

M25

General- Engine operating instructions

Type M25

Engine operating instructions	A0
Total Index Book A, B and C	A0.01
Introduction	A0.02
Safety instructions	A0.03
Technical engine data	A1
Governor-data	A1.04
Working pressures of auxiliary equipment	A1.05
Temperatures of operating media	A1.06
Torsional vibration calculation	A1.09
Acceptance Test Records	A1.10
Operating instructions	A3
Table of contents	A3.01
Introduction	A3.02
Safety instructions	A3.03
Instructions for heavy fuel operation	A3.04
Initial operation	A3.05
Operational supervision	A3.06
Removal from operation	A3.07
Danger of frost	A3.08
Running-in	A3.10
Fault tracing	A3.11
Emergency operation	A3.12
Operating media	A4
Table of contents	A4.01
Introduction	A4.02
Safety instructions	A4.03
Regulations and care	A4.05
Maintenance	A5
Table of contents	A5.01
Introduction	A5.02
Safety instructions	A5.03
Tools	A6
Table of contents	A6.01

-

<i>Spare parts catalogue</i>	<i>B0</i>
<i>Total Index Book A, B and C</i>	<i>B0.01</i>
<i>Introduction</i>	<i>B0.02</i>
<i>Spare Parts</i>	<i>B1</i>
<i>Table of contents</i>	<i>B1.01</i>
<i>Safety instructions</i>	<i>B1.03</i>
<i>Stand-by parts</i>	<i>B2</i>
<i>External documentation</i>	<i>C0</i>
<i>Total Index Book A, B and C</i>	<i>C0.01</i>
<i>Table of contents</i>	<i>C5.01</i>

M20-M601C

The present operating instructions include notes and guidelines for proper handling of the engine plant. It is matched with the equipment condition and the type of fuel sold.

Since the type of fuel used considerably influences the service life of the components, the MaK after-sales service has to be consulted when it is required to change from distillate fuel operation to heavy fuel oil operation, in order to ensure an expert retrofit of the engine plant and to exchange the necessary documentation. When changing over from heavy fuel oil operation to distillate operation, the MaK after-sales service should also be consulted for a longer period of time so that a documentation with extended maintenance intervals can be made available.

With regard to operation and maintenance of the engine including the necessary work to be carried out, the operating instructions are subdivided into the following chapters:

- A1 Technical engine data**
- A3 Operating instructions**
- A4 Fuels**
- A5 Maintenance**
- A6 Tools**

With the respective information contained in the individual chapters, the technical personnel is able to maintain the engine in such a manner that regarding its output, reliability, economy and service life optimum operating results can be achieved.

If you need further information or if you have any other questions, we kindly ask you to contact our department service technology.

The operating instructions do not release the personnel in charge of this engine plant from their duty to take care. The recognized rules of technology are to be observed, taking into account overriding regulations, observance of the general safety measures and locally applicable accident prevention regulations. Data or explanations assumed to be the basic knowledge of trained technical and engine room personnel, are not contained.

MaK is not responsible for damage caused by improper operation and maintenance.

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M20-M601C

Personnel entrusted with work on the engine/plant must have read the operating instructions and in particular the pages on safety instructions which precede the chapters before beginning work. In order to eliminate danger which may constitute a risk of life and limb of the user or of third parties, all safety regulations which are marked with the  symbol have to be observed in all cases.

Technical instructions and/or operations to be strictly observed are marked in the documents with attention. They warn of possible damage to the machinery or to other material property.

Note refers to special information on appropriate use and work to be carried out

California / USA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

M20-M601C

Technical engine data

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Governor-data

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M25

Lubricating oil

- at the last Camshaft bearing
at rated engine speed 4,0 - 5,0 bar

Cooling water

- min. feed head at pump inlet 4 m. water gauge 2,5 - 5,0 bar

Fuel at injection pump inlet

- Distillate fuel 1,5 - 3,0 bar
- Heavy fuel 4,0 - 5,0 bar

Injection nozzle opening pressure

- take the applicable figures from the acceptance test records ([A1.10](#))

Control air

7,5 bar

Starting air

12* - 30 bar

- * minimum pressure for starting

M25

Lubricating oil

- engine inlet 60 - 65 °C
- temperature rise at rated output 10 - 14 °C

Cooling water

- engine outlet 80 - 90 °C
- temperature rise at rated output 7 - 10 °C

Charge air

see also **A3.06.05.nn**

- engine inlet 45 - 60 °C *1

Distillate fuel

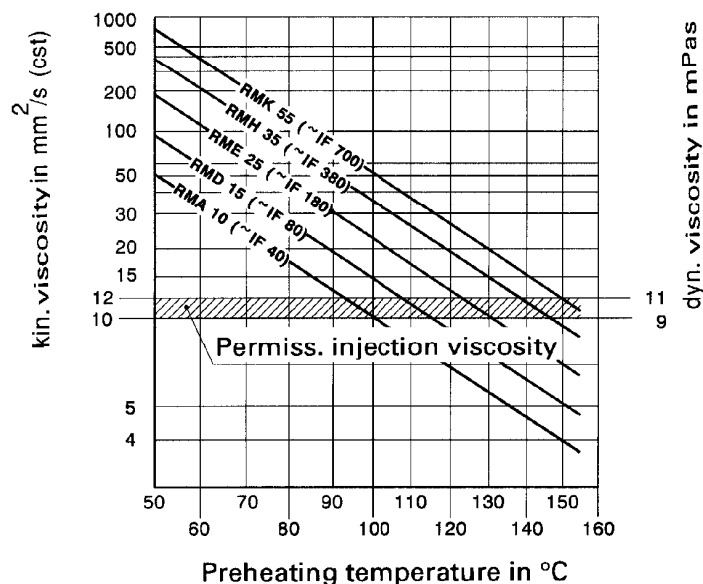
40 - 50 °C *2

Fuel before injection pumps

(see diagram)

*2

Viscosity/temperature dependence



***1** Lowest available charge air temperature should be chosen. If water condenses in the charge air manifold, raise the temperature until this is avoided. The exhaust gas temperature after turbine must not exceed 420 °C with gas oil and 400 °C with heavy fuel.

***2** Permissible injection viscosity must be set on the viscothermic device to enable a kinematic viscosity of 10 - 12 mm²/s (cSt) to be reached before the injection pumps, corresponding to a dynamic viscosity of 9 - 11 mPas (distillate fuel below 10 mm²/s or 9 mPas).
The heavy fuel specifications defined by MaK (e.g. RHM 35 (~ IF 380) give the heavy fuel temperature before engine starting.
However, the maximum temperature at injection pumps must not exceed 155 °C!

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Torsional vibration calculation

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Acceptance test records

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M20-M601C

Operating instructions

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Operating instructions	A3
Table of contents	A3.01
Introduction	A3.02
Safety instructions	A3.03
Instructions for heavy fuel operation	A3.04
Instructions for heavy fuel operation Fuel system	A3.04.07.00
Instruction for heavy fuel operation Care and supervision / Engine fuel	A3.04.07.01
Instructions for heavy fuel operation Lubricating oil system	A3.04.08.00
Instructions for heavy fuel operation Care and supervision / Lubricating Oil	A3.04.08.01
Initial operation Engine	A3.05.00
Initial operation Fuel system	A3.05.07.00
Initial operation Lubricating oil system	A3.05.08.00
Initial operation Cooling water system	A3.05.09.00
Commissioning Starting air system	A3.05.10.00
Initial operation Starting air system	A3.05.11.00
Initial operation General performance testing	A3.05.15.00
Commissioning Putting into operation/starting	A3.05.18.00
Initial operation Putting into service/starting	A3.05.18.02
Initial operation Putting into service/loading	A3.05.18.03
Initial operation Putting into service/loading	A3.05.18.04
Operational supervision Engine	A3.06.00
Monitoring Intake air temperature	A3.06.05.00
Monitoring of operation Exhaust system/Firing pressure	A3.06.06.01
Operational supervision Exhaust system/supercharging	A3.06.06.02
Operational supervision	

-

Fuel system	A3.06.07.00
Operational supervision	
Changing the type of fuel	A3.06.07.01
Operational supervision	
Lubricating oil system	A3.06.08.00
Operational supervision	
Cooling water system	A3.06.09.00
Operational supervision	
Starting system	A3.06.10.00
Operational supervision	
Partial load operation	A3.06.18.00
Removal from operation	
Engine	A3.07.00
Removal from operation	
Placing out of service/stopping	A3.07.18.01
Decommissioning	
Decommissioning/Stopping	A3.07.18.02
Danger of frost	
Engine	A3.08.00
Danger of frost	
Antifreeze protection	A3.08.01.00
Preservation	
Engine	A3.09.00.00
Preservation	
Short term preservation	A3.09.01.00
Preservation	
Depreservation	A3.09.03.00
Running-in	
Engine	A3.10.00
Running-in	
Engine	A3.10.01.00
Fault tracing	
Engine	A3.11.00
Fault tracing	
Introduction	A3.11.18.00
Fault tracing	
Remedial measures	A3.11.18.02
Emergency operation	
Engine	A3.12.00
Emergency operation	
With a defective turbocharger	A3.12.01.00
Emergency operation	
With a defective turbocharger	A3.12.01.01
Emergency operation	
With a defective turbocharger	A3.12.01.02

-

Emergency operation	
Operational misfire	A3.12.02.00
Emergency operation	
Operational misfire	A3.12.02.01

M20-M601C

Contained herein are certain points regarding the initial operation, the assurance of a reliable service as well for overcoming the need for long periods of non operation, thus ensuring a rapid return to service.

For any working data mentioned in this book, please bear the following in mind:

It is possible for the engine power to be limited before reaching its full performance capacity, to meet special requirements. Thereby in compliance with DIN ISO 3046 we differentiate between:

- **Maximum continuous power**
this is the maximum permissible output for this type of engine.
- **Rated power**
this is indicated on the acceptance test records for your engine.
- **Full stop power**
this is the power output limited by a restrictor on the injection pump racks.

Unless otherwise indicated, our information always refers to the maximum continuous power and if this is unknown to the operator he should make inquiries to the manufacturer.

The power is limited by a restrictor at the fuel injection pump control shaft during the test bed run and normally at rated power and speed. Any other arrangements can be seen from the acceptance test records (**A1.10**).

Attention:

When using heavier fuel grades independent on the density of the fuel, the rated power will be reached at a fuel rack position that is accordingly lower. As such, the limiting position must also be accordingly lower. This is especially the case after a change of fuel from that of an essentially higher density as it is the case when changing from distilled fuel to heavy oil. The alteration of the fuel rack position may only be carried out by personnel who have received permission to do this from MaK!

M20-M601C

The operators have to work with the necessary care and to keep to the safety notes. The existing protection and safety devices must not be removed nor changed, and any damage detected must be immediately reported. Safety devices may only be changed in special cases by personnel who have received permission to do this from MaK.

The preparations for the first startup are made by the MaK service engineer, who will explain the plant to the engine room staff in detail. Detail questions are to be settled on site from the operating instructions and explanations should be noted down in the instructions. After commissioning the engine, all important data and work should be recorded in either the engine log book or in our ship management system DIMOS.

Please observe the data and recommendations in your operating instructions together with the maintenance and servicing measures recommended by us. They are the basis for a long useful life with a constant degree of economy for your engine installation.

Attention:

After every cleaning of the engine with fat solvent detergents all metallic blank parts must be protected again slightly with an oil film!

Special care must be taken to ensure that all bearing points affected by the cleaning are thoroughly lubricated afterwards!

M20-M601C

Safety instructions

The MaK engine has been built in accordance with state-of-the-art standards and the recognized safety regulations.

Nevertheless, in the case of improper operation

- physical or life-threatening danger to the operator or others
- damage to the unit and other valuable objects
- a reduction in the economy of the unit.

The service personnel must possess the corresponding qualification and authorization (qualification certificate) for the engine system in operation. Before the initial operation of special systems, the service personnel must be fully acquainted with the characteristic features therein.

An introduction to the system specifications, requirements/characteristics can be carried out in the training center of MaK. For the operators of the system this is a necessary requirement to the order.

General safety instructions

During all operational and service measures the relevant pointers in the prevention of accident regulations of the particular employee's liability insurance association or equivalent institution, are to be observed, for example:

- Observe all fire-warning and fire-fighting procedures!
- Operating elements of the emergency-off device are to be free accessible!

Further valid is the following:

- Unauthorized modifications and changes to the system can impair the safety! Alteration may only be carried out by personnel with received permission to do so from MaK!
- Avoid any work procedures which may affect the safety!
- Only operate the engine if all protection facilities, e.g. detachable protection facilities, linings, heat insulation, extractors are available and functional!
- Check the engine/plant at least once per shift for damage and defects which can be recognized from the outside! If any changes occur (including changes of the operational behaviour), this must be reported immediately to the competent person! Stop the engine/plant immediately and secure it if necessary against restart! Damages and faults should be rectified immediately!
- Stop and secure the engine/plant immediately against restart in the case of functional disorders! Malfunctions should be rectified immediately!

M20-M601C

Remote control

The engine remote control of seagoing ships and inland ships will be constructed according to the safety regulations of the classification society.

Inland ships must also observe the relevant customary safety recommendations!

Safety measures for local control of the engine

Before the start:

- Check the system for defects, check lamps!
 - defective instruments, operating controls, control lights
- Clean up spillages of fuel and oil!
- Protection guards must be in operation position and operative!
- Hearing protection must be worn!
- Before putting the engine into operation, ensure that there is no danger to persons by the starting engine/plant!
- Move operational controls to neutral position and/or minimum position (r.p.m. potentiometer with locking facility)!

Starting:

- Check the instrument readings!
- Do not switch off extractors and ventilators while the engine is running!

Attention:

In no case the starting air shut-off valve must be closed during engine operation.

California / USA

Proposition 65 Warning

- Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

M20-M601C

The instructions stated below are to be stringently observed, as the readiness for service and operational reliability of the engine system during high extremes of use, requires perfect fuel and depends upon optimal concentrations and monitoring supervision.

- **Fuel system** **A3.04.07.nn**

- **Lubricating oil system** **A3.04.08.nn**

M20-M601C

Fuel system

The evermore intensive utilization of crude oils by modern processing is the reason the portion of the residual oils (heavy fuel) has become smaller and the portion of the in the residual oils remaining contaminating matter has, however, increased.

The distinguishing properties of such residual oils are their high viscosity and their density as well as the increased portion of chemical compounds with sulphur, vanadium, sodium and cat fines etc.

The remainig contaminating matters influence the operation of the “heavy fuel engine”! Optimum treatment of the fuel and an intensive supervision of the plant are therefore a precondition for economical operation of “heavy fuel engines”.

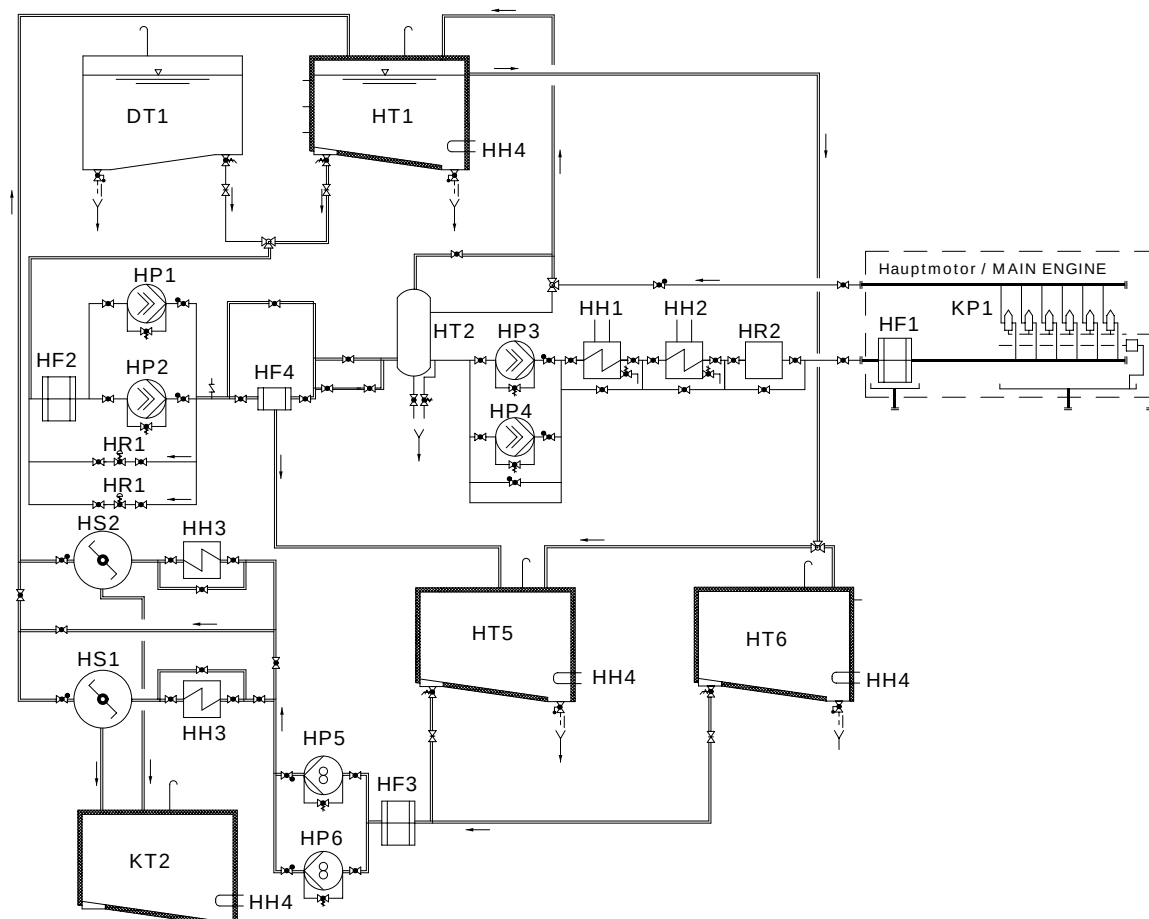
For information about **heavy fuel quality** and for instructions and maintenace see section **A4.05.07.nn.**

M25

Care and supervision

If you are uncertain of the bunker quality, a careful ascertainment of the quality must take place.

Principal diagrammatic view of the heavy fuel circulatory system



DT1	Diesel oil day tank	HR1	Fuel pressure regulating valve
HF1	Fuel fine filter (duplex filter)	HR2	Viscometer
HF2	Fuel primary filter (duplex filter)	HS1/HS2	Heavy fuel separator
HF3	Fuel coarse filter	HT1	Heavy fuel day tank
HF4	Self cleaning fuel filter	HT2	Mixing tank
HH1	Heavy fuel final preheate	HT5/6	Settling tank
HH2	Reserve final preheate	KP1	Fuel injection pump
HH3	Heavy fuel preheater	KT2	Sludge tank
HH4	Heating coil		
HP1/HP2	Fuel pressure pump		
HP3/HP4	Fuel pressure pump		
HP5/HP6	Heavy fuel transfer pump (separator)		

M25

Note:

The shown fuel circuitry diagram is as well valid for operation with distillate fuel after periods of longer operation on low partial load and prior to planned service measures. For permanent operation of the engine with distillate fuel, please refer to diagram **A3.06.07.nn**.

1. Storage tank

When fueling with heavy fuel, only empty storage tanks are to be used. This is to avoid segregation or the consequences of any incompatibility that may occur when taking on different types of fuel. If a plant has no storage tank heating, the HFO pumpability of the heavy fuel for the required temperature range must be obtained from the supplier or check the setting point by cooling.

2. Settling tank HT5, HT6

Emulsions are normally broken up under temperature influence in a settling tank, and a part of the water and heavy contaminations are separated from the heavy fuel as sludge. Two settling tanks are to be provided for HFO-operation and each one is to be designed for a full load operation of **24 hours**.

- Connect the two tanks alternately irrespective of the fuel consumed so as to obtain the best settling effect possible.
- Before cutting a tank in, thoroughly remove any water and sludge.

The longer the fuel remains in the settling tank, the more contaminants and water will be deposited.

During operation, the set temperature of the tank should be between

80 - 90 °C

3. Separator HS1, HS2

The separators have the most important task in the heavy fuel treatment. They lower the content of solids and water of the heavy fuel to the minimum that can technically be reached.

- Both separators are always to be operated parallel independently of the manufacturer/ system.
- The operational capacity is designed according to the rules and regulations of the individual manufacturer, whose authorised department has coordinated the design with **MaK-Kiel**.

Separation temperature **98 °C**.

M25

4. Day tank HT1

The day tank is designed to collect the treated fuel, for a minimum of **4 hours** of full load operation. If the treatment plant is in order, it will always be filled to the overflow level. This prevents the formation of water condensation.

- Daily de-sludging is important.
- A temperature level between

80 - 95 °C

should be maintained.

5. Fuel pressure pump HP1, HP2

The fuel pump pressurizes the mixing tank. The pump relief valve has to be closed in operation.

Test procedure:

The system pressure must not rise when increasing the valve spring load.

6. Fuel pressure-regulating valve HR1

The valve is installed in the excess return line and must be set so that the pressure at the engine is of that required (see **A1.05**).

7. Self cleaning fuel filter HF4

For fuel (heavy fuel and distilled fuel), filter elements with a mesh size of 10 µm are required.

In the event of filter alarm, which is activated between the flushing intervals if the differential pressure is excessive, the operation of the separators must be checked and the filter cleaned (for servicing instructions see the document of the manufacturer, **book C**).

8. Mixing tank HT2

This mixing tank is equipped with a level monitor. In the event of alarm and/or when filling the tank, open the vent valve several times for a short time by hand.

M25

9. Circulating pump HP3, HP4

This pump is designed like a force pump. The pump relief valve has to be closed in operation.

10. Final preheater HH1

The preheater is to lower the fuel viscosity to a level that is optimal for injection,

10 - 12 mm²/s cSt; (1,8 - 2 °E), in order to reach a good atomisation and fuel-air mixture.

- If the preheater is of electrical type, ensure the temperature switch may be set to at min.

180 °C

- If the preheater is of steam type, a condensation trap should be installed at the steam outlet to ensure sufficient heating if possible.

Attention:

Fuel temperature before engine intake ≤ 150 °C.

11. Viscosity measurement and control equipment HR2 (Viscometer)

Check whether the indicated viscosity is actually run: whenever taking on fuel, check the temperature and viscosity against the viscosity-temperature sheet (see **A4.05.07.06**) and adjust the viscometer if necessary.

12. Fine filter (Duplex Fine Filter) HF1

The fine filter protects the fuel injection system and removes solids not previously separated. It is important to clean the filter when 50% of the red area on the differential pressure gauge is visible or when the filter alarm has been activated.

For service measurements, see **A5.07.12.01.nn**.

M20-M601C

Lubricating oil system

The progressively declining quality of heavy fuel oils and the contamination contained therein can lead to engine troubles with increasing frequency if the lube oil is not cared for in an adequate manner.

For this reason, the following instructions point out the importance of a careful lube oil treatment and supervision of the lube oil circuit so as to ensure a trouble-free and economical engine operation.

Lubricating oil

The selection of the suitable lube oil and the limit values are observed according to the operating media **A4.05.08.nn**.

The lube oil has important functions in engine operation as e.g.:

- Replace metallic friction with the much lower fluid friction of the oil film.
- Protect engine parts from corrosive combustion gases.

Note:

Sulphurous residues and combustion products of the fuel form sulphuric acid with the water vapor which results from combustion and which afterwards condenses. This produces corrosive wear on bearings, pistons, valves and cylinder liners.

- Dissipate frictional heat.
- Act as a coolant (pistons).
- Improve the seal between piston, piston rings and cylinder liner, to limit gas blow-by.
- Suspend abraded particles, combustion residues and products of deterioration.

M25

Care and supervision

In heavy fuel operation, lube oil purification by separators is indispensable for a proper treatment. There are no other means to eliminate from the oil, the products resulting from cleaning and neutralisation (carbon and asphalt compounds) including water.

1. Lubrication oil filtering

Bypass oil cleaning in separators is specified for heavy oil operation. (For restrictions of guarantee see **A4.02**).

- The separation temperature must be between **90 - 95 °C**.
- The maximum utilization of the separator is to be **20%** of the rated capacity (see rating plate of the separator or pump).

2. Oil level control

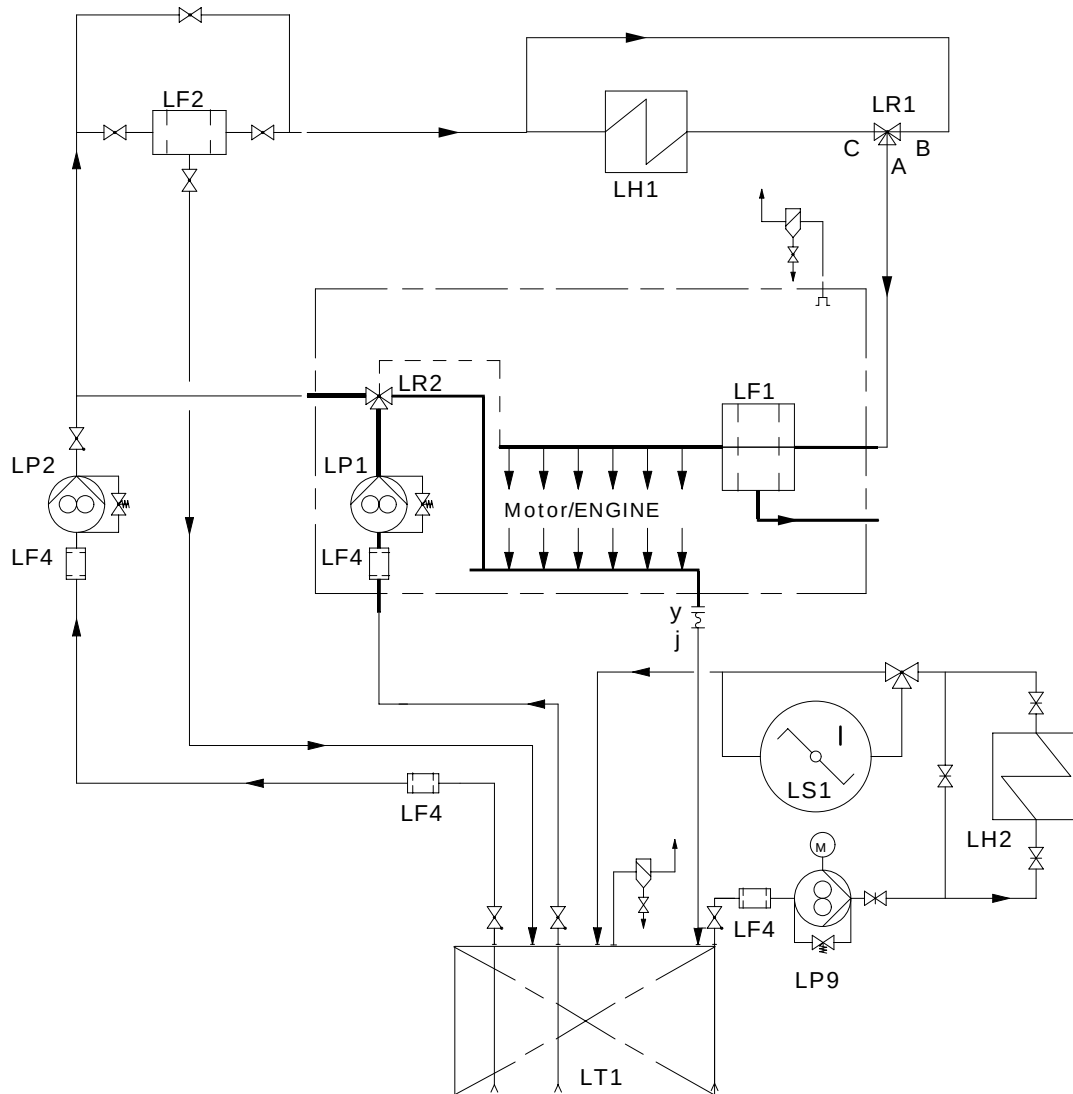
- Check the oil level daily, see **A3.05.08.nn**.
- Top up with fresh oil, if **20%** of the specified quantum has been consumed.
- This will replace parts of the additives consumed.
- Perform during operation regularly, and after longer periods of shutdown an analysis circulatory lubricating oil, see **A4.05.08.nn**.

3. Lubricating oil system

The pump fitted on the engine takes the oil from the sump tank via a protective strainer (where fitted) and pumps it to the automatic lube oil filter. The lubricating oil is then pumped via the subsequent oil cooler to the duplex filter (with indicator) and then via the safety strainer to the oil pressure limiting valve. After this, it is distributed among the engine lubricating points.

M25

Principal diagrammatic view of the lubricating oil circulatory system



LF1 Duplex lube oil filter
 LF2 Lube oil automatic filter
 LF4 Suction filter
 LH1 Lube oil cooler
 LH2 Lube oil preheater
 HH4 Heating coil
 LP1 Lube oil force pump
 LP2 Lube oil auxiliary pump
 LP9 Transfer pump (separator)

LR1 Lube oil temperature control valve
 LR2 Lube oil pressure limiting valve
 LS1 Lube oil separator
 LT1 Lube oil sump tank

M25

3.1. Prelubrication LP2 (standby or prelubrication pump)

Only a sufficient prelubrication will produce the necessary oil film on all bearings for engine starting.

- Check the pressure build-up at the last main bearing (if there is no automatic engine locking).
- Prime the circuit until the pump pressure is steady.

3.2. Check the operation of the engine-driven force pump LP1

- Check the oil pressure (at rated speed and working temperature), if the pressure is too low, check
 - is the oil pressure limiting valve closed?
 - is the pump relief valve tight?
 - are the suction pump seals tight?
 - is the suction strainer clogged?
 - is the flushing quantity of the automatic filter too large?

3.3. Lube oil automatic filter LF2

An automatic filter with oil or compressed air flushing or an automatic filter with oil flushing is employed as automatic lube filter.

Attention:

The functioning of the entire series of filters is indispensable for the proper filtration of the lube oil. The automatic filter is the main filter and as such it has the finest filtration. It must therefore only be bypassed in extreme emergencies.

3.3.1. Lube oil automatic filter LF2 (flushing with oil or compressed air)

The flushing frequency results from the quantity of the dirt particles that remain in the lube oil (which indicate the separator function).

- Monitor the flushing intervals of the filter (the flushing cycle counter indicates the contamination level).

If there are more than **100** flushing per day, the cause of the oil contamination must be detected:

- check the separator function
- charge air is too cold (soot formation)

M25

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- Check and clean the filter elements.
See servicing instructions in the documents form the manufacturer, **book C**.
 - If the back-flushing filter flushes with oil, set the flushing flow (valve in the flushing line) so that there will be no drop in the working pressure, see **A1.05**.
 - If the back-flushing filter is equipped with flushing oil preparation, the inserts of this must be cleaned or exchanged in he event of a filter alarm.

3.3.2. Lube oil automatic filter (with permanent oil flushing)

- Regular checking and cleaning of the gauze inserts (the differential pressure indication shows the contamination level of the elements).
- Carefully check the filter elements for damage.
- If the filter has various cartridges, one damaged cartridge means a malfunction of the entire filter. Renew damaged cartridges.
See servicing instructions in the documents of the manufacturer, **book C**.

3.4. Duplex lube oil filter LF1 (with indicator)

- Check the filter at regular intervals.
If required (differential pressure indicator shows **50%** of the red area or filter alarm), carefully clean the isolated filter chamber, the filter cartridges being installed at working temperature. Remove the cartridges during every **third** cleaning.
- Renew damaged filter cartridges
For servicing instructions see **A5.05.07.12.01.nn**.

3.5. Strainer filter LF4

- Clean the strainer filters (made available by the customer) in the suction pipes of the service, standby und separator pump every **6000** operating hours and/or when work has been done on the suction side of the lube oil piping system.

M20-M601C

Initial operation

M20-M601C

Fuel system

After a long break from service and/or before the initial operation with heavy and destillated fuels we recommend:

- Remove the fuel injectors according to **A5.05.07.07.01.nn**.
- Check the nozzles and opening pressure according to **A5.05.07.08.01.nn**.

The rule is: heavy fuel - cooled nozzles
 distillate fuel - uncooled nozzles

If an engine equipped for heavy fuel, is to be only temporarily run on distillate fuel, it will not be necessary to fit uncooled nozzles.

- Drain the day fuel tank, remove the sludge and refill.
- Clean the fuel filter according to **A5.05.07.12.01.nn**.
- Ensure that all cocks and valves are in the correct position.
- Vent the fuel system.

Use auxiliary fuel pump. In case the day tank is at a higher level and the pump has a bypass line: open the stop valve at the pump.

- Check for smooth operation of the control rack linkages:

Each individual control rack has movement in both directions so as to give perfect operation.

- Set all equipment parts of the fuel and nozzle cooling systems into the operating position.
- Switch the fuel circulating pump on and check the vent screws, flange connections and threaded pipe unions for leaks.

Additional preparation work for heavy fuel operation

(see **A3.04.07.nn**)

- Switch on all necessary preheaters for the correct time.
- Switch the fuel circulation pump on.

The fuel temperature before the injection pumps is to be checked according to its viscosity (see **A1.06**).

M20-M601C

Lubricating oil system

The lubricating oil should be analyzed regularly during operation and after a longer period of engine down-time, see **A4.05.08.nn**.

- Clean the lubricating oil duplex filter and the suction strainer, these both being situated in front of the lube oil force pump and the standby pump (see **A5.05.08.02.01.nn**, **A5.05.08.04.01.nn**)
 - Dry sump
 - Drain off the water from the oil tank
 - Check the oil level
 - Wet sump
 - Check the oil level in the sump by means of a dip stick.
 - Switch on the standby or pre-lubricating pump and
 - Vent the entire lubricating oil system.
 - Check all flanges and threaded connections in the system for tight connection.
 - Check the lubrication of the following points:
 - Big end and small end bearings
 - Main bearings
 - Camshaft bearings
 - Valve rockers
 - Oil nozzles for timing gear train
 - Oil nozzles for the pumps actuating gear
- A slight oil flow must be visible.
- Check lubricating oil pressure.

The working pressure has to be reached with switched-on standby or pre-lubricating pump, see **A1.05**.

Plants with lubricating oil separator:

- Start the separator and preheat the oil in this manner in due time before starting the engine.

Turbocharger with independent lubricating oil supply:

- Check the oil levels at the turbine and compressor ends (sight glass).

M20-M601C

Cooling water system

- Fill the cooling water system via the expansion tank. It is required that the cooling water has a level of corrosion protection (see [A4.05.09.nn](#)).
- Set the correct position of the isolating and changeover cocks and/or valves on the cooling water system, see [book C](#).
- Switch on the fresh water standby pump and check the system for leaks.
- If there are cocks or valves in the cooling water piping on the engine, for draining individual cooling water spaces for repair (e.g. cylinder head, turbocharger etc.), check whether these cocks or valves are open, so that there will be no heat accumulation in the parts to be cooled.
- Unless connected to a permanent venting arrangement, all components and pipes belonging to the system must be consecutively vented. The vent pipe from the engine to the header tank generally has a stop valve to throttle the water flow. While the engine is running, a sufficient permanent venting must be ensured.
- Preheat the engine in good time before starting: Switch the preheater and circulating pumps on or open the isolating valves if the cooling water circuit is connected with the circuit of the engine running.

If an engine is running on heavy fuel from pier to pier, preheating is absolutely necessary. The starting performance is better with distillate fuel. Water condensation is avoided and the time needed until the engine has been warmed up to normal working temperature is considerably shorter.

For preheating temperature see [A3.05.18.nn](#).

For pressures and temperatures see [A1.05](#) and [A1.06](#).

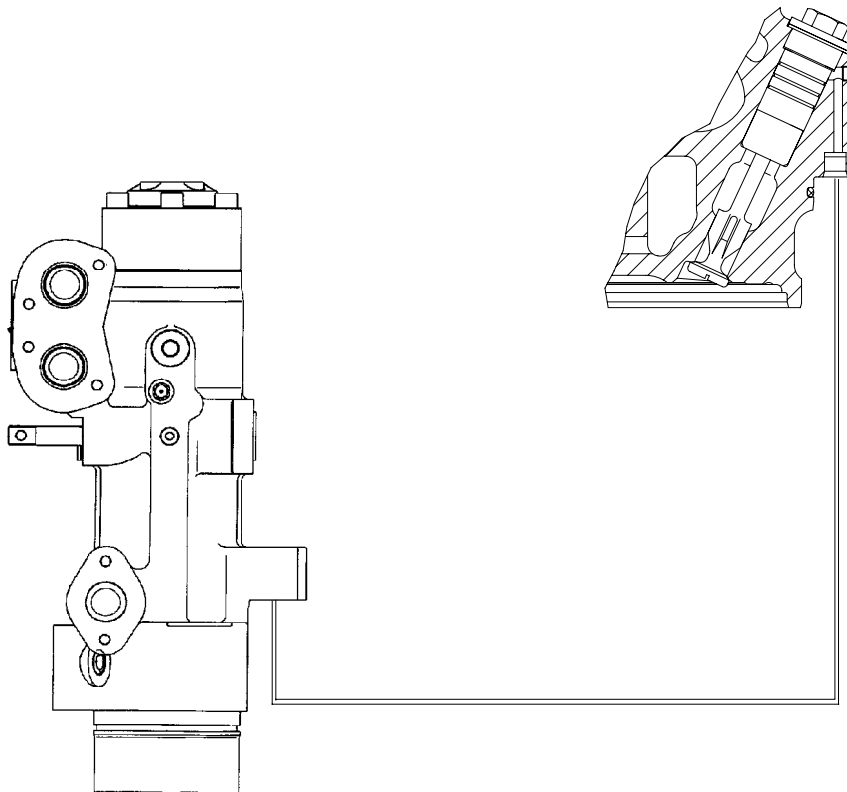
M25

Compressed air system

- Check smooth operation and tightness of the starting air and vent valves (**A5.05.05.02.01.nn**) :

The starting air is controlled via the piston of the injection pump.
The starting fuel limiter is integrated in the governor.

- Drain the starting air system and compressed air filter. Bottle pressure: refer to **A1.05**.
- Open the master valve on the air bottles.
- Check the emergency stop facility (**A5.05.10.03.01.nn**).
Press **Reset** on the safety system; the stop magnet is reset and the emergency stop system is vented.
- In no case the starting air shut-off valve must be closed during engine operation
(**A3.05.11.nn**)!



M20/M25/M32/M43/M282/M332C/M452/M453C/M551/M552C/
M601/M601C

Do not close starting air shut-off valve during operation!

- Apart from the starting system, the engine air system also supplies the emergency stop devices and the crankcase oil mist detector.
- When the shut-off valve is closed, the air supply of the emergency stop cylinders at the injection pumps and at the crankcase oil mist detector are shut off, in addition to the starting air.
- Thus the function of 2 safety systems is prevented!
- It is absolutely necessary that the starting air supply is always open during engine operation, to ensure the operational reliability of the engine.
- In no case the starting air shut-off valve must be closed during engine operation!

M20/M25/M32

General performance testing

- Ensure that the air admission into the engine room is in order.
- Drain the water from the exhaust piping after the turbocharger and check pipe for free passage.
- Check the permanent water drain at the charge air manifold for free passage.

When the engine is cold, a small amount of water may come out as a result of condensation.

Note:

If the amount of water is large, the cause must be traced. Do not start the engine to avoid the danger of water shocks.

- Open the indicator or decompression valves.
- Turn the engine by baring gear or rod, for this

If the engine has a clutch:

- Declutch the engine
- Carry out starting attempts, until no water is blown out.
- Close indicator or decompression valves, engine is ready for commissioning.

M20/M25/M32

According to the intended purpose of the engine and the level of automation, the engine is provided with the basic equipment for the direct operation at the engine (emergency operation) and further special operating devices for the function to be performed which will not be dealt with at this point.

Where these devices are included in the scope of supply of the MaK, a matching function diagram and a description has been created for this system, see **Book C**.

Direct start at the main engine

Within the framework of this commissioning, only the direct starting process at a main engine is discussed.

It is necessary to know the level of automation of the ensure the operational functionality of the total system.

If alarm and safety devices as well as the switch device for the speed are disconnected, all functions which are normally recorded automatically must be checked or performed manually.

Normal start (control panel in manometer board)

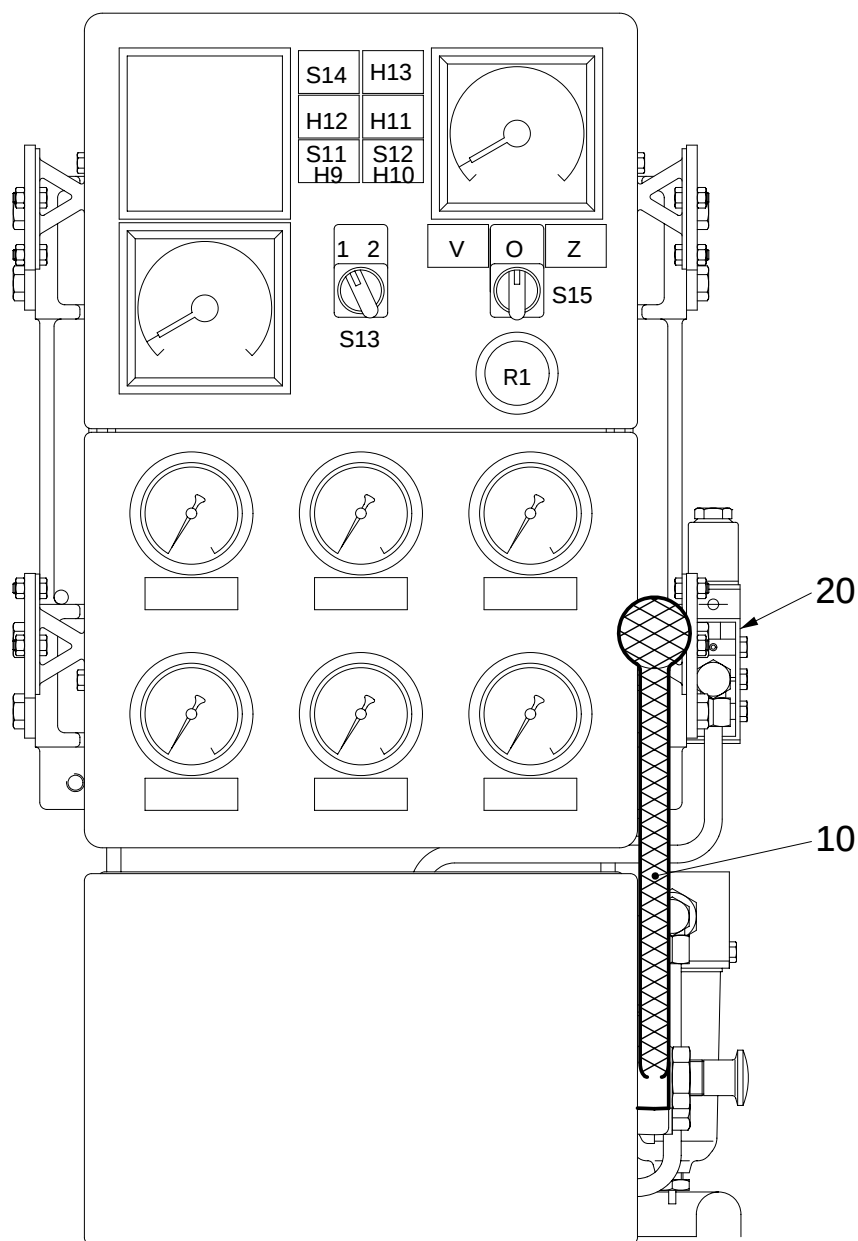
- Switch change-over switch **S13** to "**1 = Engine**".
- Put emergency-off lever (**10**) in operating position at the control station/regulation linkage.
- Prelubricate engine.
Switch on lubrication oil - prelubrication or backing pump approximately **5 minutes** before starting the engine.
For operating pressure, see **A1.05**.
- Adjust speed slightly higher than $n_{\min}$ at the speed switch **R1**.

Note:

In the case of a failure of the electronic-electrical controller, the speed adjustment can be performed at the speed switch of the mechanical-hydraulic controller!

- Activate push button **S11 "Start"**.
- Disconnect prelubrication or backing pump (automatically, otherwise manually).
- According to its temperature level, run engine slowly up to the operating temperature, see **A3.05.18.nn**.

M20/M25/M32



H11	Wrong start
H12	Start locking
H13	Run from remote control
R1	Speed adjustment
S11 / H9	Start
S12 / H10	Stop
S13	Change-over switch 1 = Engine 2 = Remote control
S14	Lamps test
S15	Change-over switch ahead / back

M20/M25/M32

Emergency start

- Switch change-over switch **S13** to "**1 = Engine**".
 - Put emergency-off leaver (**10**) in operating position at the control station/regulation linkage.
 - Prelubricate engine.
Switch on lubrication oil - lubrication - or backing pump approximately 5 minutes before starting the engine. For operating pressure, see **A1.05**.
 - Adjust speed slightly higher than $n_{\min}$ at the speed switch **R1**.
 - Start engine manually at the start solenoid or main start-up valve (**20**).
Keep the starting process as short as possible!
-

Attention:

The manual start of the engine shall only be performed in the case of a complete standstill of the engine!

- According to its temperature level, run engine slowly up to the operating temperature, see **A3.05.18.nn**.
- In no case the starting air shut-off valve must be closed during engine operation
(A3.05.11.nn)!

M20/M25/M32

According to the application of the engine and the degree of automation, apart from the basic equipment for the local control of the engine (emergency control) further special fittings and facilities to operate these are provided. These are not dealt with in this section.

Unless these facilities are included in the contractual supply scope of MaK, then a functional scheme and description of the functional scheme applying especially to this particular system will be prepared and coordinated (see **book C**).

Direct start at the generator engine

In the scope of this initial operation we are dealing exclusively with the starting procedure on the generator engine.

In order to ensure the functioning, it is important to know the automation degree of the system.

When alarm, safety systems and also revolution counters are switched off normally all functions are automatically monitored, manually checked or executed.

Starting (operating panel in the gauge board)

- Switch position selector in the board on "**2 = OFF**".
- Put emergency operating lever into the operation position at the operating stand or at the control linkage.
- Engine prelubrication:
Switch on the engine prelubrication pump or auxiliary pump approx. **5 min.** prior to start. For operating pressure, see **A1.05**.
- Set revolution speed by means of the revolution speed head on the mechanic-electric governor to **nominal setting**.
- Manually start the engine at the starter solenoid or master starting valve.
Keep the starting attempt as short as possible.
- In the event of a direct engine start with electronic governors the **stop** must be **reset** parallel to actuating the starting solenoid valve.

Attention:

Manual starting of the engine may only occur when the engine is at a total standstill!

- Switch off the prelubrication or auxiliary pump (automatically or by hand).
- In no case the starting air shut-off valve must be closed during engine operation
(A3.05.11.nn)!

M20-M601C

Loading during the warming up of a main engine

Precondition: The jacket water has been preheated to the temperature (t) given below when running on:

Distillate fuel	t = 40 °C
Heavy oil fuel	t = 5 - 10 °C below working temperature at the engine outlet. See A1.06 .

Normal loading

If loading is not controlled by a programme, the load can be increased to **60 %** within **1 min.** and to full load within **3 - 4 min.**

Cold starting, below the above preheating temperature

MaK generally advises against cold starting because of the higher wear and the high thermal loads on the parts forming the combustion chamber.

Only the following brief instructions are therefore given:

It is possible to **start the cold engine** on distillate fuel, however, this should only be done in **exceptional cases** and the engine should be warmed up very carefully.

The conditions for **starting the cold engine** with heavy fuel are very restricted. A more viscous fuel will make ignition more difficult, in addition to the above thermal influences. Incomplete combustion, heavy deposits in the exhaust system and combustion chambers with heavy wear on pistons and cylinder liners will be the consequences.

Attention:

A cold-starting attempt on heavy fuel can only be justified in an emergency!

The engine should always reach working temperature after every start, particularly in short test runs. Running the engine for a short time only, will produce sulphurous acid, which will damage the valves and exhaust ducts, in conjunction with other corrosive combustion residues.

With local control or manual monitoring of the engine, the indicators, such as pressure gauges, thermometers and tachometers must be continuously watched. The local control station should only be left, when the readings have approximately reached a steady state condition in the desired power range.

If there is a barred speed range owing to torsional vibration, this should be passed as rapidly as possible. See the plate on the engine and/or **A1.09**.

M20-M601C

Loading during the warming up of a generator motor

Precondition: The jacket water has been preheated to the temperature (t) given below when running on:

Distillate fuel	t = 40 °C
Heavy oil fuel	t = 5 - 10 °C below working temperature at the engine outlet. See A1.06 .

Normal working conditions

After preheating to **40 °C** (distillate fuel operation) the warming-up time at low load should depend on the ambient temperature e.g.:

20 °C	approx. 20 min
5 °C	approx. 40 min

If the engine has been preheated to a higher temperature (e.g. with heavy oil), loading of the engine is possible after a correspondingly shorter period.

The engine is started at a nominal speed.

When working temperature has been reached, load may be added as described in operating media **increasing the load of a warmed-up engine**.

Severe working conditions

If for example, the engine is equipped with automatic starting/stopping or is used as a standby generating set, the water jacket has to be kept at working temperature and the engine lube oil circuit automatically primed for **2 min.** at maximum intervals of **1/2 h.**

For routine testing of, for instance, generating sets, proceed as follows:

- Prime the engine lube oil circuit (if there is no continual prelubrication) and start operation as described under "Normal working conditions".

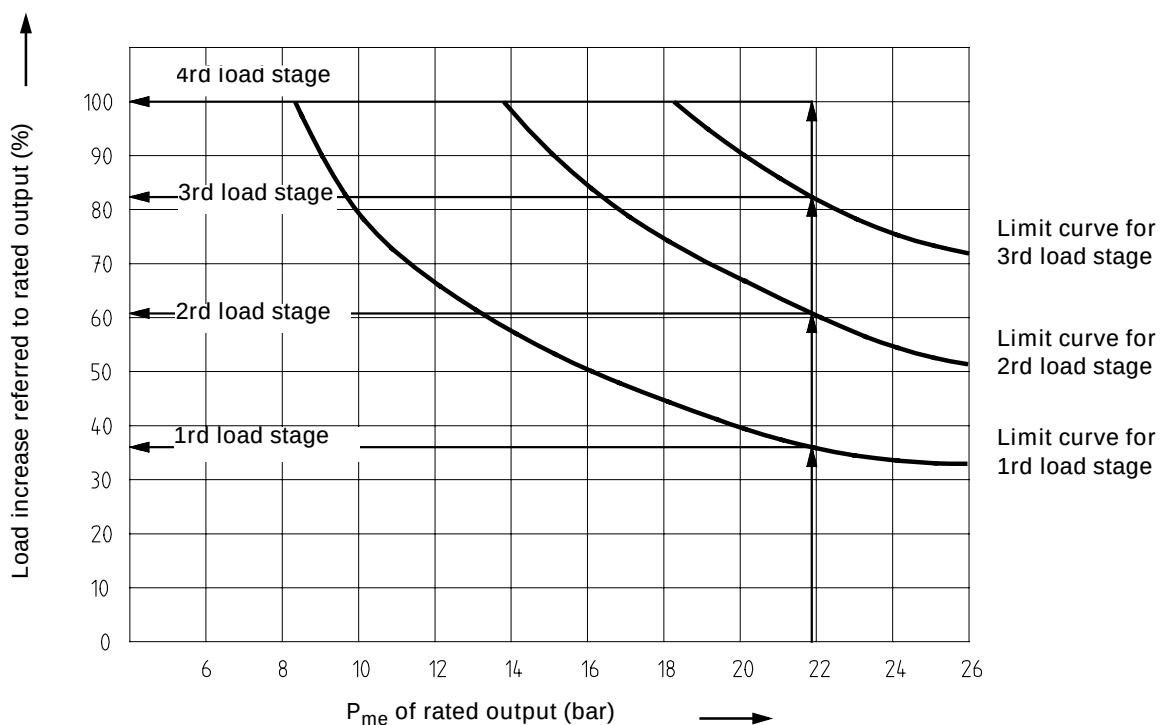
Extreme loading should be avoided when simulating an emergency, as this would not provide any additional findings about engine availability in the case of need.

M20-M601C

Increasing the load of a warmed-up engine (generator engine)

The load can only be increased depending on the continuous power P_{me} according to the values recommended by DIN 6280 and ISO 3046. The graph below shows the possible load stages at which the frequency settling time stipulated by DIN/ISO is possible.

The diagram shows guide values for load stages in % engine rating depending on the mean effective piston pressure of rated output, on the example of a 6 M20-engine with a full load $p_{me} = 21.9$ bar.



1. max. load stage from 0 % to 37 % P_{nom}
2. max. load stage from 37 % to 61 % P_{nom}
3. max. load stage from 61 % to 83 % P_{nom}
4. max. load stage from 83 % to 100 % P_{nom}

M20-M601C

Accelerated load increase

Loading within the shortest period possible, depends on various factors. If higher load increases are required than previously recommended, then in every instance these must be discussed with **MaK**. The time between two load increases must never be shorter than the settling time to rated speed (entry into the steady-state band).

The maintenance intervals for cylinder heads, running gear and engine housing must be reduced according to the duty required and its frequency.

The engine should always reach working temperature after every start, particularly in short test runs. Running the engine for a short time only, will produce sulphurous acid which will damage the valves and exhaust ducts in conjunction with other corrosive combustion residues.

With local control or manual monitoring of the engine, the indicators, such as pressure gauges, thermometers and tachometers must be continually watched. The local control station should only be left when the readings have approximately reached a steady-state condition in the desired power range.

If there is a bad speed range owing to torsional vibration, this should be passed as rapidly as possible. See the plate on the engine and/or **A1.09**.

M20-M601C

Operational supervision

M20-M601C

Operation in the case of low intake air temperatures

The engine is only allowed to be operated at max. 90 % power if the air intake temperatures are below +10 °C as otherwise the permissible nominal ignition pressure is exceeded.

It can be run at full power if the intake air is pre-warmed or mixed with machine air so that the temperature at the compressor inlet is higher than +10 °C.

In the case of compressor inlet temperatures below +10 °C, full power is only permissible if the air charge after the compressor is blown off so that the boost pressure does not exceed the values at +20 °C.

M20/M25/M32

The engine is designed so that an adjustment of delivery take-up as well as filling of the individual cylinders is no longer necessary.

The individual erection heights of the injection pumps of the individual cylinders are secured by ground, cylinder-tied, firmly mounted plates. Owing to this measure, all tolerances are eliminated between the base circle of the cam up to the upper edge of the push rod.

The injection pumps also have very narrow tolerances between the pump foot and the control edge of the pump element so that every pump can be used on every cylinder.

As the camshaft is assembled from individual sections per cylinder, there are very small differences in the delivery take-up of the individual cylinders in the scope of manufacturing tolerances for the angular position of the cams and their accidental summation.

The maximum firing pressure is set at the camshaft drive gear which has a hydraulic detachable shrink brace for this purpose.

To prevent the existing firing pressure differences from being balanced by adjusting the filling at the injection pump, the engine does not have this adjustment possibility. An adjustment of the filling would result in the cylinders having different performances and torques.

M20/M25/M32/M552C/M601C

Exhaust temperatures

A comparison of the exhaust temperatures with the values in the acceptance test certificate or the records during testing/sea trials is best suited to assess the thermodynamic performance of the engine and to analyse any deviations from the new condition of the engine (supercharging, injection, combustion). Injection pump or nozzle wear, for instance, will have a direct effect on the thermal engine performance. The influence of the prevailing air intake conditions on the engine data must be seen and taken into account.

The **exhaust temperatures after the cylinders** cannot be used for an exact performance assessment of the individual cylinders as the exhaust temperatures measured in the cylinders are influenced to a varying degree by turbulence influences in the exhaust manifold. Any deviations among the cylinders within the scope of the values given in the acceptance test certificate are perfectly normal despite balanced individual cylinder power. Such as measurement therefore only has a limited informative value which could be misleading.

Attention:

It is not permissible under any circumstances to alter the fuel injection or feed data on the injection pumps to obtain identical temperature readings! This would unbalance the power of the cylinders!

Provided the fuel cam setting is correct, the fuel injection of the injection pumps alone is decisive for balancing the cylinder power values.

The temperatures after the cylinder, however, should not deviate more than $\pm 30 \text{ K}$ from the respective cylinder value given in the acceptance test certificate **A1.10**.

Check the temperature after the cylinders regularly.

The cause must be determined if there are any deviations (e.g. nozzle, injection pump, exhaust valve), refer to **A3.11.18.nn**.

M20/M25/M32/M552C/M601C

The **exhaust temperatures before and after the turbocharger** are used to assess the thermodynamic load condition of the engine as they cover the overall thermodynamics of the engine, exhaust turbine and intake condition.

The temperatures after the turbocharger should not exceed the full load value in the acceptance test certificate **A1.10** by more than **30 K**.

$$\Delta t_{\text{texh. after turb.}} \leq 30 \text{ K}$$

- Compare the exhaust temperature after the turbocharger during full load operation with the specification in the acceptance test certificate **A1.10**.

If $\Delta t > 30 \text{ K}$, then determine the cause of the temperature rise (different ambient conditions, type of fuel, fouled charger etc.). Also refer to **A3.11.18.nn**.

Reduce the engine power if the maximum permissible temperature after the turbine is exceeded during operation with

Heavy fuel	t_{texh. after turb.} max. 400 °C
Distillate fuel	t_{texh. after turb.} max. 420 °C

- Make an additional check of the combustion by assessing the exhaust opacity. If combustion is good, the exhaust will be invisible or a light grey. Assessment of the exhaust colour: refer to **A3.11.18.nn**.

Note for exhaust temperature monitors:

Contrary to the monitor for the average exhaust temperature, an alarm is only activated when limit values are reached when monitoring the exhaust temperatures of each cylinder (thermal overload of a cylinder or misfiring). Total misfiring can cause damage to the flexible coupling!

It should be noted that partial misfiring already subjects the flexible coupling to impermissible loads. Refer to **A3.12.02.nn**.

M20/M25/M32/M552C/M601C

Indication of the firing pressure

Use the following electronic indicator for gauging the pressure:

- **Lemag PREMETS**

This method is useful to determine changes in the firing pressure of individual cylinders. Indication is always necessary if the assessment of the exhaust temperatures shows that there are changes in individual cylinders. Even if irregularities cannot be discerned during the monitoring of the exhaust temperatures, it is advisable to check the engine at regular intervals by means of indication.

Only perfect measuring instruments will make exact measurement results possible. The measuring device must be, stored with care and the manufacturer's instructions observed.

- Operating instructions for the indicator: refer to **manual C**.
- Draw indicator diagrams at full load if possible.
- Blow out the indicator valves so that no carbon deposits can get into the indicator.

Attention:

The screwed connection between the indicator and indicator valve must be gas-tight during assembly!
A finger-tight, form and force-locking connection must be attained.

- Indicating

Attention:

Completely close the indicator valve after the indication process.
Loosen the connection when there is no pressure at the indicator.

- Note the following on the diagram: date, engine number, cylinder number, exhaust temperature after the cylinder, fuel injection, engine speed, charging air pressure.

Attention:

The firing pressure is not allowed to be corrected by changing a correctly adjusted feed start. This will reduce the cylinder power!

M20/M25/M32/M552C/M601C

Turbocharger: Compressor

During operation fine adhesive dust is deposited on the inner air carrying parts of the turbocharger which can significantly reduce the performance of the compressor. For cleaning the compressor, refer to the operating instructions for the turbocharger in **manual C**.

- Daily cleaning of the compressor
- Periodic washing of the turbocharger during heavy fuel operation: refer to **A5.05.06.05.00.nn**.

Air charge cooler

- Check the permanent drain/separators of the air charge manifold

Note:

Manual correction of the air charge temperature control is only necessary in special cases! If there is water in the air charge manifold, raise the air charge temperature until condensation stops.

- Electronic thermostat: Raise the temperature by adjusting the thermostat.
- Thermostat with diaphragm valve: Raise the temperature of the water or reduce the flow in the low temperature cooling circuit by opening an external bypass.

Attention: This increases thermal engine stress.

- Observe the maximum permissible exhaust temperatures after the turbine.
Refer to **Exhaust temperatures after the turbine**.
- If the volume of discharged water is not reduced despite the temperature increase, check the air charge cooler for leakage.

M25/M32

Fuel system

- Drain the water from the day fuel tank and check it at regular intervals.
- Inspect the fuel treatment plant.
- If the engine is running on heavy fuel, change over to distillate fuel in time, see changing the type of fuel **A3.06.07.nn**.

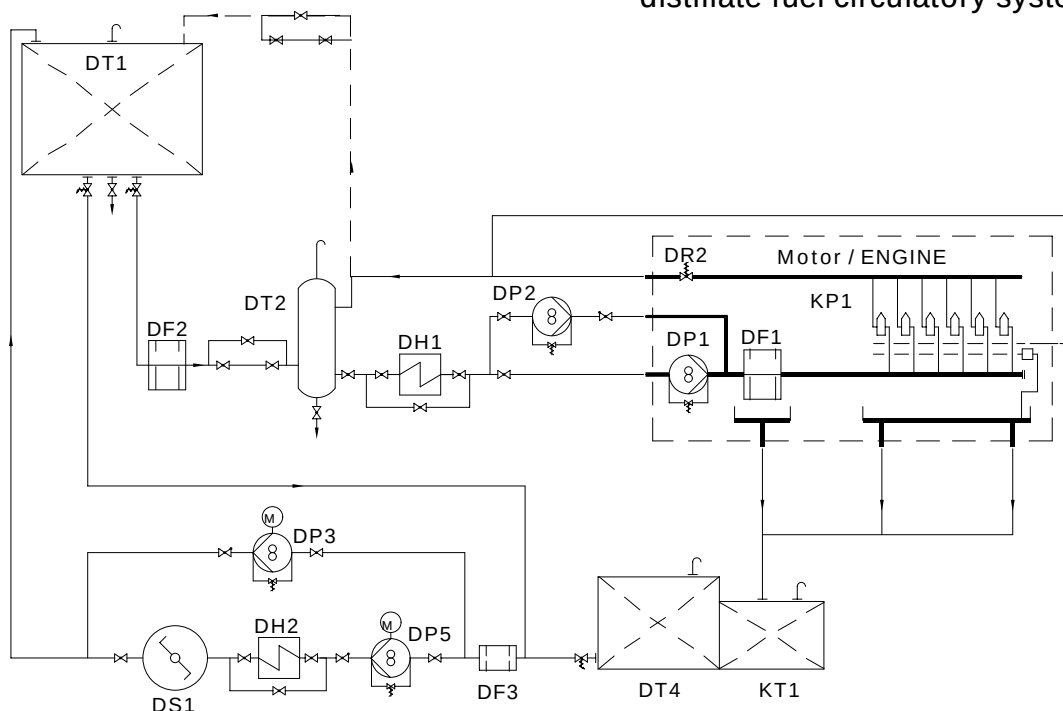
Changing over to distillate fuel may be necessary:

- after lengthy service at partial load operation. (See **A3.06.18.nn**),
- or before scheduled maintenance work on the fuel system.

Note:

The following fuel diagram is only valid for a permanent operation of the engine with distillate fuel. For operating with heavy oil see diagram in **A3.04.07.nn**.

M25/M32

 Principal diagrammatic view of the
 distillate fuel circulatory system


DF1	Fuel fine filter (duplex filter)
DF2	Fuel primary filter (duplex filter)
DF3	Fuel coarse filter
DH1	Diesel oil preheater
DH2	Electrical preheater for diesel oil (separator)
DP1	Diesel oil feed pump
DP2	Diesel oil standby feed pump
DP3	Diesel oil transfer pump (to day tank)
DP5	Diesel oil transfer pump (separator)

DR2	Fuel pressure regulating valve
DS1	Diesel oil separator
DT1	Diesel oil day tank
DT2	Diesel oil intermediate tank
DT4	Diesel oil storage tank
KP1	Fuel injection pump
KT1	Drip fuel tank

1. Storage tank DT4

When fueling, only empty storage tanks are to be used. This is to avoid segregation or the consequences of any incompatibility that may occur when taking on different types of fuel.

2. Separator DS1

The separator is only switched on, if distillate or mixed fuel is used instead of distillate fuel with 7 cSt/40 °C. It shall lower the content of solids and water to the minimum that can technically be reached.

M25/M32

3. Day tank DT1

The day tank is designed to collect the treated fuel for a minimum of **4 h** load operation. If the treatment plant is in order, it will always be filled to the overflow level. This avoids the formation of water compensation.

4. Fuel preliminary filter DF2 (duplex filter)

The fuel preliminary filter DF2 is very coarse and needs only to be checked or cleaned in cases of work on the fuel system.

5. Intermediate tank DT2**Note:**

The intermediate tank DT2 does not apply upon employment of:

- distillate fuel with 7 cSt/40 °C or
- heated day tank DT1.

The intermediate tank is equipped with a level monitoring device. Upon alarm and/or when filling the tank, open the vent valve several times for a short time by hand.

6. Diesel oil preheater DH1**Note:**

The diesel oil preheater DH1 does not apply upon employment of:

- distillate fuel with 7 cSt/40 °C o
- heated day tank DT1.

The preheater is to lower the fuel viscosity to a level that is optimal for injection, in order to reach a good atomization and fuel-air mixture.

- If the preheater is of electrical type, ensure that the temperature switch is set to a min. of
50 °C.
- If the preheater is of steam type, a condensation trap should be installed at the steam outlet to ensure sufficient heating as possible.

7. Diesel oil feed pump DP1, diesel oil standby feed pump DP2

These pumps are designed as force pumps. It has to be ensured, that the relief valves of the pumps are closed during operation.

M25/M32

8. Fuel fine filter DF1(duplex filter)

The fine filter protects the fuel injection system and removes solids not previously separated. It is important to clean the filter when **50 %** of the red area on the differential pressure gauge is visible or when the filter alarm has been activated.

For service and maintenance instructions see **A5.05.07.12.01.nn**.

Note:

When operating on distillate fuel (mixed fuel) and repeated filter alarms occur the separating temperature should be increased.

9. Fuel pressure regulating valve DR2

The valve is to be set so that the pressure at the engine is of that required (see **A1.05**).

M20-M601C

Changing the type of fuel

1. Changing over from distillate fuel to heavy fuel

Prepare the system according to A3.05.07.nn.

2. Changing over from heavy fuel to distillate fuel while the engine is running see diagram in A3.04.07.nn.

If the engine is to continue with distillate fuel operation, the system must be changed over in time because the change-over to distillate fuel will only be completed after **1/2 to 1 h**.

The change-over has to be **exclusively** made by the three-way selector cock for heavy fuel/distillate fuel.

The three-way cock in the return line (from the engine to the heavy fuel day tank and/or to the mixing tank) **has to remain** in its position so that the excess fuel will be returned.

A different procedure may lead to sticking (scuffing) of the injection pump plungers.

At the earliest, the circulating pump/final preheater should be switched off **1 h** after change-over.

Note:

A change-over of the flow towards the heavy fuel day tank (emergency) and flushing with distillate fuel, to empty heavy fuel filled system more rapidly, is only permitted when the engine has been shut down!

Fuel pressure system (only within heavy oil circle):

The fuel pressure may only be set at the pressure regulating valve, before the mixing tank.

M20-M601C

Lubricating oil system

- Check daily the levels in the:
 - Lube oil sump tank
 - Base frame
 - Oil sump
- Monitor the lubricating oil pressure, - temperature

For Pressure-, Temperature indications

see **A1.05** and **A1.06** and also Acceptance Test Records page **A1.10**.

M20-M601C

Cooling water system

- Check the level in the fresh-water expansion tank.
- Check the water pressure, temperatures and temperature rise. For pressure-temperature indications, see **A1.05** of the operation media, for Temperatures of the Operating Media **A1.06** as well as Acceptance Test Records **A1.10**.

If for any reason whatsoever temperatures are too high, lower them gradually to the normal values.

Attention:

If the cooling is too rapid, it will reduce thermal stresses and possible damage.

For specifications and care of the engine cooling water see Operating Media **A4.05.09.nn**

M25-M601C

Air starting system

- Check the pressure in the air bottles.
- Drain the water daily from the air bottles, compressed air filter, water traps and fittings.
- Secure the compressed air supply for the emergency stop facility!
- In no case the starting air shut-off valve must be closed during engine operation
(A3.05.11.nn)!

M20-M601C

Partial load operation with heavy fuel

In order to prevent increased wear and tear, pollution of air and exhaust systems and an increased contamination of the lube oil, the partial load operation has to be carried out with distillate fuel only.

The distillate fuel provides for an unlimited partial load operation.

The heavy fuel operation is not useful and economic below a rated output of 25 %.

If a heavy fuel engine is working in the lower partial load range in pier to pier operation, the combustion can be incomplete. After a lengthy operation at very low load, carbon deposits might be found in the combustion chamber and exhaust gas ducts.

If operation is then to be continued in the upper load range, the load must only be increased gradually for a period of up to **15 min.**, for reasons of safety.

If the load is raised too rapidly, deposits may impair the oil film, damaging the piston and cylinder liner.

Restrictions for partial load operation on heavy fuel cannot be avoided for some special ships, such as supply vessels, diver base vessels etc. and for generators, if the low load is run for a lengthy period, because deposits from combustion residues will then greatly increase.

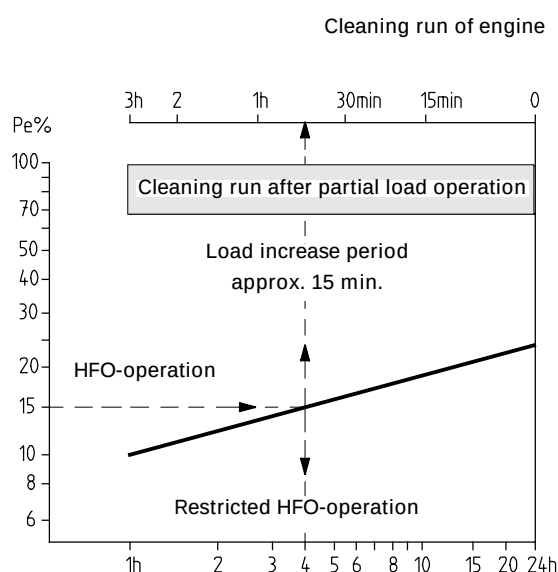
The graph below represents the restrictions for such cases.

Continuous heavy fuel operation is permitted above **25 % Pe**. Below this range, the heavy fuel operating time must be limited according to the load stage, unless the operating conditions permit a continuation at a high load stage.

Example:

The engine runs on heavy fuel at **Pe = 15 %**. After **4 h**, changing-over to distillate fuel is required or the engine will continue at a **Pe > 70 %** if this is possible.

The deposits will burn away in approx. **40 min.** and it will be possible to run with heavy fuel at low load again.



Pe, versus h graph, for engines with two-stage charge air cooler and HFO-operation. Charge air heated to 60 - 70 °C at partial load. Centrifugal lube oil purifying for 24 hours/day.

M20-M601C

Note:

If neither a changing-over to distillate fuel nor to high-load operation is possible, an increased contamination of the lubricating oil is to be expected!

Notes:

- The permissible exhaust gas temperature after the turbine (see **A3.06.06.nn**) must not be exceeded over the entire operating range, including partial load.
- Differing rules may be applicable at partial load, to protect the entire engine, during for instance, turbocharger failures. See **A3.12.00**.
- If a new engine is first operated only occasionally for several hours in a load range **< 50 %**, as is some times the case when a power station is being erected, operation with distilled fuel is strongly recommended.
- If an engine with automatic charge air control is changed over from heavy fuel to distillate fuel operation, the setting of the charge air temperature control must not be changed.

M20-M601C

Removal from operation

M20/M25/M32

The scope of this placement from service deals exclusively with the engine stop procedure on the generator engine. The function of the remote control within the MaK scope of supply, is described by a functional diagram in the documentation (see **book C**).

Attention:**Avoid sudden stops under load!****Before stopping the engine, run it under low load or let it idle for about 5 minutes!****If the engine has to be stopped under load, always cool the engine, see “Cooling”!**

Operation directly at the generator engine**Engine stop**

- Switch position selector in the board to “**2 = OFF**”.
- Set revolution speed by means of speed revolution head at the mechanic-electric governor to $n_{\min}$.
- Stop the engine by manual operation of the starter magnetic valve.
- Close the isolating valves on the starting air bottles and fuel day tank.

Engine emergency stop

- Place the emergency cut out lever on the console into the stop position or
- Activate external emergency stop device.
- Close the isolating valves on the starting air bottles and fuel day tank.

Note:

After actuation of the external emergency stop device, the button “**Reset**” at the safety system is to be actuated!

Cooling

If the engine has be stopped under load, ensure that it is being cooled for approx. **5 min.** to avoid the formation of steam bubbles.

- If the coolant water pump is independent: electrical pumps should be left in operation.
- If the pumps are engine-driven: start the standby or preheating pump.
- Various engines with mutual preheating: operate the valves according to the piping diagram.

M20/M25/M32

If the engine is to be started again after a short interval

To avoid the accumulation of heat immediately before or after shutting down, start all system circuits and keep the engine at working or preheating temperature according to the duration of the stop and the type of fuel used (see [A3.05.18.nn](#)).

When the engine is running on heavy fuel, a changeover to distillate fuel (see [A3.06.07.nn](#)) is only required if servicing the fuel injection system is intended or if, as is possible in some cases, the engine will be operated at low load for a lengthy period of time (see [A3.06.18.nn](#)).

- Cut the preheating equipment in.
- Start the coolant water circulating pump.
- If the engine is preheated by other engines in operation, open the isolating valves.
- In heavy fuel/distillate fuel operation, running of the fuel system must continue, as when operating the engine, to keep it warm: circulating pump, fuel preheating via viscosimeter, back-flushing filter (if provided) are in operation. The fuel separator before the day tank will also continue to operate.
- The nozzle cooling oil pump will be kept running, when no maintenance work is to be carried out.
- Keep the lubricating oil system warm and thus free from condensate and sludge deposits by continuous separator operation.
- Ventilate the machinery spaces only as required to avoid excessive cooling of the engines.

Before a lengthy period of standstill (e.g. up to 4 weeks), heavy fuel engines are to be changed over to distillate fuel operation (see [A3.06.07.nn](#)).

Engine preservation is required if the non-operational period exceeds 4 weeks. Climatic conditions and duration of storage, determine the nature of the measures to be taken (see [A3.09.01.nn](#) and/or [A3.09.02.nn](#)).

M20/M25/M32

Within the framework of this decommissioning, only the stoppage of the engine at the main engine is discussed. The functions of the remote control are documented with a function diagram and its description if it is included in the scope of supply of the MaK, see **Book C**.

Attention:

Avoid abrupt stopping after on-load operation!
Before stopping the engine, run for approximately 5 minutes at low load or no-load! If the engine must be stopped under load, always aftercool, see "Aftercooling"!

Direct operation at the main engine

- Disconnect engine from the mains. Switch main power switch to "Off".

Engine stop (control panel in manometer board)

- Switch change-over switch **S13** to "**1 = Engine**".
- Adjust speed to $n_{\min}$ at the speed switch **R1**.

Note:

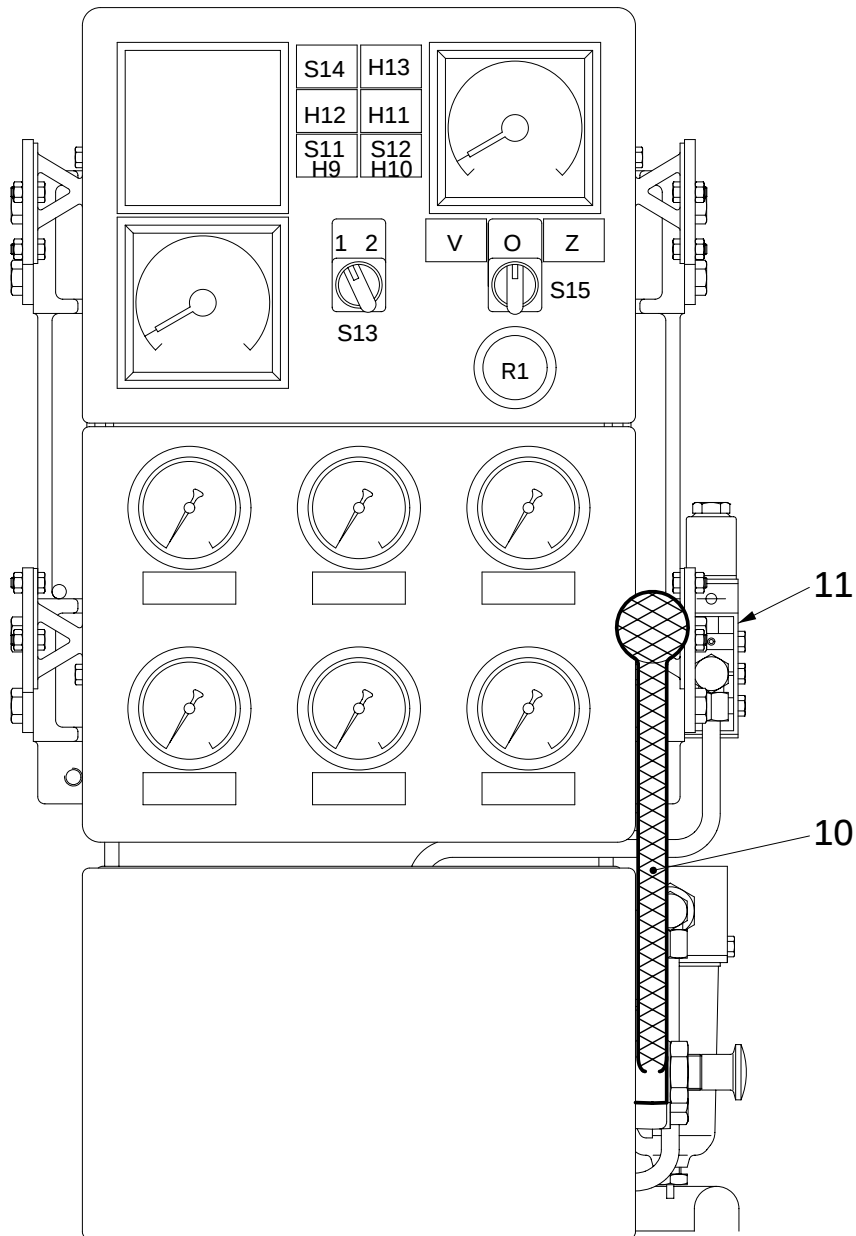
In the case of a failure of the electronic-electrical controller, the speed adjustment can be performed at the speed switch of the mechanical-hydraulic controller!

- Activate push-button switch **S12 "Stop"**.
- Close air bottles and shut off valve at the fuel service tank.

Engine emergency stop

- Put emergency-off lever **(10)** in the stop position at the control station/regulation linkage or
- Stop engine manually at the stop solenoid valve **(11)** or
- Activate external emergency stop device.
- Close air bottles and shut off valve at the fuel service tank.

M20/M25/M32



H11	Wrong start
H12	Start locking
H13	Run from remote control
R1	Speed adjustment
S11 / H9	Start
S12 / H10	Stop
S13	Change-over switch
	1 = Engine
	2 = Remote control
S14	Lamps test
S15	Change-over switch ahead / back

M20/M25/M32

Note:

The push-button switch "**Reset**" located at the safety system must be activated after an activation of the external emergency stop device!

Aftercooling

If the engine is stopped under load, it must be aftercooled for approximately **5 min.** to prevent steam bubble formation.

- If the engine is separated from the cooling water pump: Let electrical pumps go on running:.
- If the pumps are mounted at the engine: Switch on backing pump or circulation pump of the preheating device.
- Engines with mutual preheating: Switch the corresponding valve according to pipe plan.

Resumption of engine operation after short operating stop

To prevent heat collections shortly before or immediately after stopping the engine, switch on the system circulations and keep the engine at operating temperature or preheating temperature (see **A3.05.18.nn**) according to the interruption period and type of fuel.

In heavy oil operation a change-over to distillate fuel (see **A3.06.07.nn**) is only necessary if maintenance work on the injection system are planned or if operation is to be continued with a lower load during a longer period as is the case in some applications (see **A3.06.18.nn**).

- Switch on preheating device.
- Put cooling water circulation pump into operation.
- In the case of preheating through different running engines open corresponding shut-off valves.
- Continue to operate fuel system in the heavy oil/distillate operation as during engine operation to keep it at a temperature ready for operation: Circulation pump, fuel preheating via viscosity meter, reversible flow filter - if present - is in operation. Also operate fuel separator before service tank.
- Cooling oil pump for nozzles stays in operation if no maintenance work on injection valves has to be performed.

M20/M25/M32

- Keep lubrication oil system warm by means of permanent separation to prevent an accumulation of condensation products and sludge.
- Switch off ventilation for engine room only if required to make cooling-off of the engine more difficult.

Before a long term operation stop (e.g. down time up to 4 weeks), heavy oil engines must be changed over to distillate fuel several hours beforehand (see **A3.06.07.nn**).

In the case of down times of more than 4 weeks, the engine must be conserved. Climatic conditions and storage time determine the scope of the measures (see **A3.09.01.nn** or **A3.09.02.nn**).

M20-M601C

Danger of frost

M20-M601C

Antifreeze protection

If the engine is repeatedly taken out of service for only short periods (without a device in the system to keep it warm), during times when the temperature can fall under freezing point, it will be necessary to protect the system by the use of an antifreeze solution with protection against corrosion (see [A4.05.09.nn](#)).

Attention:

The concentration level of the antifreeze solution is to be chosen in such a way that a sufficient degree of protection is ensured!

Contrary to anti-corrosion emulsions, the chemical corrosion inhibitors used in the coolant water, can generally be mixed with commercial antifreeze.

Exact instructions for the use, must be enquired from the manufacturer of the anti-corrosive agent.

For a lengthy down-time period with a danger of frost the engine is to be preserved, see [A3.09.01.nn](#) and/or [A3.09.02.nn](#).

M20-M601C

The durability and effectivity of a preservation is determined by the following components:

- implemented preservation measures
- implemented package
- maximum period of storage

Only the careful implementation and tuning of these measures ensures a sufficient protection of the engine and the fittings.

The various climates of the relevant storage locations and/or destinations as well as the intended period of storage determines the kind and scope of the measures for a **short term preservation** or **long term preservation**.

Attention:

Some components are to be disassembled and consequently reassembled for a preservation! The disassemble and reassemble work is always to be carried out or monitored by by skilled mashine personnel!

Short term preservation: A short tern preservation (**A3.09.01.nn**) is to be carried out for a shut down of the engine with following storage of up to 2 months in national or Central European areas. It is also suitable for a possibly necessary road transport within Central Europe.

Long term preservation: A long term preservation (**A3.09.02.nn**) is to be carried out, if the engine is shut down for longer than 2 months, but not longer than 1 year and stored within national or Central European areas. These measures apply as well for a possibly necessary transport on board (under deck) of seagoing ships into similar international areas!

Attention:

The measures for preservation for subtropical or tropical areas are to be coordinated with MaK according to the destination and storage location and the intended period of storage!

M20-M601C

Package/Storage:

The measures for storage and package depend on period of storage and storage location.

The short term preservation provides sufficient protection when stored and placed in well ventilated machine rooms/halls and when transported on road under European climate conditions.

In case of storage in the open the engine is to be carefully protected against atmospheric influences with a water resistant tarpaulin or a plastic foil. Secure tarpaulin/foil against mechanical damages.

Ensure sufficient ventilation below the covering. In Central Europe, check tarpaulin and preservation regularly every 4 weeks.

In case of bad climate conditions, the measures of a long term preservation (**A3.09.02.nn**) are to be carried out and the engine and the fittings/tools are to be checked below the tarpaulin every 2 weeks.

Found damages are to be immediately corrected. Remove already existing corrosion and renew preservation.

If there is a danger of frost, sufficient protection must be provided, see **A3.08.01.nn** and/or **A3.09.02.nn** and **A4.05.09.nn**.

Depreservation:

The measures for depreservation (**A3.09.03.nn**) are to be carried out according to the implemented measures for a short term preservation or long term preservation **prior** to commissioning of the engine!

M20-M601C

Light preservation (short term preservation)

1. Required tools, preservation, cleaning and auxiliary means

- 1.1 spray gun, injection pipe, brush
- 1.2 preserving oil that can be sprayed and does not dry (e.g. Aral Konit SAE 30)
- 1.3 a viscous, sticking and drying preservative (e.g. Valvoline Tectyl 506)
- 1.4 corrosion-inhibiting oil (e.g. Rust Ban 310)
- 1.5 ethylene glycol inhibitor (e.g. Glysantin)
- 1.6 solvent-free cleaning and/or washing agent

Attention:

The engine finish may not be etched by cleaning and/or washing agent!
Use only suitable washing agents!
Keep to the operation, safety and sanitation instructions of the manufacturer!

2. Preservation measures engine

The preservation measures for the individual engine components are to be carried out according to the following sequence of operations.

2.1 Fuel system

- In case of heavy fuel driven engine, switch over to distilled fuel, see **A3.06.07.nn.**
- Clean fuel duplex filter, see **A5.05.07.12.01.nn.**
- Mix distilled fuel and corrosion inhibiting oil in a ratio of **1 : 1**, see 1.4.
 The required quantity of fuel **"B" (liters)** for **15 - 20 min.** running time depends on the engine type and may be calculated by the following formula:

$$B \text{ (liters)} = 7 \times \frac{\text{ kW rating }}{1000}$$

- Empty the distilled fuel day tank and fill it with with the mixture of fuel/corrosion inhibiting oil.
- Operate warmed up with the fuel/corrosion inhibiting oil at **75 %** of the nominal revolution speed at a low load.
- Monitor the level in the day tank and stop the engine, ensuring that the fuel system (piping and equipment) remain full.

Note:

If the engine is separated from the plant, run the engine until the fuel system is empty. Then firmly seal the connection points with plastic plugs!

M20-M601C

2.2 Lubricating oil system

- Cleaning the lubricating oil duplex filters, see [A5.05.08.04.01.nn](#).

Note:

The lubricating oil remains in the circuit if the values required for engine operation are in order (see [A4.05.08.nn](#)).

Recommendation: Pump fresh lubricating oil through the engine circuit, until clean oil drips out of the last small end bearing.

- If the engine is separated from the plant, remove lubricating oil. Then firmly seal each connection with blind flange or stop plug.

2.3 Cooling water system

- Cool the engine down to **30 °C** and drain the cooling water.

Note:

The cooling water tracts are protected by the corrosion inhibitor in the cooling water, see [A4.05.09.02](#).

- Engines with caged exhaust valves: fill the water spaces of the cages with glycol if there is a danger of frost, see 1.5.

2.4 Crancase, running gear, cam shaft, roller tappets for valves, injection pumps, charge air manifold

- Spray the parts with preserving oil (see 1.2) and make sure that all areas of the crankshaft, cam shaft, connecting rods and gears are coated.
- Open the charge air manifold and spray the interior with preservation oil (see 1.2) and reclose.

2.5 Upper valve rockers

- Slacken and remove rocker gear cover.
- Spray the parts fitted in the cylinder heads with preservation oil (see 1.2).
- Clean the seating of the rocker gear cover.
- Fit and tighten the rocker gear cover.

M20-M601C

2.6 External preservation

- Clean or wash all unpainted bright parts of the engine.

Attention:

The engine finish may not be etched by cleaning and/or washing agent!

Use only suitable washing agents!

Keep to the operation, safety and sanitation instructions of the manufacturer!

- Dry the cleaned parts and coat them with a drying preservative (see 1.3).

3. Preservation measures fittings and tools

Preservation measures for 6 and 12 months see heavy preservation.

M20-M601C

Depreservation

1. Required cleaning and auxiliary means

- 1.1 Clean turbine or hydraulic oil (**A4.05.08.nn**)
- 1.2 Solvent-free washing and/or cleaning agent

Attention:

**The engine finish may not be etched by the cleaning and/or washing agent!
Use only correspondingly suitable washing agents!
Keep to operation, safety and sanitation instructions of the manufacturer!**

2. Depreservation measures

The following measures are to be implemented after a light or heavy preservation.

2.1 General work

- Establish the condition the engine was in before the preservation and disassembly measures were taken: remove the protective plugs, covers, blanking flanges or other sealant parts and any locking devices.
- Reconnect the engine to the plant if it has been necessary to separate it.

2.2 Fuel system

- Depreservation is not required, even if the piping is still filled with the mixture used for the preservation run.
- Restart the engine with this possibly in the system remaining mixture.

2.3 Lubricating oil system

- No depreservation measures are required.
- If the lubricating oil was drained, refill with the specified grade, see **A4.05.08.nn**.

2.4 Cooling water system

- Check the condition of the cooling water system and flush with fresh water if necessary.
- If chemical corrosion inhibitors are to be used and corrosion inhibiting oil has been previously used, the entire system must be flushed with an alkaline solution, see **A4.05.09.02**.

M20-M601C

2.5 Governor (mechanical-hydraulic regulator)

- Re-establish the correct oil level in the governor.
- Dial governors: remove any excess preserving grease from the gear wheels behind the governor dial.

2.6 Turbocharger (with independent lubrication)

- If necessary, clean the preserved parts according to instructions of the manufacturer.
- Drain protective oil.
- Assemble new bearings and fill up oil.

2.7 External depreservation

- Remove corrosion inhibiting coating completely from all coated, bright engine parts, if necessary, wash.

Attention:

The engine finish may not be etched by the cleaning and/or washing agent!

Use only correspondingly suitable washing agents!

Keep to operation, safety and sanitation instructions of the manufacturer!

M20-M601C

Running-in

M20-M601C

Running-in

All engines leaving our works have been fully run in, thus no further running in instructions are required.

In the case of certain repairs however, such as reconditioning work on **pistons (A5.05.02.10.01.nn)**, **piston rings (A5.05.02.07.01.nn)** and **cylinder liners (A5.05.03.04.02.nn)**, as is pointed out on the job card in question, the following instructions must be observed:

- When the engine has been preheated, start at **20 %** rated power and then go to full power within the time provided for each type of engine:

M 20, M 282, M 332 C	6 h
M 25, M 32, M 453 C	8 h
M 552 C, M 601, M 601 C	8 - 10 h

If a heavy fuel engine is to be run in again and is operating between **20 %** and **50 %** of the rated power, the fuel should be of the distillate variety because of the higher production of combustion residues at part load (**A3.06.18.nn**).

While increasing the power, compare the pressures and temperatures with the figures on the **exceptance test records A1.10** to assess the engine working conditions.

No running-in instructions need to be followed when repairs have been carried out on the main and big end bearings.

M20-M601C

Fault tracing

M20-M601C

Fault tracing

In the event of any irregularity in the machinery the characteristic of the trouble should be ascertained, the fault traced and the cause found. Remedial actions must be initiated immediately.

Attention:

In case of discernible faults stop the motor timely to avoid the risk of greater damages.

Minor troubles, whose cause is not obvious or whose influence on operation seems to be less important for the present, must never be ignored. They have to be repaired as soon as possible.

The nature of the trouble, will be the determining factor as to whether the power or speed have to be reduced for the duration it lasts.

If there is a failure in the measuring instruments or monitors, that cannot be repaired immediately, run the engine with particular care. This is especially so if an alarm or safety device is concerned.

Any essential fault deviations will be signalled by the alarm and safety system, if such a degree of automation has been provided.

In the event of trouble in the remote control or certain components such as governor, turbocharger etc., see the respective sections in **book C**.

If a defective engine cannot be quickly repaired, it has to be preserved as in section **A3.09.01.nn** and/or **A3.09.02.nn**, depending on the foreseeable date of reconditioning.

M20-M601C

Engine starts poorly or does not start at all

Possible cause:

- Air pressure in the starting air bottle is too low
- Solenoid valve to the air starter is defective
- Air starter is defective

Remedy:

See [A1.05](#) for required bottle pressure

Engine reaches ignition speed but does not fire

Possible cause:

Governor does not admit fuel

- Stop cylinders are jammed and do not admit fuel
- Governor oil pressure is too low

Remedy:

see manufacturer's instructions in [book C](#): siehe Governor failures

Linkage between governor and injection pump control shaft is defective

see manufacturer's instructions in [book C](#): Governor failures

- Faulty connection between governor terminal shaft and injection pump control shaft
- Elastic element in the linkage of the injection pump control shaft
- Injection pump control shaft cannot move freely

Control shaft is jamming; fuel feed pressure is set too high

Lack of fuel

- Day tank is empty
- Inadequate venting of the fuel system
- Isolating valves are not in operating position
- Fuel filters are clogged
- Fuel feed pump is defective

Vent the system; see [A3.05.07.nn](#)

Clean filters; see [A5.05.07.12.01.nn](#)
Repair or replace pump; see [A5.05.07.13.01.nn](#)

- Lube oil pressure switch is defective or misadjusted so that the solenoid valve switches off after the starting attempt
- Engine is too cold

Warm up engine; see [A3.05.18.nn](#)

M20-M601C

Filter differential pressure is too high during starting/pre-lubrication

Possible cause:

- Fuel filter is dirty
- Differential pressure gauge is defective
- Oil is too cold
- Water in the oil causes greasy emulsion and oil thickening
- Oil cooler is leaky

Remedy:

Clean filter; see [A5.05.07.12.01.nn](#)

Engine does not reach full speed and/or full power

Possible cause:

Governor failure

Filter of fuel limiter (depending on charge air pressure) is clogged

Fuel system is defective

- Air in the fuel system
- Water in the fuel
- Fuel feed pump is defective
- Fuel filter is clogged
- Pressure valve of injection pump is defective
- Pump plunger is seized
- Nozzle is clogged; nozzle needle is seized

Quantity of combustion air is insufficient

- Air intake filter is clogged
- Air intake ducting is obstructed
- Charge air cooler is fouled
- Turbocharger is damaged
- Turbocharger is fouled

Remedy:

see manufacturer's instructions in **book C**: Governor failures

Repair or replace pump; see

[A5.05.07.13.01.nn](#)

Clean filter; see [A5.05.07.12.01.nn](#)

For servicing the injection pump, see

[A5.05.07.03.01.nn](#), [A5.05.07.08.01.nn](#)

see manufacturer's instructions in **book C**: Cleaning

For cleaning the charge air cooler see

[A5.05.06.04.02.nn](#)

For repair see manufacturer's instructions in **book C**

For cleaning the compressor end see manufacturer's instructions in **book C**

M20-M601C

Engine speed is not steady

Possible cause:

- Too much clearance in the linkage between governor and injection pump
- Fuel line is sluggish
- Friction in the injection pumps caused by excessive fuel feed pressure
- Injection pump plunger is temporarily caught, is leaky or the spring is broken
- Vibration damper is defective
- Rough drive owing to wear and tear or damaged teeth
- Governor failure

Remedy:

Check the vibration damper

see manufacturer's instructions in **book C**;
Governor failures

Opaque exhaust gas - engine is emitting soot

Possible cause:

Pressure of injection valve is too low

Nozzles are fouled by carbon deposits

Nozzle needle is jammed or nozzle is defective

Combustion air supply is insufficient

- Air intake filter is clogged
- Charge air cooler is fouled
- Turbocharger is damaged
- Turbocharger is fouled
- Engine is retarded too far
- Abgasgegendruck zu hoch, da freier Exhaust gas back pressure is too high because the exhaust ducting is clogged
- Valves are leaky
- Poor combustion due to very low load, especially at heavy fuel operation

Remedy:

Reduce fuel filling

For servicing the valves see,
A5.05.01.08.01.nn

For increasing the load or change over to gas oil operation see **A3.06.07.nn**

M20-M601C

Exhaust gases are blue

Possible cause:

Oil in the combustion chamber

- Piston rings are sticking
- Severe wear and tear of cylinder liner: scoring, ovality
- Valve guide and/or seal are worn

Remedy:

For servicing the pistons and rings see, [A5.05.02.07.01.nn](#)

For checking the cylinder liners see [A5.05.03.03.01.nn](#)

For checking the valve guide clearance see [A5.05.01.05.01.nn](#)

Exhaust gases are white

Possible cause:

- Exhaust gas condensation due to low ambient temperatures
- Part of the fuel is unburnt because the engine is too cold
- Water in the fuel
- Water in the charge air manifold
- Leakages in the cylinder head
- Cylinder head is cracked

Remedy:

For engine warm-up see [A3.05.18.nn](#)

see [A3.06.06.nn](#) „Charge air cooler“

For replacement of cooled valve seat inserts see [A5.05.01.08.03.nn](#)

M20-M601C

Emergency operation

M20-M601C

Defective turbocharger

For supercharged marine diesel engines, it may occur that they have to continue their operation as a naturally aspirated engine with a reduced output, when the turbocharger has failed.

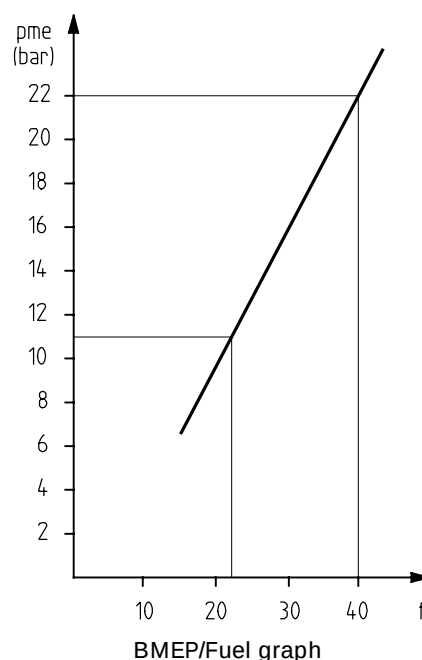
As the valve timing of the engine has been adjusted to full load, the engine will exhaust part of the combustion gases into the induction manifold and take them in again when the turbocharger is inoperative (and also normally in the lower partial load range). The high proportion of exhaust gas and the missing charge air pressure only permit a reduced bmep to protect the engine against thermal overload. The fuel injection pump delivery must be reduced according to the bmep recommended below.

Determination of the maximum permissible fuel rack position

The relation between the fuel rack position (f) and the mean brake effective pressure (p_{me}) is approx. linear.

For the determination of the permissible fuel rack position, a fuel-bmep graph can be prepared, as shown in the example by two fuel rack and bmep values taken from the acceptance test records.

The values for the 100 % and 50 % output figures should be taken for this. The characteristic intersection through both coordinates will indicate the fuel rack position for any bmep value.



Example:

$P = 100\%$, $f = 40$ mm, $b_{mep} = 22$ bar

$P = 50\%$, $f = 22$ mm, $b_{mep} = 11$ bar

M25/M32

Emergency operation of the generator engine

Plant service permitting, the set with a defective turbocharger should be shut down and separated from the mains.

If an engine shut-down is not possible, disconnect all consumption as far as is possible, so that the motor can operate with a

$$P_{me} \approx 4,5 \text{ bar at nominal power}^{\wedge} = \text{abt. 25 \%}.$$

- Stop the engine
- Remove the air filter silencer
- Shut down the turbocharger (block the rotor, Special tools are not included in the scope of supply), see manufacturer's instructions **book C**.

Note:

If blocking is not possible:

- disassemble the rotor.
- obturate the exhaust gas side against bearing housing and air side by means of a blind flange.

- Interrupt the oil supply to the turbocharger, for this:
 - unscrew the connection of the pipe at the engine and close the connector with a plug and union nut.
 - Plug and fasten the free end of the pipe.

Note:

The cooling water supply is to be interrupted only in case there is a considerable leakage at the turbine housing on gas side, which would endanger the engine.

Note:

If there are two turbochargers feeding into one charge air manifold:

- Close the air outlet casing of the turbocharger taken out of service with a blanking cover.

- Start the engine and reduce the output. If the installation is for heavy fuel, we recommend the change to distillate fuel in emergency operation.

Monitoring the engine while the turbocharger is defective

Change the fuel rack position gradually until the

exhaust gas temperature after the turbine is a max. 500 °C

Carefully monitor the exhaust gas temperatures during emergency operation, especially if exhaust-gas alarms have been cut out.

Finishing with emergency operation

After an emergency operation with heavy fuel, at least one cylinder head must be removed for reasons of safety and to ascertain whether a general overhaul of the valves is necessary.

M20-M601C

Emergency operation of the main engine

- Stop the engine
- Remove the air filter silencer
- Shut down the turbocharger (block the rotor), see manufacturer's instructions **book C**.

Note:

If blocking is not possible:

- disassemble the rotor.
- obturate the exhaust gas side against bearing housing and air side by means of a blind flange.

- Interrupt the oil supply to the turbocharger, for this:
 - unscrew the connection of the pipe at the engine and close the connector with a plug and union nut.
 - Plug and fasten the free end of the pipe.

Note:

The cooling water supply is to be interrupted only in case there is a considerable leakage at the turbine housing on gas side, which would endanger the engine.

Note:

If there are two turbochargers feeding into one charge air manifold:

- Close the air outlet casing of the turbocharger taken out of service with a blanking cover.

- Start the engine and reduce the output. If the installation is for heavy fuel, we recommend the change to distillate fuel in emergency operation.

Fixed propellers

Start the engine with a

$$P_{me} \approx 5 \text{ bar}^{\wedge} = \text{abt. 60 \% nominal power}$$

CP propellers

The load conditions, as for a fixed propeller installation, should be reached by reducing the propeller pitch and engine speed. Operation at rated speed is practically impossible, because the engine output that can be reached, is generally lower than the propeller input at zero pitch.

Multi-engine plants with one propeller

The propellers are generally of the variable pitch type. Declutch the engine with the defective turbocharger. Set the propeller pitch, so that the engine remaining in service can be run at rated speed and continuous power. It is not necessary and impossible without equipment, for unbalanced engine loads to run the defective engine at reduced output to increase the total power available. The expenditure and the gain in power would not justify this.

M20-M601C

Monitoring the engine while the turbocharger is defective

Change the fuel rack position gradually until the

exhaust gas temperature after the turbine is a maximum 500 °C

Carefully monitor the exhaust gas temperatures during emergency operation, especially if exhaust gas alarms have been cut out.

Charge air temperature while the turbocharger is defective**Note:**

If the charge air cooler has two stages, the charge air temperature is raised at part load by isolating the low-temperature circuit of the cooler, which is controlled by charge air pressure.

Because of the turbocharger failure, however, the charge air temperature should be low, but not lower than **30 °C**.

If the charge air cooler is of the two-stage type, the low-temperature circuit must therefore be opened by hand.

Finishing with emergency operation

After an emergency operation with heavy fuel, at least one cylinder head must be removed for reasons of safety and to ascertain as to whether a general overhaul of the valves is necessary.

M20-M601C

Operational misfire - protection of the flexible coupling

The following instructions and restrictions refer only to engines with flexible couplings.

Attention:

If one cylinder fails partially or completely, this will always increase the stresses in the flexible coupling.

No changes reducing the output to any one cylinder on the engine should therefore be made.

The additional loads will be the heavier, the smaller that the output of a defective cylinder is. For this reason, compression should remain, if one cylinder completely misfires. A cylinder head, valve or piston and connecting rod should only be removed if unavoidable.

If misfiring operation cannot be avoided, it may be necessary to limit the power output of the whole plant in conformity with its type.

Notes will be given to this effect on the engine control console or in the torsional vibration calculation. For results of this calculation, see **A1.09**.

If you have any doubt, contact the manufacturer or make the following provisional arrangement:

Single-engine installations with fixed or CP propeller

- First run the engine at only **50 %** of the rated output by reducing the propeller pitch or speed.
- If the gear becomes noisy and/or the speed hunts, vary the speed until the operation is acceptable.
- Stop the engine not later than **30 min.** and touch the coupling with your hand to check it for heating.

M20-M601C

The permissible surface temperature in misfiring operation is approx. 60 °C.

If heating is only moderate, the power output can be increased in steps up to max. **80 %** of the rated power, which should not be exceeded for thermal reasons.

- At this speed stage, occasionally check the flexible coupling visually and its temperature.
- The defect should be repaired immediately. Before returning to normal operation again, the flexible coupling should be checked for damage by a specialist of the maker.

Twin engine installations: Shut the defective engine down and run the plant with the other engine alone.

Defective **engines of generating sets** should also be shut down. If this is impossible, the emergency operating mode can be started analogously with single-engine installations with fixed CP propeller.

M20-M601C

Operational misfire

In general, „operational misfire“ means that the engine is operated with non-uniformly loaded cylinders.

This will cause additional loads which are the higher the more the march of the gas pressure of a defective cylinder deviates from the remaining cylinders.

Attention:

Therefore we strongly recommend not to carry out any adjustments at the engine which might result in an output reduction of individual cylinders!

In any case, troubles detected at individual cylinders should be remedied immediately!

In case the operational misfire cannot be avoided, i.e. cannot be repaired by means of on-board tools, we differentiate between the following extreme conditions, depending on the severity of the troubles:

1. Misfire

Misfire means engine operation with interrupted injection at any cylinder. The compression pressure of the troubled cylinder, however, is applied.

At engine operation the following has to be observed:

- Required output and speed restrictions are indicated in the torsional vibration calculation (**A1.09**).
- Even if there are not restrictions regarding the position of the torsional vibration, it is recommended to check a flexible coupling for excessive heating.
- It has to be **avoided** that with permanently existing engine load variations a „surging“ of the turbocharger occurs in any operating point.
- In case of an excessive vibration of the control rack you should relocate the operating point in order to reduce the vibrations.

M20-M601C

2. Total misfire

In case the engine is supported by flexible bearings and a running gear has to be dismounted completely, the engine has to be fixed in accordance with the instructions

A5.05.02.12.00.nn.

The possible outputs and speeds at which a damaged engine can be operated, depend on the system in question and have to be made out by touching while speed and output are slowly increased.

The following limit values have to be strictly observed, and the actual values must not fall below the limit values:

- The engine speed must not exceed **80%** of the rated speed (**A1.10**).
This limit value applies to engines arranged rigidly as well as flexible.
- The exhaust gas temperatures upstream turbocharger must not exceed the temperatures indicated in **A1.10**.
- „Surging“ of the turbocharger has to be avoided.
- Output and/or speed have to be changed in case transmission noises and/or high speed variations occur
- The temperature at the surface of the coupling must not exceed 60 °C.
- During emergency operation, the anchor bolts of the fixing device of a flexible bearing support are to be checked permanently for tight fit.

The engine output possible under these conditions is approx. 35 % of the rated output. In case of doubt please contact the MaK. **MaK**.

2.1 Twin engine systems / generator systems

The damaged engine should not be restarted.

M20-M601C

Operating media

-

Operating media	A4
Table of contents	A4.01
Introduction	A4.02
Safety instructions	A4.03
Regulations and care Engine	A4.05.00
Regulations and care Engine fuel	A4.05.07.00
Regulations and care Distillate fuel	A4.05.07.01
Regulations and care Heavy fuels	A4.05.07.02
Regulations and care CCAI-limit curves	A4.05.07.03.01
Regulations and care Heavy fuel specification	A4.05.07.05
Regulations and care Viscosity temperature sheet	A4.05.07.06
Regulations and care Lubricating Oil	A4.05.08.00
Regulations and care Cooling Water	A4.05.09.00
Regulations and care Treatment of cooling water	A4.05.09.01
Regulations and care Changing the cooling water	A4.05.09.02
Regulations and care [~] Diagram I	A4.05.09.03
Regulations and care [~] Diagram II + III	A4.05.09.04

M20-M601C

The use of suitable and unobjectionable operating media is an assumption for working readiness and reliability of surface of the engine system.

For that, the following notes and instructions must be observed.

- **Warranty**

When unsuitable operating media are used or are maintained insufficiently, no warranty for trouble free operation can be guaranteed.

- **Product Selection**

For not listed products exist not experience at MaK.

- **Scope**

These operating media instructions are valid for MaK-engines according to the delivery program edited 3/92.

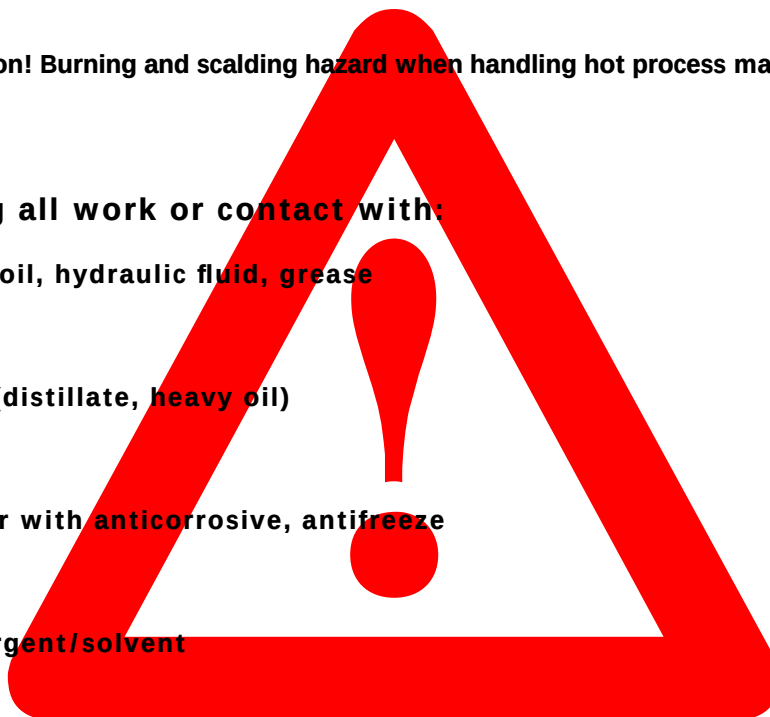
M20-M601C

Safety instructions

- No open fire during work at the fuel system!
- No smoking!
- Lube oil and fuel vapours may ignite on contact with ignition sources!
- Caution! Burning and scalding hazard when handling hot process materials!

During all work or contact with:

- lube oil, hydraulic fluid, grease
- fuel (distillate, heavy oil)
- water with anticorrosive, antifreeze
- detergent/solvent
- coolant (CO₂, N₂)



the safety instructions/safety specification sheets of the product manufacturer are to be observed!

California / USA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

M20-M601C

Regulations and care

M20-M601C

For the MaK-engines used in shore-based and ship-based operation according to their equipment condition two product groups of fuels are allowed, these are:

- **Destillate fuel**
- **Heavy oil**

M20-M601C

Distillate fuel

The fuel should be a high quality mineral oil product, have good anti-oxidant properties, not separate in storage or block the filters with wax exudation and should be free of mineral acids.

One must differentiate between two types of distillate fuels:

Pure distillates which are known as gas oil, marine **gas oil**, Diesel etc. These are fuels with a relatively low sulfur content and very good ignition characteristics.

Distillates or mixed fuels which are known as **marine Diesel oil (MDO)**, Diesel fuel oil, marine Diesel fuel (MDF) etc.

These types of fuel differ from the former types in general by their higher viscosity, specific gravity and, in some cases, considerably larger tolerances.

Normal specifications for fuels:

Fuel type	Gas oil	Marine Diesel oil
ISO 8217 : 1996	1) ISO-F-DMA	ISO-F-DMB -DMC
British Standard MA 100 : 1996 – ISO 8217 : 1996	2) see ISO 8217	
British Standard 2869 : 1970	3) Class A 1 Class B 1	Class A 2 Class B 2
ASTMD 975 - 78	No. 1 D No. 2 D	No. 2 D No. 4 D
DIN	DIN EN 590	-----
Minimum requirement for fuel preparation	Fine filter	Separator, fine filter, preheating to 50 °C
1) International specification for marine-fuels 2) MA 100 : 1982 was withdrawn in September 1989 3) Cancelled		

M20-M601C

Choice of ISO 8217 : 1996

Table 1 – Requirements for marine distillate fuels

Note

The values in this table are maximum or minimum values for each property. The actual values for any batch of fuel may vary within these limits.

Characteristic	Test method	Limit	Designation ISO-F		
			DMA	DMB	DMC
Density at 15 °C, kg/m ³	ISO 3675 or ISO 12185	max.	890,0	900,0	920,0
Kinematic viscosity at 40 °C; mm ² /s) 2)	ISO 3104	min. max.	1,50 6,00	– 11,0	– 14,0
Flash point, °C	ISO 2719	min.	60	60	60
Pour point (upper), °C 3)	ISO 3016	max.	–6	0	0
Winter quality		max.	0	6	6
Summer quality		max.	0,3	–	–
Carbon residue, (micro carbon) % (m/m) on 10 % distillation bottoms	ISO 10370	max.	–	0,3	2,50
Ash, % (m/m)	ISO 6245	max.	0,01	0,01	0,05
Sediment by extraction, % (m/m)	ISO 3735	max.	–	0,07	–
Total existent sediment, % (mm)	ISO 10307-1	max.	–	–	0,10
Water, % (V/V)	ISO 3733	max.	–	0,3	0,3
Cetane number	ISO 5165	min.	40	35	–
Visual inspection	ISO 8754	–	(see 6,2)	–	–
Sulfur, % (m/m)		max.	1,5	2,0	2,0
Vanadium, mg/kg	ISO 14597	max.	–	–	100
Aluminium + Silicium, mg/kg	ISO 10478	max.	–	–	25
2) 1 mm ² /s = 1 cSt 3) Purchasers should ensure that this pour point is suitable for the equipment on board, especially if the vessel is operating in both the Northern and Southern hemispheres. 6.2 <u>Visual inspection</u> Inspect the sample in good light and at a temperature between 10 and 25 °C. It shall appear clear and bright.					

M20-M601C

ISO-F-DMB and -DMC have viscosity limit of 11 or 14 mm²/s (cSt)/40 °C which is, however, not fully utilized in commercial fuels from the large international fuel suppliers.

Pre-heating of the fuel can be dispensed with if the viscosity of the bunkered fuel at 40 °C is below 7 mm²/s (cSt).

If this value is exceeded and a pre-heating facility is not installed the next better quality should be bunkered.

The fuel firms recommend that information about the available quality should be obtained in good time from the places where bunkering is intended.

M20-M601C

Heavy fuels

(Viscosity in mm²/s (cSt) at 100 °C, in the past at 50 °C)

All fuels are called heavy fuels that consists in the main of residual oils from oil refining.

General Requirements:

The fuel must represent a homogenous mixture of hydro-carbon coming from the mineral oil processing. The fuel must not contain other substances (e. g. mineral acids, alcali) if not explicitly noted in the specification. Minor quantities of additives to improve special fuel properties are permitted.

Depending on whether it is the highest available viscosity or a mixture with distillates to obtain the required viscosity, the following designations are still used a lot at the present:

Bunker Fuel Oil	(BFO)
Marine Fuel Oil	(MFO)
Bunker C Fuel	
Intermediate Fuel	(IF)
Light Fuel Oil	(LFO)
Thin Fuel Oil	(TFO)

Various organizations, such as:

BSI	–	British Standards Institution
CIMAC	–	Conseil International des Machines à Combustion
ISO	–	International Organisation for Standardisation

are busy to find internationally applicable limit value specifications for marine fuels, especially for heavy fuel oils, and because of their activities new designations will be introduced to describe fuel properties.

ISO-Specification (ISO 8217)

The ISO-Specification for Marine Fuels was issued in April 1987.
A revised edition was published in March 1996.

A classification according to quality characteristics and viscosities was introduced.

The classes differ from
ISO-F-RM¹⁾ A²⁾ 10³⁾ (before, e. g. IF 30 with satisfactory data)
up to
ISO-F-RM H 55 (before, e. g IF 700 with in case using the maximum limit values)

- 1) RM = Residual Marine
- 2) Quality classification
- 3) Max. viscosity at 100 °C (mm²/s)

(see **A4.05.07.05**).

M20-M601C

CIMAC-Specifications

On the basis of the ISO-Specification, the CIMAC Working Group "Future Fuels" has divided the fuels according to their physical and chemical data, which are decisive for a reliable engine operation.

In accordance with ISO, identical character/figure combinations are used for the identification of quality and viscosity,

e. g. CIMAC-A10 corresponds to ISO-F-RMA 10.

The CIMAC-Specification does not fully agree with the ISO-Specifications.

The most important differences are as follows:

- CIMAC provides fewer density limits for the A10 - D15 classes.
- Introduction of minimum viscosity with CIMAC.

The CIMAC-specification is the basis for the **MaK heavy fuel specification (A4.05.07.05)**.

BSI-Specification

The BS MA 100 which came into force in 1982 was withdrawn in September 1989. Since then the contents of BS MA 100 conforms with ISO 8217.

The **MaK Heavy Fuel Specification** indicates the equivalents of the CIMAC-Specification and the ISO-Specifications.

The most important change is the limitation of:

Density	(separability)
Carbon residue	(Conradson)(combustibility)
Vanadium	(hot corrosion)
Aluminium + Silicium	(scuffing by catfines)
Pour Point	(pumpability)
Sediments	(stability)

A classification limit about the ignition quality could not be specified up to now in default of suitable test methods.

M20-M601C

The so-called CCAI is a useful indicator when assessing the ignition behaviour. (CCI = calculated Carbon aromaticity index).

The CCAI is determined from density D (kg/m^3 t 15 degrees C) and viscosity V (mm^2/s or cSt at 50 degrees C) according to the following equation:

$$\text{CCAI} = D - 141 \log \log (V + 0,85) - 81$$

In principle, the following applies: the higher the CCI, the poorer the expected ignition behaviour.

Furthermore, the following applies: When taking a specific CCAI value as a basis, there is more risk of a poorer ignition behaviour if the viscosity is low.

Since the CCAI is **no measurement** for the ignition behaviour, but rather an **assessment aid**, absolute limit values cannot be specified.

The Mak assessments make allowances for these factors:

A lower as well as an upper CCAI limit curve is defined depending on the viscosity, the type of engine and the condition of the fittings and included in [A4.05.07.03.00](#) an [A4.05.07.03.01](#). The three sub-ranges which develop in this manner mean the following:

	Unrestricted permissible range. Impairments by insufficient ignition characteristics are not expected.
	Ignition characteristics are predominantly acceptable. Problematic fuels can, however, not be excluded.
	Range which should be avoided. Impairments and even damage to the engine can be expected.

The diagrams permit the determination of the permissible and/or maximum acceptable density of a fuel in a simple manner, depending on its viscosity.

100 °C is to be the reference temperature for indicating the viscosity of a heavy fuel. [A4.05.07.05](#) shows the conversion to 50 °C, 80 °C and Redw. l sec.

The heavy fuel grades permitted for MaK engines can be found in the table "Permissible limits for heavy fuels to be burnt in MaK engines" ([A4.05.07.04](#)).

In so doing, you should ensure that restrictions with regard to the permissible densities are possible, according to the valid CCAI limit curves ([A4.05.07.03.00](#) or [A4.05.07.03.01](#)).

M20-M601C

Notes to the specification of the permissible limits:

The equipment of the engine and the fuel treatment system are decisive for the determination of the permissible heavy fuel grade.

There may be restrictions, for instance, if the engine has no cylinder lubrication, the exhaust valve seat rings have no cooling or the pistons are of the monobloc aluminium type. Fuels to CIMAC-A10 are to be used in such cases. MaK should be contacted if necessary.

A high vanadium content accelerates corrosion on the exhaust valves, and this must be taken into account when fuelling in the Caribbean area.

It will frequently happen in the near future that the limits of the MaK heavy fuel specification are reached owing to a general change on the fuel market. If it is intended to take such fuels for a lengthy period of time and the owners have no experience with this, we recommend to contact MaK first.

The sodium and water content should be kept as low as possible after the separator (water less than 0.2 % weight).

The ash content determines the mechanical wear. So preference should be given to heavy fuel with a low ash content.

Mixing of fuel components to obtain the desired viscosity should be done in suitable mixing appliances before bunkering.

A separate filling of the two components into the ship bunker as well as the use of mixed components that are incompatible can cause a great deal of trouble.

If there are mixing facilities on board ship the compatibility of the components must be assured by the supplier.

The technical development in handling of crudes has led to a noticeable increase in the proportion of fuels from new refining processes (catalyst cracking, visbreaking) with which mixing presents more of a problem than with the established heavy fuels. It is therefore preferable to bunker ready mixed fuels.

Note

In the residues from catalyst cracking there can be catfines which lead to extensive engine wear if they are not separated out very carefully.

The flash point of the heavy fuel must be above 60 °C in accordance with the requirements of the classification societies.

In any case a sample of the heavy fuel should be taken while bunkering. Analyses can be carried out by MaK against payment of costs incurred or by the fuel supplier.

Heavy fuel operation makes necessary the use of a medium alkaline lubricating oil in accordance with our recommendation of lubricating oil brands (**A4.05.08.00**).

M20-M601C

Fuel additives

Two types of fuel additives, classified here according to their main effects, are used in various cases as required:

a) Demulsifying additives (emulsion breakers)

These additives, put in during bunkering, can prevent sludge-like agglomerations and break up stable water-heavy fuel emulsions in heated settling tanks which could not be separated in a simple separating process (mixing proportions 1 : 3000 to 1 : 6000).

Proven additives can be obtained from most oil or additive suppliers.

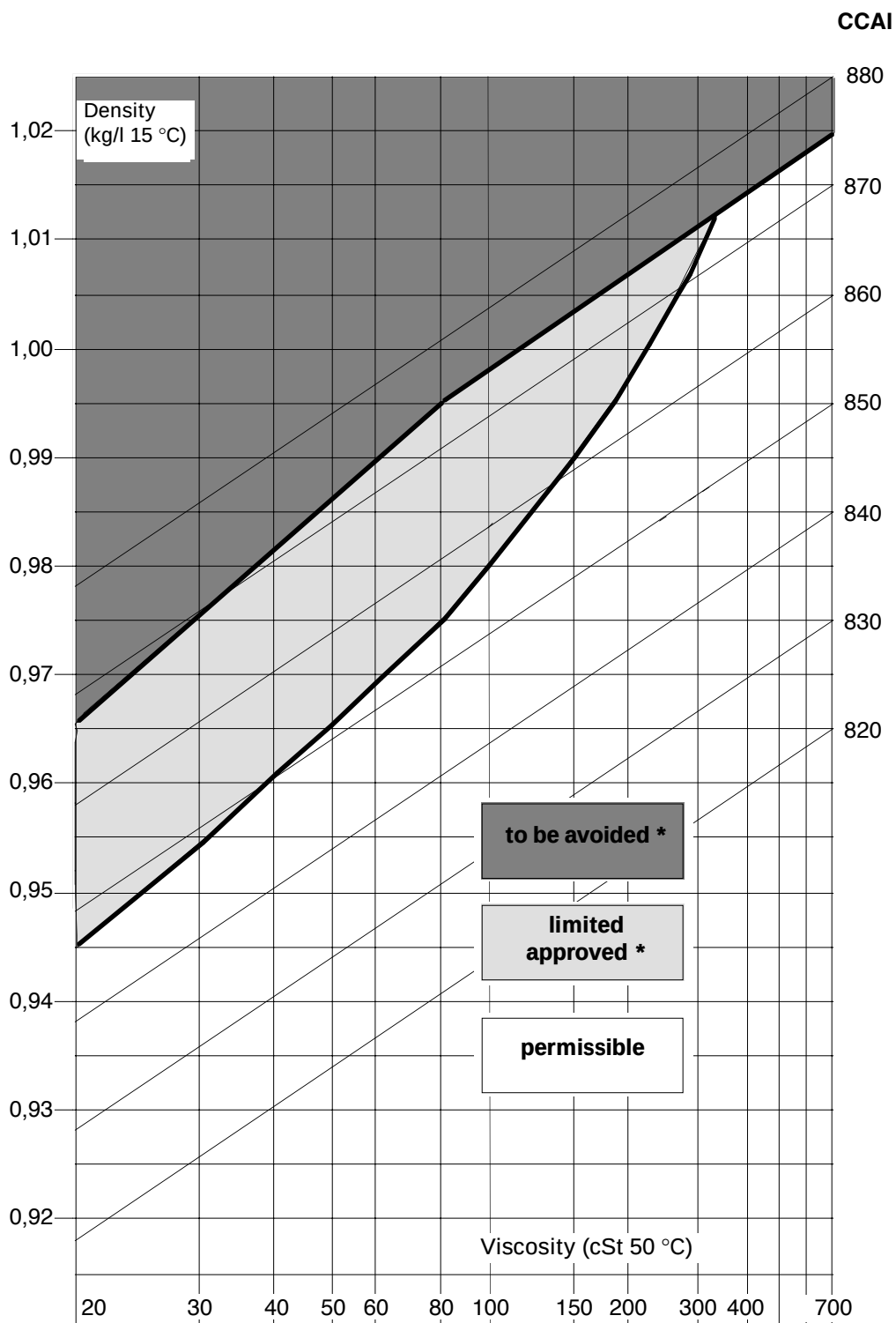
b) Additives against high-temperature corrosion

High-temperature corrosion can occur on exhaust valves and turbine blades when burning heavy fuel containing vanadium and sodium.

MaK does not require additives against high-temperature corrosion. Should they be used, however, it must at least be ensured that they are not sensitive to water, compatible with the fuel in any case and no cause of troubles, in the fuel filters, for instance.

M20-M601C

CCAI-limit curves

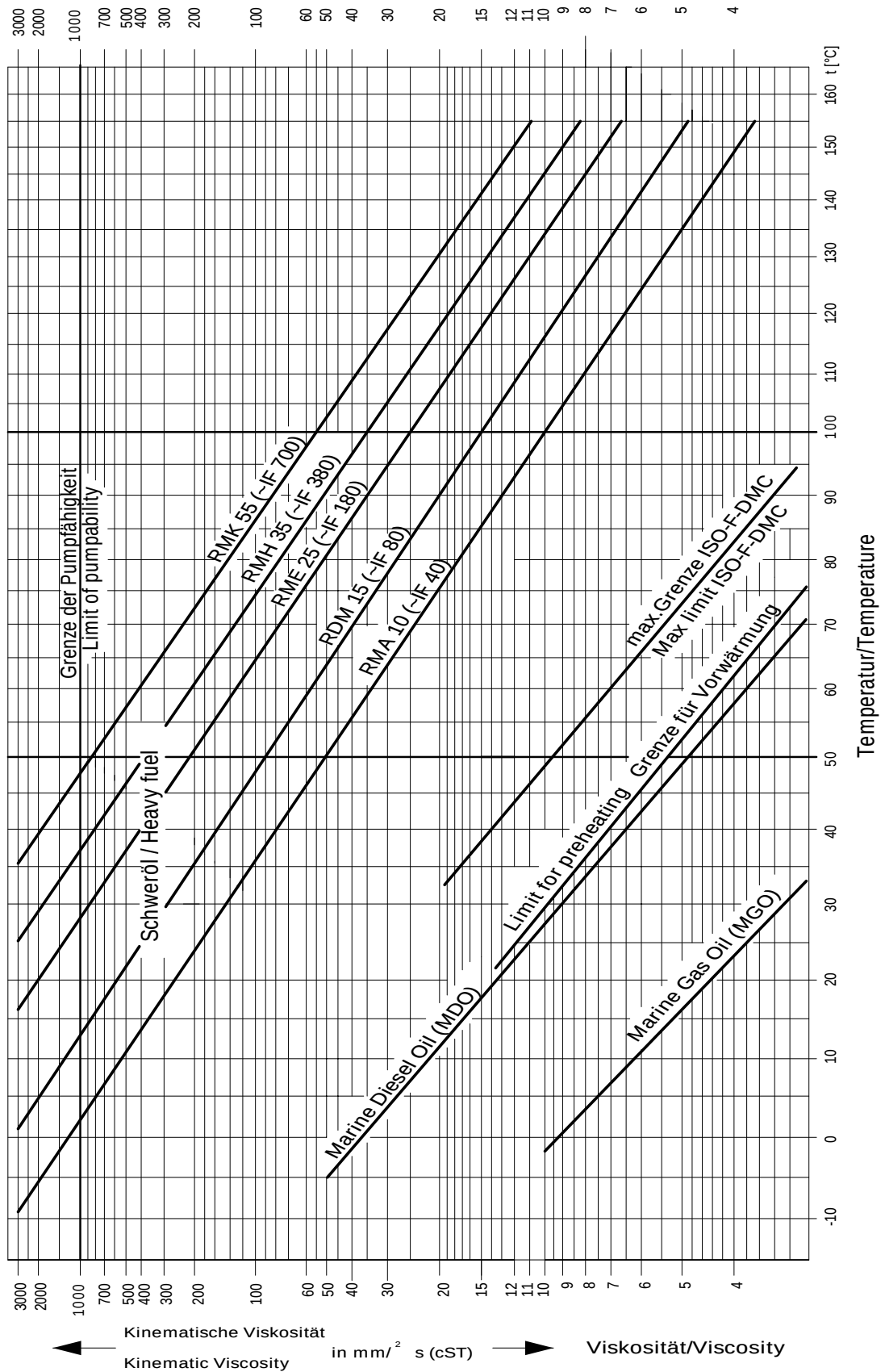


M20-M601C

CIMAC – REQUIREMENTS for RESIDUAL FUELS for diesel engines (as delivered) – ANFORDERUNGEN an RÜCKSTANDS-KRAFTSTOFF für Dieselmotoren (wie geliefert)																																	
Designation: Bezeichnung:	CIMAC A 10	CIMAC B 10	CIMAC C 10	CIMAC D 15	CIMAC E 25	CIMAC F 25	CIMAC G 35	CIMAC H 35	CIMAC K 35	CIMAC H 45	CIMAC K 45	CIMAC H 55	CIMAC K 55																				
	Related to ISO8217 (96):F–	RMA 10	RMB 10	RMC 10	RMD 15	RME 25	RMF 25	RMG 35	RMH 35	RMK 35	RMH 45	RMK 45	RMK 55																				
Dim.																																	
kg/m³	max	950 ²⁾	975 ³⁾	980 ⁴⁾	991																												
cSt ¹⁾	max min	max min	10 6 ⁵⁾	15 15 ⁵⁾	25 15 ⁵⁾			35	1010	991	1010	991	1010																				
°C	min		60	60	60			60																									
°C	max	0 6	24	30	30			30					30																				
% (m/m)	max	12 ⁶⁾	14	14	15	20	18	22					22																				
% (m/m)	max		0.10	0.10	0.10	0.15	0.15	0.15 ⁷⁾					0.15 ⁷⁾																				
% (m/m)	max		0.10	0.10	0.10	0.10		0.10					0.10																				
% (V/V)	max		0.5	0.8	1.0			1.0					1.0																				
% (m/m)	max		3.5	4.0	5.0			5.0					5.0																				
mg/kg	max	150	300	350	200	500	300	600					600																				
mg/kg	max		80	80	80			80					80																				
1)	An indication of the approximate equivalents in kinematic viscosity at 50 °C and Redw. l sec. 100 °F is given below: Kinematic viscosity at 100 °C mm²/s (cSt) Kinematic viscosity at 50 °C mm²/s (cSt) Kinematic viscosity at 100 °F Redw. l sec.	Eine ungefähre Zuordnung der kin. Viskositäten bei 50 °C sowie in Redw. l sec. bei 100 °F enthält die nachstehende Tabelle: <table><tr><td>7</td><td>10</td><td>15</td><td>25</td><td>35</td><td>45</td><td>55</td></tr><tr><td>30</td><td>40</td><td>80</td><td>180</td><td>380</td><td>500</td><td>700</td></tr><tr><td>200</td><td>300</td><td>600</td><td>1500</td><td>3000</td><td>5000</td><td>7000</td></tr></table>										7	10	15	25	35	45	55	30	40	80	180	380	500	700	200	300	600	1500	3000	5000	7000	2) ISO : 975 3) ISO : 981 4) ISO : 985 5) ISO : not limited 6 ISO : Carbon Residue Koksrückstand 10 7) ISO : 0.20
7	10	15	25	35	45	55																											
30	40	80	180	380	500	700																											
200	300	600	1500	3000	5000	7000																											

M20-M601C

Viskosität-Temperatur-Blatt / Viscosity-Temperature-Sheet



M20-M601C

Engine Lubricating Oil

The quality of the engine oil has a large influence on the service life and engine efficiency and thus the economical operation.

High demands must therefore be placed on the lubricants to be used in respect of suitability.

The oil to be used should be selected according to the specifications of the fuel which is used to run the engine.

When using heavy fuel the effect of the increased amounts of coke-type and acid deposits which form during combustion as a result of the high ash and sulfur content, must be rendered harmless and for this reason only lubricating oils which have been developed for medium-speed trunk piston Diesel engines are approved.

On engines which are equipped with special cylinder lubrication the same oil should be used in the circulation system and for the cylinder lubrication.

Base Oil

The base oil should be a high-quality solvent refined product from a source suitable for engine lubricating oil and have a good oxidation stability as well as a good load carrying capacity and thermostability.

Regenerated oils are not permitted.

Additives

The additives in the oil must remain effective and uniformly distributed at all temperatures occurring in normal operation between pour point and 220 °C as well as in storage and also fulfil the following requirements in MaK engines:

- Good detergent and dispersant properties (which for heavy fuel operation equals at least the API-CF level) to prevent the depositing of combustion products (coke and asphalt-like compositions) or dissolves these deposits and keeps them in suspension.
- Have an adequate alkalinity in order to be able to neutralize the sulfur acid compositions which occur during the combustion process. This is usually given as the Base Number (BN), or as Alkalinity Value (AV) and recorded in mgKOH/g. For MaK engines operating on heavy fuel this value should be between 30 and 40 mg KOH/g for fresh oils.

M20-M601C

Care of lubricating oil

The time between oil changes can be lengthened by the use of separators, oil centrifuges and by-pass filters.

Mechanical filters suitable for filtering blended oils may be used only. Chemically active filters are not permitted.

- Lubricating oil filtering (By-pass)

By-pass oil cleaning in separators is specified for heavy-fuel operation because the finely distributed combustion deposits cannot be removed effectively from the oil in any other way. The separator capacity should be designed in accordance with the Instructions for Heavy-Fuel Operation in **A3.04.08.nn**

One stipulation for good separation of the lubricating oil is a low viscosity which requires a correspondingly high temperature. When separating the temperature should be between 90 and 95 °C.

For gas oil or MDO operating by-pass filters can be used instead of separators.

- Lubricating oil filtering (full flow)

In order to combat the higher amount of contamination in the lubricating oil when operating on heavy fuel, the installation of an "Automatic back-flush filter" in conjunction with a following indicator filter as double filter is necessary. (See the details in the Instructions for Heavy-Fuel Operation **A3.04.08.nn**)

For gas oil or MDO operation, a double filter with manual change-over is sufficient.

Exception: automatic filters

Lubricating oil brand recommendations – Limitation of warranty

In most cases, the firm's name is part of the brand designation of the lubricating oil and should, when ordering, be placed in front of the designation to avoid confusion. MaK has insufficient experience with brands of lubricating oil listed in column II. The intended use of any of these oils must therefore be discussed with the engine manufacturer beforehand as otherwise the warranty is no longer valid.

MaK has no experience with oils not mentioned here. MaK cannot give any guarantee for the oil used because, for example, the composition and manufacture cannot be influenced by MaK. Furthermore no guarantee can be given for poor quality engine and lubricating oil care nor for the use of non-approved fuels. Proof that a defect has not been brought about by the lubricating oil must be provided by the user.

M20-M601C

• List of brands of lubricating oil for Operation with distillate fuel

The viscosity class SAE 40 is specified for all MaK engines.

Lubricating oil firm	Lubricating oil brand	I	II
AGIP	DIESEL SIGMA S		X
	CLADIUM 120		X
BP	ENERGOL DS 3-154	X	
	VANELLUS C3		X
CALTEX	DELO 1000 MARINE	X	
	DELO 2000 MARINE	X	
CASTROL	MARINE MLC	X	
	MXD 154		X
	TLX 204	X	
CEPSA	TRONCOIL 1540		X
CHEVRON	DELO 1000 MARINE OIL	X	
	DELO 2000 MARINE OIL	X	
ELF	DISOLA M 4015	X	
	AURELIA 4030		X
ESSO	EXXMAR 12 TP	X	
	EXXMAR CM+		X
	ESSOLUBE X 301		X
FINA	CAPRANO S 412	X	
	STELLANO S 420	X	
	CAPRANO TD	X	
MOBIL	MOBILGARD 412	X	
	MOBILGARD ADL	X	
	MOBILGARD 430	X	
	MOBILGARD 1-SHC		X
SHELL	GADINIA	X	
	SIRIUS FB	X	
	ARGINA S	X	
	ARGINA T	X	
TEXACO	TARO 16 XD	X	
TOTAL	THALASSA		X
	HMA SUPER X 420	X	

I Proven in use

II Permitted for controlled use. When these lubricating oils are used, MaK must be informed because at the moment there is insufficient experience available in MaK engines. Otherwise the warranty cover is invalid.

1) See also brand list for lubricating oils for heavy fuel operation.

2) Synthetic oil with a high viscosity index (SAE 15 W/40). For engines under SAE 40-regulation only allowed if the oil inlet temperature can be decreased by 5 - 10 °C.

M20-M601C

• List of brands of lubricating oil for heavy oil operation

Only the viscosity class SAE 40 is permitted.

Lubricating oil firm	Lubricating oil brand	I	II
AGIP	CLADIUM 300		X
	CLADIUM 400		X
BP	ENERGOL IC-HFX 304	X	
	ENERGOL IC-HFX 404	X	
CALTEX	DELO 3000 MARINE	X	
	DELO 3400 MARINE	X	
CASTROL	TLX 304	X	
	TLX 404	X	
CHEVRON	DELO 3000 MARINE OIL	X	
	DELO 3400 MARINE OIL	X	
ELF	AURELIA 4030	X	
	AURELIA XT 4040	X	
ESSO	EXXMAR 30 TP	X	
	EXXMAR 40 TP		X
	EXXMAR 30 TP PLUS	X	
	EXXMAR 40 TP PLUS	X	
FINA	STELLANO S 430	X	
	STELLANO S 440	X	
MOBIL	MOBILGARD 430	X	
	MOBILGARD 440	X	
SHELL	ARGINA T	X	
	ARGINA X	X	
TEXACO	TARO 30 DP	X	
	TARO 40 XL	X	
TOTAL	HMA SUPER X 430	X	
	HMA SUPER X 440	X	

I Proven in use

II Permitted for controlled use. When these lubricating oils are used, MaK must be informed because at the moment there is insufficient experience available in MaK engines. Otherwise the warranty cover is invalid.

M20-M601C

Lubricating oil changing

The oil change interval is dependent to a large extent on the quality of the oil used and is influenced also by amount circulating in the engine lubricating system, the operating conditions, the engine oil consumption, the lubricating oil care and engine maintenance.

The optimal oil circulation quantity should 1.36 l/kW.

If in special exceptions circulation amounts of at least 0.3 l/kW cannot be avoided, shorter oil change intervals are necessary. In such cases the oil change times given below must be multiplied by the quotient of the actual quantity to the normally required quantity. An oil change must be made every 6 months at the latest.

The oil level must be checked daily (the level must not drop below the minimum mark). It must be topped up at the latest when 20 % of the amount in circulation has been used.

Oil change after operating hours (h) based on 1.36 l/kW when fitted with:

Pre- and main filter	– every 1.500 h
Additional by-passfilter or oil centrifuge	– every 3.000 h
Separator	– every 6.000 h

The changing times can be lengthened if the oil is continuously checked by lubricating oil analysis and the following limits are maintained. The analyses are carried out by the lubricating oil technical service of the oil manufacturers or by MaK for a nominal charge. The oil for the test must be taken out of the system in front of the engine during operation. The amount required is approx. 1 to 2 litres.

M20-M601C

Limits:**Lubricating oil dilution by fuel**

Lowering the flash point not below 180 °C (measured according to Penski-Martens DIN 51758) or lowering the viscosity (compared with new oil) for SAE 40 (40 °C) by approx. 40 mm²/s (cSt), but not below 120 mm²/s (cSt), and for SAE 30 (40 °C) by approx. 20 mm²/s (cSt), but not below 80 mm² s (cSt).

Alkalinity (TBN)

For heavy fuel operation, the total base number of the circulation oil of engines having a separate cylinder lubrication must not fall below 15 mg KOH/g. If there is no separate cylinder lubrication, the limit value will be 18 mg KOH/g.

If the engine is running on gas oil or MDO, the total base number must not fall below 50 % of the value of the new oil.

If the base number has reached the lower limit and the other analysis values show a satisfactory oil condition the alkalinity should be increased by the addition of new oil.

Water content

If the water content rises above 0.2 % the cause of the increase should be found and eliminated immediately. The oil must be separated or it must be changed.

Contamination

When MaK engines are running on heavy fuel, separators are specified to keep the oil clean. In this way the content of insolubles can usually be kept well below 1 % by weight. If the content increases to above 1 % weight the oil must be separated more intensively.

The limit is 2 % by weight.

For gas oil operation as well the pentane or heptane insolubles must not exceed 2 % by weight.

M20-M601C

Lubricating oil for exhaust turbocharger, hydraulic governor and change-over controls

A turbine or hydraulic oil with very good anti-oxidation properties of between 68 and 90 mm²/s (cSt) at 40 °C should be selected.

When selecting the lubricating oil the regulations of the maker such as ABB, Woodward etc. should be noted.

Lubricating oil firm	Lubricating oil brand
AGIP	OSO 68 OTE 68
ARAL	TURBINE T 68 MISOLA H 68 (KOSMOL TL 68)
BP	ENERGOL HLP 68 ENERGOL THB 68
CALTEX	RANDO HD 68 REGAL R & O 68
CASTROL	PERFECTO T 68 HYSPIN AWH-M 68 AIRCOL SN 68 1)
CEPSA	HD TURBINAS 68
CHEVRON	EP HYDRAULIK OIL 68 OC TURBINE OIL 68
ELF	MISOLA H 68 TURBINE T 68 BARELF CH 68 1)
ESSO	TERESSO 68 TROMAR T SYNESSTIC 68 1)
FINA	HYDRAN TSX 68 TURBINE OIL MEDIUM
MOBIL	D.T.E OIL HEAVY RARUS SHC 1026 1)
SHELL	TELLUS OIL T 68 TURBO OIL T 68
TEXACO	RANDO OIL 68 REGAL OIL 68 R & O
TOTAL	PRESLIA 68 AZOLLA ZS 68

If none of these brands of oil are available another low-doped oil of the same viscosity and with anti-foaming additives can be used temporarily.

1) Fully synthetic special oil for extended oil change intervals in ABB-turbochargers.

M20-M601C

Multi-purpose grease – lithium saponified – consistency number 2 (also suitable for pneumatic control instruments)

Lubricating oil firm	Brand name
AGIP	GR MU 2
ARAL	EPEXA 2 (ARALUBE HL 2)
BP	ENEGREASE LS 2
CALTEX	MULTIFAK EP 2
CASTROL	SPHEEROL AP 2 GREASE
CHEVRON	DURA-LITH GREASE EP 2
ELF	EPEXA 2
ESSO	BEACON EP 2
FINA	MARSON EPL 2
MOBIL	MOBILUX EP 2
SHELL	ALVANIA R 2
TEXACO	MULTIFAK EP 2
TOTAL	MULTIS EP 2

M20-M601C

Recirculating Cooling Water

The cooling system consists of a closed cooling water circuit with a cooling water volume which must be kept constant by topping up, depending on the evaporation loss. The checking of the recirculating cooling water level has to occur at the expansion tank.

Modern Diesel engines put particular requirements on the recirculating cooling water due to the increased power density and the consequently increased heat to be dissipated.

These requirements can only be met by properly prepared, monitored and maintained cooling water. If the preparation, monitoring and maintenance work are not carried out properly, even a short period of operation may result in damages due to corrosion.

Three decisive facts are to be considered for a proper preparation:

- **Suitable fresh water**
- **effective corrosion inhibiting agent**
 - corrosion inhibiting oil, soluble
 - chemical corrosion inhibiting agent (chemicals)
- **exact dosing** of the corrosion inhibiting agent

Requirements for the cooling water

Always use clear, clean water. Suitable are:

- Natural water (deep well-, well water)
- condensate and
- fully de-ionized water.

The values for the fresh water analysis must be within the following limits:

	corrosion-inhibiting oil	Chemicals
total - alkaline earths mmol / l - Hardness * ° dGH	0,5 - 2,2 3 - 12	0 - 1,8 0 - 10***
pH value ** at 20 °C	6,5 - 8	
Chlorine ion content mg / l	max. 100	
total chloride + sulphide ions mg / l	max. 200	

M20-M601C

*) Water hardness:

Water which does not fulfil the above requirements must be hardened or softened.

Water with a hardness of $< 12^\circ$ (10°) dGH must be brought within the specified range by mixing with condensate or fully de-ionized water (by ion exchange), see Diagram I (**A4.05.09.03**).

Condensate and fully de-ionized water should be hardened up to **3° dPH**. Magnesium sulfate (Mg SO_4) should be used for this purpose, if corrosion inhibiting oils are used.

Dosing:

For **1° dPH 21.4 mg Mg SO_4 per ton of water** are required.

German total	=	Permanent hardness	+	Carbonate hardness
dGH	=	dPH	+	dKH

Comparison with other values:

1° dGH	=	$0,18^\circ$ mmol/l
1° dGH	=	$1,79^\circ$ French hardness
1° dGH	=	$1,25^\circ$ British hardness
1° dGH	=	17,9 USA hardness

**) pH value:

Concentration of hydrogen ions
 < 7 = acid, 7 = neutral, > 7 = alkaline.

***) In general, the corrosion inhibiting effect of chemicals shows the best results with low water hardness values (~ 0). At higher hardness values and with missing hardness stabilization the chemicals may react with water contents, what may result in precipitations and in reduction of the inhibiting effect.

M20-M601C

1. Treatment of cooling water with corrosion inhibitors

Anticorrosive agents to be used in MaK engines must have been tested for their effectiveness according to the rules of the "Forschungsvereinigung Verbrennungskraftmaschinen e. V." (Research Association for Internal Combustion Engines Inc).

MaK will issue a recommendation on the basis of the results of the test. No liability for the anticorrosive agent used will be accepted because MaK is unable to control the recipe and treatment.

MaK has received positive test results for the agents mentioned in 1.1 and 1.2 or they have proven effective over a long period of operation.



Safety note:

No anti-corrosion oil emulsion must be used in case of systems heating living quarters by engine cooling water or in case of shell cooling! In this cases use only chemicals!

1.1 Anti-corrosion oil

The fresh water is mixed outside the engine with anti-corrosion oil to form a stable emulsion.

For the **initial filling** or after cleaning the coolant circuit a

1.5 % emulsion

should be used and for the subsequent filling a

1.0 % emulsion

should be used.

The following anti-corrosion oils are known to us to be effective (alphabetical order, not complete):

BP:	FEDARO-M
Castrol:	SOLVEX WT3
Esso:	Kutwell 40
Shell:	Dromus B
	Shell Oil 9156

The preparation of the emulsion can generally be carried out as follows:

Add oil to the water (**15 - 25 °C**) and stir vigorously. For initial fillings take so much water that a **10 % emulsion** can be prepared with the required amount of anti-corrosion oil.

This **10 % emulsion** is added to the cooling circuit which is already filled with **75 %** of the necessary cooling water amount, via the expansion tank. Topping up can be done with the engine running.

M20-M601C

1.2 Chemical corrosion inhibitors

The chemical corrosion inhibitors have some advantages over the anti-corrosion oils e. g. no danger of sludge formation due to breaking down of the emulsion and are simpler to prepare and control.

Attention:

It is important to avoid too low concentration, because this may result in crevice corrosion!

As far as we know, the following materials are being used in MaK Diesel engines at the moment:

Manufacturer	Additive	Limit value of nitrite content as NO ₂ in mg /l
Bedia	Bedia Liquid BL1	1200 - 1500
Rohm + Haas	Dia-Prosim RD 11	1400 - 2100
Drew Ameroid	DEWT-NC (Schiff) CWT-110 (Land)	1500 - 2250
	Maxigard	800 - 1100
Maritech	Marisol CW	1000 - 2000
Nalfleet	9-108	750 - 1000
	9-111	750 - 1000
	Nalcool 2000	750 - 1000
Unitor	Dieselguard NB	1500 - 2500
	Rocor NB Liquid	1500 - 2500
Vecom	CWT Diesel / QC2 (D99)	1500 - 2500



Safety note!

Chromates are not recommended despite of their good properties due to their poisonous nature!

Using and checking procedures must be obtained from the manufacturers, taking particular care not to use any poisonous substance if fresh water plants are connected into the cooling circuit.

Note:

A chemical anticorrosive agent is added to the delivery scope (fittings) of some stationary engines. In any case, a filling with **this** chemical is to be implemented prior to commissioning.

M20-M601C

2. Checking and care of the treated water

2.1 Anti-corrosion oil

A **daily** check of the coolant level in the sight glass on the expansion tank is just as important as checking the **anti-corrosion oil contents** every **600 operating hours**. During prolonged operating breaks, a **monthly** check should be made.

Take the emulsion sample out of the supply line from expansion tank to pump and let it stand for **1 h**. Pour off oil which rises to the surface.

Carry out emulsion test e.g. with hand refractometer (specialist shop laboratory equipment) .

- 0 % – Cooling water change and cleaning necessary, see [A4.05.09.02](#)
- < 0,5 % – Emulsion freshening required
- 0,5 - 1 % – Emulsion in order
- > 1 % – Concentration too high, possibly incorrect measurement

In case the measured values are higher than **1.5 %**, test again with fresh sample water. If the result is confirmed, a correction of the emulsion is necessary.

Emulsion freshening in case of concentration too low

Mix required amount of oil according to diagram II ([A4.05.09.04](#)) with conditioning water to a highly concentrated emulsion.

Always add oil to water

Fill in the mixed emulsion via the compensator reservoir, also possible with engine running.

Emulsion correction in case of concentration too high

Drain cooling water emulsion according to diagram II ([A4.05.09.04](#)) and refill the circuit with conditioning water.

2.2 Chemical corrosion inhibitors.

The maintaining of the determined concentration is of decisive importance for a proper corrosion protection.

A concentration check of the chemical corrosion inhibitors under consideration of the limit values (see 1.2) is to be carried out with the relevant testing equipment every 150 h in accordance with the instructions of the supplying companies.

After a freshening up of the concentration mix well with engine running!

M20-M601C

1. Changing the cooling water

1.1 Anti-corrosion oil emulsion

The anti-corrosion emulsion must be changed at the latest every **6000** operating hours, at least **annually** if the **6000** operating hours are spread over a period of more than one year due to long breaks in operation.

1.1.1 Cleaning the cooling water chambers before changing the emulsion

Stop engine and let cooling water cool down to **30 °C**. First drain expansion tank with floating oil then drain the entire system.

Remove water inlets on the crankcase and flush out any sludge which may have formed.

Fill engine with an alkali solution (e. g. P3T 308 from Messrs. Henkel **0.5 %** solution) and run it for approximately **12 hours**. Stop engine and let it cool down to **30 °C**.

Drain the cleaning solution and flush engine thoroughly with fresh water.

Then put in **90 %** of the required amount of water. With the remaining **10 %** and the required amount of anti-corrosion oil (according to diagram II: **A4.05.09.04**) prepare a highly concentrated emulsion.

Attention:

Always add oil to water!

Add the emulsion to system via the expansion tank.

1.2 Chemical corrosion inhibitors

When recirculating cooling water has chemical corrosion protection the cooling water does not need changing.

M20-M601C

2. Cooling water with anti-freeze agent

In case of temperatures at or below the freezing point of the cooling water an anti-freeze agent must be added to the coolant.

Only an anti-freeze agent with a corrosion protective effect may be used.

To obtain adequate corrosion protection, a **30 %** concentration is necessary. The highest concentration is **50%**.

This agent must be changed **annually**.

When an anti-freeze agent is used, a reduction in cooling efficiency must be expected. In cases of doubt MaK should be contacted.

For summer operation, it is advisable to drain off the cooling water with anti-freeze in it and replace it with cooling water with chemical corrosion protection in order to guarantee adequate radiator performance at higher ambient temperatures.

3. Cleaning the cooling water chambers

Before badly scaled cooling water chambers can be cleaned, they must be precleaned as described and flushed well with water under pressure. This will remove loose foreign matter such as sand and sludge which may have been deposited at places where the water flow speed is low.

The firm which supplies the anti-corrosion material will usually be able to offer a good cleaning agent for scale, such as:

Drew Chemical:	SAF - ACID
Rohm + Haas:	RD 13 M

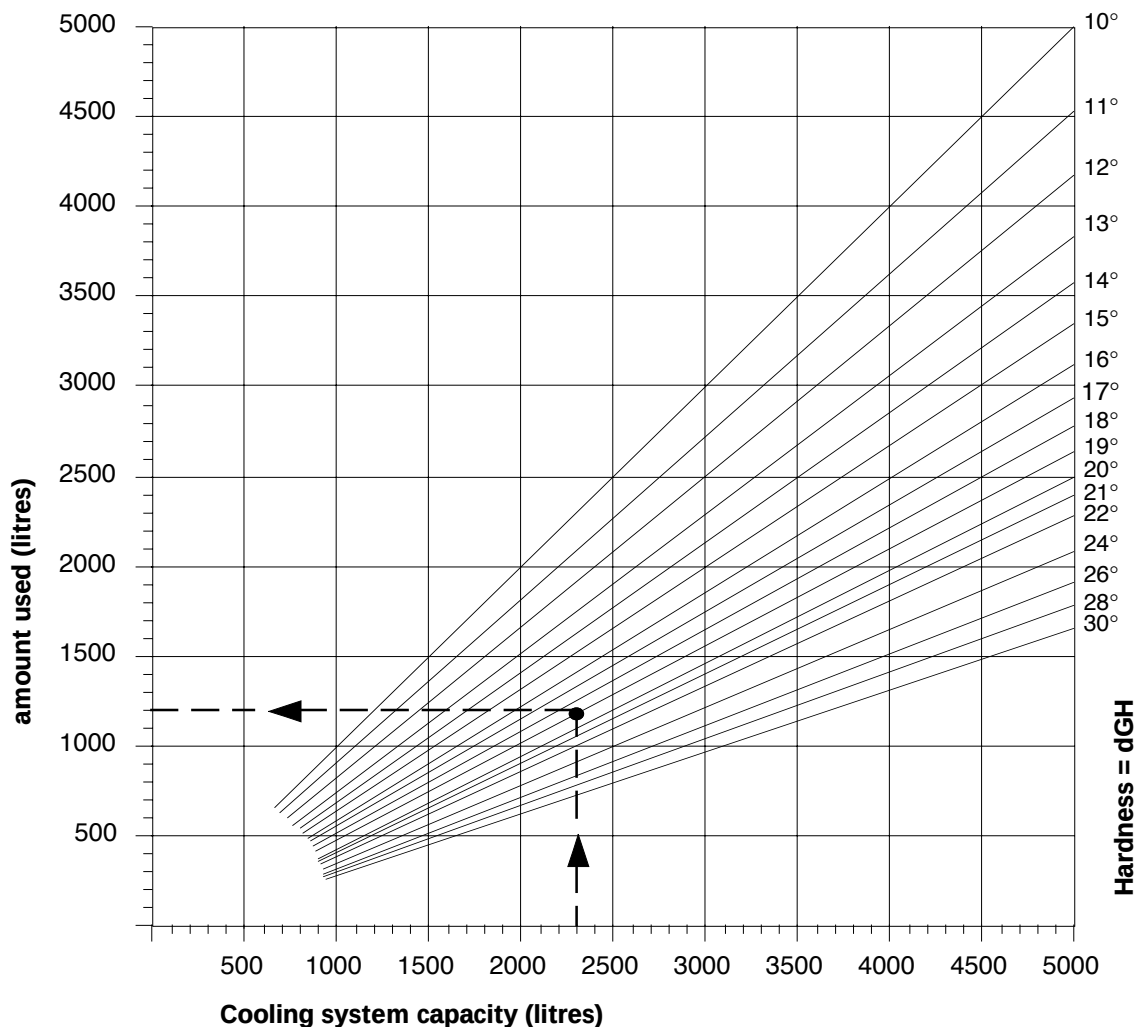
Attention:

Keep to the manufacturer's instructions! Improper use of the cleaning agents may cause damages to your health!

Flush cooling water chambers or cooling system with a **1 %** sodium carbonate solution after draining off the cleaning agent. Afterwards flush the water chambers with fresh water.

M20-M601C

Diagram I
Determining the cooling water mixture for 10° dGH



Example:

Cooling system capacity: 2300 l
Hardness of available fresh water: 19° dGH

To determine the fresh water mixture, proceed from the abscissa "Cooling system capacity" (2300 l) via the intersection of the 19° dGH line to the ordinate "Amount used" and read off the amount of water with 19° dGH which is to be used and which is to be mixed with the difference of $2300 - 1200 = 1100$ litres of condensate or fully de-ionized water.

M20-M601C

Diagram II
Emulsion freshening for weak concentration

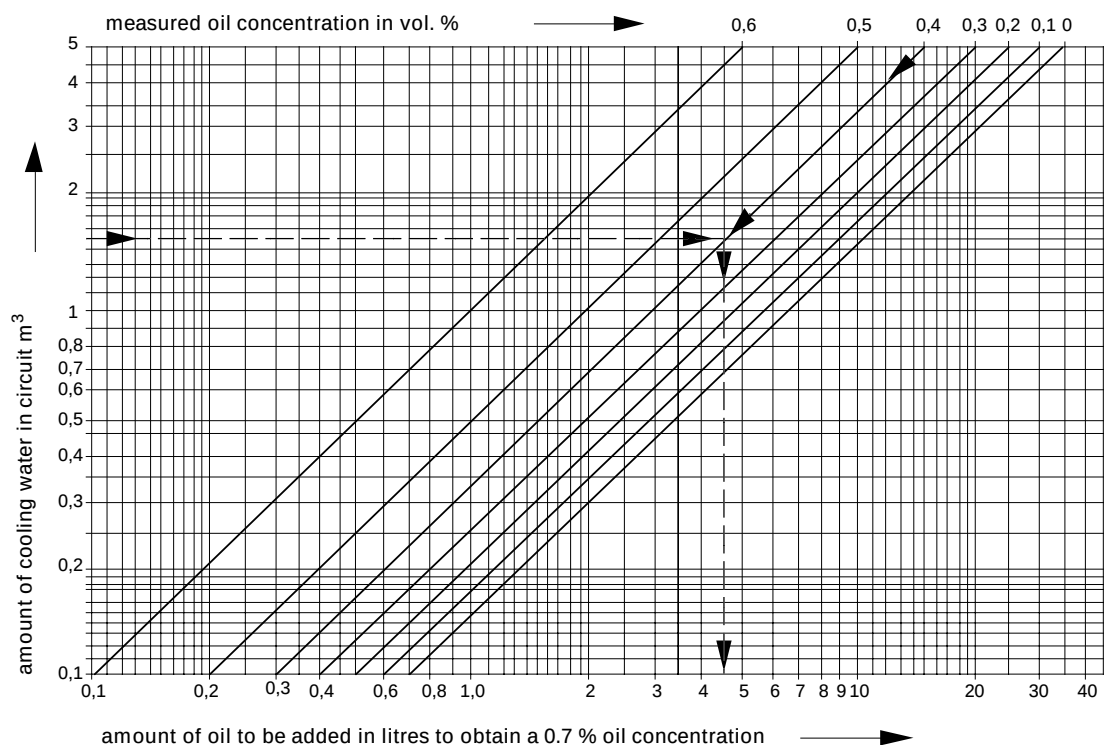
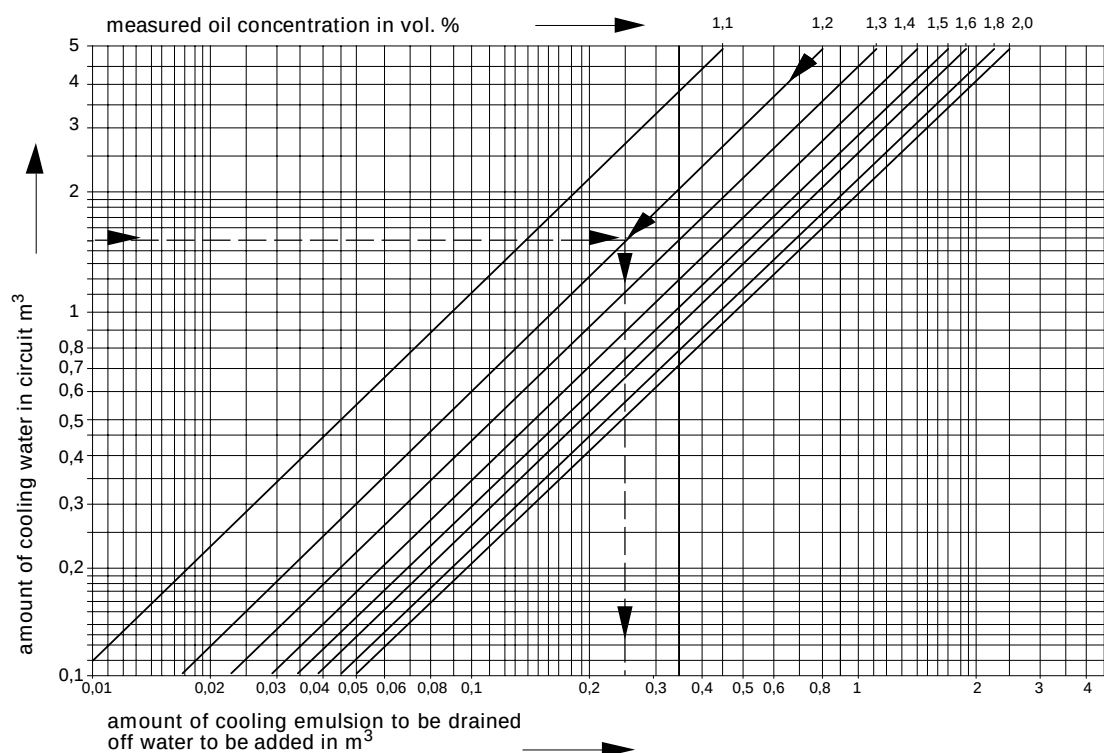


Diagram III
Emulsion freshening for weak concentration



M20-M601C

Maintenance

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Maintenance	A5
Table of contents	A5.01
Introduction	A5.02
Safety instructions	A5.03
Periodical schedule	
Distillate fuel	A5.04.01
Periodical schedule	
Heavy fuel	A5.04.02
Engine, cylinder head	A5.05.01
Valve clearance	A5.05.01.01.01.00
Rocker arm bracket	A5.05.01.02.01.00
Rocker arms	A5.05.01.02.02.00
Rocker arm bush	A5.05.01.02.03.00
Valve rotator	A5.05.01.03.01.00
Valve guide / Oil scraper ring	A5.05.01.05.01.00
Valve guide / Oil scraper ring	A5.05.01.05.01.01
Media supply system	A5.05.01.05.50.00
Cylinder head	A5.05.01.06.01.00
Düsenhülse	A5.05.01.06.50.00
Nozzle Sleeve	A5.05.01.06.50.01
Inlet and exhaust valve cones	A5.05.01.07.01.00
Inlet and exhaust valve cones	A5.05.01.07.01.01
Valve cones	A5.05.01.08.01.00
Valve seat ring	A5.05.01.08.02.00
Valve seat rings (inlet/outlet)	A5.05.01.08.03.00
Starting valve	A5.05.01.09.02.00
Starting valve	A5.05.01.09.02.01
Starting valve	A5.05.01.09.02.02
Anlaßventil	A5.05.01.09.02.03
Cylinder head	A5.05.01.10.00.00
Cylinder head	A5.05.01.10.01.00
Cylinder head	A5.05.01.10.01.01
Cylinder head	A5.05.01.11.01.00
Engine, gear	A5.05.02
Running Gear / Engine Timing	A5.05.02.01.01.00
Crank Web Deflection	A5.05.02.02.01.00
Bearing Shells and Bearing Bushes	A5.05.02.03.03.01

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Bearing Shells	A5.05.02.03.07.01
Big-end bearings	A5.05.02.04.01.00
Big-end bearings	A5.05.02.04.01.01
Big-end bearings	A5.05.02.04.02.00
Crankshaft bearing/-thrust bearing	A5.05.02.05.01.00
Crankshaft bearing/-thrust bearing	A5.05.02.05.01.01
Crankshaft bearing/-thrust bearing	A5.05.02.05.01.02
Crankshaft bearing/-thrust bearing	A5.05.02.05.01.03
Crankshaft bearing/-thrust bearing	A5.05.02.05.02.00
Crankshaft bearing/-thrust bearing	A5.05.02.05.02.01
Piston	A5.05.02.06.01.00
Piston	A5.05.02.06.01.01
Piston	A5.05.02.06.01.02
Piston	A5.05.02.06.01.03
Piston crown	A5.05.02.06.02.00
Piston Rings and Grooves	A5.05.02.07.01.00
Piston Rings and Grooves	A5.05.02.07.01.01
Piston pin	A5.05.02.08.01.00
Small end bearing	A5.05.02.09.01.00
Small end bearing	A5.05.02.09.01.01
Piston	A5.05.02.10.01.00
Piston	A5.05.02.10.01.01
Piston	A5.05.02.10.01.02
Measures for emergency operation	A5.05.02.12.00.00
Engine, housing	A5.05.03
Crankcase explosion relief valve	A5.05.03.01.01.00
Cooling water manifold housing	A5.05.03.02.00.00
Cylinder liner	A5.05.03.03.01.00
Cylinder liner	A5.05.03.03.01.01
Cylinder liner	A5.05.03.04.01.00
Cylinder liner	A5.05.03.04.01.01
Cylinder liner	A5.05.03.04.02.00
Cylinder liner	A5.05.03.04.02.01
Engine Bolting and Unions	A5.05.03.07.01.00

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Engine, control	A5.05.04
Camshaft bearing	A5.05.04.01.02.00
Camshaft	A5.05.04.04.01.00
Camshaft	A5.05.04.04.01.01
Camshaft	A5.05.04.04.01.02
Timing gear train	A5.05.04.08.01.00
Timing gear train	A5.05.04.08.02.00
Governor drive	A5.05.04.08.03.00
Camshaft vibration damper	A5.05.04.09.01.00
Camshaft vibration damper	A5.05.04.09.01.01
Engine, regulation	A5.05.05
Control shaft bedding	A5.05.05.01.02.00
Starting Valve	A5.05.05.02.01.01
Starting Fuel Limiter	A5.05.05.05.01.00
Compressed Air System	A5.05.05.09.01.01
Control Valves	A5.05.05.09.05.01
Compressed-Air Filter	A5.05.05.09.06.00
Engine, exhaust gas system/supercharging	A5.05.06
Exhaust manifold	A5.05.06.01.01.00
Exhaust manifold	A5.05.06.01.01.01
Exhaust Manifold	A5.05.06.01.01.02
Exhaust Manifold	A5.05.06.01.01.03
Exhaust Manifold	A5.05.06.01.01.04
Exhaust Manifold	A5.05.06.01.01.05
Exhaust Manifold	A5.05.06.01.01.06
Exhaust Manifold	A5.05.06.01.01.07
Exhaust Manifold	A5.05.06.01.01.08
Charge air cooler	A5.05.06.04.02.00
Charge Air Cooler	A5.05.06.04.02.01
Charge air cooler	A5.05.06.04.02.02
Charge air cooler	A5.05.06.04.02.03
Exhaust gas turbocharger	A5.05.06.05.00.00
Exhaust gas turbocharger	A5.05.06.13.01.00
Exhaust gas turbocharger	A5.05.06.13.01.01
Turbocharger	A5.05.06.13.01.02
Turbocharger	A5.05.06.13.01.03

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Engine, fuel system	A5.05.07
Injection pump	A5.05.07.02.01.00
Injection pump	A5.05.07.03.01.00
Injection pump	A5.05.07.03.01.01
Fuel Injector	A5.05.07.07.01.00
Injection valve	A5.05.07.08.01.00
Injection valve	A5.05.07.09.01.00
Injection valve	A5.05.07.09.01.01
Fuel duplex filter	A5.05.07.12.01.05
Duplex Fuel Preliminary Filter	A5.05.07.12.02.04
Fuel Feed Pump	A5.05.07.13.01.00
Fuel Feed Pump	A5.05.07.13.01.01
Fuel feed pump drive	A5.05.07.13.02.00
Fuel Distributor Manifold	A5.05.07.15.01.00
Fuel Distributor Manifold	A5.05.07.15.01.01
Engine, lubricating oil system	A5.05.08
Lubricating oil system	A5.05.08.02.01.00
Lubricating oil pump	A5.05.08.03.01.00
Lubricating oil pump	A5.05.08.03.02.00
Lubricating oil pump	A5.05.08.03.02.01
Lubricating oil duplex filter	A5.05.08.04.01.00
Prelubricating pump/Prelubrication	A5.05.08.10.00.00
Engine, cooling water system	A5.05.09
Cooling Water Centrifugal Pump	A5.05.09.07.01.00
Engine, starting system	A5.05.10
Stop cylinder	A5.05.10.03.01.00
Engine control equipment	A5.05.11
Pressure Switches	A5.05.11.01.02.01
Pressure Switches	A5.05.11.01.03.00
RPM Switch	A5.05.11.05.01.01
Lubricating Oil/Cooling Water Thermostat	A5.05.11.06.01.00
Lubricating Oil/Cooling Water Thermostat	A5.05.11.06.01.01
Crankcase Monitoring Device	A5.05.11.09.01.03

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Engine auxiliary units	A5.05.12
Vibration Damper	A5.05.12.04.01.03
Vibration Damper	A5.05.12.04.01.04
Vibration Damper	A5.05.12.04.01.05
Vibration Damper	A5.05.12.04.02.00
Vibration Damper	A5.05.12.04.02.01
Turning Device with Pneumatic Wrench	A5.05.12.08.01.00
Turning Device	A5.05.12.08.01.01
Engine additional installation	A5.05.13

M20-M601C

1. General

It is assumed that the engine room personnel has the necessary knowledge and experience required for the proper maintenance and servicing of diesel engines. For this reason and in the interest of clearness we did not go too much into details in the maintenance documents.

No claims can be raised owing to missing instructions in the maintenance documents, if damage is caused by improper handling.

All information refers to the date of printing.

2. Explanation of the maintenance system

2.1 Scheduled maintenance

With "Scheduled maintenance" the **economic** operation of supercharged engine is in the long run not possible at today's state of art.

The explanations are used to make the user of this engine plant familiar with the existing maintenance system of MaK and to interest and deepen the understanding of the user for the problems and importance of the "Scheduled maintenance".

It is the purpose of the maintenance to replace parts subject to wear and tear or to repair these parts before they are damaged.

The "Scheduled maintenance" is thereby supported by inspections according to fixed deadlines. These inspections are decision criteria for the need and extend of maintenance and servicing.

The following is used as parameter:

- data on wear and tear
- evaluation criterion and
- performance checks

Most of the work to be carried out does not have a fixed deadline since the service life of individual components is highly influenced by environmental and operating conditions, fuel qualities and their care.

Therefore the present interval schedule shall not be considered stringent in the long run, but it is left to the user to modify the maintenance schedule in accordance with own experiences.

But in any case a sufficient safety margin - even if the mean wearing levels are well-known - is to be calculated in order to cover the always occurring variations.

It is recommended to consult MaK with regard to extended intervals in order to maintain the guarantee.

The information given by us gives no rise to legal claims.

M20-M601C

2.2 Maintenance system

The maintenance system consists of:

- work interval schedule
- job cards
- maintenance schedule (large-scale plan) *

While the work interval schedule indicates the date **when** inspection, maintenance or repair shall be carried out, the job cards indicate the manner in **which** the work is to be carried out.

2.2.1 Work interval schedule

The work interval schedule shall provide for a quick summary of all intended inspection, maintenance and repair work occurring up to 48,000 operating hours.

The interval schedule is subdivided into the following four areas:

- **Daily inspection and control work**
- **Initial inspection and maintenance work**

Work which has to be carried out after first commissioning or commissioning after major repair work.

- **Periodic maintenance work**

A list of all recurrent inspection, maintenance and repair work to be carried out at the scheduled date.

The indicated intervals are statistical mean values. Other values may be obtained, depending on equipment condition, operating and maintenance conditions.

- **Maintenance work to be carried out independent of deadlines**

List of work which may be required in the scope of scheduled work which cannot be allocated to a deadline.

* will be handed over by the MaK service department for commissioning of the engine

M20-M601C

2.2.2 Job cards

The job cards are instructions for inspection, maintenance, repair and safety check.

Maintenance work		Title of the job card		Activity	
MAK		Discharge valve		A5.05.01.04.01.03	
M 551 / M 552		Inspection / Dismounting and mounting		Operating hours/maintenance deadline	
Engine type				6,000 / 12,000	
				01	
				Register Main maintenance group	
See also:		01.01.01.nn, 01.02.01.nn, 01.08.01.nn			
Spare parts list:		B1.05.01.7.2104, B1.05.01.7.2220			
Time requirement:		1 Pers. / 3 h			
Personnel qualification:		skilled engine hand			
Operating medium:		Heavy fuel and destillate fuel			

Breakdown		
Chapter maintenance	Subchapter	
Vol. A operating instructions	Job cards	
Main maintenance group		Job cards Document number
Maintenance group		A5.05. 01.04.01.03
Subgroup		
Variant		
en / 30.09.91	IB000003	1/1
Date of issue	Registration number	Page/number of pages
Language		

M20-M601C

The job card number consists of the index breakdown (A5.05) and the maintenance number (bold) subdivided into four pairs of digits.

- The **first** pair of digits indicates the engine main maintenance group:

01. Cylinder head	08. Lube oil system
02. Driving mechanism	09. Cooling water system
03. Engine housing	10. Starting air system
04. Engine control	11. Monitors
05. Regulation	12. Auxiliary generator sets and tools
06. Exhaust gas system/ supercharging	13. Additional installation
07. Fuel system	

In order to facilitate the finding of the engine main group, the pair of digits on the right margin has been set as register **01**.

- The **second** and **third pair of digits** indicates the subgroups of the main group and the titles of the job card where maintenance work is required.
- The **fourth pair of digits** indicates the type of variant.
- See job card:** Reference is made to other job cards required for maintenance work. At this point the types of variants (fourth pair of digit) are marked “nn”.
- Spare parts sheets:** For easy finding of necessary consumables and spare parts for the maintenance group in Vol. B “Spare parts catalogue”, indicating other design details in the illustrations, if necessary.

The third pair of digits in the index breakdown in the spare parts number indicates the main group/register.

- Fuel:** Documenting the sold type of fuel of the engine plant (see also: introduction **A0.02**).
- Safety note:** Each safety note is additionally marked with a symbol  in order to draw special attention to the text (see **A5.03**).
- Attention:** Marking technical regulations or measures to be strictly observed in order to avoid damage or destruction of equipment or components of the engine plant or other material.
- Note:** Gives the personnel information which optimize the work process.

M20-M601C

- In the maintenance sheets the checks, maintenance, cleaning and repair works of the maintenance sheets are briefly designated
- Under the designation "**tools** (W)" only special and additional tools are listed with the MaK tool No. Not all of these tools are included in the normal scope of supply.
- Together with the engine type it will be indicated for what engine the job card is valid.
- The indicated personnel and time requirement does not define the **working time of the individual person**.
- The indicated time is based on estimated mean values which may deviate according to the equipment of the plant and its maintenance conditions. Wherever the required working time depends on the number of cylinders the indicated time of the maintenance sheets refers to one cylinder unit only.

2.2.3 Maintenance schedule (Periodic maintenance work)

A large-scale plan showing all maintenance work up to the largest maintenance interval clearly indicating all occurrences and the future work expenditure for the individual components.

It would be useful to mount the plan on a wall; when this is not possible for space reasons, it has to be folded and filed in the map "maintenance forms" *.

We cannot and will not give instructions for handling this plan but we will only give you some guidelines how to use this plan as an aid for the maintenance system.

The work already carried out will be countersigned in fields intended for this purpose. Different colours can be used to differentiate between the results, e.g.: green = no defects/o.k.; yellow = readjustment/correction (e.g. clearances); red = damage/replacement of parts.

Typical consumption parts which are replaced routinely or any time mounting is carried out (O-ring seals, O-rings etc.) are not considered defective parts.

* The map will be handed over by the MaK service department for commissioning of the engine

M20-M601C

1. Safety instructions

1.1 Work safety symbol



All texts marked with this symbol in the maintenance sheets are safety instructions which have to be observed in all cases in order to eliminate danger to life and limb of the user or of third parties!

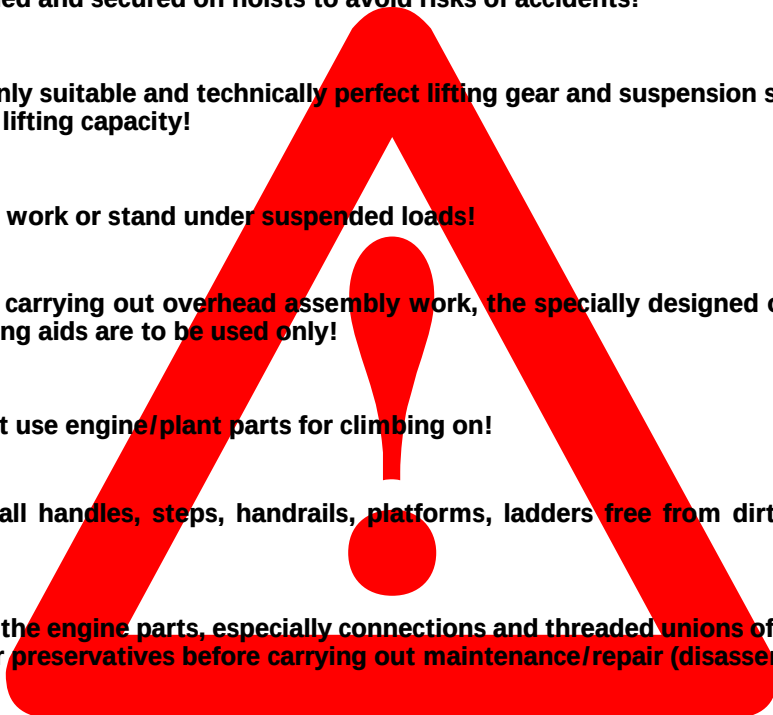
1.2 General safety instructions

The provisions of the relevant accident prevention regulations of the appropriate employer's liability insurance association are to be observed any time operation and repair work is carried out. In addition, the following is to be observed:

- Seals made of VITON^R have been used at various locations in the engine. With normal engine operation this material is completely harmless, however it should not be exposed to temperatures above 300 °C, since above 325 °C a thermal decomposition and the formation of hydrofluoric acid can occur.
- Replaced seals should be disposed of immediately, and above all, it should be taken care that this material is not overheated even by accident e.g. during combustion and welding operations. If this should however have happened, the gases emitted must not be inhaled. Skin contact with decomposed VITON^R is to be avoided at all times. After a fire with VITON^R, it is essential that neoprene gloves are worn during the clearing up operations.
- Any residues have to be neutralized before their disposal, i.e. saturated with calcium hydroxide.
- Maintenance and repair work must only be carried out by skilled and authorized personnel!
- Use personal protective equipment as far as necessary or as required by the regulations!

M20-M601C

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- **When work is being carried out on engines and systems, the switch-on devices have to be switched off and protected. In order to prevent reconnection, the engines and systems have to be marked with a plate “Do not switch” or an appropriate pictogram plate!**
 - **Re-install removed guards and protecting devices on completion of work.**
 - **During replacement work, individual parts and large assemblies are to be carefully fastened and secured on hoists to avoid risks of accidents!**
 - **Use only suitable and technically perfect lifting gear and suspension systems with adequate lifting capacity!**
 - **Never work or stand under suspended loads!**
 - **When carrying out overhead assembly work, the specially designed or safety-oriented climbing aids are to be used only!**
 - **Do not use engine/plant parts for climbing on!**
 - **Keep all handles, steps, handrails, platforms, ladders free from dirt, e.g. oil, grease, fuel!**
 - **Clean the engine parts, especially connections and threaded unions of any traces of oil, fuel or preservatives before carrying out maintenance/repair (disassembly, assembly)!**
 - **Never use aggressive detergents and preservatives!**
 - **Use non-fuzzy cleaning rags!**
 - **Pressurized plant components (lube oil, hydraulic oil, fuel, cooling water, starting and control air) must be depressurized. Shut-off valves are to be secured by a plate “Do not open”!**
 - **Mounting openings are to be protected!**
 - **Perfect hoists, tools and devices are to be used only!**
 - **Observe all indicating labels attached to the engine!**



M20-M601C

1.3 Working on electrical equipment

- Work on the electrical equipment of the engine/plant must be carried out only by a skilled electrician or by instructed persons under the supervision and guidance of a skilled electrician in accordance with the electrical engineering rules and regulations!
- Use only original fuses with the specified current rating! Switch off the engine/plant immediately if trouble occurs in the electrical system!
- The electrical equipment is to be inspected/checked at regular intervals. Defects such as loose connections or scorched cables must be rectified immediately!
- Engine or plant parts on which inspection and maintenance work is being carried out have to be - if prescribed - shut off at the power supply and provided with the notice "Do not switch on" or the corresponding warning sign!

1.4 Working with hydraulic devices

- Operating instructions, tightening torques and setting dimensions specified in the appropriate job card are to be carefully observed!
- Do not place parts of your body above/below pressurized hydraulic tools!
- The minimum bending radii $r = 130$ mm of the high-pressure hoses are to be strictly observed!
- The hose lines are to be protected against damage caused by external mechanical, thermal or chemical influences!
- Replace hydraulic hose lines at regular intervals, even if no safety relevant defects are detectable!

1.5 Checking and adjustment of injection valve

- During testing make sure that no parts of your body are positioned in the area of the fuel jet!
- Do not inhale the fuel mist - respiratory mask!

M20-M601C

1.6 Handling of liquid nitrogen or carbon dioxide snow

- When handling liquid nitrogen or carbon dioxide snow, safety shoes, safety gloves and safety glasses are to be worn in order to avoid injuries. Observe protection against cold!
- Parts of the skin which have come into contact with liquid nitrogen or carbon dioxide snow must not be rubbed but covered with sterile surgical bandage!

1.7 Cleansing agents/chemicals

- Use only cleansing agents with a flash point above 65 °C!
- Observe instructions for use in accordance with DIN safety data sheet of the regulations for dangerous substances!
- Observe the specialist disposal of all cleansing agents and chemicals in accordance with the regulations for dangerous substances!
- In case of accident, observe the accident leaflets including first-aid actions for dangerous substances in accordance with the regulations for dangerous substances!

2. The non-observance of the safety instructions may cause danger to persons and failure of important functions of engine/system!

3. California / USA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
Daily inspection and monitoring procedures (if it is not automated)		
General	Engine operating data Compare with acceptance test records: Speed, rating	A1.10
Temperature	Lubricating oil Engine inlet; Temperature rise at rated output see also A1.10	A1.06
Temperature	Cooling water Engine outlet; Temperature rise at rated output see also A1.10	A1.06
Temperature	Cooling water Upstream charge air cooler; downstream charge air cooler	A1.10
Temperature	Charge air Upstream charge air cooler; downstream charge air cooler	A1.10
Temperature	Exhaust gas After cylinder; downstream turbocharger	A1.10
Pressure	Lubricating oil At the main bearing/camshaft bearing see also A1.10	A1.05
Pressure	Cooling water Upstream engine see also A1.10	A1.05
Pressure	Fuel Upstream pumps	A1.05
Pressure	Charge air Upstream charge air cooler; downstream charge air cooler	A1.10
Pressure	Control air	A1.05
Pressure	Starting air	A1.05
Lube oil system	Lube oil circulation tank Check of the lube oil level	A3.05.08.00
Lube oil system	Lubricating oil duplex filter Maintenance/Cleaning at 50 % differential pressure	A5.05.08.04.01.00
Cooling water system	Expansion tank Check of the cooling water level	A3.05.09.00
Fuel system	Day tank Check of the fuel level	A3.05.07.00

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
Fuel system	Fuel duplex filter Maintenance/Cleaning at 50 % differential pressure	A5.05.07.12.01.05
Pressure air	Air bottles Drain	A3.06.10.00

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
First inspection and maintenance procedures Work to be carried out after the first commissioning or after major repairs.		
24 h	Duplex fuel filter Maintenance/Cleaning Strainer	A5.05.07.12.01.05
24 h	Lubricating oil system Maintenance/Oil change	A5.05.08.02.01.00
24 h	Lubricating oil duplex filter Maintenance/Cleaning Cartridges	A5.05.08.04.01.00
150 h	Engine bolting and unions Inspection/Checking Tight fit and leaks	A5.05.03.07.01.00
150 h	Compressed air strainer Maintenance/cleaning	A5.05.05.09.06.00
150 h	Exhaust gas turbocharger Function check see book C	

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
Periodical maintenance procedures		
24 h	Compressed air strainer Maintenance/Cleaning	A5.05.05.09.06.00
24 h	Exhaust gas turbocharger Maintenance/Cleaning see book C	A5.05.06.05.00.00
75 h	Prelubricating pump Prelubrication	A5.05.08.10.00.00
150 h	Valve rotor Inspection/Evaluate	A5.05.01.03.01.00
150 h	Cylinder head Inspection/Checking	A5.05.01.10.00.00
300 h	Exhaust gas turbocharger Maintenance/Cleaning see book C	A5.05.06.05.00.00
300 h	Exhaust gas turbocharger Maintenance/Cleaning	A5.05.06.13.01.00
600 h	Cooling water system Inspection/Corrosion inhibitors	A4.05.09.01
600 h	Compressed air system Inspection/Adjust	A5.05.05.09.01.01
600 h	Duplex fuel prefilter Maintenance/Cleaning	A5.05.07.12.01.05
600 h	Oil mist detector Inspection/Checking	A5.05.11.09.01.03
1,200 h	Valve clearance Inspection/Adjust	A5.05.01.01.01.00
1,200 h	Crankcase explosion safety valve Inspection/Checking	A5.05.03.01.01.00
1,200 h	Control shaft bearings Maintenance/Checking	A5.05.05.01.02.00
1,200 h	Oil mist detector Inspection/Checking	A5.05.11.09.01.03
1,200 h	Governor Governor behaviour/governor control rod see book C	
3,000 h	Running gear/engine timing Inspection/Checking	A5.05.02.01.01.00

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
3,000 h	Timing gear train Inspection/Checking	A5.05.04.08.01.00
3,000 h	Starting fuel limiter Inspection/Disassembly and reassembly	A5.05.05.05.01.00
3,000 h	Pressure switch Inspection/Adjust	A5.05.11.01.02.01
3,000 h	Governor Oil change see book C	
3,000 h	Monitors Checking of alarm and safety system see book C, section 2	
6,000 h	Anti-corrosion oil emulsion Change	A4.05.09.02
6,000 h	Inlet and exhaust valve cone Inspection/Disassembly and reassembly of one cylinder unit	A5.05.01.07.01.00
6,000 h	Starting valve Maintenance/Disassembly and reassembly	A5.05.05.02.01.01
6,000 h	Compressed air filter Maintenance/Cleaning	A5.05.05.09.06.00
6,000 h	Exhaust gas line Inspection/Checking	A5.05.06.01.01.00
6,000 h	Exhaust gas turbocharger Maintenance/Cleaning see book C	A5.05.06.05.00.00
6,000 h	RPM-switch Inspection/Adjust	A5.05.11.05.01.01
6,000 h	Lubricating oil/Cooling water thermostat Maintenance/Checking	A5.05.11.06.01.00
6,000 h	Oil mist detector Inspection/Checking	A5.05.11.09.01.03
6,000 h	Turning device Maintenance/Disassembly and reassembly	A5.05.12.08.01.00
12,000 h	Big-end bearings Inspection/Disassembly of one big-end bearing	A5.05.02.04.01.00
12,000 h	Piston rings and grooves Inspection/Checking of one piston	A5.05.02.07.01.00

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
12,000 h	Camshaft bearing Maintenance/Disassembly and reassembly of one bearing	A5.05.04.01.02.00
12,000 h	Timing gear train Inspection/Checking	A5.05.04.08.01.00
12,000 h	Governor drive Inspection/Disassembly and reassembly	A5.05.04.08.03.00
12,000 h	Vibration damper on camshaft Repair/Disassembly and reassembly	A5.05.04.09.01.00
12,000 h	Control valve Inspection/Checking	A5.05.05.09.05.01
12,000 h	Exhaust gas turbocharger Maintenance/Cleaning resp. revision of turbocharger see book C	A5.05.06.05.00.00
12,000 h	Injection pump Inspection/Disassembly and reassembly of one pump	A5.05.07.03.01.00
12,000 h	Fuel feed pump Maintenance disassembly and reassembly	A5.05.07.13.01.00
12,000 h	Fuel feed pump drive Maintenance/Disassembly and reassembly	A5.05.07.13.02.00
12,000 h	Lubricating oil pump Inspection/Checking	A5.05.08.03.01.00
12,000 h	Cooling water pump Maintenance/Disassembly and reassembly	A5.05.09.07.01.00
12,000 h	Vibration damper Inspection/Disassembly and reassembly	A5.05.12.04.02.00
24,000 h	Valve rockers Maintenance/Disassembly and reassembly	A5.05.01.02.02.00
24,000 h	Valve guide/Oil scraper ring Inspection/Replace	A5.05.01.05.01.00
24,000 h	Nozzle Sleeve Maintenance/Disassembly and reassembly	A5.05.01.06.50.00
24,000 h	Inlet and exhaust valve cones Inspection/Replace	A5.05.01.07.01.00
24,000 h	Starting valve Maintenance/Disassembly and reassembly	A5.05.01.09.02.00
24,000 h	Cylinder head Maintenance/Cleaning	A5.05.01.10.01.00

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
24,000 h	Big-end bearing Inspection/Disassembly of all big-end bearings	A5.05.02.04.01.00
24,000 h	Main thrust bearings and Main bearings Inspection/Disassembly of one main bearing	A5.05.02.05.01.00
24,000 h	Piston rings and grooves Inspection/Checking of all pistons	A5.05.02.07.01.00
24,000 h	Cylinder lining Inspection/Measuring at all cylinder units	A5.05.03.03.01.00
24,000 h	Cylinder liner Maintenance/Disassembly	A5.05.03.04.01.00
24,000 h	Camshaft bearings Maintenance/Disassembly and reassembly at all bearings	A5.05.04.01.02.00
24,000 h	Control valves Inspection/Checking	A5.05.05.09.05.01
24,000 h	Injection pump Inspection/Disassembly and reassembly of all pumps	A5.05.07.03.01.00
48,000 h	Main thrust bearings and Main bearings Inspection/Disassembly of all main bearings	A5.05.02.05.01.00
48,000 h	Small-end bush Maintenance/Measuring	A5.05.02.09.01.00

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
Non-interval dependent maintenance procedures		
	Valve rocker brackets Maintenance/Disassembly and reassembly	A5.05.01.02.01.00
	Valve rocker bush Inspection/Replace	A5.05.01.02.03.00
	Cylinder head Maintenance/Disassembly	A5.05.01.06.01.00
	Inlet and exhaust valve cones Repair/Checking	A5.05.01.08.01.00
	Valve seat ring Repair/Checking	A5.05.01.08.02.00
	Valve seat ring (inlet/outlet) Repair/Replace	A5.05.01.08.03.00
	Cylinder head Repair/Reassembly	A5.05.01.11.01.00
	Crank web deflection Inspection/Measuring	A5.05.02.02.01.00
	Bearing shells and bearing bushes Inspection/Evaluate	A5.05.02.03.03.01
	Bearing shells Inspection/Evaluate	A5.05.02.03.07.01
	Big-end bearings Inspection/Reassembly	A5.05.02.04.02.00
	Main thrust bearings and main bearings Maintenance/Reassembly	A5.05.02.05.02.00
	Pistons Maintenance/Disassembly	A5.05.02.06.01.00
	Piston crown Maintenance/Replace	A5.05.02.06.02.00
	Piston pin Inspection/Disassembly and reassembly	A5.05.02.08.01.00
	Piston Maintenance/Reassembly	A5.05.02.10.01.00
	Measures for emergency operation Repair/Disassembly and reassembly	A5.05.02.12.00.00
	Cooling water distributor housing Maintenance/Disassembly and reassembly	A5.05.03.02.00.00

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
	Cylinder liner Maintenance/Reassembly	A5.05.03.04.02.00
	Camshaft Repair/Disassembly and reassembly	A5.05.04.04.01.00
	Timing gear train Maintenance/Disassembly and reassembly	A5.05.04.08.02.00
	Charge air cooler Maintenance/disassembly and reassembly	A5.05.06.04.02.00
	Injection pump Repair/Disassembly and reassembly	A5.05.07.02.01.00
	Fuel injector Maintenance/Disassembly and reassembly	A5.05.07.07.01.00
	Fuel injector Maintenance/Adjus	A5.05.07.08.01.00
	Injection valve Repair/Disassembly and reassembly	A5.05.07.09.01.00
	Duplex fuel filter Maintenance/Cleaning	A5.05.07.12.01.05
	Fuel distributor/collection pipe Repair/Disassembly and reassembly	A5.05.07.15.01.00
	Lube oil system Maintenance/Oil change	A5.05.08.02.01.00
	Lubricating oil pump Maintenance/Disassembly and reassembly	A5.05.08.03.02.00
	Lubricating oil duplex filter Maintenance/Cleaning	A5.05.08.04.01.00
	Vibration damper Maintenance/Disassembly and reassembly	A5.05.12.04.01.03

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
Daily inspection and monitoring procedures (if it is not automated)		
General	Engine operating data Compare with acceptance test records: Speed, rating	A1.10
Temperature	Lubricating oil Engine inlet; Temperature rise at rated output see also A1.10	A1.06
Temperature	Cooling water Engine outlet; Temperature rise at rated output see also A1.10	A1.06
Temperature	Cooling water Upstream charge air cooler; downstream charge air cooler	A1.10
Temperature	Charge air Upstream charge air cooler; downstream charge air cooler	A1.10
Temperature	Exhaust gas After cylinder; downstream turbocharger	A1.10
Pressure	Lubricating oil At the main bearing/camshaft bearing see also A1.10	A1.05
Pressure	Cooling water Upstream engine see also A1.10	A1.05
Pressure	Fuel Upstream pumps	A1.05
Pressure	Charge air Upstream charge air cooler; downstream charge air cooler	A1.10
Pressure	Control air	A1.05
Pressure	Starting air	A1.05
Lube oil system	Lube oil circulation tank Check of the lube oil level	A3.05.08.00
Lube oil system	Lubricating oil duplex filter Maintenance/Cleaning at 50 % differential pressure	A5.05.08.04.01.00
Cooling water system	Expansion tank Check of the cooling water level	A3.05.09.00
Fuel system	Day tank Check of the fuel level	A3.05.07.00

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
Fuel system	Fuel duplex filter Maintenance/Cleaning at 50 % differential pressure	A5.05.07.12.01.05
Pressure air	Air bottles Drain	A3.06.10.00

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
First inspection and maintenance procedures Work to be carried out after the first commissioning or after major repairs.		
24 h	Duplex fuel filter Maintenance/Cleaning Strainer	A5.05.07.12.01.05
24 h	Lubricating oil system Maintenance/Oil change	A5.05.08.02.01.00
24 h	Lubricating oil duplex filter Maintenance/Cleaning Cartridges	A5.05.08.04.01.00
150 h	Engine bolting and unions Inspection/Checking Tight fit and leaks	A5.05.03.07.01.00
150 h	Compressed air strainer Maintenance/cleaning	A5.05.05.09.06.00
150 h	Exhaust gas turbocharger Function check see book C	

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
Periodical maintenance procedures		
24 h	Compressed air strainer Maintenance/Cleaning	A5.05.05.09.06.00
24 h	Exhaust gas turbocharger Maintenance/Cleaning see book C	A5.05.06.05.00.00
150 h	Valve rotor Inspection/Evaluate	A5.05.01.03.01.00
150 h	Cylinder head Inspection/Checking	A5.05.01.10.00.00
150h	Prelubricating pump Prelubrication	A5.05.08.10.00.00
300 h	Exhaust gas turbocharger Maintenance/Cleaning see book C	A5.05.06.05.00.00
300 h	Exhaust gas turbocharger Maintenance/Cleaning	A5.05.06.13.01.00
600 h	Cooling water system Inspection/Corrosion inhibitors	A4.05.09.01
600 h	Compressed air system Inspection/Adjust	A5.05.05.09.01.01
600 h	Duplex fuel prefilter Maintenance/Cleaning	A5.05.07.12.01.05
600 h	Oil mist detector Inspection/Checking	A5.05.11.09.01.03
1,200 h	Valve clearance Inspection/Adjust	A5.05.01.01.01.00
1,200 h	Crankcase explosion safety valve Inspection/Checking	A5.05.03.01.01.00
1,200 h	Control shaft bearings Maintenance/Checking	A5.05.05.01.02.00
1,200 h	Oil mist detector Inspection/Checking	A5.05.11.09.01.03
1,200 h	Governor Governor behaviour/governor control rod see book C	
3,000 h	Running gear/engine timing Inspection/Checking	A5.05.02.01.01.00

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
3,000 h	Timing gear train Inspection/Checking	A5.05.04.08.01.00
3,000 h	Starting fuel limiter Inspection/Disassembly and reassembly	A5.05.05.05.01.00
3,000 h	Pressure switch Inspection/Adjust	A5.05.11.01.02.01
3,000 h	Governor Oil change see book C	
3,000 h	Monitors Checking of alarm and safety system see book C, section 2	
6,000 h	Anti-corrosion oil emulsion Change	A4.05.09.02
6,000 h	Inlet and exhaust valve cone Inspection/Disassembly and reassembly of one cylinder unit	A5.05.01.07.01.00
6,000 h	Big-end bearings Inspection/Disassembly of one big-end bearing	A5.05.02.04.01.00
6,000 h	Piston rings and grooves Inspection/Checking of one piston	A5.05.02.07.01.00
6,000 h	Starting valve Maintenance/Disassembly and reassembly	A5.05.05.02.01.01
6,000 h	Compressed air filter Maintenance/Cleaning	A5.05.05.09.06.00
6,000 h	Exhaust gas line Inspection/Checking	A5.05.06.01.01.00
6,000 h	Exhaust gas turbocharger Maintenance/Cleaning see book C	A5.05.06.05.00.00
6,000 h	Injection pump Inspection/Disassembly and reassembly of one pump	A5.05.07.03.01.00
6,000 h	RPM-switch Inspection/Adjust	A5.05.11.05.01.01
6,000 h	Lubricating oil/Cooling water thermostat Maintenance/Checking	A5.05.11.06.01.00
6,000 h	Oil mist detector Inspection/Checking	A5.05.11.09.01.03

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
6,000 h	Turning device Maintenance/Disassembly and reassembly	A5.05.12.08.01.00
12,000 h	Valve guide/Oil scraper ring Inspection/Replace	A5.05.01.05.01.00
12,000 h	Inlet and exhaust valve cones Inspection/Replace	A5.05.01.07.01.00
12,000 h	Starting valve Maintenance/Disassembly and reassembly	A5.05.01.09.02.00
12,000 h	Cylinder head Maintenance/Cleaning	A5.05.01.10.01.00
12,000 h	Big-end bearing Inspection/Disassembly of all big-end bearings	A5.05.02.04.01.00
12,000 h	Main thrust bearings and Main bearings Inspection/Disassembly of one main bearing	A5.05.02.05.01.00
12,000 h	Piston rings and grooves Inspection/Checking of all pistons	A5.05.02.07.01.00
12,000 h	Cylinder lining Inspection/Measuring at all cylinder units	A5.05.03.03.01.00
12,000 h	Camshaft bearing Maintenance/Disassembly and reassembly of one bearing	A5.05.04.01.02.00
12,000 h	Timing gear train Inspection/Checking	A5.05.04.08.01.00
12,000 h	Governor drive Inspection/Disassembly and reassembly	A5.05.04.08.03.00
12,000 h	Vibration damper on camshaft Repair/Disassembly and reassembly	A5.05.04.09.01.00
12,000 h	Control valve Inspection/Checking	A5.05.05.09.05.01
12,000 h	Exhaust gas turbocharger Maintenance/Cleaning resp. revision of turbocharger see book C	A5.05.06.05.00.00
12,000 h	Injection pump Inspection/Disassembly and reassembly of all pumps	A5.05.07.03.01.00

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
12,000 h	Fuel feed pump Maintenance disassembly and reassembly	A5.05.07.13.01.00
12,000 h	Fuel feed pump drive Maintenance/Disassembly and reassembly	A5.05.07.13.02.00
12,000 h	Lubricating oil pump Inspection/Checking	A5.05.08.03.01.00
12,000 h	Cooling water pump Maintenance/Disassembly and reassembly	A5.05.09.07.01.00
12,000 h	Vibration damper Inspection/Disassembly and reassembly	A5.05.12.04.02.00
24,000 h	Valve rockers Maintenance/Disassembly and reassembly	A5.05.01.02.02.00
24,000 h	Nozzle Sleeve Maintenance/Disassembly and reassembly	A5.05.01.06.50.00
24,000 h	Main thrust bearings and Main bearings Inspection/Disassembly of all main bearings	A5.05.02.05.01.00
24,000 h	Small-end bush Maintenance/Measuring	A5.05.02.09.01.00
24,000 h	Cylinder liner Maintenance/Disassembly	A5.05.03.04.01.00
24,000 h	Camshaft bearings Maintenance/Disassembly and reassembly at all bearings	A5.05.04.01.02.00
24,000 h	Control valves Inspection/Checking	A5.05.05.09.05.01

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
Non-interval dependent maintenance procedures		
	Valve rocker brackets Maintenance/Disassembly and reassembly	A5.05.01.02.01.00
	Valve rocker bush Inspection/Replace	A5.05.01.02.03.00
	Cylinder head Maintenance/Disassembly	A5.05.01.06.01.00
	Inlet and exhaust valve cones Repair/Checking	A5.05.01.08.01.00
	Valve seat ring Repair/Checking	A5.05.01.08.02.00
	Valve seat ring (inlet/outlet) Repair/Replace	A5.05.01.08.03.00
	Cylinder head Repair/Reassembly	A5.05.01.11.01.00
	Crank web deflection Inspection/Measuring	A5.05.02.02.01.00
	Bearing shells and bearing bushes Inspection/Evaluate	A5.05.02.03.03.01
	Bearing shells Inspection/Evaluate	A5.05.02.03.07.01
	Big-end bearings Inspection/Reassembly	A5.05.02.04.02.00
	Main thrust bearings and main bearings Maintenance/Reassembly	A5.05.02.05.02.00
	Pistons Maintenance/Disassembly	A5.05.02.06.01.00
	Piston crown Maintenance/Replace	A5.05.02.06.02.00
	Piston pin Inspection/Disassembly and reassembly	A5.05.02.08.01.00
	Piston Maintenance/Reassembly	A5.05.02.10.01.00
	Measures for emergency operation Repair/Disassembly and reassembly	A5.05.02.12.00.00
	Cooling water distributor housing Maintenance/Disassembly and reassembly	A5.05.03.02.00.00

M25

Interval	Designation / Work to be carried out Remarks	Doc. No.
	Cylinder liner Maintenance/Reassembly	A5.05.03.04.02.00
	Camshaft Repair/Disassembly and reassembly	A5.05.04.04.01.00
	Timing gear train Maintenance/Disassembly and reassembly	A5.05.04.08.02.00
	Charge air cooler Maintenance/disassembly and reassembly	A5.05.06.04.02.00
	Injection pump Repair/Disassembly and reassembly	A5.05.07.02.01.00
	Fuel injector Maintenance/Disassembly and reassembly	A5.05.07.07.01.00
	Fuel injector Maintenance/Adjus	A5.05.07.08.01.00
	Injection valve Repair/Disassembly and reassembly	A5.05.07.09.01.00
	Duplex fuel filter Maintenance/Cleaning	A5.05.07.12.01.05
	Fuel distributor/collection pipe Repair/Disassembly and reassembly	A5.05.07.15.01.00
	Lube oil system Maintenance/Oil change	A5.05.08.02.01.00
	Lubricating oil pump Maintenance/Disassembly and reassembly	A5.05.08.03.02.00
	Lubricating oil duplex filter Maintenance/Cleaning	A5.05.08.04.01.00
	Vibration damper Maintenance/Disassembly and reassembly	A5.05.12.04.01.03

M25

1200

See also:

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

01

Inspection:

Check valve clearance, adjust if necessary	every	1,200 h
---	-------	---------

Tools:

Feeler gauge	W1 *	1.9075-003
Tubular box wrench, indicator valve	W2 *	1.9100-060
* not illustrated		

Note:

The valve clearance should only be measured when the engine is warm, i.e. 15 min. after the engine is shut down.

The position of the valve bridge must be readjusted before adjusting the valve clearance during scheduled inspections or due to work being carried out on the valve drive components.

Sequence of operations:

1. Adjust valve bridge.

Note:

The adjustment is necessary so that the clearance "s" of the valve bridge (**Fig.1/2**) is distributed evenly onto the corresponding valve cones (3,5).
There must be a sufficient clearance "s" between the valve adjusting screw (8) and the valve bridge (2) when adjusting the valve bridge.

1.1 Open the indicator valves.

1.2 Remove the cylinder head covers.

1.3 Move the cylinder to be adjusted to **firing TDC**. Inlet and exhaust valves are closed, rocker arm relieved.

M25

1200

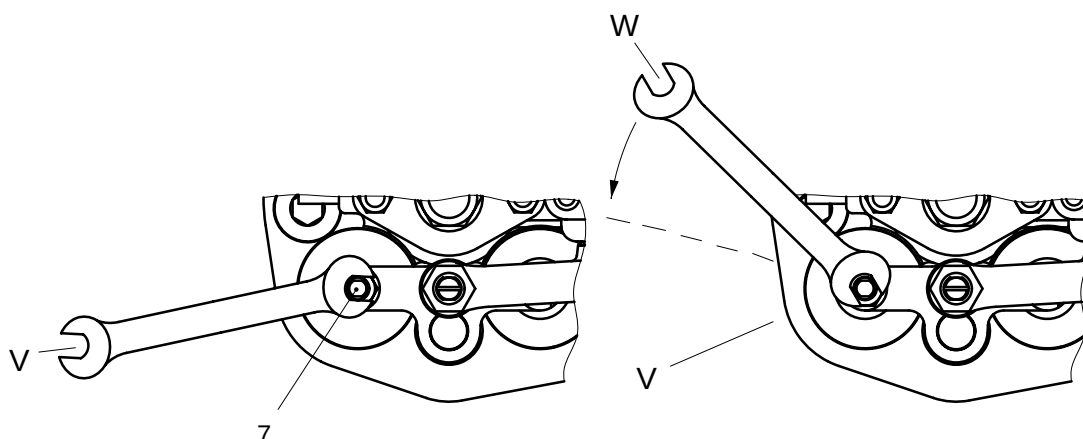
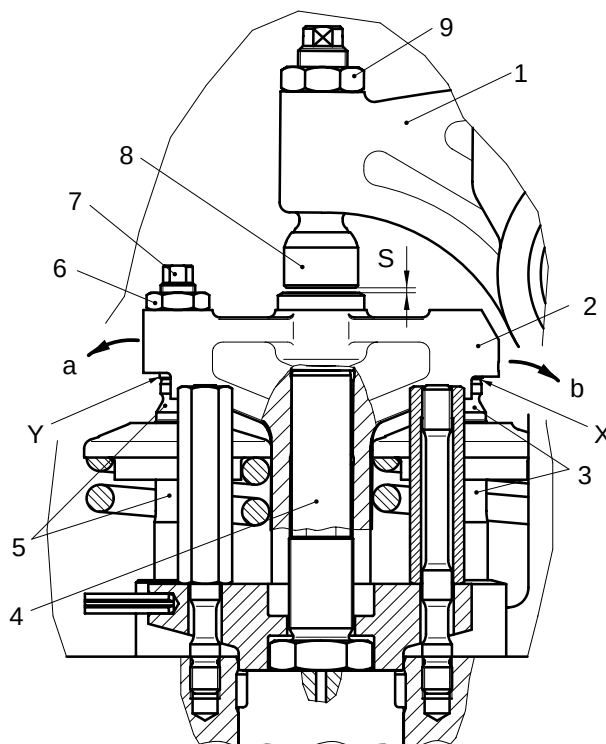
01

- 1.4 Adjust the clearance "s" by loosening the counter nut (9) and adjusting the valve adjusting screw (8) or by folding back the rocker arm (1).
- 1.5 Loosen counter nut (6), press valve bridge (2) down and in the direction "a". It must lie on "X" without any play.
- 1.6 Unscrew the adjusting screw (7) until there is a clearance at "Y" (approx. 1 mm). Then screw in the adjusting screw until it makes contact at "Y" without any clearance and without pressure. "X" still without play!
- 1.7 Mark the position (Fig. 2/V) of the adjusting screw (7).
- 1.8 Press the valve bridge in the direction (Fig. 1/b).

Note:

The valve bridge is lifted slightly at "Y" and makes contact at "X" without any play.

- 1.9 Screw in adjusting screw (7) until it makes contact again at "Y" without play and without pressure (Fig. 2/W).
- 1.10 Turn back the adjusting screw by half a rotation angle between position "V" and "W".
- 1.11 Counter adjusting screw (7).



M25

1200

01**2. Adjust valve clearance**

2.1 Press the rocker arm (**Fig. 1/1**) onto the push rod and measure the clearance (**s**) with the feeler gauge.

2.2 Correct the clearance "**s**":

2.2.1 Loosen counter nut (9).

2.2.2 Turn the valve adjusting screws (8) until the specified clearance "**s**" has been attained.

Valve clearance (**Fig. 1/s**):

Inlet: **0.5** ^{+ 0.1} mm

Outlet: **0.9** ^{+ 0.1} mm

2.2.3 Tighten counter nut (9) to fix the adjusting screw in its position.

2.2.4 Check the clearance "**s**" again.

2.3 Check the gaskets for the cylinder cover hoods and mount the cylinder cover hood.

2.4 Remove the turning rod, dismount the turning device.

2.5 Close the indicator valves.

M25

01

See also: 01.01.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,20 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

60 - 320 Nm torque wrench	W1 *	1.9454-320
Reversible ratchet 3/4	W2 *	1.9495-036
Adapter (3/4 to 1/2)	W3 *	1.9459-035
Tubular box wrench, indicator valve	W4 *	1.9100-060
Ring spanner SW 24 *		1.9459-034

* not illustrated

Auxiliary material:

Molykote paste "G-Rapid Plus" **

** or a product of equal standard

Sequence of operations:

1. Disassembly

- 1.1 Open the indicator valves.
- 1.2 Remove the cylinder head cover.
- 1.3 Turn the piston of the cylinder to be adjusted to **firing TDC**. Inlet and exhaust valves are closed, the rocker arm relieved.
- 1.4 Unscrew the retaining nuts (**Fig. 1/1**).
- 1.5 Remove the rocker arm bracket (2) with inlet and outlet rocker arm.

2. Assembly

- 2.1 Clean the contact surfaces of the rocker arm bracket (2).
- 2.2 Blow-out the oil transfer bores with compressed air.
- 2.3 Position the rocker arm bracket (2) on the cylinder head by means of the studs and align in such a way that the adjusting screws sit at the middle of the valve bridges.

M25

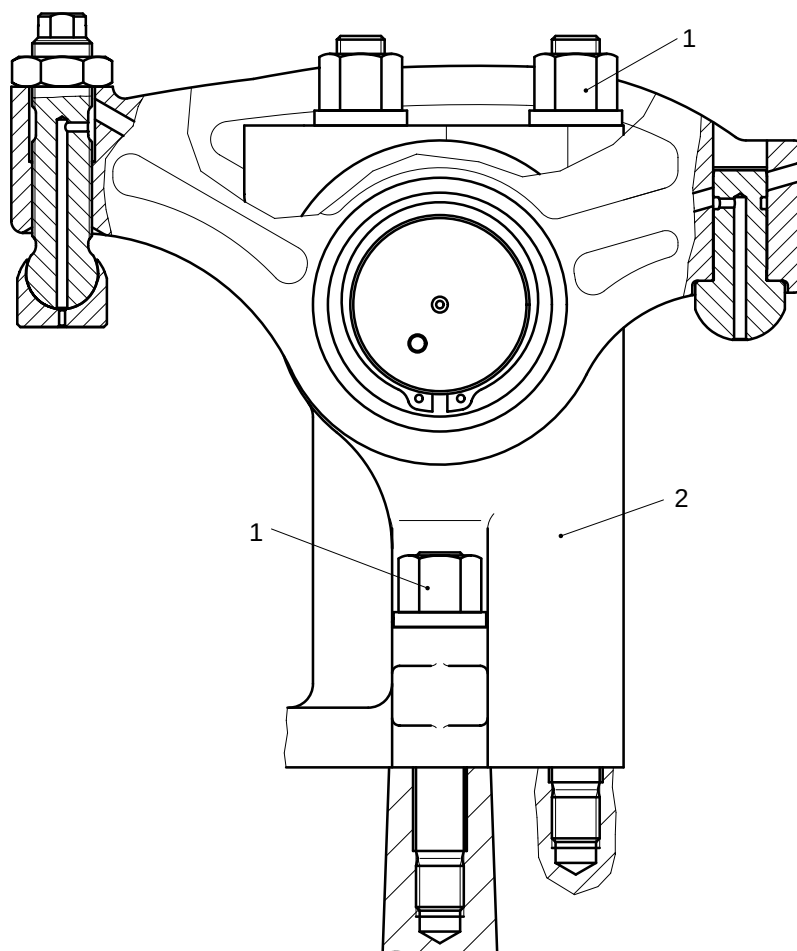
01

- 2.4 Coat the thread and contact surface of the nuts with Molykote paste "G-Rapid Plus" and tighten the nuts (1) at a torque

$$M = 160 \text{ Nm}$$

in alternating stages.

- 2.5 Adjust the valve clearance (01.01.01.nn).
- 2.6 Check the oil flow.
- 2.7 Remove the turn rod / disengage the turning device.
- 2.8 Mount the cylinder head cover (check gaskets!), close the indicator valve.



M25

24000

See also: 01.02.01.nn, 01.02.03.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,20 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

01

Maintenance:

Disassemble inlet and exhaust rocker arms and
check bearing clearance

24,000 h

Note:

The bushes are only allowed to be lubricated with oil.
Molykote paste is not allowed to be used when assembling the bushes.

The ball pins (**Fig 2/10**) are shrunk in using liquid nitrogen. It is **not** possible to replace them
using makeshift means on board.

Sequence of operations:

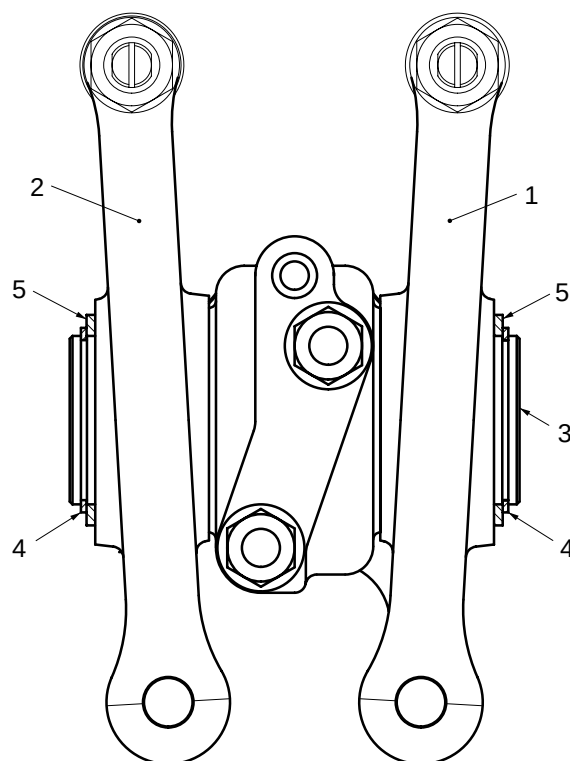
1. Disassembly

- 1.1 Remove the rocker arm bracket and
rocker shaft (**01.02.01.nn**).
2. Remove the retaining washers (**Fig.1/4**)
as well as the supporting rings (5). Pull
the inlet rocker arm (1) and exhaust rok-
ker arm (2) off the rocker shaft (3).

Note:

Further maintenance measures are
identical for the inlet and exhaust
rocker arms.

3. Clean all parts and check them for
damage. Blow out all oil holes with
compressed air and check them for free
passage.



1

M25

24000

4. Check the contact surfaces of the ball pins (**Fig. 2/10**) and the adjusting screw (12) for wear and damage. Replace the parts if necessary.

01

Note:

Freeze the ball pins to -195 °C using liquid nitrogen and then shrink .

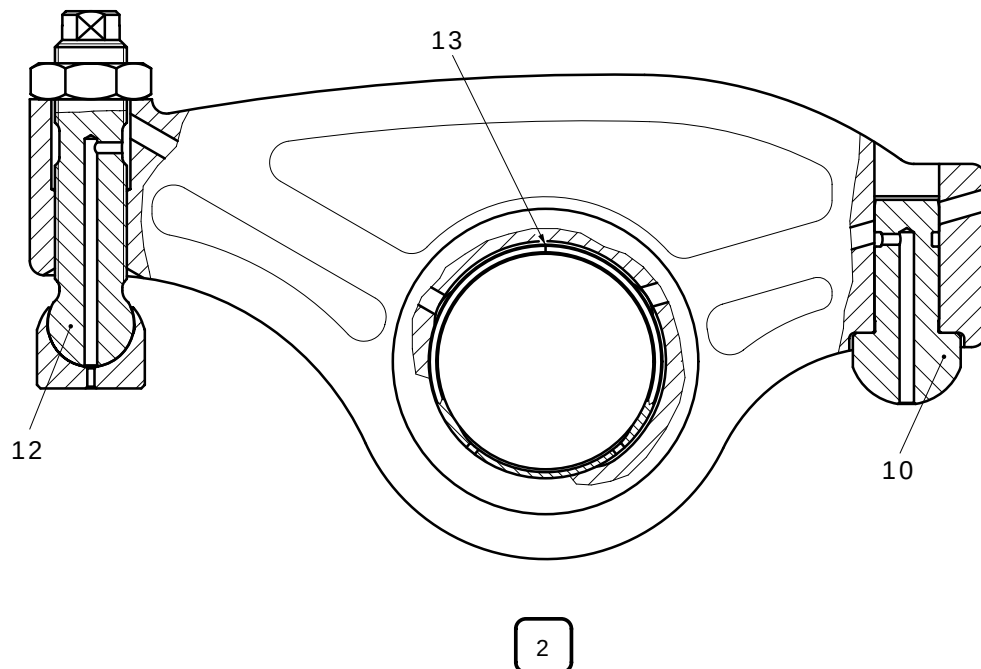


Safety note:

Observe safety regulations when handling liquid nitrogen.

5. Measure the rocker arm bush (13) and shaft (**Fig. 1/3**) and replace the rocker arm bush when the clearance limit has been reached (**01.02.03.nn**).

Clearance when new	Clearance limit
0.02-0.159	0.359



6. Reassembly

Note:

The rocker shaft **must** be undamaged and free from burr.

- 6.1 Lubricate the running surfaces of the bushes for the inlet (1) and exhaust rocker arm (2) and rocker shaft and carefully push the rocker arm onto the shaft. Do not tilt the rocker arm.
- 6.2 Mount the rocker arm bracket with rocker shaft and rocker arms on the cylinder head (**01.02.01.nn**) and check the oil flow.

M25

01

See also: 01.02.01.nn, 01.02.02.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,40 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Messing mandrel

W1 *

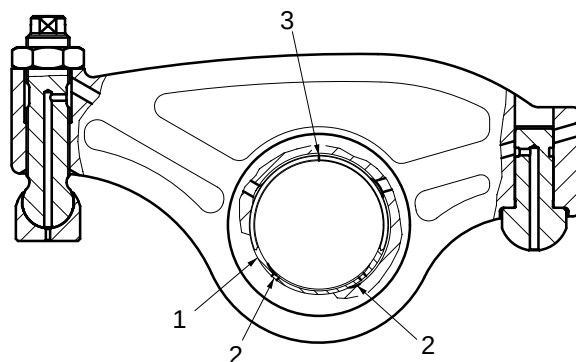
* not illustrated

Note:

The bushes are only allowed to be lubricated with oil.
Molykote paste is not allowed to be used when assembling the bushes.

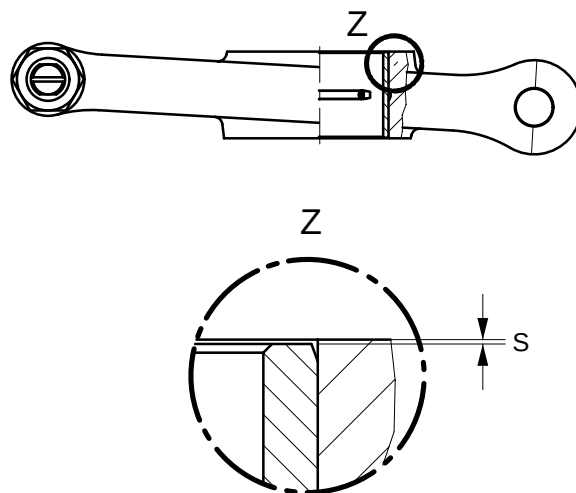
Sequence of operations:

1. Measure the rocker arm bush (Fig. 1/1)(01.02.02.nn).
2. Replace the rocker arm bush.
 - 2.1 Knock the bush (1) out of the rocker arm with an appropriately sized brass mandrel (W1).
 - 2.2 Lubricate the new bush and press it into the rocker arm.



Attention:

Pay attention to the position of the oil holes (2) and the groove (3) when pressing in new bushes. Pay attention that the rocker arm has a projection of $s = \text{approx. } 0.2 \text{ mm}$ on both sides of the bush (Fig. 1/Z). Do not damage the plastic coated running surface.



M25

150

01

See also: 01.07.01.nn, 01.10.00.nn

Spare parts list: B1.05.01.252107, B1.05.01.252225

Time requirement: 1 Pers./ 0,10 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Inspection:

of the valve rotator every 150 h

Attention:

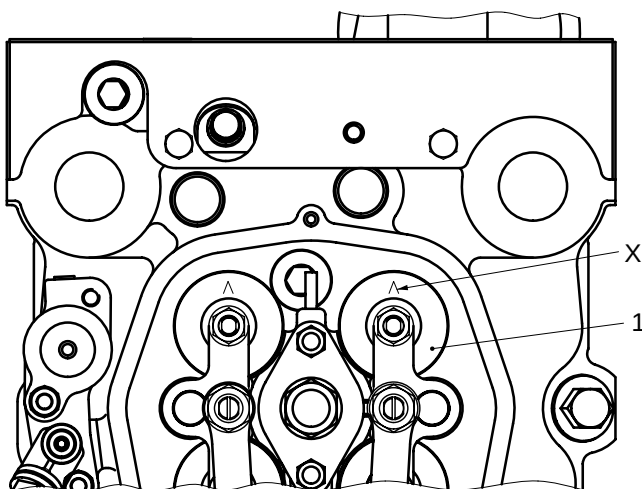
Heavy fuel operation:	= 4 valve rotators	inlet and exhaust valves
Distillate fuel operation:	= 2 valve rotators	inlet valves only

Note:

Measure the rotational speed of the valves depending on the engine speed during commissioning of the new/overhauled cylinder cover and record it for comparisons when making measurements at a later date.

Sequence of operations:

1. Open the sealing cap on the cylinder head cover and observe the rotation of the valve. There is a marking "X" on the spring plate (**Fig.1/1**).
2. The valve rotator is working properly when an even engine speed dependent rotation can be discerned.



M25

150

-
- | | |
|-----|---|
| 2.1 | The valve rotator must be lubricated with a few splashes of lubricating oil - gas oil mixture (ratio 1:1) if the rotation is noticeably slower than in a new condition. |
| 2.2 | If the engine speed slows down to $n \approx 1 \text{ min}^{-1}$ at nominal engine speed, then the valve rotator must be replaced. |

01**Note:**

A slowing down of the valve rotation can also be caused by the valve stem binding in the valve guide.

Remedy: Splash a few drops of gas oil lubricating mixture against the valve stem.

Attention:

Use lubricating oil-gas oil mixture sparingly. Danger of crankcase dilution!

M25

24000

01

See also: 01.01.01.nn, 01.02.01.nn, 01.06.01.nn, 01.07.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,20 h

Personnel qualification: skilled engine hand

Operating medium: Distillate fuel

Inspection:

of the valve guide clearance
of inlet and exhaust valves

after

24,000 h

Auxiliary materials:

Molykote Paste "G-Rapid Plus" **

** or a product of equal standard

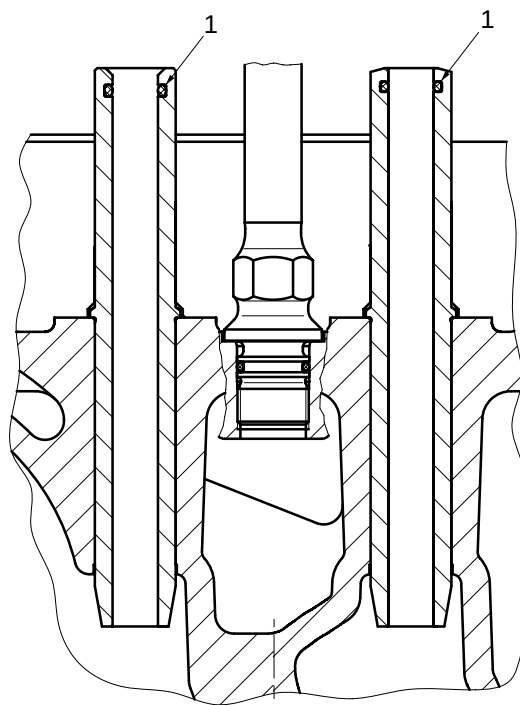
Sequence of operations:

1. **Replacement of the oil scraper rings (O-rings)**
 - 1.1 Remove the valve cone, clean stem carefully.
 - 1.2 Remove the O-Ring (**Fig. 1/1**) out of the groove by means of a sharp angled wire.

Attention:

The O-Ring is used to adjust the lubricant quantity and must be replaced by a new original MaK spare part only.

- 1.3 Clean the groove.
- 1.4 Apply a thin film of oil to the **new O-ring** and carefully insert it in the groove. The ring must not be twisted in its mounting position.



M25

24000

01
2. Measurement of the valve guide clearance

- 2.1 Measure the outside diameter of the valve stem in the guiding area of the bush.
- 2.2 Measure the inside diameter of the guide in the transverse direction of the engine.
- 2.3

	Normal clearance (mm)	Limit clearance (mm)
Outlet	0.1 - 0.15	0.35
Inlet	0.1 - 0.15	0.35

3. Replacement of the valve guide
Note:

If possible, replace the valve guide during an overhaul of the cylinder head at an MaK workshop. There is a risk of the cylinder cover being damaged when knocking out the old valve guide.

M25

12000

See also: 01.01.01.nn, 01.02.01.nn, 01.06.01.nn, 01.07.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,20 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel

01

Inspection:

of the valve guide clearance
of inlet and exhaust valves

after

12,000 h

Auxiliary materials:

Molykote Paste "G-Rapid Plus" **

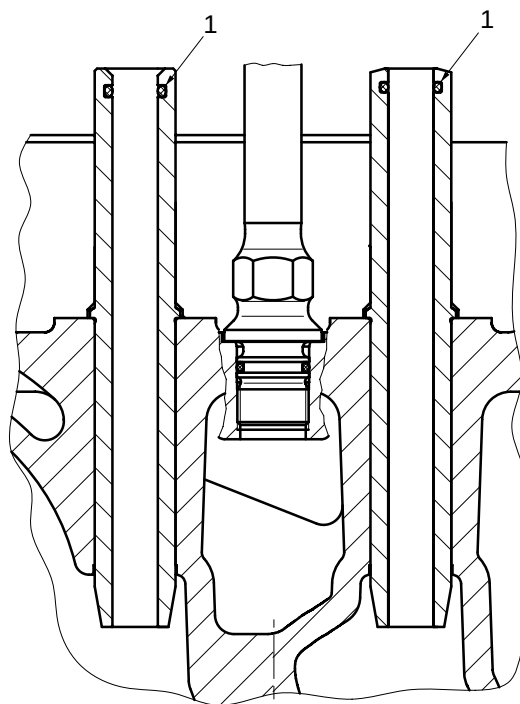
** or a product of equal standard

Sequence of operations:

1. **Replacement of the oil scraper rings (O-rings)**
 - 1.1 Remove the valve cone, clean stem carefully.
 - 1.2 Remove the O-Ring (**Fig. 1/1**) out of the groove by means of a sharp, angled wire.

Attention:

The O-Ring is used to adjust the lubricant quantity and must be replaced by a new original MAK spare part only.



- 1.3 Clean the groove.
- 1.4 Apply a thin film of oil to the **new O-ring** and carefully insert it in the groove. The ring must not be twisted in its mounting position.

M25

12000

01
2. Measurement of the valve guide clearance

- 2.1 Measure the outside diameter of the valve stem in the guiding area of the bush.
- 2.2 Measure the inside diameter of the guide in the transverse direction of the engine.
- 2.3

	Normal clearance (mm)	Limit clearance (mm)
Outlet	0.1 - 0.15	0.35
Inlet	0.1 - 0.15	0.35

3. Replacement of the valve guide
Note:

If possible, replace the valve guide during on overhaul of the cylinder head at an MaK workshop. There is a risk of the cylinder cover being damaged when knocking out the old valve guide.

M25

01

See also: 01.06.01.nn, 01.11.01.nn

Spare parts list: B1.05.01.252144

Time requirement: 1 Pers./ 0,25 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Auxiliary material:

Vaseline *

* or a product of equal standard

Sequence of operations:

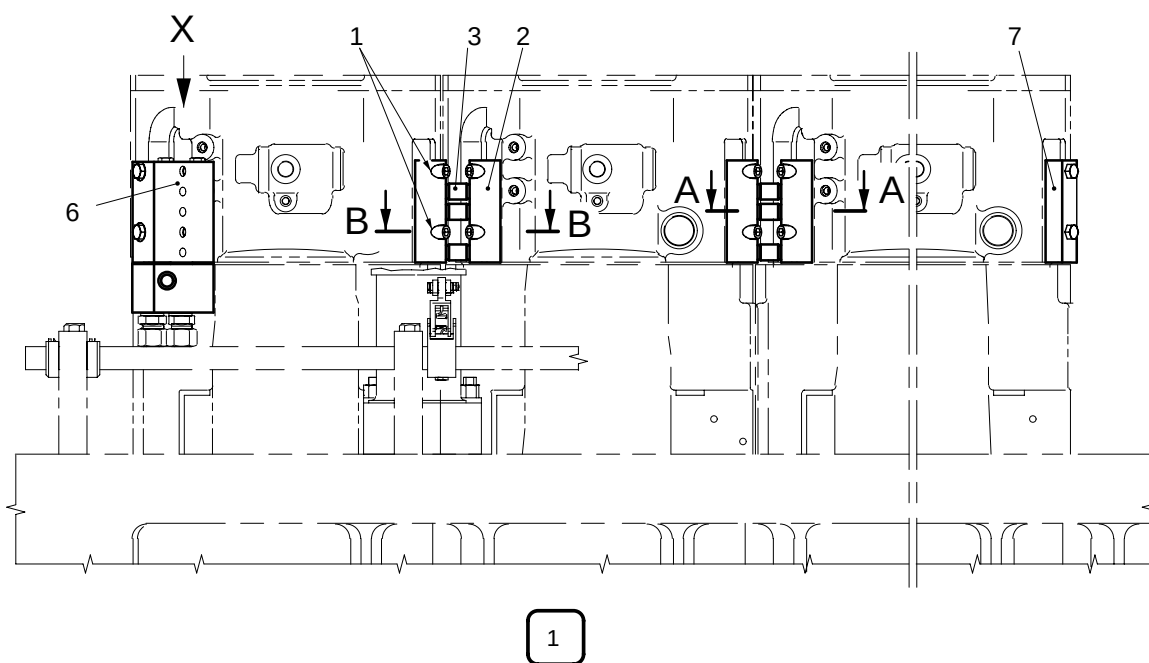
1. Disassembly



Safety note:

The system must be depressurized before commencing disassembly!

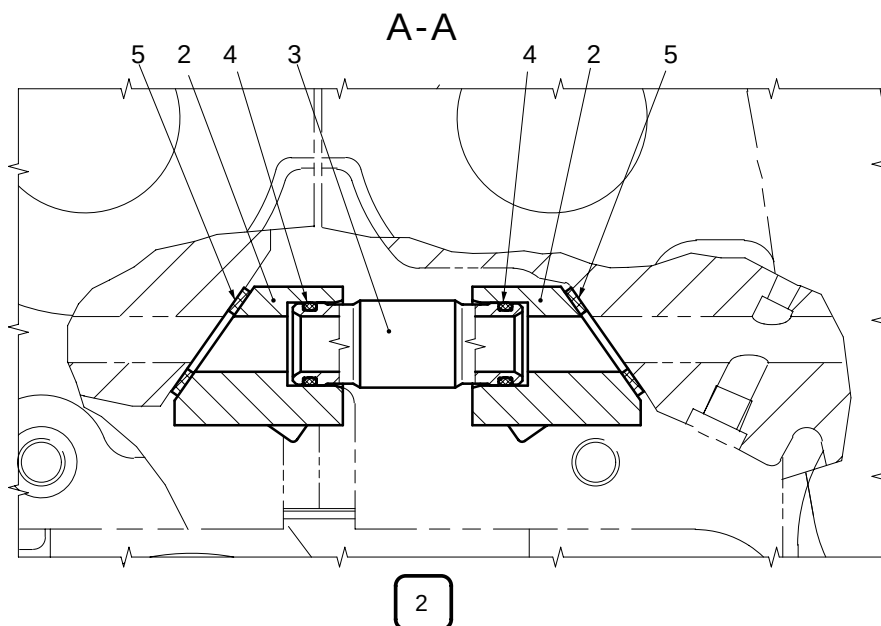
- 1.1 Loosen the cheese head screws (**Fig. 1/1**) and remove the connecting flange (2) together with the sleeves (3).



M25

01

- 1.2 Pull the sleeves (**Fig. 2/3**) out of the connecting flange (2).
- 1.3 Check the O-rings (4). Replace faulty O-rings (4).
Insert O-rings in the grooves using vaseline. Rings must not be twisted!



Check the gaskets (5) of the connecting flange (2) as well as the gaskets of the connecting flange (**Fig. 1/6 and 7**) at the first and last cylinder. Clean the sealing surfaces.

2. Reassembly

- 2.1 Mount the connecting flange (**Fig. 3/2**) with the sleeves inserted (3).
Replace faulty gaskets (5) beforehand.
- 2.2 Mount the connecting flange (**Fig. 1/6 and 7**) . Replace faulty gaskets (5) beforehand.

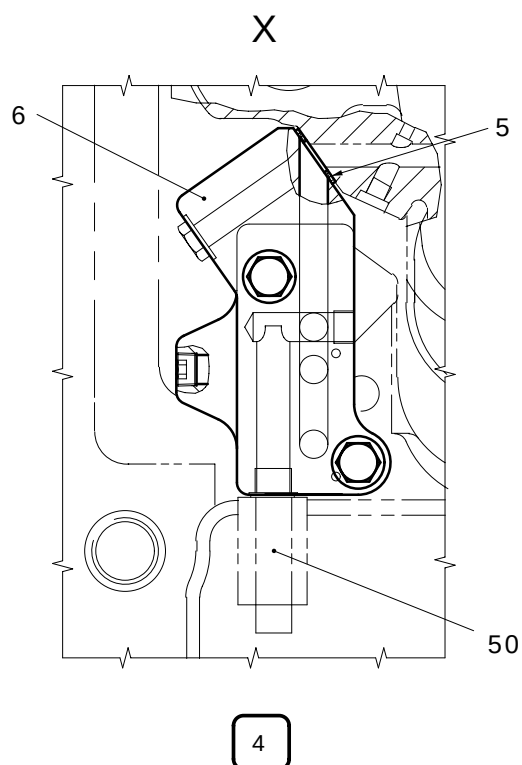
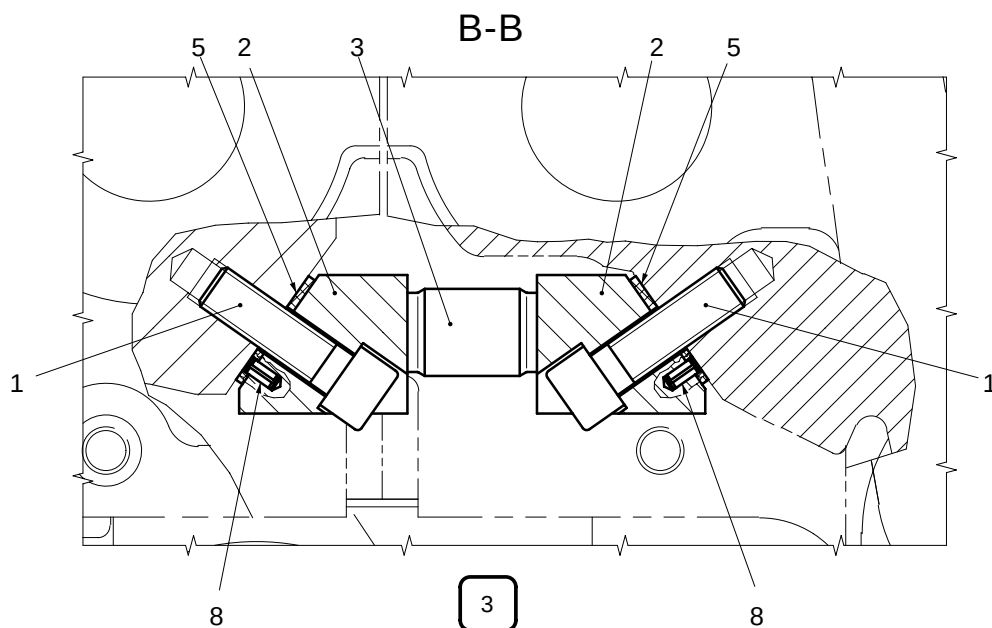
Attention:

Make sure that all gaskets (5) are centered via the dowel pins (Fig. 3/8)!

3. Check operation of the alarm probe for leakage fuel (**Fig. 4/50**). To do :
 - 3.1 Remove the alarm probe and place the tip in a medium with a test voltage connected.
Acknowledge the alarm if it is activated.
If an alarm is not activated, replace the alarm probe and repeat the test.
 - 3.2 Mount the alarm probe.

M25

01



M25

01

See also: 01.05.50.nn, 02.06.01.nn, 03.04.01.nn, 06.01.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Hydraulic device consisting of :		259203 A
High pressure pump	W1	0.9204 D
High pressure hose (1 m)	W2	0.9205 B
Hydraulic tightening element	W3	0.9213 C
Distributor	W4	0.9203-008
Support sleeve	W5	0.9203-018
Threaded sleeve	W6	0.9206-002
Pin	W7	0.9203-110
Cylinder head lifting device	W8 *	0.9221 A
Cylinder bush retaining device	W9 *	259217 A
Tubular box wrench, indicator valve	W10 *	1.9100-060

* not illustrated

Note:

The cylinder liner must always be secured with the retaining device to prevent it from coming loose when lifting the cylinder head or turning over.

Attention:

A minimum bending radius of $r = 120$ mm must be maintained for the high pressure hoses. Use hydraulic oil only as an operating medium (see A4.05.08). Store devices protected against corrosion.



Safety note:

Do not position any parts of the body over devices which are under pressure. Secure the engine against unintentional starting.

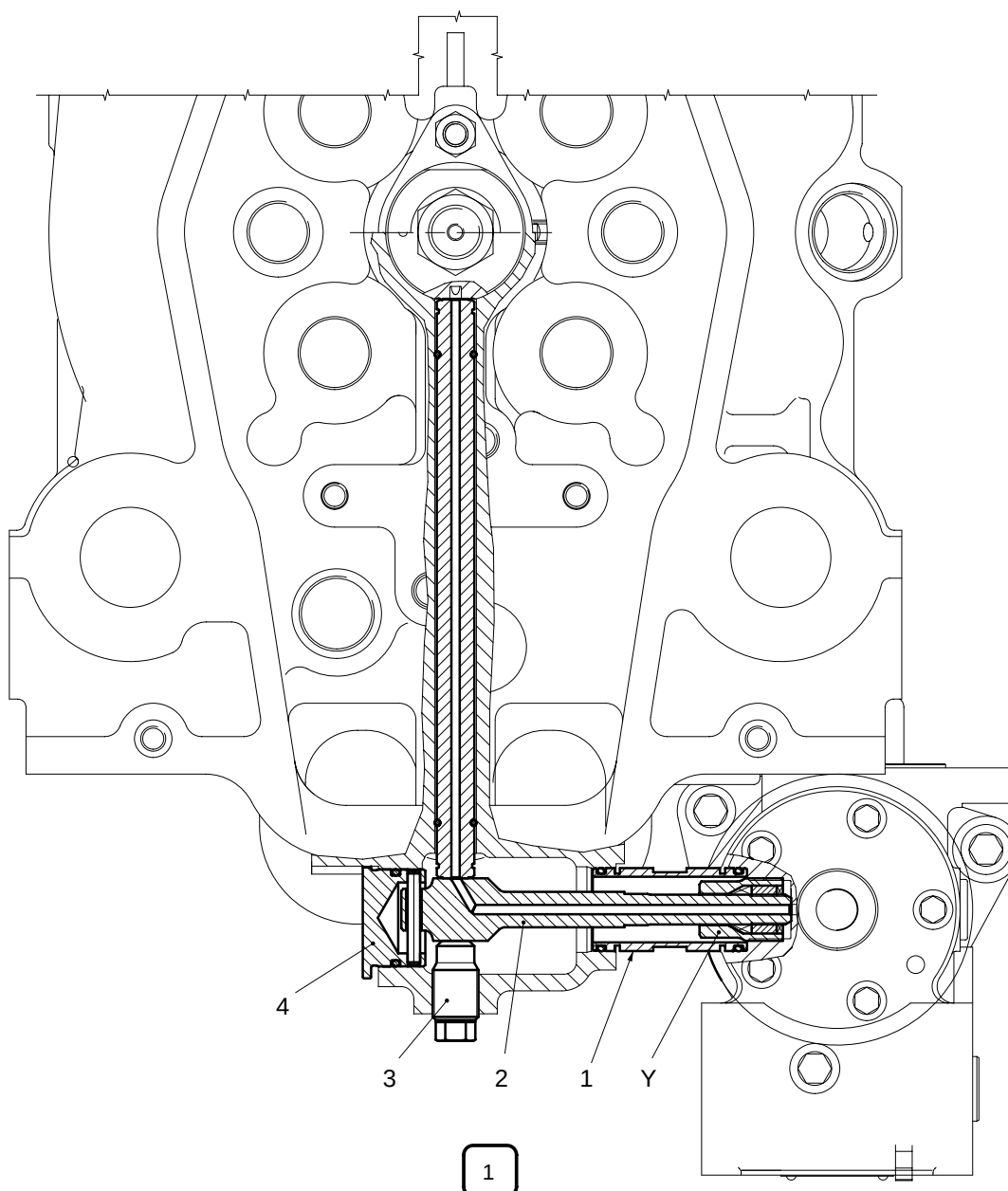
Sequence of operations:

1. Mount the cylinder liner retaining device (W9) (02.06.01.nn).
Open the indicator valves and turn the cylinder to be adjusted to **firing TDC**.
Inlet and exhaust valves closed, rocker arm relieved.
Remove the cylinder head cover and pump compartment covering.
2. Drain the cooling water on the plant side.
Inspection:
Loosen the screw plug in the return pipeline of the compressor intercooler (pipeline) below the thermometer.

M25

01

3. Dismantle the media supply system **(01.05.50.nn)**.
4. Push the sleeve (**Fig. 1/1**) to the left into the cylinder head frame.
5. Completely unscrew the screw connection (Y) of the transverse thrust piece (2) out of the injection pump.
6. Loosen the pressure screw (3) and press up the traverse thrust piece (2) with cover (4) and pull to the left out of the injection pump and the cylinder head.
7. Remove the trim panel between the exhaust pipe and cylinder head.
Remove the retaining screws for the exhaust pipe.



M25

01

8. Loosen the four cylinder head nuts with the hydraulic tightening device.

Attention:

The maximum stroke indicator (Fig. 2/10) must not project above the upper limit of the cover.

- 8.1 Place the hydraulic tightening elements (Fig. 2/W3) connected to the support sleeves (W5) above the round nuts (12). Pay attention to good accessibility of the slits (13).
- 8.2 Screw the threaded sleeves (W6) onto the cylinder head screws (11) and turn back until the shoulder

$$S = 3 \text{ mm}$$

of the threaded sleeve to the upper edge of the tightening element (W3) has been attained.

- 8.3 Connect the hydraulic tightening elements (Fig. 3/W3) and the distributor (W4) to the high pressure pump (W1) via the high pressure hoses (W2).

Connect the valve (Z) to the high pressure pump (W1) and extend all four cylinder head screws evenly and continuously at a hydraulic pressure of

$$p = 820 \text{ bar .}$$

- 8.4 Loosen the round nuts (Fig. 2/12) with pin (W7). Unscrew the round nuts by at least 8 holes.

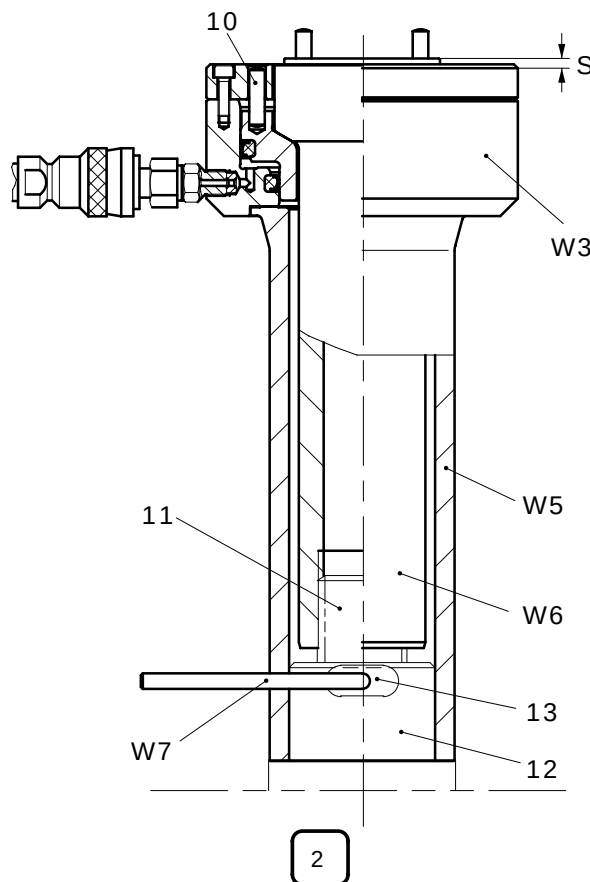
Note:

If it is not possible to loosen the round nuts, the cylinder head screw can be pretensioned at approx.

$$50 \text{ bar}$$

higher.

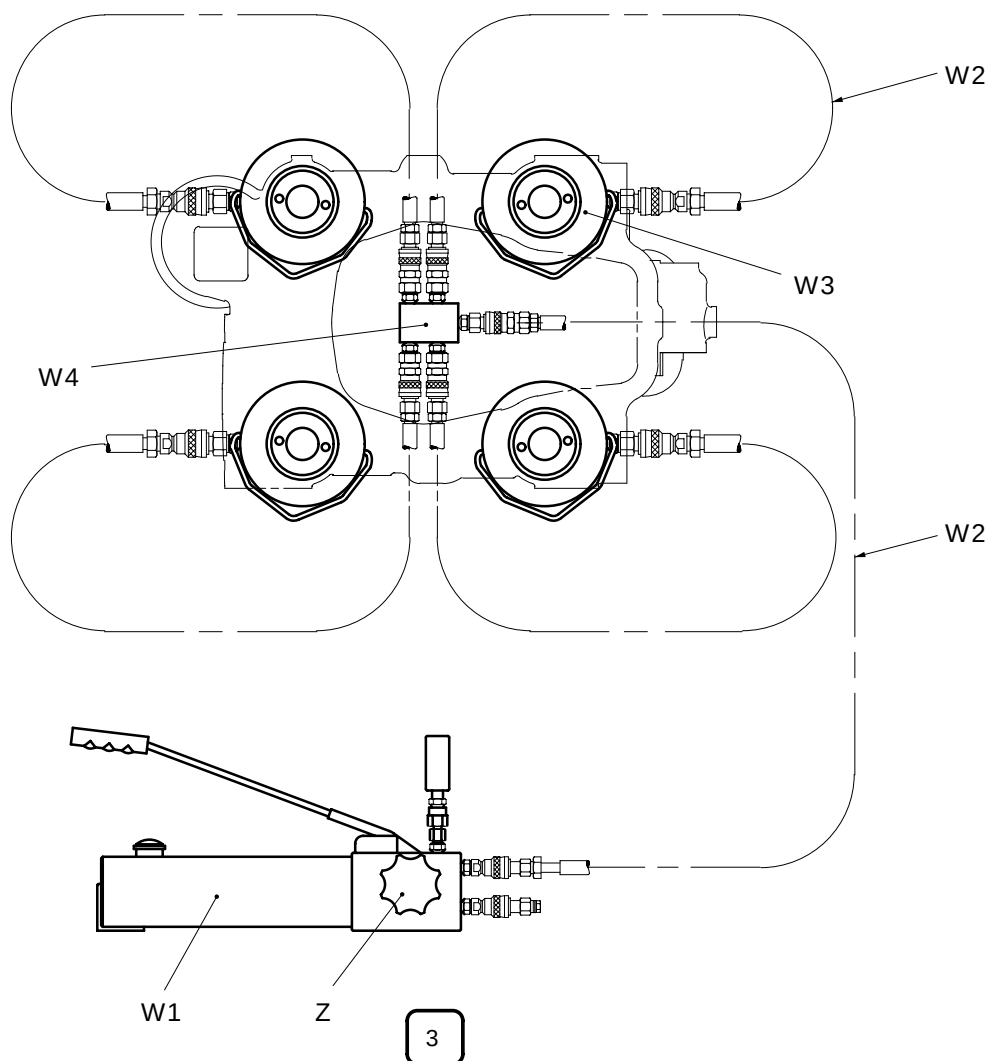
There is a danger of the round nut sticking through the expansion of the bolt thread if the pressure is increased even further.



M25

- 8.5 Relieve the tightening elements, remove the hydraulic devices and unscrew the round nuts.

01



9. Mount the cylinder head lifting device (W8) on the injection valve. Lift the cylinder head **horizontally** by means of a crane. Pay attention to the push rod bushing!

Attention:

Danger of damage being caused to transfer connecting pieces, cylinder head screws, push rods and intake connecting pieces.

10. Place the cylinder head on a wooden base.
11. Remove the turning rod, dismount the turning device.

M25

24000

See also: 01.06.01.nn, 07.07.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

01

Maintenance:

Exchange of O-rings	every	24,000 h
---------------------	-------	----------

Tools:

Nozzle sleeve mounting and removal device consisting of	W1	259222 C
Key for nozzle sleeve	W2	259222-301
Extraction device for nozzle sleeve	W3	259222-302
Extraction device for injection valve	W4	0.9111 D
Torque wrench	W5	1.9454-320

Auxiliary material:

Vaseline *

High-temperature thread paste "Dag S-5080" *

* or a product of equal standard

Sequence of operations:

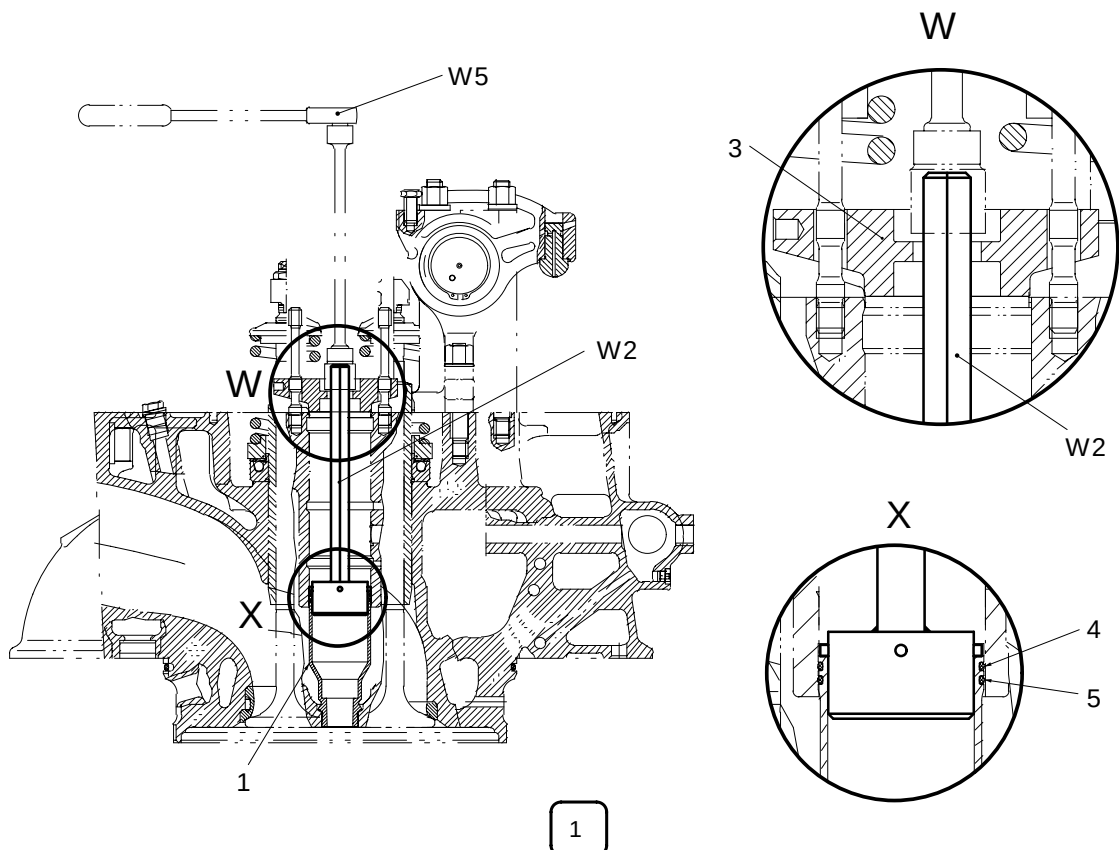
1. Nozzle sleeve removal

- 1.1 Put the key for nozzle sleeve (**W2**) onto the nozzle sleeve (**Fig. 1/1**), so that nozzle sleeve and key are intermeshing.
- 1.2 Mount the flange (**Fig. 1/3**).
- 1.3 Put the torque wrench (**W5**) onto the key for nozzle sleeve and turn out the nozzle sleeve completely.

Attention:

The threads of nozzle sleeve and cylinder head must not intermesh any more.

- 1.4 Dismantle the flange.
- 1.5 Insert extraction device for nozzle sleeve (**W3**) into the nozzle sleeve(**Fig. 2/1**).
- 1.6 Mount the extraction device for injection valve (**W4**).
- 1.7 Extract the nozzle sleeve by means of the extraction devices (**W3 and W4**).
- 1.8 Remove the O-rings (**Fig. 1/4 and 5**).



M25

24000

01

2. Nozzle sleeve reassembly

2.1 Insert new **O-ring (buna N black)** with vaseline untwisted **into the groove (5)** below.

2.2 Insert new **O-ring (Viton green)** with vaseline untwisted **into the groove (4)** above.

Attention:

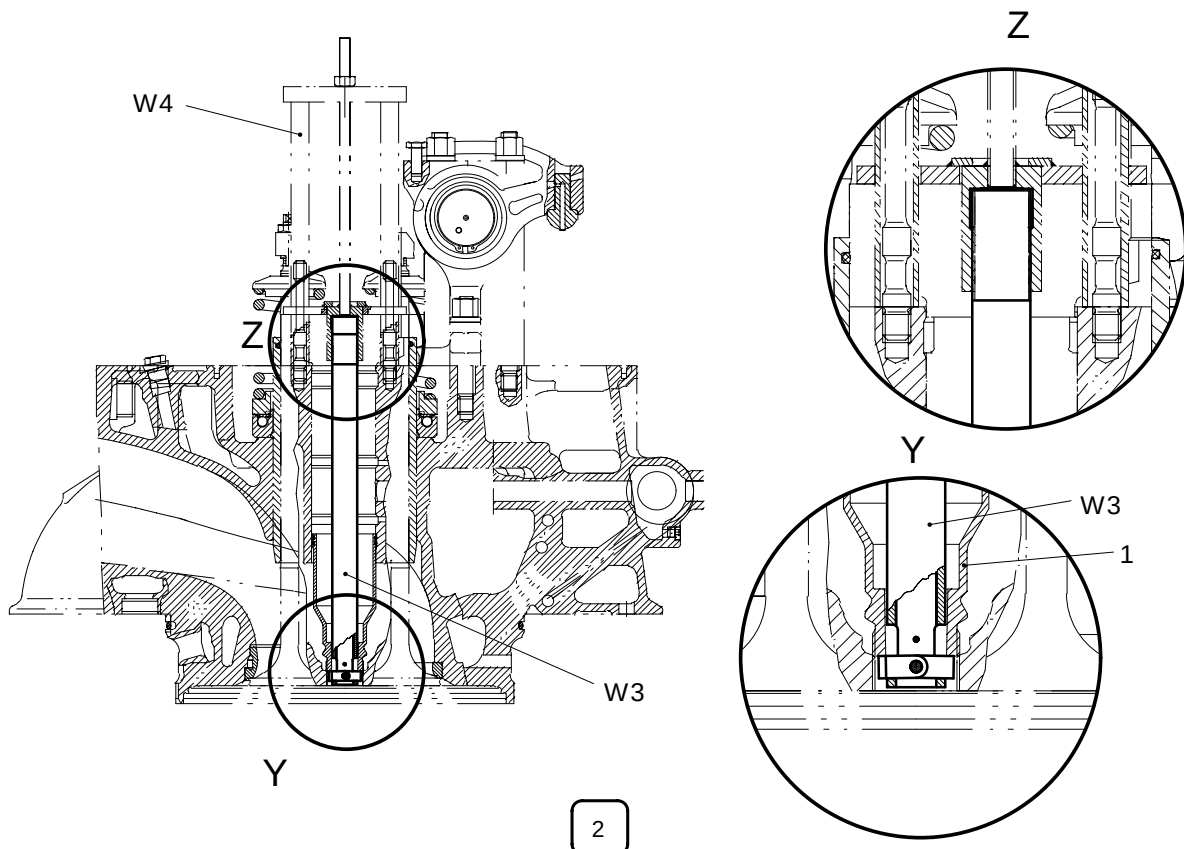
The positions of the O-rings (Fig. 1/4 and 5) must not be interchanged!

2.3 Lubricate the thread of the nozzle sleeve with high-temperature thread paste "Dag S-5080".

2.4 Introduce the nozzle sleeve.

2.5 Put on the key for nozzle sleeve and the torque wrench and tighten the nozzle sleeve with a torque of

M =160 Nm



M25

24000

See also: 01.06.01.nn, 07.07.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

01

Maintenance:

Exchange of O-rings	every	24,000 h
---------------------	-------	----------

Tools:

Nozzle sleeve mounting and removal device consisting of	W1	259222 C
Key for nozzle sleeve	W2	259222-301
Torque wrench	W3	1.9454-320

Auxiliary material:

Vaseline *

High-temperature thread paste "Dag S-5080" *

* or a product of equal standard

Sequence of operations:

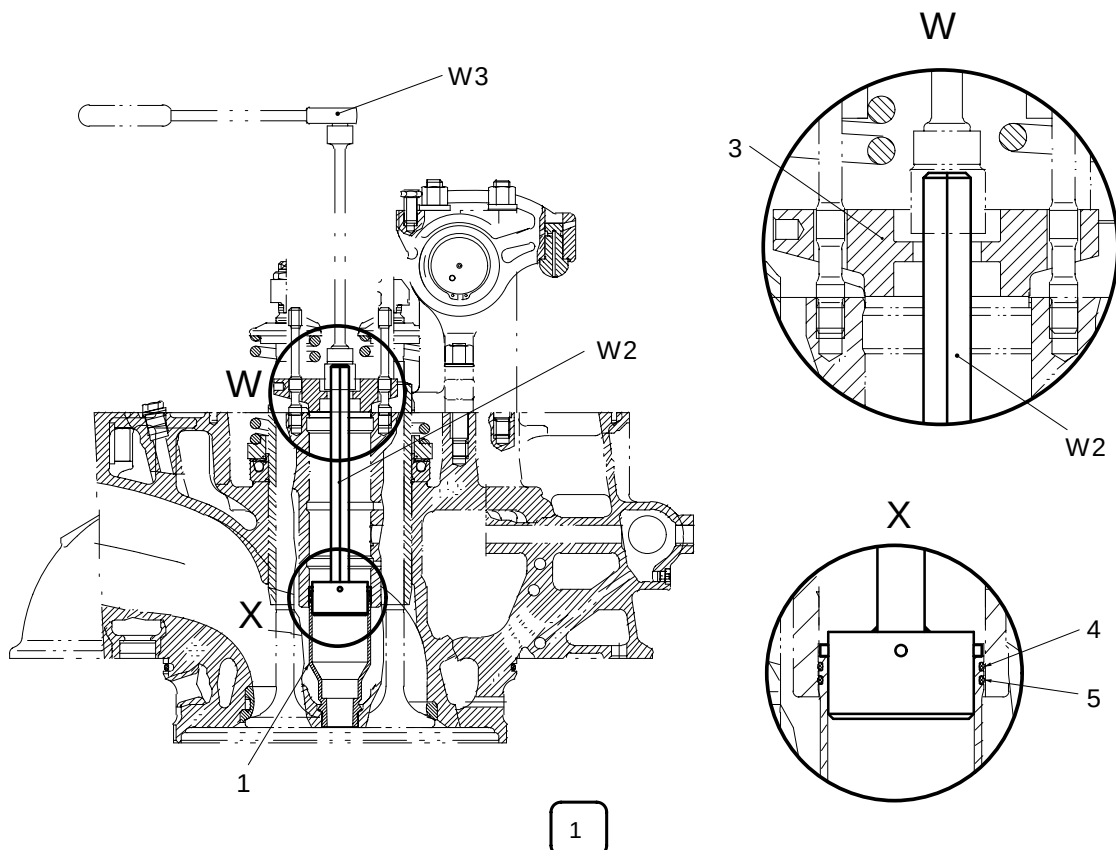
1. Nozzle sleeve removal

- 1.1 Put the key for nozzle sleeve (**W2**) onto the nozzle sleeve (**Fig. 1/1**), so that nozzle sleeve and key are intermeshing.
- 1.2 Mount the flange (**Fig. 1/3**).
- 1.3 Put the torque wrench (**W3**) onto the key for nozzle sleeve and turn out the nozzle sleeve completely.

Attention:

The threads of nozzle sleeve and cylinder head must not intermesh any more.

- 1.4 Dismantle the flange.
- 1.5 Use a brass mandrel and gently drive out the nozzle sleeve.
- 1.6 Remove the O-rings (**Fig. 1/4 and 5**).



M25

24000

2. Nozzle sleeve reassembly

01

2.1 Insert new **O-ring (buna N black)** with vaseline untwisted **into the groove (5)** below.

2.2 Insert new **O-ring (Viton green)** with vaseline untwisted **into the groove (4)** above.

Attention:

The positions of the O-rings (Fig. 1/4 and 5) must not be interchanged!

2.3 Lubricate the thread of the nozzle sleeve with high-temperature thread paste "Dag S-5080".

2.4 Introduce the nozzle sleeve.

2.5 Put on the key for nozzle sleeve and the torque wrench and tighten the nozzle sleeve with a torque of

M =160 Nm

M25

6000, 24000

01

See also: 01.02.01.nn, 01.05.01.nn, 01.06.01.nn, 01.08.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Distillate fuel

Inspection:

of the inlet and exhaust valve cones of a cylinder unit with regard to the contact reflection and accumulation of deposits	every	6,000 h
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Maintenance:

of all inlet and exhaust valve cones	after	24,000 h
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Tools:

Valve spring tensioning device	W1	259222 A
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Auxiliary material:

Molykote paste "G-Rapid Plus" **

** or a product of equal standard

Note:

The service life of the valve cones depends on the quality of the fuel used, the operating conditions of the plant and the quality of the repaired valve cone/seating rings and thus differs from plant to plant.

For this reason the operator must determine the appropriate repair intervals according to the findings of the inspections of the valve cones. The seating geometry must be checked during every disassembly of the valve cone and must be remilled if necessary (01.08.01.nn, 01.08.02.nn).

M25

6000, 24000

01

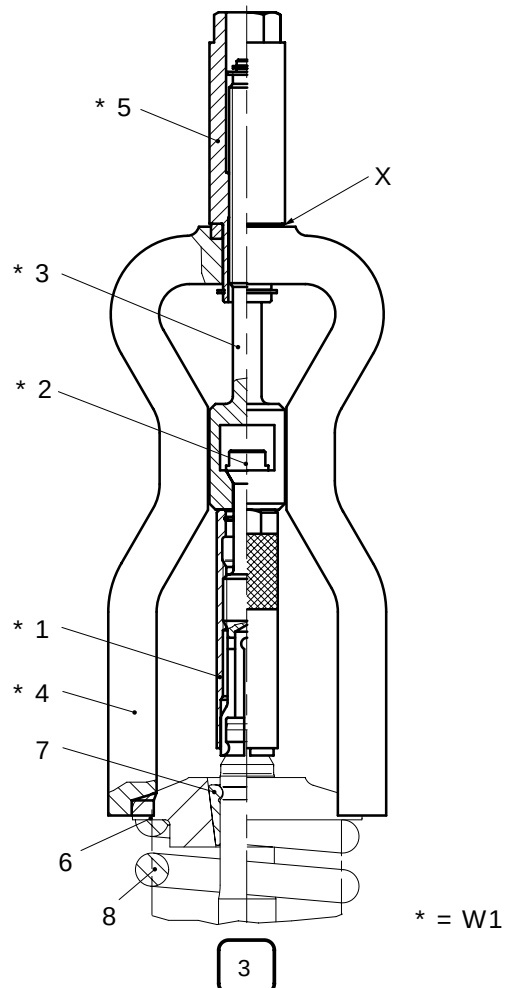
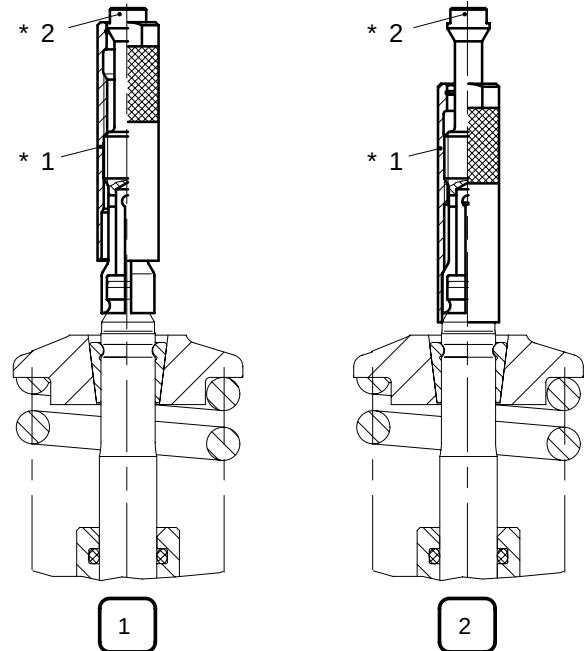
Sequence of operations:

1. Disassembly

- 1.1 Remove the cylinder head **(01.06.01.nn)**.
- 1.2 Remove the rocker arm **(01.02.01.nn)** and lift off the valve bridge.
- 1.3 Mount the valve spring tensioning device (W1).
- 1.4 Coat the contact surface (X) with Molykote paste "G-Rapid-Plus" before using the valve spring tensioning device (W1).
- 1.5 Turn back the nut (**Fig. 1/1**) to the limit.
- 1.6 Press the valve cone holder (2) into the ring groove of the valve cone.
- 1.7 Turn the nut (**Fig. 2/1**) to the limit on the valve cone holder (2).
- 1.8 Fit the draw spindle (**Fig. 3/3**) together with the hoop (4) in the valve cone holder (2).
The hoop must not rest on the cast nose of the spring plate (6).
- 1.9 Turn back the nut (1) to the limit on the draw spindle (3).
- 1.10 Tension the valve spring by turning the nut (5).
- 1.11 Remove the clamping cone halves (7). Relieve the valve spring (8) by turning the nut (5).
- 1.12 Lift the valve spring tensioning device (W1), spring plate (6), valve spring (8) as well as the valve turning device/valve spring disk off the cylinder cover.
- 1.13 Pull the valve cone out of the cylinder head.



Safety note: **Spring tension**



M25

6000, 24000

Note:**01**

Valve cones which show substantial signs of wear in the clamping area as well as clamping cone halves on which heavy burr has formed must be replaced by new parts.
Remove any projecting burr before disassembling such valve cones.
Repair of valve cone/valve seat (01.08.01.nn/01.08.02.nn).

2. Reassembly

- 2.1 Check valve clearance, **replace** O-rings (01.05.01.nn).
- 2.2 Lubricate the valve stem (free from burr) well before installation and insert the valve cone by **screwing** it in so that the O-ring is not damaged.
- 2.3 Assembly is effected in the reverse sequence of disassembly.
- 2.4 Slowly relieve the valve spring after inserting the clamping cone halves and check that the clamping cone halves sit properly.

M25

6000, 12000

01

See also: 01.02.01.nn, 01.05.01.nn, 01.06.01.nn, 01.08.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel

Inspection:

of the inlet and exhaust valve cones of a cylinder unit with regard to the contact reflection and accumulation of deposits	every	6,000 h
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Maintenance:

of all inlet and exhaust valve cones	after	12,000 h
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Tools:

Valve spring tensioning device	W1	259222 A
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Auxiliary material:

Molykote paste "G-Rapid Plus" **

** or a product of equal standard

Note:

The service life of the valve cones depends on the quality of the fuel used, the operating conditions of the plant and the quality of the repaired valve cone/seating rings and thus differs from plant to plant.

For this reason the operator must determine the appropriate repair intervals according to the findings of the inspections of the valve cones. The seating geometry must be checked during every disassembly of the valve cone and must be remilled if necessary (01.08.01.nn, 01.08.02.nn).

M25

6000, 12000

01

Sequence of operations:

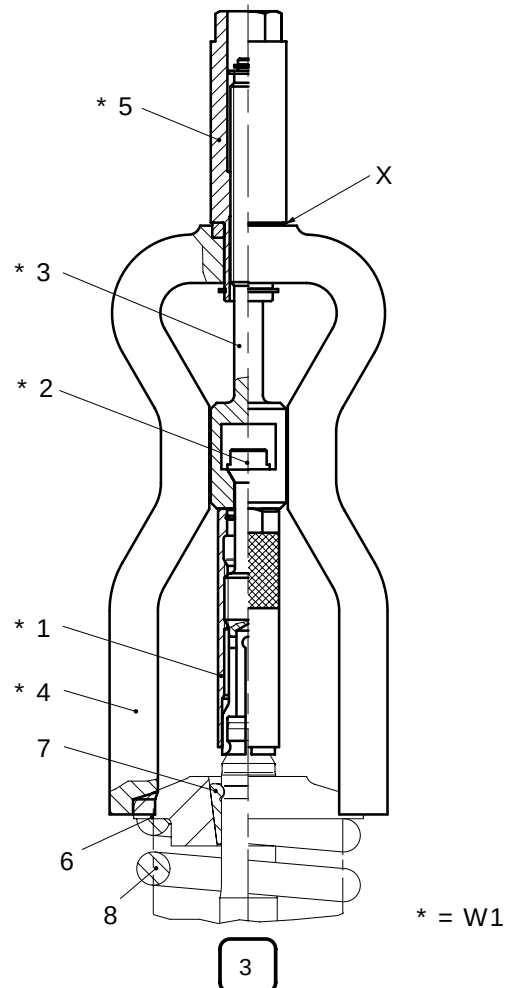
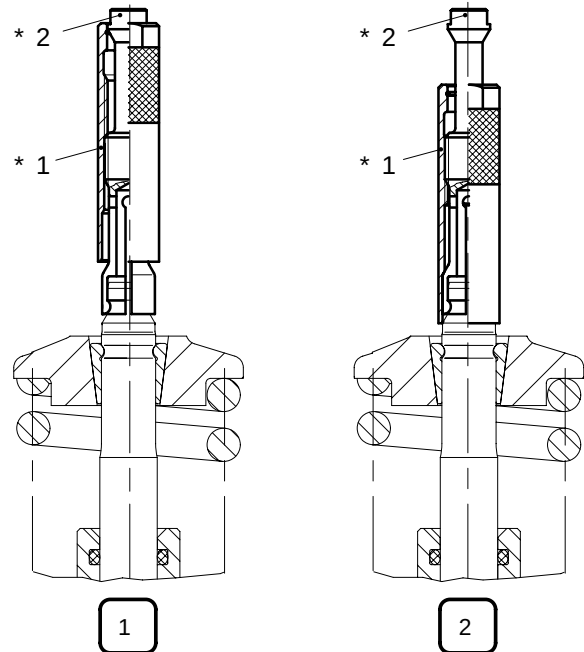
1. Disassembly

- 1.1 Remove the cylinder head **(01.06.01.nn)**.
- 1.2 Remove the rocker arm **(01.02.01.nn)** and lift off the valve bridge.
- 1.3 Mount the valve spring tensioning device (W1).
- 1.4 Coat the contact surface (X) with Molykote paste "G-Rapid-Plus" before using the valve spring tensioning device (W1).
- 1.5 Turn back the nut (**Fig. 1/1**) to the limit.
- 1.6 Press the valve cone holder (2) into the ring groove of the valve cone.
- 1.7 Turn the nut (**Fig. 2/1**) to the limit on the valve cone holder (2).
- 1.8 Fit the draw spindle (**Fig. 3/3**) together with the hoop (4) in the valve cone holder (2).
The hoop must not rest on the cast nose of the spring plate (6).
- 1.9 Turn back the nut (1) to the limit on the draw spindle (3).
- 1.10 Tension the valve spring by turning the nut (5).
- 1.11 Remove the clamping cone halves (7). Relieve the valve spring (8) by turning the nut (5).



Safety note: **Spring tension**

- 1.12 Lift the valve spring tensioning device (W1), spring plate (6), valve spring (8) as well as the valve turning device/ valve spring disk off the cylinder cover.
- 1.13 Pull the valve cone out of the cylinder head.



M25

6000, 12000

Note:**01**

Valve cones which show substantial signs of wear in the clamping area as well as clamping cone halves on which heavy burr has formed must be replaced by new parts.
Remove any projecting burr before disassembling such valve cones.
Repair of valve cone/valve seat (01.08.01.nn/ 01.08.02.nn).

2. Reassembly

- 2.1 Check valve clearance, **replace** O-rings (01.05.01.nn).
- 2.2 Lubricate the valve stem (free from burr) well before installation and insert the valve cone by **screwing** it in so that the O-ring is not damaged.
- 2.3 Assembly is effected in the reverse sequence of disassembly.
- 2.4 Slowly relieve the valve spring after inserting the clamping cone halves and check that the clamping cone halves sit properly.

M25

01

See also: 01.07.01.nn, 01.08.02.nn

Spare parts list: B1.05.01.252107

Time requirement: 0 Pers./ 0,00 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Valve refacer

W1

259224 A

Auxiliary material:

Illuminated magnifying glass (8-fold magnification)

Diamond paste Dp 30/10 - 15 µm *

Thinner F25 *

* or a product of equal standard

Note:

New or refinished or used undamaged inlet and exhaust valve cones must be ground in accordance with operating sequence 4 before being fitted.

Refinishing of the valve cones (operating sequence 3) can be necessary in the following cases:

- After extended operating times
- In the case of a negative result, e.g. damaged sealing surfaces, blow holes, uneven contact reflections of the valve cone/seat.

Sequence of operations:

1. Check of valve condition

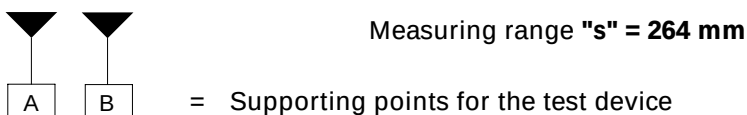
1.1 The valve may be reused **without refinishing** if

- the circumference of the valve cone face is metallically polished
- the valve cone face does not indicate carbon pockets with blow holes
- no crack formation is established on the valve cone face when checking for cracks using an illuminated magnifying glass (8-fold magnification) or a powder spraying method (Met L'Check).

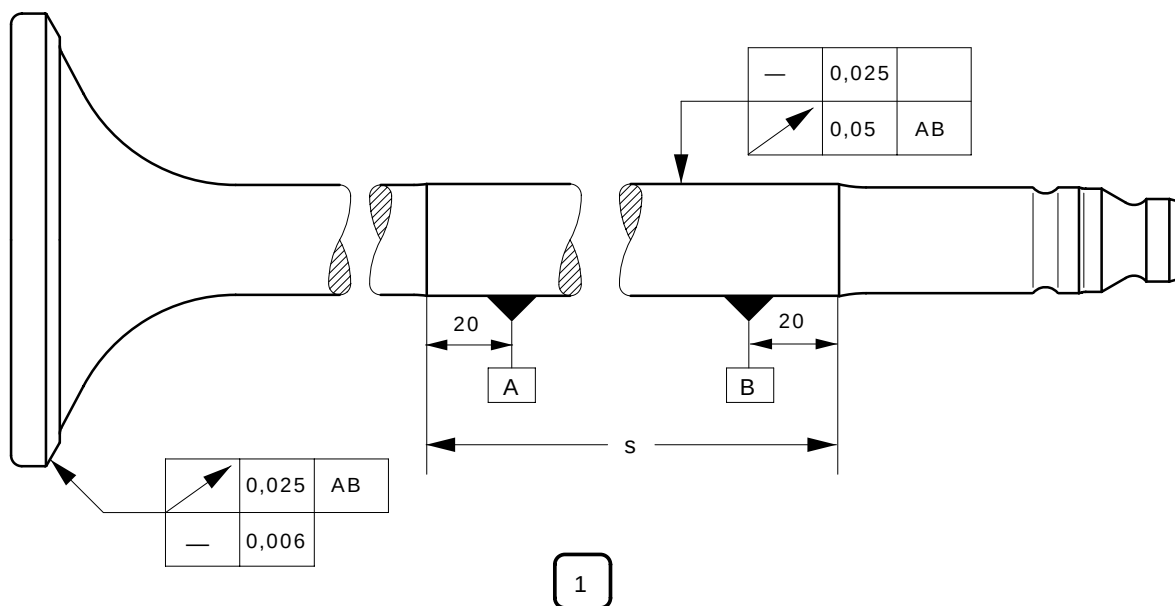
M25

01

- the deviation from the straightness is **not greater** than the following values (**Fig. 1**).

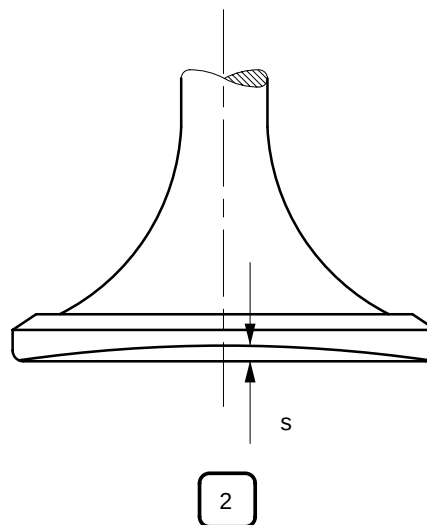


- the radial runout of the valve cones is not greater than the following values:



1.2 The valves cannot be reused in the following cases

- if the valve cone face is damaged (cracks, blow holes)
- the wear caused by corrosive material is **> 2 %** of the valve head diameter (compared with new valve)
- concave burn "s" caused by high temperature corrosion at the underside of the valve head is **> 1.5 mm (Fig. 2)**
- the underside of the valve head indicates severe pitting (formation of so called paving stones)
- corrosion pits and mechanical damage in the area of the valve stem, stem transition and valve head
- the limit dimension for refinishing is exceeded.



M25

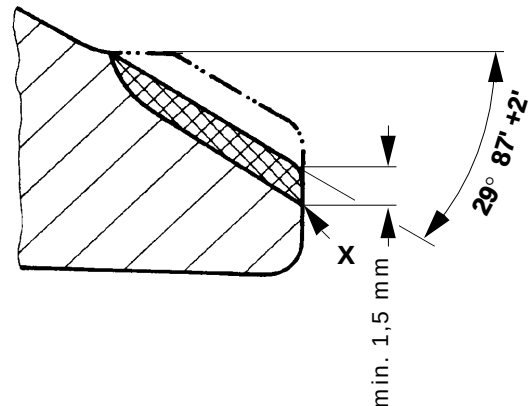
01

2. Cleaning

Clean the valve spindle, e.g. by blasting with glass beads.

Attention:

Cleaning with sharp edged tools as well as pickling with an organic acids (hydrochloric acid, sulphuric acid, hydrofluoric acid etc.) not permissible!



2a

3. Repair (refinishing of sealing surface)

Note:

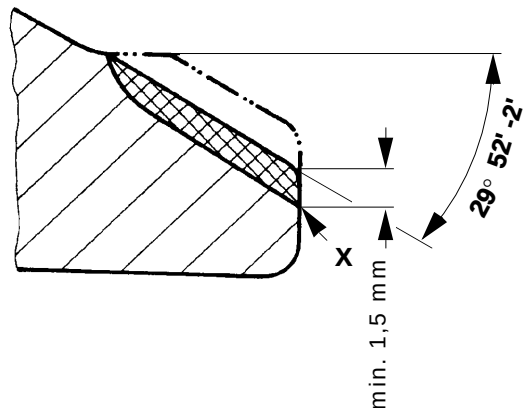
Refinishing must be carried out professionally on precision spindle grinding machines. If no such machine is available, then the valve cones should be send to an MaK workshop for regrounding.

- 3.1 Refinish the sealing surface according to the specified angle (**Fig.2a,3,3a**). Do not refinish any existing concave fillets.

Exhaust valve cone = **Fig. 2a**
(Heavy fuel)

Exhaust valve cone = **Fig. 3**
(Destillate fuel)

Inlet valve cone = **Fig. 3a**
(Heavy fuel and destillate fuel)

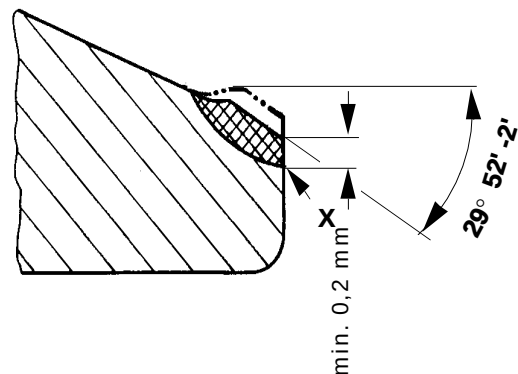


3

- 3.2 The respective information of the grinding machine manufacturer must be observed when grinding carried out.

- 3.3 The dimension between the visible edge of the base material armoring "X" and the outer edge of the seat is to be determined upon completion of the grinding process. The valve cone must be replaced if the actual dimension falls below the minimum dimension. (**Fig.2a, 3, exhaust valve, Fig. 3a, inlet valve**).

- 3.4 Outer edge rounded with stone.



3a

Attention:

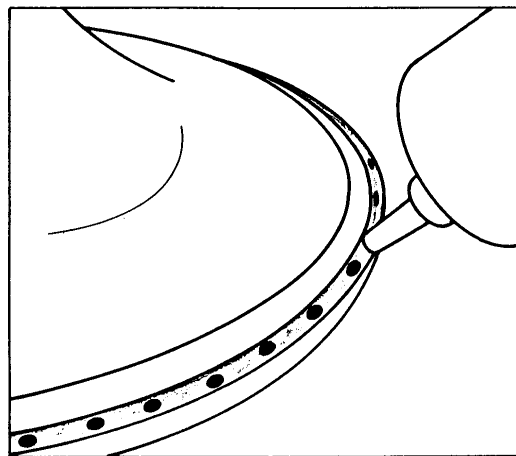
When the valve cone is refinished, the valve seating has to be refinished as well (**01.08.02.nn**).

M25

01

4. Maintenance (Check of contact reflection / grinding)

- 4.1 Apply small dots of diamond paste Dp 30/10 - 15 μm with a syringe to the valve cone or the new or remachined valve cone and distribute the paste evenly (**Fig. 4**). The seat ring surface is then sprayed with a thinner (F25) belonging to the diamond paste for dilution in order to increase the grip.


4

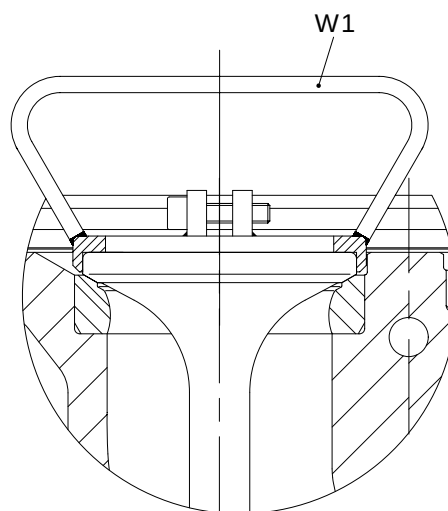
- 4.2 Push the lubricated valve stem into the guide. Fix the device (**Fig. 5/W1**) to the valve head.

- 4.3 Grind the cone and seating surface by turning the device backwards and forwards 6 to 8 times applying a moderate pressure to the valve head. Lift the cone several times thereby so that the grinding paste can flow back onto the grinding surface.

The contact area (**Fig. 6/a**), visible due to the light grinding procedure should not exceed

30 - 50 % of the seat width "b"

starting at the outer diameter


5

M25

01

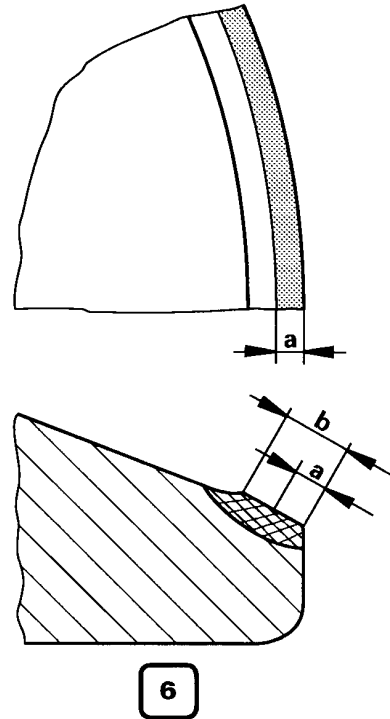
4.4 If the contact reflection is poor, the valve must not be reground anymore and both sealing faces must be refinished on a machine.

4.5 Ensure that the components (valve cone and seat ring) refaced to one another are kept together.

5. Final check

5.1 Ensure that the refinishing limits are maintained.

5.2 Carefully clean the valve cone/seat and check the sealing surfaces using an illuminated magnifying glass (8-fold magnification) or powder spraying method (Met L'Check) for cracks in the armouring and in the adjacent zone



M25

01

See also: 01.07.01.nn, 01.08.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 0 Pers./ 0,00 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Valve seat grinding machine	W1 *	1.9224 Y
Valve seat milling device	W2	259224 B

* not illustrated

Auxiliary material:

Illuminated magnifying glass (8fold magnification)
Diamond paste Dp 30/10 - 15 µm **
DIAPLASTOL thinner **

** or a product of equal standard

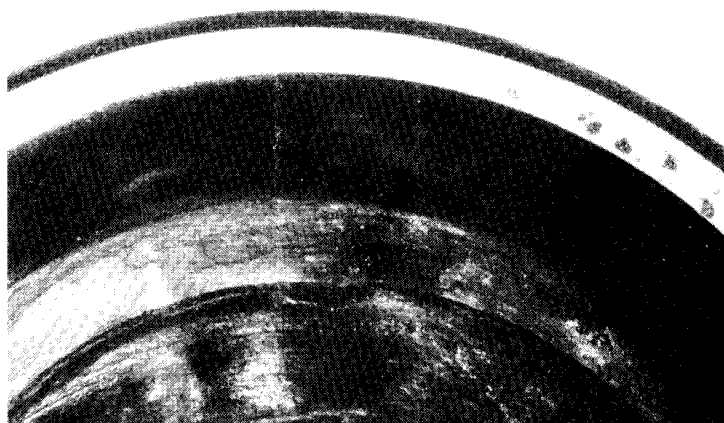
Note:

If there are irregular contact reflections or deeper scars on the sealing faces of the valve seat/valve cone, then both sealing face have to be refinished.

New or refinished valve seats are to be ground in accordance with operating sequence 4,

Refinishing of the seats may be necessary in the following cases:

- after extended operating times
- in the event of a negative result, e.g. damaged seat faces, blow holes, uneven contact reflections of the valve seat/cone (**Fig. 1 and 2**).



1

M25

01

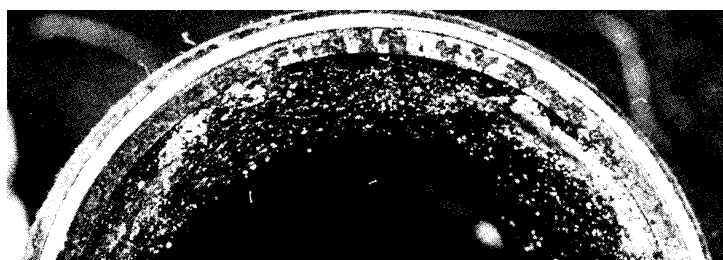


2

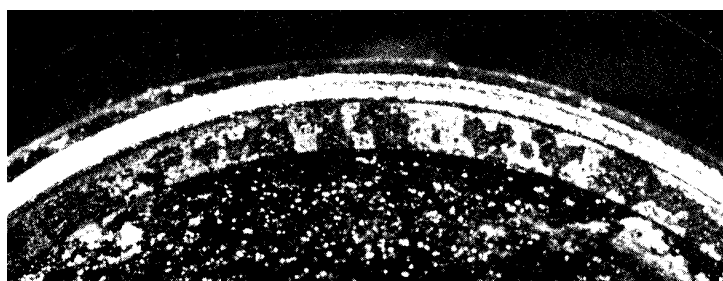
Sequence of operations:

1. Check of the valve condition

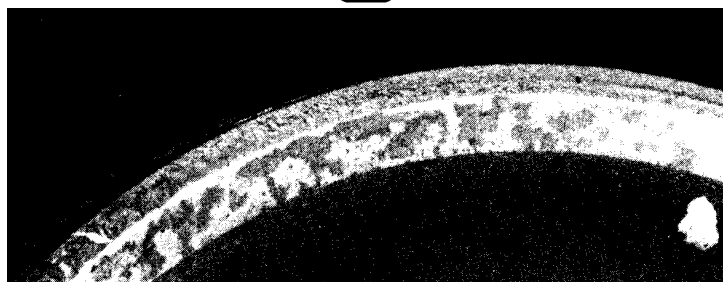
The hardness of the valve seats is designed in such a manner that there is a certain adaptability towards the valve cone. Carbon deposits are therefore a normal indication and are not dangerous if there is good cooling (Fig. 3, 4 and 5).



3



4



5

M25

01

- 1.1 The valve seat rings are reusable without refinishing if
- the circumference of the valve face is metallically smooth
 - no carbon deposits with blow holes or visible wear are present
 - no crack formation is discerned at the valve face when checking for cracks using an illuminated magnifying glass (8-fold magnification) or powder spraying procedure (Met L'Check).
- 1.2 The valve seat rings are not reusable if
- there are cracks in the seat face
 - burn holes are present
 - the refinishing limits have been exceeded.

2. Cleaning

Remove residues from the seat faces.

3. Repair (refinishing of valve seat rings)

Note:

Remachining must be carried out professionally with the **MaK seat grinding machine (W1)**. Refer to special operating instructions.

Alternatively, the seats can be refinished by means of the **MaK valve seat milling device (Fig. 6/W2)**. Unnecessary stock removal should be avoided, carbon pockets are only to be repaired if they are present in the contact area.

- 3.1 Remill the valve seat
- 3.1.1 Carefully clean the valve seat ring in the contact area (3) of the centering disk (4) in order to ensure an absolutely centric fixing of the guide mandrill (5). Remove the O-ring from the guide bush.
- 3.1.2 Insert the centering disk (4) with the guide mandrill (5) and tighten with the star knob (6).

Attention:

Handle the cutter head (2) with care, cutters are sensitive to impact , hard touch down can also damage the valve seat face.

M25

01

- 3.1.3 Place the cutter head (**Fig. 6/2**) on the greased guide mandrill, screw in the knurled screw (1) until there is a resistance.
- 3.1.4 Rotate the valve uniformly and slowly clockwise and remill the seat in one operation pass. The cutting of the cutters has to be noticeable. Set the contact pressure by touch.

Attention:

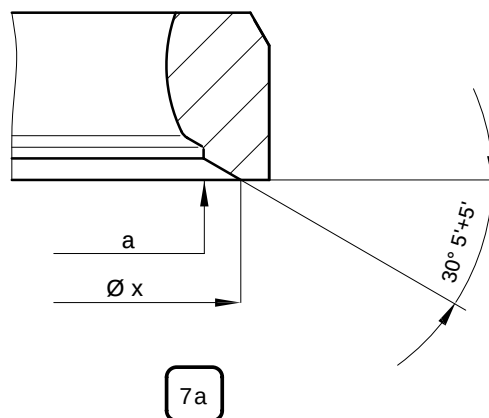
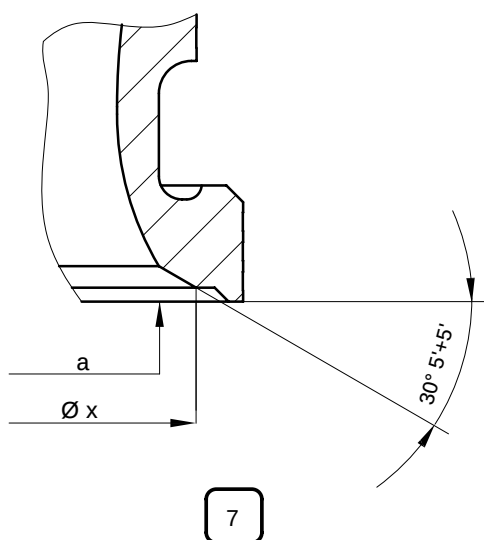
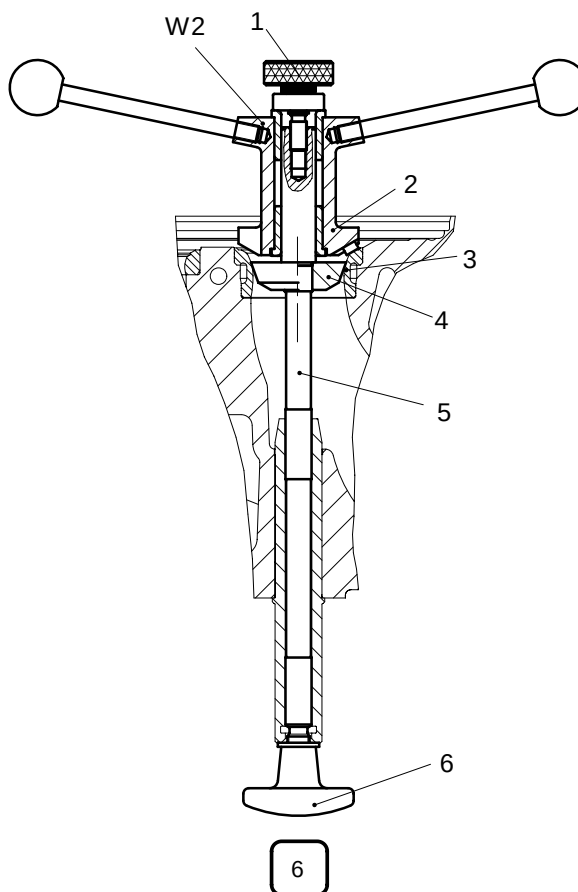
There is a danger of rattling if the contact pressure is too low and /or the cutting speed is too high.

- 3.1.5 Prior to finishing the cutting process, slowly unscrew the knurled screw (1) and simultaneously rotate the cutter head.
- 3.1.6 Maximum permissible dimension (X) for refinishing:

Exhaust valve seat ring (**Fig. 7**) = $92^{+0.2}$

Inlet valve seat ring (**Fig. 7a**) = $85^{+0.2}$

a = no stock removal



M25

01

3.1.7 If the milling cutters are blunt, then the cutter head has to be sent to **MaK** for refinishing.

3.1.8 Dismantle the milling device. Grind sharp edges with fine emery cloth.

4. Check of contact reflection / grinding

4.1 Apply small dots of diamond paste Dp 30/10 -15 µm with a syringe to the valve seat of the new or refinished valve spindle and distribute the paste evenly. Then spray the total surface of the seat ring with DIAPLASTOL thinner (**01.08.01.nn**).

4.2 Push the lubricated valve stem into the guide bush. Fasten the device (W1) (**01.08.01.nn**) to the valve head.

4.3 Grind the cone and seat by applying a moderate pressure to the valve head and rotating the device backwards and forwards 6 to 8 times. Lift the cone several times so that the grinding can flow back onto the grinding surface.

The contact reflection "a" which is visible by the light grinding process should not exceed

30 - 50 % of the circumferential seat width "b"

starting from the outside diameter (**01.08.01.nn**).

4.4 If the contact reflection is poor, the valve must not be ground anymore and booth sealing faces must be refinished on a machine.

4.5 Ensure that the components (valve cone and seat ring) refaced to one another are kept together.

5. Final check

5.1 Check whether the refinishing limit dimensions have been observed.

5.2 Carefully clean the valve cone/seat and check the sealing surfaces using an illuminated magnifying glass (8-fold magnification) or powder spraying method (Met L'Check) for cracks in the armouring and in the adjacent zone

M25

01

See also: 01.06.01.nn, 01.07.01.nn, 01.08.02.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Pressing device

W1

259222 B

Auxiliary material:

Diamond paste Dp 30/10 -15 µm *

Molykote paste "G-Rapid" *

* or a product of equal standard

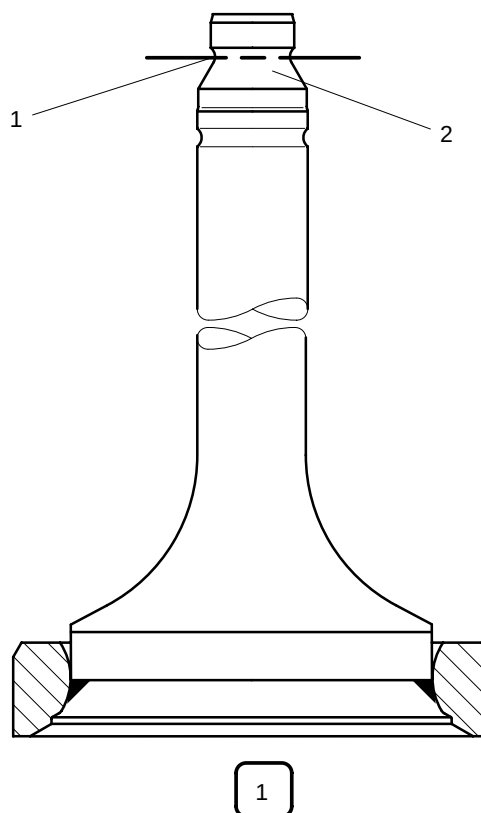
Sequence of operations:

1. Valve cones which are no longer serviceable must be cut off at the stem end (**Fig. 1/1**) and the resulting cutting surface (2) must be chamfered to prevent flattening. The valve head must be turned off on the lathe
approx. 66 mm
(inner diameter of the seat ring).

2. Place the valve cone in the valve seat ring and hold it in the position illustrated. Connect the cone and seat ring by a welding bead around the circumference (electric welding device).

The cylinder cover base outside the seat ring should be greased well to prevent damage caused by stray welding beads.

3. Drive out the valve seat ring with a powerful knock on the valve spindle. Carefully clean the location hole by hand.
4. Mount new seat ring.
- 4.1 Cool the seat ring down to at least - 20 °C and heat up the cylinder head to 130 °C.



M25

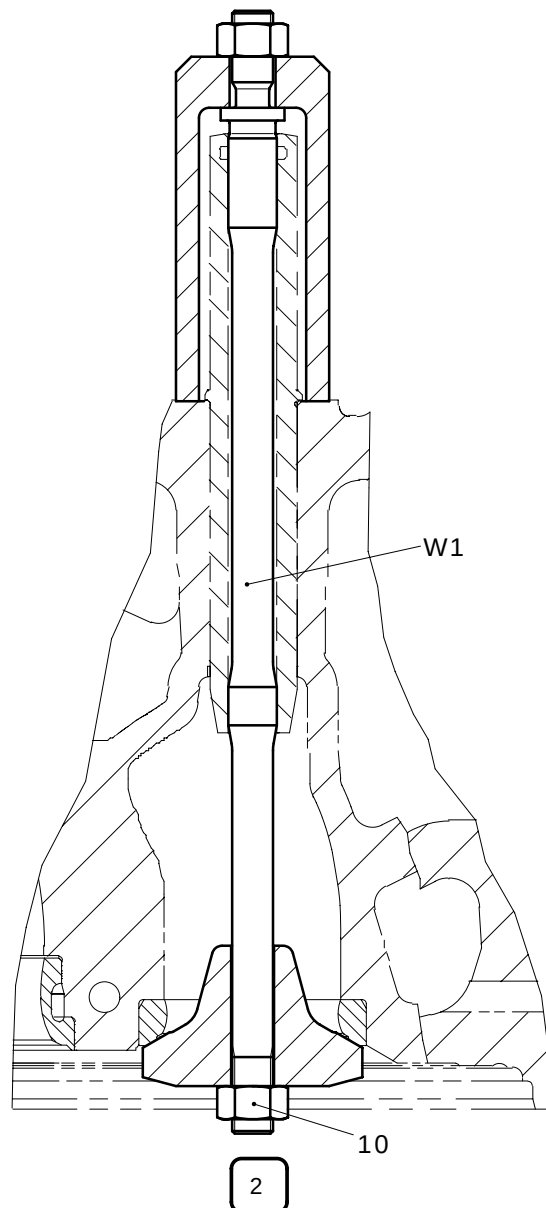
01

- 4.2 With the help of a valve cone, carefully position the seat ring at the base of the cylinder head bore by tapping it lightly with a hammer. Apply a thin coat of "G-Rapid" Molykote paste to the thread and contact surface of the nut (**Fig. 2/10**). Tighten the nut (10) with

M = 50 Nm.

Then use the pressing device (W1) to hold the seat ring in this position until the cylinder head has cooled down.

5. Refinish the seat ring, e.g. using a valve seat grinding machine or valve seat milling device. Grind the valve cone lightly with diamond paste Dp 30/10 -15 µm and check the contact reflection (**01.08.02.nn**).
6. Fit the valve cone.



M25

24000

See also: 01.06.01.nn, 01.11.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Distillate fuel

01

Maintenance:

Remove and dismantle all starting valves
and reface them if necessary

every

24,000 h

Auxiliary material:

Touch-up paint
Diamond paste Dp 30/10 -15 µm **
"G-Rapid" Molykote paste **

** or a product of equal standard

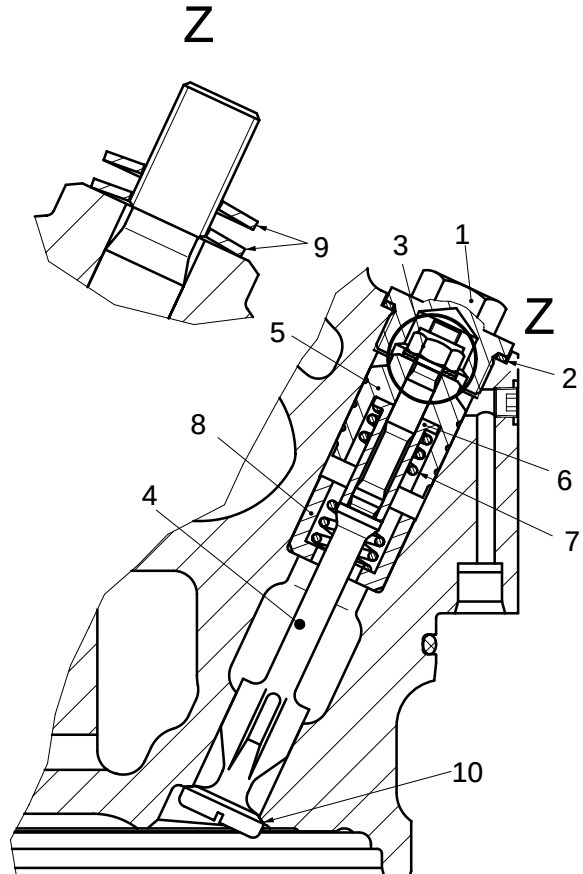
Attention:

Before doing any work on the starting system, close the main valves on the starting air bottles, vent the pipes and block the master starting valve.

Sequence of operations:

1. Disassembly

- 1.1 Remove the cylinder head.
- 1.2 Loosen the screw plug (Fig. 1/1) and remove it together with the sealing ring (2).
- 1.3 Loosen the locking nut (3) holding the valve spindle (4) with a screw driver.
- 1.4 Remove cup springs (9), piston (5), resilient sleeve (6), pressure spring (7), valve spindle (4) as well as the bush (8) from the cylinder head.
- 1.5 Carefully clean all parts in gas oil.
- 1.6 Check the piston (5), seat face of the valve spindle (4) and valve seat (10).



M25

24000

01

- 1.7 Scored pistons (5) should be smoothed down using fine emery cloth.
- 1.8 Check the tightness of the starting valve. To do so, test the contact reflection of the seating of the valve spindle (4) on the valve seat (10) in the cylinder head as follows:
 - 1.8.1 Apply 7-8 streaks of touching-up paint at the same distance to the seating of the valve spindle (4).
 - 1.8.2 Insert the valve spindle (4) with bush (8), resilient sleeve (6), piston (5) and **non** self-locking nut. Turn the valve spindle approx. 60-70°.
 - 1.8.3 Carefully remove the valve spindle and check the contact reflection. Remove the touching-up paint.
- 1.9 If the contact reflection is bad:
 - 1.9.1 Apply small dots of diamond paste equally distributed over the seating of the valve spindle (4) by means of a syringe. Then spray the whole seat ring surface with a thinner (F25) for the diamond paste for dilution and to increase the grip.
 - 1.9.2 Insert the valve spindle (4) with piston (5), resilient sleeve (6) and **non** self-locking nut.
 - 1.9.3 Grind the valve seat for a short moment. To do so, turn the valve spindle backwards and forwards 6-8 times by hand using a screwdriver under medium pressure. Lift the cone several times so that the grinding paste can flow back onto the grinding surface.

Carefully remove the valve spindle and recheck the contact reflection which is visible as a result of the grinding process.
 - 1.9.4 Repeat the grinding process if the contact reflection is bad.
- 1.10 Carefully clean the valve spindle (4) and valve seat (10) in the cylinder head

2. Reassembly

- 2.1 Rub the piston (5) in with "G-Rapid" Molykote paste.
- 2.2 Assembly is effected in the reverse sequence of disassembly.
Pay attention to the correct installation position of the cup springs (Z/9).
Tighten the **new** locking nut (3) at a torque of

M = 35 Nm.

- 2.3 Replace the sealing ring (2). Tighten the screw plug (1) at a torque of

M = 250 Nm.

M25

12000

See also: 01.06.01.nn, 01.11.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel

01

Maintenance:

Remove and dismantle all starting valves
and reface them if necessary

every

12,000 h

Auxiliary material:

Touch-up paint
Diamond paste Dp 30/10 -15 µm **
"G-Rapid" Molykote paste **

** or a product of equal standard

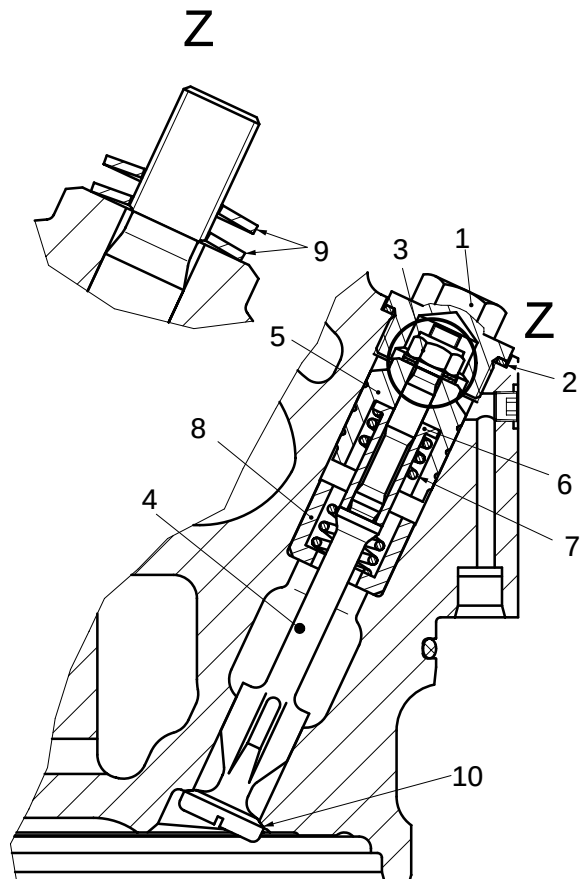
Attention:

Before doing any work on the starting system, close the main valves on the starting air bottles, vent the pipes and block the master starting valve.

Sequence of operations:

1. Disassembly

- 1.1 Remove the cylinder head.
- 1.2 Loosen the screw plug (Fig. 1/1) and remove it together with the sealing ring (2).
- 1.3 Loosen the locking nut (3) holding the valve spindle (4) with a screw driver.
- 1.4 Remove cup springs (9), piston (5), resilient sleeve (6), pressure spring (7), valve spindle (4) as well as the bush (8) from the cylinder head.
- 1.5 Carefully clean all parts in gas oil.
- 1.6 Check the piston (5), seat face of the valve spindle (4) and valve seat (10).



M25

12000

01

- 1.7 Scored pistons (5) should be smoothed down using fine emery cloth.
- 1.8 Check the tightness of the starting valve. To do so, test the contact reflection of the seating of the valve spindle (4) on the valve seat (10) in the cylinder head as follows:
 - 1.8.1 Apply 7-8 streaks of touching-up paint at the same distance to the seating of the valve spindle (4).
 - 1.8.2 Insert the valve spindle (4) with bush (8), resilient sleeve (6), piston (5) and **non** self-locking nut. Turn the valve spindle approx. 60-70°.
 - 1.8.3 Carefully remove the valve spindle and check the contact reflection. Remove the touching-up paint.
- 1.9 If the contact reflection is bad:
 - 1.9.1 Apply small dots of diamond paste equally distributed over the seating of the valve spindle (4) by means of a syringe. Then spray the whole seat ring surface with a thinner (F25) for the diamond paste for dilution and to increase the grip.
 - 1.9.2 Insert the valve spindle (4) with piston (5), resilient sleeve (6) and **non** self-locking nut.
 - 1.9.3 Grind the valve seat for a short moment. To do so, turn the valve spindle backwards and forwards 6-8 times by hand using a screwdriver under medium pressure. Lift the cone several times so that the grinding paste can flow back onto the grinding surface. Carefully remove the valve spindle and recheck the contact reflection which is visible as a result of the grinding process.
 - 1.9.4 Repeat the grinding process if the contact reflection is bad.
- 1.10 Carefully clean the valve spindle (4) and valve seat (10) in the cylinder head.

2. Reassembly

- 2.1 Rub the piston (5) in with "G-Rapid" Molykote paste.
- 2.2 Assembly is effected in the reverse sequence of disassembly.
Pay attention to the correct installation position of the cup springs (Z/9).
Tighten the **new** locking nut (3) at a torque of

M = 35 Nm.

- 2.3 Replace the sealing ring (2). Tighten the screw plug (1) at a torque

M = 250 Nm.

M25

24000

See also: 01.06.01.nn, 01.11.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Distillate fuel

01

Maintenance:

Remove and dismantle all starting valves
and reface them if necessary

every

24,000 h

Auxiliary material:

Touch-up paint
Diamond paste Dp 30/10 -15 µm **
"G-Rapid" Molykote paste **

** or a product of equal standard

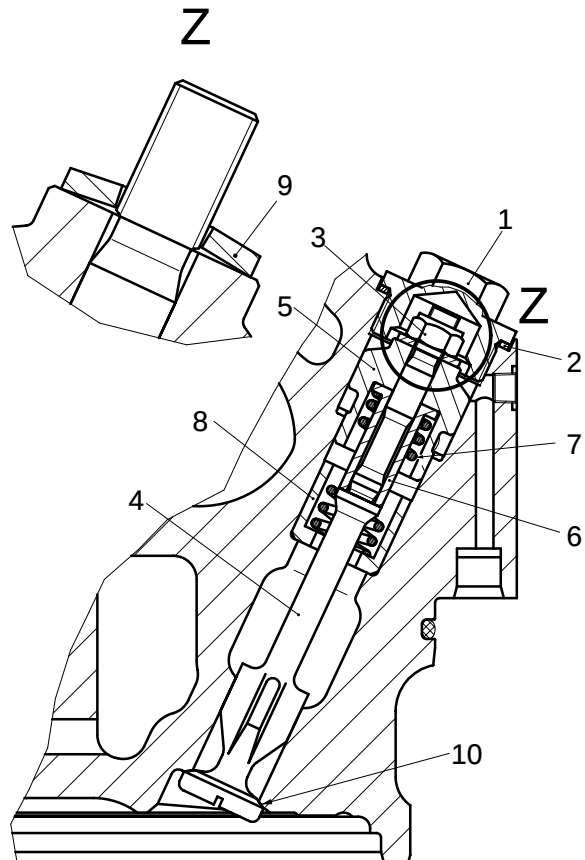
Attention:

Before doing any work on the starting system, close the main valves on the starting air bottles, vent the pipes and block the master starting valve.

Sequence of operations:

1. Disassembly

- 1.1 Remove the cylinder head.
- 1.2 Loosen the screw plug (**Fig. 1/1**) and remove it together with the sealing ring (2).
- 1.3 Loosen the locking nut (3) holding the valve spindle (4) with a screw driver.
- 1.4 Remove spring washer (9), piston (5), resilient sleeve (6), pressure spring (7), valve spindle (4) as well as the bush (8) from the cylinder head.
- 1.5 Carefully clean all parts in gas oil.
- 1.6 Check the piston (5), seat face of the valve spindle (4) and valve seat (10).



M25

24000

01

- 1.7 Scored pistons (5) should be smoothed down using fine emery cloth.
- 1.8 Check the tightness of the starting valve. To do so, test the contact reflection of the seating of the valve spindle (4) on the valve seat (10) in the cylinder head as follows:
 - 1.8.1 Apply 7-8 streaks of touching-up paint at the same distance to the seating of the valve spindle (4).
 - 1.8.2 Insert the valve spindle (4) with bush (8), resilient sleeve (6), piston (5) and **non** self-locking nut. Turn the valve spindle approx. 60-70°.
 - 1.8.3 Carefully remove the valve spindle and check the contact reflection. Remove the touching-up paint.
- 1.9 If the contact reflection is bad:
 - 1.9.1 Apply small dots of diamond paste equally distributed over the seating of the valve spindle (4) by means of a syringe. Then spray the whole seat ring surface with a thinner (F25) for the diamond paste for dilution and to increase the grip.
 - 1.9.2 Insert the valve spindle (4) with piston (5), resilient sleeve (6) and **non** self-locking nut.
 - 1.9.3 Grind the valve seat for a short moment. To do so, turn the valve spindle backwards and forwards 6-8 times by hand using a screwdriver under medium pressure. Lift the cone several times so that the grinding paste can flow back onto the grinding surface.

Carefully remove the valve spindle and recheck the contact reflection which is visible as a result of the grinding process.
 - 1.9.4 Repeat the grinding process if the contact reflection is bad.
- 1.10 Carefully clean the valve spindle (4) and valve seat (10) in the cylinder head

2. Reassembly

- 2.1 Rub the piston (5) in with "G-Rapid" Molykote paste.
- 2.2 Assembly is effected in the reverse sequence of disassembly.
Pay attention to the correct installation position of the spring washer (Z/9).
Tighten the **new** locking nut (3) at a torque of

M = 35 Nm.

- 2.3 Replace the sealing ring (2). Tighten the screw plug (1) at a torque of

M = 250 Nm.

M25

12000

See also: 01.06.01.nn, 01.11.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel

01

Maintenance:

Remove and dismantle all starting valves
and reface them if necessary

every

12,000 h

Auxiliary material:

Touch-up paint
Diamond paste Dp 30/10 -15 µm **
"G-Rapid" Molykote paste **

** or a product of equal standard

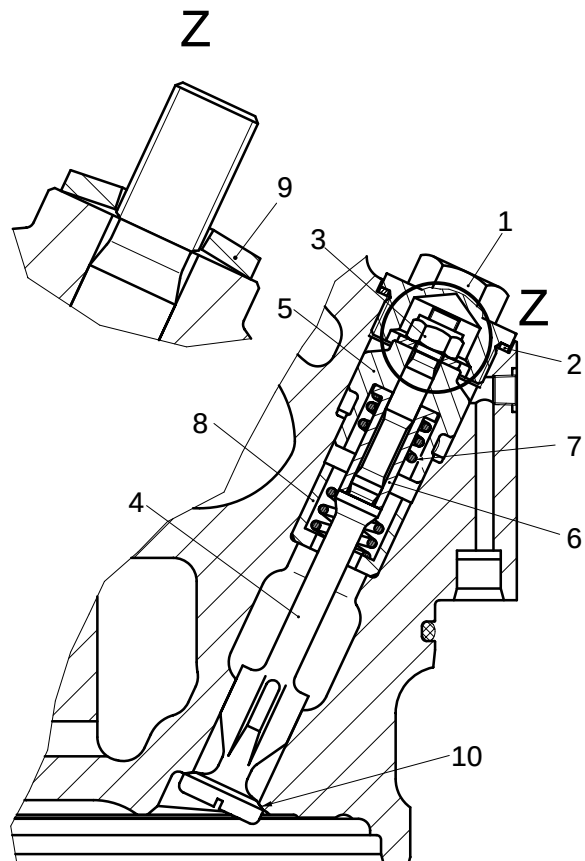
Attention:

Before doing any work on the starting system, close the main valves on the starting air bottles, vent the pipes and block the master starting valve.

Sequence of operations:

1. Disassembly

- 1.1 Remove the cylinder head.
- 1.2 Loosen the screw plug (**Fig. 1/1**) and remove it together with the sealing ring (2).
- 1.3 Loosen the locking nut (3) holding the valve spindle (4) with a screw driver.
- 1.4 Remove spring washer (9), piston (5), resilient sleeve (6), pressure spring (7), valve spindle (4) as well as the bush (8) from the cylinder head.
- 1.5 Carefully clean all parts in gas oil.
- 1.6 Check the piston (5), seat face of the valve spindle (4) and valve seat (10).



M25

12000

01

- 1.7 Scored pistons (5) should be smoothed down using fine emery cloth.
- 1.8 Check the tightness of the starting valve. To do so, test the contact reflection of the seating of the valve spindle (4) on the valve seat (10) in the cylinder head as follows:
 - 1.8.1 Apply 7-8 streaks of touching-up paint at the same distance to the seating of the valve spindle (4).
 - 1.8.2 Insert the valve spindle (4) with bush (8), resilient sleeve (6), piston (5) and **non** self-locking nut. Turn the valve spindle approx. 60-70°.
 - 1.8.3 Carefully remove the valve spindle and check the contact reflection. Remove the touching-up paint.
- 1.9 If the contact reflection is bad:
 - 1.9.1 Apply small dots of diamond paste equally distributed over the seating of the valve spindle (4) by means of a syringe. Then spray the whole seat ring surface with a thinner (F25) for the diamond paste for dilution and to increase the grip.
 - 1.9.2 Insert the valve spindle (4) with piston (5), resilient sleeve (6) and **non** self-locking nut.
 - 1.9.3 Grind the valve seat for a short moment. To do so, turn the valve spindle backwards and forwards 6-8 times by hand using a screwdriver under medium pressure. Lift the cone several times so that the grinding paste can flow back onto the grinding surface. Carefully remove the valve spindle and recheck the contact reflection which is visible as a result of the grinding process.
 - 1.9.4 Repeat the grinding process if the contact reflection is bad.
- 1.10 Carefully clean the valve spindle (4) and valve seat (10) in the cylinder head.

2. Reassembly

- 2.1 Rub the piston (5) in with "G-Rapid" Molykote paste.
- 2.2 Assembly is effected in the reverse sequence of disassembly.
Pay attention to the correct installation position of the spring washer (Z/9).
Tighten the **new** locking nut (3) at a torque of

M = 35 Nm.

- 2.3 Replace the sealing ring (2). Tighten the screw plug (1) at a torque

M = 250 Nm.

M25

150

See also: 01.03.01.nn, 01.06.01.nn, 01.11.01.nn, 07.07.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

01

Inspection:

of the cylinder heads

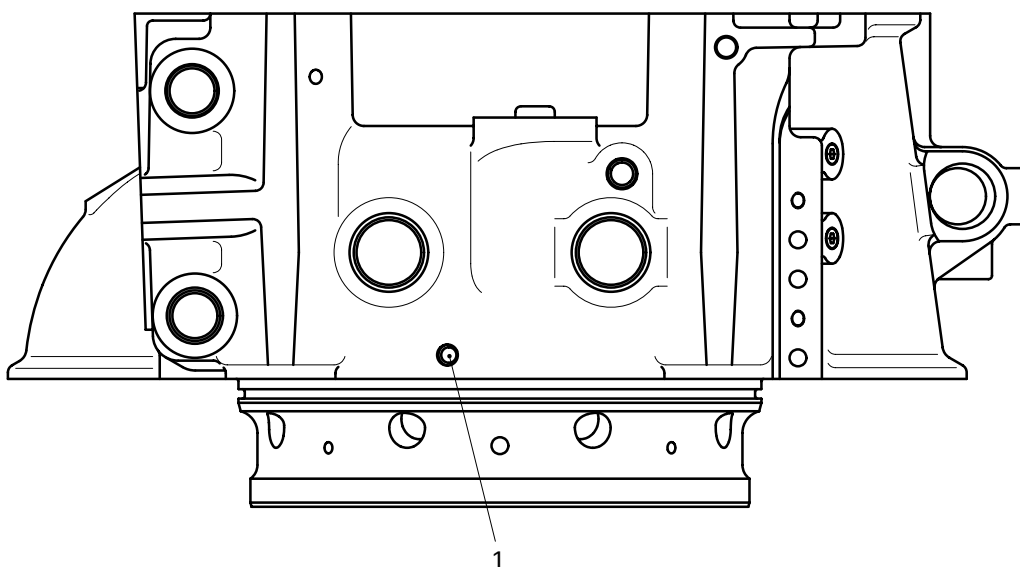
every

150 h

Sequence of operations:

1. Check the gasket between the cylinder head, cylinder liner and cooling water distributor housing for escaping combustion gases/check the cooling water at the inspection hole (**Fig. 1/1**).

In the event of a leakage, loosen the cylinder head nuts and tighten them according to the specification (**01.11.01.nn**). If the leakage cannot be eliminated, remove the cylinder head - clean and check the sealing surfaces - mount with new O-rings (if necessary) and tighten as specified (**01.06.01.nn**, **01.11.01.nn**).



M25

150

-
2. Check the outside of the cylinder head for leakage.
 - 2.1 If lubricating oil is leaking out, check the tightness of the retaining screws of the cylinder head cover / check the rubber seal for damage.
 - 2.2 If there are leaks at the connecting flanges of the media supply lines, check the tightness of the retaining screws. Replace the seals if necessary.
 3. Remove the cylinder head cover. Check the upper side of the cylinder head.
 - 3.1 Check the operation of the valve rotator (**01.03.01.nn**).
 - 3.2 Check the valve springs for damage.
 - 3.3 Check the lubricating oil supply for the valve rockers and valve rocker bearings.

01

M25

24000

See also: 01.02.01.nn, 01.06.01.nn, 01.07.01.nn, 01.09.02.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Distillate fuel

01
Note:

Place the underside of cylinder head on a wooden base only.

Sequence of operations:
The following parts have been removed:

Inlet valve, exhaust valve, injection valve, starting valve and rocker arm bracket.

1. Wash down the cylinder head with a cold cleaner.
2. Clean the inlet and exhaust ports and the underside of the cylinder head **(not the valve seats!)** of carbon deposits using a wire brush or scraper. Do not damage the sealing recess.
3. Clean the cooling water inlet ports and cooling water outlet.
4. Inspect the underside of the cylinder head for cracks, particularly at the valve stems.
5. Clean the sealing surface for the injection valve.
6. Check the free passage of the inlet and outlet bores for the media supply system.

M25

12000

See also: 01.02.01.nn, 01.06.01.nn, 01.07.01.nn, 01.09.02.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel

01
Note:

Place the underside of cylinder head on a wooden base only.

Sequence of operations
The following parts have been removed:

Inlet valve, exhaust valve, injection valve, starting valve and rocker arm bracket.

1. Wash down the cylinder head with a cold cleaner.
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3. Clean the cooling water inlet ports and cooling water outlet.
4. Inspect the underside of the cylinder head for cracks, particularly at the valve stems.
5. Clean the sealing surface for the injection valve.
6. Check the free passage of the inlet and outlet bores for the media supply system.

M25

01

See also: 01.05.50.nn, 01.06.01.nn, 03.04.01.nn, 06.01.01.nn, 07.07.01.nn

Spare parts list: B1.05.01.252107

Time requirement: 1 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Refer to repair sheet **01.06.01.nn**

Auxiliary material:

Vaseline *

* or a product of equal standard

Attention:

**The minimum bending radius $r = 120$ mm for the high pressure hoses must be observed.
Use hydraulic oil only as an operating medium.**

**Safety note:**

Do not position any part of the body over devices which are under pressure.

M25

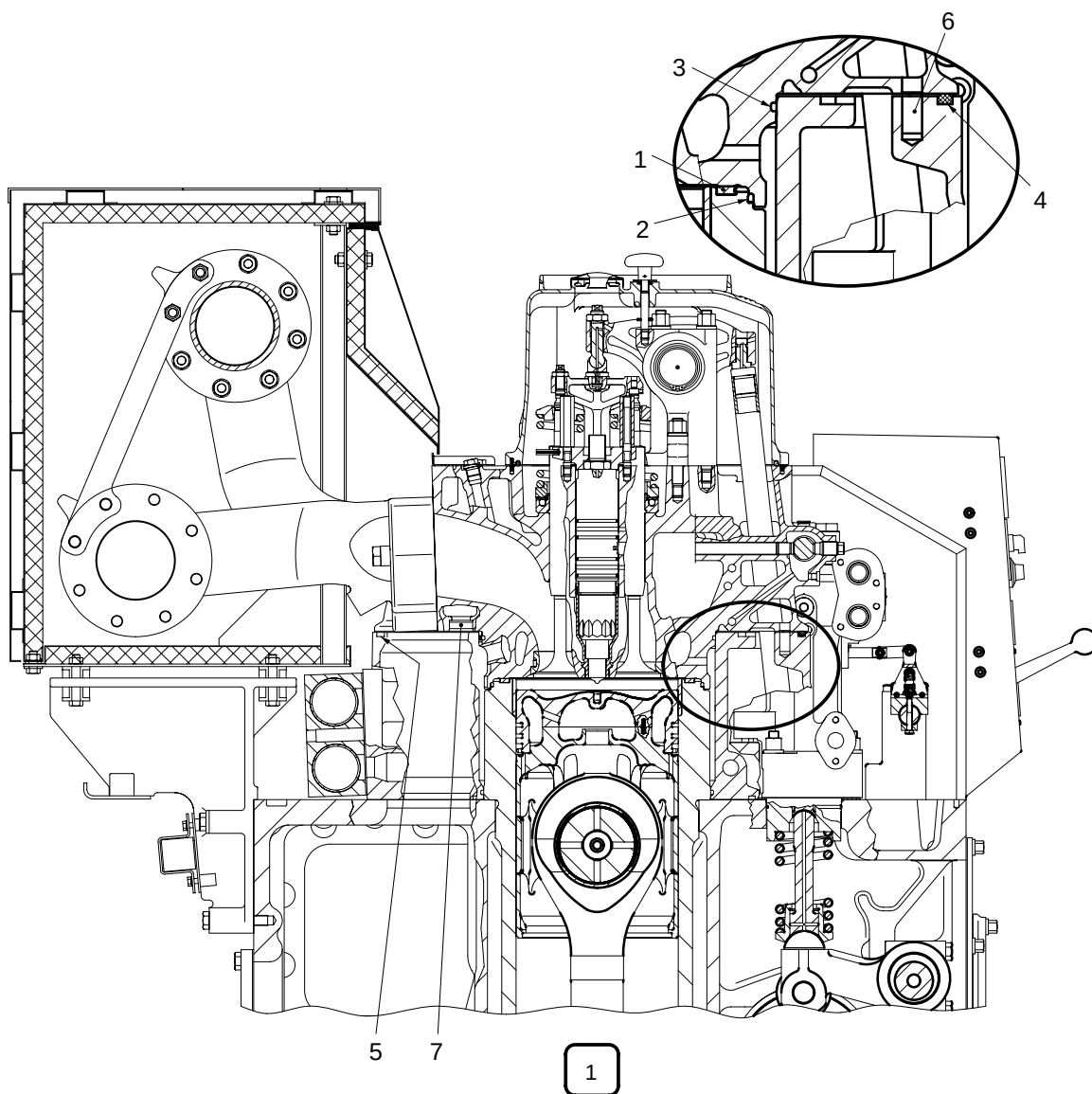
01

Sequence of operations:

1. Open the indicator valve and turn the piston to **firing TDC**.
2. Carefully clean the sealing and contact surfaces of the cylinder head and cylinder liner and check for damage. Insert a new sealing ring (**Fig. 1/1**) in the collar of the cylinder liner.

Check and clean the sealing surface on the exhaust pipeline (**06.01.01.nn**).

3. Replace the following O-rings: Upper O-ring at the collar of the cylinder liner (2), at the cylinder head (3), at the push rod lead-through (4), at the cooling water transfer (7), at the starting air inlet, at the control air inlet and at the air charge inlet connections (5).



M25

01

Note:

Use vaseline to insert the O-rings in the grooves making sure that they are not twisted. Position the sockets for cooling water, control air and starting air vertically in the cooling water distributor housing and check for completeness.

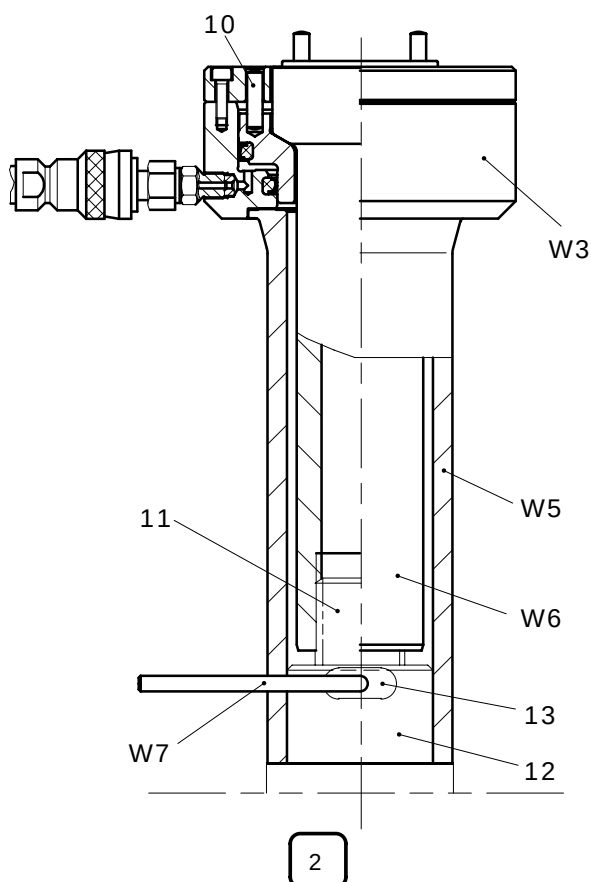
4. Carefully let down the cylinder head using the cylinder head lifting device (W8) and lifting gear. Insert the push rods in the cylinder head. Make sure that they are positioned correctly with respect to the rocker arm.
5. Continue to let down the cylinder head, align on the straight pin (6) and put it down on the cooling water distributor housing.
6. Tighten the round nuts (**Fig. 2/12**) with pins (W7) by fingertight.
7. Tighten the four cylinder head nuts together using the hydraulic tightening device.

Attention:

The maximum stroke indicator (Fig. 2/10) must not project above the upper limit of the cover.

- 7.1 Place the hydraulic tightening elements (W3) connected to the supporting sleeves (W5) over the round nuts (12). Pay attention to good accessibility of the slits (13).
- 7.2 Screw the threaded sleeves (W6) onto the cylinder head screws (11) fingertight.
- 7.3 Connect the hydraulic tightening elements (**Fig. 3/W3**) and the distributor (W4) to the high pressure pump (W1) via the high pressure hoses (W2).
- 7.4 Connect the valve (Z) to the high pressure pump and extend all four cylinder head screws simultaneously and continuously at a hydraulic pressure of

p = 820 bar.



Attention:

The pressure must remain constant in the event of the pump not being operated as otherwise tightening will be faulty.

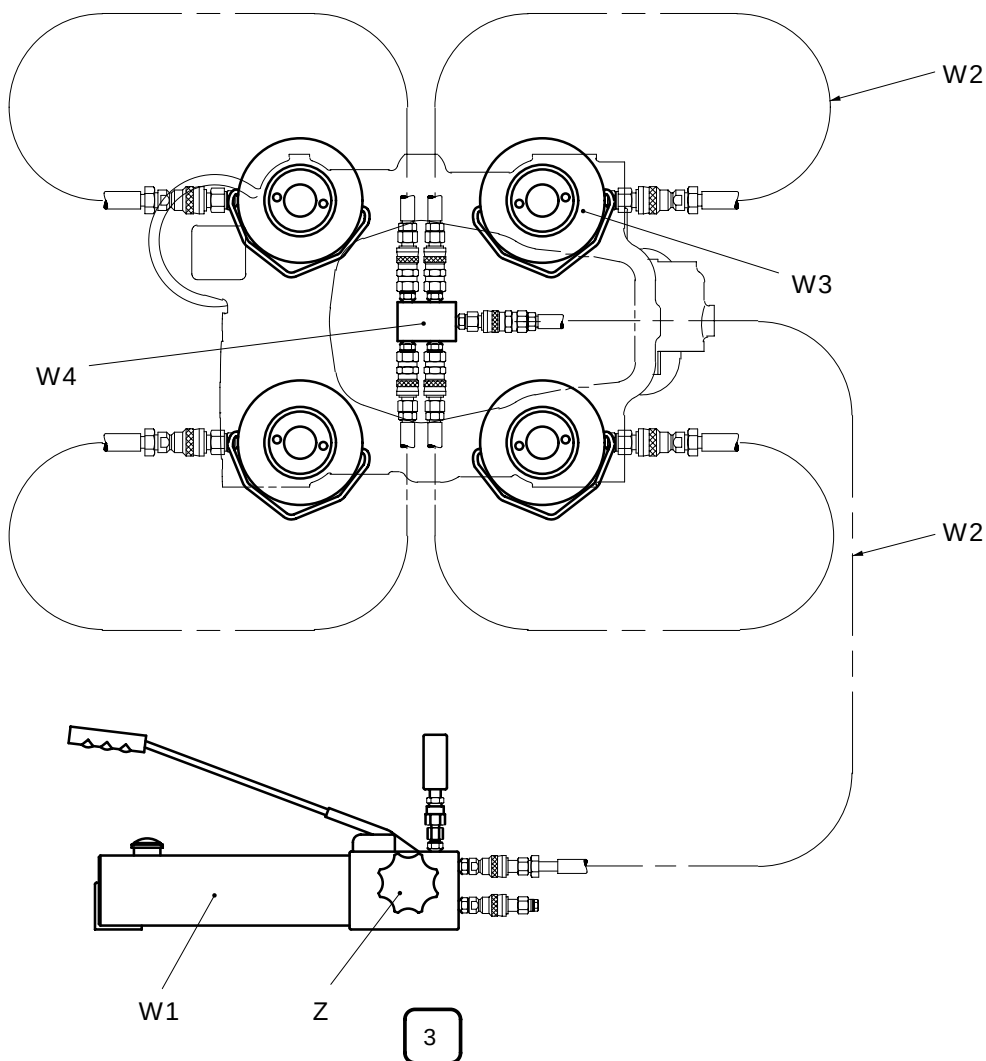
- 7.5 Firmly tighten the round nuts (**Fig. 2/12**) with pin (W7). Pay attention to easy movement.

M25

01

7.6 Check firm seating of the round nuts.

- reduce the pressure by **50 bar**.
- it should no longer be possible to loosen the round nuts with the pin.



7.7 Relieve the hydraulic tightening element and remove it.

8. Mount the exhaust pipe (**06.01.01.nn**).

9. Mount the media supply pipeline (**01.05.50.nn**).

9.1 Remount the pressure gauge lines and fill up with cooling water. Venting at the end of the cooling water return line opposite the turbo charger side.

M25

01

-
10. Mount the transverse thrust pieces for the respective injection pumps.

It is imperative that the assembly instructions are observed. Tighten the pressure screw and screw connection at the specified torque (07.07.01.nn).

11. Adjust the valve clearance (**01.01.01.nn**).
12. Check the gaskets of the cylinder cover hoods, mount the cylinder cover hoods.
13. Mount the pump compartment casing.
14. Remove the turning rod, dismount the turning device, close the indicator valves.
15. Check all connections for leakage after starting up the engine.

M25

3000

02

See also: 03.01.01.nn, 04.04.01.nn, 04.08.01.nn

Spare parts list: B1.05.03.251112

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Inspection:

Inspect running gear / engine timing	all	3.000 h
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Tools:

Socket wrench, indicator valve	W1 *	1.9100-060
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* not available as figure

Note:

Check the bearing temperature when the engine is still warm and the oil circulation has been interrupted. Do further work after a ventilation pause.

Sequence of operations:

1. Open the indicator valves and mount the barring gear.
2. Open the crank case cover approximately 10 minutes after engine shutdown.
3. Touch the crankshaft and connecting rod bearings to see whether they are of uniform and normal temperature.
4. Check all screws and nuts for locking.
5. Check the degree of fouling in the crankcase (sludge, corrosion, bearing metal deposits), loose paintwork).
6. Check the appearance of the cylinder liner surface. Check the lubeoil flow and oil outlet at the bearings.

M25

3000

-
7. Remove camshaft cover. Check the screws of the camshaft section pieces and the lower valve drive for locking.
 - 7.1 Turn engine and check the running surfaces of the camshafts and rollers. Replace defective camshaft section piece, if necessary **(04.04.01.nn)**.
 - 7.2 Check lubeoil flow for camshaft bearings and valve drive.
 8. Check the wheel drive **(04.08.01.nn)** and dismount the barring gear.
 - 8.1 Check the sump and crankcase for left behind tools, rags etc. Check the seals of all crankcase and inspection covers and mount cover.

02

M25

02

See also:

Spare parts list: B1.05.03.251110

Time requirement: 2 Pers./ 1,00 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Inspection:

In the following cases additional measurements have to be made: In the case of suspect or danger of foundation deformation, e. g.:

- by collision of a ship
- subsidence of the foundation
- bearing or crankshaft damages
- prior and after every docking of a ship.

Tools:

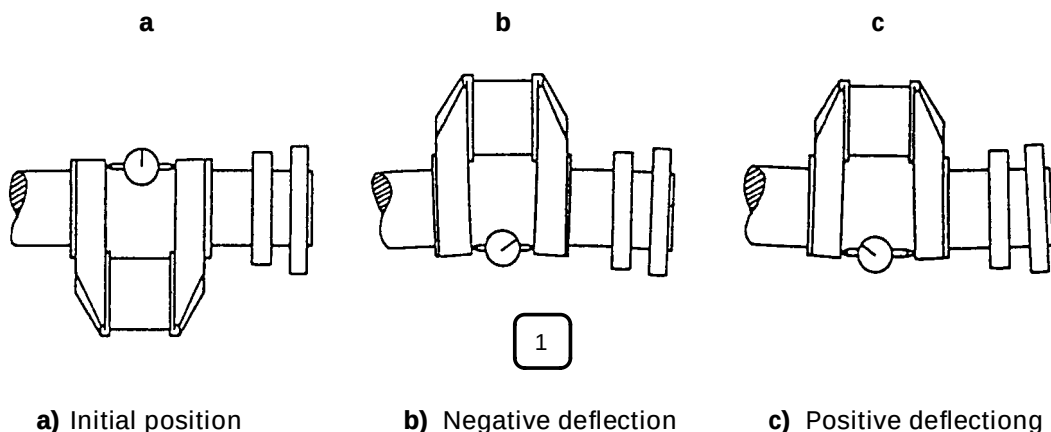
Crank web measuring device	W1	1.9425-300
Socket wrench, indicator valve	W2 *	1.9100-060

* not available as figure

Note:

Crank web deflection means the change in the distance between a pair of crank webs during one rotation of the crankshaft (**Fig. 1**). Depending on the location of the engine, the rigidity of the foundation and of the vessel, different values will be contained when the vessel is loaded; the values will also depend on whether the engine is hot or cold. The measurement should therefore, if possible, always be carried out with the vessel in the same condition as regards loading, not in the dock! Changes under similar conditions appearing suddenly or over an extended period of time give evidence of subsidence of the foundation.

Therefore we recommend to file the measuring sheet separately to be able to relate the crank web deflection values to certain periods of time and to reveal their changes. In the case of unpermissible changes, the plant has to be realigned and the respective main bearings must be inspected.

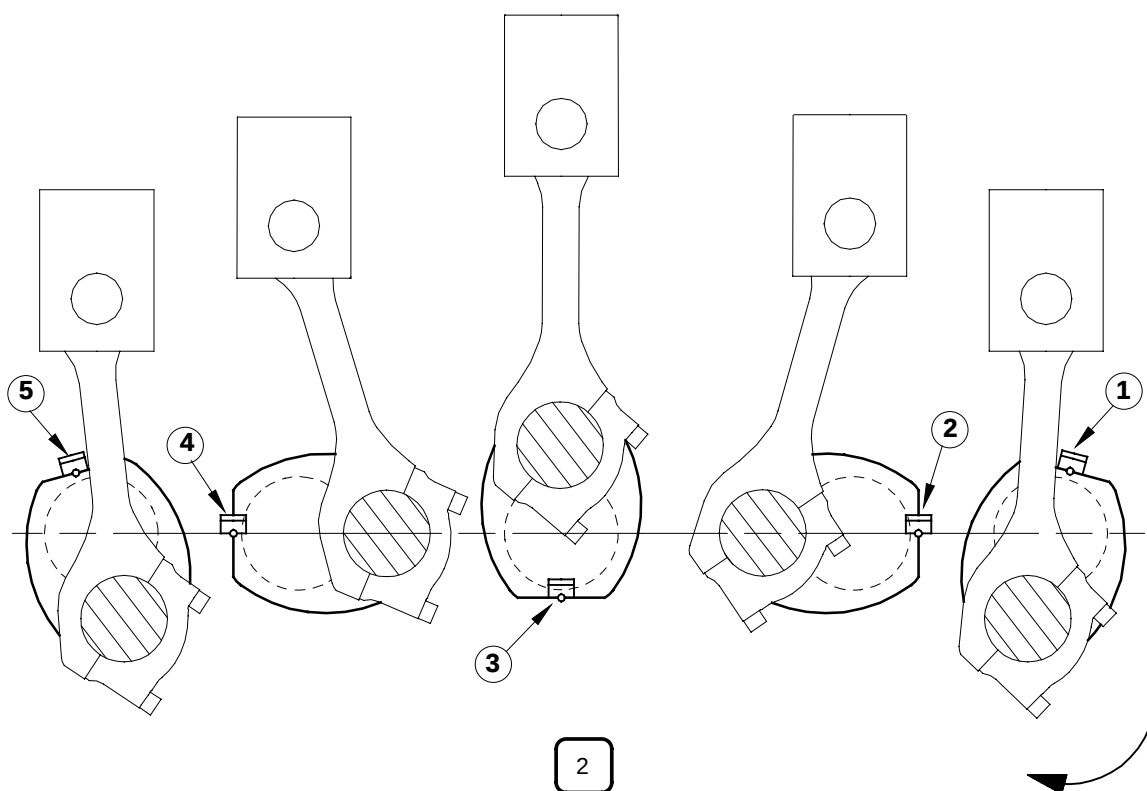


M25

02

Sequence of operations:

1. Open the indicator valves and mount the barring gear. Bar crank pin from BDC in direction of exhaust side to such an extent that the dial gauge can be applied between the crank webs at the point farthest away from the crank pin and the connecting rod just passes by the dial gauge (**Fig. 2**/1st measuring point).
Where punch holes are found, do not place the measuring tips on the centring marks, the purpose of the latter is only to indicate the space in which to use the measuring tips.
2. Adjust the value of scale "20" to the pointer: 1st measuring point (initial point).
3. Bar the crankshaft so that the crank pin turns in direction of the exhaust side and the dial gauge towards the camshaft side.
4. Continually watch the gauge and read off the values in the measuring points ② ⑤. If before or behind a measuring point a higher value than at the prescribed measuring point itself is read, **this** value has to be recorded.
- 4.1 Dismount the barring gear.



- | | | | |
|---|---|---------------------|----------------------------|
| ① | = | 1st measuring point | (initial point) |
| ② | = | 2nd measuring point | (pin on exhaust side) |
| ③ | = | 3rd measuring point | (pin in TDC) |
| ④ | = | 4th measuring point | (pin on camshaft side) |
| ⑤ | = | 5th measuring point | (pin in BDC camshaft side) |

M25

Note:**02**

Crank web deflection first of all is a criterion of the alignment of the engine with the shafting.

Heavy crank web deflection imposes additional loads on crankshaft and main bearings. This means that the admissible deflection is determined by the engine load. A high load admits less deflection than a low one.

The values below must be observed, if it is impossible to obtain the admissible limits for the plant from the **MAK After-sales Service**.

Only the values measured on an engine at operating temperature has to be used for assessment. Values from a cold engine are of inferior importance.

Values for crank web deflection:

Cylinder 1	:	- 0,11 mm
other cylinders	:	0,05 / - 0,08 mm

M25

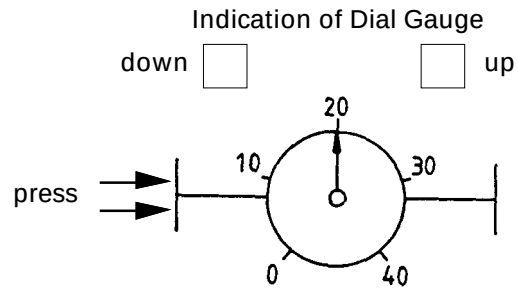
02

Operating hours	Vessel	Date
Engine Type	Engine no.	Engineer/Service Station

Engine cold ☐

Shut down for ☐ hours

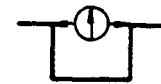
Preheated ☐ °C



Draft forward:

Draft aft:

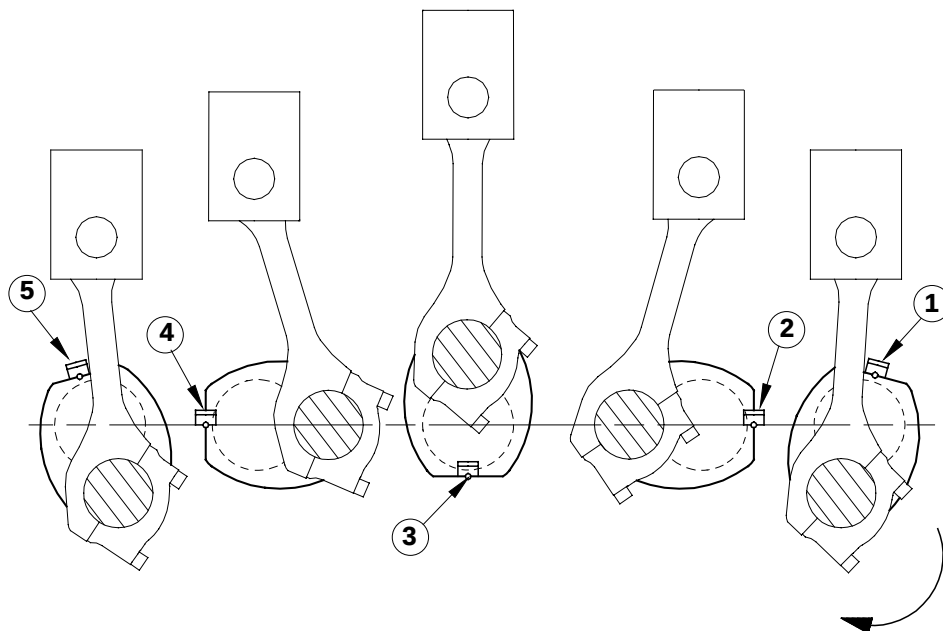
Measuring point	Cylinder								
	1	2	3	4	5	6	7	8	9
①	20	20	20	20	20	20	20	20	20
②									
③									
④									
⑤									
△ max									



△ = negative



△ = positive



M25

02

See also: 02.03.07.nn, 02.04.01.nn, 02.05.01.nn, 02.09.01.nn

Spare parts list: B1.05.02.252601, B1.05.03.251110

Time requirement: 0 Pers./ 0,00 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Note:

Contaminated oil, solid foreign matters and water are the cause of 85 % of all cases of bearing damage.

Dirt is the enemy to all bearings!

To avoid restrictions in the service life consider the following:

- See **A1.05** and **A1.06** for specifications of the lubricating oil temperature and pressure
- See **A4.05.08.nn** for recommendations of the lubricating oil brand (viscosity classification)
- See **A4.05.08.nn** for recommendations of lubricating oil treatment
- See **A4.05.08.nn** for renewal/supplement of the lubricating oil (additives)

When the engine is frequently started and stopped (mixed friction), the bearings may be more rapidly worn so that they must be renewed sooner.

When replacing the bearings in the drive unit, the bearing shells must generally be replaced in pairs (top and lower bearing shell)!

Note:

Corrosion-resistant two-metal bearings are employed at normal loaded bearings.

They consist of a steel back (layer strength **up to 10 mm thickness**) and a running-in layer of approx. **0.7 to 1.1 mm thickness** made of aluminium/tin layer (**Fig. 1**, AlSn...).

M25

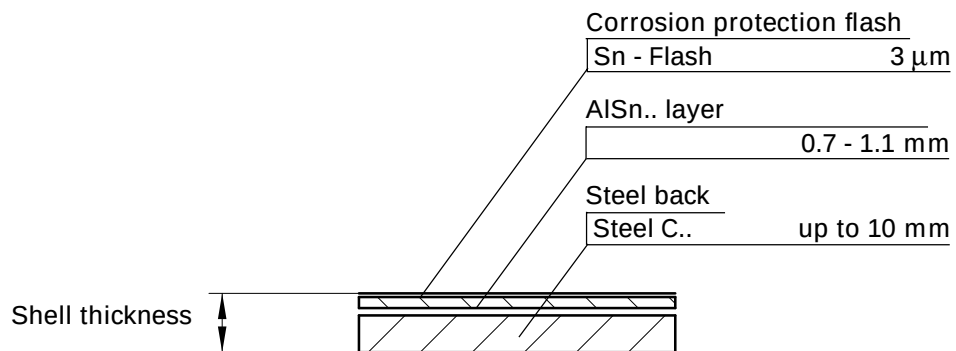
02

The corrosion protection flash of the bearing (approx. 3 µm) is already passed after a short running time.

Replacement of the bearing only after

- heavy scratches,
- exceeding of a possibly specified limit value or
- according to the specified evaluation criteria (**02.03.07.nn**).

Layer configuration of two-metal bearings - AlSn.. bearing



M25

02

See also: 02.03.03.nn, 02.05.01.nn, 02.05.02.nn

Spare parts list: B1.05.03.251110

Time requirement: 0 Pers./ 0,00 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Note:

The following assessment catalog shows different degrees of wear, caused by mechanical wear and overload of the bearing shells.

Assessment catalog:

Criteria for reuse

Fig. 1 - The contact pattern is evenly developed over the total bearing surface. As experience shows, the scratch caused by foreign matter in the lubricating oil has negligible influence on the reliability of the plain bearing.

This bearing shell may be **reused**.

Fig. 2 - The contact pattern is evenly developed over the total bearing surface. This bearing shell may be **reused**.

Fig. 3 - The contact pattern is evenly developed over the total bearing surface. The scratches in running direction are caused by small foreign matter particles in the lubricating oil.

If the depth of these scratches is neither measurable nor feelable, the bearing shell may be **reused**.

If the number, depth and a big extent of the scratches impede the development of a lubricating film, **both** bearing shells are to be **replaced**.

When replacing the bearings in the drive unit, the bearing shells must generally be replaced in pairs (top and lower bearing shell)!

M25

02

Criteria for replacement

Fig. 4 - The contact pattern show heavily developed overload along the edges with galling areas in the aluminium alloy plated overlay.

This bearing shell may not be reused, **both** bearing shells have to be **replaced**. The cause for the overload along the edges has to be found and corrected.

Fig. 5 - The contact pattern show a large area damage with differently developed gallings.

This bearing shell may not be reused, **both** bearing shells have to be **replaced**. The cause for this damage has to be found and corrected. Inspect further bearing shells.

Fig. 6 - The loaded area of the bearing shell shows bearing metal scaling caused by overload. Some bearing metal fragments may lay loosely in the effected area.

This bearing shell may not be reused, **both** bearing shells are to be **replaced**. The cause for the scaling is **definitely** to be found and corrected. Inspect further bearing shells.

M25

02



1



2



3

M25

02



4



5



6

M25

12000, 24000

02

See also: 02.03.03.nn, 02.03.07.nn, 02.06.01.nn

Spare parts list: B1.05.02.252601

Time requirement: 2 Pers./ 0,50 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Distillate fuel

Inspection:

- of one big-end bearing	every	12,000 h
- of all big-end bearings	every	24,000 h

Tools:

Holding device for pistons	W1	259226 A
300 - 800 Nm, 3/4 torque wrench	W2 *	1.9454-800
3/4 changeover ratchet	W3 *	1.9495-036
36 mm insert	W4 *	1.9450-036
Stud (2x)	W5 *	
Socket wrench for indicator valve	W6 *	1.9100-060

* not illustrated

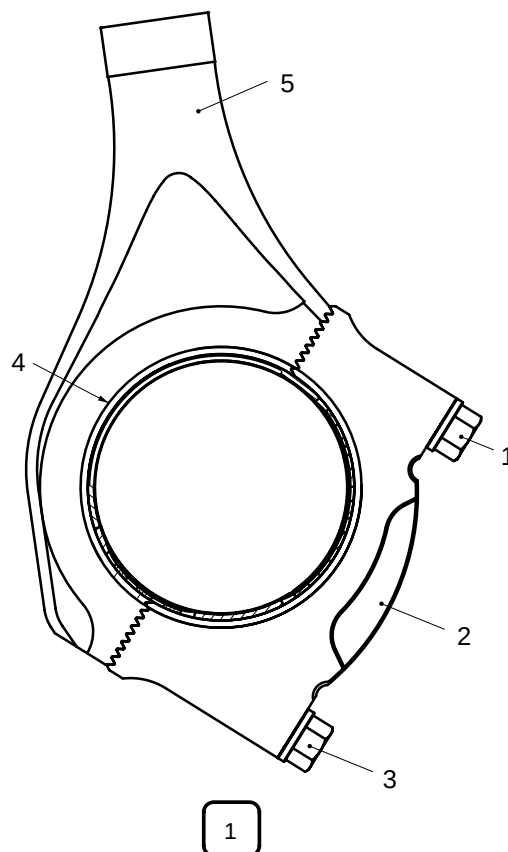
Auxiliary material:

"G Rapid plus" Molykote paste **

** or a product of equal standard

Sequence of operations:

1. **Disassembly of the big-end bearing cover**
 - 1.1 Open the indicator valves and mount the turning device.
 - 1.2 Dismantle the power unit cover of the respective cylinder.
 - 1.3 Turn the crank pin of the respective con-rod (**fig. 1/5**) to the disassembly position (approx. 20° before TDC on the control side).
 - 1.4 Remove the upper con-rod bolt (1).



M25

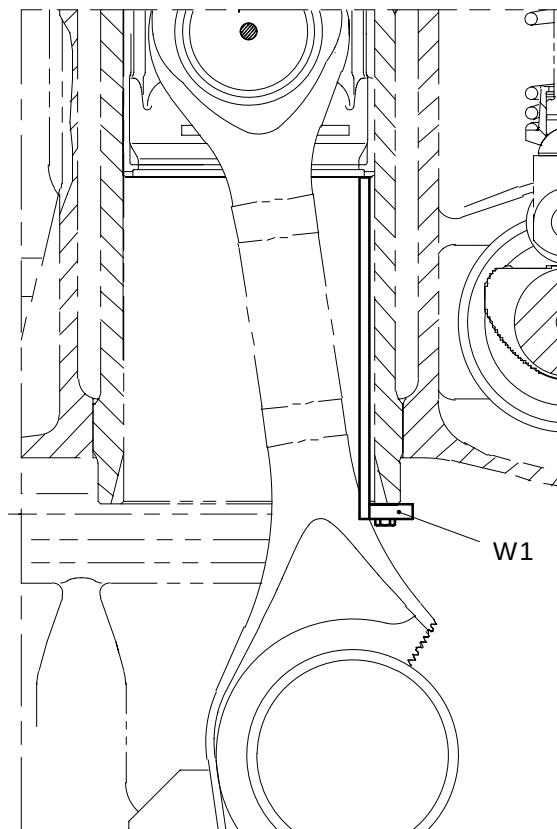
12000, 24000

02

- 1.5 Screw the studs (W5) into the upper con-rod bores.
- 1.6 Hold the big-end bearing cover (**fig. 1/2**) and remove the lower big-end bearing bolts (3).
- 1.7 Lower the big-end bearing cover onto the studs and lift it out of the crankcase.
- 1.8 Check the thread on the big-end bearing bolts and the serrated joints of the con-rod and big-end bearing cover for damage.

2. Disassembly of the bearing shells

- 2.1 Turn the piston to TDC.
- 2.2 Mount the piston holding device (**fig. 2/ W1**).
- 2.3 Carefully turn the crankshaft to the control side until the piston sits on the holding device and the crank pin swivels out of the bottom end of the con-rod.
- 2.4 Remove the bearing shells (**fig. 1/4**) from the crank pin.
- 2.5 Assess the condition of the bearing shells (**02.03.03.nn** and **02.03.07.nn**).
- 2.6 Remove the turning device.



2

M25

6000, 12000

02

See also: 02.03.03.nn, 02.03.07.nn, 02.06.01.nn

Spare parts list: B1.05.02.252601

Time requirement: 2 Pers./ 0,50 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Heavy fuel

Inspection:

- of one big-end bearing	every	6,000 h
- of all big-end bearings	every	12,000 h

Tools:

Holding device for pistons	W1	259226 A
300 - 800 Nm, 3/4 torque wrench	W2 *	1.9454-800
3/4 changeover ratchet	W3 *	1.9495-036
36 mm insert	W4 *	1.9450-036
Stud (2x)	W5 *	
Socket wrench for indicator valve	W6 *	1.9100-060

* not illustrated

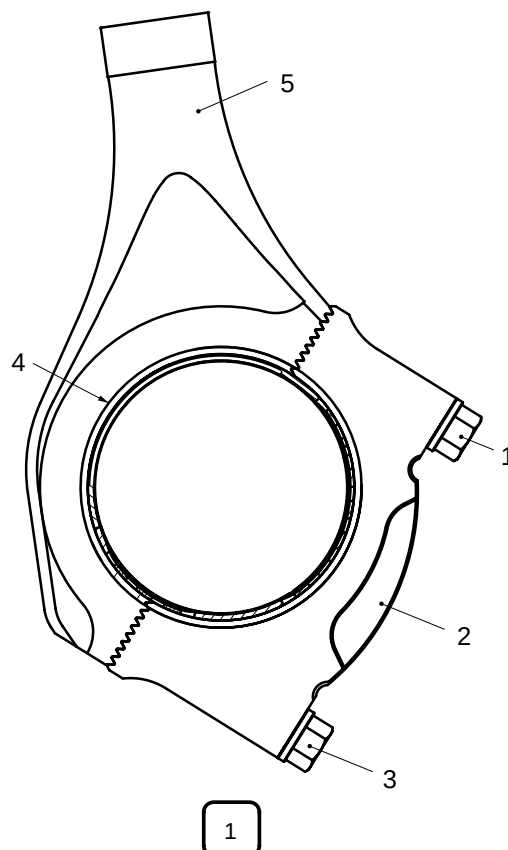
Auxiliary material:

"G Rapid plus" Molykote paste **

** or a product of equal standard

Sequence of operations:

1. **Disassembly of the big-end bearing cover**
 - 1.1 Open the indicator valves and mount the turning device.
 - 1.2 Dismantle the power unit cover of the respective cylinder.
 - 1.3 Turn the crank pin of the respective con-rod (**fig. 1/5**) to the disassembly position (approx. 20° before TDC on the control side).
 - 1.4 Remove the upper con-rod bolt (1).



M25

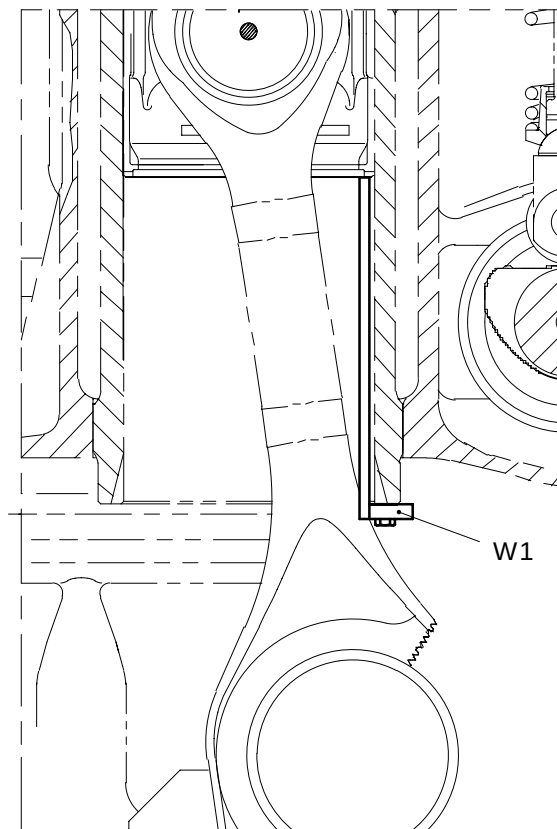
6000, 12000

02

- 1.5 Screw the studs (W5) into the upper con-rod bores.
- 1.6 Hold the big-end bearing cover (**fig. 1/2**) and remove the lower big-end bearing bolts (3).
- 1.7 Lower the big-end bearing cover onto the studs and lift it out of the crankcase.
- 1.8 Check the thread on the big-end bearing bolts and the serrated joints of the con-rod and big-end bearing cover for damage.

2. Disassembly of the bearing shells

- 2.1 Turn the piston to TDC.
- 2.2 Mount the piston holding device (**fig. 2/ W1**).
- 2.3 Carefully turn the crankshaft to the control side until the piston sits on the holding device and the crank pin swivels out of the bottom end of the con-rod.
- 2.4 Remove the bearing shells (**fig. 1/4**) from the crank pin.
- 2.5 Assess the condition of the bearing shells (**02.03.03.nn** and **02.03.07.nn**).
- 2.6 Remove the turning device.



2

M25

02

See also: 02.04.01.nn, 02.03.03.nn, 02.03.07.nn

Spare parts list: B1.05.02.252601

Time requirement: 2 Pers./ 0,50 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Tools W1-W6: Refer to **02.04.01.nn**

Assembly hoop

W7

259125 B

Auxiliary material:

"G-Rapid Plus" Molykote paste **

** or a product of equal standard

Note:

The bearing cover, bearing shells and bearing bolts are always marked at the control end according to which cylinder they belong (as viewed from the coupling end). New parts must be marked accordingly.

Use "G-Rapid Plus" Molykote paste for greasing threads and screw contact surfaces.

Sequence of operations:

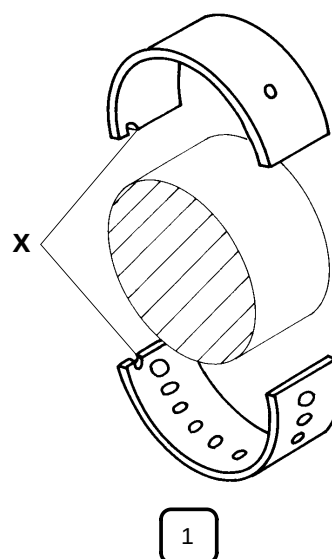
1. Fitting the bearing shells

- 1.1 Open the indicator valves, mount the turning device and turn the crank pin to the assembly position (approx. 20° before TDC).
- 1.2 Clean and lubricate the crank pin.
- 1.3 Lubricate the bearing shells on the inside and outside and place them on the crank pin.

Attention:

Insert the bearing shells in such a way that the bore (fig. 1/X) for locating the bearing shells is positioned on the exhaust side.

The bore is in the bearing shell halves facing towards the coupling end.



M25

02

Note:

The bearing shells should be replaced in **pairs**. Mark both halves with a punch according to the cylinder number (control side) (**fig. 3/Z**).

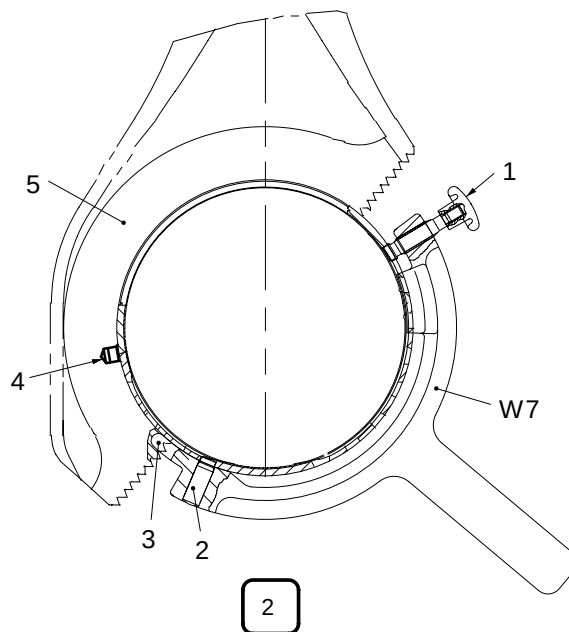
Always replace the con-rod and bearing cover **together** and mark them on the control side.

- 1.4 Hold the bearing shells in this position and push the assembly hoop (**fig. 2/W7**) over the bearing shells from the assembly side (control side).

Note:

The lower peg (2) of the assembly hoop must lock in the oil bore on the lower bearing shell and the peg on the stirrup bolt (1) must lock in the hole on the upper bearing shell.

- 1.5 Tighten the stirrup bolt (1) slightly.
- 1.6 Turn the crankshaft until the bottom end of the con-rod sits lightly on the bearing shells and the assembly hoop lies on the lower joint face of the bottom end of the con-rod (5).



Note:

The nose (3) of the assembly hoop locks in the groove in the lower joint face of the bottom end (5) for centric guidance of the bearing shells.

- 1.7 Turn the bearing shells in such a way by means of the grip on the assembly hoop so that the con-rod locating pin (4) locks in the bore in the lower and upper bearing shell and the bearing shells sit in the con-rod bore.

Attention:

There is a danger of the bearing shells being damaged if assembly is carried out incorrectly.

- 1.8 Turn the piston to TDC, remove the assembly hoop (W7) and piston holding device (W1).

M25

02
2. Fitting the big-end bearing cover (fig. 3/12).

- 2.1 Screw the studs (W5) into the upper big-end bolt bores.
- 2.2 Coat the thread and head contact surfaces of the big-end bolts with **"G-Rapid Plus" Molykote paste**.
- 2.3 Place the big-end bearing cover (12) on the studs (marking facing the control side).
- 2.4 Press the big-end bearing cover against the bottom end and screw in the lower (longer) big-end bearing bolts (13).
- 2.5 Remove the studs (W5) and screw in the upper big-end bearing bolts (11).

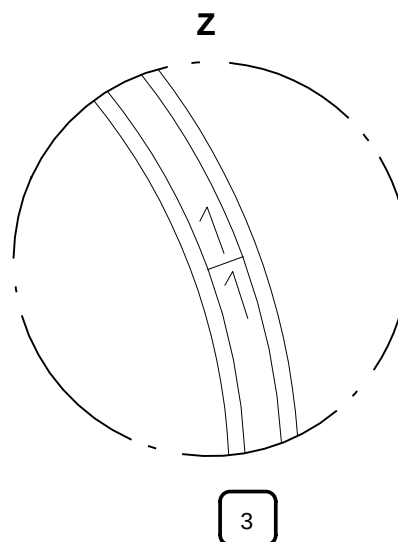
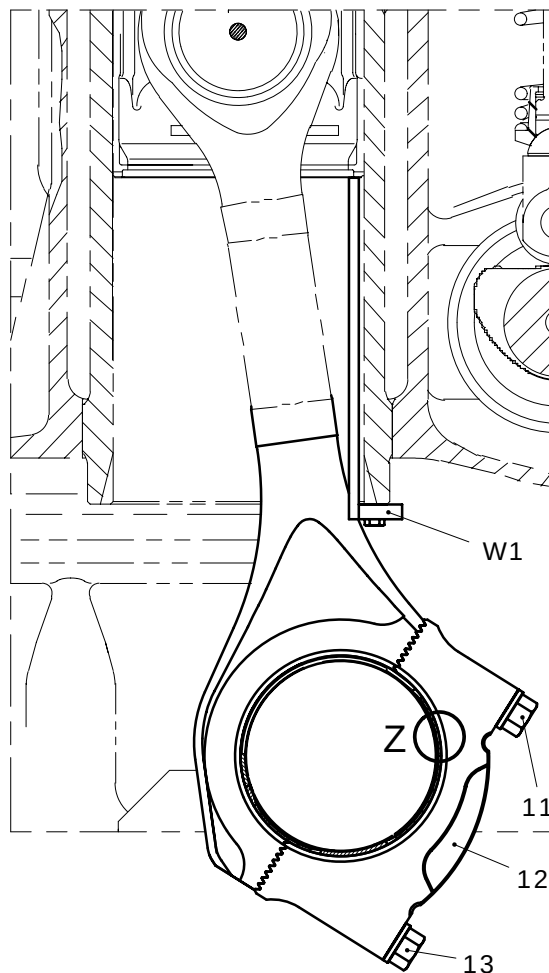
3. Tightening the big-end bearing bolts.

- 3.1 Tighten the upper big-end bearing bolts (fig. 3/11) alternately in two stages at a torque of

$$M = 300 \text{ Nm} .$$

- 3.2 Tighten the lower big-end bearing bolts (13) alternately in two stages at a torque of

$$M = 300 \text{ Nm} .$$



M25

02

3.3 Tighten the upper big-end bearing bolts (**fig. 3/11**) alternately at a torque of

M = 600 Nm.

3.4 Tighten the lower big-end bearing bolts (13) alternately at a torque of

M = 600 Nm.

3.5 Tighten the upper big-end bearing bolts (11) again alternately at a torque of

M = 600 Nm.

Attention:

The upper big-end bearing bolts (11) have to be tightened again in operating sequence 3.5 at a final torque of 600 Nm to prevent a loss of initial tension caused by settling.

3.6 Remove the piston holding device (W1) and the turning device.

3.7 Close the indicator valves and mount the power unit cover.

M25

24000, 48000

02

See also: 02.03.03.nn, 02.03.07.nn

Spare parts list: B1.05.03.251110

Time requirement: 2 Pers./ 1,00 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Distillate fuel

Inspection:

a) of one crankshaft bearing every 24,000 h

Number of cylinders	Bearing no.
6	4
8	5
9	6

b) of all crankshaft bearings every 48,000 h

Tools:

Hydraulic equipment, consisting of:	W1	
Support ring	W1.1	0.9203-209
Hydraulic tensioning element	W1.2	0.9213 C
High-pressure pump	W1.3	0.9204 D
High-pressure hose (1 m)	W1.4	0.9205 B
Pin	W1.5	0.9203-110
Threaded sleeve	W1.6	0.9206-001
Mounting / extraction device (crankshaft bearing, consisting of:	W2	259214 A
Support arms	W2.1	259214-001
Receiver	W2.2	259214-003
Carrier (bearing shells)	W2.3	259119 A
Assembly device (crankshaft bearing)	W2.4	259214-005
300 - 800 Nm torque wrench	W11 *	1.9454-800
3/4 changeover ratchet	W12 *	1.9495-036
46 mm insert (side screws)	W13 *	1.9450-046
Feeler gauge	W14 *	1.9075-003
Socket wrench for indicator valves	W15 *	1.9100-060

* not illustrated

M25

24000, 48000

02

Attention:

The smallest bending radius for high pressure hoses is $r = 120 \text{ mm}$!
Use hydraulic oil only for the hydraulic equipment.
Store the hydraulic equipment protected against corrosion.



Safety note:

Do not place any parts of the body over pressurized devices. Secure the engine against unintentional starting!

Note:

The crankshaft thrust bearing consists of the 1st crankshaft bearing (coupling end) and 4 stop disk segments which limit the axial play of the crankshaft.

The two lower stop disk segments (**fig. 1**/ 1) are fixed on the crankshaft bearing cover (3) by means of dowel pins (2). The two upper stop disk segments are pushed into grooves in the cylinder crankcase.

The bearing cover and bearing shells of the crankshaft bearings are marked consecutively according to which cylinder they belong to beginning at the coupling end and are not allowed to be interchanged. New parts must be marked accordingly.

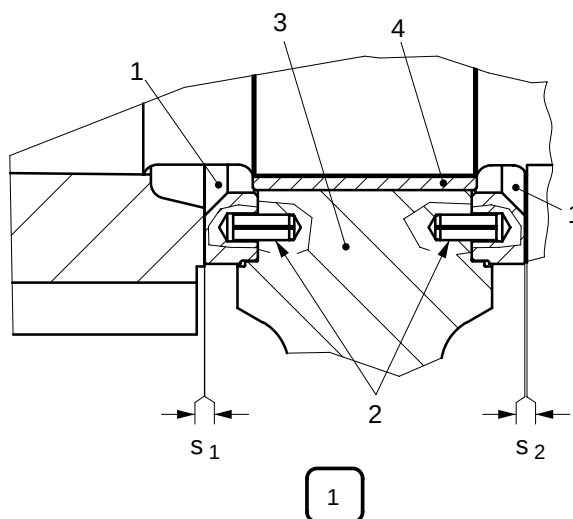
The crankshaft bearings have to be dismantled, checked and measured within the specified interval in the event of:

- Distortions of the foundation or
- Changes in the crank web deflection

after damage at sea.

Sequence of operations:

1. **Measure the axial clearance "s" (crankshaft thrust bearing).**
 - 1.1 Remove the cover below the timing gear train and the power unit cover of cylinder 1 on the control side.
 - 1.2 Measure the axial clearance " $s_1 + s_2$ " at the crankshaft thrust bearing with the feeler gauge (**fig. 1**).



M25

24000, 48000

1.2.1 Axial clearance „s“:

02

$$s = s_1 + s_2$$

Clearance when new mm	Clearance limit mm
0.3 - 0.6	0.8

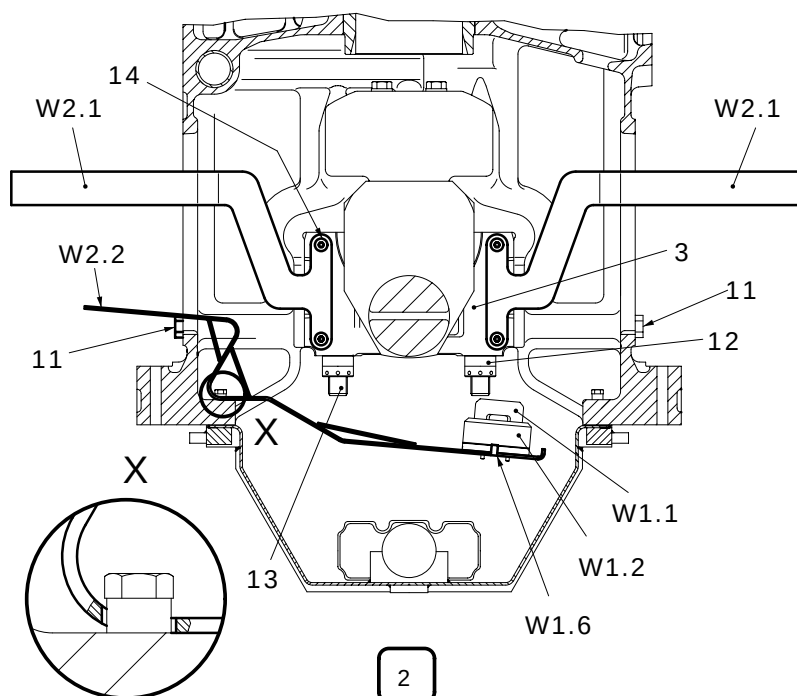
When the clearance limit is exceeded, the stop disk segments (**fig. 1/1**) and bearing shells (4) must be replaced **in pairs** ; refer to operating sequence 2, disassembly of crankshaft bearing.

Attention:

Make sure the stop disks (1) are marked before removing them for inspection purposes. Then mount them again without delay!

2. Dismantle the crankshaft bearing.

- 2.1 Open the indicator valves, mount the turning device and remove the corresponding power unit cover (control side).
- 2.2 Turn the crankshaft to a favourable position. The round nuts (**fig. 2/12**) on the crankshaft bearing bolts (13) must be freely accessible.
- 2.3 Loosen the round nuts (12) by means of the hydraulic tightening device.



M25

24000, 48000

02

- 2.3.1 Remove the hexagon bolts (**fig. 2/11**) of the respective crankshaft bearing on the exhaust and control sides.
- 2.3.2 Mount the support arms (W2.1) on the exhaust and control sides on the crankshaft bearing cover (3). Tighten the bolts (14) to the limit stop.
- 2.3.3 Place the receivers (W2.2) successively in the cylinder crankcase (**x**) on both sides of the engine and carry out the operating sequences 2.3.4 to 2.3.6.
- 2.3.4 Place the hydraulic tensioning element (W1.2) with the threaded sleeve (W1.6) and support ring (W1.1) on the receiver (W2.2).
- 2.3.5 Swivel the receiver (W2.2) under the respective round nut (12) and raise the hydraulic tools (W1.1, W1.2, W1.6) until the support ring (W1.1) lies flat on the crankshaft bearing cover (3). Pay attention good accessibility of the slits (**fig. 3/21**).
- 2.3.6 Screw the threaded sleeve firmly onto the crankshaft bearing bolt and then screw it back by **3/4** of a revolution. The ring surface (a) of the threaded sleeve is then flush with the upper surface (b) of the hydraulic tensioning element (W1.2).
- 2.3.7 Connect the hydraulic tensioning elements (**fig. 4/W1.2**) to the high-pressure pump (W1.3) via the high-pressure hoses (W1.4).

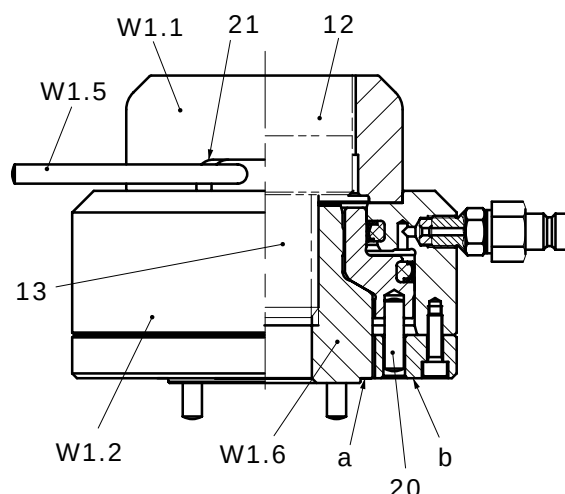
Attention:

The pin (fig. 3/20), maximum stroke indicator) must not be driven out of the hydraulic tensioning element (W1.2) when extending the crankshaft bearing bolts (13)!

- 2.3.8 Close the valve (**fig. 4/Z**) on the high pressure pump and extend both crankshaft bearing bolts **simultaneously and stepless** at a hydraulic pressure of

p = 980 bar.

- 2.3.9 Loosen the round nuts (**fig. 3/12**) with the pin (W1.5). Turn the round nuts back by at least 8 holes.



3

M25

24000, 48000

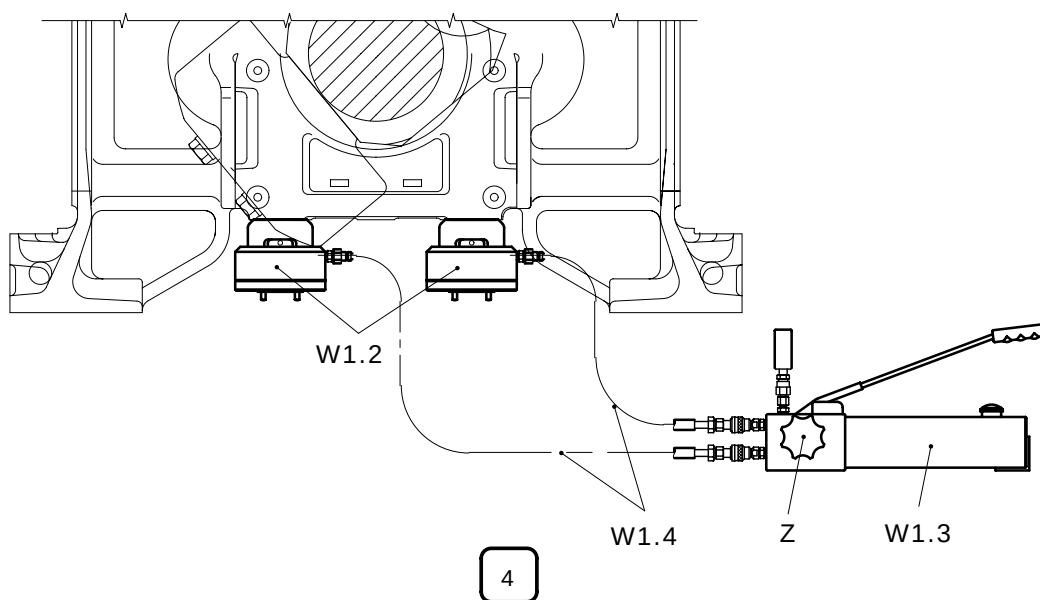
02
Note:

If it is not possible to loosen the round nuts with the pin, then the crankshaft bearing bolts can be pretensioned at a **higher** pressure of

$$p = 50 \text{ bar}$$

If the pressure is increased even further, then there is a danger of the round nut jamming as a result of the bolt thread expanding.

- 2.4 Open the valve (**fig. 4/Z**) on the high-pressure pump (W1.3). The tensioning elements (W1.2) are relieved.



- 2.4.1 Wait for the pressure to drop completely then remove the threaded sleeves (**fig. 3/W1.6**), hydraulic tensioning elements (W1.2) and support rings (W1.1).
- 2.4.2 **Only loosen** the hexagon bolts (**fig. 2/11**) on the adjacent crankshaft bearings on the exhaust and control sides.
- 2.4.3 Attach the support arms (W2.1) on the exhaust and control sides to a crane and secure them.

Attention:

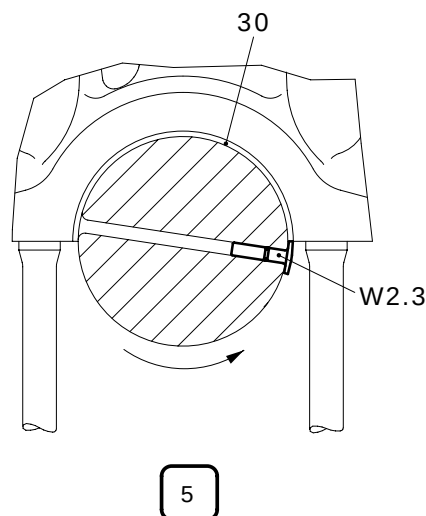
The crankshaft bearing cover (3) must be held securely in this position when removing the round nuts (12)!

M25

24000, 48000

02

- 2.5 Measure the gap, refer to operating sequence 3.
- 2.6 Remove the round nuts (**fig. 2/12**) and carefully lower the crankshaft bearing cover (3) by means of the crane.
- 2.7 Turn the crankshaft with the counter-weight towards the control side and remove the lower bearing shell (**fig. 1/4**) from the crankshaft bearing cover (3).
- 2.8 Insert the carrier (**fig. 5/W2.3**) in the oil bore on the crankshaft and turn the upper bearing shell (30) out towards the **exhaust side**.
- 2.9 Assess the bearing shells. Refer to **02.03.03.nn** and **02.03.07.nn**.
- 2.10 Measure the wear on the wall in the crankshaft stress zone at the measuring points (**fig. 6/X**) by means of a micrometer gauge.



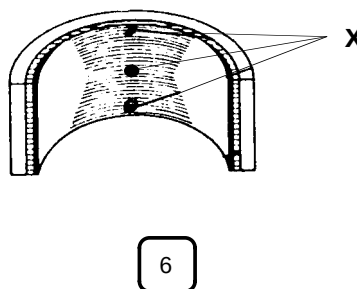
Wear = Measurement when new - actual measurement

- 2.10.1 The bearing shells must be replaced if there is a wear of **> 0.05 mm** in the crown area (**fig. 6/X**).

Measurement when new:
5,905_{-0,02} mm

Attention:

If it is necessary to replace the bearing shells, then the adjacent bearings must also be checked.



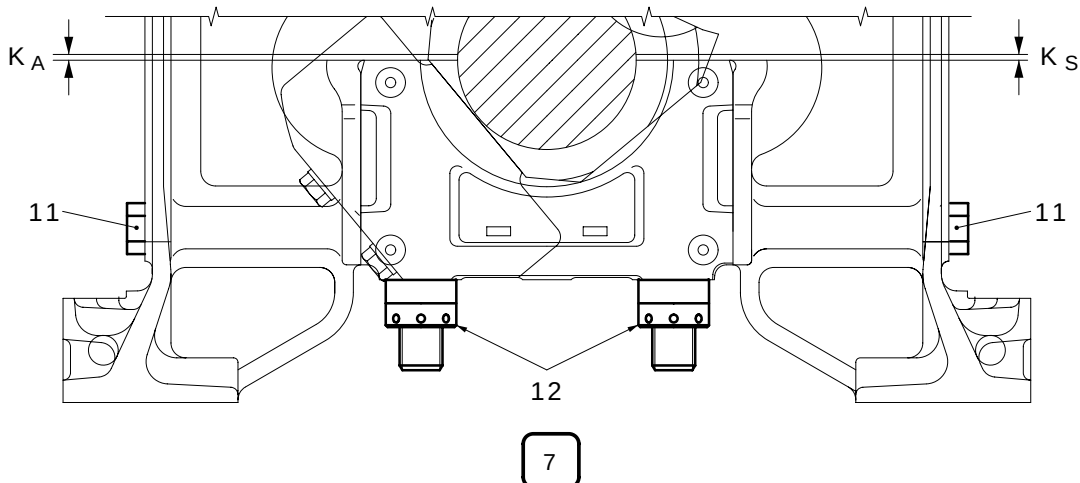
M25

24000, 48000

02

3. Measure the gap.

- 3.1 Remove the hexagon nuts (**fig. 7/11**) of the corresponding crankshaft bearing on the exhaust end control sides and **only loosen** the hexagon bolts (11) on the adjacent crankshaft bearings.



- 3.2 Loosen both round nuts hydraulically (12) according to operating sequence 2.3. Relieve the hydraulic extraction device and remove it. Refer to 2.4.
- 3.3 Loosen the round nuts further, do not remove them. Then tighten the round nuts alternately and evenly by hand until the joint faces of the bearing shells just make contact.
- 3.4 Use a feeler gauge to measure the gap "K" between the cylinder crankcase and crankshaft bearing cover on the exhaust and control sides and add the two measures values

$$K = K_A + K_S$$

Gap "K" mm	Operating limit value mm
0.80 - 1.07	0.65

M25

12000, 24000

See also: 02.03.03.nn, 02.03.07.nn

Spare parts list: B1.05.03.251110

Time requirement: 2 Pers./ 1,00 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Heavy fuel

02

Inspection:

a) of one crankshaft bearing every 12,000 h

Number of cylinders	Bearing no.
6	4
8	5
9	6

b) of all crankshaft bearings every 24,000 h

Tools:

Hydraulic equipment, consisting of:	W1	
Support ring	W1.1	0.9203-209
Hydraulic tensioning element	W1.2	0.9213 C
High-pressure pump	W1.3	0.9204 D
High-pressure hose (1 m)	W1.4	0.9205 B
Pin	W1.5	0.9203-110
Threaded sleeve	W1.6	0.9206-001
Mounting / extraction device (crankshaft bearing, consisting of:	W2	259214 A
Support arms	W2.1	259214-001
Receiver	W2.2	259214-003
Carrier (bearing shells)	W2.3	259119 A
Assembly device (crankshaft bearing)	W2.4	259214-005
300 - 800 Nm torque wrench	W11 *	1.9454-800
3/4 changeover ratchet	W12 *	1.9495-036
46 mm insert (side screws)	W13 *	1.9450-046
Feeler gauge	W14 *	1.9075-003
Socket wrench for indicator valves	W15 *	1.9100-060

* not illustrated

M25

12000, 24000

02

Attention:

The smallest bending radius for high pressure hoses is $r = 120 \text{ mm}$!
Use hydraulic oil only for the hydraulic equipment.
Store the hydraulic equipment protected against corrosion.



Safety note:

Do not place any parts of the body over pressurized devices. Secure the engine against unintentional starting!

Note:

The crankshaft thrust bearing consists of the 1st crankshaft bearing (coupling end) and 4 stop disk segments which limit the axial play of the crankshaft.
The two lower stop disk segments (**fig. 1**/ 1) are fixed on the crankshaft bearing cover (3) by means of dowel pins (2). The two upper stop disk segments are pushed into grooves in the cylinder crankcase.
The bearing cover and bearing shells of the crankshaft bearings are marked consecutively according to which cylinder they belong to beginning at the coupling end and are not allowed to be interchanged. New parts must be marked accordingly.

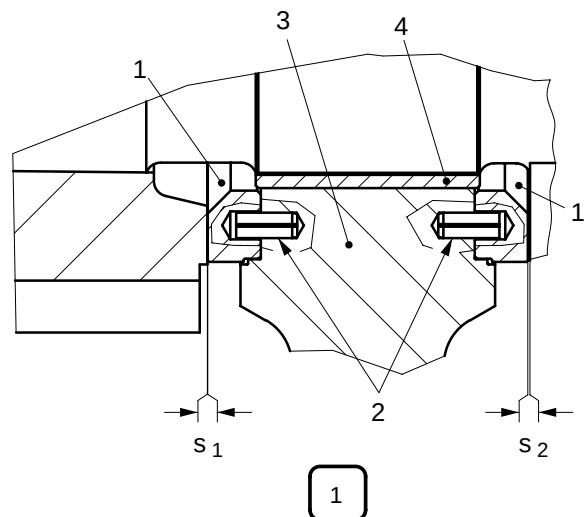
The crankshaft bearings have to be dismantled, checked and measured within the specified interval in the event of:

- Distortions of the foundation or
- Changes in the crank web deflection

after damage at sea.

Sequence of operations:

1. **Measure the axial clearance "s" (crankshaft thrust bearing).**
 - 1.1 Remove the cover below the timing gear train and the power unit cover of cylinder 1 on the control side.
 - 1.2 Measure the axial clearance " $s_1 + s_2$ " at the crankshaft thrust bearing with the feeler gauge (**fig. 1**).



M25

12000, 24000

1.2.1 Axial clearance „s“:

02

$$s = s_1 + s_2$$

Clearance when new mm	Clearance limit mm
0.3 - 0.6	0.8

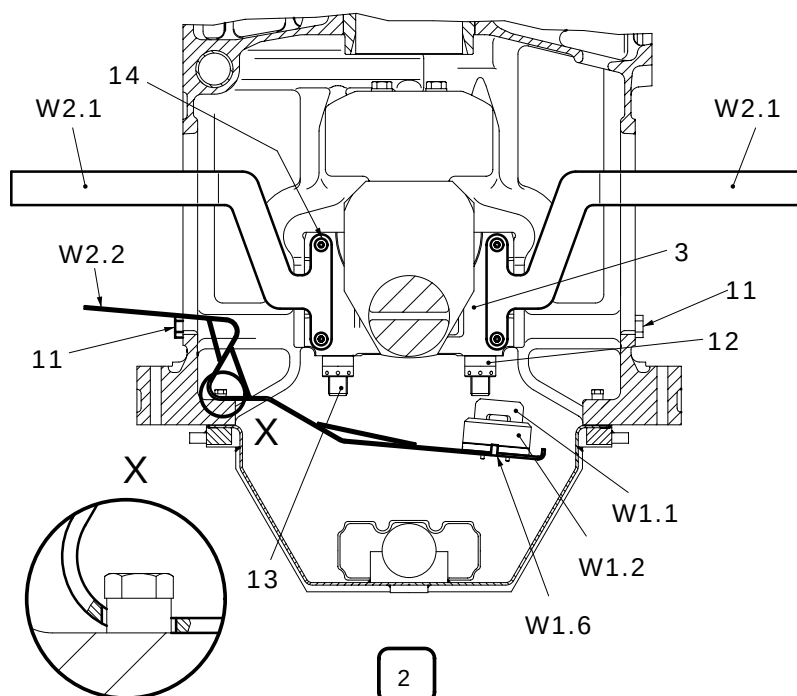
When the clearance limit is exceeded, the stop disk segments (**fig. 1/1**) and bearing shells (4) must be replaced **in pairs** ; refer to operating sequence 2, disassembly of crankshaft bearing.

Attention:

Make sure the stop disks (1) are marked before removing them for inspection purposes. Then mount them again without delay!

2. Dismantle the crankshaft bearing.

- 2.1 Open the indicator valves, mount the turning device and remove the corresponding power unit cover (control side).
- 2.2 Turn the crankshaft to a favourable position. The round nuts (**fig. 2/12**) on the crankshaft bearing bolts (13) must be freely accessible.
- 2.3 Loosen the round nuts (12) by means of the hydraulic tightening device.



M25

12000, 24000

02

- 2.3.1 Remove the hexagon bolts (**fig. 2/11**) of the respective crankshaft bearing on the exhaust and control sides.
- 2.3.2 Mount the support arms (W2.1) on the exhaust and control sides on the crankshaft bearing cover (3). Tighten the bolts (14) to the limit stop.
- 2.3.3 Place the receivers (W2.2) successively in the cylinder crankcase (**x**) on both sides of the engine and carry out the operating sequences 2.3.4 to 2.3.6.
- 2.3.4 Place the hydraulic tensioning element (W1.2) with the threaded sleeve (W1.6) and support ring (W1.1) on the receiver (W2.2).
- 2.3.5 Swivel the receiver (W2.2) under the respective round nut (12) and raise the hydraulic tools (W1.1, W1.2, W1.6) until the support ring (W1.1) lies flat on the crankshaft bearing cover (3). Pay attention good accessibility of the slits (**fig. 3/21**).
- 2.3.6 Screw the threaded sleeve firmly onto the crankshaft bearing bolt and then screw it back by **3/4** of a revolution. The ring surface (a) of the threaded sleeve is then flush with the upper surface (b) of the hydraulic tensioning element (W1.2).
- 2.3.7 Connect the hydraulic tensioning elements (**fig. 4/W1.2**) to the high-pressure pump (W1.3) via the high-pressure hoses (W1.4).

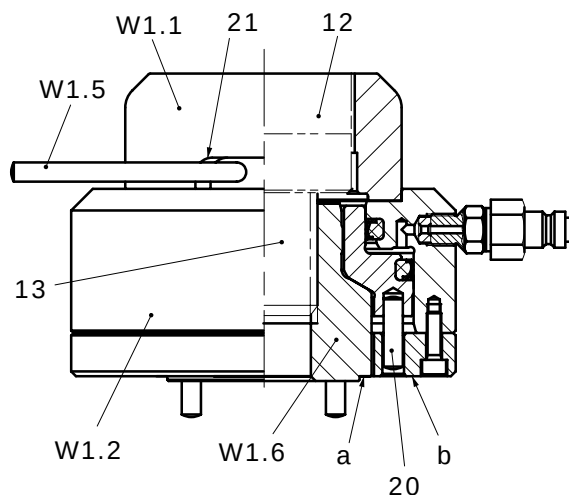
Attention:

The pin (fig. 3/20), maximum stroke indicator) must not be driven out of the hydraulic tensioning element (W1.2) when extending the crankshaft bearing bolts (13)!

- 2.3.8 Close the valve (**fig. 4/Z**) on the high pressure pump and extend both crankshaft bearing bolts **simultaneously and stepless** at a hydraulic pressure of

p = 980 bar.

- 2.3.9 Loosen the round nuts (**fig. 3/12**) with the pin (W1.5). Turn the round nuts back by at least 8 holes.



3

M25

12000, 24000

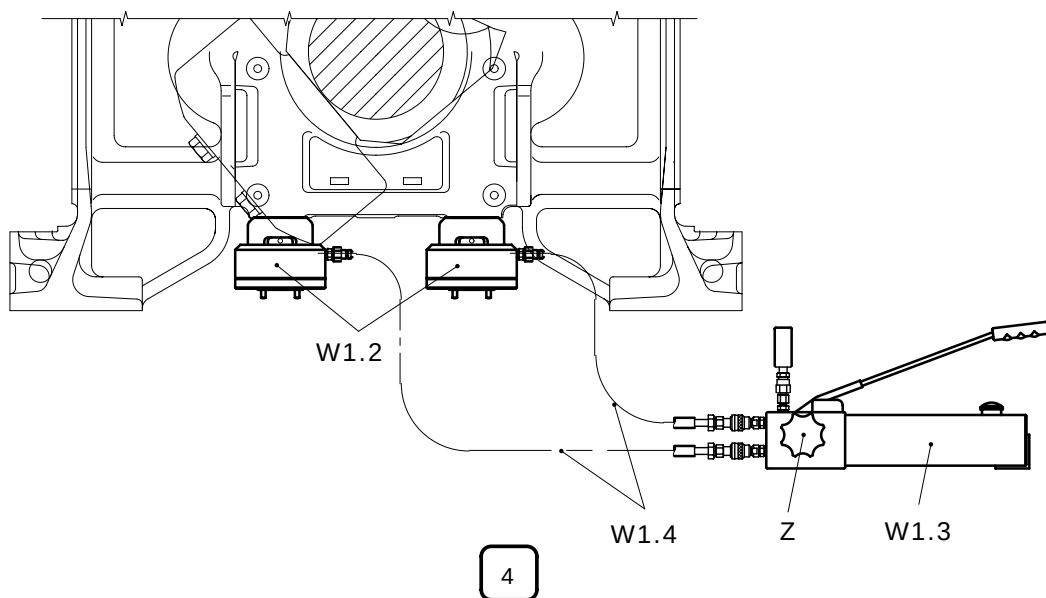
02
Note:

If it is not possible to loosen the round nuts with the pin, then the crankshaft bearing bolts can be pretensioned at a **higher** pressure of

$$p = 50 \text{ bar}$$

If the pressure is increased even further, then there is a danger of the round nut jamming as a result of the bolt thread expanding.

- 2.4 Open the valve (**fig. 4/Z**) on the high-pressure pump (W1.3). The tensioning elements (W1.2) are relieved.



- 2.4.1 Wait for the pressure to drop completely then remove the threaded sleeves (**fig. 3/W1.6**), hydraulic tensioning elements (W1.2) and support rings (W1.1).
- 2.4.2 **Only loosen** the hexagon bolts (**fig. 2/11**) on the adjacent crankshaft bearings on the exhaust and control sides.
- 2.4.3 Attach the support arms (W2.1) on the exhaust and control sides to a crane and secure them.

Attention:

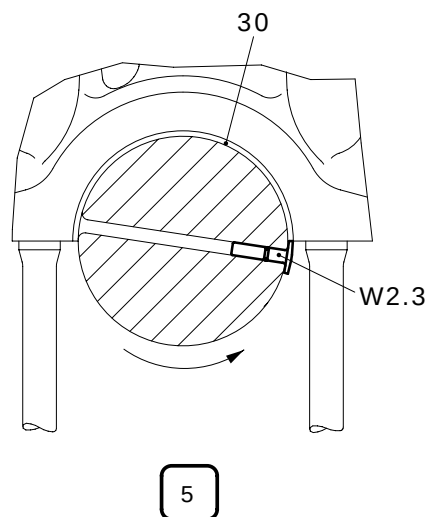
The crankshaft bearing cover (3) must be held securely in this position when removing the round nuts (12)!

M25

12000, 24000

02

- 2.5 Measure the gap, refer to operating sequence 3.
- 2.6 Remove the round nuts (**fig. 2/12**) and carefully lower the crankshaft bearing cover (3) by means of the crane.
- 2.7 Turn the crankshaft with the counter-weight towards the control side and remove the lower bearing shell (**fig. 1/4**) from the crankshaft bearing cover (3).
- 2.8 Insert the carrier (**fig. 5/W2.3**) in the oil bore on the crankshaft and turn the upper bearing shell (30) out towards the **exhaust side**.
- 2.9 Assess the bearing shells. Refer to **02.03.03.nn** and **02.03.07.nn**.
- 2.10 Measure the wear on the wall in the crankshaft stress zone at the measuring points (**fig. 6/X**) by means of a micrometer gauge.



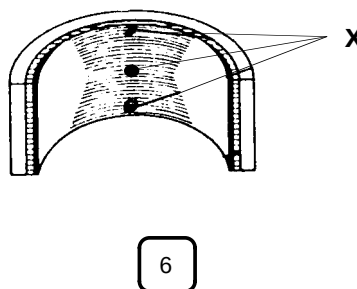
Wear = Measurement when new - actual measurement

- 2.10.1 The bearing shells must be replaced if there is a wear of **> 0.05 mm** in the crown area (**fig. 6/X**).

Measurement when new:
5,905_{-0,02} mm

Attention:

If it is necessary to replace the bearing shells, then the adjacent bearings must also be checked.



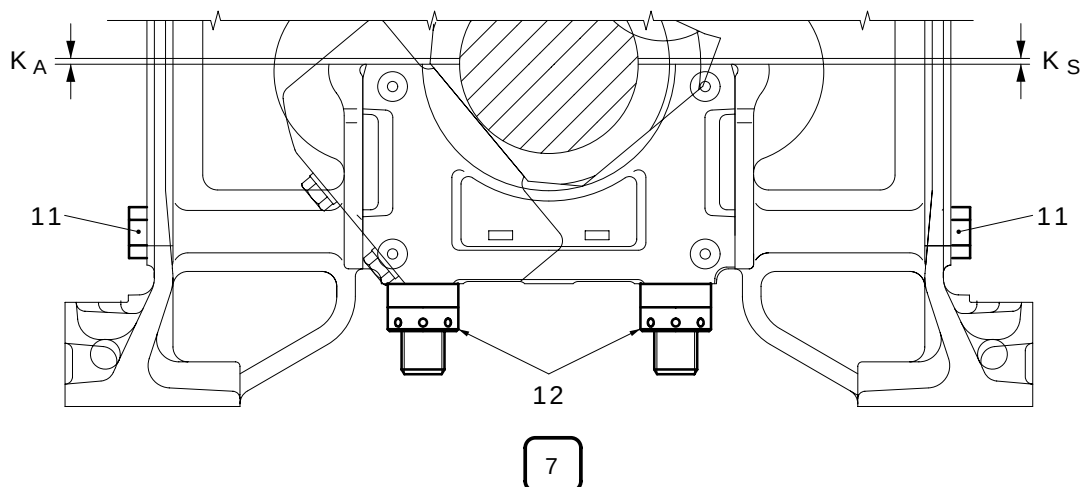
M25

12000, 24000

02

3. Measure the gap.

- 3.1 Remove the hexagon nuts (**fig. 7/11**) of the corresponding crankshaft bearing on the exhaust end control sides and **only loosen** the hexagon bolts (11) on the adjacent crankshaft bearings.



- 3.2 Loosen both round nuts hydraulically (12) according to operating sequence 2.3. Relieve the hydraulic extraction device and remove it. Refer to 2.4.
- 3.3 Loosen the round nuts further, do not remove them. Then tighten the round nuts alternately and evenly by hand until the joint faces of the bearing shells just make contact.
- 3.4 Use a feeler gauge to measure the gap "K" between the cylinder crankcase and crankshaft bearing cover on the exhaust and control sides and add the two measures values

$$K = K_A + K_S$$

Gap "K" mm	Operating limit value mm
0.80 - 1.07	0.65

M25

24000, 48000

02

See also: 02.03.03.nn, 02.03.07.nn

Spare parts list: B1.05.03.251110

Time requirement: 2 Pers./ 1,00 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Distillate fuel

Inspection:

a) of one crankshaft bearing every 24,000 h

Number of cylinders	Bearing no.
6	4
8	5
9	6

b) of all crankshaft bearings every 48,000 h

Tools:

Hydraulic equipment, consisting of:	W1	
Support ring	W1.1	0.9203-209
Hydraulic tensioning element	W1.2	0.9213 C
High-pressure pump	W1.3	0.9204 D
High-pressure hose (1 m)	W1.4	0.9205 B
Pin	W1.5	0.9203-110
Threaded sleeve	W1.6	0.9206-001
Mounting / extraction device (crankshaft bearing, consisting of:	W2	259214 A
Support arms	W2.1	259214-001
Receiver	W2.2	259214-003
Carrier (bearing shells)	W2.3	259119 A
Assembly device (crankshaft bearing)	W2.4	259214-005
Receiver plate	W2.5	259214 B
300 - 800 Nm torque wrench	W11 *	1.9454-800
3/4 changeover ratchet	W12 *	1.9495-036
46 mm insert (side screws)	W13 *	1.9450-046
Feeler gauge	W14 *	1.9075-003
Socket wrench for indicator valves	W15 *	1.9100-060

* not illustrated

Attention:

The smallest bending radius for high pressure hoses is $r = 120 \text{ mm}$!
Use hydraulic oil only for the hydraulic equipment.
Store the hydraulic equipment protected against corrosion.



Safety note:

Do not place any parts of the body over pressurized devices. Secure the engine against unintentional starting!

Note:

The crankshaft thrust bearing consists of the 1st crankshaft bearing (coupling end) and 4 stop disk segments which limit the axial play of the crankshaft.
The two lower stop disk segments (**fig. 1**/ 1) are fixed on the crankshaft bearing cover (3) by means of dowel pins (2). The two upper stop disk segments are pushed into grooves in the cylinder crankcase.
The bearing cover and bearing shells of the crankshaft bearings are marked consecutively according to which cylinder they belong to beginning at the coupling end and are not allowed to be interchanged. New parts must be marked accordingly.

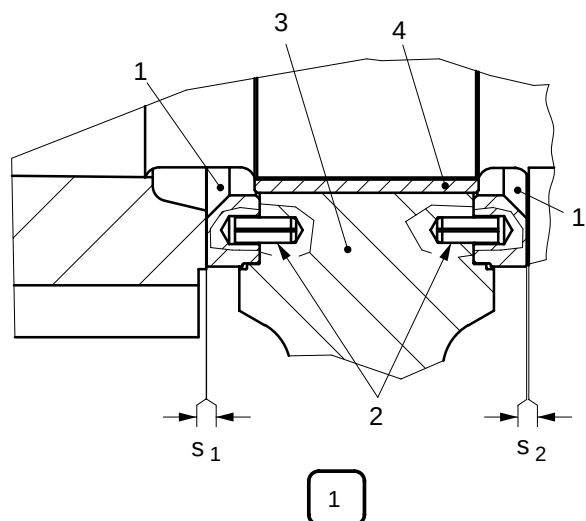
The crankshaft bearings have to be dismantled, checked and measured within the specified interval in the event of:

- Distortions of the foundation or
- Changes in the crank web deflection

after damage at sea.

Sequence of operations:

1. **Measure the axial clearance "s" (crankshaft thrust bearing).**
 - 1.1 Remove the cover below the timing gear train and the power unit cover of cylinder 1 on the control side.
 - 1.2 Measure the axial clearance " $s_1 + s_2$ " at the crankshaft thrust bearing with the feeler gauge (**fig. 1**).



M25

24000, 48000

1.2.1 Axial clearance „s“:

02

$$s = s_1 + s_2$$

Clearance when new mm	Clearance limit mm
0.3 - 0.6	0.8

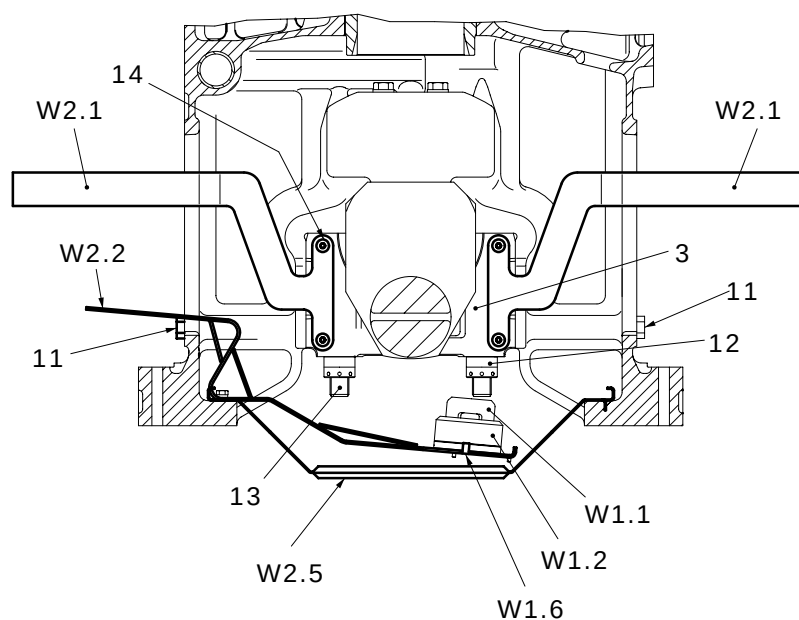
When the clearance limit is exceeded, the stop disk segments (**fig. 1/1**) and bearing shells (4) must be replaced **in pairs** ; refer to operating sequence 2, disassembly of crankshaft bearing.

Attention:

Make sure the stop disks (1) are marked before removing them for inspection purposes. Then mount them again without delay!

2. Dismantle the crankshaft bearing.

- 2.1 Open the indicator valves, mount the turning device and remove the corresponding power unit cover (control side).
- 2.2 Turn the crankshaft to a favourable position. The round nuts (**fig. 2/12**) on the crankshaft bearing bolts (13) must be freely accessible.
- 2.3 Loosen the round nuts (12) by means of the hydraulic tightening device.



2

M25

24000, 48000

02

- 2.3.1 Remove the hexagon bolts (**fig. 2/11**) of the respective crankshaft bearing on the exhaust and control sides.
- 2.3.2 Mount the support arms (W2.1) on the exhaust and control sides on the crankshaft bearing cover (3). Tighten the bolts (14) to the limit stop.
- 2.3.3 Place the receiver plate (W2.5) through the crankshaft bearing cover.
- 2.3.4 Place the receivers (W2.2) successively in the cylinder crankcase (**x**) on both sides of the engine and carry out the operating sequences 2.3.5 to 2.3.7.
- 2.3.5 Place the hydraulic tensioning element (W1.2) with the threaded sleeve (W1.6) and support ring (W1.1) on the receiver (W2.2).
- 2.3.6 Swivel the receiver (W2.2) under the respective round nut (12) and raise the hydraulic tools (W1.1, W1.2, W1.6) until the support ring (W1.1) lies flat on the crankshaft bearing cover (3). Pay attention good accessibility of the slits (**fig. 3/21**).
- 2.3.7 Screw the threaded sleeve firmly onto the crankshaft bearing bolt and then screw it back by **3/4** of a revolution. The ring surface (a) of the threaded sleeve is then flush with the upper surface (b) of the hydraulic tensioning element (W1.2).
- 2.3.8 Connect the hydraulic tensioning elements (**fig. 4/W1.2**) to the high-pressure pump (W1.3) via the high-pressure hoses (W1.4).

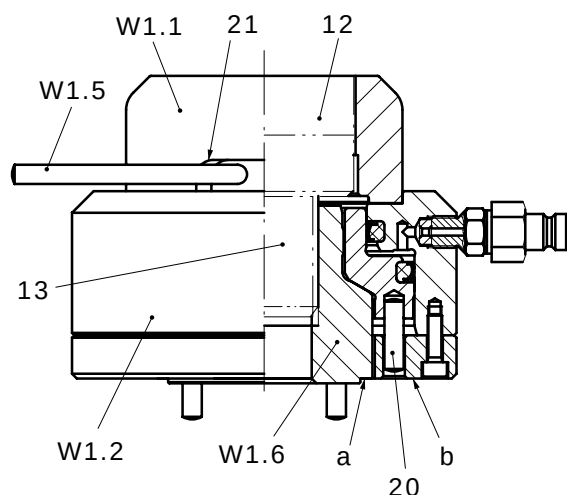
Attention:

The pin (fig. 3/20), maximum stroke indicator) must not be driven out of the hydraulic tensioning element (W1.2) when extending the crankshaft bearing bolts (13)!

- 2.3.9 Close the valve (**fig. 4/Z**) on the high pressure pump and extend both crankshaft bearing bolts **simultaneously and stepless** at a hydraulic pressure of

p = 980 bar.

- 2.3.10 Loosen the round nuts (**fig. 3/12**) with the pin (W1.5). Turn the round nuts back by at least 8 holes.



3

M25

24000, 48000

02

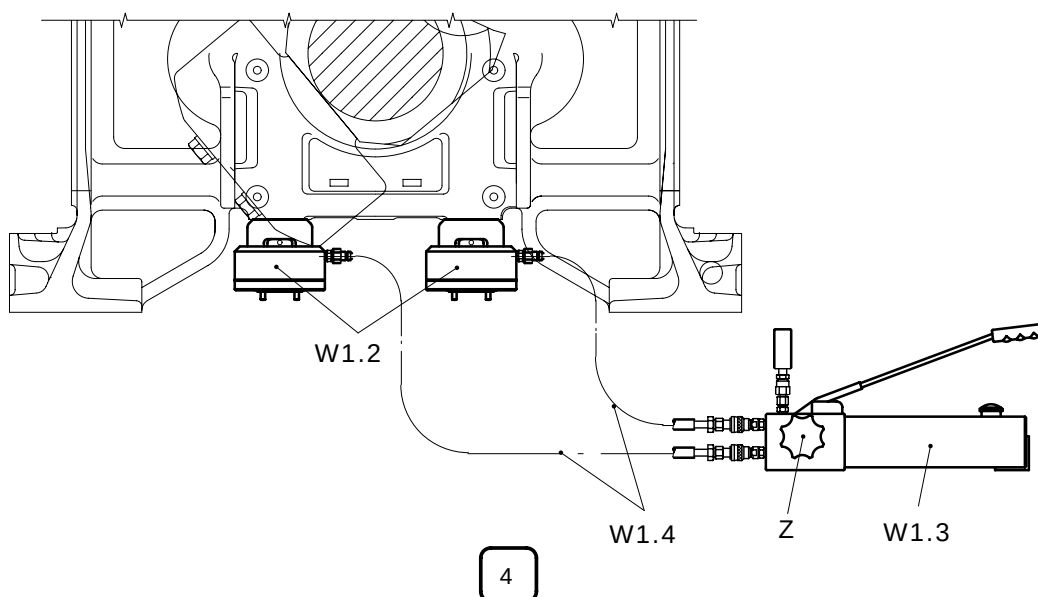
Note:

If it is not possible to loosen the round nuts with the pin, then the crankshaft bearing bolts can be pretensioned at a **higher** pressure of

$$p = 50 \text{ bar}$$

If the pressure is increased even further, then there is a danger of the round nut jamming as a result of the bolt thread expanding.

- 2.4 Open the valve (**fig. 4/Z**) on the high-pressure pump (W1.3). The tensioning elements (W1.2) are relieved.



- 2.4.1 Wait for the pressure to drop completely then remove the threaded sleeves (**fig. 3/W1.6**), hydraulic tensioning elements (W1.2) and support rings (W1.1).
- 2.4.2 **Only loosen** the hexagon bolts (**fig. 2/11**) on the adjacent crankshaft bearings on the exhaust and control sides.
- 2.4.3 Attach the support arms (W2.1) on the exhaust and control sides to a crane and secure them.

Attention:

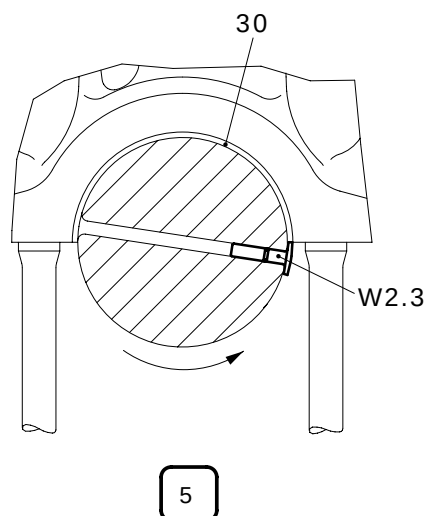
The crankshaft bearing cover (3) must be held securely in this position when removing the round nuts (12)!

M25

24000, 48000

02

- 2.5 Measure the gap, refer to operating sequence 3.
- 2.6 Remove the round nuts (**fig. 2/12**) and carefully lower the crankshaft bearing cover (3) by means of the crane.
- 2.7 Turn the crankshaft with the counter-weight towards the control side and remove the lower bearing shell (**fig. 1/4**) from the crankshaft bearing cover (3).
- 2.8 Insert the carrier (**fig. 5/W2.3**) in the oil bore on the crankshaft and turn the upper bearing shell (30) out towards the **exhaust side**.
- 2.9 Assess the bearing shells. Refer to **02.03.03.nn** and **02.03.07.nn**.
- 2.10 Measure the wear on the wall in the crankshaft stress zone at the measuring points (**fig. 6/X**) by means of a micrometer gauge.



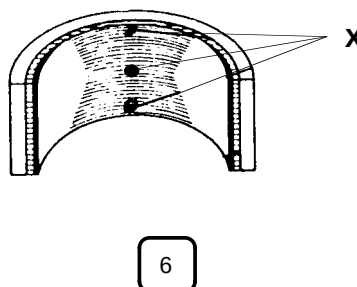
Wear = Measurement when new - actual measurement

- 2.10.1 The bearing shells must be replaced if there is a wear of **> 0.05 mm** in the crown area (**fig. 6/X**).

Measurement when new:
5,905_{-0,02} mm

Attention:

If it is necessary to replace the bearing shells, then the adjacent bearings must also be checked.



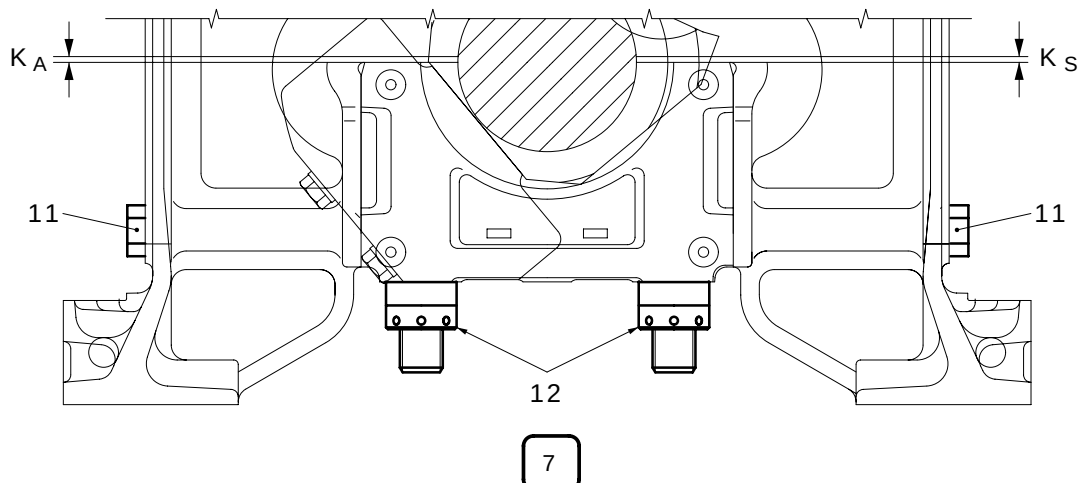
M25

24000, 48000

02

3. Measure the gap.

- 3.1 Remove the hexagon nuts (**fig. 7/11**) of the corresponding crankshaft bearing on the exhaust end control sides and **only loosen** the hexagon bolts (11) on the adjacent crankshaft bearings.



- 3.2 Loosen both round nuts hydraulically (12) according to operating sequence 2.3. Relieve the hydraulic extraction device and remove it. Refer to 2.4.
- 3.3 Loosen the round nuts further, do not remove them. Then tighten the round nuts alternately and evenly by hand until the joint faces of the bearing shells just make contact.
- 3.4 Use a feeler gauge to measure the gap "K" between the cylinder crankcase and crankshaft bearing cover on the exhaust and control sides and add the two measures values

$$K = K_A + K_S$$

Gap "K" mm	Operating limit value mm
0.80 - 1.07	0.65

M25

12000, 24000

See also: 02.03.03.nn, 02.03.07.nn

Spare parts list: B1.05.03.251110

Time requirement: 2 Pers./ 1,00 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Heavy fuel

02

Inspection:

a) of one crankshaft bearing every 12,000 h

Number of cylinders	Bearing no.
6	4
8	5
9	6

b) of all crankshaft bearings every 24,000 h

Tools:

Hydraulic equipment, consisting of:	W1	
Support ring	W1.1	0.9203-209
Hydraulic tensioning element	W1.2	0.9213 C
High-pressure pump	W1.3	0.9204 D
High-pressure hose (1 m)	W1.4	0.9205 B
Pin	W1.5	0.9203-110
Threaded sleeve	W1.6	0.9206-001
Mounting / extraction device (crankshaft bearing, consisting of:	W2	259214 A
Support arms	W2.1	259214-001
Receiver	W2.2	259214-003
Carrier (bearing shells)	W2.3	259119 A
Assembly device (crankshaft bearing)	W2.4	259214-005
Receiver plate	W2.5	259214 B
300 - 800 Nm torque wrench	W11 *	1.9454-800
3/4 changeover ratchet	W12 *	1.9495-036
46 mm insert (side screws)	W13 *	1.9450-046
Feeler gauge	W14 *	1.9075-003
Socket wrench for indicator valves	W15 *	1.9100-060

* not illustrated

Attention:

The smallest bending radius for high pressure hoses is $r = 120 \text{ mm}$!
Use hydraulic oil only for the hydraulic equipment.
Store the hydraulic equipment protected against corrosion.



Safety note:

Do not place any parts of the body over pressurized devices. Secure the engine against unintentional starting!

Note:

The crankshaft thrust bearing consists of the 1st crankshaft bearing (coupling end) and 4 stop disk segments which limit the axial play of the crankshaft.
The two lower stop disk segments (**fig. 1**/ 1) are fixed on the crankshaft bearing cover (3) by means of dowel pins (2). The two upper stop disk segments are pushed into grooves in the cylinder crankcase.
The bearing cover and bearing shells of the crankshaft bearings are marked consecutively according to which cylinder they belong to beginning at the coupling end and are not allowed to be interchanged. New parts must be marked accordingly.

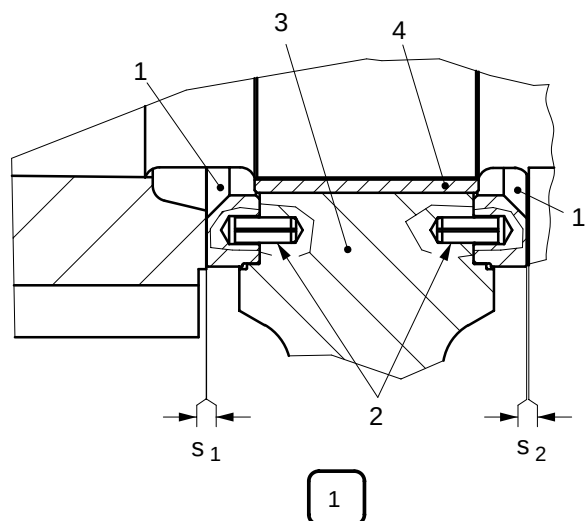
The crankshaft bearings have to be dismantled, checked and measured within the specified interval in the event of:

- Distortions of the foundation or
- Changes in the crank web deflection

after damage at sea.

Sequence of operations:

1. **Measure the axial clearance "s" (crankshaft thrust bearing).**
 - 1.1 Remove the cover below the timing gear train and the power unit cover of cylinder 1 on the control side.
 - 1.2 Measure the axial clearance " $s_1 + s_2$ " at the crankshaft thrust bearing with the feeler gauge (**fig. 1**).



M25

12000, 24000

1.2.1 Axial clearance „s“:

02

$$s = s_1 + s_2$$

Clearance when new mm	Clearance limit mm
0.3 - 0.6	0.8

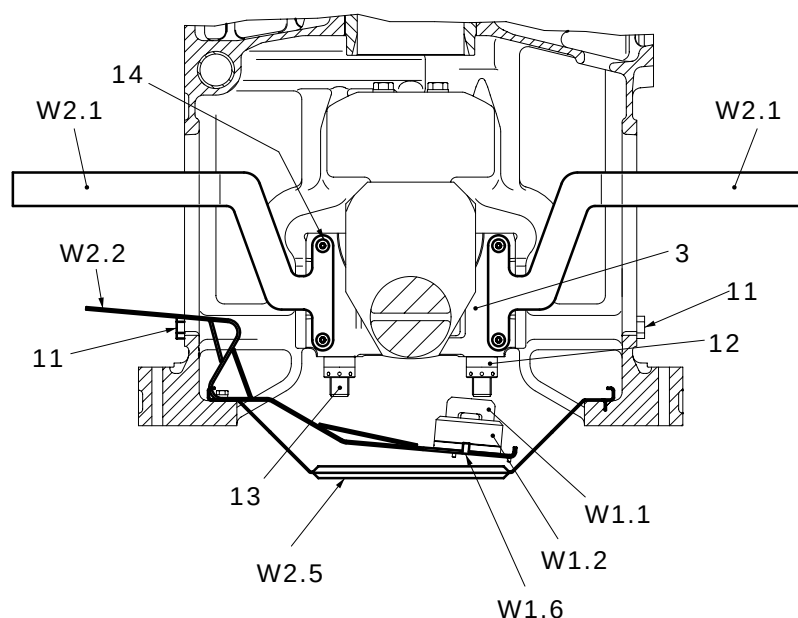
When the clearance limit is exceeded, the stop disk segments (**fig. 1/1**) and bearing shells (4) must be replaced **in pairs** ; refer to operating sequence 2, disassembly of crankshaft bearing.

Attention:

Make sure the stop disks (1) are marked before removing them for inspection purposes. Then mount them again without delay!

2. Dismantle the crankshaft bearing.

- 2.1 Open the indicator valves, mount the turning device and remove the corresponding power unit cover (control side).
- 2.2 Turn the crankshaft to a favourable position. The round nuts (**fig. 2/12**) on the crankshaft bearing bolts (13) must be freely accessible.
- 2.3 Loosen the round nuts (12) by means of the hydraulic tightening device.



2

M25

12000, 24000

02

- 2.3.1 Remove the hexagon bolts (**fig. 2/11**) of the respective crankshaft bearing on the exhaust and control sides.
- 2.3.2 Mount the support arms (W2.1) on the exhaust and control sides on the crankshaft bearing cover (3). Tighten the bolts (14) to the limit stop.
- 2.3.3 Place the receiver plate (W2.5) through the crankshaft bearing cover.
- 2.3.4 Place the receivers (W2.2) successively in the cylinder crankcase (**x**) on both sides of the engine and carry out the operating sequences 2.3.4 to 2.3.6.
- 2.3.5 Place the hydraulic tensioning element (W1.2) with the threaded sleeve (W1.6) and support ring (W1.1) on the receiver (W2.2).
- 2.3.6 Swivel the receiver (W2.2) under the respective round nut (12) and raise the hydraulic tools (W1.1, W1.2, W1.6) until the support ring (W1.1) lies flat on the crankshaft bearing cover (3). Pay attention good accessibility of the slits (**fig. 3/21**).
- 2.3.7 Screw the threaded sleeve firmly onto the crankshaft bearing bolt and then screw it back by **3/4** of a revolution. The ring surface (a) of the threaded sleeve is then flush with the upper surface (b) of the hydraulic tensioning element (W1.2).
- 2.3.8 Connect the hydraulic tensioning elements (**fig. 4/W1.2**) to the high-pressure pump (W1.3) via the high-pressure hoses (W1.4).

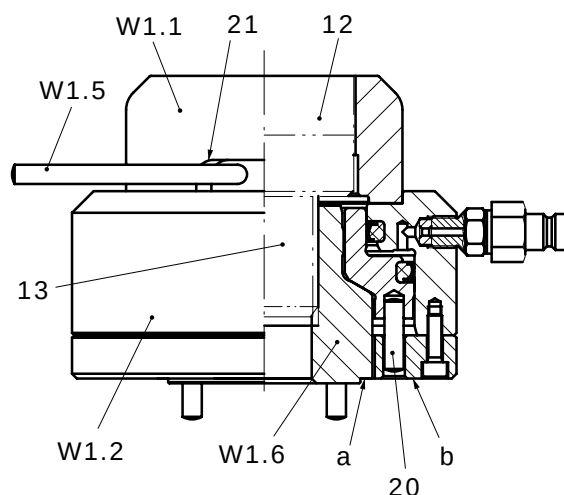
Attention:

The pin (fig. 3/20), maximum stroke indicator) must not be driven out of the hydraulic tensioning element (W1.2) when extending the crankshaft bearing bolts (13)!

- 2.3.9 Close the valve (**fig. 4/Z**) on the high pressure pump and extend both crankshaft bearing bolts **simultaneously and stepless** at a hydraulic pressure of

p = 980 bar.

- 2.3.10 Loosen the round nuts (**fig. 3/12**) with the pin (W1.5). Turn the round nuts back by at least 8 holes.



3

M25

12000, 24000

02

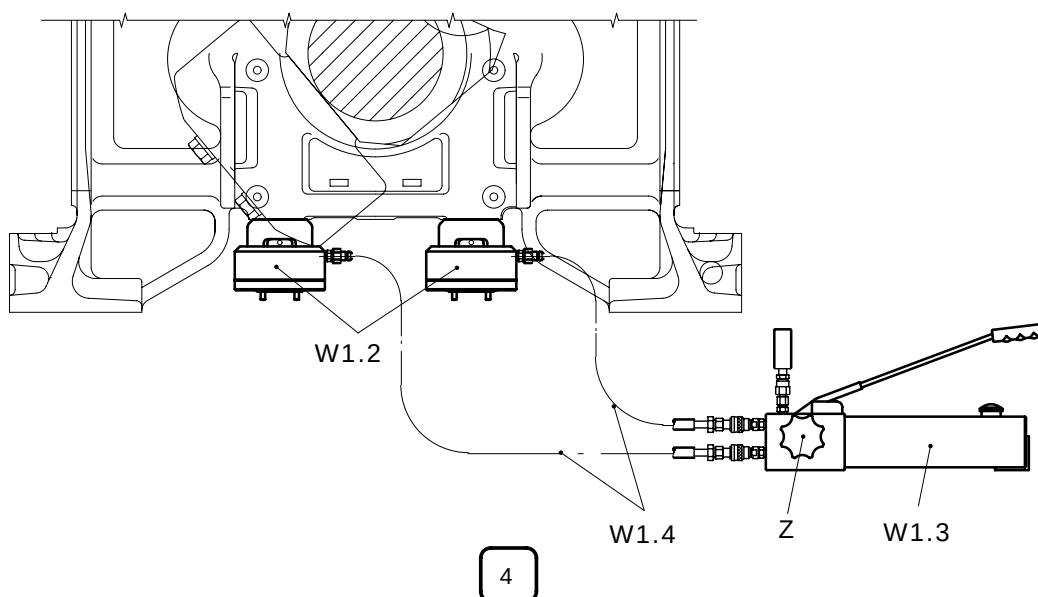
Note:

If it is not possible to loosen the round nuts with the pin, then the crankshaft bearing bolts can be pretensioned at a **higher** pressure of

$$p = 50 \text{ bar}$$

If the pressure is increased even further, then there is a danger of the round nut jamming as a result of the bolt thread expanding.

- 2.4 Open the valve (**fig. 4/Z**) on the high-pressure pump (W1.3). The tensioning elements (W1.2) are relieved.



- 2.4.1 Wait for the pressure to drop completely then remove the threaded sleeves (**fig. 3/W1.6**), hydraulic tensioning elements (W1.2) and support rings (W1.1).
- 2.4.2 **Only loosen** the hexagon bolts (**fig. 2/11**) on the adjacent crankshaft bearings on the exhaust and control sides.
- 2.4.3 Attach the support arms (W2.1) on the exhaust and control sides to a crane and secure them.

Attention:

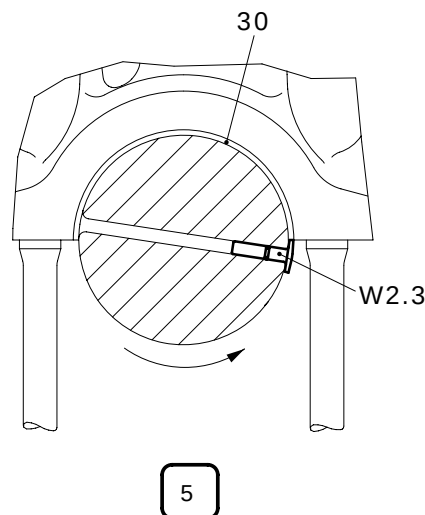
The crankshaft bearing cover (3) must be held securely in this position when removing the round nuts (12)!

M25

12000, 24000

02

- 2.5 Measure the gap, refer to operating sequence 3.
- 2.6 Remove the round nuts (**fig. 2/12**) and carefully lower the crankshaft bearing cover (3) by means of the crane.
- 2.7 Turn the crankshaft with the counter-weight towards the control side and remove the lower bearing shell (**fig. 1/4**) from the crankshaft bearing cover (3).
- 2.8 Insert the carrier (**fig. 5/W2.3**) in the oil bore on the crankshaft and turn the upper bearing shell (30) out towards the **exhaust side**.
- 2.9 Assess the bearing shells. Refer to **02.03.03.nn** and **02.03.07.nn**.
- 2.10 Measure the wear on the wall in the crankshaft stress zone at the measuring points (**fig. 6/X**) by means of a micrometer gauge.



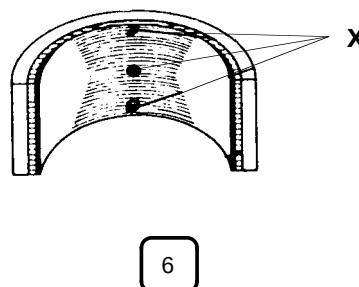
Wear = Measurement when new - actual measurement

- 2.10.1 The bearing shells must be replaced if there is a wear of **> 0.05 mm** in the crown area (**fig. 6/X**).

Measurement when new:
5,905_{-0,02} mm

Attention:

If it is necessary to replace the bearing shells, then the adjacent bearings must also be checked.



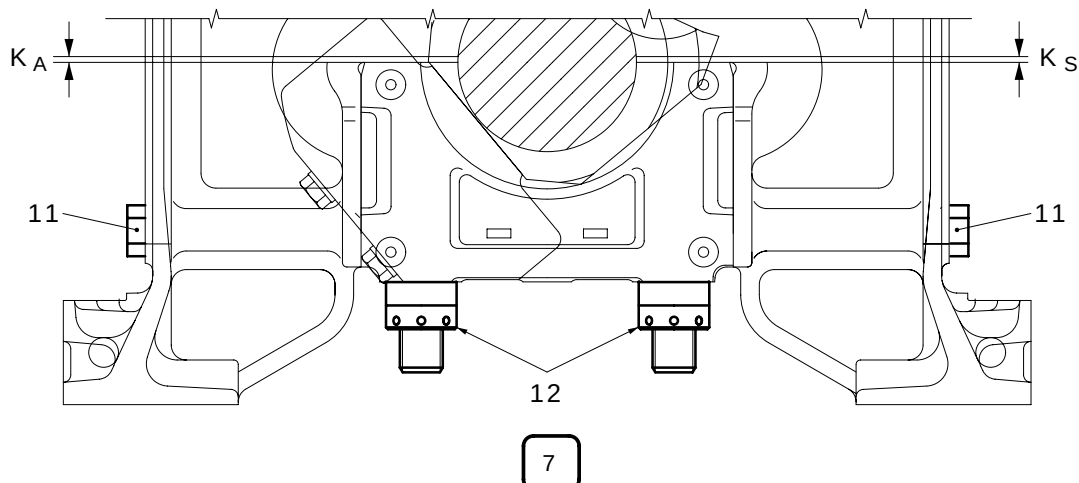
M25

12000, 24000

02

3. Measure the gap.

- 3.1 Remove the hexagon nuts (**fig. 7/11**) of the corresponding crankshaft bearing on the exhaust end control sides and **only loosen** the hexagon bolts (11) on the adjacent crankshaft bearings.



- 3.2 Loosen both round nuts hydraulically (12) according to operating sequence 2.3. Relieve the hydraulic extraction device and remove it. Refer to 2.4.
- 3.3 Loosen the round nuts further, do not remove them. Then tighten the round nuts alternately and evenly by hand until the joint faces of the bearing shells just make contact.
- 3.4 Use a feeler gauge to measure the gap "K" between the cylinder crankcase and crankshaft bearing cover on the exhaust and control sides and add the two measures values

$$K = K_A + K_S$$

Gap "K" mm	Operating limit value mm
0.80 - 1.07	0.65

M25

02

See also: 02.05.01.nn
Spare parts list: B1.05.03.251110
Time requirement: 2 Pers./ 1,00 h
Personnel qualification: skilled engine hand
Operating medium: Heavy fuel and distillate fuel

Tools:

Tools W1-W15: refer to worksheet **02.05.01.nn**

Auxiliary material:

"G-Rapid plus" Molykote paste *

* or a product of equal standard



Safety note:

Do not place any parts of the body over pressurized devices. Secure the engine against unintentional starting!

Attention:

The smallest bending radius for high pressure hoses is $r = 120$ mm.
Use hydraulic oil only for the hydraulic equipment.
Store the hydraulic equipment protected against corrosion.

Note:

The bearing cover and bearing shells of the crankshaft bearing are consecutively marked on the control side according to which cylinder they belong starting from the coupling end and must not be swapped. New parts must be marked accordingly.

The specified torques are only valid when the threads and nuts are greased with Molykote.

Damaged crankshaft bearing bolts and round nuts must be replaced together.

M25

02
Sequence of operations:
1. Mount bearing shells.
Note:

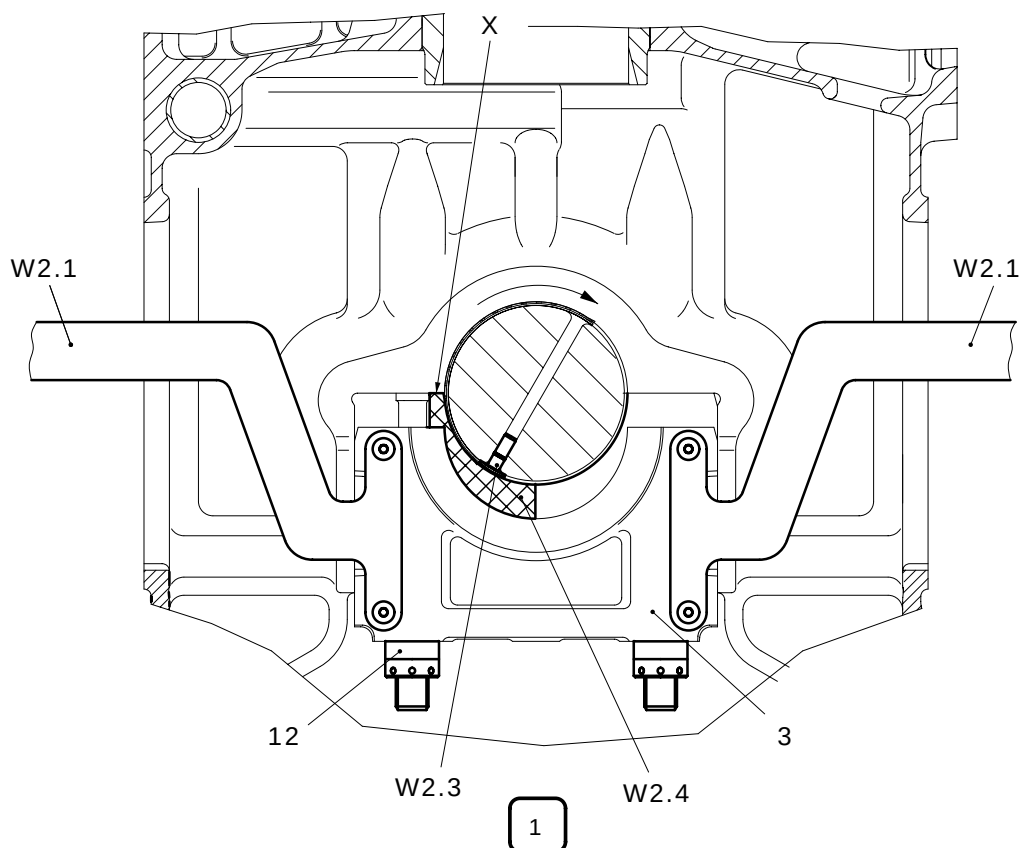
The upper bearing shell has a lubrication groove and oil bores. If removed, reinsert the upper stop disk segments (only in the case of the crankshaft thrust bearing).

- 1.1 Lubricate the running surface of the bearing shell. Dry the back of the bearing and turn the bearing shell as far as possible into the bearing.

Attention:

The bearing locating nose on the upper bearing shell faced towards the exhaust side.
The bearing shells are marked on the control side.

- 1.2 Insert the carrier (**fig. 1/W2.3**) down to the limit stop in the oil bore.
- 1.3 Place the assembly device (W2.4) in the crankshaft bearing cover (3). Pay attention to the lateral limit stop.



M25

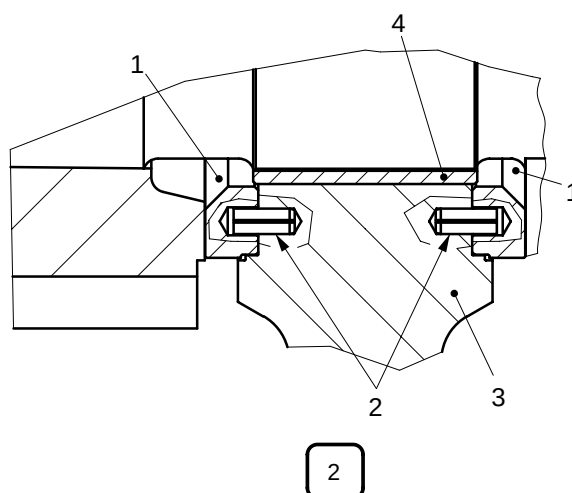
02

- 1.4 Slowly lift the crankshaft bearing cover by means of the crane and support arms (W2.1) until the assembly device (**fig. 1/W2.4**) makes contact with the bearing block (x).
- 1.5 Tighten the round nuts (12) hand-tight; the assembly device is clamped.
- 1.6 Turn the upper bearing shell **towards the control side**. Pay attention to the centric position of the bearing shell. The locating nose must glide into the guiding groove in the bearing block (exhaust side).
- 1.7 Remove the round nuts and slowly lower the crankshaft bearing cover by means of the crane and support arms (W2.1).
- 1.8 Remove the carrier (W2.3) and assembly device (W2.4).
- 1.9 Lubricate the running surface of the lower bearing shell (**fig. 2/4**). Dry the back of the bearing and insert it in the crankshaft bearing cover (3).

Attention:

The bearing locating nose on the lower bearing shell is on the control side!

- 1.10 If removed, put the lower stop disk segments (1) (only on the crankshaft thrust bearing) back on the dowel pins (2).

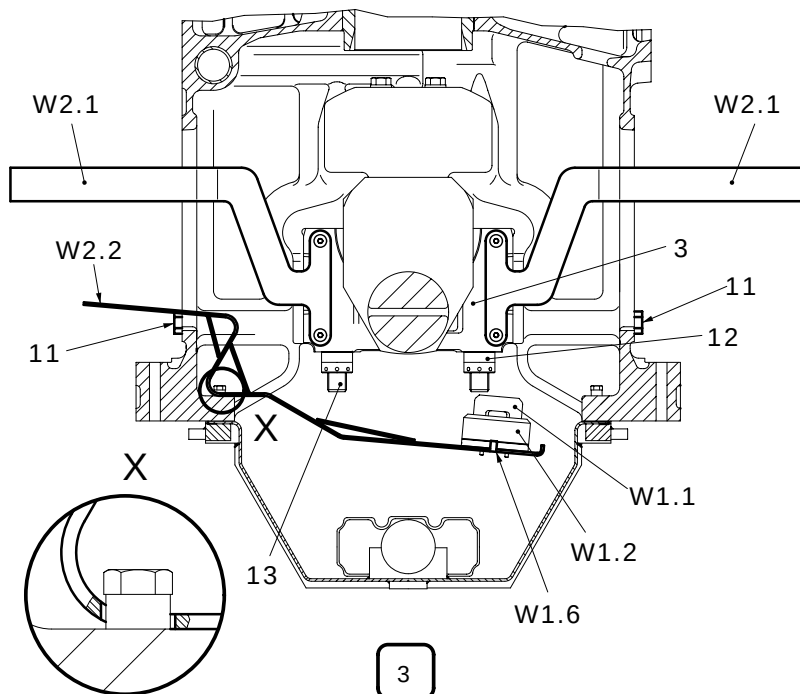

Attention:

Pay attention to the marking (to be done during disassembly) on the stop disks!

M25

02
2. Tightening the bearing shells.

- 2.1 Slowly lift the crankshaft bearing cover by means of the crane and support arms (fig. 3/ W2.1) until it lies on the bearing block.



- 2.2 Screw the round nuts (12) evenly onto the crankshaft bearing bolts (13) and tighten them hand-tight by means of the pin (fig. 4/W1.5).

Note:

Measure the gap "K" after fitting new bearing shells.
 The axial clearance must also be measured after replacing the bearing shells or the stop disk segments on the crankshaft thrust bearing (02.05.01.nn).

- 2.3 Remove the support arms (fig. 3/W2.1).
- 2.4 Apply Molykote paste "G-Rapid Plus" get to the thread and contact surfaces of the hexagon bolts (11) and tighten them alternately in three stages with the following torques

1st stage: $M = 140 \text{ Nm}$

2nd stage: $M = 420 \text{ Nm}$

3rd stage: $M = 670 \text{ Nm}$.

M25

02

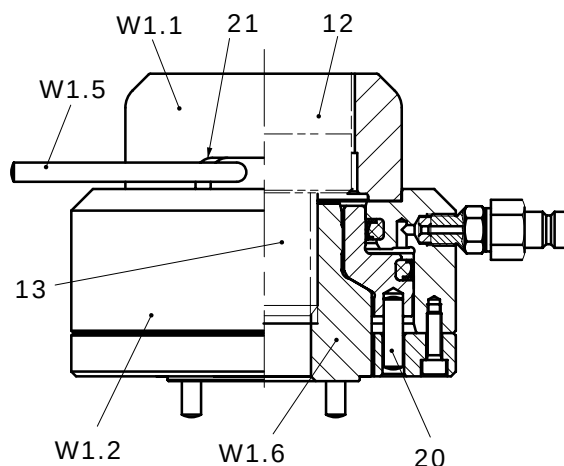
- 2.5 Mount the receivers (**Fig. 3/W2.2**) one of the other on both sides of the engine in the cylinder crankcase (x) and carry out the operating sequences 2.5.1 to 2.5.3.

- 2.5.1 Place the hydraulic tensioning element (W1.2) with the threaded sleeve (W1.6) and support ring (W1.1) on the receiver.

- 2.5.2 Swing the receiver under the respective round nut (12) and raise the hydraulic tools (W1.1, W1.2, W1.6) until the support ring (W1.1) lies flush on the crankshaft bearing cover (3). Pay attention to good accessibility of the slits (**fig. 4/21**).

- 2.5.3 Screw the threaded sleeve (W1.6) hand-tight onto the crankshaft bearing bolts (13).

- 2.6 Connect the hydraulic tensioning elements (**fig. 5/W 1.2**) to the high pressure pump (W1.3) via the high pressure hoses (W1.4).



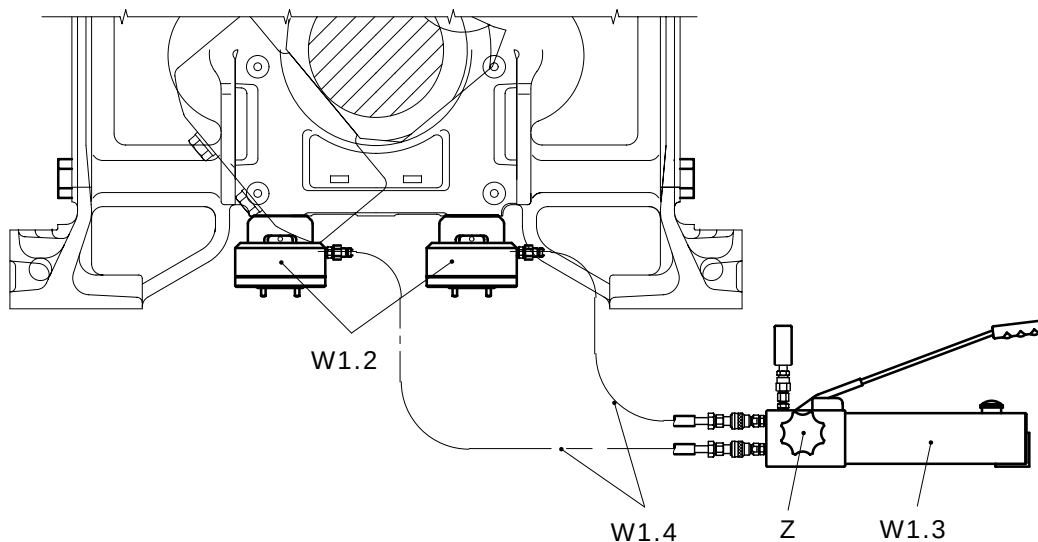
4

Attention:

The pin (fig.4/20, maximum stroke indicator) must not be driven out of the hydraulic tensioning element (W1.2) when extending the crankshaft bearing bolts (13)!

- 2.6.1 Close the valve (**fig. 5/Z**) on the higher pressure pump and extend both crankshaft bearing bolts **simultaneously and stepless** at a hydraulic pressure of

p = 980 bar.



5

M25

02
Attention:

The pressure must recrankshaft constant if the hydraulic pump is not operated otherwise tightening will be faulty!

- 2.7 Tighten the round nuts (**fig. 4/12**) evenly with the pin (W1.5). Pay attention to smooth action.
- 2.8 Check firm seating of the round nuts
 - Reduce the pressure by 50 bar
 - It must no longer be possible to loosen the round nuts with the pin.
- 2.9 Open the valve (**fig. 5/Z**) on the high pressure pump (W1.3). The tensioning elements are relieved.
- 2.10 Wait for the pressure to drop completely. Remove the threaded sleeves (**fig.4/W1.6**), hydraulic tensioning elements (W1.2) and support rings (W1.1).
- 2.11 Remove the receiver (**fig. 3/W2.2**).
- 2.12 Check the lubricating oil flow.
- 2.13 Close the indicator valves and mount the power unit cover as well as the cover under the timing gear train, if removed.
- 2.14 Remove the turning device.

M25

02

See also: 02.05.01.nn

Spare parts list: B1.05.03.251110

Time requirement: 2 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Tools W1-W15: refer to worksheet 02.05.01.nn

Auxiliary material:

"G-Rapid plus" Molykote paste *

* or a product of equal standard



Safety note:

Do not place any parts of the body over pressurized devices. Secure the engine against unintentional starting!

Attention:

The smallest bending radius for high pressure hoses is $r = 120$ mm.
Use hydraulic oil only for the hydraulic equipment.
Store the hydraulic equipment protected against corrosion.

Note:

The bearing cover and bearing shells of the crankshaft bearing are consecutively marked on the control side according to which cylinder they belong starting from the coupling end and must not be swapped. New parts must be marked accordingly.

The specified torques are only valid when the threads and nuts are greased with Molykote.

Damaged crankshaft bearing bolts and round nuts must be replaced together.

M25

02
Sequence of operations:
1. Mount bearing shells.
Note:

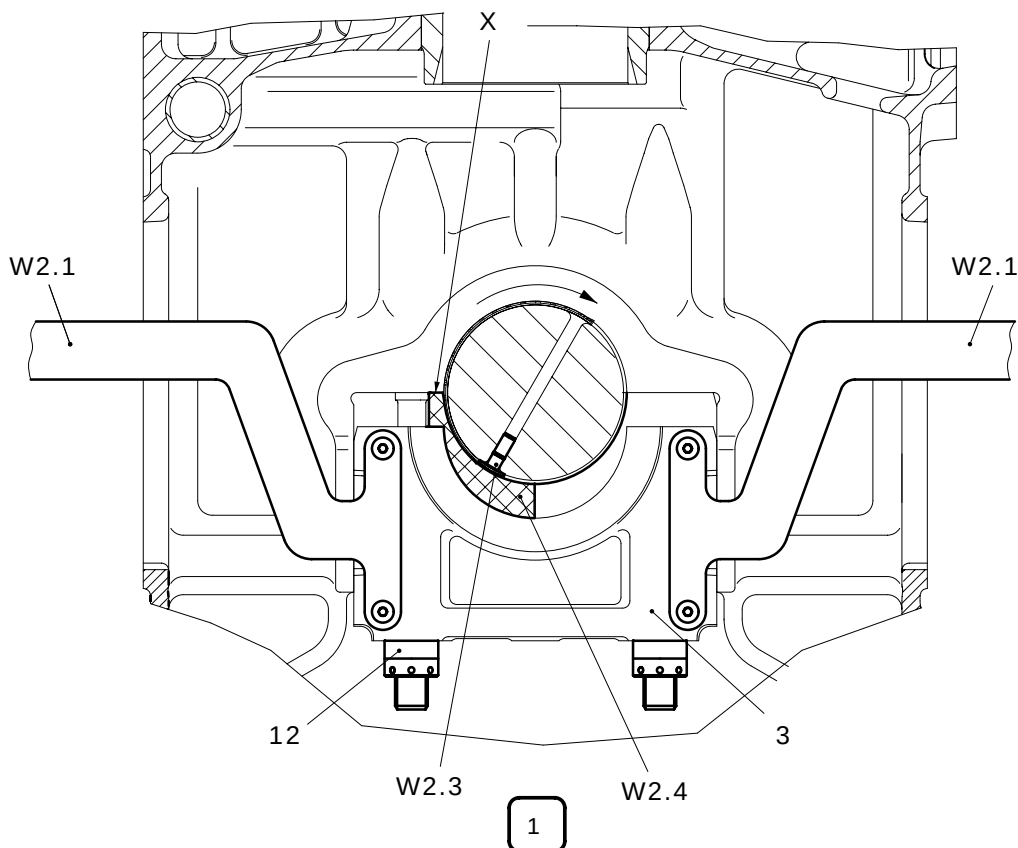
The upper bearing shell has a lubrication groove and oil bores. If removed, reinsert the upper stop disk segments (only in the case of the crankshaft thrust bearing).

- 1.1 Lubricate the running surface of the bearing shell. Dry the back of the bearing and turn the bearing shell as far as possible into the bearing.

Attention:

The bearing locating nose on the upper bearing shell faced towards the exhaust side.
The bearing shells are marked on the control side.

- 1.2 Insert the carrier (**fig. 1/W2.3**) down to the limit stop in the oil bore.
- 1.3 Place the assembly device (W2.4) in the crankshaft bearing cover (3). Pay attention to the lateral limit stop.



M25

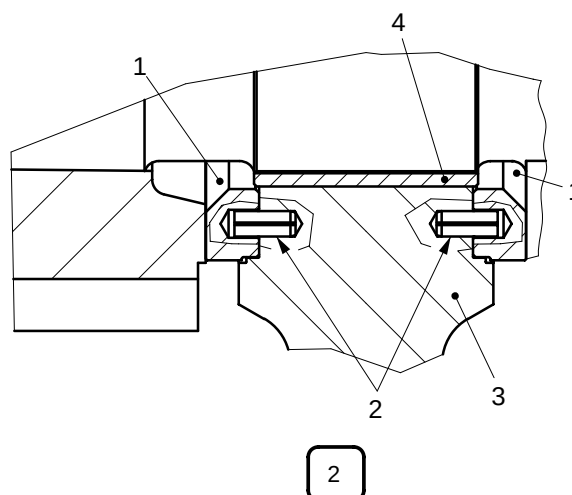
02

- 1.4 Slowly lift the crankshaft bearing cover by means of the crane and support arms (W2.1) until the assembly device (**fig. 1/W2.4**) makes contact with the bearing block (x).
- 1.5 Tighten the round nuts (12) hand-tight; the assembly device is clamped.
- 1.6 Turn the upper bearing shell **towards the control side**. Pay attention to the centric position of the bearing shell. The locating nose must glide into the guiding groove in the bearing block (exhaust side).
- 1.7 Remove the round nuts and slowly lower the crankshaft bearing cover by means of the crane and support arms (W2.1).
- 1.8 Remove the carrier (W2.3) and assembly device (W2.4).
- 1.9 Lubricate the running surface of the lower bearing shell (**fig. 2/4**). Dry the back of the bearing and insert it in the crankshaft bearing cover (3).

Attention:

The bearing locating nose on the lower bearing shell is on the control side!

- 1.10 If removed, put the lower stop disk segments (1) (only on the crankshaft thrust bearing) back on the dowel pins (2).



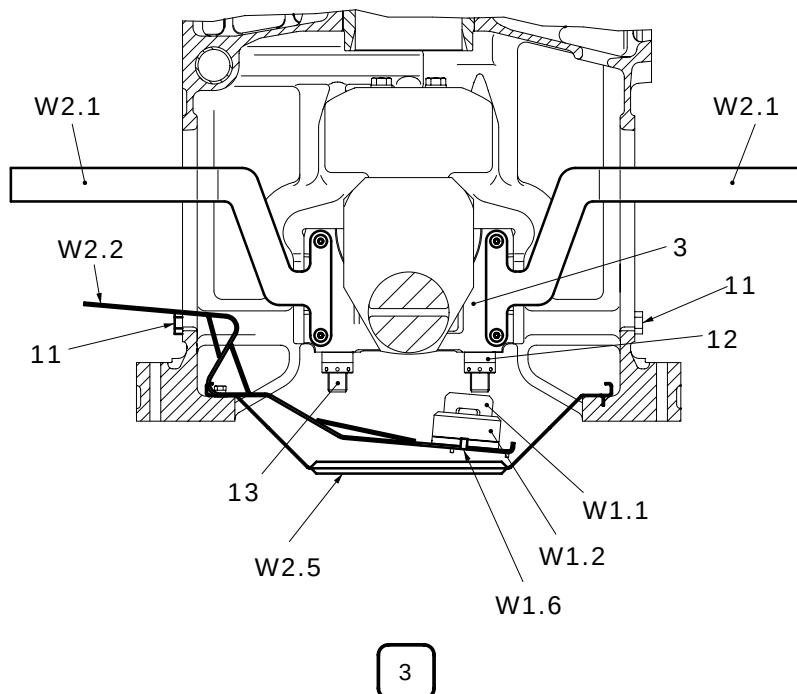
Attention:

Pay attention to the marking (to be done during disassembly) on the stop disks!

M25

02
2. Tightening the bearing shells.

- 2.1 Slowly lift the crankshaft bearing cover by means of the crane and support arms (fig. 3/ W2.1) until it lies on the bearing block.



- 2.2 Screw the round nuts (12) evenly onto the crankshaft bearing bolts (13) and tighten them hand-tight by means of the pin (fig. 4/W1.5).

Note:

Measure the gap "K" after fitting new bearing shells.
 The axial clearance must also be measured after replacing the bearing shells or the stop disk segments on the crankshaft thrust bearing (02.05.01.nn).

- 2.3 Remove the support arms (fig. 3/W2.1).
- 2.4 Apply Molykote paste "G-Rapid Plus" get to the thread and contact surfaces of the hexagon bolts (11) and tighten them alternately in three stages with the following torques

1st stage: $M = 140 \text{ Nm}$

2nd stage: $M = 420 \text{ Nm}$

3rd stage: $M = 670 \text{ Nm}$.

M25

02

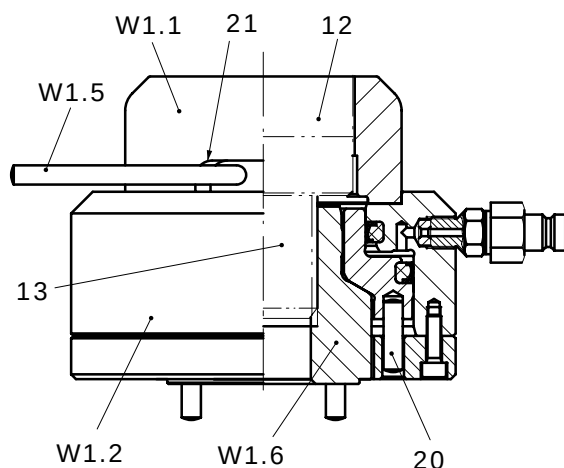
- 2.5 Mount the receivers (**Fig. 3/W2.2**) one of the other on both sides of the engine in the cylinder crankcase (x) and carry out the operating sequences 2.5.1 to 2.5.3.

- 2.5.1 Place the hydraulic tensioning element (W1.2) with the threaded sleeve (W1.6) and support ring (W1.1) on the receiver.

- 2.5.2 Swing the receiver under the respective round nut (12) and raise the hydraulic tools (W1.1, W1.2, W1.6) until the support ring (W1.1) lies flush on the crankshaft bearing cover (3). Pay attention to good accessibility of the slits (**fig. 4/21**).

- 2.5.3 Screw the threaded sleeve (W1.6) hand-tight onto the crankshaft bearing bolts (13).

- 2.6 Connect the hydraulic tensioning elements (**fig. 5/W 1.2**) to the high pressure pump (W1.3) via the high pressure hoses (W1.4).



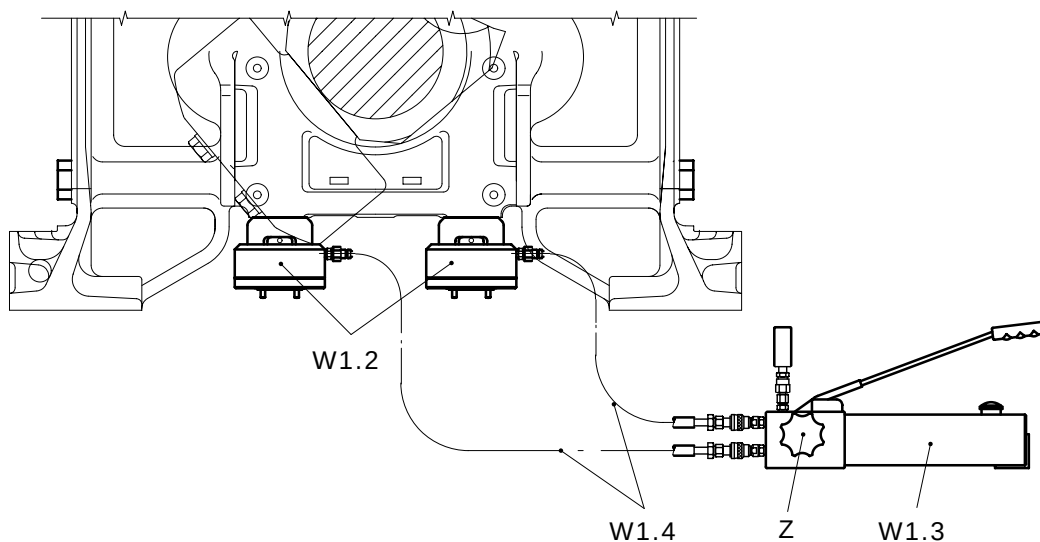
4

Attention:

The pin (fig.4/20, maximum stroke indicator) must not be driven out of the hydraulic tensioning element (W1.2) when extending the crankshaft bearing bolts (13)!

- 2.6.1 Close the valve (**fig. 5/Z**) on the higher pressure pump and extend both crankshaft bearing bolts **simultaneously and stepless** at a hydraulic pressure of

p = 980 bar.



5

M25

02
Attention:

The pressure must recrankshaft constant if the hydraulic pump is not operated otherwise tightening will be faulty!

- 2.7 Tighten the round nuts (**fig. 4/12**) evenly with the pin (W1.5). Pay attention to smooth action.
- 2.8 Check firm seating of the round nuts
 - Reduce the pressure by 50 bar
 - It must no longer be possible to loosen the round nuts with the pin.
- 2.9 Open the valve (**fig. 5/Z**) on the high pressure pump (W1.3). The tensioning elements are relieved.
- 2.10 Wait for the pressure to drop completely. Remove the threaded sleeves (**fig.4/W1.6**), hydraulic tensioning elements (W1.2) and support rings (W1.1).
- 2.11 Remove the receiver (**fig. 3/W2.2**).
- 2.12 Remove the receiver plate (**fig. 3/W2.5**).
- 2.13 Check the lubricating oil flow.
- 2.14 Close the indicator valves and mount the power unit cover as well as the cover under the timing gear train, if removed.
- 2.15 Remove the turning device.

M25

02

See also: 01.06.01.nn, 02.07.01.nn, 03.04.01.nn

Spare parts list: B1.05.02.252601

Time requirement: 1 Pers./ 0,30 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Mounting /extraction device for pistons	W1	259223 A
Cylinder liner holder	W2	259217 A
Socket wrench for indicator valves	W3 *	1.9100-060

* not illustrated

Auxiliary material:

Rust solvent „Caramba“ **

** or a produkt of equal standard

Note:

The cylinder liner must always be secured by means of the cylinder liner holder (W2) to prevent the cylinder liner (2) from coming off when lifting the cylinder head or during subsequent turning of the engine.

Sequence of operations:

1. Open the indicator valves and mount the turning device.
2. Remove the power unit cover of the respective cylinder on the control side and dismantle all the cylinder head (01.06.01.nn).
3. Turn the crank pin to approx 20° before TDC on the control side.
4. Do **not dismantle** the cylinder liner holder (W2)!
5. Check the cylinder liner and completely remove combustion deposits.

Note:

Do not damage the cylinder liner!

6. Dismantle the con-rod cover and con-rod bearing shells (02.04.01.nn).
7. Fill the ring clearance between piston and cylinder liner with grease.

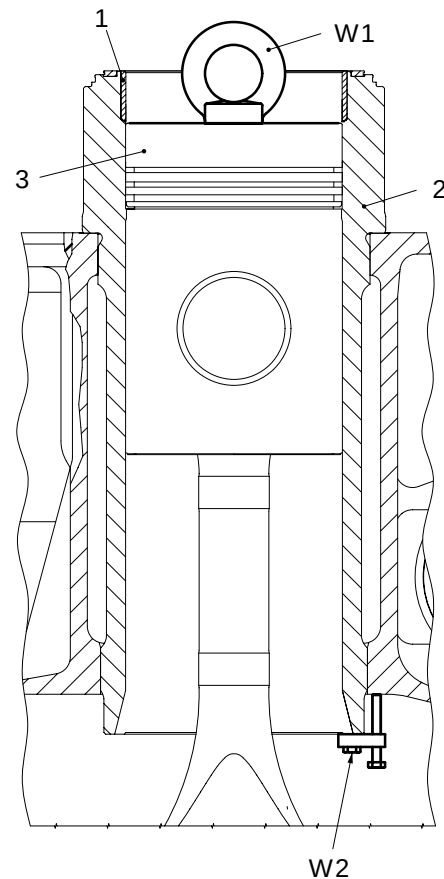
M25

02

8. Carefully scrape off and remove any carbon deposits in the cylinder liner between TDC of the 1st piston ring and bottom edge of the calibrating ring.
9. Spray the ring clearance between calibrating ring and cylinder liner lightly with rust solvent.
10. Allow the rust solvent to act.
11. Loosen the calibrating ring by light hammering with a copper hammer until the calibrating ring can be turned by hand in the guide.
12. Turn the piston to the **TDC position** and recut the tapped hole (**M12, 13.5 mm deep**) in the piston crown (3).
13. Screw the mounting/ extraction device (W1) into the piston.
14. Attach a crane to ring bolt and slowly pull out the piston, carefully inserting the bottom end of the con-rod into the cylinder liner.

Attention:

Ensure that the top piston ring expands underneath the calibrating ring, so that the calibrating ring is also pulled out when extracting the piston. Introduce the big end carefully into the cylinder liner. The big-end bearing shells must be dismantled!



15. Place the piston in a suitable device and secure it!
16. Clean the sealing and contact surfaces at the cylinder liner collar and the recess for the calibrating ring (1) and check for damages. Remove combustion residues.

Attention:

Disassemble the connecting rod eye if the piston is stored for a longer period as otherwise vibration damage can occur in the area of the piston pin bush.

17. Measure the wear on the cylinder liner.

M25

02

See also: 01.06.01.nn, 02.07.01.nn, 03.04.01.nn

Spare parts list: B1.05.02.252601

Time requirement: 1 Pers./ 0,30 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Mounting /extraction device for pistons	W1	259223 A
Cylinder liner holding device	W2	259217 B
Socket wrench for indicator valves	W3 *	1.9100-060

* not illustrated

Auxiliary material:

Rust solvent „Caramba“ **

** or a produkt of equal standard

Note:

The cylinder liner must always be secured by means of the cylinder liner holding device (W2) to prevent the cylinder liner (2) from coming off when lifting the piston or during turning of the engine.

Sequence of operations:

1. Open the indicator valves and mount the turning device.
2. Remove the power unit cover of the respective cylinder on the control side and dismantle all the cylinder head (01.06.01.nn).
3. Place a used joint ring (6) onto the cylinder liner collar to protect the sealing surface.
4. Mount the cylinder liner holding device (W2) as shown in the illustration.
5. Tighten round nuts (4) by hand.
6. Turn the crank pin to approx 20° before TDC on the control side.
7. Check the cylinder liner and completely remove combustion deposits.

Note:

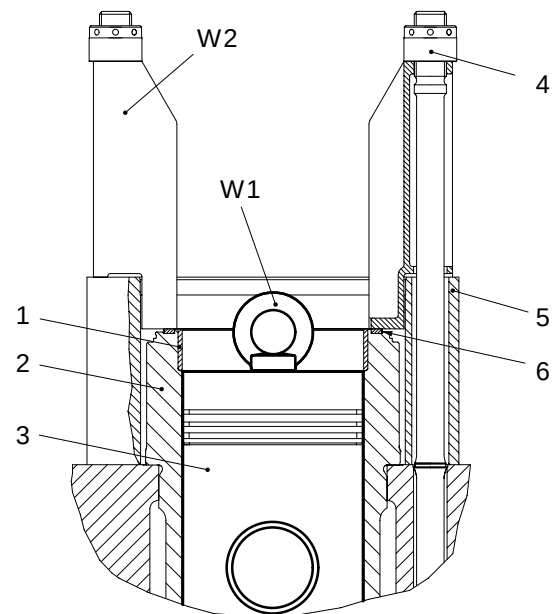
Do not damage the cylinder liner!

8. Dismantle the con-rod cover and con-rod bearing shells (02.04.01.nn).

M25

02

9. Fill the ring clearance between piston and cylinder liner with grease.
10. Carefully scrape off and remove any carbon deposits in the cylinder liner between TDC of the 1st piston ring and bottom edge of the calibrating ring.
11. Spray the ring clearance between calibrating ring and cylinder liner lightly with rust solvent.
12. Allow the rust solvent to act.
13. Loosen the calibrating ring by light hammering with a copper hammer until the calibrating ring can be turned by hand in the guide.
14. Turn the piston to the **TDC position** and recut the tapped hole (**M12, 13.5 mm deep**) in the piston crown (3).
15. Screw the mounting/ extraction device (W1) into the piston.
16. Attach a crane to ring bolt and slowly pull out the piston, carefully inserting the bottom end of the con-rod into the cylinder liner.


Attention:

Ensure that the top piston ring expands underneath the calibrating ring, so that the calibrating ring is also pulled out when extracting the piston. Introduce the big end carefully into the cylinder liner. The big-end bearing shells must be dismantled!

17. Place the piston in a suitable device and secure it!
18. Clean the sealing and contact surfaces at the cylinder liner collar and the recess for the calibrating ring (1) and check for damages. Remove combustion residues.

Attention:

Disassemble the connecting rod eye if the piston is stored for a longer period as otherwise vibration damage can occur in the area of the piston pin bush.

19. Measure the wear on the cylinder liner.

M25

02

See also: 01.06.01.nn, 02.07.01.nn, 03.04.01.nn

Spare parts list: B1.05.02.252601

Time requirement: 1 Pers./ 0,30 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Mounting /extraction device for pistons	W1	259223 A
Cylinder liner holding device	W2	259217 B
Socket wrench for indicator valves	W3 *	1.9100-060
Seeger-ring-tongs	W4 *	125-300 mm
Seeger-ring	W5 *	250X5 DIN 472

* not illustrated

Auxiliary material:

Rust solvent „Caramba“ **

** or a produkt of equal standard

Note:

The cylinder liner must always be secured by means of the cylinder liner holding device (W2) to prevent the cylinder liner (2) from coming off when lifting the piston or during turning of the engine.

Sequence of operations:

1. Open the indicator valves and mount the turning device.
2. Remove the power unit cover of the respective cylinder on the control side and dismantle the cylinder head (**01.06.01.nn**).
3. Place a used joint ring (6) onto the cylinder liner collar to protect the sealing surface.
4. Mount the cylinder liner holding device (W2) as shown in the illustration.
5. Tighten round nuts (4) by hand.
6. Turn the crank pin to approx 20° before TDC on the control side.
7. Fill the ring clearance between piston (3) and cylinder liner (2) with grease.
8. Carefully scrape off and remove any carbon deposits in the cylinder liner between TDC of the 1st piston ring and bottom edge of the calibrating ring (1), so that the edge of the calibrating ring can be felt easily all round with a finger.

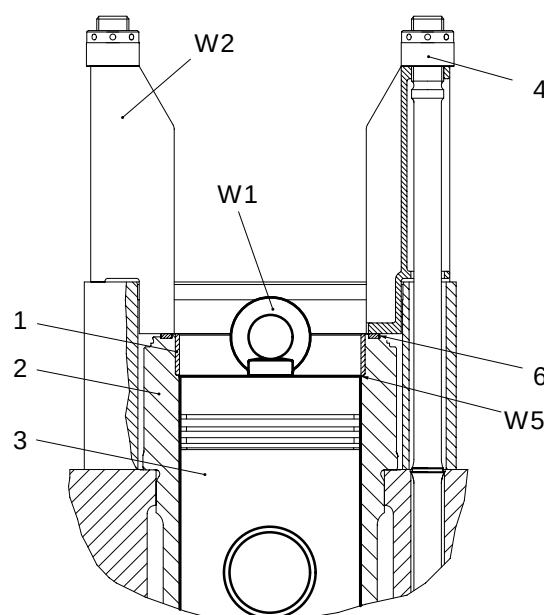
M25

02

9. Spray the ring clearance between calibrating ring and cylinder liner lwith rust solvent.
10. Allow the rust solvent to act.
11. Place the Seeger-ring (W5) by help of the Seeger-ring-tongs (W4) under the calibratingring.
12. Turn the piston to the **TDC- position** and pull out the piston.
13. Recut the tapped hole (**M12, 13.5 mm deep**) in the piston crown.
14. Screw the mounting-/ extraction device (W1) into the piston.
15. Dismantle the con-rod cover and con-rod bearing shells (**02.04.01.nn**).
16. Attach a crane to ring bolt and slowly pull out the piston.

Attention:

Ensure that the calibrating ring is also pulled out without tilt when extracting the piston.
If the calibrating ring is tilted , lower the piston and readjust the calibrating ring !
Introduce the big end carefully into the cylinder liner.
The big-end bearing shells must be dismantled!



17. Place the piston in a suitable device and secure it!
18. Clean the sealing and contact surfaces at the cylinder liner collar and the recess for the calibrating ring (1) and check for damages.

Attention:

Disassemble the connecting rod if the piston with connecting rod is stored for a longer period as otherwise vibration damage can occur in the area of the piston pin bush.

19. Check the cylinder liner and completely remove combustion deposits.

Note:

Do not damage the cylinder liner!

20. Check / Measure the wear on the cylinder liner (**03.03.01.nn**).

M25

02

See also: 01.06.01.nn, 02.07.01.nn, 03.04.01.nn

Spare parts list: B1.05.02.252601

Time requirement: 2 Pers./ 0,30 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Mounting /extraction device for pistons
Cylinder liner holding device
Socket wrench for indicator valves
Seeger-ring-tongs
Seeger-ring
Support roller
Strap

W1	259223 A
W2	259217 B
W3 *	1.9100-060
W4 *	125-300 mm
W5	250X5 DIN 472
W6	259216 C
W7	

* not illustrated

Auxiliary material:

Rust solvent „Caramba“ **

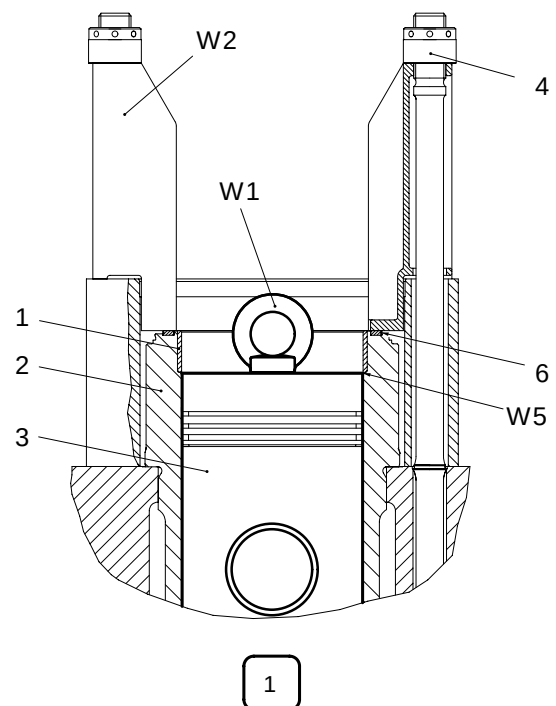
** or a product of equal standard

Note:

The cylinder liner must always be secured by means of the cylinder liner holding device (**fig.1/W2**) to prevent the cylinder liner (2) from coming off when extracting the piston or during turning of the engine.

Sequence of operations:

1. Open the indicator valves and mount the turning device.
2. Remove the crankcase cover of the respective cylinder on the camshaft side and dismantle the cylinder head (**01.06.01.nn**).



M25

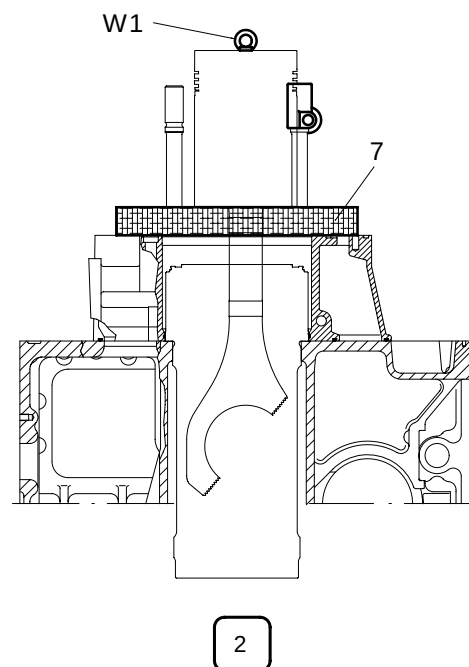
02

3. Place a used joint ring (6) onto the cylinder liner collar to protect the sealing surface.
4. Mount the cylinder liner holding device (W2) as shown in the illustration.
5. Tighten round nuts (4) by hand.
6. Turn the crank pin to approx 20° before TDC towards camshaft.
7. Fill the ring clearance between piston (3) and cylinder liner (2) with grease.
8. Carefully scrape off and remove any carbon deposits in the cylinder liner between TDC of the 1st piston ring and bottom edge of the calibrating ring (1), so that the edge of the calibrating ring can be felt easily all round with a finger.
9. Spray the ring clearance between calibrating ring and cylinder liner lightly with rust solvent.
10. Allow the rust solvent to act.
11. Place the Seeger-ring (W5) under the calibrating ring by means of the Seeger-ring-tongs (W4).
12. Turn the piston to the **TDC- position** and press out the calibrating ring.
13. Recut the tapped hole (**M12, 13.5 mm deep**) in the piston crown.
14. Screw the mounting-/ extraction device (W1) into the piston.
15. Dismantle the con-rod cover and con-rod bearing shells (**02.04.01.nn**).
16. Attach a crane to the ring bolt (W1) and slowly pull out the piston so that its position will be as shown in **fig.2**.

Attention:

Ensure that the calibrating ring is also pulled out without tilt when extracting the piston.
If the calibrating ring is tilted , lower the piston and readjust the calibrating ring !
Introduce the big end carefully into the cylinder liner.
The big-end bearing shells must be dismantled!

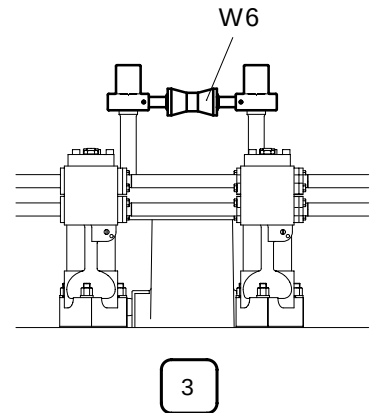
17. Dismount the cylinder liner holding device (**fig.1/W2**).
18. Put the cylinder liner onto two beams (**fig.2/7**) as support.



M25

02

19. Put the support rolls (**fig.2/W6**) on the bolts.
20. Attach the strap as shown in (**fig.4/W7**) .
21. Lift up the piston and connecting rod so that the connecting rod rests against the support roller (**fig.4/W6**) and the big end of the connecting rod (5) gets clear of the cooling collar.



Attention:

Guide the piston and connecting rod by hand with the assistance of a second man so as to make sure the piston and connecting rod gets clear !

22. Swing the piston and connecting rod away by shifting the lifting gear (**fig.4**) sideways.
23. Place the piston into a suitable device and secure it!
24. Remove the beams (**fig.2/7**).
25. Clean the sealing and contact surfaces at the cylinder liner collar and the recess for the calibrating ring (1) and check for damages.

Attention:

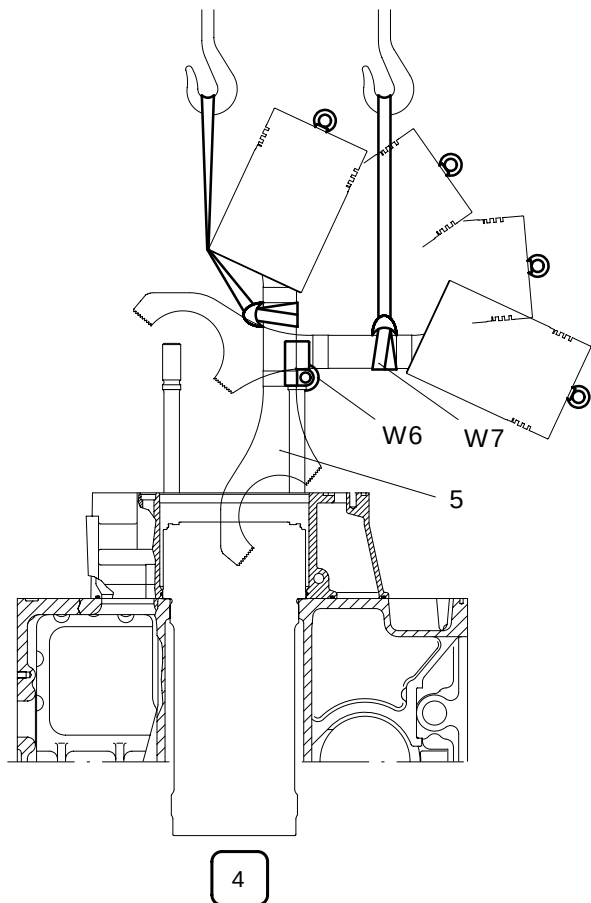
Disassemble the connecting rod if the piston with connecting rod is stored for a longer period as otherwise vibration damage can occur in the area of the piston pin bush.

26. Check the cylinder liner and completely remove combustion deposits.

Note:

Do not damage the cylinder liner !

27. Check / Measure the wear on the cylinder liner (**03.03.01.nn**).



M25

02

See also: 02.06.01.nn, 02.07.01.nn, 02.08.01.nn, 02.09.01.nn

Spare parts list: B1.05.02.252601

Time requirement: 1 Pers./ 0,70 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Mounting/extraction device for pistons

W1

259223 A

Auxiliary material:

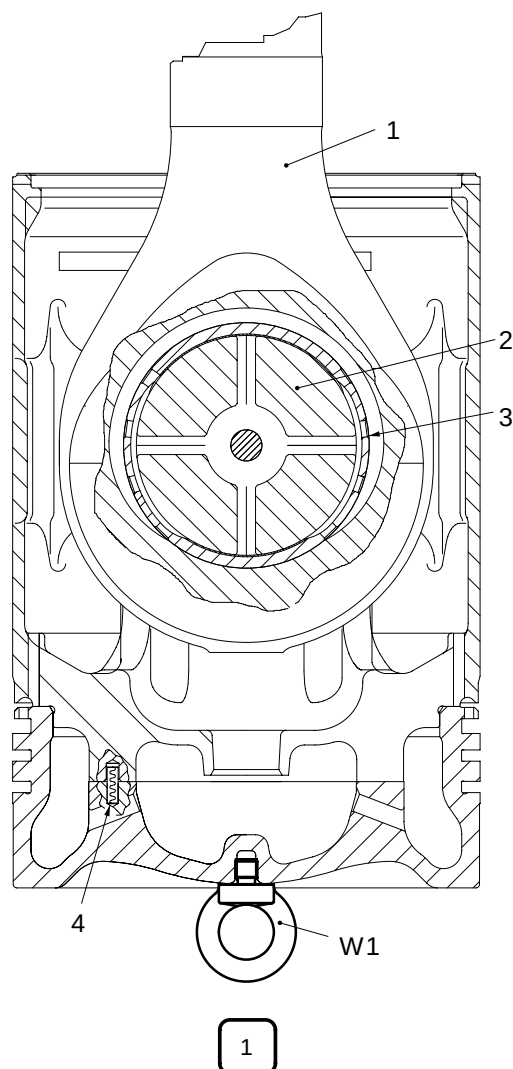
Molykote paste "G-n plus"***

** or a product of equal standard

Sequence of operations:

1. Turn the piston.

- 1.1 Attach a crane to the mounting/extraction device (**fig. 1/W1**) and raise the piston.
 - 1.2 Fit a sling to the con-rod (1) and attach it to a second crane.
 - 1.3 Carefully turn the piston together with the con-rod. **The piston must not knock against the con-rod.**
 - 1.4 Place the piston on a suitable base. Dismantle the mounting/extraction device if applicable (W1).
- #### 2. Disassembly of the piston crown
- 2.1 Dismantle the piston pin (2) (**02.08.01.nn**).
 - 2.2 Measure the small and bearing (3) (**02.09.01.nn**).



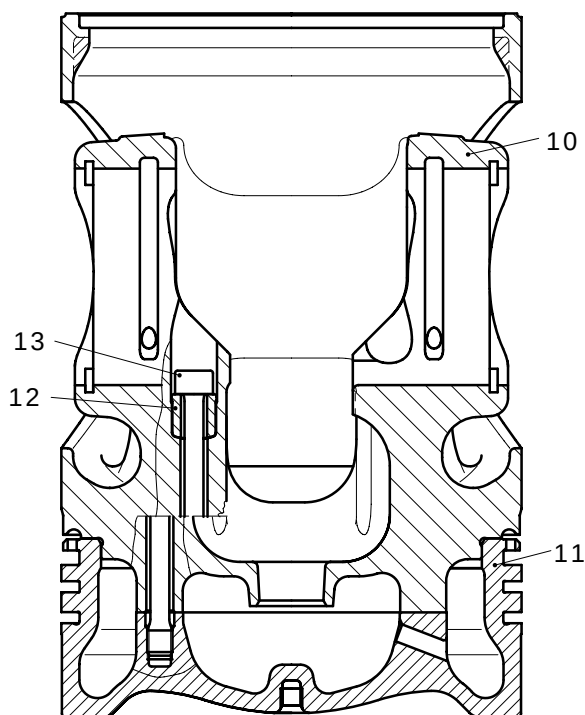
M25

02

- 2.3 Loosen the cheese head screws (fig. 2/ 13) and remove them together with the resilient sleeves (12) and piston end (10).
- 2.4 Clean the piston crown (11) and piston end (10). Pay attention to the cleanliness of the
 - slide faces of the con-rod in the piston end as well as
 - the contact surfaces of the piston parts and resilient sleeves (12).

Attention:

Check the slide and contact surfaces for signs of friction as well as signs of cold welding. Consult MaK customer services if necessary!



2.5 Assembly of the piston

- 2.6 Mount the piston end (10). The locating bore and dowel pin (4) must align.
- 2.7 Apply Molykote paste to the thread and contact surfaces of the cheese head screws (13).
- 2.8 Mount the cheese head screws (13) together with the resilient sleeves (12).
- 2.9 Tighten the cheese head screws (13) cross-wise at a torque of

M = 60 Nm

and then loosen them again.

- 2.10 Tighten the cheese head screws (13) cross-wise at a torque of

M = 20 Nm

and then turn them a further **70°**.

2.11 Check:

It should not be possible to turn the cheese head screws any further at a torque of

M = 45 Nm!

M25

12000, 24000

02

See also: 02.06.01.nn, 02.10.01.nn

Spare parts list: B1.05.02.252617

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Distillate fuel

Inspection:

of one piston and its rings	all	12,000 h
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Maintenance:

of all pistons and their rings	all	24,000 h
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Tools:

Piston ring expander	W1	259227 A
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Note:

During piston inspection, pay special attention to any sharp edges of the piston rings, ring tension, or rings sticking due to carbon deposits.

Depending on the personnel's own critical judgement the complete check of all pistons may be postponed to a later date, however, not beyond a maximum of 24,000 operating hours and subject to the following conditions:

- the running surfaces of all cylinder liners are without marks, polished spots, and without any other damages,
- the parts of the drawn piston must be in perfect condition,
- all piston rings must be free in the grooves, and
- no part must present unpermissible wear

Do not remove the graphite coating on the piston skirt.

After fitting new piston rings, the engine must be run in according to the running-in regulation **A3.10.01.nn**!

Built up pistons with chromium-plated first ring groove must only be reconditioned by MaK or MaK contract workshops.

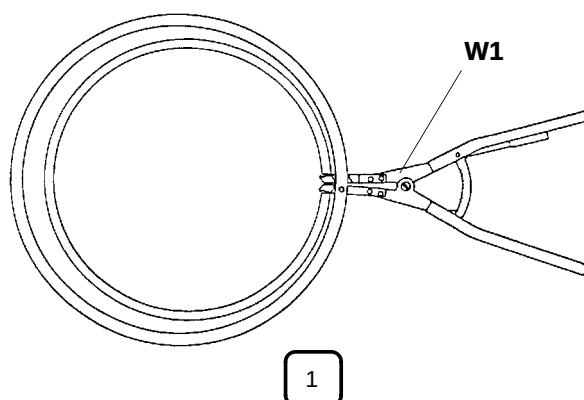
M25

12000, 24000

02
Sequence of operations:

1. **Piston inspection** (12,000 h)
 - 1.1 Open all crankcase covers.
 - 1.2 Check the running surfaces of the cylinder liners from the crank chamber.
 - 1.3 Draw the piston from the liner with the worst running pattern (**02.06.01.nn**). Draw the other pistons too, if the piston rings are stuck or burnt.
 - 1.4 Remove piston rings only with the piston ring expander (**Fig. 1/W1**). Record position of ring joints with regard to the installation position of the piston on measuring sheet.
 - 1.5 Clean the piston rings.
 - 1.6 Check the chromium layer for wear, particularly at the joint and the opposite side. Renew all rings of this piston if there is no chromium visible in some spots.

If the chromium layer of one ring is worn, check the rings of all pistons.
 - 1.7 Clean the piston, ring grooves and oil return holes for the oil control ring.
 - 1.8 Smooth light friction and seizing marks with a fine oily emery cloth or a fine carborandum stone. In case of heavy damage or deep scores renew the piston.

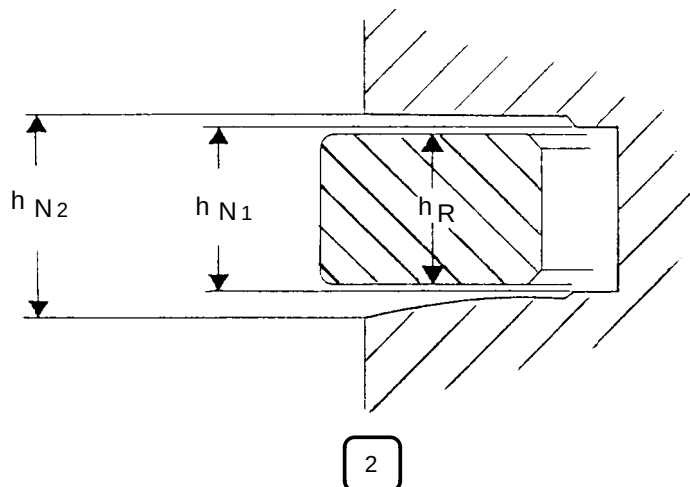


M25

12000, 24000

02

- 1.9 Measure the groove width h_N (Fig. 2) in the front area of the groove in the longitudinal and transverse directions of the engine. When exceeding the limits, have the grooves reconditioned by MaK.
- 1.10 Measure the ring thickness h_R (Fig. 2) at 4 opposite points.



h_{N1} = new
 h_{N2} = worn

- 1.11 Calculate the limit clearances and check according to the **chart for standard piston ring sets**.

Groove	Ring thickness h_R Nominal mm	Groove width h_{N2} Wear limit mm	Limit clearance $h_{N2} - h_R$ mm
1 (Piston junk ring)	6	6.45	0.50
2 (Compression ring)	6	6.45	0.50
3 (Oil control ring)	8	8.20	0.30

- 1.12 **Insert the piston rings into the grooves with the marking pointing upwards and ring joints pointing alternately towards flywheel end and free end of the engine respectively.**
- 1.13 Mount the piston (02.10.01.nn) and all crankcase covers.

M25

12000, 24000

02

2. Maintenance (24,000 h)

- 2.1 Open all crankcase covers and draw the pistons (**02.06.01.nn**).
- 2.2 Check the state of lubrication and appearance of the running surface of the piston and clean it.
- 2.3 Remove the piston rings only by means of the expander (**Fig. 1/W1**). Record the position of the ring joints with regard to the installation position of the piston on the measuring sheet.
- 2.4 Clean all ring grooves and check wear of the chromium layer. If the chromium layer is worn away in some places, send the piston to MaK for reconditioning.
- 2.5 Measure the groove width h_N according to operation sequence 1.9.
- 2.6 Replace oil control rings and compression rings.
- 2.7 Insert the piston rings into the grooves with the marking pointing upwards and ring joints pointing alternately towards flywheel end and free end of the engine respectively.**
- 2.8 Mount all pistons (**02.10.01.nn**) and crankcase covers.

M25

6000, 12000

02

See also: 02.06.01.nn, 02.10.01.nn

Spare parts list: B1.05.02.252617

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Heavy fuel

Inspection:

of one piston and its rings	all	6,000 h
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Maintenance:

of all pistons and their rings	all	12,000 h
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Tools:

Piston ring expander	W1	259227 A
----------------------	----	----------

Note:

During piston inspection, pay special attention to any sharp edges of the piston rings, ring tension, or rings sticking due to carbon deposits.

Depending on the personnel's own critical judgement the complete check of all pistons may be postponed to a later date, however, not beyond a maximum of 24,000 operating hours and subject to the following conditions:

- the running surfaces of all cylinder liners are without marks, polished spots, and without any other damages,
- the parts of the drawn piston must be in perfect condition,
- all piston rings must be free in the grooves, and
- no part must present unpermissible wear

Do not remove the graphite coating on the piston skirt.

After fitting new piston rings, the engine must be run in according to the running-in regulation **A3.10.01.nn**!

Built up pistons with chromium-plated first ring groove must only be reconditioned by MaK or MaK contract workshops.

M25

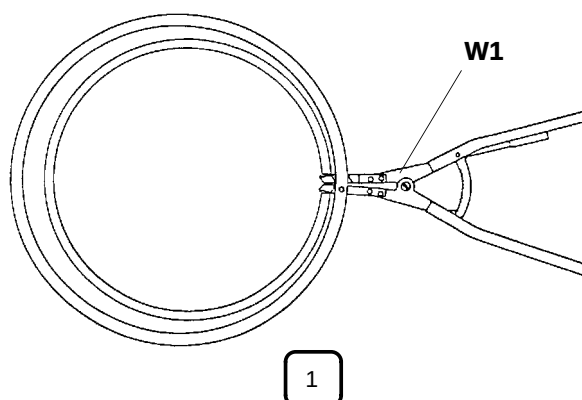
6000, 12000

02

Sequence of operations:

1. **Piston inspection** (6,000 h)
 - 1.1 Open all crankcase covers.
 - 1.2 Check the running surfaces of the cylinder liners from the crank chamber.
 - 1.3 Draw the piston from the liner with the worst running pattern (**02.06.01.nn**). Draw the other pistons too, if the piston rings are stuck or burnt.
 - 1.4 Remove piston rings only with the piston ring expander (**Fig. 1/W1**). Record position of ring joints with regard to the installation position of the piston on measuring sheet.
 - 1.5 Clean the piston rings.
 - 1.6 Check the chromium layer for wear, particularly at the joint and the opposite side. Renew all rings of this piston if there is no chromium visible in some spots.

If the chromium layer of one ring is worn, check the rings of all pistons.
 - 1.7 Clean the piston, ring grooves and oil return holes for the oil control ring.
 - 1.8 Smooth light friction and seizing marks with a fine oily emery cloth or a fine carborandum stone. In case of heavy damage or deep scores renew the piston.

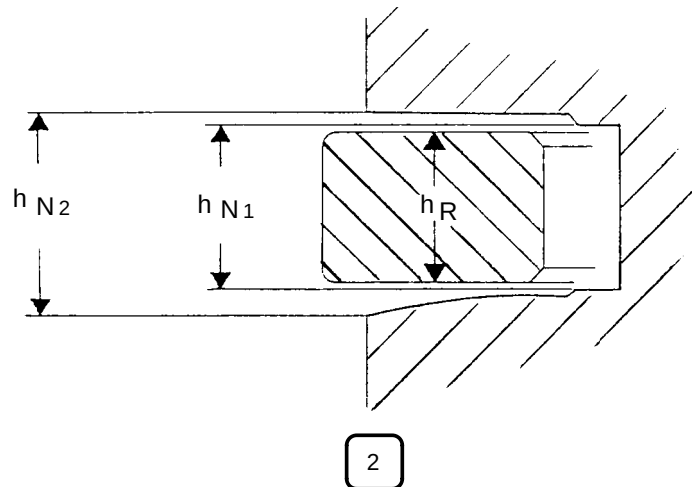


M25

6000, 12000

02

- 1.9 Measure the groove width h_N (Fig. 2) in the front area of the groove in the longitudinal and transverse directions of the engine. When exceeding the limits, have the grooves reconditioned by MaK.
- 1.10 Measure the ring thickness h_R (Fig. 2) at 4 opposite points.



h_{N1} = new
 h_{N2} = worn

- 1.11 Calculate the limit clearances and check according to the **chart for standard piston ring sets**.

Groove	Ring thickness h_R Nominal mm	Groove width h_{N2} Wear limit mm	Limit clearance $h_{N2} - h_R$ mm
1 (Piston junk ring)	6	6.45	0.50
2 (Compression ring)	6	6.45	0.50
3 (Oil control ring)	8	8.20	0.30

- 1.12 **Insert the piston rings into the grooves with the marking pointing upwards and ring joints pointing alternately towards flywheel end and free end of the engine respectively.**
- 1.13 Mount the piston (02.10.01.nn) and all crankcase covers.

M25

6000, 12000

02
2. Maintenance (12,000 h)

- 2.1 Open all crankcase covers and draw the pistons (**02.06.01.nn**).
- 2.2 Check the state of lubrication and appearance of the running surface of the piston and clean it.
- 2.3 Remove the piston rings only by means of the expander (**Fig. 1/W1**). Record the position of the ring joints with regard to the installation position of the piston on the measuring sheet.
- 2.4 Clean all ring grooves and check wear of the chromium layer. If the chromium layer is worn away in some places, send the piston to MaK for reconditioning.
- 2.5 Measure the groove width h_N according to operation sequence 1.9.
- 2.6 Replace oil control rings and all compression rings.
- 2.7 Insert the piston rings into the grooves with the marking pointing upwards and ring joints pointing alternately towards flywheel end and free end of the engine respectively.**
- 2.8 Mount all pistons (**02.10.01.nn**) and crankcase covers.

M25

02

See also: 02.06.01.nn, 02.09.01.nn

Spare parts list: B1.05.02.252601

Time requirement: 2 Pers./ 1,00 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

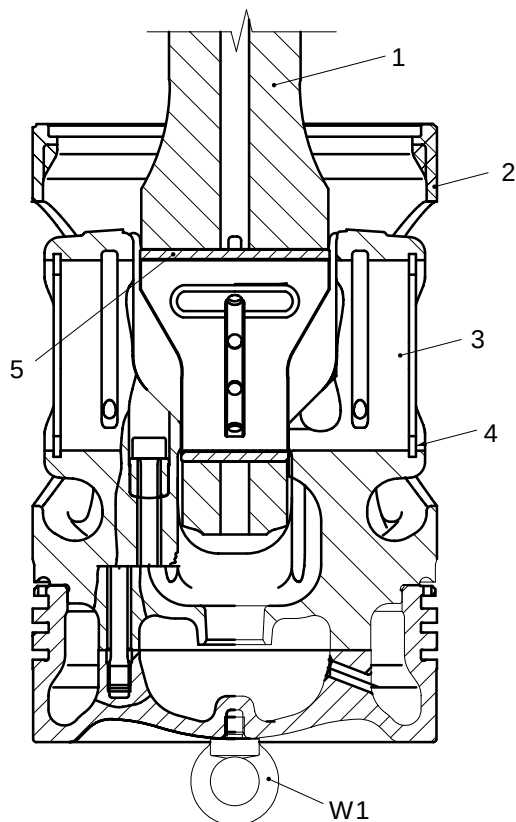
Mounting / extraction device for pistons

W1

259223 A

Sequence of operations:

1. **Turn the piston.**
 - 1.1 Attach a crane to the mounting/ extraction device (W1) and raise the piston.
 - 1.2 Fit a sling to the con-rod (1) and attach it to a second crane.
 - 1.3 Carefully turn the piston together with the con-rod. The piston must not knock against the con-rod.
 - 1.4 Place the piston on a suitable base. Dismantle the mounting/extraction device if applicable (W1).
2. **Dismantle the piston crown**
 - 2.1 Mark the con-rod (1), piston (2) and piston pin (3) for assembly on the correct side.
 - 2.2 Raise the con-rod slightly by means of a crane to relieve the piston pin.
 - 2.3 Remove the locking rings (4).
 - 2.4 Carefully push the piston pin (3) out of the piston bore and small end bearing bush without using force.



M25

02

Note:

If the piston pin cannot be pushed out by hand, heat up the piston to 80 °C in an oil bath. In most cases, the piston pin can be fitted and removed without heating up the piston. The clearances of new parts could be too small in a cold condition. The actual overall clearance is only given at operating temperature.

- 2.5 Place the con-rod on a suitable base.
- 2.6 Assess the small end bearing bush (5) (02.03.03.nn).
- 2.7 Check the bearing pin surface for cracks and damage.
- 2.8 Measure out the piston pin, piston pin bush and piston pin bore in the piston (02.09.01.nn).

3. Mount the piston pin

- 3.1 Fit a locking ring (4) in the piston bore.
- 3.2 Raise the con-rod (1) and push it into the piston until the piston bore and piston pin bush align.
- 3.3 Lubricate the piston pin (3) and push it into the piston and piston pin bush according to the side markings and without tilting it.

Note:

If necessary, heat up the piston to 80 °C in an oil bath/freeze the piston pin.

- 3.4 Secure the piston pin by means of a second locking ring (4).

M25

48000

02

See also: 02.03.03.nn

Spare parts list: B1.05.02.252601

Time requirement: 2 Pers./ 1,00 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Distillate fuel

Maintenance/repair:

Measure the bearing clearance every 48,000 h

Replace the small end bearing once a replacement criterion has been met

Note:

The small end bearing consists of the bearing pin (**fig. 2/1**) and the small end bearing bush (2).

Inserting a small end bearing bush is hardly possible with conventional equipment. This work should only be carried out by MaK or an authorized workshop.

The small end bearing bush in the stepped con-rod has a galvanic running code.

The service limit values (**fig. 1**) are decisive for assessment of the small end bearing.

A small end bearing should only be replaced if

- a clearance limit has been reached or
- the clearance limit will probably be exceeded before the next service.

	Minimum clearance	Maximum clearance	Service clearance limit
Piston boss Ø (A) Piston pin Ø (C)	0.050	0.078	0.100
Small end bearing bush Ø (B) Piston pin Ø (C)	0.110	0.160	0.210
Boss distance (D) Bush width (X)	0.500	1.100	1.300

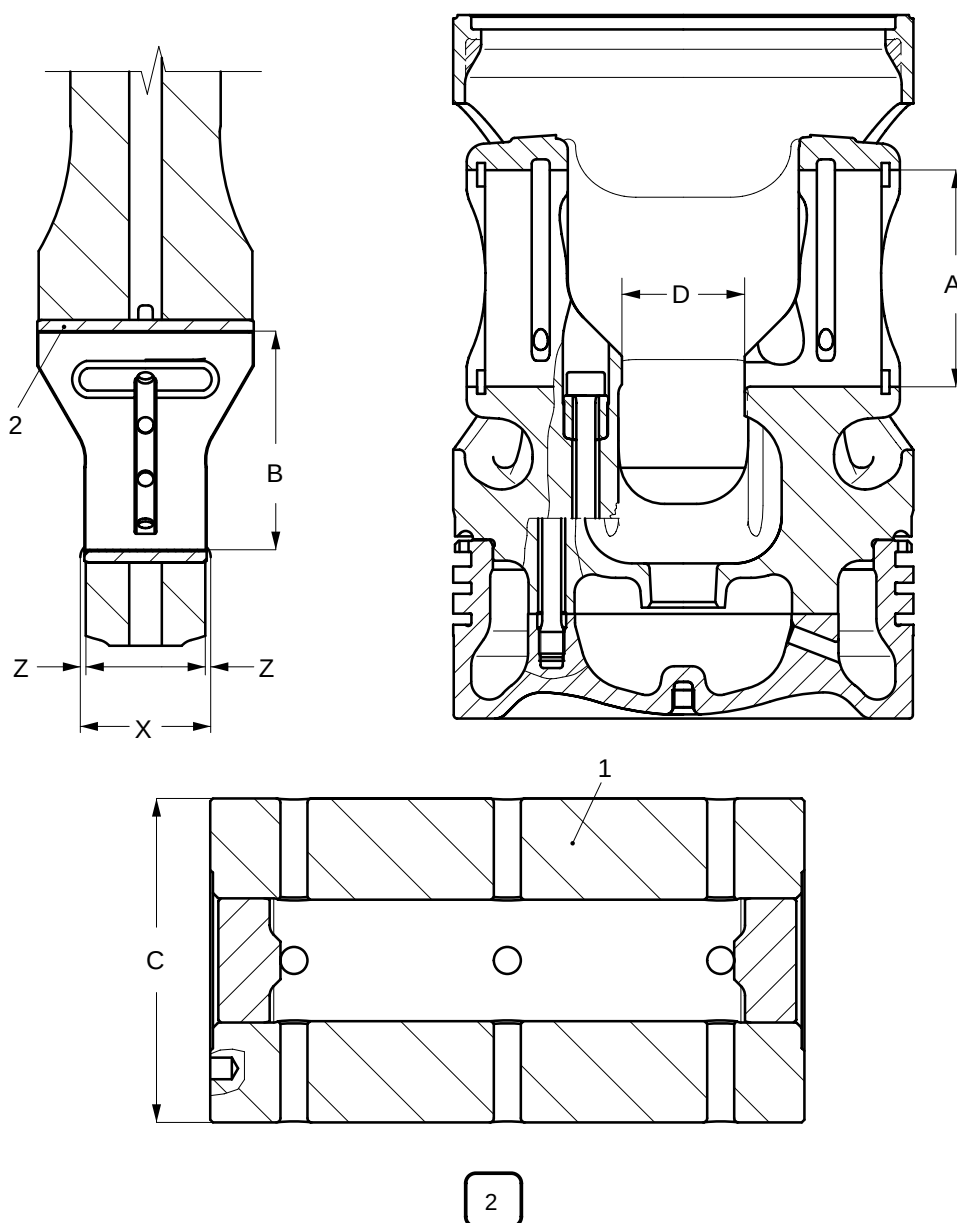
1

Sequence of operations:

1. Measure the small end bearing

- 1.1 Clean the piston pin (**fig. 2/1**), small end bearing bush (2) and piston boss.
- 1.2 Measure dimensions A, B and C by means of suitable measuring instruments such as external or internal micrometers.
- 1.3 Determine the axial clearance [measure the piston boss distance (dimension D) and bearing width (dimension X)].

The respective wearing parts have to be replaced when the service clearance limit (**fig. 1**) has been attained.



M25

48000

02

2. Disassembly of the small end bearing

Note:

The following work should only be carried out by MaK or an authorized workshop. **Only do it yourself in an emergency!**

2.1 **Do not use force** when dismantling the small end bearing bush.

The small end bearing bush (fig. 2/2) is not allowed to be pressed out. It has to be made tension-free by carefully sawing or milling it and then it is removed.

Attention:

Attention must be paid that the surface of the small end bearing bore in the con-rod is not damaged!

After removing the small end bearing, the surface of the bore has to be carefully examined for cracks, corrosive scares or other damage. Only suitable crack detectors such as Magna-Flux and a magnifying glass should be used. Accumulations of material should carefully be removed.

Con-rods with a damaged bore surface in the small end bearing bore are not allowed to be used again without being refinished.

Refinishing is usually possible by MaK. Replacement con-rods are available from MaK for such cases.

3. Assembly of the small end bearing

3.1 Undercool the small end bearing bush to approx. **-60 °C** in liquid nitrogen and heat up the con-rod to approx. 100 °C in a **clean** oil bath.

Attention:

Working with liquid nitrogen can cause burns! Pay attention to safety regulations!

3.2 Insert the small end bearing bush in the con-rod.

Attention:

•**Pay attention to the correct position of the small end bearing bush in the con-rod!**

•**The lateral projection (fig. 2/Z) of the small end bearing bush must be equal!**

•**Pay attention to the position of the oil bores and oil grooves!**

3.3 Check the dimensional accuracy and the position of the oil bores and oil grooves after reaching the normal temperature.

M25

24000

02

See also: 02.03.03.nn

Spare parts list: B1.05.02.252601

Time requirement: 2 Pers./ 1,00 h

Personnel qualification: Chief engineer, skilled engine hand

Operating medium: Heavy fuel

Maintenance/repair:

Measure the bearing clearance every 24,000 h

Replace the small end bearing once a replacement criterion has been met

Note:

The small end bearing consists of the bearing pin (**fig. 2/1**) and the small end bearing bush (2).

Inserting a small end bearing bush is hardly possible with conventional equipment. This work should only be carried out by MaK or an authorized workshop.

The small end bearing bush in the stepped con-rod has a galvanic running code.

The service limit values (**fig. 1**) are decisive for assessment of the small end bearing.

A small end bearing should only be replaced if

- a clearance limit has been reached or
- the clearance limit will probably be exceeded before the next service.

	Minimum clearance	Maximum clearance	Service clearance limit
Piston boss Ø (A) Piston pin Ø (C)	0.050	0.078	0.100
Small end bearing bush Ø (B) Piston pin Ø (C)	0.110	0.160	0.210
Boss distance (D) Bush width (X)	0.500	1.100	1.300

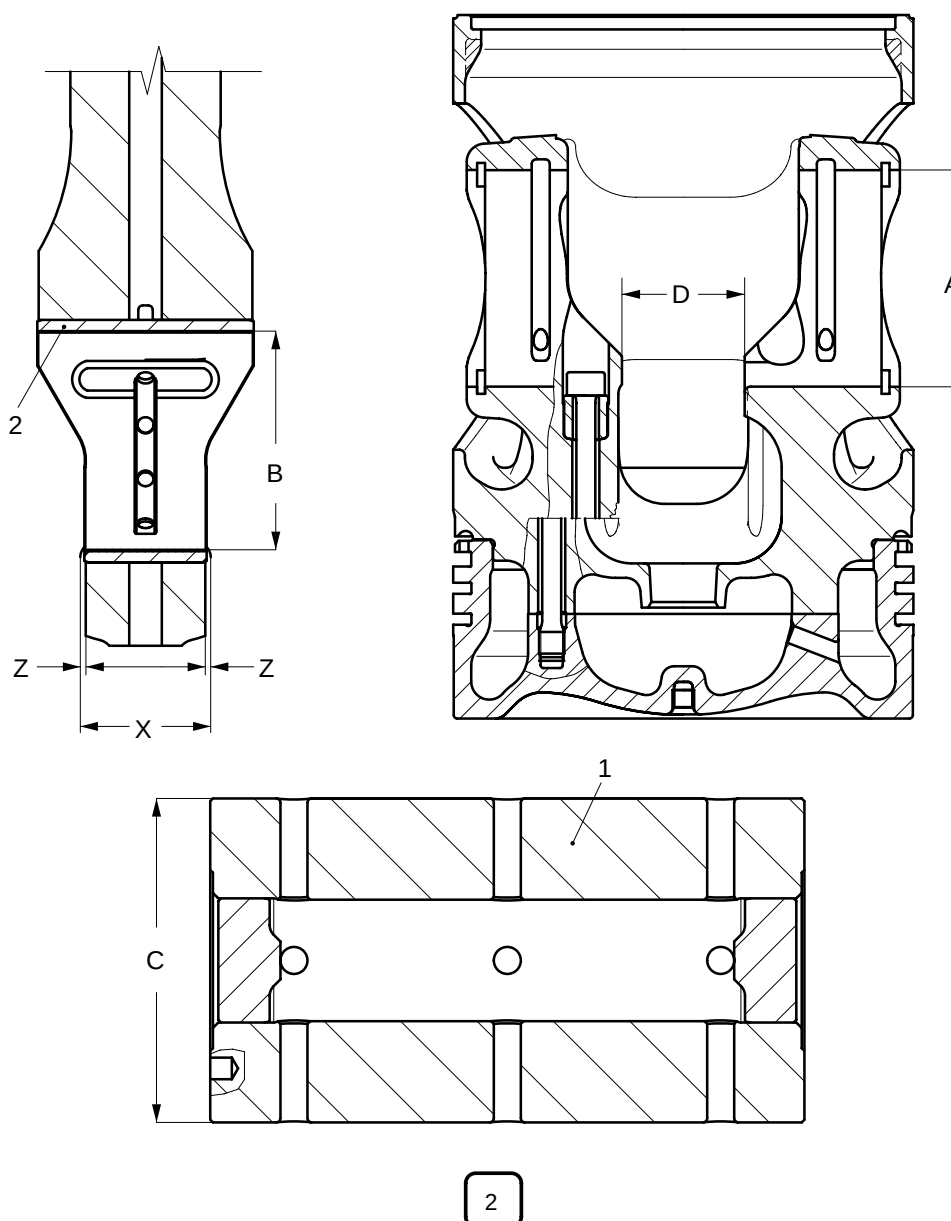
1

Sequence of operations:

1. Measure the small end bearing

- 1.1 Clean the piston pin (**fig. 2/1**), small end bearing bush (2) and piston boss.
- 1.2 Measure dimensions A, B and C by means of suitable measuring instruments such as external or internal micrometers.
- 1.3 Determine the axial clearance [measure the piston boss distance (dimension D) and bearing width (dimension X)].

The respective wearing parts have to be replaced when the service clearance limit (**fig. 1**) has been attained.



M25

24000

02

2. Disassembly of the small end bearing

Note:

The following work should only be carried out by MaK or an authorized workshop. **Only do it yourself in an emergency!**

2.1 **Do not use force** when dismantling the small end bearing bush.

The small end bearing bush (fig. 2/2) is not allowed to be pressed out. It has to be made tension-free by carefully sawing or milling it and then it is removed.

Attention:

Attention must be paid that the surface of the small end bearing bore in the con-rod is not damaged!

After removing the small end bearing, the surface of the bore has to be carefully examined for cracks, corrosive scares or other damage. Only suitable crack detectors such as Magna-Flux and a magnifying glass should be used. Accumulations of material should carefully be removed.

Con-rods with a damaged bore surface in the small end bearing bore are not allowed to be used again without being refinished.

Refinishing is usually possible by MaK. Replacement con-rods are available from MaK for such cases.

3. Assembly of the small end bearing

3.1 Undercool the small end bearing bush to approx. **-60 °C** in liquid nitrogen and heat up the con-rod to approx. 100 °C in a **clean** oil bath.

Attention:

Working with liquid nitrogen can cause burns! Pay attention to safety regulations!

3.2 Insert the small end bearing bush in the con-rod.

Attention:

•**Pay attention to the correct position of the small end bearing bush in the con-rod!**

•**The lateral projection (fig. 2/Z) of the small end bearing bush must be equal!**

•**Pay attention to the position of the oil bores and oil grooves!**

3.3 Check the dimensional accuracy and the position of the oil bores and oil grooves after reaching the normal temperature.

M25

02

See also: 02.04.02.nn, 02.06.01.nn, 02.07.01.nn

Spare parts list: B1.05.02.252601

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Mounting/extraction device for pistons	W1	259223 A
Cylinder liner holder	W2	259217 A
Piston assembly ring	W3	259220 B
Piston insertion device (sheet metal sleeve)	W4	259220 A
Socket wrench for indicator valves	W5 *	1.9100-060

* not illustrated

Auxiliary material:

Molykote paste "G-Rapid Plus" **

** or a product of equal standard

Note:

The cylinder liner must always be secured by means of the cylinder liner holder (**fig. 3/W2**) to prevent the cylinder liner from coming loose when turning the engine (without dismantled cylinder head)!

Pay attention to the cylinder number mark on the bottom end.

Drive in the engine according to the driving-in regulation (**A3.10.01**) after fitting a new piston/new piston rings!

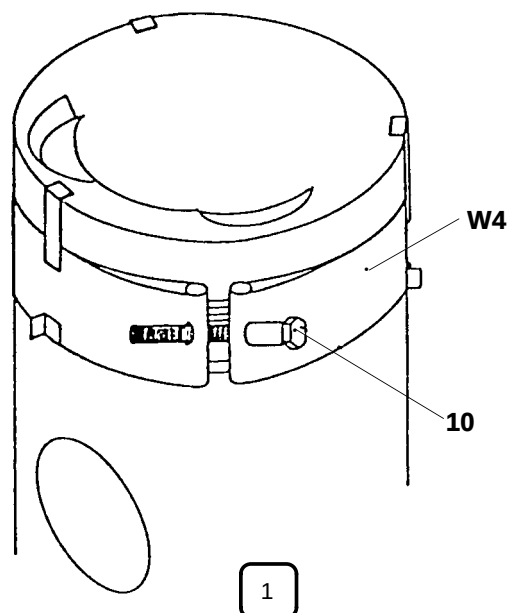
Sequence of operations:

1. Replace the piston rings as required.
2. Fit the new piston rings with the ring joints in a longitudinal direction to the engine alternately arranged opposite each other! Lubricate the piston rings and pistons well on the outside.

M25

02

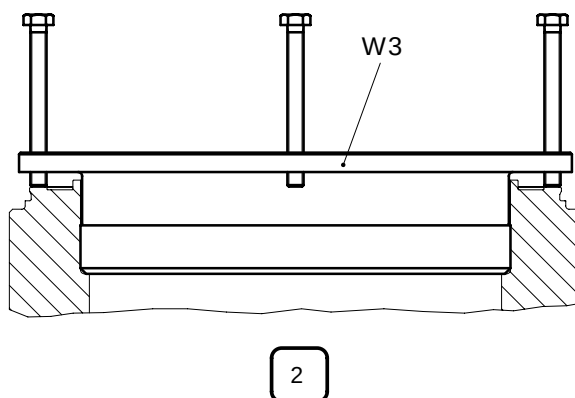
3. Slacken the tightening screw (**fig. 1/10**) until the piston insertion device (W4) has been relieved and can be guided freely over the piston rings.
4. Apply Molykote paste "G-Rapid Plus" to the thread and contact surface of the tightening screw (10).
5. Place the piston insertion device (W4) over the piston ring zone and tighten the tightening screw (10).



Attention:

Make sure the piston rings do not sit on the outer edge of the ring groove when tightening the tightening screw. Eliminate any faulty gripping by tapping the piston insertion device slightly.

6. Check the floating position of the rings by turning the piston insertion device (W4).
7. Mount the piston assembly ring (**fig. 2/W3**).
8. Open the indicator valves. Mount the turning device and piston mounting/extraction device (**fig. 3/W1**).



Attention:

Turn the crank pin to a favourable installation position. The bottom end must not knock against the crank pin when being lowered.

9. Attach the piston (3) to the crane and raise it.
10. Carefully insert the bottom end in the cylinder liner with the cylinder number mark towards the control side and **lower the piston exactly in the cylinder axis so that the bottom end does not jam in the cylinder liner.**
11. Let the piston insertion device (**fig. 1/W4**) lie flush on the piston assembly ring (**fig. 2/W3**) and **carefully** lower the piston further guiding the bottom end over the crank pin by hand.

M25

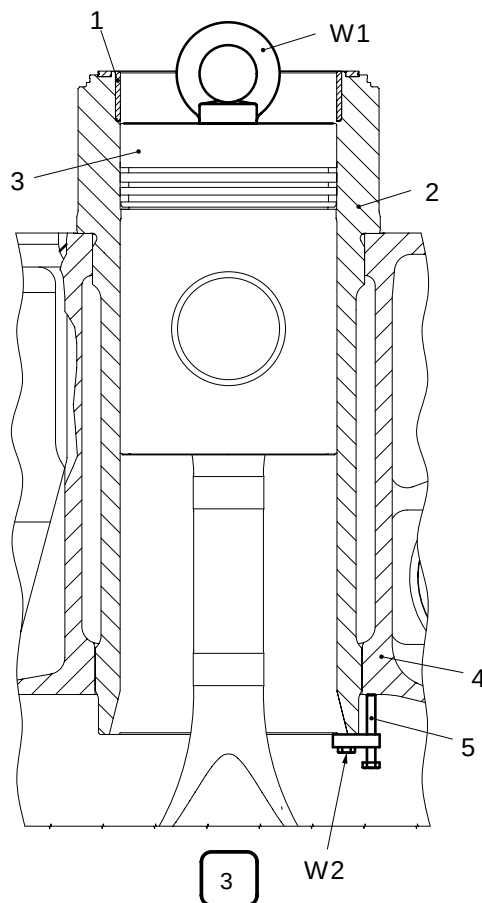
02

12. If it has been removed, mount the cylinder liner holder (**fig. 3/W2**) on the cylinder liner (2). Only screw the hexagon socket screw finger (5) tight against the cylinder crankcase (4).
13. Dismantle the piston insertion device (**fig. 1/W4**), piston assembly ring (**fig. 2/W3**) as well as the piston mounting/extraction device (**fig. 3/W1**).
14. Clean the contact surface on the cylinder liner collar.

Attention:

Insert the calibrating ring (1) only after the piston has been mounted!

15. Insert a **new** calibrating ring carefully into the cylinder liner and lower it down to the recess.
Do not tilt the calibrating ring !
16. Mount the con-rod (**02.04.02.nn**).
17. Mount the cylinder head (**01.11.01.nn**).
18. Dismantle the cylinder liner holder (W2).
19. Mount the power unit cover and close the indicator valves.
20. Dismantle the turning device.



M25

02

See also: 02.04.02.nn, 02.06.01.nn, 02.07.01.nn

Spare parts list: B1.05.02.252601

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Mounting/extraction device for pistons	W1	259223 A
Cylinder liner holder	W2	259217 B
Piston assembly ring	W3	259220 B
Piston insertion device (sheet metal sleeve)	W4	259220 A
Socket wrench for indicator valves	W5 *	1.9100-060

* not illustrated

Auxiliary material:

Molykote paste "G-Rapid Plus" **

** or a product of equal standard

Note:

The cylinder liner must always be secured by means of the cylinder liner holder (**fig. 3/W2**) to prevent the cylinder liner from coming loose when turning the engine (without dismantled cylinder head)!

Pay attention to the cylinder number mark on the bottom end.

Drive in the engine according to the driving-in regulation (**A3.10.01**) after fitting a new piston/new piston rings!

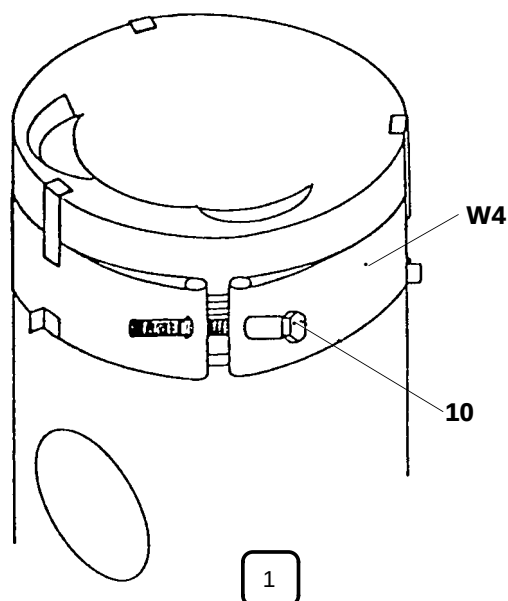
Sequence of operations:

1. Replace the piston rings as required.
2. Fit the new piston rings with the ring joints in a longitudinal direction to the engine alternately arranged opposite each other! Lubricate the piston rings and pistons well on the outside.

M25

02

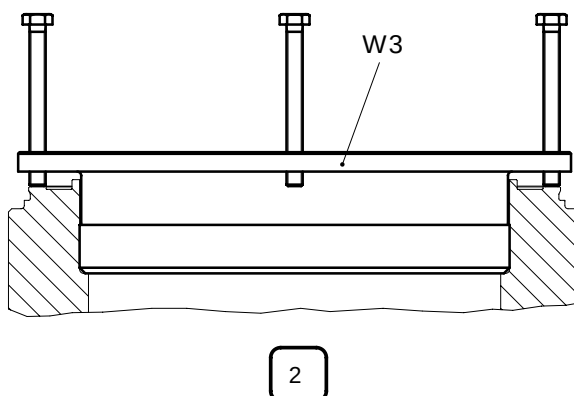
3. Slacken the tightening screw (**fig. 1/10**) until the piston insertion device (W4) has been relieved and can be guided freely over the piston rings.
4. Apply Molykote paste "G-Rapid Plus" to the thread and contact surface of the tightening screw (10).
5. Place the piston insertion device (W4) over the piston ring zone and tighten the tightening screw (10).



Attention:

Make sure the piston rings do not sit on the outer edge of the ring groove when tightening the tightening screw. Eliminate any faulty gripping by tapping the piston insertion device slightly.

6. Check the floating position of the rings by turning the piston insertion device (W4).
7. Mount the piston assembly ring (**fig. 2/W3**).
8. Open the indicator valves. Mount the turning device and piston mounting/extraction device (**fig. 3/W1**).



Attention:

Turn the crank pin to a favourable installation position. The bottom end must not knock against the crank pin when being lowered.

9. Attach the piston (3) to the crane and raise it.
10. Carefully insert the bottom end in the cylinder liner with the cylinder number mark towards the control side and **lower the piston exactly in the cylinder axis so that the bottom end does not jam in the cylinder liner.**
11. Let the piston insertion device (**fig. 1/W4**) lie flush on the piston assembly ring (**fig. 2/W3**) and **carefully** lower the piston further guiding the bottom end over the crank pin by hand.

M25

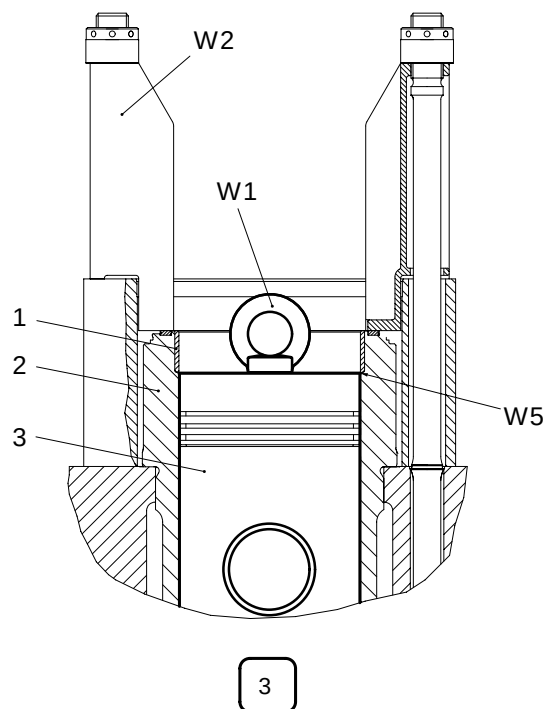
02

12. Dismantle the piston insertion device (**fig. 1/W4**), piston assembly ring (**fig. 2/W3**) as well as the piston mounting/extraction device (**fig. 3/W1**).
13. Mount the cylinder liner holder (**fig. 3/W2**) on the cylinder liner (2).
14. Clean the contact surface on the cylinder liner collar.

Attention:

Insert the calibrating ring (1) only after the piston has been mounted!

15. Insert a **new** calibrating ring carefully into the cylinder liner and lower it down to the recess.
Do not tilt the calibrating ring !
16. Mount the con-rod (**02.04.02.nn**).
17. Dismantle the cylinder liner holder (W2).
18. Mount the cylinder head (**01.11.01.nn**).
19. Mount the power unit cover and close the indicator valves.
20. Dismantle the turning device.



M25

02

See also: 02.04.02.nn, 02.06.01.nn, 02.07.01.nn

Spare parts list: B1.05.02.252601

Time requirement: 2 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Mounting/extraction device for pistons	W1	259223 A
Cylinder liner holder	W2	259217 B
Piston assembly ring	W3	259220 B
Piston insertion device (sheet metal sleeve)	W4	259220 A
Socket wrench for indicator valves	W5 *	1.9100-060
Support roller	W6	259216 C
Strap	W7	

* not illustrated

Auxiliary material:

Molykote paste "G-Rapid Plus" **

** or a product of equal standard

Note:

The cylinder liner must always be secured by means of the cylinder liner holder (**fig. 6/W2**) to prevent the cylinder liner from coming loose when turning the engine (without dismantled cylinder head)!

Pay attention to the cylinder number mark on the bottom end.

Drive in the engine according to the driving-in regulation (**A3.10.01**) after fitting a new piston/new piston rings!

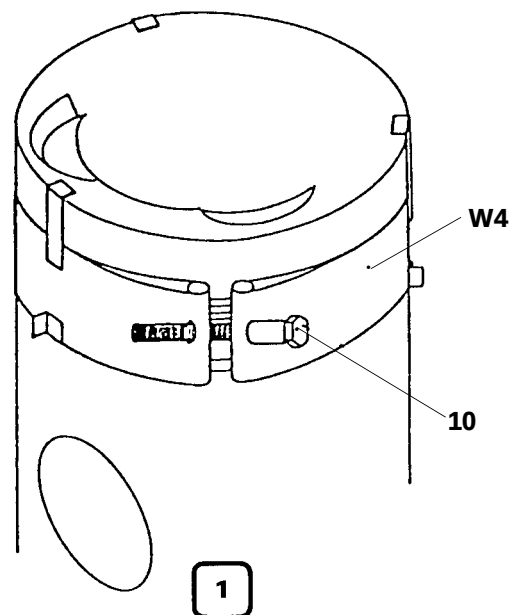
Sequence of operations:

1. Replace the piston rings as required.
2. Fit the new piston rings with the ring joints in a longitudinal direction to the engine alternately arranged opposite each other! Lubricate the piston rings and pistons well on the outside.

M25

02

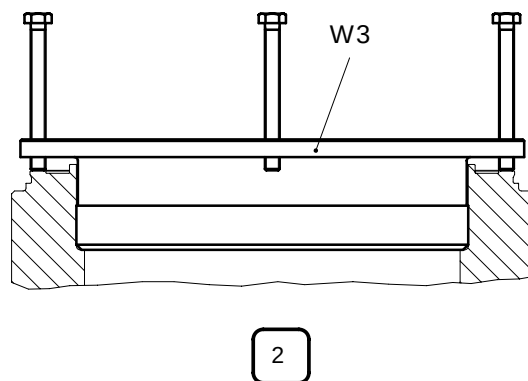
3. Slacken the tightening screw (**fig. 1/10**) until the piston insertion device (W4) has been relieved and can be guided freely over the piston rings.
4. Apply Molykote paste "G-Rapid Plus" to the thread and contact surface of the tightening screw (10).
5. Place the piston insertion device (W4) over the piston ring zone and tighten the tightening screw (10).



Attention:

Make sure the piston rings do not sit on the outer edge of the ring groove when tightening the tightening screw. Eliminate any faulty gripping by tapping the piston insertion device slightly.

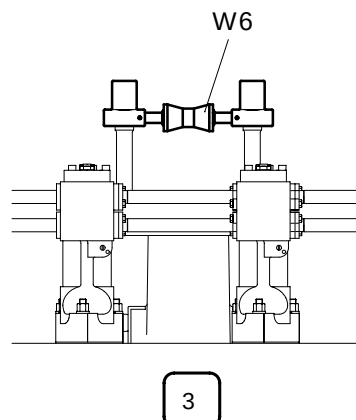
6. Check the floating position of the rings by turning the piston insertion device (W4).
7. Mount the piston assembly ring (**fig. 2/ W3**).
8. Open the indicator valves. Mount the turning device and piston mounting/ extraction device (**fig. 6/W1**).



Attention:

Turn the crank pin to a favourable installation position. The bottom end must not knock against the crank pin when being lowered.

9. Put the support rolls on the bolts (**fig.3/ W6**).



M25

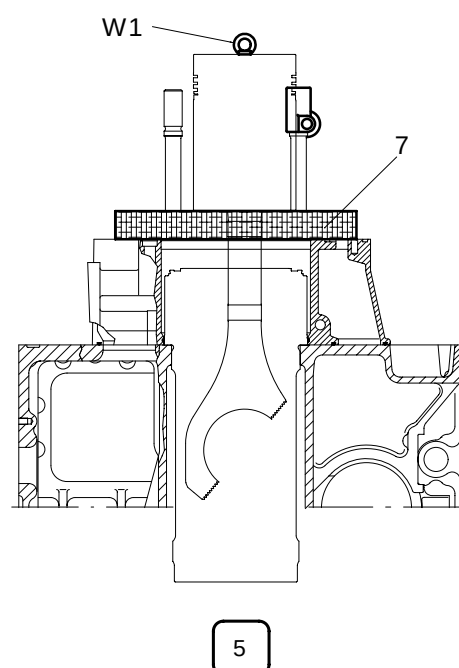
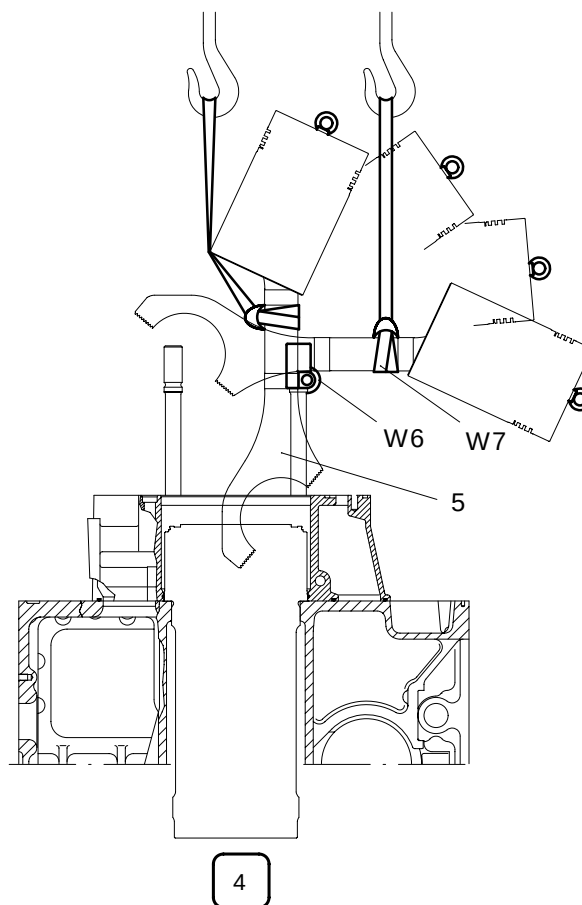
02

10. Attach the strap as shown in (fig.4/W7).
11. Lift up the piston and connecting rod so that the big end of the connecting rod (5) rests against the support roller (fig.4/W6) and gets clear of the cooling collar.

Attention:

Guide the piston and connecting rod by hand with the assistance of a second man so as to make sure the piston and connecting rod gets clear!

12. Swing the piston and connecting rod away by shifting the lifting gear (fig.4 und 5) sideways.
13. Carefully insert the bottom end in the cylinder liner with the cylinder number mark towards the control side and **lower the piston exactly in the cylinder axis so that the bottom end does not jam in the cylinder liner (fig.5).**
14. Put the piston onto two squared beams (fig.5/7) as support.
15. Remove the strap and put on the crane on the mounting / extraction device for pistons (fig.6/W1).
16. Lift up the piston and remove the squared beams.



M25

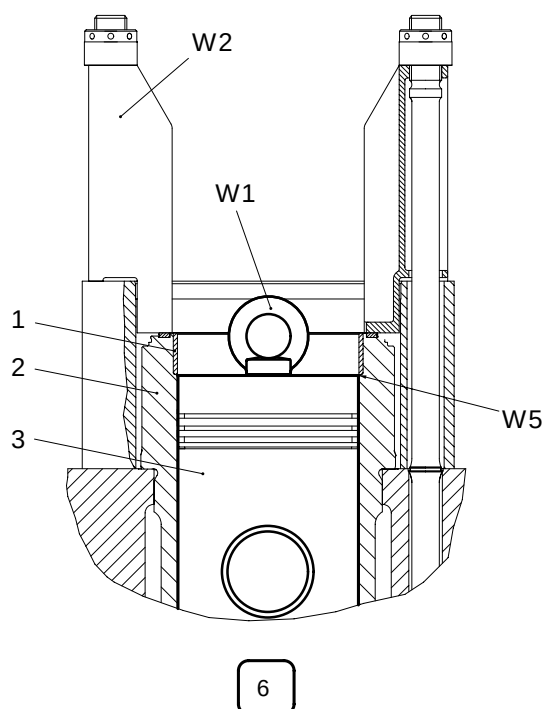
02

17. Let the piston insertion device (**fig. 1/W4**) lie flush on the piston assembly ring (**fig. 2/W3**) and **carefully** lower the piston further guiding the bottom end over the crank pin by hand.
18. Mount the con-rod (**02.04.02.nn**).
19. Dismantle the piston insertion device (**fig. 1/W4**), piston assembly ring (**fig. 2/W3**), support rolls (**fig.3/W6**) as well as the piston mounting/extraction device (**fig. 6/W1**).
20. Mount the cylinder liner holder (**fig. 6/ W2**) on the cylinder liner (2).

Attention:

Insert the calibrating ring (1) only after the piston has been mounted!

21. Insert a **new** calibrating ring carefully into the cylinder liner and lower it down to the recess.
Do not tilt the calibrating ring !
22. Dismantle the cylinder liner holder (**fig.6/W2**).
23. Mount the cylinder head (**01.11.01.nn**).
24. Mount the crankcase cover and close the indicator valves.
25. Dismantle the turning device.



M25

02

See also: 01.06.01.nn, 01.11.01.nn, 02.04.01.nn, 02.06.01.nn

Spare parts list:

Time requirement: 2 Pers./ 4,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Retaining device for rocking lever	W1	259235 B
Locking bolt for oil bore		

Attention:

In the case of flexibly mounted engines with an averaged drive the following measures for emergency operation must be carried out!

Sequence of operations

1. Retain the flexible mounting.

 1.1 Dismantle nuts and bolts (**Fig. 1/20, 21 and 22**).

1.2 Loosen stud bolts (23).

1.3 Screw down lock ring (24) together with tube (25) to limit. In order to do this, the lock ring has a 10 mm auxiliary bore (19) for tools.

Hinweis:

R = Representation in retained condition (average) (Fig.1/A-A)
S = Representation in normal operation (Fig.1/A-A)

1.4 Apply a thin coating of oil to hold-down bolts (27). Place disk (22) onto wing stopper (26) and tighten together with nut (21) with a torque of

$$M = 1250 \text{ Nm}$$

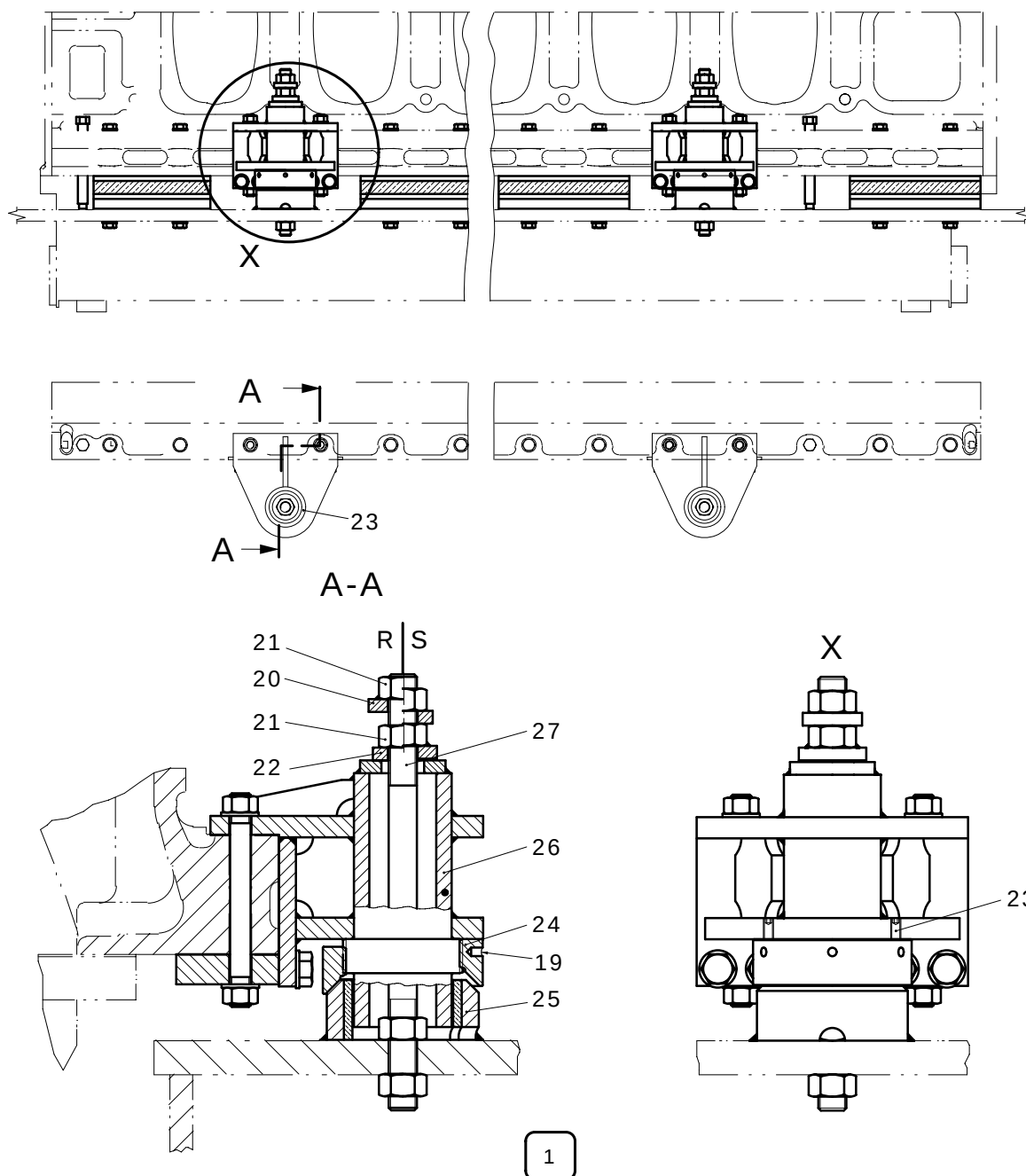
 2. Dismantle cylinder head (**01.06.01.nn**).

3. Dismantle push rods for inlet valve and exhaust valve.

4. Lift rocking lever for inlet valve and exhaust valve.

M25

02



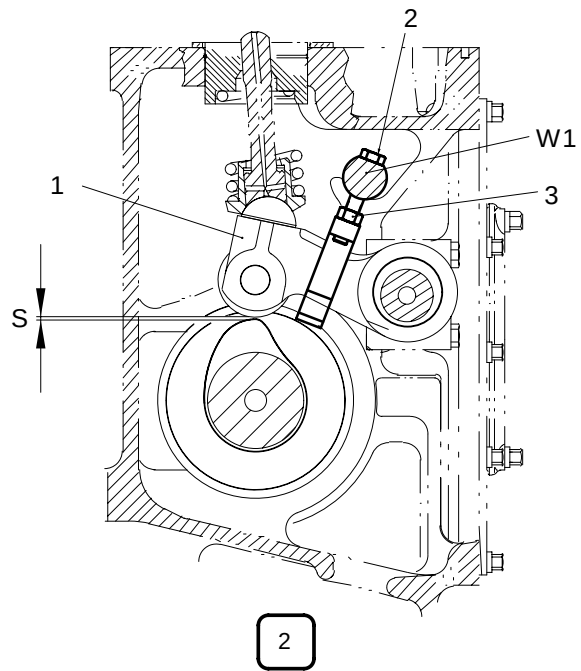
M25

02

5. Mount retaining device for rocking lever (**W1**) on bearing pedestal and rocking lever (**Fig. 2/1**) of the injection pump drive.
6. Screw in the hexagon head screw (2) until the rocking lever attains a clearance **S** to the injection cam.

$$S = 1,95 \text{ mm}$$

Secure hexagon head screw (2) with hexagon nut (3).

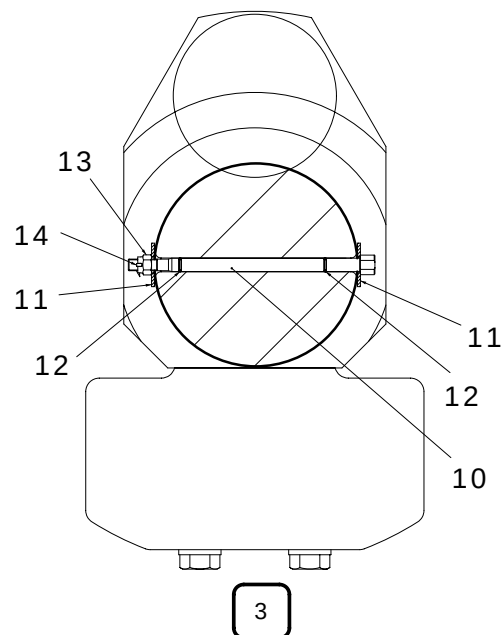


7. Draw piston (**02.06.01.nn**).
- 7.1 Dismantle cylinder liner retainers.
8. Dismantle connecting rod bearing with bearing cap as well as connecting rod (**02.04.01.nn**).
- 8.1 Place connecting rod on suitable base.
9. Dismantle **one** counter-balance from the averaged drive (**02.11.00.nn**).

Note:

In the case of 9-cylinder engines, cylinders 3 and 7 are not fitted with a counter-balance. Disassembly is not applicable in this instance.

10. Seal off oil bore in connecting pin of averaged drive with locking bolt (**Fig. 3/10**) and washers (11). Make sure the O-rings (12) are positioned correctly.
- 10.1 Tighten castellated nut (13) by hand and secure with cotter pin (14).
11. Mount cylinder head (**01.11.01.nn**).
12. Mount crankcase cover on control and exhaust side.
13. Start engine in emergency operation mode (**A3.12.02.nn**). Check foundation bolts (**Fig. 1/27**) permanently for tight fit during emergency operation. Retighten if necessary.



M25

02

14. Repair averaged engine.

14.1 Disassemble cylinder head, locking bolt in crank pin (**Fig. 3/10**), retaining device for rocking lever of the injection pump drive (**Fig. 2/1**).

14.2 Release fixation of flexible mounting.

14.3 Replace / repair defective parts.

14.4 Mount connecting rod, connecting rod bearing with bearing cap (**02.04.02.nn**), piston (**02.10.01.nn**), counter-balance, push rods for inlet valve and exhaust valve as well as cylinder head (**01.11.01.nn**).

14.5 Mount crankcase cover on control and exhaust side.

14.6 Take engine into operation (**A3.05.00.nn**)

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M25

1200

03

See also: 02.01.01.nn

Spare parts list: B1.05.03.251633

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Inspection:

Check free action of all safety valves every 1,200 h

Auxiliary material:

"JOWAT-CONTAXA 44400" glue
and "JOWAT 40469" hardener*
"G-Rapid Plus" Molykotepaste*

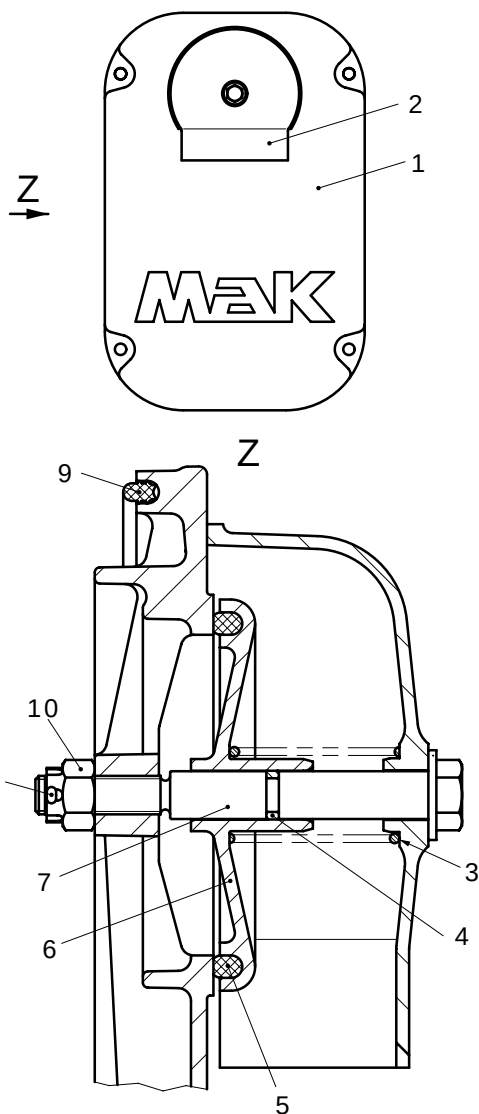
* or a product of equal standard

Sequence of operations:

1. Check the safety valve (2) for easy operation from the inside of the power unit cover (1) through manual operation of the valve head (6).
- 1.1 Dismantle the safety valve (2) in the event of malfunctions.
2. **Disassembly**
 - 2.1 Remove the cotter pin (8).
 - 2.2 Remove the hexagon nut (10).

Attention:

Pay attention to the tension of the spring (3).



M25

1200

03

-
- 2.3 Check the pressure spring (3) and replace if necessary.
 - 2.4 Check the guide of the guide bolt (7) and valve head (6) and refinish if necessary.
 - 2.5 Check the O-ring (4) on the guide bolt and replace if necessary.
 - 2.6 Cover the thread and the shank of the guide bolt with smooth material before pushing on the O-ring.
 - 2.7 Check the seal (5) of the valve head (6) and replace if necessary (glue in with glue and hardener). Rub the guide bolt in with Molykote paste.
 - 2.8 Check the seal (9) and replace if necessary.
 - 3. Assembly**
 - 3.1 Assembly in reverse sequence of disassembly.
 - 3.2 Mount the hexagon nut
 - 3.3 Insert the cotter pin and secure it.

M25

03

See also: 01.06.01.nn, 03.03.01.nn, 03.04.01.nn, 03.04.02.nn

Spare parts list: B1.05.03.251110

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

Replace the O-rings

Tools:

M16 ring bolt
Holding device for cylinder liner
* not illustrated

W1*
W2 259217 A

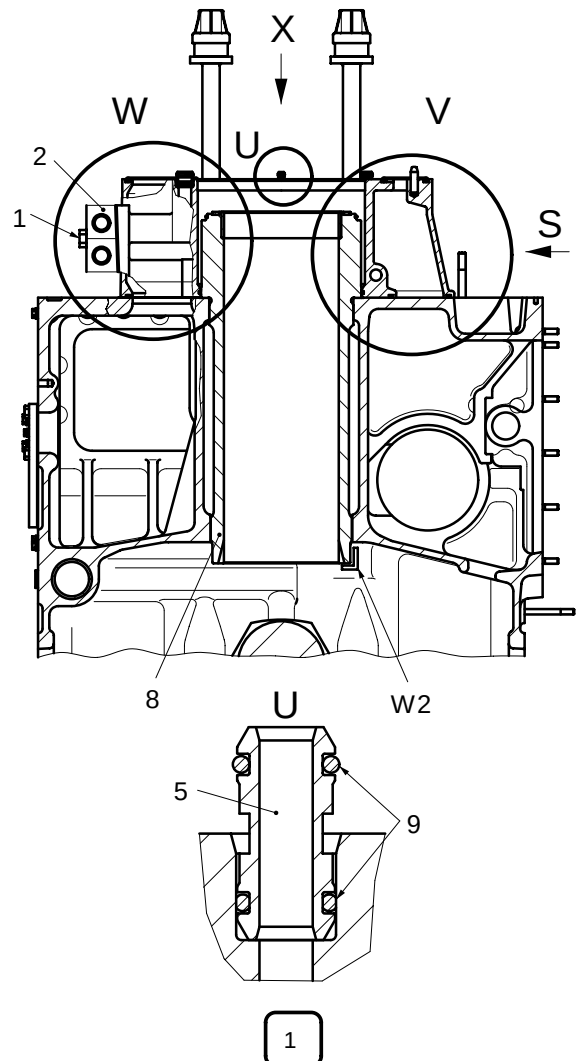
Auxiliary material:

Vaseline **
** or a product of equal standard

Sequence of operations:

1. Disassembly

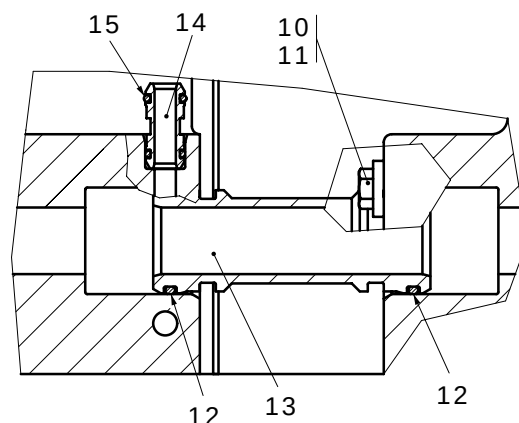
- 1.1 Dismantle the cylinder head and injection pump.
- 1.2 Remove the respective hexagon bolts (**fig. 1/1**) from the cooling water distributing and collecting pipeline (2).
- 1.3 Dismantle the power unit cover and mount the holding device (W2) on the cylinder liner (8).



M25

03

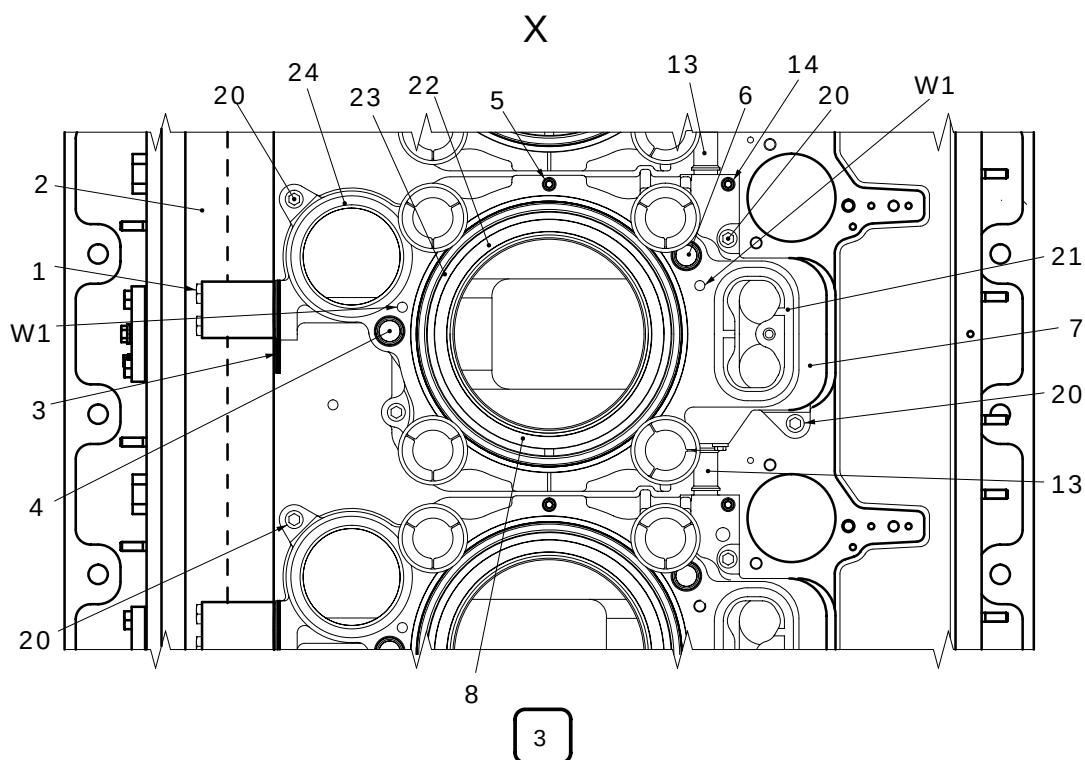
- 1.4 Remove the hexagon bolts (**fig. 2/10**) together with the washers (11). Push the sleeves (13; starting air channel) into the adjacent cooling water manifold housing (**fig. 5/7**).



- 1.5 Remove the fastening bolts (**fig. 3/20**). Screw the ring bolts (W1) into the cooling water manifold housing and raise the housing by means of a crane.

- 1.6 Remove the gasket (3).

2



3

- 1.7 Replace the O-rings on the air charge opening (**fig. 4/31**) and the push rod bushing (**fig. 5/41**). Check the O-ring (42) and replace it if necessary.

M25

03

Note:

Use vaseline to fit the new O-rings in the grooves making sure they are not twisted.

The gasket (**fig. 5/22**) and the O-ring (23) on the cylinder liner collar are replaced during the scope of the cylinder head assembly and the following O-rings are also replaced

Fig. 1/9; control air transfer

Fig. 2/15; control air inlet

Fig. 4/24; air charge transfer

Fig. 4/30; cooling water transfer

Fig. 5/21; push rod bushing

Fig. 5/43; starting air inlet!

Position the sleeves (**fig. 3/4, 5 and 6**) vertically!

- 1.8 Pull the sleeves (**fig. 2/13**) out of the adjacent cooling water manifold housings (7) and replace the O-rings (12).

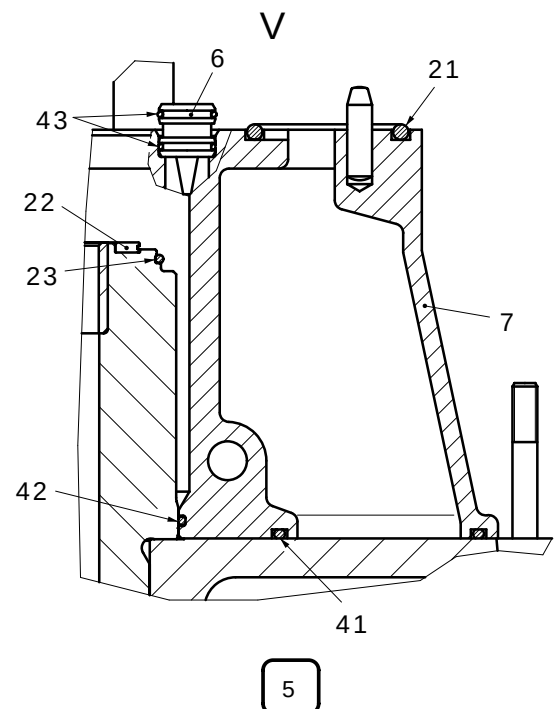
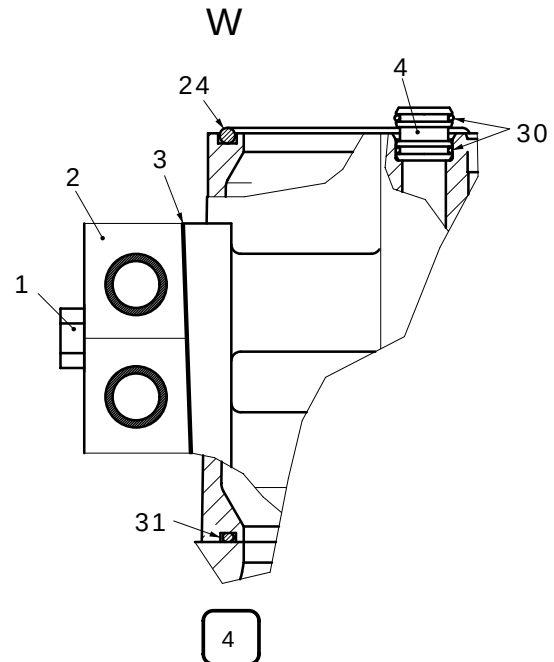
2. Assembly

- 2.1 Clean the contact surfaces on the cylinder crankcase.
Attach the cooling water manifold housing to a crane and carefully place it above the cylinder liner collar onto the cylinder crankcase together with the new O-rings.

Note:

Do not damage the O-ring (**fig. 5/42**)!

- 2.2 Tighten the fastening bolts (**fig. 3/20**).
- 2.3 Push the sleeves (**fig. 2/13**) of the control air channel into the correct position and secure by means of the hexagon bolt (10) and washer (11).
- 2.4 Tighten the hexagon bolts (**fig. 4/1**) on the cooling water distributing and collecting pipeline (2).
- 2.5 Remove the ring bolts (**fig. 3/W1**).
- 2.6 **Dismantle the holding device (fig. 1/W2)** and mount the power unit cover.



M25

24000

See also: 02.06.01.nn, 03.04.01.nn

Spare parts list: B1.05.03.251110

Time requirement: 1 Pers./ 0,20 h

Personnel qualification: Chief engineer

Operating medium: Distillate fuel

03

Inspection:

- Of all cylinder liners every 24,000 h
- Of the cylinder liner after removing the piston. Before and after fitting the cylinder liner.

Tools:

Gauge ruler for cylinder liners W1 259216-001
Precision inside micrometer W2 * 1.9425-300
* not illustrated

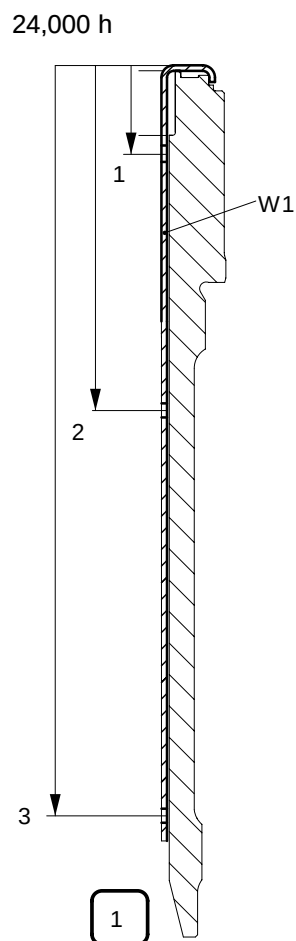
Sequence of operation:

1. Check the cylinder liner.

Note:

Extreme wear can occur on the cylinder liners which has to be evaluated and measured depending on the operating time and operating conditions (**fig. 3**).

- 1.1 Dismantle the calibrating ring (**02.05.50.nn**) and extract the piston (**02.06.01.nn**).
- 1.2 Clean the inside of the cylinder liner. The crankcase must be properly covered when doing this.
- 1.3 Measure the cylinder liner at the measuring points specified by the gauge ruler (**fig. 1/W1**) and the table (**fig. 2**) longitudinally, transversally and 2 x diagonally to the engine axis by means of the precision inside micrometer (W2).



Measuring point	Longitudinal direction	Transverse direction	Diagonal	Diagonal	Wear			
1								
2								
3 Reference dimension								

2

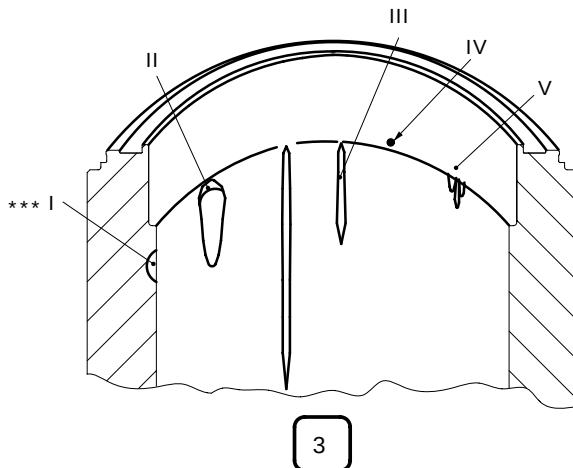
M25

24000

03

1.5 Enter the measured values in the table (fig. 2) and then determine the **wear** (d1 - reference dimension d3 etc.). Also refer to the measuring sheet in the "forms for maintenance reports" folder".

1.6 When the wear limit, normally in the area of the upper piston ring point of return (fig. 3/IV; TDC, first ring) or other limit values indicate in the table are reached, then the cylinder liner must be replaced.
Reconditioning of the cylinder liners is only possible by MaK.



Wear limit value chart

Assessment criteria			Wear limit value (mm)	Explanation
Nominal dimension Ø (new)				* Tastradius $r \geq 3\text{mm}$ ** In circumferential direction *** I: gusset, II: pocket, III: scoring, IV: TDC first ring, V: Canyon
255.0 + 0.052				
Max. out-of-round			0.25	
Wear			0.9	TCD first ring
I	Gusset	Height Depth *	6.00 0.03	Wedge shaped indentation across the entire circumference beginning from TDC of the first piston ring
II	Pocket	Number Length Width ** Depth *	3 60.00 20.00 0.02	Planiform, irregular indentations.
III	Scoring	Number Length Depth *	3 150.00 0.03	Heavy vertical, line-shaped
V	Canyon	Max. number Length Overall width	3 6.0 3.5	Individual deep blow-through ducts in the area of the first piston ring (TDC).

M25

12000

See also: 02.06.01.nn, 03.04.01.nn

Spare parts list: B1.05.03.251110

Time requirement: 1 Pers./ 0,20 h

Personnel qualification: Chief engineer

Operating medium: Heavy fuel

03

Inspection:

- Of all cylinder liners every 12,000 h
- Of the cylinder liner after removing the piston. Before and after fitting the cylinder liner.

Tools:

Gauge ruler for cylinder liners W1 259216-001
Precision inside micrometer W2 *, 1.9425-300
* not illustrated

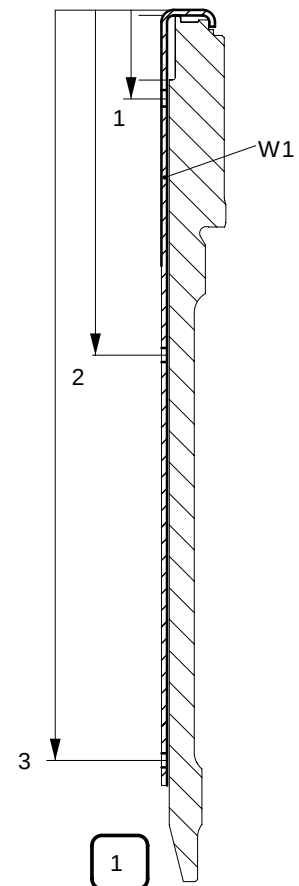
Sequence of operation:

1. Check the cylinder liner.

Note:

Extreme wear can occur on the cylinder liners which has to be evaluated and measured depending on the operating time and operating conditions (**fig. 3**).

- 1.1 Dismantle the calibrating ring (**02.05.50.nn**) and extract the piston (**02.06.01.nn**).
- 1.2 Clean the inside of the cylinder liner. The crankcase must be properly covered when doing this.
- 1.3 Measure the cylinder liner at the measuring points specified by the gauge ruler (**fig. 1/W1**) and the table (**fig. 2**) longitudinally, transversally and 2 x diagonally to the engine axis by means of the precision inside micrometer (W2).



Measuring point	Longitudinal direction	Transverse direction	Diagonal	Diagonal	Wear			
1								
2								
3 Reference dimension								

2

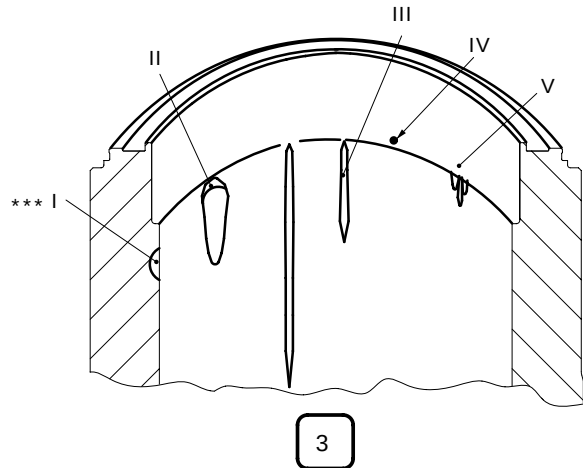
M25

12000

03

1.5 Enter the measured values in the table (fig. 2) and then determine the **wear** (d1 - reference dimension d3 etc.). Also refer to the measuring sheet in the "forms for maintenance reports" folder".

1.6 When the wear limit, normally in the area of the upper piston ring point of return (fig. 3/IV; TDC, first ring) or other limit values indicate in the table are reached, then the cylinder liner must be replaced.
Reconditioning of the cylinder liners is only possible by MaK.



Wear limit value chart

Assessment criteria			Wear limit value (mm)	Explanation
Nominal dimension Ø (new)			255.0 + 0.052	* Tastradius $r \geq 3\text{mm}$ ** In circumferential direction *** I: gusset, II: pocket, III: scoring, IV: TDC first ring, V: Canyon
Max. out-of-round			0.25	
Wear			0.9	TCD first ring
I	Gusset	Height Depth *	6.00 0.03	Wedge shaped indentation across the entire circumference beginning from TDC of the first piston ring
II	Pocket	Number Length Width ** Depth *	3 60.00 20.00 0.02	Planiform, irregular indentations.
III	Scoring	Number Length Depth *	3 150.00 0.03	Heavy vertical, line-shaped
V	Canyon	Max. number Length Overall width	3 6.0 3.5	Individual deep blow-through ducts in the area of the first piston ring (TDC).

M25

24000

See also: 02.06.01.nn, 03.03.01.nn

Spare parts list: B1.05.03.251110

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

03

Maintenance:

Dismantle the cylinder liner, Replace the O-ring	every	24,000 h
---	-------	----------

Tools:

Mounting device-cylinder liner, consisting of:	W1	259216 A
Ring nut	W1.1	
Cross-piece	W1.2	
Lifting rod	W1.3	
Cross-piece	W1.4	
Hexagon nut	W1.5	
 Holding device-cylinder liner	 W2*	 259217 A
 * not illustrated		

Auxiliary material:

"G-Rapid Plus" Molykote paste **

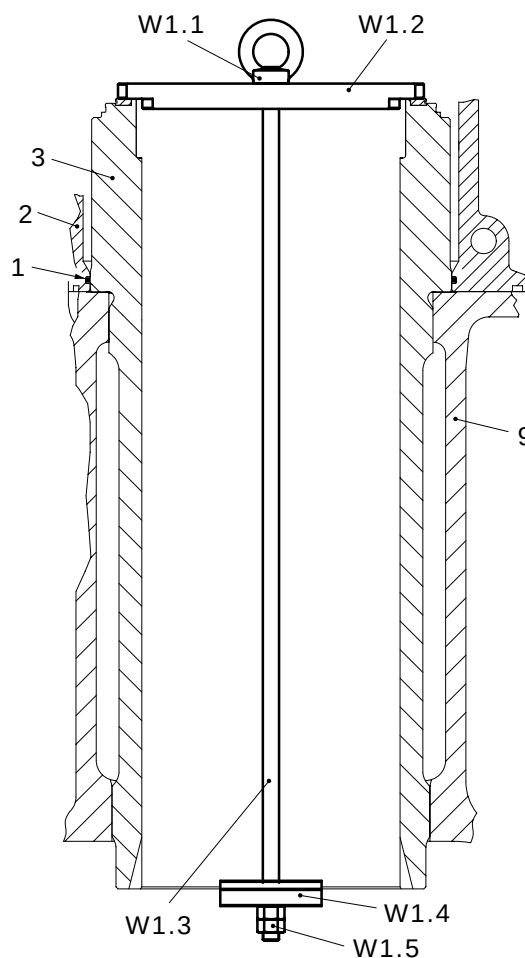
** or a product of equal standard

Attention:

The sealing surfaces of the cylinder liner must be protected against being damaged!

Sequence of operations:
1. Dismantle the cylinder liner (3).

- 1.1 Dismantle the calibrating ring.
- 1.2 Dismantle the piston and holding device (cylinder liner, piston).
- 1.3 Measure the wear.
- 1.4 Place the cross-piece (W1.2) on the cylinder liner and introduce the lifting rod (W1.3) with the ring nut (W1.1).
- 1.5 Position the second cross-piece (W1.4), tighten by means of the hexagon nuts (W1.5) and secure it.
- 1.6 Attach the lifting gear and extract the cylinder liner in the direction of the cylinder axis and place it on a suitable base.
- 1.7 Remove the O-ring (1) from the cooling water manifold housing (2).
- 1.8 Carefully clean the sealing surface and ring groove of the O-ring and check for damage.
- 1.9 Carefully clean the cooling water zone at the cylinder liner collar.
- 1.10 Clean the cylinder liner support, upper and lower fitting in the cylinder crankcase (9).



M25

24000

See also: 02.06.01.nn, 03.03.01.nn

Spare parts list: B1.05.03.251110

Time requirement: 2 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

03

Maintenance:

Dismantle the cylinder liner, Replace the O-ring	every	24,000 h
---	-------	----------

Tools:

Mounting device-cylinder liner, consisting of:	W1	259216 A
Ring nut	W1.1	
Cross-piece	W1.2	
Lifting rod	W1.3	
Cross-piece	W1.4	
Hexagon nut	W1.5	
 Holding device-cylinder liner	W2*	259217 A
Support roller	W3	259216 C
Strap	W4	

* not illustrated

Auxiliary material:

"G-Rapid Plus" Molykote paste **

** or a product of equal standard

Attention:

The sealing surfaces of the cylinder liner must be protected against being damaged!

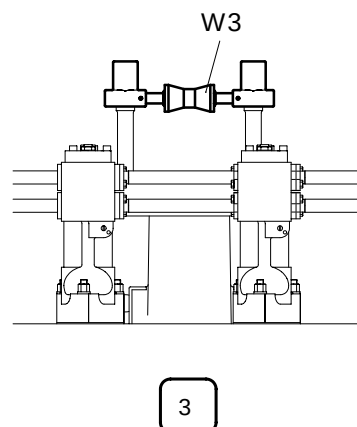
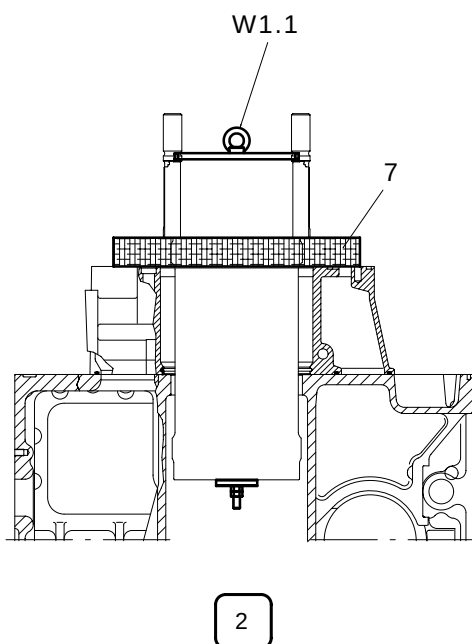
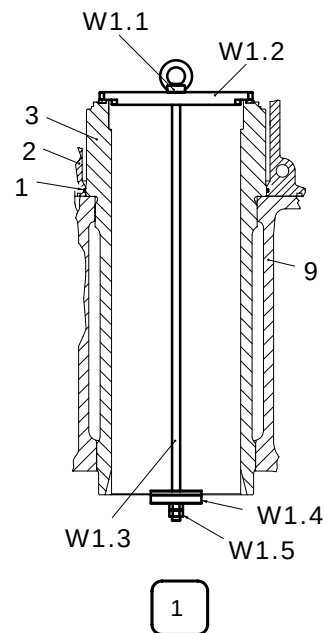
M25

24000

03

Sequence of operations:

1. **Dismantle the cylinder liner**
 - 1.1 Dismantle the calibrating ring.
 - 1.2 Dismantle the piston and holding device (cylinder liner, piston).
 - 1.3 Measure the wear **(03.03.01.nn)**.
 - 1.4 Place the cross-piece (**fig.1/W1.2**) on the cylinder liner and introduce the lifting rod (W1.3) with the ring nut (W1.1).
 - 1.5 Position the second cross-piece (W1.4), tighten by means of the hexagon nuts (W1.5) and secure it.
 - 1.6 Attach the lifting gear and extract the cylinder liner in the direction of the cylinder axis and place it so that the cylinder liner is in the indicated position see **fig.2**.
 - 1.7 Put the cylinder onto two beams (**fig.2/7**) as support.
 - 1.8 Put on the support roller (**fig.3/W3**) on the bolts.



M25

24000

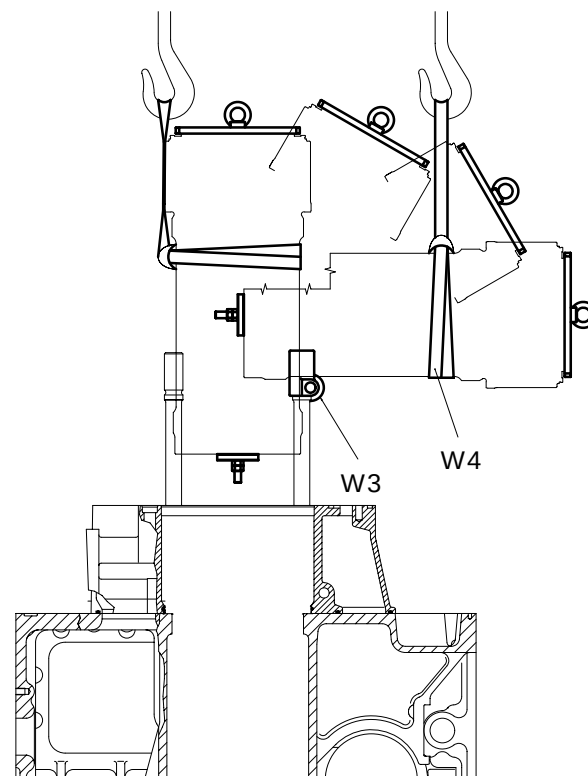
03

- 1.9 Attach the strap as shown in (fig.4/W4).
- 1.10 Lift up the cylinder liner so that the cylinder liner rests against support roller (fig.4/W3) and gets clear of the cooling collar.

Attention:

Guide the cylinder liner by hand with the assistance of a second man so as to make sure the cylinder liner gets clear !

- 1.11 Swing the cylinder liner away by shifting the lifting gear (fig.4) sideways.
- 1.12 Remove the O-ring (1) from the cooling water manifold housing (2).
- 1.13 Carefully clean the sealing surface and ring groove of the O-ring and check for damage.
- 1.14 Carefully clean the cooling water area at the cylinder liner collar.
- 1.15 Clean the cylinder liner support, upper and lower fitting in the cylinder engine block (9).



4

M25

03

See also: 03.03.01.nn, 03.04.01.nn

Spare parts list: B1.05.03.251110, B1.05.03.251611

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Extraction device (cylinder liner)	W1	259216 A
consisting of:		
Ring nut	W1.1	
Cross-piece	W1.2	
Lifting rod	W1.3	
Cross-piece	W1.4	
Hexagon nut	W1.5	

Auxiliary material:

- Vaseline *
- A-Gasket No. 2 sealing compound *
Permatex

* or a product of equal standard

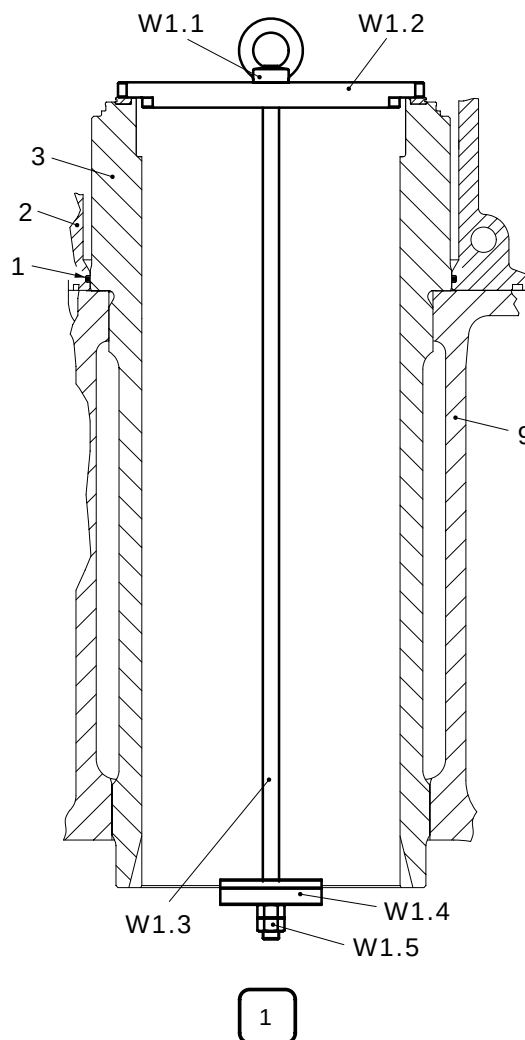
Note:

Measure the new cylinder liner after fitting a new one and **before** fitting the calibrating ring.

Pay attention to the driving-in regulation (**A3.10.01.nn**) in the operating instructions!

Sequence of operations:

1. Clean the inside of the cooling water manifold housing (**fig. 1/2**). If necessary, replace the O-rings on the push rod bushing and the air charge opening to the cylinder crankcase (**03.02.00.nn**).
2. Insert a **new** O-ring (1) in the groove on the cooling water manifold housing.



M25

03

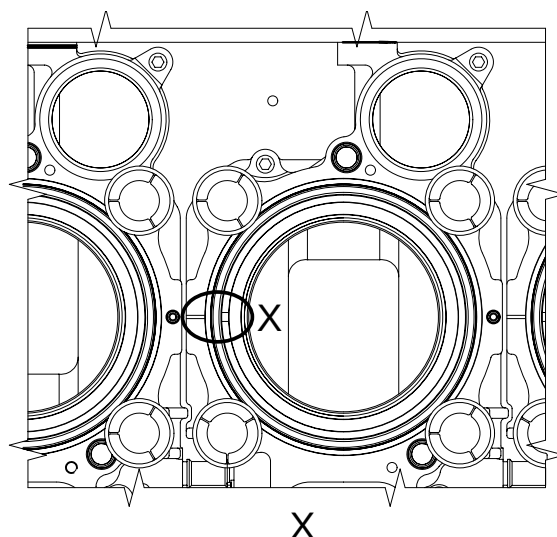
Attention:

Use vaseline to fit the O-ring in the groove making sure it is not twisted!

3. Apply sealing compound to the contact surfaces of the cylinder liner in the cylinder crankcase (**fig. 1/9**).
4. Dismantle the extraction device (W1) from the drawn cylinder liner.
5. Place the cross-piece (W1.2) on the cylinder liner which is to be fitted and introduce the lifting rod (W1.3) with the ring nut (W1.1).
6. Position the second cross-piece (W1.4) and tighten it by means of the hexagon nuts (W1.5) and secure it.
7. Attach the lifting gear to the ring nut (W1.1) and insert the cylinder liner in the cylinder crankcase (9).

Note:

Insert the cylinder liner in such a way that the mark (15) (**fig. 2/X**, top view of cylinder liner collar) points towards the coupling end in a longitudinal direction. **The mark (16) on the cooling water manifold housing can be used for alignment.**

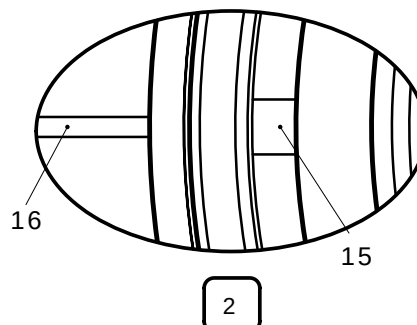


Attention:

Cylinder liners which have been fitted incorrectly can lead to engine damage as a result of the con-rod making contact!

The cylinder liner must slide into the upper and lower fitting of the cylinder crankcase by its own weight (fig. 1/9**)!**

8. Dismantle the extraction device (W1) and measure the **new** cylinder liner.
9. Mount the piston and calibrating ring.



M25

03

See also: 03.03.01.nn, 03.04.01.nn
Spare parts list: B1.05.03.251110, B1.05.03.251611
Time requirement: 2 Pers./ 0,50 h
Personnel qualification: skilled engine hand
Operating medium: Heavy fuel and distillate fuel

Tools:

Extraction device (cylinder liner)	W1	259216 A
consisting of:		
Ring nut	W1.1	
Cross-piece	W1.2	
Lifting rod	W1.3	
Cross-piece	W1.4	
Hexagon nut	W1.5	
Support roller	W2	259216 C
Strap	W3	

Auxiliary material:

- Vaseline *
 - A-Gasket No. 2 sealing compound * Permatex
- * or a product of equal standard

Note:

Measure the new cylinder liner (**A3.03.01.nn**) after fitting a new one and **before** fitting the calibrating ring.

Pay attention to the running-in regulation (**A3.10.01.nn**) in the operating instructions!

Sequence of operations:

1. Clean the inside of the cooling collar (**fig. 1/2**). If necessary, replace the O-rings on the push rod bushing and the air charge opening to the cylinder crankcase (**03.02.00.nn**).
2. Insert a **new** O-ring (1) in the groove of the cooling water manifold housing.

Attention:

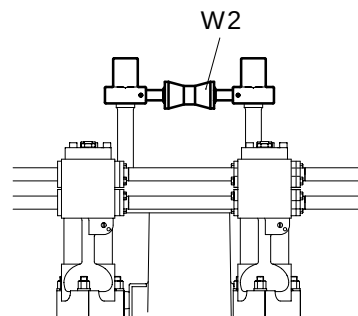
Use vaseline to fit the O-ring in the groove making sure it is not twisted!

3. Apply sealing compound to the contact surfaces of the cylinder liner in the engine block (**fig. 4/9**).

M25

03

4. Place the cross-piece (**fig. 2/W1.2**) on the cylinder liner which is to be fitted and introduce the lifting rod (W1.3) with the ring nut (W1.1).
5. Position the second cross-piece (W1.4) and tighten it by means of the hexagon nuts (W1.5) and secure it.
6. Put the support rollers (**fig. 1/W2**) on the bolts.
7. Attach the strap as shown in (**fig.2/W3**).
8. Lift up the cylinder liner so that the cylinder liner rests against the support roller (**fig.2/W2**) and gets clear of the cooling collar.

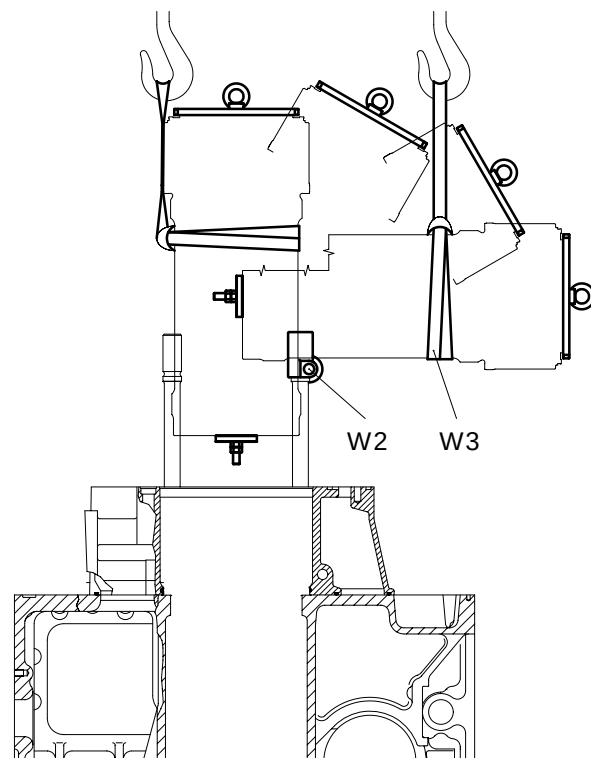


1

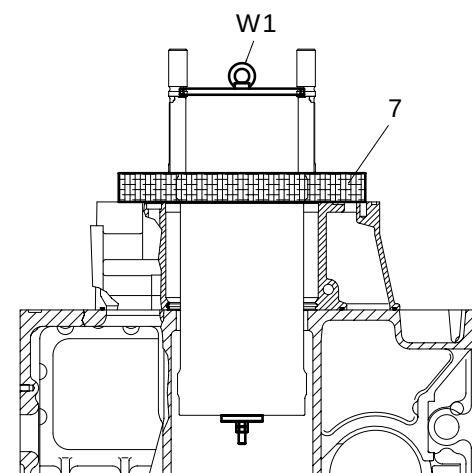
Attention:

Guide the cylinder liner by hand with the assistance of a second man so as to make sure the cylinder liner gets clear !

9. Bring the cylinder liner into the position as shown in (**fig.2**) by shifting the lifting gear sideways.
10. Put the cylinder liner onto two squared beams (**fig.2/7**) as support.



2



3

M25

03

11. Remove the strap and attach the lifting gear to the ring nut (**fig.4/W1.1**) and insert the cylinder liner into the engine block (9).

Note:

Insert the cylinder liner in such a way that the mark (15) (**fig. 2/X**, top view of cylinder liner collar) points towards the coupling end in a longitudinal direction.

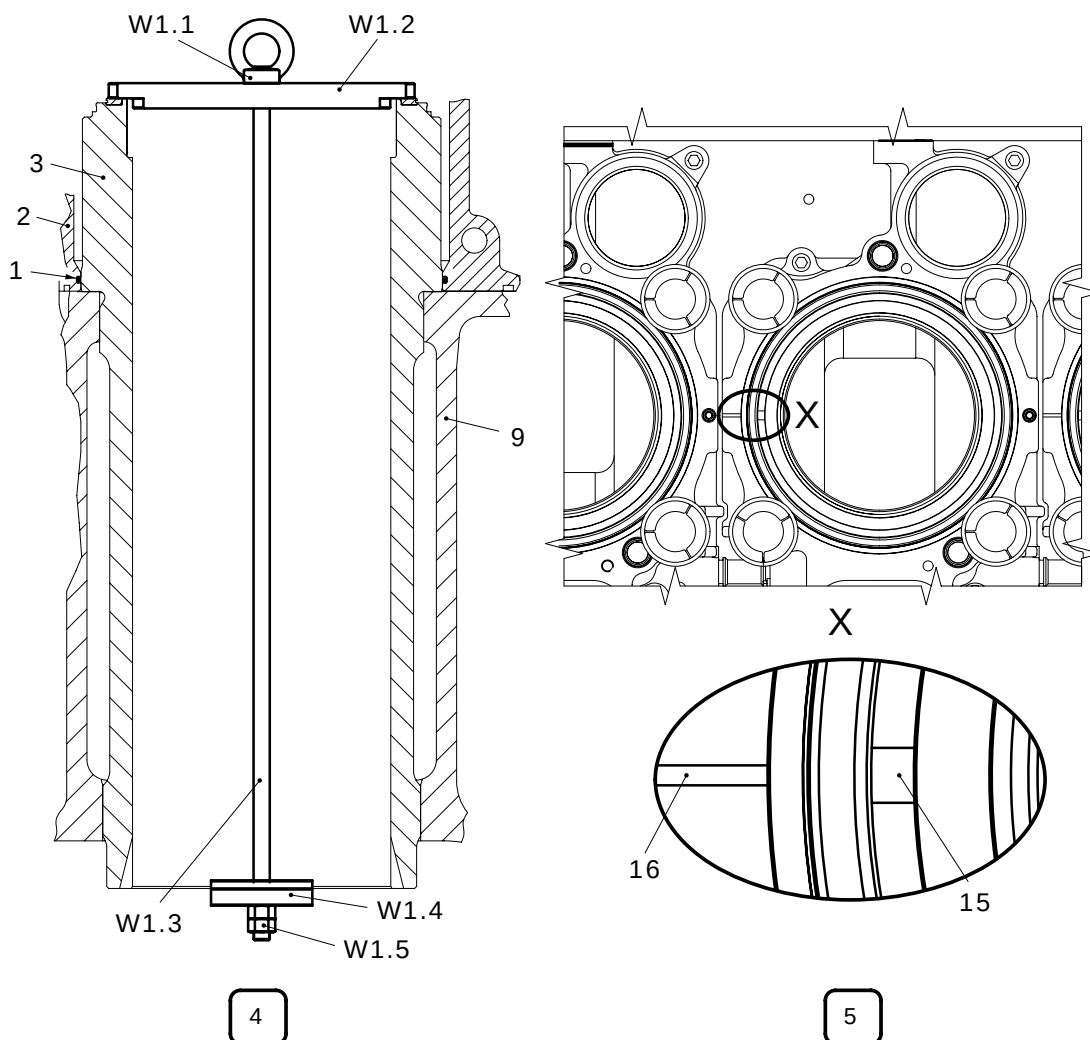
The mark (16) on the cooling water manifold housing can be used for alignment.

Attention:

Cylinder liners which have been fitted incorrectly can lead to engine damage as a result of the con-rod making contact!

The cylinder liner must slide into the upper and lower fitting of the engine block by its own weight (fig. 4/9**)!**

12. Dismantle the extraction device (W1) and measure the **new** cylinder liner.
13. Mount the piston and calibrating ring.



M25

150

03

See also: 02.02.01.nn

Spare parts list: B1.05.07.258510

Time requirement: 1 Pers./ 2,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Inspection:

of all bolts, unions and screwed connections
for good fitting and leaks every 150 h

Note:

This precautionary measure has to be taken once to detect any leaks or slack screwed connections that may result from some parts or gaskets taking a set that could cause damage.

When starting up a new unit (150 h) or after big repairs the engine unions and screwed connections are to be inspected for good fitting and leaks.

Sequence of operations:

1. Check for good mounting and leaks of flanged connections, filters, thermostats and pipe clamps of the following systems:
 - cooling water
 - lubricating oil
 - fuel
 - starting air
 - pneumatic control (emergency stop)
2. Check the expansion joints for leaks and the suspension of the exhaust piping behind the turbocharger.
3. Check the tight fitting of the suspensions and unions in the charge air manifold.

M25

150

-
4. Retighten the fixing bolts of the brackets of the injection pump control rods and check the locking washers and pins of the connection joints.
 5. Check the monitoring and control equipment for good fitting. Cables and signal pipes must not scrub against any part.
 6. Check the foundation bolts and chocks by knocking. Measure the crank web deflection after tightening slack foundation bolts (**02.02.01.nn**).
Torque values can be obtained at the MaK customer support.
 7. Check elastic bedding elements for damages.

03

M25

12000, 24000

04

See also: 04.04.01.nn, 04.09.01.nn

Spare parts list: B1.05.04.253120

Time requirement: 1 Pers./ 0,20 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Inspection:

- Check the running surface of one camshaft bearing and the corresponding camshaft section from the first cylinder onwards 12,000 h
- Check the running surfaces of all camshaft bearings and camshaft sections from the first cylinder onwards 24,000 h

Tools:

Refer to **04.04.01.nn**

Note:

Camshaft bearings are not subject to load changes. The bearing load is exclusively in the lower supporting area and is relatively high there. Slight carrying by the edges is not unusual.

Sequence of operations:

Attention:

The camshaft bearings between the camshaft gear wheel and first cylinder are only allowed to be disassembled and reassembled by MaK customer service!

1. Inspection of the running surface of one camshaft bearing and the corresponding camshaft section from the first cylinder onwards.

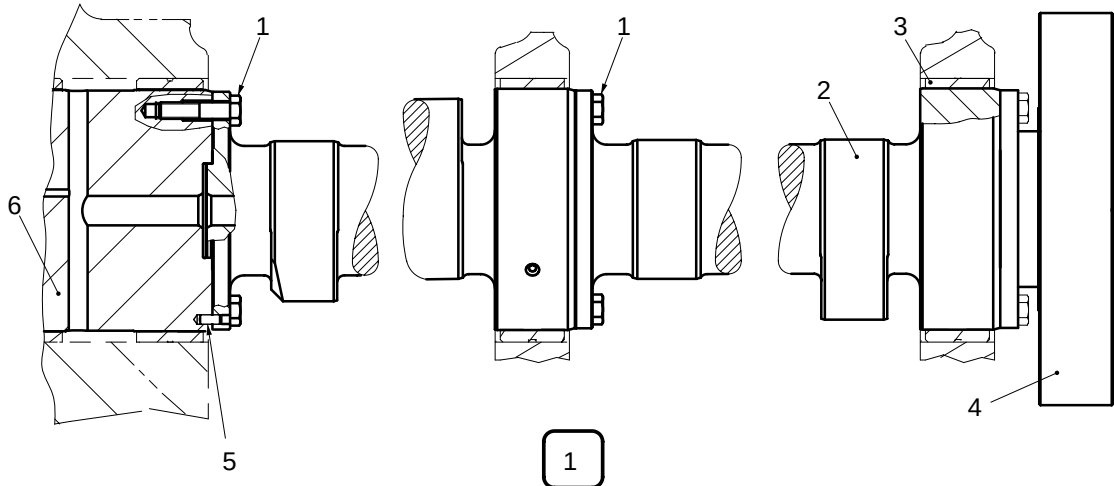
- 1.1 Relieve and lift the rocker arm of the camshaft section of the respective cylinder and all camshaft sections located on the right (**04.04.01.nn**).

M25

12000, 24000

04

- 1.2 Loosen the hexagon bolts (**Fig. 1/1**) on the left-hand flange of the camshaft section (2). **Turn the camshaft to loosen hidden hexagon bolts**, and then remove all hexagon bolts.



Note:

When removing the hexagon bolts, pay attention that the injection cam stands vertically upwards after the last turning process (TDC).

Attention:

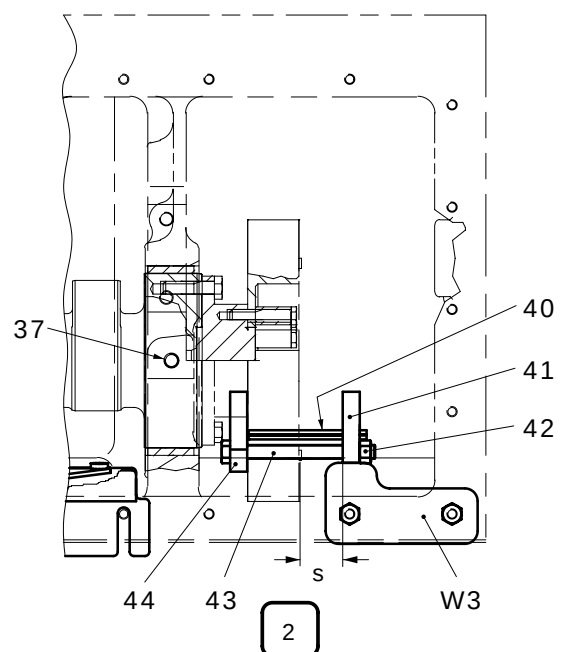
- The camshaft is only allowed to be turned with loosened screw connections if
- the rocker arms of the camshaft section to be replaced as well as all rocker arms located to the right are relieved and
 - the pin (5) has been pulled out of the bearing journal (6) / the fitted left-hand camshaft section!

- 1.3 Mount the buffer for the camshaft (**Fig. 2/W3**) on the cylinder crank case (vibration damper). This is not for checking the **last** camshaft bearing.

- 1.3.1 Mount the plate (44) with hexagon bolt (43), hexagon nut (42) and guide pin (40) and set maximum displacement of **s** (**04.04.01.nn**).

Displacement $s = 50 \pm 0.5$ mm

- 1.3.2 Tighten the hexagon nut and pull the vibration damper with the loosened camshaft onto the limit plate (41). The camshaft is secured against axial displacement.



M25

12000, 24000

04
Attention:

Do not use force during displacement! If there is any binding, check the floating of the rocker arms!
The engine can be turned over again!

Note:

To check the **last** camshaft bearing, fit the extractor to the last camshaft section (**04.04.01.nn**). Remove the vibration damper (**04.09.01.nn**) and push it to the right as far as possible!

- 1.4 Check the camshaft bearing and replace it (**04.04.01.nn**) in the event of:
 - bad contact reflection (running surface; lower contact area)
 - edge contacts
 - scoring
- 1.5 Check the fixation of the camshaft bearing. The cheese head screw (**Fig. 2/37**) at the bearing point of the camshaft bearing to be checked must be tightened at a torque of

M = 130 Nm.

If necessary, remove the loosened cheese head screw and support the respective camshaft section.
- 1.5.1 Push the camshaft bearing out to the left using a suitable piece of wood. Check for signs of abrasion on the back of the bearing and replace it if necessary (**04.04.01.nn**).
- 1.6 Check the running surfaces of the bearing flanges of all accessible camshaft sections for scoring.
- 1.7 Replace defective camshaft sections and check the corresponding camshaft bearing (**04.04.01.nn**).
- 1.8 Mount the camshaft and remove the buffer for the camshaft (**04.04.01.nn**).

Note:

After checking the **last** camshaft bearing, remove the extractor for the camshaft section on the last camshaft section (**04.04.01.nn**) and mount the vibration damper (**04.09.01.nn**)!

M25

12000, 24000

04

- 2. Check the running surfaces of all camshaft bearings and camshaft sections from the first cylinder onwards.**
- 2.1 Relieve and lift all rocker arms (**04.04.01.nn**).
- 2.2 Loosen the hexagon bolts (**Fig. 1/1**) on the left-hand flange of the camshaft section (2) of the first cylinder. **Make the hidden hexagon bolts accessible by turning the camshaft.** Loosen them and remove all hexagon bolts.
- 2.3 Mount the buffer for the camshaft (**Fig. 2/W3**) and pull the camshaft off the bearing journal (**Fig. 1/6**) (1.3 to 1.3.2).
- 2.4 Support the vibration damper and camshaft section of the first cylinder.
- 2.5 Remove the cheese head screws (**Fig. 2/37**) at the bearing points of the camshaft.
- 2.5.1 Press out the respective camshaft bearing to the left using a suitable piece of wood. Check it (1.4; 1.5.1) and replace it if necessary (**04.04.01.nn**).
- 2.6 Check the running surfaces of the bearing flanges of all camshaft sections for scoring.
- 2.7 Replace defective camshaft sections (**04.04.01.nn**).
- 2.8 Mount the camshaft and remove the buffer for the camshaft (**04.04.01.nn**).
- 2.9 Remove the turning rod, dismount the turning device.
- 2.10 Relieve the device used for supporting the rocker arm. Remove it and carry out final work (**04.04.01.nn**).

M25

04

See also: 01.01.01.nn, 01.02.01.nn, 04.08.03.nn, 04.09.01.nn

Spare parts list: B1.05.04.253120

Time requirement: 1 Pers./ 3,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Device for rocker arm (injection cam)	W1	259235 B
Extractor for camshaft section	W2	259230 A
Camshaft buffer	W3	259230-003
Torque wrench 60 - 320 Nm	W4 *	1.9454-320
Reversible ratchet 3/4	W5 *	1.9495-036
Adapter (3/4 to 1/2)	W6 *	1.9459-035
Ring spanner	W7 *	1.9459-022
Feeler gauge	W8 *	1.9075-003
Tubular box wrench, indicator valve	W9 *	1.9100-060

* not illustrated

Auxiliary material:

Molykote paste "G-Rapid Plus" **

** or a product of equal standard

Sequence of operations:

Attention:

- The camshaft is only allowed to be turned with loosened screw connections if
- the rocker arms of the camshaft section to be replaced as well as all rocker arms located to the right are relieved
- and
- the pin (Fig. 2/26) has been pulled out of the bearing journal (27) / the fitted left-hand camshaft section!
-

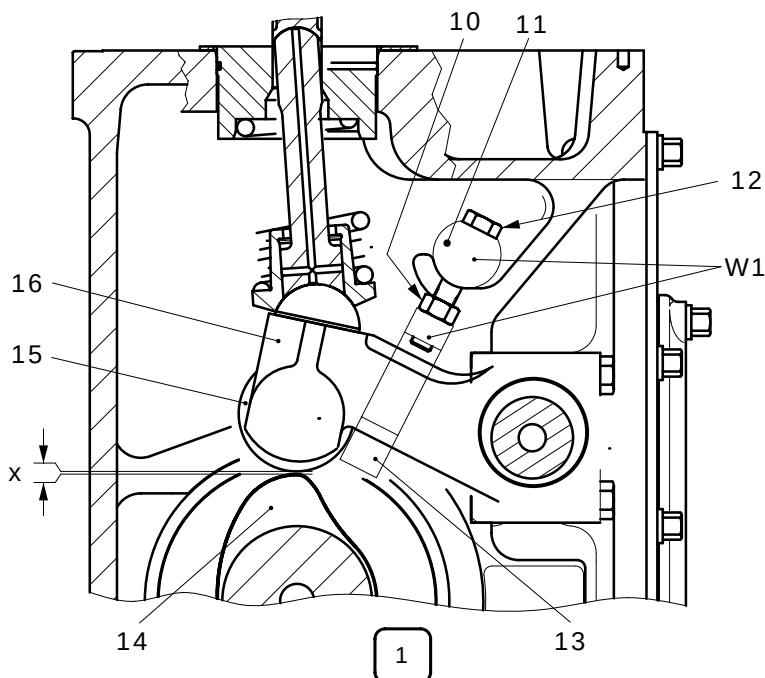
1. Disassembly

- 1.1 Open the indicator valves and remove the camshaft cover with housing covers and seals on the control side.
- 1.2 Remove all rocker arms of the respective cylinder and all cylinders located to the right to relieve the camshaft.

M25

04

- 1.3 Remove the push rods of the camshaft section of the respective cylinder and all camshaft sections located to the right of it. Lift the rocker arm of the inlet and exhaust valve drives from the cam and secure with wire.
- 1.4 Relieve the injection cam of the respective cylinder and successively relieve all cylinders to the right of it, to do so:
 - 1.4.1 Turn the injection cam (**Fig. 1/14**) to just before (approx. 30°) the TDC point.



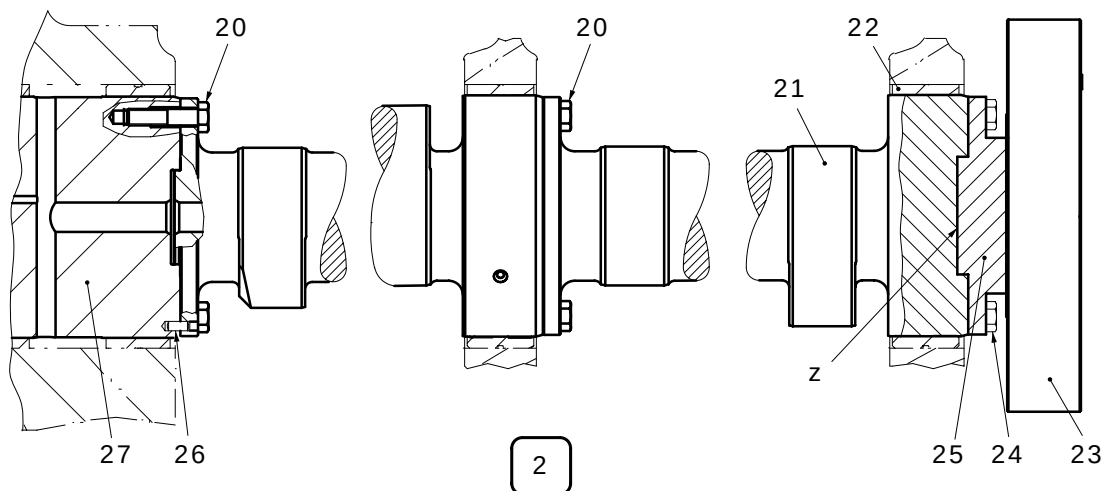
- 1.4.2 Place a brass plate (0.8 up to 1.0 mm thick) in front of the roller (15) on the injection cam.
 - 1.4.3 Turn the injection cam to the TDC position. Follow up with the brass plate, it must press the roller off the injection cam.
 - 1.4.4 Turn the injection cam to the TDC position.
 - 1.4.5 Loosen the hexagon nut (10) and suspend the device for the rocker arm (W1) with the toggle (11) in the cylinder crank case.
 - 1.4.6 Screw the hexagon bolt (12) **only in so far** until the holder (13) makes firm contact with the rocker arm (16) and the rocker arm lifts off the injection cam with a clearance of **x**.
- x = 0.8 - up to 1.0 mm**
- 1.4.7 Secure the setting with the hexagon nut (10) and remove the brass plate.

M25

04

1.5 To disassemble the **last** camshaft section:

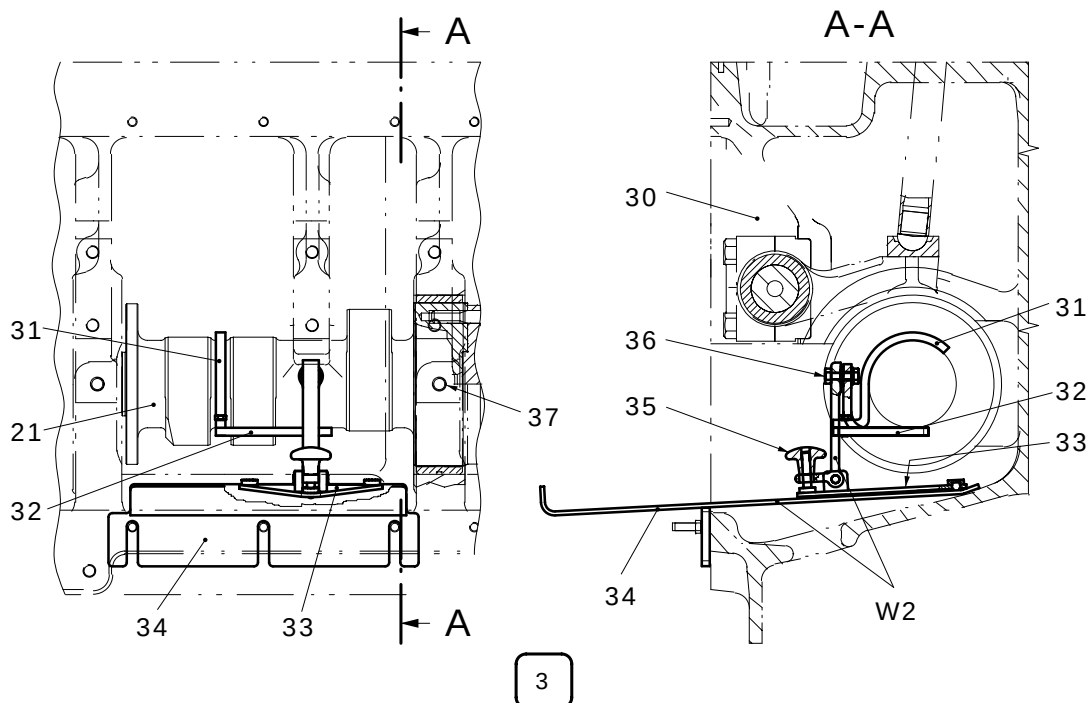
1.5.1 Remove the vibration damper (**Fig. 2/23**) and push it to the right as far as possible (**04.09.01.nn**)!



1.5.2 Remove the intermediate piece (25).

1.6 Loosen the hexagon bolts (20) on both flanges of the camshaft section (21). **Make the hidden hexagon bolts accessible by turning the camshaft.** Loosen them and then remove all hexagon bolts.

1.7 Mount the device for extracting the camshaft section (**Fig. 3/W2**).

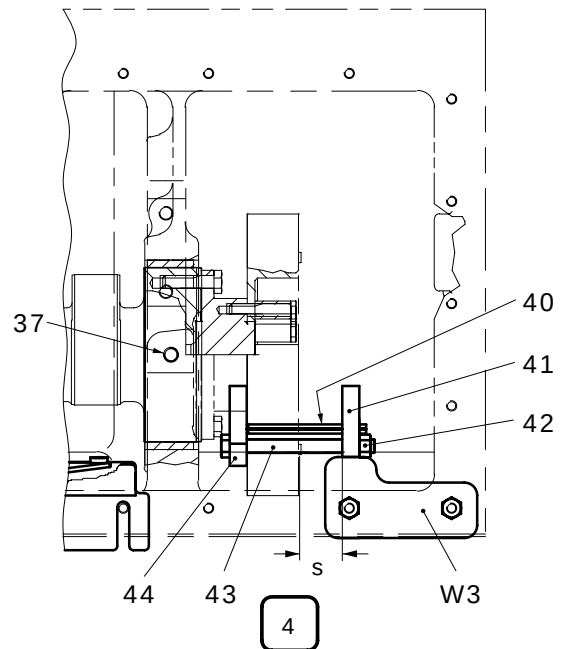


M25

04

- 1.7.1 Mount the table (**Fig. 3/34**) on the cylinder crank case of the respective cylinder.
- 1.7.2 Mount the carriage (33) on the table and push it under the camshaft section together with the delivery plate (32). Adjust the star grip (35) if necessary and tilt the delivery plate forwards.
- 1.7.3 Place the clamp (31) over the camshaft section and onto the extractor and mount it.
- 1.7.4 Use the star grip (35) to align the carriage so that the three ball bearings of the carriage lie on the table without pressure.
- 1.8 Mount the buffer for the camshaft (**Fig. 4/W3**) on the cylinder crank case (vibration damper). (Not for disassembly of the **last** camshaft section).
- 1.8.1 Mount the plate (44) with the hexagon bolt (43) and guide pin (40) and set the maximum displacement of **s** (**04.04.01.nn**).

Displacement $s = 50 \pm 0.5 \text{ mm}$
- 1.8.2 Tighten the hexagon nut (42) and pull the vibration damper with the loose camshaft up to the limit plate (41). The camshaft is secured against axial displacement.



Attention:

**Do not use any force when displacing!
If there is any binding, check the
clearance of the rocker arm!**

- 1.9 Remove the cheese head screw (**Fig. 3/37**) from the right-hand bearing point of the camshaft section to be replaced.
- 1.10 Push out the camshaft bearing (**Fig. 2/22**) to the left with a suitable piece of wood.
- 1.11 Pull the camshaft section (**Fig. 3/21**) to the left with the carriage (33) until the pin (**Fig. 2/26**) of the right-hand camshaft section is free.
- 1.12 Turn the injection cam to a horizontal position.
- 1.13 Loosen the screw connection (**Fig. 3/36**), carefully slide the camshaft section out of the right-hand bearing point in the cylinder crank case.
Tilt the camshaft section to the left with the delivery plate (32) around the center of motion (screw connection; 36) and lower using the star grip (35).

M25

04

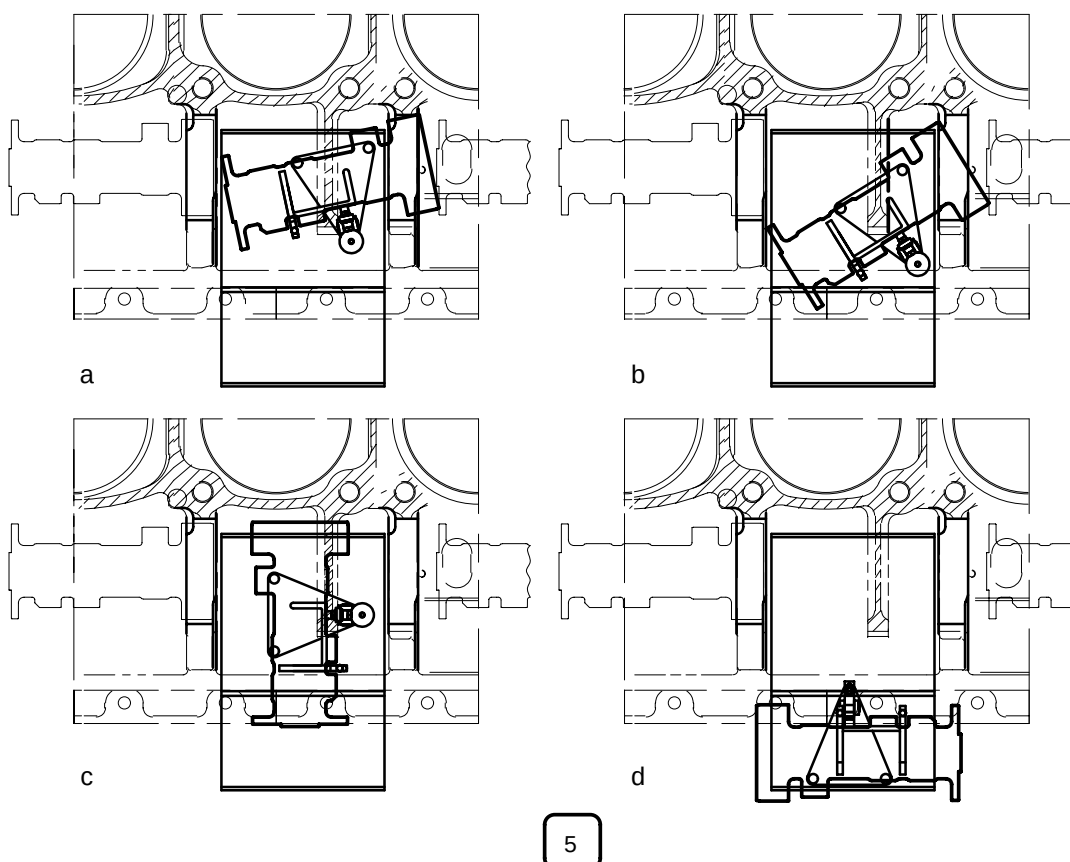
Note:

The camshaft section must be lowered beneath the bearing point (**Fig. 3/30**) of the lower valve drive.

Attention:

Do not tilt the camshaft section too much! Extreme care is of paramount importance!

- 1.14 Pull the carriage with the camshaft section forwards up to the limit of the table turning it by 180°, see **Fig. 5**.



5

- 1.15 Remove the clamp (31) and take out the camshaft section. Pay attention to the weight (approx. 48 kg)!
- 1.16 Remove the camshaft bearing (**Fig. 2/22**). Check it (**04.01.02.nn**) and replace it if necessary.

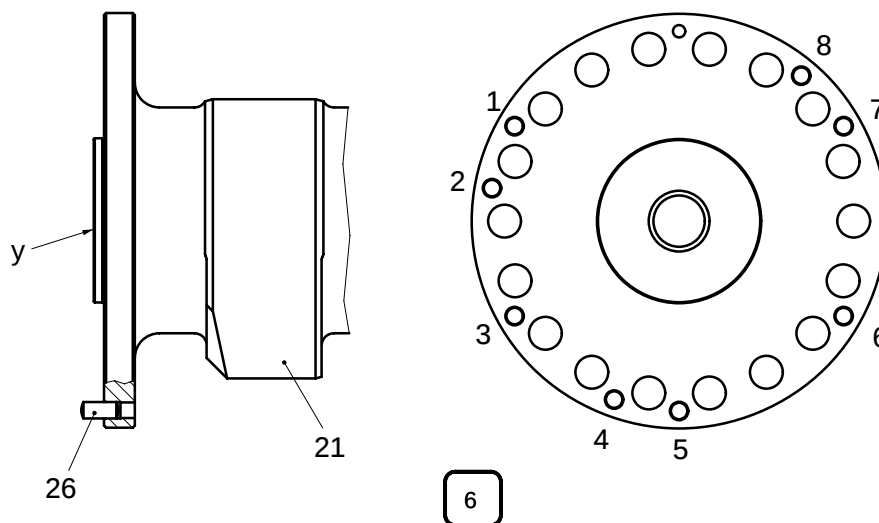
M25

04

2. Reassembly

- 2.1 Press the pin (**Fig. 6/26**) into the flange of the camshaft section (21) at the respective reference number until it bottoms.

Camshaft section for cylinder	Insert pin at reference number
1	5
2	1
3	6
4	5
5	3
6	7



- 2.2 Slightly oil the camshaft bearing on the inside and outside and place it on the injection cam of the camshaft section.
- 2.3 Place the camshaft section with pin on the delivery plate (**Fig. 3/32**) facing the opposite end of the coupling and secure it with the clamp (31).
- 2.4 Turn the injection cam into a horizontal position and swivel the camshaft section into the cylinder crank case. Tilt the camshaft section with the delivery plate around the point of motion (screw connection; 36) and lower it with the star grip (35).
- 2.5 Carefully guide the bearing journal for the camshaft section into the bearing bore in the cylinder crank case.

Attention:

Do not tilt the camshaft section too much! Extreme care is of paramount importance!

M25

04

- 2.6 Align the locating hole for the camshaft bearing (**Fig. 2/22**) with the bore for the cheese head screw (**Fig. 3/37**) in the cylinder crank case and press in evenly using a suitable piece of wood. Do not tilt it!
- 2.7 Rub the cheese head screw (37) in with Molykote, insert it and tighten it at a torque of
M = 130 Nm.
- 2.8 Align the camshaft section with pin (**Fig. 2/26**) with the bore in the bearing journal (27) / in the bearing flange in the fitted left-hand camshaft section.
- 2.9 Push the camshaft section to the left until the cheese head screw (**Fig. 6/26**) the recess (**y**) of the camshaft section hold securely.

Attention:

Do not use any force when displacing! The camshaft gear wheel must not be displaced by the camshaft section!

- 2.10 Insert all hexagon bolts ((**Fig. 2/20**) using Molykote.
- 2.11 Insert the hexagon bolts (20) as far as possible in the left-hand flange of the camshaft section and tighten at least three hexagon bolts stepwise and crosswise at a torque of

M = 140 Nm.

Bores which cannot be reached must be equipped **later!**

- 2.12 Remove the plate (**Fig. 4/44**) with the hexagon bolt (43) and guide pin (40) and push the rest of the camshaft with the vibration damper carefully to the left up to the camshaft section until the cylinder pin and recess have been inserted completely in the left-hand camshaft section.

Attention:

Do not use any force when displacing! The camshaft gear wheel must not be displaced by the camshaft section!

In the event of any binding, check the clearance of the rocker arms!

- 2.13 Insert the hexagon bolts (20) as far as possible in the bearing flange of the camshaft section and tighten at least three hexagon bolts stepwise and crosswise at a torque of

M = 140 Nm.

Bores which cannot be reached can be equipped **later.**

M25

04

- 2.14 Remove the extractor (**Fig. 3/W2**) and buffer (**Fig. 4/W3**).
- 2.15 Insert the other hexagon bolts (**Fig. 2/20**) (using Molykote), turn the engine and tighten all loose hexagon bolts stepwise and crosswise at a torque of

M = 140 Nm.
- 2.16 After assembly of the last camshaft section:
 - 2.16.1 Place the intermediate piece (**Fig. 2/25**) firmly on the camshaft section. The recess (**z**) must be fully inserted in the camshaft section.
 - 2.16.2 Insert the hexagon bolts (**Fig. 2/24**) (using Molykote) and tighten stepwise and crosswise at a torque of

M = 85 Nm.
 - 2.16.3 Mount the vibration damper (**04.09.01.nn**).
- 2.17 Turn all injection cams upwards individually (TDC position). Relieve the device for the rocker arms (**Fig. 1/W1**) and remove it.
- 2.18 Lift all rocker arms of the inlet and exhaust valve drives, remove the wire and lower the rocker arms onto the respective cams.
- 2.19 Mount the push rods.
- 2.20 Mount the rocker arms and check the valve clearance.
- 2.21 Remove the cover of the wheel casing (control side), check the axial clearance of the camshaft and remount the cover.
- 2.22 Check the lubricating oil flow.
- 2.23 Check the seals and remount the camshaft cover as well as the cover of the wheel housing.
- 2.24 Remove the turning rod, dismount the turning device.
- 2.25 Close the indicator valves

M25

04

See also: 01.01.01.nn, 01.02.01.nn, 04.08.03.nn, 04.09.01.nn

Spare parts list: B1.05.04.253120

Time requirement: 1 Pers./ 3,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Device for rocker arm (injection cam)	W1	259235 B
Extractor for camshaft section	W2	259230 A
Camshaft buffer	W3	259230-003
Torque wrench 60 - 320 Nm	W4 *	1.9454-320
Reversible ratchet 3/4	W5 *	1.9495-036
Adapter (3/4 to 1/2)	W6 *	1.9459-035
Ring spanner	W7 *	1.9459-022
Feeler gauge	W8 *	1.9075-003
Socket wrench	W9 *	1.9100-060

* not illustrated

Auxiliary material:

Molykote paste "G-Rapid Plus" **

** or a product of equal standard

Sequence of operations:

Attention:

- The camshaft is only allowed to be turned with loosened screw connections if**
- **the rocker arms of the camshaft section to be replaced as well as all rocker arms located to the right are relieved**
- and**
- **the pin (Fig. 2/26) has been pulled out of the bearing journal (27) / the fitted left-hand camshaft section!**

1. Disassembly

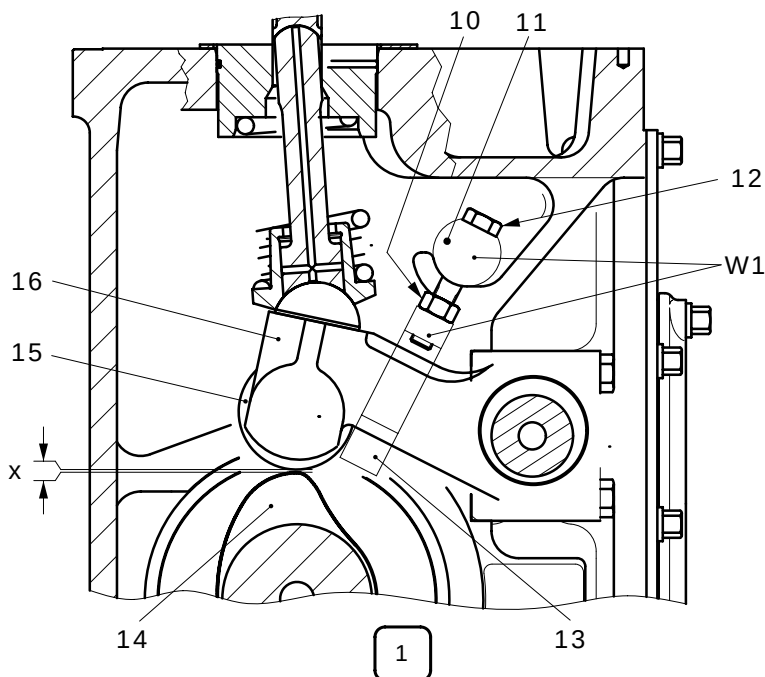
- 1.1 Open the indicator valves and remove the camshaft cover with housing covers and seals on the control side.
- 1.2 Remove all rocker arms of the respective cylinder and all cylinders located to the right to relieve the camshaft.
- 1.3 Remove the push rods of the camshaft section of the respective cylinder and all camshaft sections located to the right of it. Lift the rocker arm of the inlet and exhaust valve drives from the cam and secure with wire.

M25

04

1.4 Relieve the injection cam of the respective cylinder and successively relieve all cylinders to the right of it, to do so:

1.4.1 Turn the injection cam (**Fig. 1/14**) to just before (approx. 30°) the TDC point.



1.4.2 Place a brass plate (0.8 up to 1.0 mm thick) in front of the roller (15) on the injection cam.

1.4.3 Turn the injection cam to the TDC position. Follow up with the brass plate, it must press the roller off the injection cam.

1.4.4 Turn the injection cam to the TDC position.

1.4.5 Loosen the hexagon nut (10) and suspend the device for the rocker arm (W1) with the toggle (11) in the cylinder crank case.

1.4.6 Screw the hexagon bolt (12) **only in so far** until the holder (13) makes firm contact with the rocker arm (16) and the rocker arm lifts off the injection cam with a clearance of **x**.

x = 0.8 - up to 1.0 mm

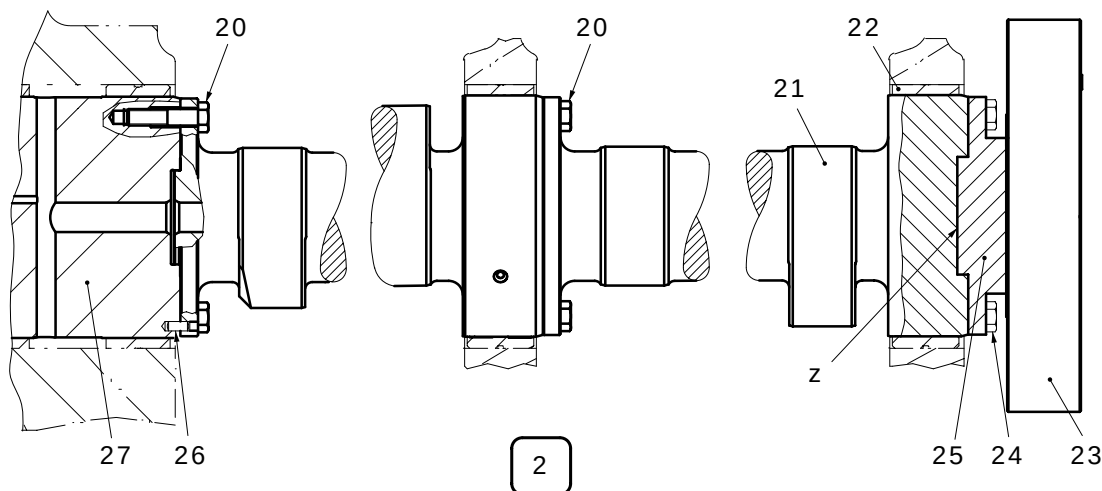
1.4.7 Secure the setting with the hexagon nut (10) and remove the brass plate.

1.5 To disassemble the **last** camshaft section:

1.5.1 Remove the vibration damper (**Fig. 2/23**) and push it to the right as far as possible (**04.09.01.nn**)!

M25

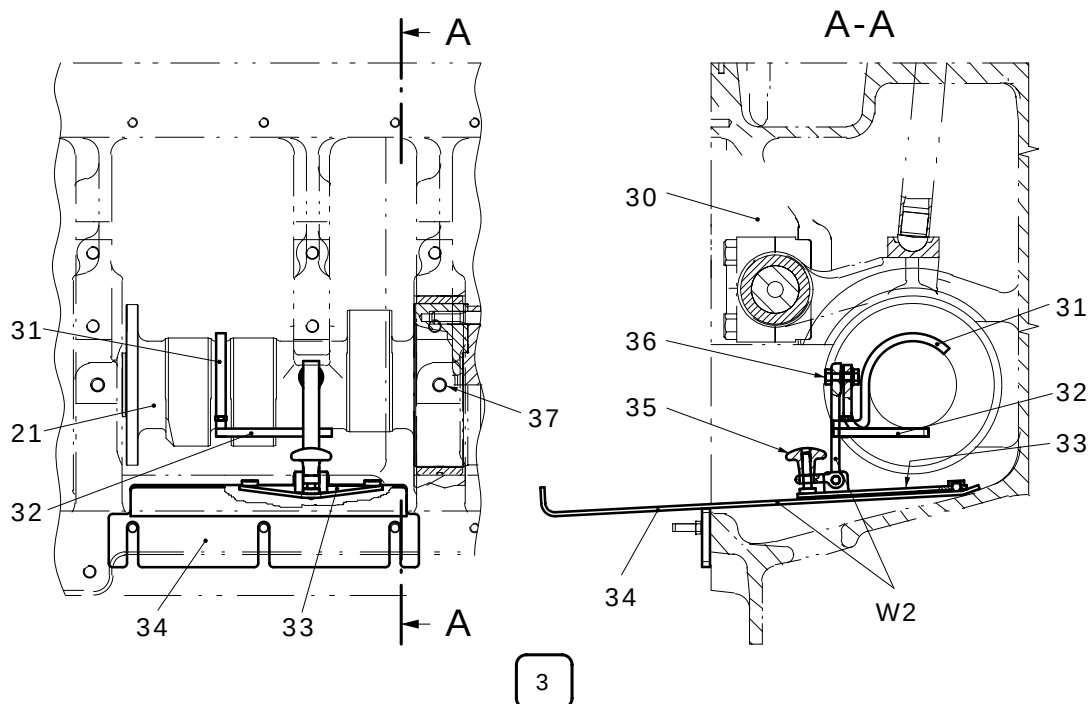
04



1.5.2 Remove the intermediate piece (25).

1.6 Loosen the hexagon bolts (20) on both flanges of the camshaft section (21). **Make the hidden hexagon bolts accessible by turning the camshaft.** Loosen them and then remove all hexagon bolts.

1.7 Mount the device for extracting the camshaft section (**Fig. 3/W2**).

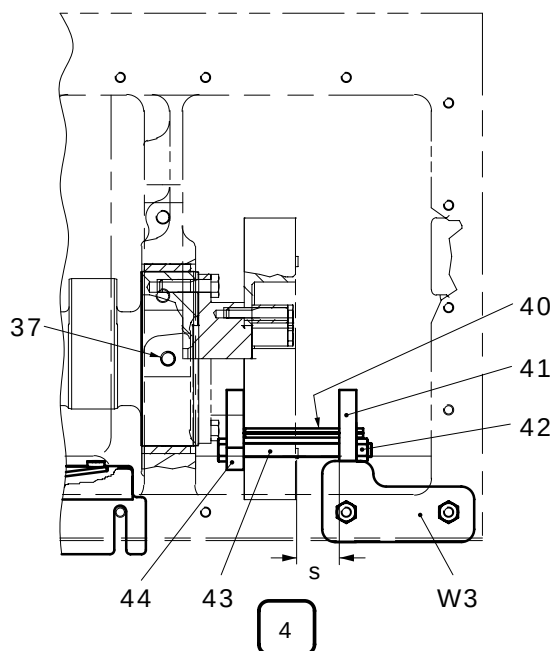


M25

04

- 1.7.1 Mount the table (**Fig. 3/34**) on the cylinder crank case of the respective cylinder.
- 1.7.2 Mount the carriage (33) on the table and push it under the camshaft section together with the delivery plate (32). Adjust the star grip (35) if necessary and tilt the delivery plate forwards.
- 1.7.3 Place the clamp (31) over the camshaft section and onto the extractor and mount it.
- 1.7.4 Use the star grip (35) to align the carriage so that the three ball bearings of the carriage lie on the table without pressure.
- 1.8 Mount the buffer for the camshaft (**Fig. 4/W3**) on the cylinder crank case (vibration damper). (Not for disassembly of the **last** camshaft section).
- 1.8.1 Mount the plate (44) with the hexagon bolt (43) and guide pin (40) and set the maximum displacement of **s (04.04.01.nn)**.

Displacement $s = 50 \pm 0.5 \text{ mm}$
- 1.8.2 Tighten the hexagon nut (42) and pull the vibration damper with the loose camshaft up to the limit plate (41). The camshaft is secured against axial displacement.



Attention:

**Do not use any force when displacing!
If there is any binding, check the
clearance of the rocker arm!**

- 1.9 Remove the cheese head screw (**Fig. 3/37**) from the right-hand bearing point of the camshaft section to be replaced.
- 1.10 Push out the camshaft bearing (**Fig. 2/22**) to the left with a suitable piece of wood.
- 1.11 Pull the camshaft section (**Fig. 3/21**) to the left with the carriage (33) until the pin (**Fig. 2/26**) of the right-hand camshaft section is free.
- 1.12 Turn the injection cam to a horizontal position.
- 1.13 Loosen the screw connection (**Fig. 3/36**), carefully slide the camshaft section out of the right-hand bearing point in the cylinder crank case.
Tilt the camshaft section to the left with the delivery plate (32) around the center of motion (screw connection; 36) and lower using the star grip (35).

M25

04

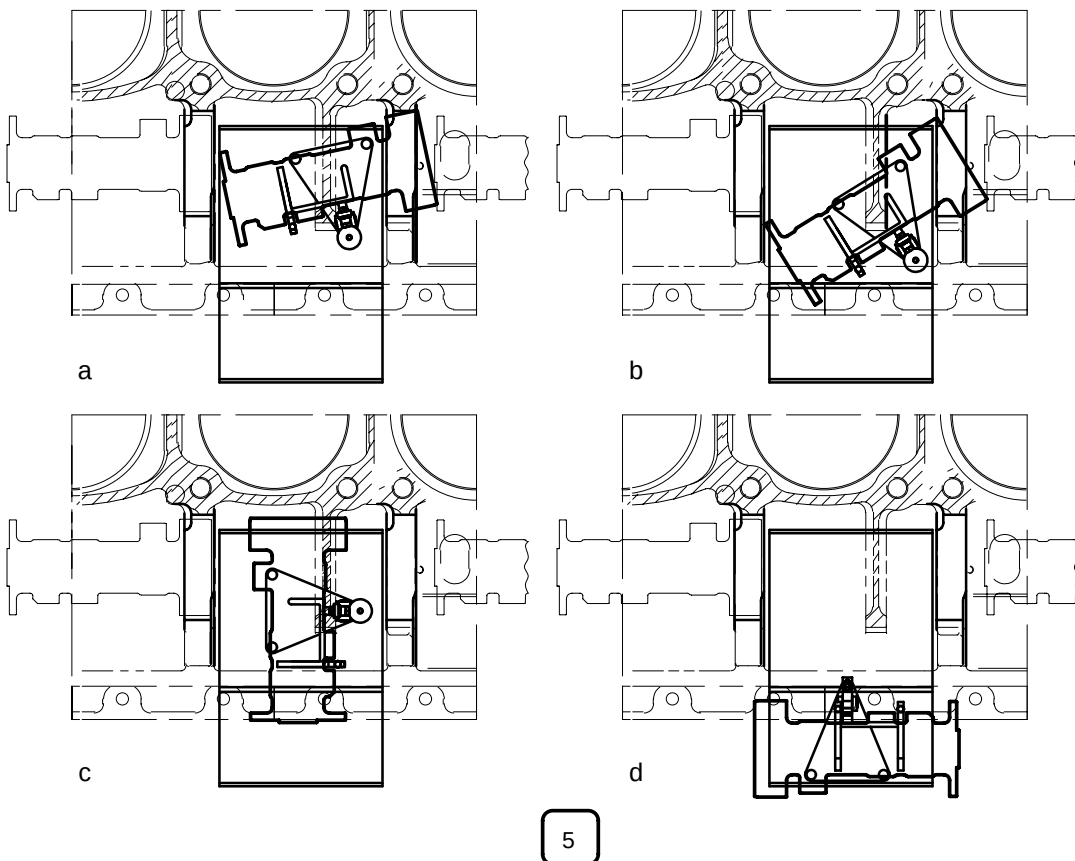
Note:

The camshaft section must be lowered beneath the bearing point (**Fig. 3/30**) of the lower valve drive.

Attention:

Do not tilt the camshaft section too much! Extreme care is of paramount importance!

- 1.14 Pull the carriage with the camshaft section forwards up to the limit of the table turning it by 180°, see **Fig. 5**.



5

- 1.15 Remove the clamp (31) and take out the camshaft section. Pay attention to the weight (approx. 48 kg)!
- 1.16 Remove the camshaft bearing (**Fig. 2/22**). Check it (**04.01.02.nn**) and replace it if necessary.

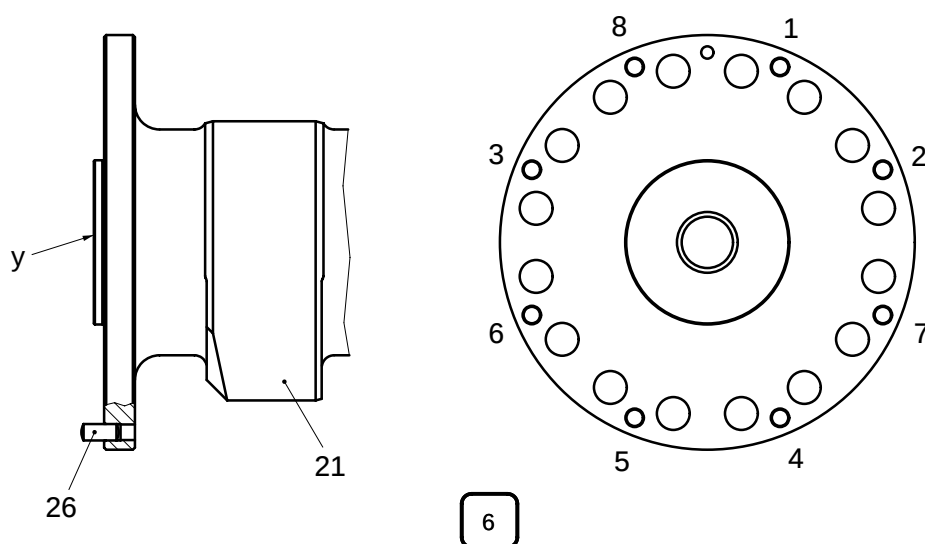
M25

04

2. Reassembly

- 2.1 Press the pin (**Fig. 6/26**) into the flange of the camshaft section (21) at the respective reference number until it bottoms.

Camshaft section for cylinder	Insert pin at reference number
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8



- 2.2 Slightly oil the camshaft bearing on the inside and outside and place it on the injection cam of the camshaft section.
- 2.3 Place the camshaft section with pin on the delivery plate (**Fig. 3/32**) facing the opposite end of the coupling and secure it with the clamp (31).
- 2.4 Turn the injection cam into a horizontal position and swivel the camshaft section into the cylinder crank case. Tilt the camshaft section with the delivery plate around the point of motion (screw connection; 36) and lower it with the star grip (35).
- 2.5 Carefully guide the bearing journal for the camshaft section into the bearing bore in the cylinder crank case.

Attention:

Do not tilt the camshaft section too much! Extreme care is of paramount importance!

M25

04

- 2.6 Align the locating hole for the camshaft bearing (**Fig. 2/22**) with the bore for the cheese head screw (**Fig. 3/37**) in the cylinder crank case and press in evenly using a suitable piece of wood. Do not tilt it!
- 2.7 Rub the cheese head screw (37) in with Molykote, insert it and tighten it at a torque of
M = 130 Nm.
- 2.8 Align the camshaft section with pin (**Fig. 2/26**) with the bore in the bearing journal (27) / in the bearing flange in the fitted left-hand camshaft section.
- 2.9 Push the camshaft section to the left until the cheese head screw (**Fig. 6/26**). the recess (**y**) of the camshaft section hold securely.

Attention:

Do not use any force when displacing! The camshaft gear wheel must not be displaced by the camshaft section!

- 2.10 Insert all hexagon bolts (**Fig. 2/20**) using Molykote.
- 2.11 Insert the hexagon bolts (20) as far as possible in the left-hand flange of the camshaft section and tighten at least three hexagon bolts stepwise and crosswise at a torque of

M = 140 Nm.

Bores which cannot be reached must be equipped **later!**

- 2.12 Remove the plate (**Fig. 4/44**) with the hexagon bolt (43) and guide pin (40) and push the rest of the camshaft with the vibration damper carefully to the left up to the camshaft section until the cylinder pin and recess have been inserted completely in the left-hand camshaft section.

Attention:

Do not use any force when displacing! The camshaft gear wheel must not be displaced by the camshaft section!

In the event of any binding, check the clearance of the rocker arms!

- 2.13 Insert the hexagon bolts (20) as far as possible in the bearing flange of the camshaft section and tighten at least three hexagon bolts stepwise and crosswise at a torque of

M = 140 Nm.

Bores which cannot be reached can be equipped **later.**

M25

04

2.14 Remove the extractor (**Fig. 3/W2**) and buffer (**Fig. 4/W3**).

2.15 Insert the other hexagon bolts (**Fig. 2/20**) (using Molykote), turn the engine and tighten all loose hexagon bolts stepwise and crosswise at a torque of

M = 140 Nm.

2.16 After assembly of the last camshaft section:

2.16.1 Place the intermediate piece (**Fig. 2/25**) firmly on the camshaft section. The recess (**z**) must be fully inserted in the camshaft section.

2.16.2 Insert the hexagon bolts (**Fig. 2/24**) (using Molykote) and tighten stepwise and crosswise at a torque of

M = 85 Nm.

2.16.3 Mount the vibration damper (**04.09.01.nn**).

2.17 Turn all injection cams upwards individually (TDC position). Relieve the device for the rocker arms (**Fig. 1/W1**) and remove it.

2.18 Lift all rocker arms of the inlet and exhaust valve drives, remove the wire and lower the rocker arms onto the respective cams.

2.19 Mount the push rods.

2.20 Mount the rocker arms and check the valve clearance.

2.21 Remove the cover of the wheel casing (control side), check the axial clearance of the camshaft and remount the cover.

2.22 Check the lubricating oil flow.

2.23 Check the seals and remount the camshaft cover as well as the cover of the wheel housing.

2.24 Remove the turning rod, dismount the turning device.

2.25 Close the indicator valves.

M25

04

See also: 01.01.01.nn, 01.02.01.nn, 04.08.03.nn, 04.09.01.nn

Spare parts list: B1.05.04.253120

Time requirement: 1 Pers./ 3,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Device for rocker arm (injection cam)	W1	259235 B
Extractor for camshaft section	W2	259230 A
Camshaft buffer	W3	259230-003
Torque wrench 60 - 320 Nm	W4 *	1.9454-320
Reversible ratchet 3/4	W5 *	1.9495-036
Adapter (3/4 to 1/2)	W6 *	1.9459-035
Ring spanner	W7 *	1.9459-022
Feeler gauge	W8 *	1.9075-003
Socket wrench	W9 *	1.9100-060

* not illustrated

Auxiliary material:

Molykote paste "G-Rapid Plus" **

** or a product of equal standard

Sequence of operations:

Attention:

- The camshaft is only allowed to be turned with loosened screw connections if
- the rocker arms of the camshaft section to be replaced as well as all rocker arms located to the right are relieved
- and
- the pin (Fig. 2/26) has been pulled out of the bearing journal (27) / the fitted left-hand camshaft section!
-

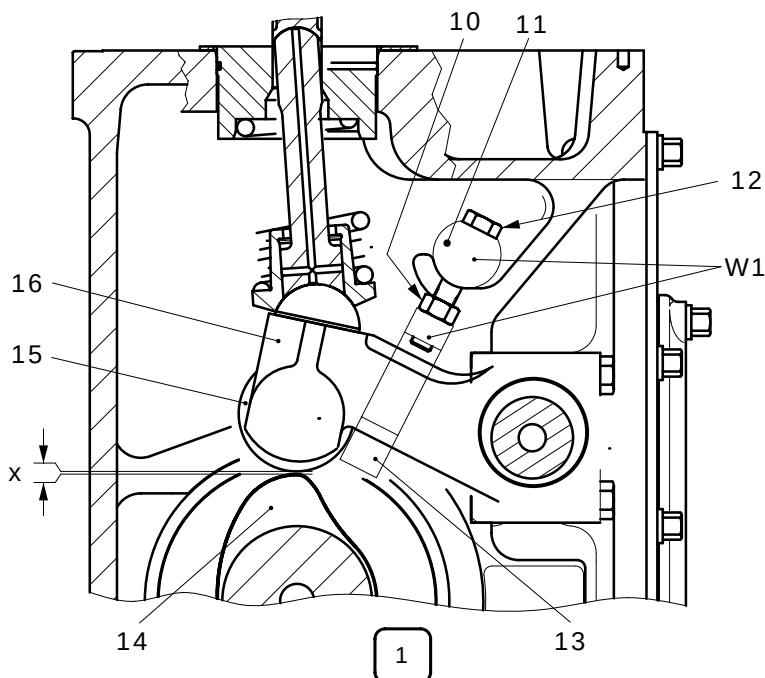
1. Disassembly

- 1.1 Open the indicator valves and remove the camshaft cover with housing covers and seals on the control side.
- 1.2 Remove all rocker arms of the respective cylinder and all cylinders located to the right to relieve the camshaft.

M25

04

- 1.3 Remove the push rods of the camshaft section of the respective cylinder and all camshaft sections located to the right of it. Lift the rocker arm of the inlet and exhaust valve drives from the cam and secure with wire.
- 1.4 Relieve the injection cam of the respective cylinder and successively relieve all cylinders to the right of it, to do so:
 - 1.4.1 Turn the injection cam (**Fig. 1/14**) to just before (approx. 30°) the TDC point.



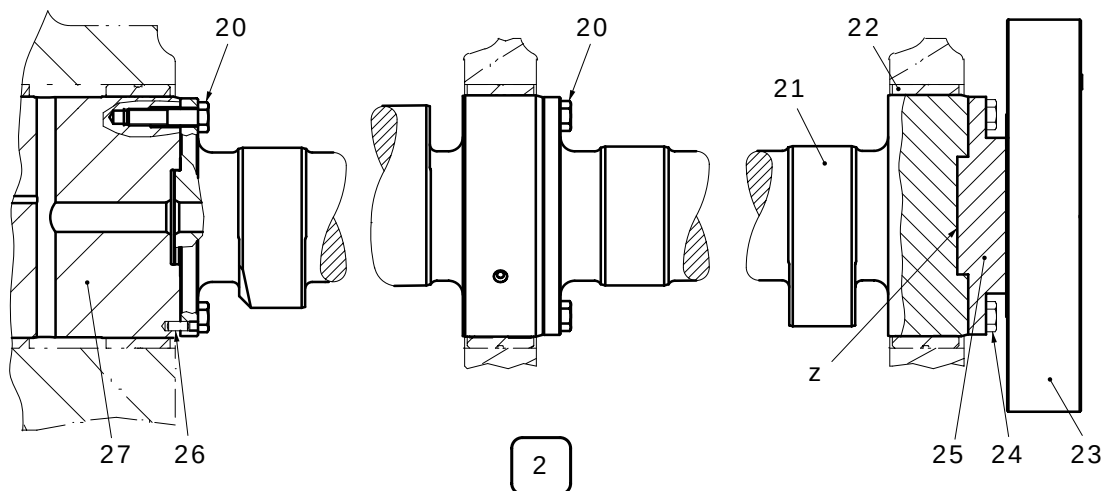
- 1.4.2 Place a brass plate (0.8 up to 1.0 mm thick) in front of the roller (15) on the injection cam.
 - 1.4.3 Turn the injection cam to the TDC position. Follow up with the brass plate, it must press the roller off the injection cam.
 - 1.4.4 Turn the injection cam to the TDC position.
 - 1.4.5 Loosen the hexagon nut (10) and suspend the device for the rocker arm (W1) with the toggle (11) in the cylinder crank case.
 - 1.4.6 Screw the hexagon bolt (12) **only in so far** until the holder (13) makes firm contact with the rocker arm (16) and the rocker arm lifts off the injection cam with a clearance of **x**.
- x = 0.8 - up to 1.0 mm**
- 1.4.7 Secure the setting with the hexagon nut (10) and remove the brass plate.

M25

04

1.5 To disassemble the **last** camshaft section:

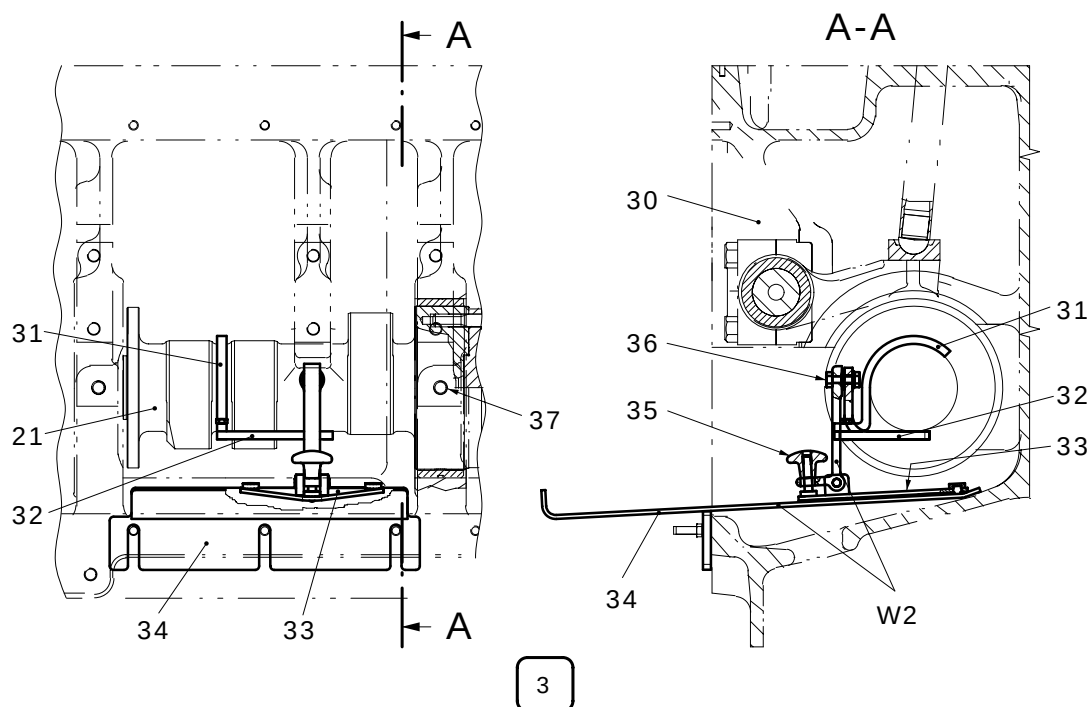
1.5.1 Remove the vibration damper (**Fig. 2/23**) and push it to the right as far as possible (**04.09.01.nn**)!



1.5.2 Remove the intermediate piece (25).

1.6 Loosen the hexagon bolts (20) on both flanges of the camshaft section (21). **Make the hidden hexagon bolts accessible by turning the camshaft.** Loosen them and then remove all hexagon bolts.

1.7 Mount the device for extracting the camshaft section (**Fig. 3/W2**).

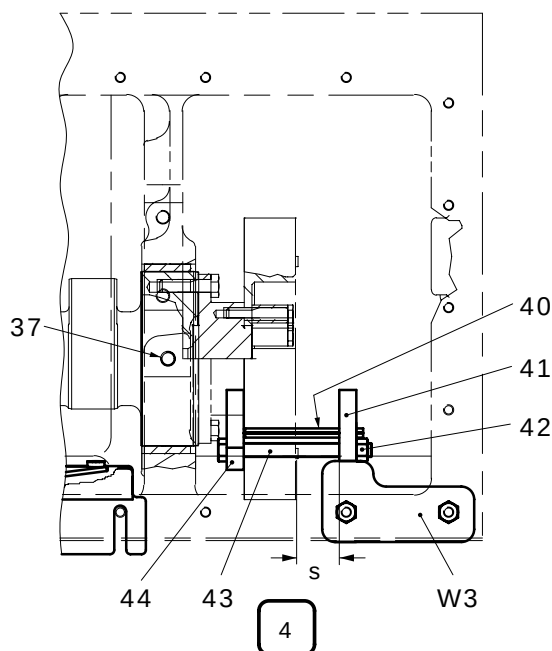


M25

04

- 1.7.1 Mount the table (**Fig. 3/34**) on the cylinder crank case of the respective cylinder.
- 1.7.2 Mount the carriage (33) on the table and push it under the camshaft section together with the delivery plate (32). Adjust the star grip (35) if necessary and tilt the delivery plate forwards.
- 1.7.3 Place the clamp (31) over the camshaft section and onto the extractor and mount it.
- 1.7.4 Use the star grip (35) to align the carriage so that the three ball bearings of the carriage lie on the table without pressure.
- 1.8 Mount the buffer for the camshaft (**Fig. 4/W3**) on the cylinder crank case (vibration damper). (Not for disassembly of the **last** camshaft section).
- 1.8.1 Mount the plate (44) with the hexagon bolt (43) and guide pin (40) and set the maximum displacement of **s** (**04.04.01.nn**).

Displacement $s = 50 \pm 0.5 \text{ mm}$
- 1.8.2 Tighten the hexagon nut (42) and pull the vibration damper with the loose camshaft up to the limit plate (41). The camshaft is secured against axial displacement.



Attention:

**Do not use any force when displacing!
If there is any binding, check the
clearance of the rocker arm!**

- 1.9 Remove the cheese head screw (**Fig. 3/37**) from the right-hand bearing point of the camshaft section to be replaced.
- 1.10 Push out the camshaft bearing (**Fig. 2/22**) to the left with a suitable piece of wood.
- 1.11 Pull the camshaft section (**Fig. 3/21**) to the left with the carriage (33) until the pin (**Fig. 2/26**) of the right-hand camshaft section is free.
- 1.12 Turn the injection cam to a horizontal position.
- 1.13 Loosen the screw connection (**Fig. 3/36**), carefully slide the camshaft section out of the right-hand bearing point in the cylinder crank case.
Tilt the camshaft section to the left with the delivery plate (32) around the center of motion (screw connection; 36) and lower using the star grip (35).

M25

04

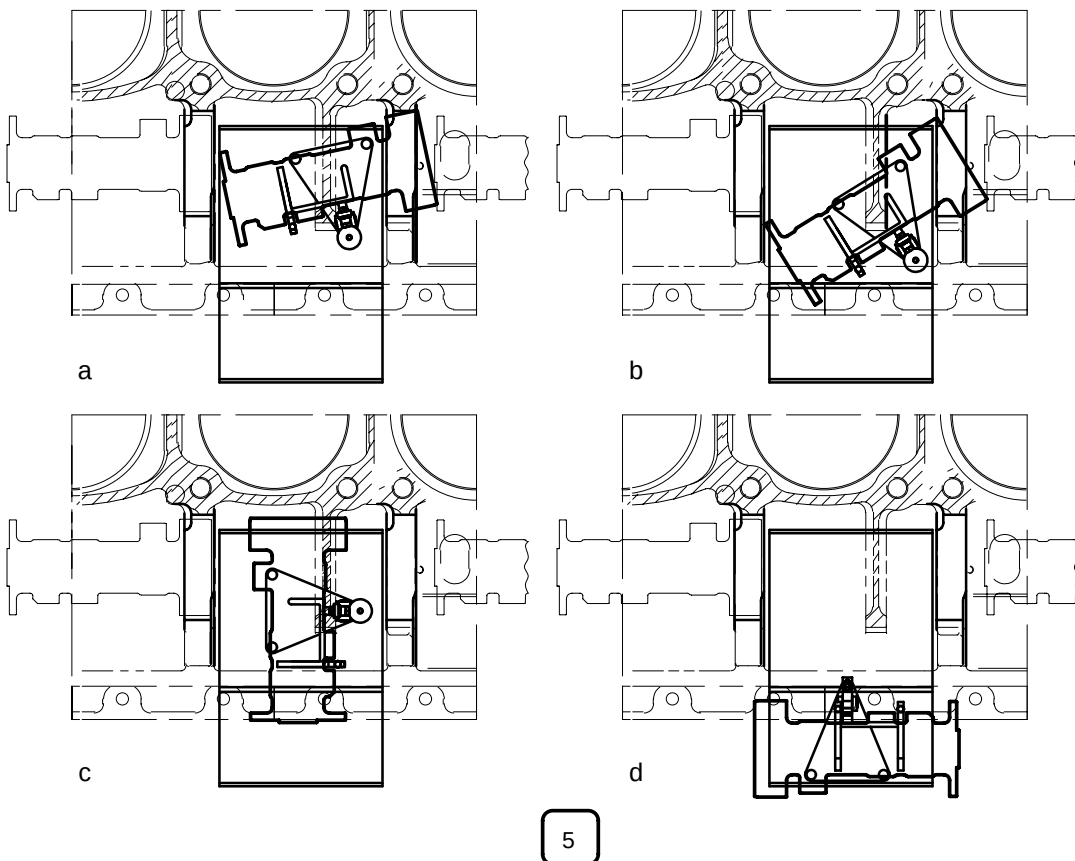
Note:

The camshaft section must be lowered beneath the bearing point (**Fig. 3/30**) of the lower valve drive.

Attention:

Do not tilt the camshaft section too much! Extreme care is of paramount importance!

- 1.14 Pull the carriage with the camshaft section forwards up to the limit of the table turning it by 180°, see **Fig. 5**.



- 1.15 Remove the clamp (31) and take out the camshaft section. Pay attention to the weight (approx. 48 kg)!
- 1.16 Remove the camshaft bearing (**Fig. 2/22**). Check it (**04.01.02.nn**) and replace it if necessary.

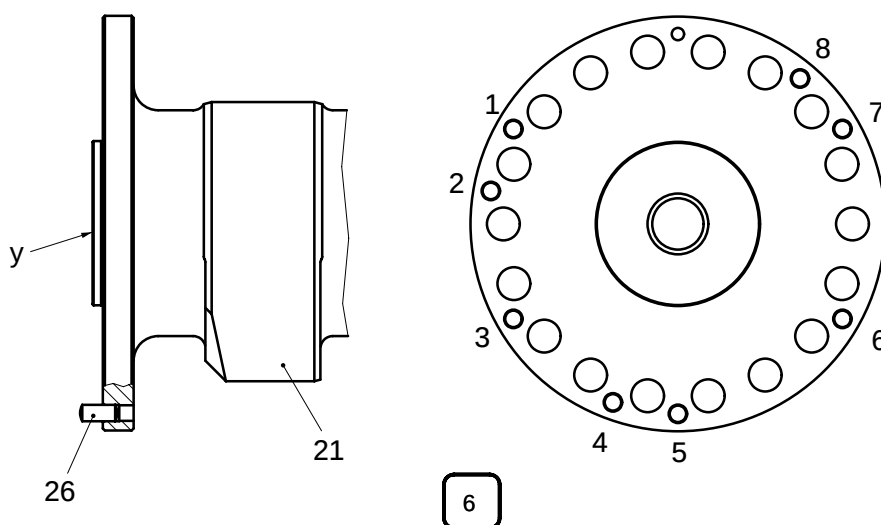
M25

04

2. Reassembly

- 2.1 Press the pin (**Fig. 6/26**) into the flange of the camshaft section (21) at the respective reference number until it bottoms.

Camshaft section for cylinder	Insert pin at reference number
1	5
2	8
3	2
4	6
5	4
6	4
7	6
8	2
9	8



- 2.2 Slightly oil the camshaft bearing on the inside and outside and place it on the injection cam of the camshaft section.
- 2.3 Place the camshaft section with pin on the delivery plate (**Fig. 3/32**) facing the opposite end of the coupling and secure it with the clamp (31).
- 2.4 Turn the injection cam into a horizontal position and swivel the camshaft section into the cylinder crank case. Tilt the camshaft section with the delivery plate around the point of motion (screw connection; 36) and lower it with the star grip (35).
- 2.5 Carefully guide the bearing journal for the camshaft section into the bearing bore in the cylinder crank case.

Attention:

Do not tilt the camshaft section too much! Extreme care is of paramount importance!

M25

04

- 2.6 Align the locating hole for the camshaft bearing (**Fig. 2/22**) with the bore for the cheese head screw (**Fig. 3/37**) in the cylinder crank case and press in evenly using a suitable piece of wood. Do not tilt it!
- 2.7 Rub the cheese head screw (37) in with Molykote, insert it and tighten it at a torque of
M = 130 Nm.
- 2.8 Align the camshaft section with pin (**Fig. 2/26**) with the bore in the bearing journal (27) / in the bearing flange in the fitted left-hand camshaft section.
- 2.9 Push the camshaft section to the left until the cheese head screw (**Fig. 6/26**) the recess (**y**) of the camshaft section hold securely.

Attention:

Do not use any force when displacing! The camshaft gear wheel must not be displaced by the camshaft section!

- 2.10 Insert all hexagon bolts (**Fig. 2/20**) using Molykote.
- 2.11 Insert the hexagon bolts (20) as far as possible in the left-hand flange of the camshaft section and tighten at least three hexagon bolts stepwise and crosswise at a torque of

M = 140 Nm.

Bores which cannot be reached must be equipped **later!**

- 2.12 Remove the plate (**Fig. 4/44**) with the hexagon bolt (43) and guide pin (40) and push the rest of the camshaft with the vibration damper carefully to the left up to the camshaft section until the cylinder pin and recess have been inserted completely in the left-hand camshaft section.

Attention:

Do not use any force when displacing! The camshaft gear wheel must not be displaced by the camshaft section!

In the event of any binding, check the clearance of the rocker arms!

- 2.13 Insert the hexagon bolts (20) as far as possible in the bearing flange of the camshaft section and tighten at least three hexagon bolts stepwise and crosswise at a torque of

M = 140 Nm.

Bores which cannot be reached can be equipped **later.**

M25

04

- 2.14 Remove the extractor (**Fig. 3/W2**) and buffer (**Fig. 4/W3**).
- 2.15 Insert the other hexagon bolts (**Fig. 2/20**) (using Molykote), turn the engine and tighten all loose hexagon bolts stepwise and crosswise at a torque of

M = 140 Nm.
- 2.16 After assembly of the last camshaft section:
 - 2.16.1 Place the intermediate piece (**Fig. 2/25**) firmly on the camshaft section. The recess (**z**) must be fully inserted in the camshaft section.
 - 2.16.2 Insert the hexagon bolts (**Fig. 2/24**) (using Molykote) and tighten stepwise and crosswise at a torque of

M = 85 Nm.
 - 2.16.3 Mount the vibration damper (**04.09.01.nn**).
- 2.17 Turn all injection cams upwards individually (TDC position). Relieve the device for the rocker arms (**Fig. 1/W1**) and remove it.
- 2.18 Lift all rocker arms of the inlet and exhaust valve drives, remove the wire and lower the rocker arms onto the respective cams.
- 2.19 Mount the push rods.
- 2.20 Mount the rocker arms and check the valve clearance.
- 2.21 Remove the cover of the wheel casing (control side), check the axial clearance of the camshaft and remount the cover.
- 2.22 Check the lubricating oil flow.
- 2.23 Check the seals and remount the camshaft cover as well as the cover of the wheel housing.
- 2.24 Remove the turning rod, dismount the turning device.
- 2.25 Close the indicator valves.

M25

3000, 12000

04

See also: 02.01.01.nn

Spare parts list: B1.05.04.255140

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Inspection:

of the tooth profile and oil nozzles	every	3,000 h
of the axial play of the intermediate wheel	every	12,000 h

Tools:

Feeler gauge W1 * 1.9075-003

* not illustrated

Auxiliary material:

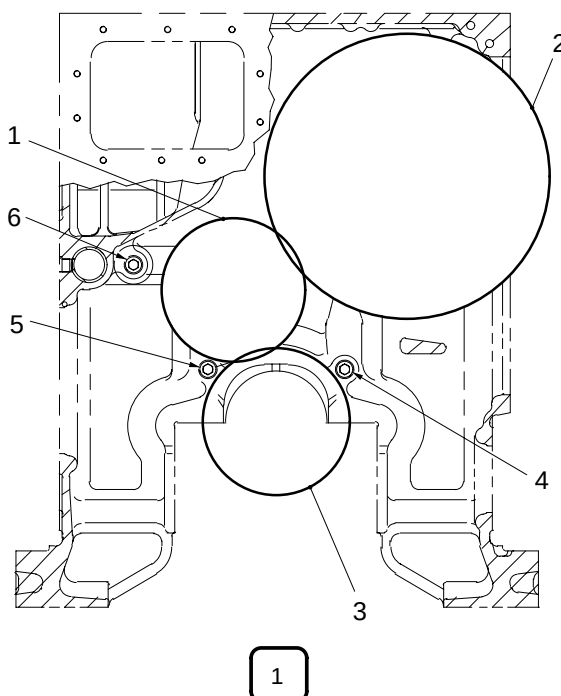
Molykote paste "G-Rapid Plus" **

** or a product of equal standard

Sequence of operations:

1. Inspection of the tooth profiles and oil nozzles.
 - 1.1 Remove the cover for the wheel casing (control side).
 - 1.2 Check the tooth profiles of the camshaft gearwheel (**Fig. 1/2**, intermediate wheel (1) and crank-shaft gearwheel (3) for pitting, slanted running, breakage etc.
 - 1.3 Use a feeler gauge to measure the play between the teeth of the intermediate wheel and the cam and crank shaft gearwheel.

Target value **0.23 - 0.35 mm**
 - 1.4 Check the operation and firm seating of the oil nozzles (4, 5 and 6).



M25

3000, 12000

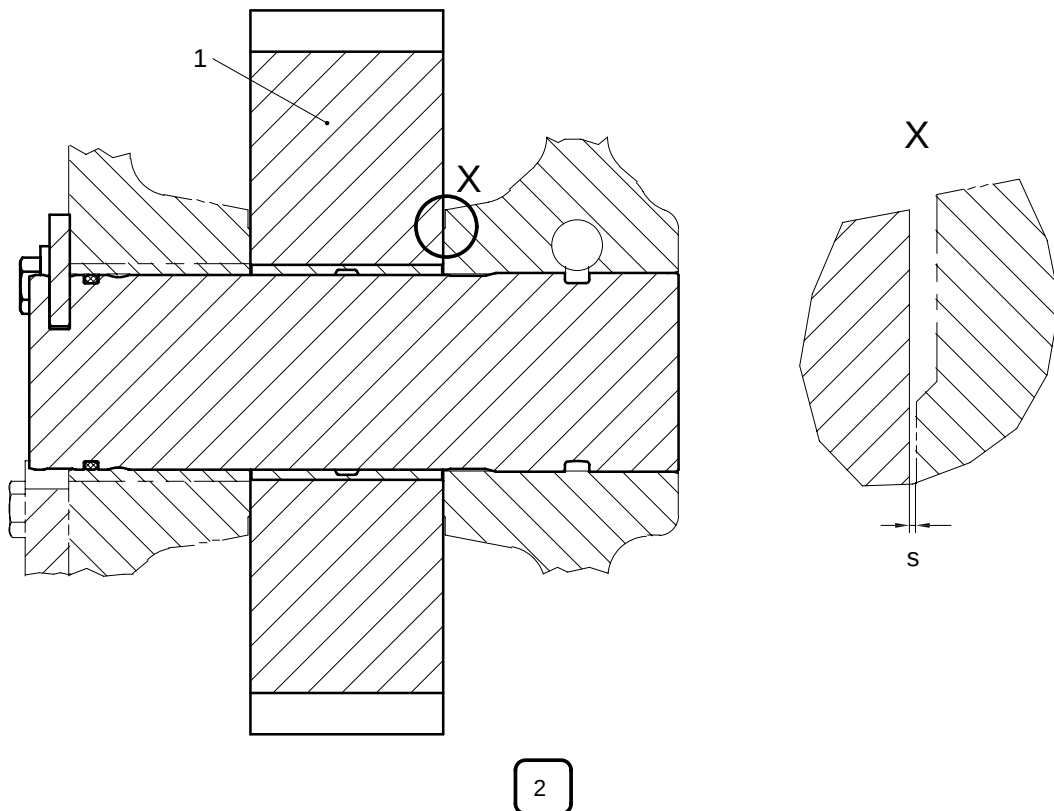
2. Measure the axial play (**Fig. 2/s**) of the intermediate wheel (1) with a feeler gauge.

Target value **s = 0.3 - 0.6 mm**

Note:

MaK customer service must be informed if the tooth profiles are damaged or if one of the permissible target values (backlash, axial play) are exceeded.

3. Check the seals and mount the cover on the wheel casing on the control side.



M25

04

See also: 02.01.01.nn

Spare parts list: B1.05.04.255140

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

60 - 320 Nm torque wrench	W1 *	1.9454-320
Reversible ratchet 3/4	W2 *	1.9495-036
Adapter (3/4 to 1/2)	W3 *	1.9459-035
Feeler gauge	W4 *	1.9075-003
Tubular box wrench, indicator valve	W5 *	1.9100-060

* not illustrated

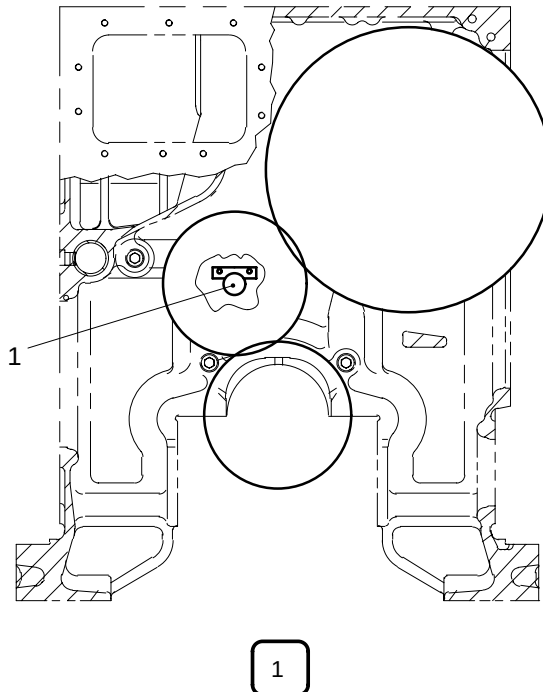
Auxiliary material:

Molykote paste "G-Rapid Plus" **

** or a product of equal standard

Sequence of operations:

1. Open the indicator valves.
- 1.1 Replace the O-ring (**Fig. 2/10**) for the intermediate wheel axle (**Fig. 1/1**).
- 1.2 Turn the engine so that the axle of the intermediate wheel can be accessed through the fly-wheel.
- 1.3 Remove the turning rod/disengage the turning rod.
Close the indicator valves.
- 1.4 Loosen the hexagon bolts (**Fig. 2/11**) and remove them together with the curved washers (12) and locking plate (13).
- 1.5 Remove the power unit cover of the first cylinder (exhaust side).
- 1.6 From the power unit, push the intermediate wheel axle (1) out of the wheel casing towards the coupling end **only** so far that the O-ring (10) is accessible.

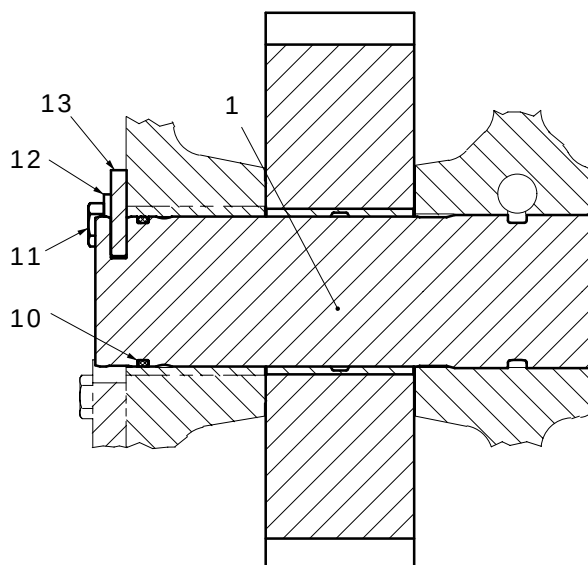


M25

04

- 1.7 Renew the O-Ring (**Fig. 2/10**).
- 1.8 Rub the thread and contact surfaces of the hexagon bolts (11) in with Molykote paste.
- 1.9 Mount the hexagon bolts (11) with curved washers (12) and locking plate (13) and tighten them by hand.
- 1.10 Press the locking plate (13) onto the hexagon bolts and tighten the bolts (11) at a torque of

M = 130 Nm.



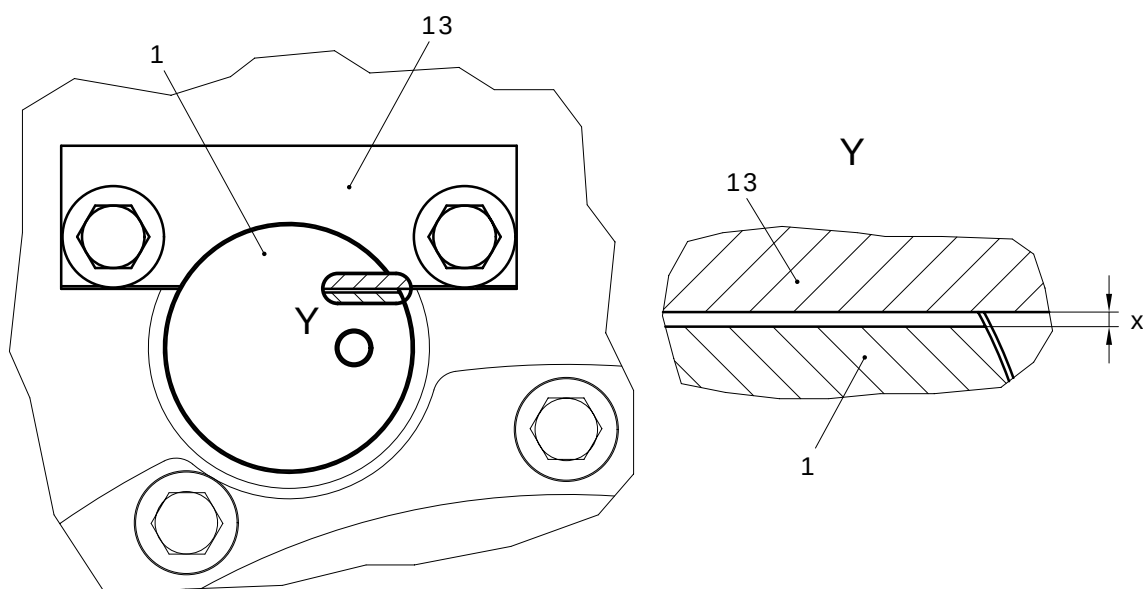
2

- 1.11 Check the size of the gap (**Fig. 3/X**) between the locking plate (13) and intermediate wheel axle (1):

X_{min.} = 0.3 mm

X_{max.} = 1.4 mm

- 1.12 If necessary, loosen the hexagon bolts and realign the locking plate.



3

M25

12000

04

See also:

Spare parts list: B1.05.03.251110, B1.05.04.254111

Time requirement: 1 Pers./ 2,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Inspection:

of the contact reflection of the helical gearwheel set and the serration of the governor drive shaft

every

12,000 h

Tools:

Feeler gauge

W1 *

1.9075-003

Dial gauge with holder *

* not illustrated

Auxiliary material:

Molykote paste "G-Rapid Plus" **

"Dirko 610.020" universal sealant **

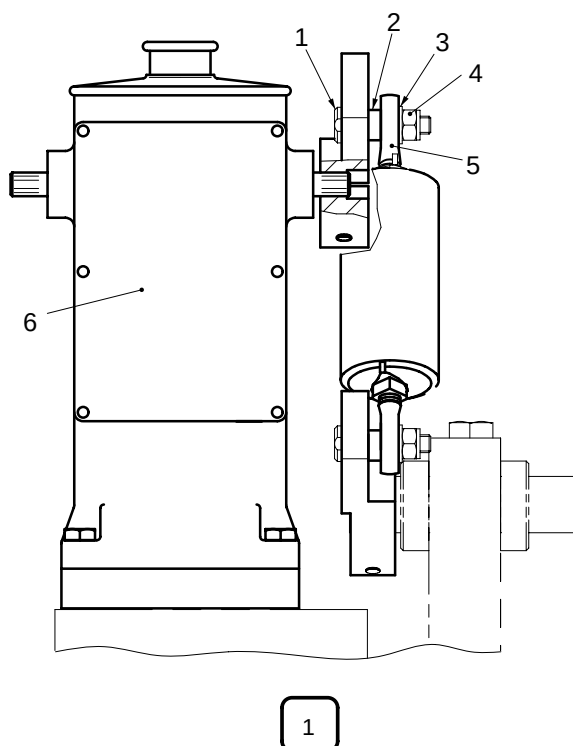
** or a product of equal standard

Sequence of operations:

1. Disassembly

1.1 Fix the stop lever in the stop position.

1.2 Remove the locking nut (**Fig. 1/4**) with bolt (1), spacer bush (2) and washer (3).



M25

12000

04

- 1.3 Remove the cover (**Fig. 2/19**) at the coupling end and the cover at the control end of the wheel casing.
- 1.4 Clean the contact surfaces on the cover and cylinder cankcase. Completely remove the sealant.
- 1.5 Use a feeler gauge to check the backlash of the helical gearwheels (21, 22)

Target value **0.15 - 0.50 mm**

Note:

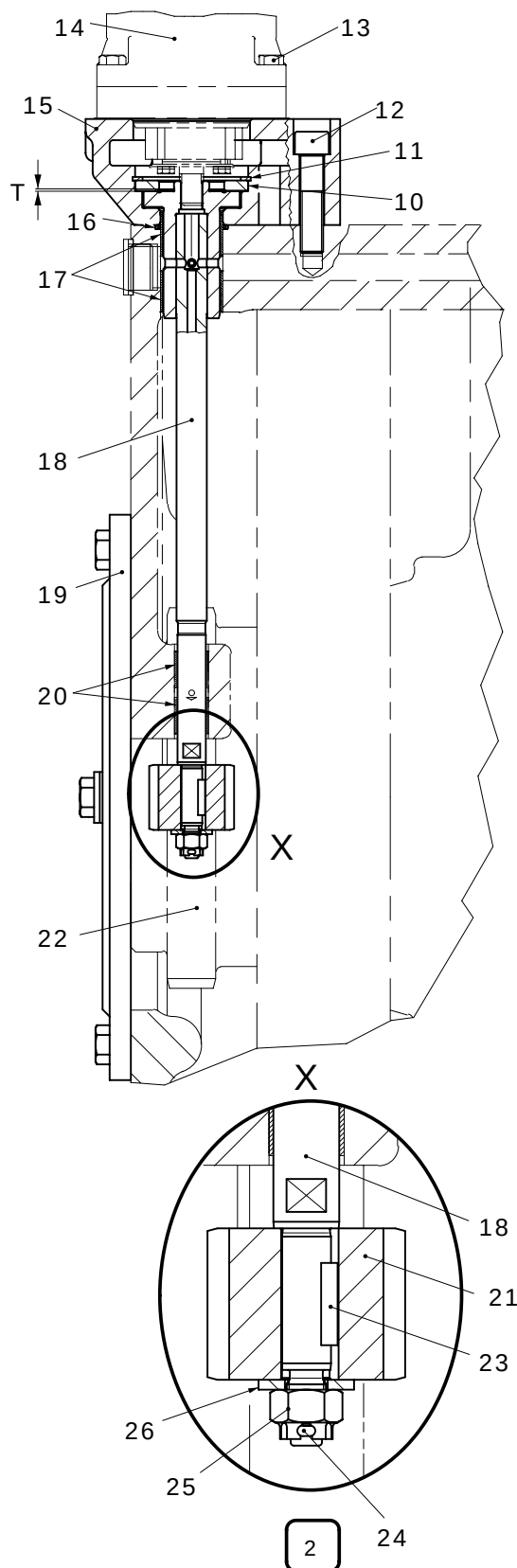
Pay attention to the axial position of the governor drive shaft (18).

- 1.6 Remove the cotter pin (24), castellated nut (25) and the curved washer (26).
- 1.7 Pull the helical gearwheel (21) off the governor drive shaft (18). Pay attention to the feather key (23).
- 1.8 Check the tooth profiles of the helical gearwheels (21, 22) for pitting, slanted running, breakage etc.
- 1.9 Remove the hexagon bolts (13) and lift the governor (14) off the governor console (15).
- 1.10 Check the axial play (**T**) of the stopping disk (10).

Target value **T = 0.3 - 0.6 mm**

If a different value is determined, check the stopping disk and replace it if necessary.

- 1.11 Remove the locking ring (11) and take out the stopping disk. Check for wear and replace if necessary.
- 1.12 Pull the governor drive shaft (18) upwards out of the cylinder cankcase and check for wear.



M25

12000

04

- 1.13 Check the serration of the governor drive shaft and governor (**Fig. 2/14**) for wear and clean if necessary.
- 1.14 Loosen the hexagon socket screws (12) and lift off the governor console (15).
- 1.15 Remove the O-ring (16) and clean the contact surfaces of the governor console and the cylinder cankcase. Completely remove the sealant.
- 1.16 Check the flow-through of all oil lubricating bores for lubricating the governor drive shaft (18) and the helical gearwheels (21, 22).

Note:

The governor drive shaft (18) is supported at the top and bottom of the cylinder frame. The bushes (17 and 20) can be forced out of the cylinder cankcase using a suitable mandril if they have to be replaced.

2. Reassembly

- 2.1 Lubricate and press-in the new bushes (17 and 20) (**Fig. 3**).

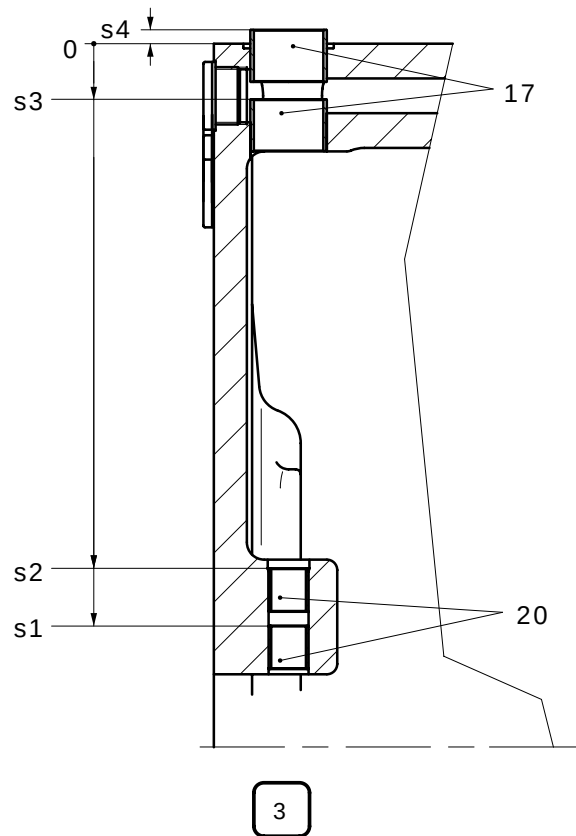
Pressing-in dimensions:

s1	=	335 mm
s2	=	302 mm
s3	=	32 mm
s4	=	8 mm

Note:

Molykote is not permissible!

- 2.2 Insert the new O-ring (**Fig. 2/16**). Clean the contacts surface of the governor console (15) and the cylinder cankcase and then apply a thin coat of sealant.
- 2.3 Place the governor console on the cylinder cankcase and tighten the hexagon socket screws (12).
- 2.4 Lubricate the governor drive shaft (18) and fit it in the cylinder cankcase from above.



Note:

Molykote is not permissible!

M25

12000

04

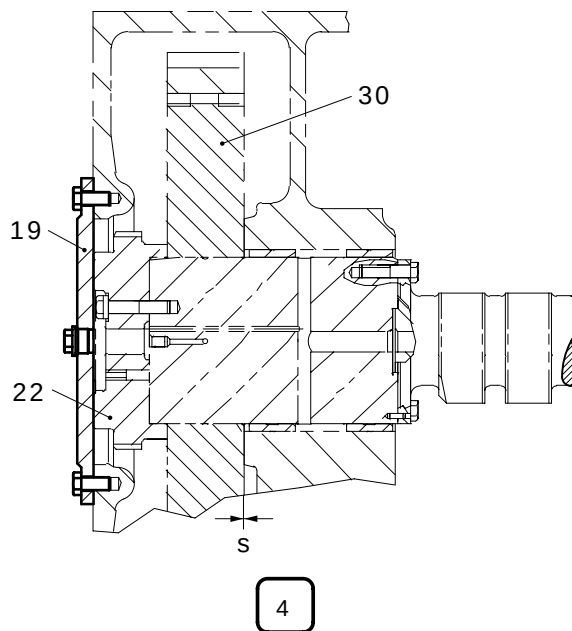
- 2.5 Lubricate the stopping disk (**Fig. 2/10**). Insert it and retain it with the locking ring (11). Check the axial play (1.10).
- 2.6 Apply Molykote to the thread of the governor drive shaft and the contact surface of the castellated nut.
- 2.7 Fit the helical gearwheel (21) together with the feather key (23) and curved washer (26) on the governor drive shaft (18) and mount the castellated nut (25).
- 2.8 Tighten the castellated nut (25) at a torque of

M = 30 Nm.

Turn the nut further to the next bore for the cotter pin and secure it with the cotter pin (24).
- 2.9 Clean the contact surface of the governor (14) and the governor console and apply a thin film of sealant.
- 2.10 Place the governor (14) on the governor console (15). The serration on the governor shaft must glide easily into the serration on the governor drive shaft (18).
- 2.11 Fit the hexagon bolts (13) on the governor and tighten them.
- 2.12 Mount the lever (**Fig. 1/15**) together with the bolt (1), spacer bush (2), washer (3) and **new** locking nut (4) on the governor (6).
- 2.13 Check the basic setting of the governor and, if necessary, readjust the governor (adjustment of governor, book C, section 5).
- 2.14 Check the flow-through for lubricating oil.
- 2.15 Mount the cover (**Fig. 2/19**, coupling end) with sealant on the cylinder crankcase. The contact surfaces must be clean.
- 2.16 Check the axial play **s** of the camshaft gearwheel with a dial gauge on the camshaft gearwheel (**Fig. 4/30**).

Target value **s = 0.3 - 0.7 mm**

Consult MaK customer service if a different value is determined.
- 2.17 Check the seals in the cover at the control end of the wheel casing and mount the cover.



M25

12000

04

See also:

Spare parts list: B1.05.03.251112, B1.05.04.253140

Time requirement: 1 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Auxiliary material:

Molykote paste "G-Rapid Plus" *
* or a product of equal standard

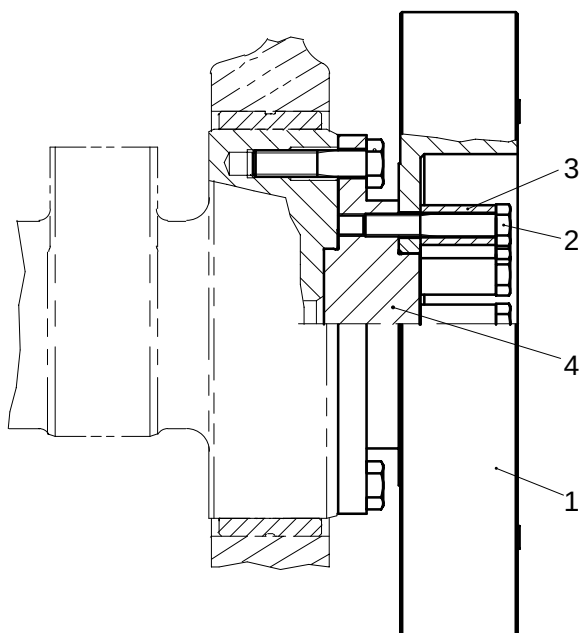
Note:

The vibration damper must be replaced every 12,000 - 15,000 operating hours.

Sequence of operation:

1. Disassembly

- 1.1 Remove the camshaft cover with the housing covers and seals.
- 1.2 Secure the vibration damper (**Fig. 1/1**) against falling down.
- 1.3 Remove the bolts (2) and resilient sleeves (3).
- 1.4 Attach the vibration damper (1) to a crane, pull it off the transition piece (4) and lift it out.



2. Reassembly

- 2.1 Clean the contact surface of the damper (1) and transition piece (4) (free from grease).
- 2.2 Apply Molykote paste "G-Rapid" to the threads of the bolts (2).
- 2.3 Push the vibration damper (1) onto the transition piece (4) and screw in the bolts (2) together with the resilient sleeves (3).
- 2.4 Tighten the bolts (2) crosswise and stepwise at a torque of

M = 50 Nm.

- 2.5 Mount the camshaft cover together with the housing covers and seals.

M25

12000

See also:

Spare parts list: B1.05.03.251112, B1.05.04.253140

Time requirement: 1 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

04

Auxiliary material:

Molykote paste "G-Rapid Plus" *
* or a product of equal standard

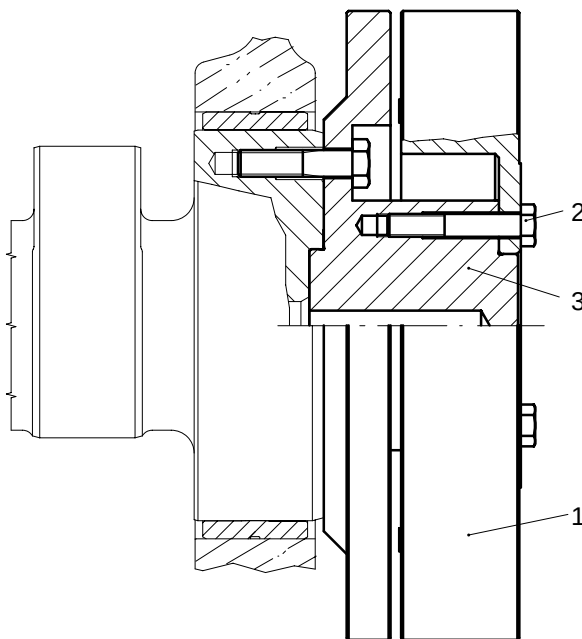
Note:

The vibration damper must be replaced every 12,000 - 15,000 operating hours.

Sequence of operation:

1. Disassembly

- 1.1 Remove the camshaft cover with the housing covers and seals.
- 1.2 Secure the vibration damper (1) against falling down.
- 1.3 Remove the bolts (2).
- 1.4 Attach the vibration damper (1) to a crane, pull it off the transition piece (3) and lift it out.



2. Reassembly

- 2.1 Clean the contact surface of the damper (1) and transition piece (3) (free from grease).
- 2.2 Apply Molykote paste "G-Rapid Plus" to the threads of the bolts (2).
- 2.3 Push the vibration damper (1) onto the transition piece (3) and screw in the bolts (2).
- 2.4 Tighten the bolts (2) crosswise and stepwise at a torque of
M = 50 Nm.
- 2.5 Mount the camshaft cover together with the housing covers and seals.

M25

1200

See also: -

Spare parts list: B1.05.04.254110

Time requirement: 1 Pers./ 0,20 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

05

Maintenance:

Oil control shaft	every	1.200 h
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Auxiliary material:

Multi-purpose grease or lubricating oil according to **A4.05.08.nn**

Sequence of operations:

1. Remove control shaft/injection pumps and control station covers.
2. Check control shaft and spindle to emergency-off lever and oil bearing areas slightly with lubricating oil.

Attention:

**After cleaning with fat dissolving agents, all bright-metallic components are to be oiled slightly.
Care has to be taken that all cleaned bearings are thoroughly greased.**

3. Grease the following bearings with multi-purpose grease:
 - swivel heads of the intermediate shaft between shaft and control station and control shaft
 - swivel head of spring link between control shaft and regulator

Remove excessive gease.
4. Oil all moving bearings of the swivel arm between control shaft and injection pump slightly.
5. Assemble covers.

M25/M32/M453C

6000

See also: A3.05.nn

Spare parts list: B1.05.05.1.4906

Time requirement: 1 Pers./ 1,20 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

05

Tools:

Torque wrench 20 - 90 Nm

W1

1.9454-020

* not available as figure

Auxiliary materials:

Molykote paste "G-rapid" **

** or a product of equal standard



Safety note:

Danger of accident! Take care when disassembling! The positions (fig. 2/20, 3/37) are spring-loaded!

Note:

All pneumatic elements are greased with a special purpose grease (see [A4.05.08.nn](#); multi-purpose grease) which assures the lubrication for many years. In the case of repair work, only this grease is to be employed. If other lubricants are used, the function of the components cannot be assured.

Sequence of operations:

1. Close main air valve at the compressed-air cylinder and the vent air lines at the engine and remove valve completely.
2. Slacken screws (fig. 1/1) and lift precontrol valve (2) of the starting valve (3).
3. Actuate push button (fig. 2/10) several times.
4. If easy running, proceed with step 5. If tight, proceed with step 4.1.

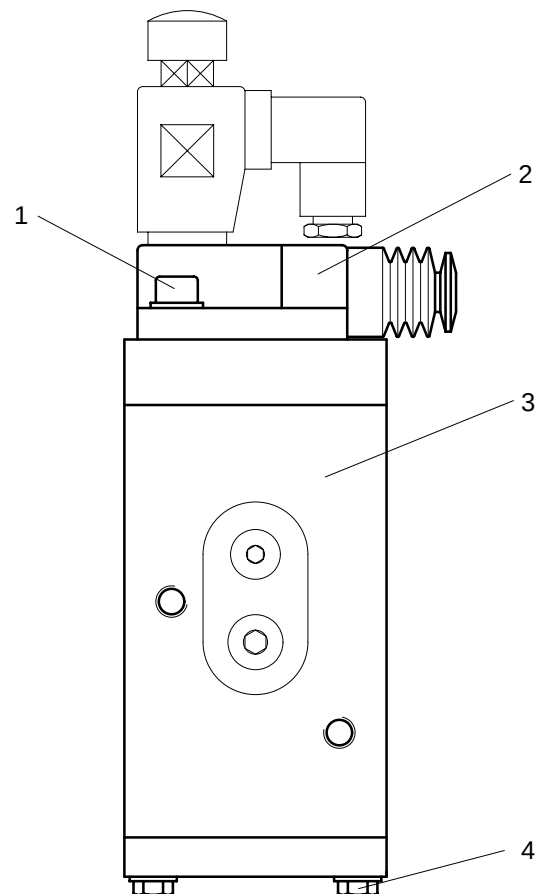


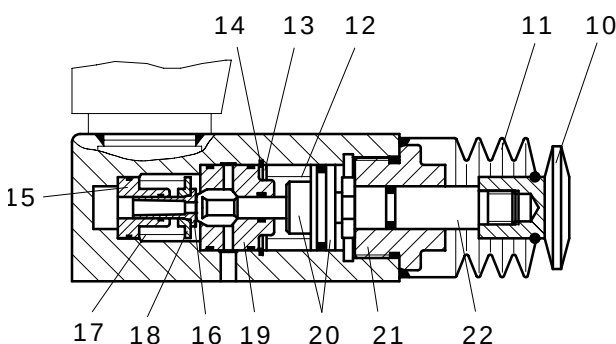
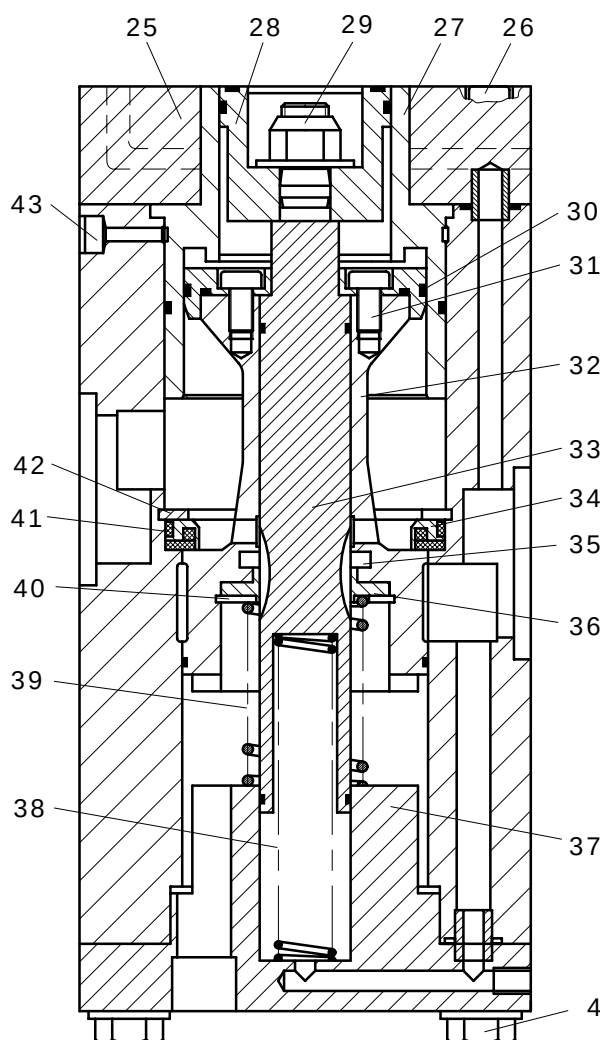
Fig. 1

M25/M32/M453C

6000

05

- 4.1 Pull off expansion bellow (11) and remove threaded pin (21).
- 4.2 Disassemble screw (22) and push button (19).
- 4.3 Remove piston (20), pressure spring (12) and washer (13).
- 4.4 Remove retaining ring (14) and observe spring pressure of the pressure spring (17).
- 4.5 Remove valve (16) with cap (18), pressure spring (17) and bearing bush (15).
- 4.6 Clean all the components with gasoil, check the sliding surfaces for rust deposits; if necessary, carefully rework with a polishing cloth.
- 4.7 Renew O-ring and grease sliding surfaces.
- 4.8 For assembly of precontrol valve, reverse removal procedure.
5. Disassemble starting valve, service and reassemble as follows.
 - 5.1 Slacken screws (**fig. 3/26**), lift plate (25) and pull out bearing bush (27).
 - 5.2 Slacken screws (4) and observe spring pressure of the pressure springs (38, 39)! Pull out bottom (37) and remove pressure springs.
 - 5.3 Slacken screws (31) and remove slide (33) and piston (30) from the top.
 - 5.4 Slacken hexagon nut (29) and remove piston (28) from slide (33).
 - 5.5 Remove slide (32) from below, remove retaining ring (40) and pull out stopper (36).
 - 5.6 Loosen and take out retaining ring (41) together with valve seat (34).
 - 5.7 Clean all the components with gasoil, check sliding surfaces for rust deposits; if necessary, carefully rework with a polishing cloth.


Fig. 2

Fig. 3

M25/M32/M453C

6000

05

-
- 5.8 If necessary, clean integral filter (43) with compressed air.
- 5.9 Renew all O-rings including sealing ring (42) and multi section ring (35). Slightly grease all sliding surfaces.
- 5.10 For assembly of the valve, reverse removal procedure and tighten the following bolts/nuts with the specified torques:
- | | |
|-----------------------------|-------------------|
| Screws/nuts (4 and 26) with | M = 12 Nm |
| Screw (31) with | M = 2.5 Nm |
| Hexagon nut (29) with | M = 40 Nm |
- 5.11 Check function of the precontrol valve (2) prior to reassembly by pushing down of the piston (28) several times.
- 5.12 Assemble precontrol valve, slightly grease all threads and bearing areas of the screws (**fig. 1/1**) with Molycotepaste and tighten screws to a torque of
- M = 24 Nm**
6. **Reassemble valve completely and open main air valve at the compressed air cylinder.**
7. Check function and tightness with starting air.

M20-M601C

3000

05

See also:

Spare parts list: B1.05.05.1.4337

Time requirement: 1 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Torque wrench 20 - 90 Nm

W1 *

1.9454-020

* not available as figure


Safety note:
Vent the air system before doing any work.
Note:

All pneumatic elements are lubricated with a special grease (see operating media, section A4), and it is not necessary to renew this for several years. Only this grease must be used for repairs. Proper operation of all parts will no longer be ensured when other lubricants are used.

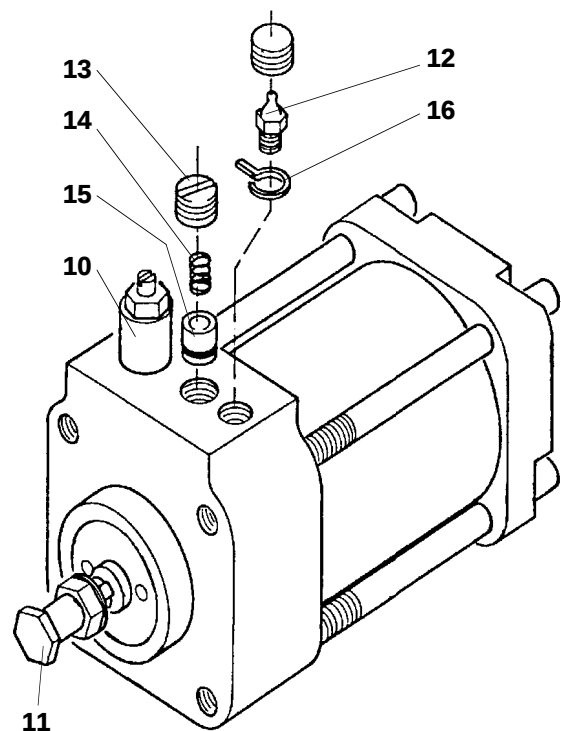

Safety note:
The piston is spring-loaded.
Sequence of operations:
1. Functional check

1.1 Check the air connection for leaks.

1.2 Check whether the piston moves easily under air pressure. If the movement is jerky, vent the oil part (para 2).

1.3 Check the setting.

1.3.1 If maximum fuel limitation has been provided, check the setting (see the Acceptance Test Records).

 1.3.2 Check whether **40 %** fuel is admitted when the piston is in the outer dead centre. Adjust by set screw (**Fig. 1/11**).

Fig. 1

- 1.4 Check whether full fuel is admitted within

15 seconds

after starting the engine. Adjust by throttle screw (**Fig. 1/10**).

2. Venting

- 2.1 Slip a transparent hose over vent screw (12) and put the other end into a an oil reservoir arranged at a lower level. Turn the vent screw entirely in and then screw one turn back.
- 2.2 Remove plug (13), spring (14) and piston (15).
- 2.3 Fill oil in as far as 7 mm below the housing top edge (SAE 20).
- 2.4 Insert the piston. Drive the air out by screwing the plug in.
- 2.5 Proceed according to 2.3 and 2.4 until no air escapes any more. Unscrew the plug. Insert the spring. Screw the plug in until it is flush with the housing top edge and secure it with locking spring (16).
- 2.6 If the cylinder is of the older type, the air must be removed by the throttle screw.

3. Disassembly

- 3.1 Close the main air valve. Remove the air connection.
- 3.2 Remove the unit from the engine.
- 3.3 Measure and note down the position of throttle screw (10) and thrust screw (11).
- 3.4 Disassemble the unit entirely and clean it in spirit.
- 3.5 Inspect all parts.

4. Reassembly

4.1 Renew all gaskets and seals (Fig. 2/1 - 9).

4.2 Assemble the unit observing the following:

4.2.1 Tighten the socket head cap screws (17) with a torque

M = 20 Nm.

4.2.2 Before fitting vent screw (12), plug (13), spring (14), piston (15) and throttle screw (10), apply a pressure of approximately

0,7 bar

to connection (A).

4.2.3 Fill oil (SAE 20) in as far as 7 mm below the housing top edge at connection (B).

4.2.4 Tighten the throttle screw (10) and socket head cap screw (18) with a torque

M = 20 Nm.

4.2.5 Vent the unit according para 2.

4.2.6 Adjust the unit and fit it on the engine.

4.2.7 Mount air connection.

4.2.8 Open main air shut-off valve

4.2.9 Check the operation according to para. 1.

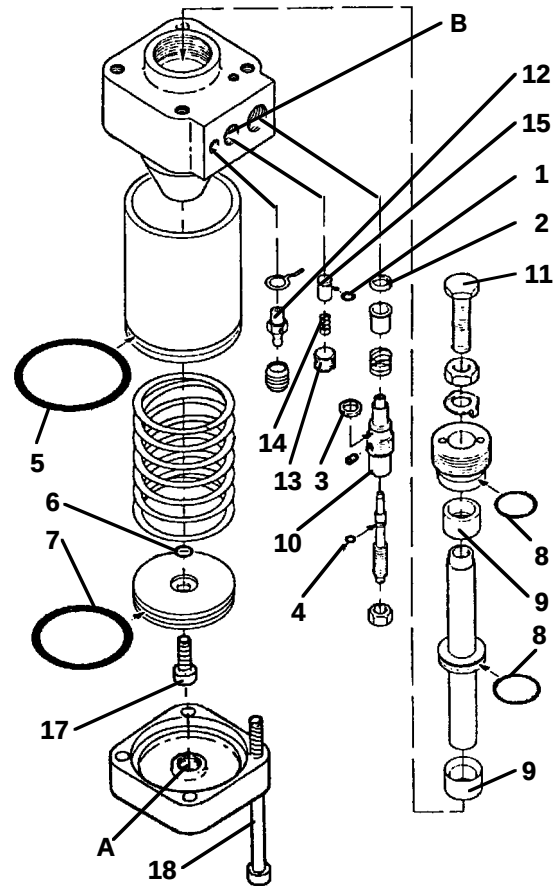


Fig. 2

Attention:

Do not shut off the air tank when the engine is in operation!

M25

600

05

See also: -

Spare parts list: B1.05.10.258610

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Inspection:

Check control air lines and fittings for tightness and proper function.

Note:

During the checks air must be admitted to the piping. In rather rare cases leakages can be stated by noise; normally an air detector will be required to find the leakages. The interval for draining results from the water quantity stated that depends on air consumption, temperature and operating site.

Sequence of operations:

Drain pipes and air vessel. The drain cocks are fitted at lowest points on the inclined side of the pipes.

Inspect the piping visually and check for tight fit of the fittings and tightness of the screwed connections.

Notes:

When fitting new pipes, the following must be observed:

Use either seamless steel pipes or copper pipes (against corrosion) for the control piping. Steel pipes must not be corroded nor have any other fault impairing their good operation. Only copper pipes are permitted for the pneumatic remote control.

All pipes have to be laid as straightlined as possible without water pockets. Water pockets which cannot be avoided must have a draining socket with plug at the lowest point. The radius of pipe bends must be as large as possible.

All pipes are to be bent in a cold condition. Never fill the pipes with sand or similar material for bending.

Fit the bent pipes carefully and free them from any scale or other impurities before mounting them on the engine.

M25

600

05

Keep the number of pipe connections and the resulting sealing points as low as possible. The use of red lead, varnish or white lead is not permitted because this would make a later undoing of the connections more difficult and disintegrated particles might enter the air ducts and cause damage.

If any pipes do not properly fit together they must be rebent so that they can be laid without tension. Blow through them with compressed air after bending.

Assembly work must be done with extreme care and cleanliness. Even the slightest dirt particles in the lines could entail failure of the control units.

M25

12000, 24000

See also:

Spare parts list: B1.05.10.25861n

Time requirement: 1 Pers./ 2,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

05

Inspection:

After two years carry out a random test of the high pressure valves, after four years of the low pressure valves.

In case of deficiencies recondition all control valves.

Note:

Low pressure valves: < 10 bar

High pressure valves: > 10 bar

Special grease for all control units see MaK Lubricant Recommendations **A4.05.08.nn**.
The use of other lubricants may be in detriment of the function of the fittings.

General instructions for maintenance see "Description to Functional Diagram" in book C, section 1.

There will result a certain cycle for control or inspection depending on kind and function of the individual control units.

Regulating units (pressure reducers) must be checked in their circuit after maintenance work for their setting values and must be reset if required.

See to it that no air is available at the components to be disassembled or that no air can be admitted to these.

Prior to disassembly operations and where required measure and mark the position of valves, lengths of levers and lever travels of, e.g., actuators, limitations by set screws, and so on.

Do not dismantle control fittings at random since the built-in springs are sometimes prestressed. In case there is available a screw or nut for adjustment of the prestress, slacken these completely. Thoroughly clean the individual parts and exchange wear parts. During assembly slightly grease rubber rings and their sliding surfaces with the grease prescribed.

M20/M25/M32/M43/M453C/M552C/M601C

24, 6000

See also:

Spare parts list: B1.05.05.1.4900

Time requirement: 1 Pers./ 0,20 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

05

Maintenance/cleaning:

Drain compressed-air filter:	every	24 h
Disassemble and clean compressed-air filter:	initially	150 h
Disassemble and clean compressed-air filter:	every	6,000 h

Auxiliary material:

Nitro-Solvents *

* or a product of equal standard



Safety note:

Close feed air lines and depressurize air system before every disassembly!

Note:

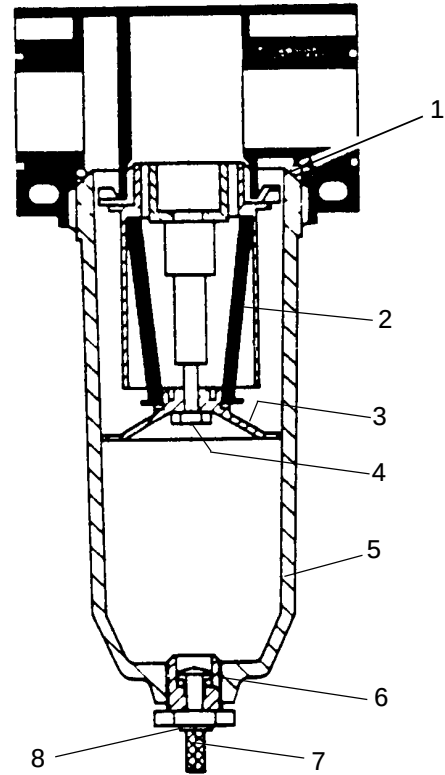
It is to be checked to what extent following units/systems (emergency stop) in the circuit are affected in their functioning by the execution of the disassembly and cleaning measures!

Sequence of operations:
1. Drain compressed-air filter

- 1.1 Loosen drain plug (7) and empty filter completely.
- 1.2 Close drain plug.

2. Disassemble compressed-air filter and clean

- 2.1 Loosen drain plug (7) and drain filter completely.
- 2.2 Close compressed-air feed line and secure.
- 2.3 Relieve compressed-air filter via drain plug.
- 2.4 Loosen housing cap (5) and remove, check O-ring (1) and replace if necessary.
- 2.5 Loosen Phillips screw (4), remove with guide (3) and filter element (2).
- 2.6 Remove locking ring (8), unscrew drain plug and check O-ring (6), replace if necessary.
- 2.7 Clean all disassembled parts and check for reuse.
- 2.8 Assemble compressed-air filter in reverse sequence. Open shut-off valve in the compressed-air supply line.
- 2.9 Close drain plug after a short while.



M25

6000

See also:

Spare parts list: B1.05.06.257210

Time requirement: 2 Pers./ 3,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

06

Inspection:

Check the exhaust manifold
for leakage every 6,000 h

Tools:

60 - 320 Nm torque wrench W1* 1.9454-320

* not illustrated

Auxiliary material:

"Dag S 5080" high temperature thread paste *

* or a product of equal standard

Note:

When carrying out this inspection, also check the exhaust piping behind the exhaust gas turbine.

If there are heavy oscillations and noises at the exhaust gas turbine, then the flange connection to the exhaust gas piping behind the turbine must be loosened and the pipe tension must be checked.

To safeguard the extension joints, they must not be subjected to bending or radial forces during removal and fitting. A small pretension (expansion; approx. 3-5 mm) is attained in an axial direction when fitting through the tightening of the expansion joints.

"Dag S 5080" high temperature thread paste must be applied to all bolts to prevent them from sticking due to the heat.

Sequence of operations:

1. Remove the covering from the exhaust manifold.



Safety note!

Careful, there is a danger of getting burnt!

Check the temperatures and let the exhaust piping cool off sufficiently before commencing work!

M25

6000

06

2. Check all screwed connections that they are properly fixed.
3. The accumulation of soot at flanges and expansion joints can indicate that there is a leakage.

Note:

Unless caused by cracks in the piping system or by loosen screwed connections, new gaskets have to be inserted, refer to 4.5.

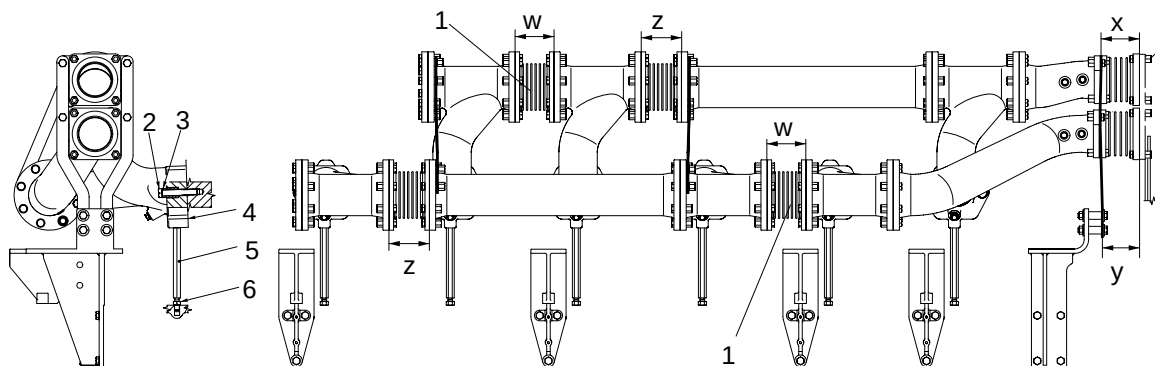
4. Replace the defective exhaust pipe:
 - 4.1 Remove the adjacent expansion joints (1).
Do not subject expansion joints to bending or radial forces!
 - 4.2 Remove the defective exhaust pipe by loosening the hexagon bolts (2) with the resilient sleeves (3).
 - 4.3 Make fitting pieces (**Fig. 1**/w, x, y or z) for fitting the new exhaust pipe.

Length of the fitting piece **w = 133 mm**
 x = 135 mm
 y = 138 mm
 z = 138 mm

- 4.4 Fix the fitting piece/fitting pieces to the new exhaust pipe.
- 4.5 Mount the new exhaust pipe. Replace the gasket (4). Insert the gasket with the strap upwards. Place the bead against the exhaust pipe flange. Tighten the hexagon bolts (2) on the cylinder head alternately in two stages using a torque wrench (W1) at a torque of

1st stage: M = 150 Nm

2nd stage: M = 250 Nm.



M25

6000

-
- 4.6 Remove the fitting piece / fitting pieces, mount the expansion joint/s.
- When fitting the expansion joint (1) pay attention to the flow-through direction marked on the flange! Do not subject expansion joints to bending or radial forces!
- Expansion joints which have cracks in the bellow must be replaced.
- 4.7 Tighten the M16 - hexagon bolts of the exhaust manifold at a torque of **M = 140 Nm**.
5. Position the holder (5) against the flange of the exhaust pipe and counter with the hexagon nut (6).
6. Replace expansion joints which have cracks in the bellows, refer to 4.6.
7. Mount the covering for the exhaust manifold.

06

M25

6000

See also:

Spare parts list: B1.05.06.257260

Time requirement: 2 Pers./ 3,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

06

Inspection:

Check the exhaust manifold for leakage	every	6,000 h
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Tools:

60 - 320 Nm torque wrench	W1*	1.9454-320
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* not illustrated

Auxiliary material:

"Dag S 5080" high temperature thread paste *

* or a product of equal standard

Note:

When carrying out this inspection, also check the exhaust piping behind the exhaust gas turbine.

If there are heavy oscillations and noises at the exhaust gas turbine, then the flange connection to the exhaust gas piping behind the turbine must be loosened and the pipe tension must be checked.

To safeguard the extension joints, they must not be subjected to bending or radial forces during removal and fitting. A small pretension (expansion; approx. 3-5 mm) is attained in an axial direction when fitting through the tightening of the expansion joints.

"Dag S 5080" high temperature thread paste must be applied to all bolts to prevent them from sticking due to the heat.

Sequence of operations:

1. Remove the covering from the exhaust manifold.



Safety note!

Careful, there is a danger of getting burnt!

Check the temperatures and let the exhaust piping cool off sufficiently before commencing work!

M25

6000

06

2. Check all screwed connections that they are properly fixed.
3. The accumulation of soot at flanges and expansion joints can indicate that there is a leakage.

Note:

Unless caused by cracks in the piping system or by loosen screwed connections, new gaskets have to be inserted, refer to 4.5.

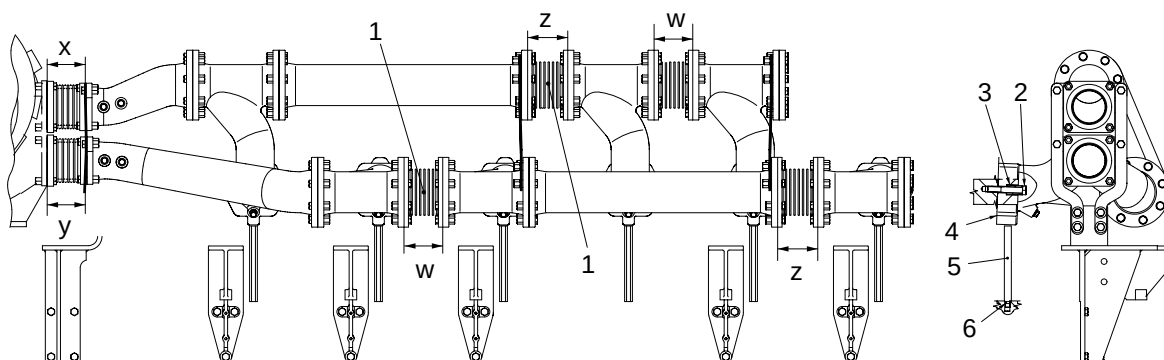
4. Replace the defective exhaust pipe:
 - 4.1 Remove the adjacent expansion joints (1).
Do not subject expansion joints to bending or radial forces!
 - 4.2 Remove the defective exhaust pipe by loosening the hexagon bolts (2) with the resilient sleeves (3).
 - 4.3 Make fitting pieces (**Fig. 1**/w, x, y or z) for fitting the new exhaust pipe.

Length of the fitting piece **w = 133 mm**
 x = 135 mm
 y = 138 mm
 z = 138 mm

- 4.4 Fix the fitting piece/fitting pieces to the new exhaust pipe.
- 4.5 Mount the new exhaust pipe. Replace the gasket (4). Insert the gasket with the strap upwards. Place the bead against the exhaust pipe flange. Tighten the hexagon bolts (2) on the cylinder head alternately in two stages using a torque wrench (W1) at a torque of

1st stage: M = 150 Nm

2nd stage: M = 250 Nm.



M25

6000

-
- 4.6 Remove the fitting piece / fitting pieces, mount the expansion joint/s.
- When fitting the expansion joint (1) pay attention to the flow-through direction marked on the flange! Do not subject expansion joints to bending or radial forces!
- Expansion joints which have cracks in the bellow must be replaced.
- 4.7 Tighten the M16 - hexagon bolts of the exhaust manifold at a torque of **M = 140 Nm**.
5. Position the holder (5) against the flange of the exhaust pipe and counter with the hexagon nut (6).
6. Replace expansion joints which have cracks in the bellows, refer to 4.6.
7. Mount the covering for the exhaust manifold.

06

M25

6000

See also:

Spare parts list: B1.05.06.257210

Time requirement: 2 Pers./ 3,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

06

Inspection:

Check the exhaust manifold for leakage	every	6,000 h
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Tools:

60 - 320 Nm torque wrench	W1*	1.9454-320
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* not illustrated

Auxiliary material:

"Dag S 5080" high temperature thread paste *

* or a product of equal standard

Note:

When carrying out this inspection, also check the exhaust piping behind the exhaust gas turbine.

If there are heavy oscillations and noises at the exhaust gas turbine, then the flange connection to the exhaust gas piping behind the turbine must be loosened and the pipe tension must be checked.

To safeguard the extension joints, they must not be subjected to bending or radial forces during removal and fitting. A small pretension (expansion; approx. 3-5 mm) is attained in an axial direction when fitting through the tightening of the expansion joints.

"Dag S 5080" high temperature thread paste must be applied to all bolts to prevent them from sticking due to the heat.

Sequence of operations:

1. Remove the covering from the exhaust manifold.



Safety note!

Careful, there is a danger of getting burnt!

Check the temperatures and let the exhaust piping cool off sufficiently before commencing work!

2. Check all screwed connections that they are properly fixed.
3. The accumulation of soot at flanges and expansion joints can indicate that there is a leakage.

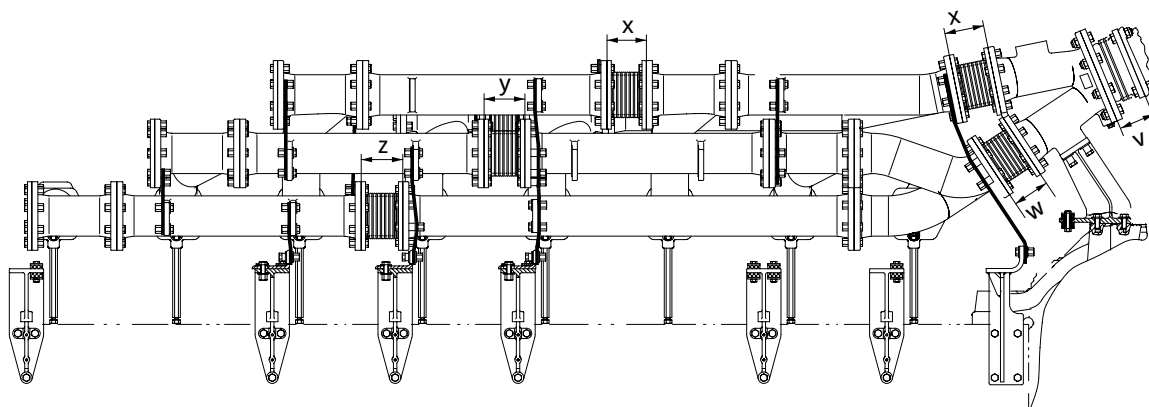
Note:

Unless caused by cracks in the piping system or by loosen screwed connections, new gaskets have to be inserted, refer to 4.5.

4. Replace the defective exhaust pipe:
 - 4.1 Remove the adjacent expansion joints .
Do not subject expansion joints to bending or radial forces!
 - 4.2 Remove the defective exhaust pipe by loosening the hexagon bolts with the resilient sleeves .
 - 4.3 Make fitting pieces (v, w, x, y, z) for fitting the new exhaust pipe.

Length of the fitting piece

- v = 124 mm**
- w = 130 mm**
- x = 138 mm**
- y = 143 mm**
- z = 146 mm**



M25

6000

06

-
- 4.4 Fix the fitting piece/fitting pieces to the new exhaust pipe.
- 4.5 Mount the new exhaust pipe. Replace the gasket. Insert the gasket with the strap upwards. Place the bead against the exhaust pipe flange. Tighten the hexagon bolts on the cylinder head alternately in two stages using a torque wrench (W1) at a torque of

1st stage: M = 150 Nm
2nd stage: M = 250 Nm.

- 4.6 Remove the fitting piece / fitting pieces, mount the expansion joint/s.
- When fitting the expansion joint pay attention to the flow-through direction marked on the flange! Do not subject expansion joints to bending or radial forces!
- Expansion joints which have cracks in the bellow must be replaced.
5. Position the holder against the flange of the exhaust pipe and counter with the hexagon nut.
6. Replace expansion joints which have cracks in the bellows, refer to 4.6.
7. Mount the covering for the exhaust manifold.

M25

6000

See also:

Spare parts list: B1.05.06.257260

Time requirement: 2 Pers./ 3,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

06

Inspection:

Check the exhaust manifold for leakage	every	6,000 h
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Tools:

60 - 320 Nm torque wrench	W1*	1.9454-320
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* not illustrated

Auxiliary material:

"Dag S 5080" high temperature thread paste *

* or a product of equal standard

Note:

When carrying out this inspection, also check the exhaust piping behind the exhaust gas turbine.

If there are heavy oscillations and noises at the exhaust gas turbine, then the flange connection to the exhaust gas piping behind the turbine must be loosened and the pipe tension must be checked.

To safeguard the extension joints, they must not be subjected to bending or radial forces during removal and fitting. A small pretension (expansion; approx. 3-5 mm) is attained in an axial direction when fitting through the tightening of the expansion joints.

"Dag S 5080" high temperature thread paste must be applied to all bolts to prevent them from sticking due to the heat.

Sequence of operations:

1. Remove the covering from the exhaust manifold.



Safety note!

Careful, there is a danger of getting burnt!

Check the temperatures and let the exhaust piping cool off sufficiently before commencing work!

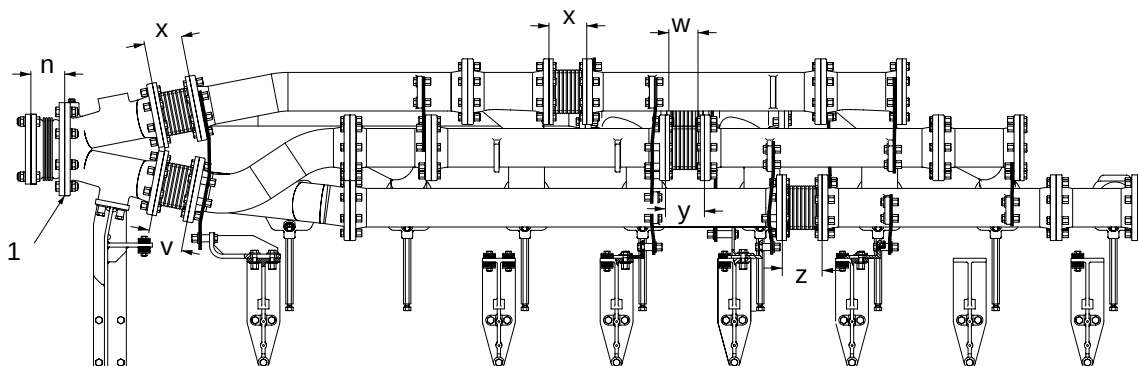
2. Check all screwed connections that they are properly fixed.
3. The accumulation of soot at flanges and expansion joints can indicate that there is a leakage.

Note:

Unless caused by cracks in the piping system or by loosen screwed connections, new gaskets have to be inserted, refer to 4.5.

4. Replace the defective exhaust pipe:
 - 4.1 Remove the adjacent expansion joints .
Do not subject expansion joints to bending or radial forces!
 - 4.2 Remove the defective exhaust pipe by loosening the hexagon bolts with the resilient sleeves .
 - 4.3 Make fitting pieces (**n, v, w, x, y, z**) for fitting the new exhaust pipe.

Length of the fitting piece **n = 124 mm, v = 130 mm, w = 133 mm**
 x = 138 mm, y = 143 mm, z = 146 mm



M25

6000

06

-
- 4.4 Fix the fitting piece/fitting pieces to the new exhaust pipe.
- 4.5 Mount the new exhaust pipe. Replace the gasket. Insert the gasket with the strap upwards. Place the bead against the exhaust pipe flange. Tighten the hexagon bolts on the cylinder head alternately in two stages using a torque wrench (W1) at a torque of
- 1st stage: M = 150 Nm**
2nd stage: M = 250 Nm
- 4.6 Remove the fitting piece / fitting pieces, mount the expansion joint/s.
- When fitting the expansion joint pay attention to the flow-through direction marked on the flange! Do not subject expansion joints to bending or radial forces!
- 4.7 Expansion joints which have cracks in the bellow must be replaced.
- 4.8 Tighten the M16 - hexagon bolts of the exhaust manifold at a torque of **M = 100 Nm.**
- 4.9 Tighten the hexagon bolts (1) at torque of **M = 200 Nm.**
5. Position the holder against the flange of the exhaust pipe and counter with the hexagon nut.
6. Mount the covering for the exhaust manifold.

M25

6000

See also:

Spare parts list: B1.05.06.257210

Time requirement: 2 Pers./ 3,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

06

Inspection:

Check the exhaust manifold for leakage	every	6,000 h
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Tools:

60 - 320 Nm torque wrench	W1*	1.9454-320
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* not illustrated

Auxiliary material:

"Dag S 5080" high temperature thread paste *

* or a product of equal standard

Note:

When carrying out this inspection, also check the exhaust piping behind the exhaust gas turbine.

If there are heavy oscillations and noises at the exhaust gas turbine, then the flange connection to the exhaust gas piping behind the turbine must be loosened and the pipe tension must be checked.

To safeguard the extension joints, they must not be subjected to bending or radial forces during removal and fitting. A small pretension (expansion; approx. 3-5 mm) is attained in an axial direction when fitting through the tightening of the expansion joints.

"Dag S 5080" high temperature thread paste must be applied to all bolts to prevent them from sticking due to the heat.

Sequence of operations:

1. Remove the covering from the exhaust manifold.



Safety note!

Careful, there is a danger of getting burnt!

Check the temperatures and let the exhaust piping cool off sufficiently before commencing work!

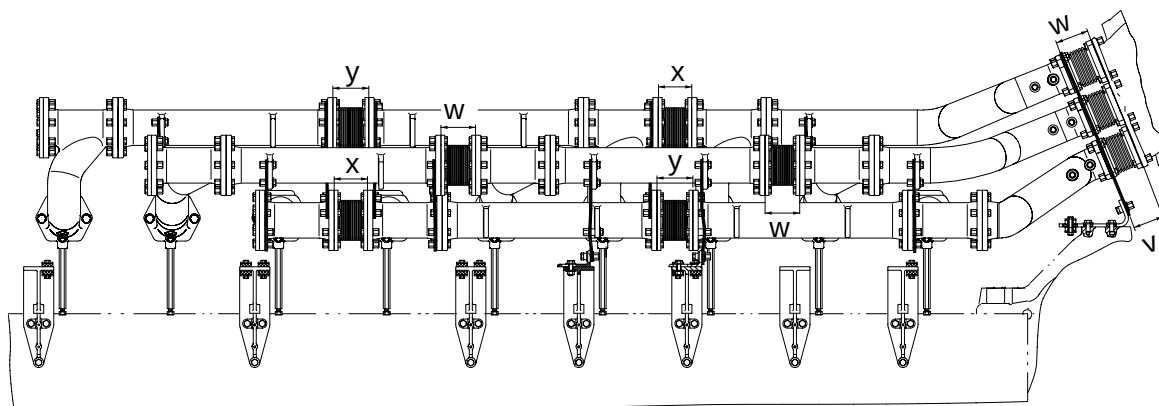
2. Check all screwed connections that they are properly fixed.
3. The accumulation of soot at flanges and expansion joints can indicate that there is a leakage.

Note:

Unless caused by cracks in the piping system or by loosen screwed connections, new gaskets have to be inserted, refer to 4.5.

4. Replace the defective exhaust pipe:
 - 4.1 Remove the adjacent expansion joints .
Do not subject expansion joints to bending or radial forces!
 - 4.2 Remove the defective exhaust pipe by loosening the hexagon bolts with the resilient sleeves .
 - 4.3 Make fitting pieces (v, w, x, y) for fitting the new exhaust pipe.

Length of the fitting piece **v = 134 mm**
 w = 138 mm
 x = 133 mm
 y = 143 mm



M25

6000

06

-
- 4.4 Fix the fitting piece/fitting pieces to the new exhaust pipe.
- 4.5 Mount the new exhaust pipe. Replace the gasket. Insert the gasket with the strap upwards. Place the bead against the exhaust pipe flange. Tighten the hexagon bolts on the cylinder head alternately in two stages using a torque wrench (W1) at a torque of

1st stage: M = 150 Nm**2nd stage: M = 250 Nm.**

- 4.6 Remove the fitting piece / fitting pieces, mount the expansion joint/s.
- When fitting the expansion joint pay attention to the flow-through direction marked on the flange! Do not subject expansion joints to bending or radial forces!
- Expansion joints which have cracks in the bellow must be replaced.
5. Position the holder against the flange of the exhaust pipe and counter with the hexagon nut.
6. Replace expansion joints which have cracks in the bellows, refer to 4.6.
7. Mount the covering for the exhaust manifold.

M25

6000

See also:

Spare parts list: B1.05.06.257260

Time requirement: 2 Pers./ 3,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

06

Inspection:

Check the exhaust manifold for leakage	every	6,000 h
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Tools:

60 - 320 Nm torque wrench	W1*	1.9454-320
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* not illustrated

Auxiliary material:

"Dag S 5080" high temperature thread paste *

* or a product of equal standard

Note:

When carrying out this inspection, also check the exhaust piping behind the exhaust gas turbine.

If there are heavy oscillations and noises at the exhaust gas turbine, then the flange connection to the exhaust gas piping behind the turbine must be loosened and the pipe tension must be checked.

To safeguard the extension joints, they must not be subjected to bending or radial forces during removal and fitting. A small pretension (expansion; approx. 3-5 mm) is attained in an axial direction when fitting through the tightening of the expansion joints.

"Dag S 5080" high temperature thread paste must be applied to all bolts to prevent them from sticking due to the heat.

Sequence of operations:

1. Remove the covering from the exhaust manifold.



Safety note!

Careful, there is a danger of getting burnt!

Check the temperatures and let the exhaust piping cool off sufficiently before commencing work!

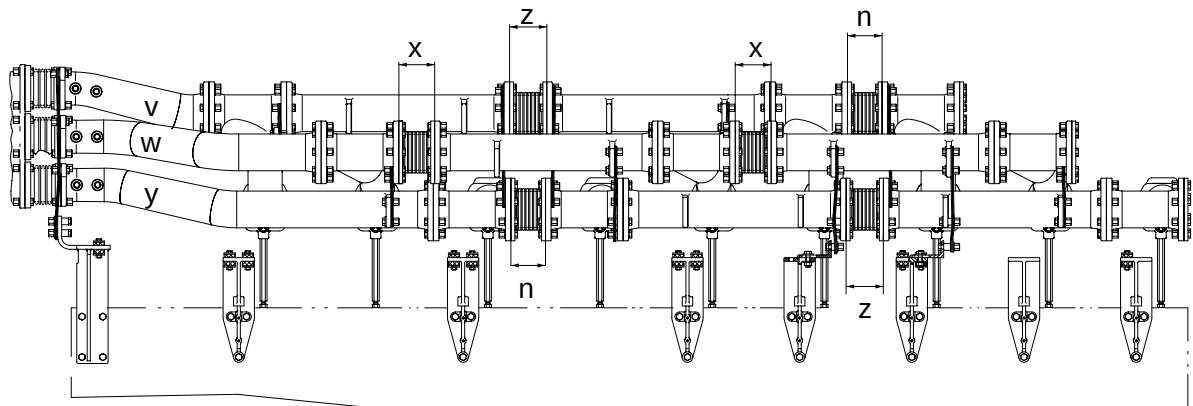
2. Check all screwed connections that they are properly fixed.
3. The accumulation of soot at flanges and expansion joints can indicate that there is a leakage.

Note:

Unless caused by cracks in the piping system or by loosen screwed connections, new gaskets have to be inserted, refer to 4.5.

4. Replace the defective exhaust pipe:
 - 4.1 Remove the adjacent expansion joints .
Do not subject expansion joints to bending or radial forces!
 - 4.2 Remove the defective exhaust pipe by loosening the hexagon bolts with the resilient sleeves .
 - 4.3 Make fitting pieces (**n, v, w, x, y, z**) for fitting the new exhaust pipe.

Length of the fitting piece **n = 133 mm, v = 134 mm, w = 137 mm**
 x = 138 mm, y = 139mm, z = 143 mm



M25

6000

06

-
- 4.4 Fix the fitting piece/fitting pieces to the new exhaust pipe.
- 4.5 Mount the new exhaust pipe. Replace the gasket. Insert the gasket with the strap upwards. Place the bead against the exhaust pipe flange. Tighten the hexagon bolts on the cylinder head alternately in two stages using a torque wrench (W1) at a torque of

1st stage: M = 150 Nm**2nd stage: M = 250 Nm**

- 4.6 Remove the fitting piece / fitting pieces, mount the expansion joint/s.
- When fitting the expansion joint pay attention to the flow-through direction marked on the flange! Do not subject expansion joints to bending or radial forces!
- Expansion joints which have cracks in the bellow must be replaced.
5. Position the holder against the flange of the exhaust pipe and counter with the hexagon nut.
6. Mount the covering for the exhaust manifold.

M25

6000

06

See also:

Spare parts list: B1.05.06.257260

Time requirement: 2 Pers./ 3,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Inspection:

Check the exhaust manifold for leakage	every	6,000 h
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Tools:

60 - 320 Nm torque wrench	W1*	1.9454-320
---------------------------	-----	------------

* not illustrated

Auxiliary material:

"Dag S 5080" high temperature thread paste *

* or a product of equal standard

Note:

When carrying out this inspection, also check the exhaust piping behind the exhaust gas turbine.

If there are heavy oscillations and noises at the exhaust gas turbine, then the flange connection to the exhaust gas piping behind the turbine must be loosened and the pipe tension must be checked.

To safeguard the extension joints, they must not be subjected to bending or radial forces during removal and fitting. A small pretension (expansion; approx. 3-5 mm) is attained in an axial direction when fitting through the tightening of the expansion joints.

"Dag S 5080" high temperature thread paste must be applied to all bolts to prevent them from sticking due to the heat.

Sequence of operations:

1. Remove the covering from the exhaust manifold.



Safety note!

Careful, there is a danger of getting burnt!

Check the temperatures and let the exhaust piping cool off sufficiently before commencing work!

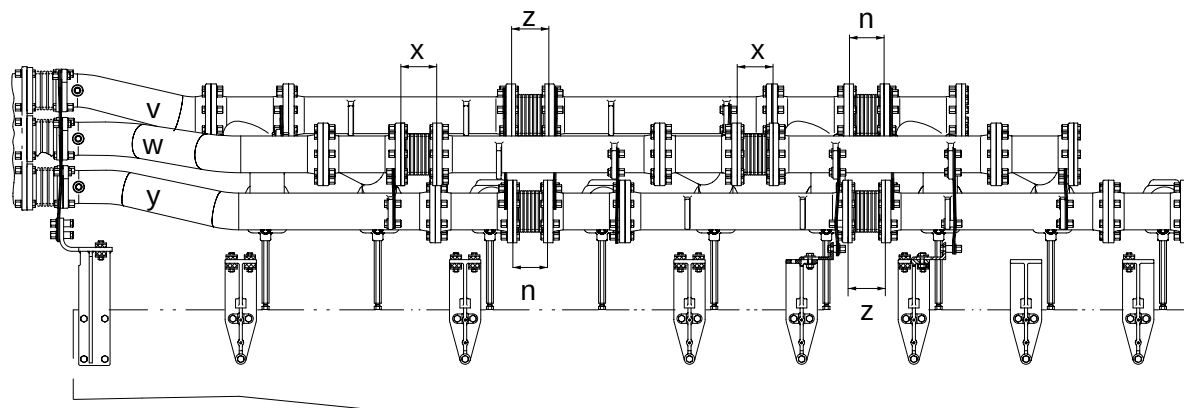
2. Check all screwed connections that they are properly fixed.
3. The accumulation of soot at flanges and expansion joints can indicate that there is a leakage.

Note:

Unless caused by cracks in the piping system or by loosen screwed connections, new gaskets have to be inserted, refer to 4.5.

4. Replace the defective exhaust pipe:
 - 4.1 Remove the adjacent expansion joints .
Do not subject expansion joints to bending or radial forces!
 - 4.2 Remove the defective exhaust pipe by loosening the hexagon bolts with the resilient sleeves .
 - 4.3 Make fitting pieces (**n, v, w, x, y, z**) for fitting the new exhaust pipe.

Length of the fitting piece **n = 133 mm, v = 146 mm, w = 149 mm**
 x = 138 mm, y = 151 mm, z = 143 mm



M25

6000

06

-
- 4.4 Fix the fitting piece/fitting pieces to the new exhaust pipe.
- 4.5 Mount the new exhaust pipe. Replace the gasket. Insert the gasket with the strap upwards. Place the bead against the exhaust pipe flange. Tighten the hexagon bolts on the cylinder head alternately in two stages using a torque wrench (W1) at a torque of

1st stage: M = 150 Nm**2nd stage: M = 250 Nm**

- 4.6 Remove the fitting piece / fitting pieces, mount the expansion joint/s.
- When fitting the expansion joint pay attention to the flow-through direction marked on the flange! Do not subject expansion joints to bending or radial forces!
- Expansion joints which have cracks in the bellow must be replaced.
5. Position the holder against the flange of the exhaust pipe and counter with the hexagon nut.
6. Mount the covering for the exhaust manifold.

M25

6000

See also:

Spare parts list: B1.05.06.257260

Time requirement: 2 Pers./ 3,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

06

Inspection:

Check the exhaust manifold for leakage	every	6,000 h
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Tools:

60 - 320 Nm torque wrench	W1*	1.9454-320
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* not illustrated

Auxiliary material:

"Dag S 5080" high temperature thread paste *

* or a product of equal standard

Note:

When carrying out this inspection, also check the exhaust piping behind the exhaust gas turbine.

If there are heavy oscillations and noises at the exhaust gas turbine, then the flange connection to the exhaust gas piping behind the turbine must be loosened and the pipe tension must be checked.

To safeguard the extension joints, they must not be subjected to bending or radial forces during removal and fitting. A small pretension (expansion; approx. 3-5 mm) is attained in an axial direction when fitting through the tightening of the expansion joints.

"Dag S 5080" high temperature thread paste must be applied to all bolts to prevent them from sticking due to the heat.

Sequence of operations:

1. Remove the covering from the exhaust manifold.


Safety note!

Careful, there is a danger of getting burnt!

Check the temperatures and let the exhaust piping cool off sufficiently before commencing work!

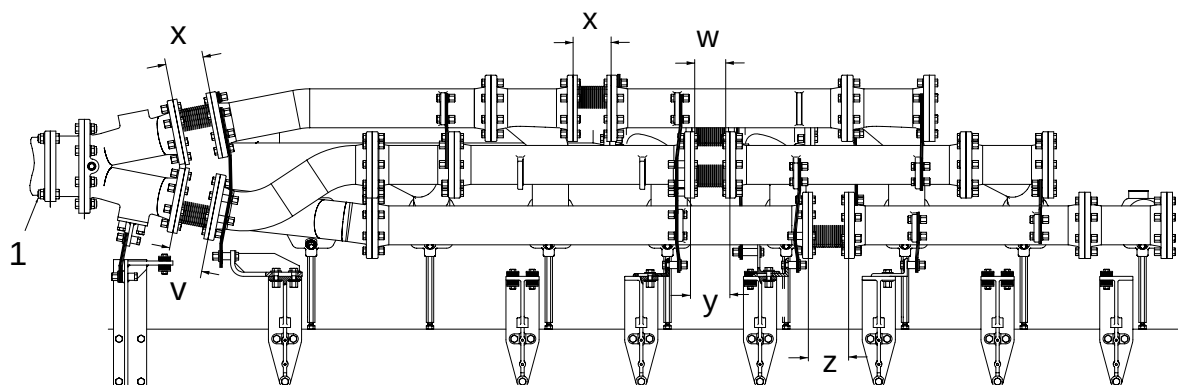
2. Check all screwed connections that they are properly fixed.
3. The accumulation of soot at flanges and expansion joints can indicate that there is a leakage.

Note:

Unless caused by cracks in the piping system or by loosen screwed connections, new gaskets have to be inserted, refer to 4.5.

4. Replace the defective exhaust pipe:
 - 4.1 Remove the adjacent expansion joints .
Do not subject expansion joints to bending or radial forces!
 - 4.2 Remove the defective exhaust pipe by loosening the hexagon bolts with the resilient sleeves .
 - 4.3 Make fitting pieces (**v, w, x, y, z**) for fitting the new exhaust pipe.

Length of the fitting piece **v = 130 mm, w = 133 mm**
 x = 138 mm, y = 143 mm, z = 146 mm



M25

6000

06

-
- 4.4 Fix the fitting piece/fitting pieces to the new exhaust pipe.
- 4.5 Mount the new exhaust pipe. Replace the gasket. Insert the gasket with the strap upwards. Place the bead against the exhaust pipe flange. Tighten the hexagon bolts on the cylinder head alternately in two stages using a torque wrench (W1) at a torque of
- 1st stage: M = 150 Nm**
2nd stage: M = 250 Nm
- 4.6 Remove the fitting piece / fitting pieces, mount the expansion joint/s.
- When fitting the expansion joint pay attention to the flow-through direction marked on the flange! Do not subject expansion joints to bending or radial forces!
- 4.7 Expansion joints which have cracks in the bellow must be replaced.
- 4.8 Tighten the M16 - hexagon bolts of the exhaust manifold at a torque of **M = 140 Nm.**
- 4.9 Tighten the hexagon bolts (1) at torque of **M = 200 Nm.**
5. Position the holder against the flange of the exhaust pipe and counter with the hexagon nut.
6. Mount the covering for the exhaust manifold.

M25

6000

See also:

Spare parts list: B1.05.06.257210

Time requirement: 2 Pers./ 3,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

06

Inspection:

Check the exhaust manifold for leakage	every	6,000 h
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Tools:

60 - 320 Nm torque wrench	W1*	1.9454-320
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* not illustrated

Auxiliary material:

"Dag S 5080" high temperature thread paste *

* or a product of equal standard

Note:

When carrying out this inspection, also check the exhaust piping behind the exhaust gas turbine.

If there are heavy oscillations and noises at the exhaust gas turbine, then the flange connection to the exhaust gas piping behind the turbine must be loosened and the pipe tension must be checked.

To safeguard the extension joints, they must not be subjected to bending or radial forces during removal and fitting. A small pretension (expansion; approx. 3-5 mm) is attained in an axial direction when fitting through the tightening of the expansion joints.

"Dag S 5080" high temperature thread paste must be applied to all bolts to prevent them from sticking due to the heat.

Sequence of operations:

1. Remove the covering from the exhaust manifold.



Safety note!

Careful, there is a danger of getting burnt!

Check the temperatures and let the exhaust piping cool off sufficiently before commencing work!

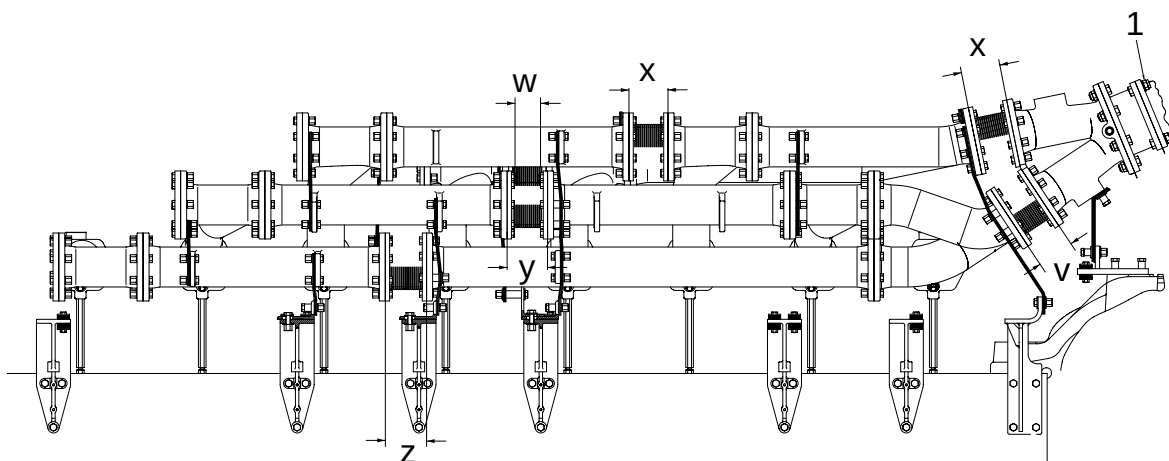
2. Check all screwed connections that they are properly fixed.
3. The accumulation of soot at flanges and expansion joints can indicate that there is a leakage.

Note:

Unless caused by cracks in the piping system or by loosen screwed connections, new gaskets have to be inserted, refer to 4.5.

4. Replace the defective exhaust pipe:
 - 4.1 Remove the adjacent expansion joints .
Do not subject expansion joints to bending or radial forces!
 - 4.2 Remove the defective exhaust pipe by loosening the hexagon bolts with the resilient sleeves .
 - 4.3 Make fitting pieces (**v, w, x, y, z**) for fitting the new exhaust pipe.

Length of the fitting piece **v = 130 mm, w = 133 mm**
 x = 138 mm, y = 143 mm, z = 146 mm



M25

6000

06

-
- 4.4 Fix the fitting piece/fitting pieces to the new exhaust pipe.
- 4.5 Mount the new exhaust pipe. Replace the gasket. Insert the gasket with the strap upwards. Place the bead against the exhaust pipe flange. Tighten the hexagon bolts on the cylinder head alternately in two stages using a torque wrench (W1) at a torque of
- 1st stage: M = 150 Nm**
2nd stage: M = 250 Nm
- 4.6 Remove the fitting piece / fitting pieces, mount the expansion joint/s.
- When fitting the expansion joint pay attention to the flow-through direction marked on the flange! Do not subject expansion joints to bending or radial forces!
- 4.7 Expansion joints which have cracks in the bellow must be replaced.
- 4.8 Tighten the M16 - hexagon bolts of the exhaust manifold at a torque of **M = 140 Nm.**
- 4.9 Tighten the hexagon bolts (1) at torque of **M = 200 Nm.**
5. Position the holder against the flange of the exhaust pipe and counter with the hexagon nut.
6. Mount the covering for the exhaust manifold.

M25

06

See also:

Spare parts list: B1.05.06.257240

Time requirement: 2 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

The charge air cooler has to be removed and cleaned at the air end when the differential pressure before/after the cooler reaches more than 1.5 times the test bed value (see acceptance test record **A1.10**).

Auxiliary material:

Cleaning material according to the recommendation of the manufacturer, e.g. from:

- Fa. Vecom GmbH, Hamburg *
- Fa. Drew Ameroid GmbH, Hamburg *
- Fa. UNITOR chemicals *

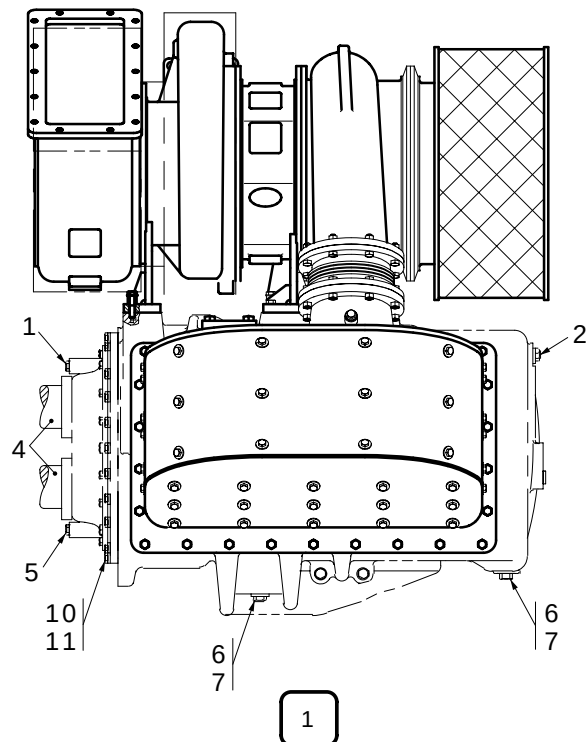
Molycote paste "G-Rapid Plus" *

* or a product of equal standard

Sequence of operations:

1. Disassembly

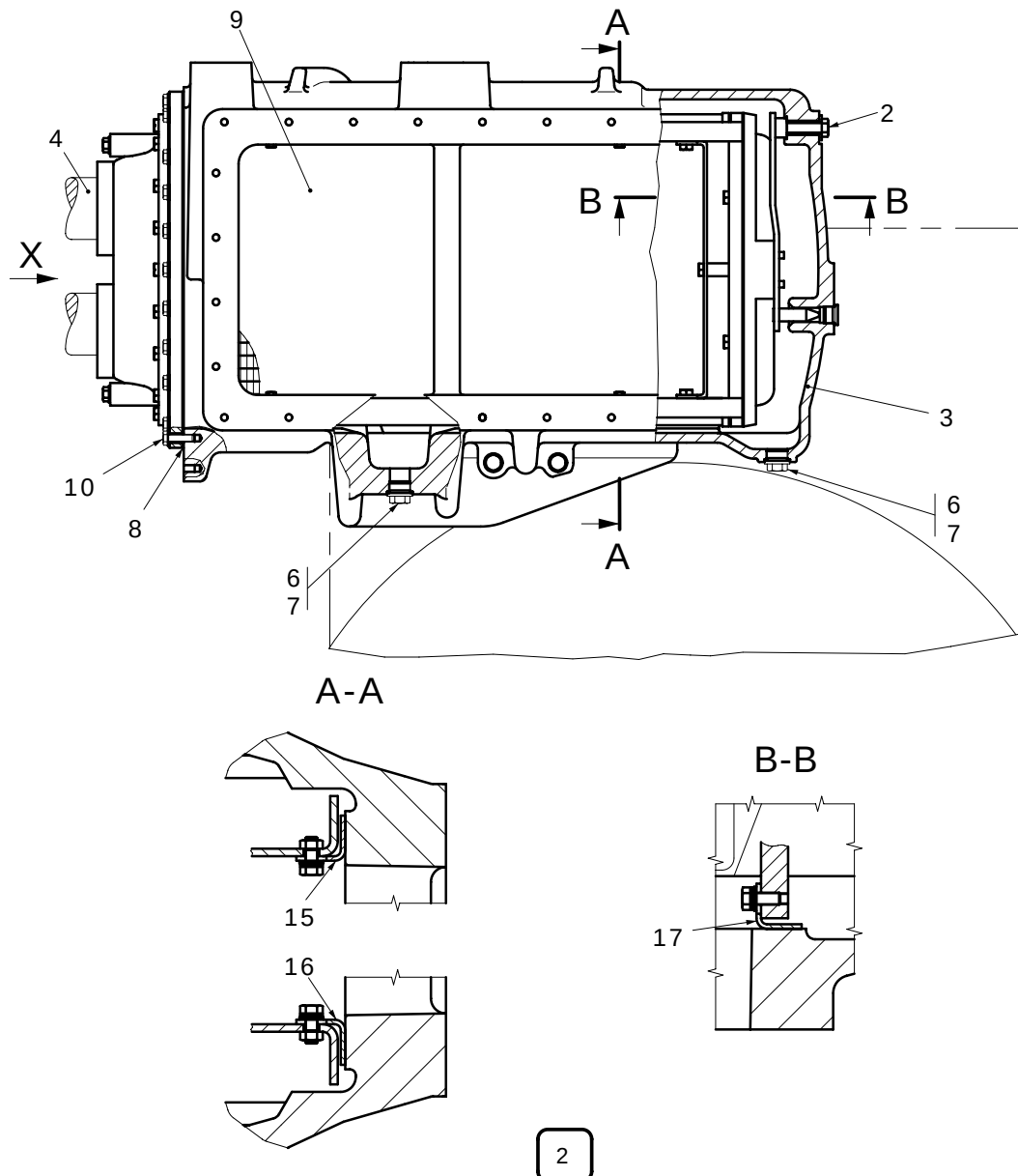
- 1.1 Loosen the vent screws (**Fig. 1/1**) or, in the case of engines with continuous ventilation, make sure that the corresponding stop cocks are opened, remove the drain plugs (5) and drain the charge air cooler.
- 1.2 Remove the cooling water feed and drain pipelines (4) from the charge air cooler.
- 1.3 Loosen the hexagon bolts (2 / 10 / 11).



M25

06

- 1.4 Pull the charge air cooler (**Fig. 2/9**) out of the housing (3) and use lifting gear to place it in a suitable vessel to be cleaned.



- 1.5 Clean the charge air cooler according to the specifications of the manufacturer (see book C, section 10).
- 1.6 Check the housing, drain the condensation water by loosening the screw plugs (6), replace the sealing rings (7) if necessary.



Safety note:

Pay close attention to the handling instructions of the manufacturer of the cleaning material used. Protect the skin against contact with the cleaning material. Wear rubber gloves, safety glasses and, if necessary, gas masks! Good ventilation must be ensured!

M25

06

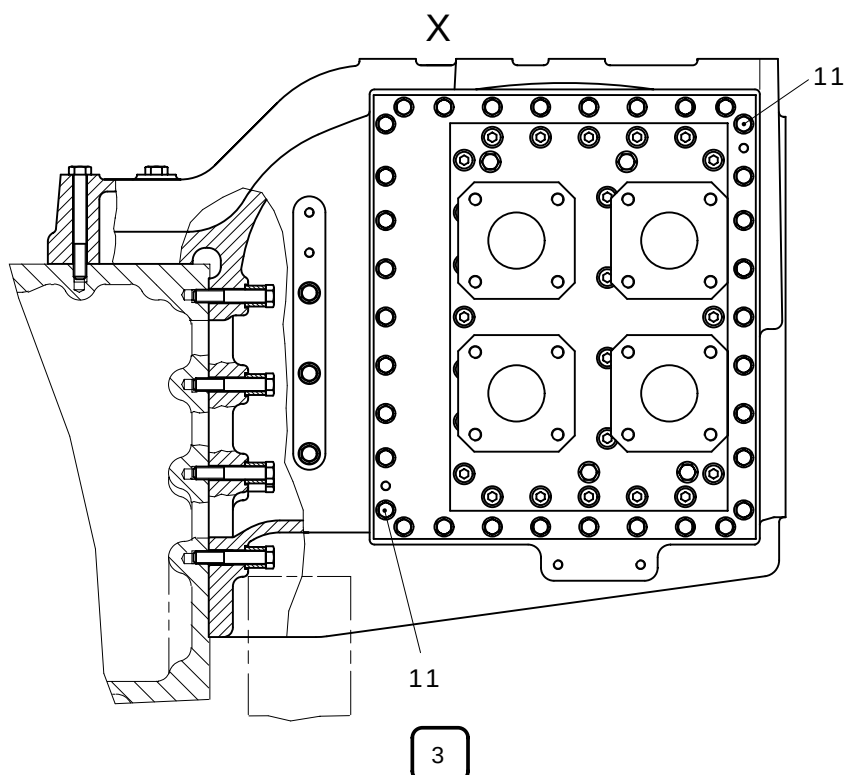
2. Reassembly

- 2.1 Reassembly in reverse sequence of disassembly.
- 2.2 Replace the seal (8).
- 2.3 Carefully place the charge air cooler (9) in the housing (3).
- 2.4 If sealing strips are fitted (15, 16 and 17) then make sure they are pressed tight. If necessary, loosen them and push them on to the housing (3).

Note:

Pay attention that the sealing strips sit properly in the housing. The sealing strips must not be adjusted.

- 2.5 Tighten the hexagon bolts (**Fig. 3/11**) first in the retaining bores.



- 2.6 Firmly tighten the hexagon bolts (2).
- 2.7 Firmly tighten the hexagon bolts (10).
- 2.8 Mount the cooling water feed and drain pipelines (**Fig. 1/4**) on the charge air cooler. Tighten the drain plugs (5) and tighten the screw plugs (6) if it has been loosened and fill-up the engine with cooling water.
- 2.9 Tighten the vent screws (1).

M25

06

See also:

Spare parts list: B1.05.06.257280

Time requirement: 2 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

The charge air cooler has to be removed and cleaned at the air end when the differential pressure before/after the cooler reaches more than 1.5 times the test bed value (see acceptance test record **A1.10**).

Auxiliary material:

Cleaning material according to the recommendation of the manufacturer, e.g. from:

- Fa. Vecom GmbH, Hamburg *
- Fa. Drew Ameroid GmbH, Hamburg *
- Fa. UNITOR chemicals *

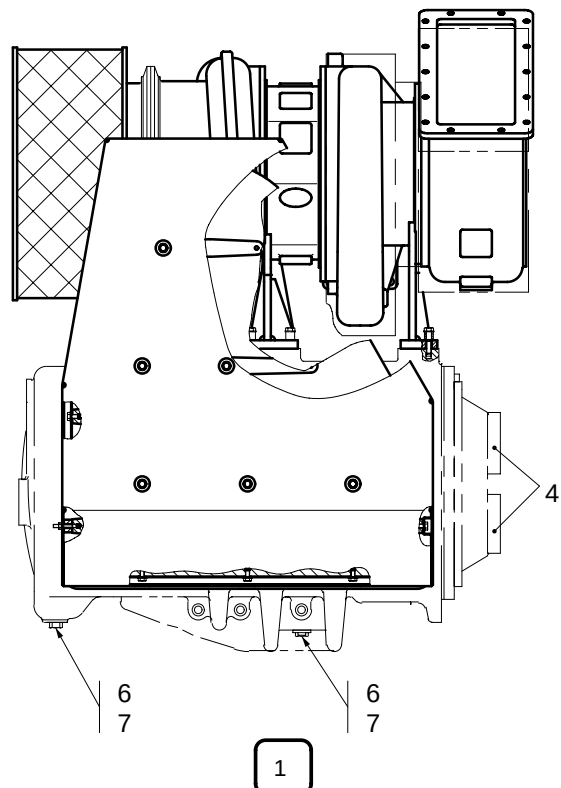
Molycote paste "G-Rapid Plus" *

* or a product of equal standard

Sequence of operations:

1. Disassembly

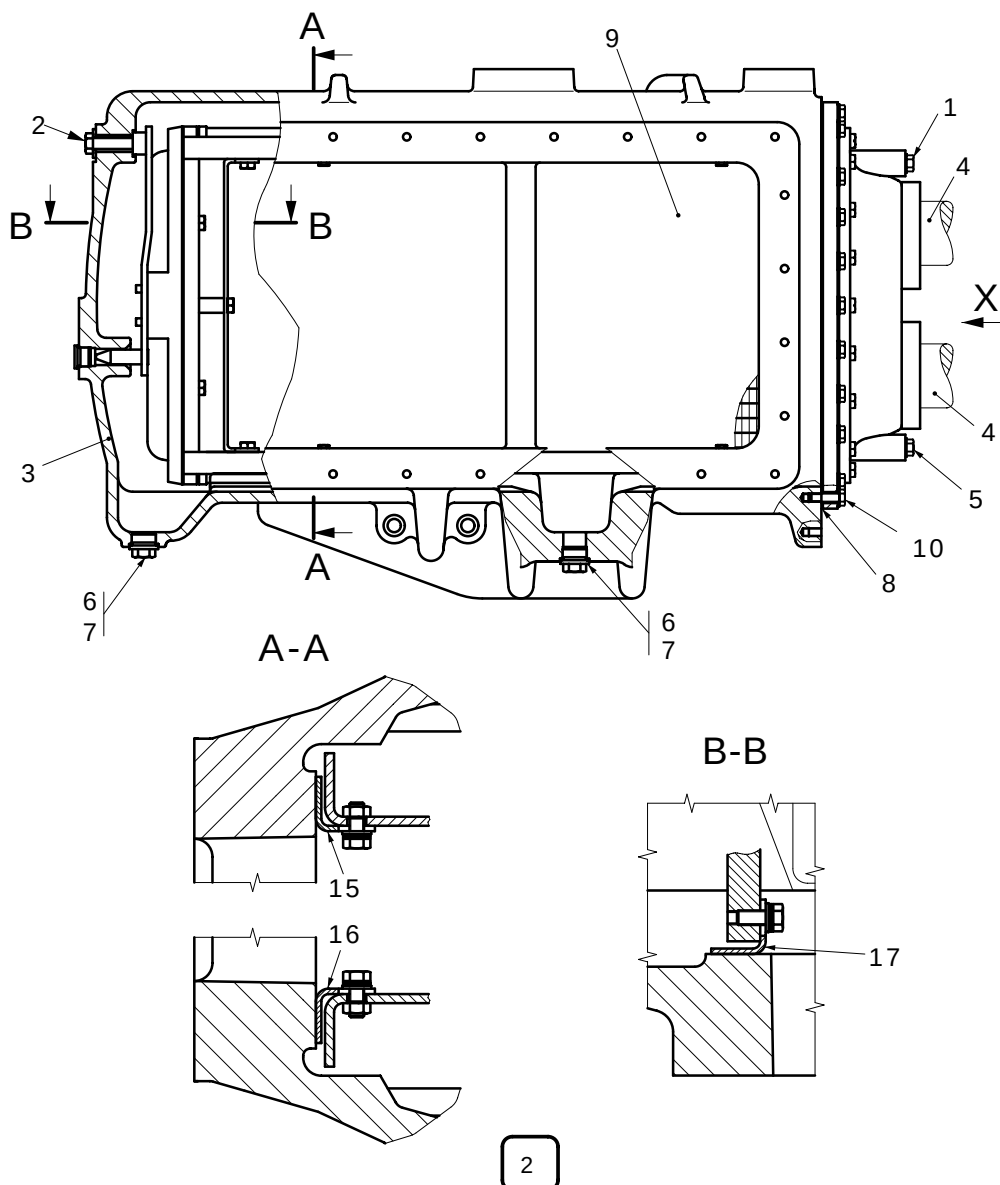
- 1.1 Loosen the vent screws (**Fig. 2/1**) or, in the case of engines with continuous ventilation, make sure that the corresponding stop cocks are opened, remove the drain plugs (5) and drain the charge air cooler.
- 1.2 Remove the cooling water feed and drain pipelines (**Fig. 1/4**) from the charge air cooler.
- 1.3 Loosen the hexagon bolts (**Fig. 2/2** and 10, **Fig. 3/11**).



M25

06

- 1.4 Pull the charge air cooler (**Fig. 2/9**) out of the housing (3) and use lifting gear to place it in a suitable vessel to be cleaned.



- 1.5 Clean the charge air cooler according to the specifications of the manufacturer (see book C, section 10).
- 1.6 Check the housing, drain the condensation water by loosening the screw plugs (6), replace the sealing rings (7) if necessary.

M25

06



Safety note:

Pay close attention to the handling instructions of the manufacturer of the cleaning material used. Protect the skin against contact with the cleaning material. Wear rubber gloves, safety glasses and, if necessary, gas masks! Good ventilation must be ensured!

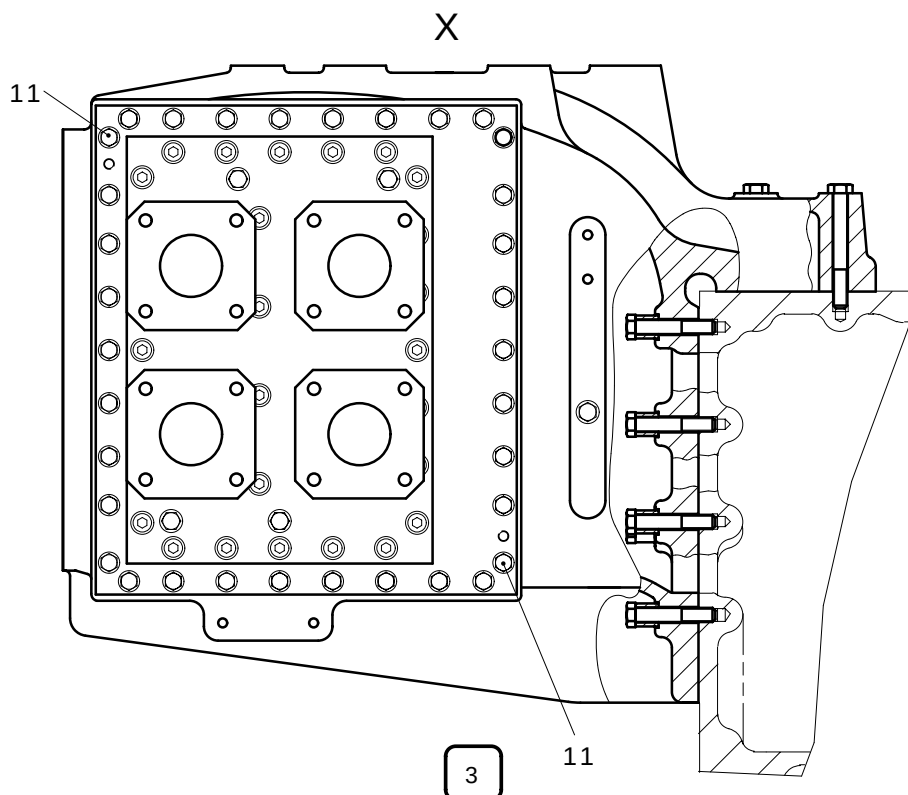
2. Reassembly

- 2.1 Reassembly in reverse sequence of disassembly.
- 2.2 Replace the seal (**Fig. 2/8**).
- 2.3 Carefully place the charge air cooler (9) in the housing (3).
- 2.4 If sealing strips are fitted (15, 16 and 17) then make sure they are pressed tight. If necessary, loosen them and push them on to the housing (3).

Note:

Pay attention that the sealing strips sit properly in the housing. The sealing strips must not be adjusted.

- 2.5 Tighten the hexagon bolts (**Fig. 3/11**) first in the retaining bores.



M25

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- 2.6 Firmly tighten the hexagon bolts (**Fig. 2/2**).
 - 2.7 Firmly tighten the hexagon bolts (10).
 - 2.8 Mount the cooling water feed and drain pipelines (4) on the charge air cooler. Tighten the drain plugs (5) and tighten the screw plugs (6) if it has been loosened and fill-up the engine with cooling water.
 - 2.9 Tighten the vent screws (1).

06

M25

06

See also:

Spare parts list: B1.05.06.257240

Time requirement: 2 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

The charge air cooler has to be removed and cleaned at the air end when the differential pressure before/after the cooler reaches more than 1.5 times the test bed value (see acceptance test record **A1.10**).

Auxiliary material:

Cleaning material according to the recommendation of the manufacturer, e.g. from:

- Fa. Vecom GmbH, Hamburg *
- Fa. Drew Ameroid GmbH, Hamburg *
- Fa. UNITOR chemicals *

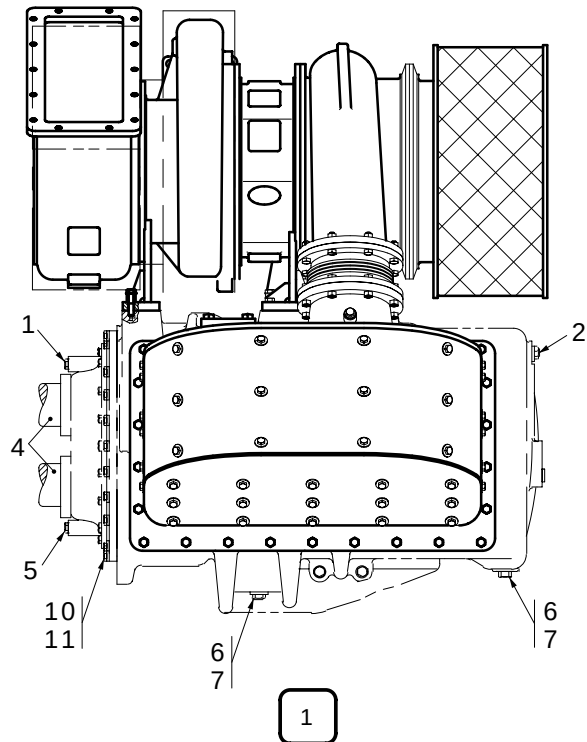
Molycote paste "G-Rapid Plus" *

* or a product of equal standard

Sequence of operations:

1. Disassembly

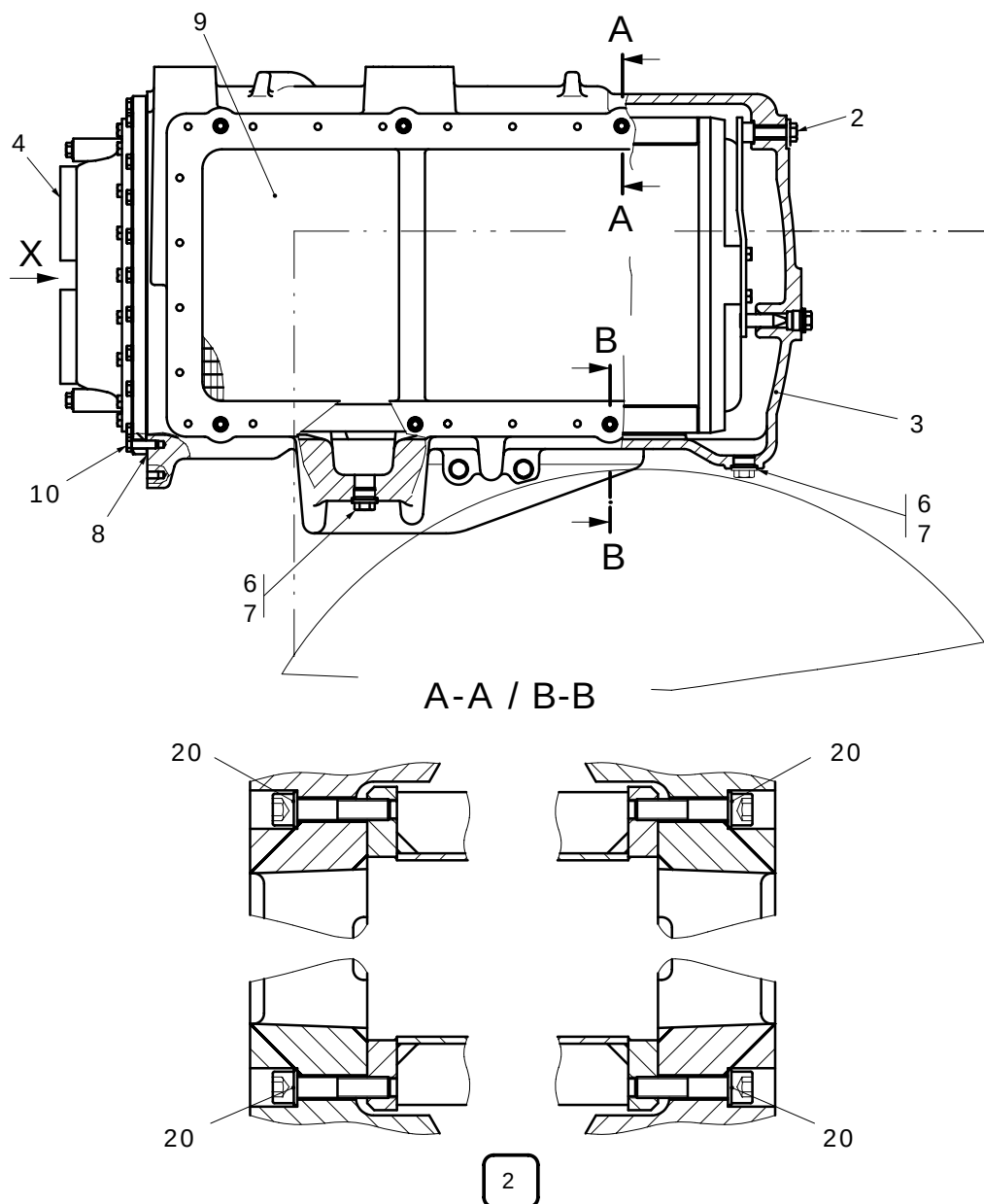
- 1.1 Loosen the vent screws (**Fig. 1/1**) or, in the case of engines with continuous ventilation, make sure that the corresponding stop cocks are opened, remove the drain plugs (5) and drain the charge air cooler.
- 1.2 Remove the cooling water feed and drain pipelines (4) from the charge air cooler.
- 1.3 Loosen the hexagon bolts (2 / 10 / 11) and the hexagon-socket head cap screws (**Fig. 2/20**).



M25

06

- 1.4 Pull the charge air cooler (**Fig. 2/9**) out of the housing (3) and use lifting gear to place it in a suitable vessel to be cleaned.



- 1.5 Clean the charge air cooler according to the specifications of the manufacturer (**see book C**).
- 1.6 Check the housing, drain the condensation water by loosening the screw plugs (6), replace the sealing rings (7) if necessary.


Safety note:

Pay close attention to the handling instructions of the manufacturer of the cleaning material used. Protect the skin against contact with the cleaning material. Wear rubber gloves, safety glasses and, if necessary, gas masks! Good ventilation must be ensured!

M25

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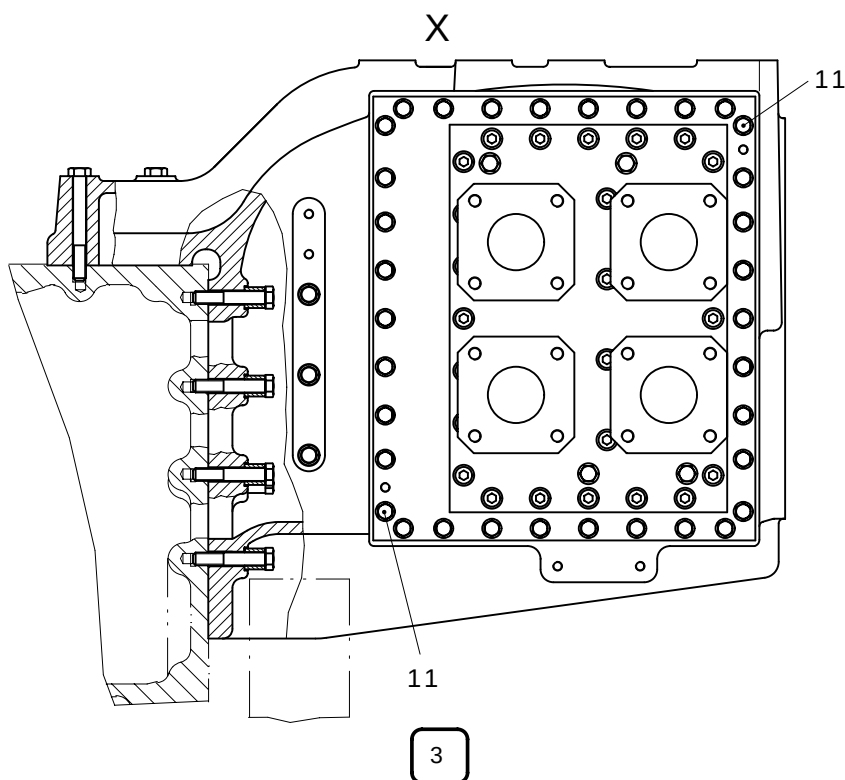
2. Reassembly

- 2.1 Reassembly in reverse sequence of disassembly.
- 2.2 Replace the seal (8).
- 2.3 Carefully place the charge air cooler (9) in the housing (3).
- 2.4 Pull the charge air cooler with socket head cap screws (**Fig. 2/20**) to the sealing face of the air inlet casing.

Attention:

Do not tighten the socket head cap screws now, but unscrew them a little bit again !

- 2.5 Tighten the hexagon bolts (**Fig. 3/11**) first in the retaining bores.



- 2.6 Firmly tighten the hexagon bolts (2).
- 2.7 Firmly tighten .
- 2.8 Mount the cooling water feed and drain pipelines (**Fig. 1/4**) on the charge air cooler. Tighten the drain plugs (5) and tighten the screw plugs (6) if it has been loosened and fill-up the engine with cooling water.
- 2.9 Tighten the vent screws (1).

M25

06

See also:

Spare parts list: B1.05.06.257280

Time requirement: 2 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

The charge air cooler has to be removed and cleaned at the air end when the differential pressure before/after the cooler reaches more than 1.5 times the test bed value (see acceptance test record **A1.10**).

Auxiliary material:

Cleaning material according to the recommendation of the manufacturer, e.g. from:

- Fa. Vecom GmbH, Hamburg *
- Fa. Drew Ameroid GmbH, Hamburg *
- Fa. UNITOR chemicals *

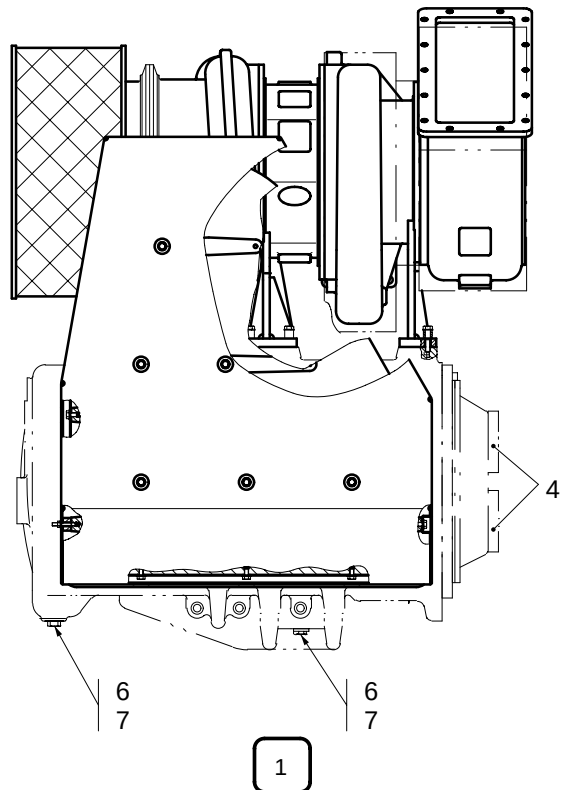
Molycote paste "G-Rapid Plus" *

* or a product of equal standard

Sequence of operations:

1. Disassembly

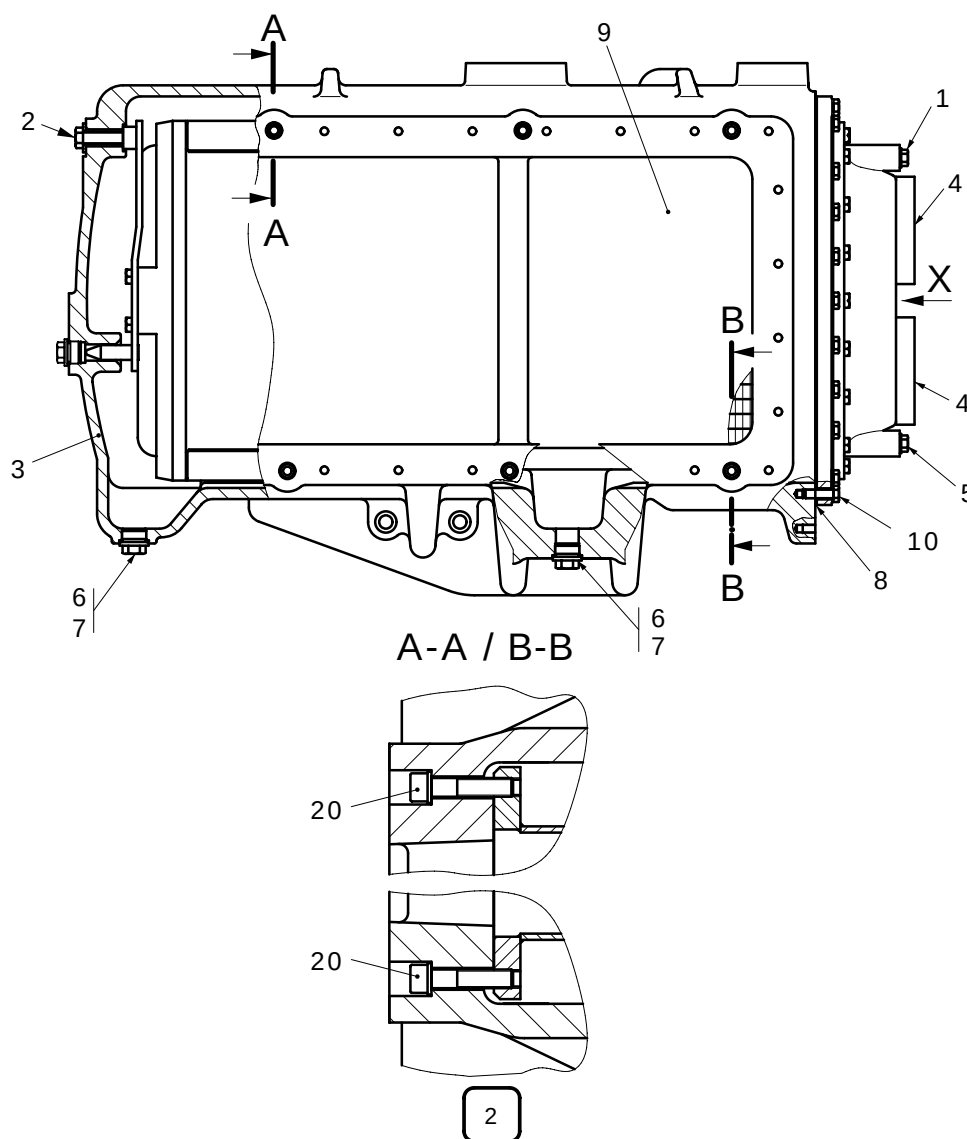
- 1.1 Loosen the vent screws (**Fig. 2/1**) or, in the case of engines with continuous ventilation, make sure that the corresponding stop cocks are opened, remove the drain plugs (5) and drain the charge air cooler.
- 1.2 Remove the cooling water feed and drain pipelines (**Fig. 1/4**) from the charge air cooler.
- 1.3 Loosen the hexagon bolts (**Fig. 2/2, 10, Fig. 3/11** and the hexagon-socket head cap screws (**Fig. 2/20**).



M25

06

- 1.4 Pull the charge air cooler (**Fig. 2/9**) out of the housing (3) and use lifting gear to place it in a suitable vessel to be cleaned.



- 1.5 Clean the charge air cooler according to the specifications of the manufacturer (see **book C**).
- 1.6 Check the housing, drain the condensation water by loosening the screw plugs (6), replace the sealing rings (7) if necessary.

M25

06



Safety note:

Pay close attention to the handling instructions of the manufacturer of the cleaning material used. Protect the skin against contact with the cleaning material. Wear rubber gloves, safety glasses and, if necessary, gas masks! Good ventilation must be ensured!

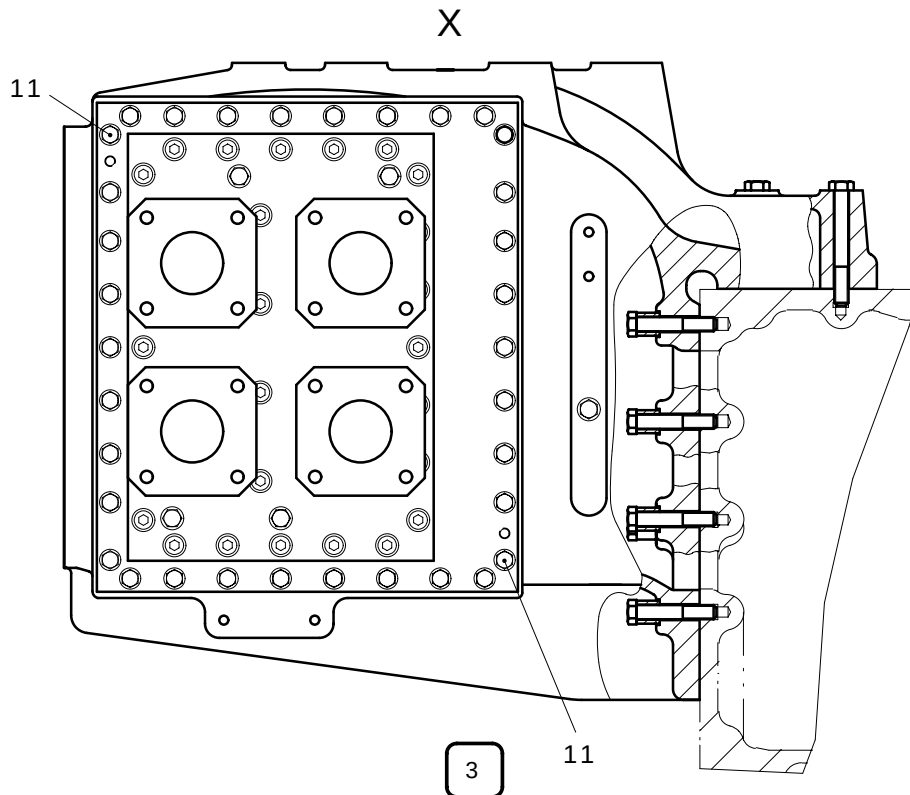
2. Reassembly

- 2.1 Reassembly in reverse sequence of disassembly.
- 2.2 Replace the seal (**Fig. 2/8**).
- 2.3 Carefully place the charge air cooler (9) in the housing (3).
- 2.4 Pull the charge air cooler with socket head cap screws (**Fig. 2/20**) to the sealing face of the air inlet casing.

Attention:

Do not tighten the socket head cap screws now, but unscrew them a little bit again !

- 2.5 Tighten the hexagon bolts (**Fig. 3/11**) first in the retaining bores.



M25

-
- 2.6 Firmly tighten the hexagon bolts (**Fig. 2/2**).
 - 2.7 Firmly tighten the socket-head cap screws (**Fig. 2/20**) so that the sealing surface of the air inlet casing.
 - 2.8 Mount the cooling water feed and drain pipelines (4) on the charge air cooler. Tighten the drain plugs (5) and tighten the screw plugs (6) if it has been loosened and fill-up the engine with cooling water.
 - 2.9 Tighten the vent screws (1).

06

M25

06

See also:

Spare parts list: B1.05.06.25725n

Time requirement: 0 Pers./ 0,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

- | | | |
|------------------------|-------|-------|
| a) Wash the compressor | every | 24 h |
| b) Wash the turbine | every | 300 h |

Maintenance of the exhaust gas turbocharger should be carried out according to the "Turbocharger Maintenance / Operation" included in **book C**.

Refer to operating instructions **A3.12.01.nn** for information concerning the emergency operation of an engine with a damaged turbocharger.

The following list gives the maintenance work which has to be carried out after the specified operating hours in the scope of the work interval schedule according to the "Turbocharger Maintenance / Operation" in **book C**.

Activity	Operating hours
Check for abnormal noises	24
Wash the compressor during operation, operate the compressor washing facility	24
Wash the turbine (exhaust side) during operation, (only by heavy fuel operation)	see 06.13.01.nn
Clean the air filter on the silencer	300
Check the retaining screws at the feet, tighten all housing screws and pipeline connections	1,200
Clean: Inner parts of the compressor, compressor impeller and guide grid	6,000
Inspection: Dismantle, clean, replace bearings Clean: Silencer and felt pads	12,000
Inspection: Check all parts	24,000

See also:

Spare parts list: B1.05.06.257259

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

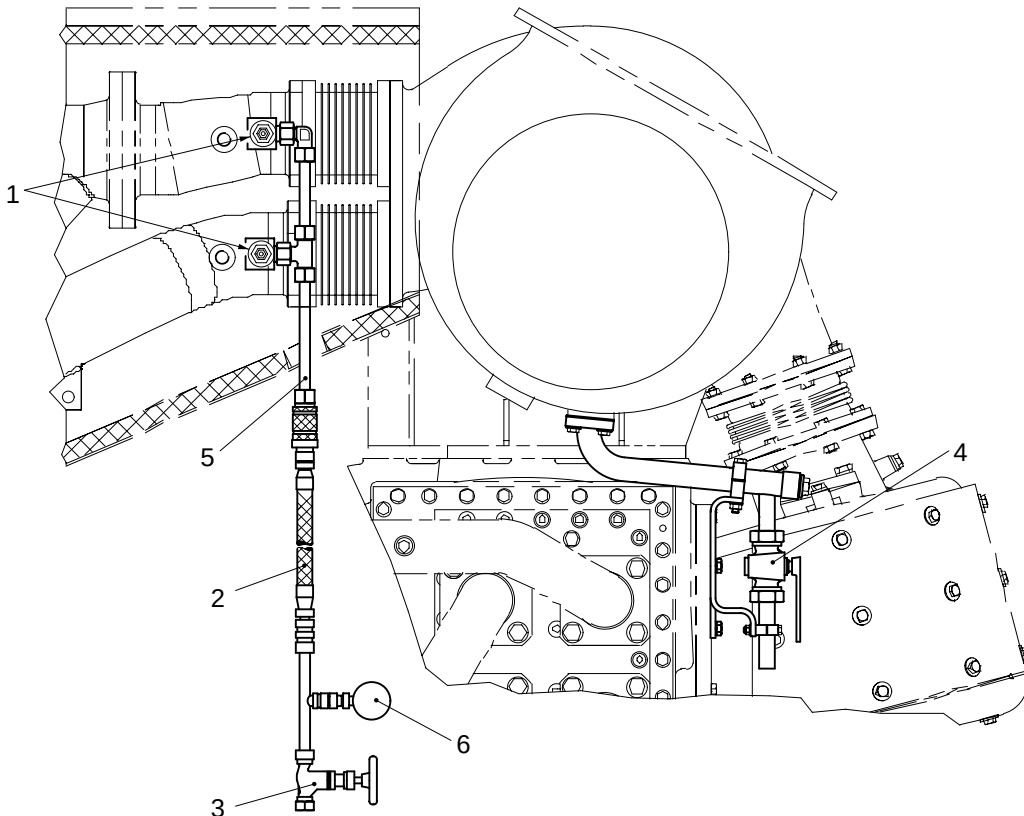
Clean the exhaust gas turbocharger every 300 h

Note:

Particularly if the engine is running on heavy fuel, deposits will form on the turbine blades decreasing the charging efficiency and increasing the bearing loads by imbalance. These deposits must be removed by injecting fresh water (without addition of detergents or solvents).

The washing intervals can only be determined by experience in operation depending on the fuel quality and operating conditions.

It must be avoided by all means water enters the exhaust manifold between the washing operations. The hose (**Fig. 1/2**) must therefore always be removed after washing.



Sequence of operations:
Note:

Before starting the cleaning read off and note the charging pressure and all exhaust gas temperatures at a reference point (75% or 100% output point).

1. Run the engine at an output of **Pe ~ 60%**
 and a speed of **n = 750 rpm**
2. Connect the cleaning pipe (**Fig. 1/5**) to the water supply (disconnectable hose (2) with shut-off valve (3)).

Attention:

Check the drain outlet of the turbocharger for obstructions. To this end open the cock (4) of the drain pipe for a short time. Exhaust gas must effuse; if necessary, push through with wire and completely remove the deposits!

If the drain line is obstructed, there is a danger that water may flow back into the engine via the exhaust manifold!

3. Reduce the engine output until the **exhaust temperature is approx. 350 °C before entering the turbine.**

Note:

Only at these temperatures will it be ensured that part of the injected water will not evaporate so that it can be drained flushing the dirt out.

4. Open the valves (1) and (3). Set the water pressure at 1.5 bar (pressure gauge [6]) and check the water coming out of the drain (4).


Safety note!

Careful, there is a danger of getting burnt!

The water comes out at a temperature of $\geq 70\text{ °C}$!

5. Keep checking the drain (4) for obstructions during the washing process. If it is blocked by dissolved larger deposits, use a wire to free the drain.
6. Adjust the engine output to approx. 30 - 50 % of the added water volume should flow out again.

M25

300

06

7. Make a note of the adjusted engine speed, fuel rack position and exhaust temperature for the subsequent washing procedures.

Washing duration	15 - 20 minutes	
Water pressure	1,5 bar	
Type of engine	M25	6 cyl. engine
Diameter of nozzles	mm	3,5
Water volume per gas inlet	l/min	6

8. Remove the hose (**Fig. 1/2**) with pressure gauge (6) and shut-off valve (3) after water has been injected.
9. **Continue running the engine at the same speed for another 10-15 minutes so that all parts dry. Then slowly increase the output up to the chosen reference point.**

Note:

The success of the cleaning can be verified on the change in pressure and the decrease in exhaust gas temperatures. The charging pressure and the exhaust gas temperatures at the reference point must come close to the values of the acceptance test certificate. If necessary, repeat the cleaning process.

See also:

Spare parts list: B1.05.06.257259

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

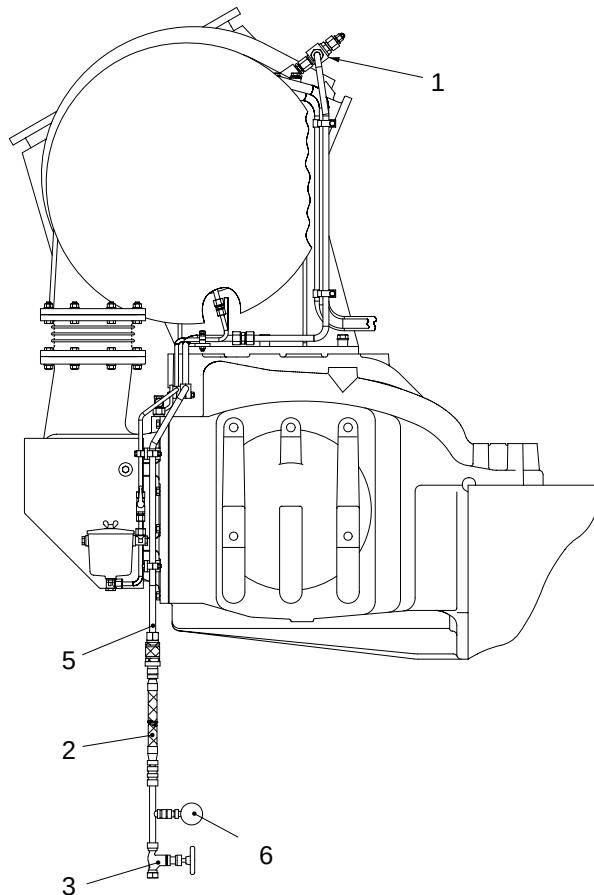
Clean the exhaust gas turbocharger	every	300 h
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Note:

Particularly if the engine is running on heavy fuel, deposits will form on the turbine blades decreasing the charging efficiency and increasing the bearing loads by imbalance. These deposits must be removed by injecting fresh water (without addition of detergents or solvents).

The washing intervals can only be determined by experience in operation depending on the fuel quality and operating conditions.

It must be avoided by all means water enters the exhaust manifold between the washing operations. The hose (**Fig. 1/2**) must therefore always be removed after washing.



Sequence of operations:
Note:

Before starting the cleaning read off and note the charging pressure and all exhaust gas temperatures at a reference point (75% or 100% output point).

1. Run the engine at an output of **$P_e \sim 60\%$**
 and a speed of **$n = 750 \text{ rpm}$**
2. Connect the cleaning pipe (**Fig. 1/5**) to the water supply (disconnectable hose (2) with shut-off valve (3)).

Attention:

Check the drain outlet of the turbocharger for obstructions. To this end open the cock of the drain pipe for a short time. Exhaust gas must effuse; if necessary, push through with wire and completely remove the deposits!
If the drain line is obstructed, there is a danger that water may flow back into the engine via the exhaust manifold!

3. Reduce the engine output until the **exhaust temperature is approx. 350 °C before entering the turbine.**

Note:

Only at these temperatures will it be ensured that part of the injected water will not evaporate so that it can be drained flushing the dirt out.

4. Open the valves (1) and (3). Set the water pressure at 1.5 bar (pressure gauge [6]) and check the water coming out of the drain.


Safety note!

Careful, there is a danger of getting burnt!
The water comes out at a temperature of $\geq 70 \text{ °C}$!

5. Keep checking the drain for obstructions during the washing process. If it is blocked by dissolved larger deposits, use a wire to free the drain.
6. Adjust the engine output to approx. 30 - 50 % of the added water volume should flow out again.

M25

300

7. Make a note of the adjusted engine speed, fuel rack position and exhaust temperature for the subsequent washing procedures.

06

Washing duration	15 - 20 minutes	
Water pressure	1.5 bar	
Type of engine	M25	8 cyl.engine
Diameter of nozzles	mm	3,5
Water volume per gas inlet	l/min	6

8. Remove the hose (**Fig. 1/2**) with pressure gauge (6) and shut-off valve (3) after water has been injected.
9. **Continue running the engine at the same speed for another 10-15 minutes so that all parts dry. Then slowly increase the output up to the chosen reference point.**

Note:

The success of the cleaning can be verified on the change in pressure and the decrease in exhaust gas temperatures. The charging pressure and the exhaust gas temperatures at the reference point must come close to the values of the acceptance test certificate. If necessary, repeat the cleaning process.

See also:

Spare parts list: B1.05.06.257259

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

Clean the exhaust gas turbocharger every 300 h

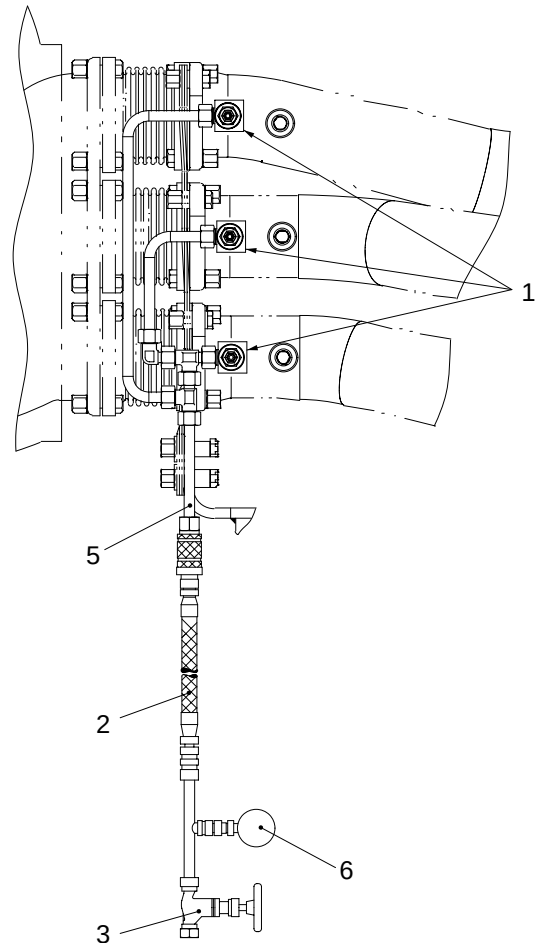
Note:

Particularly if the engine is running on heavy fuel, deposits will form on the turbine blades decreasing the charging efficiency and increasing the bearing loads by imbalance.

These deposits must be removed by injecting fresh water (without addition of detergents or solvents).

The washing intervals can only be determined by experience in operation depending on the fuel quality and operating conditions.

It must be avoided by all means water enters the exhaust manifold between the washing operations. The hose (Fig. 1/2) must therefore always be removed after washing.



Sequence of operations:
Note:

Before starting the cleaning read off and note the charging pressure and all exhaust gas temperatures at a reference point (75% or 100% output point).

1. Run the engine at an output of **Pe ~ 60%**
and a speed of **n = 750 rpm**

Note:

The speed **n** is correct only for generator operation !

2. Connect the cleaning pipe (**Fig. 1/5**) to the water supply (disconnectable hose (2) with shut-off valve (3).

Attention:

Check the drain outlet of the turbocharger for obstructions. To this end open the cock of the drain pipe for a short time. Exhaust gas must effuse; if necessary, push through with wire and completely remove the deposits!

If the drain line is obstructed, there is a danger that water may flow back into the engine via the exhaust manifold!

3. Reduce the engine output until the **exhaust temperature is approx. 350 °C before entering the turbine.**

Note:

Only at these temperatures will it be ensured that part of the injected water will not evaporate so that it can be drained flushing the dirt out.

4. Open the valves (1) and (3). Set the water pressure at 1.5 bar (pressure gauge [6]) and check the water coming out of the drain.


Safety note!

Careful, there is a danger of getting burnt!

The water comes out at a temperature of $\geq 70\text{ °C}$!

5. Keep checking the drain for obstructions during the washing process. If it is blocked by dissolved larger deposits, use a wire to free the drain.
6. Adjust the engine output to approx. 30 % , approx. 30- 50 % of the added water volume should flow out again.

M25

300

06

7. Make a note of the adjusted engine speed, fuel rack position and exhaust temperature for the subsequent washing procedures.

Washing duration	15 - 20 minutes	
Water pressure	1.5 bar	
Type of engine	M25	9 cyl. engine
Diameter of nozzles	mm	3.5
Water volume per gas inlet	l/min	6

8. Remove the hose (**Fig. 1/2**) with pressure gauge (6) and shut-off valve (3) after water has been injected.
9. **Continue running the engine at the same speed for another 10-15 minutes so that all parts dry. Then slowly increase the output up to the chosen reference point.**

Note:

The success of the cleaning can be verified on the change in pressure and the decrease in exhaust gas temperatures. The charging pressure and the exhaust gas temperatures at the reference point must come close to the values of the acceptance test certificate. If necessary, repeat the cleaning process.

M25

300

See also:

Spare parts list: B1.05.06.257259

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

06

Maintenance:

Clean the exhaust gas turbocharger every 300 h

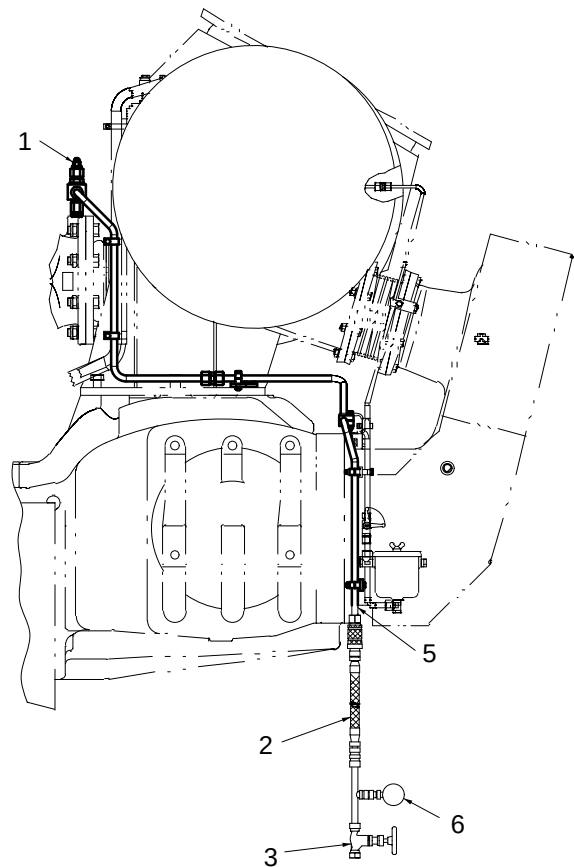
Note:

Particularly if the engine is running on heavy fuel, deposits will form on the turbine blades decreasing the charging efficiency and increasing the bearing loads by imbalance.

These deposits must be removed by injecting fresh water (without addition of detergents or solvents).

The washing intervals can only be determined by experience in operation depending on the fuel quality and operating conditions.

It must be avoided by all means water enters the exhaust manifold between the washing operations. The hose (Fig. 1/2) must therefore always be removed after washing.



Sequence of operations:

Note:

Before starting the cleaning read off and note the charging pressure and all exhaust gas temperatures at a reference point (75% or 100% output point).

1. Run the engine at an output of **Pe ~ 60%**
and a speed of **n = 750 rpm**

Note:

The speed **n** is correct only for generator operation !

2. Connect the cleaning pipe (**Fig. 1/5**) to the water supply (disconnectable hose (2) with shut-off valve (3).

Attention:

Check the drain outlet of the turbocharger for obstructions. To this end open the cock of the drain pipe for a short time. Exhaust gas must effuse; if necessary, push through with wire and completely remove the deposits!

If the drain line is obstructed, there is a danger that water may flow back into the engine via the exhaust manifold!

3. Reduce the engine output until the **exhaust temperature is approx. 350 °C before entering the turbine.**

Note:

Only at these temperatures will it be ensured that part of the injected water will not evaporate so that it can be drained flushing the dirt out.

4. Open the valves (1) and (3). Set the water pressure at 1.5 bar (pressure gauge [6]) and check the water coming out of the drain.



Safety note!

Careful, there is a danger of getting burnt!

The water comes out at a temperature of $\geq 70\text{ °C}$!

5. Keep checking the drain for obstructions during the washing process. If it is blocked by dissolved larger deposits, use a wire to free the drain.
6. Adjust the engine output to approx. 30 % , approx. 30- 50 % of the added water volume should flow out again.

M25

300

06

7. Make a note of the adjusted engine speed, fuel rack position and exhaust temperature for the subsequent washing procedures.

Washing duration	15 - 20 minutes	
Water pressure	1.5 bar	
Type of engine	M25	8 cyl. engine
Diameter of nozzles	mm	3.5
Water volume per gas inlet	l/min	6

8. Remove the hose (**Fig. 1/2**) with pressure gauge (6) and shut-off valve (3) after water has been injected.
9. **Continue running the engine at the same speed for another 10-15 minutes so that all parts dry. Then slowly increase the output up to the chosen reference point.**

Note:

The success of the cleaning can be verified on the change in pressure and the decrease in exhaust gas temperatures. The charging pressure and the exhaust gas temperatures at the reference point must come close to the values of the acceptance test certificate. If necessary, repeat the cleaning process.

M25

07

See also: 07.03.01.nn, 07.07.01.nn, 07.15.01.nn

Spare parts list: B1.05.04.253580, B1.05.07.258510, B1.05.07.258540, B1.05.08.258480

Time requirement: 1 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

60 - 320 Nm torque wrench
Reversible ratchet 3/4
Adapter (3/4 to 1/2)
Tubular box wrench, indicator valve

W1 *	1.9454-320
W2 *	1.9495-036
W3 *	1.9459-035
W4 *	1.9100-060

* not illustrated

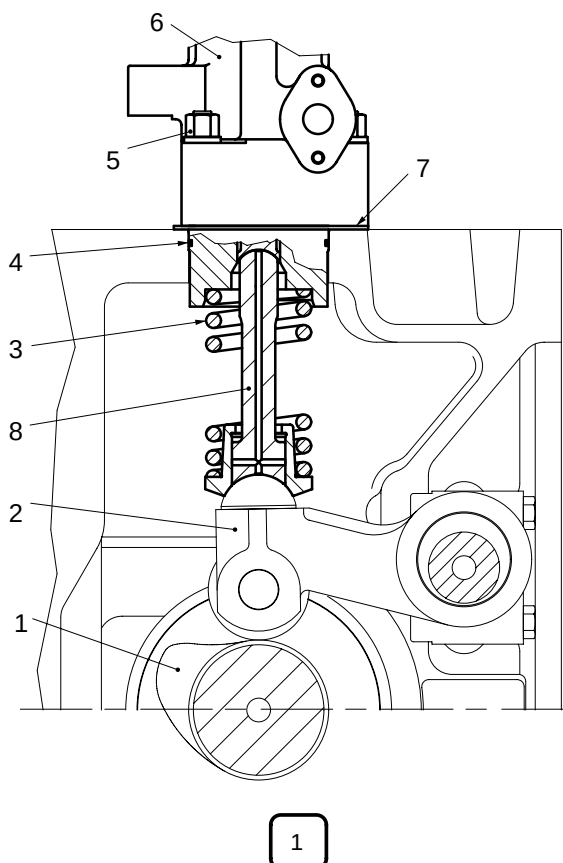
Auxiliary material:

Molykote paste "G-Rapid Plus" **

** or a product of equal standard

Sequence of operations:

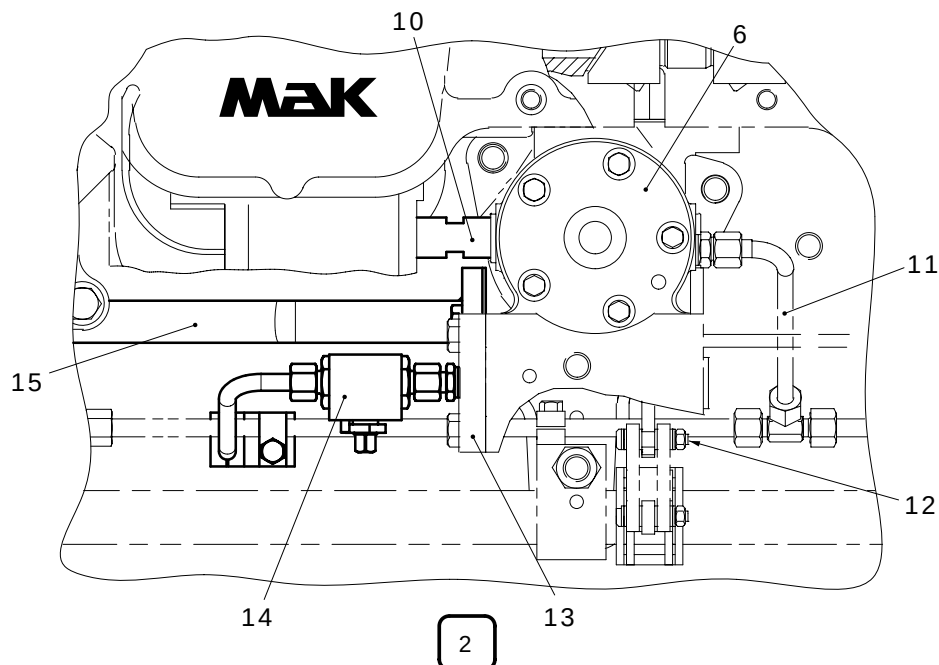
- 1. Disassembly**
 - 1.1 Open the indicator valves.
 - 1.2 Remove the camshaft cover with housing covers and gaskets at the control and.
 - 1.3 Turn over the engine so that the rocker arm (**Fig. 1/ 2**) of the corresponding injection pump drive rests on the base circle of the injection cam (1).



M25

- 1.4 Close the stop cocks, open the ball valve (**Fig. 2/14**) and drain the fuel distributor- collector pipeline.

07

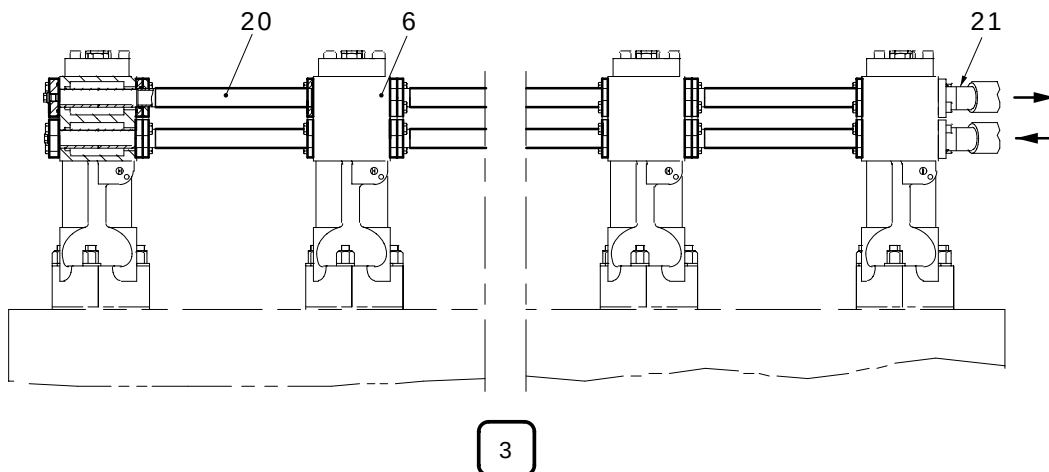


- 1.5 Remove the pipe connections on the injection pump:
- 1.5.1 Loosen the hexagon bolts for the leakage pipelines on both sides of the injection pump (6) and pull the flange off the injection pump. Check the O-rings and gaskets and replace them if necessary.

Note:

Remove the connecting flange from the outer injection pumps / loosen the flange for the leakage oil pipeline (15).

- 1.5.2 Remove the leakage fuel pipeline (11) for the injection pump.
- 1.5.3 Remove the fuel distributor / collector pipeline (**Fig. 3/20**) (**07.15.01.nn**).



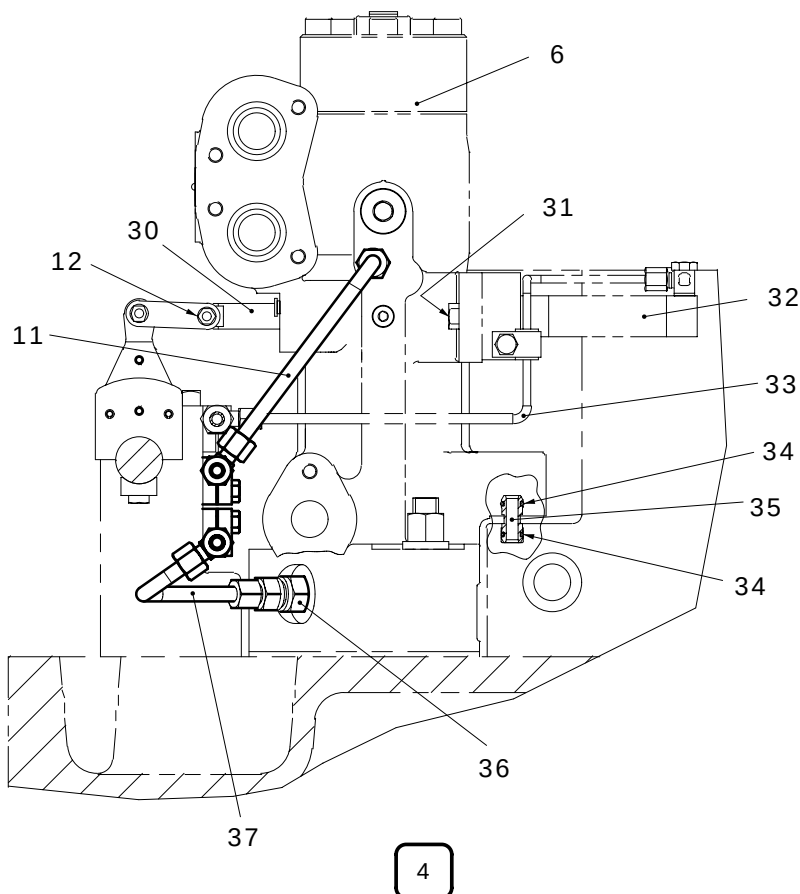
M25

07

Note:

Remove the flange (**Fig. 2/13**) for the ball valve (14) / the flange for the fuel filter pipelines (**Fig. 3/21**) on the outer injection pumps. Check the gaskets and replace them if necessary.

- 1.6 Push the sleeve (**Fig. 2/10**) into the cylinder head housing and remove the transverse pressure pipe for the injection pressure pipeline (**07.07.01.nn**).
- 1.7 Loosen the screwed connection (12) and disconnect the connection between the injection pump control rod (**Fig. 4/30**) and the control shaft.



- 1.8 Push the control rod (30) into the injection pump (6) as far as it goes.
- 1.9 Remove the hexagon bolt (31) for the stop cylinder (32).



Safety note:

Careful! The spring tension of the injection pump drive acts against the injection pump. When disassembling, the rocker arm (Fig. 1/2**) of the injection pump drive must rest on the base circle of the injection cam (1). Turn over the engine if necessary.**

M25

07

-
- 1.10 Remove the control air pipeline (**Fig. 4/37**).

Note:

Only remove the check valve (36) if the injection pump is to be replaced.

- 1.11 **Loosen** the nuts (**Fig. 1/5**) **evenly**. Lift the injection pump (6) off the cylinder cankcase and remove the sleeve (**Fig. 4/35**) with O-rings (34).
-

Attention:

The distance plates (Fig. 1/7) belonging to the cylinder are secured with semi-circular grooved drive studs and must not be removed.

2. Reassembly

- 2.1 Check that the choke pipes are firmly in position (**07.15.01.nn**).
- 2.2 Clean the contact surfaces of the injection pump (6) and the distance plates (7) as well as the contact surface of the pressure spring (3) and the compression rod (8) in the injection pump.
- 2.3 Mount the sleeve (**Fig. 4/35** with new O-rings (34).
- 2.4 Replace the O-ring (**Fig. 1/4**) and place the injection pump above the retaining screws. Insert the compression rod (8) and pressure spring (3) in the locating hole of the injection pump.

Note:

For assembly, the rocker arm (2) of the injection pump drive must rest on the base circle of the injection cam (1). Turn over the engine if necessary.


Safety note:

Careful! The spring tension of the injection pump drive acts against the injection pump.

- 2.5 Remove the turning rod/disengage the turning device.
- 2.6 Apply Molykote paste to the thread and contact surfaces of the nuts (5) and fix the injection pump on its seat by evenly and alternately tightening the nuts.
- 2.7 Tighten the nuts (5) at a torque

M = 200 Nm.

M25

07

-
- 2.8 Mount the stop cylinder (**Fig. 4/32**) together with the hexagon bolt (31).
 - 2.9 Screw the control shaft to the control rod (30) of the injection pump. **Check smooth movement of link before tightening the screwed connection (12).**
 - 2.10 Mount the control air pipeline (37) and, the check valve (36) if it has been removed.
 - 2.11 Insert the transverse pressure pipe for the injection pressure pipeline (**07.07.01.nn**) and the sleeve (**Fig. 2/10**) in the injection pump housing (lock-in position).
 - 2.12 Mount the pipeline connections for the injection pump in the reverse sequence of disassembly.
 Replace defective O-rings and sealing rings/rod seal.
 Mount the fuel distributor / collector pipeline (**Fig. 3/20**) (**07.15.01.nn**).
 - 2.13 Check the compressed air pipelines (**Fig. 4/33**) for the stop cylinder (32) for leakage by means of compressed air and the emergency stop system (function of the stop cylinders).
 - 2.14 Check the seals and mount the camshaft cover at the control end.
 - 2.15 Open the stop cocks, close the ball valve (**Fig. 2/14**), fill the fuel system with the stand-by pump, vent and close the indicator valves.

M25

12000, 24000

07

See also: 07.02.01.nn

Spare parts list: B1.05.07.253597

Time requirement: 2 Pers./ 2,00 h

Personnel qualification: skilled engine hand

Operating medium: Distillate fuel

Inspection:

of one injection pump	every	12,000 h
of all injection pumps	every	24,000 h

Tools:

60 - 320 Nm torque wrench	W1 *	1.9454-320
Reversible ratchet	W2 *	1.9495-036
Adapter (3/4 to 1/2)	W3 *	1.9459-035

* not illustrated

Auxiliary material:

Loctite 273 **

Hot bearing grease **

** or a product of equal standard

Note:

All parts of the injection pump are manufactured with utmost precision in special workshops. This is the only guarantee for proper functioning. When repairing a pump, make sure that the various parts of one pump, e.g. the control sleeve remain allocated to the **respective** housing. A renewal or exchange of the parts will considerably influence the fuel delivery. The pump must therefore be reset on the test rig.

The pump plunger (**Fig. 1/6**) and the plunger barrel (5) are only allowed to be replaced together. In order to keep repair costs low, any pump elements to be reconditioned should only be shipped complete and together with the control sleeve and the possibility of a mix-up must be excluded. Lapped surfaces must be preserved and not touched with fingers.

The pressure spring (17) is subject to increased wear through corrosion due to a lack of preheating and must be checked every 12000 operating hours. All springs must be replaced if there is heavy corrosion.

In case of a **significant drop** of the cylinder output check the injection pump and if necessary exchange the pressure maintaining valve (28) or the pump elements (pump plunger with plunger barrel).

M25

12000, 24000

Sequence of operations:

07

1. Disassembly

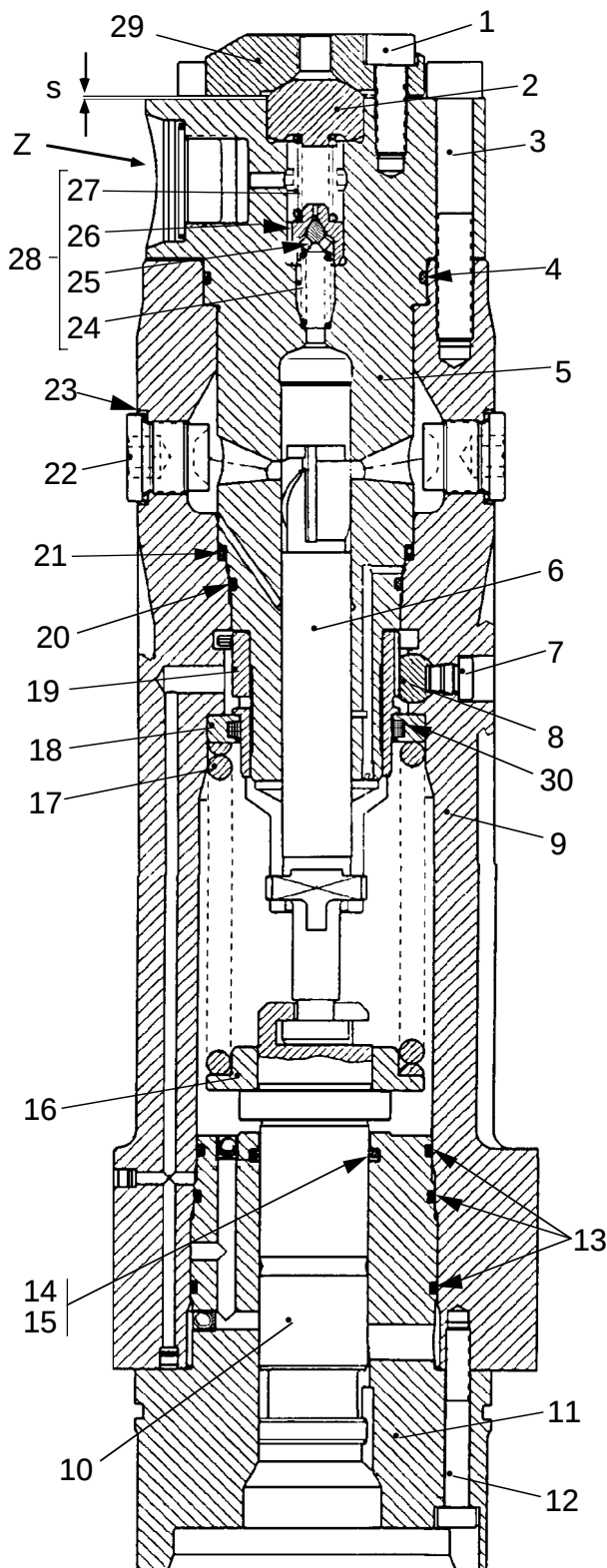
- 1.1 Clean the outside of the injection pump.
- 1.2 Remove the impact screws (22) with sealing rings (23). Check them (1.13) and replace them if necessary.



Safety note:

Careful! The spring tension of the pressure spring (17) acts against the guide pin (10)!

- 1.3 Place the injection pump in a spindle device (e.g. vice) and apply axial pressure.
- 1.4 Remove the cheese head screws (12) and slowly open the spindle device, the pressure spring (17) is relieved.
- 1.5 Remove the intermediate flange (Fig. 1/ 11) with O-rings (13, 15) and scraper ring (14).
- 1.6 Take out the guide pin (10) with the spring plate (16), pressure spring (17) and pump plunger (6). Check the pressure spring for corrosion.
- 1.7 Take out the control sleeve (19) with spring plate (18) as well as the scraper ring (30) and check the tothing of the control sleeve.
- 1.8 Remove the screw (7) and pull out the control rod (8). Check the tothing on the control rod.
- 1.9 Mount the injection pump housing (9) with flange (29) upwards.
- 1.10 Remove the flange (29) with thrust piece (2) and pressure keeping valve (28).
- 1.11 Loosen the cheese head screws (3) alternately and remove them.



1

M25

12000, 24000

07

- 1.12 Force the plunger barrel (5) out of the injection pump housing (9) with a suitable piece of round wood.
- 1.13 Clean all parts with gas oil and a hard brush. Blow out with compressed air and check.

Note:

When carrying out the visual check, special attention should be paid to the following wear phenomena:

Plunger:	Scores in the running surface, control helix wear (by cavitation or erosion). A black plunger or black spots on it indicate water in the fuel.
Barrel:	Scores in the running surface; damaged sealing surface.
Impact screws:	Cavitation in the inner bore mainly of the feed bush.
Guide pin:	Scores in the running surface, worn-out plunger seat.
Pressure keeping valve:	Damaged sealing surfaces, worn pressure rings (24, 27) and dented valve seat (valve cone (25) with valve body (26)).

- 1.14 Replace all O-rings (4, 13, 15, 20), sealing rings (21, 23) and scraper rings (14, 30).

Note:

All O-rings, the sealing ring (21) and the scraper ring (14) must be inserted in the grooves using hot bearing grease and must not be twisted. Do not pull them over sharp edges of components.

2. Reassembly

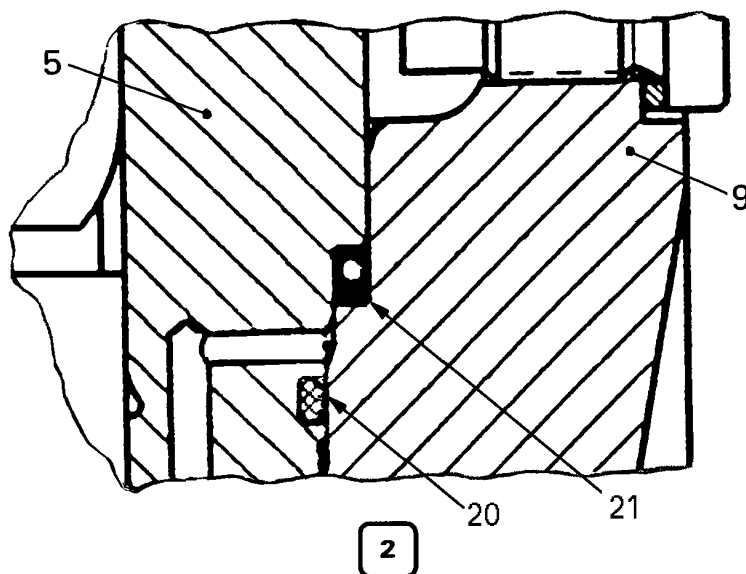
- 2.1 Reassembly is effected in the reverse sequence of disassembly.

Attention:

Refinishing of sealing surfaces is, as is the case for all injection parts, not possible on board and is thus impermissible!

When assembling, pay attention that the groove in the control rod (Fig. 1/8) lines up with the straight grooved pin of the control sleeve (19)!

- 2.2 Insert the sealing ring (**Fig. 2/21**) with the lips and the metal spiral facing upwards (**Fig. 2**).



- 2.3 Lubricate the following screws and tighten crosswise, partially stepwise, at the respective torque:

Cheese head screw (Fig. 1/3) $M = 10 \text{ und } 90 \pm 3 \text{ Nm}$

Cheese head screw (12) $M = 22 \pm 2 \text{ Nm}$

- 2.4 Lubricate the cheese head screws (1) and mount the flange (29) parallel to the element (5). The circumferential spacing s should be **3 mm**.

- 2.5 Tighten the cheese head screws (1) crosswise at a torque

$M = 53 \pm 2 \text{ Nm.}$

- 2.6 Coat the thread and contact surfaces of the impact screws (Fig. 1/22) with Loctite and tighten the impact screws at a torque of

$M = 85 \pm 5 \text{ Nm.}$

- 2.7 Tighten the screw (7) at a torque of

$M = 14 \pm 1 \text{ Nm.}$

- 2.8 Check free movement of the control rod.

M25

6000, 12000

07

See also: 07.02.01.nn

Spare parts list: B1.05.07.253597

Time requirement: 2 Pers./ 2,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel

Inspection:

of one injection pump	every	6,000 h
of all injection pumps	every	12,000 h

Tools:

60 - 320 Nm torque wrench	W1 *	1.9454-320
Reversible ratchet	W2 *	1.9495-036
Adapter (3/4 to 1/2)	W3 *	1.9459-035

* not illustrated

Auxiliary material:

Loctite 273 **

Hot bearing grease **

** or a product of equal standard

Note:

All parts of the injection pump are manufactured with utmost precision in special workshops. This is the only guarantee for proper functioning. When repairing a pump, make sure that the various parts of one pump, e.g. the control sleeve remain allocated to the **respective** housing. A renewal or exchange of the parts will considerably influence the fuel delivery. The pump must therefore be reset on the test rig.

The pump plunger (**Fig. 1/6**) and the plunger barrel (5) are only allowed to be replaced together. In order to keep repair costs low, any pump elements to be reconditioned should only be shipped complete and together with the control sleeve and the possibility of a mix-up must be excluded. Lapped surfaces must be preserved and not touched with fingers.

In case of a **significant drop** of the cylinder output check the injection pump and if necessary exchange the pressure maintaining valve (28) or the pump elements (pump plunger with plunger barrel).

M25

6000, 12000

07

Sequence of operations:

1. Disassembly

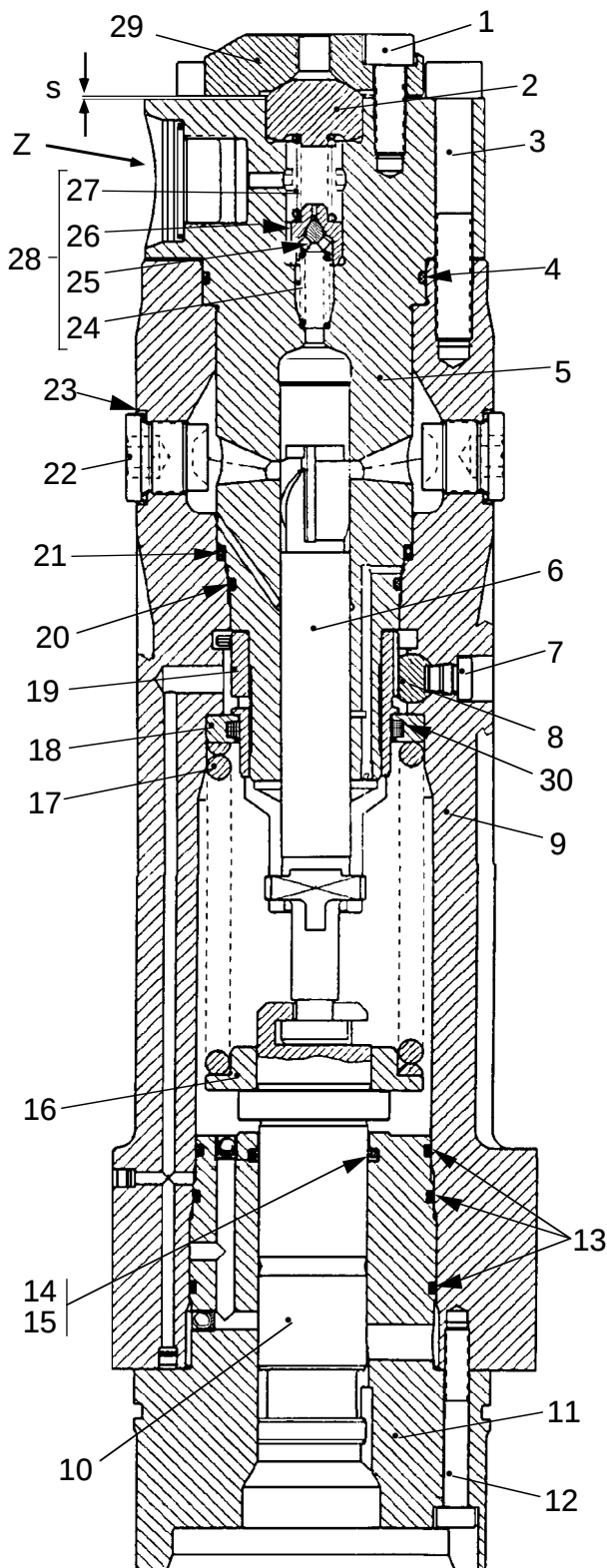
- 1.1 Clean the outside of the injection pump.
- 1.2 Remove the impact screws (22) with sealing rings (23). Check them (1.13) and replace them if necessary.



Safety note:

Careful! The spring tension of the pressure spring (17) acts against the guide pin (10)!

- 1.3 Place the injection pump in a spindle device (e.g. vice) and apply axial pressure.
- 1.4 Remove the cheese head screws (12) and slowly open the spindle device, the pressure spring (17) is relieved.
- 1.5 Remove the intermediate flange (Fig. 1/ 11) with O-rings (13, 15) and scraper ring (14).
- 1.6 Take out the guide pin (10) with the spring plate (16), pressure spring (17) and pump plunger (6). Check the pressure spring for corrosion.
- 1.7 Take out the control sleeve (19) with spring plate (18) as well as the scraper ring (30) and check the tothing of the control sleeve.
- 1.8 Remove the screw (7) and pull out the control rod (8). Check the tothing on the control rod.
- 1.9 Mount the injection pump housing (9) with flange (29) upwards.
- 1.10 Remove the flange (29) with thrust piece (2) and pressure keeping valve (28).
- 1.11 Loosen the cheese head screws (3) alternately and remove them.



1

M25

6000, 12000

07

- 1.12 Force the plunger barrel (5) out of the injection pump housing (9) with a suitable piece of round wood.
- 1.13 Clean all parts with gas oil and a hard brush. Blow out with compressed air and check.

Note:

When carrying out the visual check, special attention should be paid to the following wear phenomena:

Plunger:	Scores in the running surface, control helix wear (by cavitation or erosion). A black plunger or black spots on it indicate water in the fuel.
Barrel:	Scores in the running surface; damaged sealing surface.
Impact screws:	Cavitation in the inner bore mainly of the feed bush.
Guide pin:	Scores in the running surface, worn-out plunger seat.
Pressure keeping valve:	Damaged sealing surfaces, worn pressure rings (24, 27) and dented valve seat (valve cone (25) with valve body (26)).

- 1.14 Replace all O-rings (4, 13, 15, 20), sealing rings (21, 23) and scraper rings (14, 30).

Note:

All O-rings, the sealing ring (21) and the scraper ring (14) must be inserted in the grooves using hot bearing grease and must not be twisted. Do not pull them over sharp edges of components.

2. Reassembly

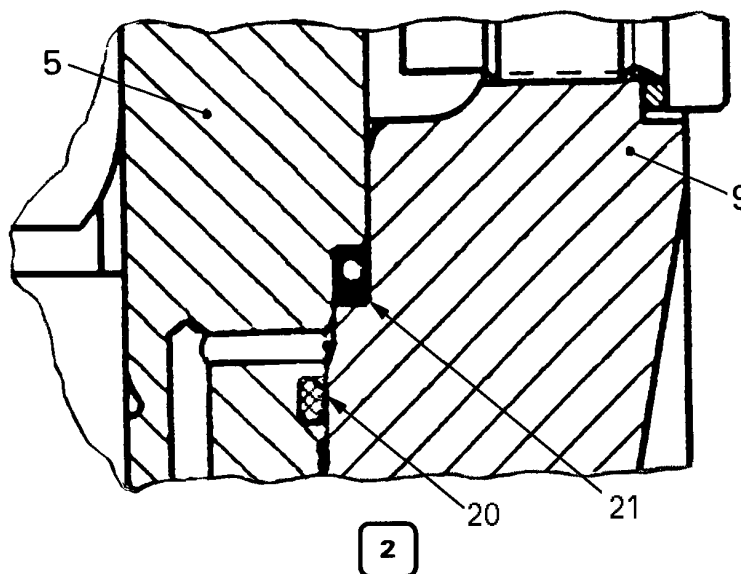
- 2.1 Reassembly is effected in the reverse sequence of disassembly.

Attention:

Refinishing of sealing surfaces is, as is the case for all injection parts, not possible on board and is thus impermissible!

When assembling, pay attention that the groove in the control rod (Fig. 1/8) lines up with the straight grooved pin of the control sleeve (19)!

- 2.2 Insert the sealing ring (**Fig. 2/21**) with the lips and the metal spiral facing upwards (**Fig. 2**).



- 2.3 Lubricate the following screws and tighten crosswise, partially stepwise, at the respective torque:

Cheese head screw (Fig. 1/3) **M = 10 und 90 ± 3 Nm**

Cheese head screw (12) **M = 22 ± 2 Nm**

- 2.4 Lubricate the cheese head screws (1) and mount the flange (29) parallel to the element (5). The circumferential spacing **s** should be **3 mm**.

- 2.5 Tighten the cheese head screws (1) crosswise at a torque

M = 53 ± 2 Nm.

- 2.6 Coat the thread and contact surfaces of the impact screws (Fig. 1/22) with Loctite and tighten the impact screws at a torque of

M = 85 ± 5 Nm.

- 2.7 Tighten the screw (7) at a torque of

M = 14 ± 1 Nm.

- 2.8 Check free movement of the control rod.

M25

07

See also: 07.08.01.nn

Spare parts list: B1.05.01.252107, B1.05.07.252260, B1.05.07.258526

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Extractor for fuel injector	W1	0.9111 D
Seat scraper for fuel injector seat	W2 *	259122 A

* not illustrated

Auxiliary material:

Molykote paste "G-Rapid Plus" **

"Dag S-5080" high temperature thread paste **

** or a product of equal standard

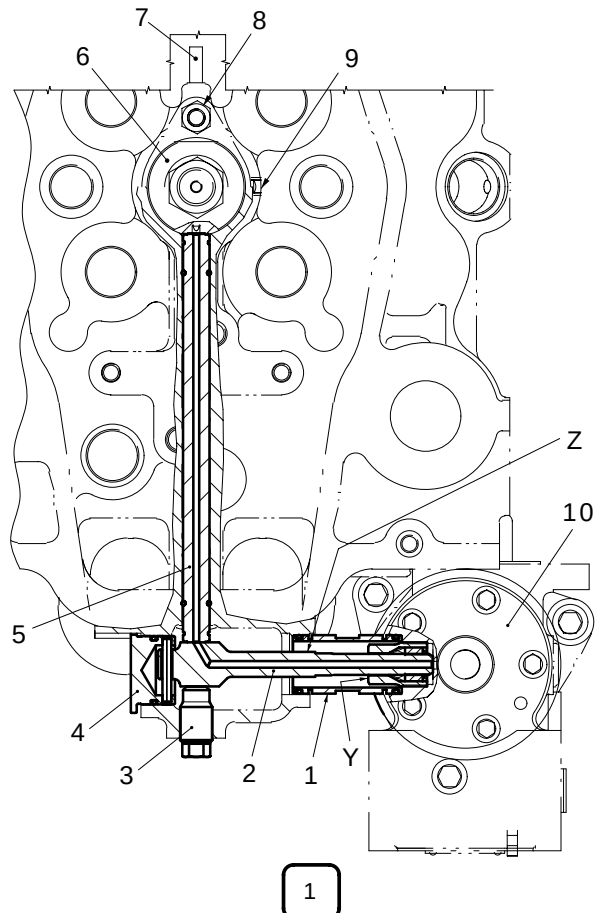
Note:

If work has to be carried out on the injection system and the engine is running on heavy fuel, the system should be switched over to distillate fuel at least half an hour beforehand so that the fuel injector is flushed properly.

Sequence of operation:

1. Disassembly

- 1.1 Switch off the standby lubricating oil pump for the main engine / the prelubricating pump in the case of generator operation.
- 1.2 Push the sleeve (**fig. 1/1**) to the left in the cylinder head frame.
- 1.3 Completely unscrew the screwed connection (Y) of the transverse thrust piece (2) out of the injection pump (10).



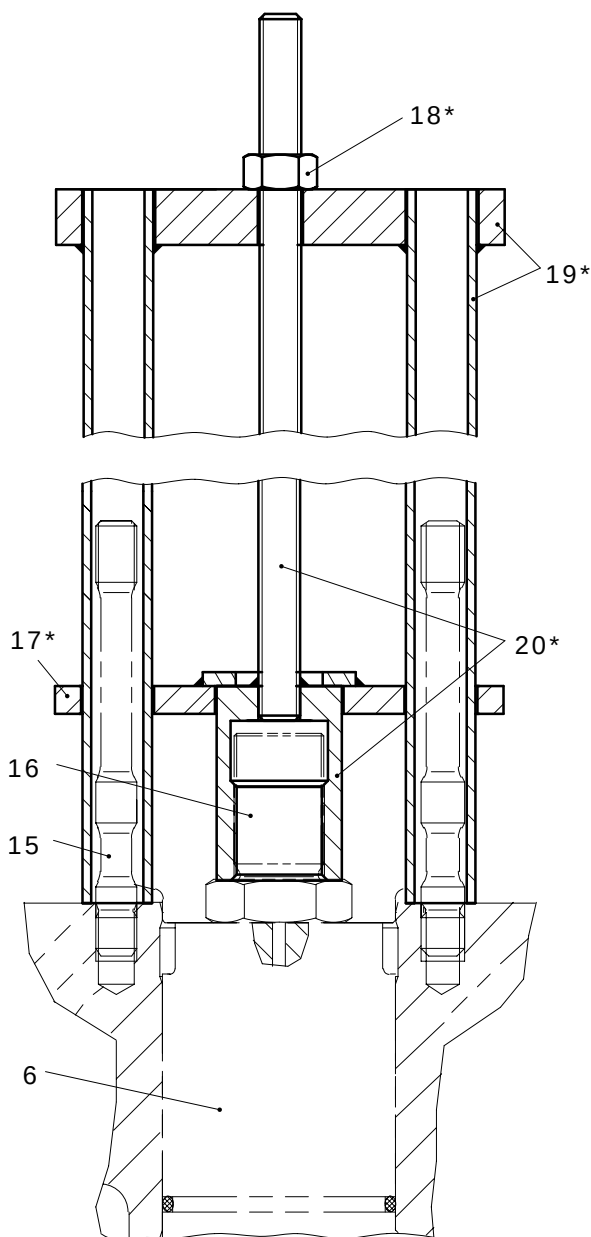
M25

07

Attention:

Always loosen the screwed connection (Y) first ! Sealing surfaces of the radial thrust piece (5) and the transverse thrust piece (2) will be damaged by wrong dismantling !

- 1.4 Loosen the pressure screw (3), press up the transverse thrust piece (2) with cover (4) and pull out of the injection pump and cylinder head to the left.
- 1.5 Pull out the radial thrust piece (fig. 1/5) by approx. 20 mm.
- 1.6 Remove the cylinder head cover.
- 1.7 Remove the nuts (fig. 3/8) and the flange (21).
- 1.8 Mount the fuel injector extractor **W1** (fig. 2). To do so:
 - 1.8.1 Screw the threaded rod (20) onto the screw plug (16).
 - 1.8.2 Place the device (19) and the tortional lock (17) on the threaded rod and studs (15).
 - 1.8.3 Mount the hexagon nuts (18).
- 1.9 Loosen the fuel injector by turning the hexagon nuts (18) against the device and unscrew it until the bottom O-ring is visible (fig. 3/22).
- 1.10 Pull the fuel injector out with the extractor. Remove the extractor.
- 1.11 Clean the outside of the fuel injector, mark it with the cylinder number and carry out a functional test of the injection nozzle (**07.08.01.nn**).
- 1.12 Scrape out the valve seat in the sleeve (fig. 3/24) using an appropriate tool **W2**. Clean the inside of the sleeve.



* = W1

2

M25

07

2. Reassembly

- 2.1 Replace the O-rings (22) and insert them in the ring grooves making sure they are not twisted.
Pay attention that the O-rings do not form loops!

Attention:

Use original MaK spare parts only.

- 2.2 Apply a thin coating of high temperature thread paste to the nozzle element (**fig. 3/23**).
- 2.3 Carefully apply Molycote paste to the thread of the studs (15), the contact surfaces of the nuts (8) and the **new** O-rings (22).

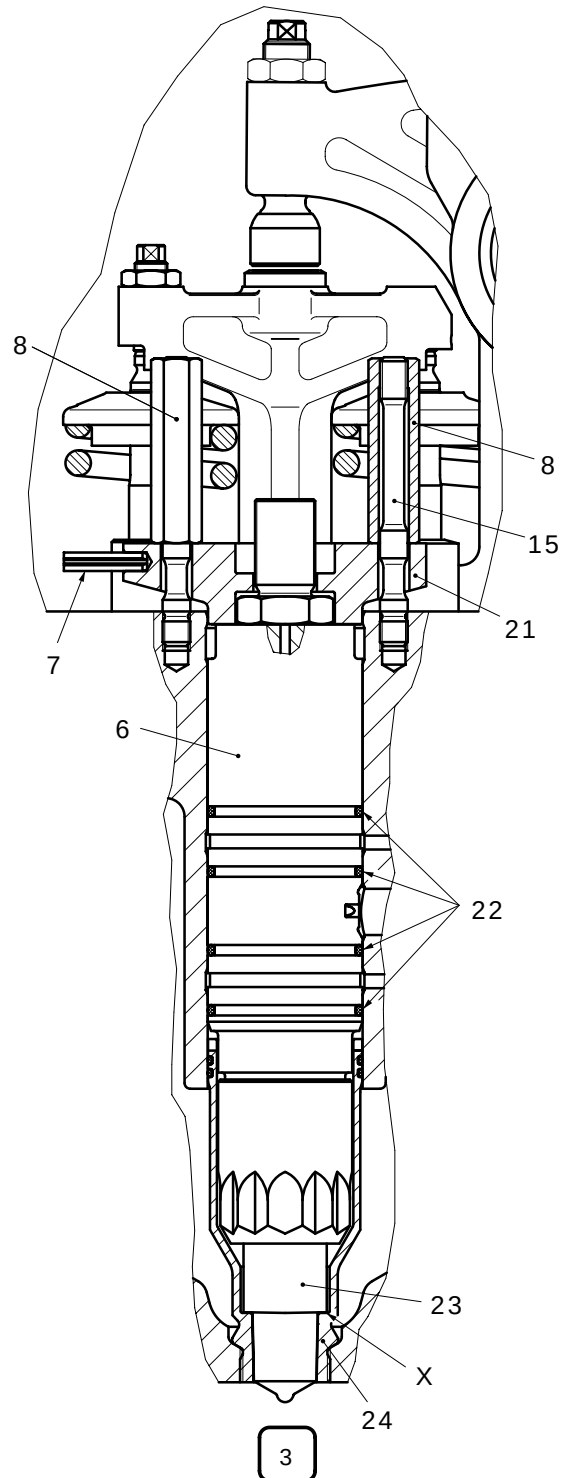
Attention:

Excess paste must be removed!
Excessive paste could result in the O-rings getting squeezed in the retention groove of the cylinder head!

No gasket between the fuel injector and sleeve in this area (fig. 3/X**).**

- 2.4 Carefully insert the fuel injector with the nozzle (23) in the sleeve (24). Pay attention to the position of the positioning pin (**fig. 1/9**).
- 2.5 Mount the flange (**Fig. 3/21**) with the dowel pin (**fig. 1/7**) facing the exhaust end and the ring collar facing downwards (**fig. 3**).
- 2.6 Tighten the nuts (8) at a torque of
- M = 35 Nm.**
- 2.7 Loosen the nuts (8) again by one revolution and then tighten at a torque of

M = 10 Nm.



M25

07

-
- 2.8 Push in the radial thrust piece (**fig. 1/5**).
- 2.9 Mount the transverse thrust piece (2), pay attention to the correct position of the cover (4)!
- 2.10 Tighten the screwed connection (Y) and the pressure screw (3) by hand (**Without wrench !**).
- 2.11 Tighten the pressure screw (3) and then the screwed connection (Y) at a torque of
- M =10 Nm.**
-

Attention:

Apply the fork wrench at the surfaces "Z" and keep the transverse thrust piece (2) in position during tightening of the screwed connection (Y) and the pressure screw (3).

- 2.12 Tighten the screwed connection (Y) at a torque of
- M =150 ± 5 Nm.**
- 2.13 Tighten the pressure screw at a torque of
- M =130 ± 5 Nm.**
- 2.14 Push the sleeve (1) into the injection pump until it reaches the locking position.
- 2.15 Tighten the nuts (8) again at a torque of
- M =35 Nm.**
- 2.16 Mount the cylinder head cover and check the lubricating and fuel circulation for leaks.

M25

07

See also: 07.07.01.nn, 07.09.01.nn
Spare parts list: B1.05.07.252260, B1.05.07.252267
Time requirement: 1 Pers./ 0,50 h
Personnel qualification: skilled engine hand
Operating medium: Heavy fuel and distillate fuel

Tools:

Nozzle tester	W1	1.9470 G
Adapter/nozzle holder for nozzle tester	W2	259208 B
Pressure pipe	W3	1.9470 C
Socket wrench for nozzle opening pressure	W4 *	

* not illustrated



Safety note:

When checking the injection pressure: Danger! Keep your hands off the fuel jet!

Note:

Carbon trumpets at the nozzle are mostly caused by insufficient cooling. Corrosive attack and erosion, however, are the consequence if the nozzle temperature is too low and/or the charge air temperature is too low or water is in the charge air.

A perfect functioning of the injection nozzles can only be assessed by the behavior of the exhaust gas temperatures/smoke behavior.

The injection valve should only be checked if there is a significant deviation of the exhaust gas temperature from the average value.

A bad injection in the test device in the case of heavy fuel nozzles is often caused by insufficient flushing of the injection valve with diesel oil before the test. The injection nozzle should be carefully cleaned again before replacing it.

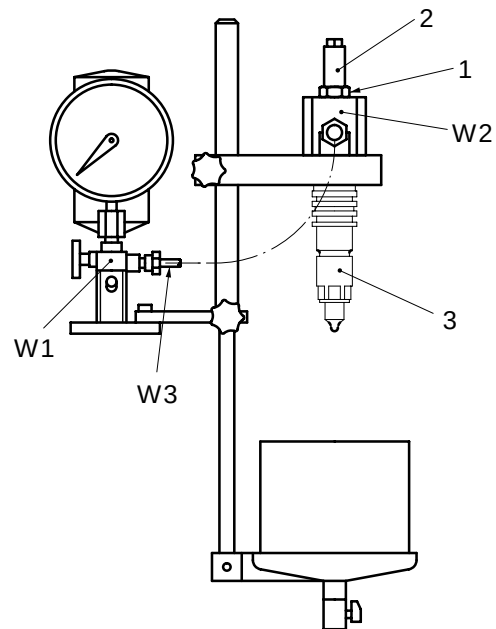
A drop in the opening pressure of up to **20 bar** is normal after a short period of operation (settling phenomena of the nozzle spring and needle).

M25

07

Sequence of operations:

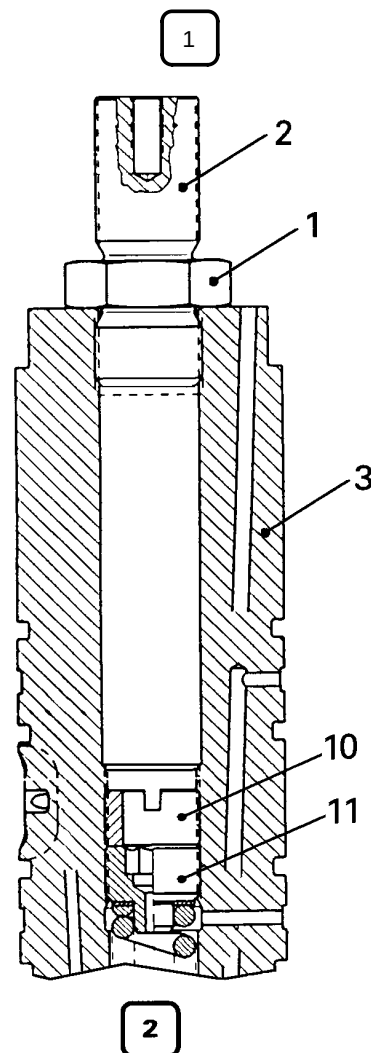
1. Use a hard brush (not a wire brush) to remove carbon residue from the nozzle.
2. Check the nozzle holes for sharp edges, ovality, corrosion and damage.
3. Place the injection valve (**Fig. 1/3**) with the adapter (**W2**) in the nozzle tester (**W1**).
4. Connect the pressure pipe (**W3**) and tighten it.
5. Loosen the hexagon nut (1) and remove it together with the screw plug (2).
6. Slowly increase the pressure by means of a pump until the injection valve ejects. **Nozzle opening pressure:** Refer to the **acceptance test certificate A1.10**.



Note:

Repair (**07.09.91.nn**) the ejection valve if there is a high volume of leakage fuel or replace it (**07.07.01.nn**).

- 6.1 If there is a deviation in the injection pressure, loosen the counter nut (**Fig. 2/10**) and set the specified opening pressure by means of the adjusting screw (11).
- 6.2 Mount the counter nut (10) as well as the screw plug (2) and tighten at the corresponding torque (**07.09.01.nn**).
- 6.3 Secure the screw plug (2) with the hexagon nuts (1).



M25

07

See also: 07.07.01.nn, 07.08.01.nn

Spare parts list: B1.05.07.252267

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

100 - 750 Nm torque wrench	W1 *	1.9454-800
60 - 320 Nm torque wrench	W2 *	1.9454-320
Reversible ratchet 3/4	W3 *	1.9495-036
Adapter (3/4 to 1/2)	W4 *	1.9459-035
Socket wrench insert	W5 *	259222 D

* not illustrated

Auxiliary material:

Molykote Paste G Rapid plus **

** or a product of equal standard

Note:

The injection valve should only be disassembled if the inspection (**07.08.01.nn**) reveals faults (e.g. leakage, insufficient ejection pressure, bad ejection).

All parts of the injection system are manufactured with utmost precision in special workshops. This is the only way ensure perfect operation. For this reason, it is not possible for the operator to carry out repairs and the necessary maintenance work should be restricted to the following

- cleaning
- checking the ejection pressure and tightness
- replacing wearing parts using original parts and replacement elements.

To keep repair costs low, any parts to be reconditioned should only be shipped complete and the possibility of a mix-up should be excluded.

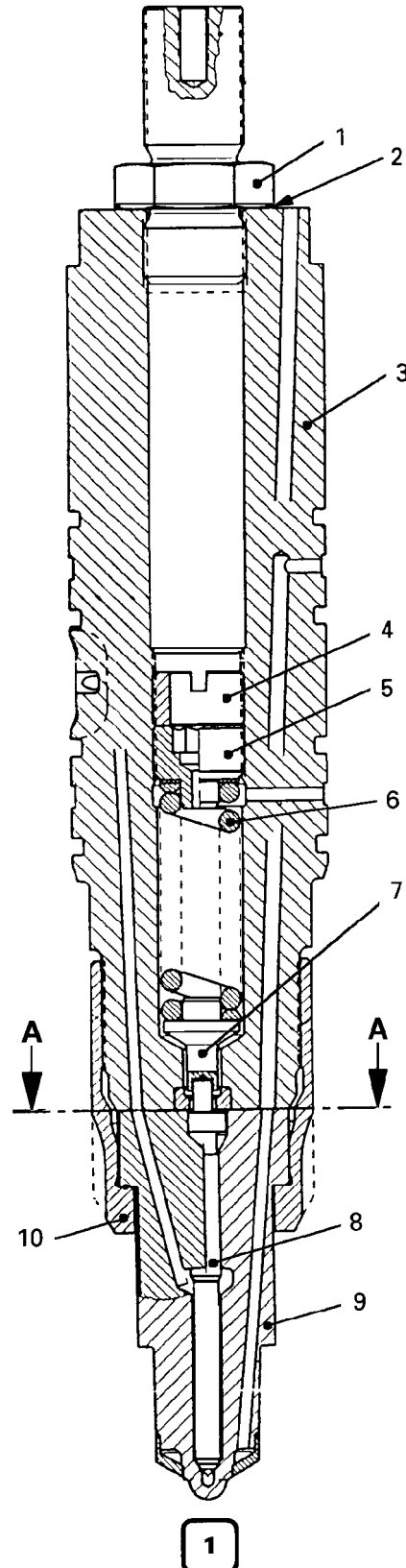
M25

07

Sequence of operations:

1. Disassembly:

- 1.1 Dismount the locking bolt (**Fig. 1/1**) with joint ring (2).
- 1.2 Remove the counter nut (4) and relieve the nozzle spring (6) by unscrewing the adjusting screw (5).
- 1.3 Lock the nozzle holder (3) in position and loosen the nozzle nut (10) with socket wrench insert (W5) by turning counter-clockwise and remove it.
- 1.4 Take out the nozzle element (9) including the nozzle needle (8) without damaging the lapped surfaces! Pay attention to the straight pins (**Fig. 2/20**) for retaining the nozzle.
- 1.5 Dismount the adjusting screw (**Fig. 1/5**) and remove the nozzle spring (6) and thrust piece (7).
- 1.6 Carry out a visual inspection of the nozzle spring (6) and thrust piece (7).
- 1.7 Clean all parts with gas oil.
- 1.8 Carry out a visual check of all parts, particularly the seat and sealing surfaces. Replace defective parts.
- 1.9 Insert the nozzle needle (8) in the nozzle element (9) using gas oil and check whether the nozzle needle falls onto the seat due to its dead weight. Replace the nozzle needle together with the nozzle element if the needle sticks.

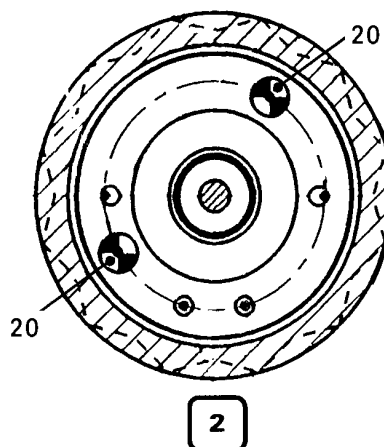


M25

07

2. Reassembly

- 2.1 Dry all sealing surfaces with clean, **fluff-free** paper.
- 2.2 Apply "Molykote Paste G Rapid plus" to the thread of the nozzle nut (10) and nozzle rest in the nozzle nut,
- 2.3 Do not damage the lapped surfaces (nozzle element, nozzle needle)!
Align the nozzle element (9) together with the nozzle needle (8) with the straight pins (**Fig. 2/20**), position and retain with the nozzle nut.
- 2.4 Insert the nozzle spring (6) with the thrust piece (**Fig. 1/7**) and screw in the adjusting screw (5).
- 2.5 Lock the nozzle holder (3) in position and tighten the nozzle nut (10) with the socket wrench insert (W5) at a torque of



M = 750 - 800 Nm.

- 2.6 Adjust the injection valve according to **07.08.01.nn.**
- 2.7 Screw in the counter nut (4) and tighten at a torque of
- 2.8 Mount the locking bolt (1) with joint ring (2) and tighten the locking bolt at a torque of

M = 90 - 130 Nm

M25

07

See also: 07.07.01.nn, 07.08.01.nn

Spare parts list: B1.05.07.252267

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

100 - 750 Nm torque wrench	W1 *	1.9454-800
60 - 320 Nm torque wrench	W2 *	1.9495-320
Reversible ratchet 3/4	W3 *	1.9495-036
Adapter (3/4 to 1/2)	W4 *	1.9459-035
Socket wrench insert	W5 *	259222 D

* not illustrated

Auxiliary material:

Molykote Paste G Rapid plus **

** or a product of equal standard

Note:

The injection valve should only be disassembled if the inspection (**07.08.01.nn**) reveals faults (e.g. leakage, insufficient ejection pressure, bad ejection).

All parts of the injection system are manufactured with utmost precision in special workshops. This is the only way ensure perfect operation. For this reason, it is not possible for the operator to carry out repairs and the necessary maintenance work should be restricted to the following

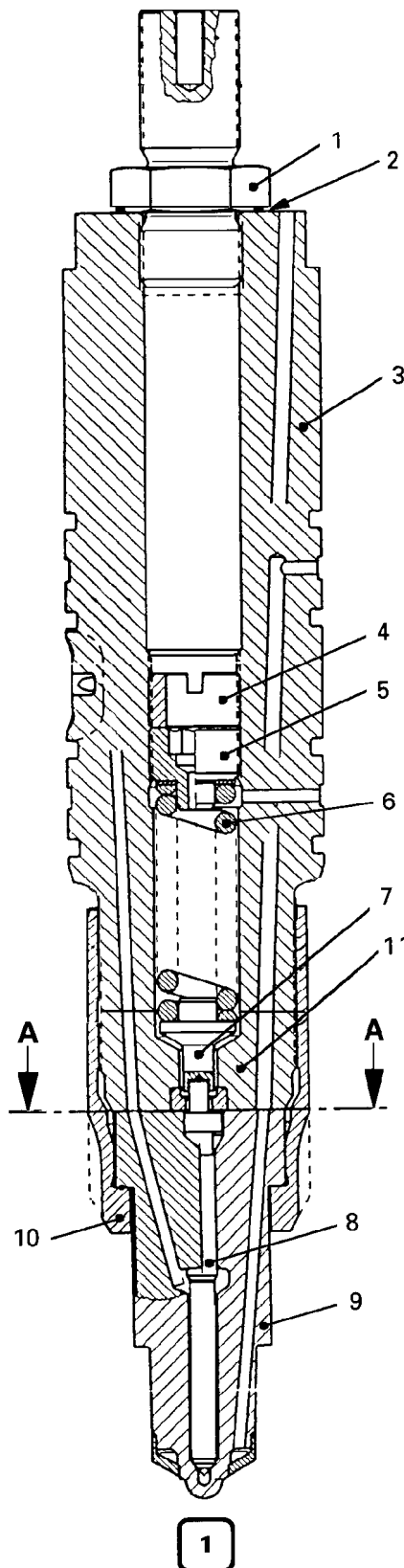
- cleaning
- checking the ejection pressure and tightness
- replacing wearing parts using original parts and replacement elements.

To keep repair costs low, any parts to be reconditioned should only be shipped complete and the possibility of a mix-up should be excluded.

M25

07
Sequence of operations:
1. Disassembly:

- 1.1 Dismount the locking bolt (**Fig. 1/1**) with joint ring (2).
- 1.2 Remove the counter nut (4) and relieve the nozzle spring (6) by unscrewing the adjusting screw (5).
- 1.3 Lock the nozzle holder (3) in position and loosen the nozzle nut (10) with socket wrench insert (W5) by turning counter-clockwise and remove it.
- 1.4 Take out the nozzle element (9) including the nozzle needle (8) without damaging the lapped surfaces! Pay attention to the straight pins (**Fig. 2/20**) for retaining the nozzle!
- 1.5 Dismount the adjusting screw (**Fig. 1/5**).
- 1.6 Remove the intermediate disk (11) with nozzle spring (6) and thrust piece (7). Pay attention to the straight pins for retaining the intermediate disk!
- 1.7 Carry out a visual inspection of the nozzle spring (6) and thrust piece (7).
- 1.8 Clean all parts with gas oil.
- 1.9 Carry out a visual check of all parts, particularly the seat and sealing surfaces. Replace defective parts.
- 1.10 Insert the nozzle needle (8) in the nozzle element (9) using gas oil and check whether the nozzle needle falls onto the seat due to its dead weight. Replace the nozzle needle together with the nozzle element if the needle sticks.



M25

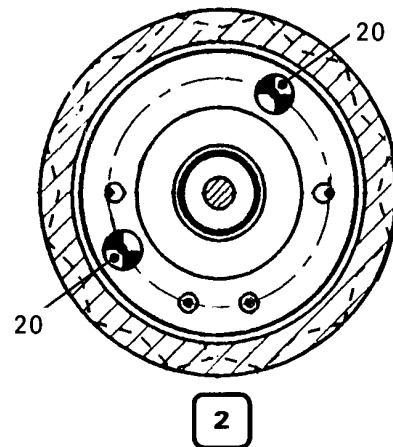
07
2. Reassembly

- 2.1 Dry all sealing surfaces with clean, **fluff-free** paper.
- 2.2 Apply "Molykote Paste G Rapid plus" to the thread of the nozzle nut (10) and nozzle rest in the nozzle nut.
- 2.3 Mount the intermediate disk (11).
Pay attention to the straight pins for retaining the intermediate disk!
- 2.4 Do not damage the lapped surfaces (nozzle element, nozzle needle)!
Align the nozzle element (9) together with the nozzle needle (8) with the straight pins (**Fig. 2/20**), position and retain with the nozzle nut.
- 2.5 Insert the nozzle spring (6) with the thrust piece (**Fig. 1/7**) and screw in the adjusting screw (5).
- 2.6 Lock the nozzle holder (3) in position and tighten the nozzle nut (10) with the socket wrench insert (W5) at a torque of

M = 750 - 800 Nm.
- 2.7 Adjust the injection valve according to **07.08.01.nn.**
- 2.8 Screw in the counter nut (4) and tighten at a torque of

M = 70 - 90 Nm.
- 2.9 Mount the locking bolt (1) with joint ring (2) and tighten the locking bolt at a torque of

M = 90 - 130 Nm



M25/M32

07

See also: -

Spare parts list: B1.05.07.n.7667

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Cleaning pistol W1
(Special tools are not included in the scope of supply)

Auxiliary material:

"Filter clean" cleaning fluid from Messrs. Vecom *

* or a product of equal standard

Note:

All maintenance and other work on the filter should be carried out with the greatest care to prevent malfunctions from occurring in the fuel injection system.

Never let a full filter cool down when being operated on heavy fuel!

The cleaning interval for the filter will depend mainly on the engine operating conditions, fuel quality and the quality of the fuel separation and will thus differ from unit to unit.

After commissioning a new system or after working on the fuel pipeline system, the filter should be checked after 24 hrs. and cleaned if necessary.

Sequence of operations:

1. Changeover to the clean filter chamber. Changeover procedure (see plate on the filter cover).

M25/M32

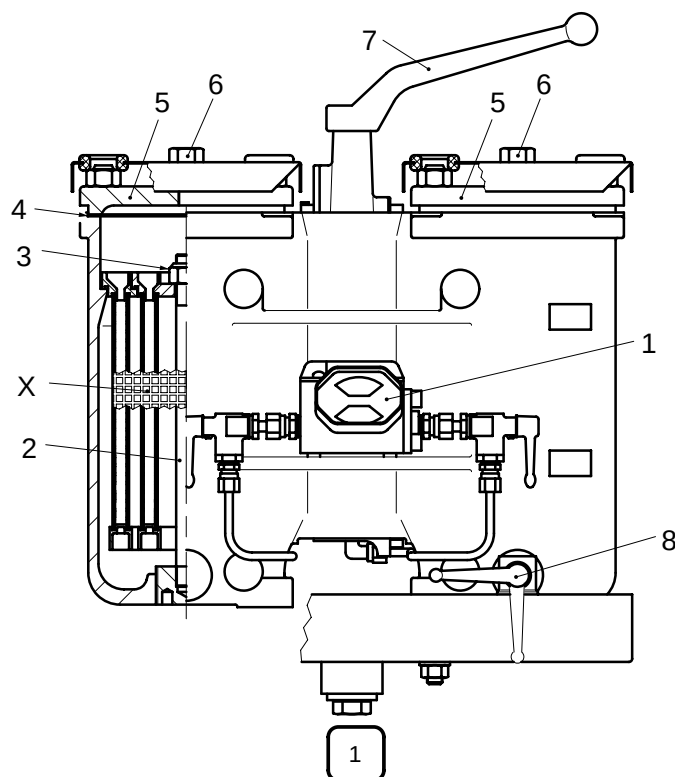
07

2. Cleaning

2.1 Clean the filter during normal operation of the engine when

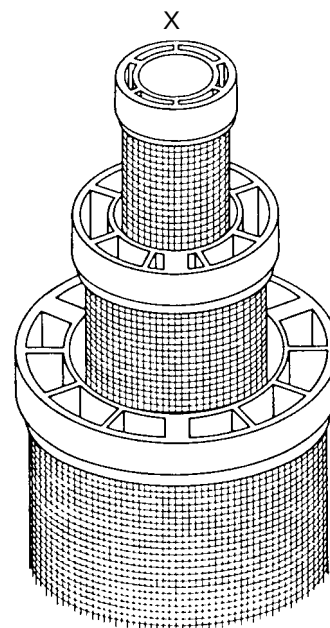
50% of the red area

of the differential pressure indicator (**Fig. 1/1**) can be seen or when the filter alarm has been activated.



Safety note:
Depressurize the filter chamber!

- 2.2 Loosen the hexagon screw (6) and compensate pressure.
- 2.3 Open the plug key (8) and drain the filter chamber.
- 2.4 Remove the cover (5) of the filter chamber which has been taken out of operation.
- 2.5 Loosen the self-locking nut (3) on the tie rod (2) and pull out the screen elements (X) one after the other.



M25/M32

07

- 2.6 Place the individual screen elements in a vessel containing a cleaning agent and rub them down with a soft brush.

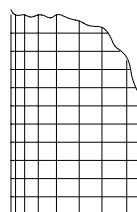
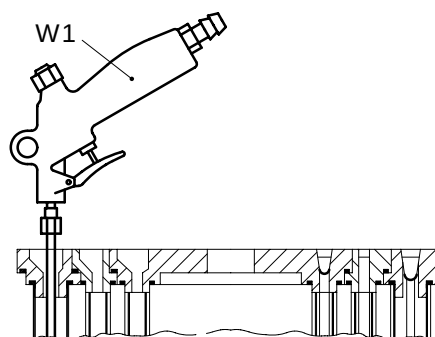
- 2.7 Blow out the clean screen elements with the cleaning pistol (Fig. 2/W1) by moving it up and down on the inside (clean side). Air pressure approx.

4 bar.

- 2.8 In the case of obstinate dirt (paint, crusts, fibres, shavings), place the screen elements in a vessel containing a cleaning agent and let them soak for up to 4 hours according to the instructions of the cleaning agent manufacturer.

Note:

The liquid is only allowed to reach up to the lower edge of the upper rim of the screen so that no contaminated liquid can flow onto the clean side from above.



- 2.9 Remove the screen elements and treat them as described in sequence 2.5 and 2.6.
- 2.10 If necessary, repeat the cleaning procedure according the sequences 2.7 and 2.8.
- 2.11 Rinse the screen elements in clean cleaning fluid and blow them out again.
- 2.12 Check the inside and outside of the cloth of the individual screen elements for damage and replace it if necessary.

Attention:

The individual screen elements are connected in parallel. The whole filter is not serviceable if one screen element is damaged.

- 2.13 Use a powerful source of light behind the cloth to check whether cleaning has been carried out successfully. Repeat cleaning if the result is bad.
- 2.14 Mount the screen elements (Fig. 1/X) in each other, insert in the filter chamber and tighten a new self-locking nut (3) slightly.

M25/M32

07

-
- 2.15 Check the seal (**Fig. 1/4**), replace if necessary. Mount the cover (5).
- 2.16 Fill up the filter chamber and vent (see plate on the filter cover). To do so:
- 2.16.1 Loosen the hexagon screw (6) and turn the key (7) by 30°.
- 2.16.2 Fill up the filter chamber and turn the key to the mark on filter chamber after approx. 10 s.
- 2.16.3 Tighten the hexagon screw (6).

M20-M601C

600

07

See also:

Spare parts list: B1.05.07.1.7668

Time requirement: 1 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

Cleaning of the filter every 600 h

Auxiliary material:

Cleaner "Filterclean" of Vecom *

* or a product of equal standard

Note:

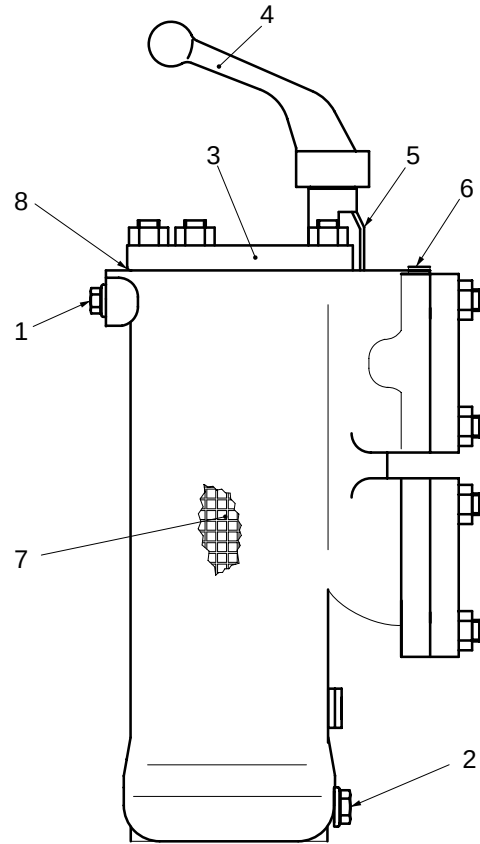
Operation and maintenance of the filter have to be carried out with utmost care to avoid troubles in the fuel system.

The cleaning intervals of the filter mostly depend on the engine operation conditions and the fuel quality and therefore are different from unit to unit.

When starting up a new plant or after doing some work on the fuel piping, check the filter after 24 hours and clean it if necessary.

Sequence of operations:
1. Cleaning

- 1.1 Change over to operable filter chamber.
- 1.2 Open the vent screw (1) of the filter chamber which has been cut off in order to vent the system.
- 1.3 Remove the drain plug (2) of the filter chamber which has been cut off.
- 1.4 Dismantle the housing cap (3) of the filter chamber which has been cut off.
- 1.5 Withdraw the screen basket (7) vertical-ly upwards.
- 1.6 Remove coarse dirt by shaking the screen basket (7).
- 1.7 Put the screen basket (7) into a solvent. An application time of 8 hours must not be exceeded.
- 1.8 After taking the screen basket (7) out of the solvent carefully blow it out with compressed air from outside to inside.
- 1.9 Remove tenacious dirt by means of a soft brush.
- 1.10 Insert the screen basket (7) into the filter chamber.
- 1.11 Check the O-ring (8) and replace it if necessary. Mount the housing cap (3).
- 1.12 Insert and tighten the drain plug (2).
- 1.13 To vent the filter chamber carefully set the operating lever (4) in such a way that the nose (5) of the plug points towards the nearest screw of the plate (6).
- 1.14 When the fuel emerges without bubbles at the vent screw (1), close this screw.
- 1.15 Reset the operating lever (4).



M25/M32

12000

See also: 07.13.02.nn

Spare parts list: B1.05.07.n.6487

Time requirement: 1 Pers./ 0,30 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

07

Maintenance:

The fuel feed pump is to be dismantled
and checked for wear every 12,000 h

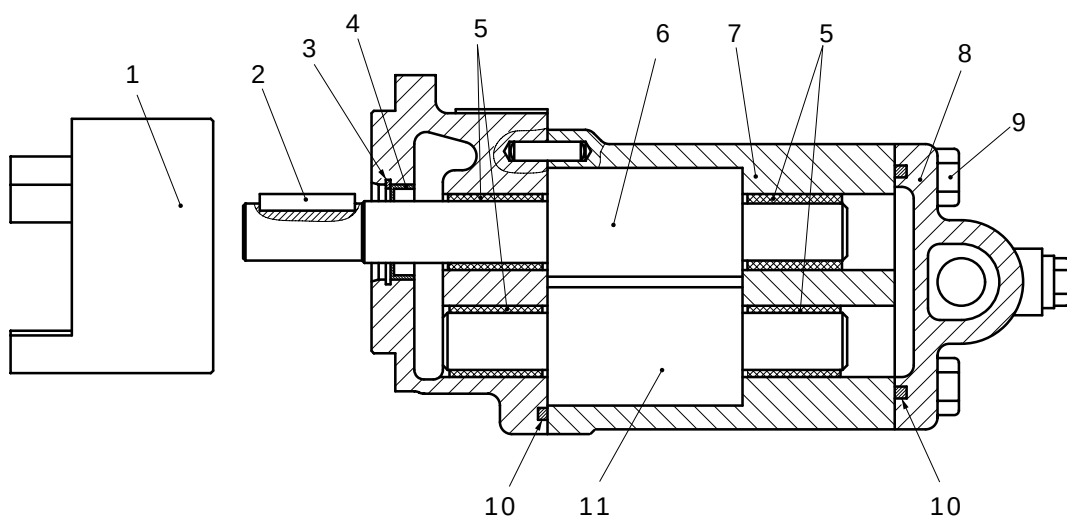
Note:

According to information of the manufacturer, the replacement of worn out individual parts can result in the performance given in **A1.05** no longer being attained. The complete fuel feed pump must be replaced in the event of excessive performance loss!

Sequence of operations:

1. Disassembly

1.1 Remove fuel feed pump with coupling halves (**Fig. 1/1**) and feather key (2) (**07.13.02.nn**).



M25/M32

12000

07

-
- 1.2 Remove locking ring (3).
 - 1.3 Loosen hexagon cap screws (9), pull off end cover (8) and wheel housing (7).
 - 1.4 Replace O-rings (10).
 - 1.5 Pull out drive wheel shaft (6) and running wheel axle (11).
 - 1.6 Check bearing bushes (5), drive wheel shaft (6) and running wheel axle (11) for wear, replace if necessary. Follow instructions!
 - 1.7 Replace rotary shaft seal (4).

2. Assembly

- 2.1 Mount fuel feed pump with new O-rings (10) and new rotary shaft seal (4).
- 2.2 Tighten hexagon cap screws (9) with a torque of
M = 14 Nm.
- 2.3 Insert feather key (2), shrink on coupling halves (1) and mount fuel feed pump,
(07.13.02.nn).

M25

12000

See also: 07.13.02.nn

Spare parts list: B1.05.07.256487

Time requirement: 1 Pers./ 0,30 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

07

Maintenance:

The fuel feed pump is to be dismantled and checked for wear every 12,000 h

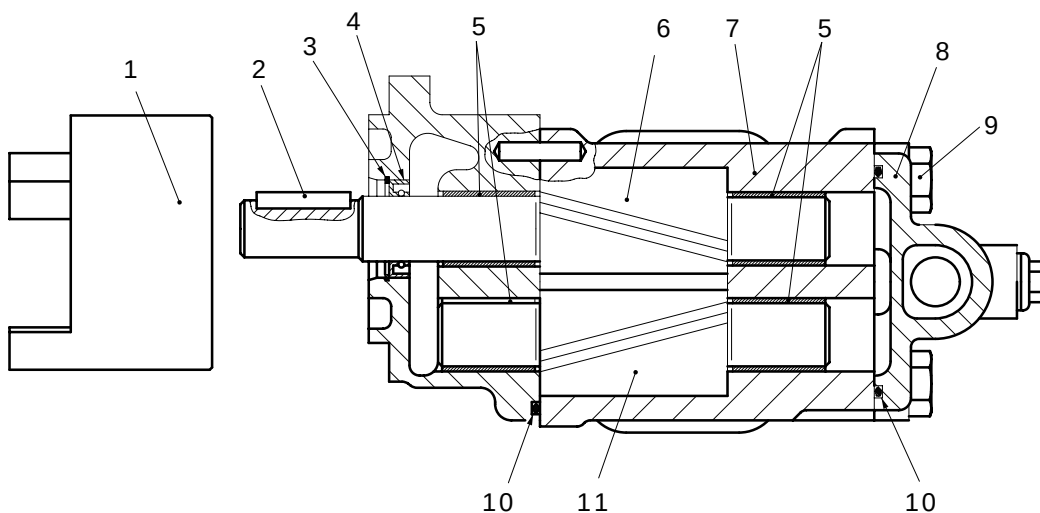
Note:

According to information of the manufacturer, the replacement of worn out individual parts can result in the performance given in **A1.05** no longer being attained. The complete fuel feed pump must be replaced in the event of excessive performance loss!

Sequence of operations:

1. Disassembly

- 1.1 Remove fuel feed pump with coupling halves (**Fig. 1/1**) and feather key (2) (**07.13.02.nn**).



M25

12000

07

-
- 1.2 Remove locking ring (3).
 - 1.3 Loosen hexagon cap screws (9), pull off end cover (8) and wheel housing (7).
 - 1.4 Replace O-rings (10).
 - 1.5 Pull out drive wheel shaft (6) and running wheel axle (11).
 - 1.6 Check bearing bushes (5), drive wheel shaft (6) and running wheel axle (11) for wear, replace if necessary. Follow instructions!
 - 1.7 Replace rotary shaft seal (4).

2. Assembly

- 2.1 Mount fuel feed pump with new O-rings (10) and new rotary shaft seal (4).
- 2.2 Tighten hexagon cap screws (9) with a torque of
M = 14 Nm.
- 2.3 Insert feather key (2), shrink on coupling halves (1) and mount fuel feed pump,
(07.13.02.nn).

M25

12000

See also:

Spare parts list: B1.05.07.25648n

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

07

Maintenance:

Dismantle the fuel feed pump and check the drive for wear	every	12,000 h
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Tools:

60 - 320 Nm torque wrench	W1 *	1.9454-320
3/4 changeover ratchet	W2 *	1.9495-036
Adapter (3/4 to 1/2)	W3 *	1.9459-035
Feeler gauge	W4 *	1.9075-003

* not illustrated

Auxiliary material:

"G-Rapid Plus" Molycote paste**
 "Dirco Grau" (grey) silicon sealing compound**

** or a product of equal standard

Sequence of operations:

1. Disassembly

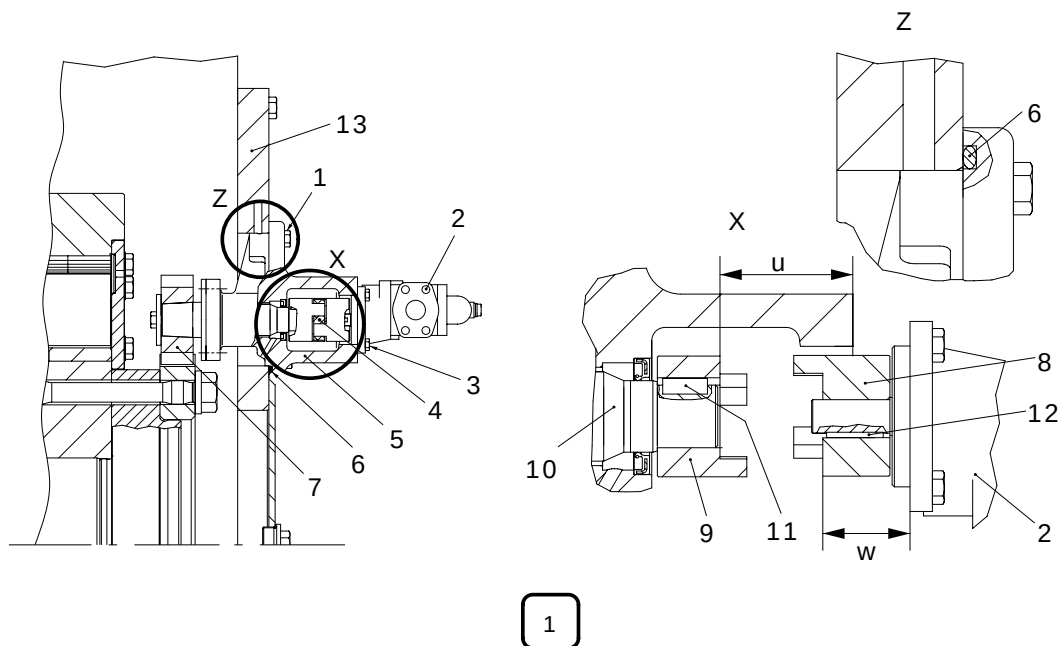
- 1.1 Close the stop cocks and drain the fuel from the lines (ball valve next to the injection pump of the 1st cylinder on the coupling side).
- 1.2 Loosen the lines on the pump.

M25

12000

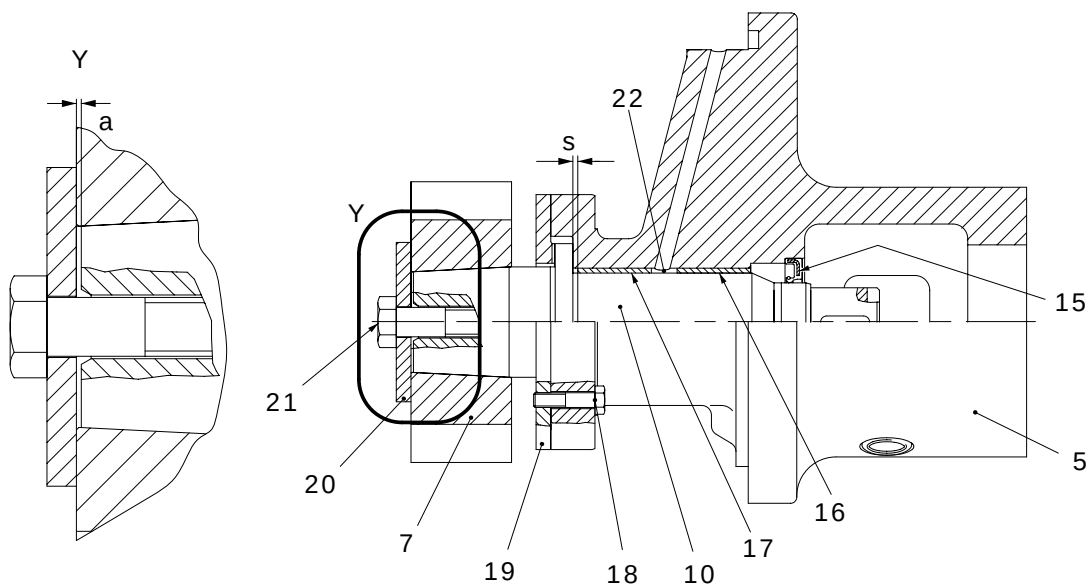
- 1.3 Loosen the hexagon bolts (**Fig.1/3**) and pull the fuel feed pump (2) with the coupling half (8) out of the drive housing (5).

07



1

- 1.4 Extract the coupling half (8) and remove the rubber element (4) and feather key (12).
- 1.5 Loosen the hexagon bolts (1) and extract the drive housing (5) together with the gear wheel (7) from the pump carrier plate (13).
- 1.6 Dismantle the hexagon bolt (**Fig.2/21**) and washer (20).



2

M25

12000

07

- 1.7 Extract the gear wheel (**Fig.2/7**) from the drive shaft (10) by means of an extractor.
- 1.8 Check the tooth profiles for wear (pitting, canted running, breakage).
- 1.9 Extract the coupling half (**Fig.1/9**) and remove the feather key (11).
- 1.10 Loosen the hexagon bolts (**Fig.2/18**) and press the drive shaft (10) together with the cover (19) towards the gear wheel side out of the drive housing (5).
- 1.11 Remove the shaft seal (15).
- 1.12 Check the bushes (16 and 17) and the drive shaft for wear. Press out worn bushes. Replace the drive shaft if it has scores.
- 1.13 Check the thrust bearing between the housing (5) and cover (19) for wear.

2. Reassembly

- 2.1 If necessary, fit the drive housing (**Fig.2/5**) with new bushes (16 and 17) making sure that the butt joint of each bush is in a horizontal position. Lubricate the bushes slightly before pressing them in. Do not use Molycote! Press in bush (16) flush with the rear shoulder and bush (17) at a distance of

$$s = 2 \text{ mm.}$$

The oil bore (22) must not be sealed off!

- 2.2 Check the contact pattern between the gear wheel cone and drive shaft cone before mounting the gear wheel (7). The contact pattern must be even and have a quota of > 80 %!
- 2.3 Clean, degrease and dry the gear wheel cone as well as the drive shaft cone.
- 2.4 Mount the gear wheel (**Fig.1/7**) on the drive shaft cone and measure and note the distance **a** (**Fig.2/Y**).
- 2.5 Erect the fuel feed pump with the drive shaft cone facing upwards.
- 2.6 Mount the cover (19) and heat up the gear wheel (7) by approx. 30 °C - 40 °C above the temperature of the drive shaft cone and place it on the drive shaft cone.

Note:

Do **not** heat the gear wheel up in an oil bath or by means of a direct flame!
 Do not apply any pressure to the gear wheel when placing it on the drive shaft cone! The dead weight of the gear wheel ensures that the necessary slip-on distance is attained!

- 2.7 Let the gear wheel cool down to room temperature and check the dimension **a**. It must be **0.14 - 0.18 mm** (slip-on distance) smaller than in a cold condition. If necessary, dismantle the gear wheel and repeat the assembly procedure.

M25

12000

07

- 2.8 Apply "G-Rapid Plus" Molycote paste to the thread as well as the contact surface of the hexagon bolt (21) and washer (20). Tighten the hexagon bolt at a torque of

$$M = 60 \text{ Nm.}$$

- 2.9 Insert a **new** shaft seal (**Fig.2/15**).
- 2.10 Push the drive shaft (10) into the drive housing (5) and mount the cover (19) on the drive housing (5). Press down the shaft seal (15).
- 2.11 Clamp the drive housing vertically and insert the feather key (**Fig.1/11**).
- 2.12 Heat up the coupling half (9) to 100 °C. Push it on to the journal of the drive shaft (10) and let it cool off.
- 2.13 Clean the contact surface on the drive housing (5) and the pump carrier plate and apply "Dirco-Grey" sealing compound.
- 2.14 Carefully place the drive housing together with the gear wheel in the pump carrier plate (the tooth profiles of the drive gear wheels must glide into each other) and assemble.
- 2.15 Insert the feather key (12), heat up the coupling half (8) to 100 °C and push it on to the shaft journal of the fuel feed pump (2). The dimension "**w**" must be observed.

$$w = u - 18,5 = \sim 40 \text{ mm}$$

Dimensions **w** and **u**: refer to **Fig. 1/X**.

- 2.16 Mount the fuel feed pump (2) together with the rubber element (4) and connect the fuel lines.
- 2.17 Remove the cover together with the seals and check the tooth clearance of the gear wheel (7) to the pump drive gear wheel by means of a feeler gauge.

Desired value **0,20 - 0,45 mm**

- 2.18 Check the seal and mount the cover.
- 2.19 Check the lubricating oil supply to the gear wheels.
- 2.20 Open the stop cocks, close the ball valve, fill the fuel system by means of the standby pump and bleed the system.

M25

07

See also: -
Spare parts list: B1.05.07.258510
Time requirement: 1 Pers./ 0,50 h
Personnel qualification: skilled engine hand
Operating medium: Heavy fuel and distillate fuel

Auxiliary material:

Molykote-paste "G-Rapid Plus" **

** or a produkt of equal standard

Sequence of operations:

1. Disassembly

- 1.1 Remove the covering of the fuel distributors.
- 1.2 Close the shut-off cocks, open the ball cock (**Fig.1/10**; beside the fuel distributor of the 1st cylinder) and drain the fuel distributor line.
- 1.3 Disassemble the hexagon cap screws (11 and 12) .
- 1.4 Hold tied the fuel distributor line (1), move the flanges (6, 7) to the right side and pull the fuel distributor line .

2. Assembly

- 2.1 Check the choking tube (8) of the fuel distributor (2), it must be tied ice-bound with an up-stand of

s = ca. 3 mm

- 2.2 Check the joint ring (5) and O-ring (4), replace if necassery.
- 2.3 Coat thread and contact surfaces of the hexagon cap screws (11, 12) with Molykote.
- 2.4 Mount the fuel distributor line (1) with flanges (6, 7), joint ring (5) and O-ring (4, both side) of the fuel distributors (2). Mount the flange (7) at the chocking tube. Mount the flange (6) at the flange (7).

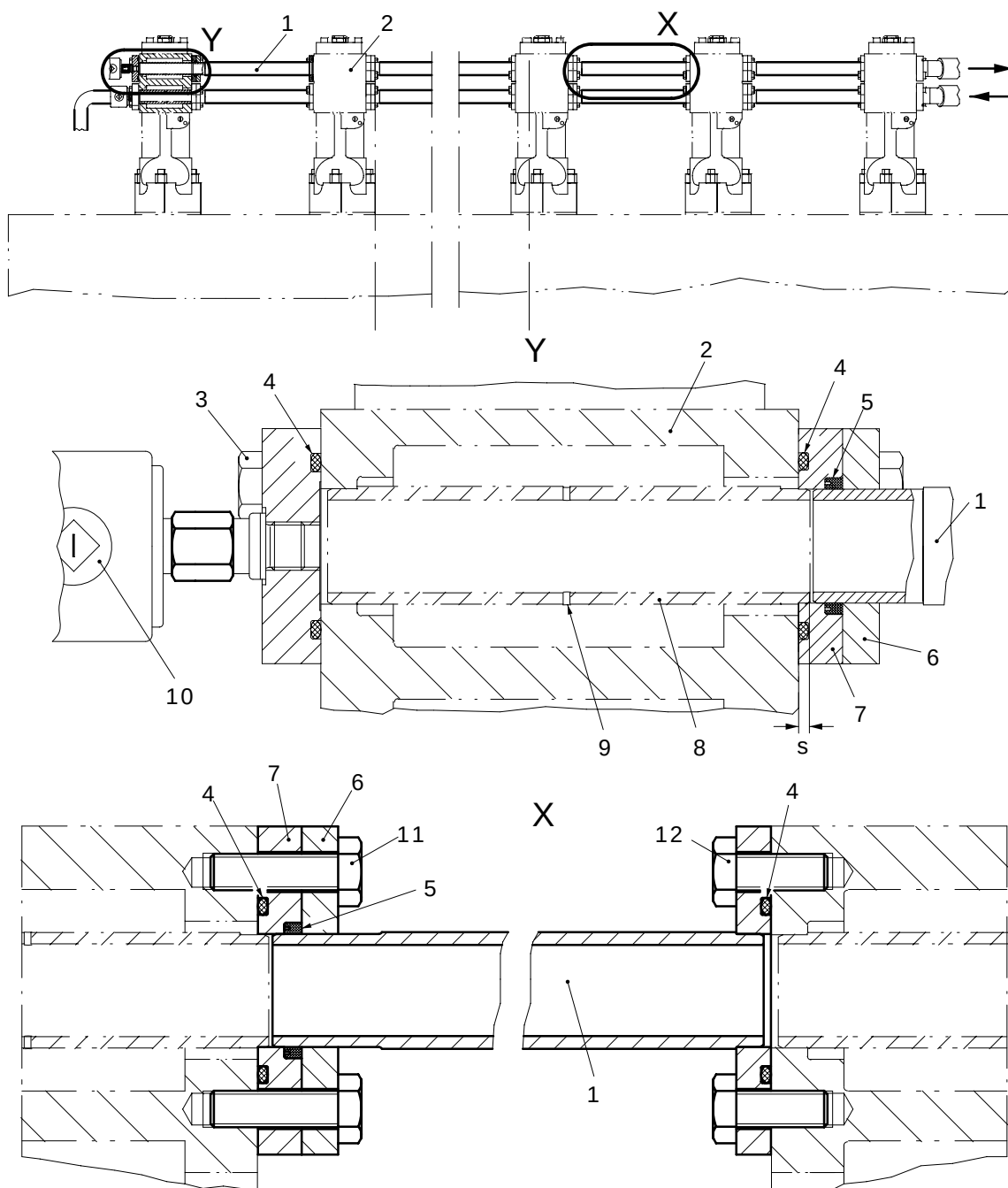
M25

- 2.5 Mount the hexagon cap screws (Fig. 1/11, 12) and tighten with a torque of

$$M = 20 + 5 \text{ Nm} .$$

- 2.6 Open the shut-off cocks, close the ball cock (10) , fill fuel system with the reserve pump and vent.

- 2.7 Mount the covering.



07

M25

07

See also: -
Spare parts list: B1.05.07.258510
Time requirement: 1 Pers./ 0,50 h
Personnel qualification: skilled engine hand
Operating medium: Heavy fuel and distillate fuel

Auxiliary material:

Molykote-paste "G-Rapid Plus" **

** or a produkt of equal standard

Sequence of operations:

1. Disassembly

- 1.1 Remove the covering of the fuel distributors.
- 1.2 Close the shut-off cocks, open the ball cock; beside the fuel distributor of the 1st cylinder) and drain the fuel distributor line.
- 1.3 Disassemble the hexagon cap screws (11 and 12) .
- 1.4 Hold tied the fuel distributor line (1), move the flanges (6, 7) to the right side and pull the fuel distributor line .

2. Assembly

- 2.1 Check the choking tube (8) of the fuel distributor (2), it must be tied ice-bound with an up-stand of

s = ca. 3 mm

- 2.2 Check the joint ring (5) and O-ring (4), replace if necassery.
- 2.3 Coat thread and contact surfaces of the hexagon cap screws (11, 12) with Molykote.
- 2.4 Mount the fuel distributor line (1) with flanges (6, 7), joint ring (5) and O-ring (4, both side) of the fuel distributors (2). Mount the flange (7) at the chocking tube. Mount the flange (6) at the flange (7).

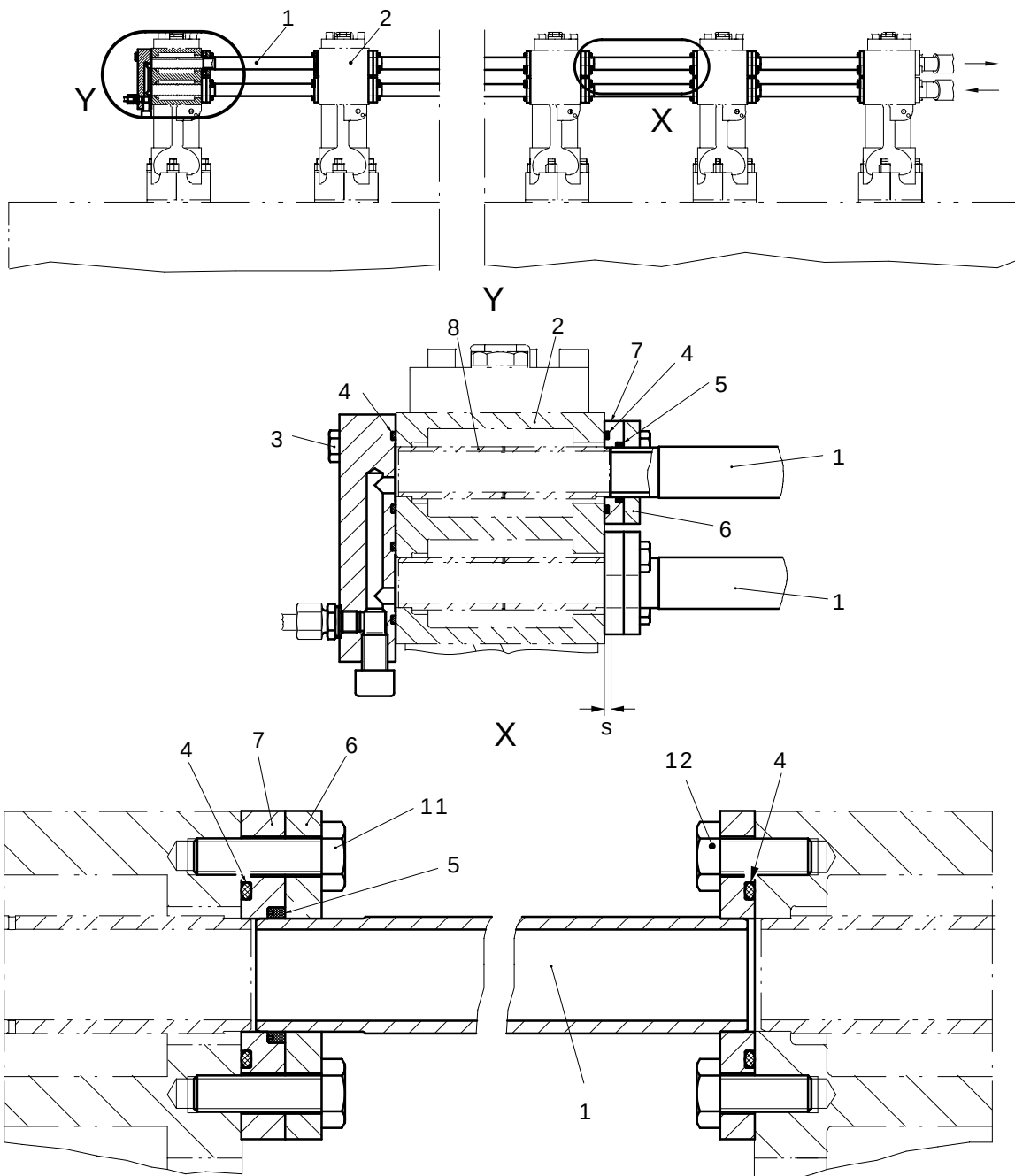
M25

- 2.5 Mount the hexagon cap screws (Fig. 1/11, 12) and tighten with a torque of

$$M = 20 + 5 \text{ Nm} .$$

- 2.6 Open the shut-off cocks, close the ball cock, fill fuel system with the reserve pump and vent.

- 2.7 Mount the covering.



07

M25

08

See also: 08.04.01.nn

Spare parts list: B1.05.08.25641n

Time requirement: 1 Pers./ 1,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Note:

After commissioning a new plant or working on the induction side of the lubricating oil piping system, the filtering screen on the induction side of the lubricating oil pumps have to be checked after 24-50 operating hours and cleaned if necessary.

The lubricating oil change interval depends on the following factors:

- Quality of the lubricating oil
- Operating conditions of the engine
- Lubricating oil consumption
- Lubricating oil filtering and separation
- Lubricating oil volume in the circulation system

The interval can be extended if the analysis values of the lubricating oil allow this. Permissible analysis values (regulations and care, engine lubricating oil, **A4.05.08**).

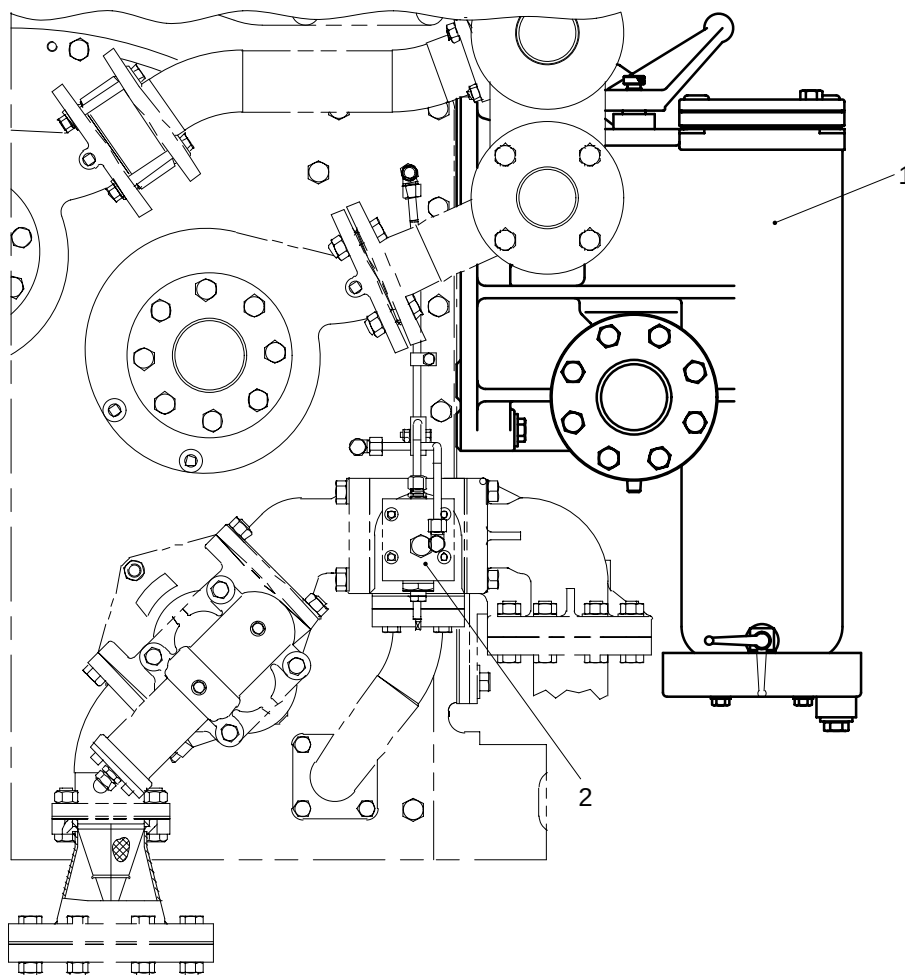
Sequence of operations:

1. Switch off the lube oil prelubricating pump.
2. Drain the engine circulation system and lubricating oil circulation tank.
3. If necessary clean the lubricating oil circulation tank and crank compartment.

M25

08

4. If necessary, remove and check the lubricating oil pressure control valve (**Fig. 1/2**) (**08.05.01.nn**).



5. Check the filtering screen in the suction lines of the lubricating oil pumps and the separator pump and clean if necessary.
6. Clean the lubricating oil duplex filter (1) (**08.04.01.nn**).
7. Clean the lubricating oil automatic filter.
8. Remove and clean the lubricating oil cooler (see the manufacturer's documents, book C, section 8).
9. Fill new lubricating oil (lubricating oil quality, **A4.05.08.nn**) up to the respective level mark on the circulation tank.
10. Fill up lubricating oil system and take the lube oil prelubricating pump into operation.

M25

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See also:

Spare parts list: B1.05.08.256417

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

08

Inspection:

Check the safety valve (Fig. 1/1)

every

12,000 h

Sequence of operations:

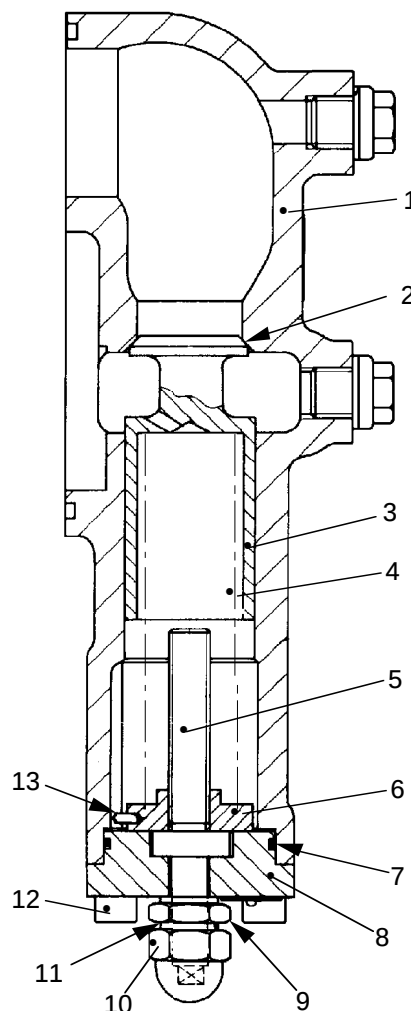
1. Loosen the hexagon nut (11) and remove the cap nut (10).



Safety note:

Pay attention to the spring tension of the pressure spring (4) on the valve cover (8)!

2. Relieve the pressure spring (4), to do so, turn the valve spindle (5) clockwise to the limit of the valve head (6) on the valve cover (8).
Note the number of revolutions.
3. Loosen the cheese head screws (12), remove the valve cover (8), valve nut (6), valve spindle (5), pressure spring (4) as well as the O-ring (7).
4. Pull the valve piston (3) out of the safety valve (1).
5. Check the sealing surfaces on the valve piston (3) and in the safety valve housing (2). Regrind the valve seat if necessary.
6. Check the running surfaces of the valve piston and in the safety valve housing.



M25

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-
7. Carefully clean the sealing and running surfaces.
 8. Check the O-ring (7) and replace it if necessary.
 9. Mount the safety valve in the reverse sequence. Pay attention to the straight pin (13).
 10. Screw in the valve spindle (5) counter-clockwise with the number to revolutions noted.
 11. Take the lubricating oil pump into operation and optimize the pressure adjustment.
 12. Screw on the cap nut (10) and secure with the hexagon nut (11).
 13. Vent the lubricating oil system. Check the tightness of the lubricating oil system.

08

M25

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See also:

Spare parts list: B1.05.08.256417

Time requirement: 0 Pers./ 0,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

60 - 320 Nm torque wrench	W1 *	1.9454-320
Reversible ratchet 3/4	W2 *	1.9495-036
Adapter (3/4 to 1/2)	W3 *	1.9459-035

* not illustrated

Auxiliary material:

Molykote paste "G-Rapid Plus" **

"Dirco 610.020" universal sealant

** or a product of equal standard

Note:

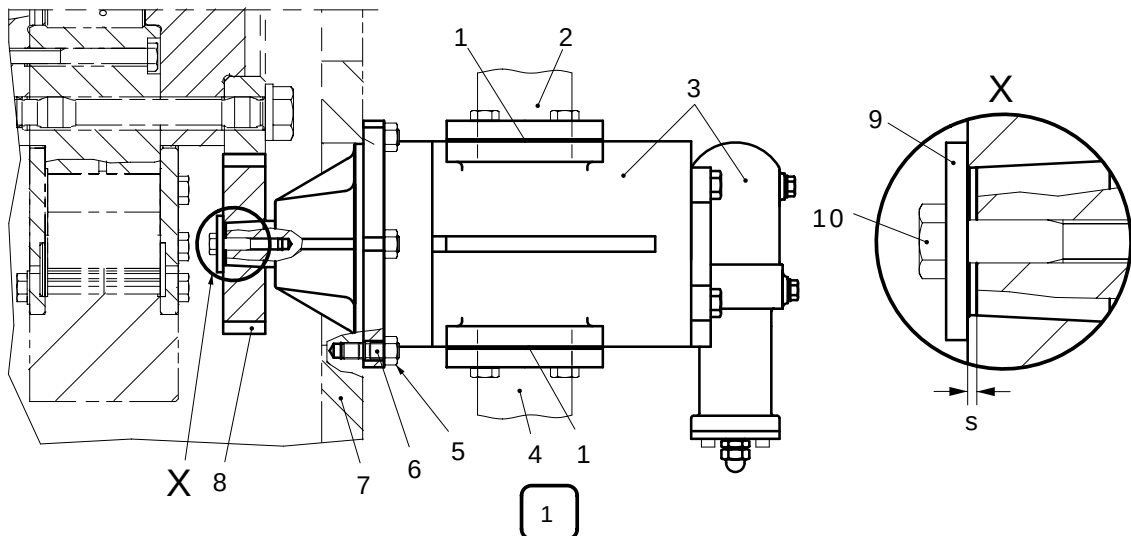
If necessary, the lubricating oil pump must be removed from the engine and the gearwheels, gearwheel shaft and bushes must be checked for wear and replaced if necessary.

Sequence of operations:

1. Disassembly

1.1 Drain the lubricating oil system.

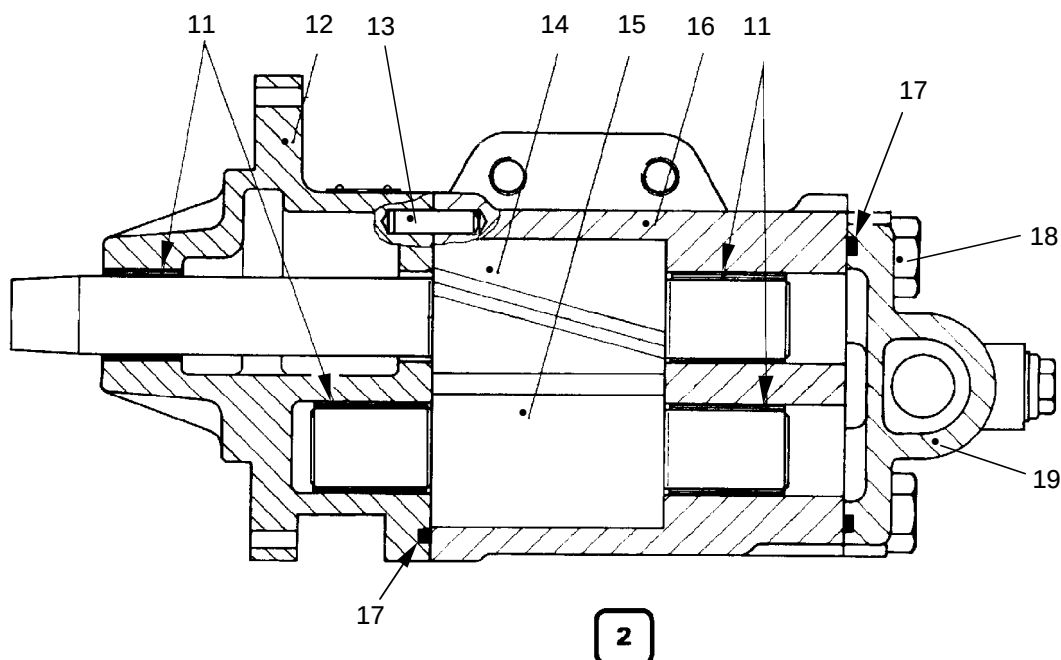
1.2 Remove the suction (**Fig. 1/4**) and pressure line (2).



M25

08

- 1.3 Loosen the hexagon nuts (**Fig. 1/5**) and pull the lubricating oil pump (3) with the gearwheel (8) off the pump support plate (7).
- 1.4 Remove the hexagon bolt (10) and washer (9).
- 1.5 Use an extractor to pull the gearwheel (8) off the drive wheel shaft (**Fig. 2/14**).
- 1.6 Check the tooth profiles for wear (pitting, slanted running, breakage).
- 1.7 Loosen the cheese head screws (18) and remove the safety valve (19) from the wheel casing (16).



- 1.8 Remove the wheel casing (16) with the drive wheel shaft (14), impeller shaft (15) and the rear bushes (11).
- 1.9 Check the bearing areas of the drive wheel shaft and impeller shaft in all bushes (11) for wear and replace the bushes with original MaK spareparts if necessary.

Note:

Cool new bushes to - 20 °C before fitting them.

2. Reassembly

- 2.1 Mount the lubricating oil pump in the reverse sequence. Check the O-rings (**Fig. 2/17**) and replace them if necessary.

M25

08

- 2.2 Before assembling the gearwheels, check the contact reflection between the gearwheel cone (**Fig. 1/8**) and the drive wheel shaft cone (**Fig. 2/14**) by spotting. The contact reflection must be even and the proportion must be > 80%!
- 2.3 Clean, degrease and dry the gearwheel cone and the drive wheel shaft cone.
- 2.4 Fit the gearwheel (**Fig. 1/8**) on the drive wheel shaft cone. Measure the distance **s** (**Fig. 1/X**) and note it.
- 2.5 Set-up the lubricating oil pump with the drive wheel shaft cone facing upwards.
- 2.6 Heat up the gearwheel (8) by approx. 90 °C to 100 °C above the temperature of the drive wheel shaft and put it on the drive wheel shaft cone.

Note:

Do **not** heat up the gearwheel in an oil bath or directly over a flame!
Do not apply pressure to the gearwheel when fitting the gearwheel on the drive wheel shaft cone! The dead weight of the gearwheel ensures that the required slip-on distance is attained!

- 2.7 Let the gearwheel cool down to room temperature and check the spacing **s**. It must be **0.4 - 0.44 mm** (slip-on distance) smaller then in a cold condition. If necessary, remove the gearwheel and repeat assembly.
- 2.8 Apply Molycote paste to the thread and contact surfaces of the hexagon bolt (10) and washer (9).
- 2.9 Tighten the hexagon bolt (10) at a torque of

M = 60 Nm.
- 2.10 Clean the contact surface of the drive cover (**Fig. 2/12**) and the pump support plate (**Fig. 1/7**) and then apply sealant.
- 2.11 Carefully insert the lubricating oil pump (3) with gearwheel (8) in the pump support plate (the teeth of the drive gearwheels must glide into each other) and mount.
- 2.12 Check the backlash **0.20 mm - 0,45mm** through the opening of cover.
- 2.13 Mount the suction line (4) and pressure line (2) with **new** seals (1).
- 2.14 Fill new lubricating oil (lubricating oil quality, see **A4.05.08.nn**) up to the respective level mark on the circulation tank.
- 2.15 Fill up the lubricating oil system and take the lube oil pre-lubricating pump into operation.
- 2.16 Vent the system and check for leakage.
- 2.17 Check the lubricating oil supply for the gearwheels.

M25

08

See also:

Spare parts list: B1.05.08.256417

Time requirement: 0 Pers./ 0,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

60 - 320 Nm torque wrench	W1 *	1.9454-320
Reversible ratchet 3/4	W2 *	1.9495-036
Adapter (3/4 to 1/2)	W3 *	1.9459-035

* not illustrated

Auxiliary material:

Molykote paste "G-Rapid Plus" **

"Dirco 610.020" universal sealant

** or a product of equal standard

Note:

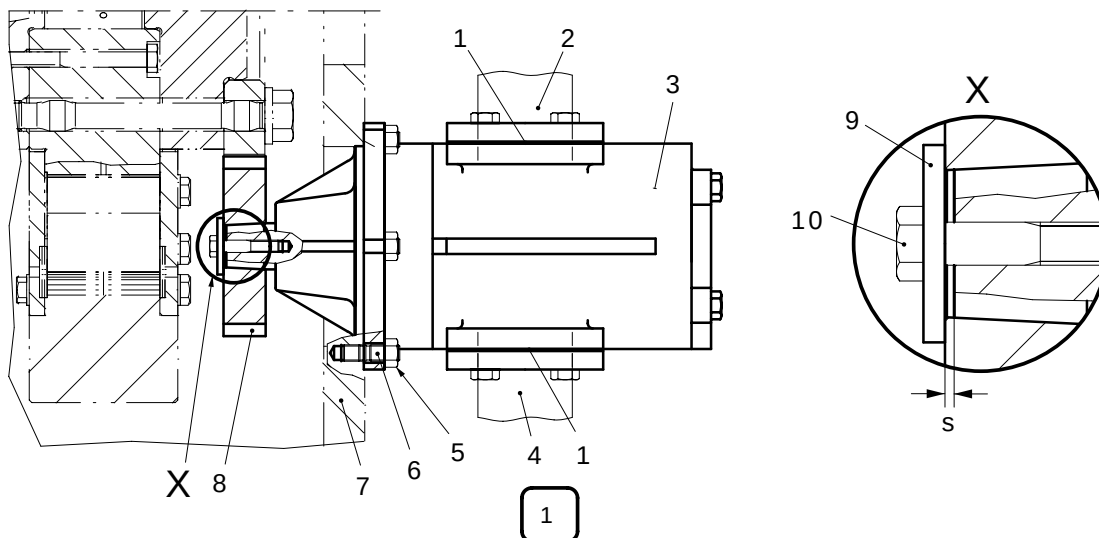
If necessary, the lubricating oil pump must be removed from the engine and the gearwheels, gearwheel shaft and bushes must be checked for wear and replaced if necessary.

Sequence of operations:

1. Disassembly

1.1 Drain the lubricating oil system.

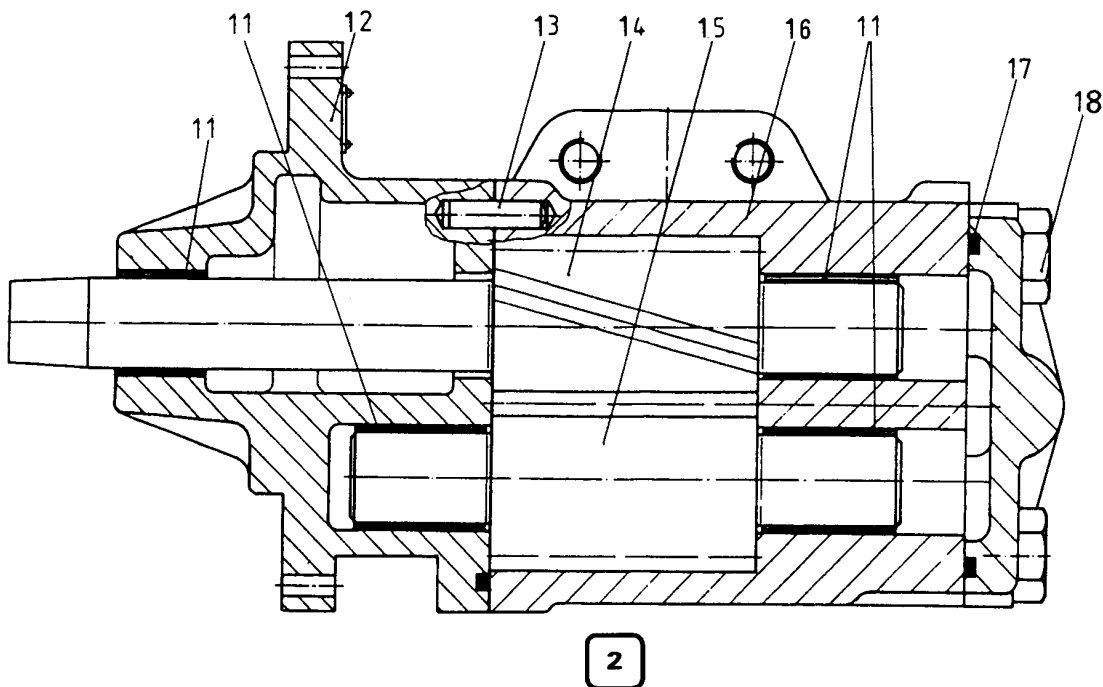
1.2 Remove the suction (**Fig. 1/4**) and pressure line (2).



M25

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- 1.3 Loosen the hexagon nuts (**Fig. 1/5**) and pull the lubricating oil pump (3) with the gearwheel (8) off the pump support plate (7).
- 1.4 Remove the hexagon bolt (10) and washer (9).
- 1.5 Use an extractor to pull the gearwheel (8) off the drive wheel shaft (**Fig. 2/14**).
- 1.6 Check the tooth profiles for wear (pitting, slanted running, breakage).
- 1.7 Loosen the cheese head screws (18) and remove the cover (19) from the wheel casing (16).



- 1.8 Remove the wheel casing (16) with the drive wheel shaft (14), impeller shaft (15) and the rear bushes (11).
- 1.9 Check the bearing areas of the drive wheel shaft and impeller shaft in all bushes (11) for wear and replace the bushes with original MaK spareparts if necessary.

Note:

Cool new bushes to - 20 °C before fitting them.

2. Reassembly

- 2.1 Mount the lubricating oil pump in the reverse sequence. Check the O-rings (**Fig. 2/17**) and replace them if necessary.
- 2.2 Tighten the cheese head screw (18) at a torque of

M = 150 Nm

M25

08

- 2.3 Before assembling the gearwheels, check the contact reflection between the gearwheel cone (**Fig. 1/8**) and the drive wheel shaft cone (**Fig. 2/14**) by spotting. The contact reflection must be even and the proportion must be > 80%!
- 2.4 Clean, degrease and dry the gearwheel cone and the drive wheel shaft cone.
- 2.5 Fit the gearwheel (**Fig. 1/8**) on the drive wheel shaft cone. Measure the distance **s** (**Fig. 1/X**) and note it.
- 2.6 Set-up the lubricating oil pump with the drive wheel shaft cone facing upwards.
- 2.7 Heat up the gearwheel (8) by approx. 90 °C to 100 °C above the temperature of the drive wheel shaft and put it on the drive wheel shaft cone.

Note:

Do **not** heat up the gearwheel in an oil bath or directly over a flame!
 Do not apply pressure to the gearwheel when fitting the gearwheel on the drive wheel shaft cone! The dead weight of the gearwheel ensures that the required slip-on distance is attained!

- 2.8 Let the gearwheel cool down to room temperature and check the spacing **s**. It must be **0.40- 0.44 mm** (slip-on distance) smaller then in a cold condition. If necessary, remove the gearwheel and repeat assembly.
- 2.9 Apply Molycote paste to the thread and contact surfaces of the hexagon bolt (10) and washer (9).
- 2.10 Tighten the hexagon bolt (10) at a torque of

M = 60 Nm.
- 2.11 Clean the contact surface of the drive cover (**Fig. 2/12**) and the pump support plate (**Fig. 1/7**) and then apply sealant.
- 2.12 Carefully insert the lubricating oil pump (3) with gearwheel (8) in the pump support plate (the teeth of the drive gearwheels must glide into each other) and mount.
- 2.13 Check the backlash **0.20 mm - 0,45mm** through the opening of cover.
- 2.14 Mount the suction line (4) and pressure line (2) with **new** seals (1).
- 2.15 Fill new lubricating oil (lubricating oil quality, see **A4.05.08.nn**) up to the respective level mark on the circulation tank.
- 2.16 Fill up the lubricating oil system and take the lube oil pre-lubricating pump into operation.
- 2.17 Vent the system and check for leakage.
- 2.18 Check the lubricating oil supply for the gearwheels.

M25

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See also:

Spare parts list: B1.05.08.257657

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Cleaning pistol	W1	1.9100-110
Cartridge ejector	W2	1.9100-120

Auxiliary material:

"Filter clean" cleaning liquid from Messrs. Vecom *

* or a product of equal standard

Note:

Operation and maintenance of the filter must be carried out with extreme care as dirt out of the tanks and pipelines can cause heavy damage to the engine.

The cleaning interval for the filter is influenced by partial load operation with heavy fuel, poor combustion, poor separation or a defective automatic filter.

After commissioning a new plant or after more extensive repairs or work on the lubricating oil piping system, the filter must be checked after 24-48 hrs and cleaned if necessary.

The filter cartridges must be removed during every 3rd cleaning (operation sequence **2.3**).

The filter cartridges should not be cleaned by means of ultrasonics as the cloth could be damaged as a result of improper storage whilst cleaning and excessively long cleaning times. This damage could be invisible to the naked eye.

M25

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Sequence of operations:

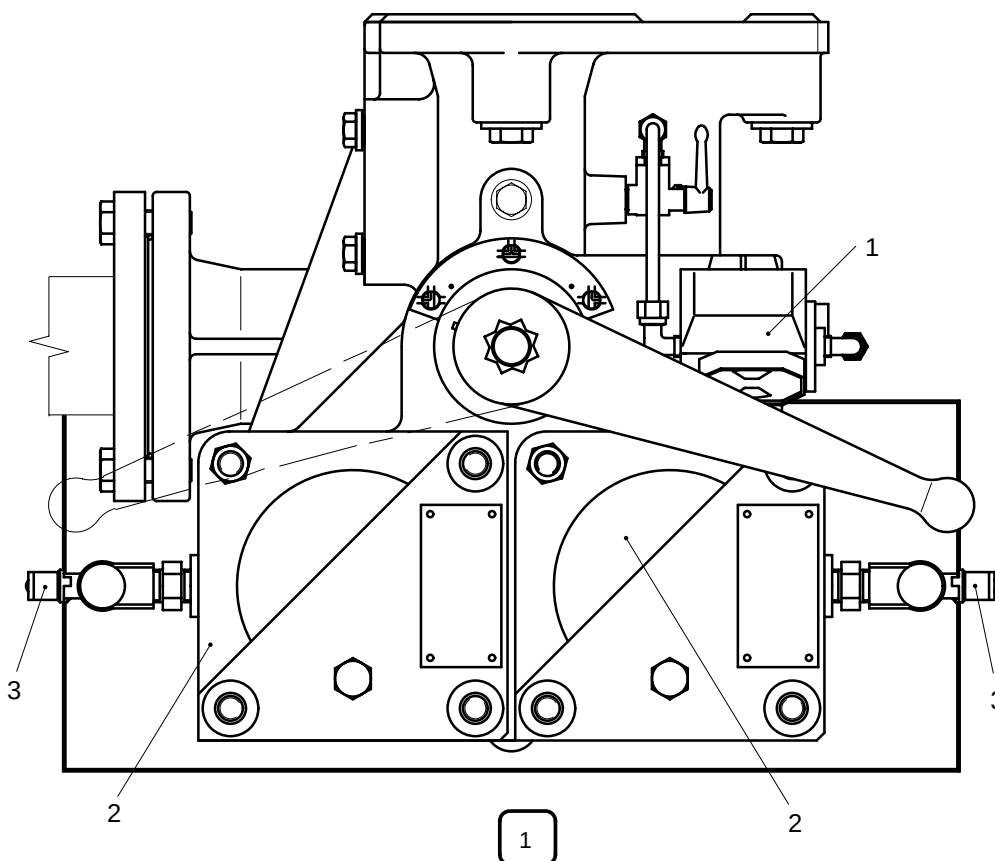
1. Carry out the Reversible procedure (see the plate on the filter cover).

2. Cleaning

2.1 Clean the filter whilst it is in a warm condition from operation when

50% of the red zone

of the differential pressure indicator (**Fig. 1/1**) is visible or the filter alarm has been activated.


2.2 Cleaning the filter with the filter cartridges fitted.


Safety note:
Depressurize the filter chamber!

2.2.1 Open the sludge drain (3) of the filter chamber which has been switched off. Drain the contaminated liquid and remove the cover (2).

2.2.2 Remove the filter insert.

M25

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- 2.2.3 Connect the cleaning pistol (Fig. 2/W1) to the compressed air supply and apply the operational air pressure.

p = 6 - max. 10 bar

- 2.2.4 Push the splash guard (13) down to the nozzle limit stop of the cleaning pistol, place it in the opening of the cartridge and hold it tight. Press the trigger of the cleaning pistol and slowly insert the nozzle down to the bottom of **each cartridge (14)**.

- 2.2.5 Check the seal, replace if necessary and mount the cover.

- 2.2.6 Fill up and vent the filter chamber (see plate on the filter cover).

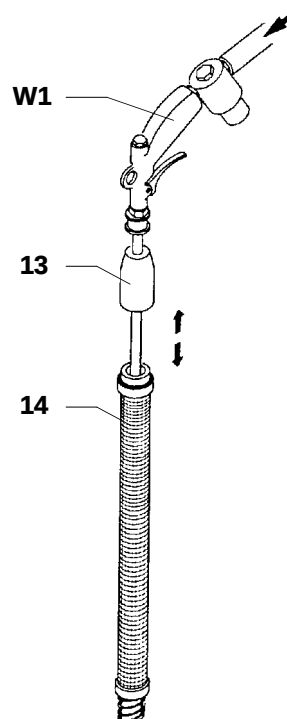
2.3 Cleaning the filter with cartridges removed (every 3rd cleaning).

- 2.3.1 Open the sludge drain (Fig. 1/3) of the filter chamber which has been switched off. Drain the contaminated fluid and remove the cover (2).

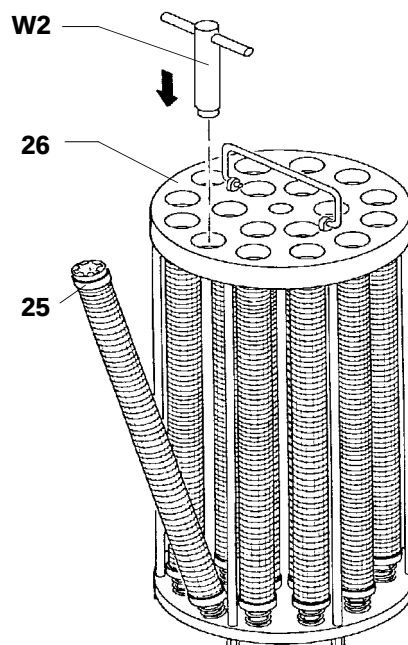
- 2.3.2 Remove the filter insert.

- 2.3.3 Flush the filter chamber with gas oil.

- 2.3.4 Place the filter insert in a vessel filled with a suitable cleaning fluid. **The fluid level is only allowed to reach up to the lower edge of the screen plate (Fig. 3/26) so that no contaminated fluid can flow into the filter cartridges (14) from the top. The upper area of the screen must therefore be visible on the inside (in the cartridge).** The soaking time depends on the instructions of the cleaning agent manufacturer, but should not exceed **4 hours**.



2



3

M25

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-
- 2.3.5 Take the filter insert out of the cleaning vessel and blow out the cartridges (14) with the cleaning pistol (**Fig. 2/W1**) (2.2.3 and 2.2.4).
 - 2.3.6 Submerge the filter insert in clean cleaning liquid again, let it drip off and then blow it out with the cleaning pistol (W1). Turn the filter insert upside down so that cleaning liquid can drain off.
 - 2.3.7 Check the cartridges for damage from time to time (**2.4**).
 - 2.3.8 Place the filter insert in the filter chamber. Check the seal and replace if necessary. Fit the cover.
 - 2.3.9 Fill up and vent the filter chamber (see the plate on the filter cover).

2.4 Cleaning the cartridges in the event of obstinate contamination.

Note:

If the filter insert is badly contaminated (paint, crusting, tar deposits, fibres, shavings), the cartridges have to be removed and cleaned individually (2.3).

- 2.4.1 Soak the filter insert in a cleaning fluid (up to **4 hrs**).
- 2.4.2 Loosen the base plate and carefully pull the protective jacket off the filter insert.
- 2.4.3 Use the cartridge ejector (**Fig. 3/W2**) to push out the cartridges (14) downwards.
Remove the O-rings (25) between the cartridge and screen plate (26) as the O-rings are not allowed to come into contact with the cleaning fluid.
- 2.4.4 **Check the cartridges and replace them if they are damaged or if there is heavy creasing.**

Attention:

If one filter cartridge is damaged, this then means that the whole filter is not serviceable. Do not place the cartridges on top of each other when removing them as this could result in the cloth being damaged.

- 2.4.5 Connect the cleaning pistol (**Fig. 2/W1**) to the compressed air supply (2.2.3).
- 2.4.6 Insert the nozzle of the cleaning pistol down to the bottom of **every cartridge** holding back the trigger.
- 2.4.7 Use a soft brush to remove dirt clinging to the cartridge.

M25

08**Note:**

If a high pressure cleaner is available, then spray the filter cartridges from the outside using a fan nozzle. The **maximum** operating pressure of the high pressure cleaner is **60 bar**.
Cleaning agent: Warm water or water with a cleaning fluid.

Attention:

When using a high pressure cleaner for cleaning, do not hold the nozzle too close to the cloth to avoid damaging / displacing the screen wires.

- 2.4.8 Rinse the cartridges in clean cleaning fluid. Blow them out and let them dry with the opening at the bottom.
- 2.4.9 Hold a powerful source of light behind the cloth and check whether cleaning has been successful. Repeat the cleaning process if the result is poor.
- 2.4.10 Fit the cartridges in the reverse sequence described under 2.4.3. The O-ring between the cartridge and the screen plate must be free from tears and must not be deformed.
- 3. Check the seal between the screen plate and filter housing and replace it if necessary.
- 4. Mount the filter insert in the filter chamber.
- 5. Check the seal and replace if necessary. Mount the cover.
- 6. Fill up and vent the filter chamber (see the plate on the filter cover).

M20/M25/M32/M43/M453C/M552C/M601C

150

See also: C5.05.08.10.00.nn

Spare parts list:

Time requirement: 1 Pers./ 0,20 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

08

Maintenance:

Prelubrication and turning approximately every 150 h

Note:

When multi-engine systems run on rigid bearings, the bearings might be damaged by vibration when individual engines are shut down for **more than 3 days**.

Prelubrication alone is no guarantee that damage caused by vibration is prevented, since the components which run on sliding bearings, are not able to float in the bearing because of the prelubricating pressure. No or only a little quantity of oil is carried to the endangered contact surfaces.

Damage caused by vibration during engine shut-down can only be avoided when the engine is lubricated and turned simultaneously.

The following method is to be applied to avoid damage caused by engine shut-down, without affecting the unattended operation of the system:

Sequence of operations:

1. Carry out steps 1.1 and 1.2 simultaneously **for approx. 5 min.**
- 1.1 Start the stand-by pump
- 1.2 Turn the engine by means of the barring gear.

M25

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See also:

Spare parts list: B1.05.09.9.6437, B1.05.09.256440

Time requirement: 1 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

09

Maintenance:

Disassemble the cooling water centrifugal pump
and check for wear every 12,000 h

Auxillary material :

Molykote-Paste „G-Rapid Plus“ *
Universal Dichtung „Dirco 610.020“ *
Loctite 222 *
Loctite 270 *

* or a product of equal standard

Sequence of operations:

1. Disassembly

- 1.1 Drain cooling water; loosen connecting pipeline from the reserve pump to the cooling water distribution pipeline.

Inspection:

Thermometer muffs above the cooling water pump.

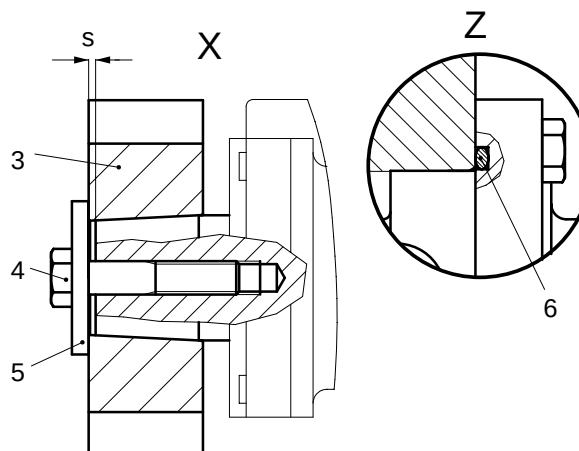
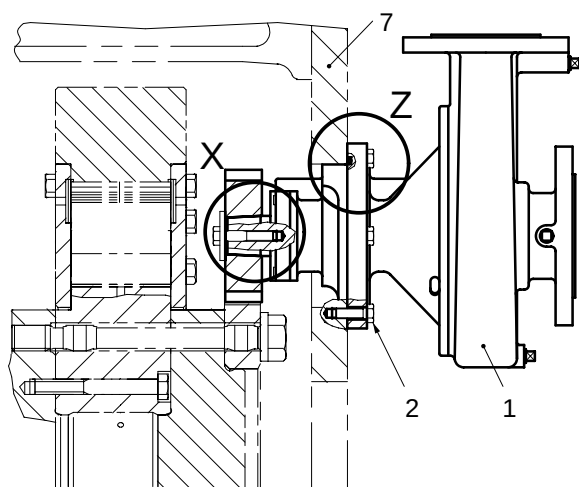
- 1.2 Remove pipelines from the cooling water pump (Fig. 1/1).

- 1.3 Loosen hexagon cap screws (2) and pull cooling water pump (1) with gearwheel (3) out of the cylinder crankcase (7).

- 1.4 Remove O-ring (6).

- 1.5 Fix shaft (Fig. 2/23) in bore (u) with pin (10 mm).

- 1.6 Loosen hexagon cap screw (Fig. 1/4) and remove with disk (5).

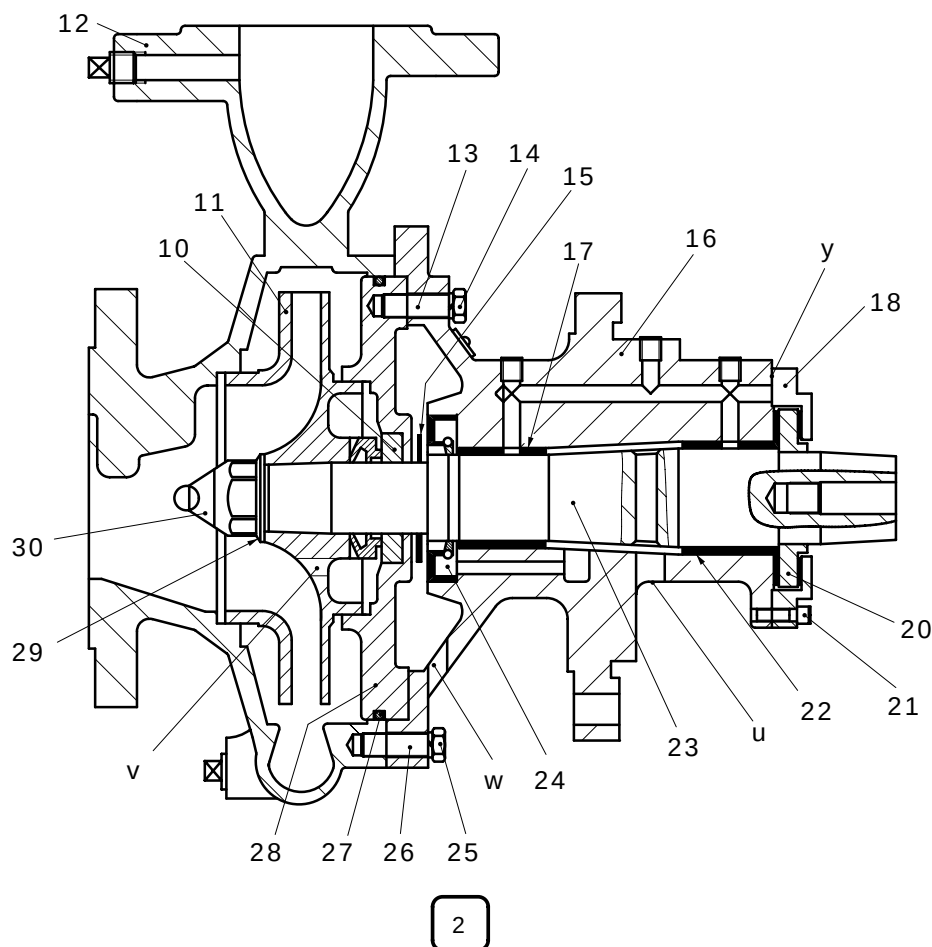


1

M25

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 1.7 Pull of gearwheel (**Fig. 1/3**) from shaft (**Fig. 2/23**) with extractor.

09


- 1.8 Check tooth profile for wear (pitting, slanting run, splintering).
- 1.9 Loosen hexagon nuts (25), extract bearing housing (16) with seal plate (28) and running wheel (11) from the spiral housing (12). Remove O-ring (27).
- 1.10 Loosen nut on running wheel (30) and remove with running wheel disk (29). Pull running wheel (11) off shaft (23) with extractor.
- 1.11 Remove gasket set (10).
- 1.12 Loosen hexagon nuts (14) and remove sealing plate (28) from bearing housing (16) and pull off centrifugal disk (15).
- 1.13 Loosen screws (21), disassemble end cover (18) and thrust washer (20).
- 1.14 Force shaft (23) out of bearing housing (16) with suitable tool, remove oil seal (24).
entfernen.

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2. Inspection**09**

- 2.1 Visual inspection of running wheel (**Fig. 2/11**), replace if there are signs of severe cavitation.
- 2.2 Inspect front and rear bearing (17 and 22) as well as shaft for wear and corrosion, replace if necessary.
- 2.3 Inspect all parts and the outlet openings (**v, w**), clean if necessary.

3. Assembly

- 3.1 Assembling is effected in the reverse sequence, taking notice of the following points:
- 3.2 Replace oil seal (24), gasket set (10) and O-ring (27). Mount centrifugal disk (15).
- 3.3 Apply a ring of silicone sealing compound around the oil bore (**y**) of the bearing housing, mount the thrust disk (20) and end plate (18).
- 3.4 Insert screws (21) with screw lock "Loctite 270" and tighten.
- 3.5 Before mounting the running wheel (11), inspect contact reflection between running wheel cone and shaft cone through spot grinding.
The contact reflection must be even and the contact reflection quota must be > 80 % !
- 3.6 Before mounting the gearwheel (**Fig. 1 /3**), inspect contact reflection between gear wheel cone and shaft cone through spot grinding.
The contact reflection must be even and the contact reflection quota must be > 80 %!
- 3.7 Clean and dry running wheel, gearwheel and shaft cones after having removed grease.
- 3.8 Mount running wheel (**Fig. 2/11**) and running wheel disk (29), coat thread of the running wheel nut (30) and the shaft (23) with screw lock.
- 3.9 Fix shaft with pin and tighten running wheel nut with a torque of

M = 60 Nm

and finally turn through an angle of 170°.

M25

12000

09

- 3.10 Mount gearwheel (**Fig. 1/3**) on drive gearwheel shaft cone, measure distance "s" (**X**) and note.
- 3.11 Place the cooling water pump with gearwheel shaft cone on top.
- 3.12 Heat up gearwheel to approx. 90 °C to 100 °C above the temperature of the shaft and mount firmly to the limit on the shaft cone

Note:

Do not heat up the gearwheel in oil-bath or with direkt flame !
 Mount the drive gearwheel shaft cone without pressure at the gearwheel ! The weight of the gearwheel makes shure, that the gearwheel will be mount correct!

- 3.13 Cool down the gearwheel to room temperature and check distance measurement "s" (**X**), it must be **0.40- 0.44 mm** smaller than in the cold condition. If neccaessary dismount and mount the gearwheel ones more.
- 3.14 Coat the thread and contact surface of the hexagon cap screw (4) and disk (5) with Molykote paste "G-Rapid Plus" and tighten with a torque of

M = 60 Nm.

- 3.15 Replace O-ring (6), carefully insert cooling water pump with gearwheel (3) into cylinder crankcase (tooth profiles of the drive gearwheels must slide into each other) and assemble.
- 3.16 Check the backlash **0.20 mm - 0,45mm** through the opening of cover.
- 3.17 Mount pipelines and connecting lines of the reserve pump to the cooling water distribution line, fill up cooling water system and vent.
- 3.18 Check lubricating oil supply of gearwheels, also check for leakage.

M25

600

See also: 07.02.01.nn

Spare parts list: B1.05.05.254241

Time requirement: 1 Pers./ 0,20 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

10

Inspection:

Check operation of the stop cylinder every 600 h

Note:

Only carry out the inspection when the engine has been shut down during the scope of other work!

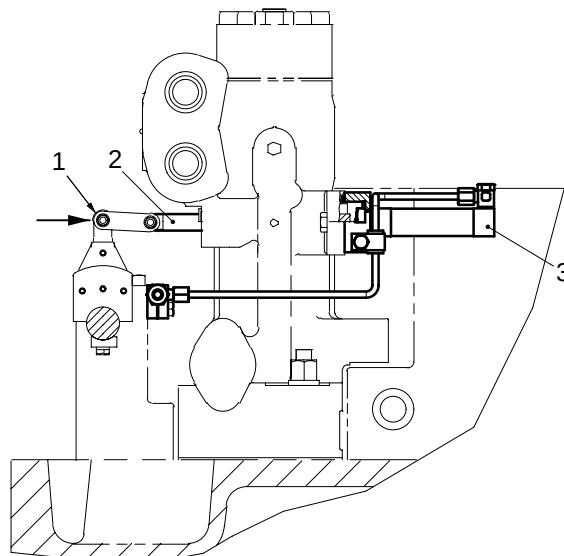
Sequence of operations:

1. Activate the emergency stop facility (machine control room).
2. Check the position of the control rods.

Attention:

The control rods must be in the "zero-filling level" position!

3. Check the stop cylinder (3). To do so, press the control rod (2) into the injection pump by applying pressure to the saddle (1).



Note:

Check all injection pumps.

Replace the respective stop cylinder if individual control rods/only one control rod can be pushed into the injection pump against the pressure of the stop cylinder (07.02.01.nn). Check the control air lines for leakage/damage if all control rods can be pushed in.

4. Press the "Reset" button on the safety system.

Note:

The solenoid valve is reset and the emergency stop facility is vented.

See also:

Spare parts list: B1.05.11.9.4843

Time requirement: 1 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Adjusting device, electro test instrument

Inspection:

Inspect the pressure switch for the set operating values every 3,000 working hours.

Note:

The following test and adjustment instruction is valid for the following types:

- Pressure range 0.2 - 2.5 bar mechanical switching differential: 0.15 bar
- Pressure range 0 - 6 bar mechanical switching differential: 0.2 bar
- Pressure range 1 - 16 bar mechanical switching differential: 0.4 bar
- Pressure range 0.9 - 1.5 bar mechanical switching differential: 0.08 bar
- Pressure range 2 - 25 bar mechanical switching differential: 1,5 bar

Sequence of operations:

1. Connection of the adjusting device

1.1 Close the cock of the pressure piping (**Fig. 1/1**).

1.2 Loosen the union nut (2) and remove the dummy plug (pressure release of the piping, at liquid medium collect the liquid with a rag).

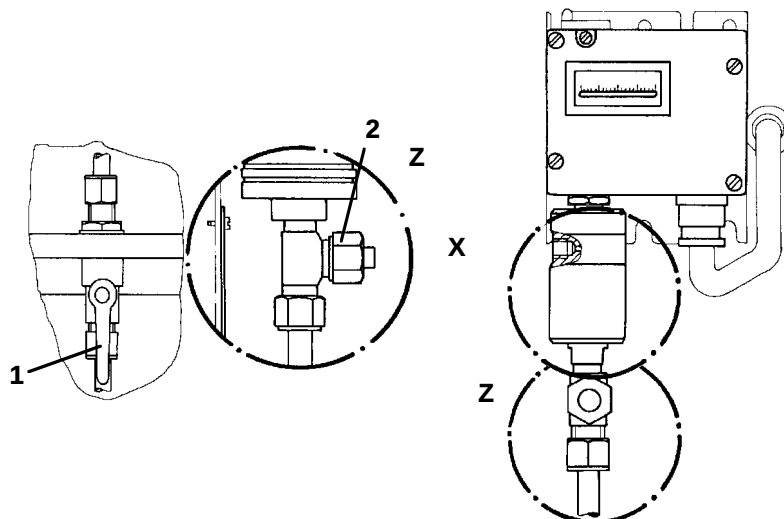


Fig. 1

Attention:

When loosen/thighten the union nut directly located at the pressure joint of the pressure switch, it should be simultaneously counter acted at the key faces of the pressure joint.

- 1.3 Connect the hose (with union nut and cutting) with the adjusting device (**Fig. 2**).

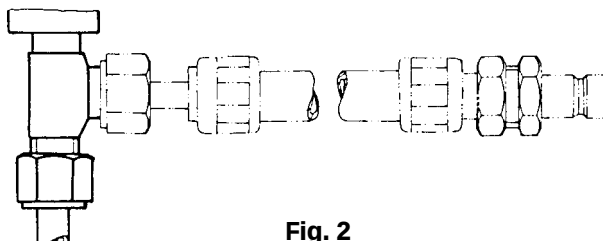


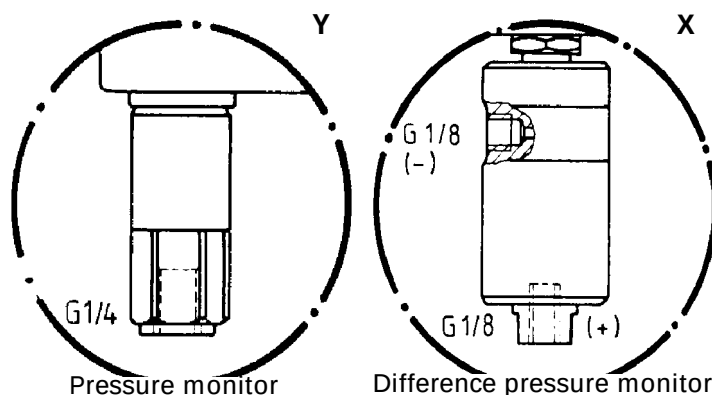
Fig. 2

2. Inspection of the set values

- 2.1 Ventilate the pressure switch via the adjustment device.

Attention:

For setting the differential pressure switch, the adjusting device must be equipped with two text connections (+, -, pressure difference) refer to view "X".



- 2.2 Inspect the pressure control via the pressure gauge (of the device) and simultaneously the switch point at the instrument or alarm unit for coincidence of the switch point with the set value.
- 2.3 At any deviation correct the adjustment due to item 3.
- 2.4 Deaerate the pressure switch slightly and simultaneously check the switch point via the test instrument. Inspect the displayed switch difference.

3. Correction of the adjustment (Performance with fixed switch difference) (Fig. 3)

Note:

The scale accuracy is $\pm 2\%$ of the span. The instrument is individually calibrated (1 - 2 on) so that no gauge inspection is necessary.

- 3.1 Remove the case cover by loosening the 4 locking screws.
- 3.2 Connect terminal (1 + 4) via cable with the adjusting device.
- 3.3 Loosen the stop screw (A).
- 3.4 Remove the cover aside by loosening the locking screw (B).
- 3.5 Set the upper or lower switching point (differential pressure switch) by means of the range spindle (C).

The lower or upper switching point (differential pressure switch) results in the fixed switching difference.

- 3.6 Tighten stop screw (A).

4. Removal of the adjusting device

- 4.1 Loosen the cable connection (terminal 1 + 4).
- 4.2 Loosen the connection hose of the adjusting device screw on the union nuts with plug (Fig. 1/2).
- 4.3 Fit the cover.
- 4.4 Tighten the cover of the range spindle.
- 4.5 Mark or lead the impacted or corrected pressure switches.

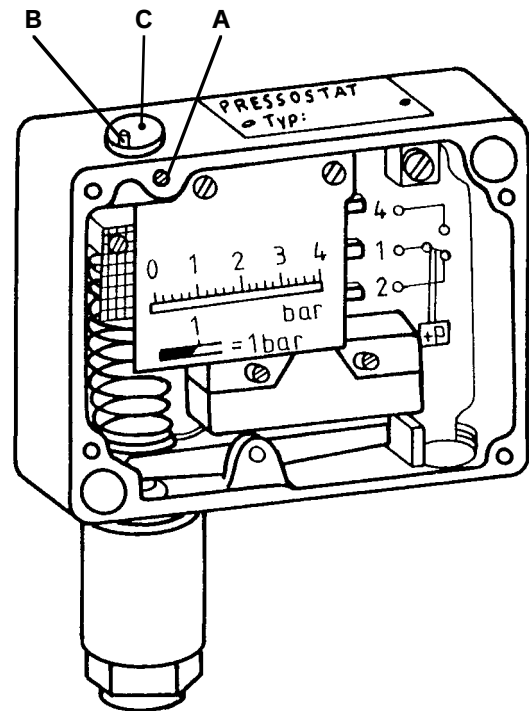


Fig. 3

M25/M32

3000

11

See also: -

Spare parts list: B1.05.11.9.4842, B1.05.11.254842

Time requirement: 1 Pers./ 0,50 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Tools:

Adjusting device, electric measuring instrument

Inspection:

Check the set operating values of the pressure switches every 3,000 operating hours.

Note:

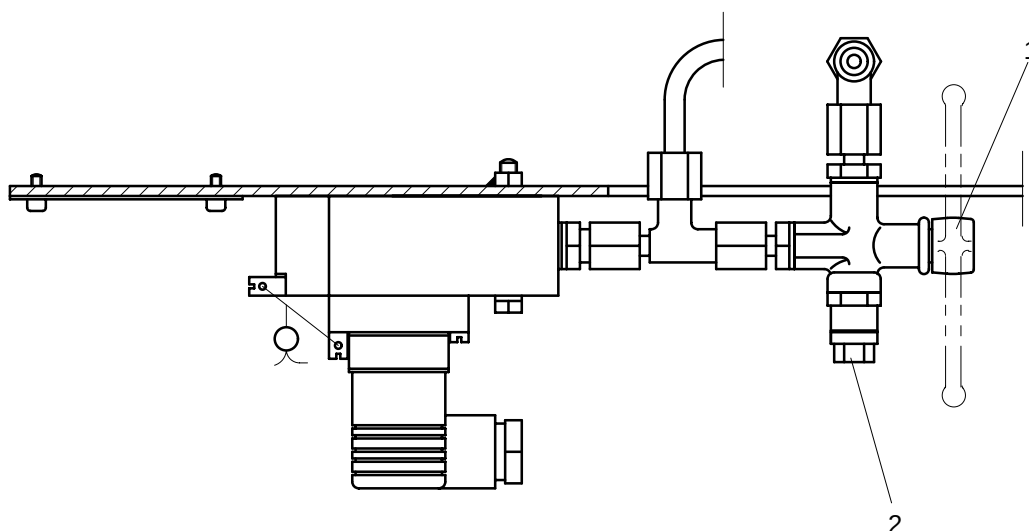
These testing and adjusting instructions apply to the following types:

Pressure range: 0 - 6 bar	Switching differential: 0.2 bar
Pressure range: 0 - 16 bar	Switching differential: 0.8 bar

Sequence of operations:

1. Connecting the adjusting device

- 1.1 Turn cock (**Fig. 1/1**) of the pressure line to test position (downwards).
- 1.2 Remove plug (**2**) (G1/8") (depressurizing the line, soaking up fluid with a rag) and connect adjusting device to test connection according to **Fig. 2** and **Fig. 3**.


Fig. 1

1.3 Pneumatic connection (Fig. 2).

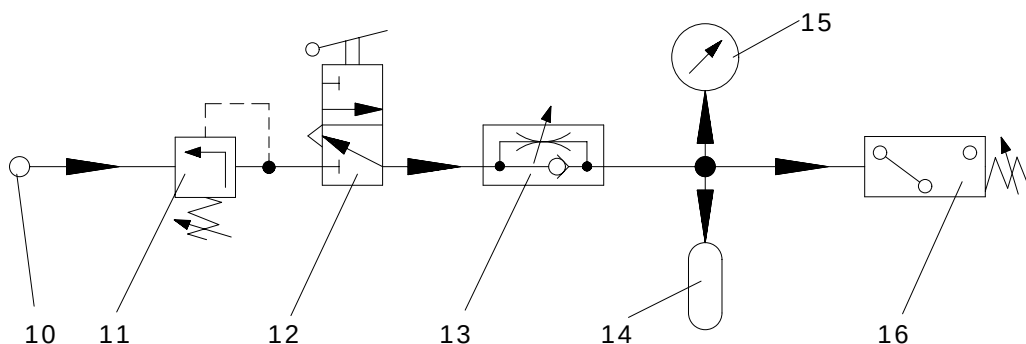


Fig. 2

- 10 Compressed-air flange > 16 bar
- 11 Pressure reducer
- 12 Shut-off valve
- 13 One-way restrictor
- 14 Volume 1 l
- 15 Precision pressure gauge
- 16 Pressure switch

1.4 Electrical connection (Fig. 3)

Connect terminals 1, 2, 3 in unit plug.

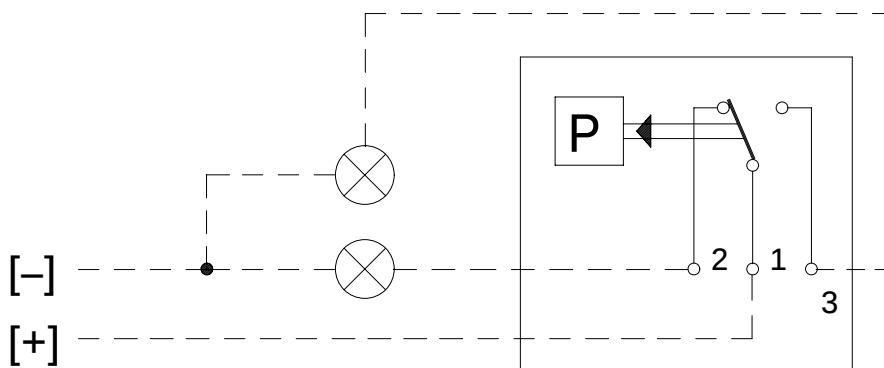


Fig. 3

2. Inspection

- 2.1 Vent pressure switch via adjusting device.
- 2.2 Check the switch point with the precision pressure gauge of the adjusting device and test lamps.
- 2.3 Slowly vent the pressure switch, thereby observing the switch point on the precision pressure gauge of the adjusting device and test lamp (check the displayed switch difference according to the measurement points list in book C).

3. Correction of the adjustment

Note:

If there is a deviation from the set value (see measurement points list in **book C**), carry out correction according to operation sequence 3. The pressure switch is set when the pressure is falling.

- 3.1 Remove lead seal.
- 3.2 Loosen housing cover (**Fig. 4/20**) of the pressure switch.
- 3.3 Set switch point to required value according to measurement points list with a hexagon spanner (5 mm).

4. Removal of the adjusting device

- 4.1 Loosen the cable connections and pneumatic connection of the test device.
- 4.2 Seal test connection with plug and turn cock (**Fig. 1/1**) to operating position.
- 4.3 Screw on housing cover and seal with lead seal.

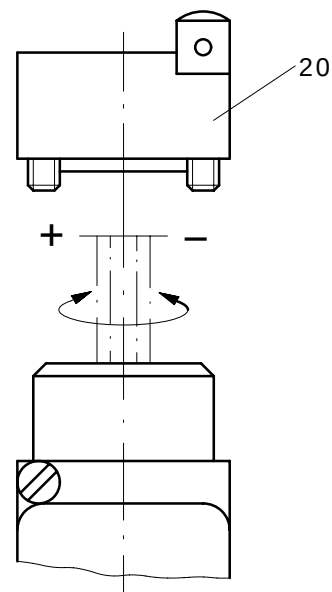


Fig. 4

M20/M25/M32/M453C/M552C

6000

See also:

Spare parts list:

Time requirement: 1 Pers./ 1,00 h

Personnel qualification: E-specialist

Operating medium: Heavy fuel and distillate fuel

11

Inspection:

Check the function of the rpm switches every 6,000 operating hours.

Note:

The engine speed must be constant whilst testing.

Sequence of operations:

1. Note the rpm switch point setting.
Loosen the pointer locking plate (2) and set the pointer (1) at the highest engine speed.

The output relay on the plug-in card must switch and the luminous diode (3) on the dial will go out (**Fig. 1**).

2. Turn the pointer carefully to the left towards 0 rpm. When reaching the engine speed, the output relay will switch and the diode on the dial must light up (switch hysteresis ± 25 rpm).
3. Set the pointer again at the original rpm switch point and lock it.

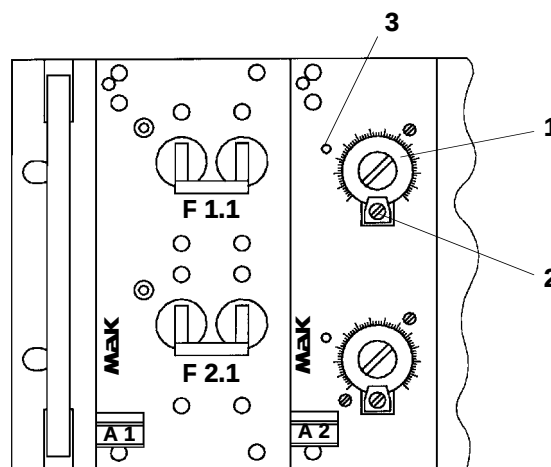


Fig. 1

If the rpm switch does not work, proceed as follows in order to locate the defect:

4. The automatic cut-out F 1.1 and F 2.1 on the plug-in card A1 in the rpm switch installation must be switched on.

At constant speed and with the setting as under point 1, continue as follows:

5. Voltage check at the plug-in socket contacts of the plug-in frame.
- 5.1 Supply (24 V DC at contact z16 and z20, contact z20 positive).

M20/M25/M32/M453C/M552C

6000

5.2 PICK UP IMPULSE (dependent upon engine speed up to 1500 Hz at contact b14 and d14).

11

If nothing could be detected whilst checking points 4 - 6, renew the plug-in card.

Attention:

Carry out the rpm adjustment of the new plug-in card. For this see the "Plant components file (C), section 5, rpm switch".

M20-M601C

6000

11

See also:

Spare parts list: B1.05.11.1.7837

Time requirement: 1 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

Disassembly and functional check of the thermostatic element of the lubricating oil/cooling water thermostat every 6,000 h

Note:

The thermostatic elements are adjusted by the manufacturer to the required temperature. Modification of the adjustment or repair is impossible. Defective elements must be exchanged completely.

Controlling the thermostatic elements in case of failure is enabled by a manual control facility. Hereto slacken counter nut (1) and turn set nut (2) clockwise in order to get a lower temperature. After setting counter again.

The cooling line is fully opened and the bypass closed when the control pin (3) is in the upper position.

This setting procedure may only be carried out if the thermostat fails.

With mounting a new thermostat, the control pin (3) must be set to its initial position by the nut (2).

Sequence of operations:

1. Disassembly (Fig. 1)

- 1.1 Drain lubricating oil/cooling water lines.
- 1.2 Unscrew nuts (5) of housing lower part (6) and remove housing cover.
- 1.3 Unscrew counter nut (1) from regulating spindle.
- 1.4 Remove thermostatic element out of housing lower part.
- 1.5 Wash parts in gas oil and blow them clean.

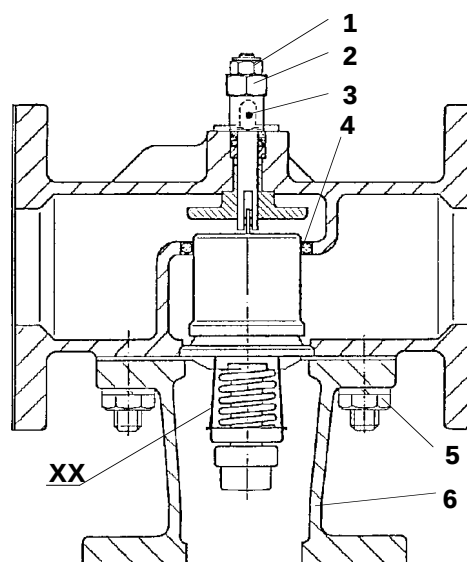


Fig. 1

M20-M601C

6000

11

- 1.6 Check lower seat and sealing faces of thermostatic element for damage.
- 1.7 Wipe clean thermostat housing with a lint-free rag and check for corrosion and deposits. Check upper plate for erosion.

2. Functional Check of the Thermostatic Element

- 2.1 Put thermostatic element (1) into a water bath of a temperature of approx. 10 K above the mean temperature specified on the insert (XX) (specification in degree Fahrenheit).
- 2.2 The thermostatic element must open steadily.

3. Assembly

- 3.1 Slightly grease inner side of O-ring (4) and upper face of element and regulating spindle. By the clearance of the O-ring, heat elongations are compensated.
- 3.2 Top up lubricating oil/cooling water system and check thermostat for leakage.

M20-M601C

6000

11

See also:

Spare parts list: B1.05.11.1.7837

Time requirement: 1 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

Disassembly of lubricating oil/cooling water thermostat,
making a functional check of thermostatic element every

6,000 h

Note:

The thermostatic elements (**Fig. 1/5**) are adjusted by the manufacturer to the required temperature. Modification of the adjustment or repair is impossible. Defective elements must be exchanged completely.

Controlling the thermostatic elements in case of failure is enabled by a manual control facility. Hereto slacken counter nut (3) and turn set screw (4) clockwise in order to get a lower temperature. After setting counter again.

The cooling line is fully opened and the bypass closed when the set screw (4) flushes with the surface of the counternut (3).

This setting procedure may only be carried out if the thermostat fails.

With mounting a new thermostat, the set screw (4) must be set to its initial position by the nut (3).

Sequence of operations:

1. Disassembly

- 1.1 Drain lubricating oil/cooling water lines.
- 1.2 Unscrew hexagon nuts (2) of housing cover (6).
- 1.3 Remove cover (6) with O-ring (1).
- 1.4 Turn out thermostatic element (5) from valve housing (7).
- 1.5 Wash parts in gas oil and blow them clean.
- 1.6 Wipe clean thermostat housing with lint-free cloth and check for corrosion and deposits.

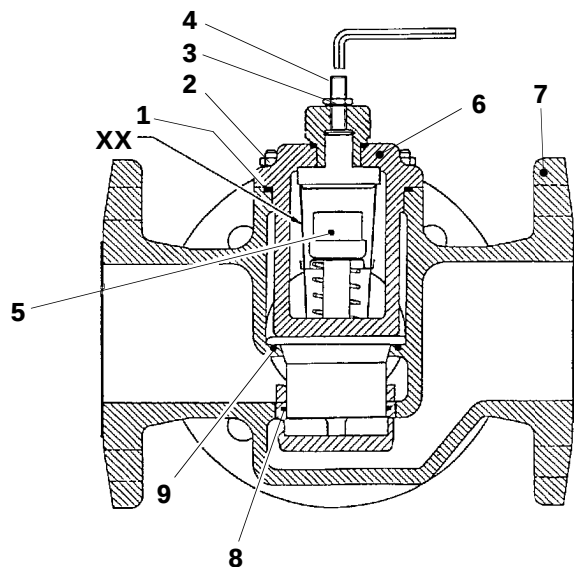


Fig. 1

M20-M601C

6000

11**2. Functional check of thermostatic element**

- 2.1 Put thermostatic element (**Fig. 1/5**) into a water bath of temperature of approx. 15 K above the temperature specified on the strap (XX) (specification in degree C).
- 2.2 The thermostatic element (5) must open steadily.

3. Assembly

- 3.1 Replace O-rings (1 and 9) and gasket (8).
- 3.2 Assembly is done in reverse order of disassembly.
- 3.3 Top up lubricating oil/cooling water system and check thermostat for leakages.

M20/M25/M32/M453C/M552C/M601C

600, 1200, 6000

See also:

Spare parts list: B1.05.11.1.4877

Time requirement: 2 Pers./ 1,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

11

Maintenance:

- | | |
|---|---------|
| a) Check the underpressure in the measuring chamber every | 600 h |
| b) Clean the infrared filter and replace the sintered bronze filter in the measuring attachment every | 1.200 h |
| c) Replace the sintered bronze filter in the pressure control every | 6.000 h |

Tools:

Test equipment and spare parts.
Service box

Maintenance and trouble shooting: refer to manual C

Attention:

The engine is not monitored in the event of the device malfunctioning. This can result in engine damage!

M25

12
See also: 08.03.02.nn, 09.07.01.nn

Spare parts list: B1.05.12.1.6347

Time requirement: 0 Pers./ 0,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

Inspection and repair of all damper packs and buffer disks as required.

Auxiliary material:

Molykote paste "G-Rapid Plus" *
 Silicone sealing compound "Dirco-Grau" *
 Loctite cyanoacrylate glue, colourless *

* or a product of equal standard

Note:

The vibration damper is connected to the lub oil system of the engine. The passage of the oil bores (13) must always be free in order to guarantee trouble-free functioning of the vibration damper!

If running of the engine becomes unbalanced at certain speeds, the damper might be defective. In order to avoid more extensive damage, the critical speed range is to be avoided and the defect is to be localized by a torsional vibration measurement as soon as possible.

When replacing the damper (possible in replacement procedure) or mounting the damper, the thread and the bolt head contact surface of the necked-down bolts (1) are to be coated with Molykote paste "G-Rapid Plus" and tightened with a pre-torque of

$$M = 400 \text{ Nm}$$

and finally tightened with a **turning angle of 60°**.

The retaining screws of the pump carrier plate (4), pump wheel carrier (15) and the gearwheel (14) must be tightened with the stipulated torques (see assembly, Molykote coating).

M25

12

Sequence of operations:
1. Disassembly

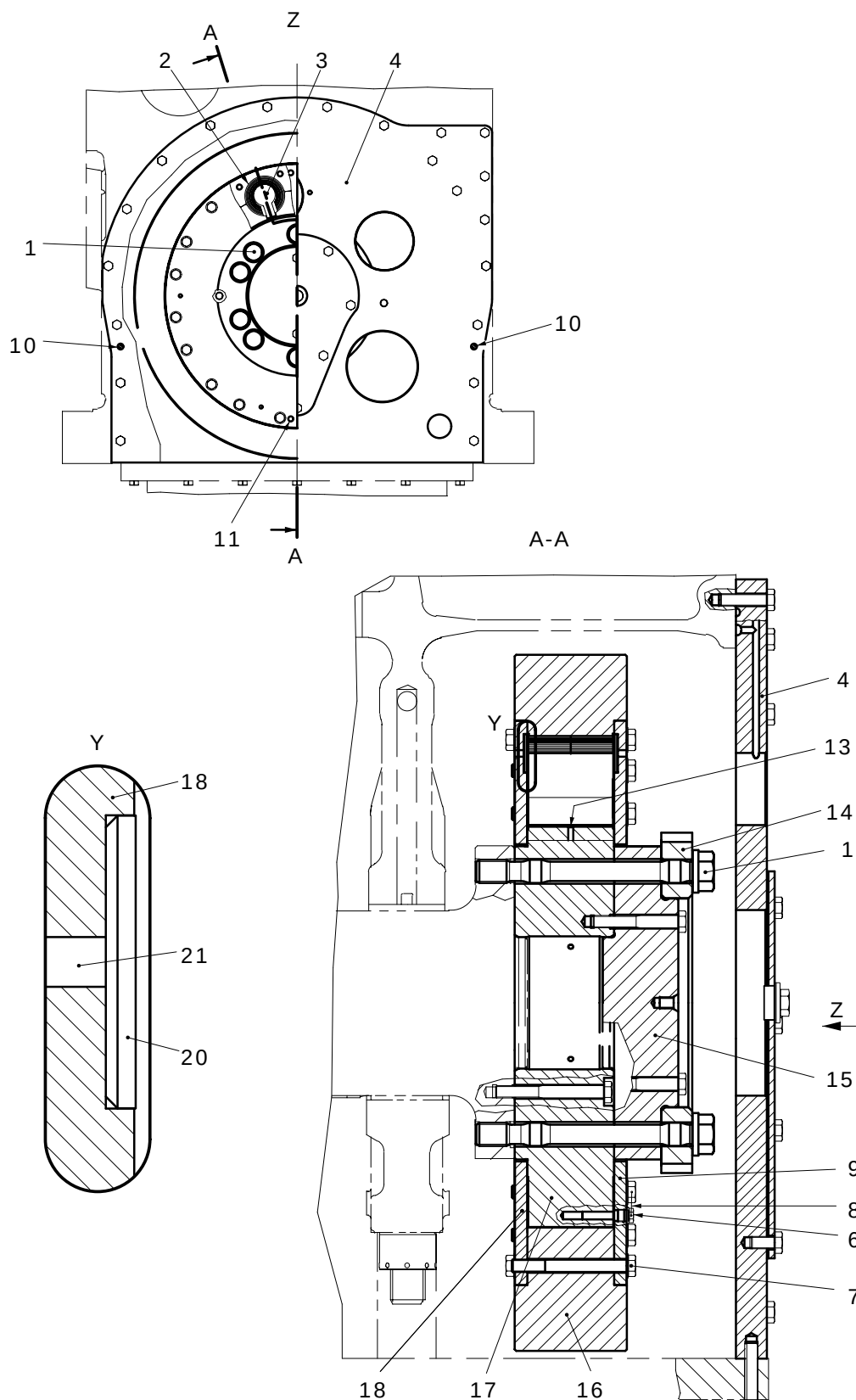
- 1.1 Remove fuel feed pump (**07.13.01.nn**), lubricating oil pump (**08.03.02.nn**) and cooling water pump (**09.07.01.nn**).
- 1.2 Remove pump carrier plate (4), completely remove silicone sealing compound.
- 1.3 Mark the installation position of the divided lateral disk (9) and remove the wire lock (8) from the screw plug (6).
- 1.4 Loosen hexagon cap screws (7) and remove lateral disk. If necessary, press back lateral disk halves with M12 screw in thread (11) (pay attention to marking).
- 1.5 Mark the position of the flywheel (16) to the carrier star (17).
- 1.6 Remove stroke limit bolt (3) and pull out sleeve springs of the three damper packs (2) with a wire hook.
 - 1.6.1 Check the wear of the buffer disks (20) of the sleeve springs in the front and rear lateral disks (9, 18). Smooth slight burrs with emery cloth. Replace buffer disks (20) if the notches are deeper as there is a danger of the ends of the sleeve springs catching in the notches and breaking during further operation.

Replacing buffer disks:

 - Insert suitable mandrel in bore (21) and press out glued-in buffer disks.
 - Completely remove glue residue in the receiver bore of the buffer disks in the lateral disks.
 - Insert new buffer disks with cyanoacrylate glue with the chamfer towards the lateral disk.
 - 1.6.2 Pull the sleeve springs off the damper packs (2) apart in a telescopic fashion.
 - Check springs for scoring and fracturing.
 - If individual springs are scored or broken, replace the damper pack (2) complete.
- 1.7 Clean the vibration damper thoroughly, check passage of oil bores (13) with a wire.
- 1.8 Check easy turning motion of flywheel rim (16) on the carrier star (17).
- 1.9 Check damping packs (2) for completeness.

M25

12



M25

12

1.10 Turn flywheel rim (16) and carrier star (17) to marked position, cover the sleeve springs on all sides with a thin film of Molykote paste "G-Rapid Plus" and push the complete damping packs (2) into the vibration damper. To do so, compress the damping packs slightly with a thumb screw.

1.11 Insert stroke limit bolt (3).

2. Assembly

2.1 Further assembling is to be carried out in reverse sequence of disassembly under observance of the marks.

Thread and screw head contact surface of the M10, M12 and M16 screws are to be coated with Molykote paste "G-Rapid Plus". Torque of the screws:

M10 = 35 Nm ; M12 = 60 Nm ; M16x1,5 = 100 Nm ; M16 = 130 Nm

2.2 Secure screw plug (6) to adjacent hexagon cap screw (7) with wire (8).

2.3 Coat pump carrier plate (4) with silicone sealing compound "Dirco-Grau", place on tapered pins (10) and screw tight.

2.4 Mount fuel feed pump (07.13.01.nn), lubricating oil pump (08.03.02.nn), cooling water pump (09.07.01.nn), check systems for leakage and check lubricating oil supply of the gearwheels.

M25

12
See also: 08.03.02.nn, 09.07.01.nn

Spare parts list: B1.05.12.1.6347

Time requirement: 0 Pers./ 0,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

Inspection and repair of all damper packs and buffer disks as required.

Auxiliary material:

Molykote paste "G-Rapid Plus" *
Silicone sealing compound "Dirco-Grau" *
Loctite cyanoacrylate glue, colourless *

* or a product of equal standard

Note:

The vibration damper is connected to the lub oil system of the engine. The passage of the oil bores (13) must always be free in order to guarantee trouble-free functioning of the vibration damper!

If running of the engine becomes unbalanced at certain speeds, the damper might be defective. In order to avoid more extensive damage, the critical speed range is to be avoided and the defect is to be localized by a torsional vibration measurement as soon as possible.

When replacing the damper (possible in replacement procedure) or mounting the damper, the thread and the bolt head contact surface of the necked-down bolts (1) are to be coated with Molykote paste "G-Rapid Plus" and tightened with a pre-torque of

M = 250 Nm

and finally tightened with a **turning angle of 90°**.

The retaining screws of the pump carrier plate (4), pump wheel carrier (15) and the gearwheel (14) must be tightened with the stipulated torques (see assembly, Molykote coating).

M25

12
Sequence of operations:
1. Disassembly

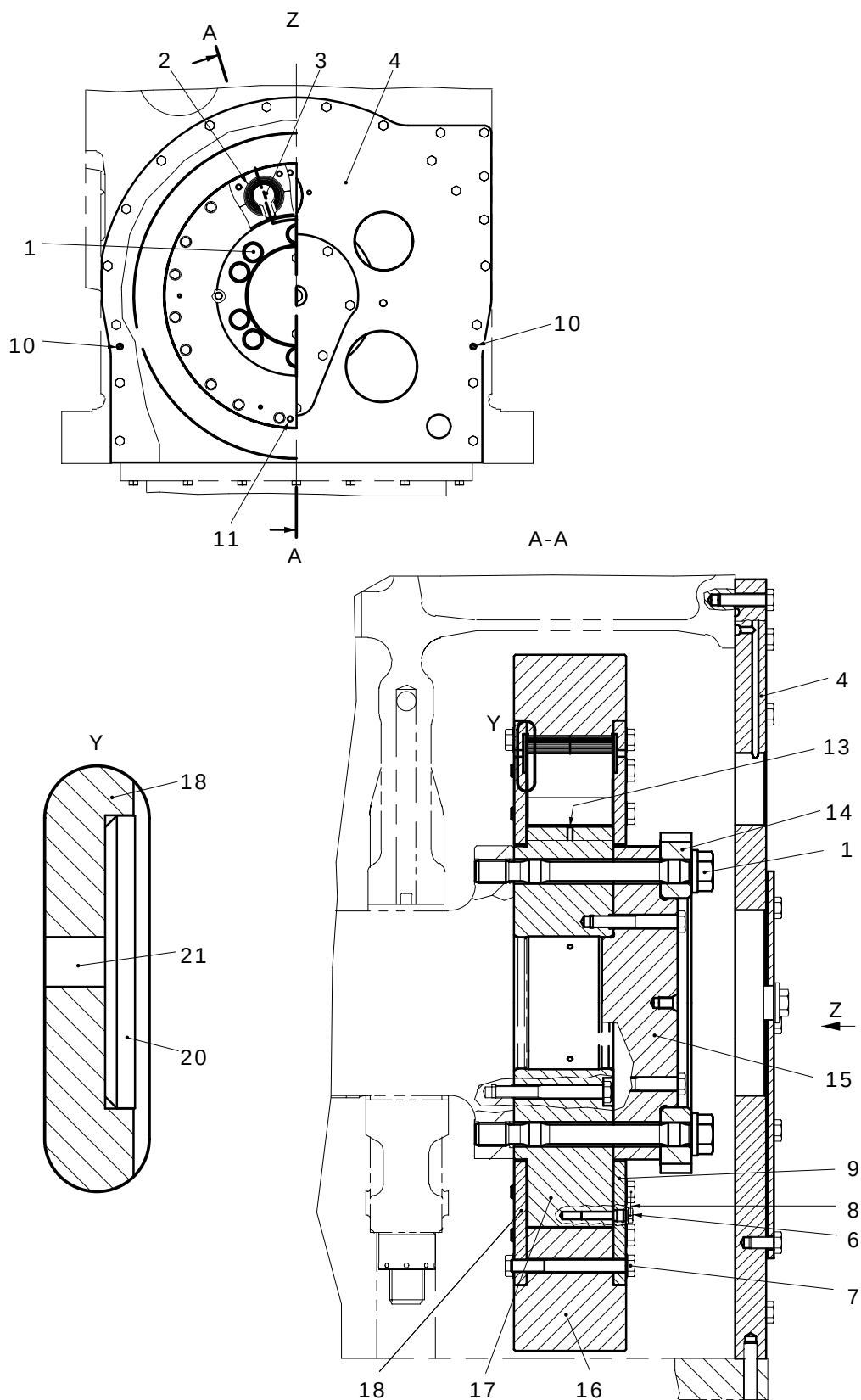
- 1.1 Remove fuel feed pump (**07.13.01.nn**), lubricating oil pump (**08.03.02.nn**) and cooling water pump (**09.07.01.nn**).
- 1.2 Remove pump carrier plate (4), completely remove silicone sealing compound.
- 1.3 Mark the installation position of the divided lateral disk (9) and remove the wire lock (8) from the screw plug (6).
- 1.4 Loosen hexagon cap screws (7) and remove lateral disk. If necessary, press back lateral disk halves with M12 screw in thread (11) (pay attention to marking).
- 1.5 Mark the position of the flywheel (16) to the carrier star (17).
- 1.6 Remove stroke limit bolt (3) and pull out sleeve springs of the three damper packs (2) with a wire hook.
 - 1.6.1 Check the wear of the buffer disks (20) of the sleeve springs in the front and rear lateral disks (9, 18). Smooth slight burrs with emery cloth. Replace buffer disks (20) if the notches are deeper as there is a danger of the ends of the sleeve springs catching in the notches and breaking during further operation.

Replacing buffer disks:

 - Insert suitable mandrel in bore (21) and press out glued-in buffer disks.
 - Completely remove glue residue in the receiver bore of the buffer disks in the lateral disks.
 - Insert new buffer disks with cyanoacrylate glue with the chamfer towards the lateral disk.
 - 1.6.2 Pull the sleeve springs off the damper packs (2) apart in a telescopic fashion.
 - Check springs for scoring and fracturing.
 - If individual springs are scored or broken, replace the damper pack (2) complete.
- 1.7 Clean the vibration damper thoroughly, check passage of oil bores (13) with a wire.
- 1.8 Check easy turning motion of flywheel rim (16) on the carrier star (17).
- 1.9 Check damping packs (2) for completeness.

M25

12



M25

12

1.10 Turn flywheel rim (16) and carrier star (17) to marked position, cover the sleeve springs on all sides with a thin film of Molykote paste "G-Rapid Plus" and push the complete damping packs (2) into the vibration damper. To do so, compress the damping packs slightly with a thumb screw.

1.11 Insert stroke limit bolt (3).

2. Assembly

2.1 Further assembling is to be carried out in reverse sequence of disassembly under observance of the marks.

Thread and screw head contact surface of the M10, M12 and M16 screws are to be coated with Molykote paste "G-Rapid Plus". Torque of the screws:

M10 = 35 Nm ; M12 = 60 Nm ; M16x1,5 = 100 Nm ; M16 = 130 Nm

2.2 Secure screw plug (6) to adjacent hexagon cap screw (7) with wire (8).

2.3 Coat pump carrier plate (4) with silicone sealing compound "Dirco-Grau", place on tapered pins (10) and screw tight.

2.4 Mount fuel feed pump (07.13.01.nn), lubricating oil pump (08.03.02.nn), cooling water pump (09.07.01.nn), check systems for leakage and check lubricating oil supply of the gearwheels.

M25

12

See also: 08.03.02.nn, 09.07.01.nn

Spare parts list: B1.05.12.1.6347

Time requirement: 0 Pers./ 0,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

Inspection and repair of all damper packs and buffer disks as required.

Auxiliary material:

Molykote paste "G-Rapid Plus" *
Silicone sealing compound "Dirco-Grau" *
Loctite cyanoacrylate glue, colourless *

* or a product of equal standard

Note:

The vibration damper is connected to the lub oil system of the engine. The passage of the oil bores (13) must always be free in order to guarantee trouble-free functioning of the vibration damper!

If running of the engine becomes unbalanced at certain speeds, the damper might be defective. In order to avoid more extensive damage, the critical speed range is to be avoided and the defect is to be localized by a torsional vibration measurement as soon as possible.

When replacing the damper (possible in replacement procedure) or mounting the damper, the thread and the bolt head contact surface of the necked-down bolts (1) are to be coated with Molykote paste "G-Rapid Plus" and tightened with a pre-torque of

$$M = 250 \text{ Nm}$$

and finally tightened with a **turning angle of 90°**.

The retaining screws of the pump carrier plate (4), stub shaft (15) and the gearwheel (14) must be tightened with the stipulated torques (see assembly, Molykote coating).

M25

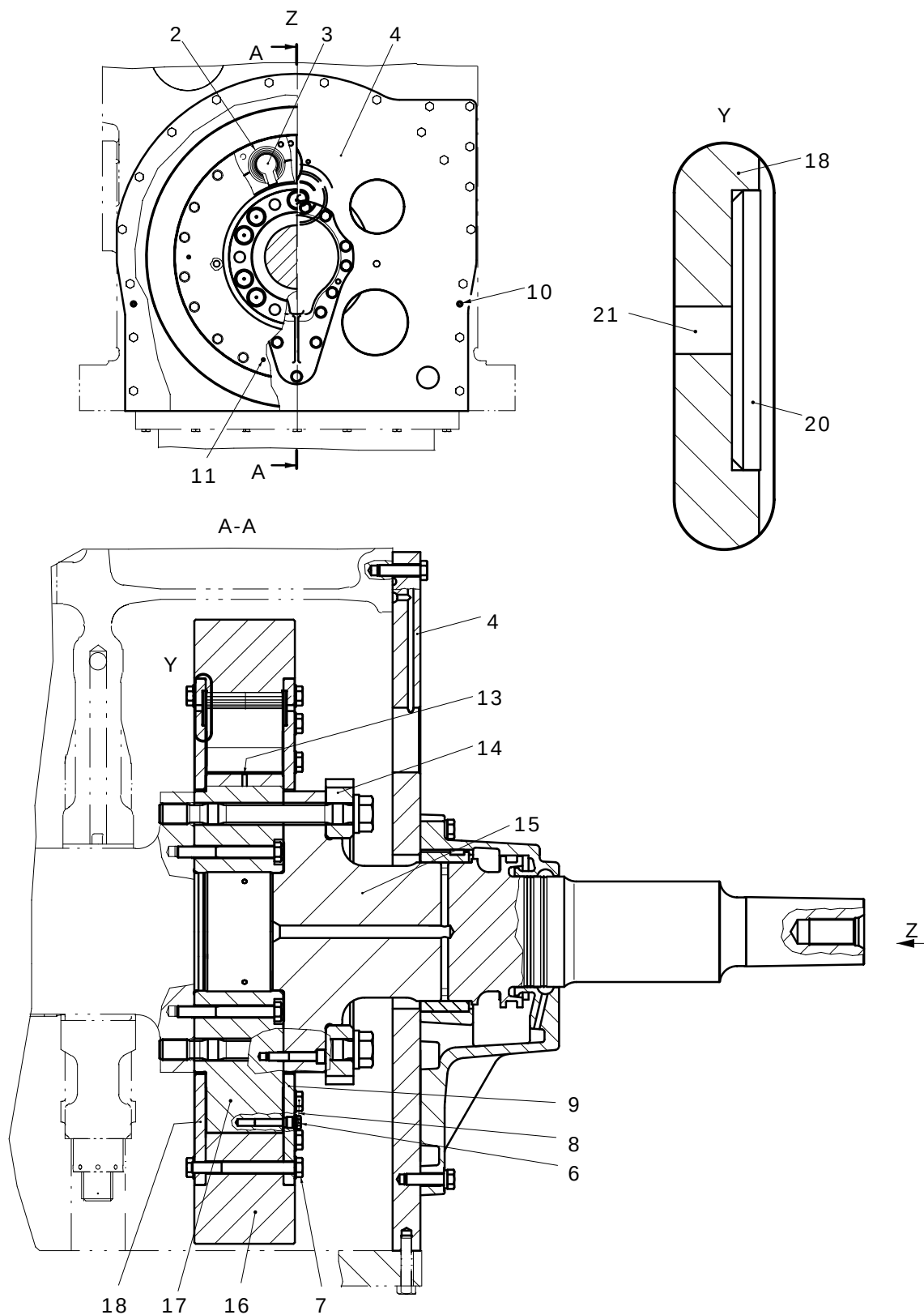
12
Sequence of operations:
1. Disassembly

- 1.1 Remove fuel feed pump (**07.13.01.nn**), lubricating oil pump (**08.03.02.nn**) and cooling water pump (**09.07.01.nn**).
- 1.2 Remove pump carrier plate (4), completely remove silicone sealing compound.
- 1.3 Mark the installation position of the divided lateral disk (9) and remove the wire lock (8) from the screw plug (6).
- 1.4 Loosen hexagon cap screws (7) and remove lateral disk. If necessary, press back lateral disk halves with M12 screw in thread (11) (pay attention to marking).
- 1.5 Mark the position of the flywheel (16) to the carrier star (17).
- 1.6 Remove stroke limit bolt (3) and pull out sleeve springs of the three damper packs (2) with a wire hook.
- 1.6.1 Check the wear of the buffer disks (20) of the sleeve springs in the front and rear lateral disks (9, 18). Smooth slight burrs with emery cloth. Replace buffer disks (20) if the notches are deeper as there is a danger of the ends of the sleeve springs catching in the notches and breaking during further operation.

 Replacing buffer disks:
 - Insert suitable mandrel in bore (21) and press out glued-in buffer disks.
 - Completely remove glue residue in the receiver bore of the buffer disks in the lateral disks.
 - Insert new buffer disks with cyanoacrylate glue with the chamfer towards the lateral disk.
- 1.6.2 Pull the sleeve springs off the damper packs (2) apart in a telescopic fashion.
 - Check springs for scoring and fracturing.
 - If individual springs are scored or broken, replace the damper pack (2) complete.
- 1.7 Clean the vibration damper thoroughly, check passage of oil bores (13) with a wire.
- 1.8 Check easy turning motion of flywheel rim (16) on the carrier star (17).
- 1.9 Check damping packs (2) for completeness.

M25

12



M25

12

1.10 Turn flywheel rim (16) and carrier star (17) to marked position, cover the sleeve springs on all sides with a thin film of Molykote paste "G-Rapid Plus" and push the complete damping packs (2) into the vibration damper. To do so, compress the damping packs slightly with a thumb screw.

1.11 Insert stroke limit bolt (3).

2. Assembly

2.1 Further assembling is to be carried out in reverse sequence of disassembly under observance of the marks.

Thread and screw head contact surface of the M10, M12 and M16 screws are to be coated with Molykote paste "G-Rapid Plus". Torque of the screws:

M10 = 35 Nm ; M12 = 60 Nm ; M16x1,5 = 100 Nm ; M16 = 130 Nm

2.2 Secure screw plug (6) to adjacent hexagon cap screw (7) with wire (8).

2.3 Coat pump carrier plate (4) with silicone sealing compound "Dirco-Grau", place on tapered pins (10) and screw tight.

2.4 Mount fuel feed pump (07.13.01.nn), lubricating oil pump (08.03.02.nn), cooling water pump (09.07.01.nn), check systems for leakage and check lubricating oil supply of the gearwheels.

M25

12000

12

See also:

Spare parts list: B1.05.12.1.6347

Time requirement: 0 Pers./ 0,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Inspection:

Inspection of 2 x 3 damping packs and the corresponding buffer disks.	every	12,000 h
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Auxiliary material:

Molykote paste "G-Rapid Plus" *

* or a product of equal standard

Note:

If running of the engine becomes unbalanced at certain speeds, the damper might be defective. In order to avoid more extensive damage, the critical speed range is to be avoided and the defect is to be localized by a torsional vibration measurement as soon as possible.

In order to check the vibration damper, inspect the 2x3 damping packs (2), the corresponding/accessible buffer disks (20) and free oil bores (13). If damage is ascertained, service vibration damper according to 12.04.01.nn.

Sequence of operations:

1. Disassembly

- 1.1 Remove cover with seal in the upper area of the pump carrier plate (4).
- 1.2 Turn the engine so that the parting line of the divided lateral disk (9) becomes visible, mark the installation position of the lateral disks.
- 1.3 Loosen the hexagon cap screws (7) of a lateral disk half (9) and remove wire lock (8) of screw plug (6) if necessary.
- 1.4 Press out lateral disk half with M12 screw in thread (11) (paying attention to marking). Fix ring bolt and attach sling to ring bolt.

M25

12000

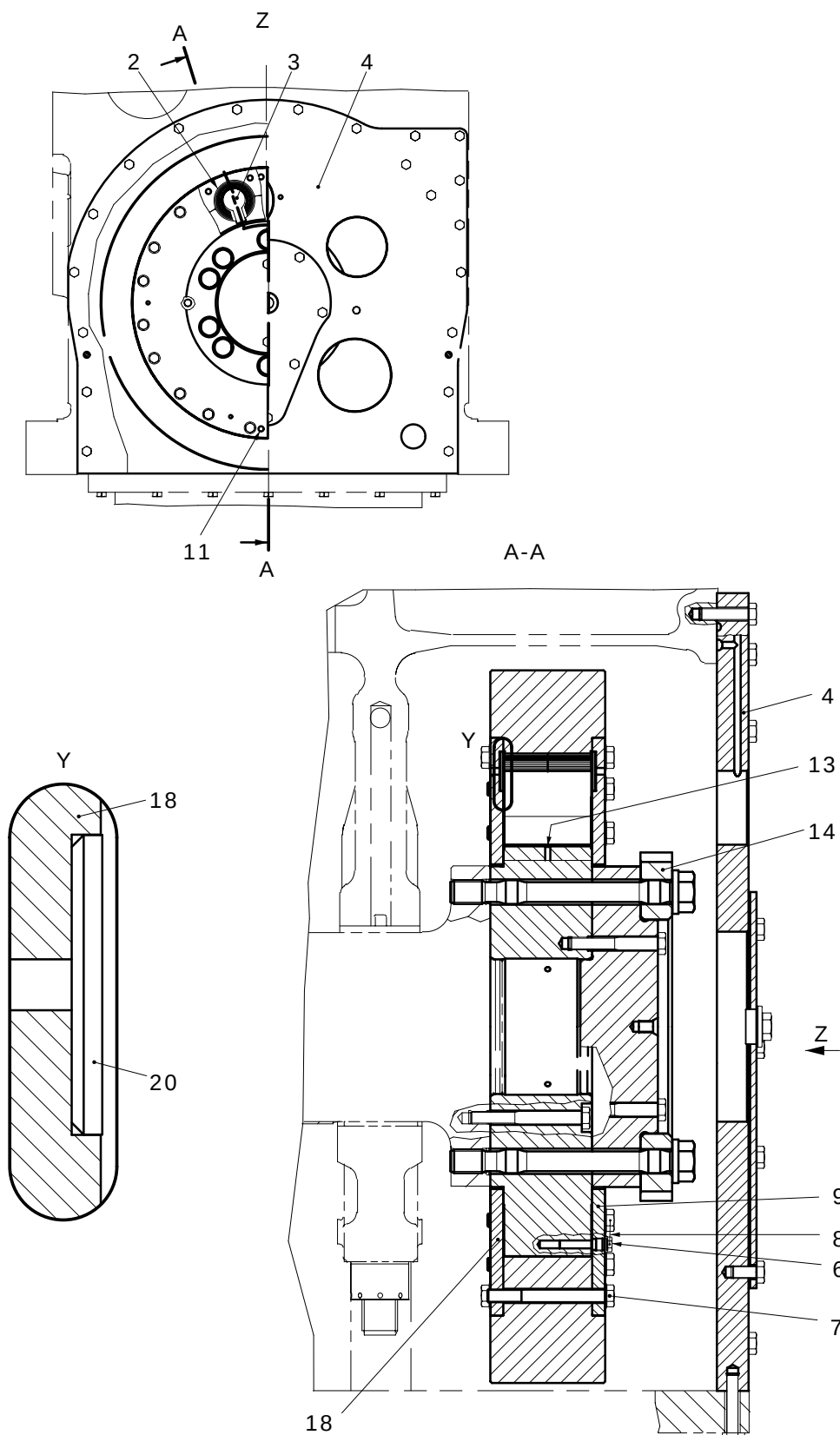
12

- 1.5 Pull lateral disk half up to pump gearwheel (14) and check buffer disks (20) of the sleeve springs for wear. Smooth slight burr with emery cloth. Replace buffer disks (20) in the case of deeper notches (**12.04.01.nn**) as there is a danger of the ends of the sleeve springs catching in the notches and breaking during further operation.
- 1.6 Turn the lateral disk sideways so that the opening is free. Secure lateral disk with sling.
- 1.7 Turn the engine carefully until the first bore with 3 damping packs to be checked is accessible. Guide lateral disk halves if necessary and press to the side again.
- 1.8 Remove stroke limit bolt (3) and pull out sleeve springs of the three damping packs (2) with a wire hook.
 - 1.8.1 Check buffer disks (20) of the sleeve springs in the rear lateral disk (18) for wear, see 1.6.
 - 1.8.2 Pull sleeve springs off the damping packs (2) apart in a telescopic fashion.
 - Check springs for scoring and fracturing.
 - If individual springs show signs of scoring or fracturing, replace complete damping pack (2).
- 1.9 Clean receiver bore of the damping packs thoroughly, check passage of oil bores (13) with wire.
- 1.10 Check damping packs (2) for completeness.
- 1.11 Coat sleeve springs all around with a thin film of Molykote paste "G-Rapid Plus" and push the complete damping packs (2) into the vibration damper. To do so, compress the damping packs slightly with a thumb screw.
- 1.12 Insert stroke limit bolt (3).
- 1.13 Carefully turn engine further until the 2nd damping pack set to be checked is accessible. Carry out further check according to 1.8 to 1.12.

M25

12000

12



M25

12000

2. Assembly**12**

- 2.1 Further assembling is carried out under the observance of the marks in reverse sequence of disassembly.

Grease threads and mating surface of the M10, M12 and M16 screws with Molykote paste "G-Rapid Plus". Torque moments of screws:

M10 = 35 Nm
M12 = 60 Nm
M16x1,5 = 100 Nm
M16 = 130 Nm

- 2.2 If necessary, remount wire (8) for securing the screw plug (6) with the adjacent hexagon cap screw (7).
- 2.3 Remount cover with seal on pump carrier plate (4).
- 2.4 Check systems for leakage and also check lubricating oil supply of gearwheels.

M25

12000

See also:

Spare parts list: B1.05.12.1.6347

Time requirement: 0 Pers./ 0,00 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

12

Inspection:

Inspection of 2 x 3 damping packs and the corresponding buffer disks.	every	12,000 h
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Auxiliary material:

Molykote paste "G-Rapid Plus" *

* or a product of equal standard

Note:

If running of the engine becomes unbalanced at certain speeds, the damper might be defective. In order to avoid more extensive damage, the critical speed range is to be avoided and the defect is to be localized by a torsional vibration measurement as soon as possible.

In order to check the vibration damper, inspect the 2x3 damping packs (2), the corresponding/accessible buffer disks (20) and free oil bores (13). If damage is ascertained, service vibration damper according to 12.04.01.nn.

Sequence of operations:

1. Disassembly

- 1.1 Remove cover with seal in the upper area of the pump carrier plate (4).
- 1.2 Turn the engine so that the parting line of the divided lateral disk (9) becomes visible, mark the installation position of the lateral disks.
- 1.3 Loosen the hexagon cap screws (7) of a lateral disk half (9) and remove wire lock (8) of screw plug (6) if necessary.
- 1.4 Press out lateral disk half with M12 screw in thread (11) (paying attention to marking). Fix ring bolt and attach sling to ring bolt.

M25

12000

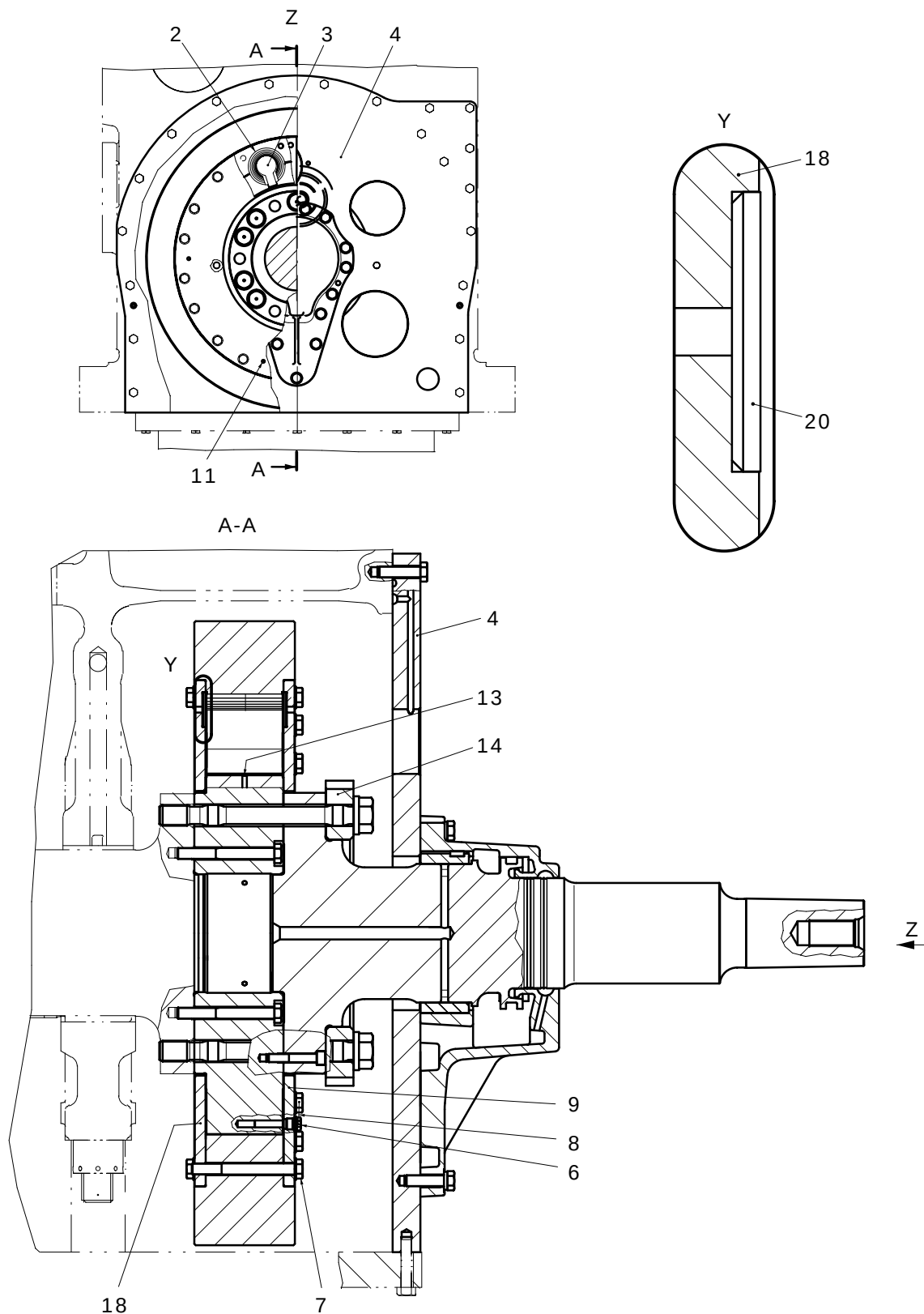
12

- 1.5 Pull lateral disk half up to pump gearwheel (14) and check buffer disks (20) of the sleeve springs for wear. Smooth slight burr with emery cloth. Replace buffer disks (20) in the case of deeper notches (**12.04.01.nn**) as there is a danger of the ends of the sleeve springs catching in the notches and breaking during further operation.
- 1.6 Turn the lateral disk sideways so that the opening is free. Secure lateral disk with sling.
- 1.7 Turn the engine carefully until the first bore with 3 damping packs to be checked is accessible. Guide lateral disk halves if necessary and press to the side again.
- 1.8 Remove stroke limit bolt (3) and pull out sleeve springs of the three damping packs (2) with a wire hook.
 - 1.8.1 Check buffer disks (20) of the sleeve springs in the rear lateral disk (18) for wear, see 1.6.
 - 1.8.2 Pull sleeve springs off the damping packs (2) apart in a telescopic fashion.
 - Check springs for scoring and facturing.
 - If individual springs show signs of scoring or fracturing, replace complete damping pack (2).
- 1.9 Clean receiver bore of the damping packs thoroughly, check passage of oil bores (13) with wire.
- 1.10 Check damping packs (2) for completeness.
- 1.11 Coat sleeve springs all around with a thin film of Molykote paste "G-Rapid Plus" and push the complete damping packs (2) into the vibration damper. To do so, compress the damping packs slightly with a thumb screw.
- 1.12 Insert stroke limit bolt (3).
- 1.13 Carefully turn engine further until the 2nd damping pack set to be checked is accessible. Carry out further check according to 1.8 to 1.12.

M25

12000

12



M25

12000

2. Assembly**12**

- 2.1 Further assembling is carried out under the observance of the marks in reverse sequence of disassembly.

Grease threads and mating surface of the M10, M12 and M16 screws with Molykote paste "G-Rapid Plus". Torque moments of screws:

M10 = 35 Nm
M12 = 60 Nm
M16x1,5 = 100 Nm
M16 = 130 Nm

- 2.2 If necessary, remount wire (8) for securing the screw plug (6) with the adjacent hexagon cap screw (7).
- 2.3 Remount cover with seal on pump carrier plate (4).
- 2.4 Check systems for leakage and also check lubricating oil supply of gearwheels.

M25

12

See also:

Spare parts list: B1.05.12.257330

Time requirement: 1 Pers./ 0,10 h

Personnel qualification: skilled engine hand

Operating medium: Heavy fuel and distillate fuel

Maintenance:

Grease bearing faces and contact faces of the turning device with Molykote paste.

Auxiliary material:

Molykote-paste „G-Rapid“ *

*or a product of equal standard

1. Operating the turning device with pneumatic wrench

1.1 Dismount cover

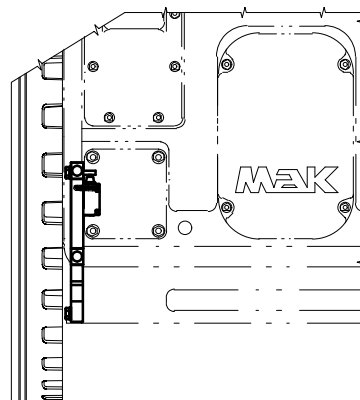
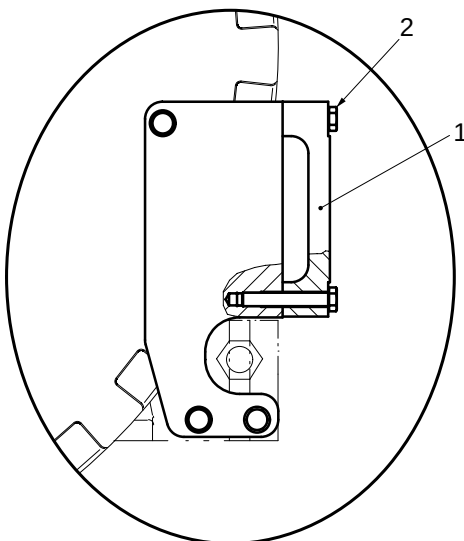


Safety note:

Neither lean over or touch any pressurized devices!
Protect engine against unintentional start-up!
Apart from these instructions, the operating instructions of the manufacturer of the pneumatic wrench have to be observed too!

1.1.1 Loosen hexagon bolts (Fig.1/2).

1.1.2 Remove cover (1) and hexagon bolts.



1

M25

12

1.2 Mount turning device.

- 1.2.1 Mount pedestal of turning device (**Fig. 2/7**).
- 1.2.2 Grease hexagon bolts (2) with Molykote.
- 1.2.3 Mount hexagon bolts and tighten them at a torque of

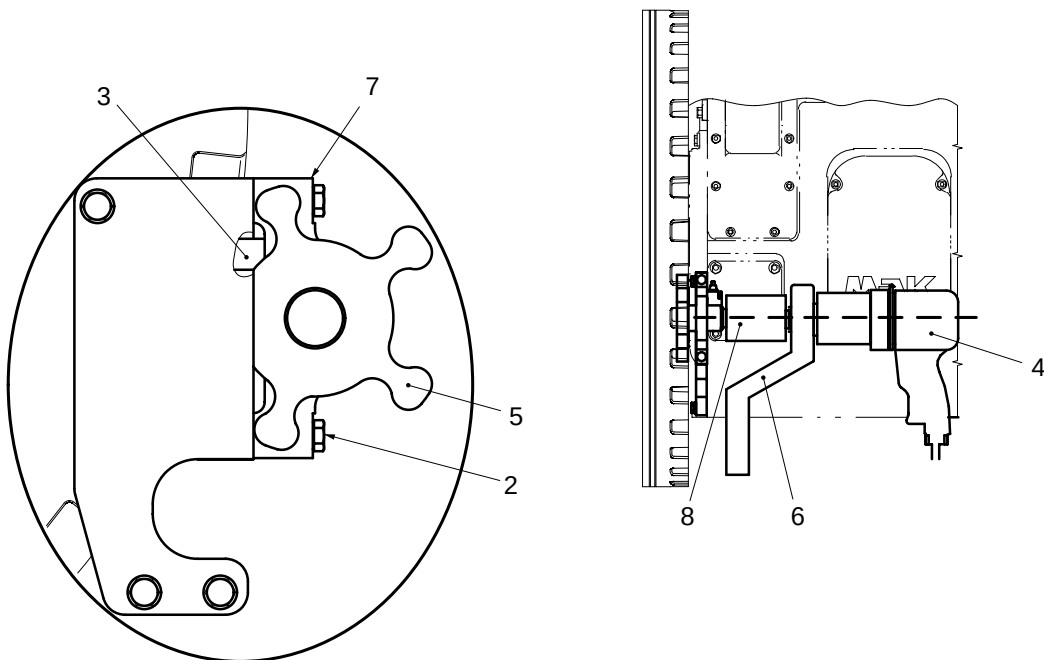
M = 130 Nm.

Attention:

When the pedestal of the turning device (7) is mounted, the position switch (3) is automatically set to position "engine OFF" - The engine cannot be started during turning!

1.3 Mount pneumatic wrench.

- 1.3.1 Connect pneumatic wrench (4) to compressed-air supply (air pressure: 3 to max. 7 bar).
- 1.3.2 Open valve for compressed-air supply.
- 1.3.3 Mount square socket NW36 (8) to square drive of pneumatic wrench (4).
- 1.3.4 Attach pneumatic wrench (4) to hexagon drive of turning wheel (5) together with socket and reaction member (6).



2

M25

12

-
- 1.3.5 Let the reaction member (6) of the pneumatic wrench carefully run against the crankcase (serving as an abutment).
-

Attention:

Always hold pneumatic wrench in axial direction of the hexagon drive of the turning wheel!

The required direction of rotation is selected on the toggle switch located on the pneumatic wrench (RH or LH rotation).

- 1.3.6 Turn the engine.

1.4 Dismount pneumatic wrench and turning device and mount the cover.

- 1.4.1 Remove pneumatic wrench and socket from the hexagon drive of the turning wheel.
- 1.4.2 Close valve for compressed-air supply.
- 1.4.3 Disconnect compressed-air supply from pneumatic wrench.
- 1.4.4 Loosen hexagon bolts (**Fig. 1/2**).
- 1.4.5 Dismount pedestal (7) and unscrew hexagon bolts.
- 1.4.6 Mount cover (1).
- 1.4.7 Grease hexagon bolts (2) with Molykote.
- 1.4.8 Mount hexagon bolts and tighten them at a torque of

$$M = 130 \text{ Nm}$$

Attention:

The engine can only be started when the cover is mounted! (Position switch (3) is in position „engine ON“).

M25

600, 3000, 24000

12

See also:

Spare parts list: *B1.05.12.257330*

Time requirement: *1 Pers./ 0,10 h*

Personnel qualification: *skilled engine hand*

Operating medium: *Heavy fuel and distillate fuel*

Maintenance:

Oil level check	every	3.000 h	or 6 months
Lubricating / greasing of shaft and gearwheel	every	600 h	or monthlys
Oil change	every	24.000 h	or 4 years

Auxiliary material:

Bearing grease „Klüber Altemp. QNB 50“ *
Gear oil „Shell Omala Oil 460“ *

*or a product of equal standard

1. Operating the turning device



Safety note:

Protect engine against unintentional start-up!

Apart from these instructions, the operating- and maintenance instructions of the manufacturer of the turning device have to be observed too !

1.1 Engaging the turning device

1.1.1 Move blockinglever (1) to position “V” and hold.

1.1.2 Move lever (2) to position “X”, so that the gearwheel of the turning device engages completely in the flywheel toothing.

1.1.3 Let off blockinglever and make sure that the blockinglever engages in position “Z”.

Attention:

When the turning device is engaged, the position switch (11) is automatically set to position “engine OFF” . The engine cannot be started during turning !

1.1.4 Turn the engine.

M25

600, 3000, 24000

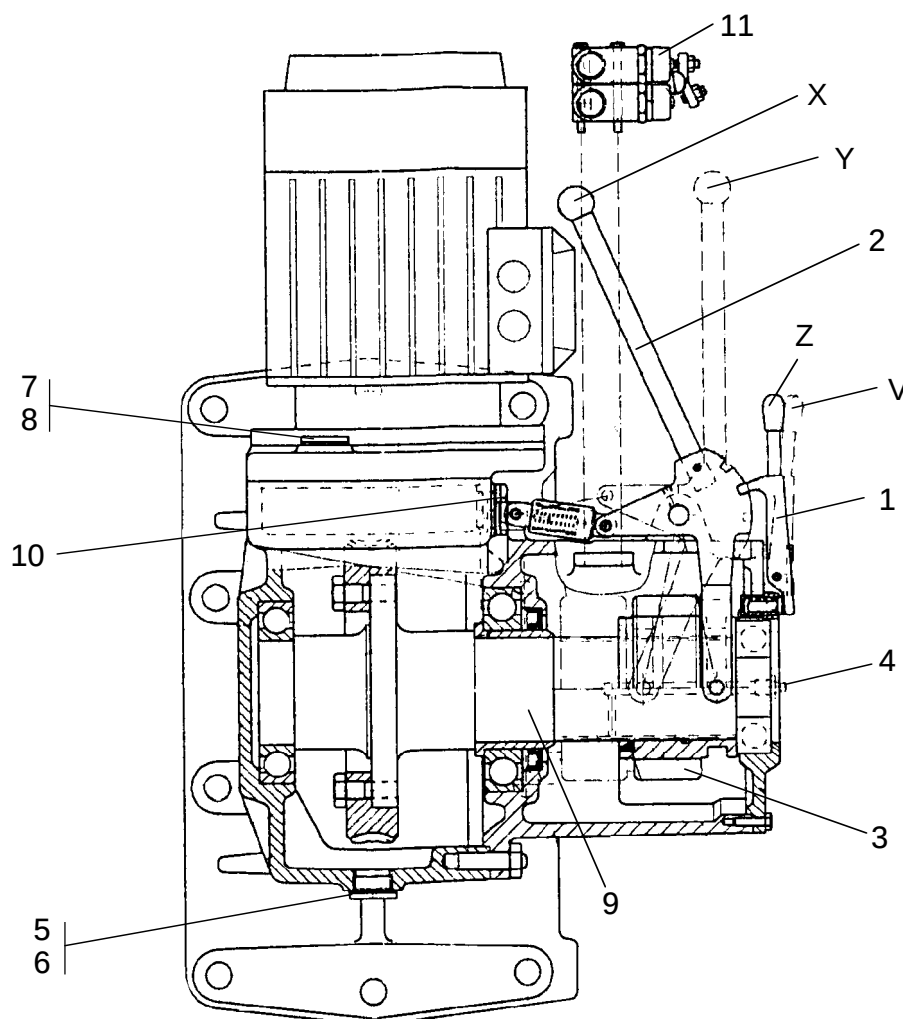
1.2 Disengaging the turning device

12

- 1.2.1 Move blockinglever (1) to position "V" and hold.
- 1.2.2 Move lever (2) to position " Y ", so that the gearwheel of the turning device is disengaged from the flywheel toothing.
- 1.2.3 Let off blockinglever and make sure that the blockinglever is engaged in position "Z".

Attention:

**The engine can only be started if the turning device is disengaged !
The position switch (11) is then in position „engine-ON“)**



M25

600, 3000, 24000

2. Maintenance

12

2.1 Oil level check

Note:

If a topping up should be necessary, only the prescribed gear oil is to be used !

- 2.1.1 Check oil level at the oil level glas (10) and fill in gear oil (e.g. Shell Omala Oil 460) up to the oil level marke.

2.2 Lubricating / greasing of shaft and gearwheel

Note:

Grease the notch on the output shaft and the gearwheel only if the turning device is engaged.

- 2.2.1 Grease the notch on the output shaft (9) and the gearwheel (3) with bearing grease by means of the grease nipple (4).

Attention:

Grease the gearwheel toothing only if the turning device is disengaged.

- 2.2.2 Coat toothing of gearwheel thinly with bearing grease.

2.3 Oil change

- 2.3.1 Remove screw plug (5) on the driving gear of the turning device.
- 2.3.2 Drain the oil from the driving gear of the turning device.
- 2.3.3 Mount the screw plug (5) with new gasket (6).
- 2.3.4 Remove screw plug (7)ont the driving gear of the turning device.
- 2.3.5 Fill in new oil (e.g. Shell Omala Oil 460 ; ca.7,5 l) up to the oil level mark (10).
- 2.3.6 Mount the screw plug (7) with new gasket (8).

-

Tools

not installed on CD-ROM

M25

General- Spare parts catalogue

Typ M25

Engine operating instructions	A0
<i>Total Index Book A, B and C</i>	<i>A0.01</i>
<i>Introduction</i>	<i>A0.02</i>
<i>Safety instructions</i>	<i>A0.03</i>
Technical engine data	A1
<i>Governor-data</i>	<i>A1.04</i>
<i>Working pressures of auxiliary equipment</i>	<i>A1.05</i>
<i>Temperatures of operating media</i>	<i>A1.06</i>
<i>Torsional vibration calculation</i>	<i>A1.09</i>
<i>Acceptance Test Records</i>	<i>A1.10</i>
Operating instructions	A3
<i>Table of contents</i>	<i>A3.01</i>
<i>Introduction</i>	<i>A3.02</i>
<i>Safety instructions</i>	<i>A3.03</i>
<i>Instructions for heavy fuel operation</i>	<i>A3.04</i>
<i>Initial operation</i>	<i>A3.05</i>
<i>Operational supervision</i>	<i>A3.06</i>
<i>Removal from operation</i>	<i>A3.07</i>
<i>Danger of frost</i>	<i>A3.08</i>
<i>Running-in</i>	<i>A3.10</i>
<i>Fault tracing</i>	<i>A3.11</i>
<i>Emergency operation</i>	<i>A3.12</i>
Operating media	A4
<i>Table of contents</i>	<i>A4.01</i>
<i>Introduction</i>	<i>A4.02</i>
<i>Safety instructions</i>	<i>A4.03</i>
<i>Regulations and care</i>	<i>A4.05</i>
Maintenance	A5
<i>Table of contents</i>	<i>A5.01</i>
<i>Introduction</i>	<i>A5.02</i>
<i>Safety instructions</i>	<i>A5.03</i>
Tools	A6
<i>Table of contents</i>	<i>A6.01</i>
Spare parts catalogue	B0
Total Index Book A, B and C	B0.01
Introduction	B0.02
Spare Parts	B1
Table of contents	B1.01
Safety instructions	B1.03
Stand-by parts	B2

-

External documentation

C0

Total Index Book A, B and C

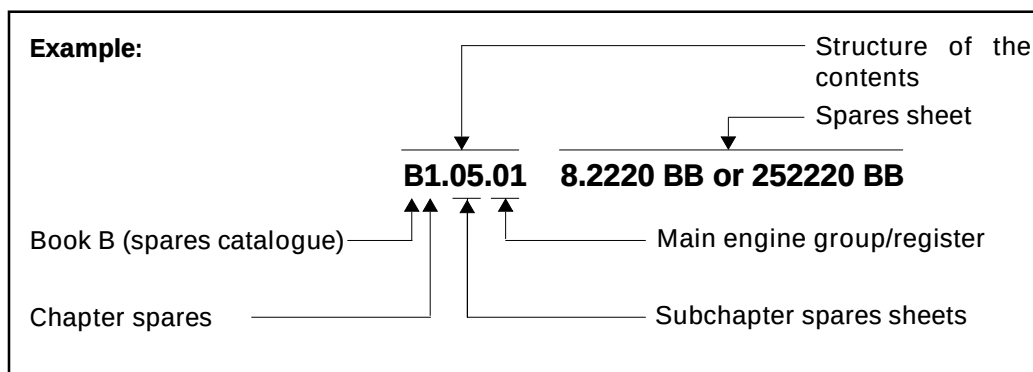
C0.01

Table of contents

C5.01

M20-M601C

The **structure of the contents** ensures that you will find the required spares very quickly.



This spares catalogue is compiled according to your engine equipment.

The spares sheets comprise a maximum scope, i.e. there may be displayed more parts than are included in your actual equipment.

The consumables (#) indicated in the spare parts sheets should be exchanged upon each disassembly/assembly if possible.

Possible modifications or additions to the catalogue due to conversions will be carried out on request by our after-sales service.

Ordering spares:

In case of multi-engine plants please do not place a collective order on a printed form.

Each engine **has** to be treated separately while stating its respective engine No.
Please find attached the required order sheets.

For reasons of order handling each order **must** contain the following data:

- a) Engine No.**
- b) Spares sheet No.**
- c) Quantity**
- d) Purchase No.**
- e) Address on invoice** i.e. the complete address to which the invoice is to be made out
- f) Forwarding address** only if differing from address on invoice
- g) Manner of delivery** unless otherwise specified we will choose the cheapest method of shipment, not prepaid ex works.

Postal address:	MaK Motoren GmbH & Co. KG, P.O. Box 9009, D-24157 Kiel	
Telex:	292993 mak d	(for spares orders and aftersales service only)
Telephone:	0431 - 3995 01	(chief operator)
Telefax:	0431 - 3995-807/808	(after-sales service only)

M20-M601C

Spare Parts

-

Spare Parts

B1

Table of contents

B1.01

Safety instructions

B1.03

Engine, cylinder head

B1.05.01

Cylinder Head

B1.05.01.252107 AA

Cylinder Head

B1.05.01.252107 BB

Set of Gaskets for Cylinder Head

B1.05.01.252108 AA

Mediums Guide

B1.05.01.252144 AA

Mediums Guide

B1.05.01.252144 BB

Mediums Guide

B1.05.01.252144 CC

Mediums Guide

B1.05.01.252144 DD

Mediums Guide

B1.05.01.252144 EE

Mediums Guide

B1.05.01.252144 FF

Cylinder Head Cap

B1.05.01.252190 AA

Valve Rotator

B1.05.01.252225 AA

Indicator Valve

B1.05.01.1.2257 DD

Engine, gear

B1.05.02

Crankshaft with Balance Weight

B1.05.02.252510 AA

Crankshaft with Balance Weigt

B1.05.02.252510 BB

Crankshaft with Balance Weight

B1.05.02.252510 CC

Crankshaft with Balance Weight

B1.05.02.252510 DD

Piston and Connecting-rod

B1.05.02.252601 AA

Piston Rings

B1.05.02.252617 AA

Free End of the Engine
with Power Take Off

B1.05.02.256340 AA

Free End of the Engine
without Power Take Off

B1.05.02.256345 AA

Free End of the Engine
without Power Take Off

B1.05.02.256345 BB

Engine, housing

B1.05.03

Engine Housing

B1.05.03.251110 AA

Engine Housing

B1.05.03.251110 BB

Engine Housing

B1.05.03.251110 CC

Engine Housing Covers

B1.05.03.251112 AA

Engine Housing Covers

B1.05.03.251112 BB

Engine Housing Covers

B1.05.03.251112 CC

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Engine Housing Covers	B1.05.03.251112 DD
Engine Housing Covers	B1.05.03.251112 EE
Engine Housing Covers	B1.05.03.251112 FF
Engine Housing Covers	B1.05.03.251112 GG
Engine Housing Covers	B1.05.03.251112 HH
Engine Housing Covers	B1.05.03.251112 KK
Engine Housing Cover	B1.05.03.251112 LL
Engine Housing Covers	B1.05.03.251112 MM
Engine Housing Covers	B1.05.03.251112 NN
Engine Housing Covers	B1.05.03.251112 PP
Crankcase Breather Mounting	B1.05.03.251165 AA
Crankcase Breather Mounting	B1.05.03.251165 BB
Oil Pan Mounting	B1.05.03.251220 AA
Oil Pan Mounting	B1.05.03.251220 BB
Oil Pan Mounting	B1.05.03.251220 CC
Oil Pan Mounting	B1.05.03.251220 DD
Oil Pan Mounting	B1.05.03.251220 EE
Oil Pan Mounting	B1.05.03.251220 FF
Oil Outlet	B1.05.03.251258 AA
Cylinder Liner	B1.05.03.251611 AA
Crankcase Cover	B1.05.03.1.1630 AA
Crankcase Cover	B1.05.03.7.1630 BB
Crankcase Cover with Relief Valve	B1.05.03.251633 AA
Pump Covers	B1.05.03.251710 AA
Pump Covers	B1.05.03.251710 BB
Pump Covers	B1.05.03.251710 CC
Pump Covers	B1.05.03.251710 DD
Pump Covers	B1.05.03.251710 EE
Pump Covers	B1.05.03.251710 FF
Engine, control	B1.05.04
Camshaft	B1.05.04.253120 AA
Camshaft	B1.05.04.253120 BB
Camshaft	B1.05.04.253120 CC
Vibration Damper Mounting for Camshaft	B1.05.04.253140 AA
Vibration Damper Mounting for Camshaft	B1.05.04.253140 BB
Bottom Part for Valve Mechanism	B1.05.04.253502 AA

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Bottom Part for Valve Mechanism	B1.05.04.253502 BB
Bottom Part for Valve Mechanism	B1.05.04.253502 CC
Bottom Part for Valve Mechanism	B1.05.04.253502 DD
Bottom Part for Valve Mechanism	B1.05.04.253502 EE
Bottom Part for Valve Mechanism	B1.05.04.253502 FF
Bottom Part for Valve Mechanism	B1.05.04.253502 GG
Injection Pump Drive	B1.05.04.253580 AA
Governor Mounting	B1.05.04.254110 AA
Governor Mounting	B1.05.04.254110 BB
Governor Mounting	B1.05.04.254110 CC
Governor Mounting	B1.05.04.254110 DD
Governor Drive	B1.05.04.254111 AA
Idle Wheel Mounting	B1.05.04.255140 AA
Engine, regulation	B1.05.05
Injection Pump Control Shaft	B1.05.05.254210 AA
Injection Pump Control Shaft	B1.05.05.254210 BB
Injection Pump Control Shaft	B1.05.05.254210 CC
Injection Pump Control Shaft	B1.05.05.254210 DD
Injection Pump Control Shaft	B1.05.05.254210 EE
Injection Pump Control Shaft	B1.05.05.254210 FF
Fuel Limiter	B1.05.05.254240 AA
Fuel Limiter	B1.05.05.254240 BB
Stop Cylinder Mounting	B1.05.05.254241 AA
Stop Cylinder Mounting	B1.05.05.254241 BB
Stop Cylinder Mounting	B1.05.05.254241 CC
Filling Transmitter Mounting	B1.05.05.254243 AA
Single-Acting Cylinder	B1.05.05.1.4337 NN
Control Stand and Gauge Panel Mounting	B1.05.05.254520 AA
Control Stand and Gauge Panel Mounting	B1.05.05.254520 BB
Control Stand and Gauge Panel Mount.	B1.05.05.254520 CC
Control Stand	B1.05.05.254523 AA
Control Stand	B1.05.05.254523 BB
Control Stand	B1.05.05.254523 CC
Compressed-Air Filter	B1.05.05.1.4900 HH
Pressure Reducer	B1.05.05.1.4902 AA
3/2 Way Valve	B1.05.05.1.4906 ZK
3/2-Way Valve	B1.05.05.1.4914 SS

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Engine, exhaust gas system/supercharging	B1.05.06
Exhaust Manifold Mounting	B1.05.06.257210 AA
Exhaust Manifold Mounting	B1.05.06.257210 BB
Exhaust Manifold Mounting	B1.05.06.257210 CC
Exhaust Manifold Mounting	B1.05.06.257210 DD
Exhaust Nozzle	B1.05.06.257218 AA
Exhaust Nozzle	B1.05.06.257218 BB
Exhaust Nozzle	B1.05.06.257218 CC
Exhaust Nozzle	B1.05.06.1.7218 XX
Exhaust Line Covering Mounting	B1.05.06.257220 AA
Exhaust Line Covering Mounting	B1.05.06.257220 BB
Exhaust Line Covering Mounting	B1.05.06.257220 CC
Charge Air Cooler Mounting	B1.05.06.257240 AA
Charge Air Cooler Mounting	B1.05.06.257240 BB
Charge Air Cooler Mounting	B1.05.06.257240 CC
Charge Air Cooler Mounting	B1.05.06.257240 DD
Turbocharger Mounting	B1.05.06.257250 AA
Turbocharger Mounting	B1.05.06.257250 BB
Turbocharger Mounting	B1.05.06.257250 CC
Turbocharger Mounting	B1.05.06.257250 DD
Turbocharger Mounting	B1.05.06.257250 EE
Turbocharger Mounting	B1.05.06.257255 AA
Turbocharger Mounting	B1.05.06.257255 BB
Turbocharger Mounting	B1.05.06.257255 CC
Turbocharger Mounting	B1.05.06.257255 DD
Turbocharger Mounting	B1.05.06.257255 EE
Cleaning Device for Turbocharger	B1.05.06.257259 AA
Cleaning Device for Turbocharger	B1.05.06.257259 BB
Cleaning Device for Turbocharger	B1.05.06.257259 CC
Cleaning Device for Turbocharger	B1.05.06.257259 DD
Cleaning Device for Turbocharger	B1.05.06.257259 EE
Cleaning Device for Turbocharger	B1.05.06.257259 FF
Cleaning Device for Turbocharger	B1.05.06.257259 GG
Cleaning Device for Turbocharger	B1.05.06.257259 HH
Cleaning Device for Turbocharger	B1.05.06.257259 KK
Connection Fittings for Turbocharger Cleaning Device	B1.05.06.1.7259 LL
Cleaning Device for Turbocharger	B1.05.06.257259 LL

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Cleaning Device for Turbocharger	B1.05.06.257259 MM
Cleaning Device for Turbocharger	B1.05.06.257259 NN
Cleaning Device for Turbocharger	B1.05.06.257259 PP
Cleaning Device for Turbocharger	B1.05.06.257259 RR
Cleaning Device for Turbocharger	B1.05.06.257259 SS
Cleaning Device for Turbocharger	B1.05.06.257259 TT
Exhaust Manifold Mounting	B1.05.06.257260 AA
Exhaust Manifold Mounting	B1.05.06.257260 BB
Exhaust Manifold Mounting	B1.05.06.257260 CC
Exhaust Manifold Mounting	B1.05.06.257260 DD
Exhaust Manifold Mounting	B1.05.06.257260 EE
Exhaust Line Covering Mounting	B1.05.06.257270 AA
Exhaust Line Covering Mounting	B1.05.06.257270 BB
Exhaust Line Covering Mounting	B1.05.06.257270 CC
Charge Air Cooler Mounting	B1.05.06.257280 AA
Charge Air Cooler Mounting	B1.05.06.257280 BB
Charge Air Cooler Mounting	B1.05.06.257280 CC
Charge Air Cooler Mounting	B1.05.06.257280 DD
Charge Air Cooler Mounting	B1.05.06.257280 EE
Corner Valve	B1.05.06.1.7297 AA
Corner Valve	B1.05.06.1.7297 BB
Connecting Point Differential Pressure for Charge Air	B1.05.06.258629 AA
Connecting Point Differential Pressure for Charge Air	B1.05.06.258629 BB
Connecting Point Differential Pressure for Charge Air	B1.05.06.258629 CC
Connecting Point Turbocharger VRT-Control	B1.05.06.258650 AA
Differential Pressure Gauge	B1.05.06.1.9284 AA
Engine, fuel system	B1.05.07
Einspritzventil	B1.05.07.252260 AA
Nozzle Holder	B1.05.07.252267 AA
Nozzle Holder	B1.05.07.252267 BB
Fuel Injection Pump	B1.05.07.253597 AA
Fuel Injection Pump	B1.05.07.253597 BB
Fuel Transfer Pump Mounting	B1.05.07.256480 AA
Cover Mounting	B1.05.07.256485 AA

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Fuel Feed Pump clockwise	B1.05.07.256487 AA
Fuel Feed Pump	B1.05.07.9.6487 AA
Fuel Feed Pump anti clockwise	B1.05.07.256487 BB
Fuel Filter Mounting	B1.05.07.257660 AA
Fuel Filter Mounting	B1.05.07.257660 BB
Duplex Fuel Fine Filter	B1.05.07.9.7667 AA
Duplex Fuel Fine Filter	B1.05.07.9.7667 BB
Duplex Fuel Fine Filter	B1.05.07.9.7667 CC
Duplex Fuel Fine Filter	B1.05.07.1.7667 FF
Duplex Fuel Primary Filter	B1.05.07.1.7668 DD
Duplex Fuel Primary Filter	B1.05.07.1.7668 GG
Fuel Distributing-/Collecting Pipe	B1.05.07.258510 AA
Fuel Distributing-/Collecting Pipe	B1.05.07.258510 BB
Fuel Distributing-/Collecting Pipe	B1.05.07.258510 CC
Fuel Distributing-/Collecting Pipe	B1.05.07.258510 DD
Fuel Distributing-/Collecting Pipe	B1.05.07.258510 EE
Fuel Distributing-/Collecting Pipe	B1.05.07.258510 FF
Fuel Injector Delivery Pipe Mounting	B1.05.07.258526 AA
Fuel Filter Pipe Mounting	B1.05.07.258535 AA
Fuel Filter Pipe Mounting	B1.05.07.258535 BB
Fuel Filter Pipe Mounting	B1.05.07.258538 AA
Leak Fuel Piping	B1.05.07.258540 AA
Leak Fuel Piping	B1.05.07.258540 BB
Leak Fuel Piping	B1.05.07.258540 CC
Leak Fuel Piping	B1.05.07.258540 DD
Leak Fuel Piping	B1.05.07.258540 EE
Leak Fuel Piping	B1.05.07.258540 FF
Leak Fuel Piping	B1.05.07.258540 GG
Leak Fuel Piping	B1.05.07.258540 HH
Leak Fuel Piping	B1.05.07.258540 KK
Leak Fuel Piping	B1.05.07.258540 LL
Leak Fuel Piping	B1.05.07.258540 MM
Leak Fuel Piping	B1.05.07.258540 NN

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Engine, lubricating oil system	B1.05.08
Lubricating Oil Pump Mounting	B1.05.08.256410 AA
Lubricating Oil Pump Mounting	B1.05.08.256410 BB
Cover Mounting	B1.05.08.256414 AA
Cover Mounting	B1.05.08.256414 BB
Lubricating Oil Pump Mounting	B1.05.08.256415 AA
Lubricating Oil Pump Mounting	B1.05.08.256415 BB
Lubricating Oil Pump clockwise	B1.05.08.256417 AA
Lubricating Oil Pump anti-clockwise	B1.05.08.256417 BB
Lubricating Oil Pump clockwise	B1.05.08.256417 CC
Lubricating Oil Pump anti-clockwise	B1.05.08.256417 DD
Lubricating Oil Pump clockwise	B1.05.08.256417 EE
Lubricating Oil Pump anti-clockwise	B1.05.08.256417 FF
Gearwheel for Lubricating Oil Pump	B1.05.08.1.6422 XX
Lubricating Oil Filter Mounting	B1.05.08.257650 AA
Lubricating Oil Filter Mounting	B1.05.08.257650 BB
Oil Centrifuge Mounting	B1.05.08.257650 CC
Duplex Lubricating Oil Filter	B1.05.08.257657 AA
Duplex Lubricating Oil Filter	B1.05.08.257657 BB
Lubricating Oil Pipes Mounting	B1.05.08.258420 AA
Lube Oil Suction Pipe for Pressure Pump	B1.05.08.258422 AA
Lube Oil Suction Pipe for Pressure Pump	B1.05.08.258422 BB
Lube Oil Pipe for Suction Pump	B1.05.08.258430 AA
Lube Oil Nozzle for Gearwheels	B1.05.08.258450 AA
Lube Oil Pipe for Valve Rocker	B1.05.08.258475 AA
Lube Oil Pipe for Valve Rocker	B1.05.08.258475 BB
Lube Oil Pipe for Valve Rocker	B1.05.08.258475 CC
Sealing Oil Connection Mounting	B1.05.08.258478 AA
Leak Oil Piping	B1.05.08.258480 AA
Leak Oil Piping	B1.05.08.258480 BB
Leak Oil Piping	B1.05.08.258480 CC
Lubricating Oil Pipe for Turbocharger	B1.05.08.258494 AA
Lubricating Oil Pipe for Turbocharger	B1.05.08.258494 BB

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Lubricating Oil Pipe for Turbocharger	B1.05.08.258494 CC
Lubricating Oil Pipe f. Turbocharger	B1.05.08.258494 DD
Lubricating Oil Pipe f. Turbocharger	B1.05.08.258494 EE
Lubricating Oil Pipe f. Turbocharger	B1.05.08.258494 FF
Engine, cooling water system	B1.05.09
Cover Mounting	B1.05.09.9.6432 AA
Cooling Water Pump	B1.05.09.9.6437 AA
Cooling Water Pump	B1.05.09.9.6437 BB
Cooling Water Pump Mounting	B1.05.09.256440 AA
Cooling Water Pump Mounting	B1.05.09.256440 BB
Cool. Water Distrib./Collecting Pipe	B1.05.09.258320 AA
Cool. Water Distrib./Collecting Pipe	B1.05.09.258320 BB
Cool. Water Distrib./Collecting Pipe	B1.05.09.258320 CC
Cool. Water Distrib./Collecting Pipe	B1.05.09.258320 DD
Cool. Water Distrib./Collecting Pipe	B1.05.09.258320 EE
Cool. Water Distrib./Collecting Pipe	B1.05.09.258320 FF
Cooling Water Pipe	B1.05.09.258330 AA
Cooling Water Pipe	B1.05.09.258330 BB
Cooling Water Pipe	B1.05.09.258330 CC
Cooling Water Thermostat Valve Mount.	B1.05.09.258332 AA
Cooling Water Pipe	B1.05.09.258360 AA
Cooling Water Pipe for Turbocharger	B1.05.09.258373 AA
Cooling Water Pipe for Turbocharger	B1.05.09.258373 BB
Cooling Water Pipe for Turbocharger	B1.05.09.258373 CC
Cooling Water Pipe for Turbocharger	B1.05.09.258377 AA
Cooling Water Pipe for Turbocharger	B1.05.09.258377 BB
Cooling Water Pipe for Turbocharger	B1.05.09.258377 CC
Cooling Water Thermometer Mounting	B1.05.09.258382 AA
Draining for Turbocharger	B1.05.09.258395 AA
Draining for Turbocharger	B1.05.09.258395 BB
Draining for Turbocharger	B1.05.09.258395 CC
Draining for Turbocharger	B1.05.09.258395 DD
Engine, starting system	B1.05.10
Valve Head for Air Bottle	B1.05.10.1.7897 AA
Air Pipe on Engine	B1.05.10.258610 AA
Air Pipe on Engine	B1.05.10.258610 BB

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Air Admission Pipe	B1.05.10.258614 AA
Air Admission Pipe	B1.05.10.258614 BB
Control Air Pipe	B1.05.10.258617 AA
Control Air Pipe	B1.05.10.258617 BB
Control Air Pipe	B1.05.10.258617 CC
Control Air Pipe	B1.05.10.258617 DD
Control Air Pipe	B1.05.10.258617 EE
Control Air Pipe	B1.05.10.258617 FF
Control Air Piping for Fuel Limiter	B1.05.10.258628 AA
Control Air Piping for Fuel Limiter	B1.05.10.258628 BB
Control Air Piping for Fuel Limiter	B1.05.10.258628 CC
Control Air Piping for Fuel Limiter	B1.05.10.258628 DD
Control Air Piping for Fuel Limiter	B1.05.10.258628 EE
Control Air Piping for Fuel Limiter	B1.05.10.258628 FF
Engine control equipment	B1.05.11
Gauge Panel	B1.05.11.254630 AA
Gauge Panel	B1.05.11.254630 BB
Gauge Panel	B1.05.11.254630 CC
Gauge Panel	B1.05.11.254630 DD
Gauge Panel	B1.05.11.254630 EE
Pressure Gauge Line Mounting	B1.05.11.254643 AA
Pressure Gauge Line Mounting	B1.05.11.254643 BB
Pressure Gauge Line Mounting	B1.05.11.254643 CC
Pressure Gauge Line Mounting	B1.05.11.254643 DD
Pressure Gauge Line Mounting	B1.05.11.254643 EE
Pressure Gauge Line Mounting	B1.05.11.254643 FF
Pressure Gauge Line Mounting	B1.05.11.254643 GG
Pressure Gauge Line Mounting	B1.05.11.254643 HH
Pressure Gauge Line Mounting	B1.05.11.254643 KK
Pressure Gauge Line Mounting	B1.05.11.254643 LL
Crankcase Oil Mist Detector	B1.05.11.254810 AA
Crankcase Oil Mist Detector	B1.05.11.254810 BB
Crankcase Oil Mist Detector	B1.05.11.254810 CC

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Pressure Regulator	B1.05.11.1.4817 AA
Water Detection	B1.05.11.254818 AA
Water Detection	B1.05.11.254818 BB
Water Detection	B1.05.11.254818 CC
Impulse Line for Charge Air Pressure	B1.05.11.254830 AA
Impulse Line for Pressure Switch	B1.05.11.254830 BB
Impulse Line for Pressure Switch	B1.05.11.254830 CC
Impulse Line for Pressure Switch	B1.05.11.254830 DD
Impulse Line for Pressure Switch	B1.05.11.254830 EE
Pressure Switch Mounting	B1.05.11.254840 AA
Pressure Switch Mounting	B1.05.11.254840 BB
Pressure Switch Mounting	B1.05.11.254840 CC
Pressure Switch Mounting	B1.05.11.254842 AA
Pressure Switch Mounting	B1.05.11.254842 BB
Pressure Switch Mounting	B1.05.11.254842 CC
Transmitter for Charge Air Pressure	B1.05.11.254842 DD
Transmitter for Lube Oil Pressure	B1.05.11.254842 EE
Transmitter for Fresh Water Pressure	B1.05.11.254842 GG
Transmitter for Fresh Water Pressure	B1.05.11.254842 HH
Transmitter for Fuel Pressure	B1.05.11.254842 KK
Pressure Switch for Fuel Pressure	B1.05.11.254842 LL
Pressure Switch for Fuel Pressure	B1.05.11.254842 MM
Transmitter for Charge Air Pressure	B1.05.11.254842 NN
Pressure Switch Mounting	B1.05.11.254842 PP
Transmitter for Starting Air Pressure	B1.05.11.9.4842 XX
Transmitter for Charge Air Pressure	B1.05.11.9.4842 YY
Pressure Switch Plate	B1.05.11.9.4842 ZB
Pressure Switch	B1.05.11.9.4843 AA
Crankcase Oil Mist Detector	B1.05.11.1.4877 GG
Crankcase Oil Mist Detector	B1.05.11.1.4877 MM
Thermostat	B1.05.11.1.7837 UU
Bracket Mounting	B1.05.11.258845 AA
Bracket Mounting	B1.05.11.258845 BB
Bracket Mounting	B1.05.11.258845 CC
Bracket Mounting	B1.05.11.258845 DD

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Engine auxiliary units	B1.05.12
Guard Cover for Vibration Damper	B1.05.12.251550 AA
Vibration Damper	B1.05.12.1.6347 ZH
Vibration Damper	B1.05.12.1.6347 ZS
Vibration Damper	B1.05.12.1.6347 ZT
Flywheel Mounting	B1.05.12.257310 AA
Barring Gear	B1.05.12.257330 AA
Barring Gear	B1.05.12.257330 BB
Barring Gear	B1.05.12.257330 CC
Dead Centre Indicator Mounting	B1.05.12.257350 AA
Dead Centre Indicator Mounting	B1.05.12.257350 BB
Engine additional installation	B1.05.13
Resilient Mounting	B1.05.13.251510 AA
Resilient Mounting	B1.05.13.251510 BB
Resilient Mounting	B1.05.13.251510 CC
Diesel Generator Set	B1.05.13.251530 AA
Diesel-Generator-Set	B1.05.13.251530 BB
Diesel Generator Set	B1.05.13.251530 CC
Diesel-Generator-Set	B1.05.13.251530 DD

M20-M601C

We explicitly draw it to your attention that only original MaK replacement parts as well as the replacement parts of our suppliers ordered via after-sales services are subject to MaK quality control.

The fitting and/or use of other parts can have a detrimental effect on given properties with regard to construction of the engine and thereby impair the operational safety and economic efficiency.

For safety reasons, unauthorized modifications and alterations to the engine system are not permissible.

Seals made of VITON^R have been used at various locations in the engine. With normal engine operation this material is completely harmless, however it should not be exposed to temperatures above 300 °C, since above 325 °C a thermal decomposition and the formation of hydrofluoric acid can occur.

Replaced seals should be disposed of immediately, and above all, it should be taken care that this material is not overheated even by accident e.g. during combustion and welding operations. If this should however has happened, the gases emitted must not be inhaled. Skin contact with decomposed VITON^R is to be avoided at all times. After a fire with VITON^R, it is essential that neoprene gloves are worn during the clearing up operations.

Any residues have to be neutralized before their disposal, i.e. saturated with calcium hydroxide.

California / USA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

Cylinder Head

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ZYLINDERKOPF, VOLLST. CYLINDER HEAD ASSEMBLY	1	252107 AA
4	VENTILFÜHRUNG, EINLASS INLET VALVE GUIDE	+ 2	252107-004
5	VENTILFÜHRUNG, AUSLASS EXHAUST VALVE GUIDE	+ 2	252107-005
6	VENTILKEGEL, AUSLASS EXHAUST VALVE STEM	+ 2	252107-006
7	VENTILKEGEL, EINLASS INLET VALVE STEM	+ 2	252107-007
8	VENTILFEDERSCHEIBE VALVE SPRING CAP	***+ 2	252107-008
9	DREHVORRICHTUNG, VOLLST. VALVE ROTATOR, COMPL.	***+ 2	SIEHE B1.05.01.252225 SEE B1.05.01.252225
9	DREHVORRICHTUNG, VOLLST. VALVE ROTATOR, COMPL.	****+ 4	SIEHE B1.05.01.252225 SEE B1.05.01.252225
11	VENTILFEDER VALVE SPRING	+ 4	252107-011
12	FEDERTELLER SPRING PLATE	+ 4	252107-012
13	KLEMMKEGEL CLAMPING CONE	+ 8	252107-013
16	FÜHRUNGSBOLZEN GUIDE BOLT	+ 1	252107-016
26	STIFTSCHRAUBE STUD	+ 2	2.2107-028
27	EINSPRITZVENTIL, VOLLST. FUEL INJECTOR, COMPL.	1	SIEHE B1.05.07.252260 SEE B1.05.07.252260
28	FLANSCH FLANGE	1	252107-028
29	MUTTER NUT	+ 2	2.2107-029
32	VENTILSPINDEL VALVE SPINDLE	+ 1	252107-032
33	BUCHSE BUSH	+ 1	3.2245-003
34	DRUCKFEDER VALVE SPRING	+ 1	3.2245-005
35	DEHNHÜLSE EXTENSION SLEEVE	+ 1	252107-035
36	KOLBEN PISTON	+ 1	252107-036

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cylinder Head

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
37	VERSCHLUSSSCHRAUBE SCREW PLUG	+ 1	252107-037
38	KOLBENRING PISTON RING	+ 1	252107-038
40	INDIZIERVENTIL, VOLLST. INDICATOR VALVE, COMPL.	1	SIEHE B1.05.01.252250 SEE B1.05.01.252250
41	ABDECKUNG COVERING	1	252107-041
43	SPRITZBLECH SPLASH PROTECTION	1	252107-043
45	HAUBE FÜR ZYLINDERKOPF, VOLLST. CYLINDER HEAD CAP, COMPL.	1	SIEHE B1.05.01.252190 SEE B1.05.01.252190
48	TELLERFEDER DISC SPRING	+ 2	1.0067-407
49	STÜTZSCHEIBE WASHER	2	1.0051-041
50	SICHERUNGSRING CIRCLIP	# 2	1.0060-190
52	DICHTRING JOINT RING	# 1	1.7033-102
53	DICHTRING JOINT RING	# 1	1.7010-302
55	SPANNSTIFT SPRING DOWEL PIN	# 1	1.0039-330
57	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-370
59	STIFTSCHRAUBE STUD	+ 2	1.1247-576
60	STIFTSCHRAUBE STUD	+ 2	1.1234-369
61	STIFTSCHRAUBE STUD	+ 2	1.1247-284
63	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-036
64	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	4	1.2035-033
65	SICHERUNGSMUTTER SELF-LOCKING HEXAGON NUT	#+ 1	1.2021-540
67	DEHNHÜLSE EXTENSION BUSH	1	1.0502-054
69	O-RING O-RING	#+ 4	1.7082-517

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cylinder Head

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
70	O-RING O-RING	#+ 2	1.7084-607
71	O-RING O-RING	# 4	1.7084-620
72	O-RING O-RING	#+ 1	1.7084-641
100	ZYLINDERKOPF, UNTERGRUPPE CYLINDER HEAD SUBASSEMBLY	*+ 1	
103	HÜLSE SLEEVE	1	252151-103
104	VENTILSITZRING, EINLASS INLET VALVE SEAT INSERT	2	252151-104
105	VENTILSITZRING, AUSLASS EXHAUST VALVE SEAT INSERT	2	252151-105
108	VERSCHLUSSSCHRAUBE SCREW PLUG	7	1.1040-356
109	VERSCHLUSSSCHRAUBE SCREW PLUG	1	1.1056-202
110	VERSCHLUSSSCHRAUBE SCREW PLUG	3	1.1040-249
111	VERSCHLUSSSCHRAUBE SCREW PLUG	1	1.1040-246
114	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-609
116	VERSCHLUSSDECKEL PLUG	1	252151-116
117	VERSCHLUSSDECKEL PLUG	6	252151-117
118	VERSCHLUSSDECKEL PLUG	4	252151-118
120	DICHTRING JOINT RING	# 7	1.7010-029
121	DICHTRING JOINT RING	# 1	1.7010-133
122	DICHTRING JOINT RING	# 3	1.7010-273
123	DICHTRING JOINT RING	# 1	1.7010-332
128	O-RING O-RING	# 2	1.7082-910

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cylinder Head

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
200	KIPPHEBEL, EINLASS, VOLLST. INLET VALVE ROCKER, COMPL.	* 1	253510-100
202	BUCHSE BUSH	1	253510-202
203	KUGELBOLZEN BALL HEAD PIN	1	253510-203
204	EINSTELLSCHRAUBE ADJUSTING SCREW	1	253510-204
206	SECHSKANTMUTTER HEXAGON THIN NUT	1	1.2017-264
300	KIPPHEBEL, AUSLASS, VOLLST. EXHAUST VALVE ROCKER, COMPL.	* 1	253520-100
202	BUCHSE BUSH	1	253510-202
203	KUGELBOLZEN BALL HEAD PIN	1	253510-203
204	EINSTELLSCHRAUBE ADJUSTING SCREW	1	253510-204
206	SECHSKANTMUTTER HEXAGON THIN NUT	1	1.2017-264
400	VENTILBRÜCKE, EINLASS, VOLLST. INLET VALVE CROSS-BAR, COMPL.	* 1	253515-100
402	DRUCKSTÜCK RAM	1	253515-402
403	DRUCKSTÜCK RAM	1	253515-403
404	EINSTELLSCHRAUBE ADJUSTING BOLT	1	253515-404
406	SECHSKANTMUTTER HEXAGON THIN NUT	1	1.2017-261
408	EXPANDER EXPANDER	1	9.3515-108
500	VENTILBRÜCKE, AUSLASS, VOLLST. EXHAUST VALVE CROSS-BAR, COMPL.	* 1	253515-100
402	DRUCKSTÜCK RAM	1	253515-402
403	DRUCKSTÜCK RAM	1	253515-403
404	EINSTELLSCHRAUBE ADJUSTING BOLT	1	253515-404

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cylinder Head

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
406	SECHSKANTMUTTER HEXAGON THIN NUT	1	1.2017-261
408	EXPANDER EXPANDER	1	9.3515-108
600	KIPPHEBELBOCK, VOLLST. VALVE ROCKER BRACKET, COMPL.	* 1	253530-100
602	KIPPHEBELACHSE VALVE ROCKER AXLE	1	253530-602
604	EXPANDER EXPANDER	1	9.3515-108

* = IN 252107 AA ENTHALTEN
INCLUDED IN 251207 AA

** = DESTILLAT-KRAFTSTOFF-BETRIEB
DISTILLATE FUEL OPERATION

*** = SCHWERÖL-BETRIEB
HEAVY FUEL OPERATION

RESERVEZYLINDERKOPF 252177
(OHNE ABBILDUNG, WIRD NUR VOLLST. GELIEFERT)
ON-BOARD SPARE ZYLINDER HEAD
(NO ILLUSTRATION, SUPPLIED COMPLETE ONLY)

+ = LIEFERUMFANG DES RESERVEZYLINDERKOPFES
SCOPE OF SUPPLY OF ON-BOARD SPARE CYLINDER HEAD

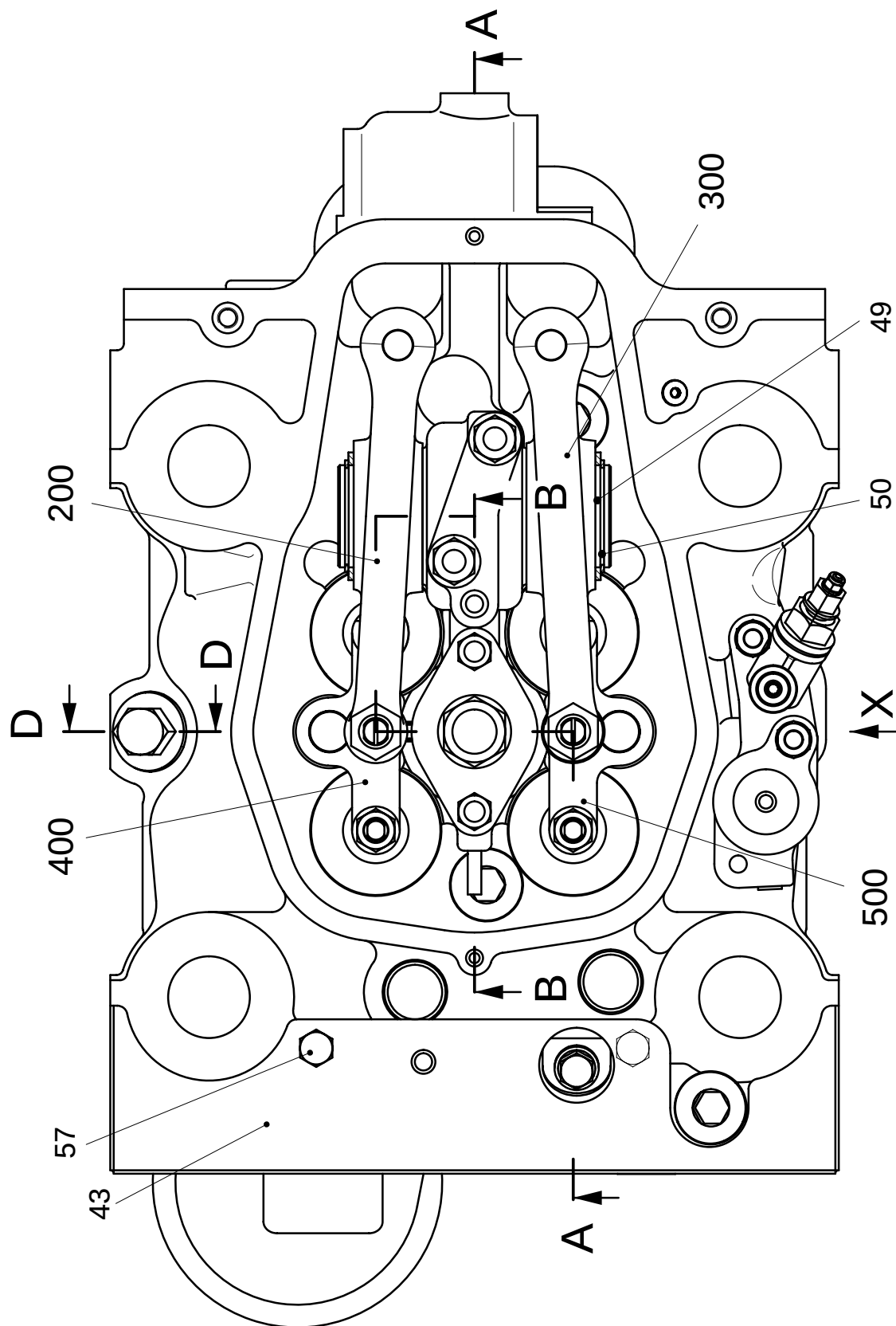
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cylinder Head

M25

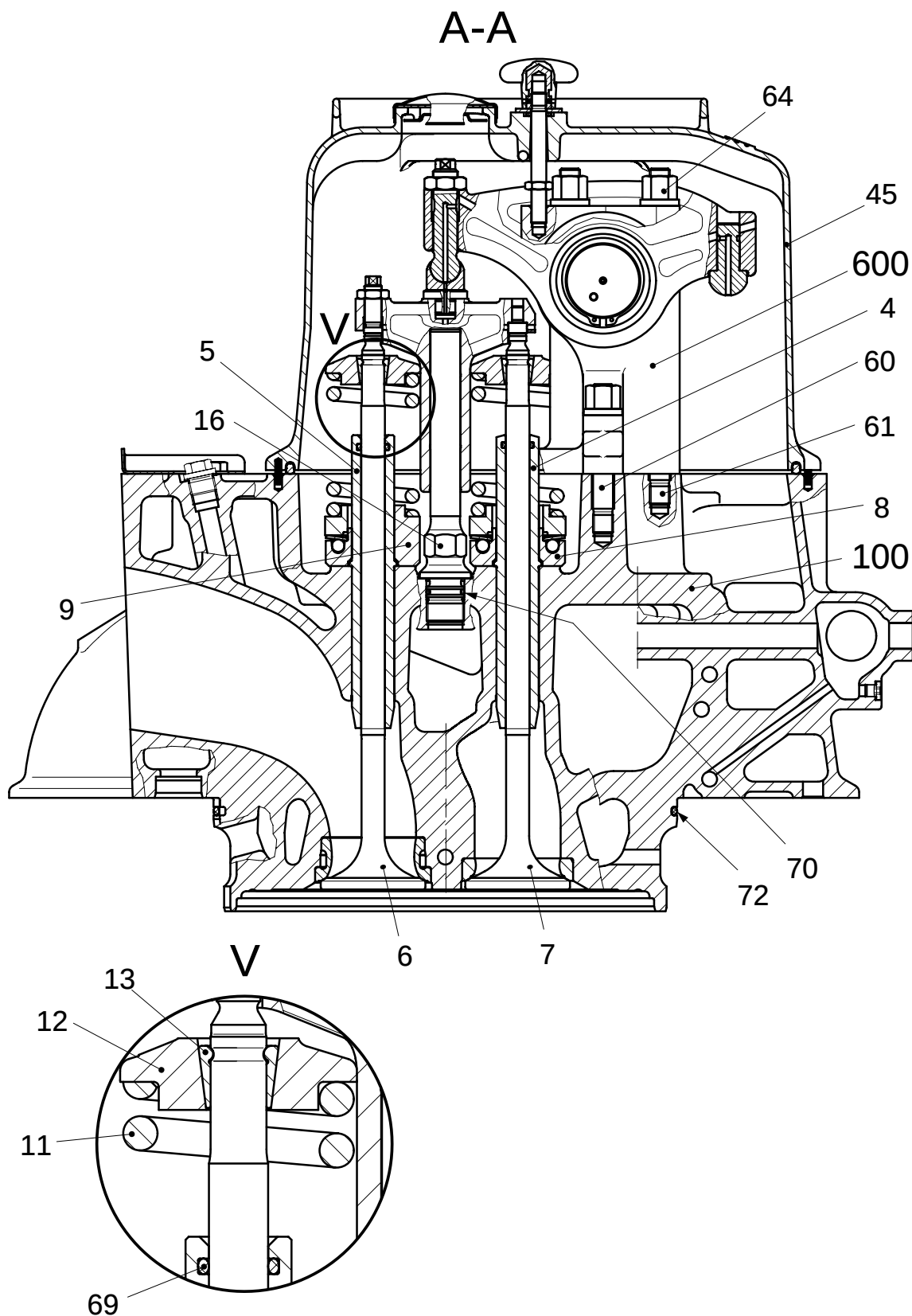
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Cylinder Head

M25

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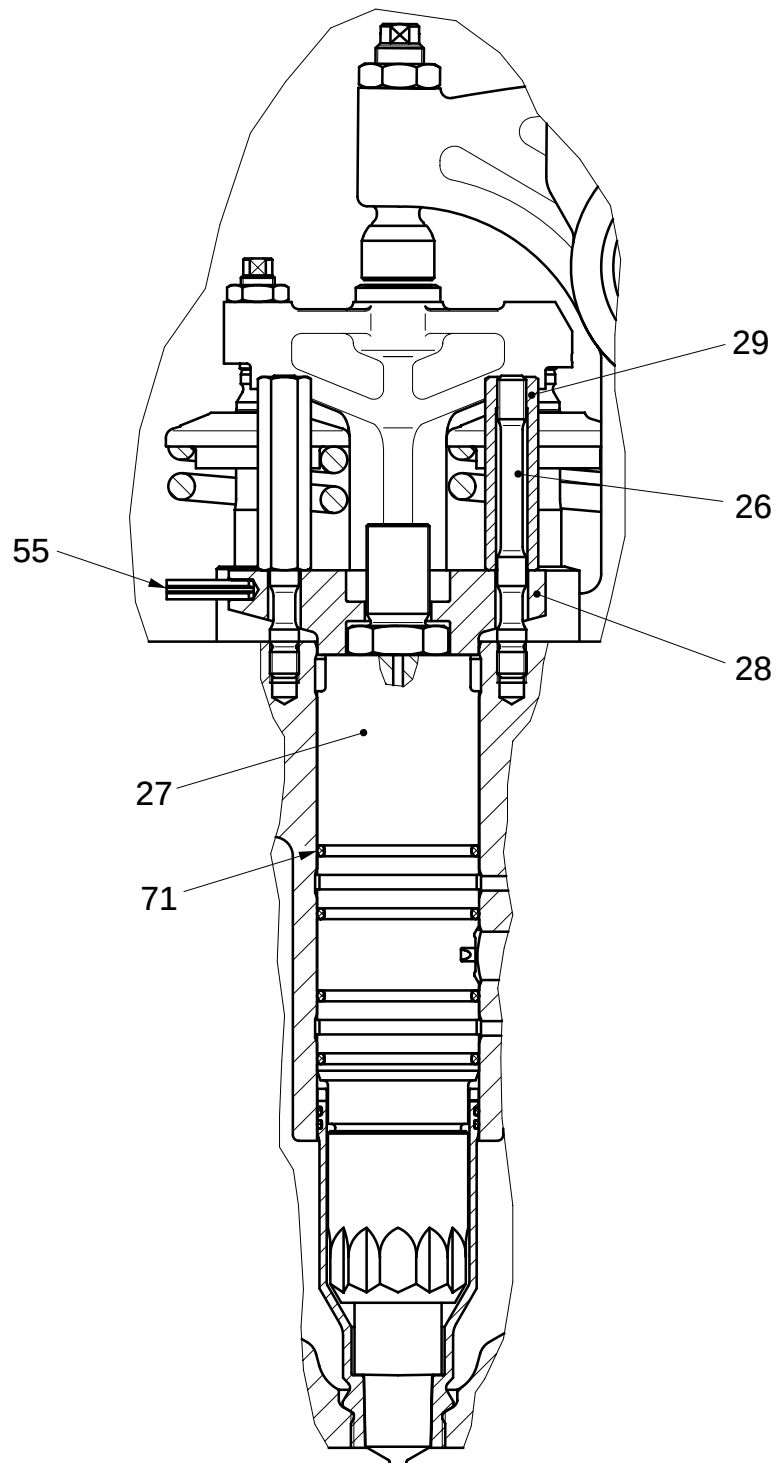


Cylinder Head

M25

01

B-B

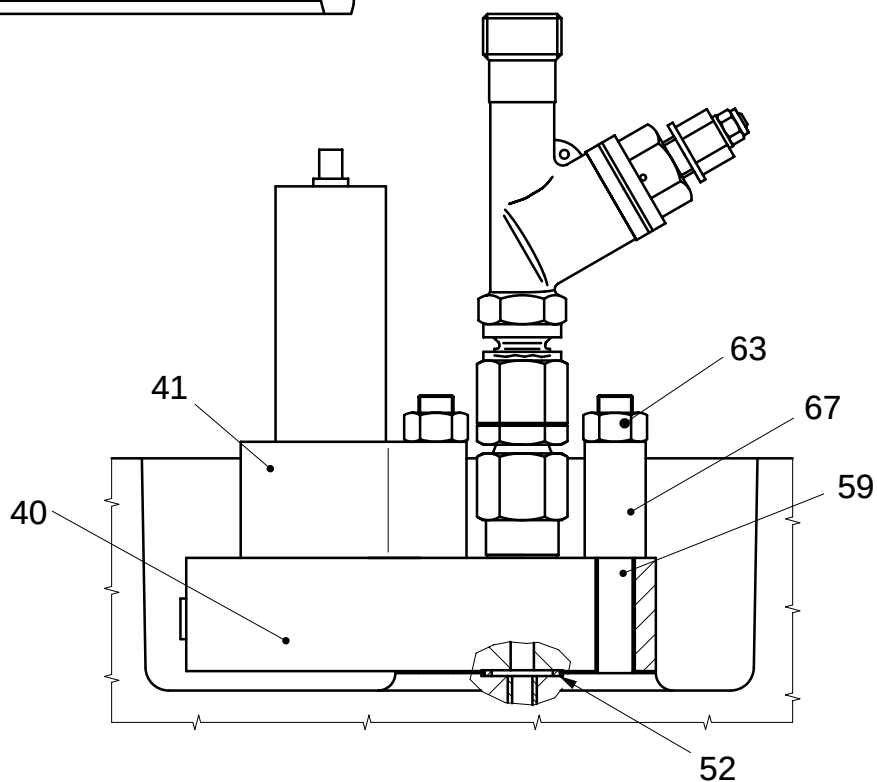
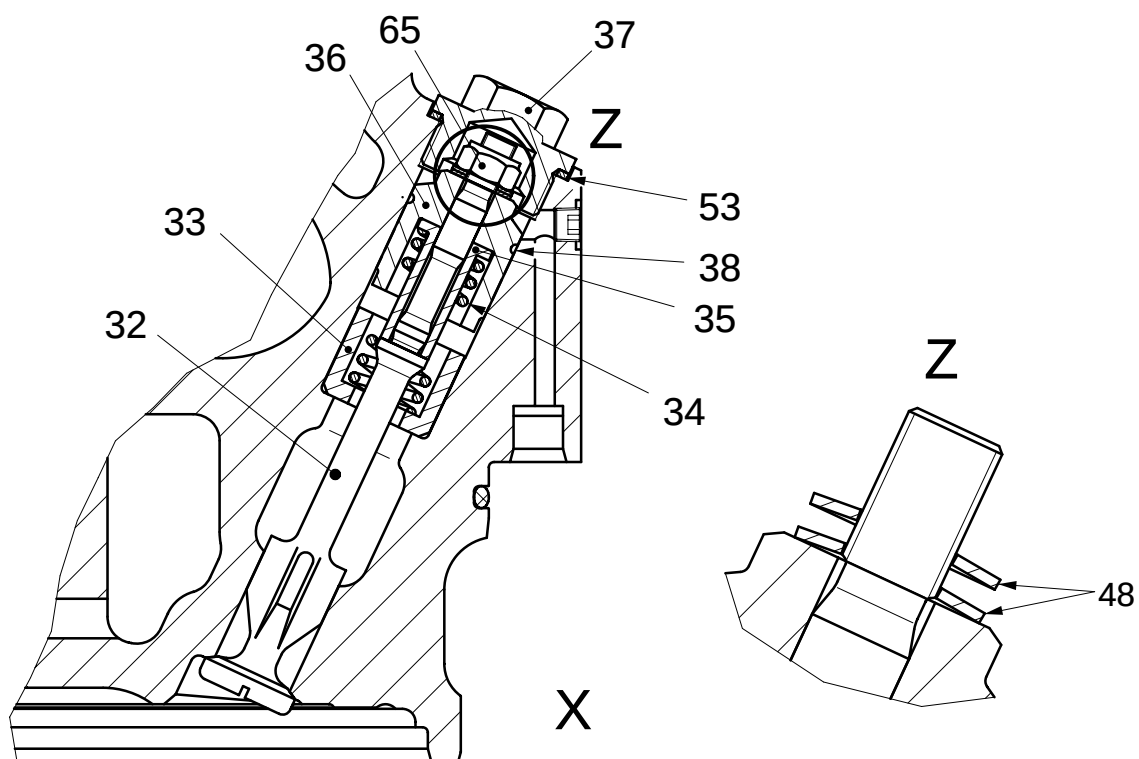


Cylinder Head

M25

01

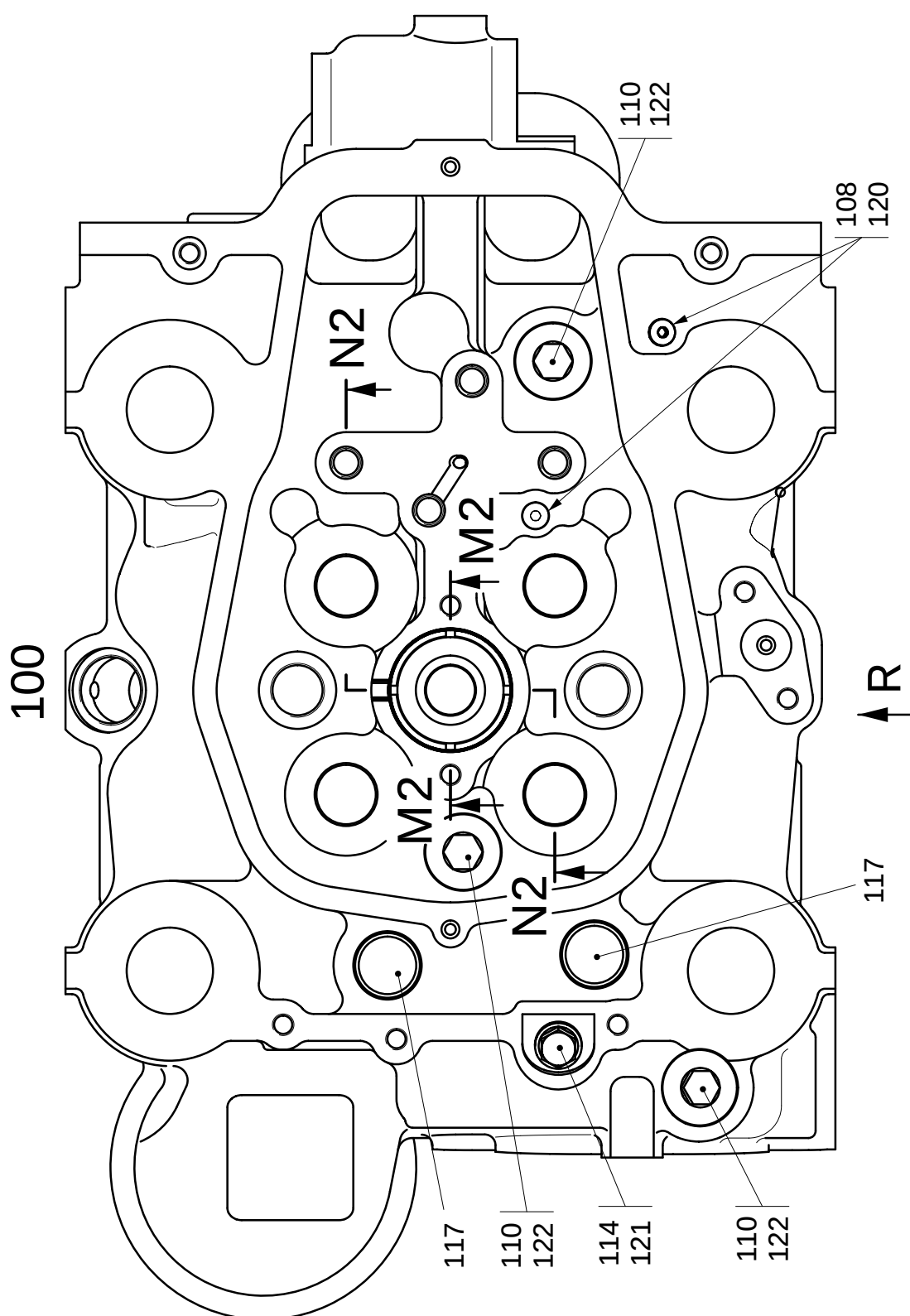
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Cylinder Head

M25

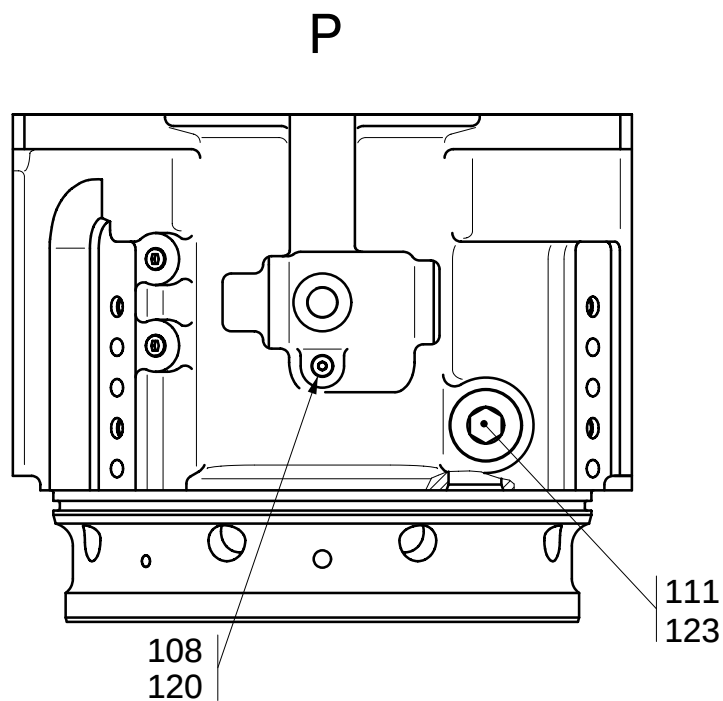
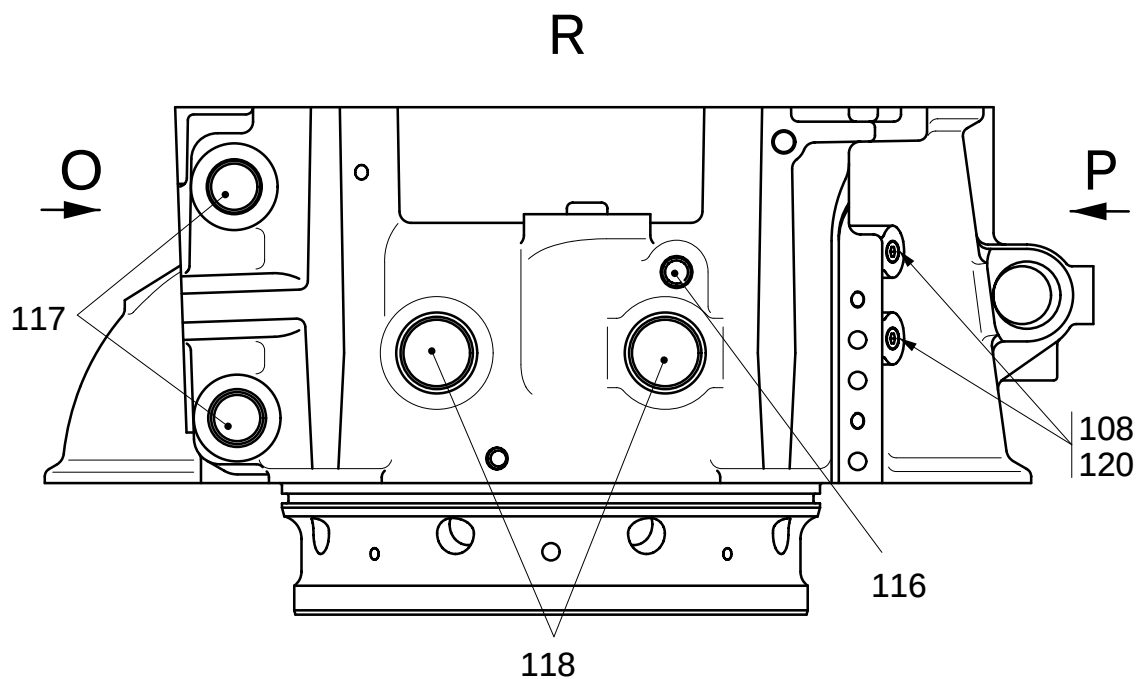
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Cylinder Head

M25

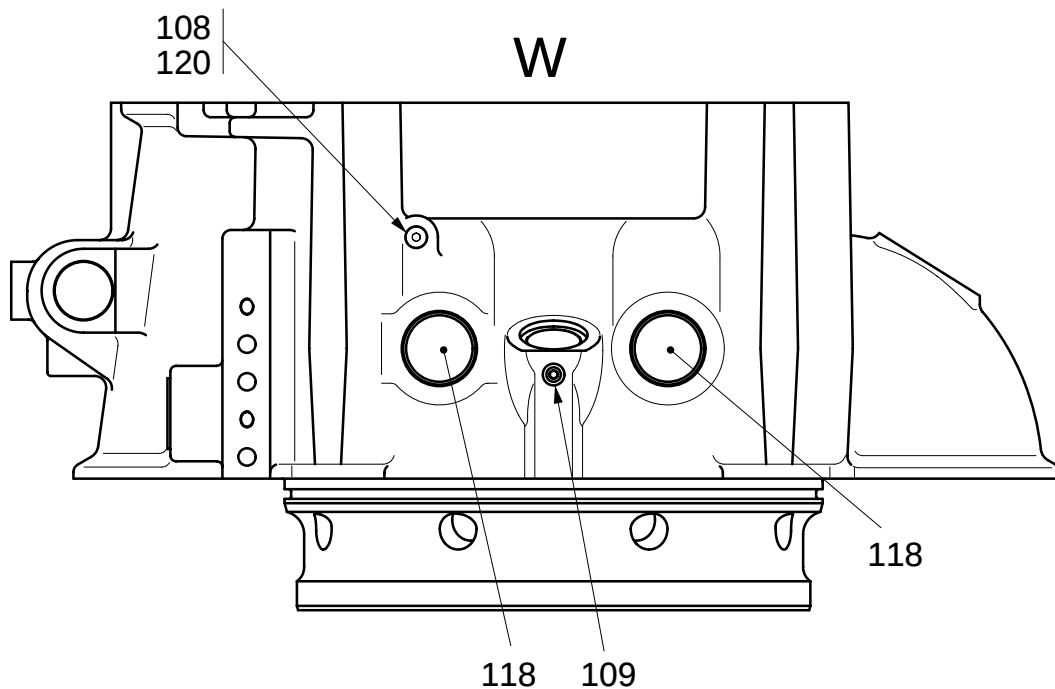
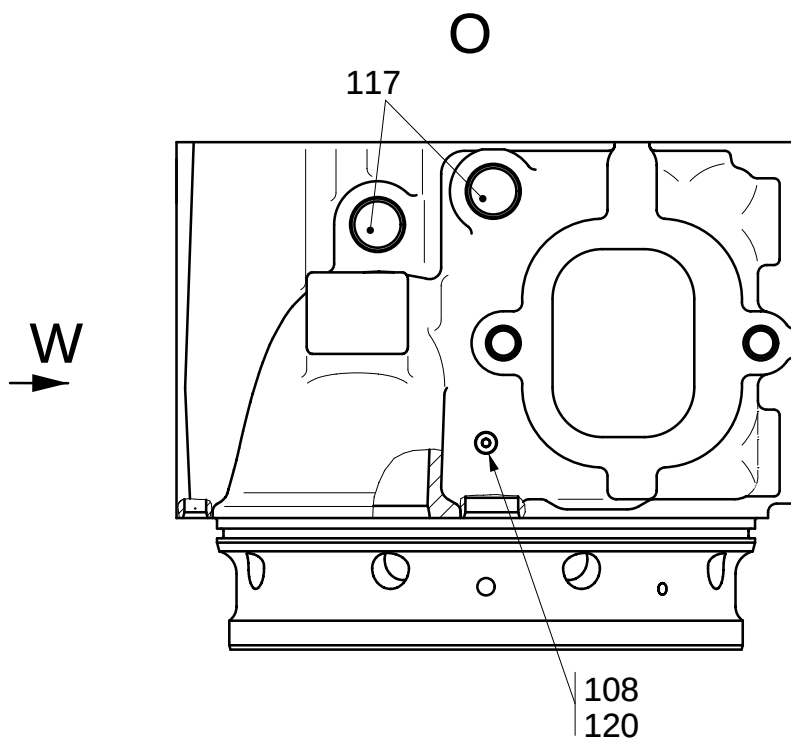
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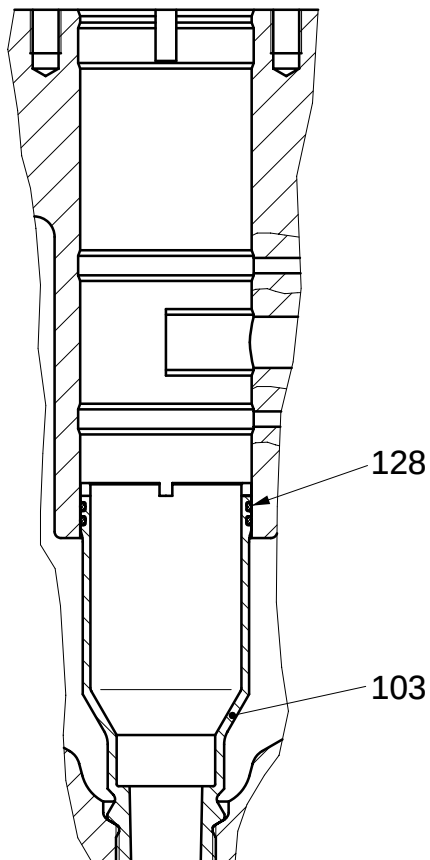
Cylinder Head

M25

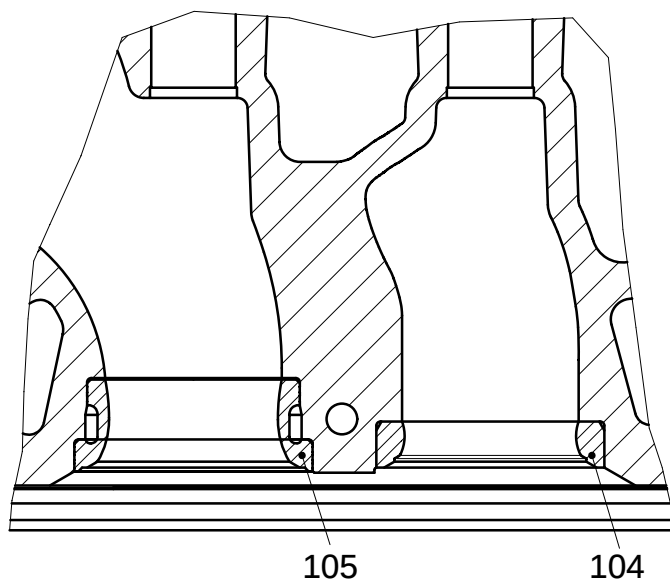
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M2-M2



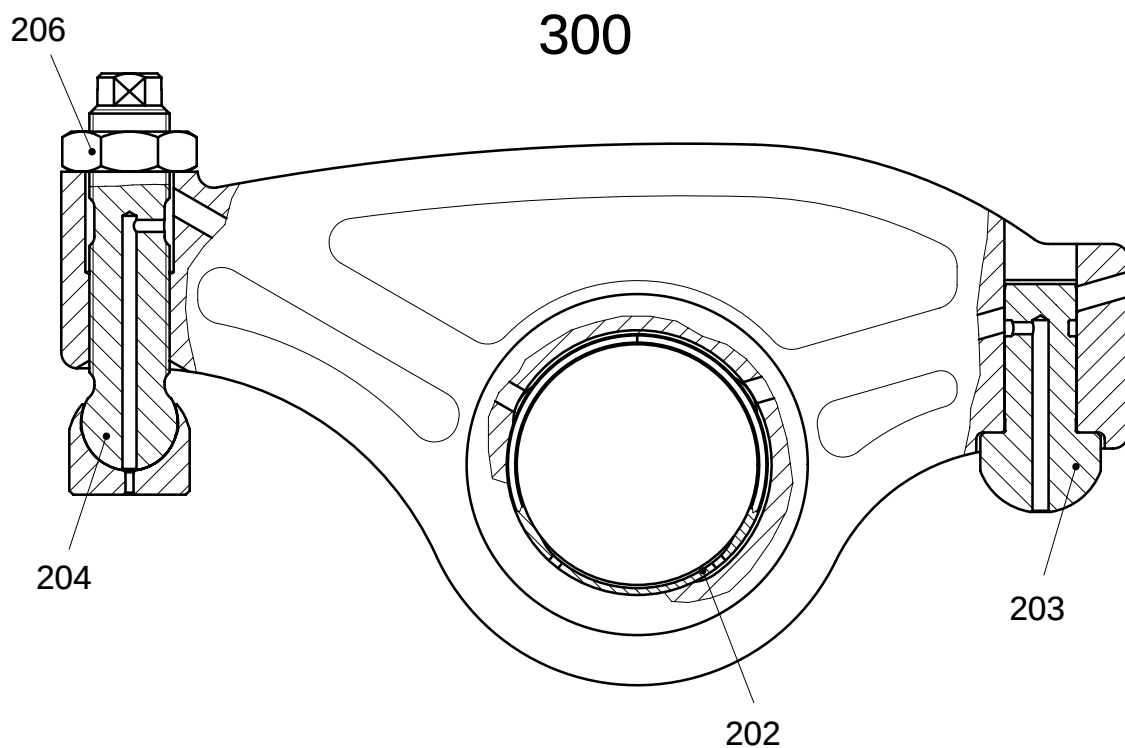
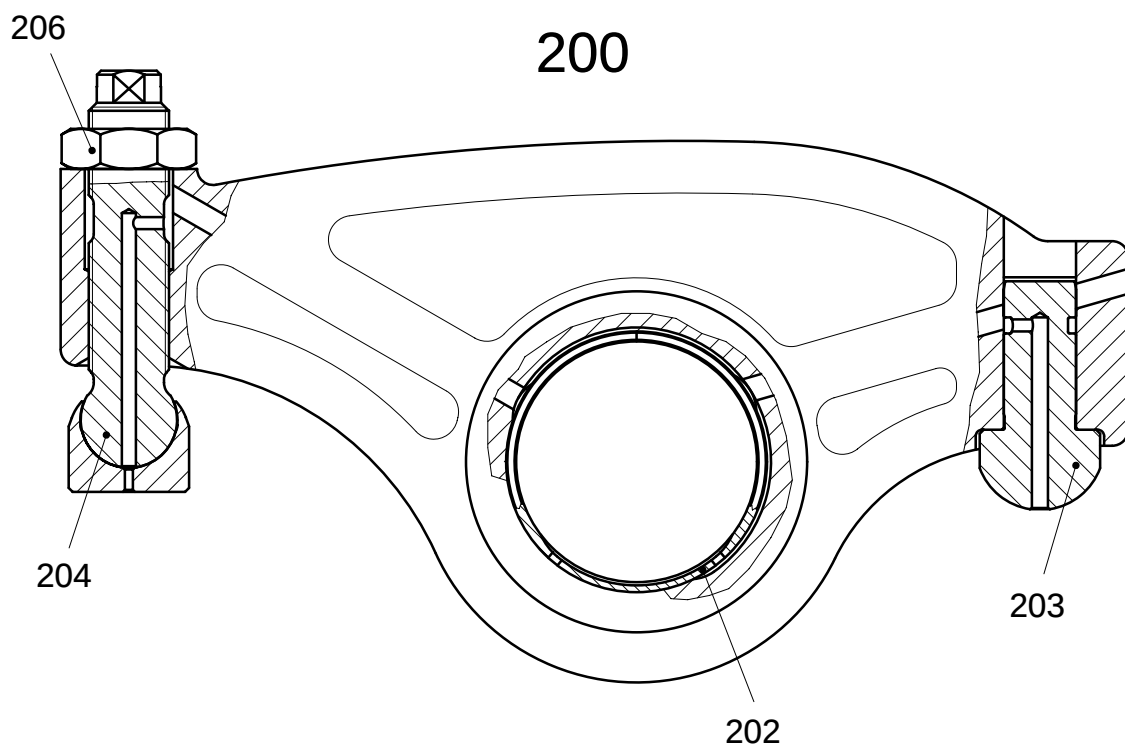
N2-N2



Cylinder Head

M25

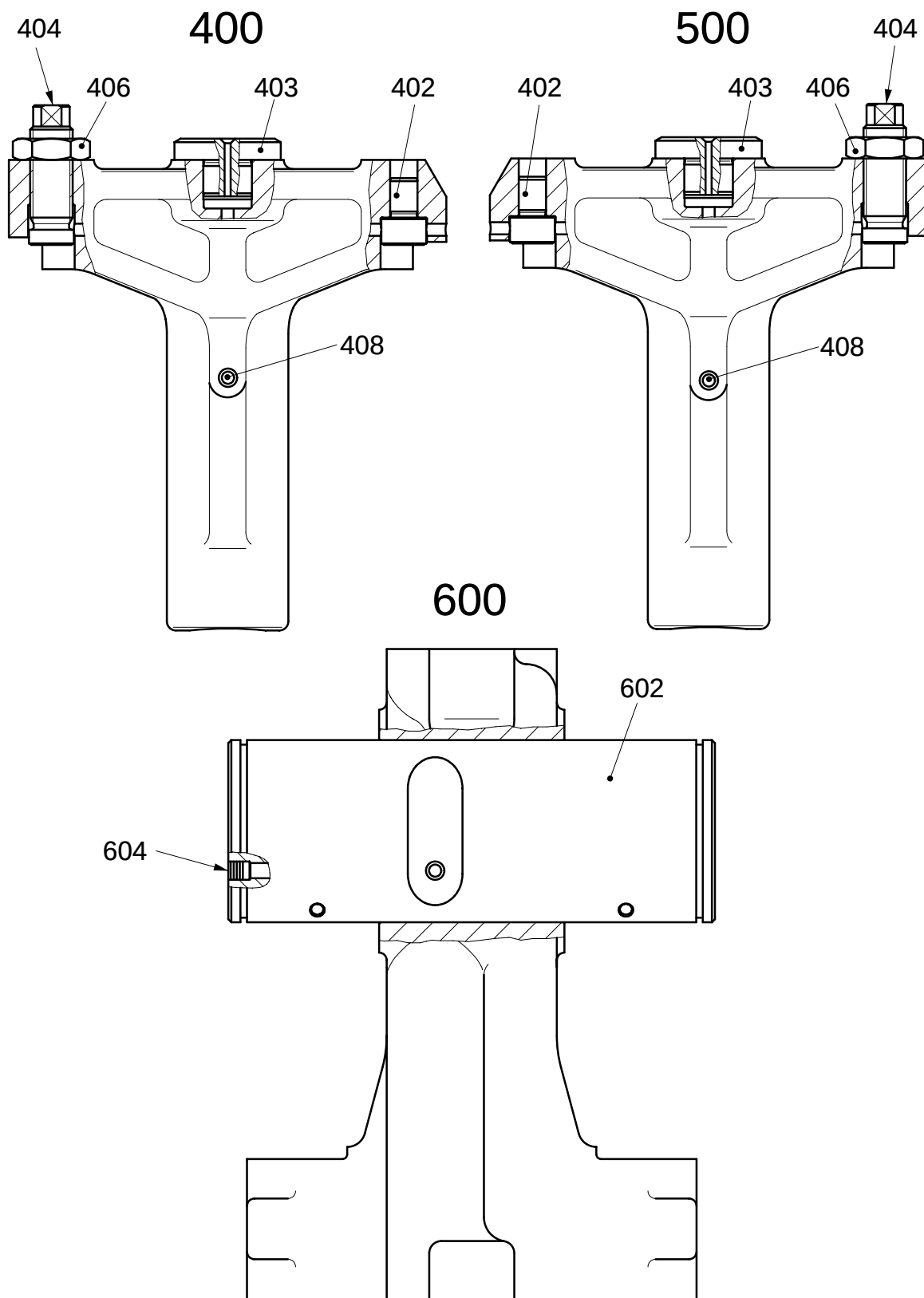
01



Cylinder Head

M25

01



Cylinder Head

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ZYLINDERKOPF, VOLLST. CYLINDER HEAD ASSEMBLY	1	252107 BB
4	VENTILFÜHRUNG, EINLASS INLET VALVE GUIDE	+ 2	252107-004
5	VENTILFÜHRUNG, AUSLASS EXHAUST VALVE GUIDE	+ 2	252107-005
6	VENTILKEGEL, AUSLASS EXHAUST VALVE STEM	+ 2	252107-006
7	VENTILKEGEL, EINLASS INLET VALVE STEM	+ 2	252107-007
8	VENTILFEDERSCHEIBE VALVE SPRING CAP	***+ 2	252107-008
9	DREHVORRICHTUNG, VOLLST. VALVE ROTATOR, COMPL.	***+ 2	SIEHE B1.05.01.252225 SEE B1.05.01.252225
9	DREHVORRICHTUNG, VOLLST. VALVE ROTATOR, COMPL.	****+ 4	SIEHE B1.05.01.252225 SEE B1.05.01.252225
11	VENTILFEDER VALVE SPRING	+ 4	252107-011
12	FEDERTELLER SPRING PLATE	+ 4	252107-012
13	KLEMMKEGEL CLAMPING CONE	+ 8	252107-013
16	FÜHRUNGSBOLZEN GUIDE BOLT	+ 1	252107-016
26	STIFTSCHRAUBE STUD	+ 2	2.2107-028
27	EINSPRITZVENTIL, VOLLST. FUEL INJECTOR, COMPL.	1	SIEHE B1.05.07.252260 SEE B1.05.07.252260
28	FLANSCH FLANGE	1	252107-028
29	MUTTER NUT	+ 2	2.2107-029
32	VENTILSPINDEL VALVE SPINDLE	+ 1	252107-032
33	BUCHSE BUSH	+ 1	252107-133
34	DRUCKFEDER VALVE SPRING	+ 1	3.2245-005
35	DEHNHÜLSE EXTENSION SLEEVE	+ 1	252107-035
36	KOLBEN PISTON	+ 1	252107-136

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cylinder Head

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
37	VERSCHLUSSSCHRAUBE SCREW PLUG	+ 1	252107-137
40	INDIZIERVENTIL, VOLLST. INDICATOR VALVE, COMPL.	1	SIEHE B1.05.01.252250 SEE B1.05.01.252250
41	ABDECKUNG COVERING	1	252107-041
43	SPRITZBLECH SPLASH PROTECTION	1	252107-043
45	HAUBE FÜR ZYLINDERKOPF, VOLLST. CYLINDER HEAD CAP, COMPL.	1	SIEHE B1.05.01.252190 SEE B1.05.01.252190
48	SPANNSCHEIBE SPRING WASHER	+ 2	1.0068-225
49	STÜTZSCHEIBE WASHER	2	1.0051-041
50	SICHERUNGSRING CIRCLIP	# 2	1.0060-190
52	DICHTRING JOINT RING	# 1	1.7033-102
53	DICHTRING JOINT RING	# 1	1.7010-332
55	SPANNSTIFT SPRING DOWEL PIN	# 1	1.0039-330
57	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-370
59	STIFTSCHRAUBE STUD	+ 2	1.1247-576
60	STIFTSCHRAUBE STUD	+ 2	1.1234-369
61	STIFTSCHRAUBE STUD	+ 2	1.1247-284
63	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-036
64	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	4	1.2035-033
65	SICHERUNGSMUTTER SELF-LOCKING HEXAGON NUT	#+ 1	1.2021-540
67	DEHNHÜLSE EXTENSION BUSH	1	1.0502-054
69	O-RING O-RING	#+ 4	1.7082-517
70	O-RING O-RING	#+ 2	1.7084-607

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cylinder Head

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
71	O-RING O-RING	# 4	1.7084-620
72	O-RING O-RING	#+ 1	1.7084-641
100	ZYLINDERKOPF, UNTERGRUPPE CYLINDER HEAD SUBASSEMBLY	*+ 1	
103	HÜLSE SLEEVE	1	252151-103
104	VENTILSITZRING, EINLASS INLET VALVE SEAT INSERT	2	252151-104
105	VENTILSITZRING, AUSLASS EXHAUST VALVE SEAT INSERT	2	252151-105
108	VERSCHLUSSSCHRAUBE SCREW PLUG	7	1.1040-356
109	VERSCHLUSSSCHRAUBE SCREW PLUG	1	1.1056-202
110	VERSCHLUSSSCHRAUBE SCREW PLUG	3	1.1040-249
111	VERSCHLUSSSCHRAUBE SCREW PLUG	1	1.1040-246
114	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-609
116	VERSCHLUSSDECKEL PLUG	1	252151-116
117	VERSCHLUSSDECKEL PLUG	6	252151-117
118	VERSCHLUSSDECKEL PLUG	4	252151-118
120	DICHTRING JOINT RING	# 7	1.7010-029
121	DICHTRING JOINT RING	# 1	1.7010-133
122	DICHTRING JOINT RING	# 3	1.7010-273
123	DICHTRING JOINT RING	# 1	1.7010-332
124	O-RING O-RING	# 1	1.7082-910
128	O-RING O-RING	# 1	1.7082-519

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cylinder Head

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
200	KIPPHEBEL, EINLASS, VOLLST. INLET VALVE ROCKER, COMPL.	* 1	253510-100
202	BUCHSE BUSH	1	253510-202
203	KUGELBOLZEN BALL HEAD PIN	1	253510-203
204	EINSTELLSCHRAUBE ADJUSTING SCREW	1	253510-204
206	SECHSKANTMUTTER HEXAGON THIN NUT	1	1.2017-264
300	KIPPHEBEL, AUSLASS, VOLLST. EXHAUST VALVE ROCKER, COMPL.	* 1	253520-100
202	BUCHSE BUSH	1	253510-202
203	KUGELBOLZEN BALL HEAD PIN	1	253510-203
204	EINSTELLSCHRAUBE ADJUSTING SCREW	1	253510-204
206	SECHSKANTMUTTER HEXAGON THIN NUT	1	1.2017-264
400	VENTILBRÜCKE, EINLASS, VOLLST. INLET VALVE CROSS-BAR, COMPL.	* 1	253515-100
402	DRUCKSTÜCK RAM	1	253515-402
403	DRUCKSTÜCK RAM	1	253515-403
404	EINSTELLSCHRAUBE ADJUSTING BOLT	1	253515-404
406	SECHSKANTMUTTER HEXAGON THIN NUT	1	1.2017-261
408	EXPANDER EXPANDER	1	9.3515-108
500	VENTILBRÜCKE, AUSLASS, VOLLST. EXHAUST VALVE CROSS-BAR, COMPL.	* 1	253515-100
402	DRUCKSTÜCK RAM	1	253515-402
403	DRUCKSTÜCK RAM	1	253515-403
404	EINSTELLSCHRAUBE ADJUSTING BOLT	1	253515-404

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cylinder Head

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
406	SECHSKANTMUTTER HEXAGON THIN NUT	1	1.2017-261
408	EXPANDER EXPANDER	1	9.3515-108
600	KIPPHEBELBOCK, VOLLST. VALVE ROCKER BRACKET, COMPL.	* 1	253530-100
602	KIPPHEBELACHSE VALVE ROCKER AXLE	1	253530-602
604	EXPANDER EXPANDER	1	9.3515-108

* = IN 252107 BB ENTHALTEN
INCLUDED IN 251207 BB

** = DESTILLAT-KRAFTSTOFF-BETRIEB
DISTILLATE FUEL OPERATION

*** = SCHWERÖL-BETRIEB
HEAVY FUEL OPERATION

RESERVEZYLINDERKOPF 252177
(OHNE ABBILDUNG, WIRD NUR VOLLST. GELIEFERT)
ON-BOARD SPARE ZYLINDER HEAD
(NO ILLUSTRATION, SUPPLIED COMPLETE ONLY)

+ = LIEFERUMFANG DES RESERVEZYLINDERKOPFES
SCOPE OF SUPPLY OF ON-BOARD SPARE CYLINDER HEAD

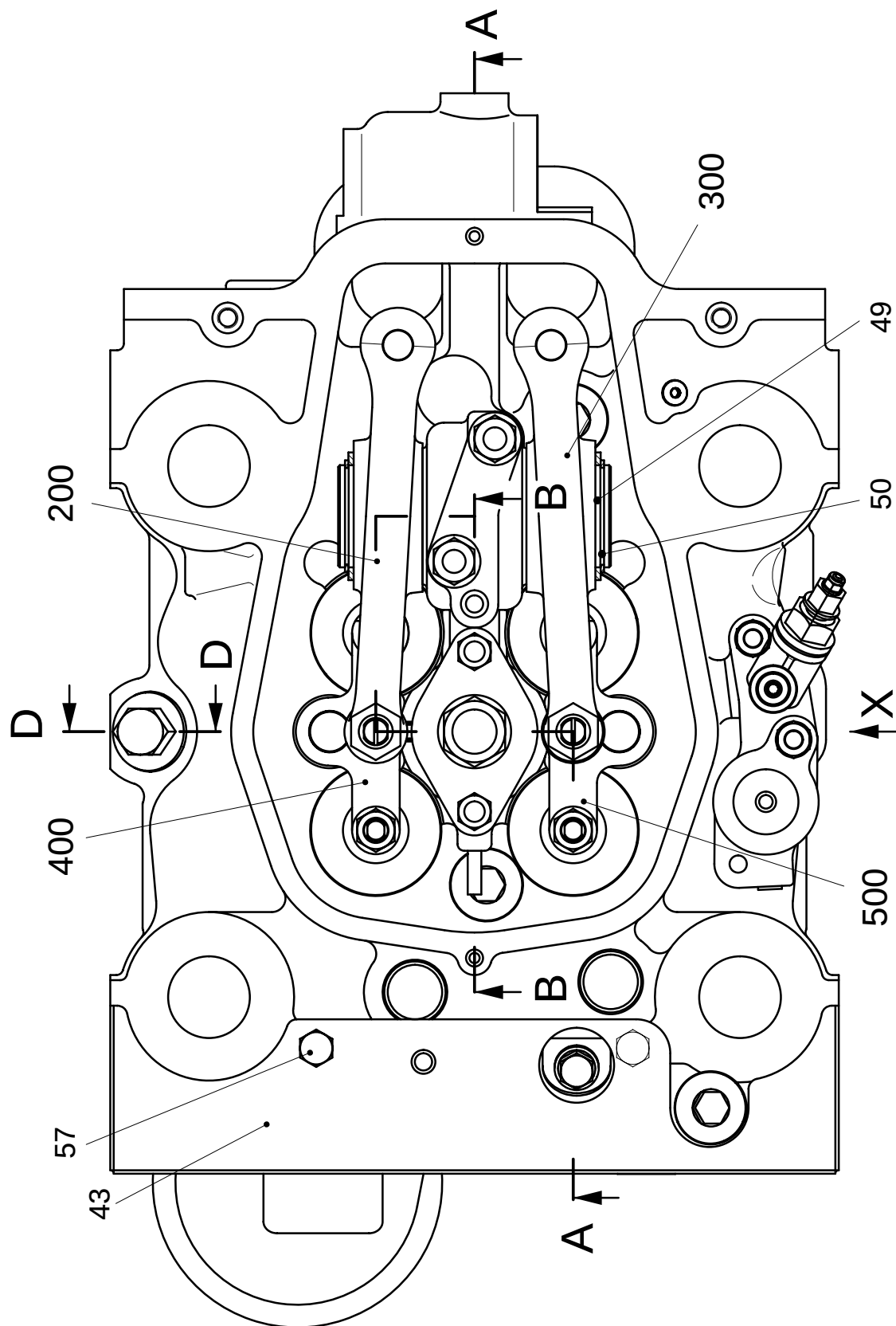
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cylinder Head

M25

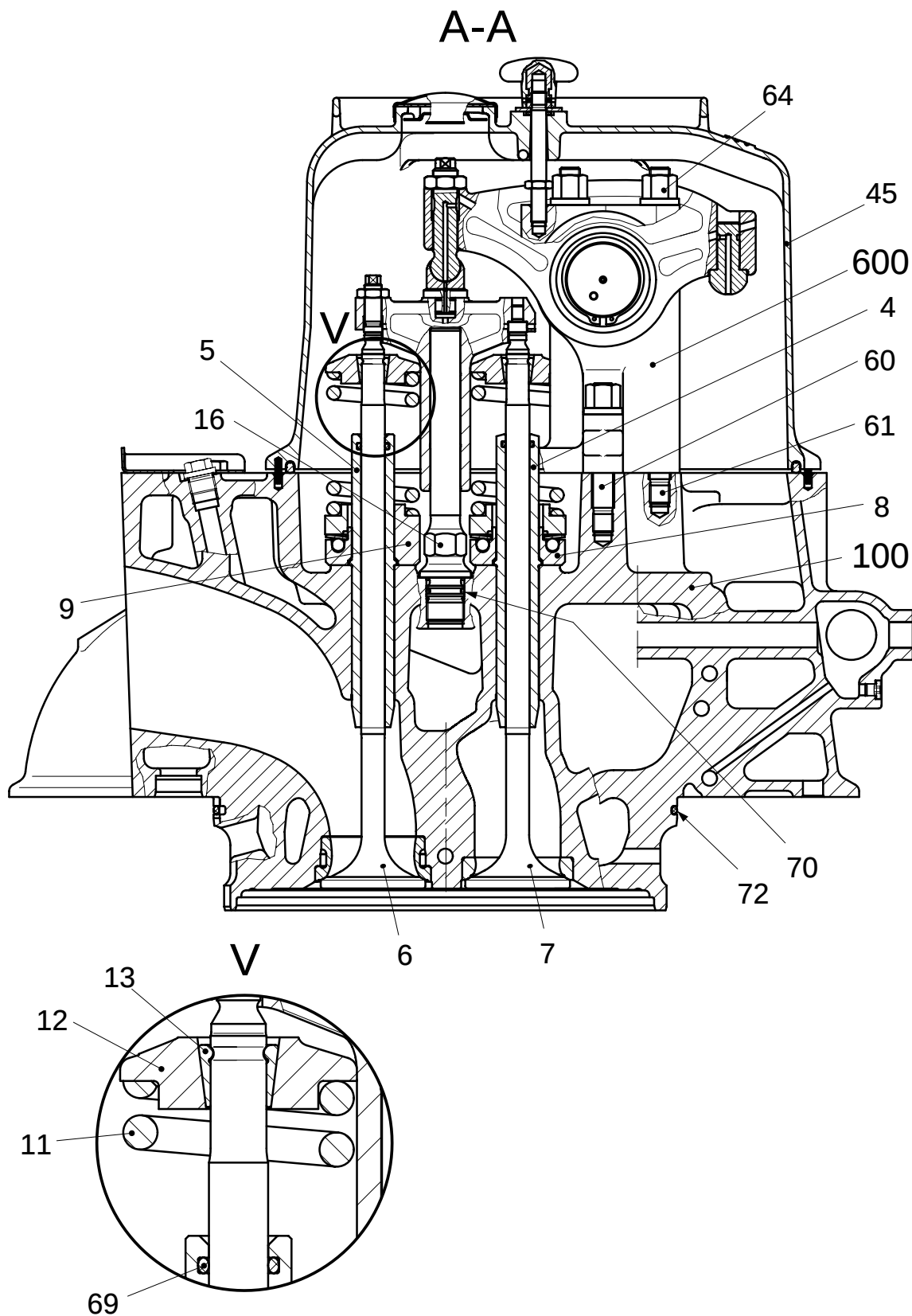
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Cylinder Head

M25

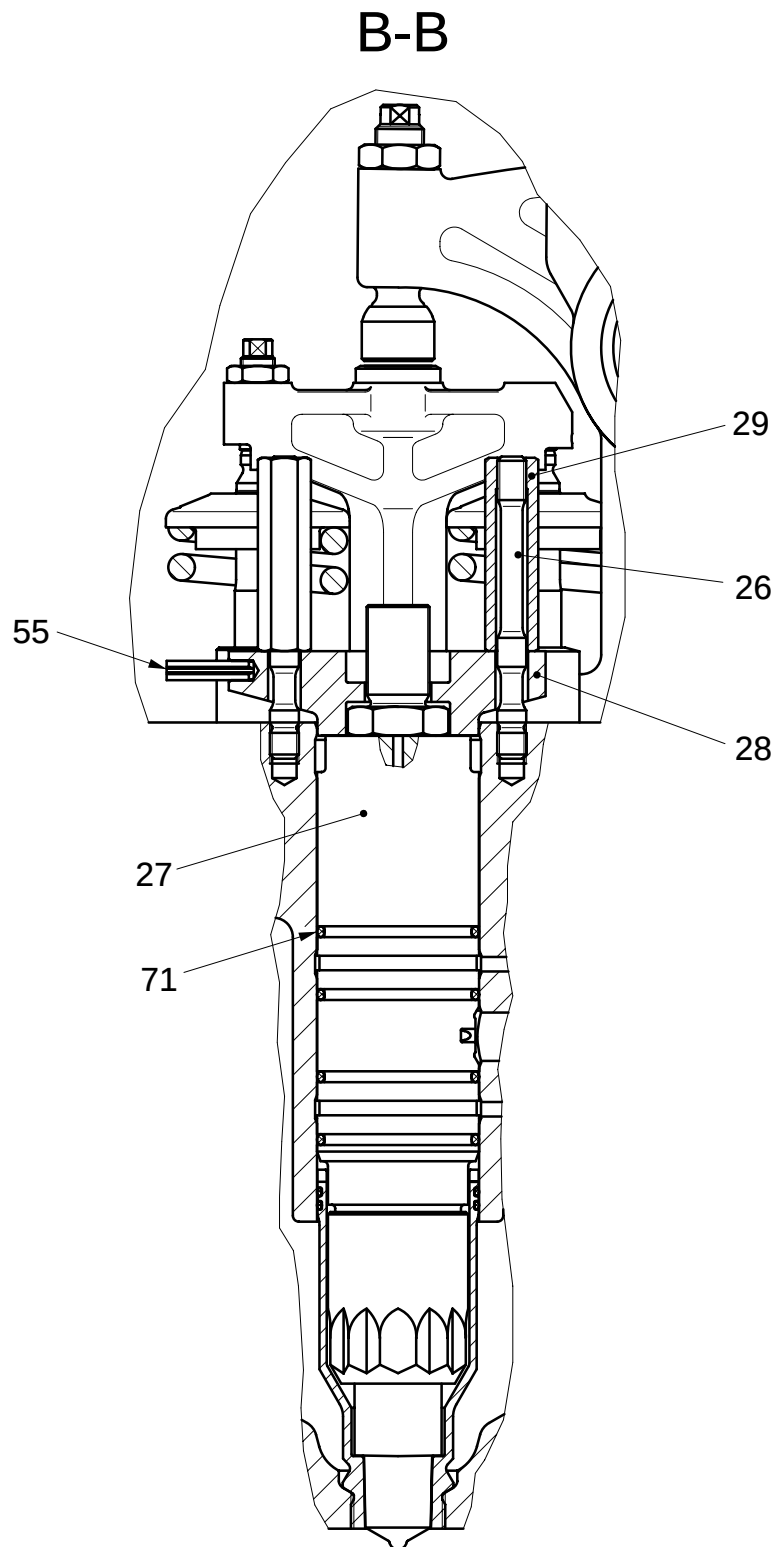
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Cylinder Head

M25

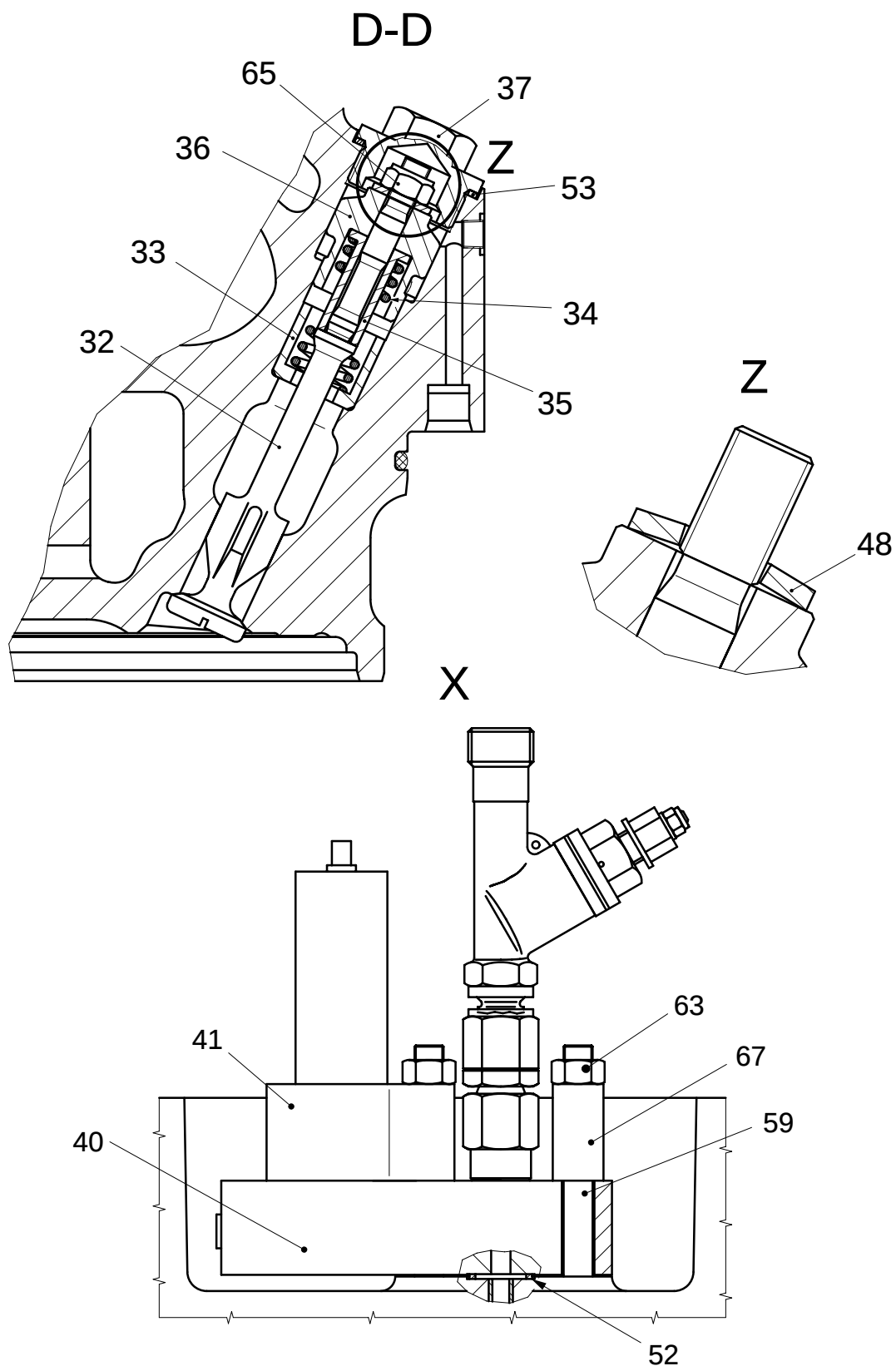
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Cylinder Head

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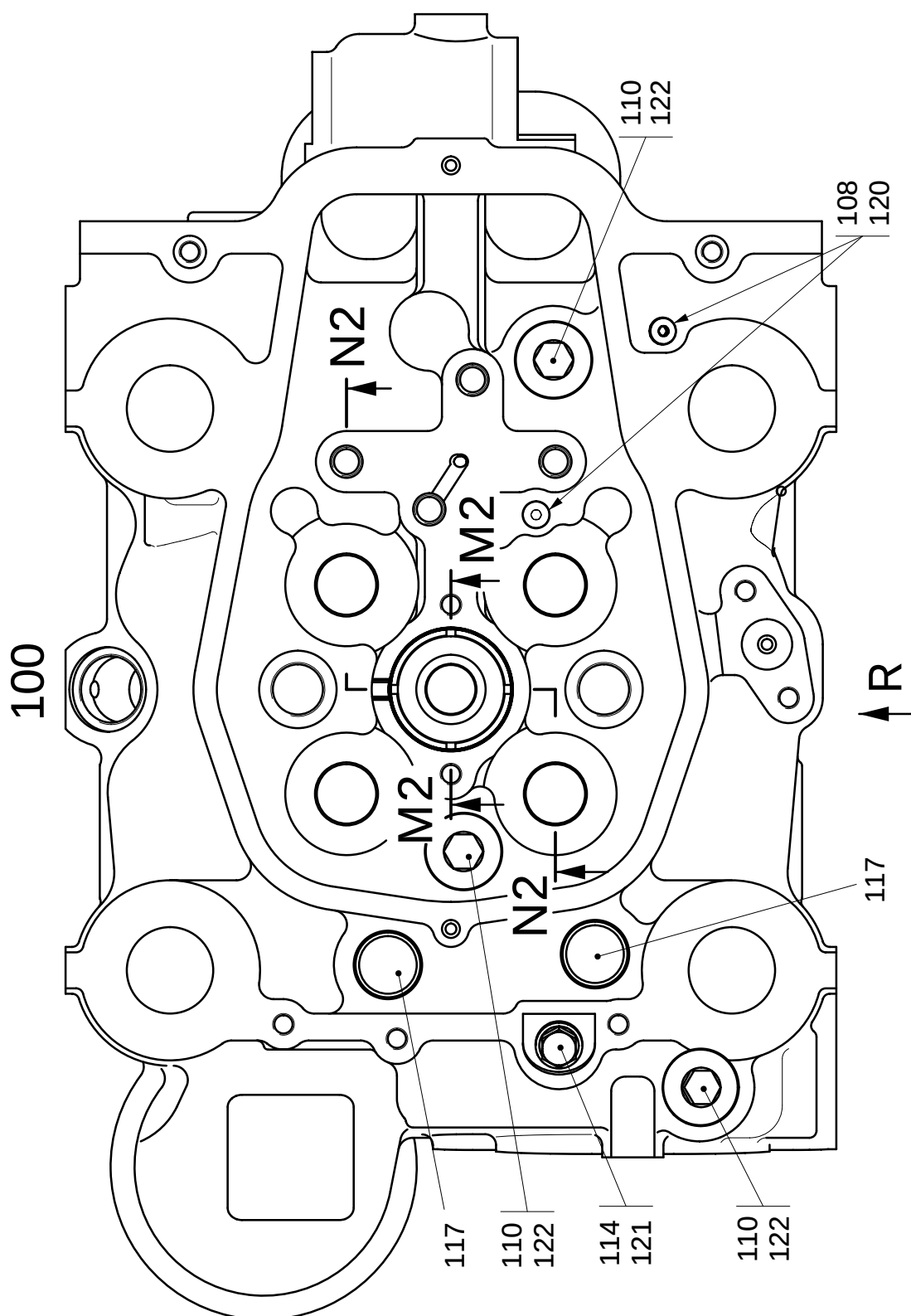
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Cylinder Head

M25

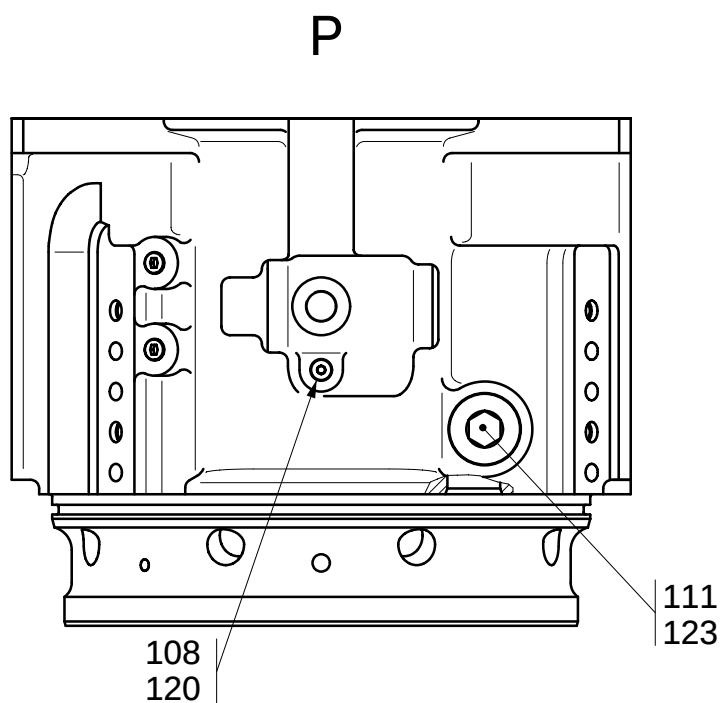
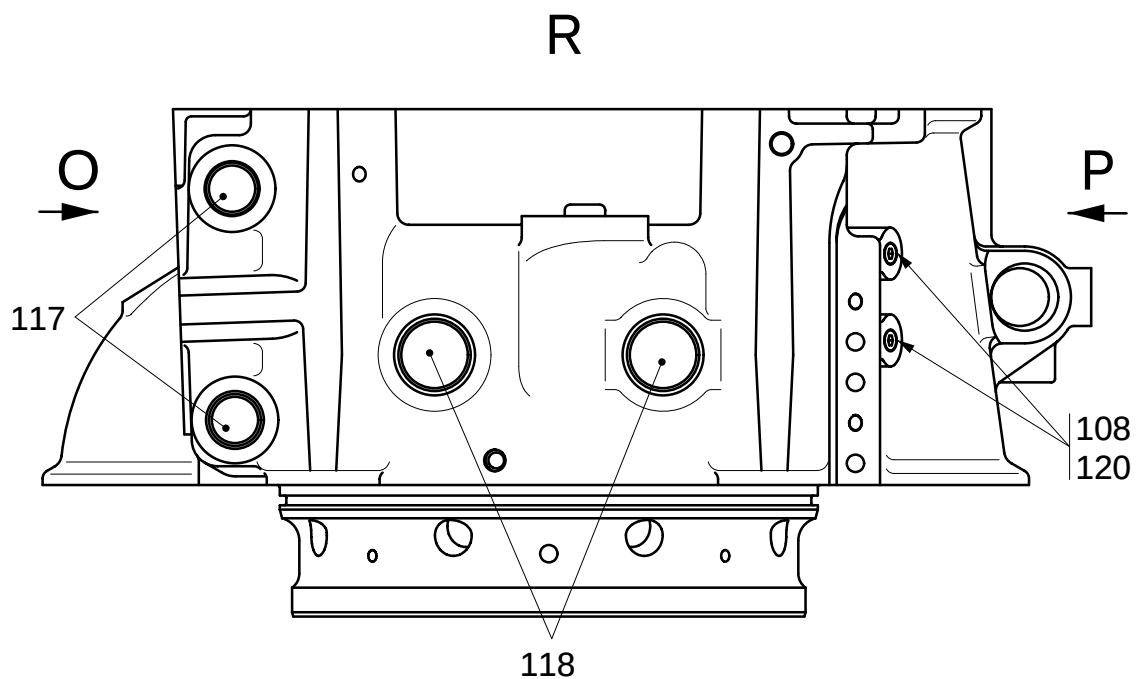
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Cylinder Head

M25

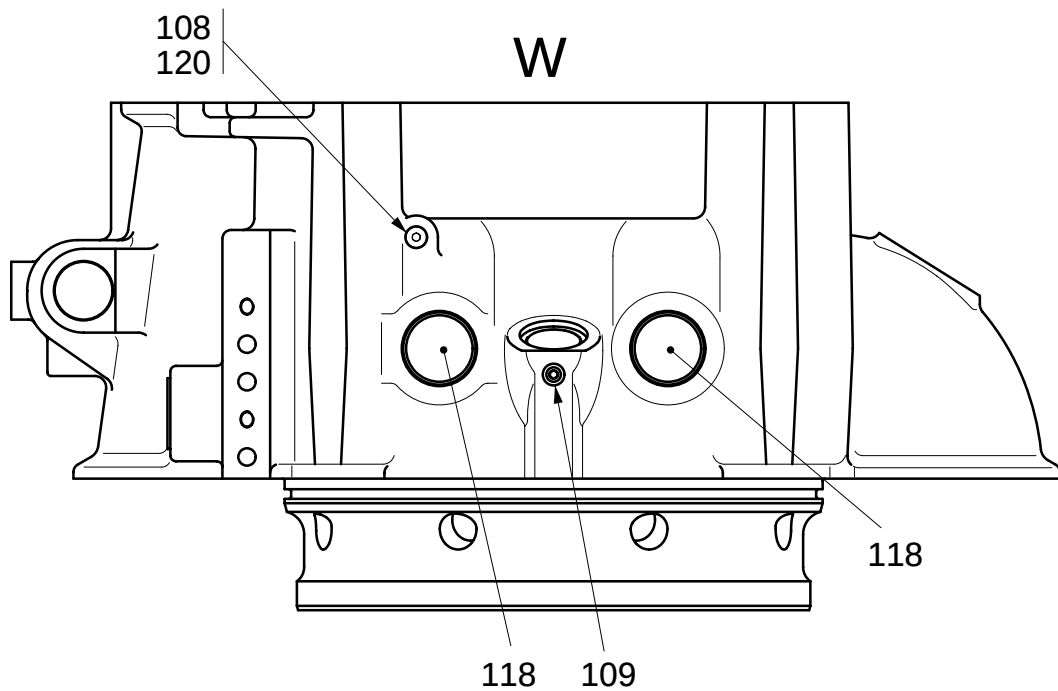
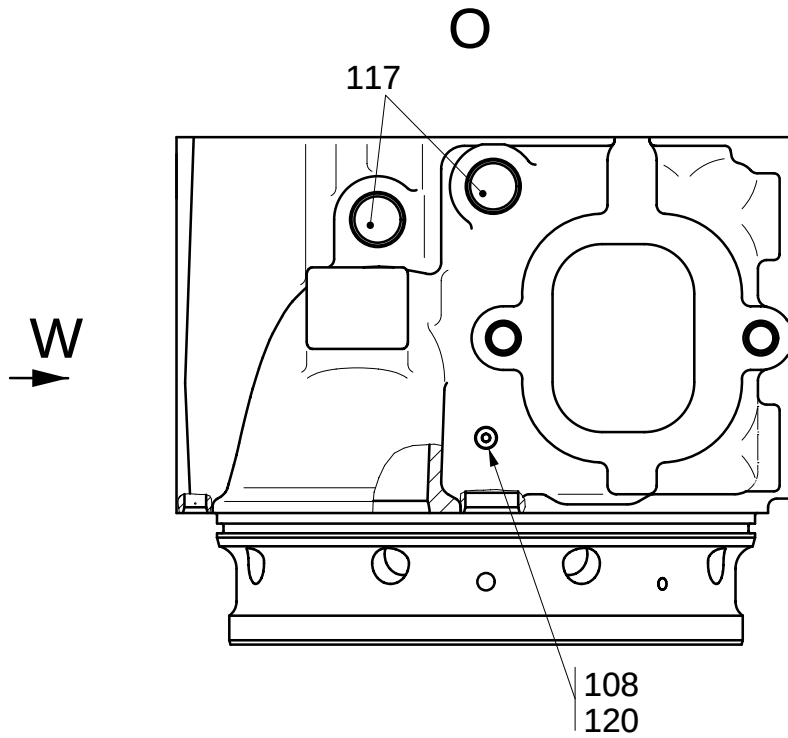
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Cylinder Head

M25

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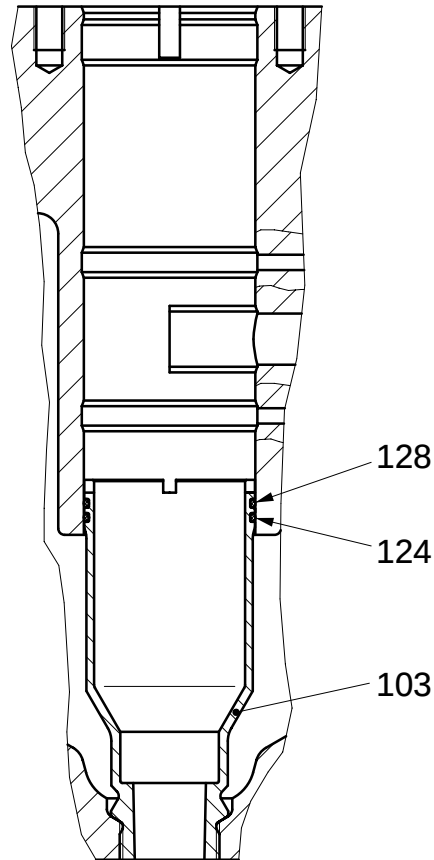


Cylinder Head

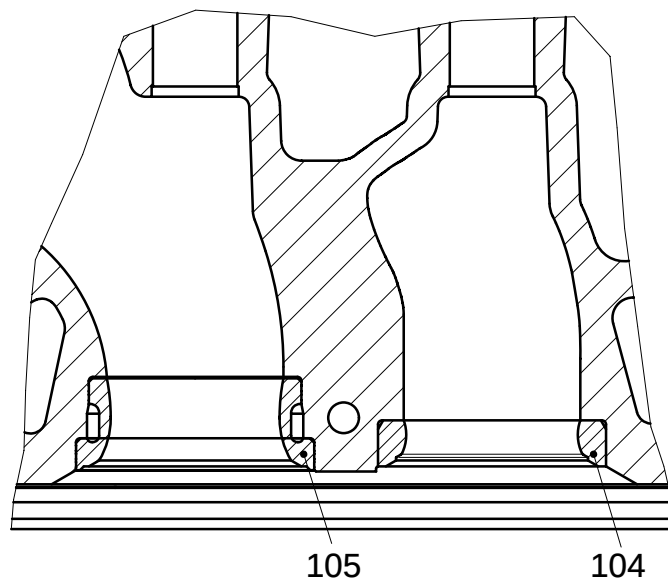
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M2-M2



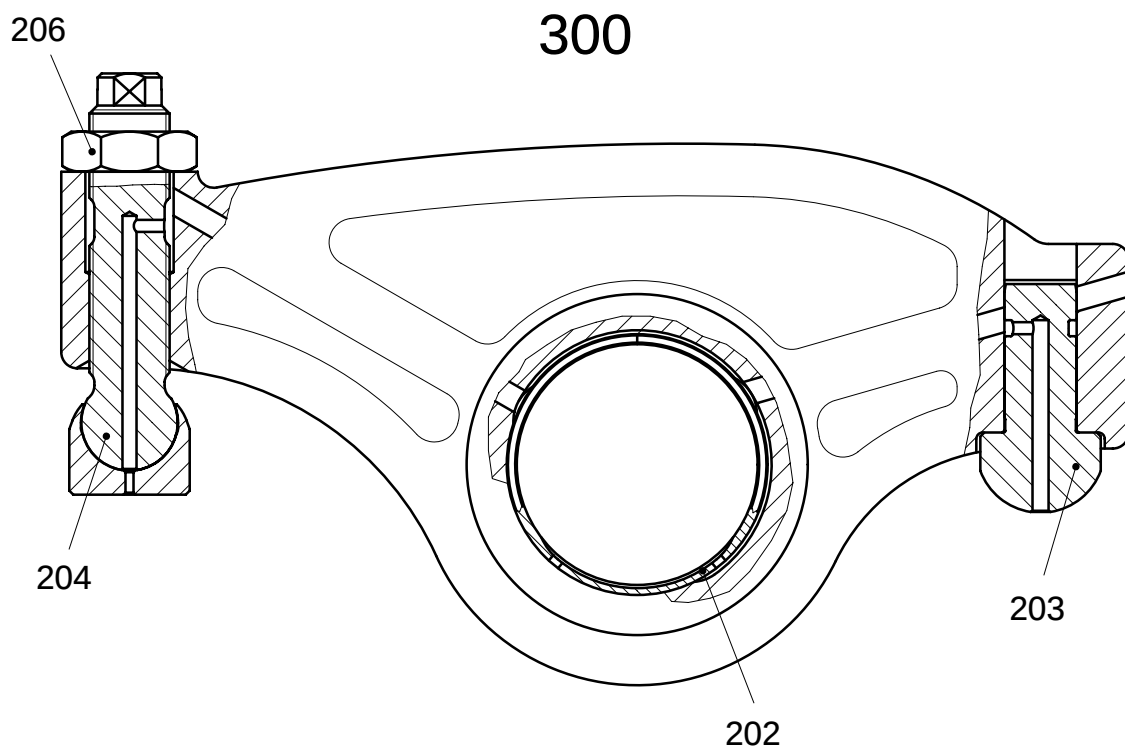
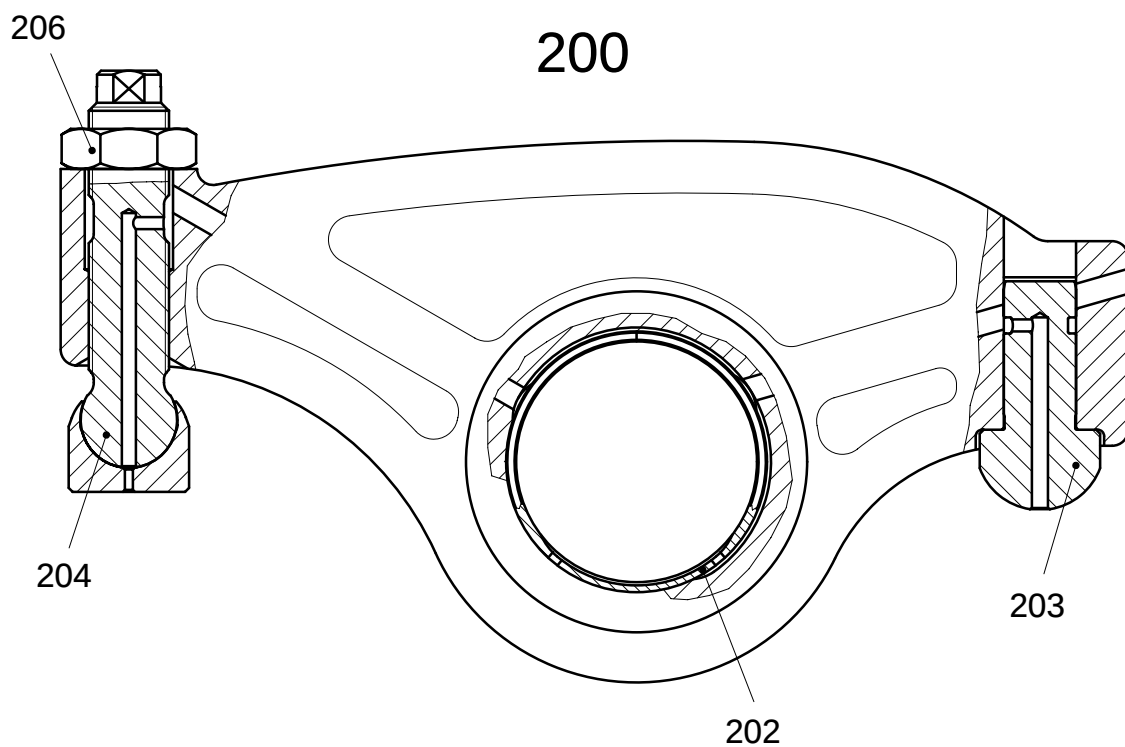
N2-N2



Cylinder Head

M25

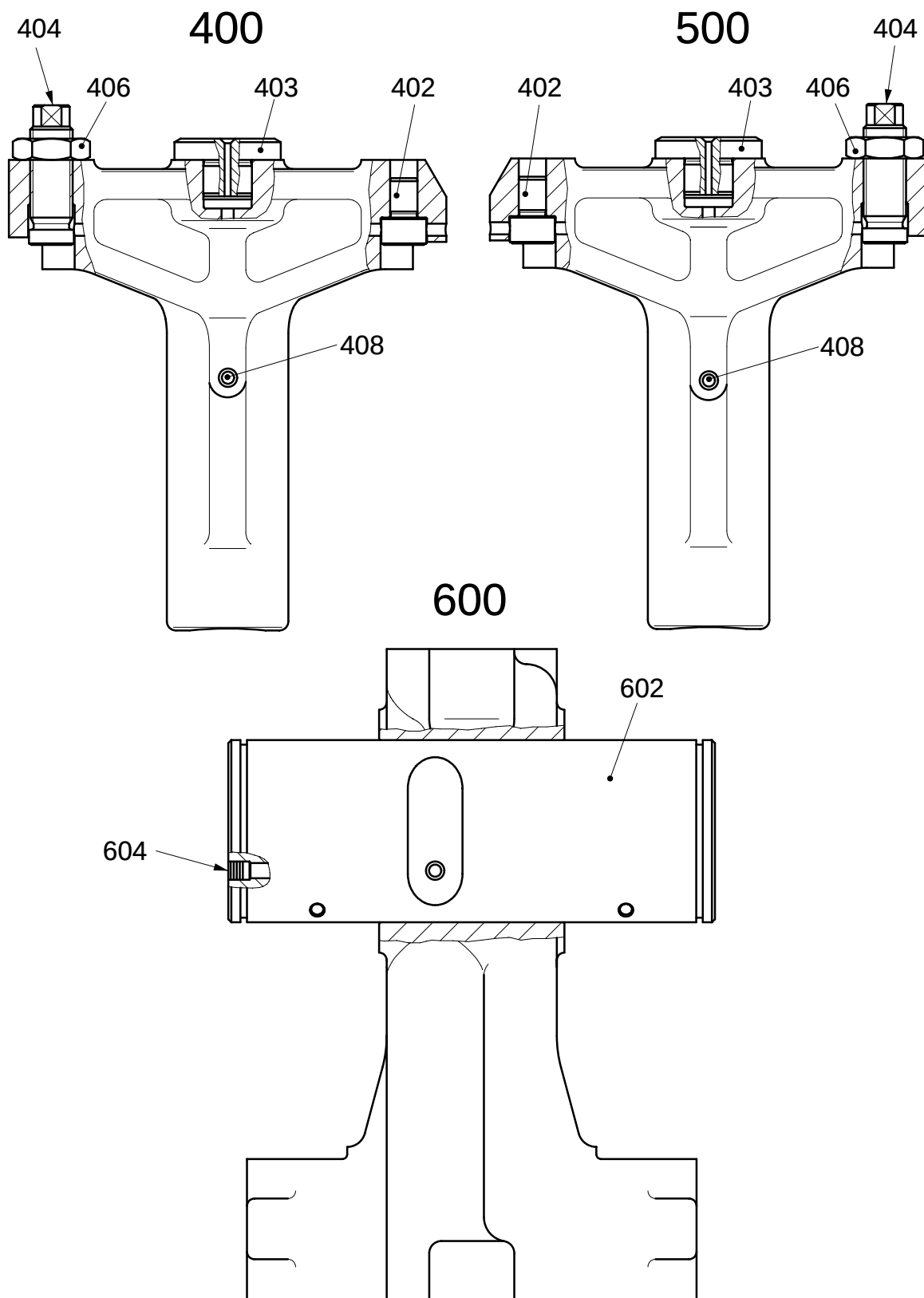
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Cylinder Head

M25

01



Set of Gaskets for Cylinder Head

M25

BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	ENTH. IN E-BLATT INCLUDED IN SHEET
DICHTUNGSSATZ, VOLLST. SET OF GASKETS ASSEMBLY	# 1	252108 AA	
DICHTUNG GASKET	3	252144-013	B1.05.01.252144
O-RING O-RING	8	1.7084-631	B1.05.01.252144
O-RING O-RING	1	1.7082-909	B1.05.03.251110
O-RING O-RING	1	1.7082-904	B1.05.03.251110
O-RING O-RING	2	1.7084-643	B1.05.03.251110
O-RING O-RING	4	1.7082-232	B1.05.03.251110
O-RING O-RING	1	1.7082-908	B1.05.03.251110
O-RING O-RING	4	1.7082-517	B1.05.01.252107
O-RING O-RING	2	1.7084-607	B1.05.01.252107
O-RING O-RING	4	1.7084-620	B1.05.01.252107
O-RING O-RING	1	1.7084-641	B1.05.01.252107
DICHTRING JOINT RING	1	1.7010-302	B1.05.01.252107
DICHTRING JOINT RING	1	1.7033-105	B1.05.01.252250
DICHTRING JOINT RING	1	1.7033-102	B1.05.01.252107
DICHTRING JOINTRING	1	251110-007	B1.05.03.251110
DICHTUNG GASKET	1	257210-015	B1.05.06.257210
O-RING O-RING	1	1.7082-910	B1.05.01.252107
O-RING O-RING	1	1.7082-519	B1.05.01.252107

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Mediums Guide

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MEDIENFÜHRUNG, VOLLST. MEDIUMS GUIDE ASSEMBLY	1	25252144 AA
1	ANSCHLUSSFLANSCH CONNECTING FLANGE	5	252144-001
2	ANSCHLUSSFLANSCH CONNECTING FLANGE	5	252144-002
6	VERTEILERPLATTE DISTRIBUTOR PLATE	1	252144-006
7	ANSCHLUSSFLANSCH CONNECTING FLANGE	1	252144-007
8	ABSCHLUSSFLANSCH CONNECTING FLANGE	1	252144-008
9	HÜLSE SLEEVE	15	9.2144-009
12	DICHTUNG GASKET	# 1	252144-012
13	DICHTUNG GASKET	# 12	252144-013
14	O-RING O-RING	# 30	1.7084-631
18	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	20	1.1152-156
19	SPANNSTIFT SPRING DOWEL PIN	# 26	1.0039-803
21	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-380
22	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-314
23	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1372-322
25	VERSCHLUSSSCHRAUBE HEXAGON SOCKET SCREW PLUG	2	1.1056-202
26	VERSCHLUSSSCHRAUBE HEXAGON SOCKET SCREW PLUG	2	1.1056-005

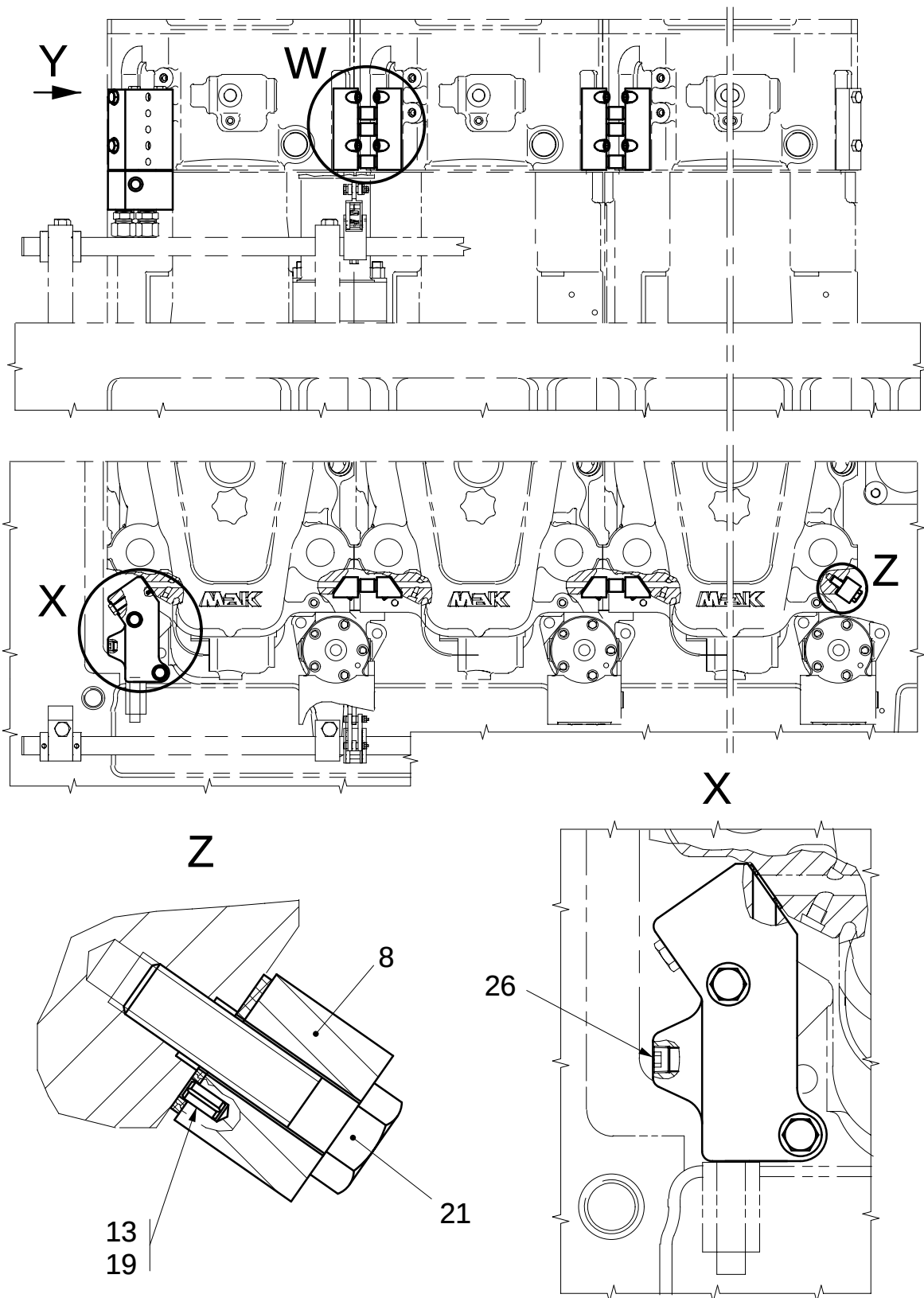
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Mediums Guide

M25

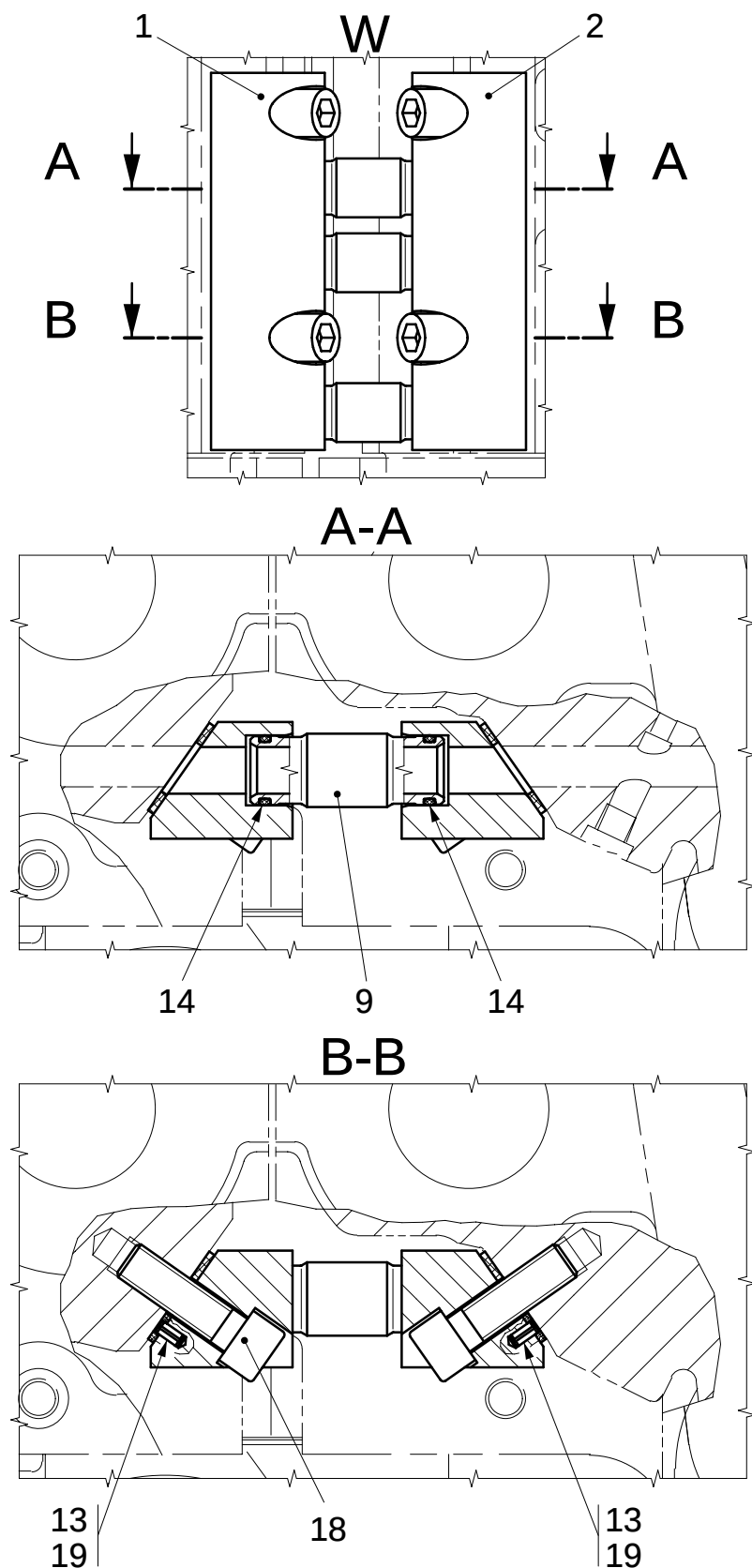
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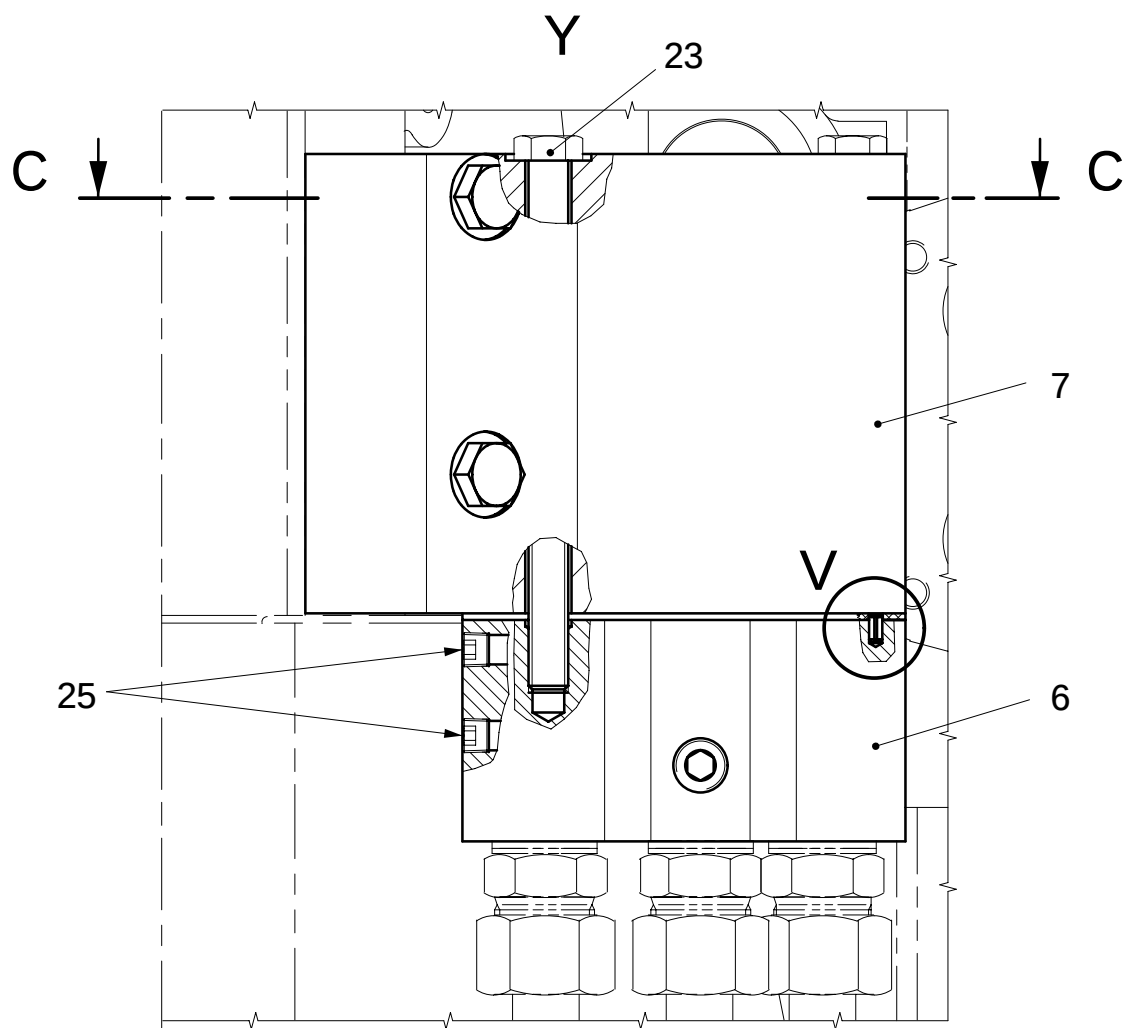


Mediums Guide

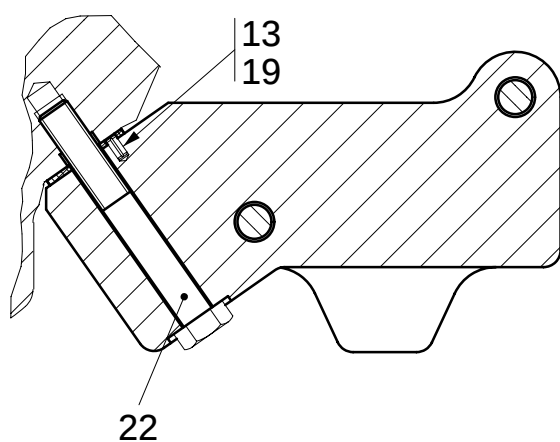
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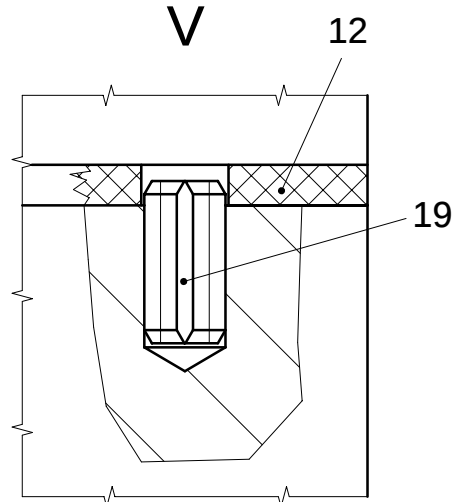




C-C



V



Mediums Guide

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MEDIENFÜHRUNG, VOLLST. MEDIUMS GUIDE ASSEMBLY	1	252144 BB
1	ANSCHLUSSFLANSCH CONNECTING FLANGE	7	252144-001
2	ANSCHLUSSFLANSCH CONNECTING FLANGE	7	252144-002
6	VERTEILERPLATTE DISTRIBUTOR PLATE	1	252144-006
7	ANSCHLUSSFLANSCH CONNECTING FLANGE	1	252144-007
8	ABSCHLUSSFLANSCH CONNECTING FLANGE	1	252144-008
9	HÜLSE SLEEVE	21	9.2144-009
12	DICHTUNG GASKET	# 1	252144-012
13	DICHTUNG GASKET	# 16	252144-013
14	O-RING O-RING	# 42	1.7084-631
18	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	28	1.1152-156
19	SPANNSTIFT SPRING DOWEL PIN	# 34	1.0039-803
21	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-380
22	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-314
23	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1372-322
25	VERSCHLUSSSCHRAUBE HEXAGON SOCKET SCREW PLUG	2	1.1056-202
26	VERSCHLUSSSCHRAUBE HEXAGON SOCKET SCREW PLUG	2	1.1056-005

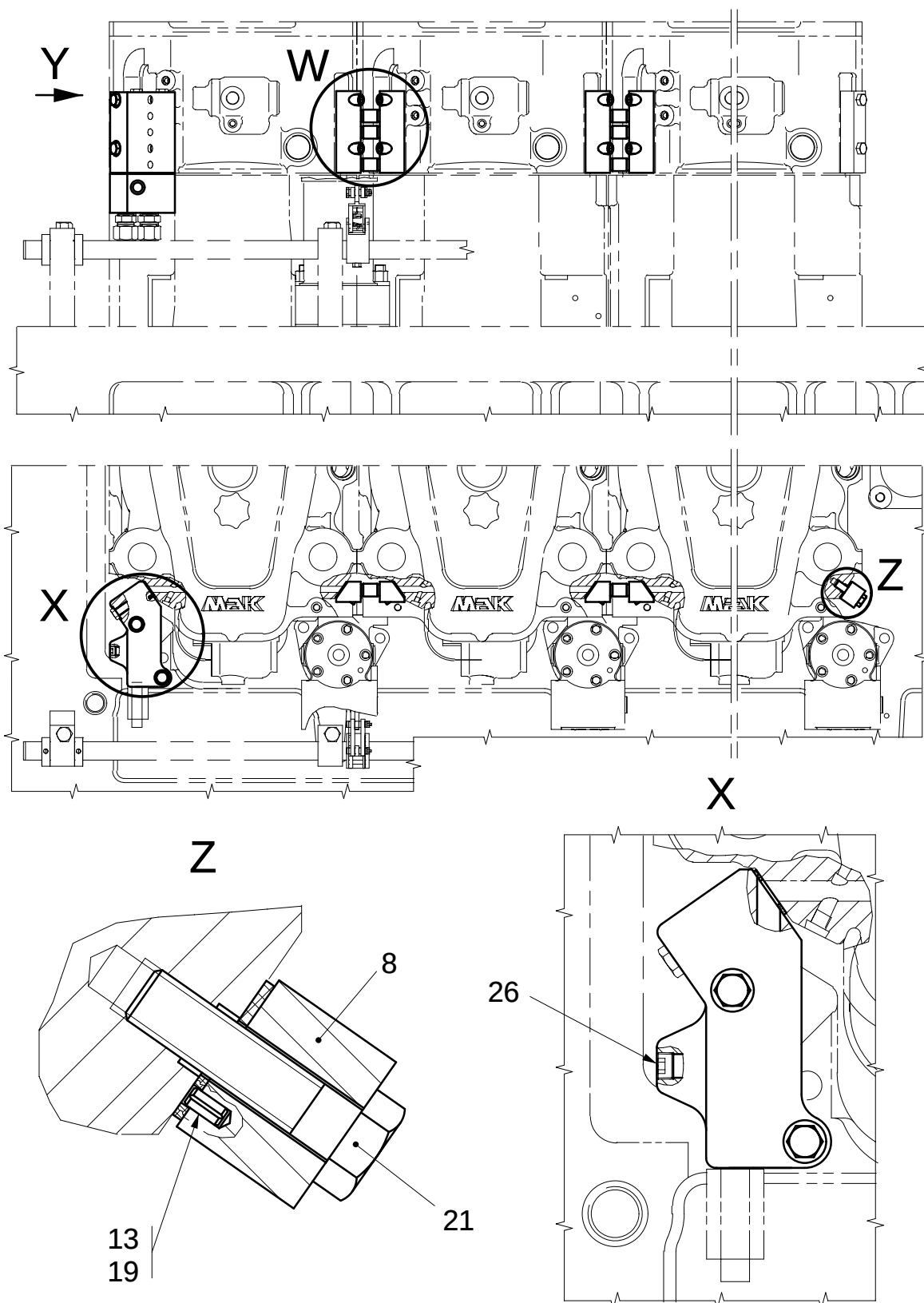
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Mediums Guide

M25

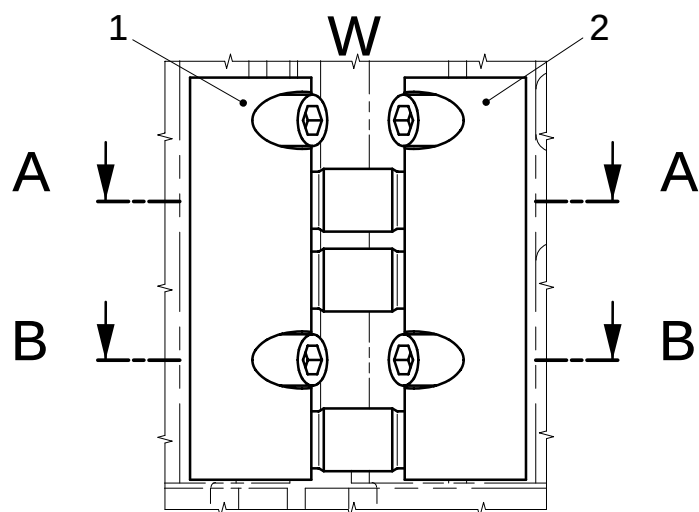
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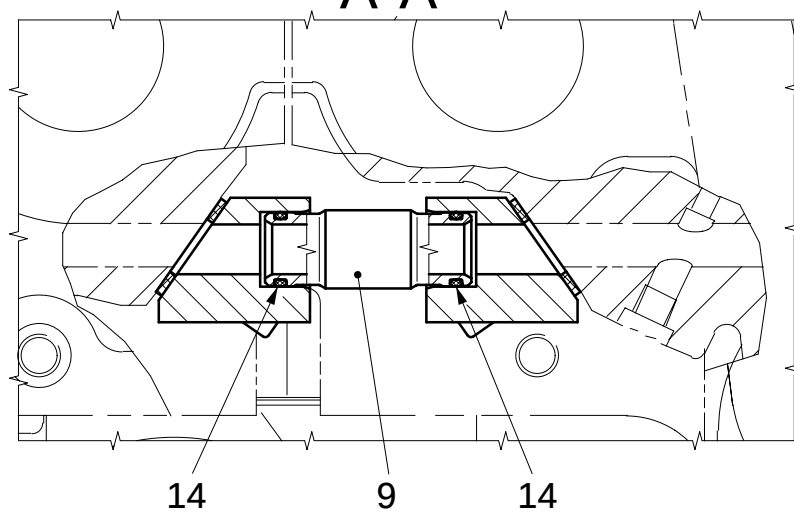
Mediums Guide

M25

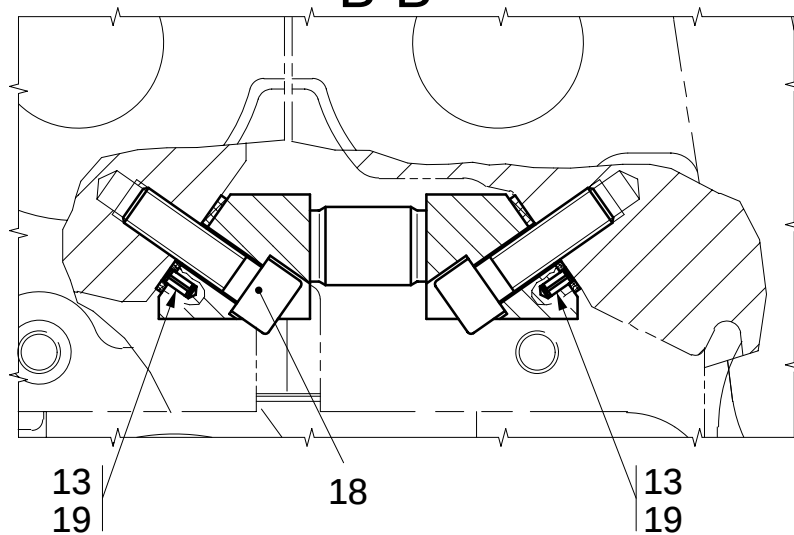
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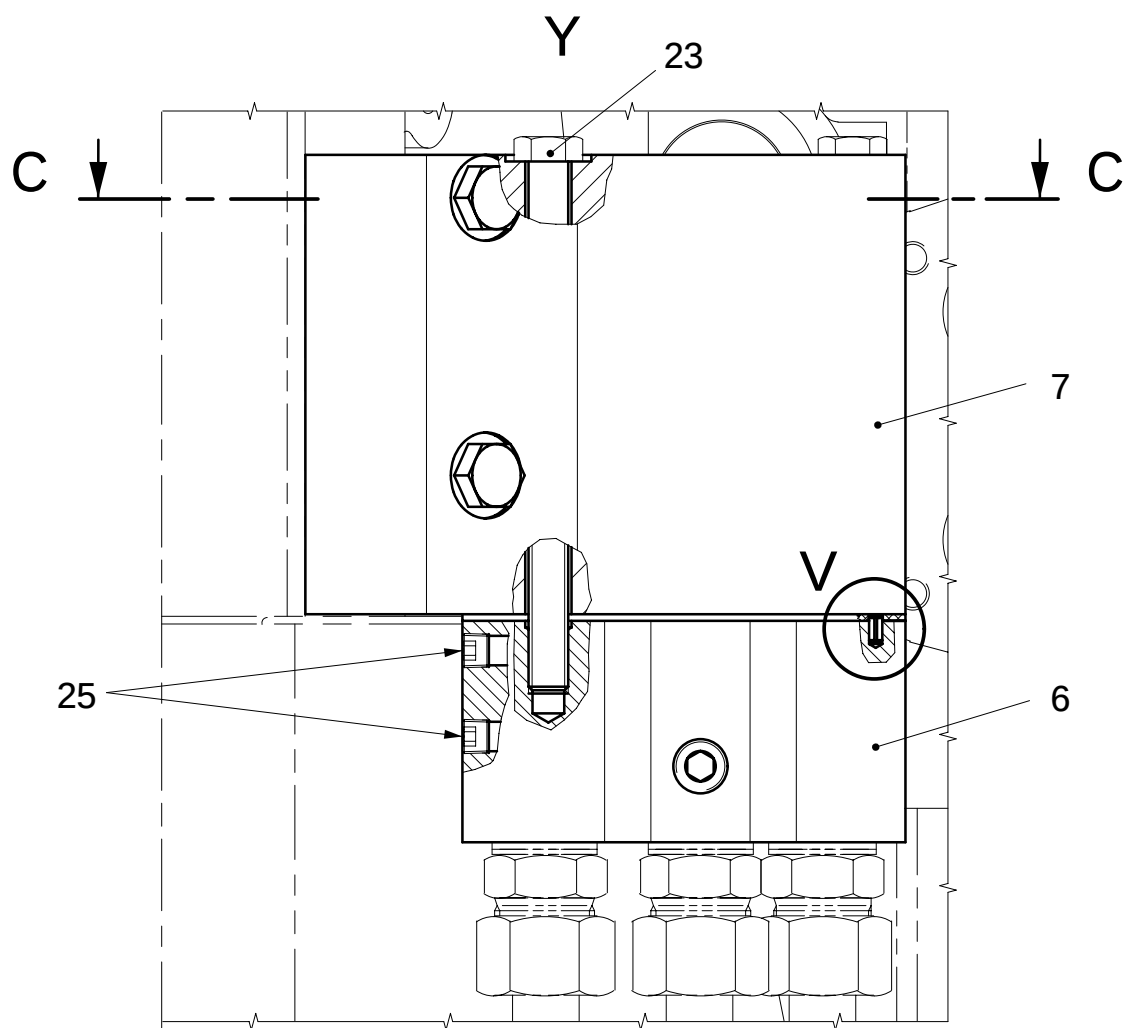


A-A

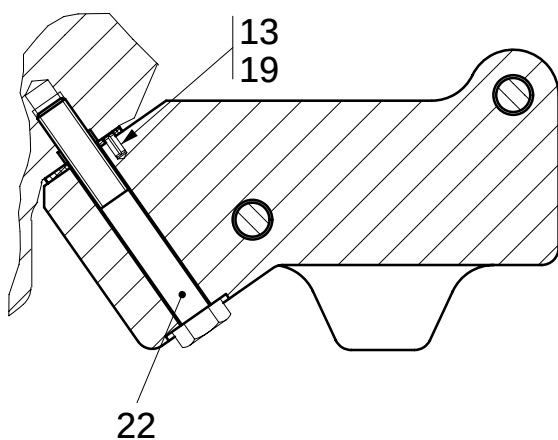


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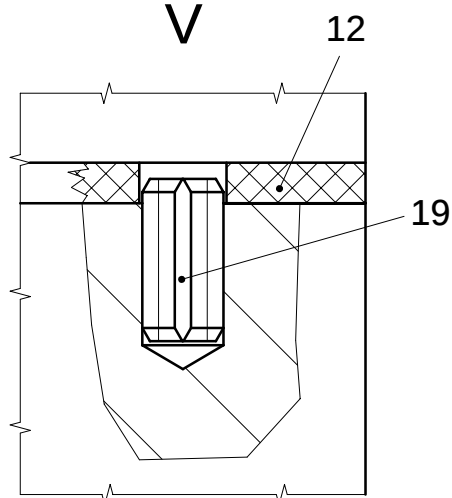




C-C



V



Mediums Guide

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MEDIENFÜHRUNG, VOLLST. MEDIUMS GUIDE ASSEMBLY	1	252144 CC
1	ANSCHLUSSFLANSCH CONNECTING FLANGE	8	252144-001
2	ANSCHLUSSFLANSCH CONNECTING FLANGE	8	252144-002
6	VERTEILERPLATTE DISTRIBUTOR PLATE	1	252144-006
7	ANSCHLUSSFLANSCH CONNECTING FLANGE	1	252144-007
8	ABSCHLUSSFLANSCH CONNECTING FLANGE	1	252144-008
9	HÜLSE SLEEVE	24	9.2144-009
12	DICHTUNG GASKET	# 1	252144-012
13	DICHTUNG GASKET	# 12	252144-013
14	O-RING O-RING	# 48	1.7084-631
18	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	32	1.1152-156
19	SPANNSTIFT SPRING DOWEL PIN	# 38	1.0039-803
21	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-380
22	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-314
23	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1372-322
25	VERSCHLUSSSCHRAUBE HEXAGON SOCKET SCREW PLUG	2	1.1056-202
26	VERSCHLUSSSCHRAUBE HEXAGON SOCKET SCREW PLUG	2	1.1056-005

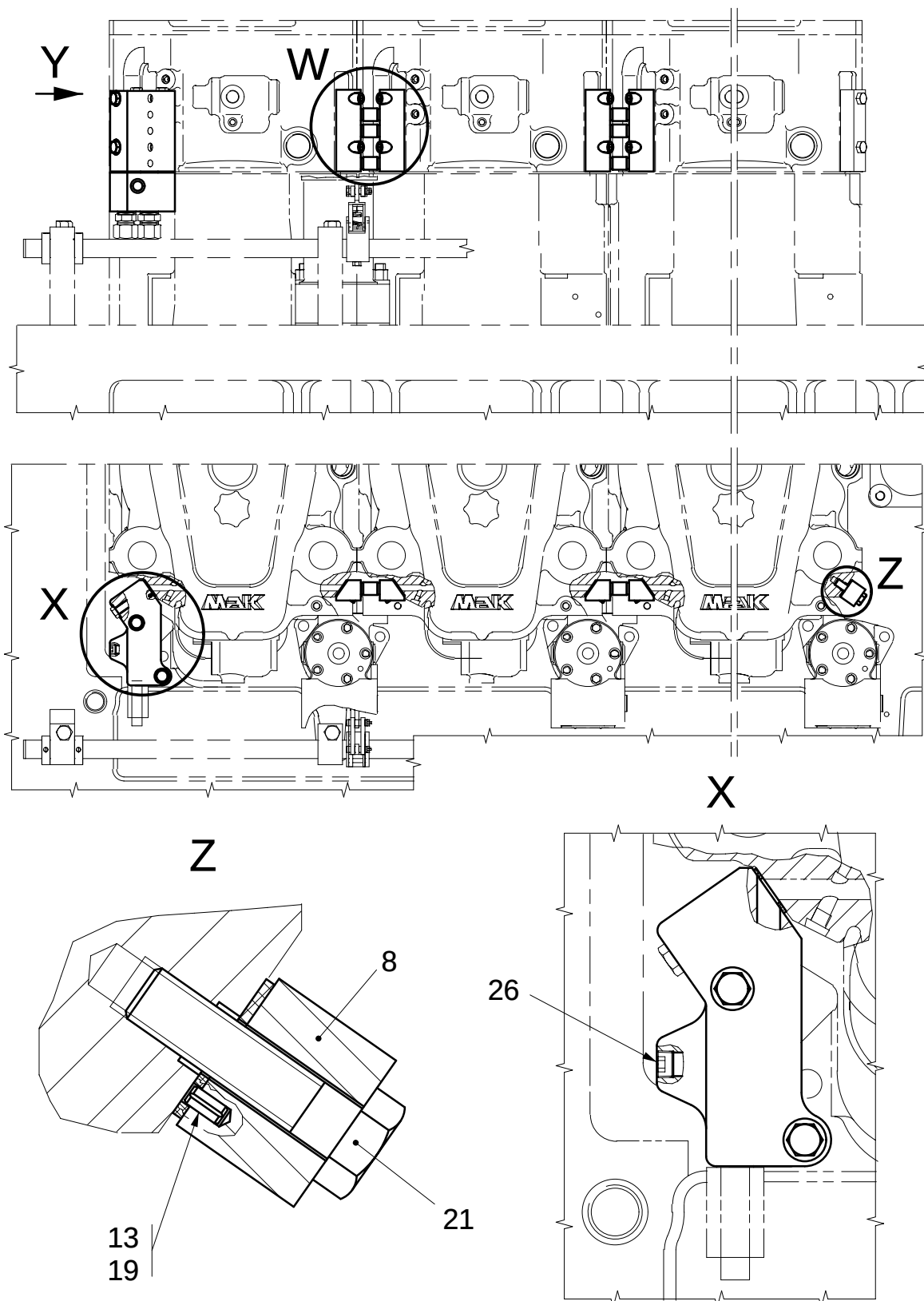
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Mediums Guide

M25

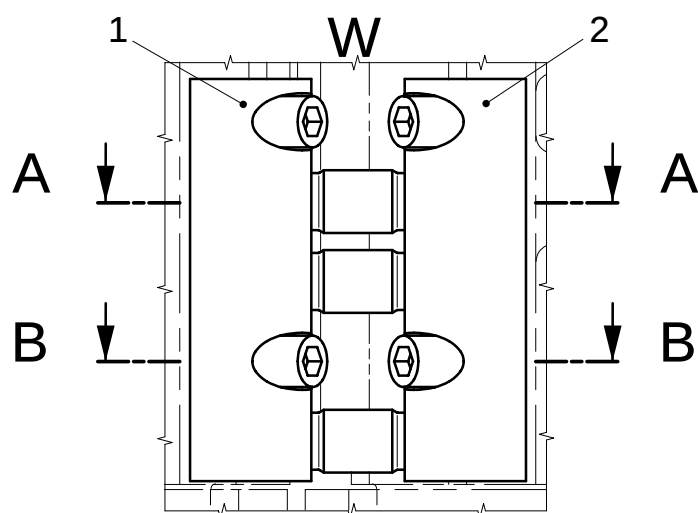
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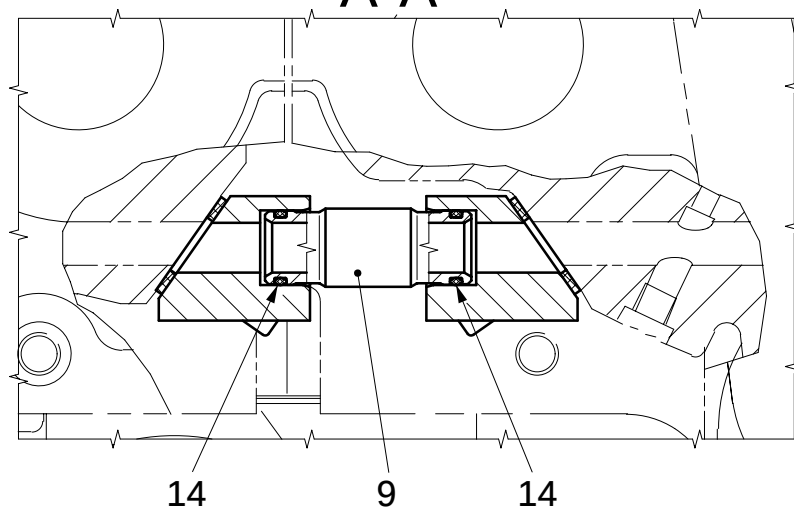
Mediums Guide

M25

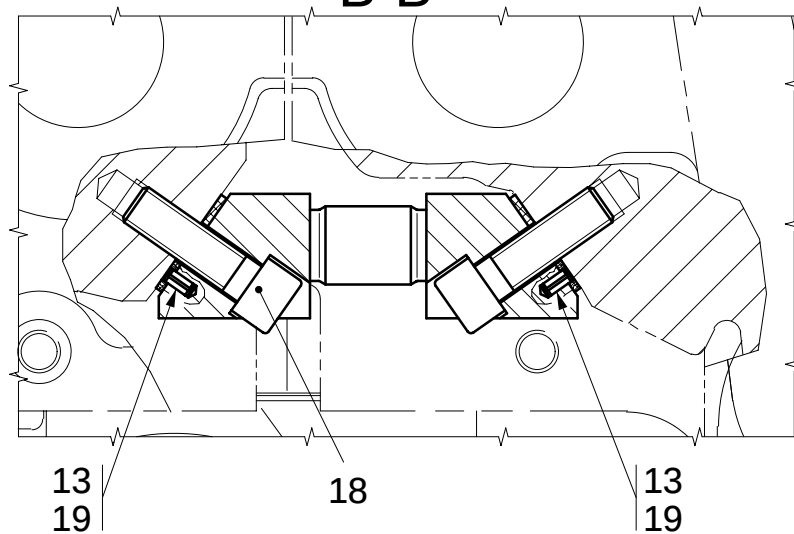
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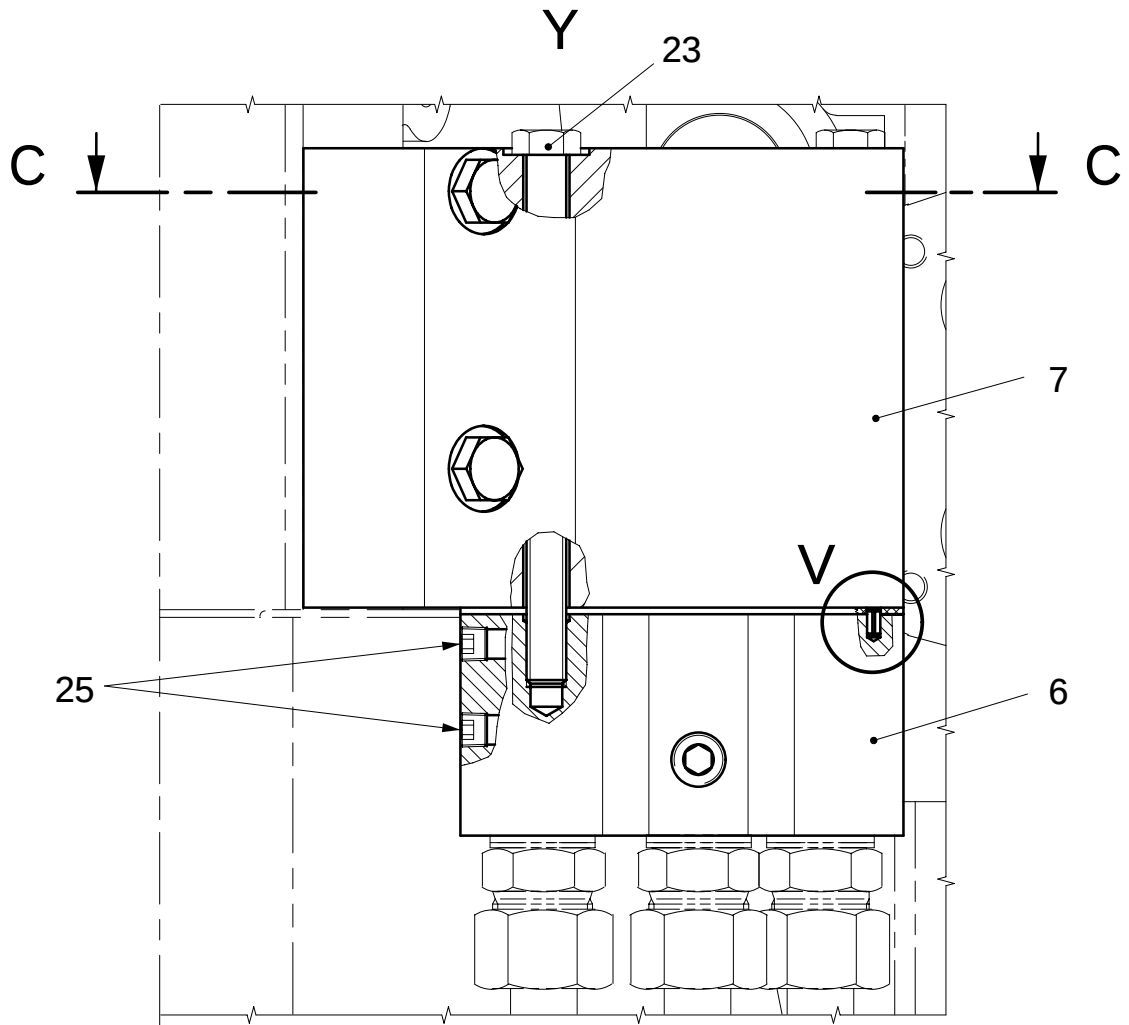


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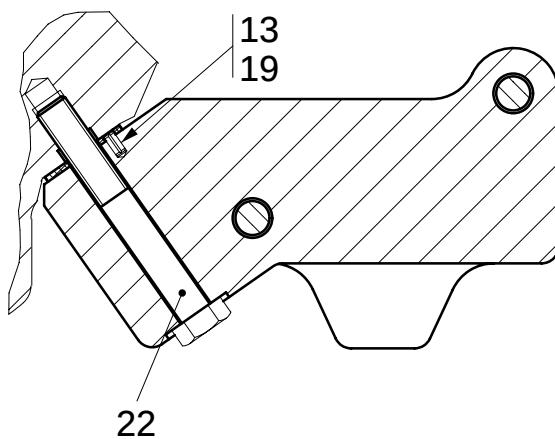


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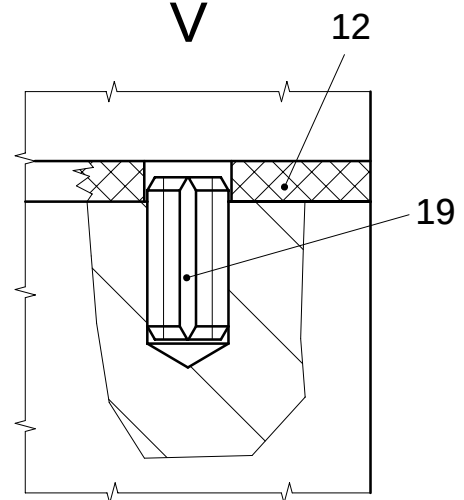




C-C



V



Mediums Guide

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MEDIENFÜHRUNG, VOLLST. MEDIUMS GUIDE ASSEMBLY	1	252144 DD
1	ANSCHLUSSFLANSCH CONNECTING FLANGE	5	252144-001
2	ANSCHLUSSFLANSCH CONNECTING FLANGE	5	252144-002
6	VERTEILERPLATTE DISTRIBUTOR PLATE	1	252144-106
7	ANSCHLUSSFLANSCH CONNECTING FLANGE	1	252144-007
8	ABSCHLUSSFLANSCH CONNECTING FLANGE	1	252144-008
9	HÜLSE SLEEVE	15	9.2144-009
12	DICHTUNG GASKET	# 1	252144-012
13	DICHTUNG GASKET	# 12	252144-013
14	O-RING O-RING	# 30	1.7084-631
18	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	20	1.1152-156
19	SPANNSTIFT SPRING DOWEL PIN	# 26	1.0039-803
21	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-380
22	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-314
23	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1372-322
25	VERSCHLUSSSCHRAUBE HEXAGON SOCKET SCREW PLUG	2	1.1056-202
26	VERSCHLUSSSCHRAUBE HEXAGON SOCKET SCREW PLUG	1	1.1056-005

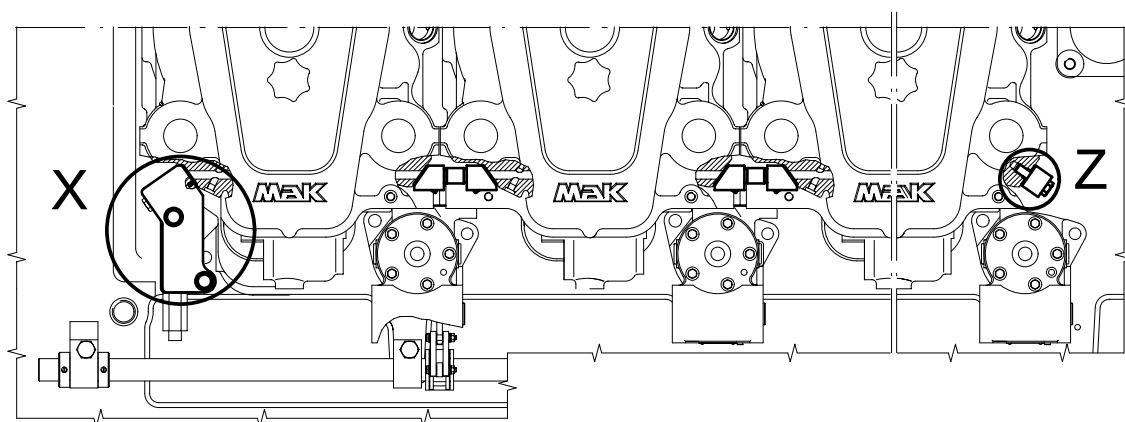
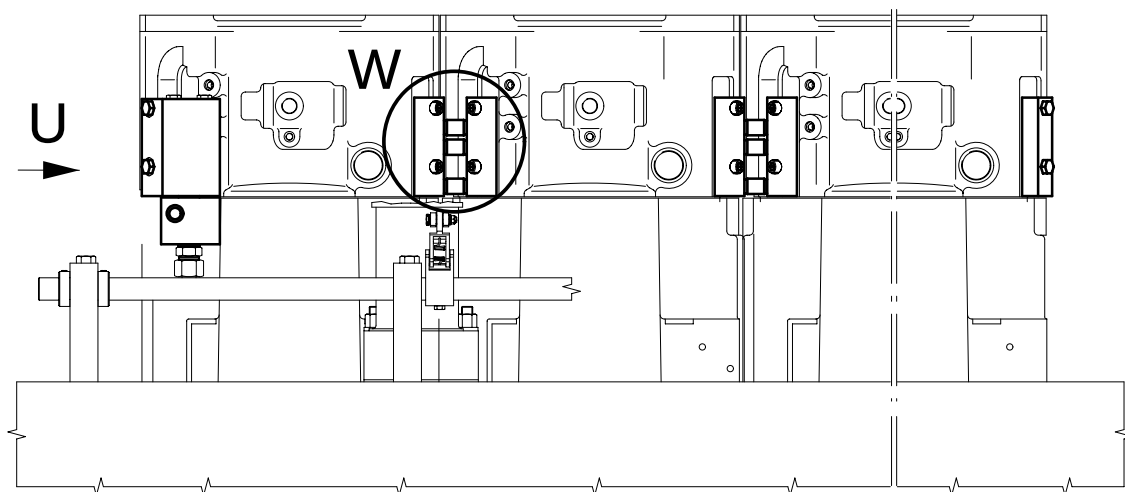
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

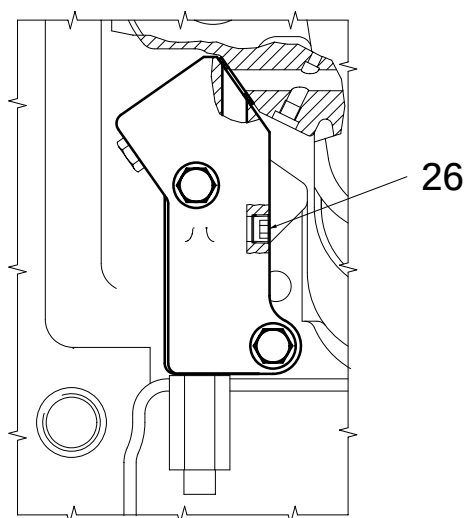
Mediums Guide

M25

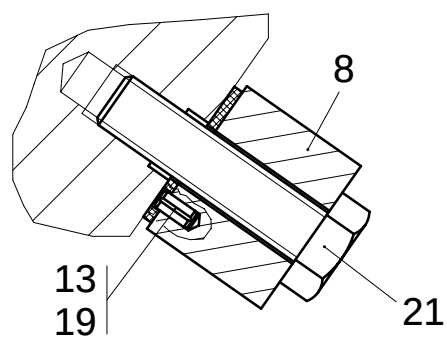
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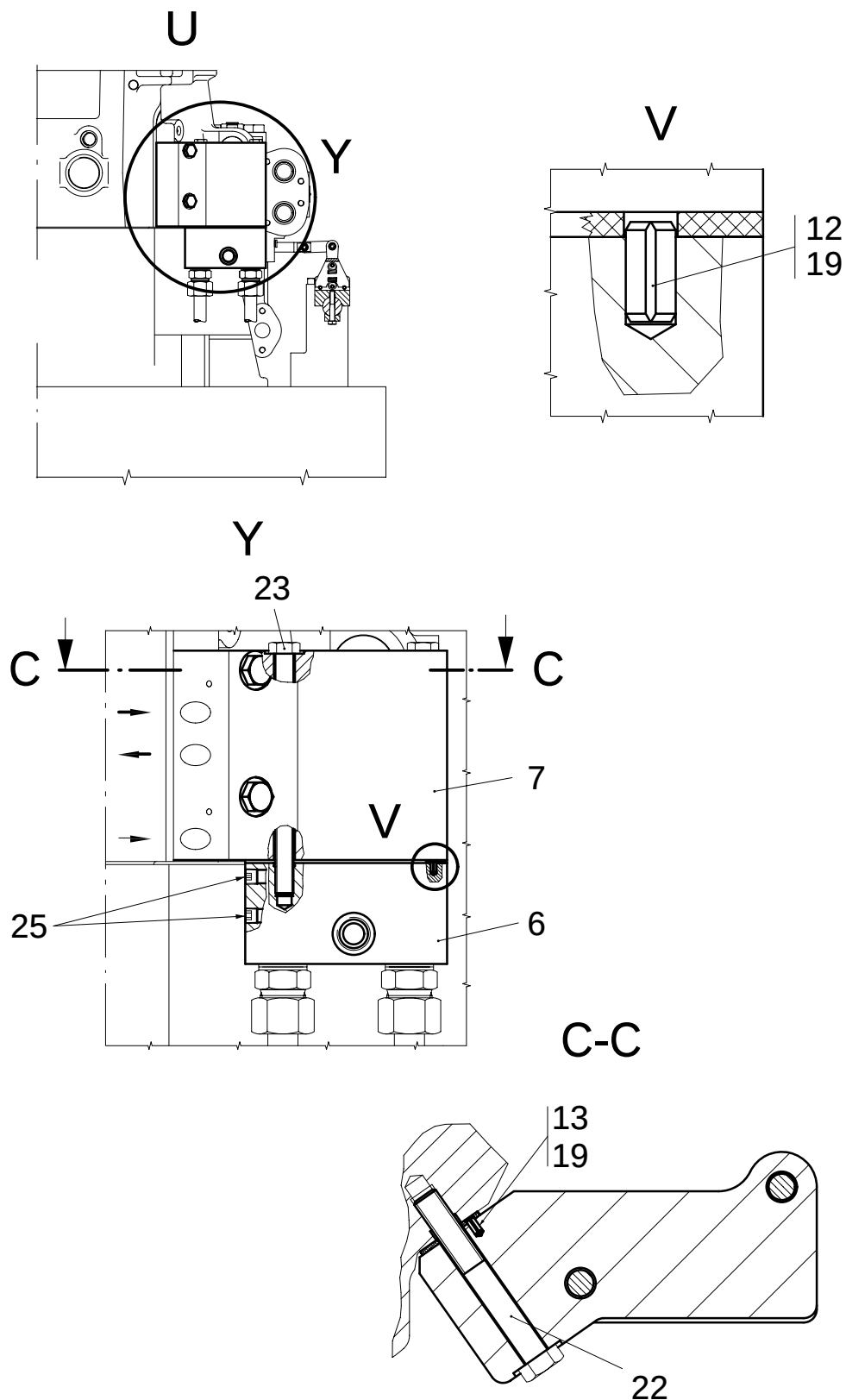


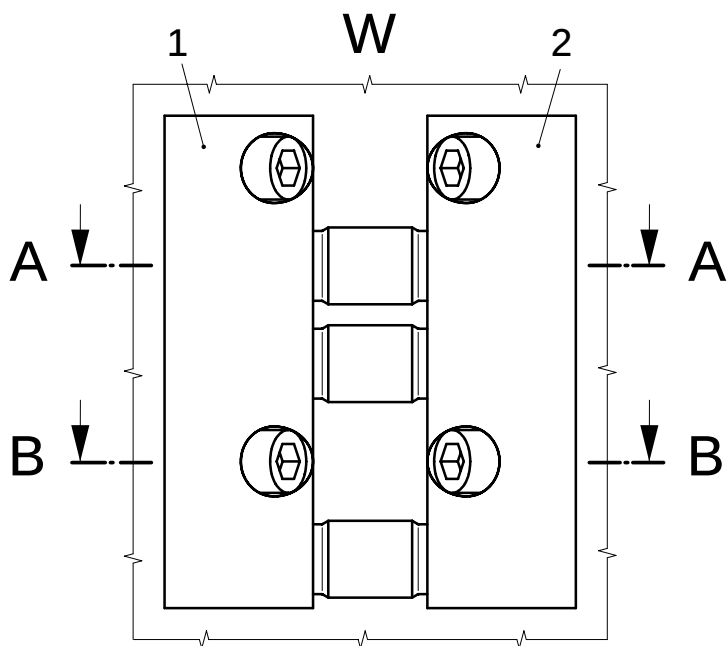
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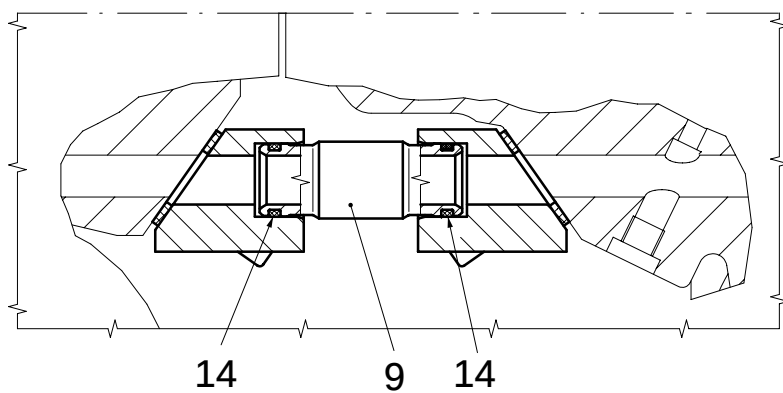
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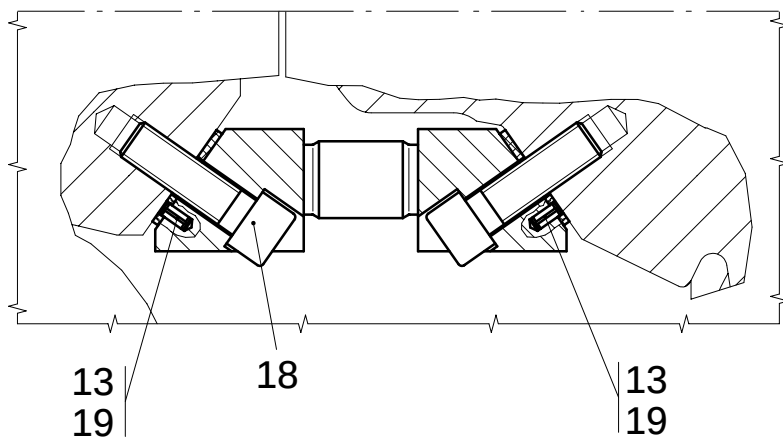




A-A



B-B



Mediums Guide

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MEDIENFÜHRUNG, VOLLST. MEDIUMS GUIDE ASSEMBLY	1	252144 EE
1	ANSCHLUSSFLANSCH CONNECTING FLANGE	7	252144-001
2	ANSCHLUSSFLANSCH CONNECTING FLANGE	7	252144-002
6	VERTEILERPLATTE DISTRIBUTOR PLATE	1	252144-106
7	ANSCHLUSSFLANSCH CONNECTING FLANGE	1	252144-007
8	ABSCHLUSSFLANSCH CONNECTING FLANGE	1	252144-008
9	HÜLSE SLEEVE	21	9.2144-009
12	DICHTUNG GASKET	# 1	252144-012
13	DICHTUNG GASKET	# 16	252144-013
14	O-RING O-RING	# 42	1.7084-631
18	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	28	1.1152-156
19	SPANNSTIFT SPRING DOWEL PIN	# 34	1.0039-803
21	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-380
22	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-314
23	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1372-322
25	VERSCHLUSSSCHRAUBE HEXAGON SOCKET SCREW PLUG	2	1.1056-202
26	VERSCHLUSSSCHRAUBE HEXAGON SOCKET SCREW PLUG	1	1.1056-005

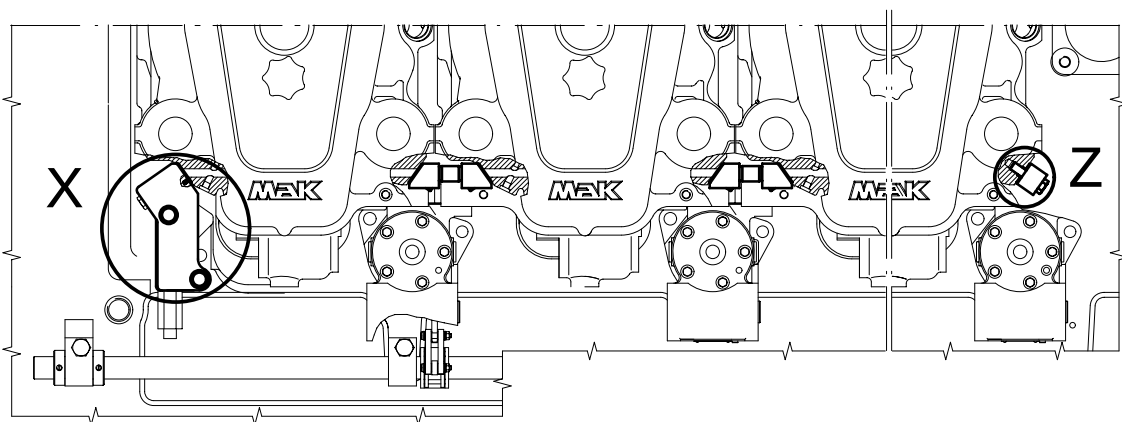
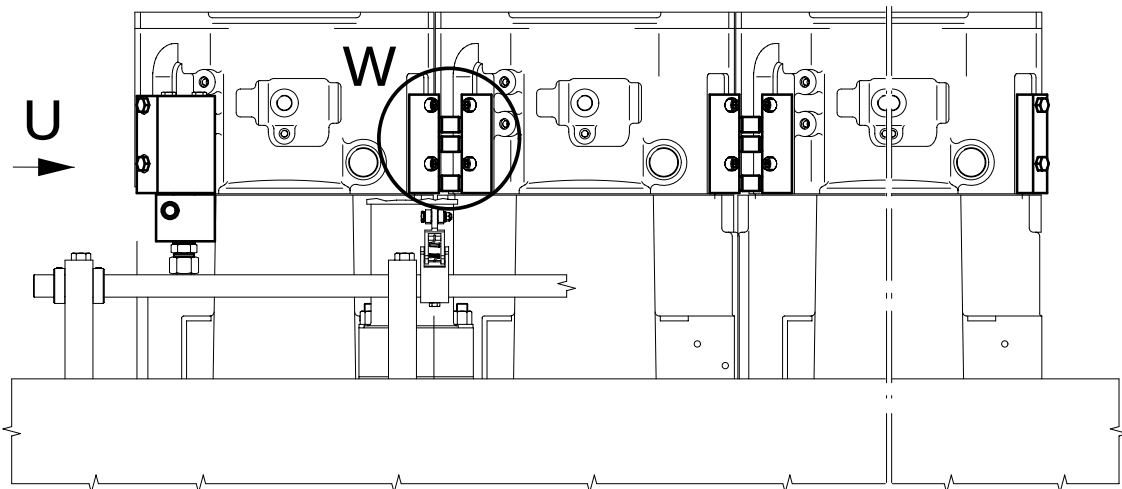
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

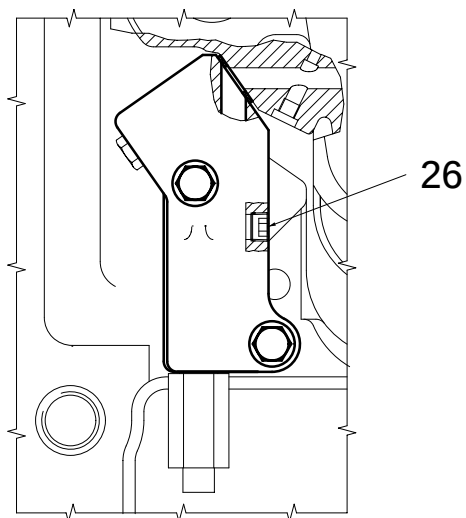
Mediums Guide

M25

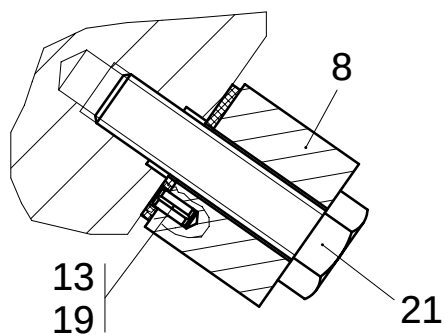
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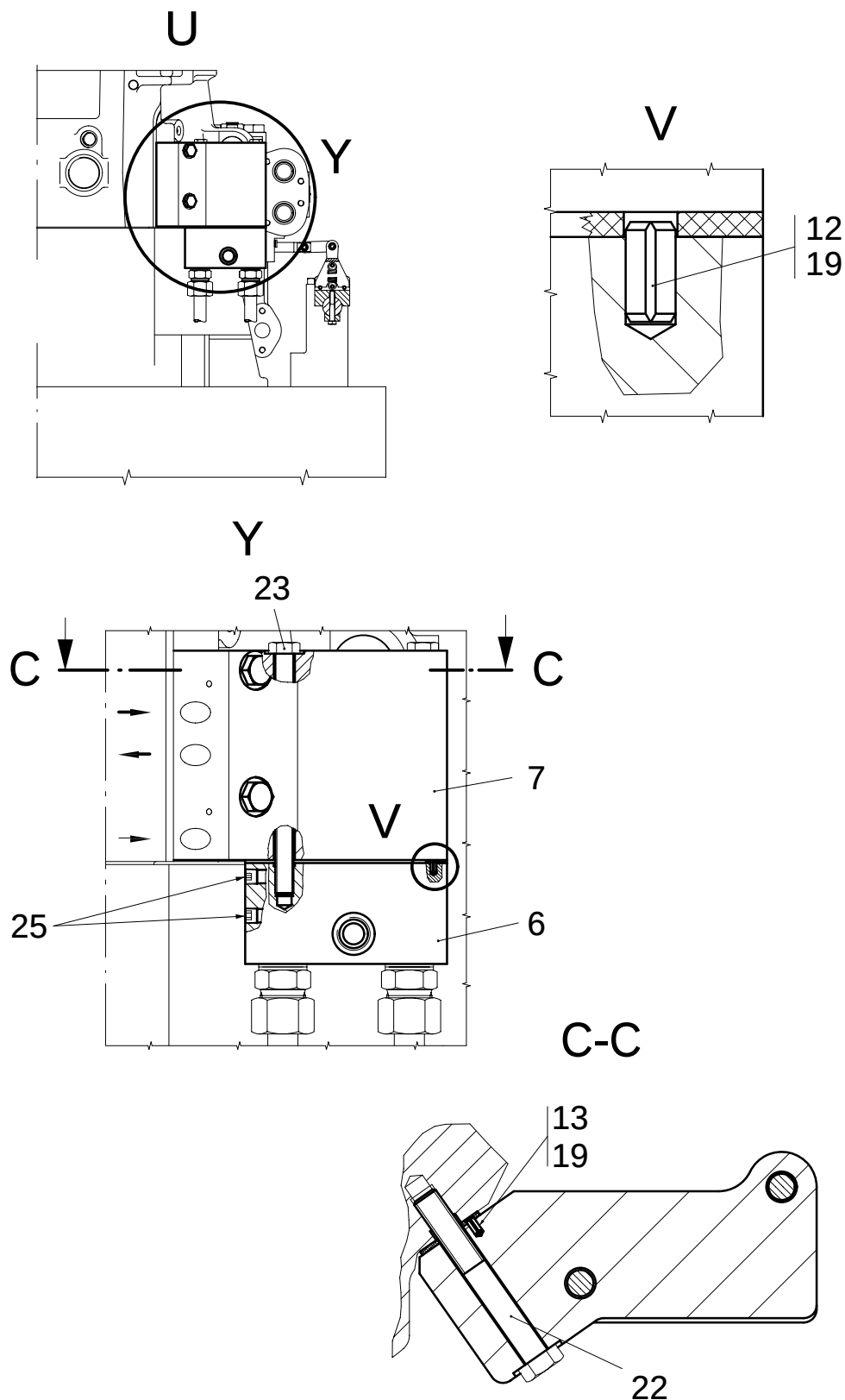


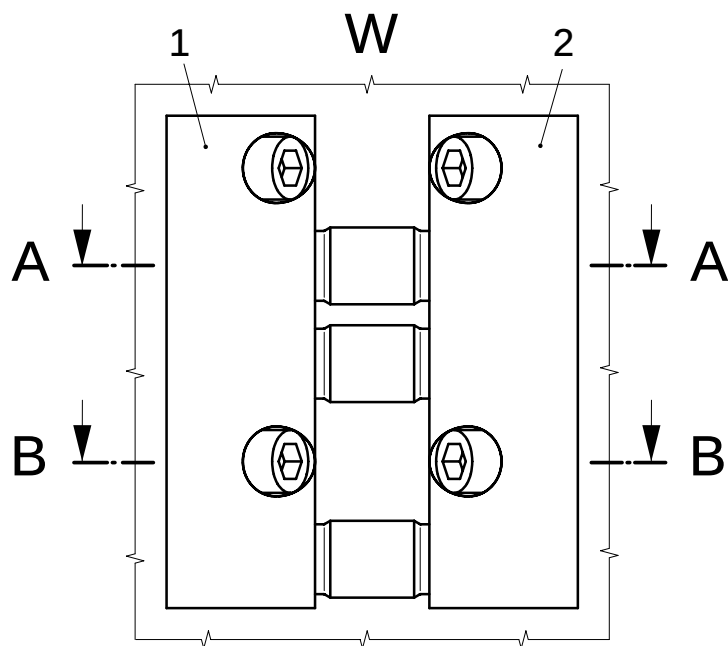
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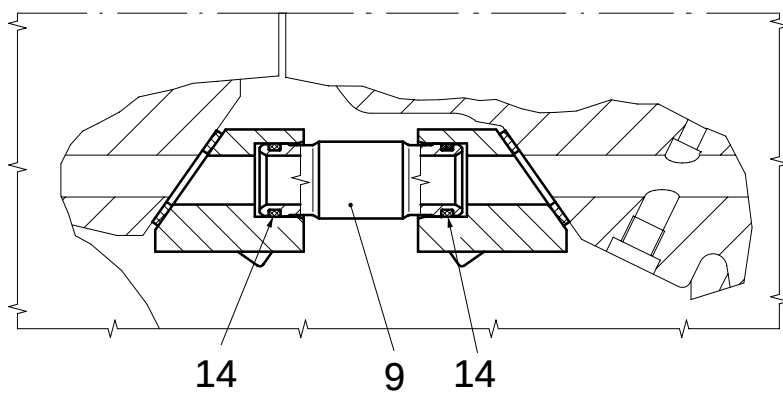
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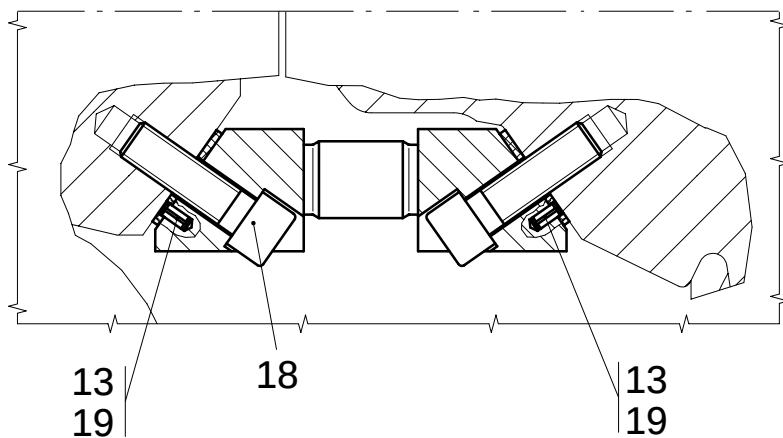




A-A



B-B



Mediums Guide

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MEDIENFÜHRUNG, VOLLST. MEDIUMS GUIDE ASSEMBLY	1	252144 FF
1	ANSCHLUSSFLANSCH CONNECTING FLANGE	8	252144-001
2	ANSCHLUSSFLANSCH CONNECTING FLANGE	8	252144-002
6	VERTEILERPLATTE DISTRIBUTOR PLATE	1	252144-106
7	ANSCHLUSSFLANSCH CONNECTING FLANGE	1	252144-007
8	ABSCHLUSSFLANSCH CONNECTING FLANGE	1	252144-008
9	HÜLSE SLEEVE	24	9.2144-009
12	DICHTUNG GASKET	# 1	252144-012
13	DICHTUNG GASKET	# 18	252144-013
14	O-RING O-RING	# 48	1.7084-631
18	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	32	1.1152-156
19	SPANNSTIFT SPRING DOWEL PIN	# 38	1.0039-803
21	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-380
22	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-314
23	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1372-322
25	VERSCHLUSSSCHRAUBE HEXAGON SOCKET SCREW PLUG	2	1.1056-202
26	VERSCHLUSSSCHRAUBE HEXAGON SOCKET SCREW PLUG	1	1.1056-005

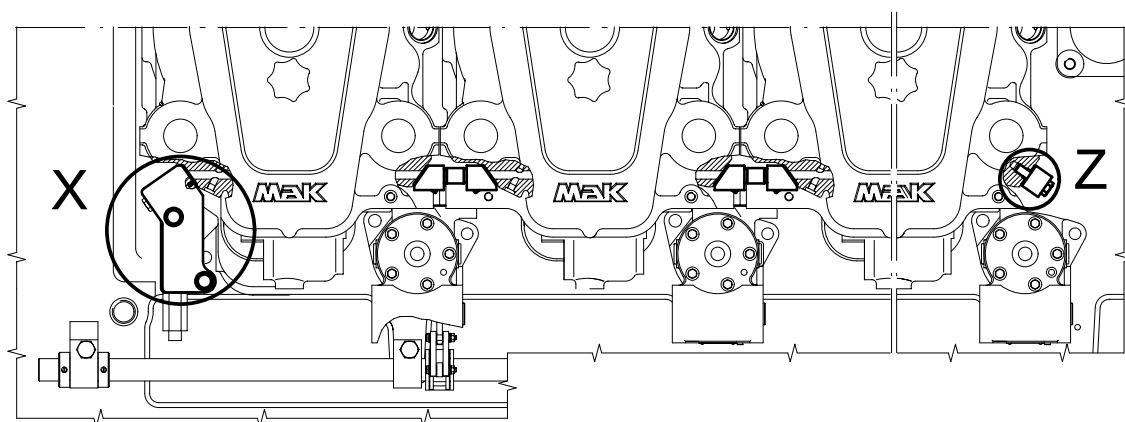
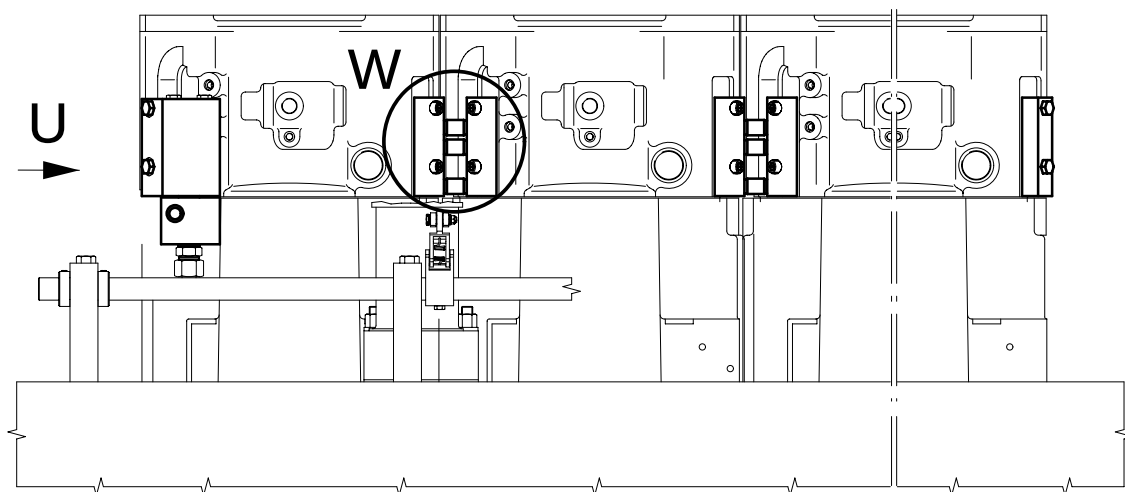
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

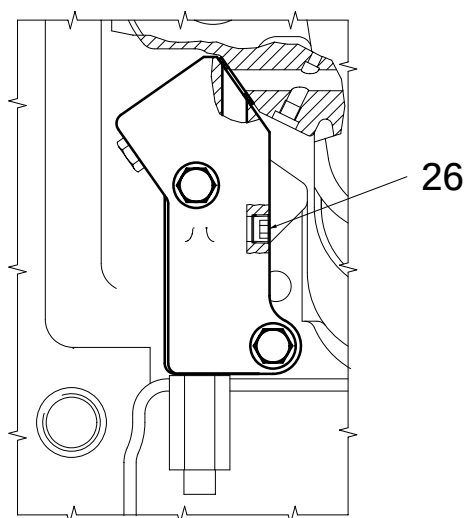
Mediums Guide

M25

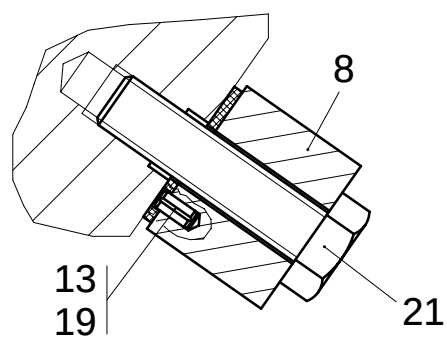
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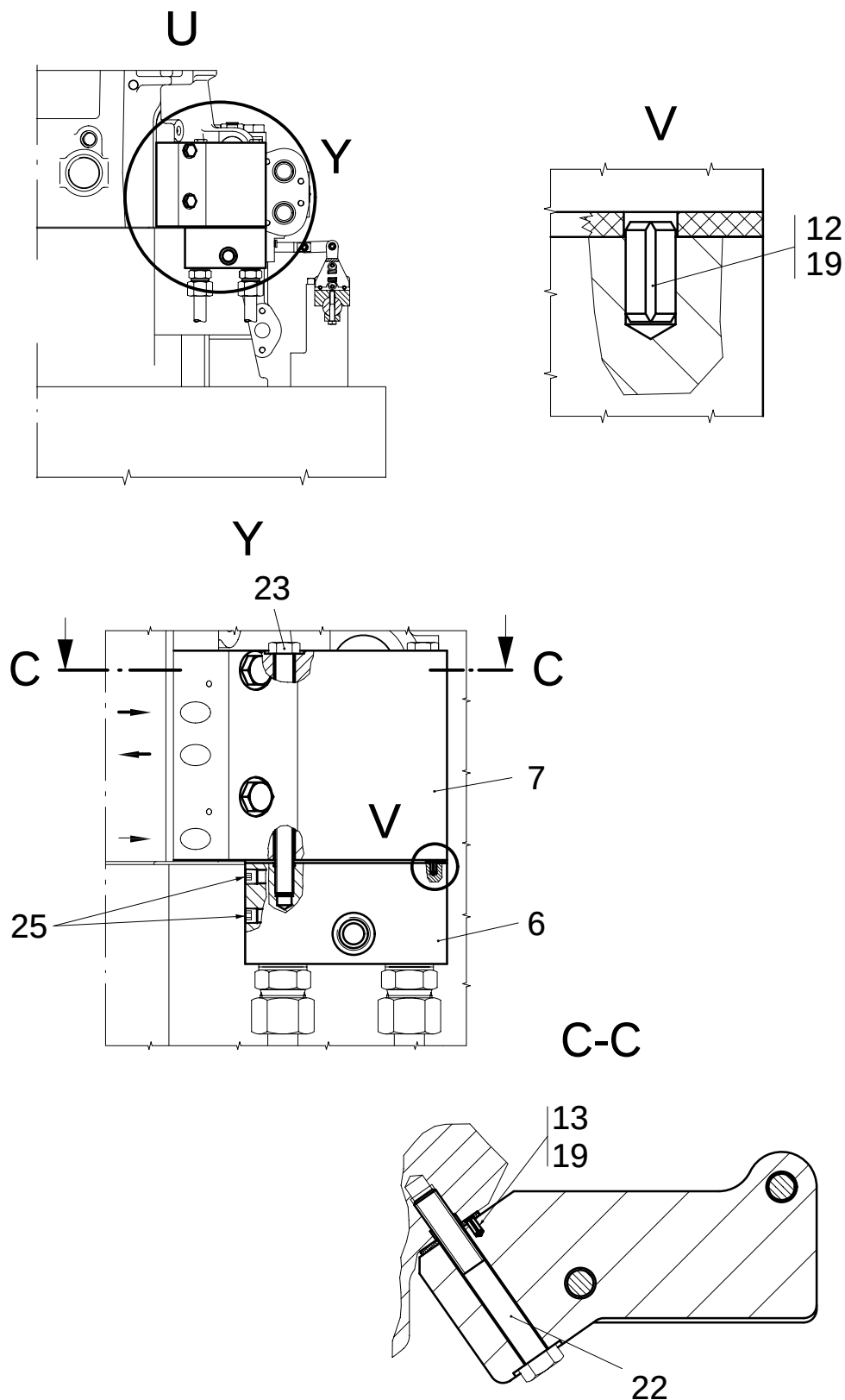


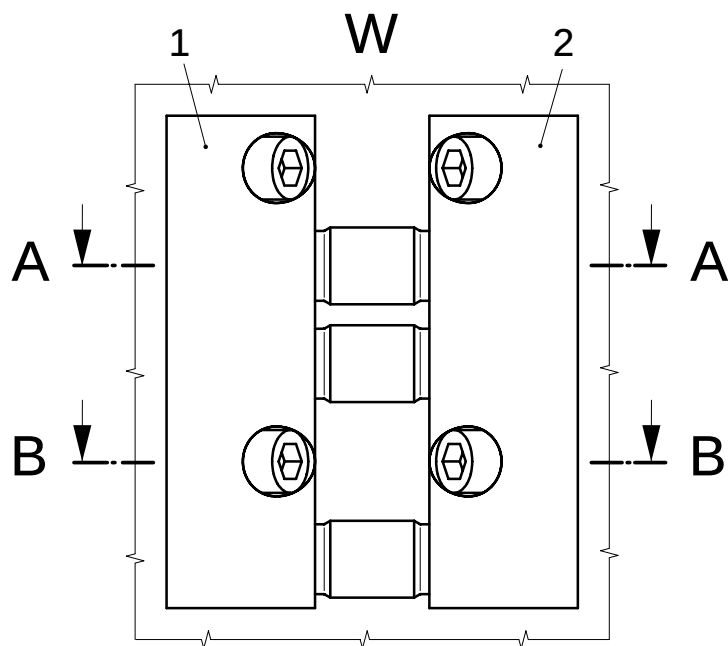
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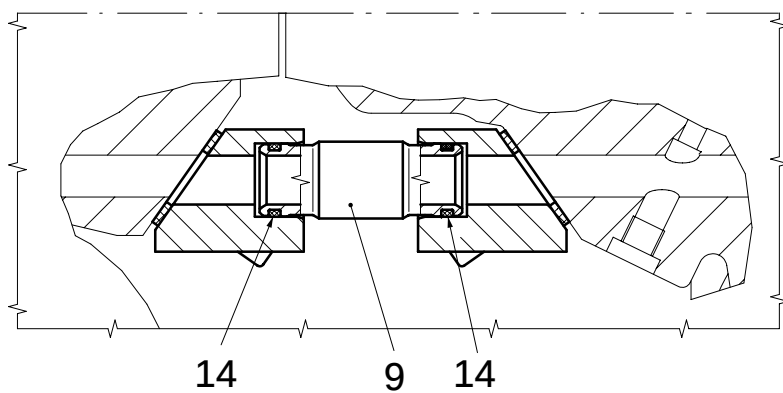
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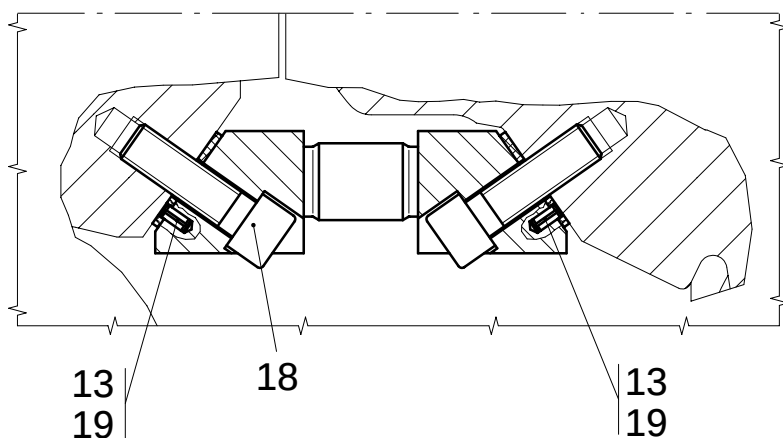




A-A



B-B



Cylinder Head Cap

M25

01

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ZYLINDERKOPFHAUBE, VOLLST. CYLINDER HEAD CAP ASSEMBLY	1	252190 AA
1	HAUBE COVER	1	252190-001
2	PROFILSCHNUR RUBBER SEALING	# 1	252190-002
6	STIFTSCHRAUBE STUD	1	1.1234-267
8	SECHSKANTMUTTER HEXAGON THIN NUT	1	1.2017-217
9	SPANNSTIFT SPRING DOWEL PIN	2	1.0039-179
10	SCHEIBE WASHER	1	1.0058-461
11	VERSCHLUSSDECKEL COVER	1	1.6050-002
13	O-RING O-RING	# 1	2.2190-014
15	STERNGRIFF STAR GRIP	1	1.3066-706

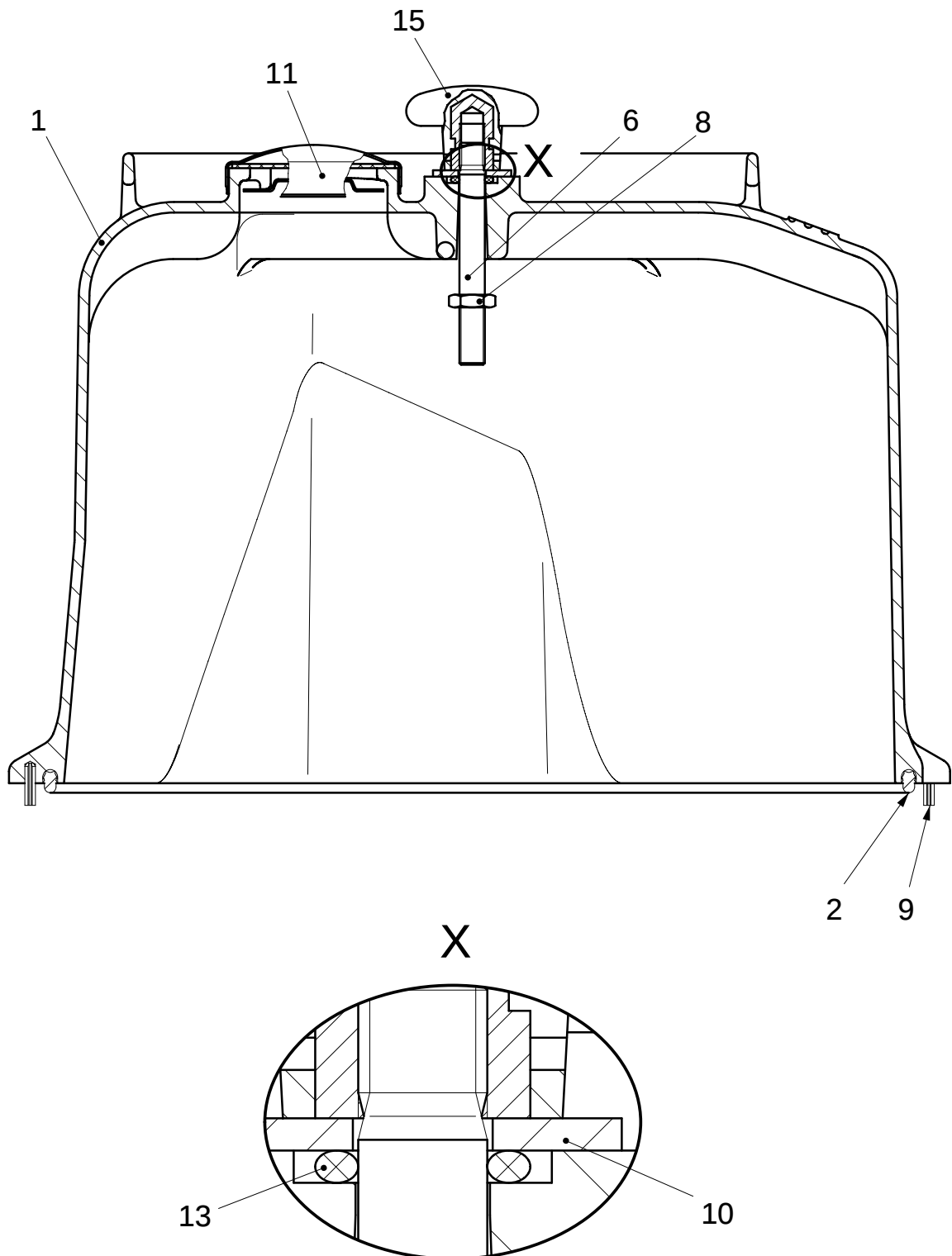
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cylinder Head Cap

M25

01



Valve Rotator

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	VENTILDREHVORRICHTUNG, VOLLST. VALVE ROTATOR ASSEMBLY	1	252225 AA
3	TELLERFEDER CUP SPRING	1	1.2225-103
4	SPRENGRING SPRING RING	1	1.2225-104
5	STAHLKUGEL STEEL BALL	7	1.2225-105
6	TANGENTIALFEDER TANGENTIAL SPRING	7	1.2225-106

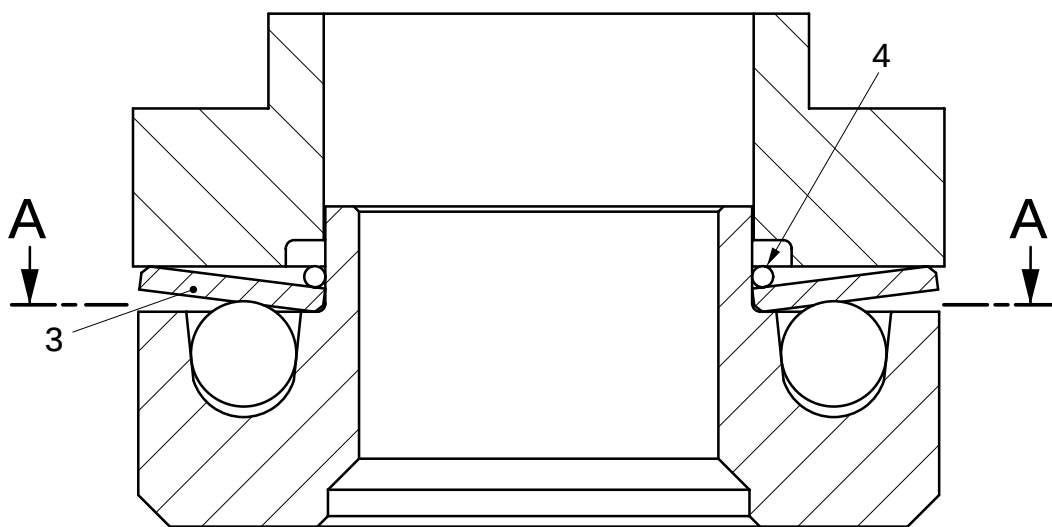
01

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

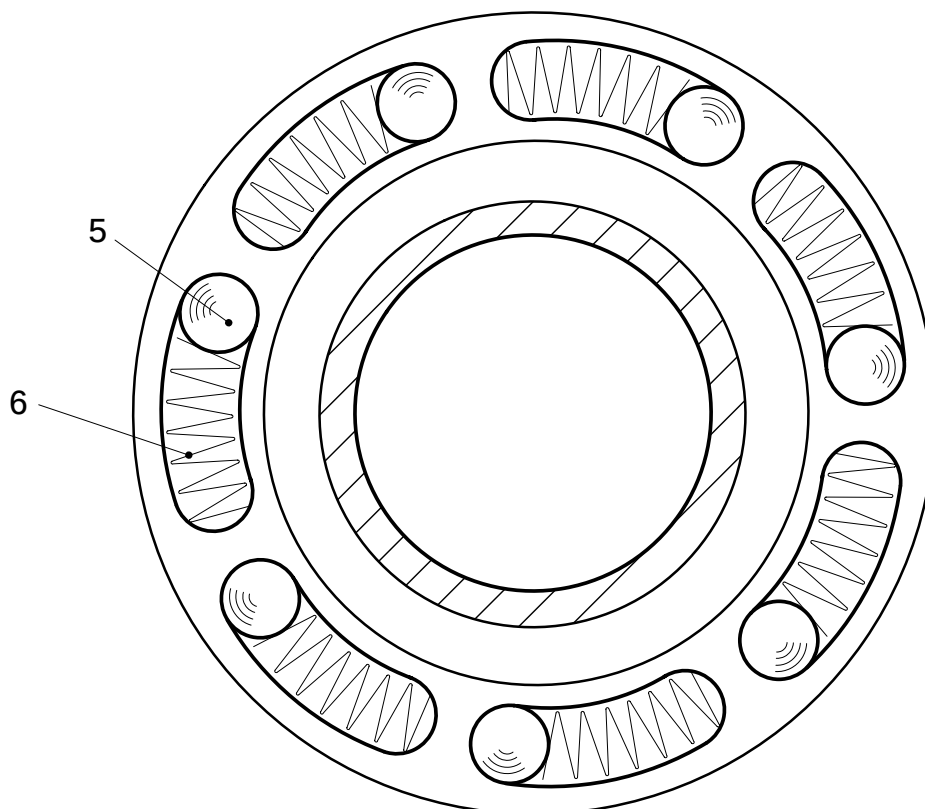
Valve Rotator

M25

01



A-A



Indicator Valve

M20-M601C

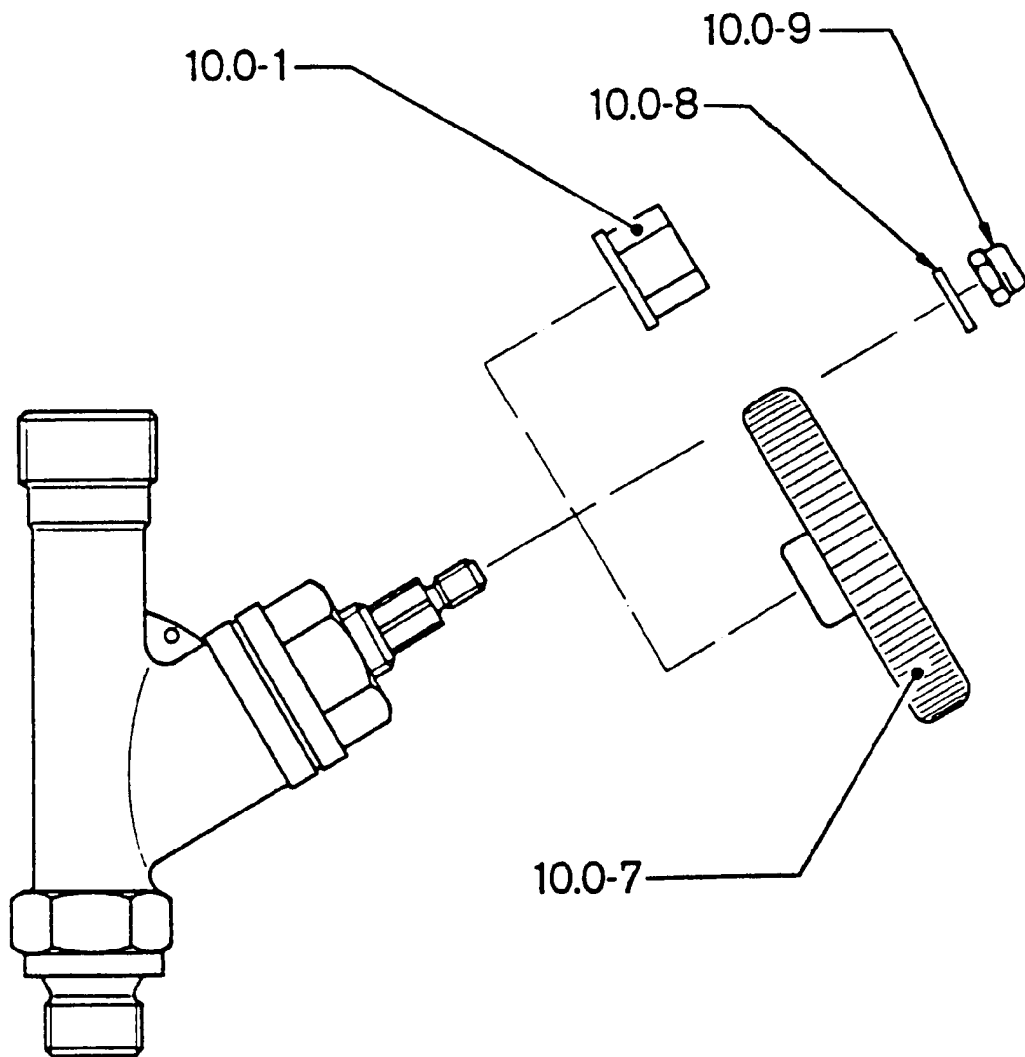
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.	
10.0	INDIZIERVENTIL, VOLLST. INDICATOR VALVE ASSEMBLY	1	1.2257 DD		
10.0-1	SECHSKANTKOPF HEXAGON HEAD	1	1.2257-1		
10.0-7	HANDRAD (ANSTELLE 10.0-1) HAND WHEEL (IN PLACE OF 10.0-1)	1	1.2257-7		
10.0-8	SCHEIBE WASHER	1	6,4	DIN125	ST
10.0-9	SECHSKANTMUTTER HEXAGON NUT	1	M6	M1536A	THERAMAG

01

Indicator Valve

M20-M601C

01



Crankshaft with Balance Weight

M25

02

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KURBELWELLE, VOLLST. CRANKSHAFT ASSEMBLY	1	252510 AA
1	KURBELWELLE CRANKSHAFT	1	252510-001
3	DEHNSCHRAUBE TENSION BOLT	24	252510-003
8	VERSCHLUSSSCHRAUBE SCREW PLUG	2	1.1040-607
9	DICHTRING JOINT RING	# 2	1.7010-064

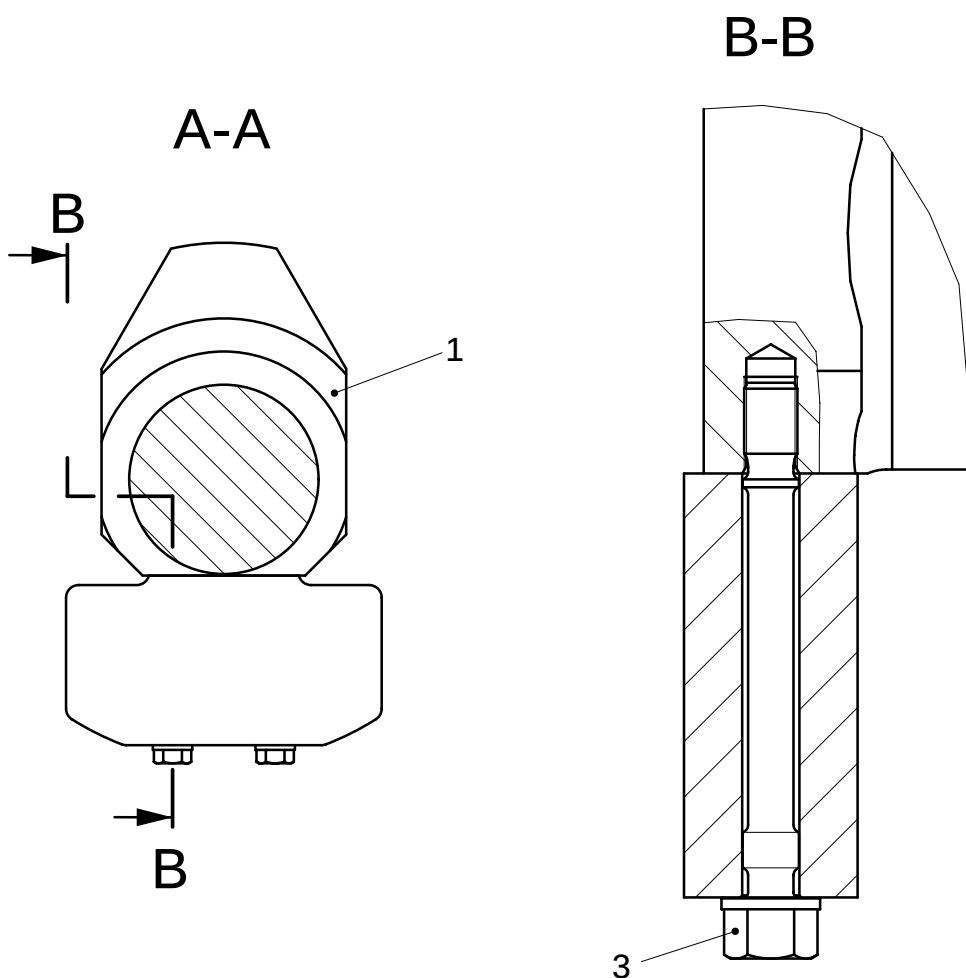
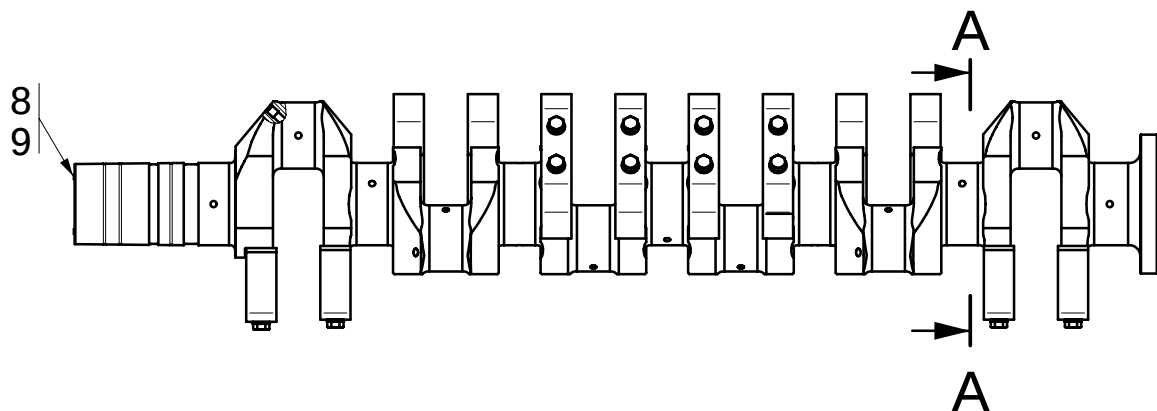
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Crankshaft with Balance Weight

M25

02



Crankshaft with Balance Weigt

M25

02

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KURBELWELLE, VOLLST. CRANKSHAFT ASSEMBLY	1	252510 BB
1	KURBELWELLE CRANKSHAFT	1	252510-101
3	DEHNSCHRAUBE TENSION BOLT	24	252510-003
8	VERSCHLUSSSCHRAUBE SCREW PLUG	2	1.1040-607
9	DICHTRING JOINT RING	# 2	1.7010-064

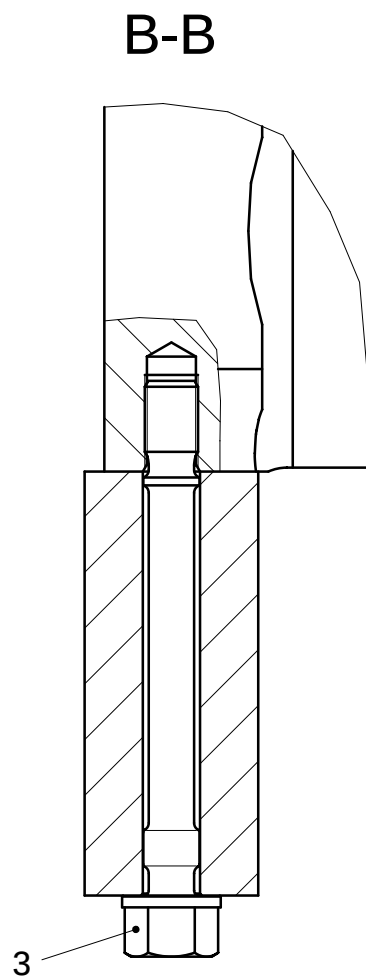
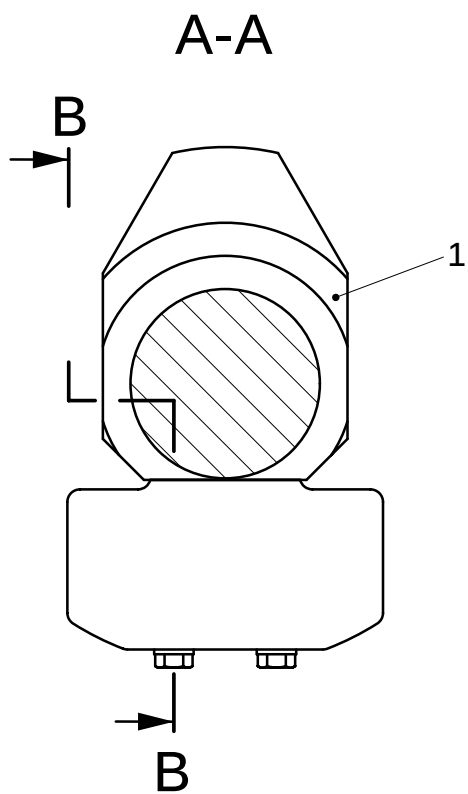
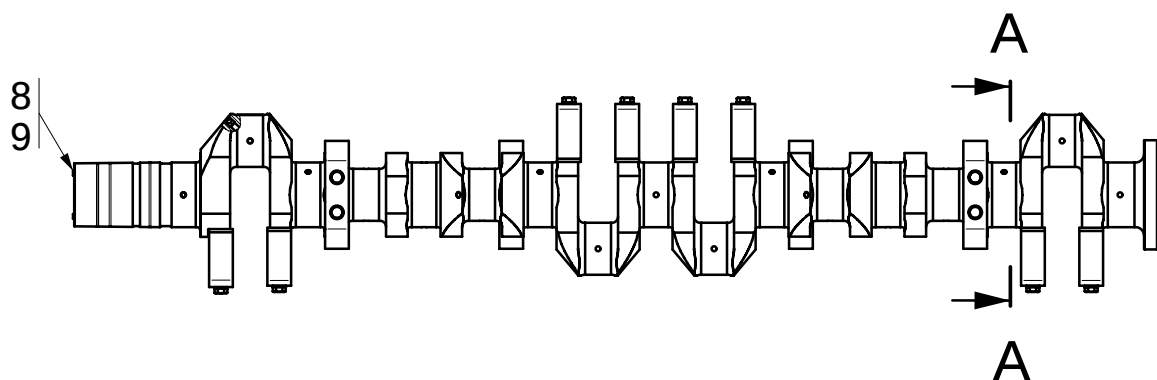
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Crankshaft with Balance Weigt

M25

02



Crankshaft with Balance Weight

M25

02

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KURBELWELLE, VOLLST. CRANKSHAFT ASSEMBLY	1	252510 CC
1	KURBELWELLE CRANKSHAFT	1	252510-201
3	DEHNSCHRAUBE TENSION BOLT	24	252510-003
8	VERSCHLUSSSCHRAUBE SCREW PLUG	2	1.1040-607
9	DICHTRING JOINT RING	# 2	1.7010-064

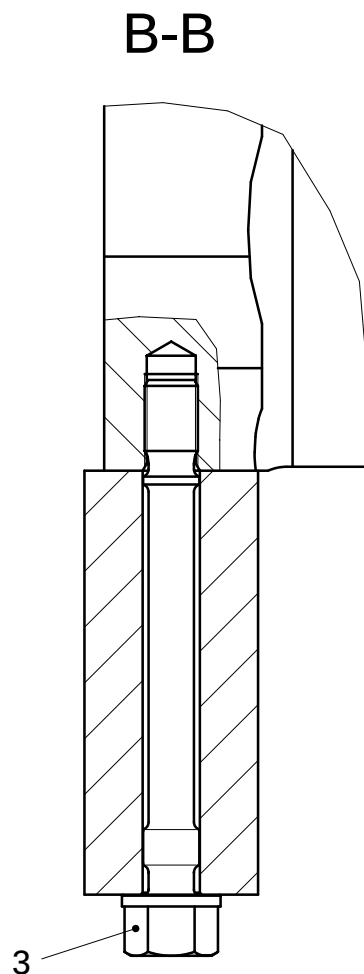
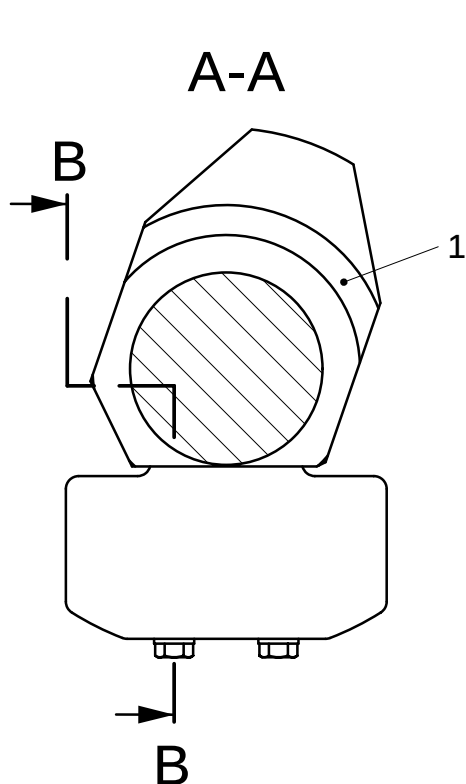
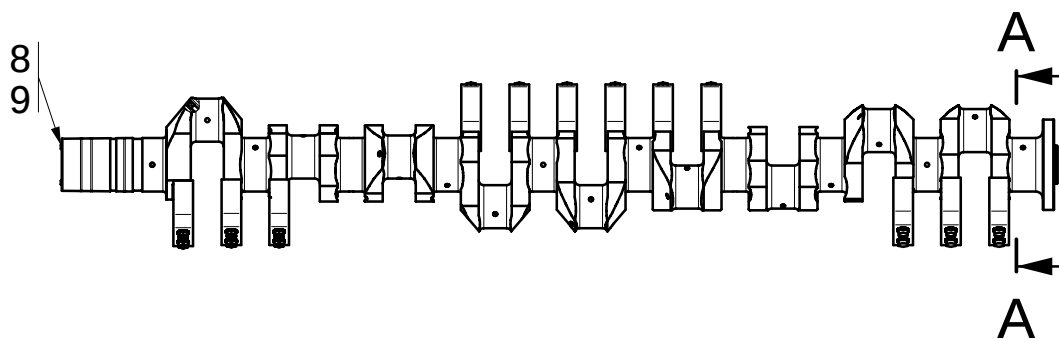
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Crankshaft with Balance Weight

M25

02



Crankshaft with Balance Weight

M25

02

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KURBELWELLE, VOLLST. CRANKSHAFT ASSEMBLY	1	252510 DD
1	KURBELWELLE CRANKSHAFT	1	252510-001
4	GEWINDESTIFT THREADED BOLT	6	9.2520-005
8	VERSCHLUSSSCHRAUBE SCREW PLUG	2	1.1040-607
9	DICHTRING JOINT RING	# 2	1.7010-064

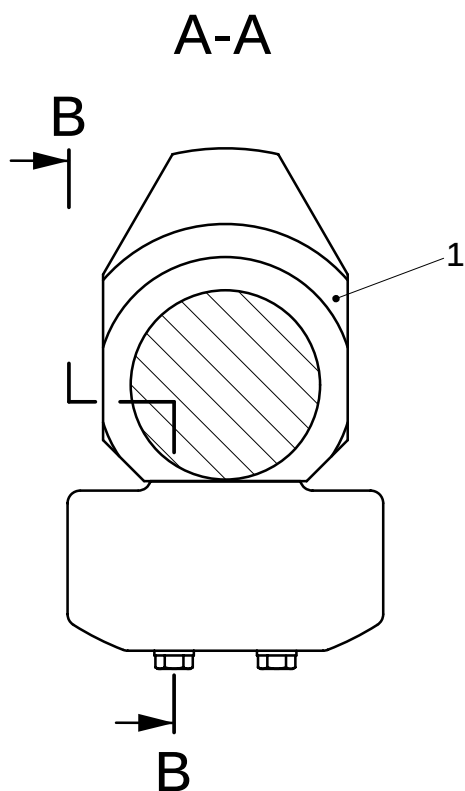
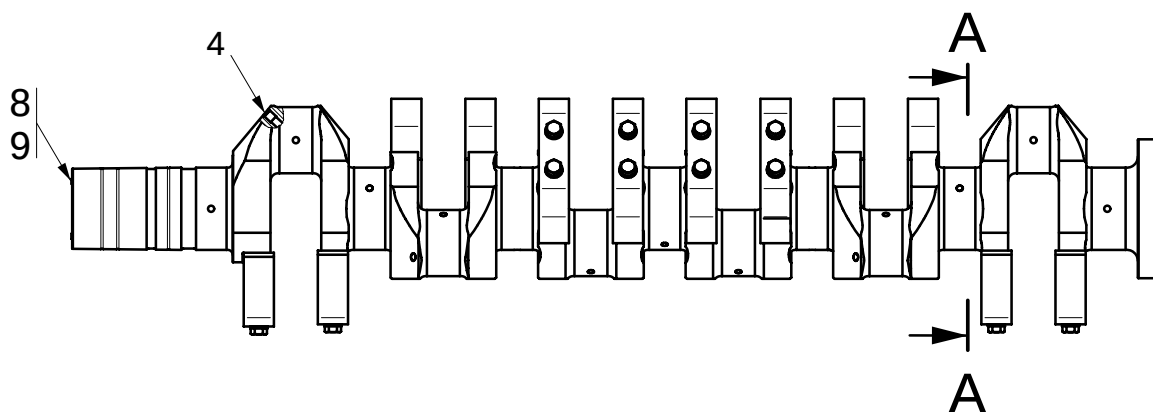
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

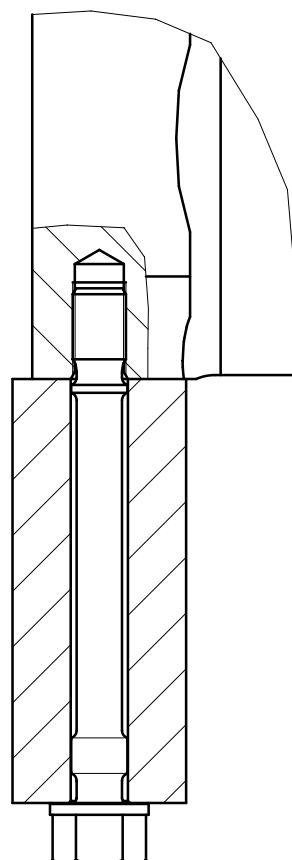
Crankshaft with Balance Weight

M25

02



B-B



Piston and Connecting-rod

M25

02

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KOLBEN MIT PLEUELST., VOLLST. PISTON AND CONNECTING-ROD ASSEMBLY	1	252601 AA
3	LAGERSCHALE, VOLLST. NORMAL BEARING, COMPL.	+* 1	252601-003
4	KOLBENBOLZEN, VOLLST. PISTON PIN, COMPL.	1	252601-004
5	SICHERUNGSRING CIRCLIP	2	252601-005
50	PLEUELSTANGE, VOLLST. CONNECTING ROD, COMPL.	+* 1	252810-100
53	KOLBENBOLZENBUCHSE SMALL-END BUSH	1	252810-053
54	PLEUELSCHRAUBE CONNECTING-ROD BOLT	2	252810-054
55	PLEUELSCHRAUBE CONNECTING-ROD BOLT	2	252810-055
56	ZYLINDERSTIFT PARALLEL PIN	2	2.2810-056
100	KOLBEN, VOLLST. PISTON, COMPL.	* 1	252670-100
101	KOLBENHEMD PISTON SKIRT	1	252670-101
102	KOLBENKRONE PISTON CROWN	1	252670-102
103	SCHWERSPANNSTIFT SPRING DOWEL PIN	# 1	252670-103
104	DEHNSCHRAUBE TENSION BOLT	4	252670-104
105	DEHNHÜLSE EXTENSION BUSH	4	252670-105

* = IN 252601 AA ENTHALTEN
INCLUDED IN 252601 AA

+ = LIEFERUMFANG DER RESERVEPLEUELSTANGE
SCOPE OF SUPPLY OF ON-BOARD SPARE CONNECTING-ROD

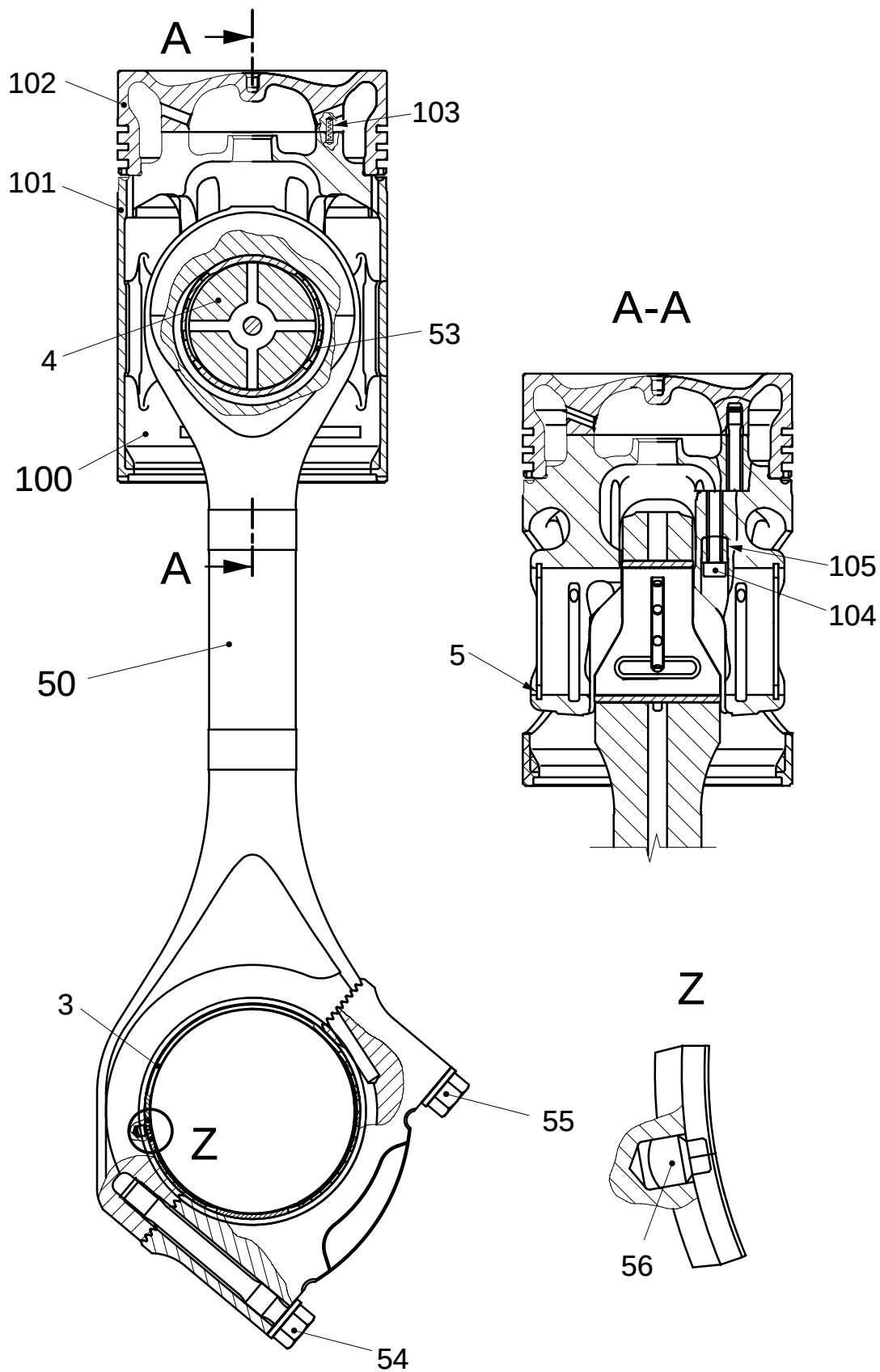
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Piston and Connecting-rod

M25

02



Piston Rings

M25

02

POS. ITEM	BENENNUNG DESCRIPTION		STCK NUMBER	BEST.-NR PART NO.
-	KOLBENRINGAUSRÜST., VOLLST. SET OF PISTON RINGS, COMPL.	*	1	252617 AA
NUT 1 GROOVE	FEUERSTEGRING FIRE RING		1	252617-001
NUT 2 GROOVE	VERDICHTUNGSRING COMPRESSION RING		1	252617-002
NUT 3 GROOVE	ÖLABSTREIFRING OIL SCRAPER RING		1	252617-003

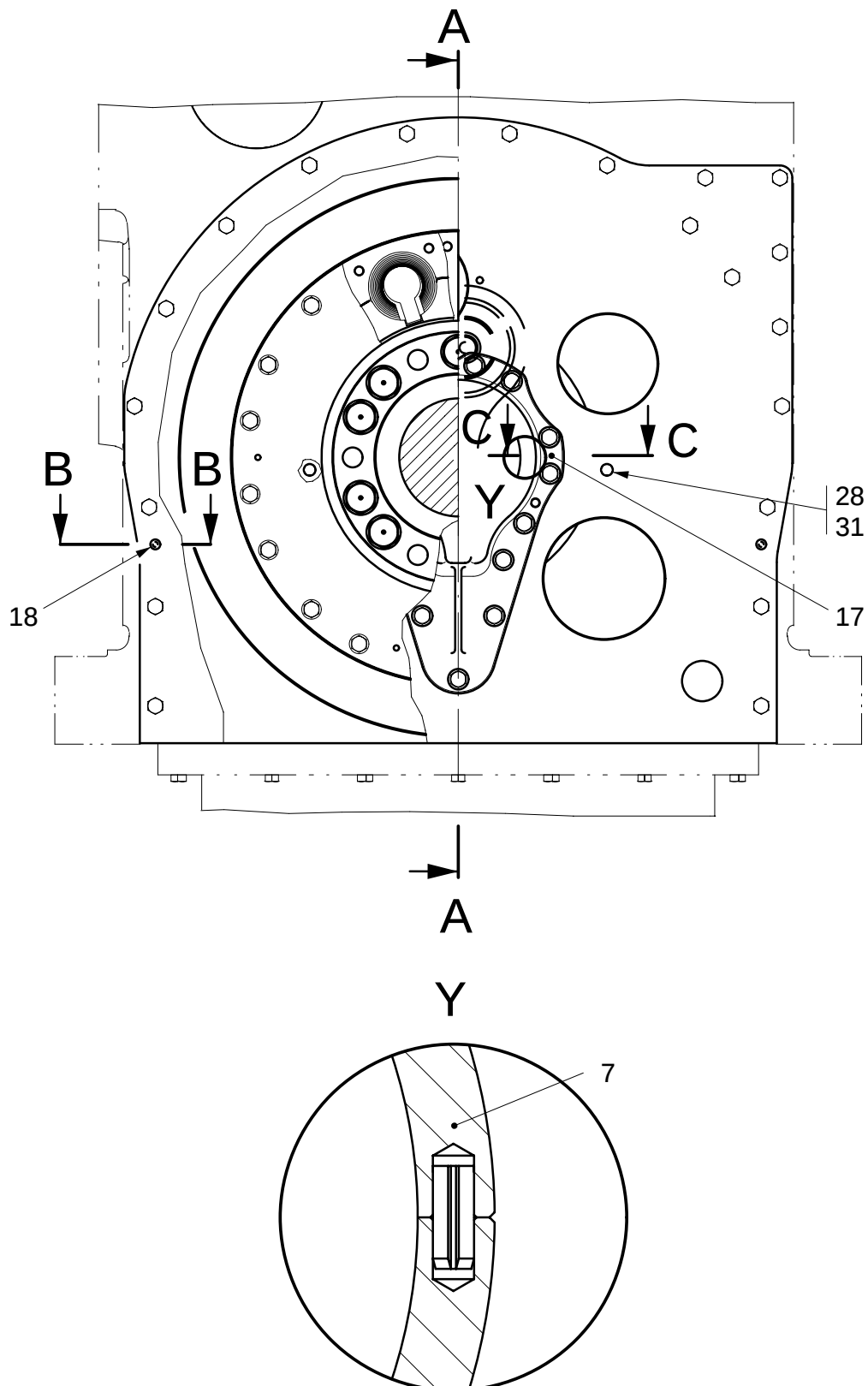
* = OHNE ABBILDUNG
NO ILLUSTRATION

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

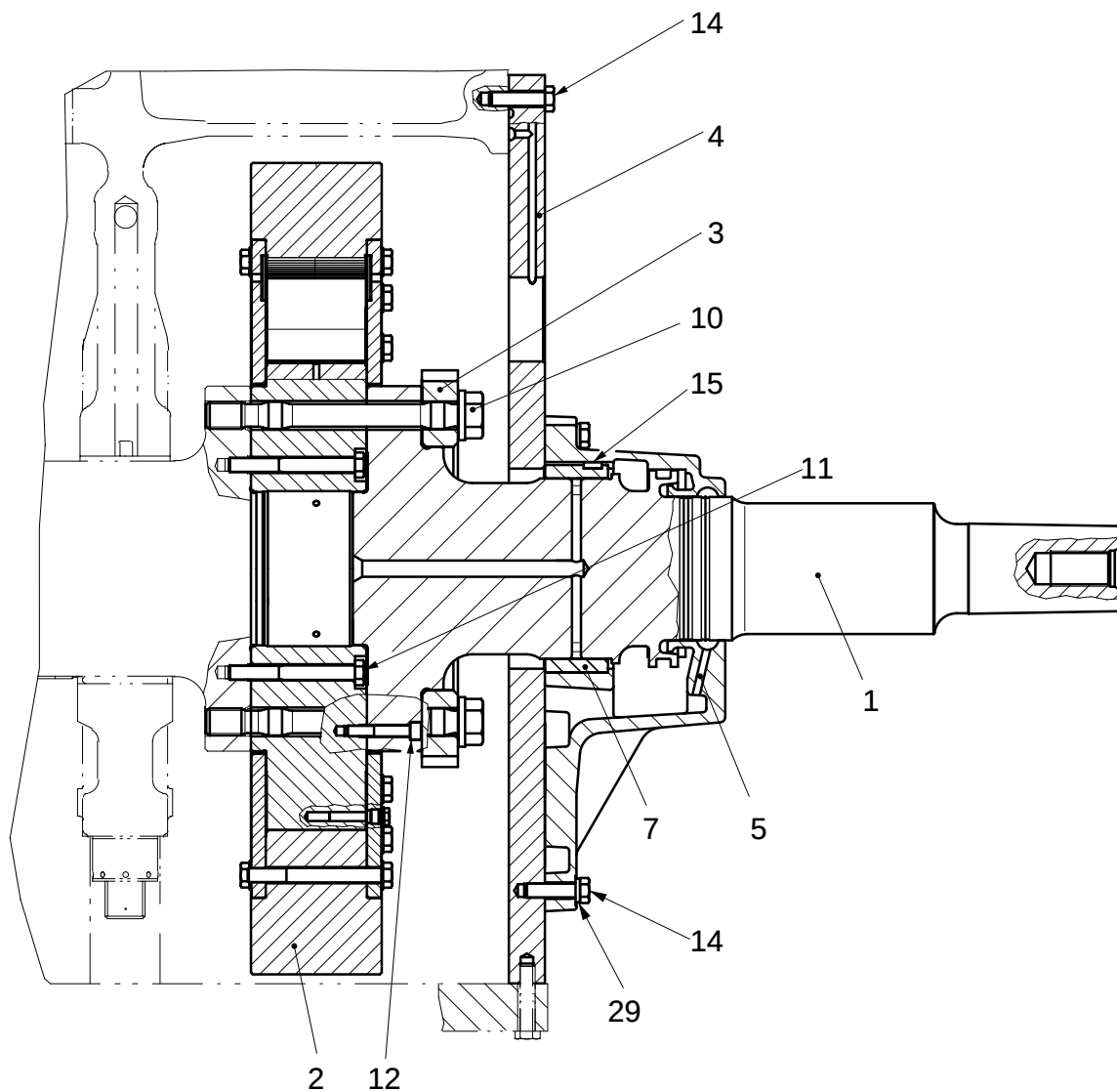
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KUPPLUNGSGEGENSEITE, VOLLST. FREE END OF THE ENGINE ASSEMBLY	1	256340 AA
1	FLANSCHWELLE STUB SHAFT	1	256340-001
2	SCHWINGUNGSDÄMPFER, VOLLST. VIBRATION DAMPER, COMPL.	1	SIEHE B1.05.12.1.6347 SEE B1.05.12.1.6347
3	ZAHNRAD GEAR WHEEL	1	256345-003
4	PUMPENTRÄGERPLATTE, VOLLST. PUMP SUPPORT, COMPL.	1	256340-004
5	LAGERGEHÄUSE BEARING HOUSING	1	256340-005
7	LAGER BEARING	1	256340-007
10	DEHNSCHRAUBE, 6 ZYL. TENSION BOLT, 6 CYL.	10	9.6345-010
10	DEHNSCHRAUBE, 8 ZYL. TENSION BOLT, 8 CYL.	12	9.6345-010
10	DEHNSCHRAUBE, 9 ZYL. TENSION BOLT, 9 CYL.	14	9.6345-010
11	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1372-384
12	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	2	1.1158-162
14	SECHSKANTSCHRAUBE HEXAGON SCREW	34	1.1367-372
15	PASSFEDER PARALLEL KEY	1	1.0080-489
17	STIFT TAPER PIN WITH THREADED END	2	1.0023-030
18	STIFT TAPER PIN WITH THREADED END	2	1.0023-072
28	DICHTRING JOINT RING	# 2	1.7010-078
29	DEHNHÜLSE EXTENSION BUSH	14	1.0502-065
31	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-204

= VERBRAUCHSTEILE
CONSUMABLES

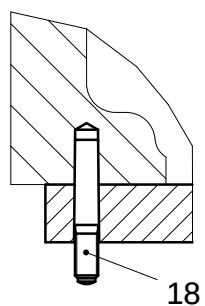
Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**



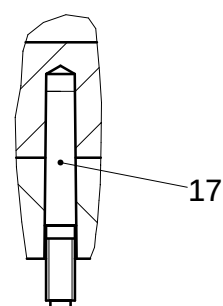
A-A



B-B



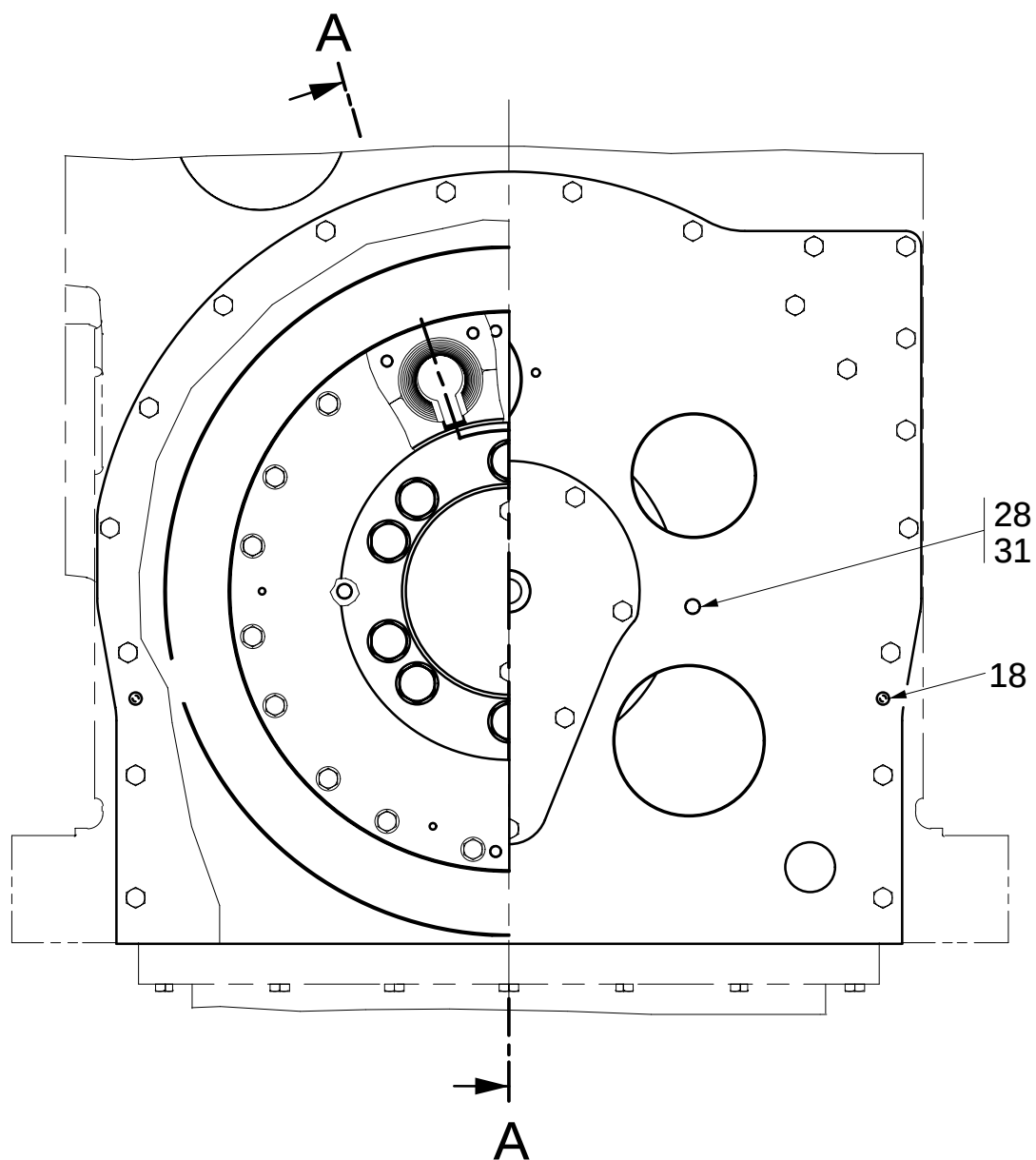
C-C

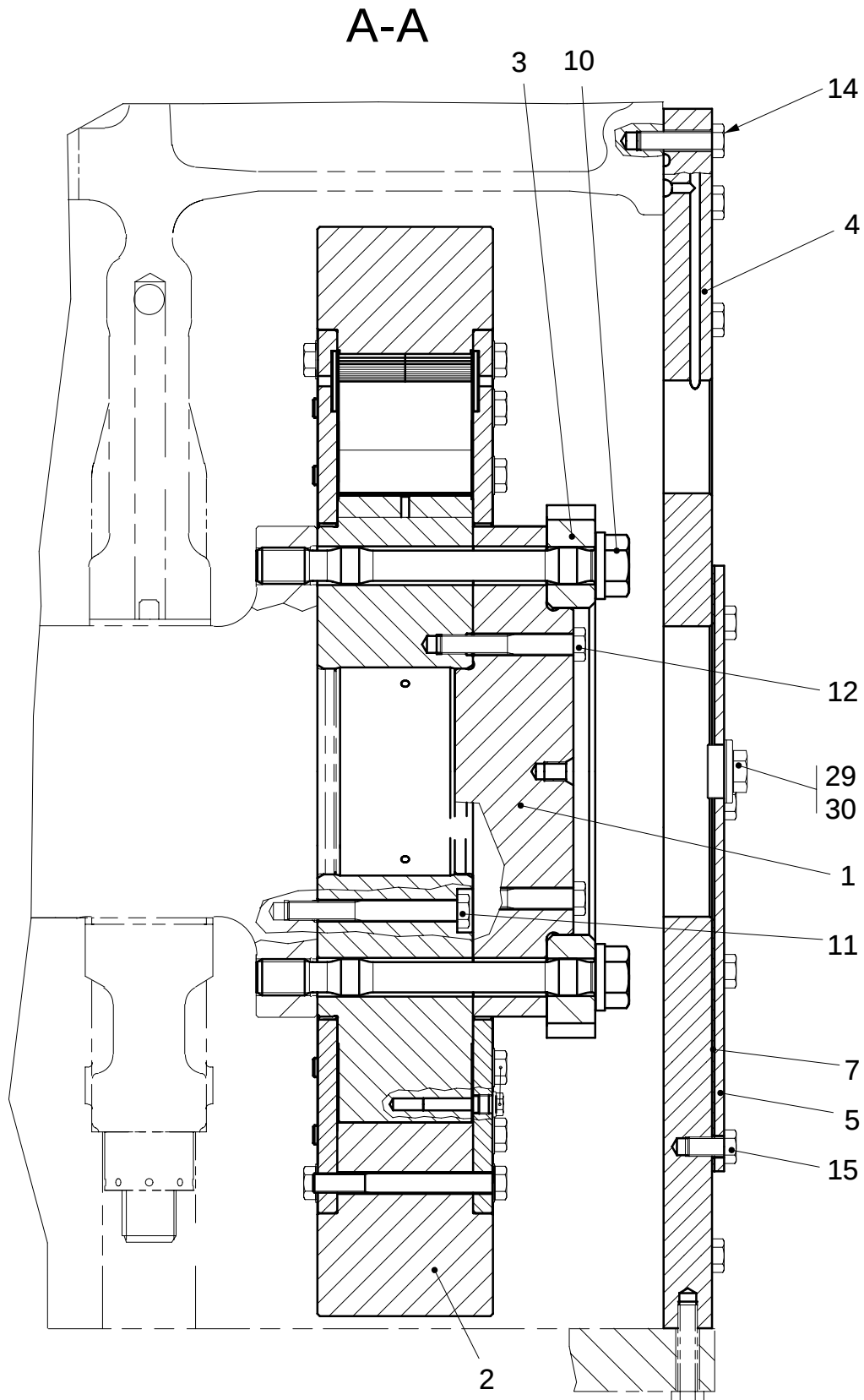


POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KUPPLUNGSGEGENSEITE, VOLLST. FREE END OF THE ENGINE ASSEMBLY	1	256345 AA
1	PUMPENRADTRÄGER PUMP GEAR SUPPORT	1	256345-001
2	SCHWINGUNGSDÄMPFER, VOLLST. VIBRATION DAMPER, COMPL.	1	SIEHE B1.05.12.1.6347 SEE B1.05.12.1.6347
3	ZAHNRAD GEAR WHEEL	1	256345-003
4	PUMPENTRÄGERPLATTE, VOLLST. PUMP SUPPORT, COMPL.	1	256345-004
5	PLATTE PLATE	1	256345-005
7	DICHTUNG GASKET	# 1	256345-007
10	DEHNSCHRAUBE, 6 ZYL. TENSION BOLT, 6 CYL.	10	9.6345-010
10	DEHNSCHRAUBE, 8 ZYL. TENSION BOLT, 8 CYL.	12	9.6345-010
10	DEHNSCHRAUBE, 9 ZYL. TENSION BOLT, 9 CYL.	14	9.6345-010
11	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1372-384
12	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-381
14	SECHSKANTSCHRAUBE HEXAGON BOLT	20	1.1367-372
15	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-441
18	STIFT TAPER PIN WITH THREADED END	2	1.0023-072
28	DICHTRING JOINT RING	# 2	1.7010-078
29	DICHTRING JOINT RING	# 1	1.7010-347
30	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-817
31	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-204

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

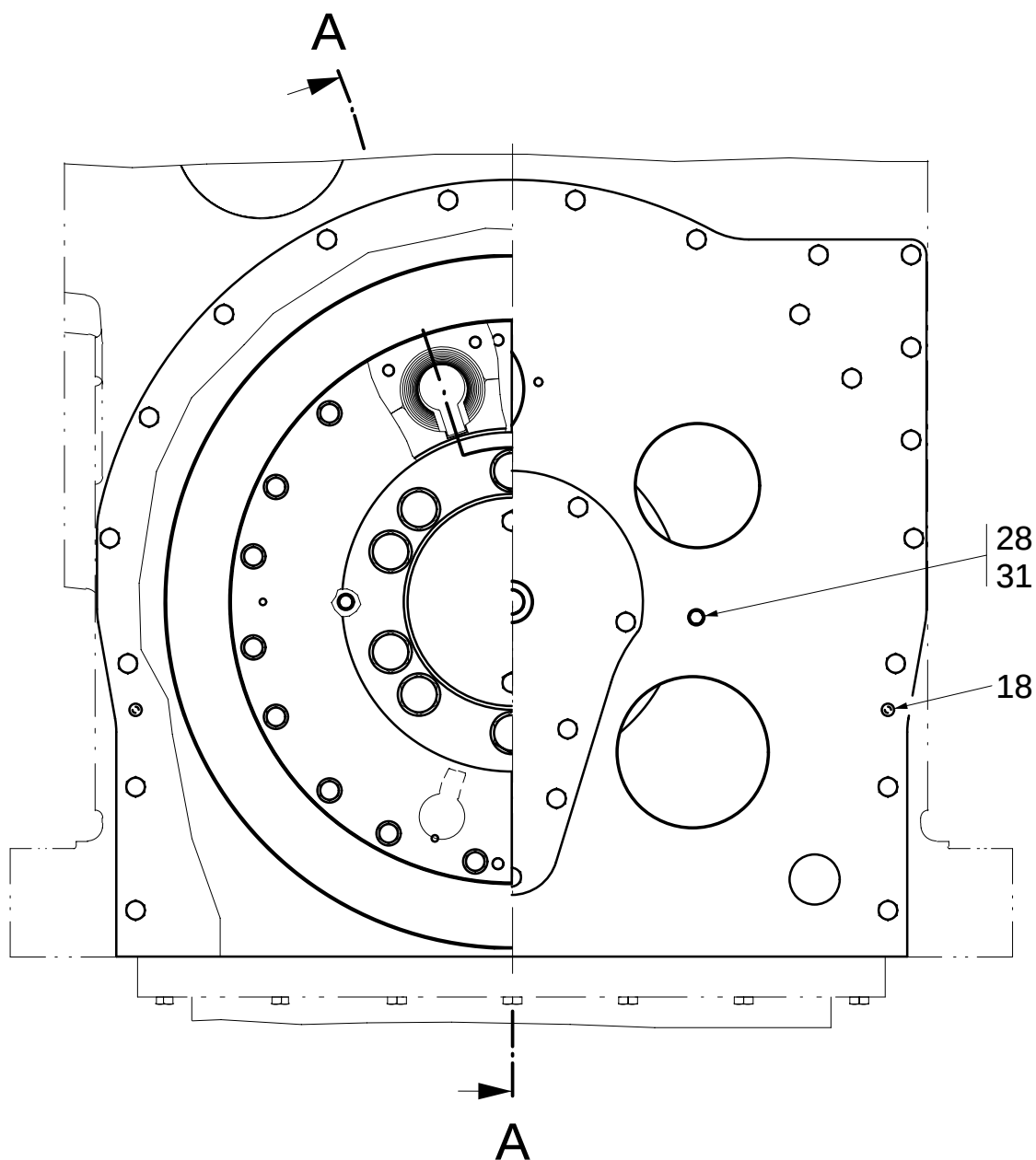




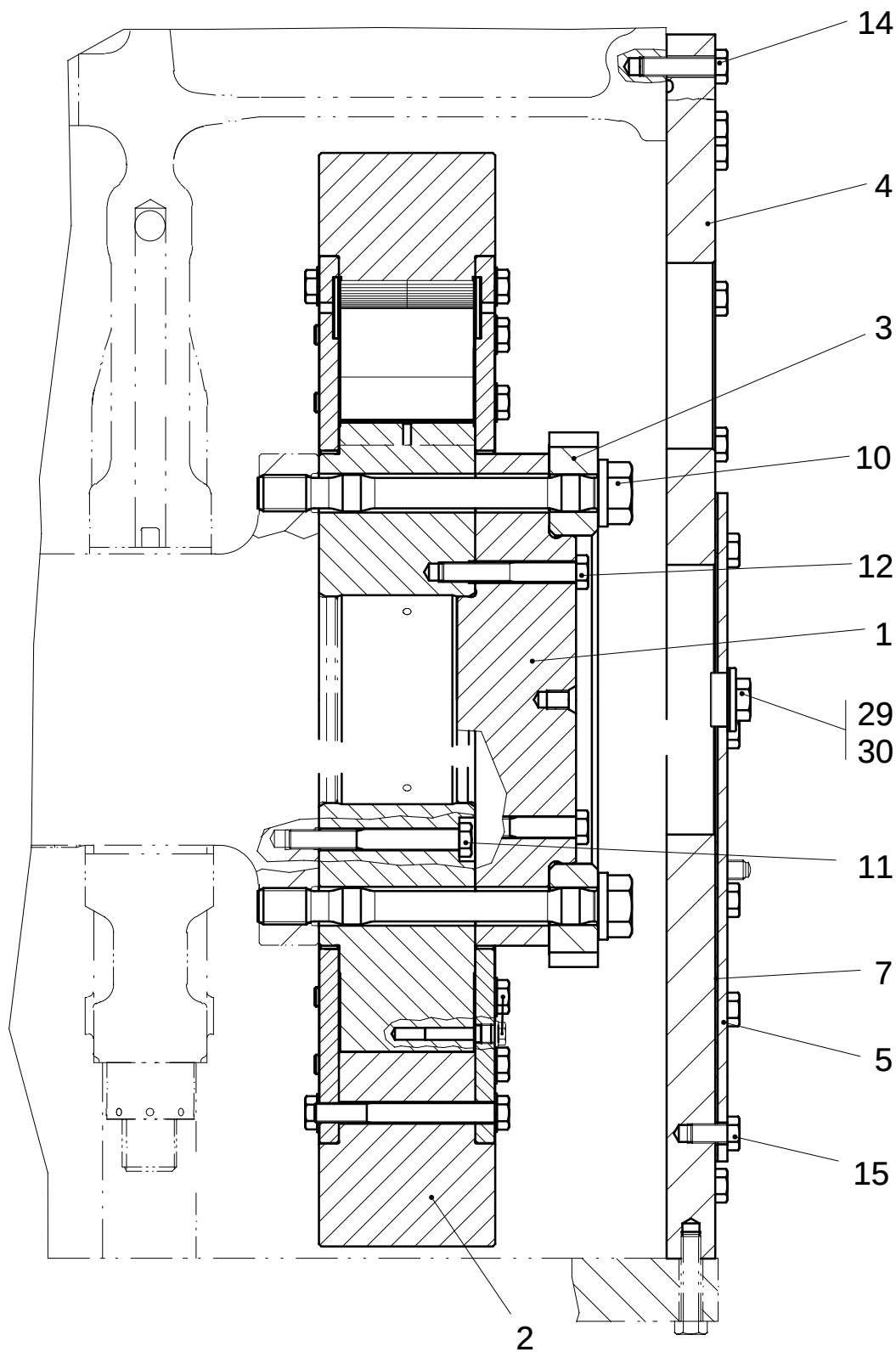
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KUPPLUNGSGEGENSEITE, VOLLST. FREE END OF THE ENGINE ASSEMBLY	1	256345 BB
1	PUMPENRADTRÄGER PUMP GEAR SUPPORT	1	256345-001
2	SCHWINGUNGSDÄMPFER, VOLLST. VIBRATION DAMPER, COMPL.	1	SIEHE B1.05.12.1.6347 SEE B1.05.12.1.6347
3	ZAHNRAD GEAR WHEEL	1	256345-003
4	PUMPENTRÄGERPLATTE, VOLLST. PUMP SUPPORT, COMPL.	1	256345-004
5	PLATTE PLATE	1	256345-105
7	DICHTUNG GASKET	# 1	256345-107
10	DEHNSCHRAUBE, 6 ZYL. TENSION BOLT, 6 CYL.	10	9.6345-010
10	DEHNSCHRAUBE, 8 ZYL. TENSION BOLT, 8 CYL.	12	9.6345-010
10	DEHNSCHRAUBE, 9 ZYL. TENSION BOLT, 9 CYL.	14	9.6345-010
11	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1372-384
12	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-381
14	SECHSKANTSCHRAUBE HEXAGON BOLT	20	1.1367-372
15	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1387-441
18	STIFT TAPER PIN WITH THREADED END	2	1.0023-072
28	DICHTRING JOINT RING	# 2	1.7010-078
29	DICHTRING JOINT RING	# 1	1.7010-347
30	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-817
31	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-204

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**



A-A



Engine Housing

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ZYLINDERKURBELGEHÄUSE, VOLLST. ENGINE HOUSING ASSEMBLY	1	251110 AA
2	KURBELWELLE, VOLLST. CRANKSHAFT, COMPL.	1	SIEHE B1.05.02.252510 SEE B1.05.02.252510
3	SPIELLAGER NORMAL BEARING	7	251110-003
4	NOCKENWELLENLAGER CAMSHAFT BEARING	8	251110-004
5	ANLAUFSCHEIBE THRUST WASHER	2	251110-005
6	ZYLINDERBUCHSE CYLINDER LINER	6	SIEHE B1.05.03.251611 SEE B1.05.03.251611
7	DICHTRING JOINT RING	6	251110-007
8	VERTEILERGEHÄUSE DISTRIBUTING CASE	6	251110-008
9	HÜLSE SLEEVE	12	251110-009
10	DEHNSTIFTSCHRAUBE CYLINDER HEAD STUD	24	251110-010
11	MUTTER NUT	24	251110-011
12	LAGERBUCHSE BEARING BUSH	1	251110-012
13	KALIBRIERRING CALIBRATION INSERT	6	251110-013
14	HÜLSE SLEEVE	12	251110-014
15	DICHTUNG GASKET	# 1	251110-015
17	SCHUTZKAPPE PROTECTING COVER	24	251110-017
18	GEWINDEFLANSCH FLANGE	2	251110-018
19	FLANSCH FLANGE	4	251110-019
20	HÜLSE SLEEVE	5	251110-020

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Engine Housing

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	ZYLINDERSTIFT DOWEL PIN	6	9.1110-022
22	SCHEIBE WASHER	24	251110-022
23	DECKEL COVER	1	251110-023
24	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	8	1.1152-715
25	STIFTSCHRAUBE STUD	18	1.1247-504
27	VERSCHLUSSSCHRAUBE SCREW PLUG	23	1.1040-245
29	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-609
30	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-805
31	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-227
32	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	24	1.1158-214
33	SECHSKANTSCHRAUBE HEXAGON SCREW	29	1.1387-444
34	SECHSKANTSCHRAUBE HEXAGON SCREW	5	1.1387-304
35	STIFTSCHRAUBE STUD	4	1.1234-270
36	STIFTSCHRAUBE STUD	50	1.1247-253
37	STIFTSCHRAUBE STUD	16	1.1247-257
38	STIFTSCHRAUBE STUD	58	1.1234-255
39	STIFTSCHRAUBE STUD	22	1.1234-357
40	DICHTRING JOINT RING	# 2	1.7010-037
41	DICHTRING JOINT RING	# 4	1.7010-102

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Engine Housing

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
42	DICHTRING JOINT RING	# 4	1.7010-133
43	DICHTRING JOINT RING	# 23	1.7010-252
46	SCHEIBE WASHER	5	1.0045-125
50	SPANNSTIFT SPRING DOWEL PIN	4	1.0039-381
53	DICHTUNG GASKET	# 6	1.7073-733
54	O-RING O-RING	# 6	1.7082-909
56	O-RING O-RING	# 6	1.7082-905
57	O-RING O-RING	# 6	1.7082-904
58	O-RING O-RING	# 6	1.7082-520
59	O-RING O-RING	# 6	1.7082-907
60	O-RING O-RING	# 24	1.7084-647
61	O-RING O-RING	# 24	1.7084-643
62	O-RING O-RING	# 10	1.7084-642
63	O-RING O-RING	# 24	1.7082-232
64	O-RING O-RING	# 6	1.7082-908
65	BUCHSE BUSH	2	9.6480-109
66	BUCHSE BUSH	2	251110-066

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Engine Housing

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
100	KURBELWELLENZAHNRAD-ANBAU CRANKSHAFT GEARWHEEL MOUNTING	# 1	252530-100
101	ZAHNRAD FÜR KURBELWELLE CRANKSHAFT GEARWHEEL	1	252530-101
200	ZYLINDERKURBELGEHÄUSE ENGINE HOUSING	# 1	251111-200
202	LAGERDECKEL MAIN BEARING CAP	7	251111-202
204	DEHNSTIFTSCHRAUBE TENSION BOLT	14	251111-204
205	MUTTER NUT	14	251110-011
206	SECHSKANTSCHRAUBE HEXAGON BOLT	14	1.1372-681
209	AUFNAHMEBOLZEN BOLT	2	9.1111-209
211	EXPANDER EXPANDER	1	1.9027-007

* = IN 251110 AA ENTHALTEN
INCLUDED IN 251110 AA

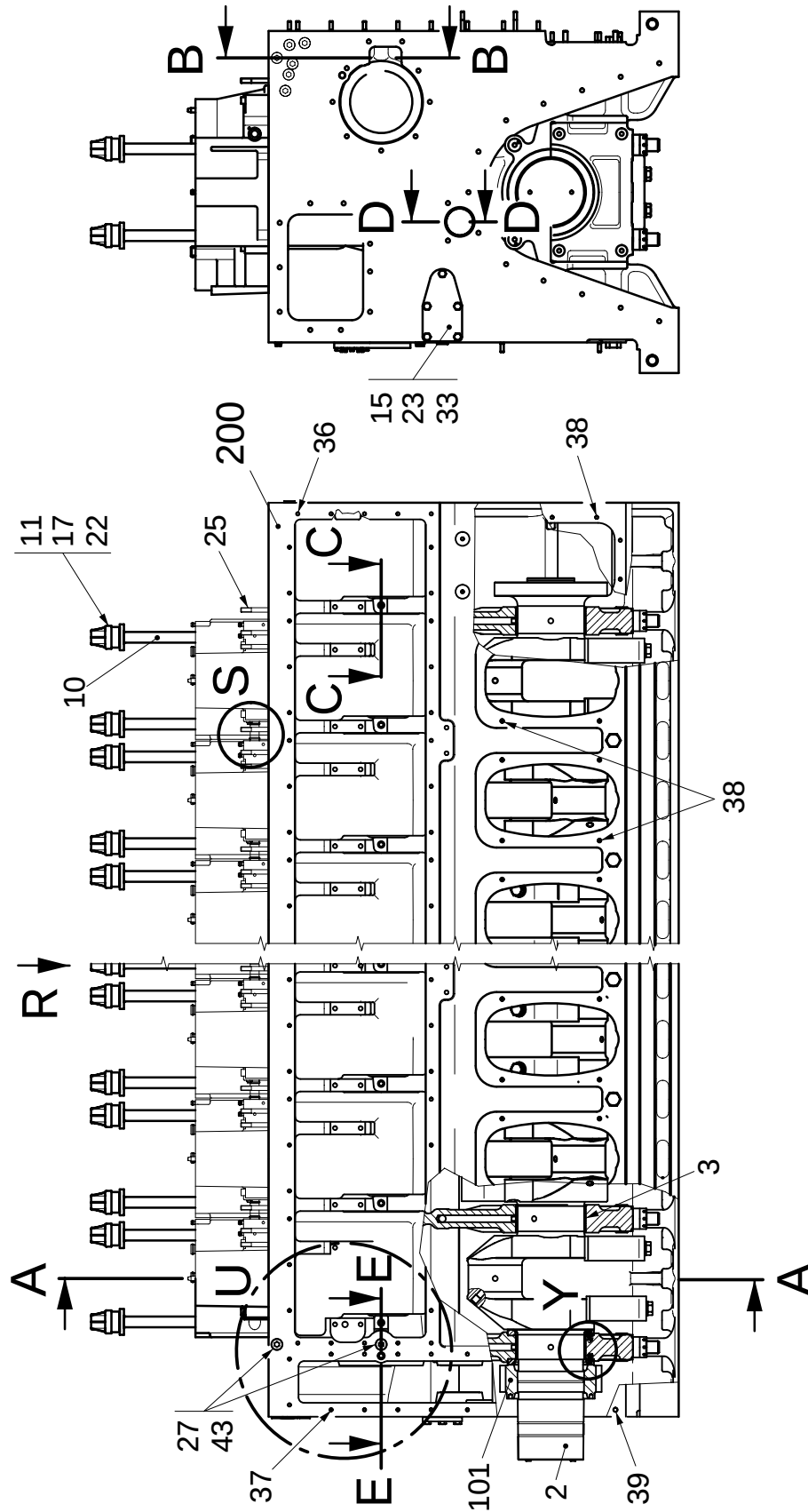
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Engine Housing

M25

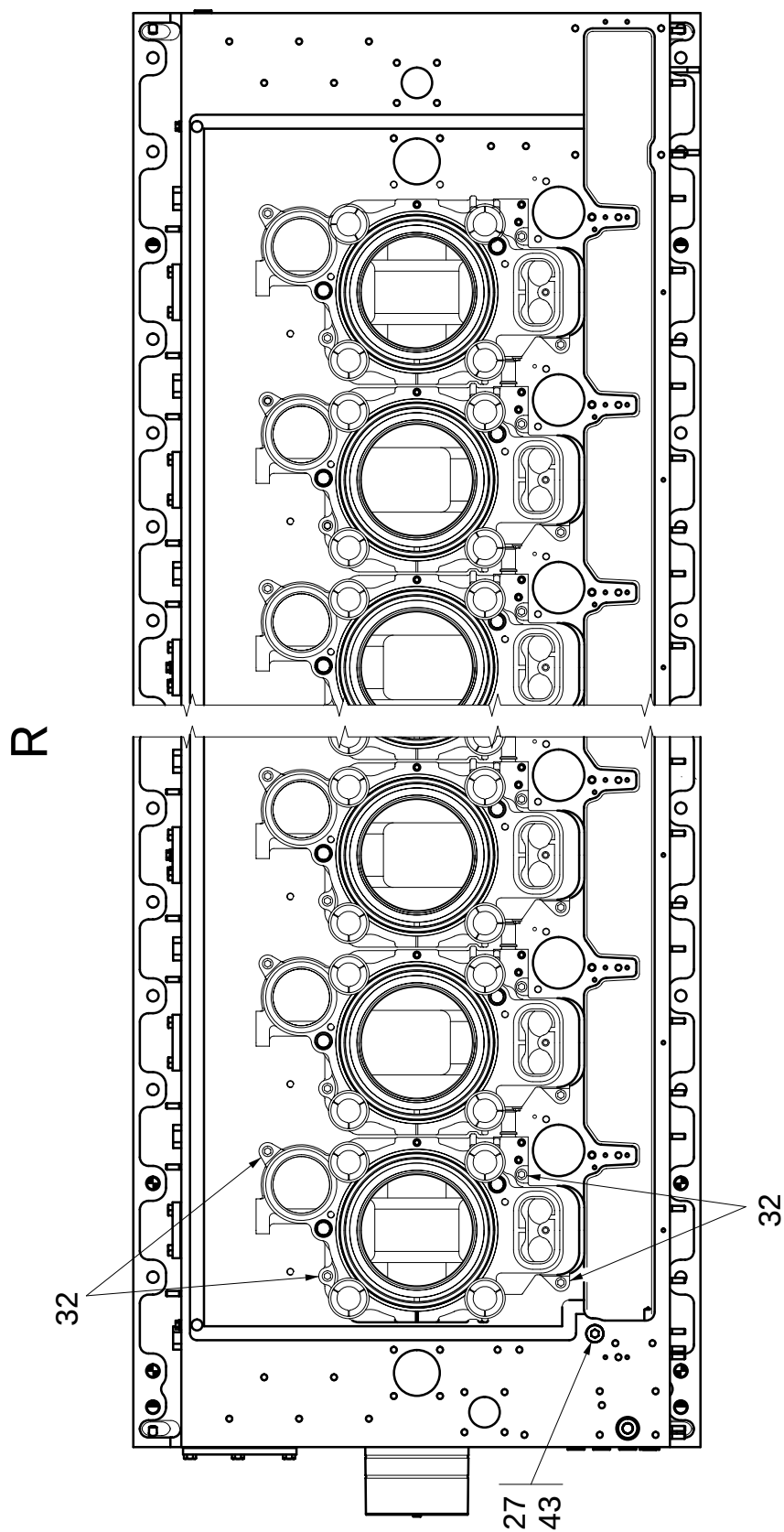
03



Engine Housing

M25

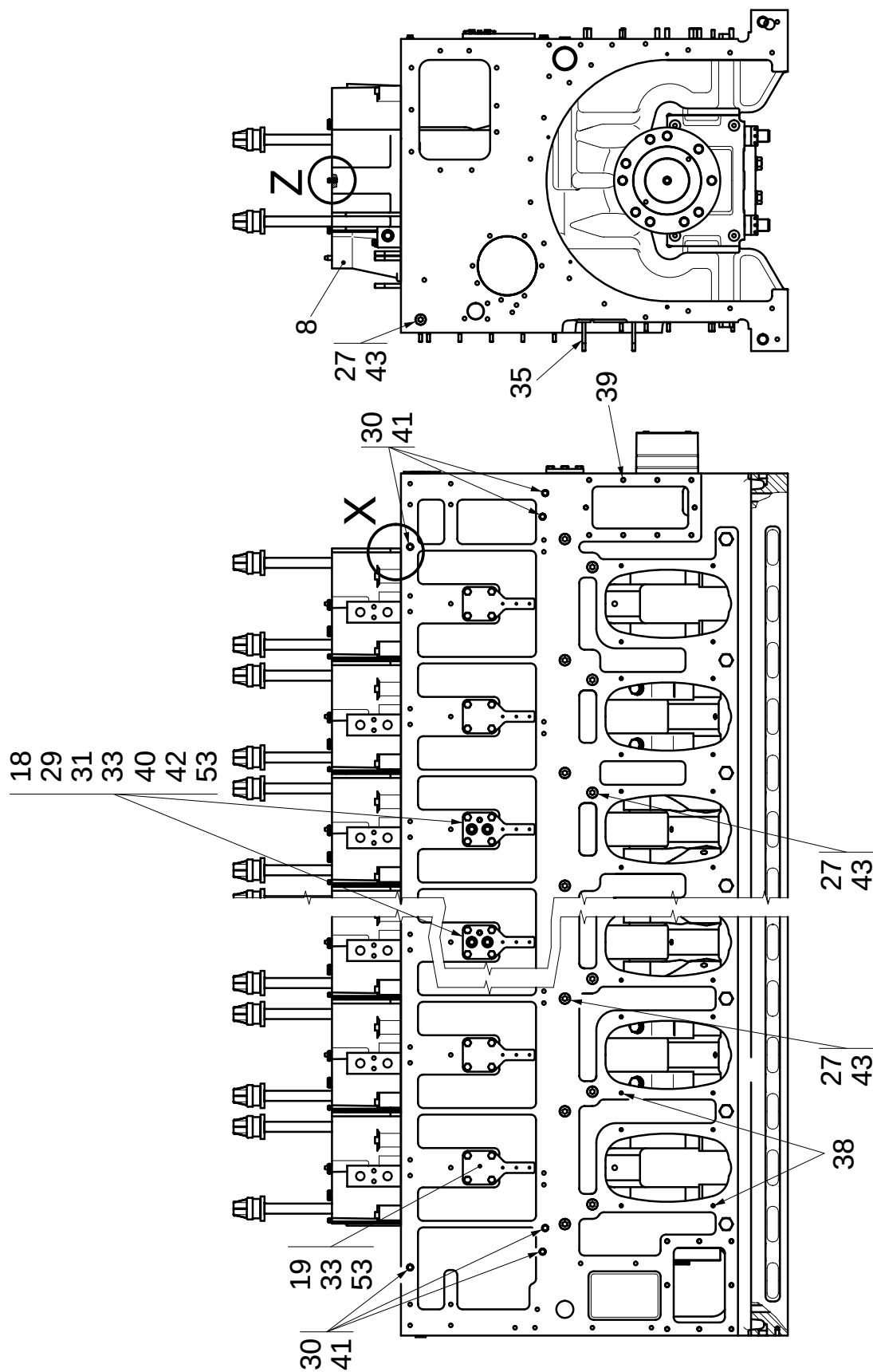
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Engine Housing

M25

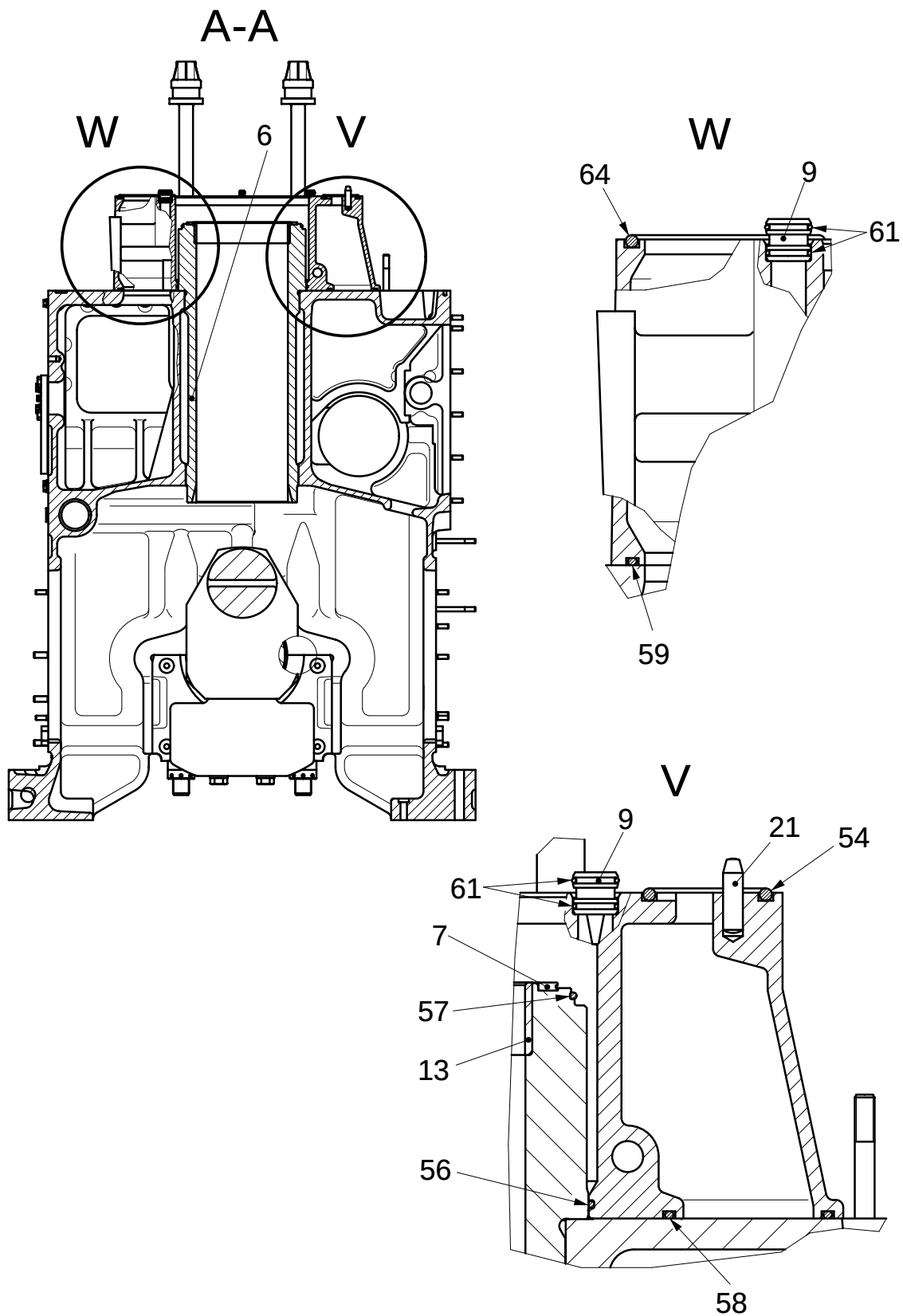
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Engine Housing

M25

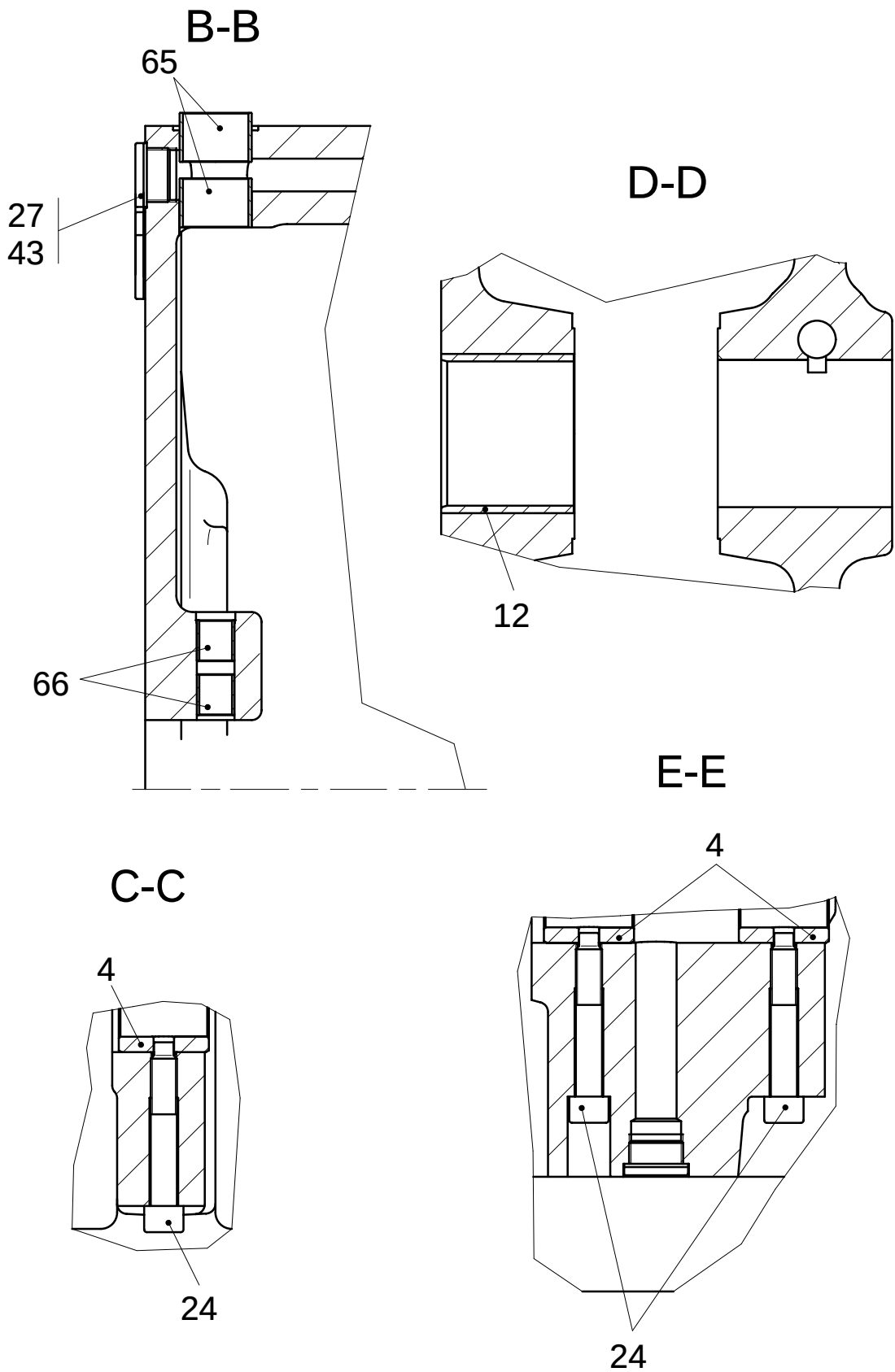
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Engine Housing

M25

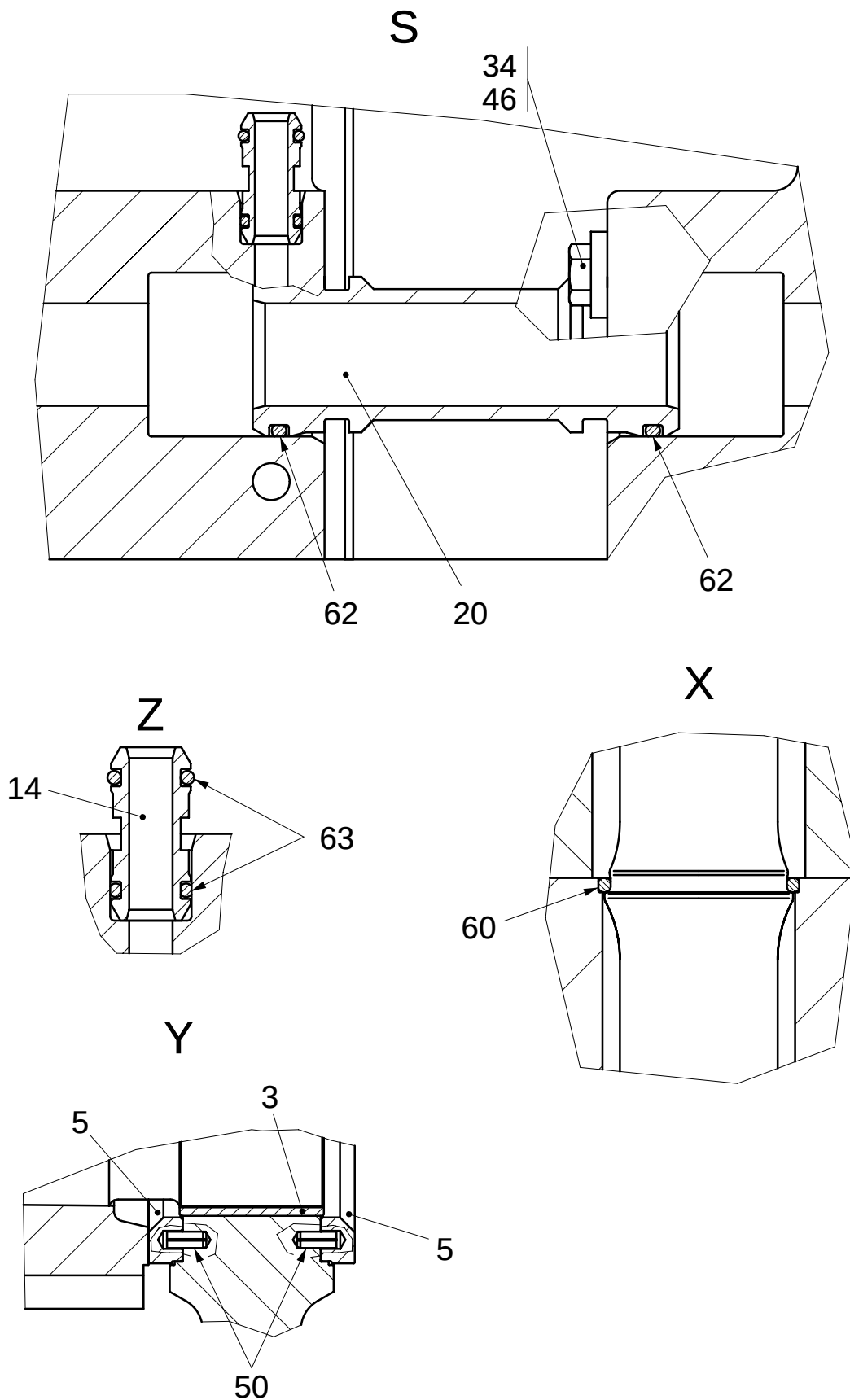
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Engine Housing

M25

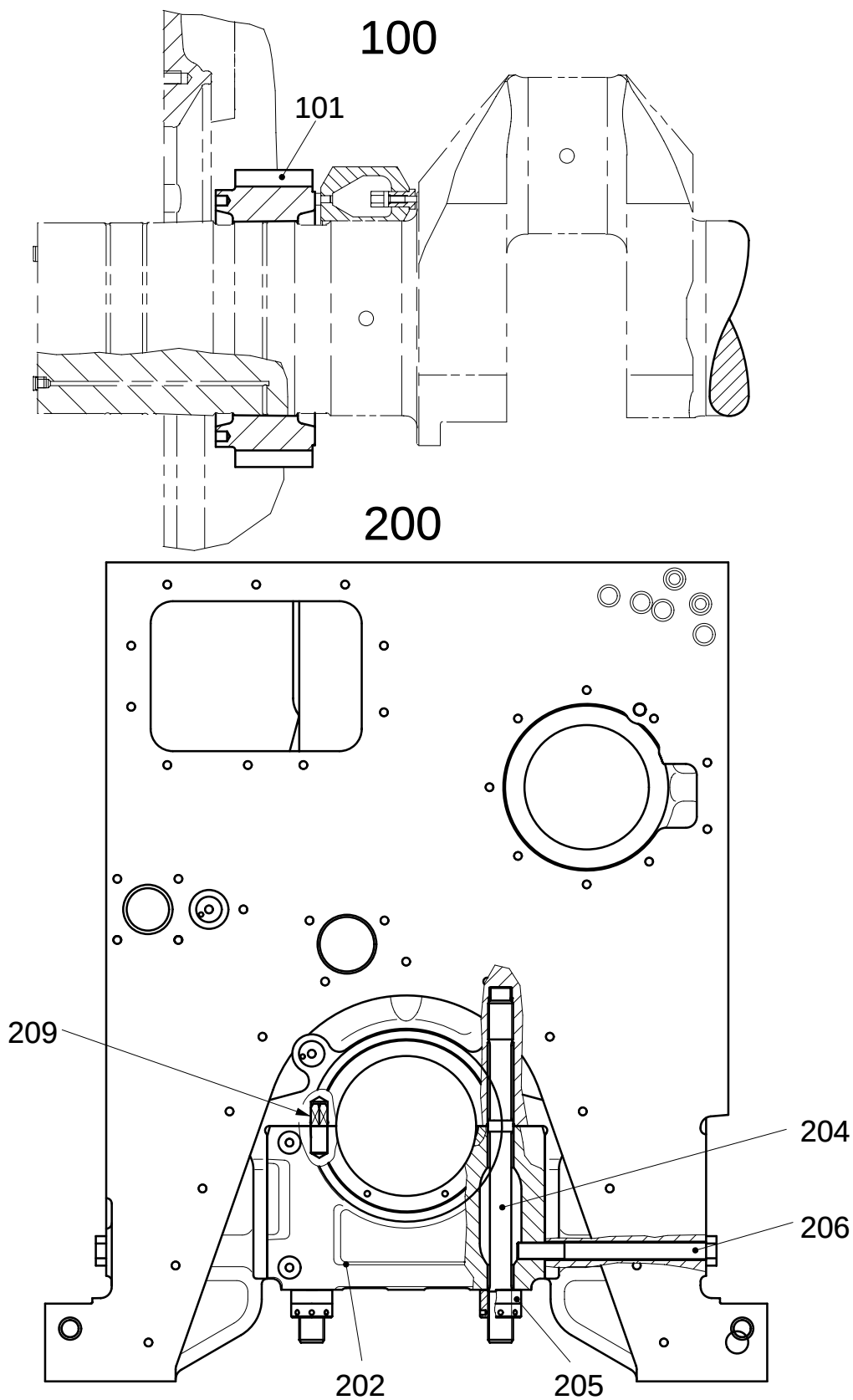
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Engine Housing

M25

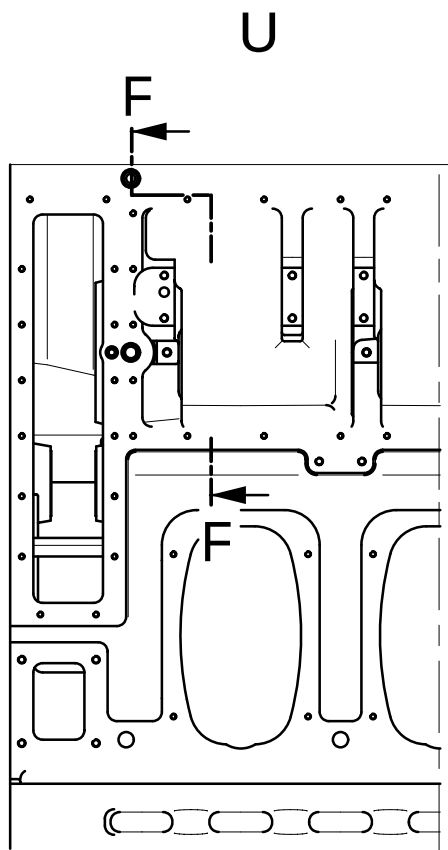
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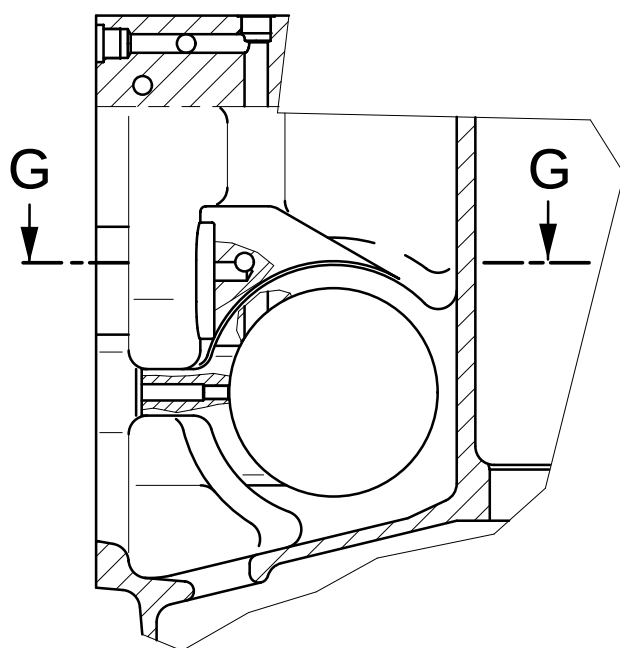
Engine Housing

M25

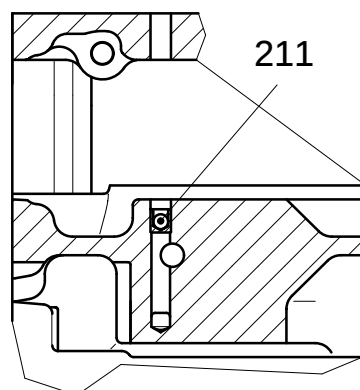
03



F-F



G-G



Engine Housing

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ZYLINDERKURBELGEHÄUSE, VOLLST. ENGINE HOUSING ASSEMBLY	1	251110 BB
2	KURBELWELLE, VOLLST. CRANKSHAFT, COMPL.	1	SIEHE B1.05.02.252510 SEE B1.05.02.252510
3	SPIELLAGER NORMAL BEARING	9	251110-003
4	NOCKENWELLENLAGER CAMSHAFT BEARING	10	251110-004
5	ANLAUFSCHEIBE THRUST WASHER	2	251110-005
6	ZYLINDERBUCHSE CYLINDER LINER	8	SIEHE B1.05.03.251611 SEE B1.05.03.251611
7	DICHTRING JOINT RING	8	251110-007
8	VERTEILERGEHÄUSE DISTRIBUTING CASE	8	251110-008
9	HÜLSE SLEEVE	16	251110-009
10	DEHNSTIFTSCHRAUBE CYLINDER HEAD STUD	32	251110-010
11	MUTTER NUT	32	251110-011
12	LAGERBUCHSE BEARING BUSH	1	251110-012
13	KALIBRIERRING CALIBRATION INSERT	8	251110-013
14	HÜLSE SLEEVE	16	251110-014
15	DICHTUNG GASKET	# 1	251110-015
17	SCHUTZKAPPE PROTECTING COVER	32	251110-017
18	GEWINDEFLANSCH FLANGE	2	251110-018
19	FLANSCH FLANGE	6	251110-019
20	HÜLSE SLEEVE	7	251110-020

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Engine Housing

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	ZYLINDERSTIFT DOWEL PIN	8	9.1110-022
22	SCHEIBE WASHER	32	251110-022
23	DECKEL COVER	1	251110-023
24	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	10	1.1152-715
25	STIFTSCHRAUBE STUD	24	1.1247-504
27	VERSCHLUSSSCHRAUBE SCREW PLUG	27	1.1040-245
29	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-609
30	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	6	1.1041-805
31	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-227
32	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	32	1.1158-214
33	SECHSKANTSCHRAUBE HEXAGON SCREW	37	1.1387-444
34	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-304
35	STIFTSCHRAUBE STUD	4	1.1234-270
36	STIFTSCHRAUBE STUD	62	1.1247-253
37	STIFTSCHRAUBE STUD	16	1.1247-257
38	STIFTSCHRAUBE STUD	74	1.1234-255
39	STIFTSCHRAUBE STUD	22	1.1234-357
40	DICHTRING JOINT RING	# 2	1.7010-037
41	DICHTRING JOINT RING	# 6	1.7010-102

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Engine Housing

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
42	DICHTRING JOINT RING	# 4	1.7010-133
43	DICHTRING JOINT RING	# 27	1.7010-252
46	SCHEIBE WASHER	7	1.0045-125
50	SPANNSTIFT SPRING DOWEL PIN	4	1.0039-381
53	DICHTUNG GASKET	# 8	1.7073-733
54	O-RING O-RING	# 8	1.7082-909
56	O-RING O-RING	# 8	1.7082-905
57	O-RING O-RING	# 8	1.7082-904
58	O-RING O-RING	# 8	1.7082-520
59	O-RING O-RING	# 8	1.7082-907
60	O-RING O-RING	# 32	1.7084-647
61	O-RING O-RING	# 32	1.7084-643
62	O-RING O-RING	# 14	1.7084-642
63	O-RING O-RING	# 32	1.7082-232
64	O-RING O-RING	# 8	1.7082-908
65	BUCHSE BUSH	2	9.6480-109
66	BUCHSE BUSH	2	251110-066

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Engine Housing

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
100	KURBELWELLENZAHNRAD-ANBAU CRANKSHAFT GEARWHEEL MOUNTING	# 1	252530-100
101	ZAHNRAD FÜR KURBELWELLE CRANKSHAFT GEARWHEEL	1	252530-101
200	ZYLINDERKURBELGEHÄUSE ENGINE HOUSING	# 1	251111-200
202	LAGERDECKEL MAIN BEARING CAP	9	251111-202
204	DEHNSTIFTSCHRAUBE TENSION BOLT	18	251111-204
205	MUTTER NUT	18	251110-011
206	SECHSKANTSCHRAUBE HEXAGON BOLT	18	1.1372-681
209	AUFNAHMEBOLZEN BOLT	2	9.1111-209
211	EXPANDER EXPANDER	1	1.9027-007

* = IN 251110 BB ENTHALTEN
INCLUDED IN 251110 BB

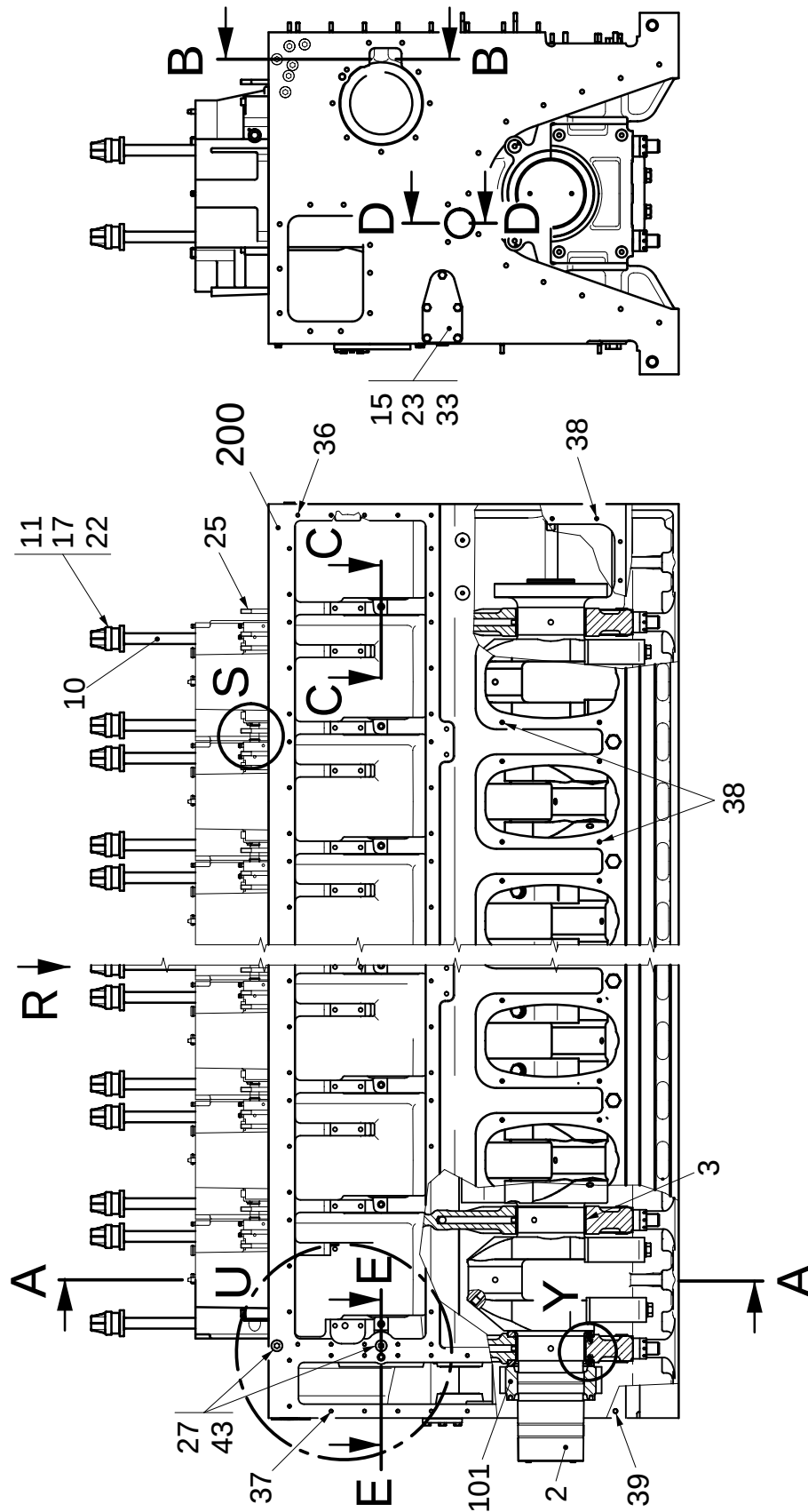
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Engine Housing

M25

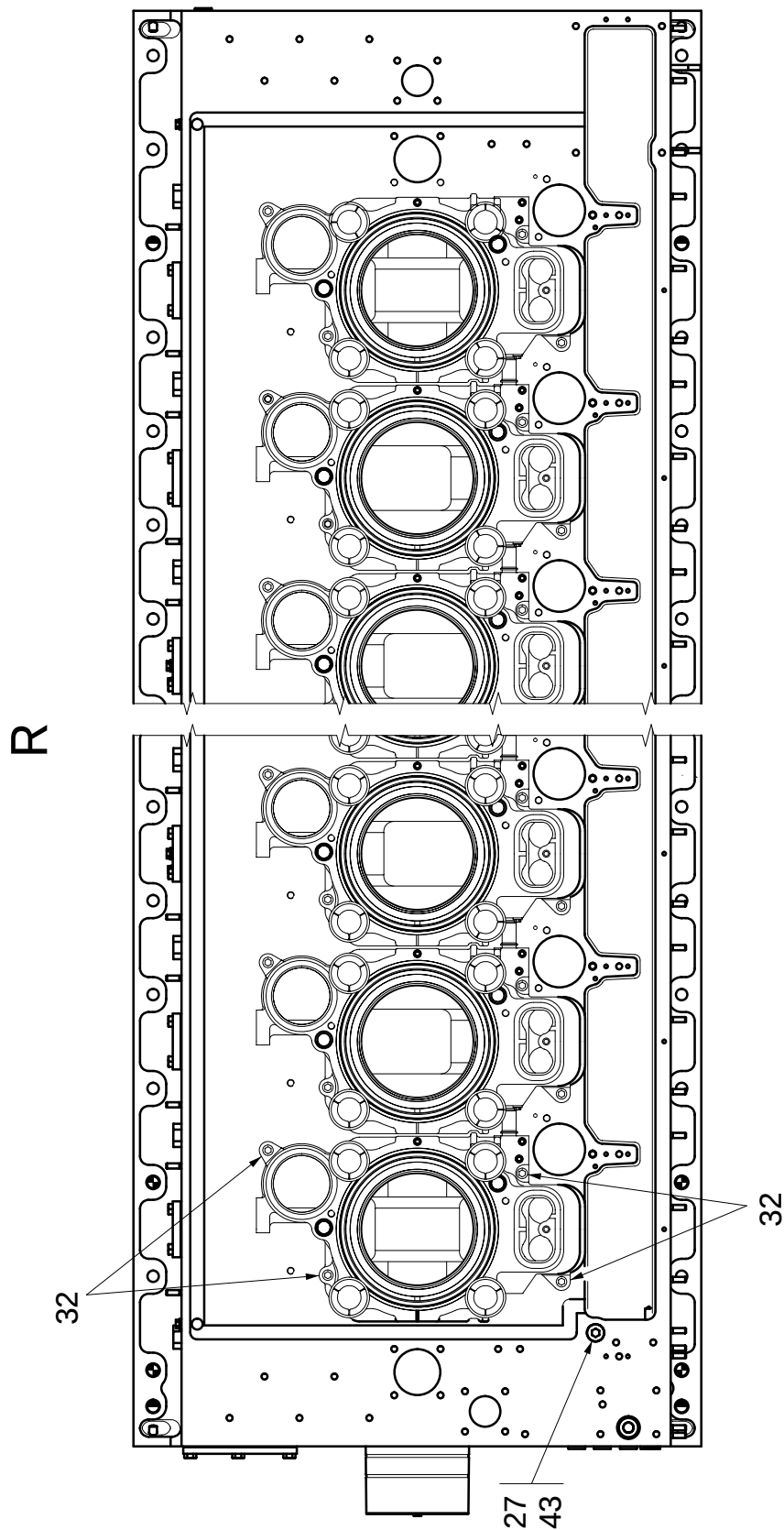
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Engine Housing

M25

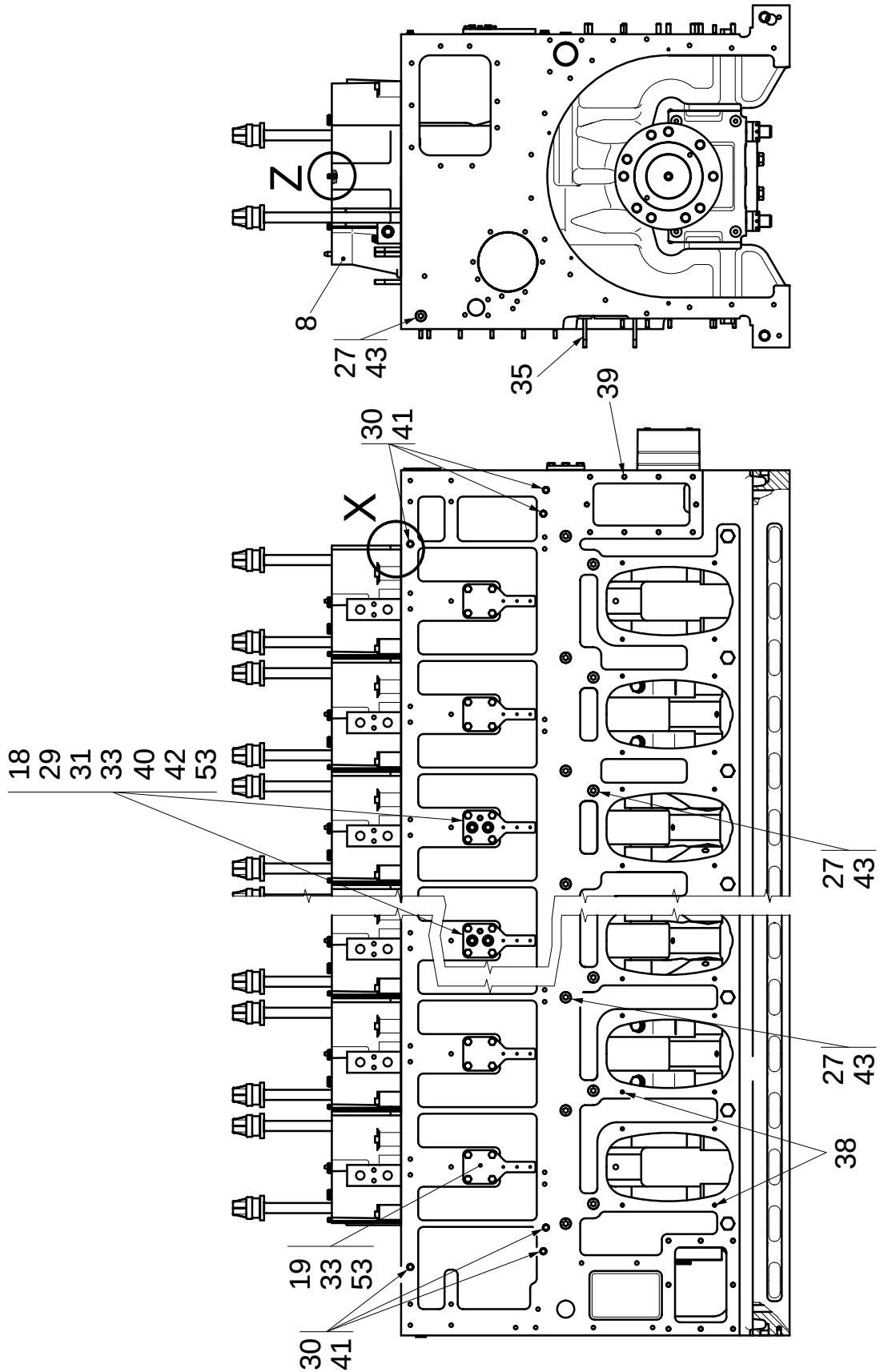
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Engine Housing

M25

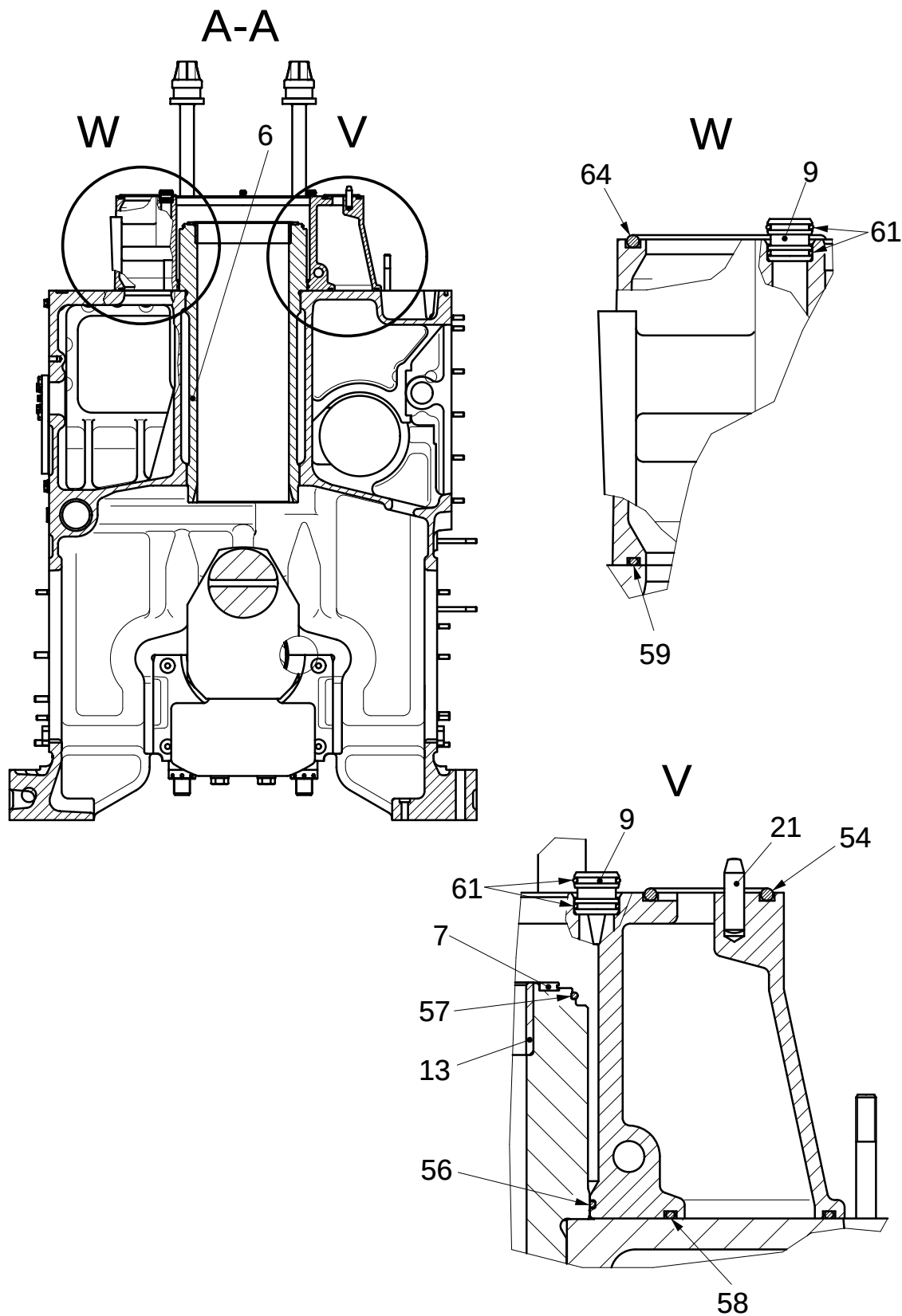
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Engine Housing

M25

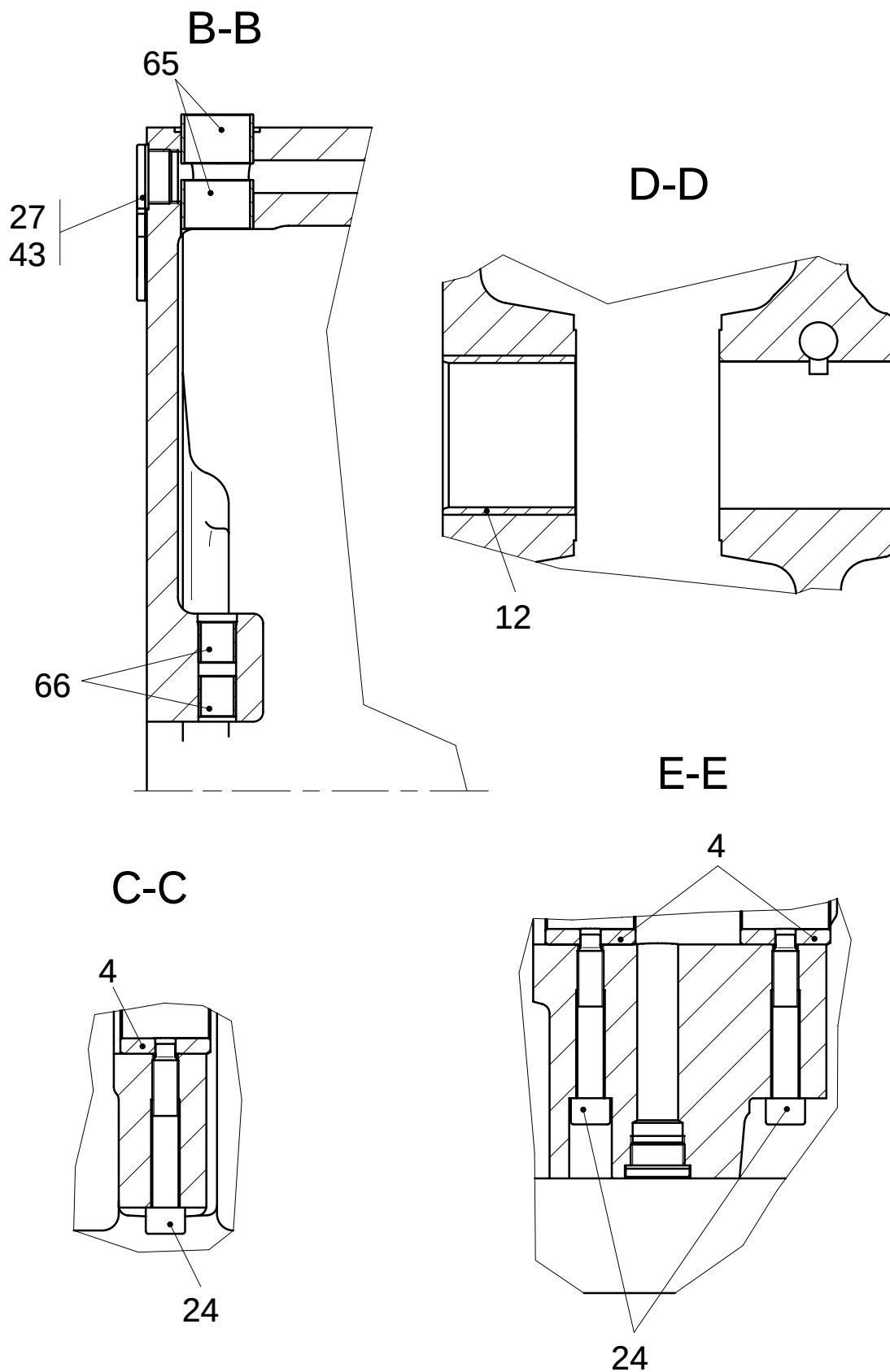
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Engine Housing

M25

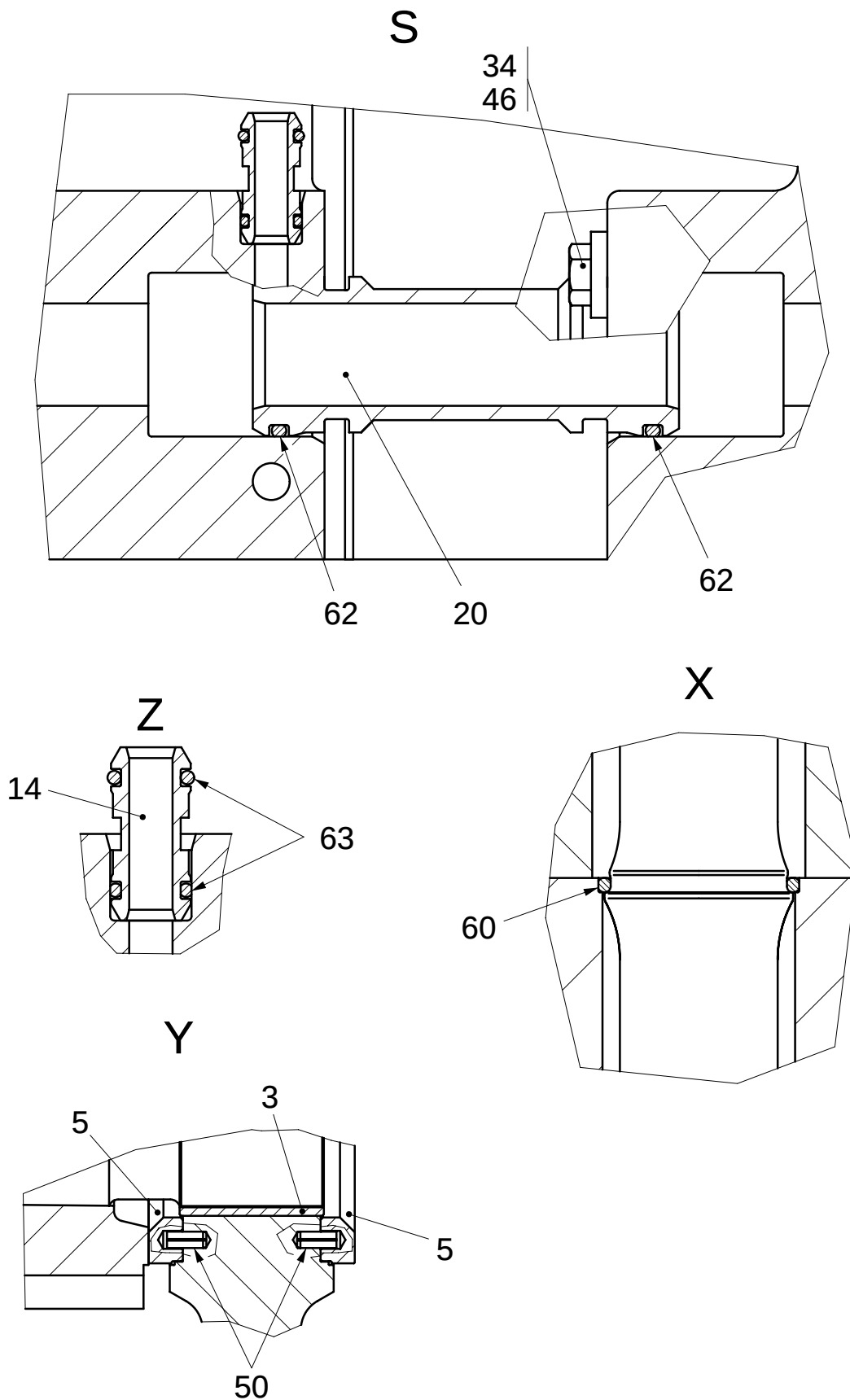
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Engine Housing

M25

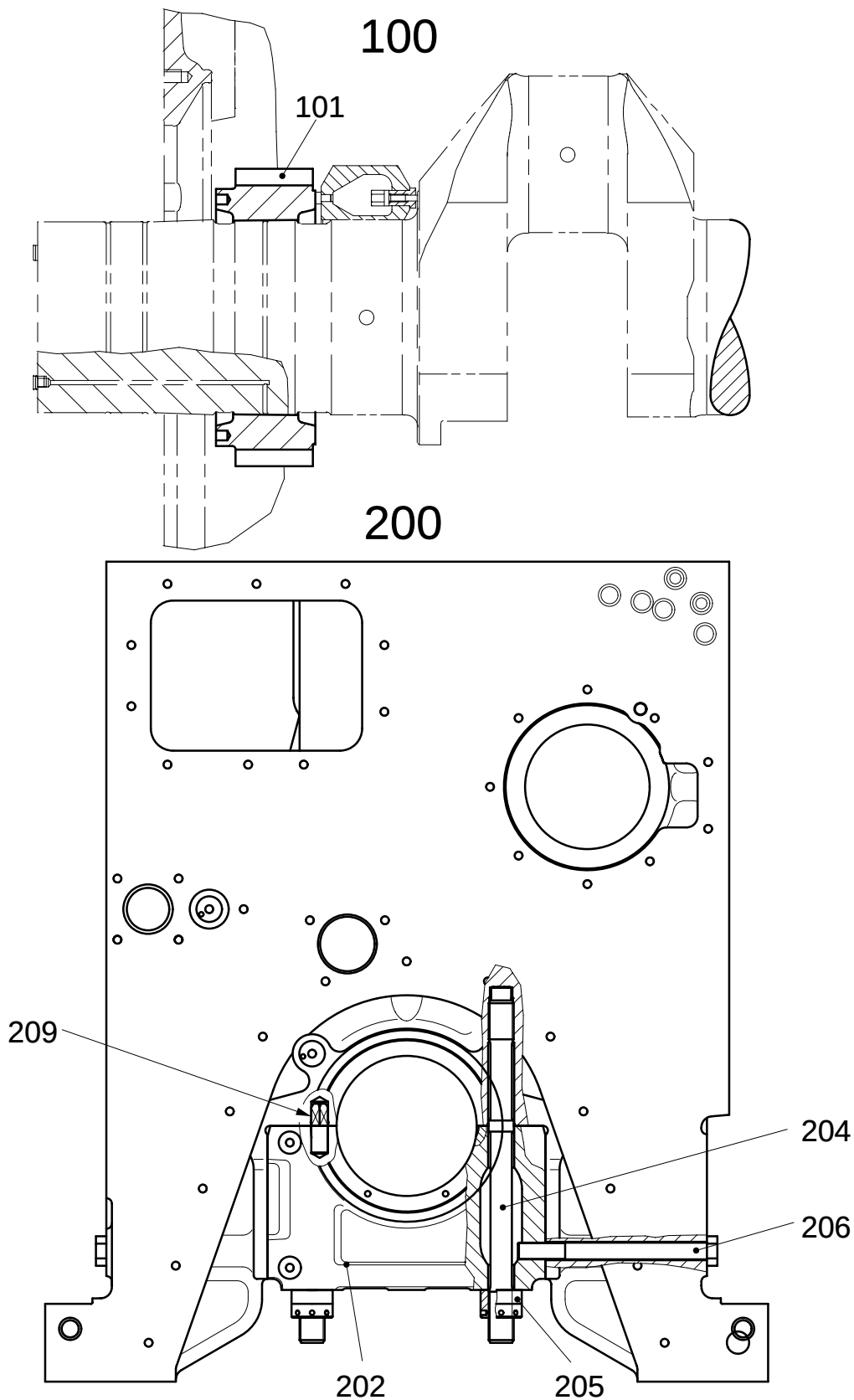
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Engine Housing

M25

03

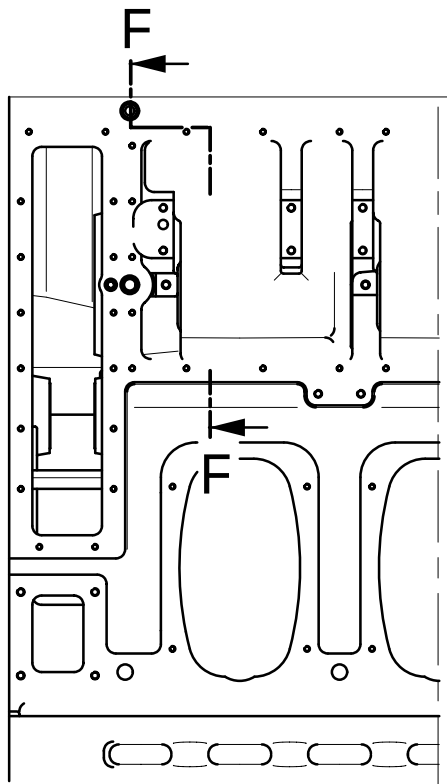


Engine Housing

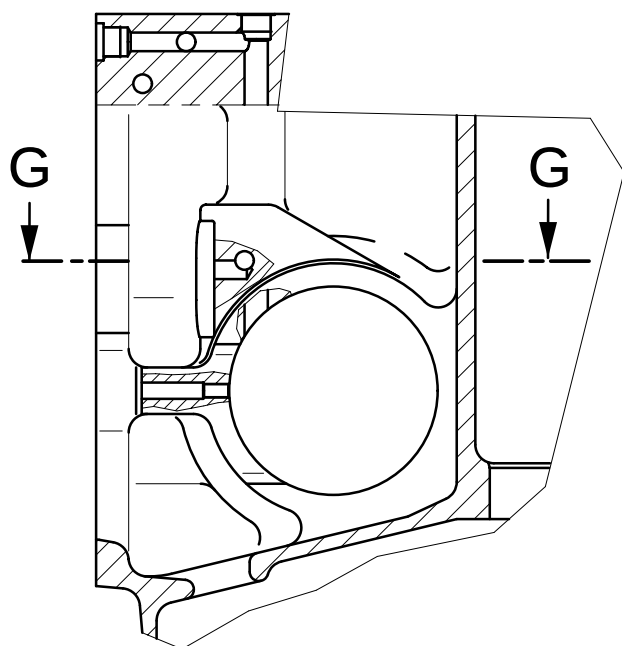
M25

03

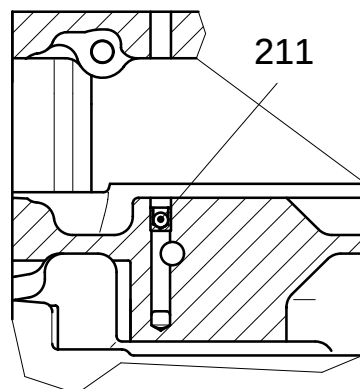
U



F-F



G-G



Engine Housing

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ZYLINDERKURBELGEHÄUSE, VOLLST. ENGINE HOUSING ASSEMBLY	1	251110 CC
2	KURBELWELLE, VOLLST. CRANKSHAFT, COMPL.	1	SIEHE B1.05.02.252510 SEE B1.05.02.252510
3	SPIELLAGER NORMAL BEARING	10	251110-003
4	NOCKENWELLENLAGER CAMSHAFT BEARING	11	251110-004
5	ANLAUFSCHEIBE THRUST WASHER	2	251110-005
6	ZYLINDERBUCHSE CYLINDER LINER	9	SIEHE B1.05.03.251611 SEE B1.05.03.251611
7	DICHTRING JOINT RING	9	251110-007
8	VERTEILERGEHÄUSE DISTRIBUTING CASE	9	251110-008
9	HÜLSE SLEEVE	18	251110-009
10	DEHNSTIFTSCHRAUBE CYLINDER HEAD STUD	36	251110-010
11	MUTTER NUT	36	251110-011
12	LAGERBUCHSE BEARING BUSH	1	251110-012
13	KALIBRIERING CALIBRATION INSERT	9	251110-013
14	HÜLSE SLEEVE	18	251110-014
15	DICHTUNG GASKET	# 1	251110-015
17	SCHUTZKAPPE PROTECTING COVER	36	251110-017
18	GEWINDEFLANSCH FLANGE	2	251110-018
19	FLANSCH FLANGE	7	251110-019
20	HÜLSE SLEEVE	8	251110-020

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Engine Housing

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	ZYLINDERSTIFT DOWEL PIN	9	9.1110-022
22	SCHEIBE WASHER	36	251110-022
23	DECKEL COVER	1	251110-023
24	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	11	1.1152-715
25	STIFTSCHRAUBE STUD	27	1.1247-504
27	VERSCHLUSSSCHRAUBE SCREW PLUG	29	1.1040-245
29	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-609
30	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	6	1.1041-805
31	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-227
32	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	36	1.1158-214
33	SECHSKANTSCHRAUBE HEXAGON SCREW	41	1.1387-444
34	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-304
35	STIFTSCHRAUBE STUD	4	1.1234-270
36	STIFTSCHRAUBE STUD	68	1.1247-253
37	STIFTSCHRAUBE STUD	16	1.1247-257
38	STIFTSCHRAUBE STUD	82	1.1234-255
39	STIFTSCHRAUBE STUD	22	1.1234-357
40	DICHTRING JOINT RING	# 2	1.7010-037
41	DICHTRING JOINT RING	# 6	1.7010-102

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Engine Housing

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
42	DICHTRING JOINT RING	# 4	1.7010-133
43	DICHTRING JOINT RING	# 29	1.7010-252
46	SCHEIBE WASHER	8	1.0045-125
50	SPANNSTIFT SPRING DOWEL PIN	4	1.0039-381
53	DICHTUNG GASKET	# 9	1.7073-733
54	O-RING O-RING	# 9	1.7082-909
56	O-RING O-RING	# 9	1.7082-905
57	O-RING O-RING	# 9	1.7082-904
58	O-RING O-RING	# 9	1.7082-520
59	O-RING O-RING	# 9	1.7082-907
60	O-RING O-RING	# 36	1.7084-647
61	O-RING O-RING	# 36	1.7084-643
62	O-RING O-RING	# 16	1.7084-642
63	O-RING O-RING	# 36	1.7082-232
64	O-RING O-RING	# 9	1.7082-908
65	BUCHSE BUSH	2	9.6480-109
66	BUCHSE BUSH	2	251110-066

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Engine Housing

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
100	KURBELWELLENZAHNRAD-ANBAU CRANKSHAFT GEARWHEEL MOUNTING	# 1	252530-100
101	ZAHNRAD FÜR KURBELWELLE CRANKSHAFT GEARWHEEL	1	252530-101
200	ZYLINDERKURBELGEHÄUSE ENGINE HOUSING	# 1	251111-200
202	LAGERDECKEL MAIN BEARING CAP	10	251111-202
204	DEHNSTIFTSCHRAUBE TENSION BOLT	20	251111-204
205	MUTTER NUT	20	251110-011
206	SECHSKANTSCHRAUBE HEXAGON BOLT	20	1.1372-681
209	AUFNAHMEBOLZEN BOLT	2	9.1111-209
211	EXPANDER EXPANDER	1	1.9027-007

* = IN 251110 CC ENTHALTEN
INCLUDED IN 251110 CC

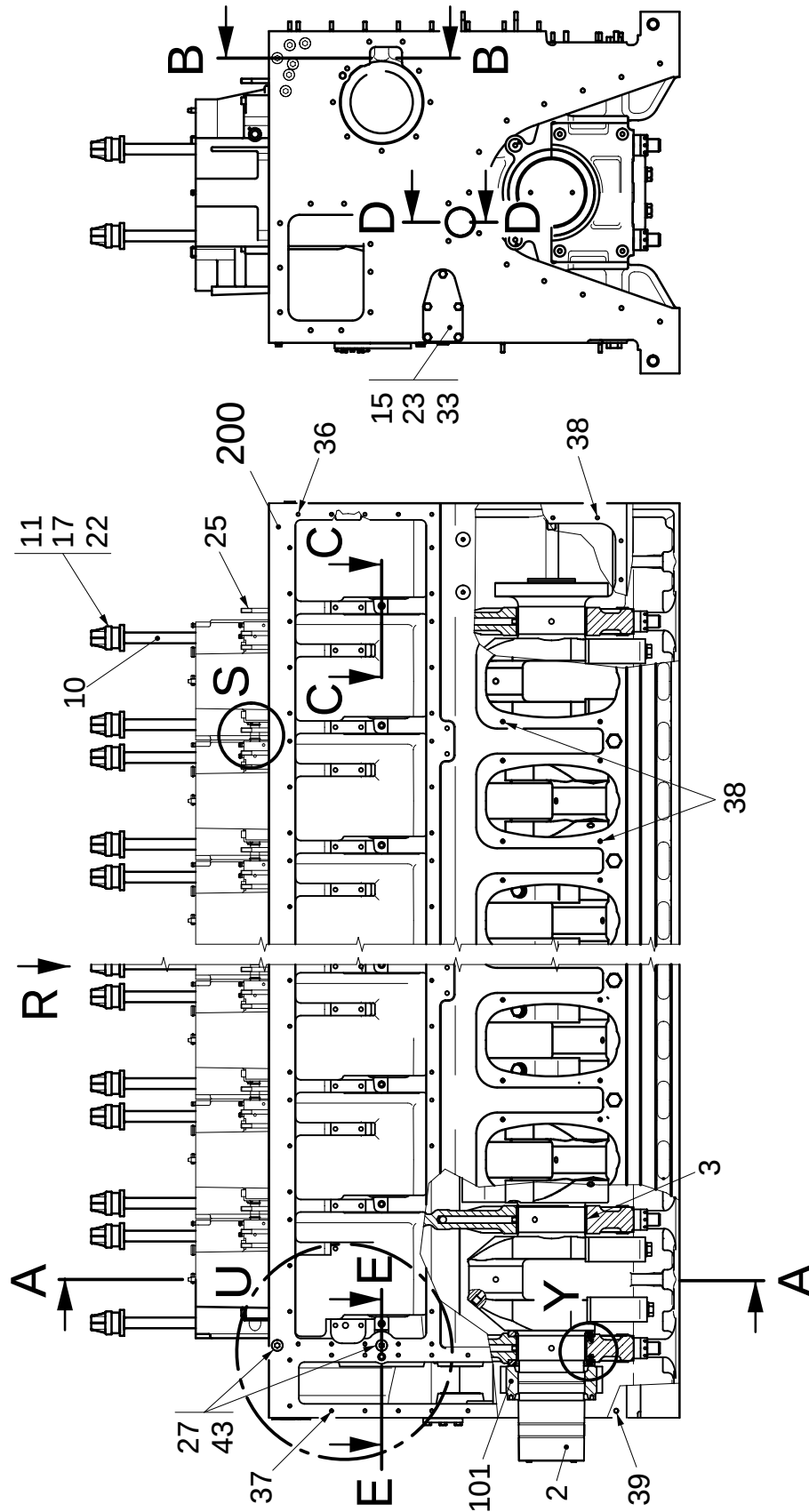
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Engine Housing

M25

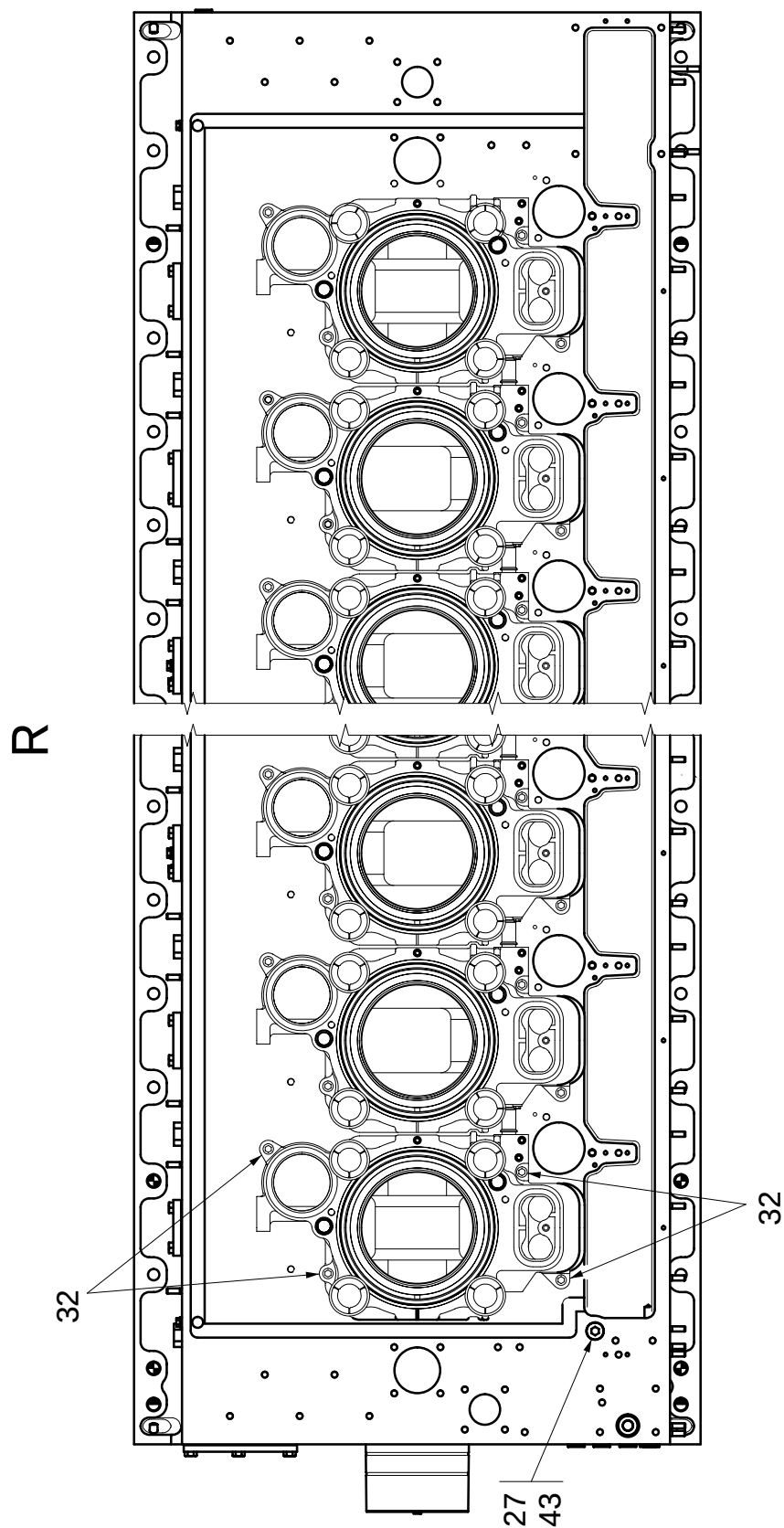
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Engine Housing

M25

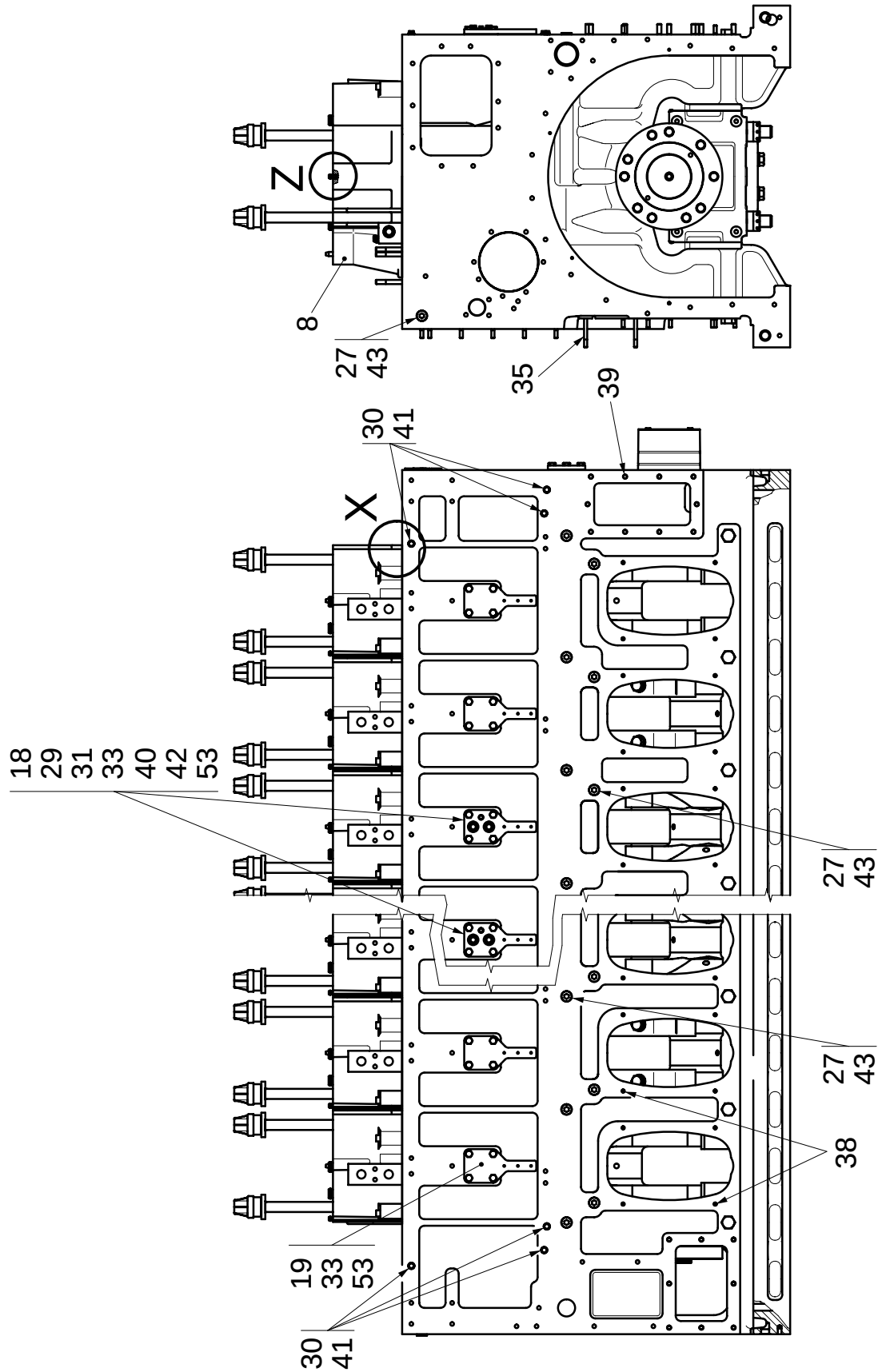
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Engine Housing

M25

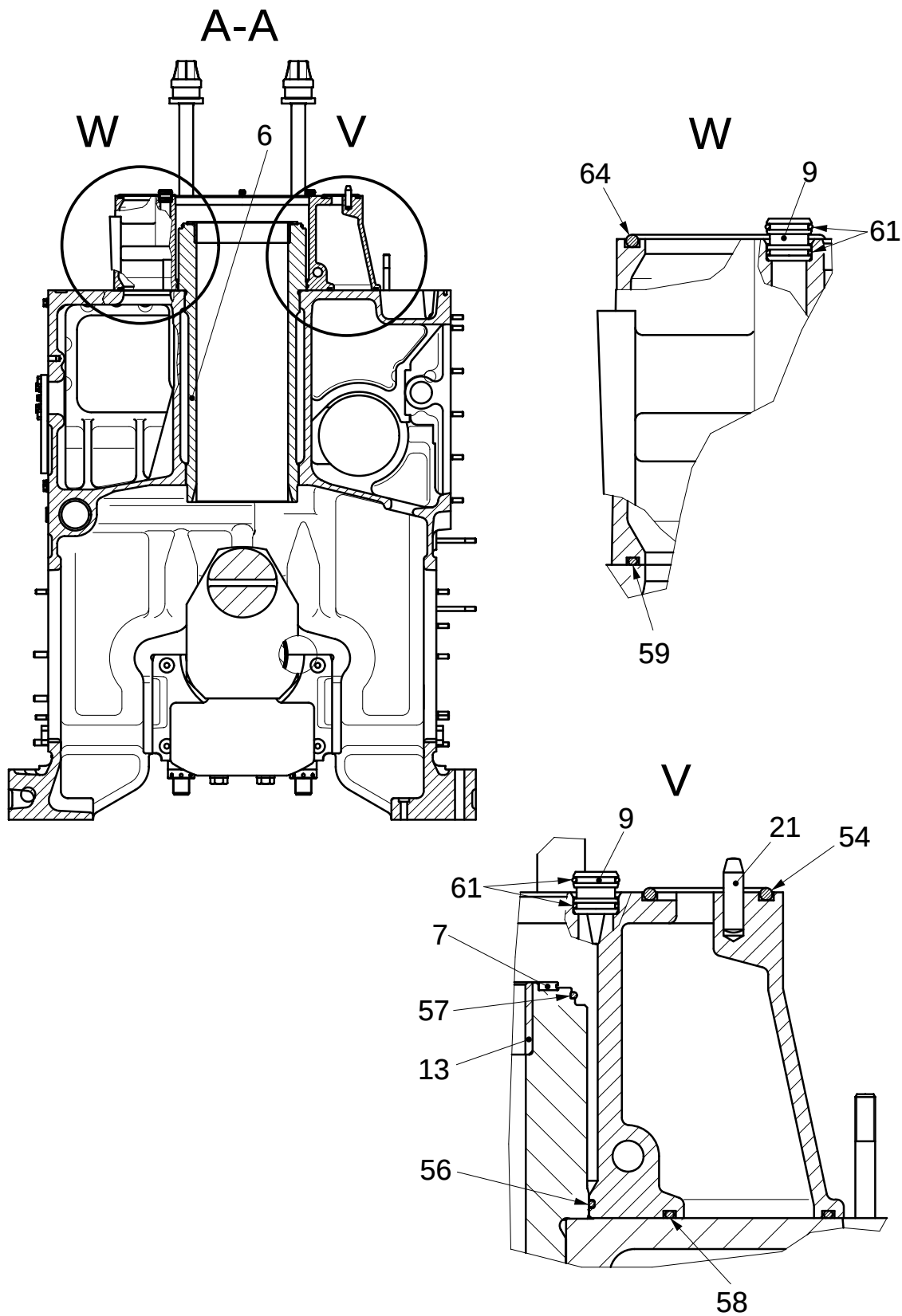
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Engine Housing

M25

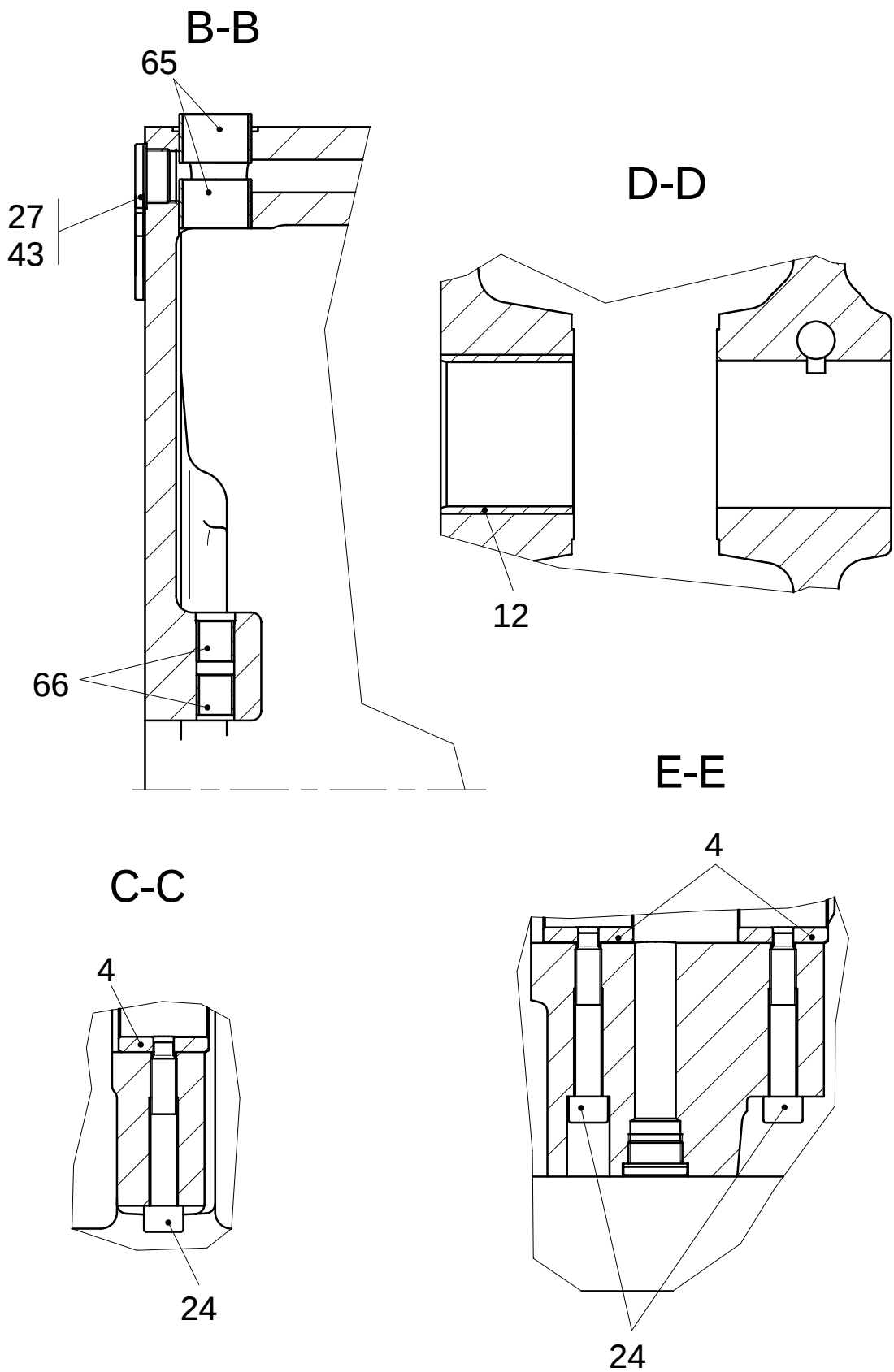
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Engine Housing

M25

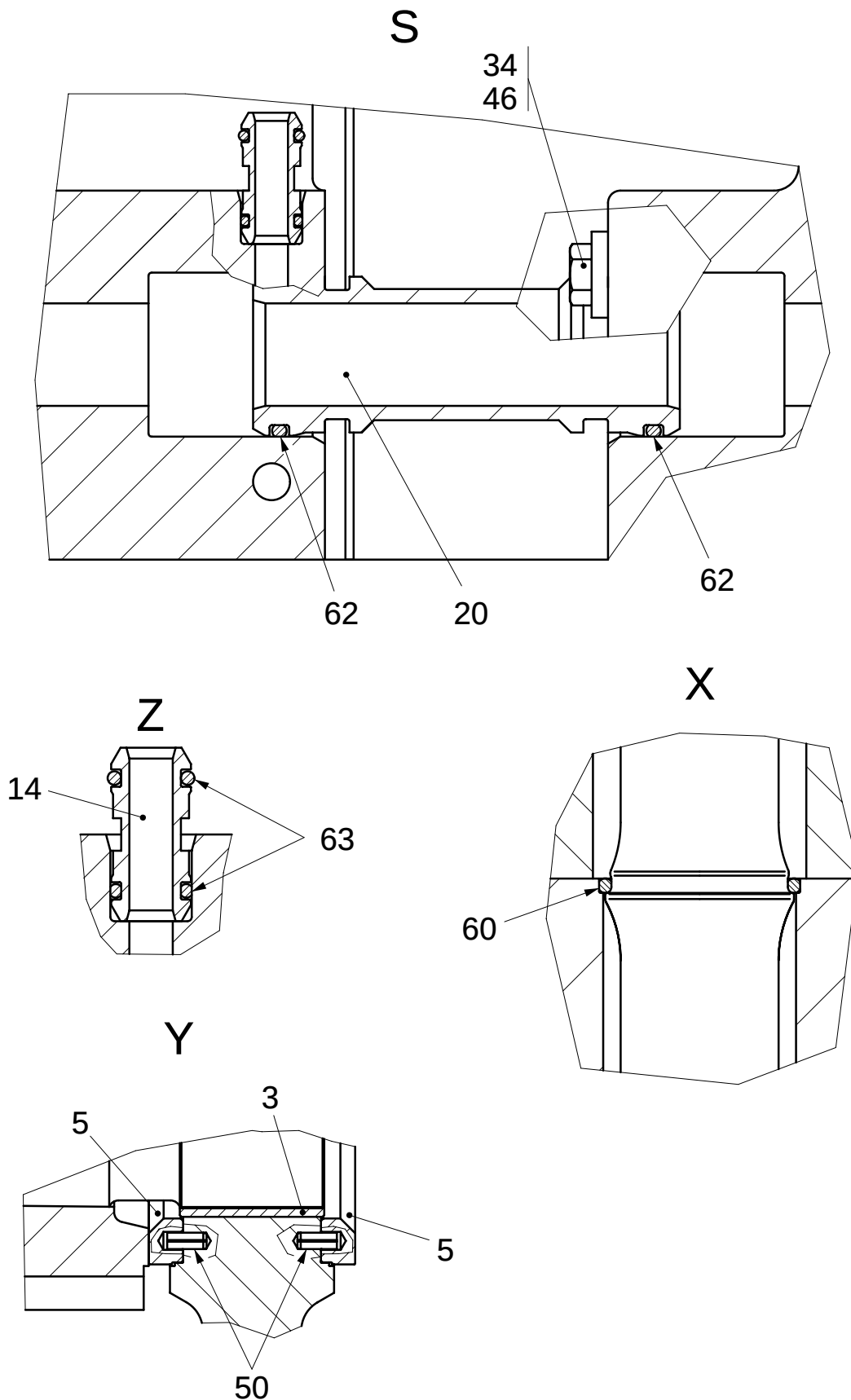
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Engine Housing

M25

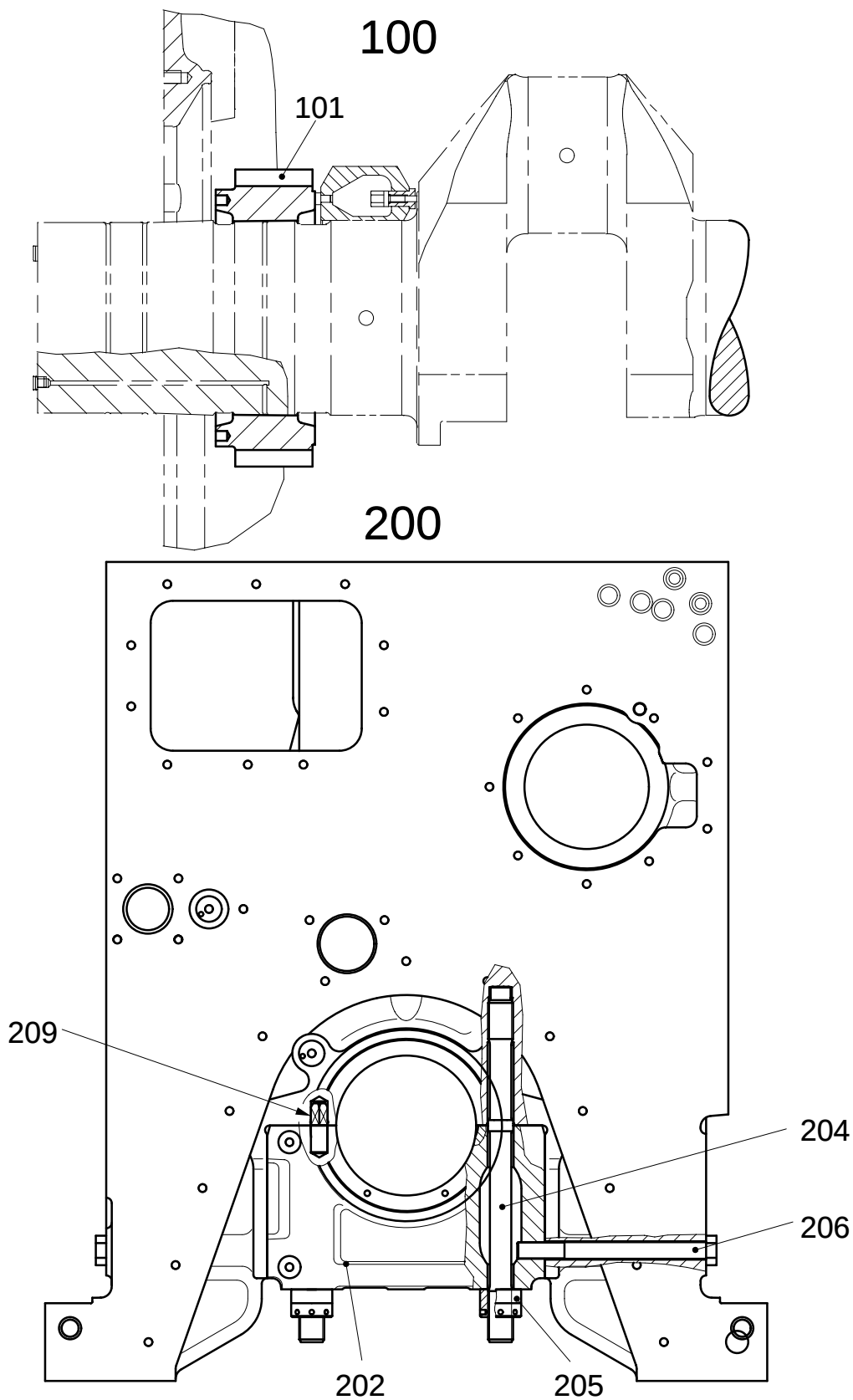
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Engine Housing

M25

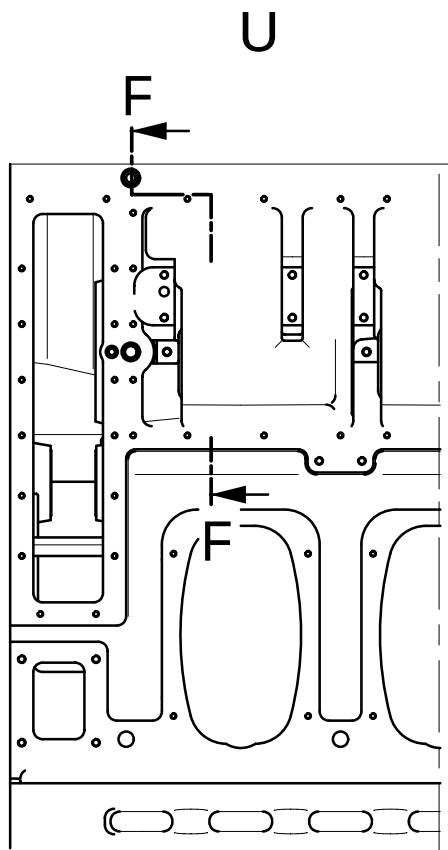
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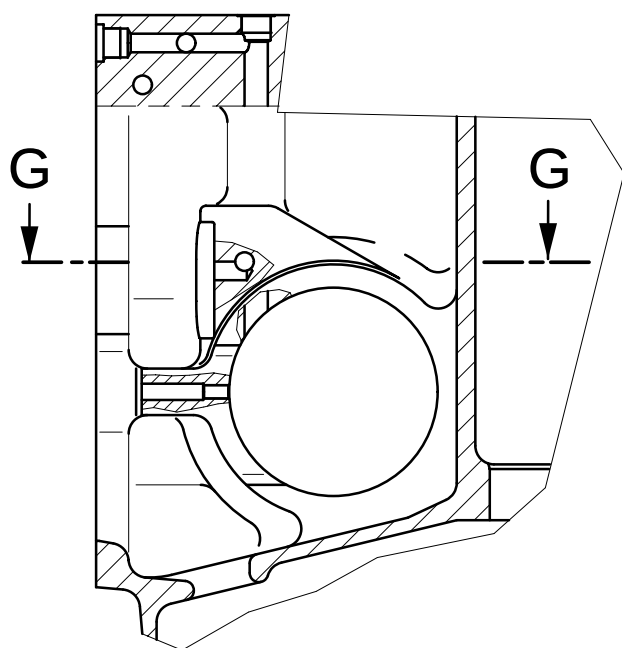
Engine Housing

M25

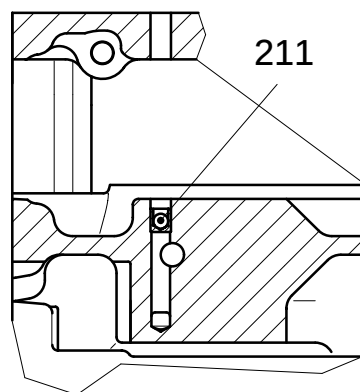
03



F-F



G-G



Engine Housing Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	VERKLEIDUNG, VOLLST. COVERS ASSEMBLY	1	251112 AA
1	NOCKENWELLEDECKEL, VOLLST. CAMSHAFT COVER, COMPL.	1	251112-001
2	GEHÄUSEDECKEL, VOLLST. CRANKCASE COVER, COMPL.	6	SIEHE B1.05.03.7.1630 SEE B1.05.03.7.1630
3	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	6	SIEHE B1.05.03.251633 SEE B1.05.03.251633
4	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	6	SIEHE B1.05.03.1.1630 SEE B1.05.03.1.1630
5	DECKEL COVER	1	251112-005
7	DECKEL COVER	1	251112-007
9	DECKEL COVER	1	251112-009
10	DECKEL COVER	1	251112-010
12	DECKEL COVER	1	251112-012
14	DICHTUNG GASKET	# 1	251112-014
17	DICHTUNG GASKET	# 1	251112-017
19	DICHTUNG GASKET	# 1	251112-119
20	DICHTUNG GASKET	# 2	251112-020
21	DICHTUNG GASKET	# 2	251112-021
24	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-444
26	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	146	1.2035-032
27	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	12	1.2035-008

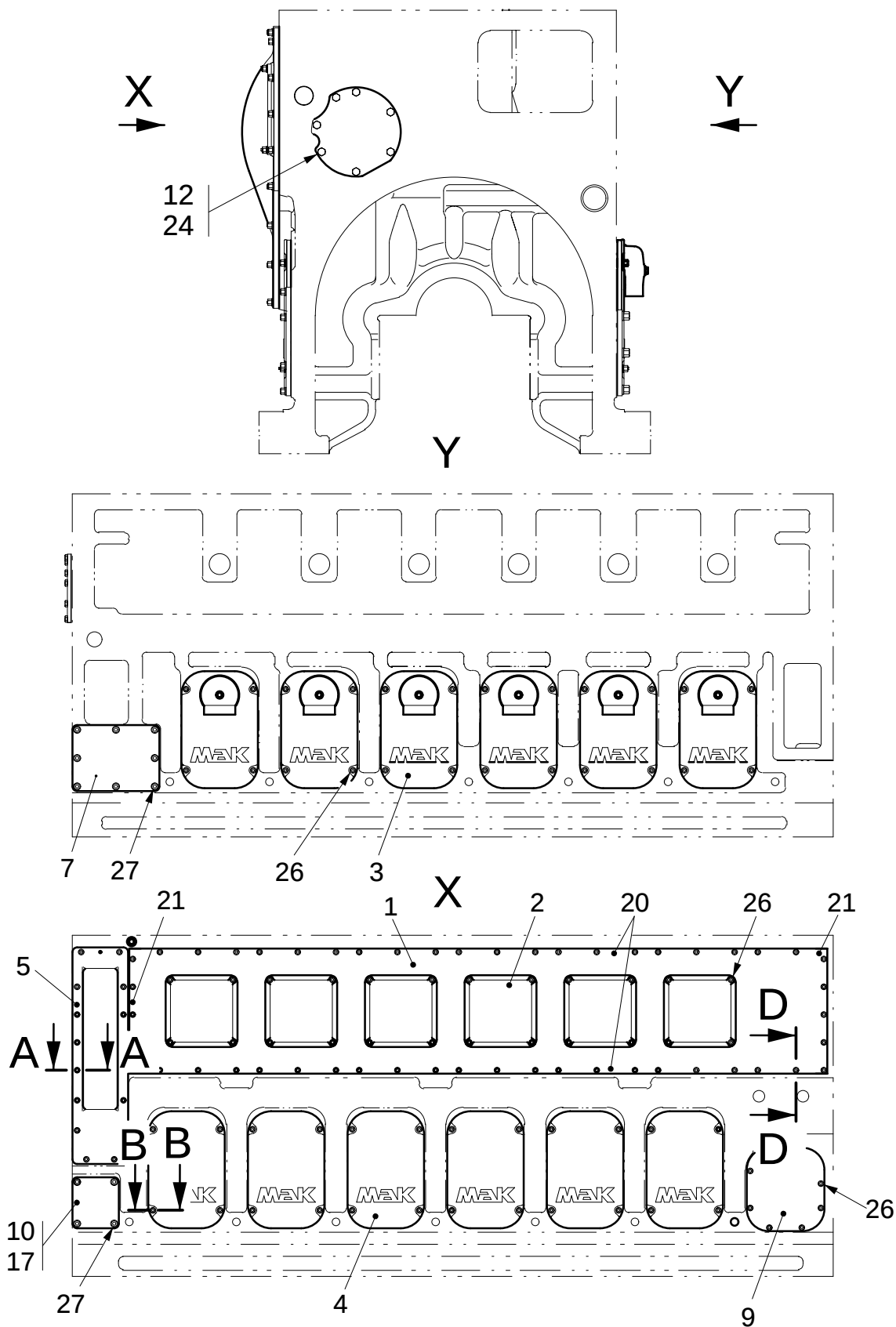
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Engine Housing Covers

M25

03

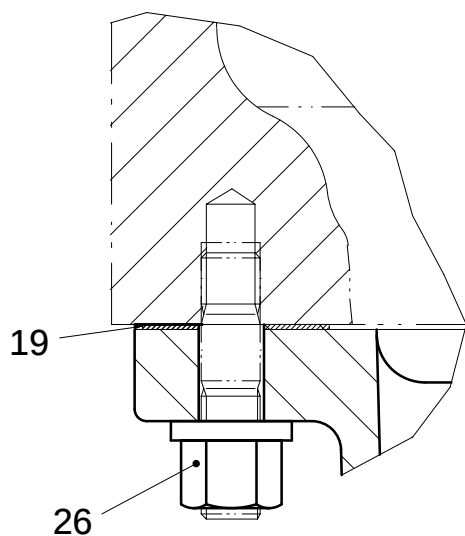


Engine Housing Covers

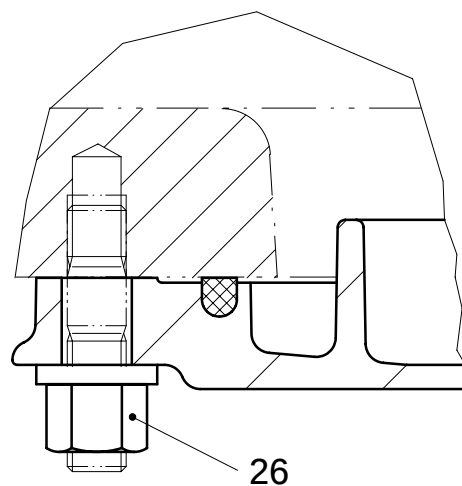
M25

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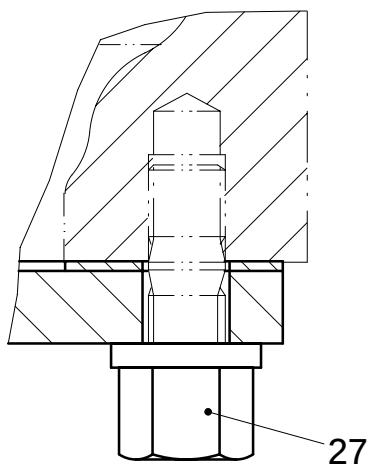
A-A



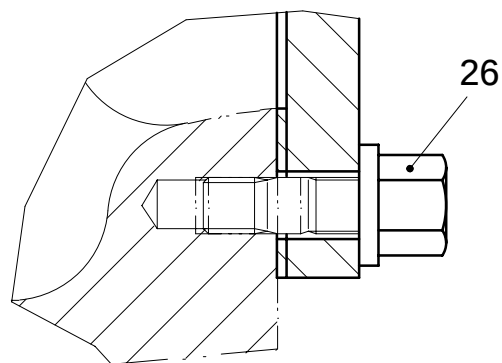
B-B



C-C



D-D



Engine Housing Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	VERKLEIDUNG, VOLLST. COVERS ASSEMBLY	1	251112 BB
1	NOCKENWELLEDECKEL, VOLLST. CAMSHAFT COVER, COMPL.	1	251112-001
2	GEHÄUSEDECKEL, VOLLST. CRANKCASE COVER, COMPL.	8	SIEHE B1.05.03.7.1630 SEE B1.05.03.7.1630
3	TRIEBRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	8	SIEHE B1.05.03.251633 SEE B1.05.03.251633
4	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	8	SIEHE B1.05.03.1.1630 SEE B1.05.03.1.1630
5	DECKEL COVER	1	251112-005
7	DECKEL COVER	1	251112-007
9	DECKEL COVER	1	251112-009
10	DECKEL COVER	1	251112-010
12	DECKEL COVER	1	251112-012
17	DICHTUNG GASKET	# 1	251112-017
19	DICHTUNG GASKET	# 1	251112-019
20	DICHTUNG GASKET	# 2	251112-020
21	DICHTUNG GASKET	# 2	251112-021
24	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-444
26	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	182	1.2035-032
27	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	12	1.2035-008

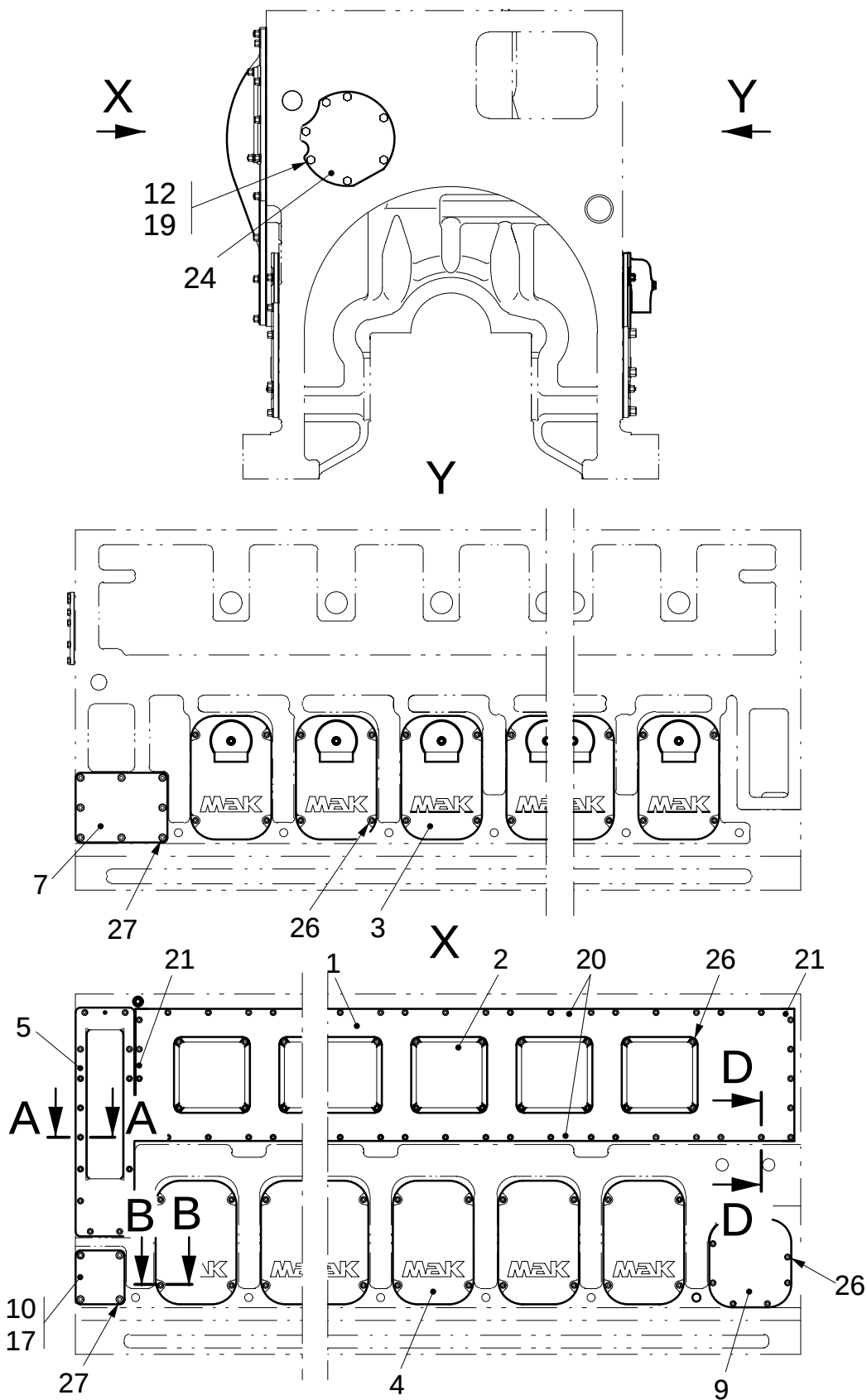
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Engine Housing Covers

M25

03

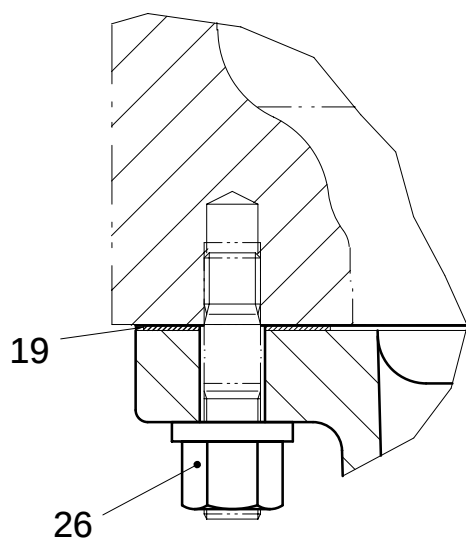


Engine Housing Covers

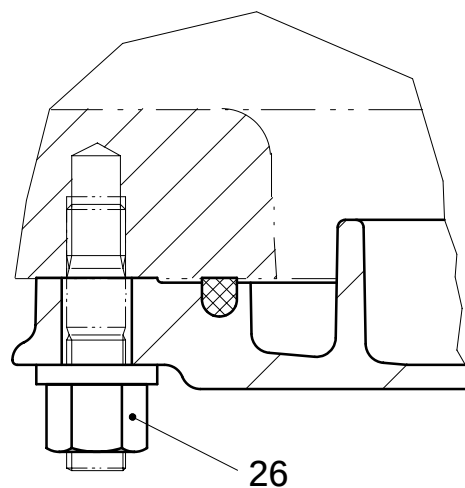
M25

03

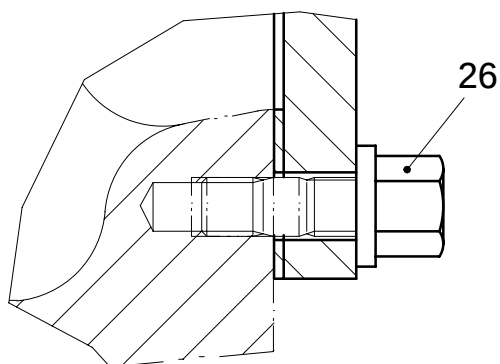
A-A



B-B



D-D



Engine Housing Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	VERKLEIDUNG, VOLLST. COVERS ASSEMBLY	1	251112 CC
1	NOCKENWELLEDECKEL, VOLLST. CAMSHAFT COVER, COMPL.	1	251112-001
2	GEHÄUSEDECKEL, VOLLST. CRANKCASE COVER, COMPL.	9	SIEHE B1.05.03.7.1630 SEE B1.05.03.7.1630
3	TRIEBRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	9	SIEHE B1.05.03.251633 SEE B1.05.03.251633
4	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	9	SIEHE B1.05.03.1.1630 SEE B1.05.03.1.1630
5	DECKEL COVER	1	251112-005
7	DECKEL COVER	1	251112-007
9	DECKEL COVER	1	251112-009
10	DECKEL COVER	1	251112-010
12	DECKEL COVER	1	251112-012
17	DICHTUNG GASKET	# 1	251112-017
19	DICHTUNG GASKET	# 1	251112-119
20	DICHTUNG GASKET	# 2	251112-020
21	DICHTUNG GASKET	# 2	251112-021
24	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-444
26	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	200	1.2035-032
27	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	12	1.2035-008

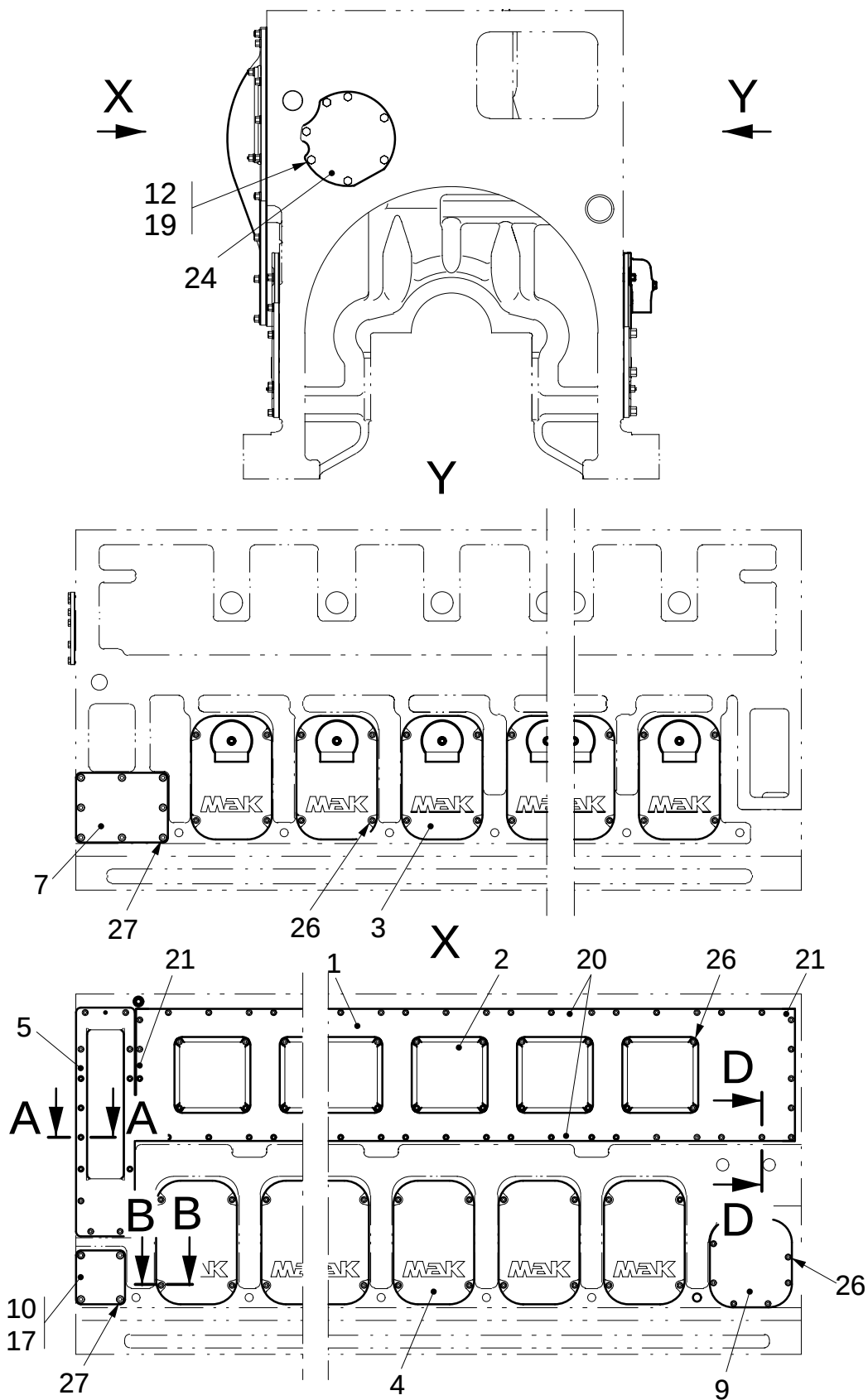
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Engine Housing Covers

M25

03

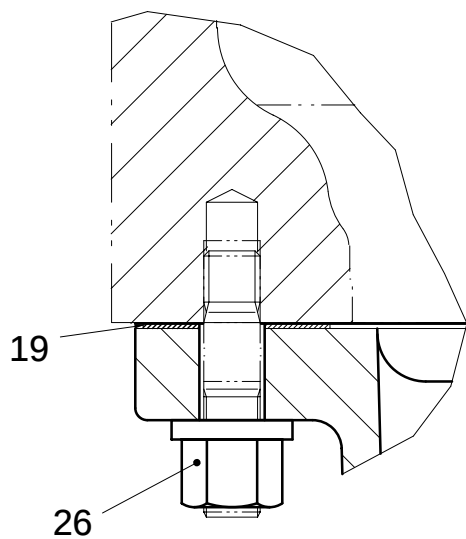


Engine Housing Covers

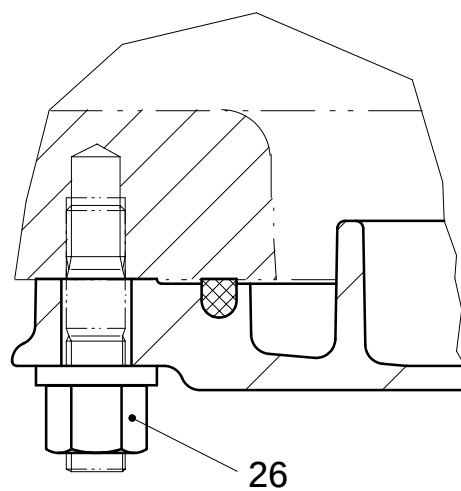
M25

03

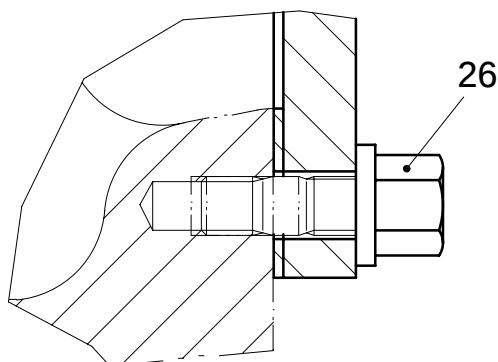
A-A



B-B



D-D



Engine Housing Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	VERKLEIDUNG, VOLLST. COVERS ASSEMBLY	1	251112 DD
1	NOCKENWELLEDECKEL, VOLLST. CAMSHAFT COVER, COMPL.	1	251112-001
2	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	6	SIEHE B1.05.03.7.1630 SEE B1.05.03.7.1630
3	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	8	SIEHE B1.05.03.251633 SEE B1.05.03.251633
4	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	2	SIEHE B1.05.03.1.1630 SEE B1.05.03.1.1630
5	KURBELRAUMDECKEL MIT ÖLPEILSTAB CRANKCASE COVER WITH OIL DIPSTICK	1	251112-105
6	KURBELRAUMDECKEL MIT ÖLEINFÜLLSTUTZEN CRANKCASE COVER WITH OIL FILLER NECK	1	251112-106
7	DECKEL COVER	1	251112-005
8	DECKEL COVER	1	251112-007
10	DECKEL COVER	1	251112-009
11	DECKEL COVER	1	251112-010
12	DECKEL COVER	1	251112-012
13	ÖLPEILSTAB OIL DIPSTICK	1	251112-113
14	ÖLPEILSTABFÜHRUNG OIL DIPSTICK GUIDE	1	251112-114
20	DICHTUNG GASKET	# 1	251112-017
21	DICHTUNG GASKET	# 1	251112-019
22	DICHTUNG GASKET	# 2	251112-020
23	DICHTUNG GASKET	# 2	251112-021
26	O-RING O-RING	# 1	1.1633-006
29	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-444
30	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-378

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Engine Housing Covers

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
33	SECHSKANTMUTTER HEXAGON NUT	142	1.2035-032
34	SECHSKANTMUTTER HEXAGON NUT	12	1.2035-033
37	SCHEIBE WASHER	4	1.0040-224

= VERBRAUCHSTEILE
CONSUMABLES

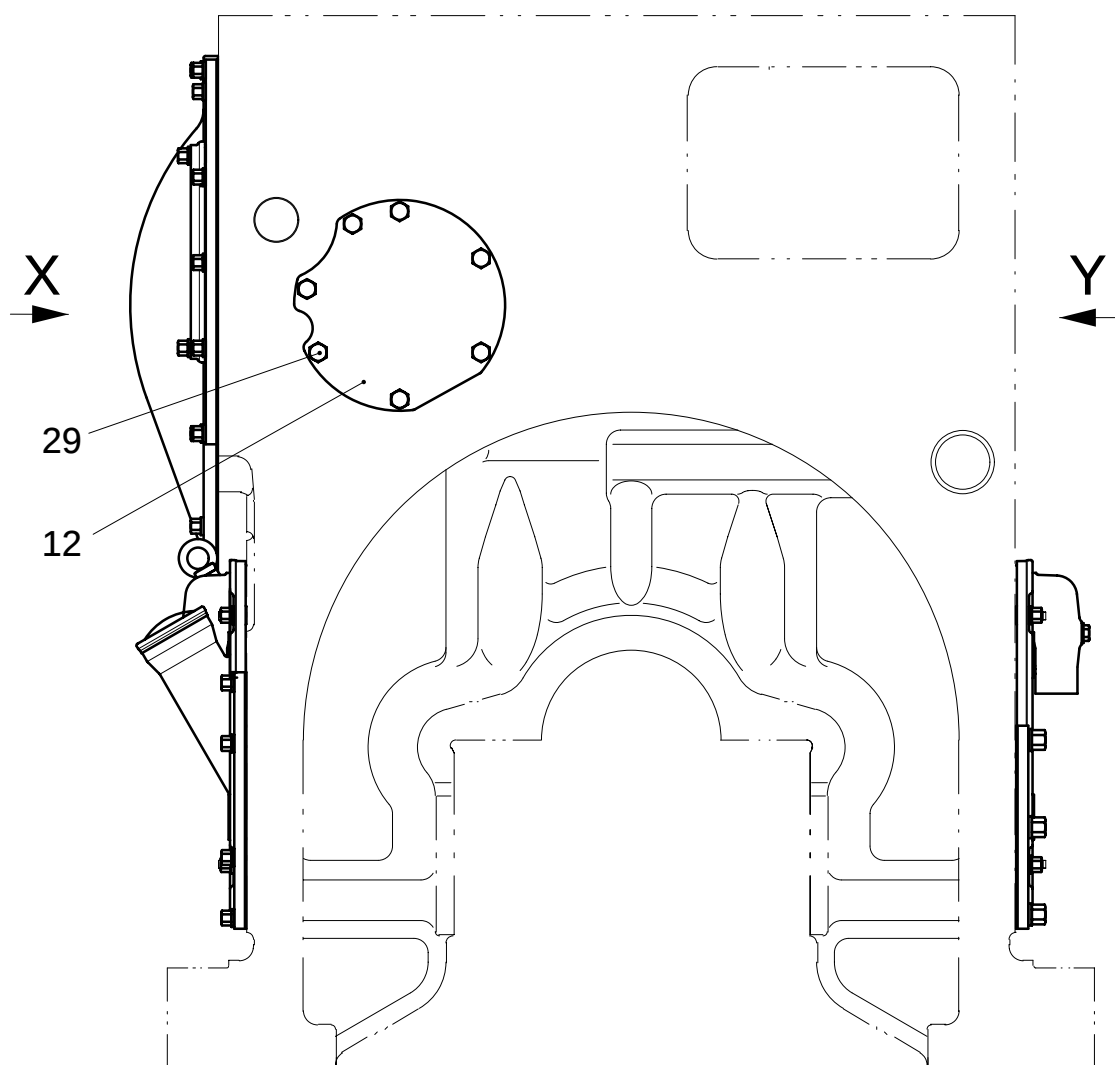
03

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Engine Housing Covers

M25

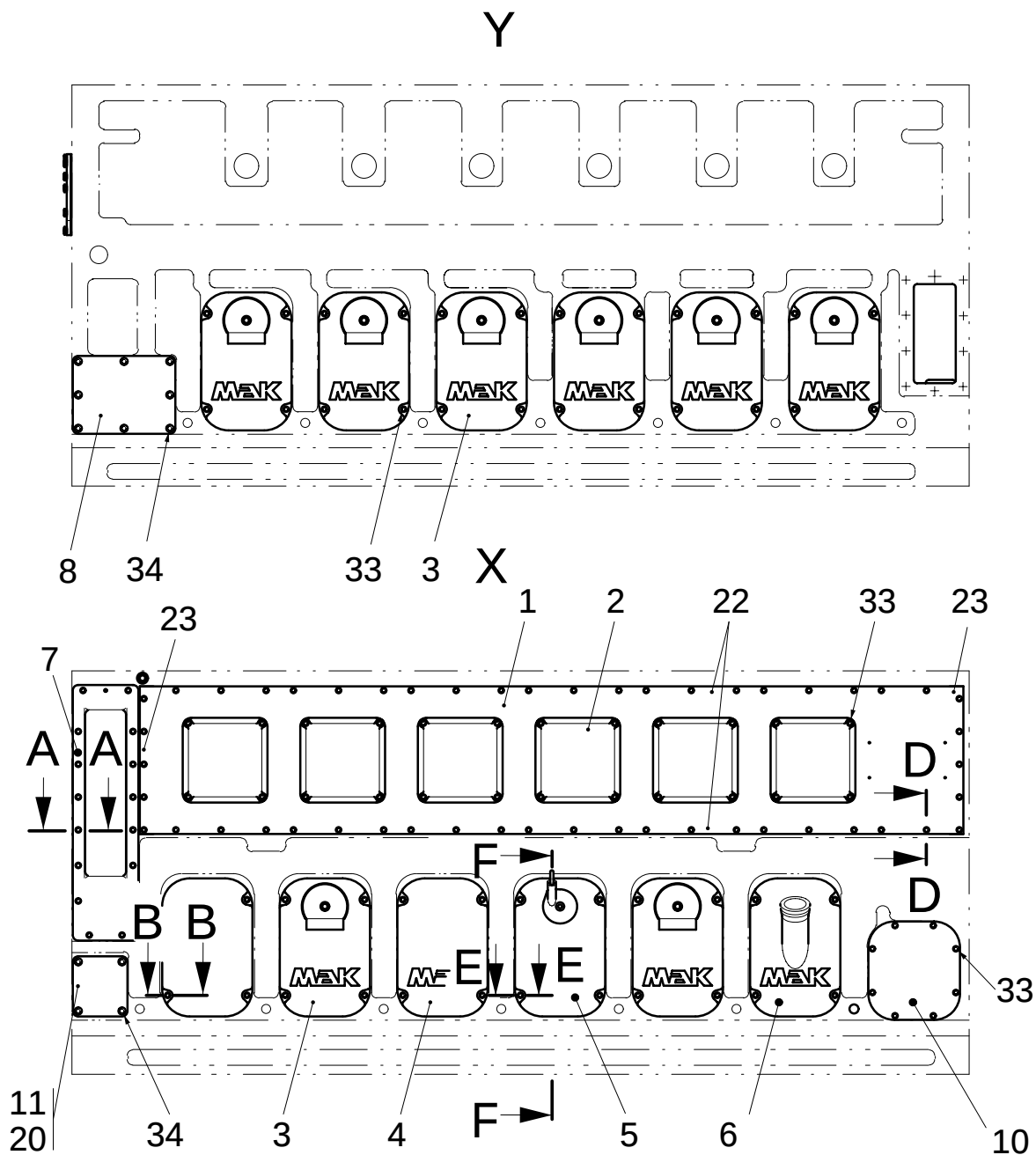
03



Engine Housing Covers

M25

03

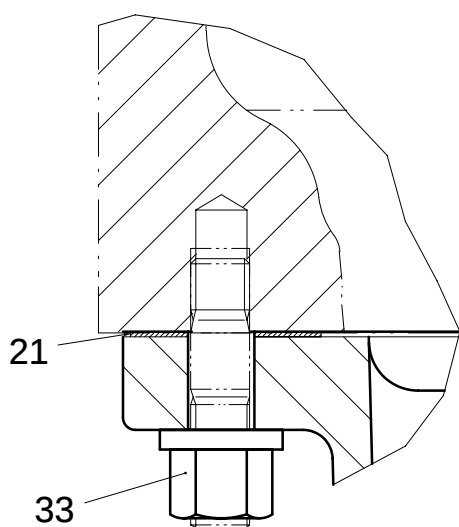


Engine Housing Covers

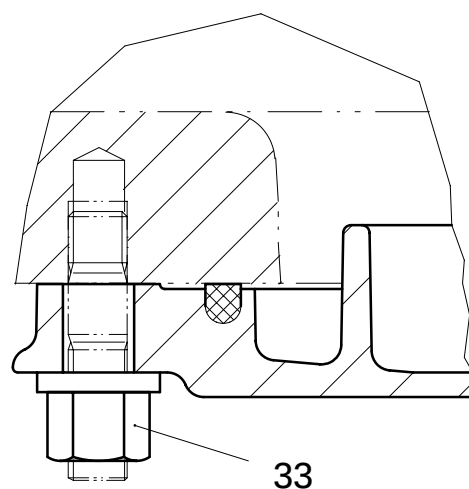
M25

03

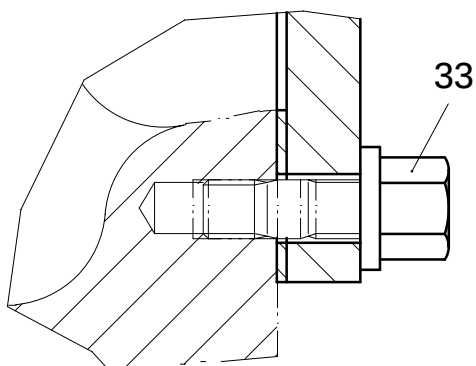
A-A



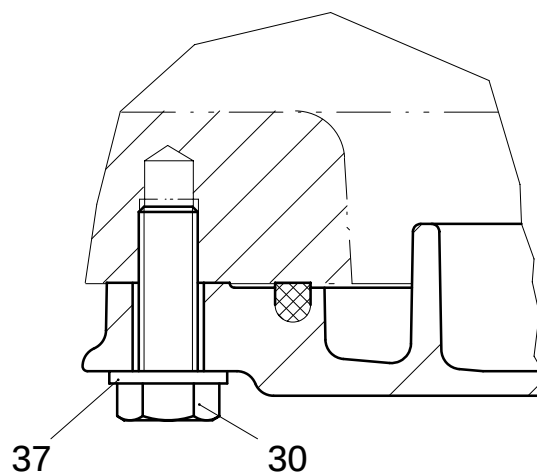
B-B



D-D



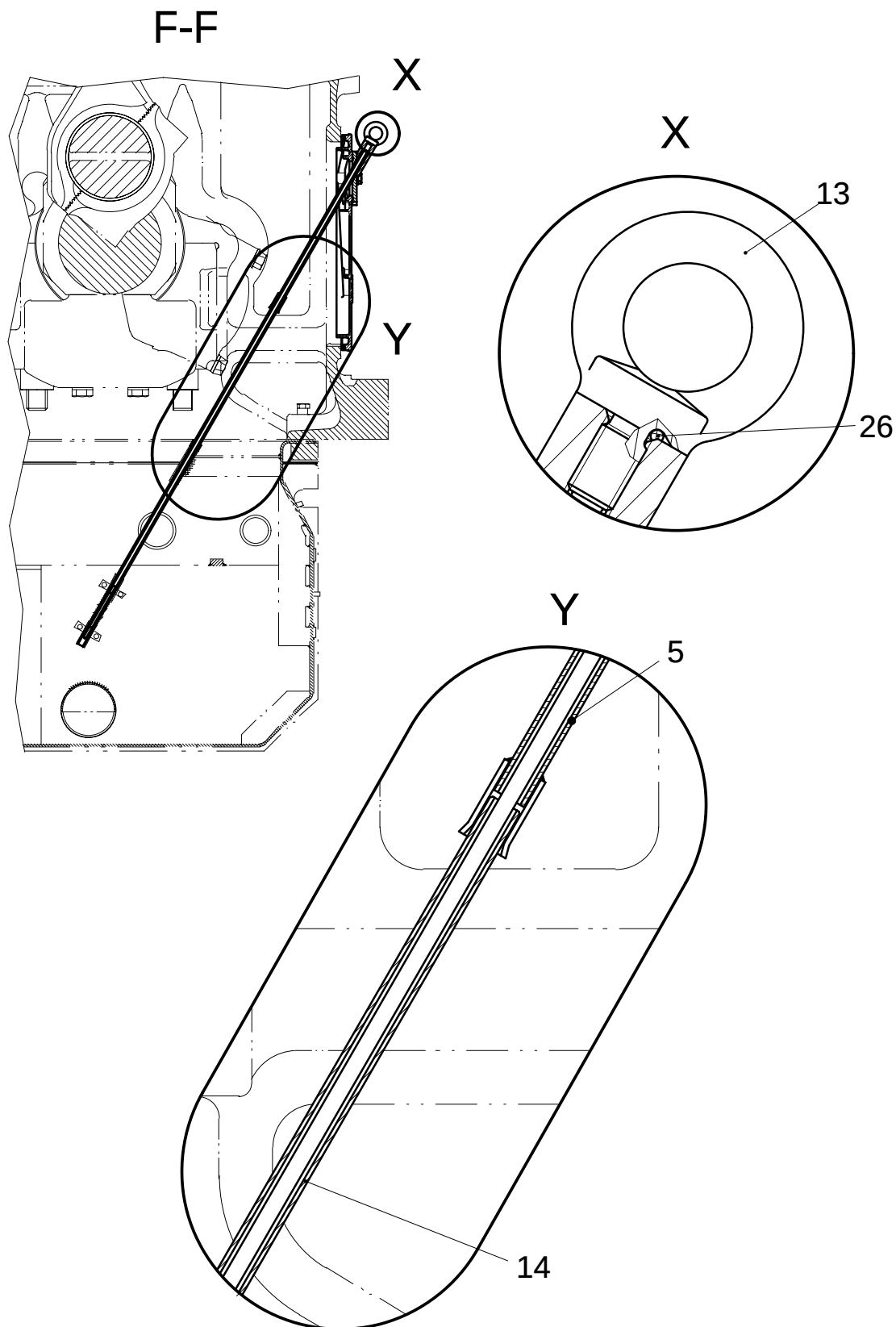
E-E



Engine Housing Covers

M25

03



Engine Housing Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	VERKLEIDUNG, VOLLST. COVERS ASSEMBLY	1	251112 EE
1	NOCKENWELLEDECKEL, VOLLST. CAMSHAFT COVER, COMPL.	1	251112-001
2	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	8	SIEHE B1.05.03.7.1630 SEE B1.05.03.7.1630
3	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	10	SIEHE B1.05.03.251633 SEE B1.05.03.251633
4	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	4	SIEHE B1.05.03.1.1630 SEE B1.05.03.1.1630
5	KURBELRAUMDECKEL MIT ÖLPEILSTAB CRANKCASE COVER WITH OIL DIPSTICK	1	251112-105
6	KURBELRAUMDECKEL MIT ÖLEINFÜLLSTUTZEN CRANKCASE COVER WITH OIL FILLER NECK	1	251112-106
7	DECKEL COVER	1	251112-005
8	DECKEL COVER	1	251112-007
10	DECKEL COVER	1	251112-009
11	DECKEL COVER	1	251112-010
12	DECKEL COVER	1	251112-012
13	ÖLPEILSTAB OIL DIPSTICK	1	251112-113
14	ÖLPEILSTABFÜHRUNG OIL DIPSTICK GUIDE	1	251112-114
20	DICHTUNG GASKET	# 1	251112-017
21	DICHTUNG GASKET	# 1	251112-119
22	DICHTUNG GASKET	# 2	251112-020
23	DICHTUNG GASKET	# 2	251112-021
26	O-RING O-RING	# 1	1.1633-006
29	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-444
30	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-378

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Engine Housing Covers

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
33	SECHSKANTMUTTER HEXAGON NUT	178	1.2035-032
34	SECHSKANTMUTTER HEXAGON NUT	12	1.2035-033
37	SCHEIBE WASHER	4	1.0040-224

03

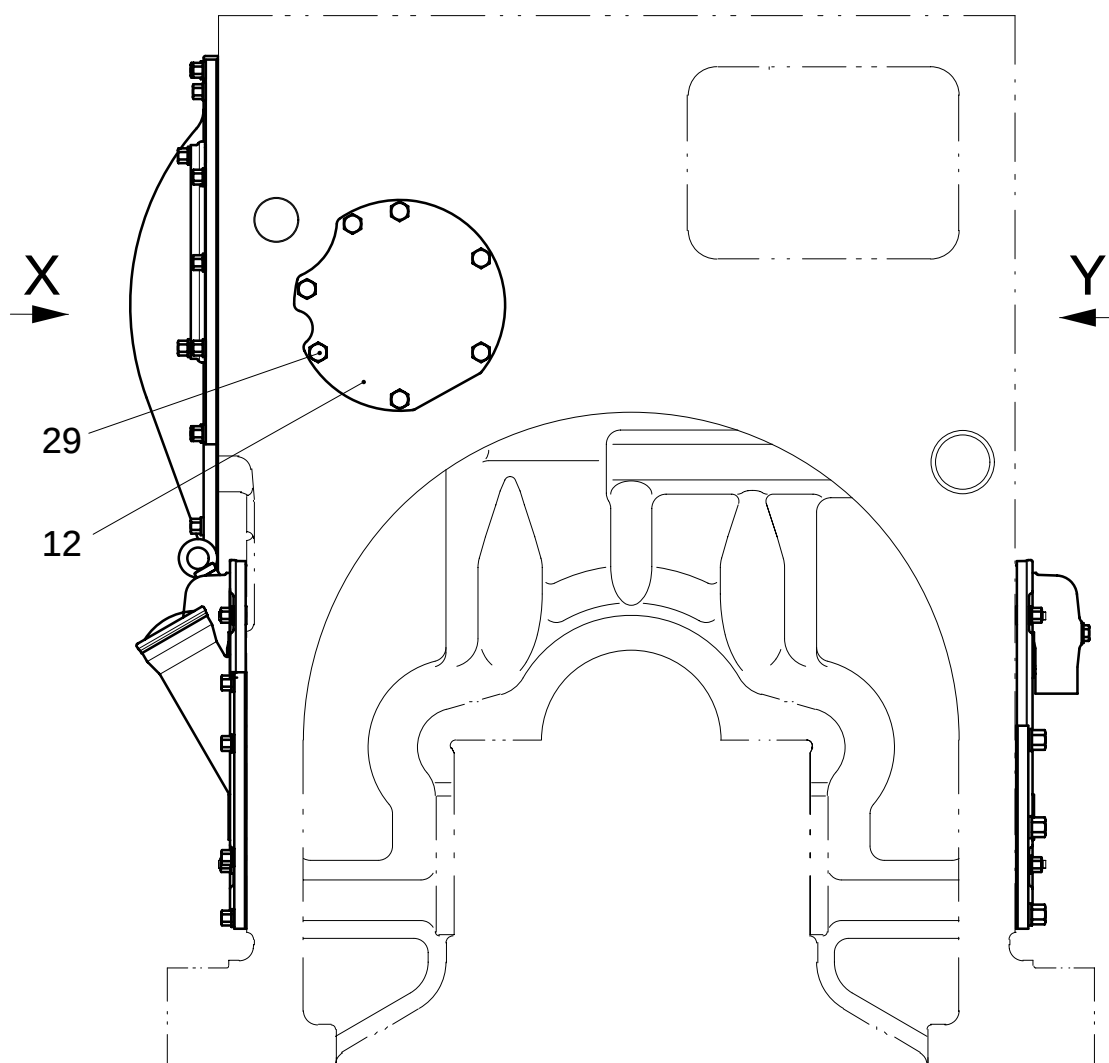
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Engine Housing Covers

M25

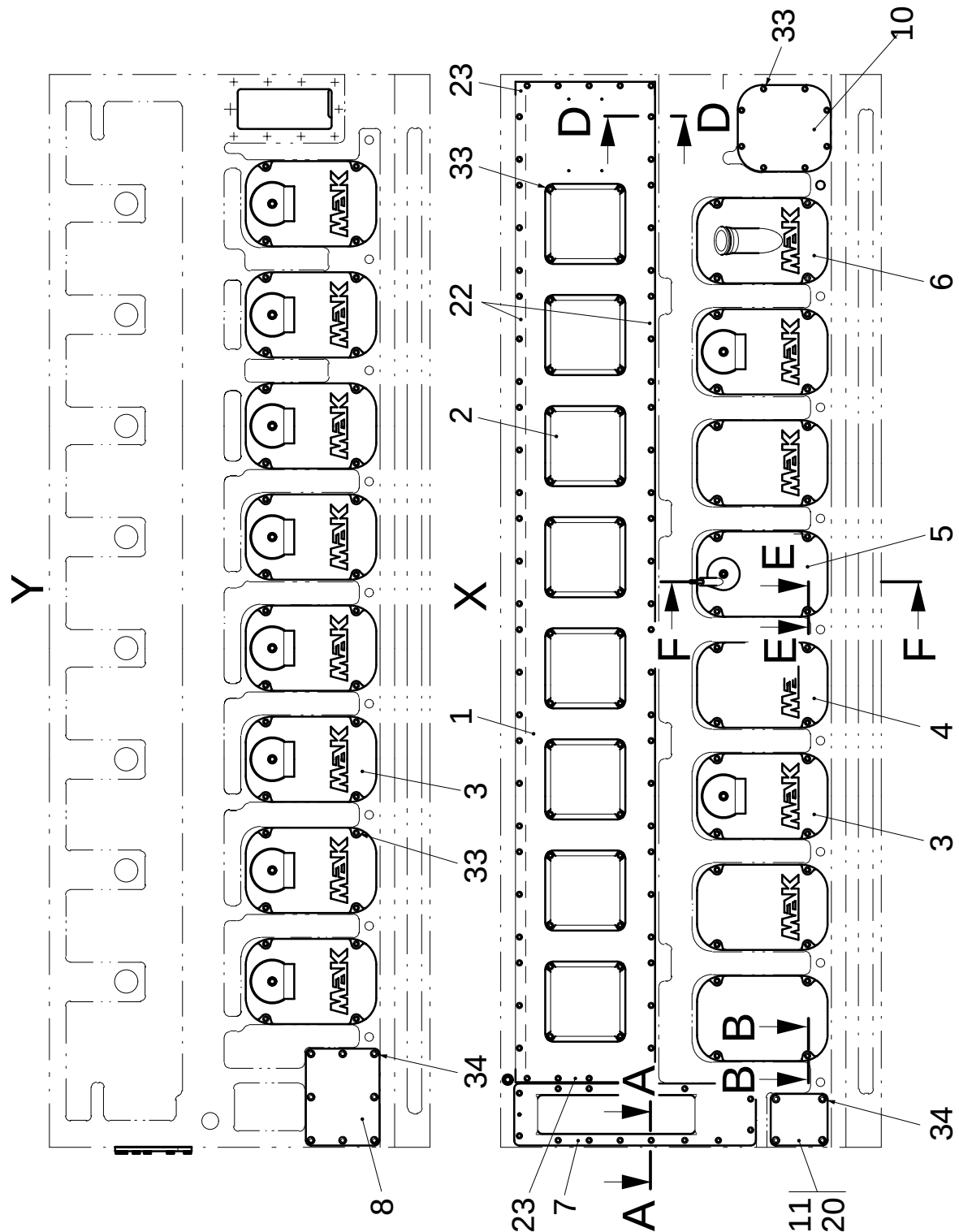
03



Engine Housing Covers

M25

03

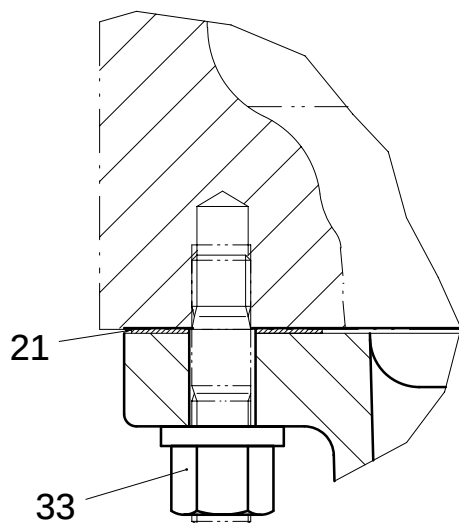


Engine Housing Covers

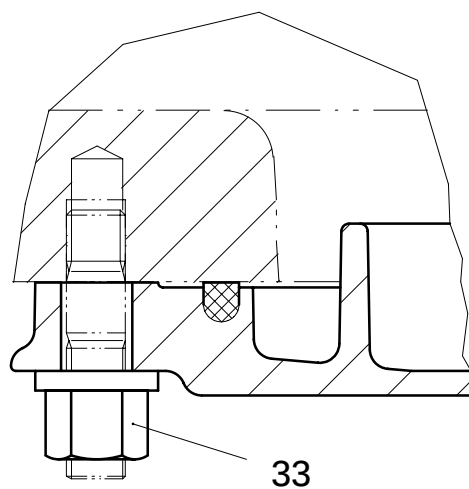
M25

03

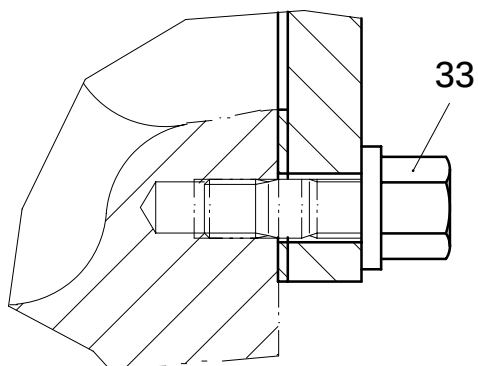
A-A



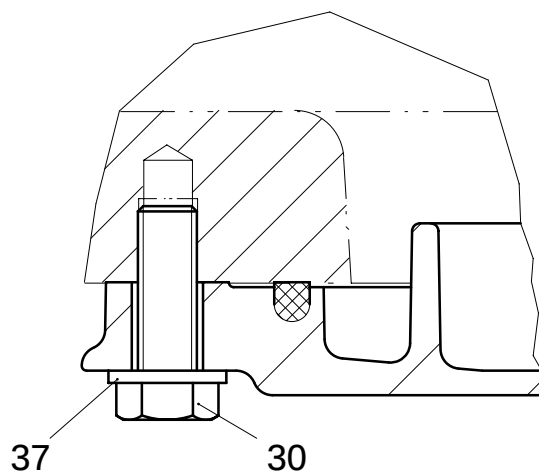
B-B



D-D



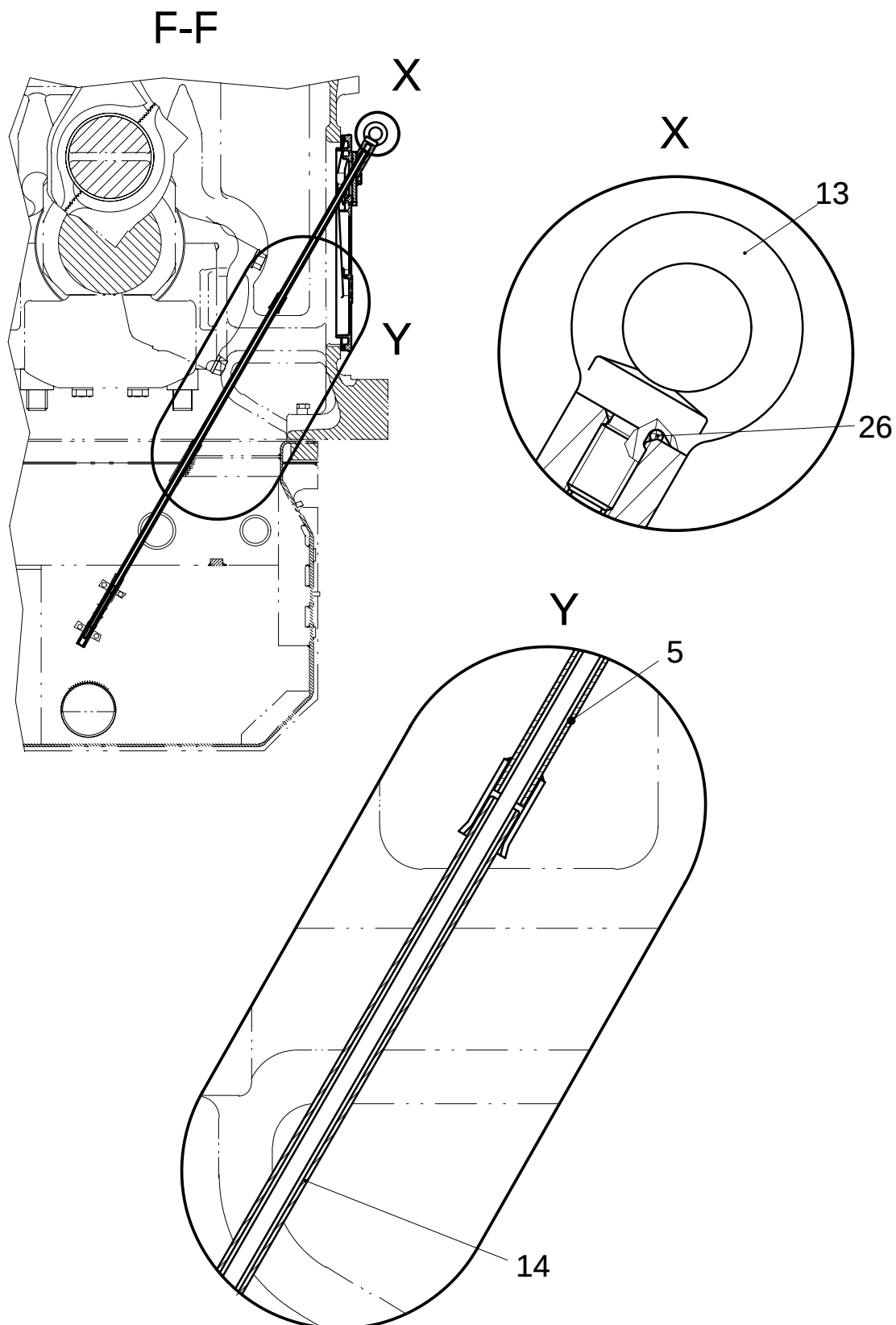
E-E



Engine Housing Covers

M25

03



Engine Housing Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	VERKLEIDUNG, VOLLST. COVERS ASSEMBLY	1	251112 FF
1	NOCKENWELLEDECKEL, VOLLST. CAMSHAFT COVER, COMPL.	1	251112-001
2	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	9	SIEHE B1.05.03.7.1630 SEE B1.05.03.7.1630
3	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	11	SIEHE B1.05.03.251633 SEE B1.05.03.251633
4	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	5	SIEHE B1.05.03.1.1630 SEE B1.05.03.1.1630
5	KURBELRAUMDECKEL MIT ÖLPEILSTAB CRANKCASE COVER WITH OIL DIPSTICK	1	251112-105
6	KURBELRAUMDECKEL MIT ÖLEINFÜLLSTUTZEN CRANKCASE COVER WITH OIL FILLER NECK	1	251112-106
7	DECKEL COVER	1	251112-005
8	DECKEL COVER	1	251112-007
10	DECKEL COVER	1	251112-009
11	DECKEL COVER	1	251112-010
12	DECKEL COVER	1	251112-012
13	ÖLPEILSTAB OIL DIPSTICK	1	251112-113
14	ÖLPEILSTABFÜHRUNG OIL DIPSTICK GUIDE	1	251112-114
20	DICHTUNG GASKET	# 1	251112-017
21	DICHTUNG GASKET	# 1	251112-119
22	DICHTUNG GASKET	# 2	251112-020
23	DICHTUNG GASKET	# 2	251112-021
26	O-RING O-RING	# 1	1.1633-006
29	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-444
30	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-378

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Engine Housing Covers

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
33	SECHSKANTMUTTER HEXAGON NUT	196	1.2035-032
34	SECHSKANTMUTTER HEXAGON NUT	12	1.2035-033
37	SCHEIBE WASHER	4	1.0040-224

03

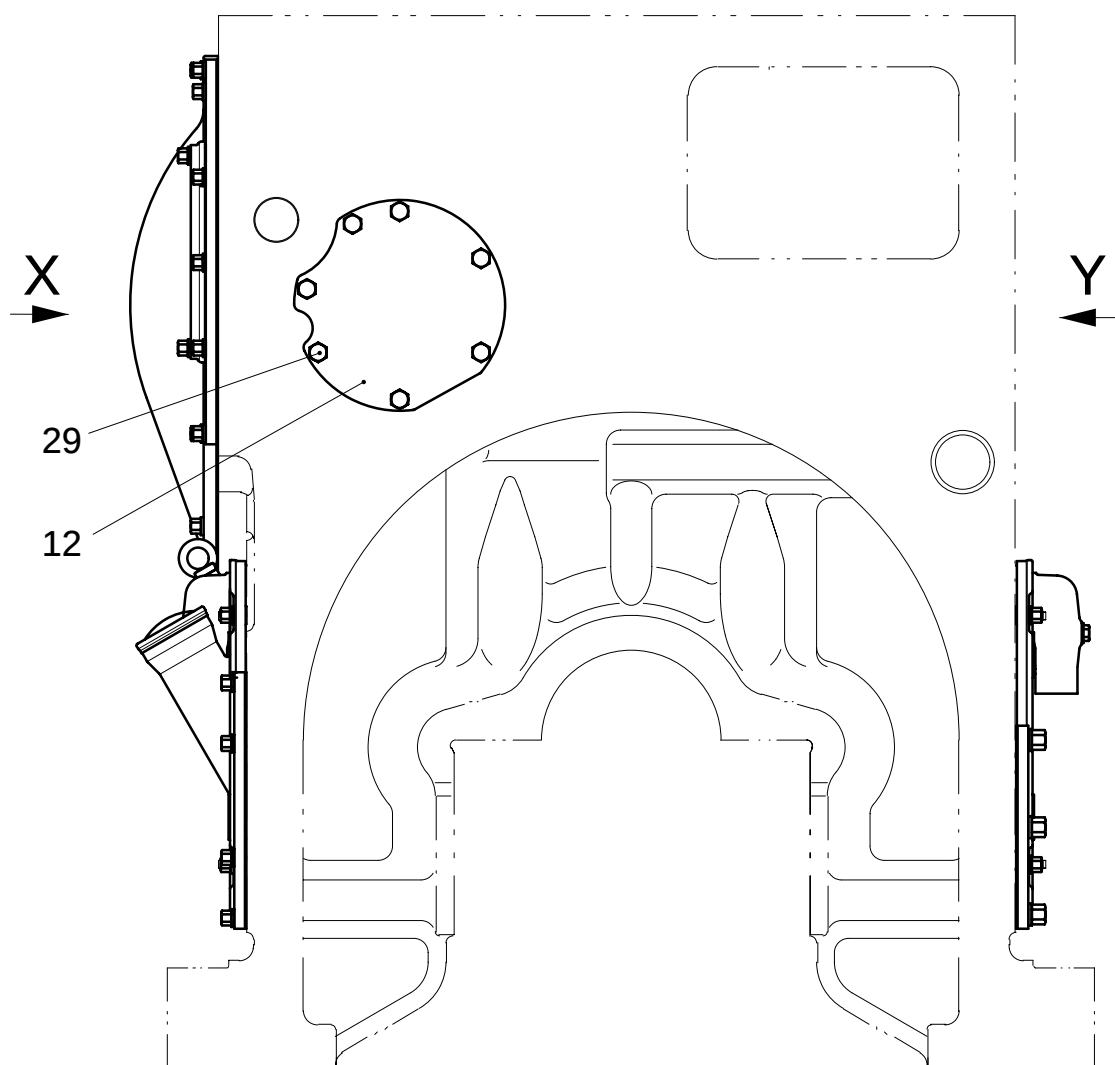
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Engine Housing Covers

M25

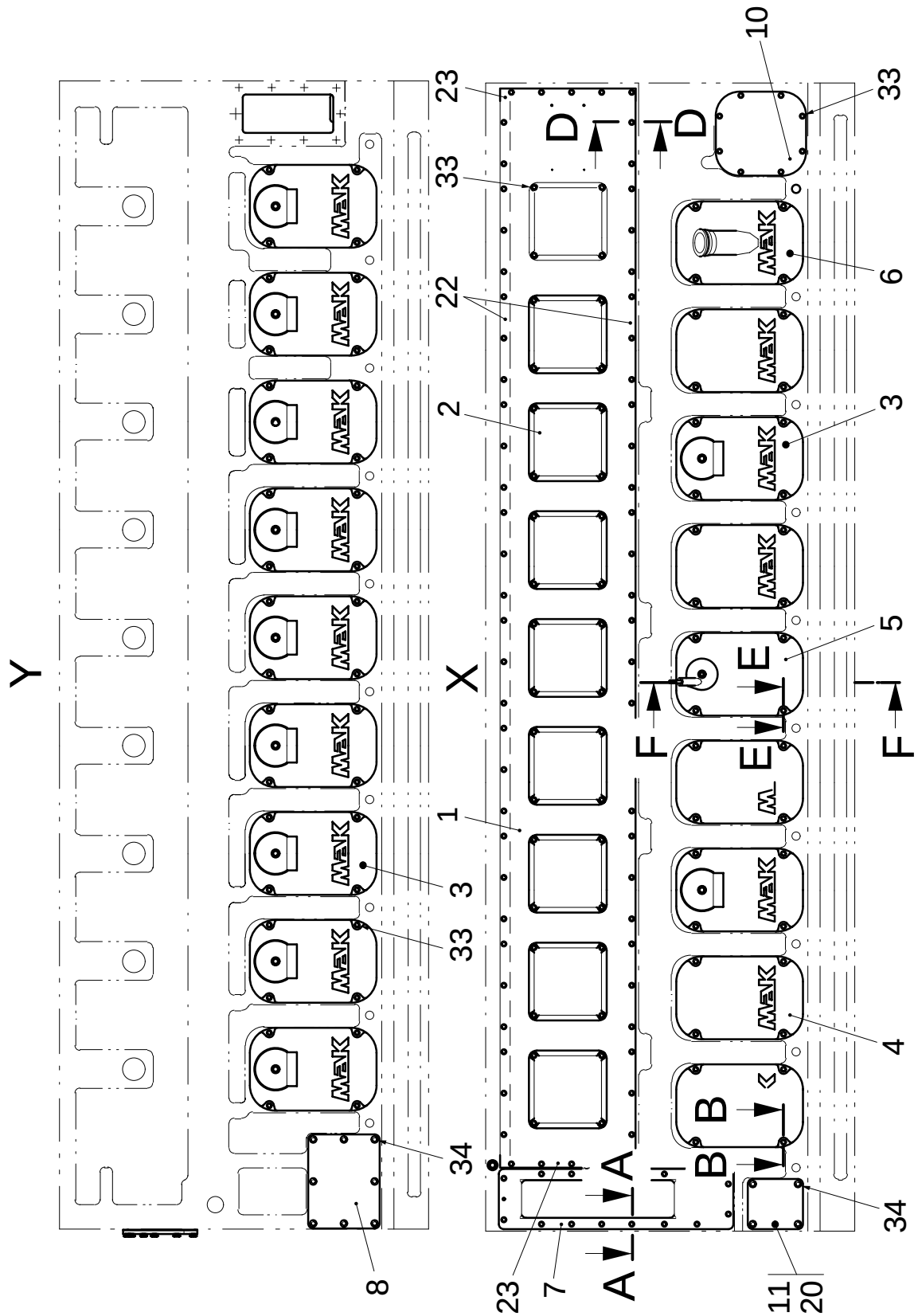
03



Engine Housing Covers

M25

03

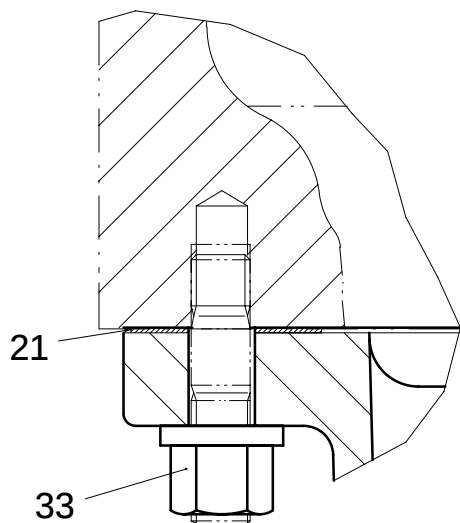


Engine Housing Covers

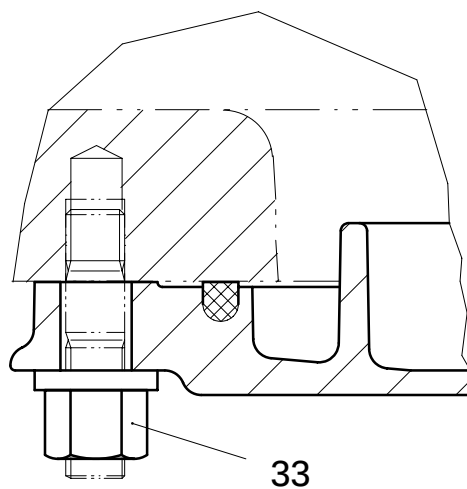
M25

03

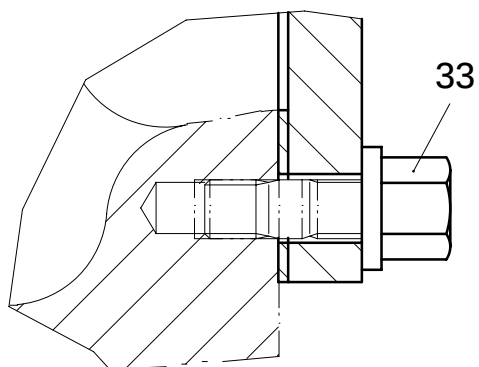
A-A



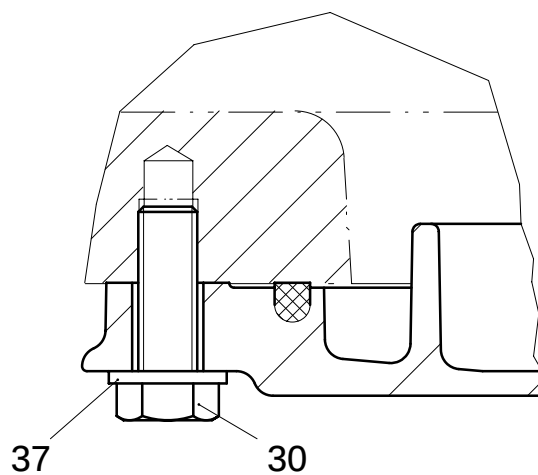
B-B



D-D



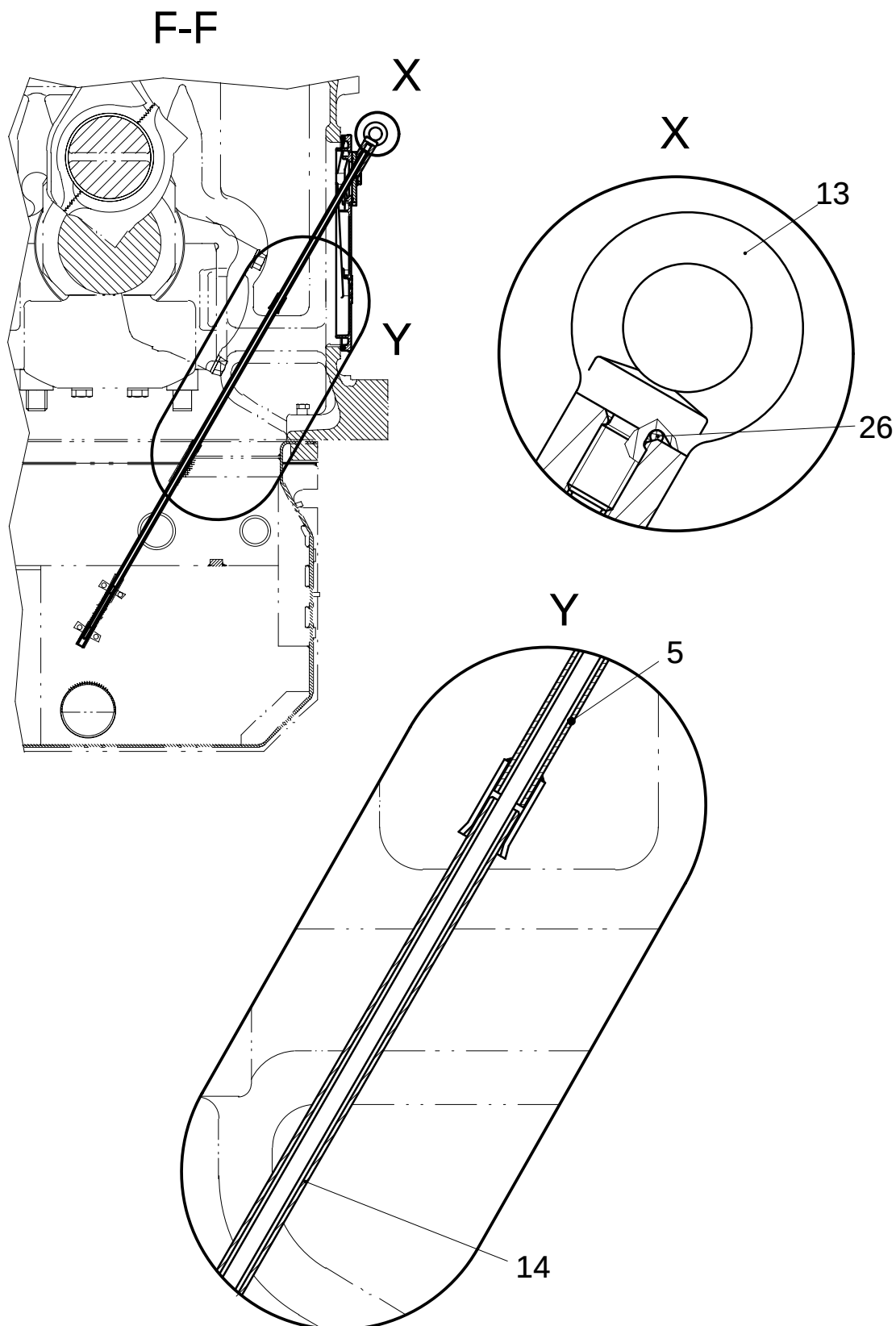
E-E



Engine Housing Covers

M25

03



Engine Housing Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	VERKLEIDUNG, VOLLST. COVERS ASSEMBLY	1	251112 GG
1	NOCKENWELLEDECKEL, VOLLST. CAMSHAFT COVER, COMPL.	1	251112-001
2	GEHÄUSEDECKEL, VOLLST. CRANKCASE COVER, COMPL.	6	SIEHE B1.05.03.7.1630 SEE B1.05.03.7.1630
3	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	6	SIEHE B1.05.03.251633 SEE B1.05.03.251633
4	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	5	SIEHE B1.05.03.1.1630 SEE B1.05.03.1.1630
5	DECKEL COVER	1	251112-005
7	DECKEL COVER	1	251112-007
8	ÖLZENTRIFUGE, ANBAU OIL CENTRIFUGE, ASSEMBLY	1	SIEHE BUCH C SEE BOOK C
9	DECKEL COVER	1	251112-009
10	DECKEL COVER	1	251112-010
12	DECKEL COVER	1	251112-012
18	DICHTUNG GASKET	# 1	251112-017
19	DICHTUNG GASKET	# 1	251112-119
20	DICHTUNG GASKET	# 2	251112-020
21	DICHTUNG GASKET	# 2	251112-021
24	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-444
26	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	142	1.2035-032
27	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	12	1.2035-033

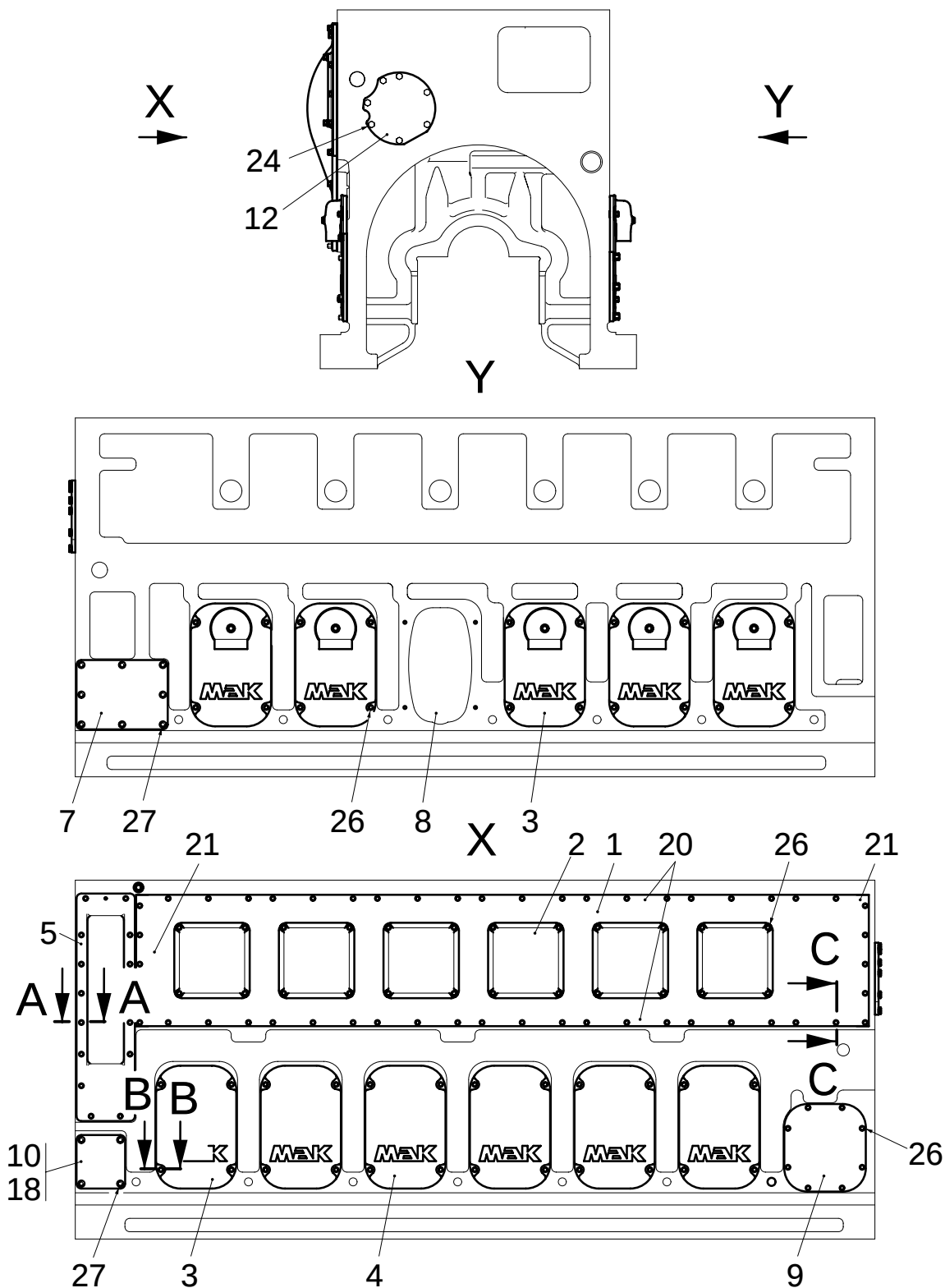
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Engine Housing Covers

M25

03

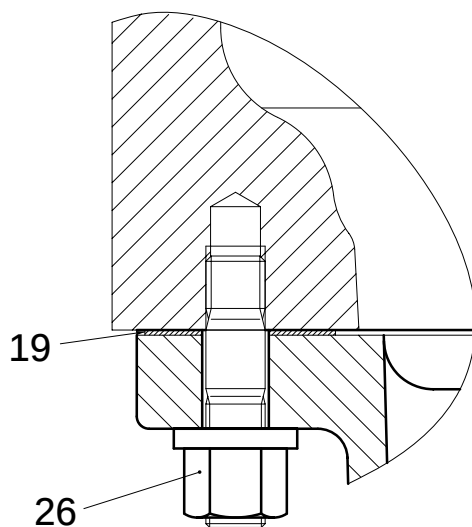


Engine Housing Covers

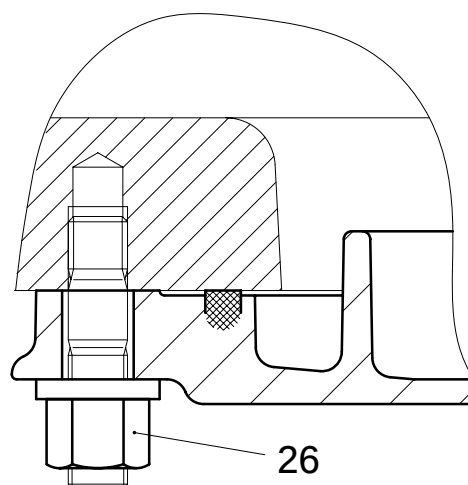
M25

03

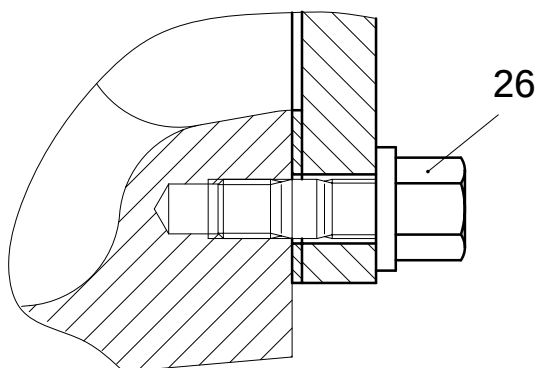
A-A



B-B



C-C



Engine Housing Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	VERKLEIDUNG, VOLLST. COVERS ASSEMBLY	1	251112 HH
1	NOCKENWELLEDECKEL, VOLLST. CAMSHAFT COVER, COMPL.	1	251112-001
2	GEHÄUSEDECKEL, VOLLST. CRANKCASE COVER, COMPL.	8	SIEHE B1.05.03.7.1630 SEE B1.05.03.7.1630
3	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	8	SIEHE B1.05.03.251633 SEE B1.05.03.251633
4	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	7	SIEHE B1.05.03.1.1630 SEE B1.05.03.1.1630
5	DECKEL COVER	1	251112-005
7	DECKEL COVER	1	251112-007
8	ÖLZENTRIFUGE, ANBAU OIL CENTRIFUGE, ASSEMBLY	1	SIEHE BUCH C SEE BOOK C
9	DECKEL COVER	1	251112-009
10	DECKEL COVER	1	251112-010
12	DECKEL COVER	1	251112-012
18	DICHTUNG GASKET	# 1	251112-017
19	DICHTUNG GASKET	# 1	251112-119
20	DICHTUNG GASKET	# 2	251112-020
21	DICHTUNG GASKET	# 2	251112-021
24	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-444
26	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	178	1.2035-032
27	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	12	1.2035-033

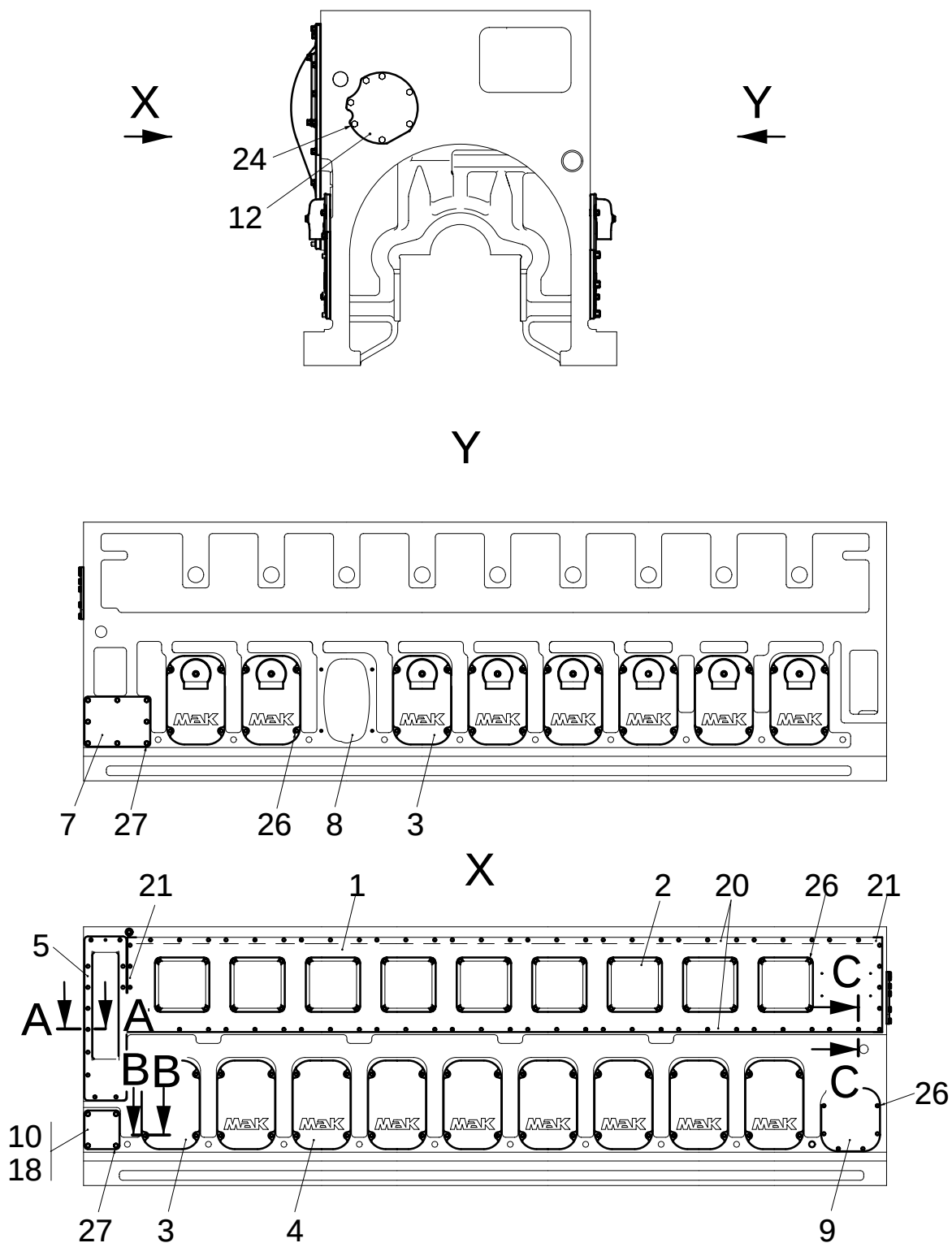
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Engine Housing Covers

M25

03

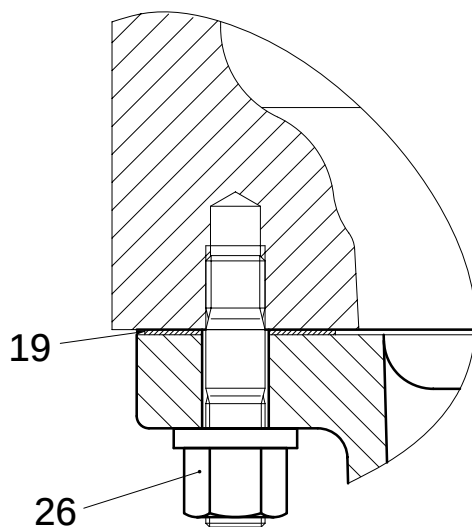


Engine Housing Covers

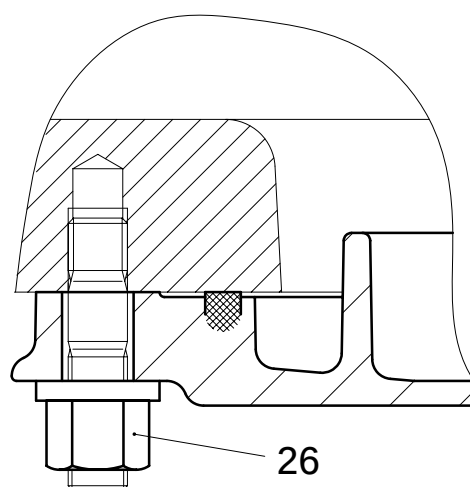
M25

03

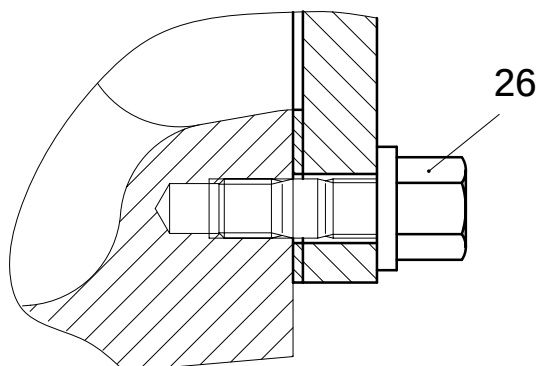
A-A



B-B



C-C



Engine Housing Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	VERKLEIDUNG, VOLLST. COVERS ASSEMBLY	1	251112 KK
1	NOCKENWELLEDECKEL, VOLLST. CAMSHAFT COVER, COMPL.	1	251112-001
2	GEHÄUSEDECKEL, VOLLST. CRANKCASE COVER, COMPL.	9	SIEHE B1.05.03.7.1630 SEE B1.05.03.7.1630
3	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	9	SIEHE B1.05.03.251633 SEE B1.05.03.251633
4	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	8	SIEHE B1.05.03.1.1630 SEE B1.05.03.1.1630
5	DECKEL COVER	1	251112-005
7	DECKEL COVER	1	251112-007
8	ÖLZENTRIFUGE, ANBAU OIL CENTRIFUGE, ASSEMBLY	1	SIEHE BUCH C SEE BOOK C
9	DECKEL COVER	1	251112-009
10	DECKEL COVER	1	251112-010
12	DECKEL COVER	1	251112-012
18	DICHTUNG GASKET	# 1	251112-017
19	DICHTUNG GASKET	# 1	251112-119
20	DICHTUNG GASKET	# 2	251112-020
21	DICHTUNG GASKET	# 2	251112-021
24	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-444
26	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	196	1.2035-032
27	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	12	1.2035-033

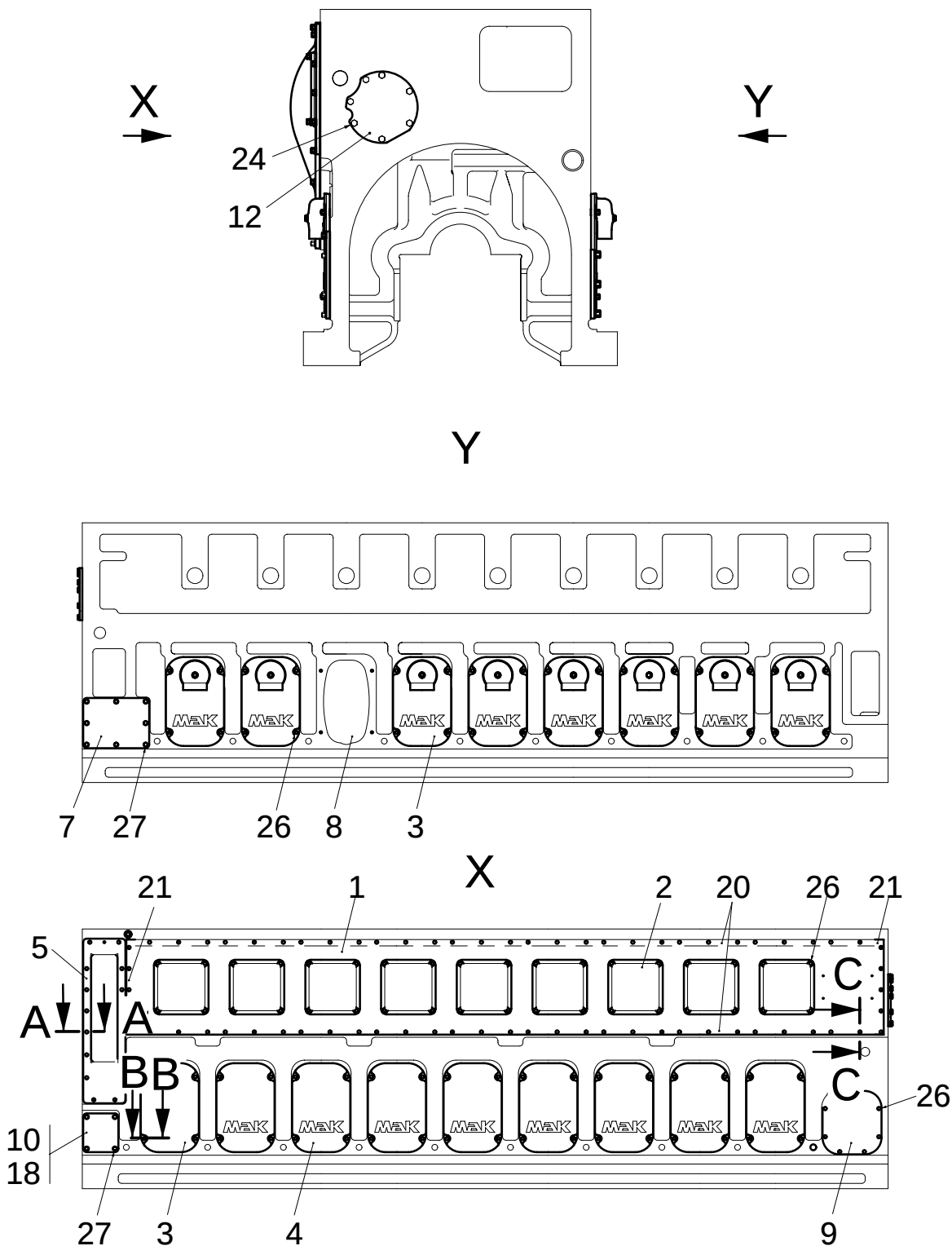
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Engine Housing Covers

M25

03

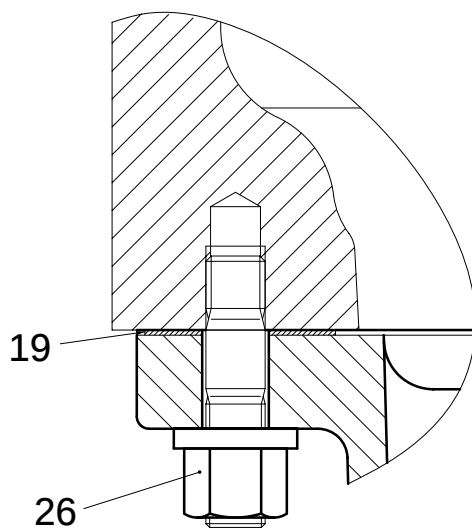


Engine Housing Covers

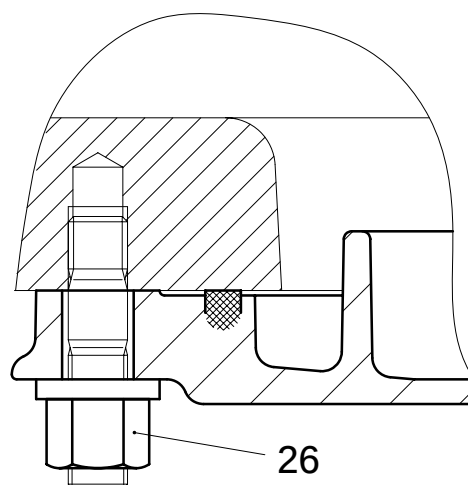
M25

03

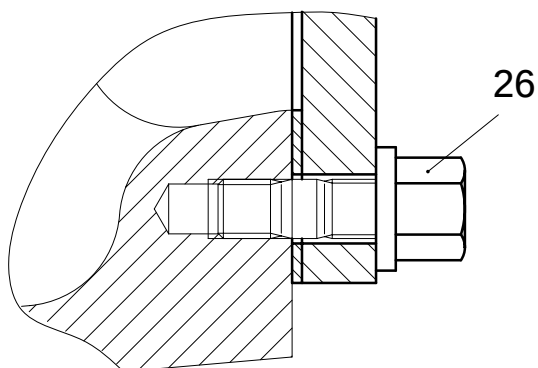
A-A



B-B



C-C



Engine Housing Cover

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	COVER, VOLLST. COVER ASSEMBLY	1	251112 LL
1	DECKEL COVER	1	251112-008
2	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-445

= VERBRAUCHSTEILE
CONSUMABLES

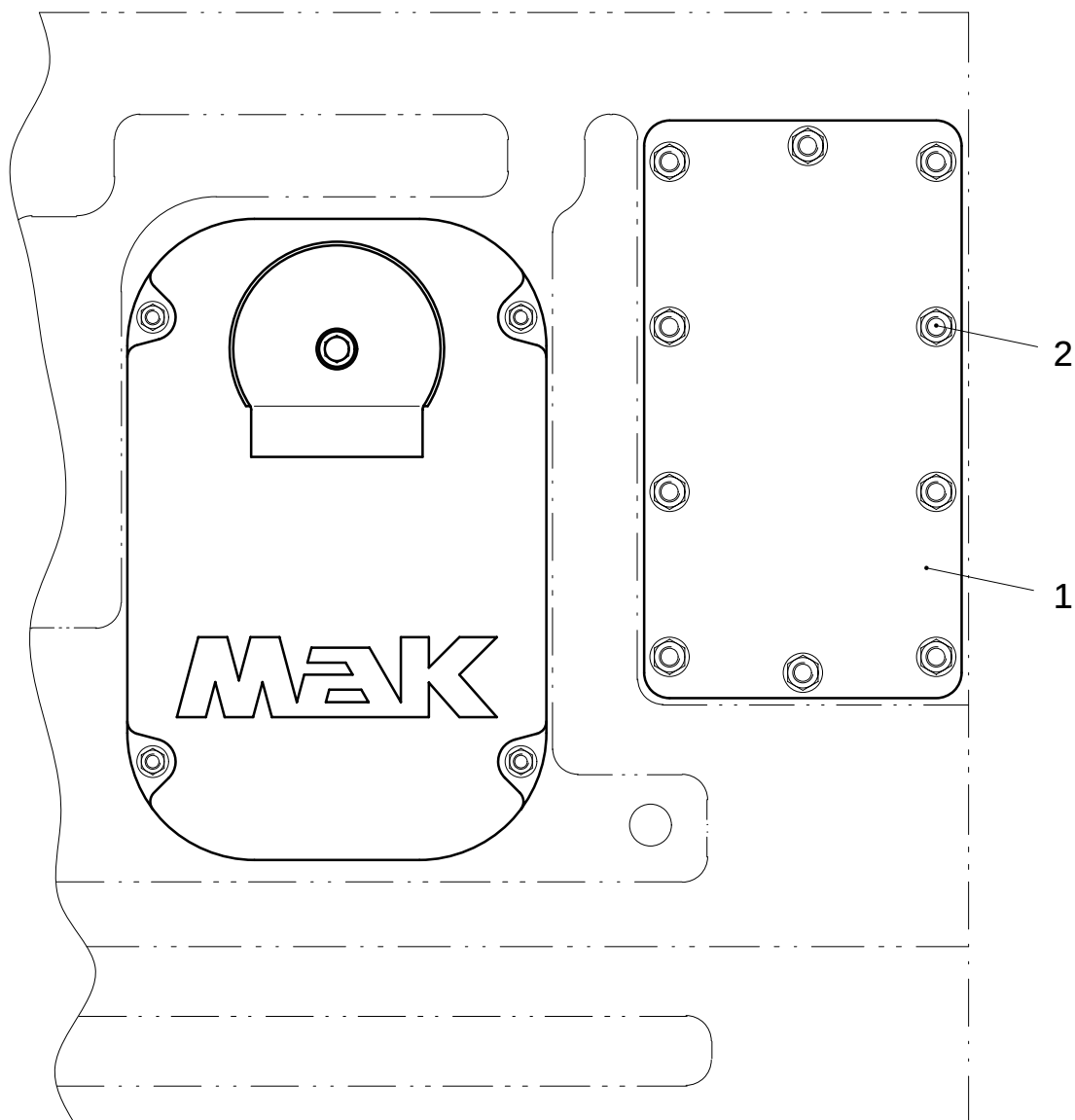
03

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Engine Housing Cover

M25

03



Engine Housing Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	VERKLEIDUNG, VOLLST. COVERS ASSEMBLY	1	251112 EE
1	NOCKENWELLEDECKEL, VOLLST. CAMSHAFT COVER, COMPL.	1	251112-001
2	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	8	SIEHE B1.05.03.7.1630 SEE B1.05.03.7.1630
3	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	10	SIEHE B1.05.03.251633 SEE B1.05.03.251633
4	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	4	SIEHE B1.05.03.1.1630 SEE B1.05.03.1.1630
5	KURBELRAUMDECKEL MIT ÖLPEILSTAB CRANKCASE COVER WITH OIL DIPSTICK	1	251112-105
6	KURBELRAUMDECKEL MIT ÖLEINFÜLLSTUTZEN CRANKCASE COVER WITH OIL FILLER NECK	1	251112-106
7	DECKEL COVER	1	251112-005
8	DECKEL COVER	1	251112-007
9	DECKEL COVER	1	251112-008
10	DECKEL COVER	1	251112-009
11	DECKEL COVER	1	251112-010
12	DECKEL COVER	1	251112-012
13	ÖLPEILSTAB OIL DIPSTICK	1	251112-113
14	ÖLPEILSTABFÜHRUNG OIL DIPSTICK GUIDE	1	251112-114
17	DICHTUNG GASKET	# 1	251112-014
18	DICHTUNG GASKET	# 1	251112-015
19	DICHTUNG GASKET	# 1	251112-016
20	DICHTUNG GASKET	# 1	251112-017
21	DICHTUNG GASKET	# 1	251112-019
22	DICHTUNG GASKET	# 2	251112-020

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Engine Housing Covers

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
23	DICHTUNG GASKET	# 2	251112-021
26	O-RING O-RING	# 1	1.1633-006
29	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-444
30	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-378
33	SECHSKANTMUTTER HEXAGON NUT	178	1.2035-032
34	SECHSKANTMUTTER HEXAGON NUT	22	1.2035-033
37	SCHEIBE WASHER	4	1.0040-224

= VERBRAUCHSTEILE
CONSUMABLES

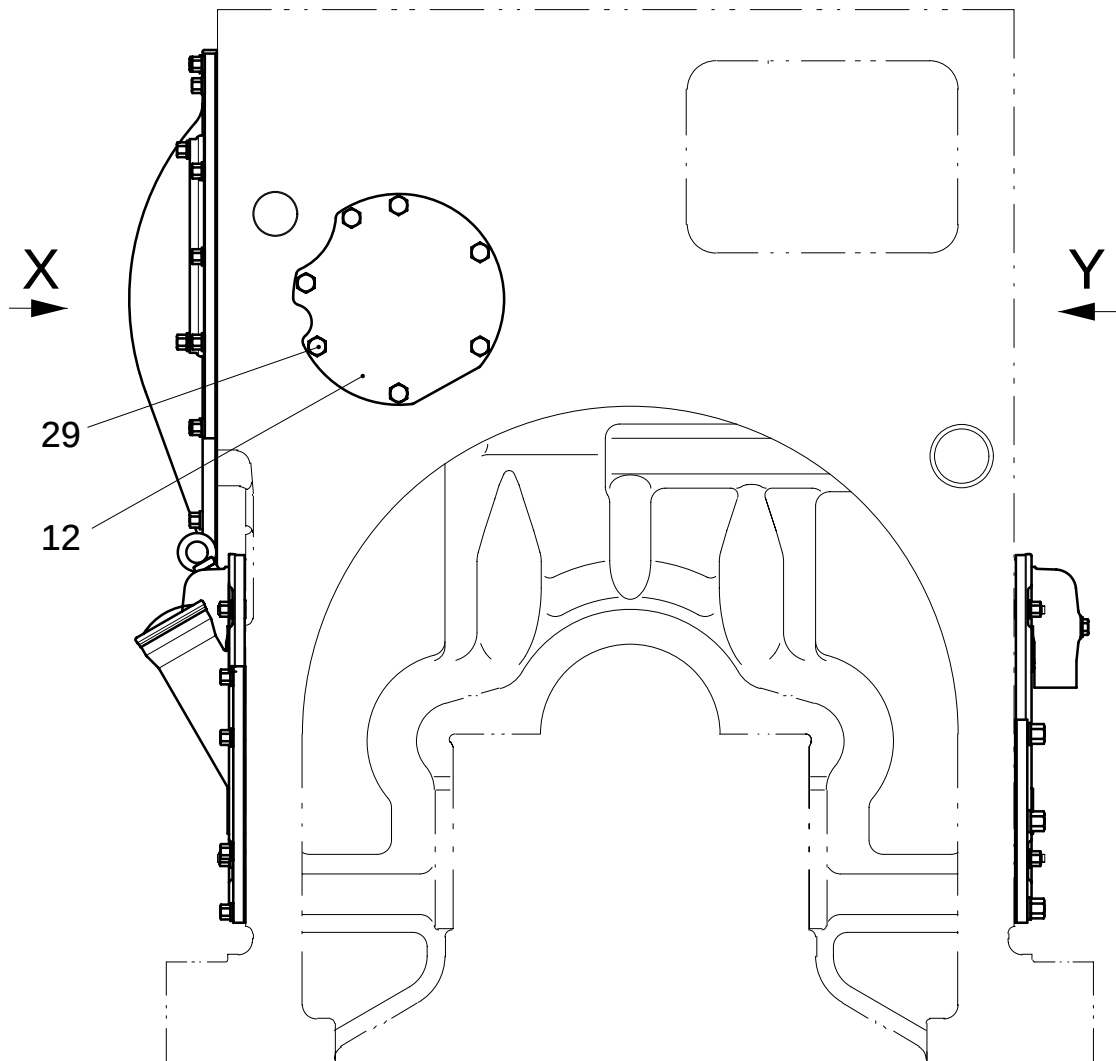
03

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Engine Housing Covers

M25

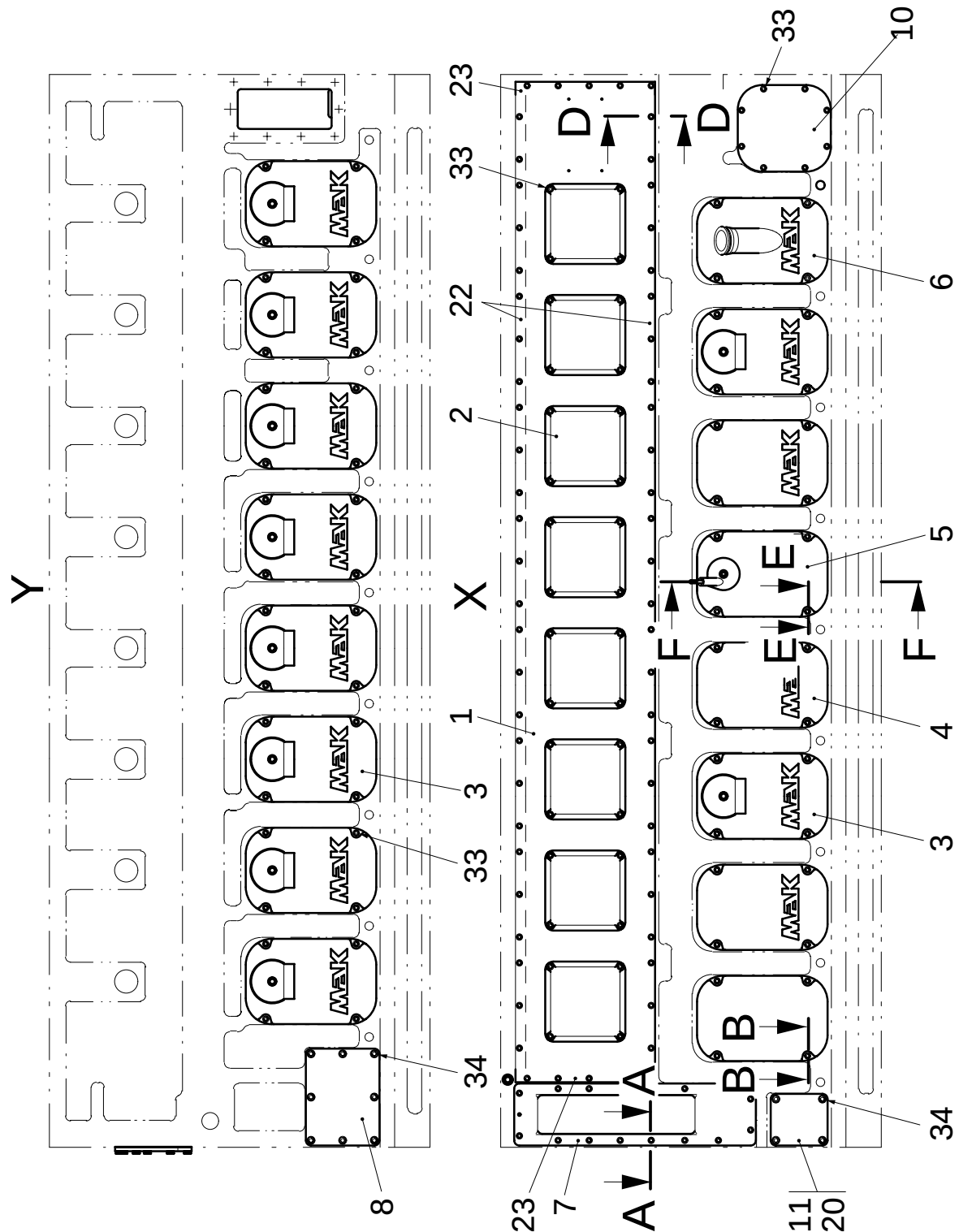
03



Engine Housing Covers

M25

03

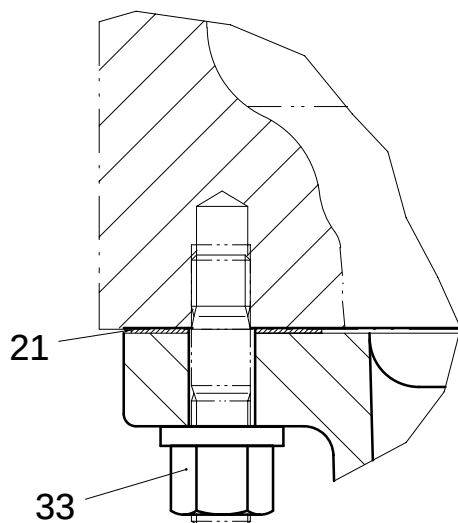


Engine Housing Covers

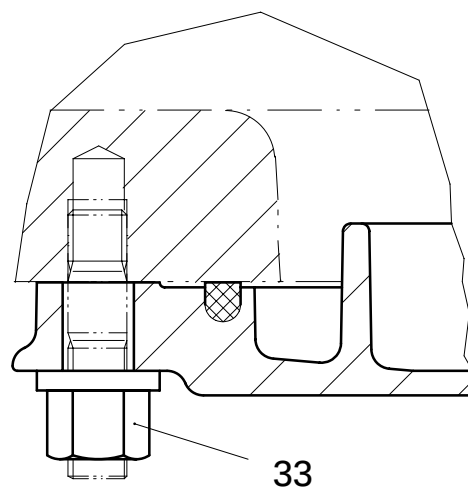
M25

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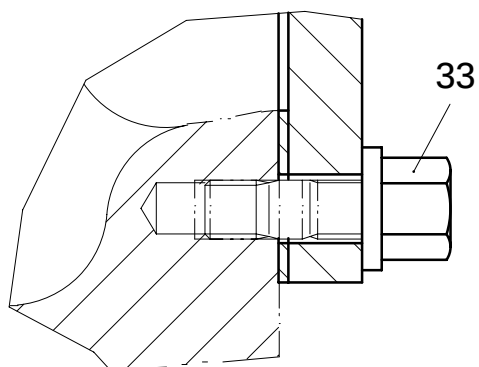
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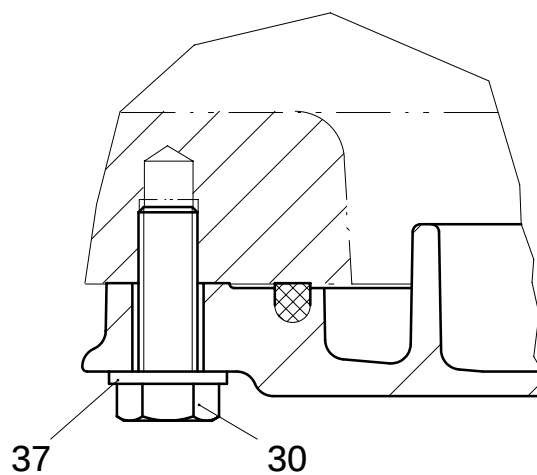
B-B



D-D



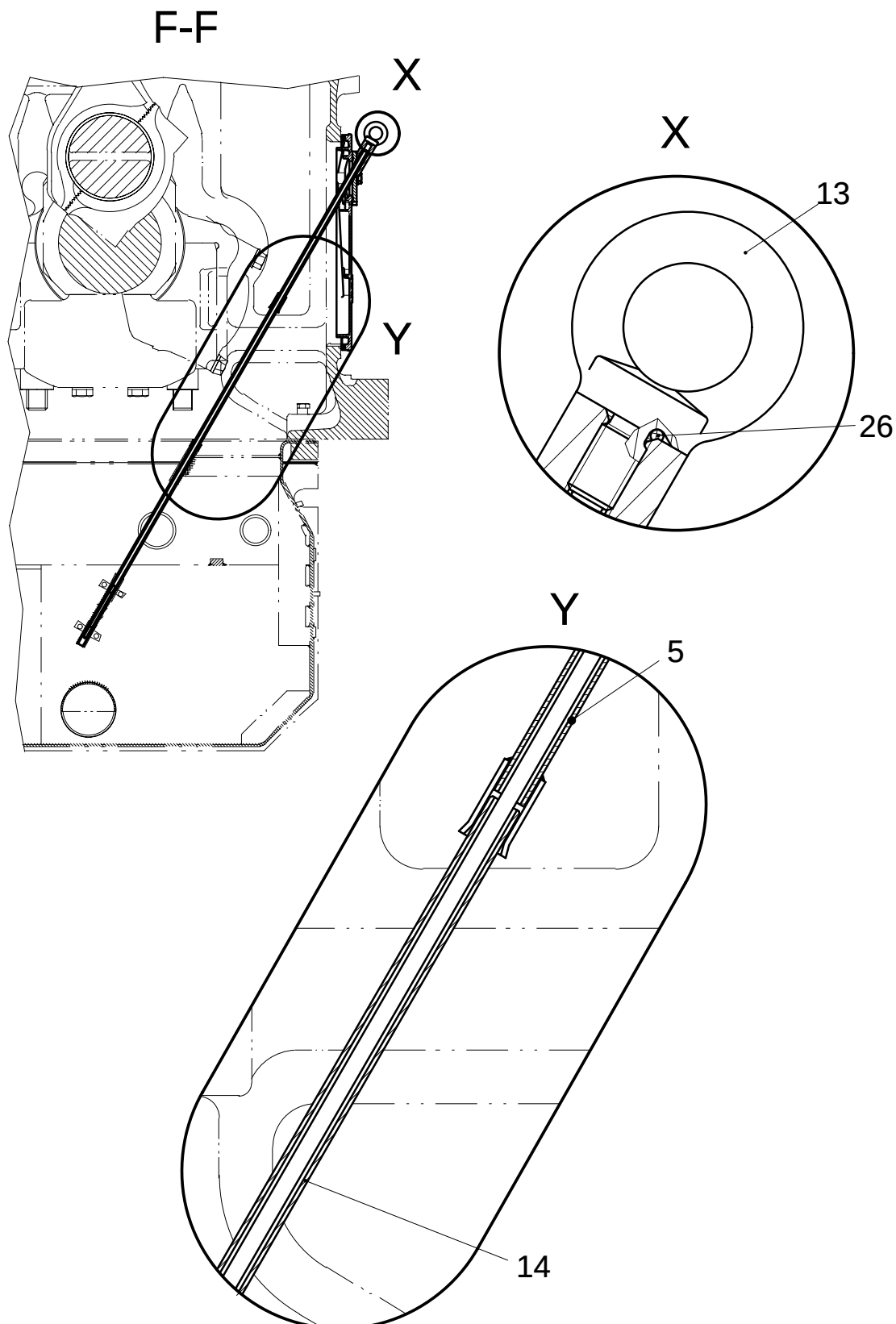
E-E



Engine Housing Covers

M25

03



Engine Housing Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	VERKLEIDUNG, VOLLST. COVERS ASSEMBLY	1	251112 FF
1	NOCKENWELLEDECKEL, VOLLST. CAMSHAFT COVER, COMPL.	1	251112-001
2	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	9	SIEHE B1.05.03.7.1630 SEE B1.05.03.7.1630
3	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	11	SIEHE B1.05.03.251633 SEE B1.05.03.251633
4	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	5	SIEHE B1.05.03.1.1630 SEE B1.05.03.1.1630
5	KURBELRAUMDECKEL MIT ÖLPEILSTAB CRANKCASE COVER WITH OIL DIPSTICK	1	251112-105
6	KURBELRAUMDECKEL MIT ÖLEINFÜLLSTUTZEN CRANKCASE COVER WITH OIL FILLER NECK	1	251112-106
7	DECKEL COVER	1	251112-005
8	DECKEL COVER	1	251112-007
10	DECKEL COVER	1	251112-009
11	DECKEL COVER	1	251112-010
12	DECKEL COVER	1	251112-012
13	ÖLPEILSTAB OIL DIPSTICK	1	251112-113
14	ÖLPEILSTABFÜHRUNG OIL DIPSTICK GUIDE	1	251112-114
20	DICHTUNG GASKET	# 1	251112-017
21	DICHTUNG GASKET	# 1	251112-119
22	DICHTUNG GASKET	# 2	251112-020
23	DICHTUNG GASKET	# 2	251112-021
26	O-RING O-RING	# 1	1.1633-006
29	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-444
30	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-378

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Engine Housing Covers

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
33	SECHSKANTMUTTER HEXAGON NUT	196	1.2035-032
34	SECHSKANTMUTTER HEXAGON NUT	12	1.2035-033
37	SCHEIBE WASHER	4	1.0040-224

03

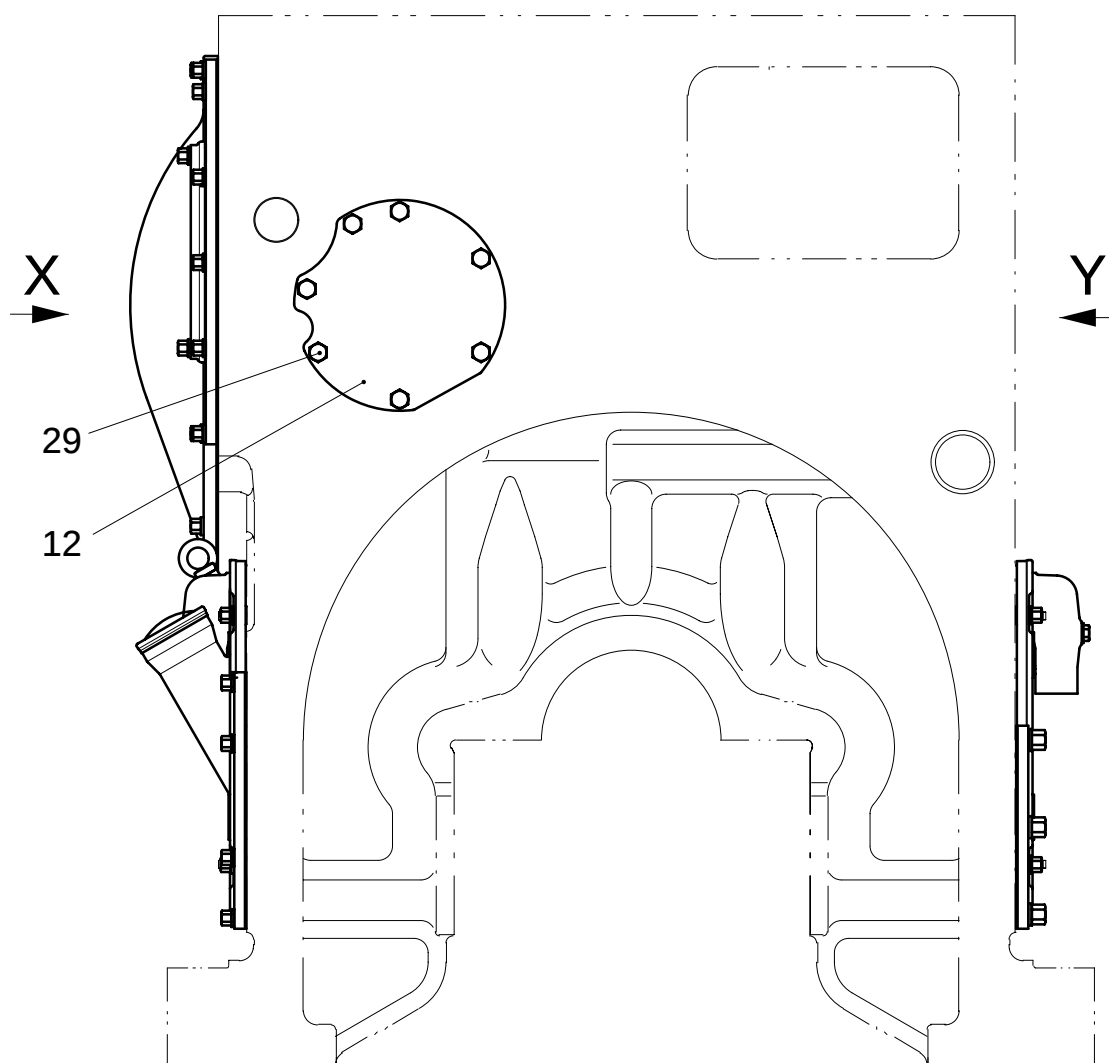
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Engine Housing Covers

M25

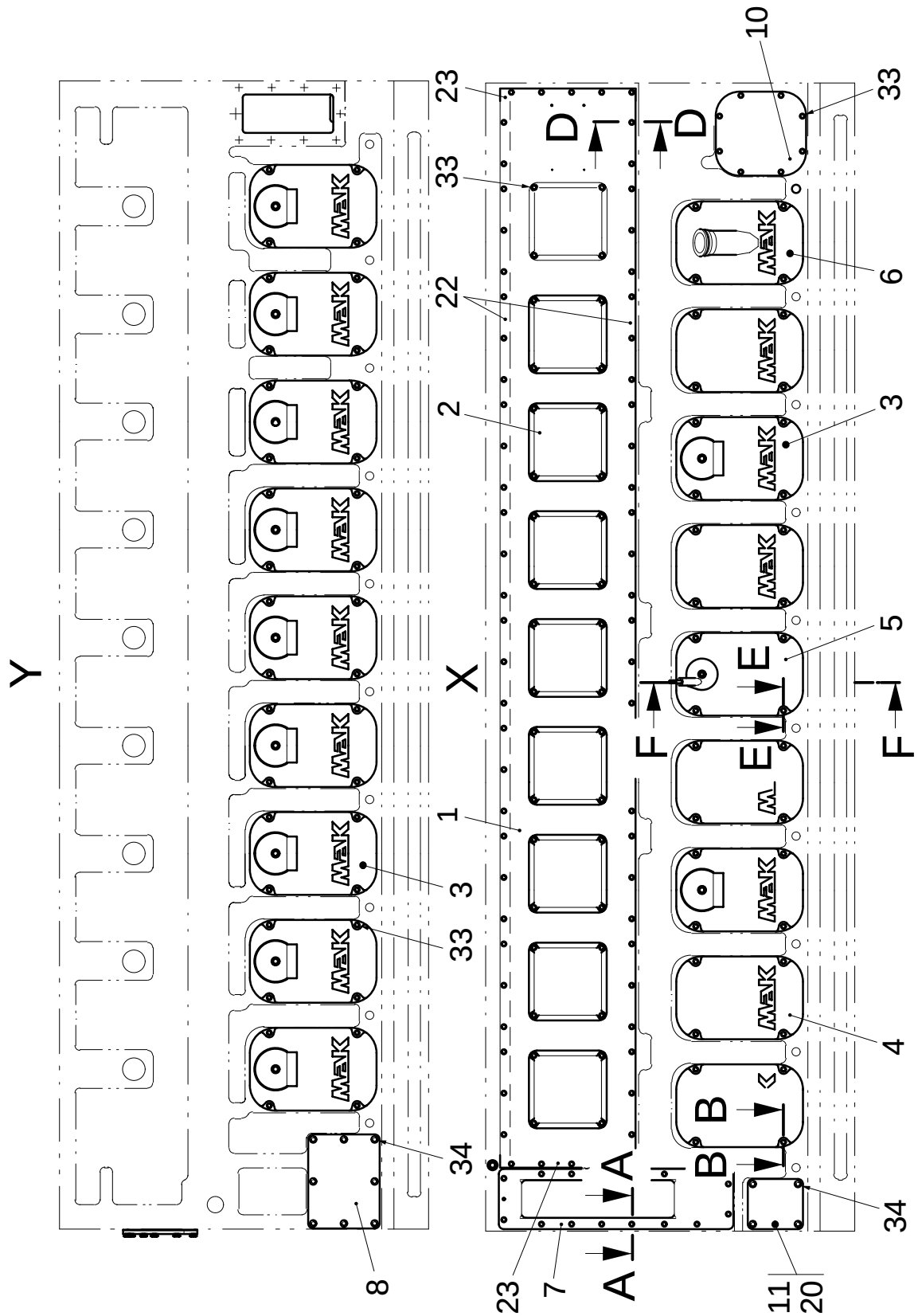
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Engine Housing Covers

M25

03

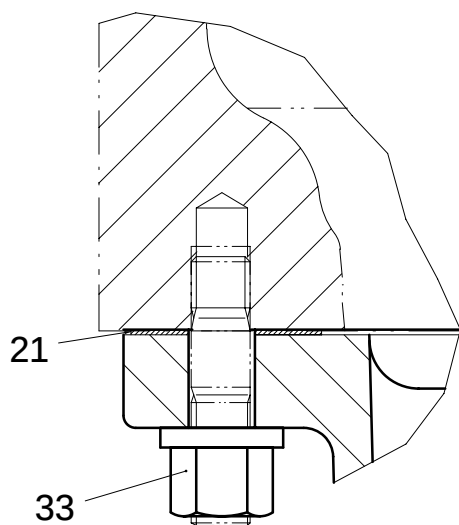


Engine Housing Covers

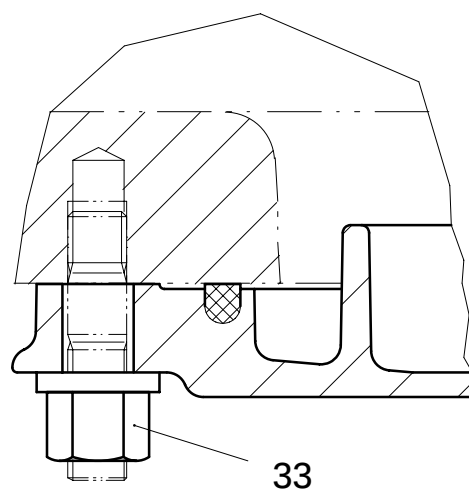
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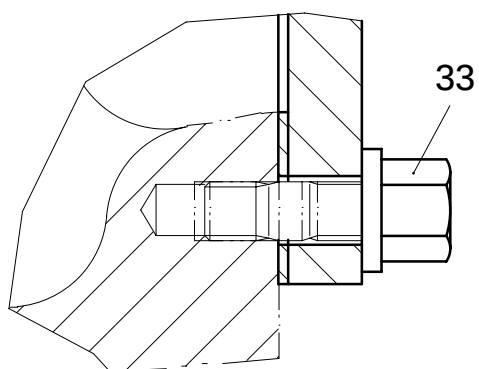
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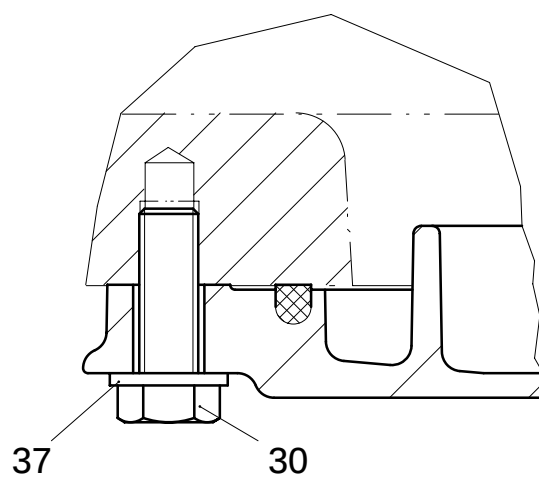
B-B



D-D



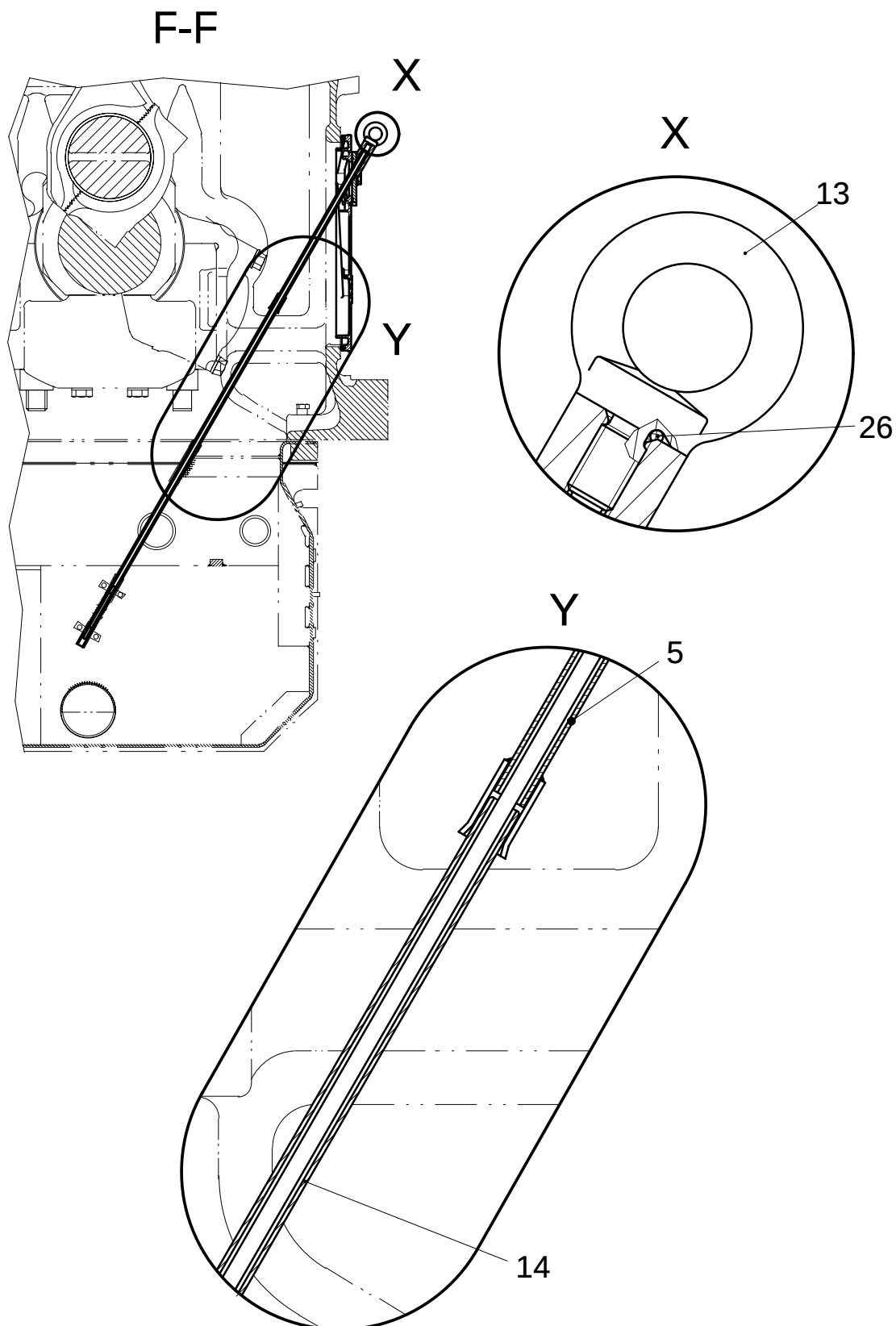
E-E



Engine Housing Covers

M25

03



Engine Housing Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	VERKLEIDUNG, VOLLST. COVERS ASSEMBLY	1	251112 FF
1	NOCKENWELLEDECKEL, VOLLST. CAMSHAFT COVER, COMPL.	1	251112-001
2	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	9	SIEHE B1.05.03.7.1630 SEE B1.05.03.7.1630
3	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	11	SIEHE B1.05.03.251633 SEE B1.05.03.251633
4	KURBELRAUMDECKEL, VOLLST. CRANKCASE COVER, COMPL.	5	SIEHE B1.05.03.1.1630 SEE B1.05.03.1.1630
5	KURBELRAUMDECKEL MIT ÖLPEILSTAB CRANKCASE COVER WITH OIL DIPSTICK	1	251112-105
6	KURBELRAUMDECKEL MIT ÖLEINFÜLLSTUTZEN CRANKCASE COVER WITH OIL FILLER NECK	1	251112-106
7	DECKEL COVER	1	251112-005
8	DECKEL COVER	1	251112-007
10	DECKEL COVER	1	251112-009
11	DECKEL COVER	1	251112-010
12	DECKEL COVER	1	251112-012
13	ÖLPEILSTAB OIL DIPSTICK	1	251112-113
14	ÖLPEILSTABFÜHRUNG OIL DIPSTICK GUIDE	1	251112-114
20	DICHTUNG GASKET	# 1	251112-017
21	DICHTUNG GASKET	# 1	251112-119
22	DICHTUNG GASKET	# 2	251112-020
23	DICHTUNG GASKET	# 2	251112-021
26	O-RING O-RING	# 1	1.1633-006
29	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-444
30	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-378

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Engine Housing Covers

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
33	SECHSKANTMUTTER HEXAGON NUT	196	1.2035-032
34	SECHSKANTMUTTER HEXAGON NUT	12	1.2035-033
37	SCHEIBE WASHER	4	1.0040-224

03

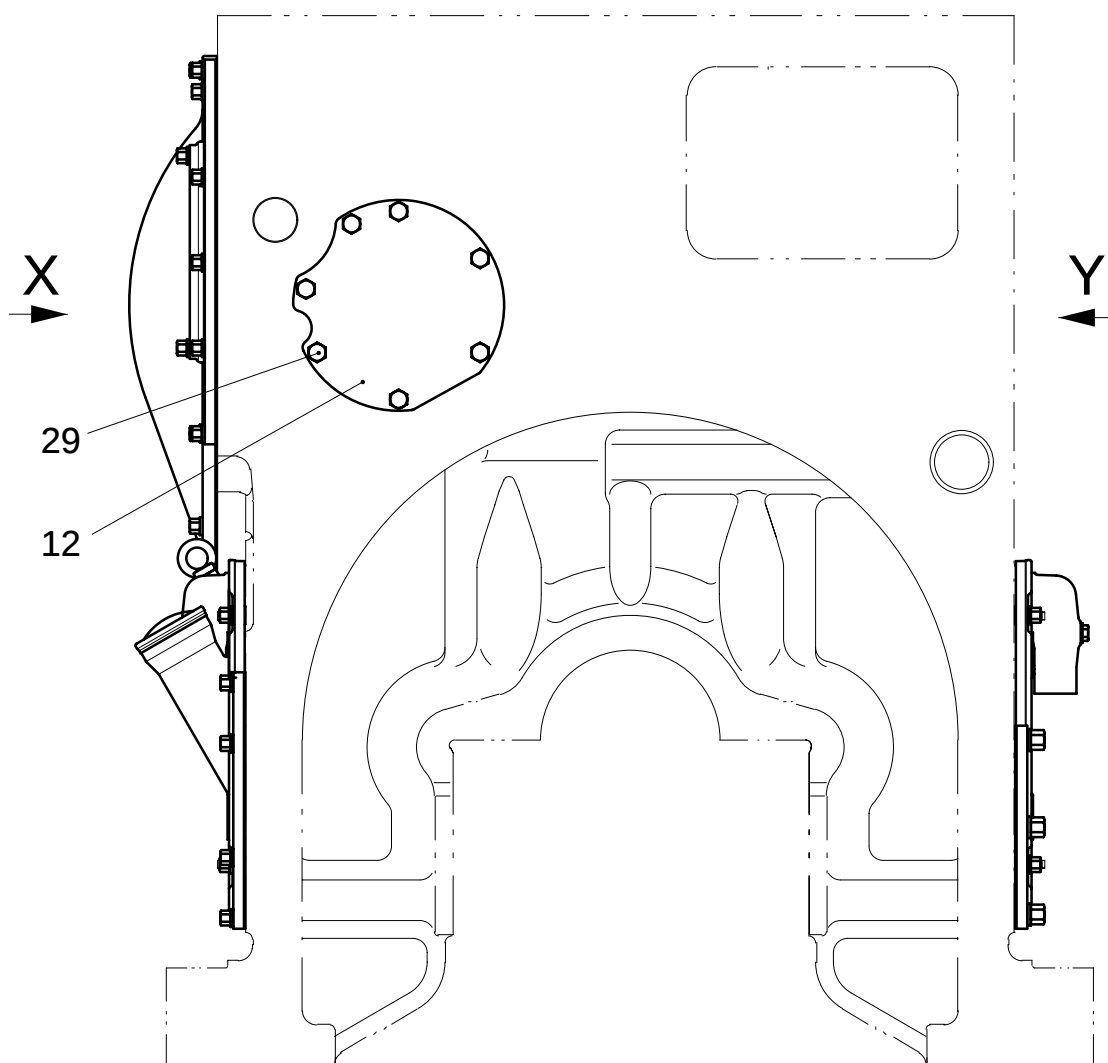
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Engine Housing Covers

M25

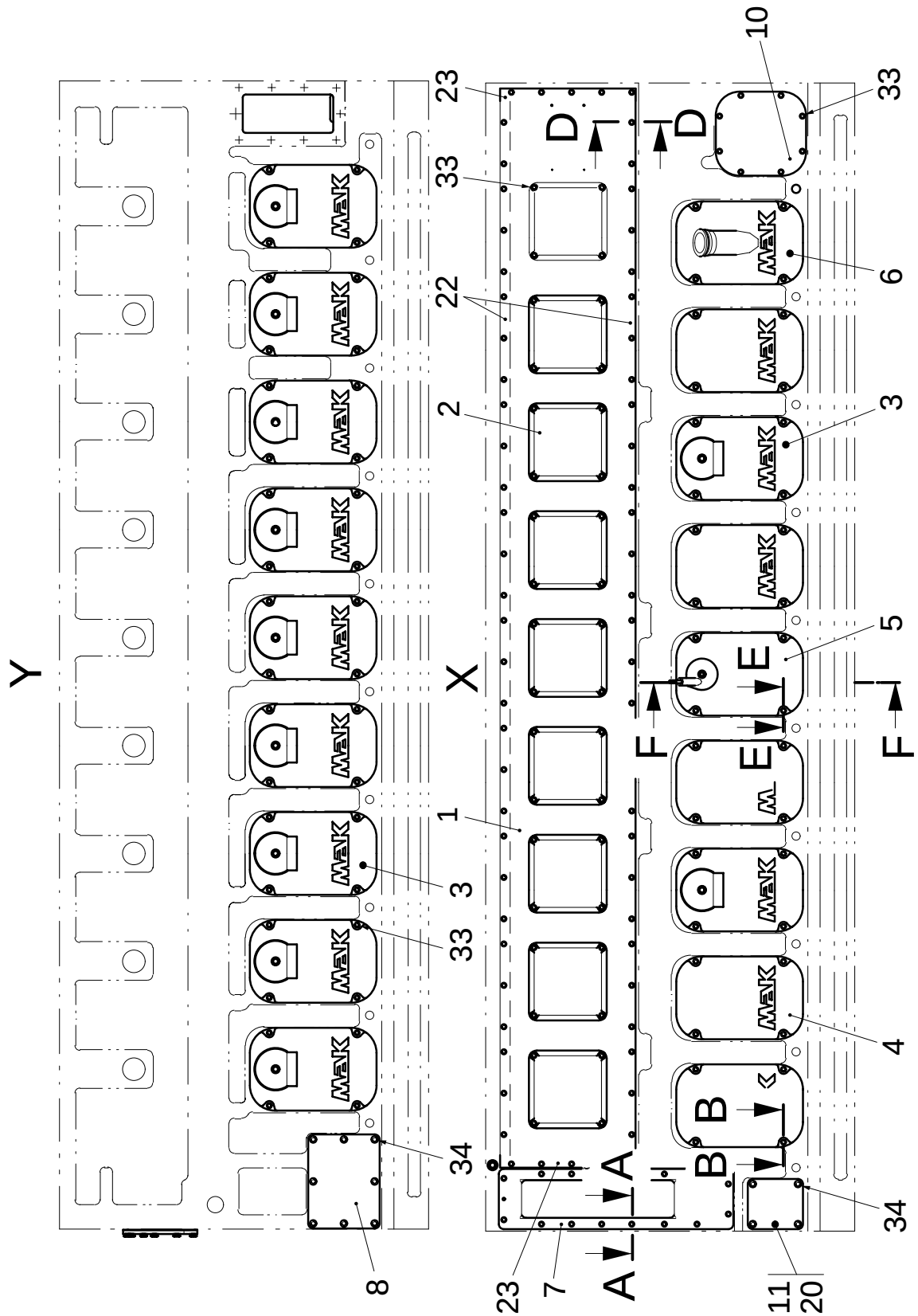
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Engine Housing Covers

M25

03

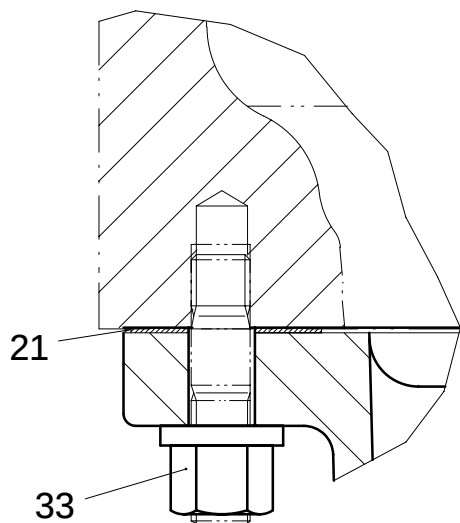


Engine Housing Covers

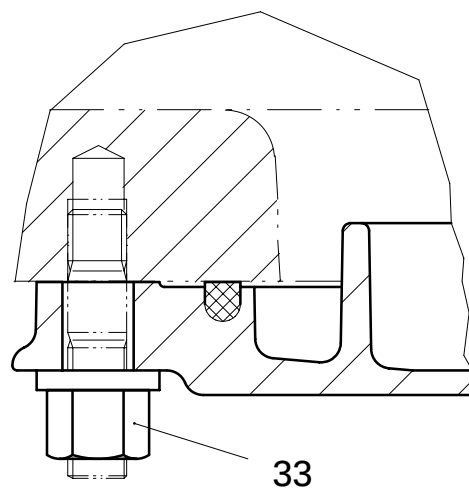
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03

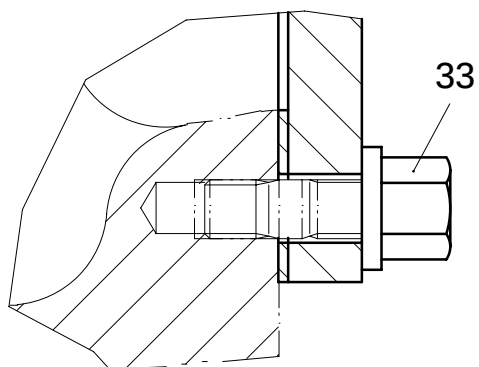
A-A



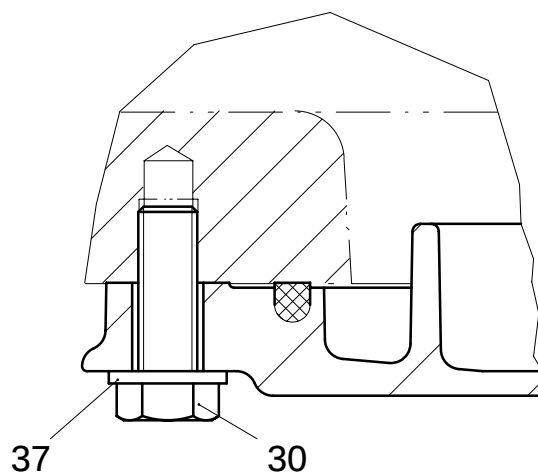
B-B



D-D



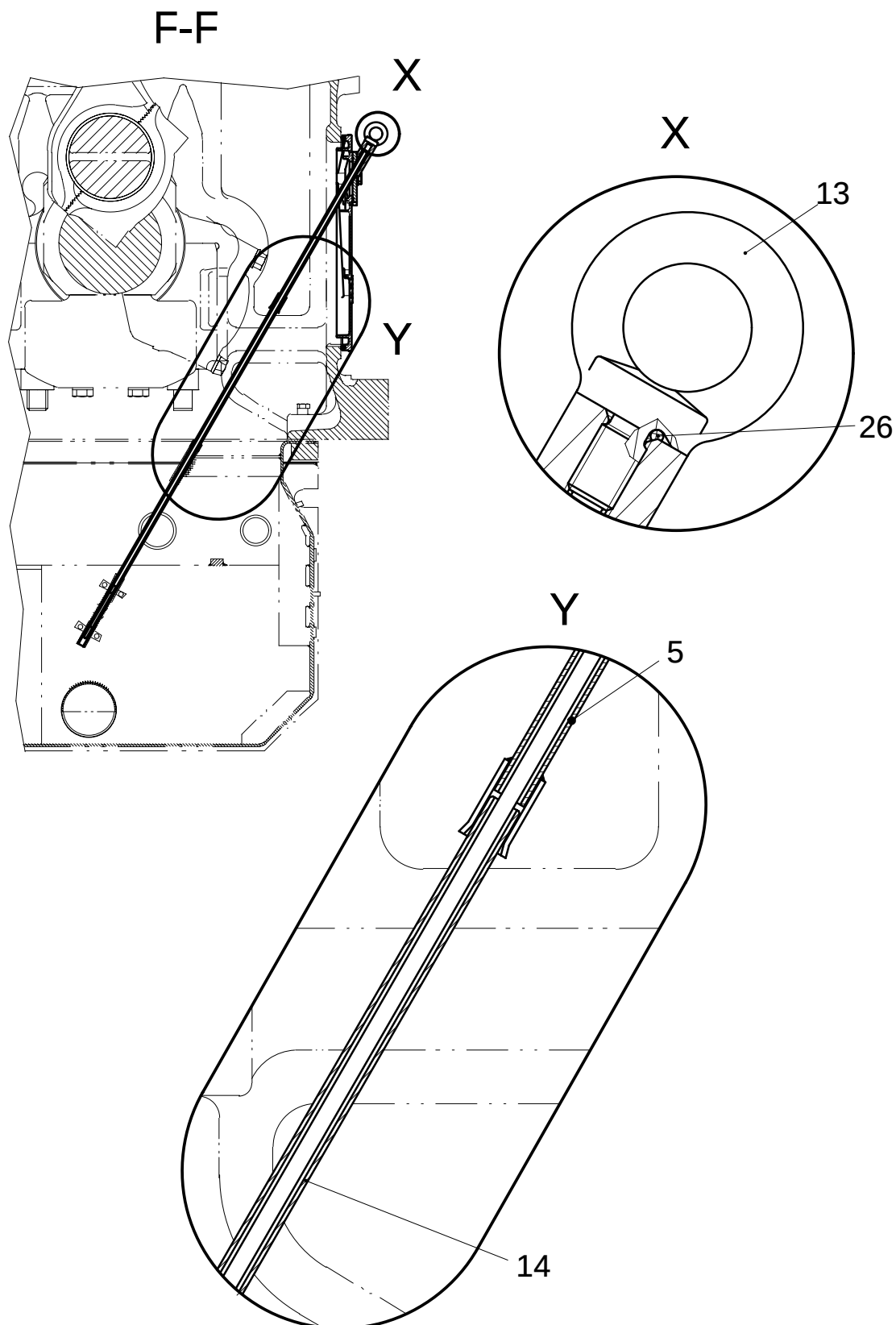
E-E



Engine Housing Covers

M25

03



Crankcase Breather Mounting

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KURBELR.-ENTL.-ANBAU, VOLLST. CRANKCASE BREATHER MOUNTING ASSEMBLY	1	251165 AA
1	FLANSCH BLANK FLANGE	1	1.5341-020
2	ROHR F. KURBELR.-ENTL., VOLLST. VENT PIPE, COMPL.	1	251165-002
3	DICHTUNG GASKET	# 2	1.7073-736
4	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-444
5	FLANSCH FLANGE	1	1.5340-120
6	DICHTUNG GASKET	# 1	1.7073-357
7	VERSCHLUSSSCHEIBE DISK	1	1.5341-127
8	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-449
9	SECHSKANTMUTTER HEXAGON NUT	8	1.2011-038

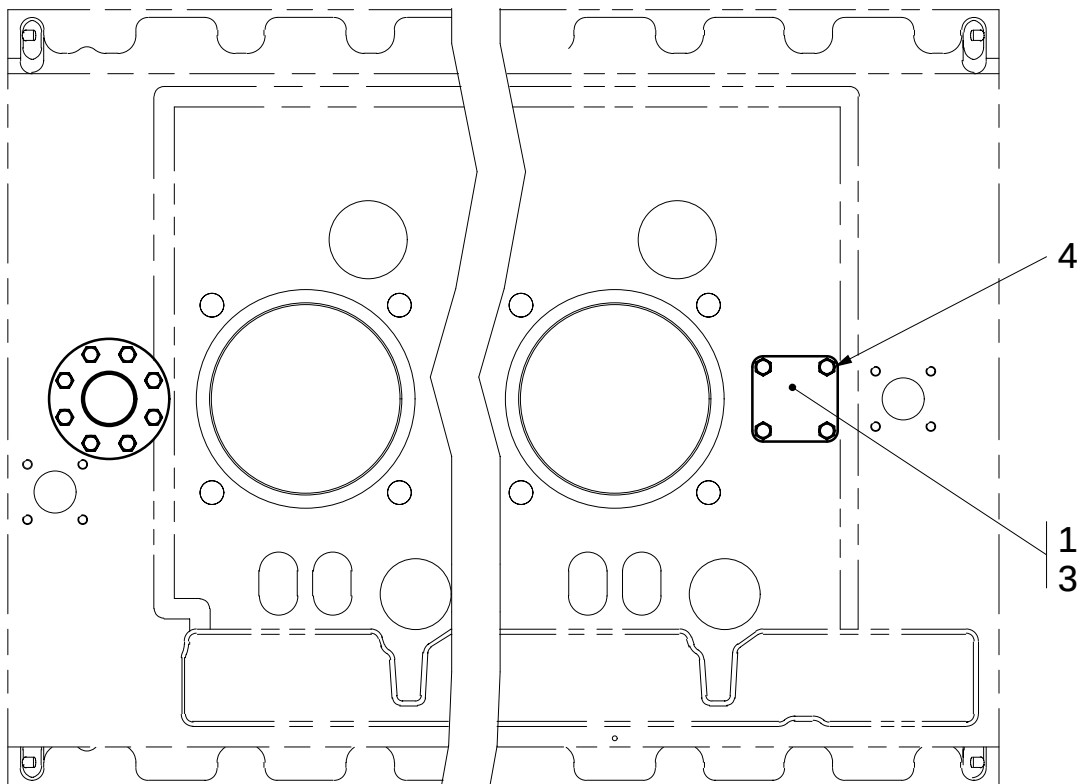
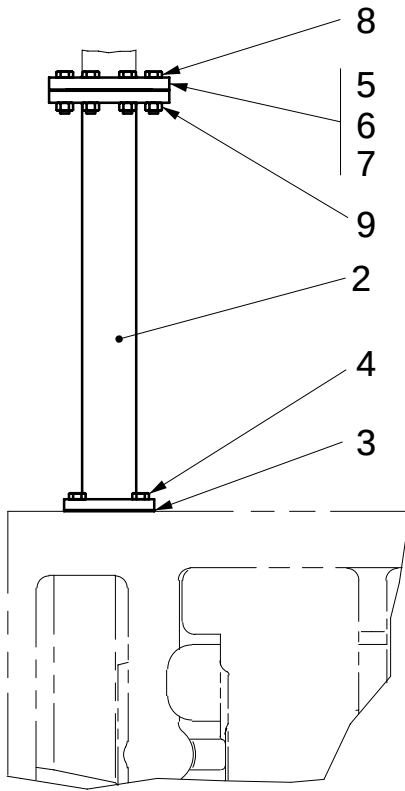
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Crankcase Breather Mounting

M25

03



Crankcase Breather Mounting

M25

03

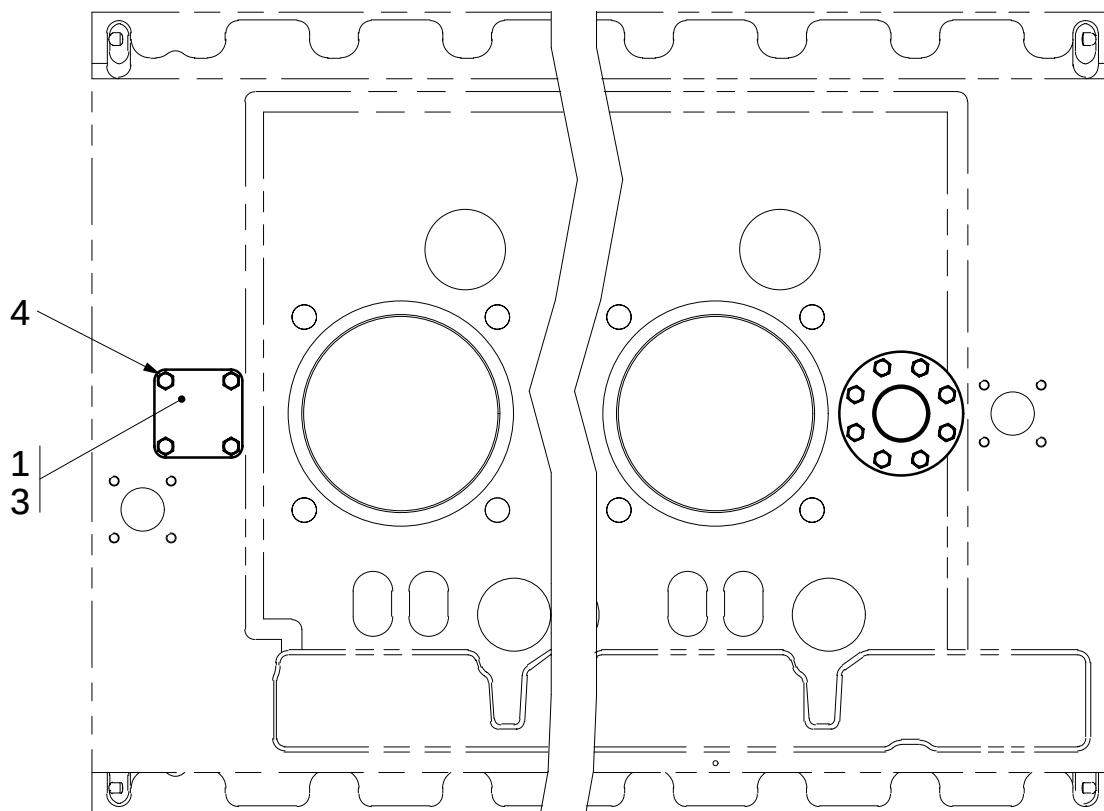
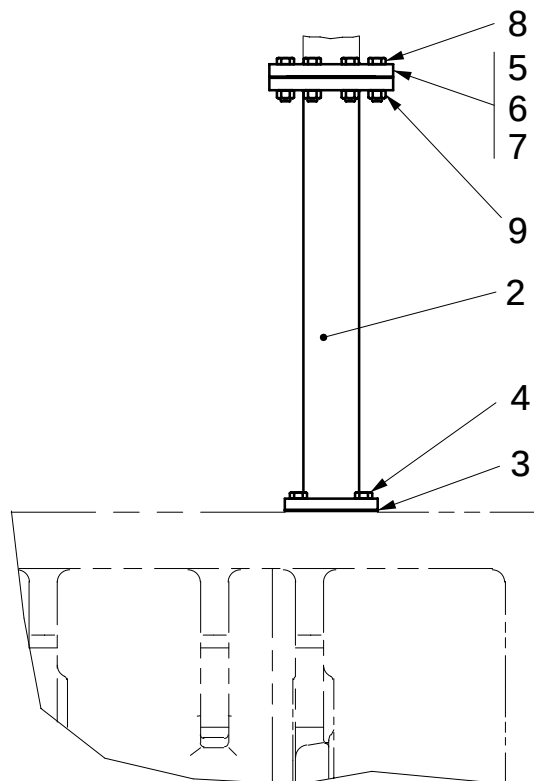
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KURBELR.-ENTL.-ANBAU, VOLLST. CRANKCASE BREATHER MOUNTING ASSEMBLY	1	251165 BB
1	FLANSCH BLANK FLANGE	1	1.5341-020
2	ROHR F. KURBELR.-ENTL., VOLLST. VENT PIPE, COMPL.	1	251165-002
3	DICHTUNG GASKET	# 2	1.7073-736
4	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-444
5	FLANSCH FLANGE	1	1.5340-120
6	DICHTUNG GASKET	# 1	1.7073-357
7	VERSCHLUSSSCHEIBE DISK	1	1.5341-127
8	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-449
9	SECHSKANTMUTTER HEXAGON NUT	8	1.2011-038

= VERBRAUCHSTEILE
CONSUMABLES

Crankcase Breather Mounting

M25

03



Oil Pan Mounting

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ANBAU DER ÖLWANNE, VOLLST. OIL PAN MOUNTING ASSEMBLY	1	251220 AA
1	ÖLWANNE, VOLLST. OIL PAN, COMPL.	1	251220-001
2	DICHTUNG GASKET	# 1	251220-002
3	FLANSCH FLANGE	1	1.1200-010
4	DICHTUNG GASKET	# 1	1.1200-012
5	FLANSCH FLANGE	1	251220-005
6	DICHTUNG GASKET	# 1	251220-006
8	FLANSCH BLANK FLANGE	2	1.5341-002
11	DICHTUNG GASKET	# 2	1.7073-727
14	SECHSKANTSCHRAUBE HEXAGON BOLT	42	1.1367-380
15	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-375
16	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-374
17	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-445
20	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-310
21	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-376
22	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-374
24	DEHNHÜLSE EXTENSION SLEEVE	42	1.0502-074
27	SPANNSCHEIBE CONICAL SPRING WASHER	# 11	1.0068-240

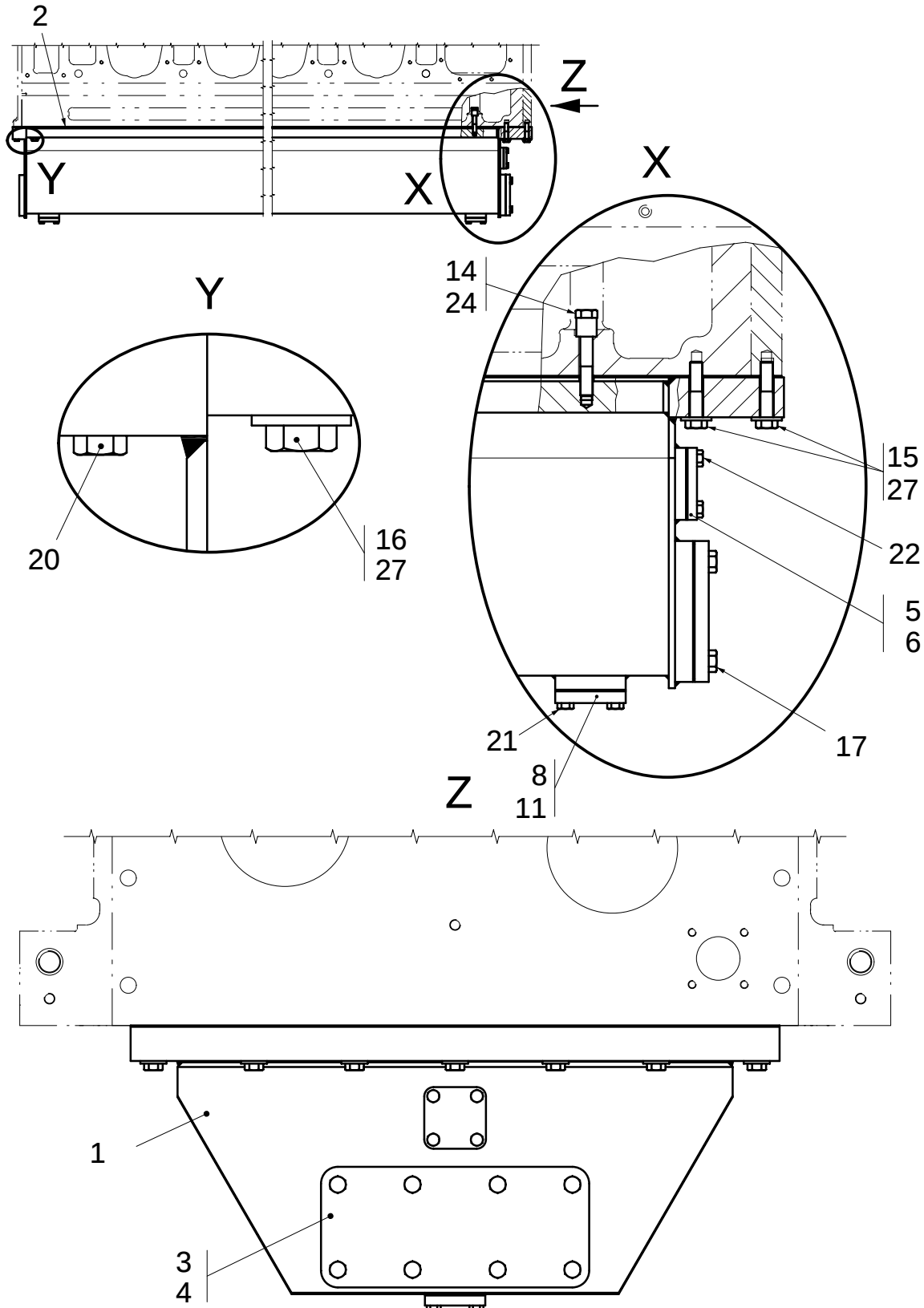
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Oil Pan Mounting

M25

03



Oil Pan Mounting

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ANBAU DER ÖLWANNE, VOLLST. OIL PAN MOUNTING ASSEMBLY	1	251220 BB
1	ÖLWANNE, VOLLST. OIL PAN, COMPL.	1	251220-001
2	DICHTUNG GASKET	# 1	251220-002
3	FLANSCH FLANGE	1	1.1200-010
4	DICHTUNG GASKET	# 1	1.1200-012
5	FLANSCH FLANGE	1	251220-005
6	DICHTUNG GASKET	# 1	251220-006
8	FLANSCH BLANK FLANGE	2	1.5341-002
11	DICHTUNG GASKET	# 2	1.7073-727
14	SECHSKANTSCHRAUBE HEXAGON BOLT	54	1.1367-380
15	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-375
16	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-374
17	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-445
20	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-310
21	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-376
22	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-374
24	DEHNHÜLSE EXTENSION SLEEVE	54	1.0502-074
27	SPANNSCHEIBE CONICAL SPRING WASHER	# 11	1.0068-240

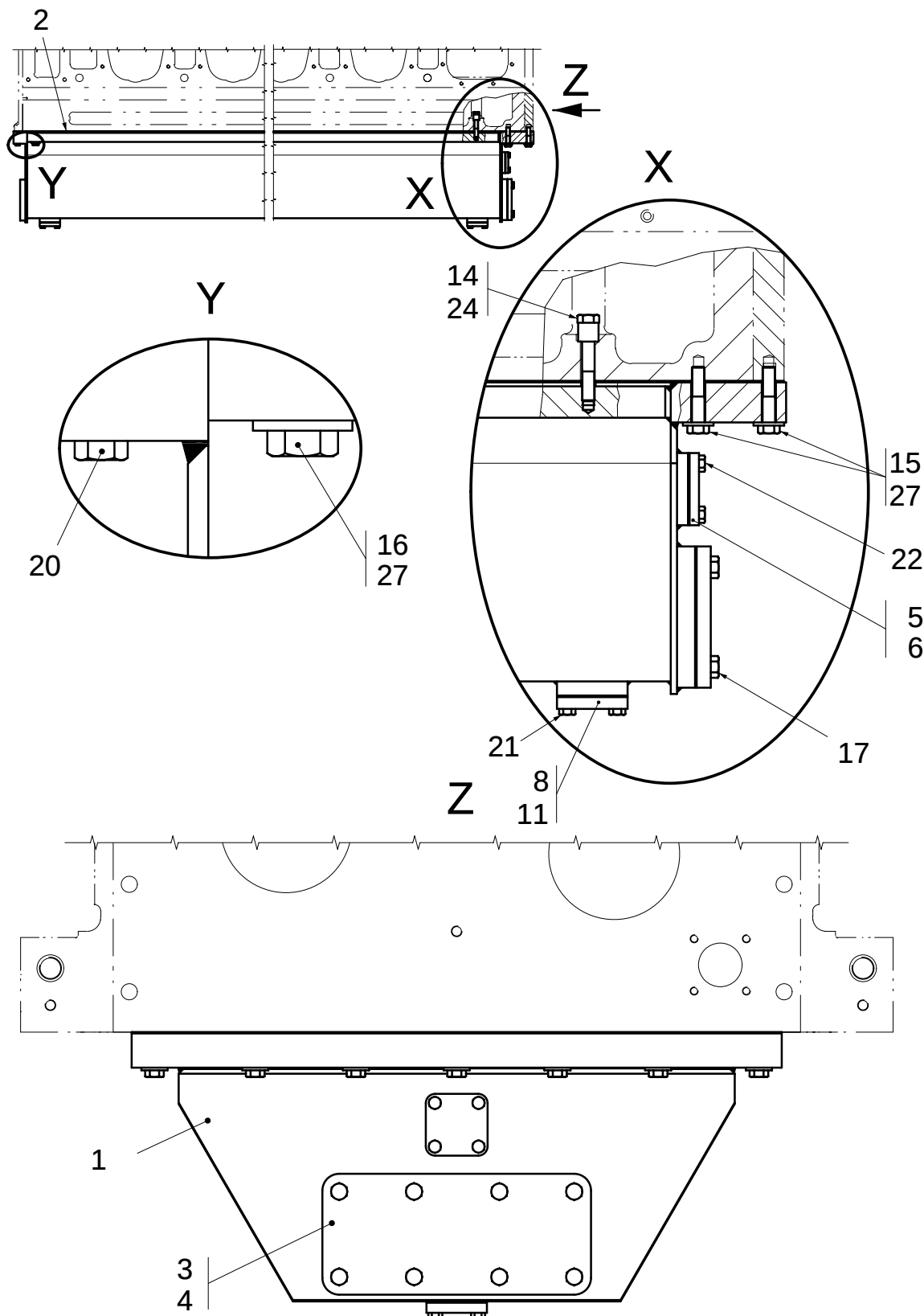
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Oil Pan Mounting

M25

03



Oil Pan Mounting

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ANBAU DER ÖLWANNE, VOLLST. OIL PAN MOUNTING ASSEMBLY	1	251220 CC
1	ÖLWANNE, VOLLST. OIL PAN, COMPL.	1	251220-001
2	DICHTUNG GASKET	# 1	251220-002
3	FLANSCH FLANGE	1	1.1200-010
4	DICHTUNG GASKET	# 1	1.1200-012
5	FLANSCH FLANGE	1	251220-005
6	DICHTUNG GASKET	# 1	251220-006
8	FLANSCH BLANK FLANGE	2	1.5341-002
11	DICHTUNG GASKET	# 2	1.7073-727
14	SECHSKANTSCHRAUBE HEXAGON BOLT	60	1.1367-380
15	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-375
16	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-374
17	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-445
20	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-310
21	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-376
22	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-374
24	DEHNHÜLSE EXTENSION SLEEVE	60	1.0502-074
27	SPANNSCHEIBE CONICAL SPRING WASHER	# 11	1.0068-240

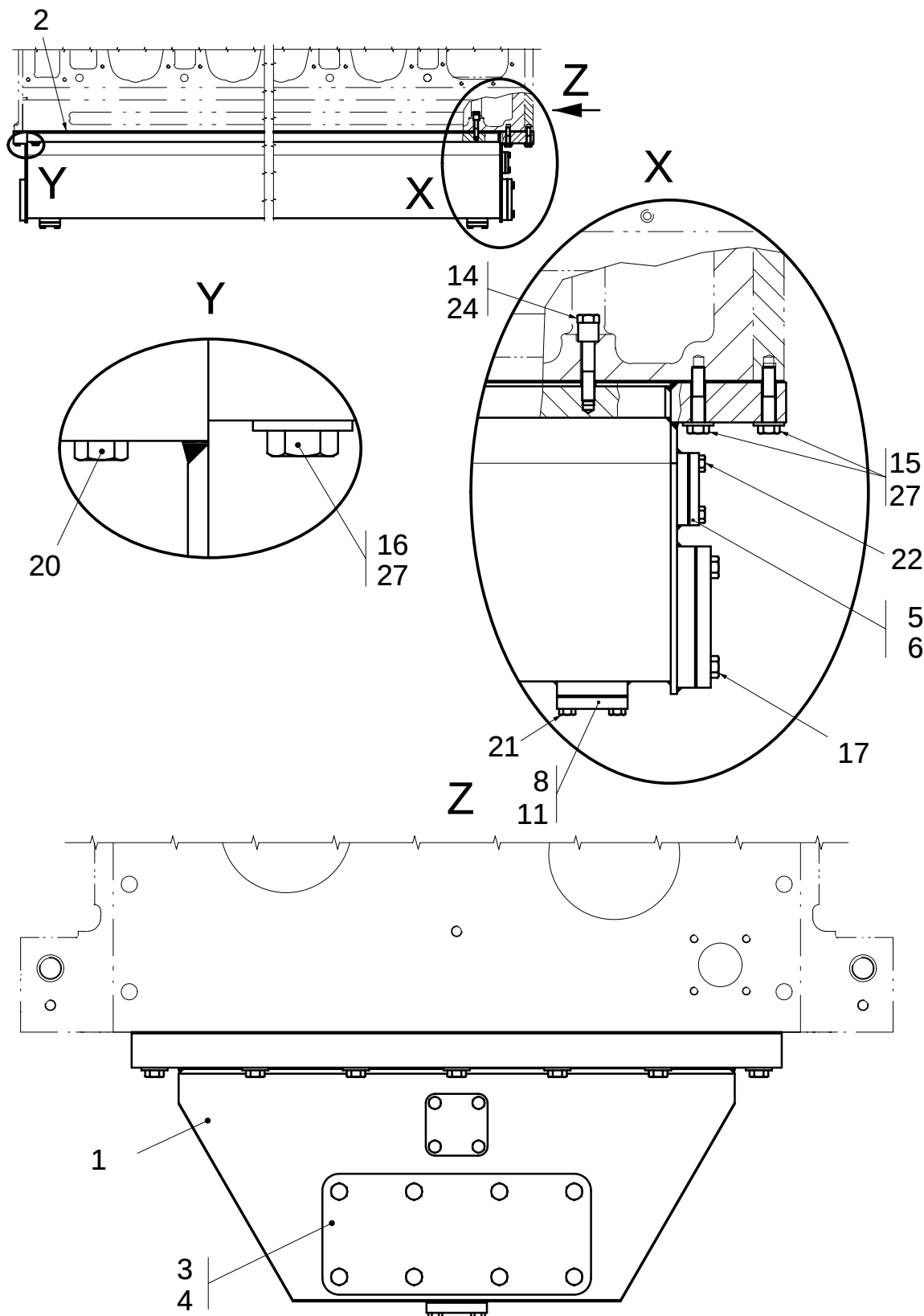
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Oil Pan Mounting

M25

03



Oil Pan Mounting

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ANBAU DER ÖLWANNE, VOLLST. OIL PAN MOUNTING ASSEMBLY	1	251220 DD
1	ÖLWANNE, VOLLST. OIL PAN, COMPL.	1	251220-001
2	DICHTUNG GASKET	# 1	251220-002
5	FLANSCH FLANGE	1	251220-105
6	FLANSCH BLANK FLANGE	1	1.5340-115
9	DICHTUNG GASKET	# 1	1.7073-355
10	DICHTUNG GASKET	# 1	1.7073-356
14	SECHSKANTSCHRAUBE HEXAGON BOLT	42	1.1367-380
15	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-375
16	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-374
17	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-446
20	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-310
24	DEHNHÜLSE EXTENSION SLEEVE	42	1.0502-074
27	SPANNSCHEIBE CONICAL SPRING WASHER	# 11	1.0068-240
30	VERSCHLUSSSCHRAUBE SCREW PLUG	3	1.1041-616
31	VERSCHLUSSSCHRAUBE SCREW PLUG	4	1.1040-360
34	DICHTRING JOINT RING	# 3	1.7010-355
35	DICHTRING JOINT RING	# 4	1.7010-102

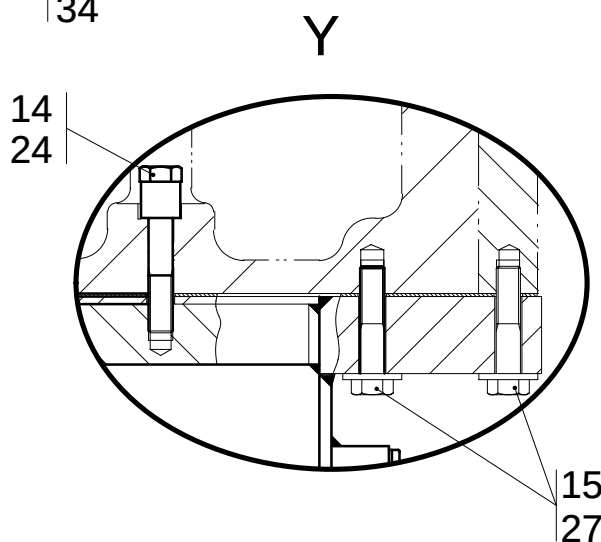
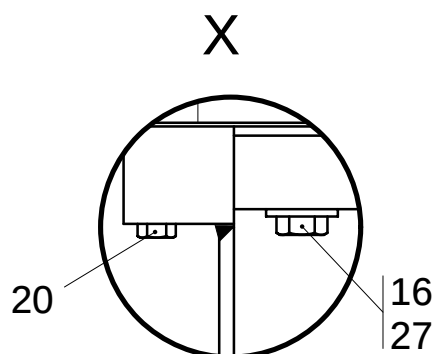
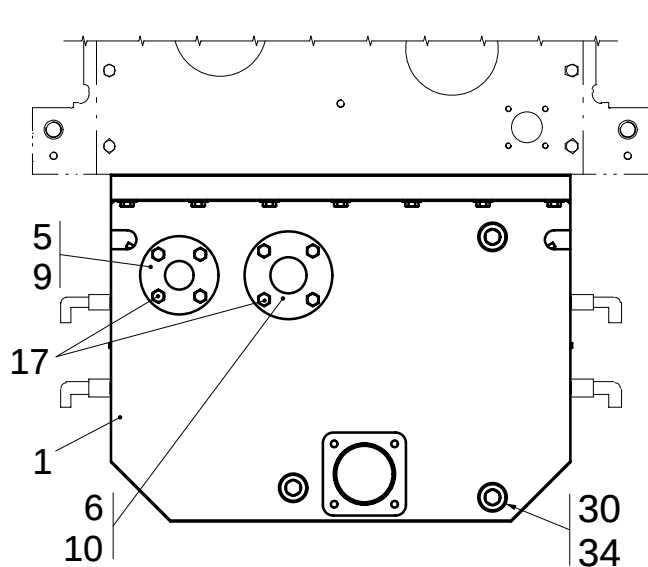
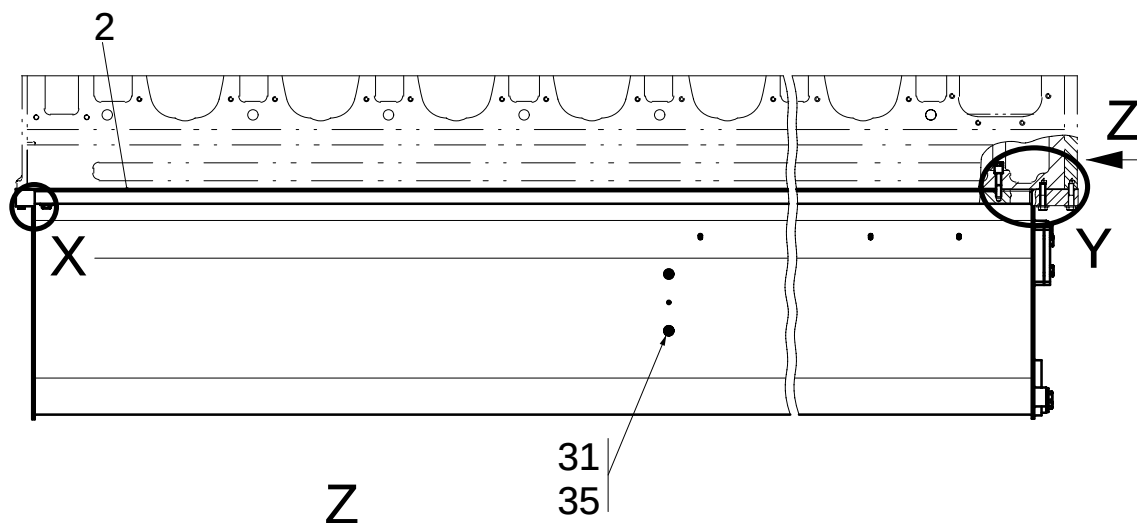
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Oil Pan Mounting

M25

03



Oil Pan Mounting

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ANBAU DER ÖLWANNE, VOLLST. OIL PAN MOUNTING ASSEMBLY	1	251220 EE
1	ÖLWANNE, VOLLST. OIL PAN, COMPL.	1	251220-001
2	DICHTUNG GASKET	# 1	251220-002
5	FLANSCH FLANGE	1	251220-105
6	FLANSCH BLANK FLANGE	1	1.5340-115
9	DICHTUNG GASKET	# 1	1.7073-355
10	DICHTUNG GASKET	# 1	1.7073-356
14	SECHSKANTSCHRAUBE HEXAGON BOLT	54	1.1367-380
15	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-375
16	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-374
17	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-446
20	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-310
24	DEHNHÜLSE EXTENSION SLEEVE	54	1.0502-074
27	SPANNSCHEIBE CONICAL SPRING WASHER	# 11	1.0068-240
30	VERSCHLUSSSCHRAUBE SCREW PLUG	3	1.1041-616
31	VERSCHLUSSSCHRAUBE SCREW PLUG	4	1.1040-360
34	DICHTRING JOINT RING	# 3	1.7010-355
35	DICHTRING JOINT RING	# 4	1.7010-102

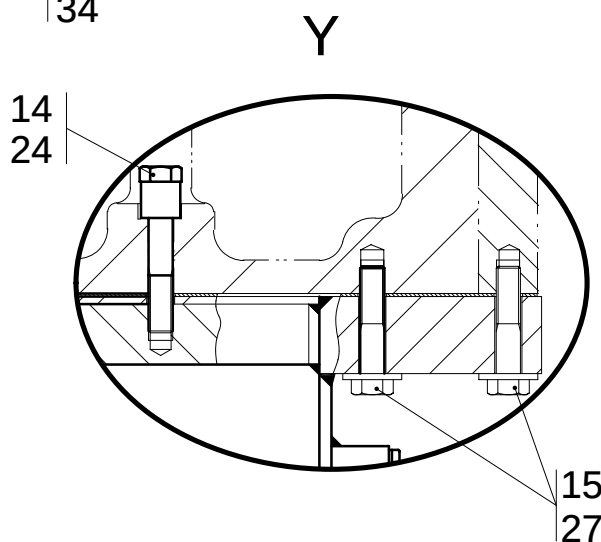
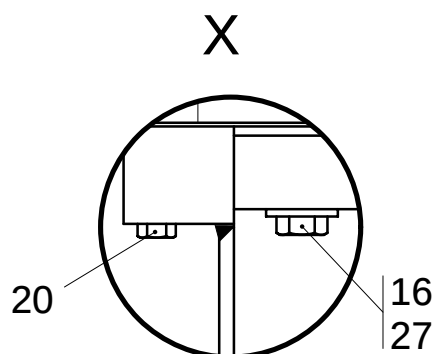
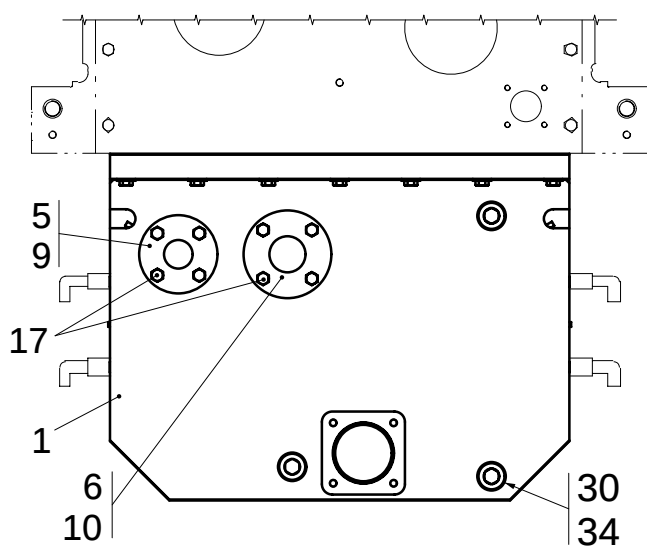
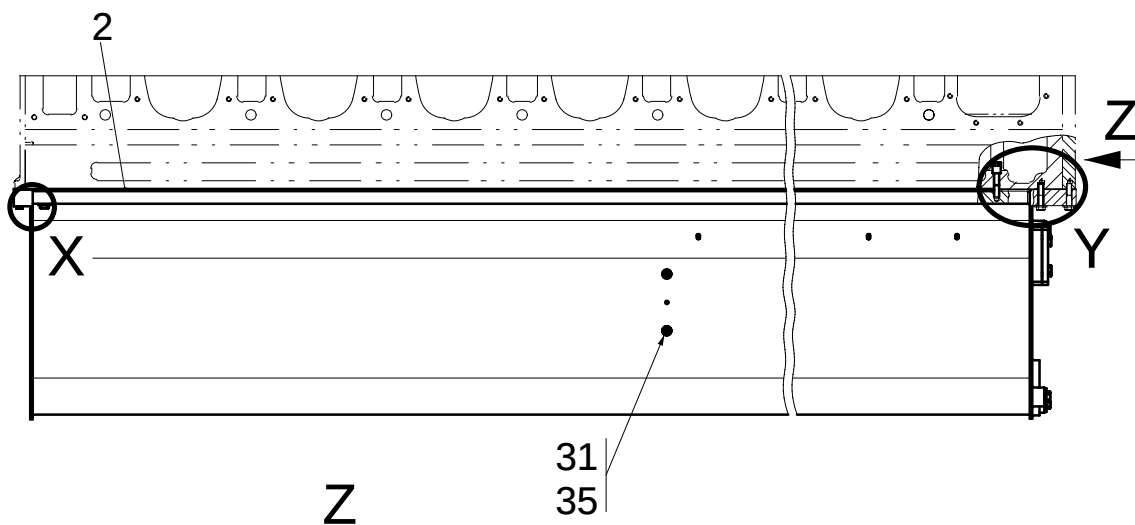
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Oil Pan Mounting

M25

03



Oil Pan Mounting

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ANBAU DER ÖLWANNE, VOLLST. OIL PAN MOUNTING ASSEMBLY	1	251220 FF
1	ÖLWANNE, VOLLST. OIL PAN, COMPL.	1	251220-001
2	DICHTUNG GASKET	# 1	251220-002
5	FLANSCH FLANGE	1	251220-105
6	FLANSCH BLANK FLANGE	1	1.5340-115
9	DICHTUNG GASKET	# 1	1.7073-355
10	DICHTUNG GASKET	# 1	1.7073-356
14	SECHSKANTSCHRAUBE HEXAGON BOLT	60	1.1367-380
15	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-375
16	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-374
17	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-446
20	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-310
24	DEHNHÜLSE EXTENSION SLEEVE	60	1.0502-074
27	SPANNSCHEIBE CONICAL SPRING WASHER	# 11	1.0068-240
30	VERSCHLUSSSCHRAUBE SCREW PLUG	3	1.1041-616
31	VERSCHLUSSSCHRAUBE SCREW PLUG	4	1.1040-360
34	DICHTRING JOINT RING	# 3	1.7010-355
35	DICHTRING JOINT RING	# 4	1.7010-102

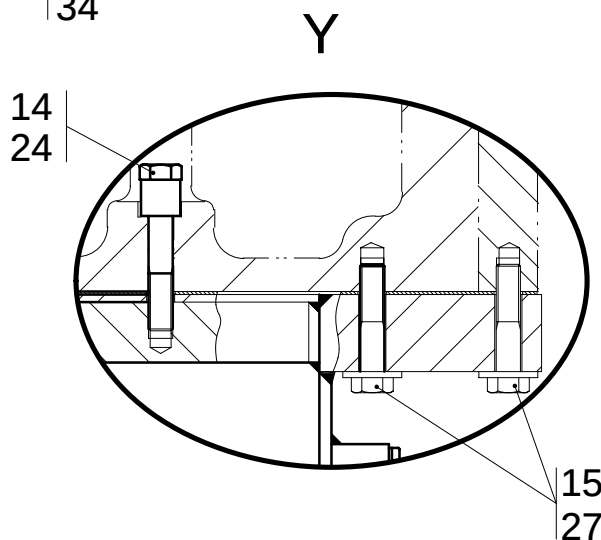
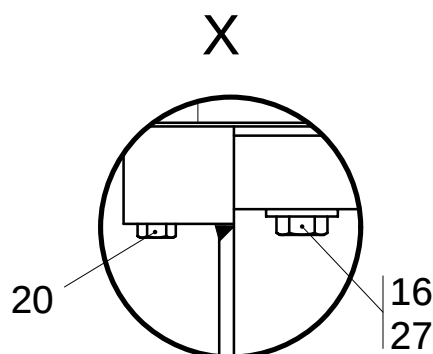
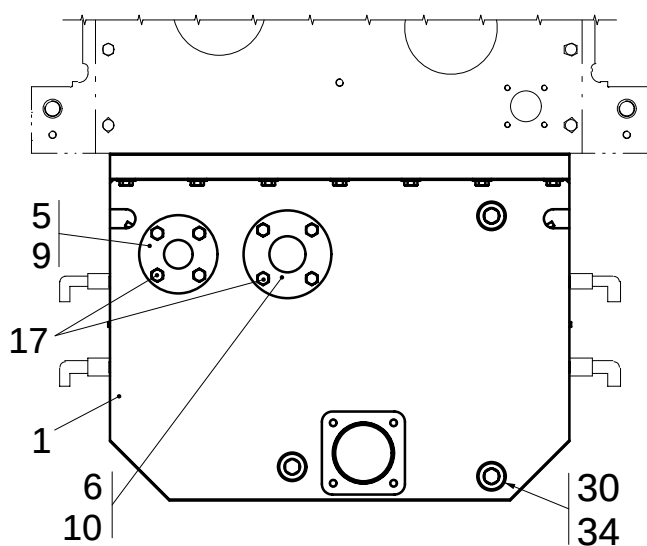
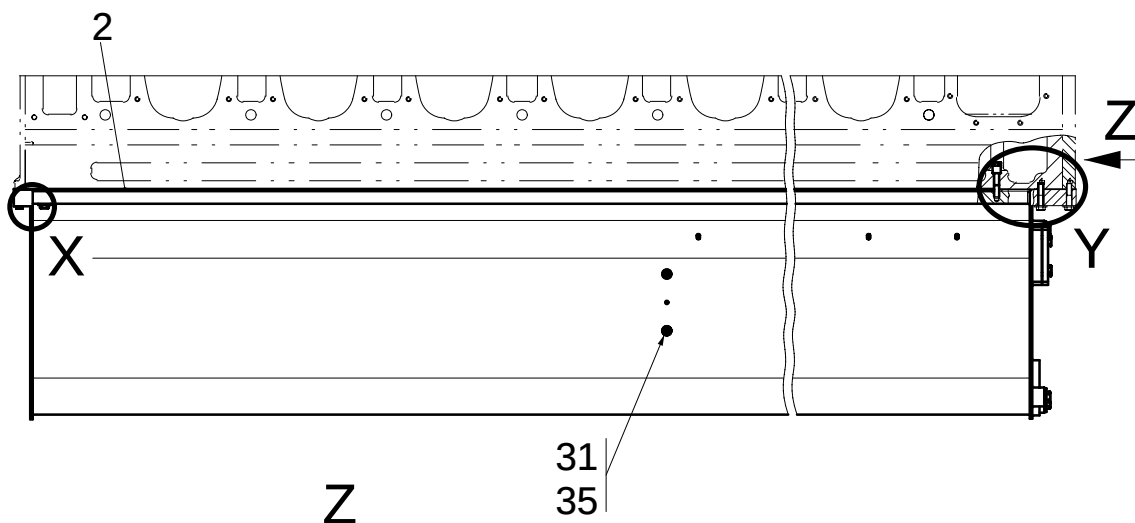
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Oil Pan Mounting

M25

03



Oil Outlet

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	FREIER ÖLABLAUF, VOLLST. OIL OUTLET ASSEMBLY	1	251258 AA
1	STUTZEN ELBOW	1	7.1250-101
2	DICHTUNG GASKET	# 1	1.1200-012
5	FLANSCH FLANGE	1	1.5340-205
8	DICHTUNG GASKET	# 1	1.7073-208
11	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-387
12	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1372-373
15	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-445
18	SECHSKANTMUTTER HEXAGON NUT	8	1.2011-038
21	SCHEIBE WASHER	8	1.0040-227
24	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-613
27	DICHTRING JOINT RING	# 1	1.7010-252

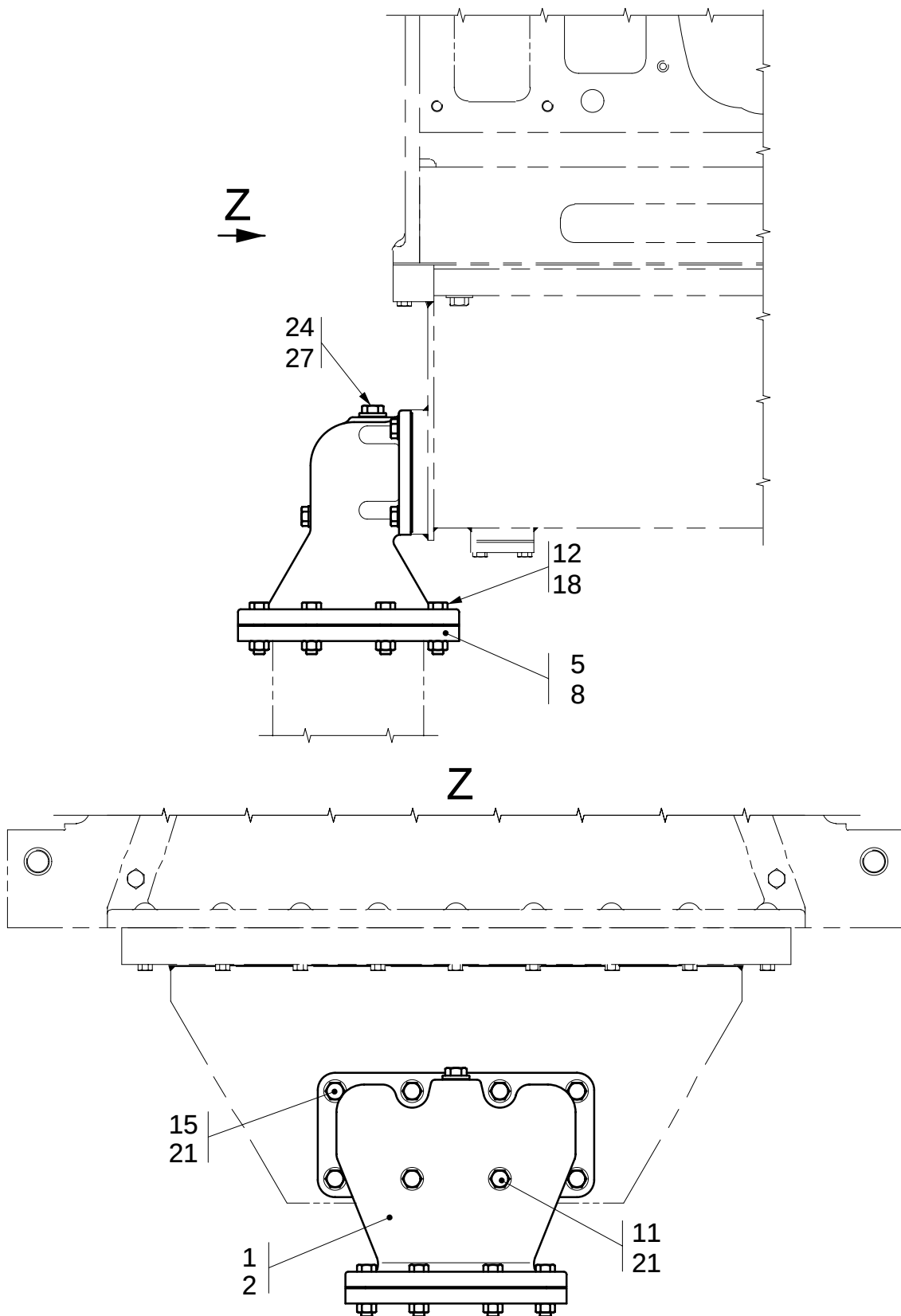
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Oil Outlet

M25

03



Cylinder Liner

M25

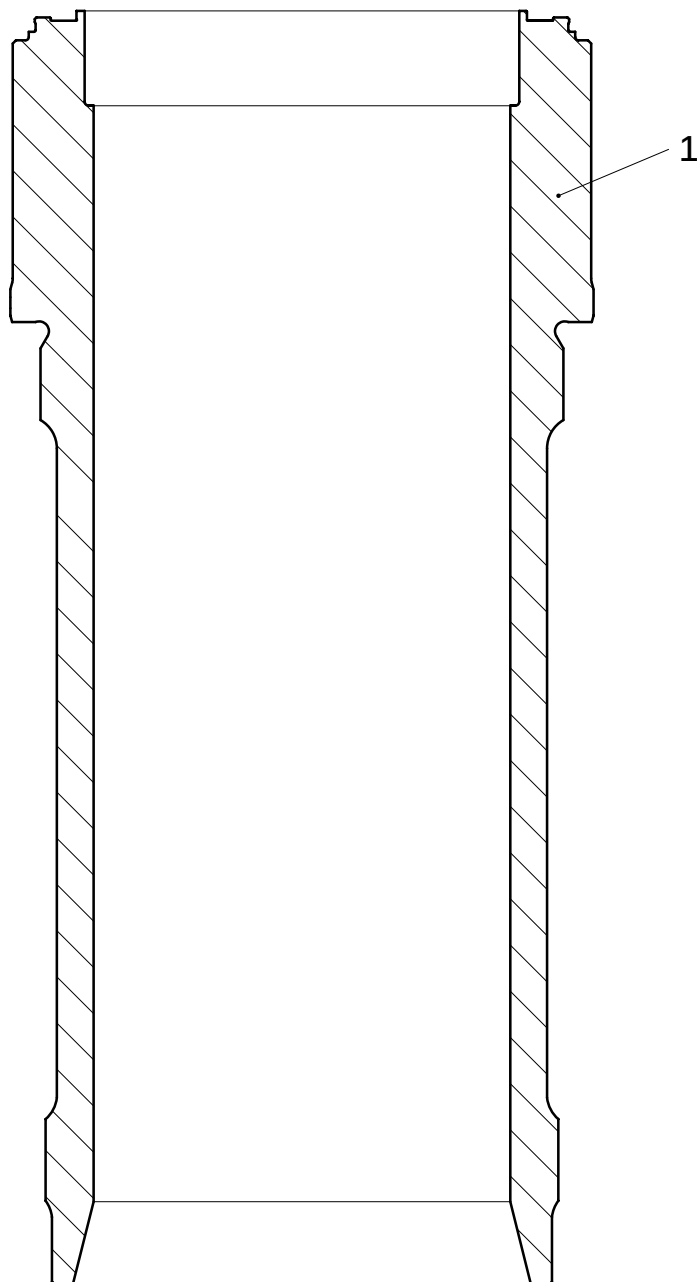
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
1	ZYLINDERBUCHSE CYLINDER LINER	1	251110-006

03

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cylinder Liner

M25

03

Crankcase Cover

M25/M32/M452/
M453C

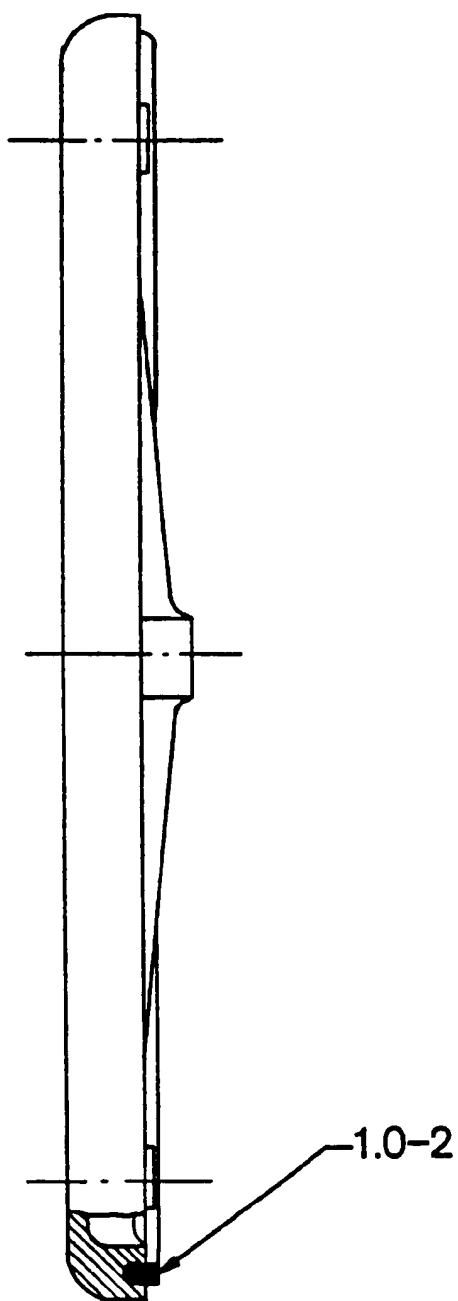
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
1.0	GEHÄUSEDECKEL, VOLLST. CRANKCASE COVER, COMPLETE	1	1.1630 AA	
1.0-2	PROFILSCHNUR RUBBER SEAL	1	1.1630-2	

03

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Crankcase Cover

M25/M32/M452/
M453C

03

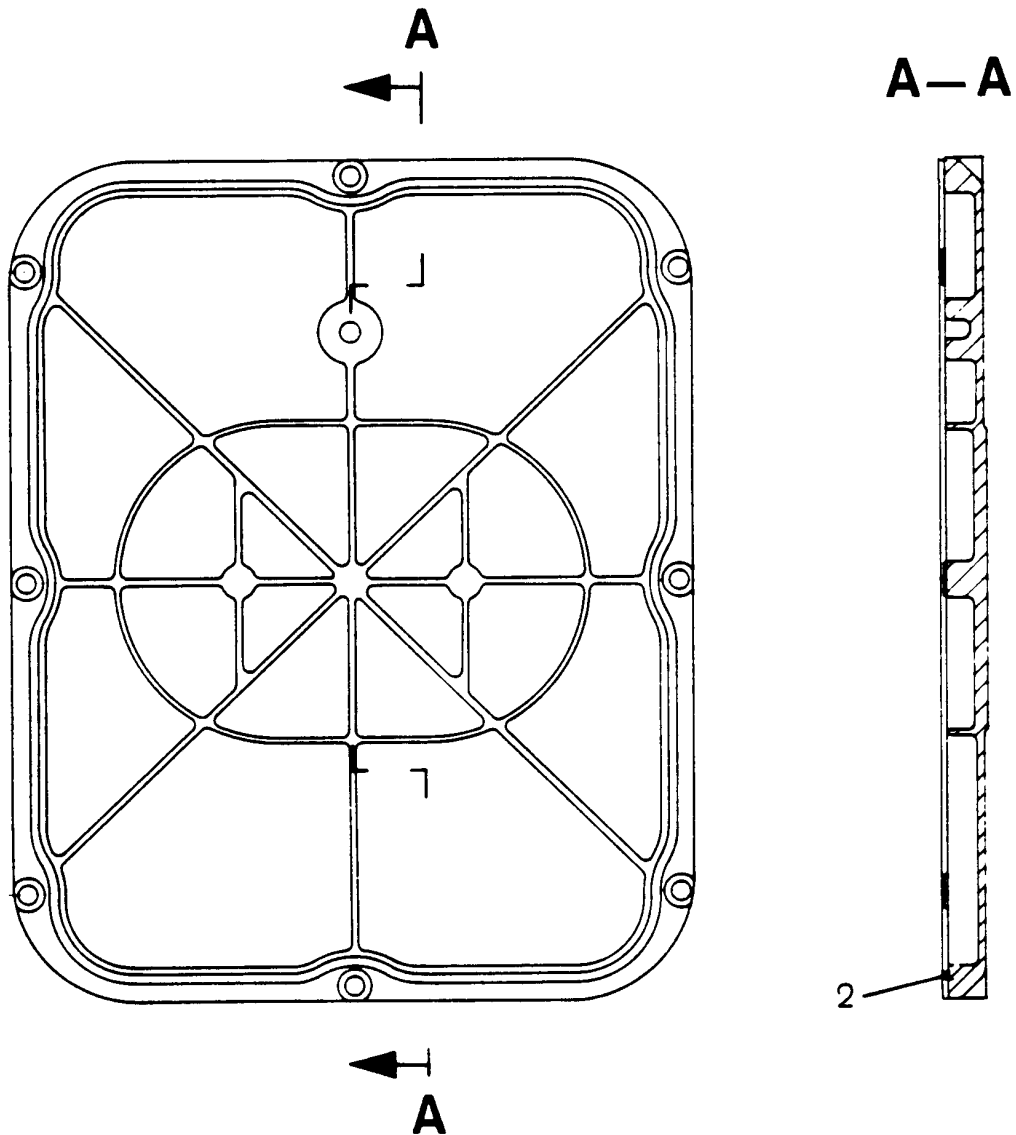
Crankcase Cover

M25/M552C

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	GEHÄUSEDECKEL, VOLLST. CRANKCASE COVER, COMPL.	1	7.1630 BB
2	PROFILSCHNUR RUBBER SEAL	1	3.1630-002

03

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**



Crankcase Cover with Relief Valve

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TRIEBRAUMDECKEL, VOLLST. CRANKCASE COVER ASSEMBLY	1	251633 AA
1	TRIEBRAUMDECKEL CRANKCASE COVER	1	251633-001
2	SCHUTZHAUBE PROTECTING COVER	1	1.1633-010
3	VENTILTeller VALVE HEAD	1	1.1633-003
4	FÜHRUNGSBOLZEN GUIDE BOLT	1	1.1633-005
5	PROFILSCHNUR RUBBER SEAL	1	1.1630-002
6	PROFILSCHNUR RUBBER SEAL	1	1.1633-004
7	DRUCKFEDER VALVE SPRING	1	1.1633-009
10	KRONENMUTTER HEXAGON CASTLE NUT	1	1.2061-809
11	SCHEIBE WASHER	1	1.0040-226
12	SCHEIBE WASHER	1	1.0040-224
13	SPLINT SPLIT PIN	1	1.0008-078
16	O-RING O-RING	# 1	1.1633-006

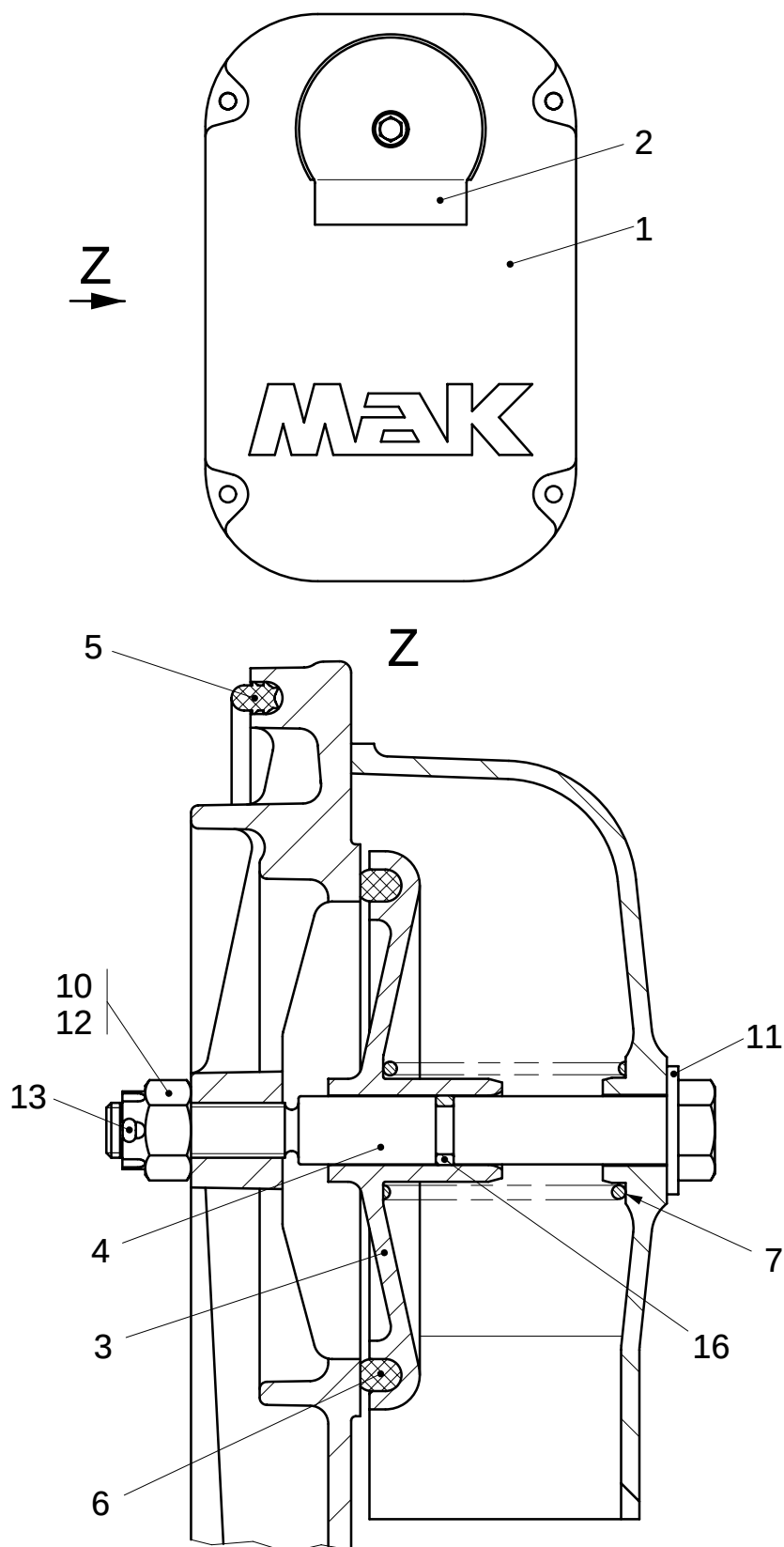
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Crankcase Cover with Relief Valve

M25

03



Pump Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	PUMPENRAUMVERKL., VOLLST. PUMP COVERS ASSEMBLY	1	251710 AA
1	VERKLEIDUNG, VOLLST. COVER, COMPL.	1	251710-001
2	VERKLEIDUNG, VOLLST. COVER, COMPL.	2	251710-002
3	ENDBODEN, VOLLST. END PLATE, COMPL.	1	251710-003
4	ZYLINDERSTIFT PARALLEL PIN	6	1.0026-235
5	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-439
13	STIFTSCHRAUBE STUD	12	251710-013
14	STERNGRIF STAR GRIP	12	1.3066-705
15	TELLERFEDER DISC SPRING	# 36	1.0067-407

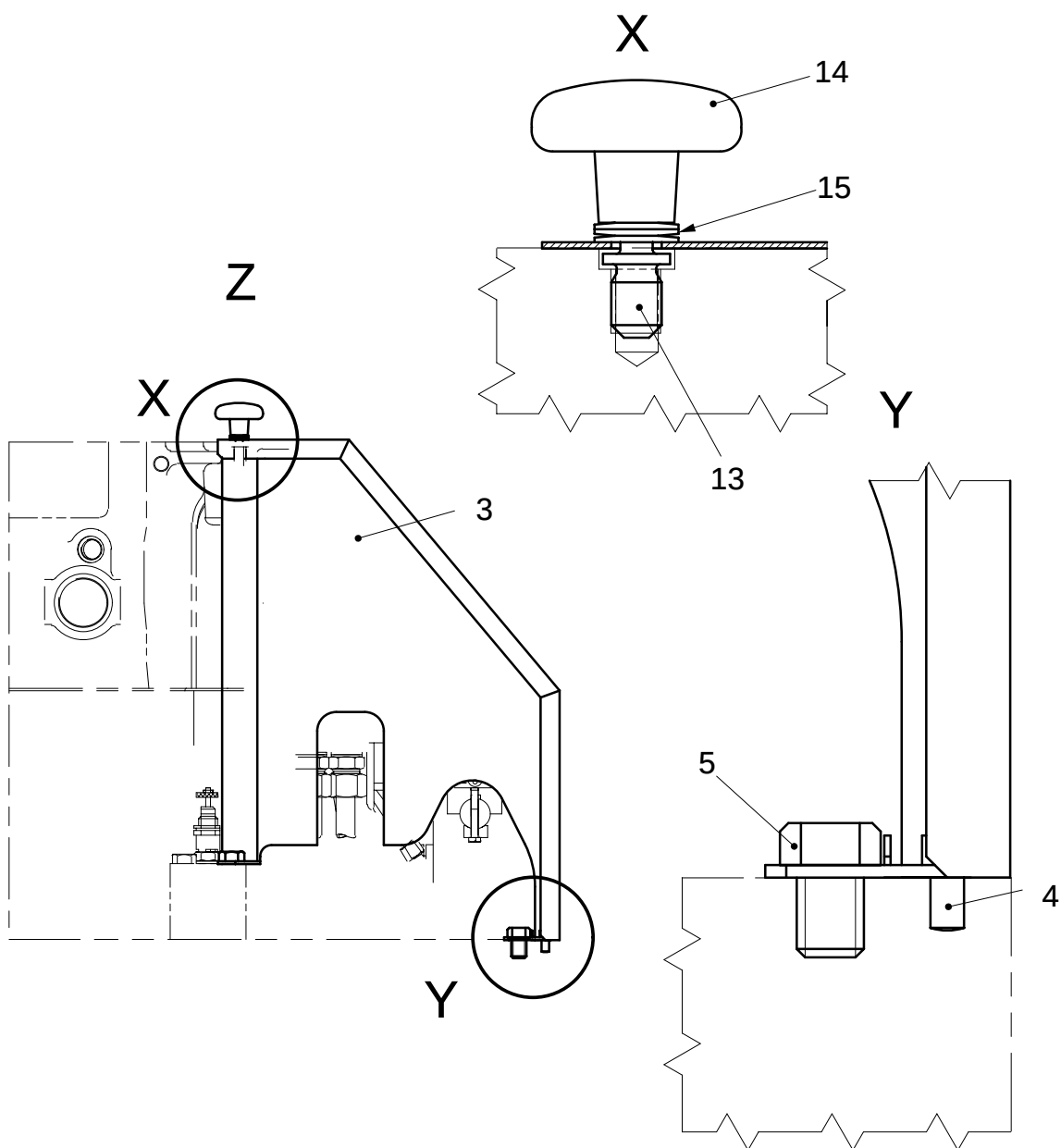
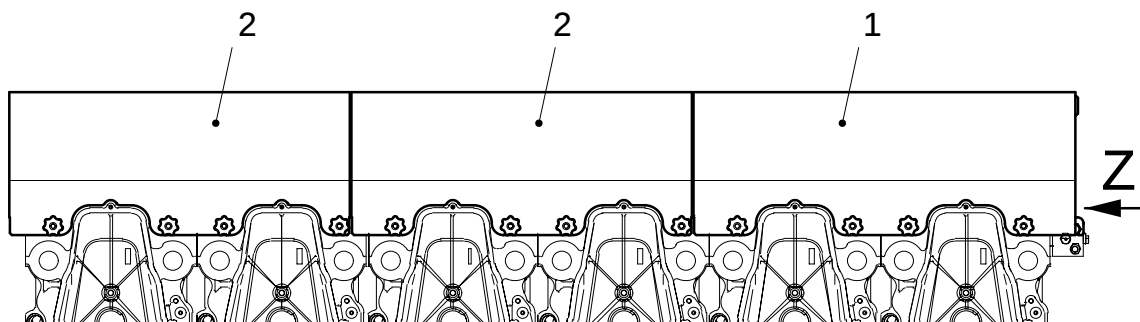
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pump Covers

M25

03



Pump Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	PUMPENRAUMVERKL., VOLLST. PUMP COVERS ASSEMBLY	1	251710 BB
1	VERKLEIDUNG, VOLLST. COVER, COMPL.	1	251710-001
2	VERKLEIDUNG, VOLLST. COVER, COMPL.	3	251710-002
3	ENDBODEN, VOLLST. END PLATE, COMPL.	1	251710-003
4	ZYLINDERSTIFT PARALLEL PIN	8	1.0026-235
5	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-439
13	STIFTSCHRAUBE STUD	16	251710-013
14	STERNGRIF STAR GRIP	16	1.3066-705
15	TELLERFEDER DISC SPRING	# 48	1.0067-407

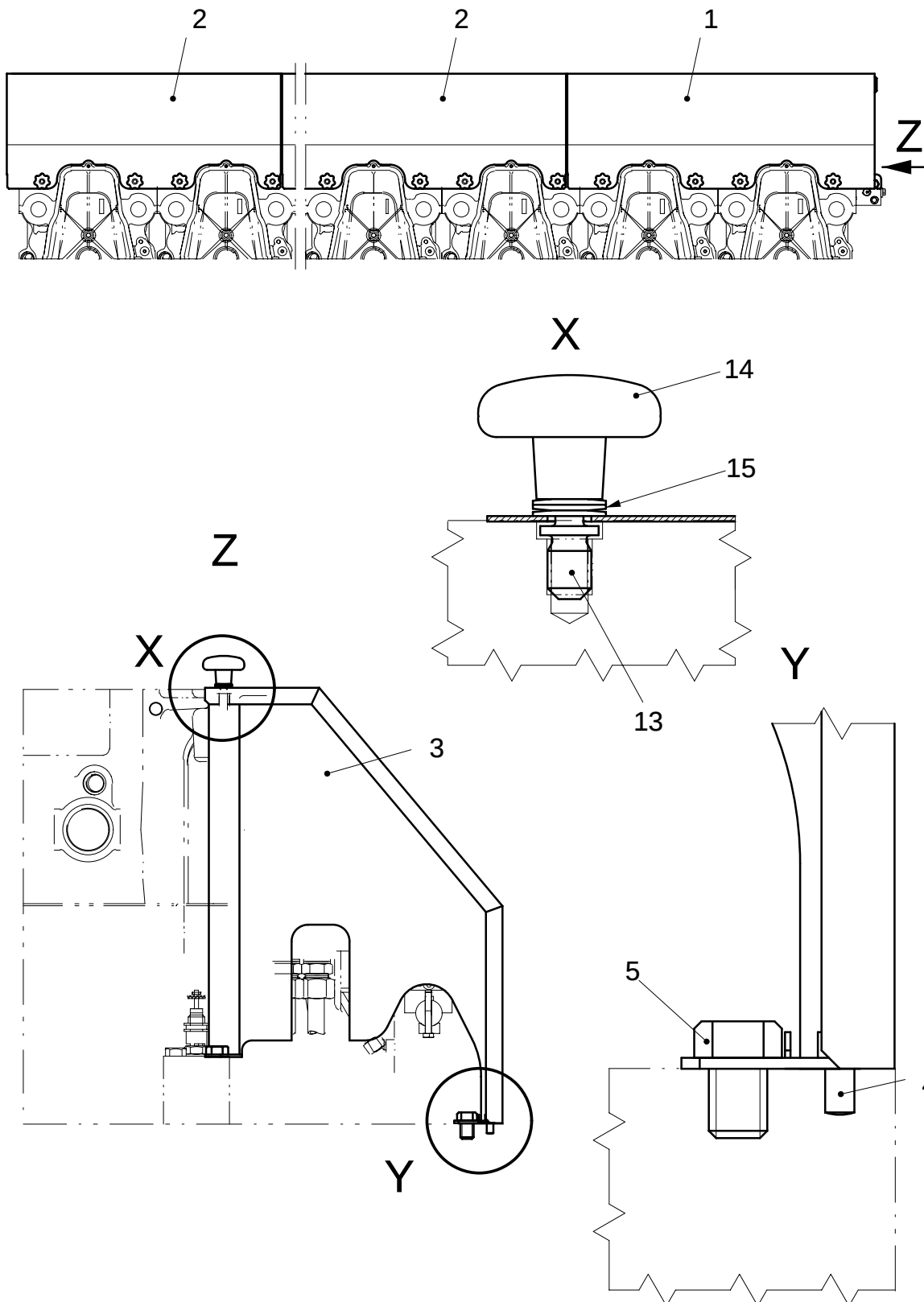
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pump Covers

M25

03



Pump Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	PUMPENRAUMVERKL., VOLLST. PUMP COVERS ASSEMBLY	1	251710 CC
1	VERKLEIDUNG, VOLLST. COVER, COMPL.	1	251710-001
2	VERKLEIDUNG, VOLLST. COVER, COMPL.	2	251710-002
3	ENDBODEN, VOLLST. END PLATE, COMPL.	1	251710-003
4	VERKLEIDUNG, VOLLST. COVER, COMPL.	1	251710-004
5	ZYLINDERSTIFT PARALLEL PIN	9	1.0026-235
6	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-439
13	STIFTSCHRAUBE STUD	18	251710-013
14	STERNGRIFF STAR GRIP	18	1.3066-705
15	TELLERFEDER DISC SPRING	# 54	1.0067-407

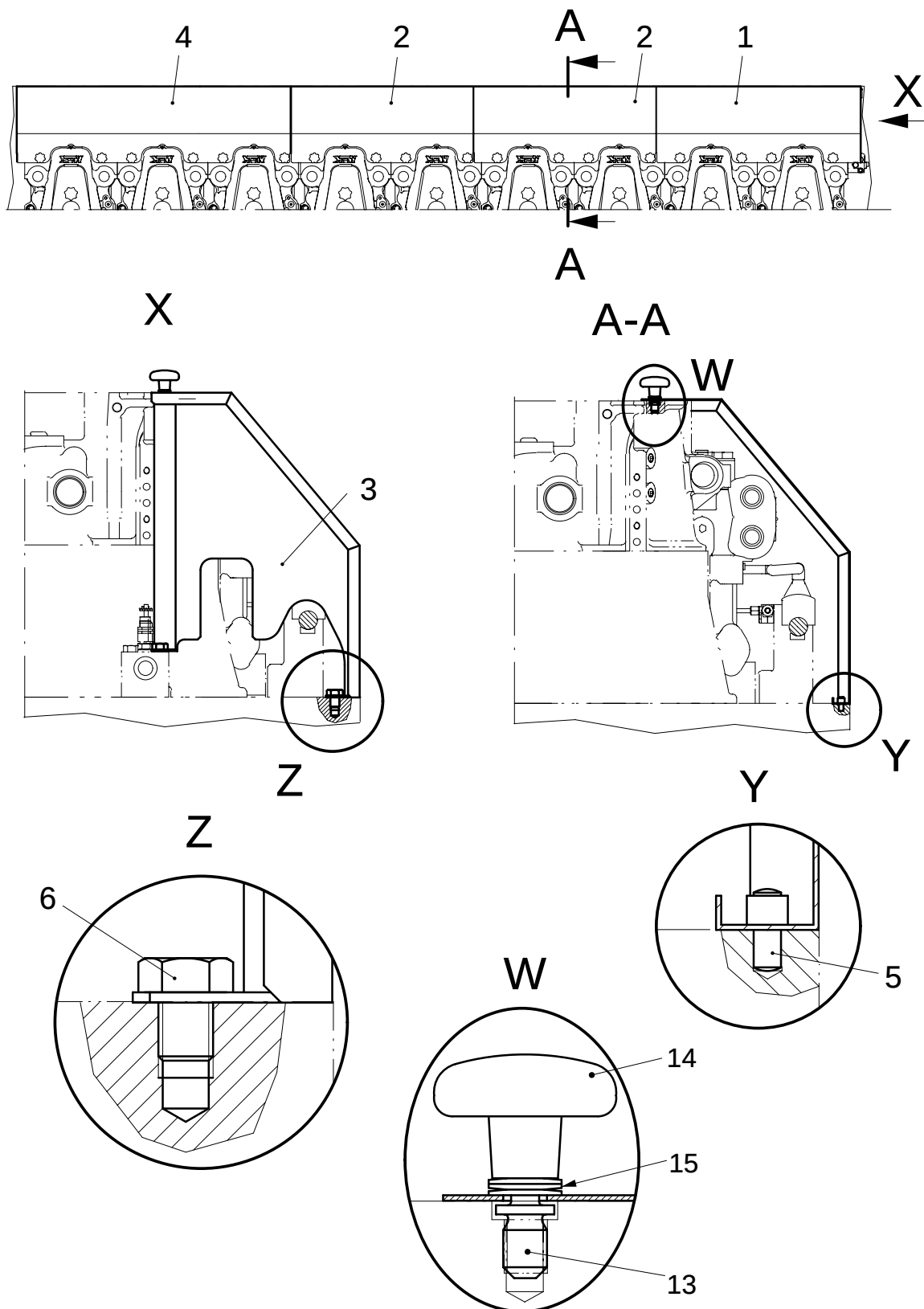
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pump Covers

M25

03



Pump Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	PUMPENRAUMVERKL., VOLLST. PUMP COVERS ASSEMBLY	1	251710 DD
1	VERKLEIDUNG, VOLLST. COVER, COMPL.	1	251710-001
2	VERKLEIDUNG, VOLLST. COVER, COMPL.	2	251710-002
3	ENDBODEN, VOLLST. END PLATE, COMPL.	1	251710-003
4	VERKLEIDUNG, VOLLST. COVER, COMPL.	1	251710-104
9	ZYLINDERSTIFT PARALLEL PIN	6	1.0026-235
10	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-439
13	BUNDBOLZEN STUD	12	251710-013
14	STERNGRIFF STAR GRIP	12	1.3066-705
15	TELLERFEDER DISC SPRING	# 36	1.0067-407

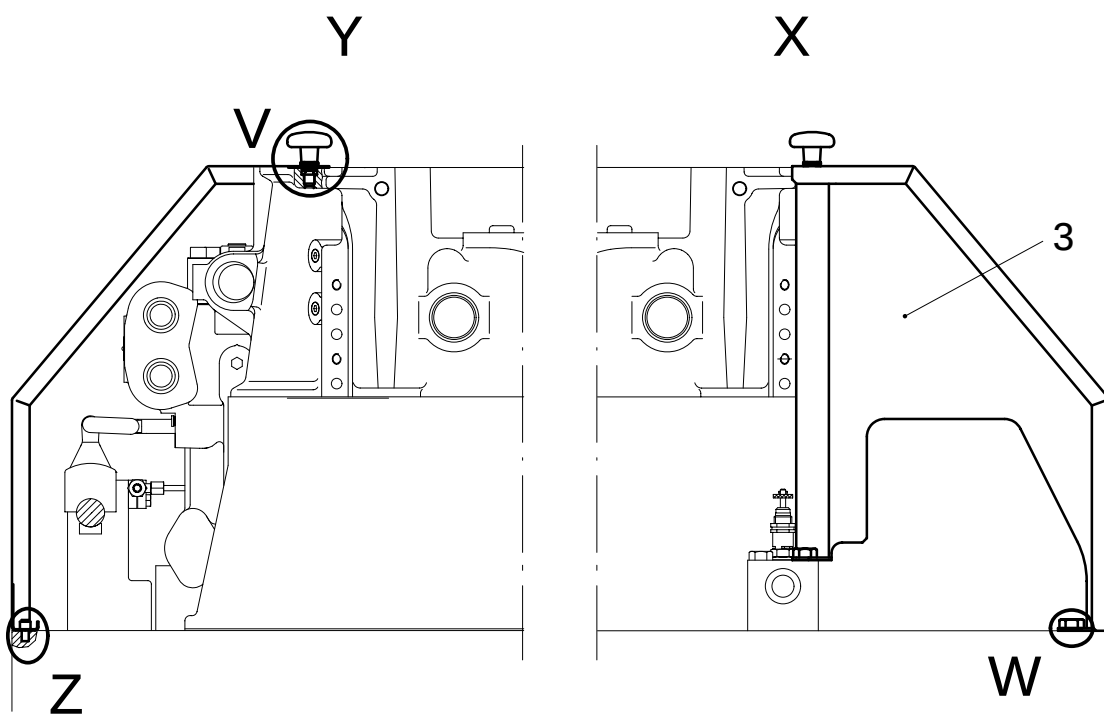
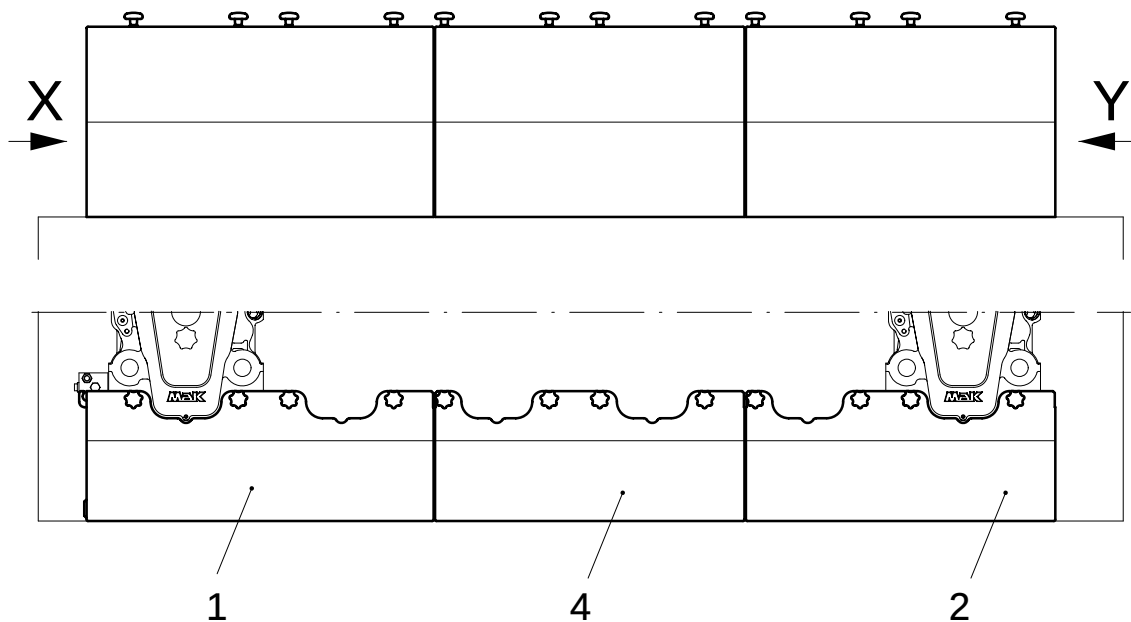
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pump Covers

M25

03



Pump Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	PUMPENRAUMVERKL., VOLLST. PUMP COVERS ASSEMBLY	1	251710 EE
1	VERKLEIDUNG, VOLLST. COVER, COMPL.	1	251710-001
2	VERKLEIDUNG, VOLLST. COVER, COMPL.	2	251710-002
3	ENDBODEN, VOLLST. END PLATE, COMPL.	1	251710-003
4	VERKLEIDUNG, VOLLST. COVER, COMPL.	1	251710-104
9	ZYLINDERSTIFT PARALLEL PIN	8	1.0026-235
10	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-439
13	STIFTSCHRAUBE STUD	16	251710-013
14	STERNGRIFF STAR GRIP	16	1.3066-705
15	TELLERFEDER DISC SPRING	# 48	1.0067-407

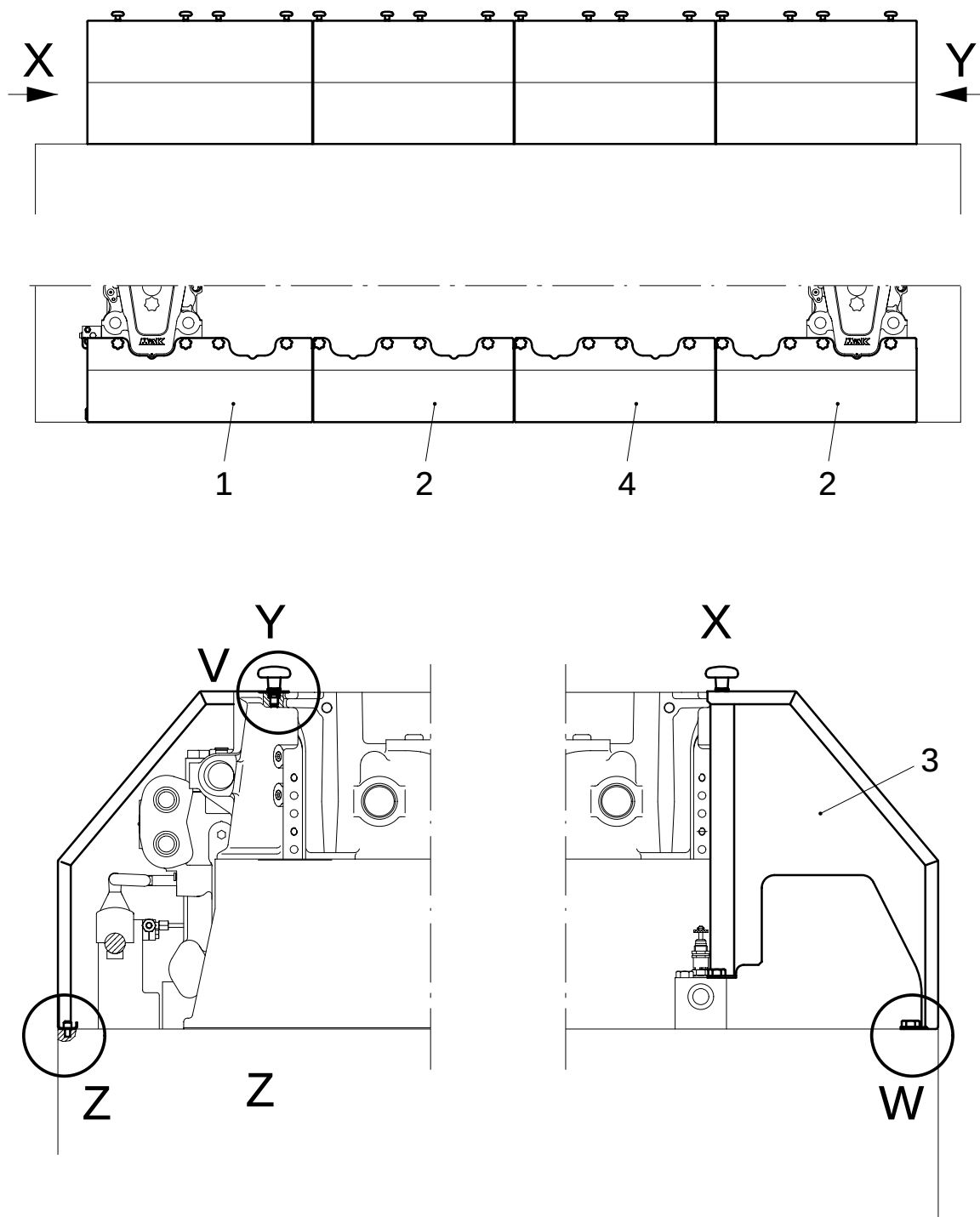
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pump Covers

M25

03

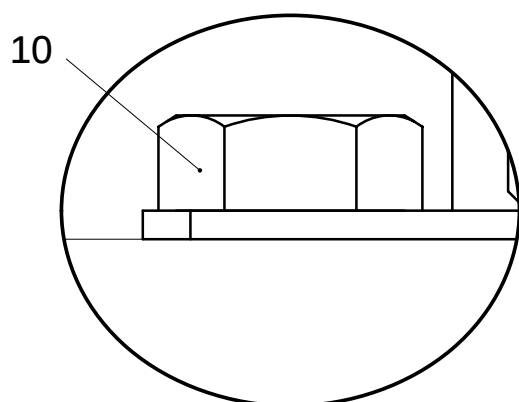


Pump Covers

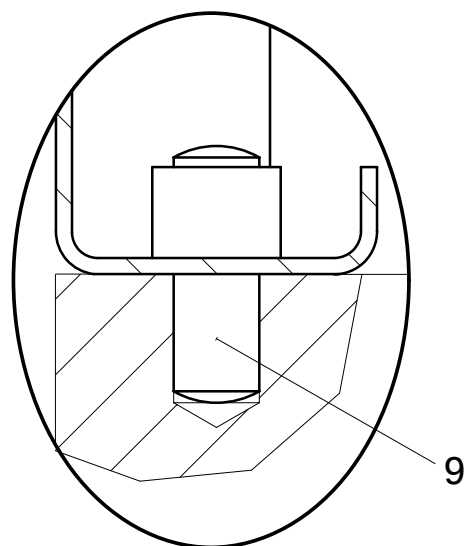
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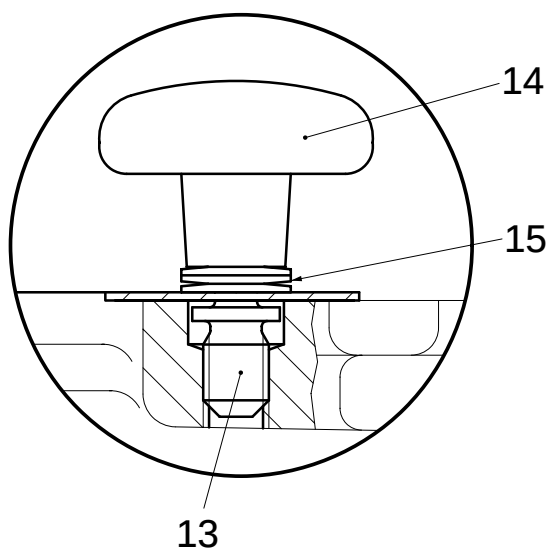
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Z



V



Pump Covers

M25

03

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	PUMPENRAUMVERKL., VOLLST. PUMP COVERS ASSEMBLY	1	251710 FF
1	VERKLEIDUNG, VOLLST. COVER, COMPL.	1	251710-001
2	VERKLEIDUNG, VOLLST. COVER, COMPL.	1	251710-002
3	ENDBODEN, VOLLST. END PLATE, COMPL.	1	251710-003
4	VERKLEIDUNG, VOLLST. COVER, COMPL.	1	251710-104
5	VERKLEIDUNG, VOLLST. COVER, COMPL.	1	251710-004
9	ZYLINDERSTIFT PARALLEL PIN	9	1.0026-235
10	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-439
13	STIFTSCHRAUBE STUD	18	251710-013
14	STERNGRIF STAR GRIP	18	1.3066-705
15	TELLERFEDER DISC SPRING	# 54	1.0067-407

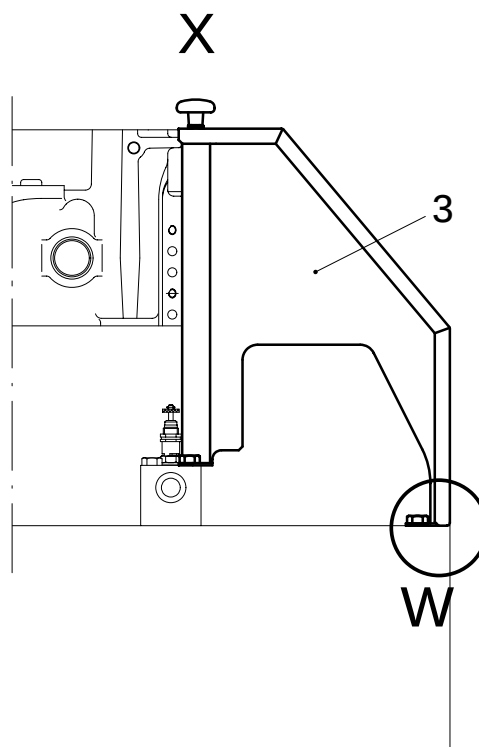
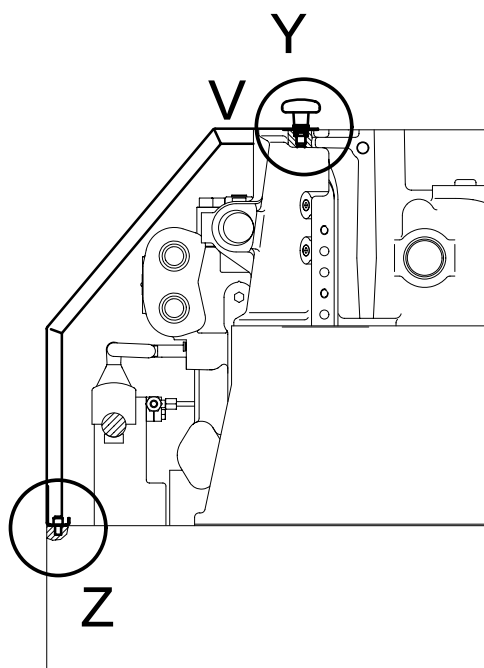
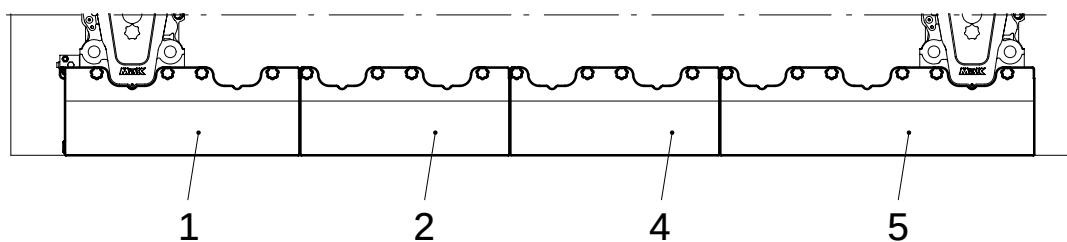
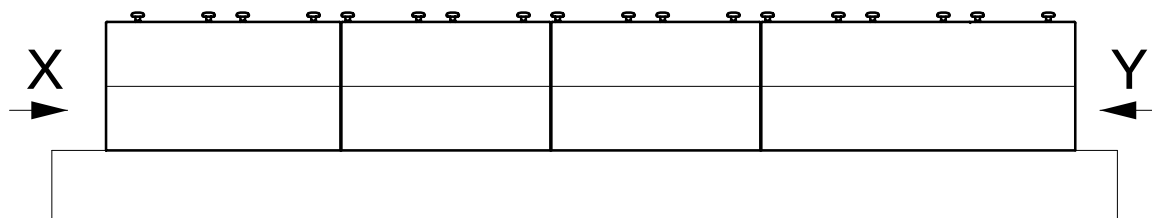
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pump Covers

M25

03

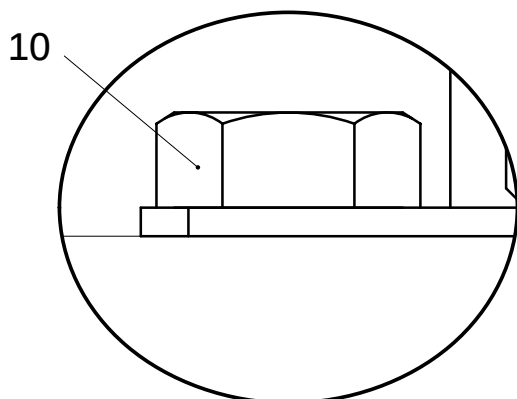


Pump Covers

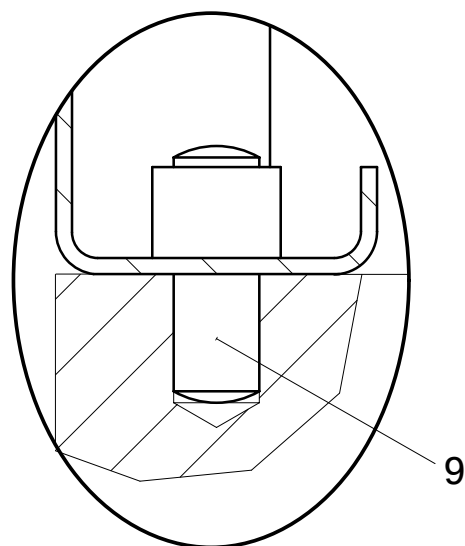
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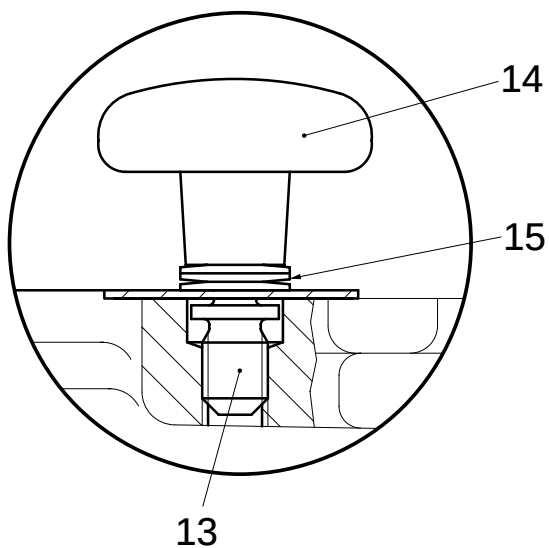
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Z



V



Camshaft

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	NOCKENWELLE, VOLLST. CAMSHAFT ASSEMBLY	1	253120 AA
1	NOCKENWELLENTILSTÜCK CAMSHAFT SECTION	6	253120-001
2	LAGERZAPFEN BEARING JOURNAL	1	253120-002
4	SCHRAUBRAD SPIRAL-TOOTHED GEARWHEEL	1	253120-004
5	ZAHNRAD GEARWHEEL	1	253120-005
6	SCHEIBE WASHER	3	1.1200-016
8	SECHSKANTSCHRAUBE HEXAGON BOLT	108	1.1374-340
9	SECHSKANTSCHRAUBE HEXAGON BOLT	3	1.1367-376
10	ZYLINDERSTIFT PARALLEL PIN	# 6	1.0026-226

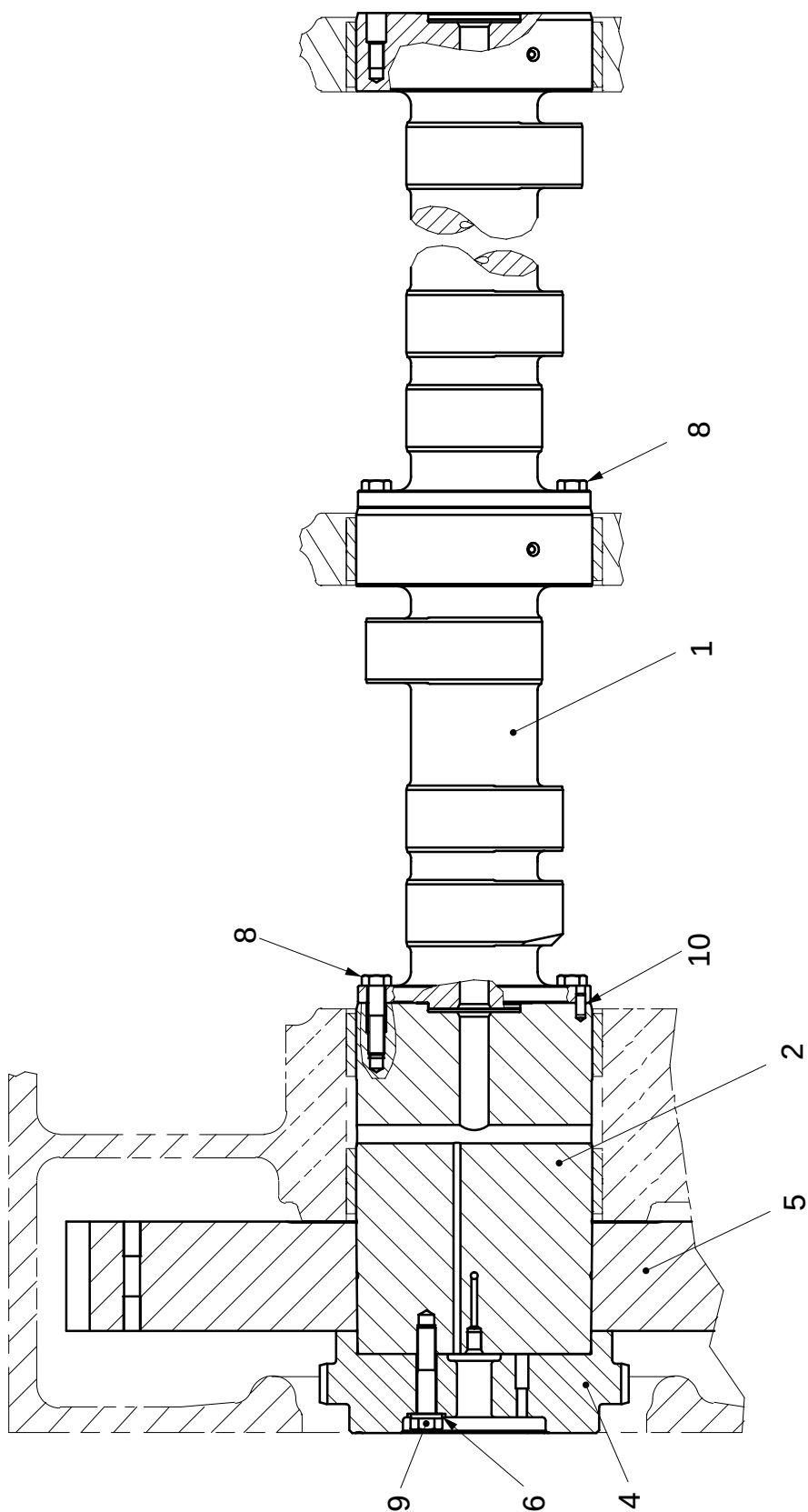
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Camshaft

M25

04



Camshaft

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	NOCKENWELLE, VOLLST. CAMSHAFT ASSEMBLY	1	253120 BB
1	NOCKENWELLENTILSTÜCK CAMSHAFT SECTION	8	253120-001
2	LAGERZAPFEN BEARING JOURNAL	1	253120-002
4	SCHRAUBRAD SPIRAL-TOOTHED GEARWHEEL	1	253120-004
5	ZAHNRAD GEARWHEEL	1	253120-005
6	SCHEIBE WASHER	3	1.1200-016
8	SECHSKANTSCHRAUBE HEXAGON BOLT	128	1.1374-340
9	SECHSKANTSCHRAUBE HEXAGON BOLT	3	1.1367-376
10	ZYLINDERSTIFT PARALLEL PIN	# 8	1.0026-226

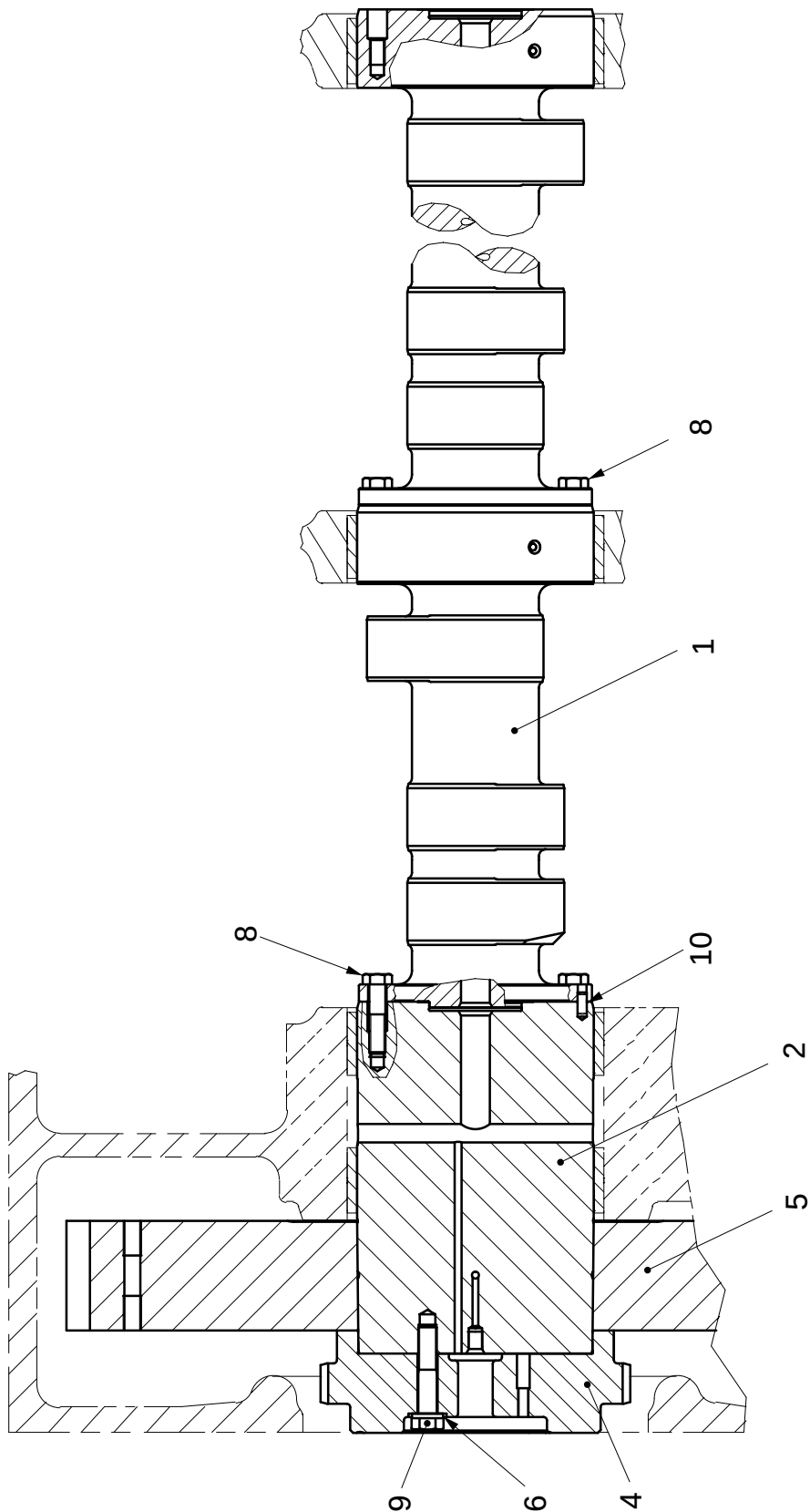
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Camshaft

M25

04



Camshaft

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	NOCKENWELLE, VOLLST. CAMSHAFT ASSEMBLY	1	253120 CC
1	NOCKENWELLENTILSTÜCK CAMSHAFT SECTION	9	253120-001
2	LAGERZAPFEN BEARING JOURNAL	1	253120-002
4	SCHRAUBRAD SPIRAL-TOOTHED GEARWHEEL	1	253120-004
5	ZAHNRAD GEARWHEEL	1	253120-005
6	SCHEIBE WASHER	3	1.1200-016
8	SECHSKANTSCHRAUBE HEXAGON BOLT	162	1.1374-340
9	SECHSKANTSCHRAUBE HEXAGON BOLT	3	1.1367-376
10	ZYLINDERSTIFT PARALLEL PIN	# 9	1.0026-226

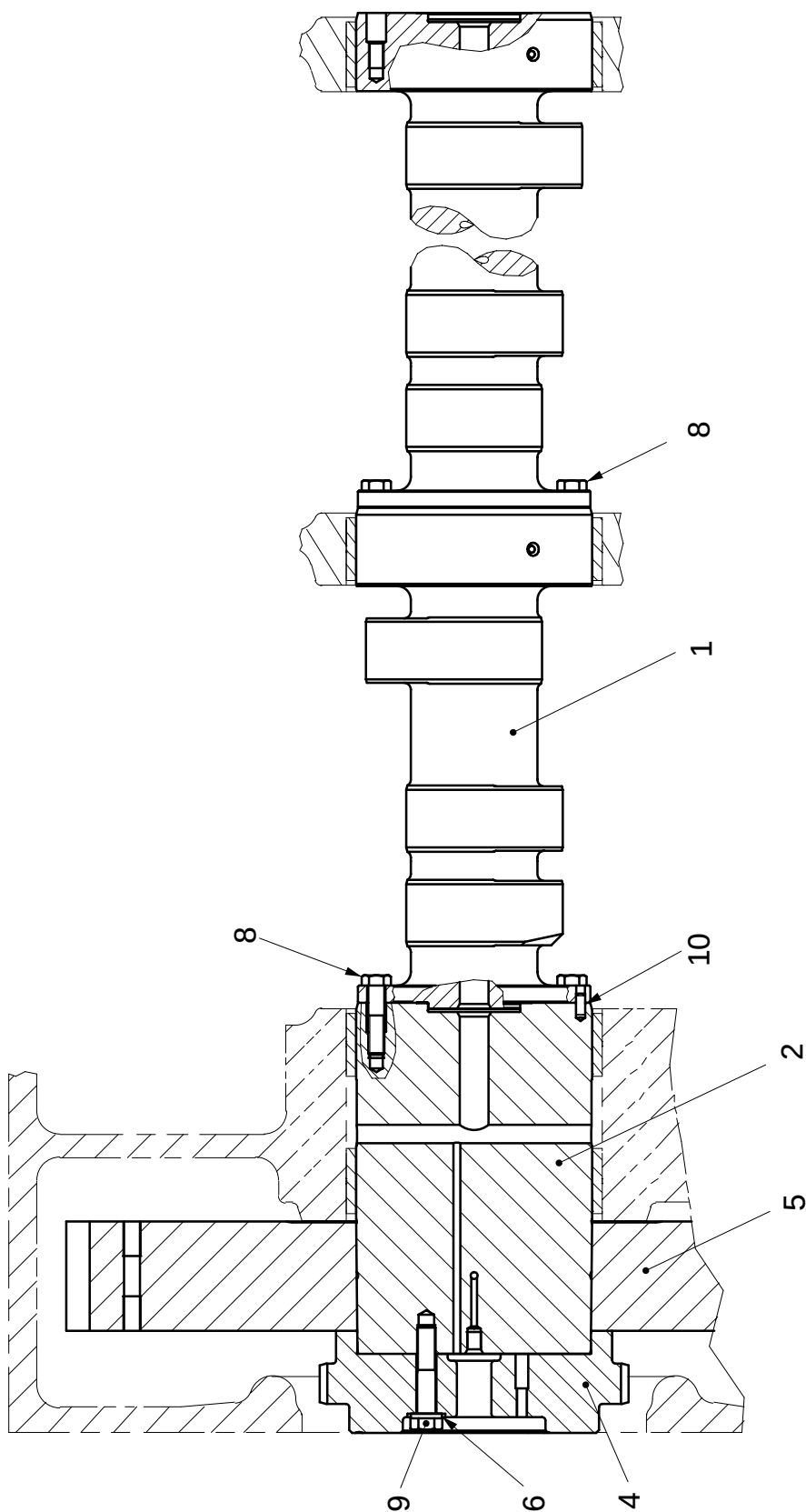
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Camshaft

M25

04



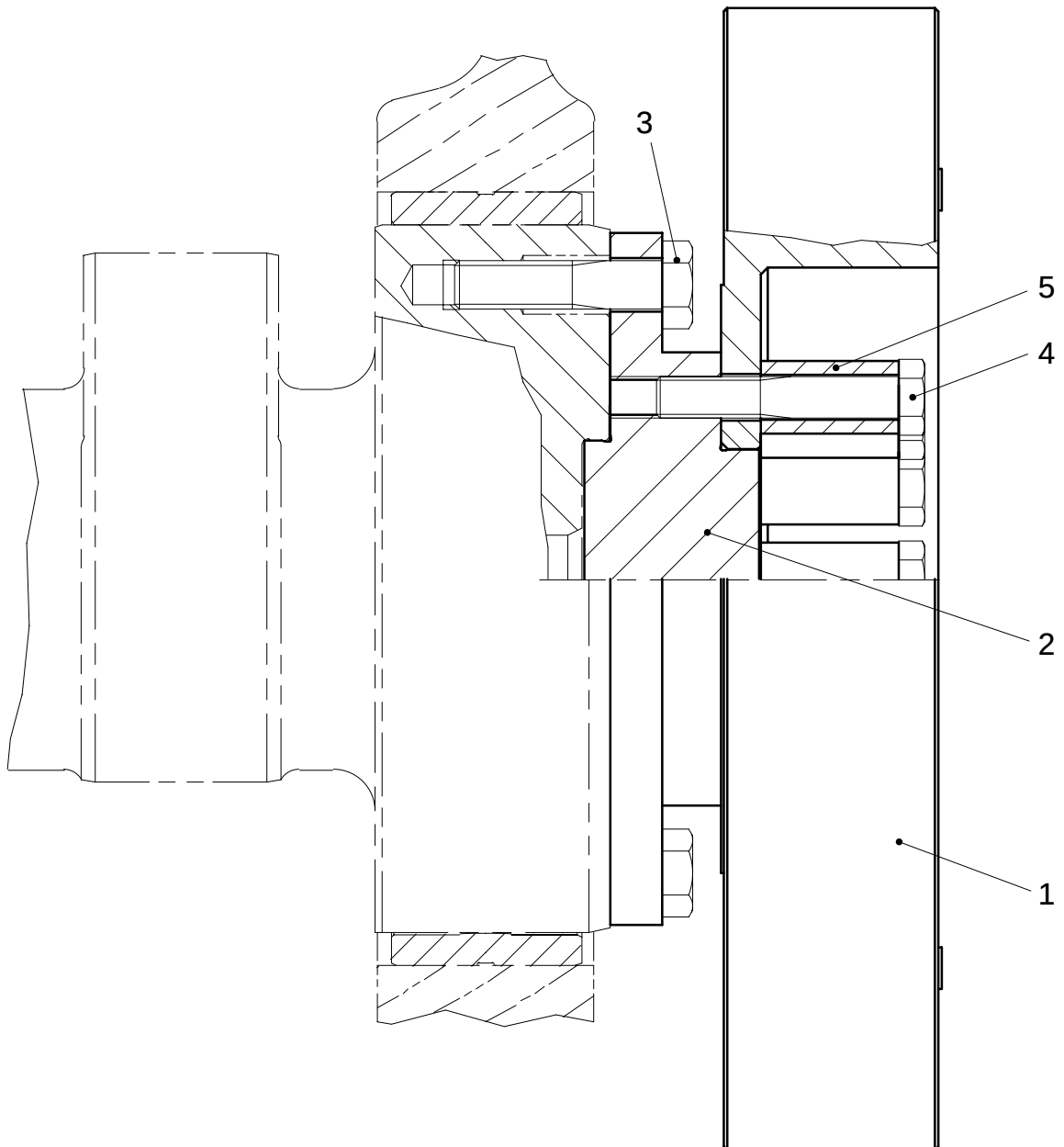
Vibration Damper Mounting
for Camshaft

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHWING.-DÄMPFER-ANB., VOLLST. VIBRATION DAMPER MOUNTING ASSEMBLY	1	253140 AA
1	SCHWINGUNGSDÄMPFER, VOLLST. VIBRATION DAMPER, COMPL.	1	253140-001
2	ZWISCHENSTÜCK INTERMEDIATE PIECE	1	253140-003
3	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1372-340
4	SECHSKANTSCHRAUBE HEXAGON SCREW	12	1.1367-310
5	DEHNHÜLSE EXTENSION BUSH	12	1.0502-054

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**



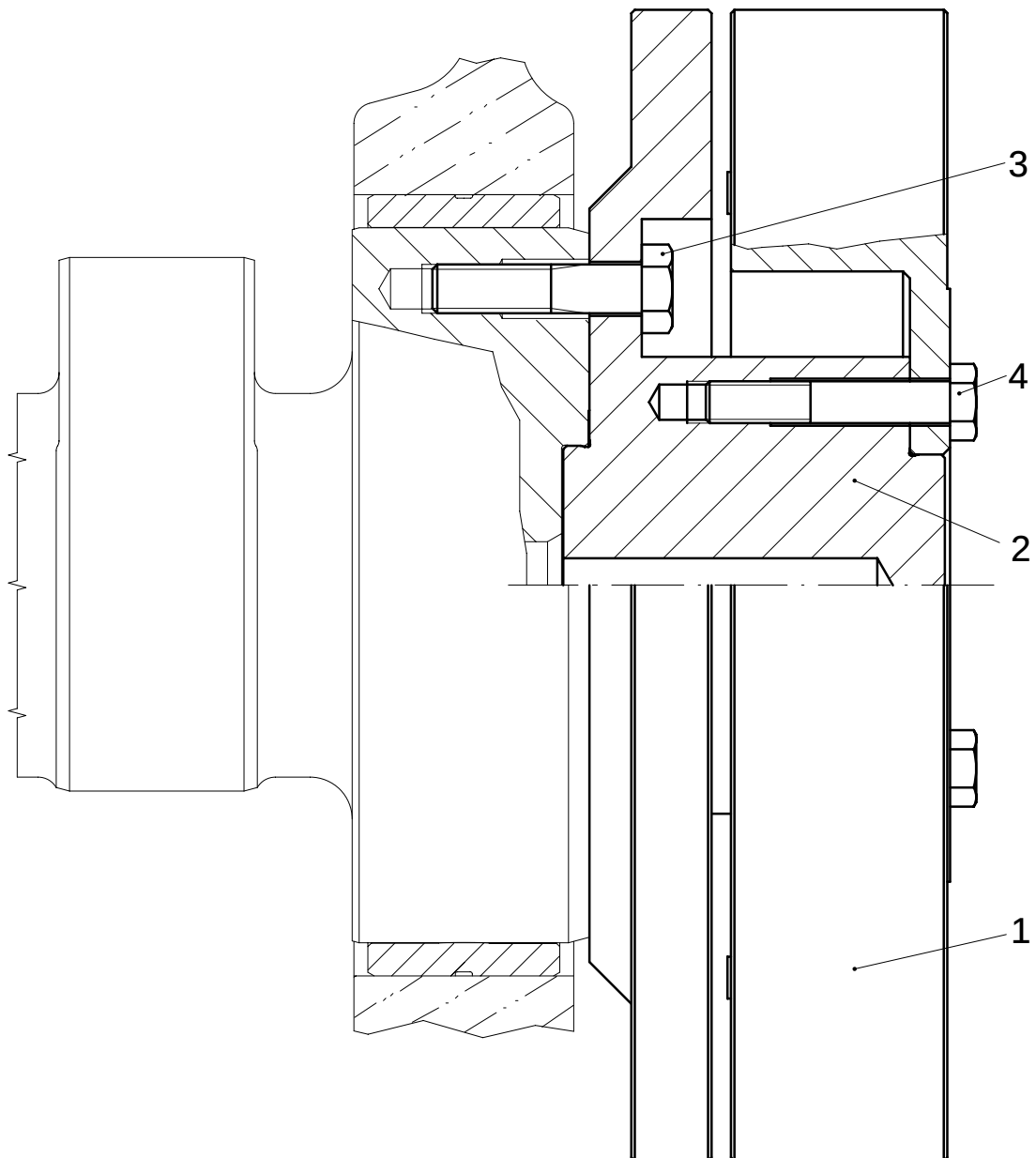
Vibration Damper Mounting
for Camshaft

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHWING.-DÄMPFER-ANB., VOLLST. VIBRATION DAMPER MOUNTING ASSEMBLY	1	253140 BB
1	SCHWINGUNGSDÄMPFER, VOLLST. VIBRATION DAMPER, COMPL.	1	253140-001
2	ZWISCHENSTÜCK INTERMEDIATE PIECE	1	253140-003
3	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1372-340
4	SECHSKANTSCHRAUBE HEXAGON SCREW	12	1.1367-310

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**



Bottom Part for Valve Mechanism

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	UNTERER VENTILANTRIEB, VOLLST. BOTTOM PART FOR VALVE MECHANISM ASS.	1	253502 AA
1	SCHWINGHEBELACHSE ROCKING LEVER AXLE	1	253502-001
2	SCHWINGHEBELACHSE ROCKING LEVER AXLE	5	253502-002
3	SCHWINGHEBELACHSE ROCKING LEVER AXLE	1	253502-003
4	SCHELLE, VOLLST. CLAMPING COLLAR, COMPL.	6	253502-004
5	BOCK BRACKET	1	253502-005
6	BOCK BRACKET	12	253502-006
7	STOSSSTANGE, VOLLST. PUSH-ROD, COMPL.	12	253502-007
10	DISTANZBUCHSE DISTANCE BUSH	1	253502-010
11	DISTANZBUCHSE DISTANCE BUSH	6	253502-011
12	DISTANZBUCHSE DISTANCE BUSH	6	253502-012
14	SECHSKANTSCHRAUBE HEXAGON BOLT	26	1.1367-381
15	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-808
16	DICHTRING JOINT RING	# 1	1.7010-172
18	O-RING O-RING	# 1	1.7084-625
19	O-RING O-RING	# 6	1.7084-614

04

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Bottom Part for Valve Mechanism

M25

04

POS. ITEM	BENENNUNG DESCRIPTION		STCK NUMBER	BEST.-NR PART NO.
100	SCHWINGHEBEL, VOLLST. ROCKING LEVER, COMPL.	*	12	253566-100
101	SCHWINGHEBEL ROCKING LEVER		12	253566-101
102	KUGELPFANNE THRUST PIECE		12	253566-102
103	ROLLE ROLLER		12	6.3560-101
104	BOLZEN BOLT		12	253566-104
105	SPANNSTIFT SPRING DOWEL PIN	#	12	1.0039-289
200	SCHWINGHEBEL, VOLLST. ROCKING LEVER, COMPL.	*	6	253565-200
201	SCHWINGHEBEL ROCKING LEVER		6	253565-201
202	KUGELSTÜCK THRUST PIECE		6	253565-202
203	ROLLE ROLLER		6	253565-203
204	BOLZEN BOLT		6	253565-204
205	SPANNSTIFT SPRING DOWEL PIN	#	6	1.0039-289

* = IN 253502 AA ENTHALTEN
INCLUDED IN 253502 AA

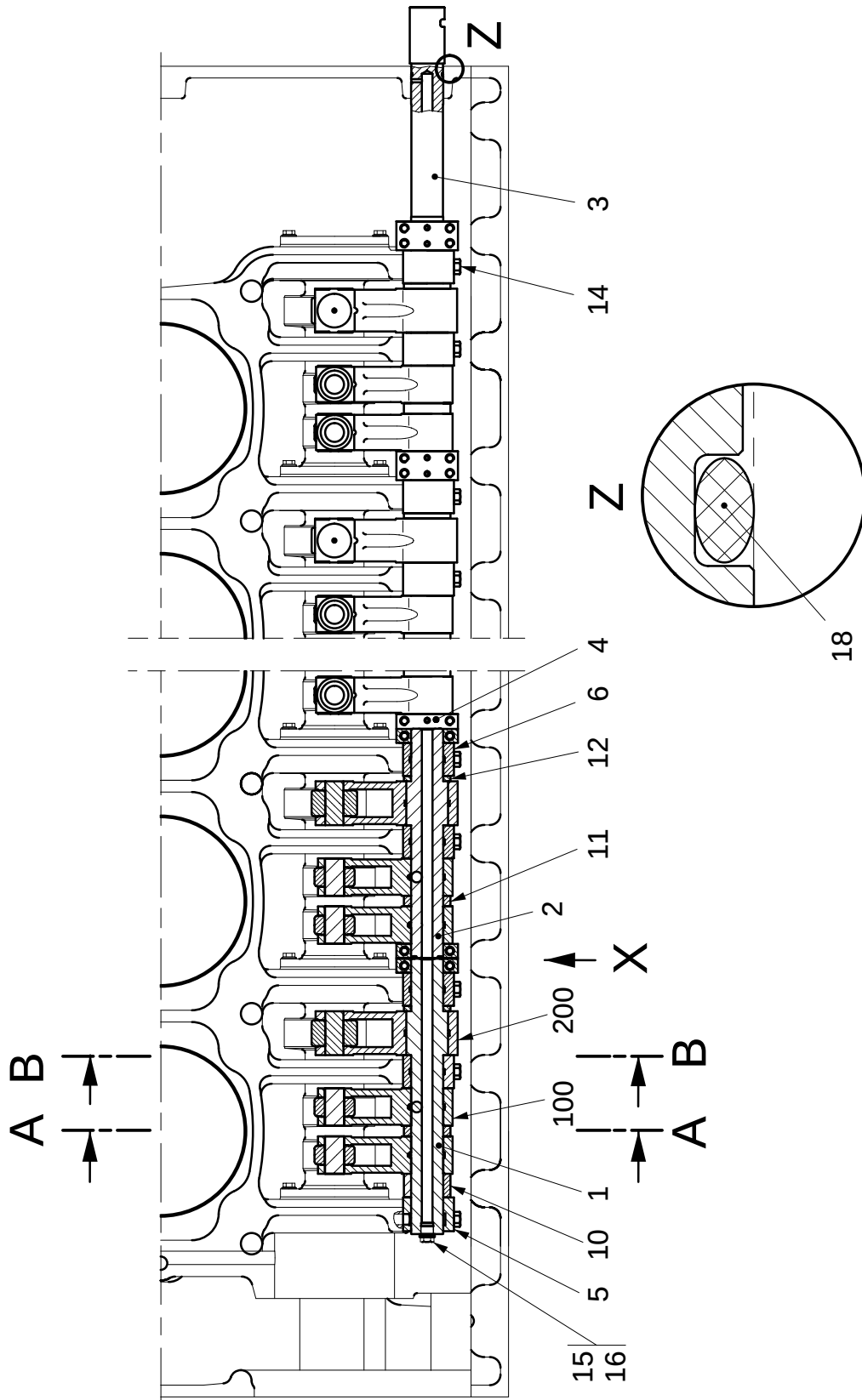
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Bottom Part for Valve Mechanism

M25

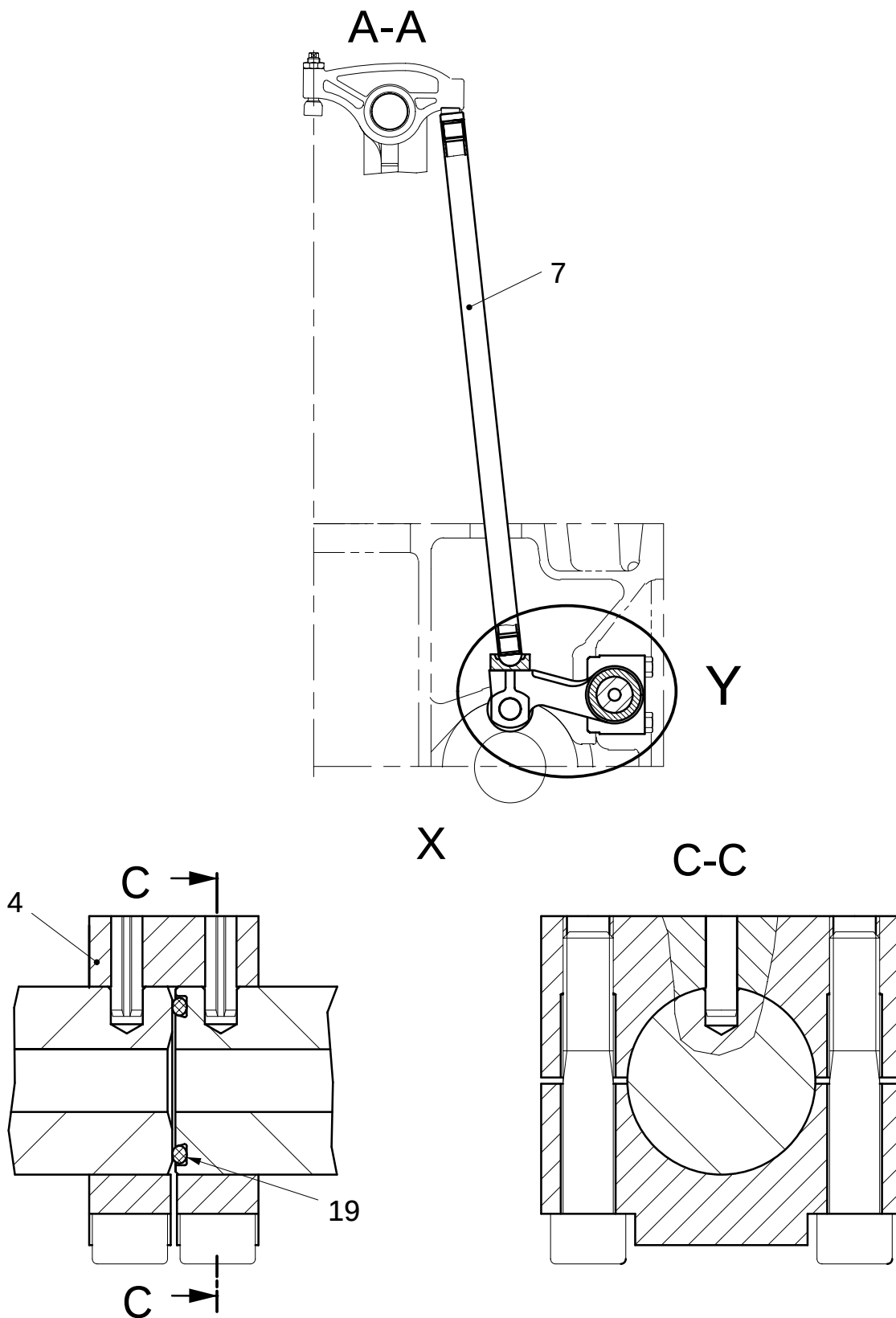
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Bottom Part for Valve Mechanism

M25

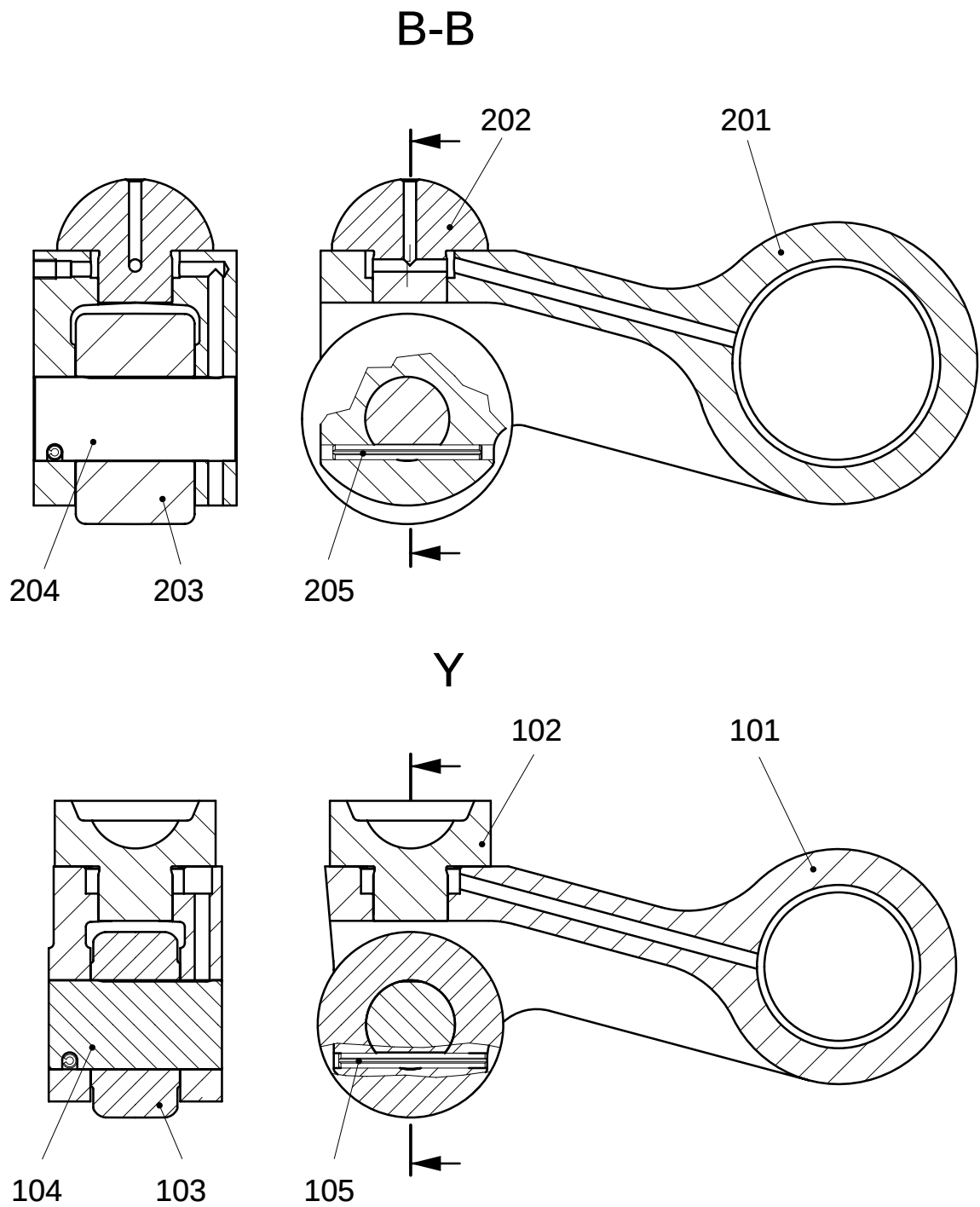
04



Bottom Part for Valve Mechanism

M25

04



Bottom Part for Valve Mechanism

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	UNTERER VENTILANTRIEB, VOLLST. BOTTOM PART FOR VALVE MECHANISM ASS.	1	253502 BB
1	SCHWINGHEBELACHSE ROCKING LEVER AXLE	1	253502-101
2	SCHWINGHEBELACHSE ROCKING LEVER AXLE	5	253502-102
3	SCHWINGHEBELACHSE ROCKING LEVER AXLE	1	253502-103
4	BOCK BRACKET	6	253502-104
5	BOCK BRACKET	1	253502-005
6	BOCK BRACKET	6	253502-106
7	STOSSSTANGE, VOLLST. PUSH-ROD, COMPL.	12	253502-007
10	DISTANZBUCHSE DISTANCE BUSH	6	253502-010
11	DISTANZBUCHSE DISTANCE BUSH	6	253502-011
12	FLANSCH BLANK FLANGE	1	253502-112
14	SECHSKANTSCHRAUBE HEXAGON BOLT	26	1.1367-381
15	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-444
17	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-808
18	SPANNSTIFT SPRING DOWEL PIN	# 2	1.0039-313
19	DICHTUNG GASKET	# 1	1.7073-754
20	DICHTRING JOINT RING	# 1	1.7010-172

04

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Bottom Part for Valve Mechanism

M25

04

POS. ITEM	BENENNUNG DESCRIPTION		STCK NUMBER	BEST.-NR PART NO.
100	SCHWINGHEBEL, VOLLST. ROCKING LEVER, COMPL.	*	12	253566-100
101	SCHWINGHEBEL ROCKING LEVER		12	253566-101
102	KUGELPFANNE THRUST PIECE		12	253566-102
103	ROLLE ROLLER		12	6.3560-101
104	BOLZEN BOLT		12	253566-104
105	SPANNSTIFT SPRING DOWEL PIN	#	12	1.0039-289
200	SCHWINGHEBEL, VOLLST. ROCKING LEVER, COMPL.	*	6	253565-200
201	SCHWINGHEBEL ROCKING LEVER		6	253565-201
202	KUGELSTÜCK THRUST PIECE		6	253565-202
203	ROLLE ROLLER		6	253565-203
204	BOLZEN BOLT		6	253565-204
205	SPANNSTIFT SPRING DOWEL PIN	#	6	1.0039-289
208	GEWINDESTIFT HEXAGON SOCKET GRUB SCREW		6	1.1100-046

* = IN 253502 BB ENTHALTEN
INCLUDED IN 253502 BB

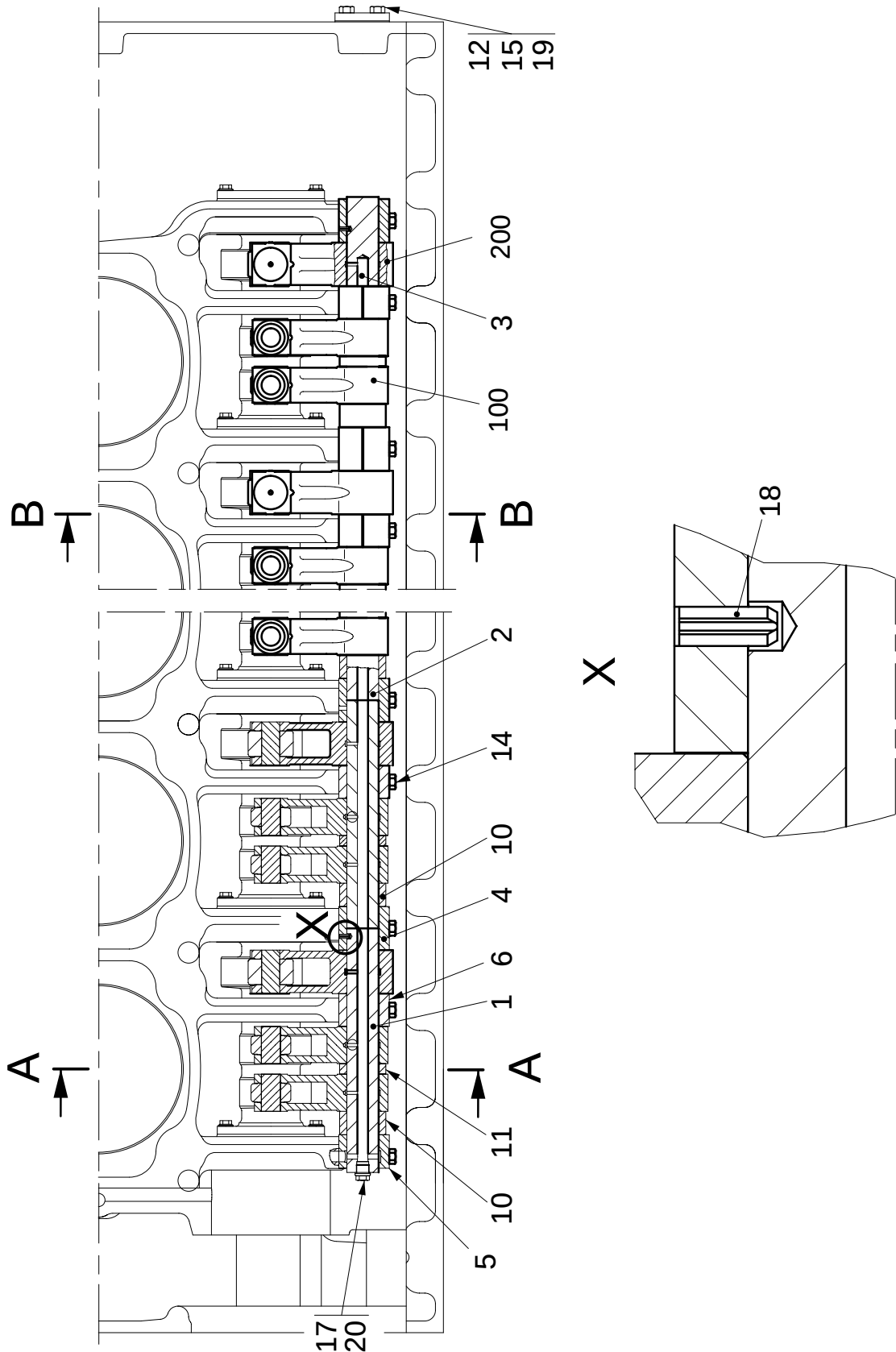
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Bottom Part for Valve Mechanism

M25

04

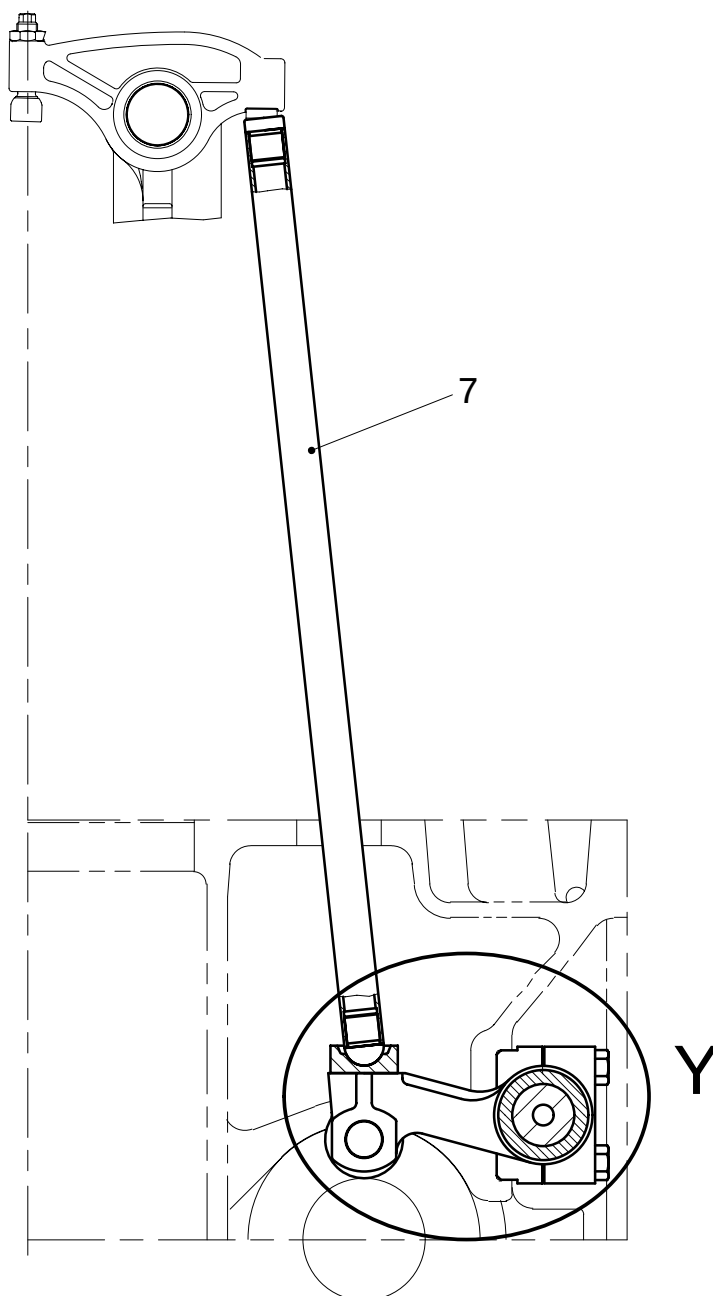


Bottom Part for Valve Mechanism

M25

04

A-A

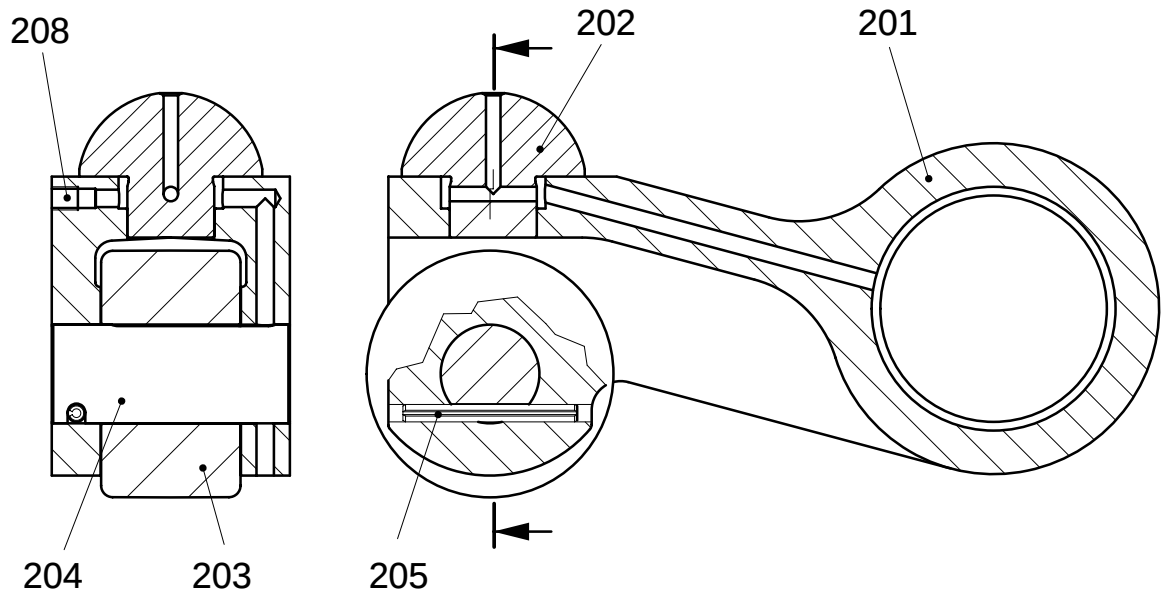


Bottom Part for Valve Mechanism

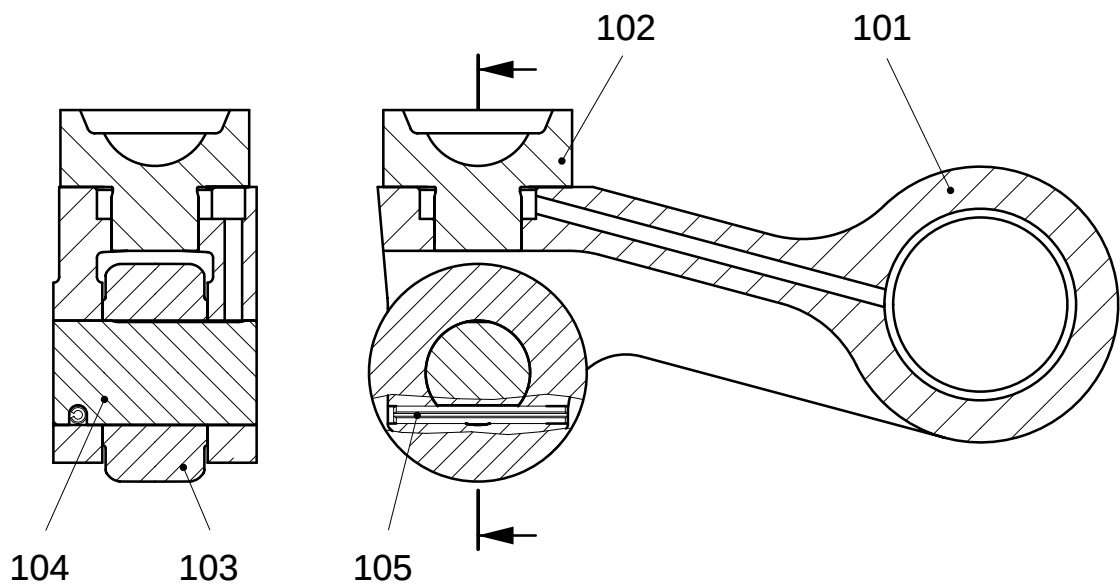
M25

04

B-B



Y



Bottom Part for Valve Mechanism

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	UNTERER VENTILANTRIEB, VOLLST. BOTTOM PART FOR VALVE MECHANISM ASS.	1	253502 CC
1	SCHWINGHEBELACHSE ROCKING LEVER AXLE	1	253502-101
2	SCHWINGHEBELACHSE ROCKING LEVER AXLE	6	253502-102
3	SCHWINGHEBELACHSE ROCKING LEVER AXLE	1	253502-103
4	BOCK BRACKET	8	253502-104
5	BOCK BRACKET	1	253502-005
6	BOCK BRACKET	8	253502-106
7	STOSSSTANGE, VOLLST. PUSH-ROD, COMPL.	16	253502-007
10	DISTANZBUCHSE DISTANCE BUSH	8	253502-010
11	DISTANZBUCHSE DISTANCE BUSH	8	253502-011
12	FLANSCH BLANK FLANGE	1	253502-112
14	SECHSKANTSCHRAUBE HEXAGON BOLT	34	1.1367-381
15	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-444
17	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-808
18	SPANNSTIFT SPRING DOWEL PIN	# 2	1.0039-313
19	DICHTUNG GASKET	# 1	1.7073-754
20	DICHTRING JOINT RING	# 1	1.7010-172

04

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Bottom Part for Valve Mechanism

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
100	SCHWINGHEBEL, VOLLST. ROCKING LEVER, COMPL.	* 16	253566-100
101	SCHWINGHEBEL ROCKING LEVER	16	253566-101
102	KUGELPFANNE THRUST PIECE	16	253566-102
103	ROLLE ROLLER	16	6.3560-101
104	BOLZEN BOLT	16	253566-104
105	SPANNSTIFT SPRING DOWEL PIN	# 16	1.0039-289
200	SCHWINGHEBEL, VOLLST. ROCKING LEVER, COMPL.	* 8	253565-200
201	SCHWINGHEBEL ROCKING LEVER	8	253565-201
202	KUGELSTÜCK THRUST PIECE	8	253565-202
203	ROLLE ROLLER	8	253565-203
204	BOLZEN BOLT	8	253565-204
205	SPANNSTIFT SPRING DOWEL PIN	# 8	1.0039-289
208	GEWINDESTIFT HEXAGON SOCKET GRUB SCREW	8	1.1100-046

* = IN 253502 CC ENTHALTEN
INCLUDED IN 253502 CC

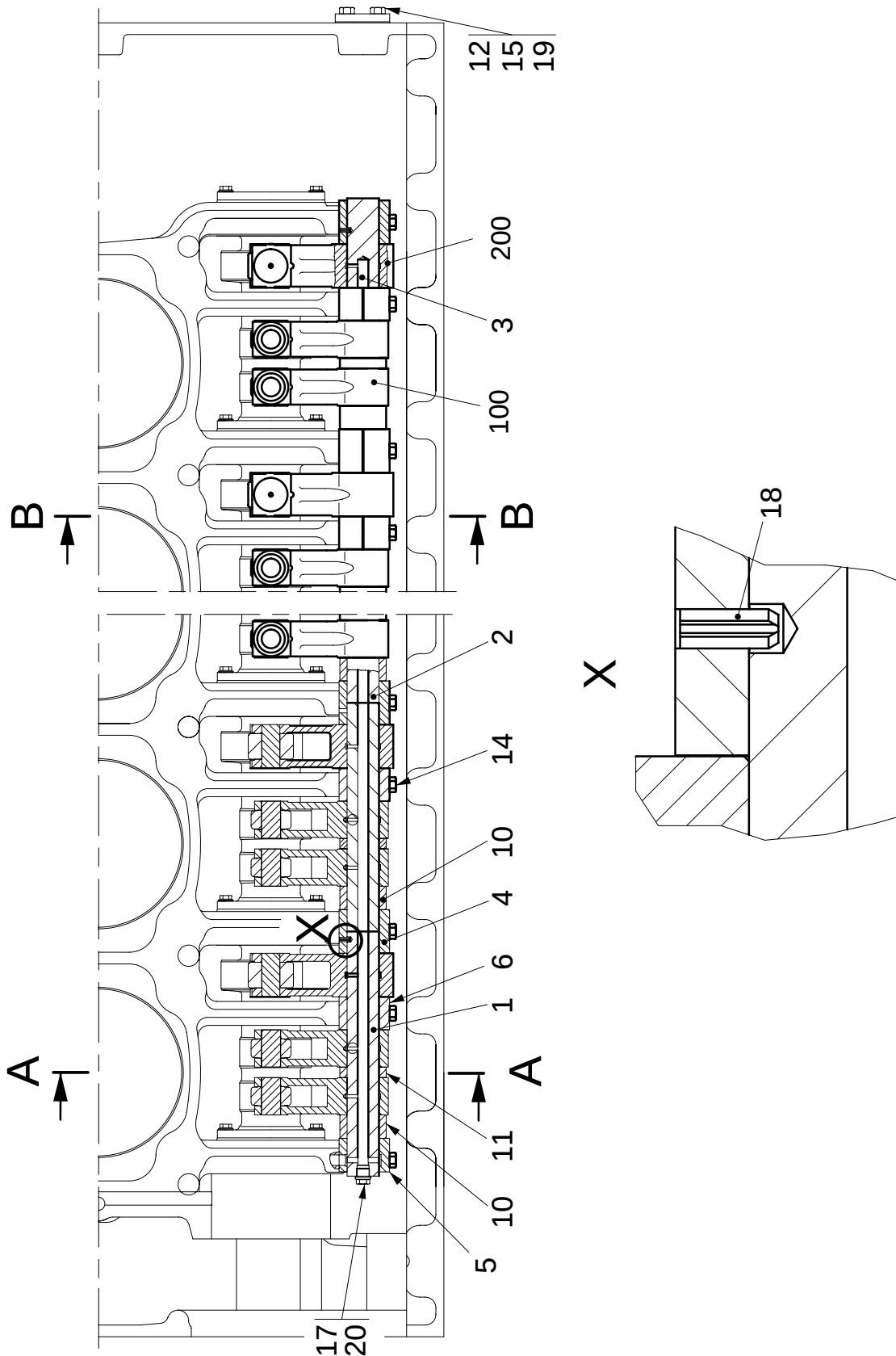
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Bottom Part for Valve Mechanism

M25

04

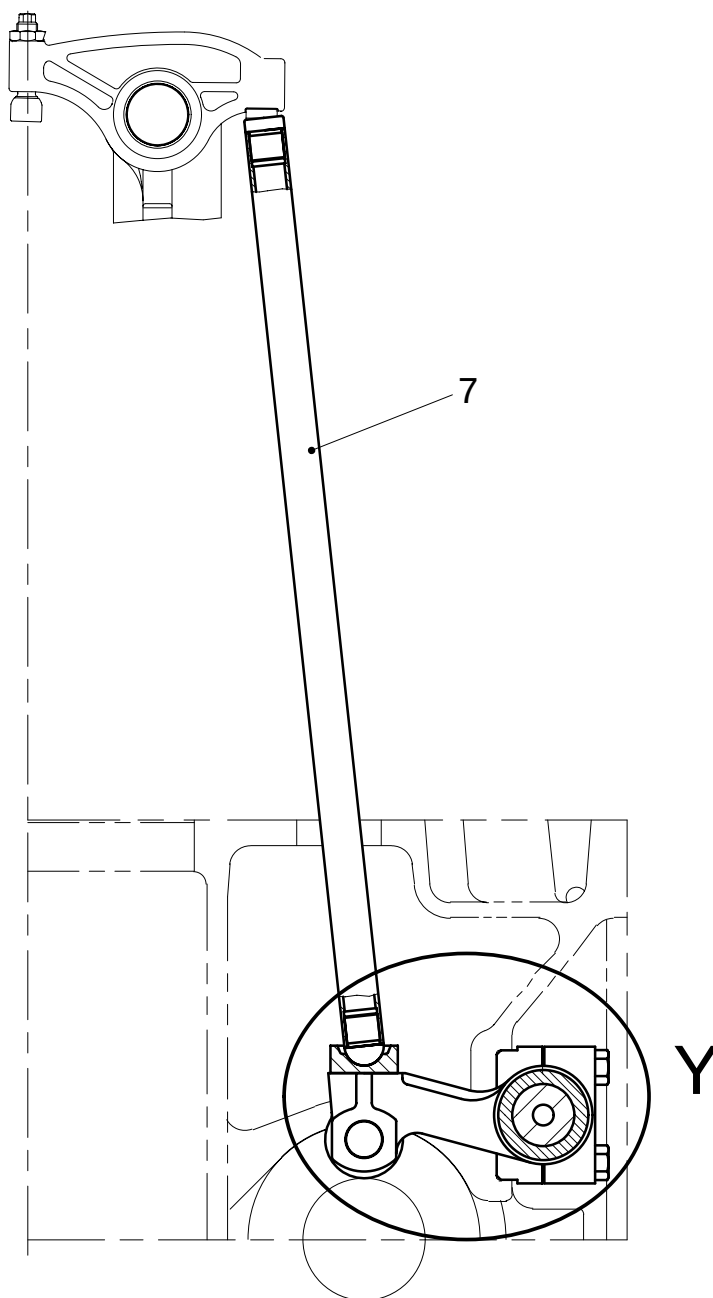


Bottom Part for Valve Mechanism

M25

04

A-A

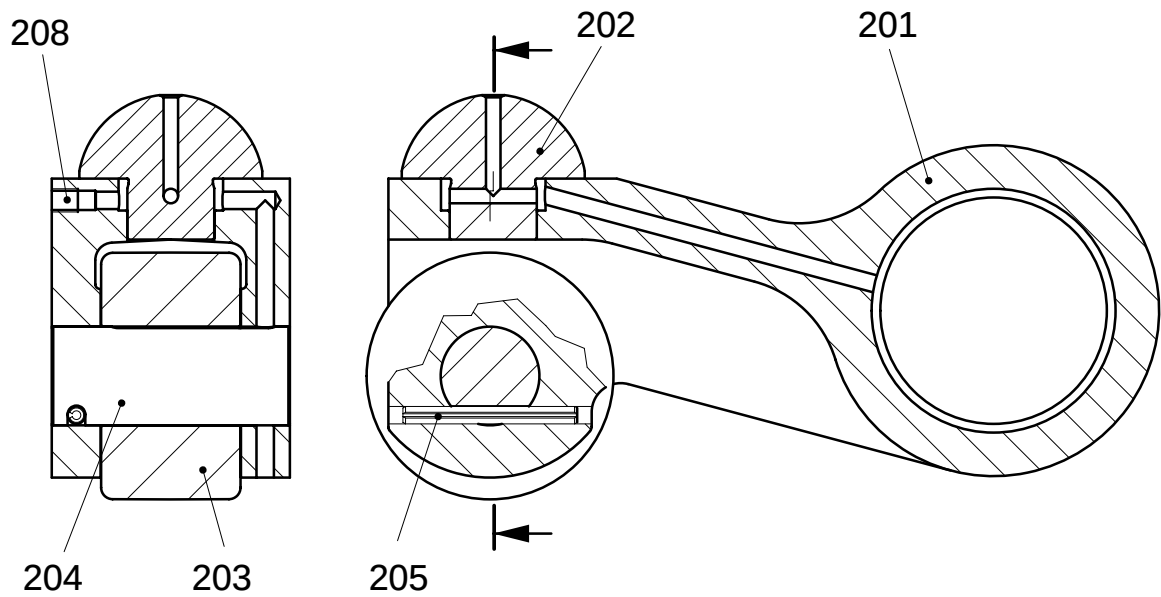


Bottom Part for Valve Mechanism

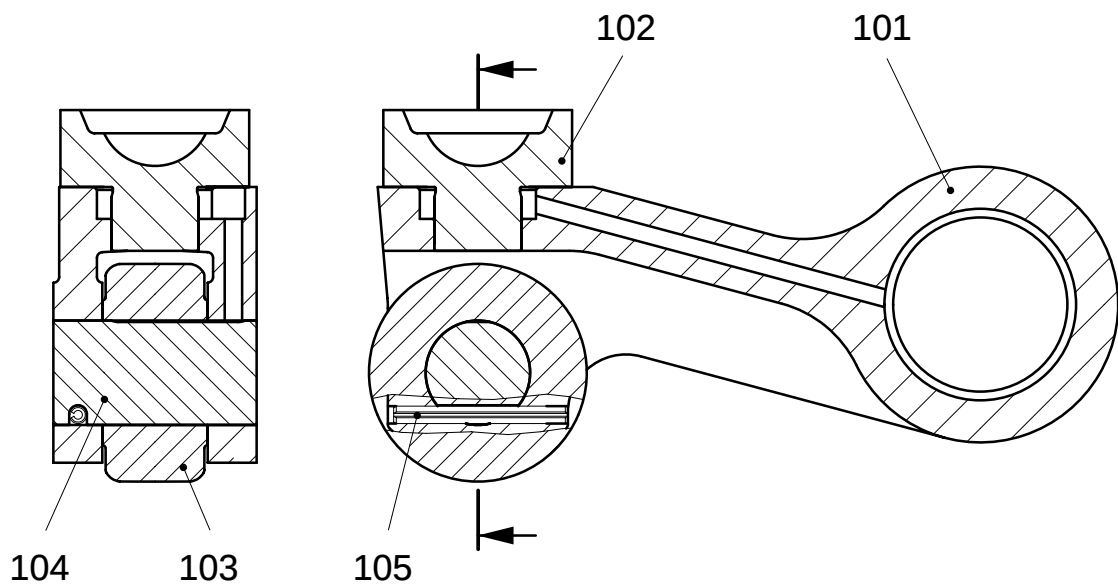
M25

04

B-B



Y



Bottom Part for Valve Mechanism

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	UNTERER VENTILANTRIEB, VOLLST. BOTTOM PART FOR VALVE MECHANISM ASS.	1	253502 DD
1	SCHWINGHEBELACHSE ROCKING LEVER AXLE	1	253502-101
2	SCHWINGHEBELACHSE ROCKING LEVER AXLE	7	253502-102
3	SCHWINGHEBELACHSE ROCKING LEVER AXLE	1	253502-103
4	BOCK BRACKET	9	253502-104
5	BOCK BRACKET	1	253502-005
6	BOCK BRACKET	9	253502-106
7	STOSSSTANGE, VOLLST. PUSH-ROD, COMPL.	18	253502-007
10	DISTANZBUCHSE DISTANCE BUSH	9	253502-010
11	DISTANZBUCHSE DISTANCE BUSH	9	253502-011
12	FLANSCH BLANK FLANGE	1	253502-112
14	SECHSKANTSCHRAUBE HEXAGON BOLT	38	1.1367-381
15	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-444
17	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-808
18	SPANNSTIFT SPRING DOWEL PIN	# 2	1.0039-313
19	DICHTUNG GASKET	# 1	1.7073-754
20	DICHTRING JOINT RING	# 1	1.7010-172

04

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Bottom Part for Valve Mechanism

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
100	SCHWINGHEBEL, VOLLST. ROCKING LEVER, COMPL.	* 18	253566-100
101	SCHWINGHEBEL ROCKING LEVER	18	253566-101
102	KUGELPFANNE THRUST PIECE	18	253566-102
103	ROLLE ROLLER	18	6.3560-101
104	BOLZEN BOLT	18	253566-104
105	SPANNSTIFT SPRING DOWEL PIN	# 18	1.0039-289
200	SCHWINGHEBEL, VOLLST. ROCKING LEVER, COMPL.	* 9	253565-200
201	SCHWINGHEBEL ROCKING LEVER	9	253565-201
202	KUGELSTÜCK THRUST PIECE	9	253565-202
203	ROLLE ROLLER	9	253565-203
204	BOLZEN BOLT	9	253565-204
205	SPANNSTIFT SPRING DOWEL PIN	# 9	1.0039-289
208	GEWINDESTIFT HEXAGON SOCKET GRUB SCREW	9	1.1100-046

* = IN 253502 DD ENTHALTEN
INCLUDED IN 253502 DD

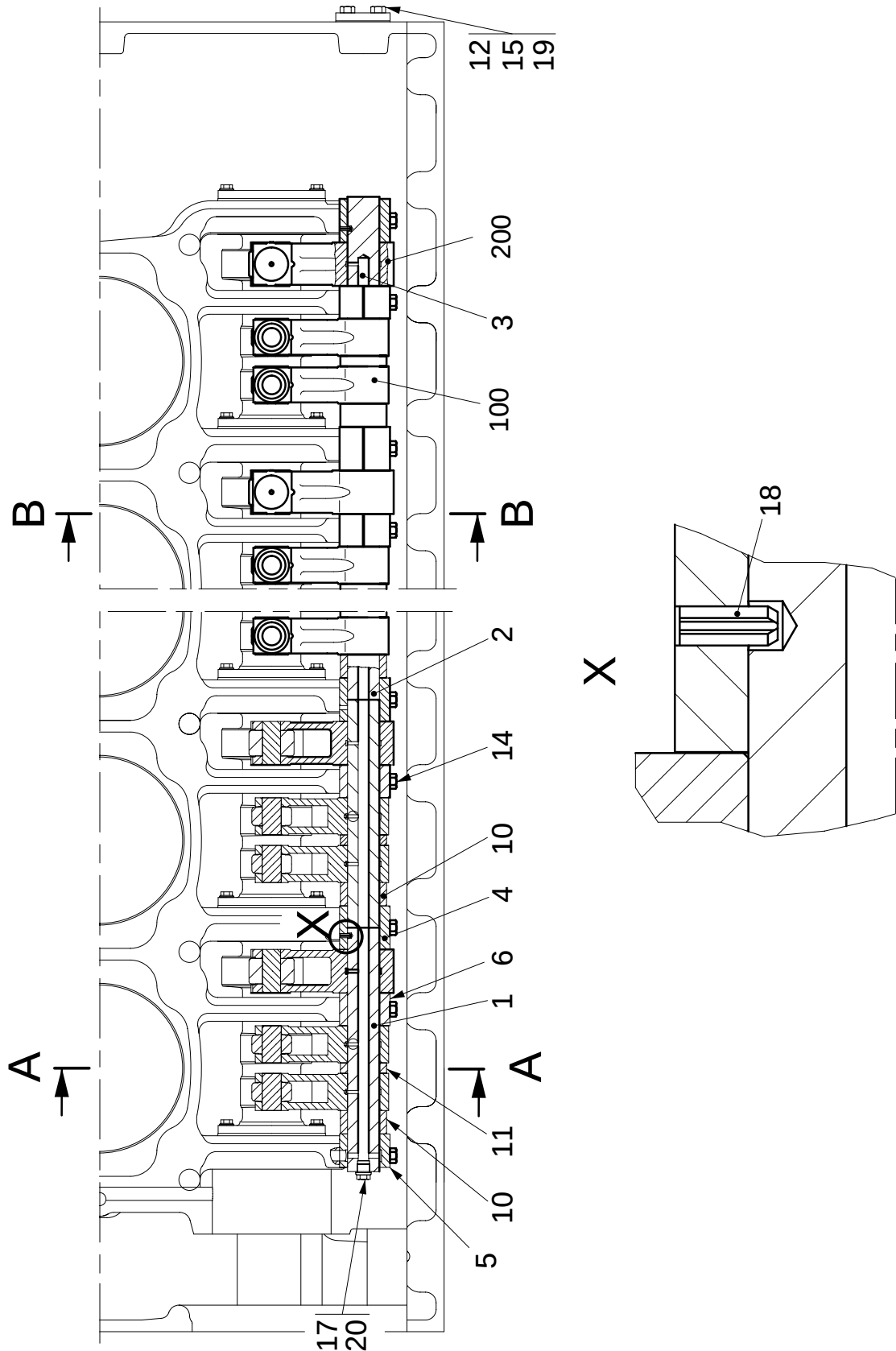
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Bottom Part for Valve Mechanism

M25

04

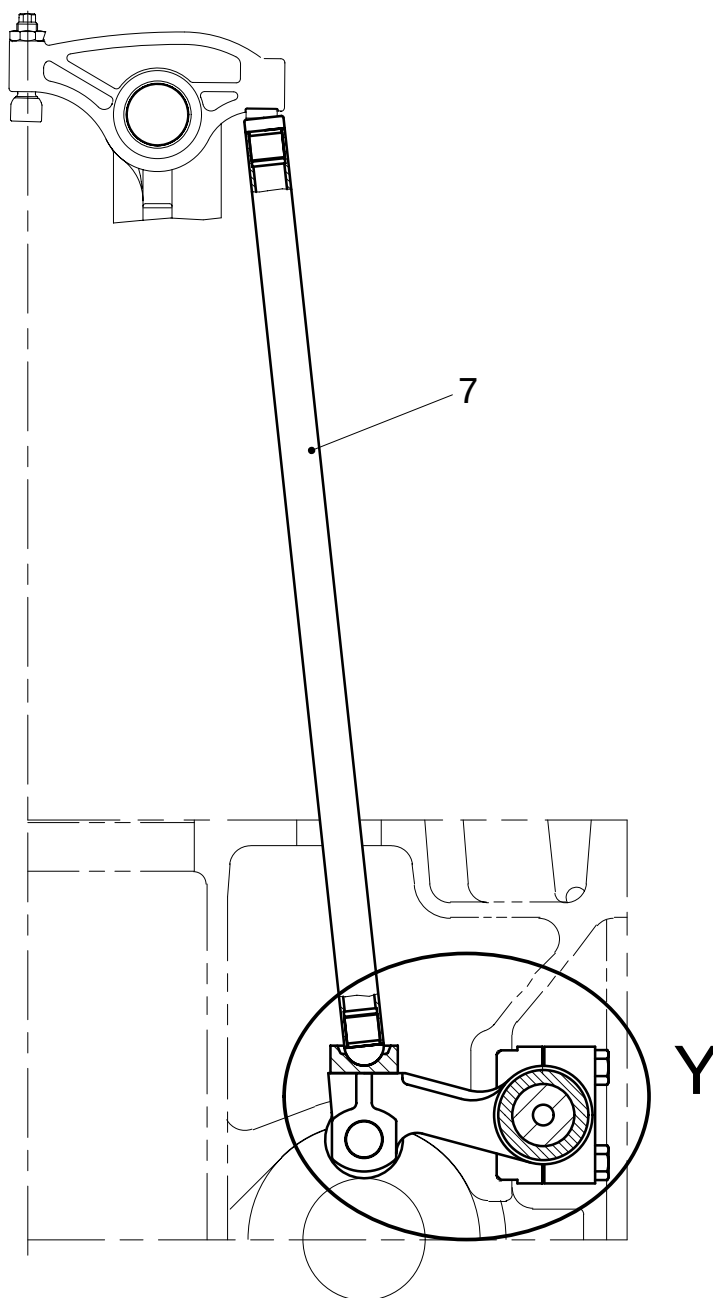


Bottom Part for Valve Mechanism

M25

04

A-A

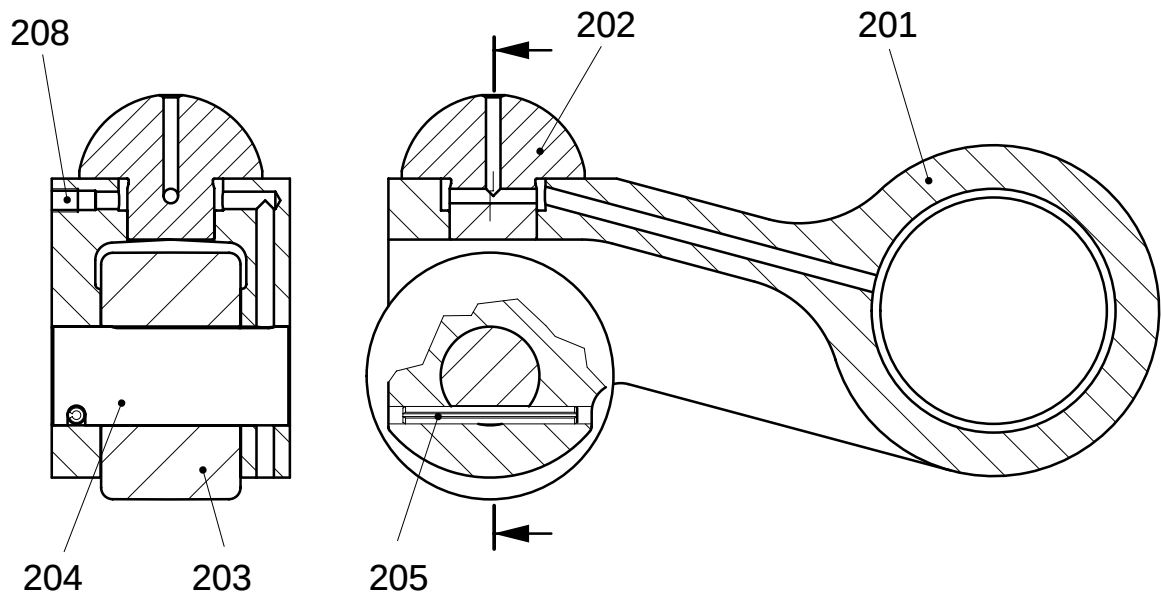


Bottom Part for Valve Mechanism

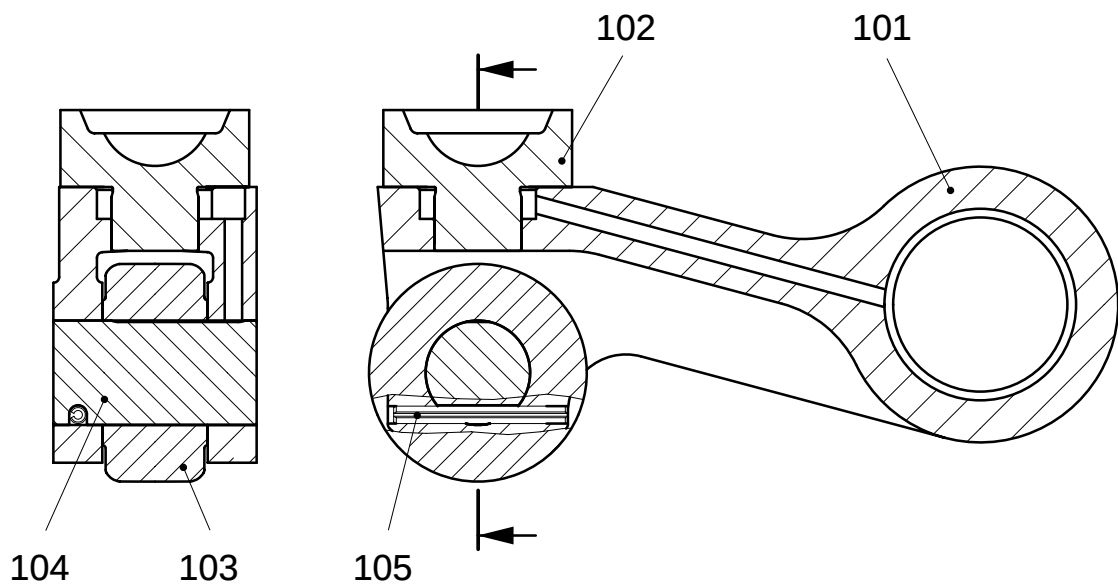
M25

04

B-B



Y



Bottom Part for Valve Mechanism

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	UNTERER VENTILANTRIEB, VOLLST. BOTTOM PART FOR VALVE MECHANISM ASS.	1	253502 EE
1	SCHWINGHEBELACHSE ROCKING LEVER AXLE	1	253502-101
2	SCHWINGHEBELACHSE ROCKING LEVER AXLE	4	253502-102
3	SCHWINGHEBELACHSE ROCKING LEVER AXLE	1	253502-103
4	BOCK BRACKET	6	253502-104
5	BOCK BRACKET	1	253502-005
6	BOCK BRACKET	6	253502-106
7	STOSSSTANGE, VOLLST. PUSH-ROD, COMPL.	12	253502-007
10	DISTANZBUCHSE DISTANCE BUSH	6	253502-010
11	DISTANZBUCHSE DISTANCE BUSH	6	253502-011
12	FLANSCH BLANK FLANGE	1	253502-112
14	SECHSKANTSCHRAUBE HEXAGON BOLT	26	1.1367-381
15	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-444
17	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-808
18	SPANNSTIFT SPRING DOWEL PIN	# 2	1.0039-313
19	DICHTUNG GASKET	# 1	1.7073-754
20	DICHTRING JOINT RING	# 1	1.7010-172

04

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Bottom Part for Valve Mechanism

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
100	SCHWINGHEBEL, VOLLST. ROCKING LEVER, COMPL.	* 12	253566-100
101	SCHWINGHEBEL ROCKING LEVER	12	253566-101
102	KUGELPFANNE THRUST PIECE	12	253566-102
103	ROLLE ROLLER	12	253566-103
104	BOLZEN BOLT	12	253566-104
105	BUCHSE BUSH	12	253566-105
106	SPANNSTIFT SPRING DOWEL PIN	# 12	1.0039-289
200	SCHWINGHEBEL, VOLLST. ROCKING LEVER, COMPL.	* 6	253565-200
201	SCHWINGHEBEL ROCKING LEVER	6	253565-201
202	KUGELSTÜCK THRUST PIECE	6	253565-202
203	ROLLE ROLLER	6	253565-203
204	BOLZEN BOLT	6	253565-204
205	BUCHSE BUSH	6	253566-205
206	SPANNSTIFT SPRING DOWEL PIN	# 6	1.0039-289
208	GEWINDESTIFT HEXAGON SOCKET GRUB SCREW	6	1.1100-046

* = IN 253502 EE ENTHALTEN
INCLUDED IN 253502 EE

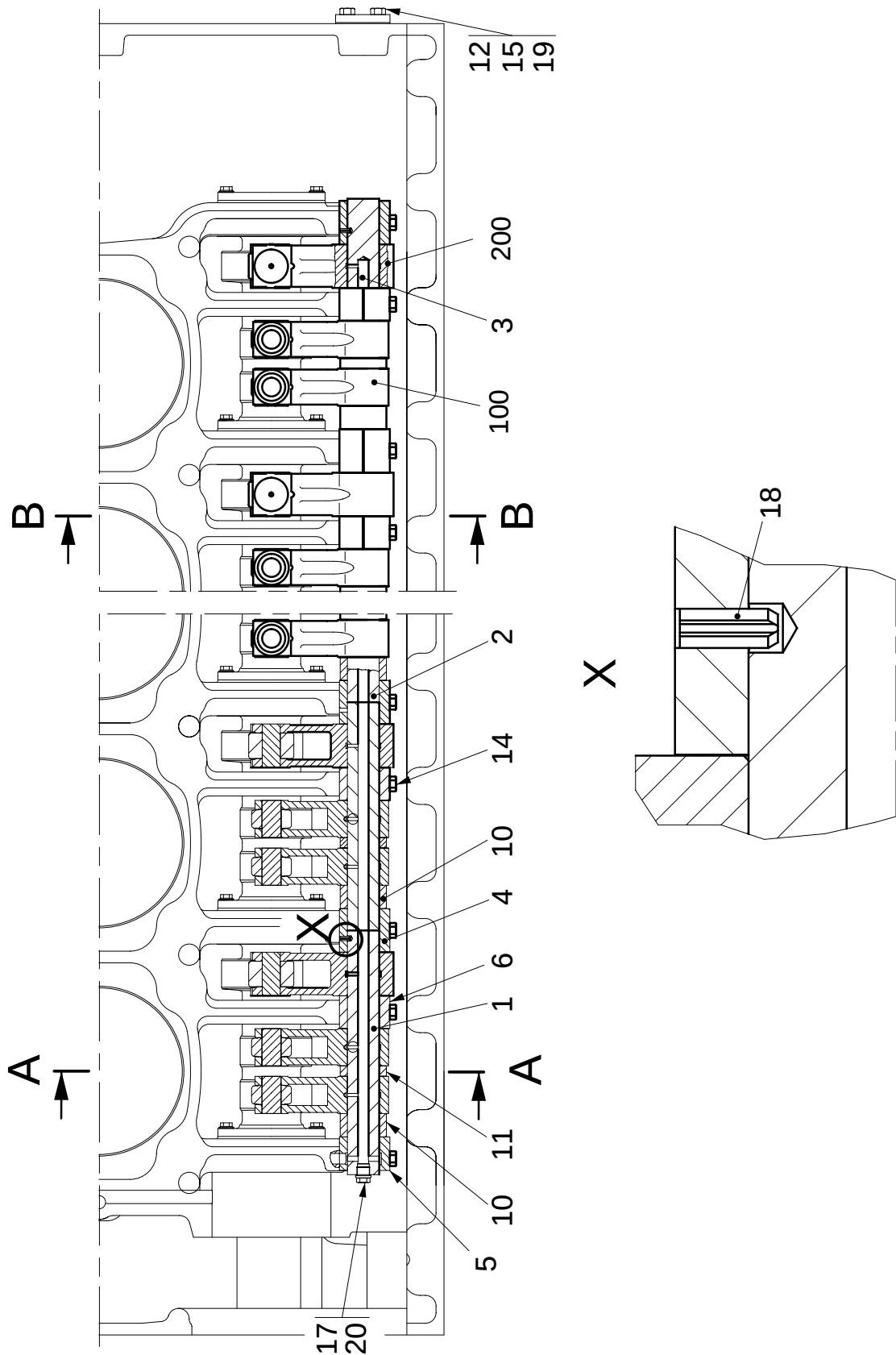
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Bottom Part for Valve Mechanism

M25

04

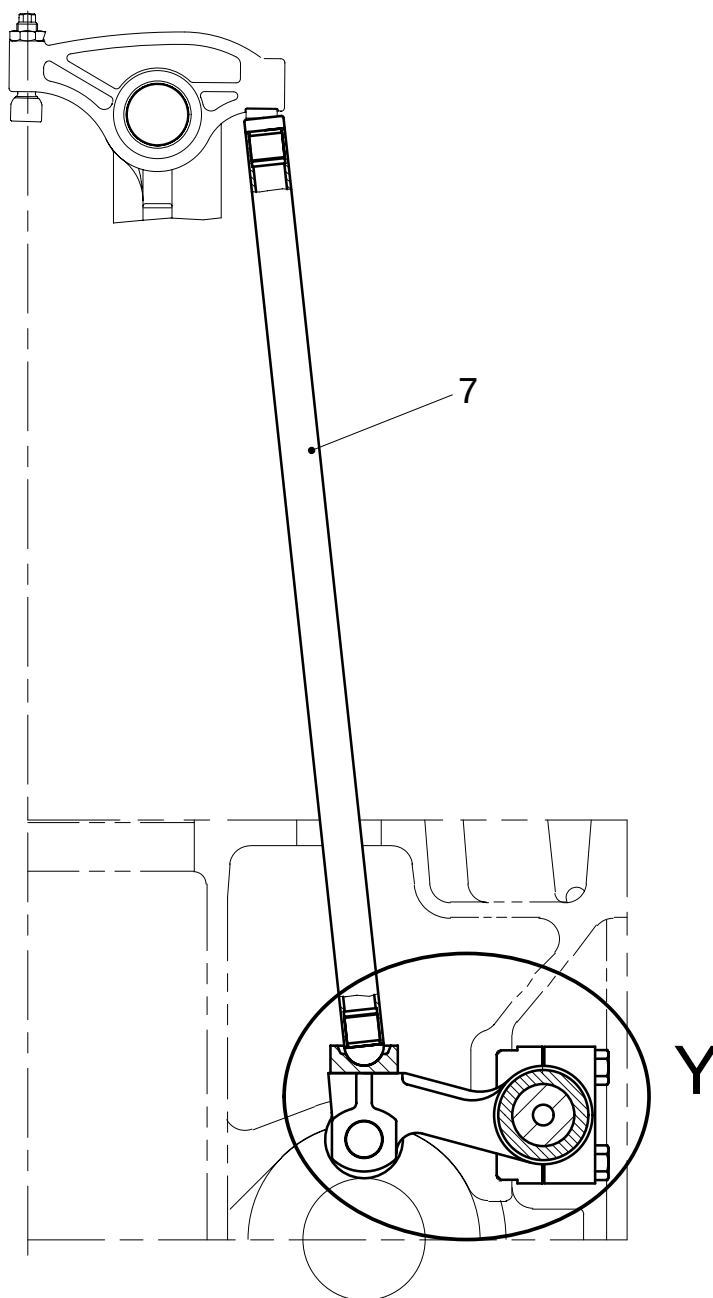


Bottom Part for Valve Mechanism

M25

04

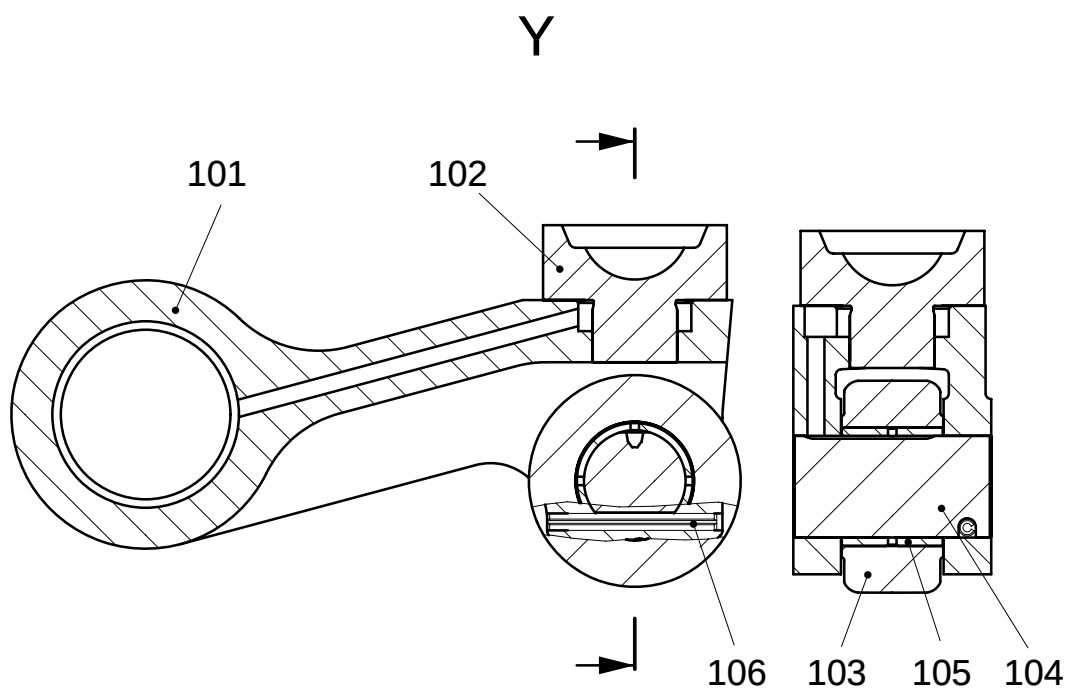
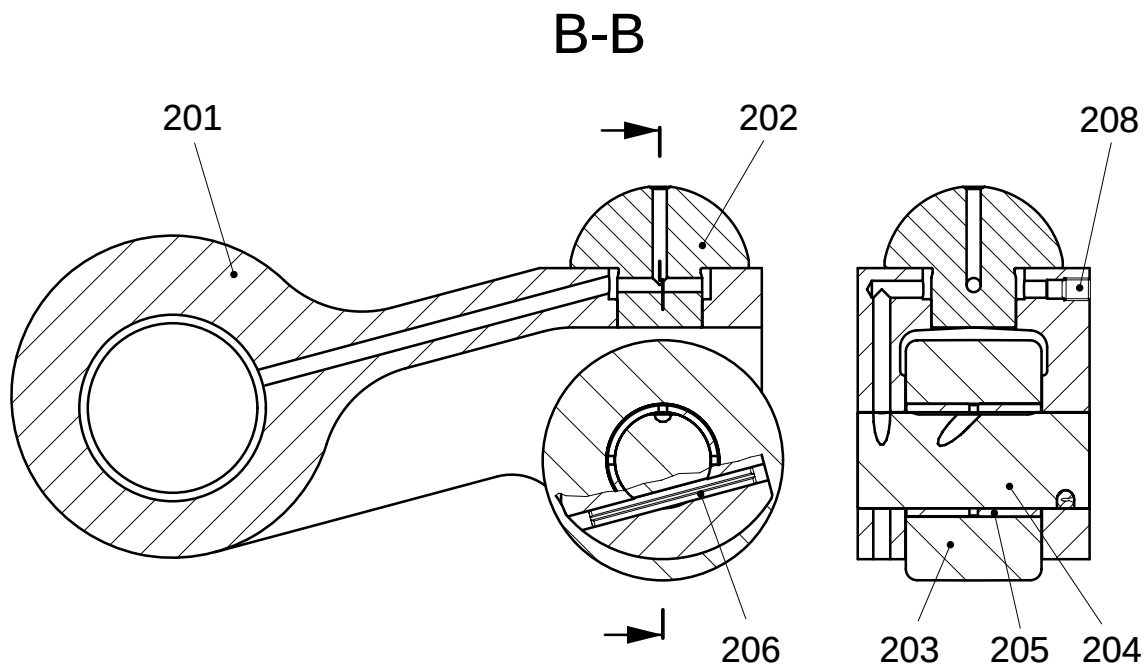
A-A



Bottom Part for Valve Mechanism

M25

04



Bottom Part for Valve Mechanism

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	UNTERER VENTILANTRIEB, VOLLST. BOTTOM PART FOR VALVE MECHANISM ASS.	1	253502 FF
1	SCHWINGHEBELACHSE ROCKING LEVER AXLE	1	253502-101
2	SCHWINGHEBELACHSE ROCKING LEVER AXLE	6	253502-102
3	SCHWINGHEBELACHSE ROCKING LEVER AXLE	1	253502-103
4	BOCK BRACKET	8	253502-104
5	BOCK BRACKET	1	253502-005
6	BOCK BRACKET	8	253502-106
7	STOSSSTANGE, VOLLST. PUSH-ROD, COMPL.	16	253502-007
10	DISTANZBUCHSE DISTANCE BUSH	8	253502-010
11	DISTANZBUCHSE DISTANCE BUSH	8	253502-011
12	FLANSCH BLANK FLANGE	1	253502-112
14	SECHSKANTSCHRAUBE HEXAGON BOLT	34	1.1367-381
15	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-444
17	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-808
18	SPANNSTIFT SPRING DOWEL PIN	# 2	1.0039-313
19	DICHTUNG GASKET	# 1	1.7073-754
20	DICHTRING JOINT RING	# 1	1.7010-172

04

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Bottom Part for Valve Mechanism

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
100	SCHWINGHEBEL, VOLLST. ROCKING LEVER, COMPL.	* 16	253566-100
101	SCHWINGHEBEL ROCKING LEVER	16	253566-101
102	KUGELPFANNE THRUST PIECE	16	253566-102
103	ROLLE ROLLER	16	253566-103
104	BOLZEN BOLT	16	253566-104
105	BUCHSE BUSH	16	253566-105
106	SPANNSTIFT SPRING DOWEL PIN	# 16	1.0039-289
200	SCHWINGHEBEL, VOLLST. ROCKING LEVER, COMPL.	* 8	253565-200
201	SCHWINGHEBEL ROCKING LEVER	8	253565-201
202	KUGELSTÜCK THRUST PIECE	8	253565-202
203	ROLLE ROLLER	8	253565-203
204	BOLZEN BOLT	8	253565-204
205	BUCHSE BUSH	8	253566-205
206	SPANNSTIFT SPRING DOWEL PIN	# 8	1.0039-289
208	GEWINDESTIFT HEXAGON SOCKET GRUB SCREW	8	1.1100-046

* = IN 253502 FF ENTHALTEN
INCLUDED IN 253502 FF

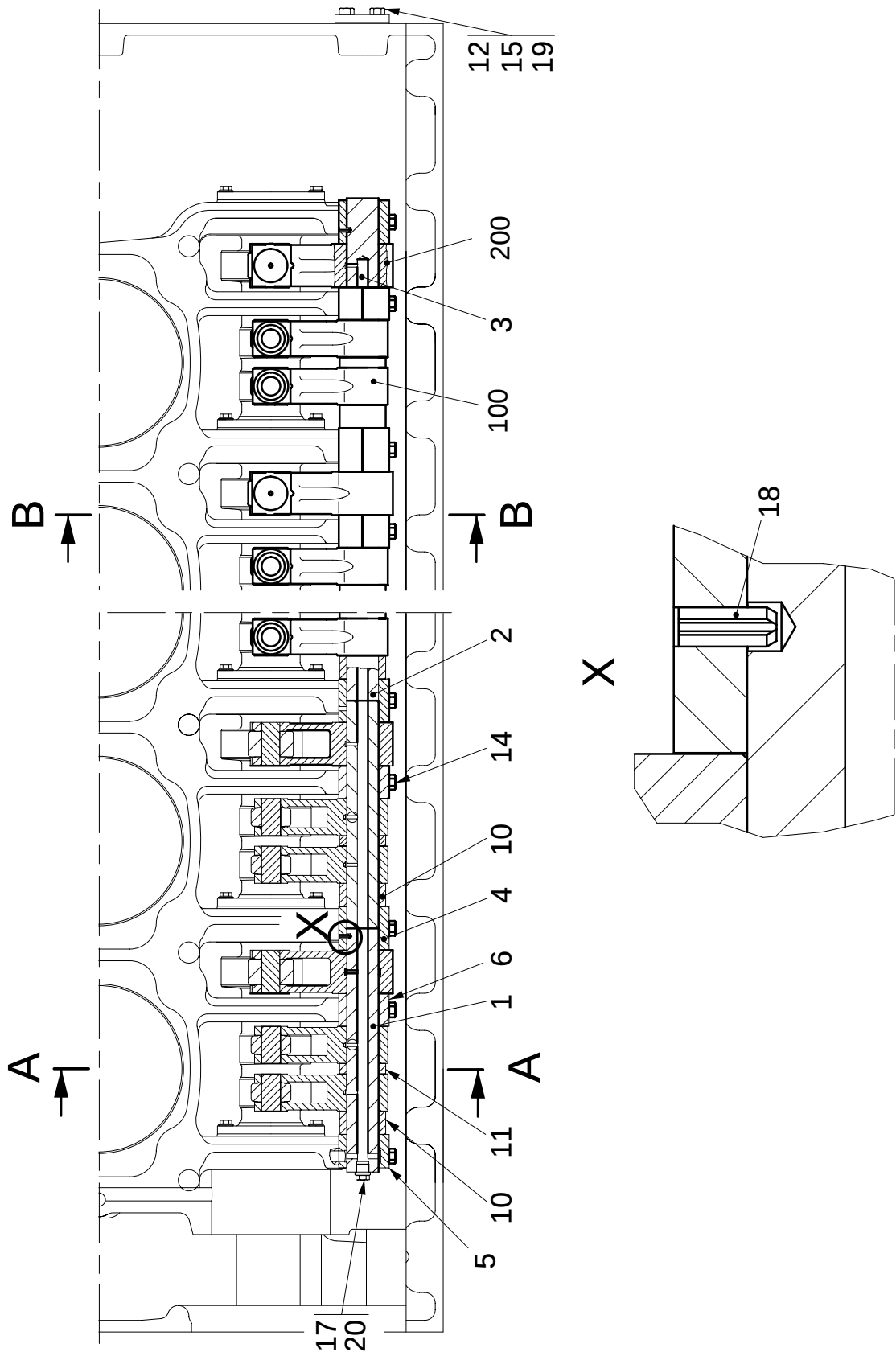
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Bottom Part for Valve Mechanism

M25

04

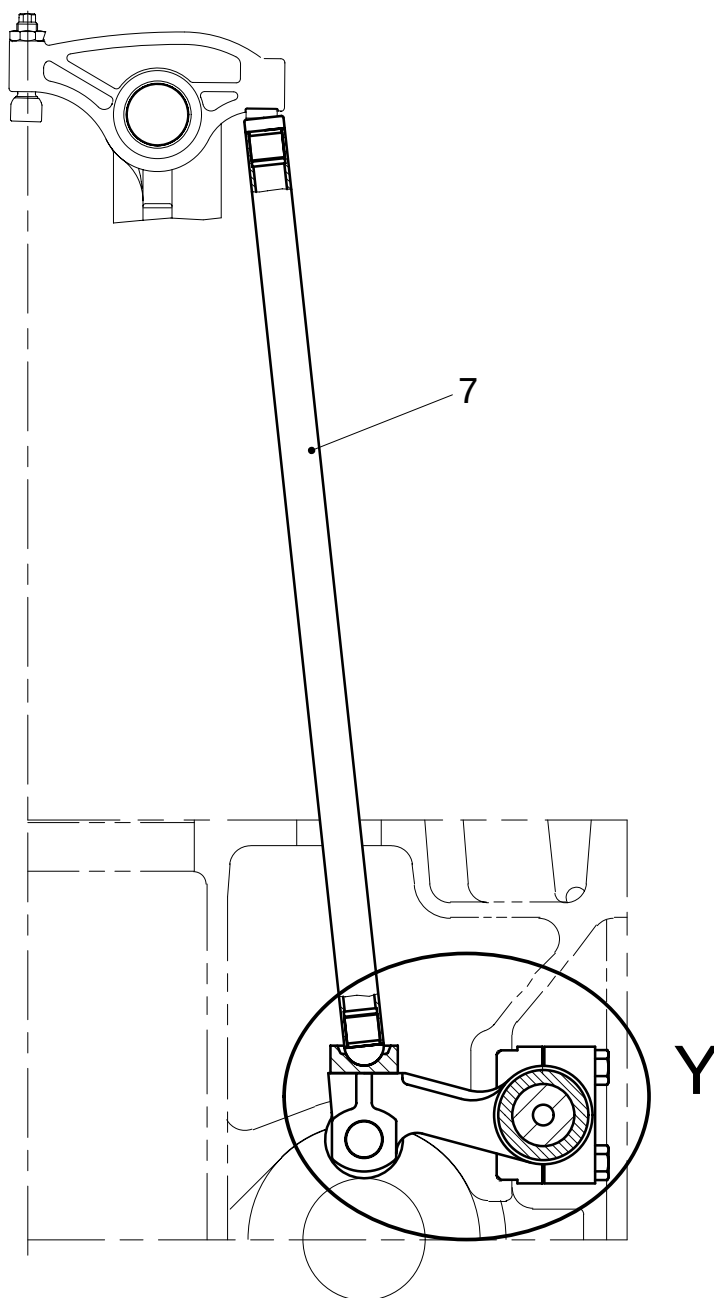


Bottom Part for Valve Mechanism

M25

04

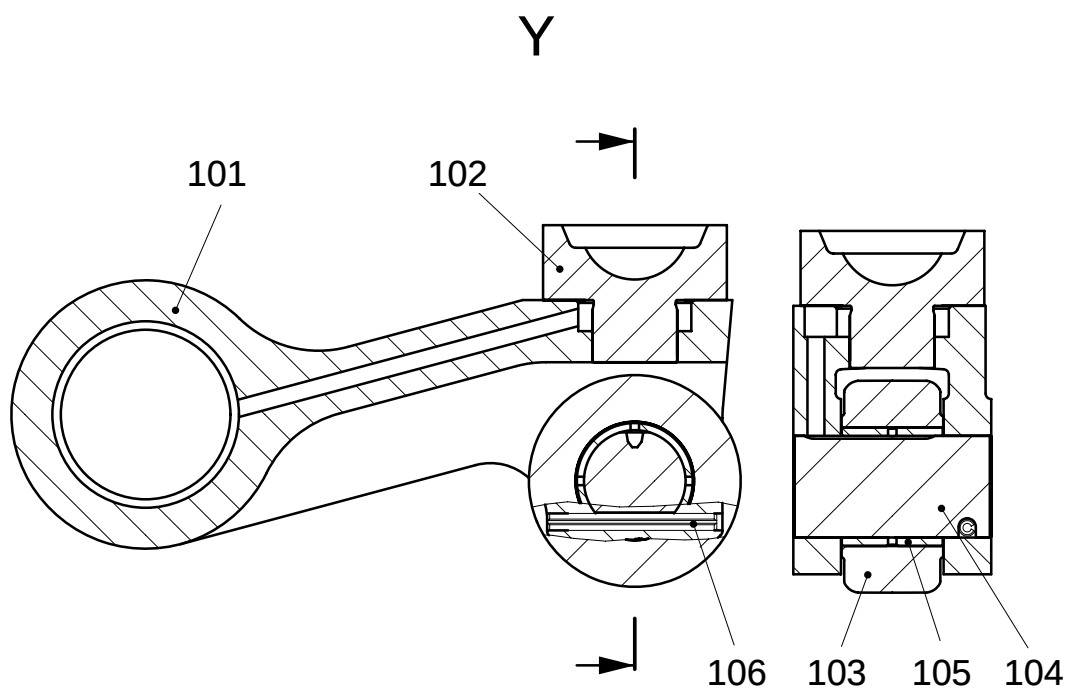
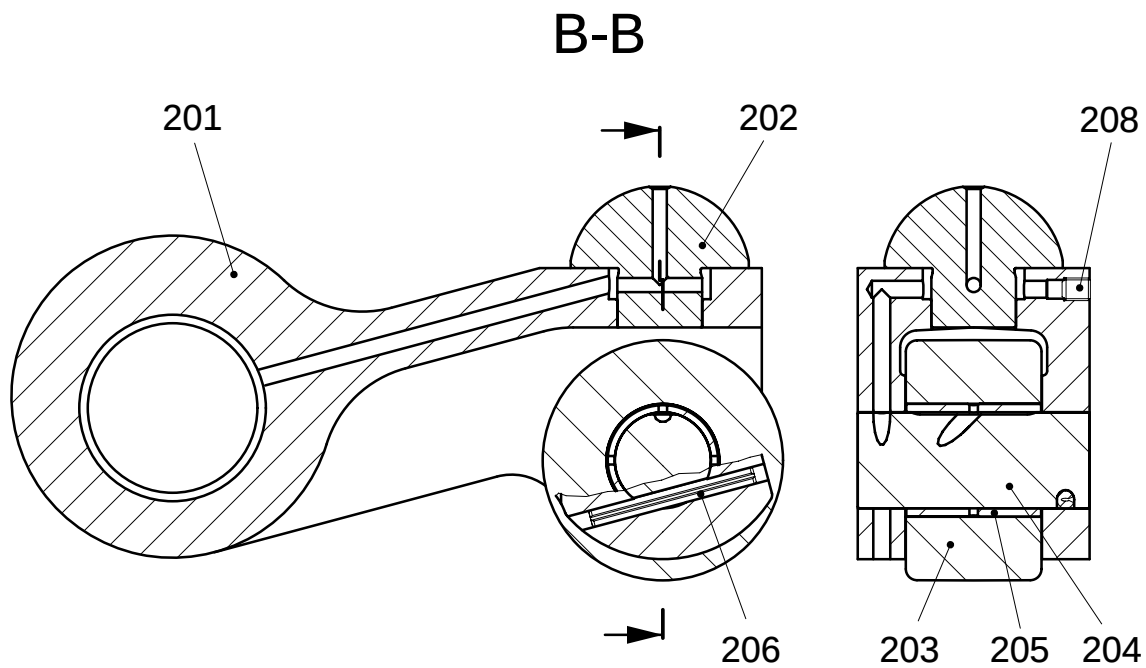
A-A



Bottom Part for Valve Mechanism

M25

04



Bottom Part for Valve Mechanism

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	UNTERER VENTILANTRIEB, VOLLST. BOTTOM PART FOR VALVE MECHANISM ASS.	1	253502 GG
1	SCHWINGHEBELACHSE ROCKING LEVER AXLE	1	253502-101
2	SCHWINGHEBELACHSE ROCKING LEVER AXLE	7	253502-102
3	SCHWINGHEBELACHSE ROCKING LEVER AXLE	1	253502-103
4	BOCK BRACKET	9	253502-104
5	BOCK BRACKET	1	253502-005
6	BOCK BRACKET	9	253502-106
7	STOSSSTANGE, VOLLST. PUSH-ROD, COMPL.	18	253502-007
10	DISTANZBUCHSE DISTANCE BUSH	9	253502-010
11	DISTANZBUCHSE DISTANCE BUSH	9	253502-011
12	FLANSCH BLANK FLANGE	1	253502-112
14	SECHSKANTSCHRAUBE HEXAGON BOLT	38	1.1367-381
15	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-444
17	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-808
18	SPANNSTIFT SPRING DOWEL PIN	# 2	1.0039-313
19	DICHTUNG GASKET	# 1	1.7073-754
20	DICHTRING JOINT RING	# 1	1.7010-172

04

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Bottom Part for Valve Mechanism

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
100	SCHWINGHEBEL, VOLLST. ROCKING LEVER, COMPL.	* 18	253566-100
101	SCHWINGHEBEL ROCKING LEVER	18	253566-101
102	KUGELPFANNE THRUST PIECE	18	253566-102
103	ROLLE ROLLER	18	253566-103
104	BOLZEN BOLT	18	253566-104
105	BUCHSE BUSH	18	253566-105
106	SPANNSTIFT SPRING DOWEL PIN	# 18	1.0039-289
200	SCHWINGHEBEL, VOLLST. ROCKING LEVER, COMPL.	* 9	253565-200
201	SCHWINGHEBEL ROCKING LEVER	9	253565-201
202	KUGELSTÜCK THRUST PIECE	9	253565-202
203	ROLLE ROLLER	9	253565-203
204	BOLZEN BOLT	9	253565-204
205	BUCHSE BUSH	9	253566-205
206	SPANNSTIFT SPRING DOWEL PIN	# 9	1.0039-289
208	GEWINDESTIFT HEXAGON SOCKET GRUB SCREW	9	1.1100-046

* = IN 253502 GG ENTHALTEN
INCLUDED IN 253502 GG

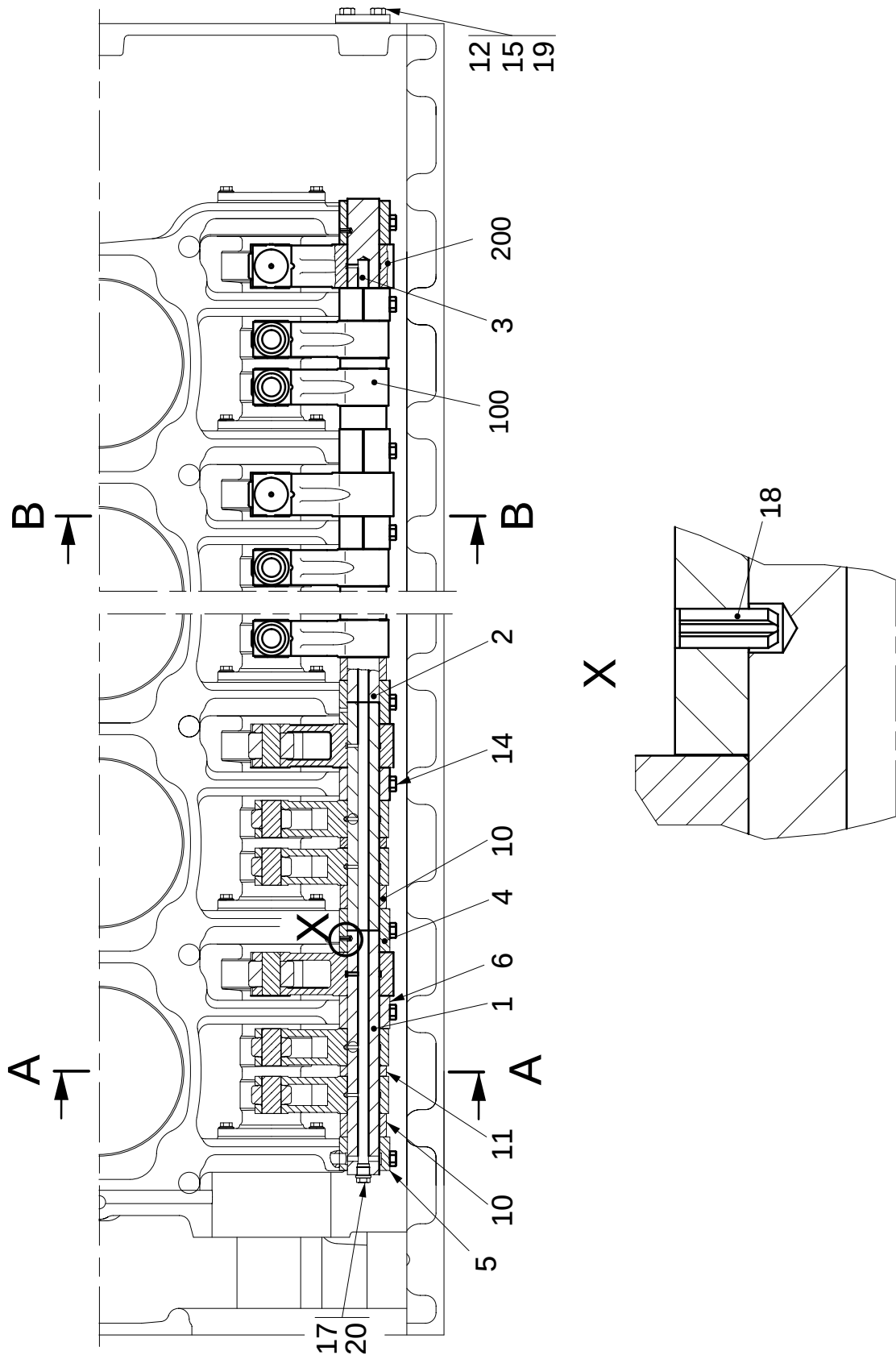
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Bottom Part for Valve Mechanism

M25

04

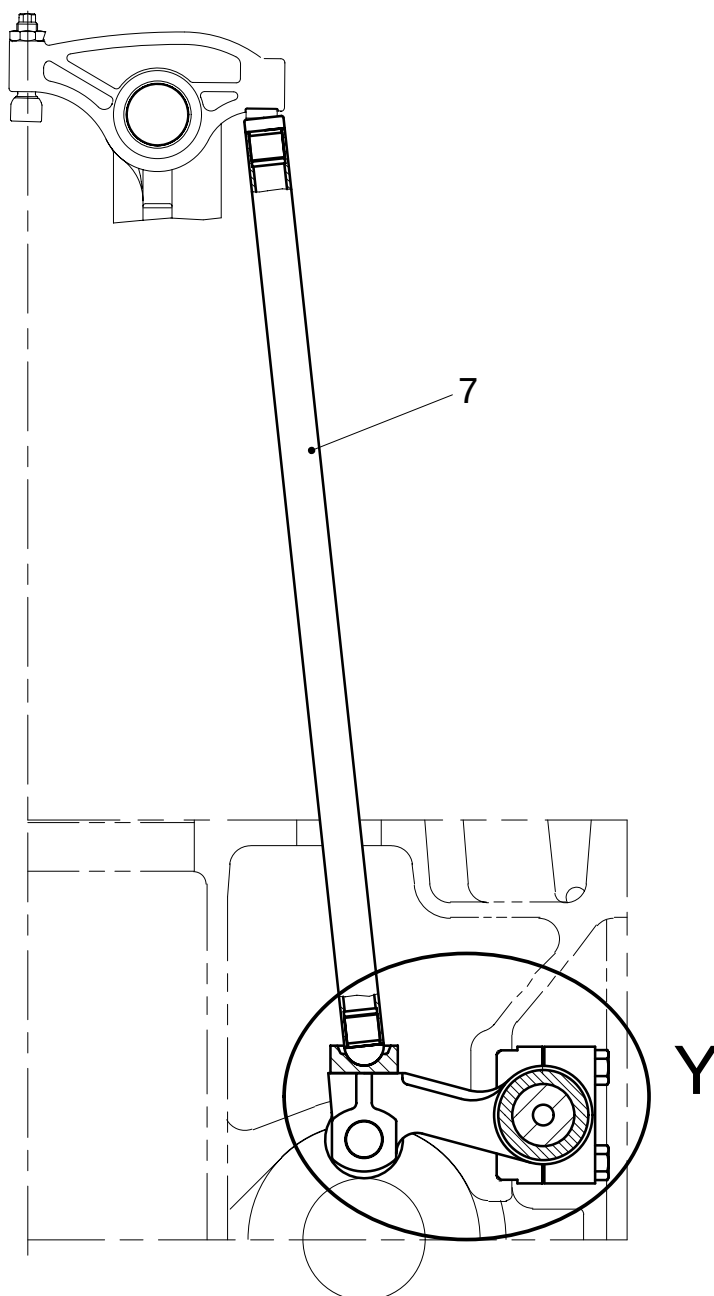


Bottom Part for Valve Mechanism

M25

04

A-A

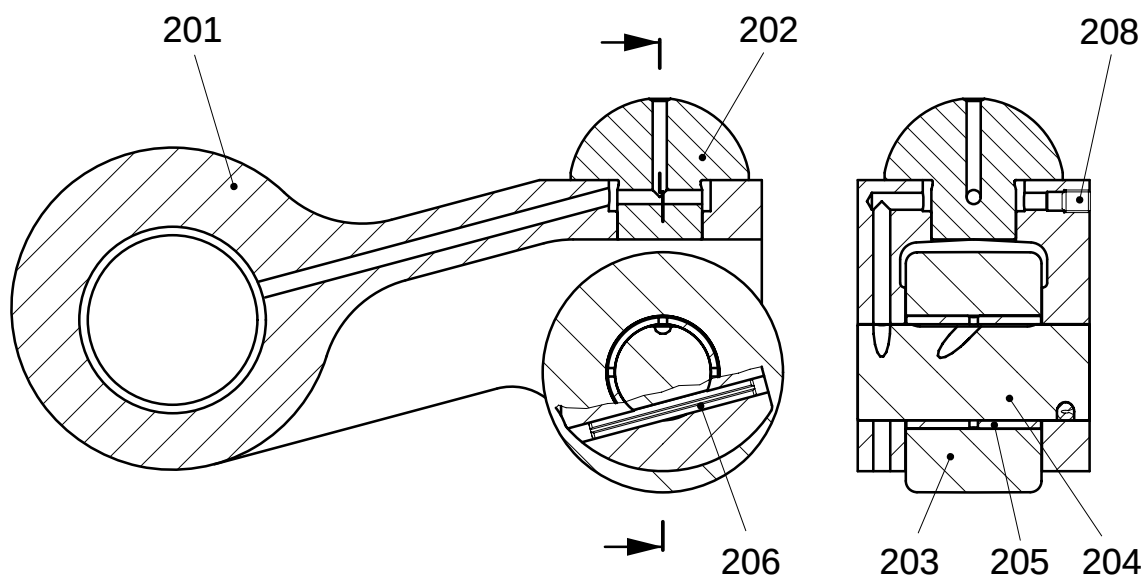


Bottom Part for Valve Mechanism

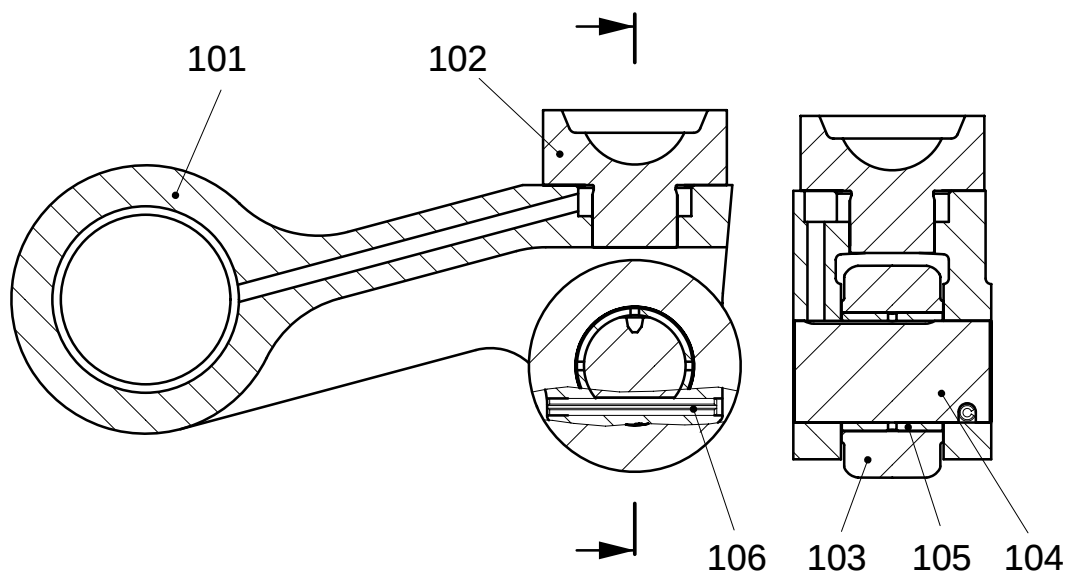
M25

04

B-B



Y



Injection Pump Drive

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	EINSPRITZPUMPENANTRIEB, VOLLST. INJECTION PUMP DRIVE ASSEMBLY	1	253580 AA
1	EINSPRITZPUMPE, VOLLST. FUEL INJECTION PUMP, COMPL.	1	SIEHE B1.05.07.253597 SEE B1.05.07.253597
5	DRUCKSTANGE THRUST ROD	1	253580-005
6	FEDERTELLER SPRING PLATE	1	253580-006
8	DRUCKFEDER PRESSURE SPRING	1	253580-008
10	DISTANZPLATTE, 2,2 DISTANCE PLATE, 2,2	1	253580-010
11	DISTANZPLATTE, 2,4 DISTANCE PLATE, 2,4	1	253580-011
12	DISTANZPLATTE, 2,6 DISTANCE PLATE, 2,6	1	253580-012
13	DISTANZPLATTE, 2,8 DISTANCE PLATE, 2,8	1	253580-013
14	DISTANZPLATTE, 3,0 DISTANCE PLATE, 3,0	1	253580-014
15	DISTANZPLATTE, 3,2 DISTANCE PLATE, 3,2	1	253580-015
16	DISTANZPLATTE, 3,4 DISTANCE PLATE, 3,4	1	253580-016
17	DISTANZPLATTE, 3,6 DISTANCE PLATE, 3,6	1	253580-017
27	SECHSKANTMUTTER HEXAGON NUT WITH COLLAR	3	1.2035-033
28	HALBRUNDKERBNAGEL GROOVED DRIVE STUD	2	1.0036-864
29	O-RING O-RING	# 1	1.7084-640

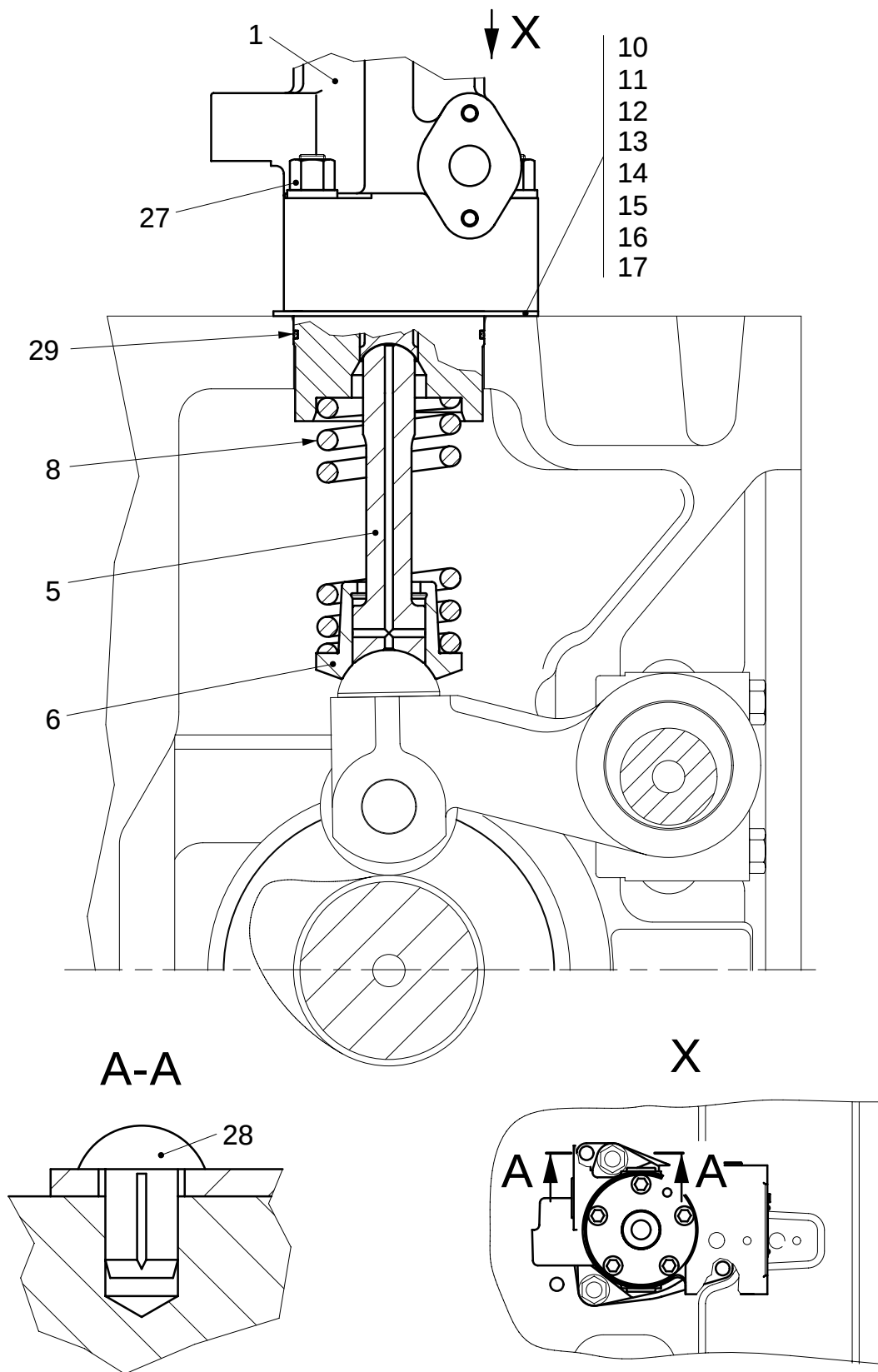
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Injection Pump Drive

M25

04



Governor Mounting

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR. PART NO.
-	REGLERANORDNUNG, VOLLST. GOVERNOR MOUNTING ASSEMBLY	1	254110 AA
1	FEDERGLIED, VOLLST. ELASTIC CONNECTING-ROD, COMPL.	1	254110-001
2	HEBEL LEVER	1	254110-002
3	HEBEL LEVER	1	254110-003
4	DISTANZBUCHSE DISTANCE BUSH	2	254110-004
6	BOLZEN BOLT	2	1.0015-048
7	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-346
8	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-242
9	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-239
11	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-036
12	SICHERUNGSMUTTER SELF LOCKING HEXAGON NUT	# 2	1.2021-507
14	SCHEIBE WASHER	2	1.0040-223
15	GEWINDESTIFT HEXAGON SOCKET GRUB SCREW, CONE POINT	1	1.1102-032
17	REGLER, VOLLST. GOVERNOR, COMPL.	1	SIEHE BUCH C, ABSCHNITT 3 SEE BOOK C, SECTION 3
19	GELENKKOPF LINK HEAD	2	1.3048-405

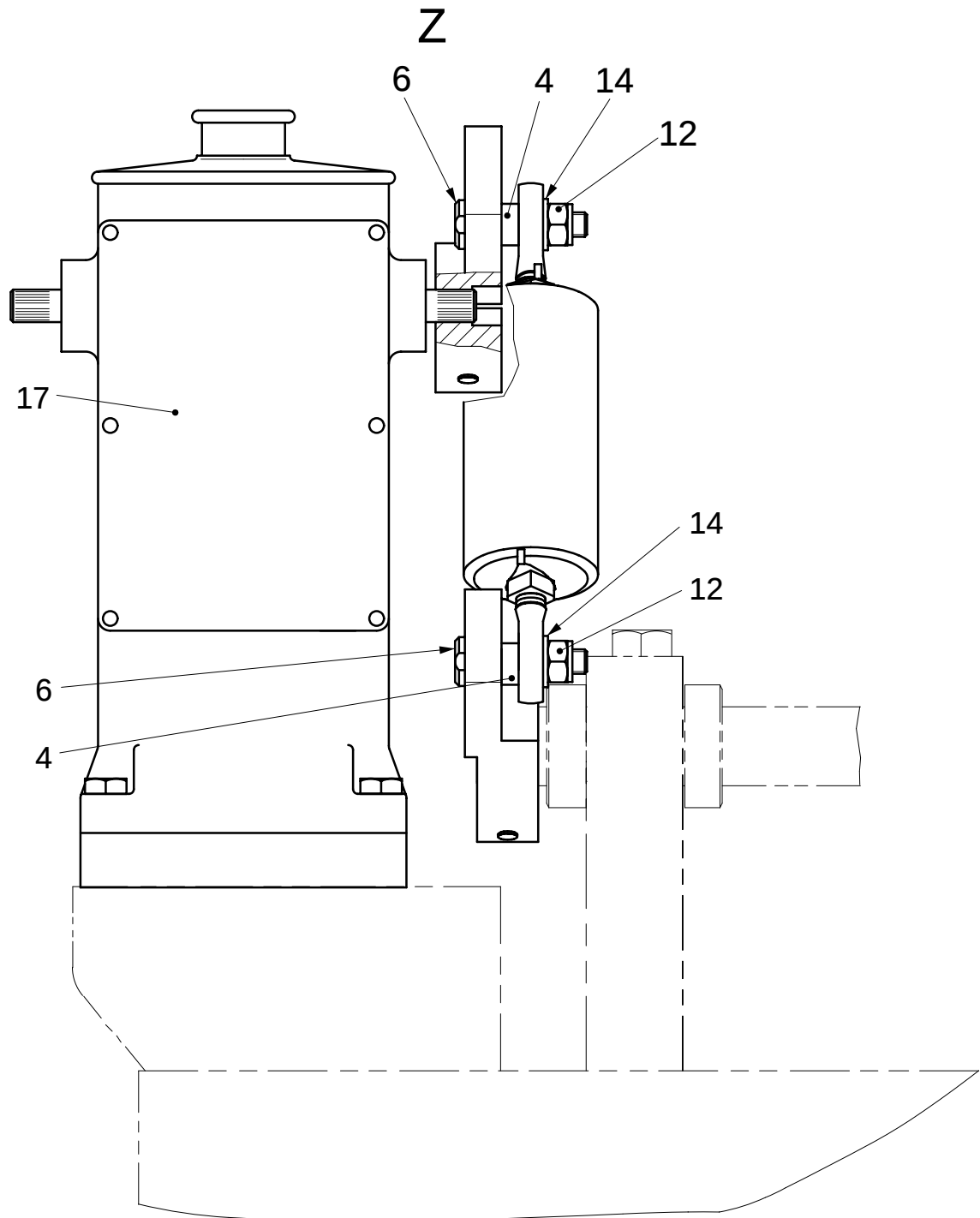
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Governor Mounting

M25

04



Governor Mounting

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REGLERANORDNUNG, VOLLST. GOVERNOR MOUNTING ASSEMBLY	1	254110 BB
1	FEDERGLIED, VOLLST. ELASTIC CONNECTING-ROD, COMPL.	1	254110-001
2	HEBEL LEVER	1	254110-002
3	HEBEL LEVER	1	254110-003
4	DISTANZBUCHSE DISTANCE BUSH	2	254110-004
5	HALTER BRACKET	1	254110-005
7	BOLZEN BOLT	2	1.0015-048
9	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-347
10	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-242
11	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-239
12	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-312
13	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-036
14	SICHERUNGSMUTTER SELF LOCKING HEXAGON NUT	# 2	1.2021-507
15	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034
17	SCHEIBE WASHER	2	1.0040-223
18	GEWINDESTIFT HEXAGON SOCKET GRUB SCREW	1	1.1102-032
19	GERADER EINSCHRAUBSTUTZEN MALE CONNECTOR	1	1.4191-006
20	REGLER, VOLLST. GOVERNOR, COMPL.	1	SIEHE BUCH C, ABSCHNITT 3 SEE BOOK C, SECTION 3
21	GELENKKOPF LINK HEAD	2	1.3048-405
22	UEBERGANGSNIPPEL ADAPTER	1	1.5105-202
23	STUTZEN MALE CONNECTOR	1	1.5094-122

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Governor Mounting

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
24	STUTZEN MALE CONNECTOR	1	1.5093-222
25	DICHTRING JOINT RING	1	1.7010-133
26	DICHTRING JOINT RING	1	1.7010-064
28	ROHRKLEMME PIPE CLAMP	2	1.5011-002
100	ROHR,VOLLST. PIPE, COMPL.	1	254110-100
101	ROHR PIPE	1	1.9090-018
103	ÜBERWURFMUTTER UNION NUT	2	1.5040-116
104	SCHNEIDRING CUTTING RING	2	1.5059-086
105	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	2	1.3088-012

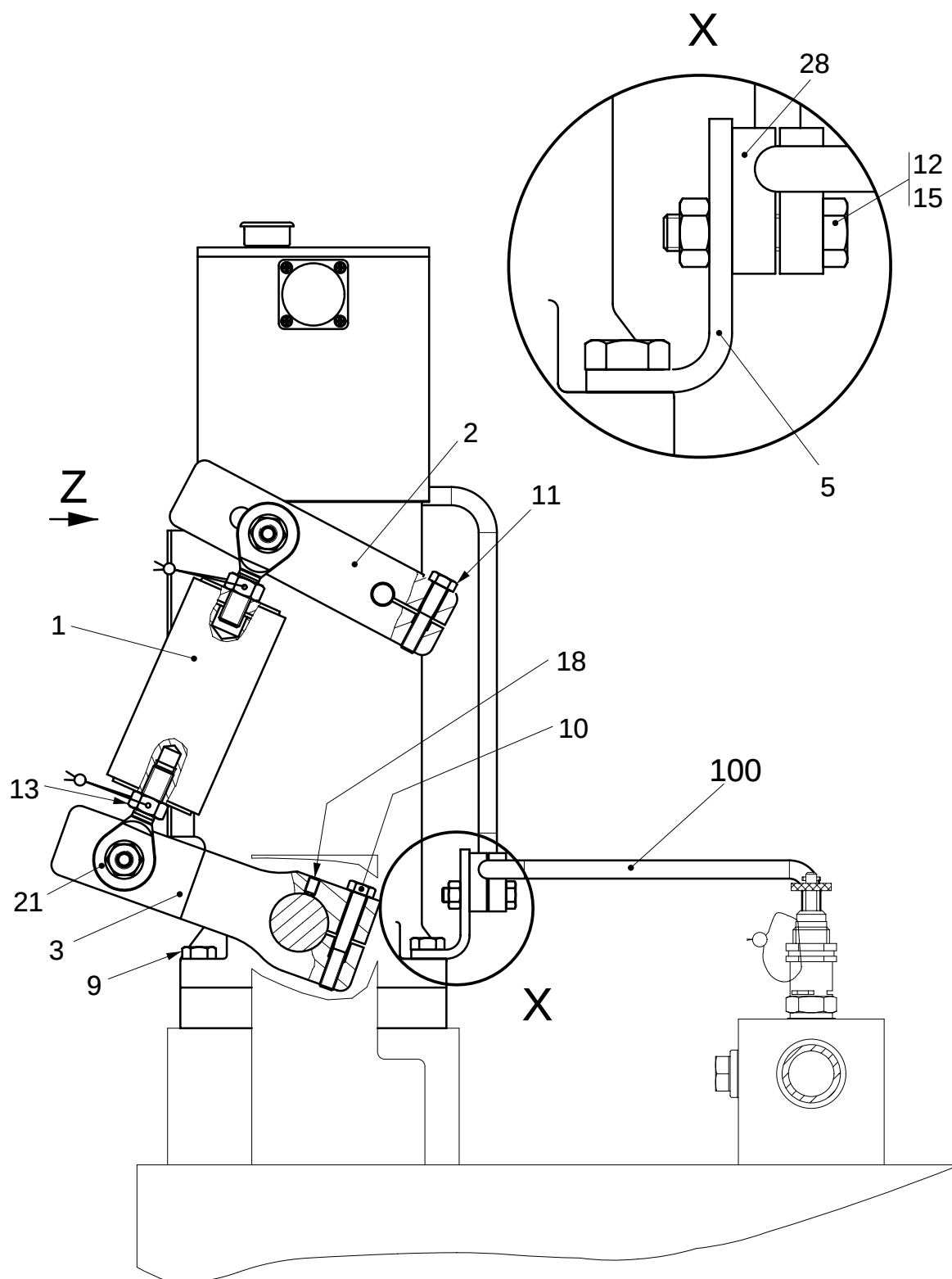
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Governor Mounting

M25

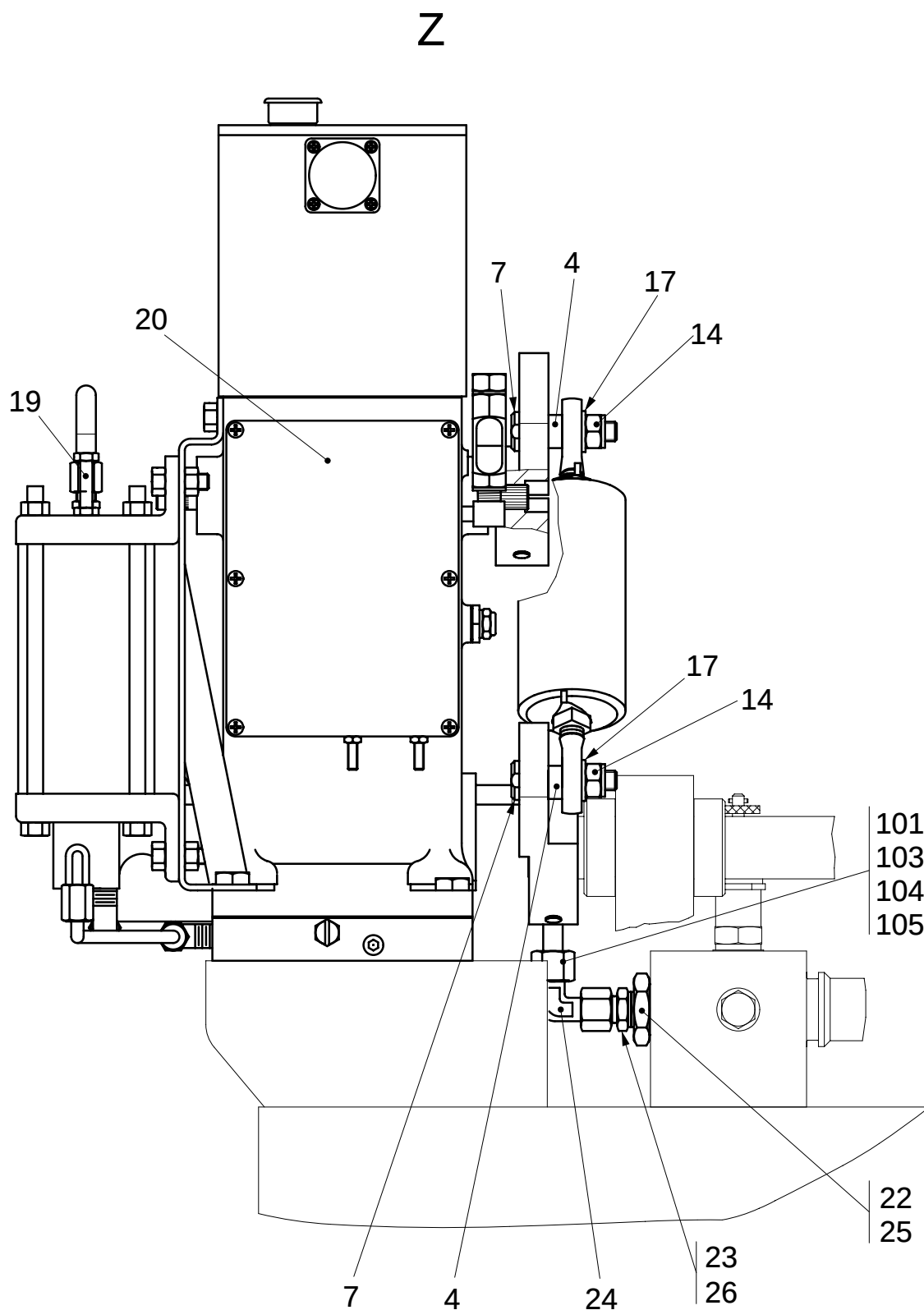
04



Governor Mounting

M25

04



Governor Mounting

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REGLERANORDNUNG, VOLLST. GOVERNOR MOUNTING ASSEMBLY	1	254110 CC
1	FEDERGLIED, VOLLST. ELASTIC CONNECTING-ROD, COMPL.	1	254110-001
2	HEBEL LEVER	1	254110-002
3	HEBEL LEVER	1	254110-003
4	DISTANZBUCHSE DISTANCE BUSH	2	254110-004
5	HALTER BRACKET	1	254110-005
6	LUFTLEITUNG, VOLLST. AIR PIPE, COMPL.	1	254110-006
7	BOLZEN BOLT	2	1.0015-048
9	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-347
10	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-242
11	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1373-243
12	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-312
13	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-036
14	SICHERUNGSMUTTER SELF LOCKING HEXAGON NUT	# 2	1.2021-507
15	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034
16	SECHSKANTMUTTER HEXAGON NUT	1	1.2021-106
17	SCHEIBE WASHER	2	1.0040-223
18	GEWINDESTIFT HEXAGON SOCKET GRUB SCREW	1	1.1102-032
19	GERADER EINSCHRAUBSTUTZEN MALE CONNECTOR	1	1.4191-005
20	REGLER, VOLLST. GOVERNOR, COMPL.	1	SIEHE BUCH C, ABSCHNITT 3 SEE BOOK C, SECTION 3
21	GELENKKOPF LINK HEAD	2	1.3048-405

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Governor Mounting

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
22	UEBERGANGSNIPPEL ADAPTER	1	1.5105-202
24	SCHWENKVERSCHRAUBUNG BANJO	1	1.5093-627
25	DICHTRING JOINT RING	1	1.7010-133
27	SCHEIBE WASHER	1	1.0052-306
28	ROHRKLEMME PIPE CLAMP	2	1.5011-002

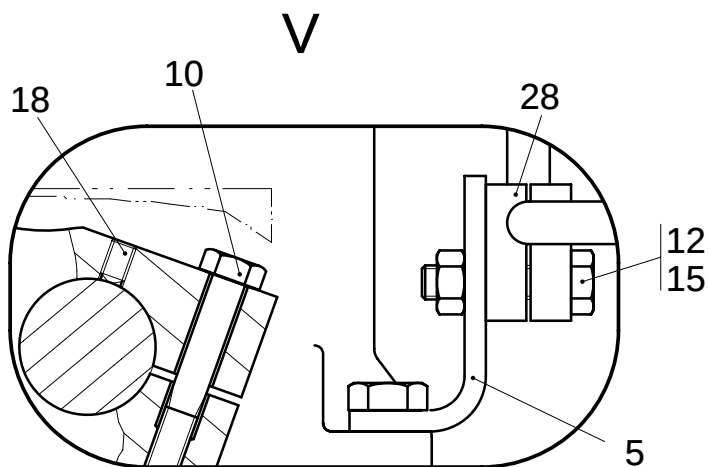
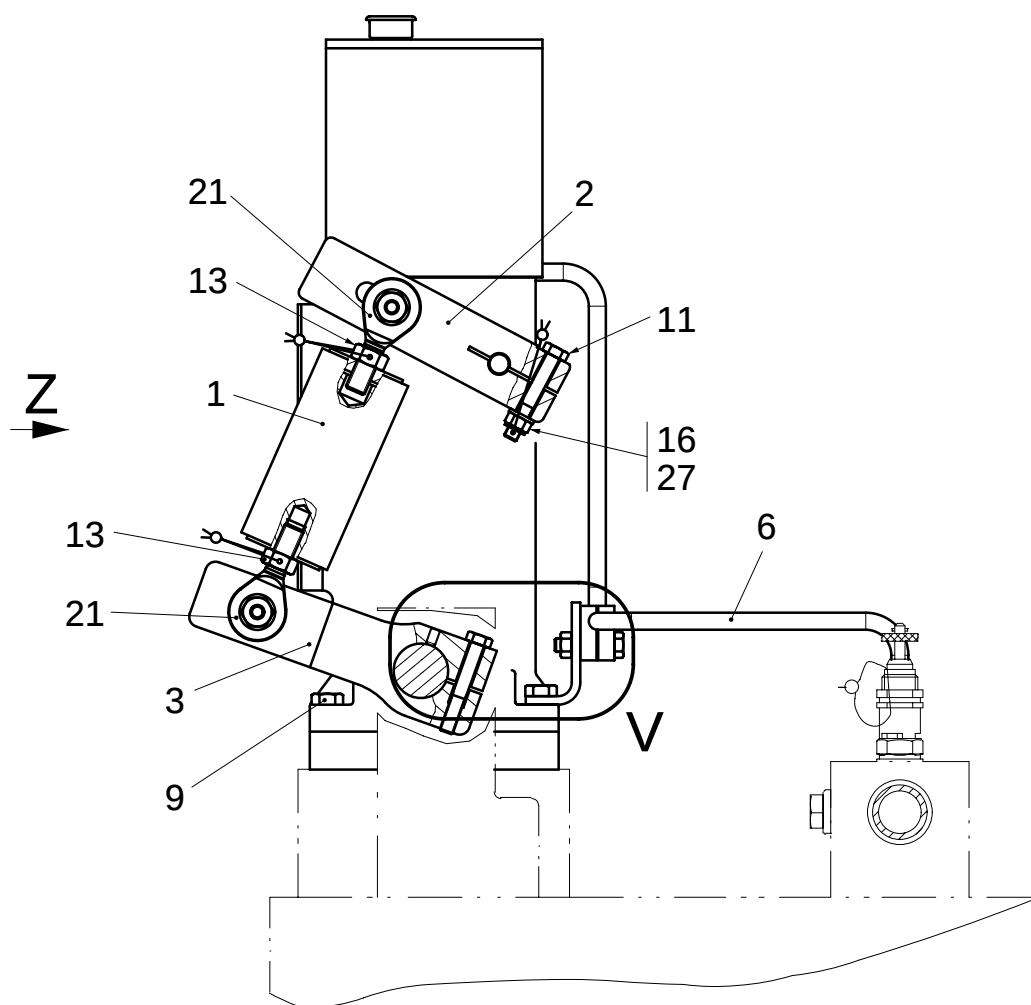
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Governor Mounting

M25

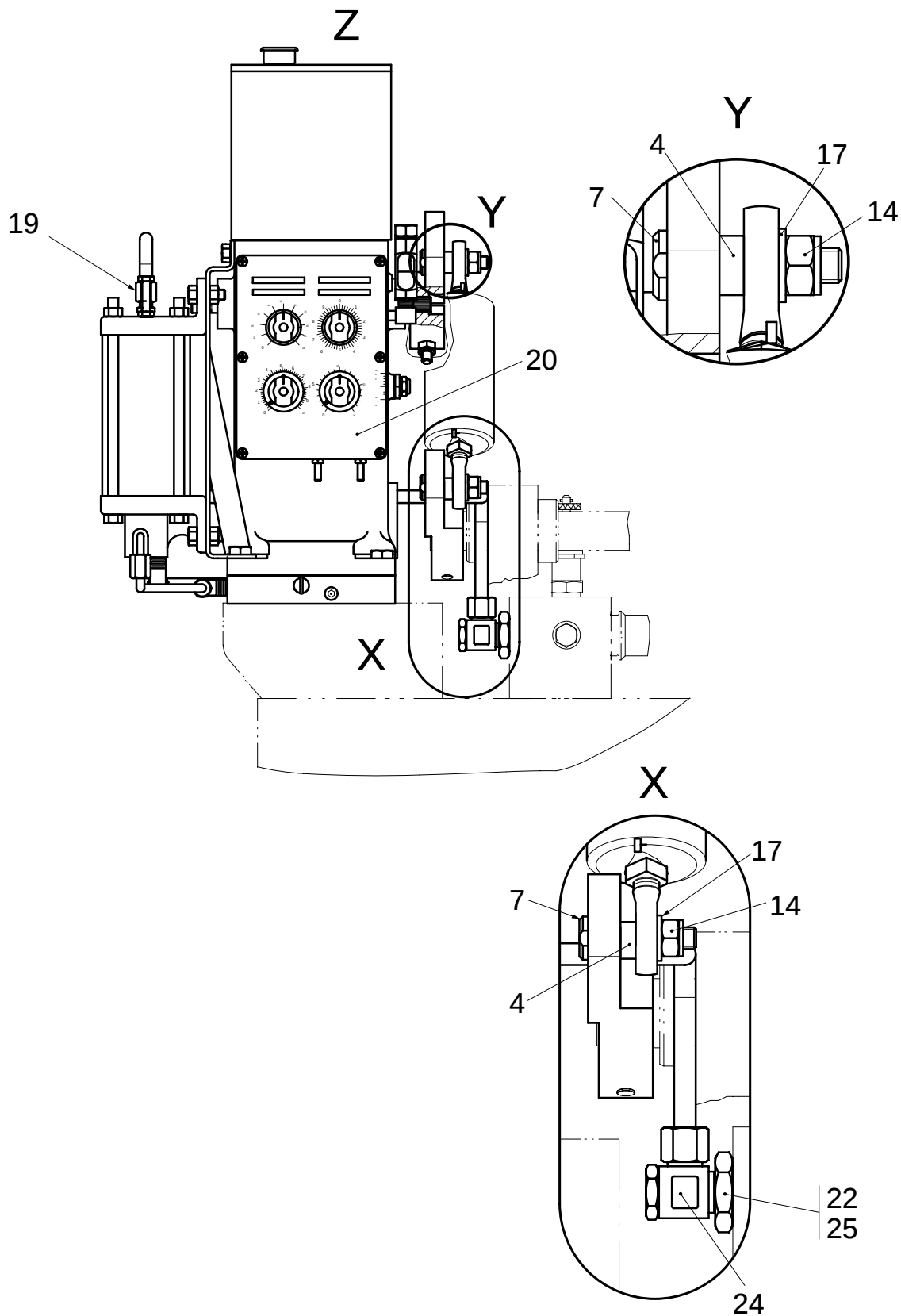
04



Governor Mounting

M25

04



Governor Mounting

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REGLERANORDNUNG, VOLLST. GOVERNOR MOUNTING ASSEMBLY	1	254110 DD
1	FEDERGLIED, VOLLST. ELASTIC CONNECTING-ROD, COMPL.	1	254110-001
2	HEBEL LEVER	1	254110-002
3	HEBEL LEVER	1	254110-003
4	DISTANZBUCHSE DISTANCE BUSH	2	254110-004
5	HALTER BRACKET	1	254110-005
6	LUFTLEITUNG, VOLLST. AIR PIPE, COMPL.	1	254110-106
7	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.0015-048
9	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-347
10	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-242
11	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1373-243
12	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-312
13	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-036
14	SICHERUNGSMUTTER SELF LOCKING HEXAGON NUT	# 2	1.2021-507
15	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034
16	SECHSKANTMUTTER HEXAGON NUT	1	1.2021-106
17	SCHEIBE WASHER	2	1.0040-223
18	GEWINDESTIFT HEXAGON SOCKET GRUB SCREW	1	1.1102-032
19	GERADER EINSCHRAUBSTUTZEN MALE CONNECTOR	1	1.4191-005
20	REGLER, VOLLST. GOVERNOR, COMPL.	1	SIEHE BUCH C, ABSCHNITT 3 SEE BOOK C, SECTION 3
21	GELENKKOPF LINK HEAD	2	1.3048-405

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Governor Mounting

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
22	REDUZIERNIPPEL ADAPTER	1	1.5105-202
23	STUTZEN PIPE UNION	2	1.5093-222
24	SCHWENKVERSCHRAUBUNG BANJO	1	1.5093-627
25	DICHTRING JOINT RING	1	1.7010-133
27	SCHEIBE WASHER	1	1.0052-306
28	ROHRKLEMME PIPE CLAMP	2	1.5011-002

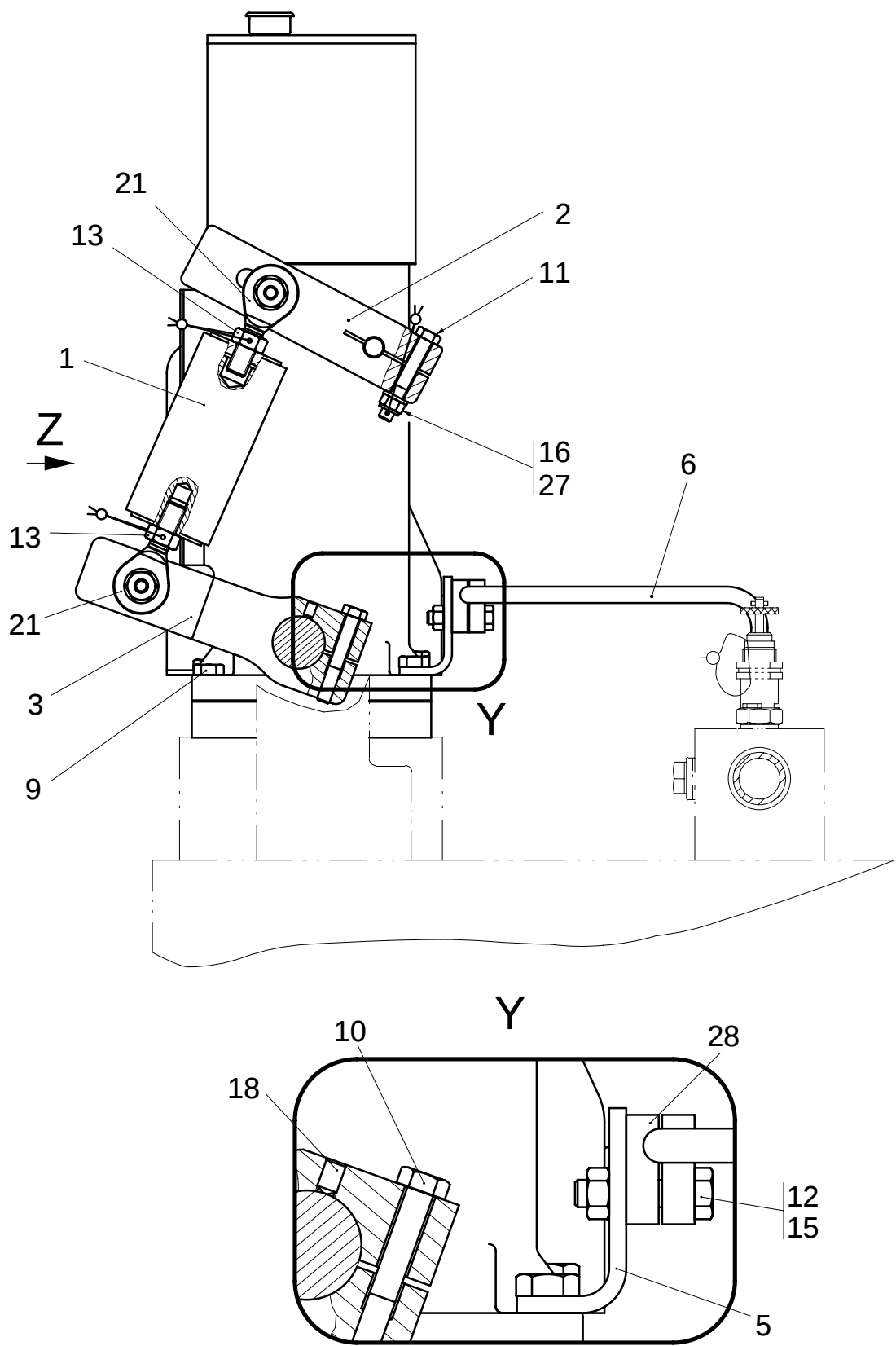
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Governor Mounting

M25

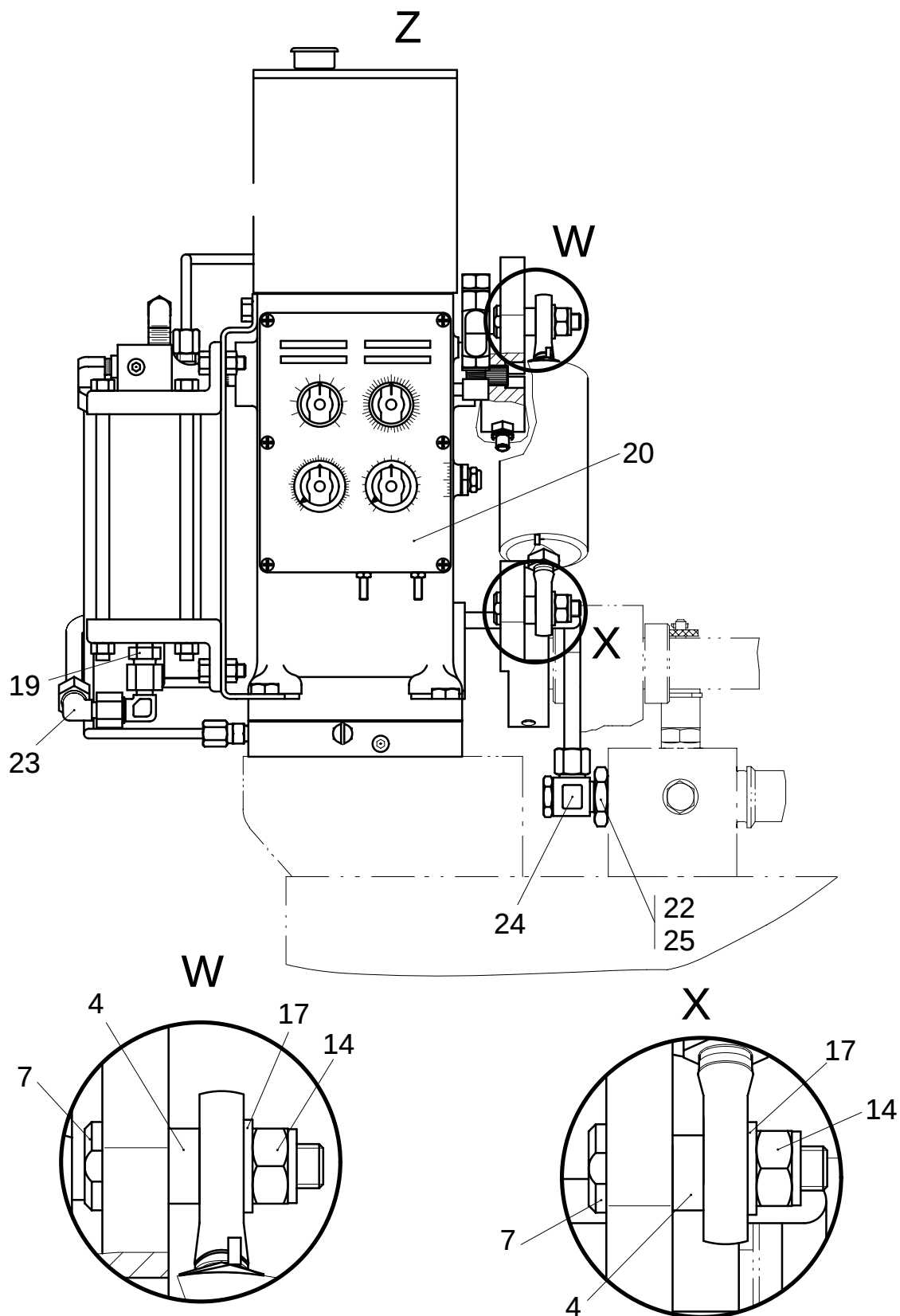
04



Governor Mounting

M25

04



Governor Drive

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REGLERANTRIEB, VOLLST. GOVERNOR DRIVE ASSEMBLY	1	254111 AA
1	REGLERKONSOLE GOVERNOR BRACKET	1	254111-001
3	SCHRAUBRAD SPIRAL-TOOTHED GEAR WHEEL	1	254111-003
4	REGLERANTRIEBSWELLE, VOLLST. GOVERNOR DRIVE SHAFT, COMPL.	1	254111-004
5	ANLAUFSCHEIBE THRUST WASHER	1	254111-005
6	DECKEL COVER	1	254111-006
15	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	4	1.1158-210
16	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1387-444
20	KRONENMUTTER HEXAGON CASTLE NUT	1	1.2061-862
24	SPANNSCHEIBE CONICAL SPRING WASHER	# 1	1.0068-222
25	SICHERUNGSRING CIRCLIP	1	1.0061-170
30	SPLINT SPLIT PIN	1	1.0008-078
31	PASSFEDER PARALLEL KEY	1	1.0080-152
35	O-RING O-RING	# 1	1.7084-646
36	VERSCHLUSSSCHRAUBE SCREW PLUG	1	1.1041.811
37	DICHTRING JOINT RING	# 1	1.7010-218

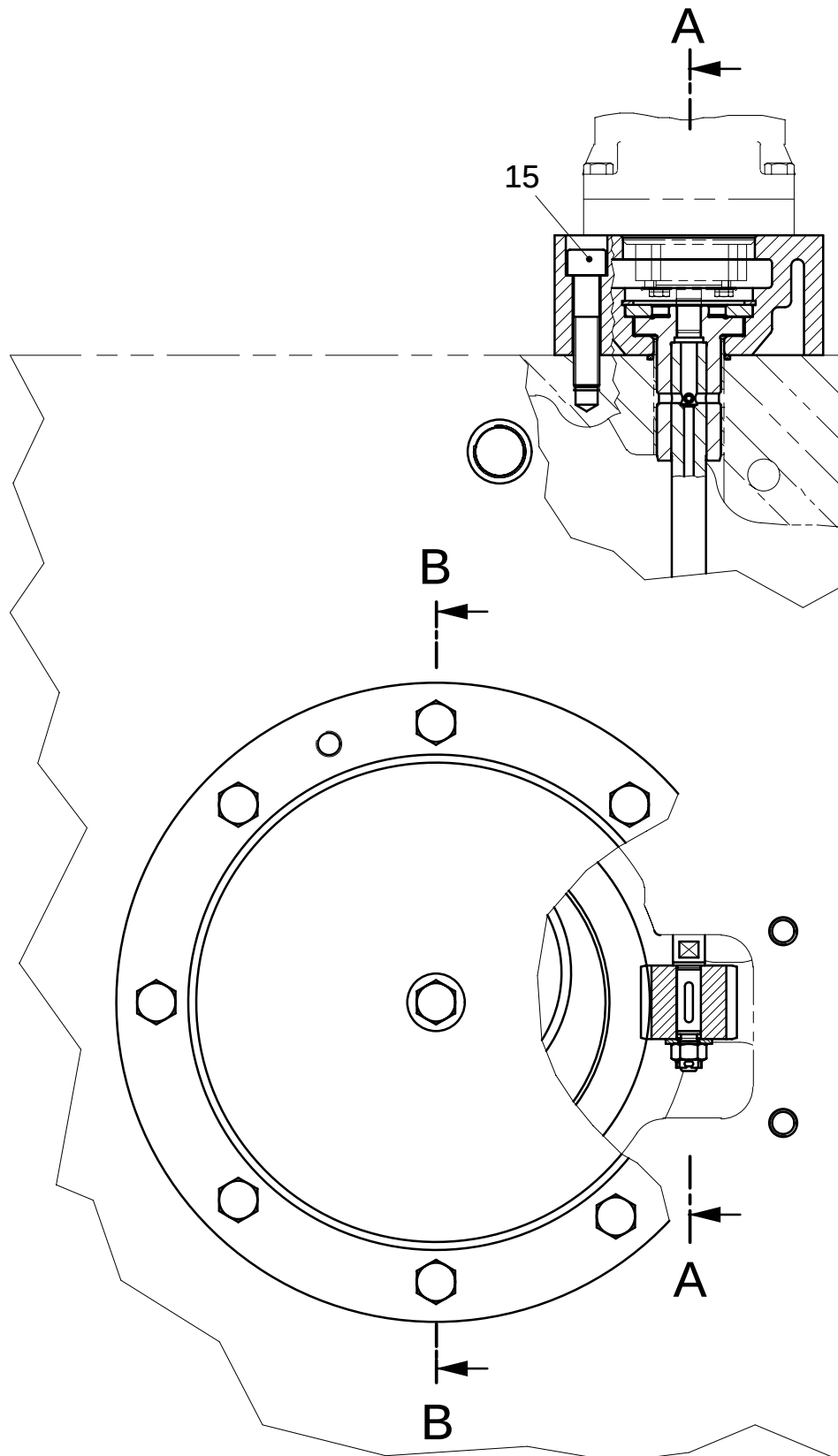
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Governor Drive

M25

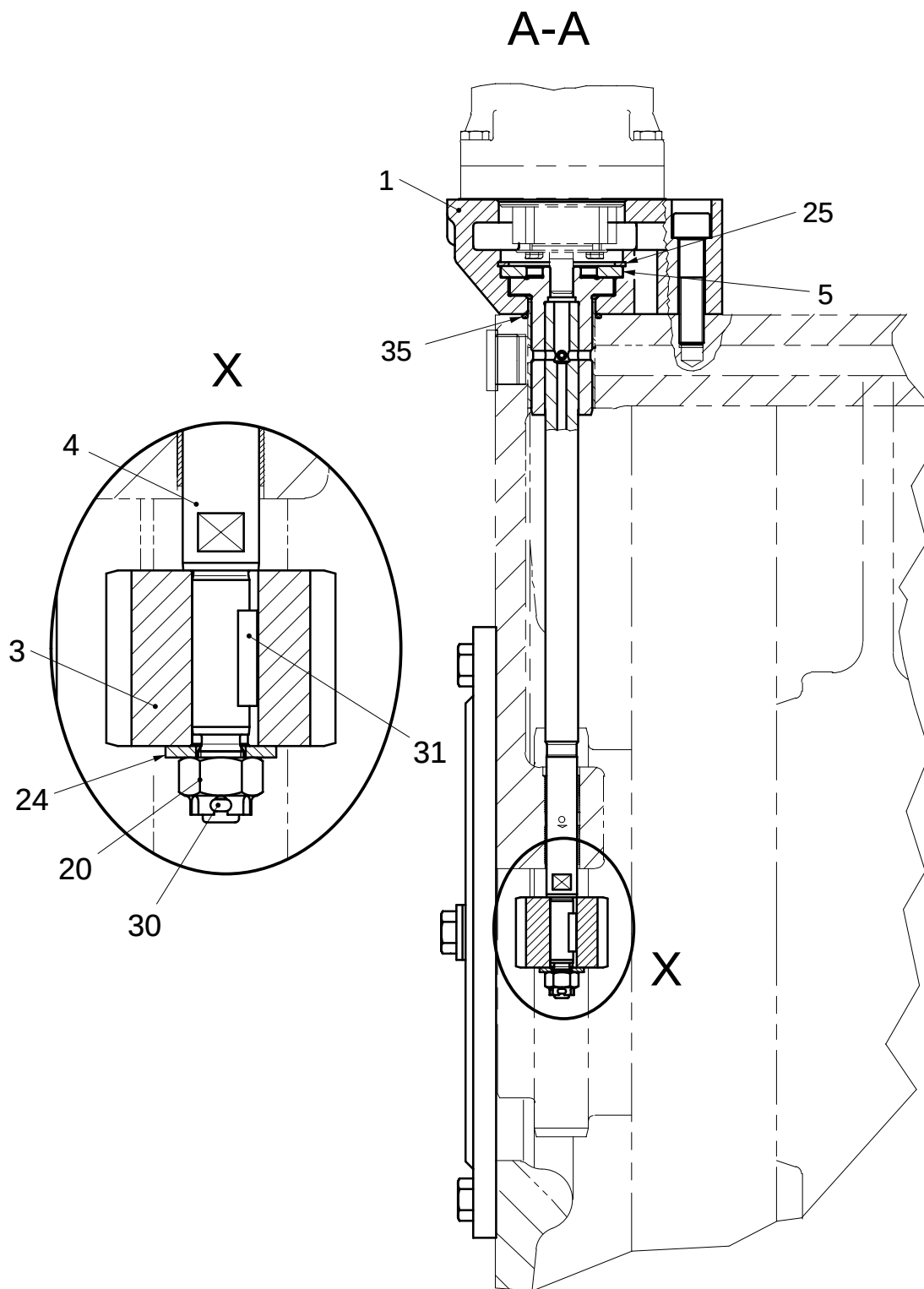
04



Governor Drive

M25

04

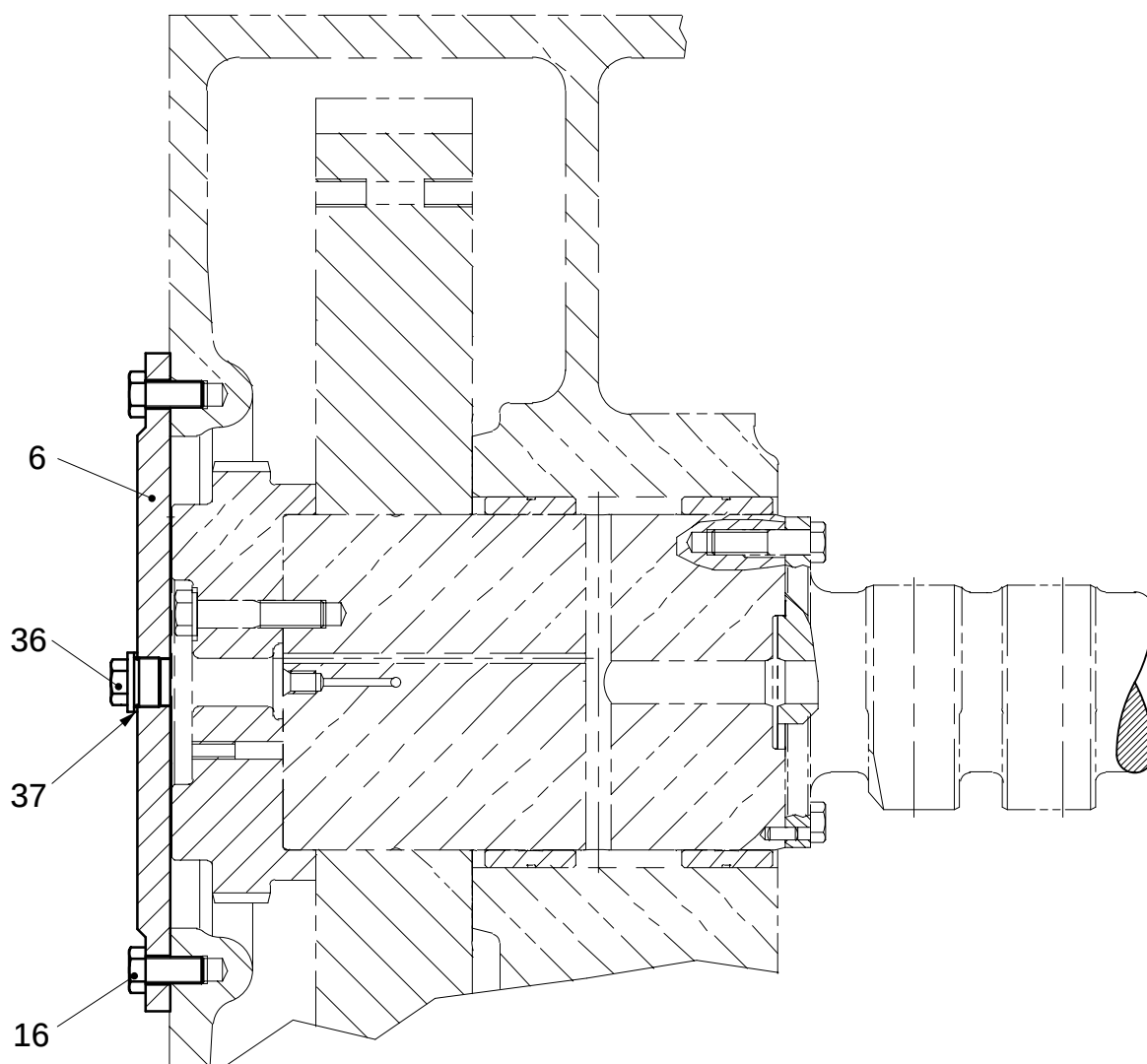


Governor Drive

M25

04

B-B



Idle Wheel Mounting

M25

04

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ZWISCHENRAD-ANBAU, VOLLST. IDLE WHEEL MOUNTING ASSEMBLY	1	255140 AA
1	ZWISCHENRAD, VOLLST. IDLE WHEEL, COMPL.	1	255140-001
2	ACHSE, VOLLST. AXLE, COMPL.	1	255140-002
5	SICHERUNGSBLECH LOCKING PLATE	1	9.5140-005
7	O-RING O-RING	# 1	1.7084-639
9	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-444
10	SPANNSCHEIBE CONICAL SPRING WASHER	# 2	1.0068-240

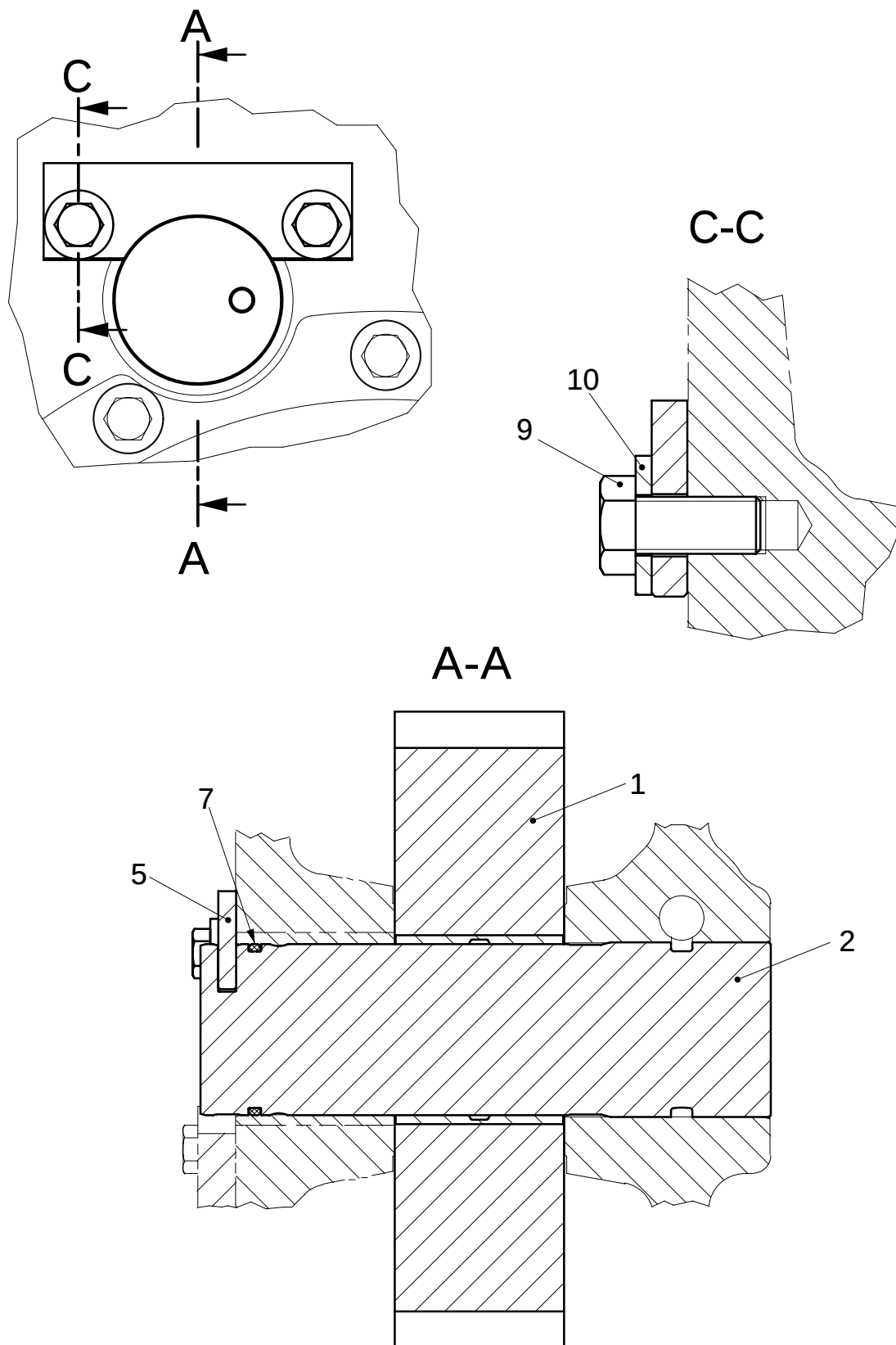
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Idle Wheel Mounting

M25

04



Injection Pump Control Shaft

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REGULIERGESTÄNGE, VOLLST. INJECTION PUMP CONTROL SHAFT ASSEMBLY	1	254210 AA
1	REGULIERWELLE CONTROL SHAFT	1	254210-001
2	LAGERBOCK, VOLLST. BEARING BRACKET, COMPL.	4	254210-002
3	LAGERBOCK BEARING BRACKET	3	254210-003
5	STELLRING SET COLLAR	2	1.0090-037
6	SECHSKANTSCHRAUBE HEXAGON BOLT	7	1.1367-389
7	SPANNSTIFT SPRING DOWEL PIN	# 11	1.0039-313
100	GELENKHEBEL, VOLLST. HINGED LEVER, COMPL.	* 6	254212-100
101	SATTEL LEVER, TOP PART	6	254212-101
102	HALTER BRACKET	6	254212-102
103	LASCHE STRAP	12	254212-103
104	KLEMMSTÜCK SHIM	6	254212-104
105	ZUGFEDER TENSION SPRING	6	254212-105
107	BOLZEN BOLT	12	1.0015-047
108	SECHSKANTSCHRAUBE HEXAGON BOLT	6	1.1367-241
109	SECHSKANTMUTTER SELF-LOCKING HEXAGON NUT	12	1.2021-104

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Injection Pump Control Shaft

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
110	SCHEIBE WASHER	12	1.0040-220
111	SCHEIBE WASHER	12	1.0040-222
112	SPANNSTIFT SPRING DOWEL PIN	# 6	1.1210-011
113	SPANNSTIFT SPRING DOWEL PIN	# 18	1.0039-275
114	INNENRING INNER RING	24	254212-114

* = IN 254210 AA ENTHALTEN
INCLUDED IN 254210 AA

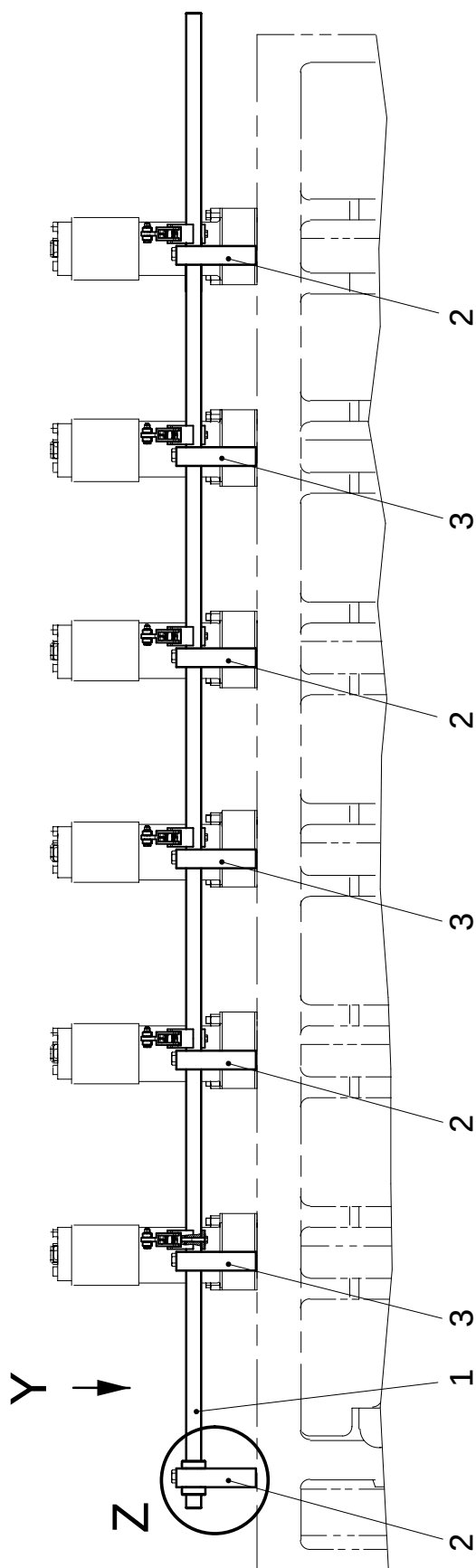
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Injection Pump Control Shaft

M25

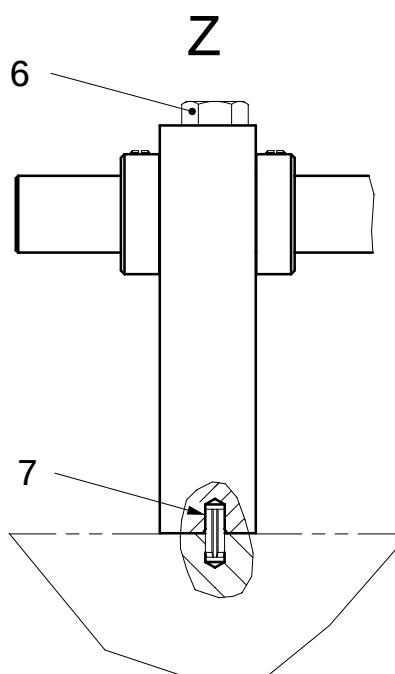
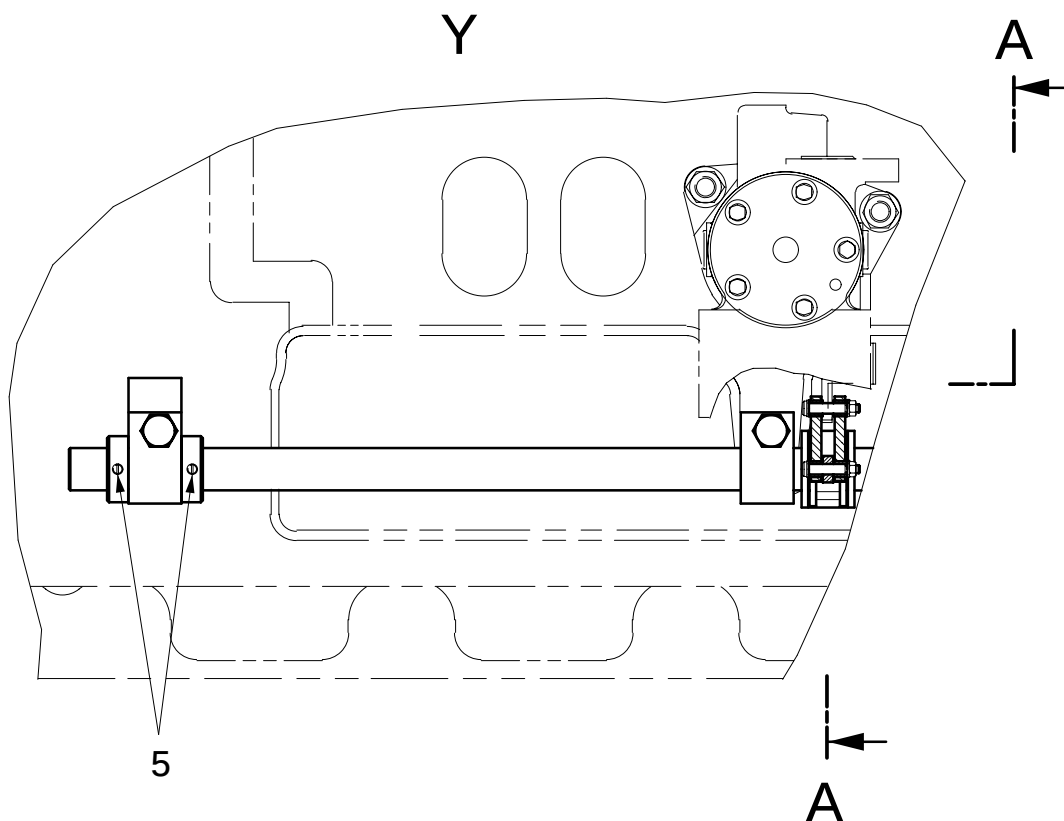
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Injection Pump Control Shaft

M25

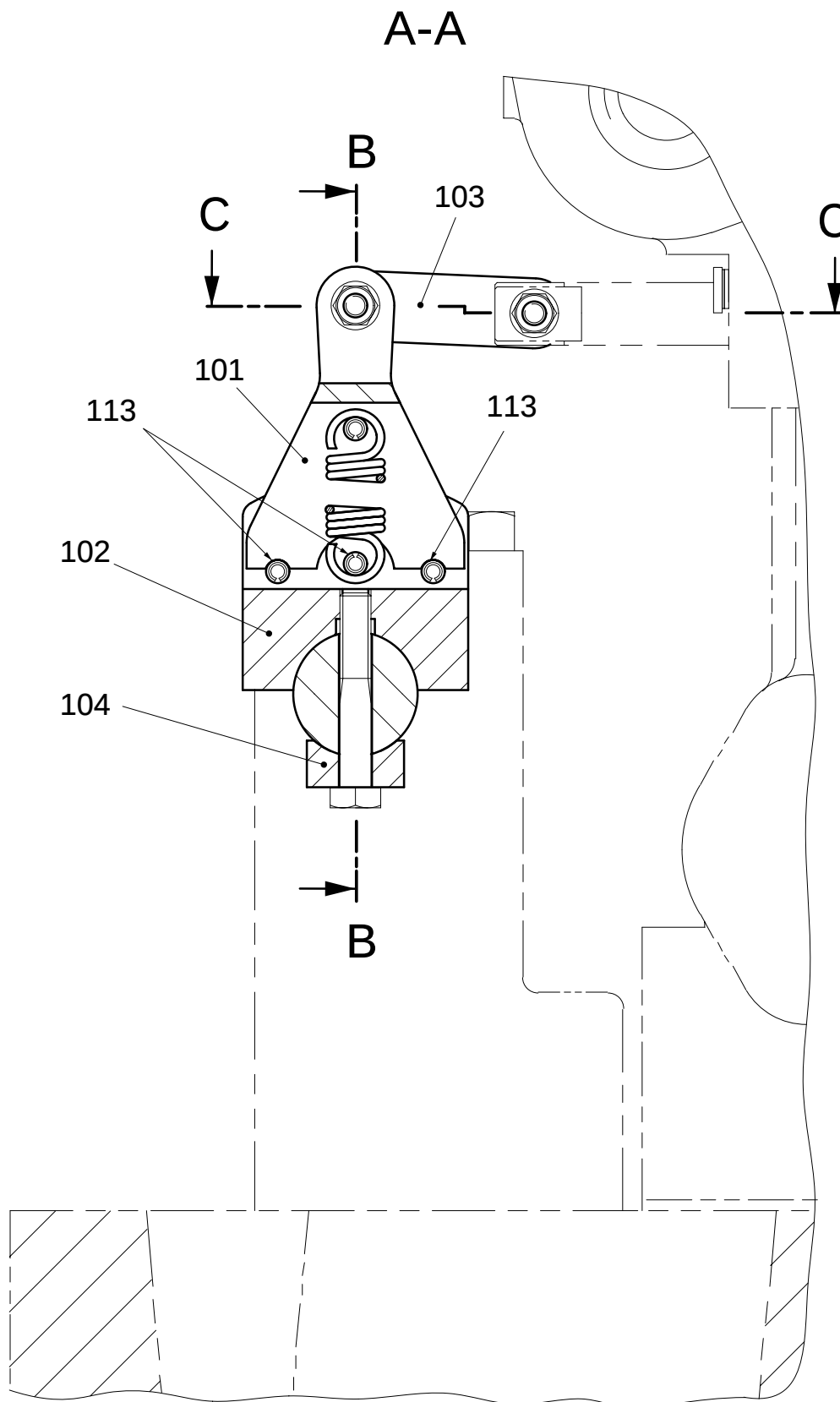
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Injection Pump Control Shaft

M25

05

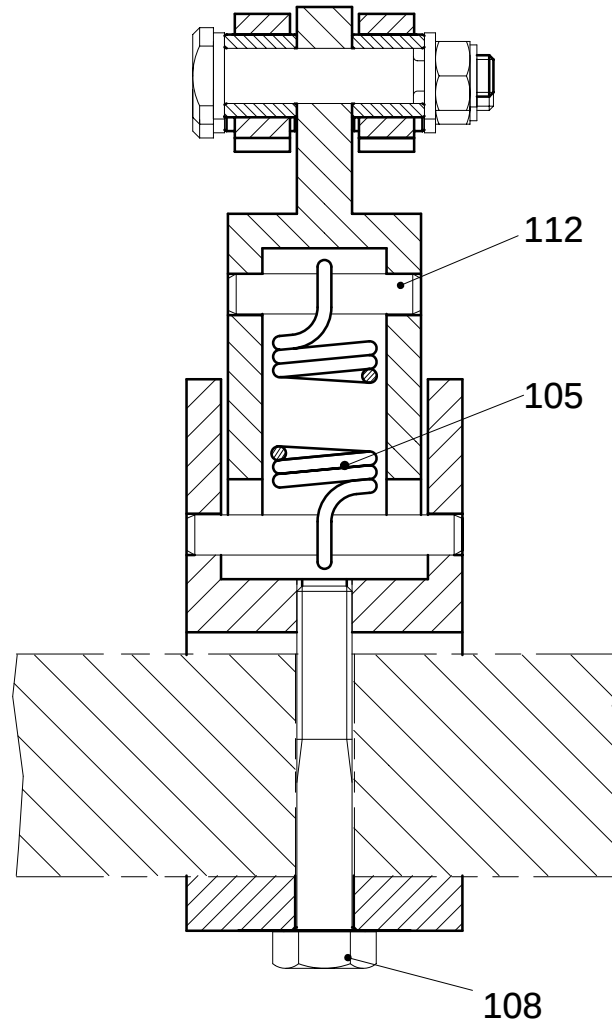


Injection Pump Control Shaft

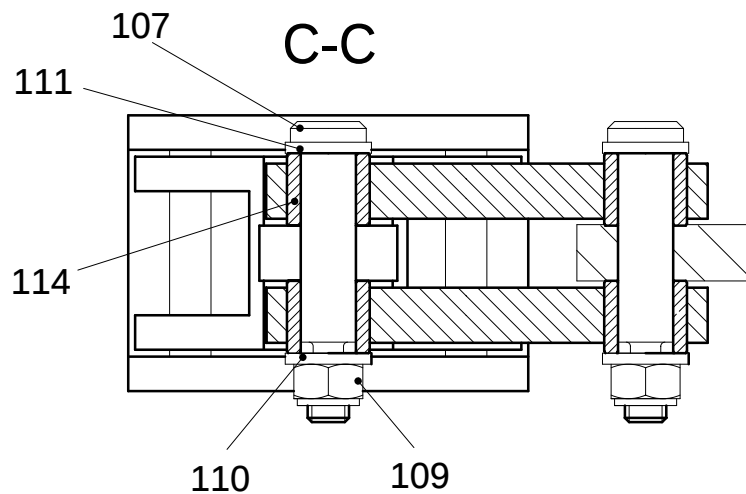
M25

05

B-B



C-C



Injection Pump Control Shaft

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REGULIERGESTÄNGE, VOLLST. INJECTION PUMP CONTROL SHAFT ASSEMBLY	1	254210 BB
1	REGULIERWELLE CONTROL SHAFT	1	254210-001
2	LAGERBOCK, VOLLST. BEARING BRACKET, COMPL.	5	254210-002
3	LAGERBOCK BEARING BRACKET	4	254210-003
5	STELLRING SET COLLAR	2	1.0090-037
6	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-389
7	SPANNSTIFT SPRING DOWEL PIN	# 13	1.0039-313
100	GELENKHEBEL, VOLLST. HINGED LEVER, COMPL.	* 8	254212-100
101	SATTEL LEVER, TOP PART	8	254212-101
102	HALTER BRACKET	8	254212-102
103	LASCHE STRAP	16	254212-103
104	KLEMMSTÜCK SHIM	8	254212-104
105	ZUGFEDER TENSION SPRING	8	254212-105
107	BOLZEN BOLT	16	1.0015-047
108	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-241
109	SECHSKANTMUTTER SELF-LOCKING HEXAGON NUT	16	1.2021-104

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Injection Pump Control Shaft

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
110	SCHEIBE WASHER	16	1.0040-220
111	SCHEIBE WASHER	16	1.0040-222
112	SPANNSTIFT SPRING DOWEL PIN	# 8	1.1210-011
113	SPANNSTIFT SPRING DOWEL PIN	# 24	1.0039-275
114	INNENRING INNER RING	32	254212-114

* = IN 254210 BB ENTHALTEN
INCLUDED IN 254210 BB

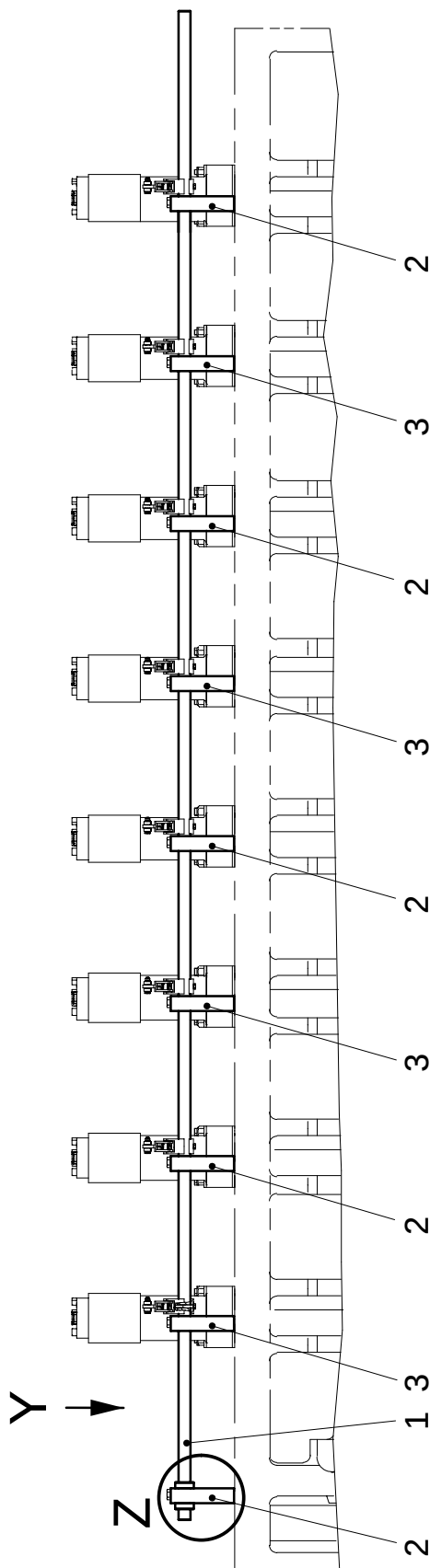
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Injection Pump Control Shaft

M25

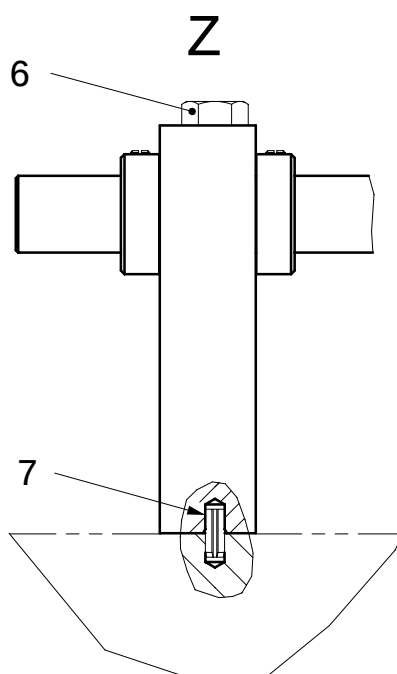
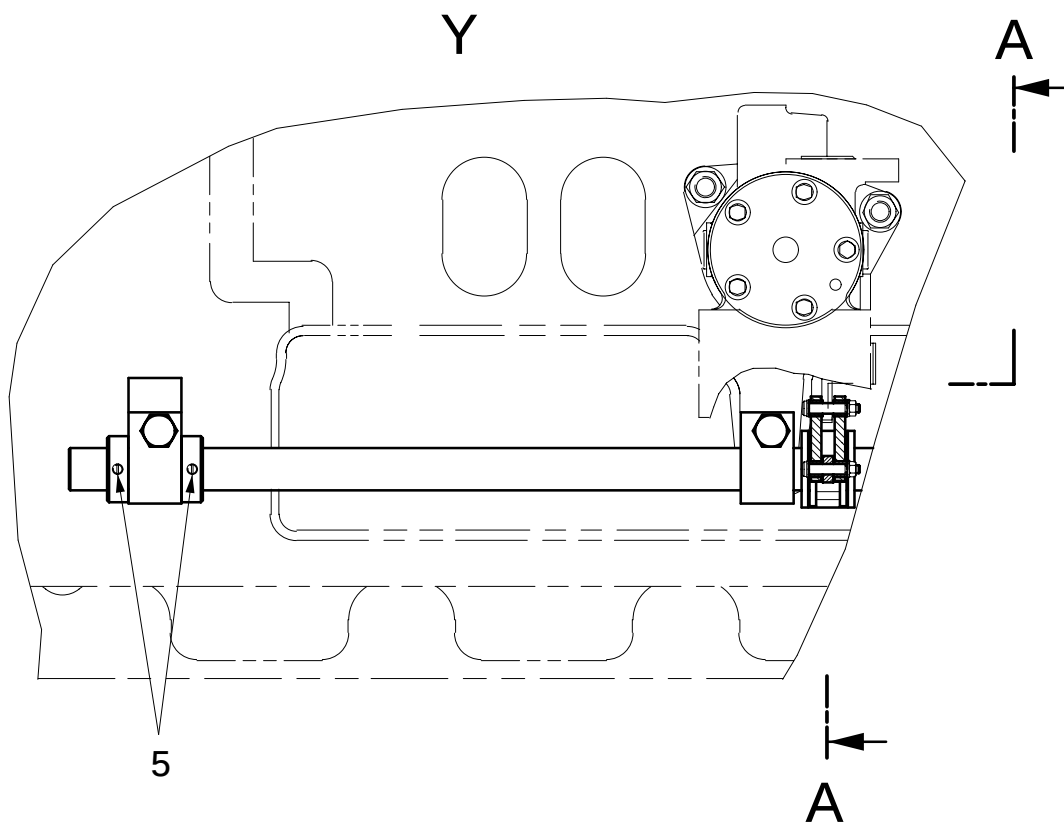
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Injection Pump Control Shaft

M25

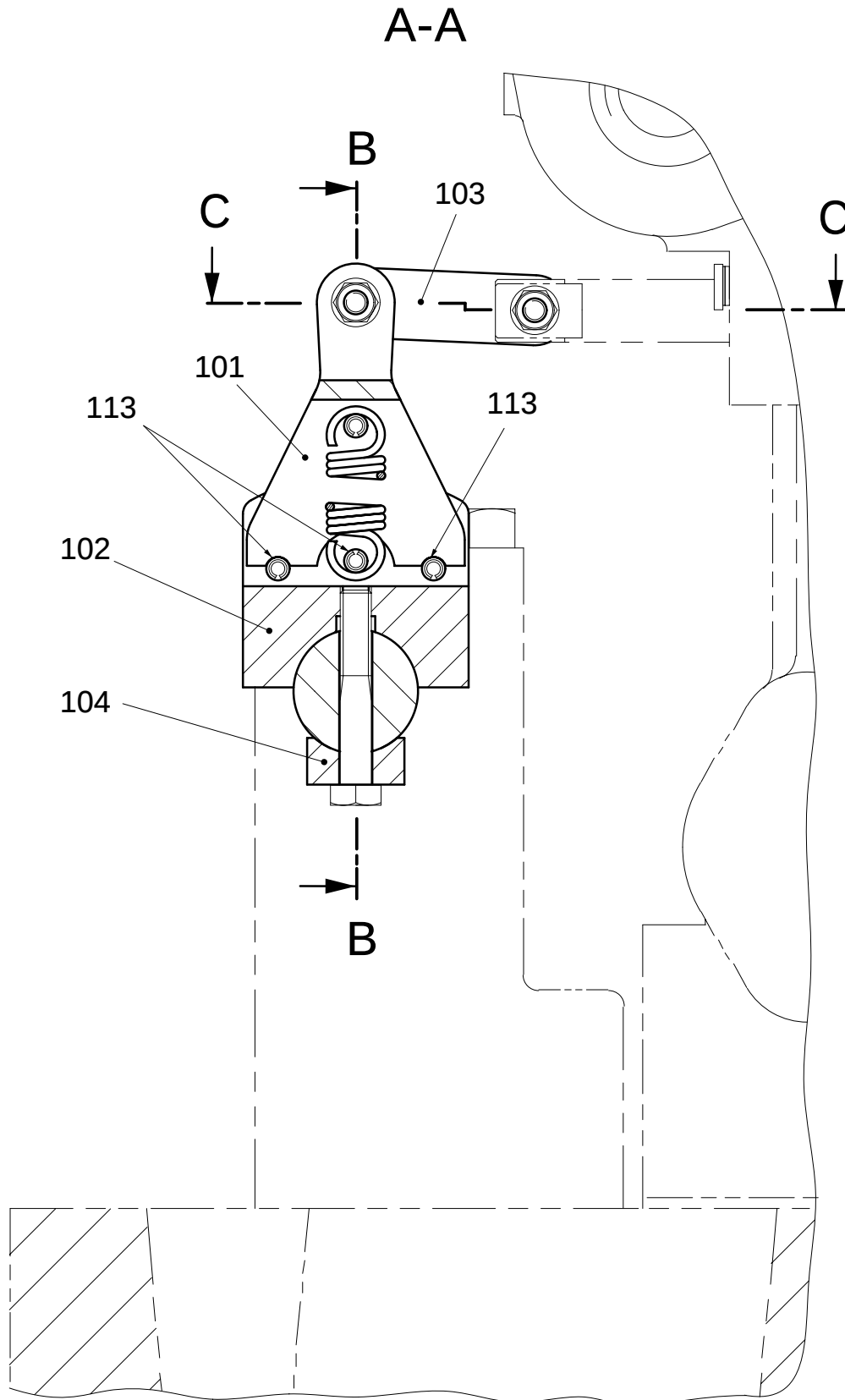
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Injection Pump Control Shaft

M25

05

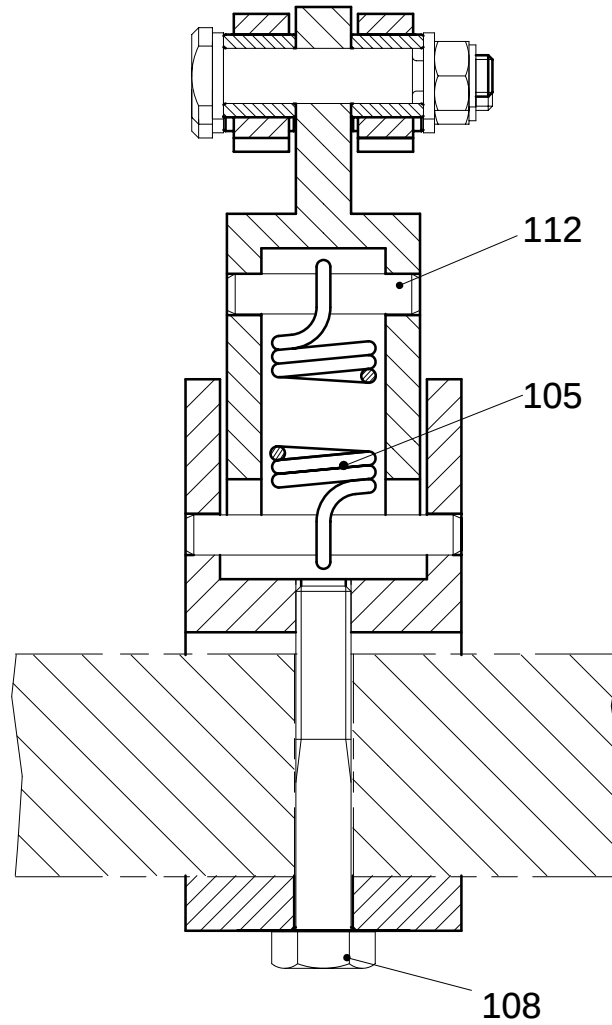


Injection Pump Control Shaft

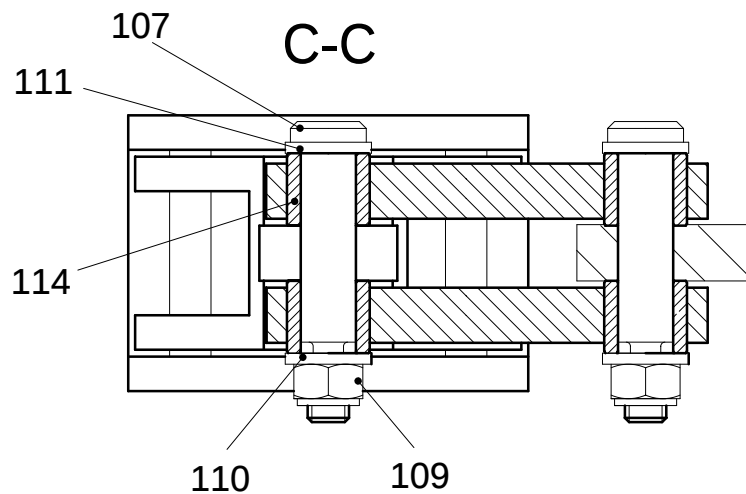
M25

05

B-B



C-C



Injection Pump Control Shaft

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REGULIERGESTÄNGE, VOLLST. INJECTION PUMP CONTROL SHAFT ASSEMBLY	1	254210 CC
1	REGULIERWELLE CONTROL SHAFT	1	254210-001
2	LAGERBOCK, VOLLST. BEARING BRACKET, COMPL.	5	254210-002
3	LAGERBOCK BEARING BRACKET	5	254210-003
5	STELLRING SET COLLAR	2	1.0090-037
6	SECHSKANTSCHRAUBE HEXAGON BOLT	10	1.1367-389
7	SPANNSTIFT SPRING DOWEL PIN	# 14	1.0039-313
100	GELENKHEBEL, VOLLST. HINGED LEVER, COMPL.	* 9	254212-100
101	SATTEL LEVER, TOP PART	9	254212-101
102	HALTER BRACKET	9	254212-102
103	LASCHE STRAP	18	254212-103
104	KLEMMSTÜCK SHIM	9	254212-104
105	ZUGFEDER TENSION SPRING	9	254212-105
107	BOLZEN BOLT	18	1.0015-047
108	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-241
109	SECHSKANTMUTTER SELF-LOCKING HEXAGON NUT	18	1.2021-104

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Injection Pump Control Shaft

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
110	SCHEIBE WASHER	18	1.0040-220
111	SCHEIBE WASHER	18	1.0040-222
112	SPANNSTIFT SPRING DOWEL PIN	# 9	1.1210-011
113	SPANNSTIFT SPRING DOWEL PIN	# 27	1.0039-275
114	INNENRING INNER RING	36	254212-114

* = IN 254210 CC ENTHALTEN
INCLUDED IN 254210 CC

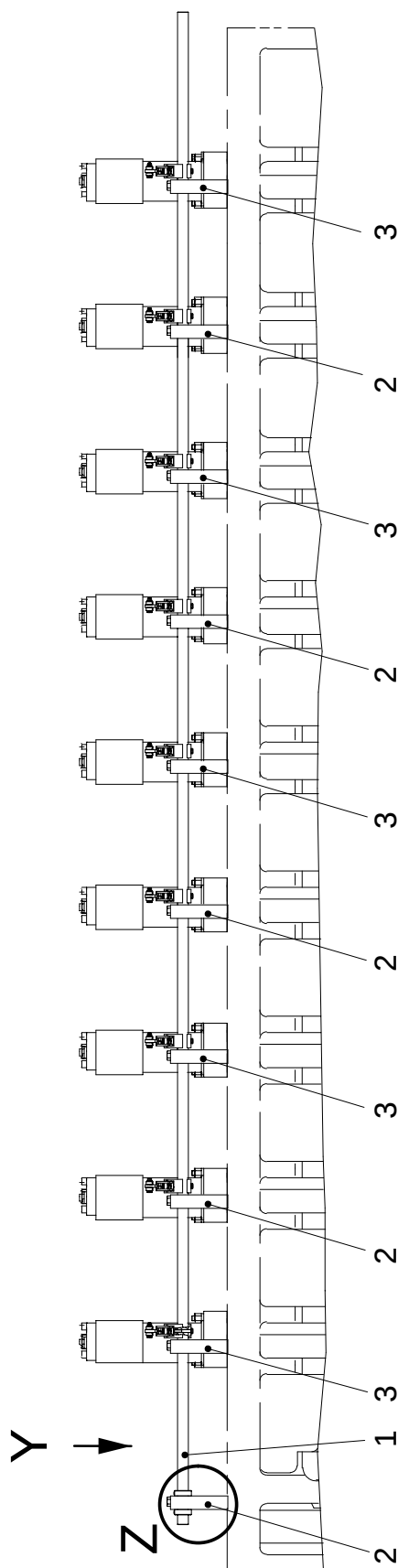
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Injection Pump Control Shaft

M25

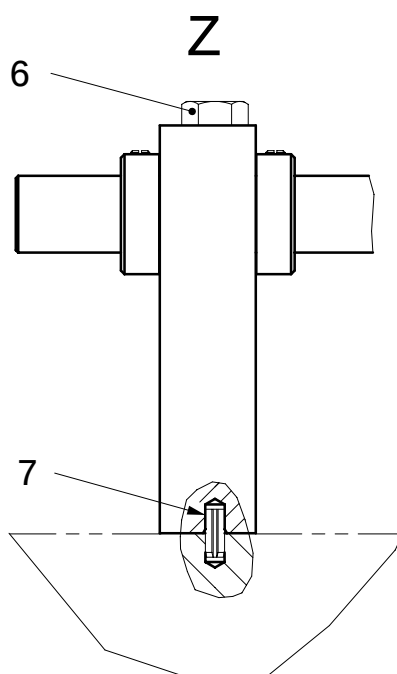
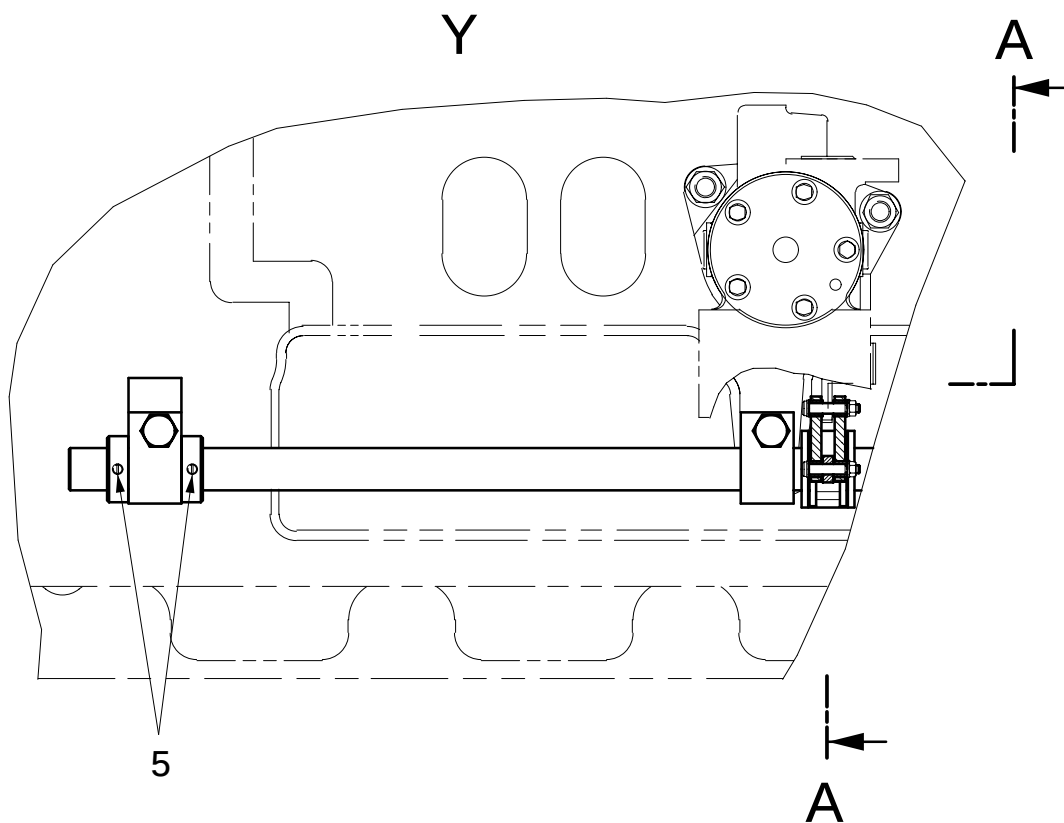
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Injection Pump Control Shaft

M25

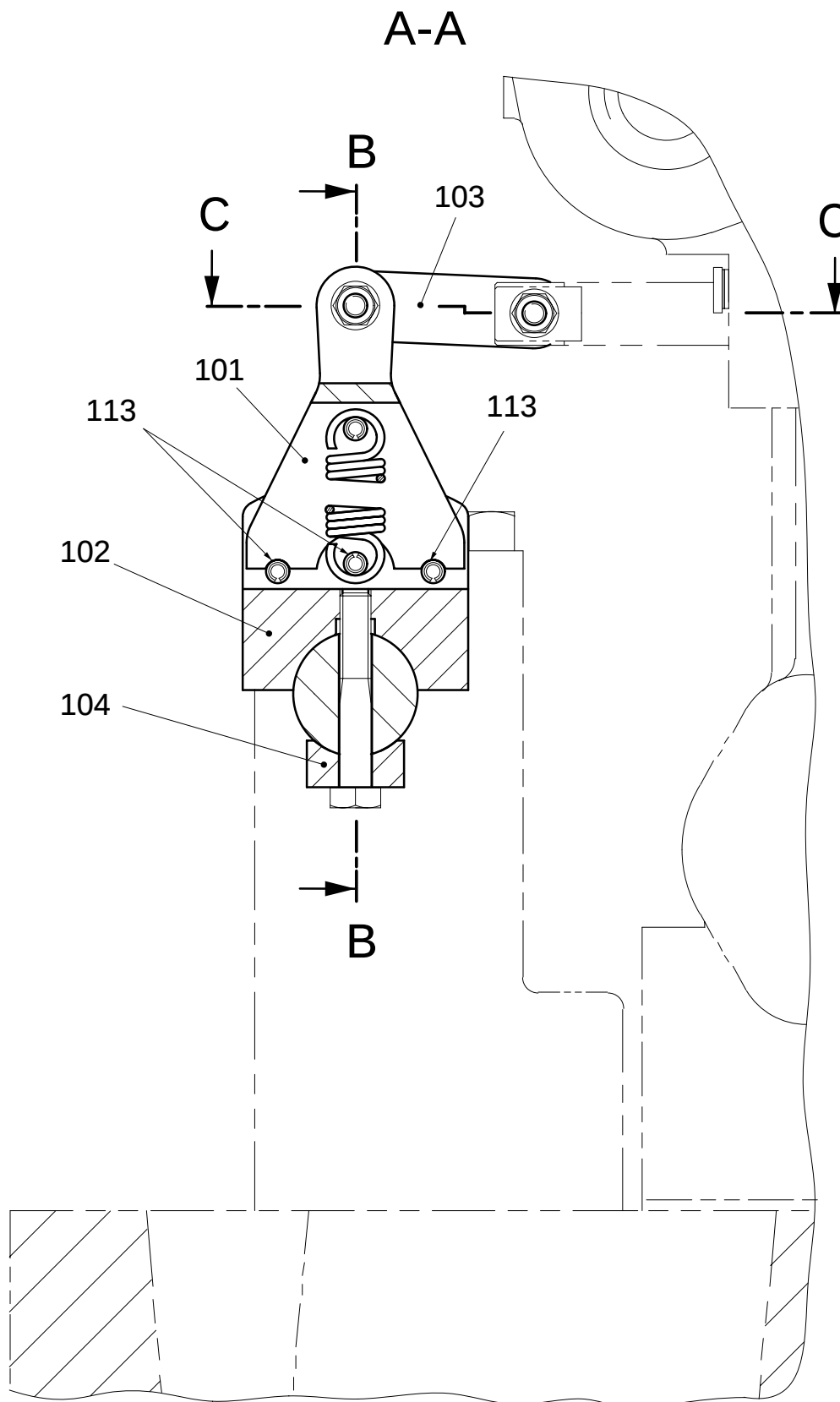
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Injection Pump Control Shaft

M25

05

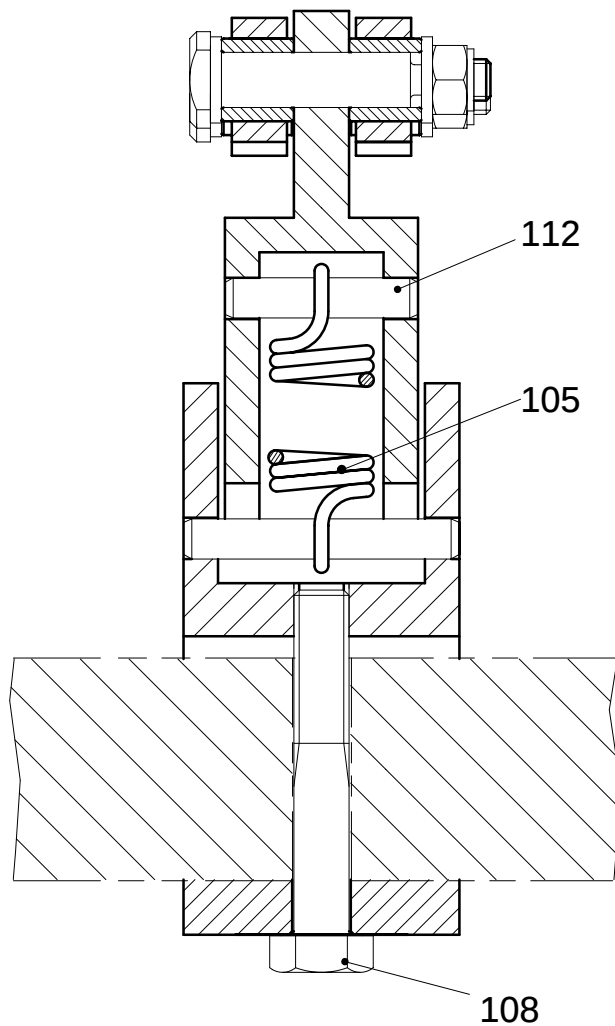


Injection Pump Control Shaft

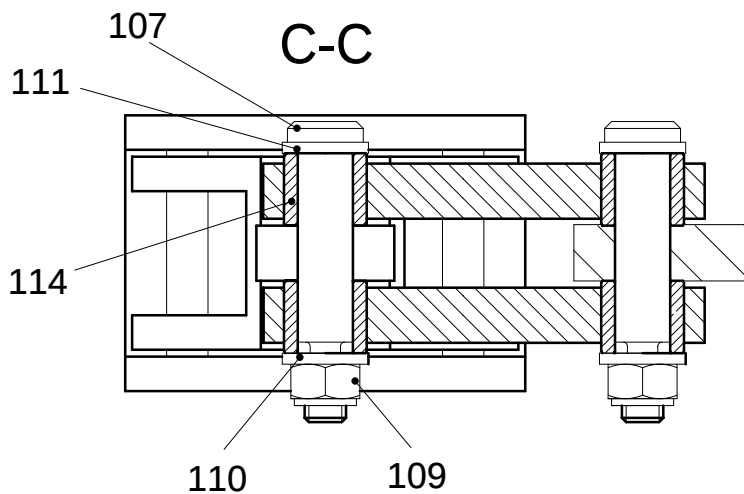
M25

05

B-B



C-C



Injection Pump Control Shaft

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REGULIERGESTÄNGE, VOLLST. INJECTION PUMP CONTROL SHAFT ASSEMBLY	1	254210 DD
1	REGULIERWELLE CONTROL SHAFT	1	254210-001
2	LAGERBOCK BEARING BRACKET	3	254210-002
3	LAGERBOCK BEARING BRACKET	3	254210-003
5	LAGERBOCK BEARING BRACKET	1	254210-005
6	HEBEL LEVER	1	254210-006
8	STELLRING SET COLLAR	2	1.0090-037
9	SECHSKANTSCHRAUBE HEXAGON BOLT	7	1.1367-389
10	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1387-309
11	SPANNSTIFT SPRING DOWEL PIN	# 11	1.0039-313
100	GELENKHEBEL, VOLLST. HINGED LEVER, COMPL.	* 6	254212-100
101	SATTEL LEVER, TOP PART	6	254212-101
102	HALTER BRACKET	6	254212-102
103	LASCHE STRAP	12	254212-103
104	KLEMMSTÜCK SHIM	6	254212-104
105	ZUGFEDER TENSION SPRING	6	254212-105
107	BOLZEN BOLT	12	1.0015-047
108	SECHSKANTSCHRAUBE HEXAGON BOLT	6	1.1367-241
109	SECHSKANTMUTTER SELF-LOCKING HEXAGON NUT	12	1.2021-104
111	SCHEIBE WASHER	24	1.0040-222

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Injection Pump Control Shaft

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
112	SPANNSTIFT SPRING DOWEL PIN	# 6	1.0039-880
113	SPANNSTIFT SPRING DOWEL PIN	# 18	1.0039-275
114	INNENRING INNER RING	24	254212-114

* = IN 254210 DD ENTHALTEN
INCLUDED IN 254210 DD

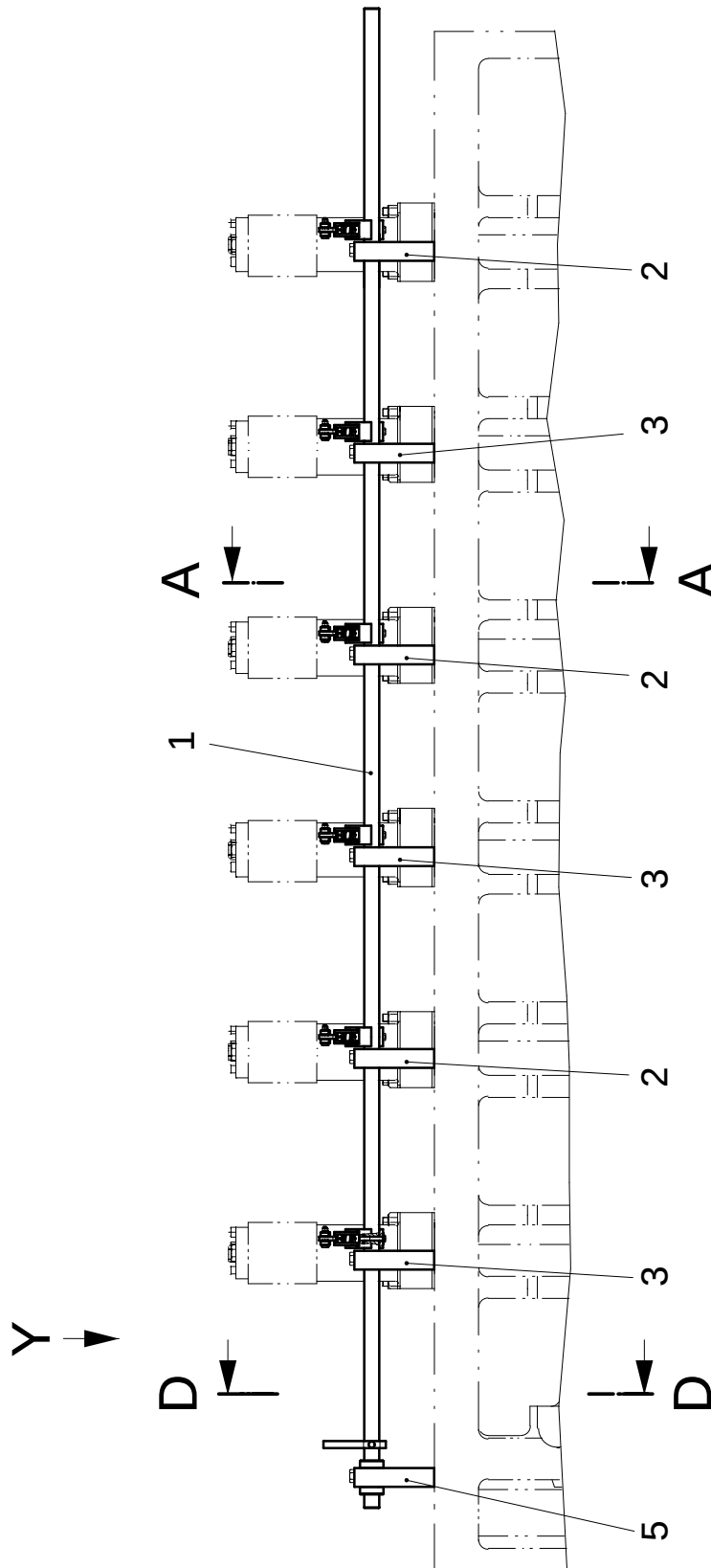
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Injection Pump Control Shaft

M25

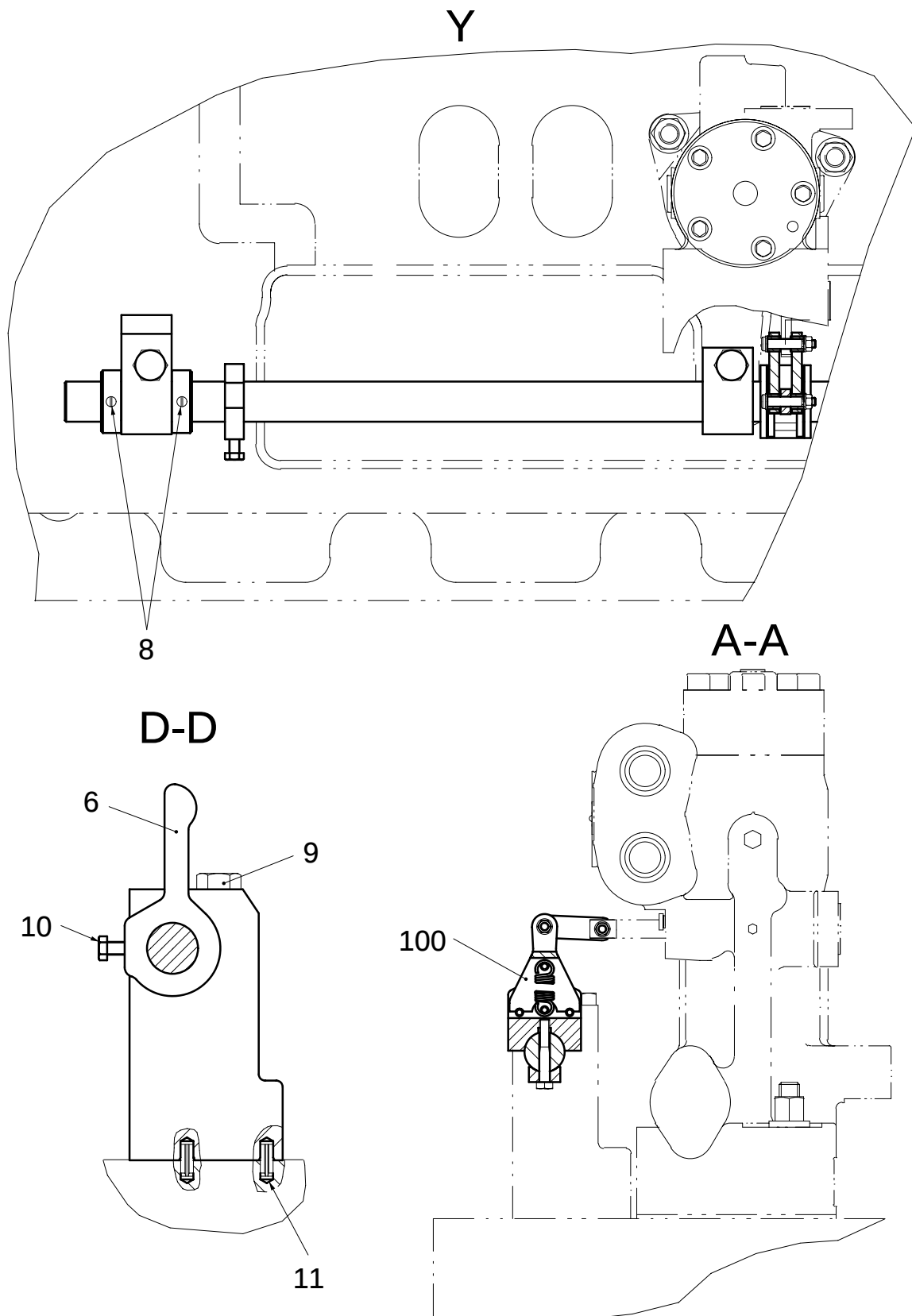
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Injection Pump Control Shaft

M25

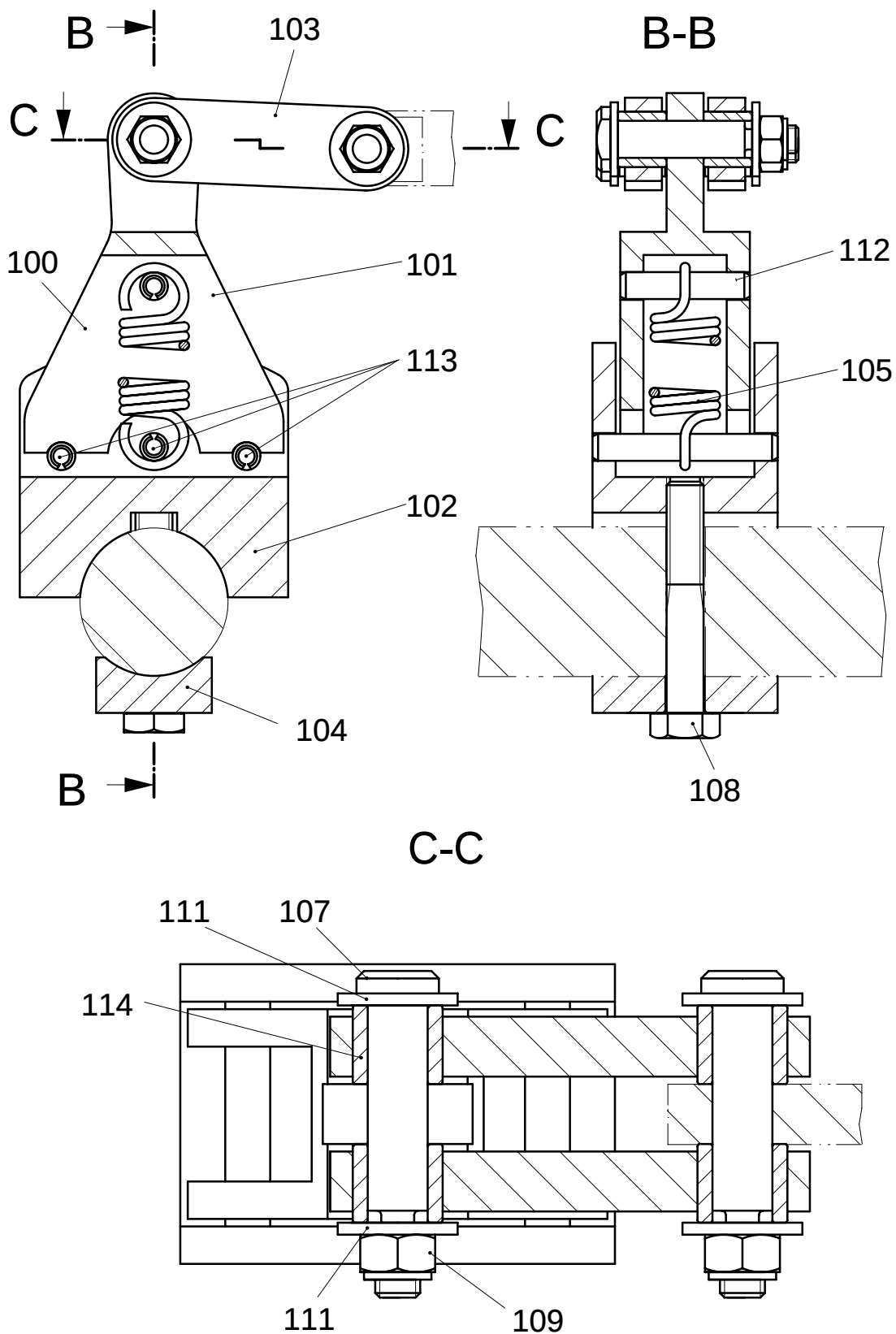
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Injection Pump Control Shaft

M25

05



Injection Pump Control Shaft

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REGULIERGESTÄNGE, VOLLST. INJECTION PUMP CONTROL SHAFT ASSEMBLY	1	254210 EE
1	REGULIERWELLE CONTROL SHAFT	1	254210-001
2	LAGERBOCK BEARING BRACKET	4	254210-002
3	LAGERBOCK BEARING BRACKET	4	254210-003
5	LAGERBOCK BEARING BRACKET	1	254210-005
6	HEBEL LEVER	1	254210-006
8	STELLRING SET COLLAR	2	1.0090-037
9	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-389
10	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1387-309
11	SPANNSTIFT SPRING DOWEL PIN	# 14	1.0039-313
100	GELENKHEBEL, VOLLST. HINGED LEVER, COMPL.	* 8	254212-100
101	SATTEL LEVER, TOP PART	8	254212-101
102	HALTER BRACKET	8	254212-102
103	LASCHE STRAP	16	254212-103
104	KLEMMSTÜCK SHIM	8	254212-104
105	ZUGFEDER TENSION SPRING	8	254212-105
107	BOLZEN BOLT	16	1.0015-047
108	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-241
109	SECHSKANTMUTTER SELF-LOCKING HEXAGON NUT	16	1.2021-104
111	SCHEIBE WASHER	32	1.0040-222

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Injection Pump Control Shaft

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
112	SPANNSTIFT SPRING DOWEL PIN	# 8	1.0039-880
113	SPANNSTIFT SPRING DOWEL PIN	# 24	1.0039-275
114	INNENRING INNER RING	32	254212-114

* = IN 254210 EE ENTHALTEN
INCLUDED IN 254210 EE

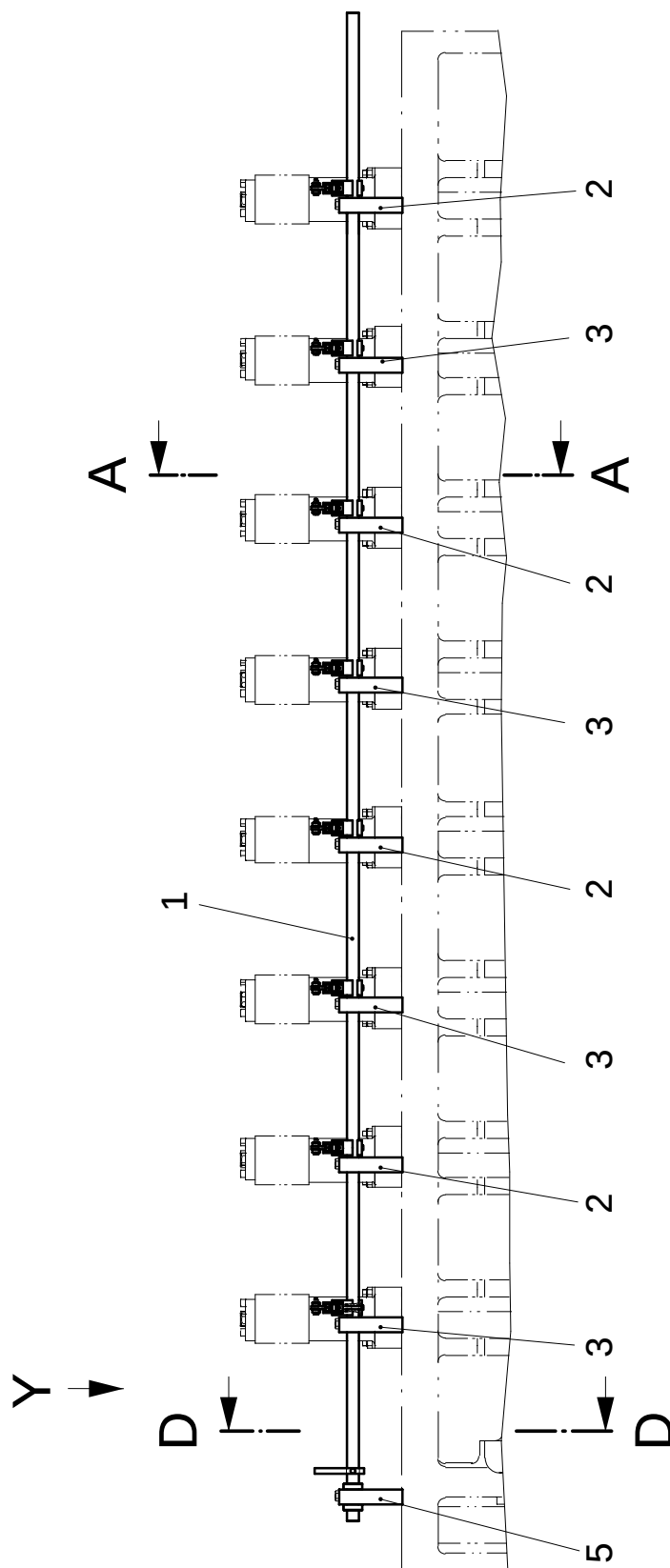
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Injection Pump Control Shaft

M25

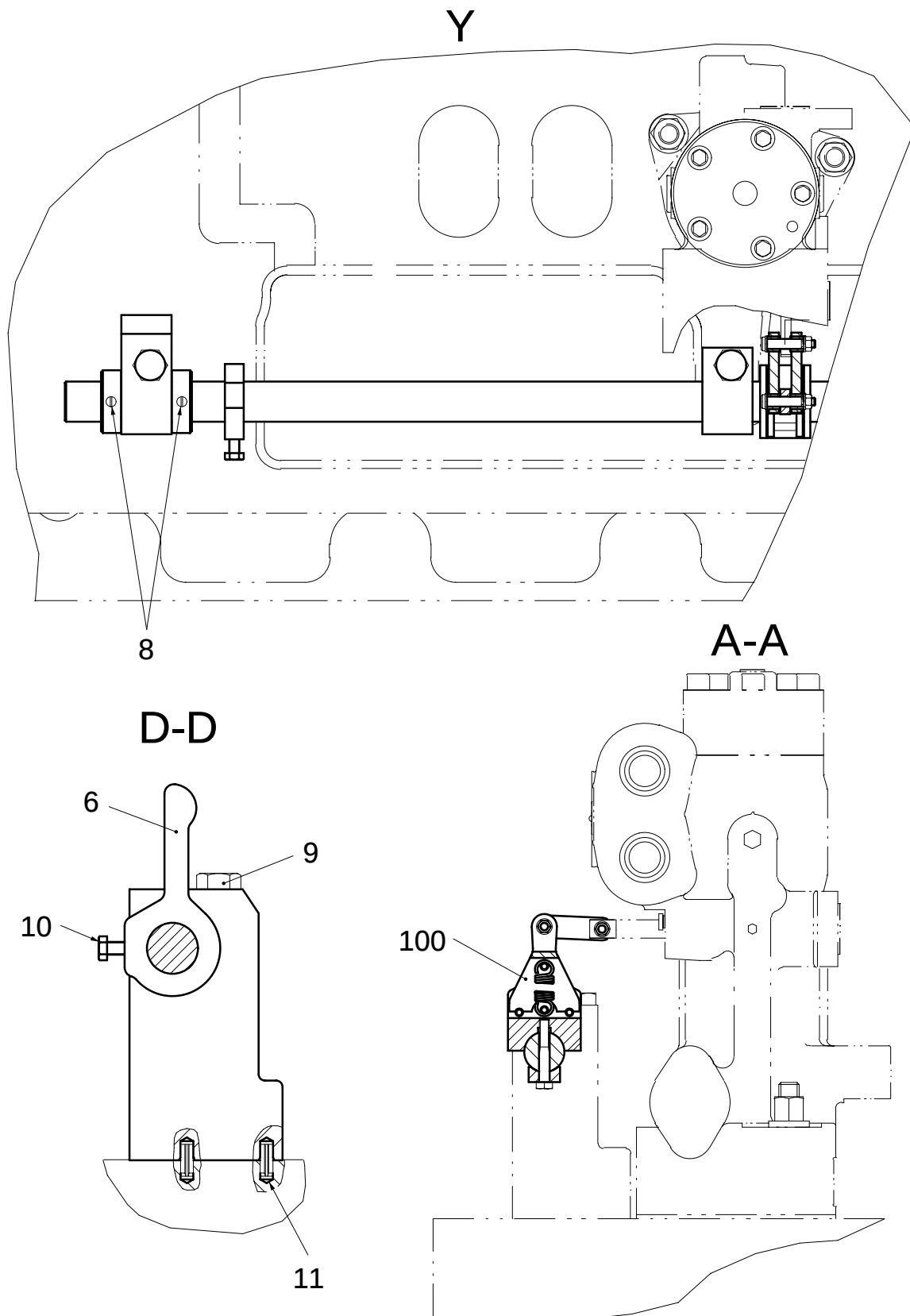
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Injection Pump Control Shaft

M25

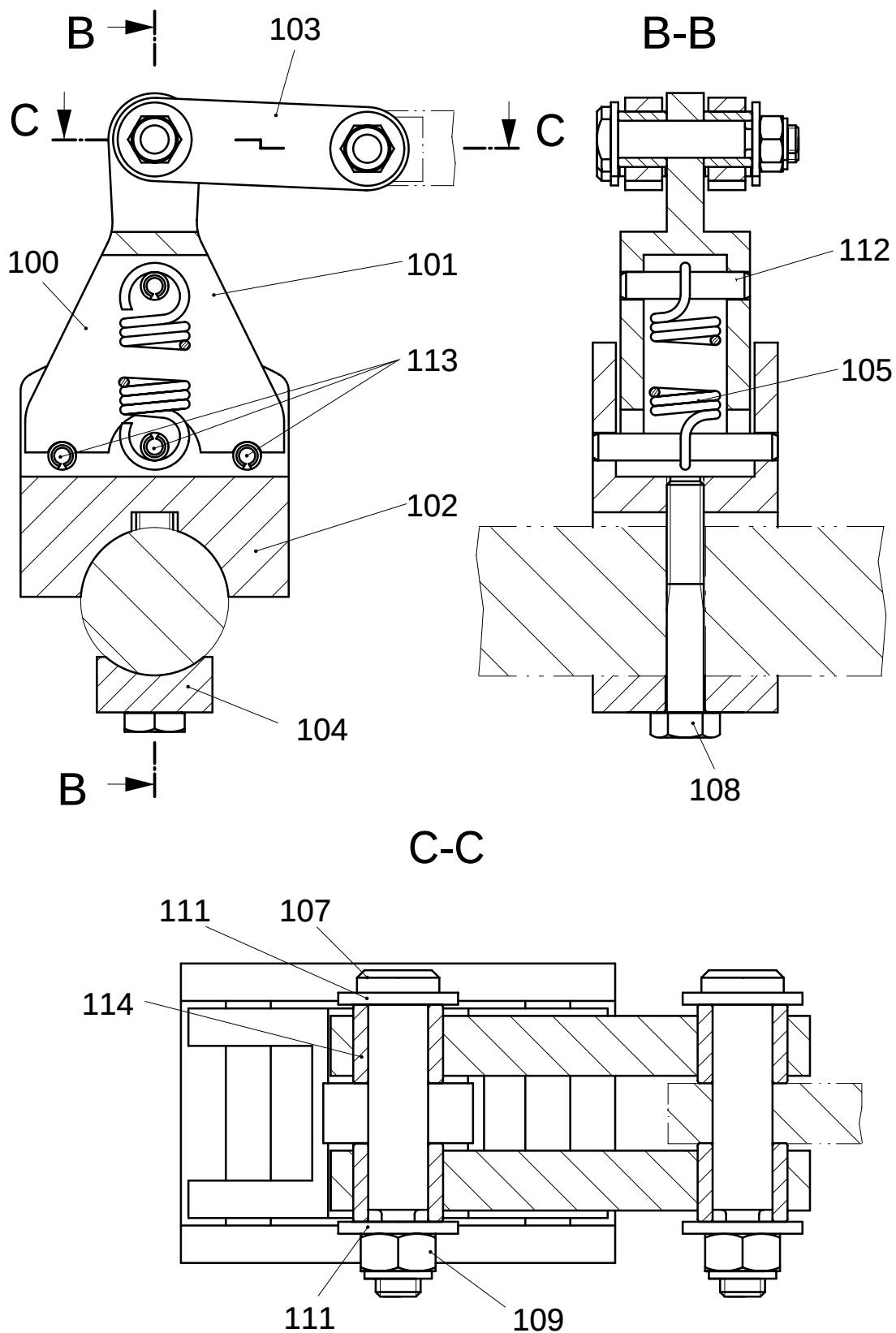
05



Injection Pump Control Shaft

M25

05



Injection Pump Control Shaft

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REGULIERGESTÄNGE, VOLLST. INJECTION PUMP CONTROL SHAFT ASSEMBLY	1	254210 FF
1	REGULIERWELLE CONTROL SHAFT	1	254210-001
2	LAGERBOCK BEARING BRACKET	4	254210-002
3	LAGERBOCK BEARING BRACKET	5	254210-003
5	LAGERBOCK BEARING BRACKET	1	254210-005
6	HEBEL LEVER	1	254210-006
8	STELLRING SET COLLAR	2	1.0090-037
9	SECHSKANTSCHRAUBE HEXAGON BOLT	10	1.1367-389
10	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1387-309
11	SPANNSTIFT SPRING DOWEL PIN	# 15	1.0039-313
100	GELENKHEBEL, VOLLST. HINGED LEVER, COMPL.	* 9	254212-100
101	SATTEL LEVER, TOP PART	9	254212-101
102	HALTER BRACKET	9	254212-102
103	LASCHE STRAP	18	254212-103
104	KLEMMSTÜCK SHIM	9	254212-104
105	ZUGFEDER TENSION SPRING	9	254212-105
107	BOLZEN BOLT	18	1.0015-047
108	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-241
109	SECHSKANTMUTTER SELF-LOCKING HEXAGON NUT	18	1.2021-104
111	SCHEIBE WASHER	36	1.0040-222

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Injection Pump Control Shaft

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
112	SPANNSTIFT SPRING DOWEL PIN	# 9	1.0039-880
113	SPANNSTIFT SPRING DOWEL PIN	# 27	1.0039-275
114	INNENRING INNER RING	36	254212-114

* = IN 254210 FF ENTHALTEN
INCLUDED IN 254210 FF

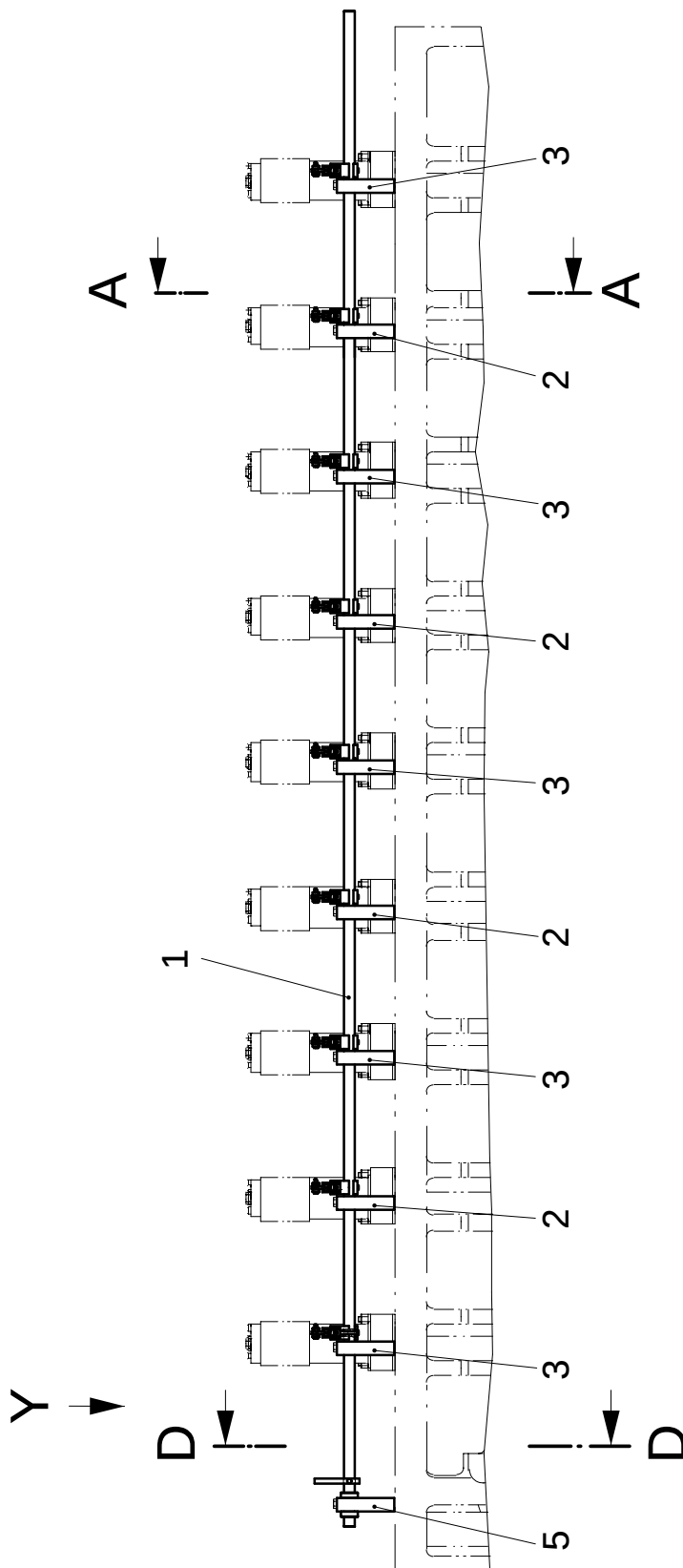
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Injection Pump Control Shaft

M25

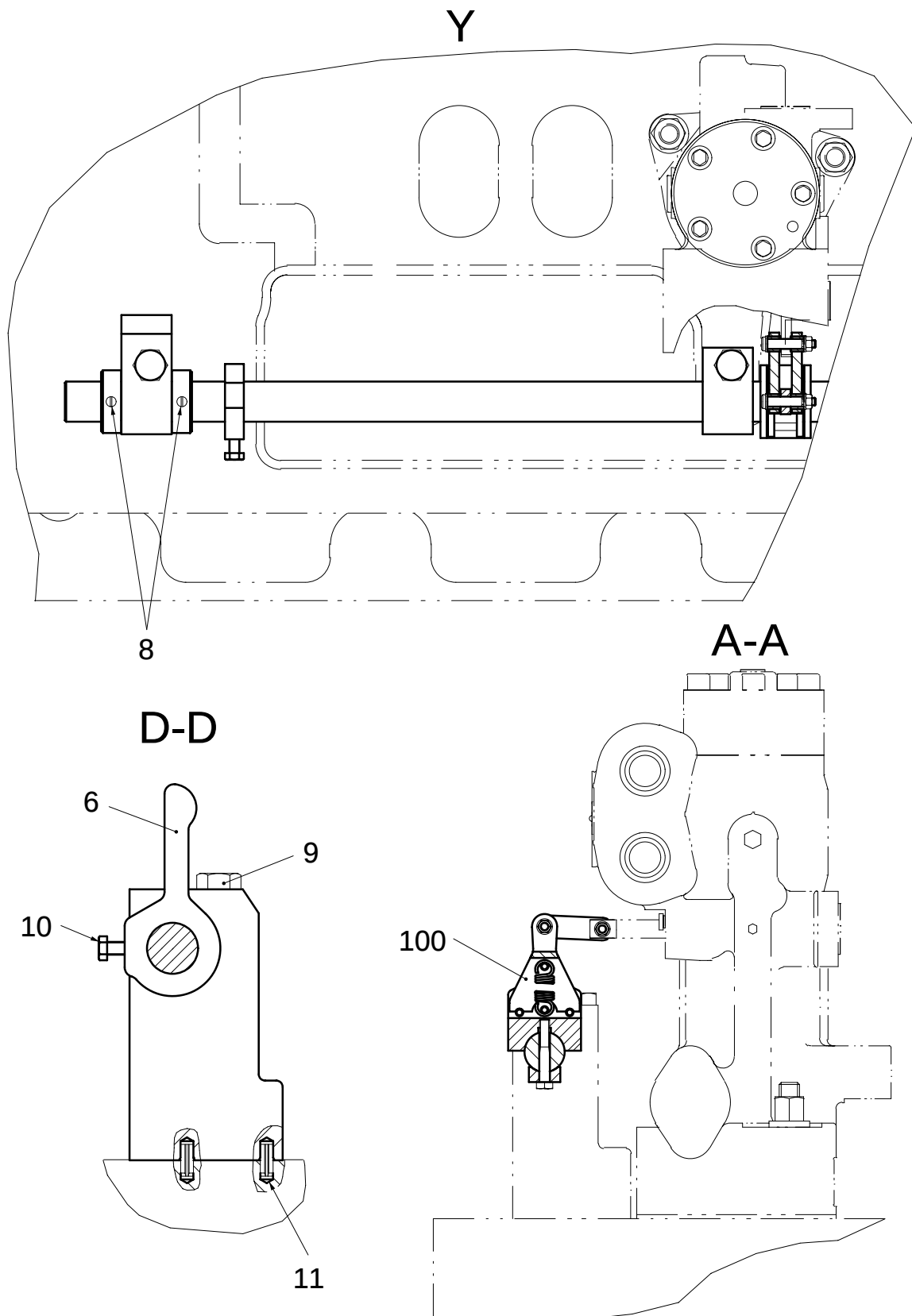
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Injection Pump Control Shaft

M25

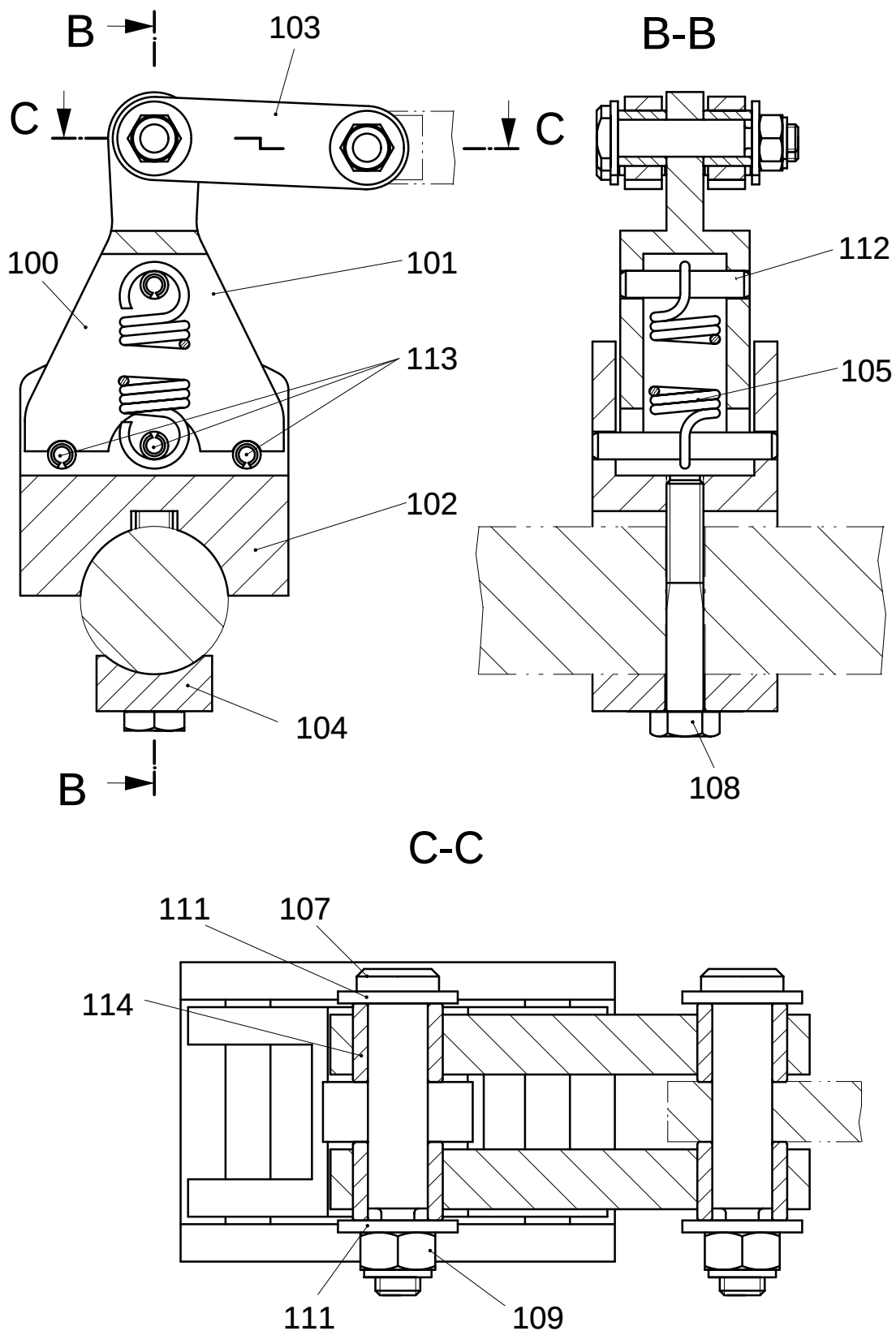
05



Injection Pump Control Shaft

M25

05



Fuel Limiter

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	FÜLLUNGSBEGRENZUNG, VOLLST. FUEL LIMITER, COMPL.	1	254240 AA
1	ZYLINDER, VOLLST. CYLINDER, COMPL.	1	SIEHE B1.05.05.1.4337 SEE B1.05.05.1.4337
2	HALTER, VOLLST. BRACKET, COMPL.	1	254240-002
3	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254240-003
5	ROHRKLEMME CLAMP	2	1.5011-002
7	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-374
8	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-309
9	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-311
11	SCHWENKVERSCHRAUBUNG BANJO	1	1.5098-820
13	SPANNSTIFT SPRING DOWEL PIN	# 1	1.0039-289

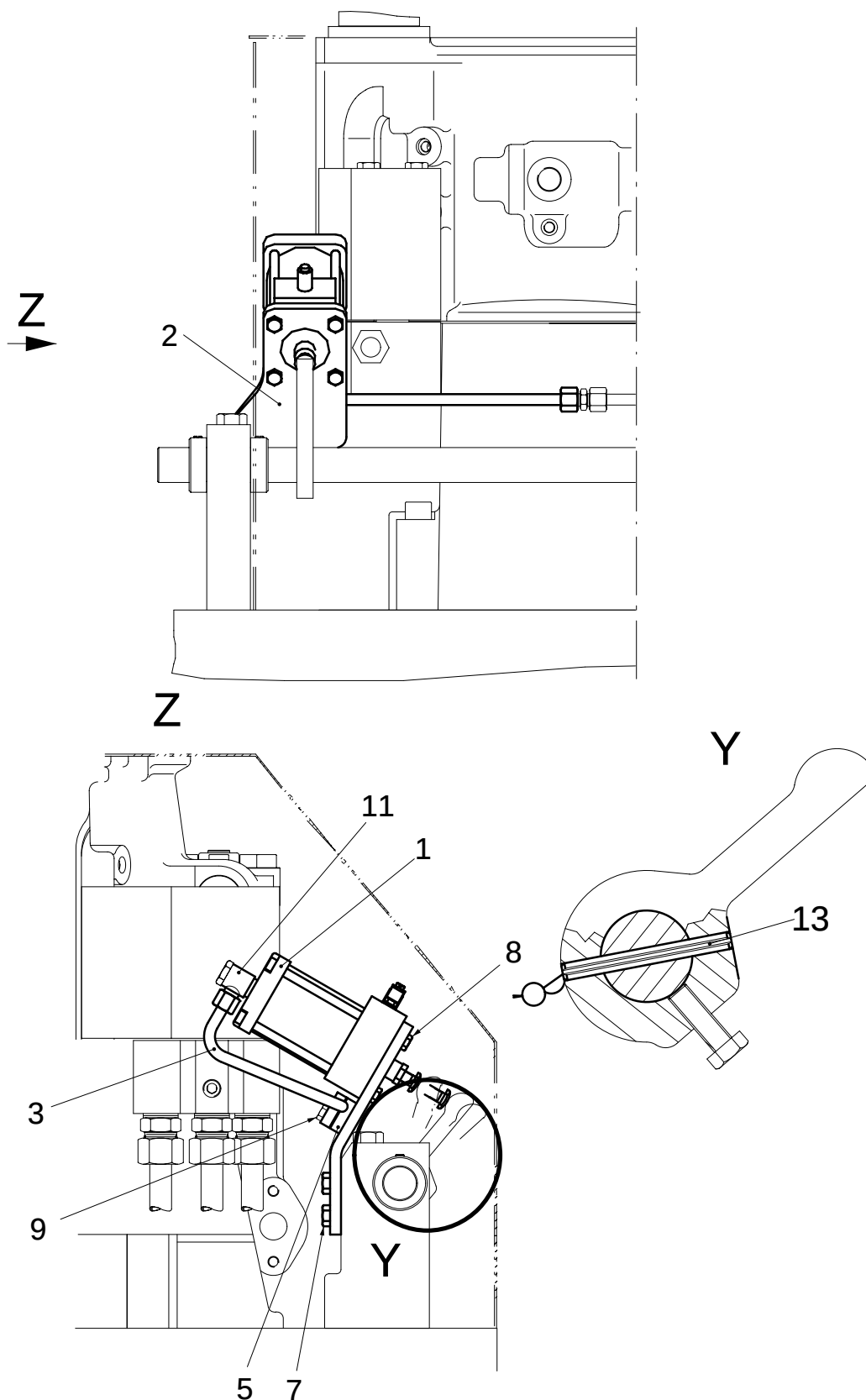
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Fuel Limiter

M25

05



Fuel Limiter

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	FÜLLUNGSBEGRENZUNG, VOLLST. FUEL LIMITER, COMPL.	1	254240 BB
1	ZYLINDER, VOLLST. CYLINDER, COMPL.	1	SIEHE B1.05.05.1.4337 SEE B1.05.05.1.4337
2	HALTER, VOLLST. BRACKET, COMPL.	1	254240-002
3	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254240-103
5	ROHRKLEMME CLAMP	2	1.5011-002
7	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-374
8	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-309
9	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-311
11	SCHWENKVERSCHRAUBUNG BANJO	1	1.5098-820
13	SPANNSTIFT SPRING DOWEL PIN	# 1	1.0039-289

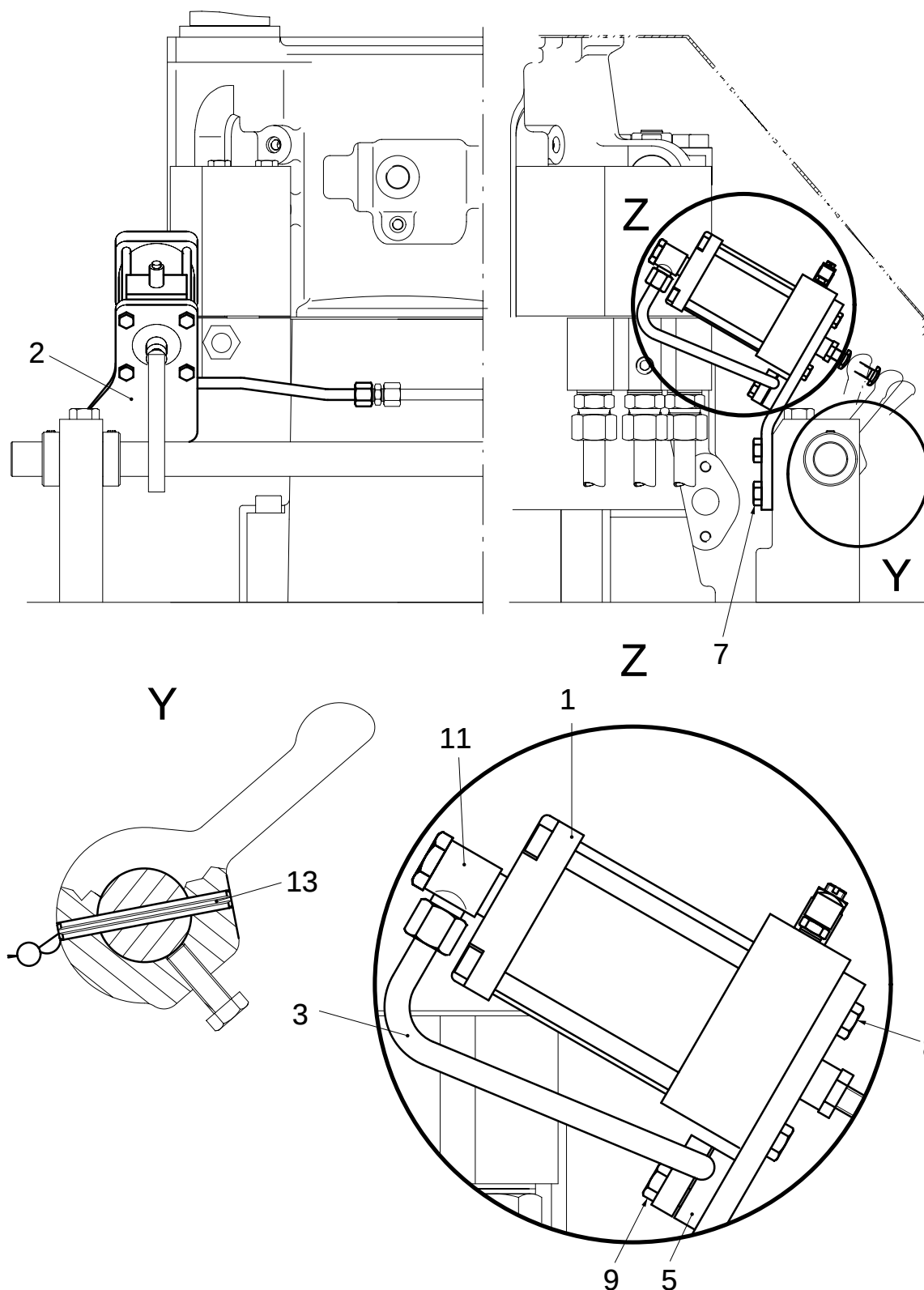
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Fuel Limiter

M25

05



Stop Cylinder Mounting

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	STOPPZYLINDER-ANBAU, VOLLST. STOP CYLINDER MOUNTING ASSEMBLY	1	254241 AA
1	STOPPZYLINDER, VOLLST. STOP CYLINDER, COMPL.	6	254241-001
2	HALTER BRACKET	6	254241-002
3	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	5	254241-003
4	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	6	254241-004
5	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	1	254241-005
6	STUTZEN PIPE UNION	1	1.5095-072
7	T-REDUZIERUNG UNION TEE	6	1.5098-007
8	SCHWENKVERSCHRAUBUNG BANJO CONNECTION	6	1.5093-605
9	ÜBERWURFMUTTER UNION NUT	1	1.5040-116
10	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-563
11	ROHRKLEMME PIPE CLAMP	24	1.5011-002
12	GUMMITÜLLE RUBBER SOCKET	1	1.5011-194
13	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-345
14	SECHSKANTSCHRAUBE HEXAGON SCREW	12	1.1387-311
16	O-RING O-RING	# 6	1.7084-645

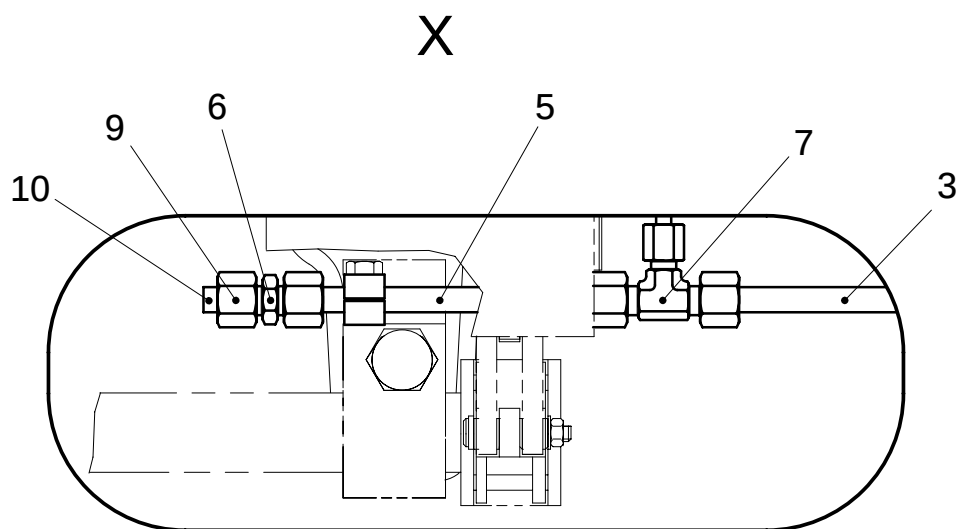
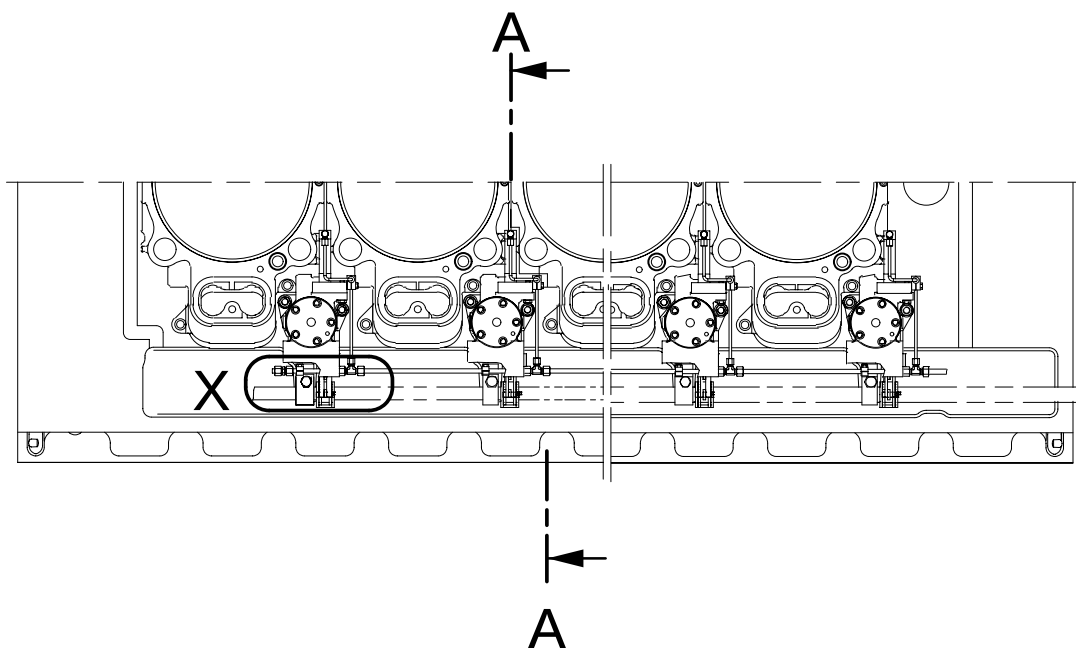
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Stop Cylinder Mounting

M25

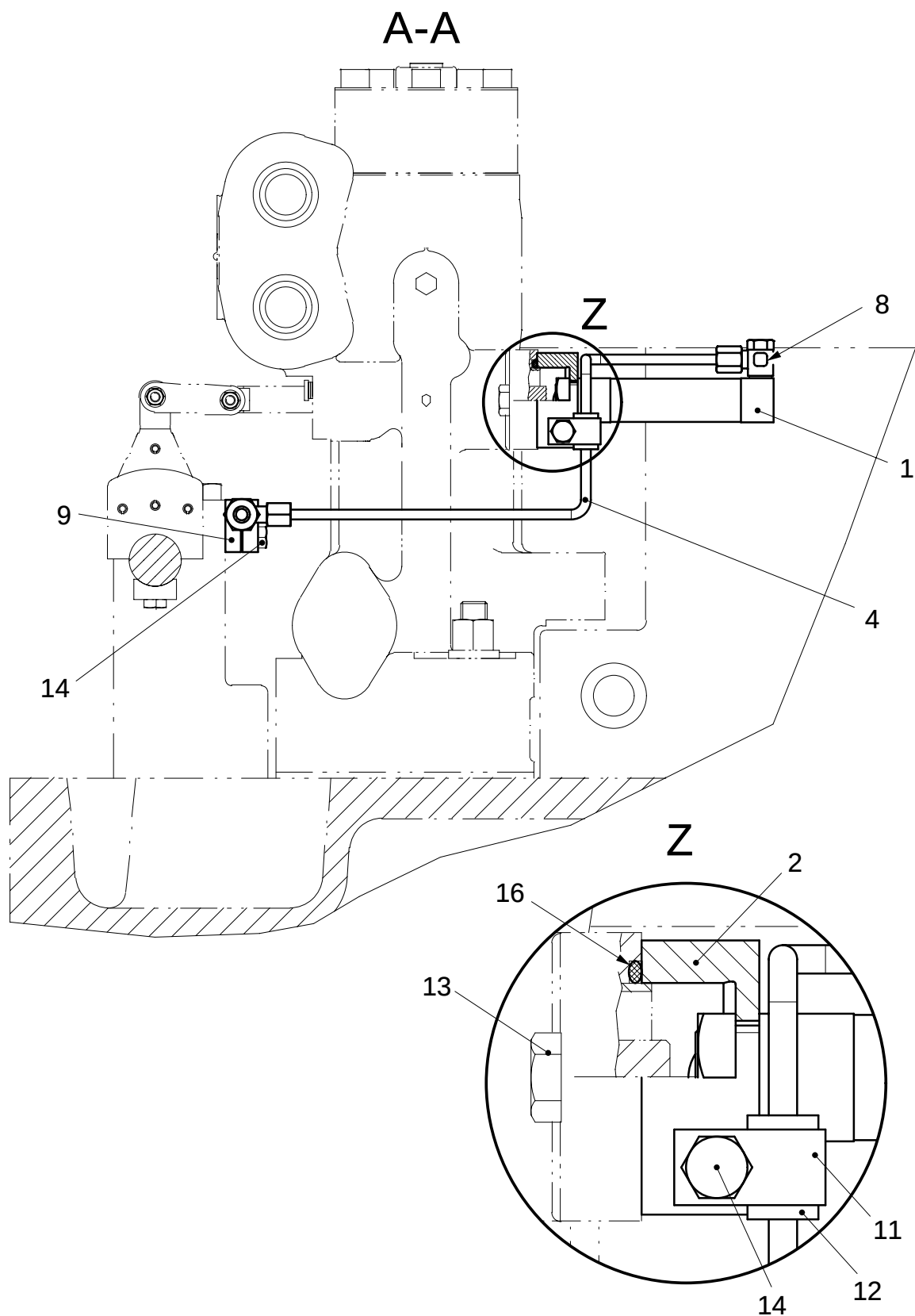
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Stop Cylinder Mounting

M25

05



Stop Cylinder Mounting

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	STOPPZYLINDER-ANBAU, VOLLST. STOP CYLINDER MOUNTING ASSEMBLY	1	254241 BB
1	STOPPZYLINDER, VOLLST. STOP CYLINDER, COMPL.	8	254241-001
2	HALTER BRACKET	8	254241-002
3	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	7	254241-003
4	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	8	254241-004
5	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	1	254241-005
6	STUTZEN PIPE UNION	1	1.5095-072
7	T-REDUZIERUNG UNION TEE	8	1.5098-007
8	SCHWENKVERSCHRAUBUNG BANJO CONNECTION	8	1.5093-605
9	ÜBERWURFMUTTER UNION NUT	1	1.5040-116
10	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-563
11	ROHRKLEMME PIPE CLAMP	32	1.5011-002
12	GUMMITÜLLE RUBBER SOCKET	1	1.5011-194
13	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-345
14	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1387-311
16	O-RING O-RING	# 8	1.7084-645

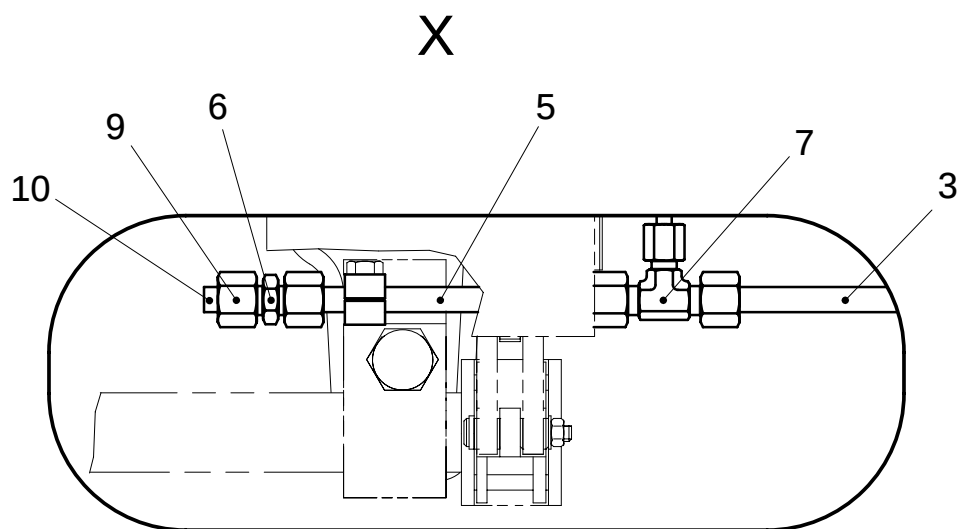
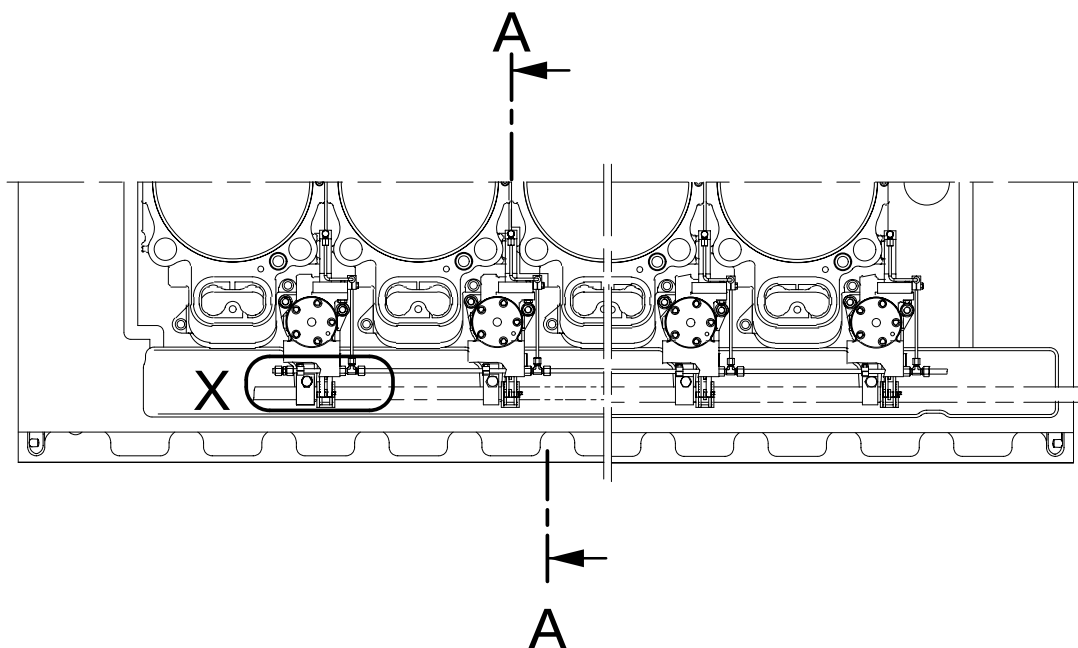
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Stop Cylinder Mounting

M25

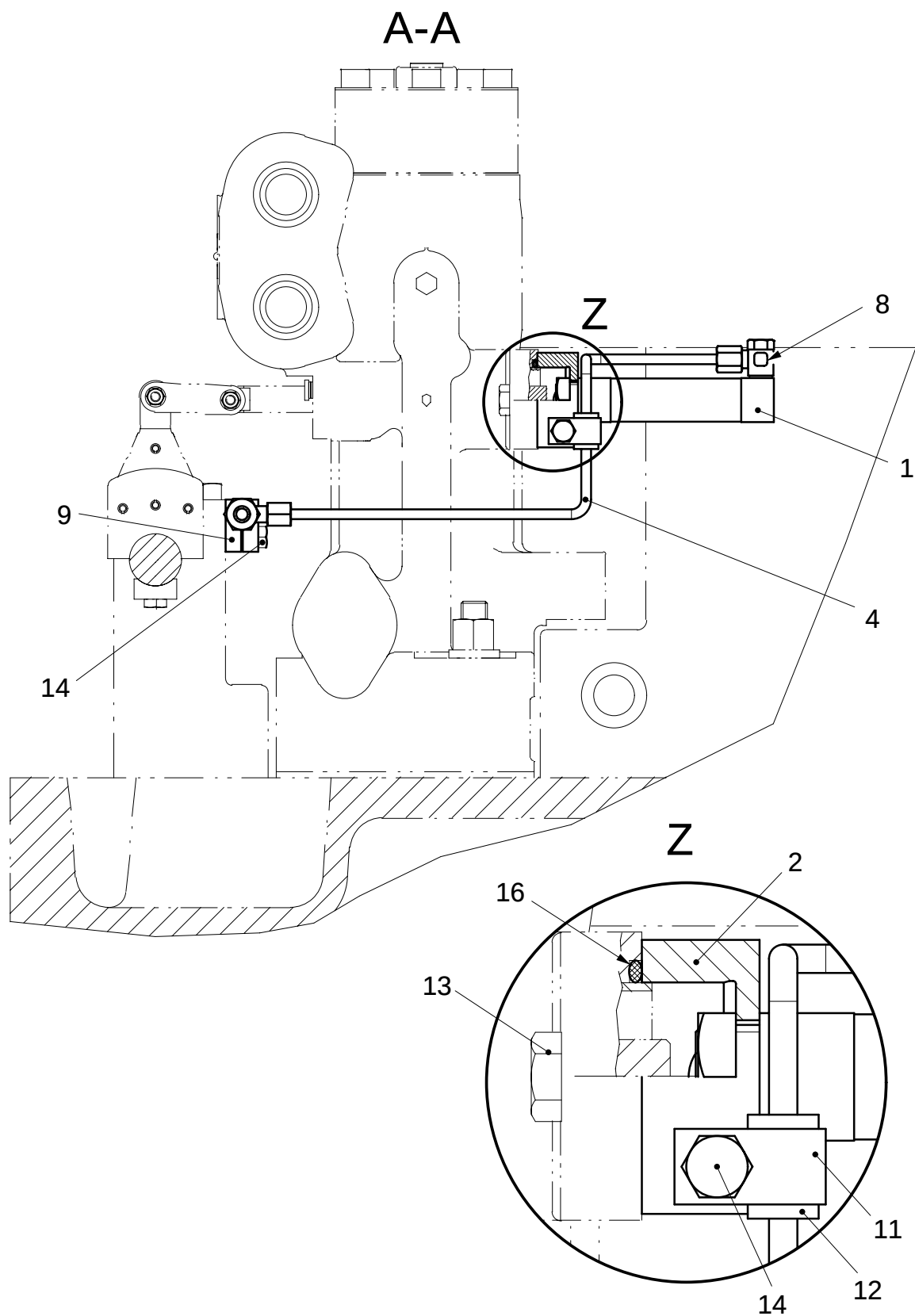
05



Stop Cylinder Mounting

M25

05



Stop Cylinder Mounting

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	STOPPZYLINDER-ANBAU, VOLLST. STOP CYLINDER MOUNTING ASSEMBLY	1	254241 CC
1	STOPPZYLINDER, VOLLST. STOP CYLINDER, COMPL.	9	254241-001
2	HALTER BRACKET	9	254241-002
3	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	8	254241-003
4	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	9	254241-004
5	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	1	254241-005
6	STUTZEN PIPE UNION	1	1.5095-072
7	T-REDUZIERUNG UNION TEE	9	1.5098-007
8	SCHWENKVERSCHRAUBUNG BANJO CONNECTION	9	1.5093-605
9	ÜBERWURFMUTTER UNION NUT	1	1.5040-116
10	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-563
11	ROHRKLEMME PIPE CLAMP	36	1.5011-002
12	GUMMITÜLLE RUBBER SOCKET	1	1.5011-194
13	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1387-345
14	SECHSKANTSCHRAUBE HEXAGON SCREW	18	1.1387-311
16	O-RING O-RING	# 9	1.7084-645

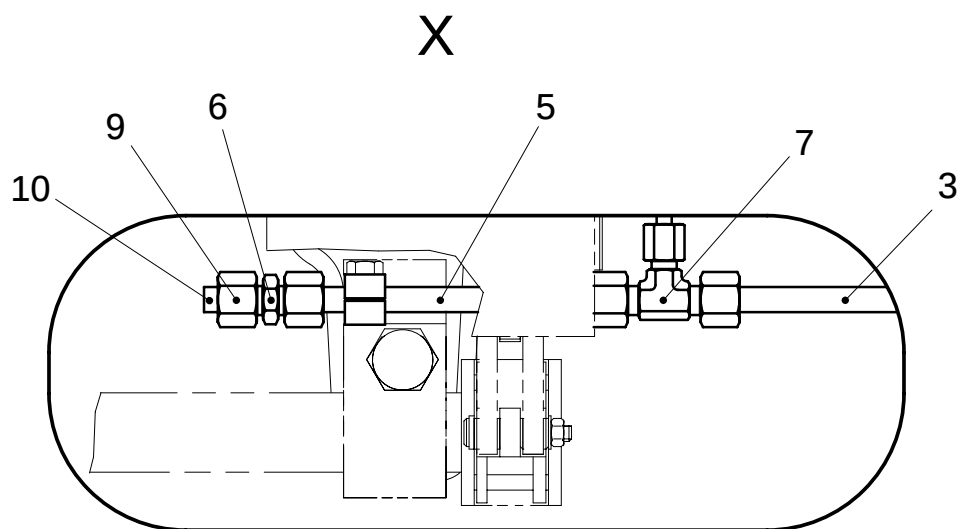
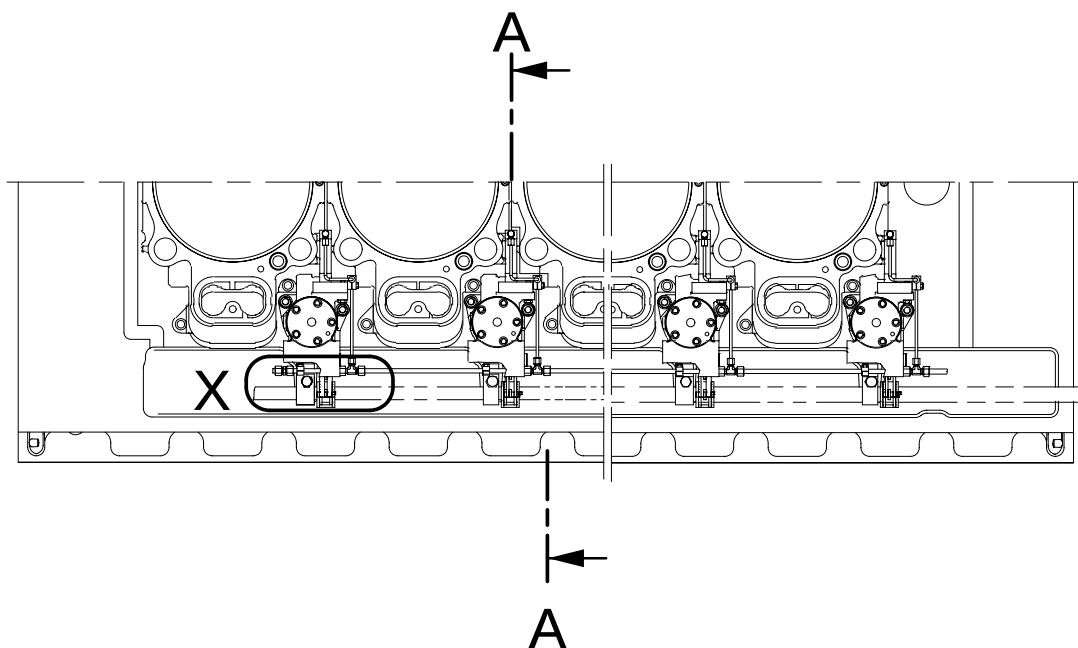
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Stop Cylinder Mounting

M25

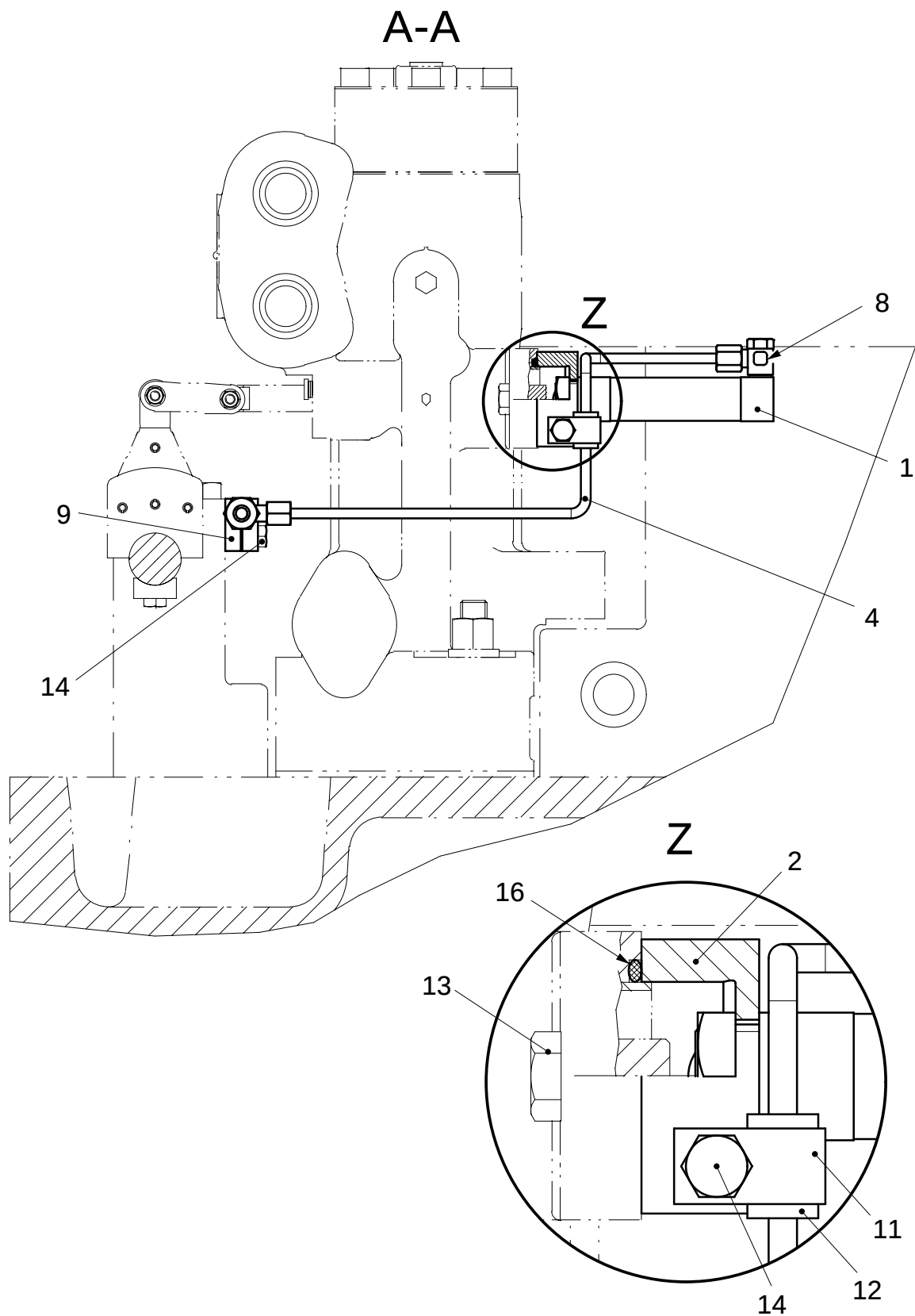
05



Stop Cylinder Mounting

M25

05



Filling Transmitter Mounting

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	FÜLLUNGSGEBER-ANBAU, VOLLST. FILLING TRANSMITTER MOUNTING ASSEMBLY	1	254243 AA
1	DREHWINKELGEBER ANGLE OF ROTATION TRANSMITTER	* 1	
5	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	2	1.1152-044
8	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1387-315

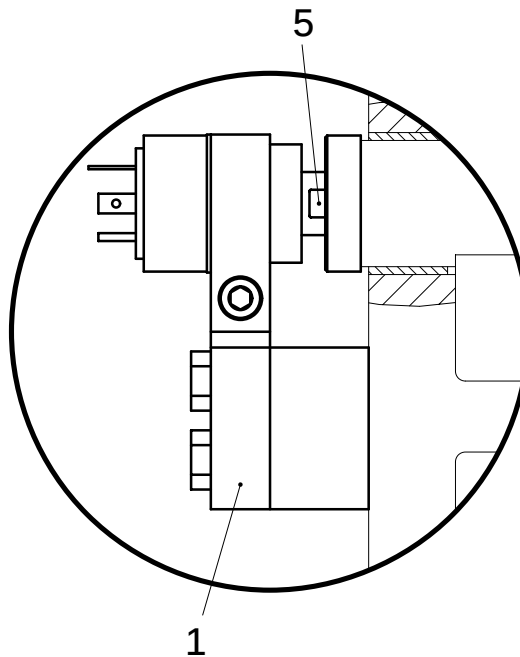
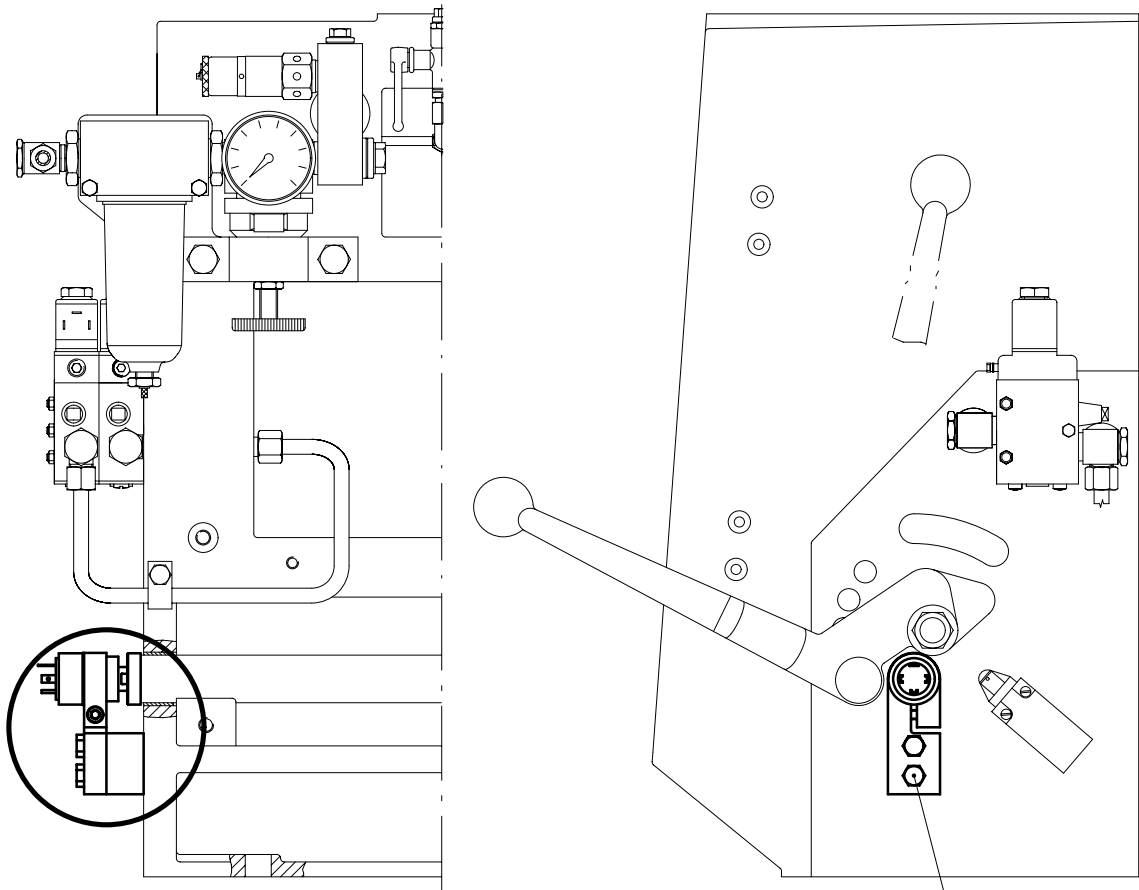
* = AUF ANFRAGE
ON INQUIRY

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Filling Transmitter Mounting

M25

05



Single-Acting Cylinder

M20-M601C

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
10.0	EINFACHWIRK. ZYLINDER, VOLLST. SINGLE-ACTING CYLINDER, ASS.	1	1.4337 NN	
10.0-1	O-RING O-RING	* 1		
10.0-2	O-RING O-RING	* 1		
10.0-3	O-RING O-RING	* 1		
10.0-4	O-RING O-RING	* 1		
10.0-5	O-RING O-RING	* 2		
10.0-6	O-RING O-RING	* 1		
10.0-7	O-RING O-RING	* 1		
10.0-8	O-RING O-RING	* 1		
10.0-9	O-RING O-RING	* 1		

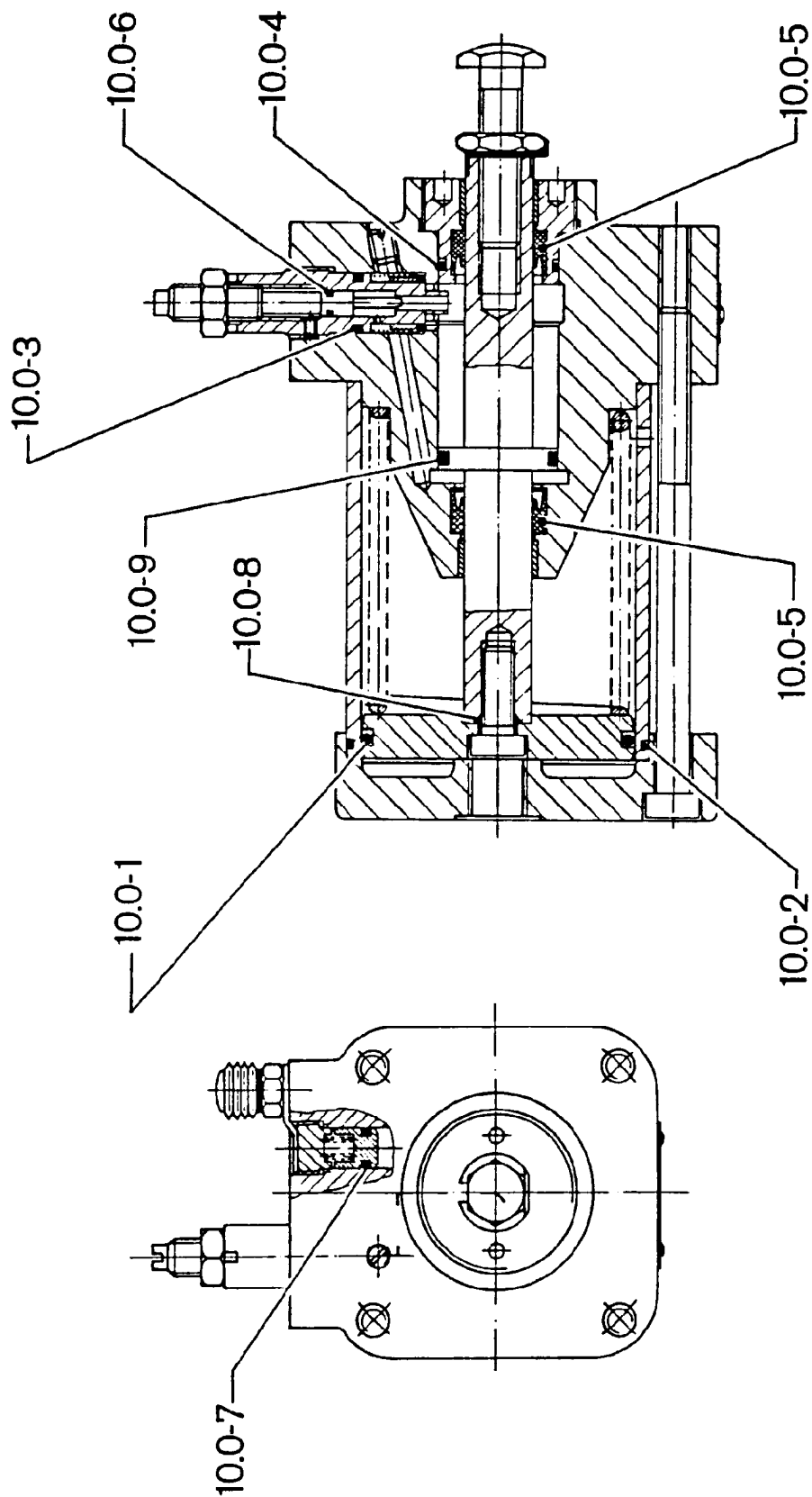
* = E-PÄCKCHEN, NUR VOLLST. # 1 1.4337-914
 COMPLETE SET OF SPARE PARTS
 BEI REPARATUR KOMPLETT AUSWECHSELN
 RENEW THESE PARTS ON REPAIR

= VERBRAUCHSTEILE
 CONSUMABLES

Single-Acting Cylinder

M20-M601C

05



Control Stand and Gauge Panel Mounting

M25

05

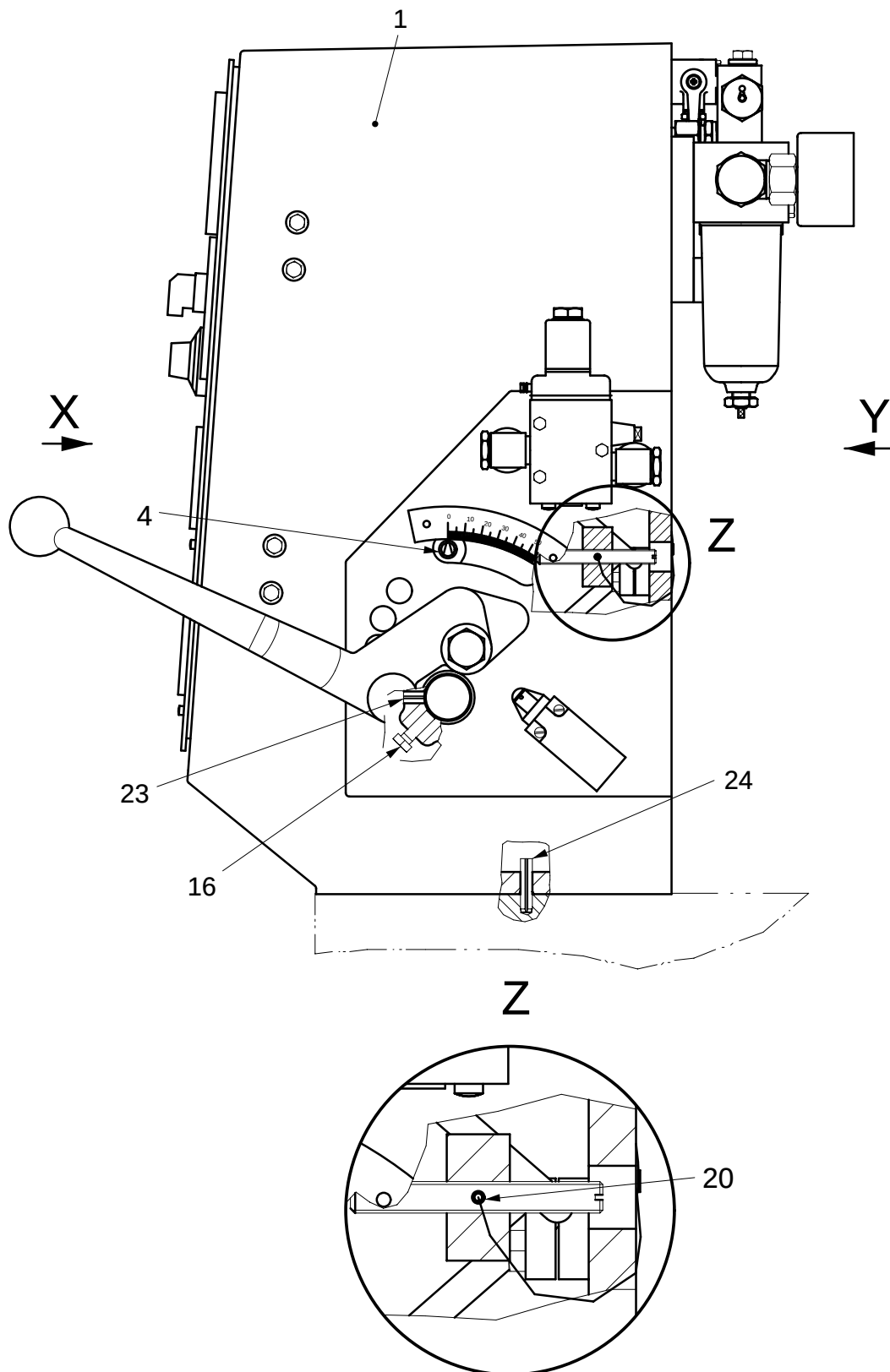
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ANBAU, VOLLST. MOUNTING ASSEMBLY	1	254520 AA
1	BEDIENSTAND, VOLLST. CONTROL PANEL ASSEMBLY	1	SIEHE B1.05.05.254523 SEE B1.05.05.254523
2	MANOMETERTAFEL, VOLLST. GAUGE PANEL ASSEMBLY	1	SIEHE B1.05.11.254630 SEE B1.05.11.254630
3	HEBEL LEVER	1	9.4250-003
4	ZEIGER INDICATOR	1	2.4523-104
6	KUGELHAHN BALL VALVE	6	254520-006
7	HALTER BRACKET	1	254520-007
9	ELASTISCHE VERBINDUNG HOSE	3	2.4639-005
10	ELASTISCHE VERBINDUNG HOSE	3	2.4639-003
11	V-PUFFER BONDED RUBBER PAD	4	1.4630-102
13	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-444
15	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-336
16	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-309
17	SECHSKANTSCHRAUBE HEXAGON SCREW	12	1.1387-241
19	SECHSKANTMUTTER HEXAGON NUT	6	1.2007-144
20	SPANNSTIFT SPRING DOWEL PIN	1	1.0039-151
21	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034
22	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-032
23	SPANNSTIFT SPRING DOWEL PIN	1	1.0039-344
24	SPANNSTIFT SPRING DOWEL PIN	2	1.0039-330

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Control Stand and Gauge Panel Mounting

M25

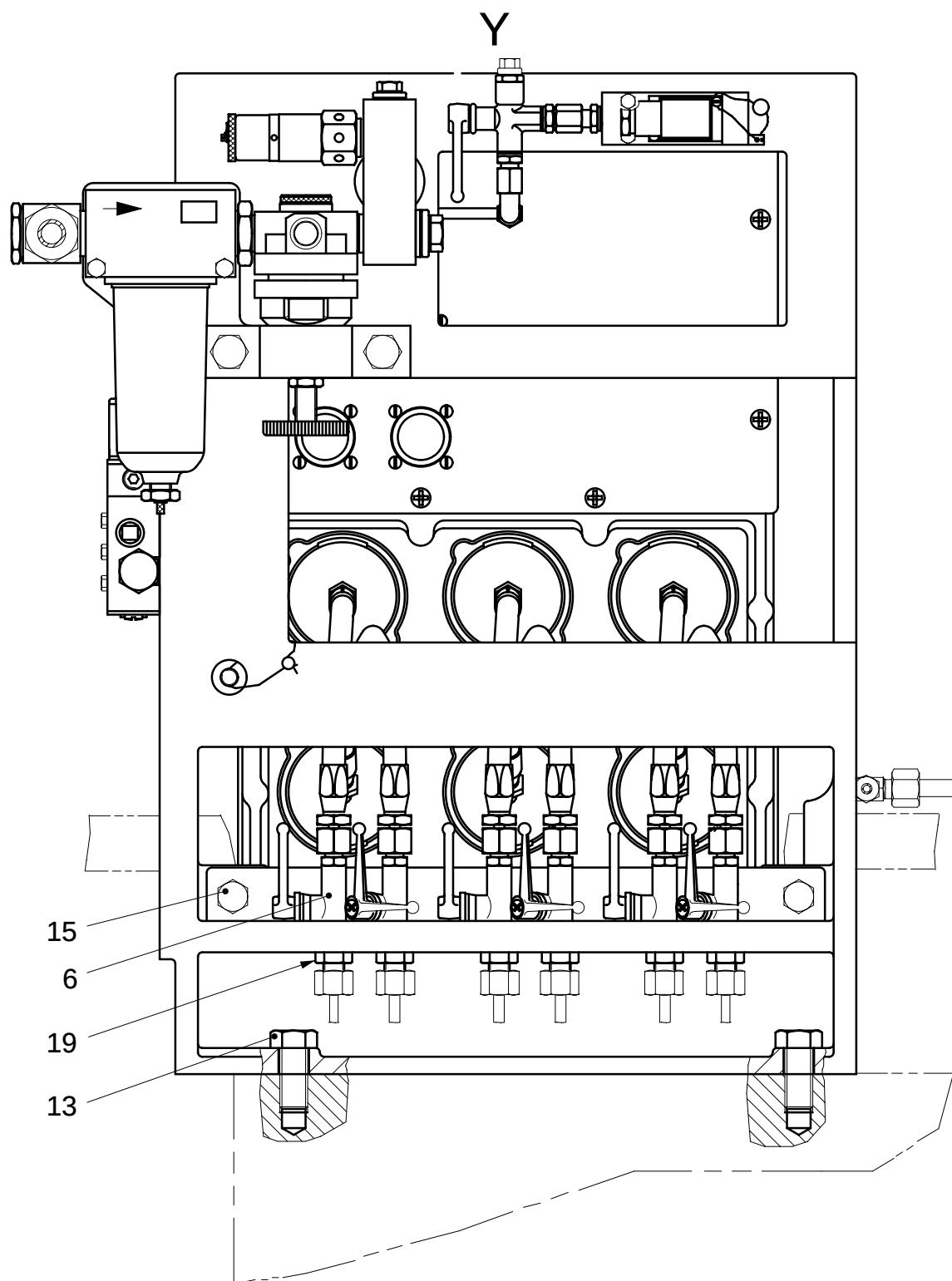
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Control Stand and Gauge Panel Mounting

M25

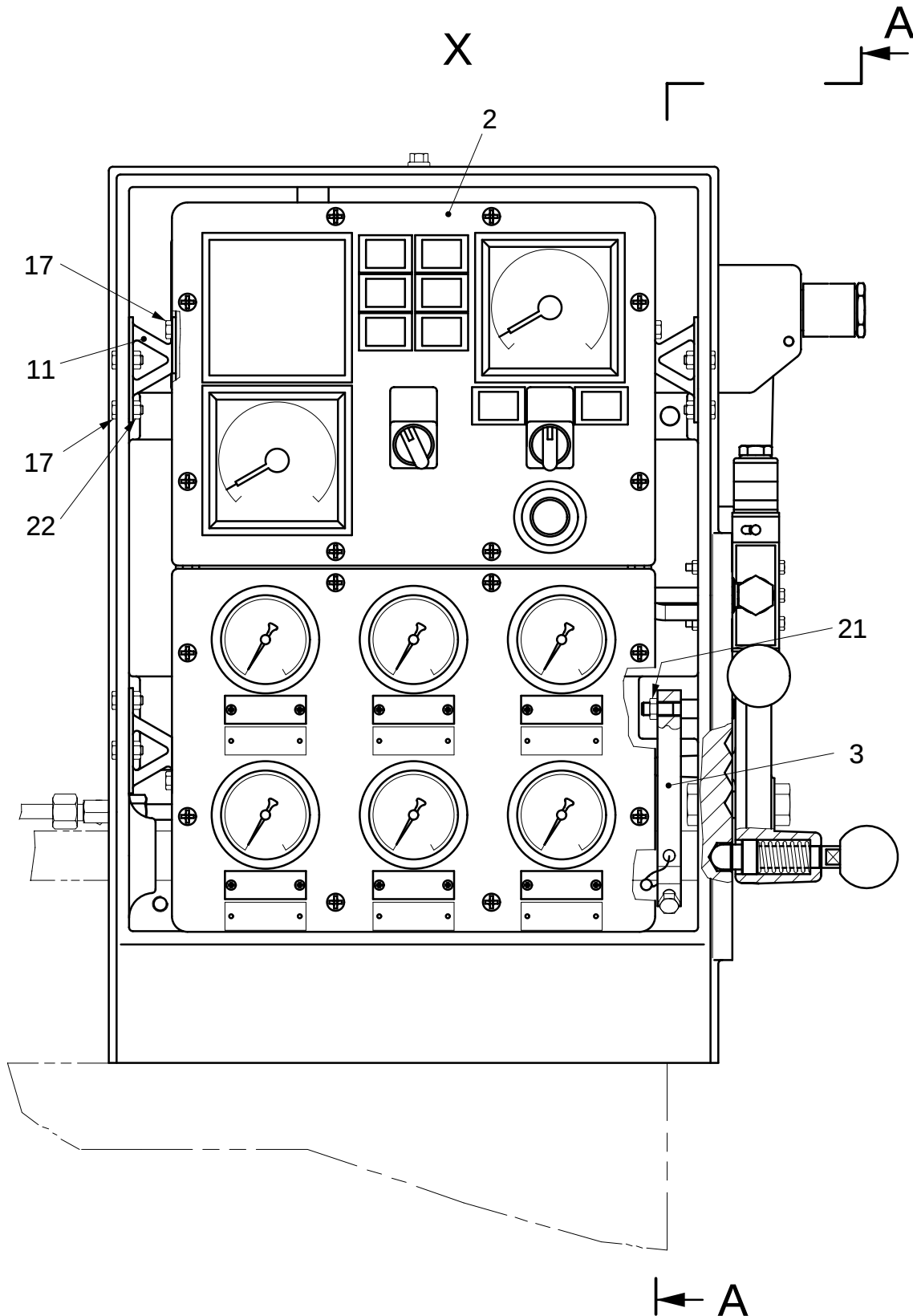
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Control Stand and Gauge Panel Mounting

M25

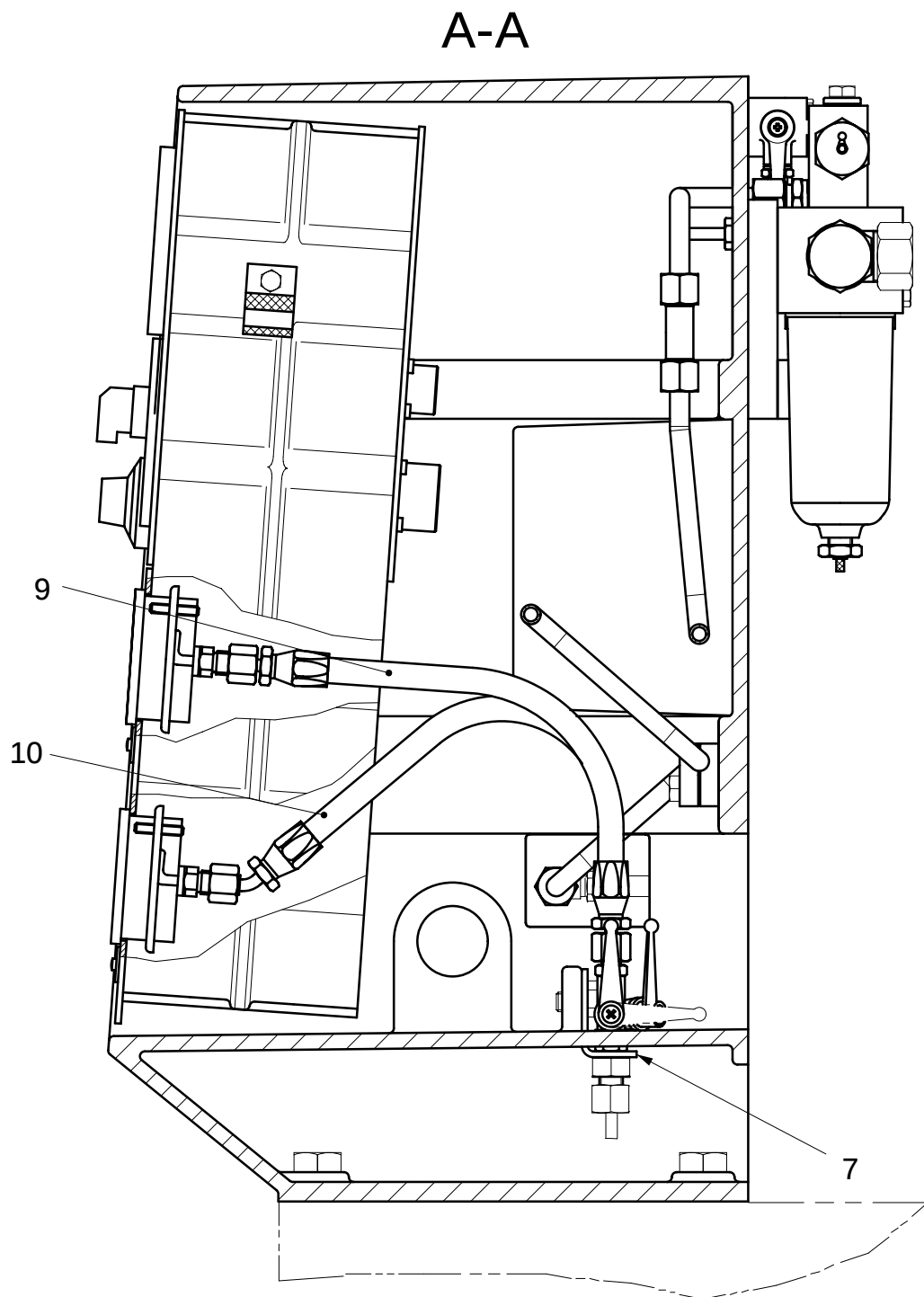
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Control Stand and Gauge Panel Mounting

M25

05



Control Stand and Gauge Panel Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ANBAU, VOLLST. MOUNTING ASSEMBLY	1	254520 BB
1	BEDIENSTAND, VOLLST. CONTROL PANEL ASSEMBLY	1	SIEHE B1.05.05.254523 SEE B1.05.05.254523
2	MANOMETERTAFEL, VOLLST. GAUGE PANEL ASSEMBLY	1	SIEHE B1.05.11.254630 SEE B1.05.11.254630
3	HEBEL LEVER	1	9.4250-003
4	ZEIGER INDICATOR	1	2.4523-104
11	V-PUFFER BONDED RUBBER PAD	4	1.4630-102
13	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-444
16	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-309
17	SECHSKANTSCHRAUBE HEXAGON SCREW	12	1.1387-241
21	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034
22	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-032
23	SPANNSTIFT SPRING DOWEL PIN	1	1.0039-344
24	SPANNSTIFT SPRING DOWEL PIN	2	1.0039-330
26	SPANNSTIFT SPRING DOWEL PIN	1	1.0039-151

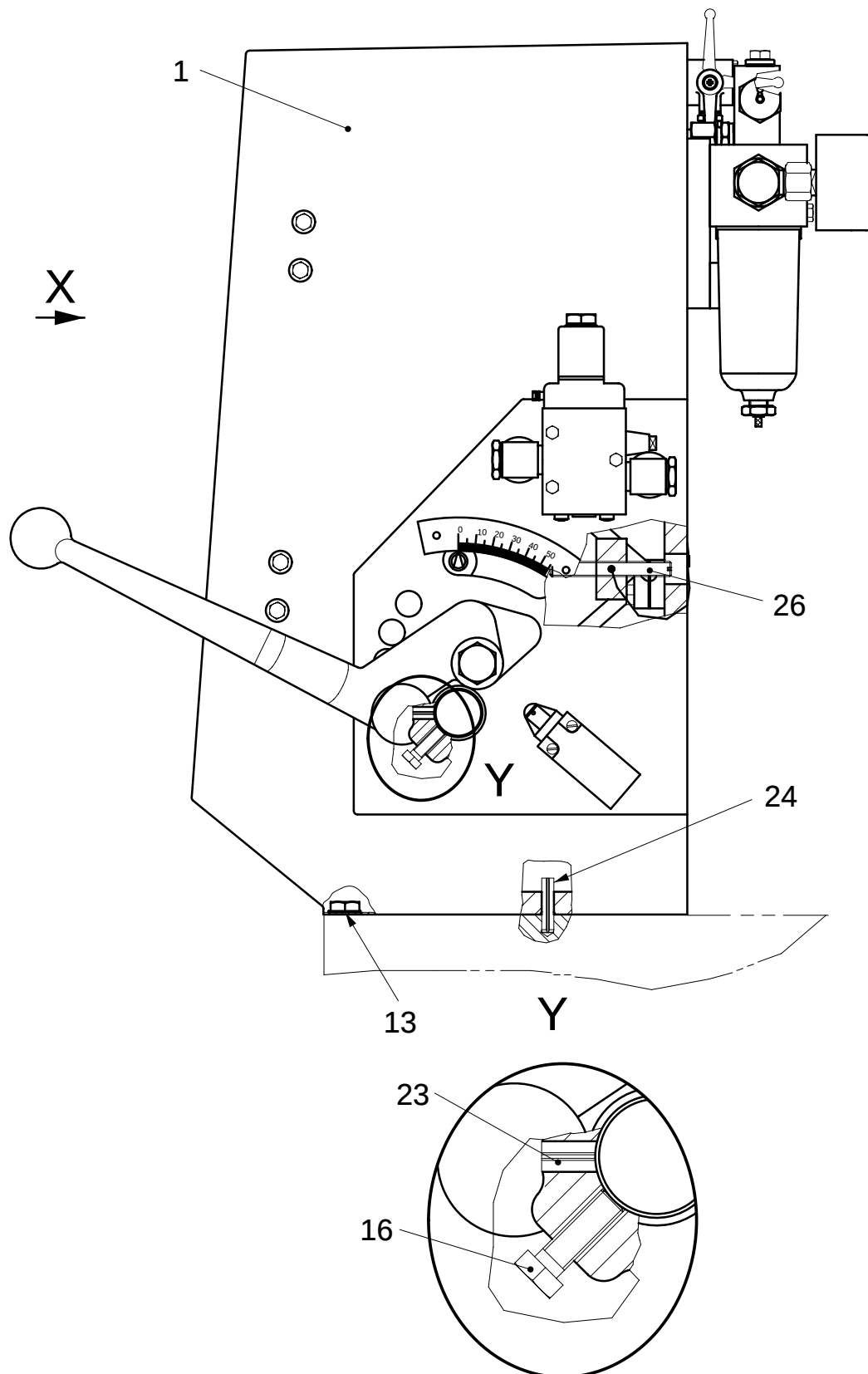
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Stand and Gauge Panel Mounting

M25

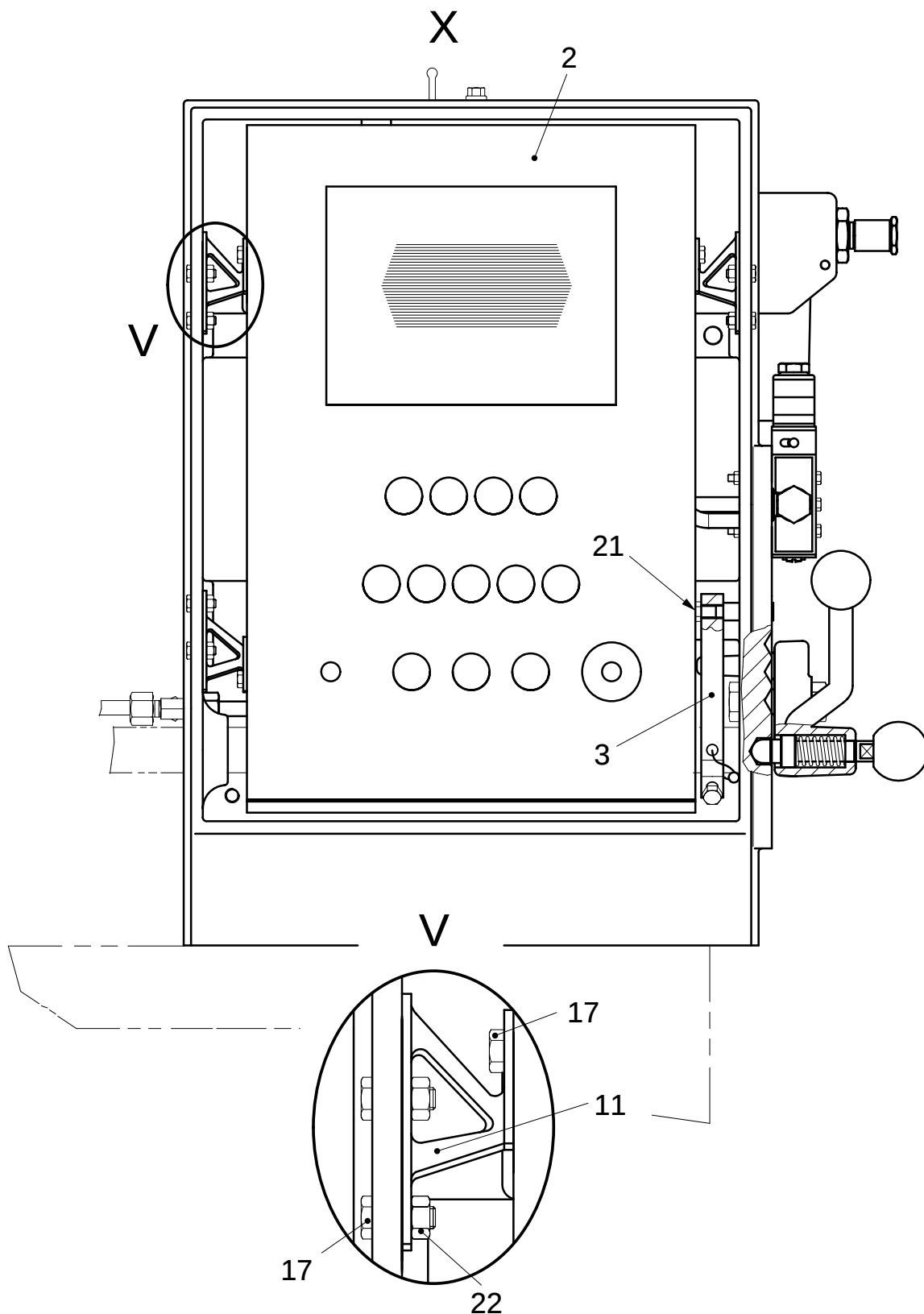
05



Control Stand and Gauge Panel Mounting

M25

05



Control Stand and Gauge Panel Mount.

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ANBAU, VOLLST. MOUNTING ASSEMBLY	1	254520 CC
1	BEDIENSTAND, VOLLST. CONTROL PANEL ASSEMBLY	1	SIEHE B1.05.05.254523 SEE B1.05.05.254523
2	MANOMETERTAFEL, VOLLST. GAUGE PANEL ASSEMBLY	1	SIEHE B1.05.11.254630 SEE B1.05.11.254630
3	HEBEL LEVER	1	9.4250-003
4	ZEIGER INDICATOR	1	2.4523-104
6	KUGELHAHN BALL VALVE	6	254520-006
7	HALTER BRACKET	1	254520-007
9	ELASTISCHE VERBINDUNG HOSE	3	2.4639-005
10	ELASTISCHE VERBINDUNG HOSE	3	2.4639-003
11	V-PUFFER BONDED RUBBER PAD	4	1.4630-102
13	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-444
15	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-336
16	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-309
17	SECHSKANTSCHRAUBE HEXAGON SCREW	12	1.1387-241
19	SECHSKANTMUTTER HEXAGON NUT	6	1.2007-144
20	SPANNSTIFT SPRING DOWEL PIN	# 1	1.0039-151
21	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034
22	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-032
23	SPANNSTIFT SPRING DOWEL PIN	# 1	1.0039-344
24	SPANNSTIFT SPRING DOWEL PIN	# 2	1.0039-330

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

M25

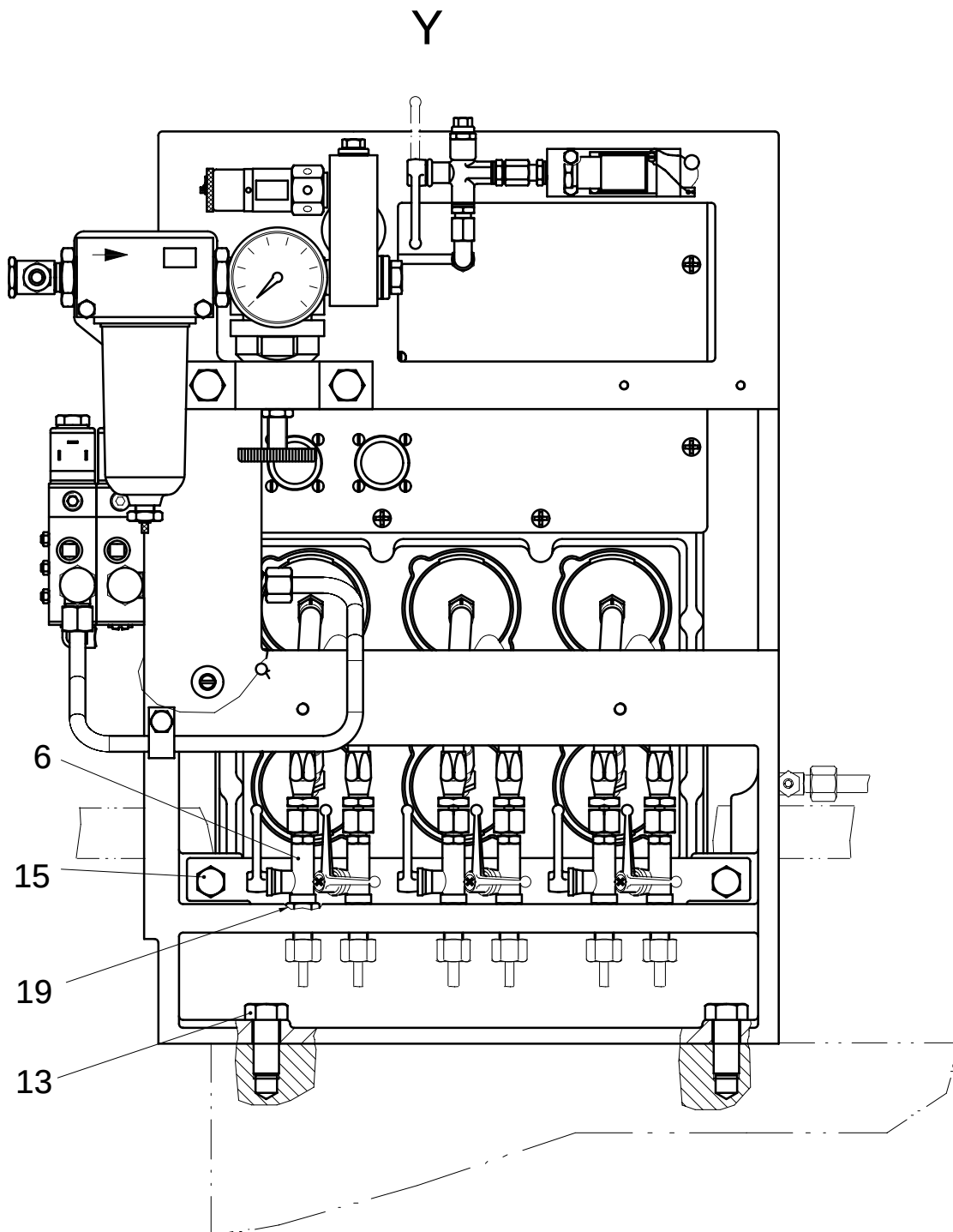
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Control Stand and Gauge Panel Mount.

M25

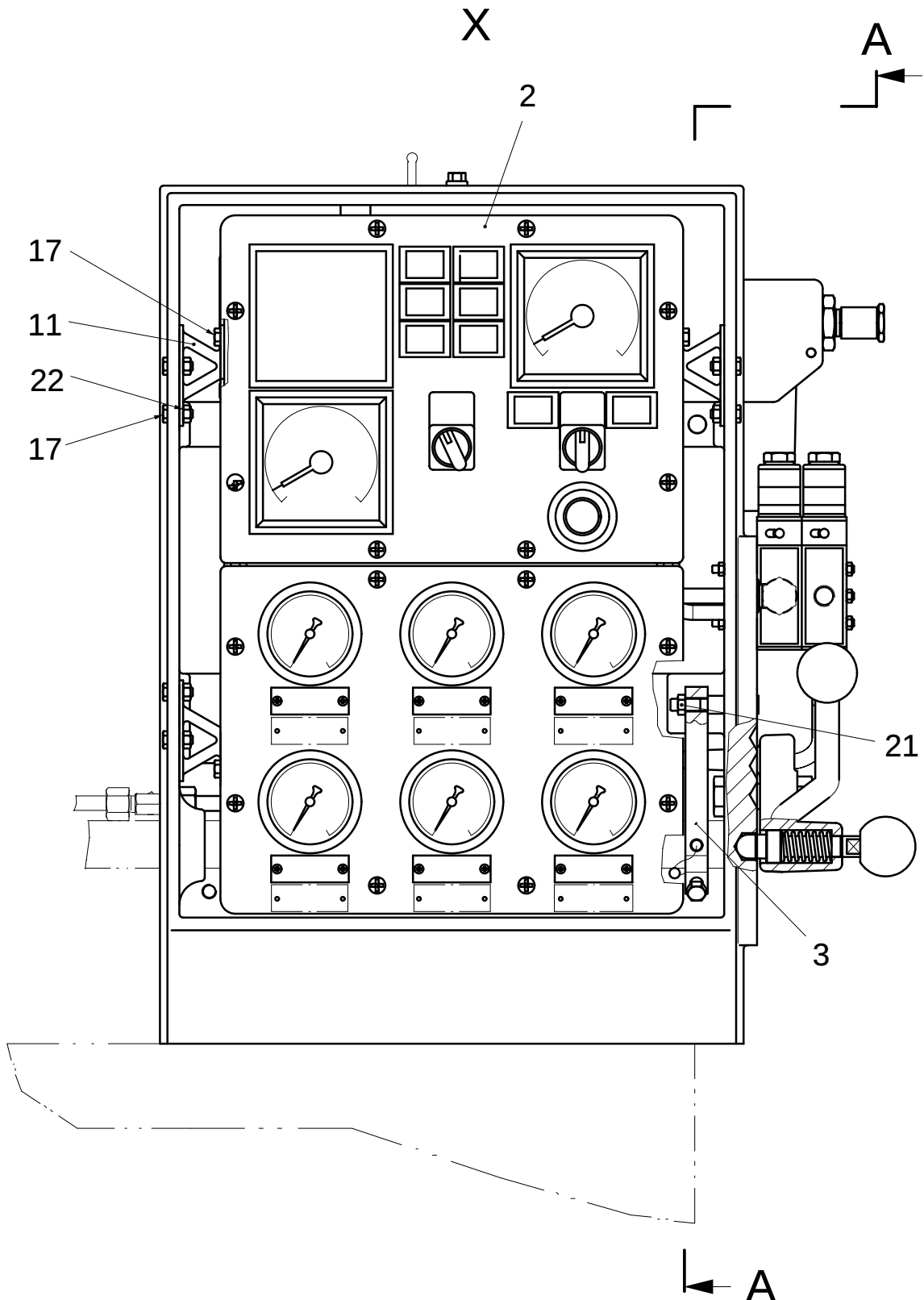
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Control Stand and Gauge Panel Mount.

M25

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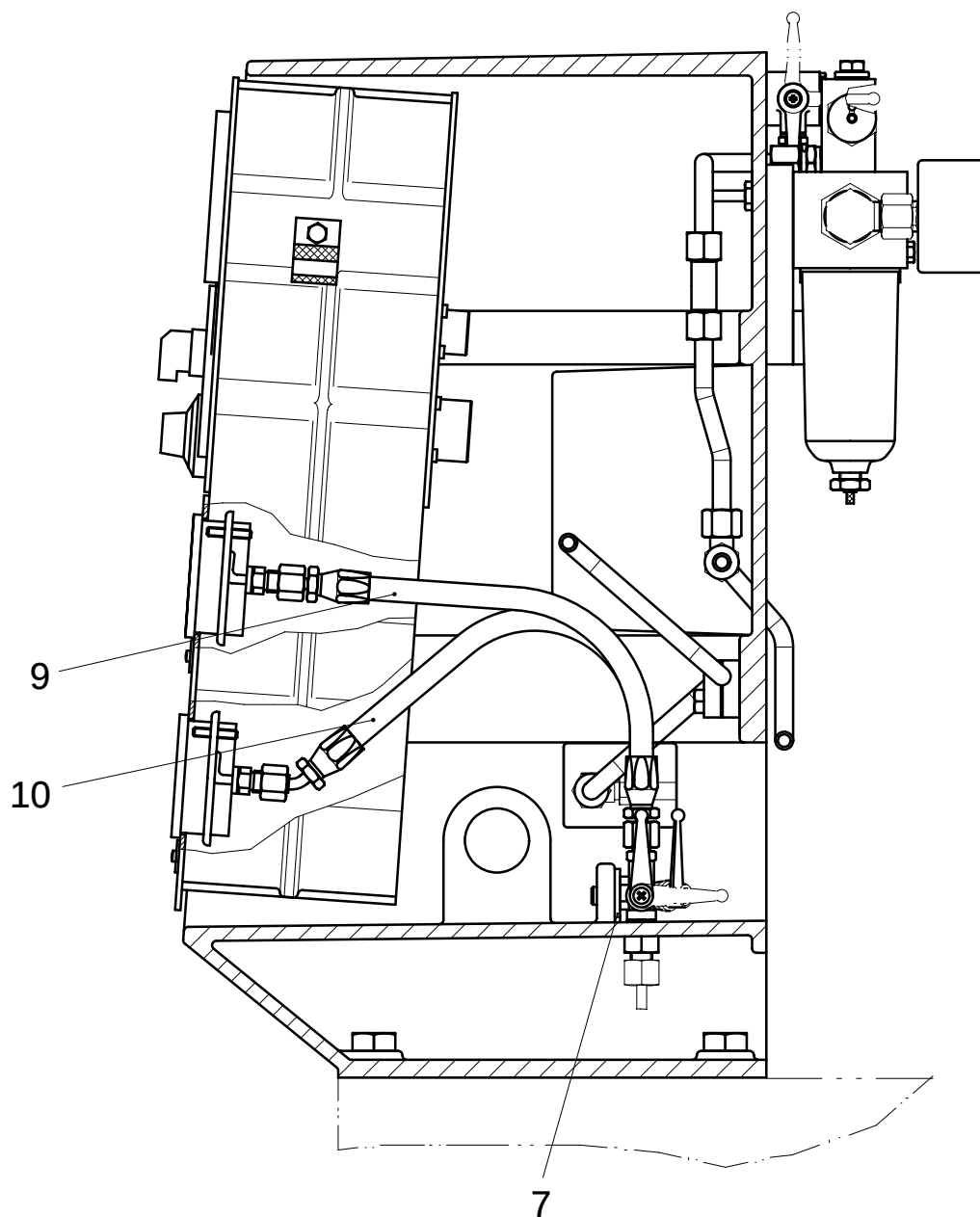


Control Stand and Gauge Panel Mount.

M25

05

A-A



Control Stand

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	BEDIENSTAND, VOLLST. CONTROL STAND ASSEMBLY	1	254523 AA
1	BEDIENSTAND CONTROL STAND	1	254523-001
2	HEBEL LEVER	1	9.4523-008
3	HALTER BRACKET	1	254523-003
4	LUFTVERTEILER AIR DISTRIBUTOR	1	2.4523-020
5	HALTER BRACKET	1	9.4523-106
6	ZWISCHENPLATTE INTERMEDIATE PLATE	1	9.4250-008
7	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254523-007
8	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254523-008
9	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254523-009
10	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254523-010
11	FÜHRUNGSSTIFT PIN	1	6.4250-004
12	DRUCKFEDER COMPRESSION SPRING	1	1.4250-005
13	DRUCKLUFTFILTER, VOLLST. COMPRESSED-AIR FILTER, COMPL.	1	SIEHE B1.05.05.1.4900 SEE B1.05.05.1.4900
14	DRUCKMINDERVENTIL, VOLLST. PRESSURE REDUCER, COMPL.	1	SIEHE B1.05.05.1.4902 SEE B1.05.05.1.4902
15	3/2-WEGE MAGNETVENTIL, VOLLST. 3/2-WAY SOLENOID VALVE, COMPL.	1	SIEHE B1.05.05.1.4914 SEE B1.05.05.1.4914
16	SICHERHEITSVENTIL RELIEF VALVE	1	1.4918-102
17	DRUCKWÄCHTER PRESSURE SWITCH	1	2.4523-014
18	POSITIONSSCHALTER SWITCH	1	9.4250-017
19	KUGELHAHN THREE-WAY BALL VALVE	1	2.4523-078
20	GERÄUSCHDÄMPFER SILENCER	1	2.4523-054

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Control Stand

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	ROHRSCHELLE CLAMP	1	1.5021-040
22	BUCHSE BUSH	1	9.4214-002
23	SCHWENKVERSCHRAUBUNG BANJO	1	1.5093-627
24	SCHWENKVERSCHRAUBUNG BANJO	2	1.5093-959
25	STUTZEN MALE CONNECTOR	1	1.5094-242
26	STUTZEN CONNECTION UNION	1	1.5096-862
27	STUTZEN MALE CONNECTOR	2	1.5094-140
28	T-REDUZIERUNG UNION TEE	1	1.5098-007
29	STUTZEN ADJUSTABLE ELBOW	1	1.5093-241
30	ÜBERGANGSDOPPELNIPPEL DOUBLE NIPPLE	1	1.5106-205
31	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-803
32	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-606
33	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-807
34	BUNDSCHRAUBE COLLAR SCREW	1	2.4523-021
35	DICHTKANTENRING JOINT RING	1	1.7043-204
36	DICHTKANTENRING JOINT RING	1	1.7043-257
37	PASSSCHRAUBE HEXAGON FIT BOLT	1	1.1330-106
38	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-380
40	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-311
41	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-181
42	SECHSKANTSCHRAUBE HEXAGON BOLT	3	1.1372-146

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Control Stand

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
43	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-215
44	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	2	1.1133-192
45	SECHSKANTMUTTER HEXAGON NUT	3	1.2007-031
46	SECHSKANTMUTTER HEXAGON THIN NUT	1	1.2017-219
47	DICHTRING JOINT RING	# 2	1.7010-133
48	DICHTRING JOINT RING	# 2	1.7010-083
49	DICHTRING JOINT RING	# 2	1.7010-064
50	DICHTRING JOINT RING	# 4	1.7010-027
56	KUGELKNOPF BALL KNOB	1	1.3067-265
57	ÜBERGANGSNIPPEL ADAPTER	1	1.5105-202
58	GEWINDESTIFT GRUB SCREW	1	254523-056
60	DRUCKMESSGERÄT PRESSURE GAUGE	1	9.4523-269

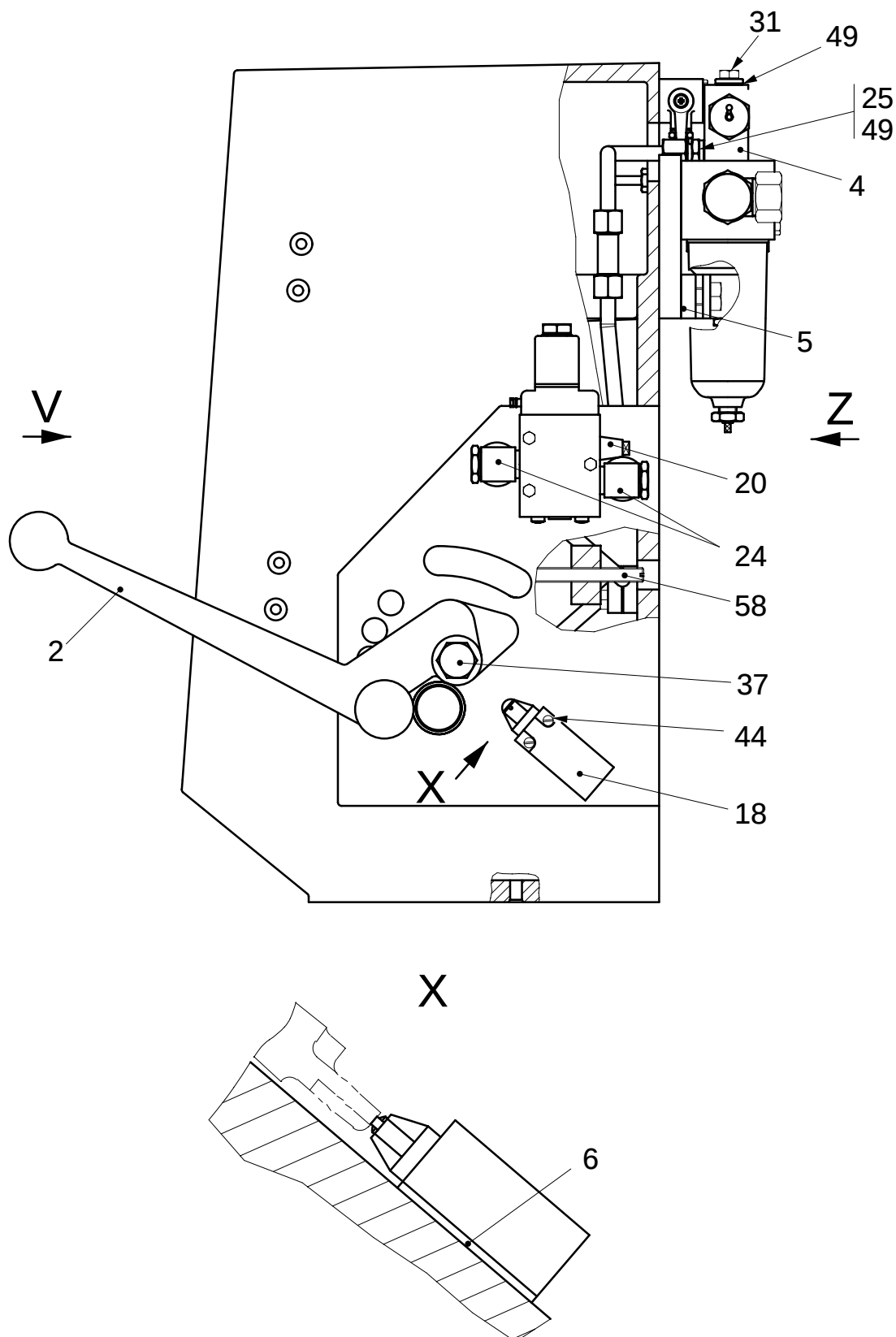
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Control Stand

M25

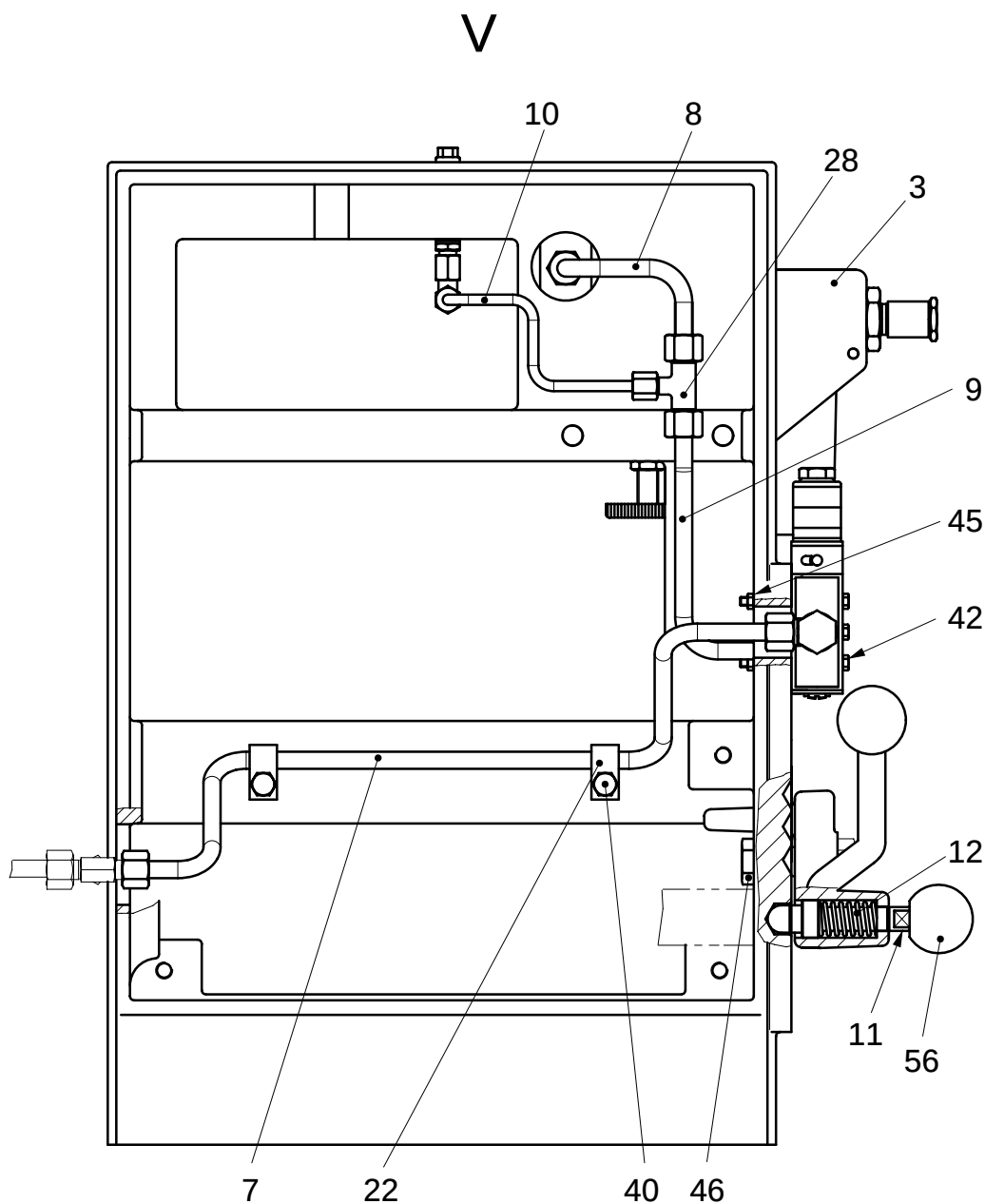
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Control Stand

M25

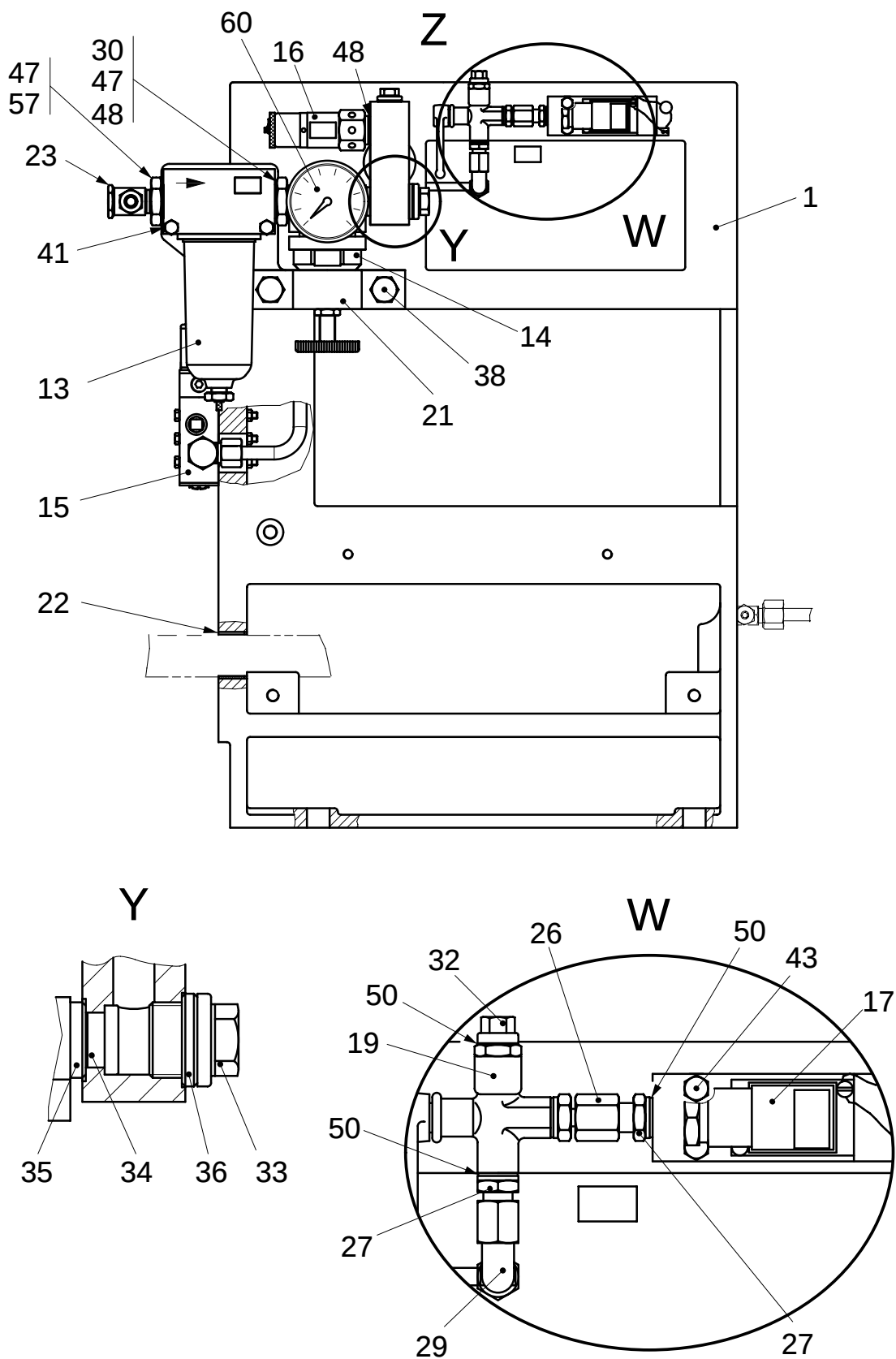
05



Control Stand

M25

05



Control Stand

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	BEDIENSTAND, VOLLST. CONTROL STAND ASSEMBLY	1	254523 BB
1	BEDIENSTAND CONTROL STAND	1	254523-001
2	HEBEL SEGMENT LEVER SEGMENT	1	2.4523-011
3	HALTER BRACKET	1	254523-003
4	LUFTVERTEILER AIR DISTRIBUTOR	1	2.4523-020
5	HALTER BRACKET	1	9.4523-106
7	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254523-007
8	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254523-008
9	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254523-009
10	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254523-010
13	DRUCKLUFTFILTER, VOLLST. COMPRESSED-AIR FILTER, COMPL.	1	SIEHE B1.05.05.1.4900 SEE B1.05.05.1.4900
14	DRUCKMINDERVENTIL, VOLLST. PRESSURE REDUCER, COMPL.	1	SIEHE B1.05.05.1.4902 SEE B1.05.05.1.4902
15	3/2-WEGE MAGNETVENTIL, VOLLST. 3/2-WAY SOLENOID VALVE, COMPL.	1	SIEHE B1.05.05.1.4914 SEE B1.05.05.1.4914
16	SICHERHEITSVENTIL RELIEF VALVE	1	1.4918-102
17	DRUCKWÄCHTER PRESSURE SWITCH	1	2.4523-014
19	KUGELHAHN THREE-WAY BALL VALVE	1	2.4523-078
20	GERÄUSCHDÄMPFER SILENCER	1	2.4523-054
21	ROHRSCHELLE CLAMP	1	1.5021-040
22	BUCHSE BUSH	1	9.4214-002
23	SCHWENKVERSCHRAUBUNG BANJO	1	1.5093-627
24	SCHWENKVERSCHRAUBUNG BANJO	2	1.5093-959

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Stand

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
25	STUTZEN MALE CONNECTOR	1	1.5094-242
26	STUTZEN CONNECTION UNION	1	1.5096-862
27	STUTZEN MALE CONNECTOR	2	1.5094-140
28	T-REDUZIERUNG UNION TEE	1	1.5098-007
29	STUTZEN ADJUSTABLE ELBOW	1	1.5093-241
30	ÜBERGANGSDOPPELNIPPEL DOUBLE NIPPLE	1	1.5106-205
31	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-803
32	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-606
33	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-807
34	BUNDSCHRAUBE COLLAR SCREW	1	2.4523-021
35	DICHTKANTENRING JOINT RING	1	1.7043-204
36	DICHTKANTENRING JOINT RING	1	1.7043-257
37	PASSSCHRAUBE HEXAGON FIT BOLT	1	1.1330-106
38	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-380
39	ROHRKLEMME CLAMP	4	1.5011-002
40	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-311
41	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-181
42	SECHSKANTSCHRAUBE HEXAGON BOLT	3	1.1372-146
43	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-215
45	SECHSKANTMUTTER HEXAGON NUT	3	1.2007-031
46	SECHSKANTMUTTER HEXAGON THIN NUT	1	1.2017-219

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Stand

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
47	DICHTRING JOINT RING	# 2	1.7010-133
48	DICHTRING JOINT RING	# 2	1.7010-083
49	DICHTRING JOINT RING	# 2	1.7010-064
50	DICHTRING JOINT RING	# 4	1.7010-027
56	RASTBOLZEN STOP BOLT	1	1.0272-041
57	ÜBERGANGSNIPPEL ADAPTER	1	1.5105-202
58	GEWINDESTIFT GRUB SCREW	1	254523-056
60	DRUCKMESSGERÄT PRESSURE GAUGE	1	2.4523-073

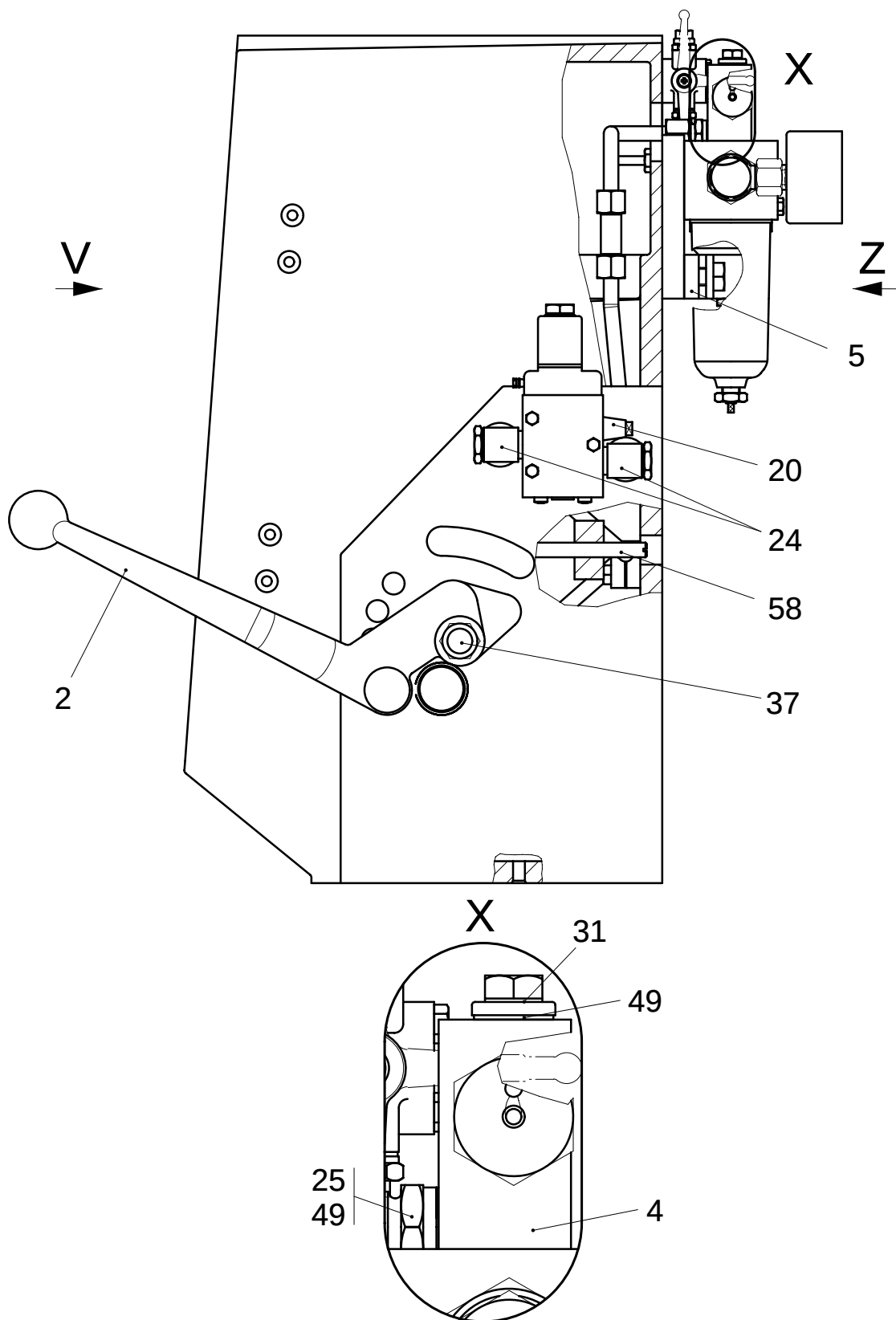
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Stand

M25

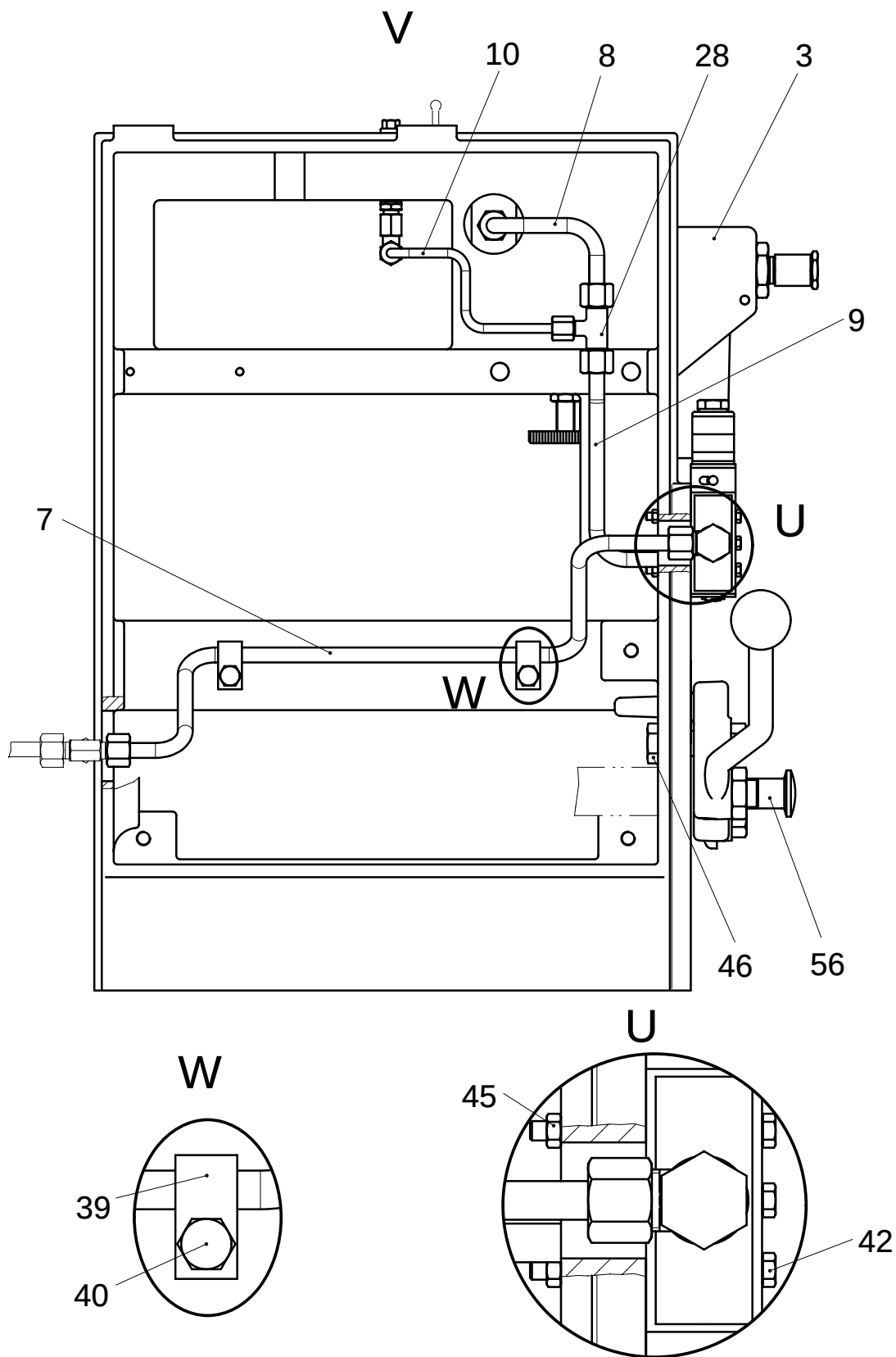
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Control Stand

M25

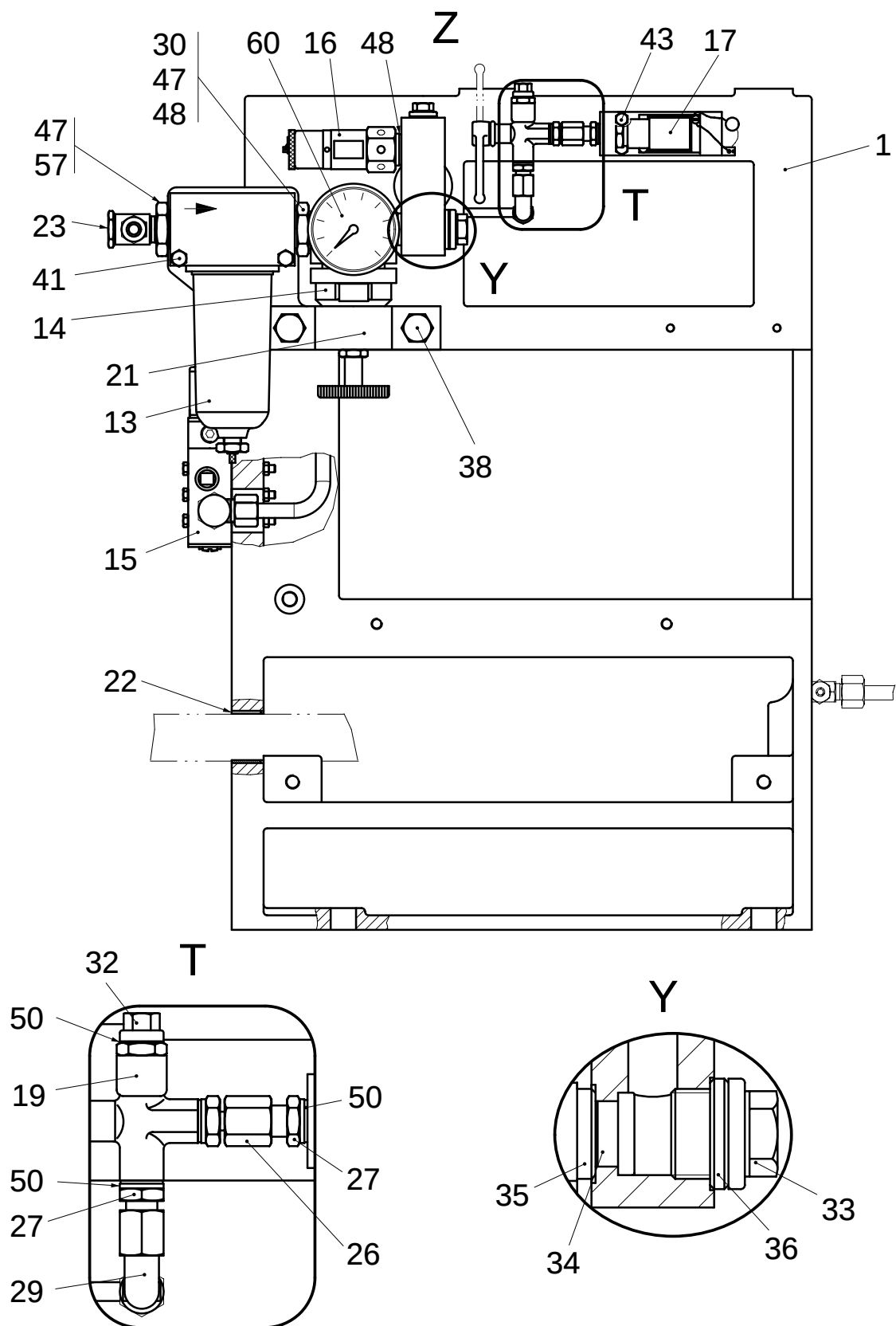
05



Control Stand

M25

05



Control Stand

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	BEDIENSTAND, VOLLST. CONTROL STAND ASSEMBLY	1	254523 CC
1	BEDIENSTAND CONTROL STAND	1	254523-001
2	HEBELSEGMENT LEVER SEGMENT	1	2.4523-011
3	HALTER BRACKET	1	254523-003
4	LUFTVERTEILER AIR DISTRIBUTOR	1	2.4523-020
5	HALTER BRACKET	1	9.4523-106
7	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254523-007
8	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254523-008
9	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254523-109
10	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254523-010
11	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254523-011
12	STEUERLEITUNG, VOLLST. CONTROL PIPE, COMPL.	1	254523-012
13	DRUCKLUFTFILTER, VOLLST. COMPRESSED-AIR FILTER, COMPL.	1	SIEHE B1.05.05.1.4900 SEE B1.05.05.1.4900
14	DRUCKMINDERVENTIL, VOLLST. PRESSURE REDUCER, COMPL.	1	SIEHE B1.05.05.1.4902 SEE B1.05.05.1.4902
15	3/2-WEGE MAGNETVENTIL, VOLLST. 3/2-WAY SOLENOID VALVE, COMPL.	1	SIEHE B1.05.05.1.4914 SEE B1.05.05.1.4914
16	SICHERHEITSVENTIL RELIEF VALVE	1	1.4918-102
17	DRUCKWÄCHTER PRESSURE SWITCH	1	2.4523-014
18	STUTZEN MALE CONNECTOR	1	1.5095-442
19	KUGELHAHN THREE-WAY BALL VALVE	1	2.4523-078
20	GERÄUSCHDÄMPFER SILENCER	2	2.4523-054
21	ROHRSCHELLE CLAMP	1	1.5021-040

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Stand

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
22	BUCHSE BUSH	1	9.4214-002
23	SCHWENKVERSCHRAUBUNG BANJO	1	1.5093-627
24	SCHWENKVERSCHRAUBUNG BANJO	3	1.5098-820
25	STUTZEN MALE CONNECTOR	1	1.5094-242
26	STUTZEN CONNECTION UNION	1	1.5096-862
27	STUTZEN MALE CONNECTOR	2	1.5094-140
28	T-REDUZIERUNG UNION TEE	1	1.5098-007
29	STUTZEN ADJUSTABLE ELBOW	1	1.5093-241
30	ÜBERGANGSDOPPELNIPPEL DOUBLE NIPPLE	1	1.5106-205
31	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-803
32	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-606
33	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-807
34	BUNDSCHRAUBE COLLAR SCREW	1	2.4523-021
35	DICHTKANTENRING JOINT RING	1	1.7043-204
36	DICHTKANTENRING JOINT RING	1	1.7043-257
37	PASSSCHRAUBE HEXAGON FIT BOLT	1	1.1330-106
38	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-380
39	ROHRKLEMME CLAMP	6	1.5011-002
40	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-311
41	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-181
42	GEWINDEBOLZEN THREADED BOLT	3	1.0017-030

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Stand

M25

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
43	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-215
45	SECHSKANTMUTTER HEXAGON NUT	6	1.2007-031
46	SECHSKANTMUTTER HEXAGON THIN NUT	1	1.2017-219
47	DICHTRING JOINT RING	# 2	1.7010-133
48	DICHTRING JOINT RING	# 2	1.7010-083
49	DICHTRING JOINT RING	# 2	1.7010-064
50	DICHTRING JOINT RING	# 4	1.7010-027
56	RASTBOLZEN STOP BOLT	1	1.0272-041
57	ÜBERGANGSNIPPEL ADAPTER	1	1.5105-202
58	GEWINDESTIFT GRUB SCREW	1	254523-056
60	DRUCKMESSGERÄT PRESSURE GAUGE	1	2.4523-073

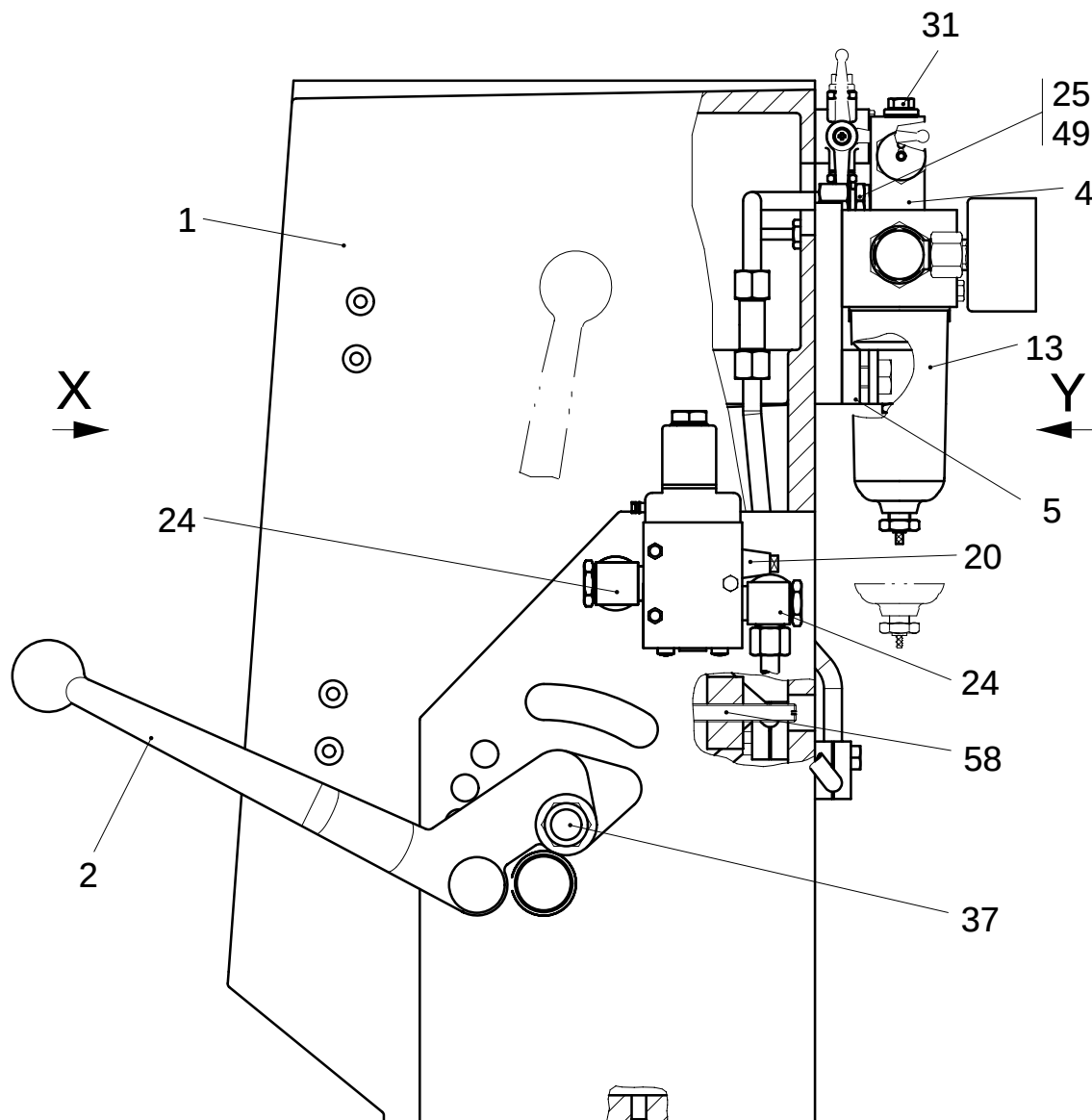
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Stand

M25

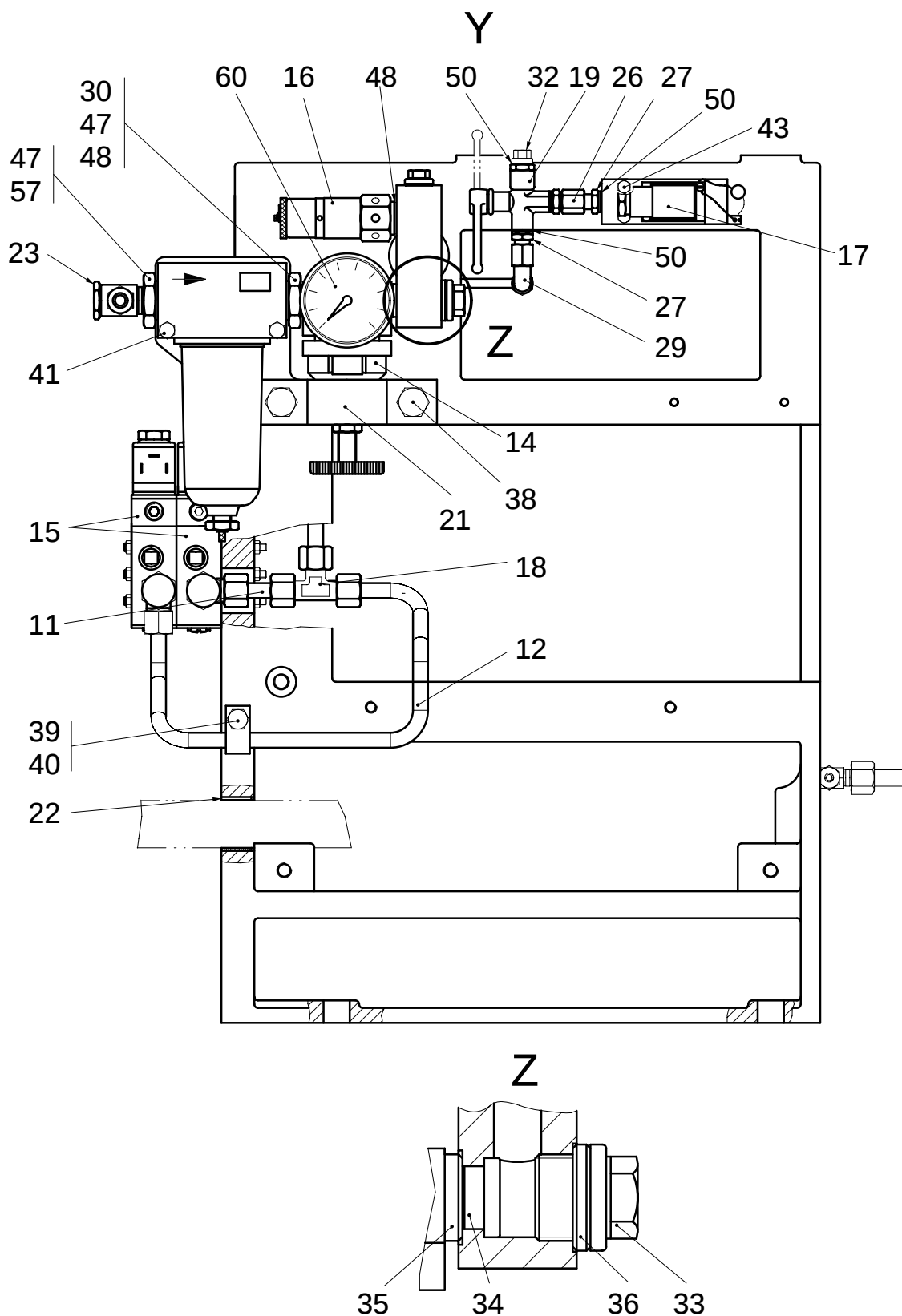
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Control Stand

M25

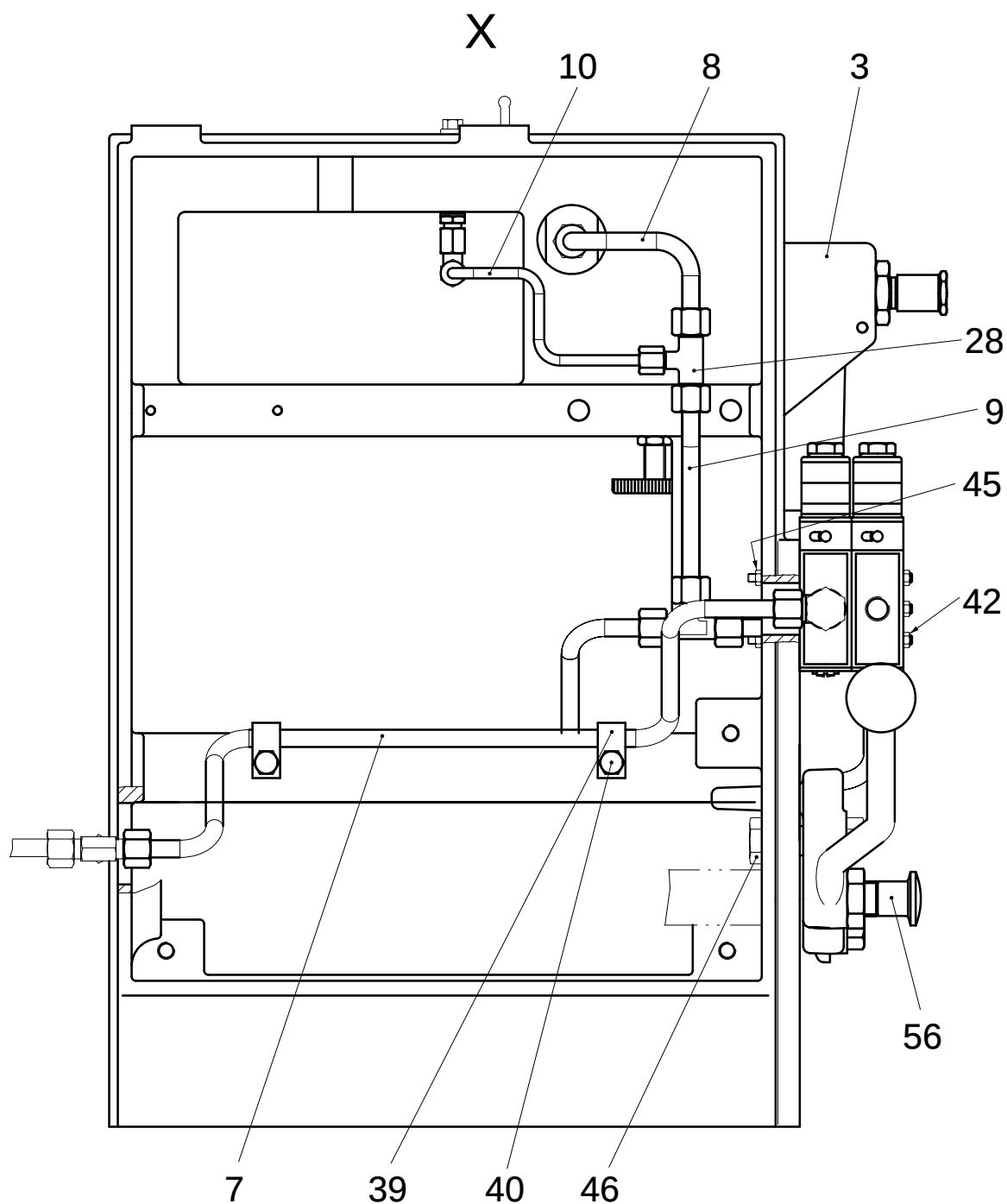
05



Control Stand

M25

05



Compressed-Air Filter

M20-M601C

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
10.0	DRUCKLUFTFILTER, VOLLST. COMPRESSED-AIR FILTER ASSEMBLY	1	1.4900 HH	
10.0-1	O-RING O-RING	* 1		
10.0-2	FILTERELEMENT FILTER ELEMENT	* 1		
10.0-3	O-RING O-RING	* 1		

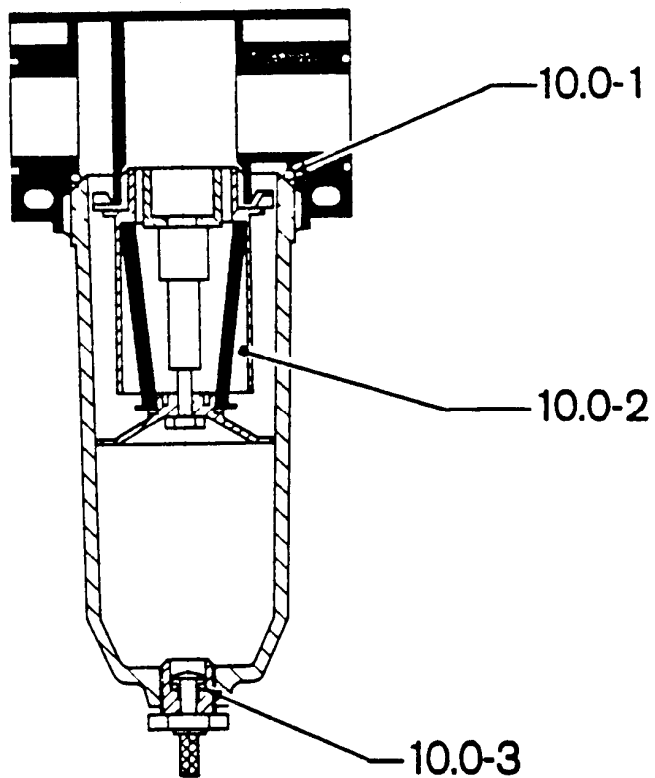
* = E-PÄCKCHEN, NUR VOLLST. # 1 1.4900-908
 (BEI REPARATUR KOMPLETT AUSWECHSLEN)
 COMPLETE SET OF SPARE PARTS
 (RENEW THESE PARTS ON REPAIR)

= VERBRAUCHSTEILE
 CONSUMED PARTS

05

Compressed-Air Filter

M20-M601C

05

Pressure Reducer

M20-M601C

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
10.0	DRUCKMINDERER, VOLLST. PRESSURE REDUCER ASSEMBLY	1	1.4902 AA	
10.0-1	KEGEL, VOLLST. VALVE ASSEMBLY	* 1		
10.0-2	MEMBRANE, VOLLST. DIAPHRAGM ASSEMBLY	* 1		
10.0-3	DICHTUNGSRING JOINT RING	* 1		
10.0-4	DICHTUNG JOINT RING	* 2		
10.0-5	O-RING O-RING	* 1		

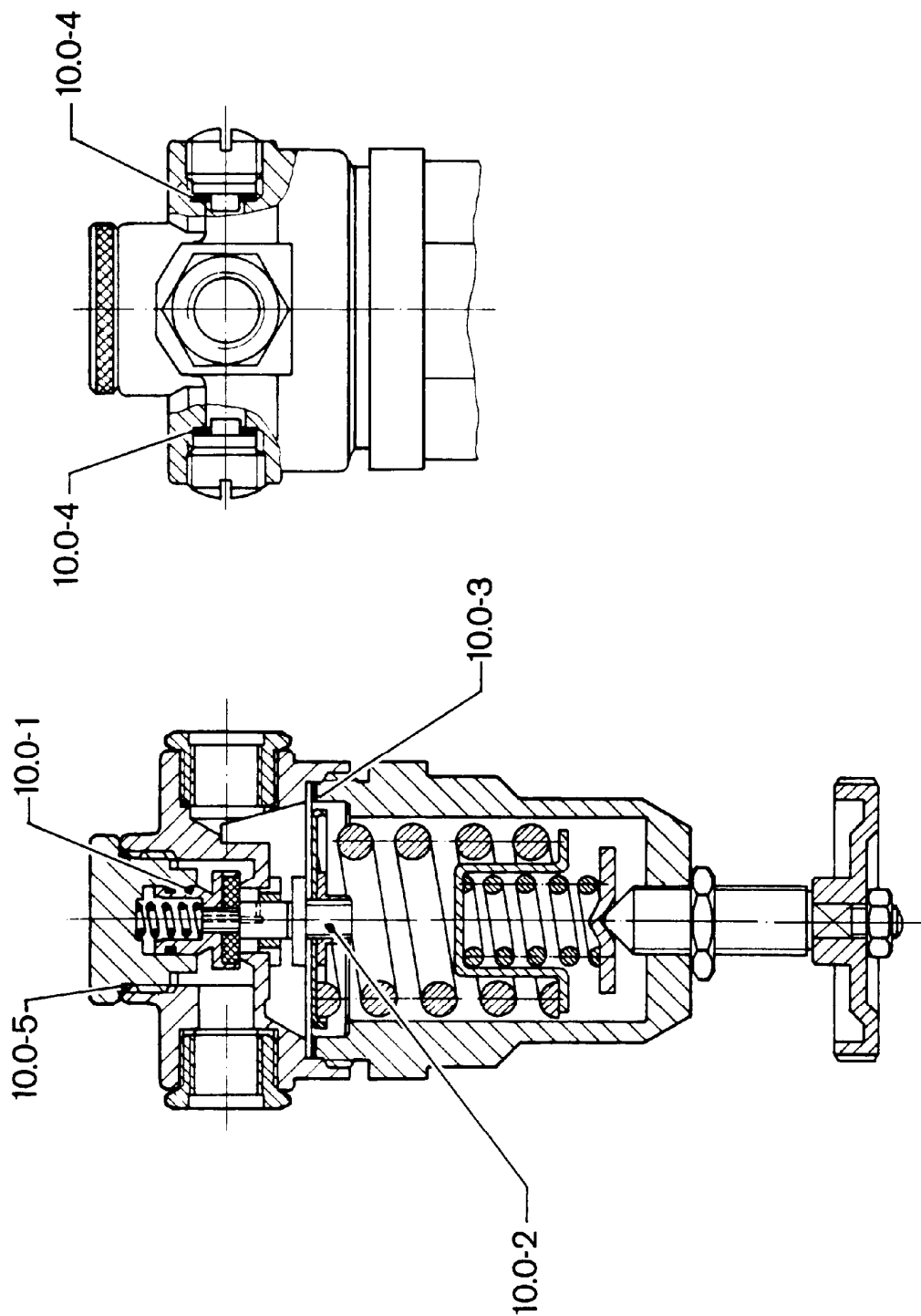
* = E-PÄCKCHEN, NUR VOLLST. # 1 1.4902-901
 (BEI REPARATUR KOMPLETT AUSWECHSLEN)
 COMPLETE SET OF SPARE PARTS
 (RENEW THESE PARTS ON REPAIR)

= VERBRAUCHSTEILE
 CONSUMABLES

Pressure Reducer

M20-M601C

05



3/2 Way Valve

M25/M32/
M453C

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
-	3/2 WEGEVENTIL, VOLLST. 3/2 WAY VALVE ASSEMBLY	1	1.4906 ZK	
1	ANKER ARMATURE	* 1		
2	O-RING O-RING	* 1		
3	O-RING O-RING	* 1		
4	VENTIL VALVE	* 1		
5	O-RING O-RING	* 2		
6	O-RING O-RING	* 2		
7	O-RING O-RING	* 1		
8	O-RING O-RING	* 1		
9	O-RING O-RING	* 1		
10	FALTENBALG BOOT	* 1		
11	O-RING O-RING	* 1		
12	O-RING O-RING	* 1		
13	O-RING O-RING	* 2		
14	O-RING O-RING	* 1		
15	DICHTRING SEALING RING	* 1		
16	O-RING O-RING	* 2		
17	O-RING O-RING	* 1		
18	O-RING O-RING	* 3		
19	O-RING O-RING	* 2		

3/2 Way Valve

M25/M32/
M453C

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
20	O-RING O-RING	* 1		
21	O-RING O-RING	* 1		
22	MANTELRING JACKET RING	* 1		

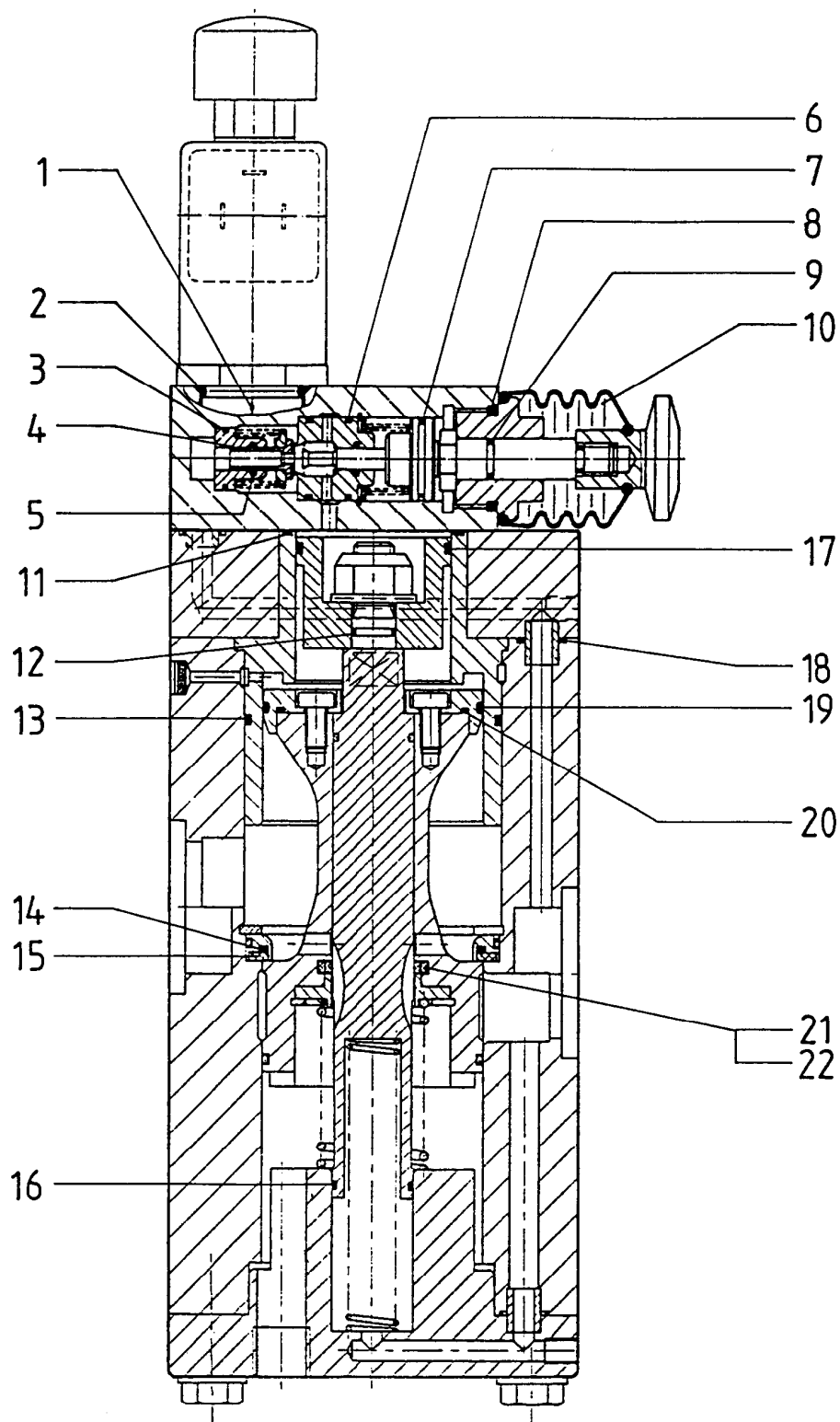
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COMPLETE SET OF SPARE PARTS
(BEI REPARATUR KOMPLETT AUSWECHSELN)
(RENEW THESE PARTS ON REPAIR)

= VERBRAUCHSTEILE
CONSUMED PARTS

3/2 Way Valve

M25/M32/
M453C

05



3/2-Way Valve

M20-M601C

05

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
-	3/2-WEGEVENTIL, VOLLST. 3/2-WAY SOLENOID VALVE ASSEMBLY	1	1.4914 SS	
1	ANKER ARMATURE	* 1		
2	ANKERFÜHRUNG ARMATURE GUIDE	* 1		
3	O-RING O-RING	* 1		
4	O-RING O-RING	* 1		
5	O-RING O-RING	* 1		
6	SCHEIBE WASHER	** 6		
7	DICHTUNG GASKET	** 1		
8	NUTRING SEALING RING	** 2		
9	DICHTRING SEALING RING	** 6		

* = E-PÄCKCHEN, NUR VOLLST. # 1 1.4914-918
COMPLETE SET OF SPARE PARTS

** = E-PÄCKCHEN, NUR VOLLST. # 1 1.4914-916
COMPLETE SET OF SPARE PARTS

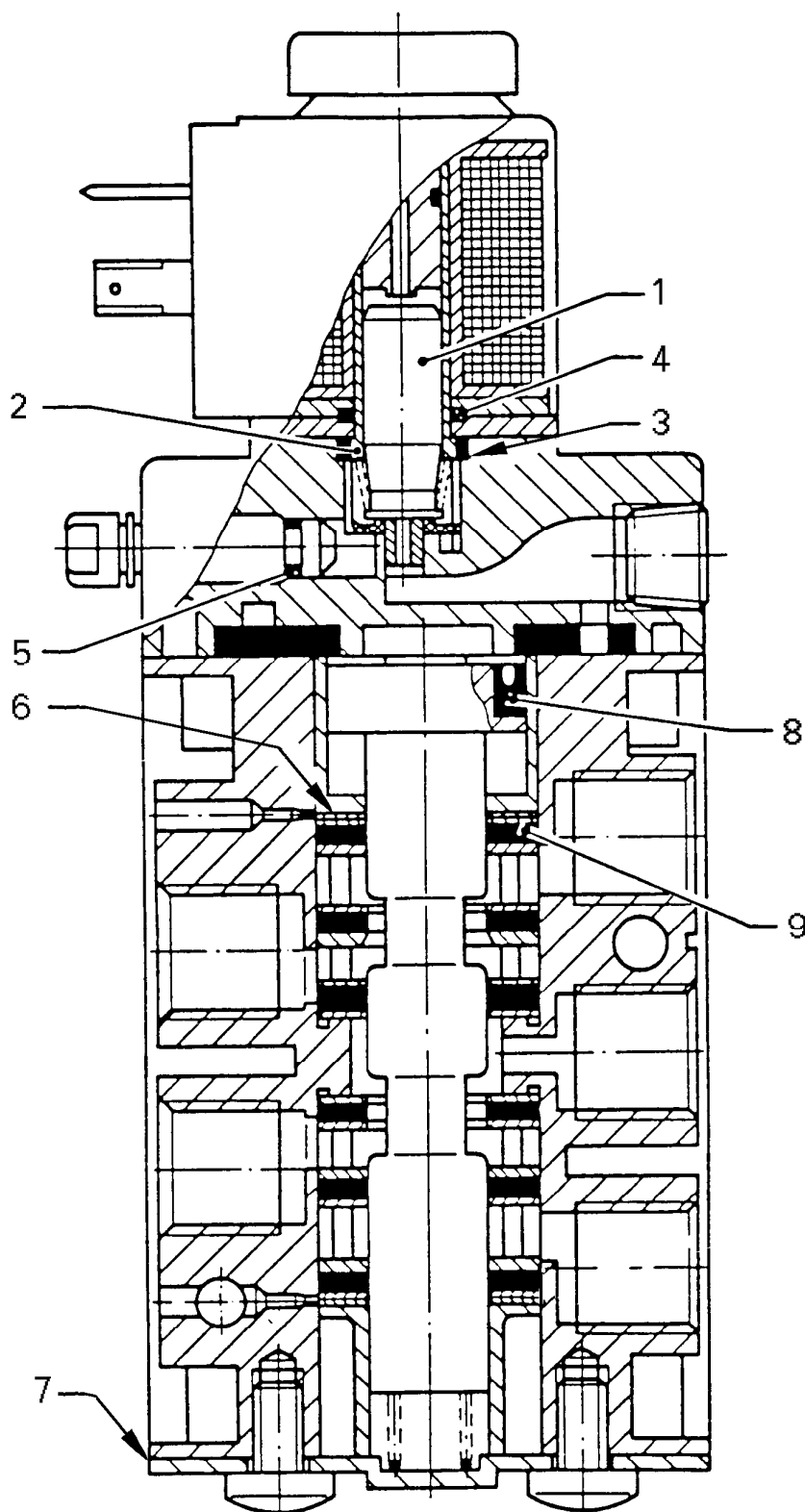
(BEI REPARATUR KOMPLETT AUSWECHSELN)
(RENEW THESE PARTS ON REPAIR)

= VERBRAUCHSTEILE
CONSUMABLES

3/2-Way Valve

M20-M601C

05



Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASLEITUNG-ANBAU, VOLLST. EXHAUST MANIFOLD ASSEMBLY	1	257210 AA
1	ABGASLEITUNG EXHAUST PIPE	3	257210-001
2	ABGASLEITUNG EXHAUST PIPE	3	257210-002
3	ABGASLEITUNG EXHAUST PIPE	1	257210-003
4	ABGASLEITUNG EXHAUST PIPE	1	257210-004
5	ABGASLEITUNG EXHAUST PIPE	2	257210-005
6	VERBINDUNGSLASCHE LINK	4	257210-006
7	VERBINDUNGSLASCHE LINK	4	257260-007
8	HALTER BRACKET	1	257210-008
9	HALTERUNG BRACKET	4	257210-009
10	HALTER BRACKET	6	257210-010
11	VERBINDUNGSLASCHE LINK	6	257260-011
14	DICHTUNG GASKET	# 6	257210-014
15	DICHTUNG GASKET	# 6	257210-015
16	BLINDFLANSCH BLANK FLANGE	2	257210-016
17	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	4	257210-017
18	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	2	257210-018
19	SECHSKANTMUTTER HEXAGON NUT	140	1.7260-012
22	DEHNHÜLSE EXTENSION BUSH	2	1.0502-068
23	DEHNHÜLSE EXTENSION BUSH	4	1.0502-077
25	DEHNHÜLSE EXTENSION BUSH	120	1.0502-164

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Exhaust Manifold Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
26	SCHEIBE WASHER	194	1.1200-016
27	DICHTRING JOINT RING	# 10	1.7010-133
28	SECHSKANTMUTTER HEXAGON NUT	6	1.2007-038
29	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	10	1.1041-609
30	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-444
32	SECHSKANTSCHRAUBE HEXAGON BOLT	16	1.1367-378
33	SECHSKANTSCHRAUBE HEXAGON BOLT	6	257210-034
34	SECHSKANTSCHRAUBE HEXAGON BOLT	56	257210-035
35	SECHSKANTSCHRAUBE HEXAGON BOLT	62	9.7260-028
36	SECHSKANTSCHRAUBE HEXAGON BOLT	8	257210-151
37	SECHSKANTSCHRAUBE HEXAGON BOLT	4	9.7260-029
38	SECHSKANTSCHRAUBE HEXAGON BOLT	12	257210-038
40	BUNDBUCHSE COLLAR BUSH	30	9.7220-026
41	RINGLAGER ELASTIC RING BEARING	30	9.7220-030
43	SECHSKANTSCHRAUBE HEXAGON BOLT	15	1.1367-309
44	SECHSKANTMUTTER HEXAGON NUT	15	1.2007-036

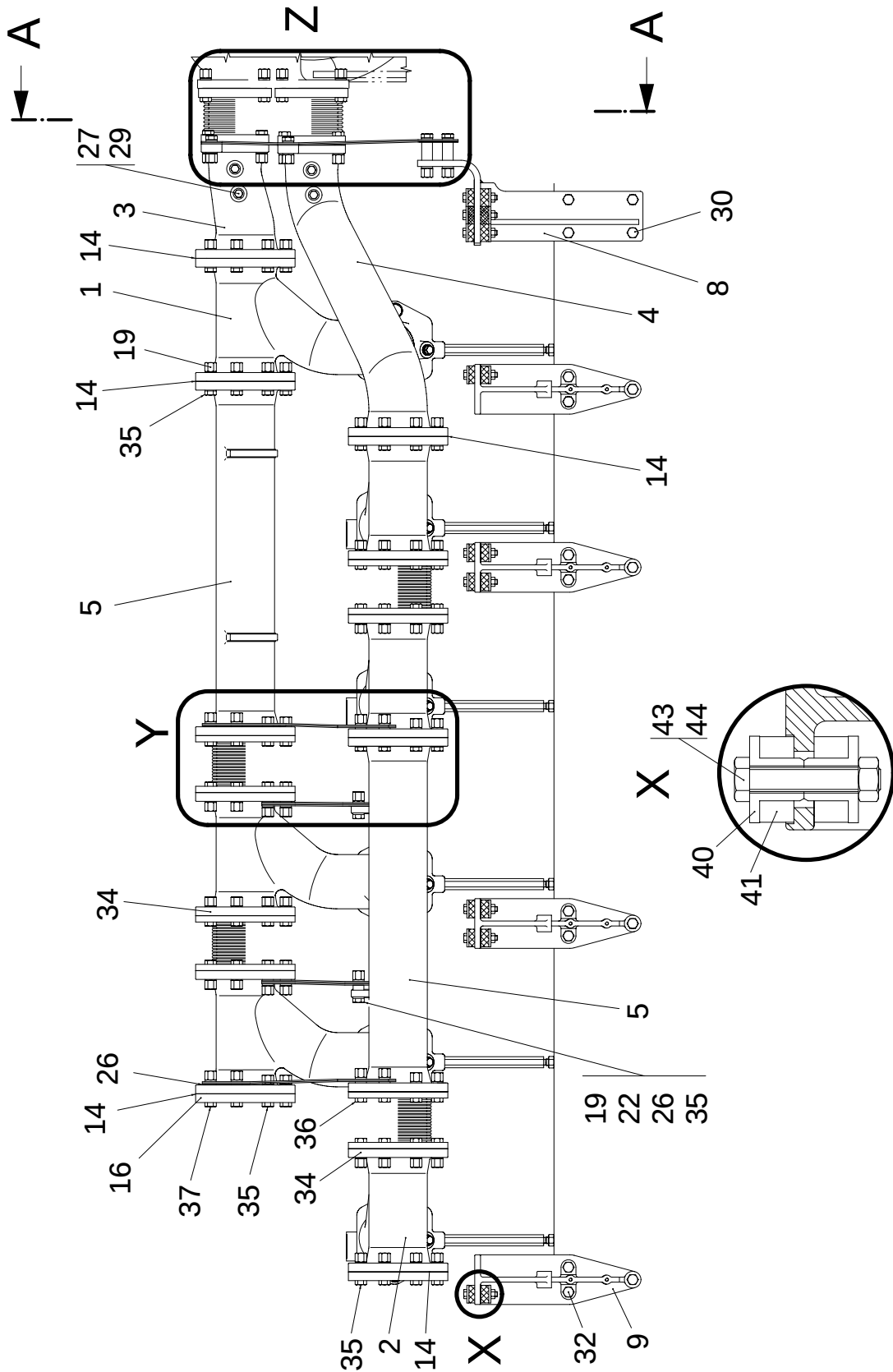
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Exhaust Manifold Mounting

M25

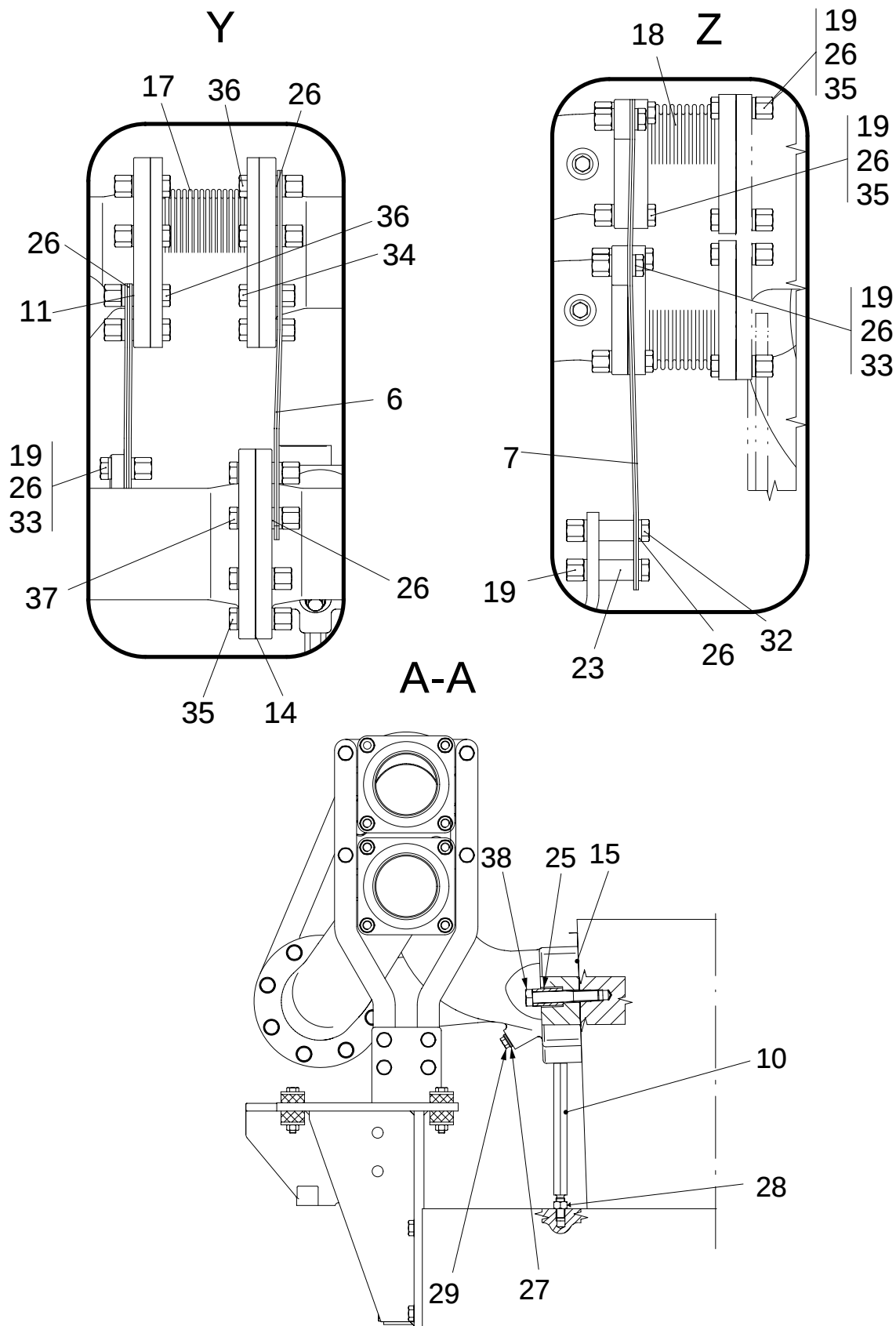
06



Exhaust Manifold Mounting

M25

06



Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASLEITUNG-ANBAU, VOLLST. EXHAUST MANIFOLD ASSEMBLY	1	257210 BB
1	KONVERTER CONVERTER	1	257210-101
2	ABGASLEITUNG EXHAUST PIPE	1	257210-102
3	ABGASLEITUNG EXHAUST PIPE	1	257210-002
4	ABGASLEITUNG EXHAUST PIPE	2	257210-104
5	ABGASLEITUNG EXHAUST PIPE	2	257210-105
6	ABGASLEITUNG EXHAUST PIPE	2	257210-001
7	ABGASLEITUNG EXHAUST PIPE	1	257210-107
8	ABGASLEITUNG EXHAUST PIPE	4	257210-005
9	ABGASLEITUNG EXHAUST PIPE	1	257210-109
10	ABGASLEITUNG EXHAUST PIPE	1	257210-110
11	ABGASLEITUNG EXHAUST PIPE	1	257210-111
12	HALTER BRACKET	1	257210-112
13	HALTER BRACKET	1	257210-113
14	HALTERUNG BRACKET	6	257210-114
15	HALTER BRACKET	3	257210-115
16	HALTER BRACKET	8	257210-010
17	VERBINDUNGSLASCHE LINK	6	257210-117
18	VERBINDUNGSLASCHE LINK	3	257210-118
19	VERBINDUNGSLASCHE LINK	3	257210-119
20	VERBINDUNGSLASCHE LINK	3	257260-120

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	VERBINDUNGSLASCHE LINK	3	257210-121
23	VERBINDUNGSLASCHE LINK	3	257210-123
24	VERBINDUNGSLASCHE LINK	6	257210-124
25	VERBINDUNGSLASCHE LINK	3	257210-125
26	VERBINDUNGSLASCHE LINK	3	257210-126
27	VERBINDUNGSLASCHE LINK	6	257210-127
28	VERBINDUNGSLASCHE LINK	3	257210-128
29	VERBINDUNGSLASCHE LINK	3	257210-129
30	DICHTUNG GASKET	# 12	257210-014
31	DICHTUNG GASKET	# 8	257210-015
32	BLINDFLANSCH BLANK FLANGE	4	257210-016
33	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	1	257210-018
34	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	8	257210-017
35	SECHSKANTMUTTER HEXAGON NUT	264	1.7260-012
36	SICHERUNGSMUTTER LOCKING HEXAGON NUT	12	1.2021-213
37	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-038
38	SCHEIBE WASHER	232	1.1200-016
39	DEHNHÜLSE EXTENSION BUSH	10	1.0502-068
40	DEHNHÜLSE EXTENSION BUSH	19	1.0502-074
41	DEHNHÜLSE EXTENSION BUSH	16	1.0502-073
42	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	9	1.1041-609

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
43	DICHTRING JOINT RING	# 9	1.7010-133
44	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-444
45	SECHSKANTSCHRAUBE HEXAGON BOLT	18	1.1367-378
47	SECHSKANTSCHRAUBE HEXAGON BOLT	26	257210-147
48	SECHSKANTSCHRAUBE HEXAGON BOLT	127	257210-034
49	SCHEIBE WASHER	12	1.6310-014
50	SECHSKANTSCHRAUBE HEXAGON BOLT	82	9.7260-028
51	SECHSKANTSCHRAUBE HEXAGON BOLT	8	257210-151
52	SECHSKANTSCHRAUBE HEXAGON BOLT	15	1.1378-303
53	SECHSKANTSCHRAUBE HEXAGON BOLT	12	1.1378-304
54	SECHSKANTSCHRAUBE HEXAGON BOLT	16	257210-038
55	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1374-375
56	SPANNSCHEIBE CONICAL SPRING WASHER	# 70	1.0068-240
57	VERBINDUNGLASCHE LINK	6	257210-157
58	BUNDBUCHSE COLLAR BUSH	52	9.7220-026
59	RINGLAGER ELASTIC RING BEARING	36	9.7220-030
61	SECHSKANTSCHRAUBE HEXAGON BOLT	18	1.1367-309
62	SECHSKANTMUTTER HEXAGON NUT	18	1.2007-036
63	SECHSKANTSCHRAUBE HEXAGON BOLT	12	257210-035
64	HALTER BRACKET	1	257260-138
65	SCHEIBE WASHER	4	1.0045-129

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
66	DEHNHÜLSE EXTENSION BUSH	2	1.0502-064
67	DEHNHÜLSE EXTENSION BUSH	4	1.0502-067
68	SECHSKANTSCHRAUBE HEXAGON BOLT	2	9.7260-133

06

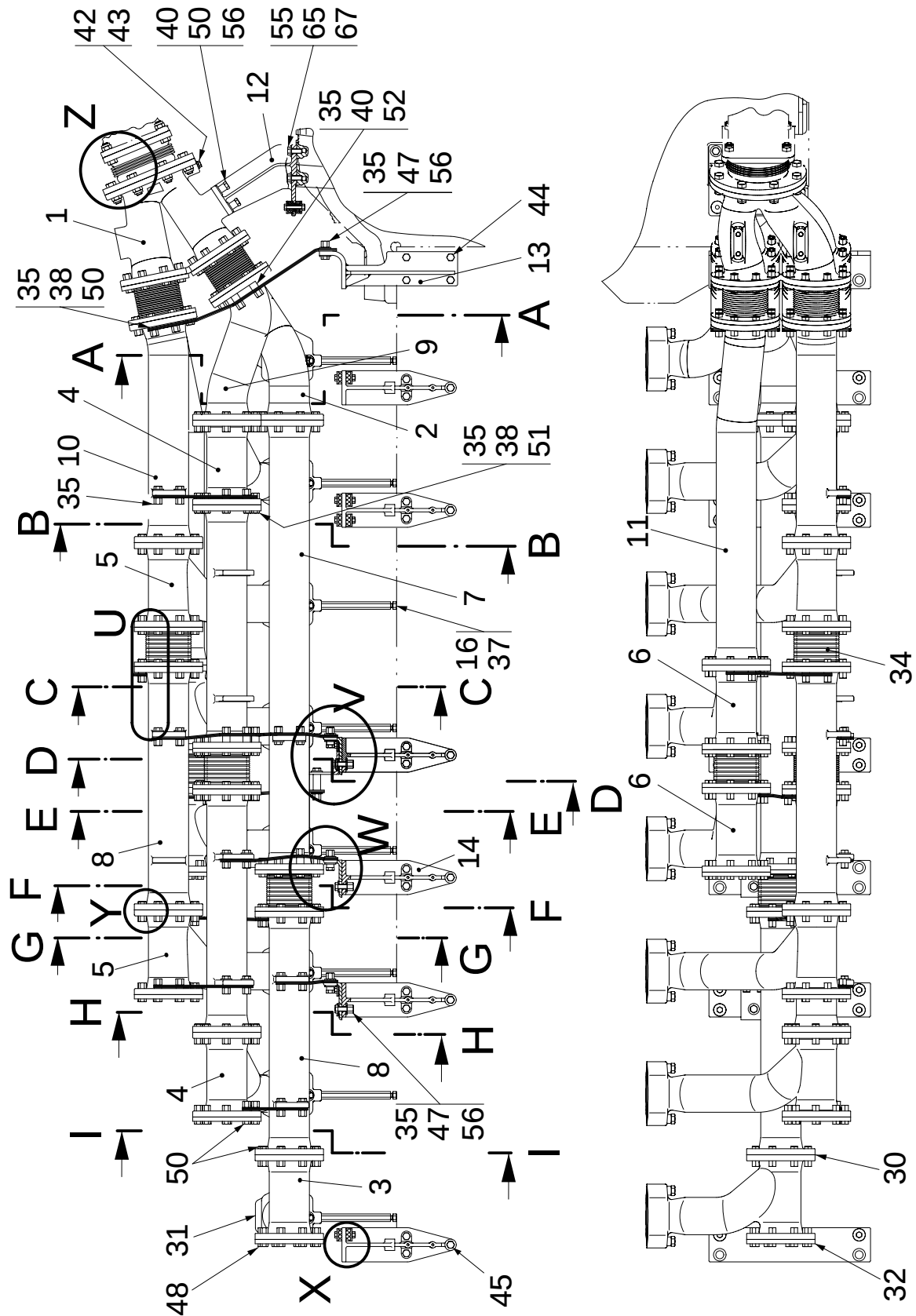
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

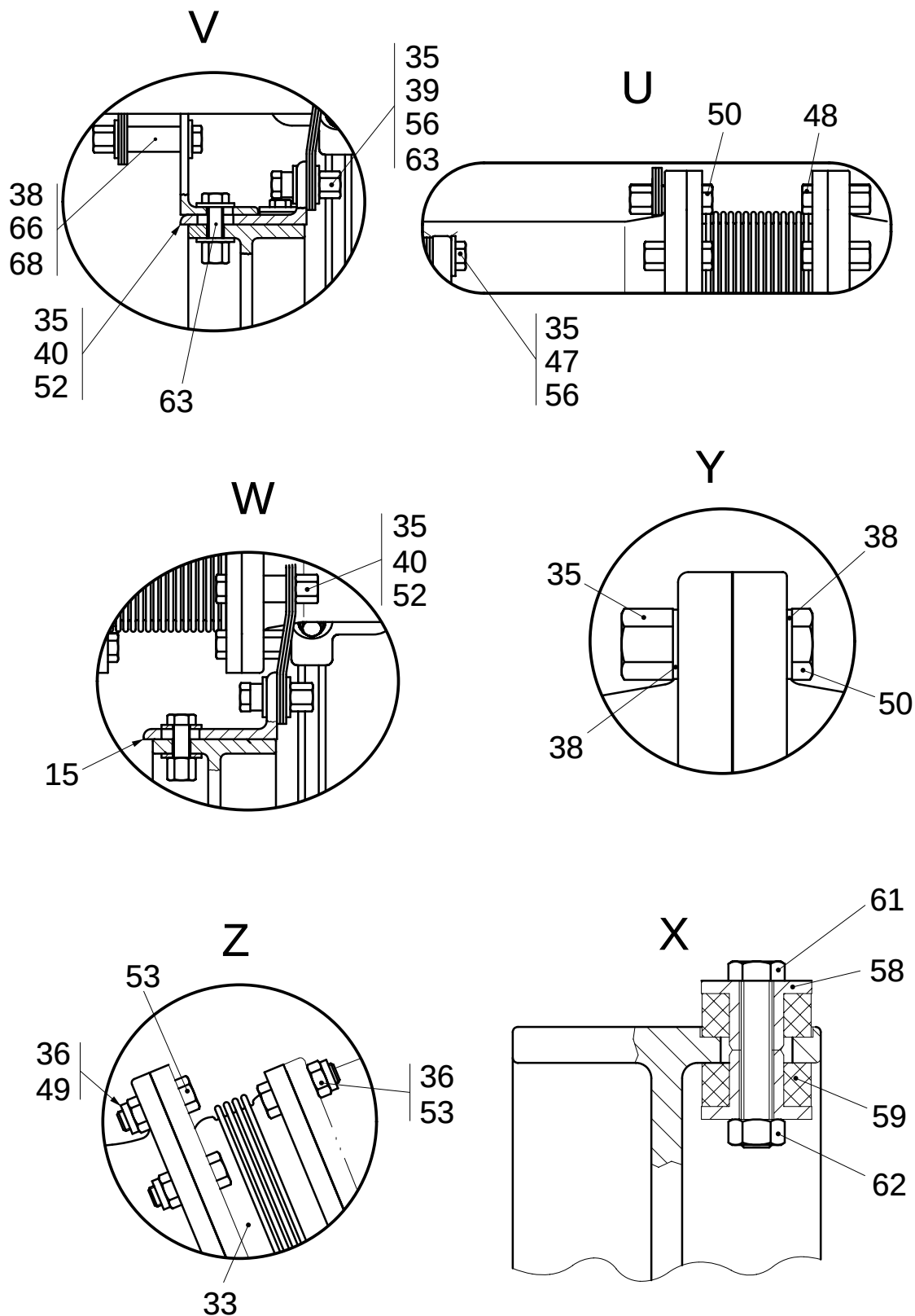
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Exhaust Manifold Mounting

M25

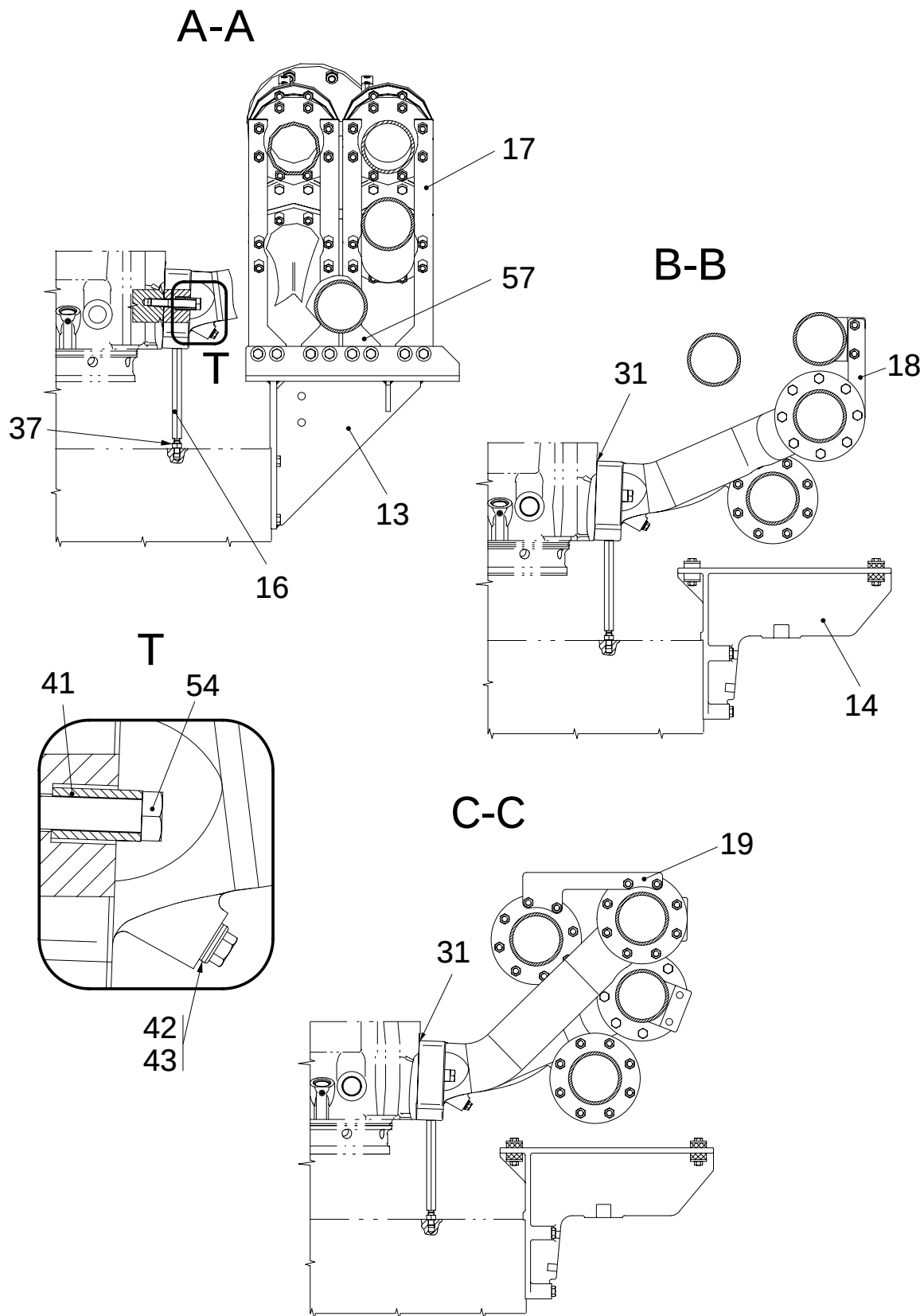
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Exhaust Manifold Mounting

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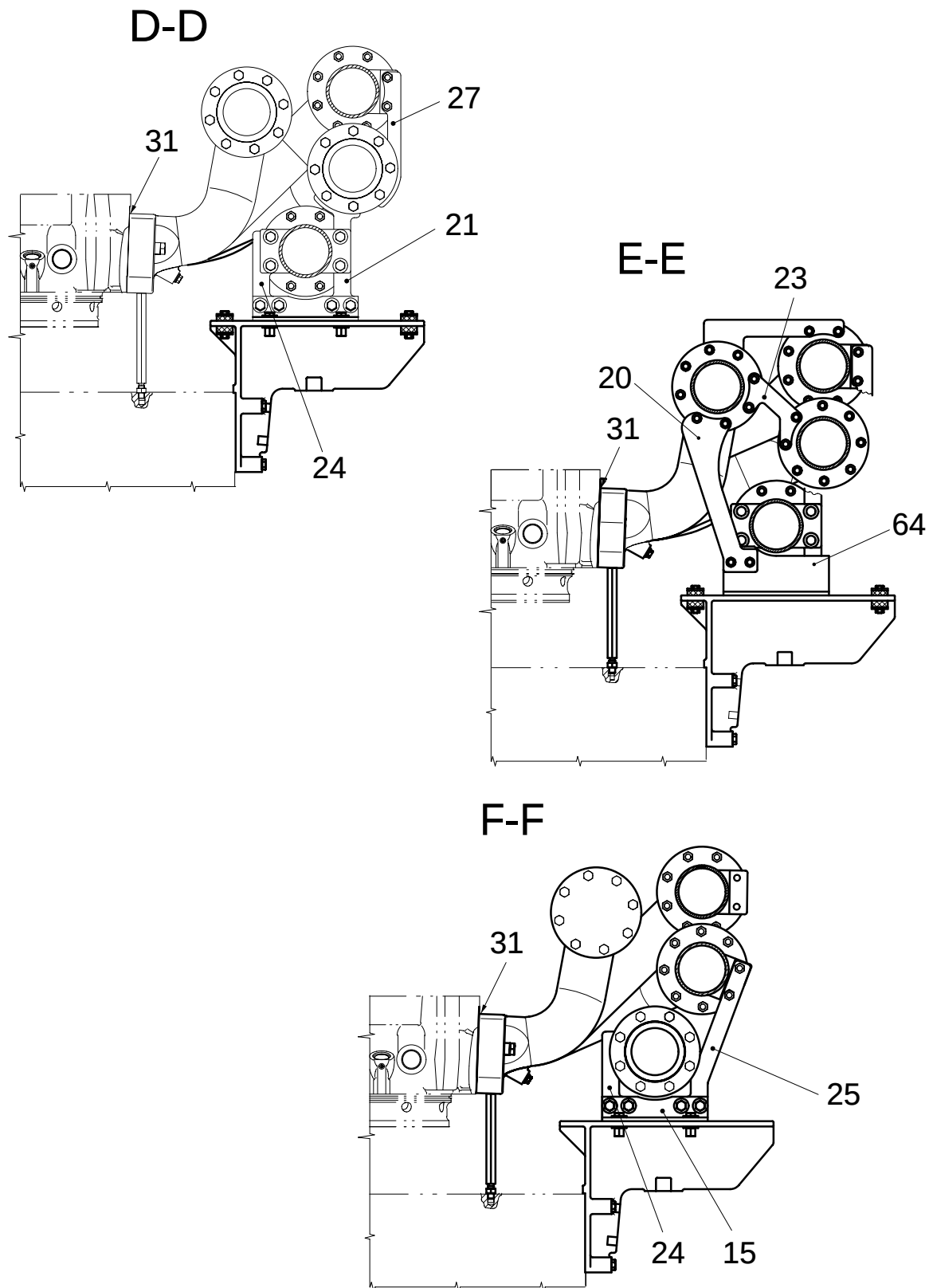
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Exhaust Manifold Mounting

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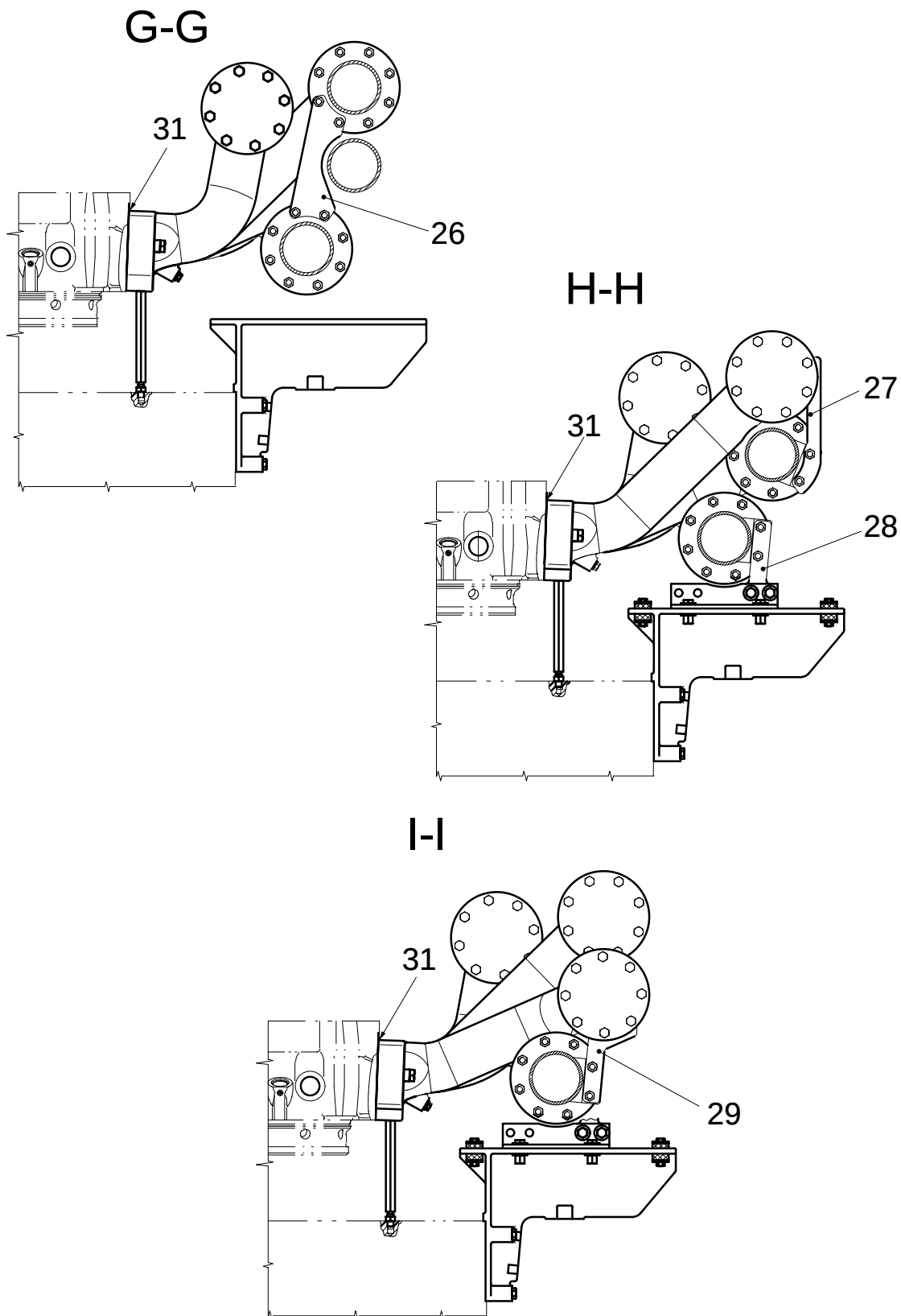
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Exhaust Manifold Mounting

M25

06



Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASLEITUNG-ANBAU, VOLLST. EXHAUST MANIFOLD ASSEMBLY	1	257210 CC
1	ABGASLEITUNG EXHAUST PIPE	3	257210-002
2	ABGASLEITUNG EXHAUST PIPE	3	257210-104
3	ABGASLEITUNG EXHAUST PIPE	3	257210-001
4	ABGASLEITUNG EXHAUST PIPE	1	257210-204
5	ABGASLEITUNG EXHAUST PIPE	1	257210-205
6	ABGASLEITUNG EXHAUST PIPE	1	257210-206
7	ABGASLEITUNG EXHAUST PIPE	6	257210-005
11	HALTER BRACKET	7	257210-114
12	HALTER BRACKET	2	257210-115
13	HALTERUNG BRACKET	9	257210-010
14	HALTER BRACKET	1	257210-214
15	HALTER BRACKET	1	257210-215
17	VERBINDUNGSLASCHE LINK	6	257210-217
18	VERBINDUNGSLASCHE LINK	9	257210-218
19	VERBINDUNGSLASCHE LINK	6	257210-123
20	VERBINDUNGSLASCHE LINK	3	257210-220
21	VERBINDUNGSLASCHE LINK	6	257210-125
22	VERBINDUNGSLASCHE LINK	9	257210-006
26	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	6	257210-017
27	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	3	257210-018

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
30	BUNDBUCHSE COLLAR BUSH	36	9.7220-026
32	SCHEIBE WASHER	294	1.1200-016
35	SECHSKANTMUTTER HEXAGON NUT	246	1.7260-012
37	DICHTUNG GASKET	# 9	257210-015
38	DICHTUNG GASKET	# 12	257210-014
40	BLINDFLANSCH BLANK FLANGE	3	257210-016
46	DEHNHÜLSE EXTENSION BUSH	2	1.0502-079
47	DEHNHÜLSE EXTENSION BUSH	10	1.0502-068
48	DEHNHÜLSE EXTENSION BUSH	2	1.0502-080
49	DEHNHÜLSE EXTENSION BUSH	2	1.0502-081
50	DEHNHÜLSE EXTENSION BUSH	18	1.0502-073
53	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	15	1.1041-609
54	DICHTRING JOINT RING	# 15	1.7010-133
57	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-444
58	SECHSKANTSCHRAUBE HEXAGON BOLT	16	257210-147
59	SECHSKANTSCHRAUBE HEXAGON BOLT	16	257210-034
60	SECHSKANTSCHRAUBE HEXAGON BOLT	102	257210-035
61	SECHSKANTSCHRAUBE HEXAGON BOLT	112	9.7260-028
62	SECHSKANTSCHRAUBE HEXAGON BOLT	2	257210-151
63	SECHSKANTSCHRAUBE HEXAGON BOLT	4	9.7260-029
64	SECHSKANTSCHRAUBE HEXAGON BOLT	3	1.1378-303

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
65	SECHSKANTSCHRAUBE HEXAGON BOLT	21	1.1367-378
66	SECHSKANTSCHRAUBE HEXAGON BOLT	18	257210-038
67	SECHSKANTSCHRAUBE HEXAGON BOLT	18	1.1367-309
70	SECHSKANTMUTTER HEXAGON NUT	18	1.2007-036
71	SECHSKANTMUTTER HEXAGON NUT	13	1.2007-038
74	SPANNSCHEIBE CONICAL SPRING WASHER	# 48	1.0068-240
77	RINGLAGER ELASTIC RING BEARING	36	9.7220-030

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CONSUMABLES

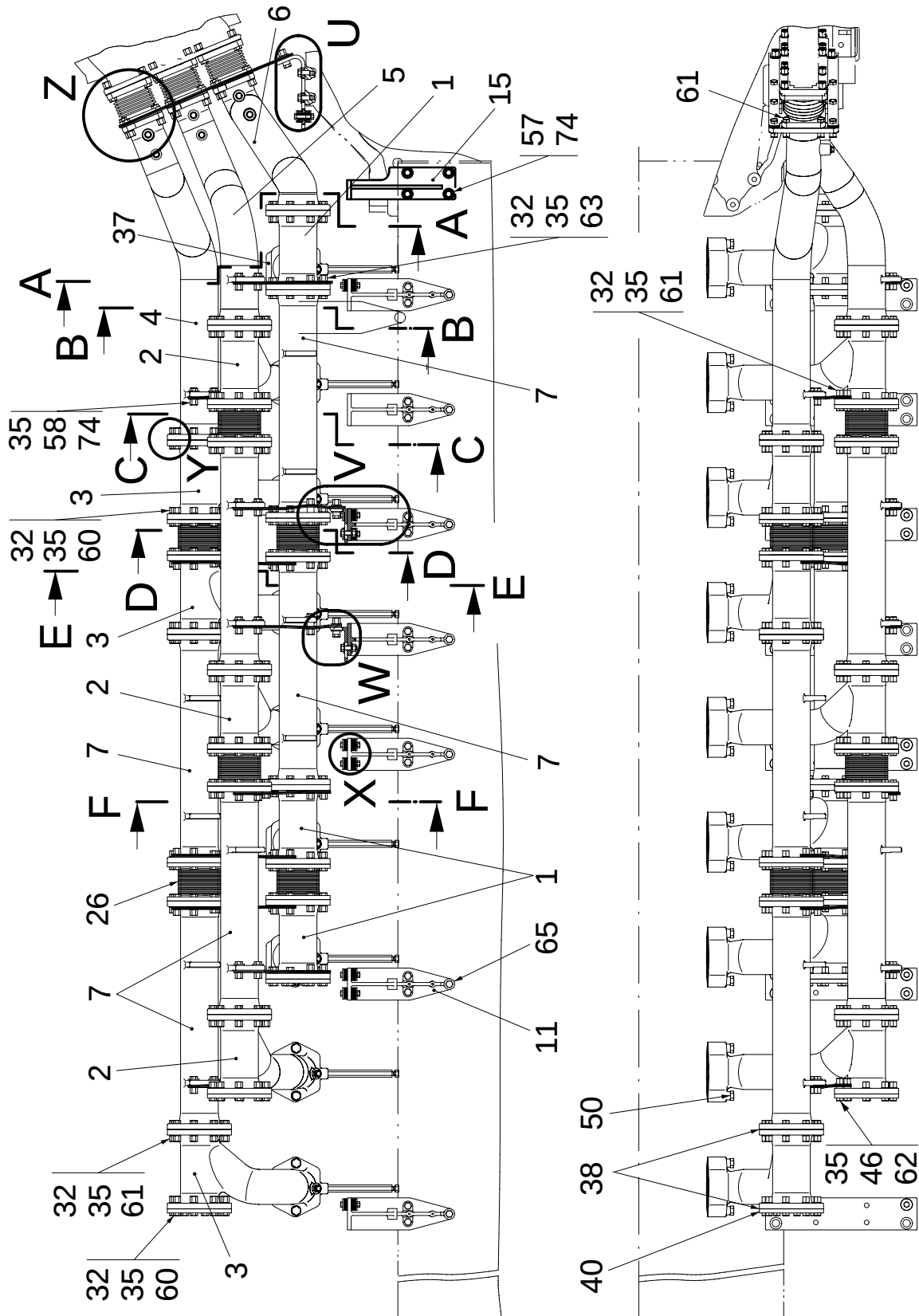
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

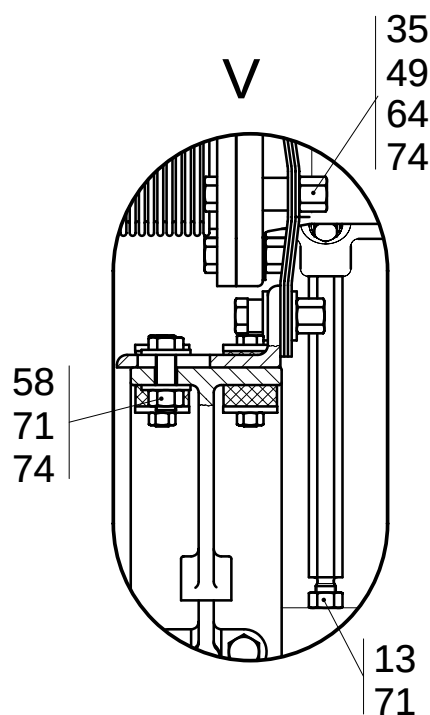
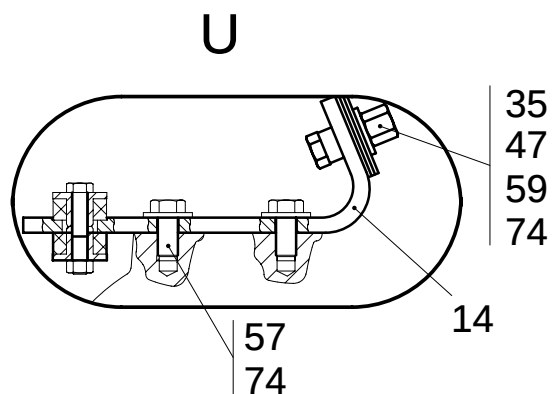
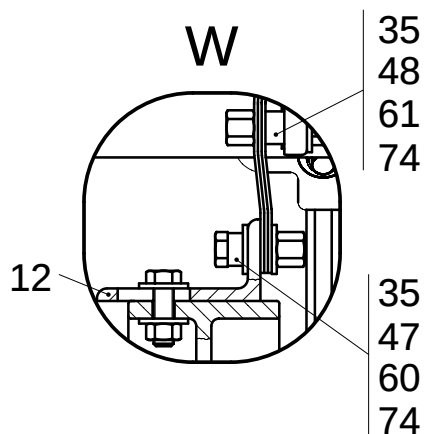
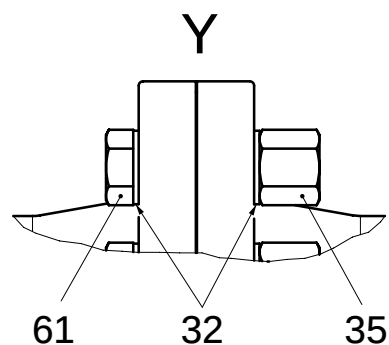
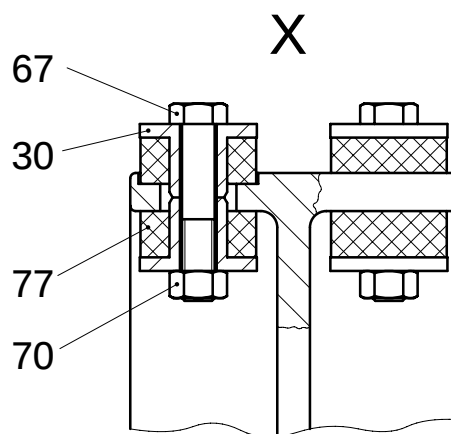
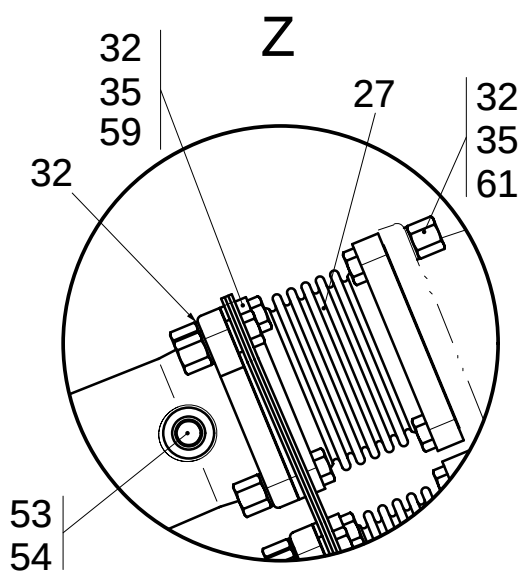
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Exhaust Manifold Mounting

M25

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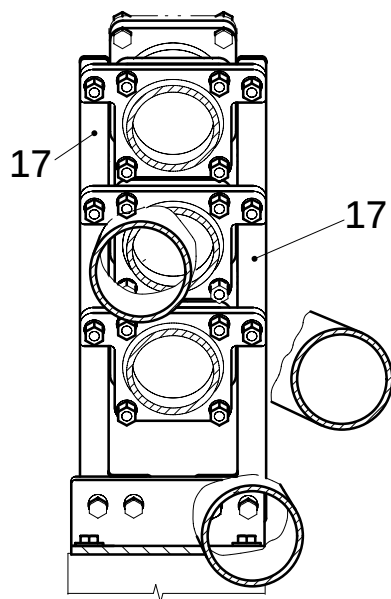


Exhaust Manifold Mounting

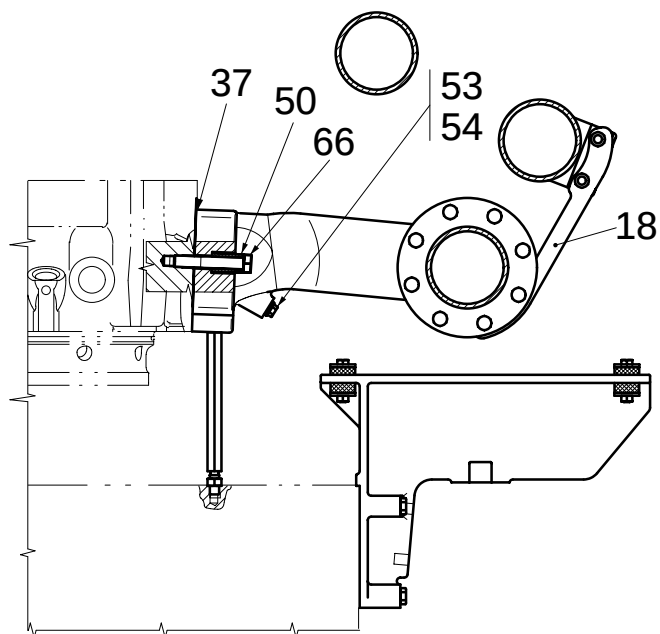
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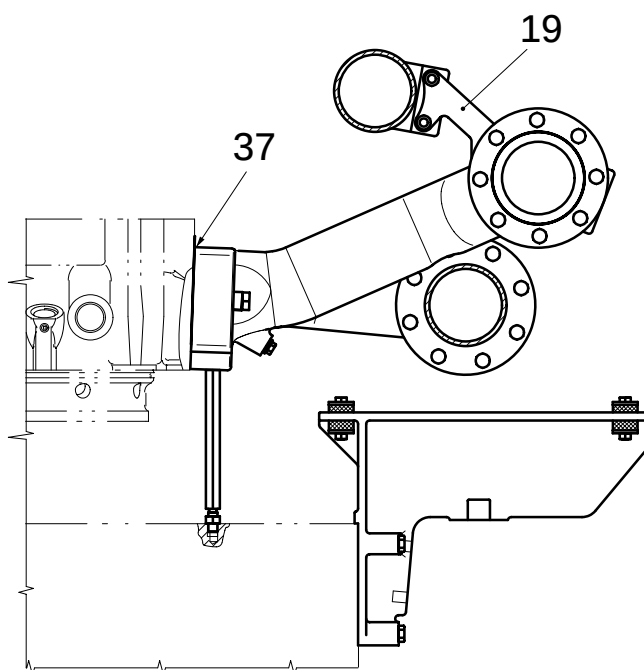
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B-B



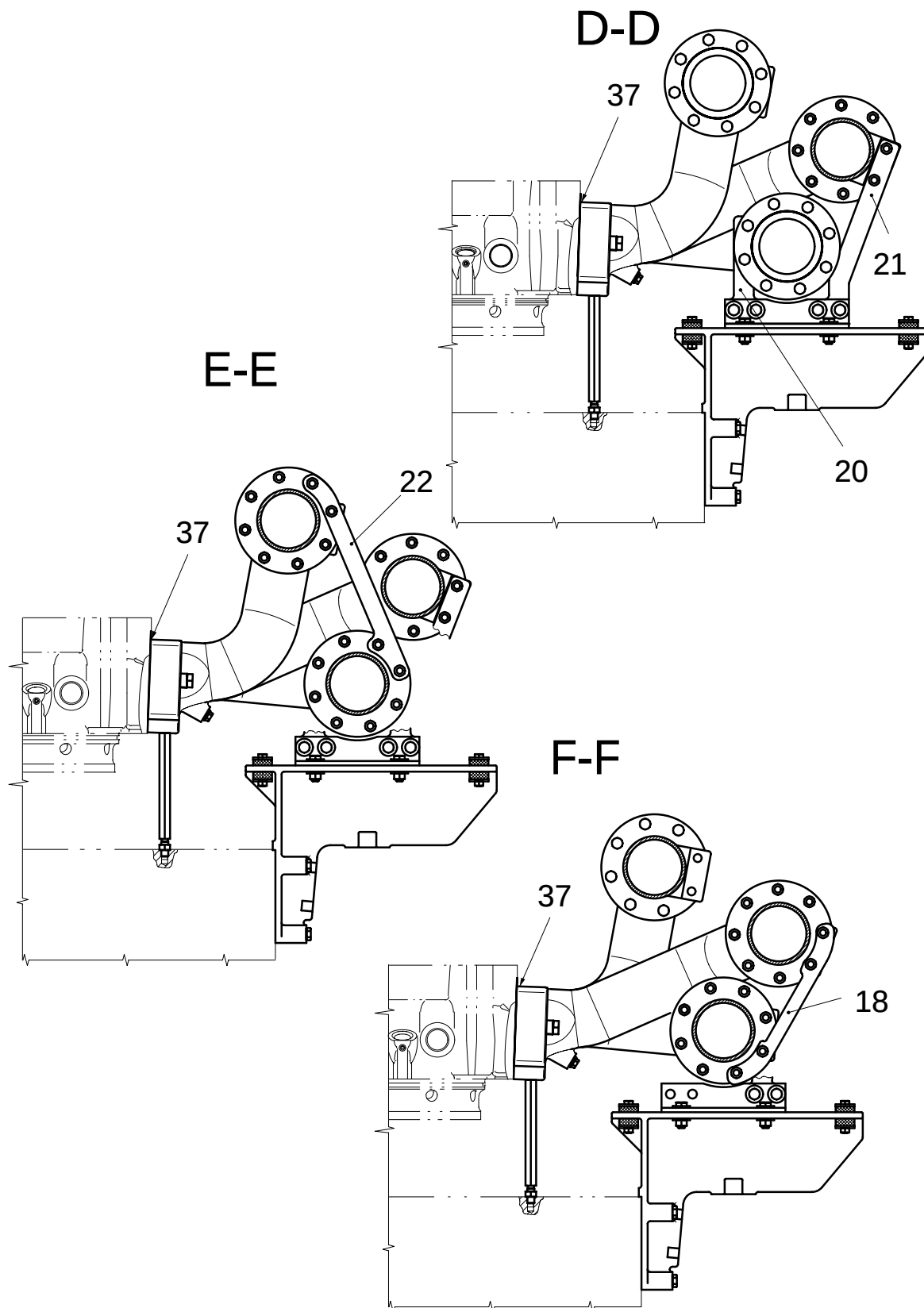
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Exhaust Manifold Mounting

M25

06



Exhaust Manifold Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASLEITUNG-ANBAU, VOLLST. EXHAUST MANIFOLD ASSEMBLY	1	257210 DD
1	KONVERTER CONVERTER	1	257210-101
3	ABGASLEITUNG EXHAUST PIPE	2	257210-001
4	ABGASLEITUNG EXHAUST PIPE	1	257210-002
5	ABGASLEITUNG EXHAUST PIPE	4	257210-005
6	ABGASLEITUNG EXHAUST PIPE	2	257210-105
7	ABGASLEITUNG EXHAUST PIPE	2	257210-104
8	ABGASLEITUNG EXHAUST PIPE	1	257210-102
9	ABGASLEITUNG EXHAUST PIPE	1	257210-110
10	ABGASLEITUNG EXHAUST PIPE	1	257210-109
11	ABGASLEITUNG EXHAUST PIPE	1	257210-111
12	ABGASLEITUNG EXHAUST PIPE	1	257210-107
15	HALTER BRACKET	8	257210-010
16	VERBINDUNGSLASCHE LINK	4	257260-016
17	LASCHE LINK	6	257210-112
19	VERBINDUNGSLASCHE LINK	3	257210-129
20	VERBINDUNGSLASCHE LINK	6	257210-127
21	VERBINDUNGSLASCHE LINK	3	257210-128
22	VERBINDUNGSLASCHE LINK	3	257210-126
23	VERBINDUNGSLASCHE LINK	6	257210-124
24	VERBINDUNGSLASCHE LINK	3	257210-125

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
25	VERBINDUNGSLASCHE LINK	3	257210-119
26	VERBINDUNGSLASCHE LINK	3	257210-123
28	VERBINDUNGSLASCHE LINK	3	257210-121
30	VERBINDUNGSLASCHE LINK	3	257210-118
31	VERBINDUNGSLASCHE LINK	6	257210-117
32	VERBINDUNGSLASCHE LINK	6	257210-157
34	VERBINDUNGSLASCHE LINK	3	257260-120
35	DOPPELASCHE DOUBLE LINK	4	257210-135
38	HALTER BRACKET	1	257210-113
39	HALTER BRACKET	1	257210-139
41	HALTER BRACKET	6	257210-114
43	HALTER BRACKET	3	257210-115
44	HALTER BRACKET	1	257260-138
46	ZWISCHENSTÜCK INTERMEDIATE RING	1	257260-241
47	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	8	257210-017
49	DICHTUNG GASKET	# 12	257210-014
50	DICHTUNG GASKET	# 8	257210-015
51	DICHTUNG GASKET	# 1	257260-285
52	DICHTUNG GASKET	# 1	257260-286
54	BLINDFLANSCH BLANK FLANGE	4	257210-016
56	SECHSKANTMUTTER HEXAGON NUT	280	1.7260-012

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
57	SCHEIBE WASHER	282	1.1200-016
58	BUNDBUCHSE COLLAR BUSH	52	9.7220-026
59	DEHNHÜLSE EXTENSION BUSH	29	1.0502-136
60	DEHNHÜLSE EXTENSION BUSH	16	1.0502-164
62	SCHEIBE WASHER	4	257260-062
63	SCHEIBE WASHER	12	257260-063
65	DICHTRING JOINT RING	# 9	1.7010-133
66	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	9	1.1041-609
68	DEHNHÜLSE EXTENSION BUSH	2	1.0502-141
69	RINGLAGER ELASTIC RING BEARING	36	9.7220-030
71	SECHSKANTSCHRAUBE HEXAGON SCREW	18	1.1367-309
74	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1387-444
77	SECHSKANTSCHRAUBE HEXAGON BOLT	22	257210-147
78	SECHSKANTSCHRAUBE HEXAGON BOLT	86	257210-034
79	SECHSKANTSCHRAUBE HEXAGON BOLT	10	257210-035
80	SECHSKANTSCHRAUBE HEXAGON BOLT	96	9.7260-028
81	SECHSKANTSCHRAUBE HEXAGON BOLT	4	257210-151
83	SECHSKANTSCHRAUBE HEXAGON BOLT	6	1.1367-376
85	SECHSKANTSCHRAUBE HEXAGON BOLT	39	9.7260-030
87	SECHSKANTSCHRAUBE HEXAGON BOLT	2	9.7260-133
90	SECHSKANTSCHRAUBE HEXAGON BOLT	12	1.1378-304

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
92	SECHSKANTSCHRAUBE HEXAGON BOLT	16	257210-038
95	SECHSKANTMUTTER HEXAGON NUT	18	1.2007-036
97	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-038
99	SECHSKANTMUTTER HEXAGON NUT	12	1.2021-213

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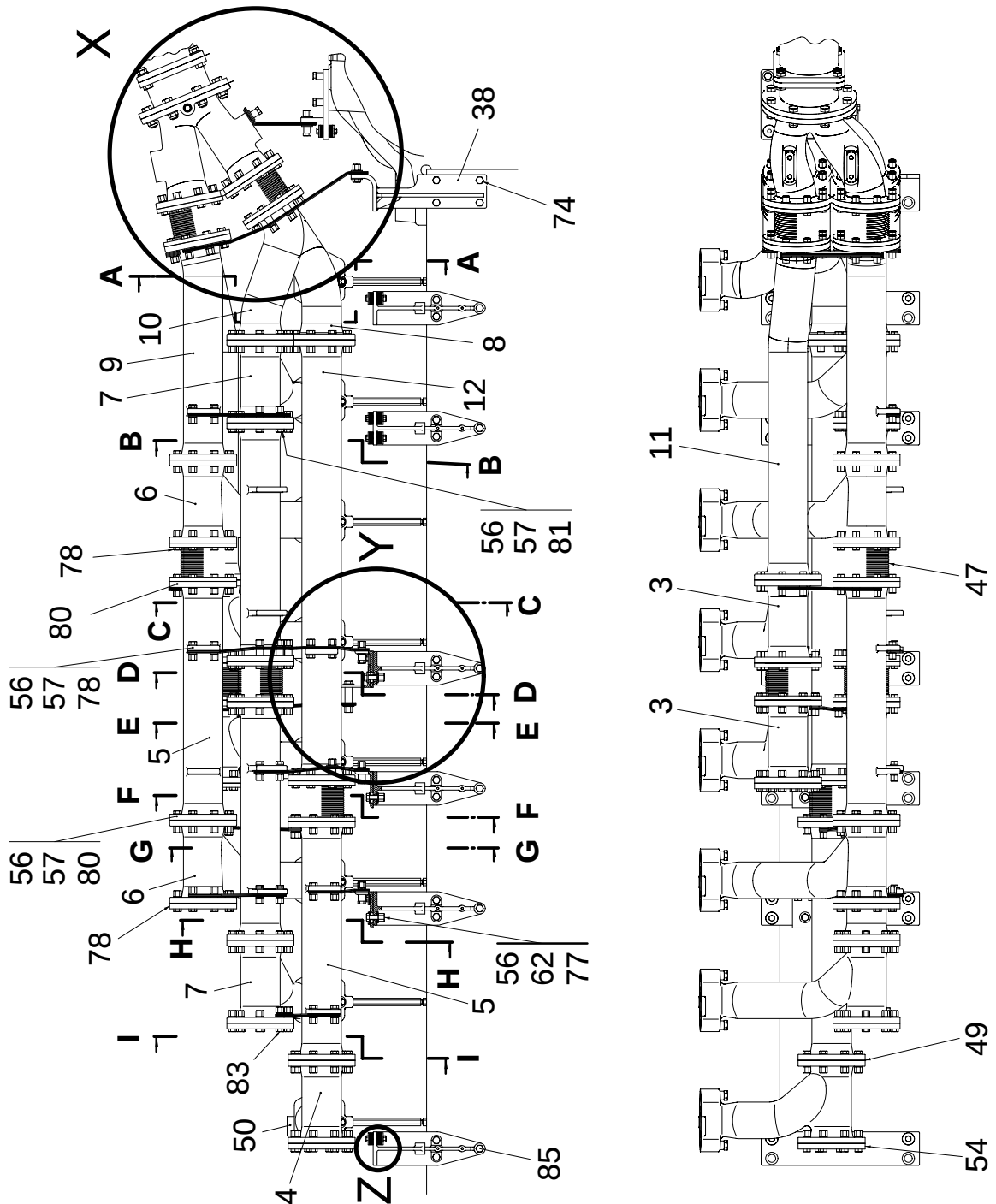
= VERBRAUCHSTEILE
CONSUMABLES

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Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

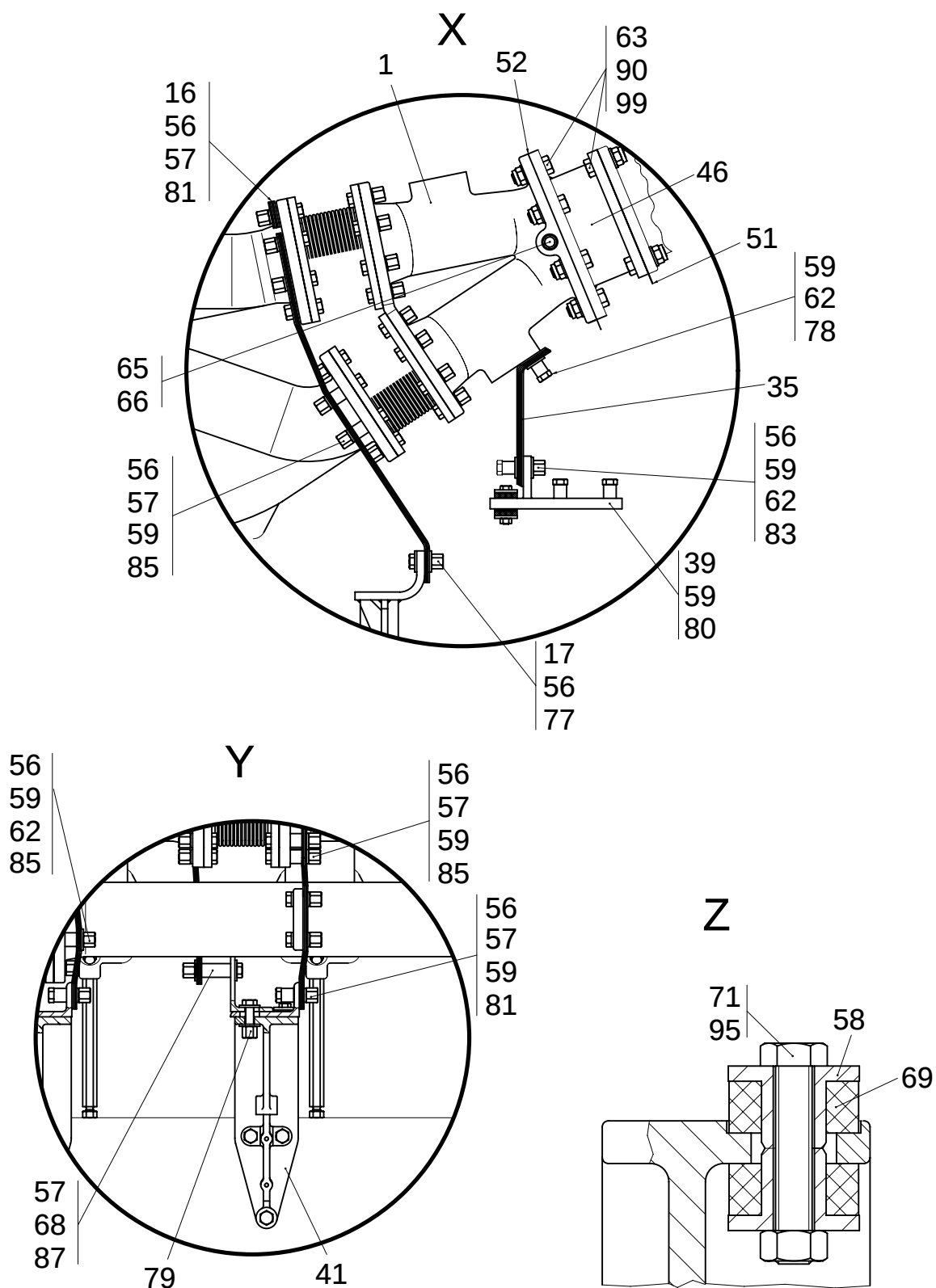
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Exhaust Manifold Mounting

M25

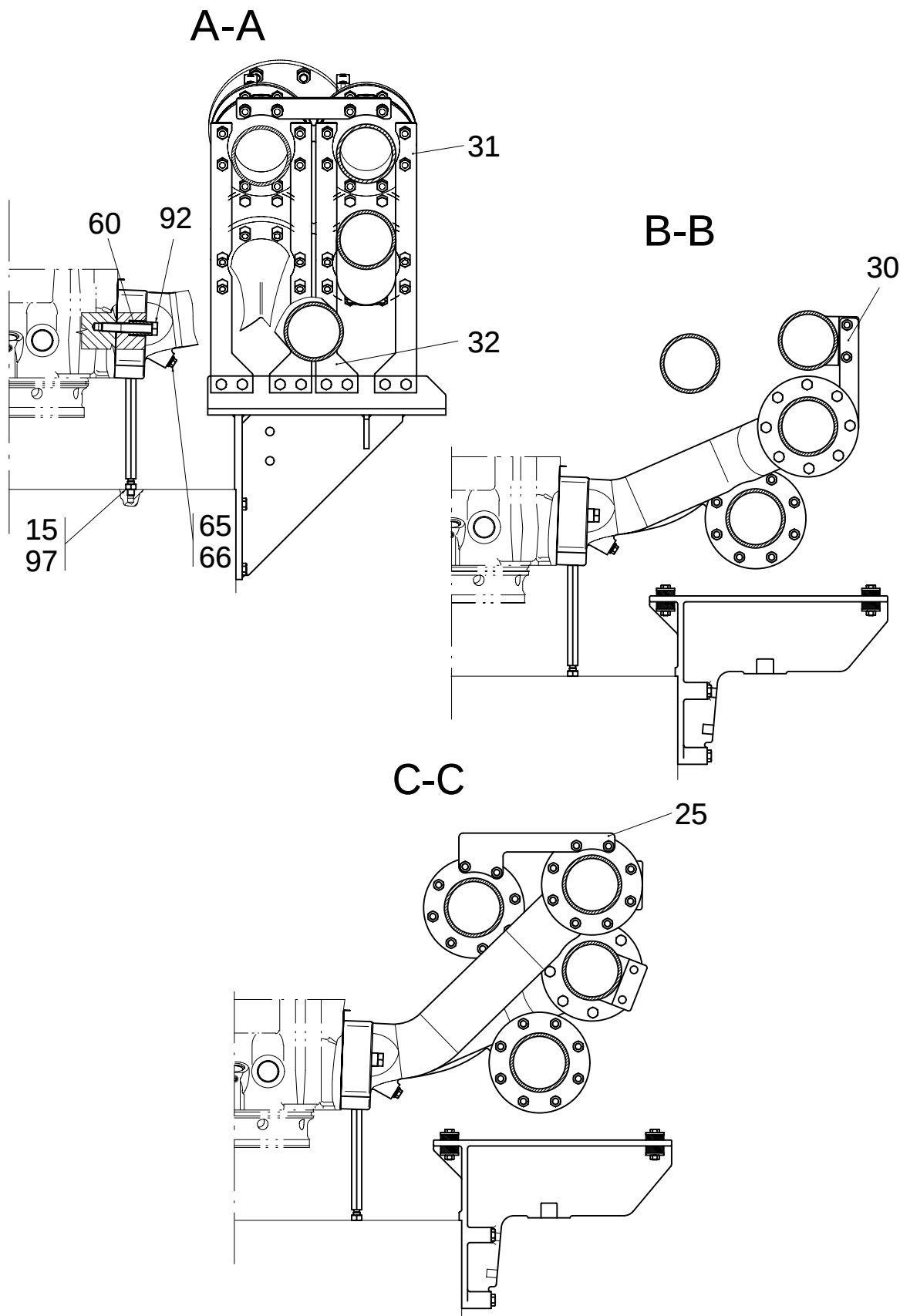
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Exhaust Manifold Mounting

M25

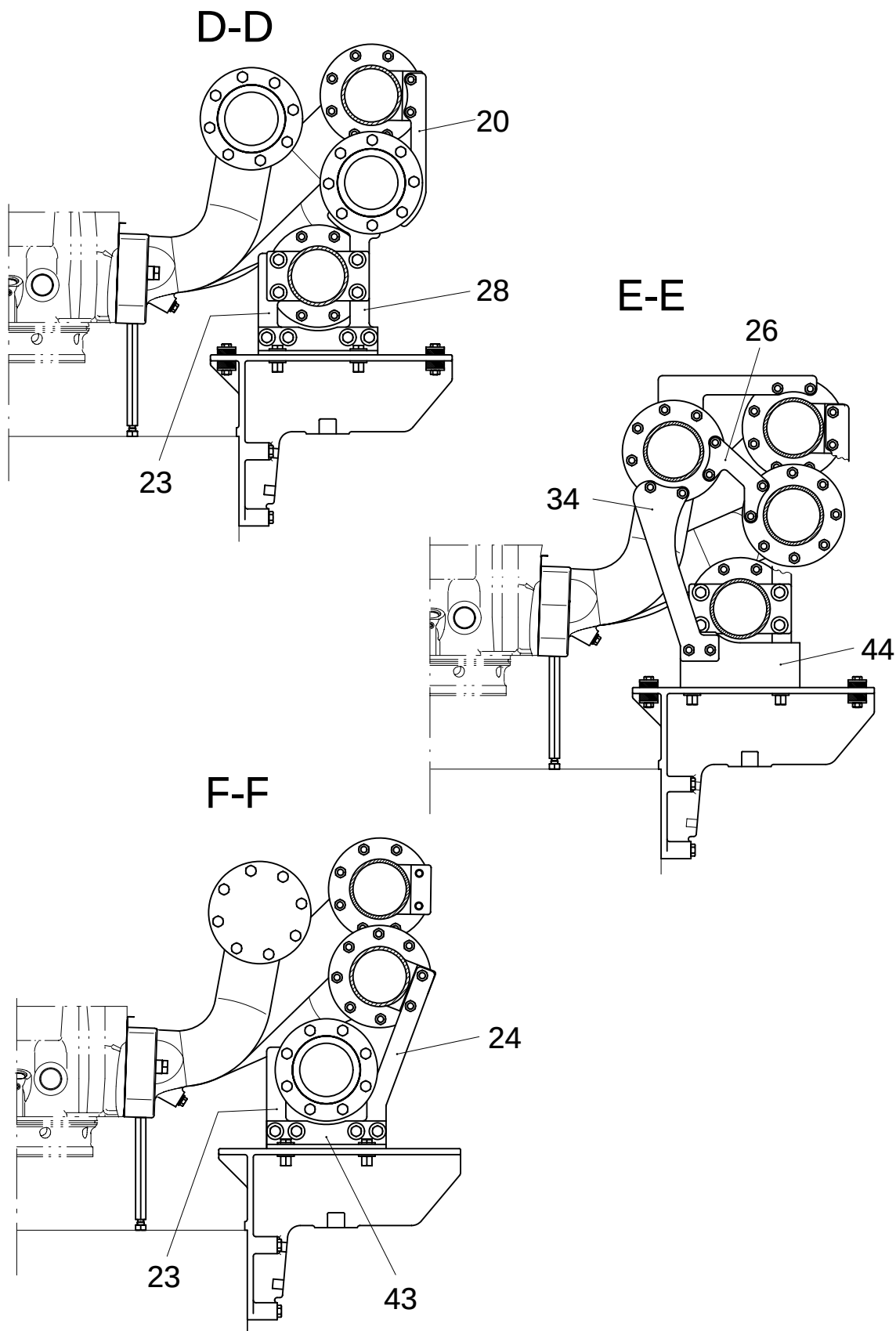
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Exhaust Manifold Mounting

M25

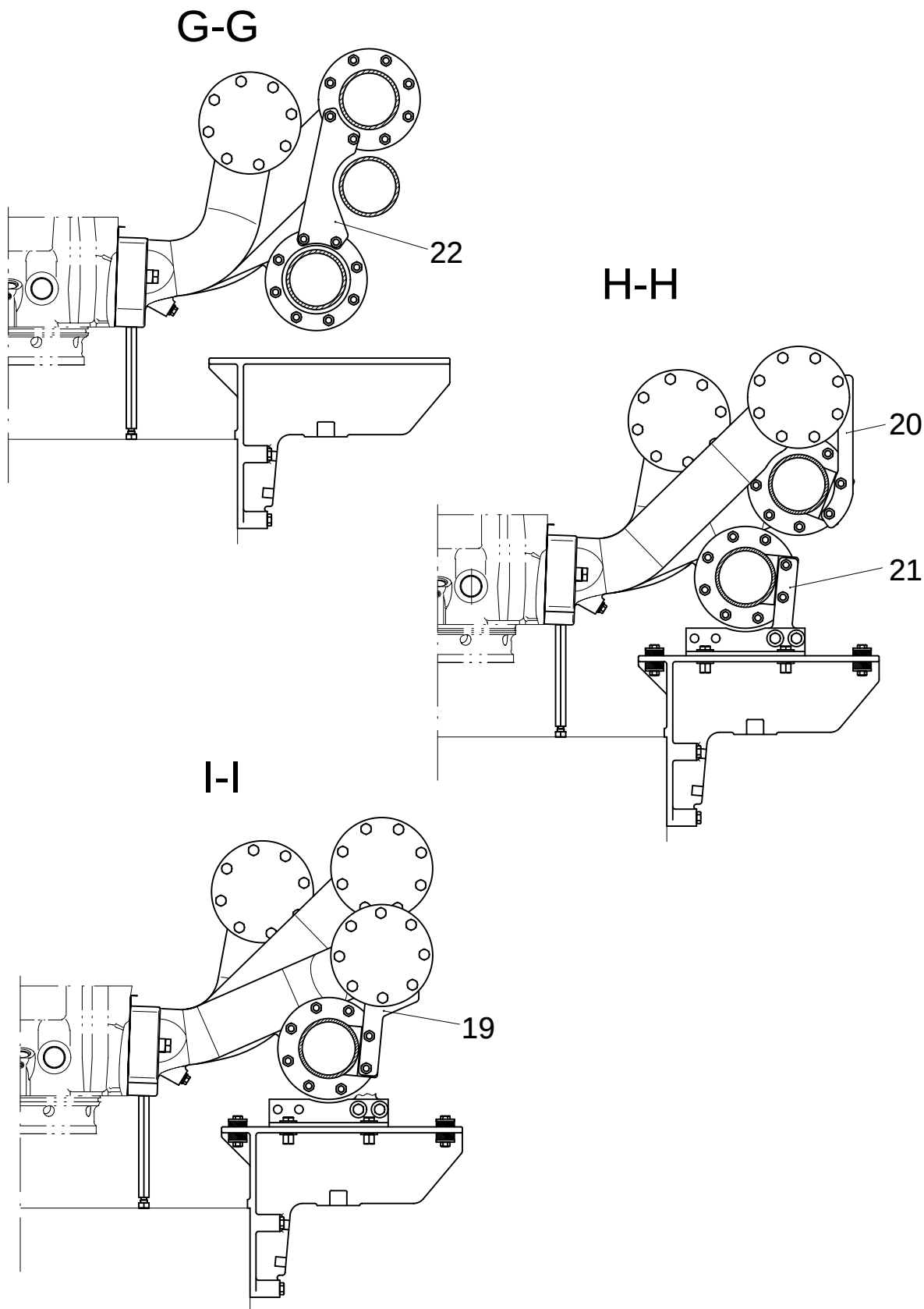
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Exhaust Manifold Mounting

M25

06



Exhaust Nozzle

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASSTUTZEN, VOLLST. EXHAUST NOZZLE ASSEMBLY	1	257218 AA
2	DICHTUNG GASKET	# 1	257218-002
7	FLANSCH WELDING FLANGE	2	1.5383-201
8	DICHTUNG GASKET	# 1	1.7073-564
14	SECHSKANTSCHRAUBE HEXAGON BOLT	20	1.1387-456
15	SECHSKANTSCHRAUBE HEXAGON SCREW	18	1.1387-382
16	SECHSKANTMUTTER HEXAGON NUT	20	1.2007-040
17	SECHSKANTMUTTER HEXAGON NUT	18	1.2007-036
18	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-709
20	DICHTRING JOINT RING	# 4	1.7010-133
101	ABGASSTUTZEN EXHAUST NOZZLE	1	257218-101/1

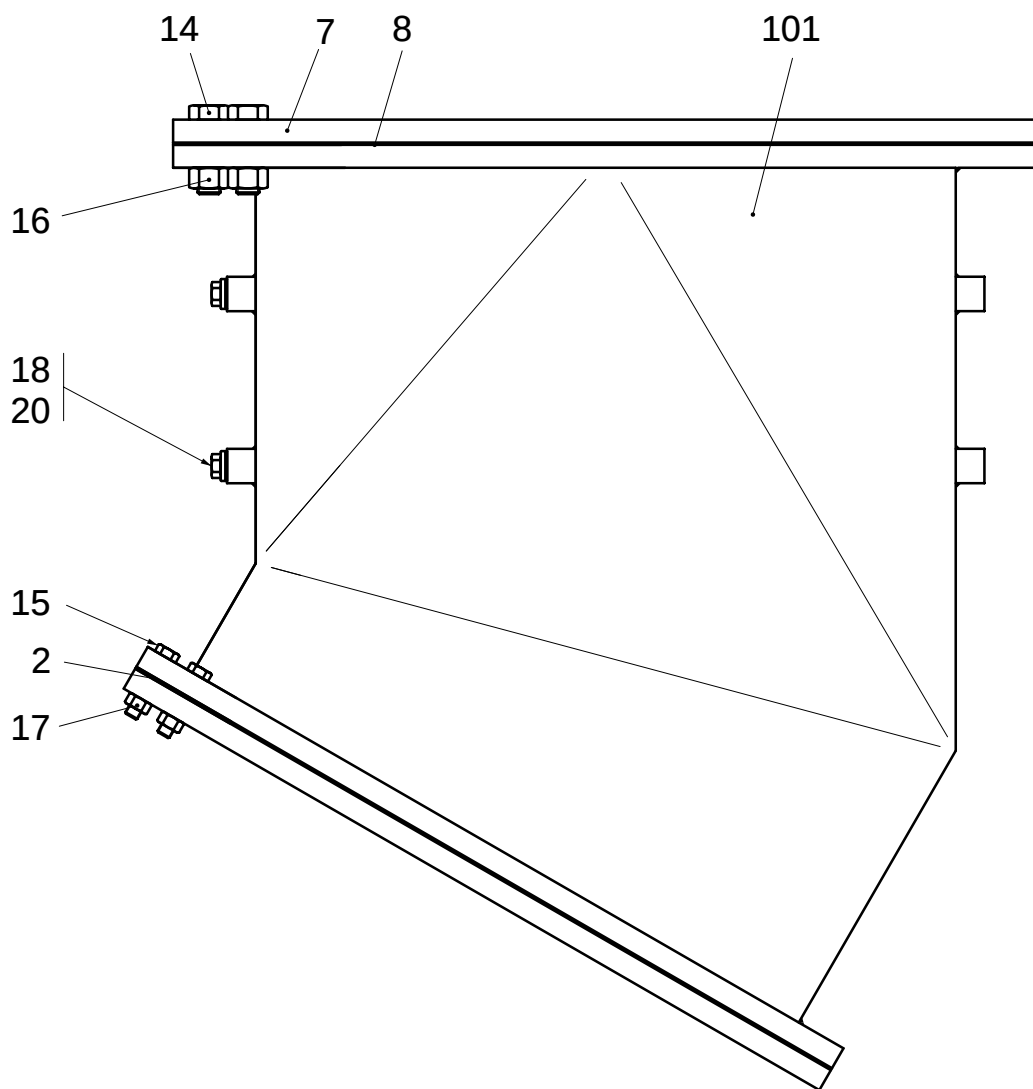
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Nozzle

M25

06



Exhaust Nozzle

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASSTUTZEN, VOLLST. EXHAUST NOZZLE ASSEMBLY	1	257218 BB
2	DICHTUNG GASKET	# 1	1.7218-052
6	FLANSCH WELDING FLANGE	2	1.5383-208
7	DICHTUNG GASKET	# 1	1.7073-380
14	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-709
15	SECHSKANTSCHRAUBE HEXAGON BOLT	14	1.1387-380
16	SECHSKANTSCHRAUBE HEXAGON SCREW	20	1.1387-454
17	SECHSKANTMUTTER HEXAGON NUT	14	1.2007-036
18	SECHSKANTMUTTER HEXAGON NUT	20	1.2007-040
20	DICHTRING JOINT RING	# 4	1.7010-133
101	ABGASSTUTZEN EXHAUST NOZZLE	1	257218-101/2

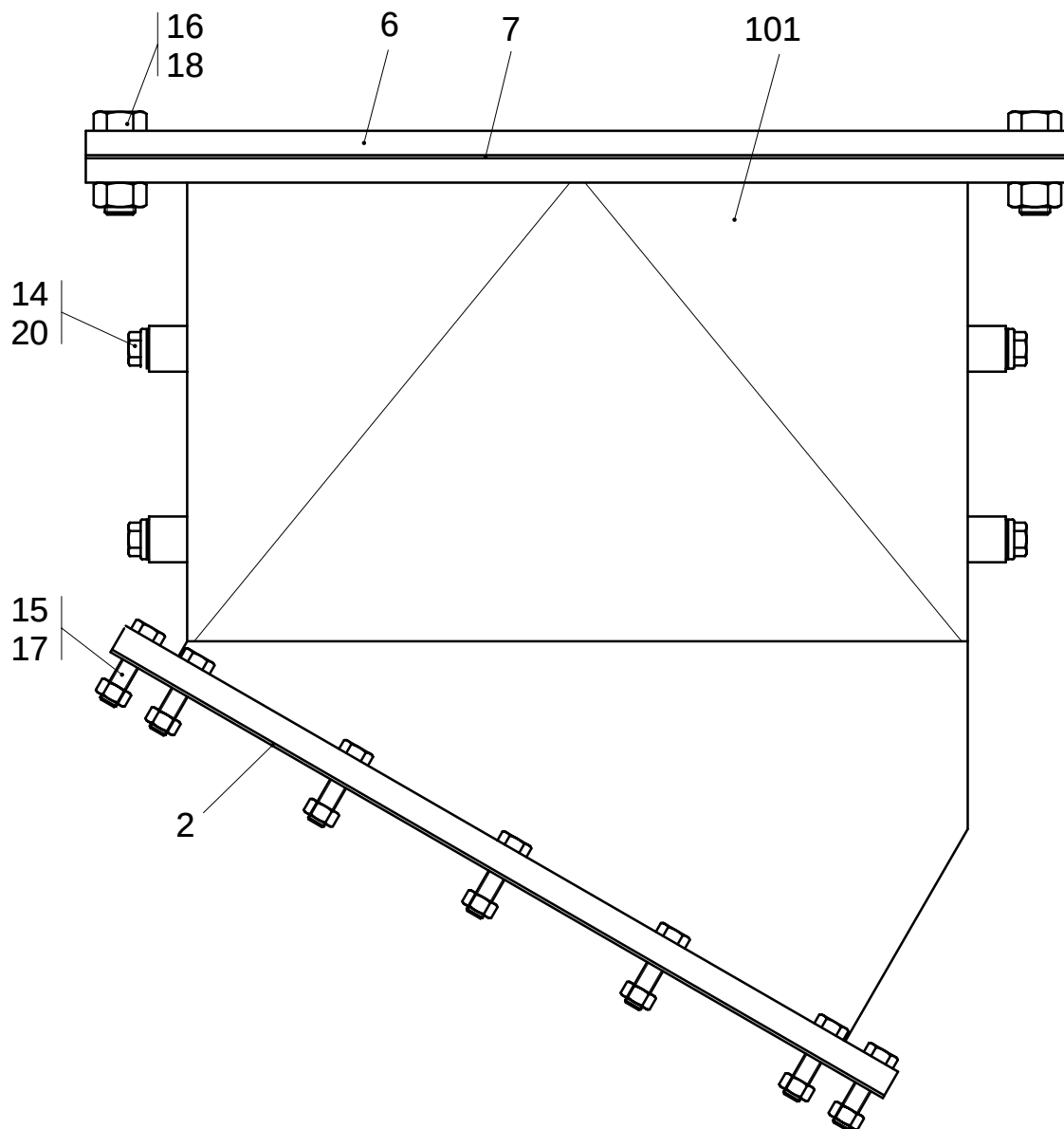
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Nozzle

M25

06



Exhaust Nozzle

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASSTUTZEN, VOLLST. EXHAUST NOZZLE ASSEMBLY	1	257218 CC
2	DICHTUNG GASKET	# 1	257218-002
7	FLANSCH WELDING FLANGE	2	1.5383-201
8	DICHTUNG GASKET	# 1	1.7073-564
14	SECHSKANTSCHRAUBE HEXAGON BOLT	20	1.1387-456
15	SECHSKANTSCHRAUBE HEXAGON SCREW	18	1.1387-382
16	SECHSKANTMUTTER HEXAGON NUT	20	1.2007-040
17	SECHSKANTMUTTER HEXAGON NUT	18	1.2007-036
18	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-709
20	DICHTRING JOINT RING	# 4	1.7010-133
101	ABGASSTUTZEN EXHAUST NOZZLE	1	257218-101/3

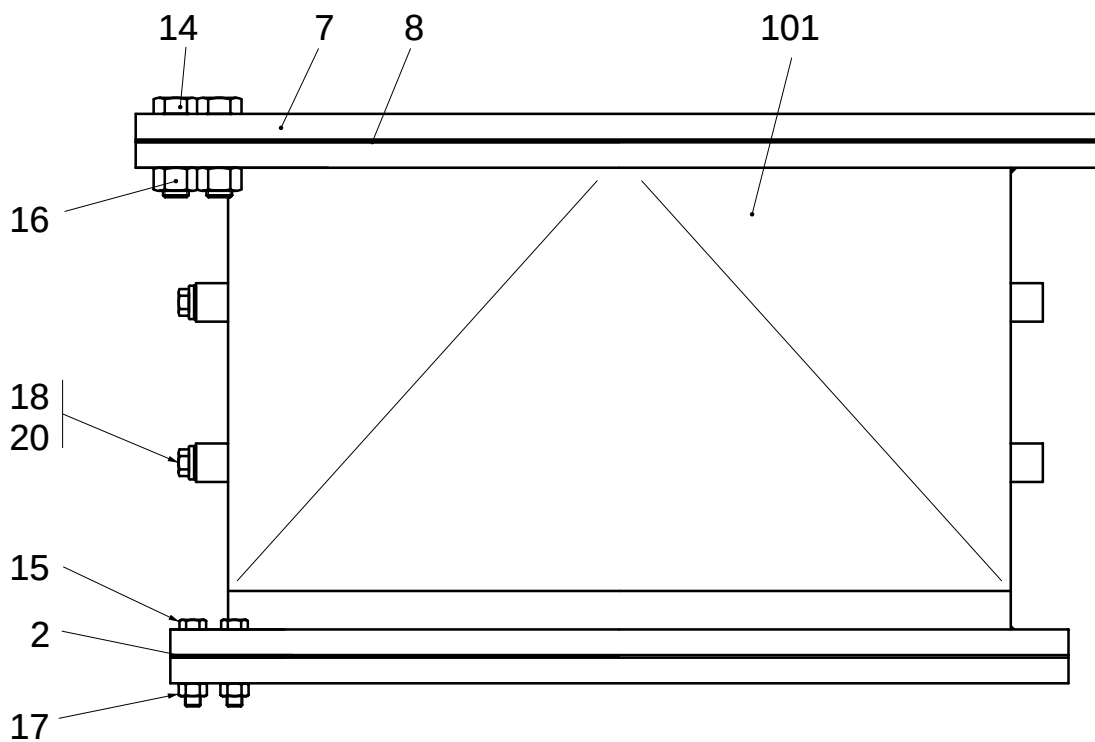
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Nozzle

M25

06



Exhaust Nozzle

M20/M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASSTUTZEN, VOLLST. EXHAUST NOZZLE ASSEMBLY	1	1.7218 XX
2	DICHTUNG GASKET	# 1	1.7218-052
6	FLANSCH WELDING FLANGE	1	1.5383-208
7	DICHTUNG GASKET	# 1	1.7073-380
14	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-709
15	SECHSKANTSCHRAUBE HEXAGON SCREW	14	1.1387-378
16	SECHSKANTSCHRAUBE HEXAGON SCREW	20	1.1367-454
17	SECHSKANTMUTTER HEXAGON NUT	20	1.2007-040
18	DICHTRING JOINT RING	# 4	1.7010-133

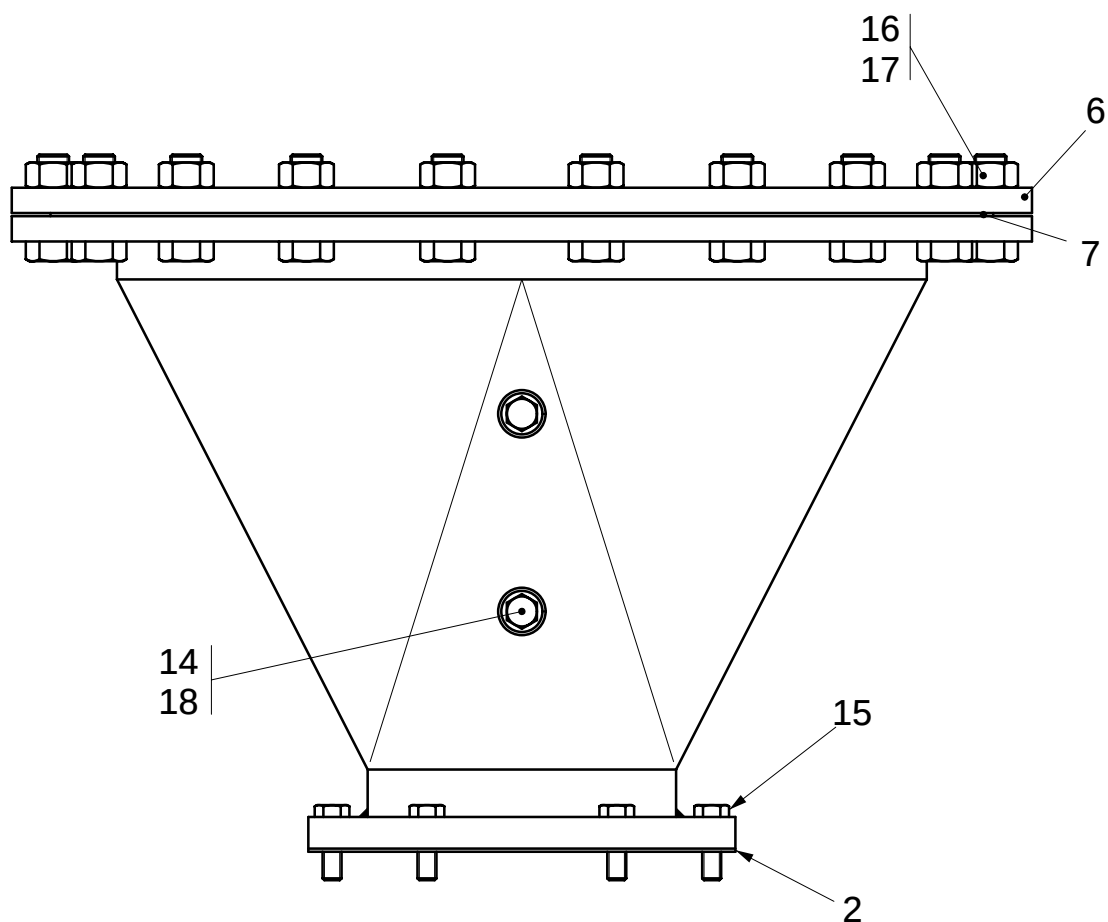
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Nozzle

M20/M25

06



Exhaust Line Covering Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASVERKLEIDUNG ANBAU, VOLLST. EXHAUST LINE COVERING MOUNTING ASS.	1	257220 AA
1	VERKLEIDUNG, VOLLST. COVERING, COMPL.	1	257220-001
2	VERKLEIDUNG, VOLLST. COVERING, COMPL.	1	257220-002
3	VERKLEIDUNG, VOLLST. COVERING, COMPL.	1	257220-003
5	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	1	257220-005
7	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	1	257220-007
9	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	1	257220-009
10	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257220-010
11	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257220-011
12	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257220-012
13	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257220-013
14	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257220-014
15	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257220-015
16	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257220-016
17	BODENPLATTE, VOLLST. BOTTOM PLATE, COMPL.	1	257220-017
18	DECKEL, VOLLST. COVER, COMPL.	1	257220-018
19	ABDECKBLECH, VOLLST. COVER PLATE, COMPL.	1	257220-019
25	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-380
26	SECHSKANTSCHRAUBE HEXAGON BOLT	15	1.1392-385
27	SECHSKANTSCHRAUBE HEXAGON BOLT	18	1.1387-372

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Line Covering Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
30	SCHEIBE WASHER	28	1.0040-224
31	SPANNSCHEIBE CONICAL SPRING WASHER	8	1.0068-222
35	SECHSKANTMUTTER HEXAGON NUT	9	1.2007-036

= VERBRAUCHSTEILE
CONSUMABLES

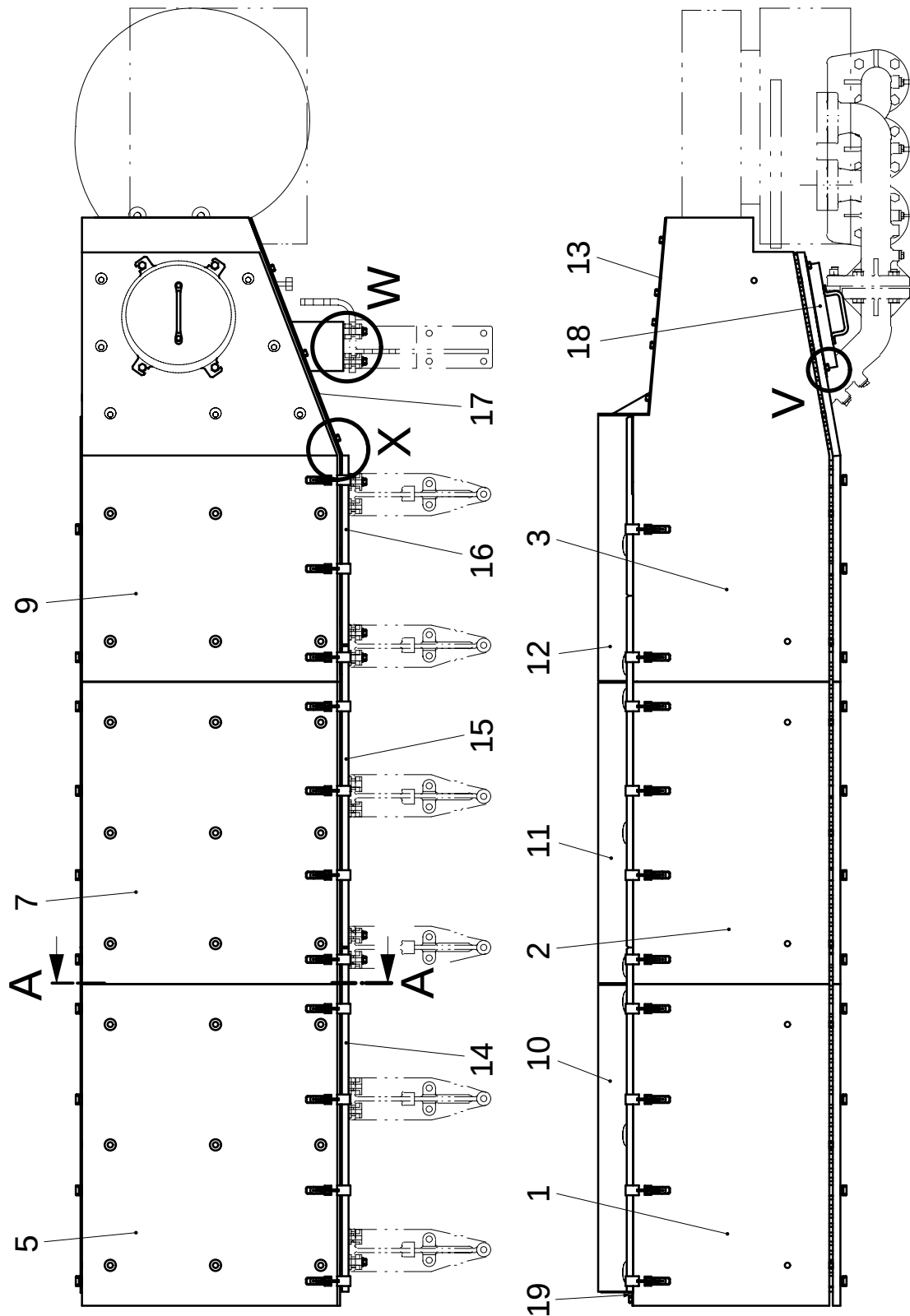
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Line Covering Mounting

M25

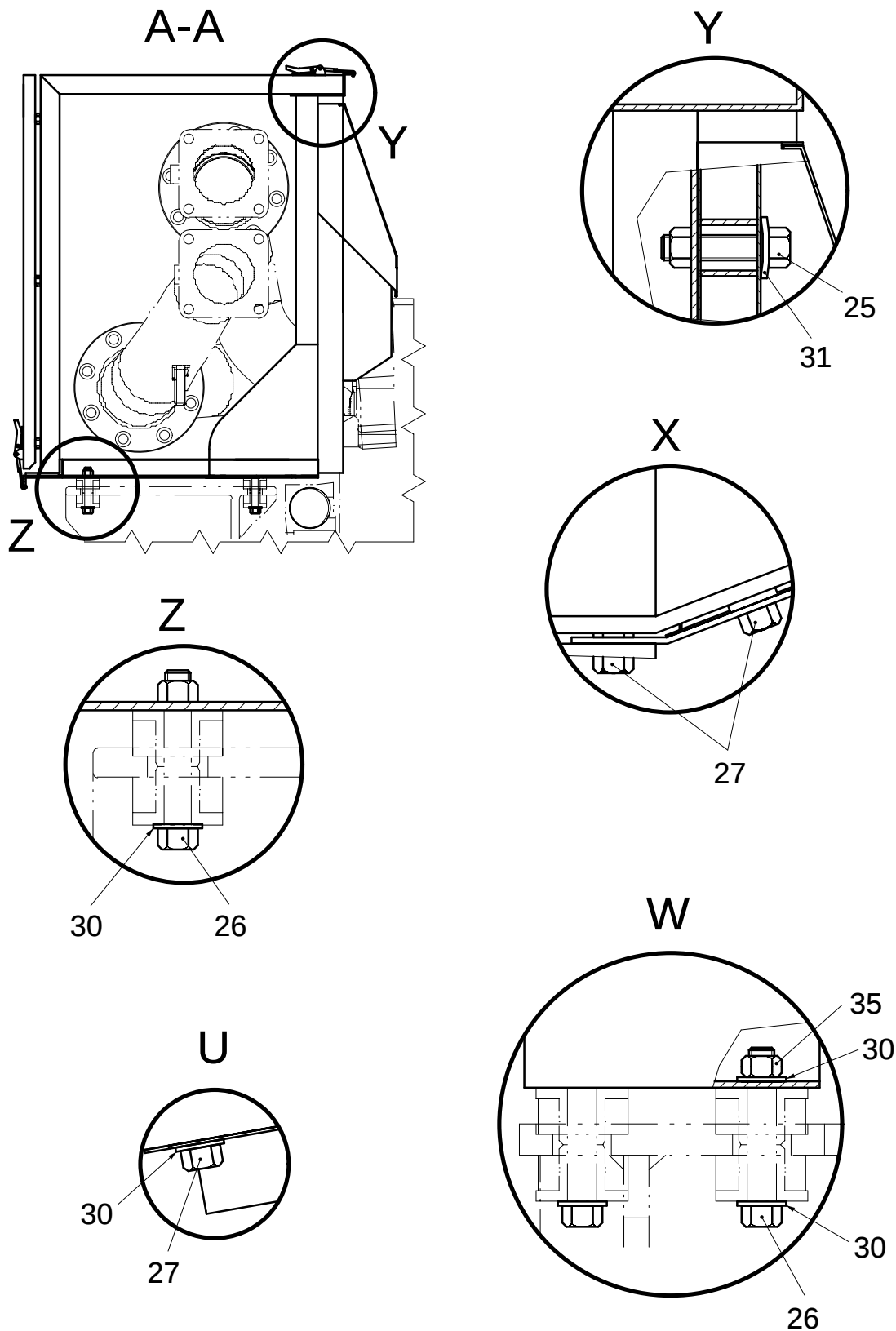
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Exhaust Line Covering Mounting

M25

06



Exhaust Line Covering Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASVERKLEIDUNG ANBAU, VOLLST. EXHAUST LINE COVERING MOUNTING ASS.	1	257220 BB
1	VERKLEIDUNG, VOLLST. COVERING, COMPL.	1	257220-101
2	VERKLEIDUNG, VOLLST. COVERING, COMPL.	3	257220-102
3	VERKLEIDUNG, VOLLST. COVERING, COMPL.	1	257220-103
5	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	1	257220-105
6	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	3	257220-106
7	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	1	257220-107
9	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257220-109
10	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257220-110
11	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257220-111
12	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257220-112
14	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257220-114
15	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257220-115
16	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257220-116
17	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257220-117
18	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257220-118
20	DECKEL, VOLLST. COVER, COMPL.	1	257220-120
21	ABDECKBLECH, VOLLST. COVER PLATE, COMPL.	1	257220-121
22	ABSCHLUSSBLECH, VOLLST. COVER PLATE, COMPL.	1	257220-122
25	SECHSKANTSCHRAUBE HEXAGON BOLT	7	1.1387-380
26	SECHSKANTSCHRAUBE HEXAGON BOLT	18	1.1392-385

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Line Covering Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
27	SECHSKANTSCHRAUBE HEXAGON BOLT	17	1.1387-372
30	SCHEIBE WASHER	20	1.0040-224
31	SPANNSCHEIBE CONICAL SPRING WASHER	18	1.0068-222
35	SECHSKANTMUTTER HEXAGON NUT	21	1.2007-036

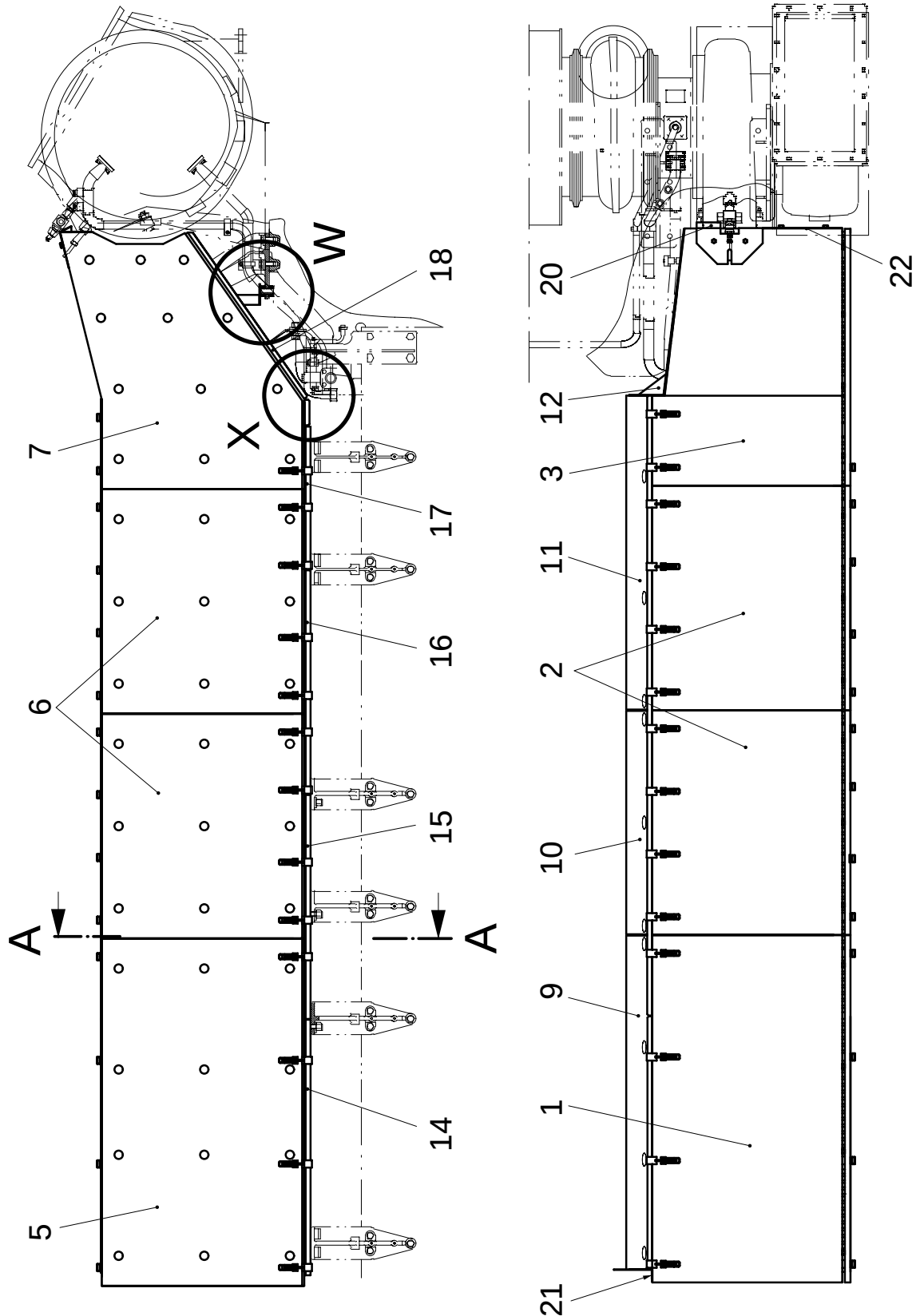
= VERBRAUCHSTEILE
CONSUMABLES

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Line Covering Mounting

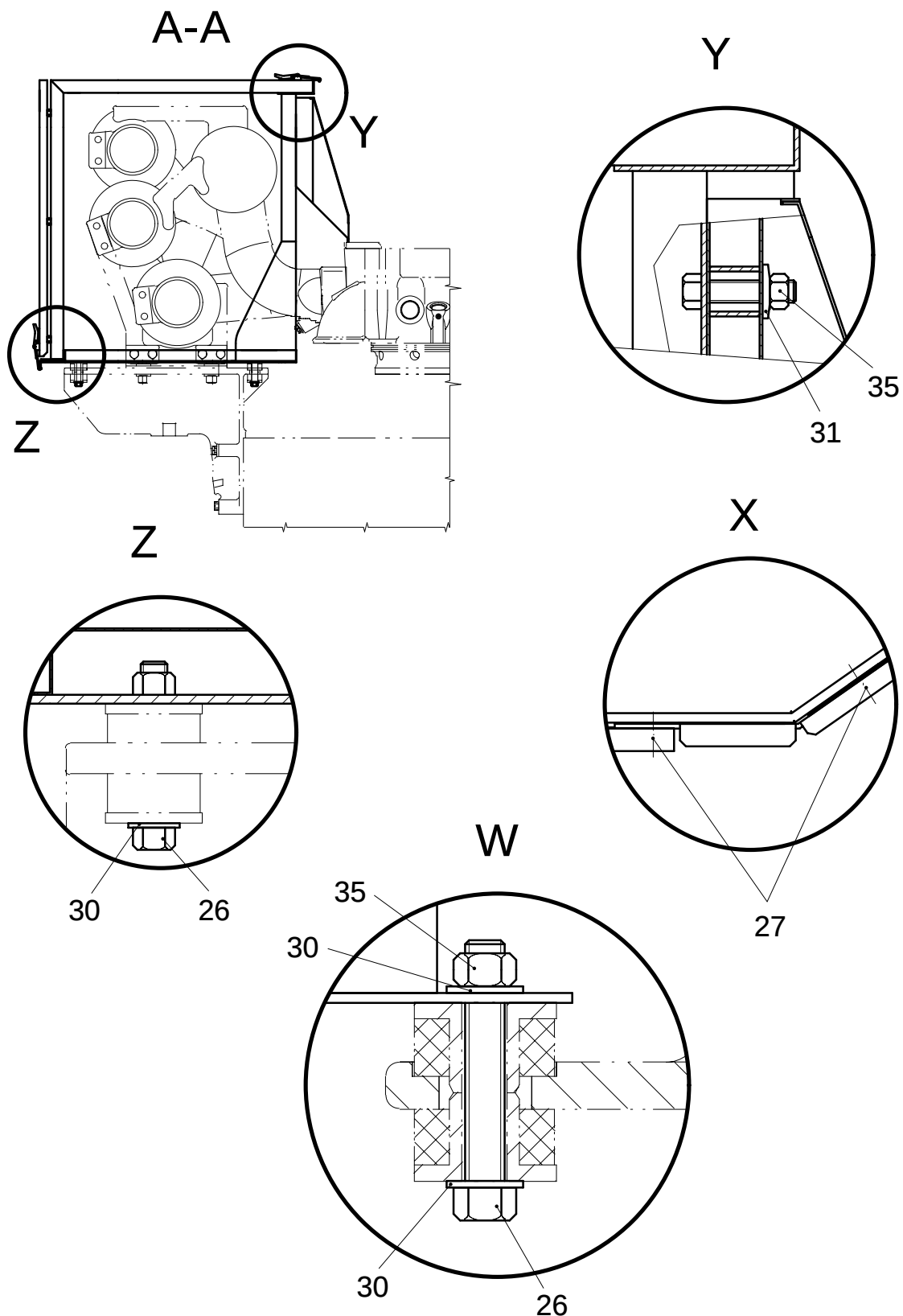
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Exhaust Line Covering Mounting

M25

06



Exhaust Line Covering Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASVERKLEIDUNG ANBAU, VOLLST. EXHAUST LINE COVERING MOUNTING ASS.	1	257220 CC
1	VERKLEIDUNG, VOLLST. COVERING, COMPL.	1	257220-201
2	VERKLEIDUNG, VOLLST. COVERING, COMPL.	3	257220-202
3	VERKLEIDUNG, VOLLST. COVERING, COMPL.	1	257220-203
5	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	1	257220-205
6	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	3	257220-206
7	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	1	257220-207
9	RÜCKWAND, VOLLST. COVERING, COMPL.	1	257220-209
10	RÜCKWAND, VOLLST. COVERING, COMPL.	2	257220-210
11	RÜCKWAND, VOLLST. COVERING, COMPL.	1	257220-211
12	RÜCKWAND, VOLLST. COVERING, COMPL.	1	257220-212
14	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257220-214
15	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257220-215
16	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257220-216
17	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257220-217
18	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257220-218
20	ABDECKBLECH, VOLLST. COVER PLATE, COMPL.	1	257220-220
21	BLLENDE, VOLLST. ORIFICE, COMPL.	1	257220-221
22	DECKEL, VOLLST. COVER, COMPL.	1	257220-222
23	ABDECKUNG, VOLLST. COVER, COMPL.	1	257220-223
26	SECHSKANTSCHRAUBE HEXAGON BOLT	18	1.1392-385

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Line Covering Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
27	SECHSKANTSCHRAUBE HEXAGON BOLT	66	1.1387-372
30	SCHEIBE WASHER	20	1.0040-224
31	SPANNSCHEIBE CONICAL SPRING WASHER	12	1.0068-222
35	SECHSKANTMUTTER HEXAGON NUT	14	1.2007-036

= VERBRAUCHSTEILE
CONSUMABLES

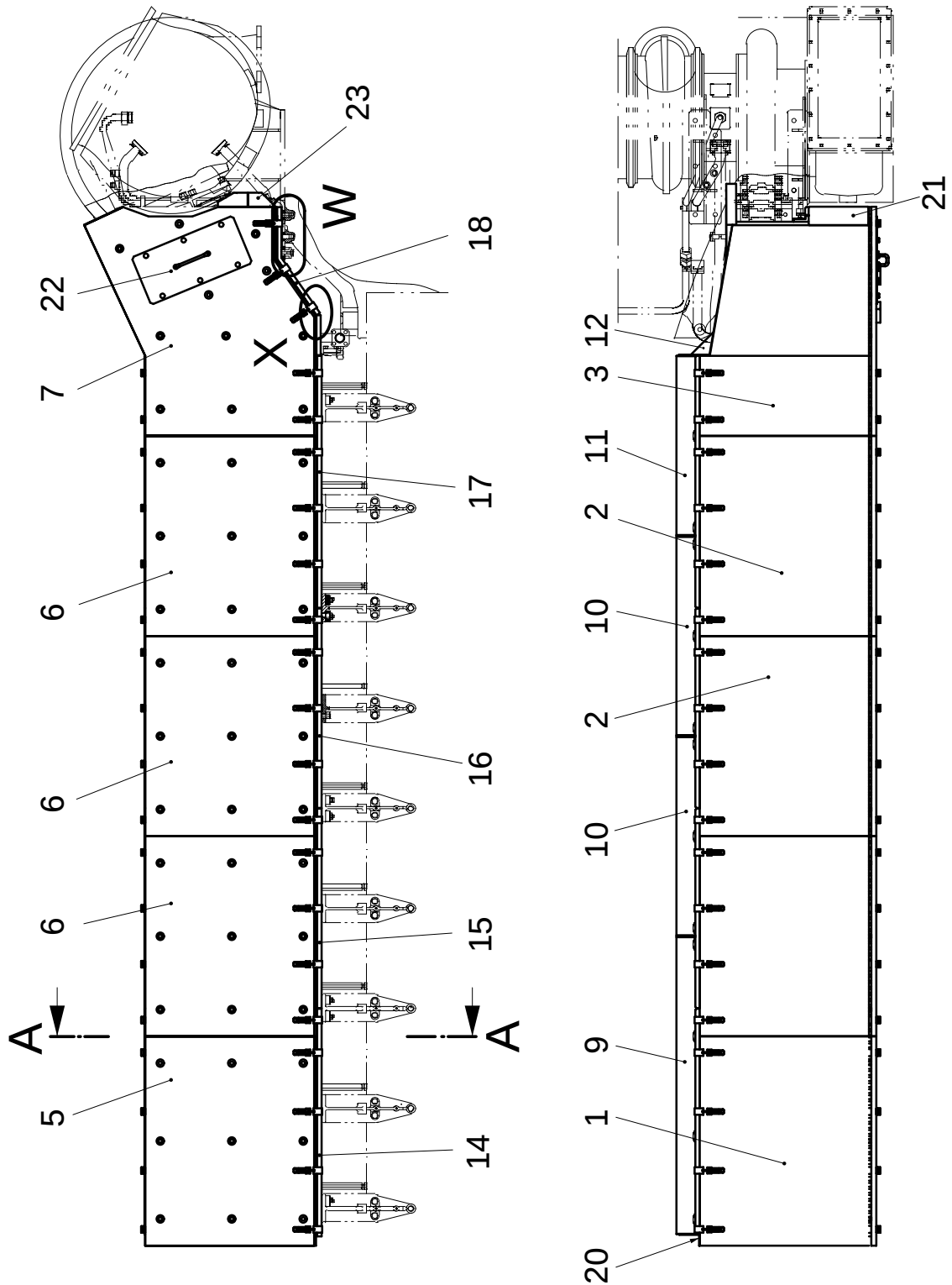
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Line Covering Mounting

M25

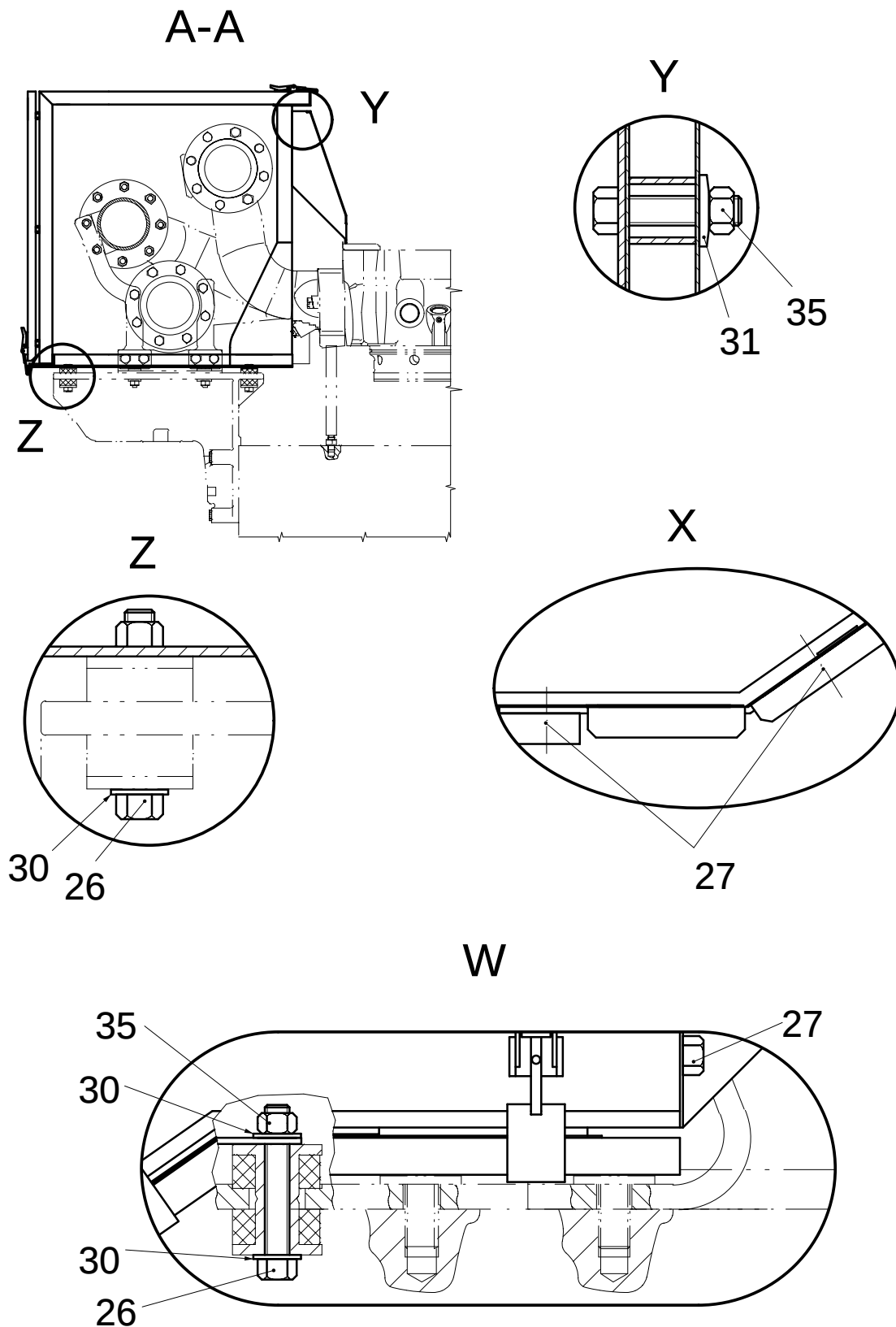
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Exhaust Line Covering Mounting

M25

06



Charge Air Cooler Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LADELUFTKÜHLER-ANBAU, VOLLST. CHARGE AIR COOLER MOUNTING ASSEMBLY	1	257240 AA
1	GEHÄUSE HOUSING	1	257240-001
2	LADELUFTKÜHLER, VOLLST. CHARGE AIR COOLER, COMPL.	1	SIEHE BUCHC, ABSCHNITT 10 SEE BOOK C, SECTION 10
3	DICHTUNG GASKET	# 1	257240-003
4	WINKELSCHIENE CUP WASHER	1	257240-004
5	DECKEL COVER	1	257240-005
6	DICHTUNG GASKET	# 1	257240-006
8	DISTANZSTÜCK SPACER	2	1.8645-012
9	DEHNHÜLSE EXTENSION SLEEVE	10	1.0502-074
11	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-240
12	SECHSKANTSCHRAUBE HEXAGON SCREW	34	1.1387-378
13	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-444
14	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1392-453
15	SECHSKANTSCHRAUBE HEXAGON BOLT	10	1.1367-378
16	SECHSKANTSCHRAUBE HEXAGON BOLT	5	1.1372-384
18	SCHEIBE WASHER	8	1.0045-129
19	SCHEIBE WASHER	34	1.0041-224
21	VERSCHLUSSSCHRAUBE SCREW PLUG	2	1.1040-364
22	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-812
23	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	3	1.1041-609

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Charge Air Cooler Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
25	DICHTRING JOINT RING	# 2	1.7010-191
26	DICHTRING JOINT RING	# 2	1.7010-252
27	DICHTRING JOINT RING	# 2	1.7010-133

06

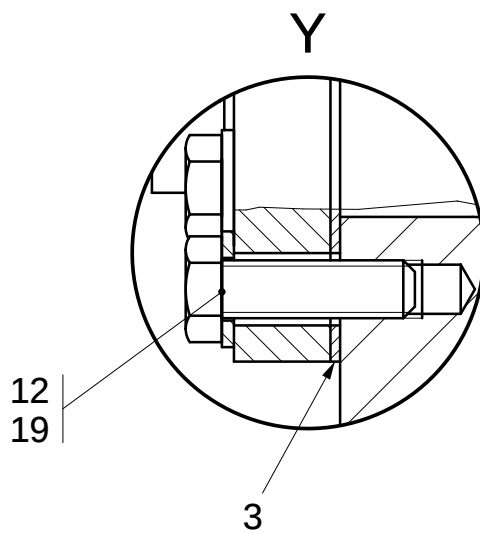
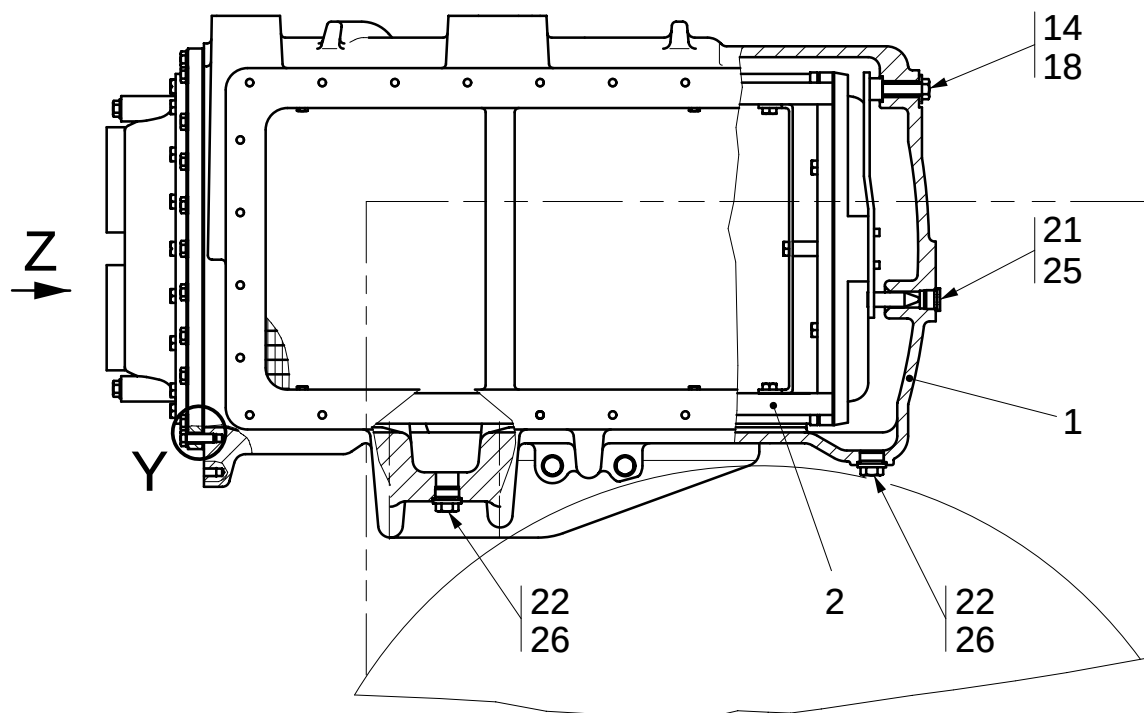
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Charge Air Cooler Mounting

M25

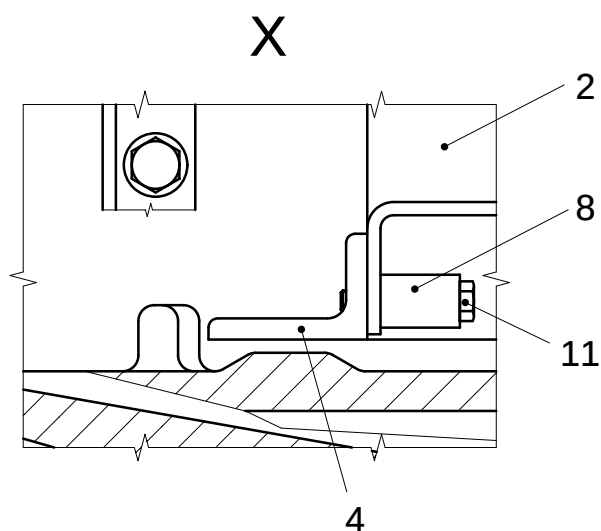
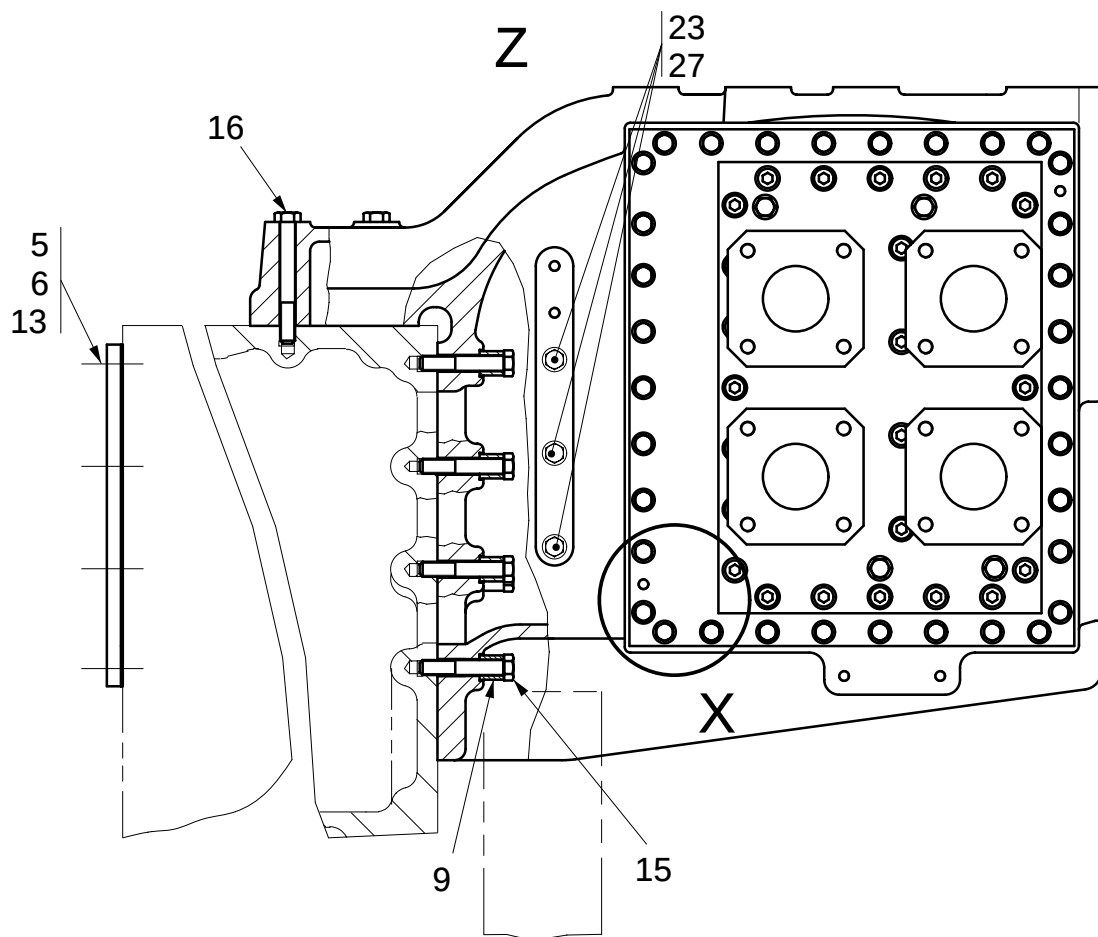
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Charge Air Cooler Mounting

M25

06



Charge Air Cooler Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LADELUFTKÜHLER-ANBAU, VOLLST. CHARGE AIR COOLER MOUNTING ASSEMBLY	1	257240 BB
1	GEHÄUSE HOUSING	1	257240-101
2	LADELUFTKÜHLER, VOLLST. CHARGE AIR COOLER, COMPL.	1	SIEHE BUCHC, ABSCHNITT 10 SEE BOOK C, SECTION 10
3	DICHTUNG GASKET	# 1	257240-003
4	WINKELSCHIENE CUP WASHER	1	257240-004
5	DECKEL COVER	1	257240-005
6	DICHTUNG GASKET	# 1	257240-006
8	DISTANZSTÜCK SPACER	2	1.8645-012
9	DEHNHÜLSE EXTENSION SLEEVE	10	1.0502-074
11	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-240
12	SECHSKANTSCHRAUBE HEXAGON SCREW	34	1.1387-378
13	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-444
14	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1392-453
15	SECHSKANTSCHRAUBE HEXAGON BOLT	10	1.1367-378
16	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1372-384
18	SCHEIBE WASHER	12	1.0045-129
19	SCHEIBE WASHER	34	1.0041-224
21	VERSCHLUSSSCHRAUBE SCREW PLUG	2	1.1040-364
22	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-812
23	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-609

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Charge Air Cooler Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
25	DICHTRING JOINT RING	# 2	1.7010-191
26	DICHTRING JOINT RING	# 2	1.7010-252
27	DICHTRING JOINT RING	# 2	1.7010-133

= VERBRAUCHSTEILE
CONSUMABLES

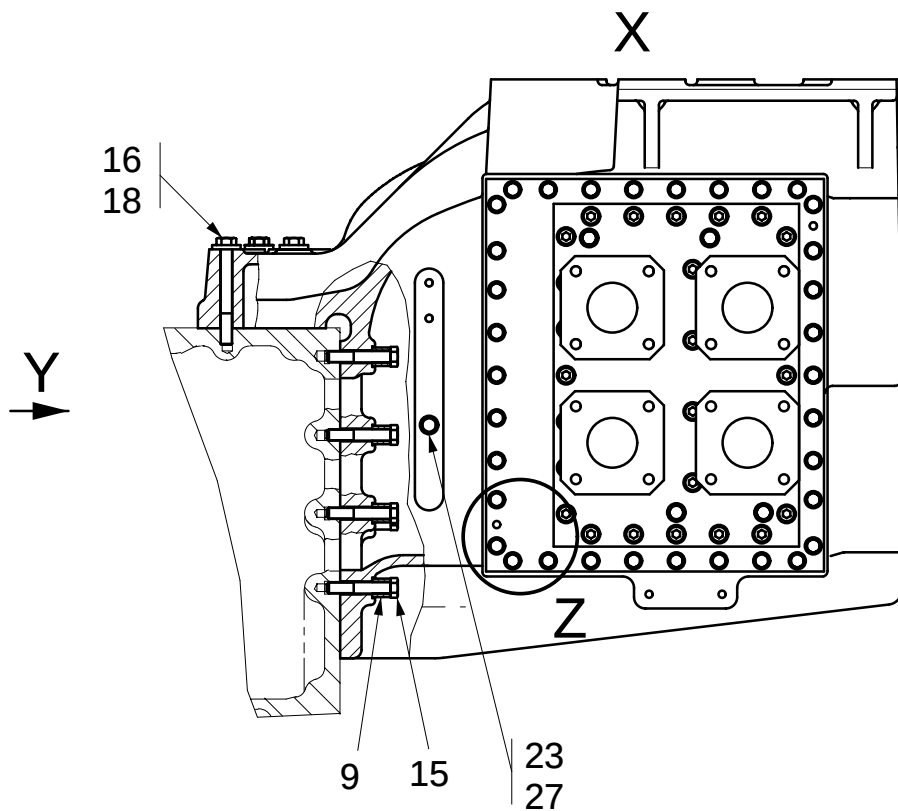
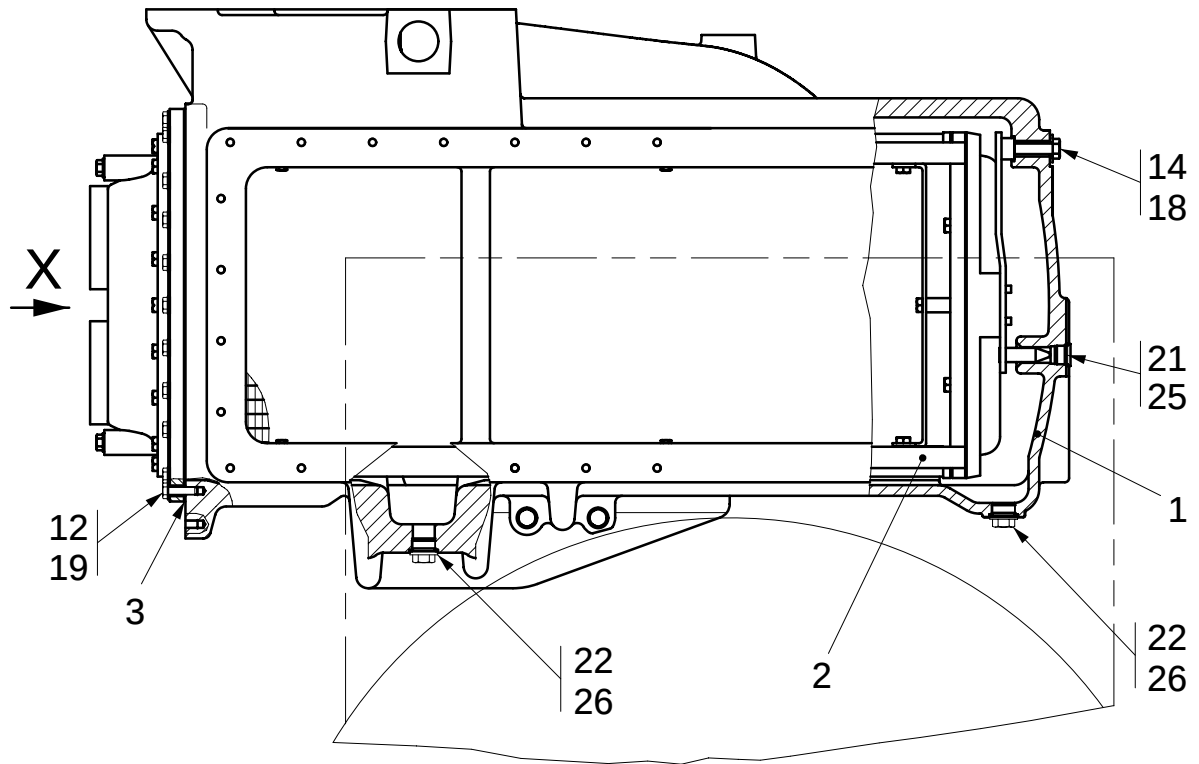
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Charge Air Cooler Mounting

M25

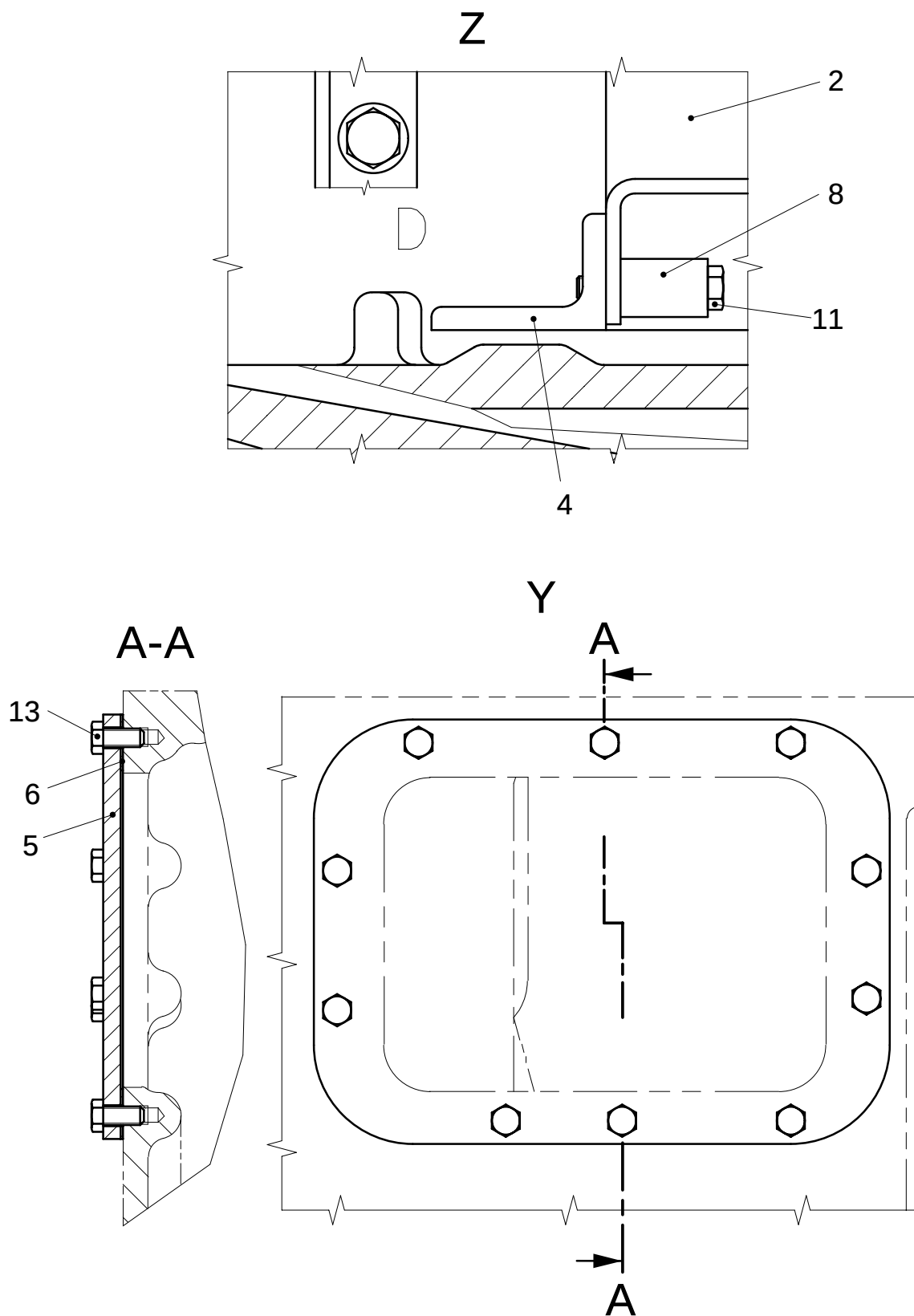
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Charge Air Cooler Mounting

M25

06



Charge Air Cooler Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LADELUFTKÜHLER-ANBAU, VOLLST. CHARGE AIR COOLER MOUNTING ASSEMBLY	1	257240 CC
1	GEHÄUSE HOUSING	1	257240-001
2	LADELUFTKÜHLER, VOLLST. CHARGE AIR COOLER, COMPL.	1	SIEHE BUCH C SEE BOOK C
3	DICHTUNG GASKET	# 1	257240-003
4	WINKELSCHIENE CUP WASHER	1	257240-004
5	DECKEL COVER	1	257240-005
6	DICHTUNG GASKET	# 1	257240-006
8	DISTANZSTÜCK SPACER	2	1.8645-012
9	DEHNHÜLSE EXTENSION SLEEVE	10	257280-009
10	SECHSKANTSCHRAUBE HEXAGON BOLT	7	1.1367-669
11	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-668
12	SECHSKANTSCHRAUBE HEXAGON SCREW	34	1.1387-378
13	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-444
14	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1312-903
15	SECHSKANTSCHRAUBE HEXAGON BOLT	3	1.1367-378
16	SECHSKANTSCHRAUBE HEXAGON BOLT	5	1.1372-384
17	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	6	1.1153-169
18	SCHEIBE WASHER	8	1.0045-129
19	SCHEIBE WASHER	34	1.0040-224
20	SCHEIBE WASHER	6	1.0043-082
21	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-811

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Charge Air Cooler Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
22	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-812
23	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-609
25	DICHTRING JOINT RING	# 2	1.7010-218
26	DICHTRING JOINT RING	# 2	1.7010-252
27	DICHTRING JOINT RING	# 1	1.7010-133
29	DICHTRING JOINT RING	# 2	1.7010-029
30	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-606

= VERBRAUCHSTEILE
CONSUMABLES

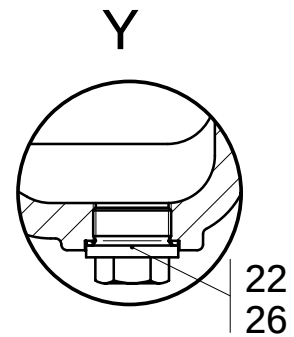
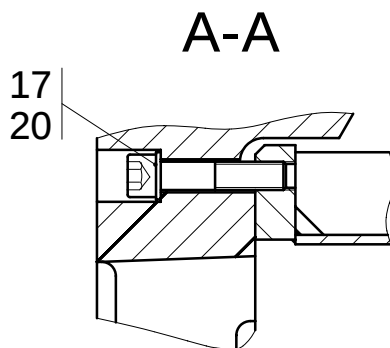
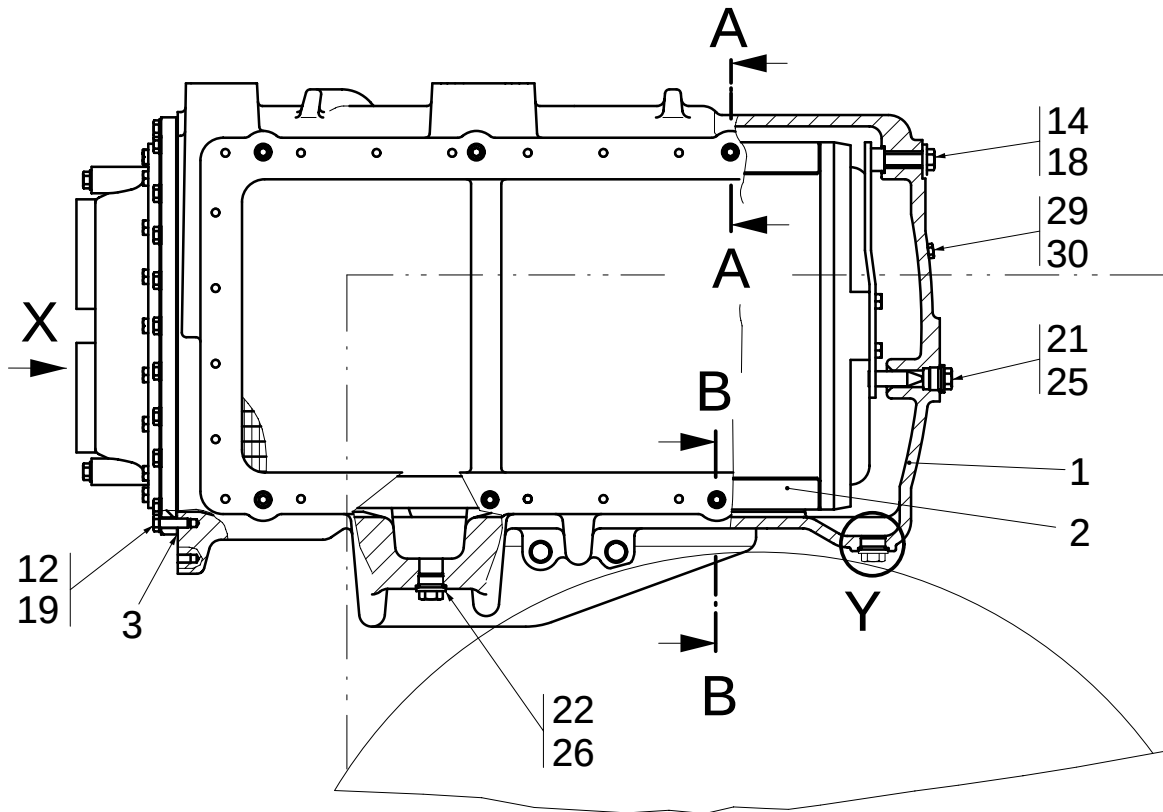
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

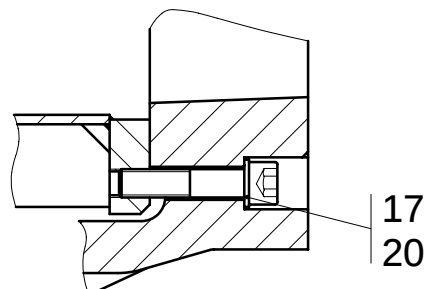
Charge Air Cooler Mounting

M25

06



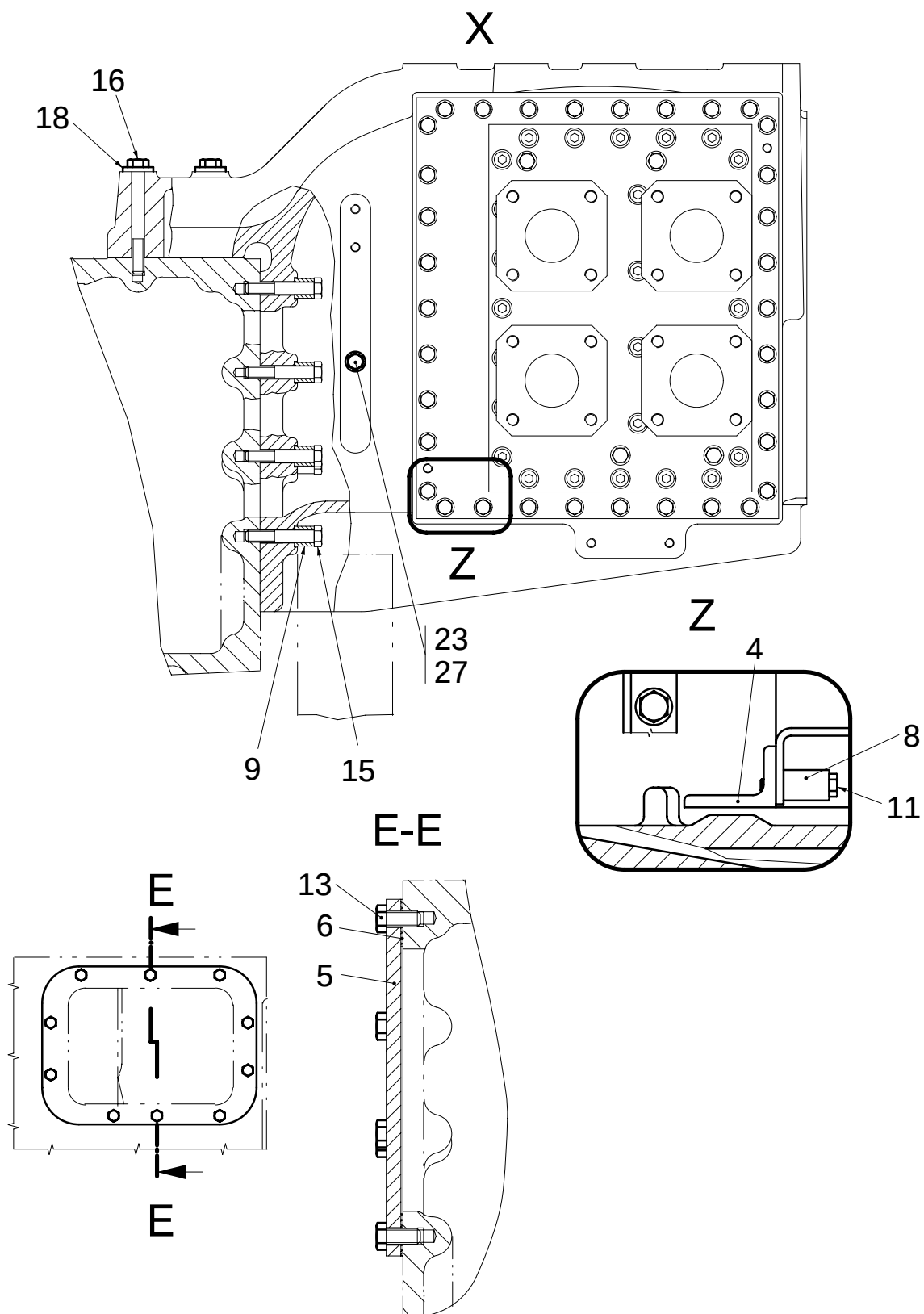
B-B



Charge Air Cooler Mounting

M25

06



Charge Air Cooler Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LADELUFTKÜHLER-ANBAU, VOLLST. CHARGE AIR COOLER MOUNTING ASSEMBLY	1	257240 DD
1	GEHÄUSE HOUSING	1	257240-101
2	LADELUFTKÜHLER, VOLLST. CHARGE AIR COOLER, COMPL.	1	SIEHE BUCH C SEE BOOK C
3	DICHTUNG GASKET	# 1	257240-003
4	WINKELSCHIENE CUP WASHER	1	257240-004
5	DECKEL COVER	1	257240-005
6	DICHTUNG GASKET	# 1	257240-006
8	DISTANZSTÜCK SPACER	2	1.8645-012
9	DEHNHÜLSE EXTENSION SLEEVE	10	257280-009
10	SECHSKANTSCHRAUBE HEXAGON BOLT	7	1.1367-669
11	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-668
12	SECHSKANTSCHRAUBE HEXAGON SCREW	34	1.1387-378
13	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-444
14	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1312-903
15	SECHSKANTSCHRAUBE HEXAGON BOLT	3	1.1367-378
16	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1372-384
17	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	8	1.1153-170
18	SCHEIBE WASHER	12	1.0045-129
19	SCHEIBE WASHER	34	1.0040-224
20	SCHEIBE WASHER	8	1.0043-082
21	VERSCHLUSSSCHRAUBE SCREW PLUG	2	1.1041-811

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Charge Air Cooler Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
22	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-812
23	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-609
25	DICHTRING JOINT RING	# 2	1.7010-218
26	DICHTRING JOINT RING	# 2	1.7010-252
27	DICHTRING JOINT RING	# 2	1.7010-133
29	DICHTRING JOINT RING	# 2	1.7010-029
30	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-606

= VERBRAUCHSTEILE
CONSUMABLES

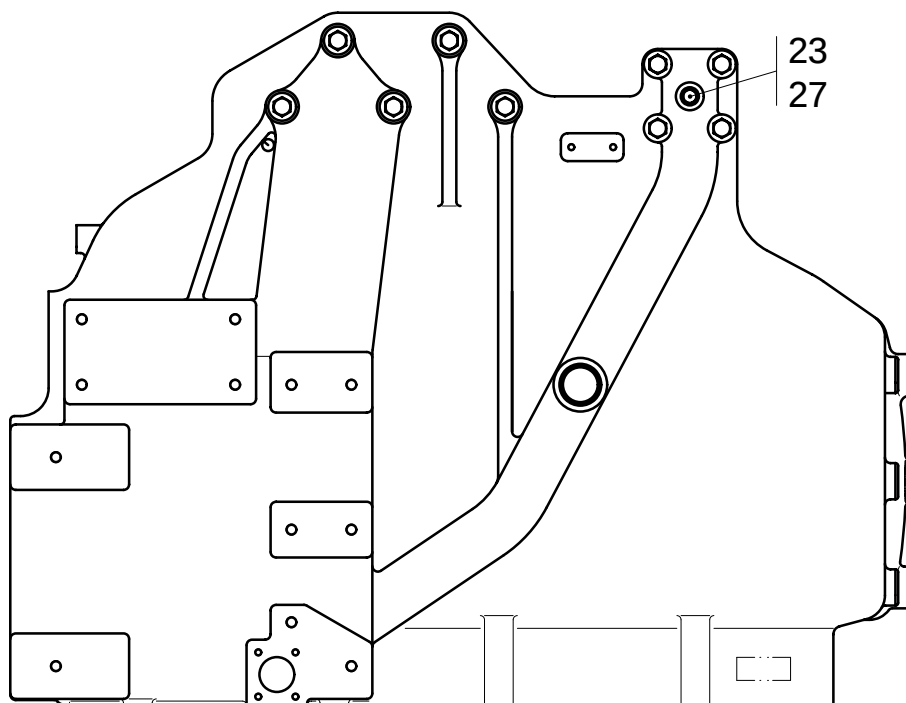
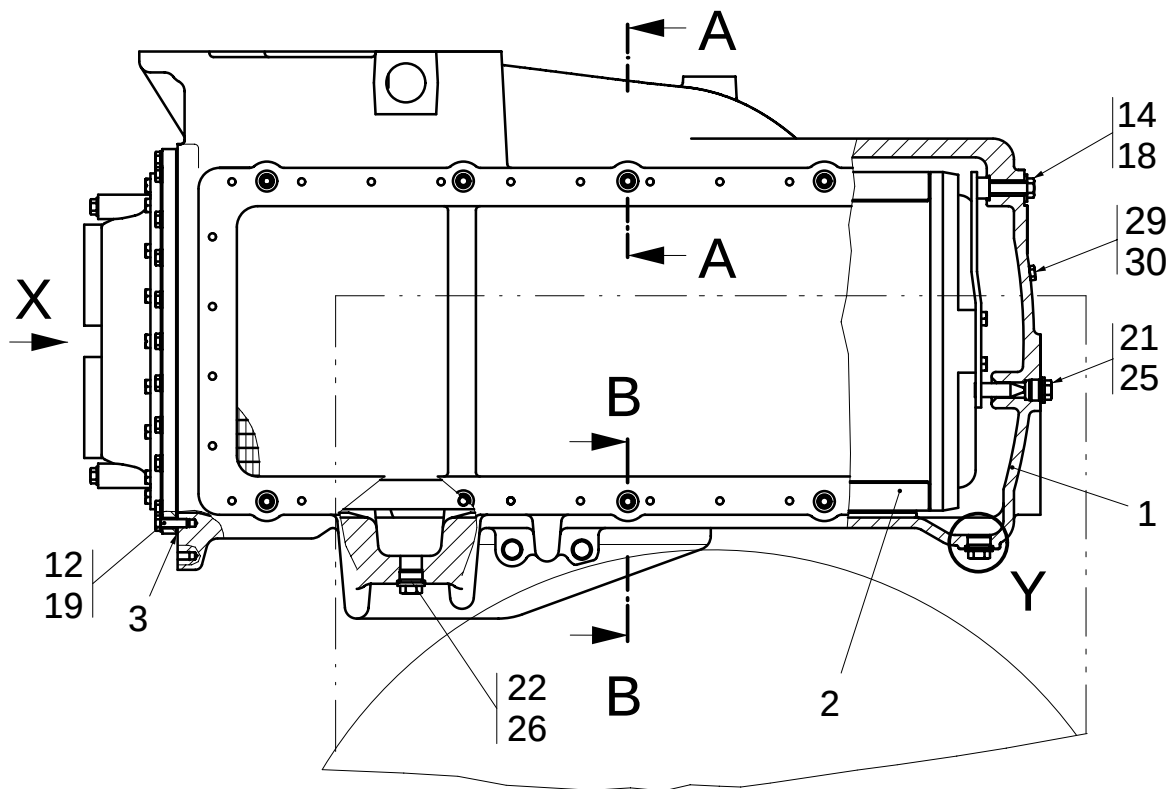
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Charge Air Cooler Mounting

M25

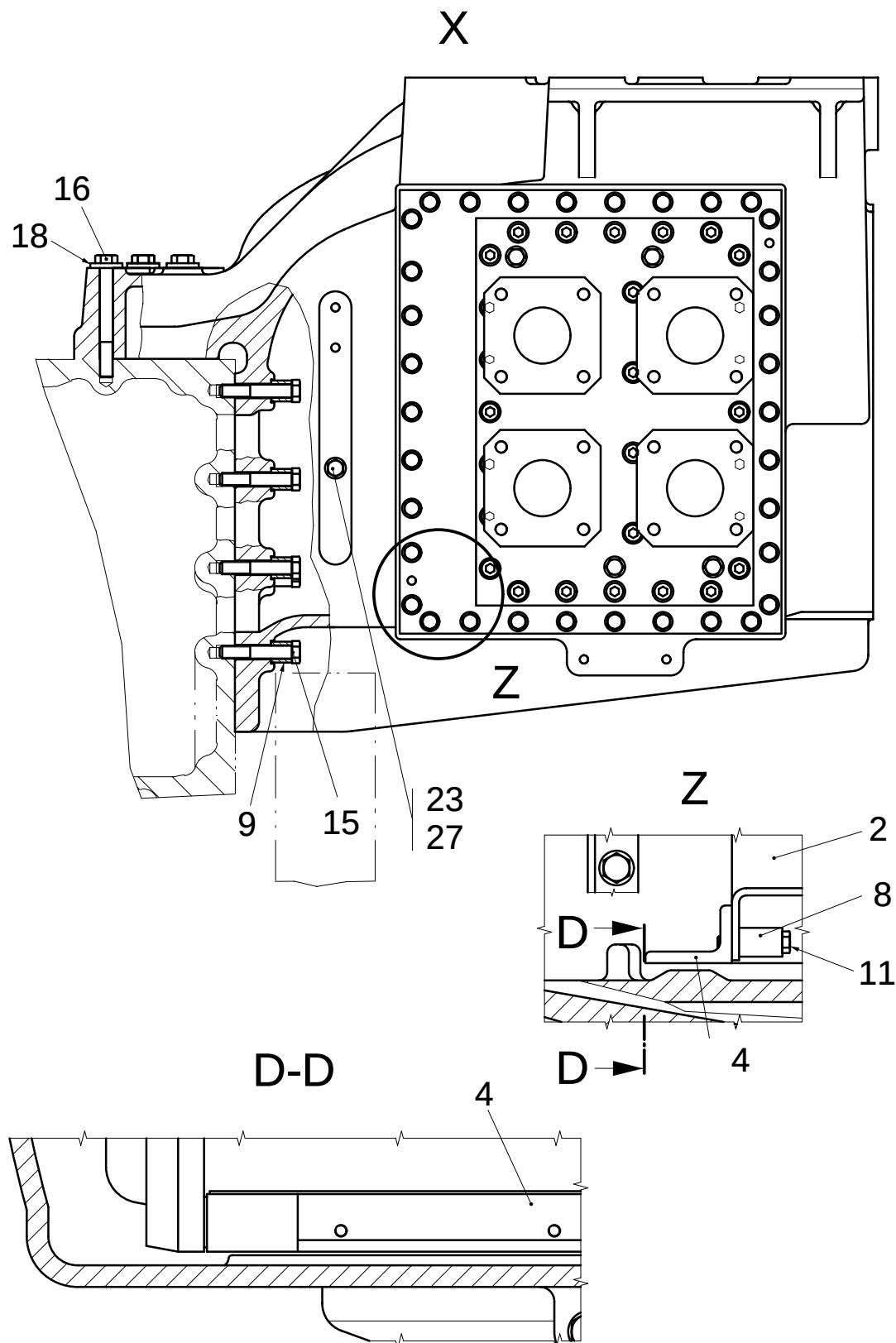
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Charge Air Cooler Mounting

M25

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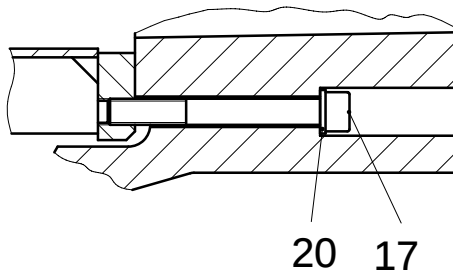


Charge Air Cooler Mounting

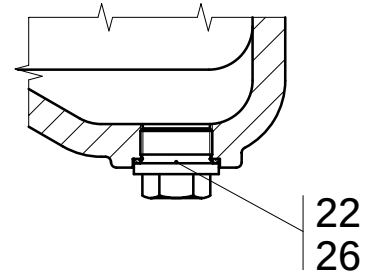
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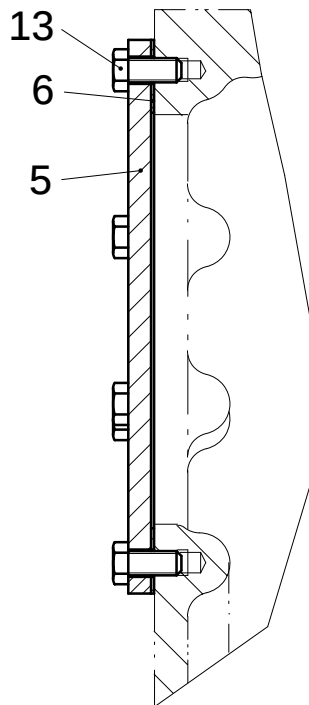
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B-B**



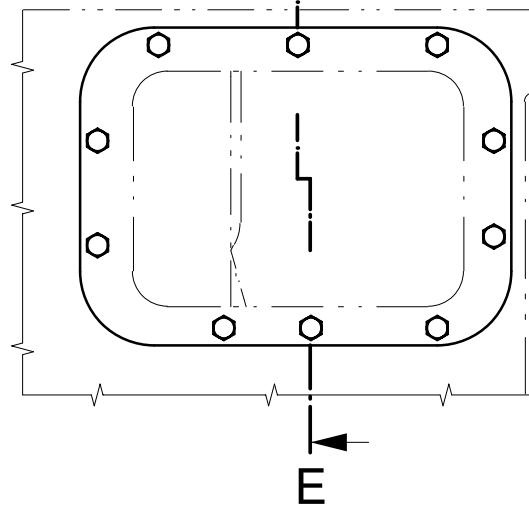
Y



E-E



E



Turbocharger Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TURBOLADER-ANBAU, VOLLST. TURBOCHARGER MOUNTING ASSEMBLY	1	257250 AA
1	TURBOLADER, VOLLST. TURBOCHARGER, COMPL.	1	SIEHE BUCH C, ABSCHNITT 10 SEE BOOK C, SECTION 10
2	LUFTEINTRITTSGEHÄUSE, VOLLST. AIR INLET CASING, COMPL.	1	257250-002
3	DICHTUNG GASKET	# 1	257250-003
4	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	1	257250-004
5	SCHMIERÖLLEITUNG LUBRICATING OIL PIPE	1	257250-005
8	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-377
9	SECHSKANTSCHRAUBE HEXAGON BOLT	10	1.1367-307
10	SECHSKANTSCHRAUBE HEXAGON SCREW	26	1.1387-378
11	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1387-379
12	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	2	1.1152-137
13	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	2	1.1152-142
14	SECHSKANTMUTTER HEXAGON NUT	16	1.2007-036
17	DEHNHÜLSE EXTENSION SLEEVE	10	1.0502-069
18	SCHEIBE WASHER	4	1.0043-081
19	SCHEIBE WASHER	11	1.0041-224
20	FEDERRING SPRING WASHER	# 26	1.0065-213
22	O-RING O-RING	# 1	1.7084-637

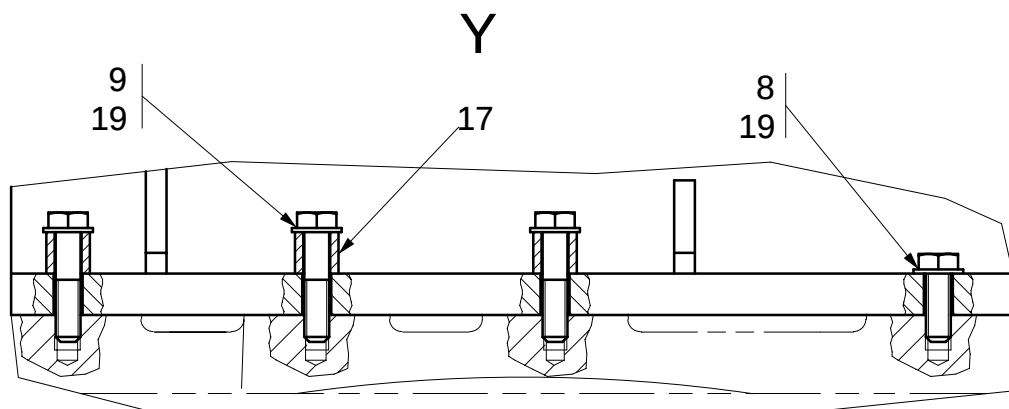
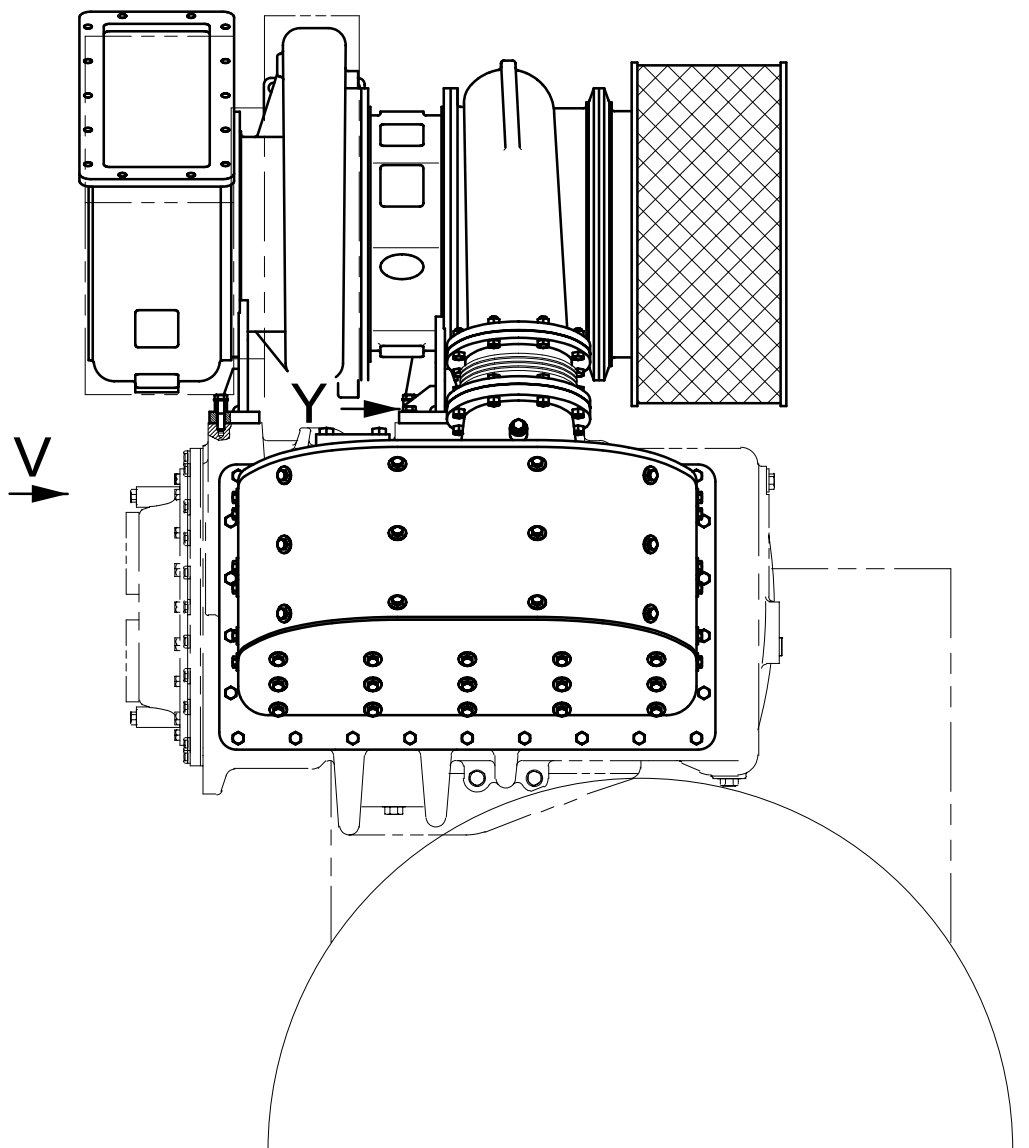
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Turbocharger Mounting

M25

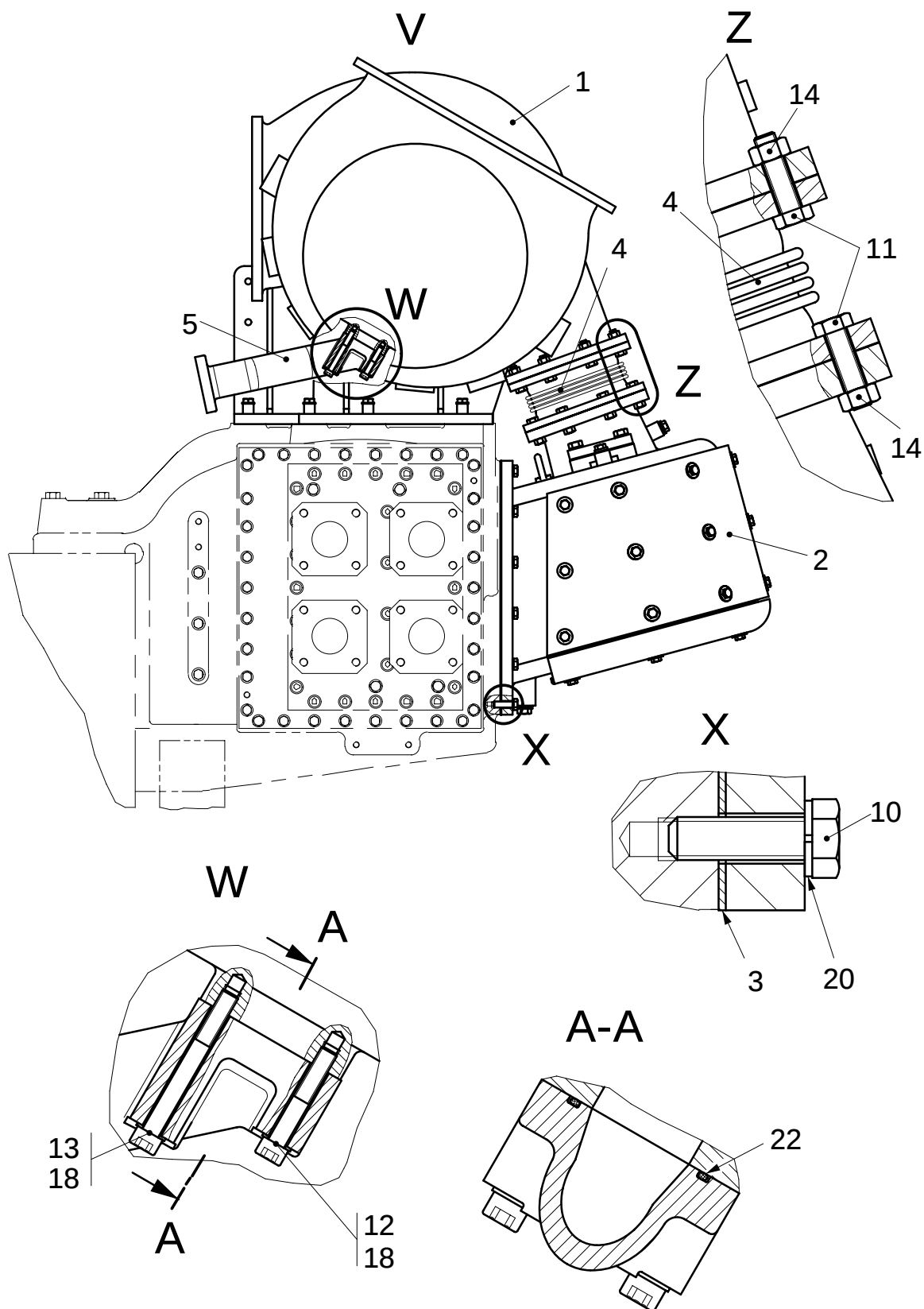
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Turbocharger Mounting

M25

06



Turbocharger Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TURBOLADER-ANBAU, VOLLST. TURBOCHARGER MOUNTING ASSEMBLY	1	257250 BB
1	TURBOLADER, VOLLST. TURBOCHARGER, COMPL.	1	SIEHE BUCH C, ABSCHNITT 10 SEE BOOK C, SECTION 10
2	LUFTEINTRITTSGEHÄUSE, VOLLST. AIR INLET CASING, COMPL.	1	257250-202
3	DICHTUNG GASKET	# 1	257255-103
4	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	1	257255-104
5	FLANSCH FLANGE	1	257255-105
6	FLANSCH FLANGE	1	257255-106
7	ÖLLEITUNG OIL PIPE	1	257250-207
8	SICHERUNGSBLECH TAB WASHER	1	257255-108
9	DICHTUNG GASKET	# 1	257255-109
10	DICHTUNG GASKET	# 1	1.7073-726
11	O-RING O-RING	# 2	1.7082-097
12	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-372
13	SECHSKANTSCHRAUBE HEXAGON SCREW	30	1.1387-378
14	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1387-380
15	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-346
16	SECHSKANTMUTTER HEXAGON NUT	16	1.2007-036
17	DEHNHÜLSE EXTENSION SLEEVE	8	1.0502-063
18	SCHEIBE WASHER	8	1.0040-227

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

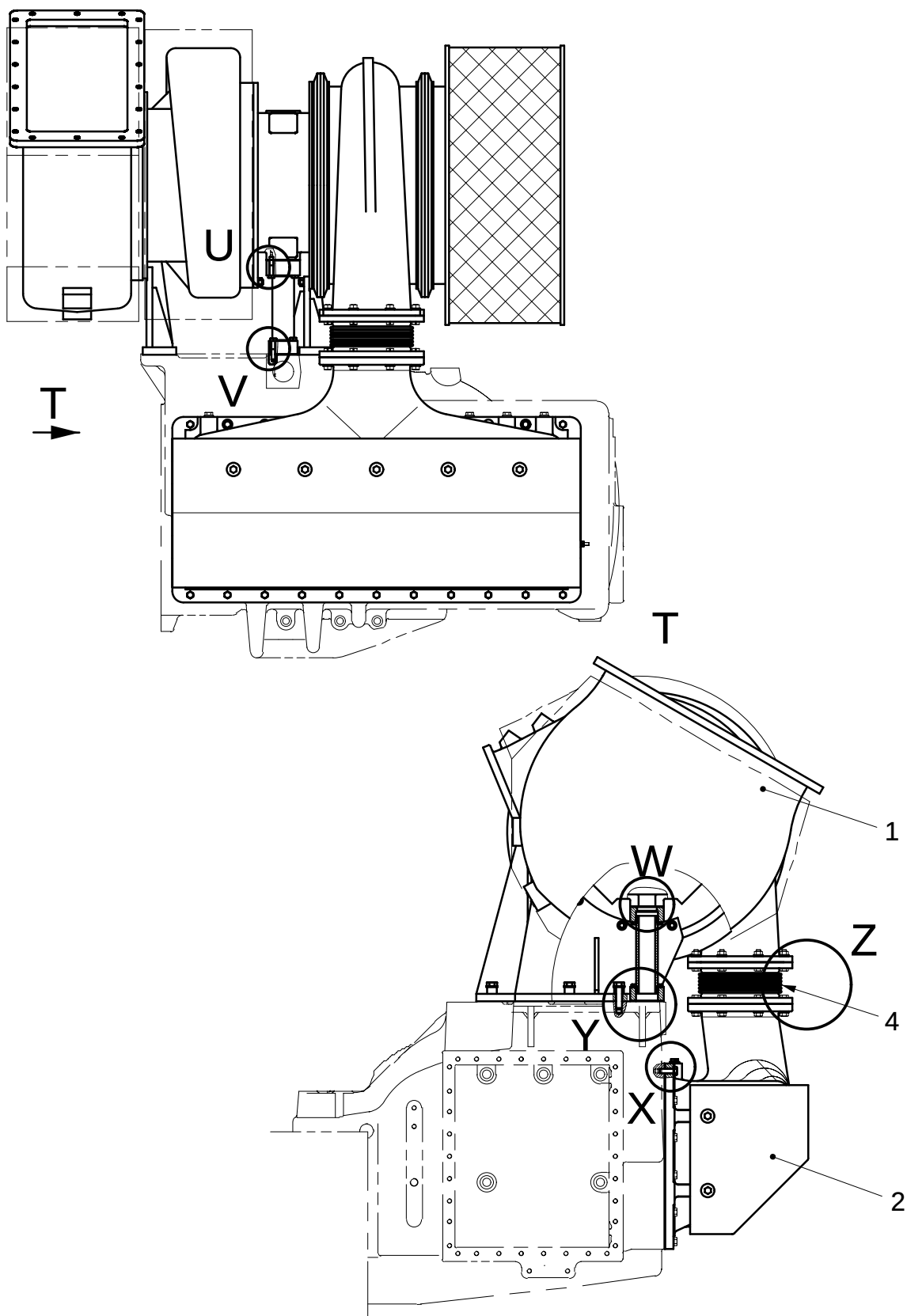
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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
19	SCHEIBE WASHER	46	1.0040-224
25	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-609
26	DICHTRING JOINT RING	# 4	1.7010-133

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

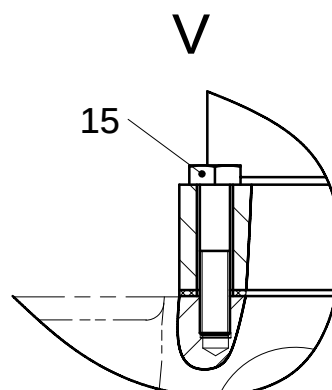
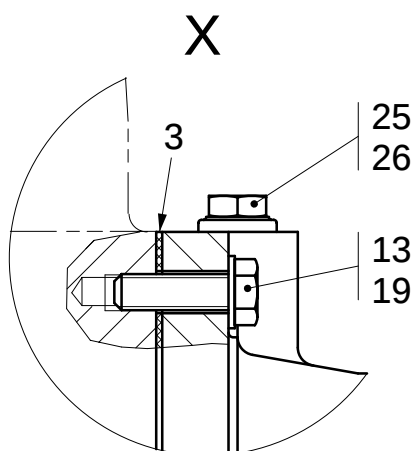
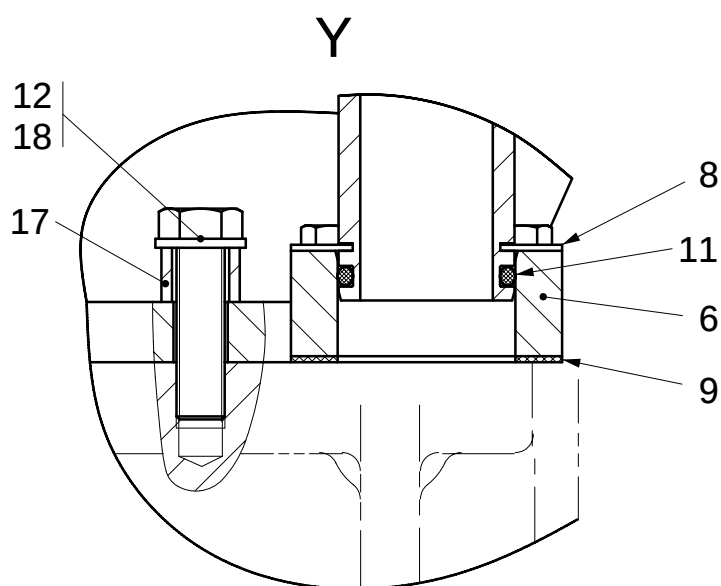
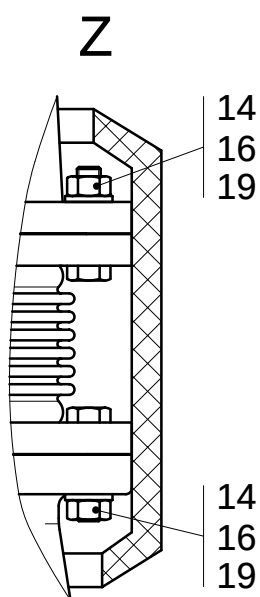
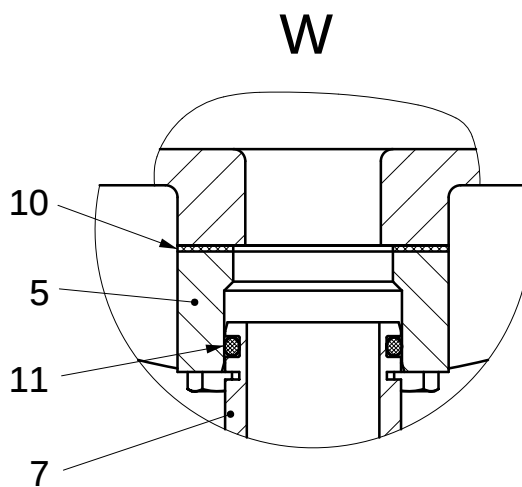
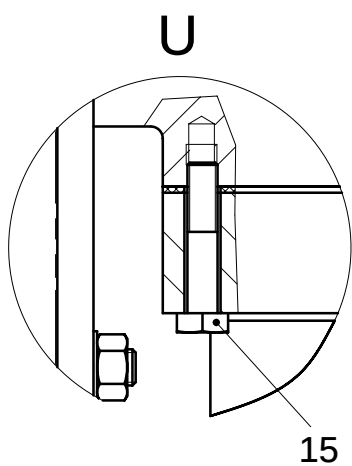
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Turbocharger Mounting

M25

06



Turbocharger Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TURBOLADER-ANBAU, VOLLST. TURBOCHARGER MOUNTING ASSEMBLY	1	257250 CC
1	TURBOLADER, VOLLST. TURBOCHARGER, COMPL.	1	SIEHE BUCH C, ABSCHNITT 10 SEE BOOK C, SECTION 10
2	LUFTEINTRITTSGEHÄUSE, VOLLST. AIR INLET CASING, COMPL.	1	257250-002
3	DICHTUNG GASKET	# 1	257250-003
4	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	1	257250-004
5	SCHMIERÖLLEITUNG LUBRICATING OIL PIPE	1	257250-005
8	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-377
9	SECHSKANTSCHRAUBE HEXAGON BOLT	10	1.1367-307
10	SECHSKANTSCHRAUBE HEXAGON SCREW	17	1.1387-378
11	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1387-379
12	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1367-308
13	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	2	1.1152-137
14	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	2	1.1152-142
15	SECHSKANTMUTTER HEXAGON NUT	16	1.2007-036
16	DEHNHÜLSE EXTENSION SLEEVE	10	1.0502-069
17	DEHNHÜLSE EXTENSION SLEEVE	5	1.0502-053
18	SCHEIBE WASHER	4	1.0043-081
19	SCHEIBE WASHER	37	1.0041-224
20	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-609

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	DICHTRING JOINT RING	# 4	1.7010-133
22	O-RING O-RING	# 1	1.7084-637

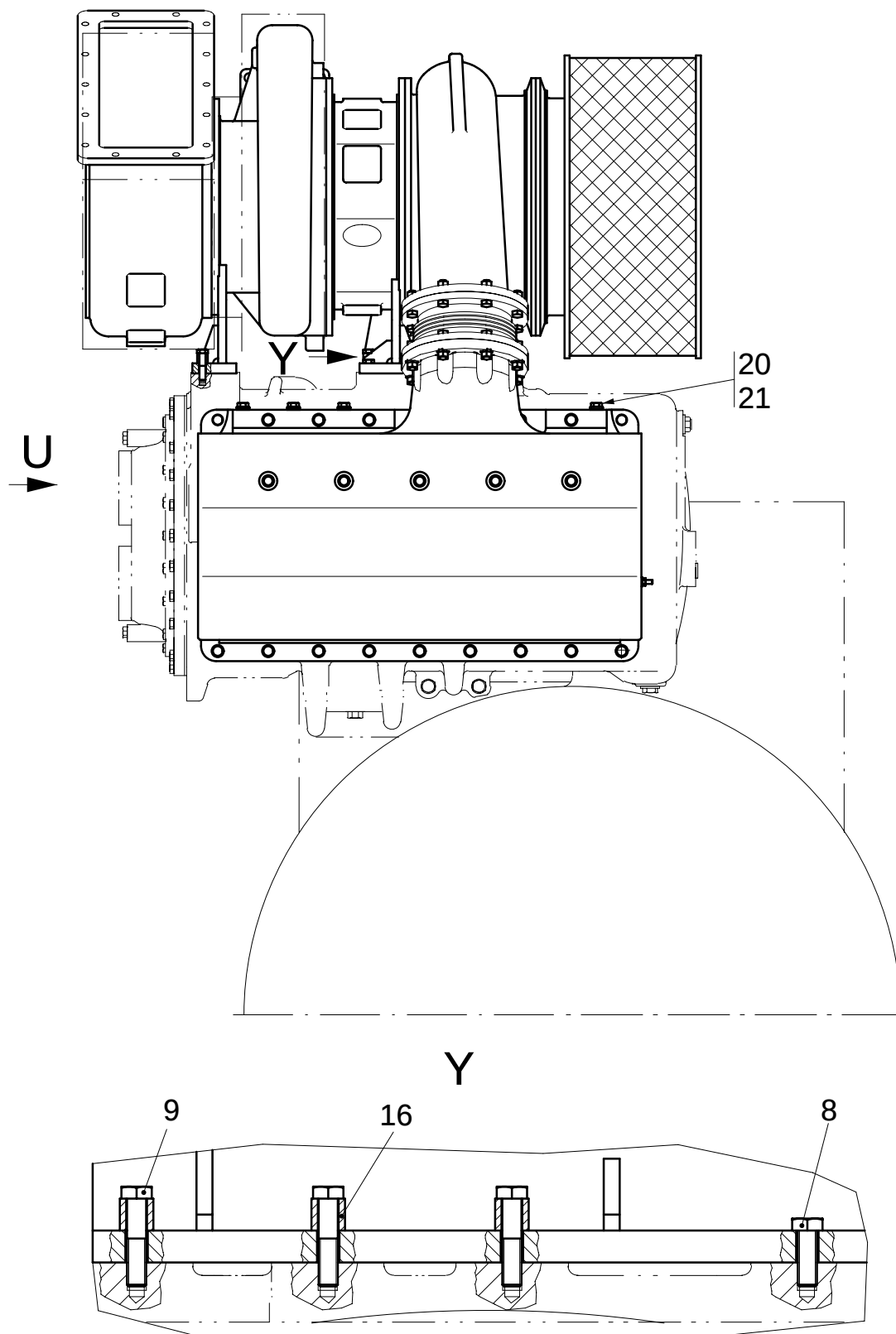
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

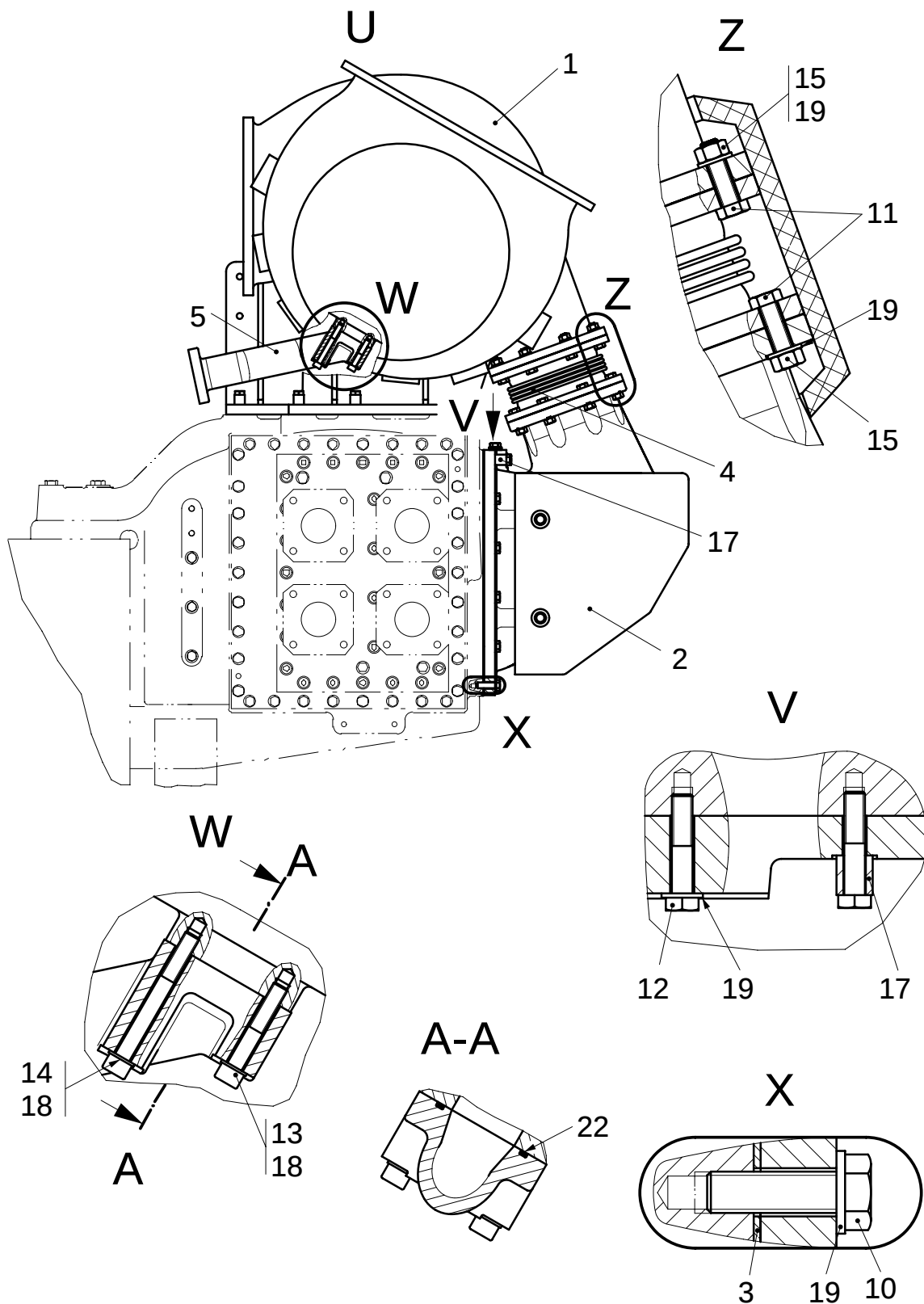
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Turbocharger Mounting

M25

06



Turbocharger Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TURBOLADER-ANBAU, VOLLST. TURBOCHARGER MOUNTING ASSEMBLY	1	257250 DD
1	TURBOLADER, VOLLST. TURBOCHARGER, COMPL.	1	SIEHE BUCH C, ABSCHNITT 10 SEE BOOK C, SECTION 10
2	LUFTEINTRITTSGEHÄUSE, VOLLST. AIR INLET CASING, COMPL.	1	257250-002
3	DICHTUNG GASKET	# 1	257250-003
4	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	1	257250-004
5	SCHMIERÖLLEITUNG LUBRICATING OIL PIPE	1	257250-005
8	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-377
9	SECHSKANTSCHRAUBE HEXAGON BOLT	10	1.1367-307
10	SECHSKANTSCHRAUBE HEXAGON SCREW	17	1.1387-378
11	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1387-379
12	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1367-309
13	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	2	1.1152-137
14	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	2	1.1152-142
15	SECHSKANTMUTTER HEXAGON NUT	16	1.2007-036
16	DEHNHÜLSE EXTENSION SLEEVE	10	1.0502-069
17	DEHNHÜLSE EXTENSION SLEEVE	5	1.0502-053
18	SCHEIBE WASHER	4	1.0043-081
19	SCHEIBE WASHER	42	1.0041-224
20	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-609
21	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	6	1.1041-808

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
22	DICHTRING JOINT RING	# 4	1.7010-133
23	DICHTRING JOINT RING	# 6	1.7010-172
24	O-RING O-RING	# 1	1.7084-637

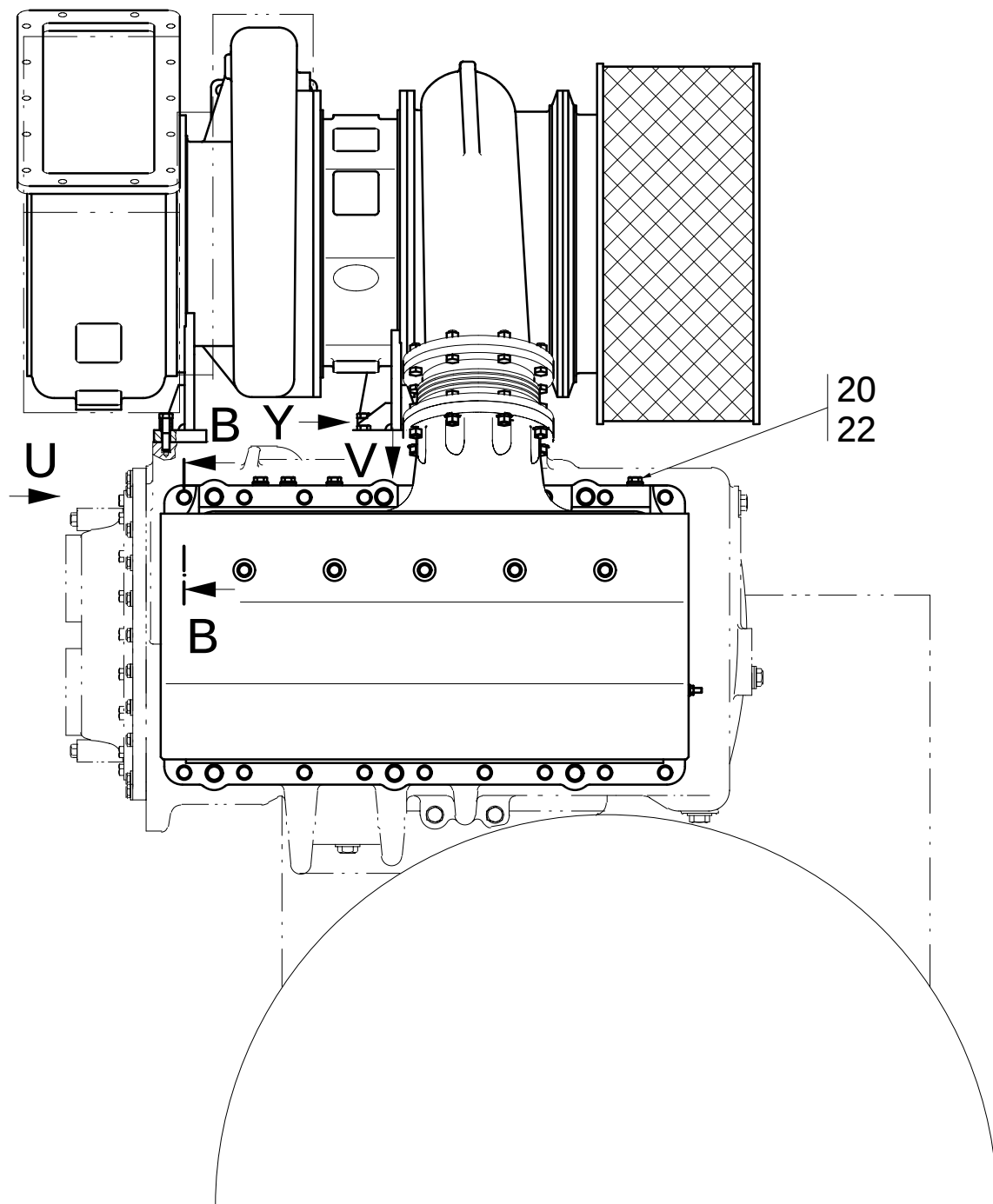
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

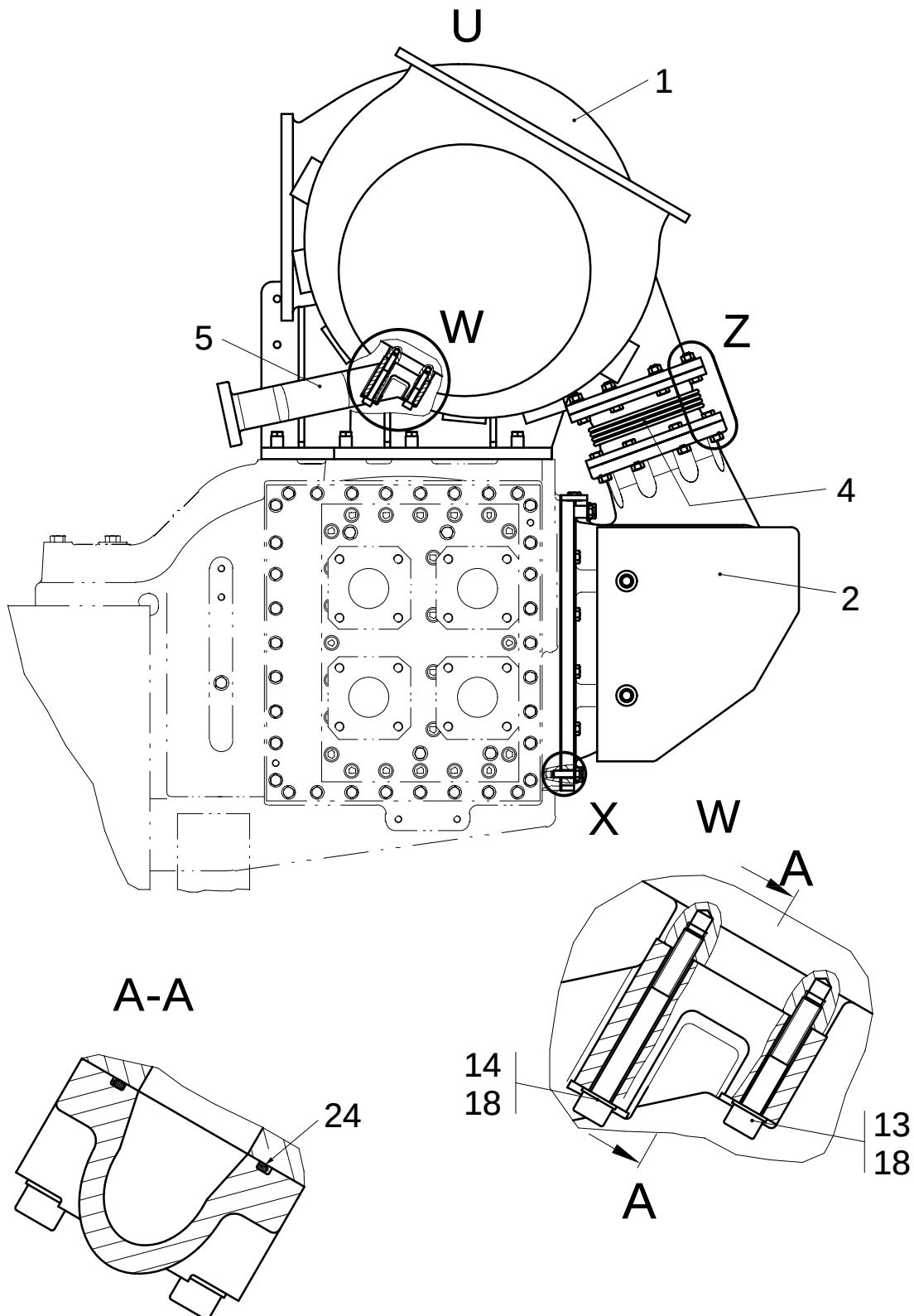
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Turbocharger Mounting

M25

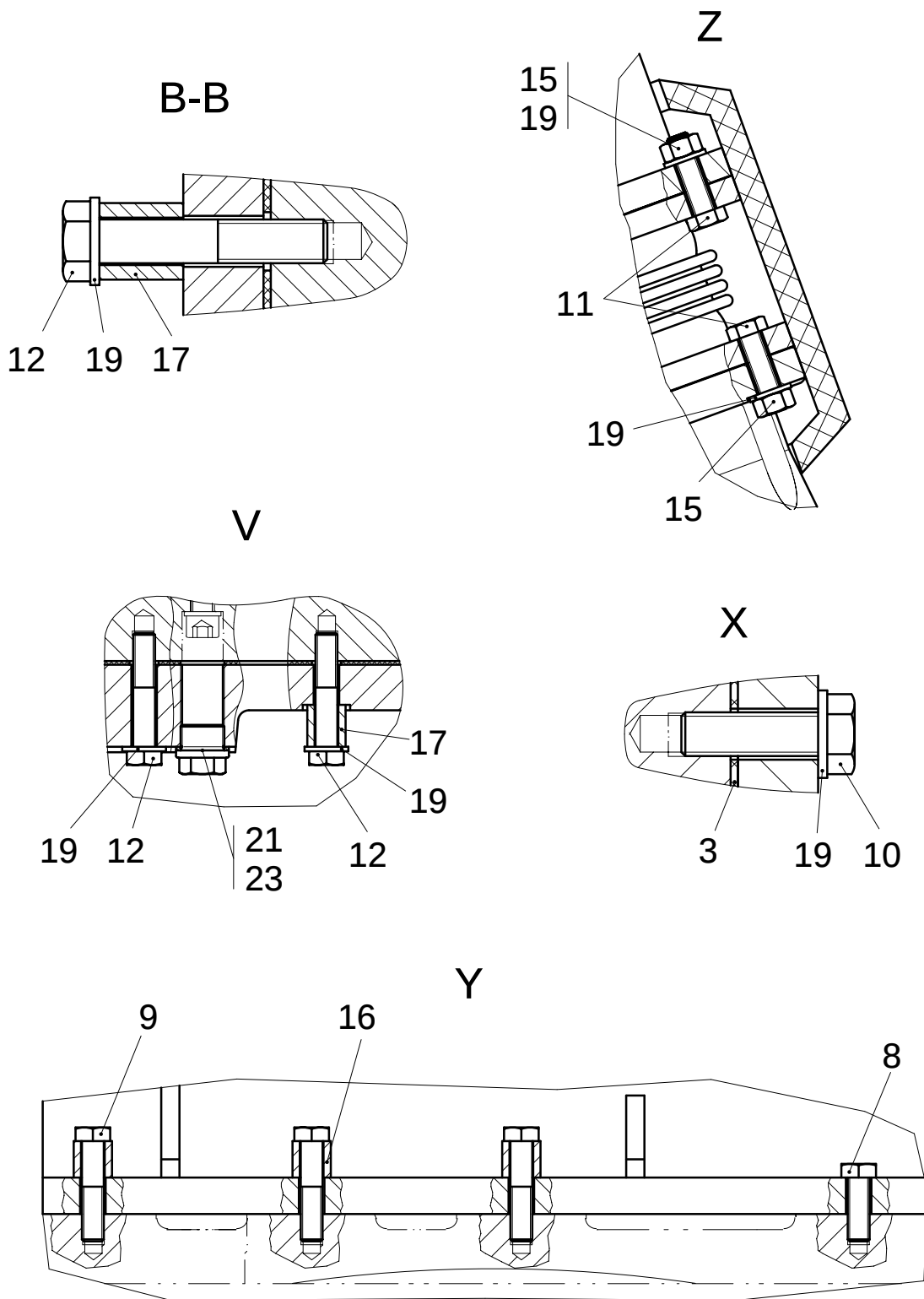
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Turbocharger Mounting

M25

06



Turbocharger Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TURBOLADER-ANBAU, VOLLST. TURBOCHARGER MOUNTING ASSEMBLY	1	257250 EE
1	TURBOLADER, VOLLST. TURBOCHARGER, COMPL.	1	SIEHE BUCH C, ABSCHNITT 10 SEE BOOK C, SECTION 10
2	LUFTEINTRITTSGEHÄUSE, VOLLST. AIR INLET CASING, COMPL.	1	257250-202
3	DICHTUNG GASKET	# 1	257255-103
4	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	1	257255-104
5	FLANSCH FLANGE	1	257255-105
6	FLANSCH FLANGE	1	257255-106
7	ÖLLEITUNG OIL PIPE	1	257250-207
8	SICHERUNGSBLECH TAB WASHER	1	257255-108
9	DICHTUNG GASKET	# 1	257255-109
10	DICHTUNG GASKET	# 1	1.7073-726
11	O-RING O-RING	# 2	1.7082-097
12	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-372
13	SECHSKANTSCHRAUBE HEXAGON SCREW	19	1.1387-378
14	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1387-380
15	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-346
16	SECHSKANTMUTTER HEXAGON NUT	16	1.2007-036
17	DEHNHÜLSE EXTENSION SLEEVE	8	1.0502-063
18	DEHNHÜLSE EXTENSION SLEEVE	7	1.0502-053
19	SCHEIBE WASHER	46	1.0040-224
20	SECHSKANTSCHRAUBE HEXAGON SCREW	11	1.1367-309

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
25	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-609
26	DICHTRING JOINT RING	# 4	1.7010-133
27	DICHTRING JOINT RING	# 8	1.7010-172
28	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	8	1.1041-808

= VERBRAUCHSTEILE
CONSUMABLES

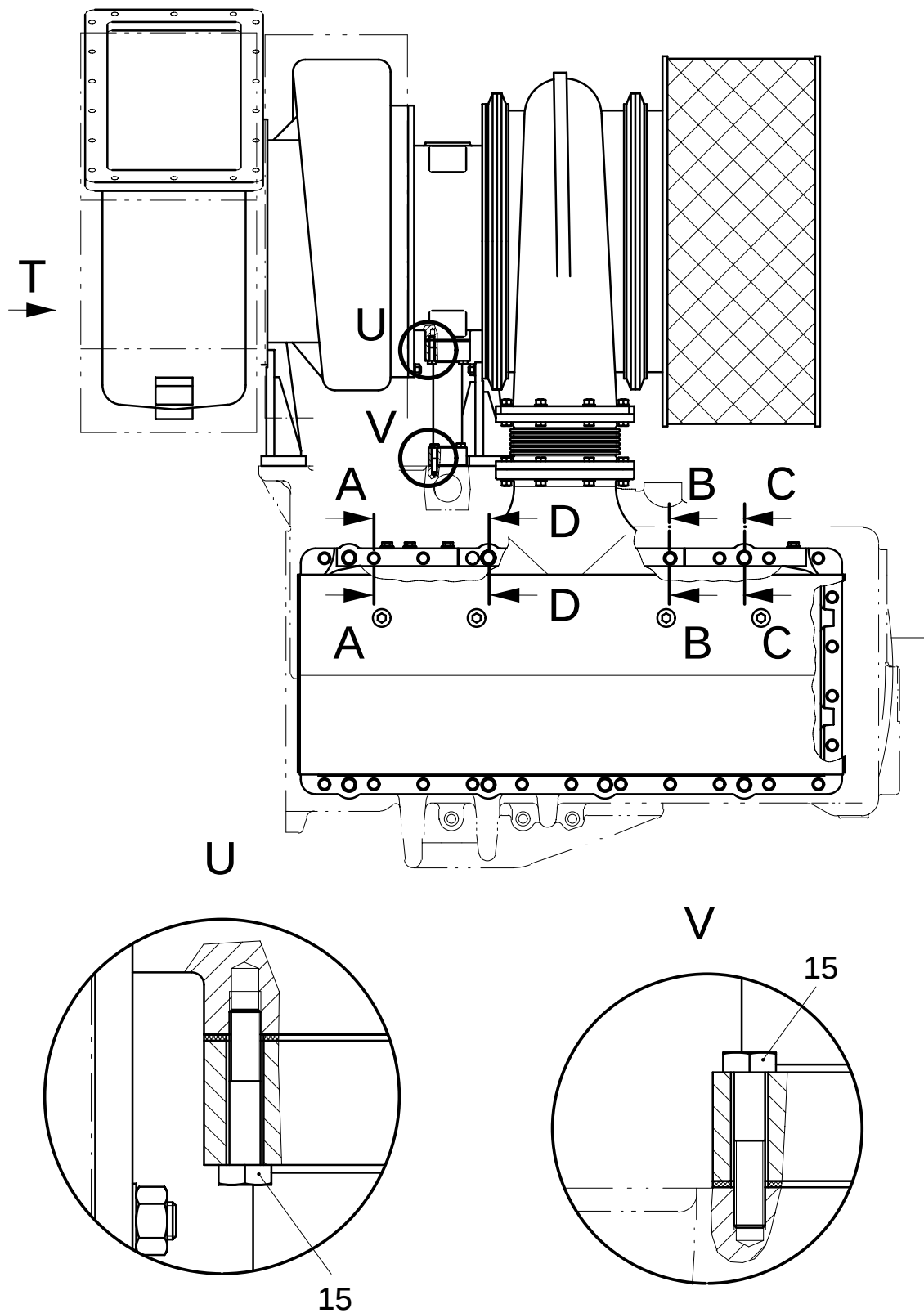
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

06

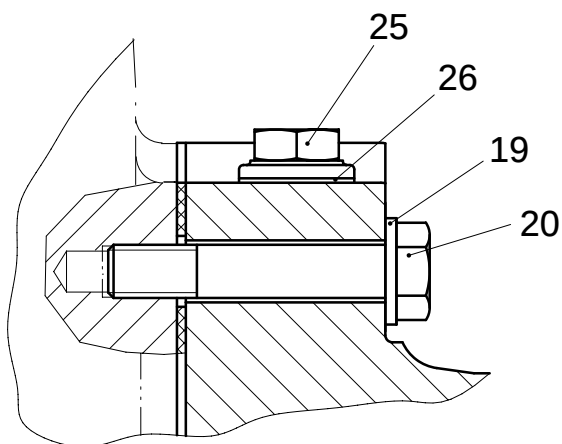


Turbocharger Mounting

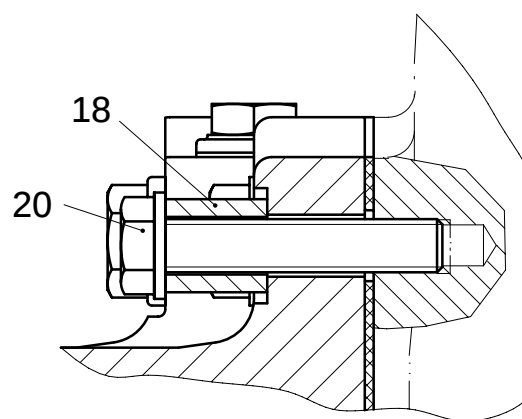
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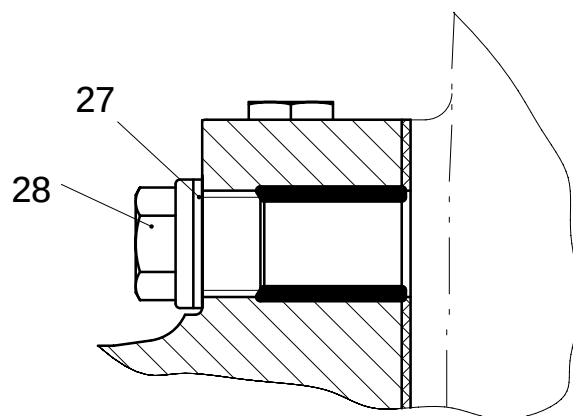
A-A



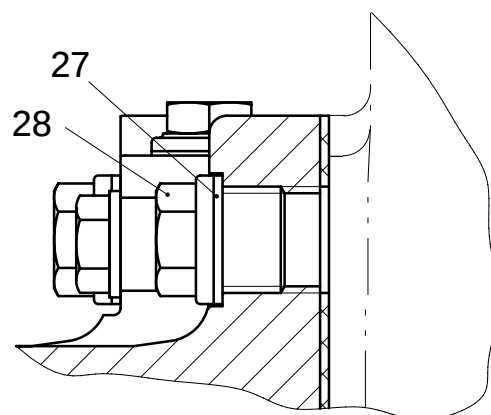
B-B



C-C



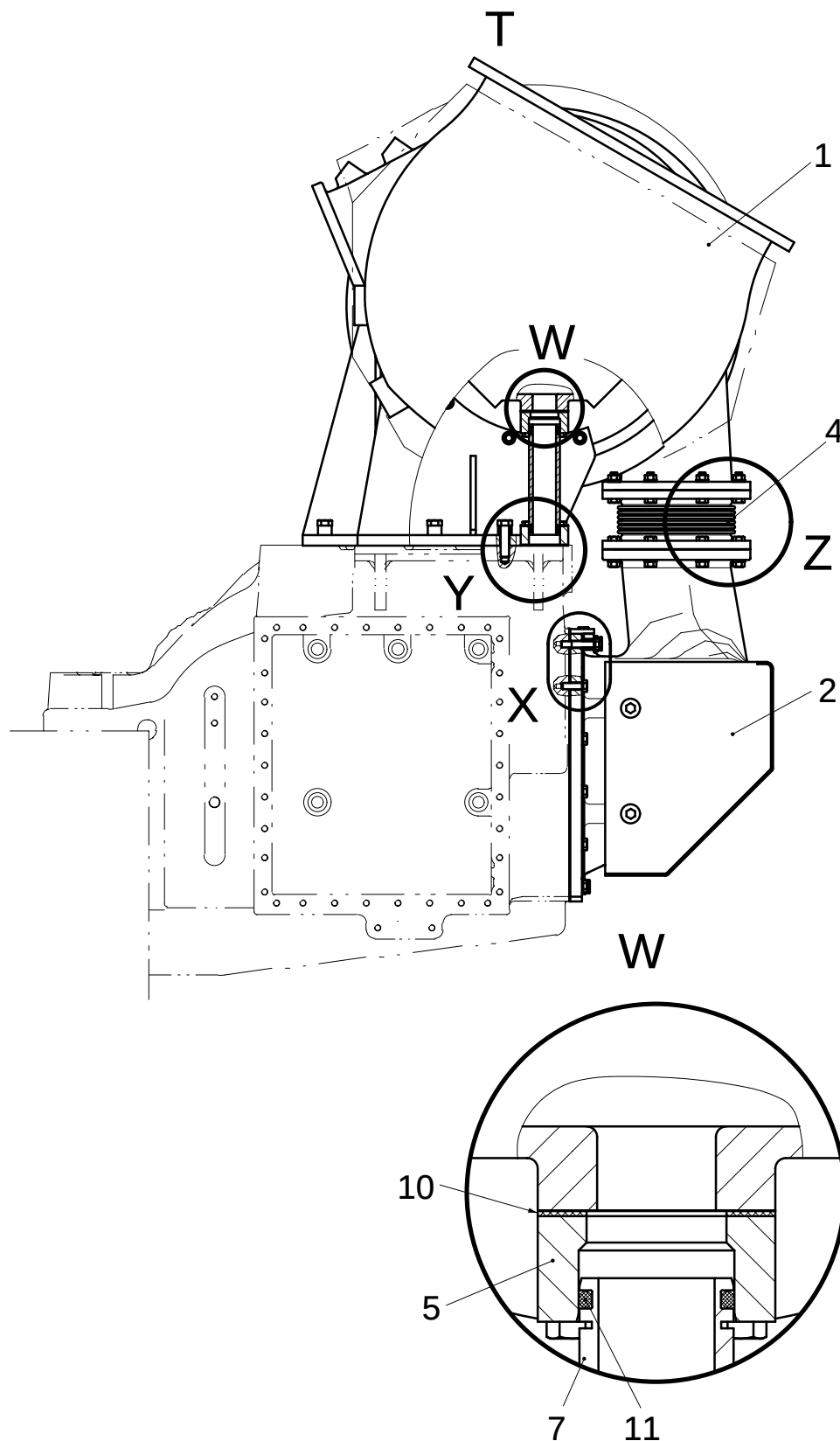
D-D



Turbocharger Mounting

M25

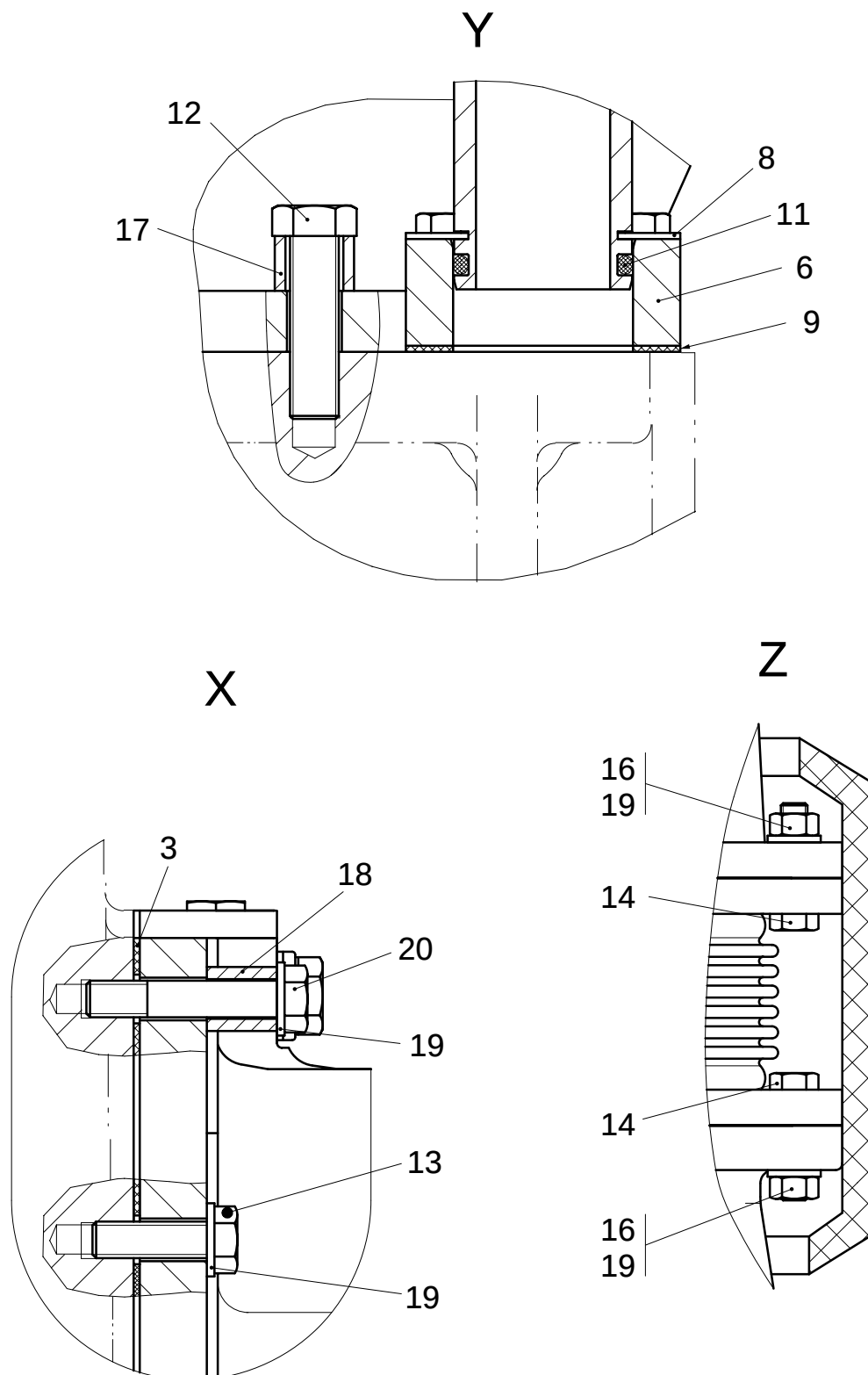
06



Turbocharger Mounting

M25

06



Turbocharger Mounting

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TURBOLADER-ANBAU, VOLLST. TURBOCHARGER MOUNTING ASSEMBLY	1	257255 AA
1	TURBOLADER, VOLLST. TURBOCHARGER, COMPL.	1	SIEHE BUCH C, ABSCHNITT 10 SEE BOOK C, SECTION 10
2	EINTRITTSGEHÄUSE INLET CASING	1	257255-002
3	DICHTUNG GASKET	# 1	257250-003
4	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	1	257250-004
5	ABDECKBLECH,VOLLST. COVER PLATE,COMPL,	1	257255-005
6	ABSTANDSSTÜCK DISTANCE PIECE	2	1.0520-170
9	SECHSKANTSCHRAUBE HEXAGON BOLT	11	1.1367-307
10	SECHSKANTSCHRAUBE HEXAGON SCREW	26	1.1387-378
11	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1387-379
12	SECHSKANTSCHRAUBE HEXAGON SCREW	15	1.1387-338
13	STIFTSCHRAUBE STUD	2	1.1234-168
14	SECHSKANTMUTTER HEXAGON NUT	16	1.2007-036
15	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034
16	DEHNHÜLSE EXTENSION SLEEVE	11	1.0502-069
17	SPANNSCHEIBE SPRING WASHER	2	1.0068-209
18	SPANNSCHEIBE SPRING WASHER	15	1.0068-225
19	SCHEIBE WASHER	11	1.0040-224
20	FEDERRING SPRING WASHER	# 26	1.0065-213

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
28	VERSCHLUSSCHRAUBE HEXAGON HEAD SCREW PLUG	# 4	1.1041-609
29	DICHTRING JOINT RING	# 4	1.7010-133

= VERBRAUCHSTEILE
CONSUMABLES

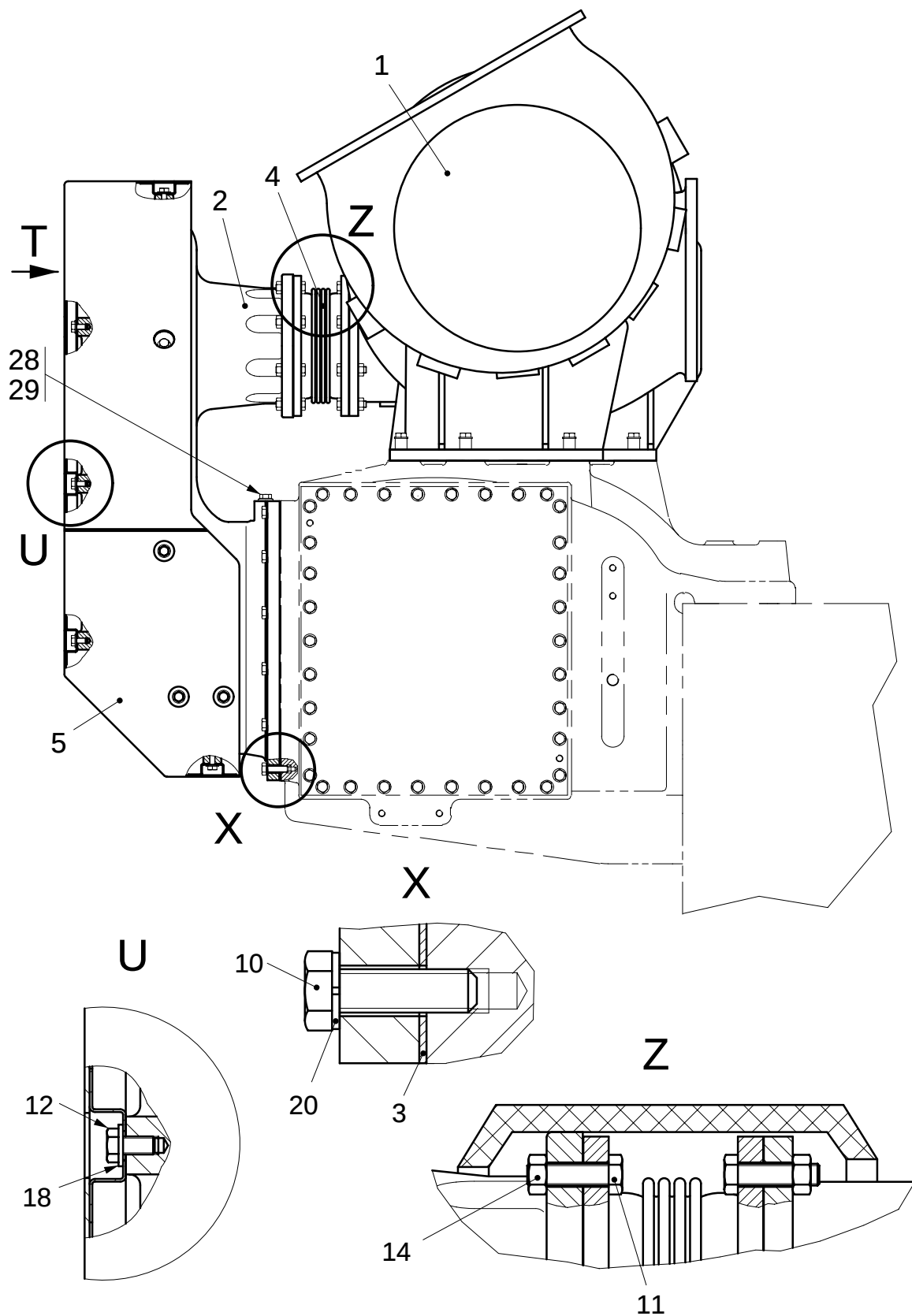
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

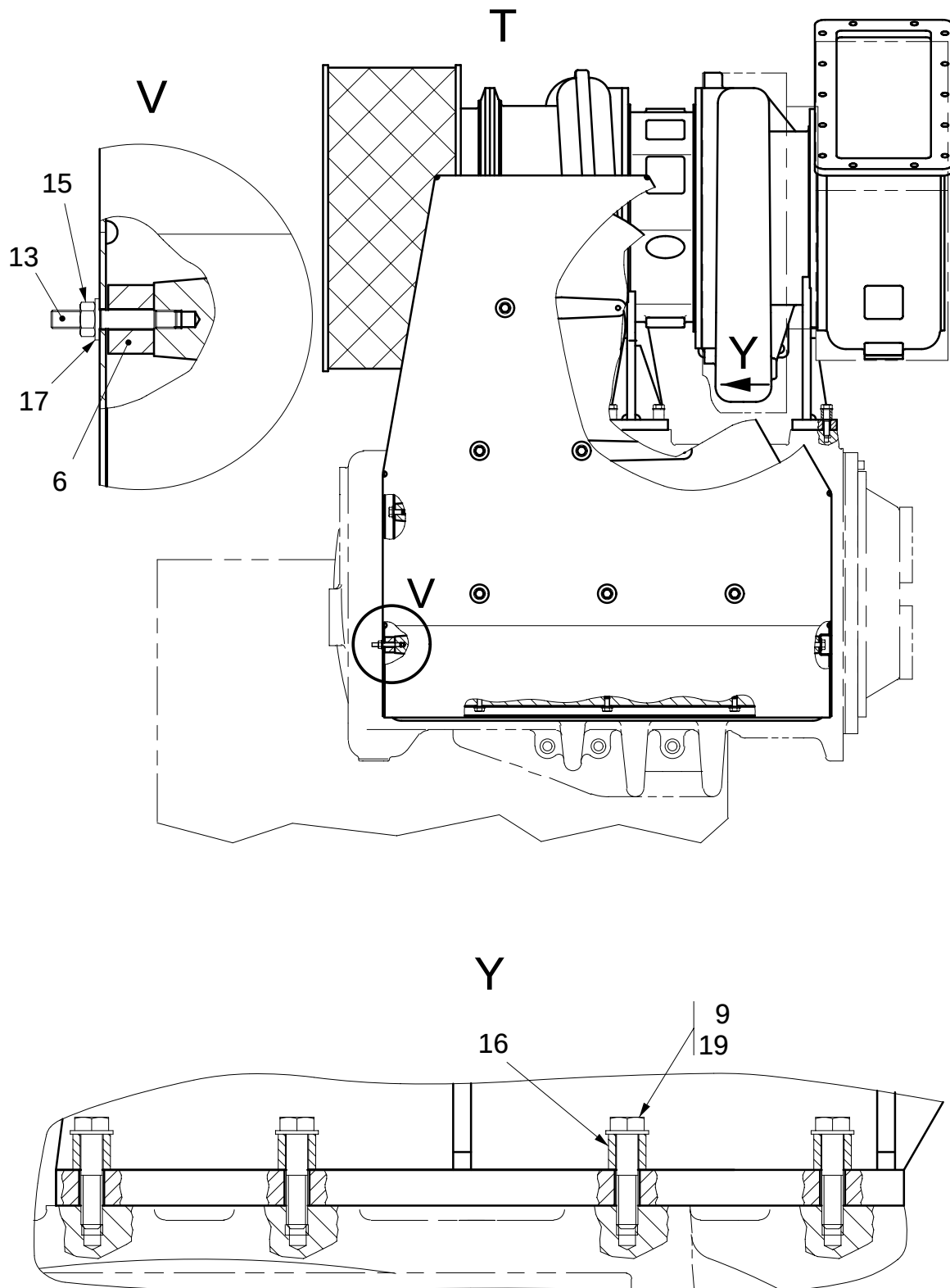
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Turbocharger Mounting

M25

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Turbocharger Mounting

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TURBOLADER-ANBAU, VOLLST. TURBOCHARGER MOUNTING ASSEMBLY	1	257255 BB
1	TURBOLADER, VOLLST. TURBOCHARGER, COMPL.	1	SIEHE BUCH C, ABSCHNITT 10 SEE BOOK C, SECTION 10
2	LUFTEINTRITTSGEHÄUSE, VOLLST. AIR INLET CASING, COMPL.	1	257255-102
3	DICHTUNG GASKET	# 1	257255-103
4	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	1	257255-104
5	FLANSCH FLANGE	1	257255-105
6	FLANSCH FLANGE	1	257255-106
7	ÖLLEITUNG OIL PIPE	1	257255-107
8	SICHERUNGSBLECH TAB WASHER	1	257255-108
9	DICHTUNG GASKET	# 1	257255-109
10	DICHTUNG GASKET	# 1	1.7073-726
11	O-RING O-RING	# 2	1.7082-097
12	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-372
13	SECHSKANTSCHRAUBE HEXAGON SCREW	21	1.1387-378
14	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1387-380
15	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1387-383
16	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-346
17	SECHSKANTMUTTER HEXAGON NUT	16	1.2007-036
18	DEHNHÜLSE EXTENSION SLEEVE	8	1.0502-081
19	SCHEIBE WASHER	30	1.0040-227
20	SCHEIBE WASHER	16	1.0041-224

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-347
26	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-609
27	DICHTRING JOINT RING	# 4	1.7010-133

= VERBRAUCHSTEILE
CONSUMABLES

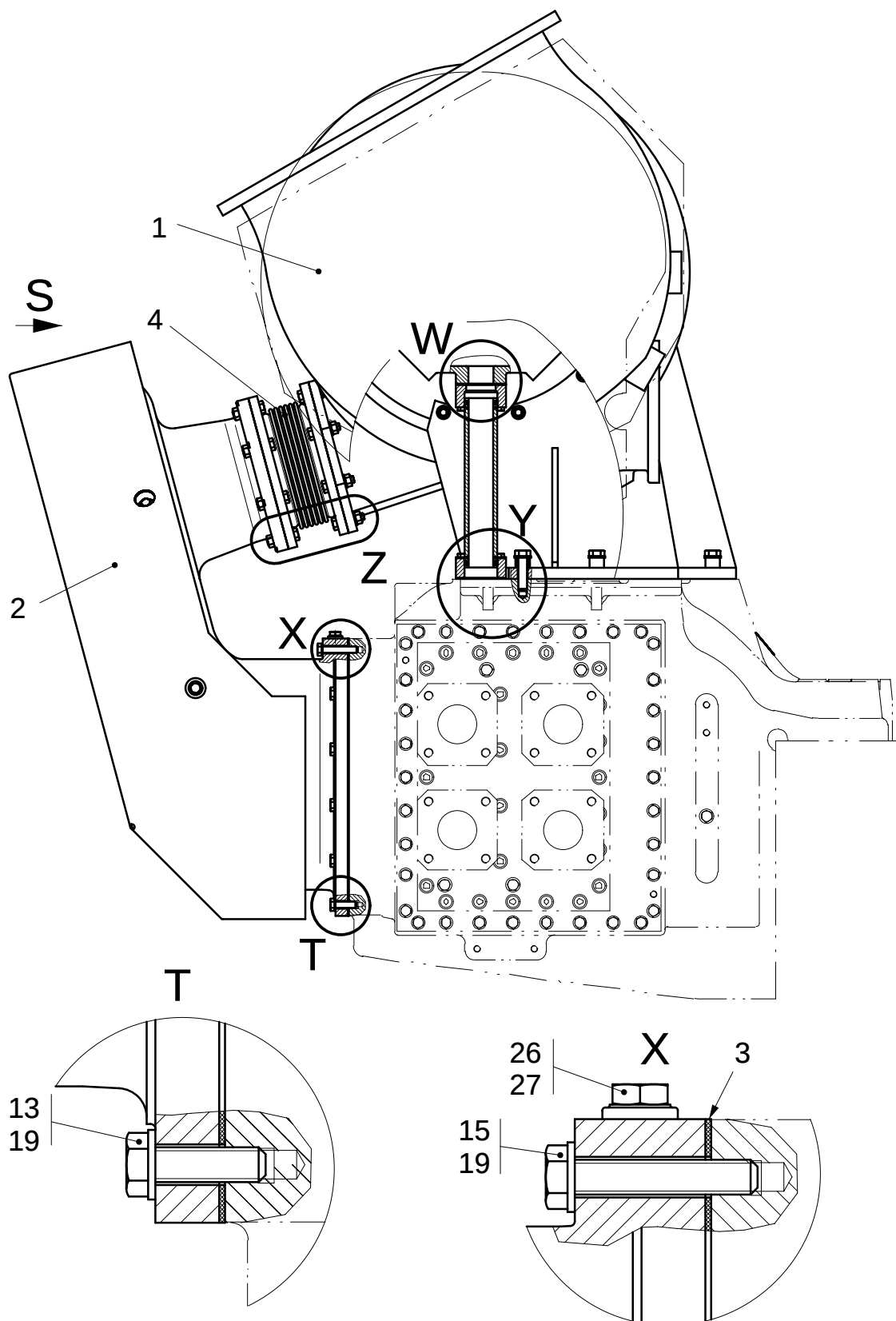
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

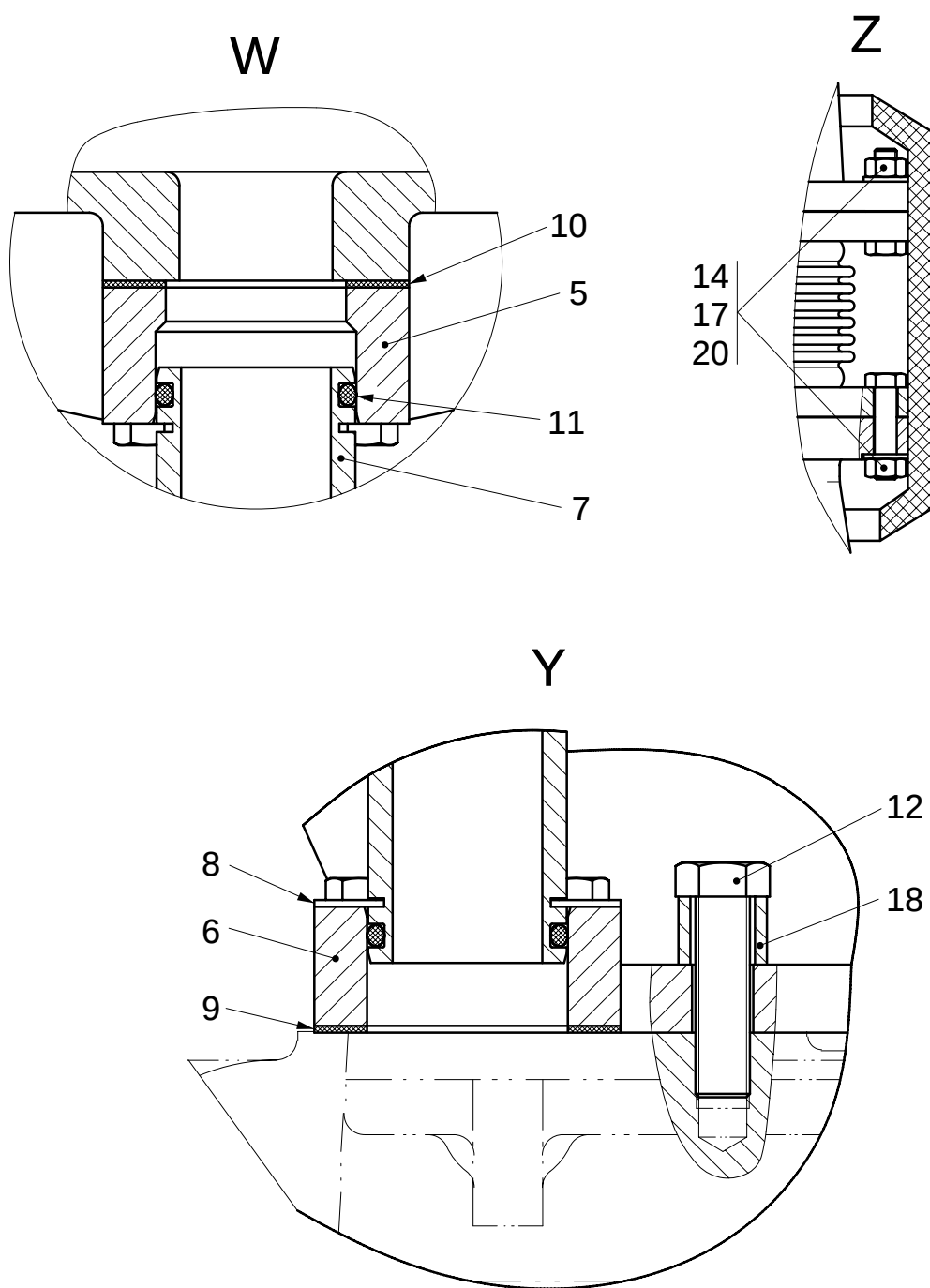
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Turbocharger Mounting

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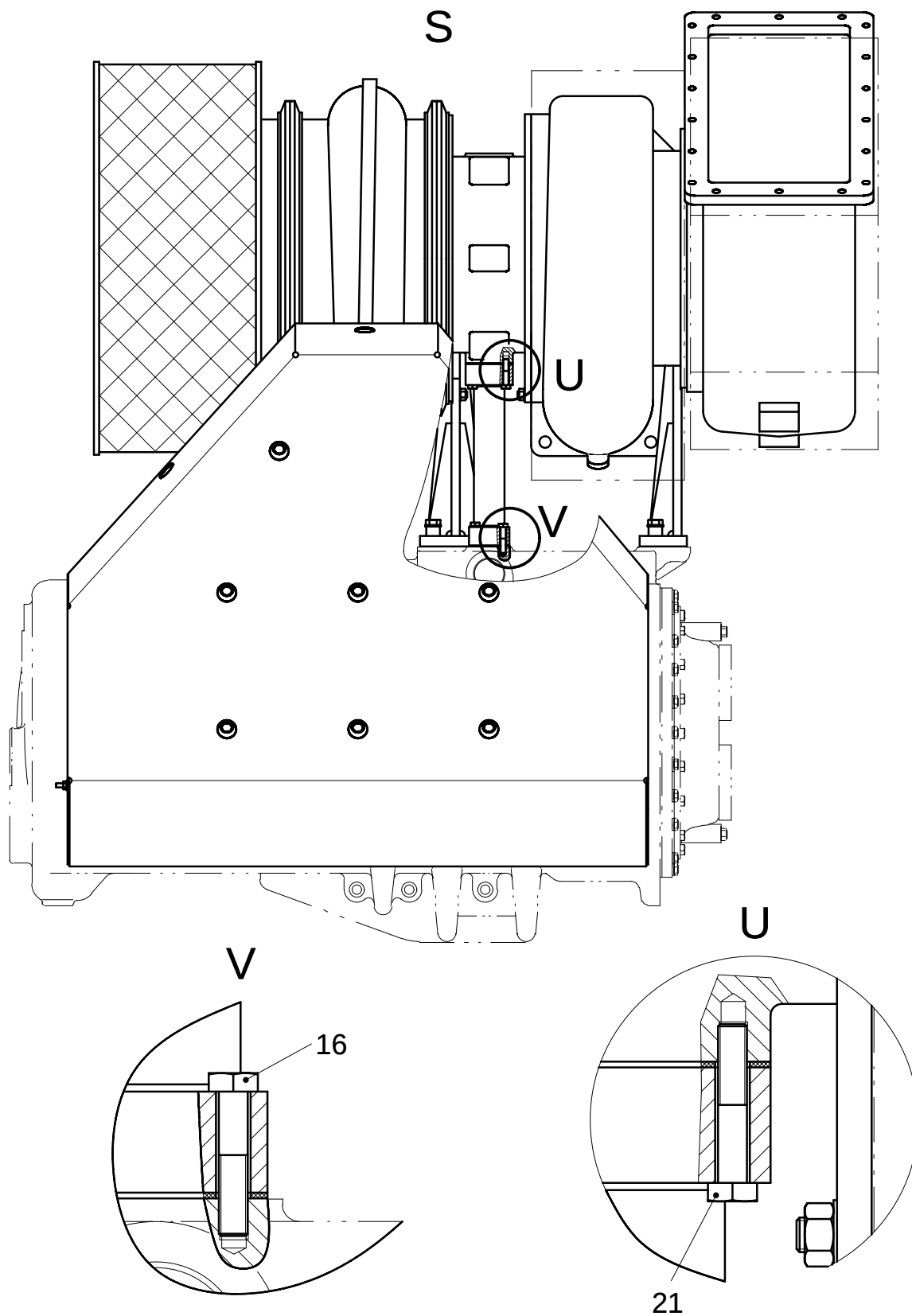
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Turbocharger Mounting

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Turbocharger Mounting

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TURBOLADER-ANBAU, VOLLST. TURBOCHARGER MOUNTING ASSEMBLY	1	257255 CC
1	TURBOLADER, VOLLST. TURBOCHARGER, COMPL.	1	SIEHE BUCH C, ABSCHNITT 10 SEE BOOK C, SECTION 10
2	LUFTEINTRITTSGEHÄUSE, VOLLST. AIR INLET CASING, COMPL.	1	257255-002
3	DICHTUNG GASKET	# 1	257250-003
4	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	1	257250-004
5	SECHSKANTSCHRAUBE HEXAGON SCREW	17	1.1387-378
6	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-379
7	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-380
8	SECHSKANTSCHRAUBE HEXAGON BOLT	11	1.1367-307
9	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-309
10	SECHSKANTMUTTER HEXAGON NUT	16	1.2007-036
11	DEHNHÜLSE EXTENSION SLEEVE	11	1.0502-069
12	DEHNHÜLSE EXTENSION SLEEVE	2	1.0502-053
13	SCHEIBE WASHER	42	1.0040-224
18	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-609
19	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	6	1.1041-808
20	DICHTRING JOINT RING	# 4	1.7010-133
21	DICHTRING JOINT RING	# 6	1.7010-172

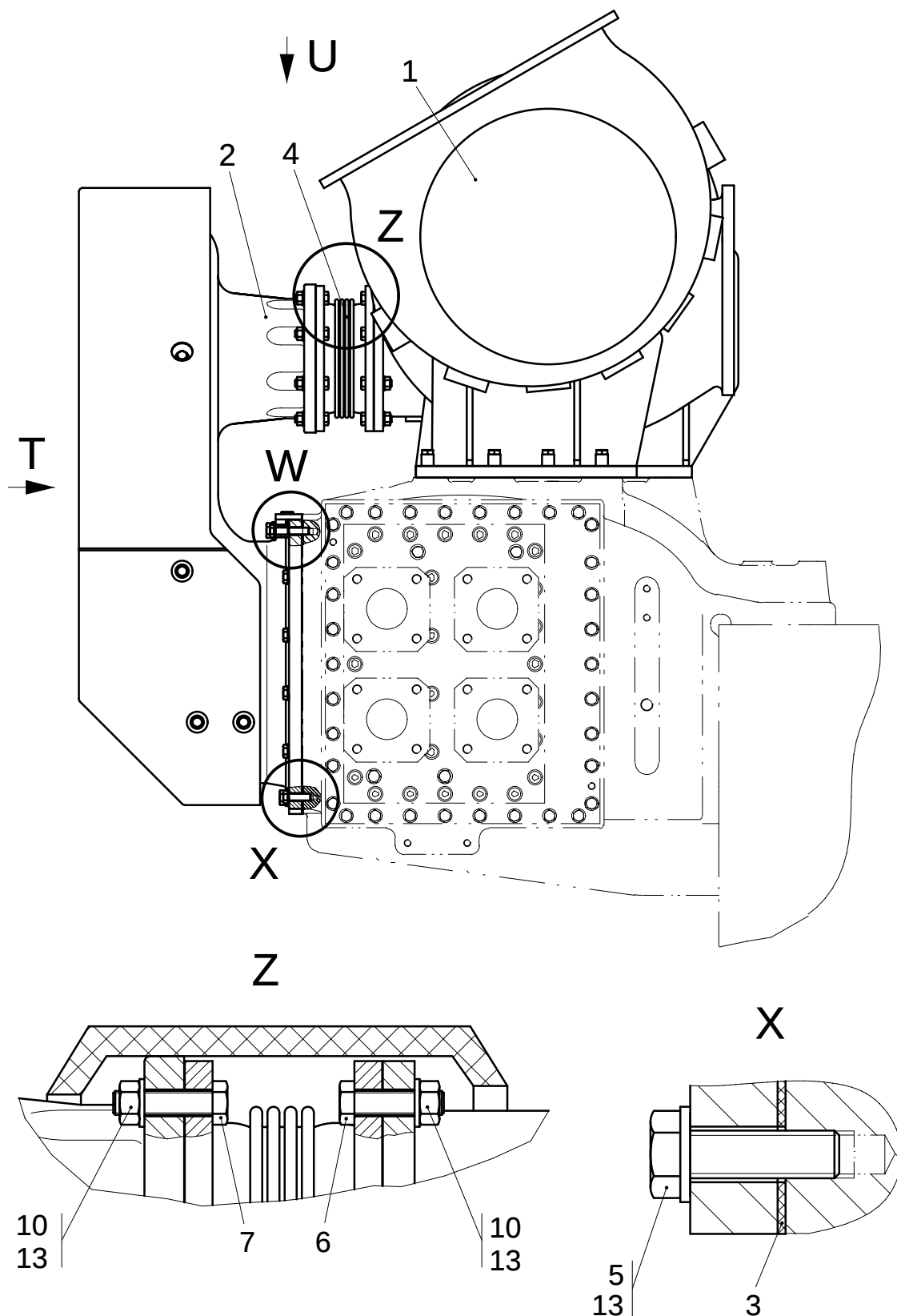
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

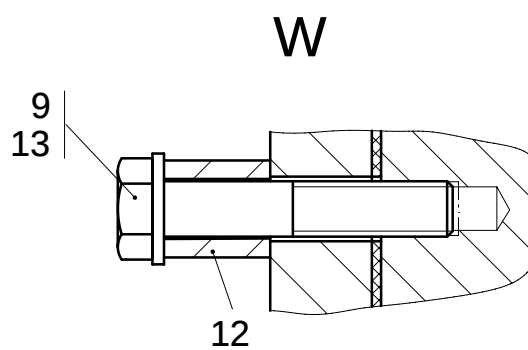
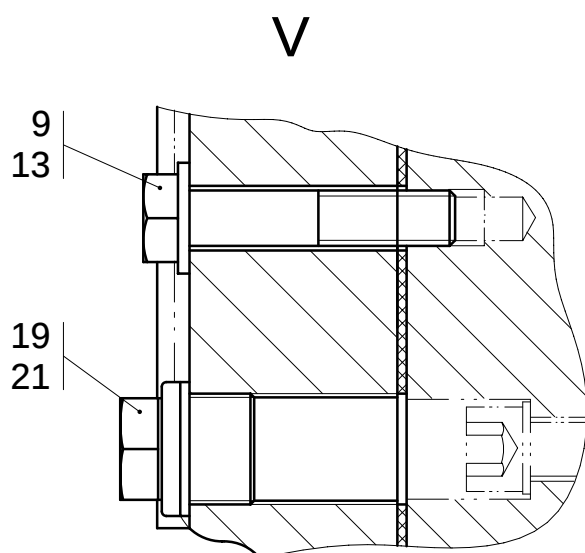
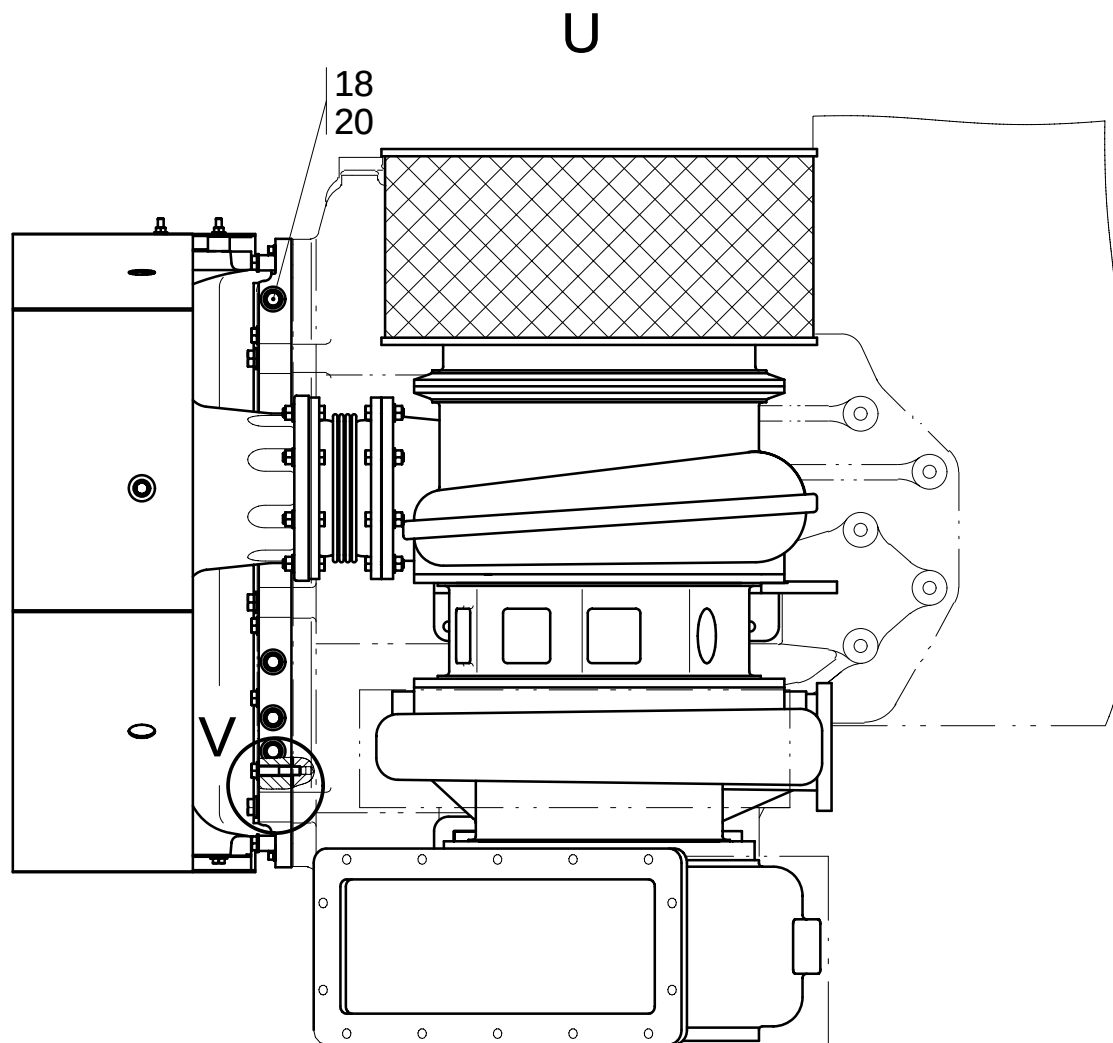
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Turbocharger Mounting

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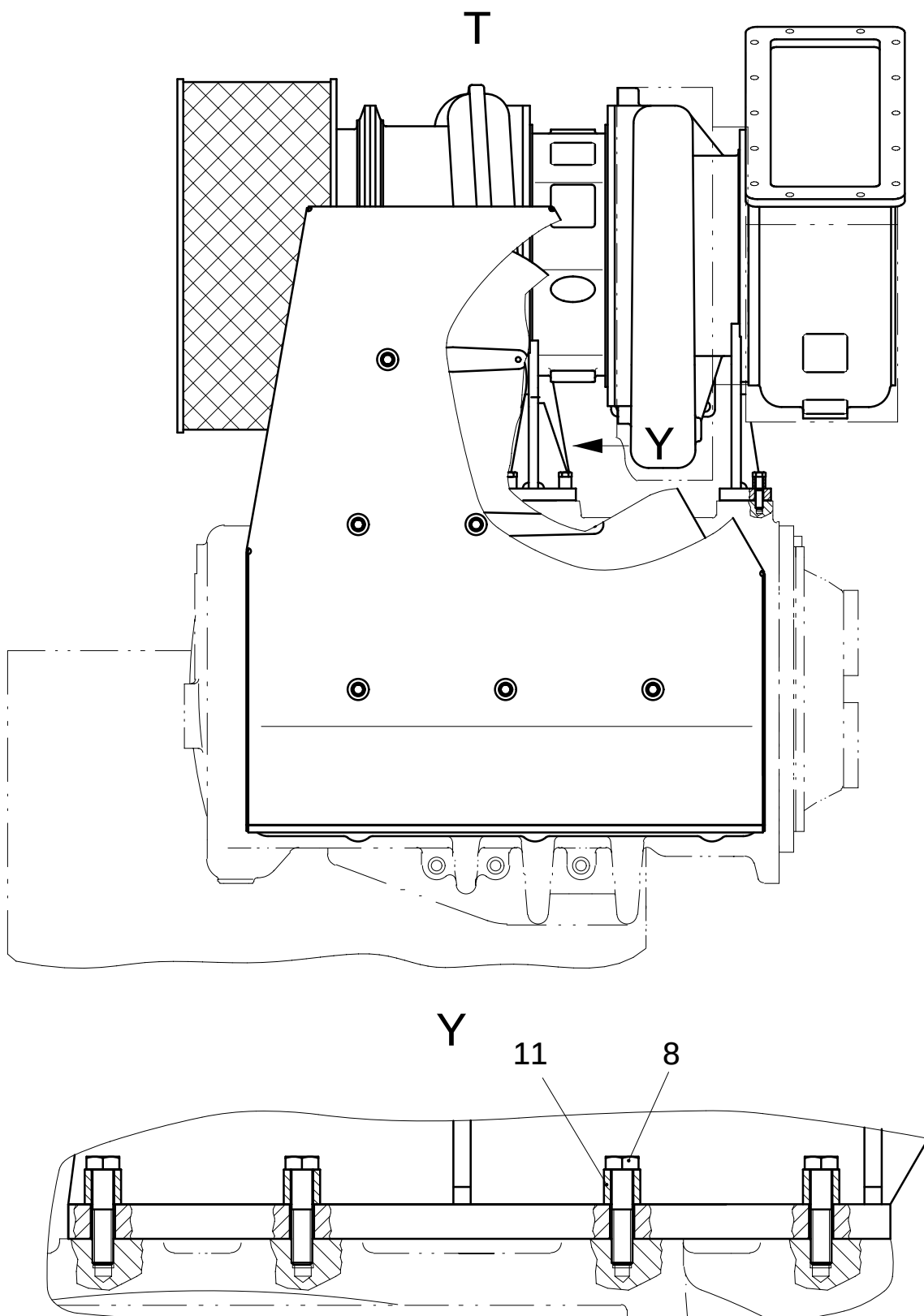
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Turbocharger Mounting

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Turbocharger Mounting

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TURBOLADER-ANBAU, VOLLST. TURBOCHARGER MOUNTING ASSEMBLY	1	257255 DD
1	TURBOLADER, VOLLST. TURBOCHARGER, COMPL.	1	SIEHE BUCH C, ABSCHNITT 10 SEE BOOK C, SECTION 10
2	LUFTEINTRITTSGEHÄUSE, VOLLST. AIR INLET CASING, COMPL.	1	257255-102
3	DICHTUNG GASKET	# 1	257255-103
4	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	1	257255-104
5	FLANSCH FLANGE	1	257255-105
6	FLANSCH FLANGE	1	257255-106
7	ÖLLEITUNG OIL PIPE	1	257255-107
8	SICHERUNGSBLECH TAB WASHER	1	257255-108
9	DICHTUNG GASKET	# 1	257255-109
10	DICHTUNG GASKET	# 1	1.7073-726
11	O-RING O-RING	# 2	1.7082-097
12	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-372
13	SECHSKANTSCHRAUBE HEXAGON SCREW	19	1.1387-378
14	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1387-380
15	SECHSKANTSCHRAUBE HEXAGON SCREW	11	1.1387-383
16	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-346
17	SECHSKANTMUTTER HEXAGON NUT	16	1.2007-036
18	DEHNHÜLSE EXTENSION SLEEVE	8	1.0502-081
19	SCHEIBE WASHER	46	1.0040-224
20	DEHNHÜLSE EXTENSION SLEEVE	2	1.0502-053

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION		STCK NUMBER	BEST.-NR PART NO.
21	SECHSKANTSCHRAUBE HEXAGON SCREW		4	1.1387-347
26	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG		4	1.1041-609
27	DICHTRING JOINT RING	#	4	1.7010-133
28	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG		8	1.1041-808
29	DICHTRING JOINT RING	#	8	1.7010-172

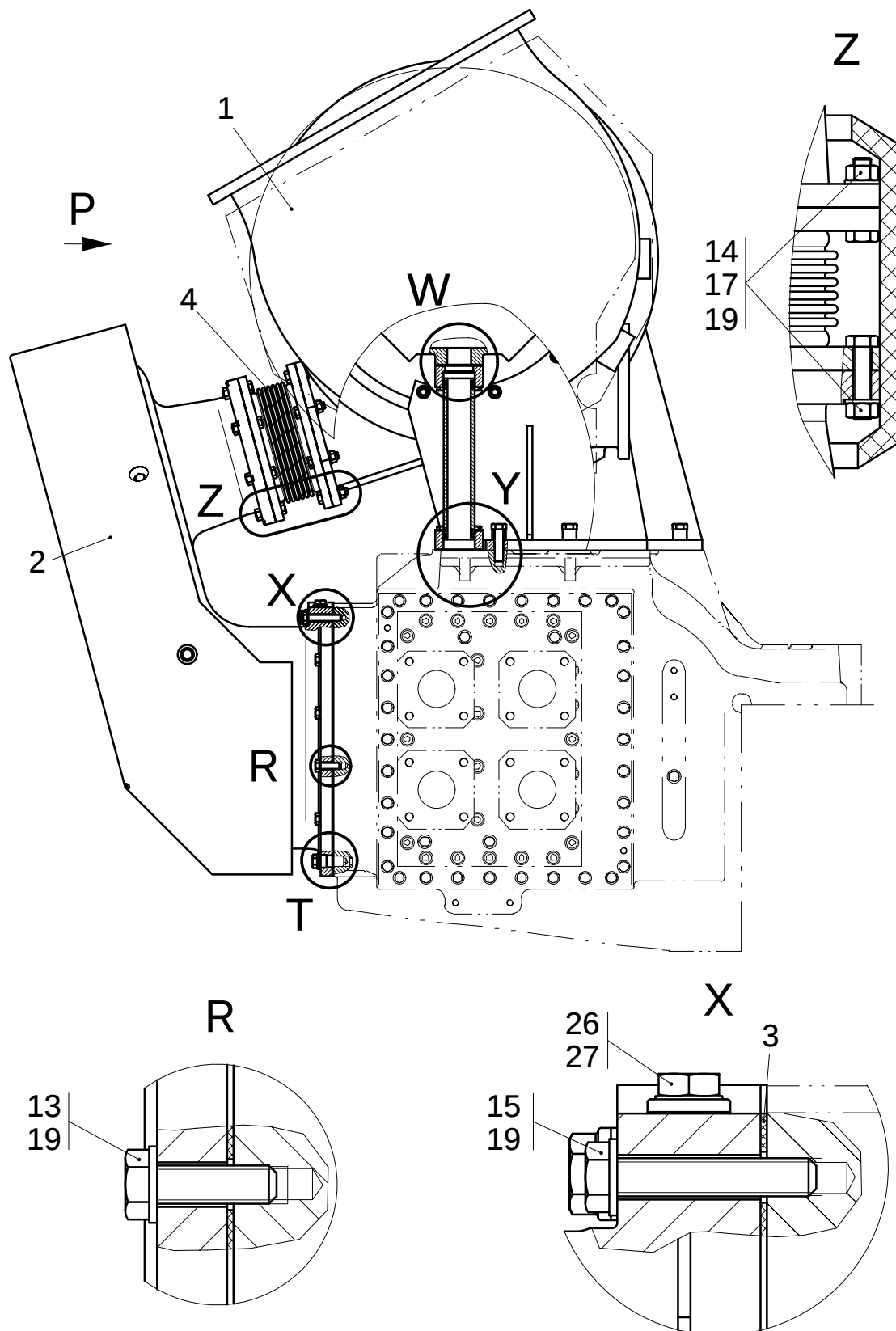
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

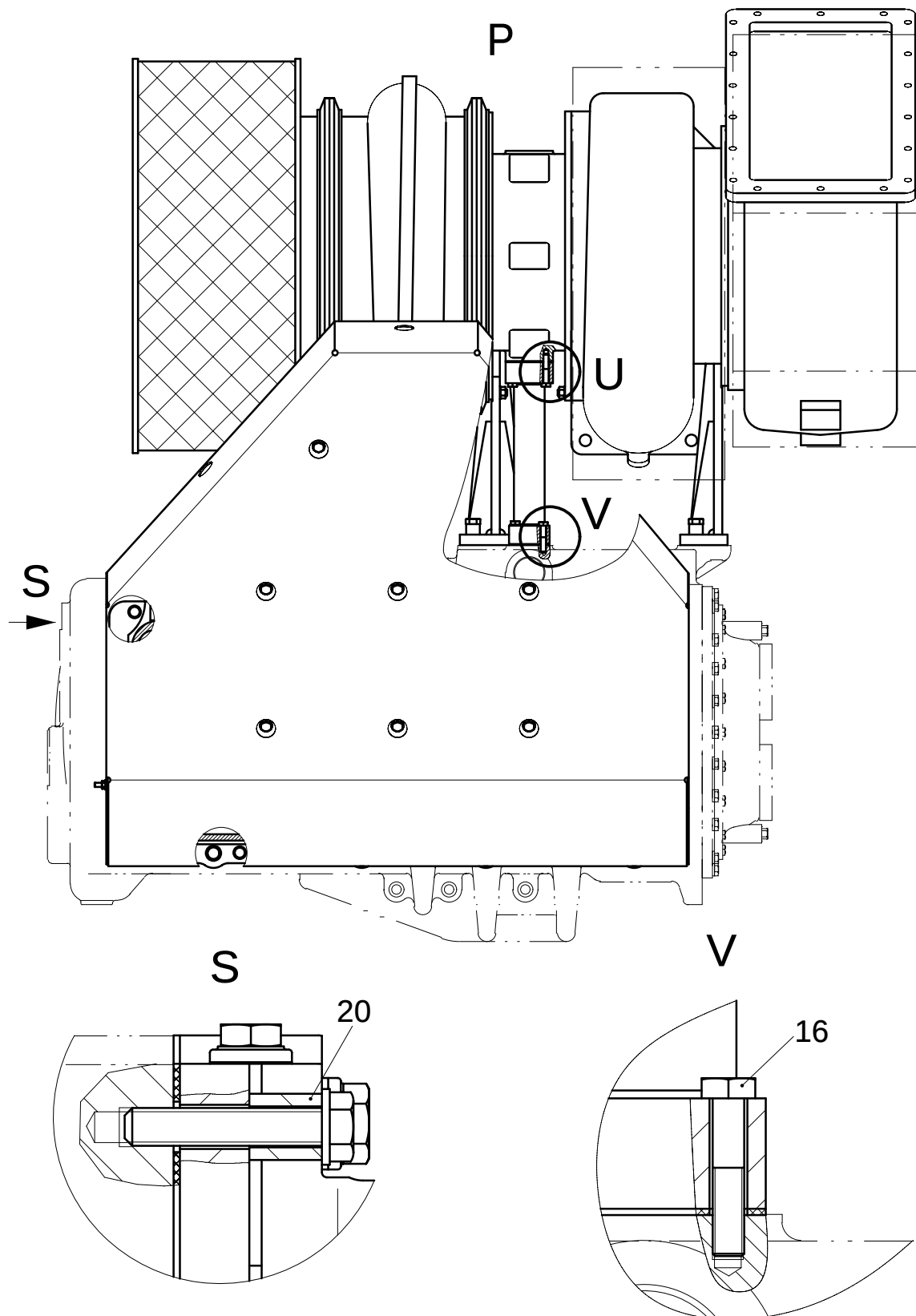
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Turbocharger Mounting

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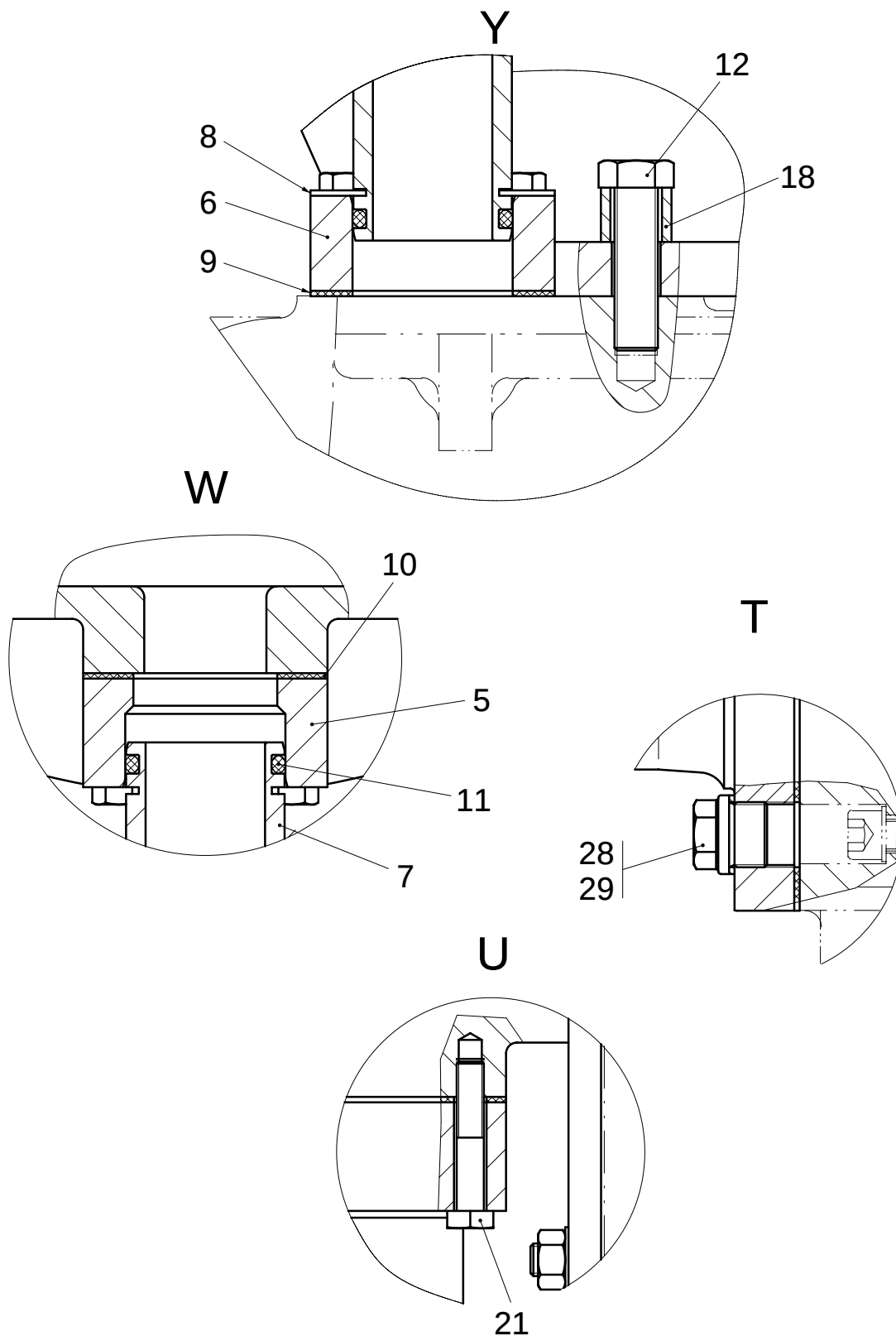
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Turbocharger Mounting

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Turbocharger Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TURBOLADER-ANBAU, VOLLST. TURBOCHARGER MOUNTING ASSEMBLY	1	257255 EE
1	TURBOLADER, VOLLST. TURBOCHARGER, COMPL.	1	SIEHE BUCH C SEE BOOK C
2	LUFTEINTRITTSGEHÄUSE, VOLLST. AIR INLET CASING, COMPL.	1	257255-202
3	TURBOLADERFUSS TURBOCHARGERHOLDER	1	257255-003
4	HALTER BRACKET	1	257255-004
5	DICHTUNG GASKET	# 1	257255-103
6	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	1	257255-006
7	DEHNHÜLSE EXTENSION SLEEVE	2	1.4110-028
8	DEHNHÜLSE EXTENSION SLEEVE	12	257255-008
9	O-RING O-RING	# 2	1.7084-637
10	O-RING O-RING	# 1	1.7984-648
11	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1374-574
12	SECHSKANTSCHRAUBE HEXAGON SCREW	24	1.1367-372
13	SECHSKANTSCHRAUBE HEXAGON SCREW	11	1.1387-383
14	SECHSKANTSCHRAUBE HEXAGON SCREW	19	1.1387-378
15	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-376
16	SECHSKANTMUTTER HEXAGON NUT	12	1.2007-038
17	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-036
18	SCHEIBE WASHER	12	1.0040-227
19	SCHEIBE WASHER	28	1.0040-224
23	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-609

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
24	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	8	1.1041-808
25	DICHTRING JOINT RING	# 4	1.7010-133
26	DICHTRING JOINT RING	# 8	1.7010-172
33	FLANSCH FLANGE	2	1.5341-343
34	DICHTUNG GASKET	# 2	1.7073-723

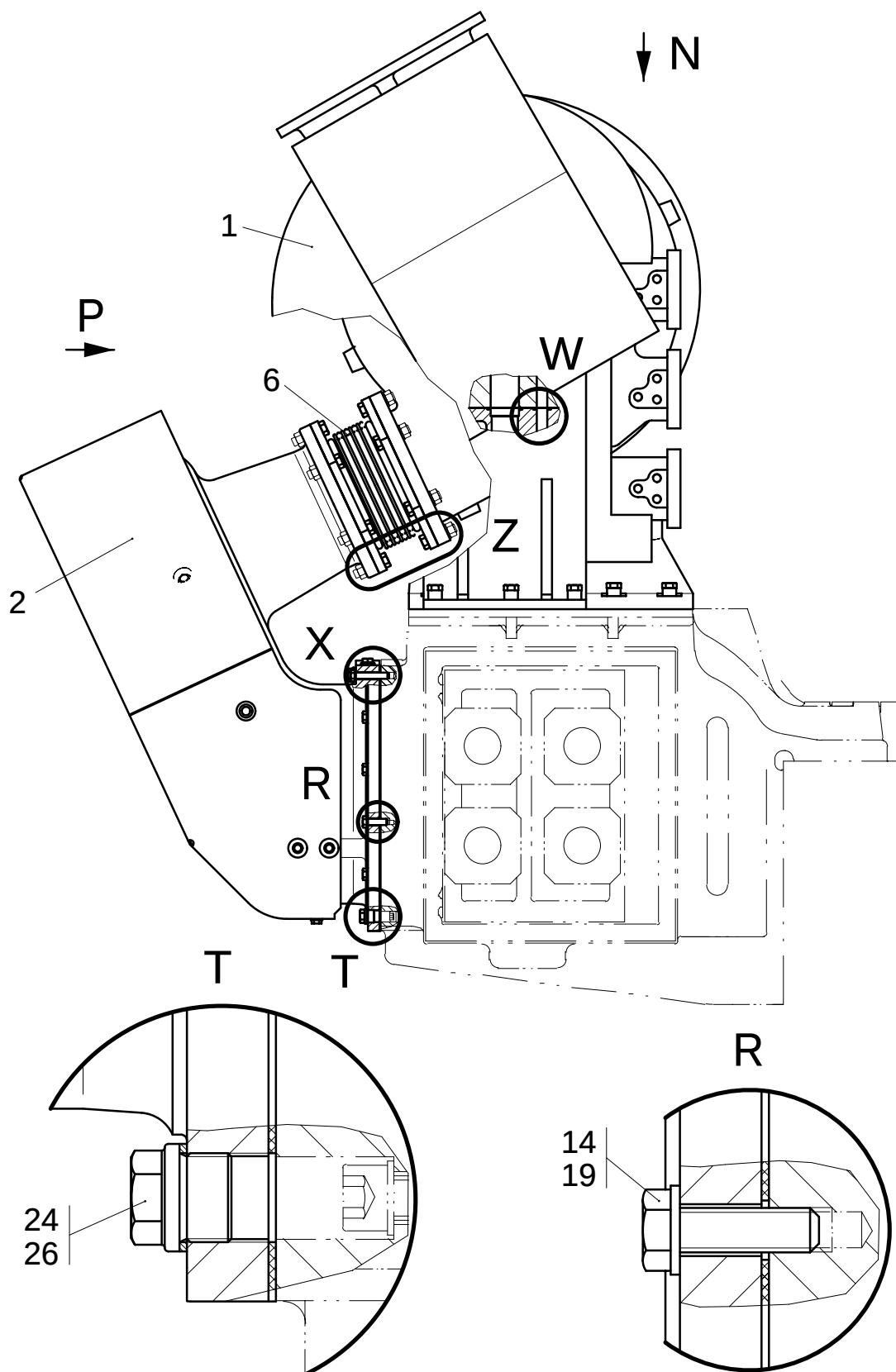
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Turbocharger Mounting

M25

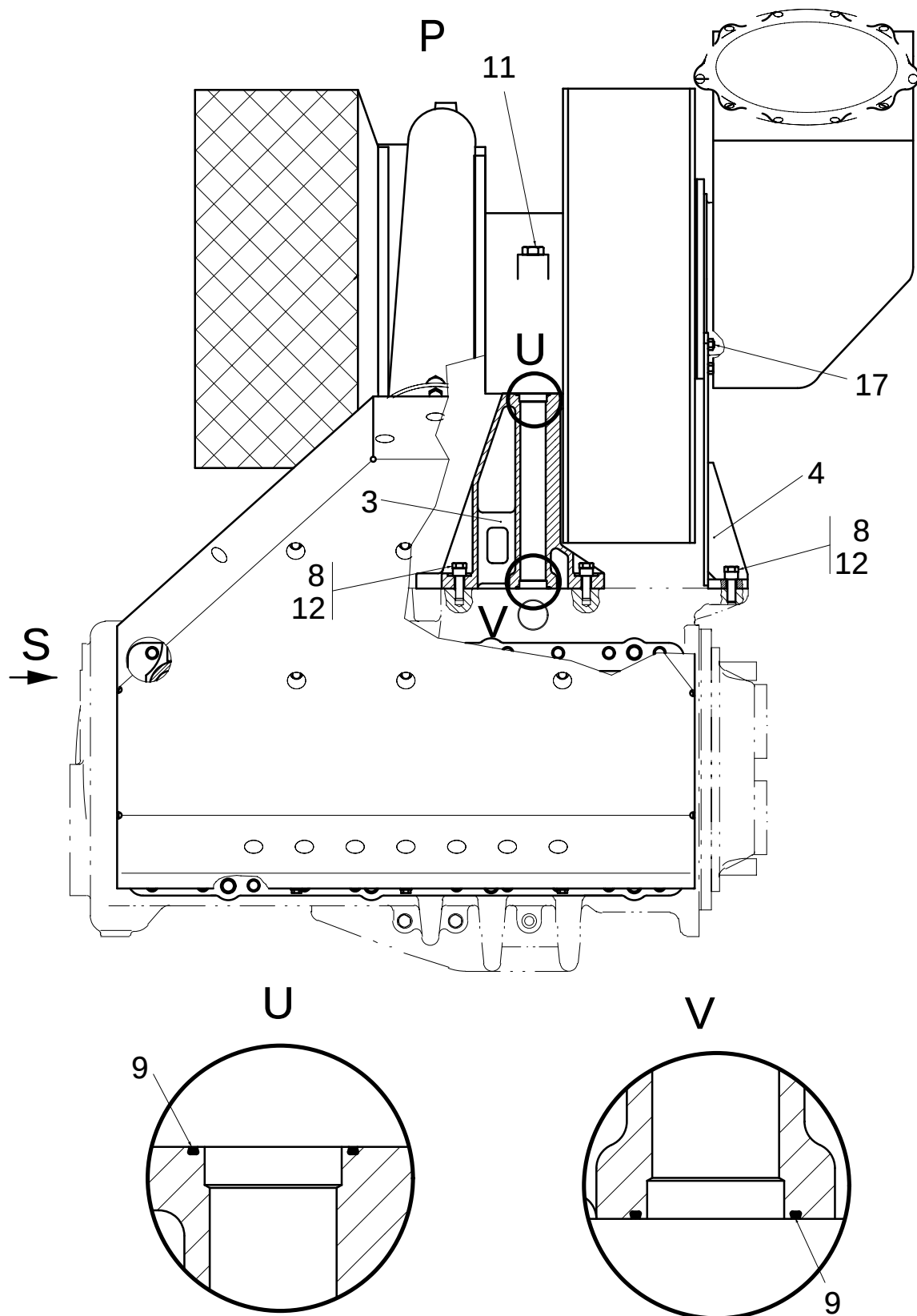
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Turbocharger Mounting

M25

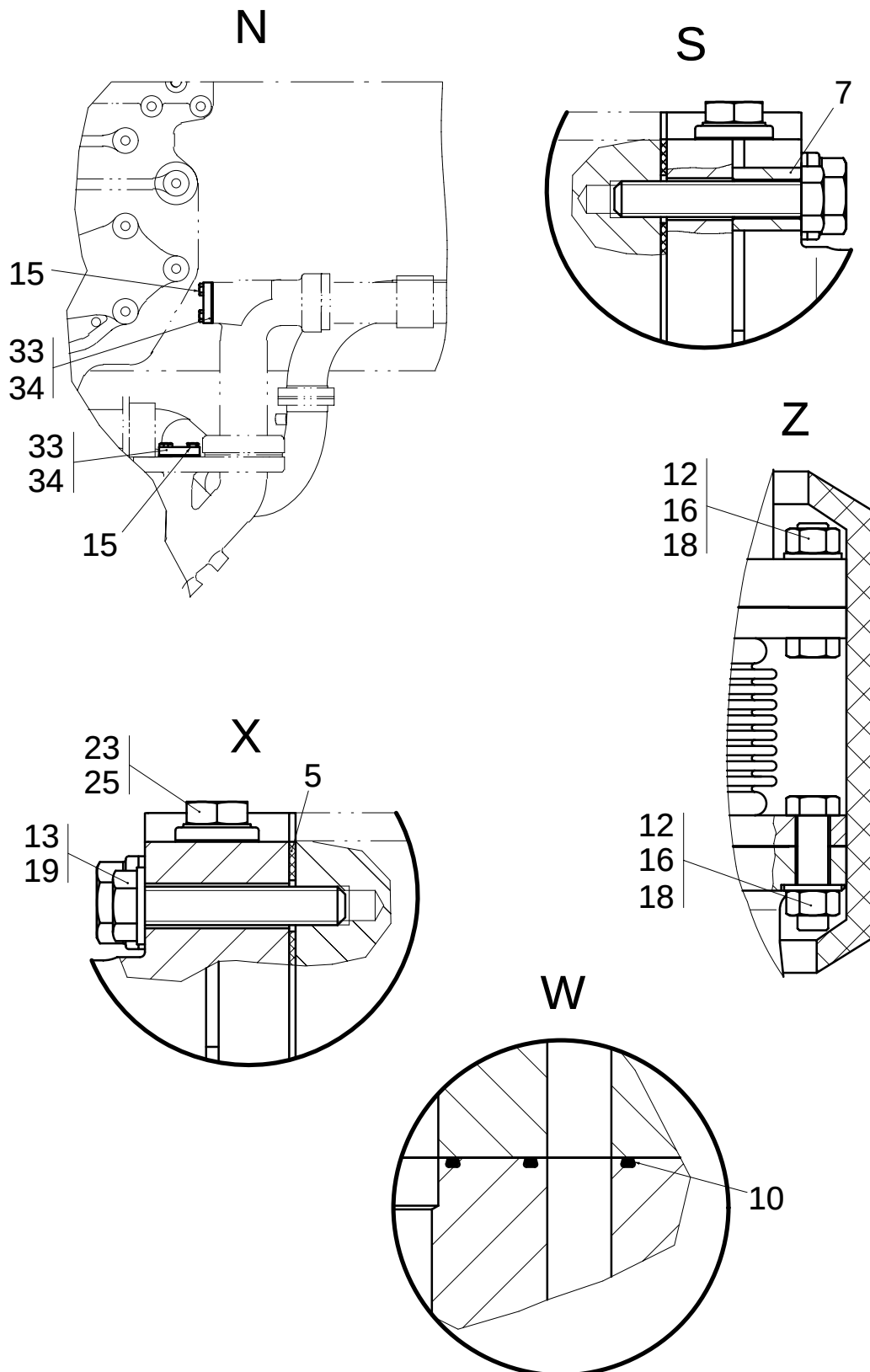
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Turbocharger Mounting

M25

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Cleaning Device for Turbocharger

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 AA
1	ECKVENTIL, VOLLST. CORNER VALVE, COMPL.	2	SIEHE B1.05.06.1.7297 SEE B1.05.06.1.7297
6	ROHRLEITUNG TUBE	1	257259-306
7	ROHRLEITUNG TUBE	1	257259-207
10	STUTZEN UNION	1	1.5093-415
11	STUTZEN ADJUSTABLE ELBOW	1	1.5093-254
20	DICHTRING JOINT RING	# 2	1.7010-133

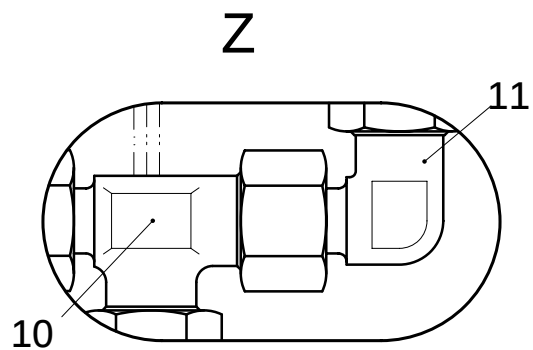
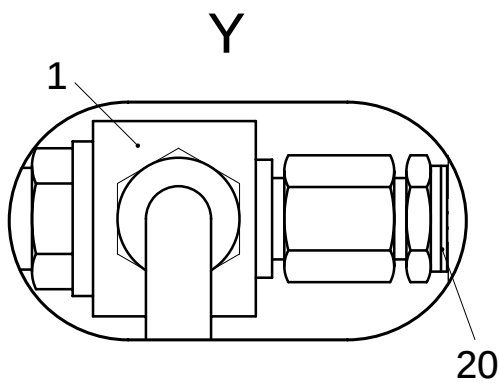
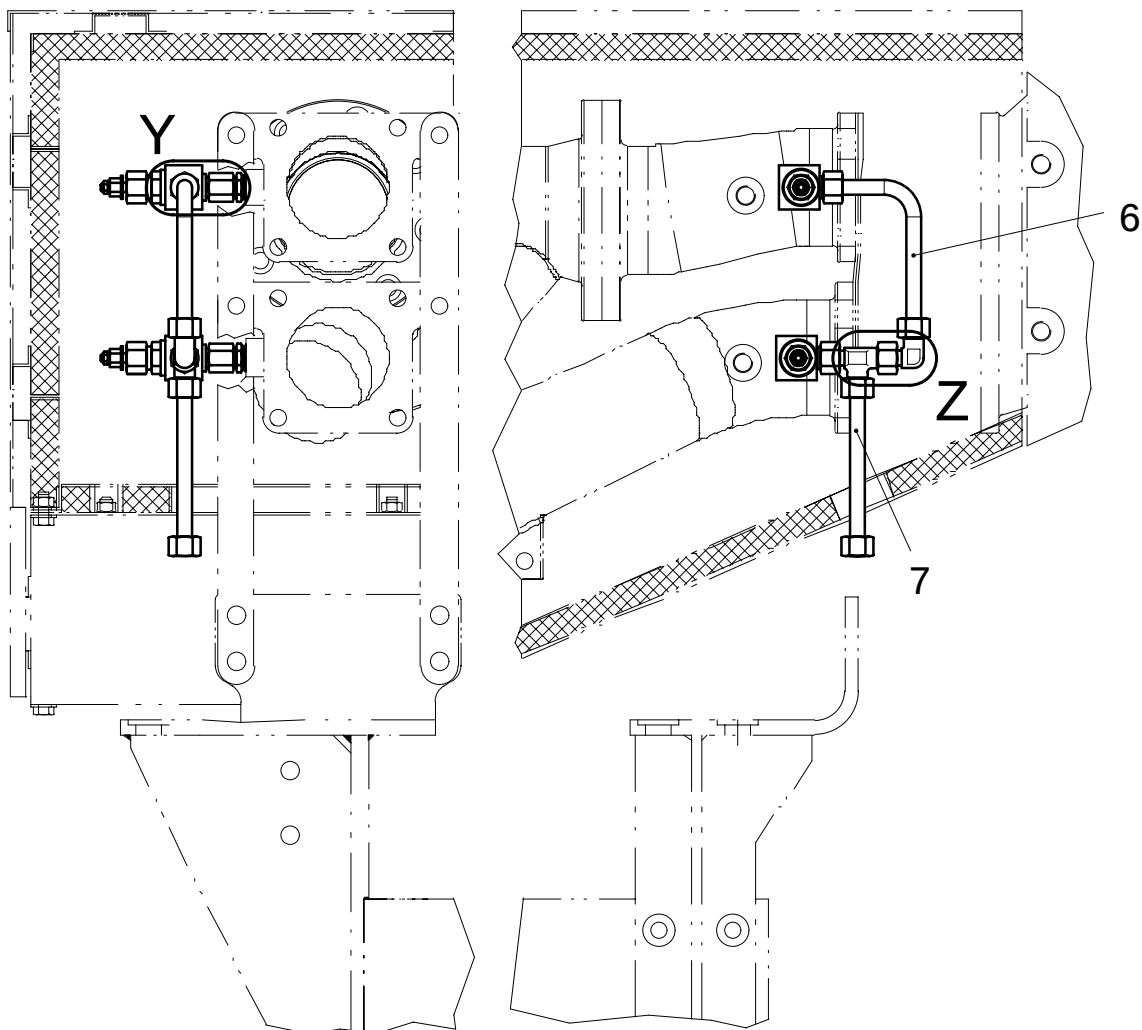
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Cleaning Device for Turbocharger

M25

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Cleaning Device for Turbocharger

M25

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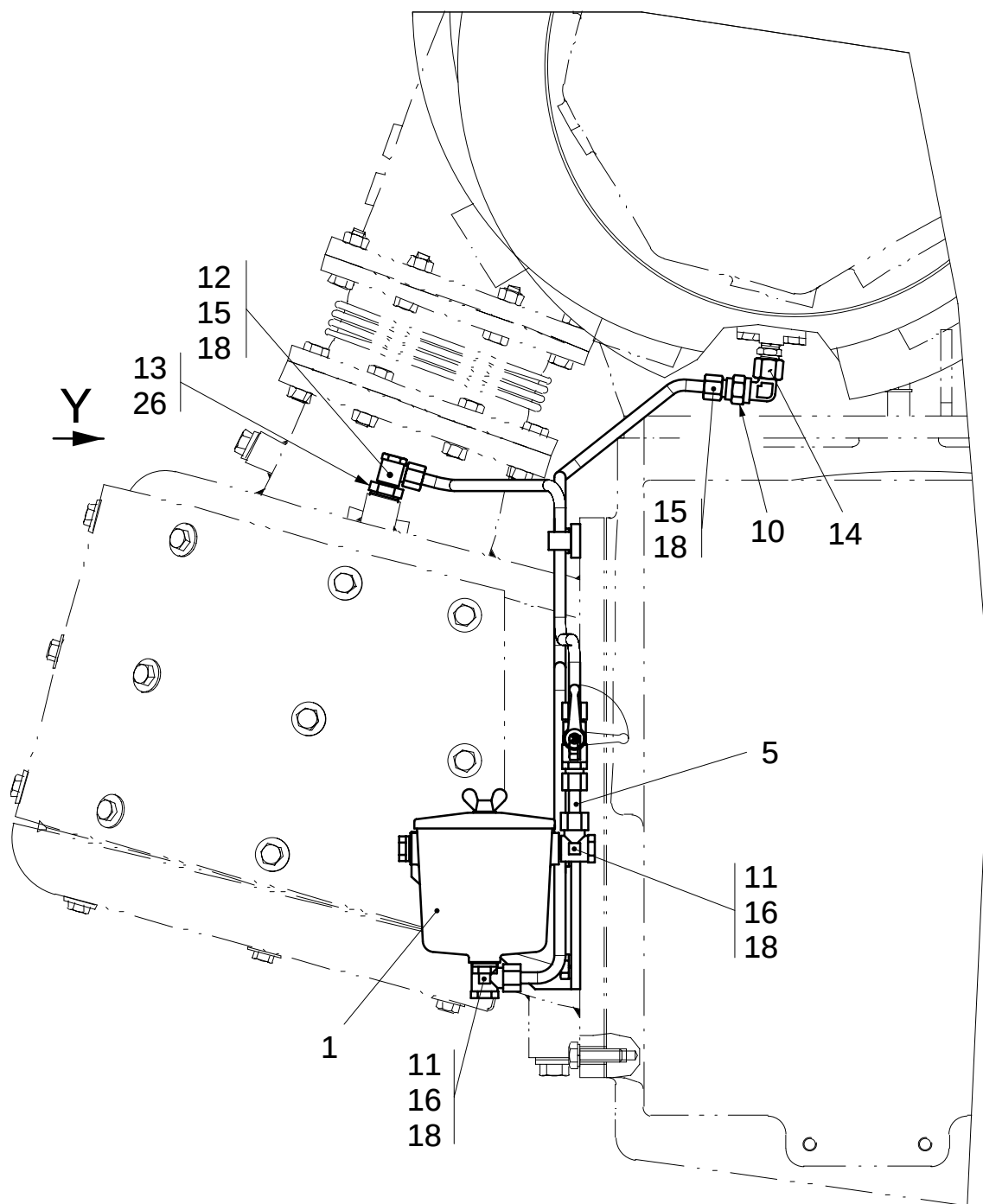
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 BB
1	DOSIERGEFÄSS, VOLLST. DOSING TANK, COMPL.	1	1.7259-017
2	KUGELHAHN COCK	1	1.4840-054
3	HALTER BRACKET	1	257259-003
4	HALTER BRACKET	1	9.7259-002
5	ROHRLEITUNG COPPER TUBE		1.9090-018
10	WINKEL REDUZIERANSCHLUSS REDUCING UNION	1	1.5097-365
11	SCHWENKVERSCHRAUBUNG BANJO	2	1.5093-614
12	SCHWENKVERSCHRAUBUNG BANJO	1	1.5093-607
13	GEWINDEREDUZIERUNG REDUCER	1	1.5036-003
14	STUTZEN UNION	1	1.5093-223
15	ÜBERWURFMUTTER UNION NUT	2	1.5040-116
16	ÜBERWURFMUTTER UNION NUT	2	1.5040-136
18	SCHNEIDRING CUTTING RING	4	1.5059-207
21	ROHRKLEMME PIPE CLAMP	2	1.5011-001
22	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-311
23	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-380
24	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034
26	DICHTRING JOINT RING	# 1	1.7010-133
27	SCHEIBE WASHER	3	1.0040-222

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Cleaning Device for Turbocharger

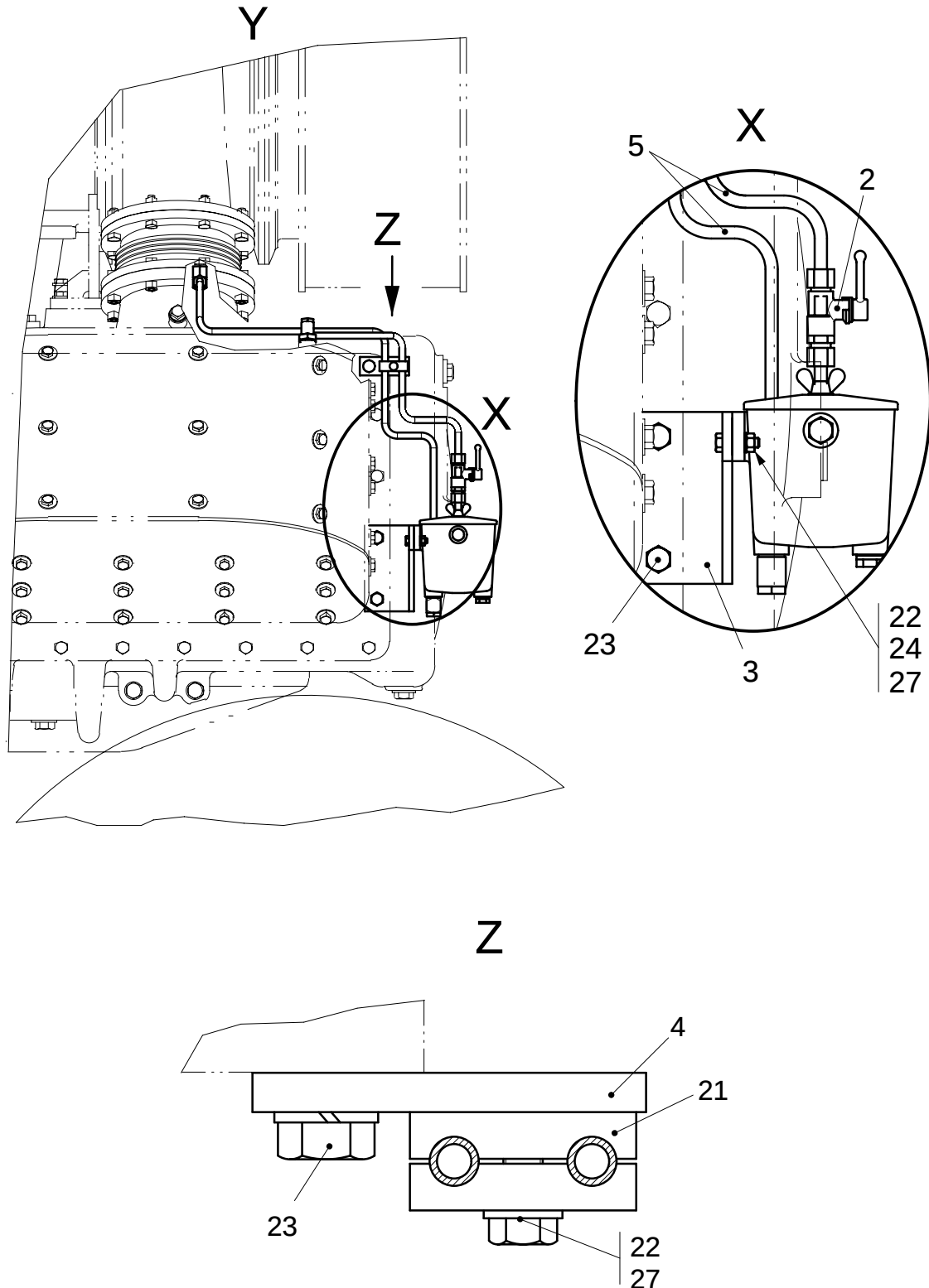
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Cleaning Device for Turbocharger

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Cleaning Device for Turbocharger

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 CC
1	ECKVENTIL, VOLLST. CORNER VALVE, COMPL.	2	SIEHE B1.05.06.1.7297 SEE B1.05.06.1.7297
6	ROHRLEITUNG PIPE	1	257259-306
7	ROHRLEITUNG PIPE	1	257259-207
10	STUTZEN ADJUSTABLE T-UNION	1	1.5093-415
11	STUTZEN ADJUSTABLE ELBOW	1	1.5093-254
20	DICHTRING JOINT RING	# 2	1.7010-133

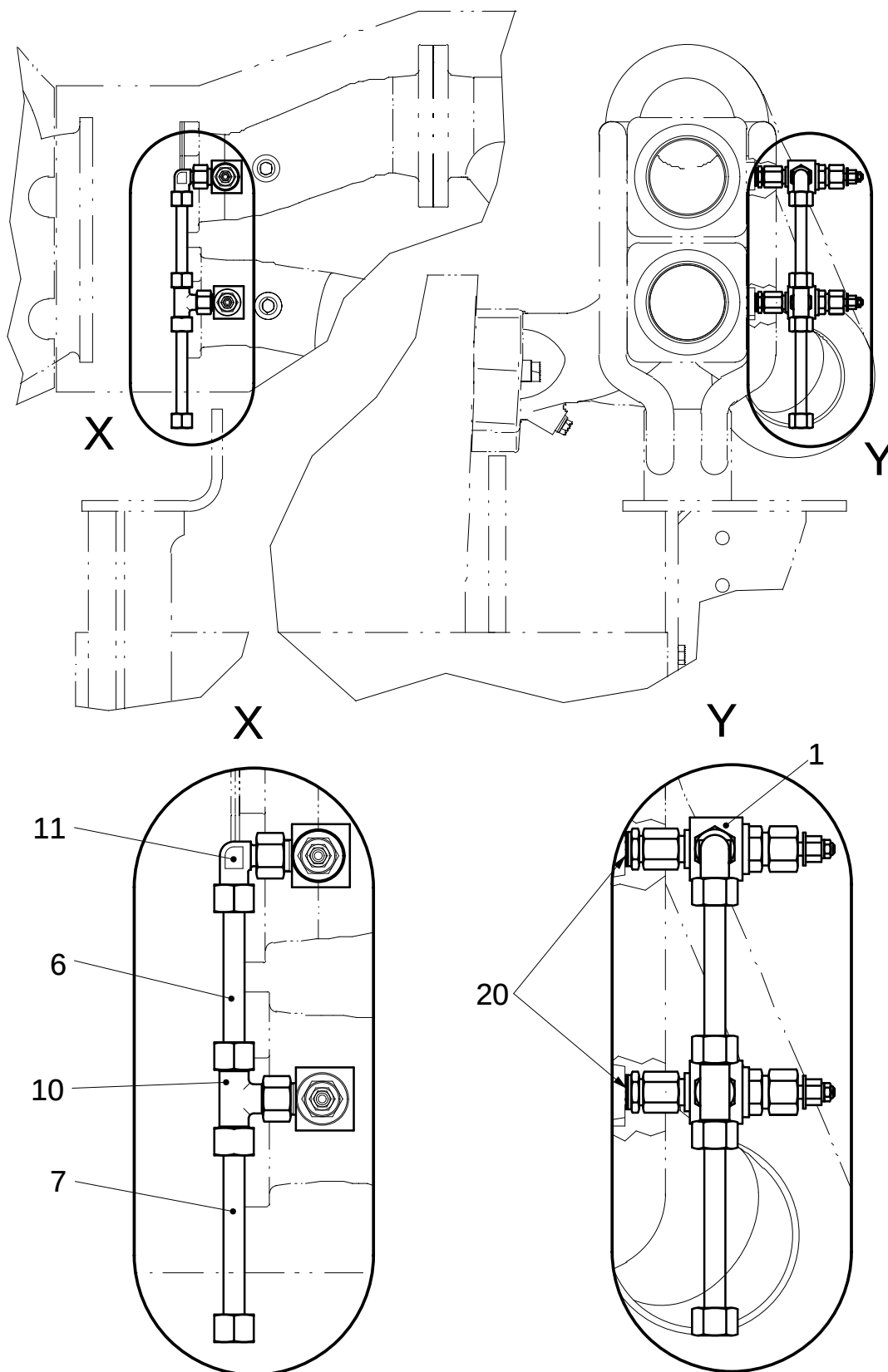
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

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Cleaning Device for Turbocharger

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 DD
1	DOSIERGEFÄSS, VOLLST. DOSING TANK, COMPL.	1	1.7259-017
2	KUGELHAHN COCK	1	1.4840-054
3	HALTER BRACKET	1	257259-103
4	HALTER BRACKET	1	257259-104
5	ROHRLEITUNG TUBE	1	257259-105
6	ROHRLEITUNG TUBE	1	257259-106
7	ROHRLEITUNG TUBE	1	257259-302
10	KONUS-REDUZIERANSCHLUSS REDUCING UNION	1	1.5097-365
11	SCHWENKVERSCHRAUBUNG BANJO	3	1.5093-614
13	GEWINDEREDUZIERUNG REDUCER	1	1.5036-004
16	ÜBERWURFMUTTER UNION NUT	3	1.5040-136
20	ROHRKLEMME PIPE CLAMP	2	1.5011-002
21	ROHRKLEMME PIPE CLAMP	2	1.5011-001
25	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-311
26	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-380
27	SECHSKANTMUTTER HEXAGON NUT	1	1.1387-381
30	DICHTRING JOINT RING	# 1	1.7010-133

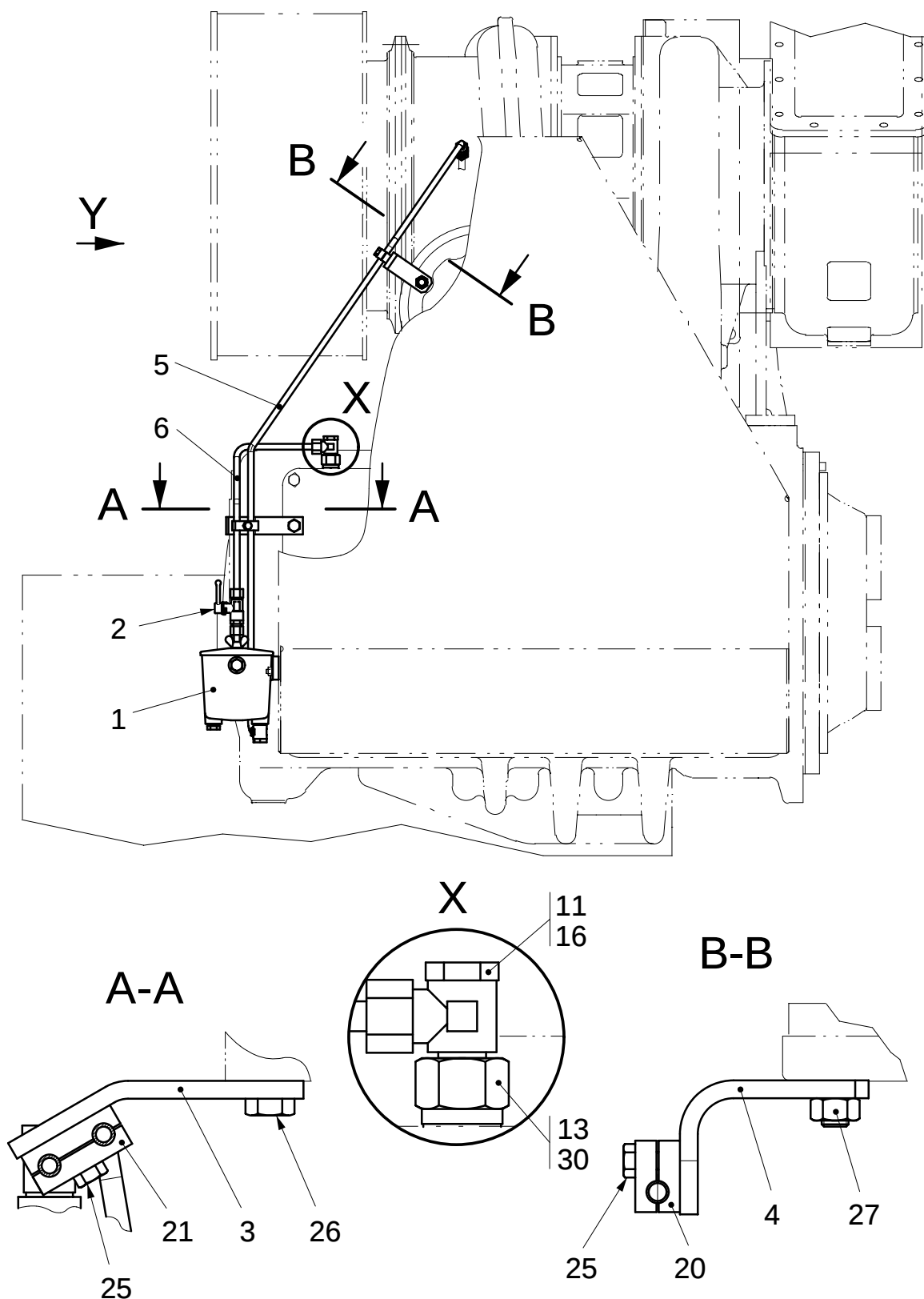
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

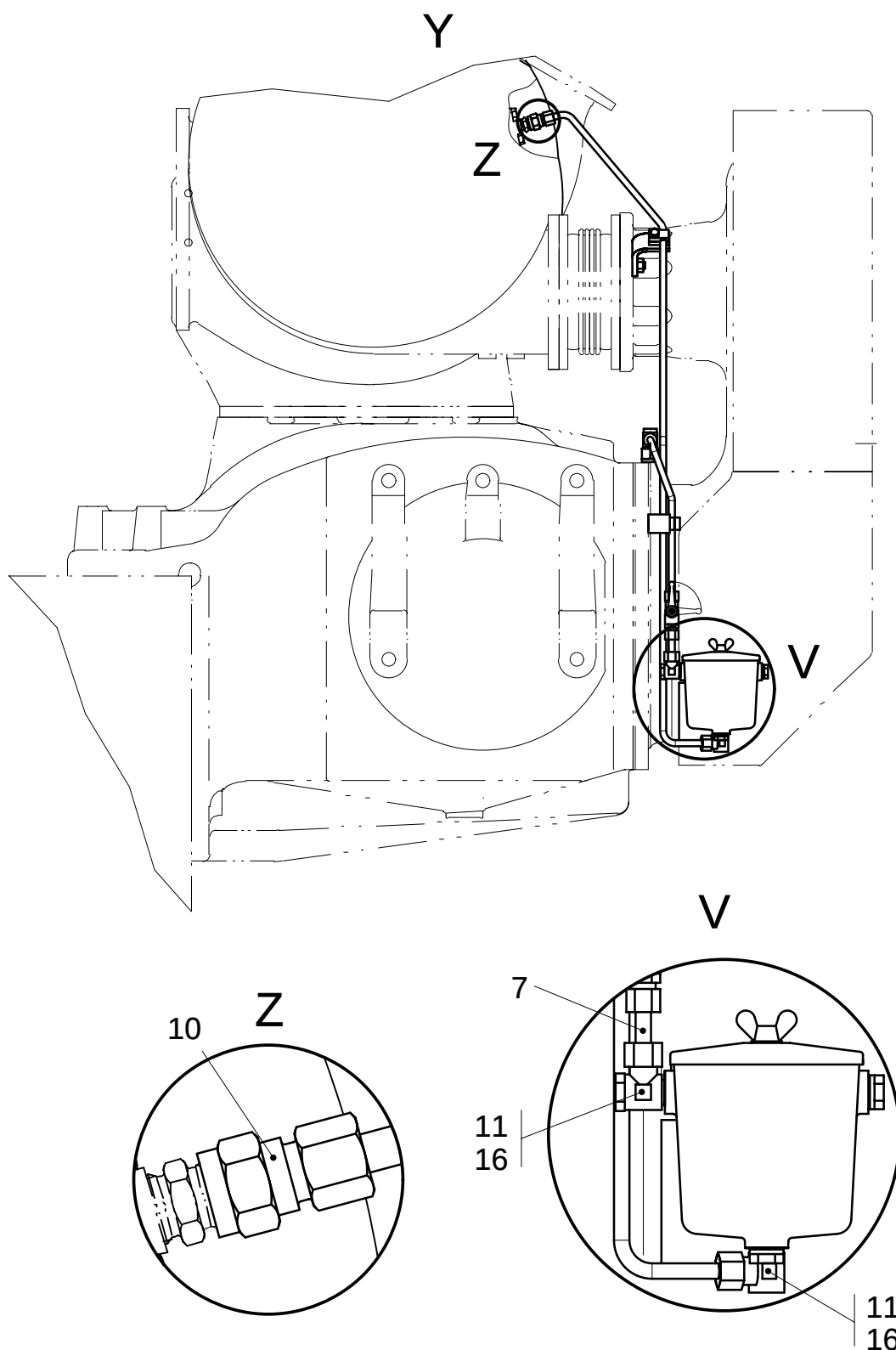
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Cleaning Device for Turbocharger

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Cleaning Device for Turbocharger

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 EE
1	ROHRLEITUNG STEEL TUBE	1	257259-001
2	ROHRLEITUNG STEEL TUBE	1	257259-002
3	HALTER BRACKET	1	257259-203
4	STUTZEN PIPE UNION	1	1.5095-025
5	ECKVENTIL, VOLLST. CORNER VALVE, COMPL.	1	SIEHE B1.05.06.1.7297 SEE B1.05.06.1.7297
6	ROHRKLEMME PIPE CLAMP	12	1.5011-041
8	DICHTRING JOINT RING	# 1	1.7010-133
10	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-314
11	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-244
12	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-311
13	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-251
14	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-374
15	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034
16	ROHRKLEMME PIPE CLAMP	2	1.5011-003
18	ÜBERWURFMUTTER UNION NUT	1	1.5040-139
19	SCHNEIDRING CUTTING RING	1	1.5059-206

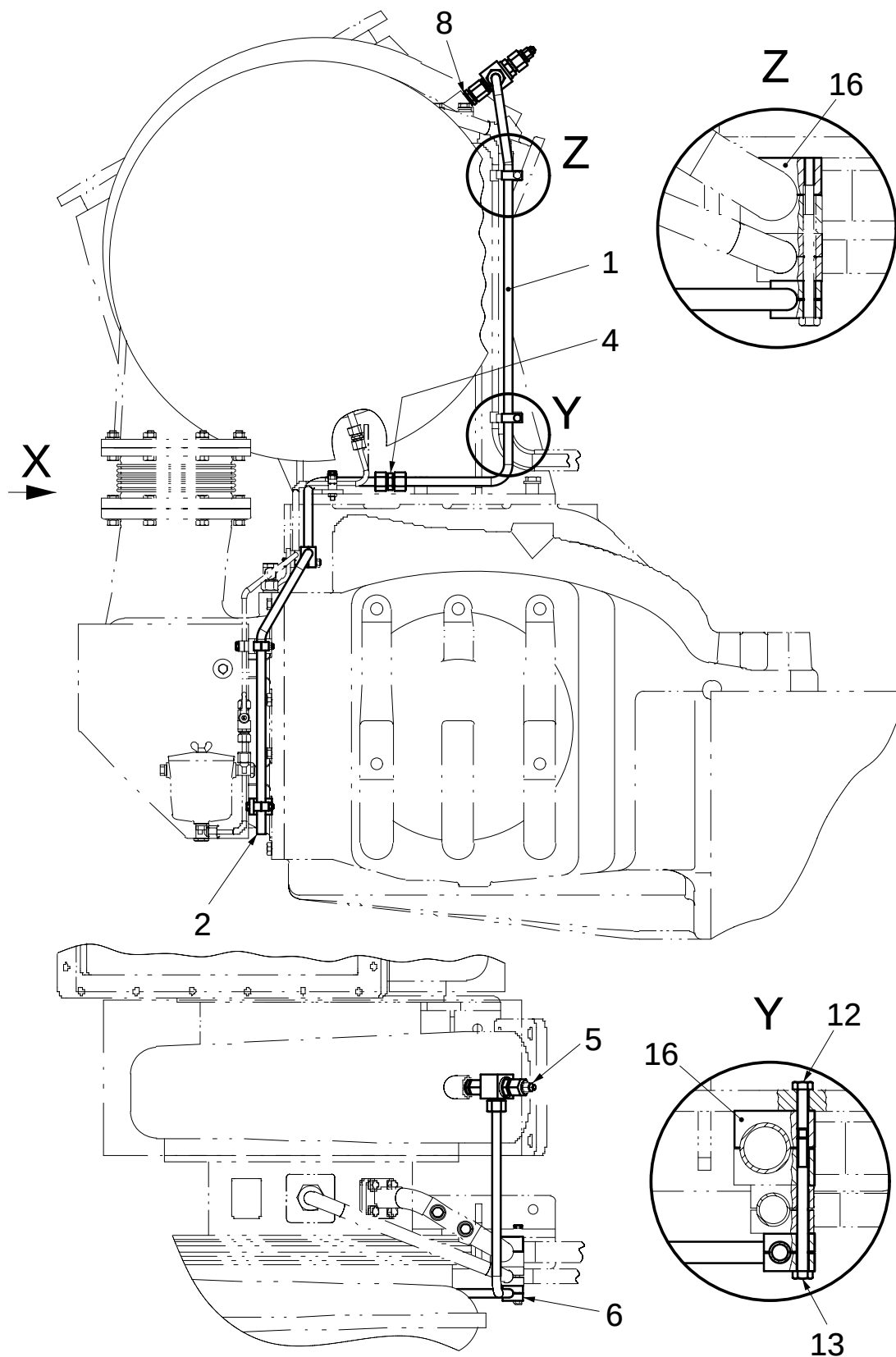
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

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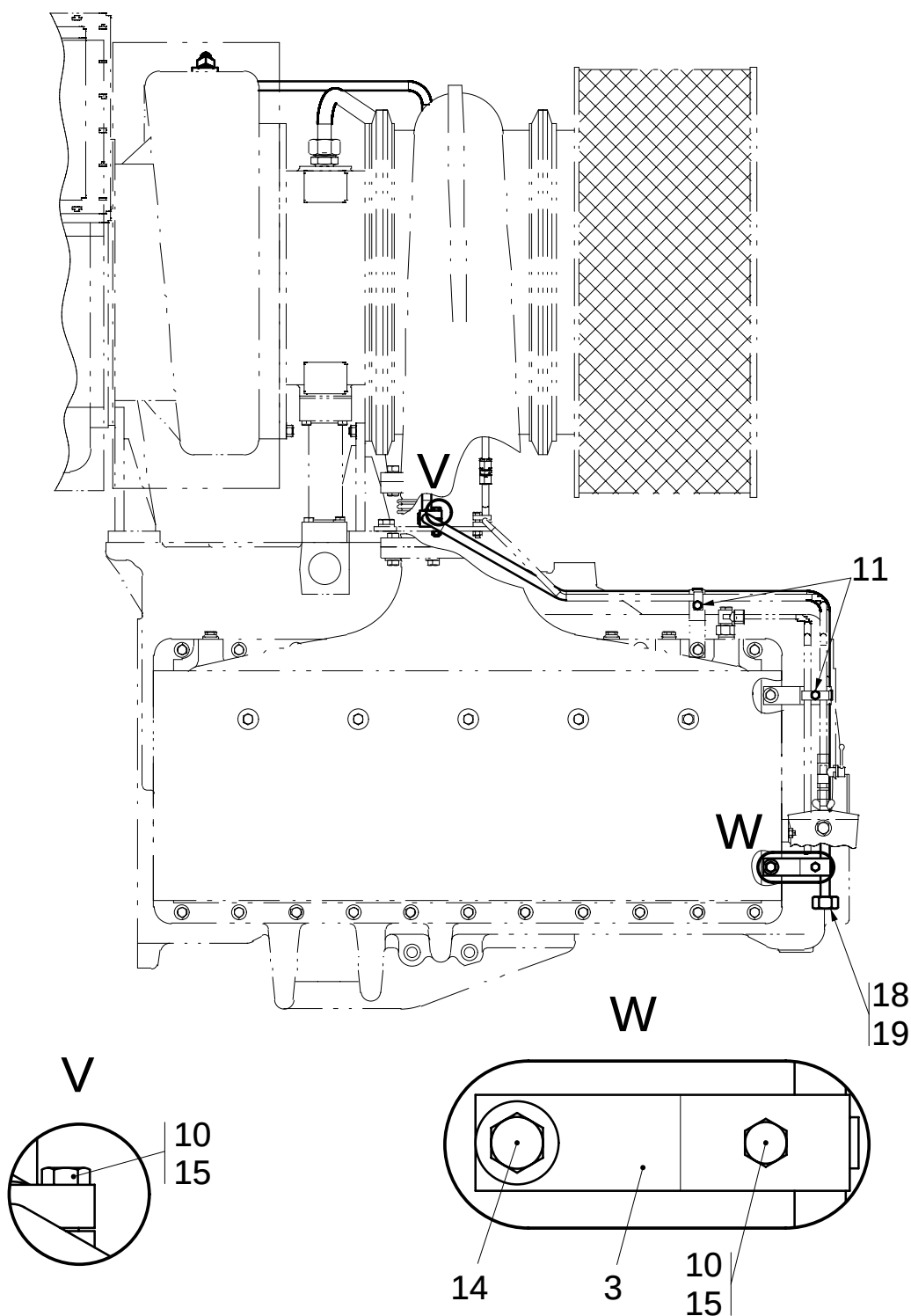


Cleaning Device for Turbocharger

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Cleaning Device for Turbocharger

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 FF
1	ROHRLEITUNG PIPE	1	257259-301
2	ROHRLEITUNG PIPE	1	257259-302
3	ROHRLEITUNG PIPE	1	257259-303
4	HALTER BRACKET	1	257259-304
5	HALTER BRACKET	2	257259-203
8	DOSIERGEFÄß, VOLLST. DOSING TANK, COMPL.	1	1.7259-017
9	KUGELHAHN BALL COCK	1	1.4840-054
10	ROHRKLEMME PIPE CLAMP	2	1.5011-001
11	ROHRKLEMME PIPE CLAMP	4	1.5011-002
12	SCHWENKVERSCHRAUBUNG BANJO	3	1.5093-634
13	GEWINDEREDUZIERUNG REDUCER	1	1.5036-054
14	KONUS-REDUZIERANSCHLUSS REDUCING UNION	1	1.5097-365
18	DICHTRING JOINT RING	# 1	1.7010-133
19	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1367-240
20	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-446
21	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-379
22	SECHSKANTMUTTER HEXAGON NUT	3	1.2007-034

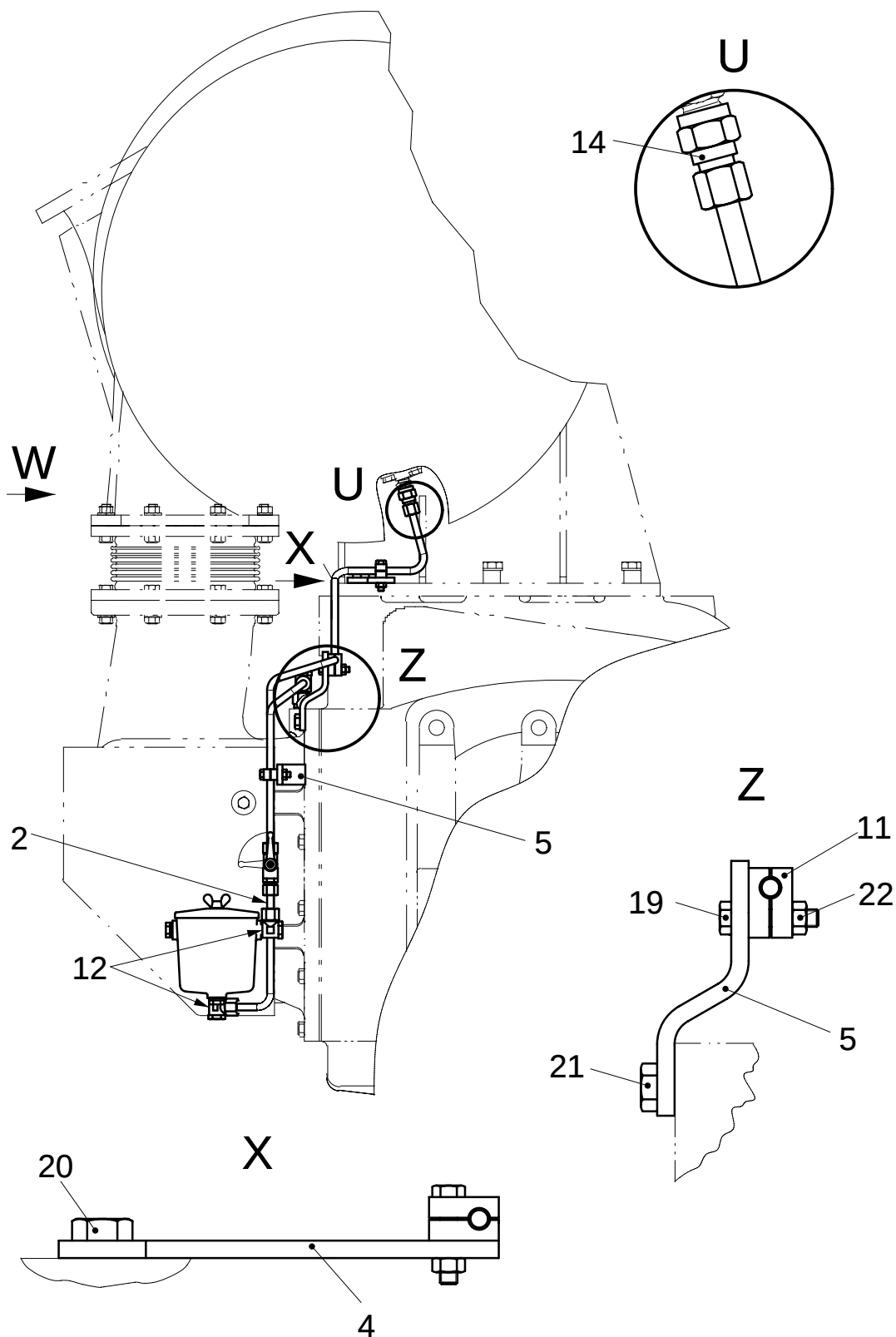
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

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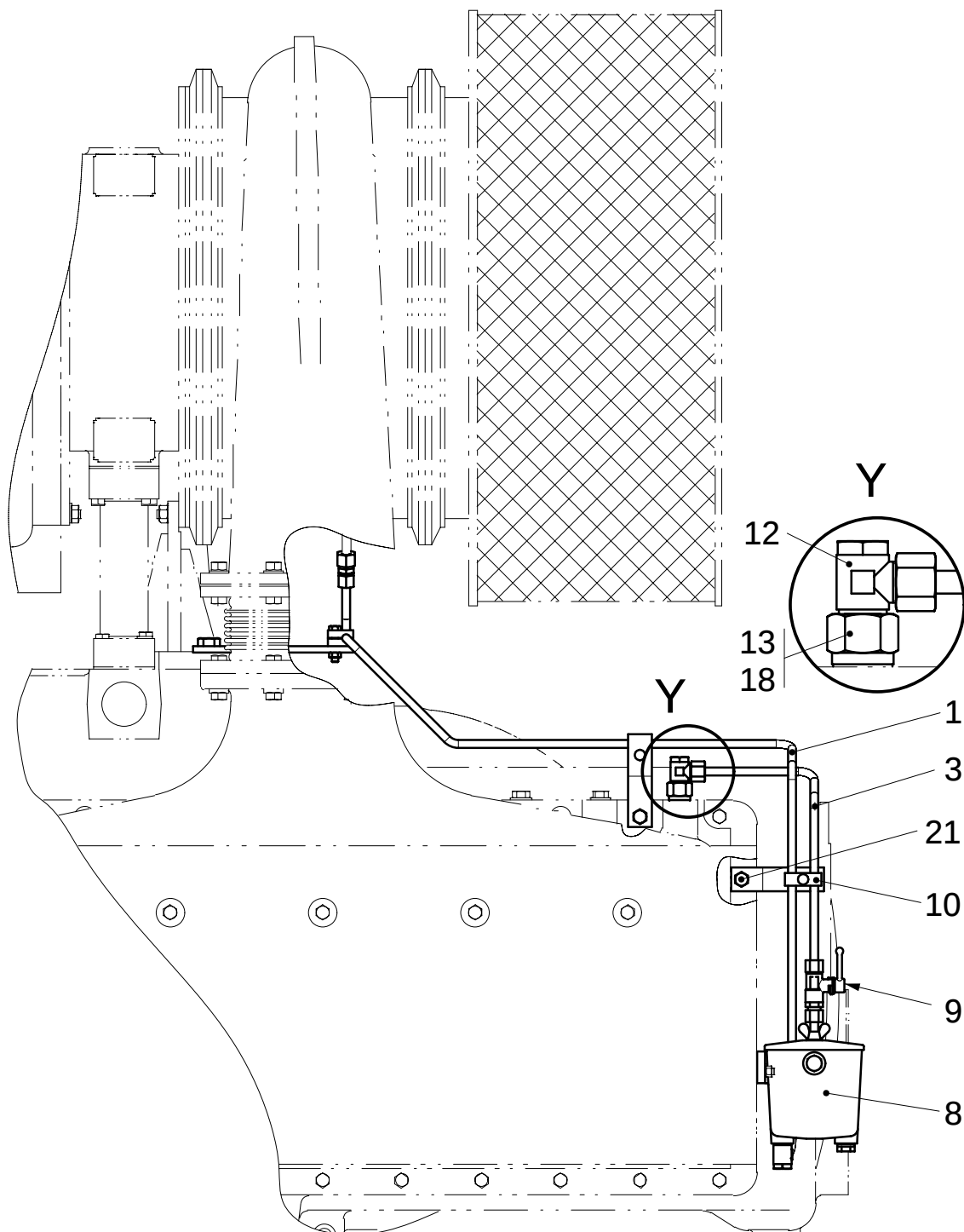


Cleaning Device for Turbocharger

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Cleaning Device for Turbocharger

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 GG
1	ECKVENTIL, VOLLST. CORNER VALVE, COMPL.	3	SIEHE B1.05.06.1.7297 SEE B1.05.06.1.7297
4	ROHRLEITUNG STEEL TUBE	1	257259-004
5	ROHRLEITUNG STEEL TUBE	1	257259-005
6	ROHRLEITUNG STEEL TUBE	1	257259-006
9	STUTZEN PIPE UNION	1	1.5093-254
10	STUTZEN PIPE UNION	2	2.7295-008
13	DICHTRING JOINT RING	# 3	1.7033-102

= VERBRAUCHSTEILE
CONSUMABLES

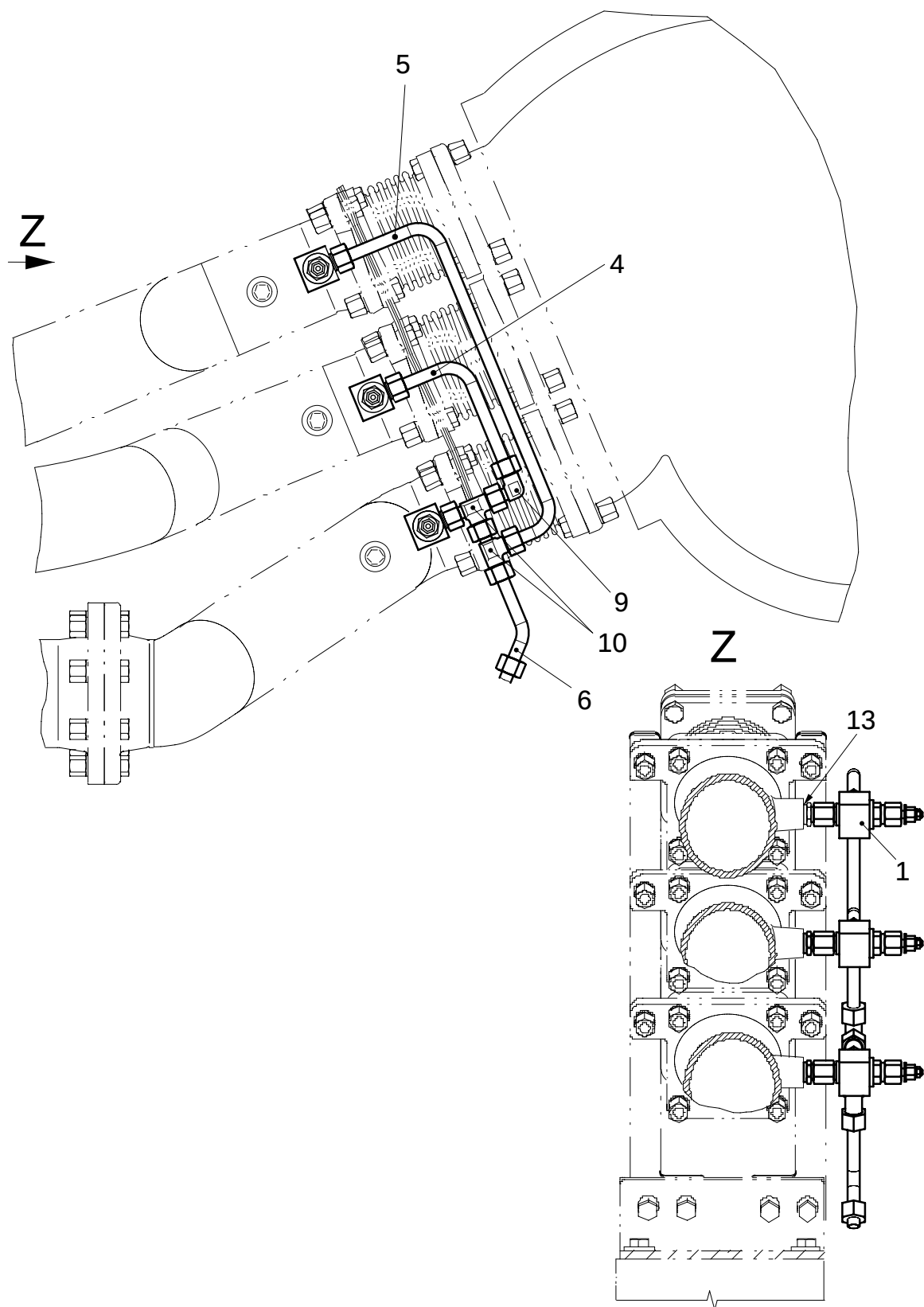
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

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Cleaning Device for Turbocharger

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 HH
1	ROHRLEITUNG TUBE	1	257259-401
2	ROHRLEITUNG TUBE	1	257259-502
3	ROHRLEITUNG TUBE	1	257259-403
5	HALTER BRACKET	2	257259-203
8	DOSIERGEFÄSS, VOLLST. DOSING TANK, COMPL.	1	1.7259-017
9	KUGELHAHN COCK	1	1.4840-054
10	ROHRKLEMME PIPE CLAMP	2	1.5011-001
11	ROHRKLEMME PIPE CLAMP	2	1.5011-002
12	SCHWENKVERSCHRAUBUNG BANJO	3	1.5093-614
13	GEWINDEREDUZIERUNG REDUCER	1	1.5036-004
14	KONUS-REDUZIERANSCHLUSS REDUCING UNION	1	1.5097-365
18	DICHTRING JOINT RING	# 1	1.7010-133
19	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-239
20	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-309
21	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-379
22	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034

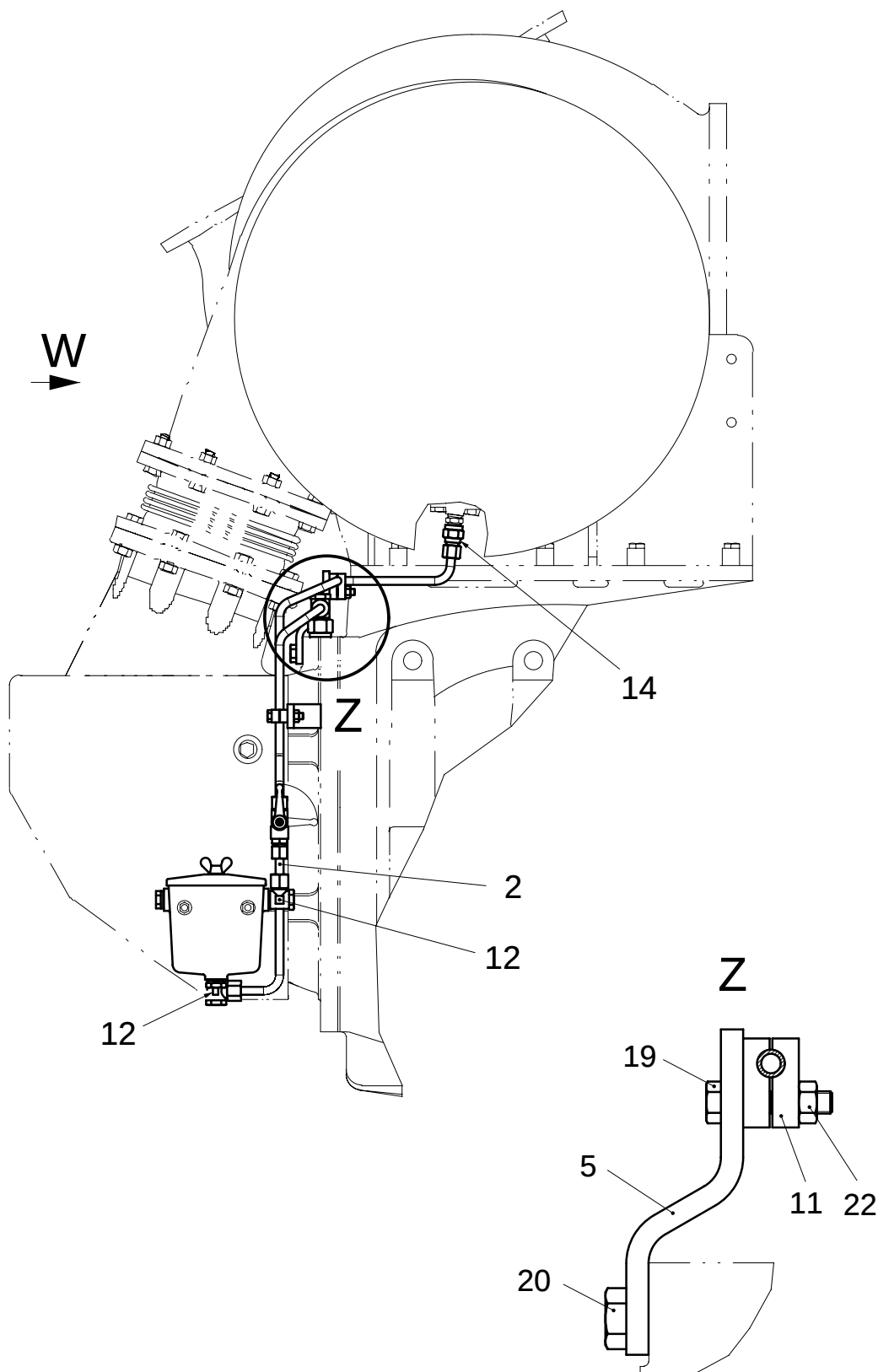
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

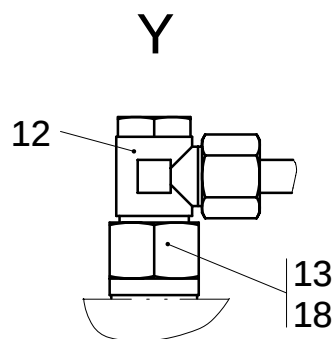
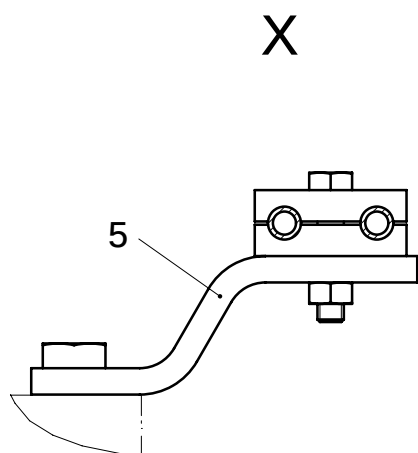
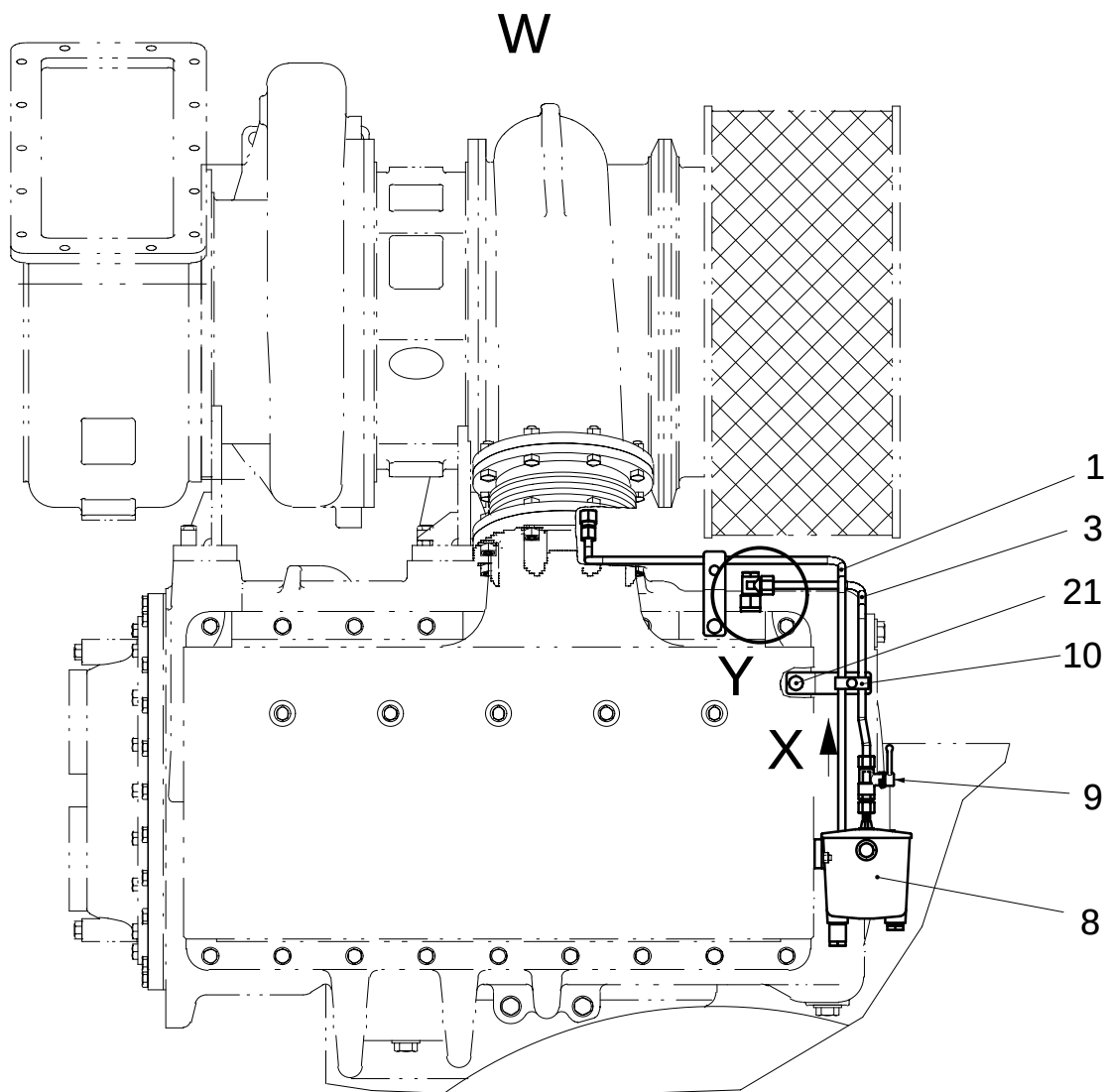
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Cleaning Device for Turbocharger

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Cleaning Device for Turbocharger

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 KK
1	ROHRLEITUNG PIPE	1	257259-501
2	ROHRLEITUNG PIPE	1	257259-502
3	ROHRLEITUNG PIPE	1	257259-503
4	HALTER BRACKET	1	257259-304
5	HALTER BRACKET	1	257259-505
6	HALTER BRACKET	1	257259-506
8	DOSIERGEFÄSS, VOLLST. DOSING TANK, COMPL.	1	1.7259-017
9	KUGELHAHN BALL COCK	1	1.4840-054
10	ROHRKLEMME PIPE CLAMP	2	1.5011-001
11	ROHRKLEMME PIPE CLAMP	4	1.5011-002
12	SCHWENKVERSCHRAUBUNG BANJO	3	1.5093-634
13	GEWINDEREDUZIERUNG REDUCER	1	1.5036-054
14	KONUS-REDUZIERANSCHLUSS REDUCING UNION	1	1.5097-365
18	DICHTRING JOINT RING	# 1	1.7010-133
19	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1367-240
20	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-446
21	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-384

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
22	SECHSKANTMUTTER HEXAGON NUT	3	1.2007-034
23	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-379

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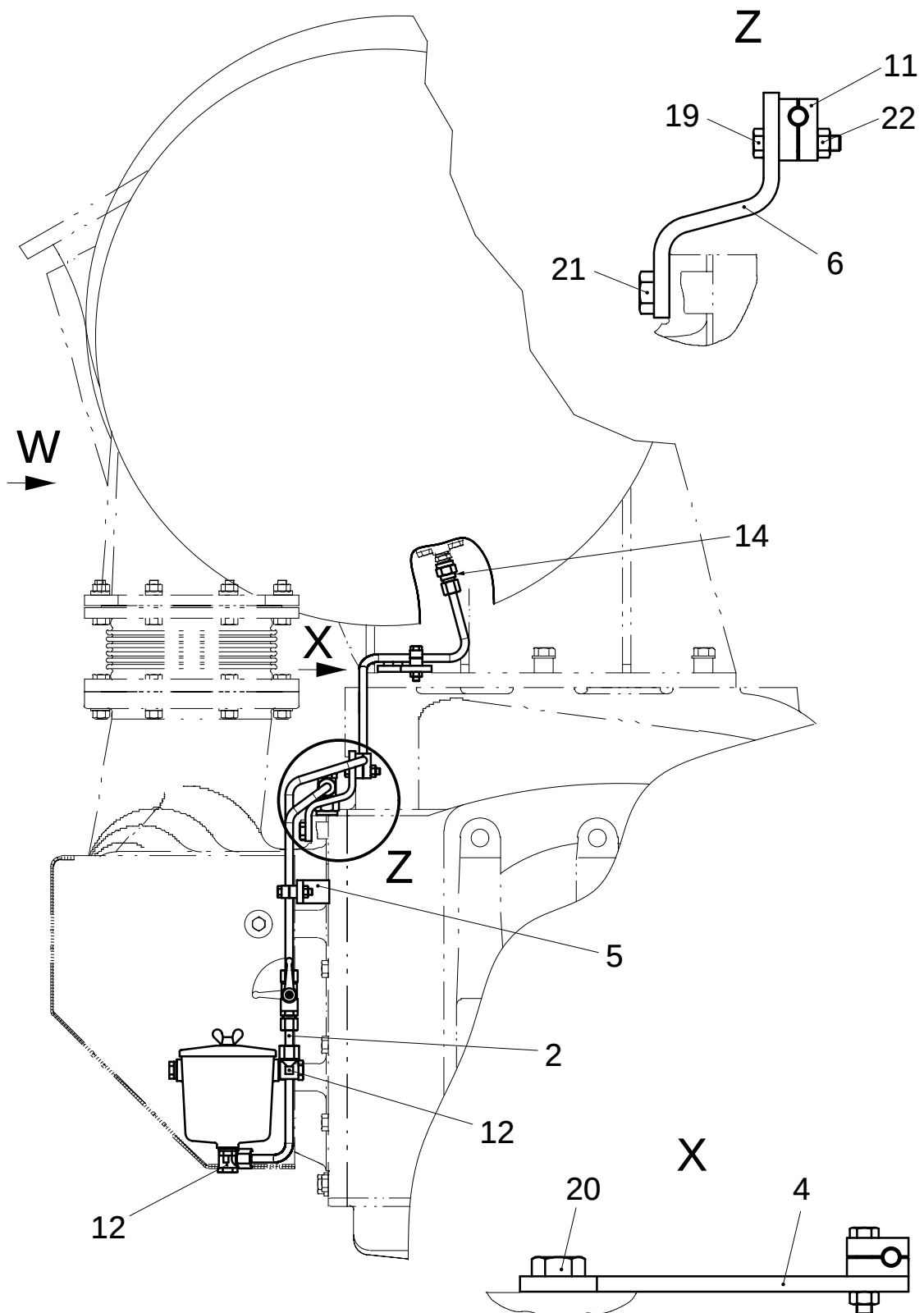
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

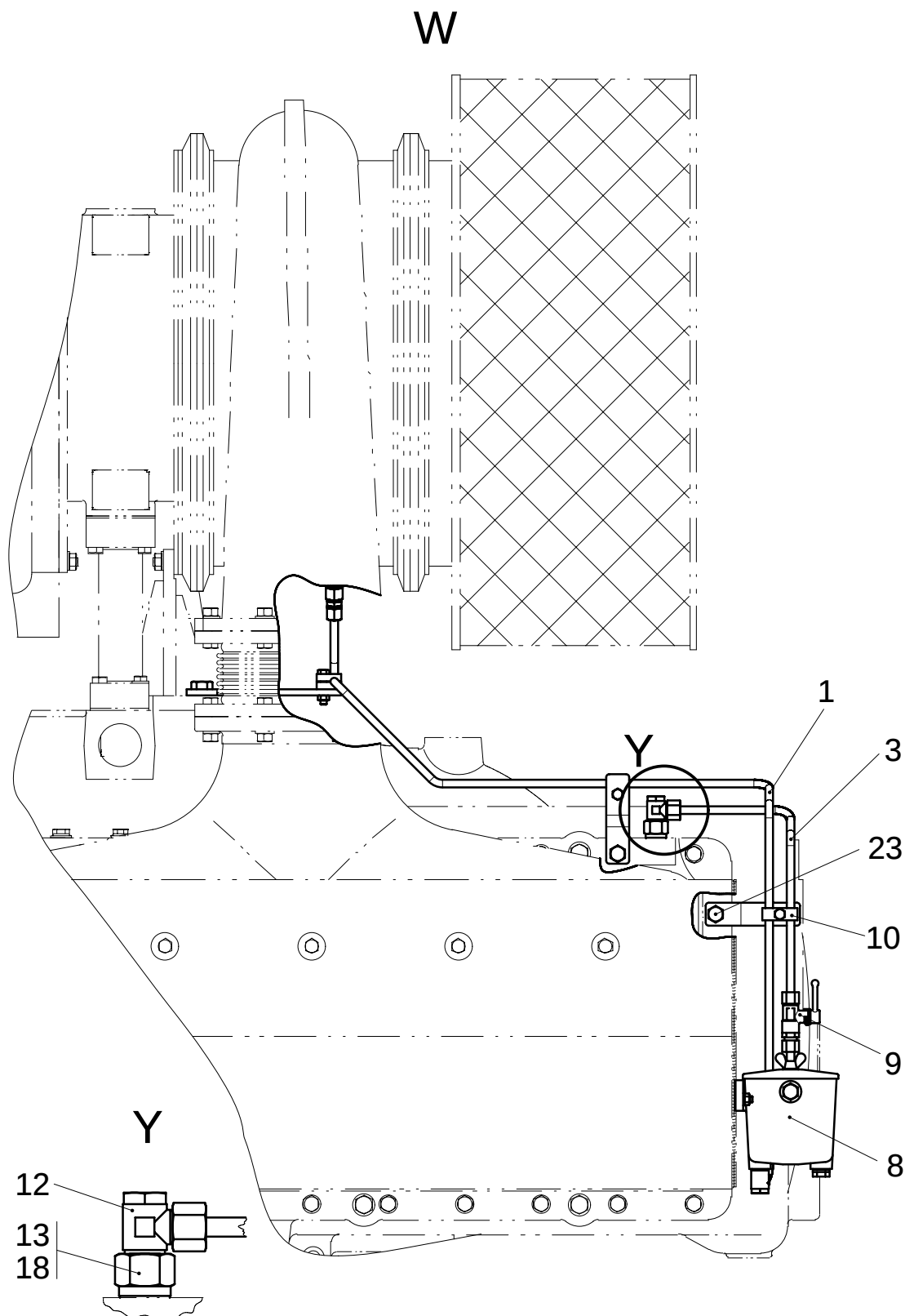
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Cleaning Device for Turbocharger

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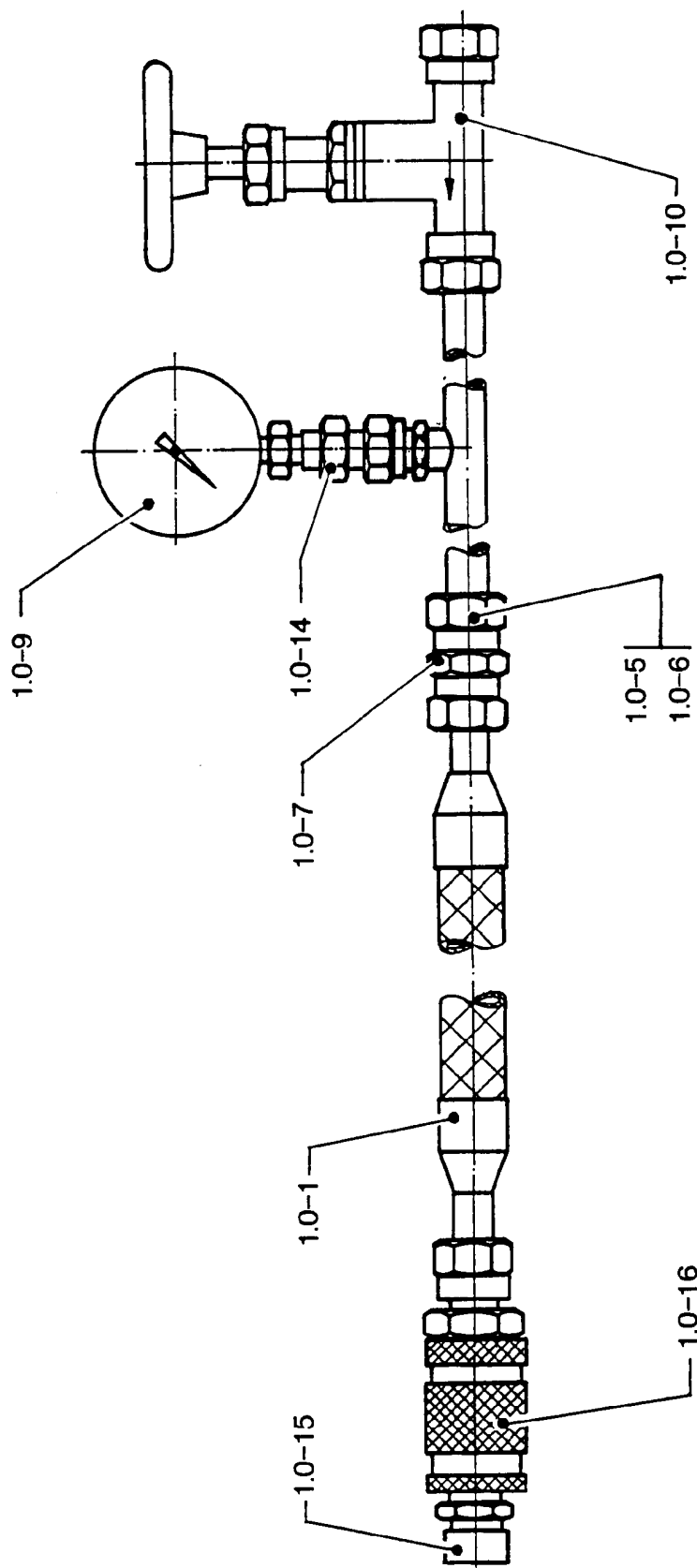
Connection Fittings

M20-M601C

for Turbocharger Cleaning Device

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.	
1.0	ANSCHLUSSARMATUREN, VOLLST. CONNECTION FITTINGS ASS.	1	1.7259 LL		
1.0-1	SCHLAUCHVERBINDER HOSE CLIP	1	1.8810-55		
1.0-5	SCHNEIDRING CUTTING RING	3	S16	DIN3861	ST-B2D
1.0-6	ÜBERWURFMUTTER UNION NUT	3	AS16	DIN3870	A3C
1.0-7	STUTZEN PIPE UNION	1	S16	DIN3902	ST-A3C
1.0-9	DRUCKMESSGERÄT PRESSURE GAUGE	1	1.7259-10		
1.0-10	VENTIL VALVE WITHOUT NUT AND CUTTING RING	1	CS16	DIN86501	RG-N
1.0-14	MANOMETER-ANSCHL.-STUTZEN PRESSURE GAUGE UNION	1	1.7259-12		
1.0-15	DURCHGANGSNIPPEL NIPPLE SOCKET	1	1.7259-215		
1.0-16	VERSCHLUSSKUPPLUNG COUPLING GEAR	1	1.7259-216		

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Cleaning Device for Turbocharger

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 LL
1	ROHRLEITUNG STEEL TUBE	1	257259-001
2	ROHRLEITUNG STEEL TUBE	1	257259-202
3	HALTER BRACKET	1	257259-505
4	STUTZEN PIPE UNION	1	1.5095-025
5	ECKVENTIL, VOLLST. CORNER VALVE, COMPL.	1	SIEHE B1.05.06.1.7297 SEE B1.05.06.1.7297
6	ROHRKLEMME PIPE CLAMP	12	1.5011-041
8	DICHTRING JOINT RING	# 1	1.7010-133
10	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-314
11	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-244
12	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-311
13	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-251
14	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-379
15	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034
16	ROHRKLEMME PIPE CLAMP	2	1.5011-003
18	ÜBERWURFMUTTER UNION NUT	1	1.5040-139
19	SCHNEIDRING CUTTING RING	1	1.5059-206

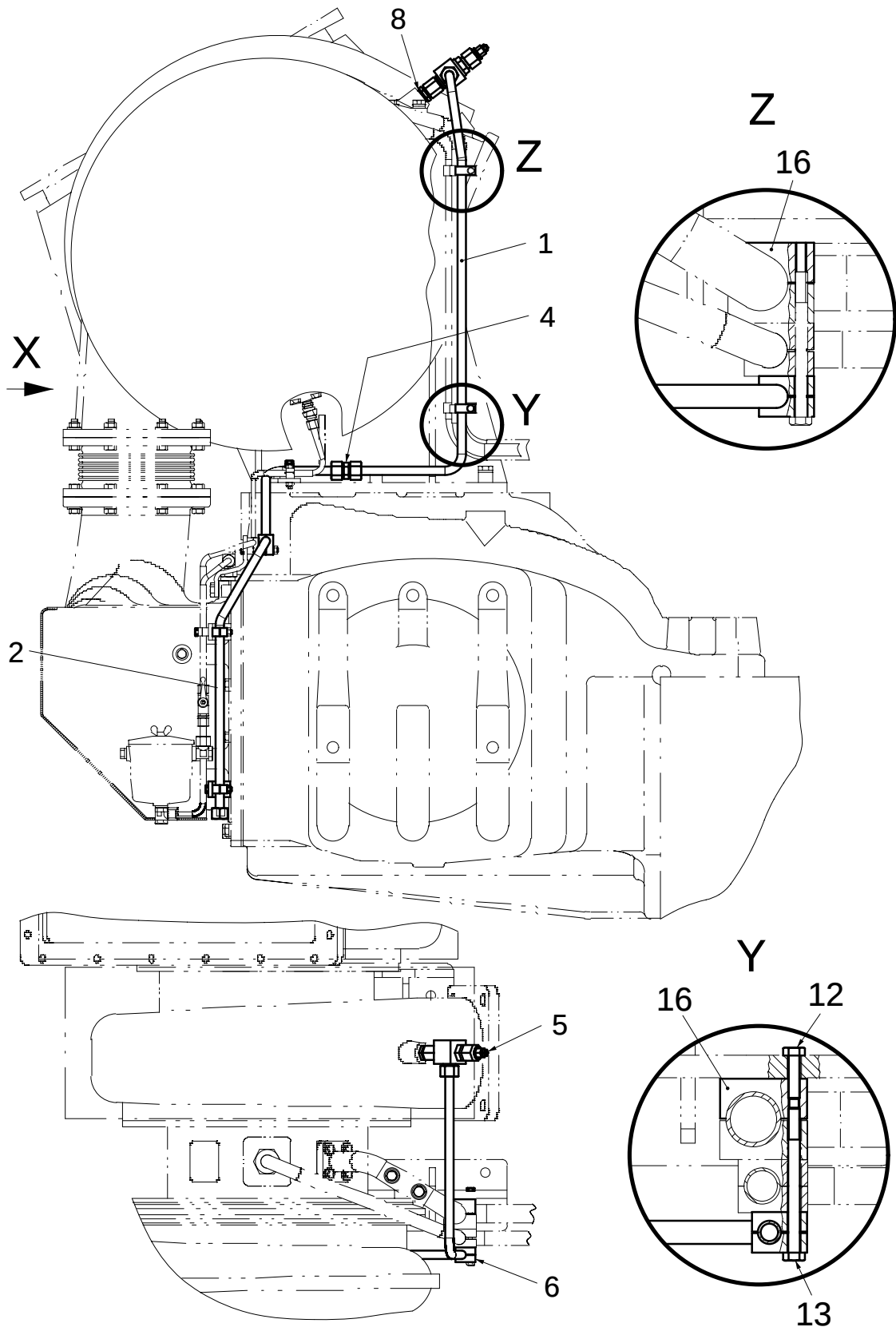
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

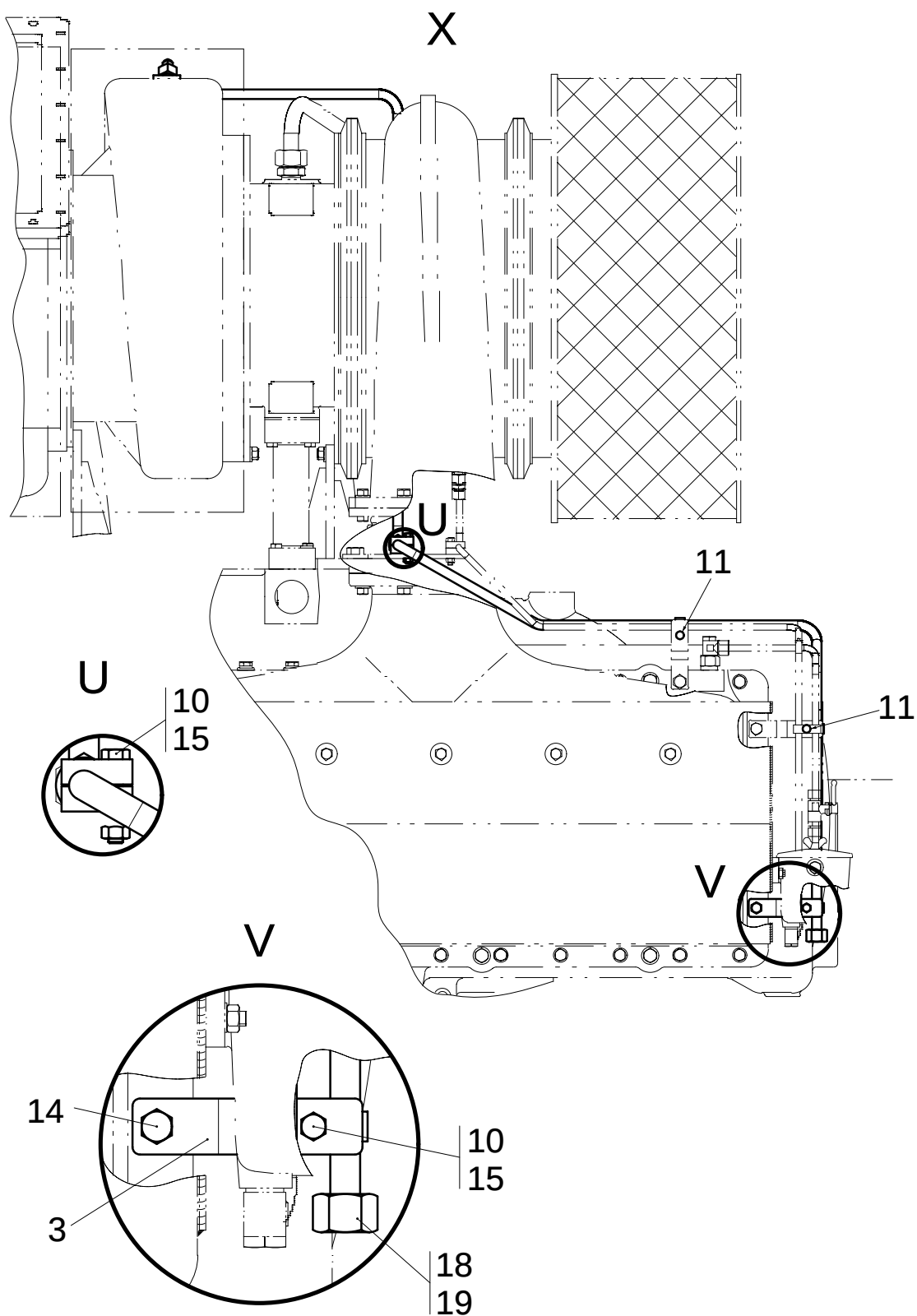
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Cleaning Device for Turbocharger

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Cleaning Device for Turbocharger

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 MM
1	ROHRLEITUNG PIPE	1	257259-101
2	ROHRLEITUNG PIPE	1	257259-102
3	HALTER BRACKET	1	257259-304
4	HALTER BRACKET	1	257259-606
7	ROHRKLEMME PIPE CLAMP	12	1.5011-041
8	ROHRKLEMME PIPE CLAMP	2	1.5011-023
9	ECKVENTIL, VOLLST. CORNER VALVE, COMPL.	1	SIEHE B1.05.06.1.7297 SEE B1.05.06.1.7297
11	DICHTRING JOINT RING	# 1	1.7010-133
12	STUTZEN PIPE UNION	1	1.5095-025
13	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1367-240
14	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-246
15	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-251
16	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-379
17	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-447
18	SECHSKANTMUTTER HEXAGON NUT	5	1.2007-034

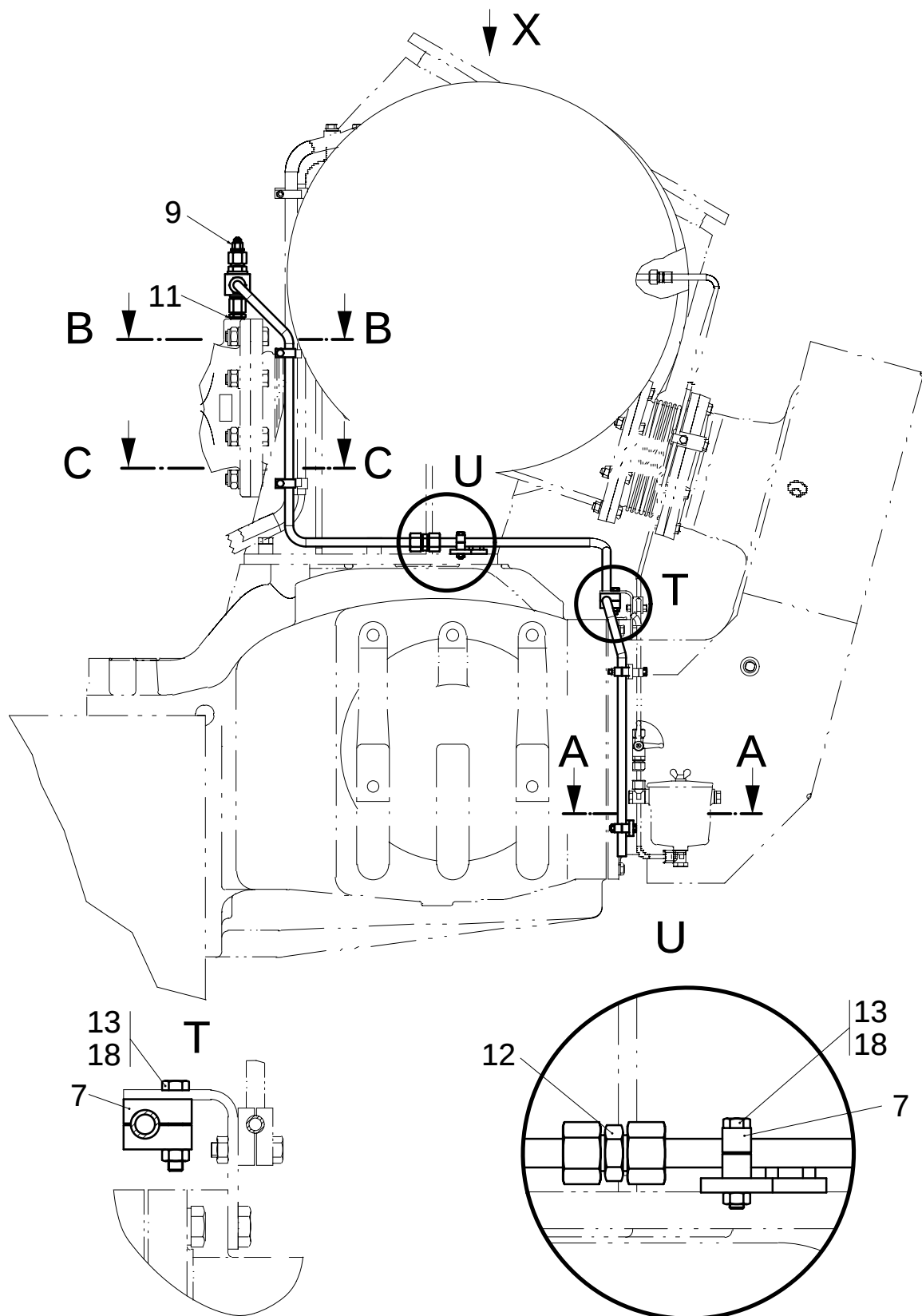
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

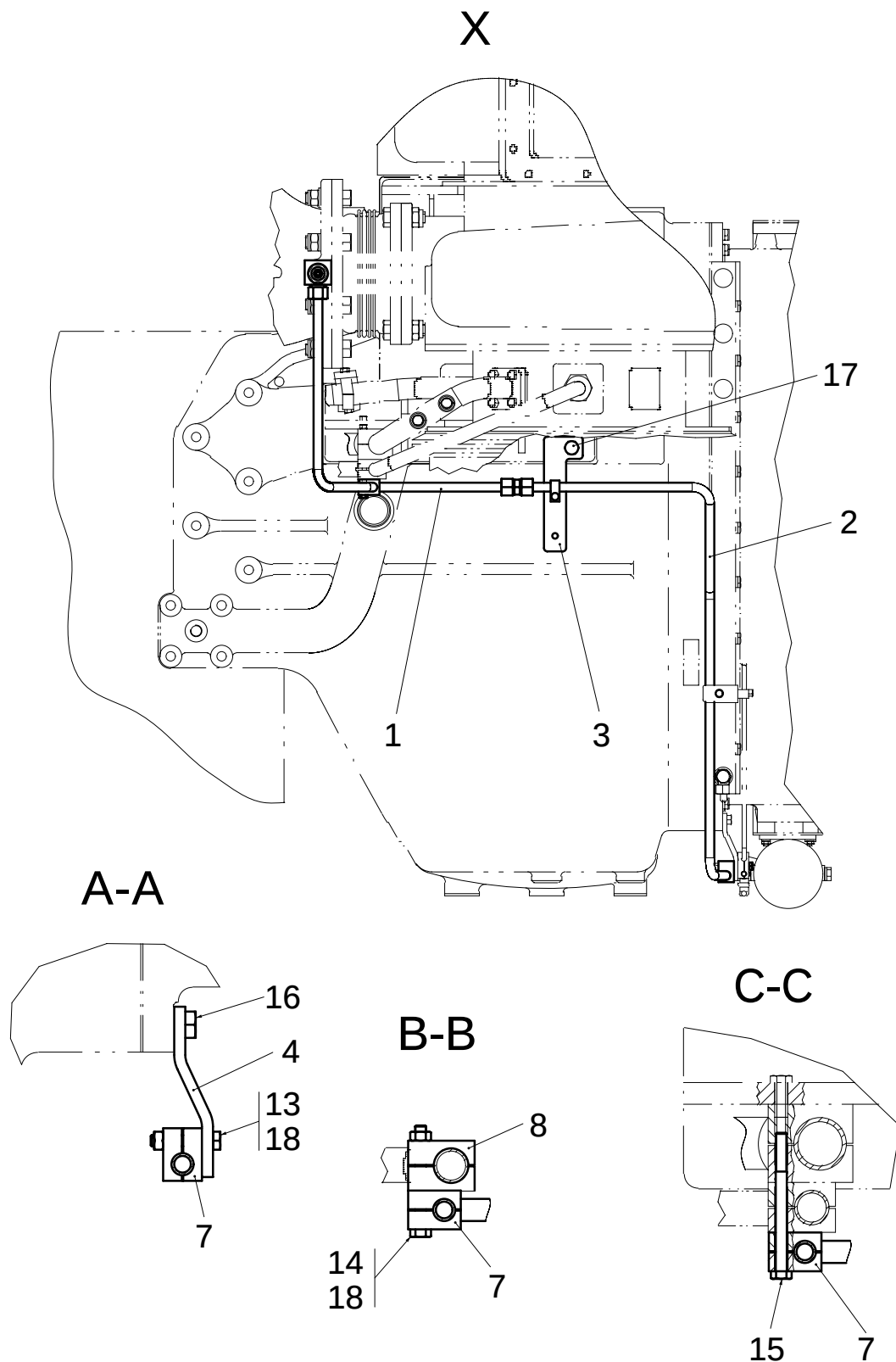
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Cleaning Device for Turbocharger

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Cleaning Device for Turbocharger

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 NN
1	ROHRLEITUNG PIPE	1	257259-601
2	ROHRLEITUNG PIPE	1	257259-602
3	ROHRLEITUNG PIPE	1	257259-603
4	ROHRLEITUNG PIPE	1	257259-302
5	HALTER BRACKET	1	257259-605
6	HALTER BRACKET	1	257259-606
7	HALTER BRACKET	1	257259-607
10	DOSIERGEFÄß, VOLLST. DOSING TANK, COMPL.	1	1.7259-017
11	KUGELHAHN BALL COCK	1	1.4840-054
12	ROHRKLEMME PIPE CLAMP	4	1.5011-002
13	ROHRKLEMME PIPE CLAMP	2	1.5011-001
14	SCHWENKVERSCHRAUBUNG BANJO	3	1.5093-634
15	GEWINDEREDUZIERUNG REDUCER	1	1.5036-054
16	KONUS-REDUZIERANSCHLUSS REDUCING UNION	1	1.5097-365
17	STUTZEN PIPE UNION	1	1.5095-042
20	DICHTRING JOINT RING	# 1	1.7010-133
21	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-312
23	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-244
24	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-308

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
25	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-379
26	SECHSKANTMUTTER HEXAGON NUT	5	1.2007-034
27	SCHEIBE WASHER	1	1.0040-224
28	SPANNSCHEIBE SPRING WASHER	2	1.0068-209

= VERBRAUCHSTEILE
CONSUMABLES

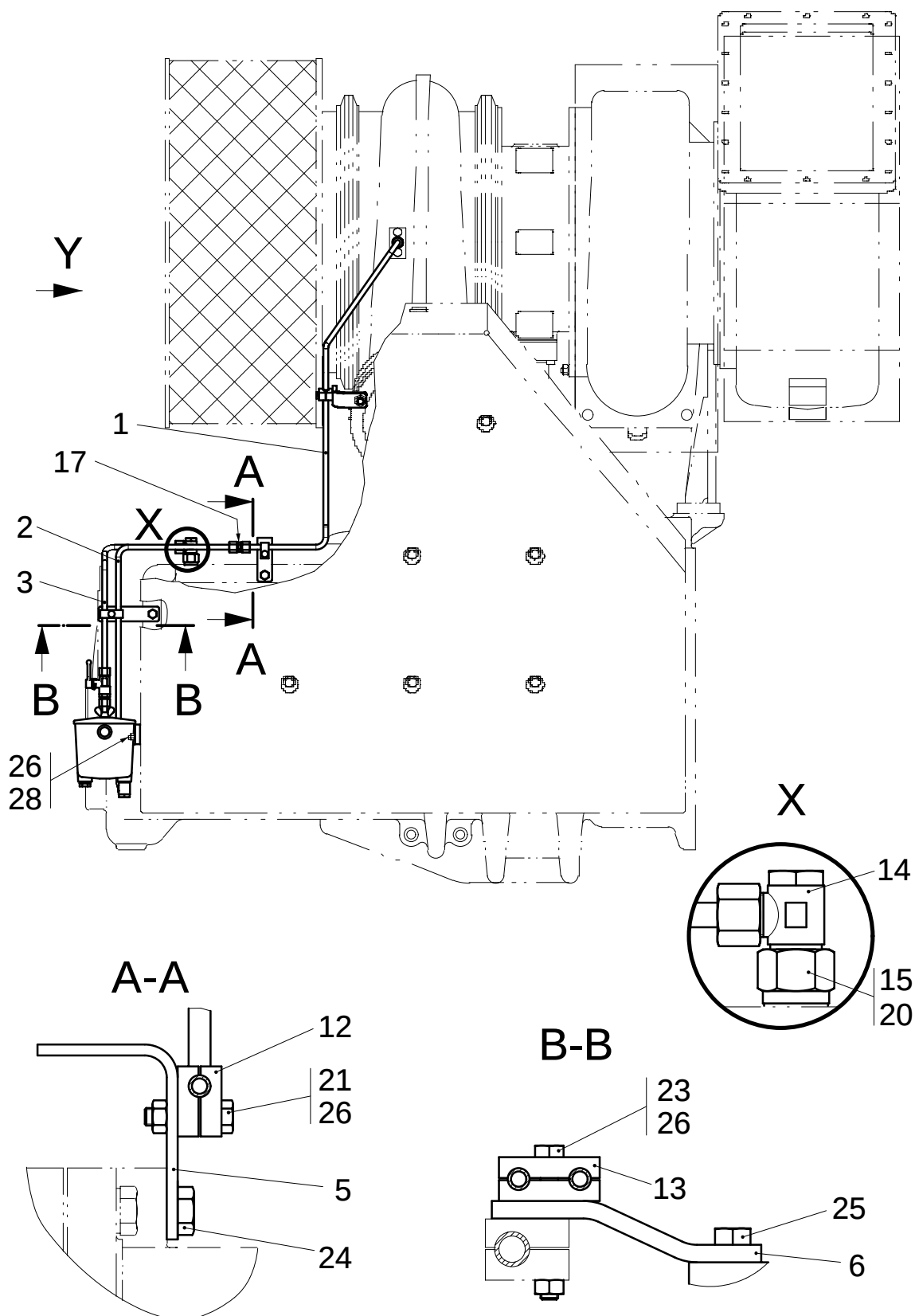
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

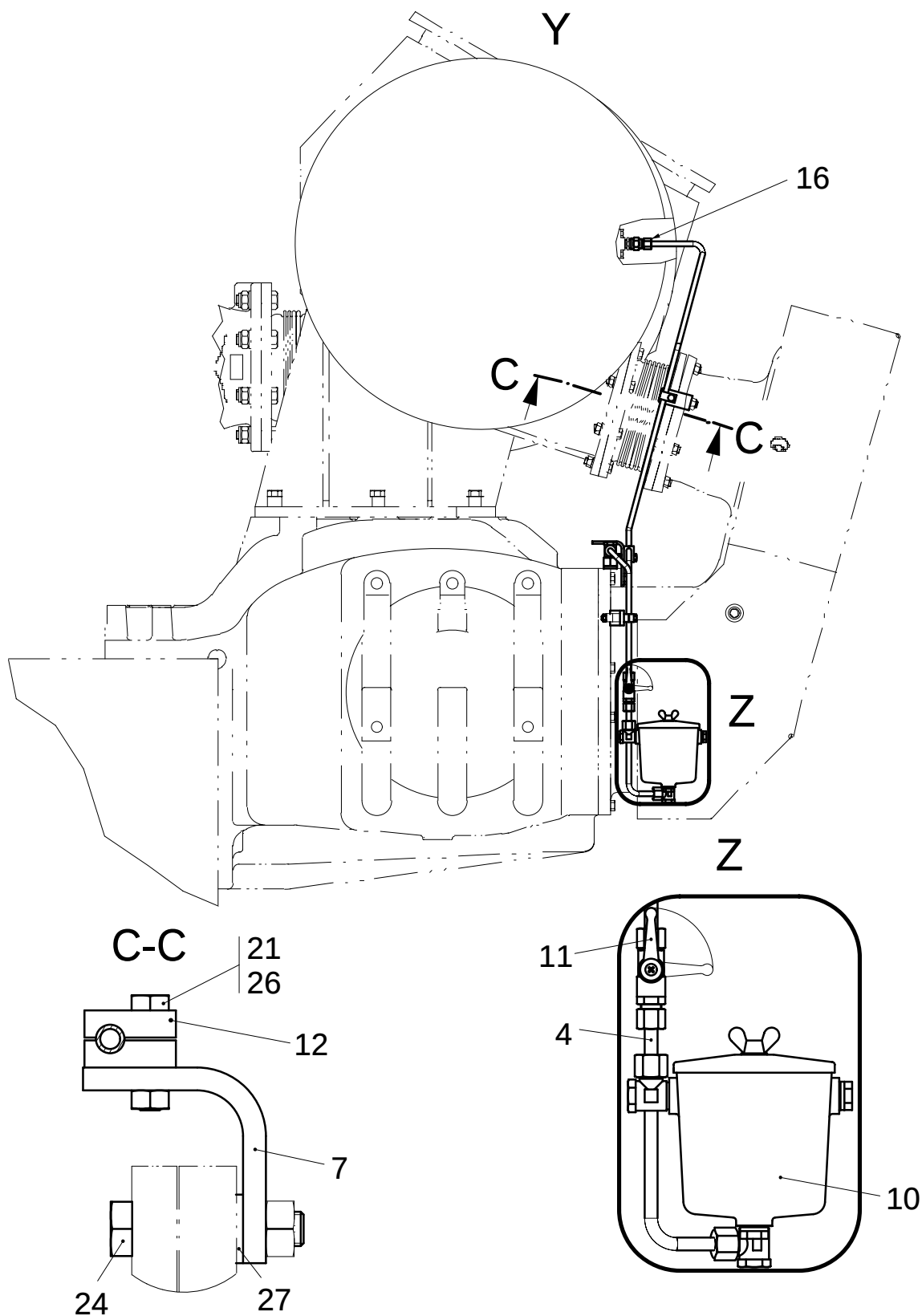
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Cleaning Device for Turbocharger

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Cleaning Device for Turbocharger

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 PP
1	ECKVENTIL, VOLLST. CORNER VALVE, COMPL.	3	SIEHE B1.05.06.1.7297 SEE B1.05.06.1.7297
4	ROHRLEITUNG STEEL TUBE	1	257259-206
5	ROHRLEITUNG STEEL TUBE	1	257259-205
6	ROHRLEITUNG STEEL TUBE	1	257259-207
9	STUTZEN PIPE UNION	1	1.5093-254
10	STUTZEN PIPE UNION	2	2.7295-008
13	DICHTRING JOINT RING	# 3	1.7033-102

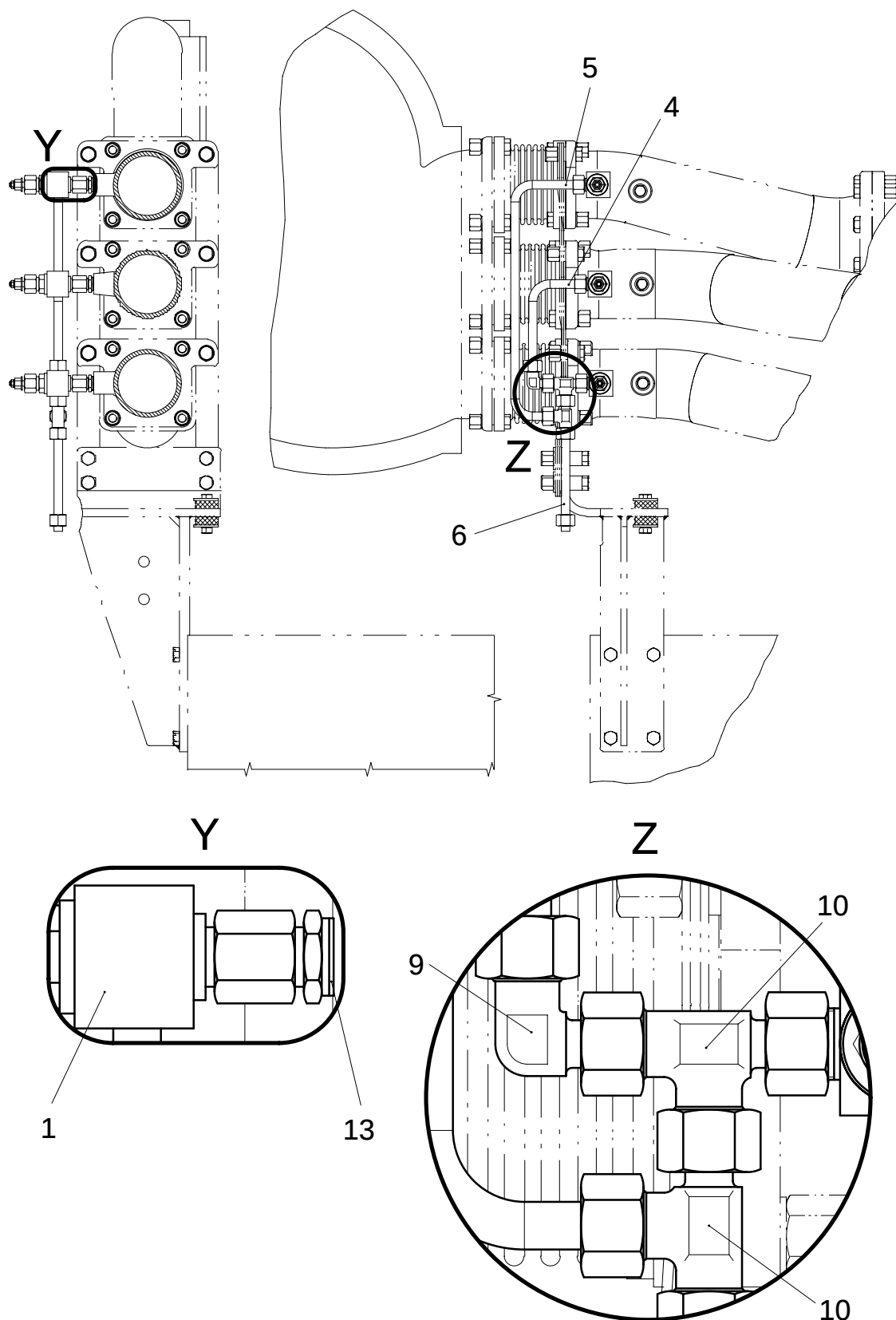
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

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Cleaning Device for Turbocharger

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 RR
1	ROHRLEITUNG PIPE	1	257259-801
2	ROHRLEITUNG PIPE	1	257259-802
3	ROHRLEITUNG PIPE	1	257259-803
4	ROHRLEITUNG PIPE	1	257259-804
5	HALTER BRACKET	1	257259-605
6	HALTER BRACKET	1	257259-806
7	HALTER BRACKET	1	257259-807
10	DOSIERGEFÄß, VOLLST. DOSING TANK, COMPL.	1	257259-810
12	ROHRKLEMME PIPE CLAMP	8	1.5011-002
14	STUTZEN PIPE UNION	1	1.5094-270
15	STUTZEN PIPE UNION	1	1.5098-014
16	STUTZEN PIPE UNION	2	1.5094-222
17	GERADER VERBINDUNGSSTUTZEN STRAIGHT PIPE UNION	2	1.5095-042
19	DICHTRING JOINT RING	# 1	1.7010-078
20	DICHTRING JOINT RING	# 2	1.7033-103
21	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-312
22	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-243
23	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1367-244
24	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-308

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
25	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-379
26	SECHSKANTMUTTER HEXAGON NUT	3	1.2007-034

06

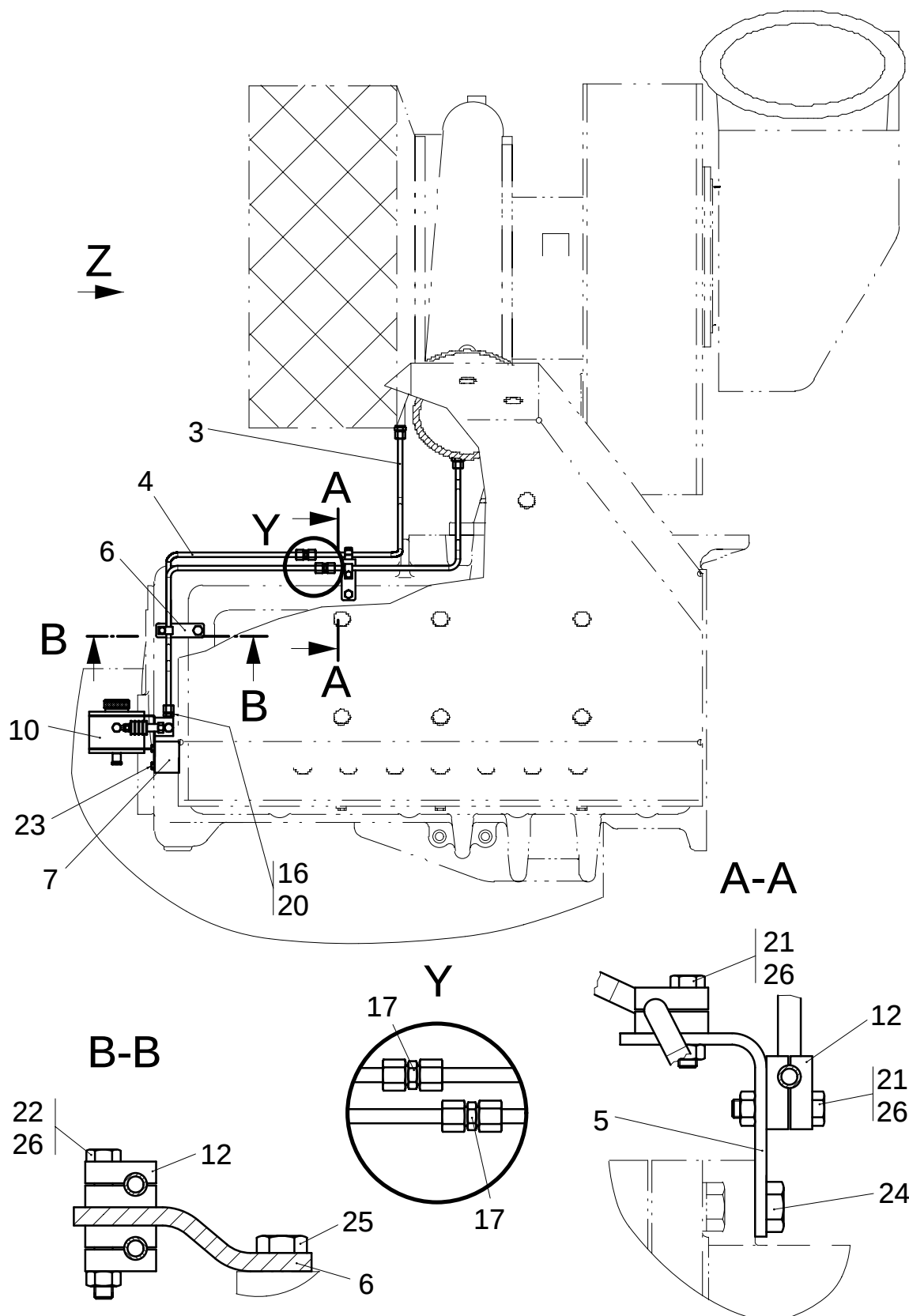
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

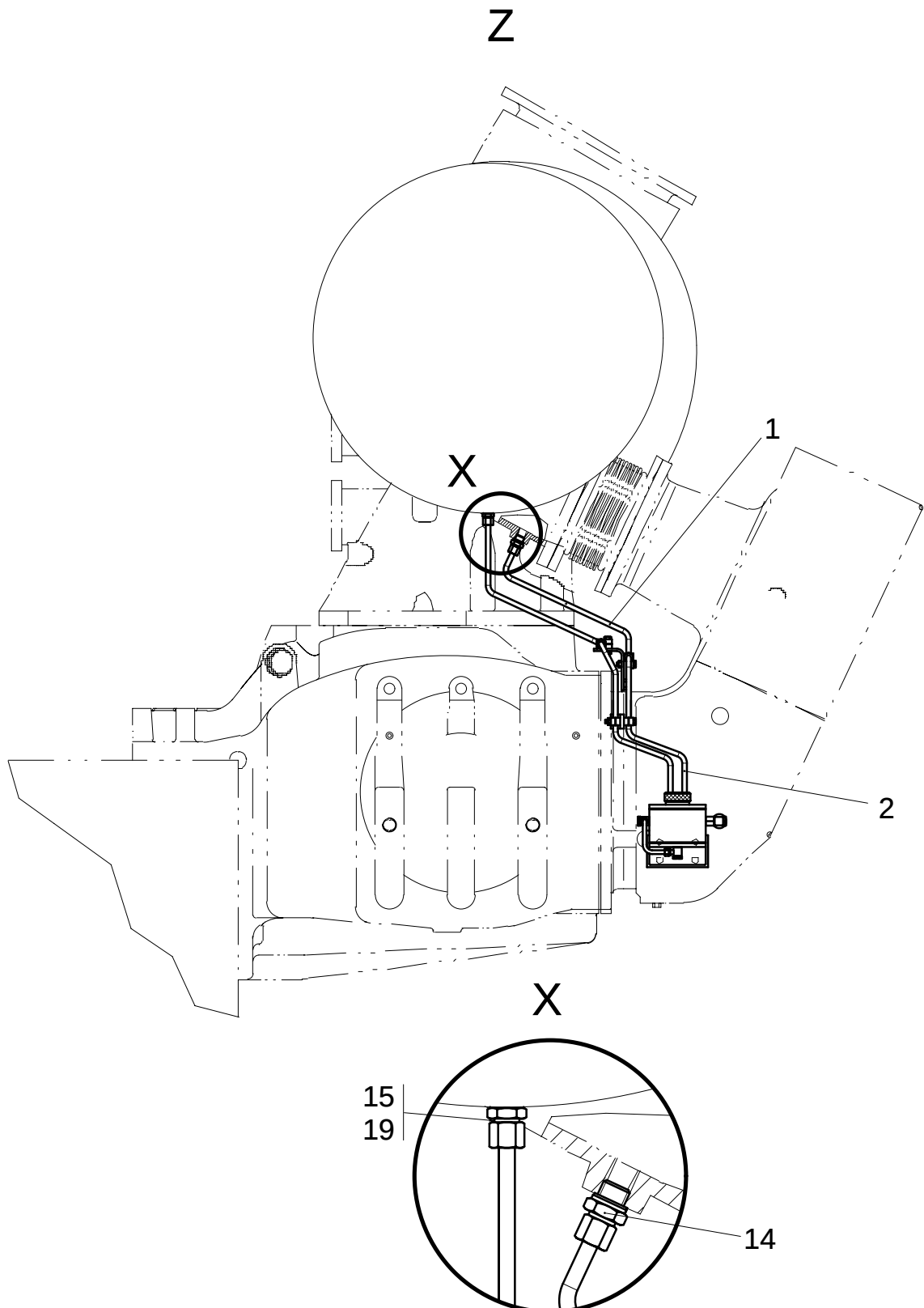
06



Cleaning Device for Turbocharger

M25

06



Cleaning Device for Turbocharger

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 SS
1	ROHRLEITUNG PIPE	1	257259-701
2	ROHRLEITUNG PIPE	2	257259-702
3	ROHRLEITUNG PIPE	1	257259-703
5	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-314
6	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034
8	STUTZEN PIPE UNION	2	1.5094-182
9	STUTZEN PIPE UNION	3	1.5094-274
10	T-STUTZEN T-PIPE UNION	2	1.5093-461
11	WINKELSTUTZEN ANGLE PIPE UNION	1	1.5093-263
13	DICHTRING JOINT RING	# 2	1.7033-102
15	KUGELHAHN BALL COCK	1	257259-715
16	ROHRKLEMME PIPE CLAMP	2	1.5011-041

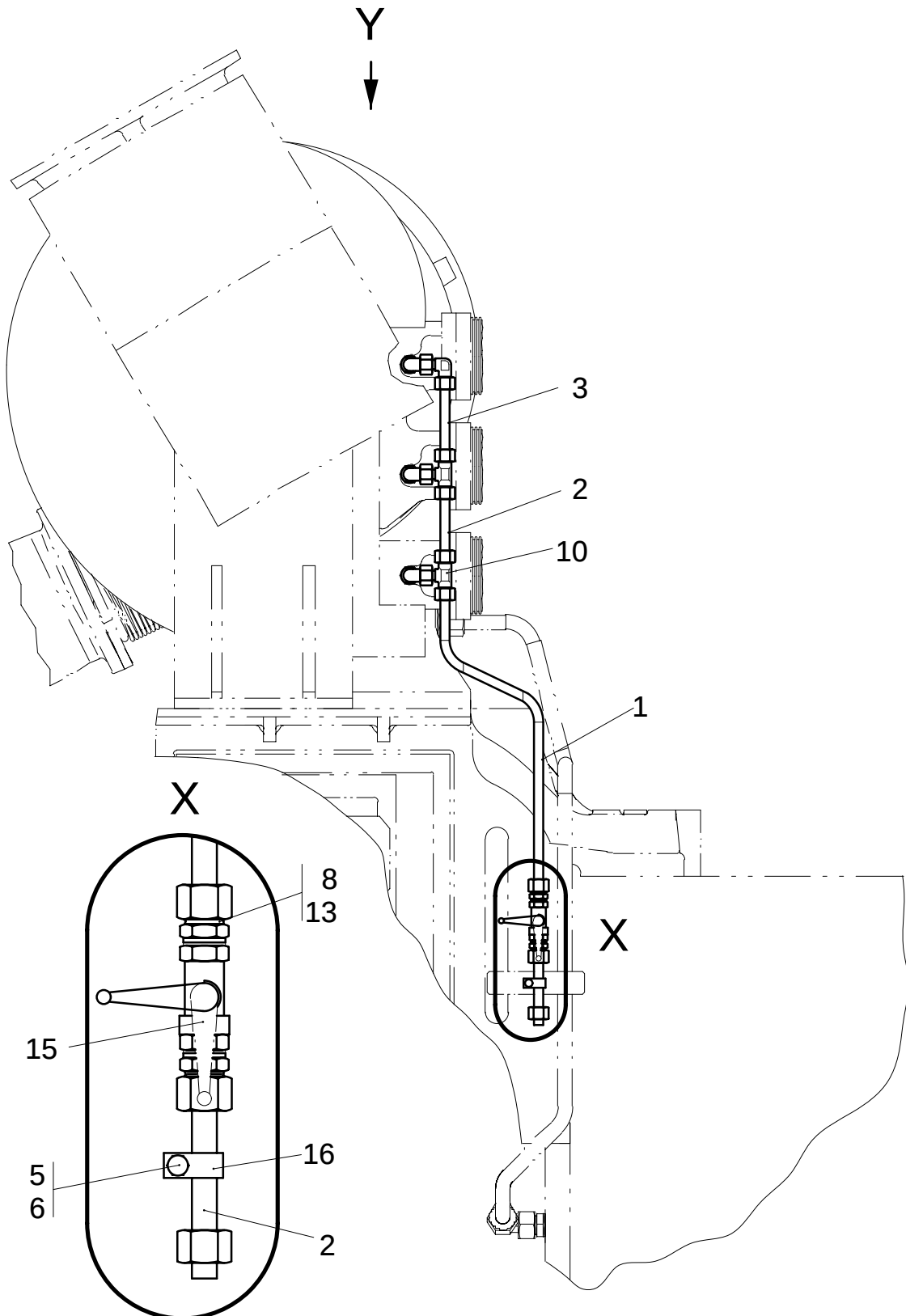
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

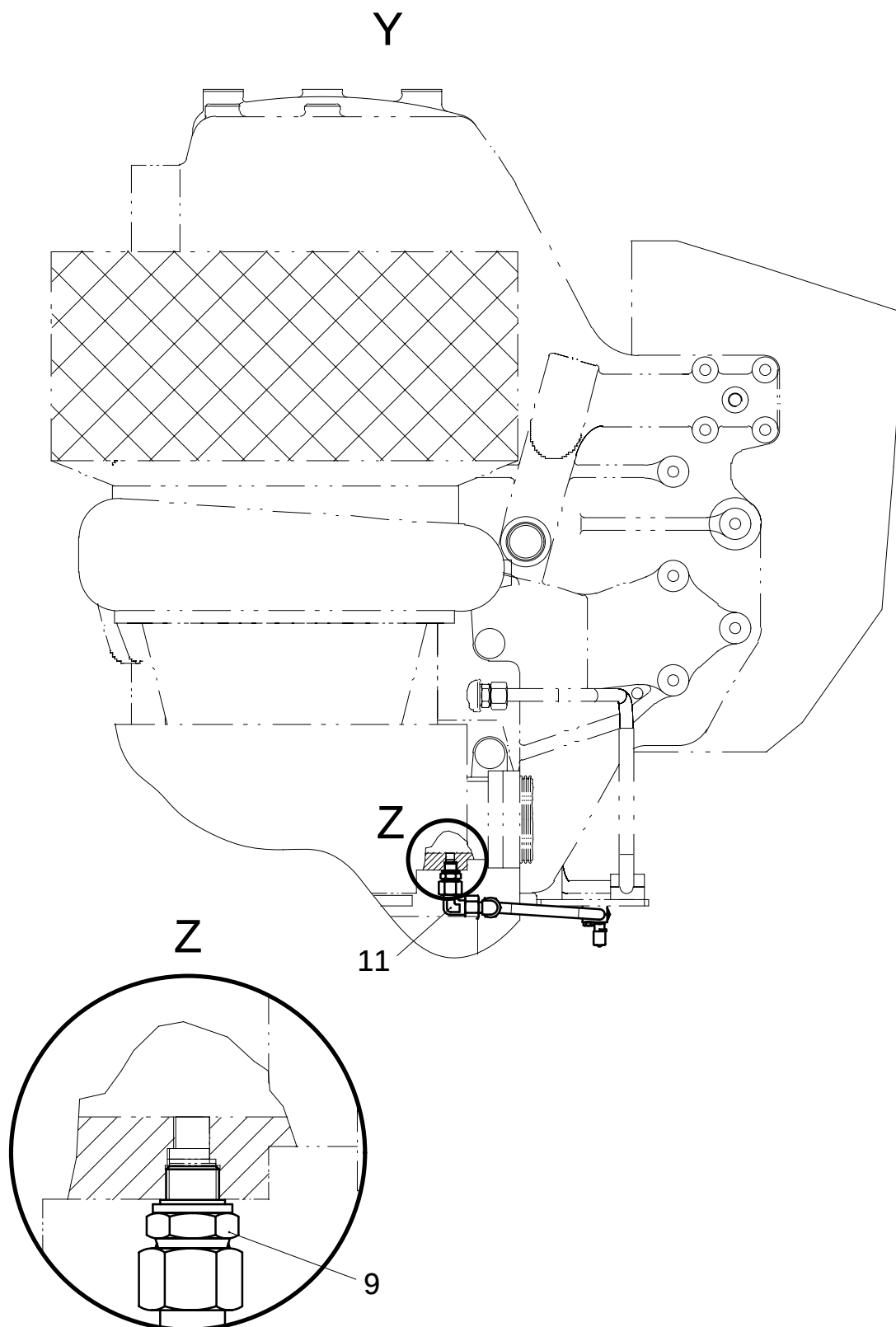
06



Cleaning Device for Turbocharger

M25

06



Cleaning Device for Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	REINIGUNGSANLAGE, VOLLST. CLEANING DEVICE ASSEMBLY	1	257259 TT
1	ECKVENTIL, VOLLST. CORNER VALVE, COMPL.	1	SIEHE B1.05.06.1.7297 SEE B1.05.06.1.7297
3	ROHRLEITUNG PIPE	1	257259-903
5	ROHRKLEMME PIPE CLAMP	2	1.5011-041
6	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-314
7	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034
10	DICHTRING JOINT RING	# 2	1.7010-133

= VERBRAUCHSTEILE
CONSUMABLES

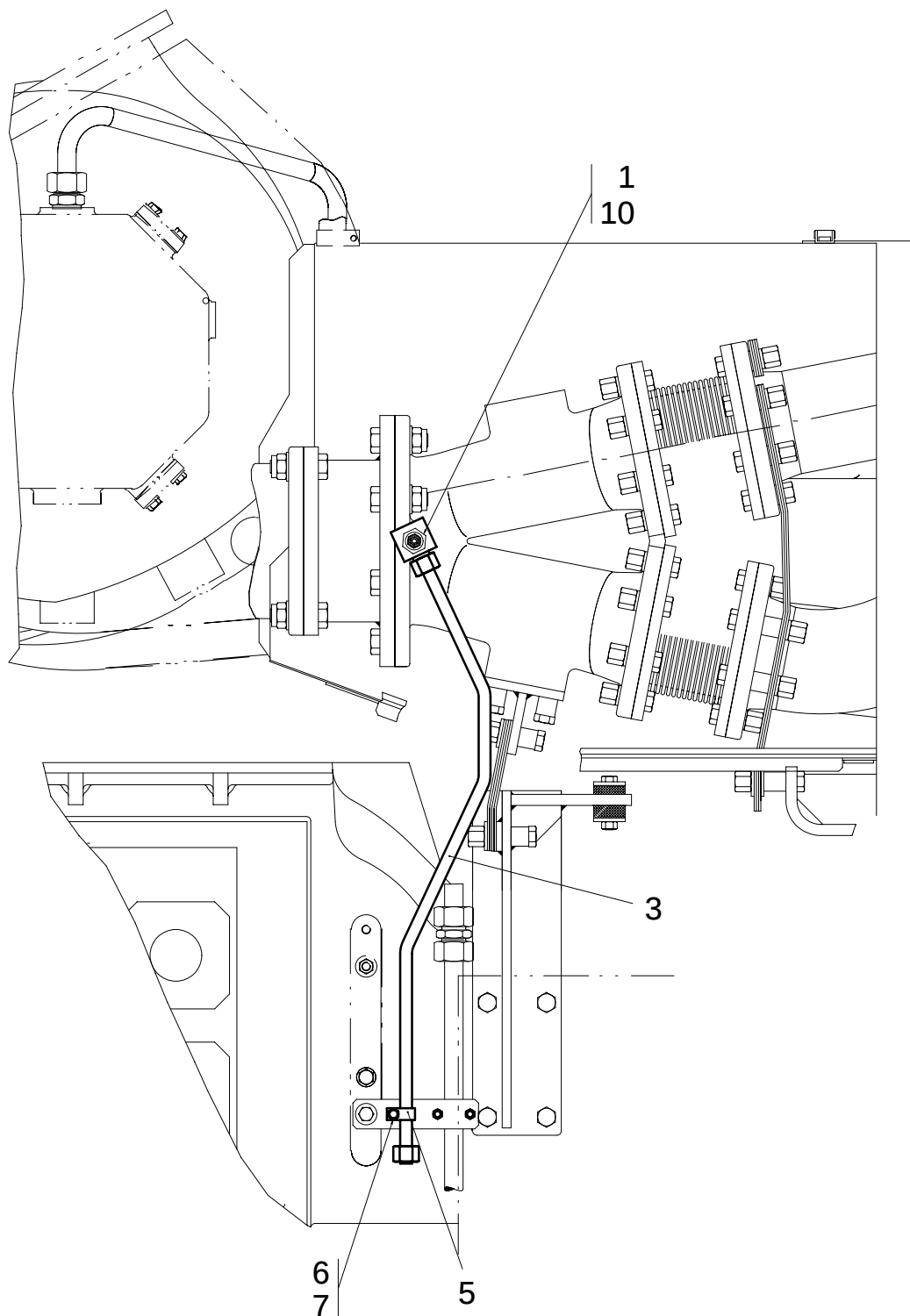
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cleaning Device for Turbocharger

M25

06



Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASLEITUNG-ANBAU, VOLLST. EXHAUST MANIFOLD MOUNTING ASSEMBLY	1	257260 AA
1	ABGASLEITUNG EXHAUST PIPE	3	257260-001
2	ABGASLEITUNG EXHAUST PIPE	3	257260-002
3	ABGASLEITUNG EXHAUST PIPE	1	257260-003
4	ABGASLEITUNG EXHAUST PIPE	1	257260-004
5	ABGASLEITUNG EXHAUST PIPE	2	257210-005
6	VERBINDUNGSLASCHE LINK	4	257210-006
7	VERBINDUNGSLASCHE LINK	4	257260-007
8	HALTER BRACKET	1	257210-008
9	HALTER BRACKET	4	257210-009
10	HALTER BRACKET	6	257210-010
11	VERBINDUNGSLASCHE LINK	6	257260-011
14	DICHTUNG GASKET	# 6	257210-014
15	DICHTUNG GASKET	# 6	257210-015
16	BLINDFLANSCH BLANK FLANGE	2	257210-016
17	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	4	257210-017
18	KOMPENSATOR, VOLLST. EXPANSION JOINT , COMPL.	2	257210-018
19	SECHSKANTMUTTER HEXAGON NUT	140	1.7260-012
20	SCHEIBE WASHER	194	1.1200-016
22	DEHNHÜLSE EXTENSION SLEEVE	2	1.0502-068
23	DEHNHÜLSE EXTENSION SLEEVE	4	1.0502-077

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Exhaust Manifold Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
25	DEHNHÜLSE EXTENSION SLEEVE	12	1.0502-164
27	DICHTRING JOINT RING	# 10	1.7010-133
28	SECHSKANTMUTTER HEXAGON NUT	6	1.2007-038
29	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	10	1.1041-609
30	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-444
32	SECHSKANTSCHRAUBE HEXAGON BOLT	16	1.1367-378
33	SECHSKANTSCHRAUBE HEXAGON BOLT	6	257210-034
34	SECHSKANTSCHRAUBE HEXAGON BOLT	56	257210-035
35	SECHSKANTSCHRAUBE HEXAGON BOLT	62	9.7260-028
36	SECHSKANTSCHRAUBE HEXAGON BOLT	8	257210-151
37	SECHSKANTSCHRAUBE HEXAGON BOLT	4	9.7260-029
38	SECHSKANTSCHRAUBE HEXAGON BOLT	12	257210-038
40	BUNDBUCHSE COLLAR BUSH	30	9.7220-026
41	RINGLAGER ELASTIC RING BEARING	30	9.7220-030
43	SECHSKANTSCHRAUBE HEXAGON BOLT	15	1.1367-309
44	SECHSKANTMUTTER HEXAGON NUT	15	1.2007-036

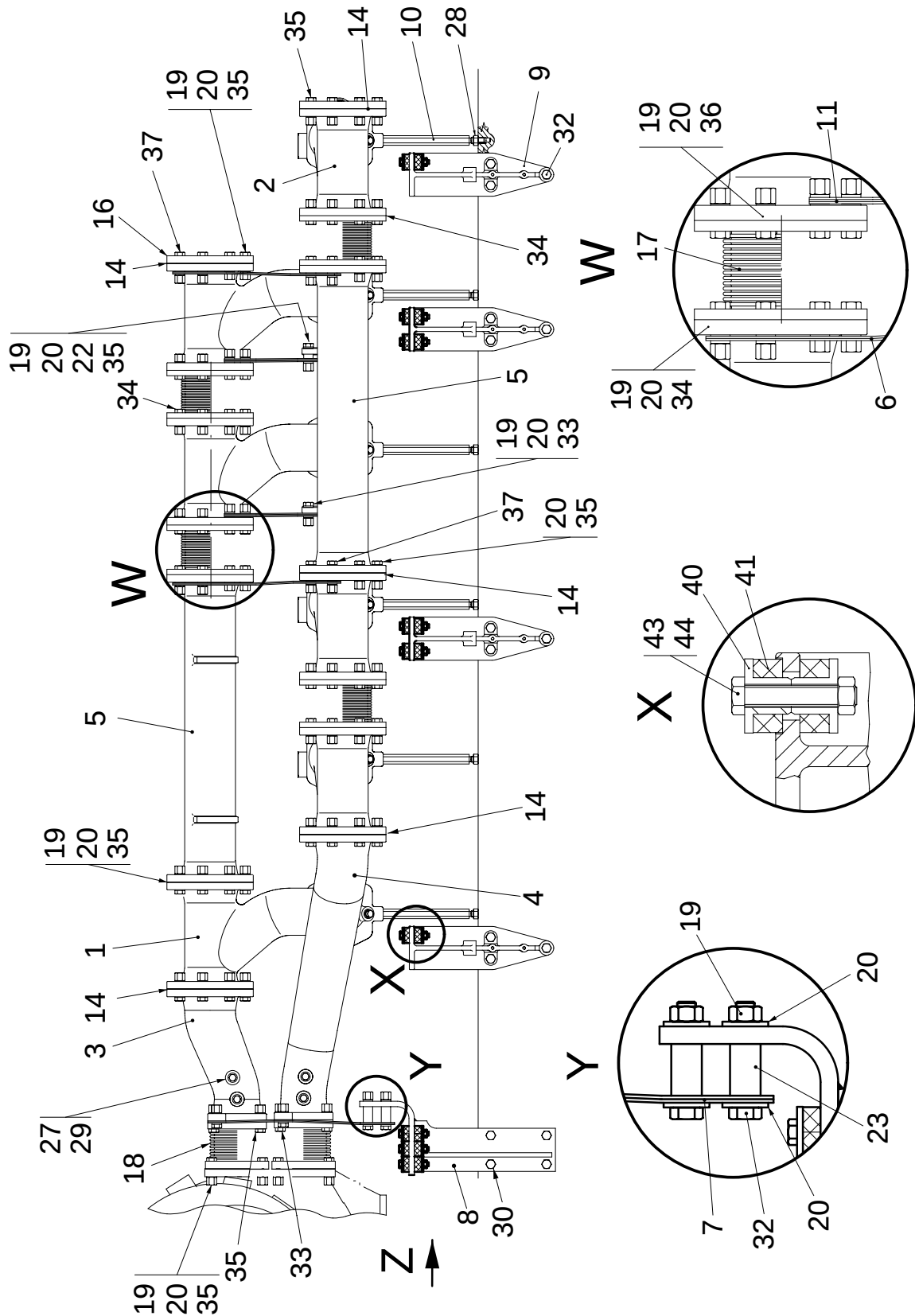
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Exhaust Manifold Mounting

M25

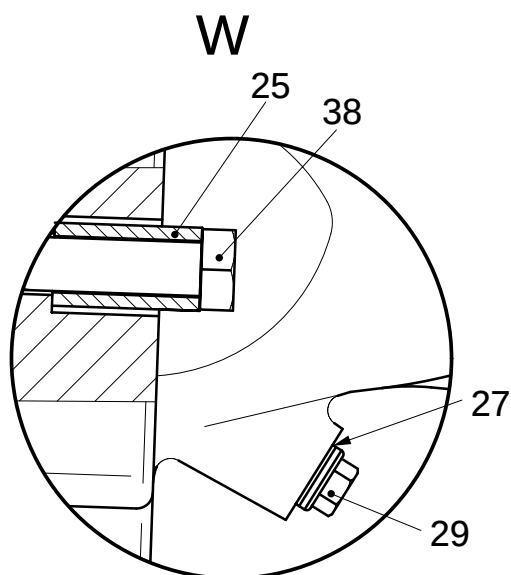
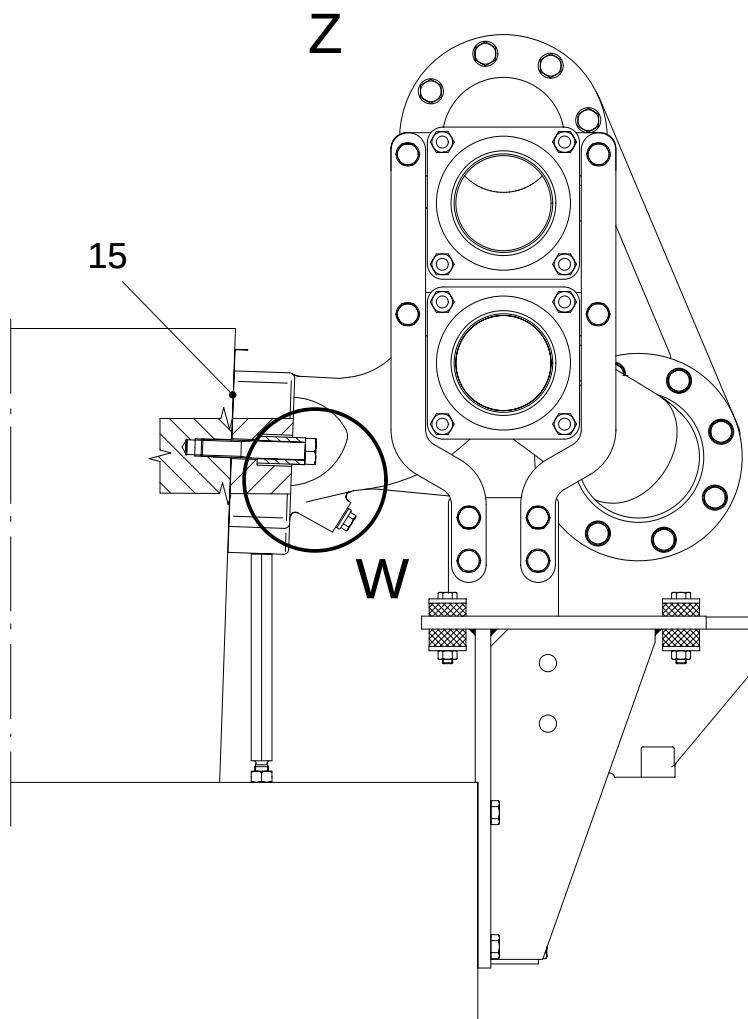
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Exhaust Manifold Mounting

M25

06



Exhaust Manifold Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASLEITUNG-ANBAU, VOLLST. EXHAUST MANIFOLD ASSEMBLY	1	257260 BB
1	KONVERTER CONVERTER	1	257210-101
2	ABGASLEITUNG EXHAUST PIPE	1	257260-102
3	ABGASLEITUNG EXHAUST PIPE	1	257260-002
4	ABGASLEITUNG EXHAUST PIPE	2	257260-104
5	ABGASLEITUNG EXHAUST PIPE	2	257260-105
6	ABGASLEITUNG EXHAUST PIPE	2	257260-001
7	ABGASLEITUNG EXHAUST PIPE	1	257210-107
8	ABGASLEITUNG EXHAUST PIPE	4	257210-005
9	ABGASLEITUNG EXHAUST PIPE	1	257260-109
10	ABGASLEITUNG EXHAUST PIPE	1	257260-110
11	ABGASLEITUNG EXHAUST PIPE	1	257260-111
15	HALTER BRACKET	1	257260-115
16	HALTER BRACKET	1	257260-116
17	HALTER BRACKET	7	257210-114
18	HALTER BRACKET	3	257210-115
19	HALTER BRACKET	8	257210-010
20	VERBINDUNGSLASCHE LINK	3	257260-120
23	VERBINDUNGSLASCHE LINK	6	257260-123
24	VERBINDUNGSLASCHE LINK	3	257210-118
25	VERBINDUNGSLASCHE LINK	3	257210-119

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
27	VERBINDUNGSLASCHE LINK	3	257210-121
29	VERBINDUNGSLASCHE LINK	3	257210-123
30	VERBINDUNGSLASCHE LINK	6	257210-124
31	VERBINDUNGSLASCHE LINK	3	257210-125
32	VERBINDUNGSLASCHE LINK	3	257210-126
33	VERBINDUNGSLASCHE LINK	6	257210-127
34	VERBINDUNGSLASCHE LINK	3	257210-128
35	VERBINDUNGSLASCHE LINK	3	257210-129
36	VERBINDUNGSLASCHE LINK	6	257260-136
38	HALTER BRACKET	1	257260-138
40	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	8	257210-017
41	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	1	257210-018
44	BUNDBUCHSE COLLAR BUSH	32	9.7220-026
46	SCHEIBE WASHER	232	1.1200-016
47	SCHEIBE WASHER	12	1.6310-014
49	SECHSKANTMUTTER HEXAGON NUT	284	1.7260-012
51	DICHTUNG GASKET	# 12	257210-014
52	DICHTUNG GASKET	# 8	257210-015
54	BLINDFLANSCH BLANK FLANGE	4	257210-016
60	SICHERUNGSMUTTER LOCKING HEXAGON NUT	12	1.2021-213
61	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-038

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
62	DEHNHÜLSE EXTENSION BUSH	18	1.0502-067
63	DEHNHÜLSE EXTENSION BUSH	21	1.0502-074
64	DEHNHÜLSE EXTENSION BUSH	16	1.0502-073
65	DEHNHÜLSE EXTENSION BUSH	2	1.0502-064
66	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	9	1.1041-609
67	DICHTRING JOINT RING	# 9	1.7010-133
68	SECHSKANTSCHRAUBE HEXAGON SCREW	2	9.7260-133
70	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-444
71	SECHSKANTSCHRAUBE HEXAGON BOLT	21	1.1367-378
72	SECHSKANTSCHRAUBE HEXAGON BOLT	26	257210-147
73	SECHSKANTSCHRAUBE HEXAGON BOLT	137	257210-034
74	SECHSKANTSCHRAUBE HEXAGON BOLT	84	9.7260-028
75	SECHSKANTSCHRAUBE HEXAGON BOLT	10	257210-151
76	SECHSKANTSCHRAUBE HEXAGON BOLT	15	1.1378-303
77	SECHSKANTSCHRAUBE HEXAGON BOLT	12	1.1378-304
78	SECHSKANTSCHRAUBE HEXAGON BOLT	16	257210-038
79	SECHSKANTSCHRAUBE HEXAGON BOLT	18	9.7260-271
80	SPANNSCHEIBE CONICAL SPRING WASHER	# 76	1.0068-240
81	SECHSKANTSCHRAUBE HEXAGON BOLT	16	1.1367-309

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
82	SECHSKANTMUTTER HEXAGON NUT	16	1.2007-036
83	SECHSKANTSCHRAUBE HEXAGON BOLT	34	257210-035
84	RINGLAGER ELASTIC RING BEARING	32	9.7220-030

06

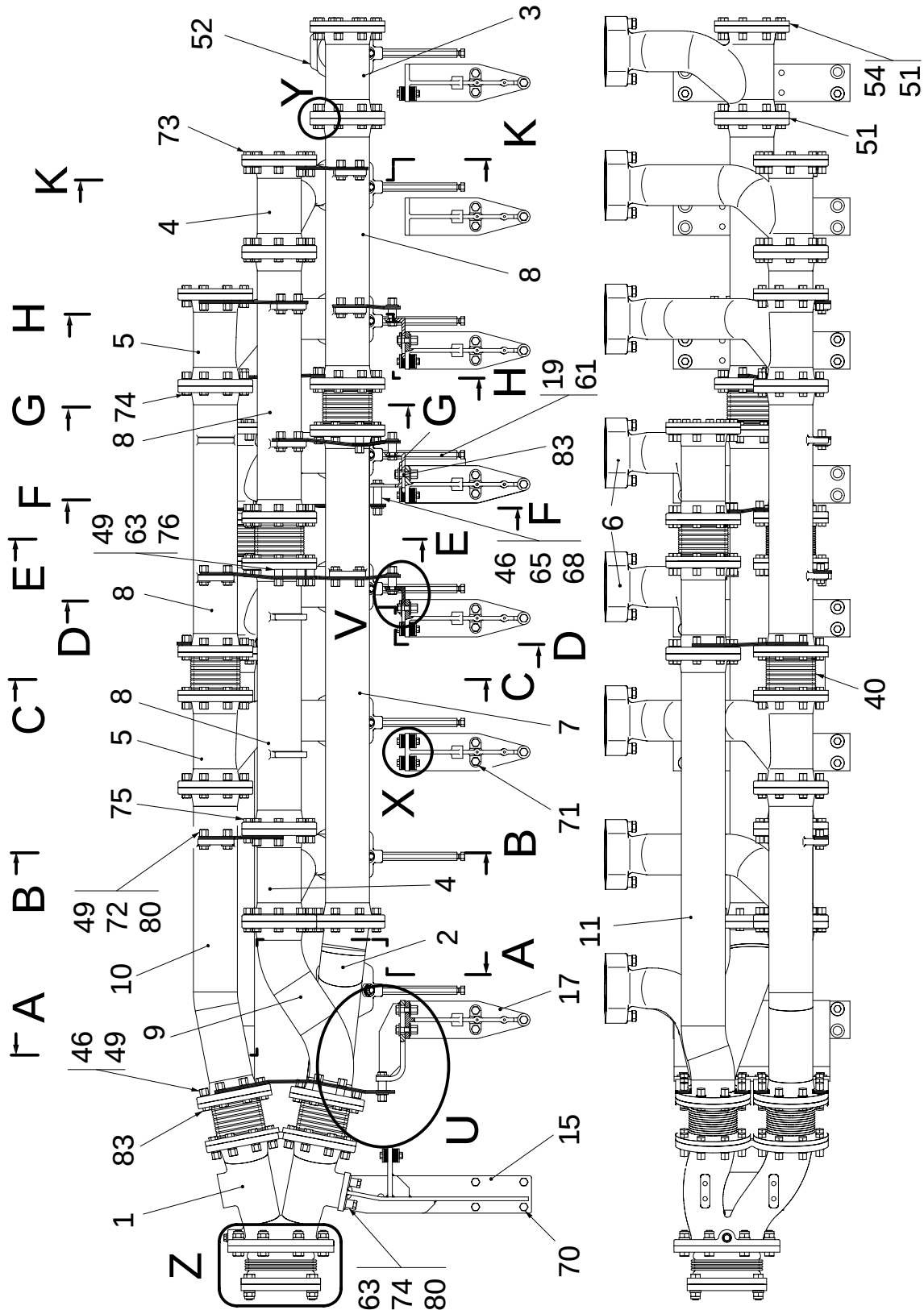
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

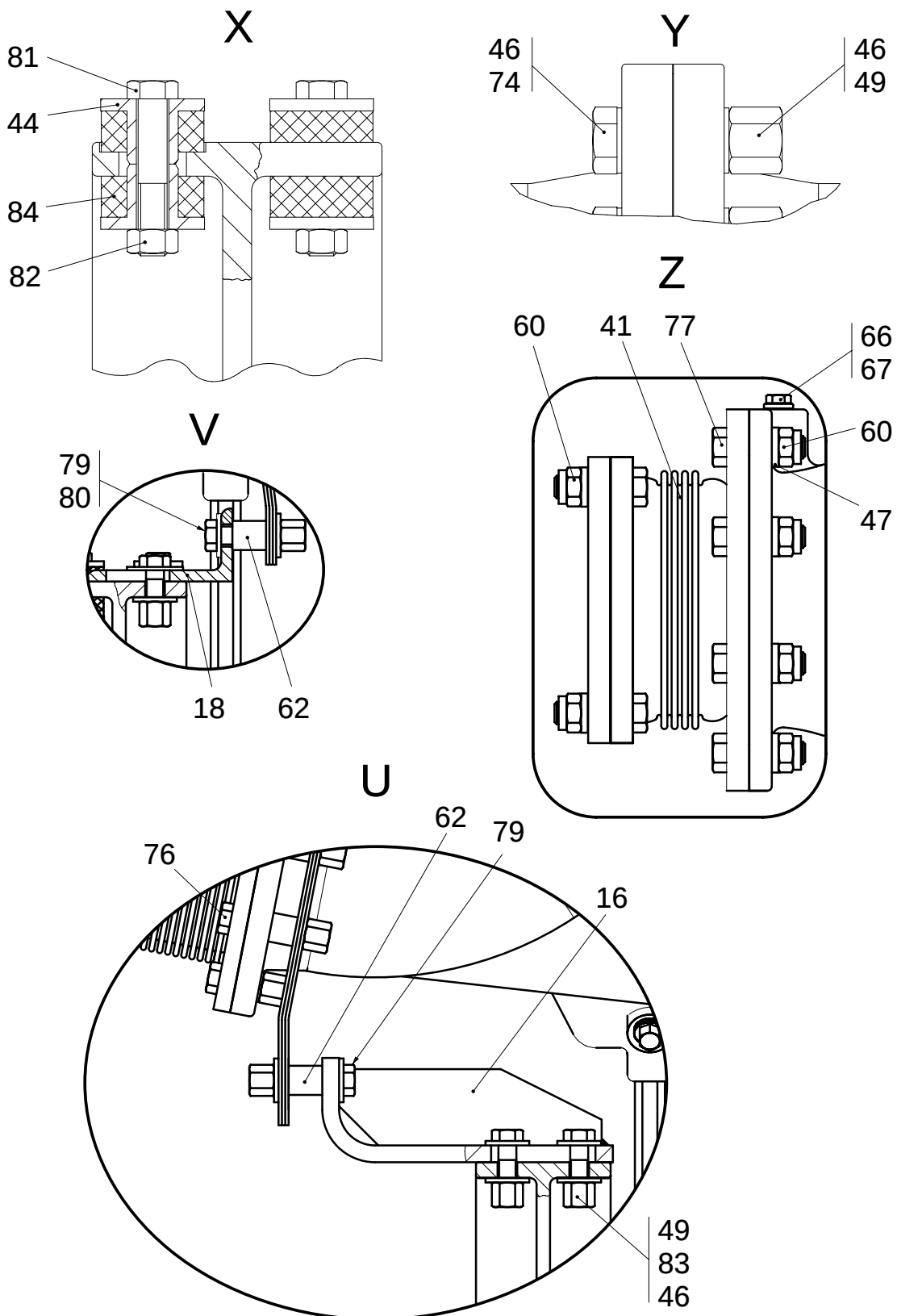
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Exhaust Manifold Mounting

M25

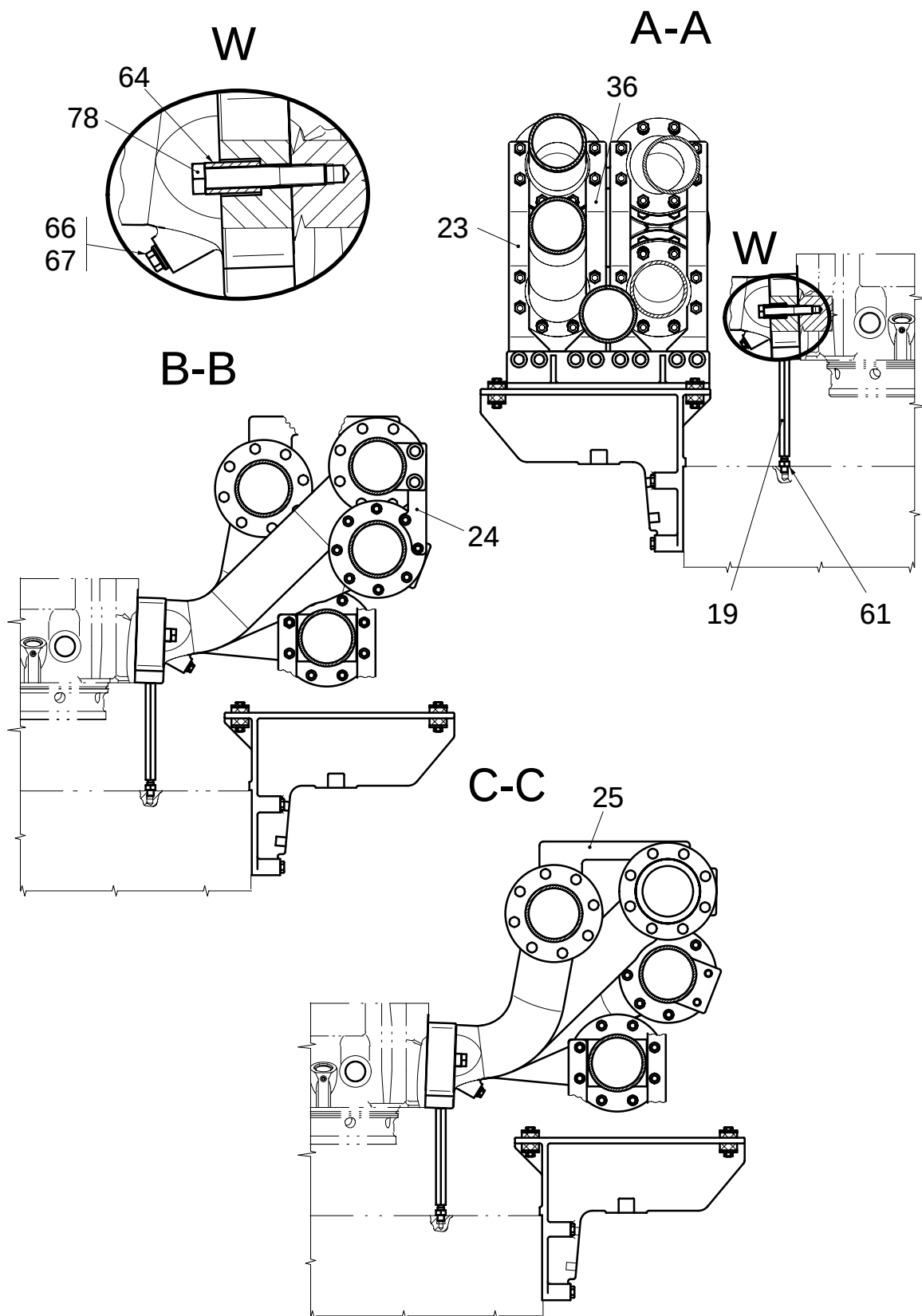
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Exhaust Manifold Mounting

M25

06

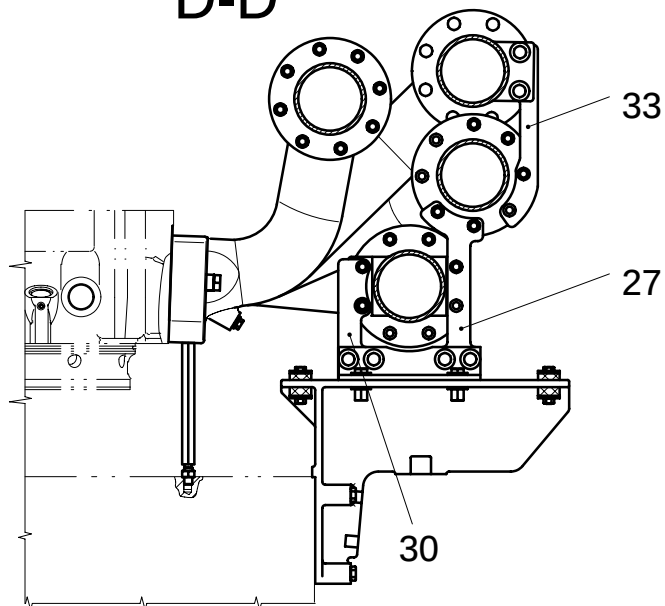


Exhaust Manifold Mounting

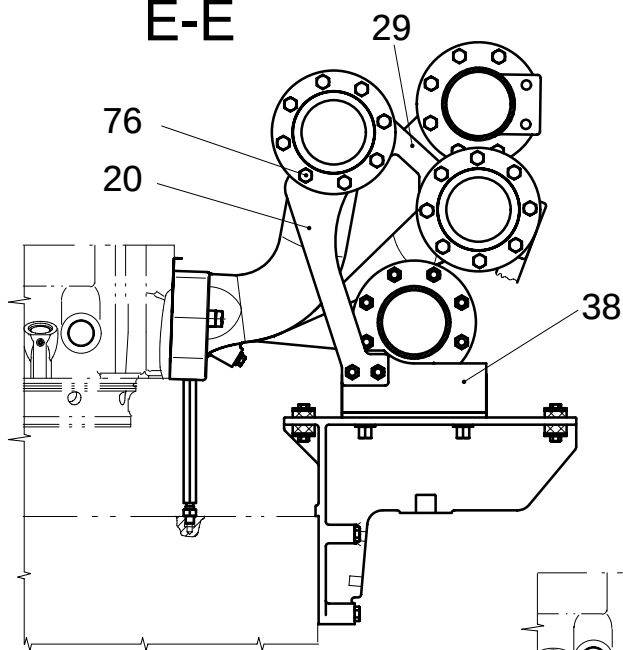
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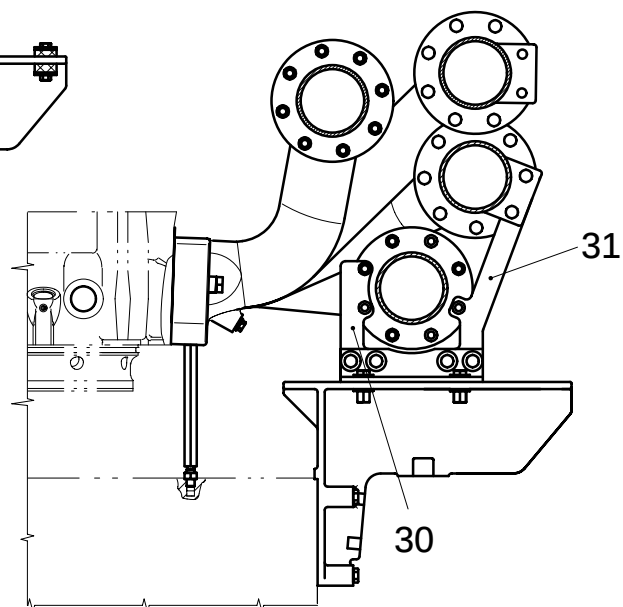
D-D



E-E



F-F

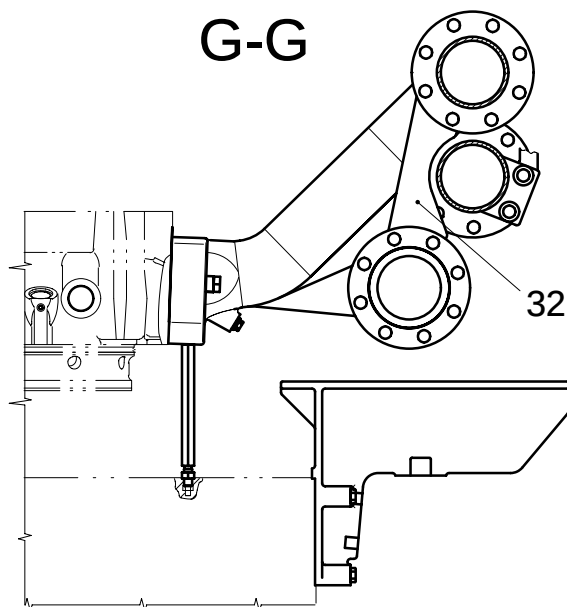


Exhaust Manifold Mounting

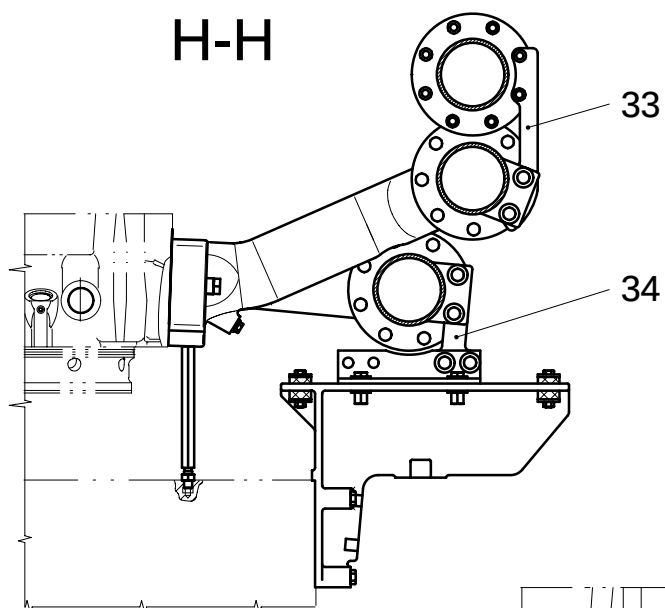
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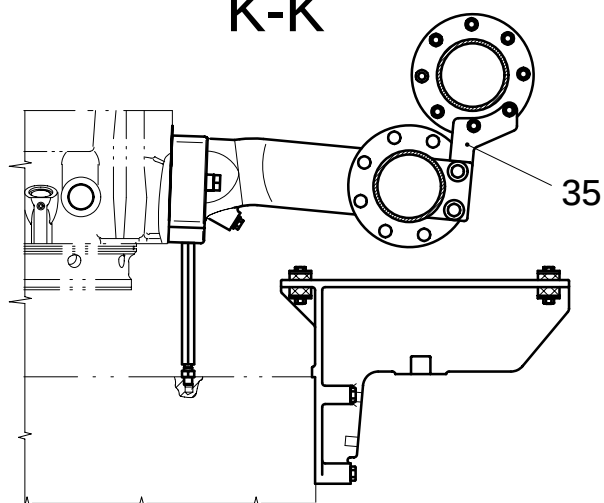
G-G



H-H



K-K



Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASLEITUNG-ANBAU, VOLLST. EXHAUST MANIFOLD ASSEMBLY	1	257260 CC
1	ABGASLEITUNG EXHAUST PIPE	3	257260-002
2	ABGASLEITUNG EXHAUST PIPE	3	257260-104
3	ABGASLEITUNG EXHAUST PIPE	3	257260-001
4	ABGASLEITUNG EXHAUST PIPE	1	257260-204
5	ABGASLEITUNG EXHAUST PIPE	1	257260-205
6	ABGASLEITUNG EXHAUST PIPE	1	257260-206
7	ABGASLEITUNG EXHAUST PIPE	6	257210-005
11	HALTER BRACKET	7	257210-114
12	HALTER BRACKET	2	257210-115
13	HALTER BRACKET	9	257210-010
14	HALTER BRACKET	1	257260-214
17	VERBINDUNGSLASCHE LINK	6	257260-217
18	VERBINDUNGSLASCHE LINK	3	257210-218
19	VERBINDUNGSLASCHE LINK	6	257210-123
20	VERBINDUNGSLASCHE LINK	3	257210-220
21	VERBINDUNGSLASCHE LINK	6	257210-125
22	VERBINDUNGSLASCHE LINK	9	257210-006
23	VERBINDUNGSLASCHE LINK	6	257210-129
26	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	6	257210-017
27	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	3	257210-018

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
30	BUNDBUCHSE COLLAR BUSH	40	9.7220-026
32	SCHEIBE WASHER	291	1.1200-016
35	SECHSKANTMUTTER HEXAGON NUT	247	1.7260-012
37	DICHTUNG GASKET	# 9	257210-015
38	DICHTUNG GASKET	# 12	257210-014
40	BLINDFLANSCH BLANK FLANGE	3	257210-016
46	DEHNHÜLSE EXTENSION BUSH	6	1.0502-079
47	DEHNHÜLSE EXTENSION BUSH	4	1.0502-068
48	DEHNHÜLSE EXTENSION BUSH	1	1.0502-080
49	DEHNHÜLSE EXTENSION BUSH	9	1.0502-074
50	DEHNHÜLSE EXTENSION BUSH	18	1.0502-073
53	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	15	1.1041-609
54	DICHTRING JOINT RING	# 15	1.7033-102
57	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-444
58	SECHSKANTSCHRAUBE HEXAGON BOLT	18	257210-147
59	SECHSKANTSCHRAUBE HEXAGON BOLT	10	257210-034
60	SECHSKANTSCHRAUBE HEXAGON BOLT	100	257210-035
61	SECHSKANTSCHRAUBE HEXAGON BOLT	113	9.7260-028
62	SECHSKANTSCHRAUBE HEXAGON BOLT	6	257210-151
63	SECHSKANTSCHRAUBE HEXAGON BOLT	6	9.7260-029
64	SECHSKANTSCHRAUBE HEXAGON BOLT	3	1.1378-303

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
65	SECHSKANTSCHRAUBE HEXAGON BOLT	21	1.1367-378
66	SECHSKANTSCHRAUBE HEXAGON BOLT	18	257210-038
67	SECHSKANTSCHRAUBE HEXAGON BOLT	20	1.1367-309
68	SECHSKANTSCHRAUBE HEXAGON BOLT	2	9.7260-271
70	SECHSKANTMUTTER HEXAGON NUT	20	1.2007-036
71	SECHSKANTMUTTER HEXAGON NUT	13	1.2007-038
74	SPANNSCHEIBE CONICAL SPRING WASHER	# 33	1.0068-240
77	RINGLAGER ELASTIC RING BEARING	40	9.7220-030

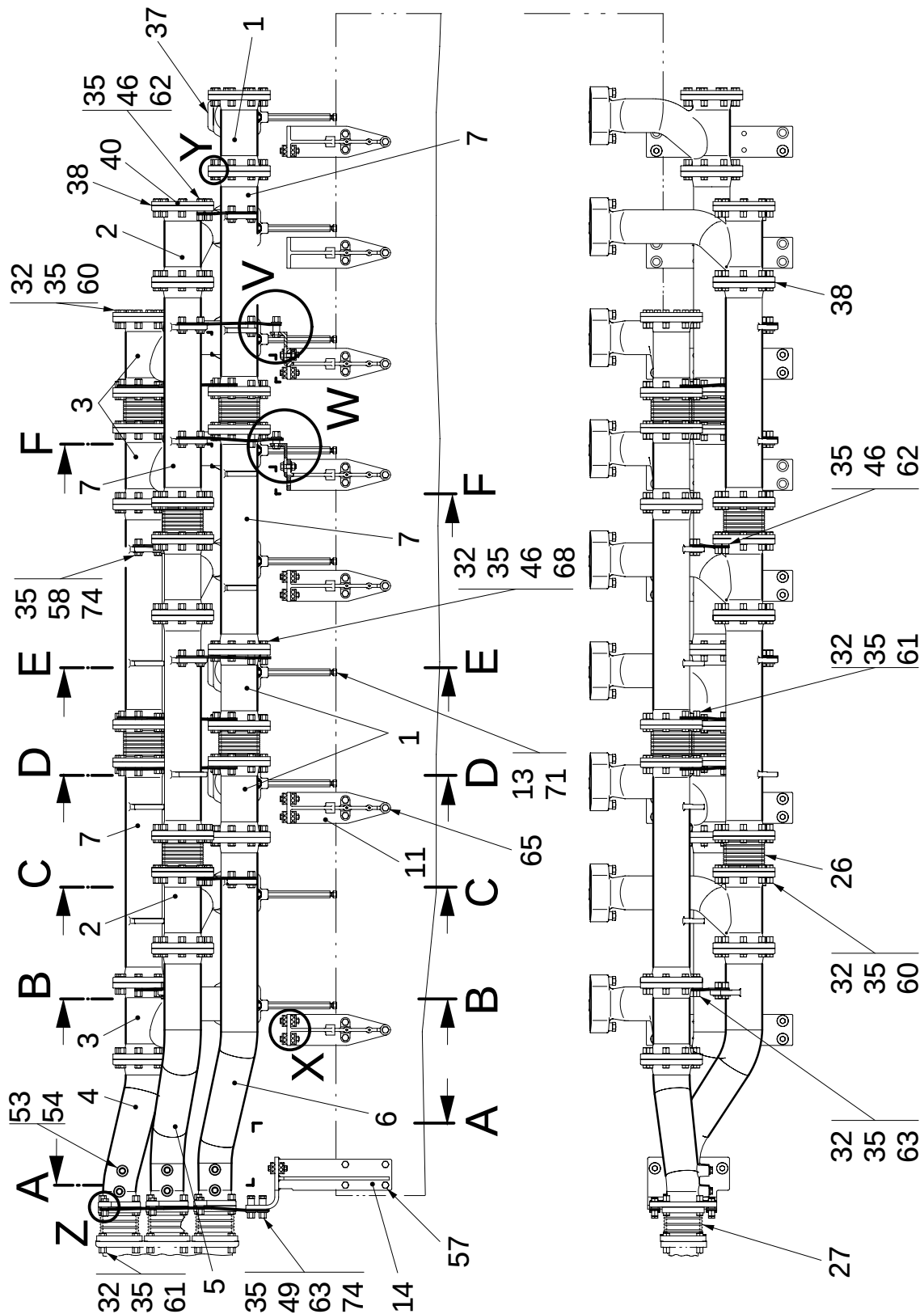
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

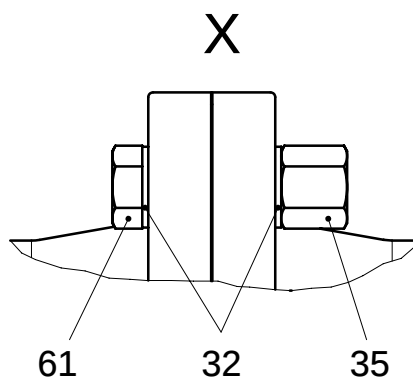
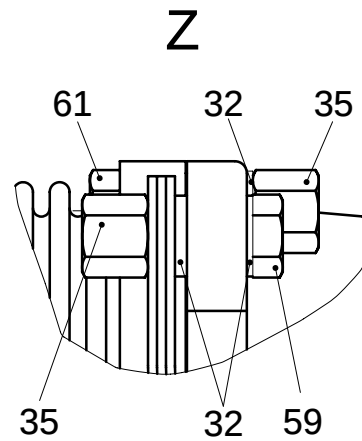
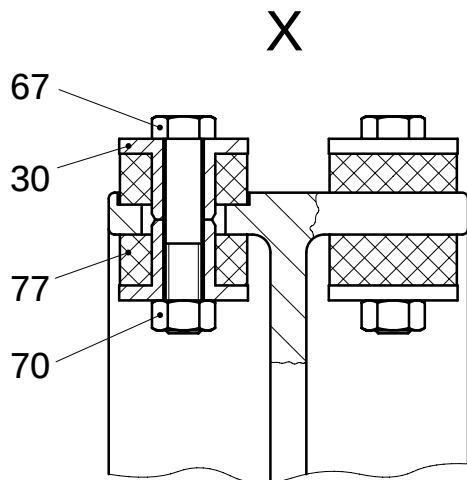
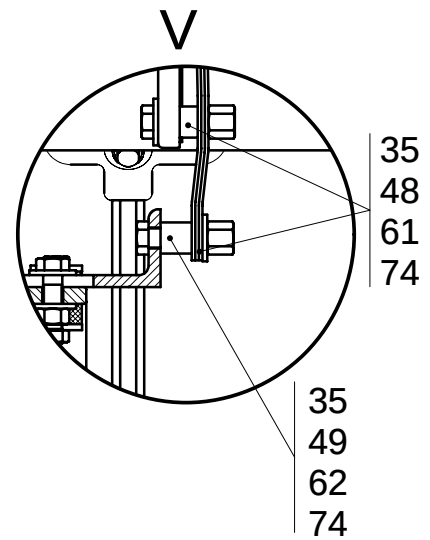
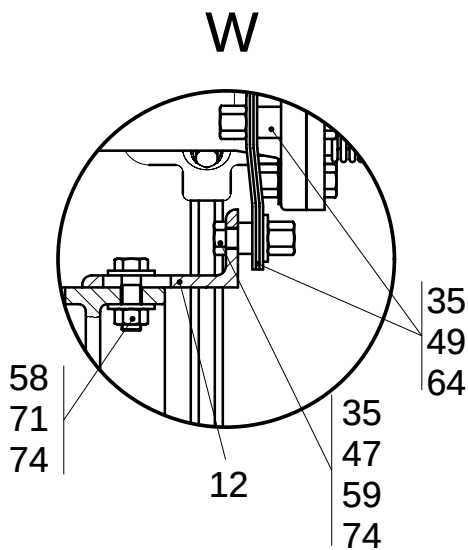
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Exhaust Manifold Mounting

M25

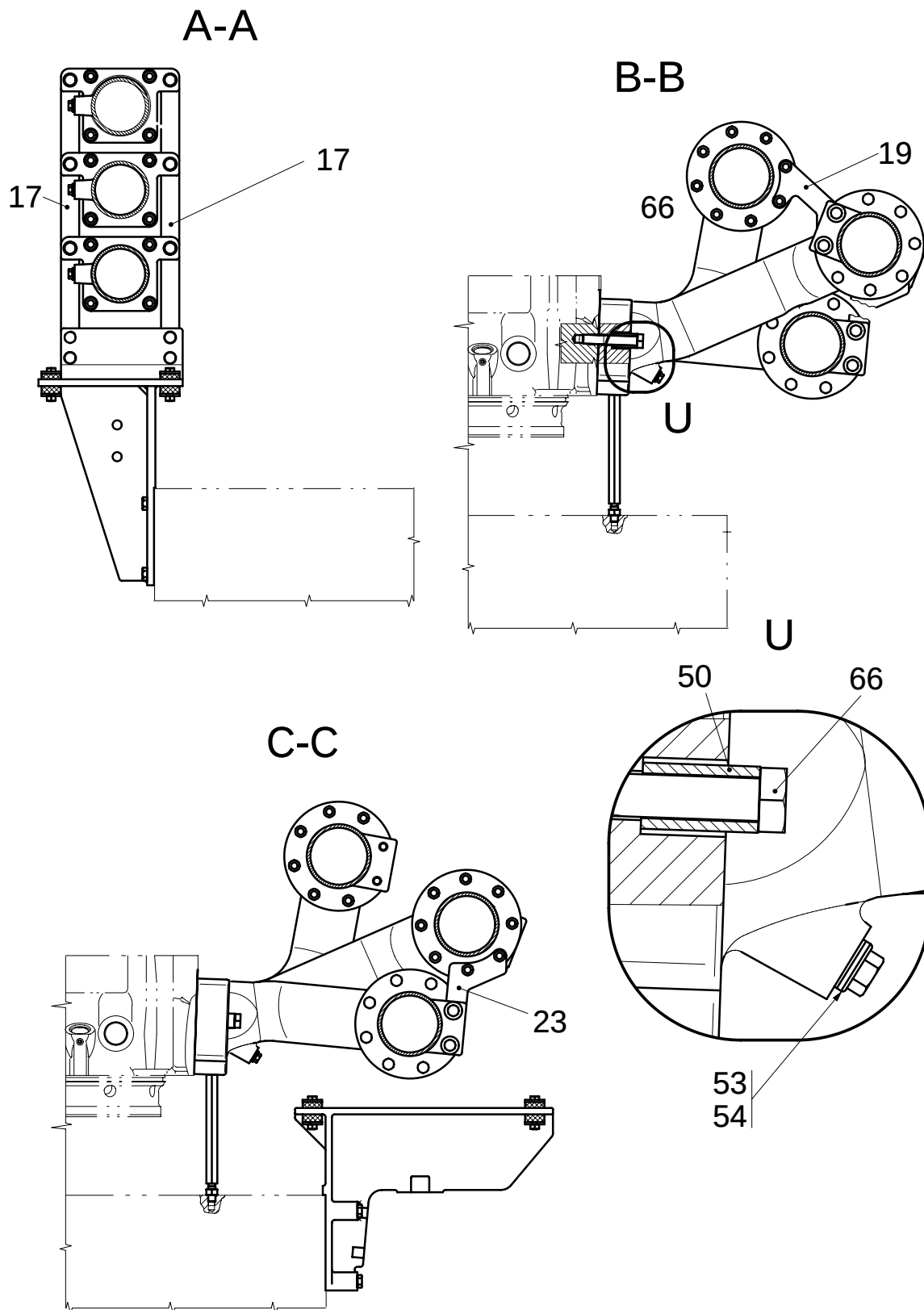
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Exhaust Manifold Mounting

M25

06

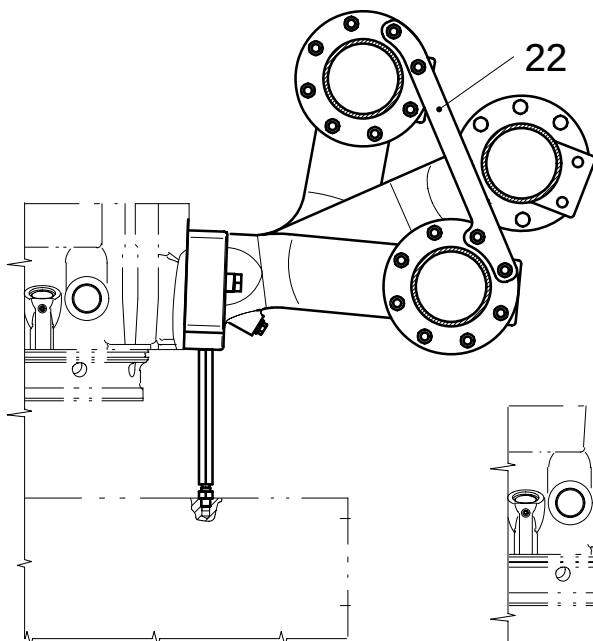


Exhaust Manifold Mounting

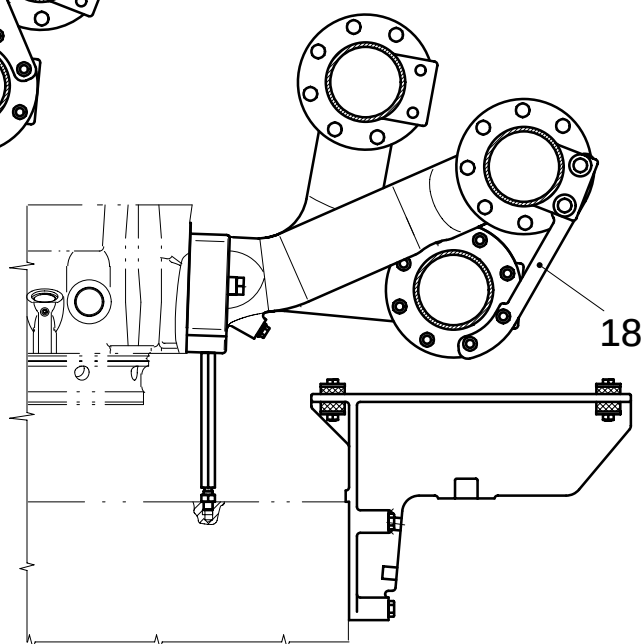
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06

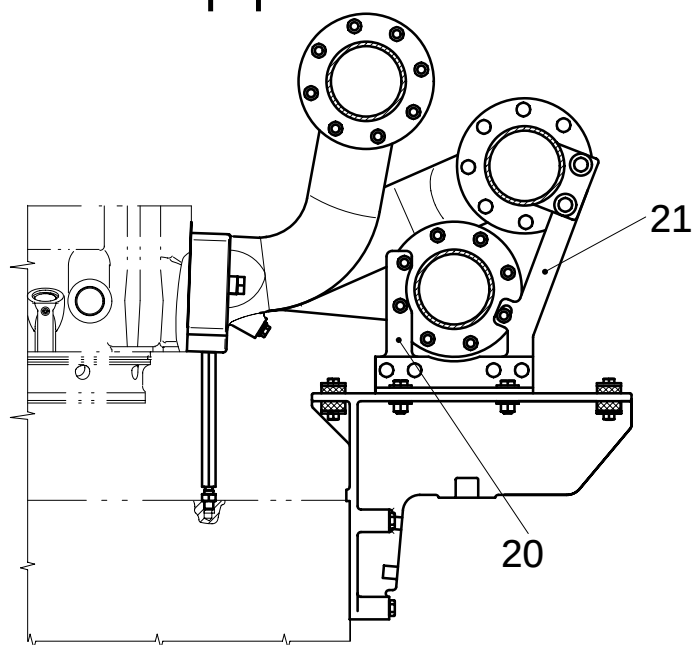
D-D



E-E



F-F



Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASLEITUNG-ANBAU, VOLLST. EXHAUST MANIFOLD ASSEMBLY	1	257260 DD
1	ABGASLEITUNG EXHAUST PIPE	3	257260-002
2	ABGASLEITUNG EXHAUST PIPE	3	257260-104
3	ABGASLEITUNG EXHAUST PIPE	3	257260-001
4	ABGASLEITUNG EXHAUST PIPE	1	257260-304
5	ABGASLEITUNG EXHAUST PIPE	1	257260-305
6	ABGASLEITUNG EXHAUST PIPE	1	257260-306
7	ABGASLEITUNG EXHAUST PIPE	6	257210-005
11	HALTER BRACKET	7	257210-114
12	HALTER BRACKET	2	257210-115
13	HALTER BRACKET	9	257210-010
14	HALTER BRACKET	1	257260-214
17	VERBINDUNGSLASCHE LINK	12	257260-317
18	VERBINDUNGSLASCHE LINK	3	257210-218
19	VERBINDUNGSLASCHE LINK	6	257210-123
20	VERBINDUNGSLASCHE LINK	3	257210-220
21	VERBINDUNGSLASCHE LINK	6	257210-125
22	VERBINDUNGSLASCHE LINK	9	257210-006
23	VERBINDUNGSLASCHE LINK	6	257210-129
26	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	6	257210-017
27	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	3	257260-327

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
30	BUNDBUCHSE COLLAR BUSH	40	9.7220-026
32	SCHEIBE WASHER	295	1.1200-016
35	SECHSKANTMUTTER HEXAGON NUT	247	1.7260-012
37	DICHTUNG GASKET	# 9	257210-015
38	DICHTUNG GASKET	# 12	257210-014
40	BLINDFLANSCH BLANK FLANGE	3	257210-016
46	DEHNHÜLSE EXTENSION BUSH	6	1.0502-079
47	DEHNHÜLSE EXTENSION BUSH	4	1.0502-068
48	DEHNHÜLSE EXTENSION BUSH	11	1.0502-080
49	DEHNHÜLSE EXTENSION BUSH	5	1.0502-074
50	DEHNHÜLSE EXTENSION BUSH	18	1.0502-073
53	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	15	1.1041-609
54	DICHTRING JOINT RING	# 15	1.7033-102
57	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-444
58	SECHSKANTSCHRAUBE HEXAGON BOLT	18	257210-147
59	SECHSKANTSCHRAUBE HEXAGON BOLT	4	257210-034
60	SECHSKANTSCHRAUBE HEXAGON BOLT	100	257210-035
61	SECHSKANTSCHRAUBE HEXAGON BOLT	113	9.7260-028
62	SECHSKANTSCHRAUBE HEXAGON BOLT	6	257210-151
63	SECHSKANTSCHRAUBE HEXAGON BOLT	2	9.7260-029
64	SECHSKANTSCHRAUBE HEXAGON BOLT	13	1.1378-303

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
65	SECHSKANTSCHRAUBE HEXAGON BOLT	21	1.1367-378
66	SECHSKANTSCHRAUBE HEXAGON BOLT	18	257210-038
67	SECHSKANTSCHRAUBE HEXAGON BOLT	20	1.1367-309
68	SECHSKANTSCHRAUBE HEXAGON BOLT	2	9.7260-271
70	SECHSKANTMUTTER HEXAGON NUT	20	1.2007-036
71	SECHSKANTMUTTER HEXAGON NUT	13	1.2007-038
74	SPANNSCHEIBE CONICAL SPRING WASHER	# 33	1.0068-240
77	RINGLAGER ELASTIC RING BEARING	40	9.7220-030

= VERBRAUCHSTEILE
CONSUMABLES

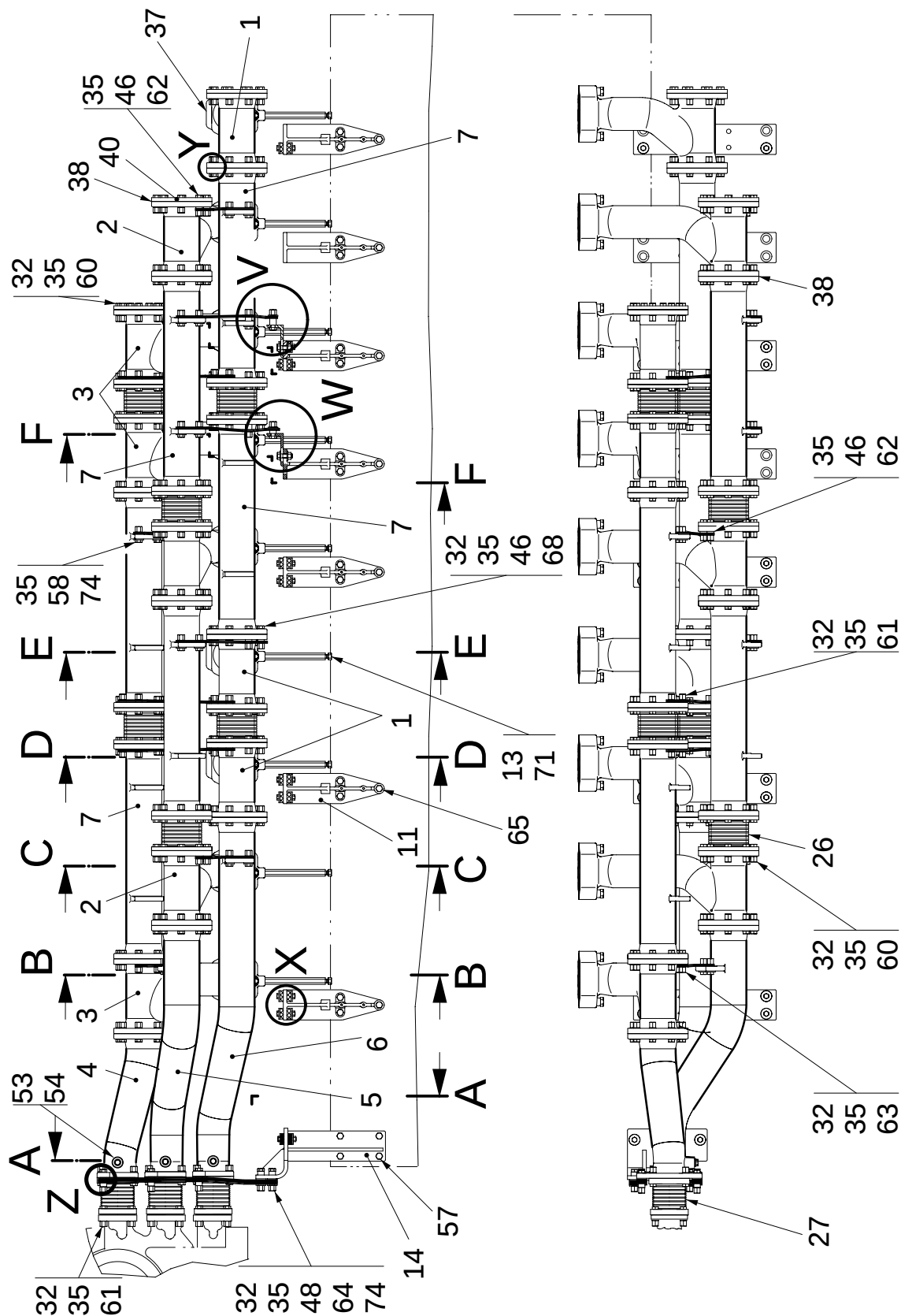
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

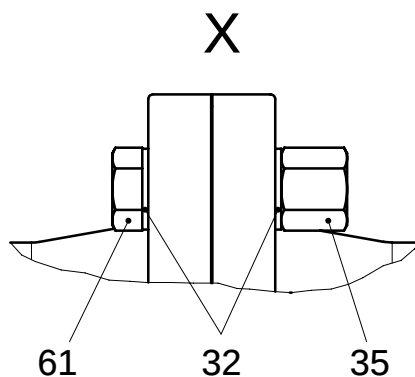
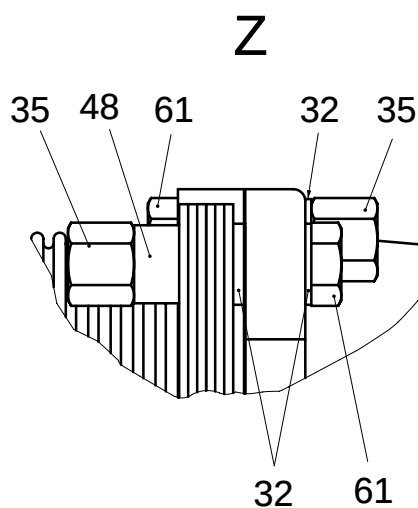
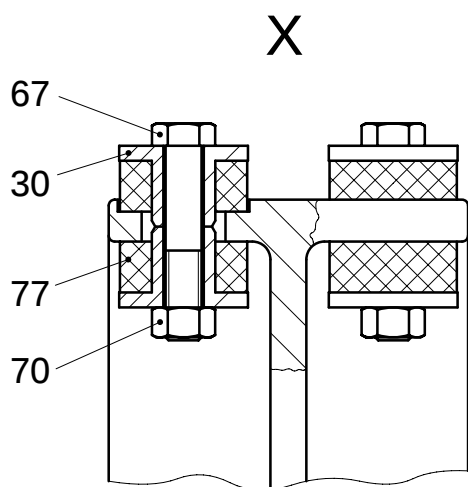
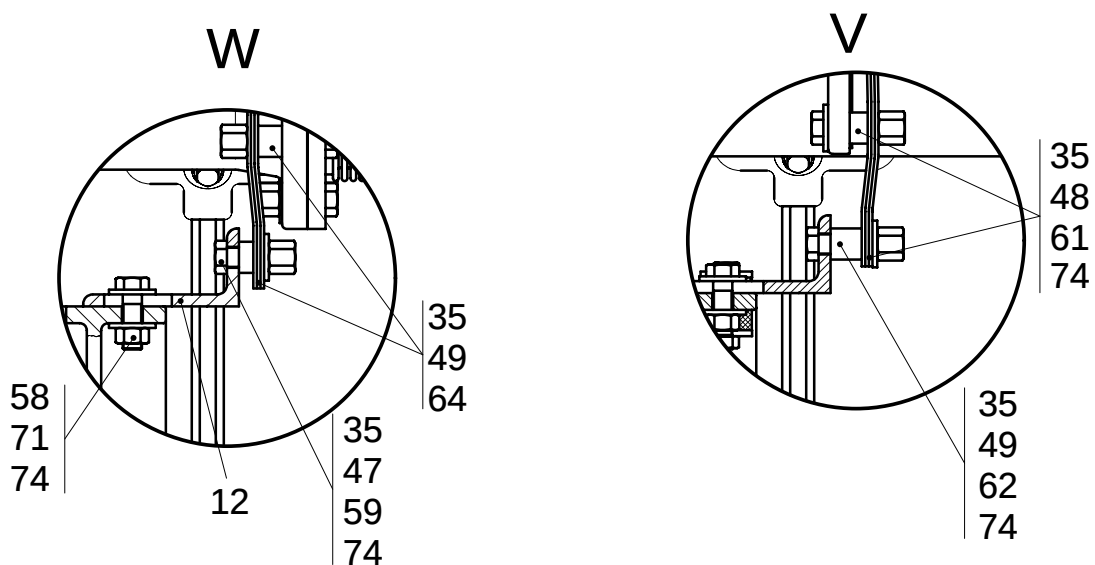
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Exhaust Manifold Mounting

M25

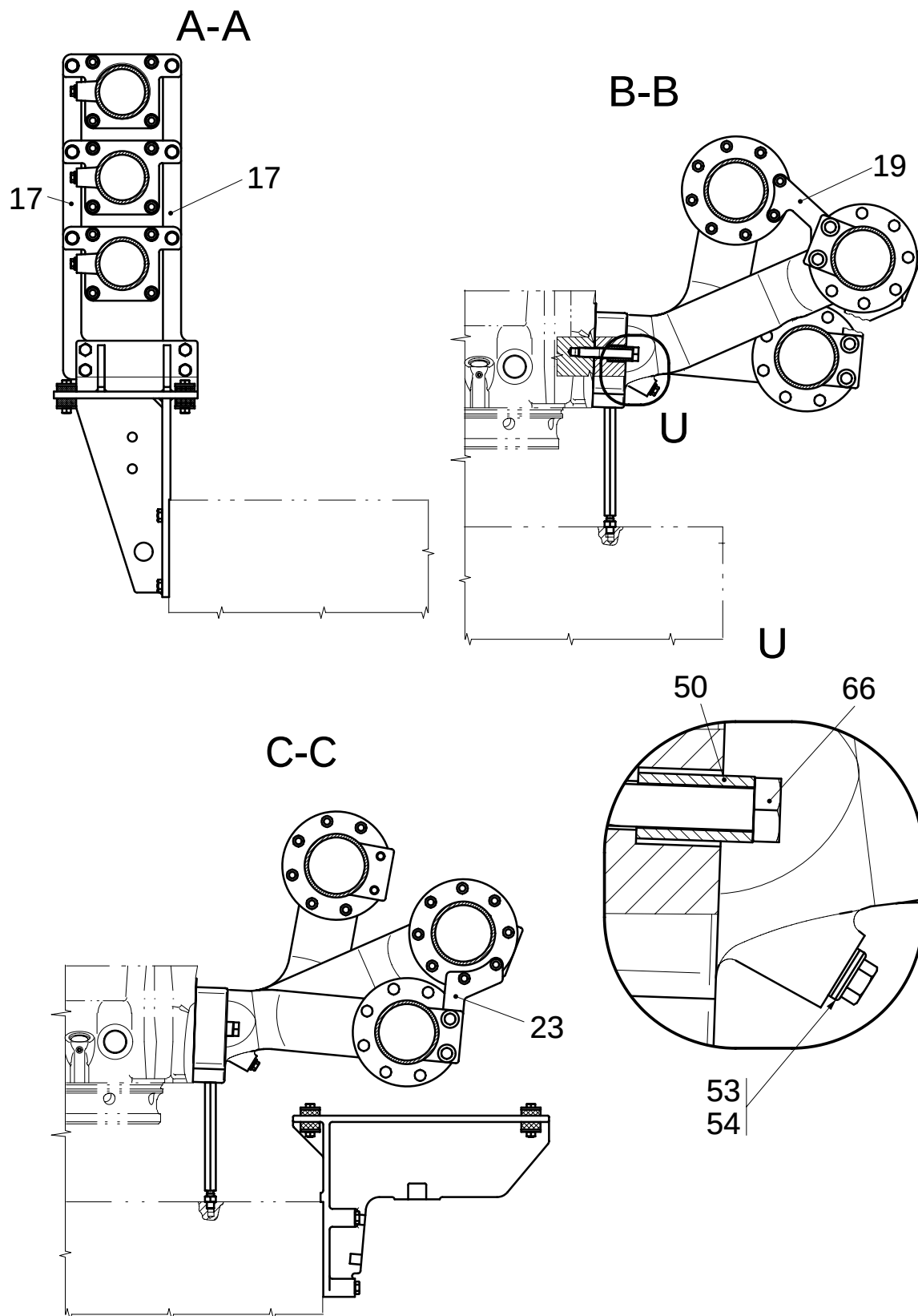
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Exhaust Manifold Mounting

M25

06

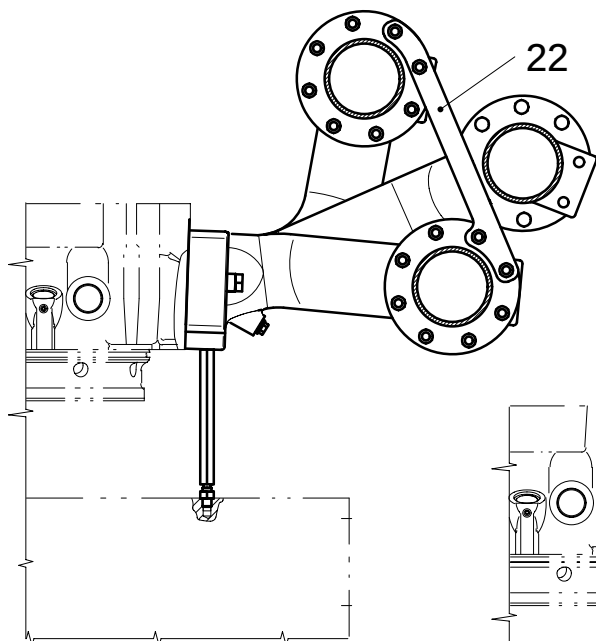


Exhaust Manifold Mounting

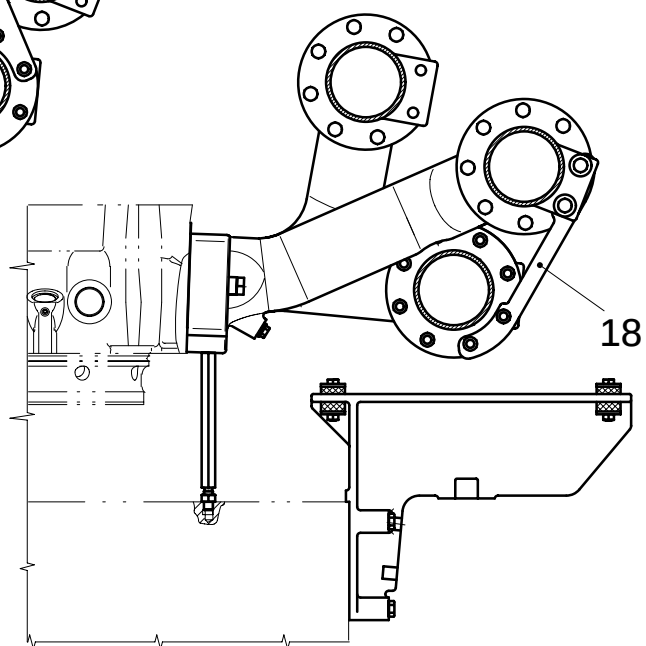
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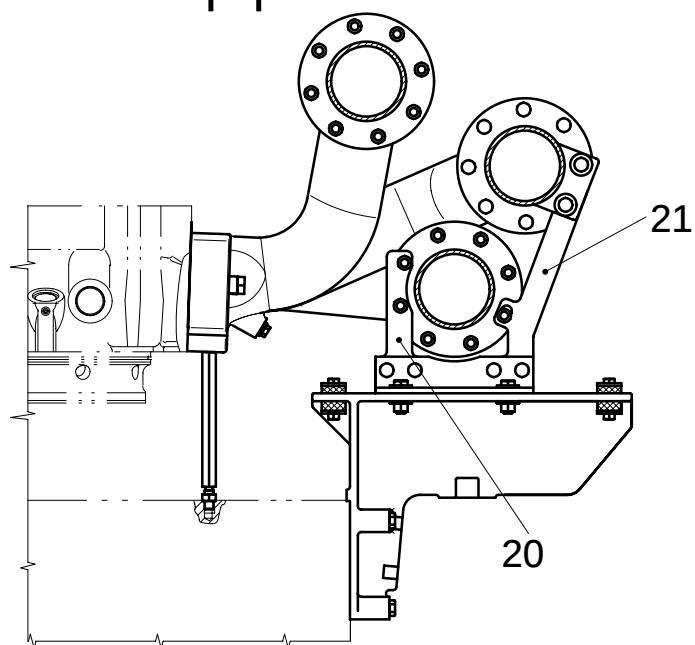
D-D



E-E



F-F



Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASLEITUNG-ANBAU, VOLLST. EXHAUST MANIFOLD ASSEMBLY	1	257260 EE
1	KONVERTER CONVERTER	1	257210-101
3	ABGASLEITUNG EXHAUST PIPE	2	257260-001
4	ABGASLEITUNG EXHAUST PIPE	1	257260-002
5	ABGASLEITUNG EXHAUST PIPE	4	257210-005
6	ABGASLEITUNG EXHAUST PIPE	2	257260-105
7	ABGASLEITUNG EXHAUST PIPE	2	257260-104
8	ABGASLEITUNG EXHAUST PIPE	1	257260-102
9	ABGASLEITUNG EXHAUST PIPE	1	257260-110
10	ABGASLEITUNG EXHAUST PIPE	1	257260-109
11	ABGASLEITUNG EXHAUST PIPE	1	257260-111
12	ABGASLEITUNG EXHAUST PIPE	1	257210-107
15	HALTER BRACKET	8	257210-010
16	VERBINDUNGSLASCHE LINK	4	257260-016
17	LASCHE LINK	8	257210-112
19	VERBINDUNGSLASCHE LINK	3	257210-129
20	VERBINDUNGSLASCHE LINK	6	257210-127
21	VERBINDUNGSLASCHE LINK	3	257210-128
22	VERBINDUNGSLASCHE LINK	3	257210-126
23	VERBINDUNGSLASCHE LINK	6	257210-124
24	VERBINDUNGSLASCHE LINK	3	257210-125

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
25	VERBINDUNGSLASCHE LINK	3	257210-119
26	VERBINDUNGSLASCHE LINK	3	257210-123
28	VERBINDUNGSLASCHE LINK	3	257210-121
30	VERBINDUNGSLASCHE LINK	3	257210-118
31	VERBINDUNGSLASCHE LINK	6	257260-136
32	VERBINDUNGSLASCHE LINK	6	257260-123
34	VERBINDUNGSLASCHE LINK	3	257260-120
35	DOPPELASCHE DOUBLE LINK	4	257260-228
38	HALTER BRACKET	1	257260-116
39	HALTER BRACKET	1	257260-215
40	HALTER BRACKET	1	257260-221
41	HALTER BRACKET	7	257210-114
43	HALTER BRACKET	3	257210-115
44	HALTER BRACKET	1	257260-138
46	ZWISCHENSTÜCK INTERMEDIATE RING	1	257260-241
47	KOMPENSATOR, VOLLST. EXPANSION JOINT, COMPL.	8	257210-017
49	DICHTUNG GASKET	# 12	257210-014
50	DICHTUNG GASKET	# 8	257210-015
51	DICHTUNG GASKET	# 1	257260-285
52	DICHTUNG GASKET	# 1	257260-286
54	BLINDFLANSCH BLANK FLANGE	4	257210-016

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
56	SECHSKANTMUTTER HEXAGON NUT	274	1.7260-012
57	SCHEIBE WASHER	296	1.1200-016
58	BUNDBUCHSE COLLAR BUSH	52	9.7220-026
59	DEHNHÜLSE EXTENSION BUSH	29	1.0502-136
60	DEHNHÜLSE EXTENSION BUSH	16	1.0502-164
62	SCHEIBE WASHER	46	257260-062
63	SCHEIBE WASHER	12	257260-063
65	DICHTRING JOINT RING	# 9	1.7010-133
66	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	9	1.1041-609
67	DEHNHÜLSE EXTENSION BUSH	18	1.0502-138
68	DEHNHÜLSE EXTENSION BUSH	2	1.0502-141
69	RINGLAGER ELASTIC RING BEARING	32	9.7220-030
71	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1367-309
74	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1387-444
77	SECHSKANTSCHRAUBE HEXAGON BOLT	4	257210-147
78	SECHSKANTSCHRAUBE HEXAGON BOLT	16	257210-034
79	SECHSKANTSCHRAUBE HEXAGON BOLT	162	257210-035
80	SECHSKANTSCHRAUBE HEXAGON BOLT	58	9.7260-028
81	SECHSKANTSCHRAUBE HEXAGON BOLT	3	257210-151
83	SECHSKANTSCHRAUBE HEXAGON BOLT	21	1.1367-376
85	SECHSKANTSCHRAUBE HEXAGON BOLT	34	9.7260-030

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
87	SECHSKANTSCHRAUBE HEXAGON BOLT	2	9.7260-133
90	SECHSKANTSCHRAUBE HEXAGON BOLT	12	1.1378-304
92	SECHSKANTSCHRAUBE HEXAGON BOLT	16	257210-038
95	SECHSKANTMUTTER HEXAGON NUT	18	1.2007-036
97	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-038
99	SECHSKANTMUTTER HEXAGON NUT	12	1.2021-213

= VERBRAUCHSTEILE
CONSUMABLES

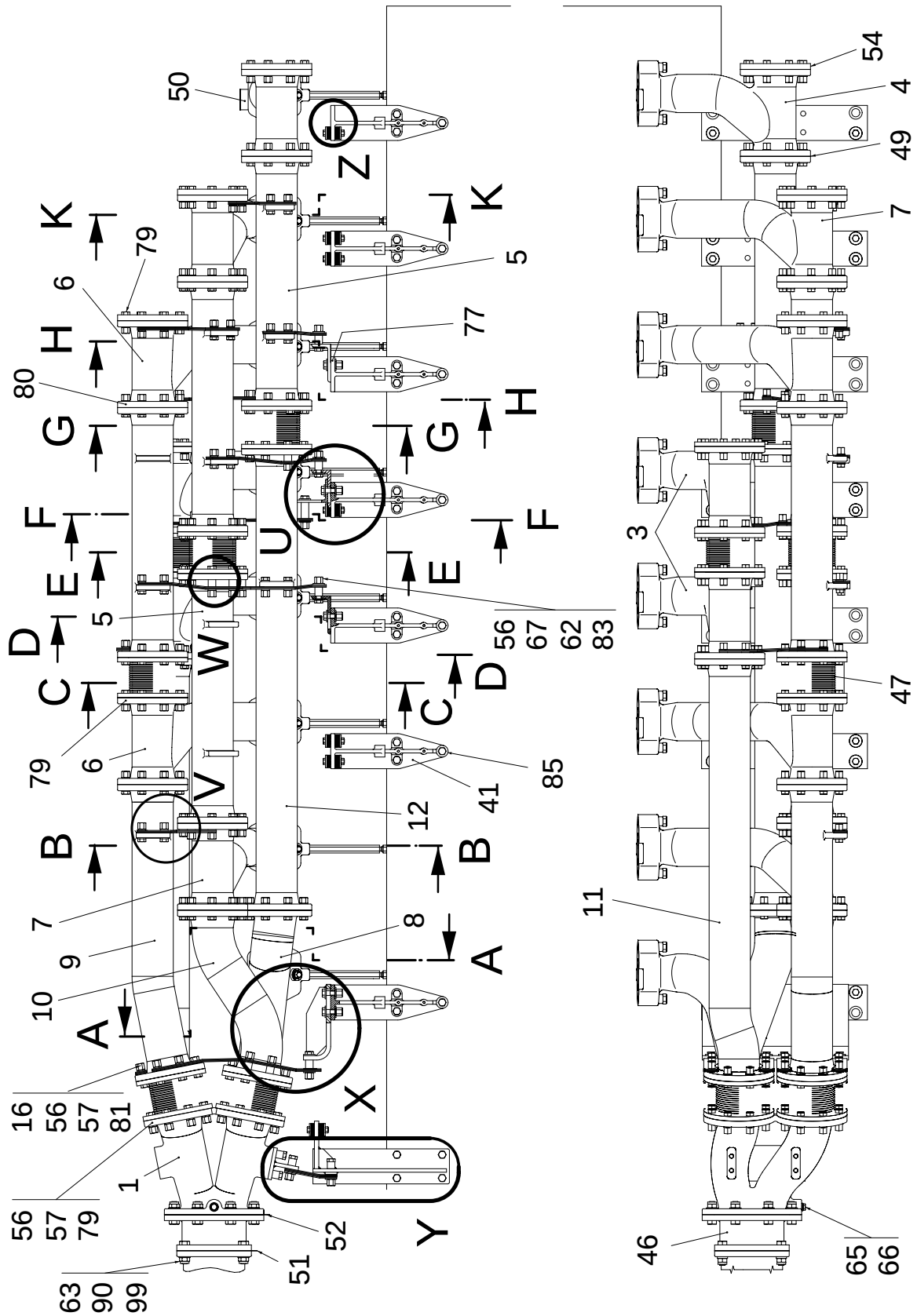
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Manifold Mounting

M25

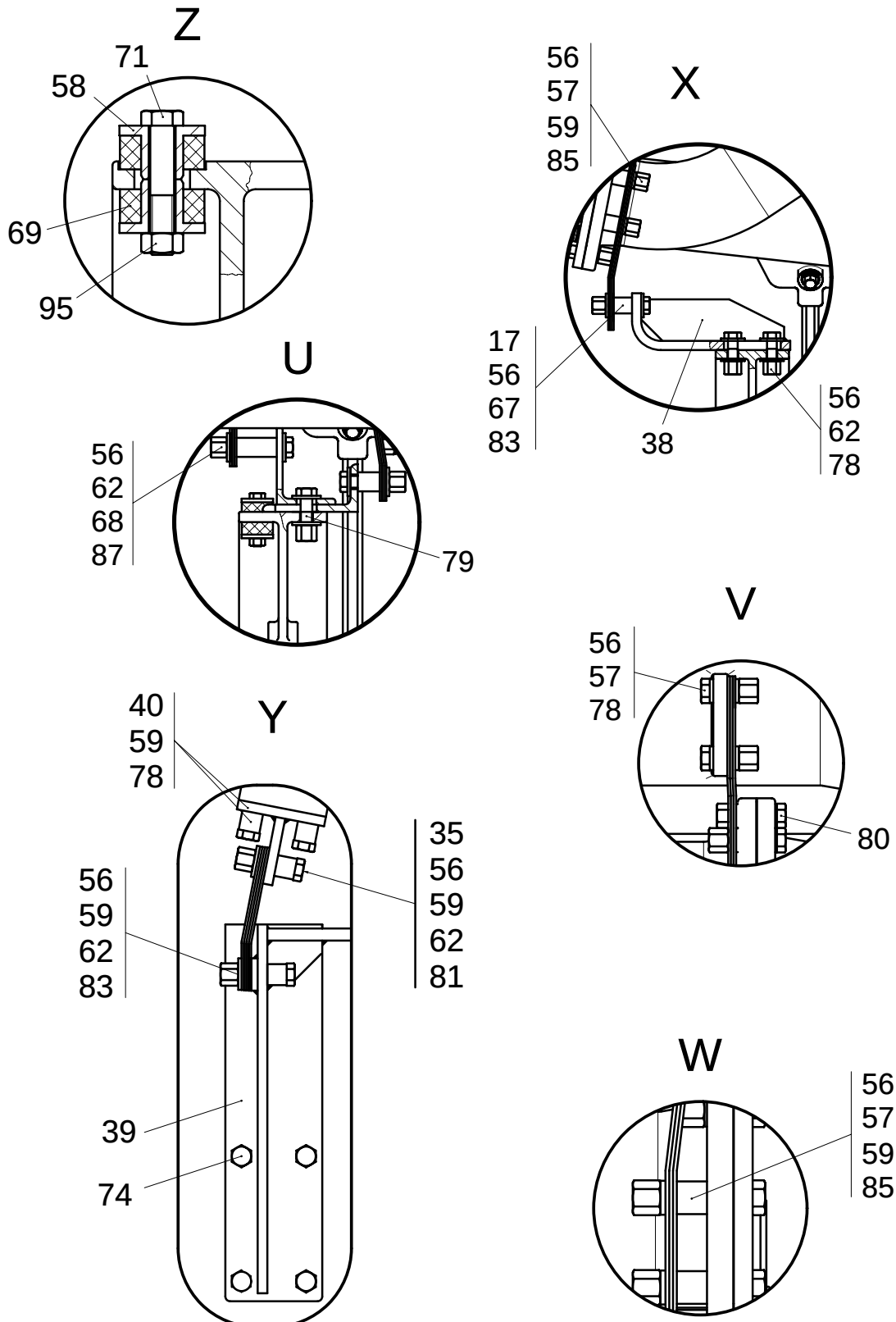
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Exhaust Manifold Mounting

M25

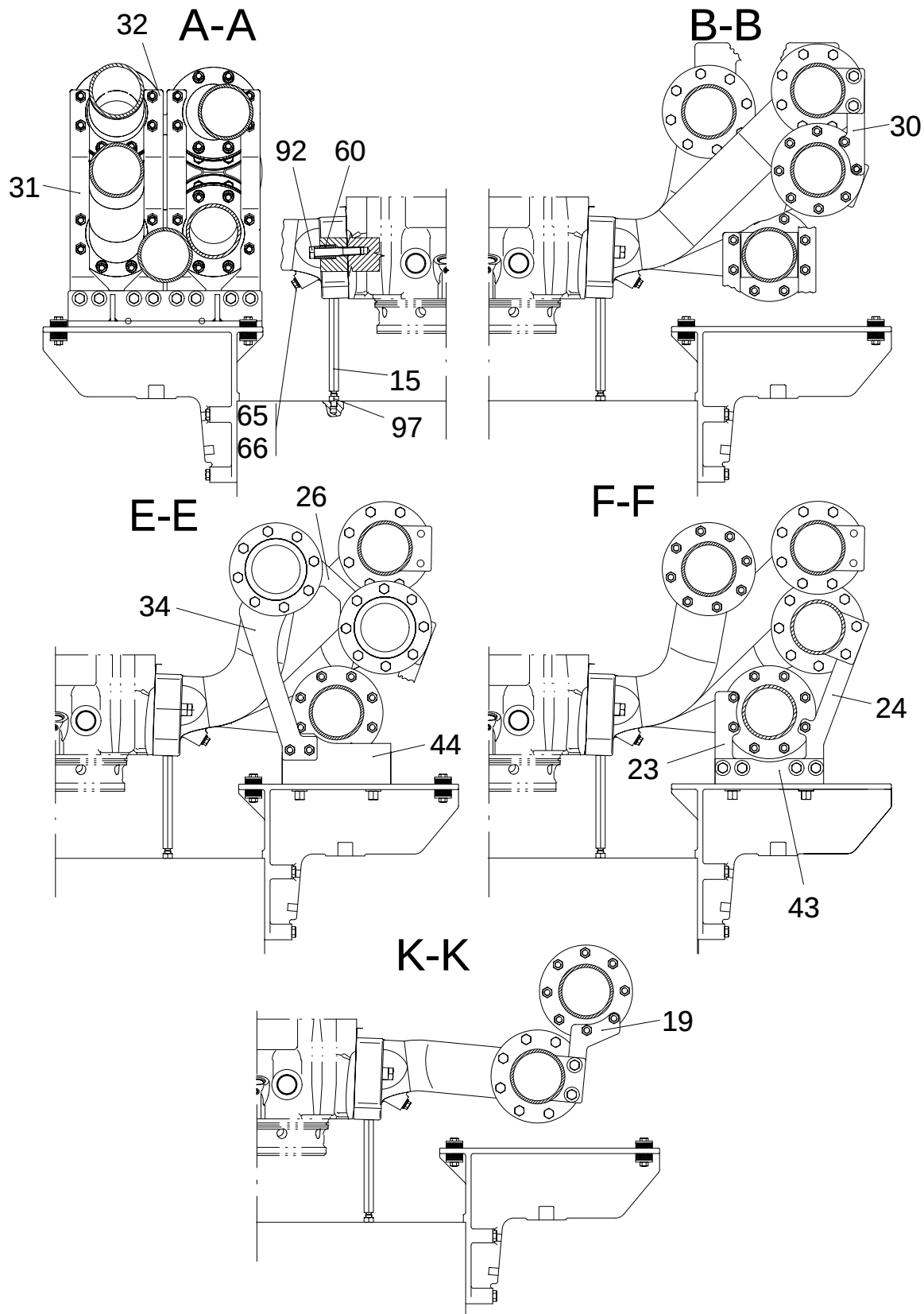
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Exhaust Manifold Mounting

M25

06



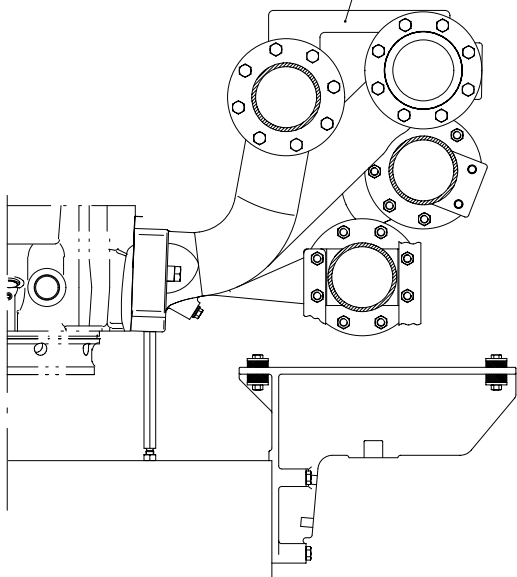
Exhaust Manifold Mounting

M25

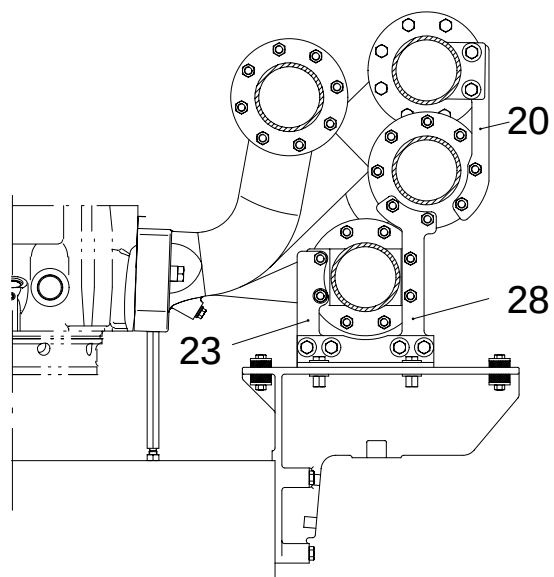
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C-C

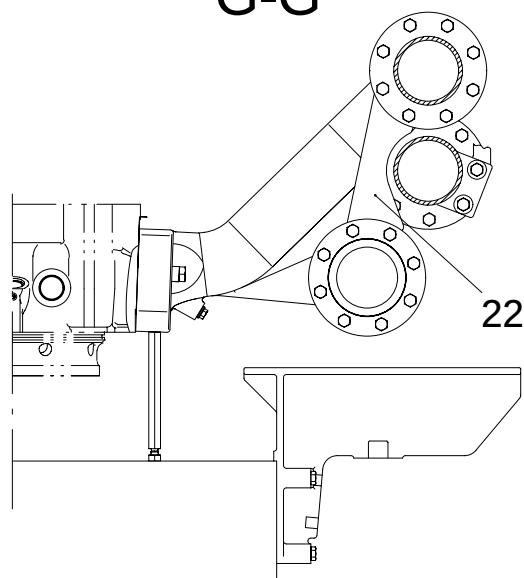
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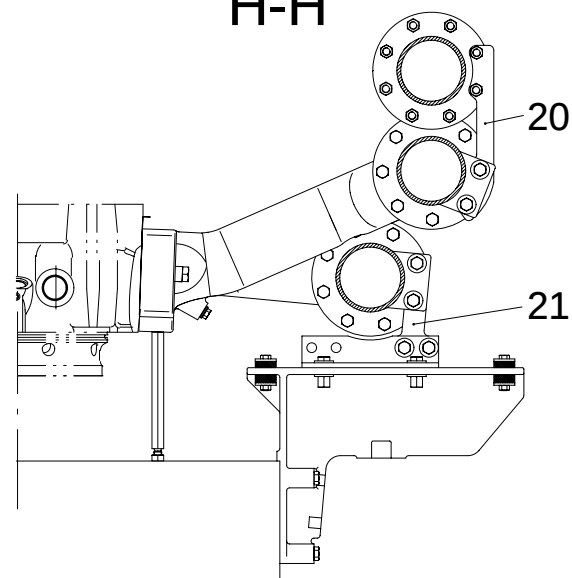
D-D



G-G



H-H



Exhaust Line Covering Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASVERKLEIDUNG ANBAU, VOLLST. EXHAUST LINE COVERING MOUNTING ASS.	1	257270 AA
1	VERKLEIDUNG, VOLLST. COVERING, COMPL.	1	257270-001
2	VERKLEIDUNG, VOLLST. COVERING, COMPL.	1	257270-002
3	VERKLEIDUNG, VOLLST. COVERING, COMPL.	1	257270-003
6	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	1	257270-006
8	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	1	257270-008
10	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257270-010
11	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257270-011
12	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257270-012
13	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257270-013
14	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257270-014
15	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257270-015
16	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257270-016
17	BODENPLATTE, VOLLST. BOTTOM PLATE, COMPL.	1	257270-017
18	ABDECKBLECH, VOLLST. COVER PLATE, COMPL.	1	257270-018
19	BLLENDE, VOLLST. COVERING, COMPL.	1	257270-019
20	DECKEL, VOLLST. COVER, COMPL.	1	257270-020
25	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-380
26	SECHSKANTSCHRAUBE HEXAGON BOLT	15	1.1392-385
27	SECHSKANTSCHRAUBE HEXAGON BOLT	15	1.1387-372
28	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1387-374

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Line Covering Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
30	SCHEIBE WASHER	32	1.0040-224
31	SPANNSCHEIBE CONICAL SPRING WASHER	8	1.0068-222
35	SECHSKANTMUTTER HEXAGON NUT	15	1.2007-036

= VERBRAUCHSTEILE
CONSUMABLES

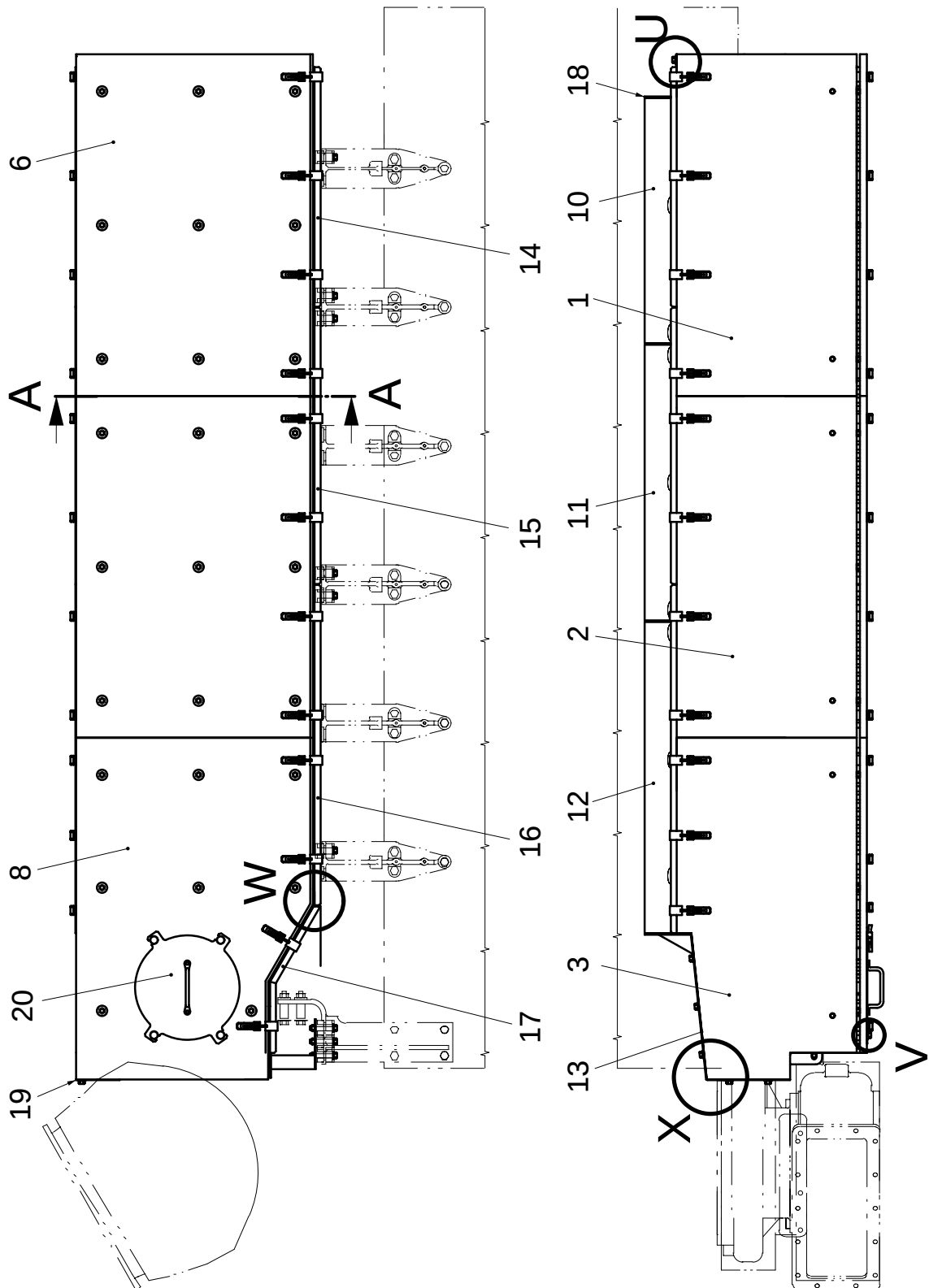
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Line Covering Mounting

M25

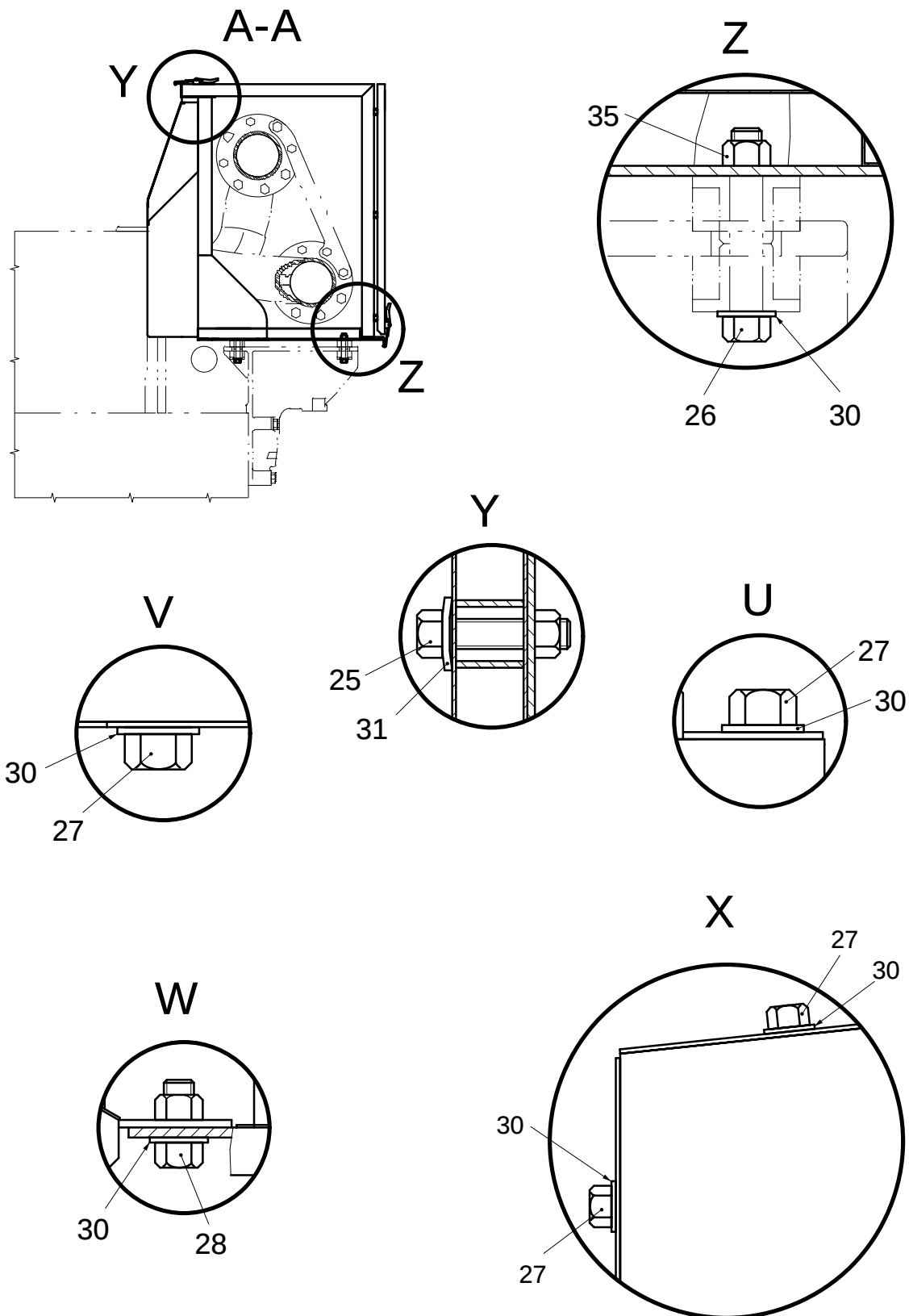
06



Exhaust Line Covering Mounting

M25

06



Exhaust Line Covering Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASVERKLEIDUNG ANBAU, VOLLST. EXHAUST LINE COVERING MOUNTING ASS.	1	257270 BB
1	ABGASVERKLEIDUNG, VOLLST. EXHAUST LINE COVERING, COMPL.	1	257270-201
2	ABGASVERKLEIDUNG, VOLLST. EXHAUST LINE COVERING, COMPL.	2	257220-102
3	ABGASVERKLEIDUNG, VOLLST. EXHAUST LINE COVERING, COMPL.	1	257270-203
4	ABGASVERKLEIDUNG, VOLLST. EXHAUST LINE COVERING, COMPL.	1	257270-204
5	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	1	257270-205
6	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	2	257220-106
7	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	1	257270-207
8	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	1	257270-208
9	RÜCKWAND, VOLLST. COVER PLATE, COMPL.	1	257270-209
10	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	2	257220-110
11	RÜCKWAND, VOLLST. COVER PLATE, COMPL.	1	257270-211
12	RÜCKWAND, VOLLST. COVER PLATE, COMPL.	1	257270-212
14	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257270-214
15	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257270-215
16	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257270-216
17	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257270-217
18	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257270-218
21	ABDECKBLECH, VOLLST. COVER PLATE, COMPL.	1	257270-221
23	ABGASVERKLEIDUNG, VOLLST. EXHAUST LINE COVERING, COMPL.	1	257270-223
25	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-340

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Line Covering Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
26	SECHSKANTSCHRAUBE HEXAGON BOLT	20	1.1392-385
27	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-372
30	SCHEIBE WASHER	16	1.0040-224
31	SPANNSCHEIBE CONICAL SPRING WASHER	# 11	1.0068-222
32	SCHEIBE WASHER	8	1.0040-223
35	SECHSKANTMUTTER HEXAGON NUT	19	1.2007-036

= VERBRAUCHSTEILE
CONSUMABLES

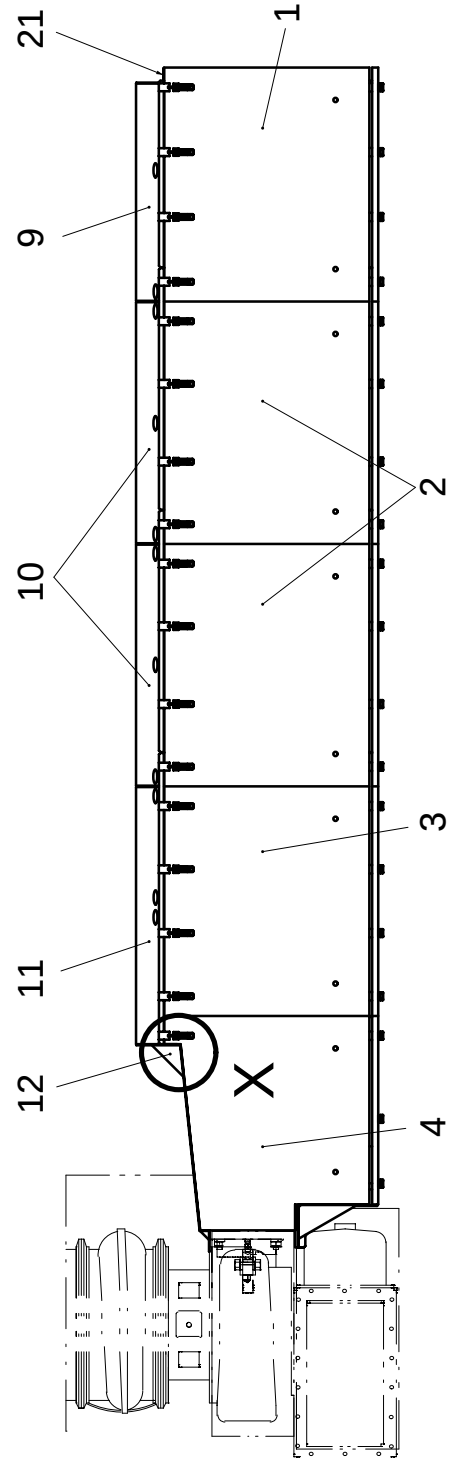
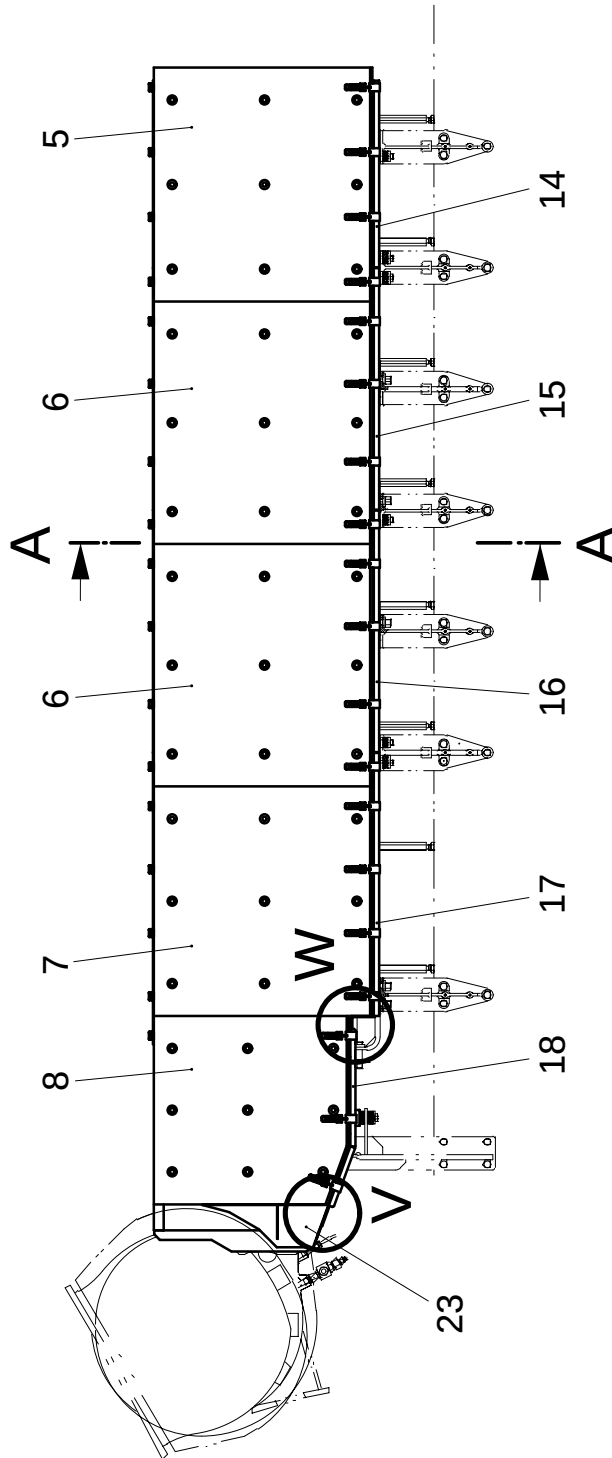
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Line Covering Mounting

M25

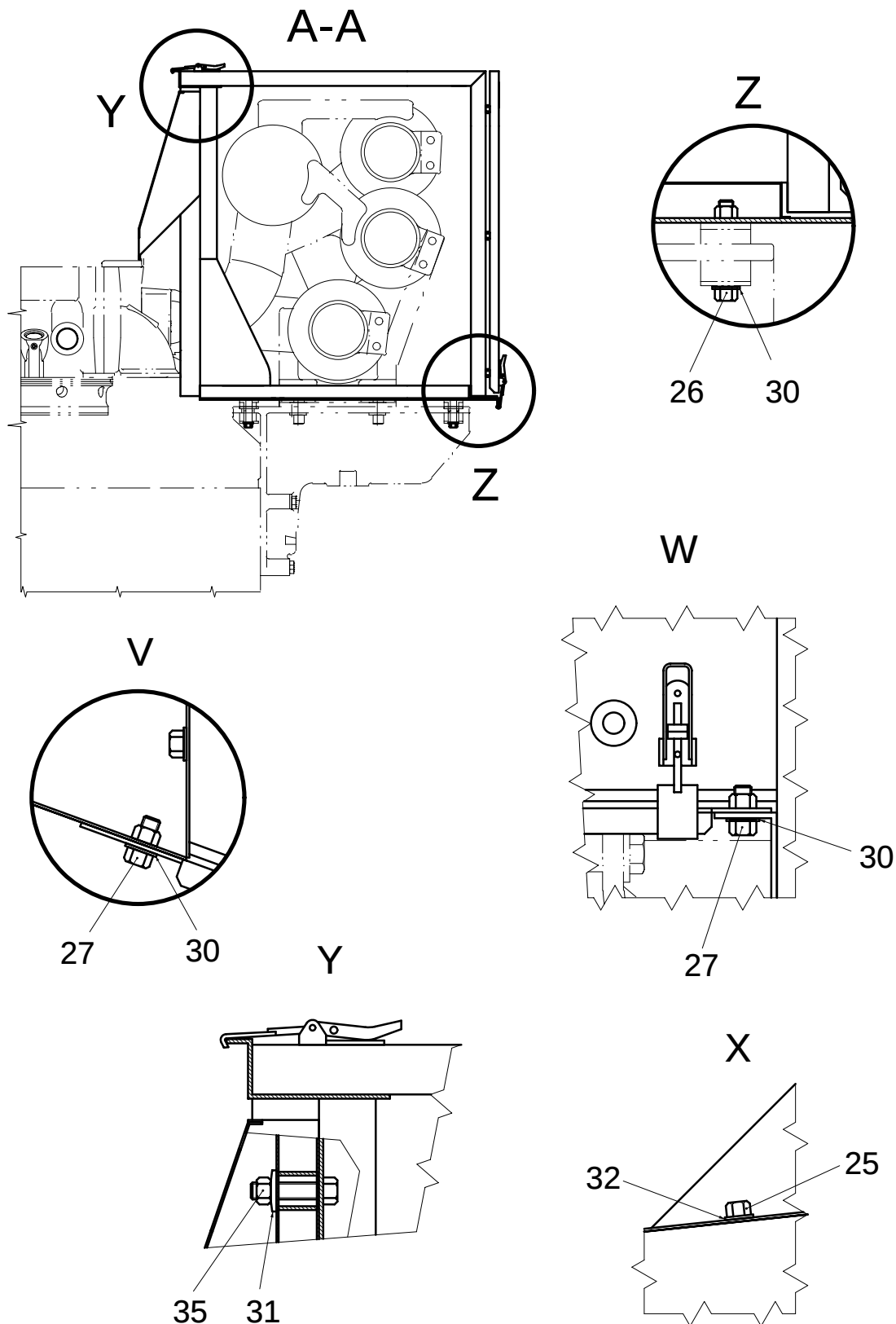
06



Exhaust Line Covering Mounting

M25

06



Exhaust Line Covering Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ABGASVERKLEIDUNG ANBAU, VOLLST. EXHAUST LINE COVERING MOUNTING ASS.	1	257270 CC
1	ABGASVERKLEIDUNG, VOLLST. EXHAUST LINE COVERING, COMPL.	1	257270-101
2	ABGASVERKLEIDUNG, VOLLST. EXHAUST LINE COVERING, COMPL.	3	257220-202
3	ABGASVERKLEIDUNG, VOLLST. EXHAUST LINE COVERING, COMPL.	1	257270-103
5	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	1	257270-105
6	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	3	257220-206
7	BERÜHRUNGSSCHUTZ, VOLLST. PROTECTION AGAINST CONTACT, COMPL.	1	257270-107
9	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257270-109
10	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	2	257220-210
11	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257270-111
12	RÜCKWANDBLECH, VOLLST. COVER PLATE, COMPL.	1	257270-112
14	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257270-114
15	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257270-115
16	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257270-116
17	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257270-117
18	STÜTZBLECH, VOLLST. SUPPORT PLATE, COMPL.	1	257270-118
20	ABDECKBLECH, VOLLST. COVER PLATE, COMPL.	1	257270-120
21	ABGASVERKLEIDUNG, VOLLST. EXHAUST LINE COVERING, COMPL.	1	257270-121
22	DECKEL, VOLLST. COVER, COMPL.	1	257220-222
25	SECHSKANTSCHRAUBE HEXAGON BOLT	25	1.1387-374
26	SECHSKANTSCHRAUBE HEXAGON BOLT	16	1.1392-385

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Line Covering Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
30	SCHEIBE WASHER	33	1.0040-224
31	SPANNSCHEIBE CONICAL SPRING WASHER	# 12	1.0068-222
35	SECHSKANTMUTTER HEXAGON NUT	20	1.2007-036

= VERBRAUCHSTEILE
CONSUMABLES

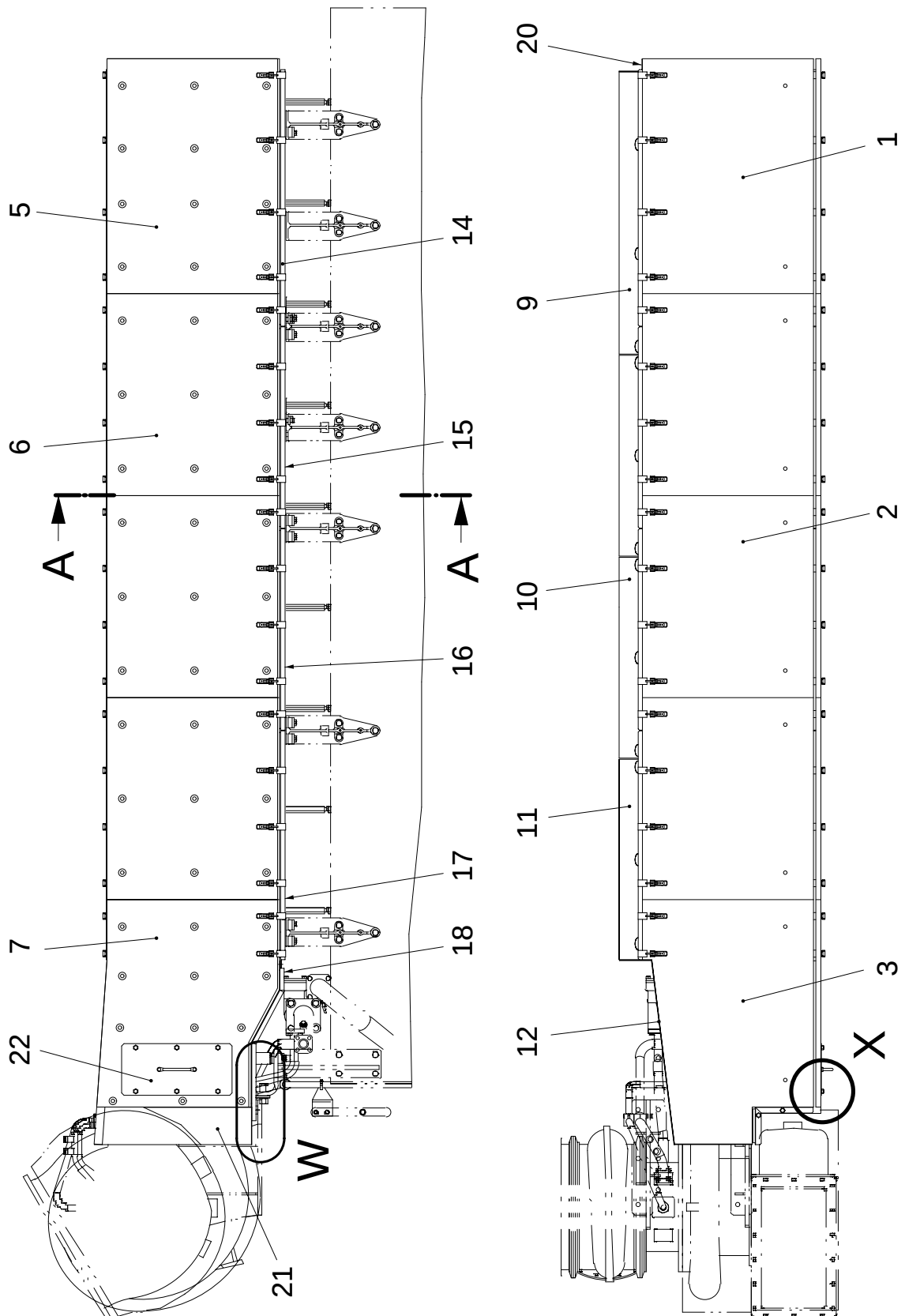
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Exhaust Line Covering Mounting

M25

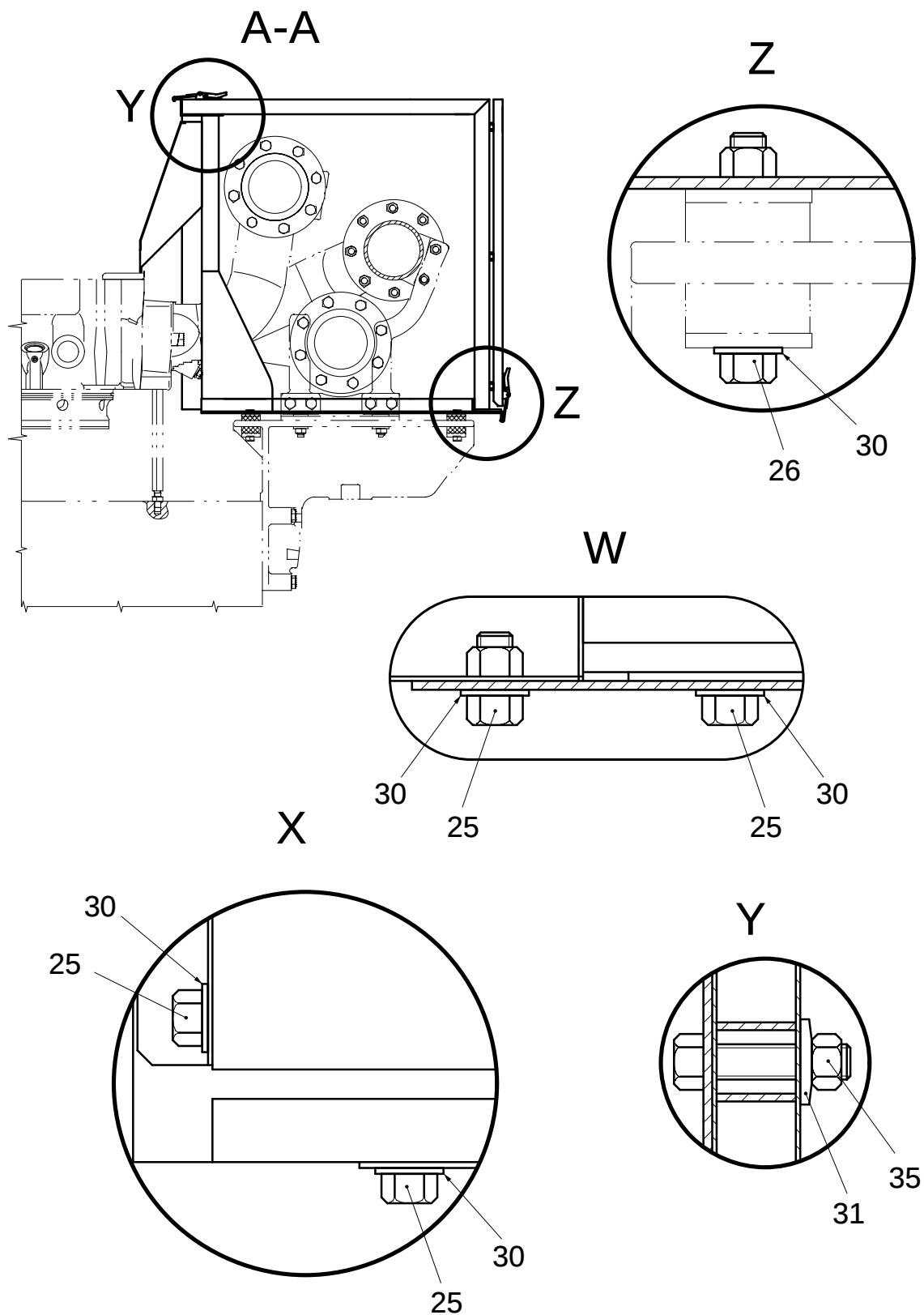
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Exhaust Line Covering Mounting

M25

06



Charge Air Cooler Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LADELUFTKÜHLER-ANBAU, VOLLST. CHARGE AIR COOLER MOUNTING ASSEMBLY	1	257280 AA
1	GEHÄUSE HOUSING	1	257280-001
2	LADELUFTKÜHLER, VOLLST. CHARGE AIR COOLER, COMPL.	1	SIEHE BUCHC, ABSCHNITT 10 SEE BOOK C, SECTION 10
3	DICHTUNG GASKET	# 1	257240-003
4	WINKELSCHIENE CUP WASHER	1	257240-004
5	DECKEL COVER	1	257240-005
6	DICHTUNG GASKET	# 1	257240-006
8	DISTANZSTÜCK SPACER	2	1.8645-012
9	DEHNHÜLSE EXTENSION SLEEVE	10	1.0502-074
11	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-240
12	SECHSKANTSCHRAUBE HEXAGON SCREW	34	1.1387-378
13	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-444
14	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1392-453
15	SECHSKANTSCHRAUBE HEXAGON BOLT	10	1.1367-378
16	SECHSKANTSCHRAUBE HEXAGON BOLT	5	1.1372-384
18	SCHEIBE WASHER	8	1.0045-129
19	SCHEIBE WASHER	34	1.0041-224
21	VERSCHLUSSSCHRAUBE SCREW PLUG	2	1.1040-364
22	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-812
23	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-609

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Charge Air Cooler Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
25	DICHTRING JOINT RING	# 2	1.7010-191
26	DICHTRING JOINT RING	# 2	1.7010-252
27	DICHTRING JOINT RING	# 1	1.7010-133

= VERBRAUCHSTEILE
CONSUMABLES

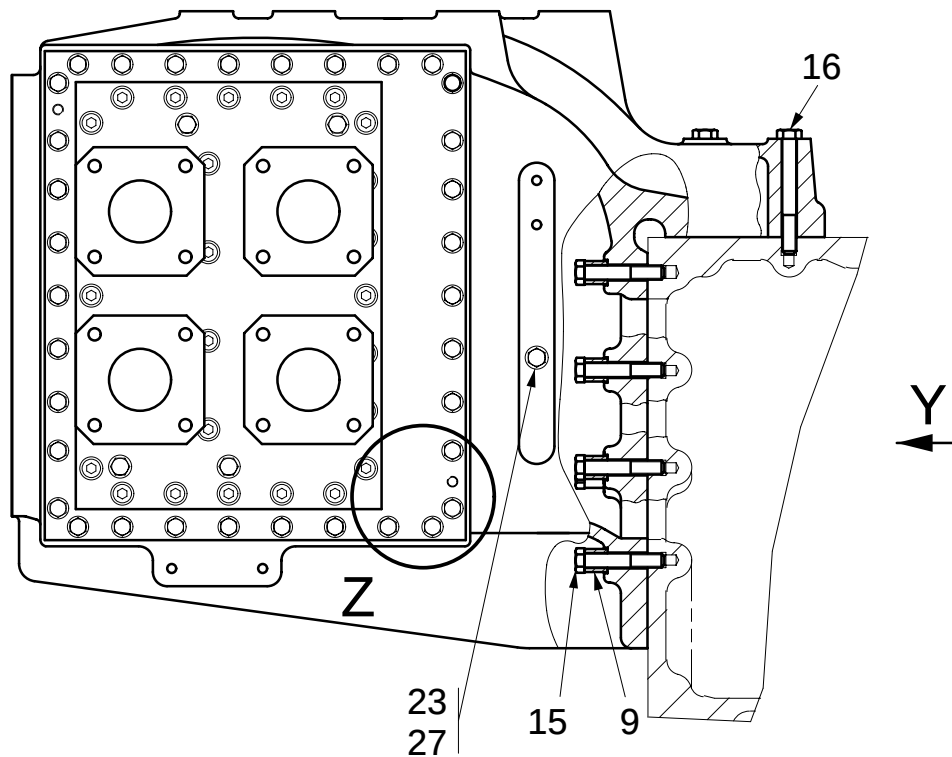
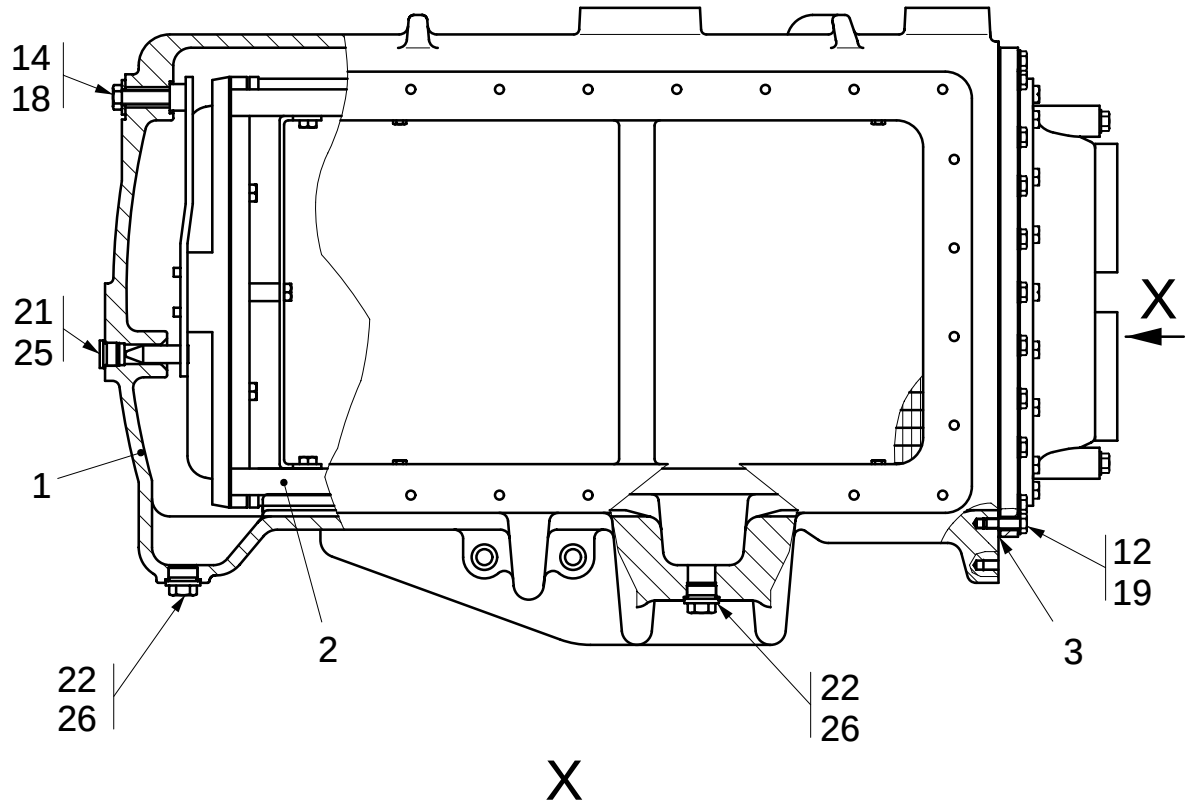
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Charge Air Cooler Mounting

M25

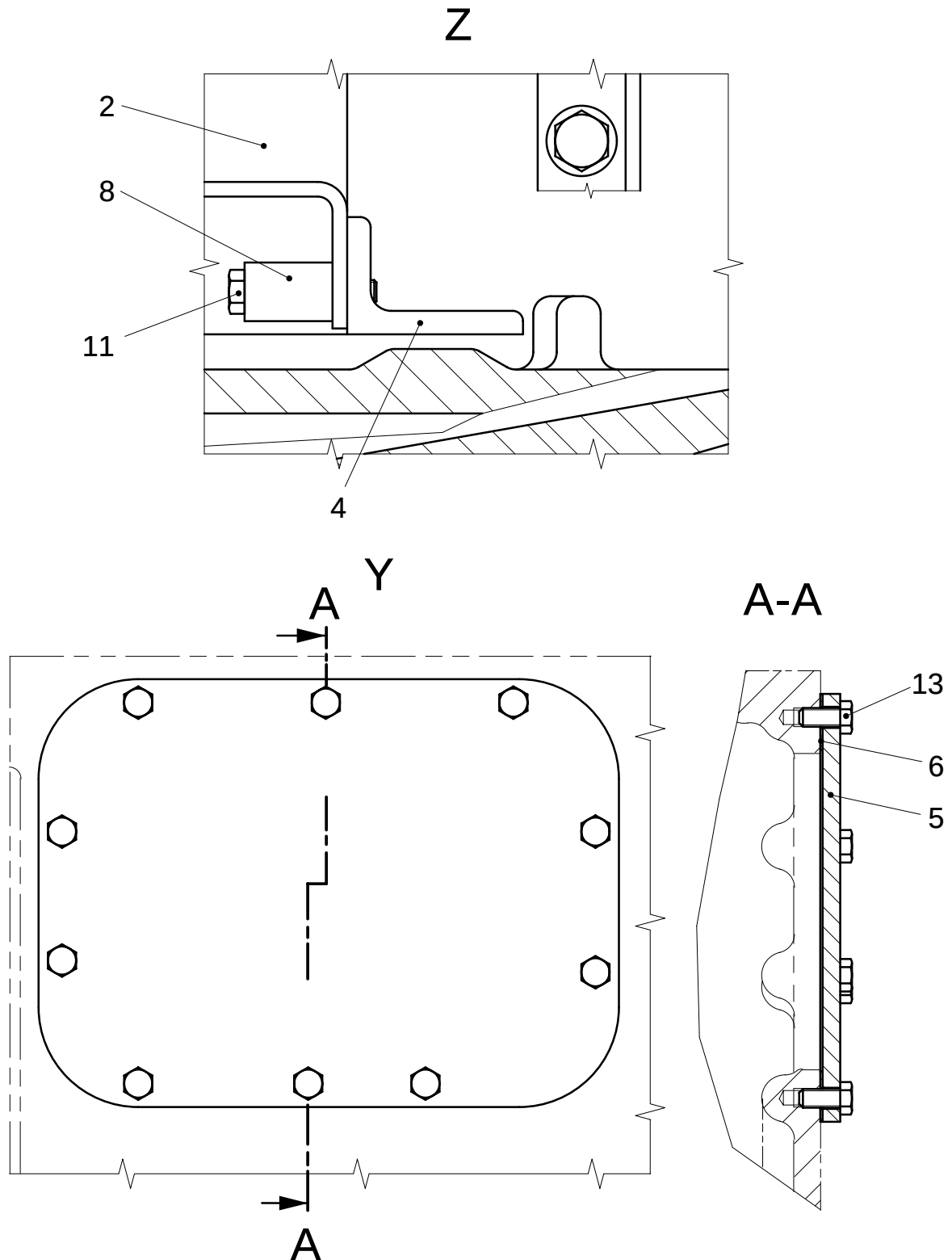
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Charge Air Cooler Mounting

M25

06



Charge Air Cooler Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LADELUFTKÜHLER-ANBAU, VOLLST. CHARGE AIR COOLER MOUNTING ASSEMBLY	1	257280 BB
1	GEHÄUSE HOUSING	1	257280-101
2	LADELUFTKÜHLER, VOLLST. CHARGE AIR COOLER, COMPL.	1	SIEHE BUCHC, ABSCHNITT 10 SEE BOOK C, SECTION 10
3	DICHTUNG GASKET	# 1	257240-003
4	WINKELSCHIENE CUP WASHER	1	257240-004
5	DECKEL COVER	1	257240-005
6	DICHTUNG GASKET	# 1	257240-006
8	DISTANZSTÜCK SPACER	2	1.8645-012
9	DEHNHÜLSE EXTENSION SLEEVE	10	1.0502-074
11	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-240
12	SECHSKANTSCHRAUBE HEXAGON SCREW	34	1.1387-378
13	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-444
14	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1392-453
15	SECHSKANTSCHRAUBE HEXAGON BOLT	10	1.1367-378
16	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1372-384
18	SCHEIBE WASHER	12	1.0045-129
19	SCHEIBE WASHER	34	1.0041-224
21	VERSCHLUSSSCHRAUBE SCREW PLUG	2	1.1040-364
22	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-812
23	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-609

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Charge Air Cooler Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
25	DICHTRING JOINT RING	# 2	1.7010-191
26	DICHTRING JOINT RING	# 2	1.7010-252
27	DICHTRING JOINT RING	# 1	1.7010-133

= VERBRAUCHSTEILE
CONSUMABLES

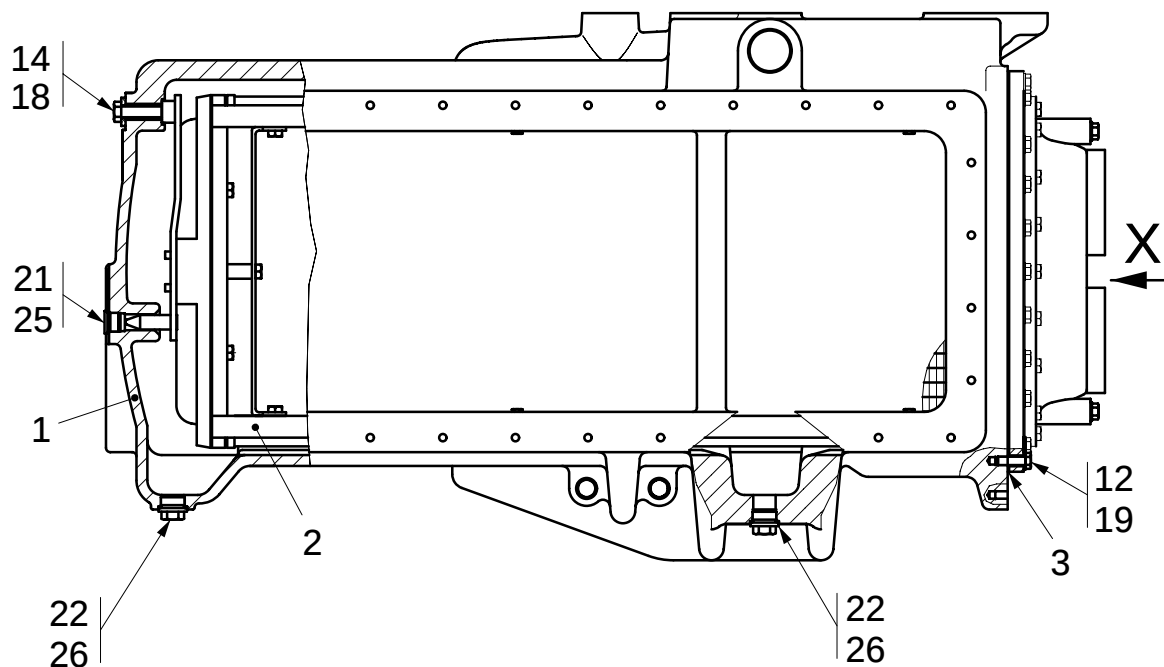
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

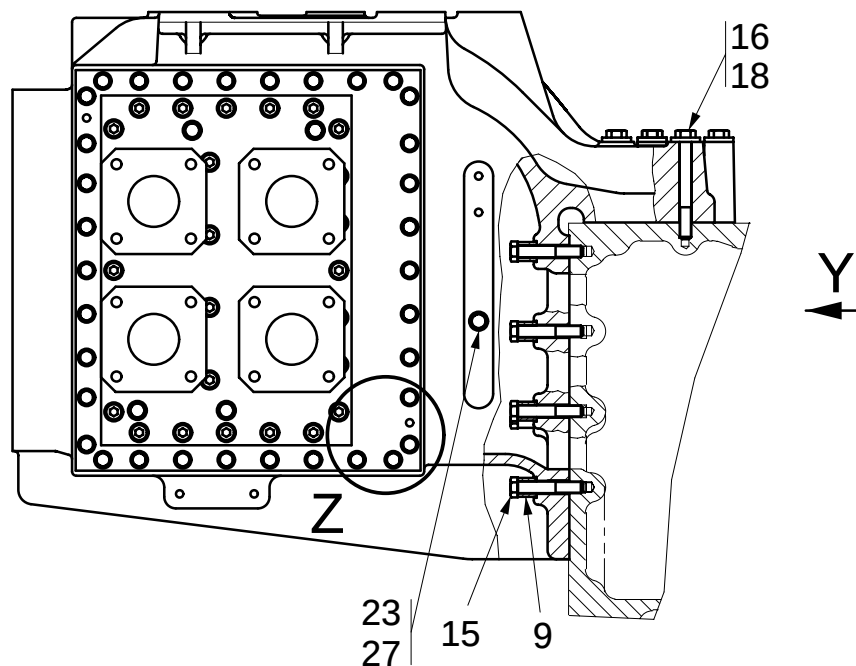
Charge Air Cooler Mounting

M25

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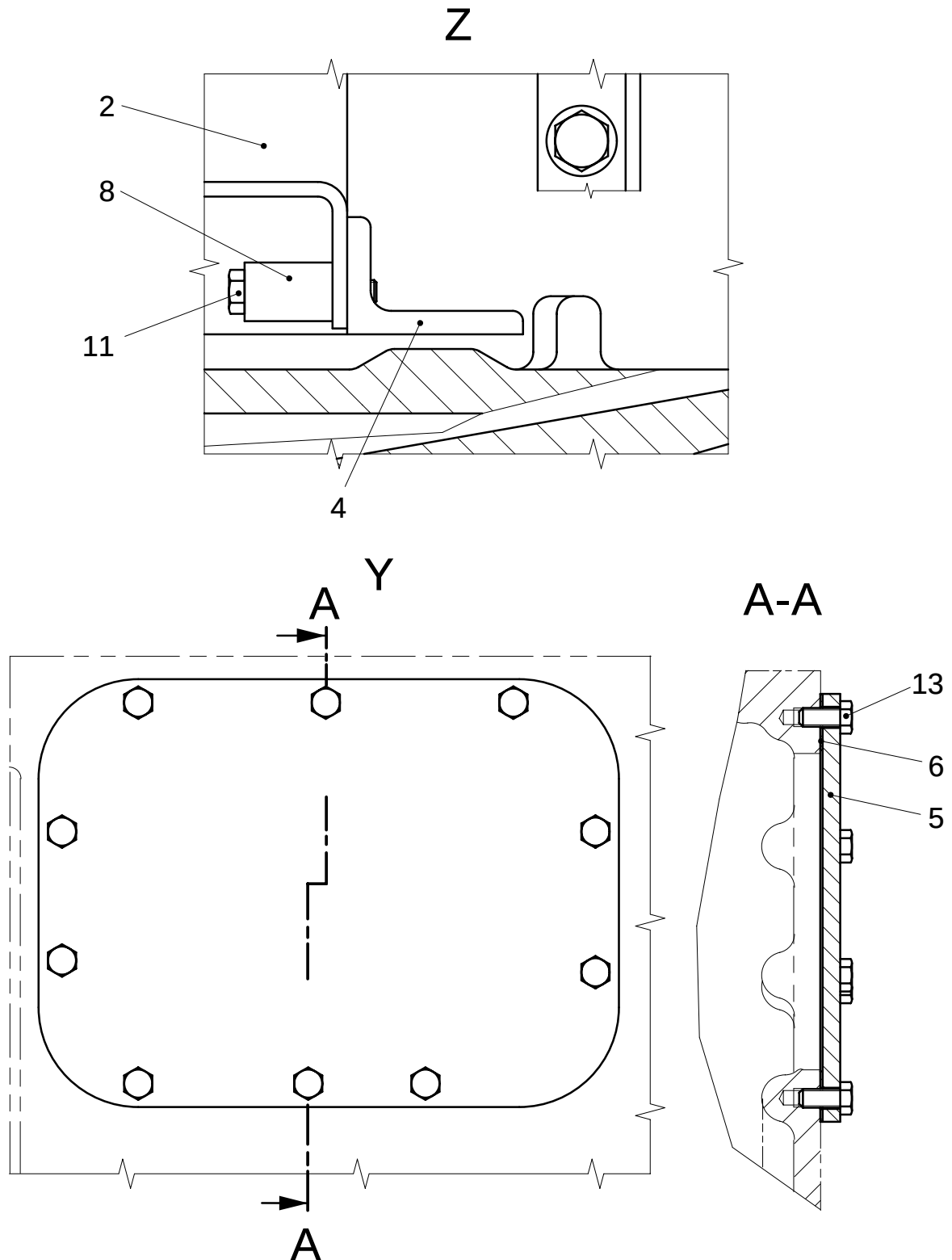
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Charge Air Cooler Mounting

M25

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Charge Air Cooler Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LADELUFTKÜHLER-ANBAU, VOLLST. CHARGE AIR COOLER MOUNTING ASSEMBLY	1	257280 CC
1	GEHÄUSE HOUSING	1	257280-301
2	LADELUFTKÜHLER, VOLLST. CHARGE AIR COOLER, COMPL.	1	SIEHE BUCH C SEE BOOK C
3	DICHTUNG GASKET	# 1	257240-003
4	WINKELSCHIENE CUP WASHER	1	257240-004
5	DECKEL COVER	1	257240-005
6	DICHTUNG GASKET	# 1	257240-006
8	DISTANZSTÜCK SPACER	2	1.8645-012
9	DEHNHÜLSE EXTENSION SLEEVE	10	257280-009
10	SECHSKANTSCHRAUBE HEXAGON BOLT	7	1.1367-669
11	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-668
12	SECHSKANTSCHRAUBE HEXAGON SCREW	34	1.1387-378
13	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-444
14	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1312-903
15	SECHSKANTSCHRAUBE HEXAGON BOLT	3	1.1367-378
16	SECHSKANTSCHRAUBE HEXAGON BOLT	5	1.1372-384
18	SCHEIBE WASHER	8	1.0045-129
19	SCHEIBE WASHER	34	1.0040-224
20	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	6	1.1153-169
21	VERSCHLUSSSCHRAUBE SCREW PLUG	2	1.1040-811
22	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-812

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Charge Air Cooler Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
23	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-609
24	SCHEIBE WASHER	6	1.0043-082
25	DICHTRING JOINT RING	# 2	1.7010-218
26	DICHTRING JOINT RING	# 2	1.7010-252
27	DICHTRING JOINT RING	# 1	1.7010-133
29	DICHTRING JOINT RING	# 2	1.7010-029
30	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-606

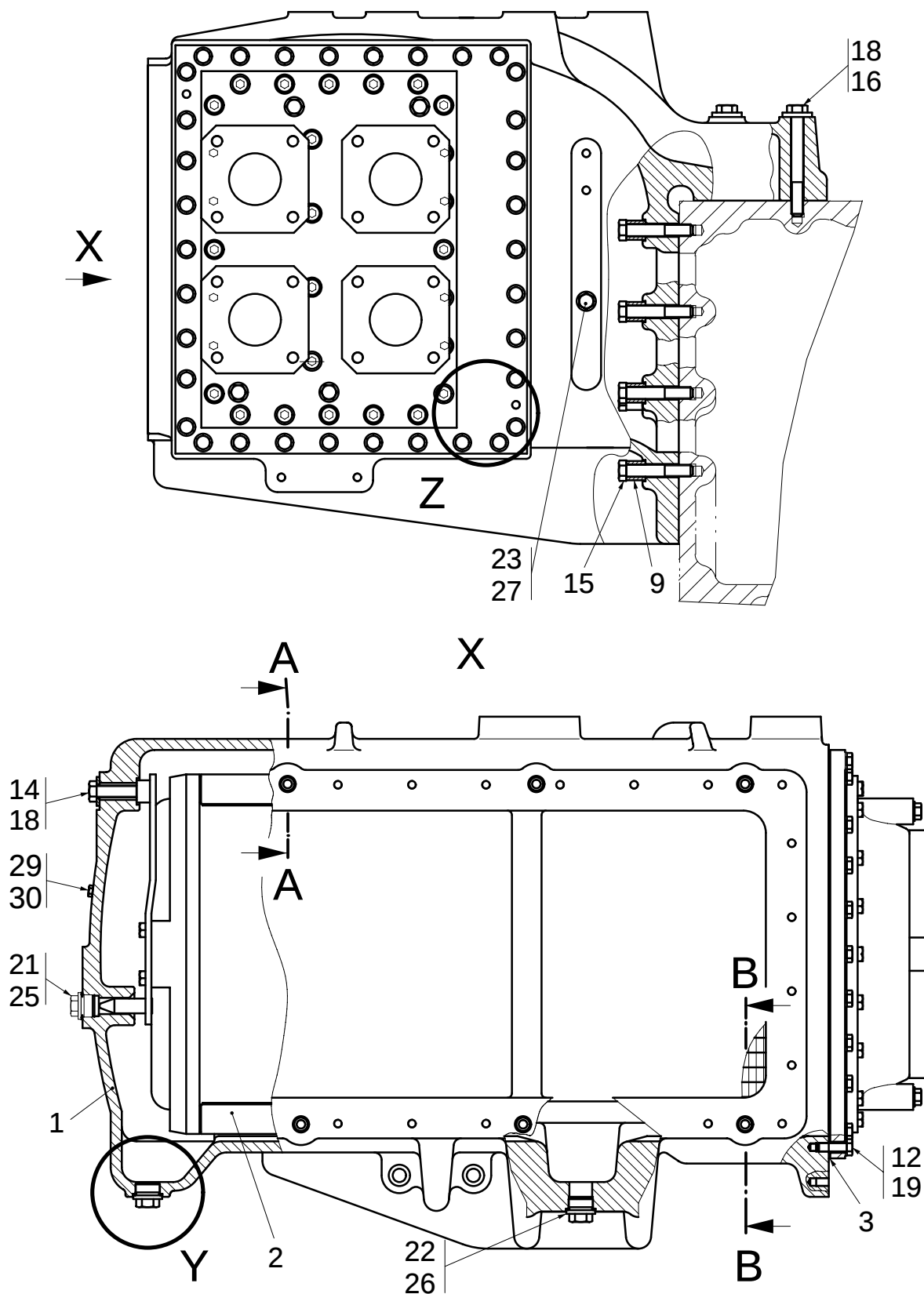
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Charge Air Cooler Mounting

M25

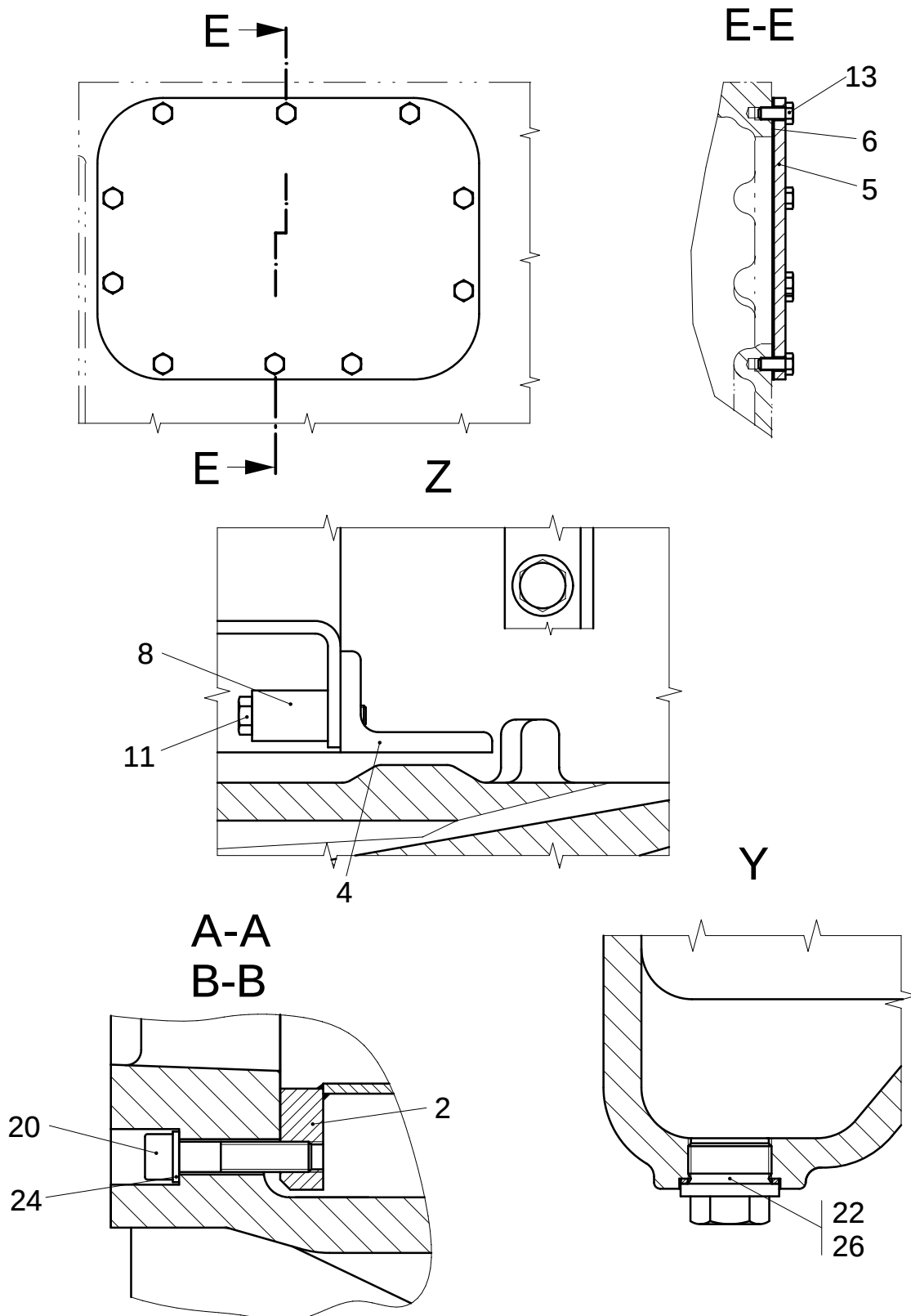
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Charge Air Cooler Mounting

M25

06



Charge Air Cooler Mounting

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LADELUFTKÜHLER-ANBAU, VOLLST. CHARGE AIR COOLER MOUNTING ASSEMBLY	1	257280 DD
1	GEHÄUSE HOUSING	1	257280-201
2	LADELUFTKÜHLER, VOLLST. CHARGE AIR COOLER, COMPL.	1	SIEHE BUCH C SEE BOOK C
3	DICHTUNG GASKET	# 1	257240-003
4	WINKELSCHIENE CUP WASHER	1	257240-004
5	DECKEL COVER	1	257240-005
6	DICHTUNG GASKET	# 1	257240-006
8	DISTANZSTÜCK SPACER	2	1.8645-012
9	DEHNHÜLSE EXTENSION SLEEVE	10	257280-009
10	SECHSKANTSCHRAUBE HEXAGON BOLT	7	1.1367-669
11	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-668
12	SECHSKANTSCHRAUBE HEXAGON SCREW	34	1.1387-378
13	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-444
14	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1312-903
15	SECHSKANTSCHRAUBE HEXAGON BOLT	10	1.1367-378
16	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1372-384
17	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	8	1.1153-170
18	SCHEIBE WASHER	12	1.0045-129
19	SCHEIBE WASHER	34	1.0040-224
20	SCHEIBE WASHER	8	1.0043-082
21	VERSCHLUSSSCHRAUBE SCREW PLUG	2	1.1040-364

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Charge Air Cooler Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
22	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-812
23	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-609
25	DICHTRING JOINT RING	# 2	1.7010-191
26	DICHTRING JOINT RING	# 2	1.7010-252
27	DICHTRING JOINT RING	# 2	1.7010-133
29	DICHTRING JOINT RING	# 2	1.7010-029
30	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-606

= VERBRAUCHSTEILE
CONSUMABLES

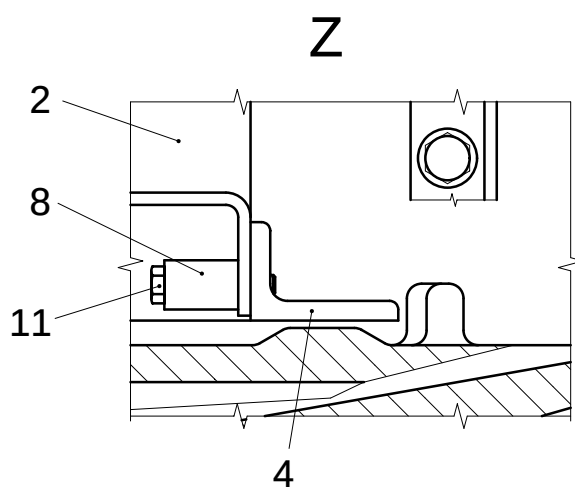
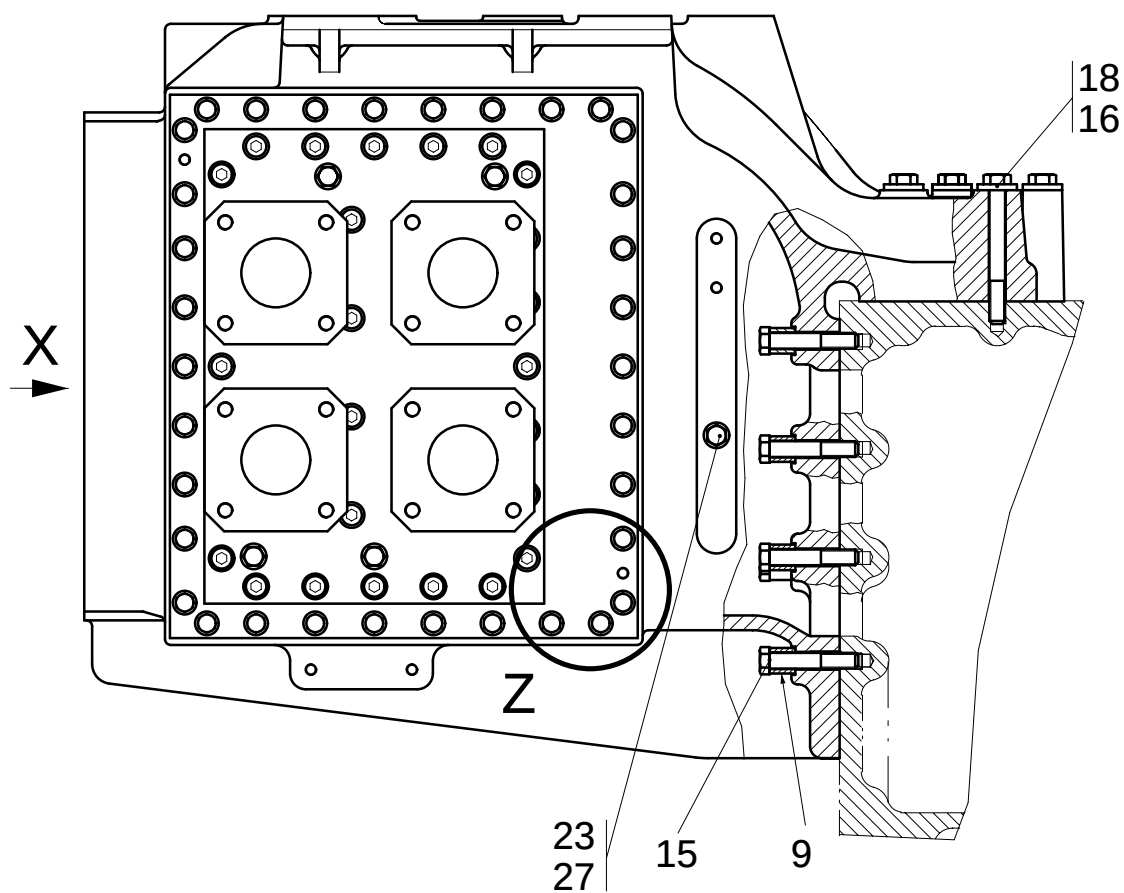
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Charge Air Cooler Mounting

M25

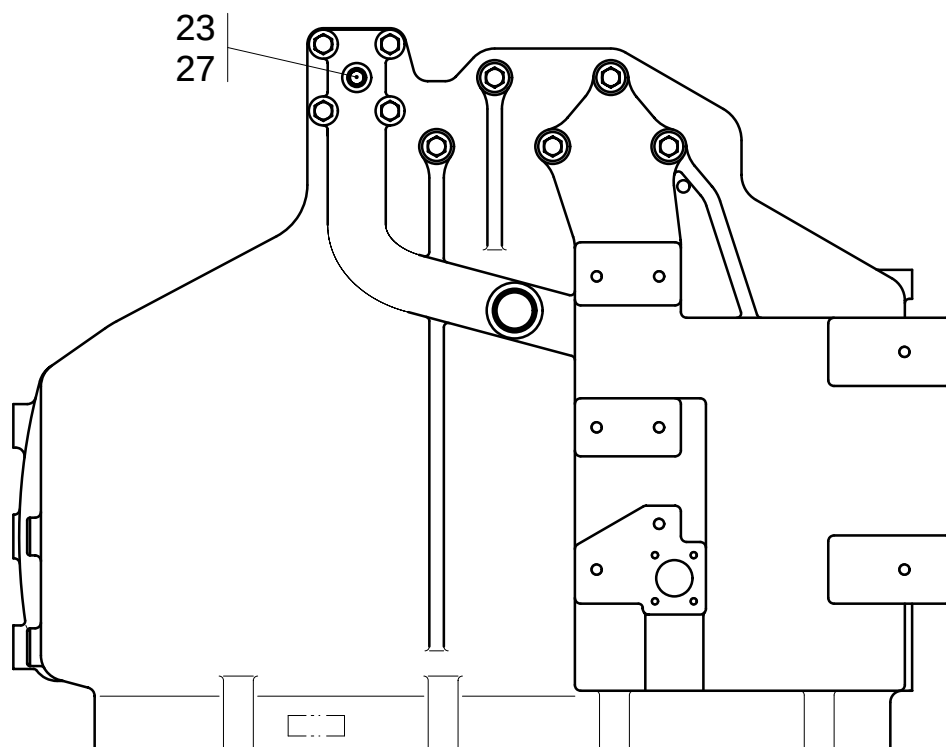
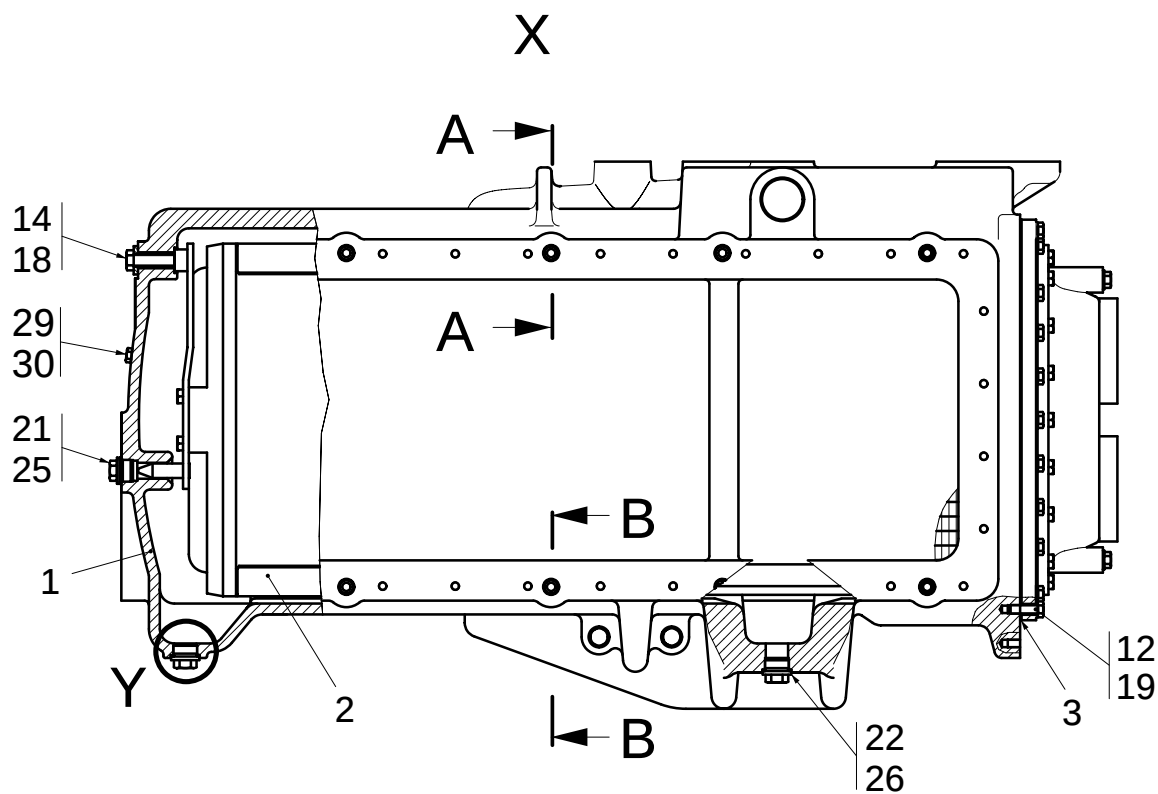
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Charge Air Cooler Mounting

M25

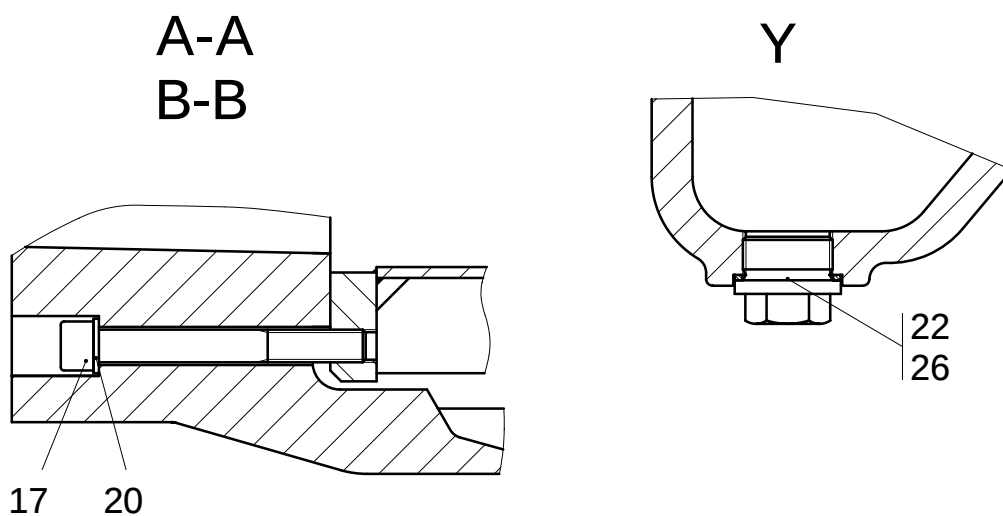
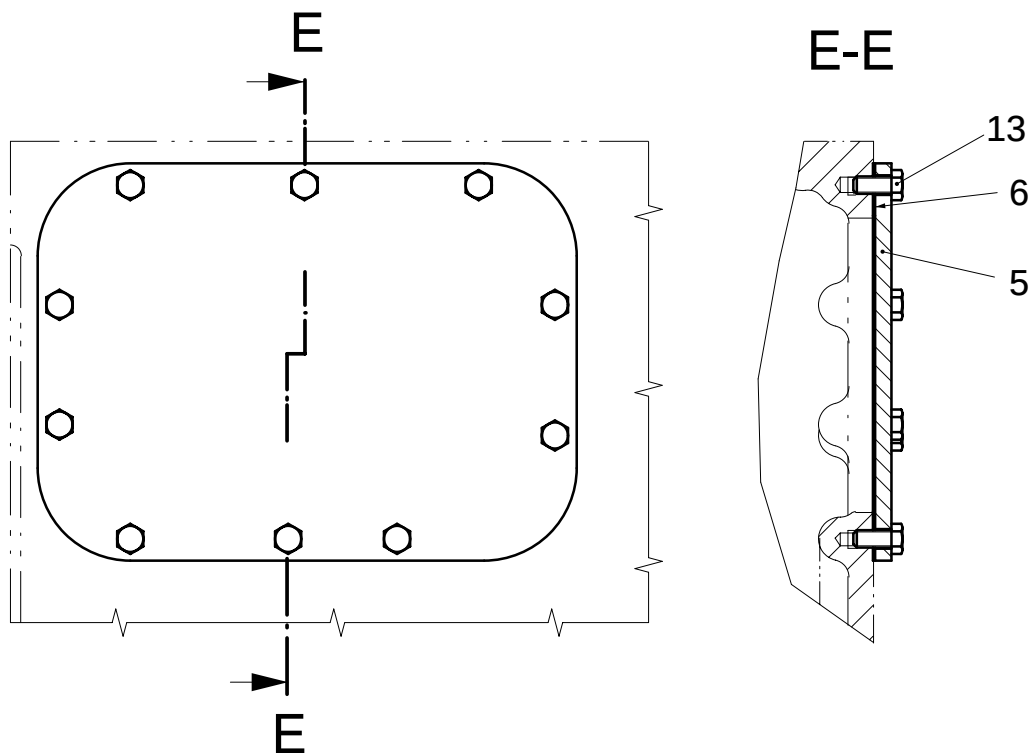
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Charge Air Cooler Mounting

M25

06



Charge Air Cooler Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LADELUFTKÜHLER-ANBAU, VOLLST. CHARGE AIR COOLER MOUNTING ASSEMBLY	1	257280 EE
1	GEHÄUSE HOUSING	1	257280-201
2	LADELUFTKÜHLER, VOLLST. CHARGE AIR COOLER, COMPL.	1	SIEHE BUCH C SEE BOOK C
3	DICHTUNG GASKET	# 1	257240-003
4	WINKELSCHIENE CUP WASHER	1	257240-004
5	DECKEL COVER	1	257240-005
6	DICHTUNG GASKET	# 1	257240-006
8	DISTANZSTÜCK SPACER	2	1.8645-012
9	DEHNHÜLSE EXTENSION SLEEVE	10	257280-009
10	SECHSKANTSCHRAUBE HEXAGON BOLT	7	1.1367-669
11	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-668
12	SECHSKANTSCHRAUBE HEXAGON SCREW	34	1.1387-378
13	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-444
14	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1392-453
15	SECHSKANTSCHRAUBE HEXAGON BOLT	3	1.1367-378
16	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1372-384
17	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	8	1.1158-166
18	SCHEIBE WASHER	12	1.0045-129
19	SCHEIBE WASHER	34	1.0040-224
20	SCHEIBE WASHER	8	1.0043-082
21	VERSCHLUSSSCHRAUBE SCREW PLUG	2	1.1040-364

06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Charge Air Cooler Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
22	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-812
23	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-609
25	DICHTRING JOINT RING	# 2	1.7010-191
26	DICHTRING JOINT RING	# 2	1.7010-252
27	DICHTRING JOINT RING	# 2	1.7010-133
29	DICHTRING JOINT RING	# 2	1.7010-029
30	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-606

= VERBRAUCHSTEILE
CONSUMABLES

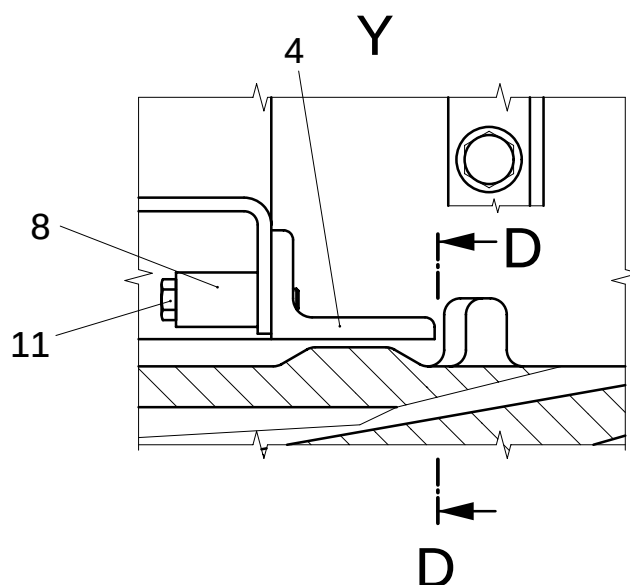
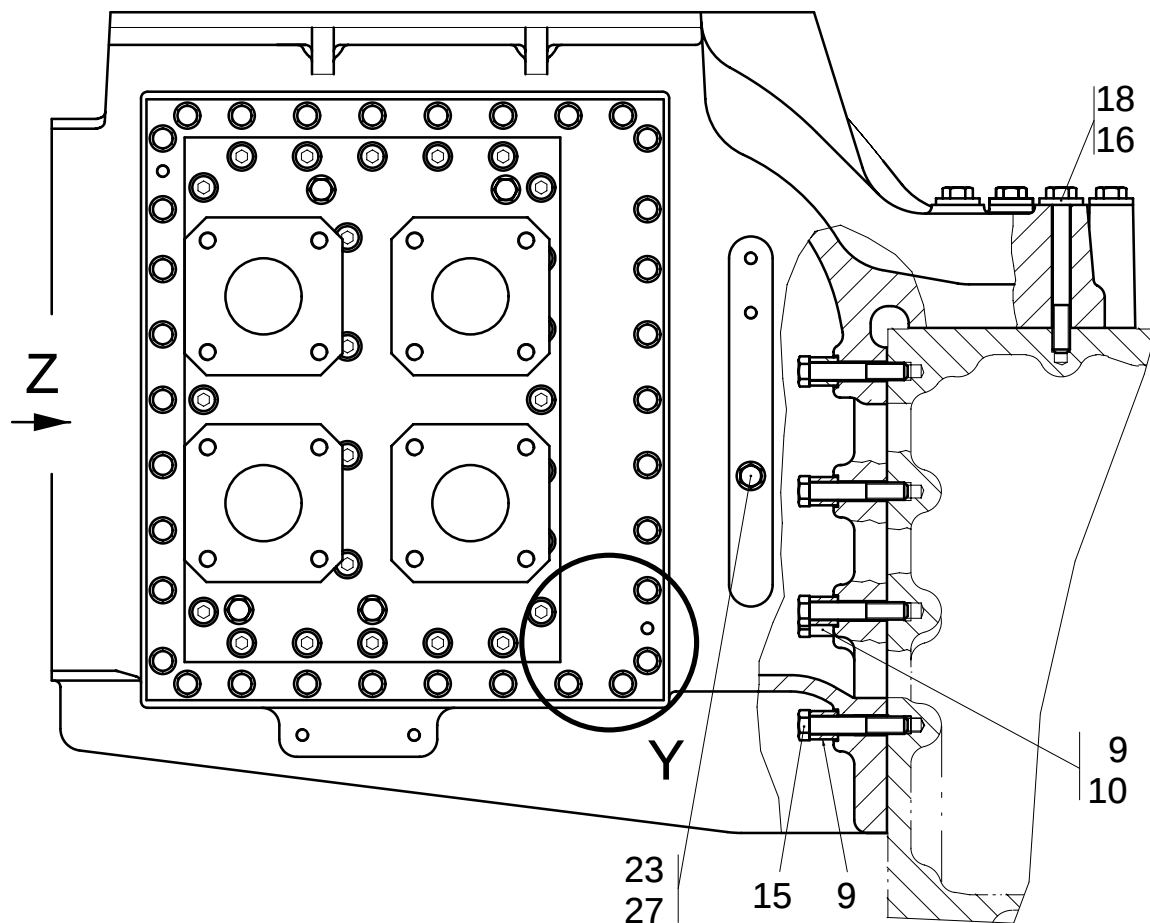
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Charge Air Cooler Mounting

M25

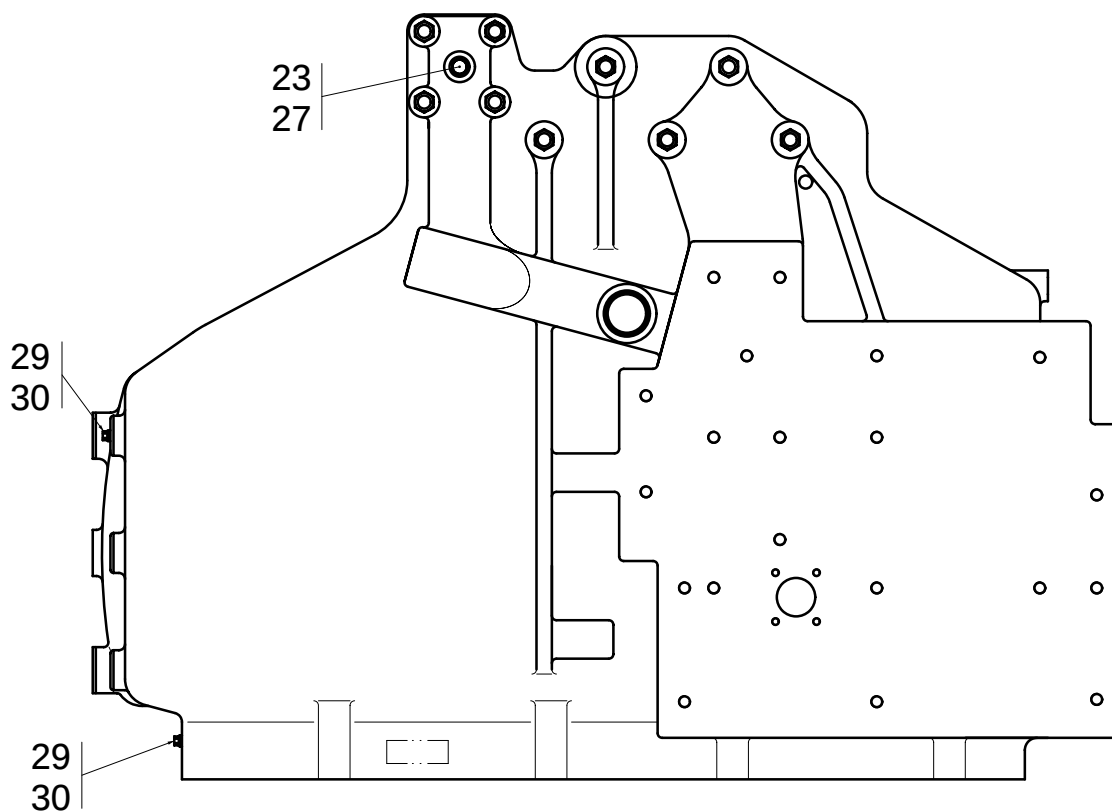
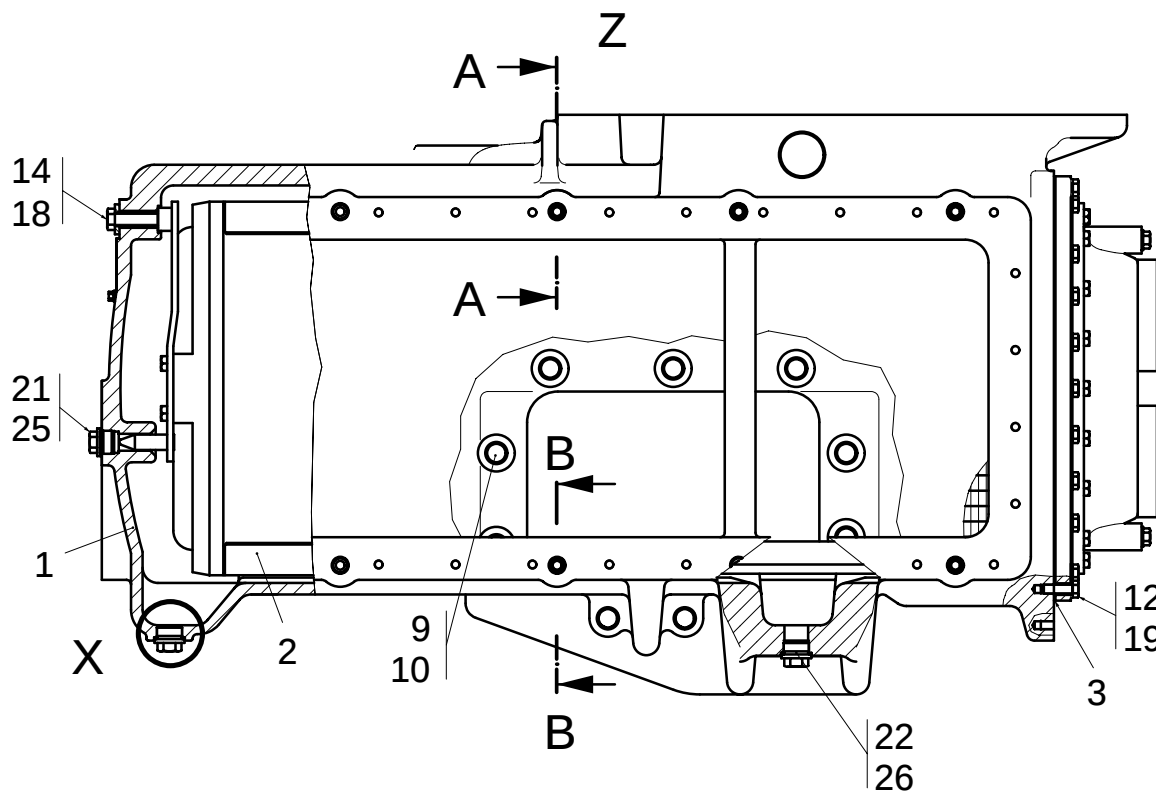
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Charge Air Cooler Mounting

M25

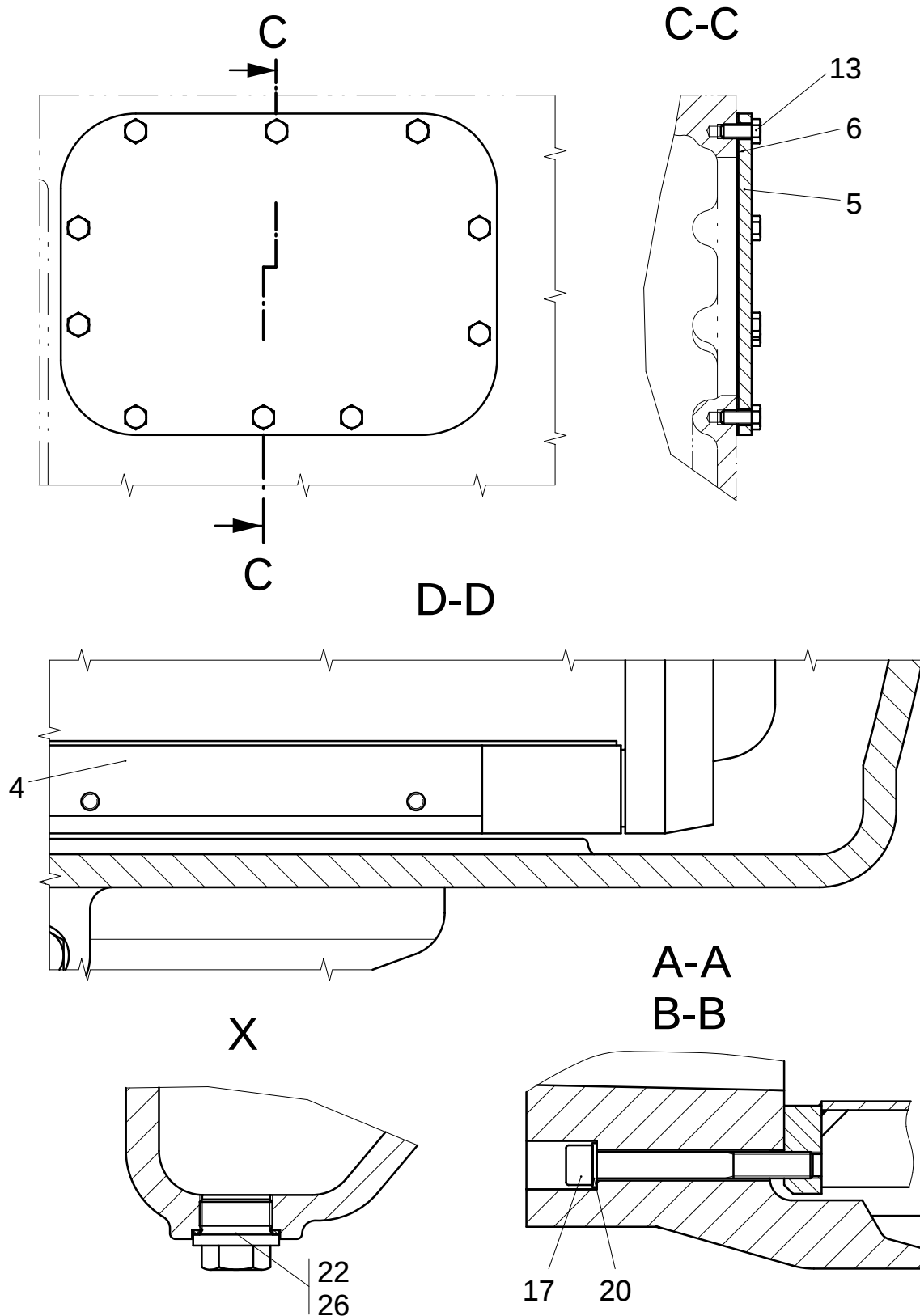
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Charge Air Cooler Mounting

M25

06



Corner Valve

M20-M601C

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
10.0	ECKVENTIL, VOLLST. CORNER VALVE ASSEMBLY	1	1.7297 AA
10.0-1	GEHÄUSE HOUSING	1	1.7297-001
10.0-2	VENTILSITZ VALVE SEAT	1	1.7297-002
10.0-3	VENTILKEGEL VALVE	1	1.7297-003
10.0-4	VENTILSPINDEL VALVE SCREW	1	1.7297-004
10.0-5	KOPFSTÜCK HEAD	1	1.7297-005
10.0-6	FEDERELEMENTE SPRING	8	1.7297-006
10.0-7	ÜBERWURFMUTTER HEAD NUT	1	1.7297-007
10.0-8	PACKUNG PACKING	# 1	1.7297-008
10.0-9	ANSCHLUSSSTÜCK UNION	1	1.7297-009
10.0-10	SPANNMUFFE SOCKET	1	1.7297-010
10.0-11	DICHTRING JOINT RING	# 1	1.7297-011
10.0-12	SCHLÜSSELEINSATZ WRENCH SOCKET	1	1.7297-012
10.0-13	SCHEIBE WASHER	1	1.7297-013
10.0-14	SECHSKANTMUTTER HEXAGON NUT	1	1.7297-014
10.0-15	BUCHSE BUSH	1	1.7297-015
10.0-16	HOCHDRUCKPACKUNG HIGH-PRESSURE PACKING	# 1	1.7297-016
10.0-17	DICHTRING JOINT RING	# 1	1.7297-017
10.0-18	SPRENGRING SPRING RING	1	1.7297-018
10.0-50	ANSCHLUSSST., VOLLST. (POS.: -9,-10,-11) CONNECTING PIECE, COMPL. (POS.: -9,-10,-11)	1	1.7297-500

Corner Valve

M20-M601C

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
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06

ANSCHLUSSTEILE: CONNECTING PARTS:

00-1	SCHNEIDRING CUTTING RING		SIEHE B1.05.06.n.7259 SEE B1.05.06.n.7259
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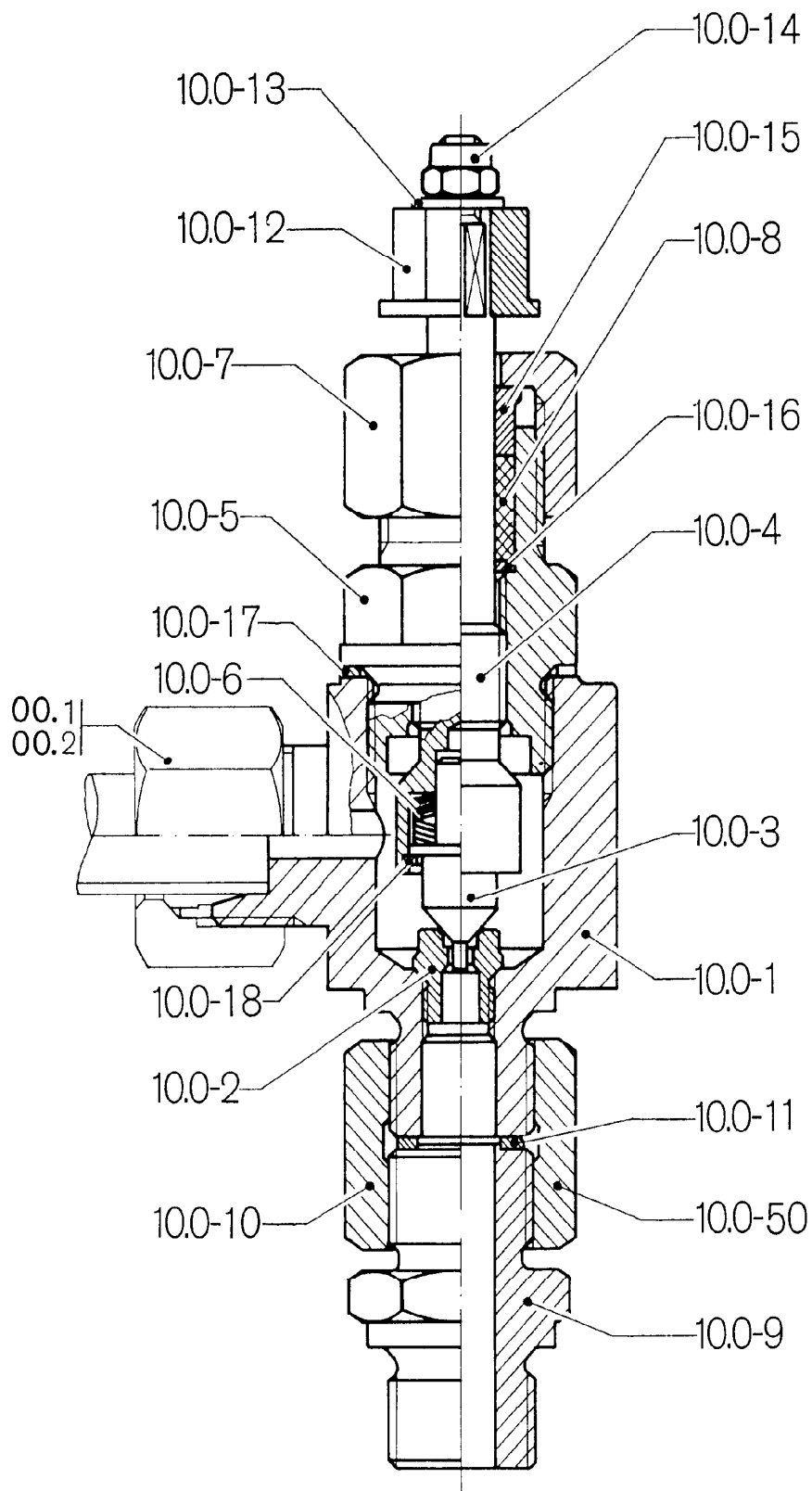
00-2	ÜBERWURFMUTTER UNION NUT		SIEHE B1.05.06.n.7259 SEE B1.05.06.n.7259
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= VERBRAUCHSTEILE
CONSUMABLES

Corner Valve

M20-M601C

06



Corner Valve

M20-M601C

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
10.0	ECKVENTIL, VOLLST. CORNER VALVE ASSEMBLY	1	1.7297 BB
10.0-1	GEHÄUSE HOUSING	1	1.7297-101
10.0-3	VENTILKEGEL VALVE	1	1.7297-103
10.0-4	VENTILSPINDEL VALVE SCREW	1	1.7297-004
10.0-5	KOPFSTÜCK HEAD	1	1.7297-005
10.0-6	TELLERFEDER CUP SPRING	# 8	1.7297-006
10.0-7	ÜBERWURFMUTTER HEAD NUT	1	1.7297-007
10.0-8	STOPFBUCHSE PACKING	# 1	1.7297-008
10.0-9	ANSCHLUSSSTÜCK UNION	1	1.7297-109
10.0-10	SPANNMUFFE SOCKET	1	1.7297-010
10.0-11	DICHTRING JOINT RING	# 1	1.7297-011
10.0-12	SCHLÜSSELEINSATZ WRENCH SOCKET	1	1.7297-012
10.0-13	SCHEIBE WASHER	1	1.7297-013
10.0-14	SECHSKANTMUTTER HEXAGON NUT	1	1.7297-014
10.0-15	BUCHSE BUSH	1	1.7297-015
10.0-16	HOCHDRUCKPACKUNG HIGH-PRESSURE PACKING	# 1	1.7297-016
10.0-17	DICHTRING JOINT RING	# 1	1.7297-017
10.0-18	SPRENGRING SPRING RING	1	1.7297-018

= VERBRAUCHSTEILE
CONSUMABLES

Corner Valve

M20-M601C

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
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06

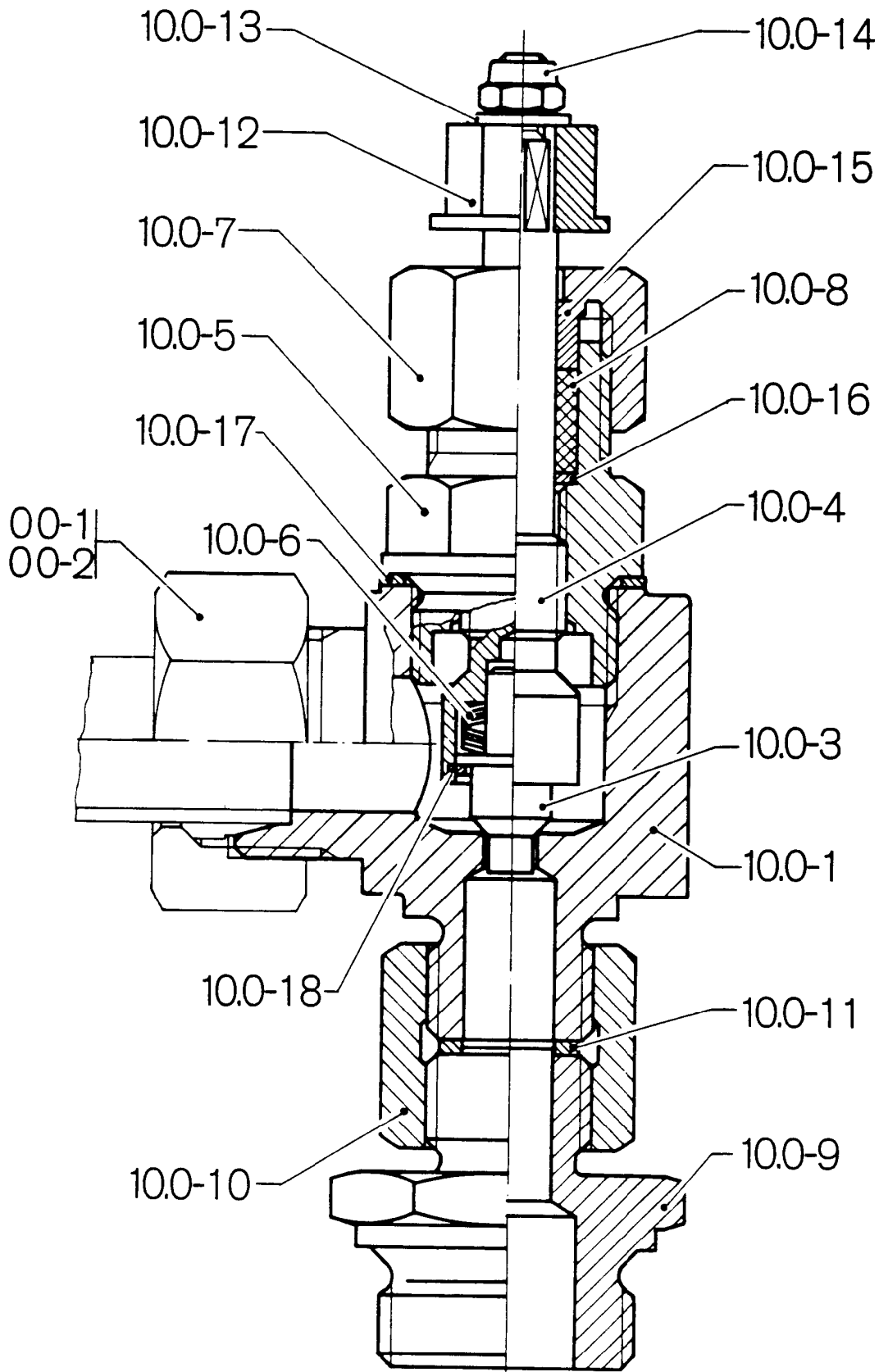
ANSCHLUSSTEILE: CONNECTING PARTS:

00-1	SCHNEIDRING CUTTING RING		SIEHE B1.05.06.n.7259 SEE B1.05.06.n.7259
00-2	ÜBERWURFMUTTER UNION NUT		SIEHE B1.05.06.n.7259 SEE B1.05.06.n.7259

Corner Valve

M20-M601C

06



Connecting Point

M25

Differential Pressure for Charge Air

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TRENNSTELLE, VOLLST. CONNECTING POINT ASSEMBLY	1	258629 AA
1	VERSCHLUSSNIPPEL NIPPLE	2	1.7240-054
2	STUTZEN CONNECTION UNION	2	1.5096-862

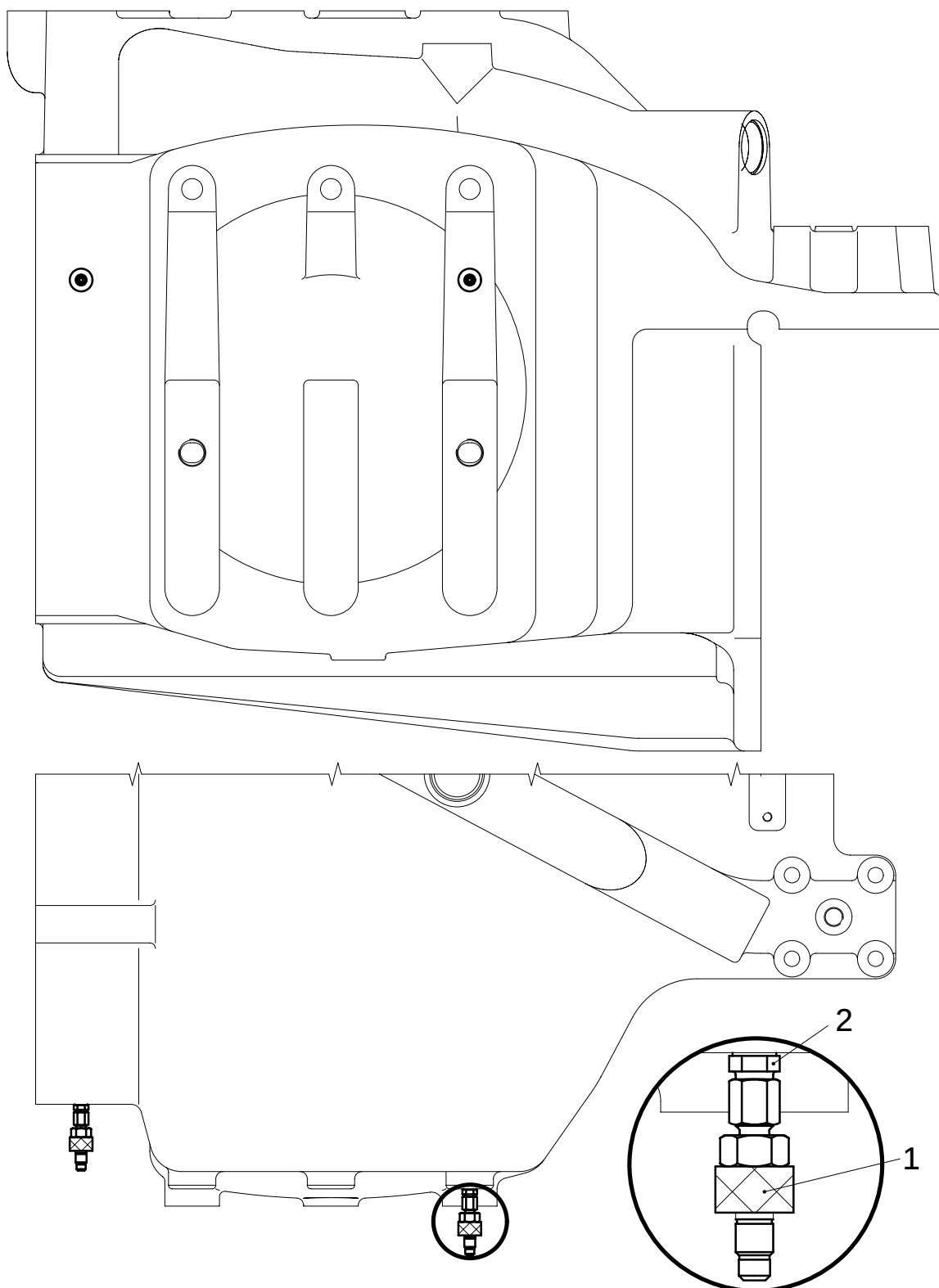
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

M25

Connecting Point
Differential Pressure for Charge Air

06



Connecting Point

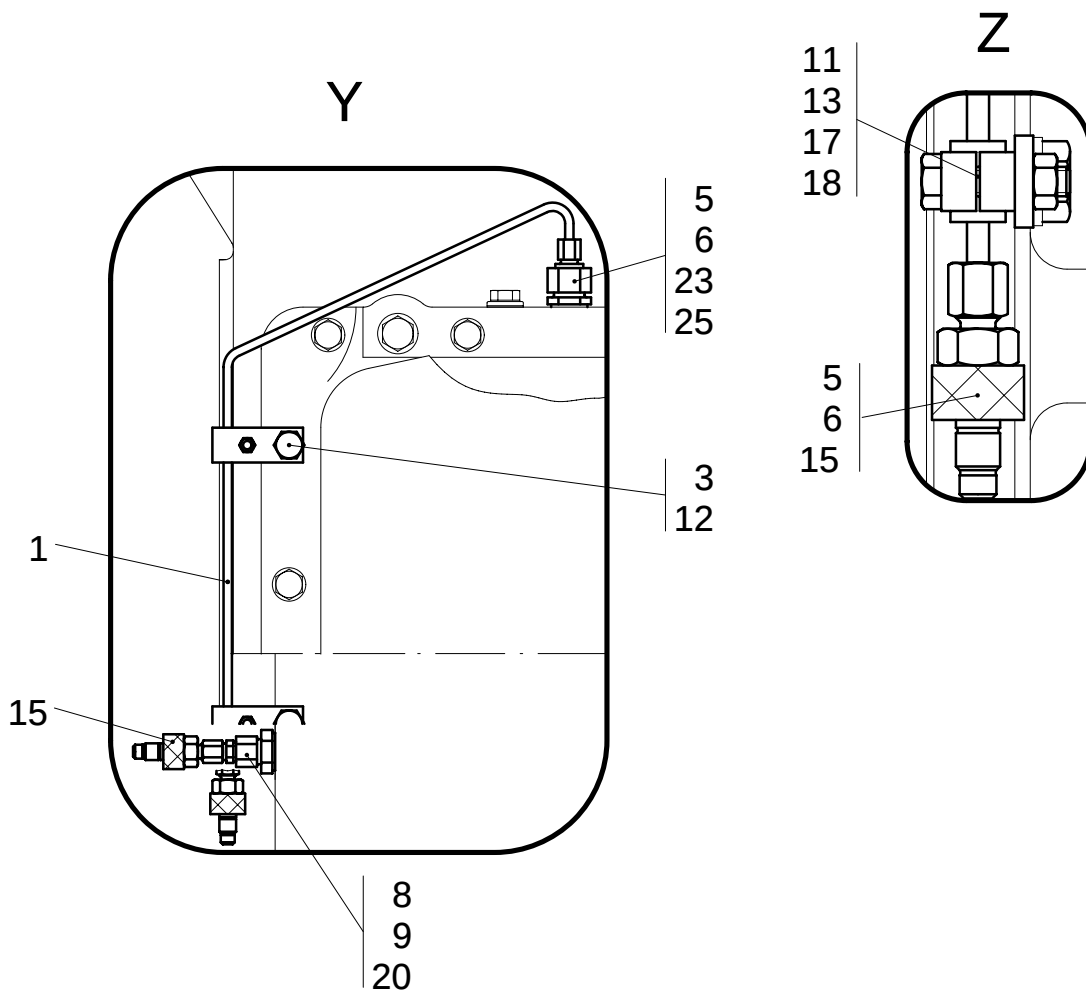
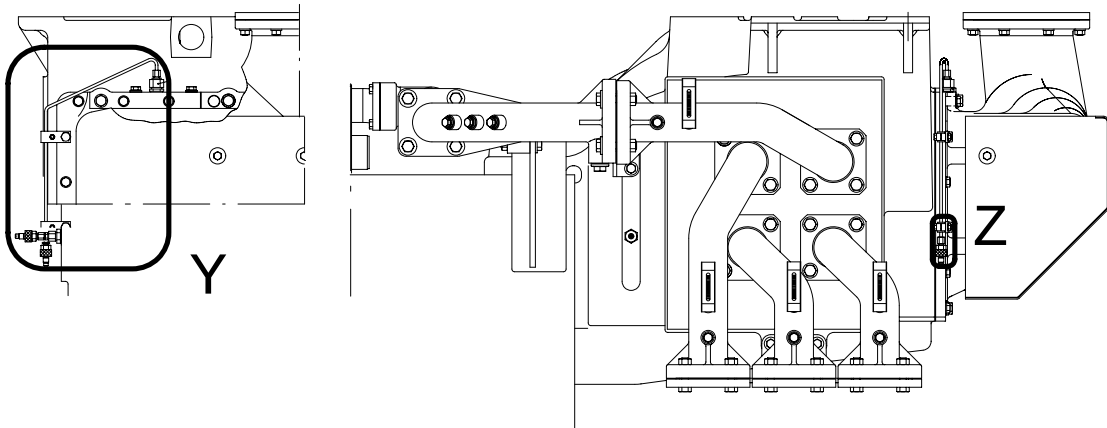
M25

Differential Pressure for Charge Air

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TRENNSTELLE, VOLLST. CONNECTING POINT ASSEMBLY	1	258629 BB
1	ROHRLEITUNG TUBE		1.9090-010
3	HALTER BRACKET	2	2.8629-003
5	ÜBERWURFMUTTER UNION NUT	2	1.5040-114
6	SCHNEIDRING CUTTING RING	2	1.5059-208
8	GEWINDEREDUZIERUNG REDUCER	1	1.5036-003
9	GEWINDEREDUZIERUNG REDUCER	1	1.4639-049
11	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-312
12	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-379
13	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034
15	VERSCHLUSSNIPPEL NIPPLE	2	1.7240-054
17	ROHRKLEMME PIPE CLAMP	4	1.5011-002
18	GUMMITÜLLE RUBBER SOCKET	2	1.5011-194
20	STUTZEN CONNECTION UNION	1	1.5096-862
23	STUTZEN UNION	1	1.5094-144
25	KONUS-REDUZIERANSCHLUß REDUCING UNION	1	1.5097-392

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**



Connecting Point

M25

Differential Pressure for Charge Air

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TRENNSTELLE, VOLLST. CONNECTING POINT ASSEMBLY	1	258629 CC
1	DRUCKTRANSMITTER PRESSURE TRANSMITTER	1	438629-021
4	SCHELLE CLAMP	1	258629-004
5	HALTER BRACKET	1	258629-005
8	HALTER BRACKET	4	2.8629-003
11	ROHR TUBE		1.9090-010
15	SCHNEIDRING CUTTING RING	4	1.5059-208
16	ÜBERWURFMUTTER UNION NUT	4	1.5040-114
19	GEWINDEREDUZIERUNG REDUCER	1	1.5036-003
20	GEWINDEREDUZIERUNG REDUCER	1	1.4639-049
23	STUTZEN UNION	3	1.5094-140
24	STUTZEN UNION	1	1.5094-144
27	KONUS-REDUZIERANSCHLUß REDUCING UNION	1	1.5097-392
30	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-309
31	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-311
35	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	1	1.1152-131
40	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	1	1.1152-141
45	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-379
46	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-380
50	SPANNSCHEIBE CONICAL SPRING WASHER	1	1.0068-222
53	GUMMITÜLLE RUBBER SOCKET	4	1.5011-194

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Connecting Point

M25

Differential Pressure for Charge Air

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
56	ROHRKLEMME PIPE CLAMP	5	1.5011-002
57	ROHRKLEMME PIPE CLAMP	3	1.5011-089
60	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034

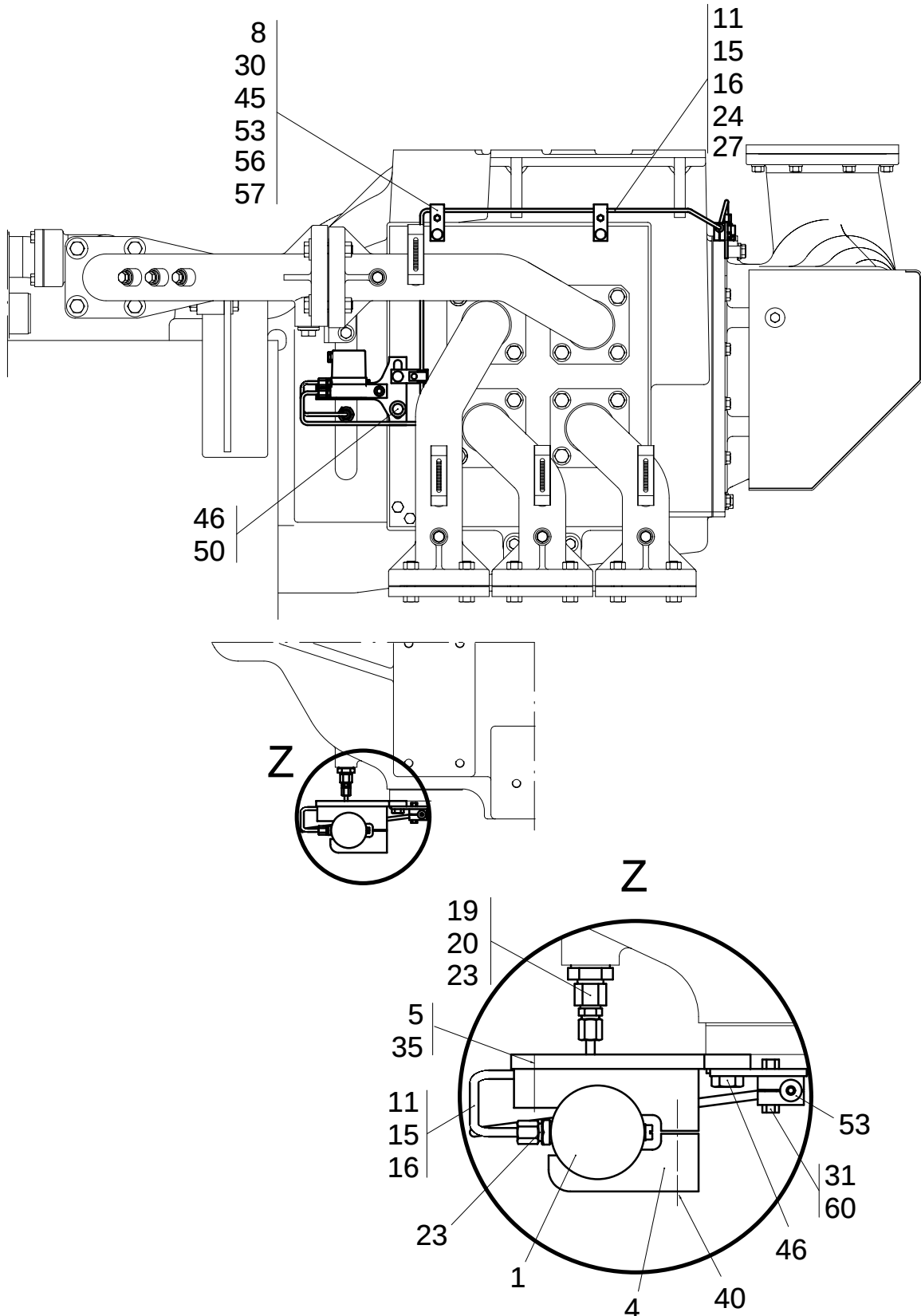
06

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

M25

Connecting Point
Differential Pressure for Charge Air

06



Connecting Point

M25

Turbocharger VRT-Control

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TRENNSTELLE, VOLLST. CONNECTING POINT ASSEMBLY	1	258650 AA
1	HALTER BRACKET	1	258650-001
3	VENTIL VALVE	1	258650-003
6	HALTER BRACKET	4	9.7259-002
9	ROHR TUBE		1.9090-010
14	ROHR TUBE		1.9090-018
19	ROHR TUBE		1.9090-046
23	G-SCHOTTSTUTZEN BULKHEAD UNION	3	1.5095-620
24	G-SCHOTTSTUTZEN BULKHEAD UNION	2	1.5095-624
27	KONTERMUTTER COUNTER HEXAGON NUT	3	1.2047-192
28	KONTERMUTTER COUNTER HEXAGON NUT	2	1.2047-197
31	STUTZEN UNION	3	1.5094-120
34	STUTZEN UNION	1	1.5094-122
35	GERADER VERBINDUNGSSTUTZEN PIPE UNION	1	1.5095-042
36	T-VERBINDUNGSSTUTZEN UNION TEE	1	1.5095-442
37	STUTZEN UNION	1	1.5094-270
38	SCHWENKVERSCHRAUBUNG BANJO	3	1.5093-727
41	STUTZEN UNION	2	1.5094-224
45	DICHTRING JOINT RING	# 3	1.7010-028
46	DICHTRING JOINT RING	# 1	1.7010-064
47	DICHTRING JOINT RING	# 2	1.7010-102

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Connecting Point
Turbocharger VRT-Control

M25

06

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
50	ROHRKLEMME PIPE CLAMP	2	1.5011-002
51	ROHRKLEMME PIPE CLAMP	16	1.5011-015
52	ROHRKLEMME PIPE CLAMP	2	1.5011-007
55	ROHRKLEMME PIPE CLAMP	6	1.5011-001
59	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	6	1.3088-006
60	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	8	1.3088-012
61	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	4	1.3088-017
64	SCHNEIDRING CUTTING RING	6	1.5059-084
65	SCHNEIDRING CUTTING RING	8	1.5059-086
66	SCHNEIDRING CUTTING RING	4	1.5059-068
69	ÜBERWURFMUTTER UNION NUT	6	1.5040-114
70	ÜBERWURFMUTTER UNION NUT	8	1.5040-116
71	ÜBERWURFMUTTER UNION NUT	4	1.5040-118
74	GUMMITÜLLE RUBBER SOCKET	7	1.5011-194
75	GUMMITÜLLE RUBBER SOCKET	8	1.5011-193
76	GUMMITÜLLE RUBBER SOCKET	1	1.5011-195
78	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-214
80	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-311
81	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-312
82	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-313
87	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-445

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Connecting Point

M25

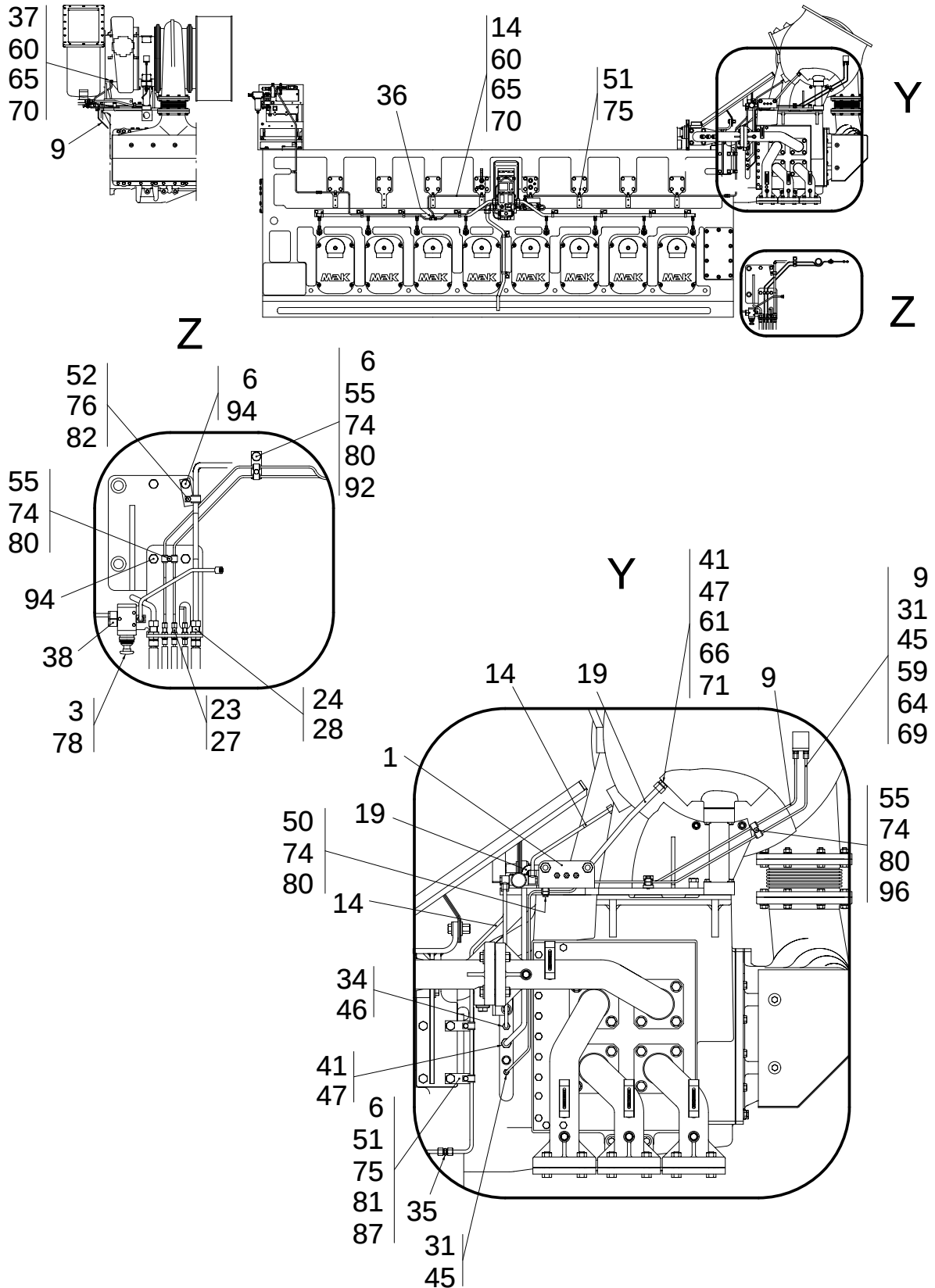
Turbocharger VRT-Control

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
92	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1372-373
94	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1367-375
96	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034

06

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**



Differential Pressure Gauge

M20-M601C

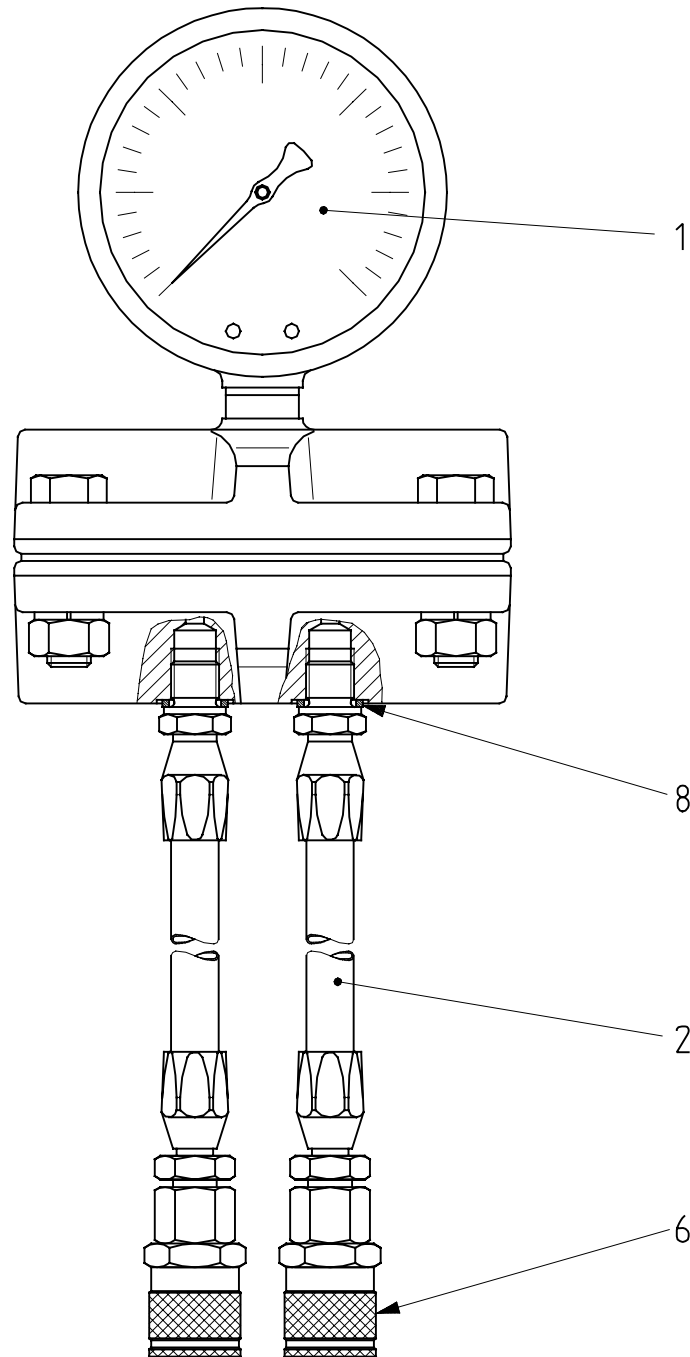
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
	DIFFERENZDRUCKMANOMETER, VOLLST. DIFFERENTIAL PRESSURE GAUGE ASSEMBLY	1	1.9284 AA	
1	DIFFERENZDRUCKMANOMETER, VOLLST. DIFFERENTIAL PRESSURE GAUGE, COMPL.	1	1.9284-1	
2	ELASTISCHE VERBINDUNG FLEXIBLE CONNECTION	2	1.8810-78	
6	VERSCHLUSSKUPPLUNG PLUG-IN COUPLING	2	1.9284-6	
8	DICHTRING JOINT RING	# 2	A14X18	DIN7603 CU

= VERBRAUCHSTEILE
CONSUMABLES

06

Differential Pressure Gauge

M20-M601C

06

Einspritzventil

M25

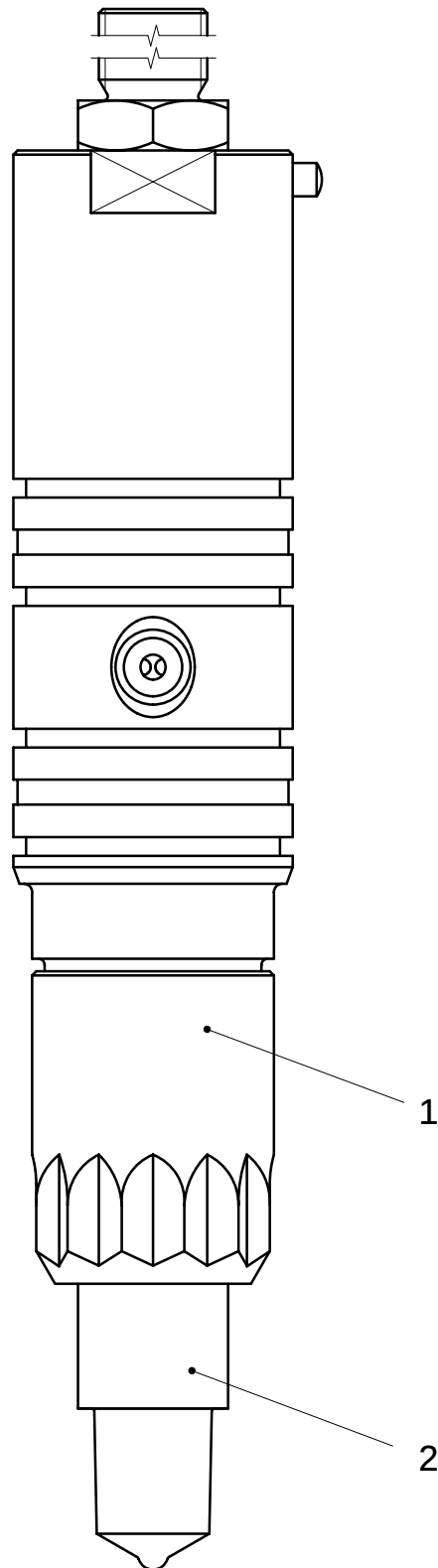
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	EINSPRITZVENTIL, VOLLST. FUEL INJECTOR ASSEMBLY	1	252260 AA
1	DÜSENHALTER, VOLLST. NOZZLE HOLDER, COMPL.	1	SIEHE B1.05.07.252267 SEE B1.05.07.252267
2	DÜSE NOZZLE ELEMENT	1	252260-002

07

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Einspritzventil

M25

07

Nozzle Holder

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DÜSENHALTER, VOLLST. NOZZLE HOLDER ASSEMBLY	1	252267 AA
3	DRUCKBOLZEN PRESSURE PIN	1	252267-003
4	DRUCKFEDER NOZZLE SPRING	1	252267-004
6	EINSTELLSCHRAUBE ADJUSTING SCREW	1	252267-006
7	DÜSENMUTTER NOZZLE NUT	1	252267-007
8	GEWINDEBUCHSE THREADED BUSH	1	252267-008
9	VERSCHLUSSSCHRAUBE LOCKING BOLT	1	252267-009
10	DICHTRING JOINT RING	# 1	252267-010
11	ZYLINDERSTIFT PARALLEL PIN	1	252267-011
51	ZYLINDERSTIFT PARALLEL PIN	2	252267-051

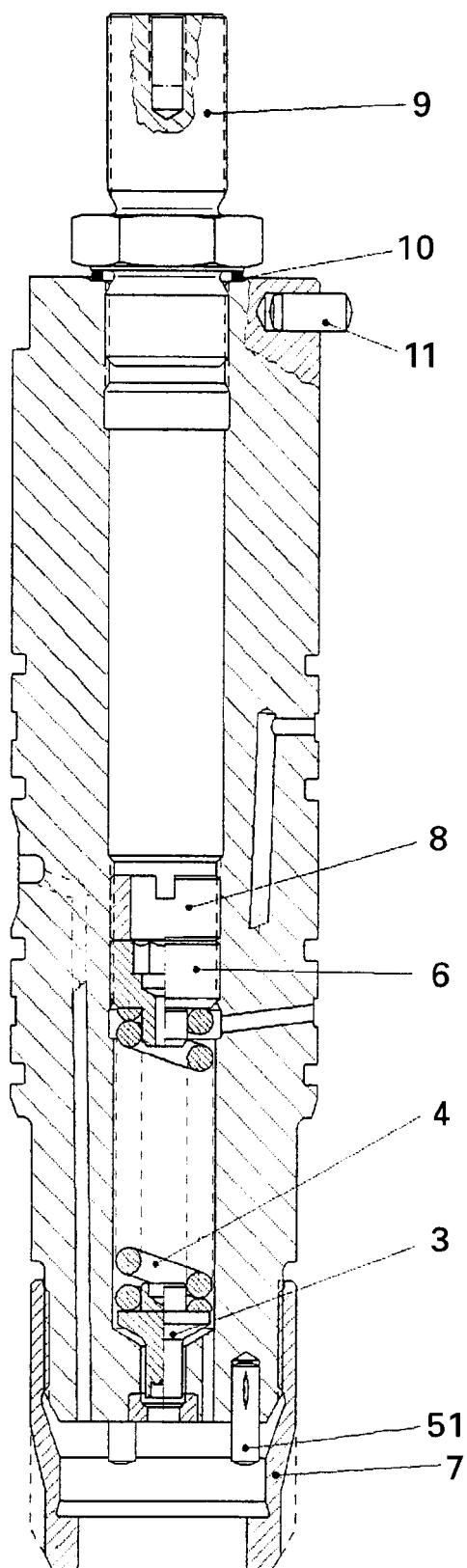
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Nozzle Holder

M25

07



Nozzle Holder

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DÜSENHALTER, VOLLST. NOZZLE HOLDER ASSEMBLY	1	252267 BB
2	ZWISCHENSCHIBE INTERMEDIATE DISK	1	252267-002
3	DRUCKBOLZEN PRESSURE PIN	1	252267-003
4	DRUCKFEDER NOZZLE SPRING	1	252267-004
6	EINSTELLSCHRAUBE ADJUSTING SCREW	1	252267-006
7	DÜSENMUTTER NOZZLE NUT	1	252267-107
8	GEWINDEBUCHSE THREADED BUSH	1	252267-008
9	VERSCHLUSSSCHRAUBE LOCKING BOLT	1	252267-009
10	DICHTRING JOINT RING	# 1	252267-010
11	ZYLINDERSTIFT PARALLEL PIN	1	252267-011
51	ZYLINDERSTIFT PARALLEL PIN	4	252267-051

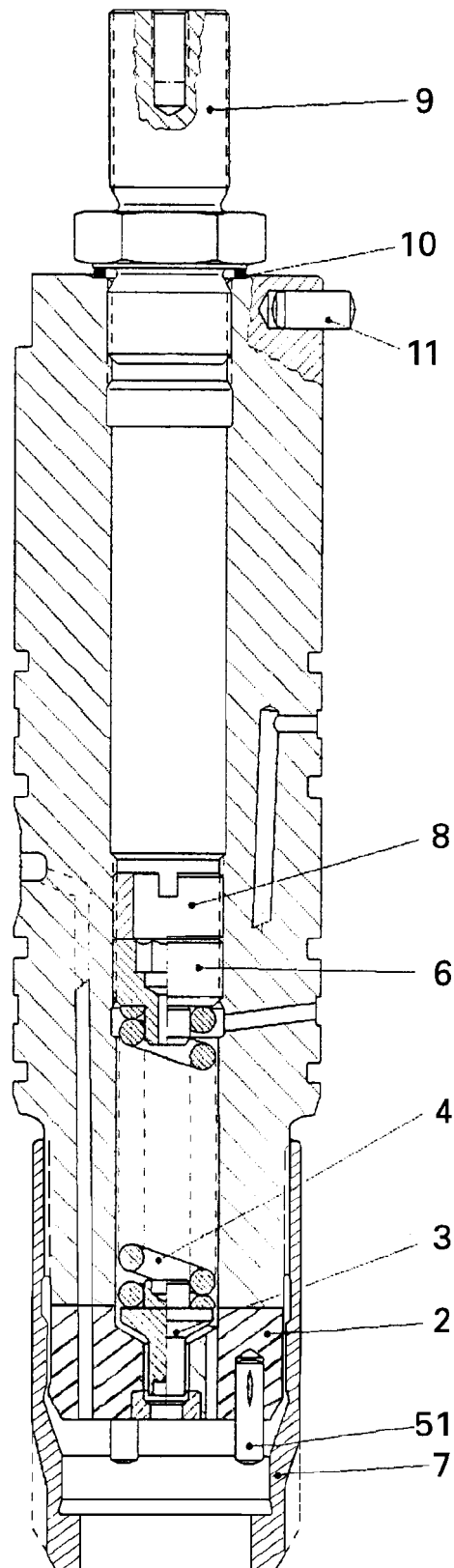
=VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Nozzle Holder

M25

07



Fuel Injection Pump

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	EINSPRITZPUMPE, VOLLST. FUEL INJECTION PUMP ASSEMBLY	1	253597 AA
8	ZEIGER RACK POINTER	1	1.3597-030
9	SENKSCHRAUBE COUNTERSUNK HEAD SCREW	1	253597-009
10	SCHEIBE WASHER	2	1.3597-029
11	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	5	253597-011
12	PRALLSCHRAUBE BAFFLE SCREW	2	1.3597-362
13	DICHTRING JOINT RING	# 2	253597-013
34	ZWISCHENFLANSCH INTERMEDIATE FLANGE	1	253597-034
35	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	4	253597-035
39	O-RING O-RING	# 3	253597-039
40	FÜHRUNGSBOLZEN GUIDE BOLT	1	253597-040
41	FEDERTELLER SPRING PLATE	1	253597-041
46	O-RING O-RING	# 1	253597-046
47	ABSTREIFRING SCRAPPER RING	1	253597-047
60	DRUCKFEDER COMPRESSION SPRING	1	253597-060
61	FEDERTELLER SPRING PLATE	1	253597-061
70	REGELSTANGE CONTROL RACK	# 1	253597-070
71	SCHRAUBE SCREW	1	1.3597-271
73	REGELHÜLSE CONTROL SLEEVE	1	253597-073
74	ABSTREIFRING SCRAPPER RING	1	253597-074

07

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Fuel Injection Pump

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
100	PUMPENELEMENT, VOLLST. (TEILESATZ) PUMP ELEMENT, COMPL. (SET OF PARTS)	1	253597-900
101	DICHTRING JOINT RING	* 1	253597-051
102	O-RING O-RING	* 1	253597-052
103	O-RING O-RING	* 1	253597-053
104	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	* 4	253597-095
105	VENTILKÖRPER VALVE BODY	* 1	
106	DRUCKFEDER COMPRESSION SPRING	* 1	
107	VENTILKEGEL VALVE STEM	* 1	
108	DRUCKFEDER COMPRESSION SPRING	* 1	
109	DRUCKSTÜCK RAM	* 1	
110	FLANSCH FLANGE	* 1	

* = IM PUMPENELEMENT, VOLLST. (TEILESATZ) ENTHALTEN
INCLUDED IN PUMP ELEMENT, COMPL. (SET OF PARTS)

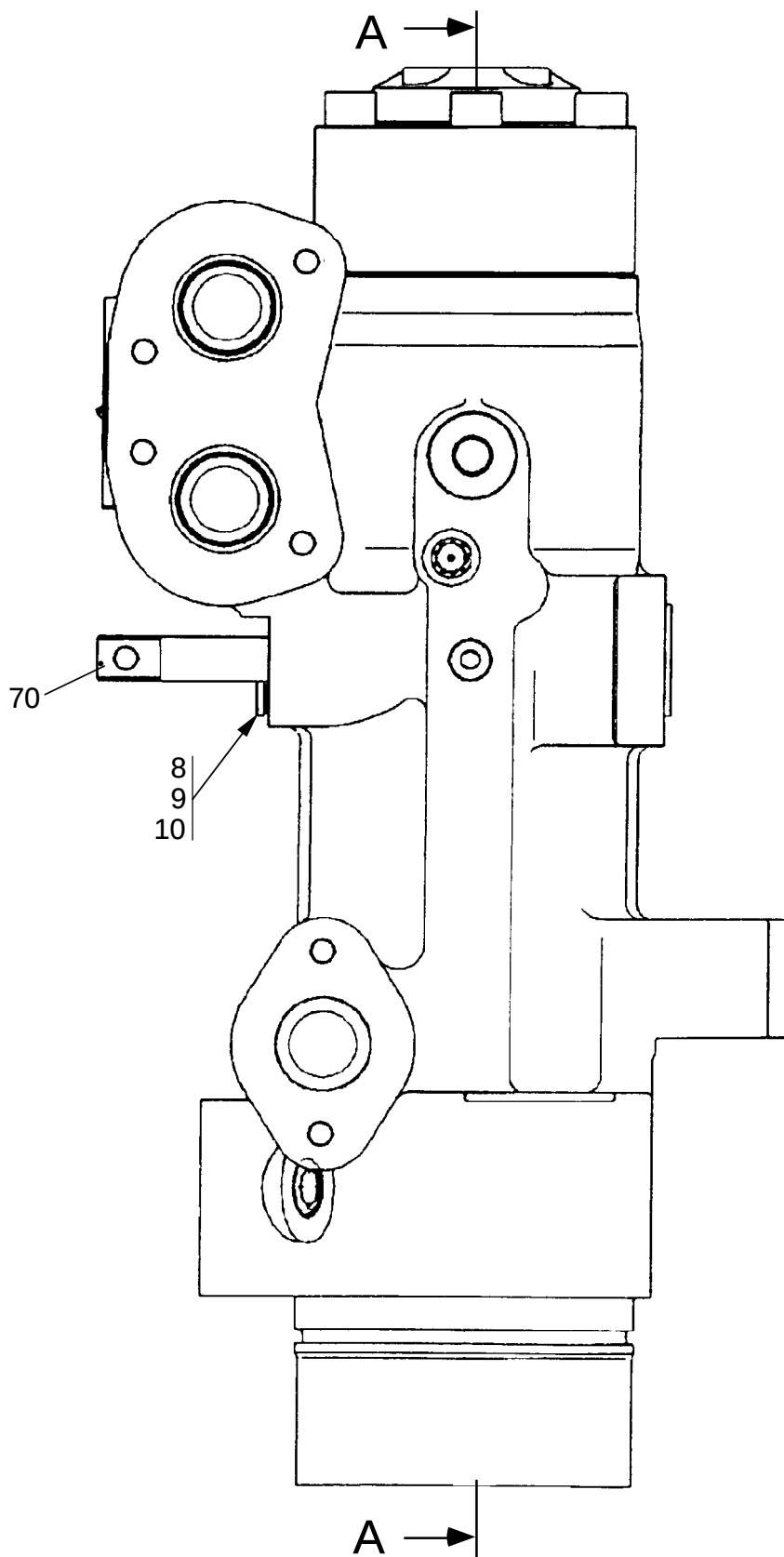
= VERBRAUCHSTEILE
CONSUMABLES

07

Fuel Injection Pump

M25

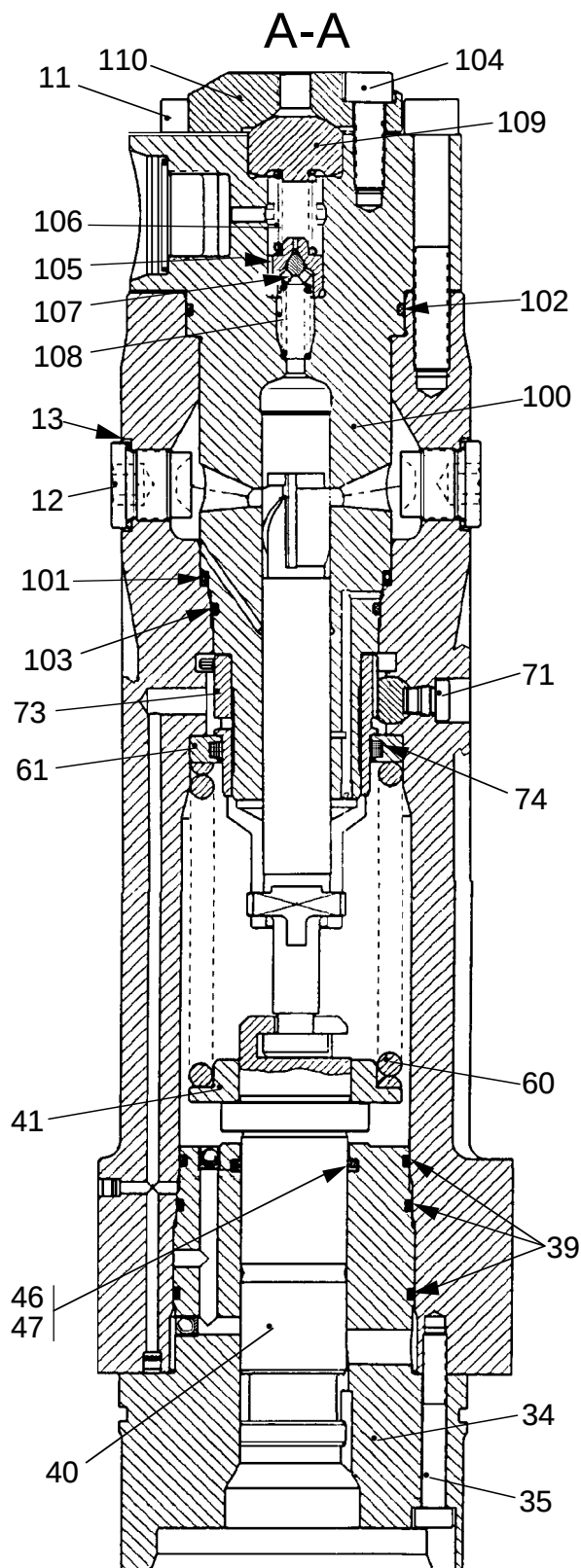
07



Fuel Injection Pump

M25

07



Fuel Injection Pump

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	EINSPRITZPUMPE, VOLLST. FUEL INJECTION PUMP ASSEMBLY	1	253597 BB
8	ZEIGER RACK POINTER	1	1.3597-030
9	SENKSCHRAUBE COUNTERSUNK HEAD SCREW	1	253597-009
10	SCHEIBE WASHER	2	1.3597-029
11	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	5	253597-011
12	PRALLSCHRAUBE BAFFLE SCREW	2	1.3597-362
13	DICHTRING JOINT RING	# 2	253597-013
34	ZWISCHENFLANSCH INTERMEDIATE FLANGE	1	253597-034
35	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	4	253597-035
39	O-RING O-RING	# 3	253597-039
40	FÜHRUNGSBOLZEN GUIDE BOLT	1	253597-040
41	FEDERTELLER SPRING PLATE	1	253597-041
46	O-RING O-RING	# 1	253597-046
47	ABSTREIFRING SCRAPPER RING	1	253597-047
60	DRUCKFEDER COMPRESSION SPRING	1	253597-060
61	FEDERTELLER SPRING PLATE	1	253597-061
70	REGELSTANGE CONTROL RACK	# 1	253597-070
71	SCHRAUBE SCREW	1	1.3597-271
73	REGELHÜLSE CONTROL SLEEVE	1	253597-073
74	ABSTREIFRING SCRAPPER RING	1	253597-074

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Fuel Injection Pump

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
100	PUMPENELEMENT, VOLLST. (TEILESATZ) PUMP ELEMENT, COMPL. (SET OF PARTS)	1	253597-800
101	DICHTRING JOINT RING	* 1	253597-051
102	O-RING O-RING	* 1	253597-052
103	O-RING O-RING	* 1	253597-053
104	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	* 4	253597-095
105	VENTILKÖRPER VALVE BODY	* 1	
106	DRUCKFEDER COMPRESSION SPRING	* 1	
107	VENTILKEGEL VALVE STEM	* 1	
108	DRUCKFEDER COMPRESSION SPRING	* 1	
109	DRUCKSTÜCK RAM	* 1	
110	FLANSCH FLANGE	* 1	

* = IM PUMPENELEMENT, VOLLST. (TEILESATZ) ENTHALTEN
INCLUDED IN PUMP ELEMENT, COMPL. (SET OF PARTS)

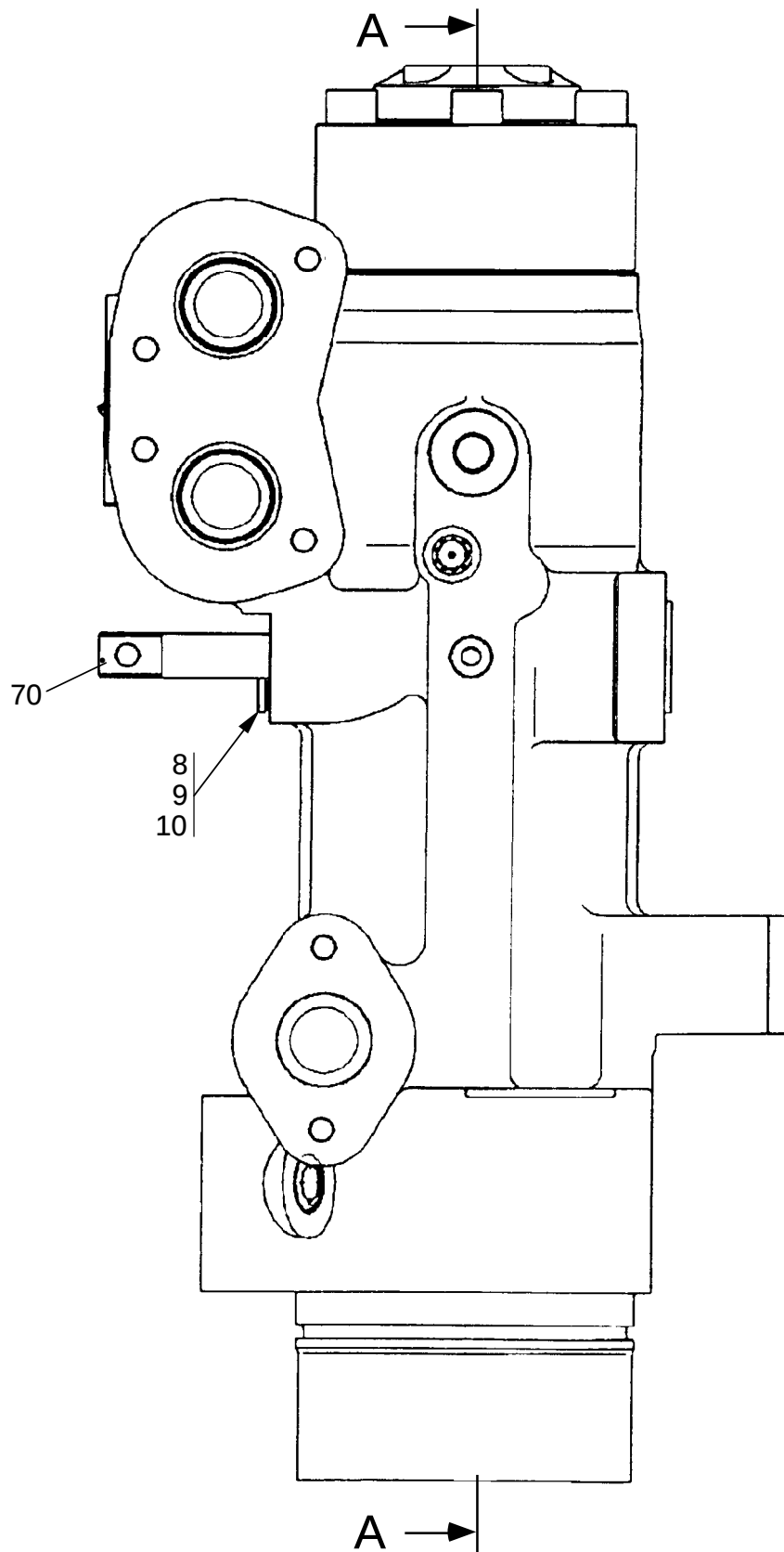
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Fuel Injection Pump

M25

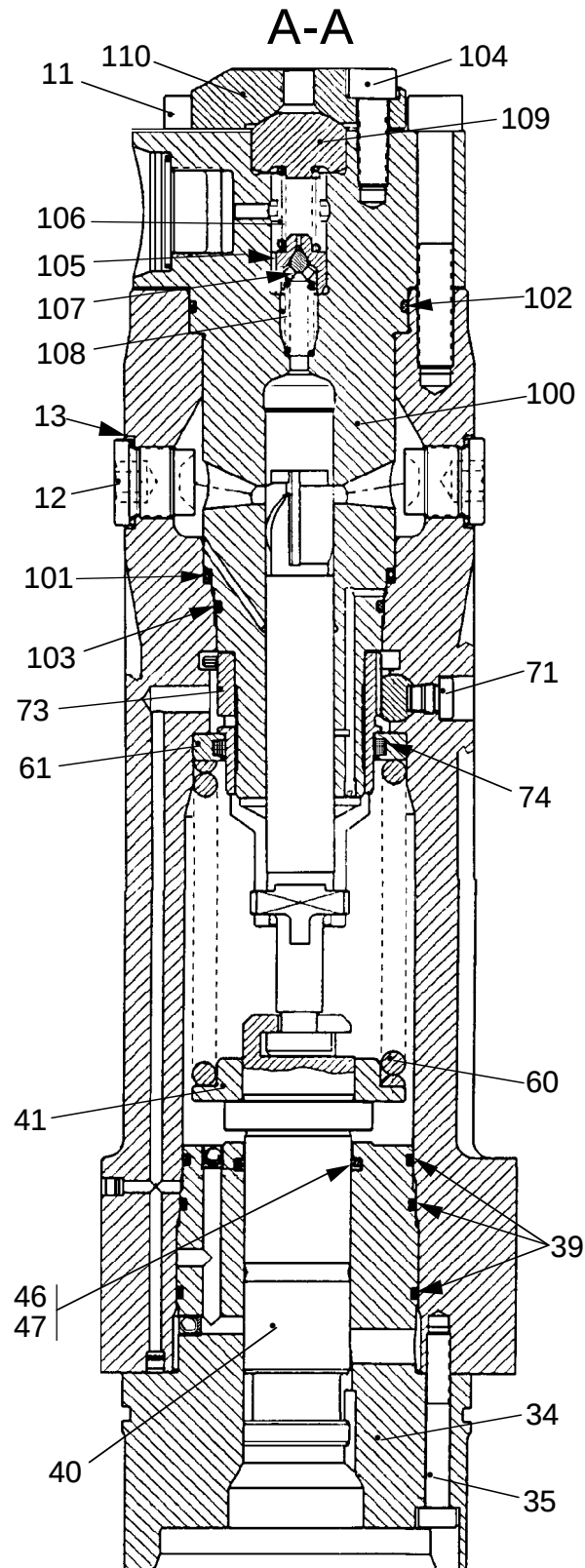
07



Fuel Injection Pump

M25

07



Fuel Transfer Pump Mounting

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	FÖRDERPUMPEN-ANBAU, VOLLST. FUEL TRANSFER PUMP MOUNTING ASSEMBLY	1	256480 AA
2	KUPPLUNG, VOLLST. COUPLING, COMPL.	1	9.6480-002
3	ZAHNRADPUMPE, VOLLST. GEAR PUMP, COMPL.	1	SIEHE B1.05.07.9.6487 SEE B1.05.07.9.6487
5	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-307
6	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-444
8	O-RING O-RING	# 1	1.7084-636
9	PASSFEDER PARALLEL KEY	1	1.0080-489
100	ANTRIEB, VOLLST. DRIVE, COMPL.	* 1	256480-100
101	ANTRIEBSGEHÄUSE DRIVE HOUSING	1	9.6480-101
102	ANTRIEBSWELLE DRIVING SHAFT	1	9.6480-102
103	DECKEL COVER	1	9.6480-103
104	ZAHNRAD GEARWHEEL	1	256480-104
105	SCHEIBE WASHER	1	9.6410-008
107	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-309
108	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-382
109	BUCHSE BUSH	2	9.6480-109
110	WELLENDICHTRING SHAFT SEALING	1	1.7003-081

* = IN B1.05.07.256480 AA ENTHALTEN
INCLUDED IN B1.05.07.256480 AA

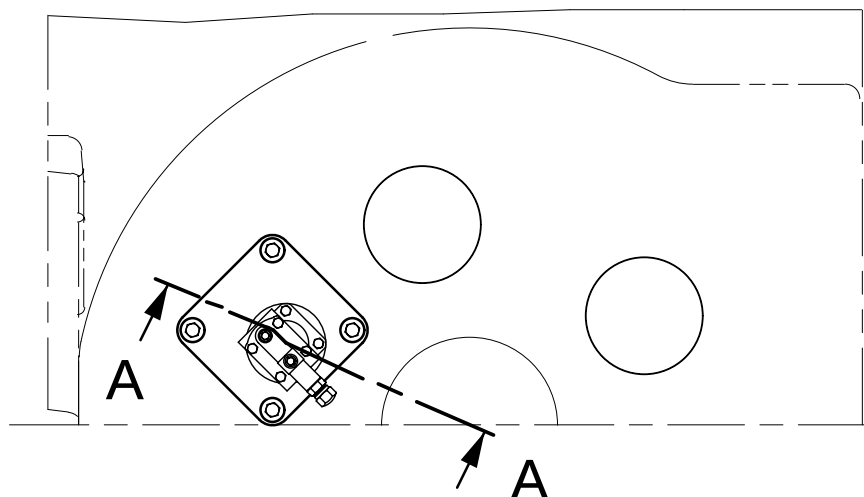
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

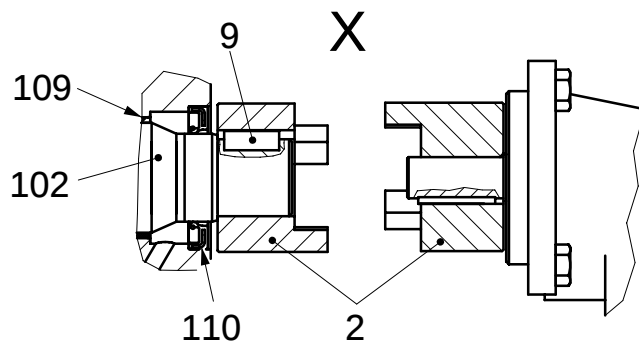
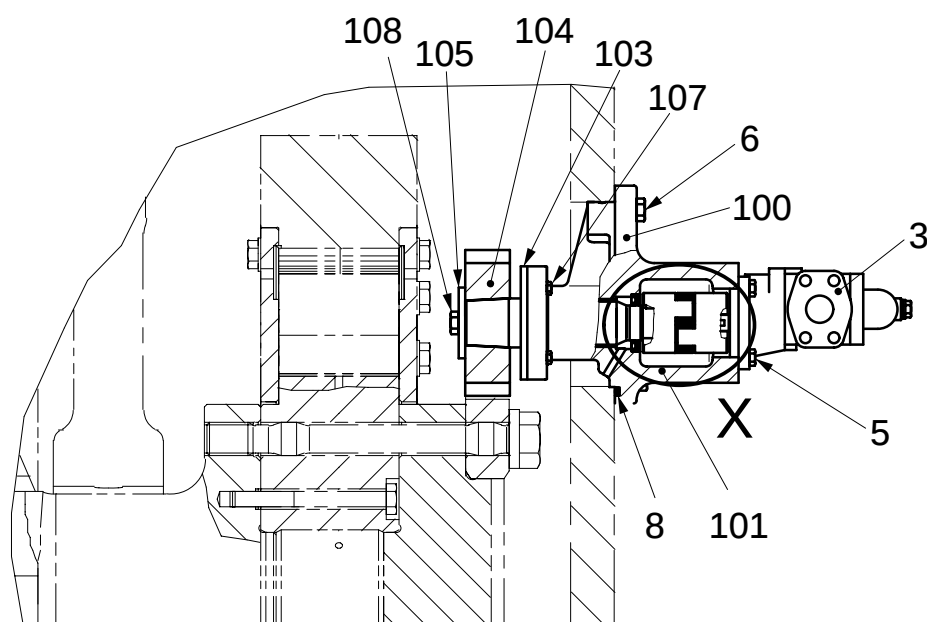
Fuel Transfer Pump Mounting

M25

07



A-A



Cover Mounting

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DECKEL-ANBAU, VOLLST. COVER MOUNTING ASSEMBLY	1	256485 AA
1	DECKEL COVER	1	9.6485-001
2	O-RING O-RING	# 1	1.7084-636
4	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-444

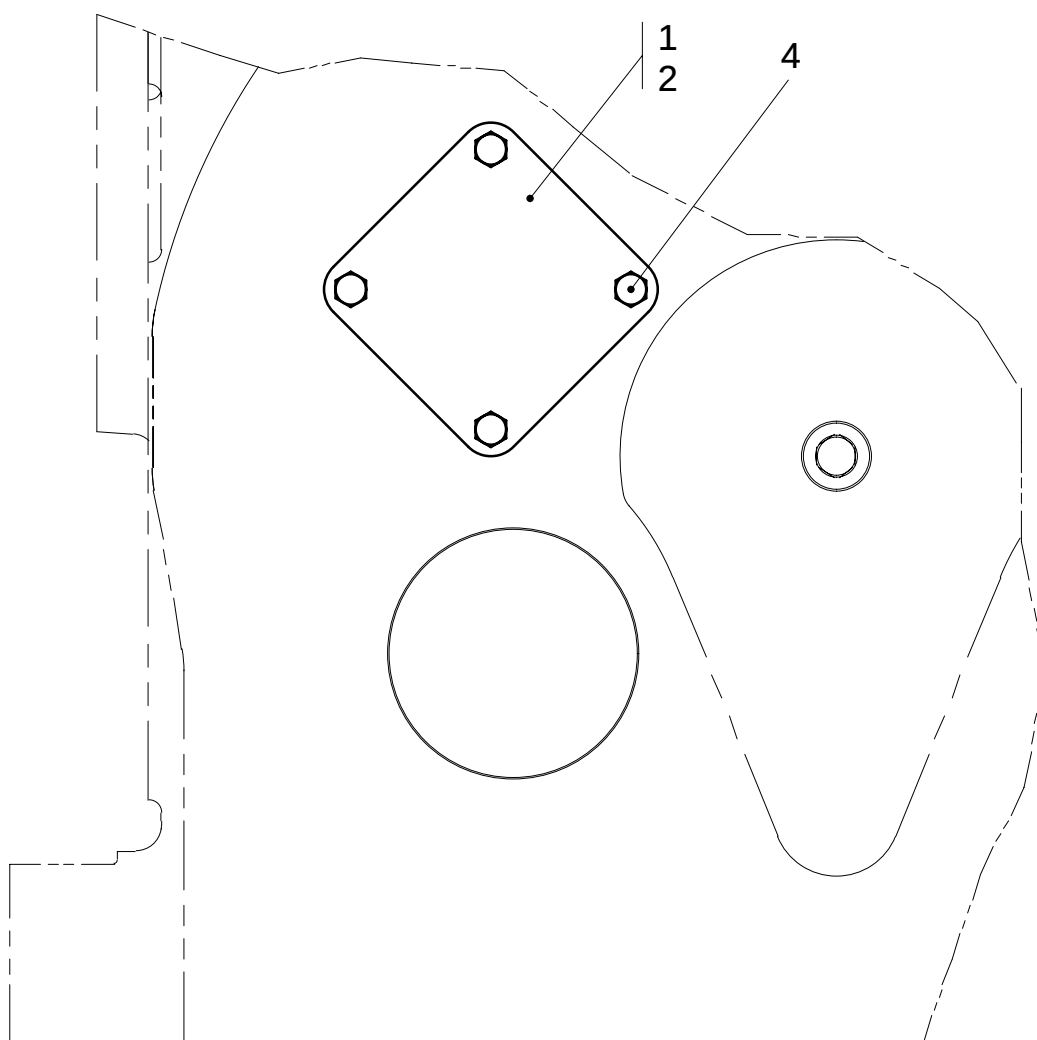
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cover Mounting

M25

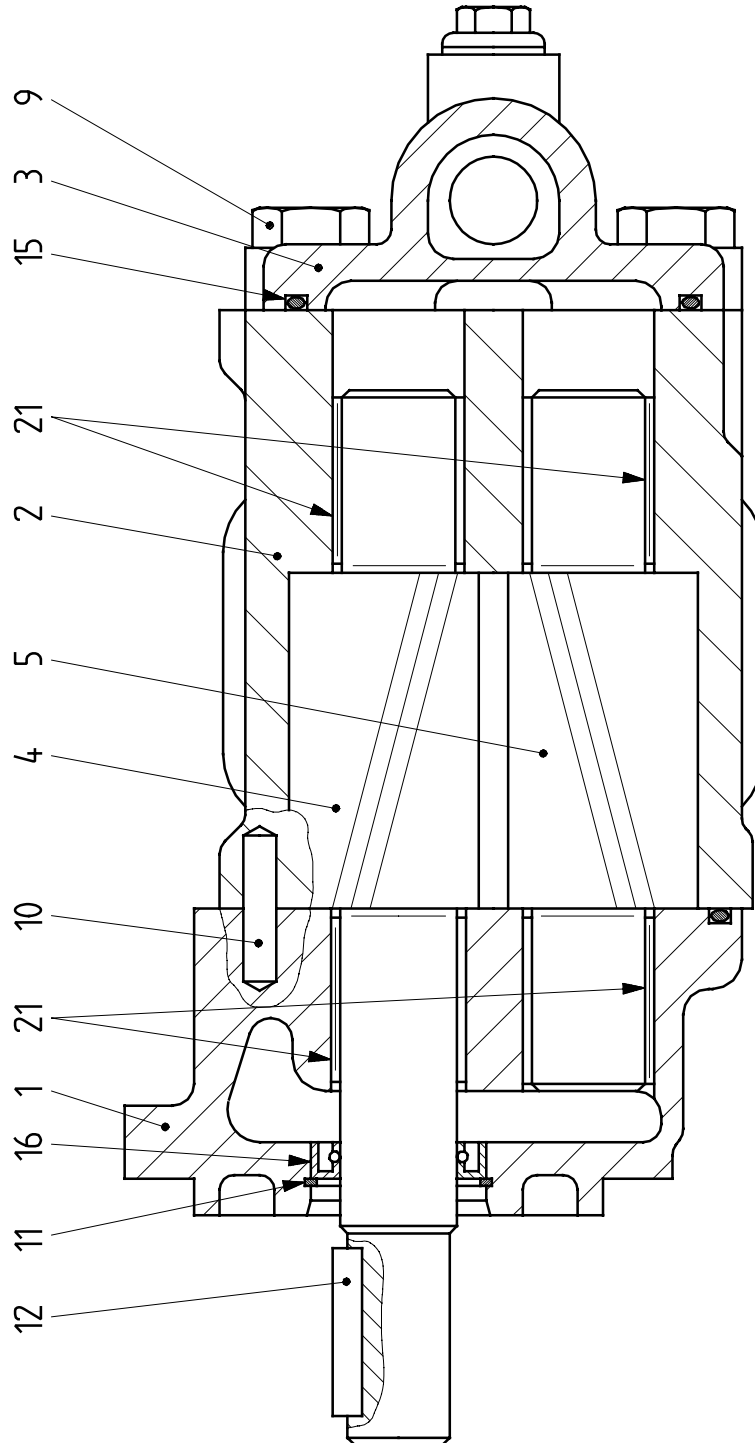
07



POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFPUMPE, VOLLST. FUEL FEED PUMP ASSEMBLY	1	256487 AA
1	ANTRIEBSDECKEL DRIVE END COVER	1	256487-001
2	RÄDERGEHÄUSE GEAR CASING	1	256487-002
3	DRUCKBEGRENZUNGSVENTIL PRESSURE ADJUSTING VALVE	1	2.6487-105
4	ANTRIEBSRADWELLE POWER ROTOR SHAFT	1	9.6487-004
5	LAUFRADACHSE IMPELLER AXLE	1	9.6487-005
9	SECHSKANTSCHRAUBE HEXAGON SCREW	4	256487-009
10	ZYLINDERSTIFT PARALLEL PIN	2	1.0026-130
11	SICHERUNGSRING CIRCLIP	# 1	1.0061-068
12	PASSFEDER PARALLEL KEY	1	256487-012
15	O-RING O-RING	# 2	2.6487-015
16	WELLENDICHTRING SHAFT SEAL	# 1	2.6487-016
21	LAGERBUCHSE BEARING BUSH	4	2.6487-021

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**



Fuel Feed Pump

M25/M32

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.	
-	KRAFTSTOFFPUMPE, VOLLST. FUEL FEED PUMP ASSEMBLY	1	9.6487 AA		
1	ANTRIEBSDECKEL DRIVE END COVER	1	2.6487-1		
2	RÄDERGEHÄUSE GEAR CASING	1	9.6487-2		
3	SCHLUßDECKEL END COVER	1	2.6487-105		
4	ANTRIEBSRADWELLE POWER ROTOR SHAFT	1	9.6487-4		
5	LAUFRADACHSE IMPELLER AXLE	1	9.6487-5		
9	SECHSKANTSCHRAUBE HEXAGON SCREW	4	M6X100	DIN931	8.8
10	ZYLINDERSTIFT PARALLEL PIN	2	5M6X20	DIN7	
11	SICHERUNGSRING CIRCLIP	# 1	28X1,2	DIN472	
12	PASSFEDER PARALLEL KEY	1	A5X5X28	DIN6885	
15	O-RING O-RING	# 2	2.6487-115		
16	WELLENDICHTRING SHAFT SEAL	# 1	2.6487-116		
21	LAGERBUCHSE BEARING BUSH	4	2.6487-21		

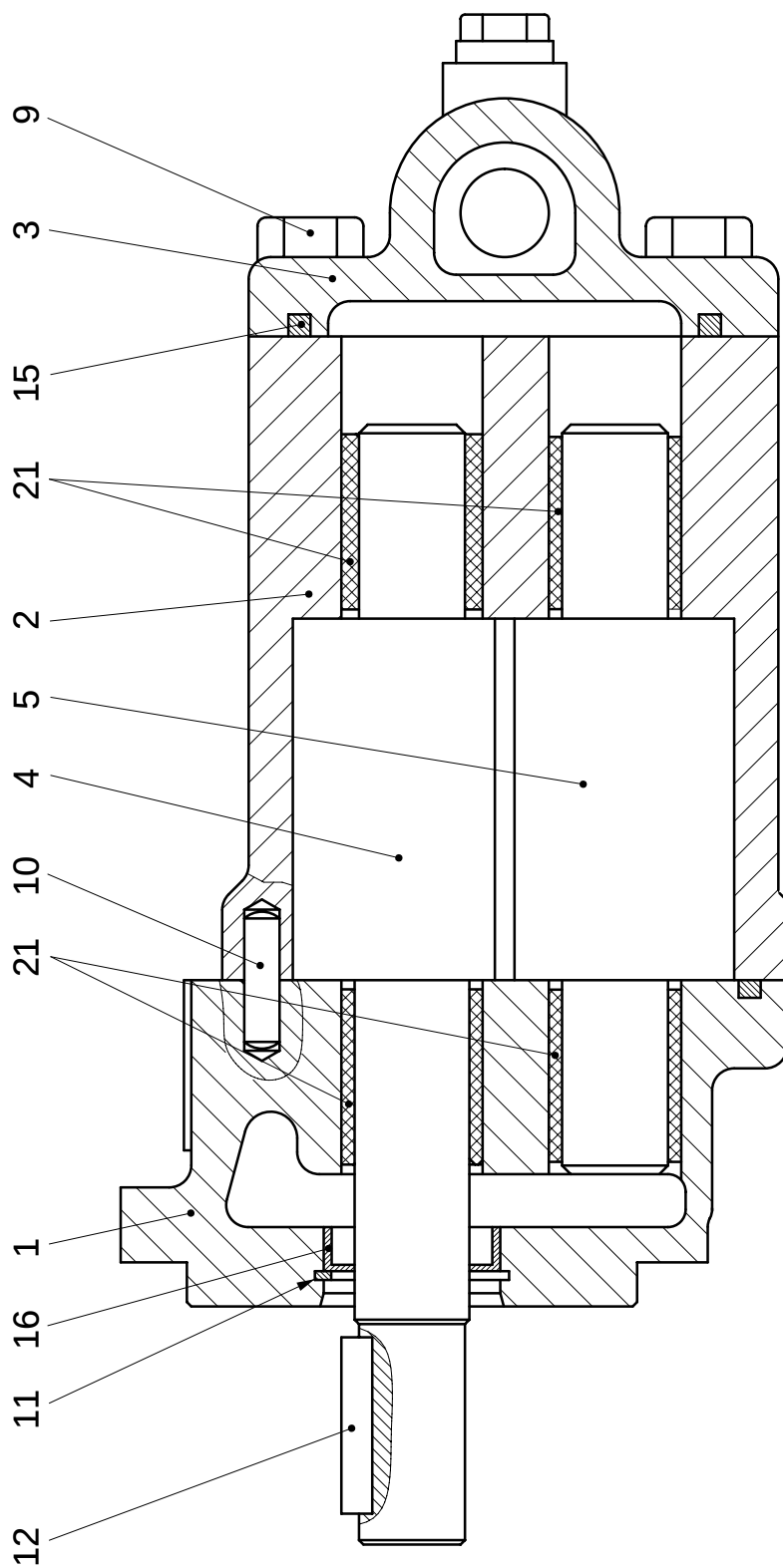
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Fuel Feed Pump

M25/M32

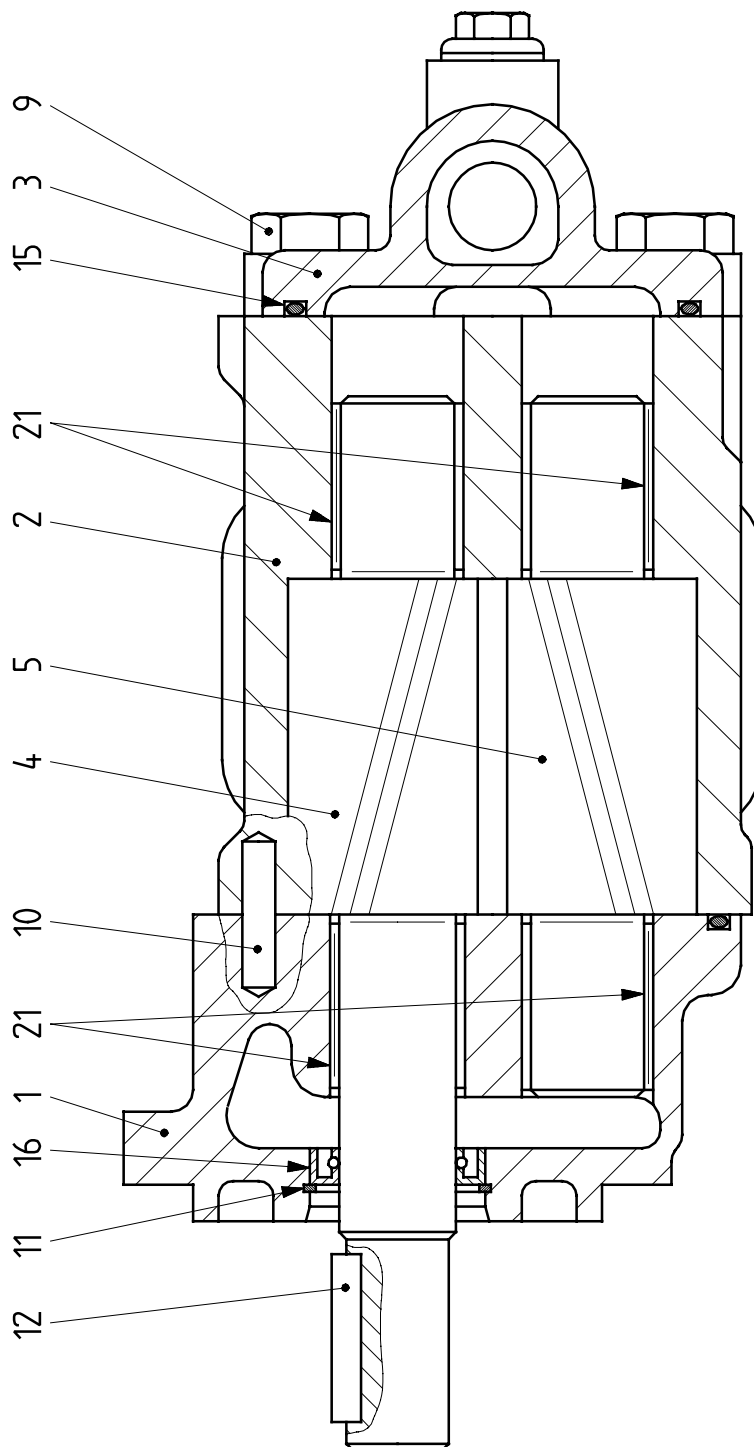
07



POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFPUMPE, VOLLST. FUEL FEED PUMP ASSEMBLY	1	256487 BB
1	ANTRIEBSDECKEL DRIVE END COVER	1	256487-001
2	RÄDERGEHÄUSE GEAR CASING	1	256487-002
3	DRUCKBEGRENZUNGSVENTIL PRESSURE ADJUSTING VALVE	1	2.6487-105
4	ANTRIEBSRADWELLE POWER ROTOR SHAFT	1	9.6487-004
5	LAUFRADACHSE IMPELLER AXLE	1	9.6487-005
9	SECHSKANTSCHRAUBE HEXAGON SCREW	4	256487-009
10	ZYLINDERSTIFT PARALLEL PIN	2	1.0026-130
11	SICHERUNGSRING CIRCLIP	# 1	1.0061-068
12	PASSFEDER PARALLEL KEY	1	256487-012
15	O-RING O-RING	# 2	2.6487-015
16	WELLENDICHTRING SHAFT SEAL	# 1	2.6487-016
21	LAGERBUCHSE BEARING BUSH	4	2.6487-021

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**



Fuel Filter Mounting

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFFILTER-ANBAU, VOLLST. FUEL FILTER MOUNTING, ASSEMBLY	1	257660 AA
1	KRAFTSTOFFFILTER FUEL FILTER	1	SIEHE B1.05.07.n.7667 SEE B1.05.07.n.7667
3	ZWISCHENSTÜCK INTERMEDIATE PIECE	1	9.7660-003
5	DICHTUNG GASKET	# 2	1.7073-731
6	DICHTRING JOINT RING	# 3	1.7010-133
7	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1372-322
9	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	3	1.1041-609
10	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-038
11	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-036

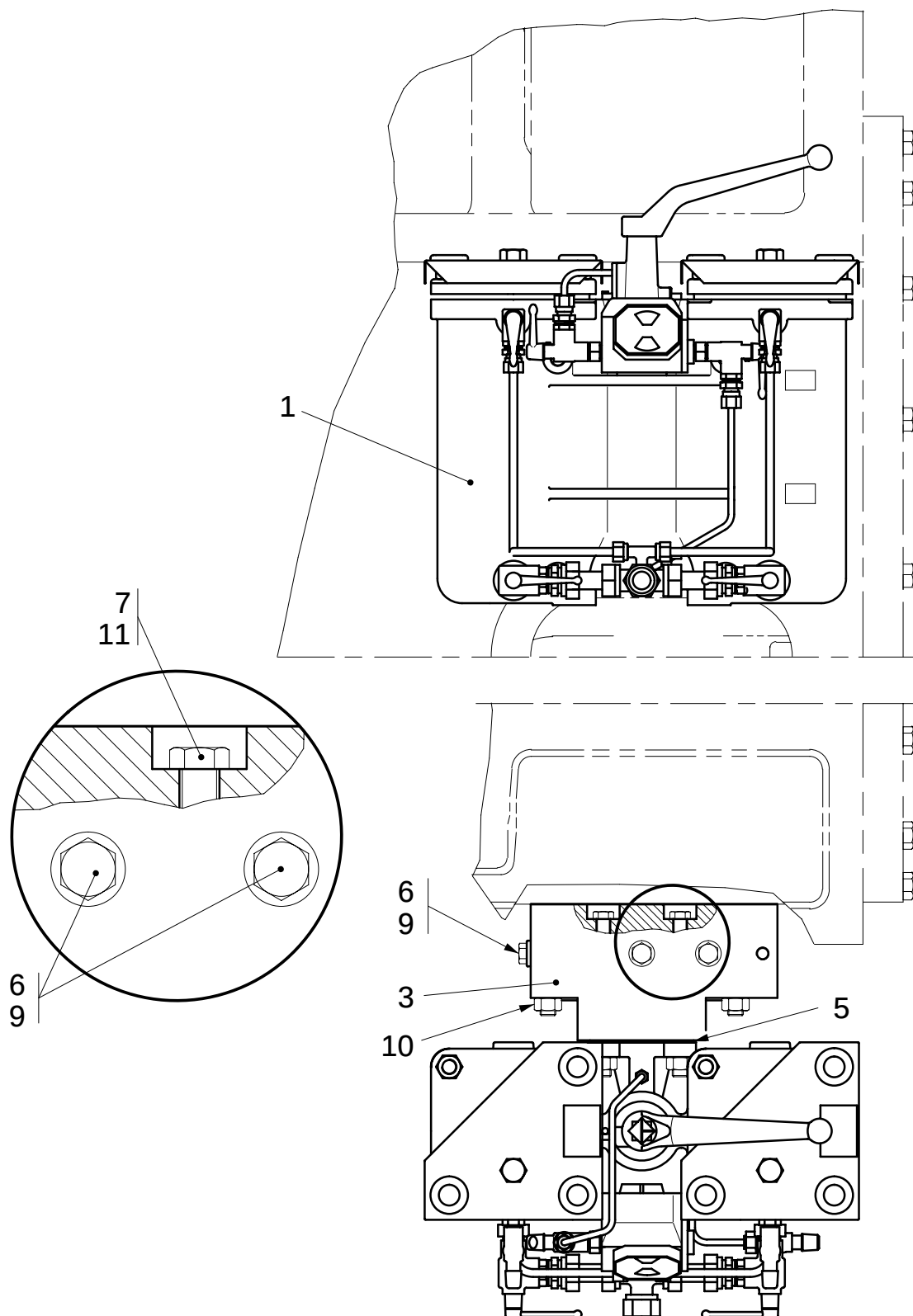
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Fuel Filter Mounting

M25

07



Fuel Filter Mounting

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFFILTER-ANBAU, VOLLST. FUEL FILTER MOUNTING, ASSEMBLY	1	257660 BB
1	KRAFTSTOFFFILTER FUEL FILTER	1	SIEHE B1.05.07.n.7667 SEE B1.05.07.n.7667
3	ZWISCHENSTÜCK INTERMEDIATE PIECE	1	9.7660-003
5	DICHTUNG GASKET	# 2	1.7073-731
6	DICHTRING JOINT RING	# 3	1.7010-133
7	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1372-322
9	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	3	1.1041-609
10	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-038
11	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-036

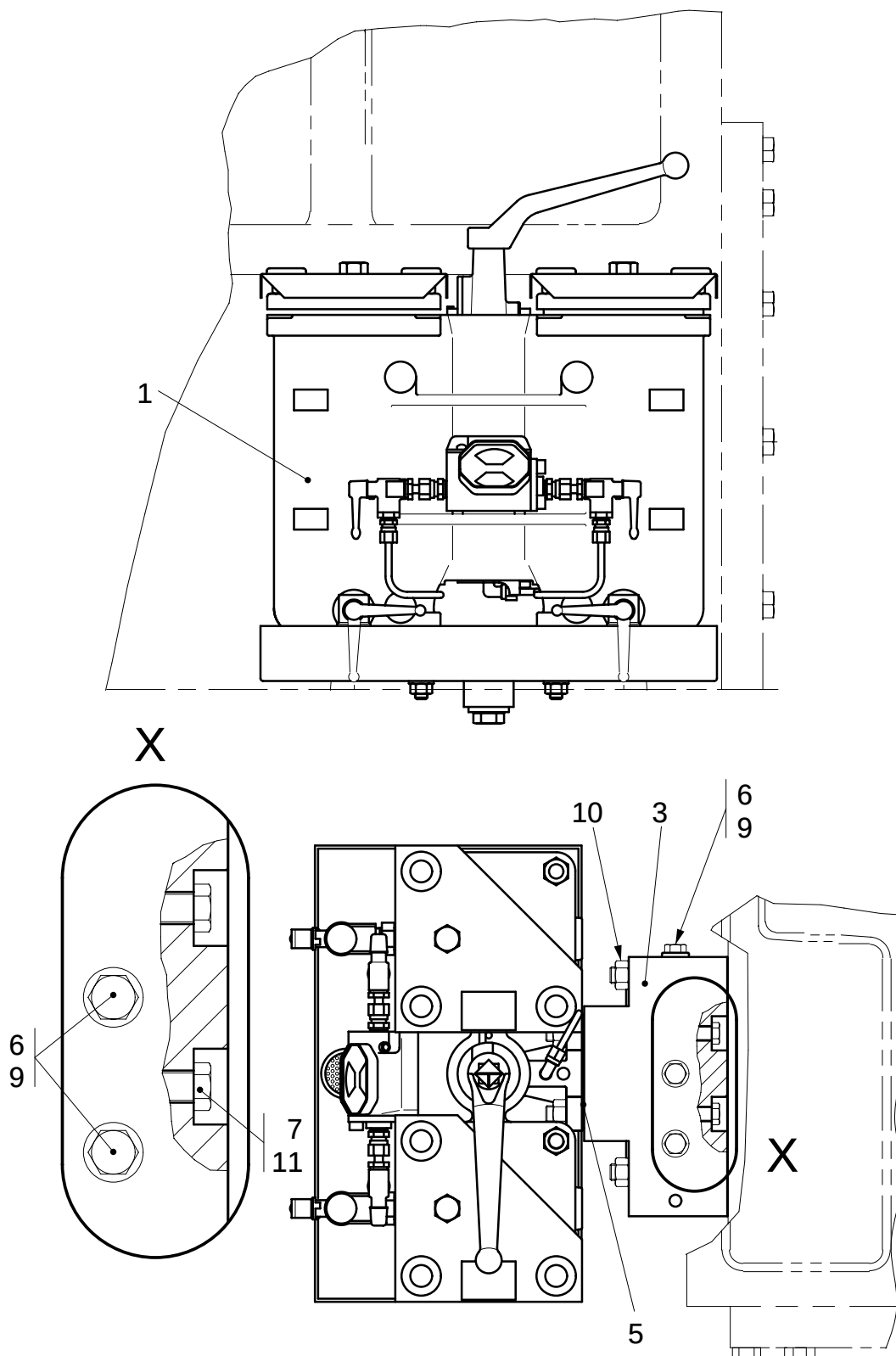
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Fuel Filter Mounting

M25

07



Duplex Fuel Fine Filter

M25/M32

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
-	KRAFTSTOFF-FEINFILTER, VOLLST. DUPLEX FUEL FINE FILTER ASSEMBLY	1	9.7667 AA	
1	GEHÄUSE HOUSING	1	1.7667-201	
2	GEWINDESTOPFEN THREADED PLUG	2	1.7667-102	
3	VERSCHLUSSSCHRAUBE SCREW PLUG	2	1.7667-211	
4	DICHTRING JOINT RING	# 2	2.7667-4	
6	HOCHDRUCKDICHTUNG GASKET	# 2	1.7667-215	
7	DECKELSICHERUNG COVERSECURING	2	1.7667-7	
9	STIFTSCHRAUBE STUD	8	1.7667-206	
10	SECHSKANTMUTTER HEXAGON NUT	8	2.7657-9	
11	DECKEL COVER	2	1.7676-11	
17	MANTELSIEBEINSATZ FILTER ELEMENT	2	1.7667-17	
18	ANKER STUD	2	2.7667-18	
19	SECHSKANTMUTTER HEXAGON NUT	2	2.7657-13	
23	KÜKEN COCK PLUG	1	1.7667-203	
24	RUNDSCHNURRING O-RING	# 2	1.7667-219	
25	SPANNHÜLSE SPRING DOWEL	1	1.7667-214	
26	SPANNHÜLSE SPRING DOWEL	1	1.7668-214	
27	ZYLINDERKERBSTIFT CYLINDRICAL SPLINED PIN	1	1.7667-27	
28	SCHLÜSSEL COCK HANDLE	1	1.7667-28	
45	DIFFERENZDRUCKANZEIGER DIFFERENTIAL PRESSURE GAUGE	1	1.7667-228	

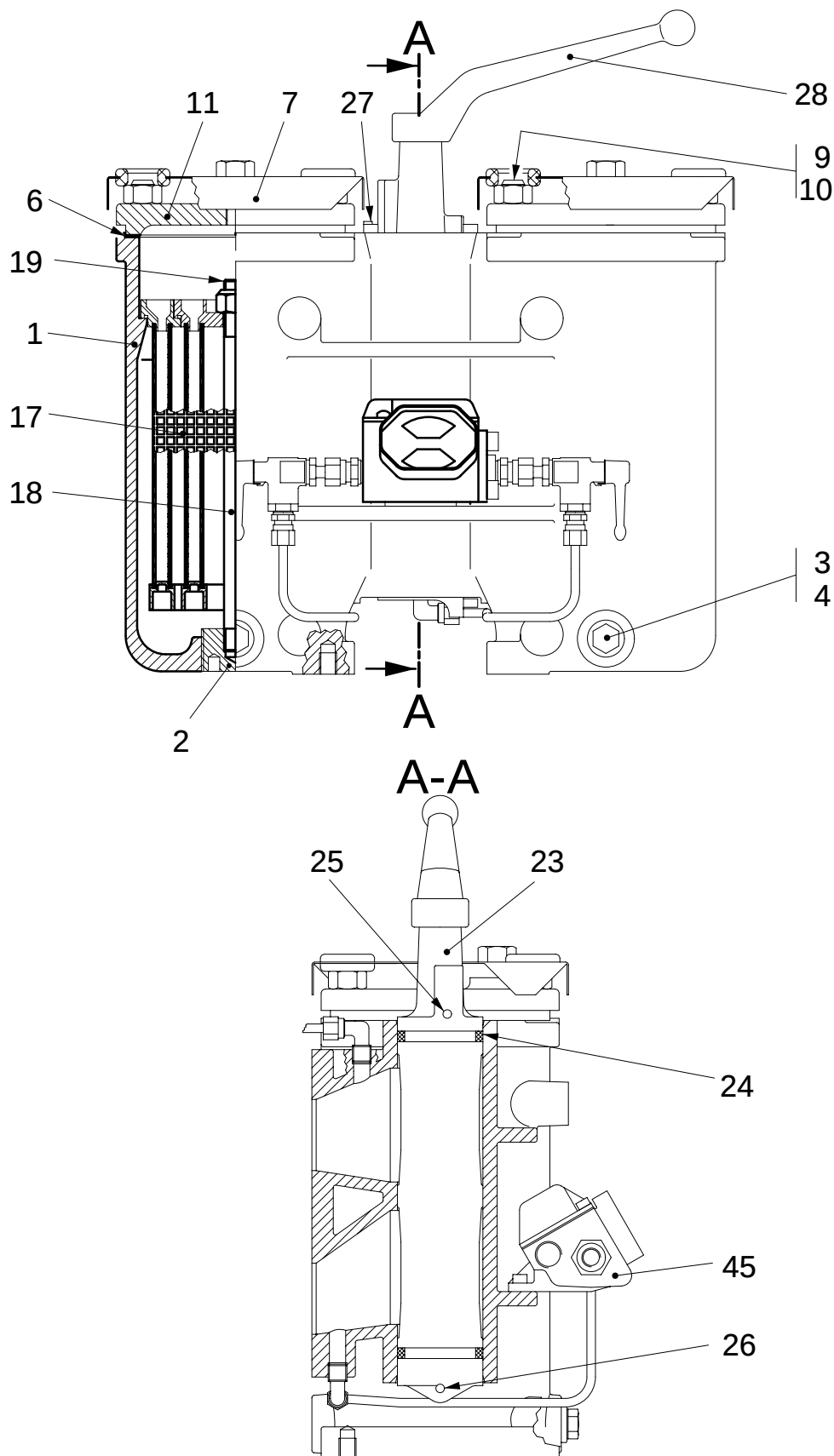
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Duplex Fuel Fine Filter

M25/M32

07



Duplex Fuel Fine Filter

M25/M32

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFF-FEINFILTER, VOLLST. DUPLEX FUEL FINE FILTER ASSEMBLY	1	9.7667 BB
1	GEHÄUSE HOUSING	1	1.7667-201
2	GEWINDESTOPFEN THREADED PLUG	2	1.7667-102
3	DOPPELNIPPEL SPACER BLOCK	2	1.7667-160
4	WINKELKUGELHAHN ANGLE BALL COCK	2	1.7667-151
6	HOCHDRUCKDICHTUNG GASKET	# 2	1.7667-215
7	DECKELSICHERUNG COVERSECURING	2	1.7667-007
9	STIFTSCHRAUBE STUD	8	1.1234-355
10	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-038
11	DECKEL COVER	2	1.7667-011
17	MANTELSIEBEINSATZ FILTER ELEMENT	2	1.7667-017
18	ANKER STUD	1	2.7667-018
19	SECHSKANTMUTTER HEXAGON NUT	2	1.2021-116
23	KÜKEN COCK PLUG	1	1.7667-203
24	RUNDSCHNURRING O-RING	# 2	1.7667-219
25	SPANNHÜLSE SPRING DOWEL	1	1.7667-214
26	SPANNHÜLSE SPRING DOWEL	1	1.0039-881
28	SCHLÜSSEL COCK HANDLE	1	1.7667-028
45	DIFFERENZDRUCKANZEIGER, VOLLST. DIFFERENTIAL PRESSURE GAUGE, COMPL.	1	1.7667-228
55	ÖLWANNE, VOLLST. OIL PAN, COMPL.	1	1.7667-555

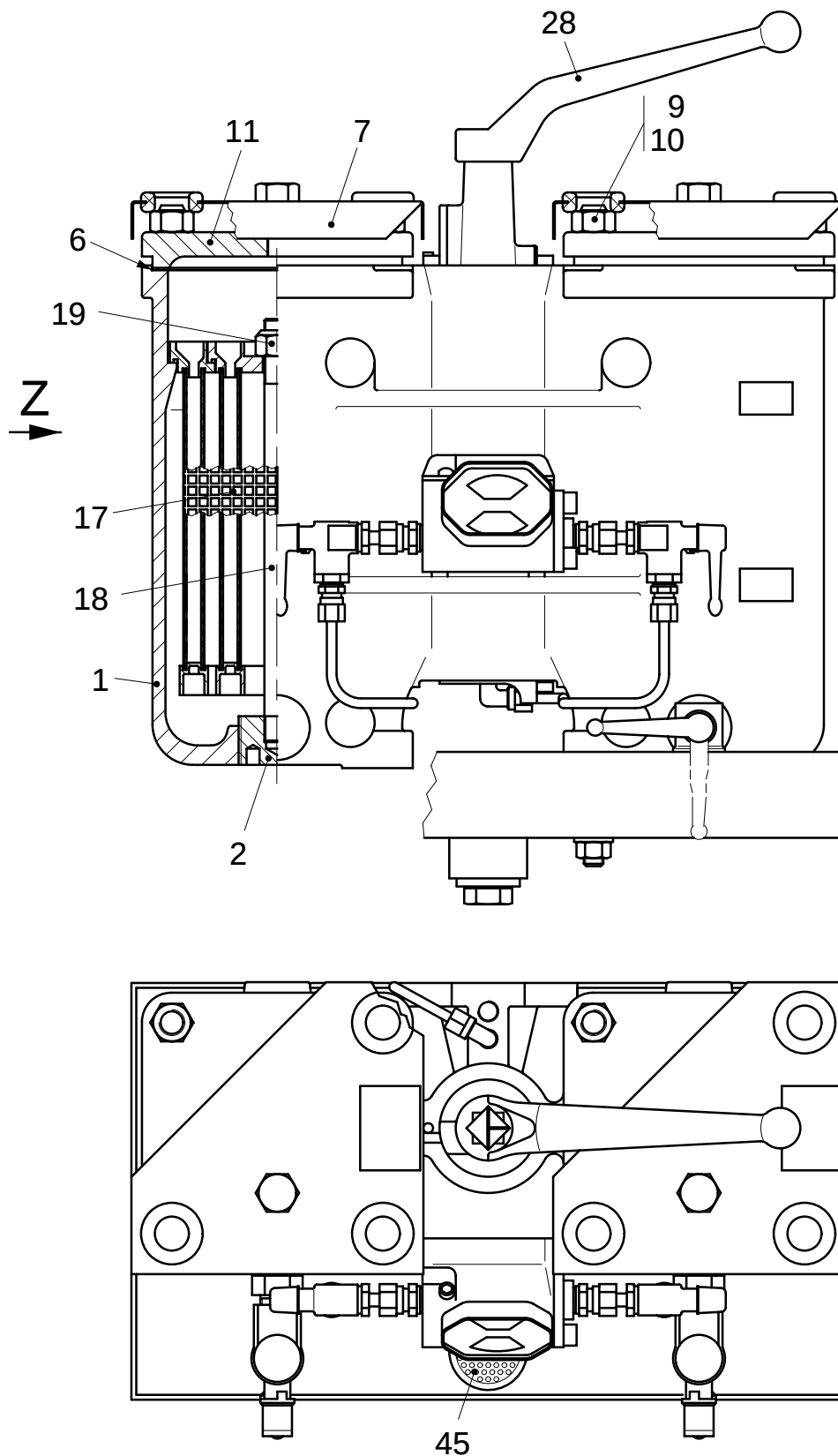
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Duplex Fuel Fine Filter

M25/M32

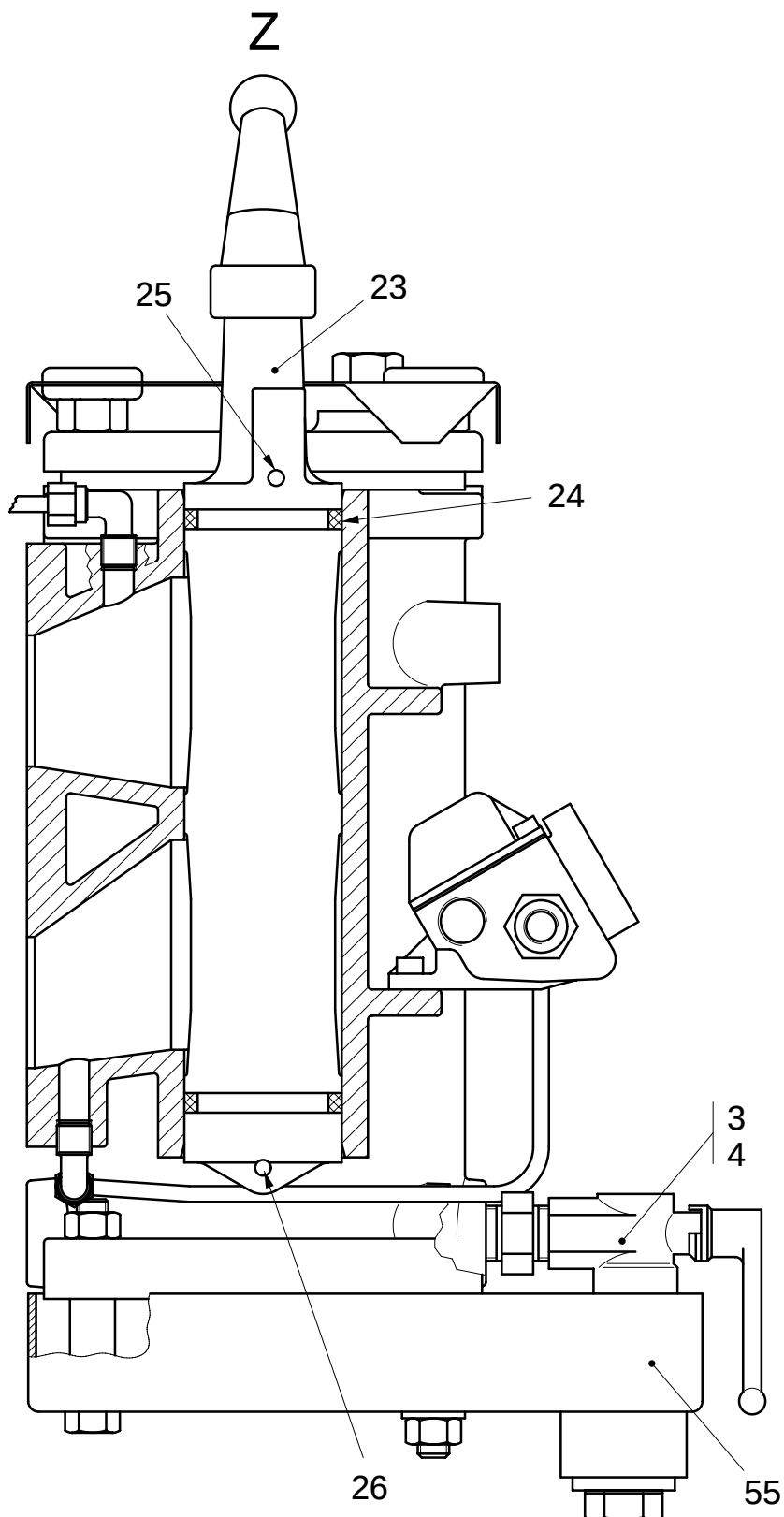
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Duplex Fuel Fine Filter

M25/M32

07



Duplex Fuel Fine Filter

M25/M32

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFF-FEINFILTER, VOLLST. DUPLEX FUEL FINE FILTER ASSEMBLY	1	9.7667 CC
2	GEWINDESTOPFEN THREADED PLUG	2	1.7667-102
3	DOPPELNIPPEL SPACER BLOCK	2	1.7667-160
4	WINKELKUGELHAHN ANGLE BALL COCK	2	1.7667-151
6	HOCHDRUCKDICHTUNG GASKET	# 2	1.7667-215
7	DECKELSICHERUNG COVERSECURING	2	1.7667-007
9	STIFTSCHRAUBE STUD	8	1.1234-355
10	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-038
11	DECKEL COVER	2	1.7667-011
17	MANTELSIEBEINSATZ FILTER ELEMENT	2	1.7667-017
18	ANKER STUD	1	2.7667-018
19	SECHSKANTMUTTER HEXAGON NUT	2	1.2021-116
23	KÜKEN COCK PLUG	1	1.7667-203
24	RUNDSCHNURRING O-RING	# 2	1.7667-219
25	SPANNHÜLSE SPRING DOWEL	1	1.7667-214
26	SPANNHÜLSE SPRING DOWEL	1	1.0039-881
28	SCHLÜSSEL COCK HANDLE	1	1.7667-028
55	ÖLWANNE, VOLLST. OIL PAN, COMPL.	1	1.7667-555

07

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Duplex Fuel Fine Filter

M25/M32

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
100	DIFFERENZDRUCK-ANZEIGER, VOLLST. DIFFERENTIAL PRESSURE GAUGE, COMPL.	1	1.7667-228
101	WINKELKUGELHAHN ANGLE BALL COCK	2	1.7667-024
102	VERSCHRAUBUNG SCREWED CONNECTION	4	1.7667-152
103	DICHTRING JOINT RING	# 6	1.7010-064
104	O-RING O-RING	# 4	9.7657-104
105	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	2	9.7657-105
106	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-032

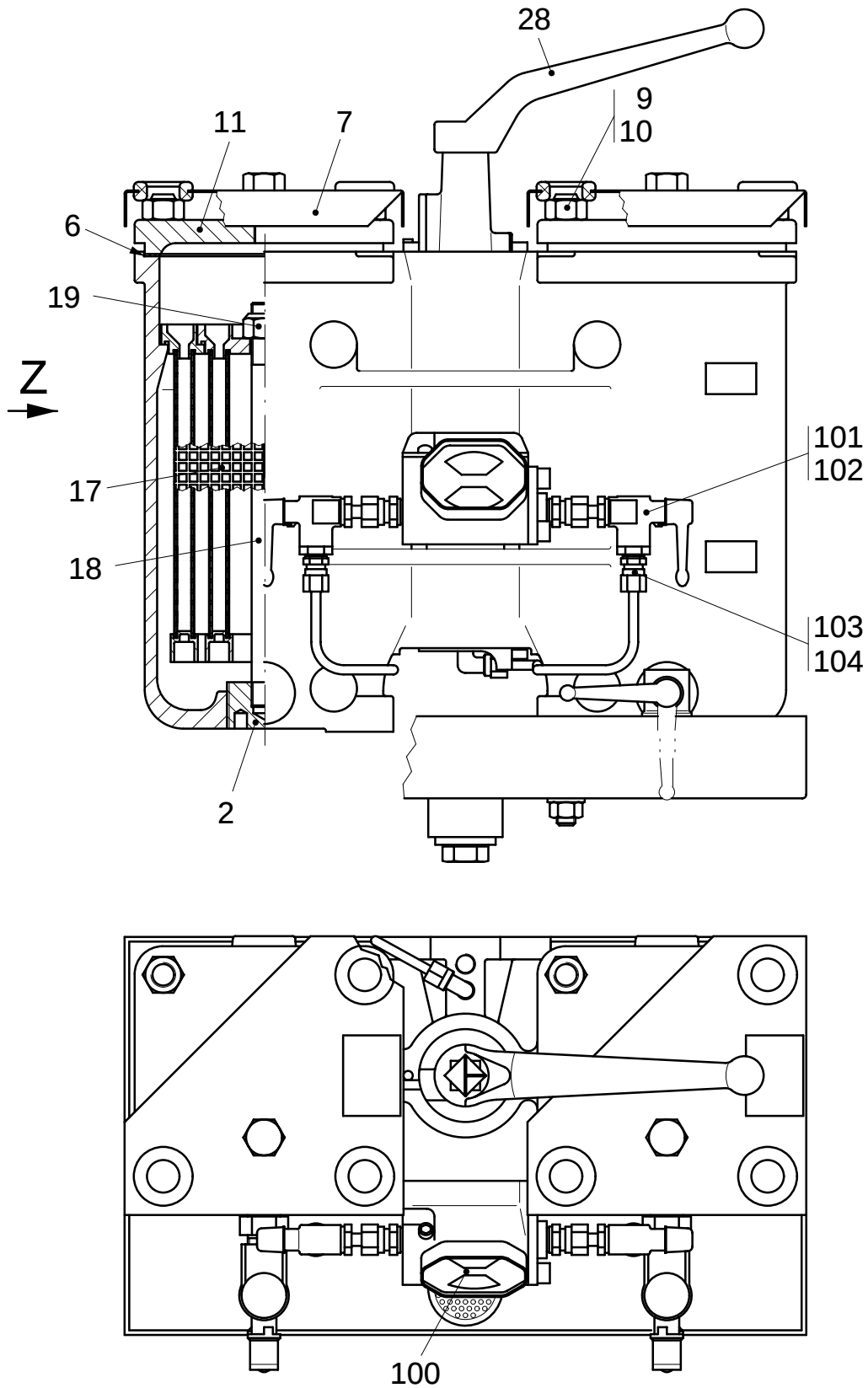
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Duplex Fuel Fine Filter

M25/M32

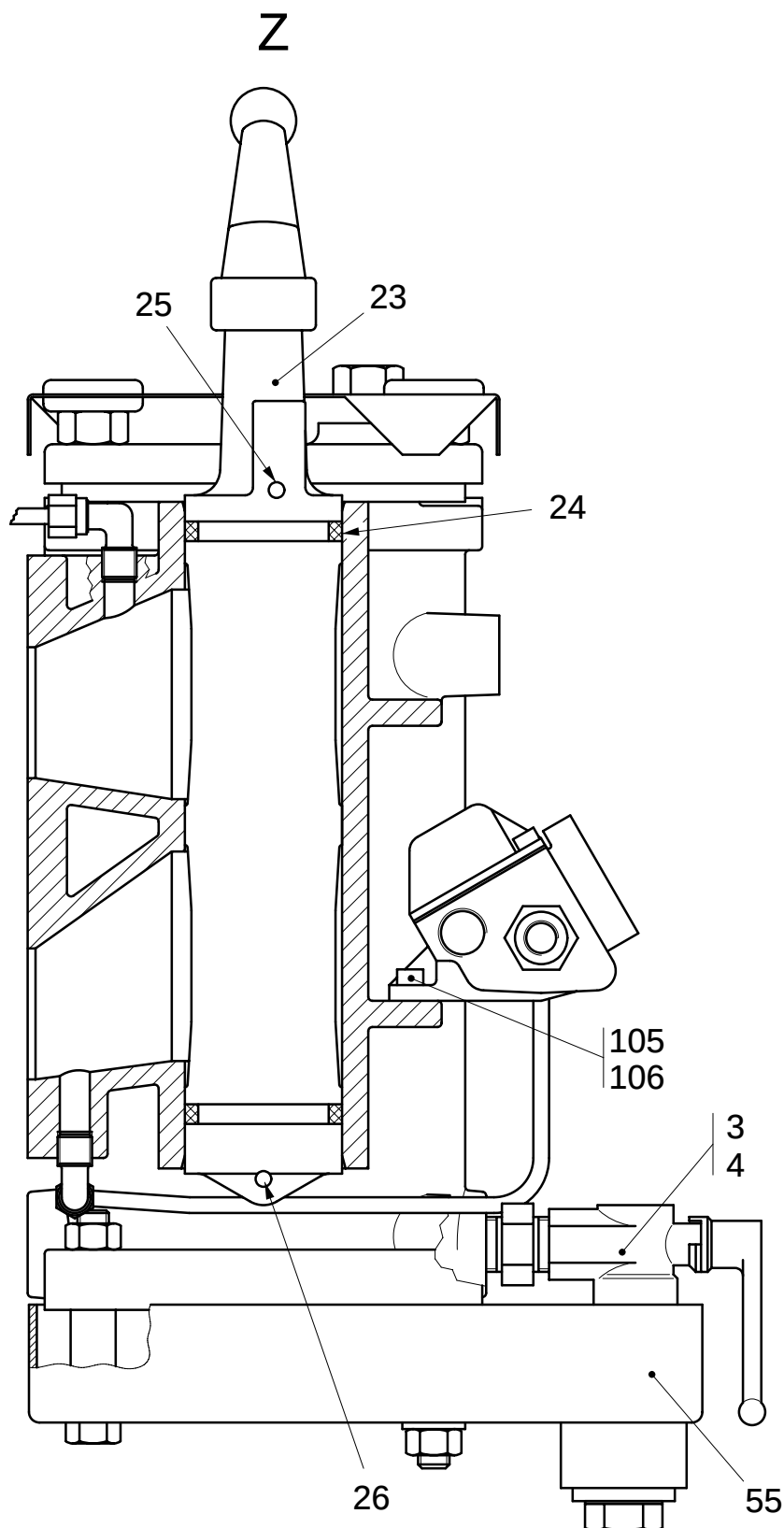
07



Duplex Fuel Fine Filter

M25/M32

07



Duplex Fuel Fine Filter

M20-M601C

07

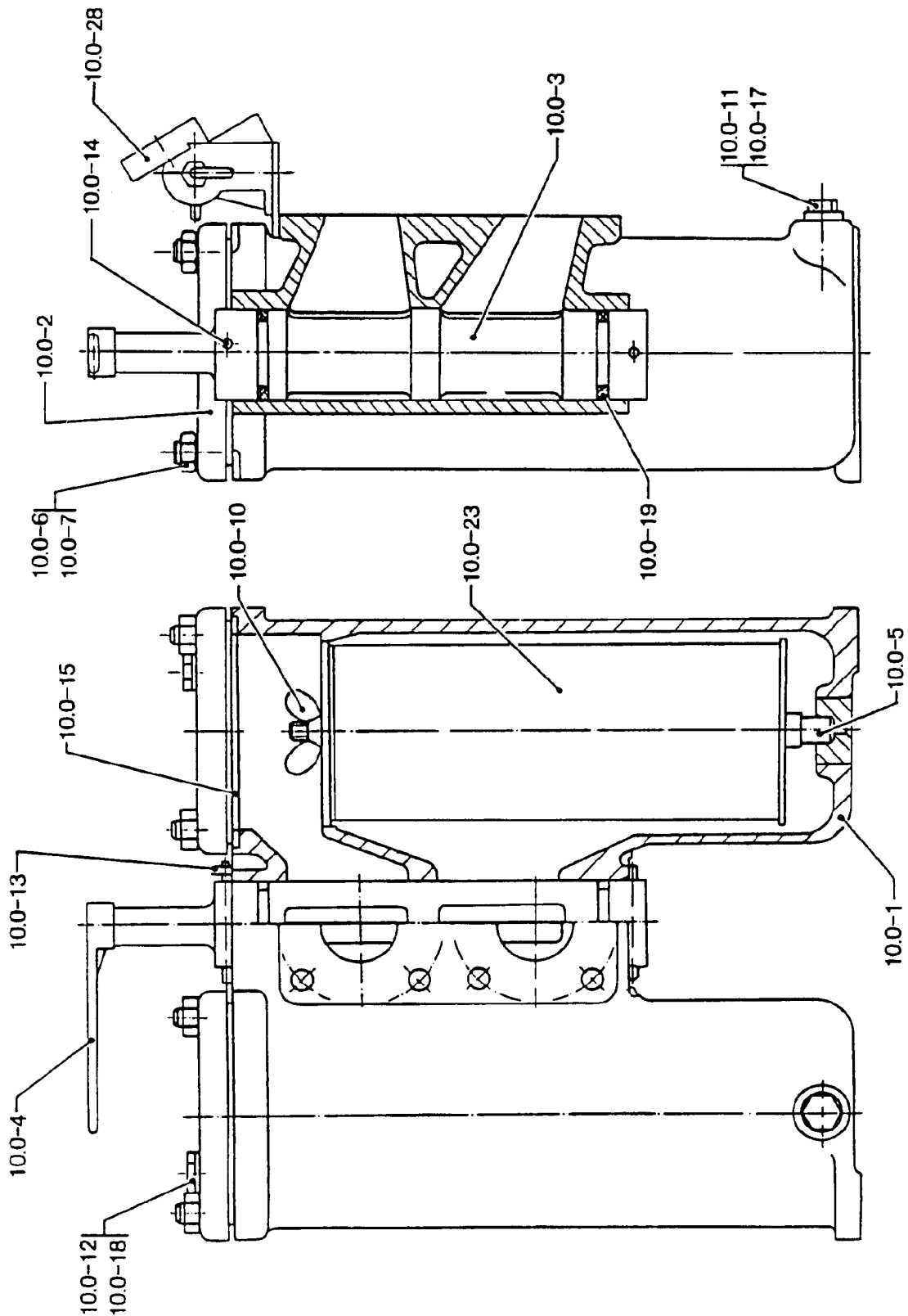
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
10.0	KRAFTSTOFF-FEINFILTER, VOLLST. DUPLEX FUEL FINE FILTER, ASS.	1	1.7667 FF	
10.0-1	GEHÄUSE HOUSING	1	1.7667-201	
10.0-2	DECKEL COVER	2	1.7667-202	
10.0-3	KÜKEN COCK PLUG	1	1.7667-203	
10.0-4	SCHLÜSSEL COCK HANDLE	1	1.7667-204	
10.0-5	ANKER STUD	2	1.7667-205	
10.0-6	SCHRAUBE STUD	8	1.7667-206	
10.0-7	MUTTER NUT	8	1.7667-207	
10.0-10	MUTTER NUT	2	1.7668-210	
10.0-11	SCHRAUBE SCREW PLUG	2	1.7667-211	
10.0-12	SCHRAUBE SCREW	2	1.7667-212	
10.0-13	STIFT PIN	1	1.7667-213	
10.0-14	STIFT PIN	2	1.7667-214	
10.0-15	DICHTUNG GASKET	# 2	1.7667-215	
10.0-17	DICHTUNG JOINT RING	# 2	1.7667-217	
10.0-18	DICHTUNG JOINT RING	# 2	1.7667-218	
10.0-19	DICHTUNG O-RING	# 3	1.7667-219	
10.0-23	MANTELSIEBEINSATZ FILTER ELEMENT	2	1.7667-223	
10.0-28	DIFFERENZDRUCKANZEIGER DIFFERENTIAL PRESSURE GAUGE	1	1.7667-228	

= VERBRAUCHSTEILE
CONSUMABLES

Duplex Fuel Fine Filter

M20-M601C

07



Duplex Fuel Primary Filter

M20-M601C

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
10.0	KR.-STOFF-DOPPEL-VORF., VOLLST. DUPLEX FUEL PRIMARY FILTER, ASS.	1	1.7668 DD	
10.0-1	GEHÄUSE HOUSING	1	1.7668-201	
10.0-2	DECKEL COVER	2	1.7668-202	
10.0-3	KÜKEN COCK PLUG	1	1.7668-203	
10.0-4	SCHLÜSSEL COCK HANDLE	1	1.7668-204	
10.0-5	ANKER TIE-ROD	2	1.7668-205	
10.0-6	SCHRAUBE STUD	3	1.7668-206	
10.0-7	MUTTER NUT	8	1.7668-207	
10.0-10	MUTTER NUT	2	1.7668-210	
10.0-11	SCHRAUBE SCREW PLUG	2	1.7668-211	
10.0-12	SCHRAUBE SCREW PLUG	2	1.7668-212	
10.0-13	STIFT PIN	1	1.7668-213	
10.0-14	STIFT PIN	2	1.7668-214	
10.0-15	DICHTUNG GASKET	# 2	1.7667-215	
10.0-17	DICHTUNG JOINT RING	# 2	1.7668-217	
10.0-18	DICHTUNG JOINT RING	# 2	1.7668-218	
10.0-19	DICHTUNG O-RING	# 3	1.7668-219	
10.0-23	SIEB FILTER ELEMENT	2	1.7668-223	
10.0-28	DIFFERENZDRUCKANZEIGER DIFFERENTIAL PRESS. INDICATOR	* 1	1.7668-228	

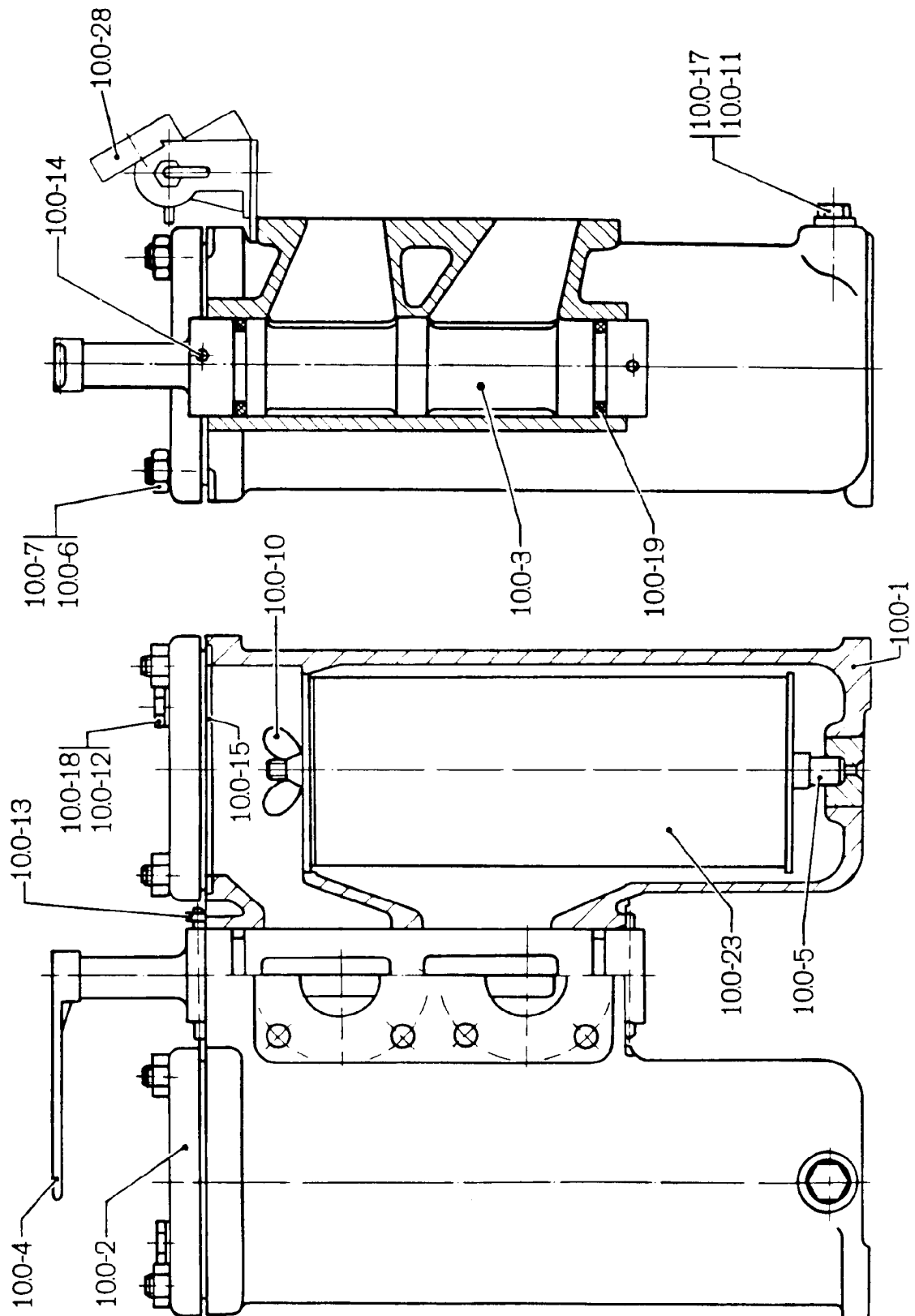
* = NUR AUF BESONDERE BESTELLUNG
SUPPLIED TO SPECIAL ORDER ONLY

= VERBRAUCHSTEILE
CONSUMED PARTS

Duplex Fuel Primary Filter

M20-M601C

07



Duplex Fuel Primary Filter

M20/M25/
M332C

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
-	KRAFTST.-DOPPEL-VORFILT., VOLLST. DUPLEX FUEL PRIMARY FILTER, ASS.	1	1.7668 GG	
2	VERSCHLUSSSCHRAUBE SCREW PLUG	2	1.7668-2	
3	DICHTRING JOINTRING	# 2	1.7668-3	
4	VERSCHLUSSSCHRAUBE SCREW PLUG	4	1.7668-4	
5	DICHTRING JOINTRING	# 4	1.7667-218	
10	STIFTSCHRAUBE STUD	14	1.7668-10	
11	DECKEL COVER	2	1.7668-12	
12	O-RING O-RING	# 2	1.7668-13	
13	SECHSKANTMUTTER HEXAGON NUT	14	1.7668-14	
18	KÜKEN COCK PLUG	1	1.7668-15	
19	O-RING O-RING	# 2	1.7668-18	
20	SICHERUNGSRING CIRCLIP	# 1	1.7668-19	
21	HAHNSCHLÜSSEL COCK HANDLE	1	1.7667-28	
22	FILTEREINSATZ, VOLLST. FILTER ELEMENT ASSEMBLY	2	1.7668-65	
36	DICHTUNG GASKET	# 2	2.7667-34	
60	DECKELSICHERUNG COVERSECURING	1	1.7668-21	

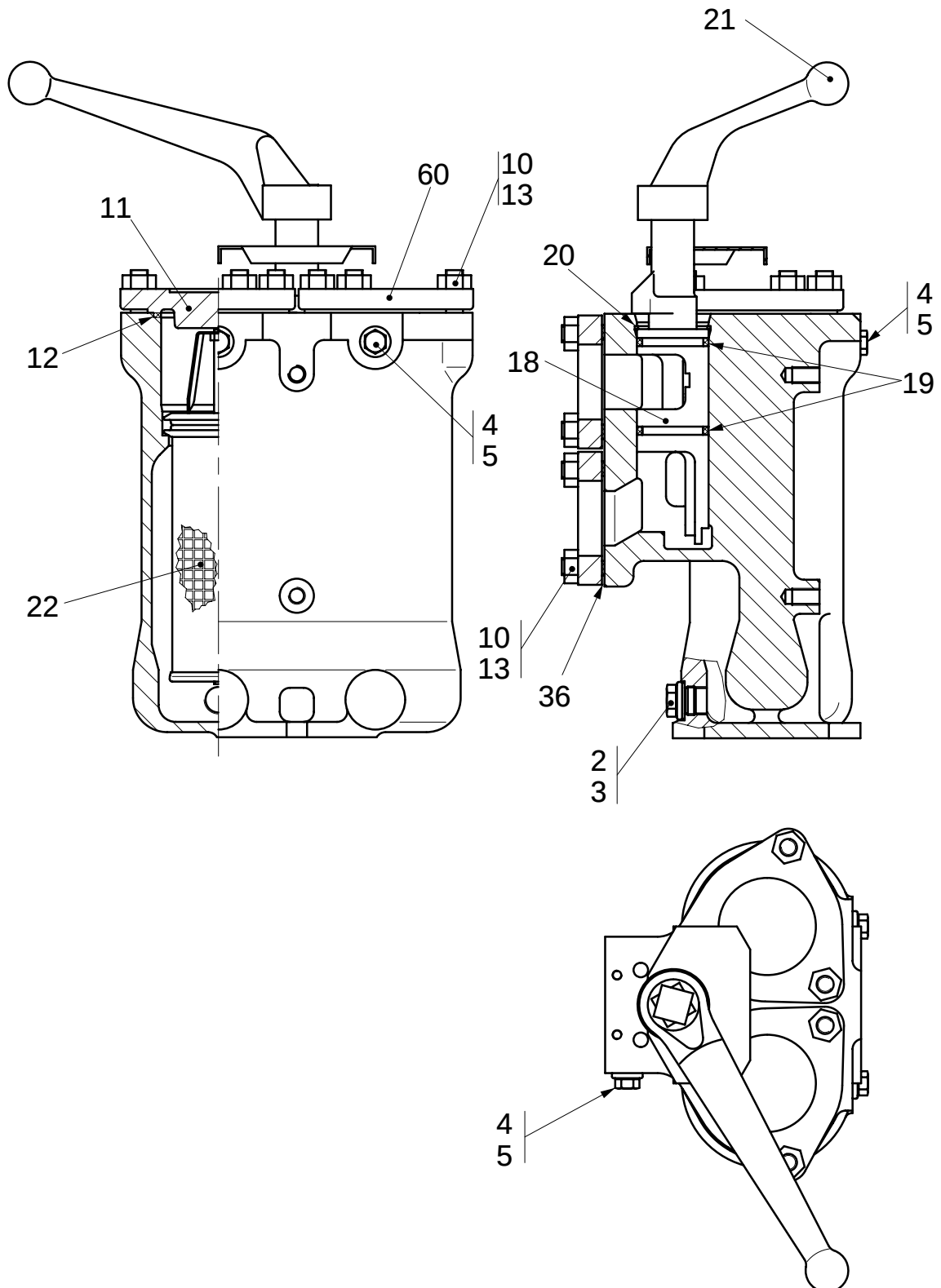
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Duplex Fuel Primary Filter

M20/M25/
M332C

07



Fuel Distributing-/Collecting Pipe

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLEITUNG, VOLLST. FUEL PIPES ASSEMBLY	1	258510 AA
2	FLANSCH FLANGE	2	258510-002
5	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-342
6	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-831
8	O-RING O-RING	# 2	1.7084-649
9	DICHTRING JOINT RING	# 1	1.7010-064
100	NIEDERDRUCKVERROHRUNG, VOLLST. LOW-PRESSURE PIPING, COMPL.	* 10	258512-100
101	FLANSCHROHR FLANGED PIPE	10	258512-101
102	FLANSCH FLANGE	10	258512-102
103	FLANSCH FLANGE	10	258512-103
104	O-RING O-RING	# 20	258512-104
105	STANGENDICHTUNG JOINT RING	# 10	258512-105
106	SECHSKANTSCHRAUBE HEXAGON SCREW	20	258512-106
107	SECHSKANTSCHRAUBE HEXAGON SCREW	20	258512-107

* = IN 258510 AA ENTHALTEN
INCLUDED IN 258510 AA

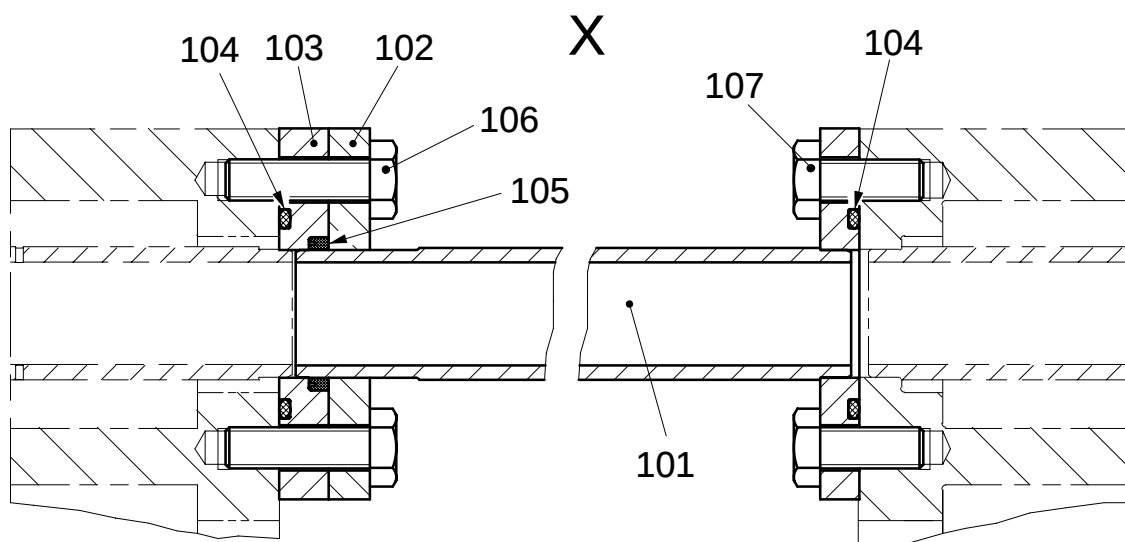
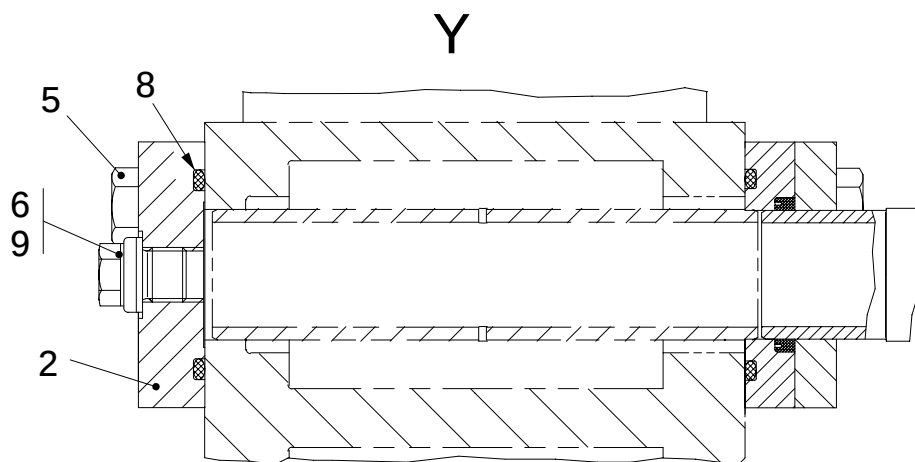
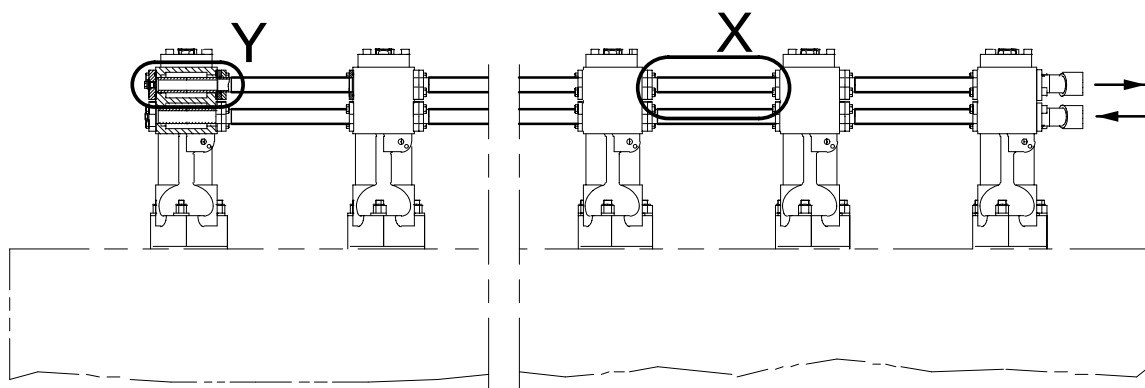
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Fuel Distributing-/Collecting Pipe

M25

07



Fuel Distributing-/Collecting Pipe

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLEITUNG, VOLLST. FUEL PIPES ASSEMBLY	1	258510 BB
2	FLANSCH FLANGE	2	258510-002
5	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-342
6	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-831
8	O-RING O-RING	# 2	1.7084-649
9	DICHTRING JOINT RING	# 1	1.7010-064
100	NIEDERDRUCKVERROHRUNG, VOLLST. LOW-PRESSURE PIPING, COMPL.	* 14	258512-100
101	FLANSCHROHR FLANGED PIPE	14	258512-101
102	FLANSCH FLANGE	14	258512-102
103	FLANSCH FLANGE	14	258512-103
104	O-RING O-RING	# 28	258512-104
105	STANGENDICHTUNG JOINT RING	# 14	258512-105
106	SECHSKANTSCHRAUBE HEXAGON SCREW	28	258512-106
107	SECHSKANTSCHRAUBE HEXAGON SCREW	28	258512-107

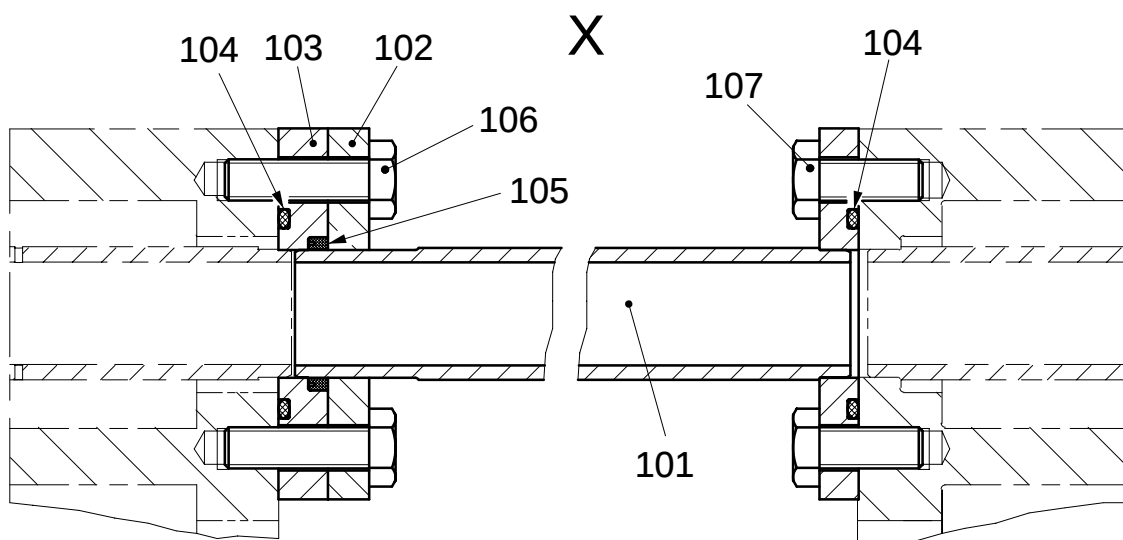
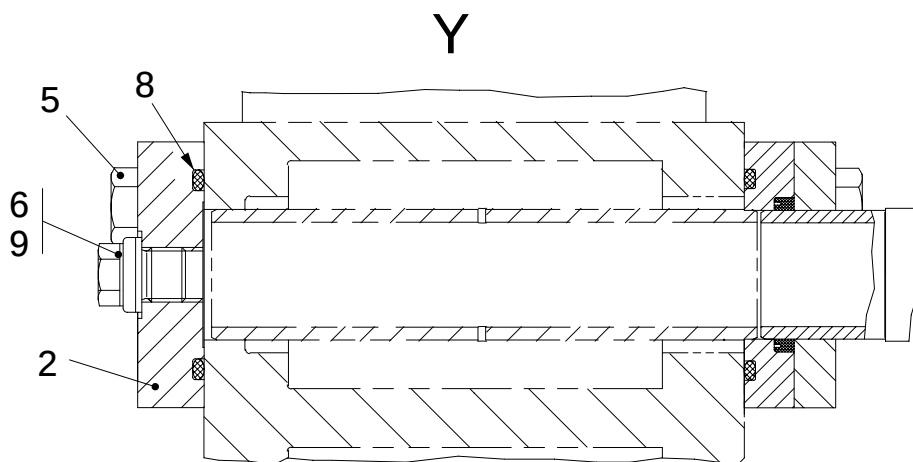
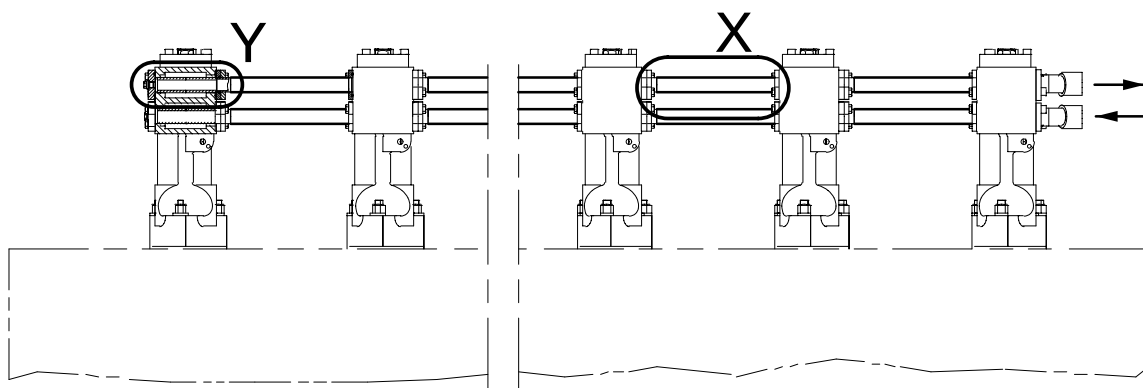
* = IN 258510 BB ENTHALTEN
INCLUDED IN 258510 BB

= VERBRAUCHSTEILE
CONSUMABLES

Fuel Distributing-/Collecting Pipe

M25

07



Fuel Distributing-/Collecting Pipe

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLEITUNG, VOLLST. FUEL PIPES ASSEMBLY	1	258510 CC
2	FLANSCH FLANGE	2	258510-002
5	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-342
6	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-831
8	O-RING O-RING	# 2	1.7084-649
9	DICHTRING JOINT RING	# 1	1.7010-064
100	NIEDERDRUCKVERROHRUNG, VOLLST. LOW-PRESSURE PIPING, COMPL.	* 16	258512-100
101	FLANSCHROHR FLANGED PIPE	16	258512-101
102	FLANSCH FLANGE	16	258512-102
103	FLANSCH FLANGE	16	258512-103
104	O-RING O-RING	# 32	258512-104
105	STANGENDICHTUNG JOINT RING	# 16	258512-105
106	SECHSKANTSCHRAUBE HEXAGON SCREW	32	258512-106
107	SECHSKANTSCHRAUBE HEXAGON SCREW	32	258512-107

* = IN 258510 CC ENTHALTEN
INCLUDED IN 258510 CC

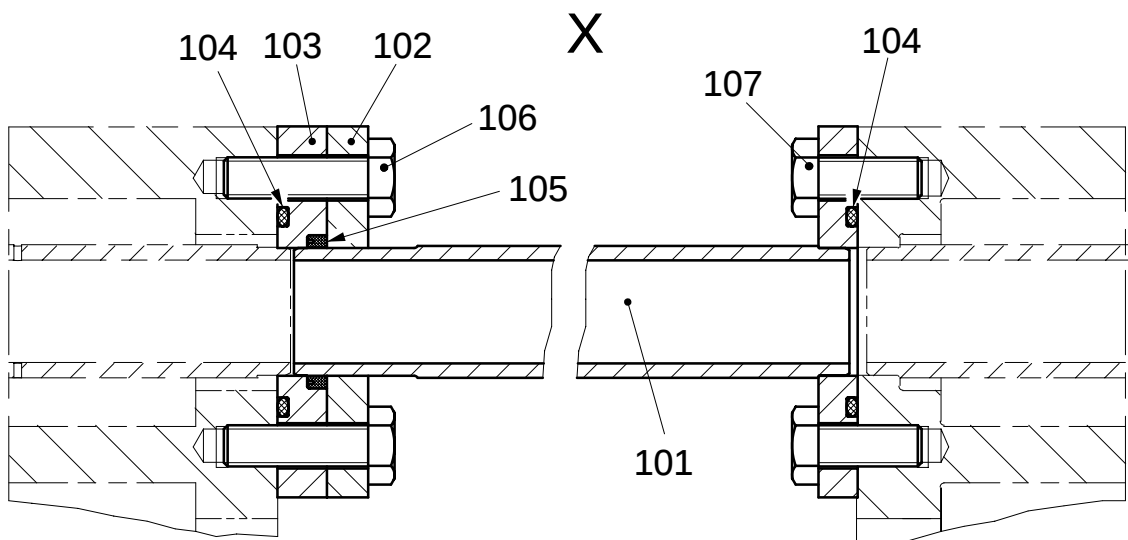
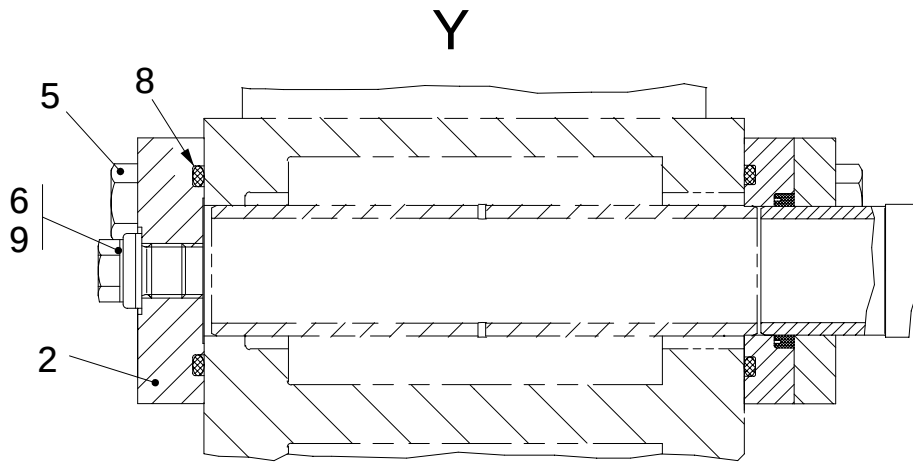
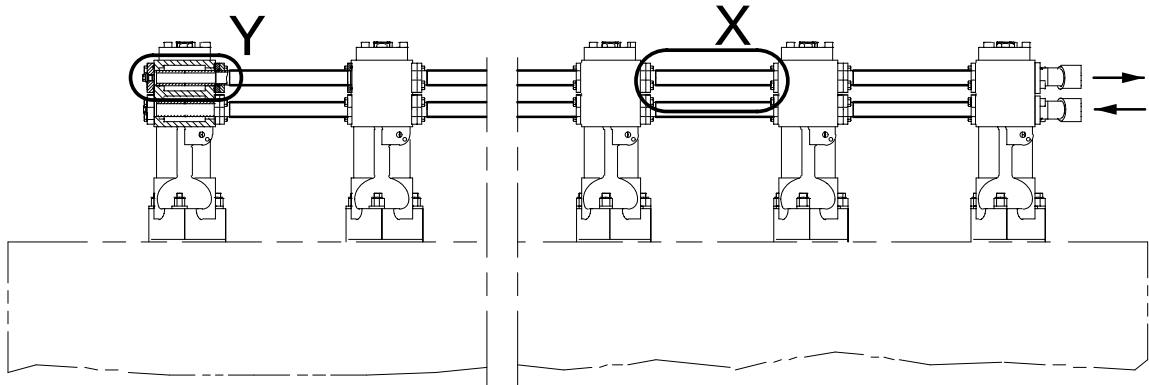
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Fuel Distributing-/Collecting Pipe

M25

07



Fuel Distributing-/Collecting Pipe

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLEITUNG, VOLLST. FUEL PIPES ASSEMBLY	1	258510 DD
2	FLANSCH FLANGE	1	258510-102
3	ZYLINDERSCHRAUBE CILINDRICAL SCREW	1	258510-103
5	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-345
6	STUTZEN UNION	1	1.5094-146
8	O-RING O-RING	# 2	1.7084-649
9	DICHTRING JOINT RING	# 1	1.7010-064
100	NIEDERDRUCKVERROHRUNG, VOLLST. LOW-PRESSURE PIPING, COMPL.	* 10	258512-100
101	KRAFTSTOFFLEITUNG FUEL PIPE	10	258512-101
102	FLANSCH FLANGE	10	258512-102
103	FLANSCH FLANGE	10	258512-103
104	O-RING O-RING	# 20	258512-104
105	STANGENDICHTUNG JOINT RING	# 10	258512-105
106	SECHSKANTSCHRAUBE HEXAGON SCREW	20	258512-106
107	SECHSKANTSCHRAUBE HEXAGON SCREW	20	258512-107

* = IN 258510 DD ENTHALTEN
INCLUDED IN 258510 DD

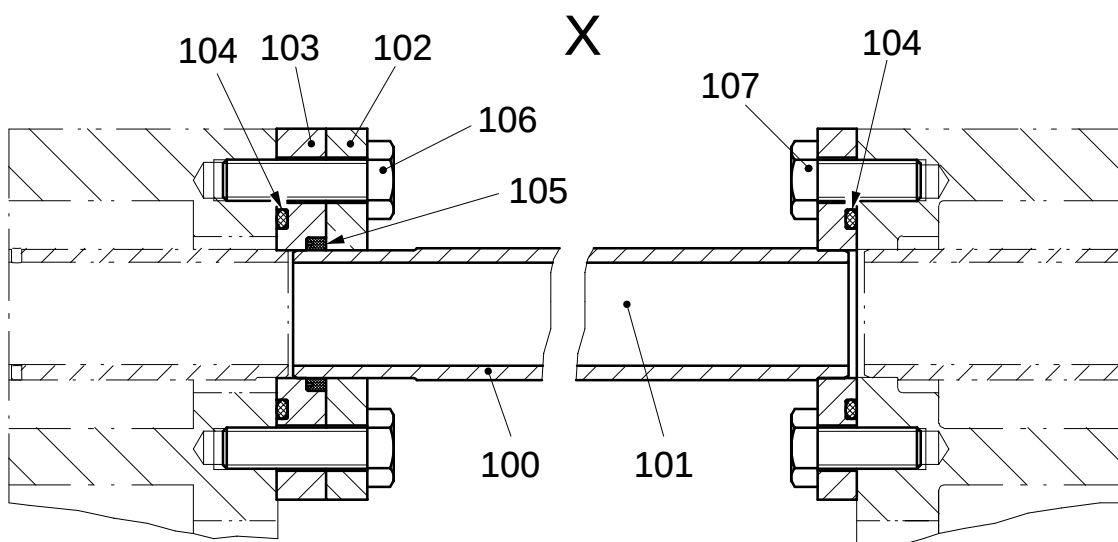
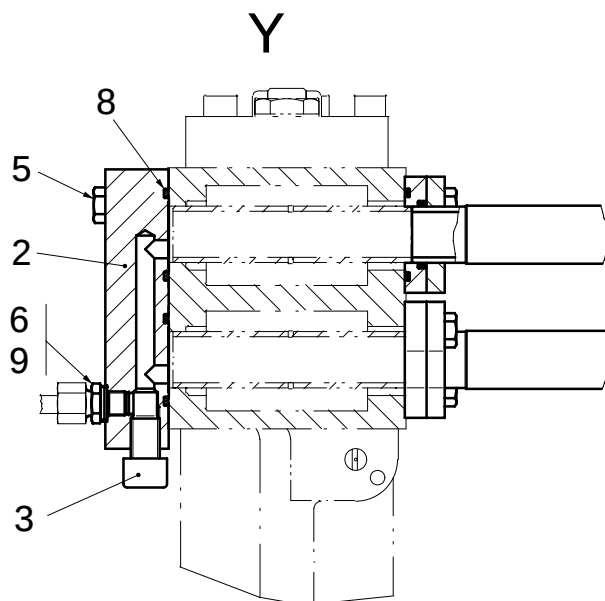
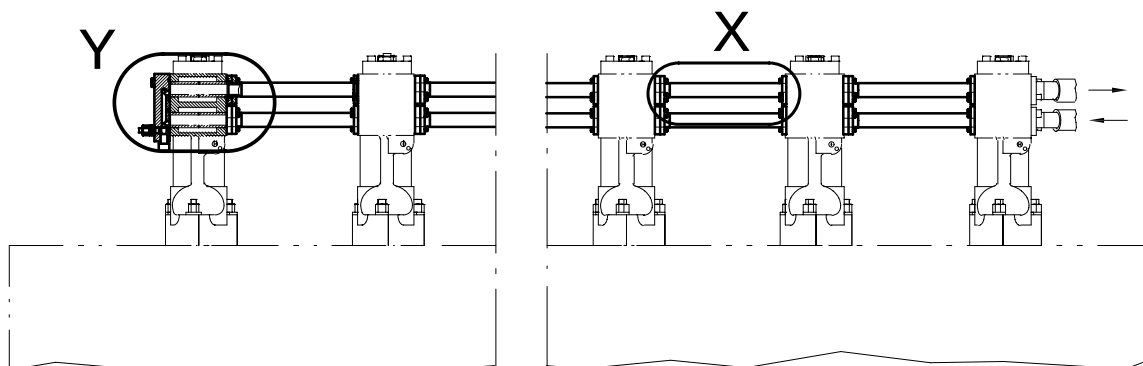
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Fuel Distributing-/Collecting Pipe

M25

07



Fuel Distributing-/Collecting Pipe

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLEITUNG, VOLLST. FUEL PIPES ASSEMBLY	1	258510 EE
2	FLANSCH FLANGE	1	258510-102
3	ZYLINDERSCHRAUBE CILINDRICAL SCREW	1	258510-103
5	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-345
6	STUTZEN UNION	1	1.5094-146
8	O-RING O-RING	# 2	1.7084-649
9	DICHTRING JOINT RING	# 1	1.7010-064
100	NIEDERDRUCKVERROHRUNG, VOLLST. LOW-PRESSURE PIPING, COMPL.	* 14	258512-100
101	KRAFTSTOFFLEITUNG FUEL PIPE	14	258512-101
102	FLANSCH FLANGE	14	258512-102
103	FLANSCH FLANGE	14	258512-103
104	O-RING O-RING	# 28	258512-104
105	STANGENDICHTUNG JOINT RING	# 14	258512-105
106	SECHSKANTSCHRAUBE HEXAGON SCREW	28	258512-106
107	SECHSKANTSCHRAUBE HEXAGON SCREW	28	258512-107

* = IN 258510 EE ENTHALTEN
INCLUDED IN 258510 EE

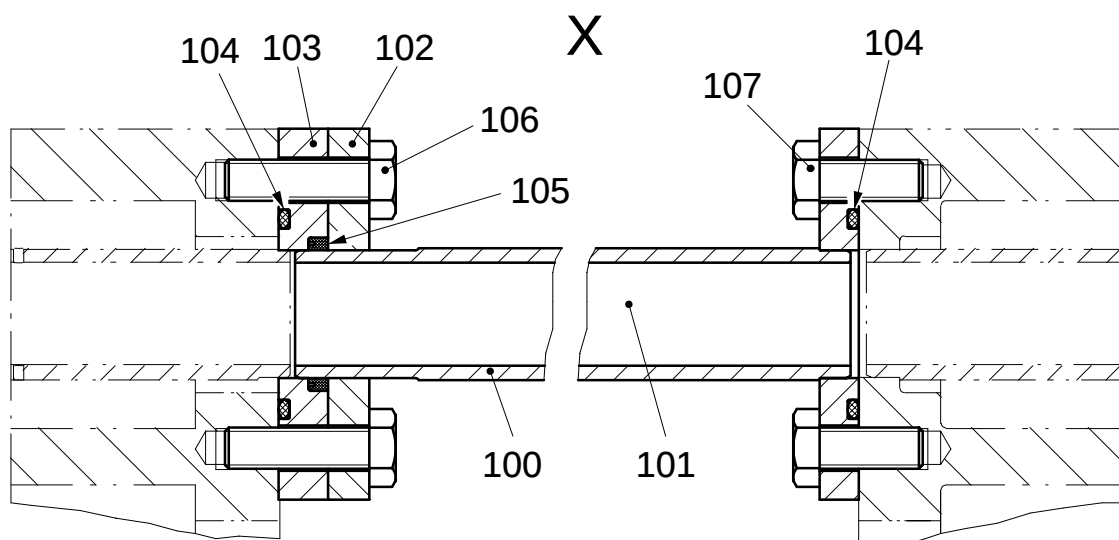
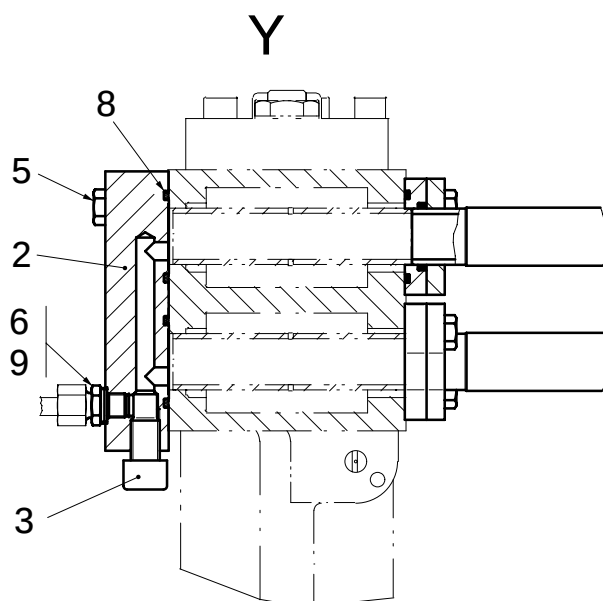
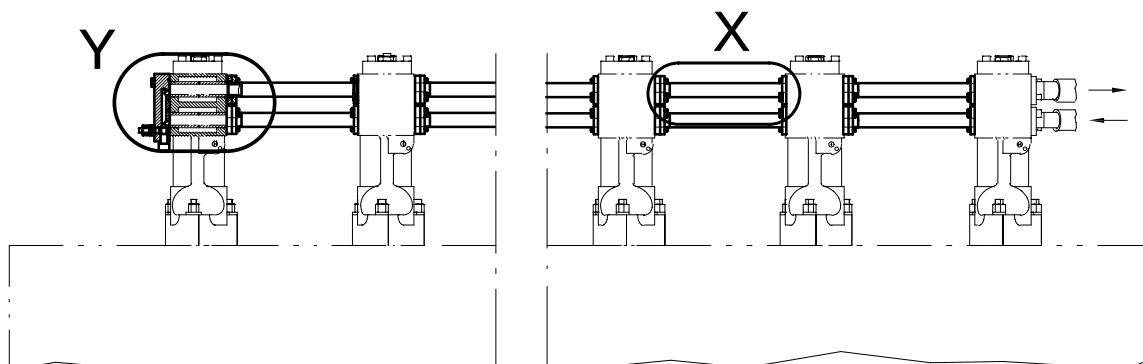
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Fuel Distributing-/Collecting Pipe

M25

07



Fuel Distributing-/Collecting Pipe

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLEITUNG, VOLLST. FUEL PIPES ASSEMBLY	1	258510 FF
2	FLANSCH FLANGE	1	258510-102
3	ZYLINDERSCHRAUBE CILINDRICAL SCREW	1	258510-103
5	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-345
6	STUTZEN UNION	1	1.5094-146
8	O-RING O-RING	# 2	1.7084-649
9	DICHTRING JOINT RING	# 1	1.7010-064
100	NIEDERDRUCKVERROHRUNG, VOLLST. LOW-PRESSURE PIPING, COMPL.	* 16	258512-100
101	KRAFTSTOFFLEITUNG FUEL PIPE	16	258512-101
102	FLANSCH FLANGE	16	258512-102
103	FLANSCH FLANGE	16	258512-103
104	O-RING O-RING	# 28	258512-104
105	STANGENDICHTUNG JOINT RING	# 16	258512-105
106	SECHSKANTSCHRAUBE HEXAGON SCREW	28	258512-106
107	SECHSKANTSCHRAUBE HEXAGON SCREW	28	258512-107

* = IN 258510 FF ENTHALTEN
INCLUDED IN 258510 FF

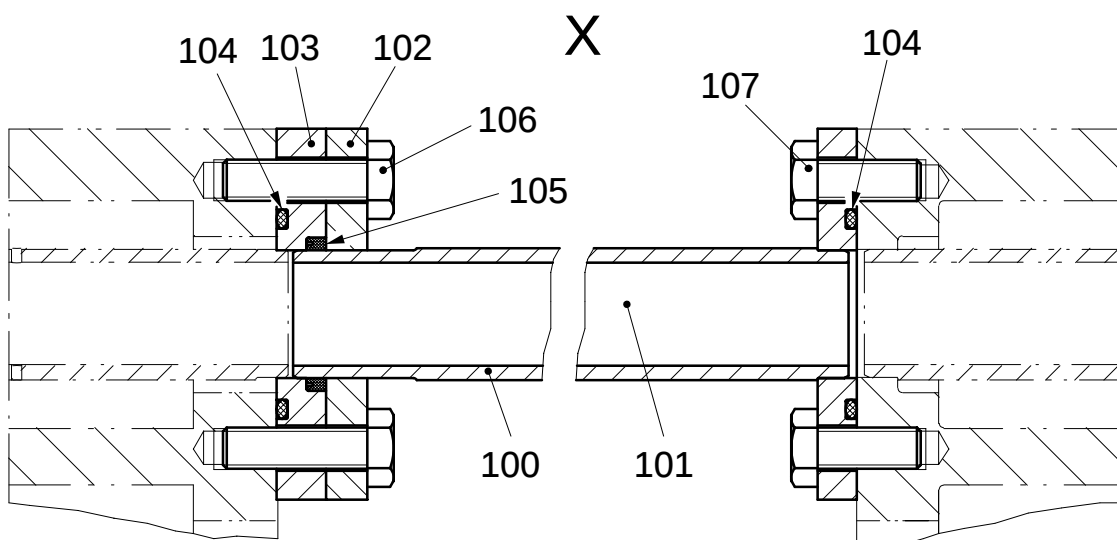
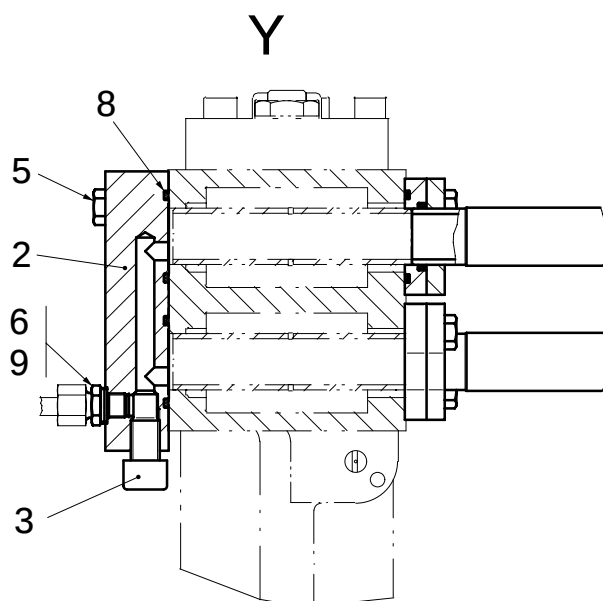
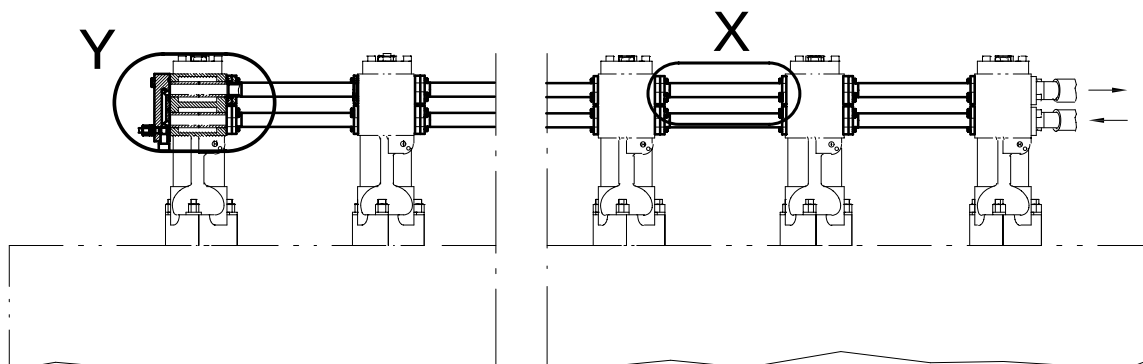
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Fuel Distributing-/Collecting Pipe

M25

07



Fuel Injector Delivery Pipe Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	EINSPRITZDRUCKLEITUNG, VOLLST. FUEL INJECTOR DELIVERY PIPE ASSEMBLY	1	258526 AA
1	QUERDRUCKSTÜCK PRESSURE PIECE	1	258526-001
2	RADIALDRUCKSTÜCK PRESSURE PIECE	1	258526-002
3	DRUCKSCHRAUBE THRUST SCREW	1	258526-003
6	HÜLSE SLEEVE	1	258526-006
7	DECKEL COVER	1	258526-007
10	SPANNSTIFT SPRING DOWEL PIN	1	1.0039-280
12	O-RING O-RING	# 2	1.7084-644
13	O-RING O-RING	# 1	1.7084-642
14	O-RING O-RING	# 1	1.7084-645

= VERBRAUCHSTEILE
CONSUMABLES

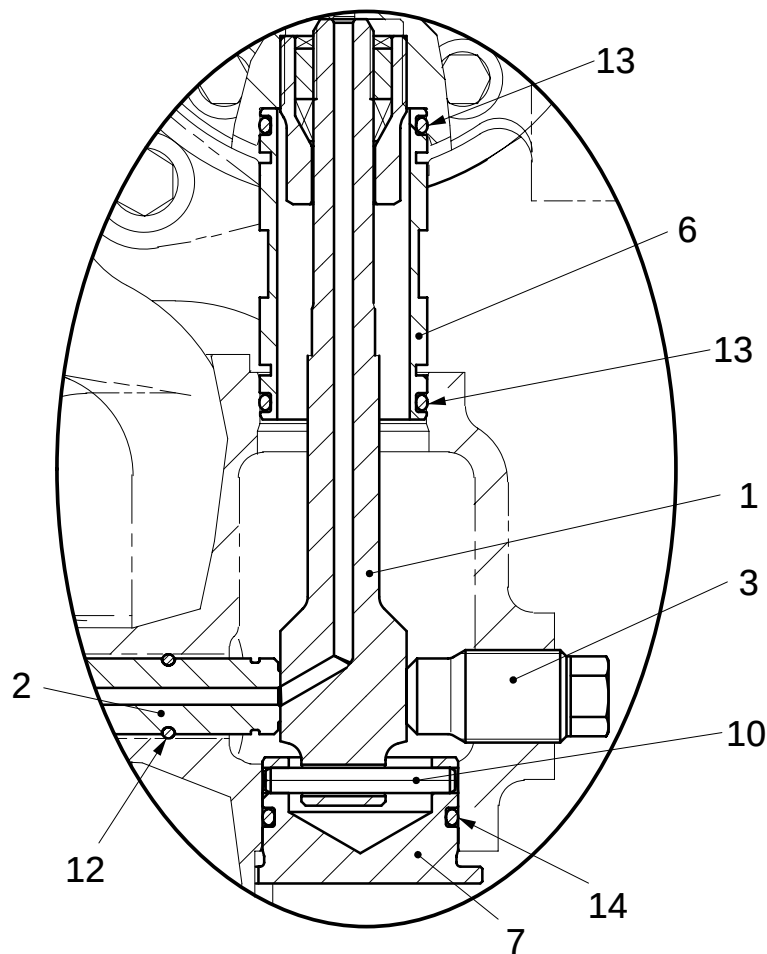
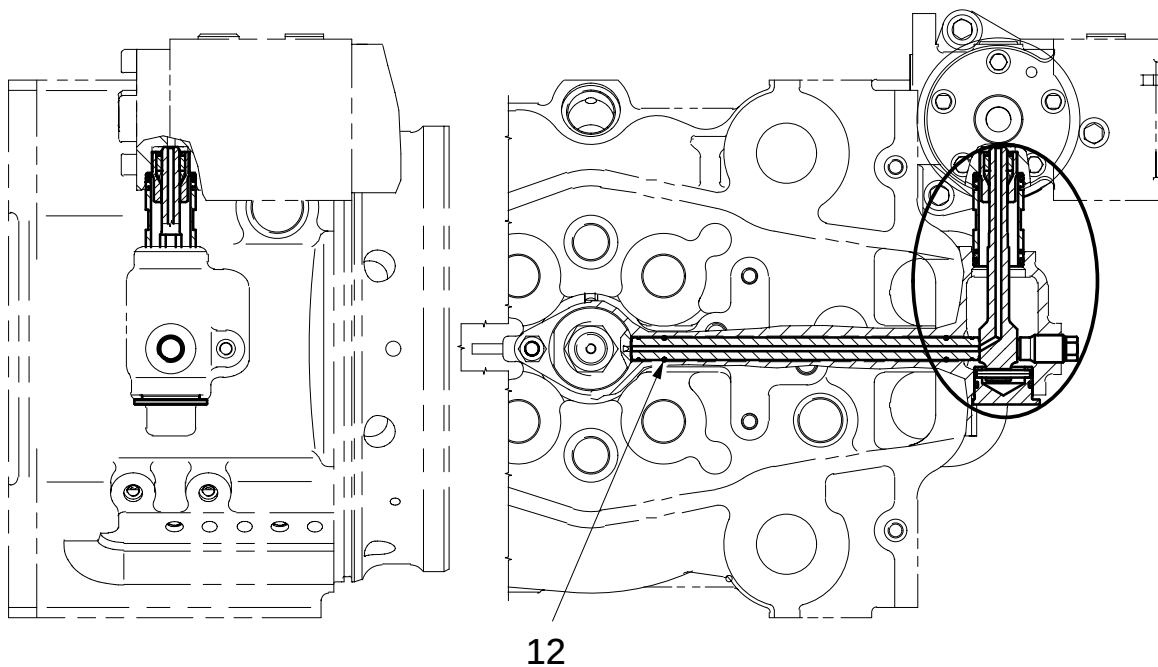
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Fuel Injector Delivery Pipe Mounting

M25

07



Fuel Filter Pipe Mounting

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFFILTERLEITUNG -ANBAU, VOLLST. FUEL FILTER PIPE MOUNTING ASSEMBLY	1	258535 AA
1	KRAFTSTOFFLEITUNG, VOLLST. FUEL PIPE, COMPL.	1	258535-001
2	KRAFTSTOFFLEITUNG, VOLLST. FUEL PIPE, COMPL.	1	258535-002
3	KRAFTSTOFFFILTERLEITUNG, VOLLST. FUEL FILTER PIPE, COMPL.	1	9.8535-001
4	KRAFTSTOFFRÜCKLAUFLEITUNG, VOLLST. FUEL RETURN PIPE, COMPL.	1	258535-004
5	KRAFTSTOFFZULAUFLEITUNG, VOLLST. FUEL ADMISSION PIPE, COMPL.	1	258535-005
6	KRAFTSTOFFFILTERLEITUNG, VOLLST. FUEL FILTER PIPE, COMPL.	1	9.8535-008
7	HALTER BRACKET	2	258538-105
8	HALTER BRACKET	1	258538-106
9	DRUCKREGELVENTIL, VOLLST. PRESSURE REGULATION VALVE, COMPL.	1	9.8535-100
10	FLANSCH FLANGE	3	1.5340-137
11	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-812
12	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-609
13	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-448
14	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-441
15	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1367-311
16	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-377
17	SECHSKANTSCHRAUBE HEXAGON BOLT	6	1.1367-279
18	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1387-343
19	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	4	1.1152-132
20	SECHSKANTMUTTER HEXAGON NUT	12	1.2007-038

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Fuel Filter Pipe Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-035
22	DICHTRING JOINT RING	# 1	1.7010-252
23	DICHTRING JOINT RING	# 1	1.7010-133
24	DICHTUNG GASKET	# 3	1.7073-353
25	DICHTUNG GASKET	# 3	1.7073-725
26	O-RING O-RING	# 2	1.7084-649
27	O-RING O-RING	# 4	1.7084-619
28	ROHRKLEMME PIPE CLAMP	4	1.5011-060
29	ROHRKLEMME PIPE CLAMP	4	1.5011-035
30	SECHSKANTSCHRAUBE HEXAGON SCREW	12	1.1387-447

= VERBRAUCHSTEILE
CONSUMABLES

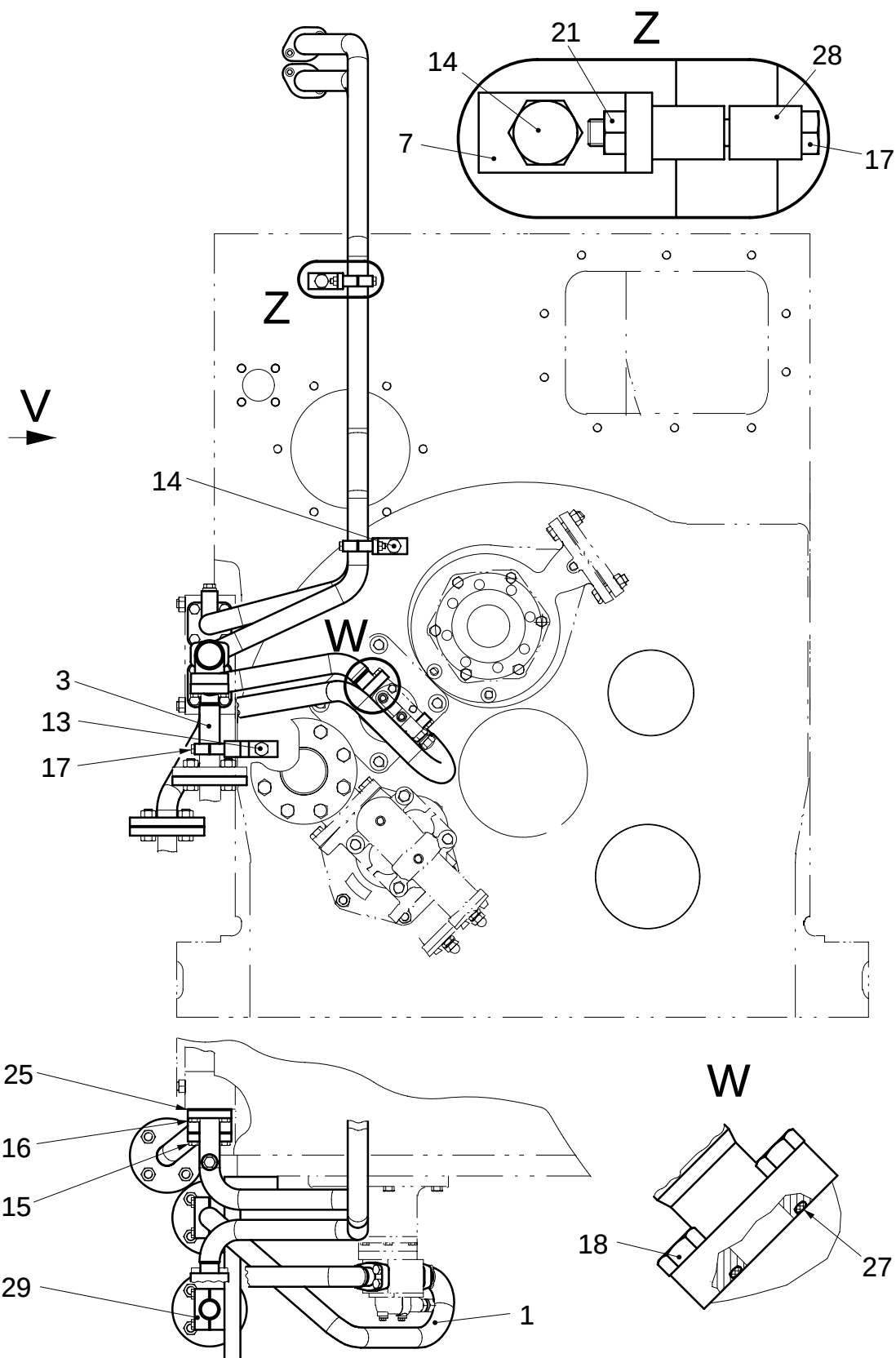
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Fuel Filter Pipe Mounting

M25

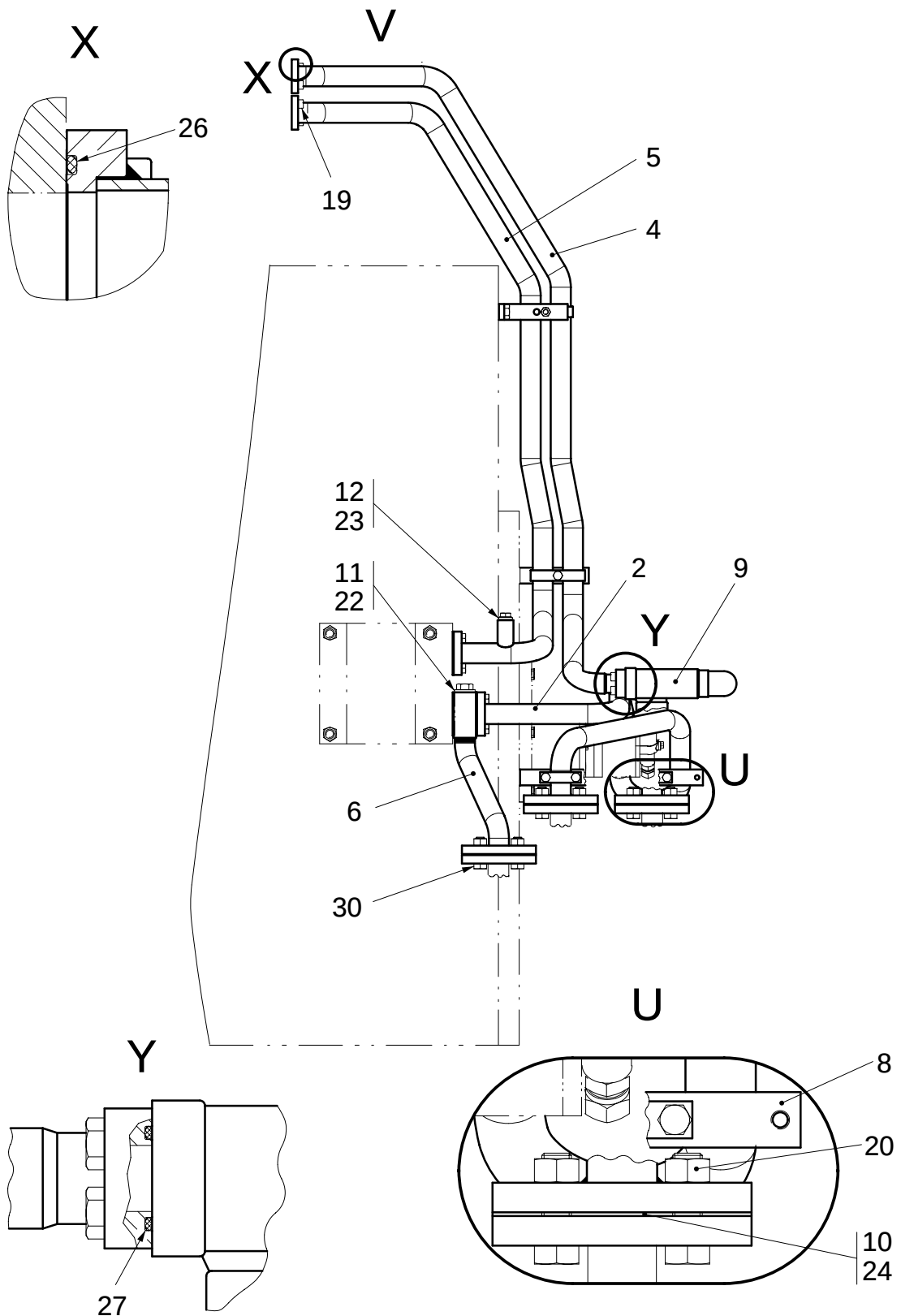
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Fuel Filter Pipe Mounting

M25

07



Fuel Filter Pipe Mounting

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFFILTERLEITUNG -ANBAU, VOLLST. FUEL FILTER PIPE MOUNTING ASSEMBLY	1	258535 BB
1	KRAFTSTOFFLEITUNG, VOLLST. FUEL PIPE, COMPL.	1	258535-101
2	KRAFTSTOFFLEITUNG, VOLLST. FUEL PIPE, COMPL.	1	258535-102
3	KRAFTSTOFFFILTERLEITUNG, VOLLST. FUEL FILTER PIPE, COMPL.	1	9.8535-001
4	KRAFTSTOFFRÜCKLAUFLEITUNG, VOLLST. FUEL RETURN PIPE, COMPL.	1	258535-004
5	KRAFTSTOFFZULAUFLEITUNG, VOLLST. FUEL ADMISSION PIPE, COMPL.	1	258535-005
6	KRAFTSTOFFFILTERLEITUNG, VOLLST. FUEL FILTER PIPE, COMPL.	1	9.8535-008
7	HALTER BRACKET	2	258538-105
8	HALTER BRACKET	1	258538-106
9	DRUCKREGELVENTIL, VOLLST. PRESSURE REGULATION VALVE, COMPL.	1	9.8535-100
10	FLANSCH FLANGE	3	1.5340-137
11	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-812
12	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-609
13	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-389
14	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-441
15	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1367-311
16	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-377
17	SECHSKANTSCHRAUBE HEXAGON BOLT	6	1.1367-279
18	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1387-343
19	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-343
20	SECHSKANTMUTTER HEXAGON NUT	12	1.2007-038

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Fuel Filter Pipe Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-035
22	DICHTRING JOINT RING	# 1	1.7010-252
23	DICHTRING JOINT RING	# 1	1.7010-133
24	DICHTUNG GASKET	# 3	1.7073-353
25	DICHTUNG GASKET	# 3	1.7073-725
26	O-RING O-RING	# 2	1.7084-649
27	O-RING O-RING	# 4	1.7084-619
28	ROHRKLEMME PIPE CLAMP	4	1.5011-060
29	ROHRKLEMME PIPE CLAMP	4	1.5011-035
30	SECHSKANTSCHRAUBE HEXAGON SCREW	12	1.1387-447

= VERBRAUCHSTEILE
CONSUMABLES

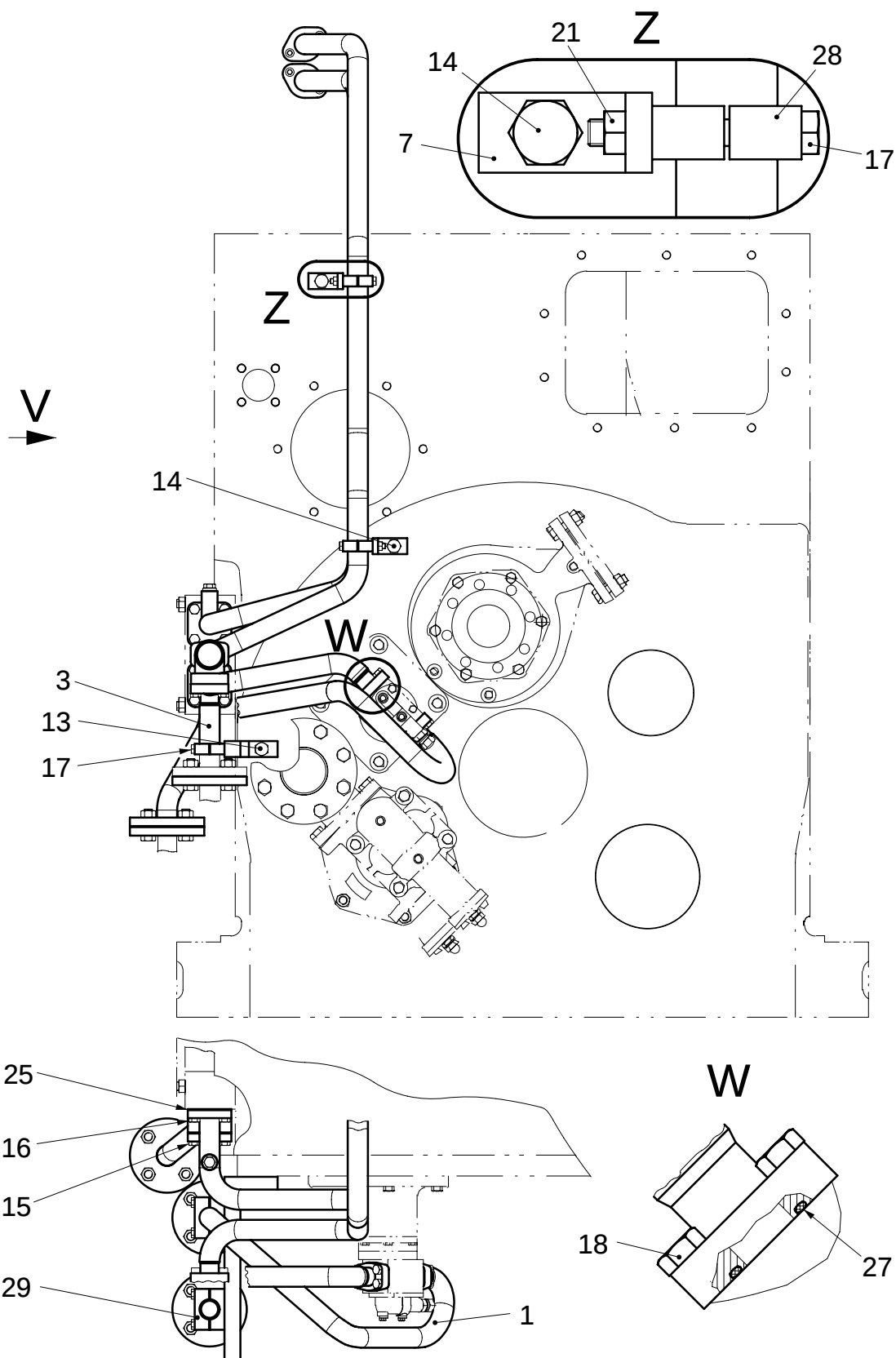
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Fuel Filter Pipe Mounting

M25

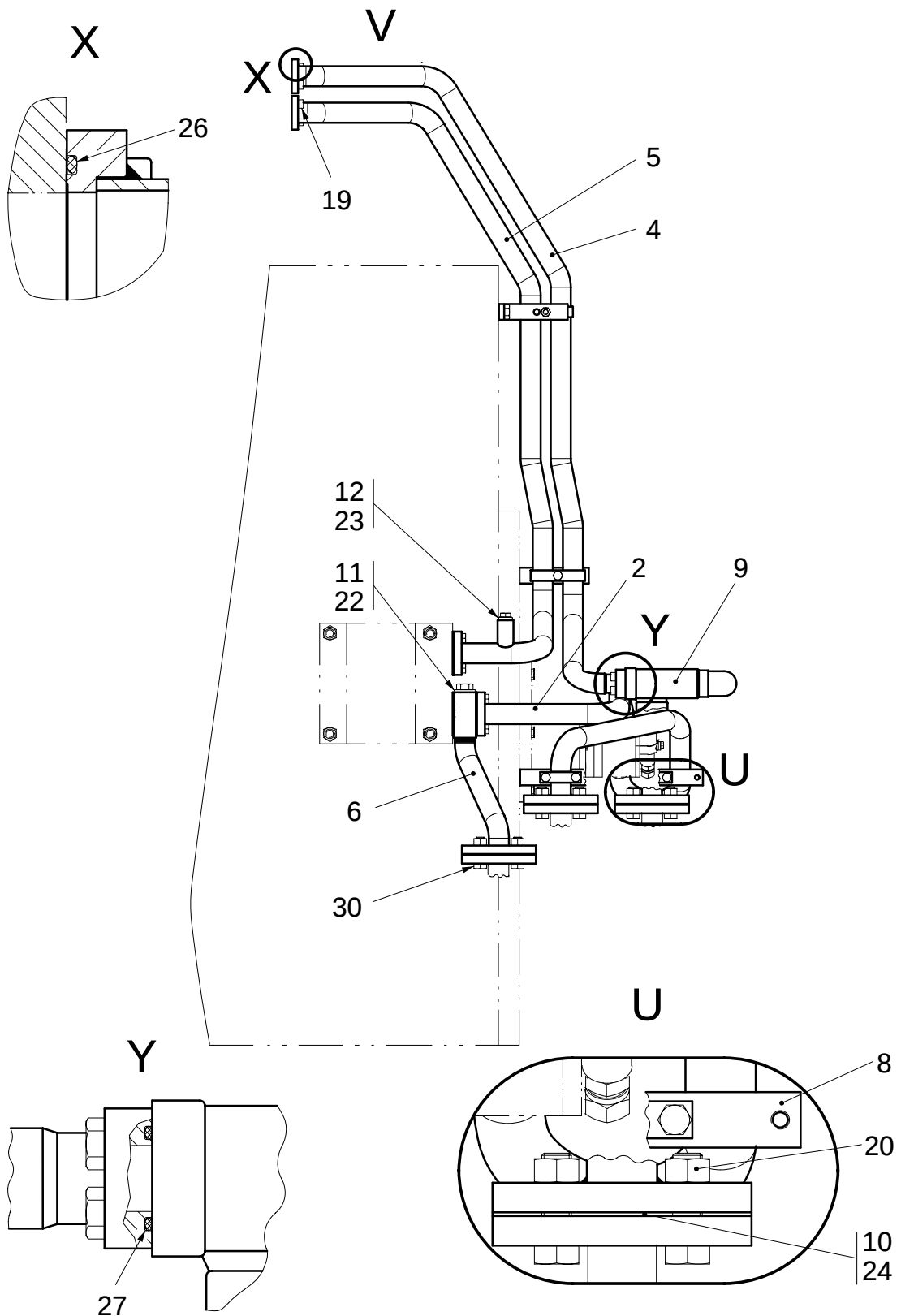
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Fuel Filter Pipe Mounting

M25

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Fuel Filter Pipe Mounting

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFFILTERLTG.-ANBAU, VOLLST. FUEL FILTER PIPE MOUNTING ASSEMBLY	1	258538 AA
1	KRAFTSTOFFRÜCKLAUFLEITUNG, VOLLST. FUEL RETURN PIPE, COMPL.	1	258538-101
2	KRAFTSTOFFZULAUFLEITUNG, VOLLST. FUEL ADMISSION PIPE, COMPL.	1	258538-102
3	KRAFTSTOFFFILTERLEITUNG, VOLLST. FUEL FILTER PIPE, COMPL.	1	9.8538-001
4	KRAFTSTOFFFILTERLEITUNG, VOLLST. FUEL FILTER PIPE, COMPL.	1	9.8538-002
5	HALTER BRACKET	2	258538-105
6	HALTER BRACKET	1	258538-106
7	FLANSCH FLANGE	2	1.5340-137
8	ROHRKLEMME PIPE CLAMP	4	1.5011-060
9	ROHRKLEMME PIPE CLAMP	4	1.5011-035
10	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-609
11	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	4	1.1152-132
12	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	4	1.1152-131
13	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-279
14	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-377
15	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-441
16	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-389
17	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-035
18	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-038
19	DICHTRING JOINT RING	# 1	1.7010-133
20	DICHTUNG GASKET	# 2	1.7073-725

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Fuel Filter Pipe Mounting

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	O-RING O-RING	# 2	1.7084-649
22	O-RING O-RING	# 1	1.7084-619
23	DICHTUNG GASKET	# 2	1.7073-353
24	SCHEIBE WASHER	1	1.0052-313
25	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1392-349
26	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-447

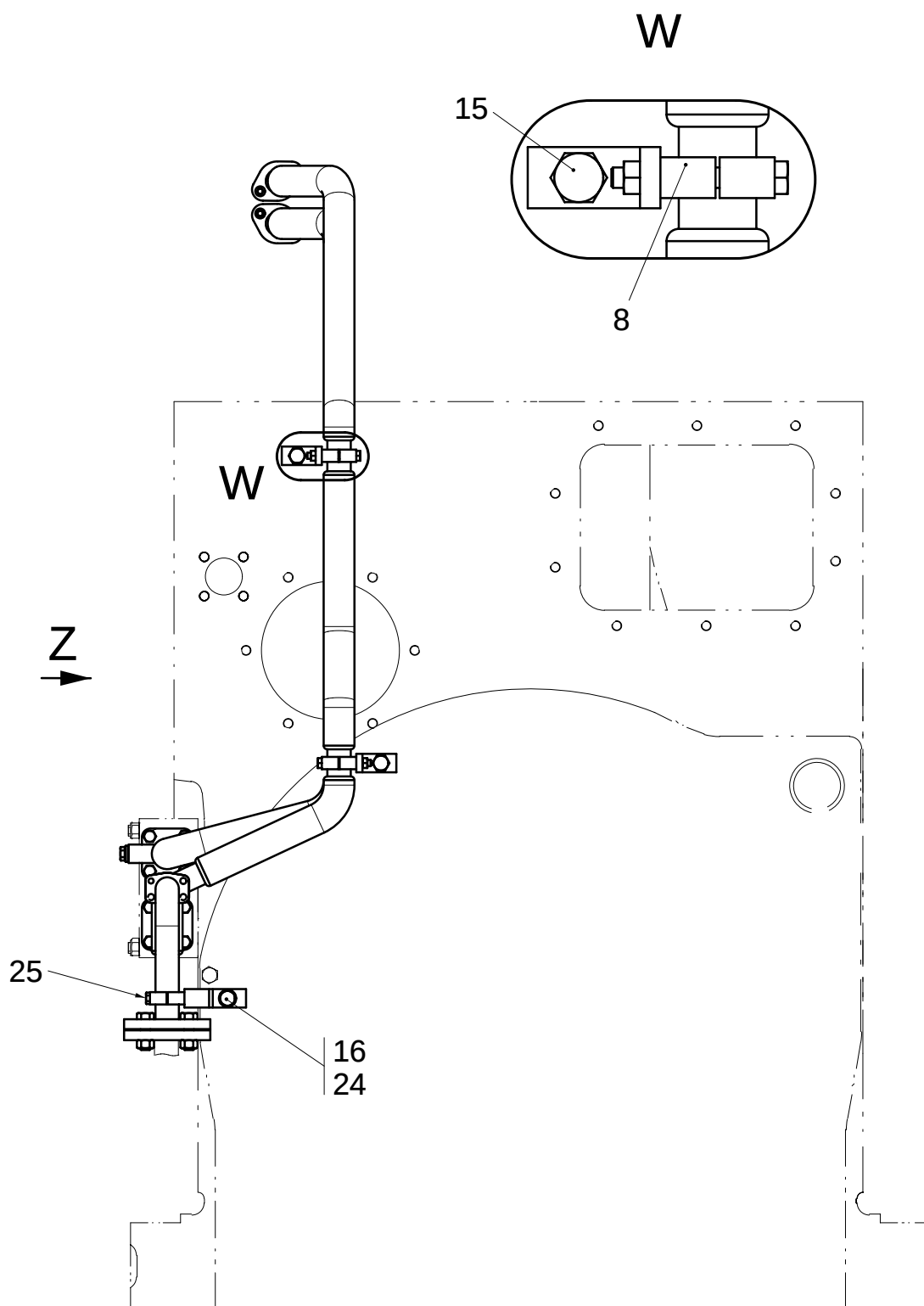
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Fuel Filter Pipe Mounting

M25

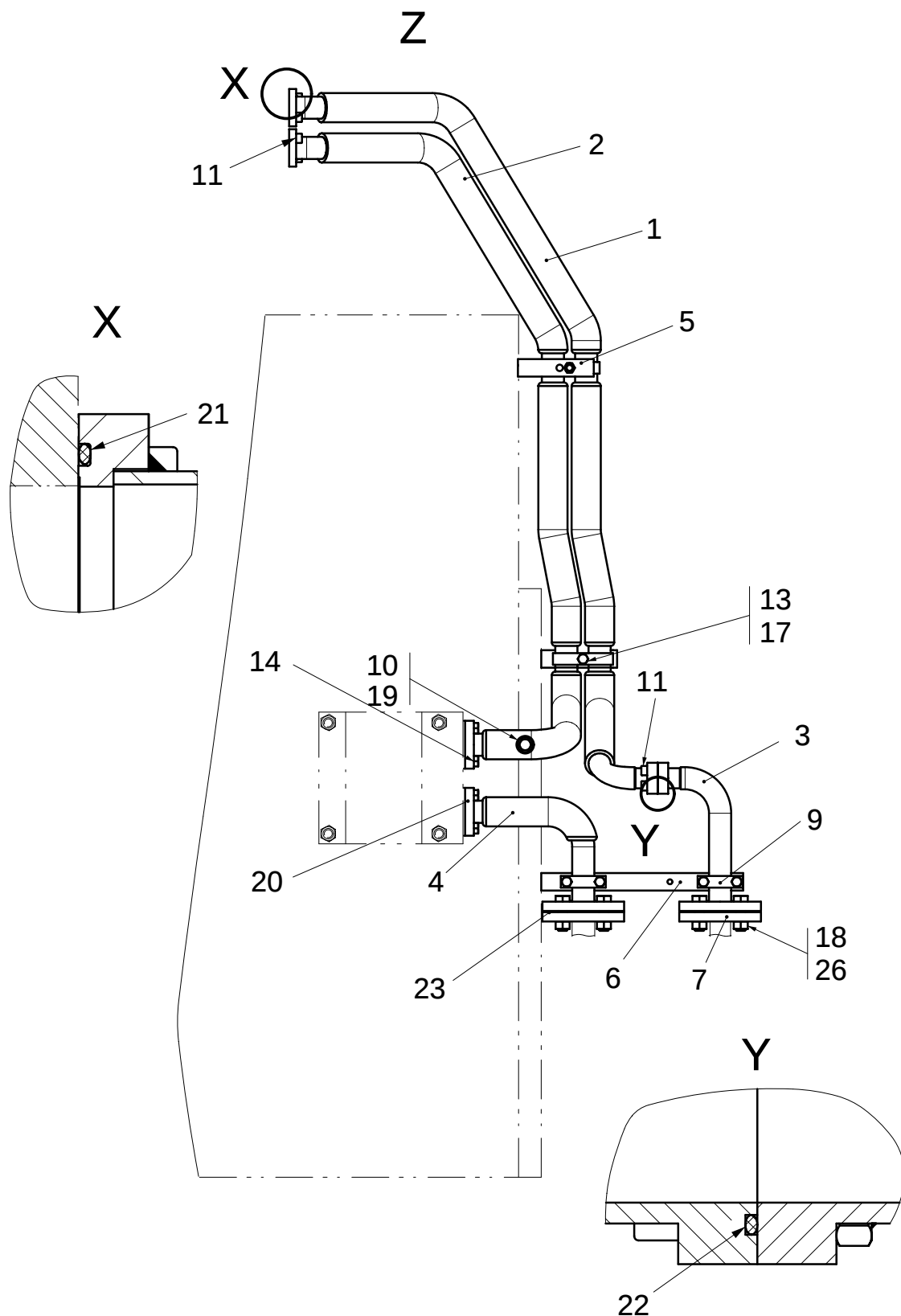
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Fuel Filter Pipe Mounting

M25

07



Leak Fuel Piping

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLECKLEITUNG-ANBAU, VOLLST. LEAK FUEL PIPING ASSEMBLY	1	258540 AA
1	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	5	258478-001
2	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-002
3	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	5	258540-003
6	STUTZEN PIPE UNION	6	1.5098-034
7	STUTZEN PIPE UNION	1	1.5095-072
9	STUTZEN UNION TEE	5	1.5095-512
12	DICHTRING JOINT RING	# 6	1.7010-038
15	ROHRKLEMME PIPE CLAMP	12	1.5011-002
17	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-311

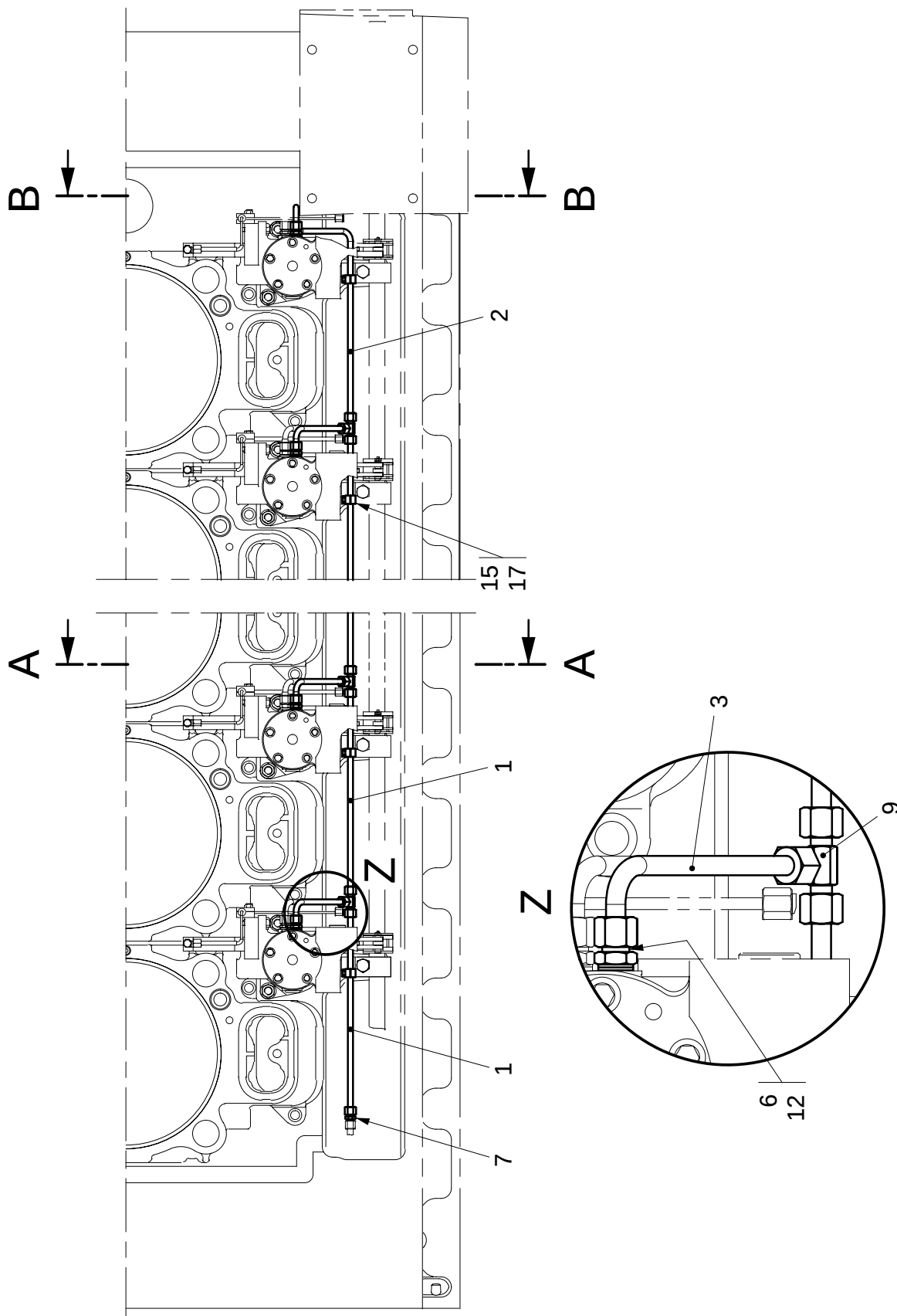
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Leak Fuel Piping

M25

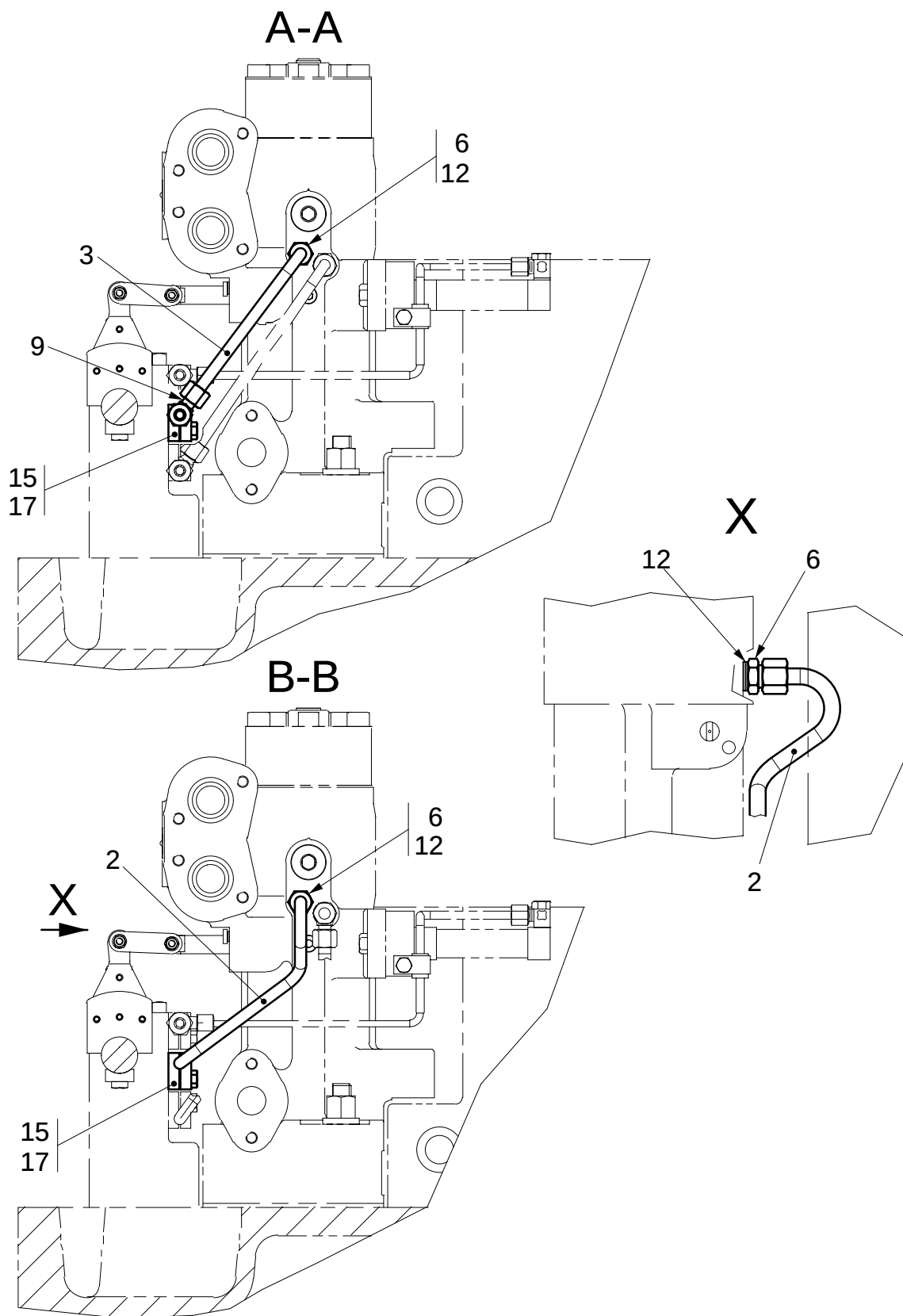
07



Leak Fuel Piping

M25

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Leak Fuel Piping

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LECKLEITUNG-ANBAU, VOLLST. LEAK FUEL PIPING ASSEMBLY	1	258540 BB
1	DÜSENLECKLEITUNG, VOLLST. NOZZLE LEAK FUEL PIPE, COMPL.	1	258540-101
2	DÜSENLECKLEITUNG, VOLLST. NOZZLE LEAK FUEL PIPE, COMPL.	1	258540-102
3	DRUCKROHRLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-103
4	PUMPENLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-104
5	PUMPENLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-105
6	PUMPENTROGLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-106
7	PUMPENLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-107
8	PUMPENLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-108
9	KRAFTSTOFFLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-109
10	HALTER BRACKET	1	258540-110
11	HALTER BRACKET	1	258540-111
12	HALTER BRACKET	1	258540-112
13	STUTZEN MALE CONNECTOR	2	1.5094-173
14	STUTZEN MALE CONNECTOR	1	1.5094-268
15	STUTZEN ADJUSTABLE PIPE UNION	1	1.5096-867
16	STUTZEN PIPE UNION	4	1.5095-027
17	STUTZEN PIPE UNION	3	1.5095-072
18	GERADE REDUZIERVERSCHRAUBUNG REDUCING UNION	1	1.5098-033
19	KUGELHAHN COCK	1	9.8540-310
20	ROHRKLEMME PIPE CLAMP	6	1.5011-067

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Leak Fuel Piping

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	ROHRKLEMME PIPE CLAMP	8	1.5011-002
22	DICHTRING JOINT RING	# 2	1.7010-196
23	DICHTRING JOINT RING	# 1	1.7010-252
24	DICHTRING JOINT RING	# 1	1.7033-103
25	DICHTUNG GASKET	# 1	1.7073-804
26	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-441
27	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-340
28	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-246
29	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-244
30	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-240
31	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-311
32	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
33	SCHEIBE WASHER	1	1.0040-224
34	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-543
35	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	3	1.3088-568
36	ÜBERWURFMUTTER UNION NUT	3	1.5040-141
37	ÜBERWURFMUTTER UNION NUT	1	1.5040-116

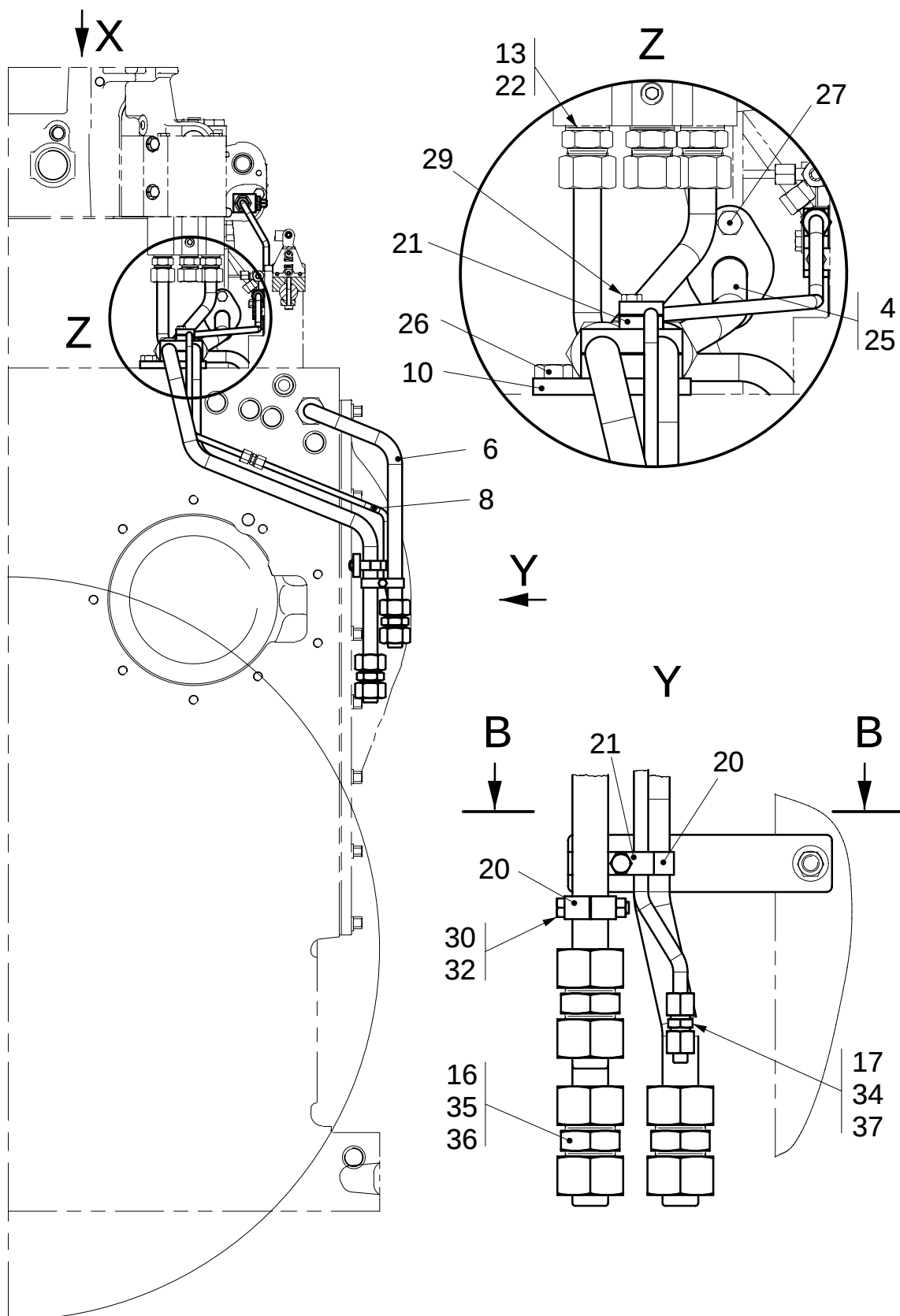
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
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Leak Fuel Piping

M25

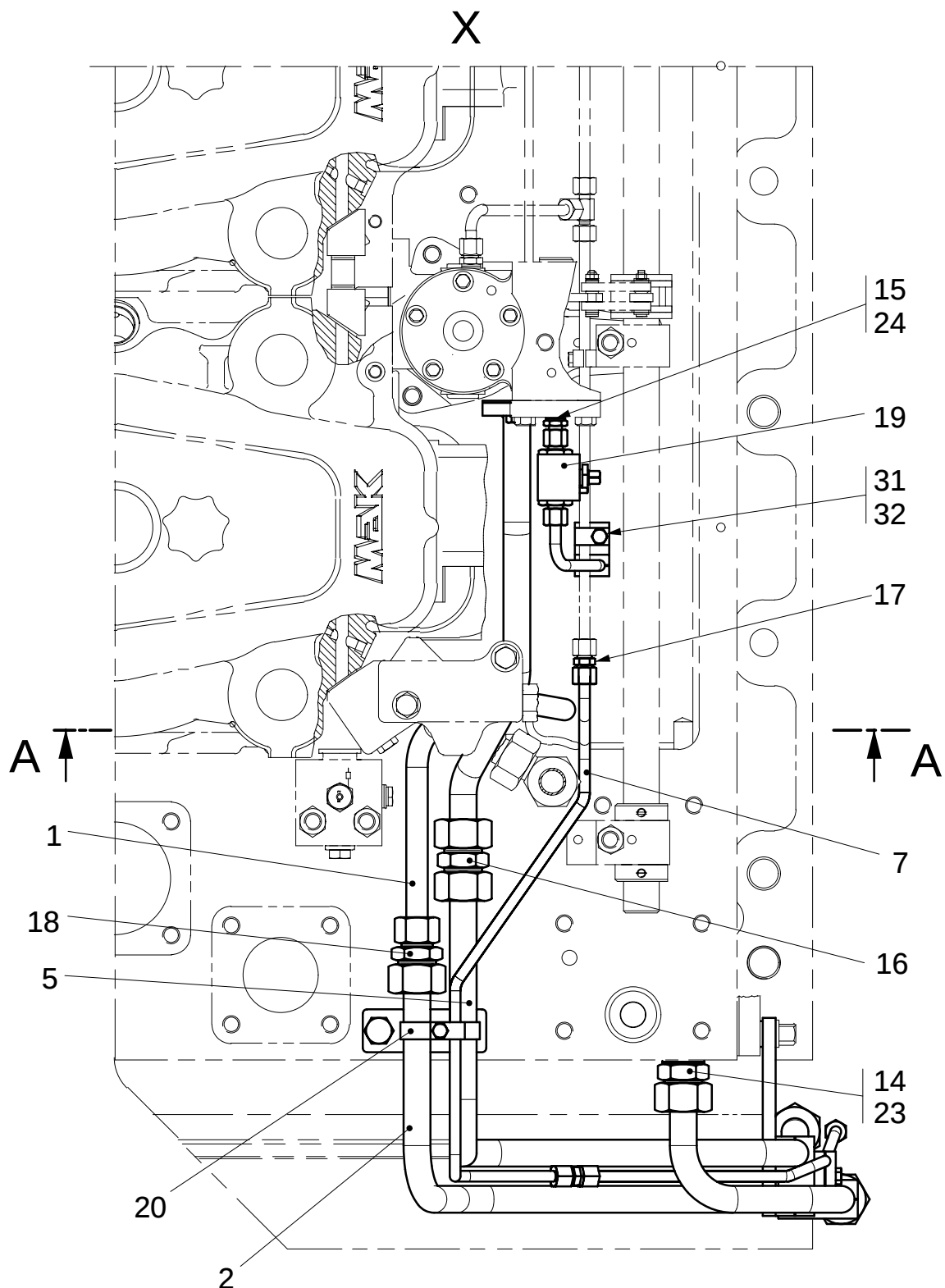
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Leak Fuel Piping

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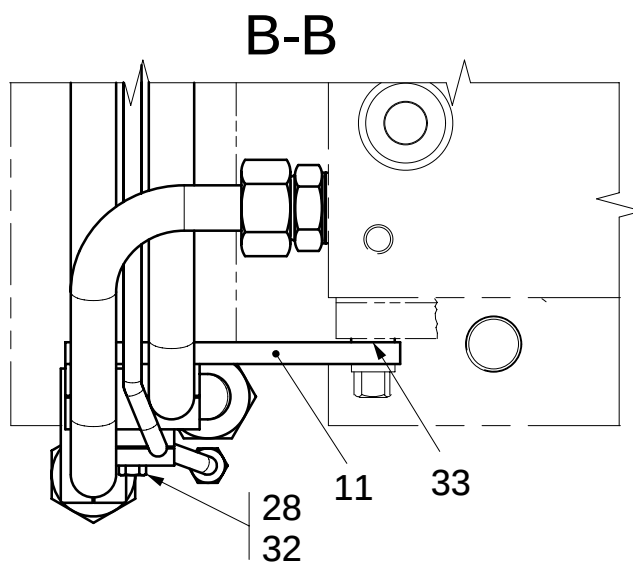
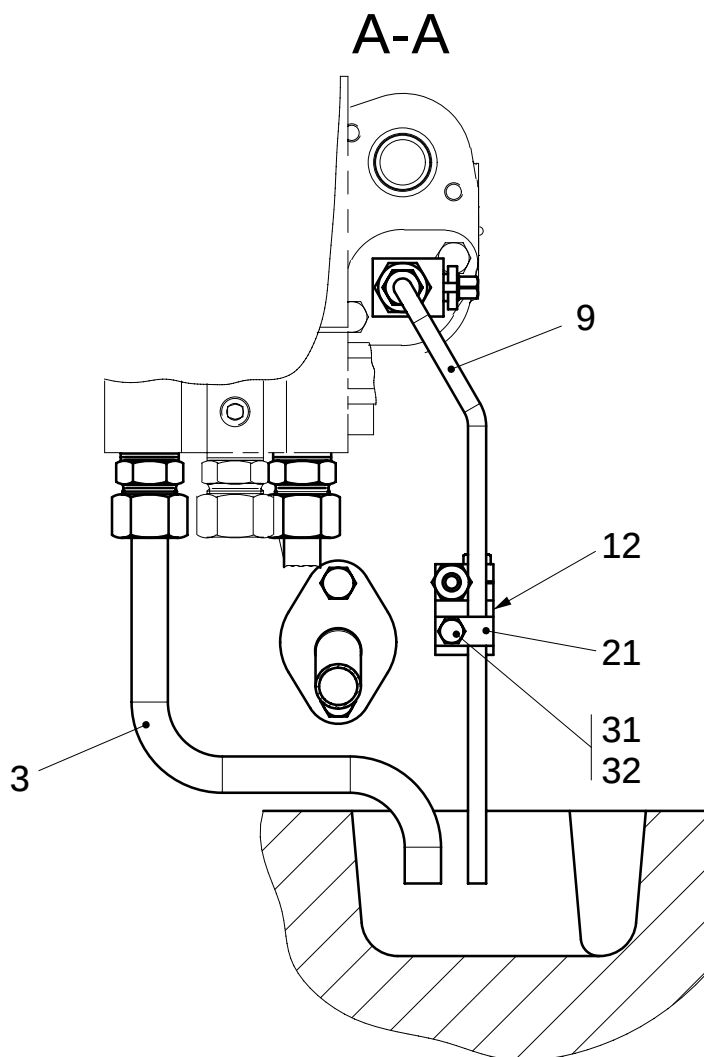
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Leak Fuel Piping

M25

07



Leak Fuel Piping

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLECKLEITUNG-ANBAU, VOLLST. LEAK FUEL PIPING ASSEMBLY	1	258540 CC
1	DÜSENLECKLEITUNG, VOLLST. NOZZLE LEAK FUEL PIPE, COMPL.	1	258540-101
2	DÜSENLECKLEITUNG, VOLLST. NOZZLE LEAK FUEL PIPE, COMPL.	1	258540-102
3	KRAFTSTOFFLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-103
4	KRAFTSTOFFLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-104
5	KRAFTSTOFFLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-105
6	PUMPENTROGLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-106
7	KRAFTSTOFFLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-107
8	KRAFTSTOFFLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-108
9	KRAFTSTOFFLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-109
10	HALTER BRACKET	1	258540-110
11	HALTER BRACKET	1	258540-111
12	HALTER BRACKET	1	258540-112
13	STUTZEN MALE CONNECTOR	2	1.5094-173
14	STUTZEN MALE CONNECTOR	1	1.5094-268
16	STUTZEN PIPE UNION	4	1.5095-027
17	STUTZEN PIPE UNION	3	1.5095-072
18	GERADE REDUZIERVERSCHRAUBUNG REDUCING UNION	1	1.5098-033
20	ROHRKLEMME PIPE CLAMP	6	1.5011-067
21	ROHRKLEMME PIPE CLAMP	8	1.5011-002
22	DICHTRING JOINT RING	# 2	1.7010-196

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Leak Fuel Piping

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
23	DICHTRING JOINT RING	# 1	1.7010-252
25	DICHTUNG GASKET	# 1	1.7073-804
26	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-441
27	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-340
28	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-246
29	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-244
30	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-240
31	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-311
32	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
33	SCHEIBE WASHER	1	1.0040-224
34	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-543
35	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	3	1.3088-568
36	ÜBERWURFMUTTER UNION NUT	3	1.5040-141
37	ÜBERWURFMUTTER UNION NUT	1	1.5040-116

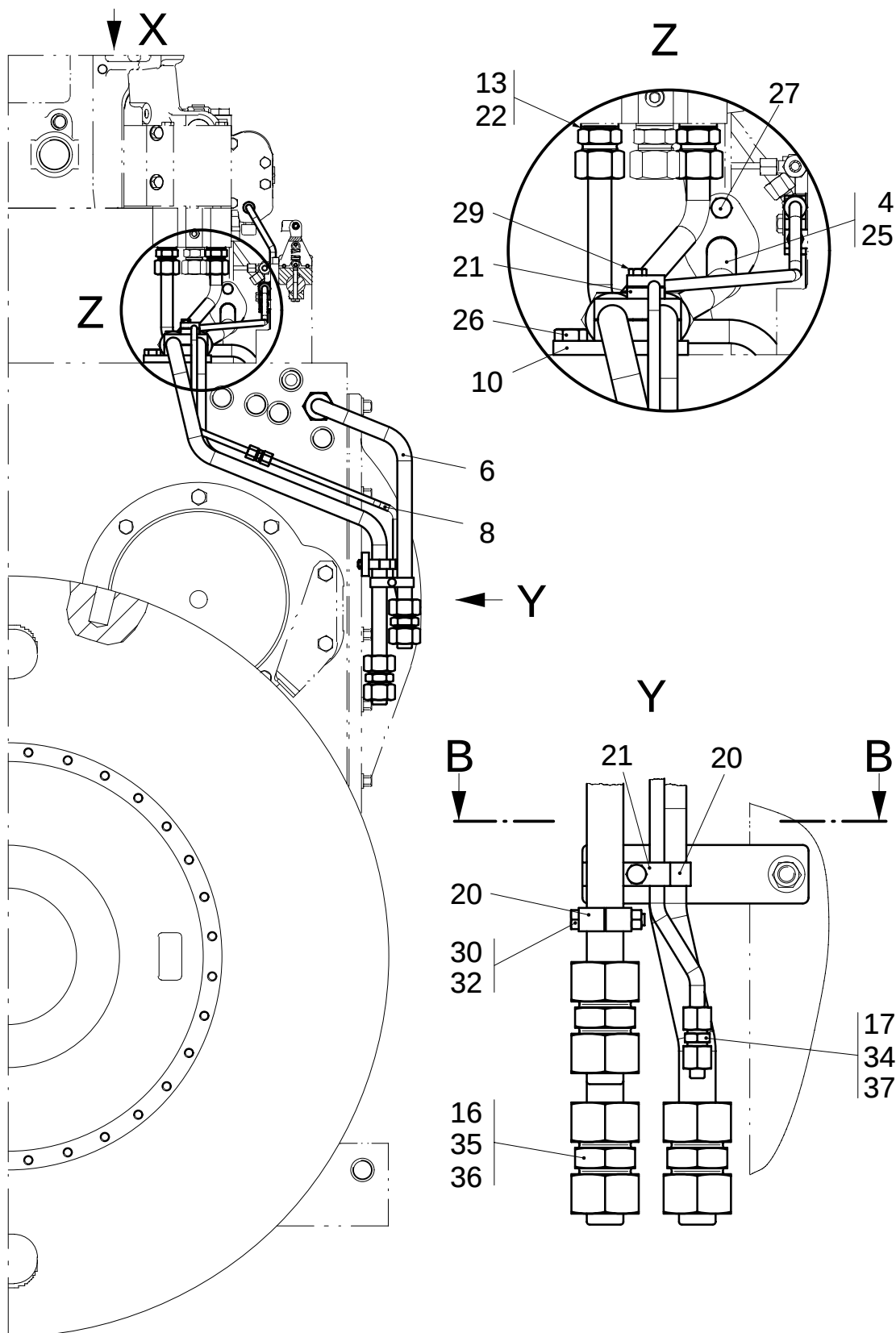
= VERBRAUCHSTEILE
CONSUMABLES

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Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Leak Fuel Piping

M25

07

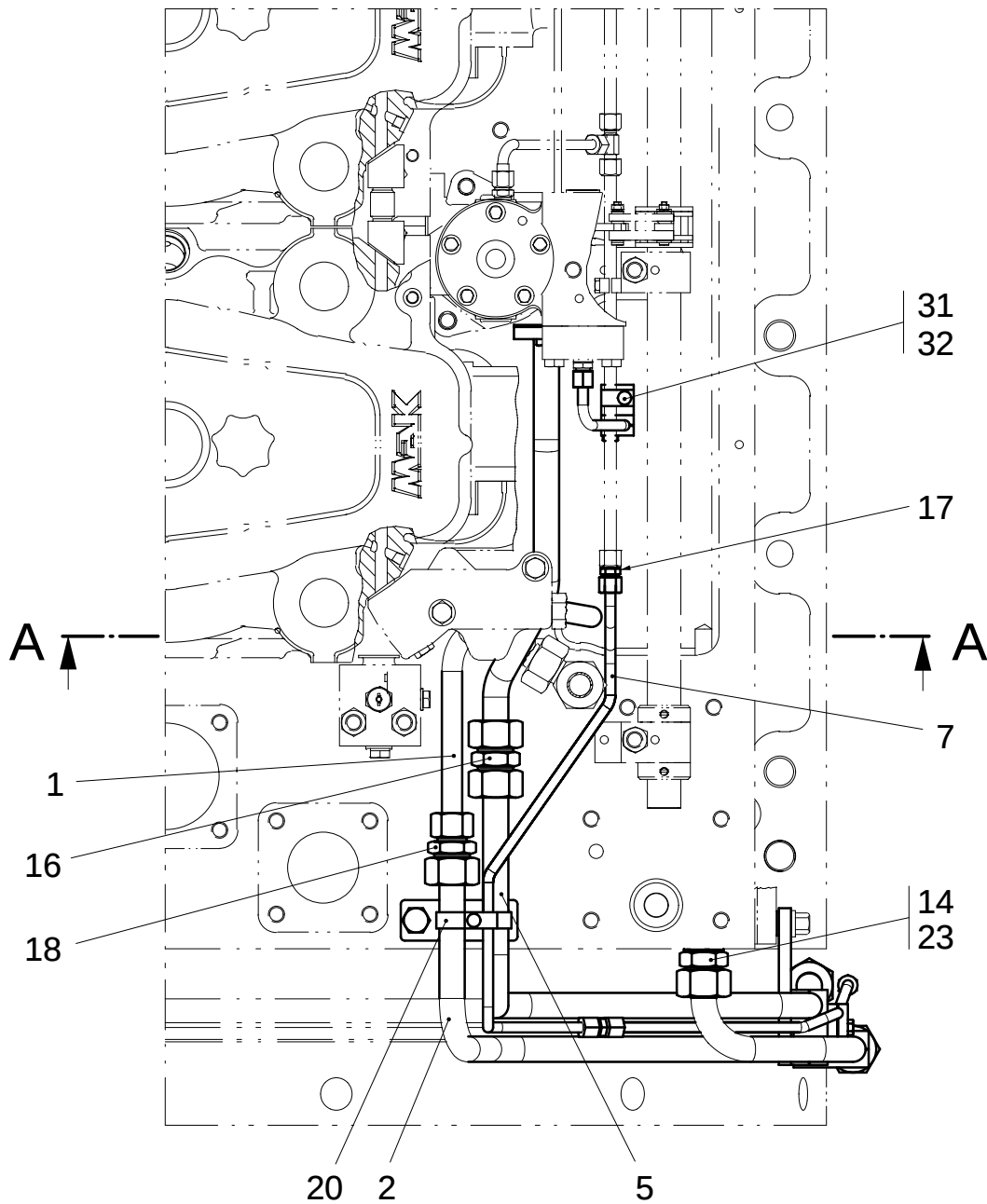


Leak Fuel Piping

M25

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X

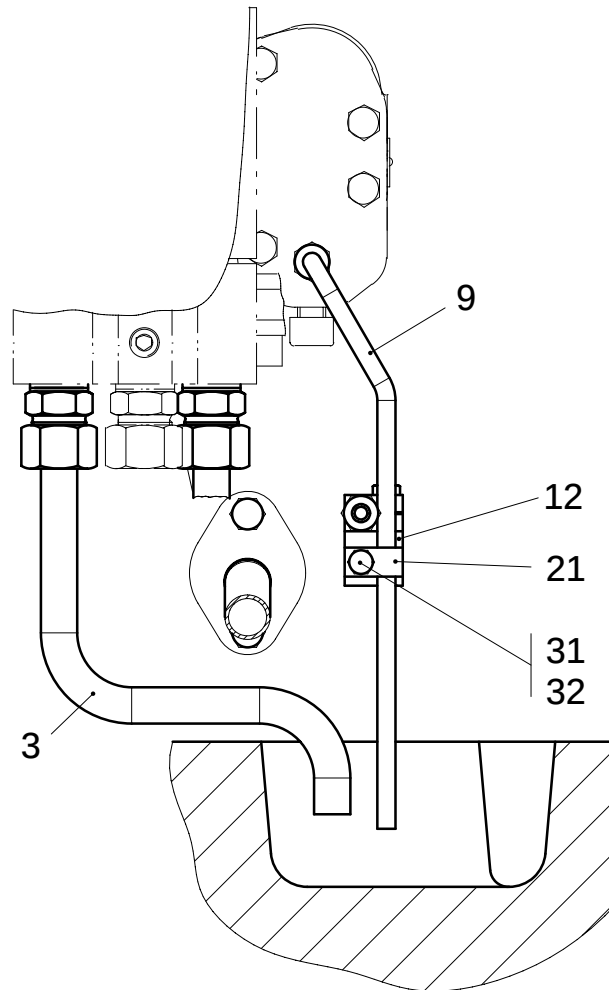


Leak Fuel Piping

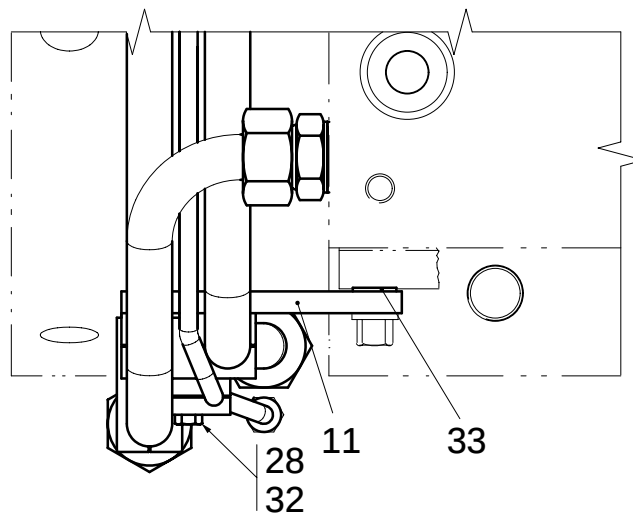
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07

A-A



B-B



Leak Fuel Piping

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLECKLEITUNG-ANBAU, VOLLST. LEAK FUEL PIPING ASSEMBLY	1	258540 DD
1	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	7	258478-001
2	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-002
3	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	7	258540-003
6	STUTZEN PIPE UNION	8	1.5098-034
7	STUTZEN PIPE UNION	1	1.5095-072
9	STUTZEN UNION TEE	7	1.5095-512
12	DICHTRING JOINT RING	# 8	1.7010-038
15	ROHRKLEMME PIPE CLAMP	16	1.5011-002
17	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-311

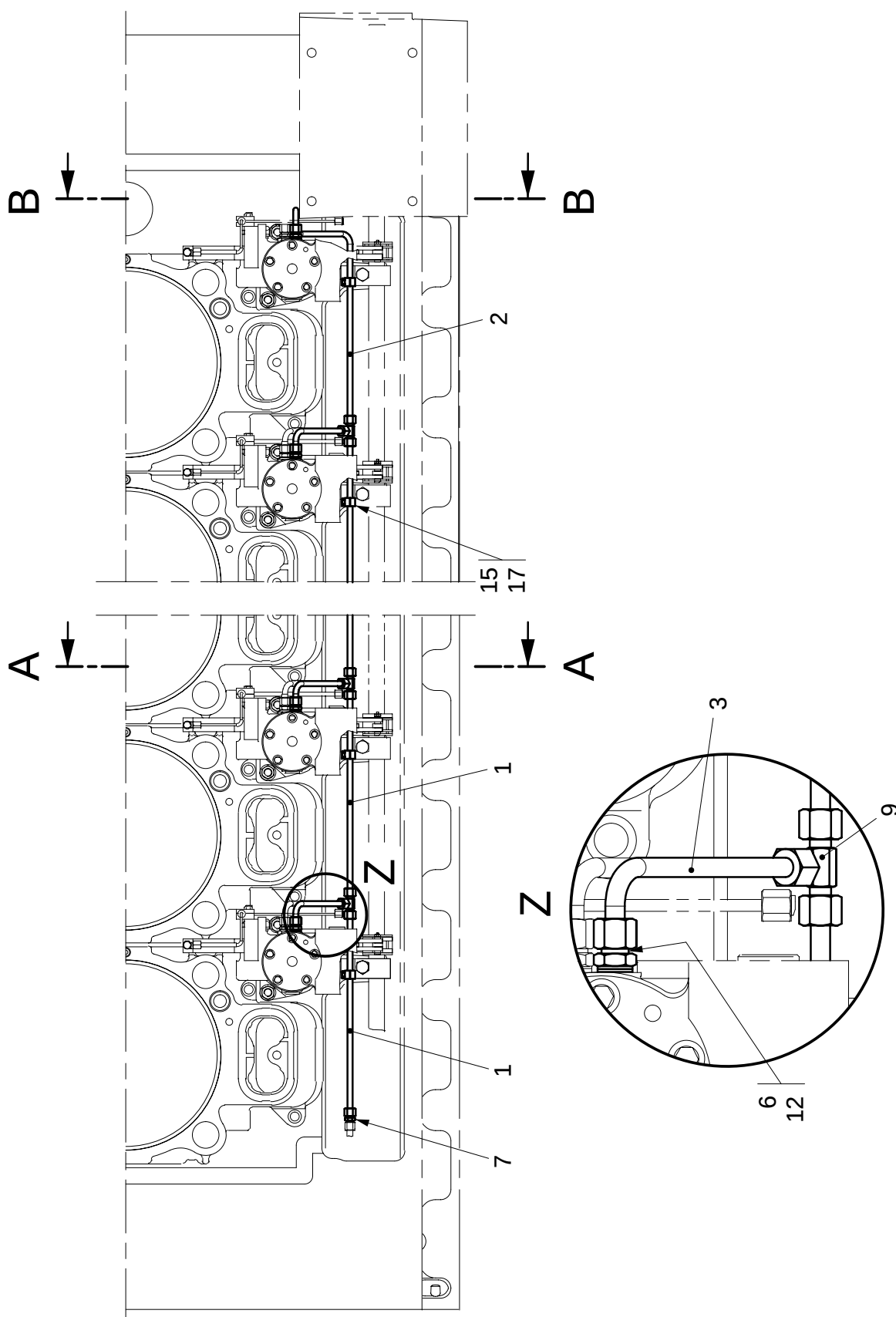
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Leak Fuel Piping

M25

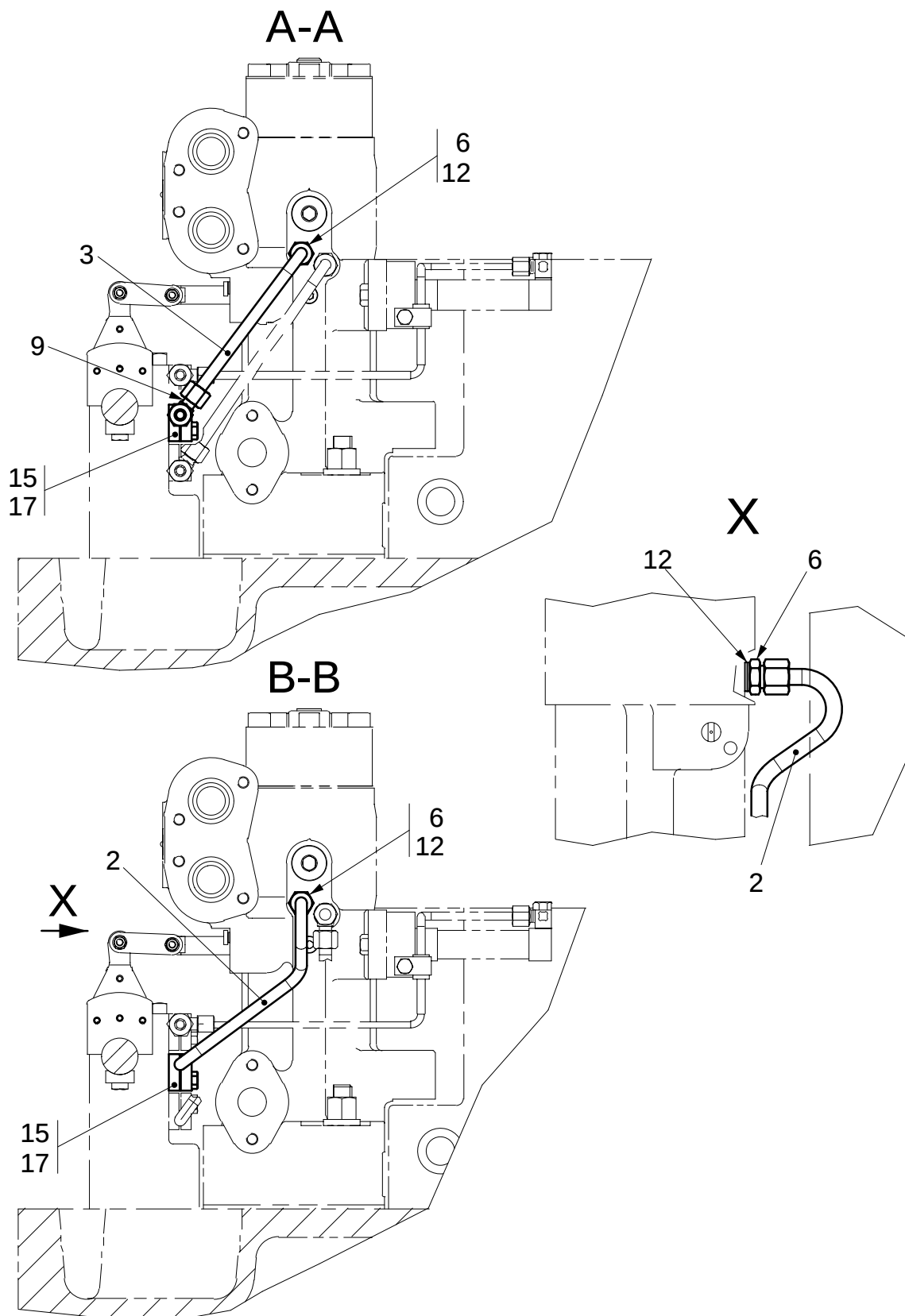
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Leak Fuel Piping

M25

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Leak Fuel Piping

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLECKLEITUNG-ANBAU, VOLLST. LEAK FUEL PIPING ASSEMBLY	1	258540 EE
1	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	8	258478-001
2	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-002
3	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	8	258540-003
6	STUTZEN PIPE UNION	9	1.5098-034
7	STUTZEN PIPE UNION	1	1.5095-072
9	STUTZEN UNION TEE	8	1.5095-512
12	DICHTRING JOINT RING	# 9	1.7010-038
15	ROHRKLEMME PIPE CLAMP	18	1.5011-002
17	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1387-311

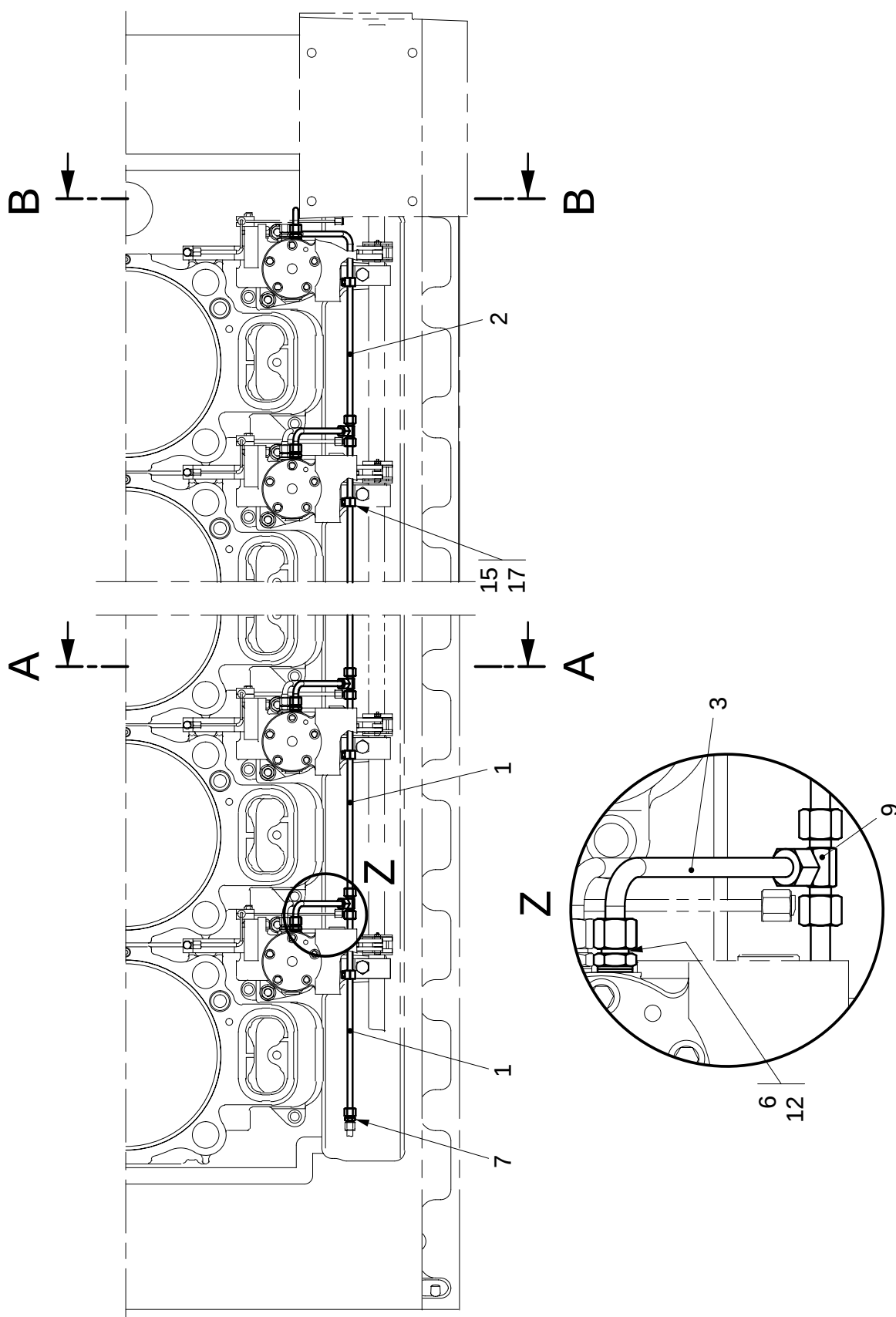
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CONSUMABLES

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Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Leak Fuel Piping

M25

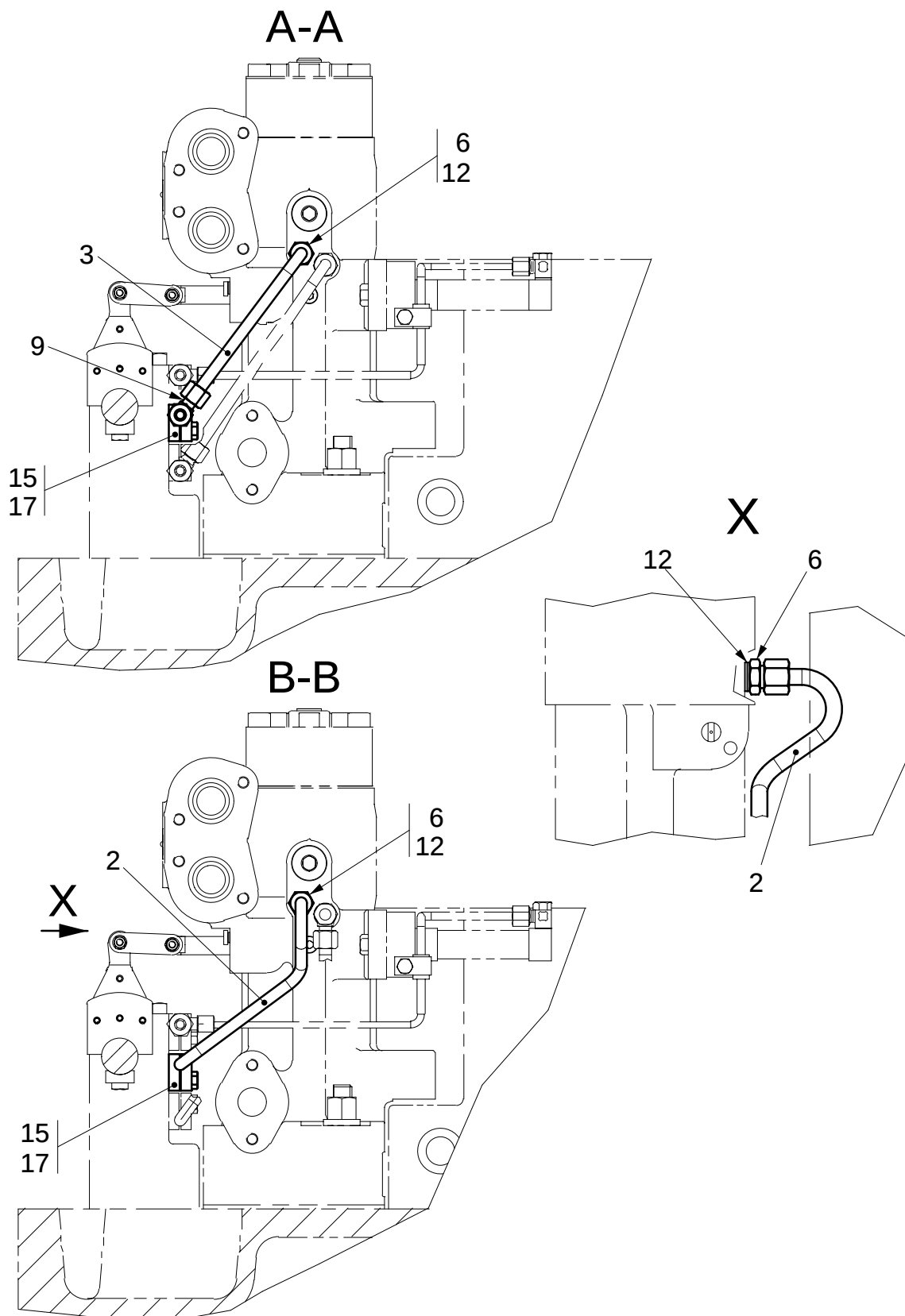
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Leak Fuel Piping

M25

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Leak Fuel Piping

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LECKLEITUNG-ANBAU, VOLLST. LEAK FUEL PIPING ASSEMBLY	1	258540 FF
1	DÜSENLECKLEITUNG, VOLLST. NOZZLE LEAK FUEL PIPE, COMPL.	1	258540-101
2	DÜSENLECKLEITUNG, VOLLST. NOZZLE LEAK FUEL PIPE, COMPL.	1	258540-202
3	KRAFTSTOFFLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-103
4	KRAFTSTOFFLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-204
5	KRAFTSTOFFLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-205
6	KRAFTSTOFFLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-206
7	KRAFTSTOFFLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-207
9	KRAFTSTOFFLECKLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-109
10	HALTER BRACKET	1	258540-110
11	HALTER BRACKET	1	258540-211
12	HALTER BRACKET	1	258540-112
13	STUTZEN MALE CONNECTOR	2	1.5094-173
14	STUTZEN MALE CONNECTOR	1	1.5094-268
16	STUTZEN PIPE UNION	2	1.5095-027
17	STUTZEN PIPE UNION	1	1.5095-227
18	GERADE REDUZIERVERSCHRAUBUNG REDUCING UNION	1	1.5098-033
19	ROHRKLEMME PIPE CLAMP	4	1.5011-023
20	ROHRKLEMME PIPE CLAMP	2	1.5011-067
21	ROHRKLEMME PIPE CLAMP	4	1.5011-002
22	DICHTRING JOINT RING	# 2	1.7010-196

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Leak Fuel Piping

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
23	DICHTRING JOINT RING	# 1	1.7010-252
25	DICHTUNG GASKET	# 1	1.7073-804
26	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-441
27	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-340
29	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-242
31	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-311
32	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
33	SCHEIBE WASHER	1	1.0040-224
35	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	2	1.3088-568
36	ÜBERWURFMUTTER UNION NUT	2	1.5040-141

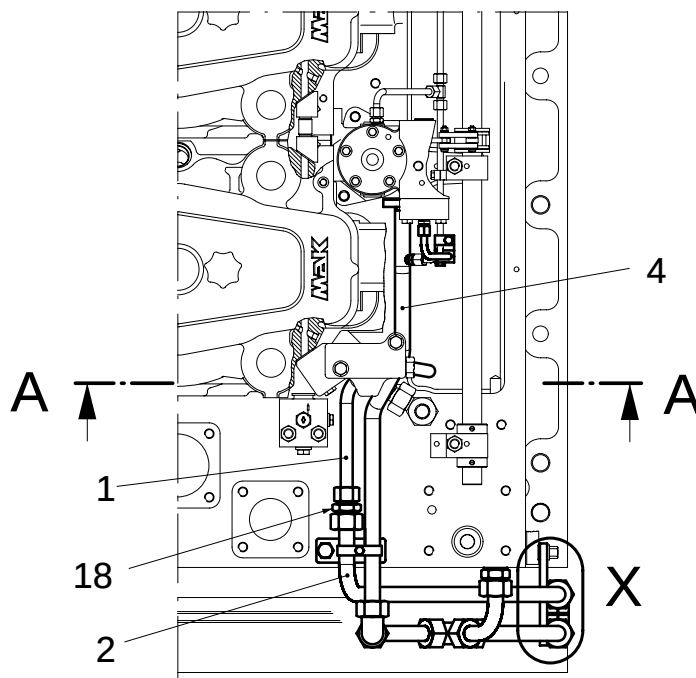
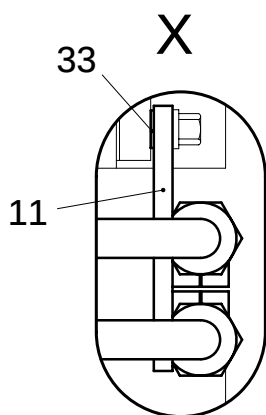
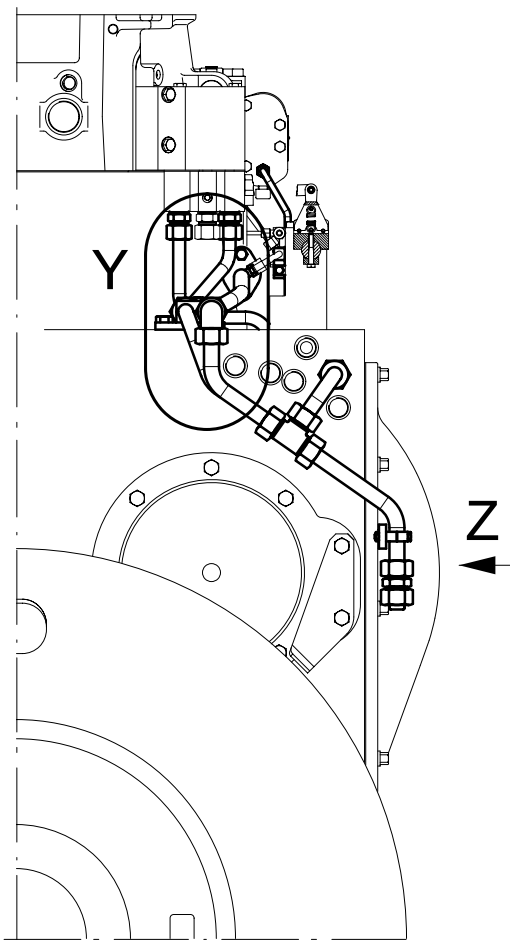
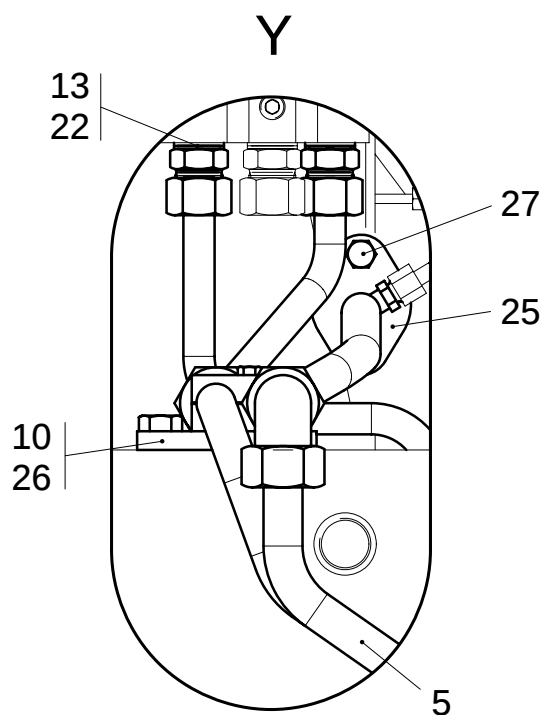
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Leak Fuel Piping

M25

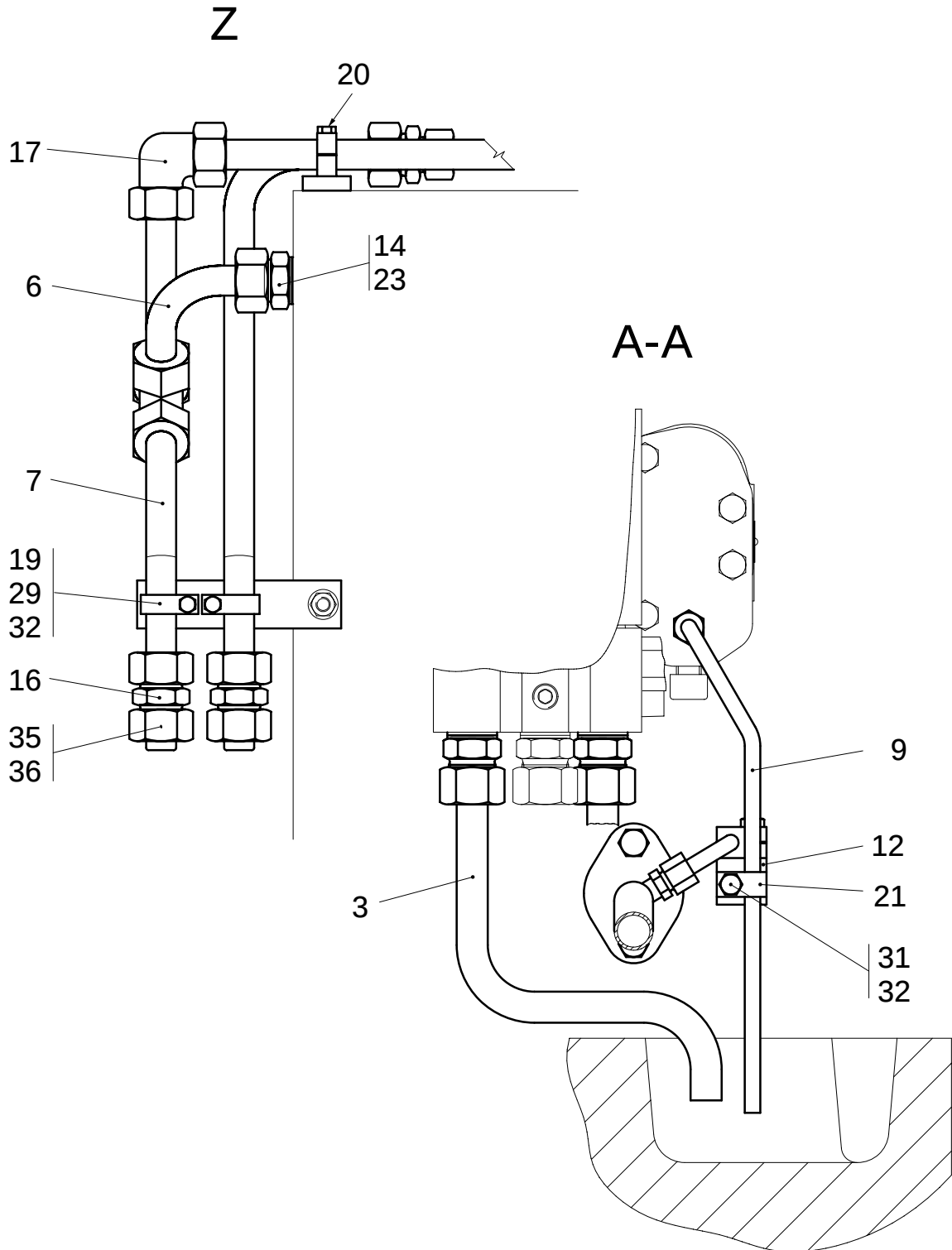
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Leak Fuel Piping

M25

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Leak Fuel Piping

M25

07

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLECKLEITUNG-ANBAU, VOLLST. LEAK FUEL PIPING ASSEMBLY	1	258540 GG
1	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	5	258478-001
2	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-002
3	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	5	258540-003
6	STUTZEN PIPE UNION	6	1.5098-034
7	STUTZEN PIPE UNION	1	1.5095-072
9	STUTZEN UNION TEE	5	1.5095-512
12	DICHTRING JOINT RING	# 6	1.7010-038
15	ROHRKLEMME PIPE CLAMP	12	1.5011-002
17	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-311

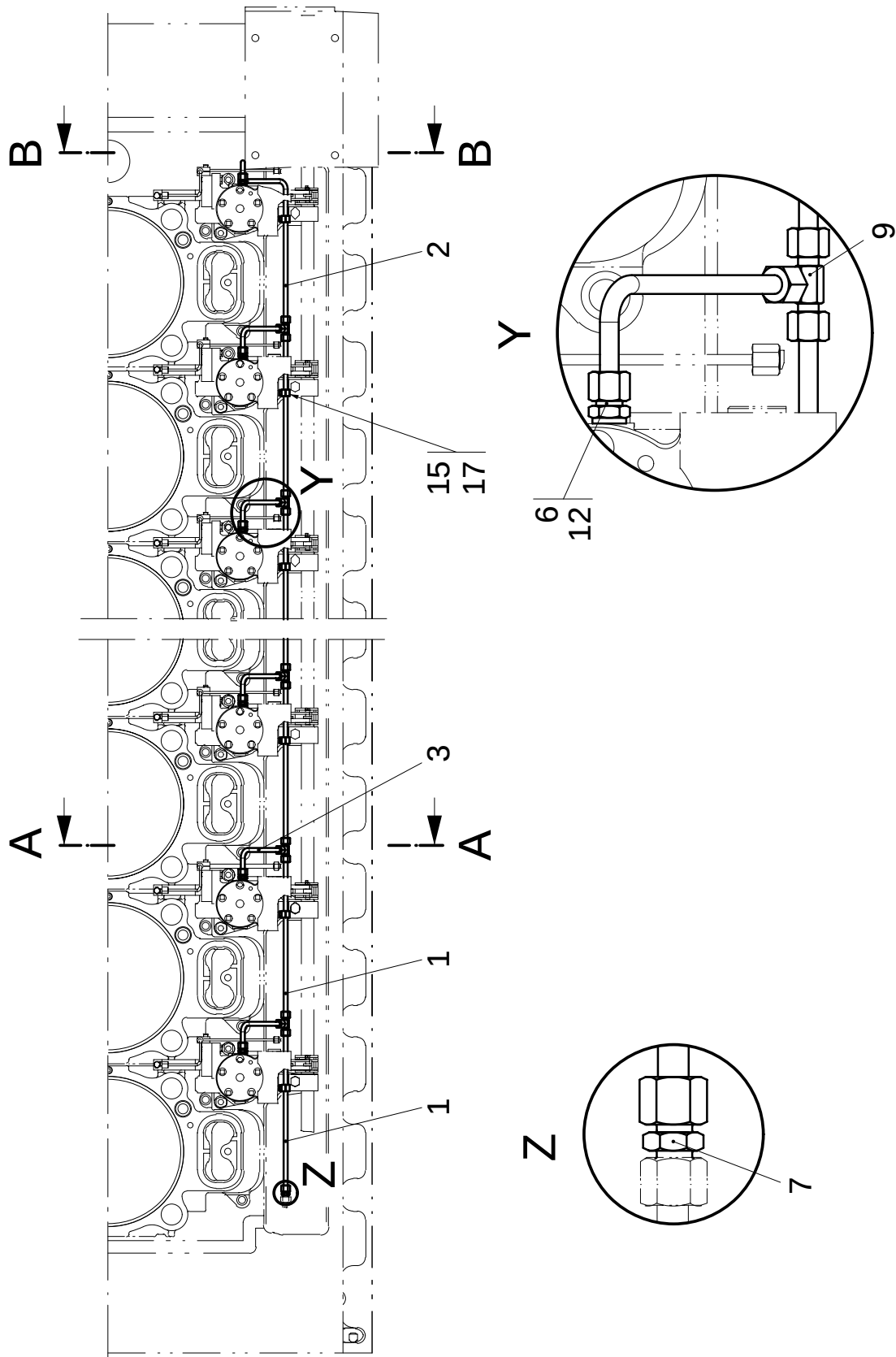
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Leak Fuel Piping

M25

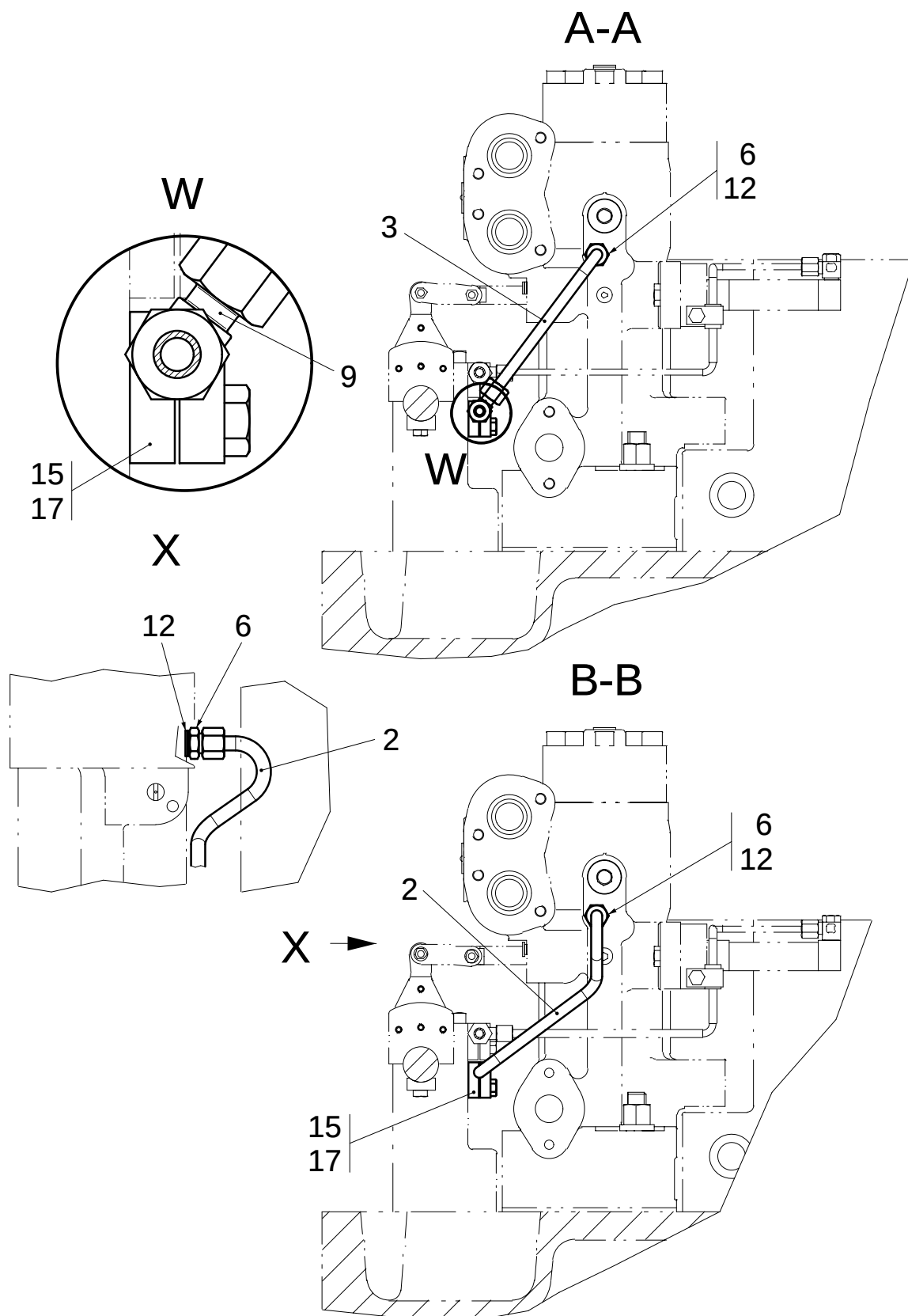
07



Leak Fuel Piping

M25

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Leak Fuel Piping

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLECKLEITUNG-ANBAU, VOLLST. LEAK FUEL PIPING ASSEMBLY	1	258540 HH
1	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	7	258478-001
2	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-002
3	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	7	258540-003
6	STUTZEN PIPE UNION	8	1.5098-034
7	STUTZEN PIPE UNION	1	1.5095-072
9	STUTZEN UNION TEE	7	1.5095-512
12	DICHTRING JOINT RING	# 8	1.7010-038
15	ROHRKLEMME PIPE CLAMP	16	1.5011-002
17	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-311

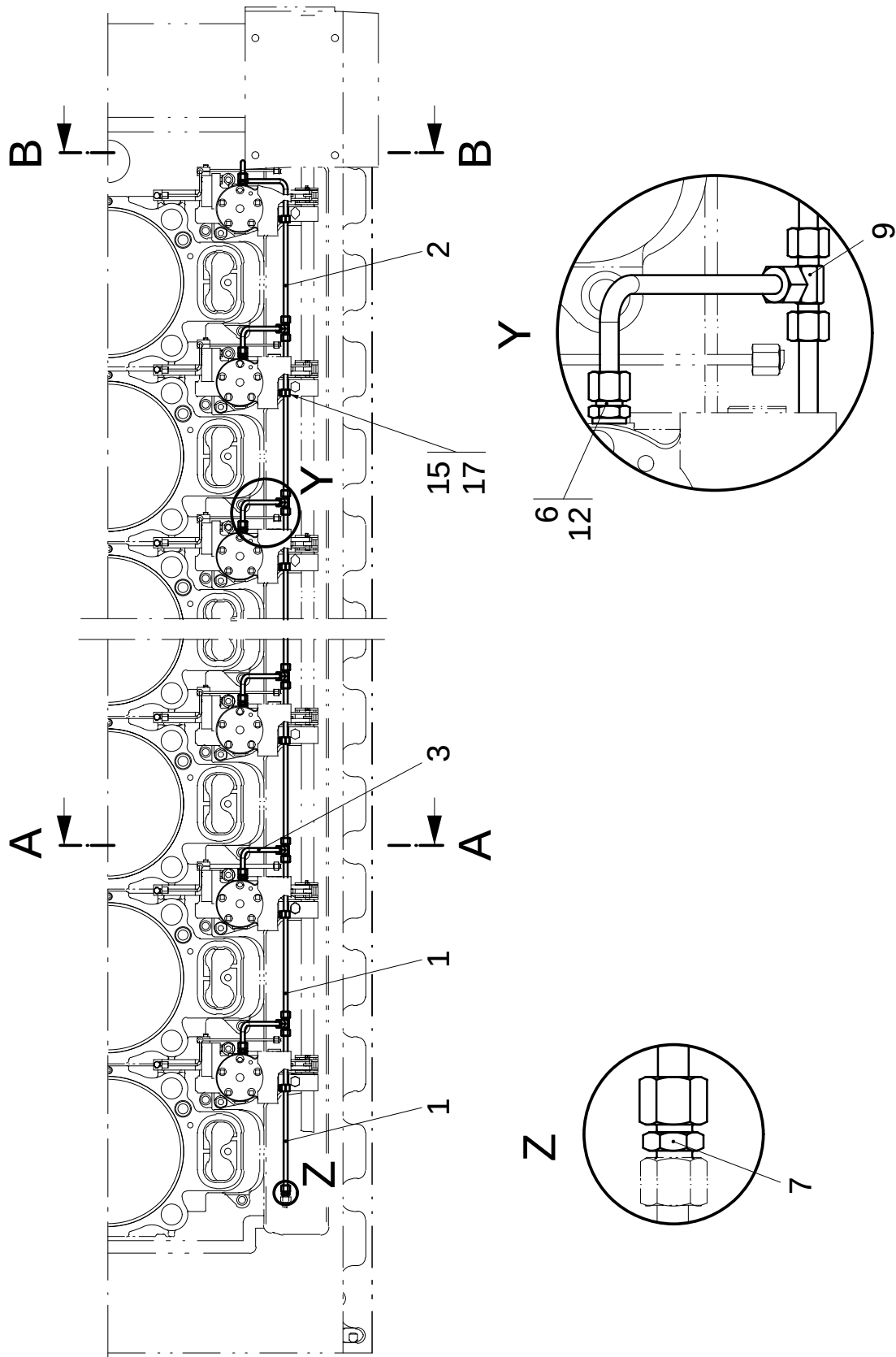
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CONSUMABLES

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Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Leak Fuel Piping

M25

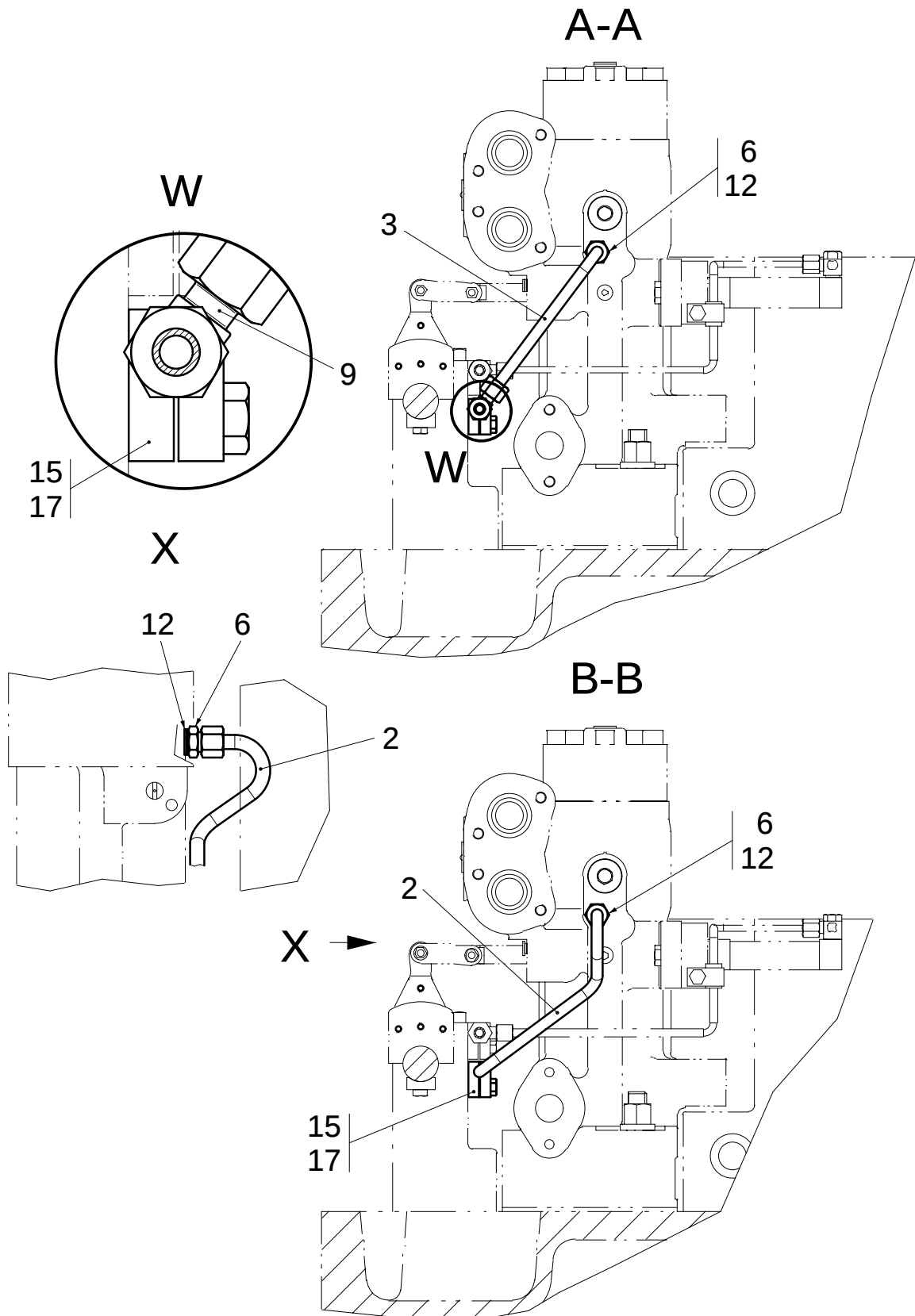
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Leak Fuel Piping

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Leak Fuel Piping

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLECKLEITUNG-ANBAU, VOLLST. LEAK FUEL PIPING ASSEMBLY	1	258540 KK
1	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	8	258478-001
2	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-002
3	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	8	258540-003
6	STUTZEN PIPE UNION	9	1.5098-034
7	STUTZEN PIPE UNION	1	1.5095-072
9	STUTZEN UNION TEE	8	1.5095-512
12	DICHTRING JOINT RING	# 9	1.7010-038
15	ROHRKLEMME PIPE CLAMP	18	1.5011-002
17	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1387-311

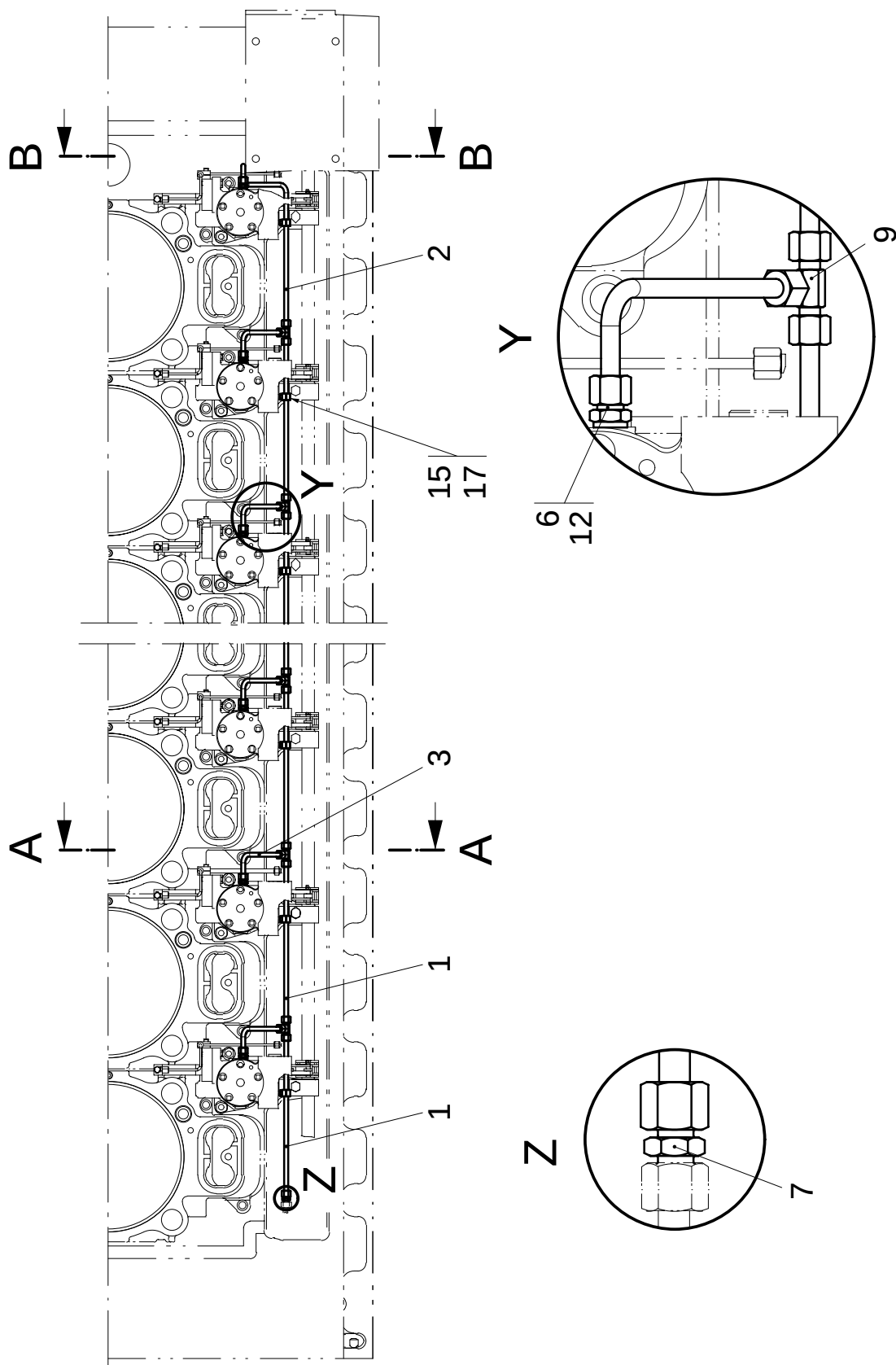
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Leak Fuel Piping

M25

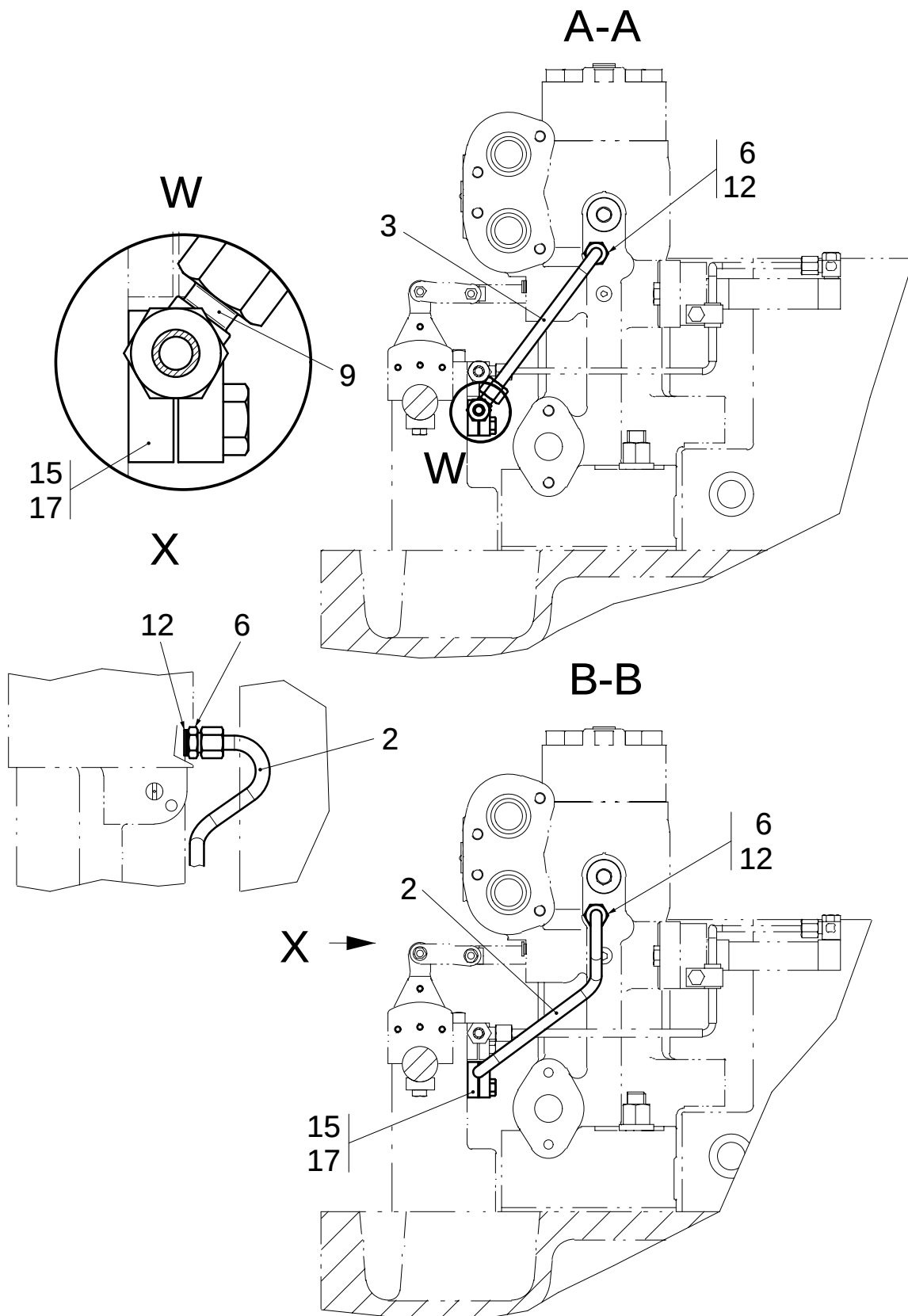
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Leak Fuel Piping

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Leak Fuel Piping

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLECKLEITUNG-ANBAU, VOLLST. LEAK FUEL PIPING ASSEMBLY	1	258540 LL
1	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	6	258478-001
2	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-002
3	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	7	258540-003
4	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-004
6	STUTZEN PIPE UNION	8	1.5098-034
9	STUTZEN UNION TEE	7	1.5095-512
12	DICHTRING JOINT RING	# 8	1.7010-038
15	ROHRKLEMME PIPE CLAMP	16	1.5011-002
17	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-311

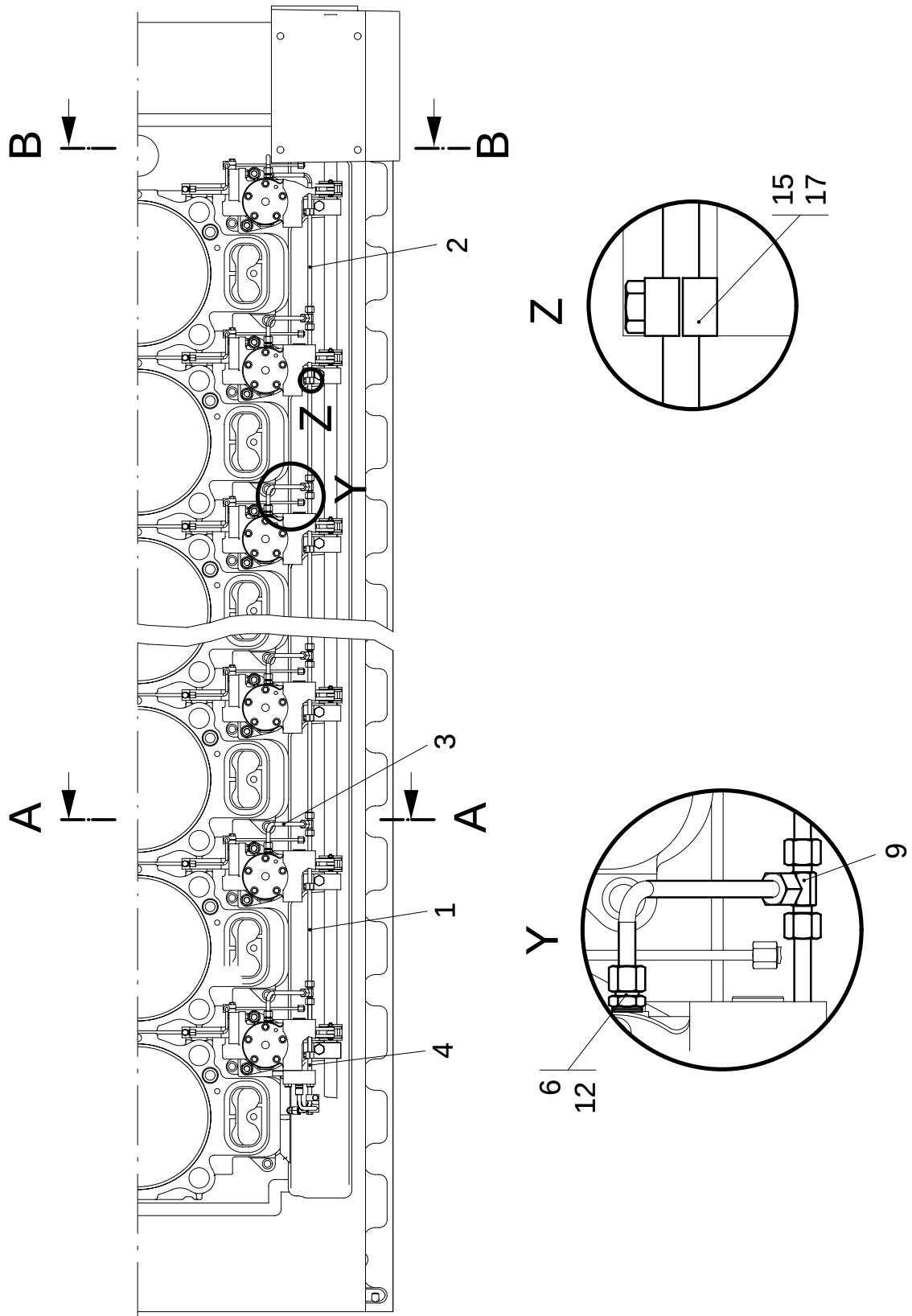
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Leak Fuel Piping

M25

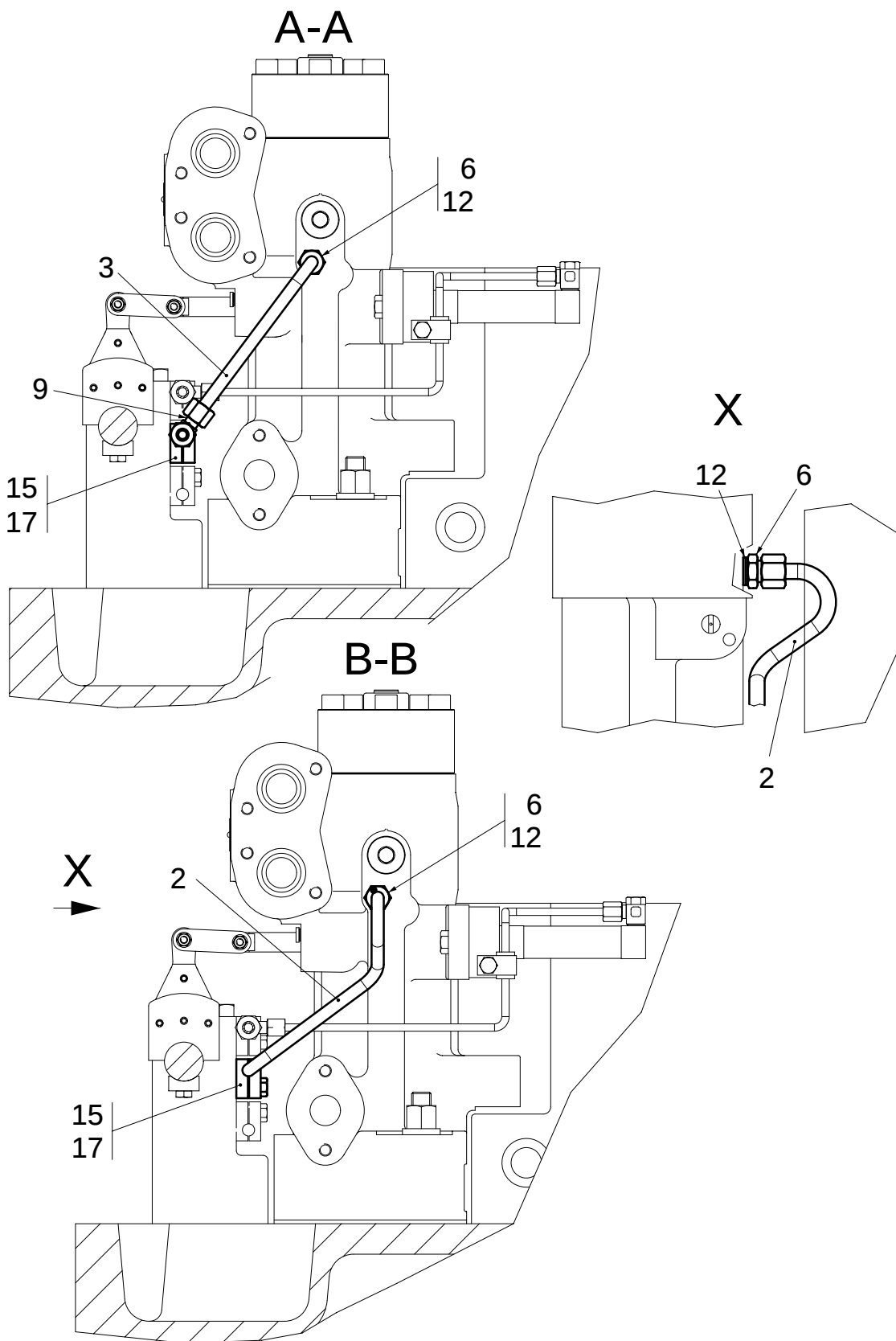
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Leak Fuel Piping

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Leak Fuel Piping

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLECKLEITUNG-ANBAU, VOLLST. LEAK FUEL PIPING ASSEMBLY	1	258540 MM
1	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	4	258478-001
2	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-002
3	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	5	258540-003
4	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-004
6	STUTZEN PIPE UNION	6	1.5098-034
9	STUTZEN UNION TEE	5	1.5095-512
12	DICHTRING JOINT RING	# 6	1.7010-038
15	ROHRKLEMME PIPE CLAMP	12	1.5011-002
17	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-311

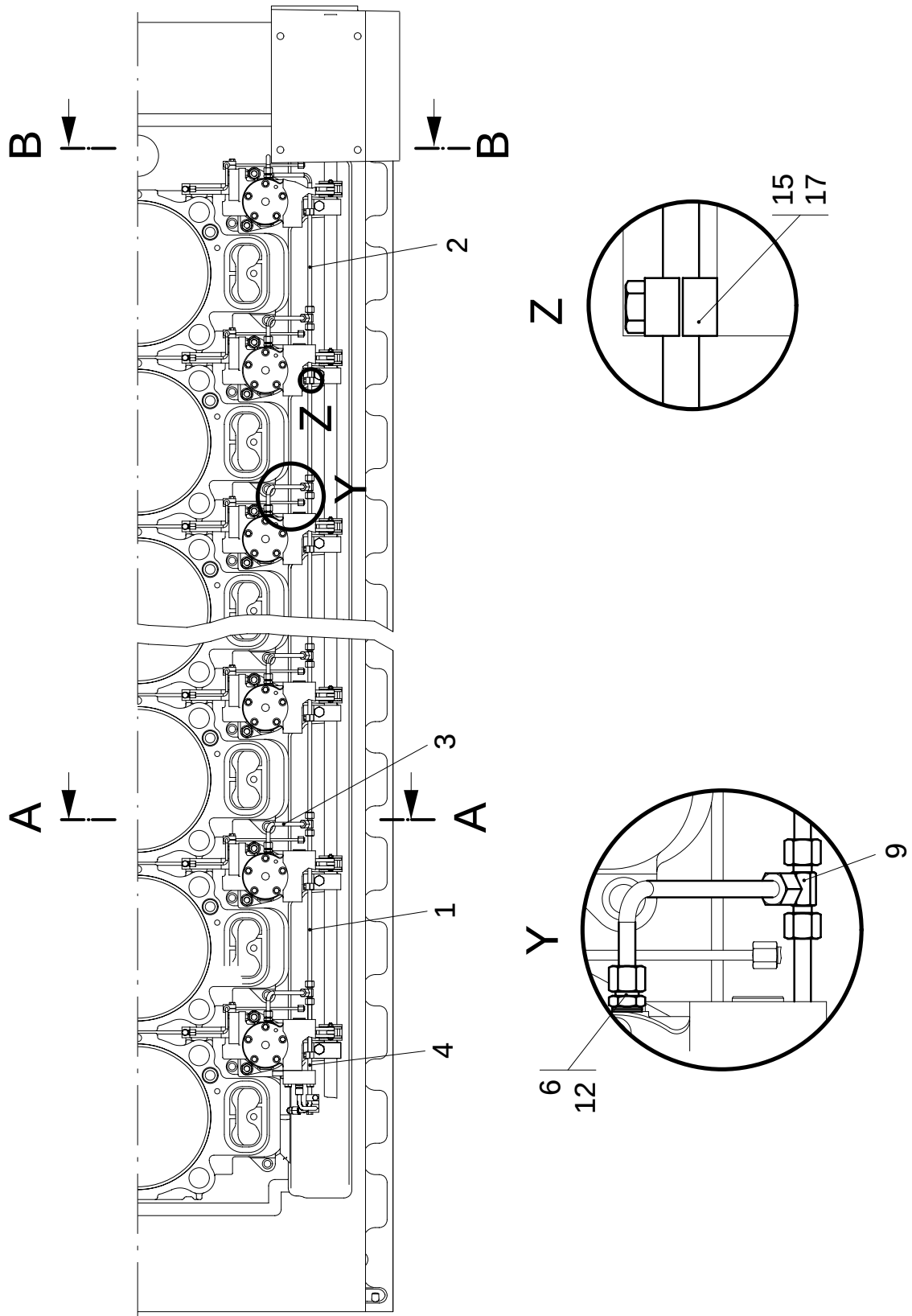
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Leak Fuel Piping

M25

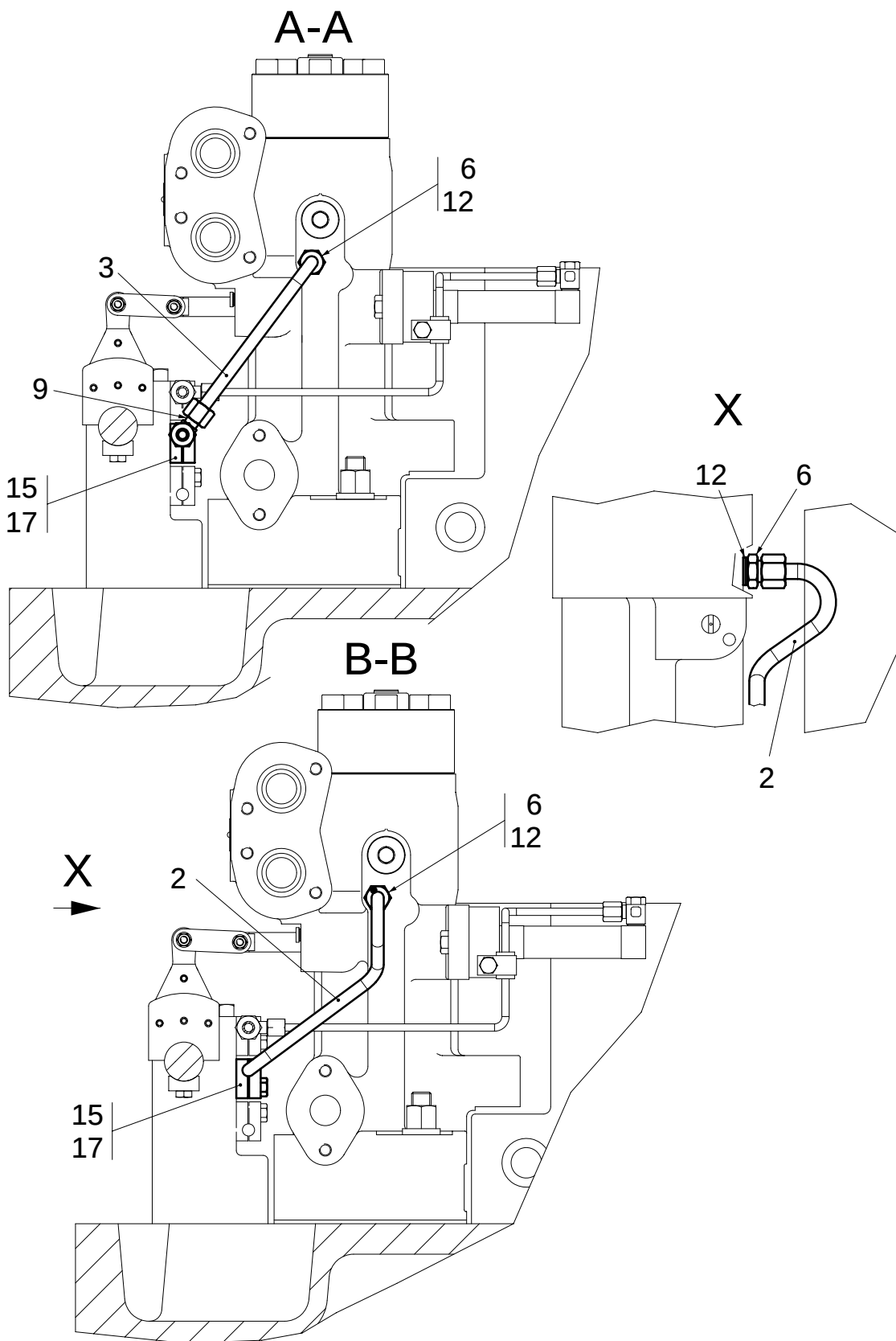
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Leak Fuel Piping

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Leak Fuel Piping

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KRAFTSTOFFLECKLEITUNG-ANBAU, VOLLST. LEAK FUEL PIPING ASSEMBLY	1	258540 NN
1	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	7	258478-001
2	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-002
3	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	8	258540-003
4	KRAFTSTOFFLECKÖLLEITUNG, VOLLST. LEAK FUEL PIPE, COMPL.	1	258540-004
6	STUTZEN PIPE UNION	9	1.5098-034
9	STUTZEN UNION TEE	8	1.5095-512
12	DICHTRING JOINT RING	# 9	1.7010-038
15	ROHRKLEMME PIPE CLAMP	18	1.5011-002
17	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1387-311

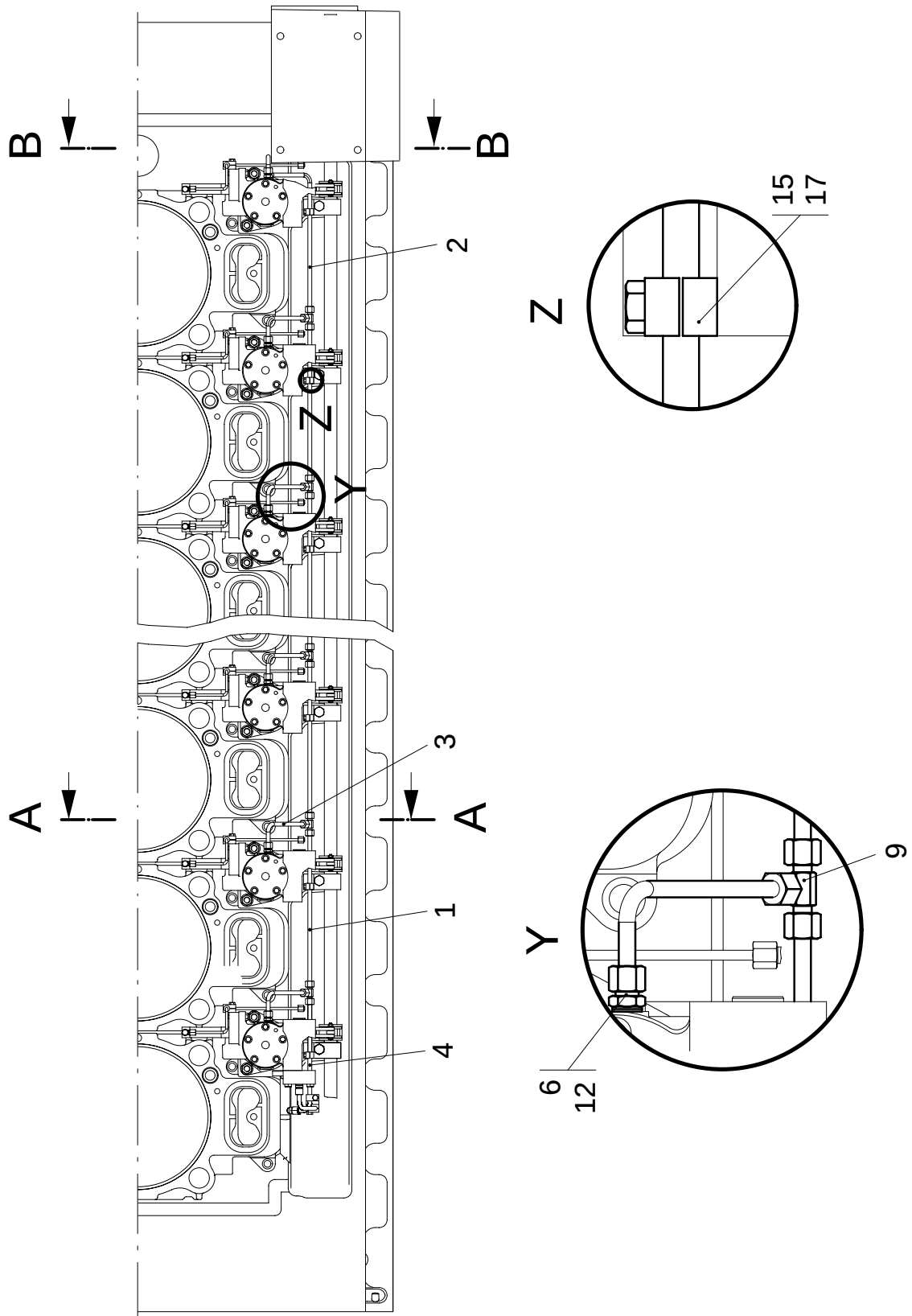
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Leak Fuel Piping

M25

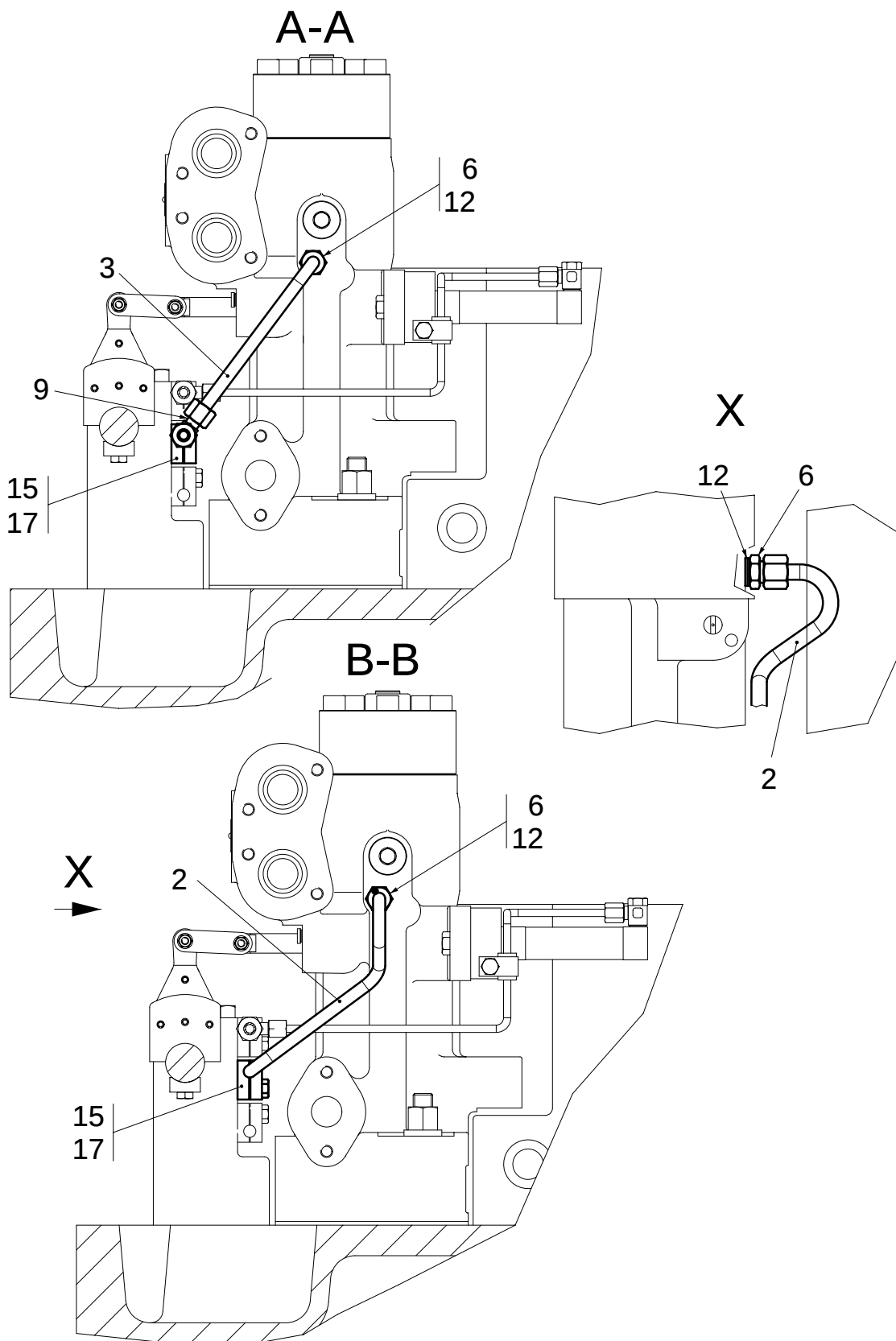
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Leak Fuel Piping

M25

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Lubricating Oil Pump Mounting

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLPUMPEN.-ANBAU, VOLLST. LUBRICATING OIL PUMP MOUNTING ASSEMBLY	1	256410 AA
1	ZAHNRADPUMPE, VOLLST. GEAR PUMP, COMPL.	1	SIEHE B1.05.08.256417 SEE B1.05.08.256417
3	ZAHNRAD GEARWHEEL	1	SIEHE B1.05.08.1.6422 SEE B1.05.08.1.6422
4	FILTERGEHÄUSE, VOLLST. FILTER HOUSING, COMPL.	1	256410-004
5	FILTEREINRICHTUNG, VOLLST. FILTER INSTALLATION, COMPL.	1	1.8430-002
6	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPE, COMPL.	1	256410-006
8	SCHEIBE WASHER	1	2.6410-012
10	DICHTUNG GASKET	# 1	256410-010
11	DICHTUNG GASKET	# 1	1.7073-302
12	DICHTUNG GASKET	# 1	1.7073-735
13	FLANSCH FLANGE	1	1.5340-125
15	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-308
16	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1372-371
17	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-445
18	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1372-373
20	STIFTSCHRAUBE STUD	6	1.1234-355
22	SECHSKANTMUTTER HEXAGON NUT	18	1.2007-038

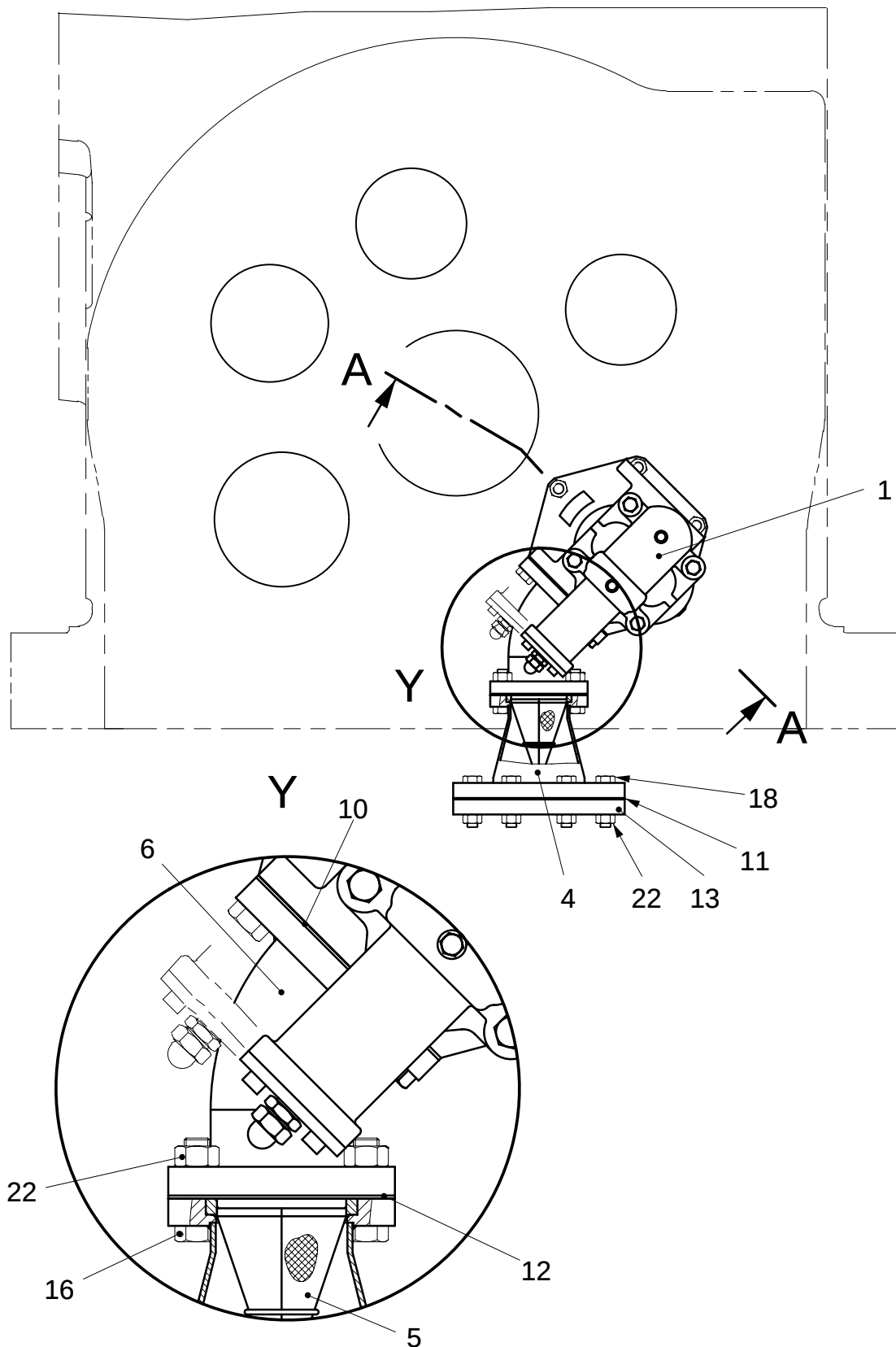
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Lubricating Oil Pump Mounting

M25

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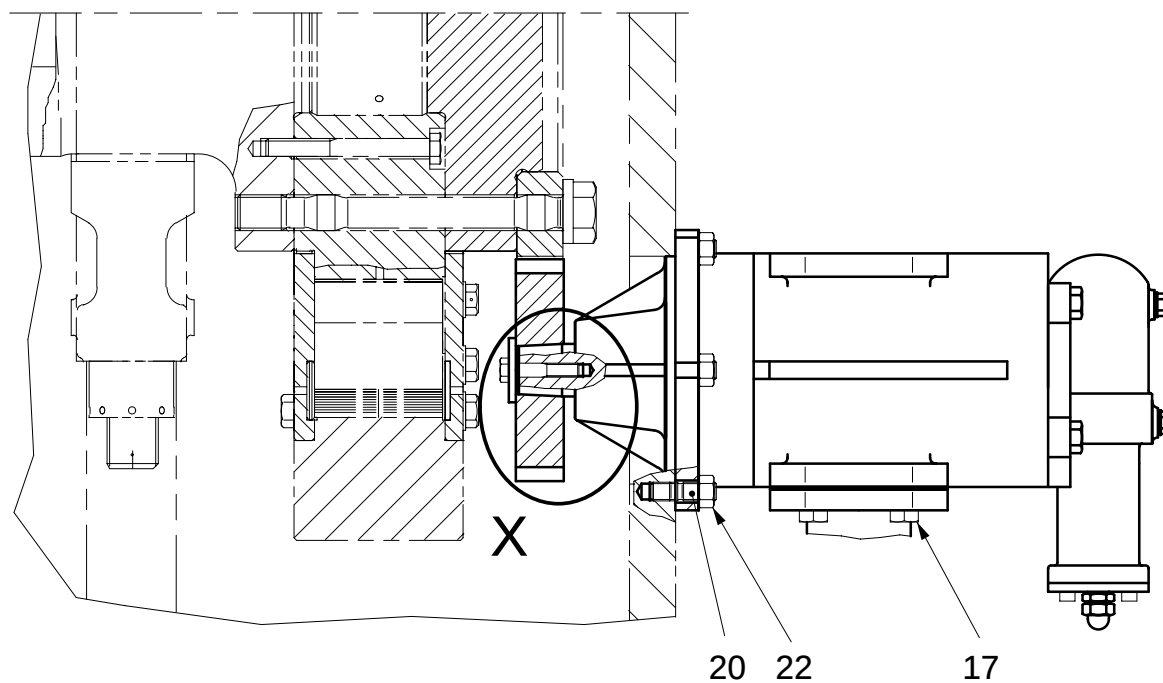


Lubricating Oil Pump Mounting

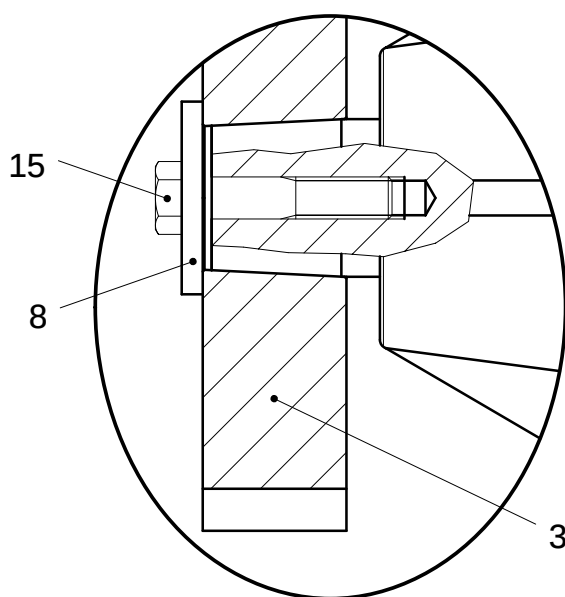
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Lubricating Oil Pump Mounting

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLPUMPEN.-ANBAU, VOLLST. LUBRICATING OIL PUMP MOUNTING ASSEMBLY	1	256410 BB
1	ZAHNRADPUMPE, VOLLST. GEAR PUMP, COMPL.	1	SIEHE B1.05.08.256417 SEE B1.05.08.256417
3	ZAHNRAD GEARWHEEL	1	SIEHE B1.05.08.1.6422 SEE B1.05.08.1.6422
4	FILTERGEHÄUSE, VOLLST. FILTER HOUSING, COMPL.	1	256410-004
5	FILTEREINRICHTUNG, VOLLST. FILTER INSTALLATION, COMPL.	1	1.8430-002
6	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPE, COMPL.	1	256410-006
8	SCHEIBE WASHER	1	2.6410-012
10	DICHTUNG GASKET	# 1	256410-010
11	DICHTUNG GASKET	# 1	1.7073-302
12	DICHTUNG GASKET	# 1	1.7073-735
13	FLANSCH FLANGE	1	1.5340-125
15	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-308
16	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1372-371
17	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-445
18	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1372-373
20	STIFTSCHRAUBE STUD	6	1.1234-355
22	SECHSKANTMUTTER HEXAGON NUT	18	1.2007-038

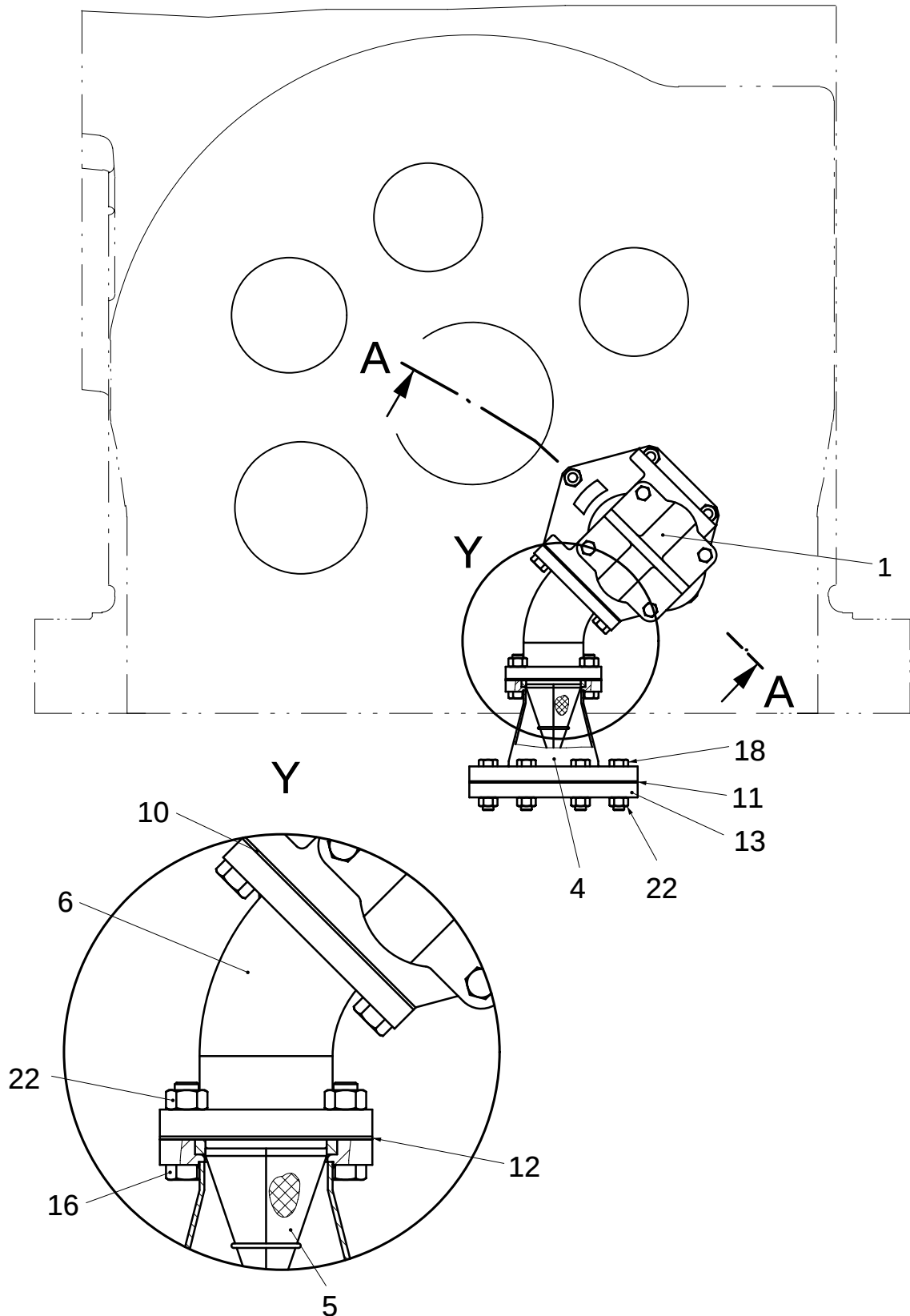
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lubricating Oil Pump Mounting

M25

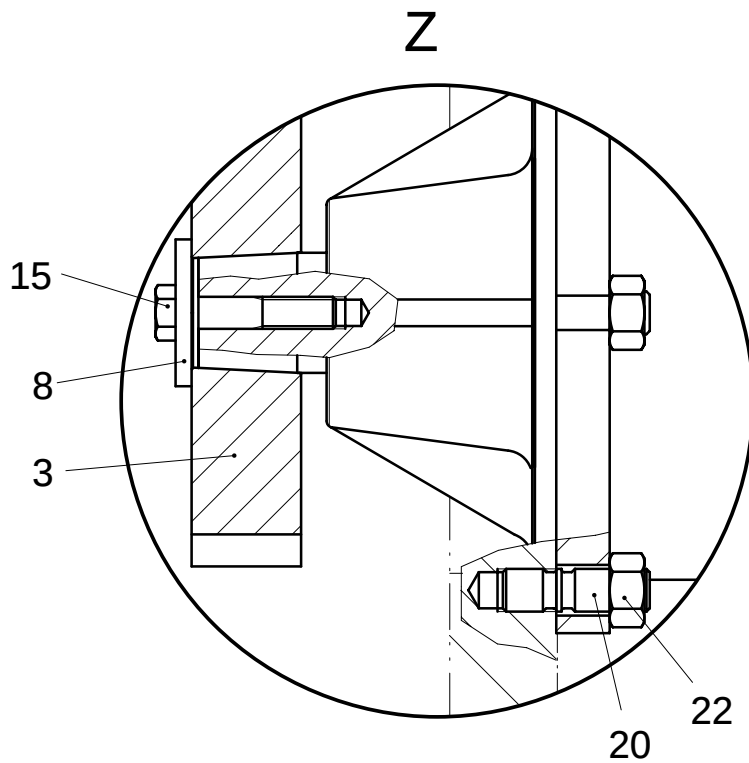
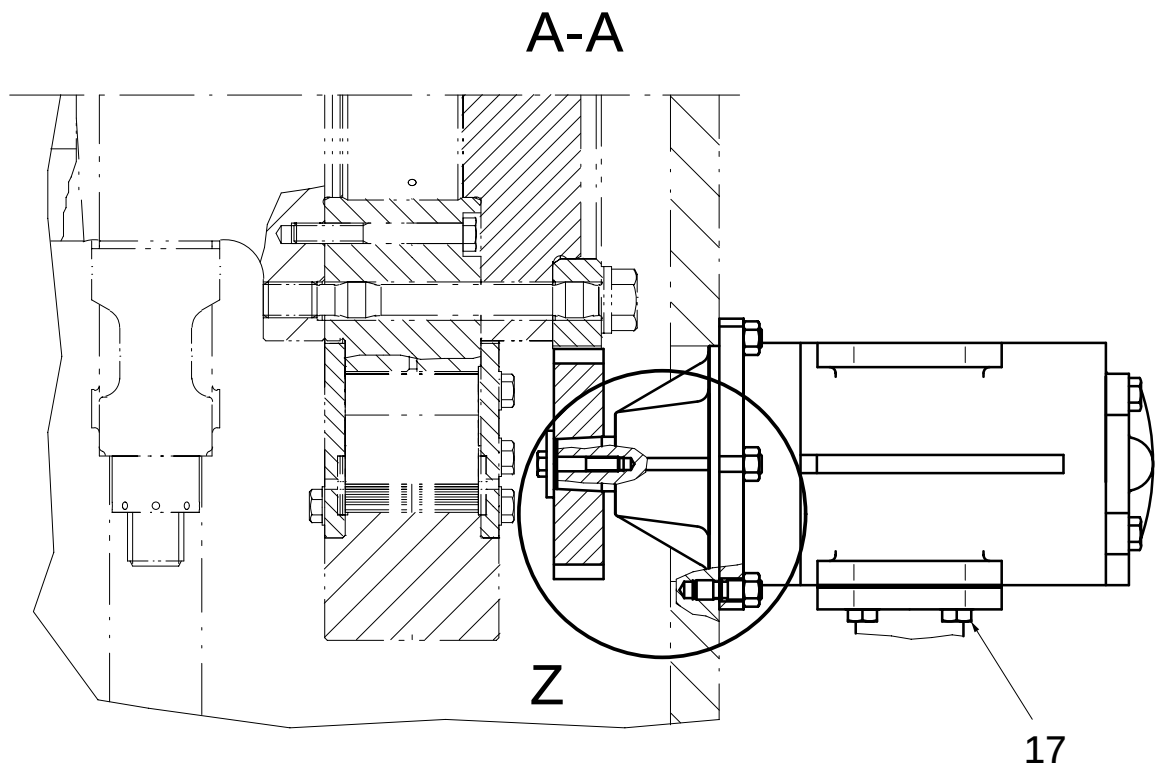
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Lubricating Oil Pump Mounting

M25

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Cover Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DECKEL-ANBAU, VOLLST. COVER MOUNTING ASSEMBLY	1	256414 AA
1	DECKEL COVER	1	256414-001
2	DICHTUNG GASKET	# 1	256414-002
4	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-441

= VERBRAUCHSTEILE
CONSUMABLES

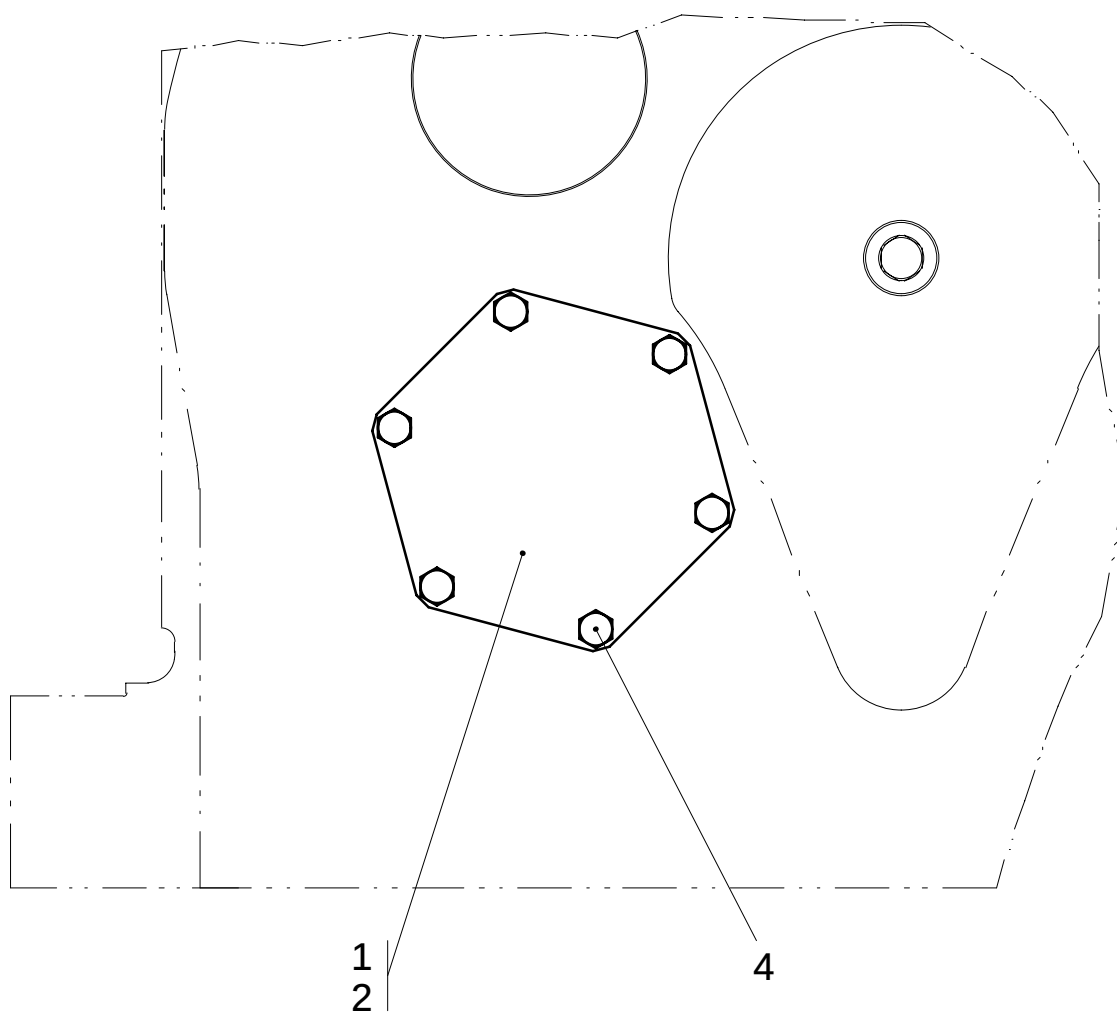
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cover Mounting

M25

08



Cover Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DECKEL-ANBAU, VOLLST. COVER MOUNTING ASSEMBLY	1	256414 BB
1	DECKEL COVER	1	256414-001
2	DICHTUNG GASKET	# 1	256414-002
4	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-443

= VERBRAUCHSTEILE
CONSUMABLES

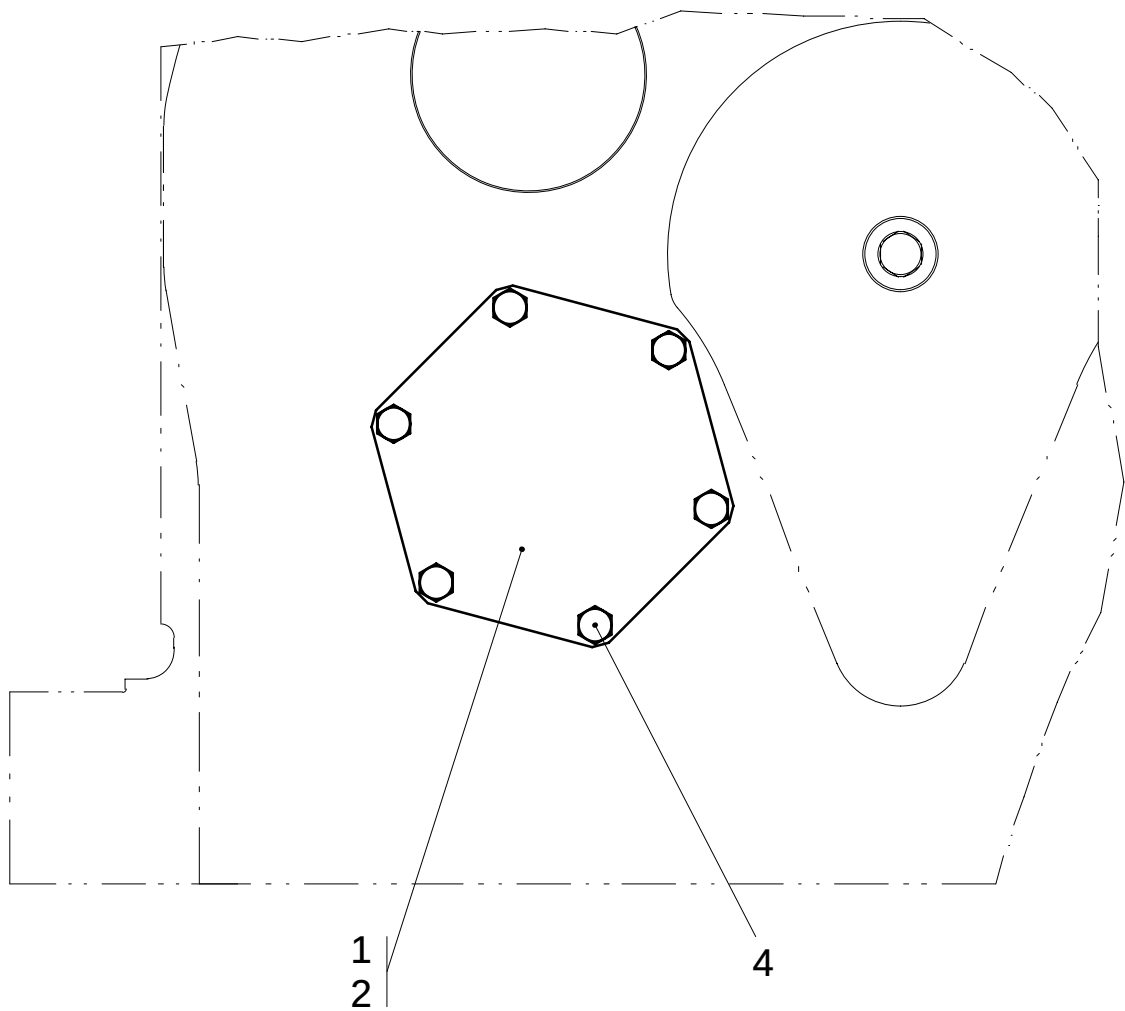
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cover Mounting

M25

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Lubricating Oil Pump Mounting

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLPPEN.-ANBAU, VOLLST. LUBRICATING OIL PUMP MOUNTING ASSEMBLY	1	256415 AA
1	ZAHNRADPUMPE, VOLLST. GEAR PUMP, COMPL.	1	SIEHE B1.05.08.256417 SEE B1.05.08.256417
3	ZAHNRAD GEARWHEEL	1	SIEHE B1.05.08.1.6422 SEE B1.05.08.1.6422
7	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPE, COMPL.	1	256415-007
8	SCHEIBE WASHER	1	2.6420-012
10	DICHTUNG GASKET	# 1	256410-010
11	DICHTUNG GASKET	# 1	1.7073-357
13	FLANSCH FLANGE	1	1.5340-120
15	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-308
17	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-445
18	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-372
20	STIFTSCHRAUBE STUD	6	1.1234-355
22	SECHSKANTMUTTER HEXAGON NUT	14	1.2007-038

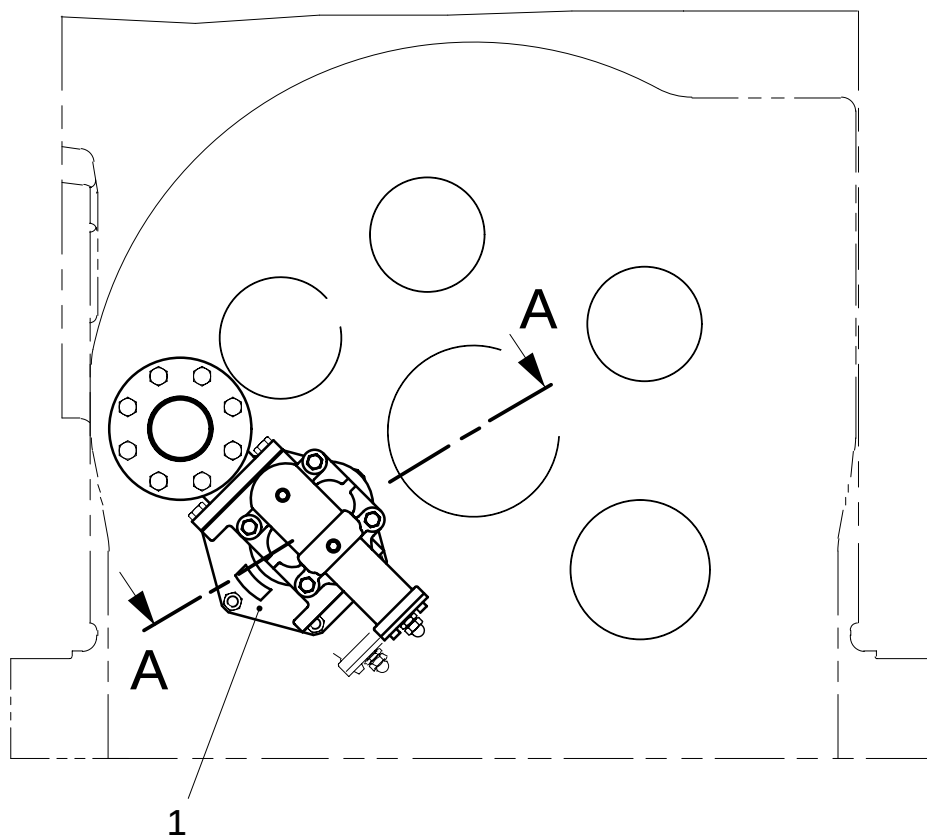
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

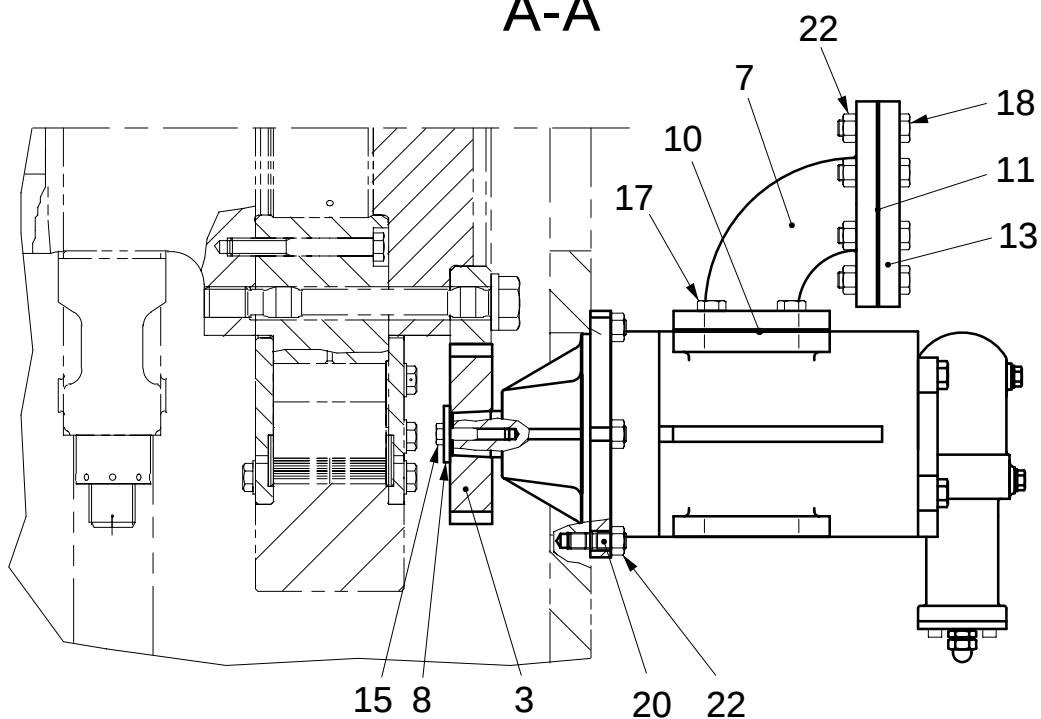
Lubricating Oil Pump Mounting

M25

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Lubricating Oil Pump Mounting

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLPPEN.-ANBAU, VOLLST. LUBRICATING OIL PUMP MOUNTING ASSEMBLY	1	256415 BB
1	ZAHNRADPUMPE, VOLLST. GEAR PUMP, COMPL.	1	SIEHE B1.05.08.256417 SEE B1.05.08.256417
2	ZAHNRAD GEARWHEEL	1	SIEHE B1.05.08.1.6422 SEE B1.05.08.1.6422
7	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPE, COMPL.	1	256415-007
8	SCHEIBE WASHER	1	2.6420-012
10	DICHTUNG GASKET	# 1	256410-010
11	DICHTUNG GASKET	# 1	1.7073-357
13	FLANSCH FLANGE	1	1.5340-120
15	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-308
17	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-445
18	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-372
20	STIFTSCHRAUBE STUD	6	1.1234-355
22	SECHSKANTMUTTER HEXAGON NUT	14	1.2007-038

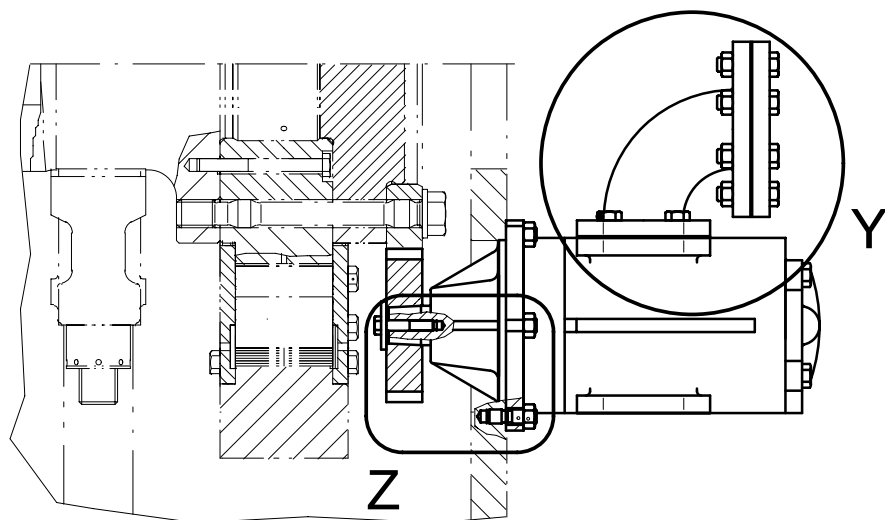
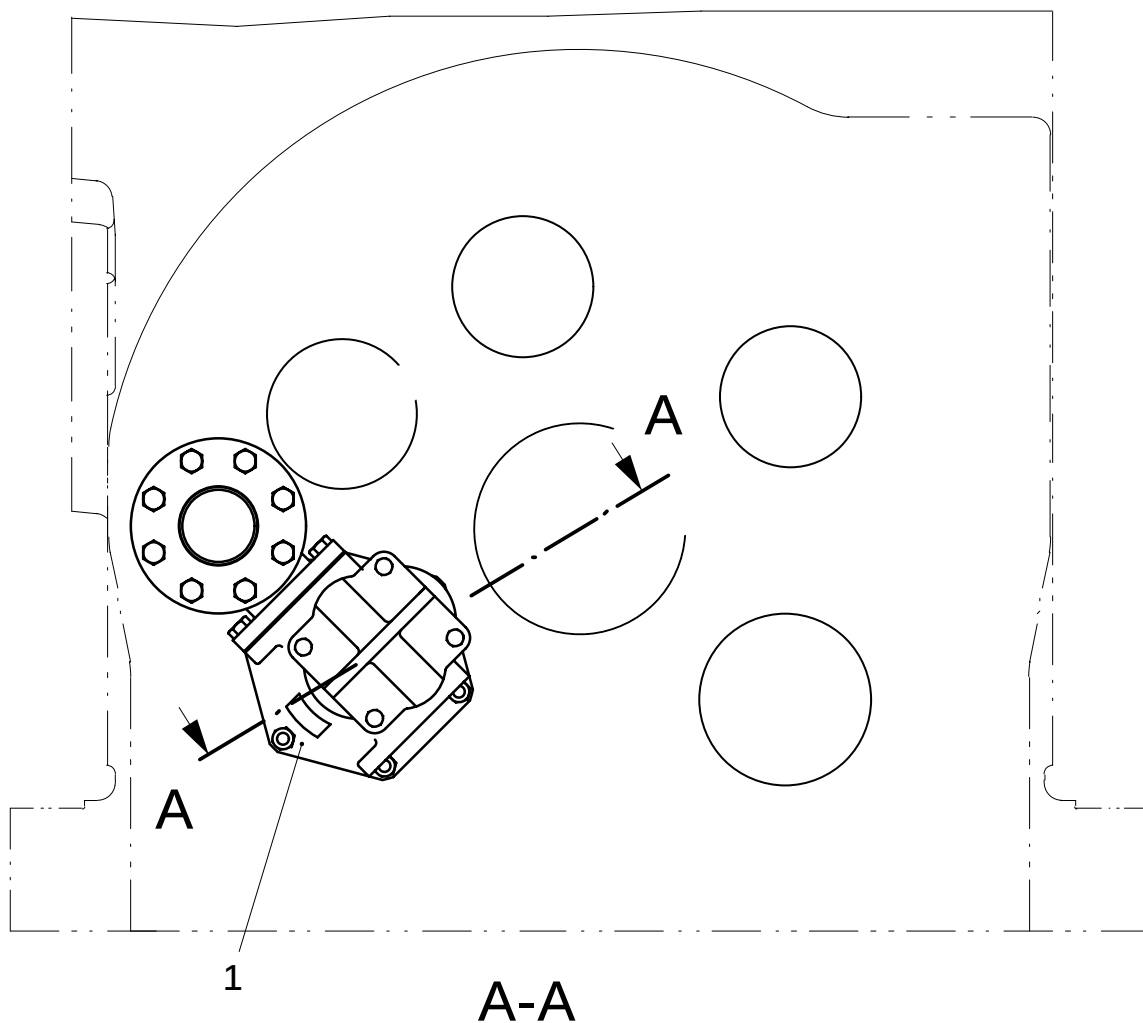
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lubricating Oil Pump Mounting

M25

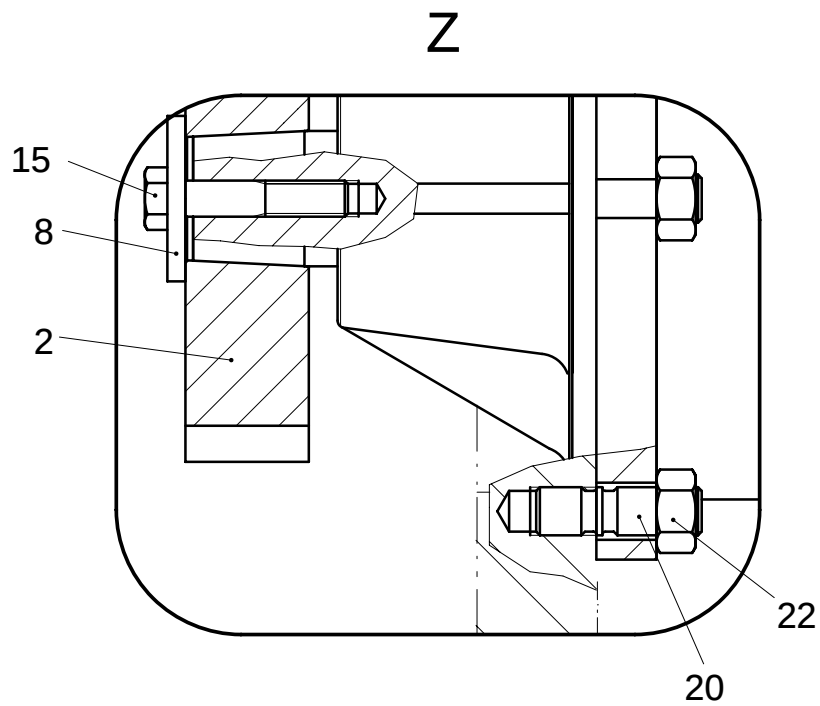
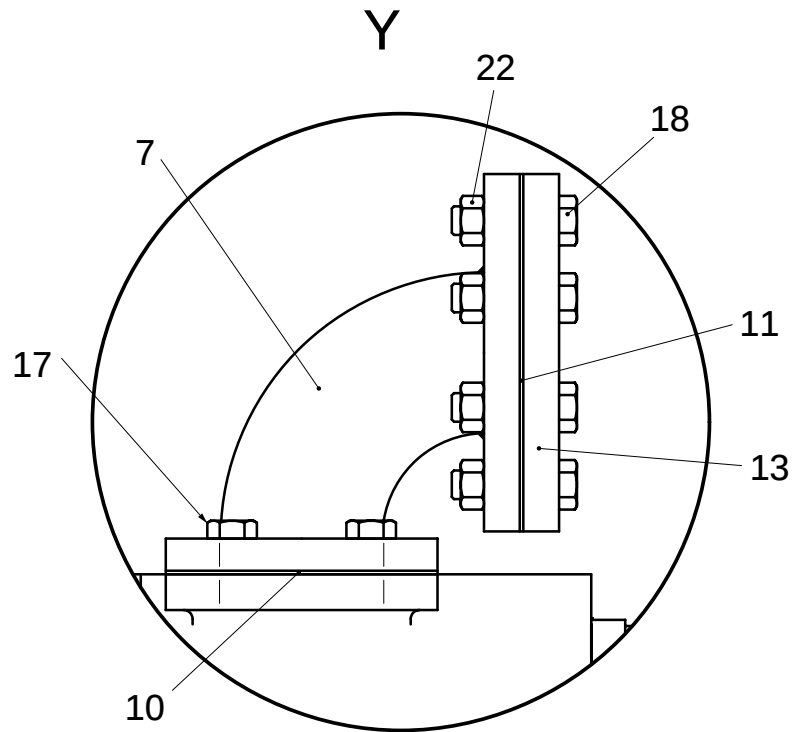
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Lubricating Oil Pump Mounting

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLPUMPE, VOLLST. LUBRICATING OIL PUMP ASSEMBLY	1	256417 AA
4	ANTRIEBSRADWELLE POWER ROTOR SHAFT	1	256417-004
5	LAUFRADACHSE ROTOR AXLE	1	256417-005
7	SECHSKANTSCHRAUBE HEXAGON BOLT	4	256417-007
8	ZYLINDERSTIFT PARALLEL PIN	2	1.0026-331
10	O-RING O-RING	# 2	256417-010
11	LAGERBUCHSE BEARING BUSH	4	256417-011
100	DRUCKBEGRENZUNGSVENTIL, VOLLST. PRESSURE LIMITATION VALVE, COMPL.	* 1	256417-100
102	VENTILKOLBEN VALVE PISTON	1	256417-102
103	VENTILDECKEL VALVE COVER	1	256417-103
104	VENTILSPINDEL VALVE SPINDLE	1	256417-104
105	VENTILMUTTER VALVE NUT	1	256417-105
106	DRUCKFEDER COMPRESSION SPRING	1	1.6417-610
109	ZYLINDERSTIFT PARALLEL PIN	1	256417-109

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

M25

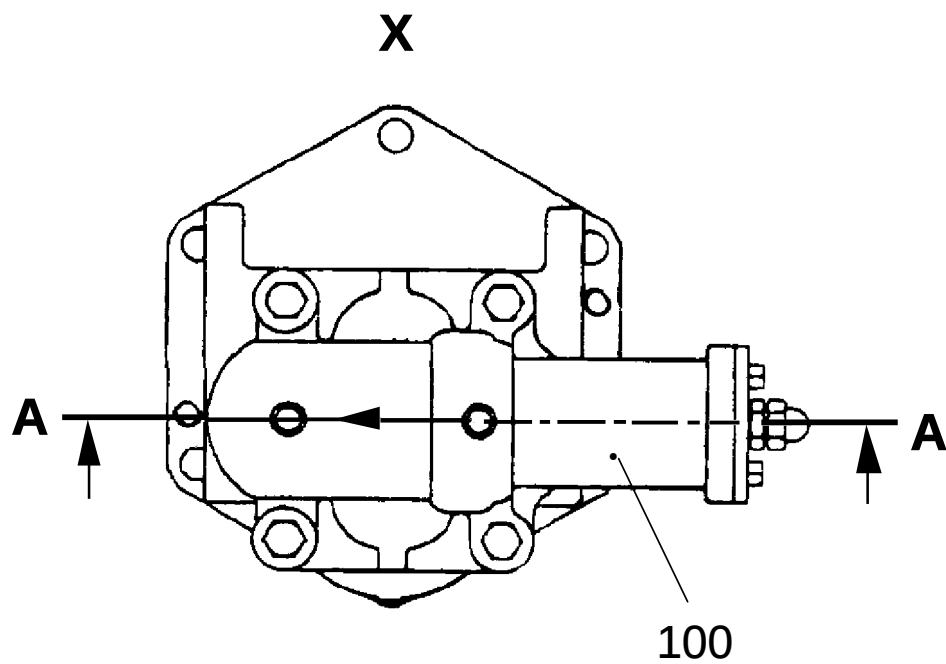
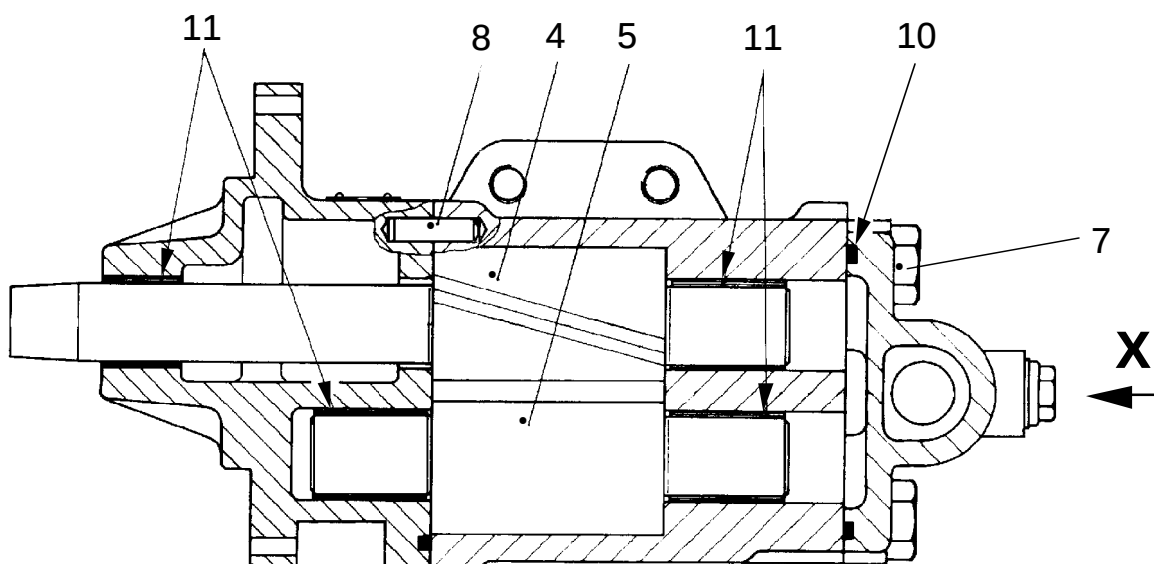
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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
110	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	4	1.1152-086
111	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-831
112	SECHSKANTMUTTER HEXAGON NUT	1	1.2017-261
113	HUTMUTTER DOMED CAP NUT	1	256417-113
114	DICHTRING JOINT RING	# 4	1.7010-064
116	O-RING O-RING	# 1	256417-116

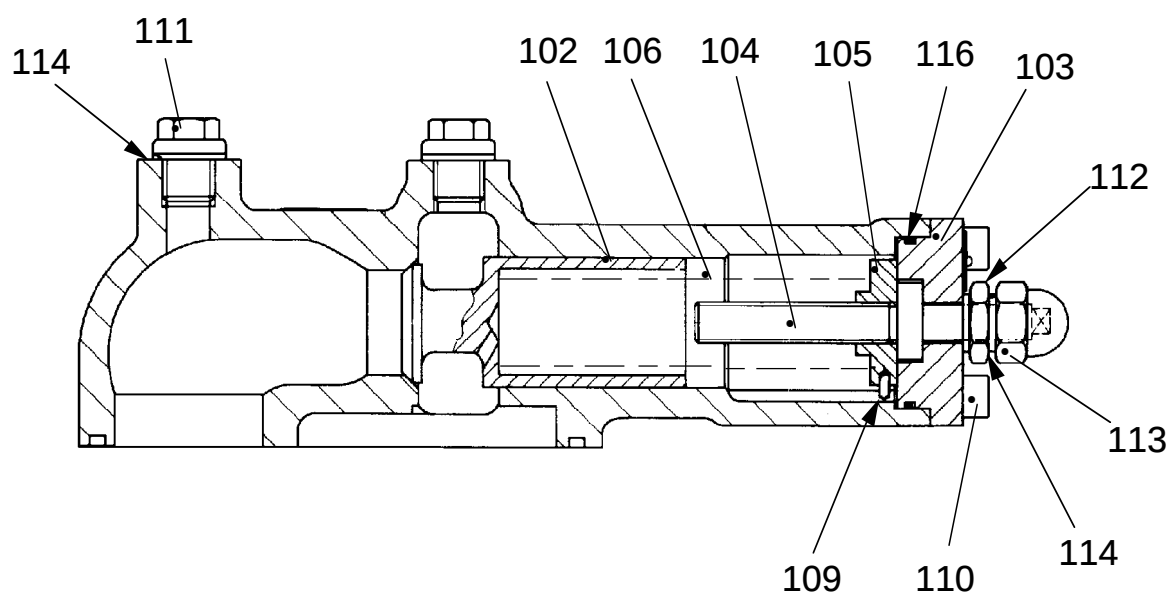
* = IN 256417 AA ENTHALTEN
INCLUDED IN 256417 AA

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**



A-A



M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLPUMPE, VOLLST. LUBRICATING OIL PUMP ASSEMBLY	1	256417 BB
4	ANTRIEBSRADWELLE POWER ROTOR SHAFT	1	256417-004
5	LAUFRADACHSE ROTOR AXLE	1	256417-005
7	SECHSKANTSCHRAUBE HEXAGON BOLT	4	256417-007
8	ZYLINDERSTIFT PARALLEL PIN	2	1.0026-331
10	O-RING O-RING	# 2	256417-010
11	LAGERBUCHSE BEARING BUSH	4	256417-011
100	DRUCKBEGRENZUNGSVENTIL, VOLLST. PRESSURE LIMITATION VALVE, COMPL.	* 1	256417-100
102	VENTILKOLBEN VALVE PISTON	1	256417-102
103	VENTILDECKEL VALVE COVER	1	256417-103
104	VENTILSPINDEL VALVE SPINDLE	1	256417-104
105	VENTILMUTTER VALVE NUT	1	256417-105
106	DRUCKFEDER COMPRESSION SPRING	1	1.6417-610
109	ZYLINDERSTIFT PARALLEL PIN	1	256417-109

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

M25

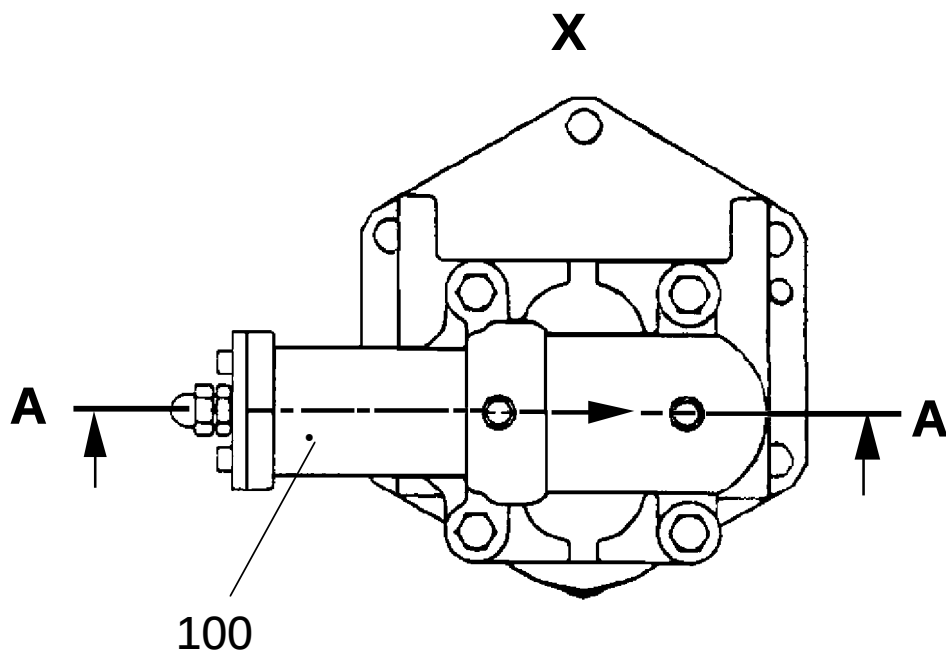
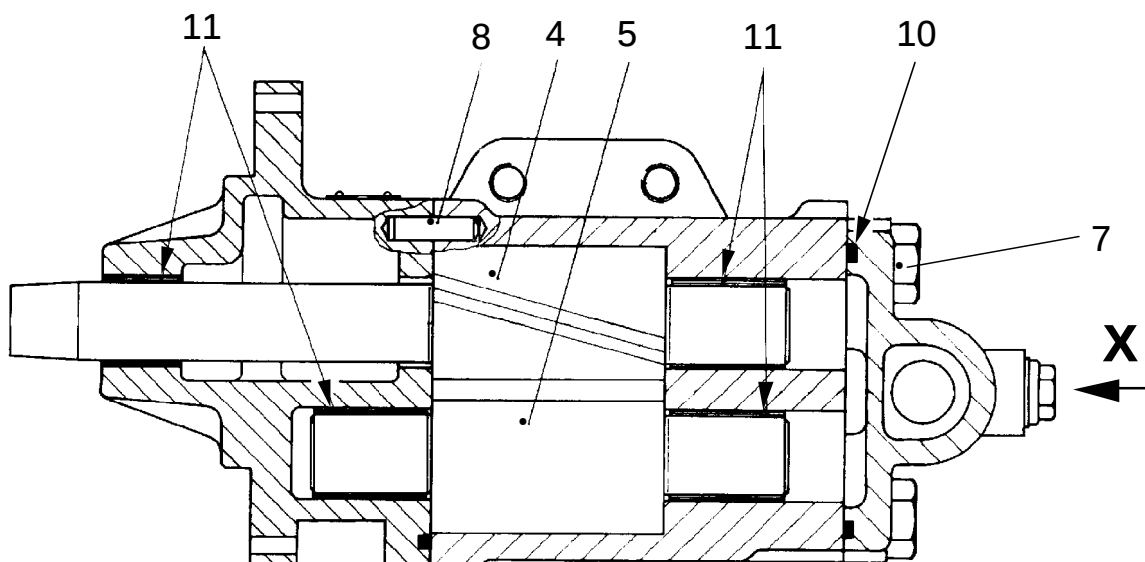
08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
110	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	4	1.1152-086
111	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-831
112	SECHSKANTMUTTER HEXAGON NUT	1	1.2017-261
113	HUTMUTTER DOMED CAP NUT	1	256417-113
114	DICHTRING JOINT RING	# 4	1.7010-064
116	O-RING O-RING	# 1	256417-116

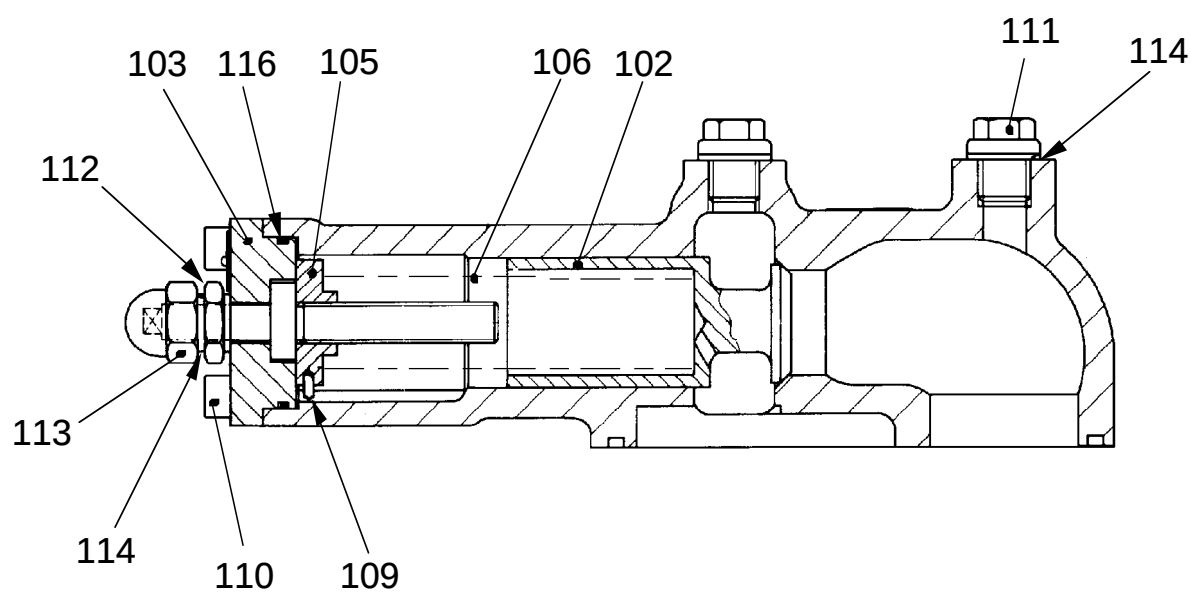
* = IN 256417 BB ENTHALTEN
INCLUDED IN 256417 BB

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**



A-A



M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLPUMPE, VOLLST. LUBRICATING OIL PUMP ASSEMBLY	1	256417 CC
4	ANTRIEBSRADWELLE POWER ROTOR SHAFT	1	256417-004
5	LAUFRADACHSE ROTOR AXLE	1	256417-005
7	SECHSKANTSCHRAUBE HEXAGON BOLT	4	256417-007
8	ZYLINDERSTIFT PARALLEL PIN	2	1.0026-331
10	O-RING O-RING	# 2	256417-010
11	LAGERBUCHSE BEARING BUSH	4	256417-011
100	DRUCKBEGRENZUNGSVENTIL, VOLLST. PRESSURE LIMITATION VALVE, COMPL.	* 1	256417-100
102	VENTILKOLBEN VALVE PISTON	1	256417-102
103	VENTILDECKEL VALVE COVER	1	256417-103
104	VENTILSPINDEL VALVE SPINDLE	1	256417-104
105	VENTILMUTTER VALVE NUT	1	256417-105
106	DRUCKFEDER COMPRESSION SPRING	1	1.6417-610
109	ZYLINDERSTIFT PARALLEL PIN	1	256417-109

M25

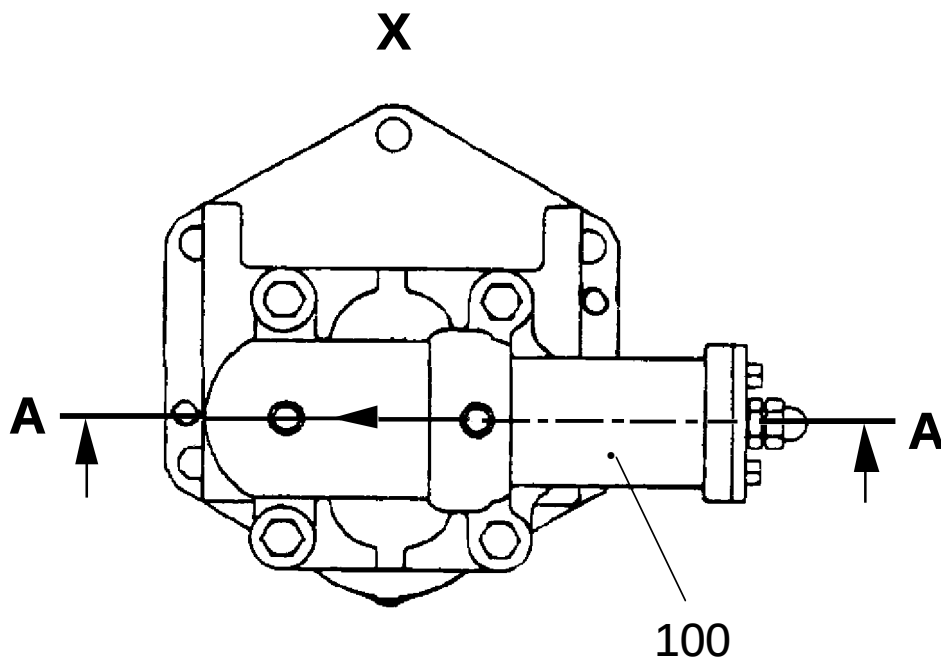
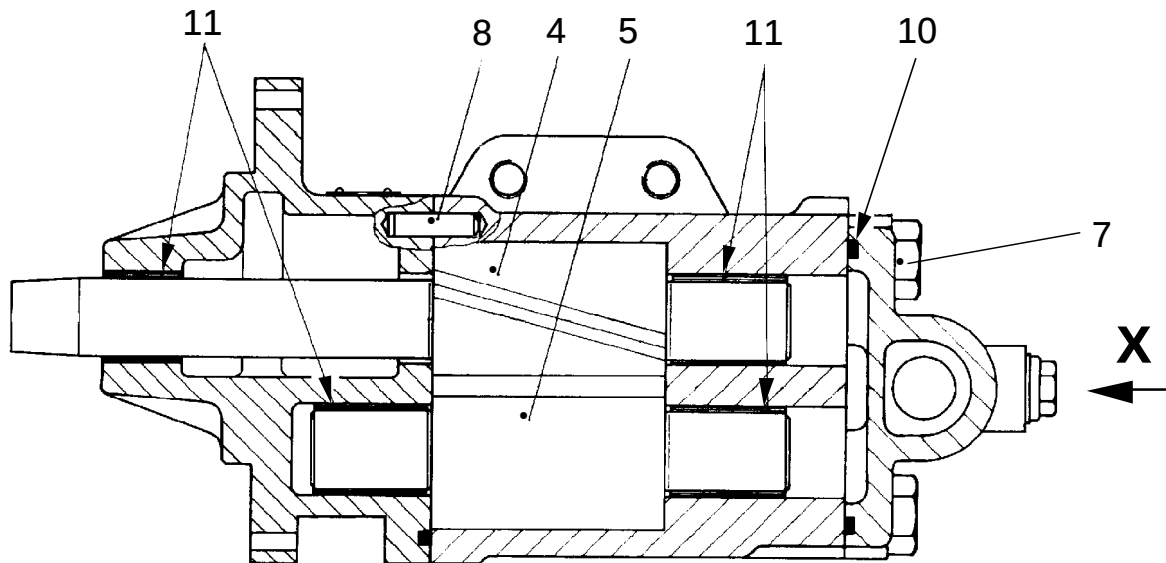
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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
110	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	4	1.1152-086
111	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-831
112	SECHSKANTMUTTER HEXAGON NUT	1	1.2017-261
113	HUTMUTTER DOMED CAP NUT	1	256417-113
114	DICHTRING JOINT RING	# 4	1.7010-064
116	O-RING O-RING	# 1	256417-116

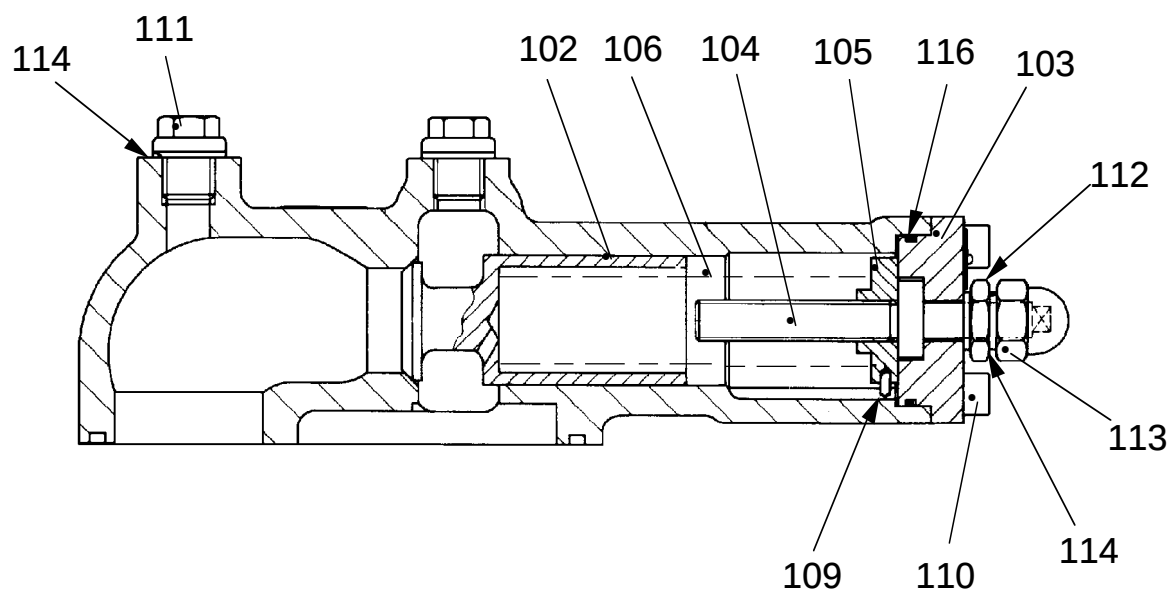
* = IN 256417 CC ENTHALTEN
INCLUDED IN 256417 CC

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**



A-A



M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLPUMPE, VOLLST. LUBRICATING OIL PUMP ASSEMBLY	1	256417 DD
4	ANTRIEBSRADWELLE POWER ROTOR SHAFT	1	256417-004
5	LAUFRADACHSE ROTOR AXLE	1	256417-005
7	SECHSKANTSCHRAUBE HEXAGON BOLT	4	256417-007
8	ZYLINDERSTIFT PARALLEL PIN	2	1.0026-331
10	O-RING O-RING	# 2	256417-010
11	LAGERBUCHSE BEARING BUSH	4	256417-011
100	DRUCKBEGRENZUNGSVENTIL, VOLLST. PRESSURE LIMITATION VALVE, COMPL.	* 1	256417-100
102	VENTILKOLBEN VALVE PISTON	1	256417-102
103	VENTILDECKEL VALVE COVER	1	256417-103
104	VENTILSPINDEL VALVE SPINDLE	1	256417-104
105	VENTILMUTTER VALVE NUT	1	256417-105
106	DRUCKFEDER COMPRESSION SPRING	1	1.6417-610
109	ZYLINDERSTIFT PARALLEL PIN	1	256417-109

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

M25

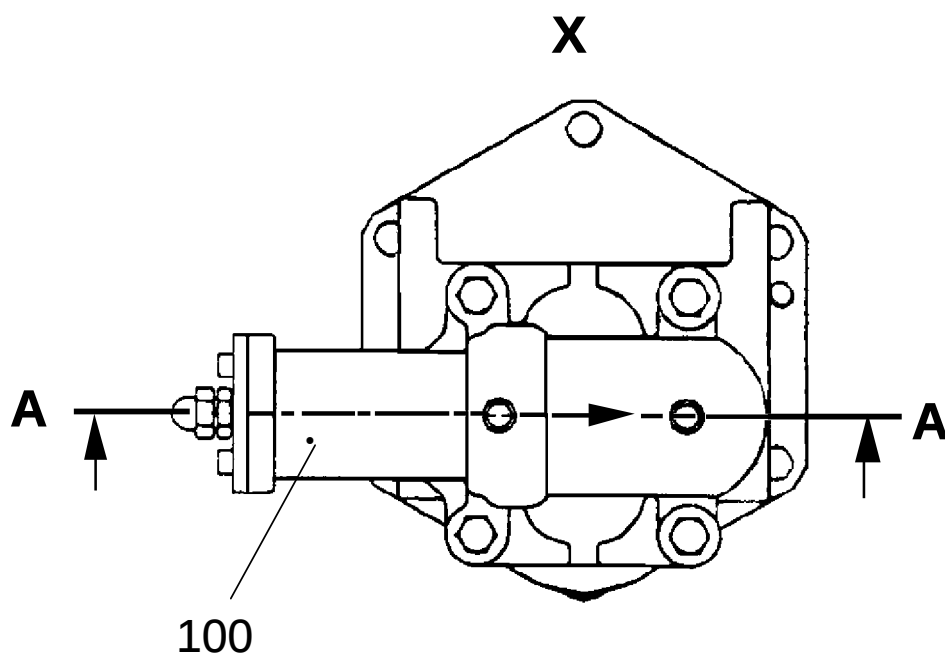
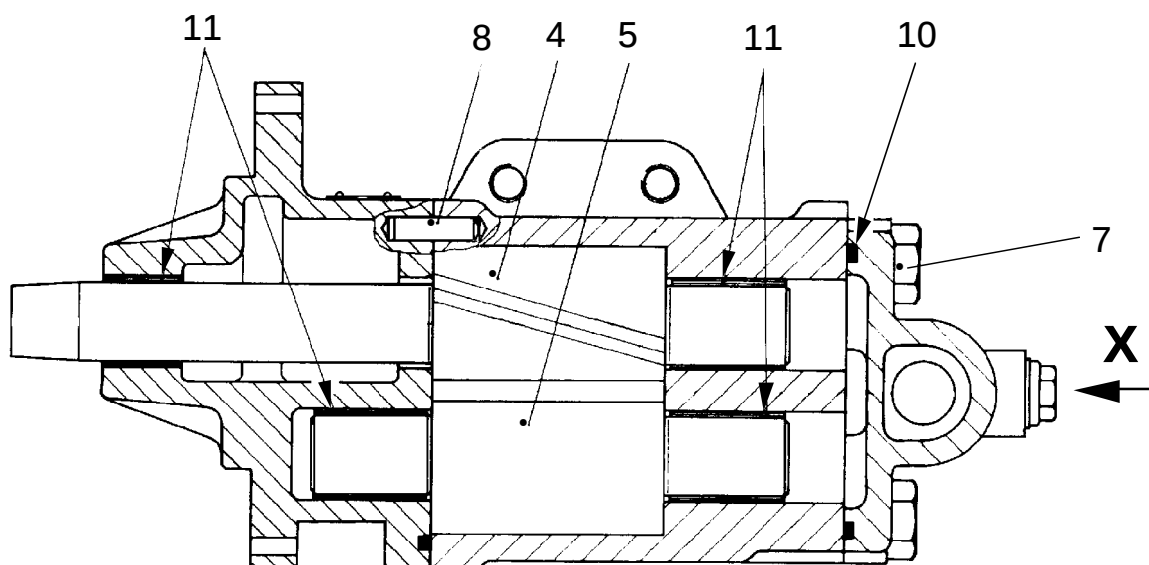
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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
110	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	4	1.1152-086
111	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-831
112	SECHSKANTMUTTER HEXAGON NUT	1	1.2017-261
113	HUTMUTTER DOMED CAP NUT	1	256417-113
114	DICHTRING JOINT RING	# 4	1.7010-064
116	O-RING O-RING	# 1	256417-116

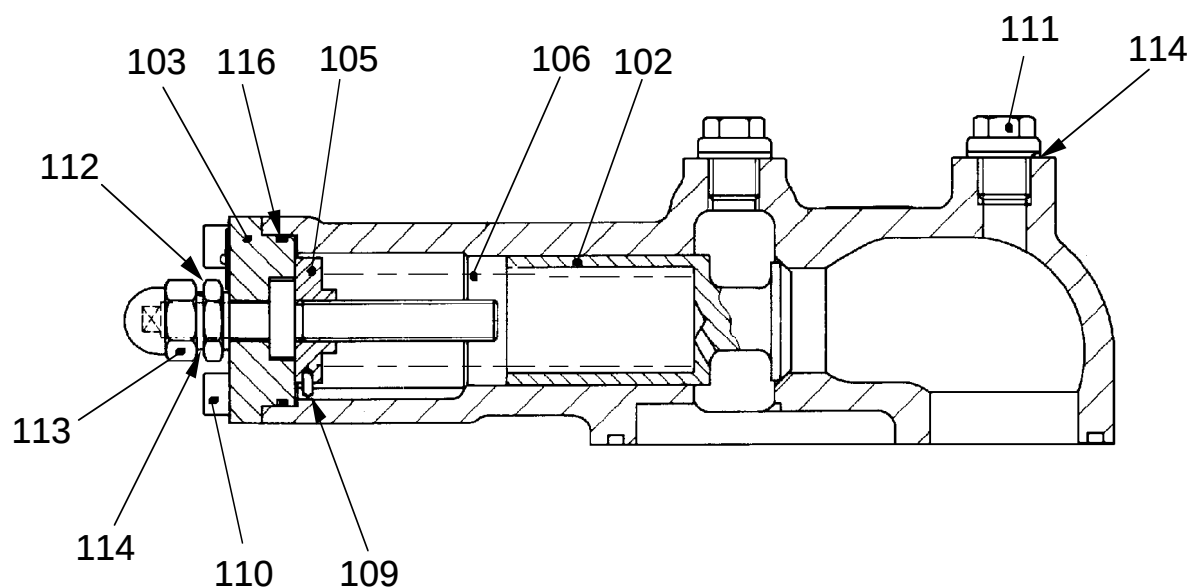
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= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**



A-A

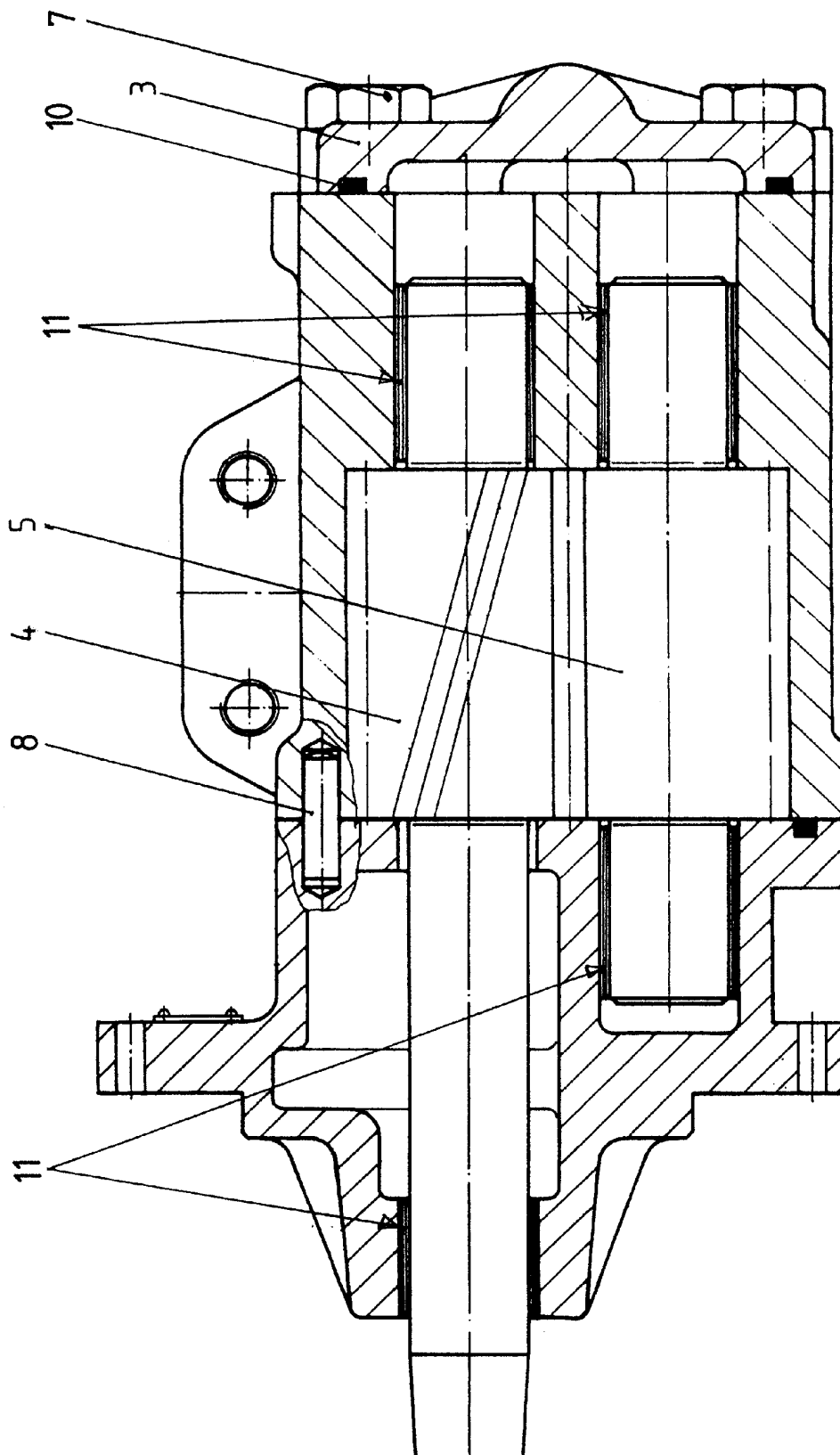


M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLPUMPE, VOLLST. LUBRICATING OIL PUMP ASSEMBLY	1	256417 EE
3	DECKEL COVER	1	256417-503
4	ANTRIEBSRADWELLE POWER ROTOR SHAFT	1	256417-004
5	LAUFRADACHSE ROTOR AXLE	1	256417-005
7	SECHSKANTSCHRAUBE HEXAGON BOLT	4	256417-007
8	ZYLINDERSTIFT PARALLEL PIN	2	1.0026-331
10	O-RING O-RING	# 2	256417-010
11	LAGERBUCHSE BEARING BUSH	4	256417-011

= VERBRAUCHSTEILE
CONSUMABLES



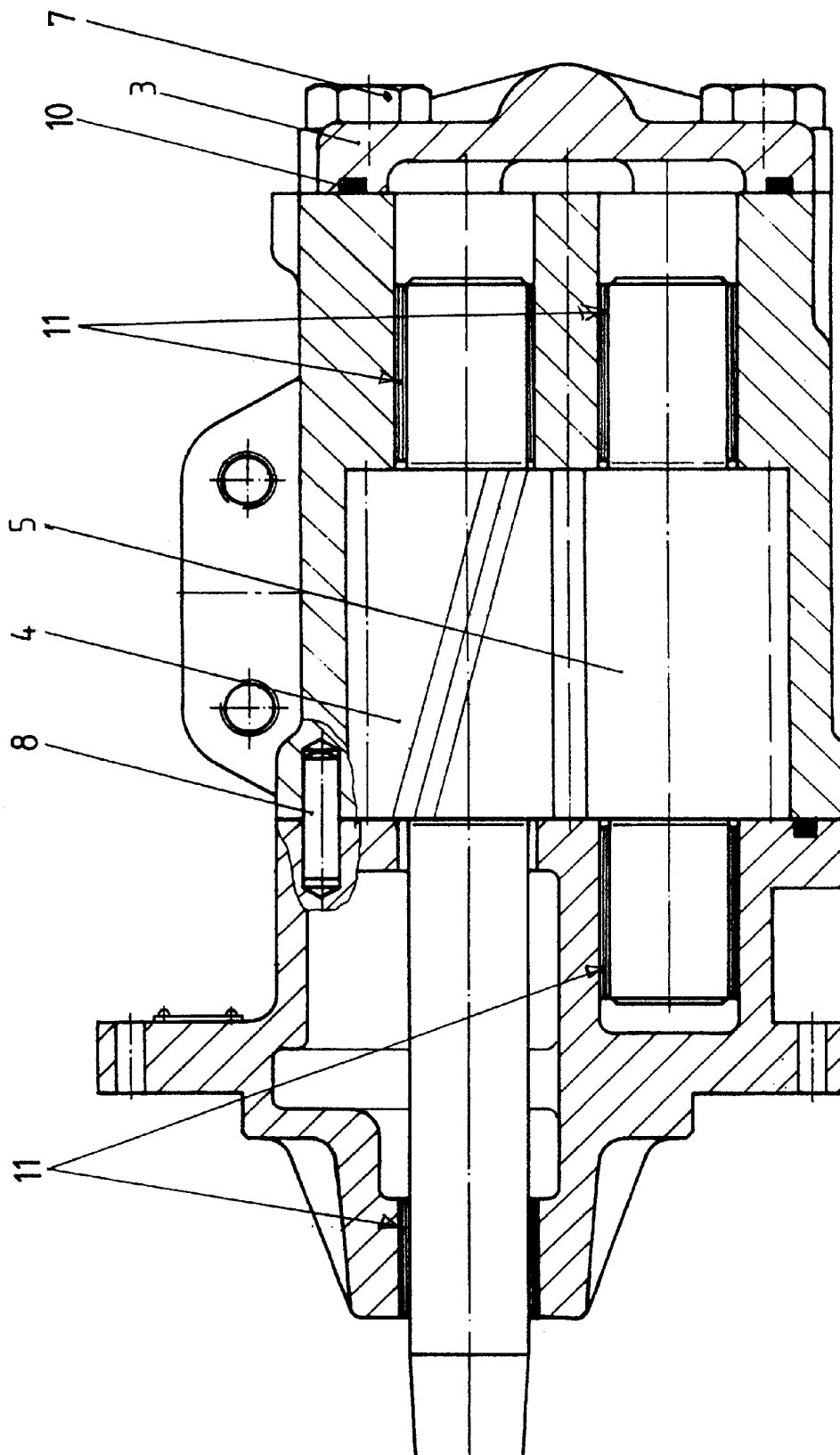
M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLPUMPE, VOLLST. LUBRICATING OIL PUMP ASSEMBLY	1	256417 FF
3	DECKEL COVER	1	256417-503
4	ANTRIEBSRADWELLE POWER ROTOR SHAFT	1	256417-004
5	LAUFRADACHSE ROTOR AXLE	1	256417-005
7	SECHSKANTSCHRAUBE HEXAGON BOLT	4	256417-007
8	ZYLINDERSTIFT PARALLEL PIN	2	1.0026-331
10	O-RING O-RING	# 2	256417-010
11	LAGERBUCHSE BEARING BUSH	4	256417-011

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**



Gearwheel

M20-M601C

for Lubricating Oil Pump

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
1.0-50	ZAHNRAD GEARWHEEL			
	Z = 21	1	1.6422-21	
	Z = 22	1	1.6422-22	
	Z = 23	1	1.6422-23	
	Z = 24	1	1.6422-24	
	Z = 25	1	1.6422-25	
	Z = 26	1	1.6422-26	
	Z = 27	1	1.6422-27	
	Z = 28	1	1.6422-28	
	Z = 29	1	1.6422-29	
	Z = 30	1	1.6422-30	
	Z = 31	1	1.6422-31	
	Z = 32	1	1.6422-32	
	Z = 33	1	1.6422-33	
	Z = 34	1	1.6422-34	
	Z = 35	1	1.6422-35	
	Z = 36	1	1.6422-36	
	Z = 37	1	1.6422-37	
	Z = 38	1	1.6422-38	
	Z = 39	1	1.6422-39	
	Z = 40	1	1.6422-40	
	Z = 41	1	1.6422-41	
	Z = 42	1	1.6422-42	
	Z = 43	1	1.6422-43	
	Z = 44	1	1.6422-44	
	Z = 45	1	1.6422-45	
	Z = 46	1	1.6422-46	
	Z = 47	1	1.6422-47	
	Z = 48	1	1.6422-48	
	Z = 49	1	1.6422-49	
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	Z = 55	1	1.6422-55	
	Z = 56	1	1.6422-56	
	Z = 57	1	1.6422-57	
	Z = 58	1	1.6422-58	
	Z = 59	1	1.6422-59	
	Z = 60	1	1.6422-60	
	Z = 61	1	1.6422-61	
	Z = 62	1	1.6422-62	
	Z = 63	1	1.6422-63	
	Z = 64	1	1.6422-64	
	Z = 65	1	1.6422-65	

Lubricating Oil Filter Mounting

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLFILTER-ANBAU, VOLLST. LUBRICATING OIL FILTER MOUNTING ASSEMBLY	1	257650 AA
1	SCHMIERÖLFILTER, VOLLST. LUBRICATING OIL FILTER, COMPL.	1	SIEHE B1.05.08.257657 SEE B1.05.08.257657
2	BOCK BRACKET	1	9.7650-002
3	O-RING O-RING	# 3	1.7084-624
4	FLANSCH FLANGE	1	1.5340-120
5	DICHTUNG GASKET	# 1	1.7073-357
6	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-609
7	DICHTRING JOINT RING	# 2	1.7010-133
8	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-372
9	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-374
10	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1367-378
11	SECHSKANTMUTTER HEXAGON NUT	16	1.2007-036

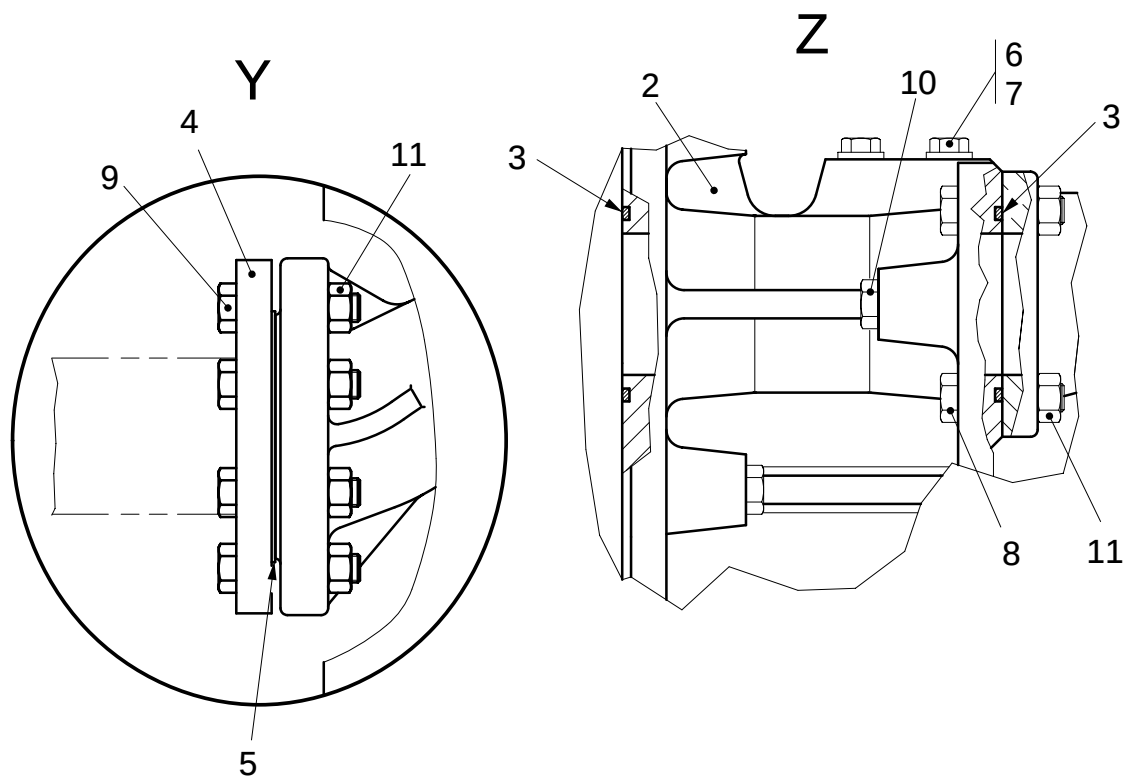
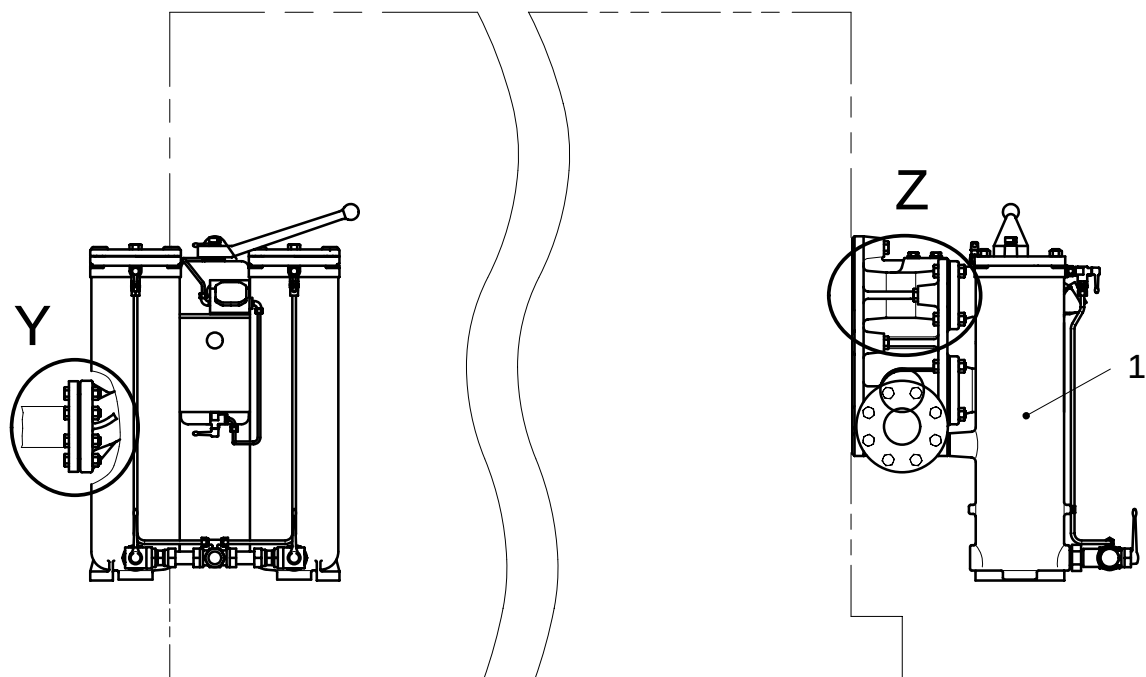
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Lubricating Oil Filter Mounting

M25

08



Lubricating Oil Filter Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLFILTER-ANBAU, VOLLST. LUBRICATING OIL FILTER MOUNTING ASSEMBLY	1	257650 BB
1	SCHMIERÖLFILTER, VOLLST. LUBRICATING OIL FILTER, COMPL.	1	SIEHE B1.05.08.257657 SEE B1.05.08.257657
3	O-RING O-RING	# 1	1.7084-624
4	FLANSCH FLANGE	1	1.5340-120
5	DICHTUNG GASKET	# 1	1.7073-357
7	SPANNSCHEIBE CONICAL SPRING WASHER	# 5	1.0068-240
8	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-447
9	SECHSKANTSCHRAUBE HEXAGON BOLT	5	1.1367-378

= VERBRAUCHSTEILE
CONSUMABLES

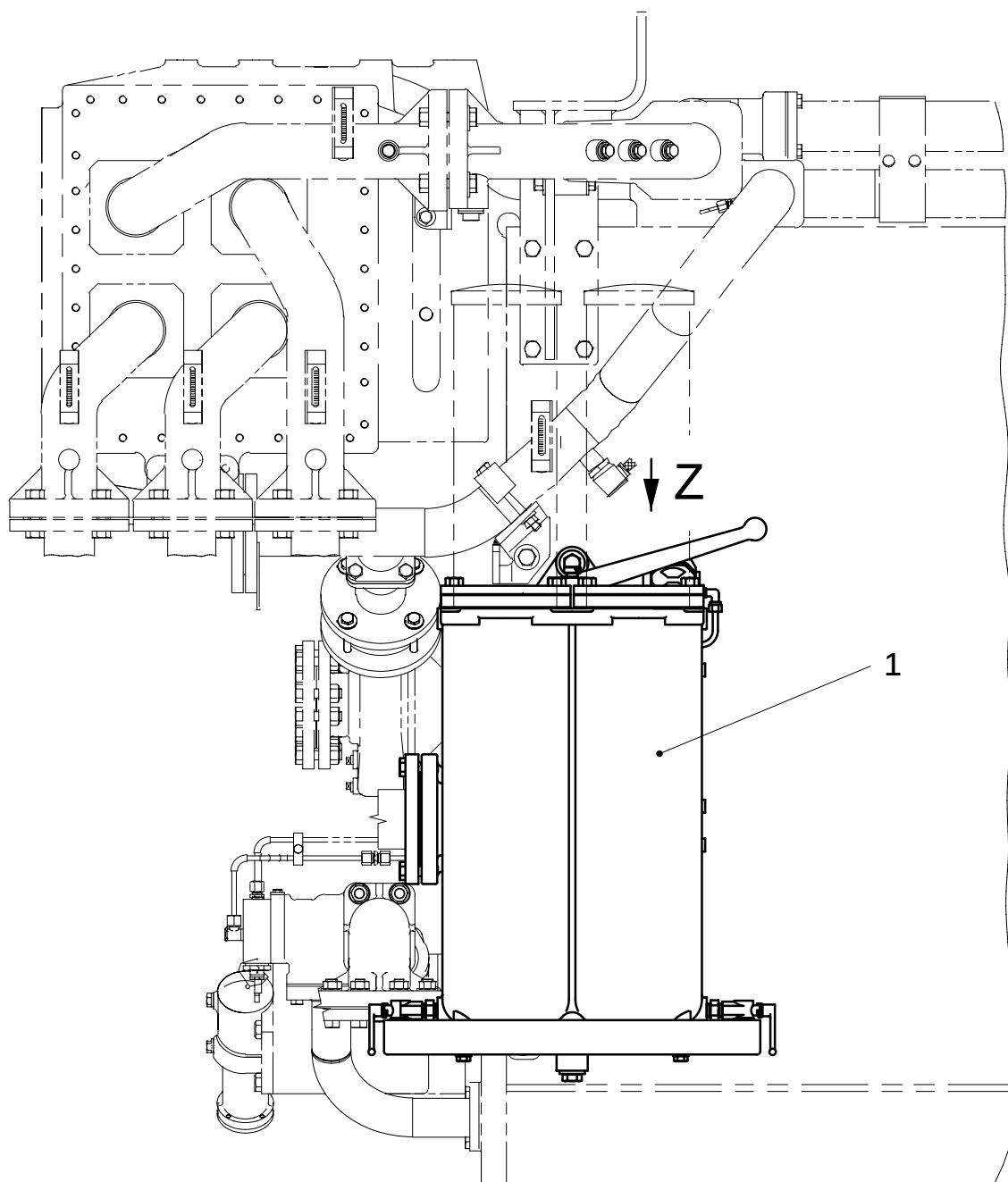
08

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lubricating Oil Filter Mounting

M25

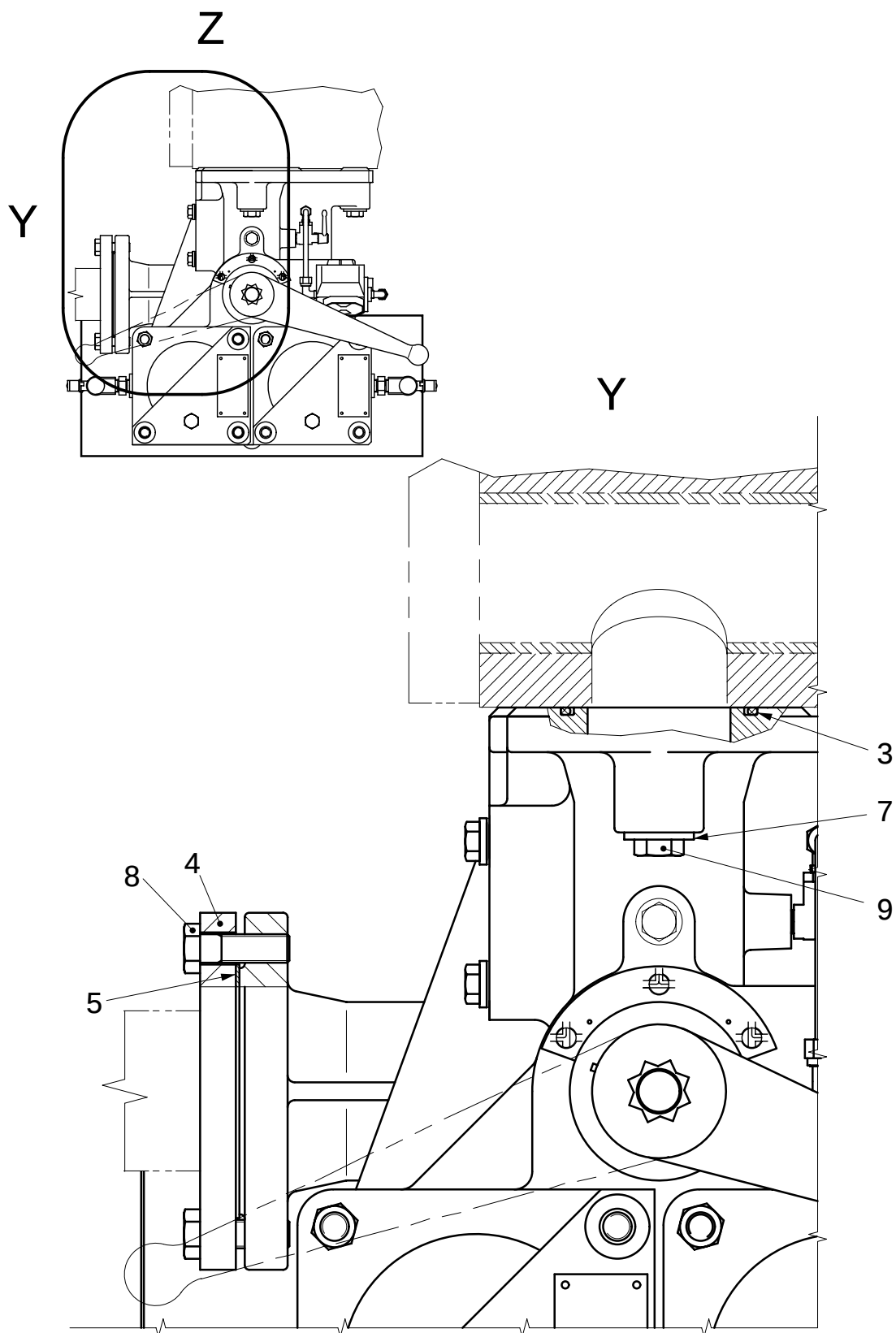
08



Lubricating Oil Filter Mounting

M25

08



Oil Centrifuge Mounting

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ÖLZENTRIFUGE-ANBAU, VOLLST. OIL CENTRIFUGE MOUNTING, ASS.	1	257650 CC
1	ÖLZENTRIFUGE, VOLLST. OIL CENTRIFUGE, COMPL.	1	SIEHE BUCH C SEE BOOK C
2	KURBELRAUMDECKEL CRANKCASE COVER	1	257650-002
3	DICHTUNG GASKET	# 1	257650-003
4	SCHWENKVERSCHRAUBUNG BANJO	1	1.5098-833
5	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1387-377
6	SECHSKANTMUTTER HEXAGON SCREW	4	1.2035-032

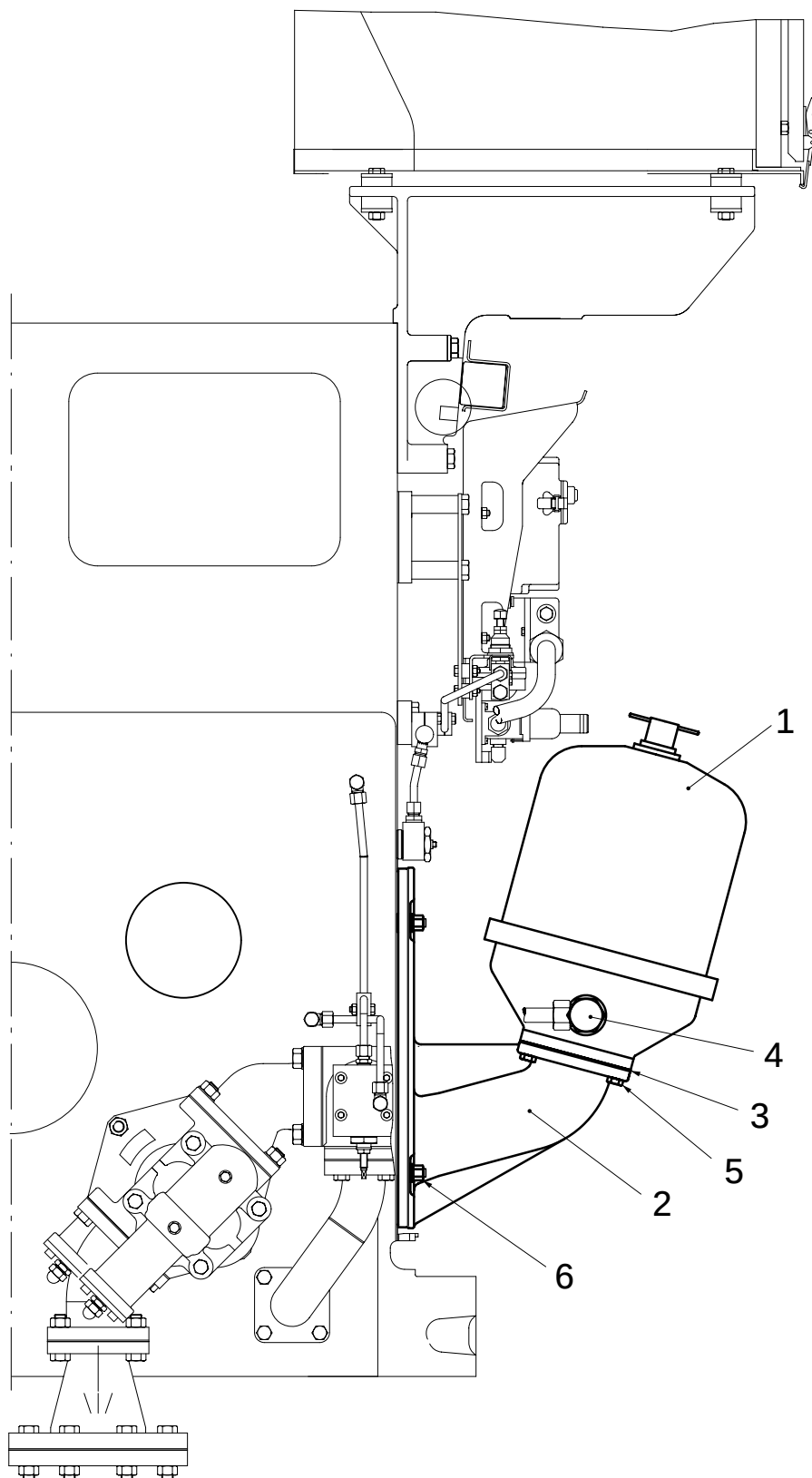
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Oil Centrifuge Mounting

M25

08



Duplex Lubricating Oil Filter

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖL-DOPPELFILTER, VOLLST. DUPLEX LUBRICATING OIL FILTER ASS.	1	257657 AA
2	GEWINDESTOPFEN THREADED PLUG	2	2.7657-002
3	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	3	1.1041-609
4	DICHTRING JOINT RING	# 3	1.7010-133
5	DICHTUNG GASKET	# 2	2.7657-005
6	DECKELSICHERUNG COVERSECURING	2	2.7657-006
8	STIFTSCHRAUBE STUD	8	1.1234-357
9	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-038
10	DECKEL COVER	2	2.7657-010
12	ANKER STUD	2	1.7657-312
13	SECHSKANTMUTTER HEXAGON NUT	2	1.2021-116
14	KÜKEN COCK PLUG	1	2.7657-014
15	O-RING O-RING	2	2.7657-015
16	SICHERUNGSRING LOCKING RING	2	1.0061-206
18	DRUCKAUSGLEICHKÜKEN PRESSURE BALANCE COCK-PLUG	1	2.7657-018
19	O-RING O-RING	# 2	2.7657-019
20	GEWINDESTIFT GRUB SCREW	1	2.7657-020
21	FEDERRING SPRING WASHER	1	2.7657-021
23	HAHNSCHLÜSSEL REVERSING HANDLE	1	1.7657-204
24	DIFFERENZDRUCK-ANZEIGER, VOLLST. DIFFERENTIAL PRESSURE GAUGE, COMPL.	1	1.7657-228
25	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	2	2.7657-025

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Duplex Lubricating Oil Filter

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
26	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-032
27	ENTLÜFTUNGSSSCHRAUBE VENT SCREW	2	1.7667-032
28	DICHTRING JOINT RING	# 2	1.7010-064
43	ROHRLEITUNG, VOLLST. STEEL PIPE, COMPL.	1	257657-043
45	VERSCHRAUBUNG SCREWING	3	257657-045
46	VERSCHRAUBUNG SCREWING	1	1.7667-152
48	DOPPELNIPPEL SPACER BLOCK	2	1.7667-158
49	WINKELKUGELHAHN ANGLE BALL COCK	2	1.7667-024
50	WINKELKUGELHAHN ANGLE BALL COCK	2	1.7667-151
51	DOPPELNIPPEL SPACER BLOCK	2	1.7667-160
55	ÖLWANNE OIL PAN	1	257657-055
58	SECHSKANTSCHRAUBE HEXAGON SCREW	4	257657-058
59	SCHEIBE WASHER	4	1.0040-224
60	O-RING O-RING	4	257657-060
64	GEWINDESTIFT GRUB SCREW	1	1.1102-036
100	SIEBEINSATZ, VOLLST. SIEVE ELEMENT, COMPL.	2	1.7657-450
101	SIEBKERZE FILTER CARTRIDGE	36	1.7657-456
102	O-RING O-RING	# 2	1.7657-428

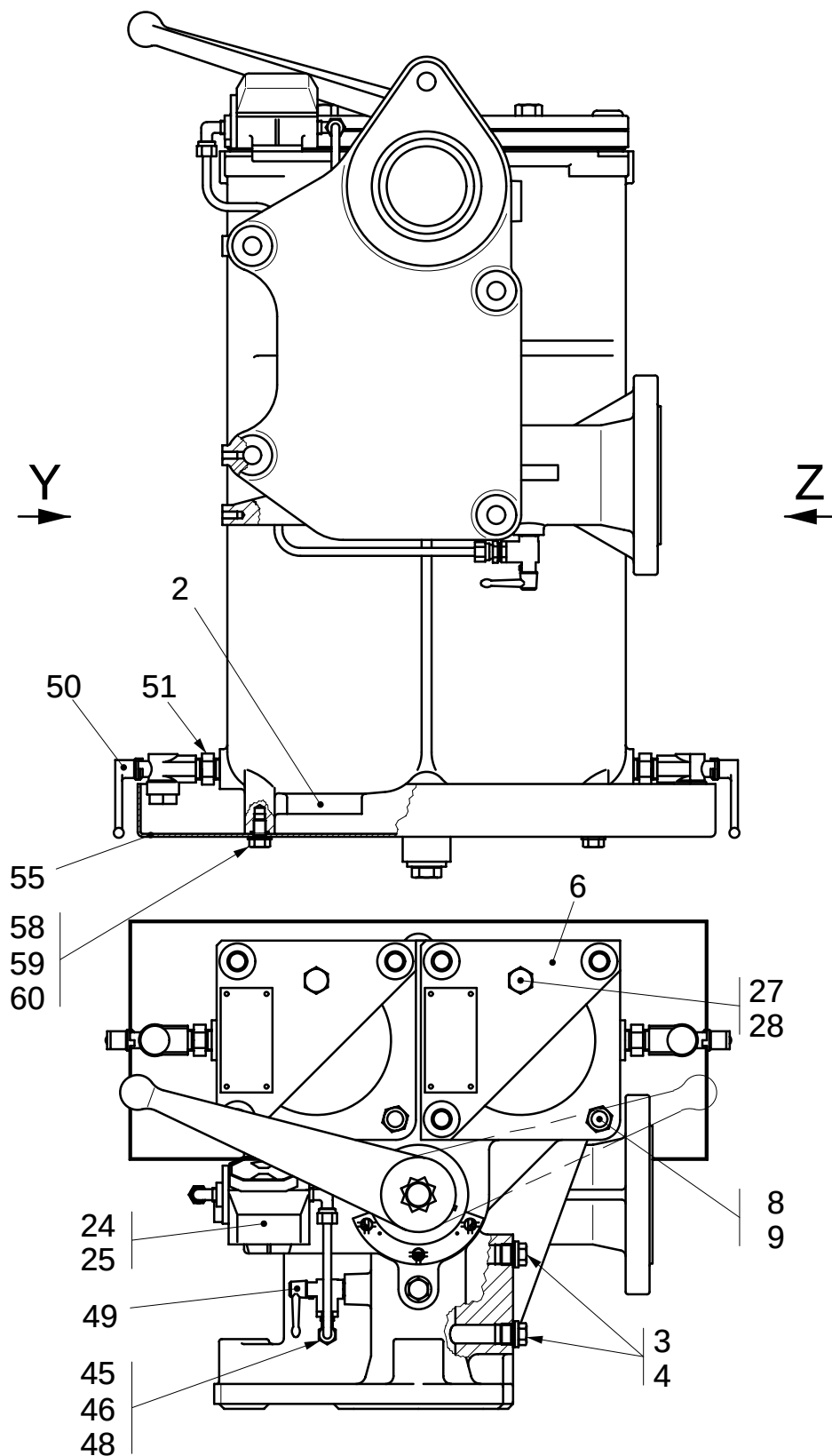
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Duplex Lubricating Oil Filter

M25

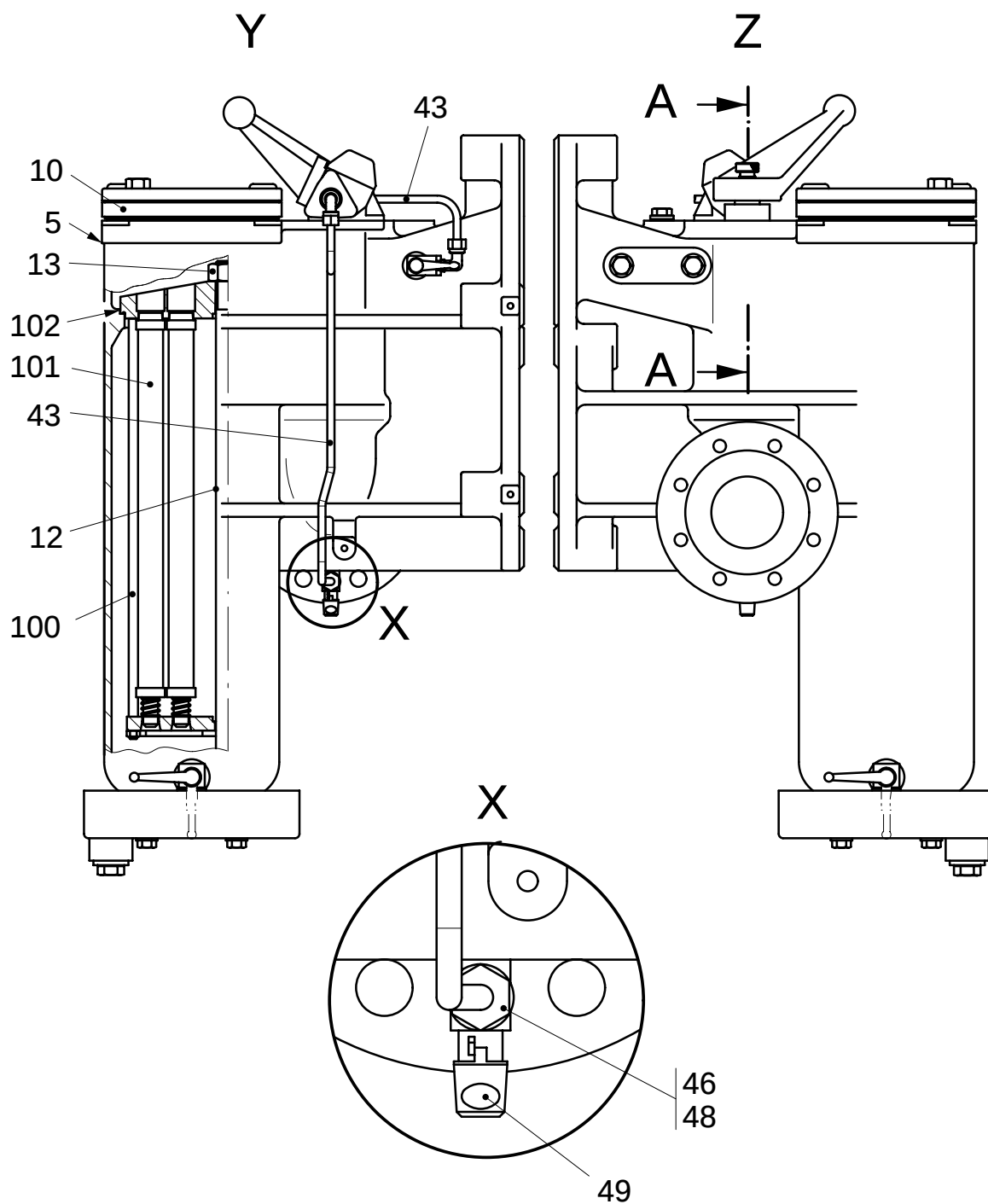
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Duplex Lubricating Oil Filter

M25

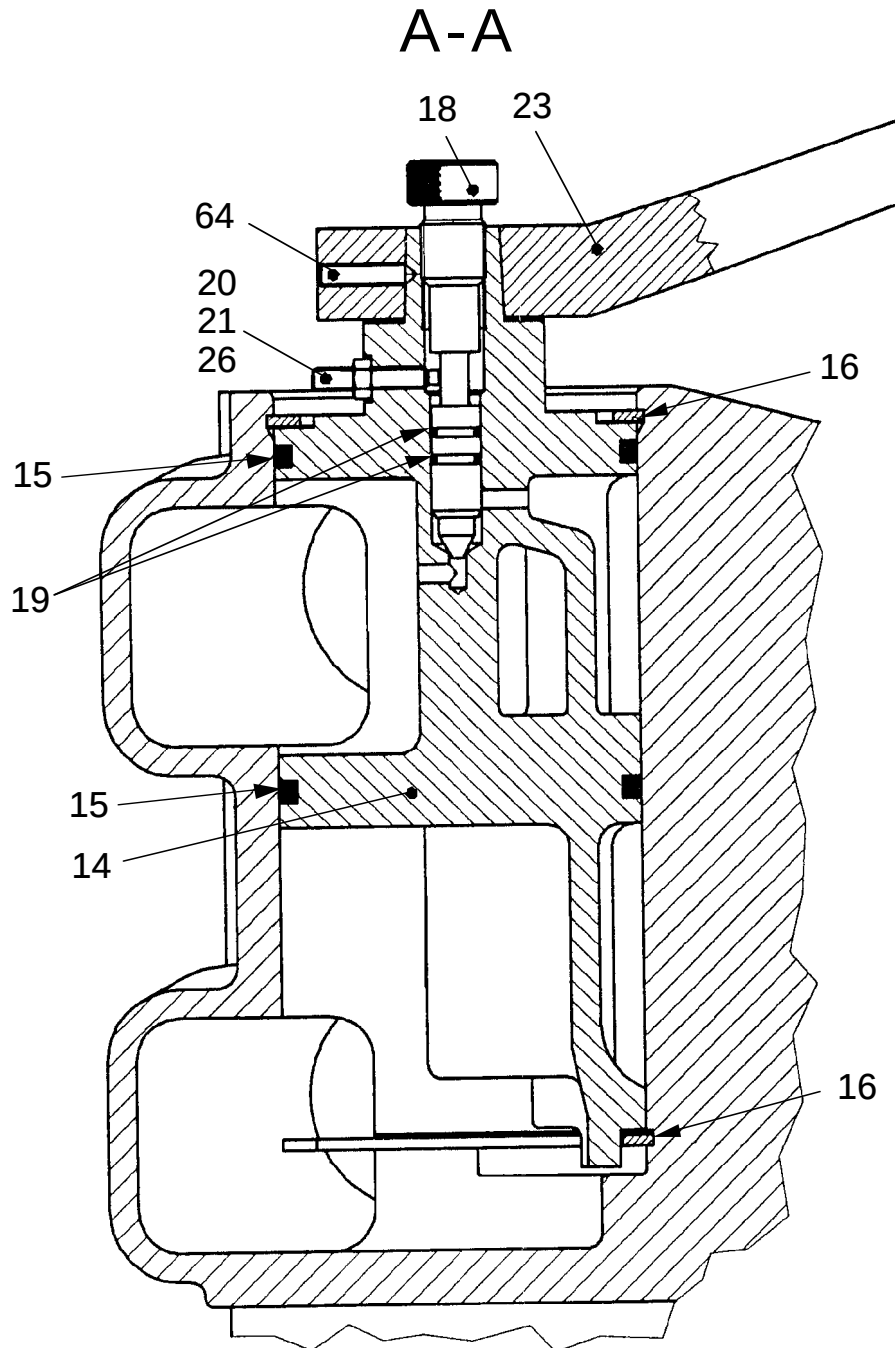
08



Duplex Lubricating Oil Filter

M25

08



Duplex Lubricating Oil Filter

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖL-DOPPELFILTER, VOLLST. DUPLEX LUBRICATING OIL FILTER ASS.	1	257657 BB
2	GEWINDESTOPFEN THREADED PLUG	2	2.7657-002
3	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	3	1.1041-609
4	DICHTRING JOINT RING	# 3	1.7010-133
5	DICHTUNG GASKET	# 2	2.7657-005
6	DECKELSICHERUNG COVERSECURING	2	2.7657-006
8	STIFTSCHRAUBE STUD	8	1.1234-357
9	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-038
10	DECKEL COVER	2	2.7657-010
12	ANKER STUD	2	1.7657-312
13	SECHSKANTMUTTER HEXAGON NUT	2	1.2021-116
14	KÜKEN COCK PLUG	1	2.7657-014
15	O-RING O-RING	2	2.7657-015
16	SICHERUNGSRING LOCKING RING	2	1.0061-206
18	DRUCKAUSGLEICHKÜKEN PRESSURE BALANCE COCK-PLUG	1	2.7657-018
19	O-RING O-RING	# 2	2.7657-019
20	GEWINDESTIFT GRUB SCREW	1	2.7657-020
21	FEDERRING SPRING WASHER	1	2.7657-021
23	HAHNSCHLÜSSEL REVERSING HANDLE	1	1.7657-204
26	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-032
27	ENTLÜFTUNGSSSCHRAUBE VENT SCREW	2	1.7667-032

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Duplex Lubricating Oil Filter

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
28	DICHTRING JOINT RING	# 2	1.7010-064
50	WINKELKUGELHAHN ANGLE BALL COCK	2	1.7667-151
51	DOPPELNIPPEL SPACER BLOCK	2	1.7667-160
55	ÖLWANNE OIL PAN	1	257657-055
58	SECHSKANTSCHRAUBE HEXAGON SCREW	4	257657-058
59	SCHEIBE WASHER	4	1.0040-224
60	O-RING O-RING	# 4	257657-060
64	GEWINDESTIFT GRUB SCREW	1	1.1102-036
100	DIFFERENZDRUCK-ANZEIGER, VOLLST. DIFFERENTIAL PRESSURE GAUGE, COMPL.	1	1.7657-228
101	WINKELKUGELHAHN ANGLE BALL COCK	2	1.7667-024
102	VERSCHRAUBUNG SCREWING	4	1.7667-152
103	DICHTRING JOINT RING	# 6	1.7010-064
104	O-RING O-RING	# 4	9.7657-104
105	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	2	9.7657-105
106	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-032
200	SIEBEINSATZ, VOLLST. SIEVE ELEMENT, COMPL.	2	1.7657-450
201	SIEBKERZE FILTER CARTRIDGE	36	1.7657-456
202	O-RING O-RING	# 2	1.7657-428

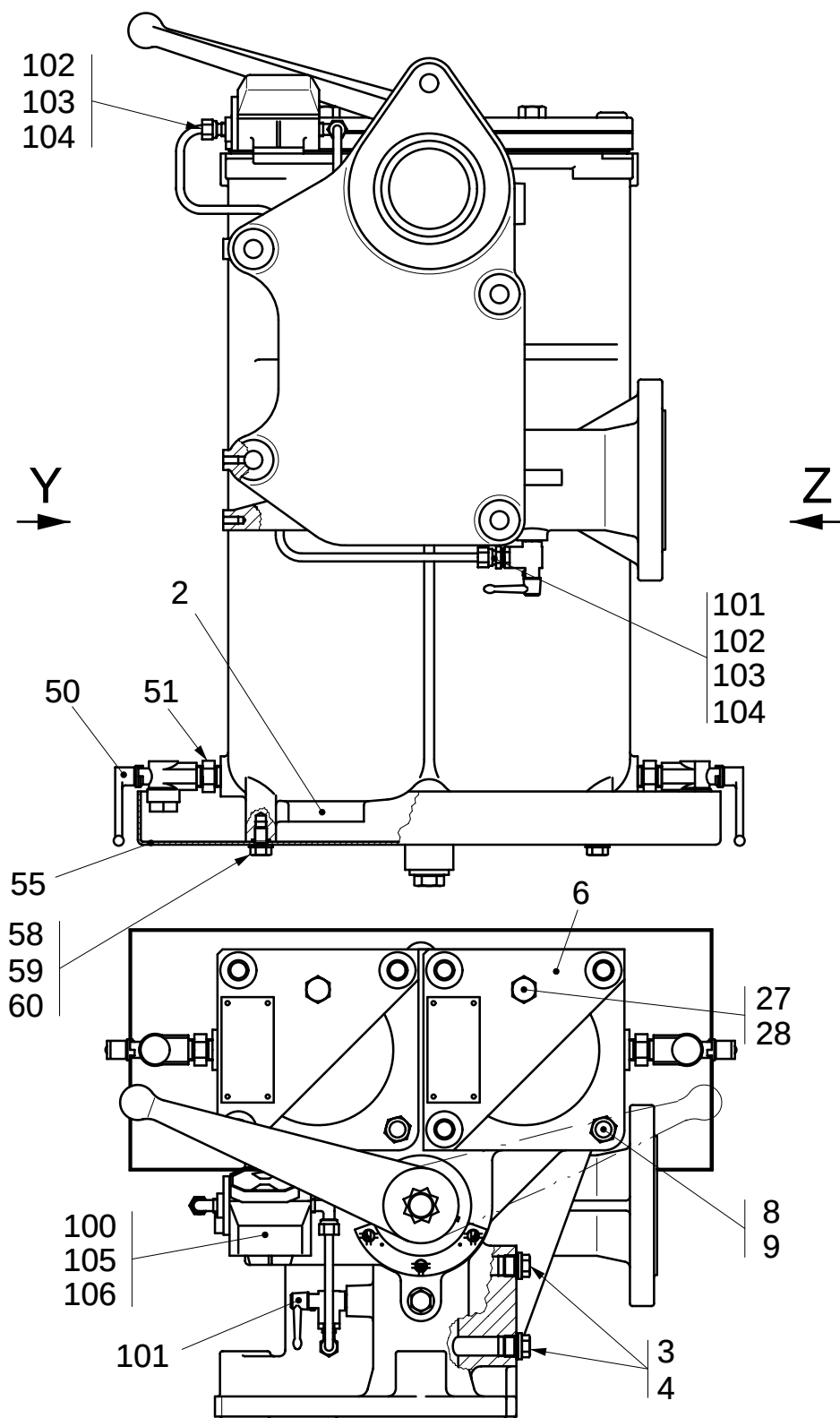
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Duplex Lubricating Oil Filter

M25

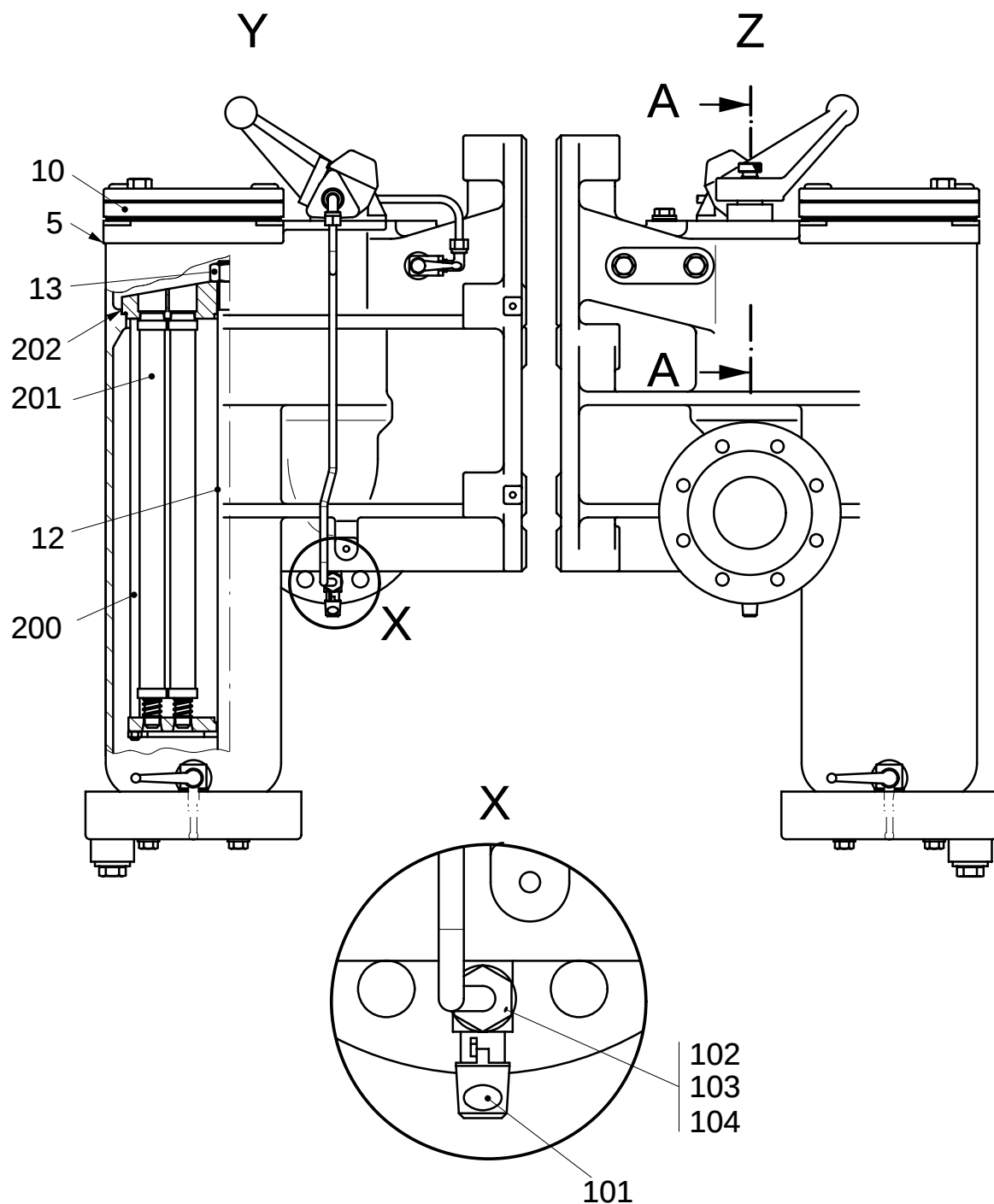
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Duplex Lubricating Oil Filter

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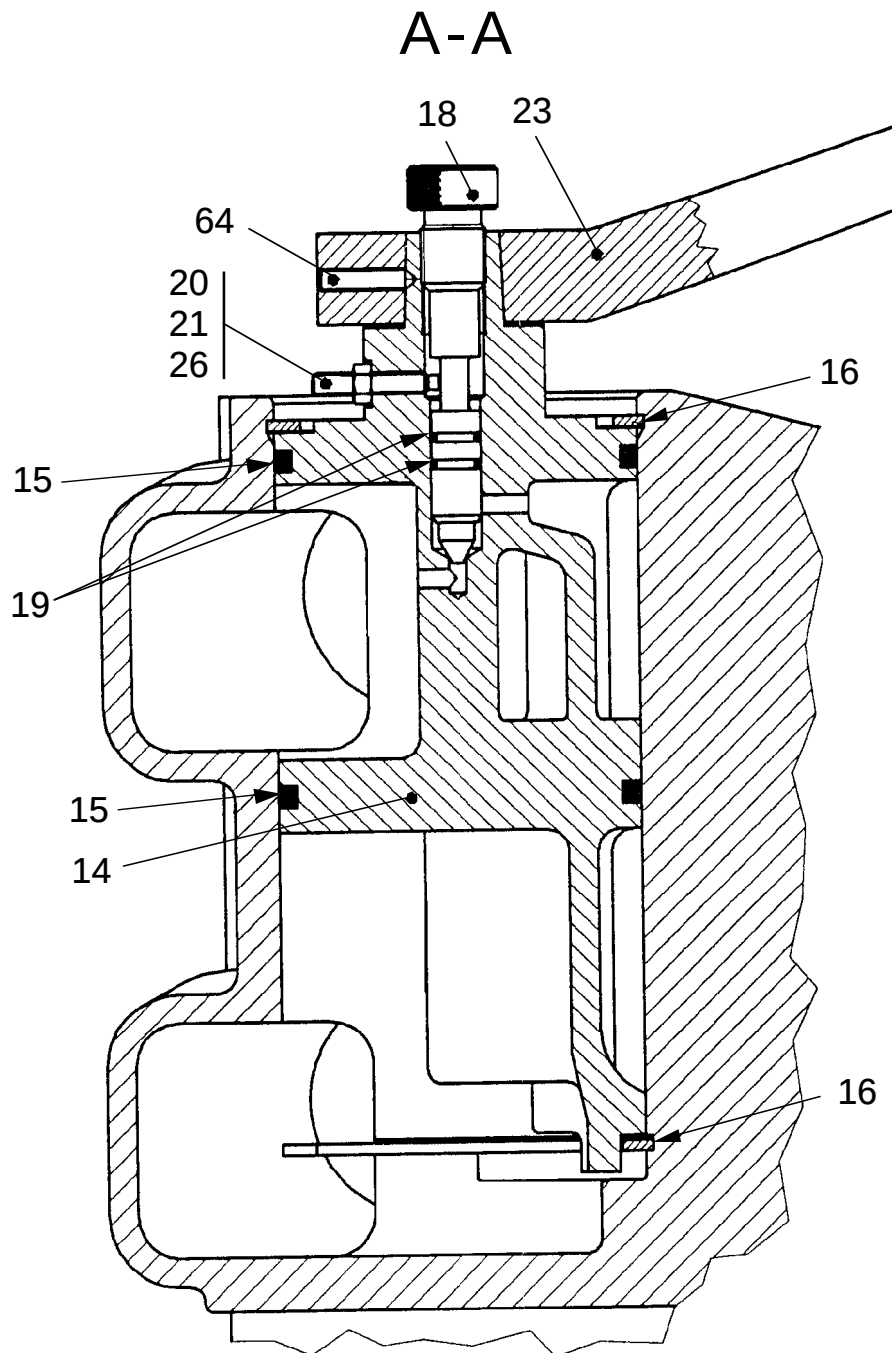
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Duplex Lubricating Oil Filter

M25

08



Lubricating Oil Pipes Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPES ASSEMBLY	1	258420 AA
1	KRÜMMER BEND	1	258420-001
2	SCHMIERÖLLEITUNG LUBRICATING OIL PIPE	1	258420-002
3	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPE, COMPL.	1	258420-003
4	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPE, COMPL.	1	258420-004
5	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPE, COMPL.	1	258420-005
6	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPE, COMPL.	1	258420-006
7	HALTER BRACKET	1	258420-007
8	DRUCKBEGRENZUNGSVENTIL, VOLLST. PRESSURE LIMITATION VALVE, COMPL.	1	SIEHE B1.05.08.n.7810 SEE B1.05.08.n.7810
9	DICHTUNG GASKET	# 3	9.8420-007
10	DICHTUNG GASKET	# 1	9.6410-010
11	DICHTUNG GASKET	# 1	1.7073-731
12	DICHTUNG GASKET	# 1	1.7073-357
13	FLANSCH FLANGE	# 1	1.5340-120
15	ROHRKLEMME PIPE CLAMP	4	1.5011-001
16	SCHWENKVERSCHRAUBUNG BANJO	2	1.5093-707
17	SCHWENKVERSCHRAUBUNG BANJO	1	1.5093-607
18	STUTZEN MALE CONNECTOR	1	1.5094-146
19	DICHTRING JOINT RING	# 1	1.7010-064
21	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-311
22	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-376

08

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lubricating Oil Pipes Mounting

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
23	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-445
24	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-446
25	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-372
26	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1372-373
27	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1387-444
28	STIFTSCHRAUBE STUD	4	1.1247-283
29	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034
30	SECHSKANTMUTTER HEXAGON NUT	18	1.2007-038
31	DÄMFUNGSSTUTZEN DAMPING PIPE UNION	1	1.5075-026
32	SPANNSCHEIBE CONICAL SPRING WASHER	# 6	1.0068-240
35	SCHEIBE WASHER	20	1.0040-227

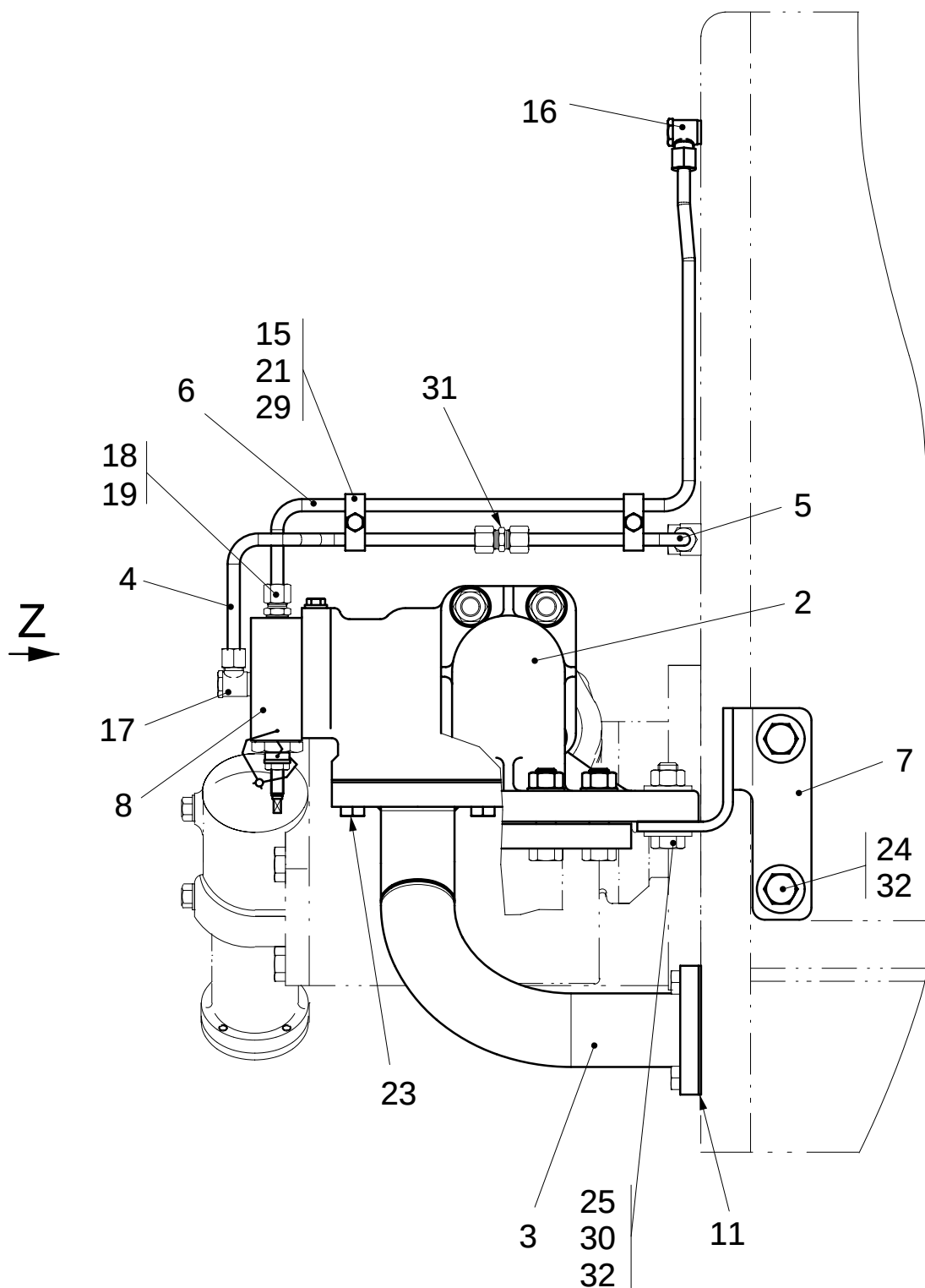
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lubricating Oil Pipes Mounting

M25

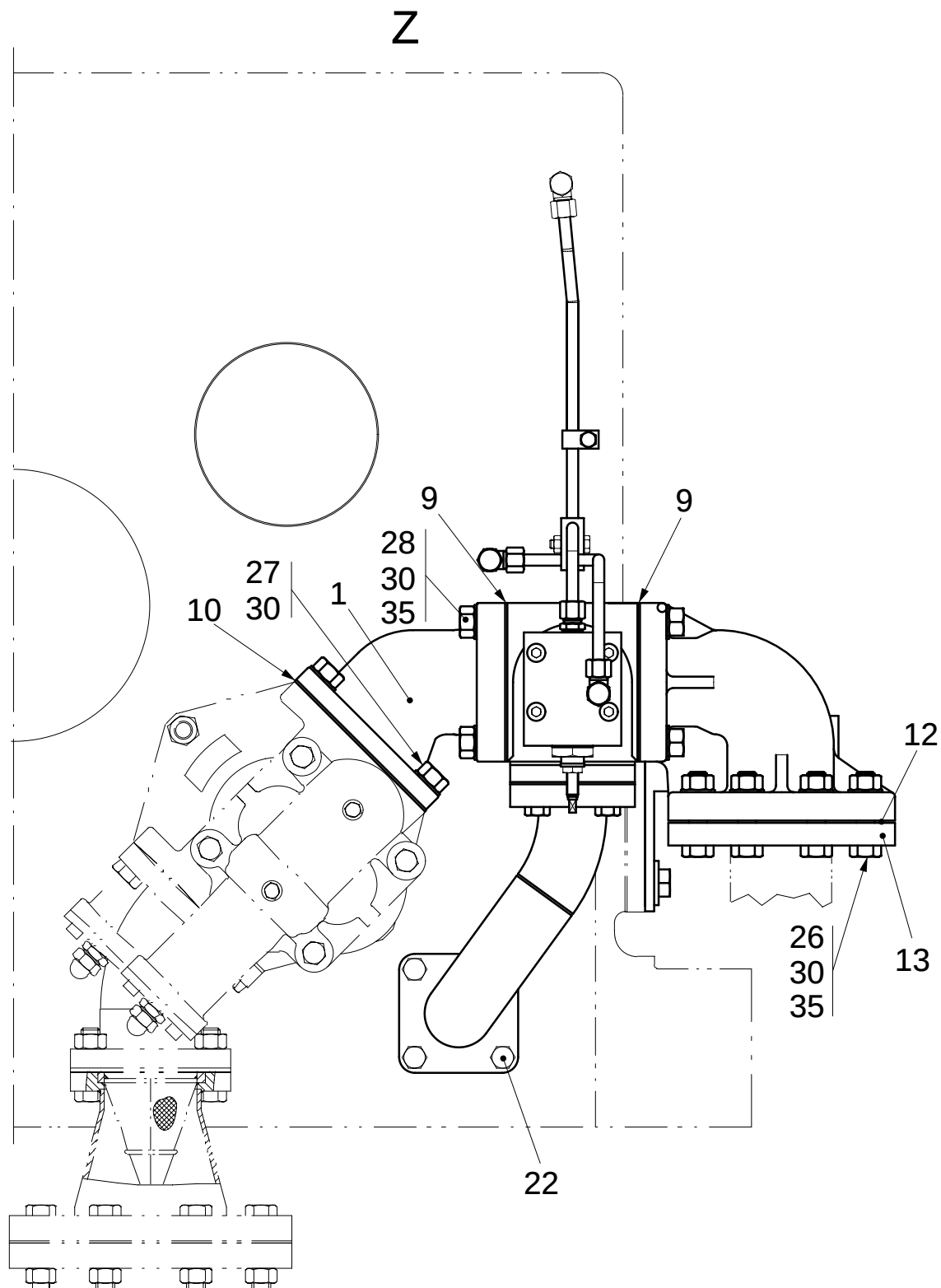
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Lubricating Oil Pipes Mounting

M25

08



Lube Oil Suction Pipe for Pressure Pump

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLSAUGELEITUNG, VOLLST. LUBE OIL SUCTION PIPE ASSEMBLY	1	258422AA
1	SCHMIERÖLLEITUNG, VOLLST. LUBE OIL PIPE, COMPL.	1	258422-001
4	FLANSCH FLANGE	1	1.5340-125
7	DICHTUNG GASKET	# 1	1.7073-737
8	DICHTUNG GASKET	# 1	1.7073-302
11	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-446
12	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1372-373
13	SECHSKANTMUTTER HEXAGON NUT	12	1.2007-038

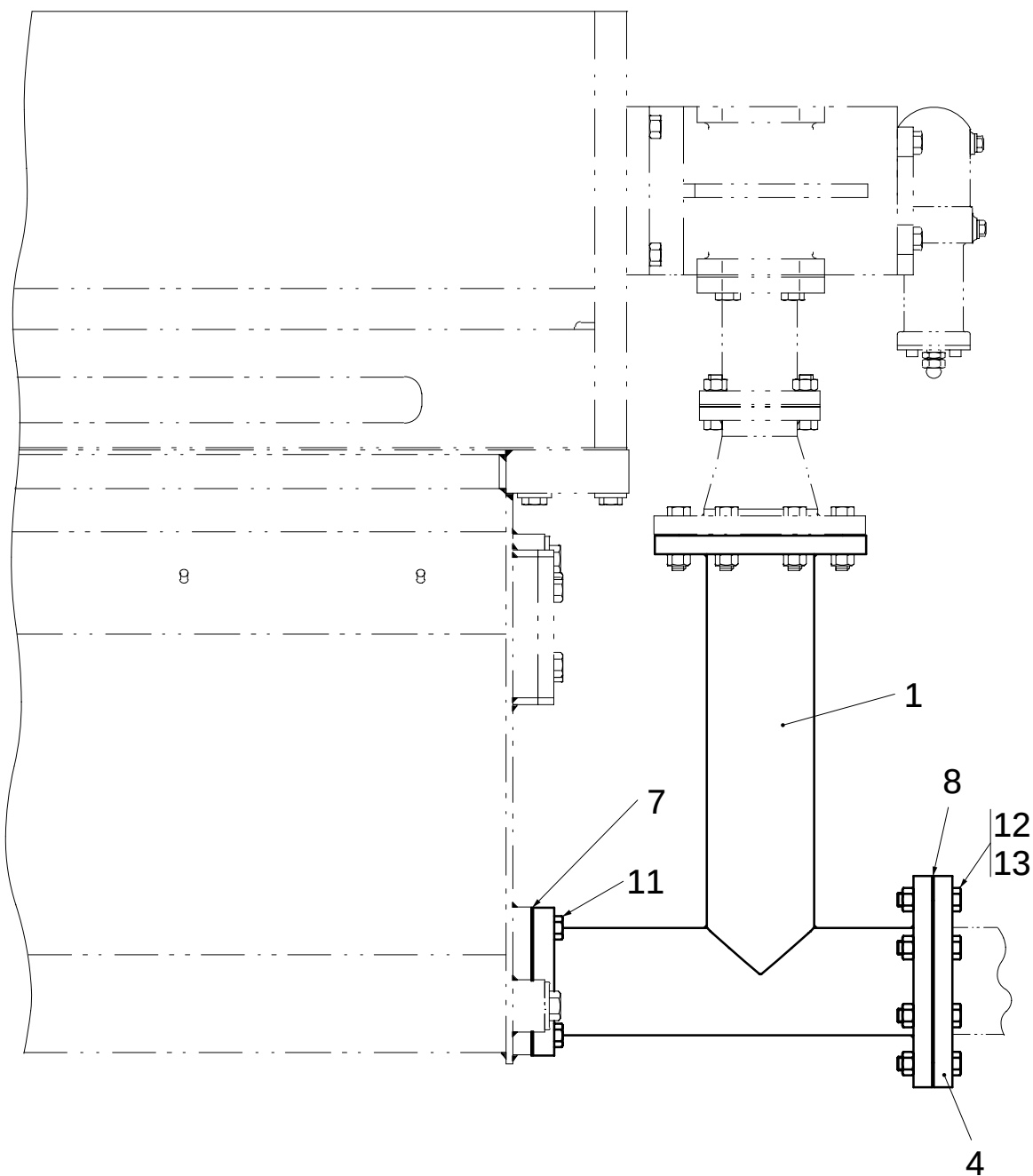
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lube Oil Suction Pipe for Pressure Pump

M25

08



Lube Oil Suction Pipe for Pressure Pump

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLSAUGELEITUNG, VOLLST. LUBE OIL SUCTION PIPE ASSEMBLY	1	258422BB
1	SCHMIERÖLLEITUNG, VOLLST. LUBE OIL PIPE, COMPL.	1	258422-101
4	FLANSCH FLANGE	1	1.5340-125
7	DICHTUNG GASKET	# 1	1.7073-737
8	DICHTUNG GASKET	# 1	1.7073-302
11	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-446
12	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-372
13	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-038

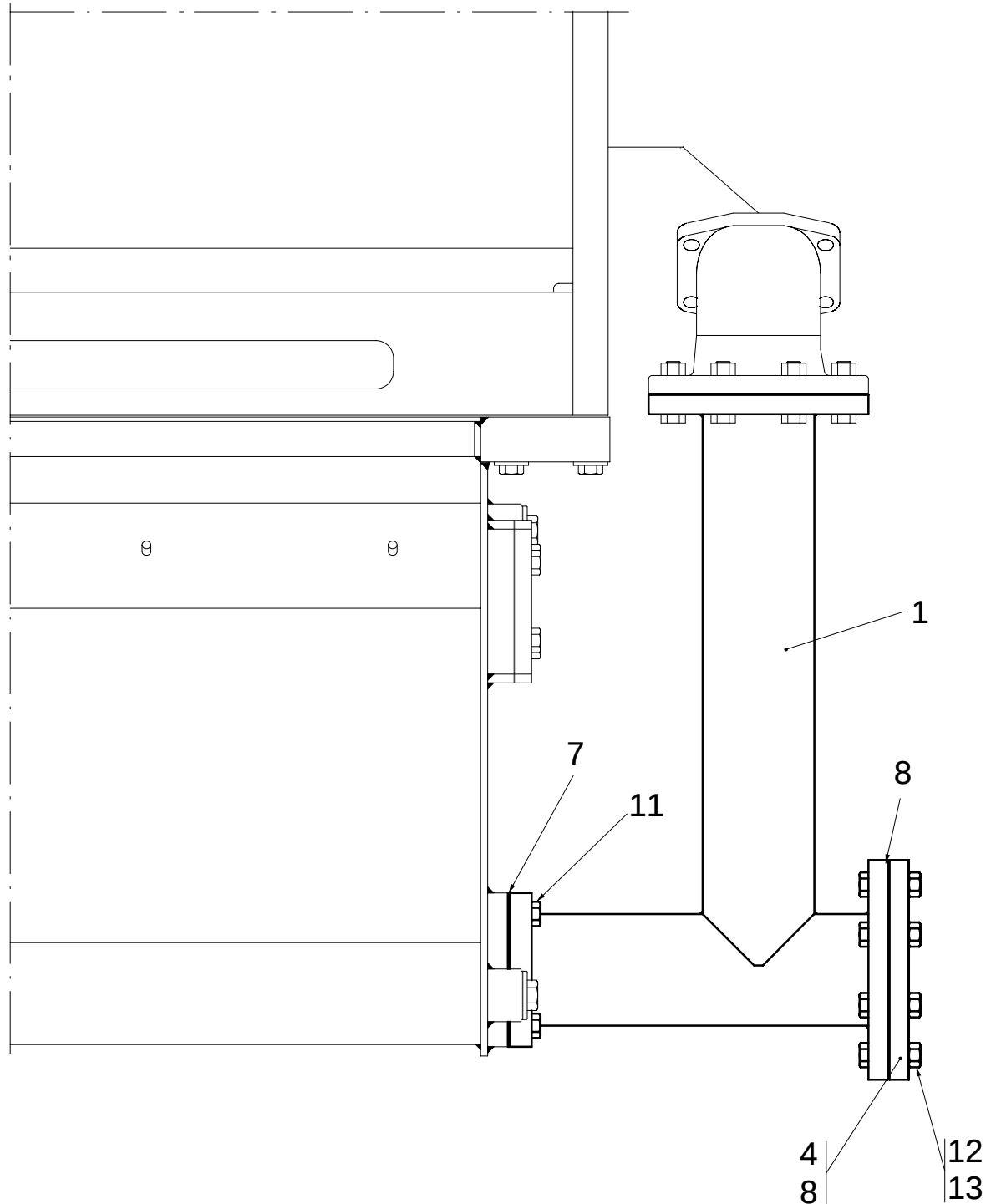
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lube Oil Suction Pipe for Pressure Pump

M25

08



Lube Oil Pipe for Suction Pump

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLLEITUNG, VOLLST. LUBE OIL PIPE ASSEMBLY	1	258430 AA
1	SCHMIERÖLSAUGELEITUNG, VOLLST. LUBE OIL SUCTION PIPE, COMPL.	1	258430-001
2	SCHMIERÖLSAUGELEITUNG, VOLLST. LUBE OIL SUCTION PIPE, COMPL.	1	258430-002
3	ROHRKLEMME PIPE CLAMP	2	258430-003
4	DICHTUNG GASKET	# 1	1.1200-012
5	DICHTUNG GASKET	# 1	256410-010
8	FLANSCH FLANGE	1	1.5340-125
11	DICHTUNG GASKET	# 1	1.7073-737
12	DICHTUNG GASKET	# 1	1.7073-302
15	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1367-380
16	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-445
17	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1372-373
18	STIFTSCHRAUBE STUD	4	1.1234-362
21	SECHSKANTMUTTER HEXAGON NUT	12	1.2007-038

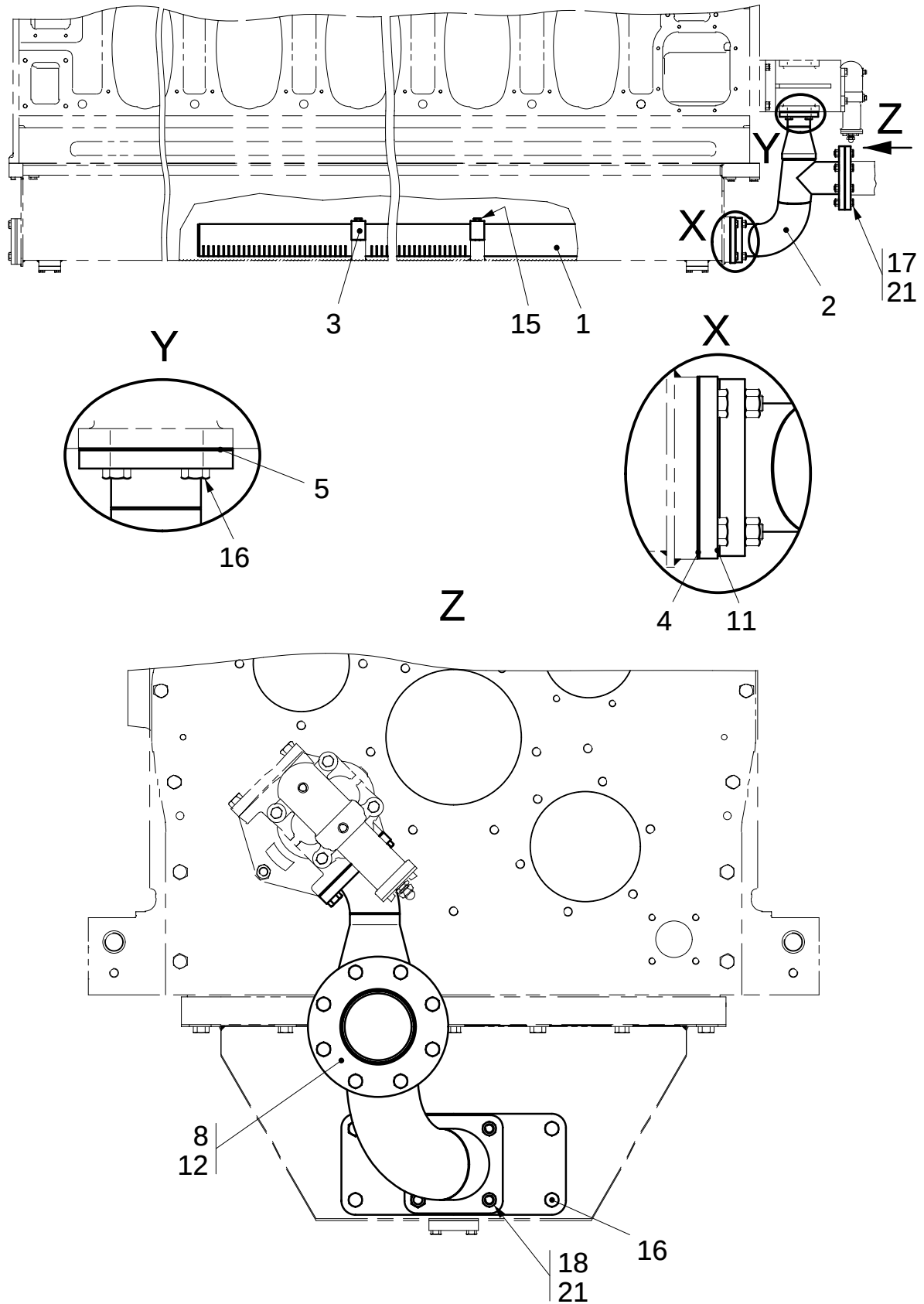
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Lube Oil Pipe for Suction Pump

M25

08



Lube Oil Nozzle for Gearwheels

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLDÜSEN, VOLLST. LUBE OIL NOZZLE ASSEMBLY	1	258450 AA
1	ÖLDÜSE LUBE OIL NOZZLE	3	258540-001
2	SCHRAUBE SCREW	3	9.8450-002
3	SPANNSTIFT SPRING DOWEL PIN	3	1.0039-313

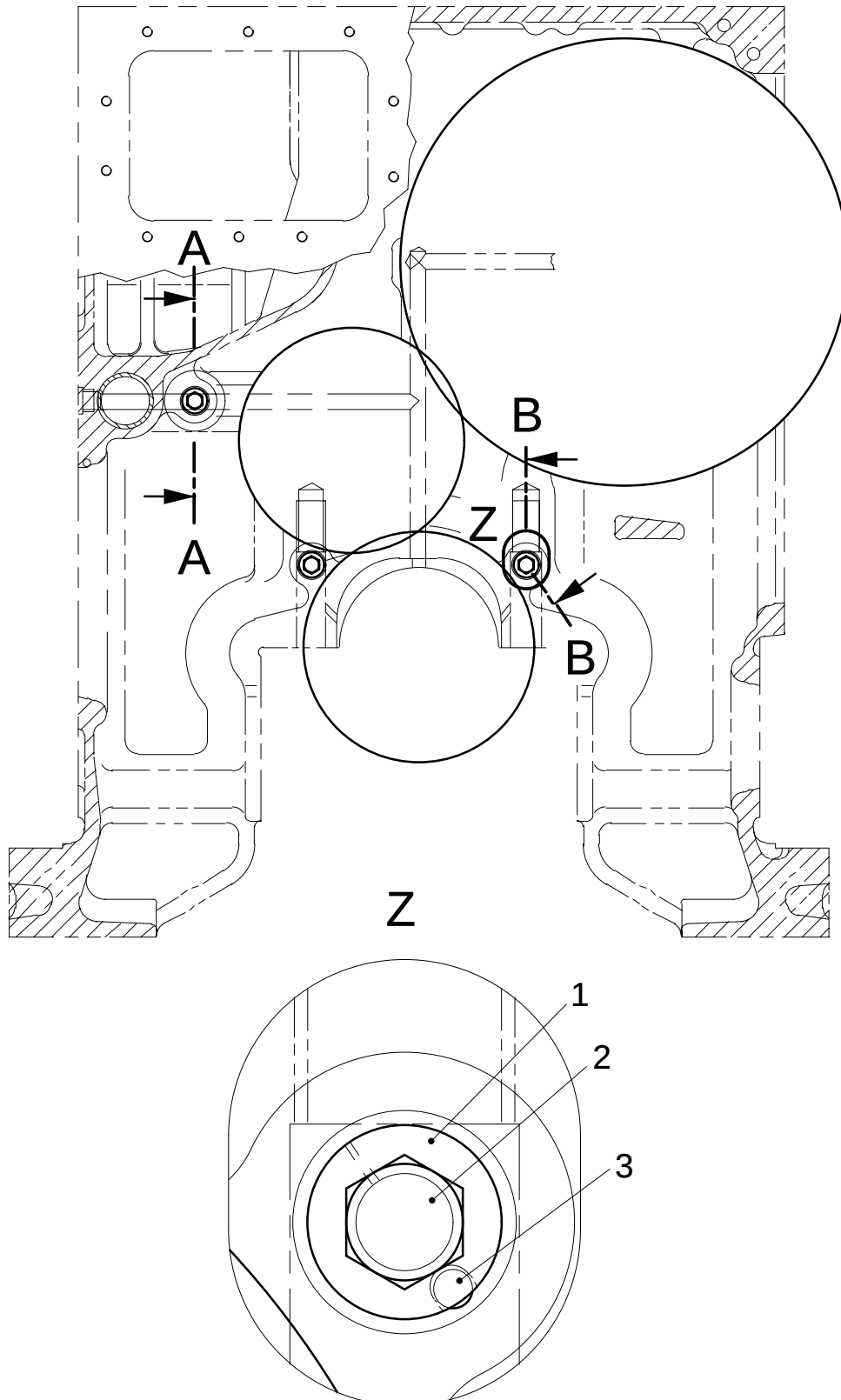
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Lube Oil Nozzle for Gearwheels

M25

08

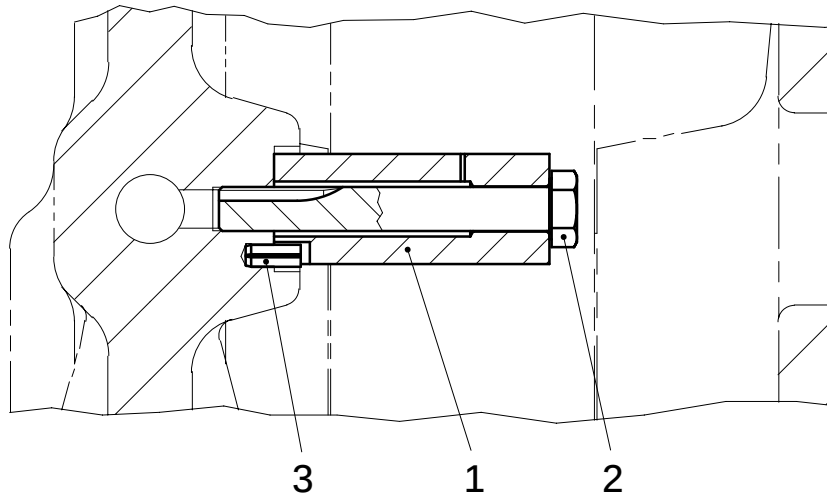


Lube Oil Nozzle for Gearwheels

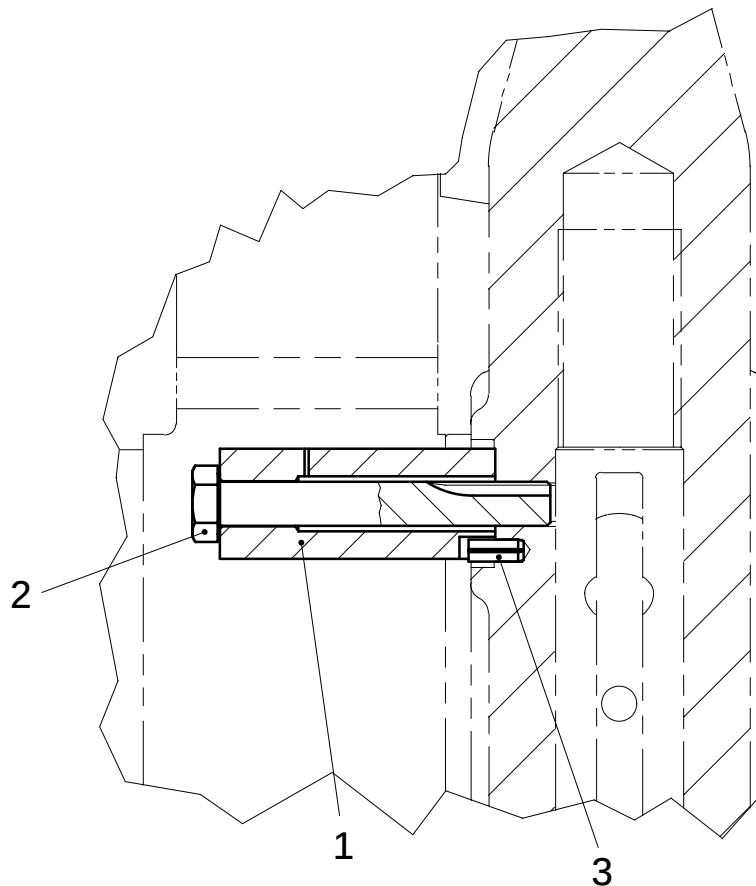
M25

08

A-A



B-B



Lube Oil Pipe for Valve Rocker

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLLEITUNG, VOLLST. LUBE OIL PIPE ASSEMBLY	1	258475 AA
1	SCHMIERÖLLEITUNG, VOLLST. LUBE OIL PIPE, COMPL.	1	258475-001
2	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-568
3	ÜBERWURFMUTTER UNION NUT	1	1.5040-141
5	STUTZEN MALE CONNECTOR	1	1.5094-268
6	DICHTRING JOINT RING	# 2	1.7010-252
7	STUTZEN ADJUSTABLE MALE RUN TEE	1	1.5093-337
8	STUTZEN MALE CONNECTOR	1	1.5094-184

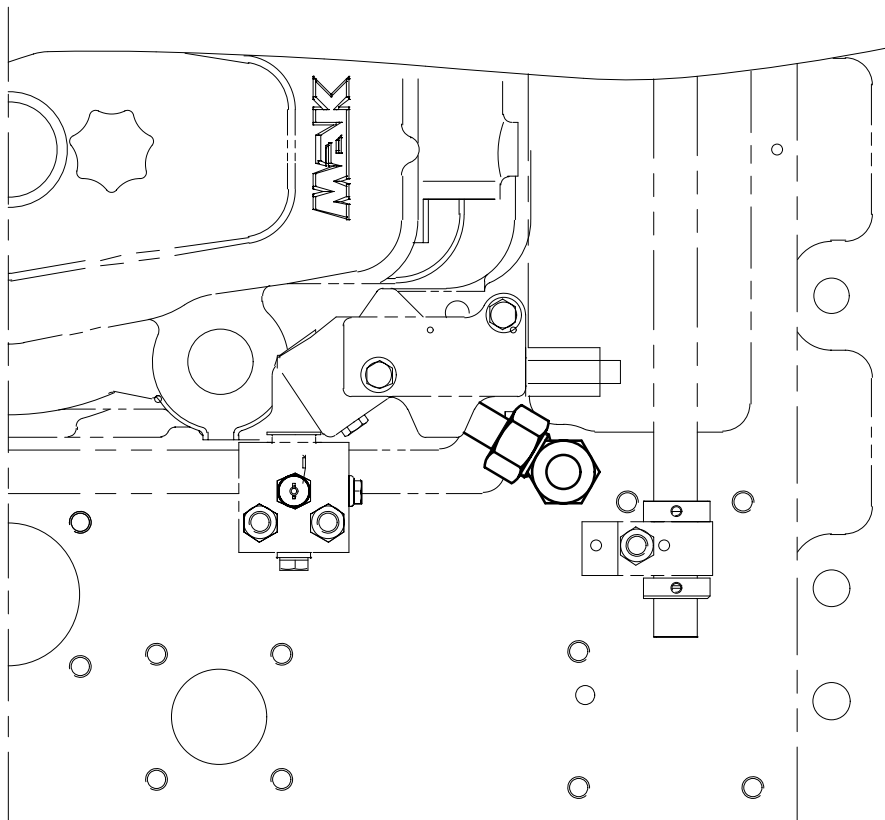
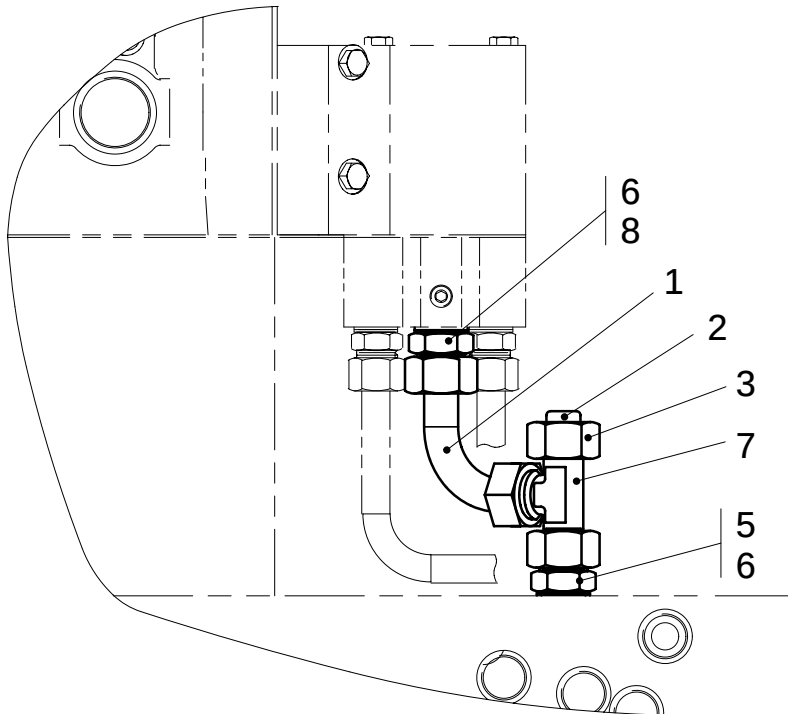
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Lube Oil Pipe for Valve Rocker

M25

08



Lube Oil Pipe for Valve Rocker

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLLEITUNG, VOLLST. LUBE OIL PIPE ASSEMBLY	1	258475 BB
1	SCHMIERÖLLEITUNG, VOLLST. LUBE OIL PIPE, COMPL.	1	258475-101
4	STUTZEN MALE CONNECTOR	1	1.5094-268
5	STUTZEN ADJUSTABLE MALE RUN TEE	1	1.5093-337
6	KONUS-REDUZIERANSCHLUSS CONICAL REDUCING UNION	1	1.5098-039
7	SCHWENKVERSCHRAUBUNG BANJO	1	1.5098-832
8	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-568
10	ÜBERWURFMUTTER UNION NUT	1	1.5040-141
12	DICHTRING JOINT RING	# 1	1.7010-252

= VERBRAUCHSTEILE
CONSUMABLES

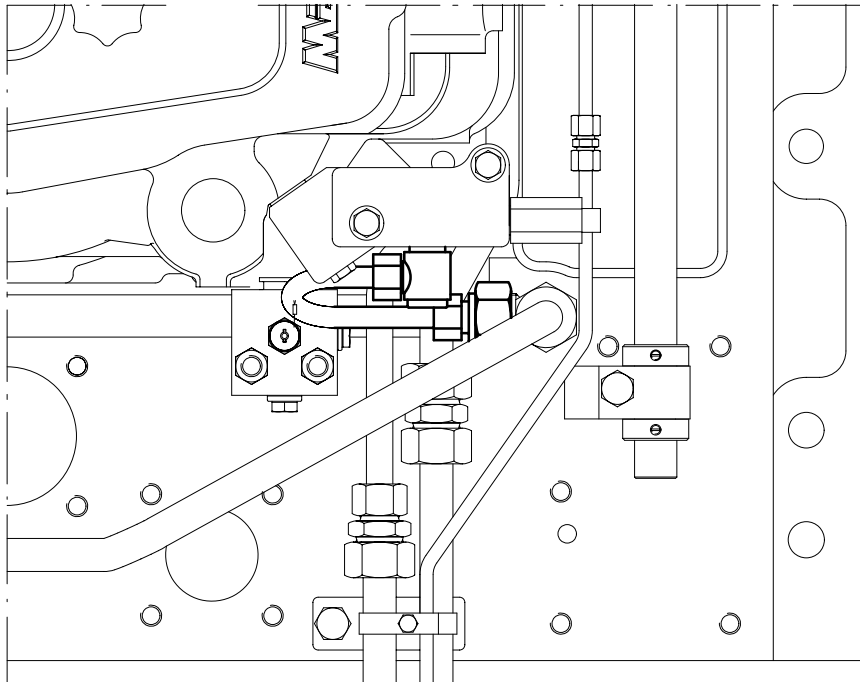
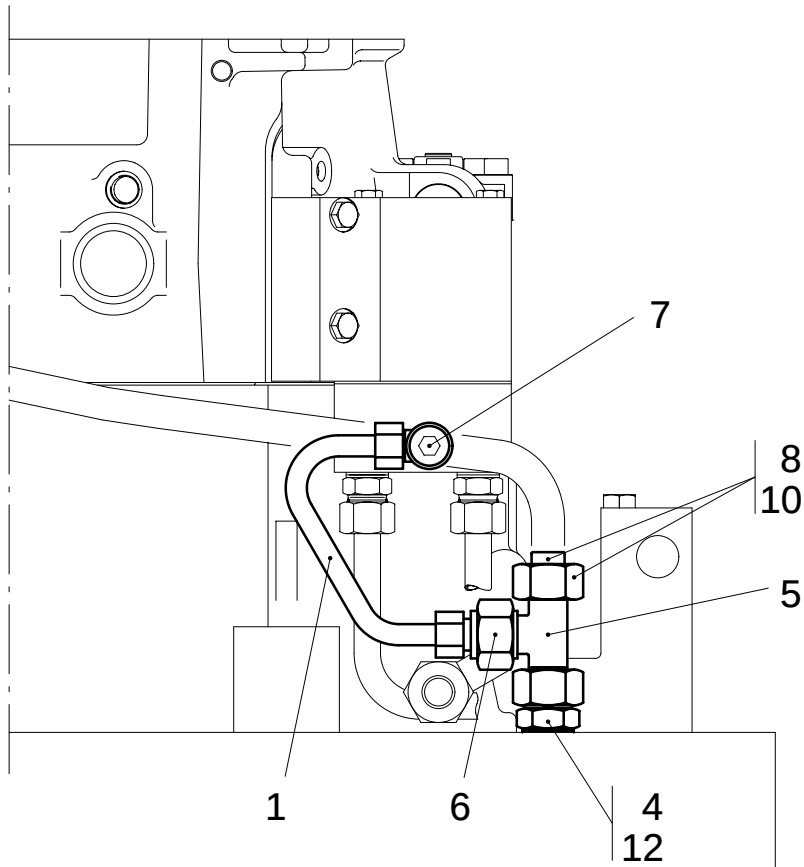
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lube Oil Pipe for Valve Rocker

M25

08



Lube Oil Pipe for Valve Rocker

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLLEITUNG, VOLLST. LUBE OIL PIPE ASSEMBLY	1	258475 CC
1	SCHMIERÖLLEITUNG, VOLLST. LUBE OIL PIPE, COMPL.	1	258475-201
4	STUTZEN MALE CONNECTOR	1	1.5094-268
5	STUTZEN ADJUSTABLE MALE RUN TEE	1	1.5093-337
6	KONUS-REDUZIERANSCHLUSS CONICAL REDUCING UNION	1	1.5098-039
7	SCHWENKVERSCHRAUBUNG BANJO	1	1.5098-832
8	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-568
10	ÜBERWURFMUTTER UNION NUT	1	1.5040-141
12	DICHTRING JOINT RING	# 1	1.7010-252
15	O-RING O-RING	# 2	1.5207-311

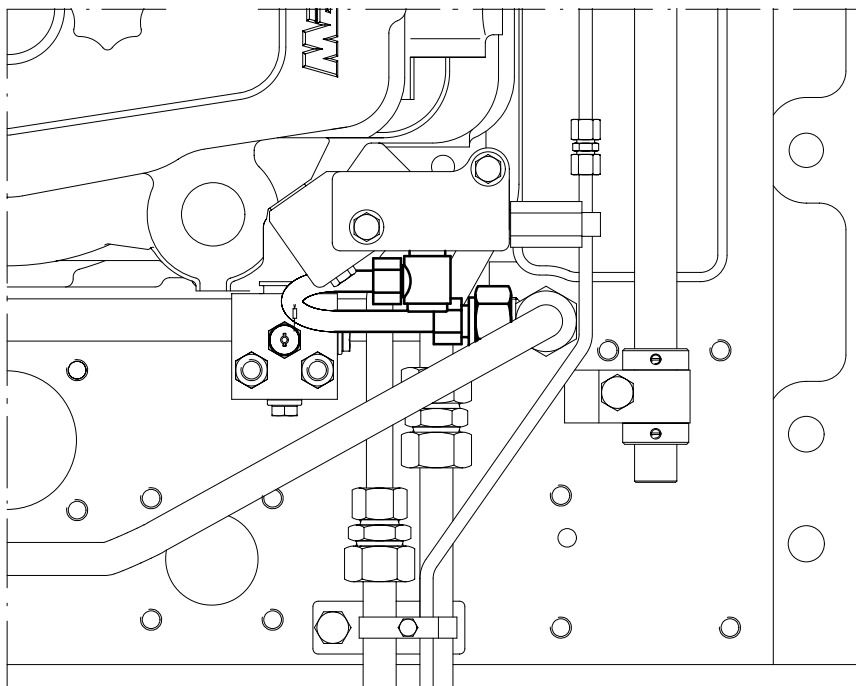
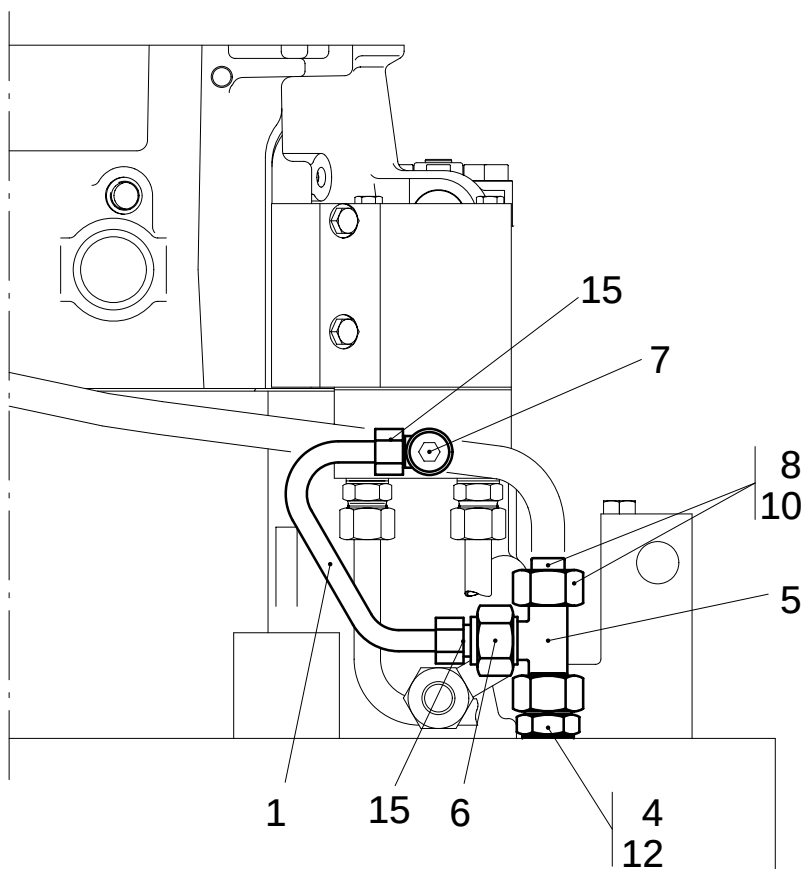
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lube Oil Pipe for Valve Rocker

M25

08



Sealing Oil Connection Mounting

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SPERRÖLANSCHLUSS-ANBAU, VOLLST. SEALING OIL CONNECTION MOUNTING ASSEMBLY	1	258478 AA
1	LECKÖLLEITUNG, VOLLST. LEAK OIL PIPE, COMPL.	4	258478-001
2	SPERRÖLLEITUNG, VOLLST. SEALING OIL PIPE, COMPL.	1	258478-002
3	SPERRÖLLEITUNG, VOLLST. SEALING OIL PIPE, COMPL.	1	258478-003
4	SPERRÖLLEITUNG, VOLLST. SEALING OIL PIPE, COMPL.	5	258478-004
7	STUTZEN PIPE UNION	1	1.5095-072
9	STUTZEN UNION TEE	5	1.5095-512
10	STUTZEN ADJUSTABLE MALE RUN TEE	1	1.5093-322
11	STUTZEN PIPE UNION	6	1.5098-034
13	ÜBERWURFMUTTER UNION NUT	1	1.5040-116
14	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-563
16	DICHTRING JOINT RING	# 6	1.7010-038
18	ROHRKLEMME PIPE CLAMP	12	1.5011-002
19	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-311

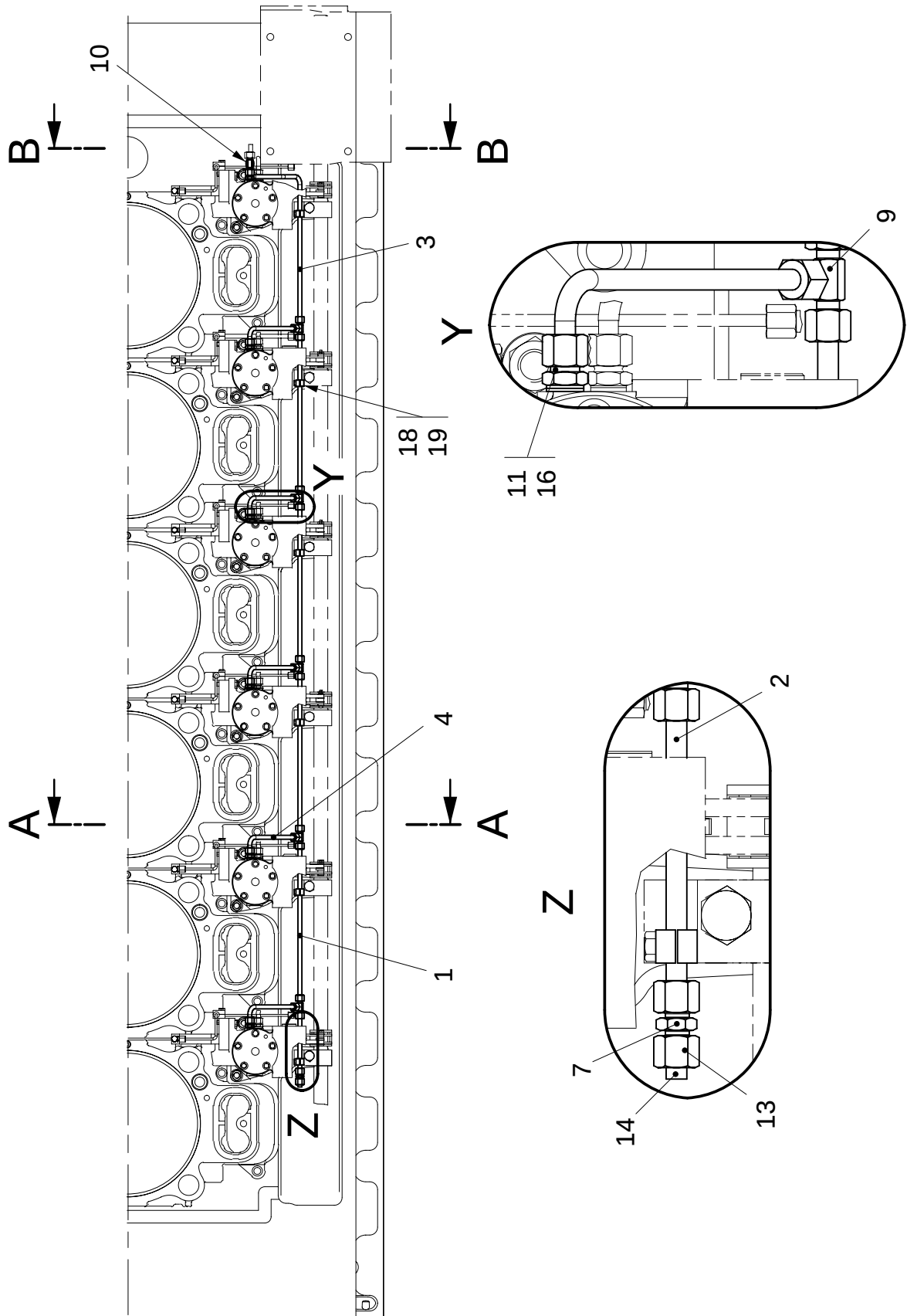
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Sealing Oil Connection Mounting

M25

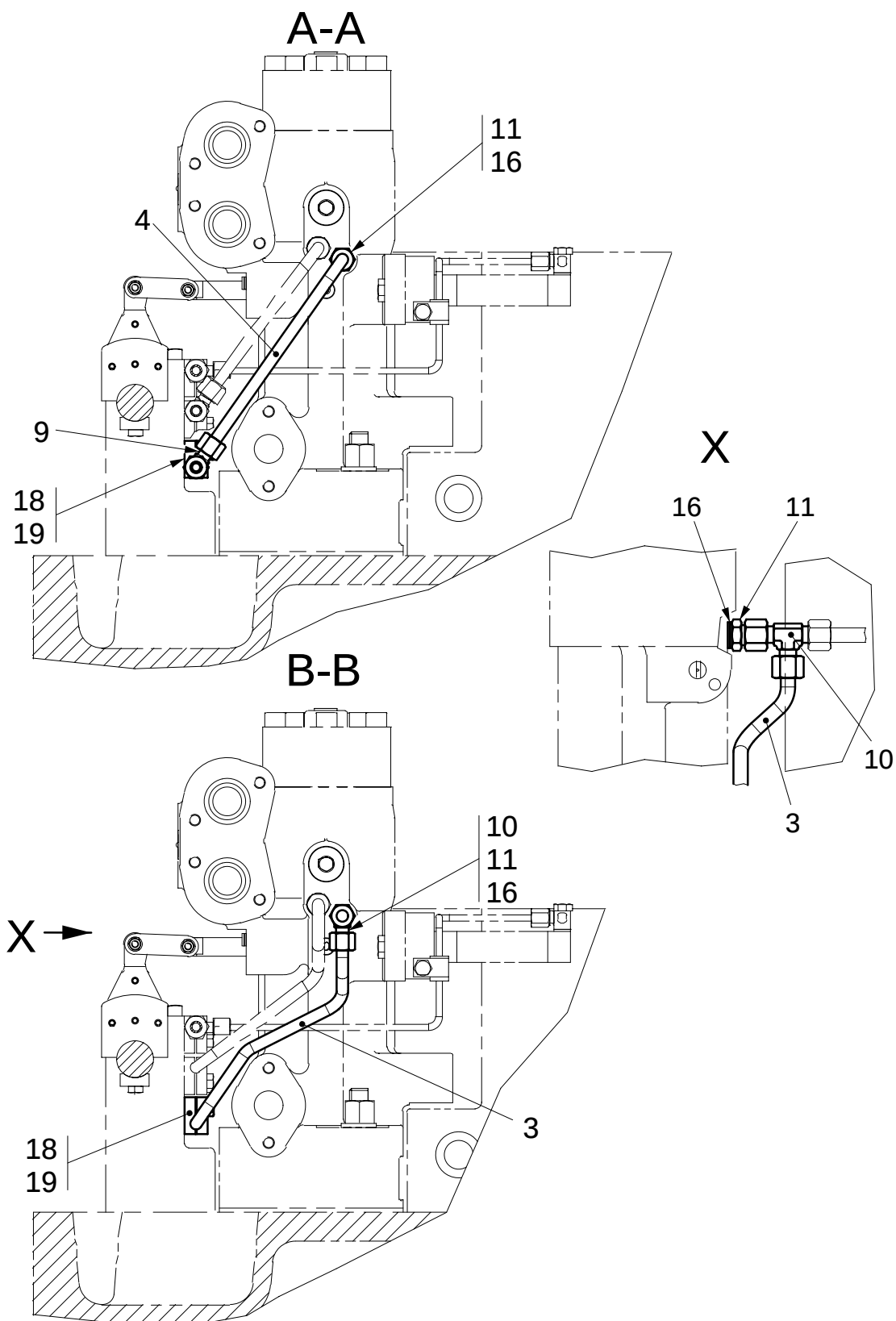
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Sealing Oil Connection Mounting

M25

08



Leak Oil Piping

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LECKLEITUNG-ANBAU, VOLLST. LEAK OIL PIPING ASSEMBLY	1	258480 AA
1	ROHR PIPE	5	258480-001
3	FLANSCH FLANGE	10	258480-003
5	FLANSCH OVAL BLANK FLANGE	1	1.5342-033
7	O-RING O-RING	# 10	1.7984-648
9	DICHTUNG GASKET	# 11	258480-009
12	SECHSKANTSCHRAUBE HEXAGON SCREW	22	1.1392-859

= VERBRAUCHSTEILE
CONSUMABLES

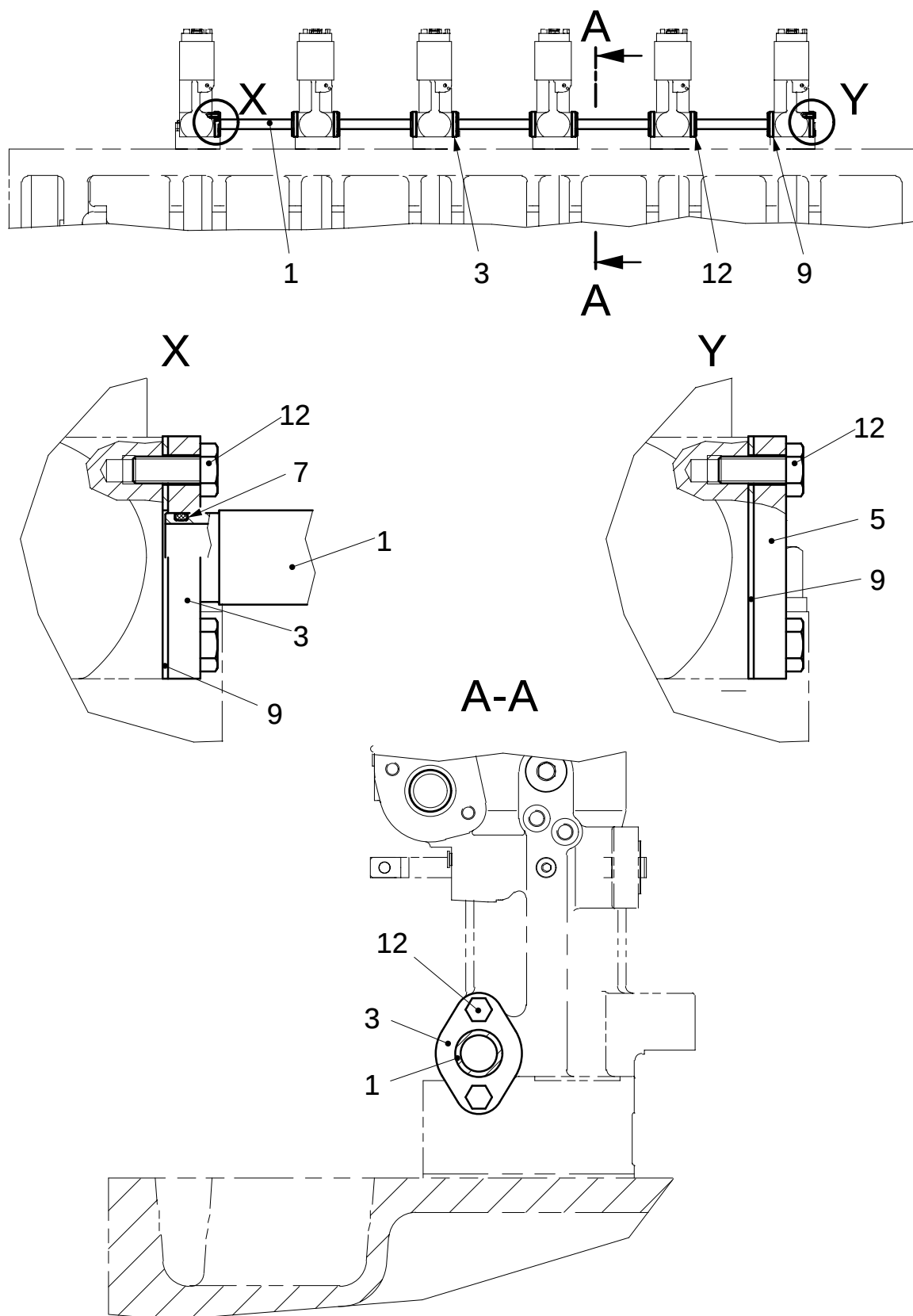
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Leak Oil Piping

M25

08



Leak Oil Piping

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LECKLEITUNG-ANBAU, VOLLST. LEAK OIL PIPING ASSEMBLY	1	258480 BB
1	ROHR PIPE	8	258480-001
3	FLANSCH FLANGE	16	258480-003
5	FLANSCH OVAL BLANK FLANGE	1	1.5342-033
7	O-RING O-RING	# 16	1.7984-648
9	DICHTUNG GASKET	# 17	258480-009
12	SECHSKANTSCHRAUBE HEXAGON SCREW	34	1.1392-859

= VERBRAUCHSTEILE
CONSUMABLES

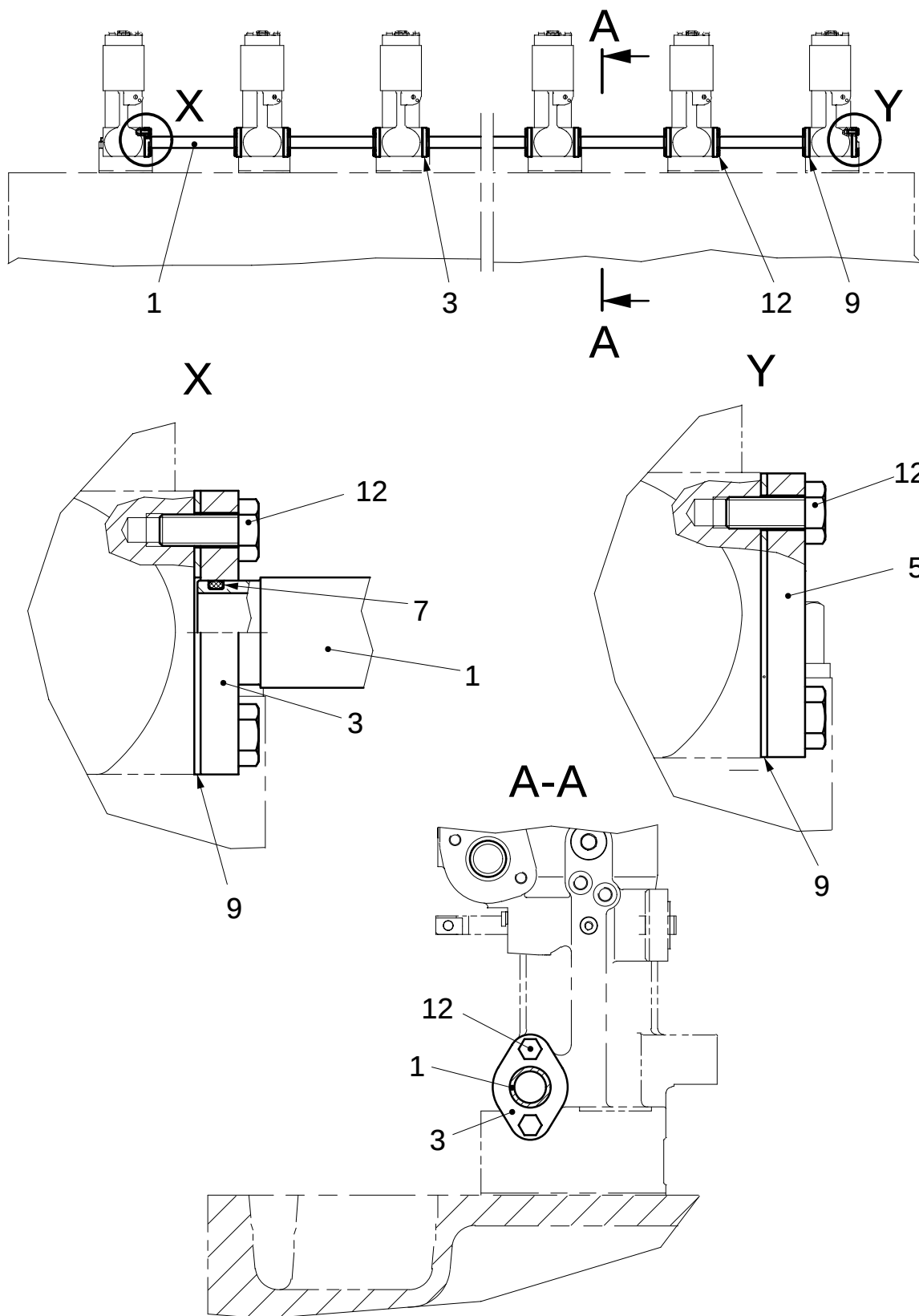
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Leak Oil Piping

M25

08



Leak Oil Piping

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LECKLEITUNG-ANBAU, VOLLST. LEAK OIL PIPING ASSEMBLY	1	258480 CC
1	ROHR PIPE	7	258480-001
3	FLANSCH FLANGE	14	258480-003
5	FLANSCH OVAL BLANK FLANGE	1	1.5342-033
7	O-RING O-RING	# 14	1.7984-648
9	DICHTUNG GASKET	# 15	258480-009
12	SECHSKANTSCHRAUBE HEXAGON SCREW	30	1.1392-859

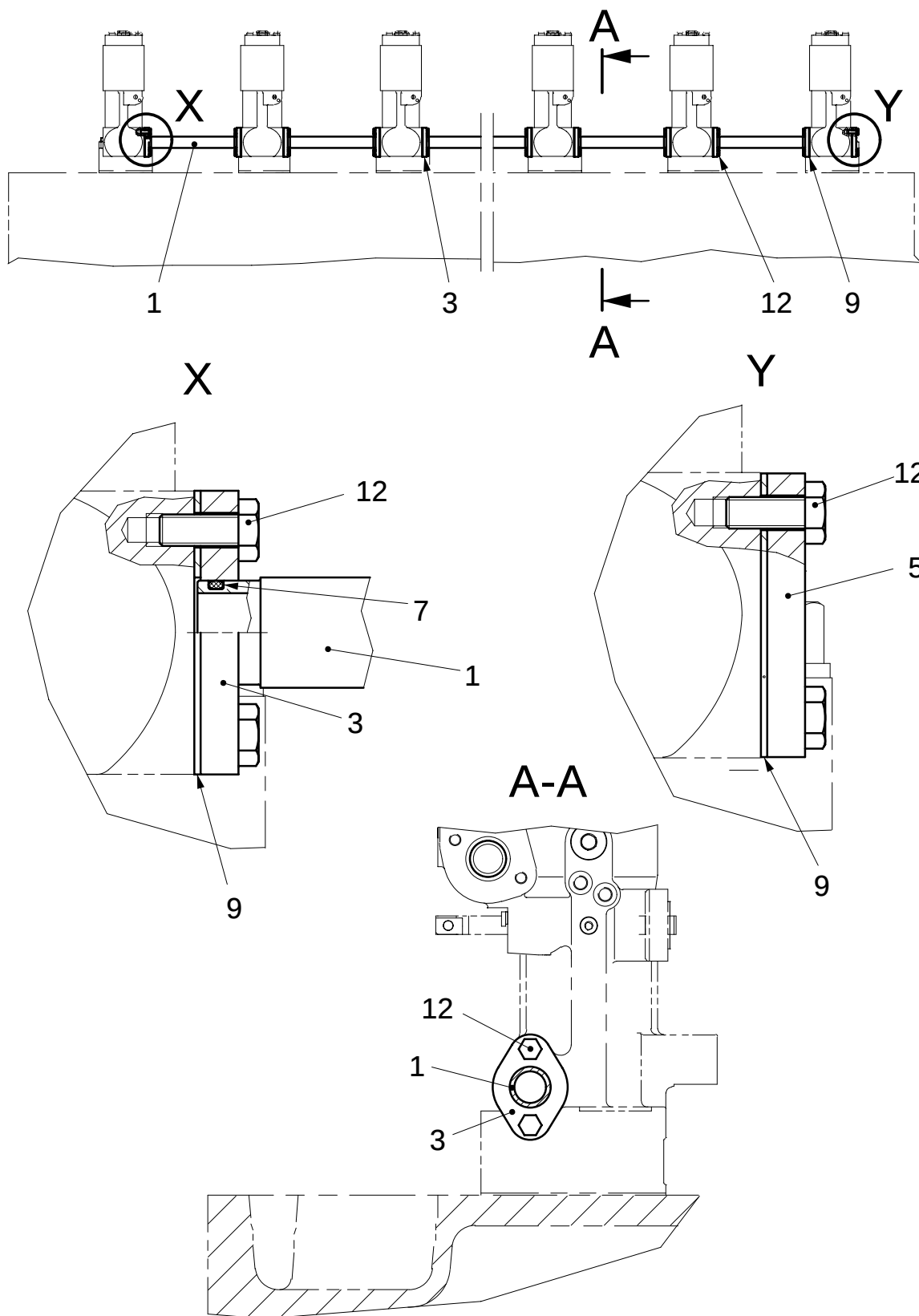
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Leak Oil Piping

M25

08



Lubricating Oil Pipe for Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPE ASSEMBLY	1	258494 AA
1	ÖLZULAUFLEITUNG, VOLLST. OIL ADMISSION PIPE, COMPL.	1	258494-001
2	ÖLZULAUFLEITUNG, VOLLST. OIL ADMISSION PIPE, COMPL.	1	258494-002
3	ÖLABLAUFLEITUNG, VOLLST. OIL RETURN PIPE, COMPL.	1	258494-003
4	HALTER BRACKET	1	258494-004
5	ROHRKLEMME PIPE CLAMP	4	258494-005
6	STUTZEN MALE CONNECTOR	1	1.5094-173
7	GERADE REDUZIERVERSCHRAUBUNG REDUCING UNION	1	1.5098-033
8	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-609
9	DICHTRING JOINT RING	# 1	1.7010-133
10	DICHTRING JOINT RING	# 1	1.7010-196
11	DICHTUNG GASKET	# 1	1.7073-731
12	DICHTUNG GASKET	# 2	1.7073-733
13	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-274
14	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-276
15	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-445
16	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-379
17	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-277
18	SECHSKANTMUTTER HEXAGON NUT	6	1.2007-035
19	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-036
20	SPANNSCHEIBE CONICAL SPRING WASHER	# 4	1.0068-222

08

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Lubricating Oil Pipe for Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	SPANNSCHEIBE CONICAL SPRING WASHER	# 8	1.0068-225
22	FEDERRING SPRING WASHER	# 4	1.0065-215
23	FLANSCH FLANGE	1	1.5341-019
24	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-812
25	DICHTRING JOINT RING	# 1	1.7033-110

= VERBRAUCHSTEILE
CONSUMABLES

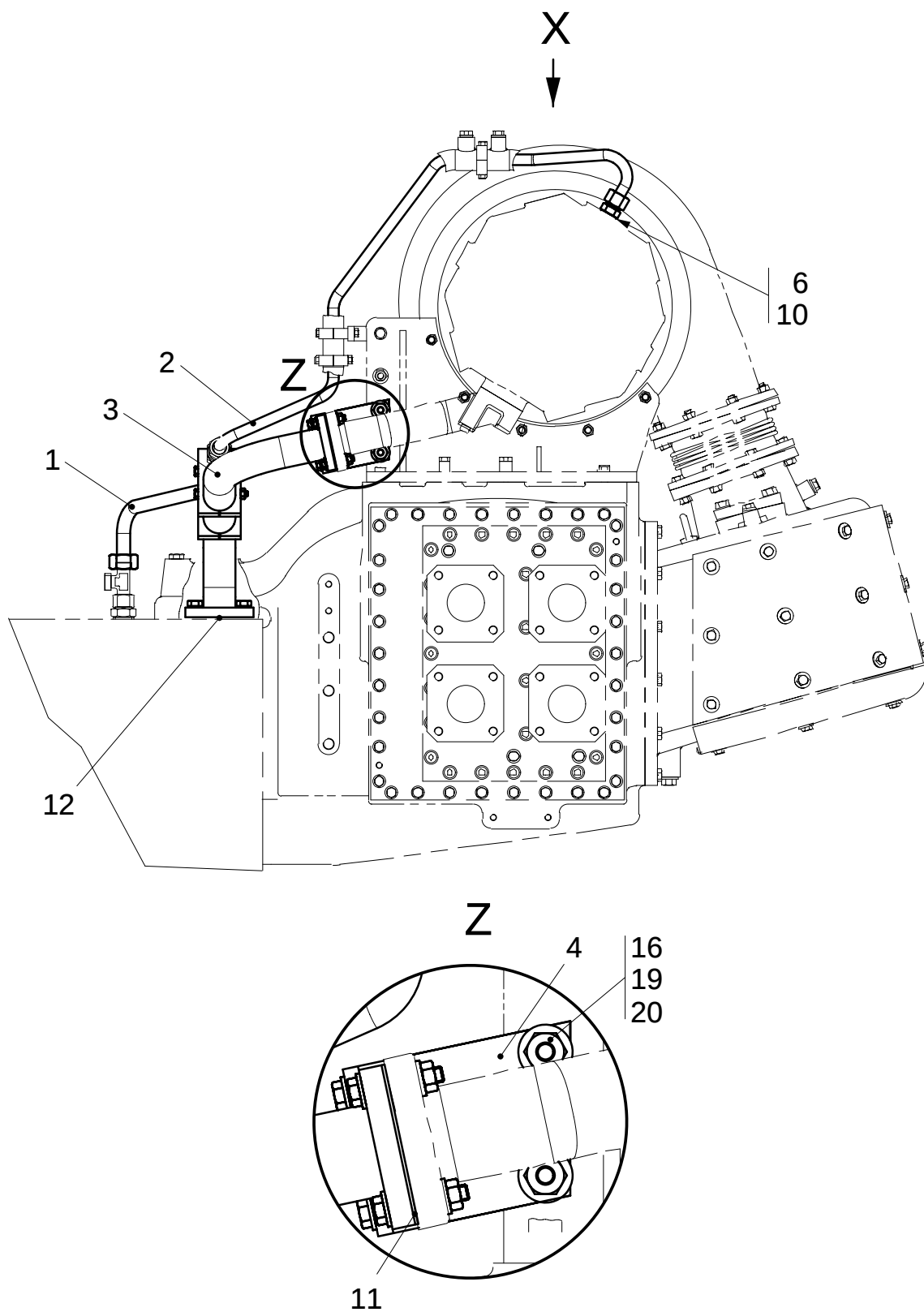
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Lubricating Oil Pipe for Turbocharger

M25

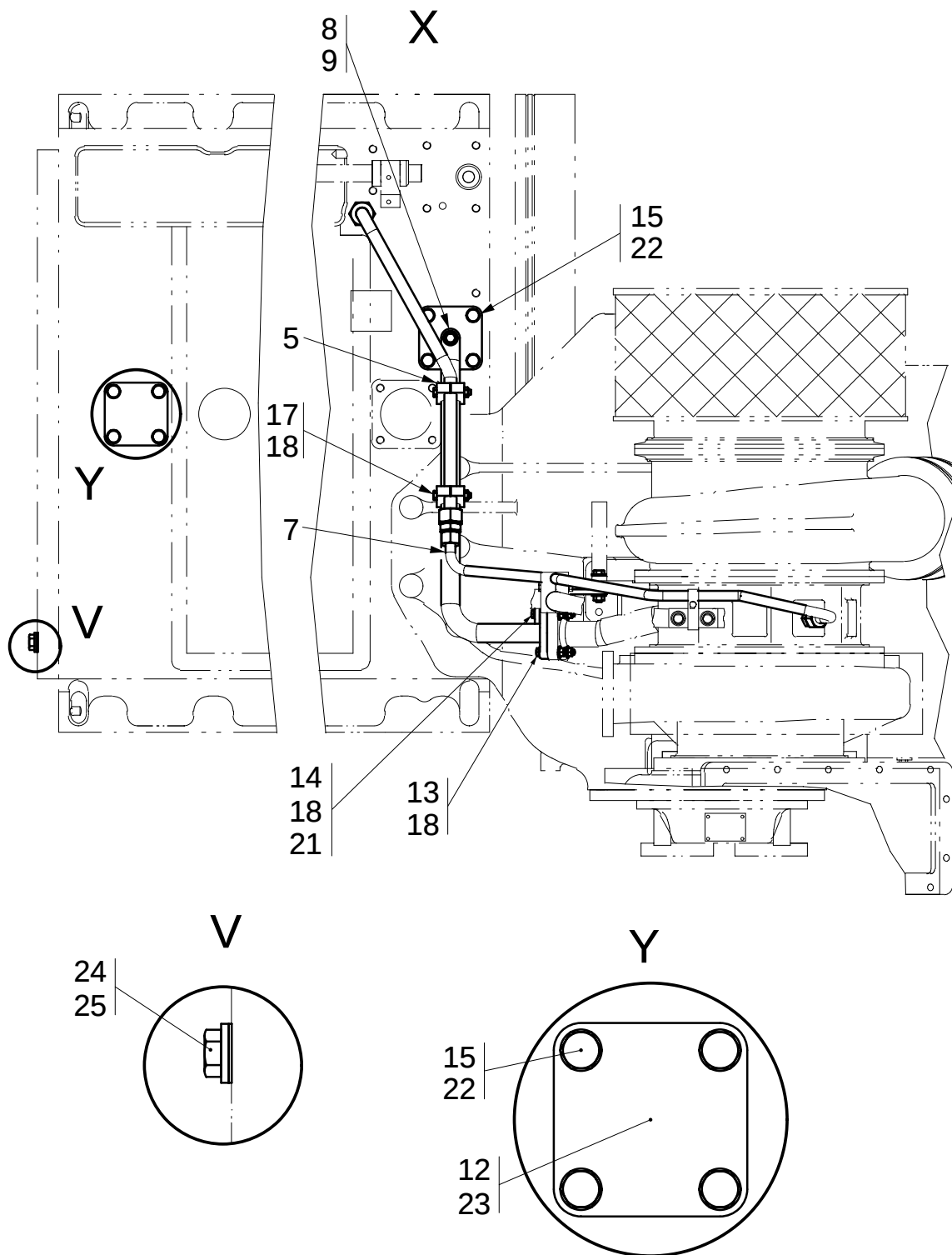
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Lubricating Oil Pipe for Turbocharger

M25

08



Lubricating Oil Pipe for Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPE ASSEMBLY	1	258494 BB
1	ÖLZULAUFLEITUNG, VOLLST. OIL INLET PIPE, COMPL.	1	258494-201
2	ÖLZULAUFLEITUNG, VOLLST. OIL INLET PIPE, COMPL.	1	258494-202
3	ÖLABLAUFLEITUNG, VOLLST. OIL RETURN PIPE, COMPL.	1	258494-203
4	HALTER BRACKET	1	258494-304
5	HALTER BRACKET	1	258494-205
6	STUTZEN MALE CONNECTOR	1	1.5094-173
7	STUTZEN MALE CONNECTOR	1	1.5093-257
8	STUTZEN MALE CONNECTOR	1	1.5098-033
9	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-609
10	DICHTRING JOINT RING	# 1	1.7010-196
11	DICHTRING JOINT RING	# 1	1.7010-133
12	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-279
13	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-345
14	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-342
15	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-445
16	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-376
17	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-243
18	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034
19	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-035
20	SPANNSCHEIBE CONICAL SPRING WASHER	# 1	1.0068-222

08

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lubricating Oil Pipe for Turbocharger

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	FEDERRING SPRING WASHER	# 8	1.0065-215
22	SPANNSCHEIBE CONICAL SPRING WASHER	# 4	1.0068-225
23	SCHEIBE WASHER	2	1.0040-223
24	DICHTRING JOINT RING	# 1	1.7010-252
25	FLANSCH FLANGE	1	1.5341-019
26	DICHTUNG GASKET	# 1	1.7073-726
27	DICHTUNG GASKET	# 2	1.7073-733
28	STUTZEN MALE CONNECTOR	1	1.5094-268
29	ROHRKLEMME PIPE CLAMP	2	1.5011-035
30	ROHRKLEMME PIPE CLAMP	2	1.5011-081

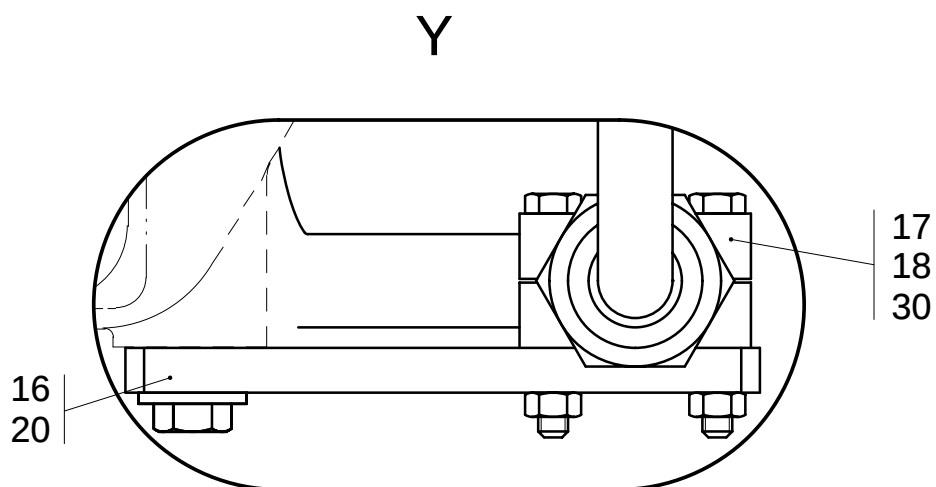
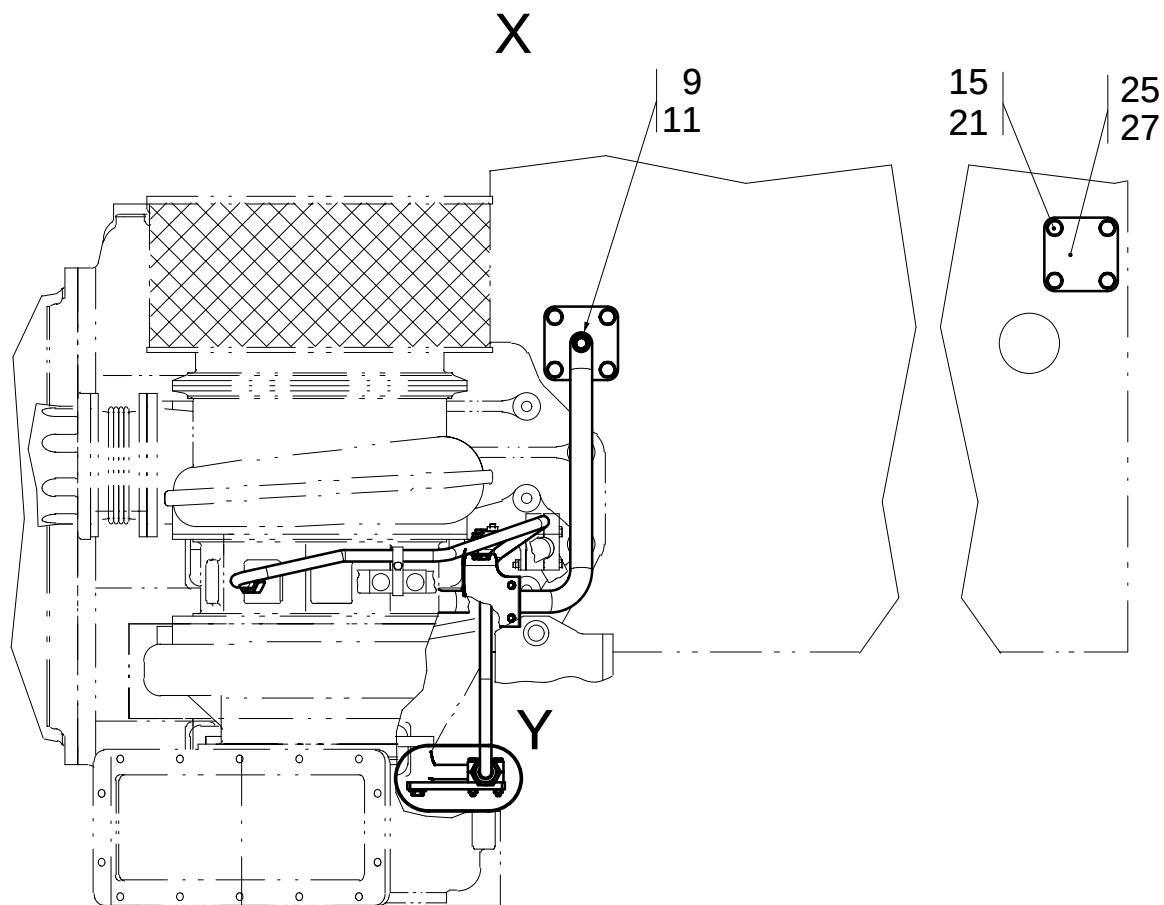
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lubricating Oil Pipe for Turbocharger

M25

08



Lubricating Oil Pipe for Turbocharger

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPE ASSEMBLY	1	258494 CC
1	ÖLZULAUFLEITUNG, VOLLST. OIL ADMISSION PIPE, COMPL.	1	258494-101
2	ÖLZULAUFLEITUNG, VOLLST. OIL ADMISSION PIPE, COMPL.	1	258494-102
3	HALTER BRACKET	1	258494-103
4	ROHRKLEMME PIPE CLAMP	8	1.5011-023
5	STUTZEN MALE CONNECTOR	1	1.5094-184
6	STUTZEN MALE CONNECTOR	1	1.5095-027
7	DICHTRING JOINT RING	# 1	1.7010-196
8	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1387-338
9	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-253
10	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-242
11	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-251
12	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
15	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-445
16	FEDERRING SPRING WASHER	# 4	1.0065-215
20	DICHTUNG GASKET	# 1	1.7073-733
21	FLANSCH FLANGE	1	1.5341-019
22	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-812
23	DICHTRING JOINT RING	# 1	1.7033-110

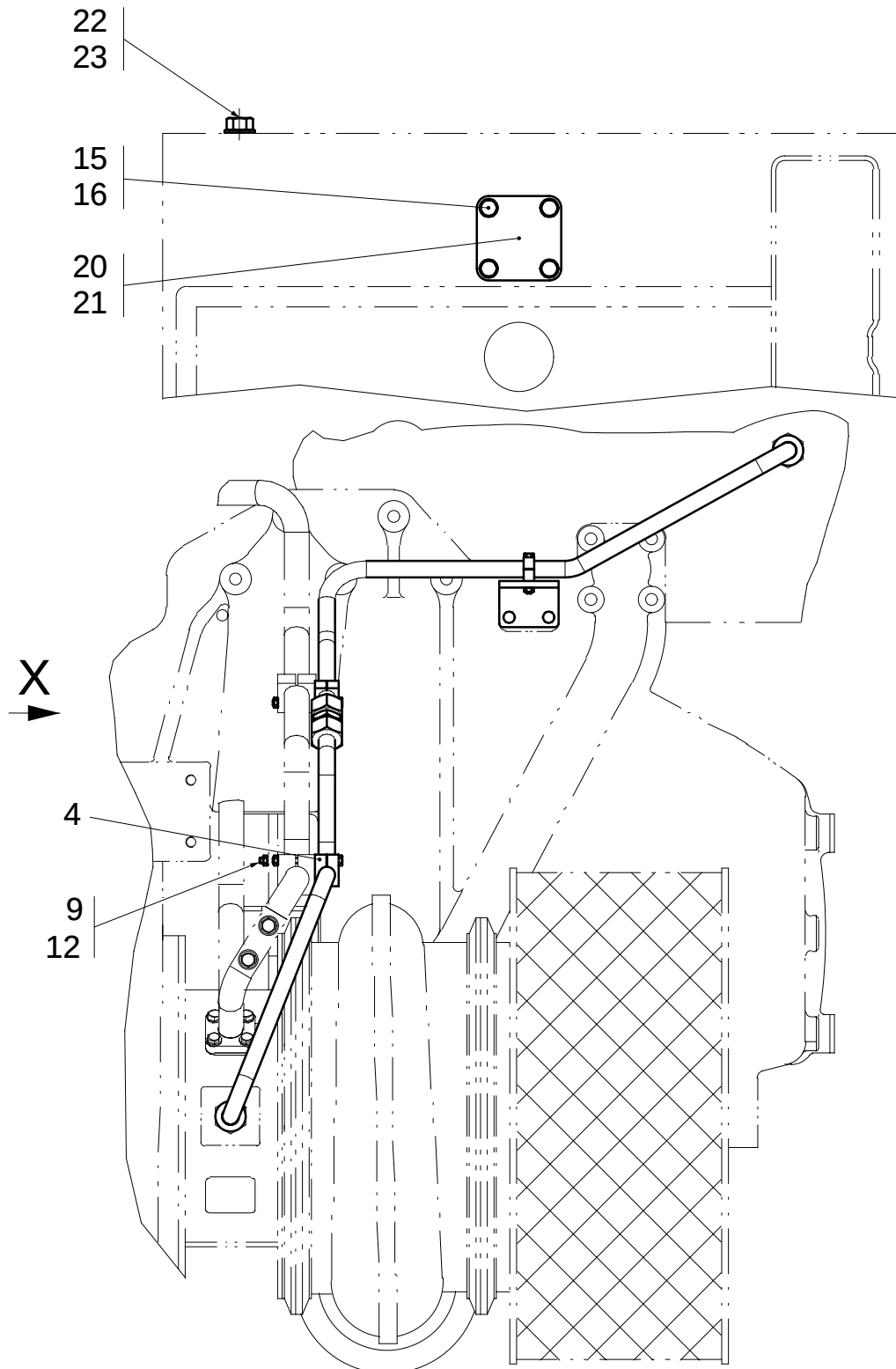
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lubricating Oil Pipe for Turbocharger

M25

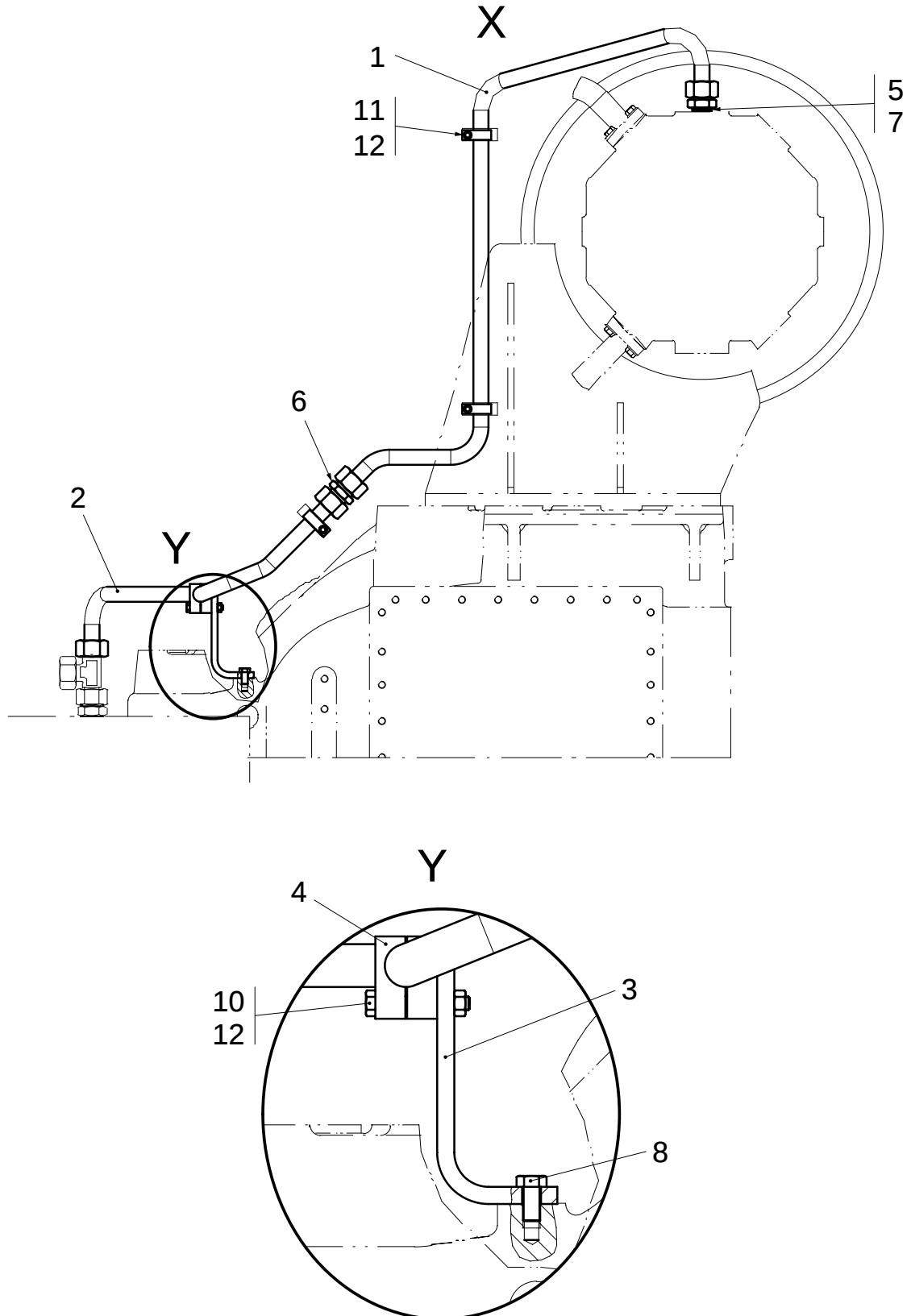
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Lubricating Oil Pipe for Turbocharger

M25

08



Lubricating Oil Pipe f. Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPE ASSEMBLY	1	258494 DD
1	ÖLZULAUFLEITUNG, VOLLST. OIL INLET PIPE, COMPL.	1	258494-301
2	ÖLZULAUFLEITUNG, VOLLST. OIL INLET PIPE, COMPL.	1	258494-201
3	HALTER BRACKET	1	258494-304
7	ROHRKLEMME PIPE CLAMP	4	1.5011-023
8	STUTZEN MALE CONNECTOR	1	1.5094-184
9	STUTZEN MALE CONNECTOR	1	1.5095-027
10	STUTZEN MALE CONNECTOR	1	1.5093-257
11	DICHTRING JOINT RING	# 2	1.7010-196
12	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1387-376
13	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-246
14	STUTZEN MALE CONNECTOR	1	1.5094-268
15	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-243
16	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034
18	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1387-445
19	FEDERRING SPRING WASHER	# 4	1.0065-215
20	SPANNSCHEIBE CONICAL SPRING WASHE	# 1	1.0068-222
21	DICHTUNG GASKET	# 1	1.7073-733

08

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lubricating Oil Pipe f. Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
22	FLANSCH FLANGE	1	1.5341-019
23	ROHRKLEMME PIPE CLAMP	2	1.5011-014

08

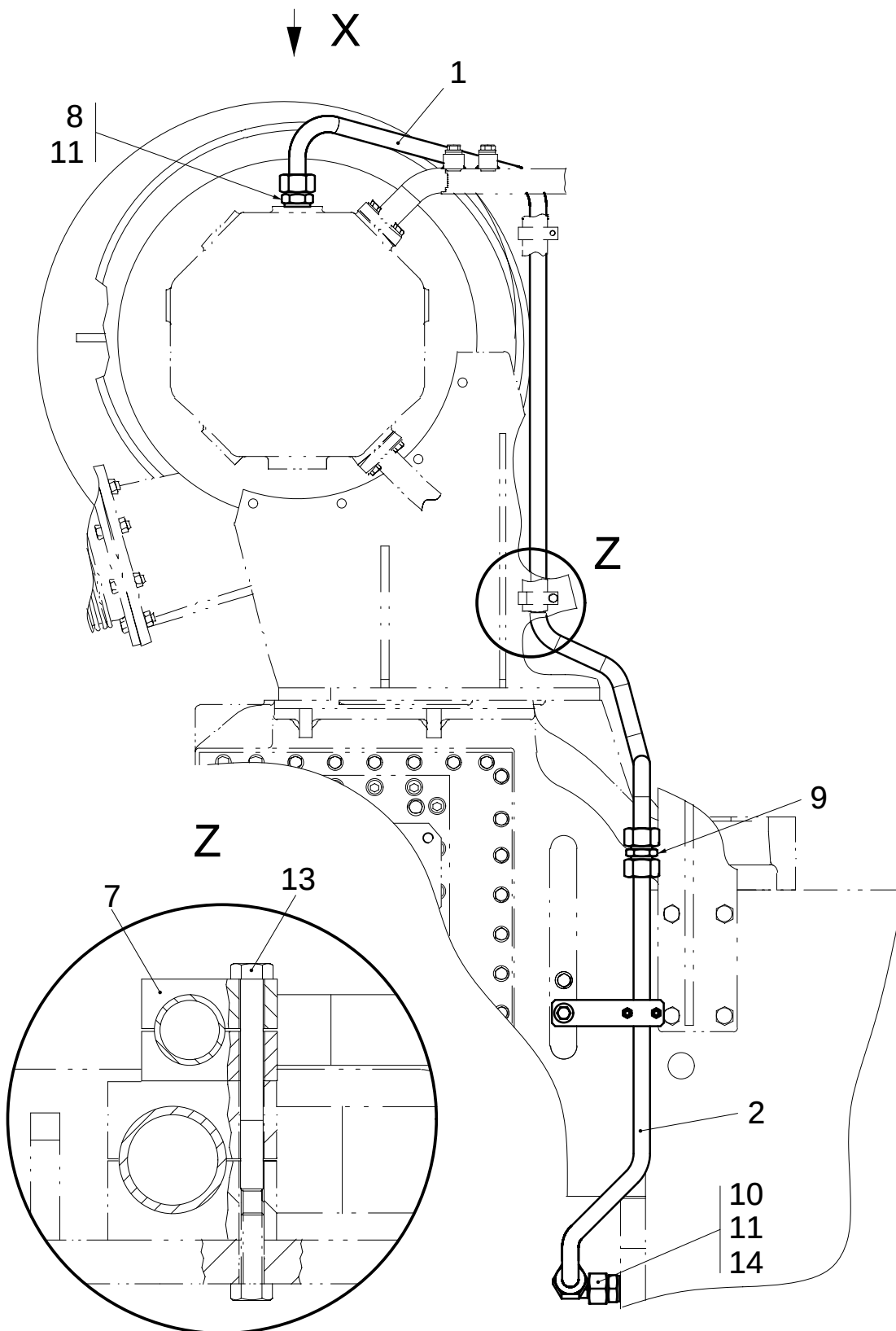
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lubricating Oil Pipe f. Turbocharger

M25

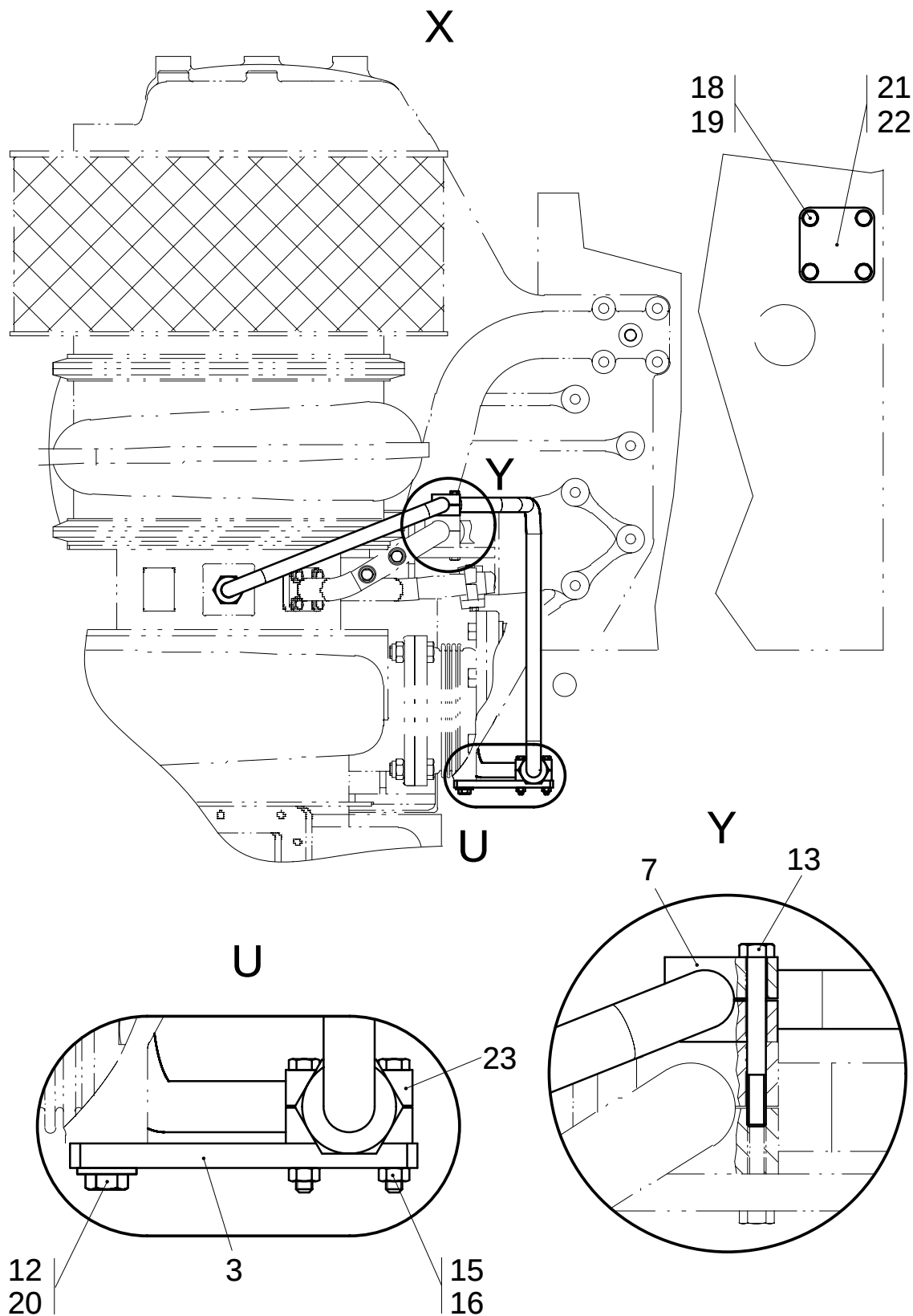
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Lubricating Oil Pipe f. Turbocharger

M25

08



Lubricating Oil Pipe f. Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPE ASSEMBLY	1	258494 EE
1	ÖLZULAUFLEITUNG, VOLLST. OIL INLET PIPE, COMPL.	1	258494-401
2	ÖLZULAUFLEITUNG, VOLLST. OIL INLET PIPE, COMPL.	1	258494-402
3	HALTER BRACKET	1	258494-304
7	ROHRKLEMME PIPE CLAMP	4	1.5011-023
8	STUTZEN MALE CONNECTOR	1	1.5094-184
9	STUTZEN MALE CONNECTOR	1	1.5095-027
10	STUTZEN MALE CONNECTOR	1	1.5093-257
11	DICHTRING JOINT RING	# 2	1.7010-196
12	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1387-376
13	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-246
14	STUTZEN MALE CONNECTOR	1	1.5094-268
15	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-243
16	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034
18	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1387-445
19	FEDERRING SPRING WASHER	# 4	1.0065-215
20	SPANNSCHEIBE CONICAL SPRING WASHE	# 1	1.0068-222
21	DICHTUNG GASKET	# 1	1.7073-733
22	FLANSCH FLANGE	1	1.5341-019

08

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lubricating Oil Pipe f. Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
23	ROHRKLEMME PIPE CLAMP	2	1.5011-014
25	O-RING O-RING	# 4	1.5207-313

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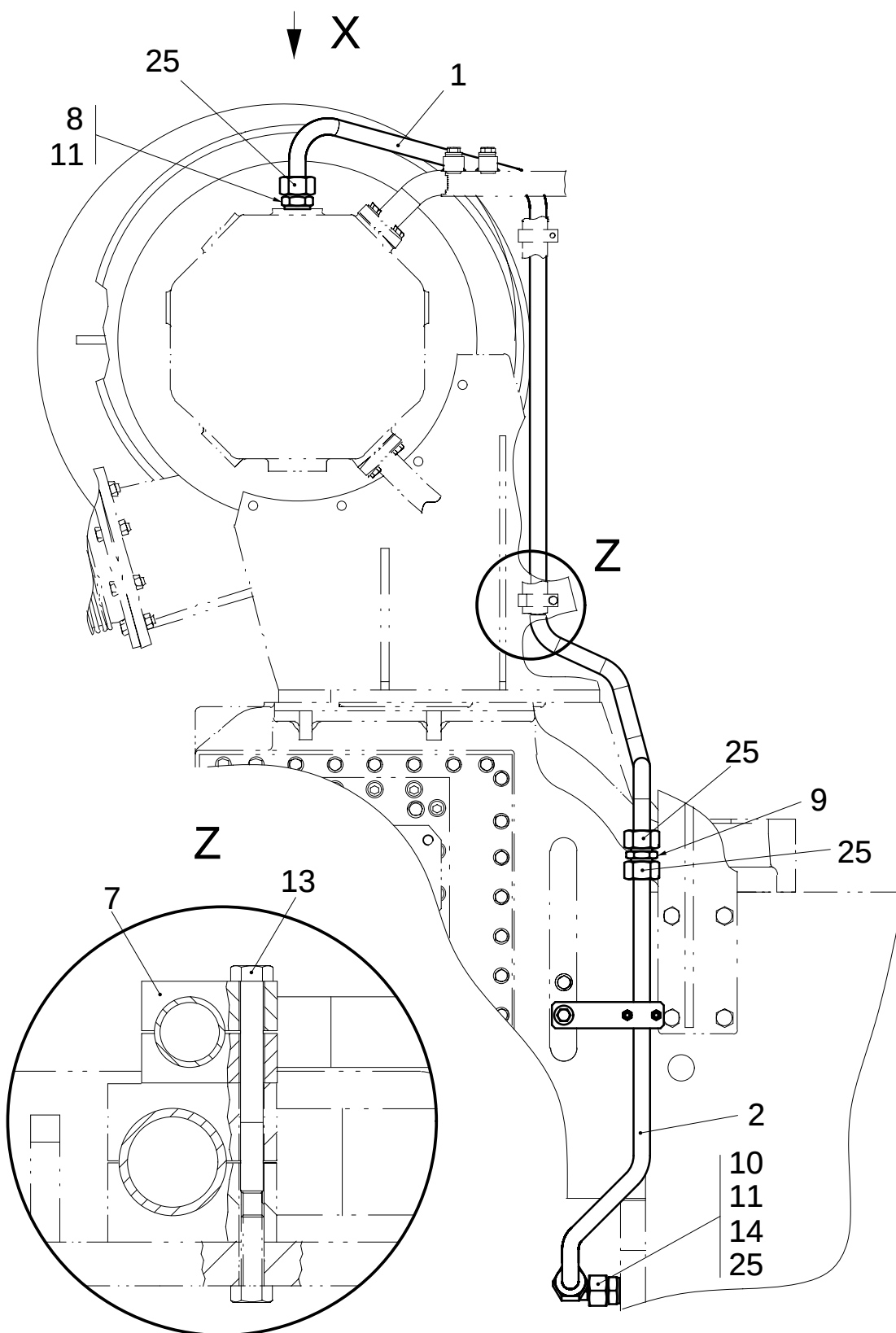
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lubricating Oil Pipe f. Turbocharger

M25

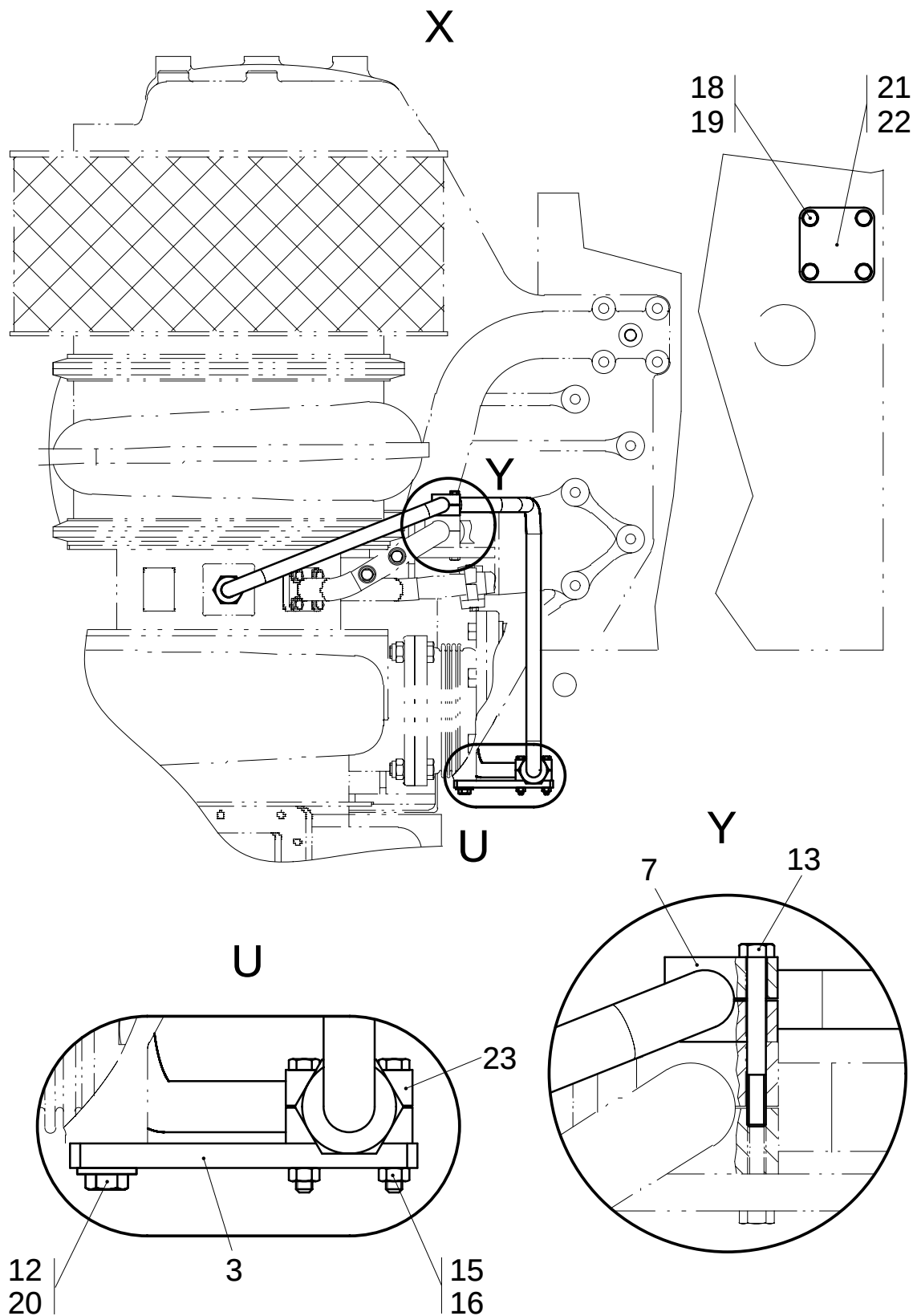
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Lubricating Oil Pipe f. Turbocharger

M25

08



Lubricating Oil Pipe f. Turbocharger

M25

08

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHMIERÖLLEITUNG, VOLLST. LUBRICATING OIL PIPE ASSEMBLY	1	258494 FF
1	ÖLZULAUFLEITUNG, VOLLST. OIL INLET PIPE, COMPL.	1	258494-501
3	HALTER BRACKET	1	258494-304
8	STUTZEN MALE CONNECTOR	1	1.5094-184
10	WINKELSTUTZEN MALE CONNECTOR	1	1.5093-257
11	DICHTRING JOINT RING	# 1	1.7010-196
12	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1387-376
13	DICHTRING JOINT RING	# 1	1.7033-110
14	STUTZEN MALE CONNECTOR	1	1.5094-268
15	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-243
16	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034
18	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1387-445
19	FEDERRING SPRING WASHER	# 4	1.0065-215
20	SPANNSCHEIBE CONICAL SPRING WASHE	# 1	1.0068-222
21	DICHTUNG GASKET	# 1	1.7073-733
22	FLANSCH FLANGE	1	1.5341-019
23	ROHRKLEMME PIPE CLAMP	2	1.5011-014

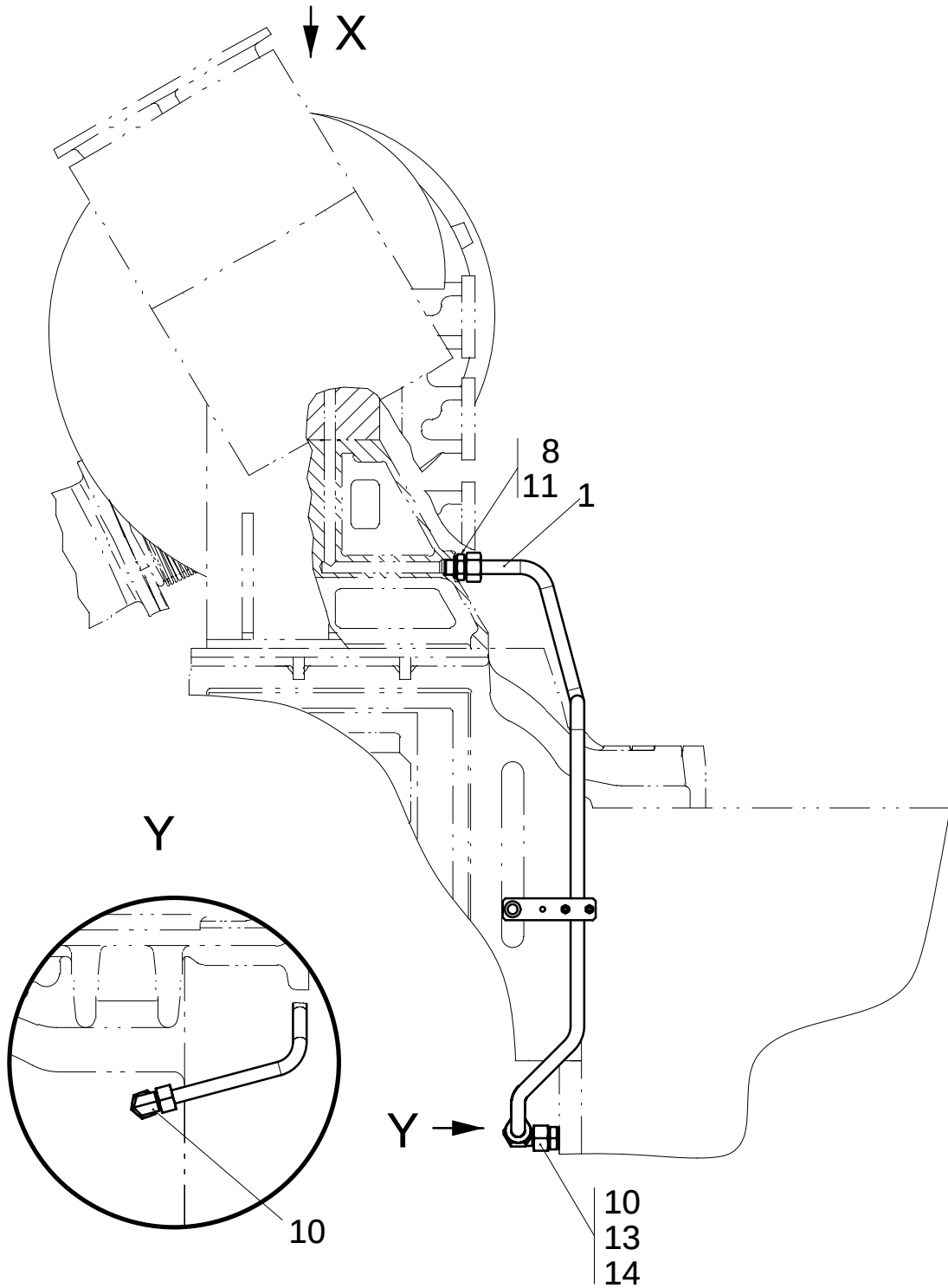
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Lubricating Oil Pipe f. Turbocharger

M25

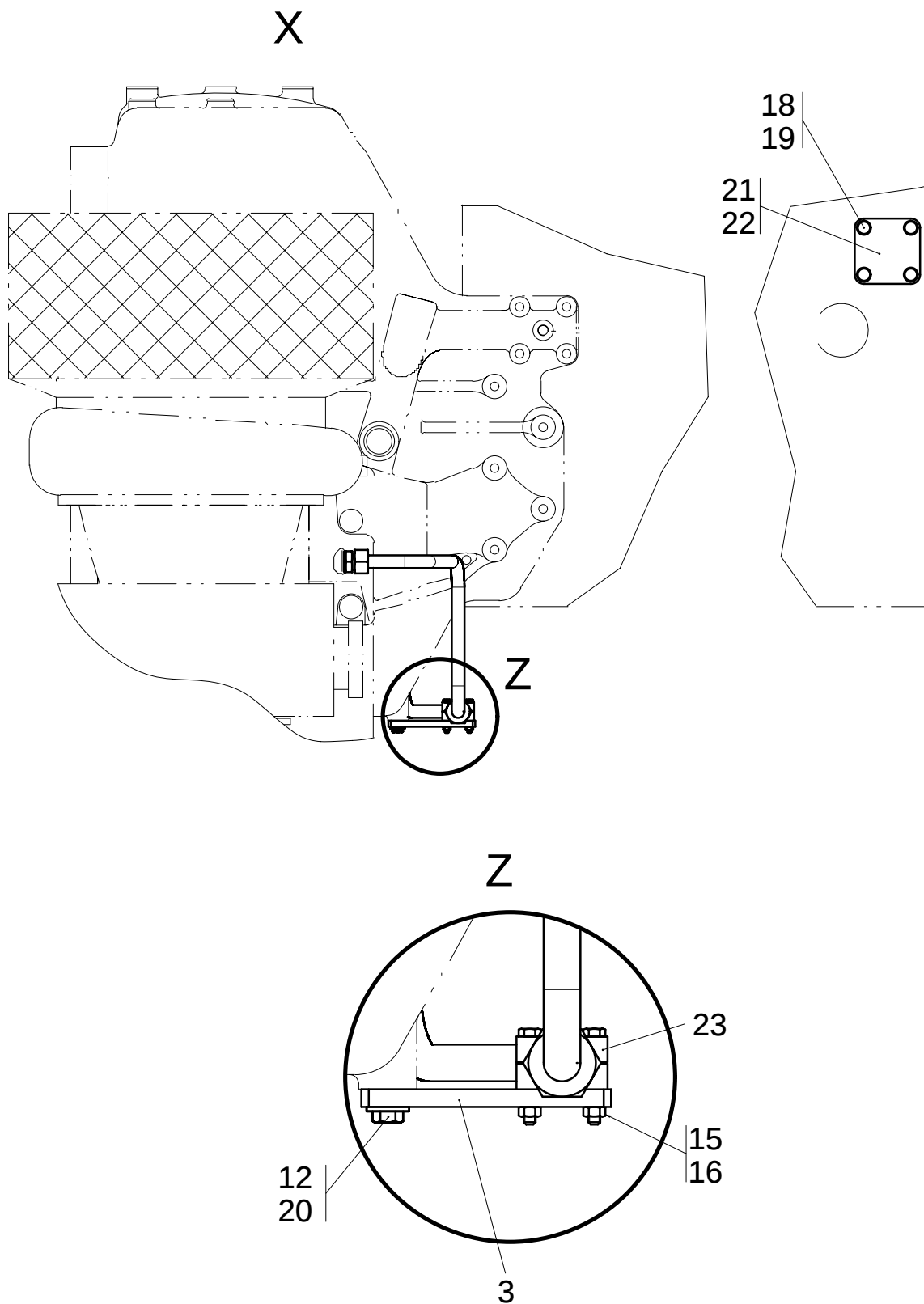
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Lubricating Oil Pipe f. Turbocharger

M25

08



Cover Mounting

M25/M32

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.	
-	DECKEL-ANBAU, VOLLST. COVER MOUNTING ASSEMBLY	1	9.6432 AA		
1	DECKEL COVER	1	9.6432-1		
2	O-RING O-RING	# 1	1.7084-623		
4	SECHSKANTSCHRAUBE HEXAGON SCREW	6	M12X30	DIN933	8.8-A3C

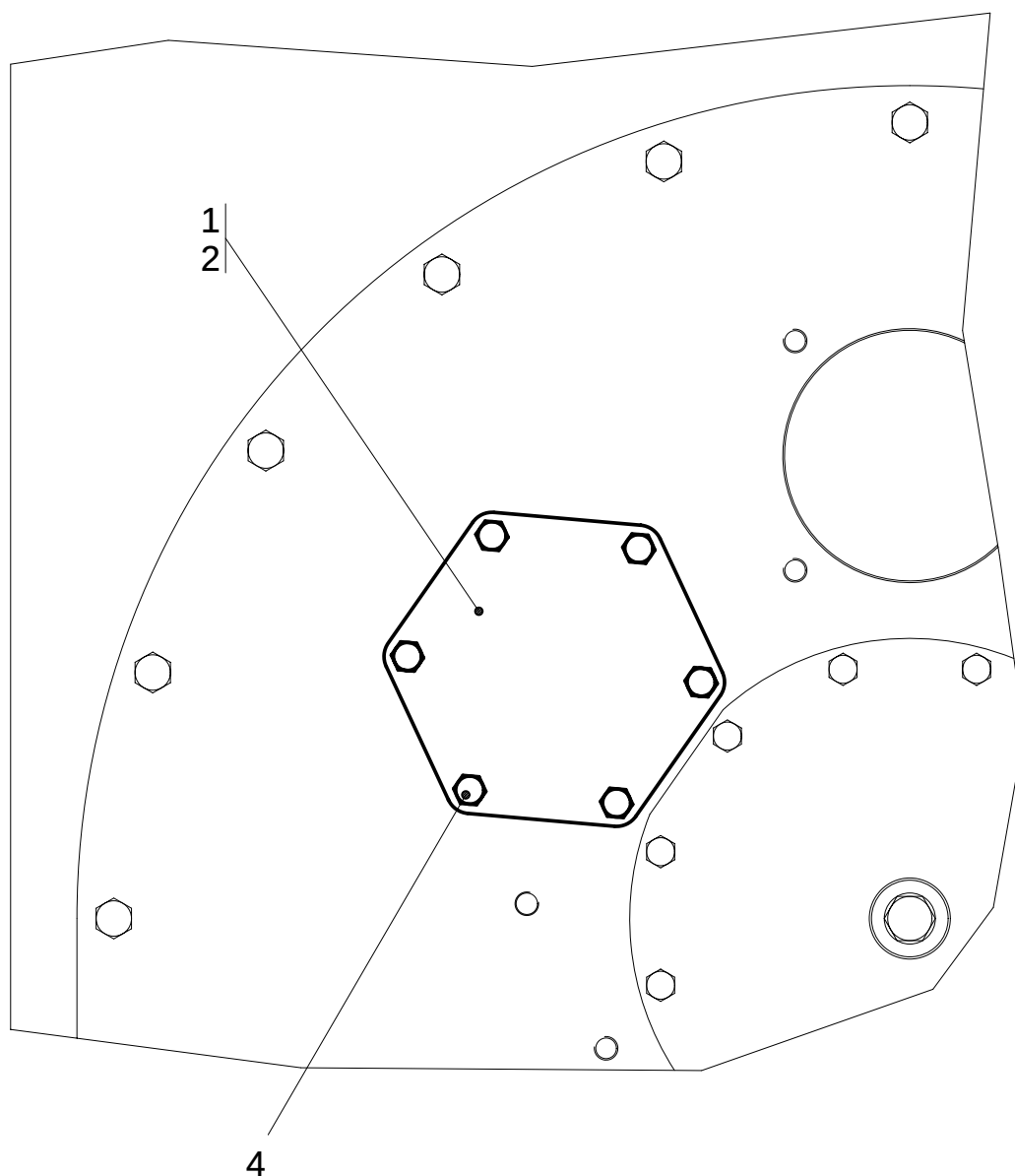
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CONSUMABLES

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Cover Mounting

M25/M32

09



Cooling Water Pump

M25/M32

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
-	KÜHLWASSERPUMPE, VOLLST. COOLING WATER PUMP ASSEMBLY	1	9.6437 AA	
1	SPIRALGEHÄUSE VOLUTE	1	9.6437-1	
2	LAUFRAD IMPELLER	1	9.6437-2	
3	DICHTPLATTE SEAL PLATE	1	9.6437-3	
4	WELLE SHAFT	1	9.6437-4	
5	LAGERGEHÄUSE BEARING HOUSING	1	9.6437-5	
6	DRUCKRING THRUST RING	1	9.6437-6	
7	ABSCHLUSSDECKEL END COVER	1	9.6437-7	
8	VORDERES LAGER FRONT BEARING	1	9.6437-8	
9	HINTERES LAGER REAR BEARING	1	9.6437-9	
11	DICHTUNGSSATZ SEAL ASSEMBLY	# 1	9.6437-11	
12	LAUFRADMUTTER IMPELLER NUT	1	9.6437-12	
13	LAUFRADSCHIEBE IMPELLER WASHER	1	9.6437-13	
14	SCHLEUDERSCHIEBE FLINGER	1	9.6437-14	
15	DREHZAHLANZEIGER ROTATION INDICATOR	1	9.6437-15	
17	SCHNEIDSCHRAUBE DRIVE SCREW	6	9.6437-17	
18	FEDERRING SPRING WASHER	# 4	9.6437-18	
19	FEDERRING SPRING WASHER	# 8	9.6437-19	
20	SECHSKANTMUTTER HEXAGON NUT	4	9.6437-20	
21	SECHSKANTMUTTER HEXAGON NUT	8	9.6437-21	
22	SCHRAUBE CAPSCREW	4	9.6437-22	

09

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Cooling Water Pump

M25/M32

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
23	STIFTSCHRAUBE STUD	4	9.6437-23	
24	STIFTSCHRAUBE STUD	8	9.6437-24	
25	O-RING O-RING	# 1	9.6437-25	
26	DICHTUNG OILSEAL	# 1	9.6437-26	
27	VERSCHLUSSSTOPFEN SOLID PLUG	4	9.6437-27	
28	VERSCHLUSSSTOPFEN RECESSED PLUG	2	9.6437-28	

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CONSUMABLES

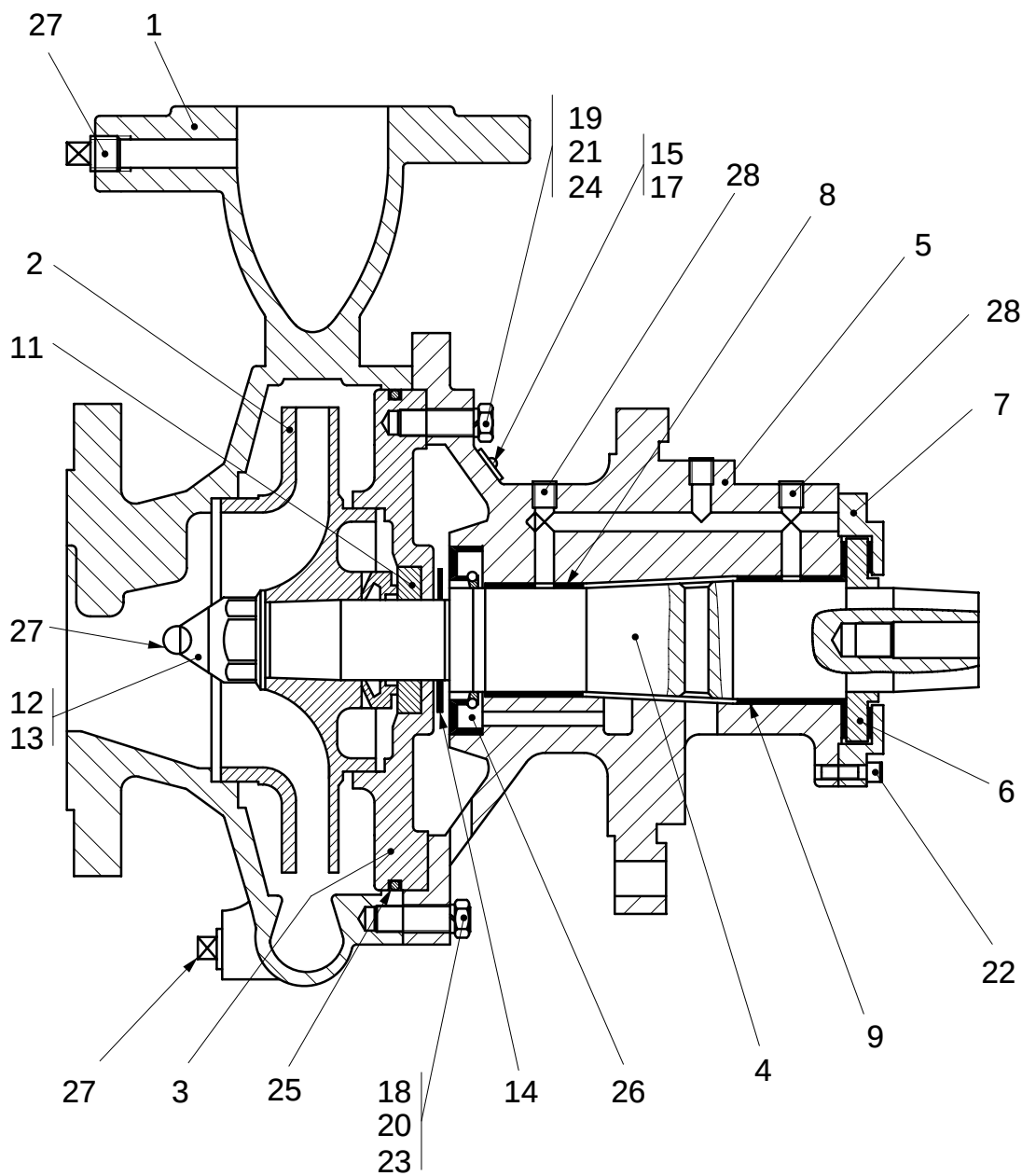
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Cooling Water Pump

M25/M32

09



Cooling Water Pump

M25/M32

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
-	KÜHLWASSERPUMPE, VOLLST. COOLING WATER PUMP ASSEMBLY	1	9.6437 BB	
1	SPIRALGEHÄUSE VOLUTE	1	9.6437-101	
2	LAUFRAD IMPELLER	1	9.6437-102	
3	DICHTPLATTE SEAL PLATE	1	9.6437-3	
4	WELLE SHAFT	1	9.6437-104	
5	LAGERGEHÄUSE BEARING HOUSING	1	9.6437-5	
6	DRUCKRING THRUST RING	1	9.6437-6	
7	ABSCHLUSSDECKEL END COVER	1	9.6437-107	
8	VORDERES LAGER FRONT BEARING	1	9.6437-8	
9	HINTERES LAGER REAR BEARING	1	9.6437-9	
11	DICHTUNGSSATZ SEAL ASSEMBLY	# 1	9.6437-11	
12	LAUFRADMUTTER IMPELLER NUT	1	9.6437-112	
13	LAUFRADSCHEIBE IMPELLER WASHER	1	9.6437-13	
14	SCHLEUDERSCHEIBE FLINGER	1	9.6437-14	
15	DREHZAHLANZEIGER ROTATION INDICATOR	1	9.6437-15	
17	SCHNEIDSCHRAUBE DRIVE SCREW	6	9.6437-17	
18	FEDERRING SPRING WASHER	# 4	9.6437-18	
19	FEDERRING SPRING WASHER	# 8	9.6437-19	
20	SECHSKANTMUTTER HEXAGON NUT	4	9.6437-20	
21	SECHSKANTMUTTER HEXAGON NUT	8	9.6437-21	
22	SCHRAUBE CAPSCREW	4	9.6437-22	

09

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Cooling Water Pump

M25/M32

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
23	STIFTSCHRAUBE STUD	4	9.6437-23	
24	STIFTSCHRAUBE STUD	8	9.6437-24	
25	O-RING O-RING	# 1	9.6437-25	
26	DICHTUNG OILSEAL	# 1	9.6437-26	
27	VERSCHLUSSSTOPFEN SOLID PLUG	4	9.6437-27	
28	VERSCHLUSSSTOPFEN RECESSED PLUG	2	9.6437-28	

= VERBRAUCHSTEILE
CONSUMABLES

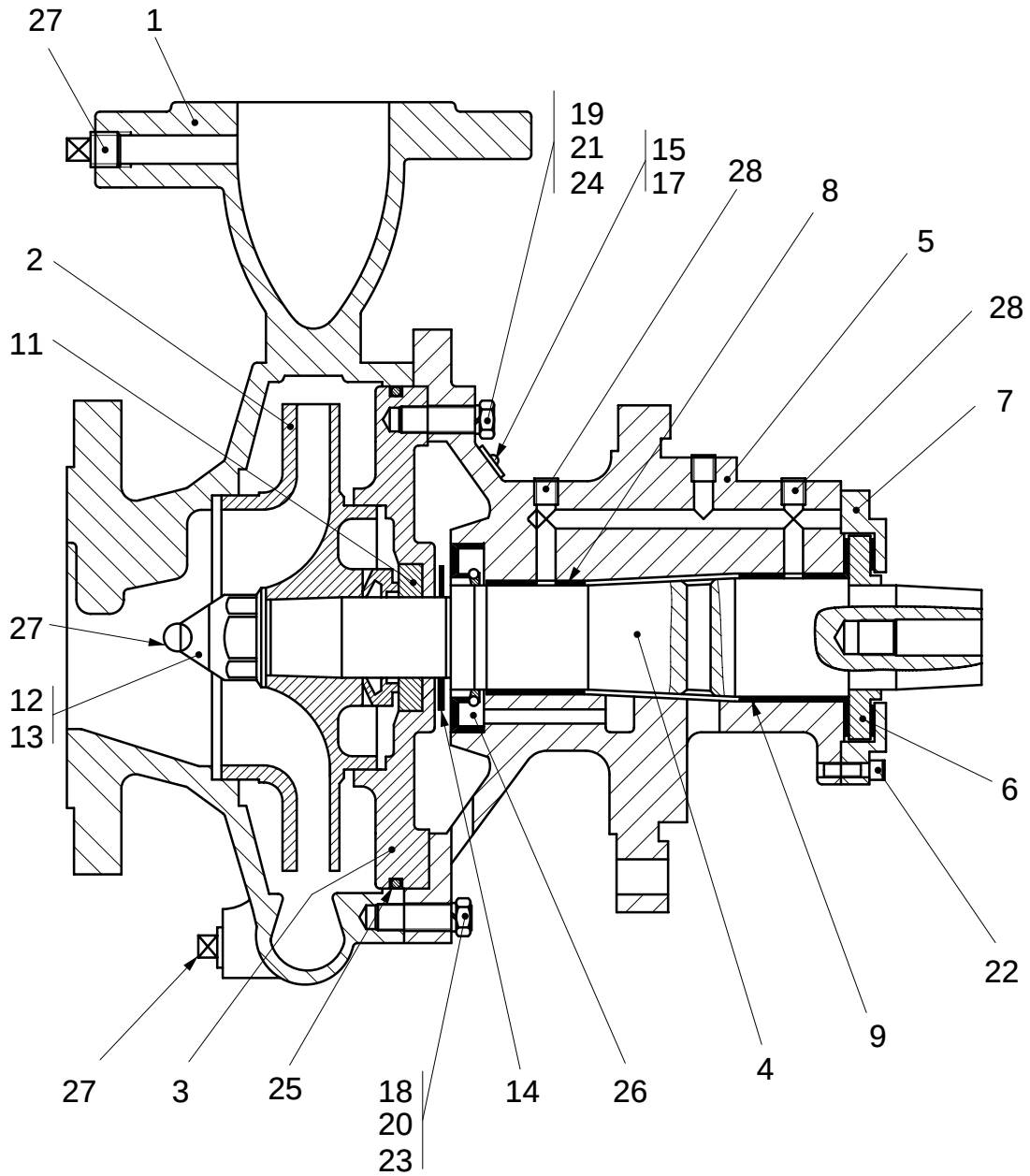
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Cooling Water Pump

M25/M32

09



Cooling Water Pump Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERPPEN.-ANB., VOLLST. COOLING WATER PUMP MOUNTING ASSEMBLY	1	256440 AA
1	KREISELPUMPE, VOLLST. CENTRIFUGAL PUMP, COMPL.	1	SIEHE B1.05.09.9.6437 SEE B1.05.09.9.6437
5	ZAHNRAD GEAR WHEEL	1	256440-005
8	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-382
9	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-377
10	SCHEIBE WASHER	1	2.6420-012
12	O-RING O-RING	# 1	1.7084-623

= VERBRAUCHSTEILE
CONSUMABLES

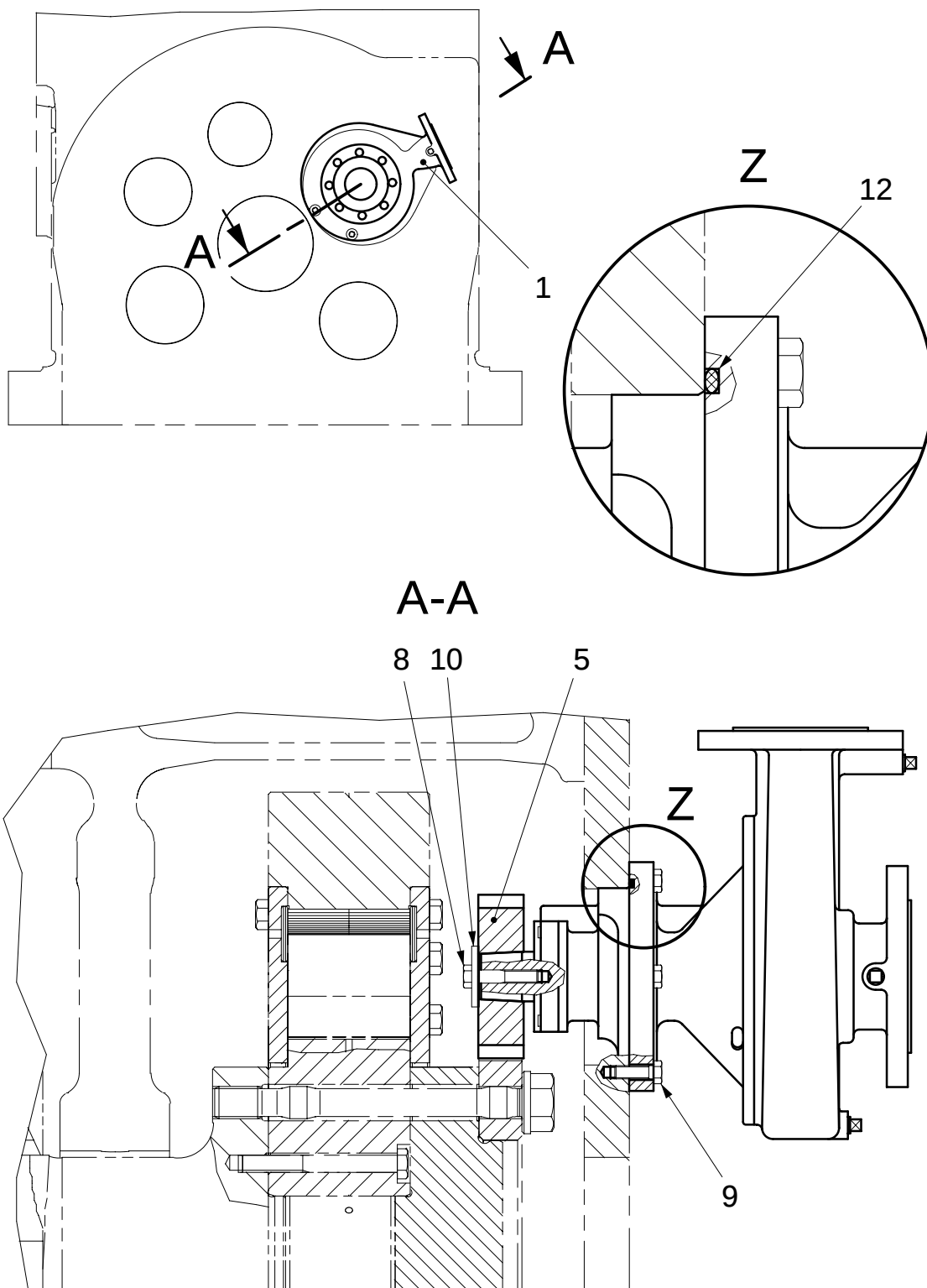
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Cooling Water Pump Mounting

M25

09



Cooling Water Pump Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERPUMPEN.-ANB., VOLLST. COOLING WATER PUMP MOUNTING ASSEMBLY	1	256440 BB
1	KREISELPUMPE, VOLLST. CENTRIFUGAL PUMP, COMPL.	1	SIEHE B1.05.09.9.6437 SEE B1.05.09.9.6437
5	ZAHNRAD GEAR WHEEL	1	256440-005
8	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-382
9	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-377
10	SCHEIBE WASHER	1	2.6420-012
12	O-RING O-RING	# 1	1.7084-623

= VERBRAUCHSTEILE
CONSUMABLES

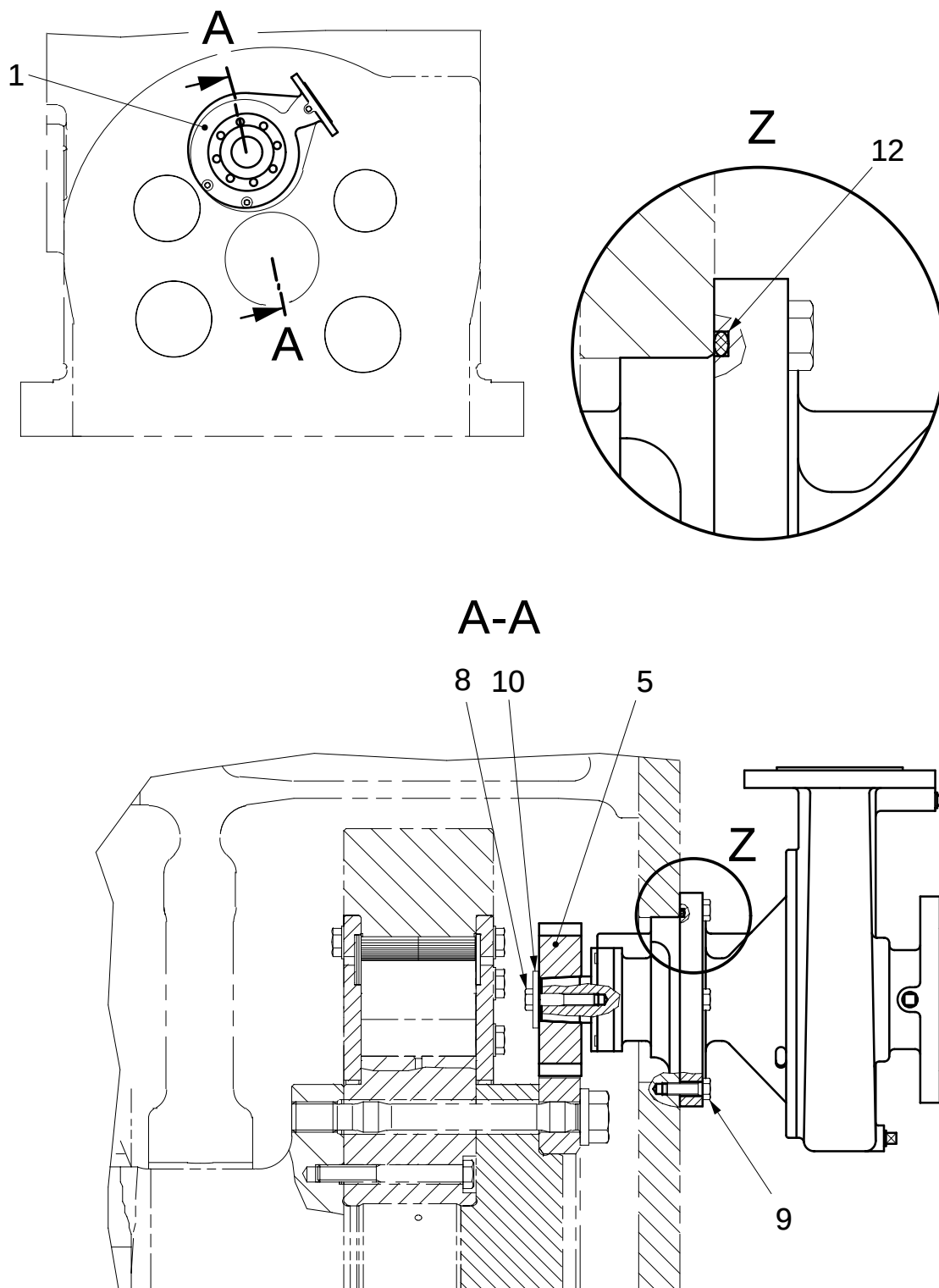
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Cooling Water Pump Mounting

M25

09



Cool. Water Distrib./Collecting Pipe

M25

09

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258320 AA
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258320-001
2	DICHTUNG GASKET	# 6	258320-002
3	SECHSKANTSCHRAUBE HEXAGON BOLT	12	1.1367-381
4	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-831
5	DICHTRING JOINT RING	# 1	1.7010-064
6	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-613
7	DICHTRING JOINT RING	# 1	1.7010-252

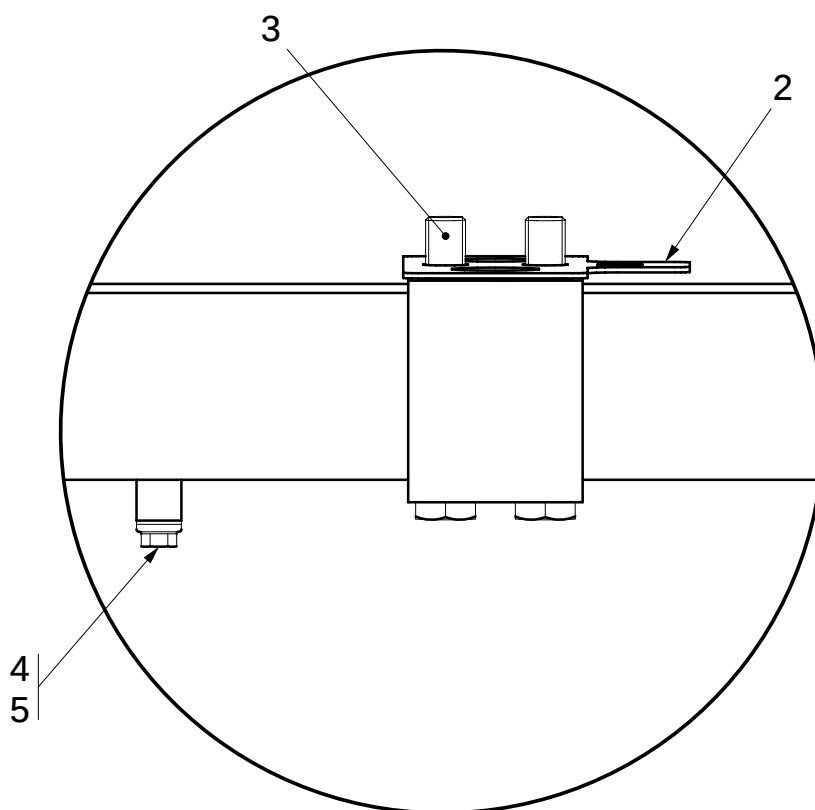
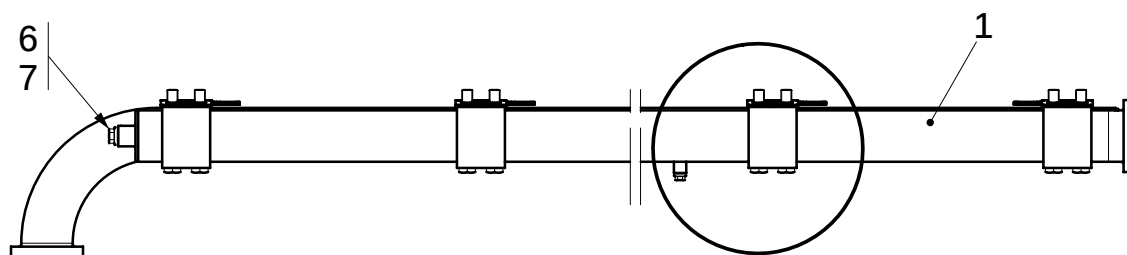
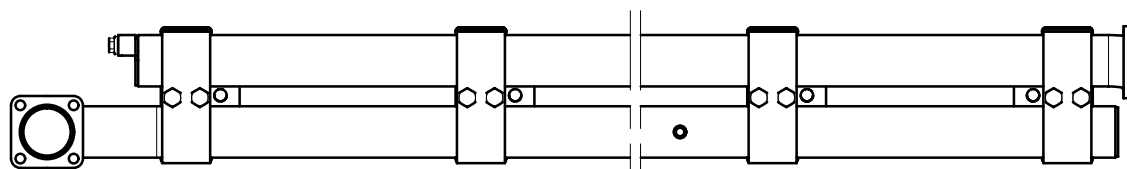
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Cool. Water Distrib./Collecting Pipe

M25

09



Cool. Water Distrib./Collecting Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258320 BB
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258320-001
2	DICHTUNG GASKET	# 6	258320-002
3	SECHSKANTSCHRAUBE HEXAGON BOLT	12	1.1367-381
4	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-831
5	DICHTRING JOINT RING	# 1	1.7010-064
6	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-679
7	DICHTRING JOINT RING	# 1	1.7010-133

= VERBRAUCHSTEILE
CONSUMABLES

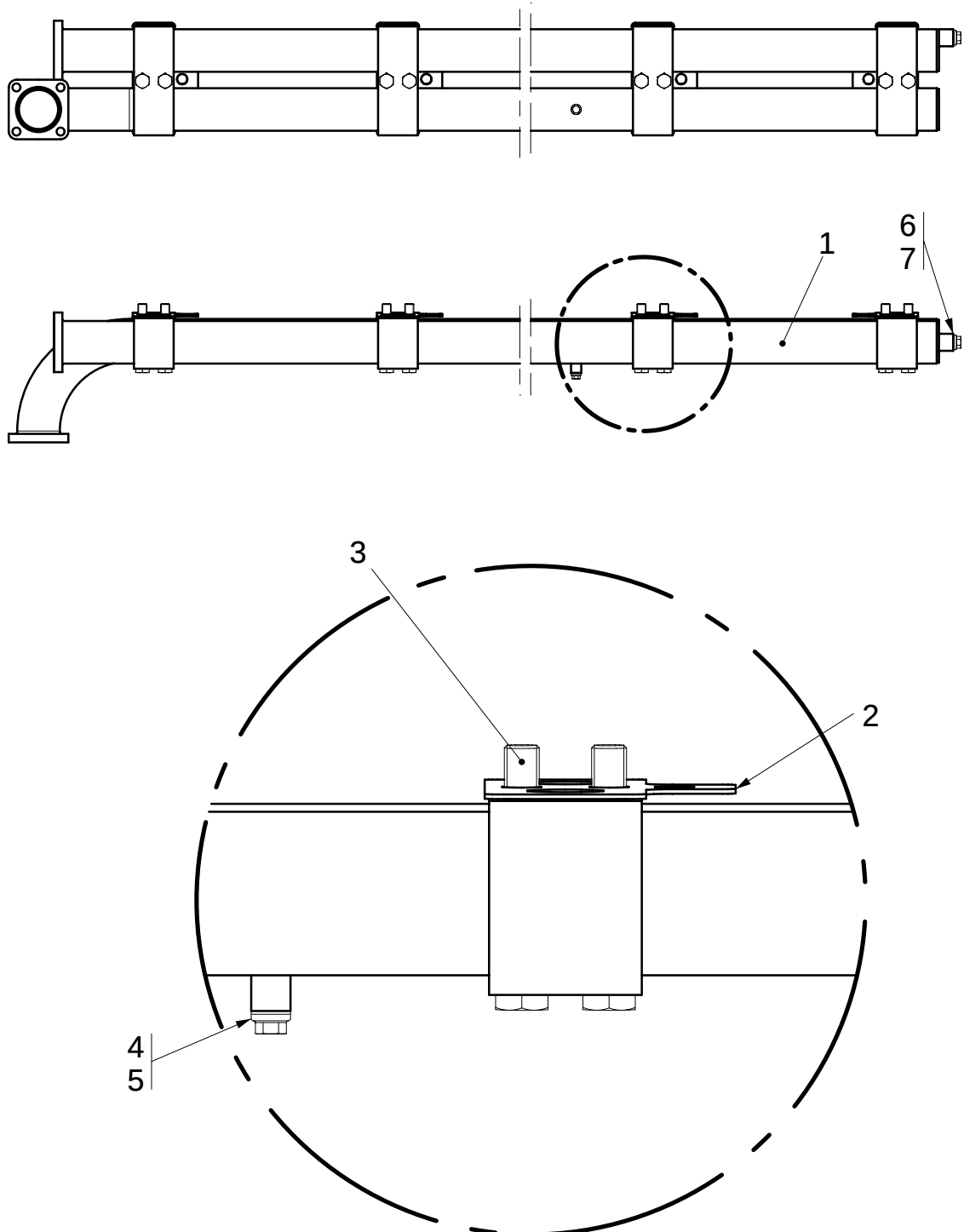
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cool. Water Distrib./Collecting Pipe

M25

09



Cool. Water Distrib./Collecting Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258320 CC
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258320-001
2	DICHTUNG GASKET	# 8	258320-002
3	SECHSKANTSCHRAUBE HEXAGON BOLT	12	1.1367-381
4	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-831
5	DICHTRING JOINT RING	# 1	1.7010-064
6	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-679
7	DICHTRING JOINT RING	# 1	1.7010-133

= VERBRAUCHSTEILE
CONSUMABLES

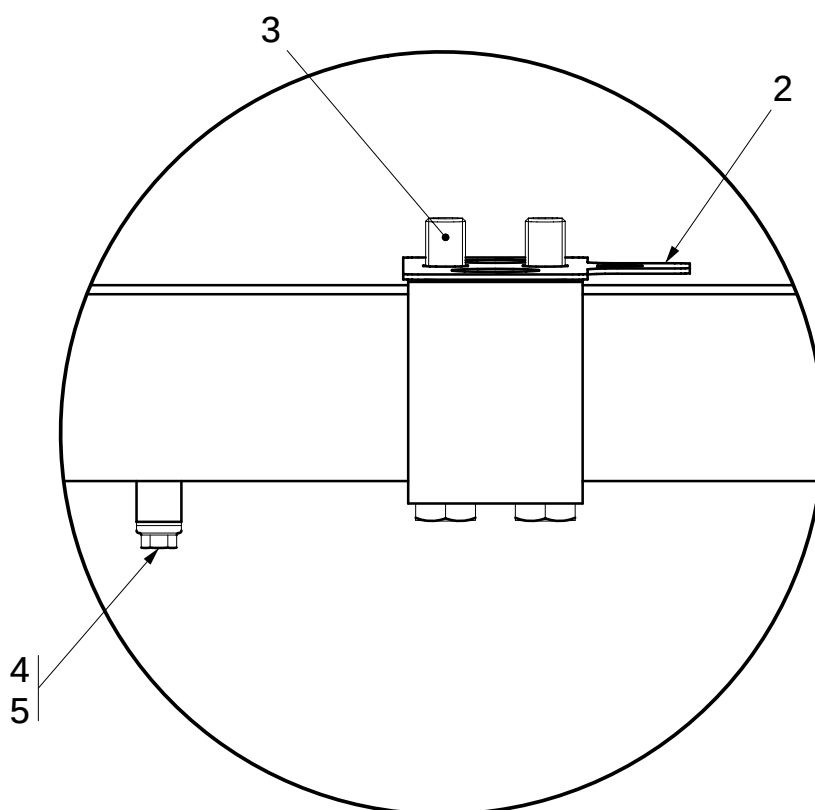
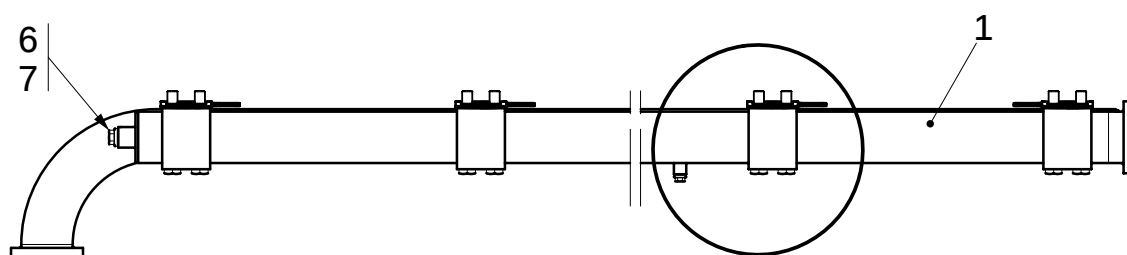
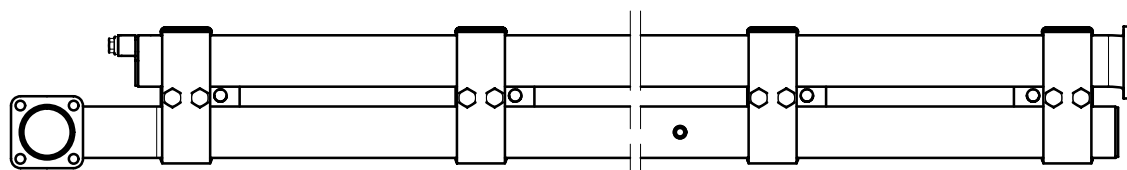
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cool. Water Distrib./Collecting Pipe

M25

09



Cool. Water Distrib./Collecting Pipe

M25

09

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258320 DD
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258320-001
2	DICHTUNG GASKET	# 8	258320-002
3	SECHSKANTSCHRAUBE HEXAGON BOLT	16	1.1367-381
4	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-831
5	DICHTRING JOINT RING	# 1	1.7010-064
6	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-679
7	DICHTRING JOINT RING	# 1	1.7010-133

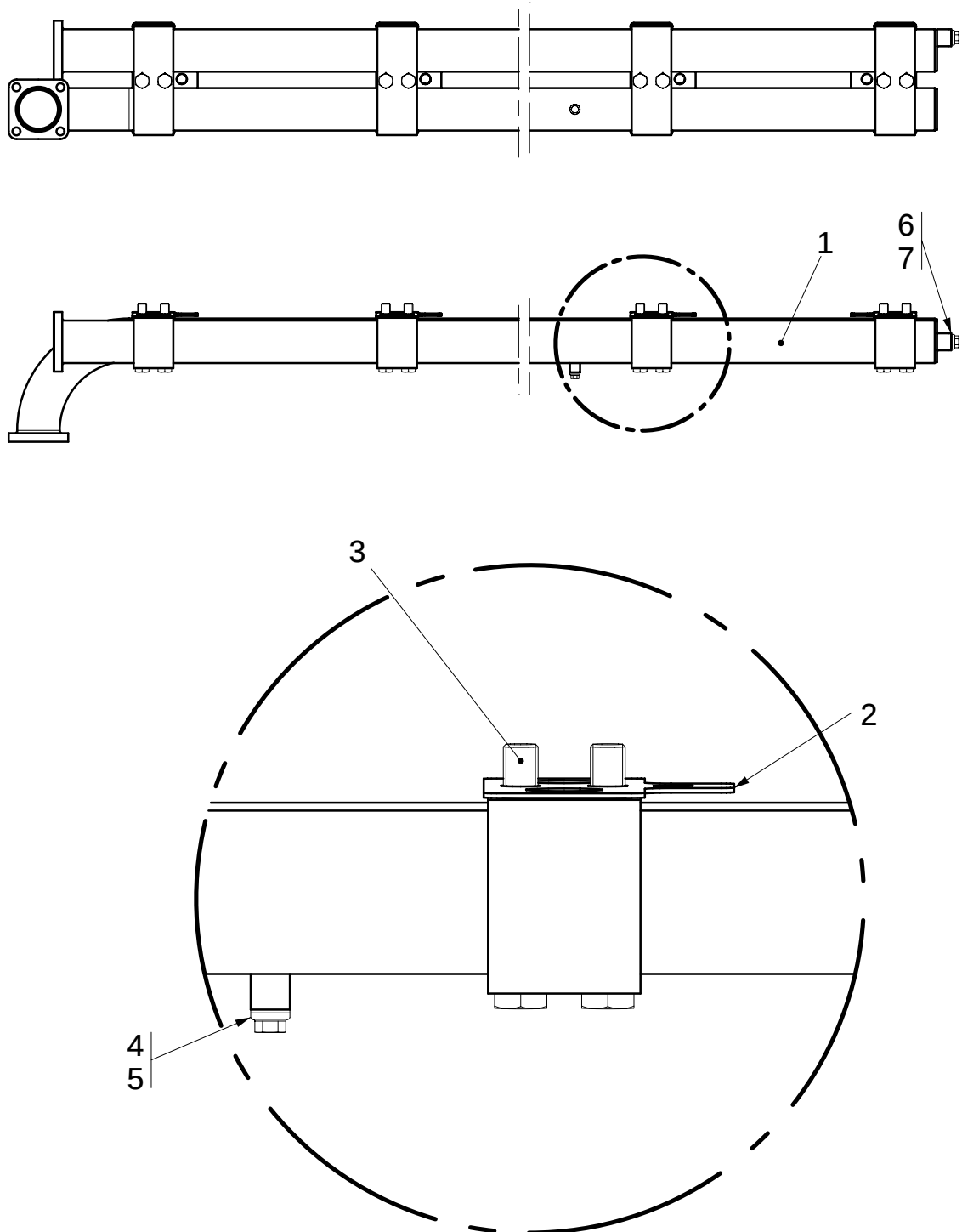
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cool. Water Distrib./Collecting Pipe

M25

09



Cool. Water Distrib./Collecting Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258320 EE
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258320-001
2	DICHTUNG GASKET	# 9	258320-002
3	SECHSKANTSCHRAUBE HEXAGON BOLT	18	1.1367-381
4	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-831
5	DICHTRING JOINT RING	# 1	1.7010-064
6	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-679
7	DICHTRING JOINT RING	# 1	1.7010-133

= VERBRAUCHSTEILE
CONSUMABLES

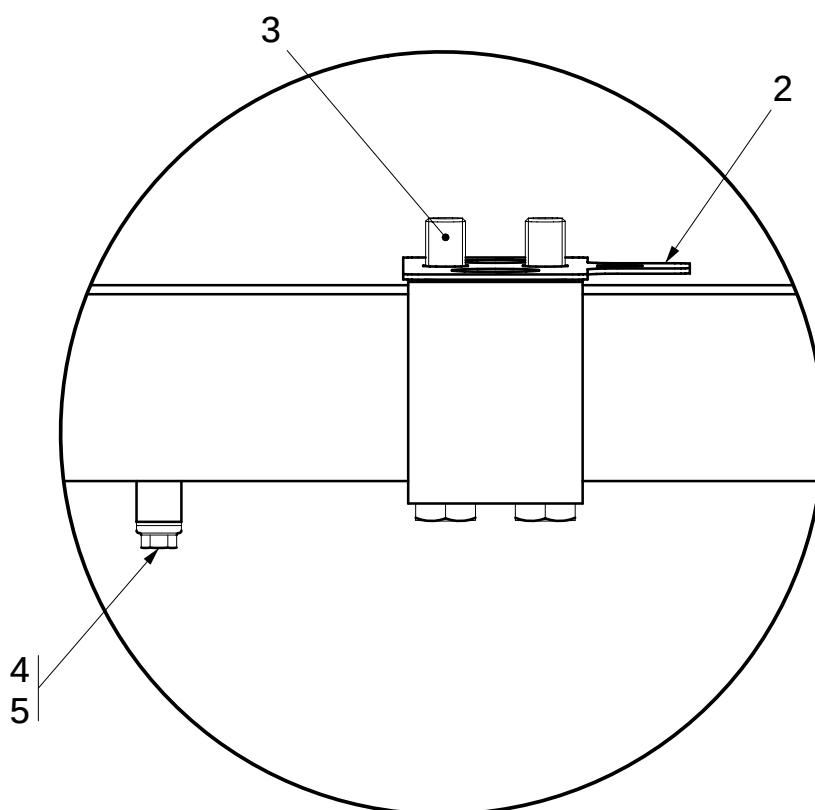
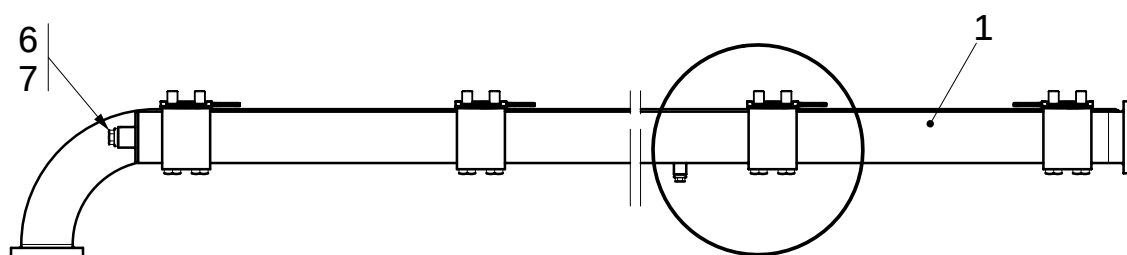
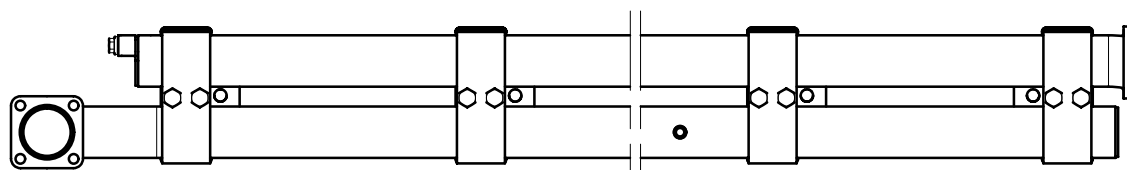
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cool. Water Distrib./Collecting Pipe

M25

09



Cool. Water Distrib./Collecting Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258320 FF
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258320-001
2	DICHTUNG GASKET	# 9	258320-002
3	SECHSKANTSCHRAUBE HEXAGON BOLT	18	1.1367-381
4	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-831
5	DICHTRING JOINT RING	# 1	1.7010-064
6	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-679
7	DICHTRING JOINT RING	# 1	1.7010-133

= VERBRAUCHSTEILE
CONSUMABLES

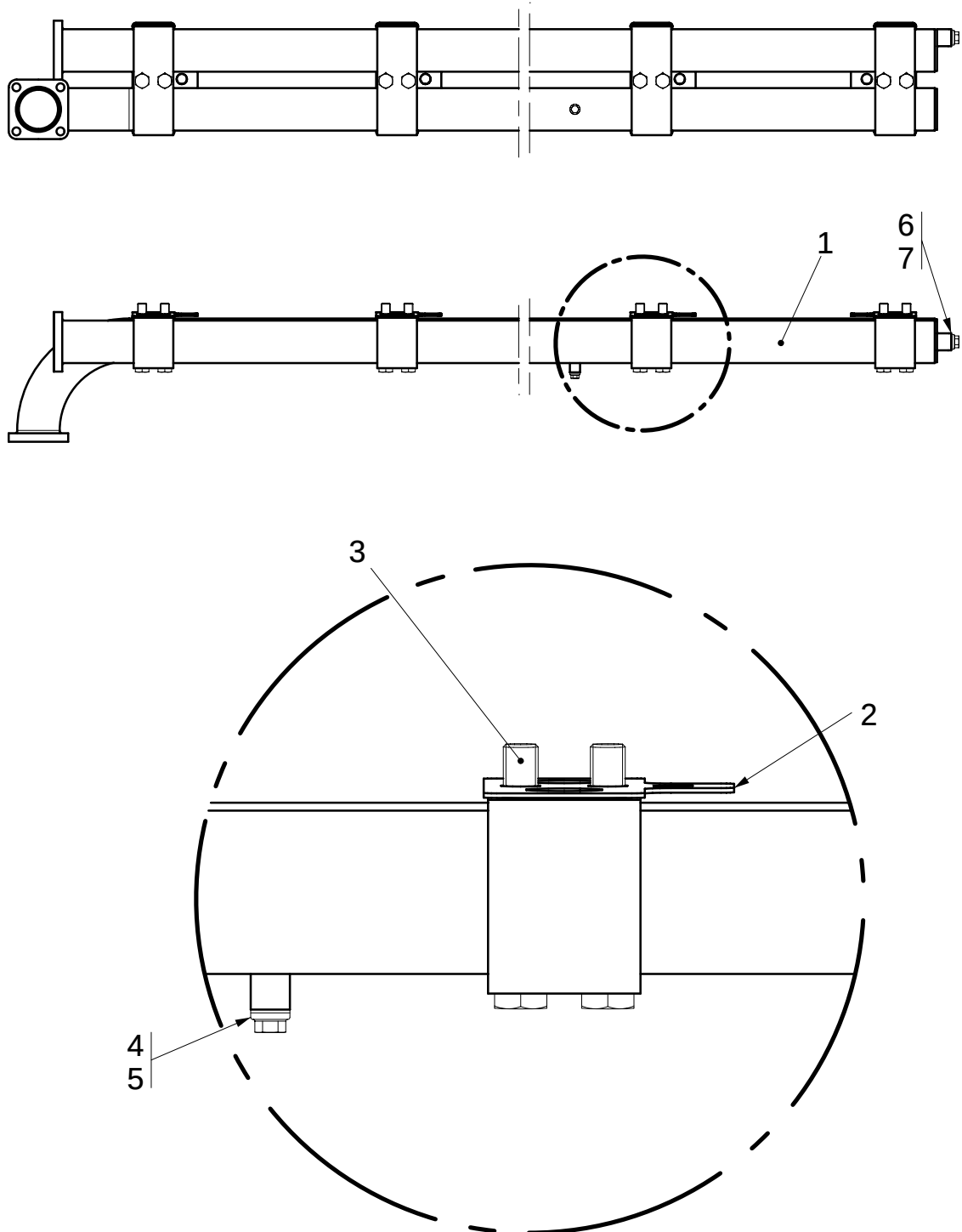
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cool. Water Distrib./Collecting Pipe

M25

09



Cooling Water Pipe

M25

09

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258330 AA
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258330-001
2	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258330-002
3	KÜHLWASSERLEITUNG COOLING WATER PIPE	1	258330-003
4	KÜHLWASSERLEITUNG COOLING WATER PIPE	1	258330-004
5	WINKELSTUTZEN ELBOW	2	258330-005
6	KÜHLWASSERLEITUNG COOLING WATER PIPE	2	258330-006
7	HALTER BRACKET	1	258330-007
8	HALTER BRACKET	1	258330-008
9	HALTER BRACKET	1	258330-009
10	HALTER BRACKET	1	258330-010
11	SCHELLE PIPE CLAMP	2	258330-011
13	FLANSCH FLANGE	1	1.5340-120
14	FLANSCH FLANGE	4	1.5340-115
15	DICHTUNG GASKET	# 11	1.7073-356
16	DICHTUNG GASKET	# 2	1.7073-734

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Cooling Water Pipe

M25

09

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
17	DICHTUNG GASKET	# 3	1.7073-731
18	DICHTUNG GASKET	# 1	1.7073-357
19	BLLENDE ORIFICE PLATE	1	1.8330-205
20	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1367-378
21	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1367-376
22	SECHSKANTSCHRAUBE HEXAGON BOLT	22	1.1372-373
23	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1372-371
24	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-446
25	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1387-445
26	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-441
27	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-317
28	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-379
29	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-376
30	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-374
31	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-372
33	SECHSKANTMUTTER HEXAGON NUT	48	1.2007-038

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Cooling Water Pipe

M25

09

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
34	SECHSKANTMUTTER HEXAGON NUT	16	1.2007-036
35	SPANNSCHEIBE CONICAL SPRING WASHER	# 38	1.0068-240
36	SPANNSCHEIBE CONICAL SPRING WASHER	# 20	1.0068-222
39	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-613
40	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	13	1.1041-609
41	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-831
42	DICHTRING JOINT RING	# 1	1.7010-252
43	DICHTRING JOINT RING	# 13	1.7010-133
44	DICHTRING JOINT RING	# 1	1.7010-064
47	DISCO-RÜCKSCHLAGKLAPPE NON-RETURN VALVE	1	1.8330-029

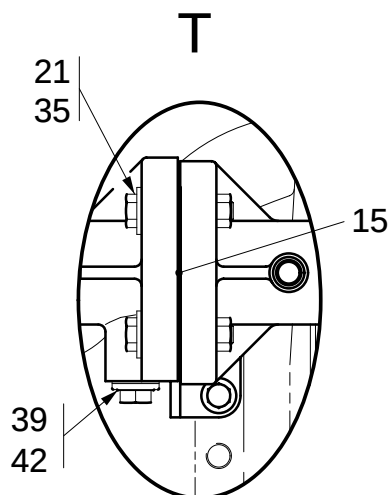
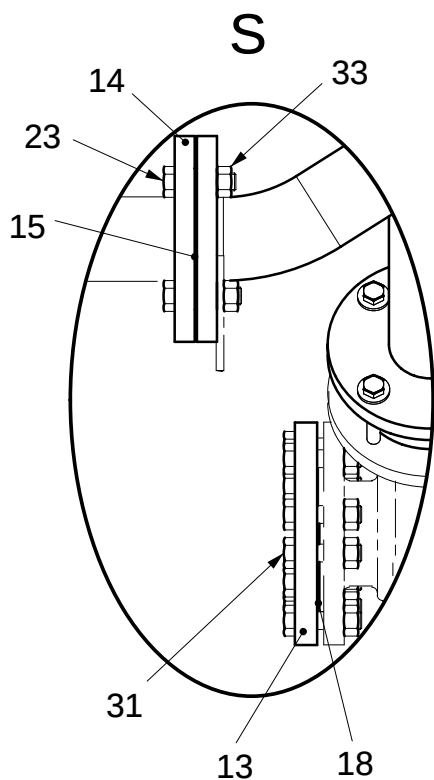
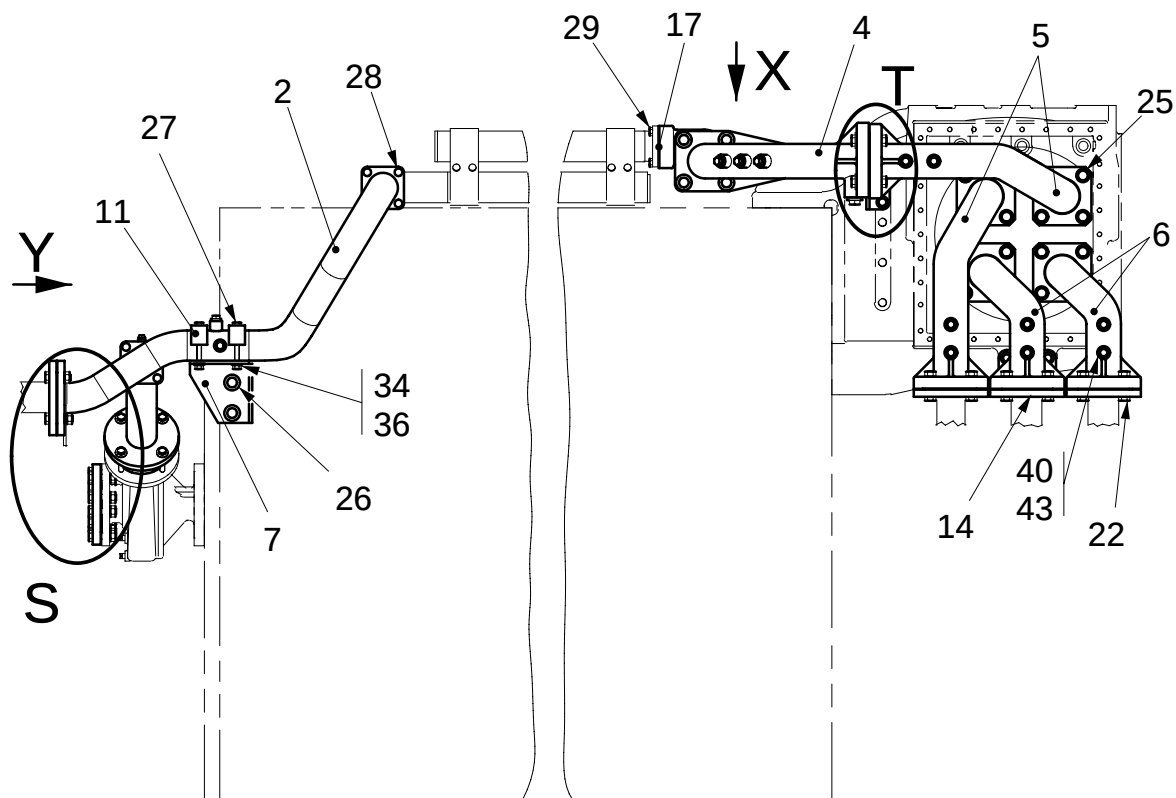
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Cooling Water Pipe

M25

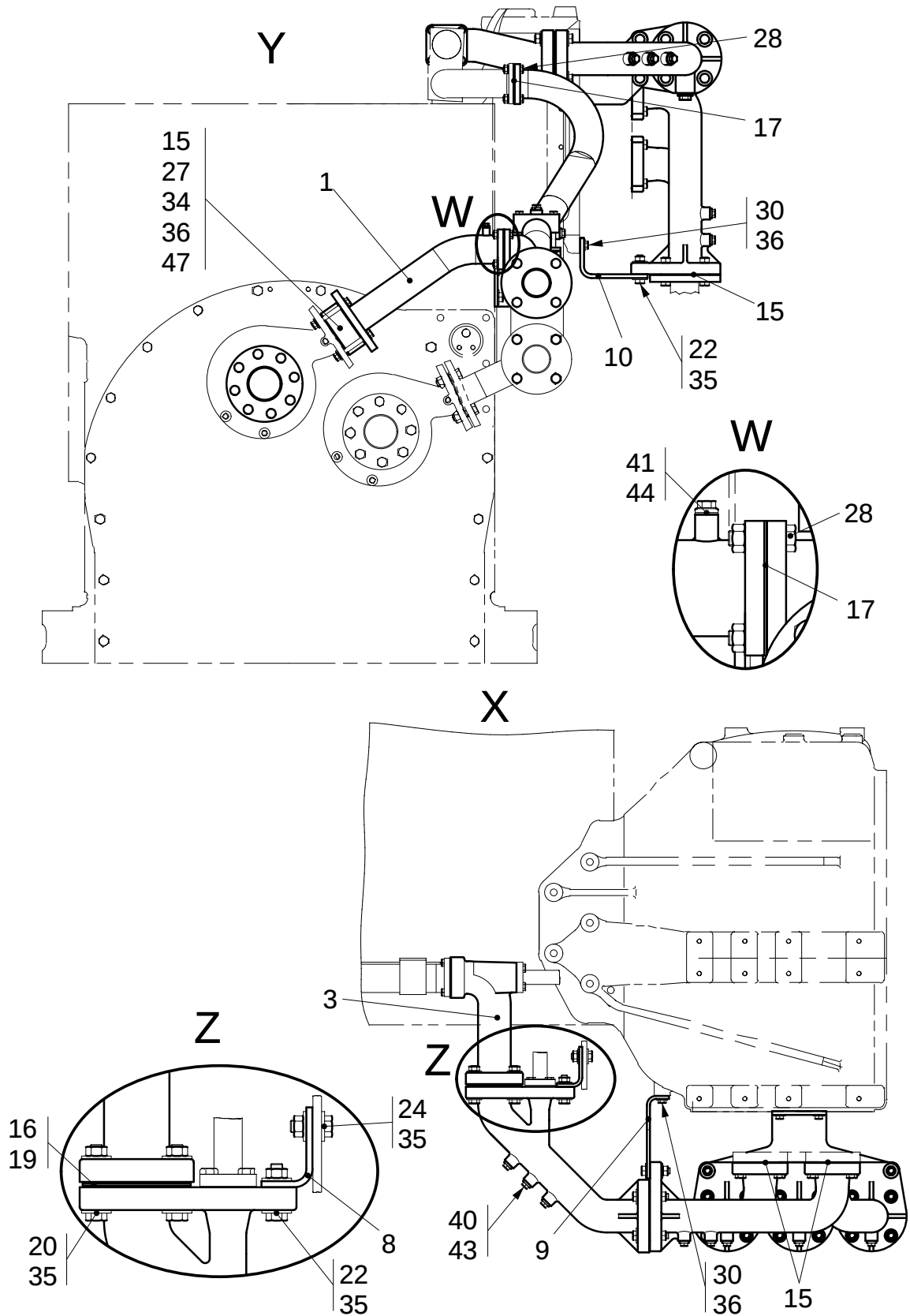
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Cooling Water Pipe

M25

09



Cooling Water Pipe

M25

09

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258330 BB
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258330-001
2	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258330-002
3	KÜHLWASSERLEITUNG COOLING WATER PIPE	1	258330-003
4	KÜHLWASSERLEITUNG COOLING WATER PIPE	1	258330-004
5	WINKELSTUTZEN ELBOW	2	258330-005
6	KÜHLWASSERLEITUNG COOLING WATER PIPE	2	258330-006
7	HALTER BRACKET	1	258330-107
8	HALTER BRACKET	1	258330-108
9	HALTER BRACKET	1	258330-010
10	SCHELLE PIPE CLAMP	1	258330-011
11	FLANSCH FLANGE	1	1.5340-120
12	FLANSCH FLANGE	4	1.5340-115
13	DICHTUNG GASKET	# 10	1.7073-356
14	DICHTUNG GASKET	# 2	1.7073-734
15	DICHTUNG GASKET	# 3	1.7073-731
16	DICHTUNG GASKET	# 1	1.7073-357
17	BLLENDE ORIFICE PLATE	1	1.8330-205
18	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1367-378
19	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1372-377
20	SECHSKANTSCHRAUBE HEXAGON BOLT	22	1.1372-373

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cooling Water Pipe

M25

09

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-372
22	SECHSKANTSCHRAUBE HEXAGON BOLT	6	1.1372-371
23	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1387-447
24	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-441
25	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-318
26	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1367-317
27	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-379
28	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-376
29	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-374
30	SECHSKANTMUTTER HEXAGON NUT	40	1.2007-038
31	SECHSKANTMUTTER HEXAGON NUT	10	1.2007-036
32	SPANNSCHEIBE CONICAL SPRING WASHER	# 40	1.0068-240
33	SPANNSCHEIBE CONICAL SPRING WASHER	# 14	1.0068-222
34	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-613
35	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	7	1.1041-609
37	DICHTRING JOINT RING	# 1	1.7010-252
38	DICHTRING JOINT RING	# 7	1.7010-133
40	DISCO-RÜCKSCHLAGKLAPPE NON-RETURN VALVE	1	1.8330-029
41	HALTER BRACKET	1	258330-041

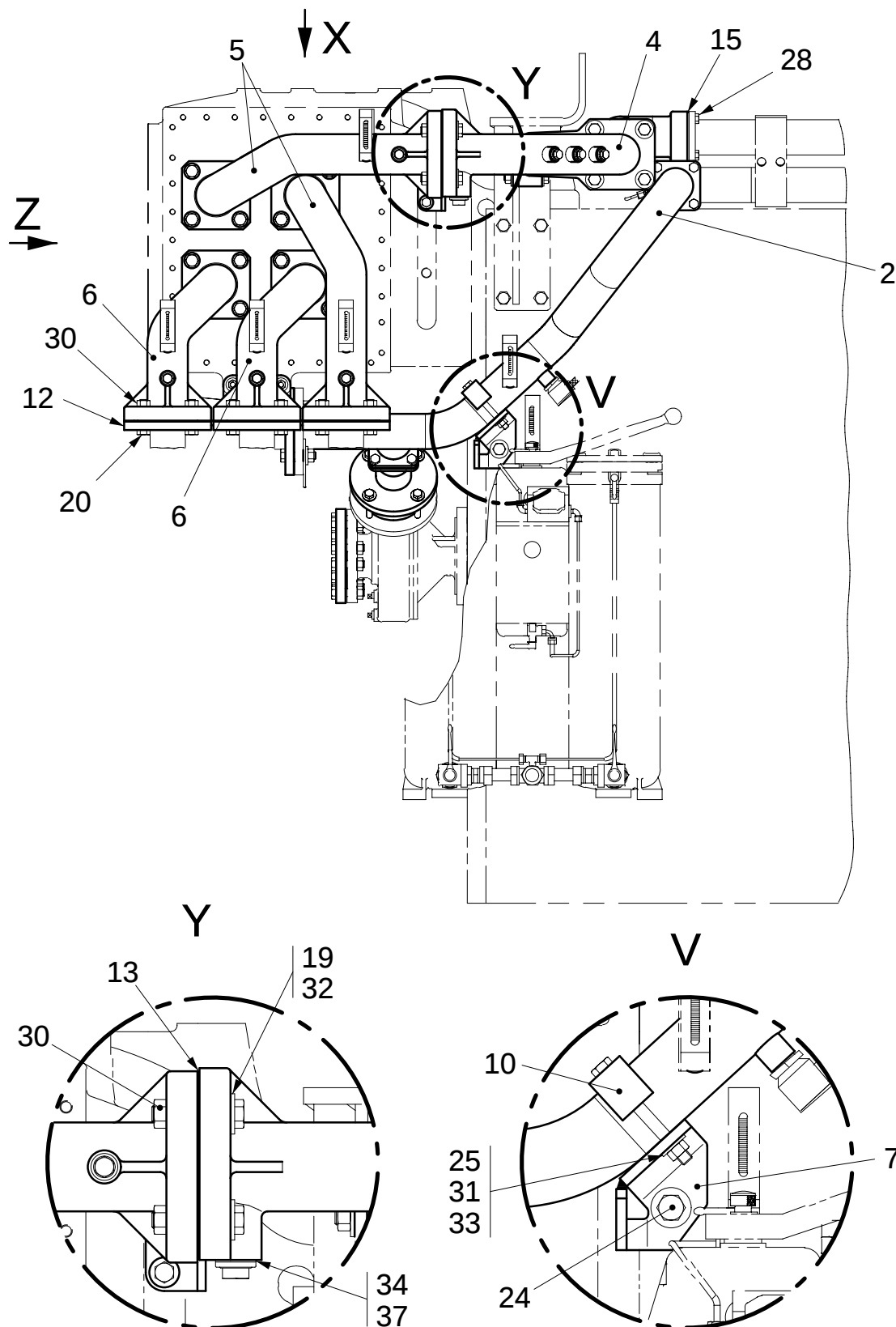
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cooling Water Pipe

M25

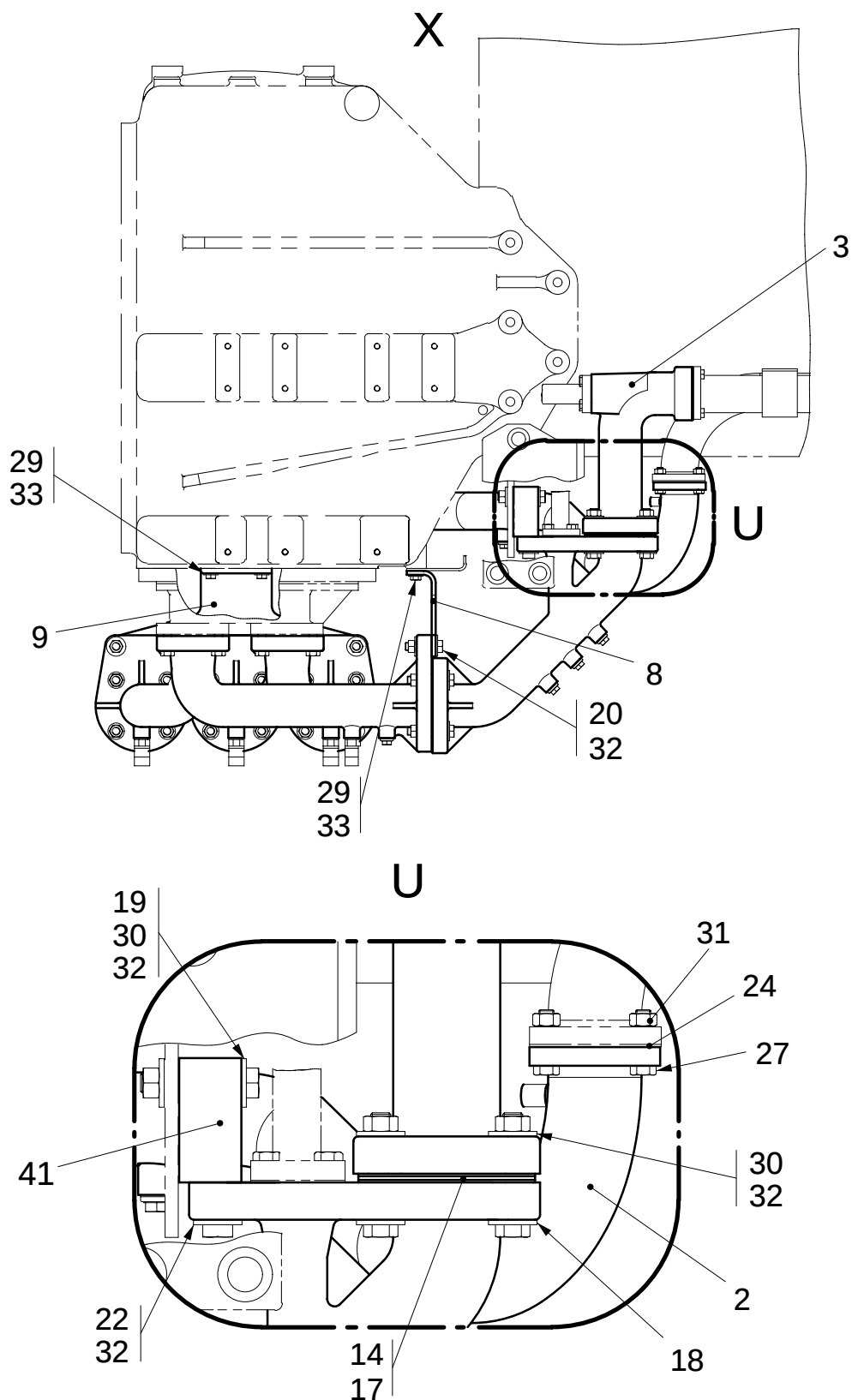
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Cooling Water Pipe

M25

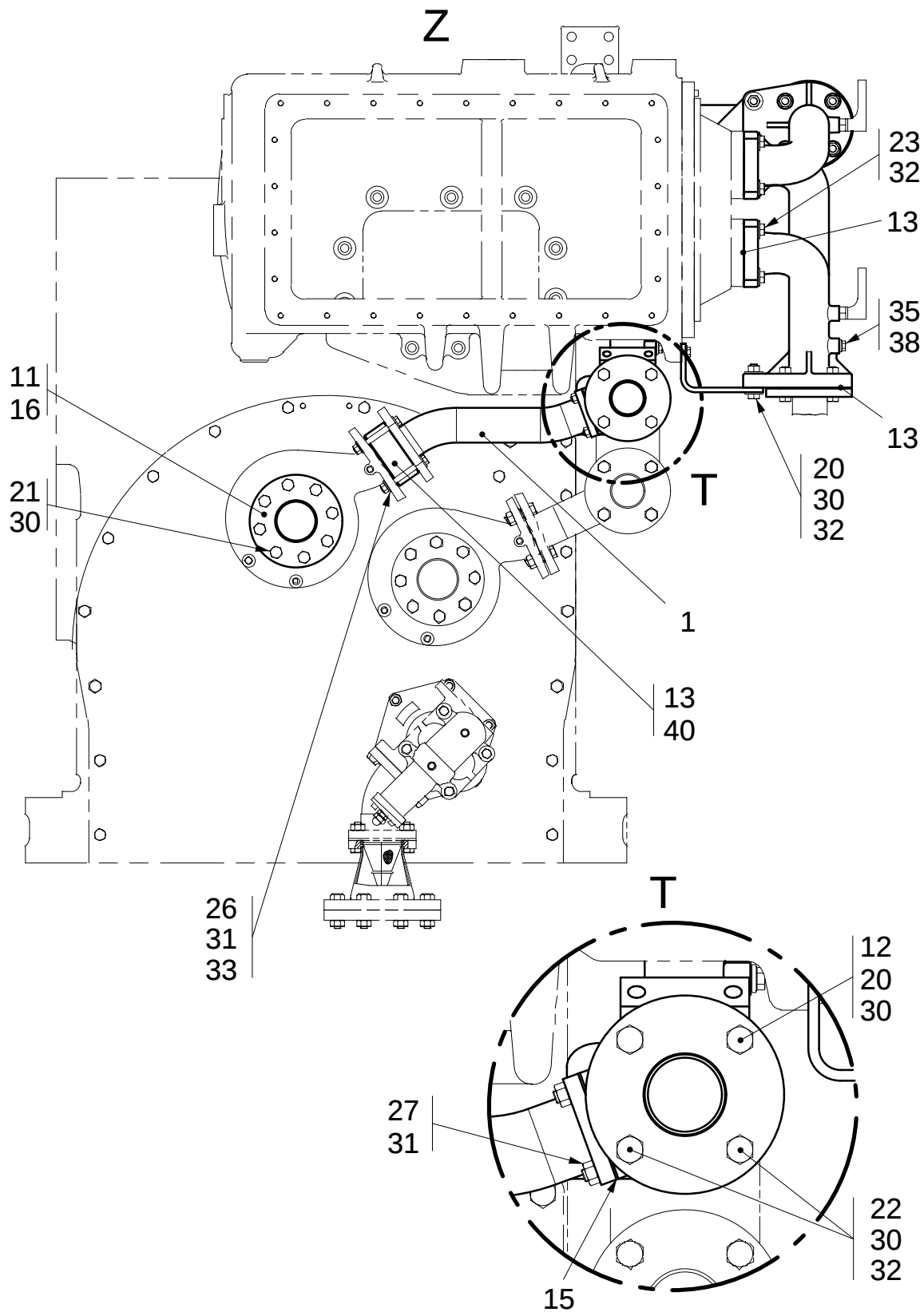
09



Cooling Water Pipe

M25

09



Cooling Water Pipe

M25

09

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258330 CC
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258330-001
2	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258330-002
3	KÜHLWASSERLEITUNG COOLING WATER PIPE	1	258330-003
4	KÜHLWASSERLEITUNG COOLING WATER PIPE	1	258330-004
5	WINKELSTUTZEN ELBOW	2	258330-005
6	KÜHLWASSERLEITUNG COOLING WATER PIPE	2	258330-006
7	HALTER BRACKET	1	258330-107
8	HALTER BRACKET	1	258330-009
9	HALTER BRACKET	1	258330-010
10	SCHELLE PIPE CLAMP	1	258330-011
11	FLANSCH FLANGE	1	1.5340-120
12	FLANSCH FLANGE	4	1.5340-115
13	DICHTUNG GASKET	# 10	1.7073-356
14	DICHTUNG GASKET	# 2	1.7073-734
15	DICHTUNG GASKET	# 3	1.7073-731
16	DICHTUNG GASKET	# 1	1.7073-357
17	BLLENDE ORIFICE PLATE	1	1.8330-205
18	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1367-378
19	SECHSKANTSCHRAUBE HEXAGON BOLT	6	1.1372-376
20	SECHSKANTSCHRAUBE HEXAGON BOLT	22	1.1372-373

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cooling Water Pipe

M25

09

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-372
22	SECHSKANTSCHRAUBE HEXAGON BOLT	6	1.1372-371
23	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1387-445
24	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-441
25	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-318
26	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1367-317
27	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-379
28	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-376
29	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-374
30	SECHSKANTMUTTER HEXAGON NUT	40	1.2007-038
31	SECHSKANTMUTTER HEXAGON NUT	10	1.2007-036
32	SPANNSCHEIBE CONICAL SPRING WASHER	# 40	1.0068-240
33	SPANNSCHEIBE CONICAL SPRING WASHER	# 14	1.0068-222
34	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-613
35	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	7	1.1041-609
37	DICHTRING JOINT RING	# 1	1.7010-252
38	DICHTRING JOINT RING	# 7	1.7010-133
40	DISCO-RÜCKSCHLAGKLAPPE NON-RETURN VALVE	1	1.8330-029
41	HALTER BRACKET	1	258330-041

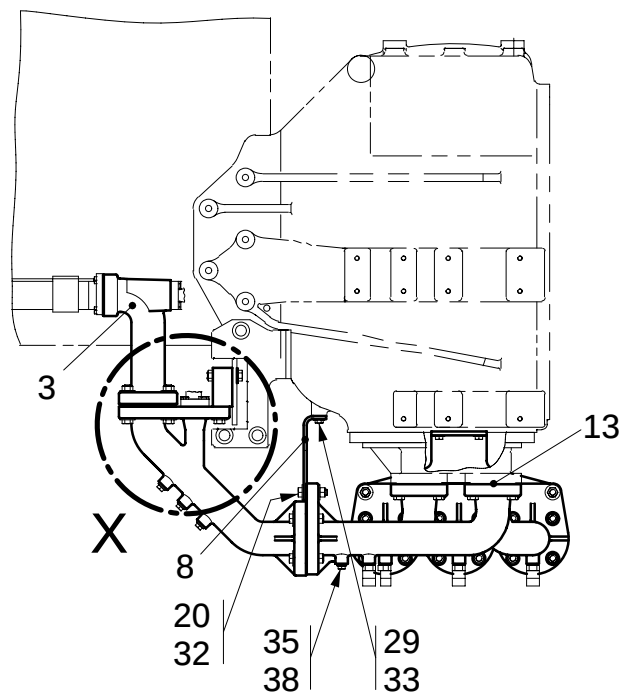
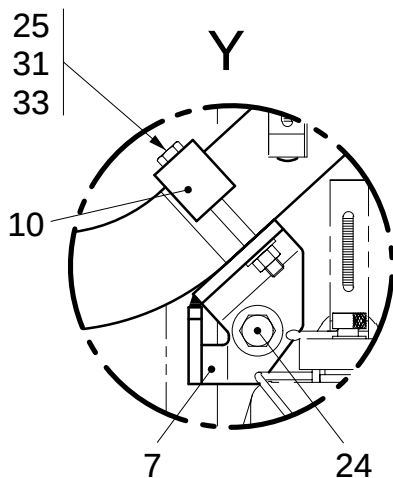
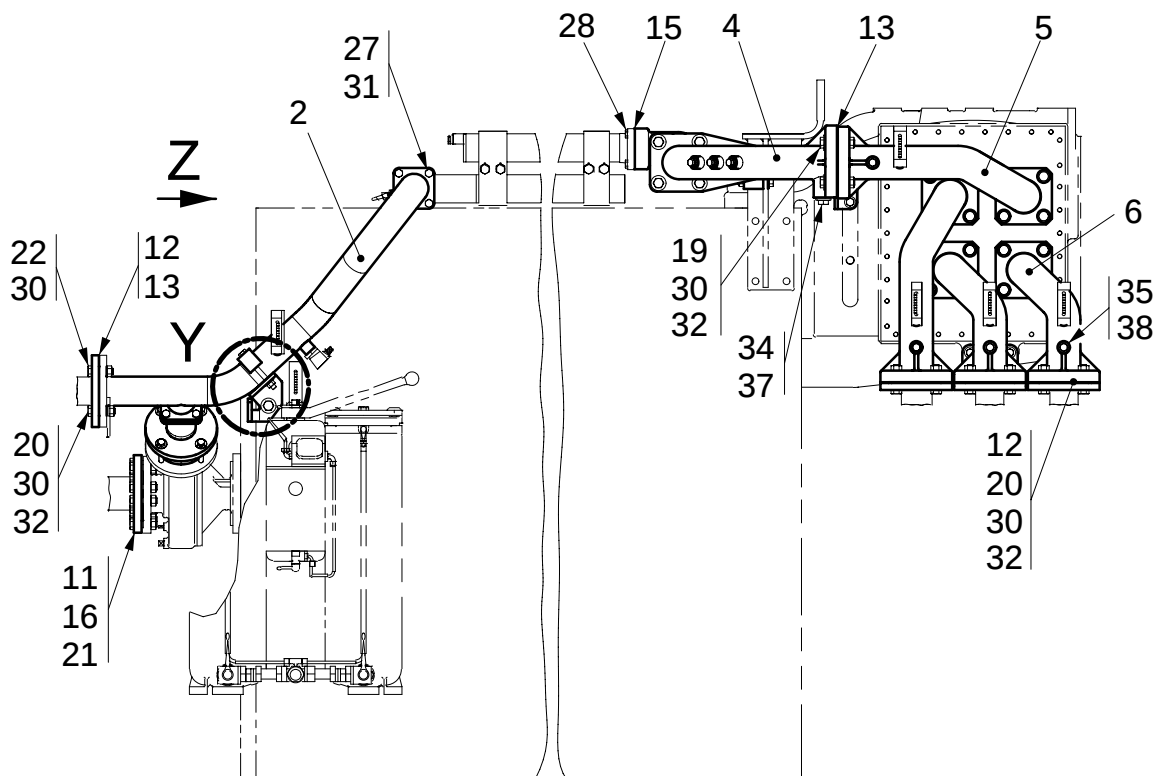
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cooling Water Pipe

M25

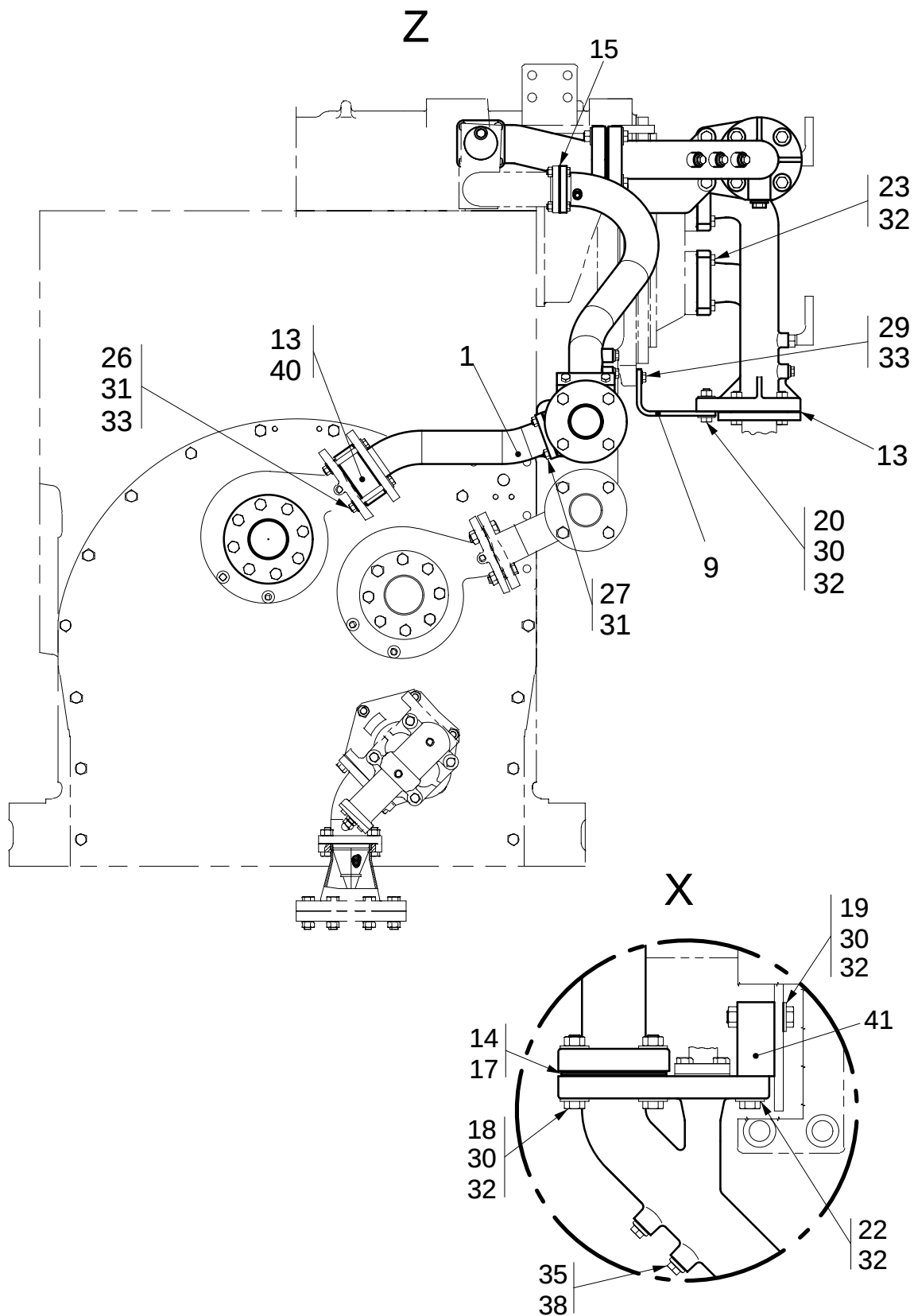
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Cooling Water Pipe

M25

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Cooling Water Thermostat Valve Mount.

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERREGLER-ANBAU, VOLLST. COOLING WATER THERMOSTAT VALVE M. ASS.	1	258332 AA
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258332-001
3	FLANSCH FLANGE	1	258332-003
5	TEMPERATURREGLER, VOLLST. THERMOSTAT VALVE, COMPL.	1	SIEHE B1.05.11.1.7837 SEE B1.05.11.1.7837
8	FLANSCH FLANGE	1	1.5340-120
9	FLANSCH FLANGE	1	1.5341-347
12	DICHTUNG GASKET	# 4	1.7073-357
13	DICHTUNG GASKET	# 1	1.7073-724
16	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1387-379
19	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-445
21	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-447
22	SECHSKANTSCHRAUBE HEXAGON SCREW	24	1.1372-371
25	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-036
26	SECHSKANTMUTTER HEXAGON NUT	24	1.2007-038

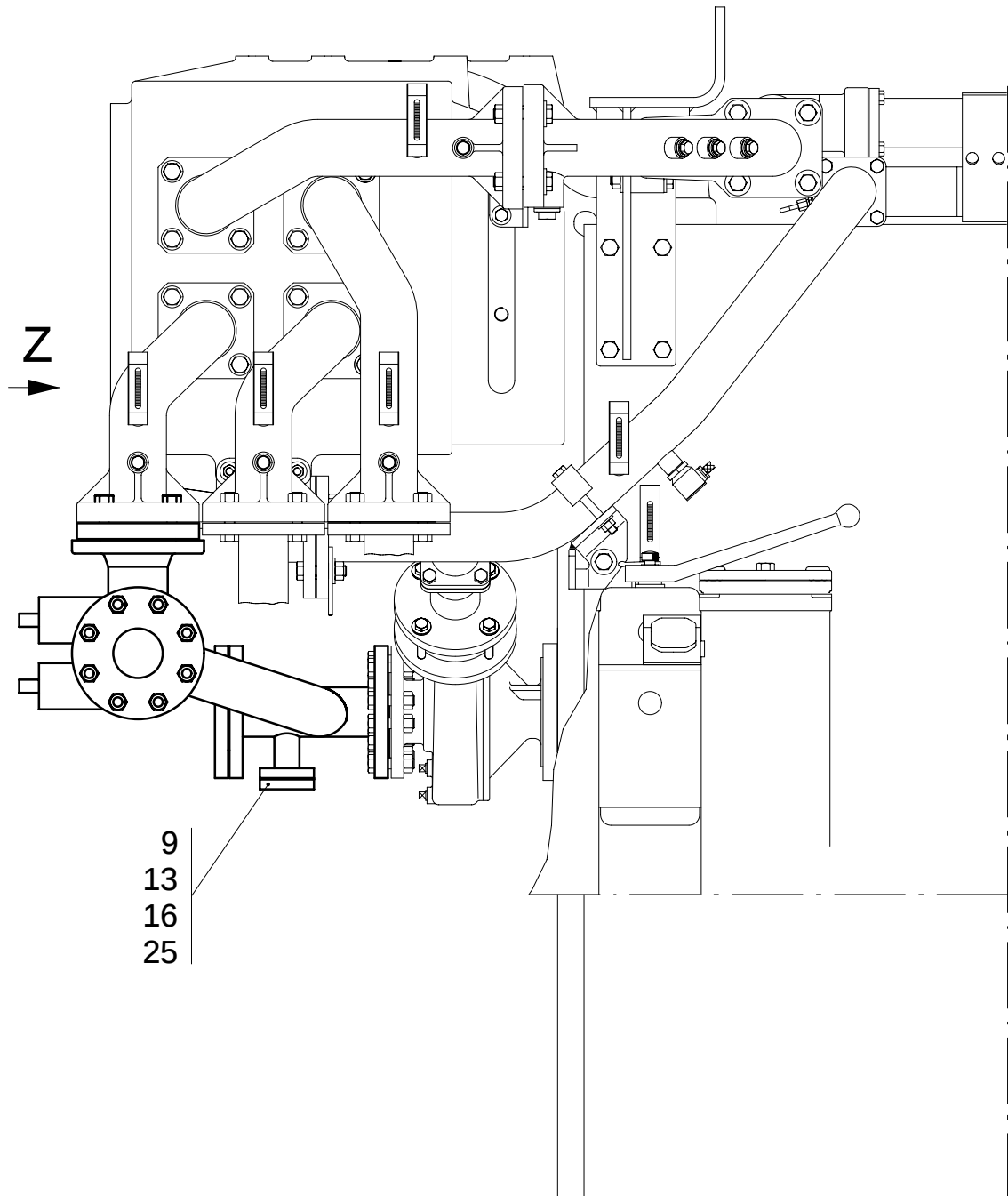
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cooling Water Thermostat Valve Mount.

M25

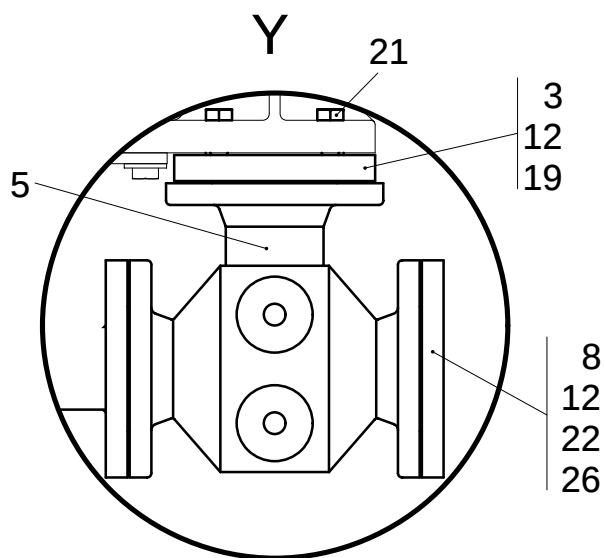
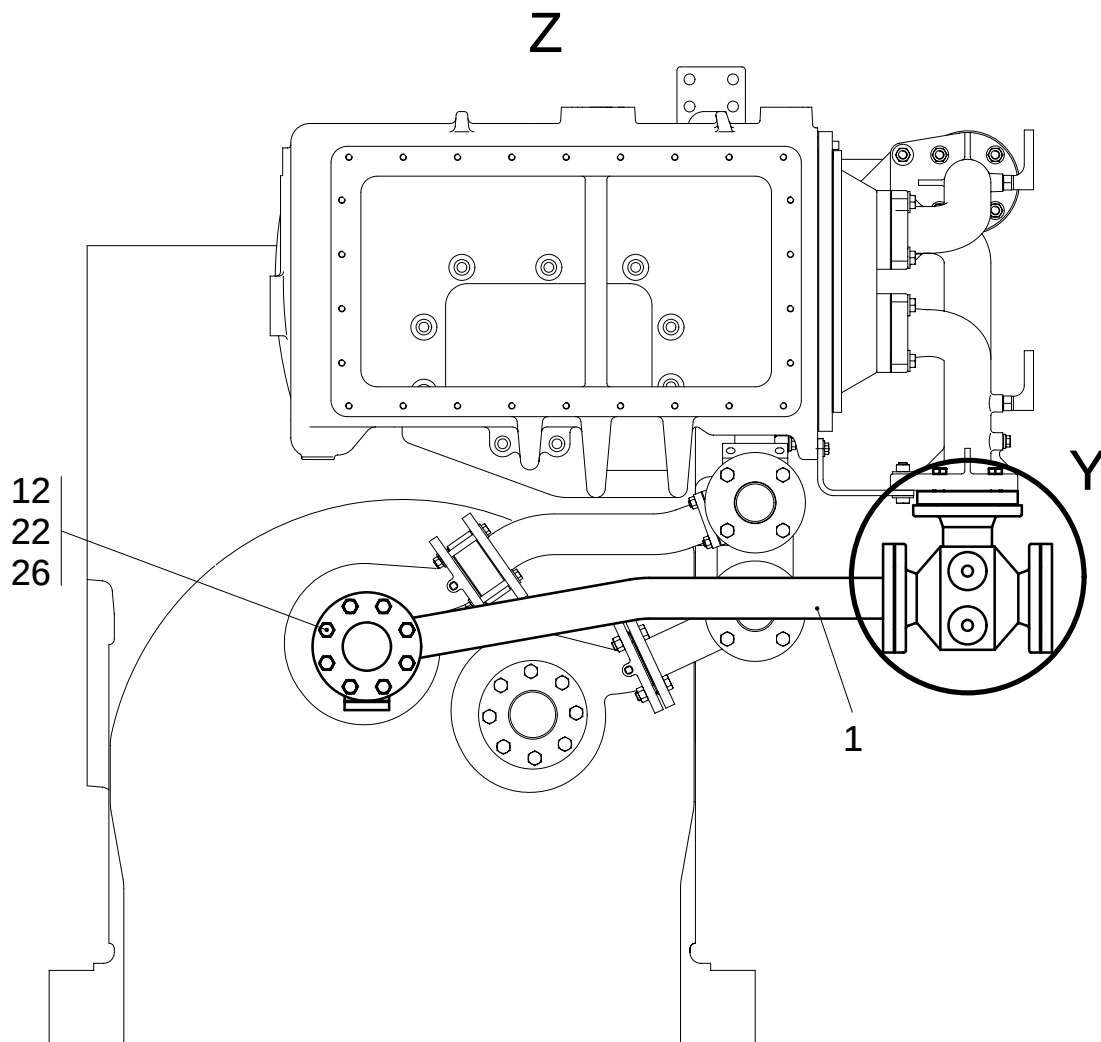
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Cooling Water Thermostat Valve Mount.

M25

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Cooling Water Pipe

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258360 AA
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258360-001
2	HALTER BRACKET	1	258360-002
4	FLANSCH FLANGE	1	1.5340-120
5	FLANSCH FLANGE	1	1.5340-115
6	DICHTUNG GASKET	# 1	1.7073-357
7	DICHTUNG GASKET	# 2	1.7073-356
8	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1372-373
9	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1367-372
10	SECHSKANTSCHRAUBE HEXAGON BOLT	6	1.1372-371
11	SECHSKANTMUTTER HEXAGON NUT	16	1.2007-038
12	SPANNSCHEIBE CONICAL SPRING WASHER	# 2	1.0068-240
13	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-831
14	DICHTRING JOINT RING	# 1	1.7010-064

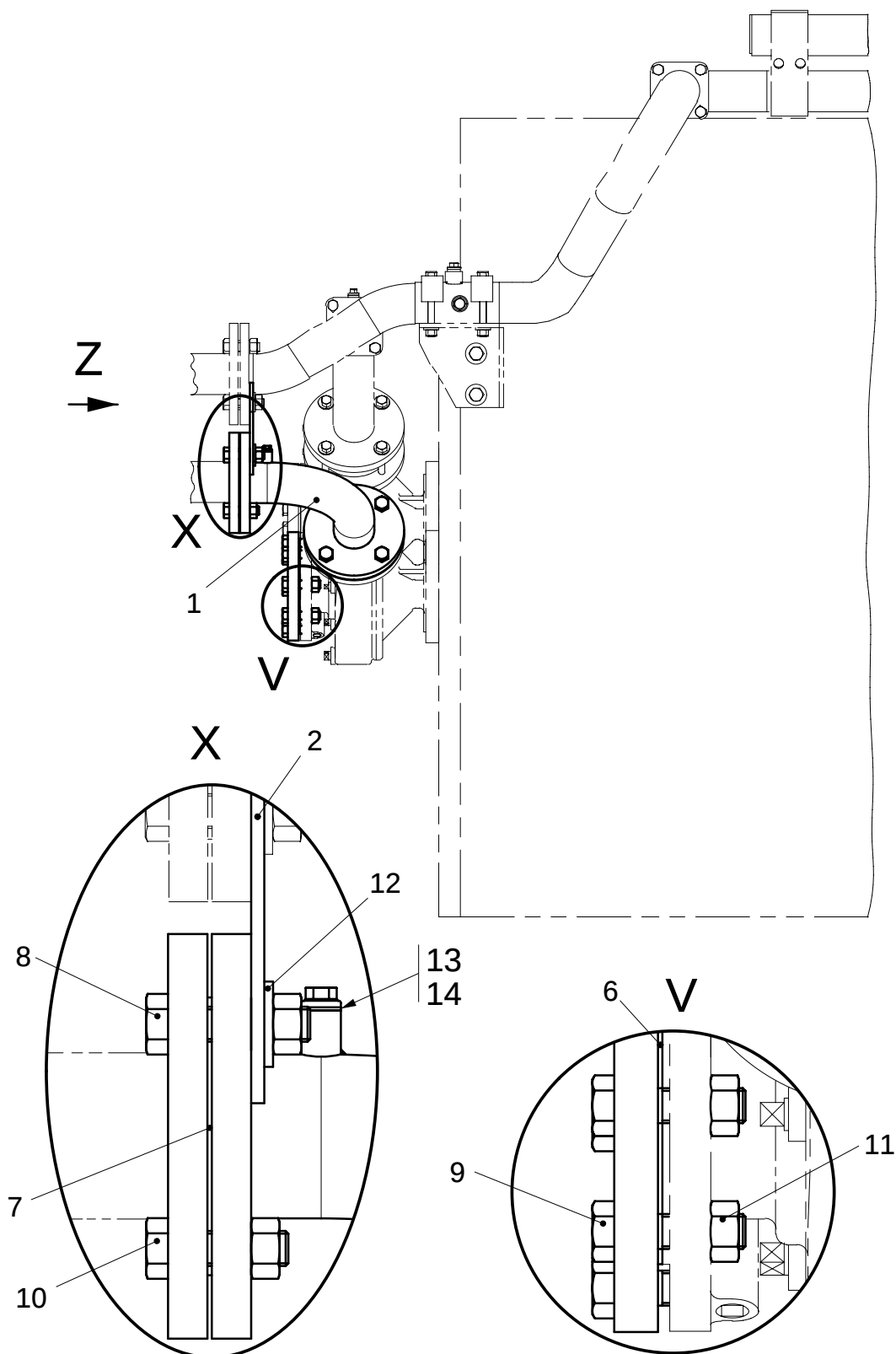
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cooling Water Pipe

M25

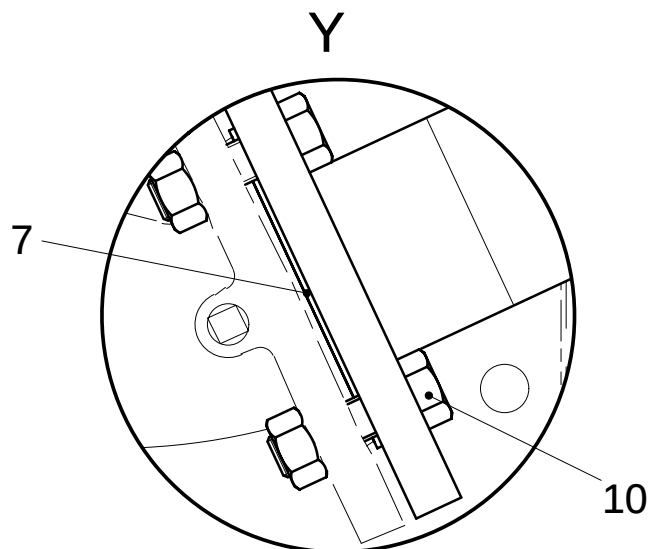
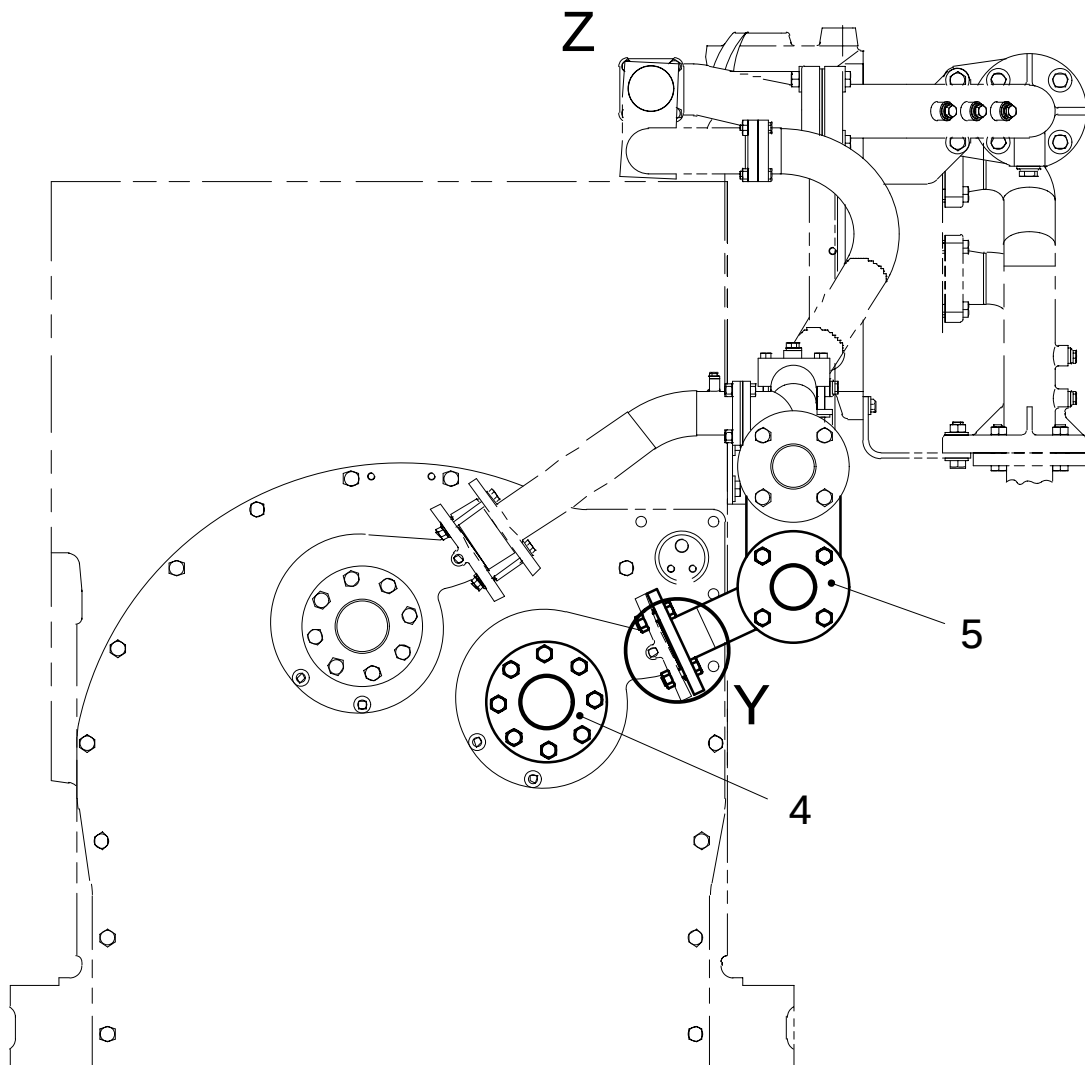
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Cooling Water Pipe

M25

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Cooling Water Pipe for Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258373 AA
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258373-001
2	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258373-002
3	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258373-003
4	ROHRKLEMME PIPE CLAMP	4	258373-004
5	HALTER BRACKET	1	258373-005
6	HALTER BRACKET	1	258373-006
7	ROHRKLEMME PIPE CLAMP	4	1.5011-063
8	DICHTUNG GASKET	# 5	1.7073-723
9	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-342
10	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-345
11	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-346
12	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-377
13	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-379
14	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-381
15	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-244
16	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-246
17	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
18	SECHSKANTMUTTER HEXAGON NUT	5	1.2007-035
19	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-036
20	FEDERRING SPRING WASHER	# 8	1.0065-213

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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cooling Water Pipe for Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	SPANNSCHEIBE CONICAL SPRING WASHER	# 18	1.0068-225
22	SPANNSCHEIBE CONICAL SPRING WASHER	# 4	1.0068-222
23	DICHTRING JOINT RING	# 3	1.7010-133
24	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	3	1.1041-609

= VERBRAUCHSTEILE
CONSUMABLES

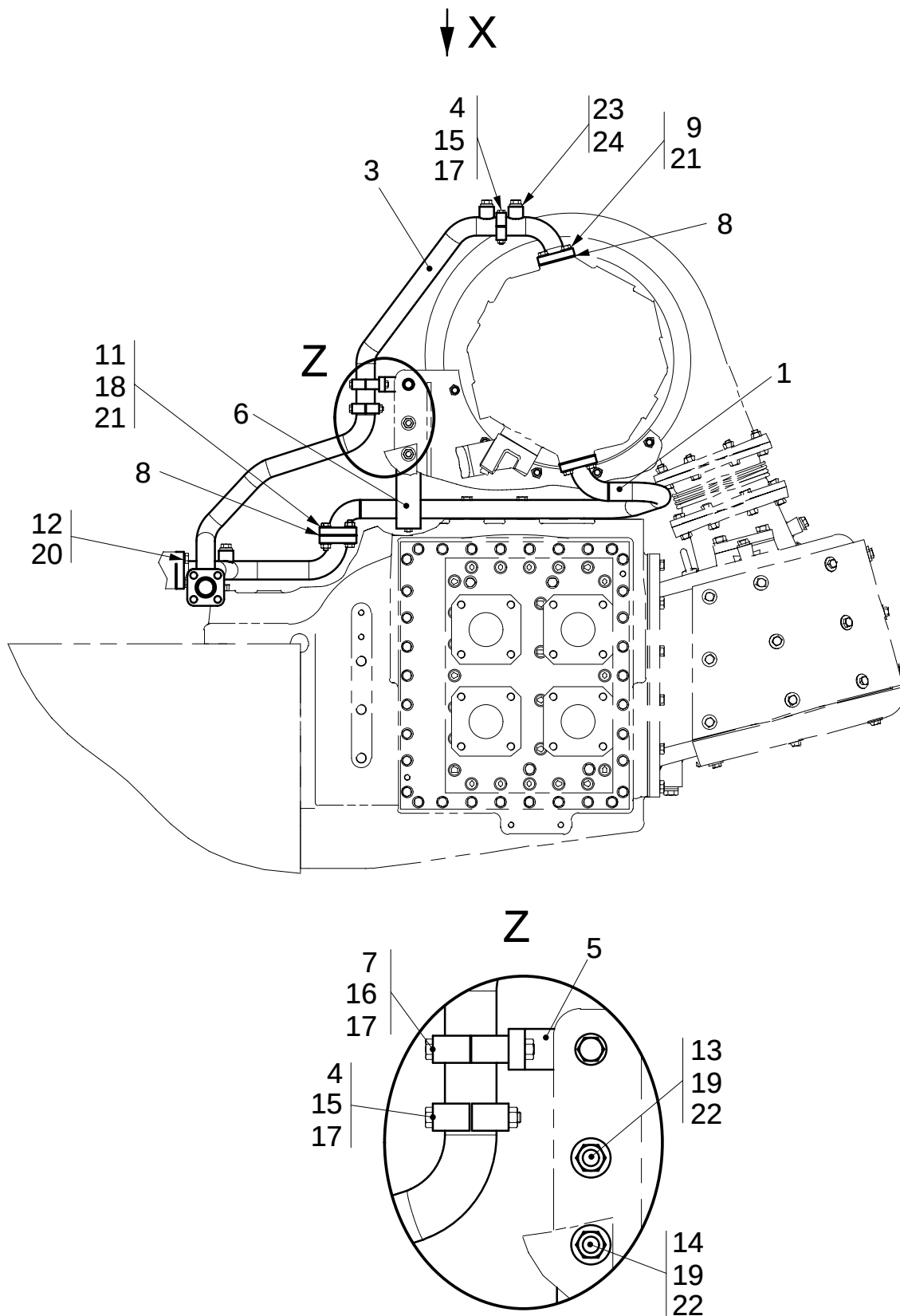
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Cooling Water Pipe for Turbocharger

M25

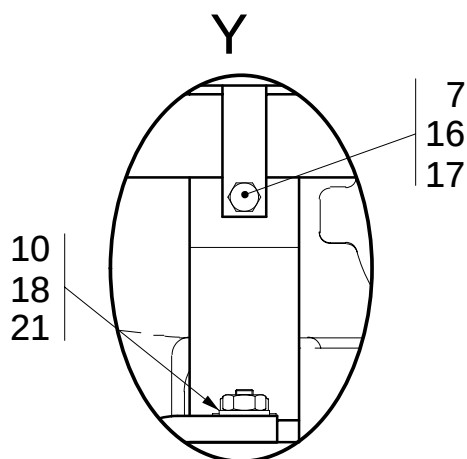
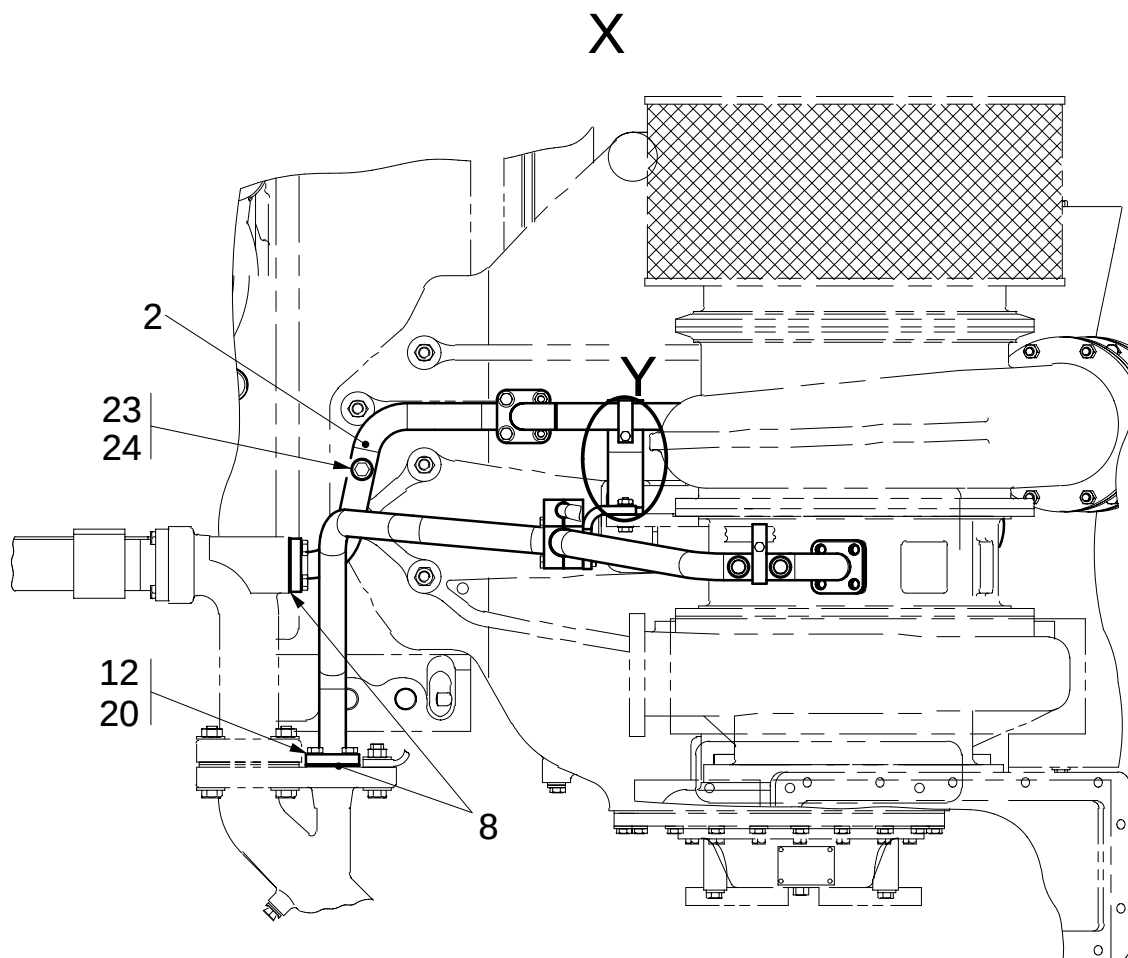
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Cooling Water Pipe for Turbocharger

M25

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Cooling Water Pipe for Turbocharger

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258373 BB
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258373-101
2	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258373-102
3	HALTER BRACKET	1	258373-103
4	ROHRKLEMME PIPE CLAMP	8	1.5011-063
5	DICHTUNG GASKET	# 4	1.7073-723
6	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-447
7	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-377
8	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-342
9	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-247
10	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034
12	SPANNSCHEIBE CONICAL SPRING WASHER	# 8	1.0068-225
13	DICHTRING JOINT RING	# 3	1.7010-133
14	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	3	1.1041-609

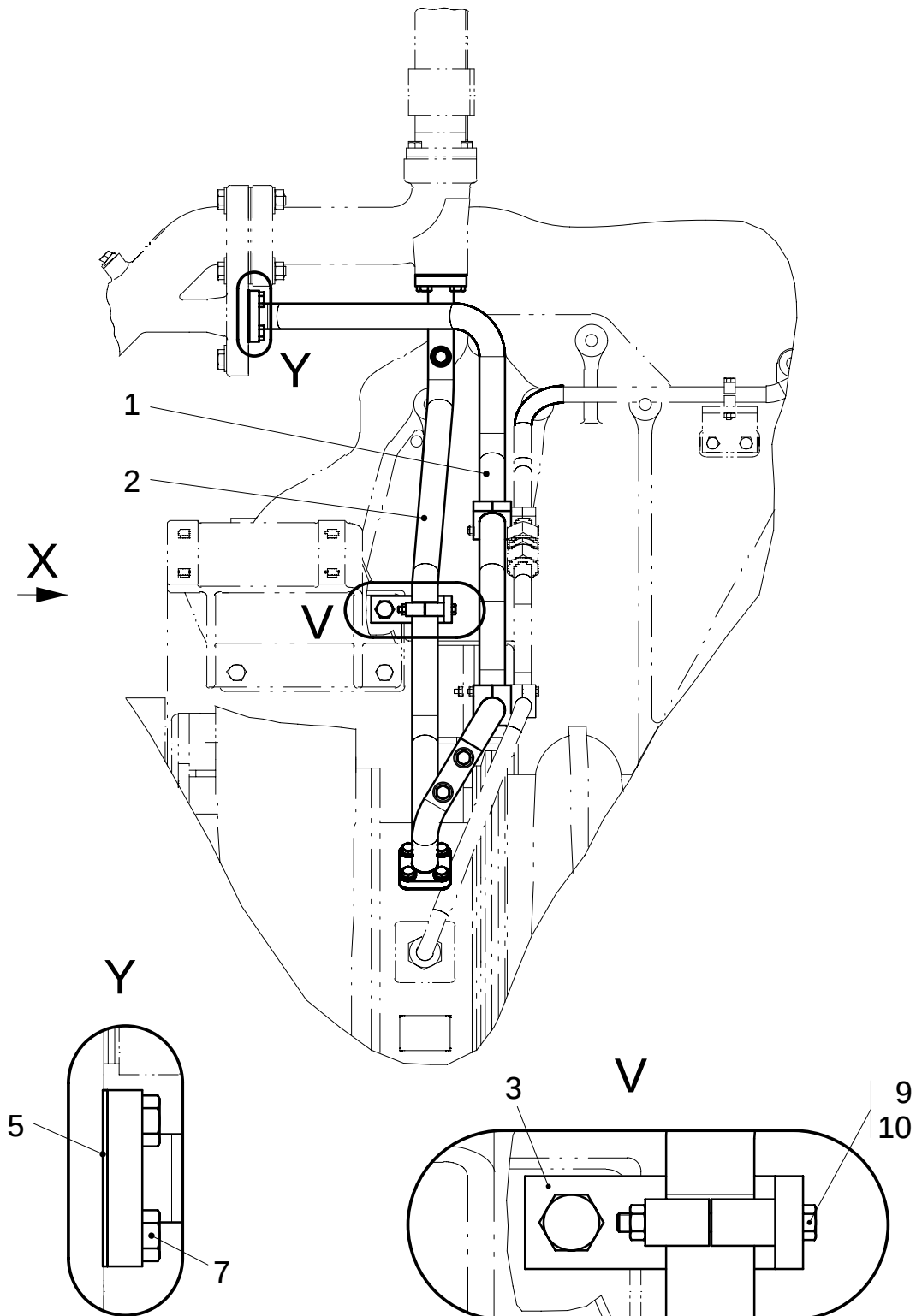
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cooling Water Pipe for Turbocharger

M25

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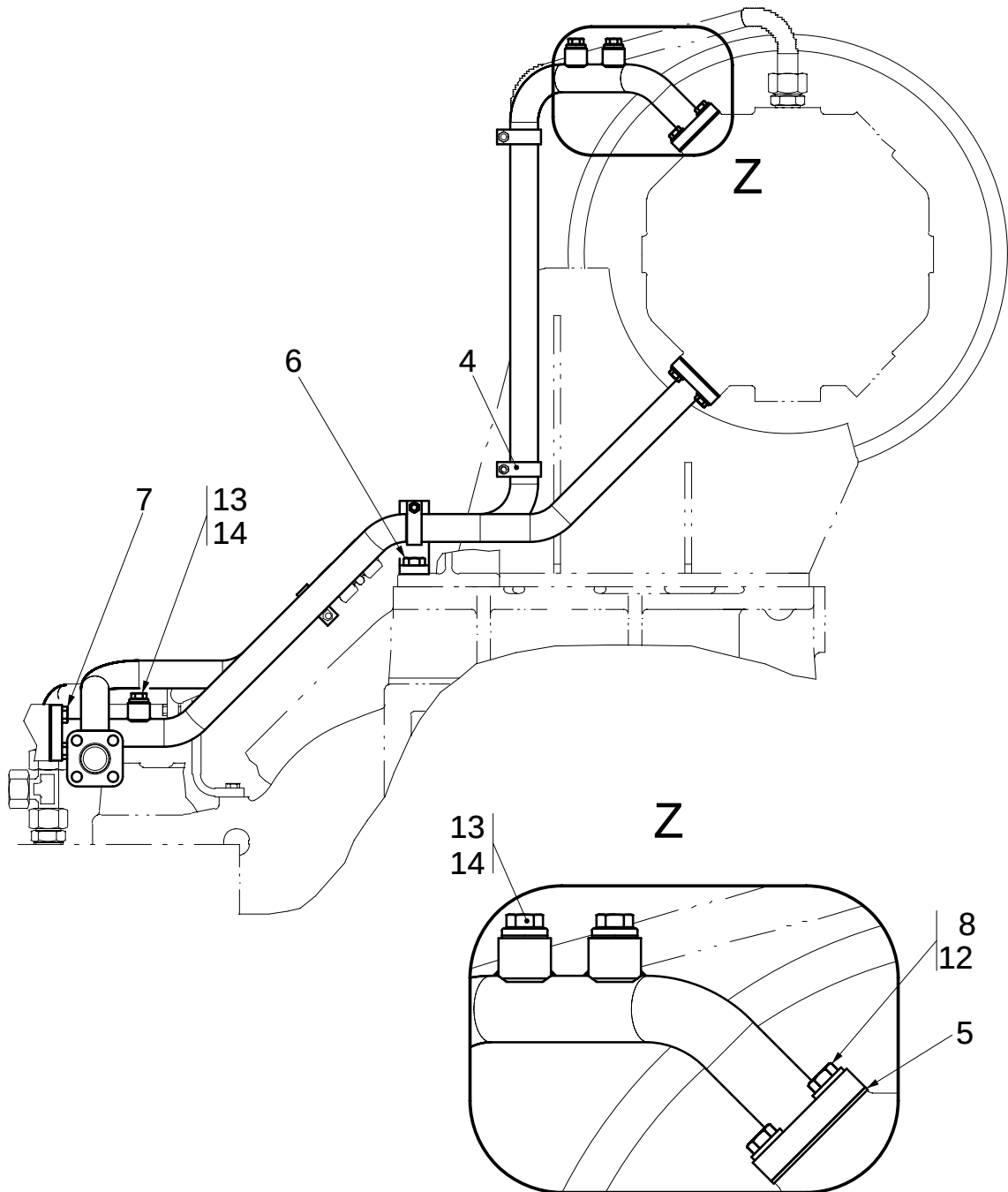


Cooling Water Pipe for Turbocharger

M25

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Cooling Water Pipe for Turbocharger

M25

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POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258373 CC
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258373-201
3	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258373-003
4	ROHRKLEMME PIPE CLAMP	4	258373-004
5	HALTER BRACKET	1	258373-005
7	ROHRKLEMME PIPE CLAMP	2	1.5011-063
8	DICHTUNG GASKET	# 4	1.7073-723
9	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-342
11	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-348
12	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-377
13	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-379
15	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-244
16	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-246
17	SECHSKANTMUTTER HEXAGON NUT	3	1.2007-034
19	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-036
21	SPANNSCHEIBE CONICAL SPRING WASHER	# 8	1.0068-225
22	SPANNSCHEIBE CONICAL SPRING WASHER	# 1	1.0068-222
23	DICHTRING JOINT RING	# 2	1.7010-133
24	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-609

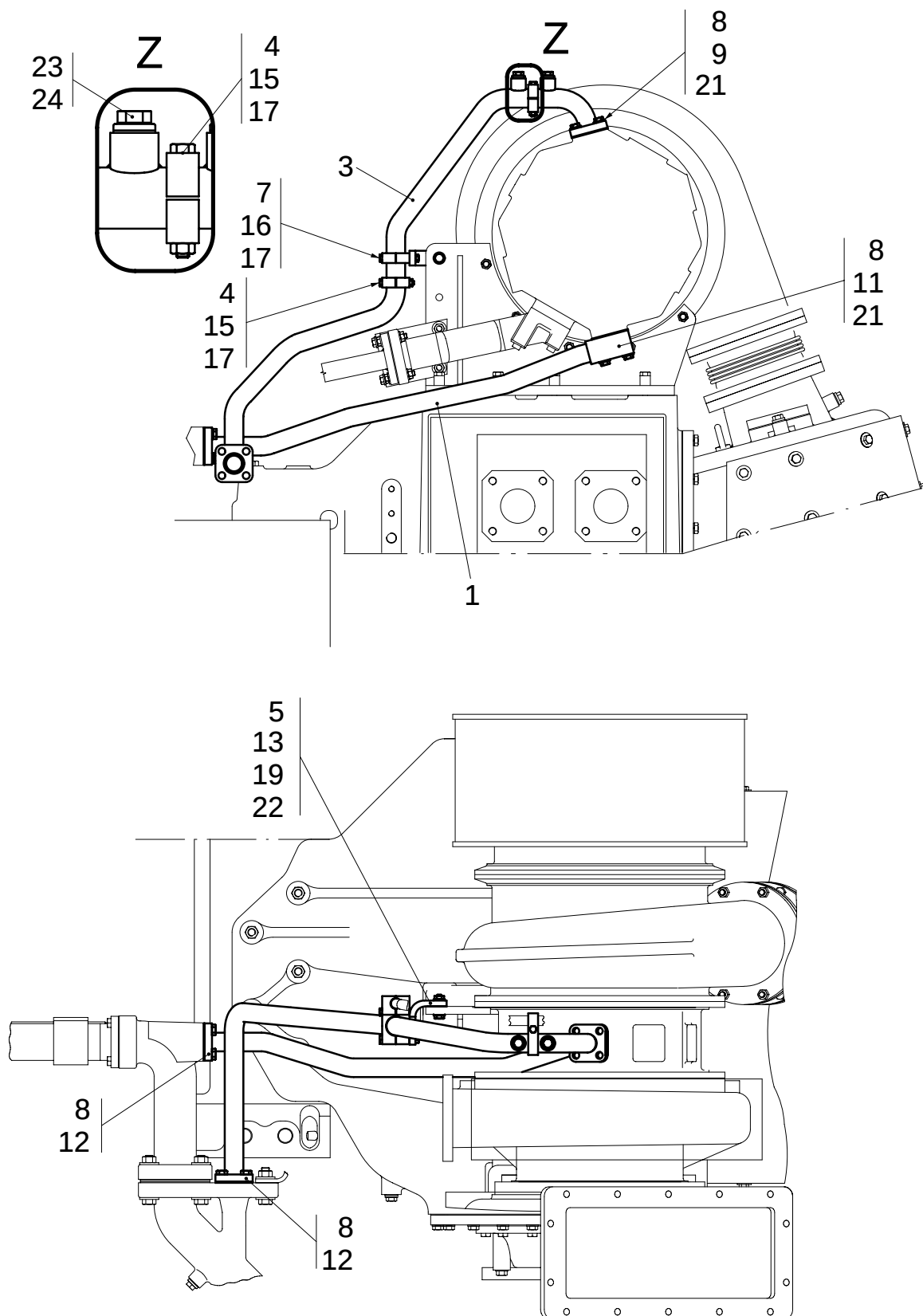
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cooling Water Pipe for Turbocharger

M25

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Cooling Water Pipe for Turbocharger

M25

09

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258377 AA
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258377-001
2	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258377-002
3	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258377-003
4	ROHRKLEMME PIPE CLAMP	4	258377-004
5	HALTER BRACKET	1	258377-005
6	HALTER BRACKET	1	258377-006
7	ROHRKLEMME PIPE CLAMP	4	1.5011-063
8	DICHTUNG GASKET	# 5	1.7073-723
9	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-342
11	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-346
12	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1387-377
13	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-379
15	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-244
16	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-246
17	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
18	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-035
19	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-036
20	FEDERRING SPRING WASHER	# 8	1.0065-213
21	SPANNSCHEIBE CONICAL SPRING WASHER	# 18	1.0068-225

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cooling Water Pipe for Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
22	SPANNSCHEIBE CONICAL SPRING WASHER	# 2	1.0068-222
23	DICHTRING JOINT RING	# 2	1.7010-133
24	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-609

= VERBRAUCHSTEILE
CONSUMABLES

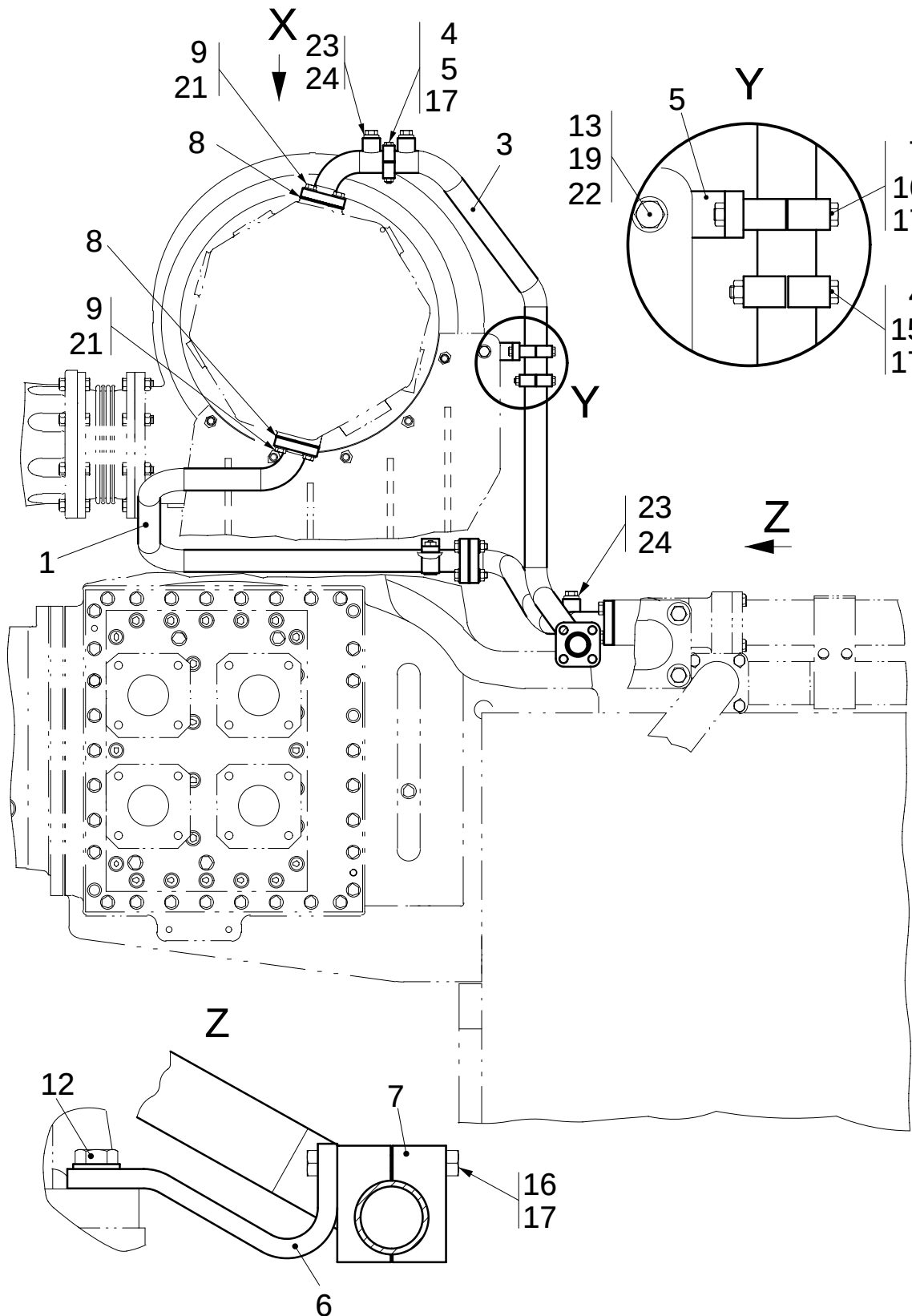
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cooling Water Pipe for Turbocharger

M25

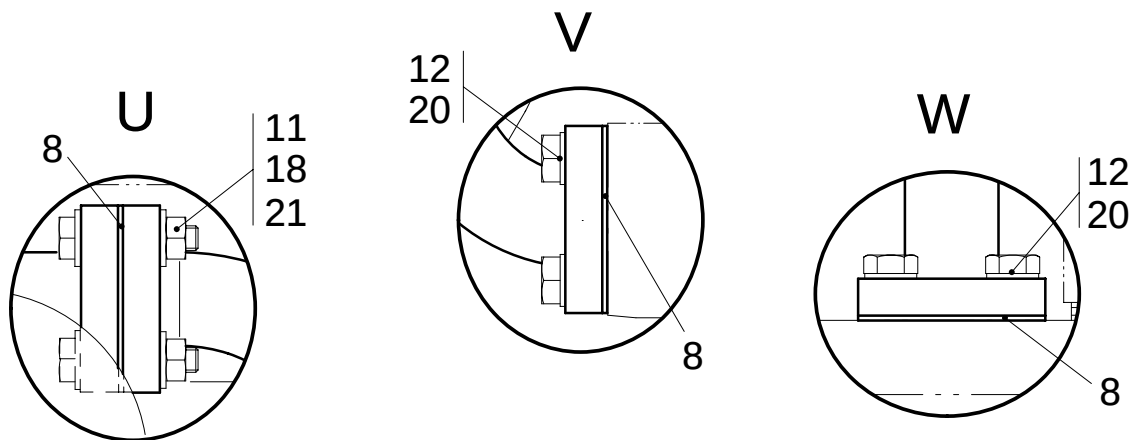
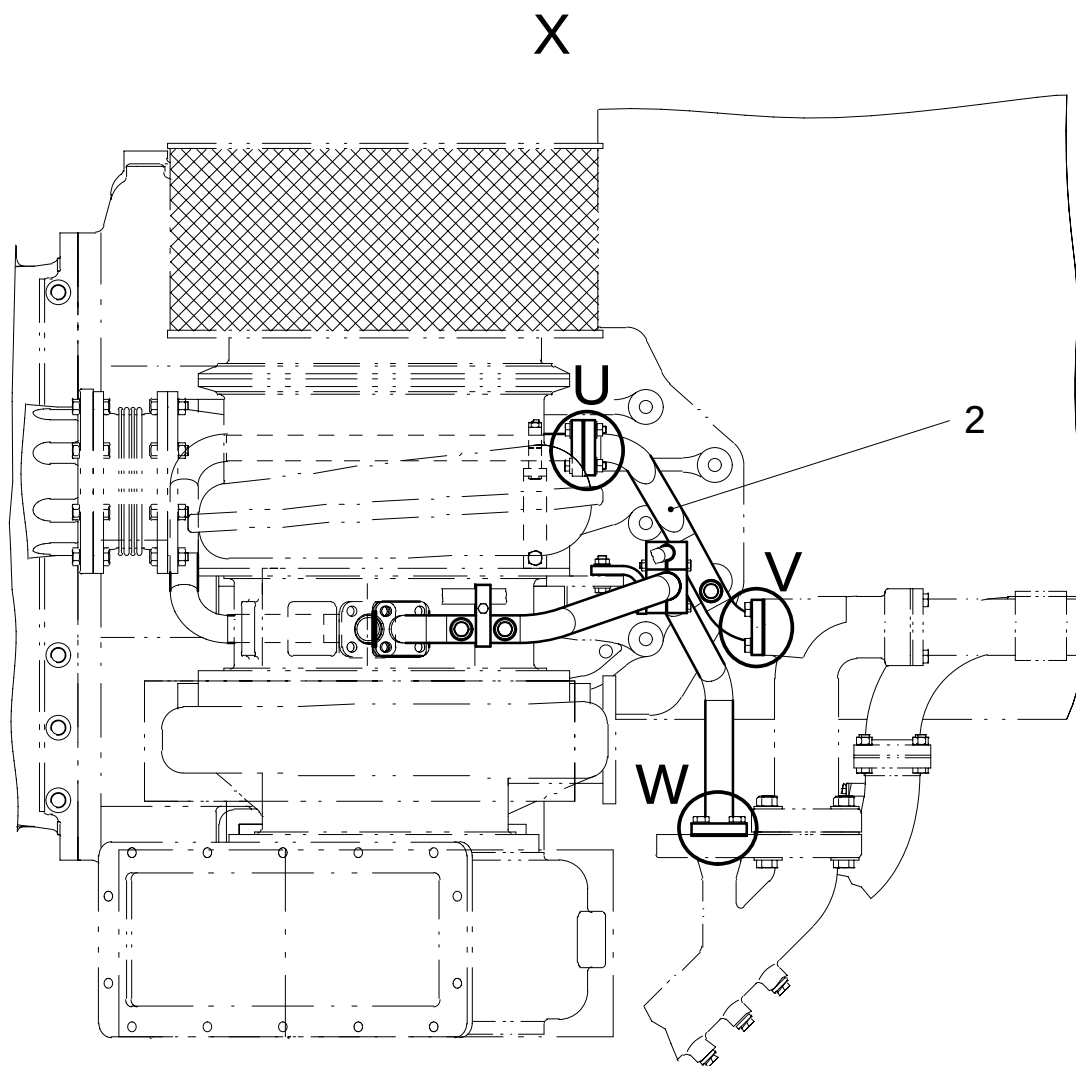
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Cooling Water Pipe for Turbocharger

M25

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Cooling Water Pipe for Turbocharger

M25

09

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258377 BB
1	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258377-101
2	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258377-102
6	ROHRKLEMME PIPE CLAMP	2	1.5011-003
7	ROHRKLEMME PIPE CLAMP	2	1.5011-063
8	DICHTUNG GASKET	# 4	1.7073-723
10	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-377
11	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-342
15	SPANNSCHEIBE CONICAL SPRING WASHER	# 8	1.0068-225
16	DICHTRING JOINT RING	# 3	1.7010-133
17	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-609
18	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-679
19	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-239
20	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-309

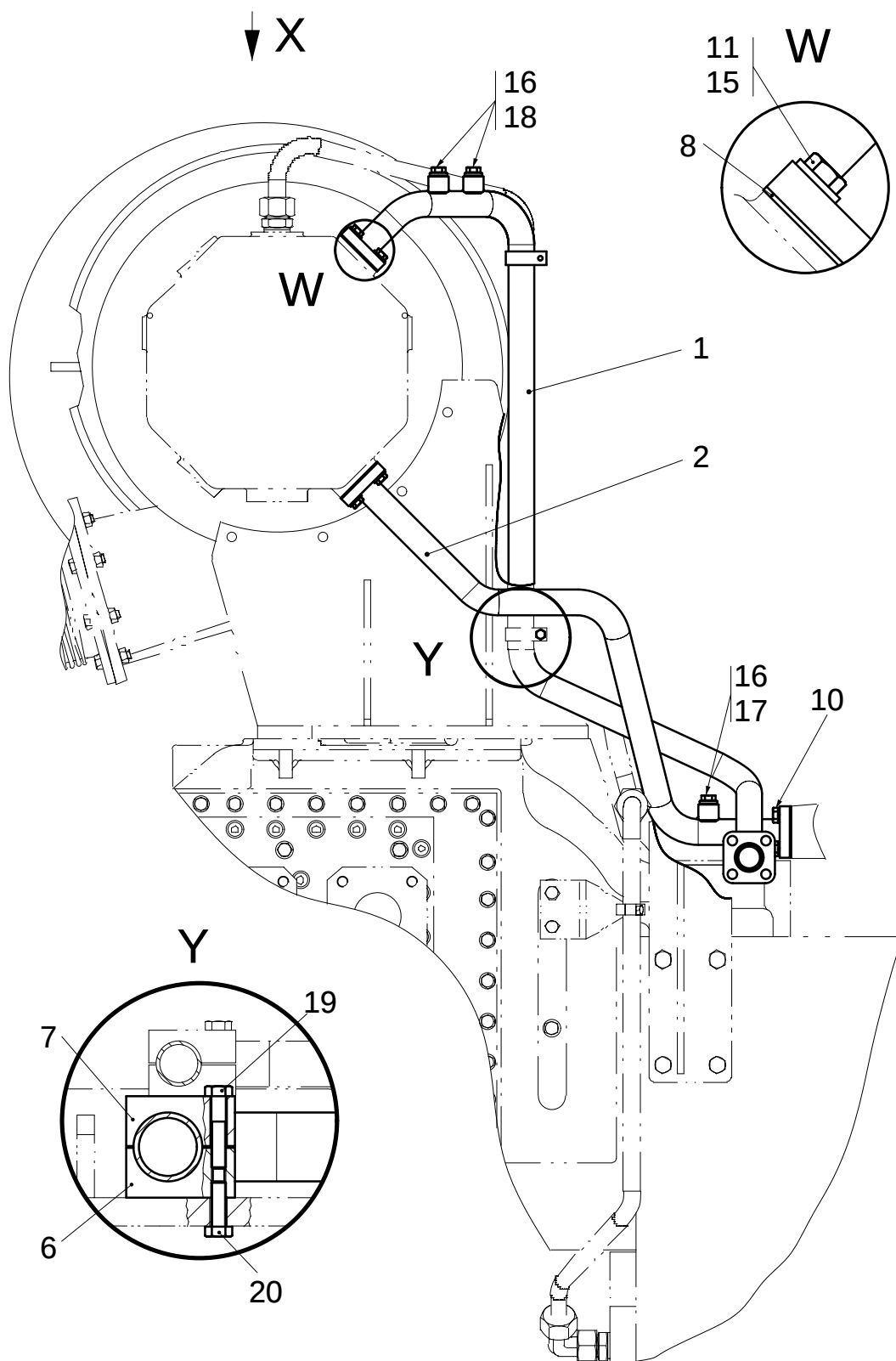
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cooling Water Pipe for Turbocharger

M25

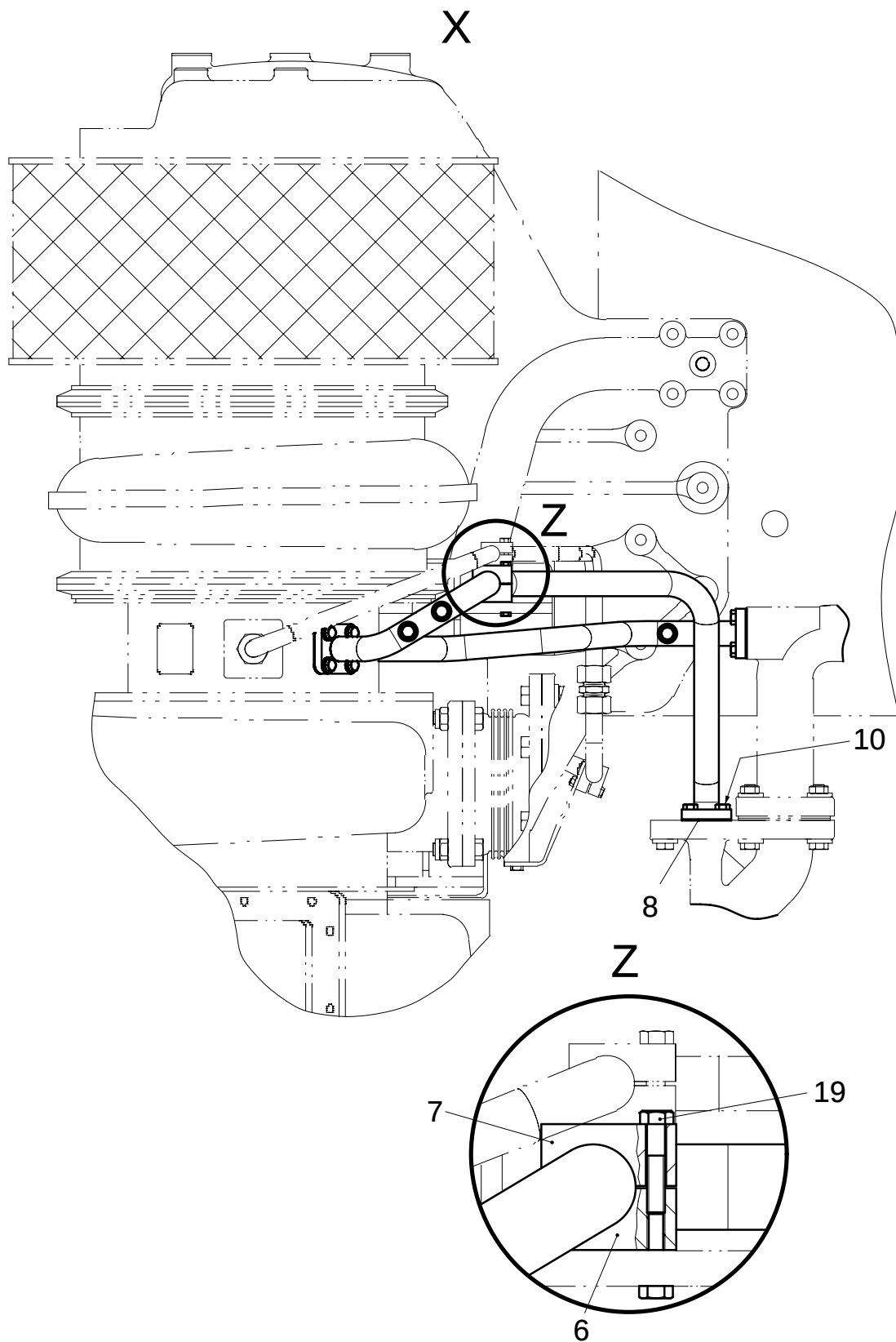
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Cooling Water Pipe for Turbocharger

M25

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Cooling Water Pipe for Turbocharger

M25

09

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE ASSEMBLY	1	258377 CC
1	KÜHLWASSERLEITUNG,VOLLST. COOLING WATER PIPE, COMPL.	1	258377-201
3	KÜHLWASSERLEITUNG, VOLLST. COOLING WATER PIPE, COMPL.	1	258377-203
4	ROHRKLEMME PIPE CLAMP	4	258377-004
5	HALTER BRACKET	1	258377-005
7	ROHRKLEMME PIPE CLAMP	2	1.5011-063
8	DICHTUNG GASKET	# 4	1.7073-723
9	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-342
11	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-348
12	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-377
13	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-379
15	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-244
16	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-246
17	SECHSKANTMUTTER HEXAGON NUT	3	1.2007-034
19	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-036
21	SPANNSCHEIBE CONICAL SPRING WASHER	# 8	1.0068-225
22	SPANNSCHEIBE CONICAL SPRING WASHER	# 1	1.0068-222
23	DICHTRING JOINT RING	# 2	1.7010-133
24	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	2	1.1041-609

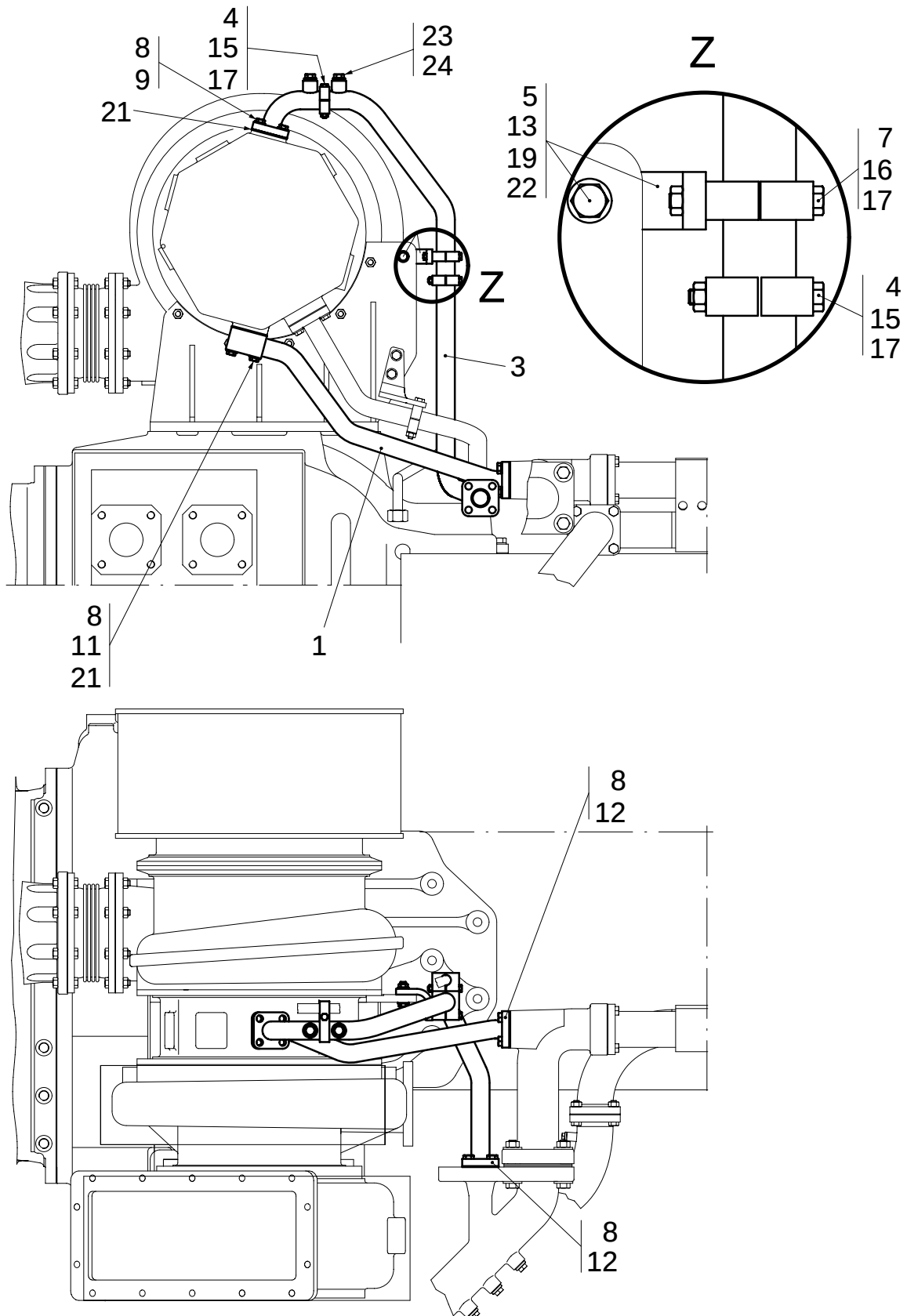
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Cooling Water Pipe for Turbocharger

M25

09



Cooling Water Thermometer Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR. PART NO.
-	THERMOMETER-ANBAU, VOLLST. THERMOMETER MOUNTING ASSEMBLY	1	258382 AA
1	THERMOMETER THERMOMETER	1	2.8382-001
3	STUTZEN SOCKET	1	258382-003
5	DICHTRING JOINT RING	# 1	1.7010-273
6	DICHTRING JOINT RING	# 1	1.7010-133

= VERBRAUCHSTEILE
CONSUMABLES

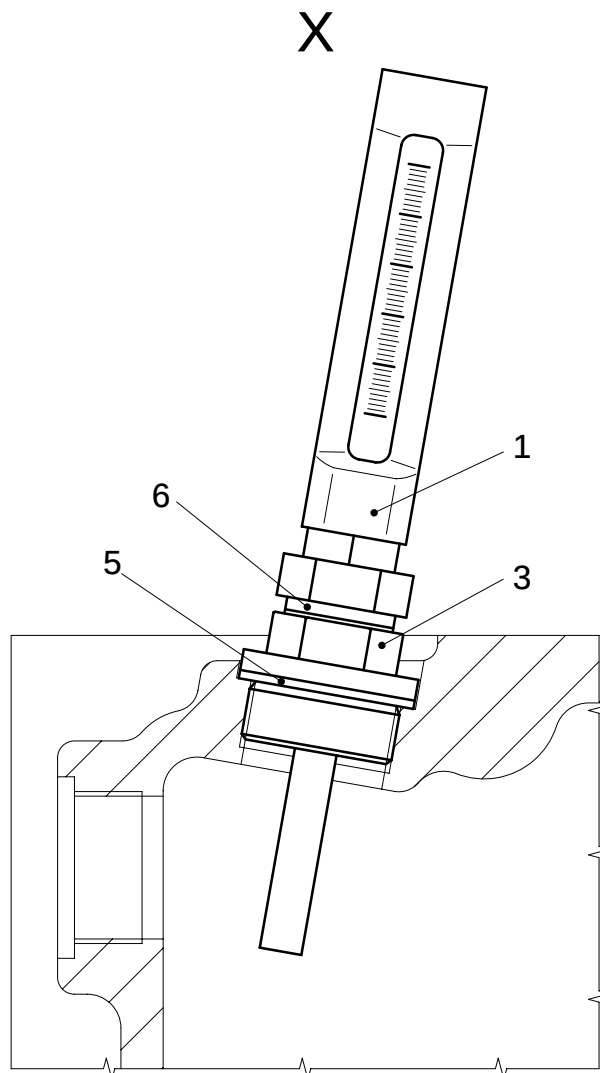
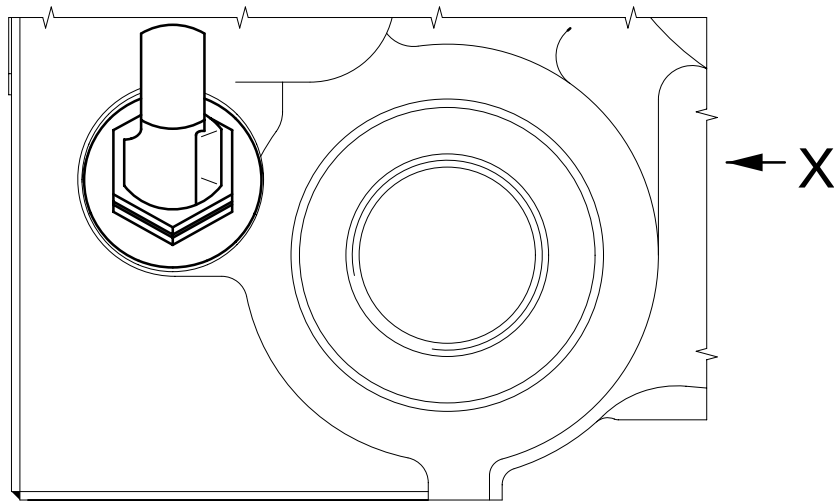
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Cooling Water Thermometer Mounting

M25

09



Draining for Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ENTWÄSSERUNG, VOLLST. DRAINING FOR TURBOCHARGER ASSEMBLY	1	258395 AA
2	HALTER BRACKET	1	258395-002
4	DICHTUNG GASKET	# 1	1.7073-723
5	SPANNSCHEIBE CONICAL SPRING WASHER	# 4	1.0068-225
6	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-342
7	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-378
8	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-279
9	SCHEIBE WASHER	2	1.0040-223
10	ROHRKLEMME PIPE CLAMP	2	1.5011-035
12	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-316
13	SCHEIBE WASHER	2	1.0040-222
14	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034
15	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-035
16	ROHRKLEMME PIPE CLAMP	2	1.5011-014
100	ENTWÄSSERUNGSLEITUNG, VOLLST. DRAIN PIPE, COMPL.	* 1	258396-100
102	ROHRLEITUNG, VOLLST. PIPE, COMPL.	1	258396-102
104	ROHRLEITUNG, VOLLST. PIPE, COMPL.	1	258396-104
106	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-811

09

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Draining for Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
107	DICHTRING JOINT RING	# 1	1.7010-218
110	HAHN TAP	1	1.3009-197

* = ENTHALTEN IN 258395 AA
INCLUDED IN 258395 AA

= VERBRAUCHSTEILE
CONSUMABLES

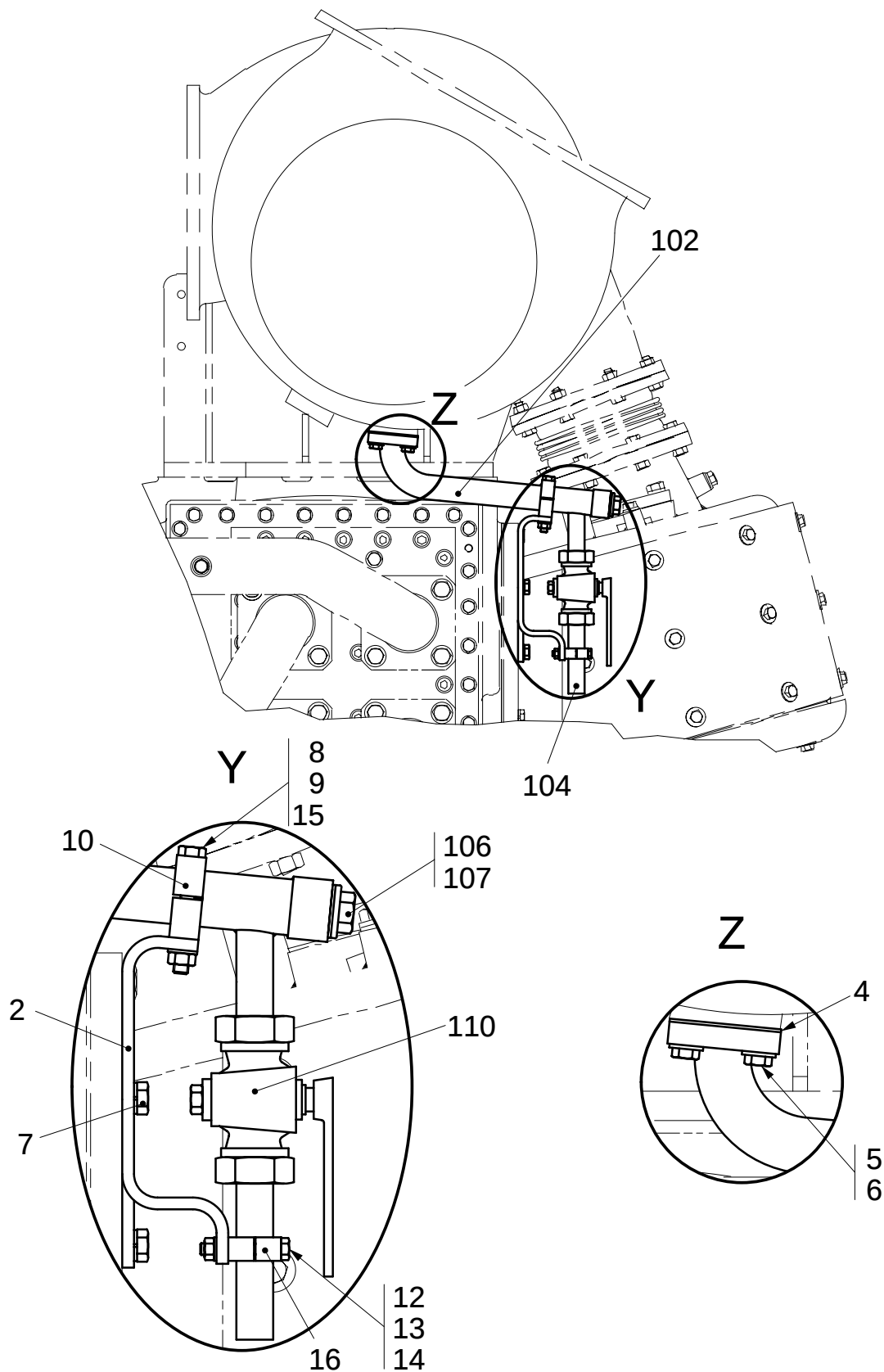
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Draining for Turbocharger

M25

09



Draining for Turbocharger

M25

09

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ENTWÄSSERUNG, VOLLST. DRAINING FOR TURBOCHARGER ASSEMBLY	1	258395 BB
2	HALTER BRACKET	1	258395-102
4	DICHTUNG GASKET	# 1	1.7073-723
5	SPANNSCHEIBE CONICAL SPRING WASHER	# 4	1.0068-225
6	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-342
7	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-378
8	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-279
9	SCHEIBE WASHER	2	1.0040-223
10	ROHRKLEMME PIPE CLAMP	2	1.5011-035
12	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-316
13	SCHEIBE WASHER	2	1.0040-222
14	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034
15	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-035
16	ROHRKLEMME PIPE CLAMP	2	1.5011-014
100	ENTWÄSSERUNGSLEITUNG, VOLLST. DRAIN PIPE, COMPL.	* 1	258396-200
102	ROHRLEITUNG, VOLLST. PIPE, COMPL.	1	258396-202
104	ROHRLEITUNG, VOLLST. PIPE, COMPL.	1	258396-204
106	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-811

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Draining for Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
107	DICHTRING JOINT RING	# 1	1.7010-218
110	HAHN TAP	1	1.3009-197

* = ENTHALTEN IN 258395 BB
INCLUDED IN 258395 BB

= VERBRAUCHSTEILE
CONSUMABLES

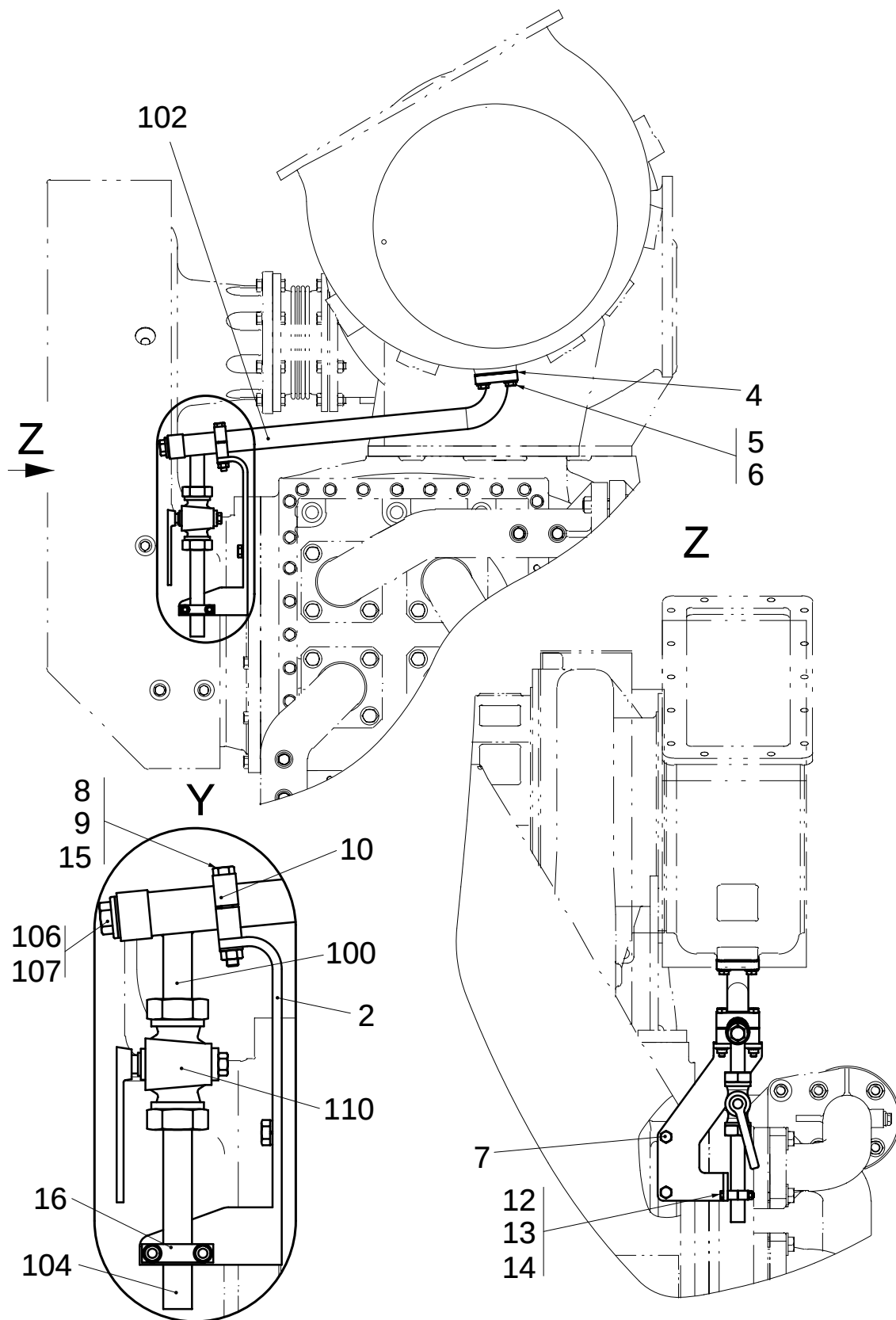
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Draining for Turbocharger

M25

09



Draining for Turbocharger

M25

09

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ENTWÄSSERUNG, VOLLST. DRAINING FOR TURBOCHARGER ASSEMBLY	1	258395 CC
2	HALTER BRACKET	1	258395-202
3	ROHRKLEMME PIPE CLAMP	2	1.5011-014
4	DICHTUNG GASKET	# 1	1.7073-723
5	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-343
6	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-345
7	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1387-316
8	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034
9	SCHEIBE WASHER	2	1.0040-222
10	SCHEIBE WASHER	4	1.0040-223
100	ENTWÄSSERUNGSLEITUNG, VOLLST. DRAIN PIPE, COMPL.	* 1	258396-300
102	ROHRLEITUNG, VOLLST. PIPE, COMPL.	1	258396-302
103	ROHRLEITUNG, VOLLST. PIPE, COMPL.	1	258396-303
104	HAHN TAP	1	1.3009-197

* = ENTHALTEN IN 258395 CC
INCLUDED IN 258395 CC

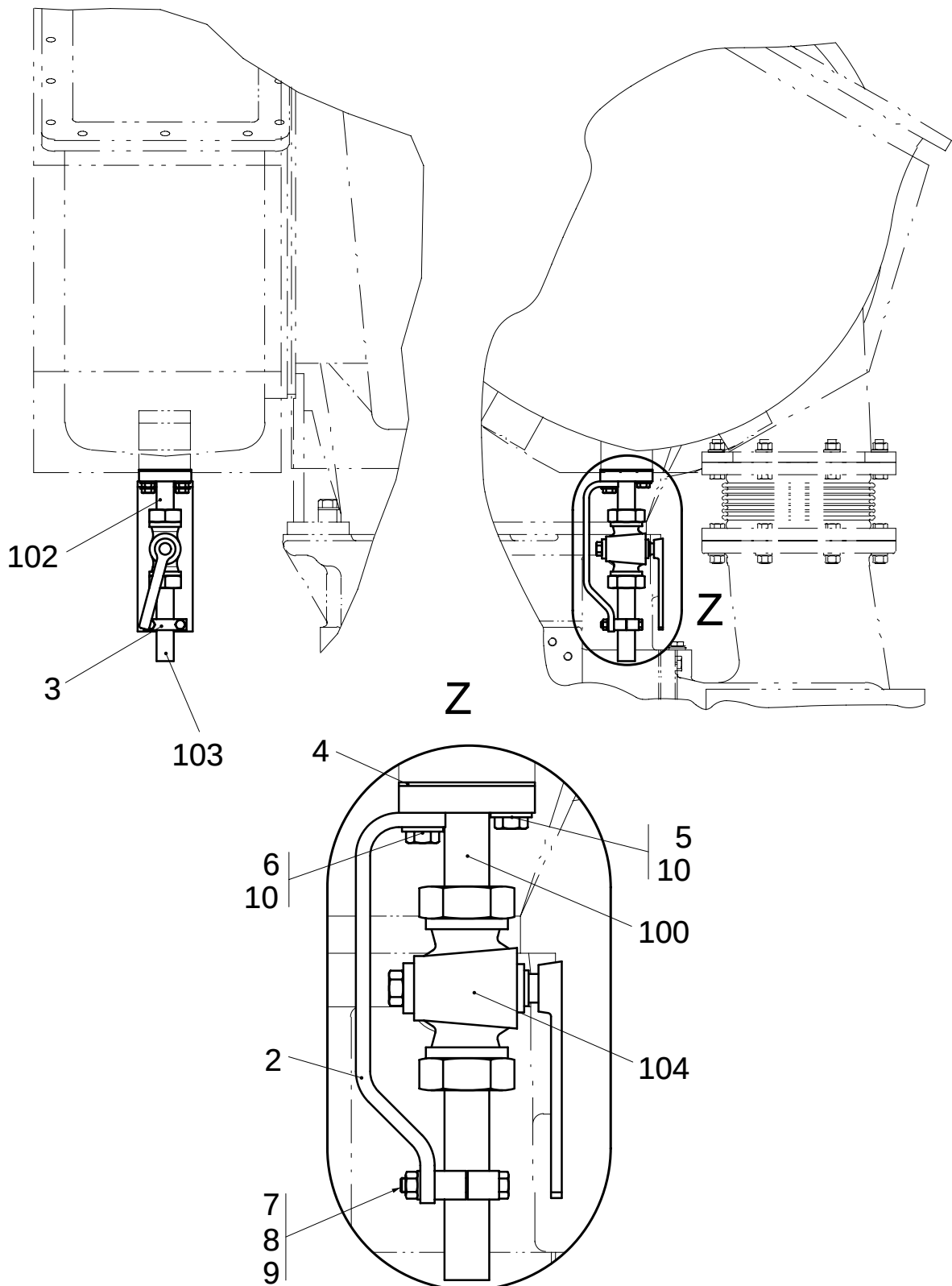
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Draining for Turbocharger

M25

09



Draining for Turbocharger

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ENTWÄSSERUNG, VOLLST. DRAINING FOR TURBOCHARGER ASSEMBLY	1	258395 DD
2	HALTER BRACKET	1	258395-202
3	ROHRKLEMME PIPE CLAMP	2	1.5011-014
4	DICHTUNG GASKET	# 1	1.7073-723
5	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-343
6	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-345
7	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1387-316
8	SECHSKANTMUTTER HEXAGON NUT	2	1.2007-034
9	SCHEIBE WASHER	2	1.0040-222
10	SCHEIBE WASHER	4	1.0040-223
100	ENTWÄSSERUNGSLEITUNG, VOLLST. DRAIN PIPE, COMPL.	* 1	258396-300
102	ROHRLEITUNG, VOLLST. PIPE, COMPL.	1	258396-302
103	ROHRLEITUNG, VOLLST. PIPE, COMPL.	1	258396-303
104	HAHN TAP	1	1.3009-197

* = ENTHALTEN IN 258395 DD
INCLUDED IN 258395 DD

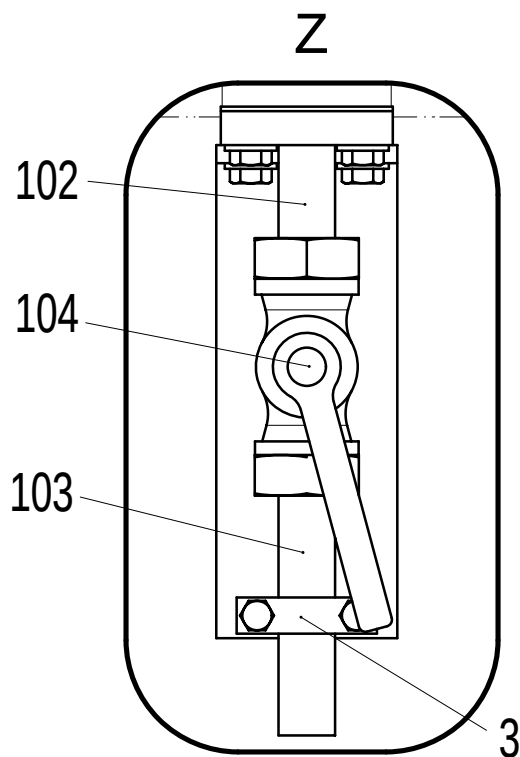
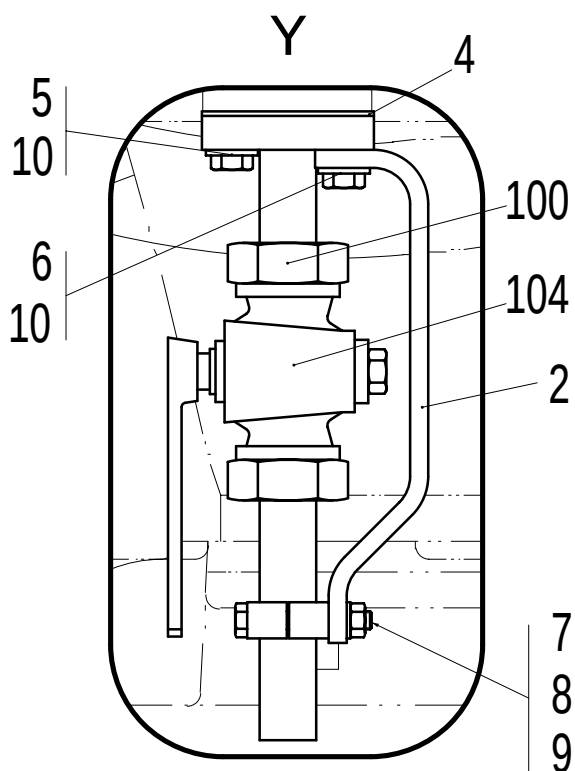
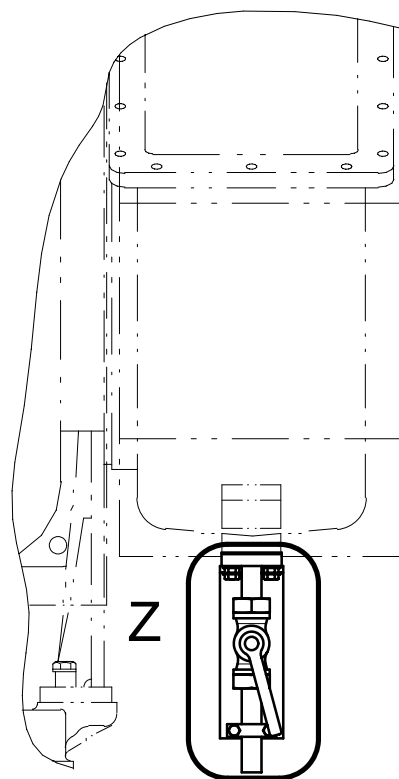
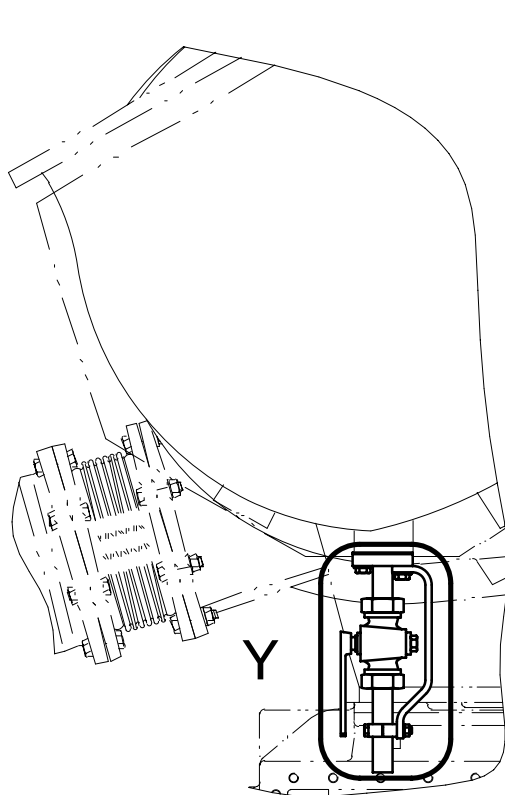
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Draining for Turbocharger

M25

09



Valve Head for Air Bottle

M20-M601C

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.	
10.0	VENTILKOPF, VOLLST. VALVE HEAD ASSEMBLY	1	1.7897 AA		
10.0-2	VENTILEINSATZ, VOLLST. VALVE INSERT ASSEMBLY	1	1.7897-2		
10.0-3	VENTILSITZ, VOLLST. VALVE SEAT	1	1.7897-3		
10.0-4	VENTILEINSATZ, VOLLST. VALVE INSERT ASSEMBLY	1	1.7897-4		
10.0-5	VENTILSITZ, VOLLST. VALVE SEAT	1	1.7897-5		
10.0-6	VENTIL, VOLLST. VALVE ASSEMBLY	2	1.7897-6		
10.0-7	SICHERHEITSVENTIL, VOLLST. RELIEF VALVE ASSEMBLY	1	1.8660-106		
10.0-8	VERSCHLUSSSCHRAUBE SCREW PLUG	* 2	R1/2"	DIN910	
10.0-9	VENTIL, VOLLST. VALVE ASSEMBLY	1	1.7897-9		
10.0-10	DICHTRING JOINT RING	# 4	A21X26	DIN7603	CU
10.0-11	ÜBERWURFMUTTER UNION PLUG	1	AL 12	DIN3871	ST-A2C
10.0-12	SCHNEIDRING CUTTING RING	1	L12	DIN3861	ST-A2C
10.0-13	STIFTSCHRAUBE STUD	2	M20X2X55	DIN939	5.6
10.0-14	SECHSKANTMUTTER HEXAGON NUT	2	M20X2	DIN934	MG 5
10.0-21	SICHERUNGSBLECH LOCKING PLATE	# 1	1.7897-21		
10.0-22	HALBRUNDSCHRAUBE ROUND HEAD SCREW	1	M6X8	DIN86	4.6
10.0-23	SICHERUNGSBLECH LOCKING PLATE	# 1	1.7897-23		
10.0-24	HALBRUNDSCHRAUBE ROUND HEAD SCREW	1	M5X6	DIN86	4.6
10.0-26	GEWINDEROHR THREADED TUBE	1	R11/2"X160	DIN2440	ST-VERZ.
10.0-27	DICHTRING JOINT RING	# 1	A42X49	DIN7603	CU
10.0-28	DICHTRING JOINT RING	# 1	A65X74	DIN7603	CU

Valve Head for Air Bottle

M20-M601C

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
10.0-33	DICHTRING JOINT RING	# 1	A50X57	DIN7603 CU
10.0-40	DICHTRING JOINT RING	# 1	A105X120X2	DIN7603 IT300
10.0-41	DICHTRING JOINT RING	# 1	A14X18	DIN7603 CU
10.0-42	MANOMETER PRESSURE GAUGE	1	1.7897-42	
1.0-50	DRUCKLUFTBEHÄLTER AIR BOTTLE	1	1.7897-50	

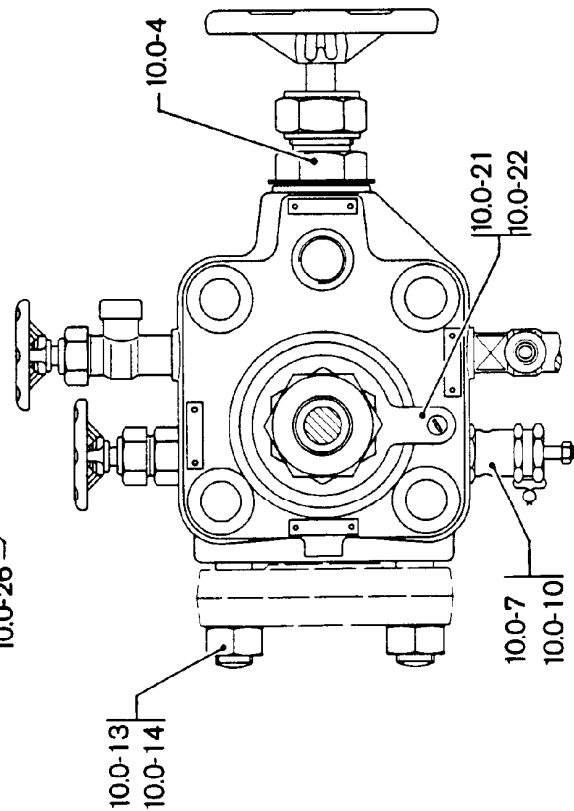
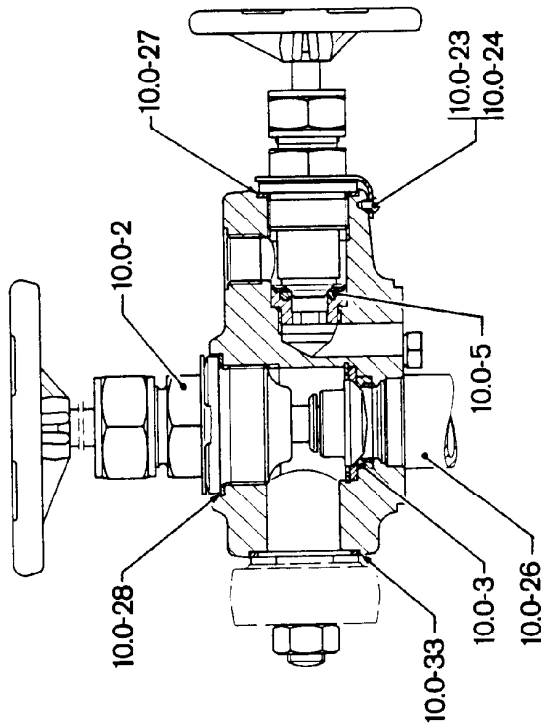
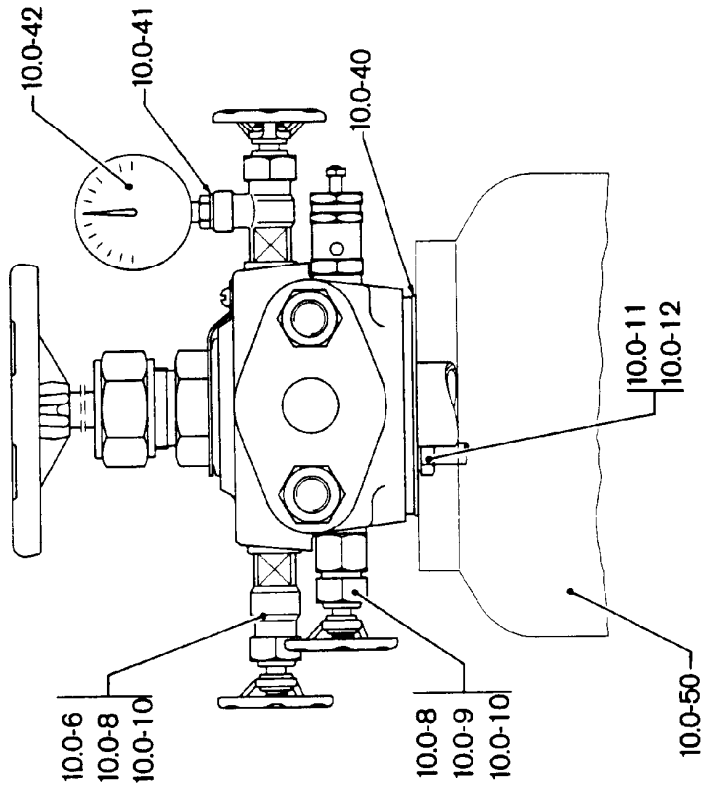
* = ANSTELLE VON POS. 10.0-6 UND 10.0-9
INSTEAD OF ITEM 10.0-6 AND 10.0-9

= VERBRAUCHSTEILE
CONSUMED PARTS

Valve Head for Air Bottle

M20-M601C

10



Air Pipe on Engine

M25

10

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LUFTLTG. F. GRUNDMOTOR, VOLLST. AIR PIPE ON ENGINE ASSEMBLY	1	258610 AA
1	HALTER BRACKET	1	258610-001
2	HALTER BRACKET	1	258610-002
3	LUFTLEITUNG, VOLLST. AIR PIPE, COMPL.	1	258610-003
4	HÜLSE MIT FLAMMSCHUTZ SLEEVE WITH FLAME PROTECTION	1	258610-004
5	HÜLSE SLEEVE	1	251110-020
7	ANFAHRVENTIL, VOLLST. MASTER STARTING VALVE, COMPL.	1	SIEHE B1.05.05.1.4906 SEE B1.05.05.1.4906
8	SICHERHEITSVENTIL, VOLLST. RELIEF VALVE, COMPL.	1	1.8660-106
9	FLANSCH WELDING NECK FLANGE	1	1.5365-137
11	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-381
12	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-380
13	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1372-371
14	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1367-314
15	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-376
16	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-305
17	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-038
19	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-811
20	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-709

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Air Pipe on Engine

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-628
22	SCHEIBE WASHER	2	1.0045-125
23	DICHTUNG GASKET	# 1	1.7073-353
24	DICHTRING JOINT RING	# 2	1.7010-273
25	DICHTRING JOINT RING	# 1	1.7010-218
26	DICHTRING JOINT RING	# 2	1.7033-102
27	DICHTRING JOINT RING	# 1	1.7010-083
28	O-RING O-RING	# 4	1.7084-642

= VERBRAUCHSTEILE
CONSUMABLES

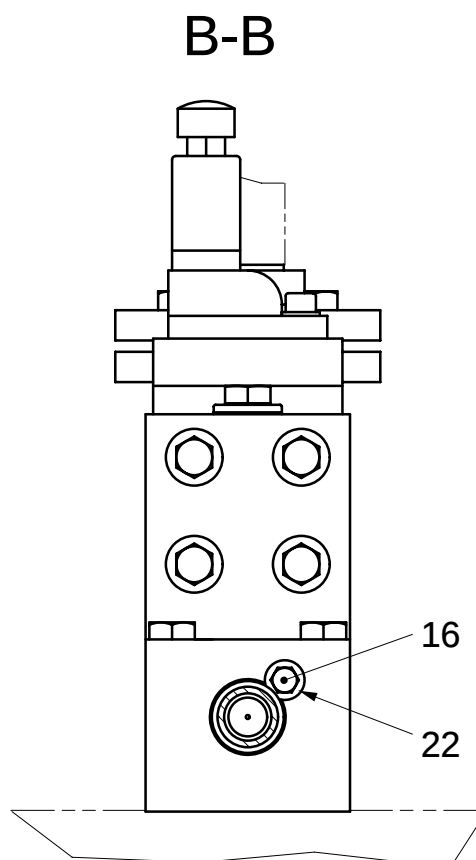
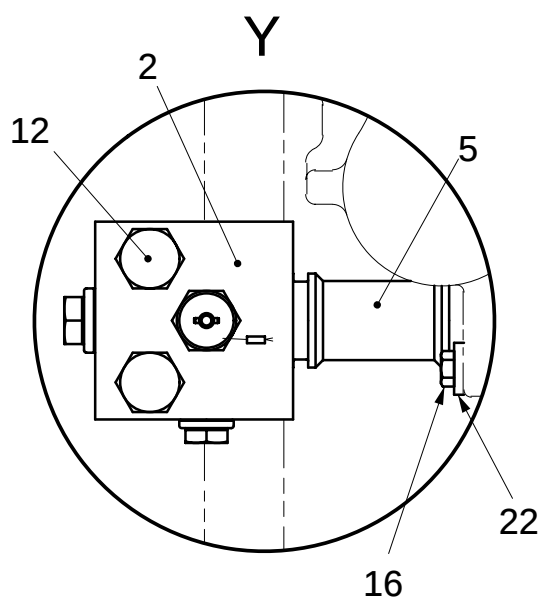
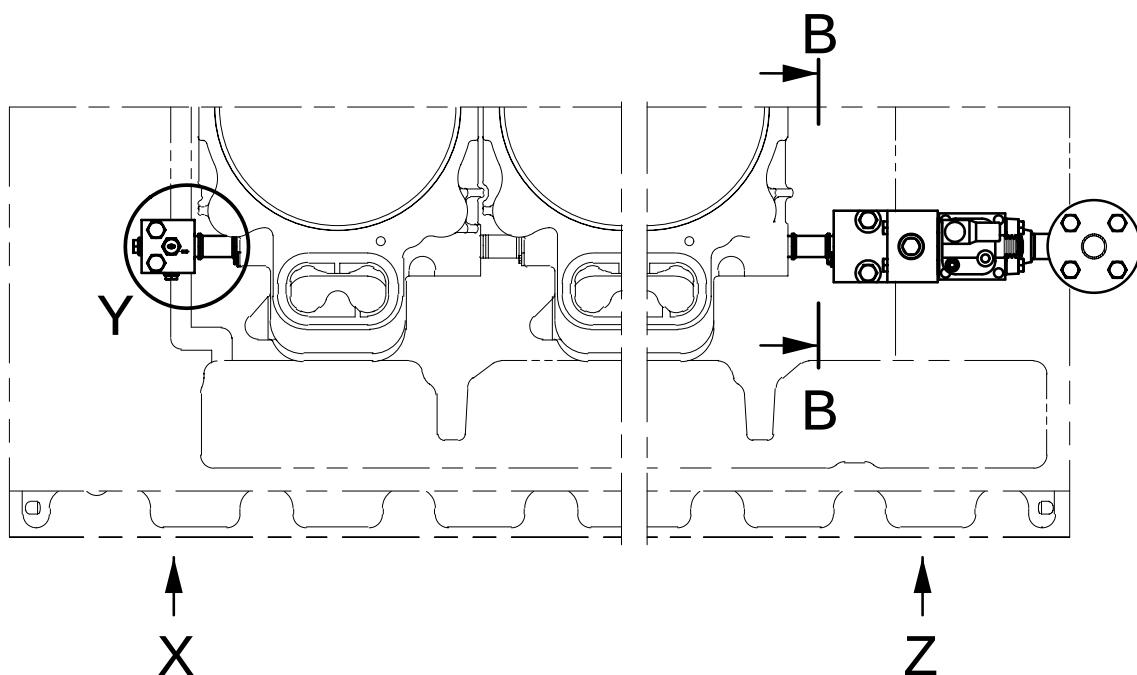
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Air Pipe on Engine

M25

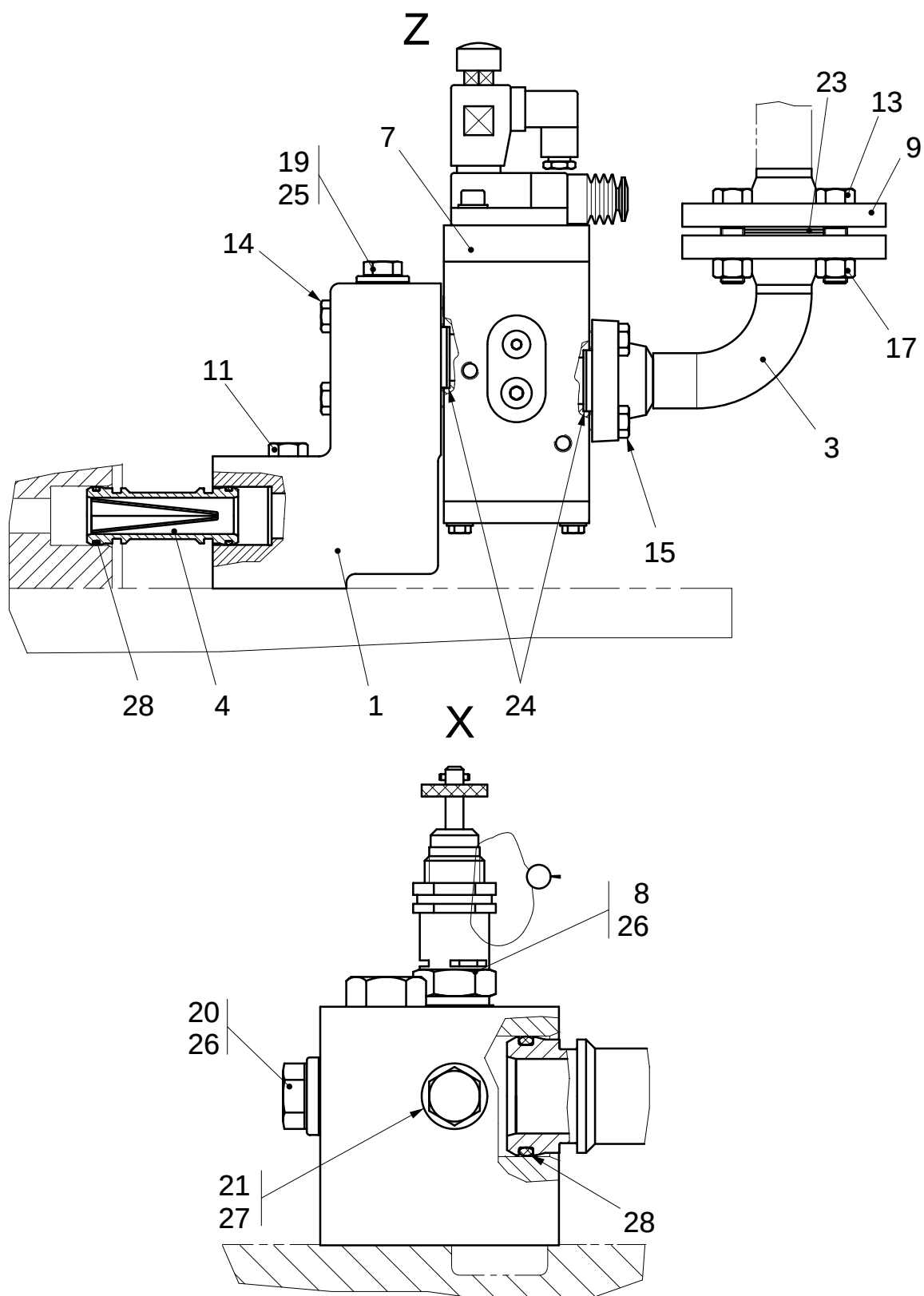
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Air Pipe on Engine

M25

10



Air Pipe on Engine

M25

10

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LUFTLEITUNG FÜR GRUNDMOTOR, VOLLST. AIR PIPE ON ENGINE ASSEMBLY	1	258610 BB
1	HALTER BRACKET	1	258610-002
2	HÜLSE SLEEVE	1	251110-020
3	HÜLSE MIT FLAMMSCHUTZ SLEEVE WITH FLAME PROTECTION	1	258610-103
5	ANFAHRVENTIL, VOLLST. MASTER STARTING VALVE, COMPL.	1	SIEHE B1.05.05.1.4906 SEE B1.05.05.1.4906
6	SICHERHEITSVENTIL, VOLLST. RELIEF VALVE, COMPL.	1	1.8660-106
7	FLANSCH WELDING NECK FLANGE	1	1.6881-006
8	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1372-386
9	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-380
10	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-444
11	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-305
12	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-709
13	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-628
14	SCHEIBE WASHER	2	1.0045-125
15	DICHTUNG GASKET	# 1	1.7073-354
16	DICHTRING JOINT RING	# 2	1.7033-102
17	DICHTRING JOINT RING	# 1	1.7010-083
18	O-RING O-RING	# 4	1.7084-642
19	O-RING O-RING	# 1	1.7084-654

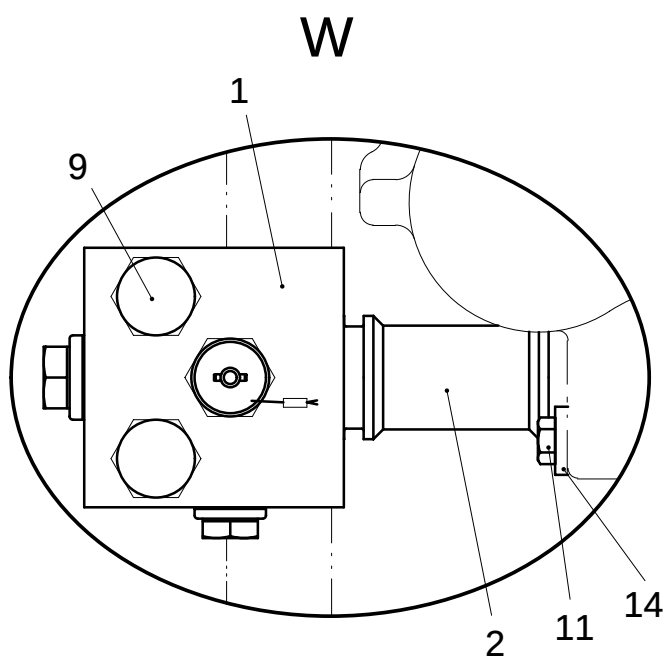
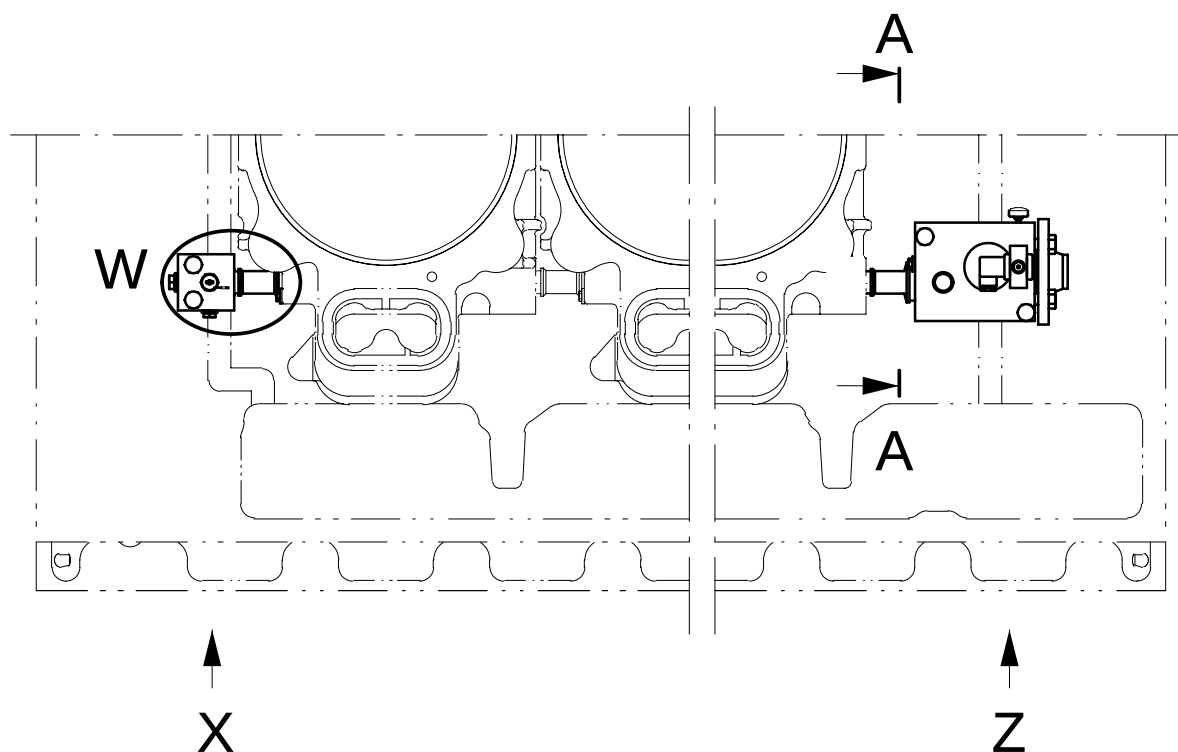
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Air Pipe on Engine

M25

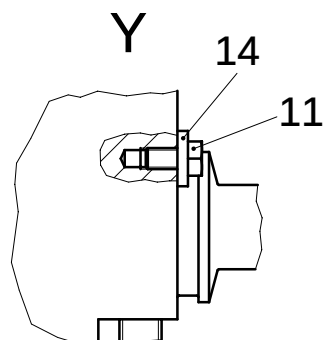
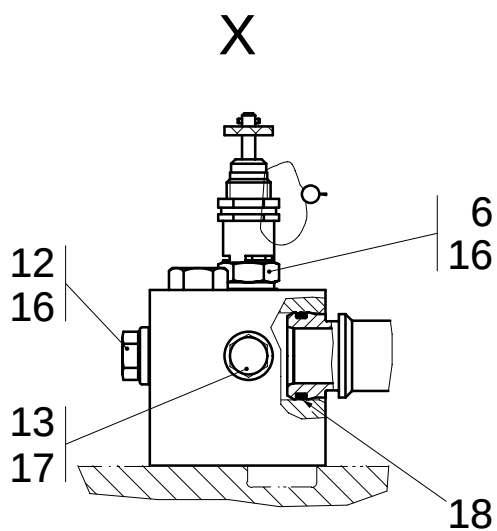
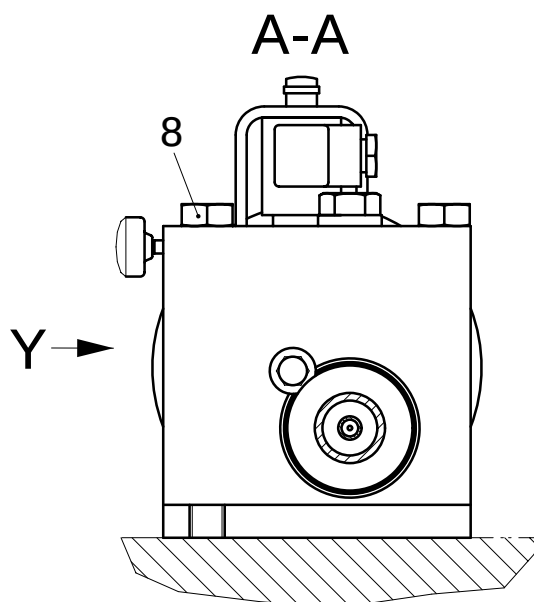
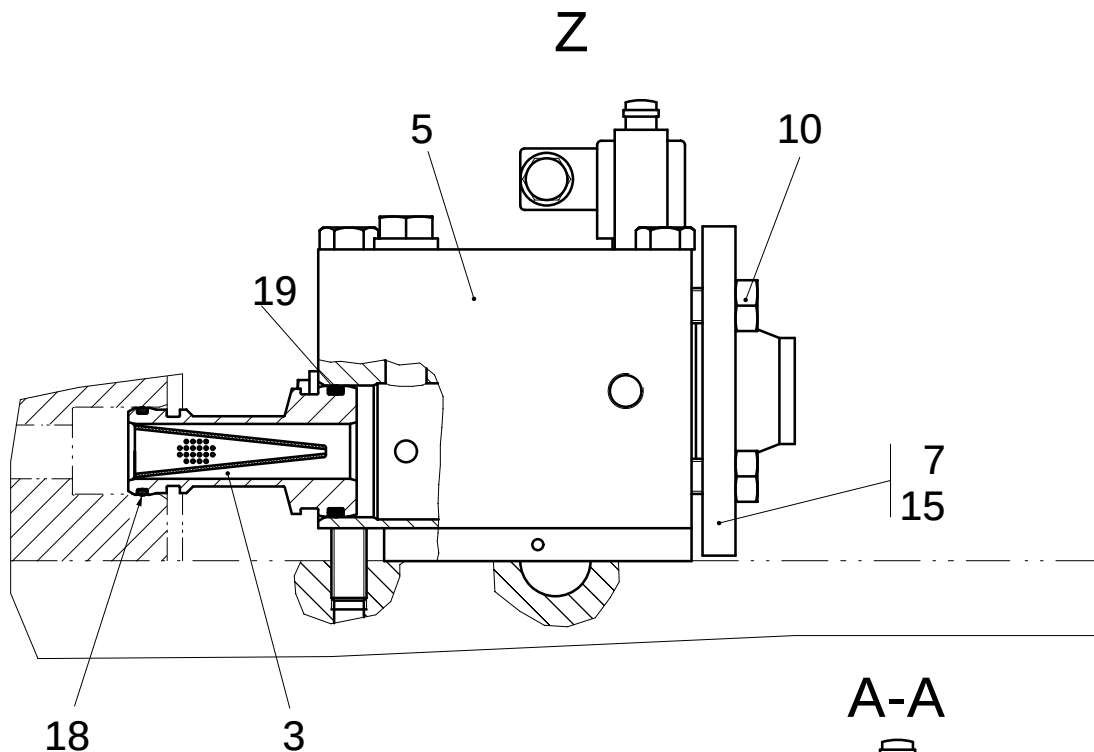
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Air Pipe on Engine

M25

10



Air Admission Pipe

M25

10

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LUFTZUFÜHRLEITUNG, VOLLST. AIR ADMISSION PIPE ASSEMBLY	1	258614 AA
1	ROHR, VOLLST. PIPE, COMPL.	1	258614-001
2	STUTZEN ADJUSTABLE ELBOW	1	1.5093-222
3	STUTZEN PIPE UNION	1	1.5098-014
4	DICHTRING JOINT RING	# 1	1.7010-078

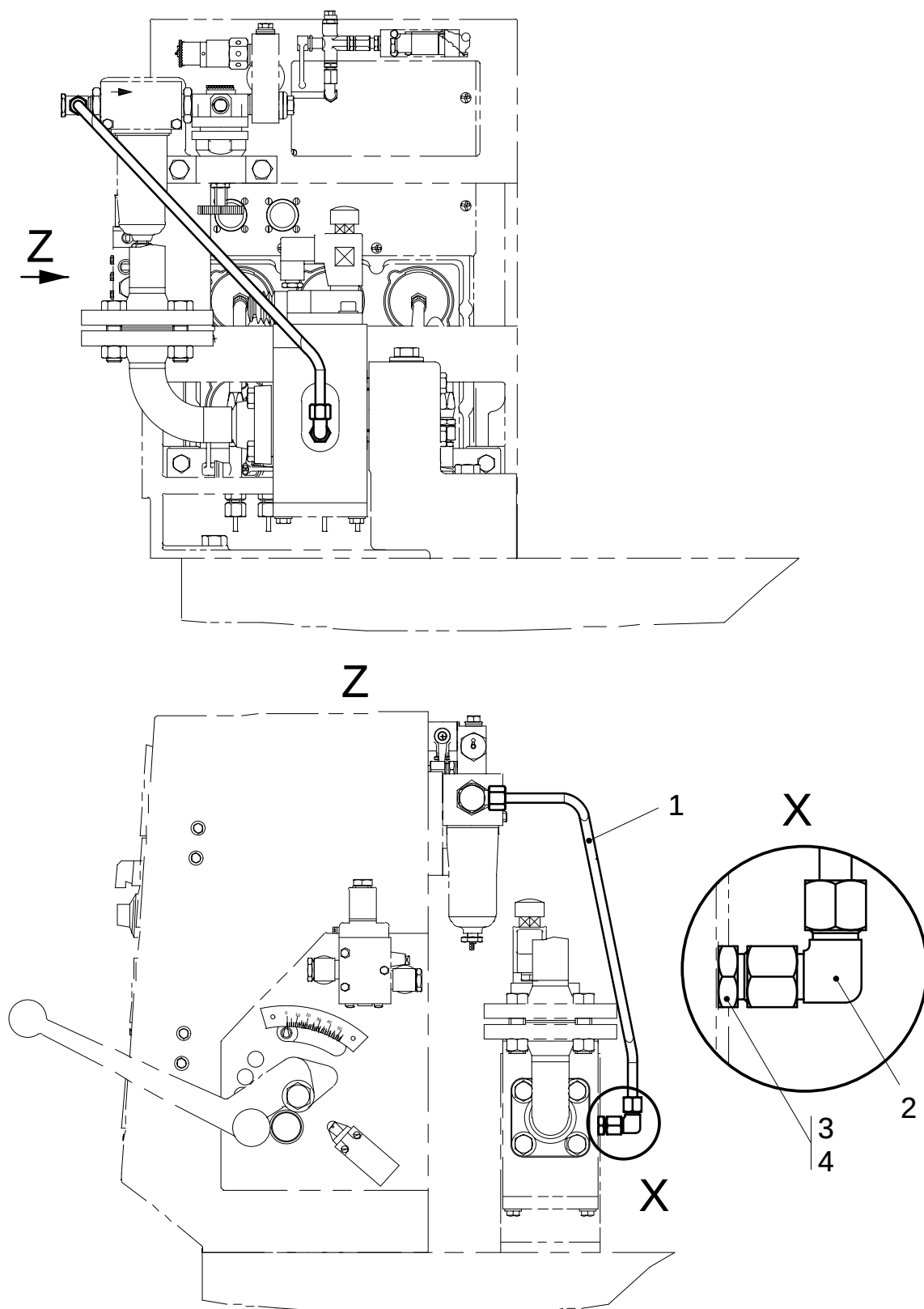
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Air Admission Pipe

M25

10



Air Admission Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	LUFTZUFÜHRLEITUNG, VOLLST. AIR ADMISSION PIPE ASSEMBLY	1	258614 BB
1	ROHR, VOLLST. PIPE, COMPL.	1	258614-101
2	STUTZEN ADJUSTABLE ELBOW	1	1.5093-222
3	STUTZEN PIPE UNION	1	1.5098-014
4	DICHTRING JOINT RING	# 1	1.7010-078

= VERBRAUCHSTEILE
CONSUMABLES

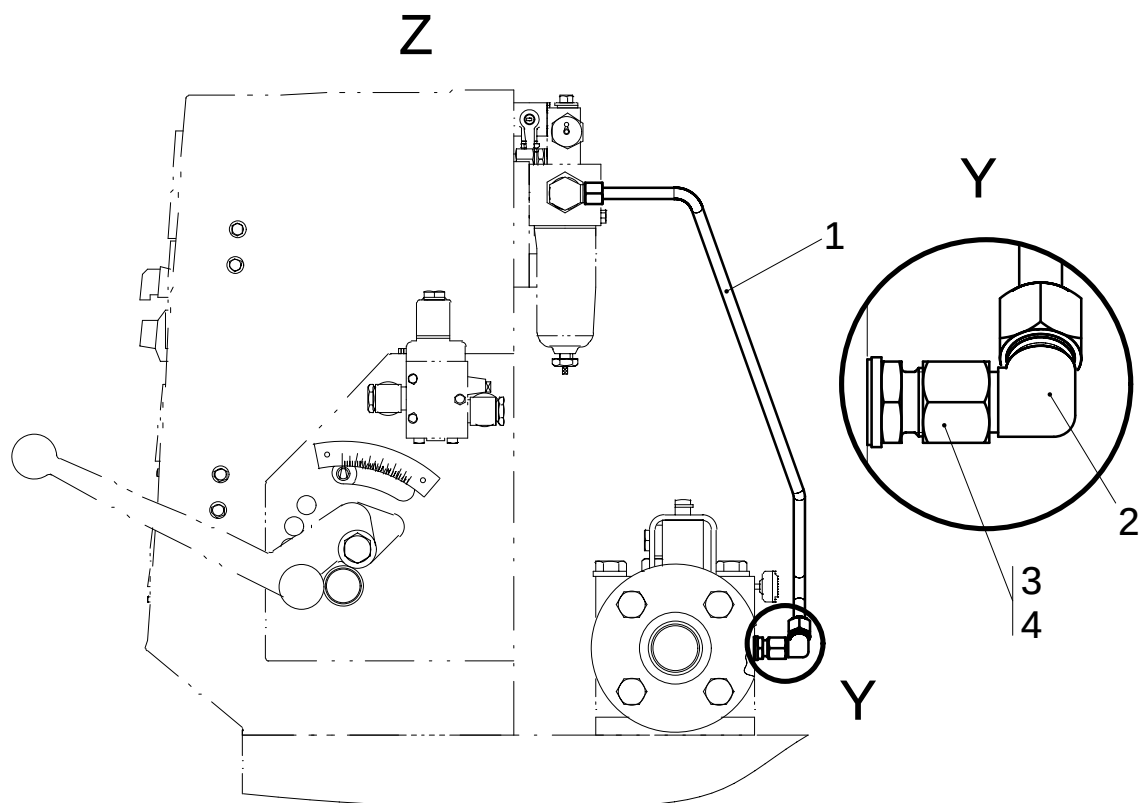
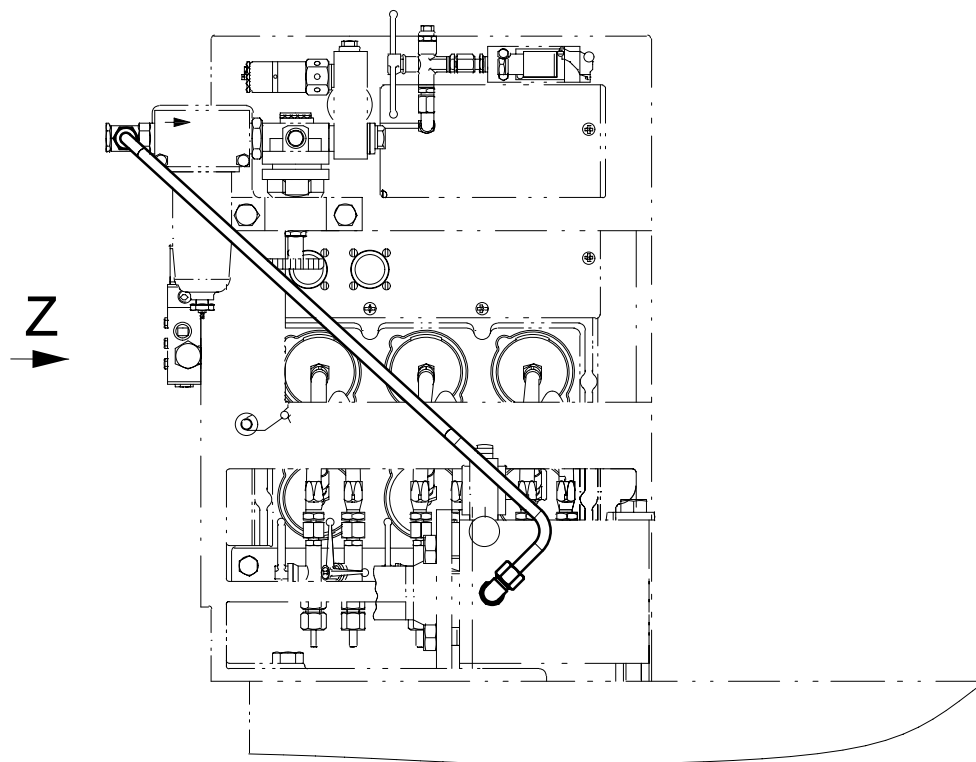
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Air Admission Pipe

M25

10



Control Air Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	STEUERLUFTLEITUNG, ANBAU. CONTROL AIR PIPE ASSEMBLY	1	258617 AA
1	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-001
2	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-002
3	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-003
4	STEUERLUFTLEITUNG CONTROL AIR PIPE	4	258617-004
5	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-005
6	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-006
7	STEUERLUFTLEITUNG CONTROL AIR PIPE	5	258617-007
8	REDUZIERSTUTZEN REDUCER	1	258617-008
9	HALTER BRACKET	1	258617-009
10	DRUCKLUFTFILTER COMPRESSED-AIR FIL TER	1	SIEHE B1.05.05.1.4900 SEE B1.05.05.1.4900
11	RÜCKSCHLAGVENTIL NON RETURN VALVE	6	1.3090-121
12	SCHWENKVERSCHRAUBUNG BANJO	2	1.5093-607
13	STUTZEN PIPE UNION	1	1.5094-242
14	STUTZEN PIPE UNION	6	1.5095-512
15	GEWINDEREDUZIERUNG PIPE UNION	2	1.5036-003
16	STUTZEN PIPE UNION	1	1.5095-072
17	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-543
18	ÜBERWURFMUTTER UNION NUT	1	1.5040-116
19	DICHTRING JOINT RING	# 1	1.7010-218
20	DICHTRING JOINT RING	# 2	1.7010-133

10

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Air Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	DICHTRING JOINT RING	# 3	1.7010-064
22	ROHRKLEMME PIPE CLAM	12	1.5011-002
23	SECHSKANTSCHRAUBE HEXAGON BOLT	6	1.1387-311
24	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-182
25	SCHEIBE WASHER	2	1.0040-220

= VERBRAUCHSTEILE
CONSUMABLES

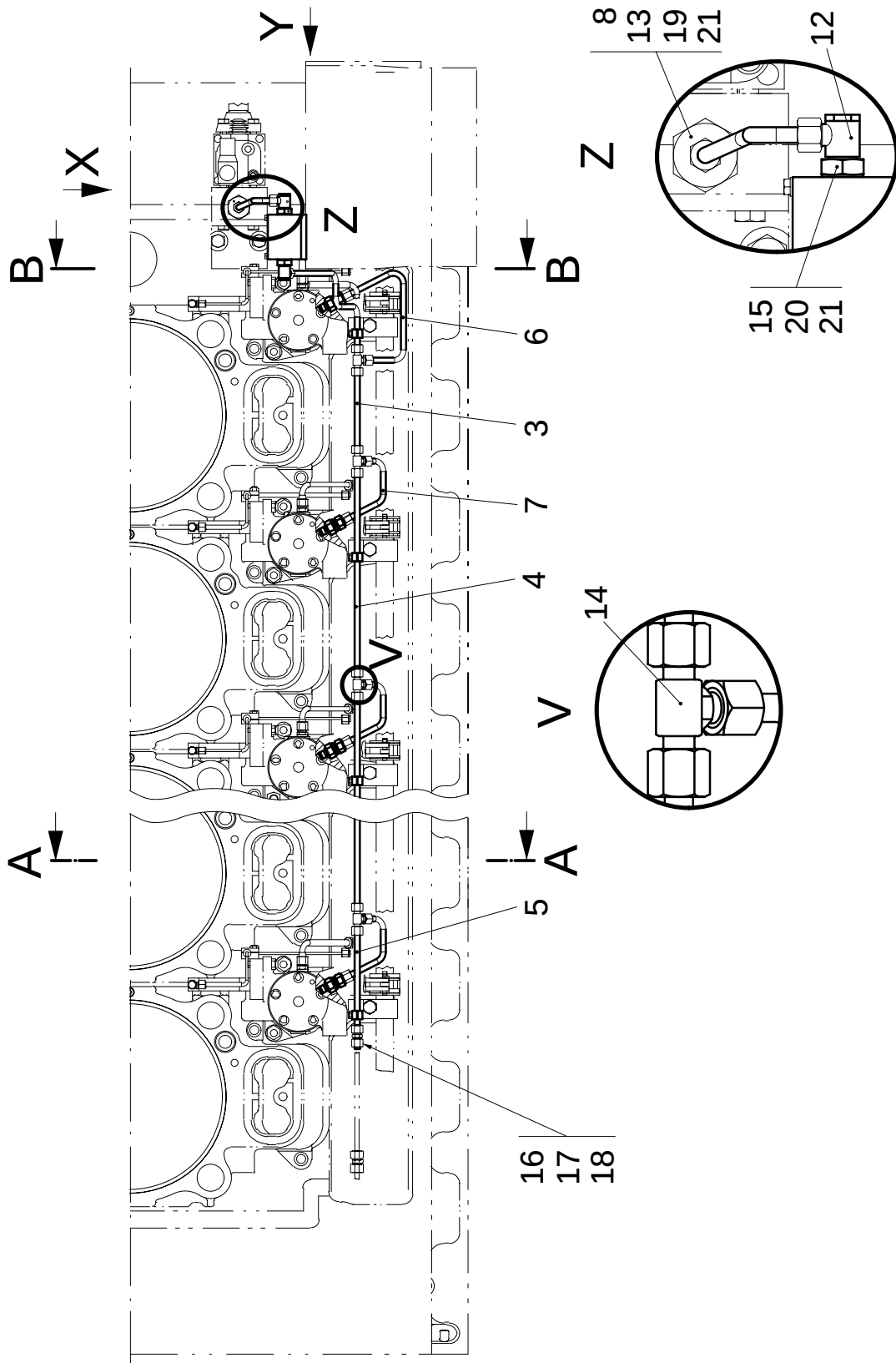
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Air Pipe

M25

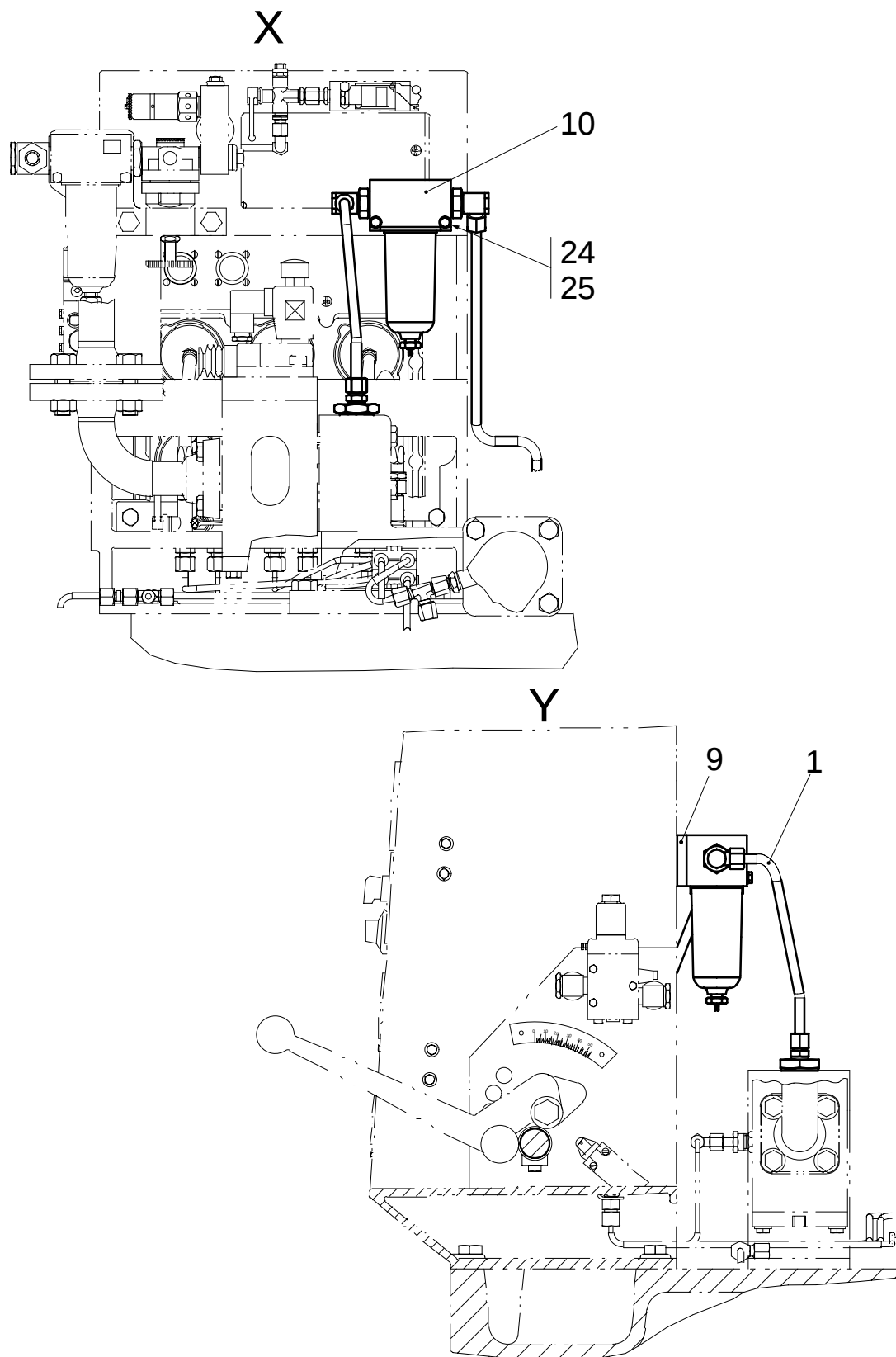
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Control Air Pipe

M25

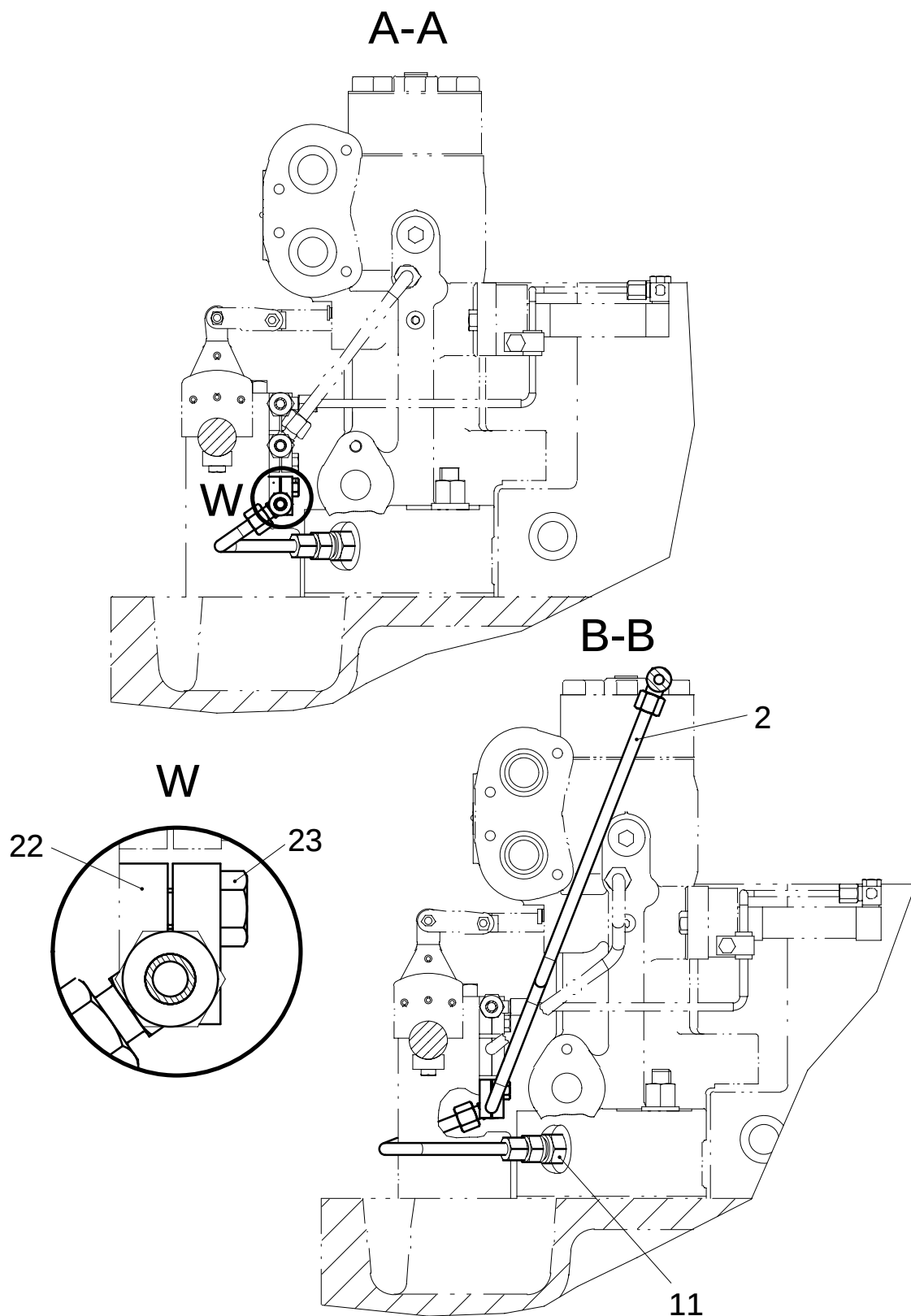
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Control Air Pipe

M25

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Control Air Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	STEUERLUFTLEITUNG, ANBAU. CONTROL AIR PIPE ASSEMBLY	1	258617 BB
1	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-001
2	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-002
3	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-003
4	STEUERLUFTLEITUNG CONTROL AIR PIPE	6	258617-004
5	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-005
6	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-006
7	STEUERLUFTLEITUNG CONTROL AIR PIPE	7	258617-007
8	REDUZIERSTUTZEN REDUCER	1	258617-008
9	HALTER BRACKET	1	258617-009
10	DRUCKLUFTFILTER COMPRESSED-AIR FIL TER	1	SIEHE B1.05.05.1.4900 SEE B1.05.05.1.4900
11	RÜCKSCHLAGVENTIL NON RETURN VALVE	8	1.3090-121
12	SCHWENKVERSCHRAUBUNG BANJO	2	1.5093-607
13	STUTZEN PIPE UNION	1	1.5094-242
14	STUTZEN PIPE UNION	8	1.5095-512
15	GEWINDEREDUZIERUNG PIPE UNION	2	1.5036-003
16	STUTZEN PIPE UNION	1	1.5095-072
17	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-543
18	ÜBERWURFMUTTER UNION NUT	1	1.5040-116
19	DICHTRING JOINT RING	# 1	1.7010-218
20	DICHTRING JOINT RING	# 2	1.7010-133

10

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Air Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	DICHTRING JOINT RING	# 3	1.7010-064
22	ROHRKLEMME PIPE CLAM	16	1.5011-002
23	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-311
24	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-182
25	SCHEIBE WASHER	2	1.0040-220

= VERBRAUCHSTEILE
CONSUMABLES

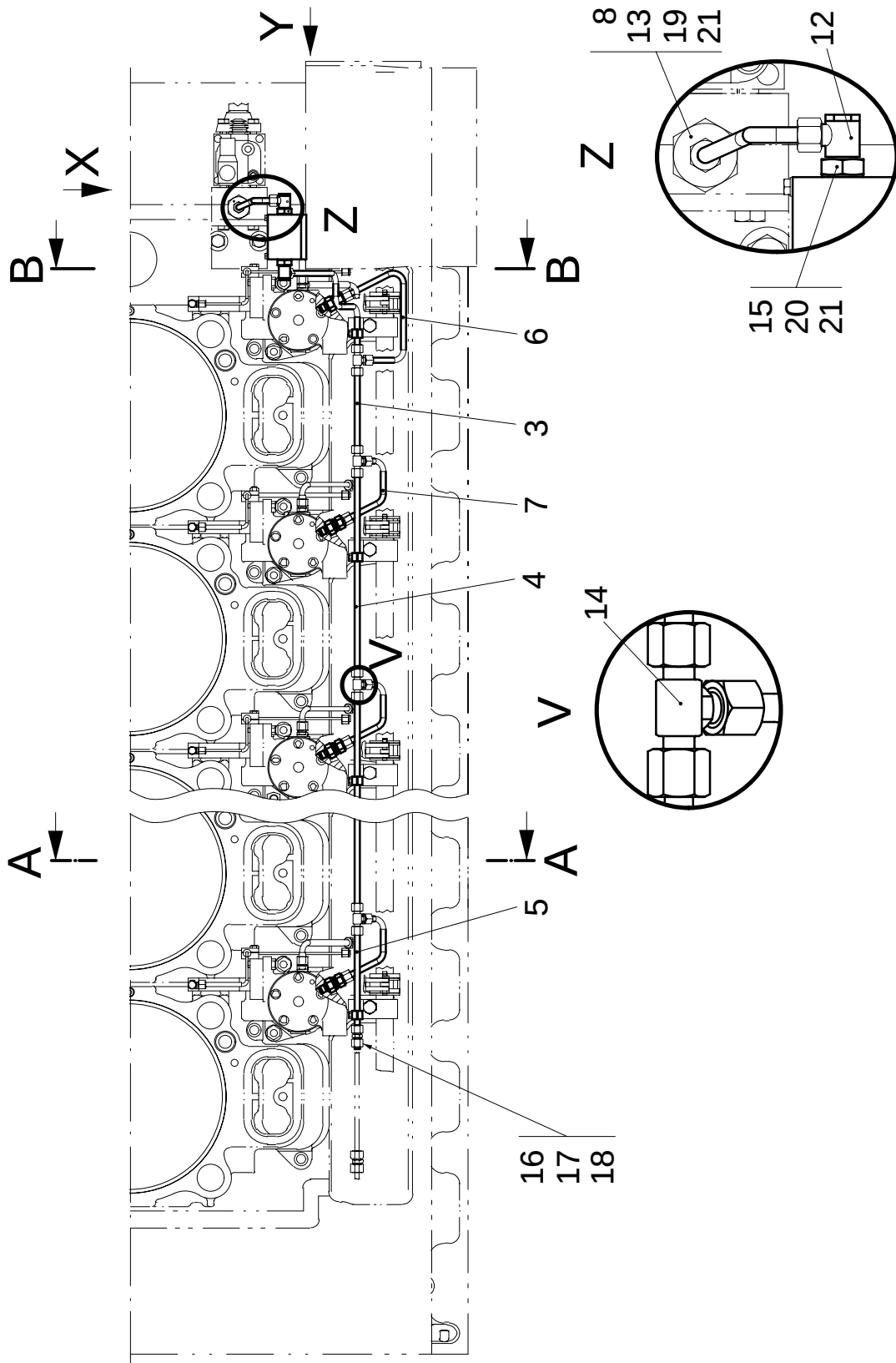
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Air Pipe

M25

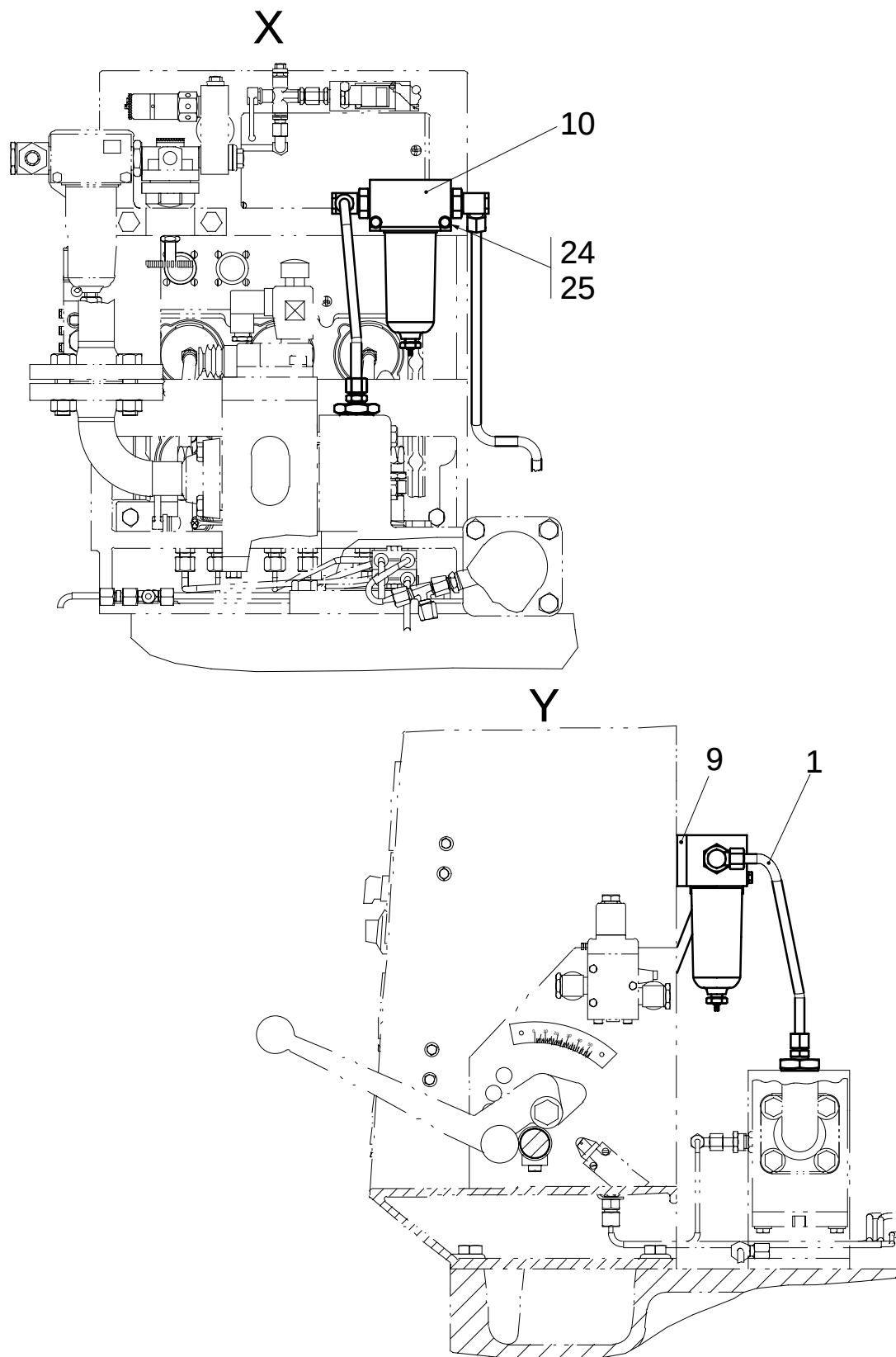
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Control Air Pipe

M25

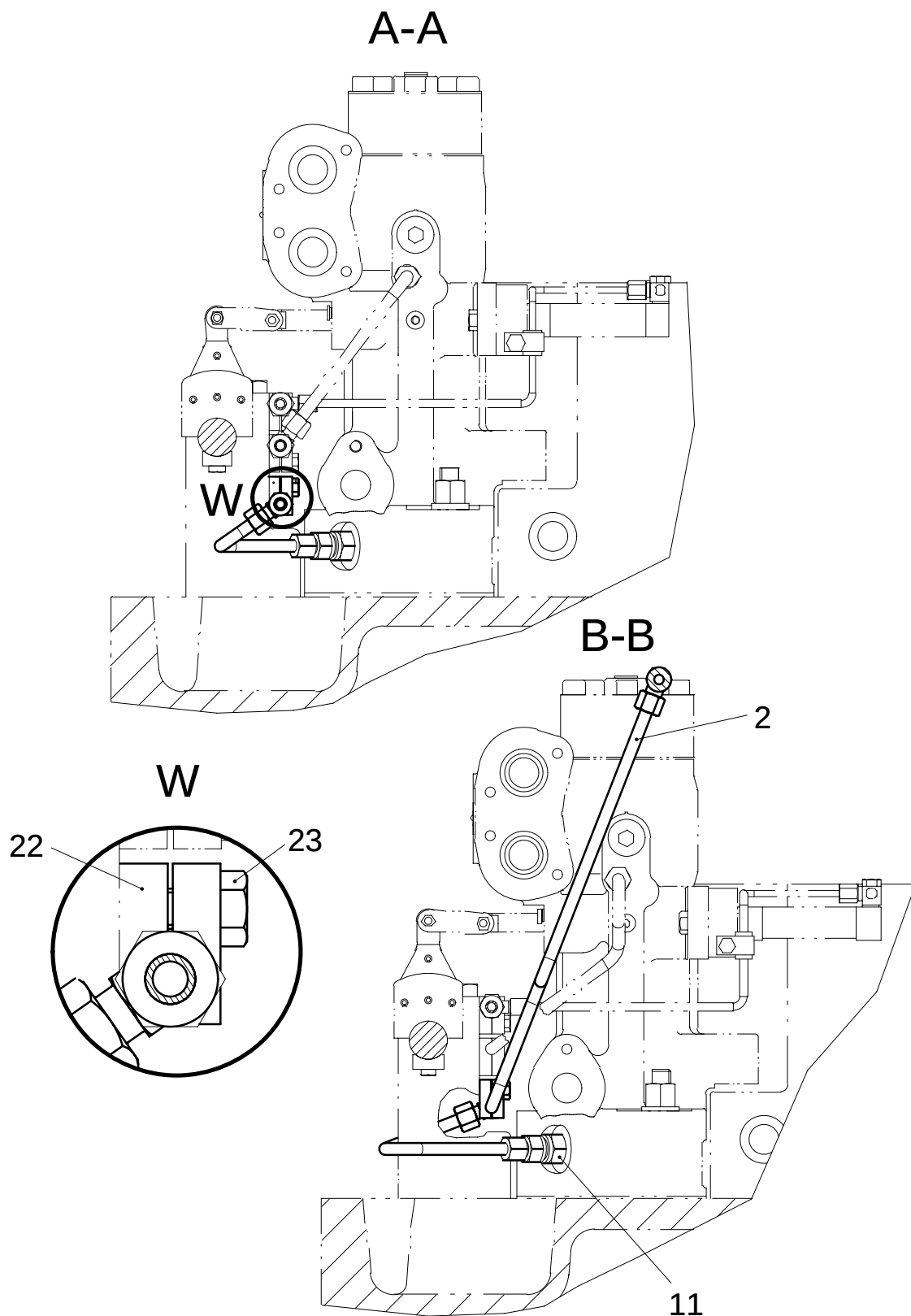
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Control Air Pipe

M25

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Control Air Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	10
-	STEUERLUFTLEITUNG, ANBAU. CONTROL AIR PIPE ASSEMBLY	1	258617 CC	
1	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-001	
2	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-002	
3	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-003	
4	STEUERLUFTLEITUNG CONTROL AIR PIPE	7	258617-004	
5	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-005	
6	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-006	
7	STEUERLUFTLEITUNG CONTROL AIR PIPE	8	258617-007	
8	REDUZIERSTUTZEN REDUCER	1	258617-008	
9	HALTER BRACKET	1	258617-009	
10	DRUCKLUFTFILTER COMPRESSED-AIR FIL TER	1	SIEHE B1.05.05.1.4900 SEE B1.05.05.1.4900	
11	RÜCKSCHLAGVENTIL NON RETURN VALVE	9	1.3090-121	
12	SCHWENKVERSCHRAUBUNG BANJO	2	1.5093-607	
13	STUTZEN PIPE UNION	1	1.5094-242	
14	STUTZEN PIPE UNION	9	1.5095-512	
15	GEWINDEREDUZIERUNG PIPE UNION	2	1.5036-003	
16	STUTZEN PIPE UNION	1	1.5095-072	
17	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-543	
18	ÜBERWURFMUTTER UNION NUT	1	1.5040-116	
19	DICHTRING JOINT RING	# 1	1.7010-218	
20	DICHTRING JOINT RING	# 2	1.7010-133	

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Air Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
21	DICHTRING JOINT RING	# 3	1.7010-064
22	ROHRKLEMME PIPE CLAM	18	1.5011-002
23	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1387-311
24	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-182
25	SCHEIBE WASHER	2	1.0040-220

= VERBRAUCHSTEILE
CONSUMABLES

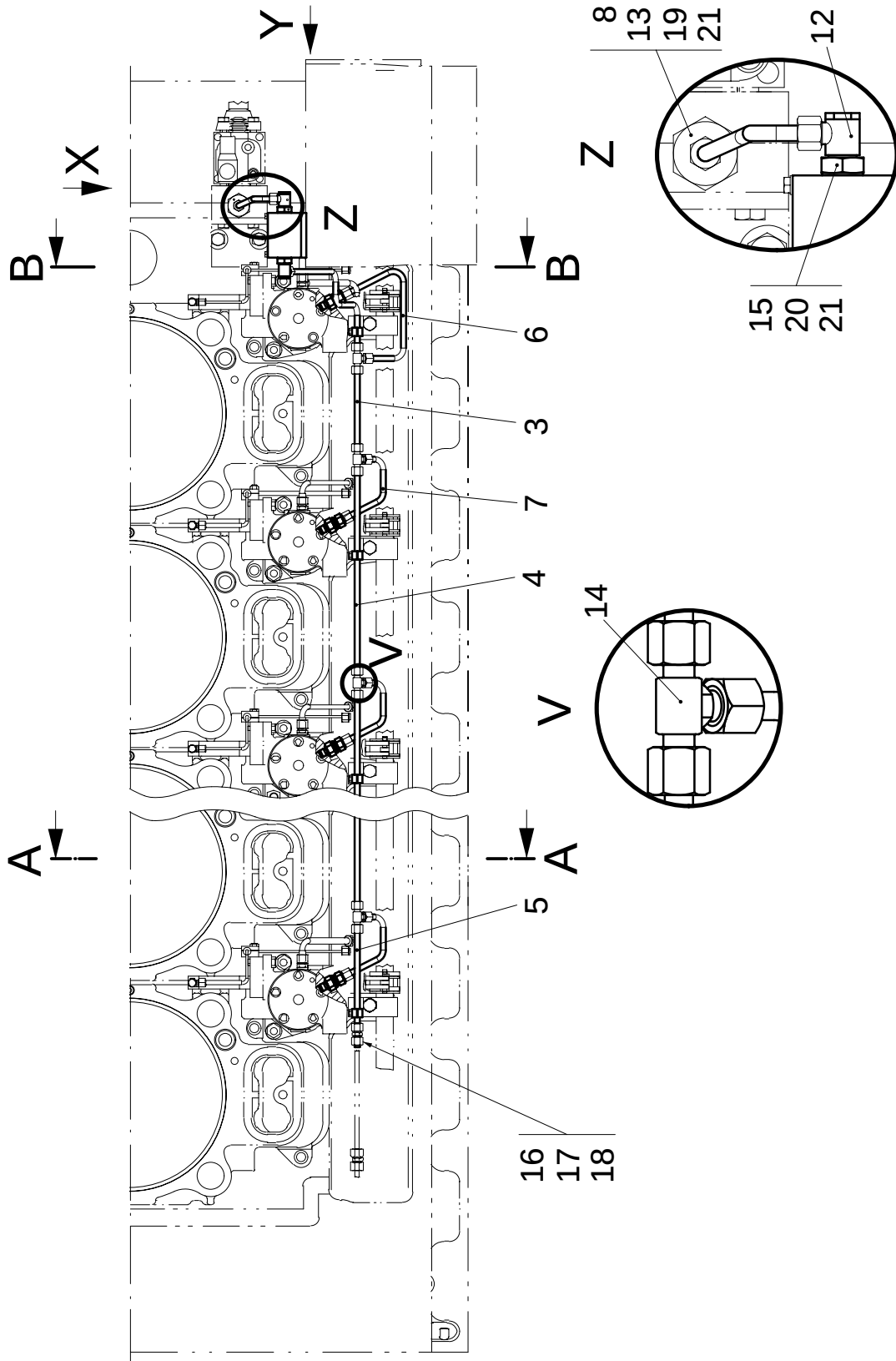
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Air Pipe

M25

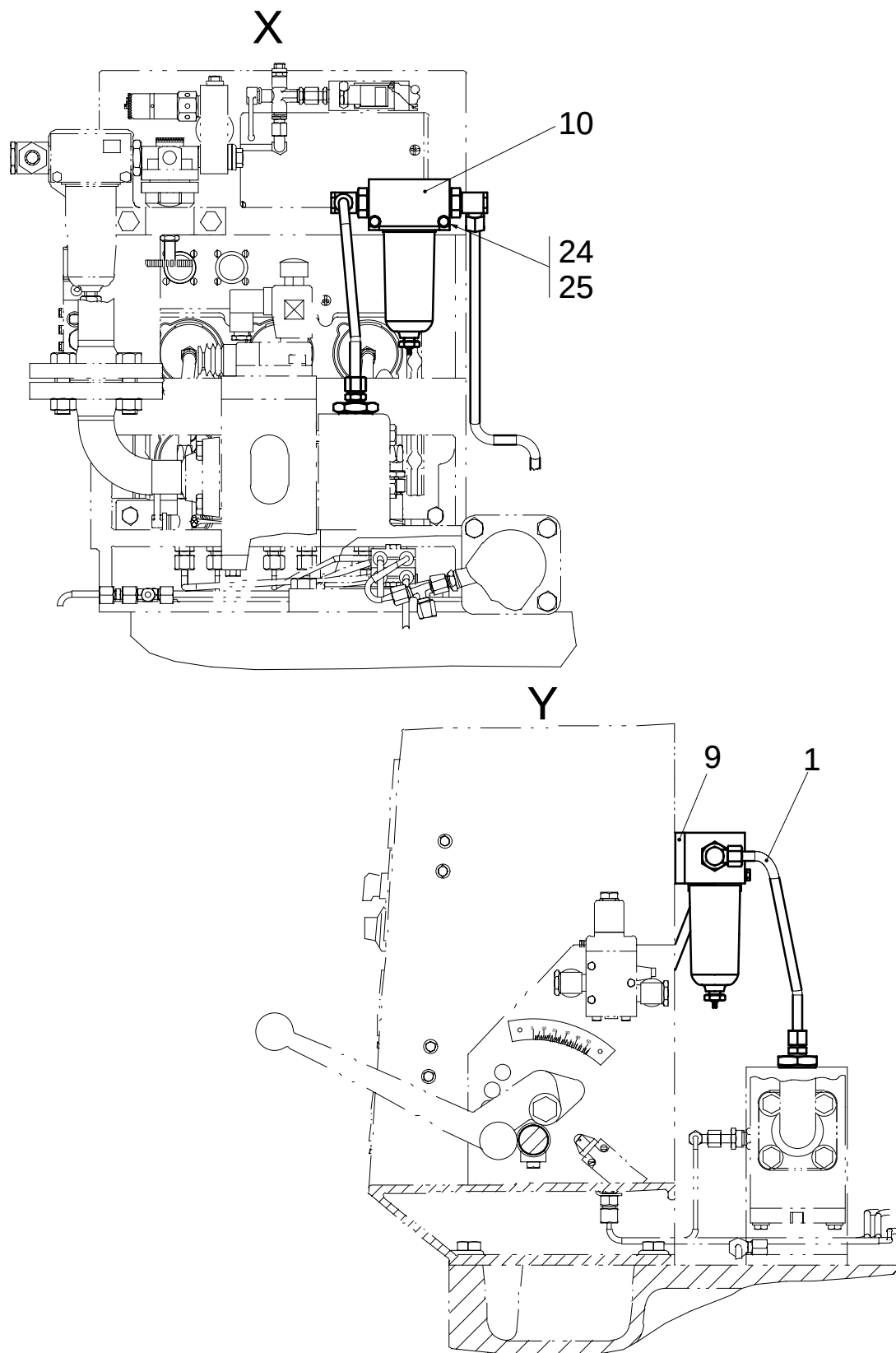
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Control Air Pipe

M25

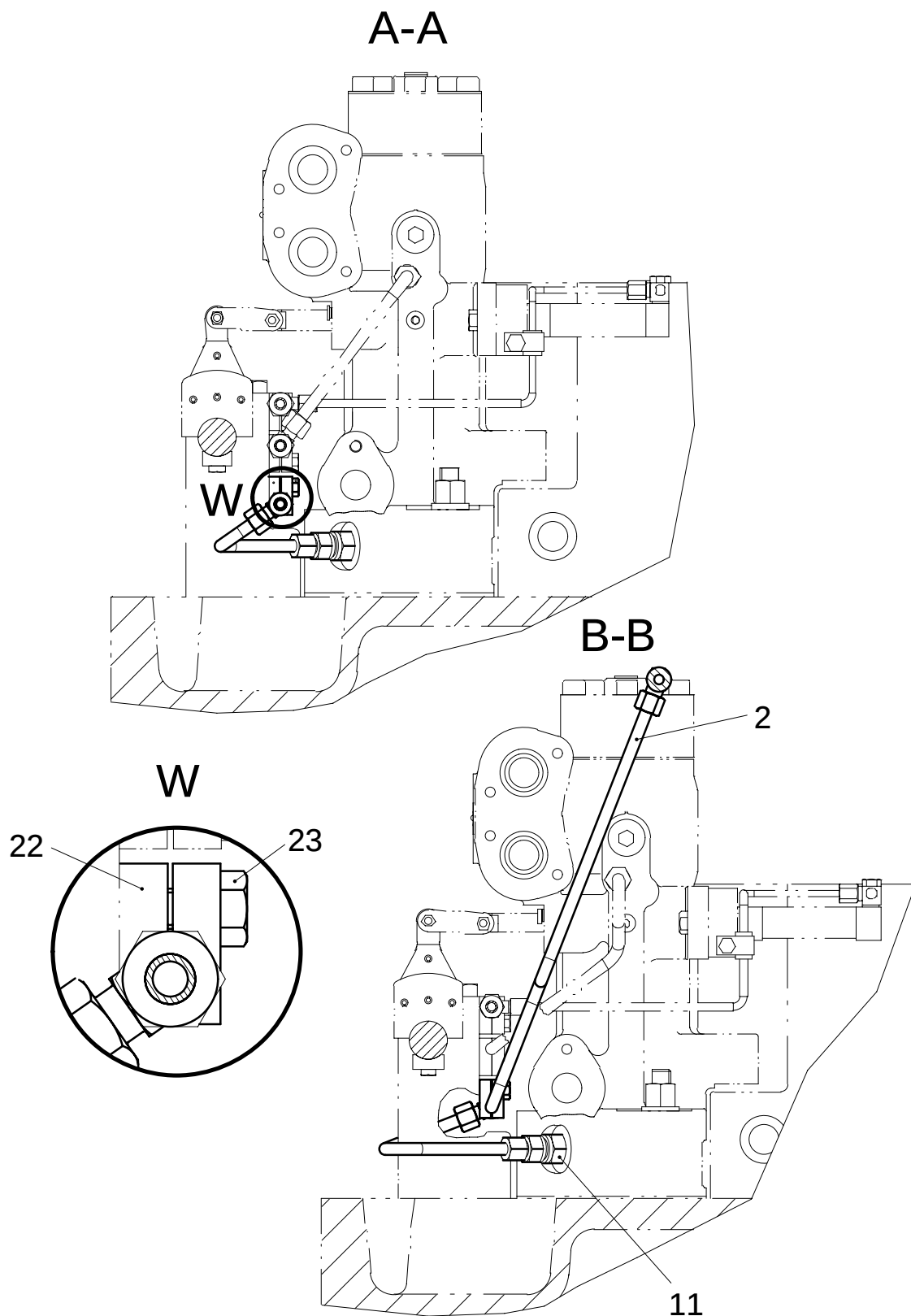
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Control Air Pipe

M25

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Control Air Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	STEUERLUFTLEITUNG, ANBAU. CONTROL AIR PIPE ASSEMBLY	1	258617 DD
1	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-101
2	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-002
3	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-003
4	STEUERLUFTLEITUNG CONTROL AIR PIPE	4	258617-004
5	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-005
6	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-006
7	STEUERLUFTLEITUNG CONTROL AIR PIPE	5	258617-007
9	HALTER BRACKET	1	258617-009
10	DRUCKLUFTFILTER COMPRESSED-AIR FILTER	1	SIEHE B1.05.05.1.4900 SEE B1.05.05.1.4900
11	RÜCKSCHLAGVENTIL NON RETURN VALVE	6	1.3090-121
12	SCHWENKVERSCHRAUBUNG BANJO	2	1.5093-607
13	STUTZEN PIPE UNION	1	1.5094-186
14	STUTZEN PIPE UNION	6	1.5095-512
15	GEWINDEREDUZIERUNG PIPE UNION	2	1.5036-003
16	STUTZEN PIPE UNION	1	1.5095-072
17	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-543
18	ÜBERWURFMUTTER UNION NUT	1	1.5040-116
20	DICHTRING JOINT RING	# 3	1.7010-133
21	DICHTRING JOINT RING	# 2	1.7010-064
22	ROHRKLEMME PIPE CLAM	12	1.5011-002

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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Air Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
23	SECHSKANTSCHRAUBE HEXAGON BOLT	6	1.1387-311
24	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-182
25	SCHEIBE WASHER	2	1.0040-220

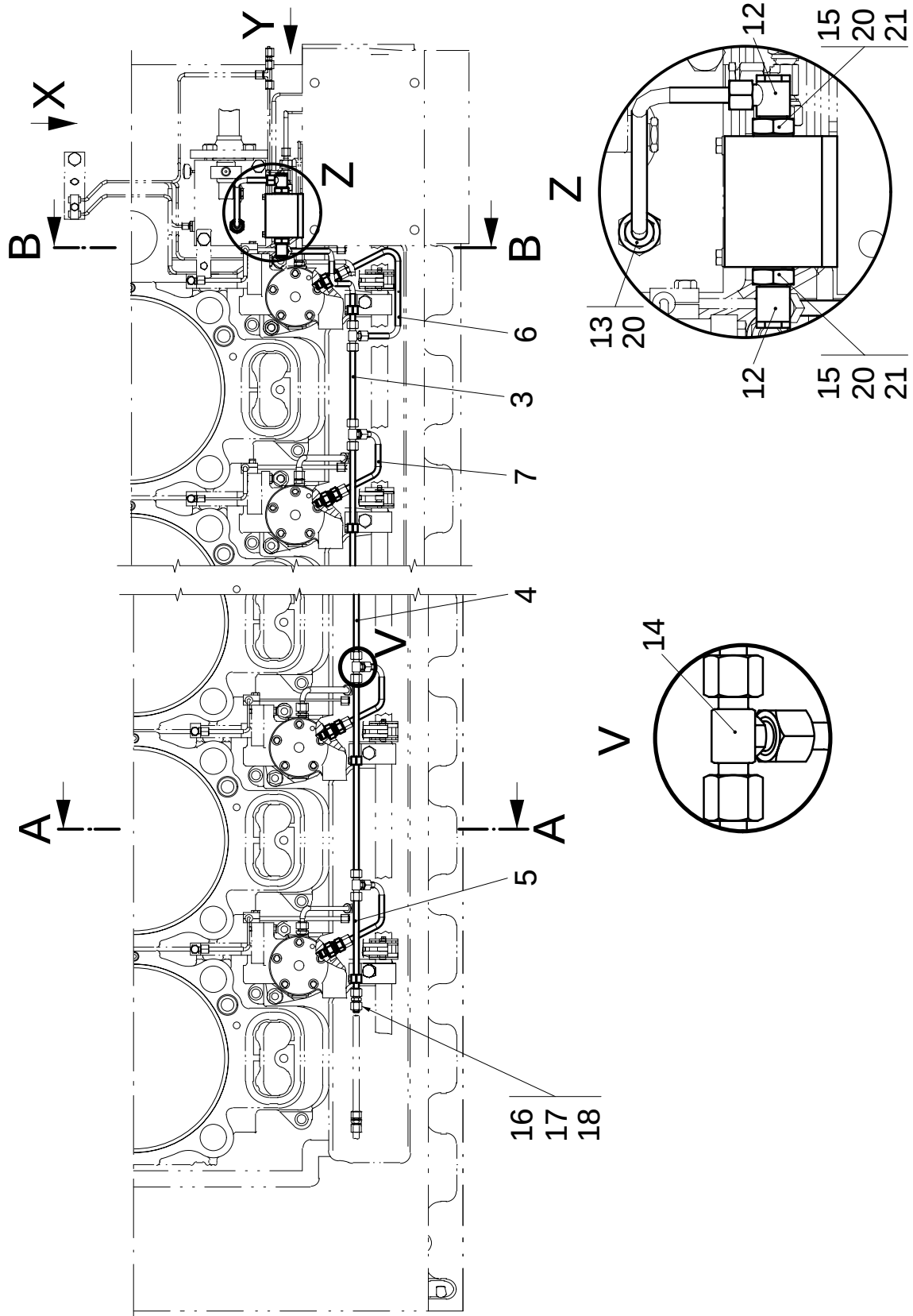
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= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Air Pipe

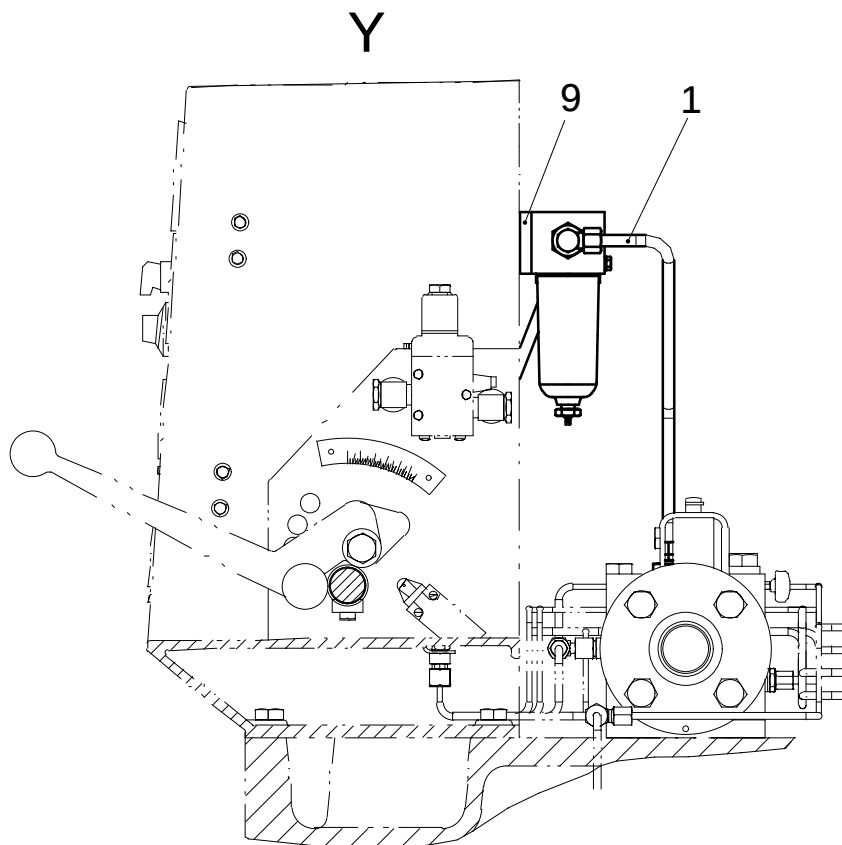
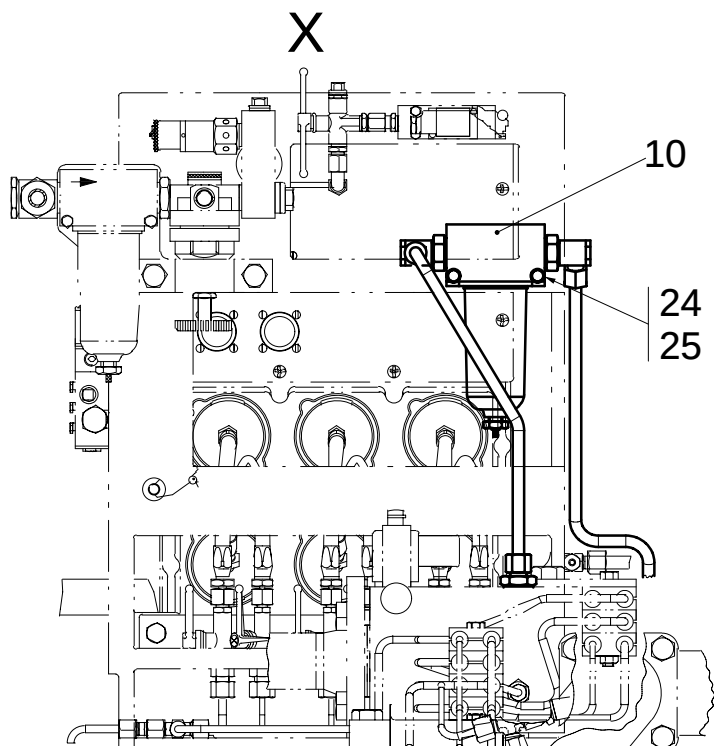
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Control Air Pipe

M25

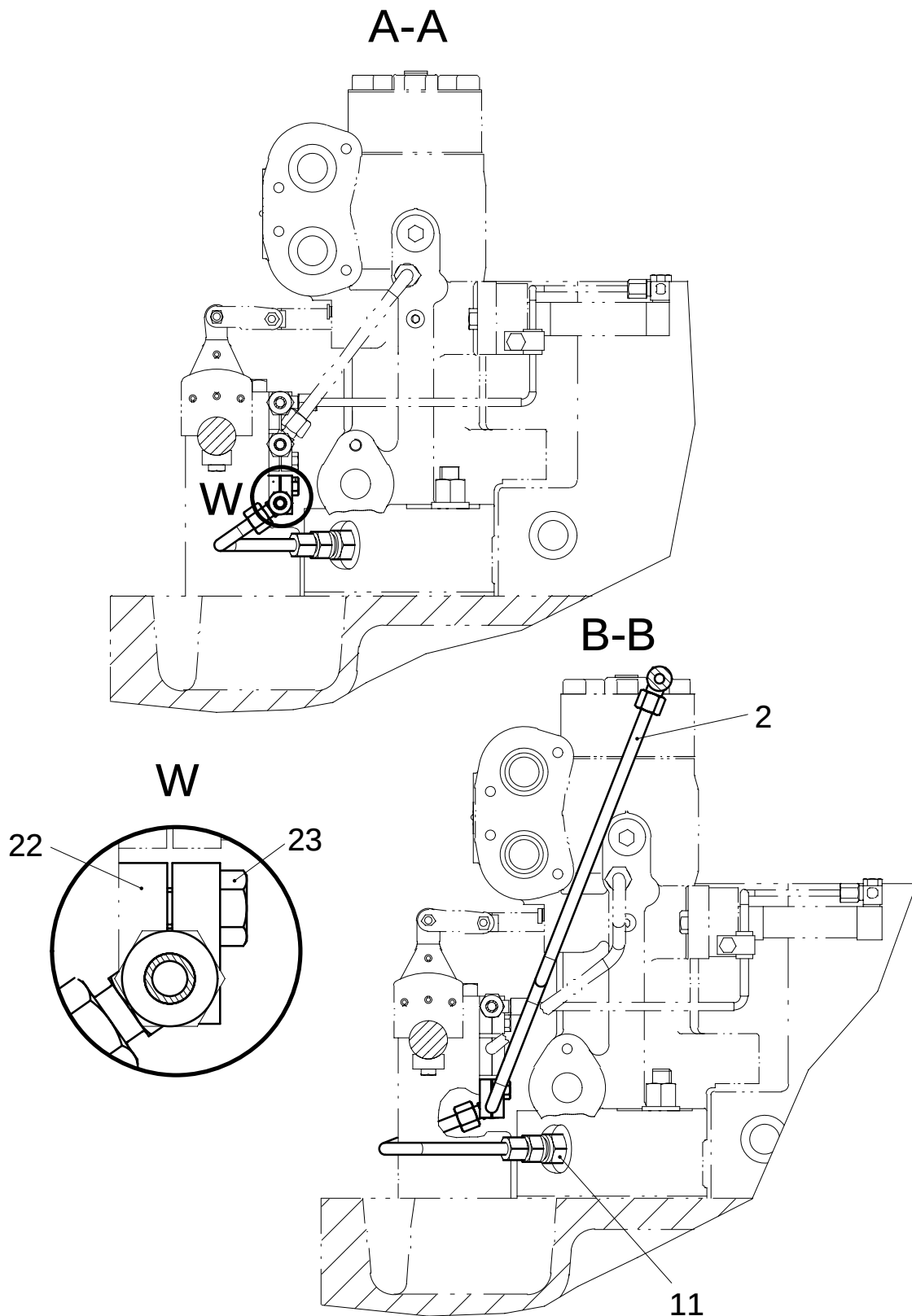
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Control Air Pipe

M25

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Control Air Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	STEUERLUFTLEITUNG, ANBAU. CONTROL AIR PIPE ASSEMBLY	1	258617 EE
1	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-101
2	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-002
3	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-003
4	STEUERLUFTLEITUNG CONTROL AIR PIPE	6	258617-004
5	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-005
6	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-006
7	STEUERLUFTLEITUNG CONTROL AIR PIPE	7	258617-007
9	HALTER BRACKET	1	258617-009
10	DRUCKLUFTFILTER COMPRESSED-AIR FILTER	1	SIEHE B1.05.05.1.4900 SEE B1.05.05.1.4900
11	RÜCKSCHLAGVENTIL NON RETURN VALVE	8	1.3090-121
12	SCHWENKVERSCHRAUBUNG BANJO	2	1.5093-607
13	STUTZEN PIPE UNION	1	1.5094-186
14	STUTZEN PIPE UNION	8	1.5095-512
15	GEWINDEREDUZIERUNG PIPE UNION	2	1.5036-003
16	STUTZEN PIPE UNION	1	1.5095-072
17	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-543
18	ÜBERWURFMUTTER UNION NUT	1	1.5040-116
20	DICHTRING JOINT RING	# 3	1.7010-133
21	DICHTRING JOINT RING	# 2	1.7010-064
22	ROHRKLEMME PIPE CLAM	16	1.5011-002

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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Air Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
23	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-311
24	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-182
25	SCHEIBE WASHER	2	1.0040-220

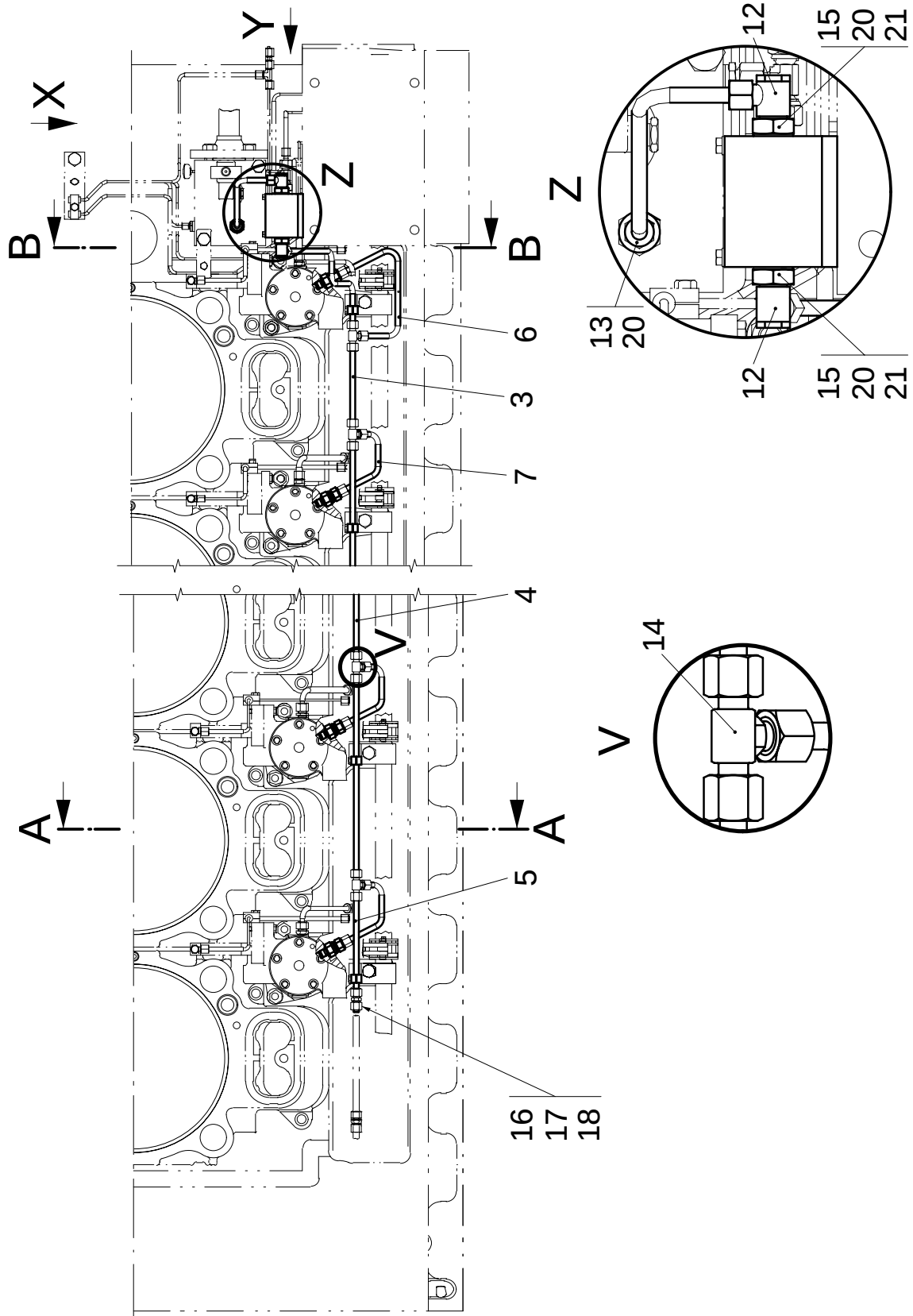
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= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Air Pipe

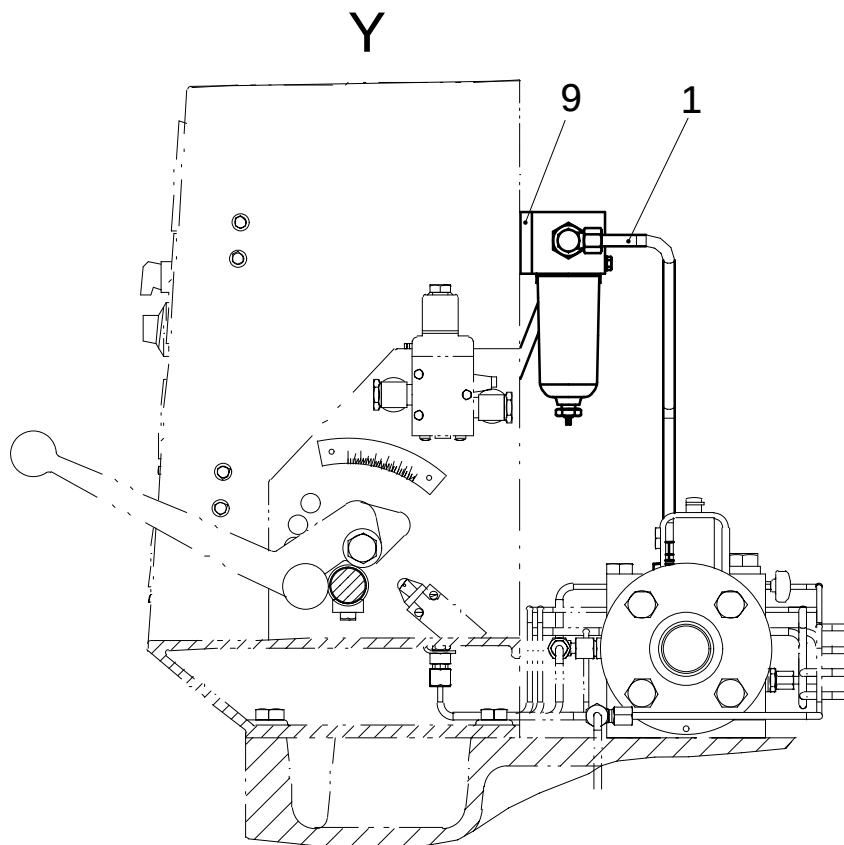
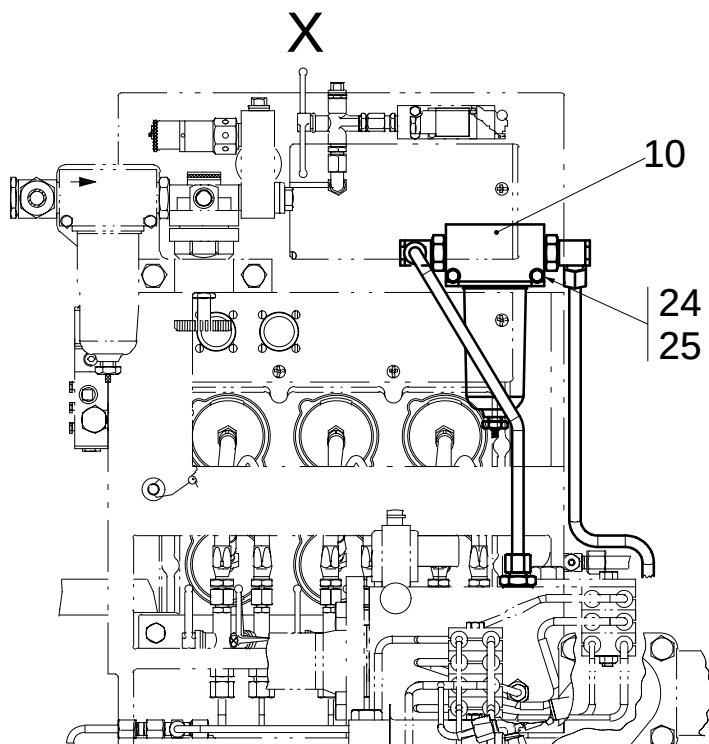
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Control Air Pipe

M25

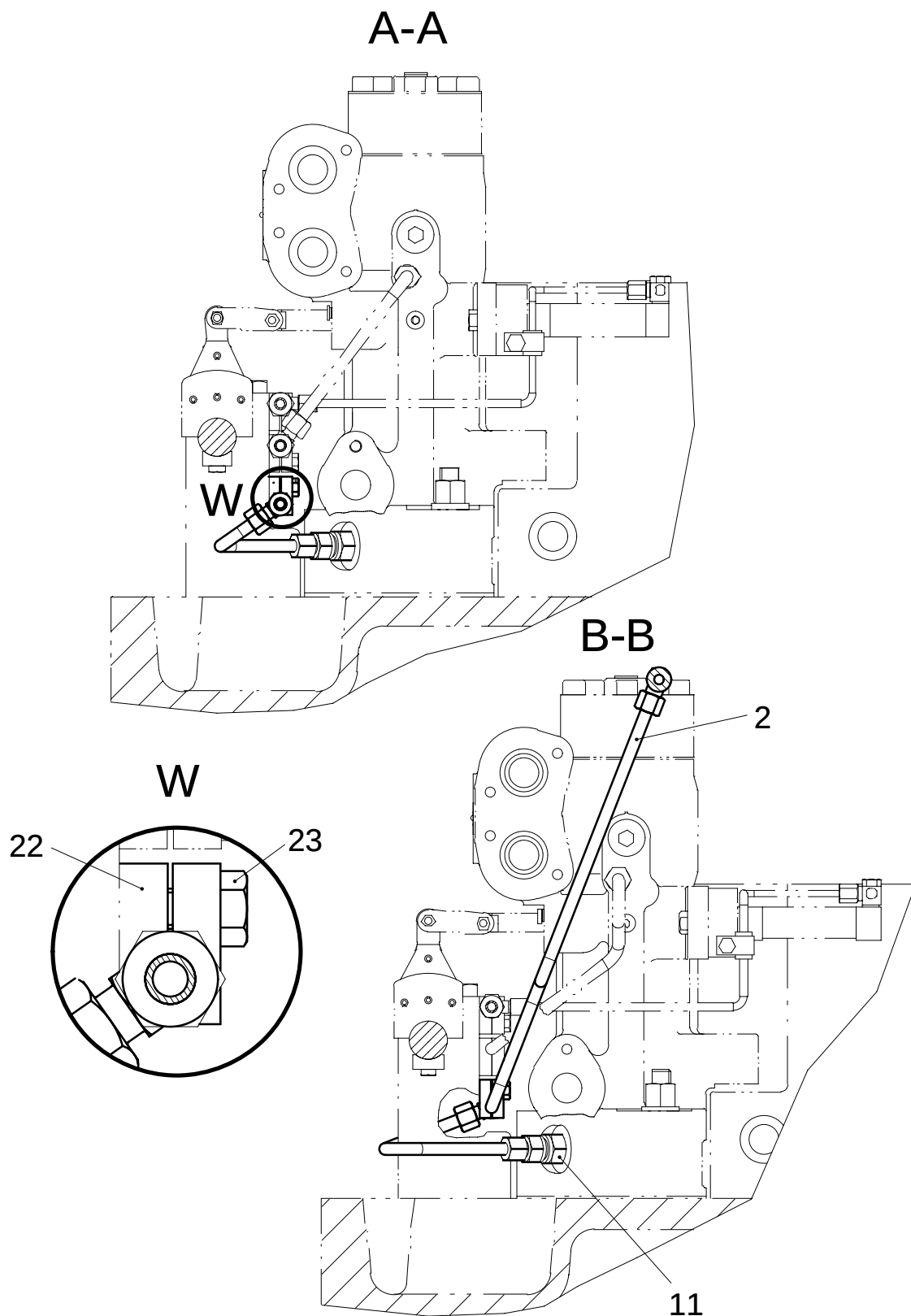
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Control Air Pipe

M25

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Control Air Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	STEUERLUFTLEITUNG, ANBAU. CONTROL AIR PIPE ASSEMBLY	1	258617 FF
1	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-101
2	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-002
3	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-003
4	STEUERLUFTLEITUNG CONTROL AIR PIPE	7	258617-004
5	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-005
6	STEUERLUFTLEITUNG CONTROL AIR PIPE	1	258617-006
7	STEUERLUFTLEITUNG CONTROL AIR PIPE	8	258617-007
9	HALTER BRACKET	1	258617-009
10	DRUCKLUFTFILTER COMPRESSED-AIR FILTER	1	SIEHE B1.05.05.1.4900 SEE B1.05.05.1.4900
11	RÜCKSCHLAGVENTIL NON RETURN VALVE	9	1.3090-121
12	SCHWENKVERSCHRAUBUNG BANJO	2	1.5093-607
13	STUTZEN PIPE UNION	1	1.5094-186
14	STUTZEN PIPE UNION	9	1.5095-512
15	GEWINDEREDUZIERUNG PIPE UNION	2	1.5036-003
16	STUTZEN PIPE UNION	1	1.5095-072
17	VERSCHLUSSBUTZEN PLUG FOR PIPE UNIONS	1	1.3088-543
18	ÜBERWURFMUTTER UNION NUT	1	1.5040-116
20	DICHTRING JOINT RING	# 3	1.7010-133
21	DICHTRING JOINT RING	# 2	1.7010-064
22	ROHRKLEMME PIPE CLAM	18	1.5011-002

10

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Air Pipe

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
23	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1387-311
24	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-182
25	SCHEIBE WASHER	2	1.0040-220

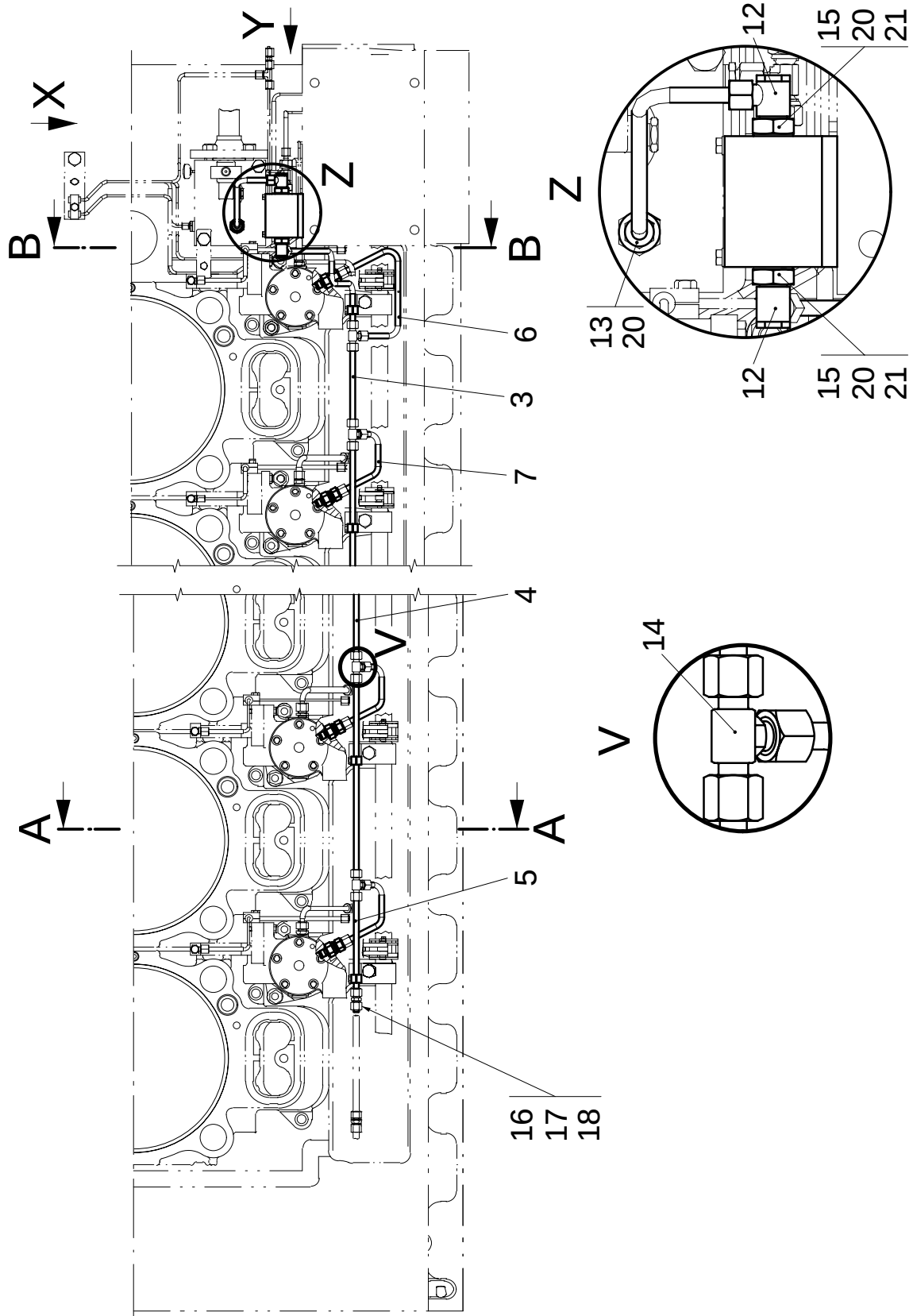
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= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Control Air Pipe

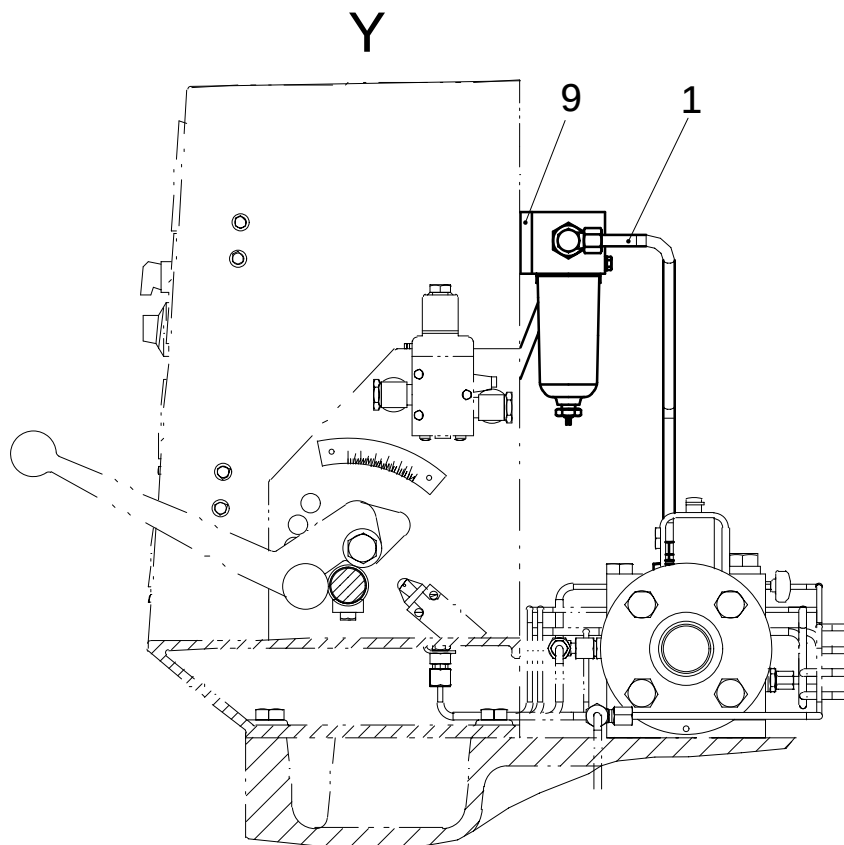
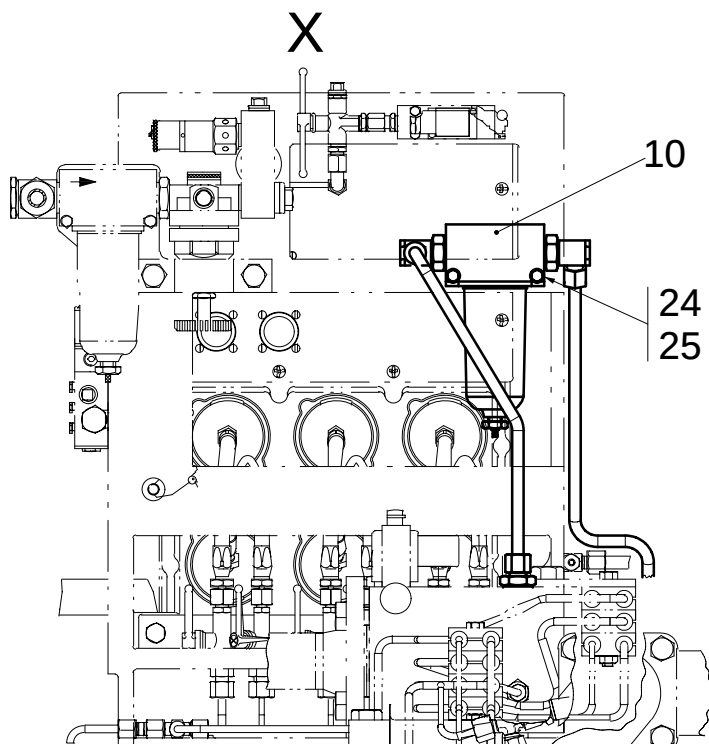
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Control Air Pipe

M25

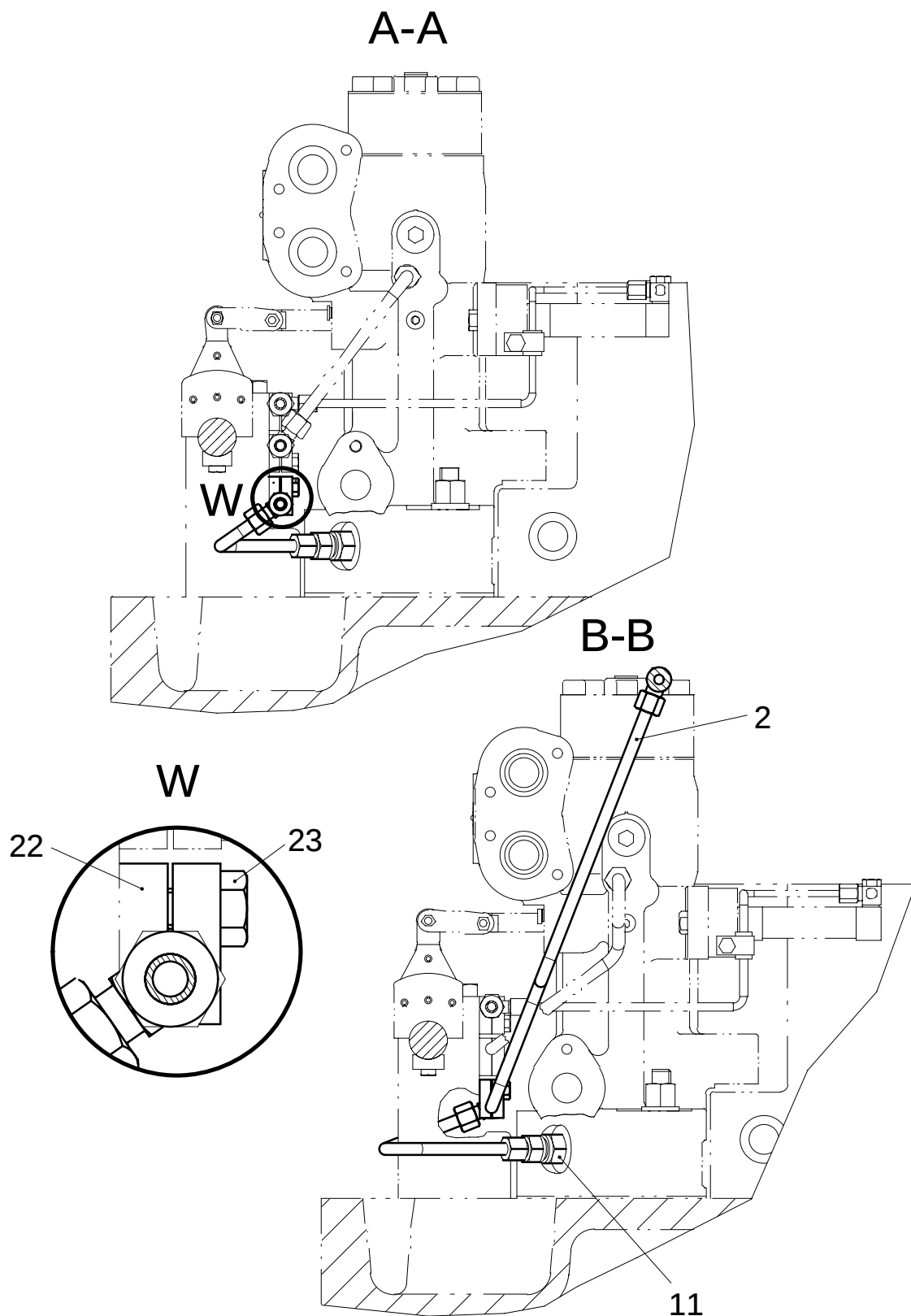
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Control Air Pipe

M25

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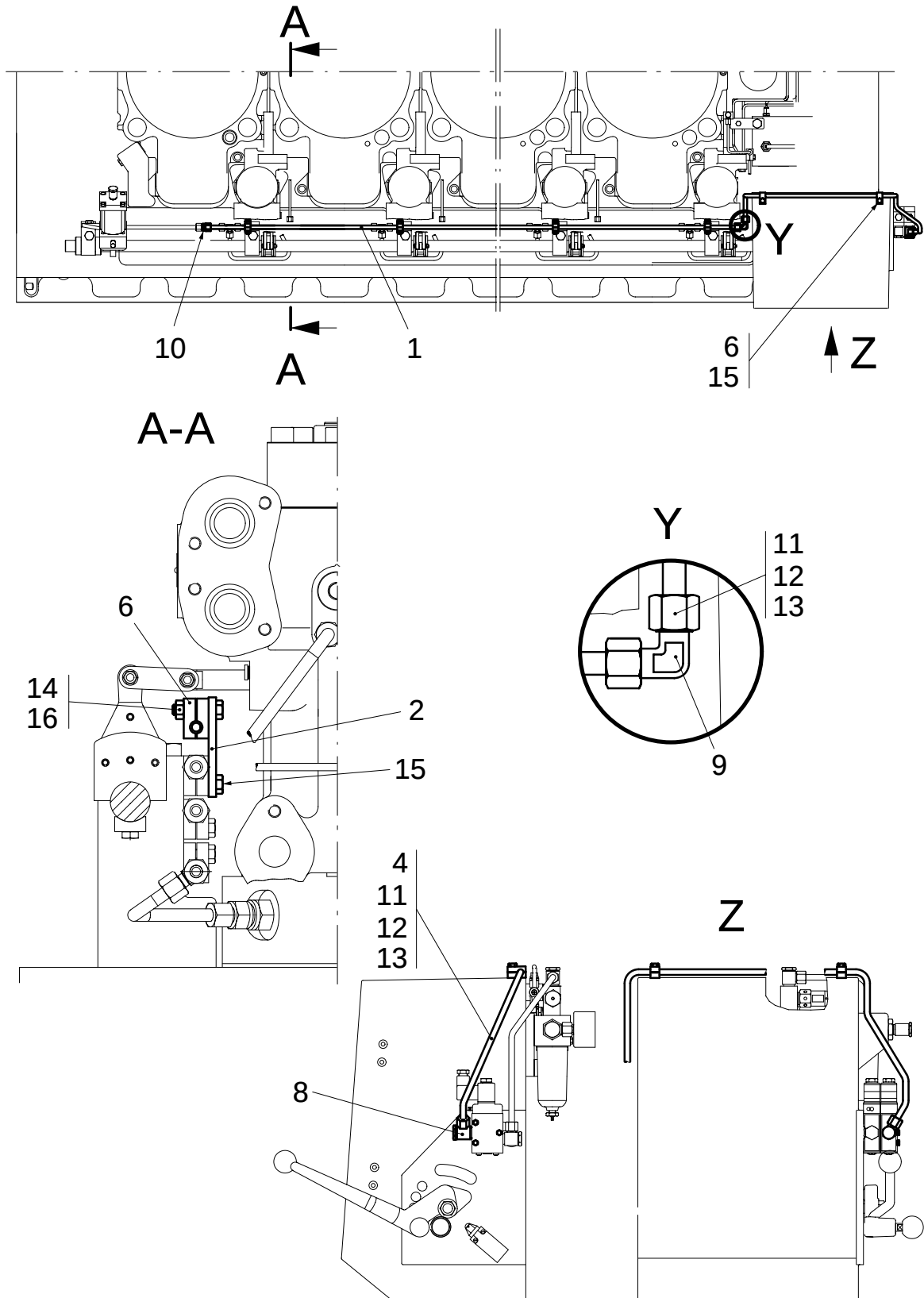
M25

Control Air Piping
for Fuel Limiter

10

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPING ASSEMBLY	1	258628 AA
1	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	1	258628-201
2	HALTER BRACKET	6	258628-002
4	ROHRLEITUNG PIPE		1.9090-018
6	ROHRKLEMME PIPE CLAMP	16	1.5011-002
8	SCHWENKVERSCHRAUBUNG BANJO	1	1.5098-820
9	STUTZEN UNION ELBOW	1	1.5095-242
10	STUTZEN PIPE UNION	1	1.5095-042
11	ÜBERWURFMUTTER UNION NUT	2	1.5040-116
12	SCHNEIDRING CUTTING RING	2	1.5059-086
13	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	2	1.3088-012
14	SECHSKANTSCHRAUBE HEXAGON BOLT	6	1.1387-312
15	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-311
16	SECHSKANTMUTTER HEXAGON NUT	6	1.2007-034

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**



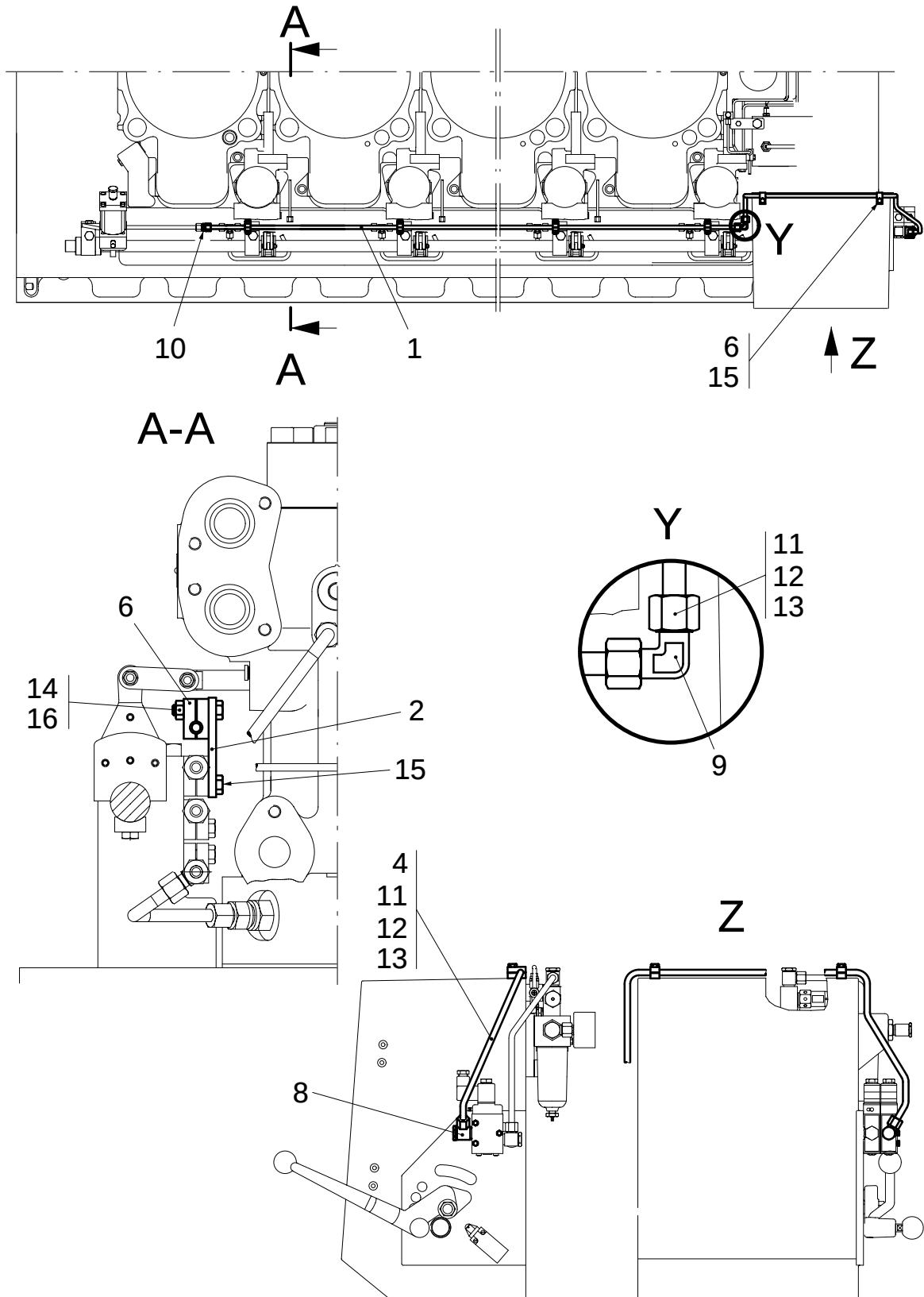
M25

Control Air Piping
for Fuel Limiter

10

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPING ASSEMBLY	1	258628 BB
1	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	1	258628-101
2	HALTER BRACKET	8	258628-002
4	ROHRLEITUNG PIPE		1.9090-018
6	ROHRKLEMME PIPE CLAMP	20	1.5011-002
8	SCHWENKVERSCHRAUBUNG BANJO	1	1.5098-820
9	STUTZEN UNION ELBOW	1	1.5095-242
10	STUTZEN PIPE UNION	1	1.5095-042
11	ÜBERWURFMUTTER UNION NUT	2	1.5040-116
12	SCHNEIDRING CUTTING RING	2	1.5059-086
13	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	2	1.3088-012
14	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-312
15	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-311
16	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-034

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**



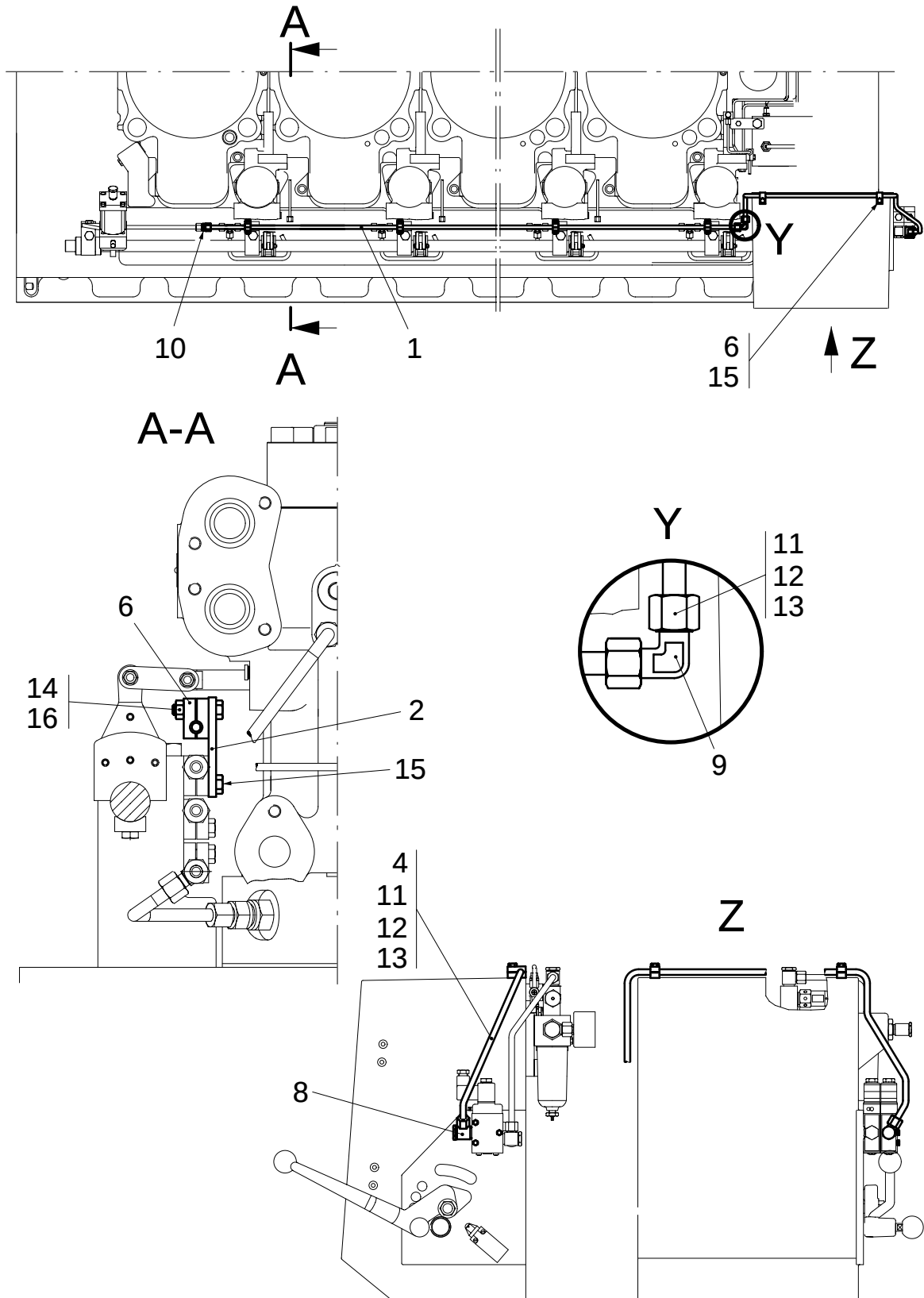
M25

Control Air Piping
for Fuel Limiter

10

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPING ASSEMBLY	1	258628 CC
1	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	1	258628-001
2	HALTER BRACKET	9	258628-002
4	ROHRLEITUNG PIPE		1.9090-018
6	ROHRKLEMME PIPE CLAMP	22	1.5011-002
8	SCHWENKVERSCHRAUBUNG BANJO	1	1.5098-820
9	STUTZEN UNION ELBOW	1	1.5095-242
10	STUTZEN PIPE UNION	1	1.5095-042
11	ÜBERWURFMUTTER UNION NUT	2	1.5040-116
12	SCHNEIDRING CUTTING RING	2	1.5059-086
13	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	2	1.3088-012
14	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1387-312
15	SECHSKANTSCHRAUBE HEXAGON SCREW	11	1.1387-311
16	SECHSKANTMUTTER HEXAGON NUT	9	1.2007-034

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**



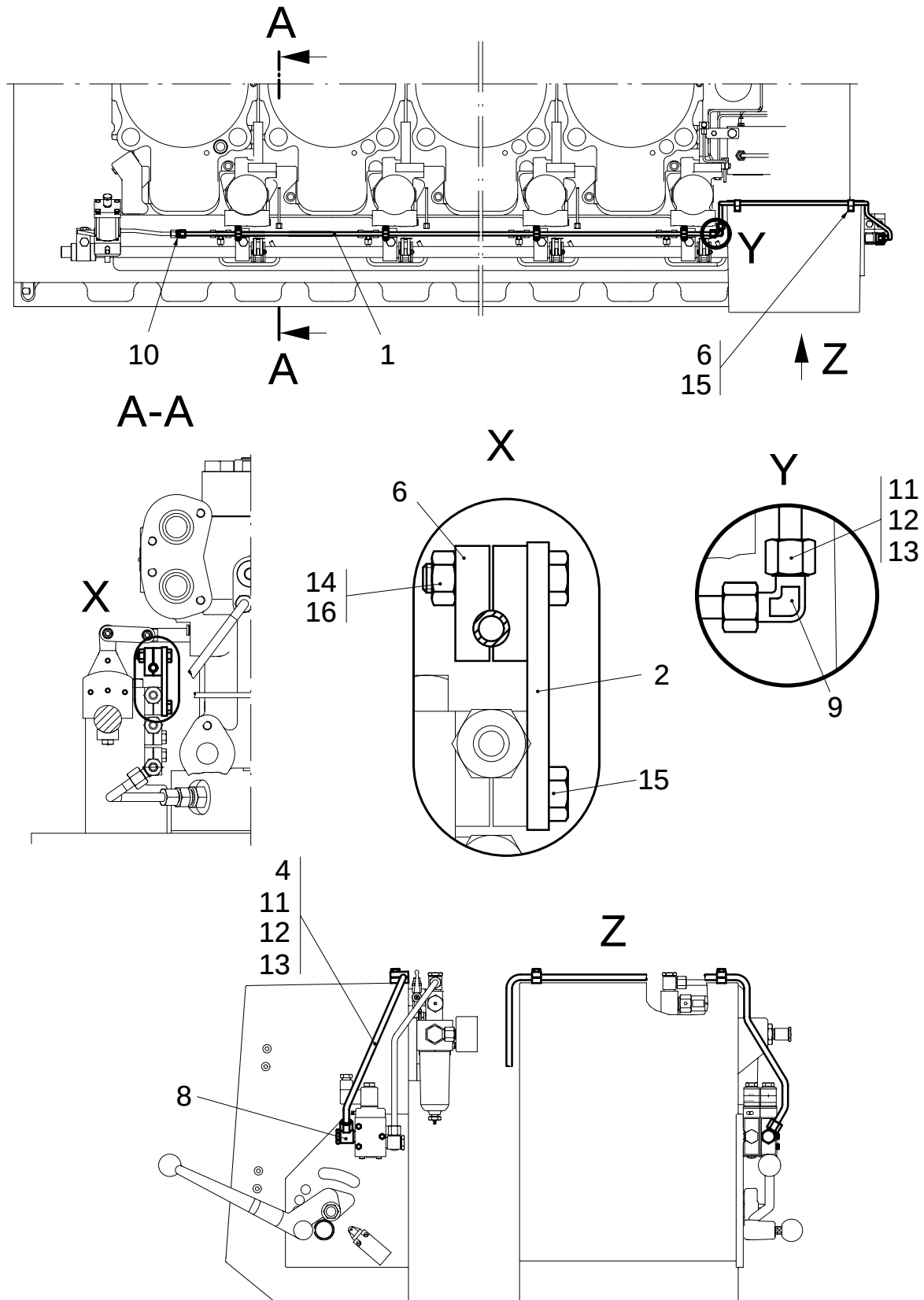
M25

Control Air Piping
for Fuel Limiter

10

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPING ASSEMBLY	1	258628 DD
1	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	1	258628-301
2	HALTER BRACKET	6	258628-002
4	ROHRLEITUNG PIPE		1.9090-018
6	ROHRKLEMME PIPE CLAMP	16	1.5011-002
8	SCHWENKVERSCHRAUBUNG BANJO	1	1.5098-820
9	STUTZEN UNION ELBOW	1	1.5095-242
10	STUTZEN PIPE UNION	1	1.5095-042
11	ÜBERWURFMUTTER UNION NUT	2	1.5040-116
12	SCHNEIDRING CUTTING RING	2	1.5059-086
13	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	2	1.3088-012
14	SECHSKANTSCHRAUBE HEXAGON BOLT	6	1.1387-312
15	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-311
16	SECHSKANTMUTTER HEXAGON NUT	6	1.2007-034

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**



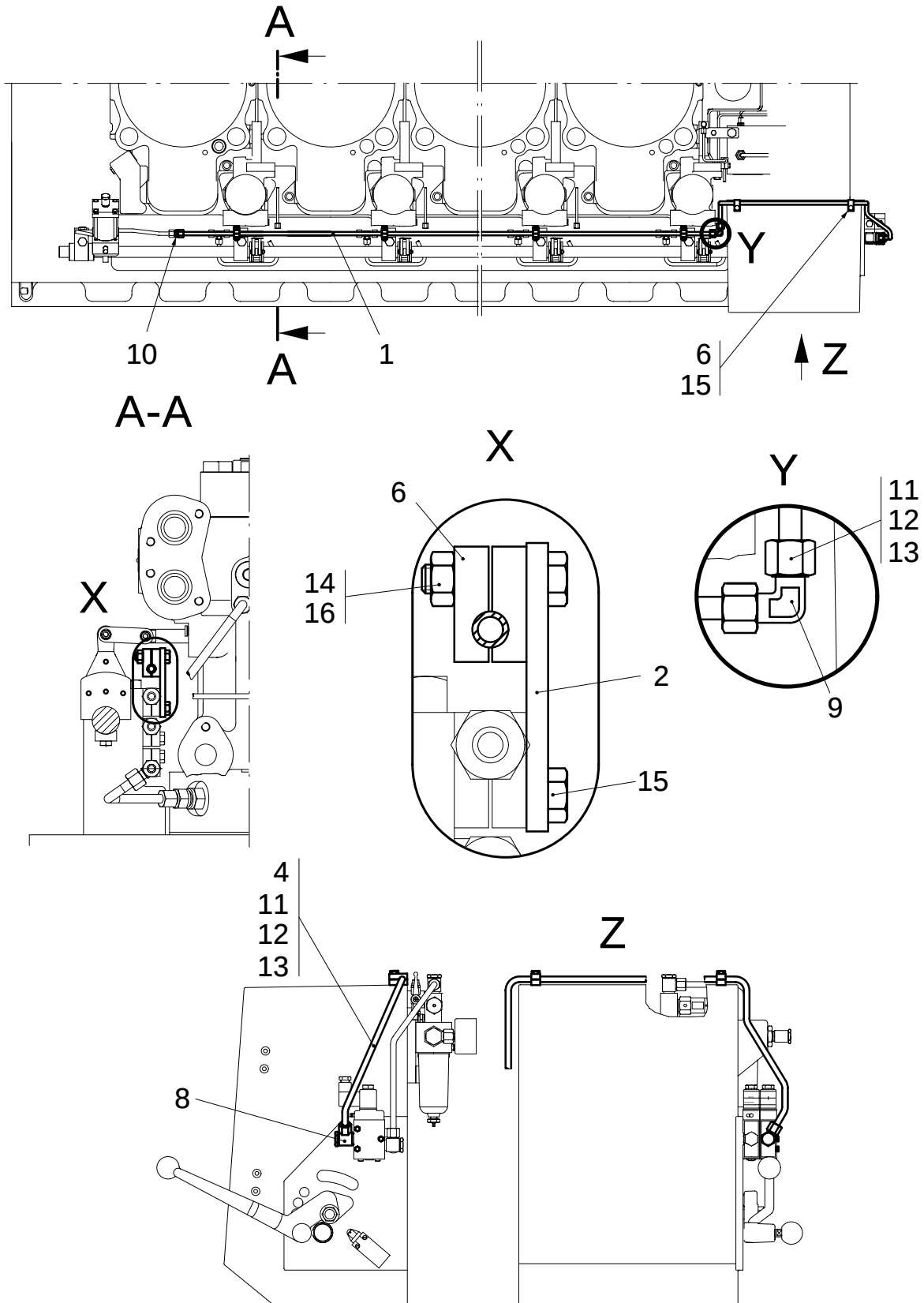
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Control Air Piping
for Fuel Limiter

10

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPING ASSEMBLY	1	258628 EE
1	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	1	258628-401
2	HALTER BRACKET	8	258628-002
4	ROHRLEITUNG PIPE		1.9090-018
6	ROHRKLEMME PIPE CLAMP	20	1.5011-002
8	SCHWENKVERSCHRAUBUNG BANJO	1	1.5098-820
9	STUTZEN UNION ELBOW	1	1.5095-242
10	STUTZEN PIPE UNION	1	1.5095-042
11	ÜBERWURFMUTTER UNION NUT	2	1.5040-116
12	SCHNEIDRING CUTTING RING	2	1.5059-086
13	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	2	1.3088-012
14	SECHSKANTSCHRAUBE HEXAGON BOLT	8	1.1387-312
15	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-311
16	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-034

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**



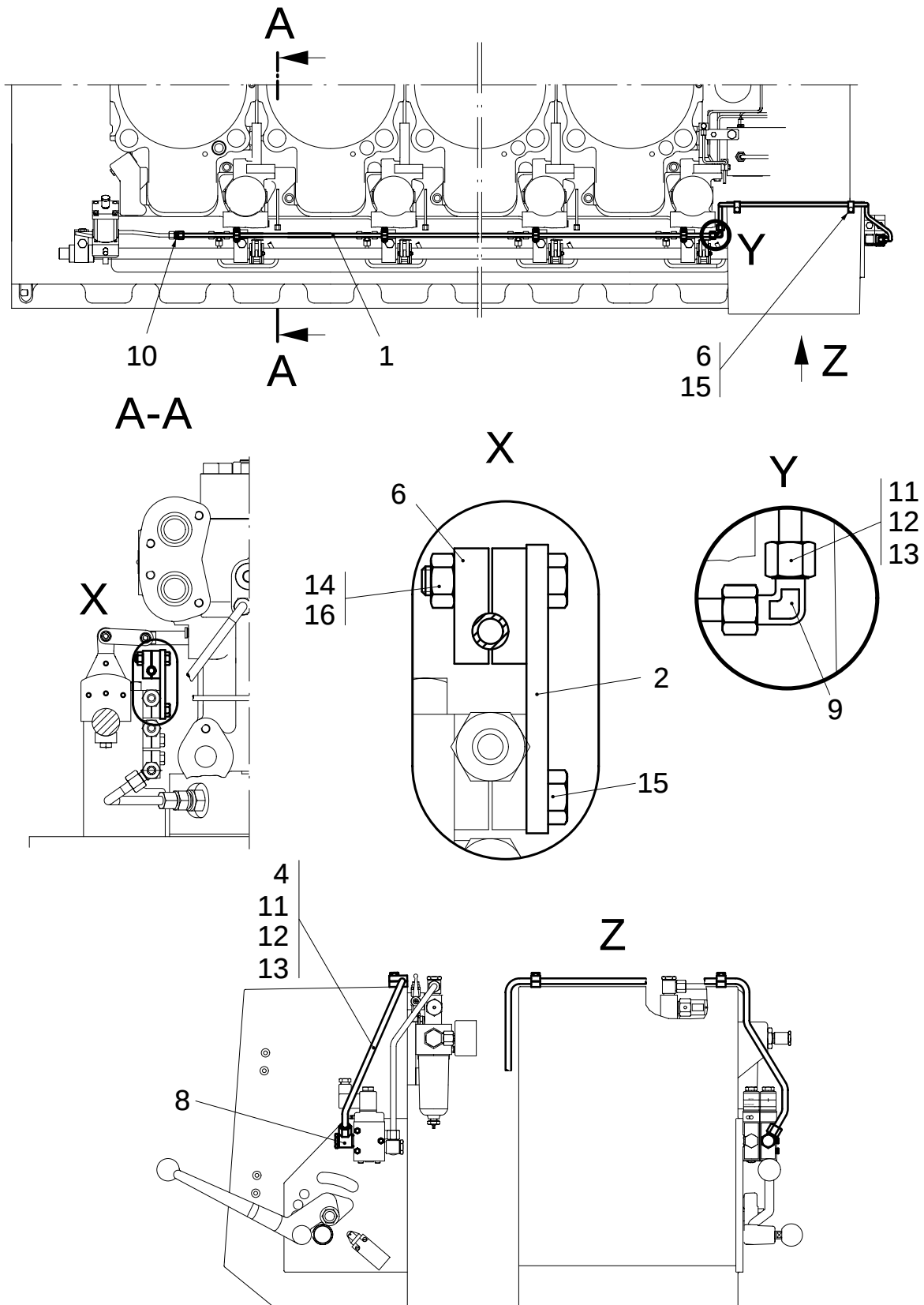
Control Air Piping
for Fuel Limiter

M25

10

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPING ASSEMBLY	1	258628 FF
1	STEUERLUFTLEITUNG, VOLLST. CONTROL AIR PIPE, COMPL.	1	258628-501
2	HALTER BRACKET	9	258628-002
4	ROHRLEITUNG PIPE		1.9090-018
6	ROHRKLEMME PIPE CLAMP	22	1.5011-002
8	SCHWENKVERSCHRAUBUNG BANJO	1	1.5098-820
9	STUTZEN UNION ELBOW	1	1.5095-242
10	STUTZEN PIPE UNION	1	1.5095-042
11	ÜBERWURFMUTTER UNION NUT	2	1.5040-116
12	SCHNEIDRING CUTTING RING	2	1.5059-086
13	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	2	1.3088-012
14	SECHSKANTSCHRAUBE HEXAGON BOLT	9	1.1387-312
15	SECHSKANTSCHRAUBE HEXAGON SCREW	11	1.1387-311
16	SECHSKANTMUTTER HEXAGON NUT	9	1.2007-034

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**



Gauge Panel

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERTAFEL, VOLLST. GAUGE PANEL ASSEMBLY	1	254630 AA
1	GEHÄUSE HOUSING	1	9.4630-001
2	TABLEAU GAUGE BOARD	1	9.4630-002
3	TABLEAU GAUGE BOARD	1	9.4630-003
4	TABLEAU GAUGE BOARD	1	9.4630-004
7	MANOMETER, 0-60 BAR PRESSURE GAUGE, 0-60 BAR	1	1.4630-113
8	MANOMETER, 0-4 BAR PRESSURE GAUGE, 0-4 BAR	1	1.4630-111
9	MANOMETER, 0-8 BAR PRESURE GAUGE, 0-8 BAR	3	1.4630-112
10	MANOMETER, 0-16 BAR PRESSURE GAUGE, 0-16 BAR	1	1.4630-114
20	TEMPERATURMESSGERÄT TEMPERATURE MEASURING INSTRUMENT	1	0.9963-020
21	DREHZAHLANZEIGE SPEED INDICATOR	2	0.9963-021
22	SKALA SCALE	1	0.9963-322
23	SKALA SCALE	1	0.9963-422
25	LEUCHTDRUCKTASTE LUMINOUS PUSH-BUTTON	3	0.9963-025
26	MELDELEUCHTE INDICATOR LAMP	3	0.9963-026
27	FRONTRAHMEN FRONT FRAME	6	0.9963-027
28	DRUCKHAUBE PUSH-BUTTON CAP	2	0.9963-028
29	DRUCKHAUBE PUSH-BUTTON CAP	2	0.9963-029
30	DRUCKHAUBE PUSH-BUTTON CAP	1	0.9963-030
31	DRUCKHAUBE PUSH-BUTTON CAP	1	0.9963-031
32	GLÜHLAMPE BULB	# 5	0.3621-956

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Gauge Panel

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
35	POTENTIOMETER POTENTIOMETER	1	0.9963-035
36	EINSTELLKNOPF ADJUSTING KNOB	1	0.9963-036
37	STELLUNGSWÄHLER POSITION SELECTOR	1	0.9963-037
38	SCHALTANSATZ SWITCHING CONNECTION	1	0.9963-038
39	SCHALTANSATZ SWITCHING CONNECTION	1	0.9963-039
40	SCHILDTRÄGER PLATE SUPPORT	1	0.9963-040
45	STECKVERBINDER CONNECTOR	2	0.9963-042
46	STECKVERBINDER CONNECTOR	1	0.9963-046
51	SENKSCRAUBE RAISED COUNTERSUNK HEAD SCREW	24	1.1284-021
52	ZYLINDERSCHRAUBE CHEESE HEAD SCREW	16	1.1135-183
53	FEDERRING SPRING WASHER	# 16	1.0065-207
54	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-030

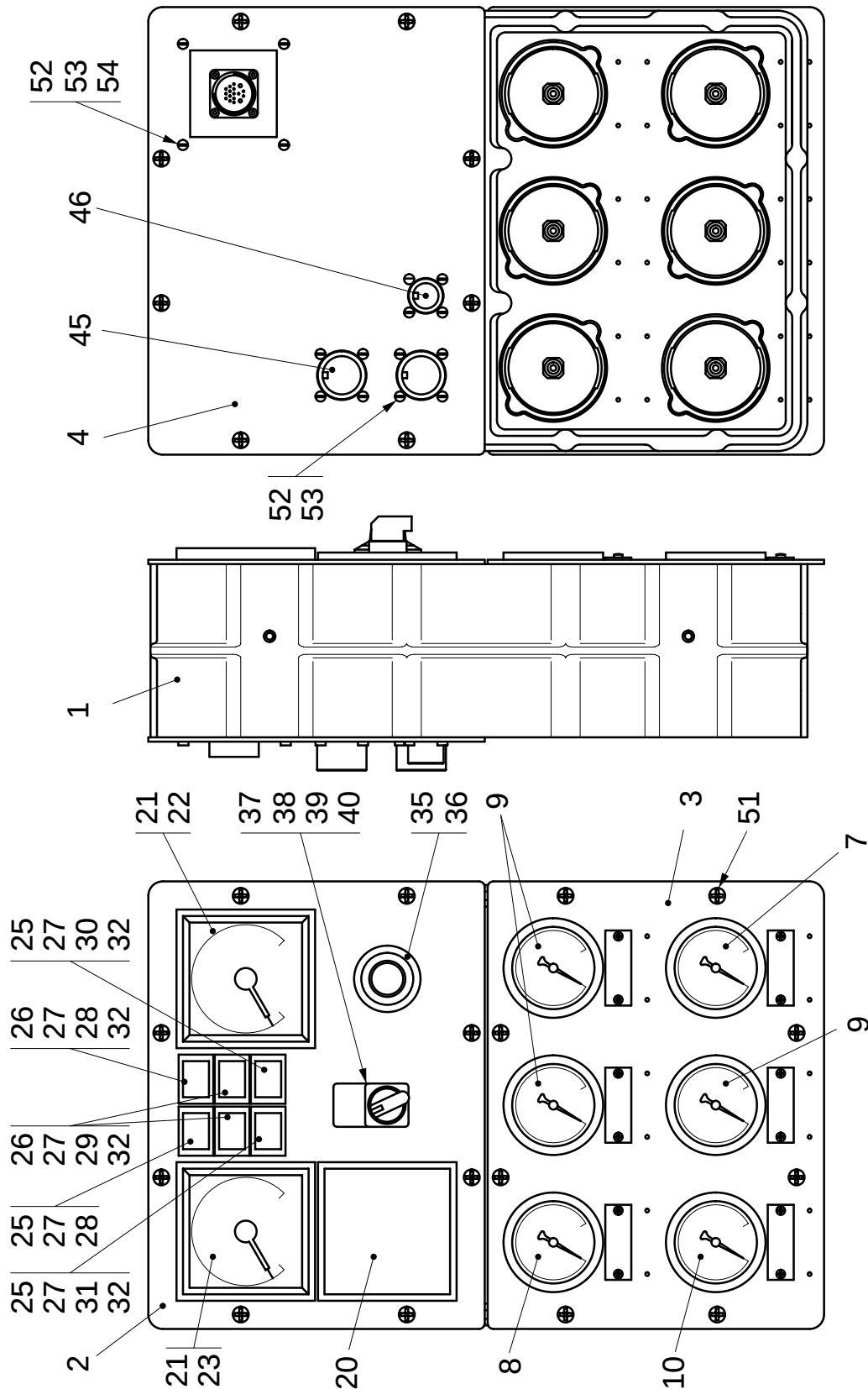
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Gauge Panel

M25

11



Gauge Panel

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERTAFEL, VOLLST. GAUGE PANEL ASSEMBLY	1	254630 BB
1	GEHÄUSE HOUSING	1	9.4630-001
2	TABLEAU GAUGE BOARD	1	254630-002
3	TABLEAU GAUGE BOARD	1	9.4630-003
4	TABLEAU GAUGE BOARD	1	9.4630-004
7	MANOMETER PRESSURE GAUGE	1	1.4630-113
8	MANOMETER PRESSURE GAUGE	1	1.4630-111
9	MANOMETER PRESSURE GAUGE	3	1.4630-112
10	MANOMETER PRESSURE GAUGE	1	1.4630-114
20	TEMPERATURMESSGERÄT TEMPERATURE MEASURING INSTRUMENT	1	0.9963-020
21	DREHZAHLANZEIGE SPEED INDICATOR	2	0.9963-021
22	SKALA SCALE	1	0.9963-322
23	SKALA SCALE	1	0.9963-422
25	LEUCHTDRUCKTASTE LUMINOUS PUSH-BUTTON	3	0.9963-025
26	MELDELEUCHTE INDICATOR LAMP	5	0.9963-026
27	FRONTRAHMEN FRONT FRAME	8	0.9963-027
28	DRUCKHAUBE PUSH-BUTTON CAP	4	0.9963-028
29	DRUCKHAUBE PUSH-BUTTON CAP	2	0.9963-029
30	DRUCKHAUBE PUSH-BUTTON CAP	1	0.9963-030
31	DRUCKHAUBE PUSH-BUTTON CAP	1	0.9963-031
32	GLÜHLAMPE BULB	# 7	0.3621-956

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Gauge Panel

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
35	POTENTIOMETER POTENTIOMETER	1	0.9963-035
36	EINSTELLKNOPF ADJUSTING KNOB	1	0.9963-036
37	STELLUNGSWÄHLER SELECTOR SWITCH	1	0.9963-237
39	SCHALTANSATZ SWITCH SUPPORT	1	0.9963-139
40	SCHILDTRÄGER PLATE SUPPORT	2	0.9963-040
42	BETÄTIGUNGSVORSATZ FÜR SCHALTER OPERATION SUPPORT FOR SWITCH	1	0.9963-142
43	UMSCHALTER CHANGE-OVER SWITCH	1	0.9963-043
45	STECKVERBINDER CONNECTOR	2	0.9963-042
46	STECKVERBINDER CONNECTOR	1	0.9963-046
51	SENKSCRAUBE RAISED COUNTERSUNK HEAD SCREW	16	1.1284-021
52	ZYLINDERSCHRAUBE CHEESE HEAD SCREW	16	1.1135-183
53	FEDERRING SPRING WASHER	# 16	1.0065-207
54	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-030

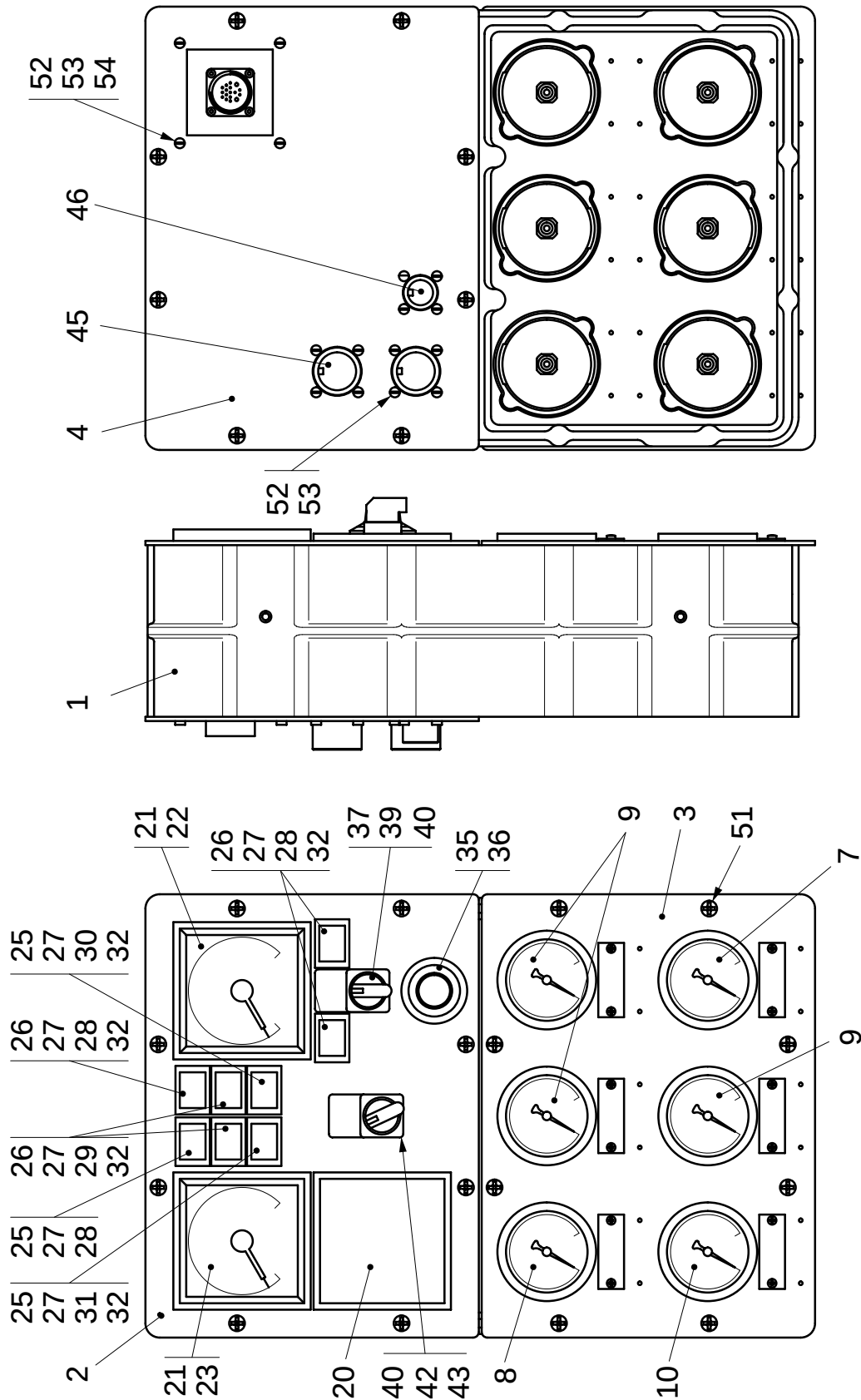
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Gauge Panel

M25

11



Gauge Panel

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERTAFEL, VOLLST. GAUGE PANEL ASSEMBLY	1	254630 CC
1	GEHÄUSE HOUSING	1	9.4630-001
2	TABLEAU GAUGE BOARD	1	254630-102
3	TABLEAU GAUGE BOARD	1	9.4630-003
4	TABLEAU GAUGE BOARD	1	9.4630-004
7	MANOMETER, 0-60 BAR PRESSURE GAUGE, 0-60 BAR	1	1.4630-113
8	MANOMETER, 0-4 BAR PRESSURE GAUGE, 0-4 BAR	1	1.4630-111
9	MANOMETER, 0-8 BAR PRESURE GAUGE, 0-8 BAR	3	1.4630-112
10	MANOMETER, 0-16 BAR PRESSURE GAUGE, 0-16 BAR	1	1.4630-114
20	TEMPERATURMESSGERÄT TEMPERATURE MEASURING INSTRUMENT	1	0.9963-020
21	DREHZAHLANZEIGE SPEED INDICATOR	1	0.9963-021
22	SKALA SCALE	1	0.9963-322
25	LEUCHTDRUCKTASTE LUMINOUS PUSH-BUTTON	1	0.9963-025
27	FRONTRAHMEN FRONT FRAME	1	0.9963-027
31	DRUCKHAUBE PUSH-BUTTON CAP	1	0.9963-031
37	SCHLOSS LOCK	1	0.9963-137
38	UMSCHALTER CHANGE-OVER SWITCH	1	0.9963-138
40	SCHILDTRÄGER PLATE SUPPORT	1	0.9963-040
45	STECKVERBINDER CONNECTOR	1	0.9963-042
46	STECKVERBINDER CONNECTOR	1	0.9963-046
47	DECKEL COVER	1	9.4630-047

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Gauge Panel

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
51	SENKSCHRAUBE RAISED COUNTERSUNK HEAD SCREW	24	1.1284-021
52	ZYLINDERSCHRAUBE CHEESE HEAD SCREW	16	1.1135-183
53	FEDERRING SPRING WASHER	# 16	1.0065-207
54	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-030

= VERBRAUCHSTEILE
CONSUMABLES

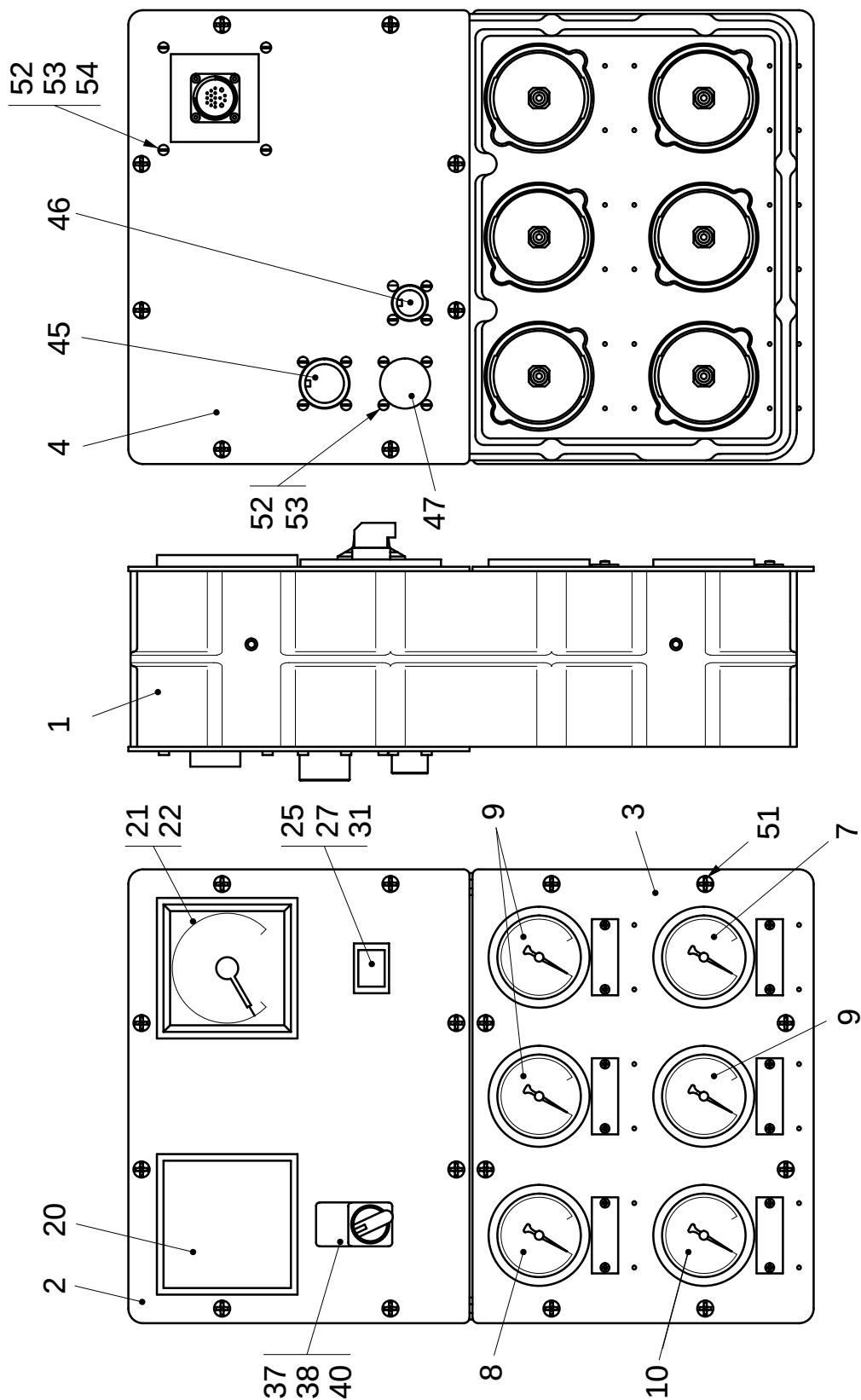
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Gauge Panel

M25

11



Gauge Panel

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERTAFEL, VOLLST. GAUGE PANEL ASSEMBLY	1	254630 DD
1	GEHÄUSE HOUSING	1	9.4630-001
2	TABLEAU GAUGE BOARD	1	2.4630-102
3	TABLEAU GAUGE BOARD	1	9.4630-003
4	TABLEAU GAUGE BOARD	1	2.4630-004
7	MANOMETER, 0-60 BAR PRESSURE GAUGE, 0-60 BAR	1	1.4630-113
8	MANOMETER, 0-4 BAR PRESSURE GAUGE, 0-4 BAR	1	1.4630-111
9	MANOMETER, 0-8 BAR PRESURE GAUGE, 0-8 BAR	3	1.4630-112
10	MANOMETER, 0-16 BAR PRESSURE GAUGE, 0-16 BAR	1	1.4630-114
21	DREHZAHLANZEIGE SPEED INDICATOR	1	0.9963-021
22	SKALA SCALE	1	0.9963-322
25	LEUCHTDRUCKTASTE LUMINOUS PUSH-BUTTON	1	0.9963-025
27	FRONTRAHMEN FRONT FRAME	1	0.9963-027
31	DRUCKHAUBE PUSH-BUTTON CAP	1	0.9963-031
37	SCHLOSS LOCK	1	0.9963-137
38	UMSCHALTER CHANGE-OVER SWITCH	1	0.9963-138
40	SCHILDTRÄGER PLATE SUPPORT	1	0.9963-040
45	STECKVERBINDER CONNECTOR	1	0.9963-042
46	STECKVERBINDER CONNECTOR	1	0.9963-046
47	DECKEL COVER	1	9.4630-047
51	SENKSCHRAUBE RAISED COUNTERSUNK HEAD SCREW	24	1.1284-021

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Gauge Panel

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
52	ZYLINDERSCHRAUBE CHEESE HEAD SCREW	12	1.1135-183
53	FEDERRING SPRING WASHER	# 12	1.0065-207
54	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-030

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CONSUMABLES

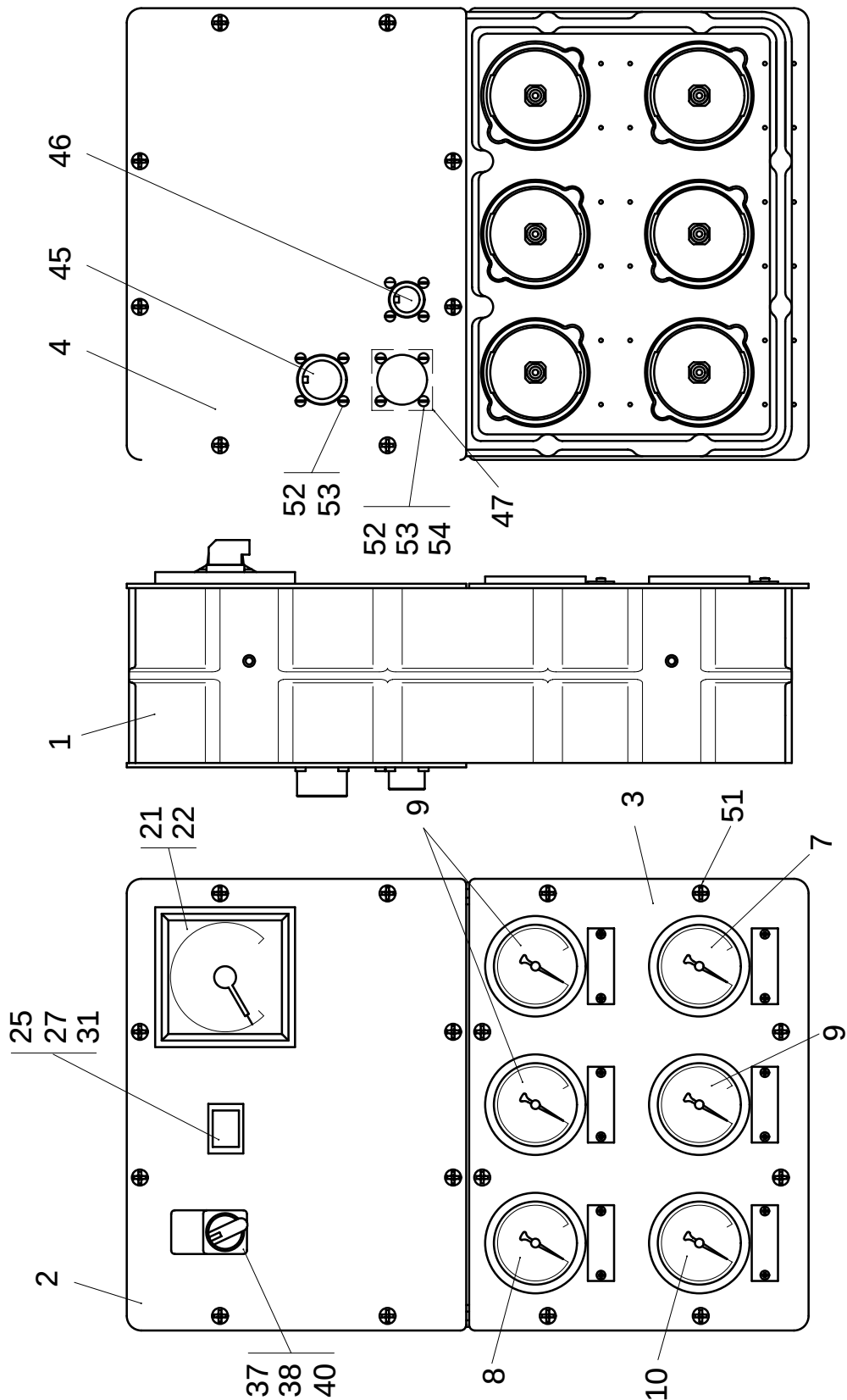
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Gauge Panel

M25

11



Gauge Panel

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERTAFEL, VOLLST. GAUGE PANEL ASSEMBLY	1	254630 EE
1	GEHÄUSE HOUSING	1	9.4630-001
2	TABLEAU GAUGE BOARD	1	254630-202
3	TABLEAU GAUGE BOARD	1	9.4630-003
7	MANOMETER, 0-60 BAR PRESSURE GAUGE, 0-60 BAR	1	1.4630-113
8	MANOMETER, 0-4 BAR PRESSURE GAUGE, 0-4 BAR	1	1.4630-111
9	MANOMETER, 0-8 BAR PRESURE GAUGE, 0-8 BAR	3	1.4630-112
10	MANOMETER, 0-16 BAR PRESSURE GAUGE, 0-16 BAR	1	1.4630-114
51	SENKSCRAUBE RAISED COUNTERSUNK HEAD SCREW	16	1.1284-021

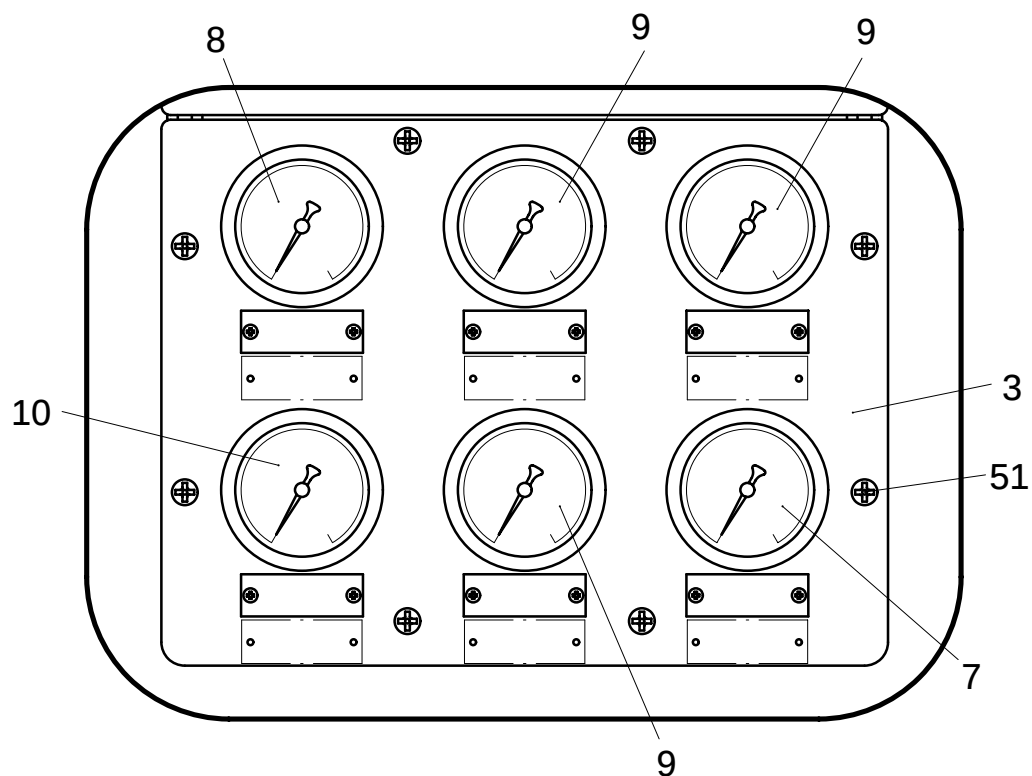
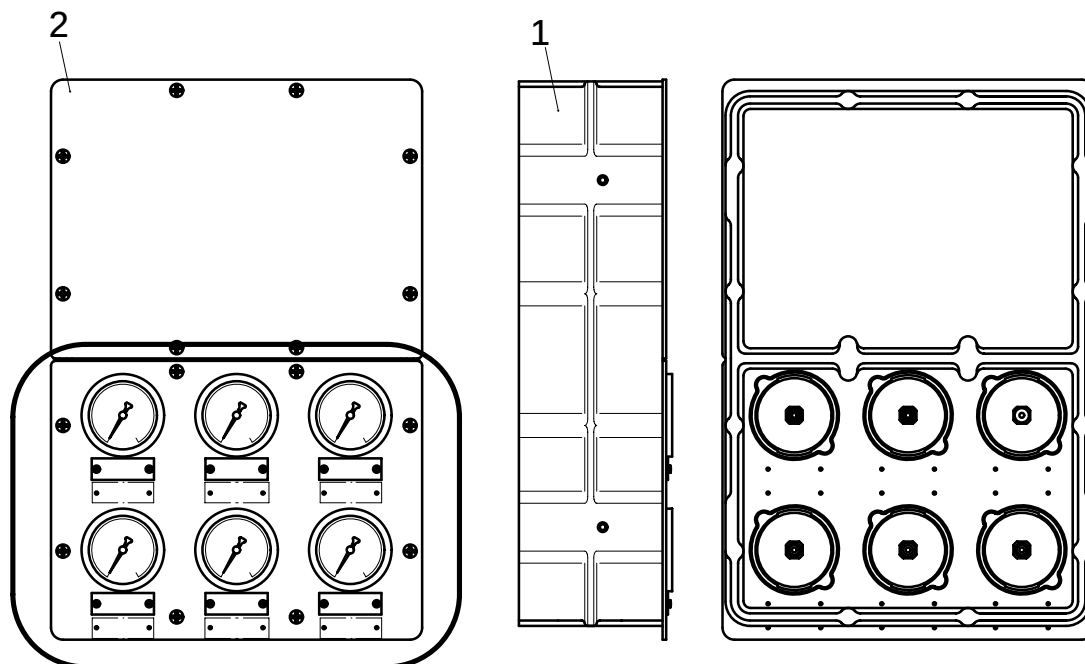
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Gauge Panel

M25

11



Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERLEITUNGEN, VOLLST. PRESSURE GAUGE LINE ASSEMBLY	1	254643 AA
1	ROHRLEITUNG STEEL TUBE		1.9056-201
8	ROHRLEITUNG COPPER TUBE		1.9090-010
16	STUTZEN MALE CONNECTOR	2	1.5094-130
17	STUTZEN MALE CONNECTOR	1	1.5094-230
18	STUTZEN MALE CONNECTOR	1	1.5094-250
19	STUTZEN PIPE UNION	1	1.5098-014
20	STUTZEN PIPE UNION	2	1.5095-040
21	STUTZEN UNION TEE	2	1.5095-440
22	STUTZEN UNION TEE	1	1.5095-510
23	STUTZEN ADJUSTABLE T-ADAPTER	1	1.5093-441
24	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-330
25	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-300
26	GEWINDEREDUZIERUNG REDUCER	1	1.5036-053
27	KONUS-REDUZIERANSCHLUSS REDUCING UNION	1	1.4519-443
28	GEWINDEREDUZIERUNG REDUCER	1	1.4639-049
29	HALTER BRACKET	3	254643-029
30	DÄMPFUNGSSTUTZEN DAMPING SOCKET	1	1.5075-013
31	DÄMPFUNGSSTUTZEN DAMPING UNION	1	1.5075-012
32	SCHEIBE WASHER	2	1.0058-459
33	ÜBERWURFMUTTER UNION NUT	5	1.5040-134

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Pressure Gauge Line Mounting

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
34	ÜBERWURFMUTTER UNION NUT	17	1.5040-114
35	SCHNEIDRING CUTTING RING	8	1.5059-208
36	SCHNEIDRING CUTTING RING	16	1.5059-084
37	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	16	1.3088-006
39	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-445
40	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-251
41	SECHSKANTSCHRAUBE HEXAGON BOLT	5	1.1367-241
42	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-311
43	SECHSKANTMUTTER HEXAGON NUT	3	1.2009-534
44	DICHTRING JOINT RING	# 1	1.7010-133
45	DICHTRING JOINT RING	# 1	1.7010-078
46	DICHTRING JOINT RING	# 1	1.7010-064
47	DICHTRING JOINT RING	# 2	1.7033-103
48	DICHTRING JOINT RING	# 1	1.7010-037
50	ROHRKLEMME PIPE CLAMP	27	1.5011-001
51	ROHRKLEMME PIPE CLAMP	8	1.5011-002
52	GUMMITÜLLE RUBBER SOCKET	29	1.5011-194

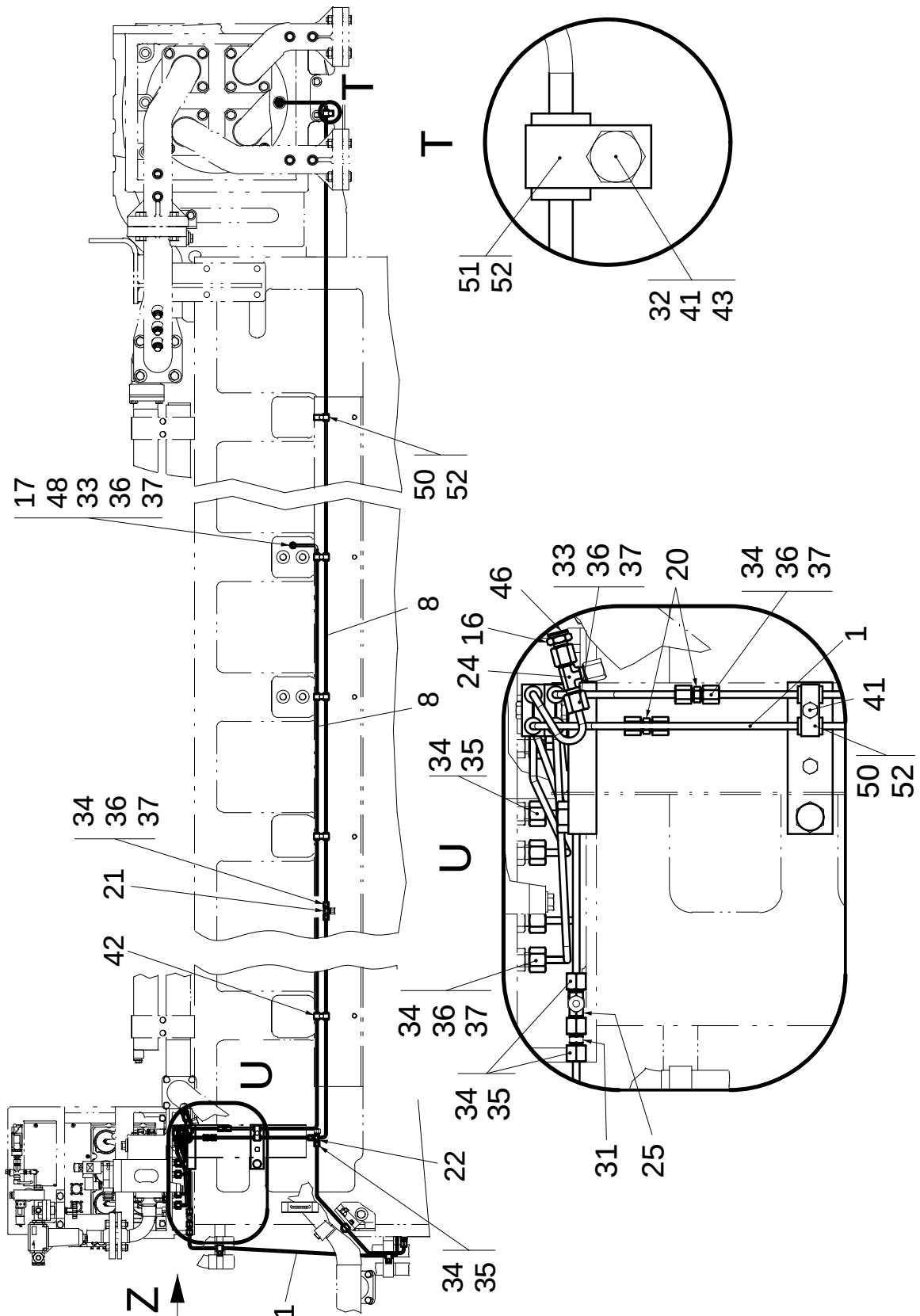
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Pressure Gauge Line Mounting

M25

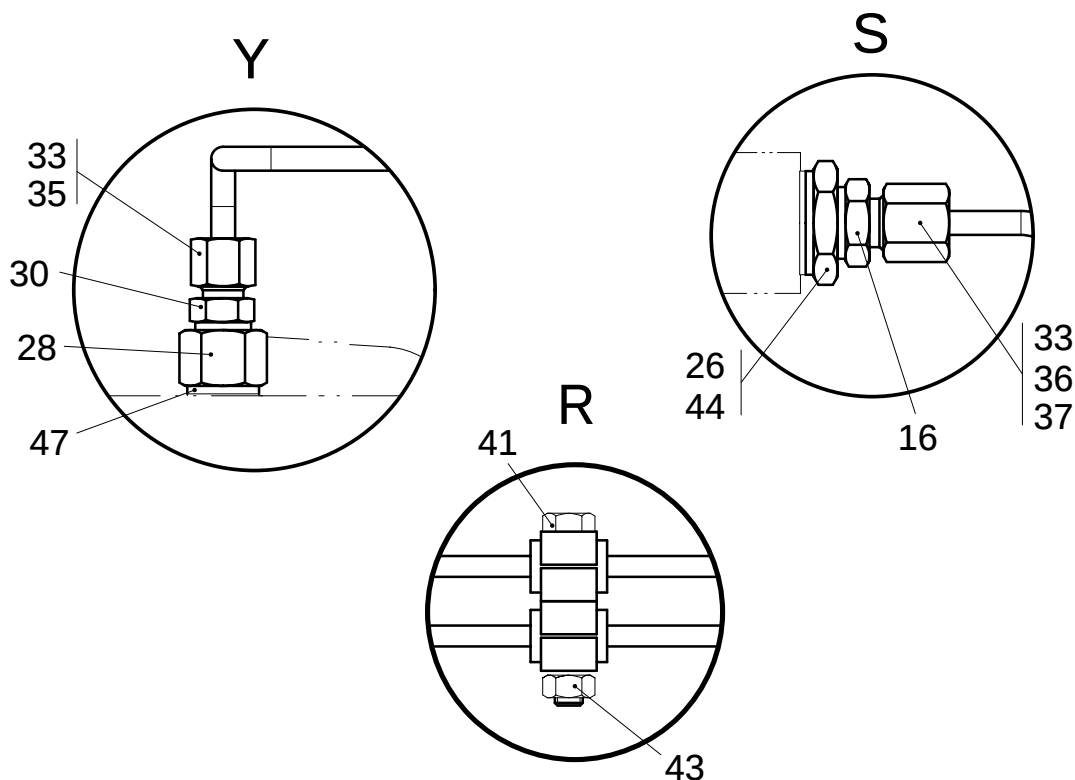
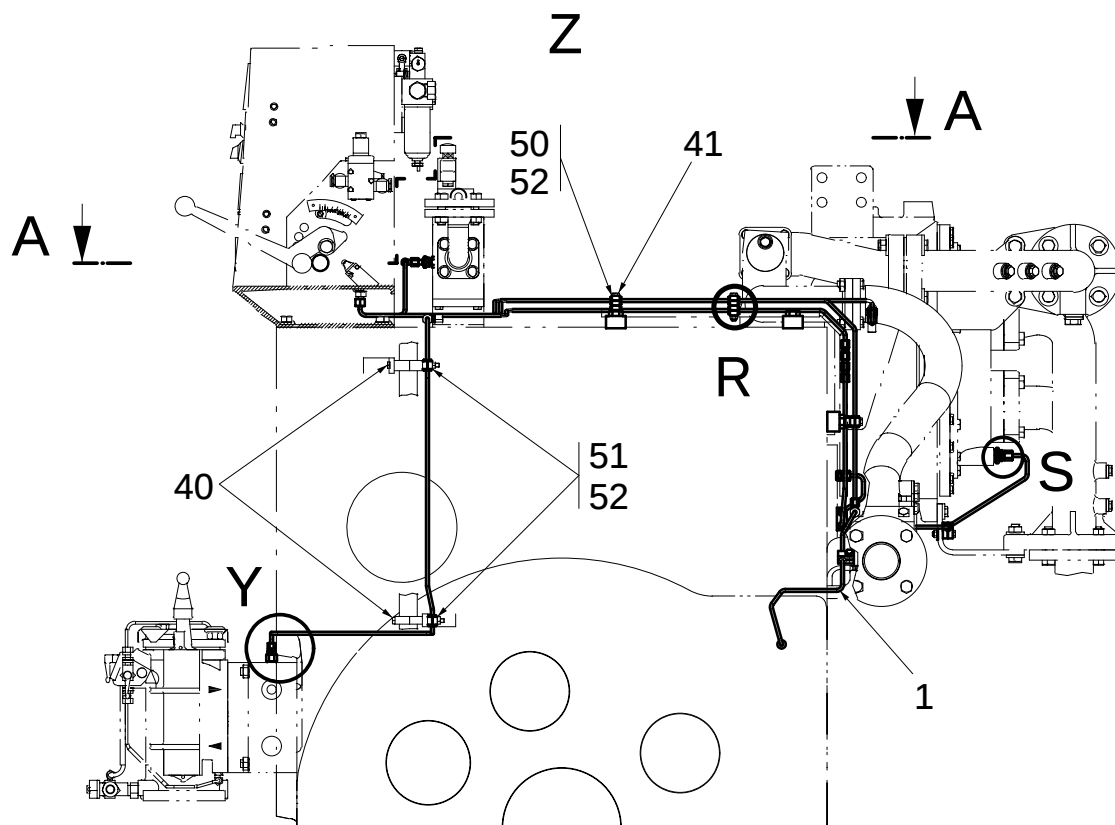
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Pressure Gauge Line Mounting

M25

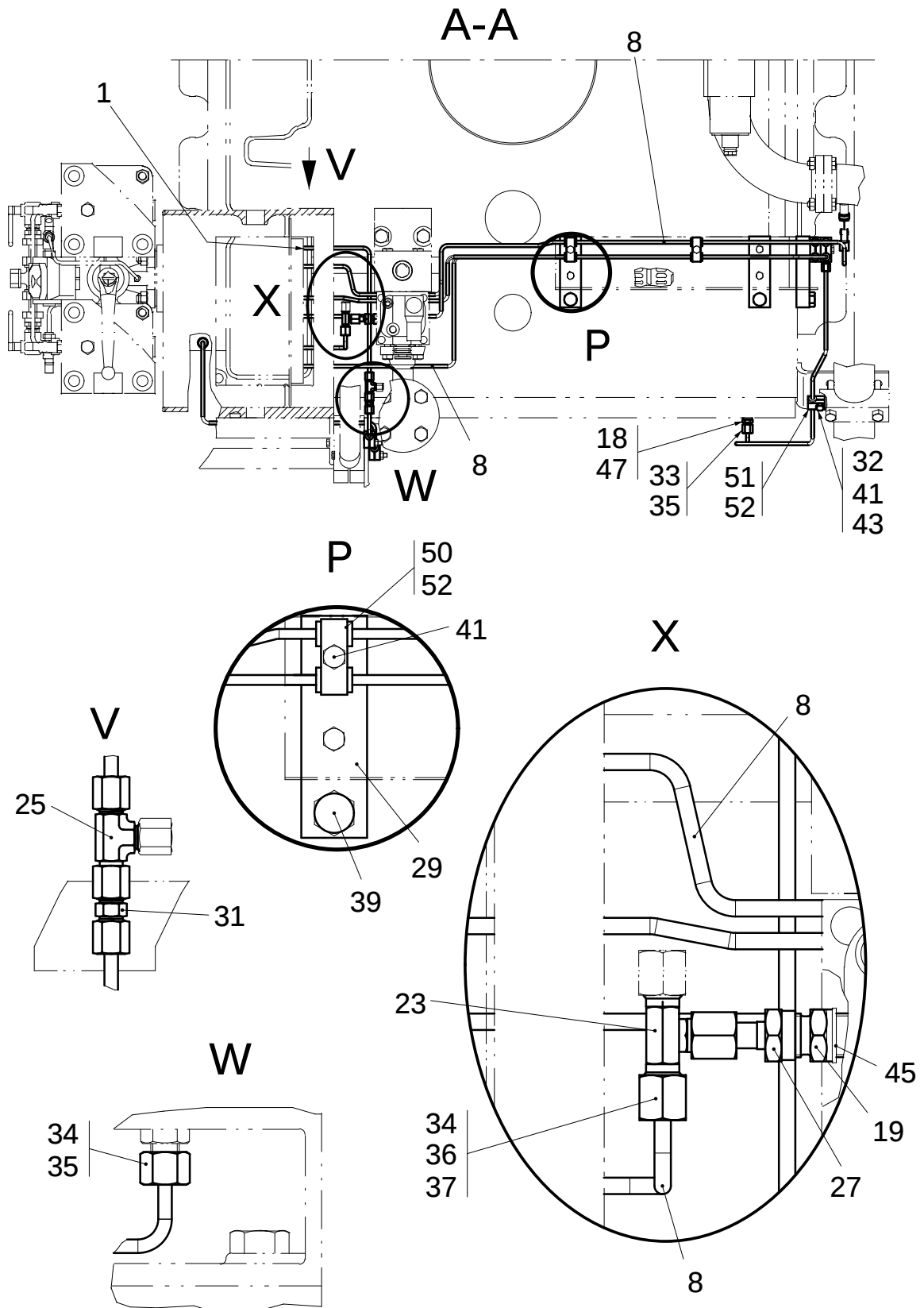
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Pressure Gauge Line Mounting

M25

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Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERLEITUNGEN, VOLLST. PRESSURE GAUGE LINE ASSEMBLY	1	254643 BB
1	ROHRLEITUNG STEEL TUBE		1.9056-201
8	ROHRLEITUNG COPPER TUBE		1.9090-010
16	STUTZEN MALE CONNECTOR	1	1.5094-130
17	STUTZEN MALE CONNECTOR	1	1.5094-230
18	STUTZEN MALE CONNECTOR	1	1.5094-250
19	STUTZEN PIPE UNION	1	1.5098-014
20	STUTZEN PIPE UNION	1	1.5095-040
21	STUTZEN UNION TEE	2	1.5095-440
22	STUTZEN UNION TEE	1	1.5095-510
23	STUTZEN ADJUSTABLE T-ADAPTER	1	1.5093-442
24	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-330
25	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-300
26	STUTZEN UNION TEE	1	1.5094-188
27	KONUS-REDUZIERANSCHLUSS REDUCING UNION	2	1.4519-443
28	GEWINDEREDUZIERUNG REDUCER	1	1.4639-049
30	DÄMPFUNGSSTUTZEN DAMPING SOCKET	1	1.5075-013
31	DÄMPFUNGSSTUTZEN DAMPING UNION	1	1.5075-012
32	SCHEIBE WASHER	2	1.0058-459

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
33	ÜBERWURFMUTTER UNION NUT	4	1.5040-134
34	ÜBERWURFMUTTER UNION NUT	18	1.5040-114
35	SCHNEIDRING CUTTING RING	8	1.5059-208
36	SCHNEIDRING CUTTING RING	16	1.5059-084
37	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	16	1.3088-006
38	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-239
39	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-445
40	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-251
41	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-241
42	SECHSKANTSCHRAUBE HEXAGON SCREW	5	1.1387-311
43	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
45	DICHTRING JOINT RING	# 1	1.7010-078
46	DICHTRING JOINT RING	# 1	1.7010-064
47	DICHTRING JOINT RING	# 2	1.7033-103
48	DICHTRING JOINT RING	# 1	1.7010-037
49	STUTZEN MALE CONNECTOR	1	1.5095-240
50	ROHRKLEMME PIPE CLAMP	20	1.5011-001
51	ROHRKLEMME PIPE CLAMP	8	1.5011-002
52	GUMMITÜLLE RUBBER SOCKET	23	1.5011-194

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
53	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-247
54	HALTER BRACKET	1	254643-054
55	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-387

= VERBRAUCHSTEILE
CONSUMABLES

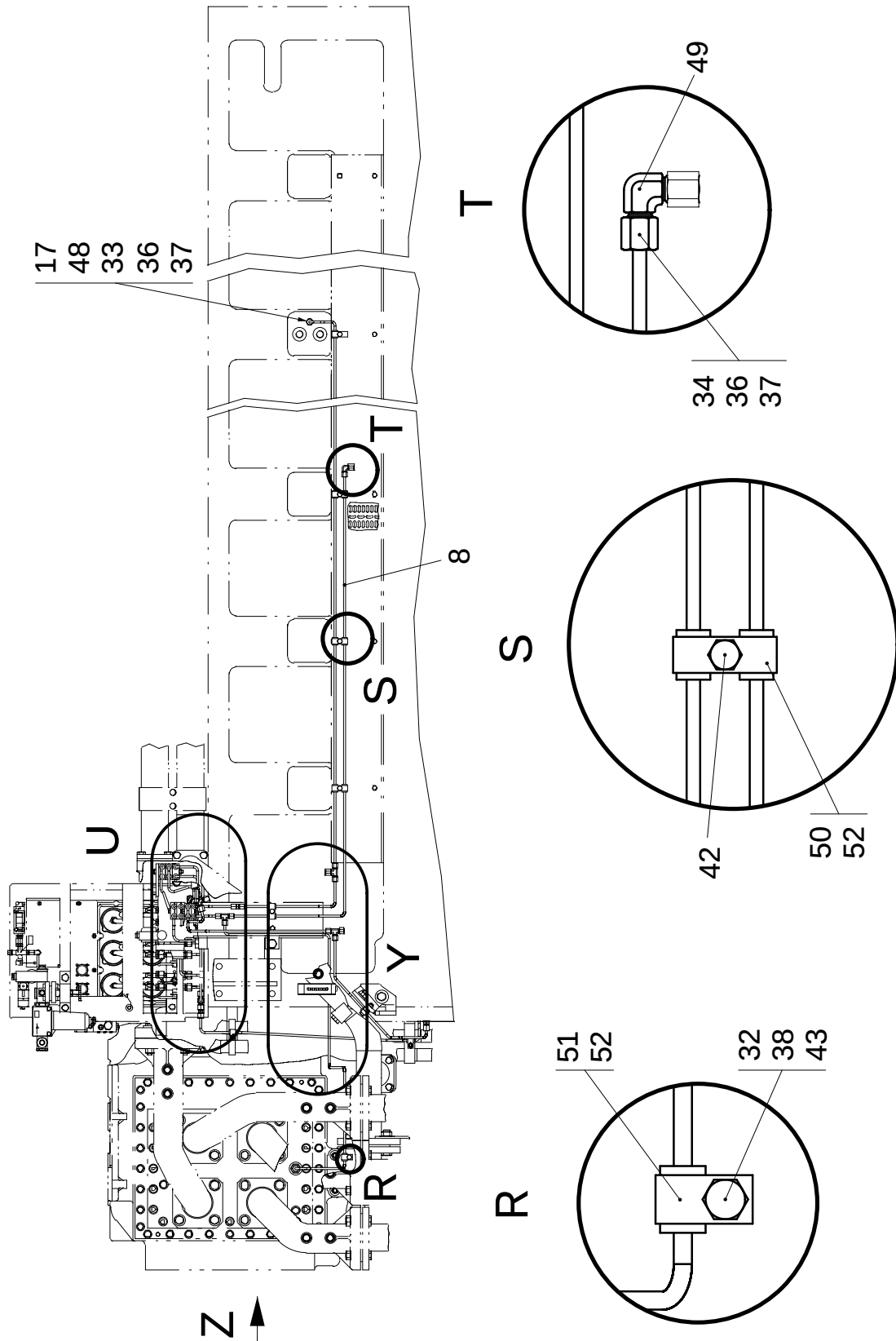
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

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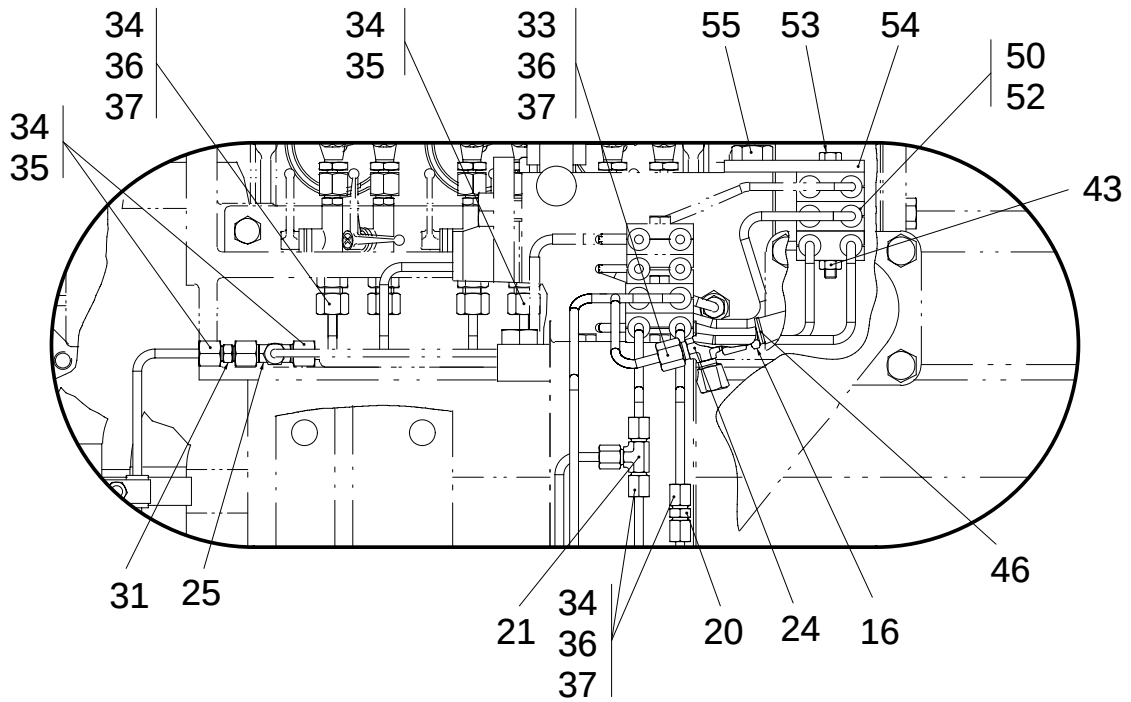


Pressure Gauge Line Mounting

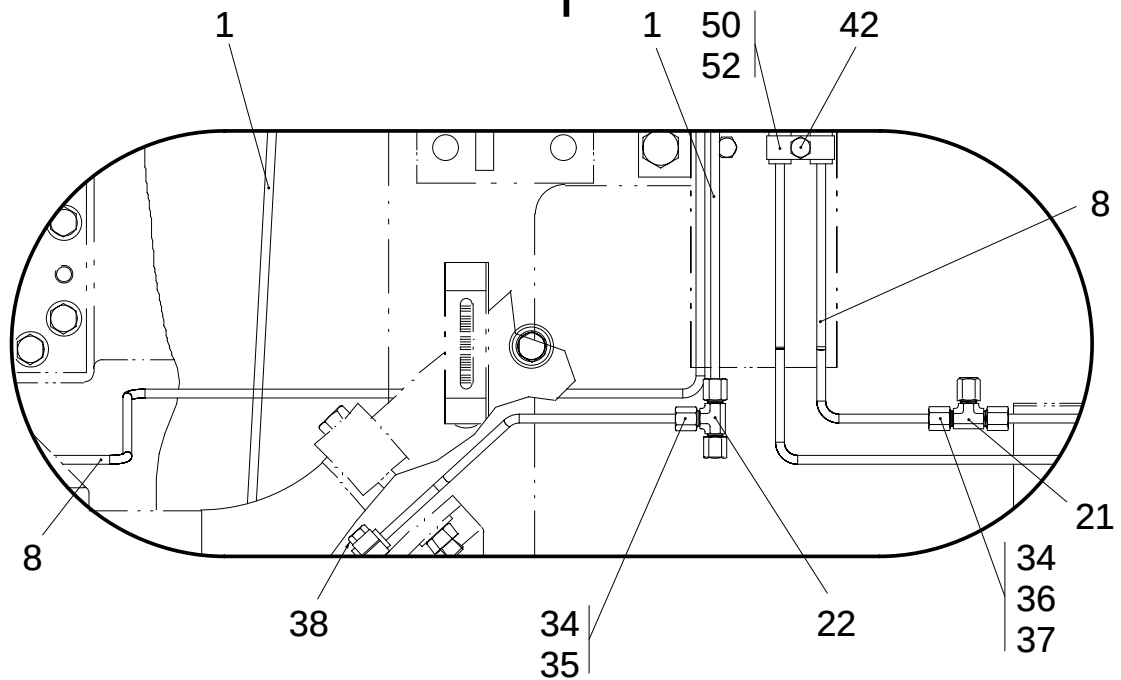
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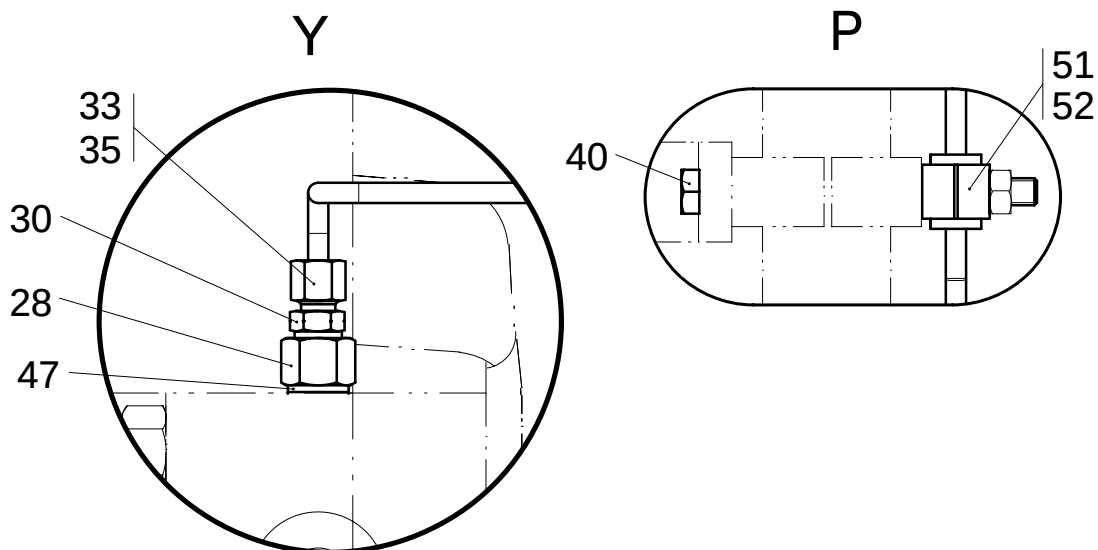
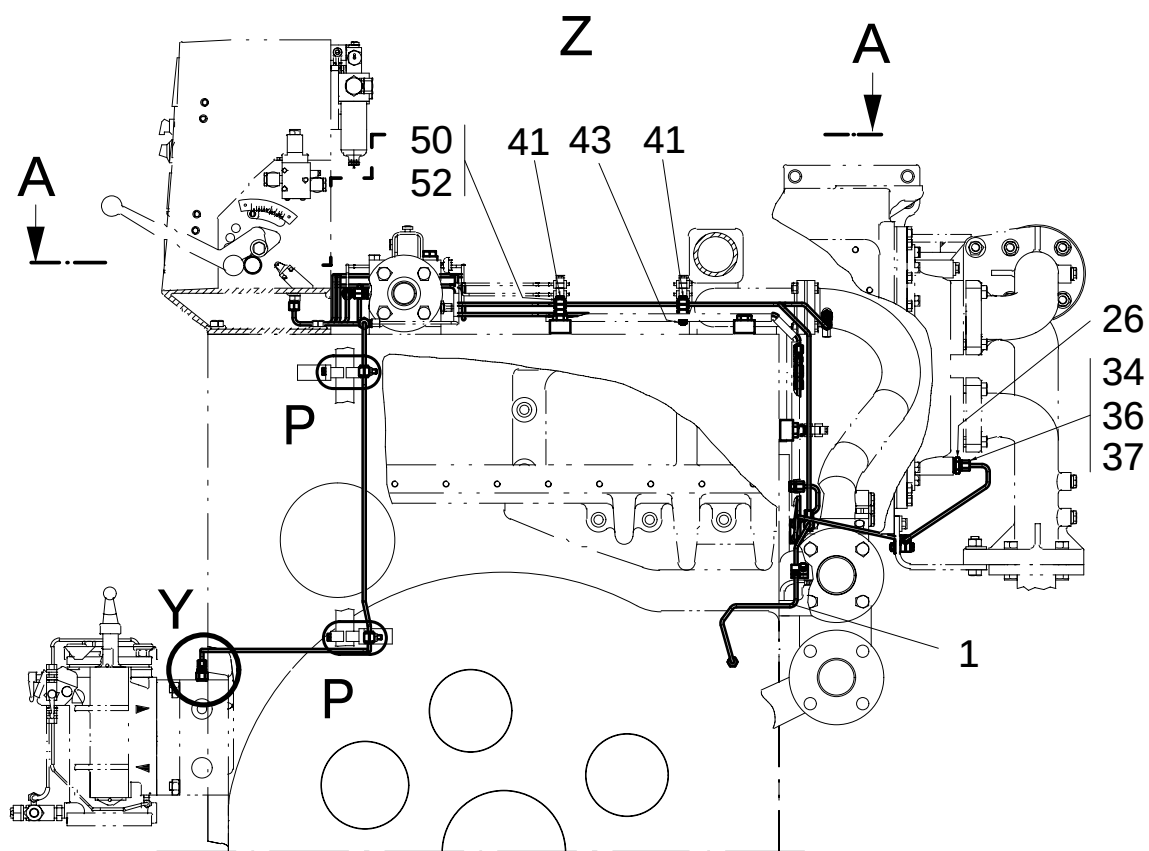
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Pressure Gauge Line Mounting

M25

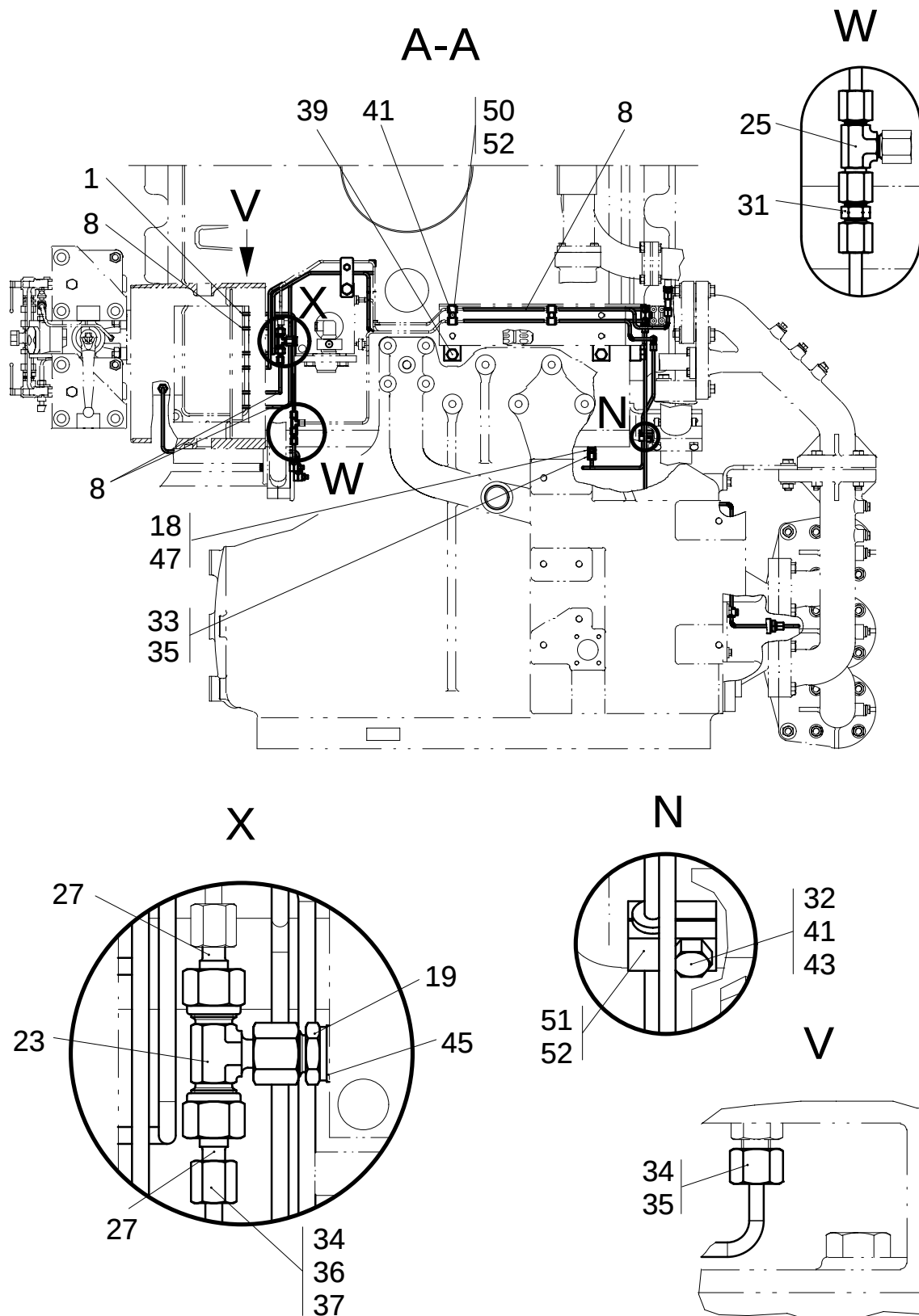
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Pressure Gauge Line Mounting

M25

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Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERLEITUNGEN, VOLLST. PRESSURE GAUGE LINE ASSEMBLY	1	254643 CC
1	ROHRLEITUNG STEEL TUBE		1.9056-201
8	ROHRLEITUNG COPPER TUBE		1.9090-010
16	STUTZEN MALE CONNECTOR	1	1.5094-130
17	STUTZEN MALE CONNECTOR	1	1.5094-230
18	STUTZEN MALE CONNECTOR	1	1.5094-250
19	STUTZEN PIPE UNION	1	1.5098-014
20	STUTZEN PIPE UNION	1	1.5095-040
21	STUTZEN UNION TEE	2	1.5095-440
22	STUTZEN UNION TEE	1	1.5095-510
23	STUTZEN ADJUSTABLE T-ADAPTER	1	1.5093-442
24	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-330
25	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-300
26	STUTZEN UNION TEE	1	1.5094-188
27	KONUS-REDUZIERANSCHLUSS REDUCING UNION	2	1.4519-443
28	GEWINDEREDUZIERUNG REDUCER	1	1.4639-049
30	DÄMPFUNGSSTUTZEN DAMPING SOCKET	1	1.5075-013
31	DÄMPFUNGSSTUTZEN DAMPING UNION	1	1.5075-012
32	SCHEIBE WASHER	2	1.0058-459

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
33	ÜBERWURFMUTTER UNION NUT	4	1.5040-134
34	ÜBERWURFMUTTER UNION NUT	18	1.5040-114
35	SCHNEIDRING CUTTING RING	8	1.5059-208
36	SCHNEIDRING CUTTING RING	16	1.5059-084
37	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	16	1.3088-006
38	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-239
39	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-445
40	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-251
41	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-241
42	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-311
43	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
45	DICHTRING JOINT RING	# 1	1.7010-078
46	DICHTRING JOINT RING	# 1	1.7010-064
47	DICHTRING JOINT RING	# 2	1.7033-103
48	DICHTRING JOINT RING	# 1	1.7010-037
49	STUTZEN MALE CONNECTOR	1	1.5095-240
50	ROHRKLEMME PIPE CLAMP	22	1.5011-001
51	ROHRKLEMME PIPE CLAMP	8	1.5011-002
52	GUMMITÜLLE RUBBER SOCKET	24	1.5011-194

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
53	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-247
54	HALTER BRACKET	1	254643-054
55	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-387

= VERBRAUCHSTEILE
CONSUMABLES

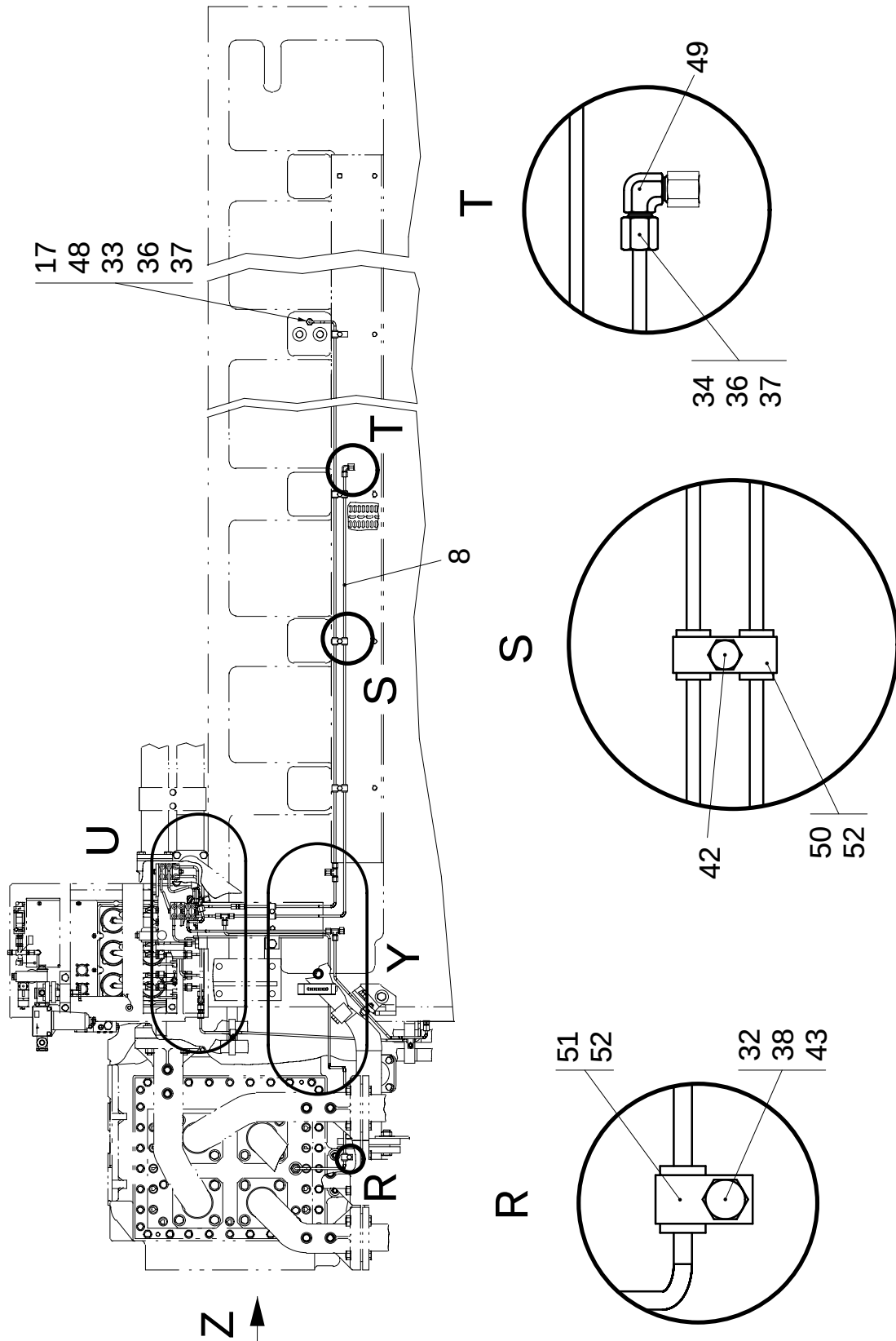
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

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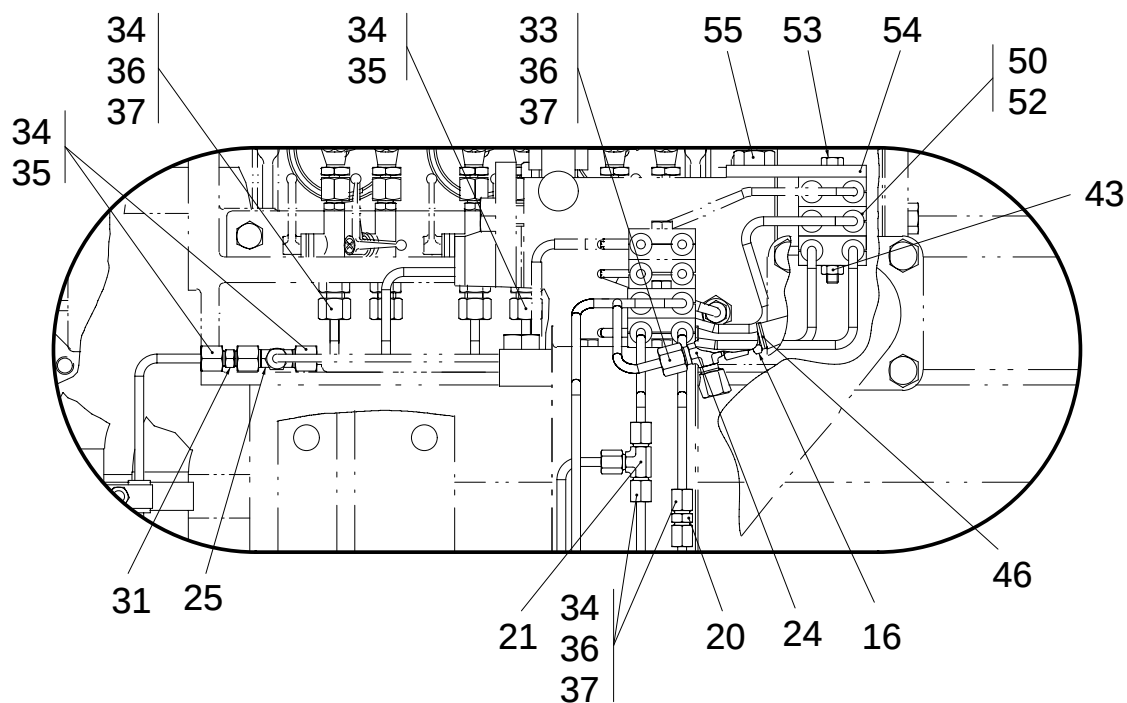


Pressure Gauge Line Mounting

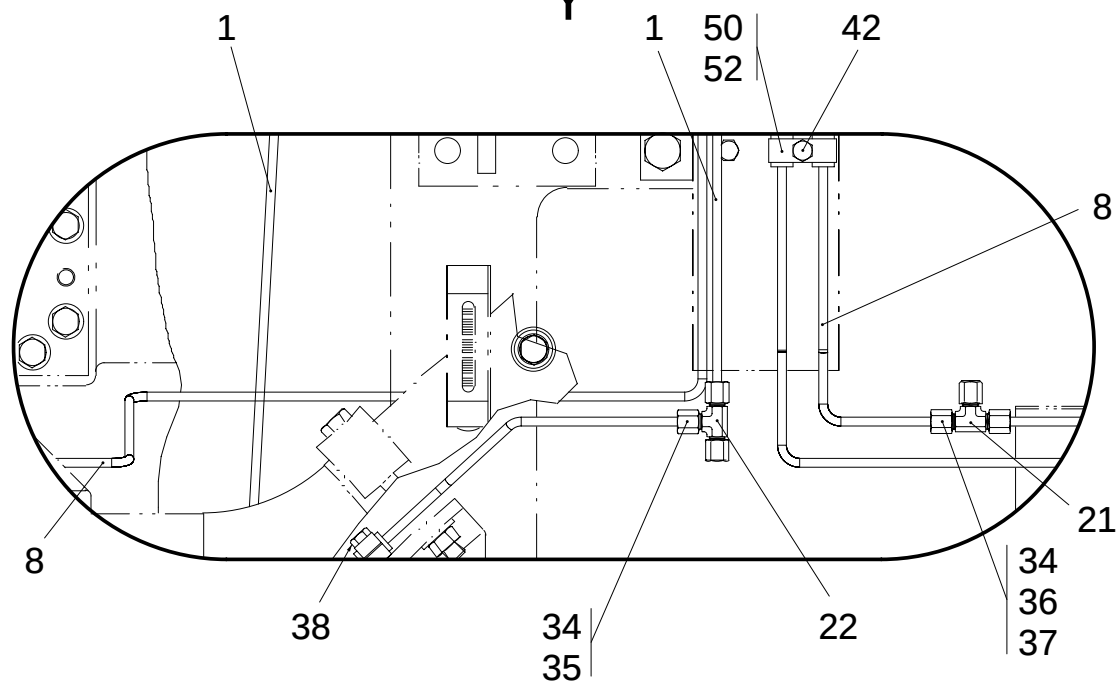
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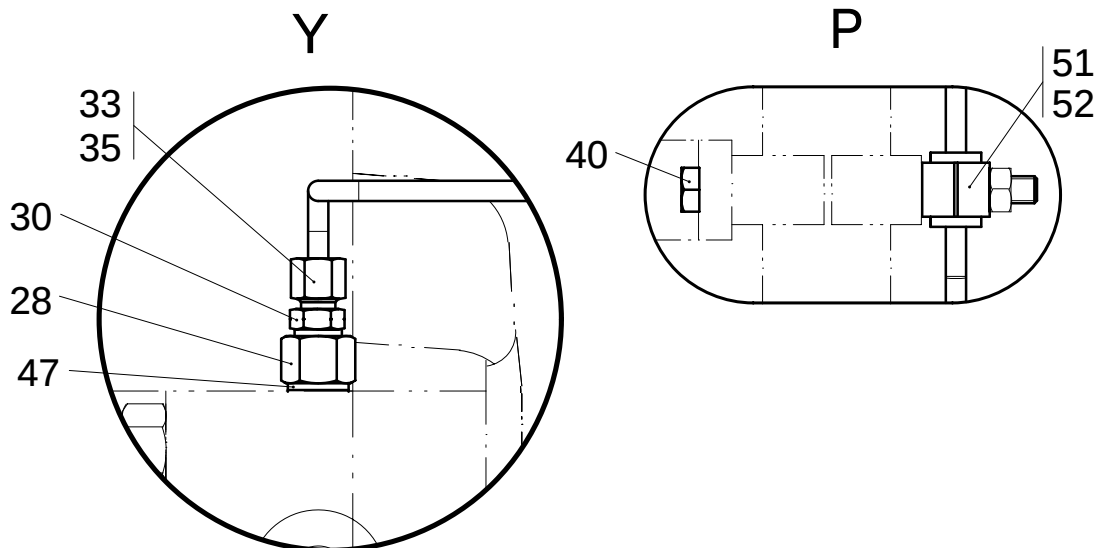
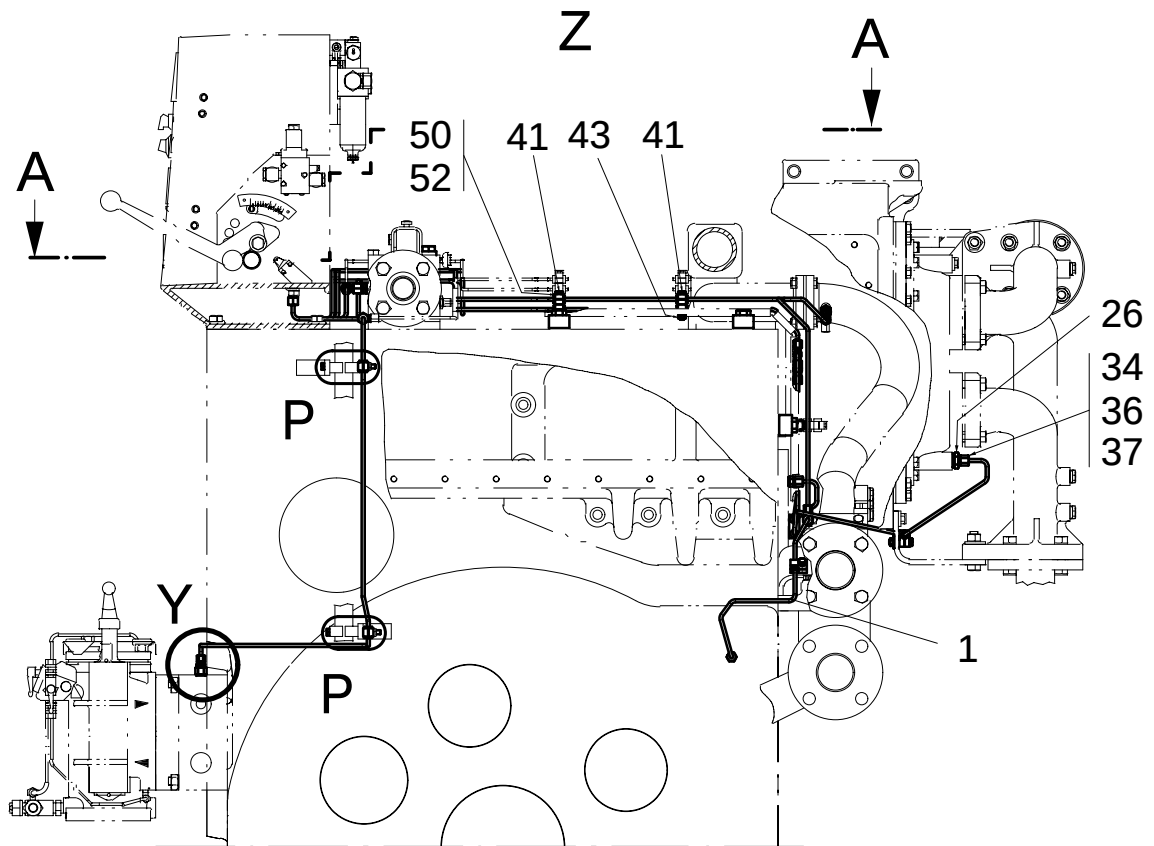
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Pressure Gauge Line Mounting

M25

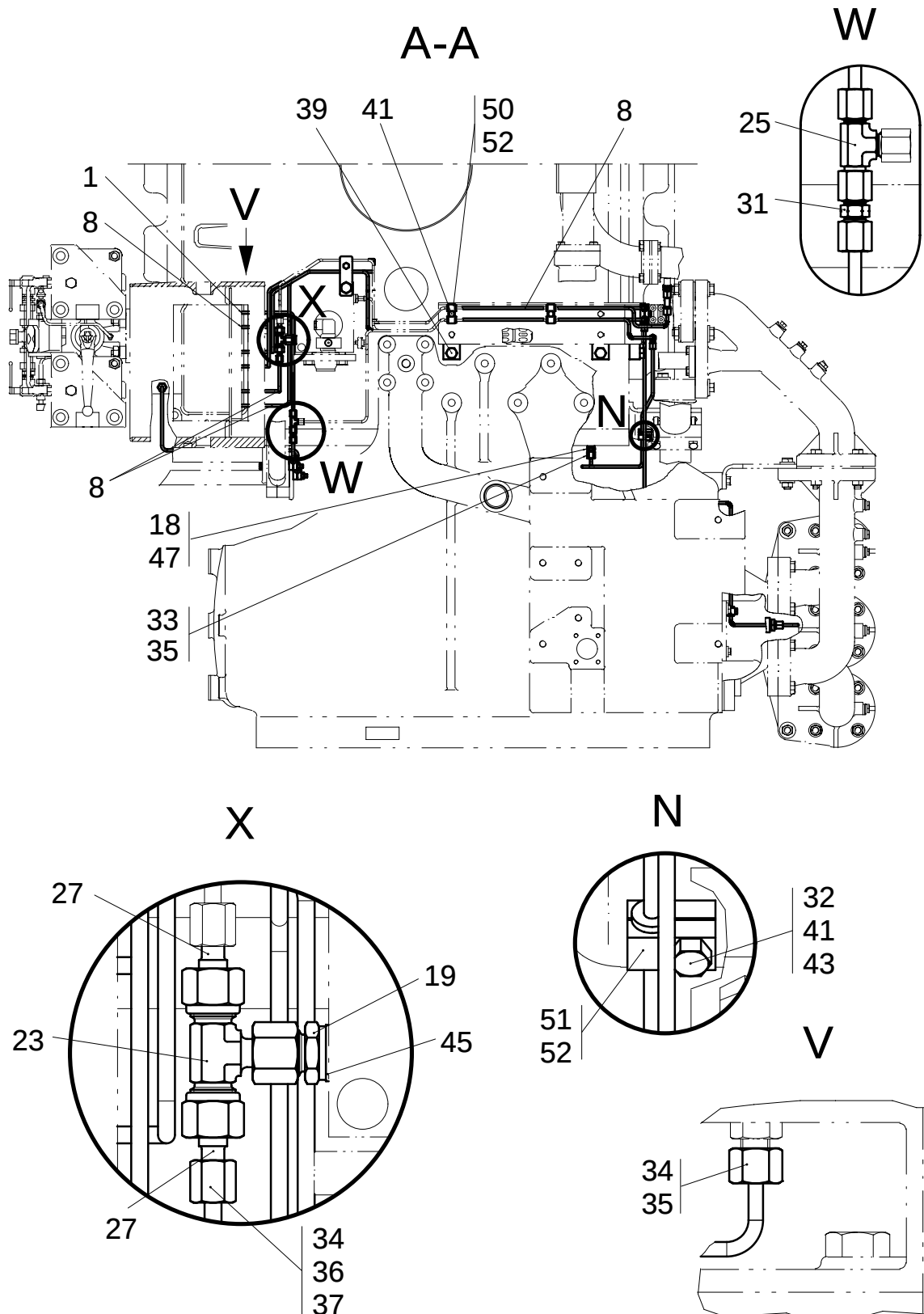
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Pressure Gauge Line Mounting

M25

11



Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERLEITUNGEN, VOLLST. PRESSURE GAUGE LINE ASSEMBLY	1	254643 DD
1	ROHRLEITUNG STEEL TUBE		1.9056-201
8	ROHRLEITUNG COPPER TUBE		1.9090-010
16	STUTZEN MALE CONNECTOR	1	1.5094-130
17	STUTZEN MALE CONNECTOR	1	1.5094-230
18	STUTZEN MALE CONNECTOR	1	1.5094-250
19	STUTZEN PIPE UNION	1	1.5098-014
20	STUTZEN PIPE UNION	1	1.5095-040
21	STUTZEN UNION TEE	2	1.5095-440
22	STUTZEN UNION TEE	1	1.5095-510
23	STUTZEN ADJUSTABLE T-ADAPTER	1	1.5093-442
24	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-330
25	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-300
26	STUTZEN UNION TEE	1	1.5094-188
27	KONUS-REDUZIERANSCHLUSS REDUCING UNION	2	1.4519-443
28	GEWINDEREDUZIERUNG REDUCER	1	1.4639-049
30	DÄMPFUNGSSTUTZEN DAMPING SOCKET	1	1.5075-013
31	DÄMPFUNGSSTUTZEN DAMPING UNION	1	1.5075-012
32	SCHEIBE WASHER	2	1.0058-459

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
33	ÜBERWURFMUTTER UNION NUT	4	1.5040-134
34	ÜBERWURFMUTTER UNION NUT	18	1.5040-114
35	SCHNEIDRING CUTTING RING	8	1.5059-208
36	SCHNEIDRING CUTTING RING	16	1.5059-084
37	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	16	1.3088-006
38	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-239
39	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-445
40	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-251
41	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-241
42	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-311
43	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
45	DICHTRING JOINT RING	# 1	1.7010-078
46	DICHTRING JOINT RING	# 1	1.7010-064
47	DICHTRING JOINT RING	# 2	1.7033-103
48	DICHTRING JOINT RING	# 1	1.7010-037
49	STUTZEN MALE CONNECTOR	1	1.5095-240
50	ROHRKLEMME PIPE CLAMP	24	1.5011-001
51	ROHRKLEMME PIPE CLAMP	8	1.5011-002
52	GUMMITÜLLE RUBBER SOCKET	25	1.5011-194

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
53	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-247
54	HALTER BRACKET	1	254643-054
55	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-387

= VERBRAUCHSTEILE
CONSUMABLES

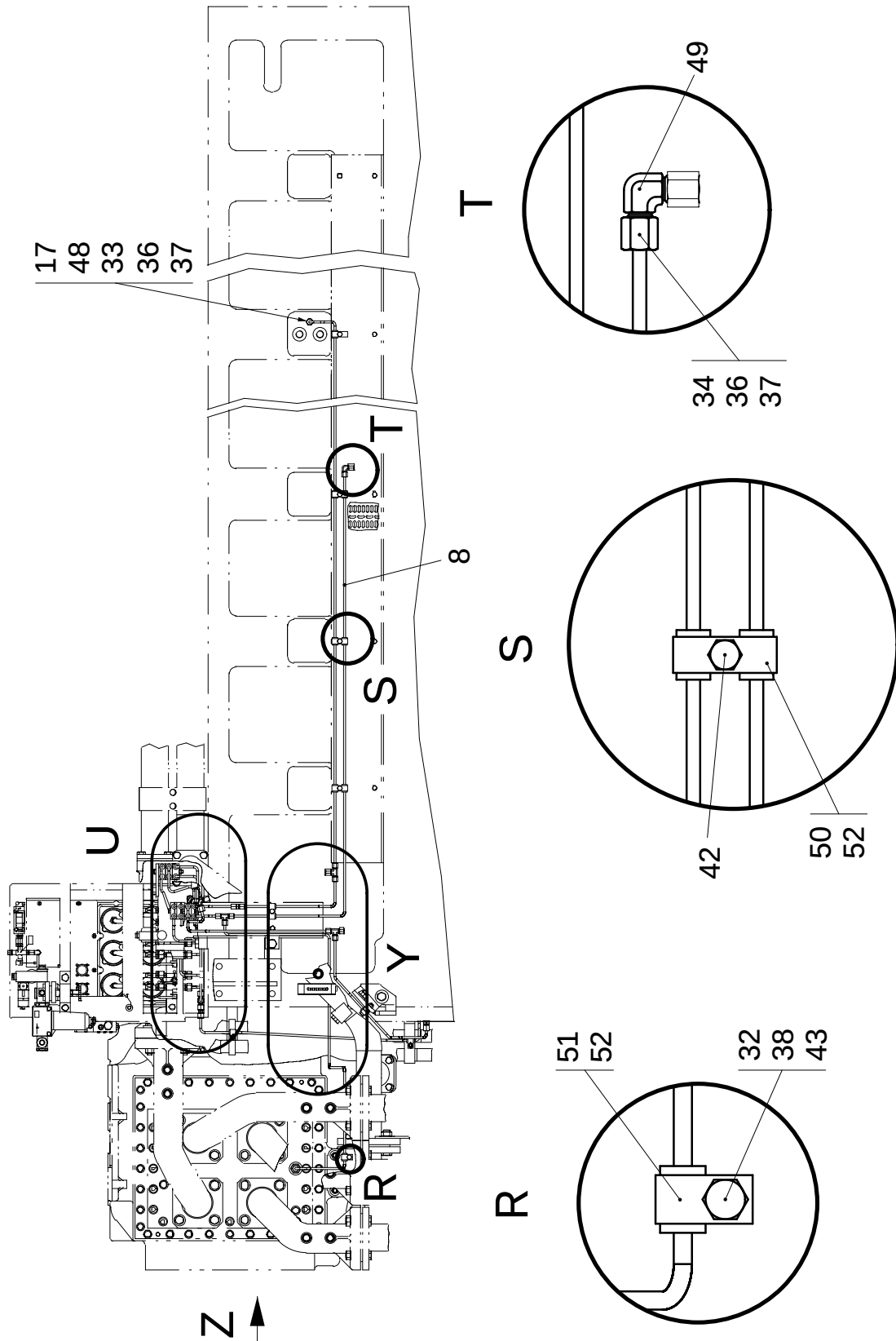
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

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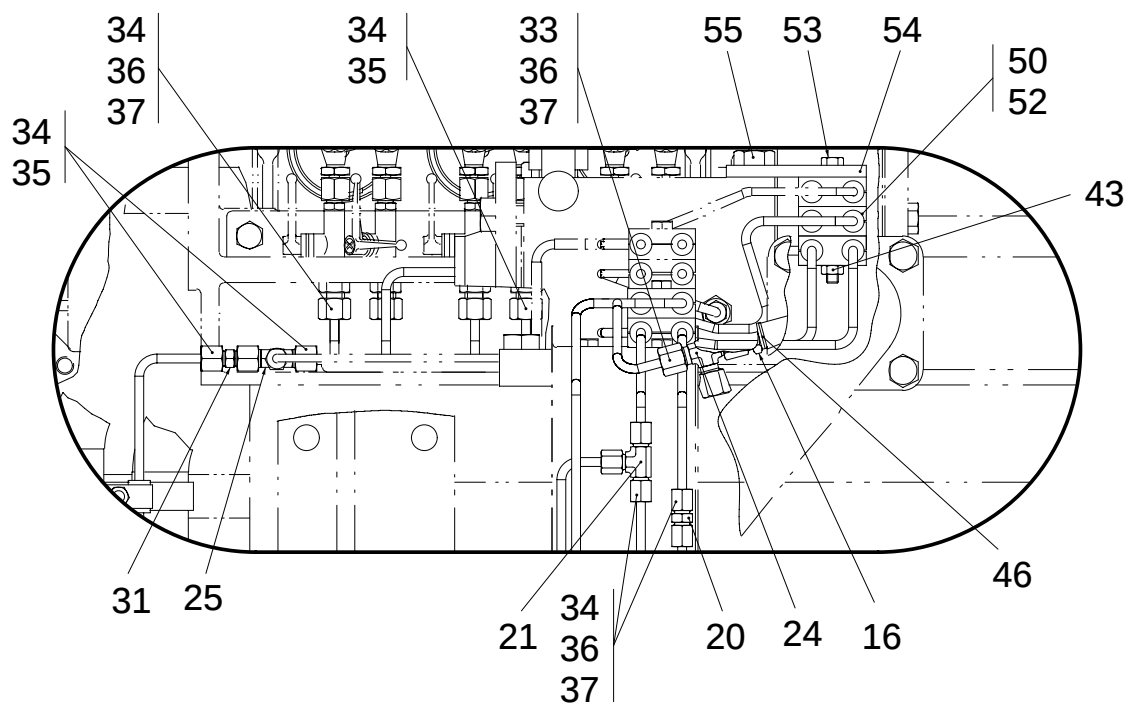


Pressure Gauge Line Mounting

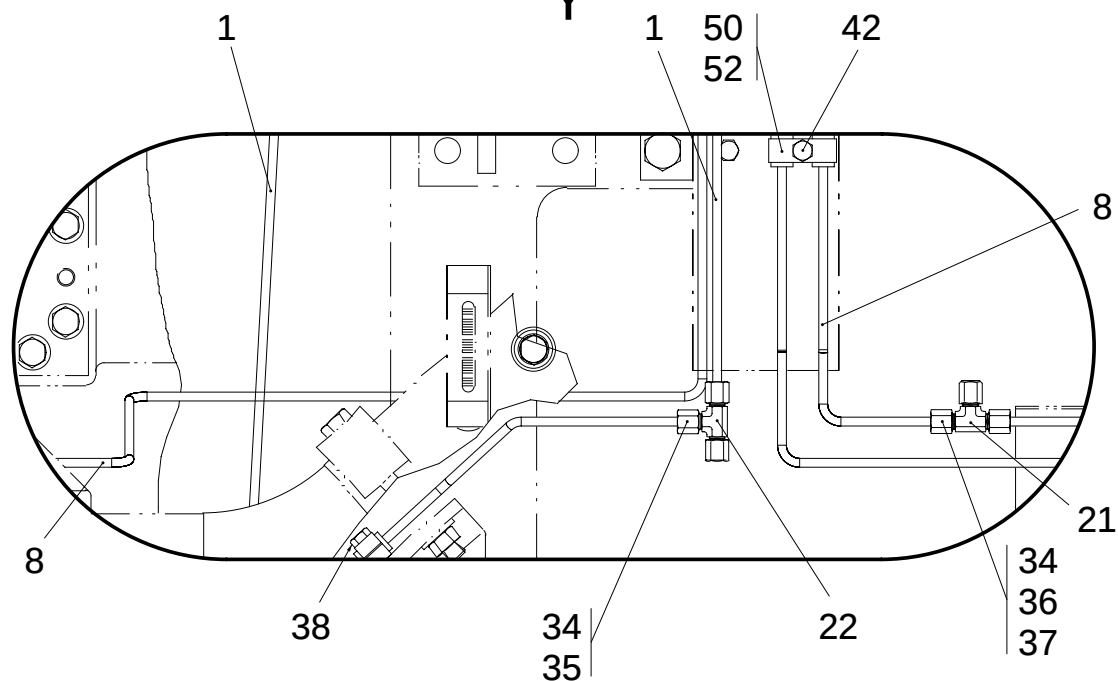
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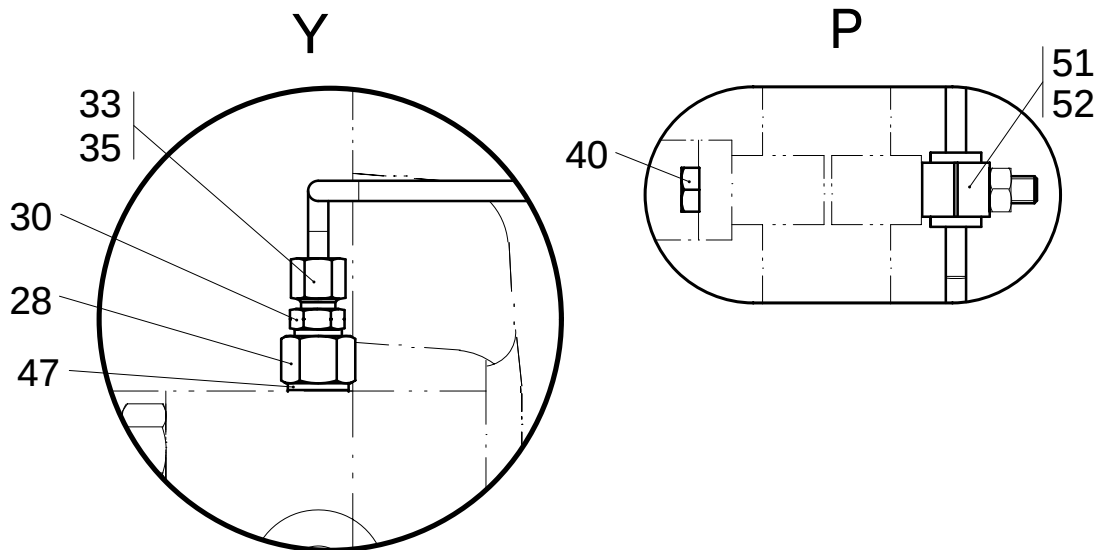
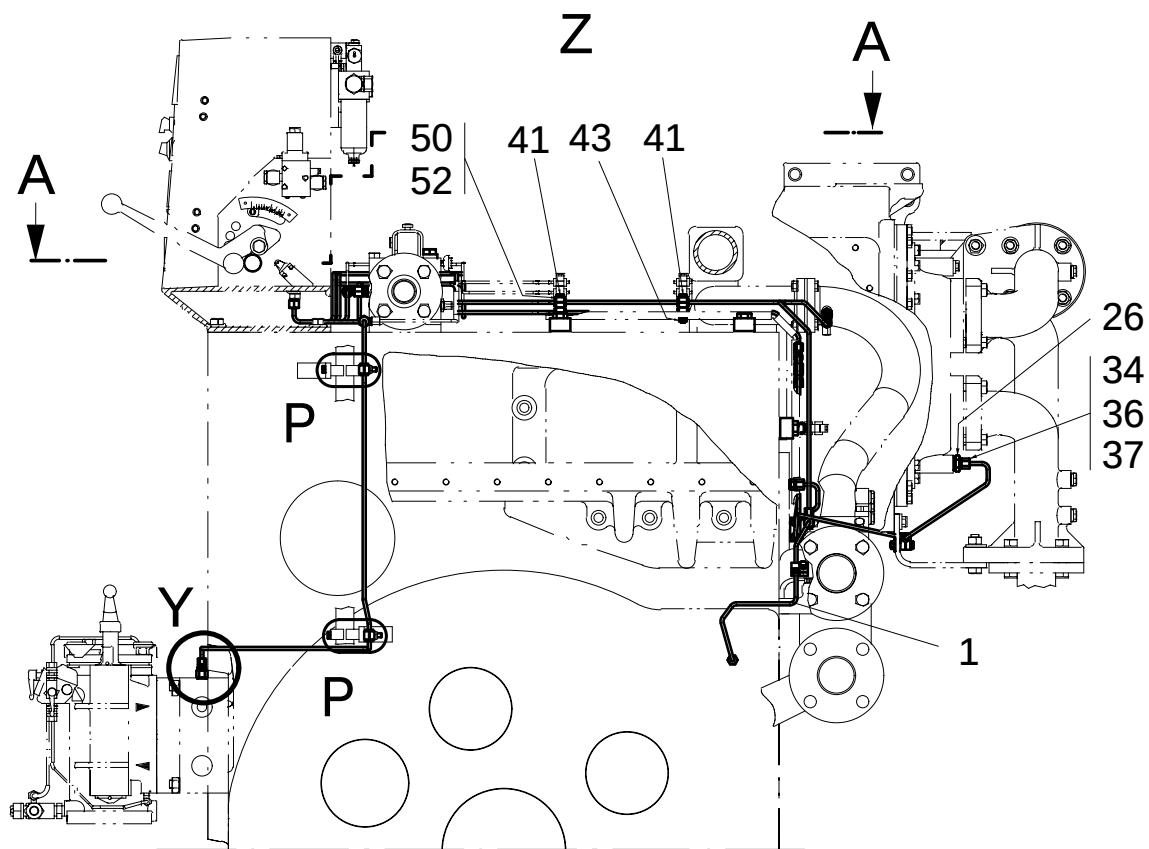
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Pressure Gauge Line Mounting

M25

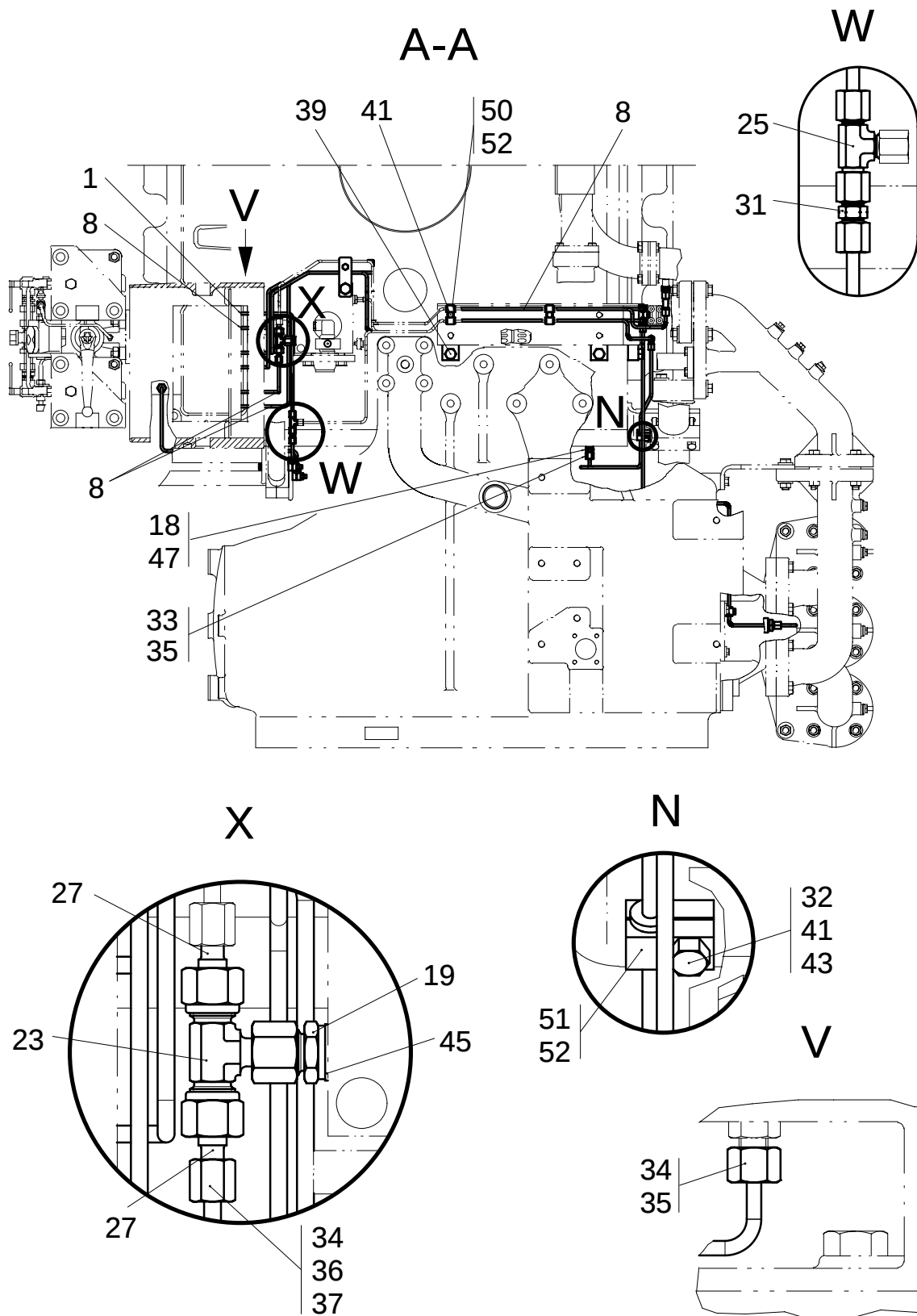
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Pressure Gauge Line Mounting

M25

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Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERLEITUNGEN, VOLLST. PRESSURE GAUGE LINE ASSEMBLY	1	254643 EE
1	ROHRLEITUNG STEEL TUBE		1.9056-201
8	ROHRLEITUNG COPPER TUBE		1.9090-010
16	STUTZEN MALE CONNECTOR	2	1.5094-130
17	STUTZEN MALE CONNECTOR	1	1.5094-230
18	STUTZEN MALE CONNECTOR	1	1.5094-250
19	STUTZEN PIPE UNION	1	1.5098-014
20	STUTZEN PIPE UNION	2	1.5095-040
21	STUTZEN UNION TEE	2	1.5095-440
22	STUTZEN UNION TEE	1	1.5095-510
23	STUTZEN ADJUSTABLE T-ADAPTER	1	1.5093-442
24	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-330
25	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-300
26	GEWINDEREDUZIERUNG REDUCER	1	1.5036-053
27	KONUS-REDUZIERANSCHLUSS REDUCING UNION	2	1.4519-443
28	GEWINDEREDUZIERUNG REDUCER	1	1.4639-049
30	DÄMPFUNGSSTUTZEN DAMPING SOCKET	1	1.5075-013
31	DÄMPFUNGSSTUTZEN DAMPING UNION	1	1.5075-012
32	SCHEIBE WASHER	2	1.0058-459

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
33	ÜBERWURFMUTTER UNION NUT	5	1.5040-134
34	ÜBERWURFMUTTER UNION NUT	17	1.5040-114
35	SCHNEIDRING CUTTING RING	8	1.5059-208
36	SCHNEIDRING CUTTING RING	16	1.5059-084
37	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	16	1.3088-006
38	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-239
39	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-445
40	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-251
41	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-241
42	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-311
43	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
44	DICHTRING JOINT RING	# 1	1.7010-133
45	DICHTRING JOINT RING	# 1	1.7010-078
46	DICHTRING JOINT RING	# 1	1.7010-064
47	DICHTRING JOINT RING	# 2	1.7033-103
48	DICHTRING JOINT RING	# 1	1.7010-037
50	ROHRKLEMME PIPE CLAMP	28	1.5011-001
51	ROHRKLEMME PIPE CLAMP	10	1.5011-002
52	GUMMITÜLLE RUBBER SOCKET	29	1.5011-194

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
53	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-247
54	HALTER BRACKET	1	254643-054
55	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-387

= VERBRAUCHSTEILE
CONSUMABLES

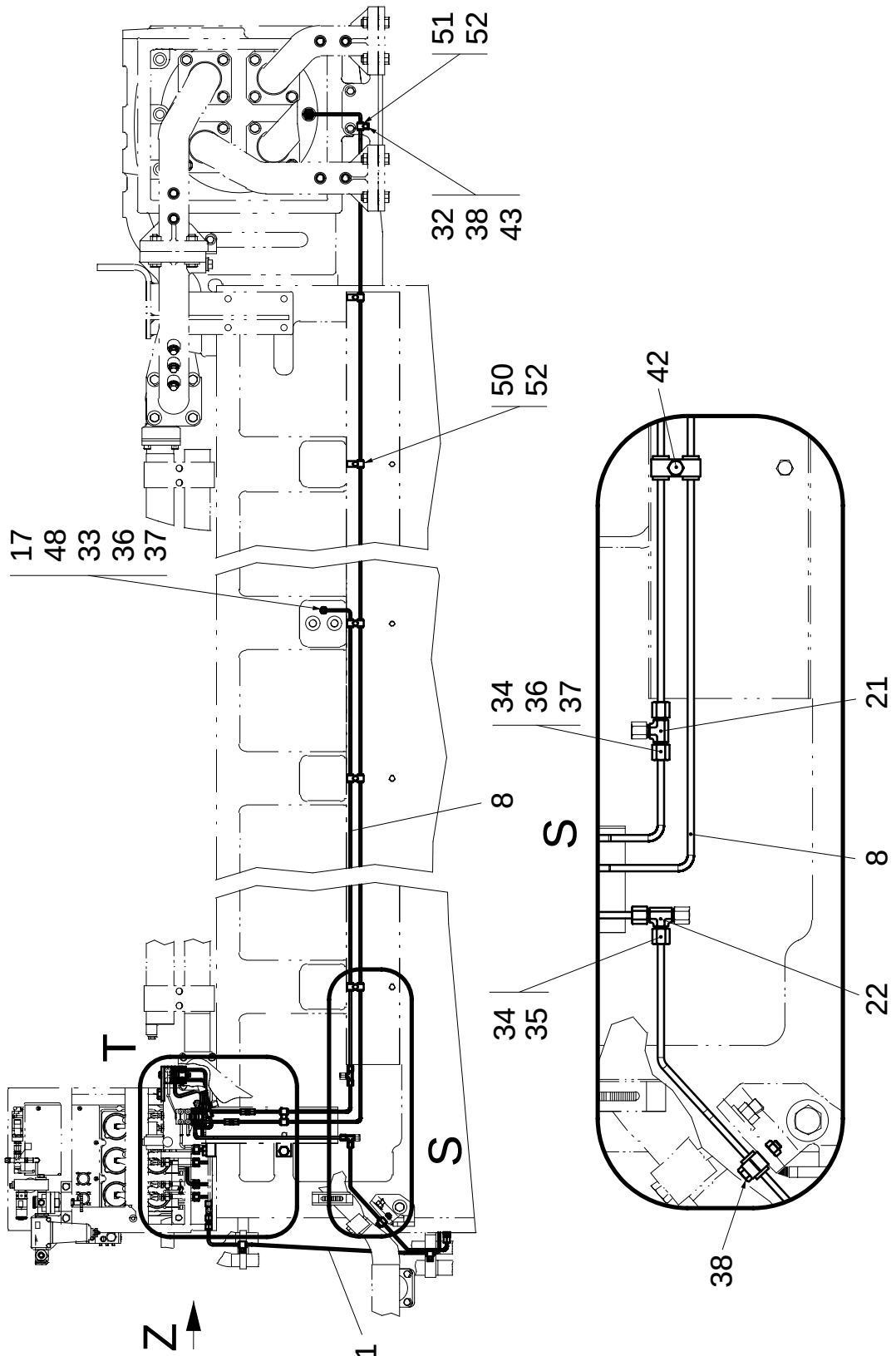
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

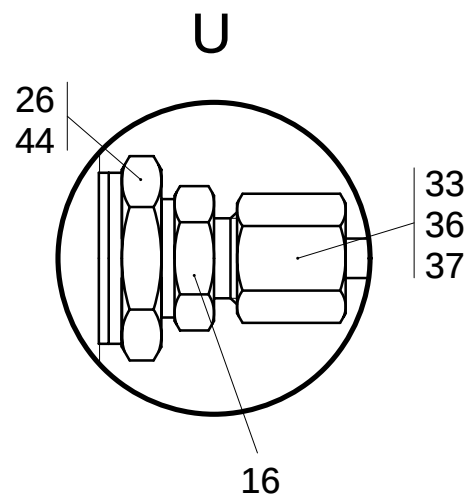
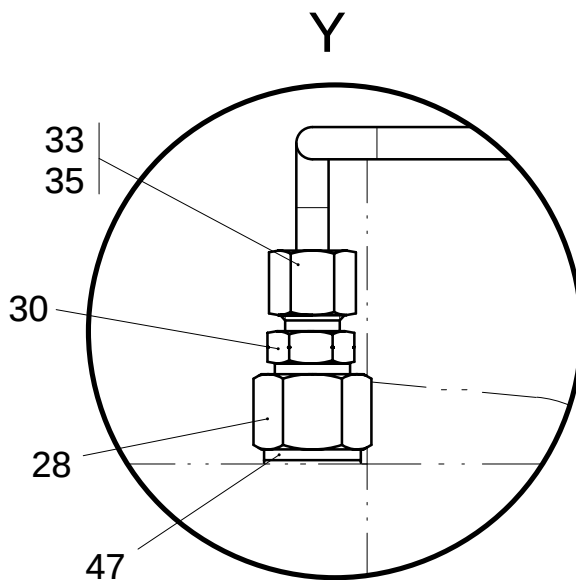
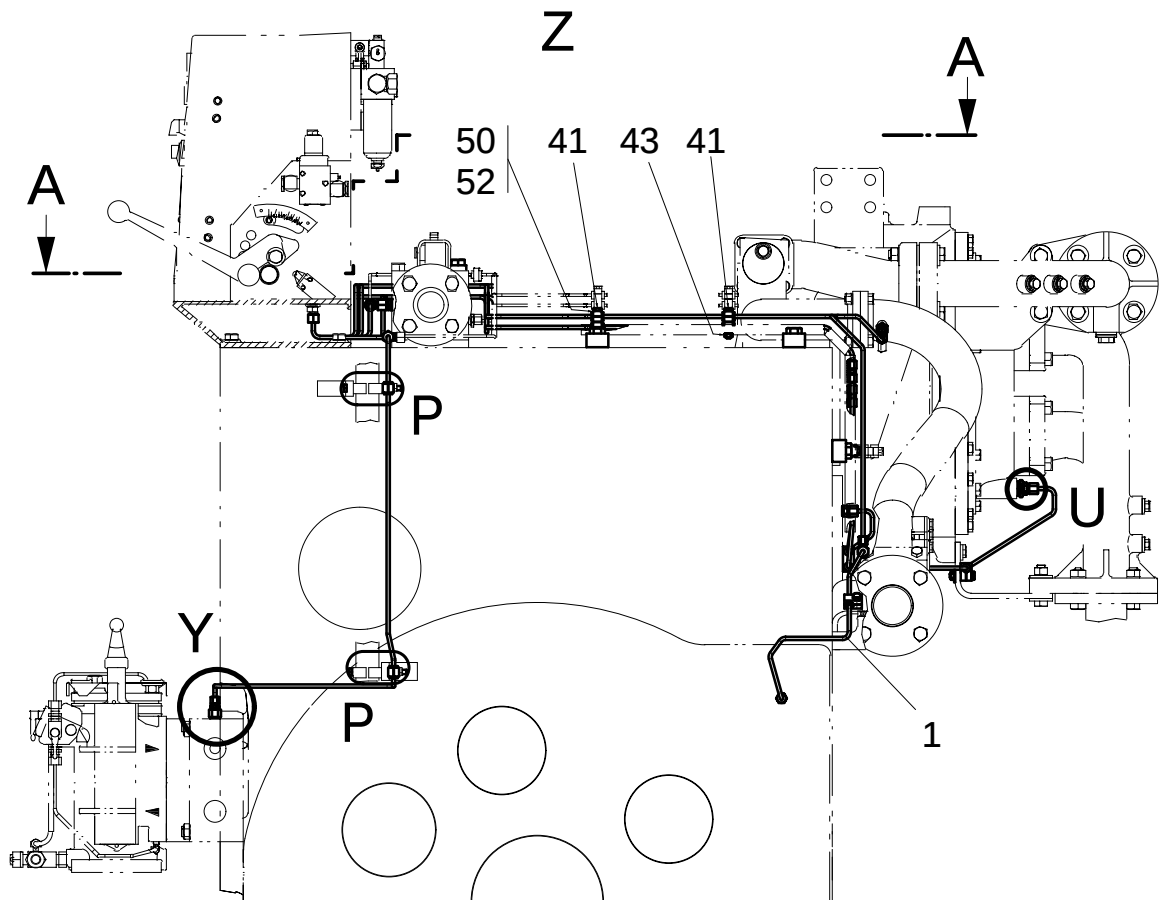
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Pressure Gauge Line Mounting

M25

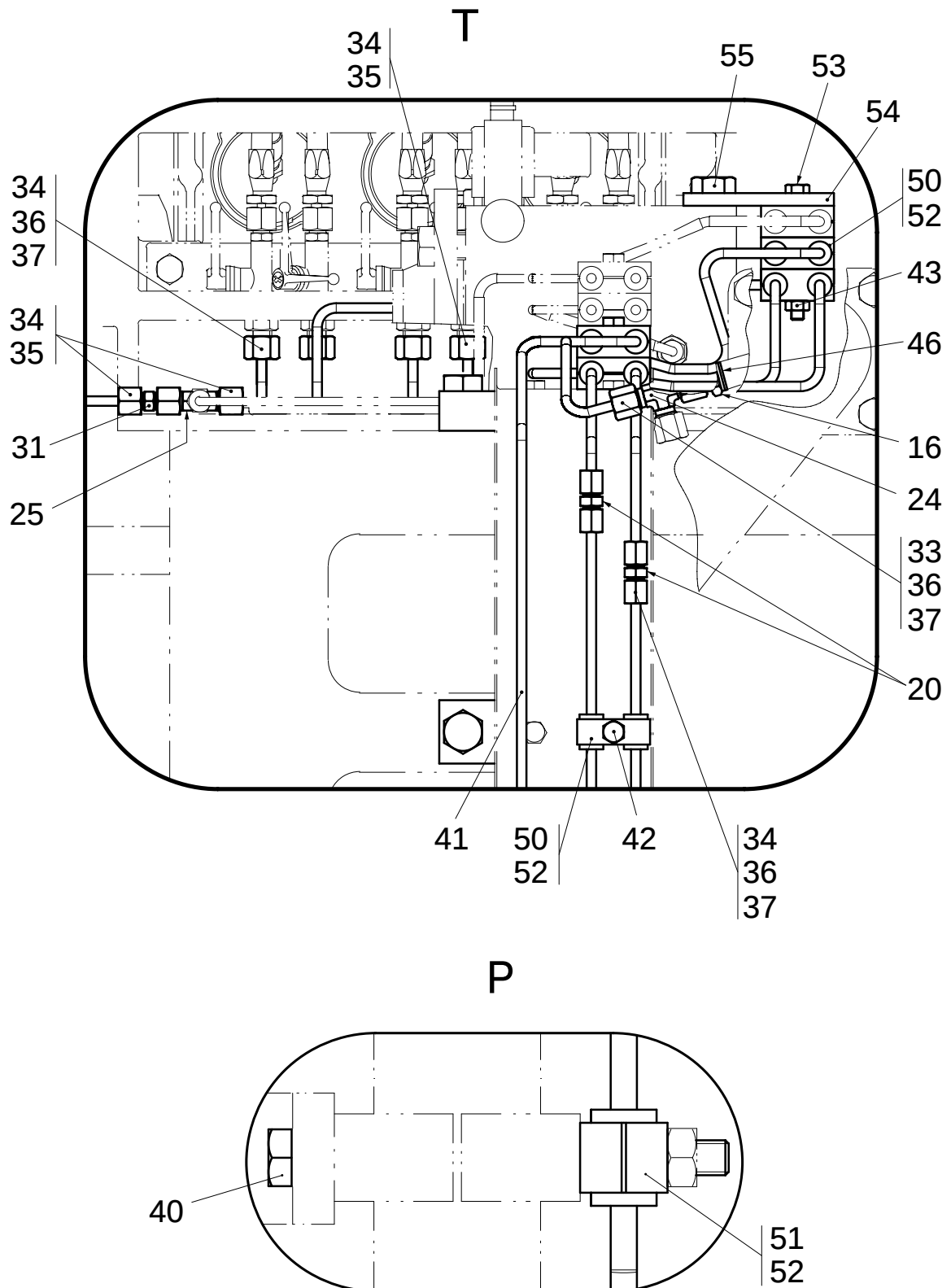
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Pressure Gauge Line Mounting

M25

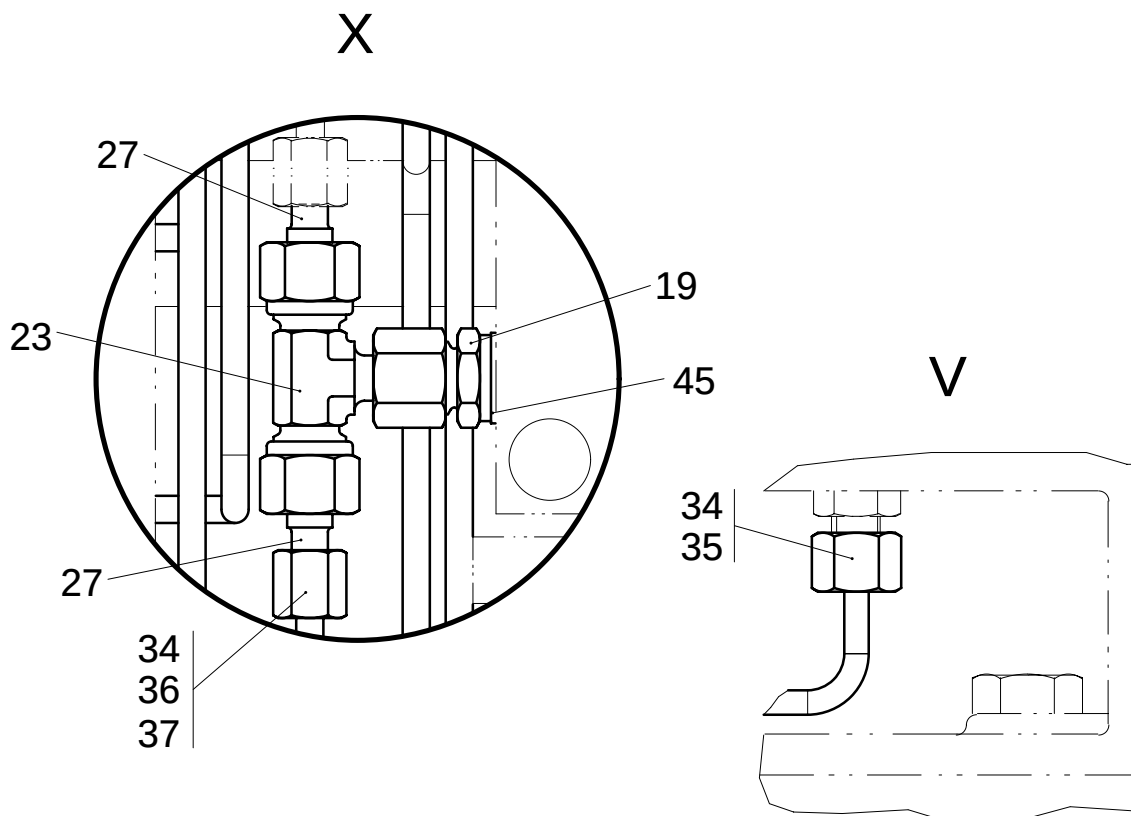
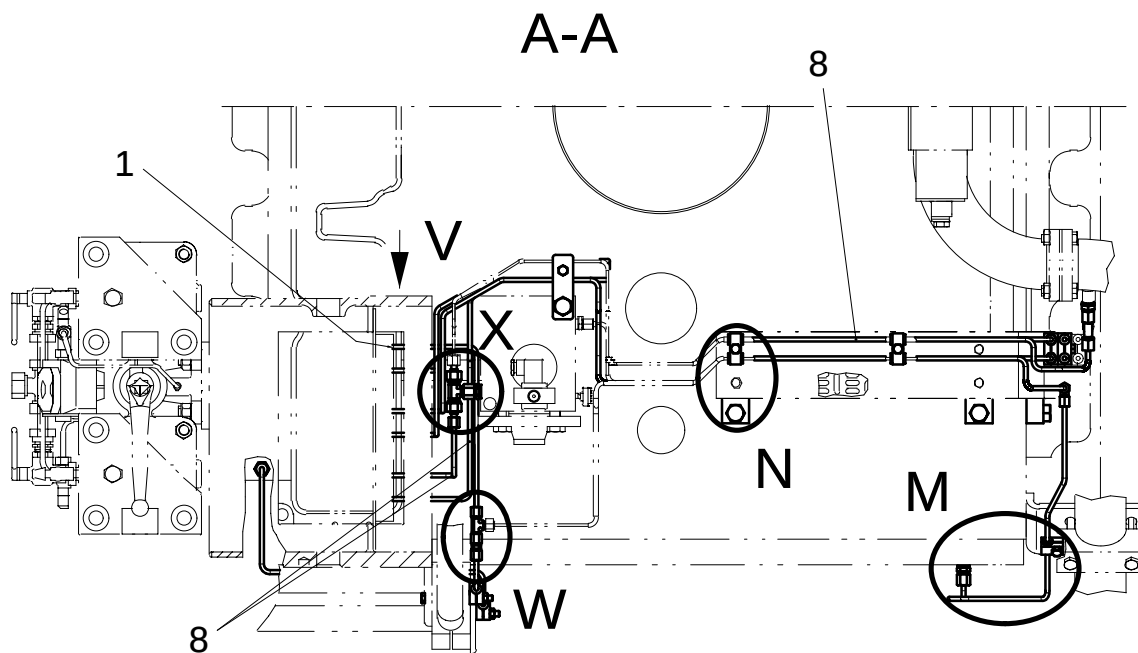
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Pressure Gauge Line Mounting

M25

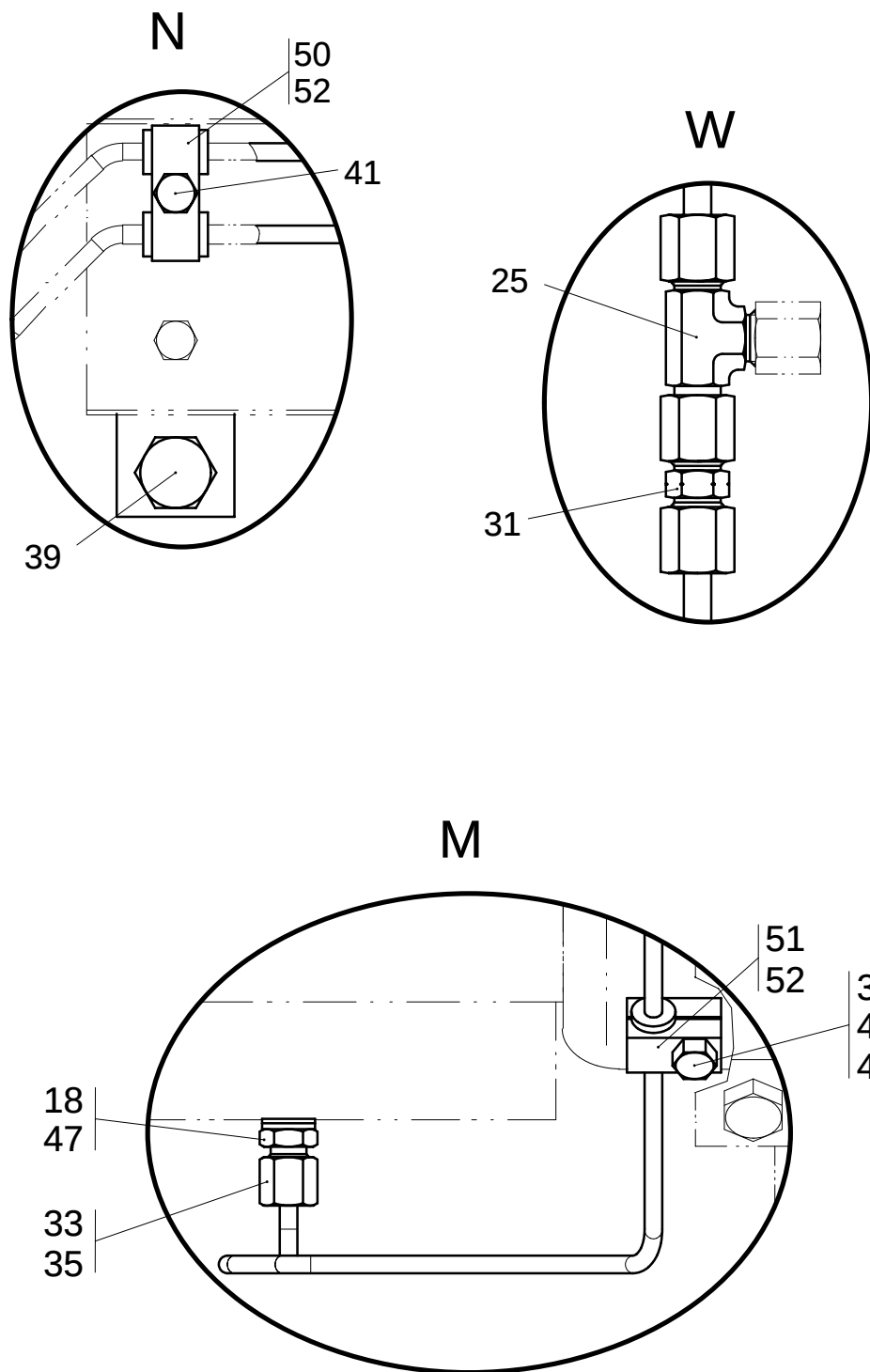
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Pressure Gauge Line Mounting

M25

11



Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERLEITUNGEN, VOLLST. PRESSURE GAUGE LINE ASSEMBLY	1	254643 FF
1	ROHRLEITUNG STEEL TUBE		1.9056-201
8	ROHRLEITUNG COPPER TUBE		1.9090-010
16	STUTZEN MALE CONNECTOR	2	1.5094-130
17	STUTZEN MALE CONNECTOR	1	1.5094-230
18	STUTZEN MALE CONNECTOR	1	1.5094-250
19	STUTZEN PIPE UNION	1	1.5098-014
20	STUTZEN PIPE UNION	2	1.5095-040
21	STUTZEN UNION TEE	2	1.5095-440
22	STUTZEN UNION TEE	1	1.5095-510
23	STUTZEN ADJUSTABLE T-ADAPTER	1	1.5093-442
24	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-330
25	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-300
26	GEWINDEREDUZIERUNG REDUCER	1	1.5036-053
27	KONUS-REDUZIERANSCHLUSS REDUCING UNION	2	1.4519-443
28	GEWINDEREDUZIERUNG REDUCER	1	1.4639-049
30	DÄMPFUNGSSTUTZEN DAMPING SOCKET	1	1.5075-013
31	DÄMPFUNGSSTUTZEN DAMPING UNION	1	1.5075-012
32	SCHEIBE WASHER	2	1.0058-459

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
33	ÜBERWURFMUTTER UNION NUT	5	1.5040-134
34	ÜBERWURFMUTTER UNION NUT	17	1.5040-114
35	SCHNEIDRING CUTTING RING	8	1.5059-208
36	SCHNEIDRING CUTTING RING	16	1.5059-084
37	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	16	1.3088-006
38	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-239
39	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-445
40	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-251
41	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-241
42	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1387-311
43	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
44	DICHTRING JOINT RING	# 1	1.7010-133
45	DICHTRING JOINT RING	# 1	1.7010-078
46	DICHTRING JOINT RING	# 1	1.7010-064
47	DICHTRING JOINT RING	# 2	1.7033-103
48	DICHTRING JOINT RING	# 1	1.7010-037
50	ROHRKLEMME PIPE CLAMP	32	1.5011-001
51	ROHRKLEMME PIPE CLAMP	10	1.5011-002
52	GUMMITÜLLE RUBBER SOCKET	33	1.5011-194

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
53	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-247
54	HALTER BRACKET	1	254643-054
55	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-387

= VERBRAUCHSTEILE
CONSUMABLES

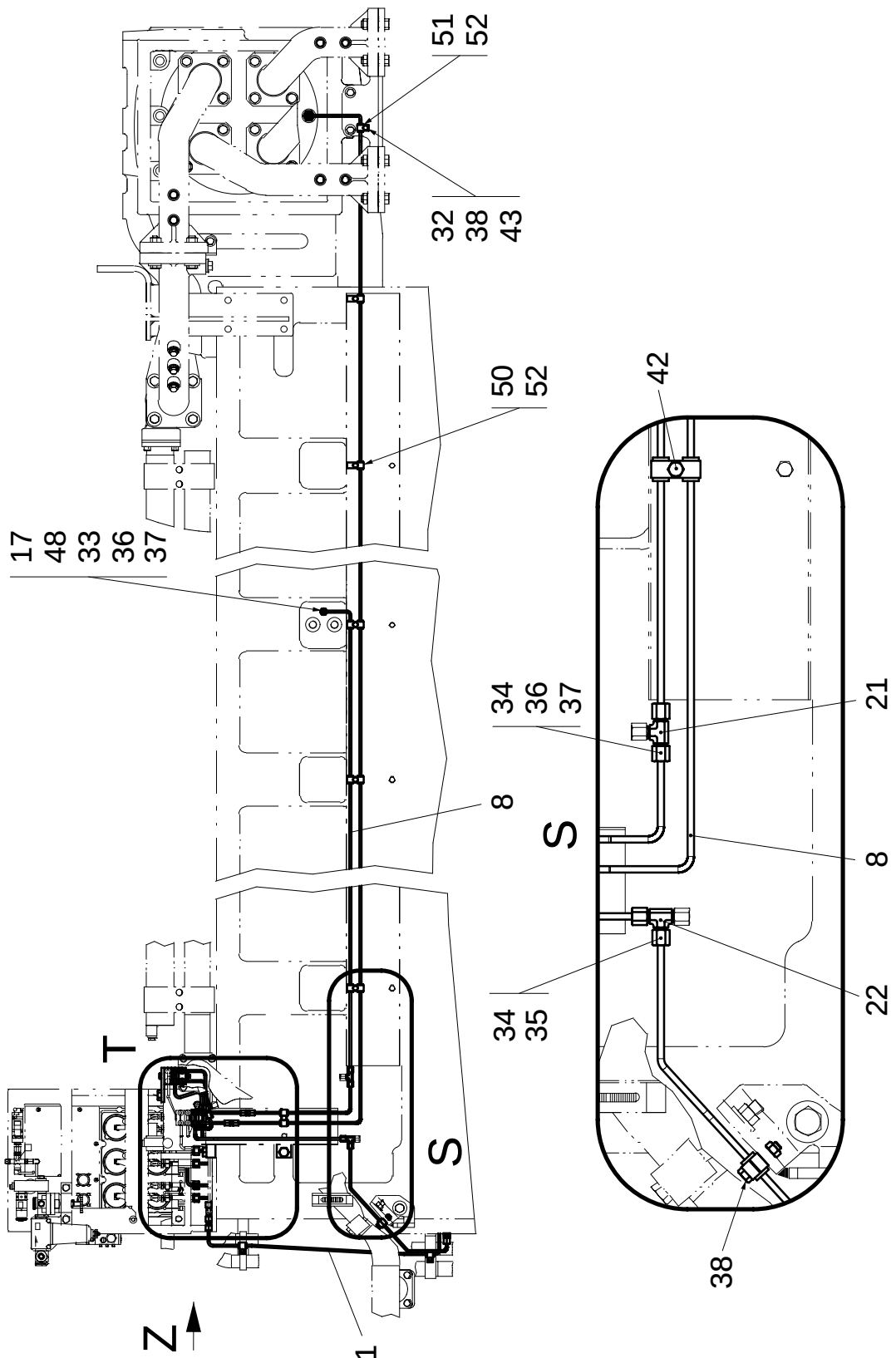
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

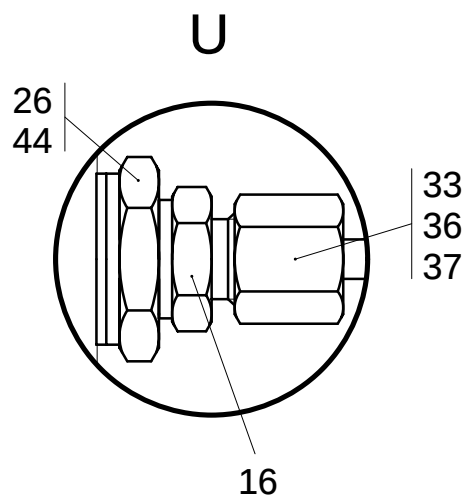
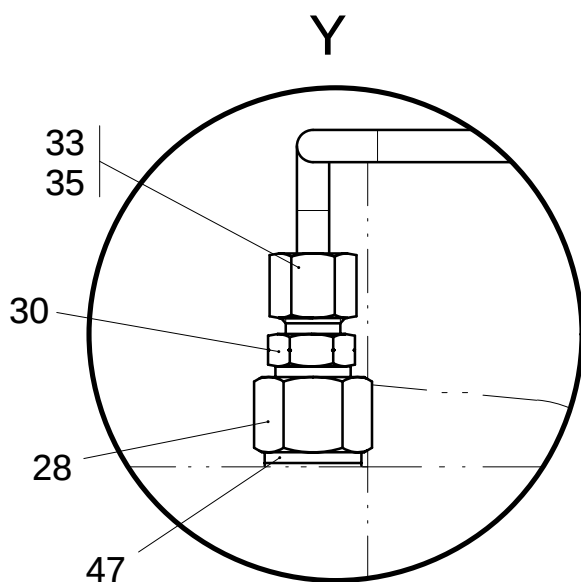
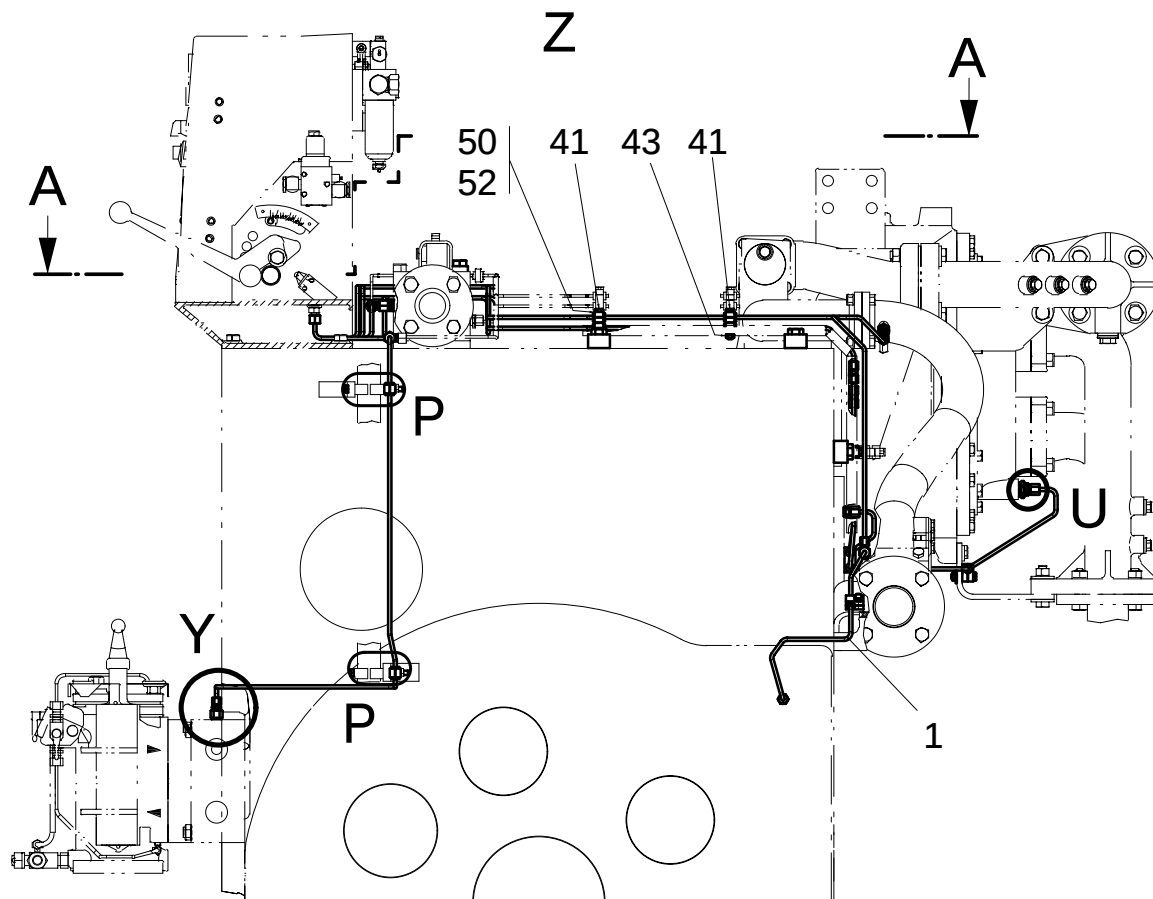
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Pressure Gauge Line Mounting

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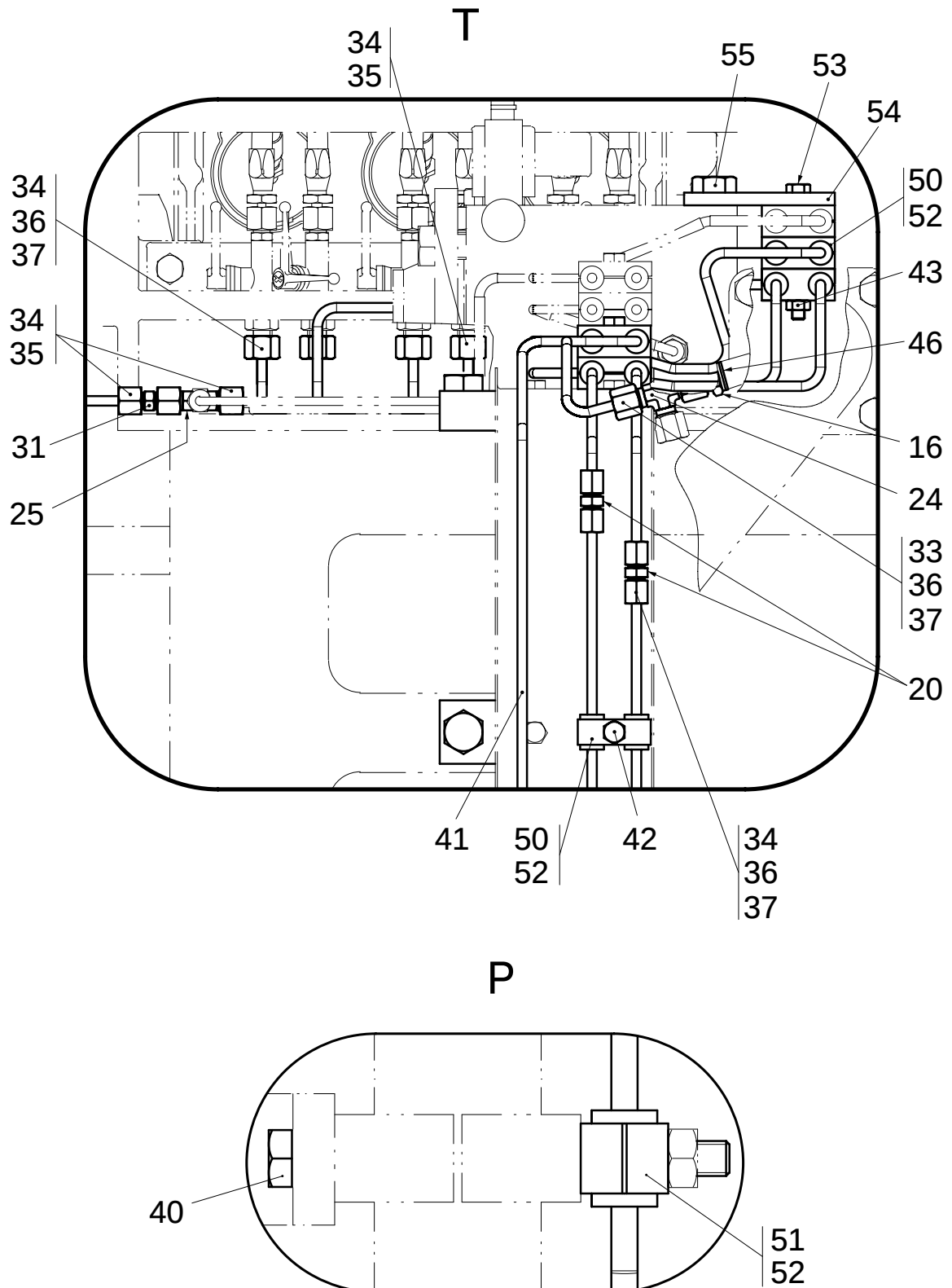
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Pressure Gauge Line Mounting

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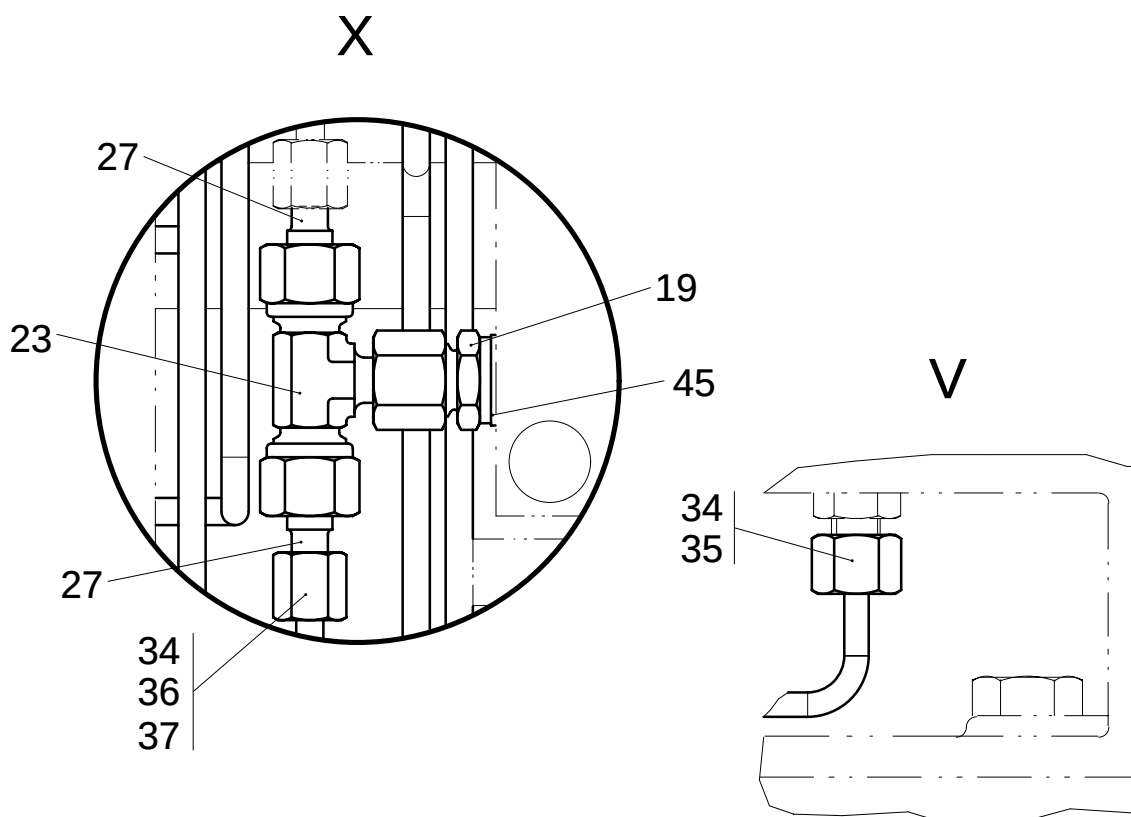
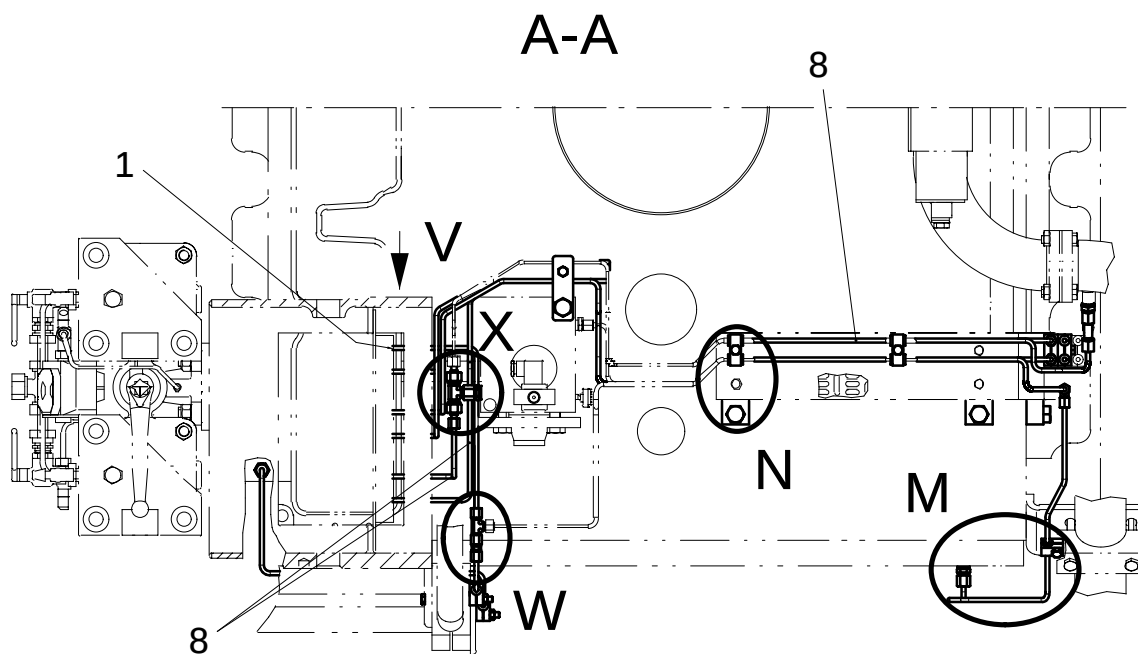
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Pressure Gauge Line Mounting

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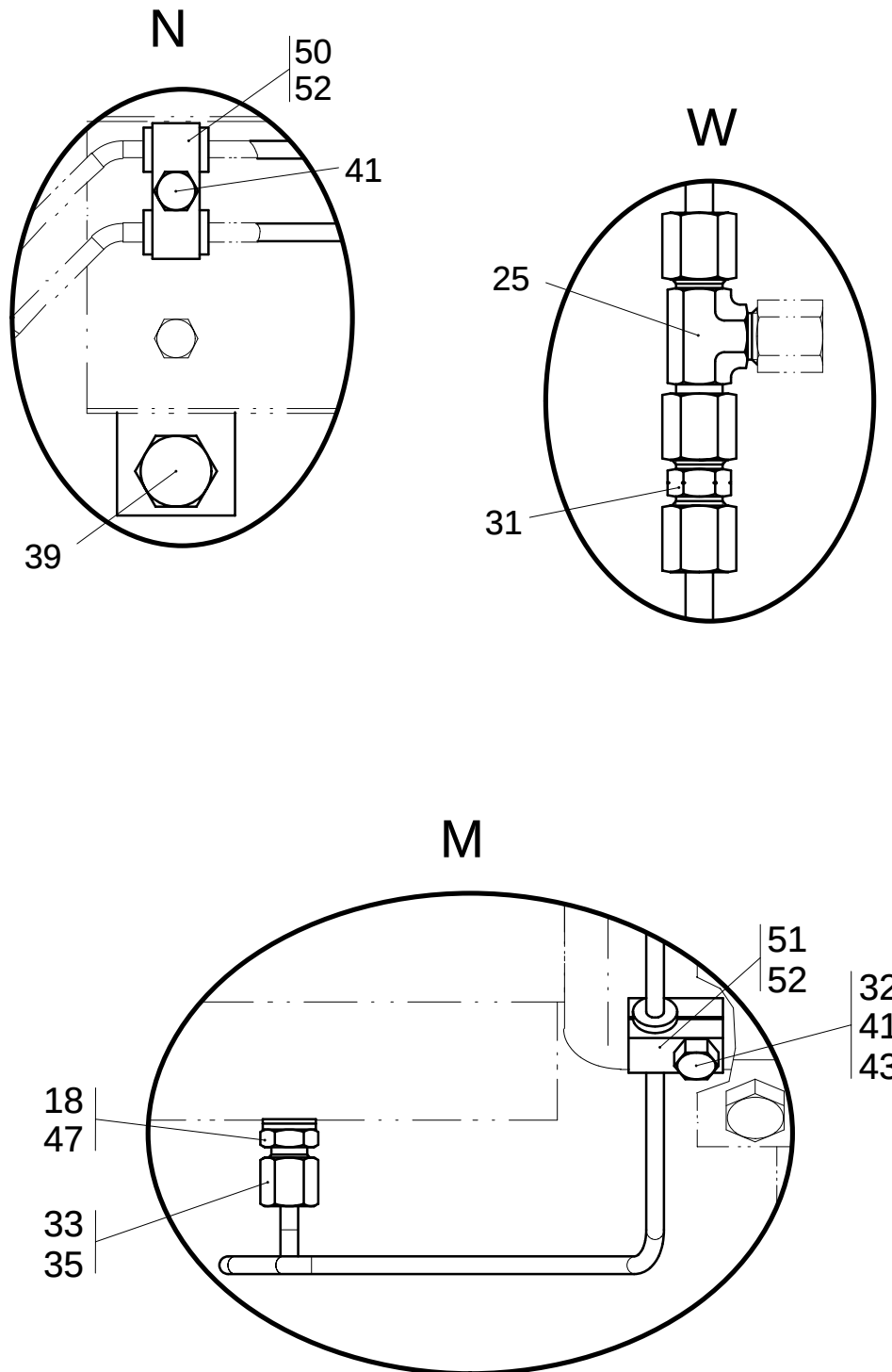
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Pressure Gauge Line Mounting

M25

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Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERLEITUNGEN, VOLLST. PRESSURE GAUGE LINE ASSEMBLY	1	254643 GG
1	ROHRLEITUNG STEEL TUBE		1.9056-201
8	ROHRLEITUNG COPPER TUBE		1.9090-010
16	STUTZEN MALE CONNECTOR	2	1.5094-130
17	STUTZEN MALE CONNECTOR	1	1.5094-230
18	STUTZEN MALE CONNECTOR	1	1.5094-250
19	STUTZEN PIPE UNION	1	1.5098-014
20	STUTZEN PIPE UNION	2	1.5095-040
21	STUTZEN UNION TEE	2	1.5095-440
22	STUTZEN UNION TEE	1	1.5095-510
23	STUTZEN ADJUSTABLE T-ADAPTER	1	1.5093-442
24	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-330
25	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-300
26	GEWINDEREDUZIERUNG REDUCER	1	1.5036-053
27	KONUS-REDUZIERANSCHLUSS REDUCING UNION	2	1.4519-443
28	GEWINDEREDUZIERUNG REDUCER	1	1.4639-049
30	DÄMPFUNGSSTUTZEN DAMPING SOCKET	1	1.5075-013
31	DÄMPFUNGSSTUTZEN DAMPING UNION	1	1.5075-012
32	SCHEIBE WASHER	2	1.0058-459

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
33	ÜBERWURFMUTTER UNION NUT	5	1.5040-134
34	ÜBERWURFMUTTER UNION NUT	17	1.5040-114
35	SCHNEIDRING CUTTING RING	8	1.5059-208
36	SCHNEIDRING CUTTING RING	16	1.5059-084
37	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	16	1.3088-006
38	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-239
39	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-445
40	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-251
41	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-241
42	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-311
43	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
44	DICHTRING JOINT RING	# 1	1.7010-133
45	DICHTRING JOINT RING	# 1	1.7010-078
46	DICHTRING JOINT RING	# 1	1.7010-064
47	DICHTRING JOINT RING	# 2	1.7033-103
48	DICHTRING JOINT RING	# 1	1.7010-037
50	ROHRKLEMME PIPE CLAMP	34	1.5011-001
51	ROHRKLEMME PIPE CLAMP	10	1.5011-002
52	GUMMITÜLLE RUBBER SOCKET	35	1.5011-194

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
53	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-247
54	HALTER BRACKET	1	254643-054
55	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-387

= VERBRAUCHSTEILE
CONSUMABLES

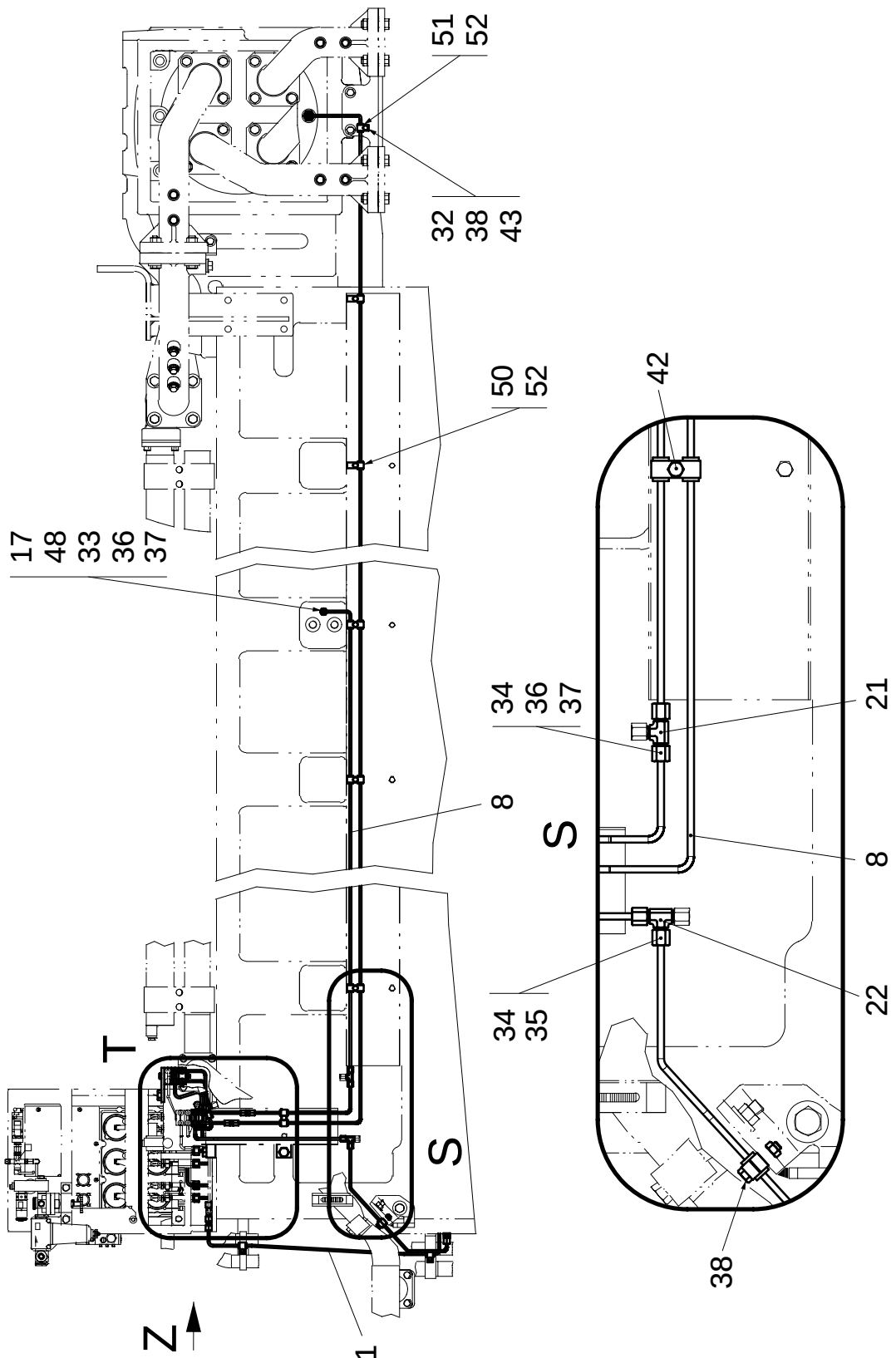
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

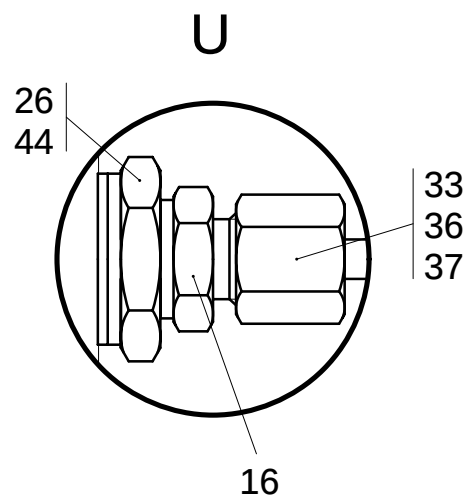
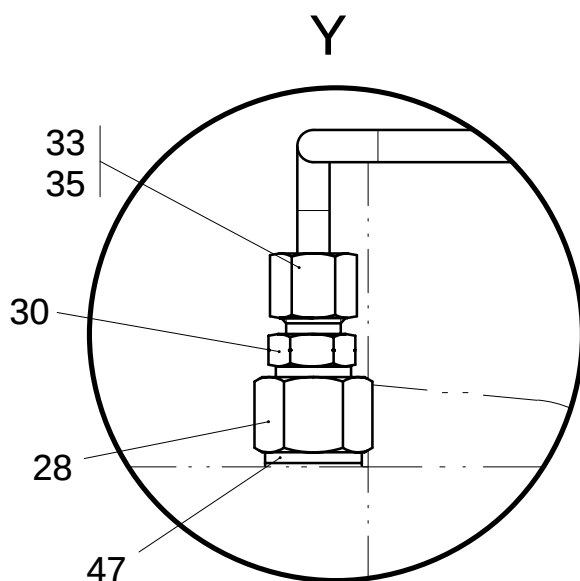
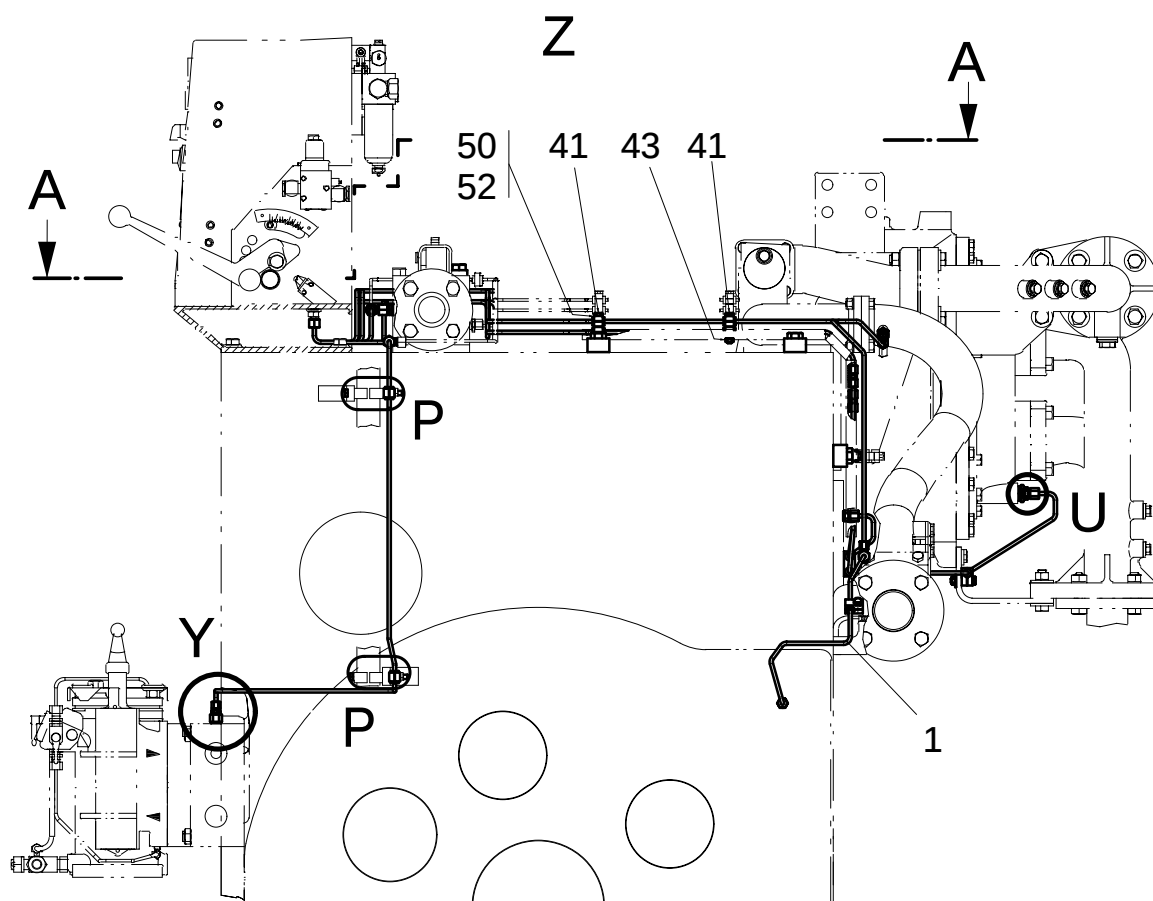
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Pressure Gauge Line Mounting

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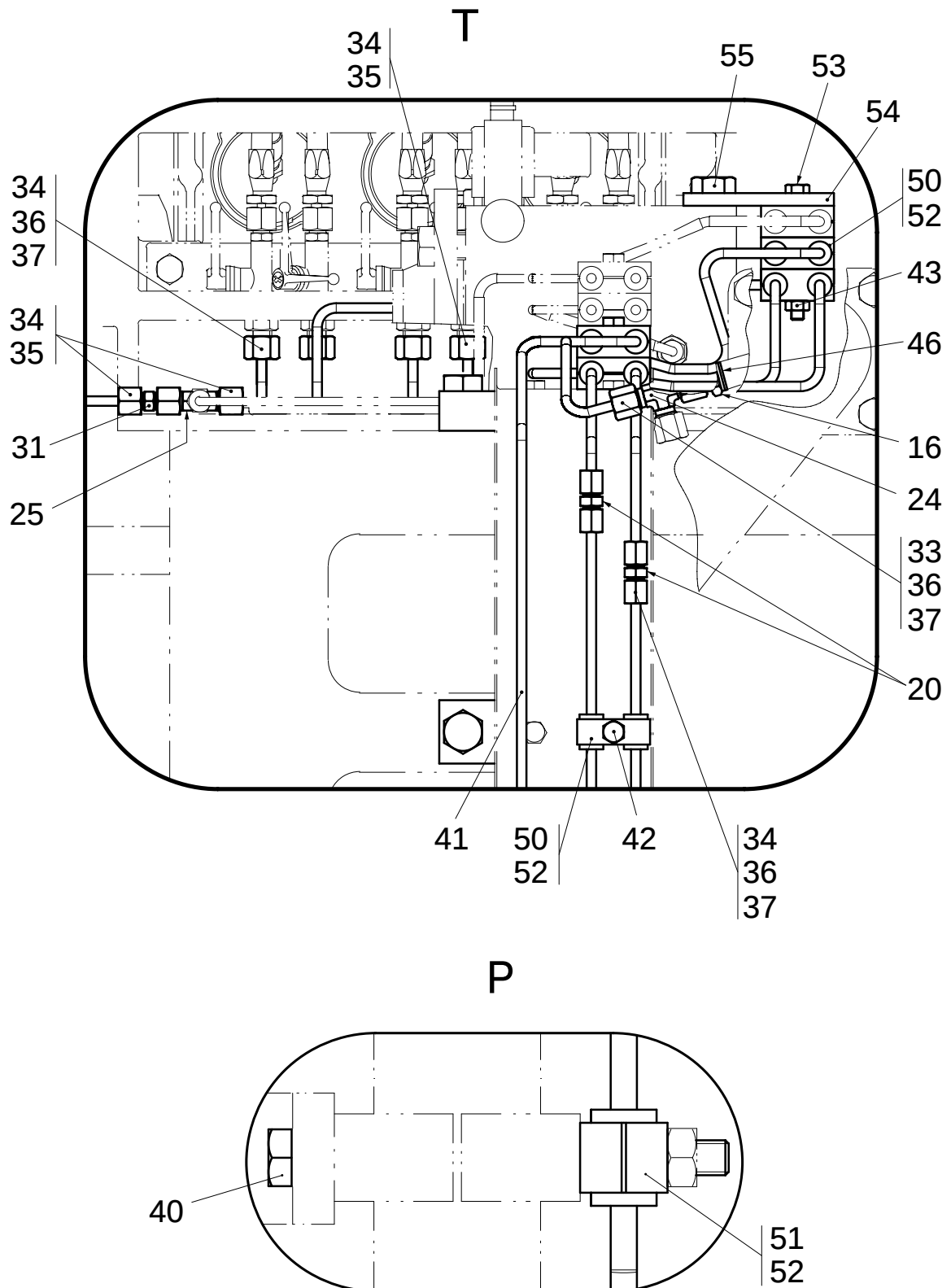
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Pressure Gauge Line Mounting

M25

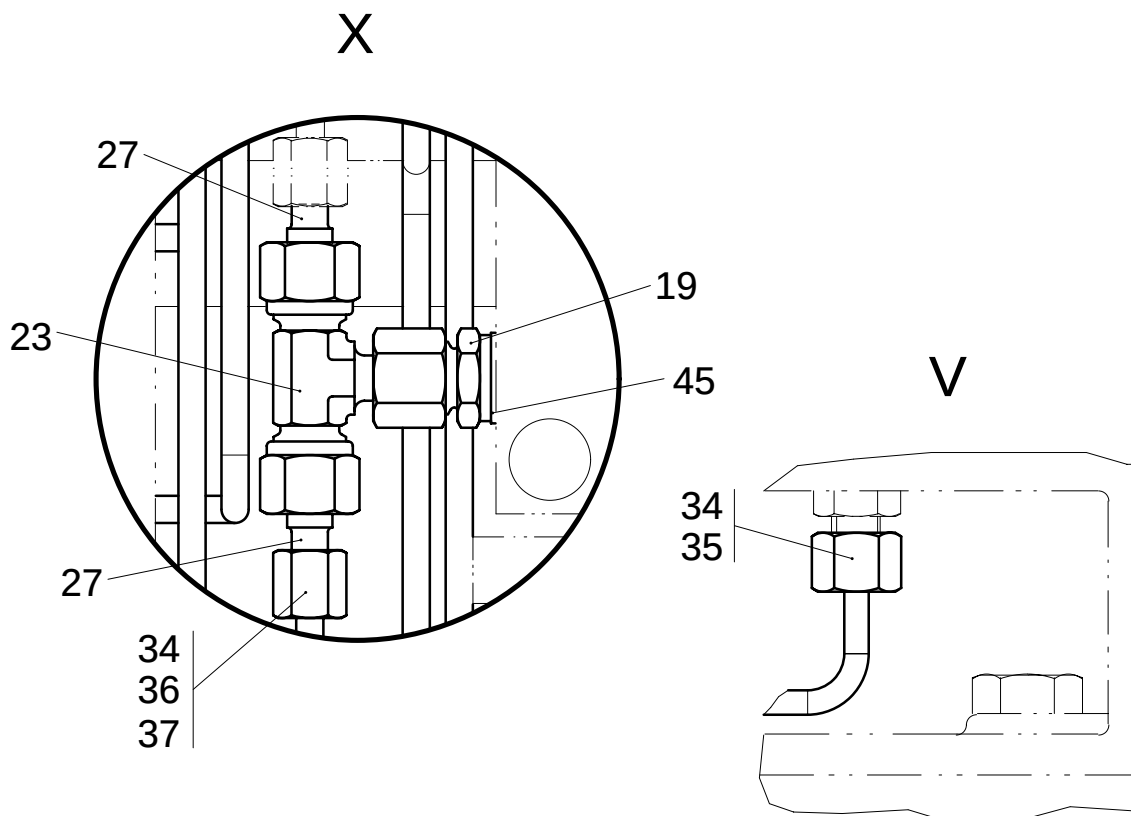
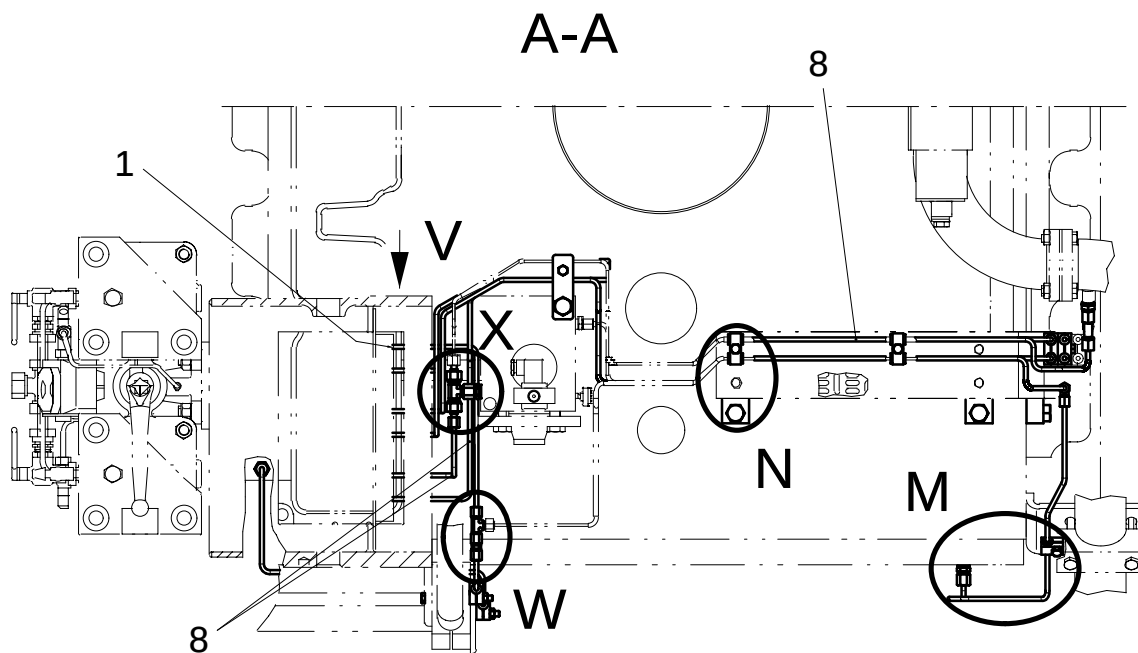
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Pressure Gauge Line Mounting

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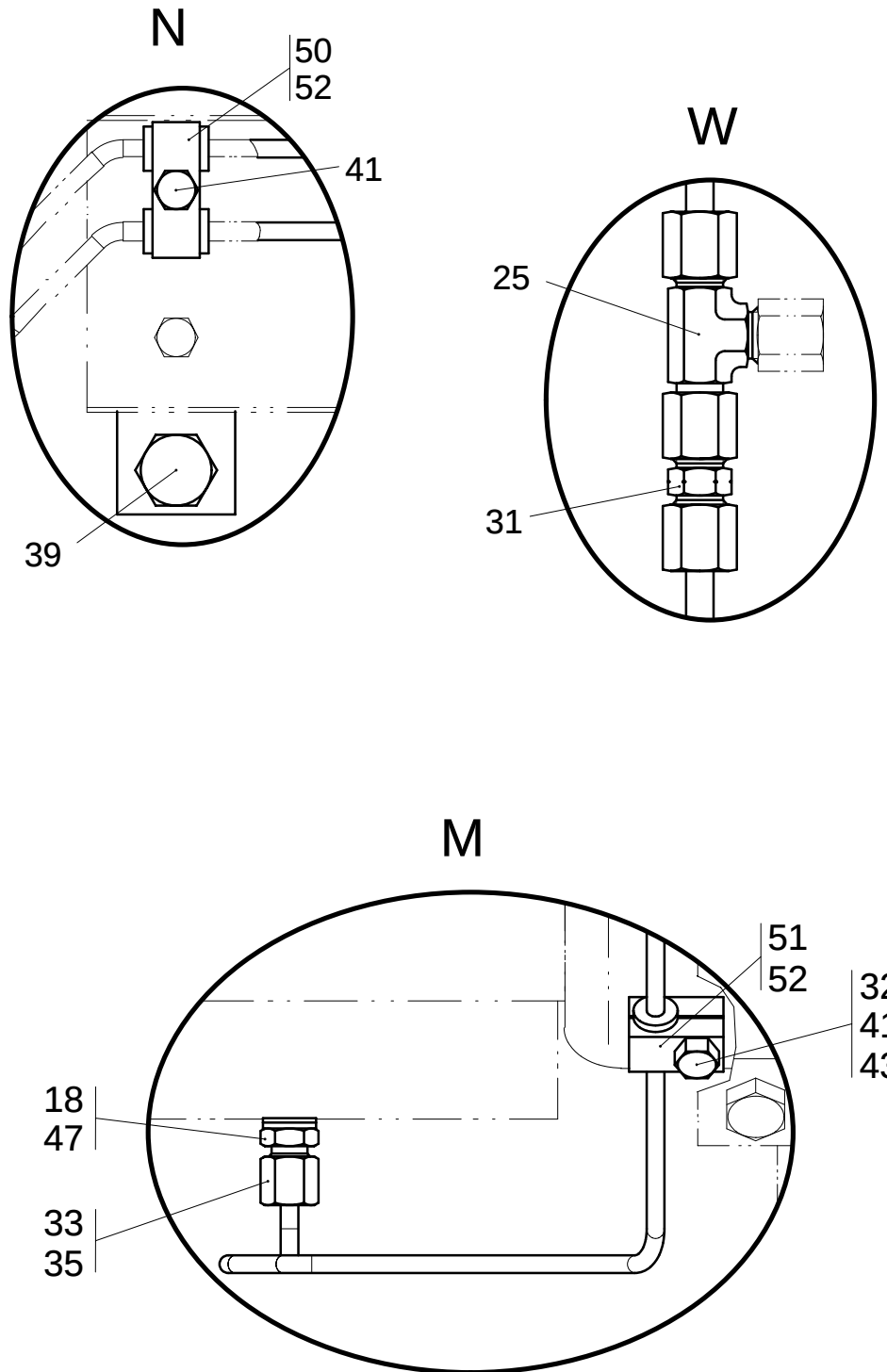
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Pressure Gauge Line Mounting

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Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERLEITUNGEN, VOLLST. PRESSURE GAUGE LINE ASSEMBLY	1	254643 HH
1	ROHRLEITUNG STEEL TUBE		1.9056-201
8	ROHRLEITUNG COPPER TUBE		1.9090-010
16	STUTZEN MALE CONNECTOR	1	1.5094-130
17	STUTZEN MALE CONNECTOR	1	1.5094-230
18	STUTZEN MALE CONNECTOR	1	1.5094-250
19	STUTZEN PIPE UNION	1	1.5098-014
20	STUTZEN PIPE UNION	2	1.5095-040
21	STUTZEN UNION TEE	2	1.5095-440
22	STUTZEN UNION TEE	1	1.5095-510
23	STUTZEN ADJUSTABLE T-ADAPTER	1	1.5093-442
24	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-330
25	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-300
26	STUTZEN MALE CONNECTOR	1	1.5094-188
27	KONUS-REDUZIERANSCHLUSS REDUCING UNION	2	1.4519-443
28	GEWINDEREDUZIERUNG REDUCER	1	1.4639-049
29	HALTER BRACKET	3	254643-029
30	DÄMPFUNGSSTUTZEN DAMPING SOCKET	1	1.5075-013
31	DÄMPFUNGSSTUTZEN DAMPING UNION	1	1.5075-012
32	SCHEIBE WASHER	2	1.0058-459
33	ÜBERWURFMUTTER UNION NUT	3	1.5040-134

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
34	ÜBERWURFMUTTER UNION NUT	21	1.5040-114
35	SCHNEIDRING CUTTING RING	8	1.5059-208
36	SCHNEIDRING CUTTING RING	16	1.5059-084
37	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	16	1.3088-006
38	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-239
39	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-445
40	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-251
41	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-241
42	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-311
43	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
45	DICHTRING JOINT RING	# 1	1.7010-078
46	DICHTRING JOINT RING	# 1	1.7010-064
47	DICHTRING JOINT RING	# 2	1.7033-103
48	DICHTRING JOINT RING	# 1	1.7010-037
49	STUTZEN UNION TEE	1	1.5095-240
50	ROHRKLEMME PIPE CLAMP	20	1.5011-001
51	ROHRKLEMME PIPE CLAMP	8	1.5011-002
52	GUMMITÜLLE RUBBER SOCKET	23	1.5011-194

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

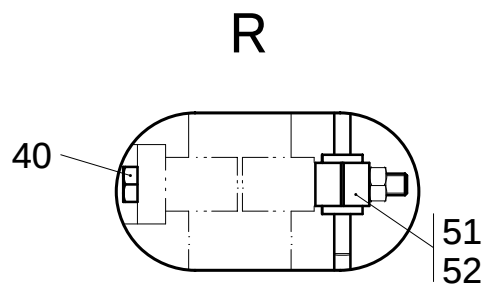
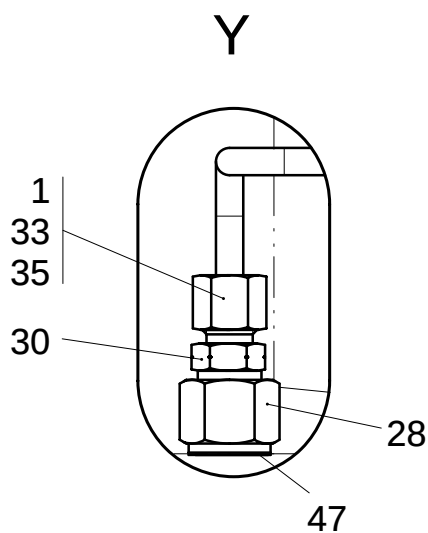
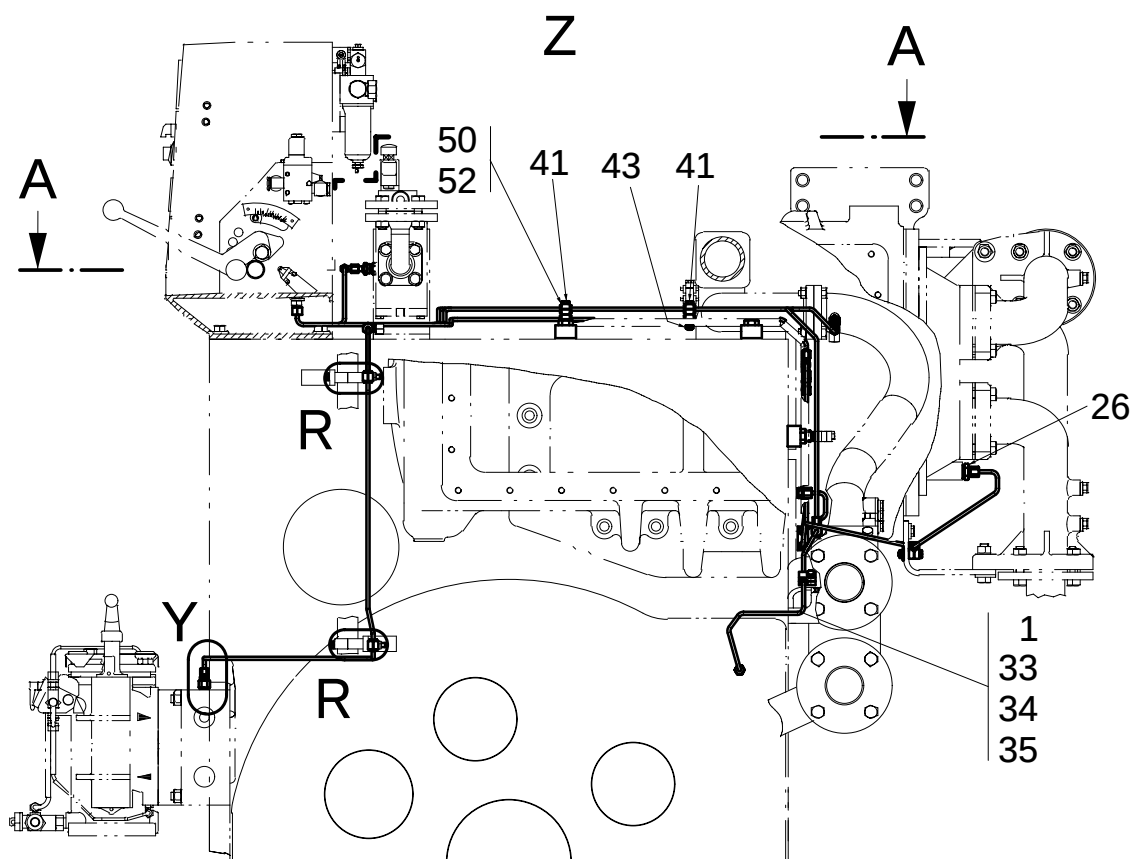
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Pressure Gauge Line Mounting

M25

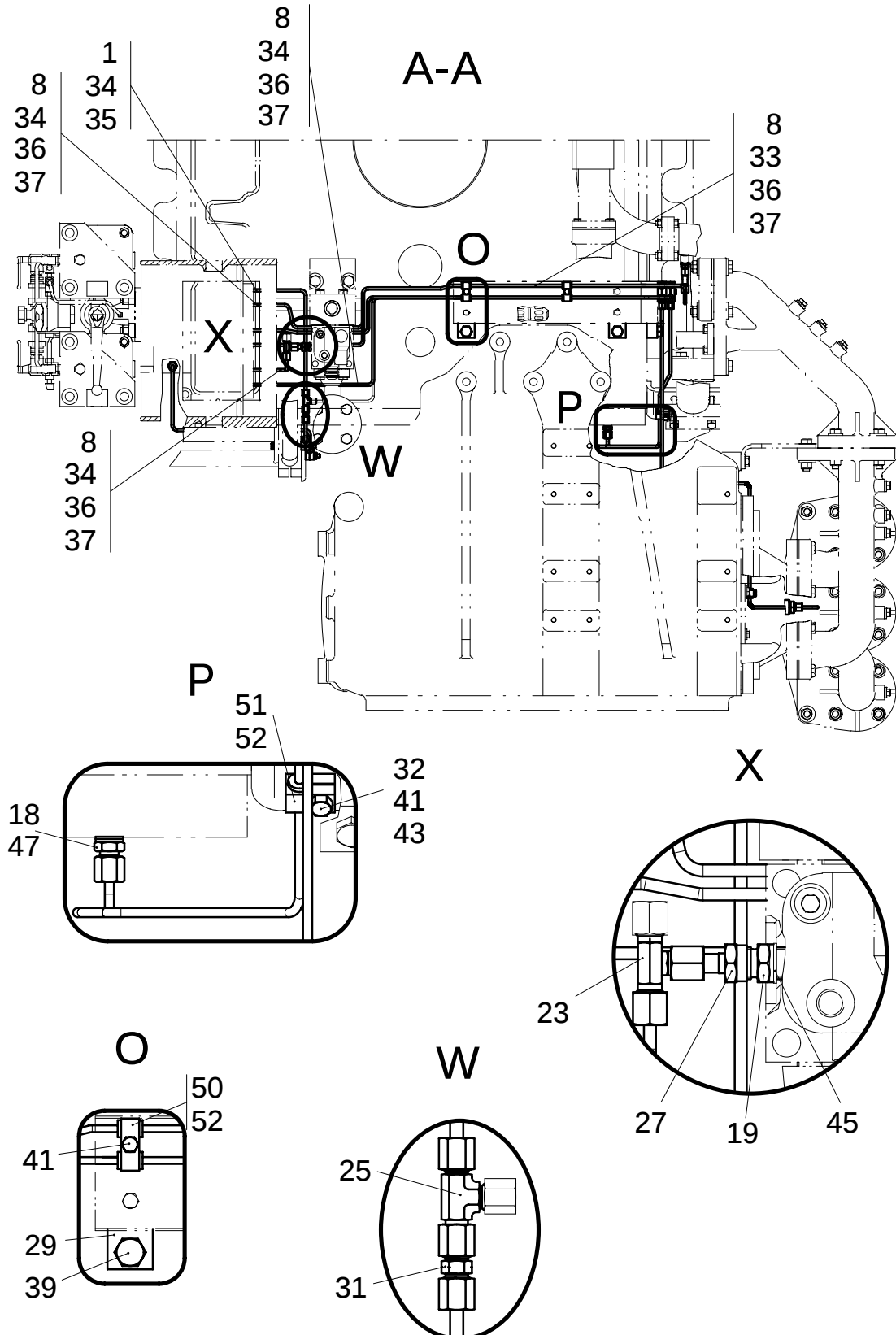
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Pressure Gauge Line Mounting

M25

11



Pressure Gauge Line Mounting

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERLEITUNGEN, VOLLST. PRESSURE GAUGE LINE ASSEMBLY	1	254643 KK
1	ROHRLEITUNG STEEL TUBE		1.9056-201
8	ROHRLEITUNG COPPER TUBE		1.9090-010
16	STUTZEN MALE CONNECTOR	1	1.5094-130
17	STUTZEN MALE CONNECTOR	1	1.5094-230
18	STUTZEN MALE CONNECTOR	1	1.5094-250
19	STUTZEN PIPE UNION	1	1.5098-014
20	STUTZEN PIPE UNION	1	1.5095-040
21	STUTZEN UNION TEE	2	1.5095-440
22	STUTZEN UNION TEE	1	1.5095-510
23	STUTZEN ADJUSTABLE T-ADAPTER	1	1.5093-442
24	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-330
25	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-300
26	STUTZEN MALE CONNECTOR	1	1.5094-188
27	KONUS-REDUZIERANSCHLUSS REDUCING UNION	2	1.4519-443
28	GEWINDEREDUZIERUNG REDUCER	1	1.4639-049
30	DÄMPFUNGSSTUTZEN DAMPING SOCKET	1	1.5075-013
31	DÄMPFUNGSSTUTZEN DAMPING UNION	1	1.5075-012
32	SCHEIBE WASHER	2	1.0058-459
33	ÜBERWURFMUTTER UNION NUT	4	1.5040-134
34	ÜBERWURFMUTTER UNION NUT	18	1.5040-114

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
35	SCHNEIDRING CUTTING RING	8	1.5059-208
36	SCHNEIDRING CUTTING RING	16	1.5059-084
37	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	16	1.3088-006
38	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-239
39	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-445
40	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-251
41	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-241
42	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-311
43	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
45	DICHTRING JOINT RING	# 1	1.7010-078
46	DICHTRING JOINT RING	# 1	1.7010-064
47	DICHTRING JOINT RING	# 2	1.7033-103
48	DICHTRING JOINT RING	# 1	1.7010-037
49	STUTZEN UNION TEE	1	1.5095-240
50	ROHRKLEMME PIPE CLAMP	22	1.5011-001
51	ROHRKLEMME PIPE CLAMP	8	1.5011-002
52	GUMMITÜLLE RUBBER SOCKET	24	1.5011-194
53	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-247
54	HALTER BRACKET	1	254643-054
55	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-387
56	WINKELSTUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-241

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
57	STUTZEN MALE CONNECTOR	1	1.5096-862
58	LEITUNGSBRUCHSICHERUNG PIPEBREAKFUSE	2	9.4830-040
59	GEWINDEREDUZIERUNG REDUCER	3	1.5036-008
60	STUTZEN MALE CONNECTOR	2	1.5094-140
61	STUTZEN MALE CONNECTOR	1	1.5096-810
62	GEWINDEREDUZIERUNG REDUCER	1	1.5036-001
63	WINKELSTUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-210

= VERBRAUCHSTEILE
CONSUMABLES

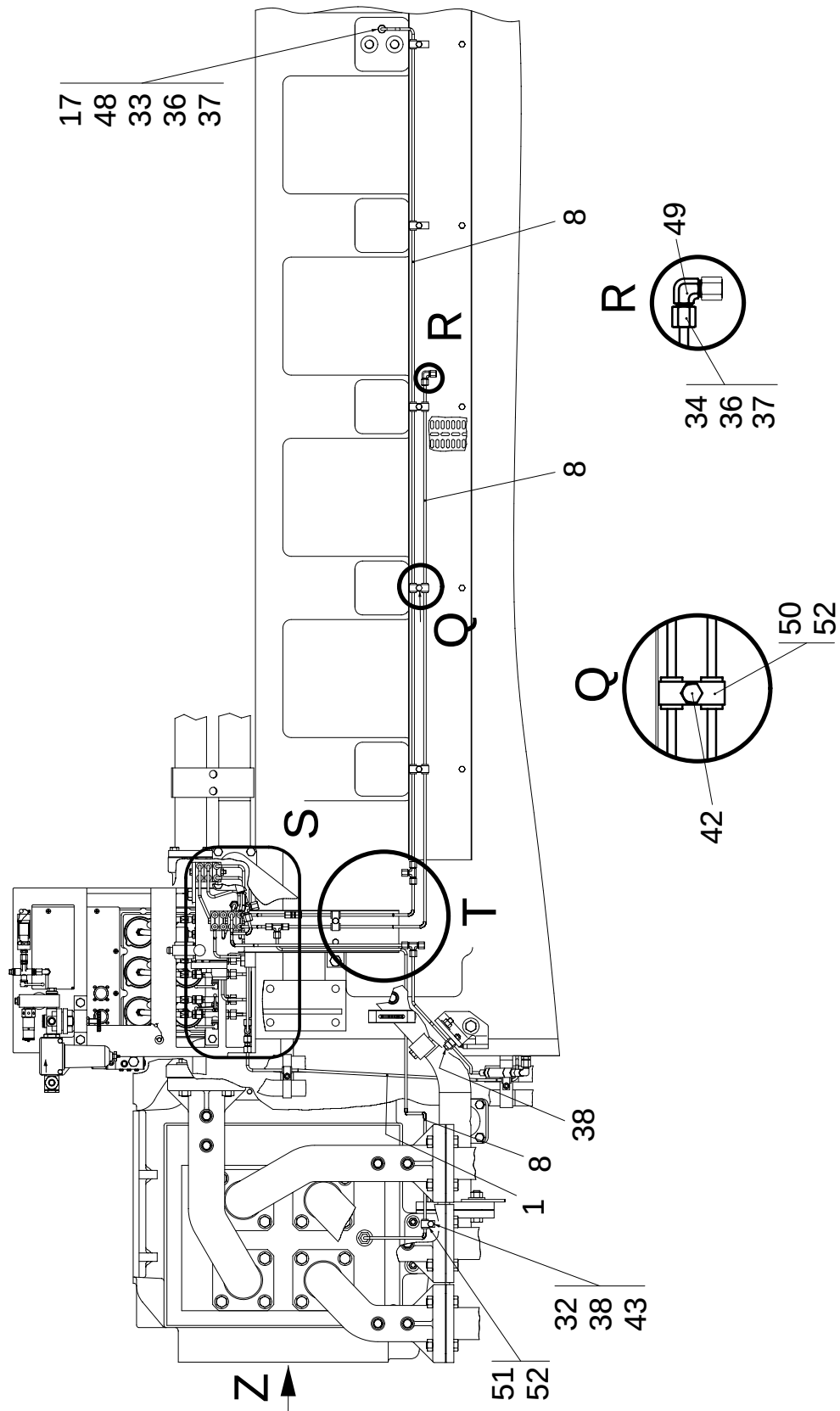
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

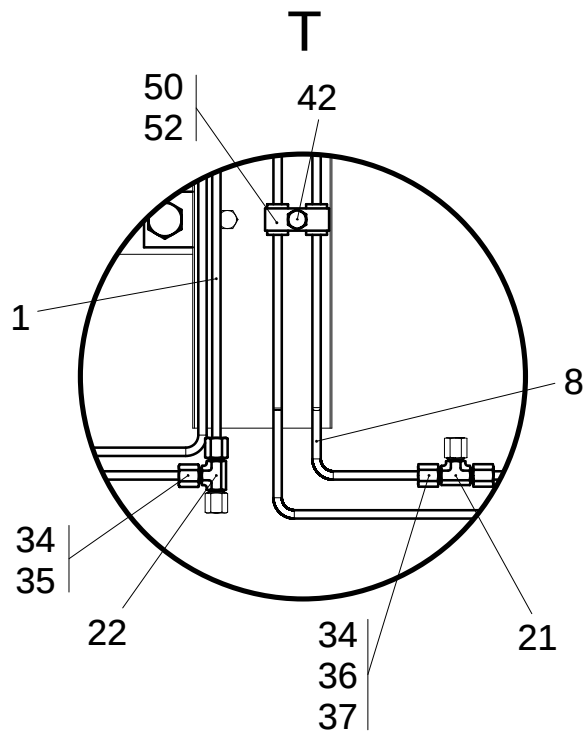
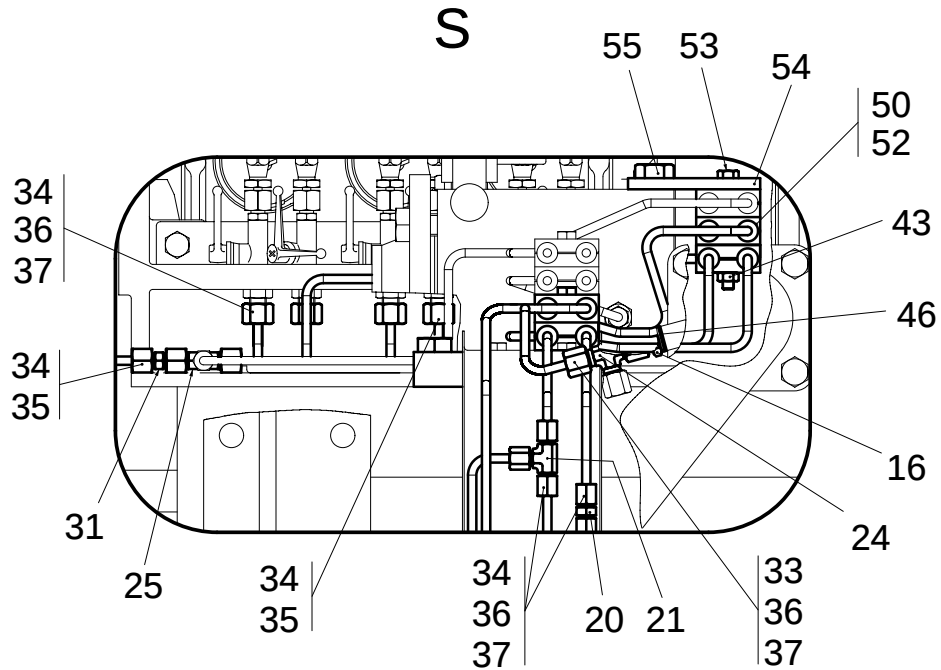
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Pressure Gauge Line Mounting

M25

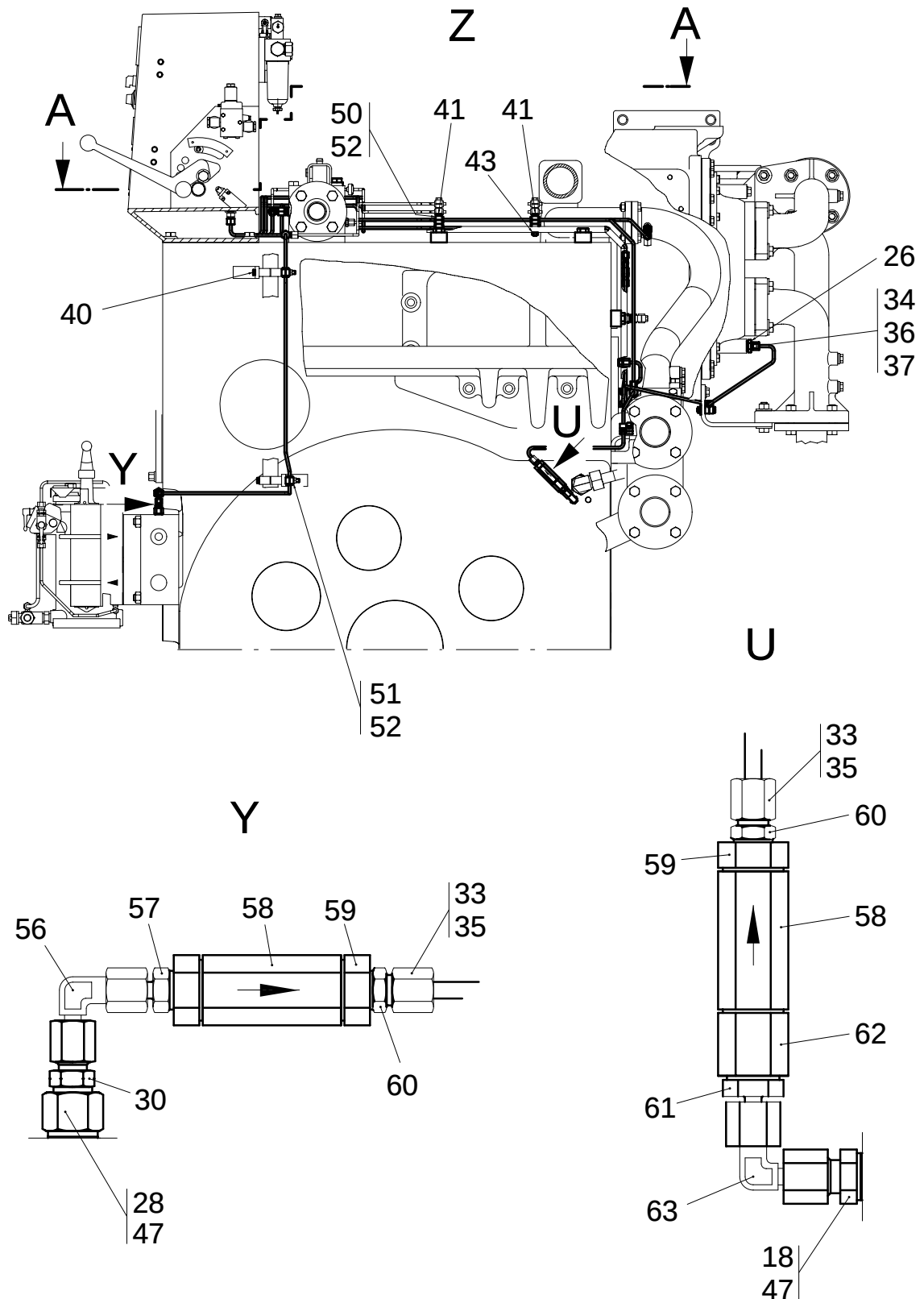
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Pressure Gauge Line Mounting

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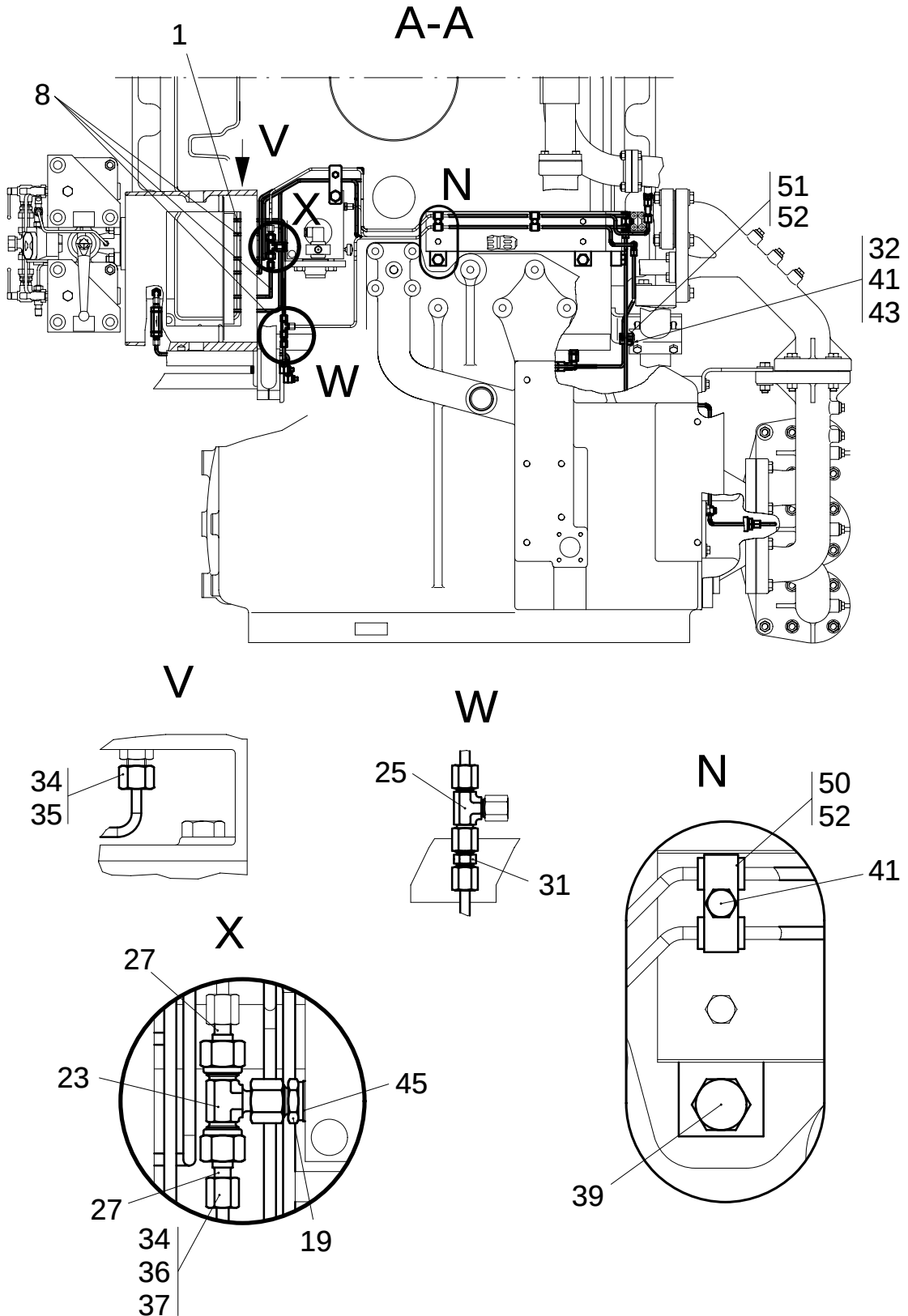
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Pressure Gauge Line Mounting

M25

11



Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	MANOMETERLEITUNGEN, VOLLST. PRESSURE GAUGE LINE ASSEMBLY	1	254643 LL
1	ROHRLEITUNG STEEL TUBE		1.9056-201
8	ROHRLEITUNG COPPER TUBE		1.9090-010
16	STUTZEN MALE CONNECTOR	1	1.5094-130
17	STUTZEN MALE CONNECTOR	1	1.5094-230
18	STUTZEN MALE CONNECTOR	1	1.5094-250
19	STUTZEN PIPE UNION	1	1.5098-014
20	STUTZEN PIPE UNION	1	1.5095-040
21	STUTZEN UNION TEE	2	1.5095-440
22	STUTZEN UNION TEE	1	1.5095-510
23	STUTZEN ADJUSTABLE T-ADAPTER	1	1.5093-442
24	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-330
25	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-300
26	STUTZEN MALE CONNECTOR	1	1.5094-188
27	KONUS-REDUZIERANSCHLUSS REDUCING UNION	2	1.4519-443
28	GEWINDEREDUZIERUNG REDUCER	1	1.4639-049
30	DÄMPFUNGSSTUTZEN DAMPING SOCKET	1	1.5075-013
31	DÄMPFUNGSSTUTZEN DAMPING UNION	1	1.5075-012
32	SCHEIBE WASHER	2	1.0058-459
33	ÜBERWURFMUTTER UNION NUT	4	1.5040-134
34	ÜBERWURFMUTTER UNION NUT	18	1.5040-114

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
35	SCHNEIDRING CUTTING RING	8	1.5059-208
36	SCHNEIDRING CUTTING RING	16	1.5059-084
37	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	16	1.3088-006
38	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1367-239
39	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-445
40	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-251
41	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-241
42	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-311
43	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-034
45	DICHTRING JOINT RING	# 1	1.7010-078
46	DICHTRING JOINT RING	# 1	1.7010-064
47	DICHTRING JOINT RING	# 2	1.7033-103
48	DICHTRING JOINT RING	# 1	1.7010-037
49	STUTZEN UNION TEE	1	1.5095-240
50	ROHRKLEMME PIPE CLAMP	24	1.5011-001
51	ROHRKLEMME PIPE CLAMP	8	1.5011-002
52	GUMMITÜLLE RUBBER SOCKET	25	1.5011-194
53	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-247
54	HALTER BRACKET	1	254643-054
55	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1367-387
56	WINKELSTUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-241

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
57	STUTZEN MALE CONNECTOR	1	1.5096-862
58	LEITUNGSBRUCHSICHERUNG PIPEBREAKFUSE	2	9.4830-040
59	GEWINDEREDUZIERUNG REDUCER	3	1.5036-008
60	STUTZEN MALE CONNECTOR	2	1.5094-140
61	STUTZEN MALE CONNECTOR	1	1.5096-810
62	GEWINDEREDUZIERUNG REDUCER	1	1.5036-001
63	WINKELSTUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-210

= VERBRAUCHSTEILE
CONSUMABLES

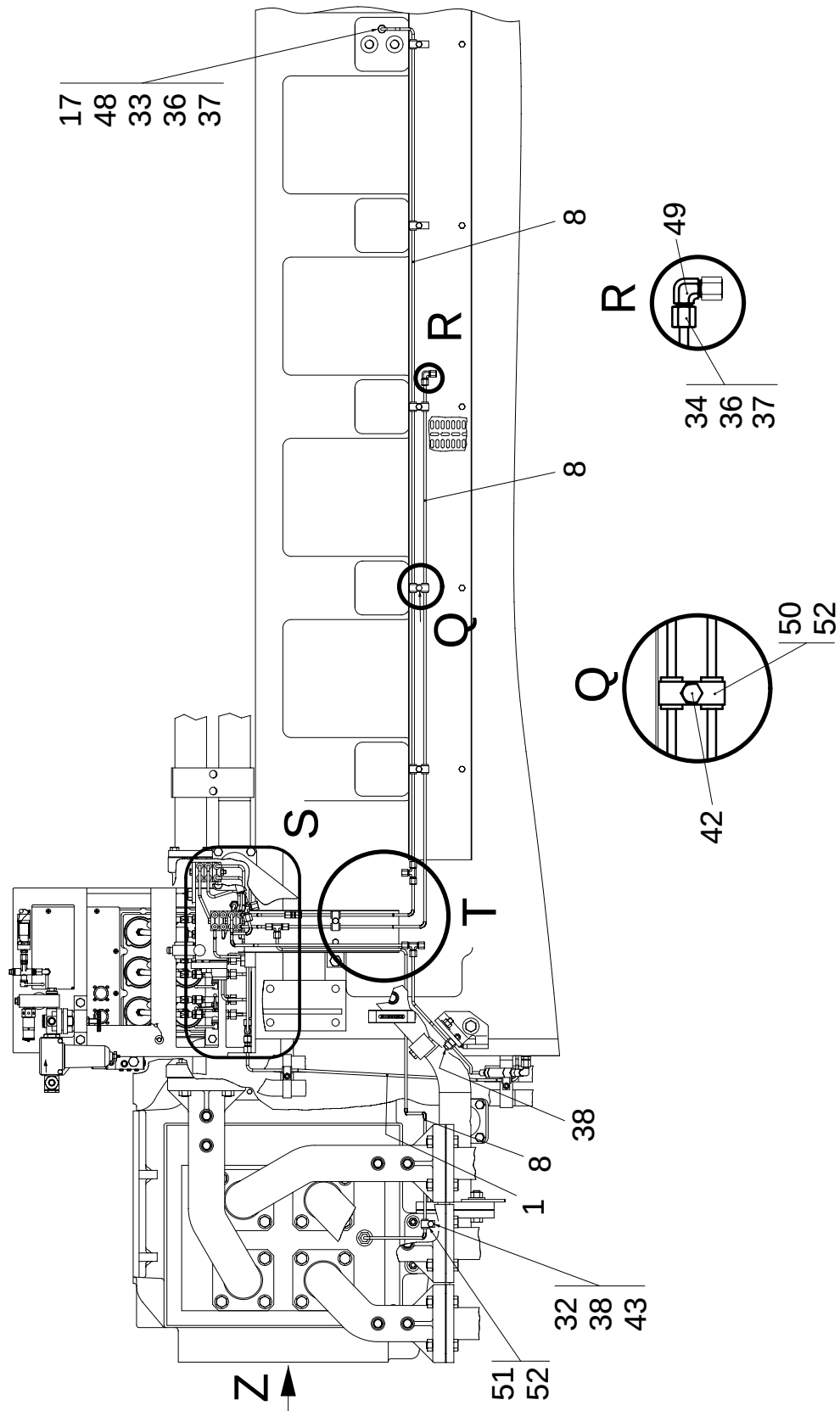
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Gauge Line Mounting

M25

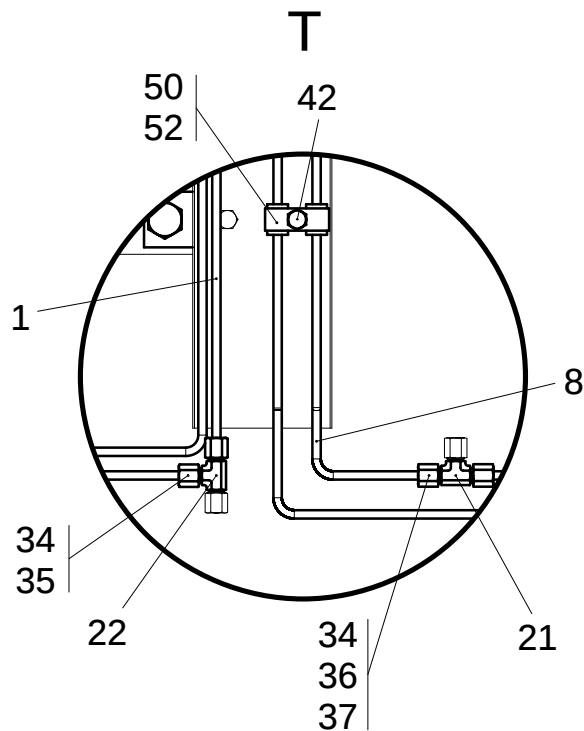
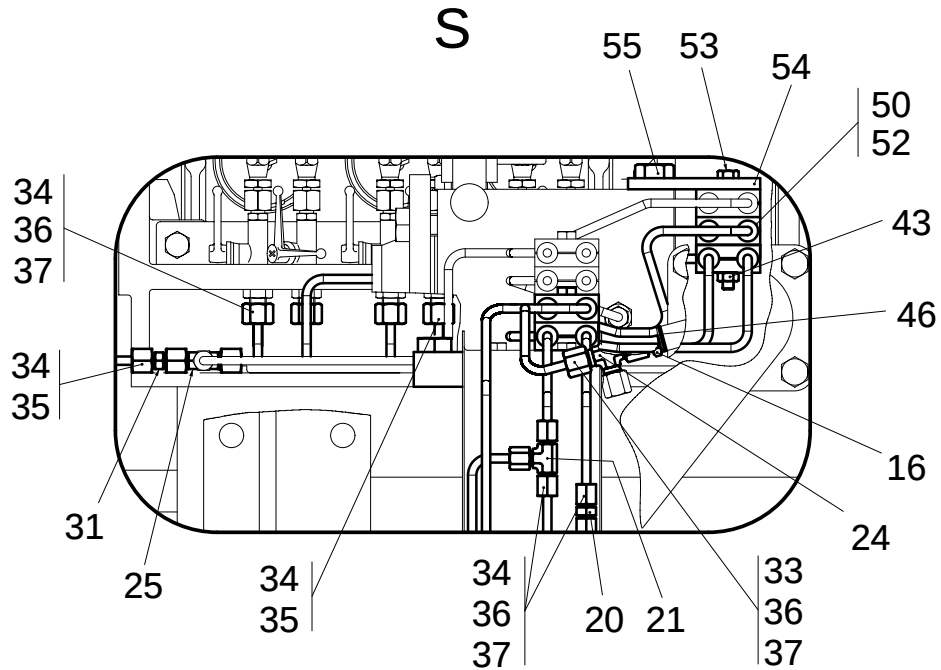
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Pressure Gauge Line Mounting

M25

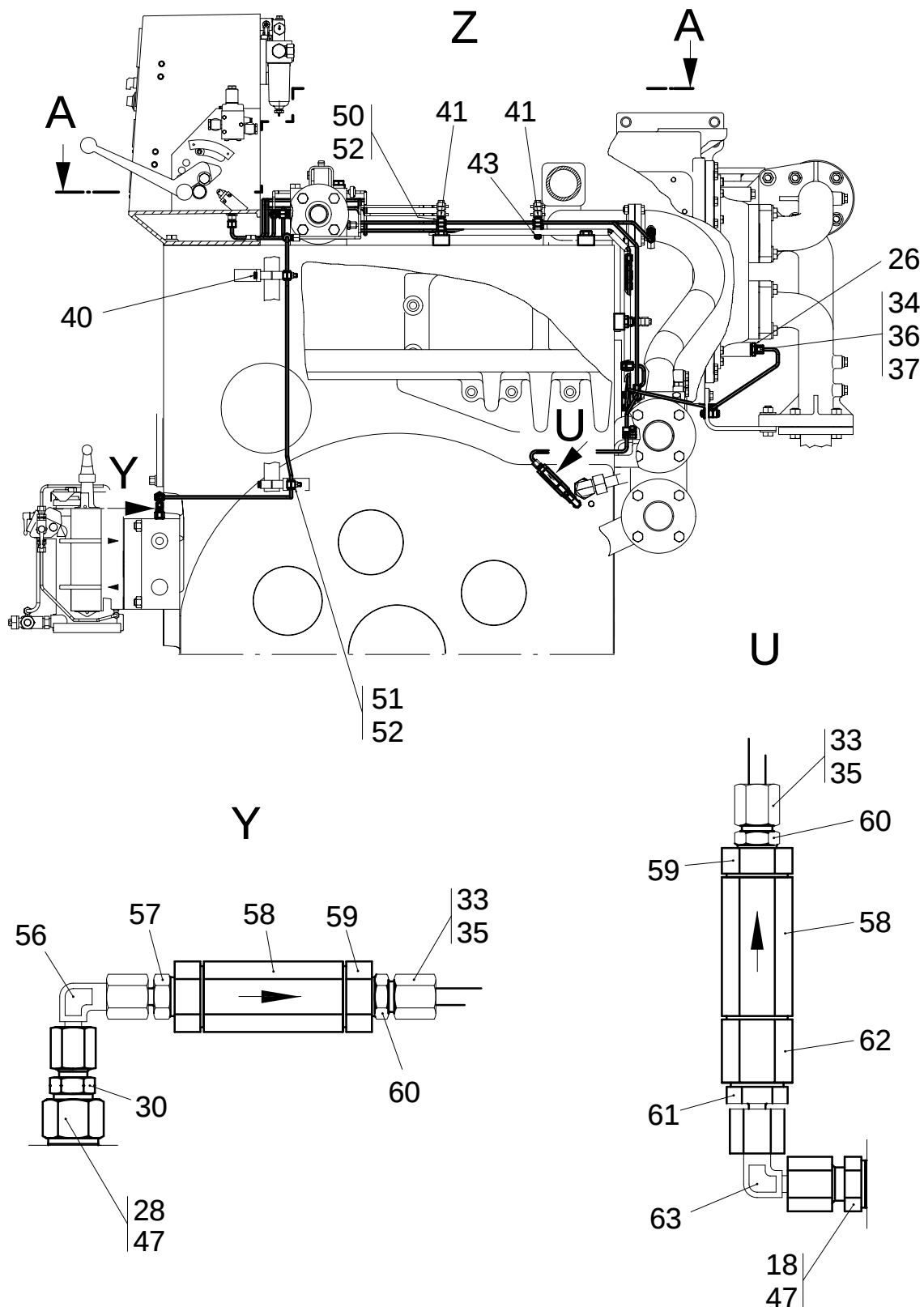
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Pressure Gauge Line Mounting

M25

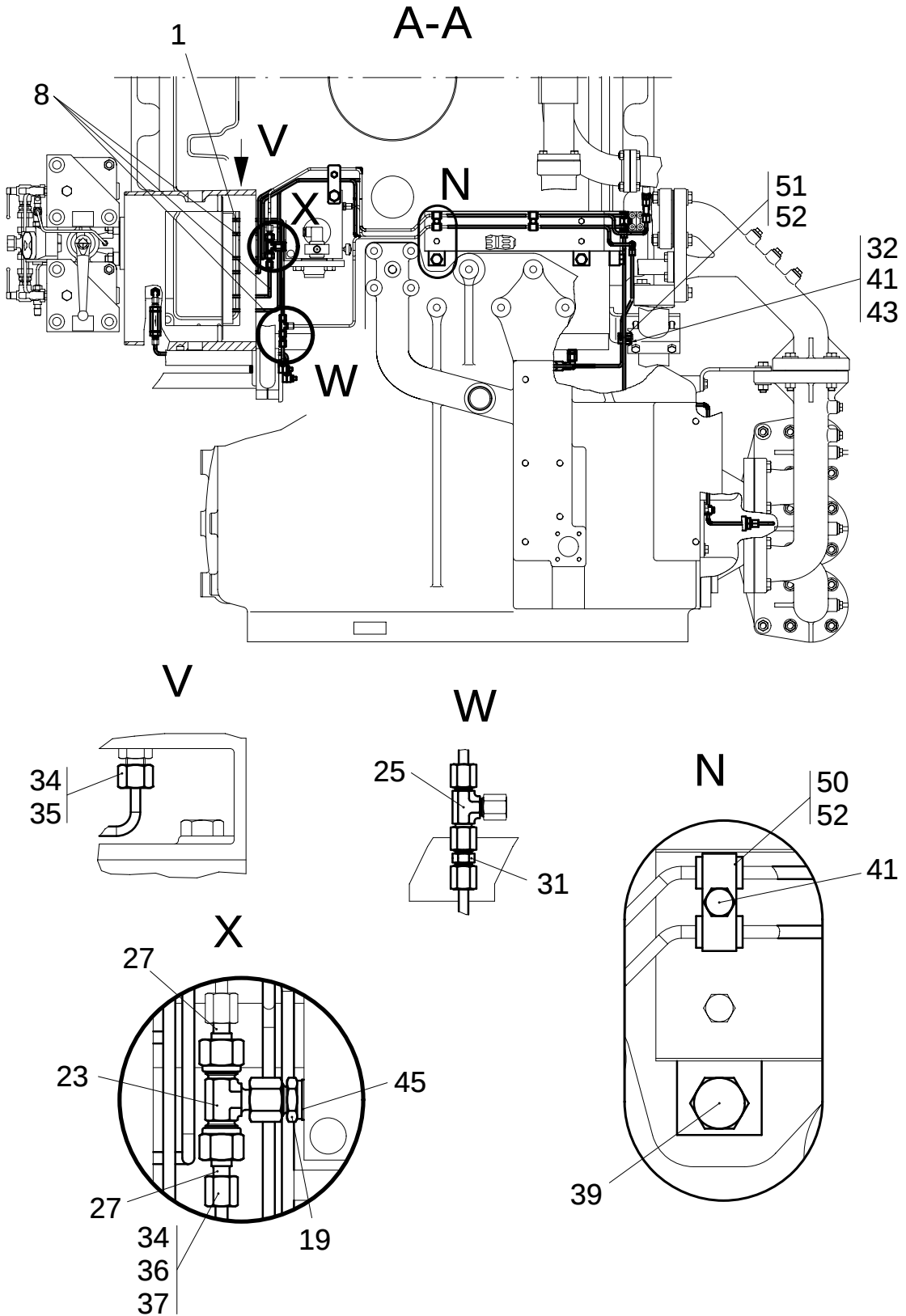
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Pressure Gauge Line Mounting

M25

11



Crankcase Oil Mist Detector

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TRIEBRAUMÜBERWACHUNG, VOLLST. CRANKCASE OIL MIST DETECTOR ASSEMBLY	1	254810 AA
1	TRIEBRAUMÜBERWACHUNGSGERÄT, VOLLST. CRANKCASE OIL MIST DETECTOR, COMPL.	1	SIEHE B1.05.11.1.4877 SEE B1.05.11.1.4877
2	ABSTANDSSTÜCK DISTANCE PIECE	4	1.0520-169
5	VERSCHRAUBUNG UNION ELBOW	6	9.4810-005
6	REDUZIERSTUTZEN REDUCING UNION	6	254810-006
9	ABSTANDSHALTER DISTANCE PIECE	7	9.4810-009
10	ABSTANDSHALTER DISTANCE PIECE	1	254810-010
12	SAMMELROHR, VOLLST. COLLECTING PIPE, COMPL.	1	254810-012
13	SAMMELROHR, VOLLST. COLLECTING PIPE, COMPL.	1	254810-013
14	ABLUFTRÖHR, VOLLST. VENT PIPE, COMPL.	1	254810-014
16	ANSAUGROHR, VOLLST. SUCTION PIPE, COMPL.	6	254810-016
18	ROHRLEITUNG COPPER TUBE		1.9090-018
22	ROHRKLEMME PIPE CLAMP	16	1.5011-023
23	ROHRKLEMME PIPE CLAMP	4	1.5011-002
27	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-314
28	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1367-381
29	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-244
30	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-445
34	STUTZEN PIPE UNION	1	1.5095-042
35	SCHWENKVERSCHRAUBEUNG BANJO	1	1.5093-727
36	STUTZEN MALE CONNECTOR	3	1.5094-179

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Crankcase Oil Mist Detector

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
37	STUTZEN ADJUSTABLE ELBOW	1	1.5093-257
42	DICHTRING JOINT RING	# 9	1.7010-196
43	DICHTRING JOINT RING	# 6	1.7010-252
45	ÜBERWURFMUTTER UNION NUT	4	1.5040-116
46	SCHNEIDRING CUTTING RING	4	1.5059-086
47	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	4	1.3088-012

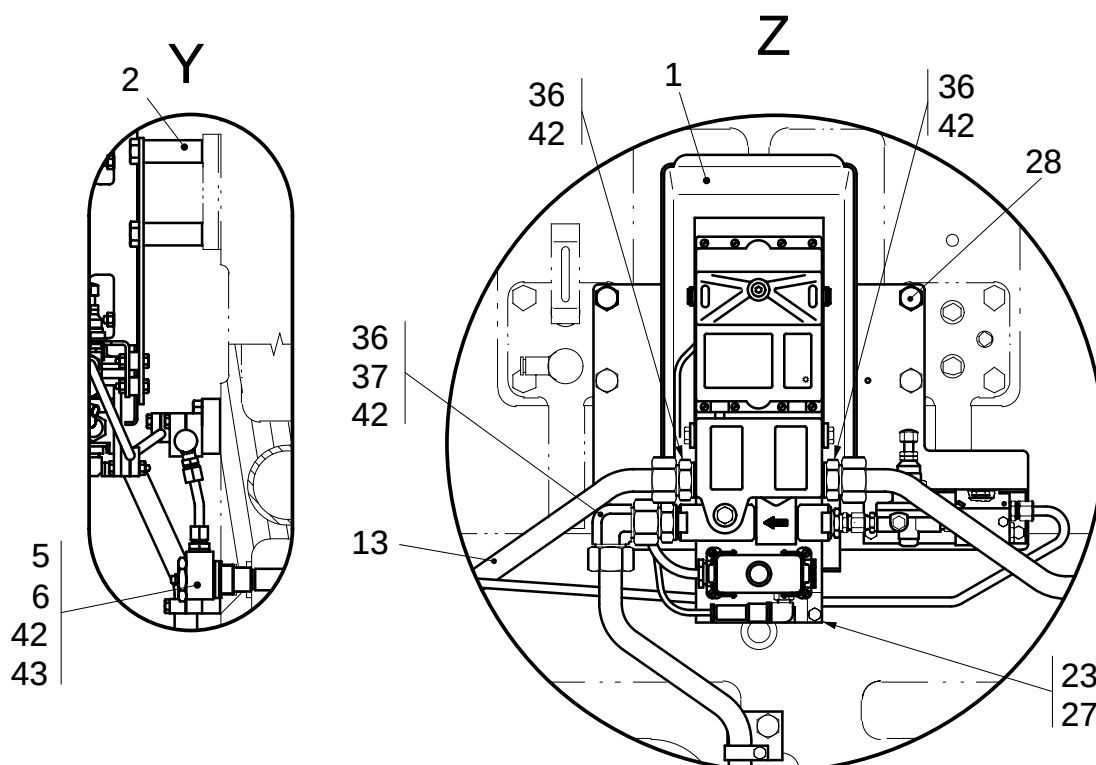
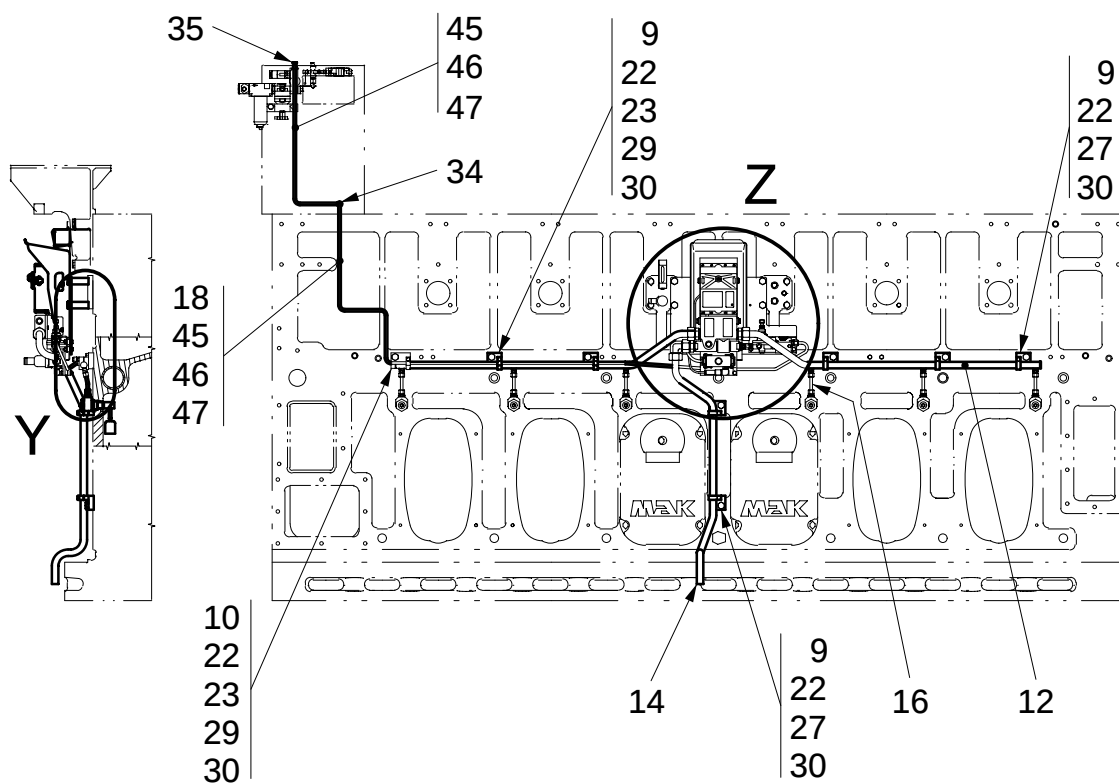
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Crankcase Oil Mist Detector

M25

11



Crankcase Oil Mist Detector

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TRIEBRAUMÜBERWACHUNG, VOLLST. CRANKCASE OIL MIST DETECTOR ASSEMBLY	1	254810 BB
1	TRIEBRAUMÜBERWACHUNGSGERÄT, VOLLST. CRANKCASE OIL MIST DETECTOR, COMPL.	1	SIEHE B1.05.11.1.4877 SEE B1.05.11.1.4877
2	ABSTANDSSTÜCK DISTANCE PIECE	4	1.0520-169
5	VERSCHRAUBUNG UNION ELBOW	8	9.4810-005
6	REDUZIERSTUTZEN REDUCING UNION	8	254810-006
9	ABSTANDSHALTER DISTANCE PIECE	9	9.4810-009
10	ABSTANDSHALTER DISTANCE PIECE	1	254810-010
12	SAMMELROHR, VOLLST. COLLECTING PIPE, COMPL.	1	254810-112
13	SAMMELROHR, VOLLST. COLLECTING PIPE, COMPL.	1	254810-113
14	ABLUFTRÖHR, VOLLST. VENT PIPE, COMPL.	1	254810-014
16	ANSAUGRÖHR, VOLLST. SUCTION PIPE, COMPL.	8	254810-016
18	ROHRLEITUNG COPPER TUBE		1.9090-018
22	ROHRKLEMME PIPE CLAMP	20	1.5011-023
23	ROHRKLEMME PIPE CLAMP	6	1.5011-002
27	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-314
28	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1367-381
29	SECHSKANTSCHRAUBE HEXAGON BOLT	3	1.1367-244
30	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-445
34	STUTZEN PIPE UNION	1	1.5095-042
35	SCHWENKVERSCHRAUBEUNG BANJO	1	1.5093-727
36	STUTZEN MALE CONNECTOR	3	1.5094-179

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Crankcase Oil Mist Detector

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
37	STUTZEN ADJUSTABLE ELBOW	1	1.5093-257
42	DICHTRING JOINT RING	# 11	1.7010-196
43	DICHTRING JOINT RING	# 8	1.7010-252
45	ÜBERWURFMUTTER UNION NUT	4	1.5040-116
46	SCHNEIDRING CUTTING RING	4	1.5059-086
47	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	4	1.3088-012

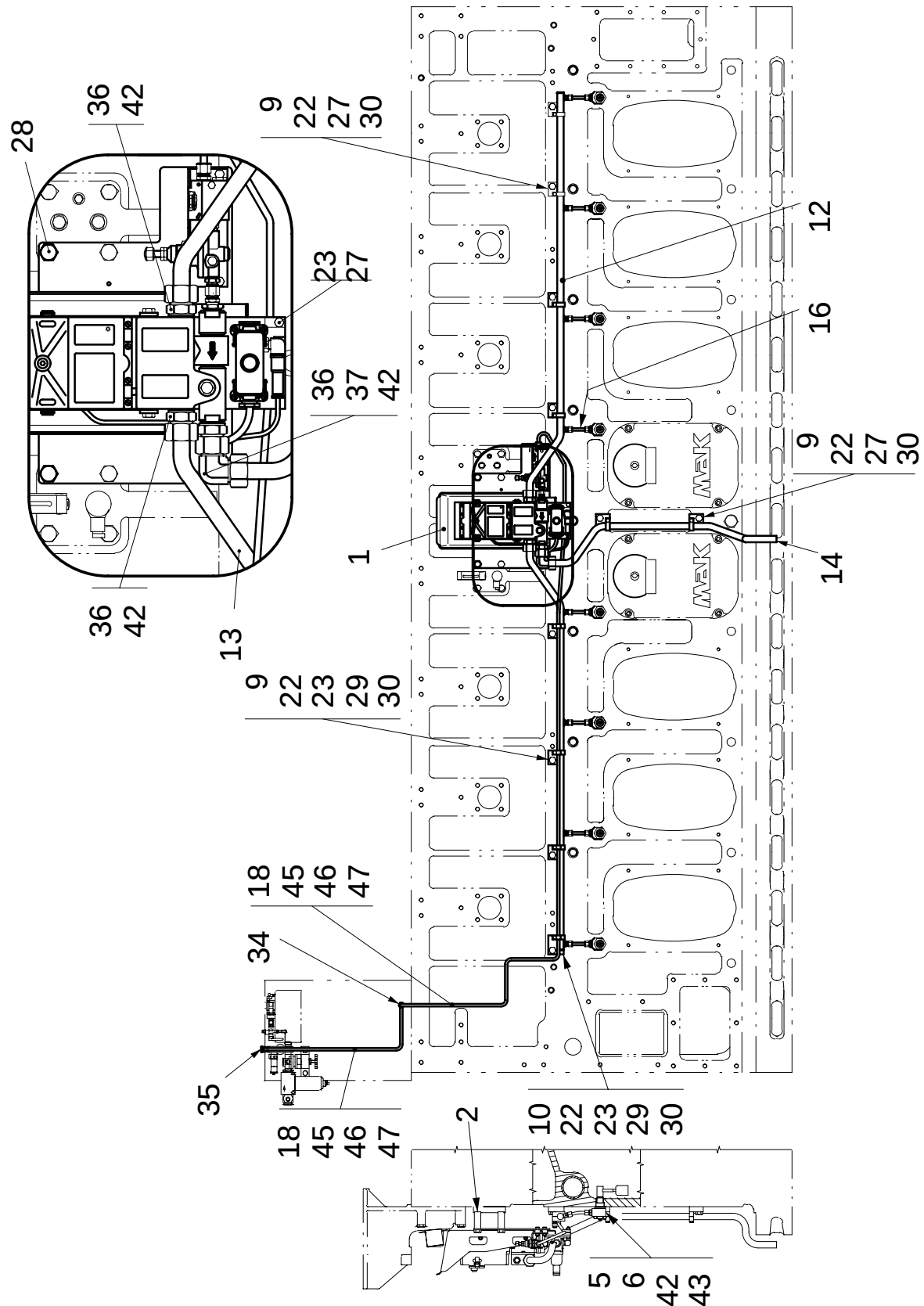
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Crankcase Oil Mist Detector

M25

11



Crankcase Oil Mist Detector

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TRIEBRAUMÜBERWACHUNG, VOLLST. CRANKCASE OIL MIST DETECTOR ASSEMBLY	1	254810 CC
1	TRIEBRAUMÜBERWACHUNGSGERÄT, VOLLST. CRANKCASE OIL MIST DETECTOR, COMPL.	1	SIEHE B1.05.11.1.4877 SEE B1.05.11.1.4877
2	ABSTANDSSTÜCK DISTANCE PIECE	4	1.0520-169
5	VERSCHRAUBUNG UNION ELBOW	9	9.4810-005
6	REDUZIERSTUTZEN REDUCING UNION	9	254810-006
9	ABSTANDSHALTER DISTANCE PIECE	10	9.4810-009
10	ABSTANDSHALTER DISTANCE PIECE	1	254810-010
12	SAMMELROHR, VOLLST. COLLECTING PIPE, COMPL.	1	254810-112
13	SAMMELROHR, VOLLST. COLLECTING PIPE, COMPL.	1	254810-213
14	ABLUFTRÖHR, VOLLST. VENT PIPE, COMPL.	1	254810-014
16	ANSAUGRÖHR, VOLLST. SUCTION PIPE, COMPL.	9	254810-016
18	ROHRLEITUNG COPPER TUBE		1.9090-018
22	ROHRKLEMME PIPE CLAMP	22	1.5011-023
23	ROHRKLEMME PIPE CLAMP	8	1.5011-002
27	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1387-314
28	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1367-381
29	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1367-244
30	SECHSKANTSCHRAUBE HEXAGON SCREW	11	1.1387-445
34	STUTZEN PIPE UNION	1	1.5095-042
35	SCHWENKVERSCHRAUBEUNG BANJO	1	1.5093-727
36	STUTZEN MALE CONNECTOR	3	1.5094-179

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Crankcase Oil Mist Detector

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
37	STUTZEN ADJUSTABLE ELBOW	1	1.5093-257
42	DICHTRING JOINT RING	# 12	1.7010-196
43	DICHTRING JOINT RING	# 9	1.7010-252
45	ÜBERWURFMUTTER UNION NUT	4	1.5040-116
46	SCHNEIDRING CUTTING RING	4	1.5059-086
47	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	4	1.3088-012

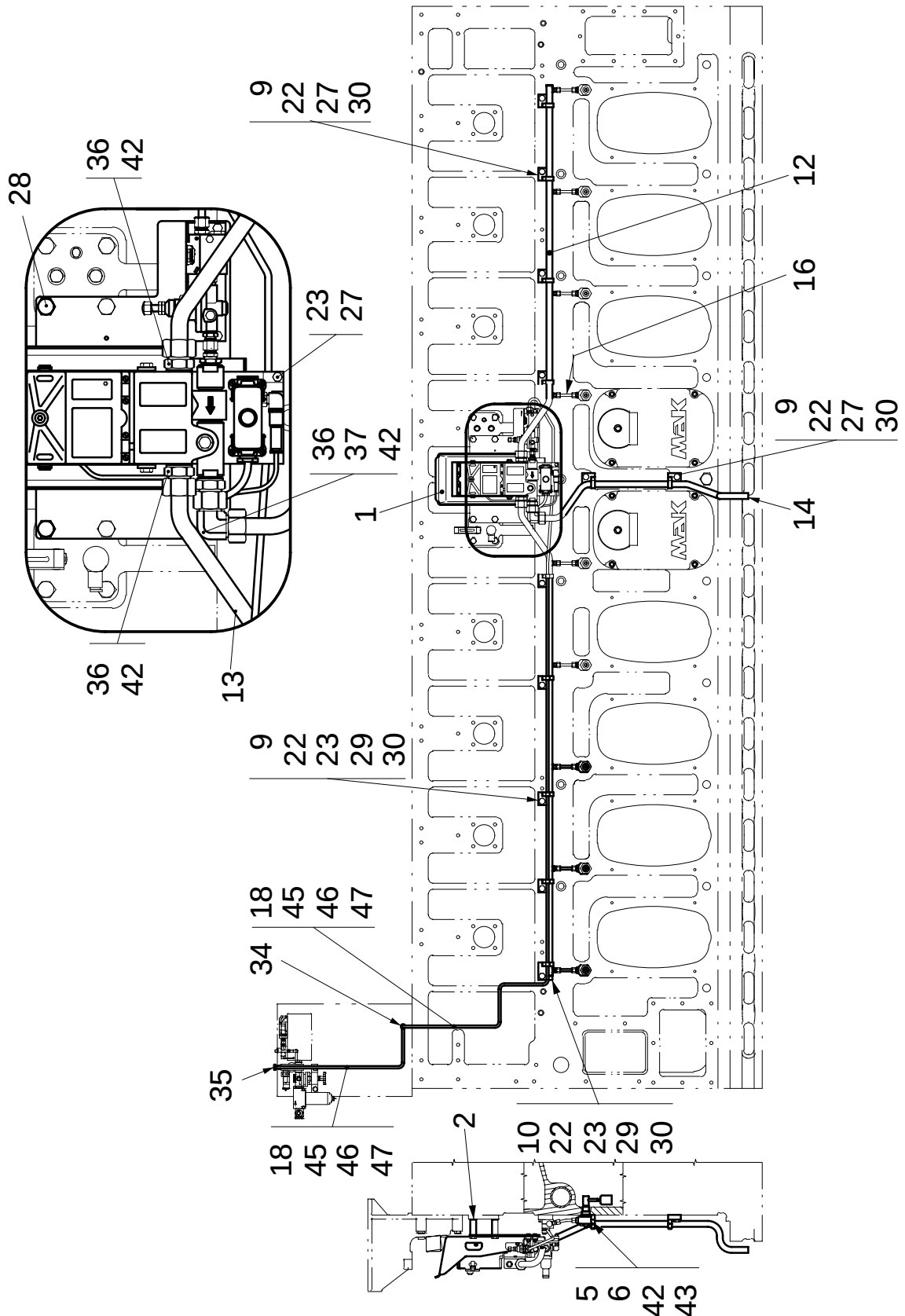
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Crankcase Oil Mist Detector

M25

11



Pressure Regulator

M25-M601C

11

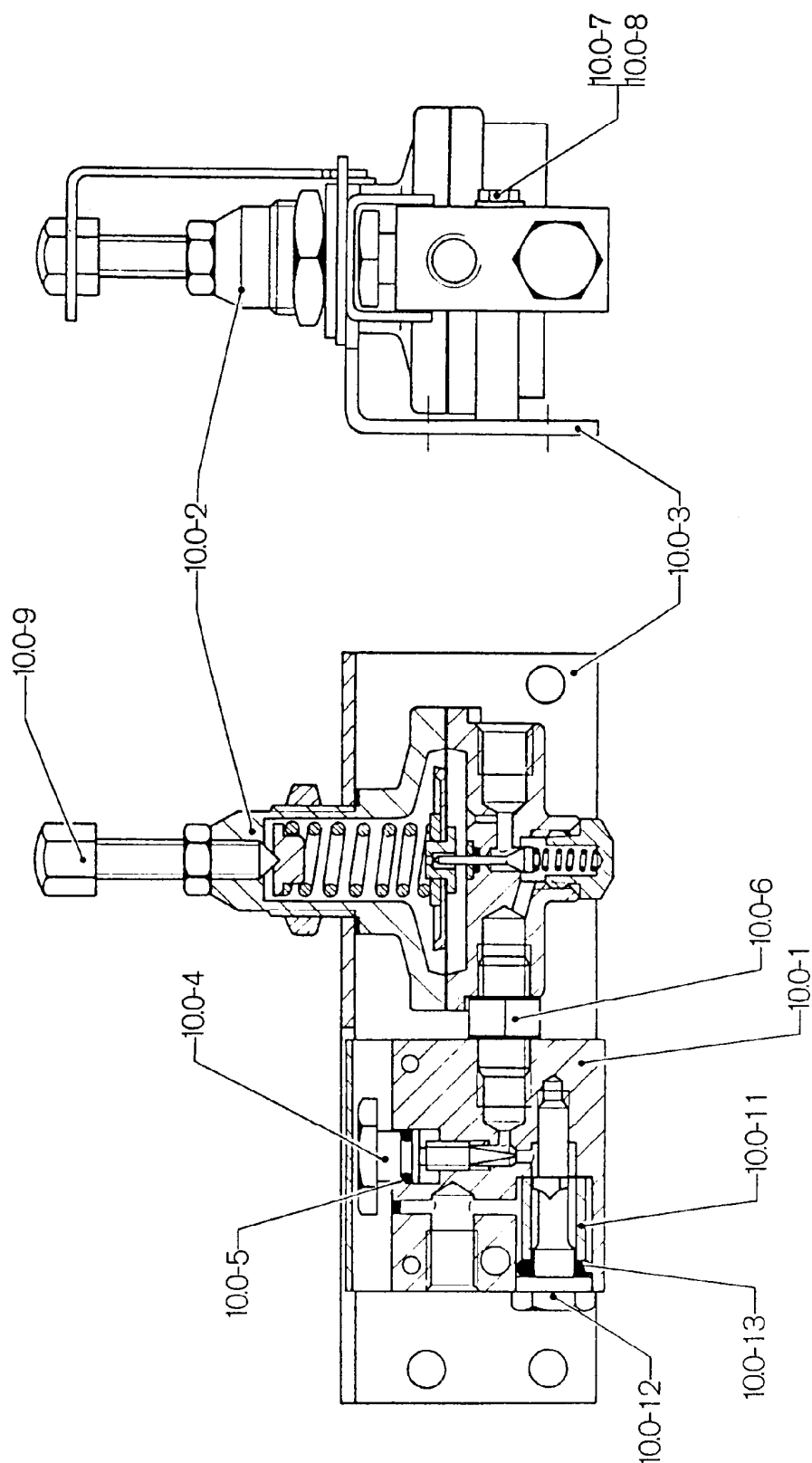
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
10.0	DRUCKREGELEINHEIT, VOLLST. PRESSURE REGULATOR ASS.	1	1.4817 AA	
10.0-1	VENTILGEHÄUSE HOUSING	1	1.4817-1	
10.0-2	FEINDRUCKREGLER PRESSURE REDUCER	1	SIEHE E-BLATT B1.05.05.1.4902 SEE LIST B1.05.05.1.4902	
10.0-3	MONTAGEWINKEL MOUNTING ANGLE	1	1.4817-3	
10.0-4	STELLSCHRAUBE ADJUSTING SCREW	1	1.4817-4	
10.0-5	O-RING O-RING	# 1	1.4817-5	
10.0-6	DOPPELNIPPEL NIPPLE	1	1.4817-6	
10.0-7	ZYLINDERSCHRAUBE SCREW	1	1.4817-7	
10.0-8	ZAHNSCHEIBE TOOTHED LOCK	1	1.4817-8	
10.0-9	HUTMUTTER CAP NUT	1	1.4817-9	
10.0-11	SINTERBRONZE-FILTER (BUCHSE) AGGLOMERATE-FILTER (BUSH)	1	1.4817-11	
10.0-12	HALTESCHRAUBE SCREW	1	1.4817-12	
10.0-13	O-RING O-RING	# 1	1.4817-13	

= VERBRAUCHSTEILE
CONSUMABLES

Pressure Regulator

M25-M601C

11



Water Detection

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	WASSERERKENNUNG, VOLLST. WATER DETECTION ASSEMBLY	1	254818 AA
1	VERSCHLUSSBUTZEN SEALING PLUG	2	2.4818-001
3	STUTZEN MALE CONNECTOR	2	1.5096-880
4	STUTZEN UNION ELBOW	2	1.5095-242
6	ÜBERWURFMUTTER UNION NUT	2	1.5040-116
8	REDUZIERSTUTZEN REDUCING UNION	2	9.4818-008
10	DICHTRING JOINT RING	# 2	1.7010-064
11	DICHTRING JOINT RING	# 2	1.7010-102

= VERBRAUCHSTEILE
CONSUMABLES

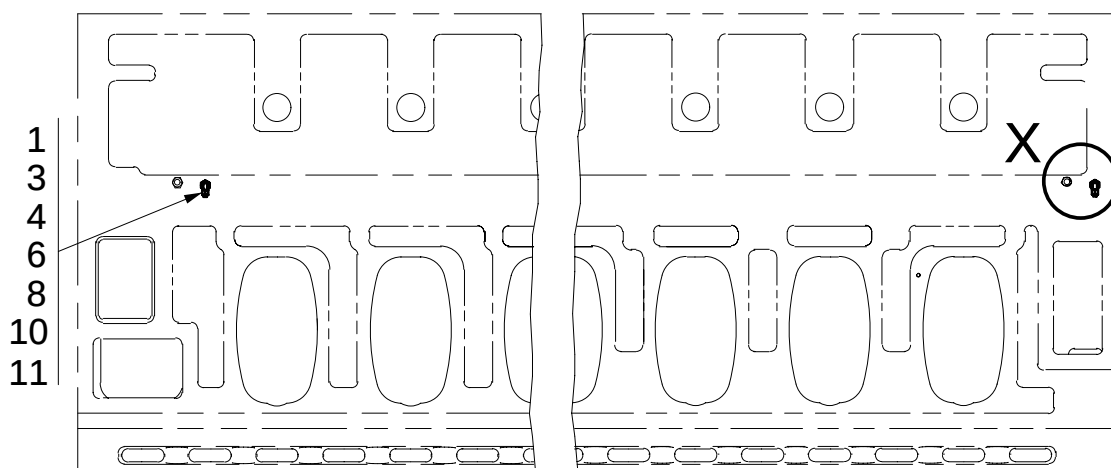
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

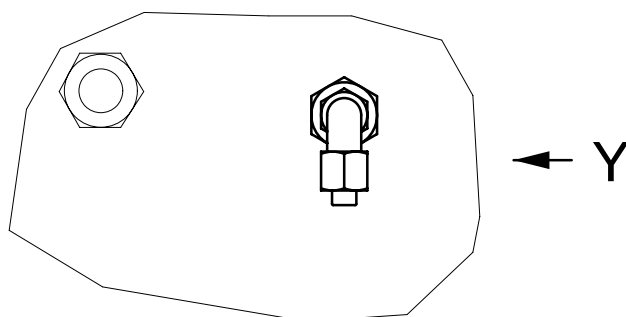
Water Detection

M25

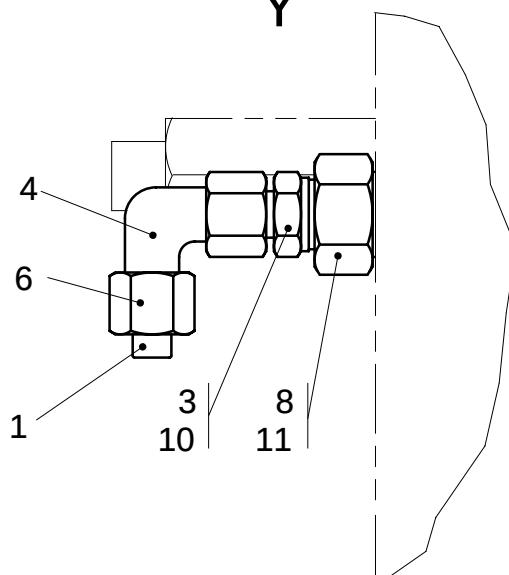
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X



Y



Water Detection

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	WASSERERKENNUNG, VOLLST. WATER DETECTION ASSEMBLY	1	254818 BB
1	LEITUNG PIPE	2	9.4818-001
2	STUTZEN MALE CONNECTOR	2	1.5094-270

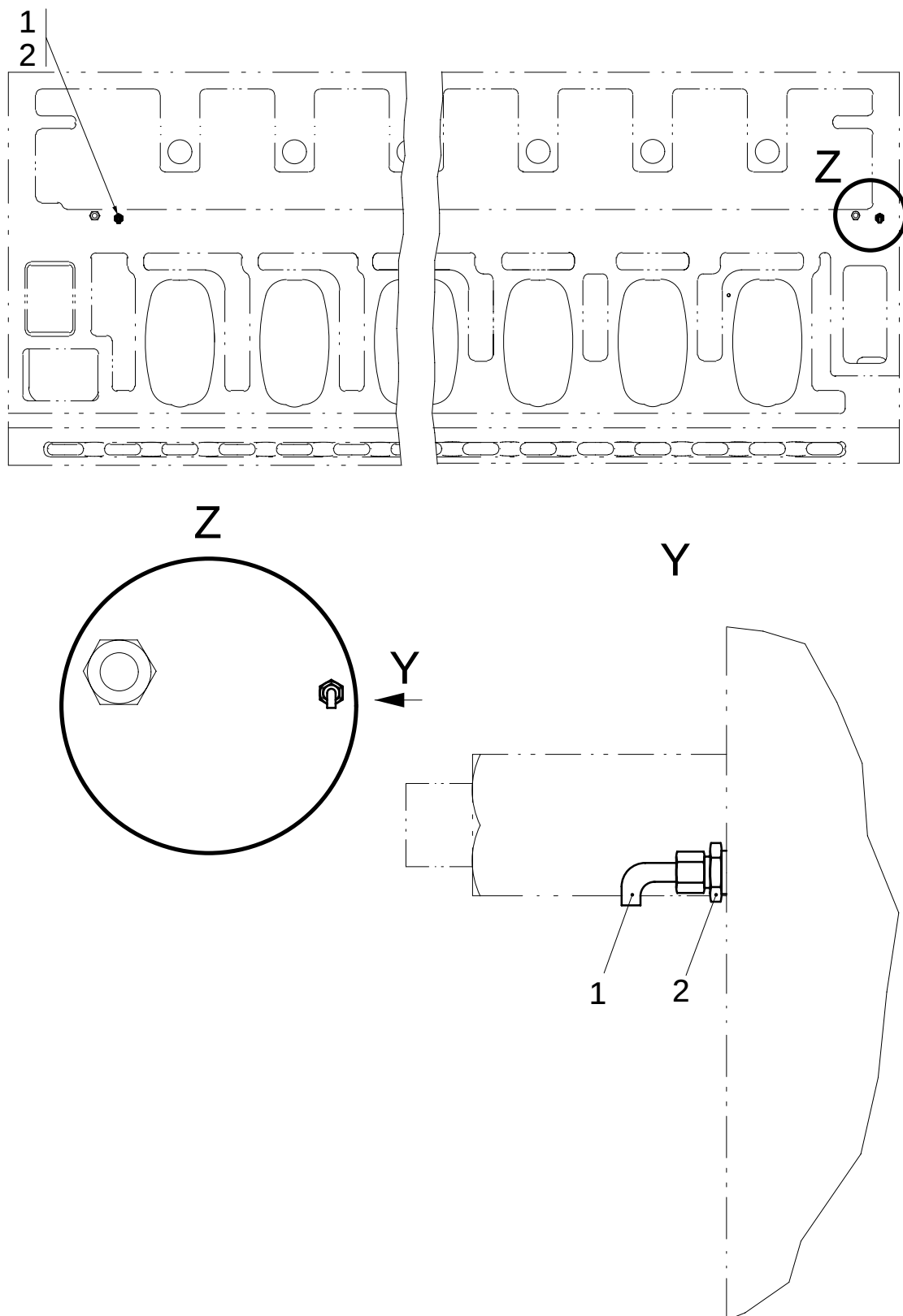
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Water Detection

M25

11



Water Detection

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	WASSERERKENNUNG, VOLLST. WATER DETECTION ASSEMBLY	1	254818 CC
1	LEITUNG PIPE	2	9.4818-001
2	STUTZEN MALE CONNECTOR	2	1.5094-270

= VERBRAUCHSTEILE
CONSUMABLES

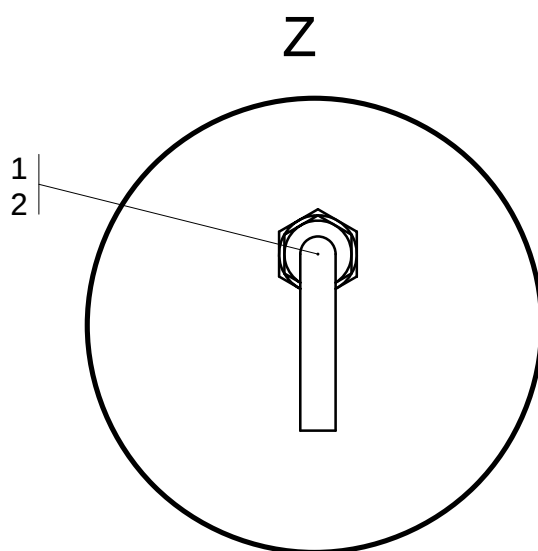
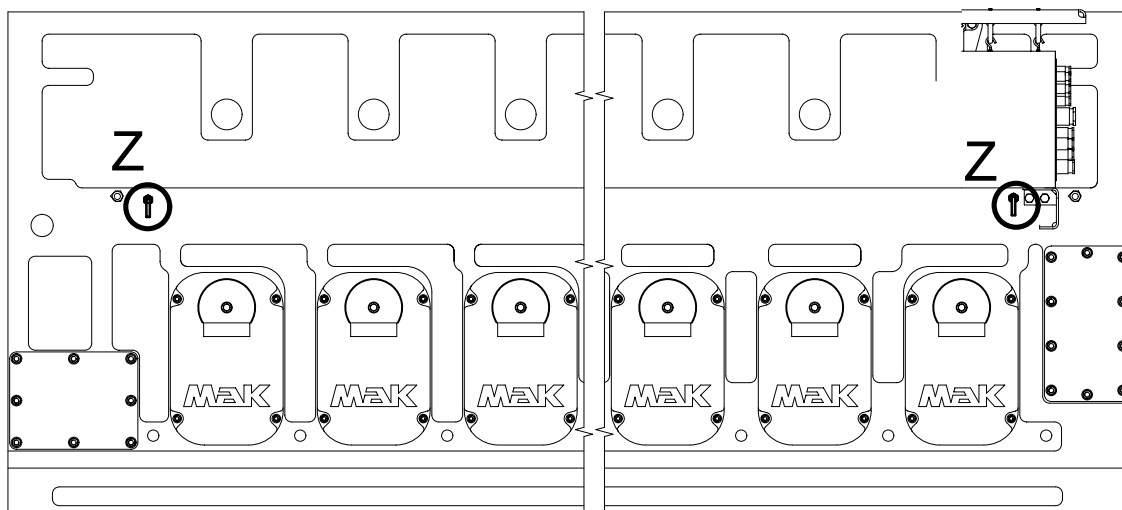
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Water Detection

M25

11



Impulse Line for Charge Air Pressure

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	IMPULSLEITUNG, VOLLST. IMPULSE LINE ASSEMBLY	1	254830 AA
1	ROHRLEITUNG COPPER TUBE		1.9090-010
3	ELASTISCHE VERBINDUNG HOSE	1	9.4830-012
5	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	2	1.3088-006
6	ÜBERWURFMUTTER UNION NUT	2	1.5040-114
7	SCHNEIDRING CUTTING RING	2	1.5059-084
8	STUTZEN BULKHEAD UNION	1	1.5095-620
9	MUTTER THIN NUT	1	1.2047-192

= VERBRAUCHSTEILE
CONSUMABLES

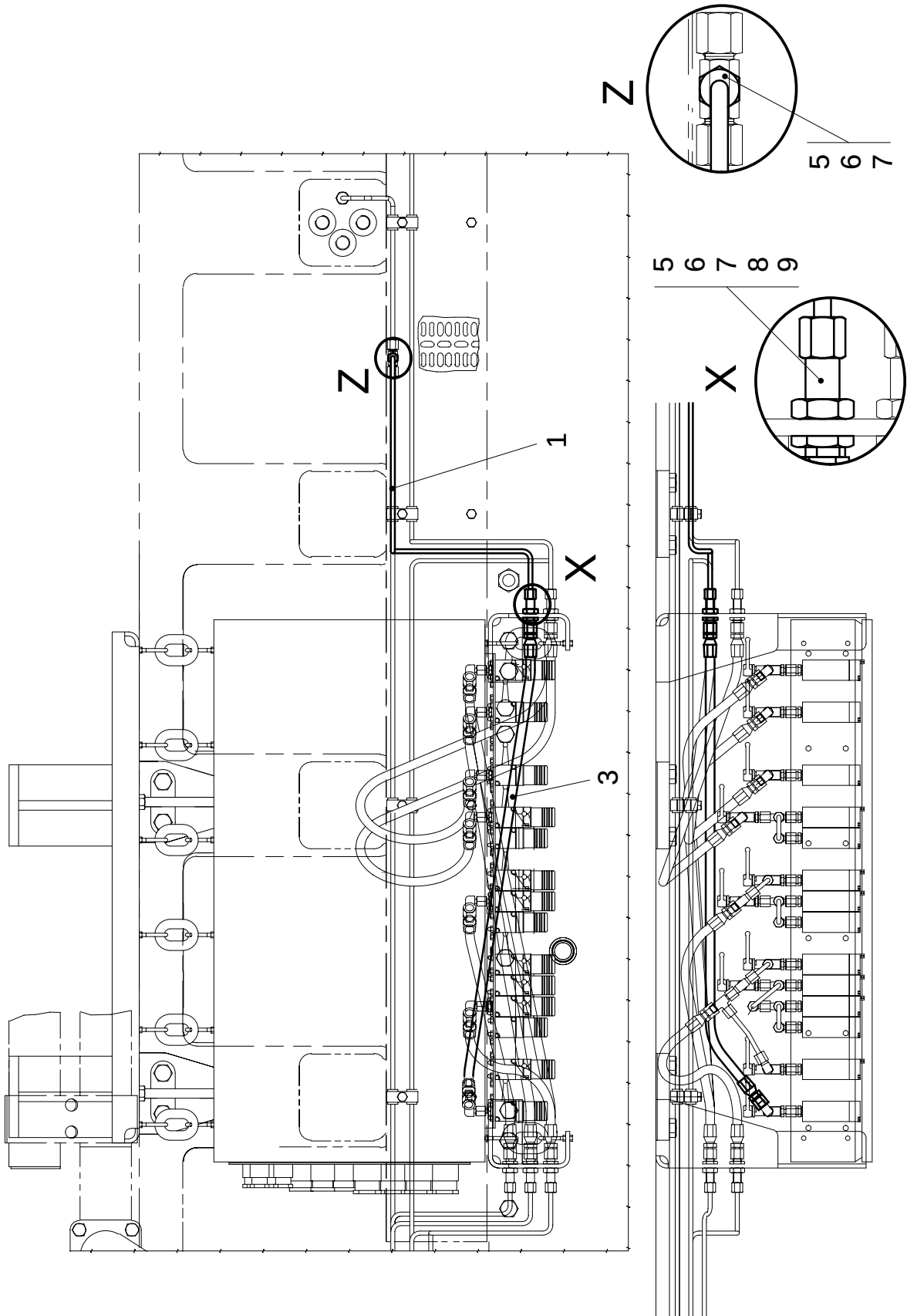
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Impulse Line for Charge Air Pressure

M25

11



Impulse Line for Pressure Switch

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	IMPULSLEITUNG, VOLLST. IMPULSE LINE ASSEMBLY	1	254830 BB
1	ROHRLEITUNG STEEL PIPE		1.9056-201
4	ROHRLEITUNG COPPER TUBE		1.9090-010
11	ELASTISCHE VERBINDUNG HOSE	4	9.4830-012
12	ELASTISCHE VERBINDUNG HOSE	2	9.4830-013
14	STUTZEN MALE CONNECTOR	1	1.4519-442
15	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	16	1.3088-006
16	ÜBERWURFMUTTER UNION NUT	20	1.5040-114
17	SCHNEIDRING CUTTING RING	16	1.5059-084
18	SCHNEIDRING CUTTING RING	4	1.5059-208
19	STUTZEN BULKHEAD UNION	2	1.5095-640
20	STUTZEN BULKHEAD UNION	4	1.5095-620
21	MUTTER THIN NUT	6	1.2047-192
22	STUTZEN PIPE UNION	2	1.5095-040
23	STUTZEN PIPE UNION	1	1.5095-070
24	DICHTRING JOINT RING	# 1	1.7010-064
26	ROHRKLEMME PIPE CLAMP	24	1.5011-001

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Impulse Line for Pressure Switch

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
27	GUMMITÜLLE RUBBER SOCKET	24	1.5011-194
28	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-315
29	SECHSKANTSCHRAUBE HEXAGON SCREW	1	1.1387-311
30	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-249
31	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-245
32	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034

11

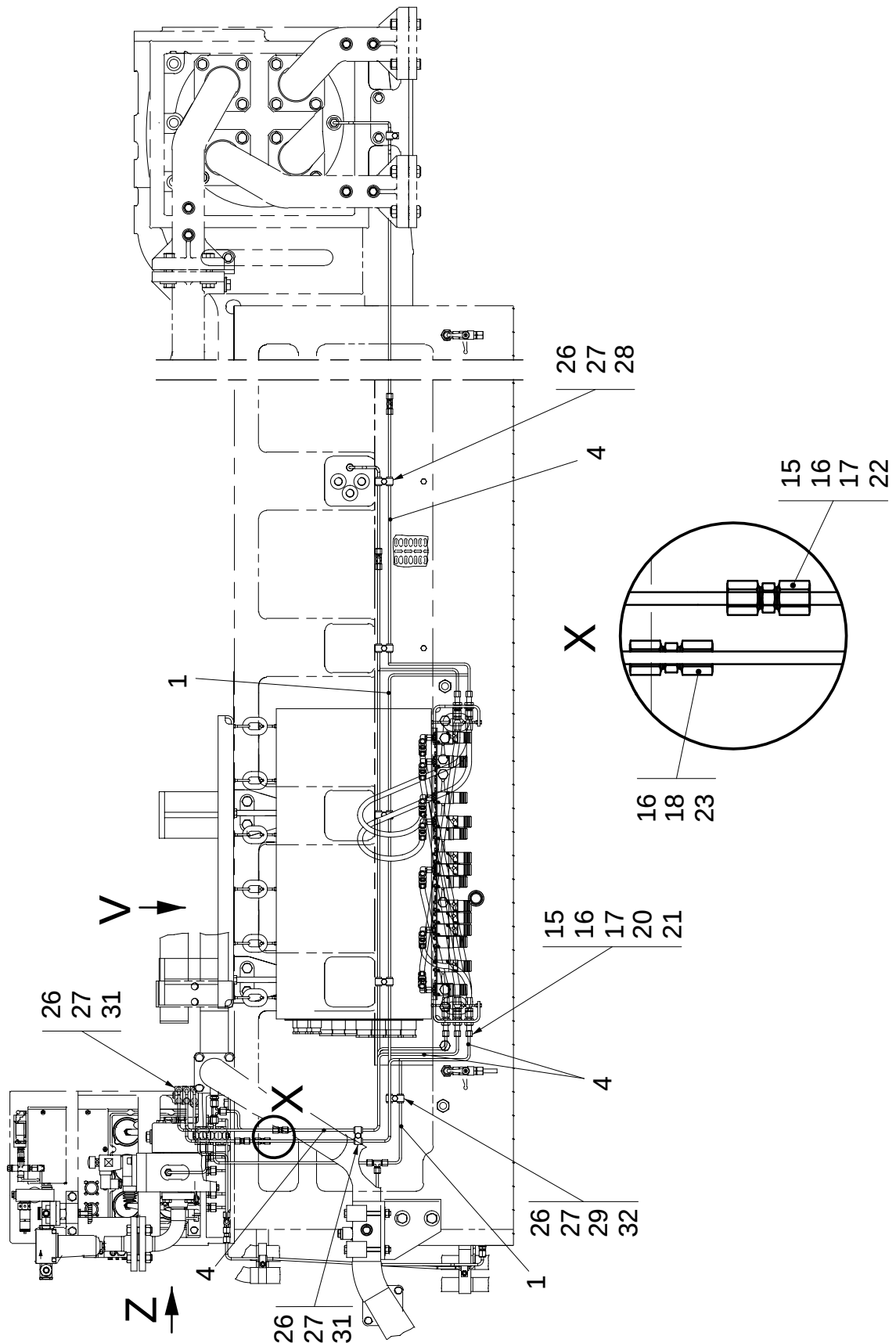
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Impulse Line for Pressure Switch

M25

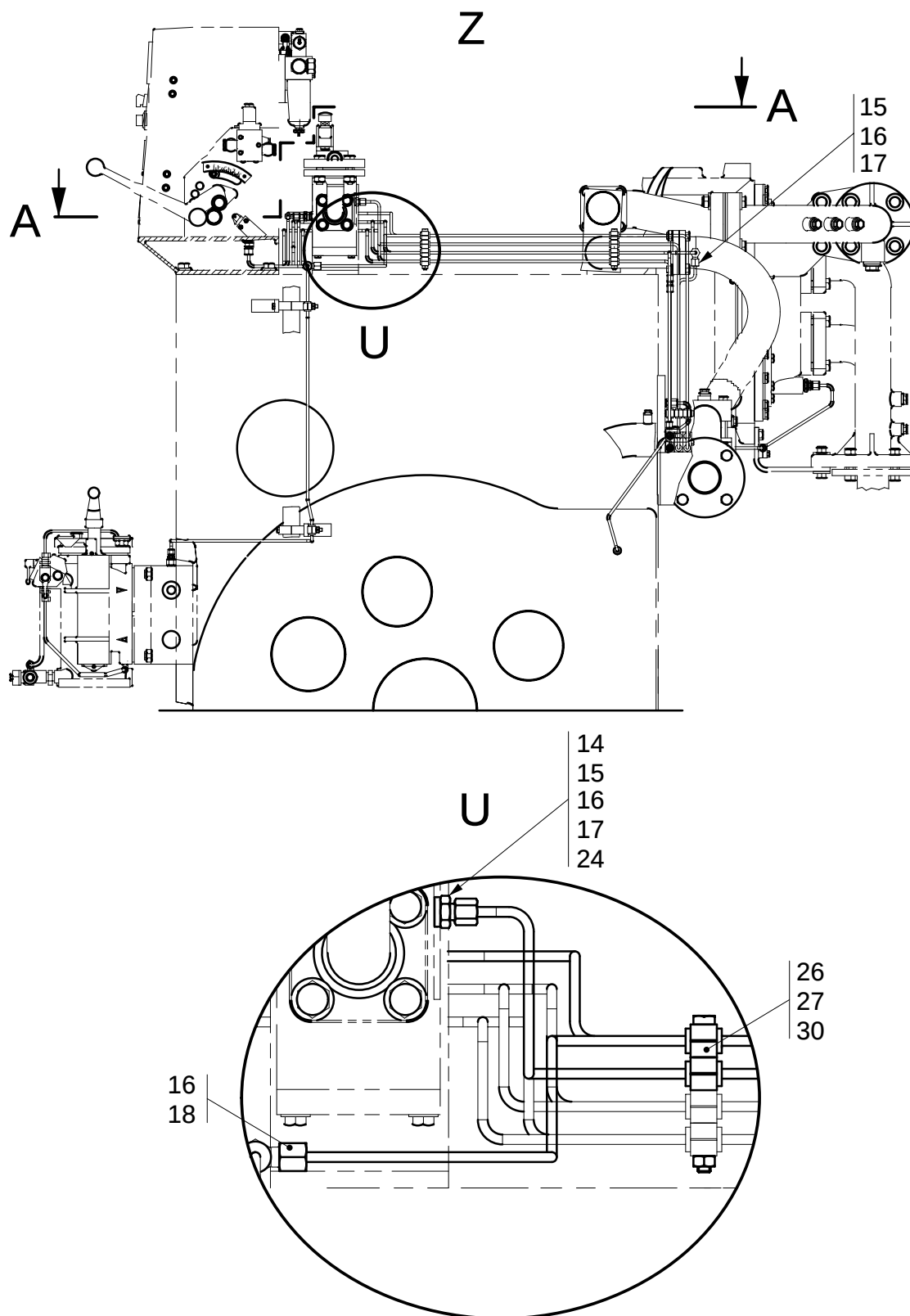
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Impulse Line for Pressure Switch

M25

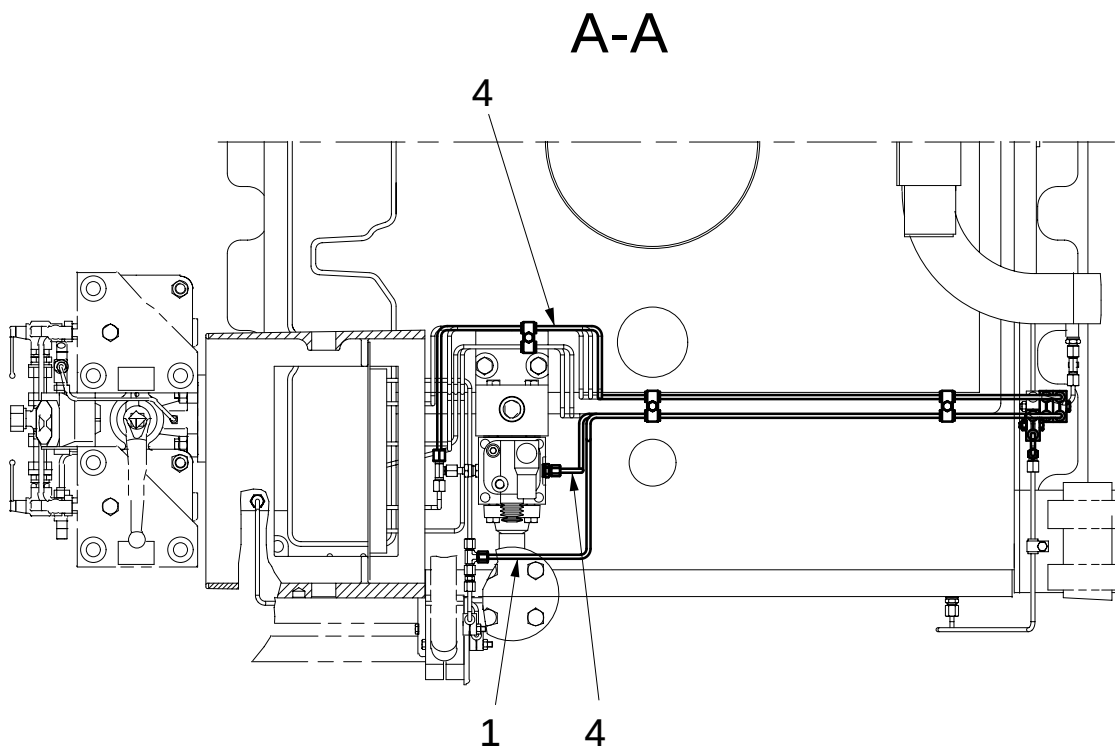
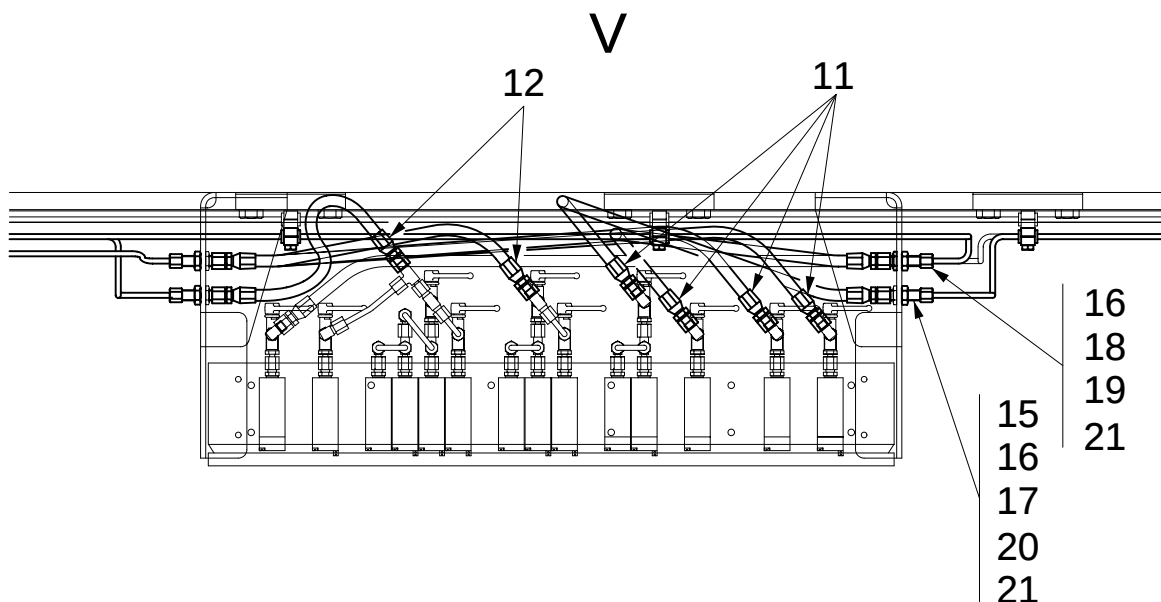
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Impulse Line for Pressure Switch

M25

11



Impulse Line for Pressure Switch

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	IMPULSLEITUNG, VOLLST. IMPULSE LINE ASSEMBLY	1	254830 CC
1	ROHRLEITUNG STEEL PIPE		1.9056-201
4	ROHRLEITUNG COPPER TUBE		1.9090-010
11	ELASTISCHE VERBINDUNG HOSE	4	9.4830-012
12	ELASTISCHE VERBINDUNG HOSE	2	9.4830-013
14	STUTZEN MALE CONNECTOR	1	1.4519-442
15	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	18	1.3088-006
16	ÜBERWURFMUTTER UNION NUT	18	1.5040-114
17	SCHNEIDRING CUTTING RING	14	1.5059-084
18	SCHNEIDRING CUTTING RING	4	1.5059-208
19	STUTZEN BULKHEAD UNION	2	1.5095-640
20	STUTZEN BULKHEAD UNION	4	1.5095-620
21	MUTTER THIN NUT	6	1.2047-192
22	STUTZEN PIPE UNION	1	1.5095-040
23	STUTZEN PIPE UNION	1	1.5095-070
24	DICHTRING JOINT RING	# 1	1.7010-064
26	ROHRKLEMME PIPE CLAMP	24	1.5011-001
27	GUMMITÜLLE RUBBER SOCKET	25	1.5011-194
28	SECHSKANTSCHRAUBE HEXAGON SCREW	5	1.1387-315

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Impulse Line for Pressure Switch

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
30	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-249
31	SECHSKANTSCHRAUBE HEXAGON BOLT	1	1.1367-245
32	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034

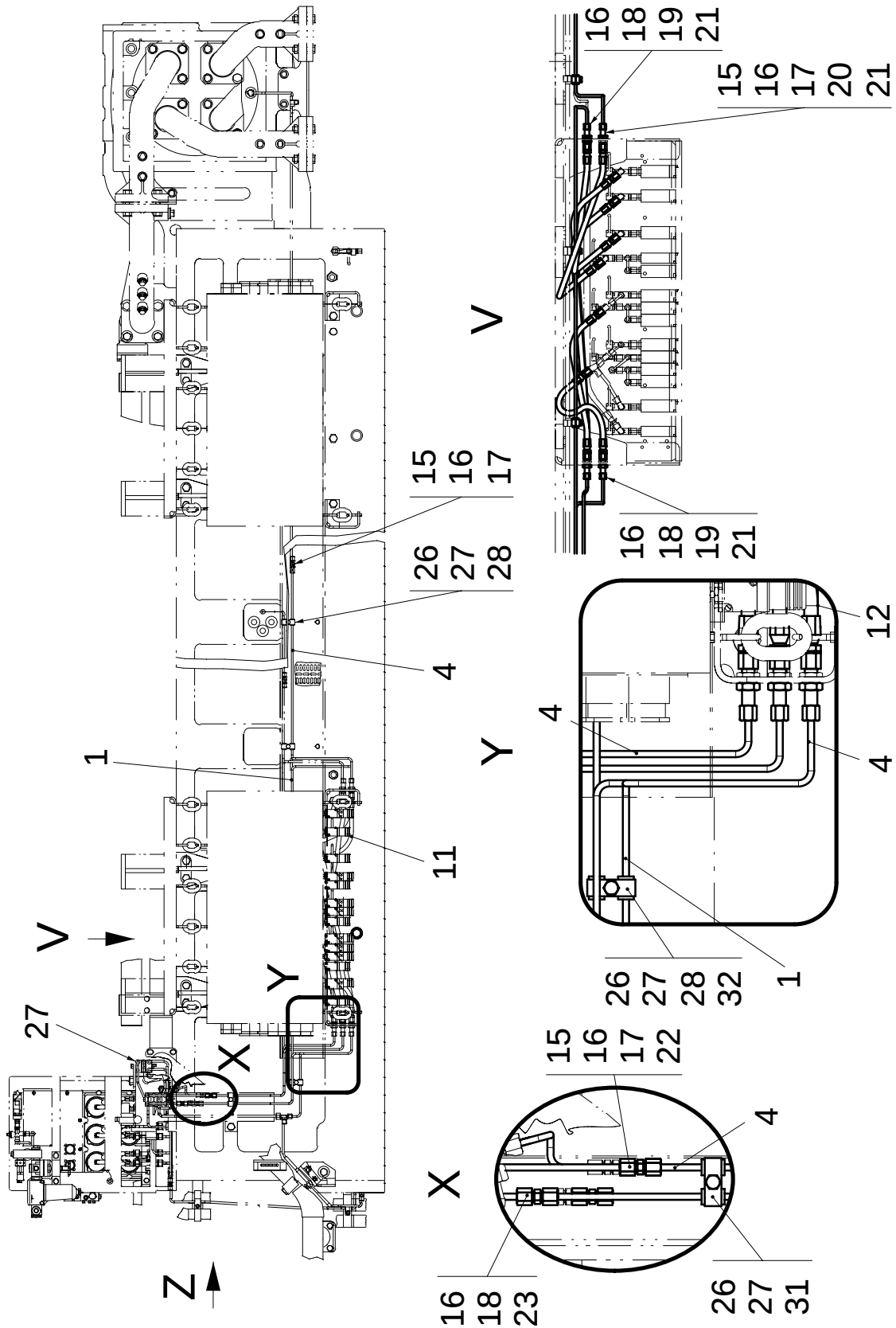
= VERBRAUCHSTEILE
CONSUMABLES

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Impulse Line for Pressure Switch

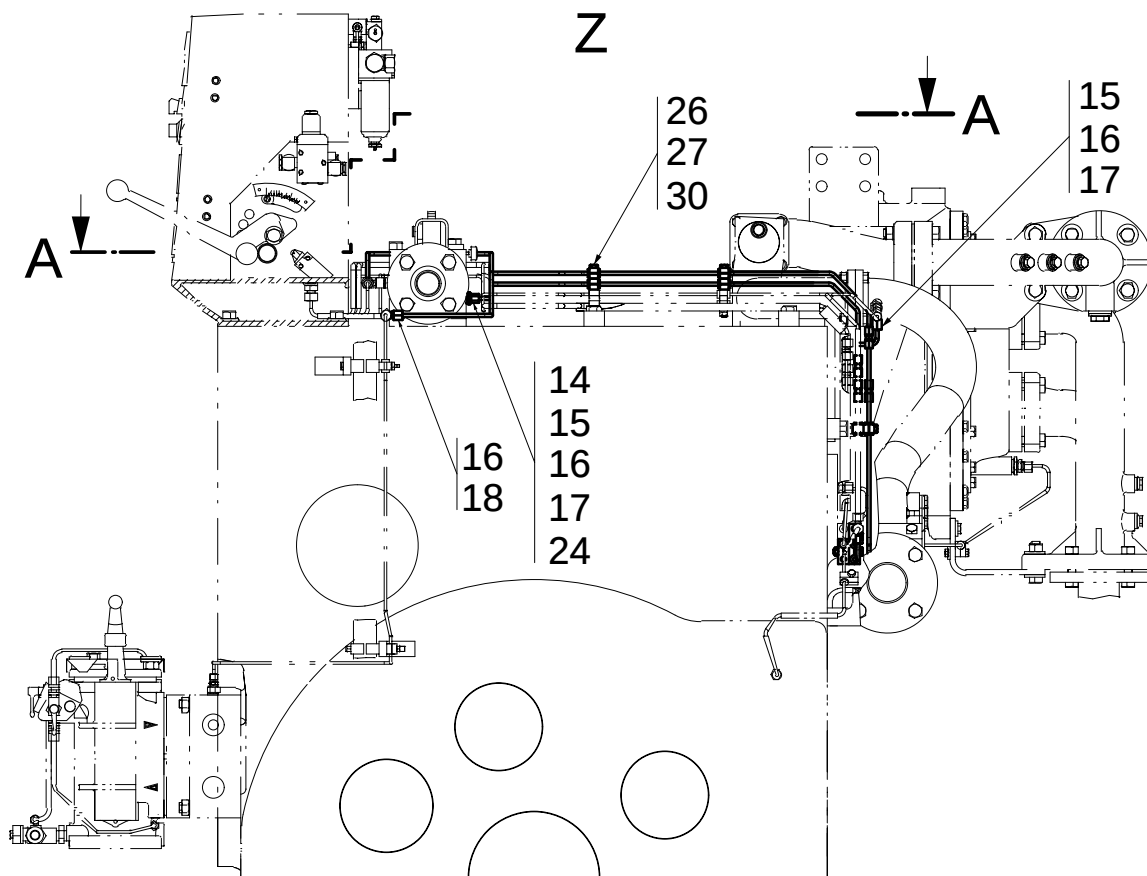
M25



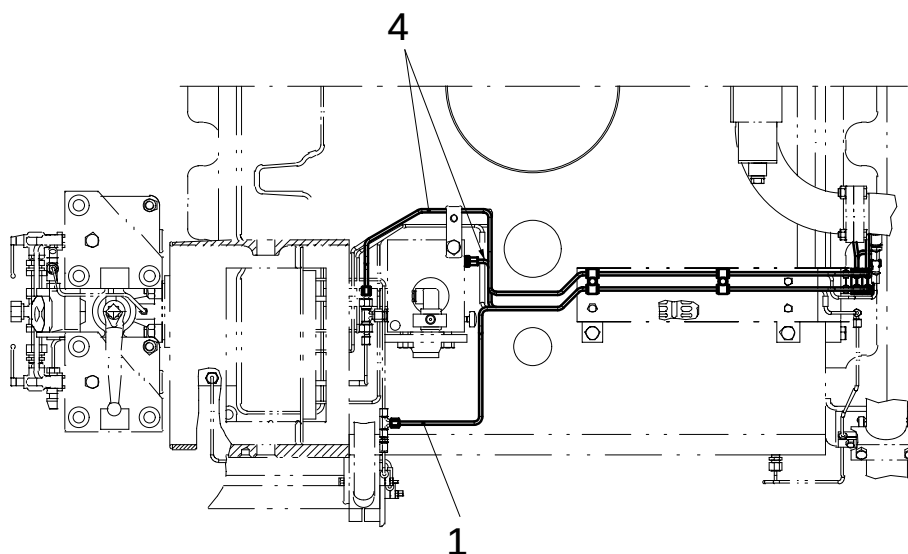
Impulse Line for Pressure Switch

M25

11



A-A



Impulse Line for Pressure Switch

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	IMPULSLEITUNG, VOLLST. IMPULSE LINE ASSEMBLY	1	254830 DD
1	ROHRLEITUNG STEEL PIPE		1.9056-201
4	ROHRLEITUNG COPPER TUBE		1.9090-010
9	ELASTISCHE VERBINDUNG HOSE	1	2.4639-005
10	ELASTISCHE VERBINDUNG HOSE	2	2.4639-003
11	ELASTISCHE VERBINDUNG HOSE	1	9.4830-110
12	ELASTISCHE VERBINDUNG HOSE	2	2.4639-004
13	ELASTISCHE VERBINDUNG HOSE	1	1.8810-083
14	STUTZEN MALE CONNECTOR	1	1.4519-442
15	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	16	1.3088-006
16	ÜBERWURFMUTTER UNION NUT	22	1.5040-114
17	SCHNEIDRING CUTTING RING	16	1.5059-084
18	SCHNEIDRING CUTTING RING	6	1.5059-208
19	STUTZEN BULKHEAD UNION	2	1.5095-640
20	STUTZEN BULKHEAD UNION	5	1.5095-620
21	MUTTER THIN NUT	7	1.2047-192
22	STUTZEN PIPE UNION	3	1.5095-040
23	STUTZEN PIPE UNION	1	1.5095-070
24	DICHTRING JOINT RING	# 1	1.7010-064
26	ROHRKLEMME PIPE CLAMP	24	1.5011-001
27	GUMMITÜLLE RUBBER SOCKET	25	1.5011-194

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Impulse Line for Pressure Switch

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
28	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-315
30	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-249
31	SECHSKANTSCHRAUBE HEXAGON BOLT	3	1.1367-245
32	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034
34	STUTZEN PIPE UNION	1	1.5093-241
35	STUTZEN PIPE UNION	1	1.5093-220

= VERBRAUCHSTEILE
CONSUMABLES

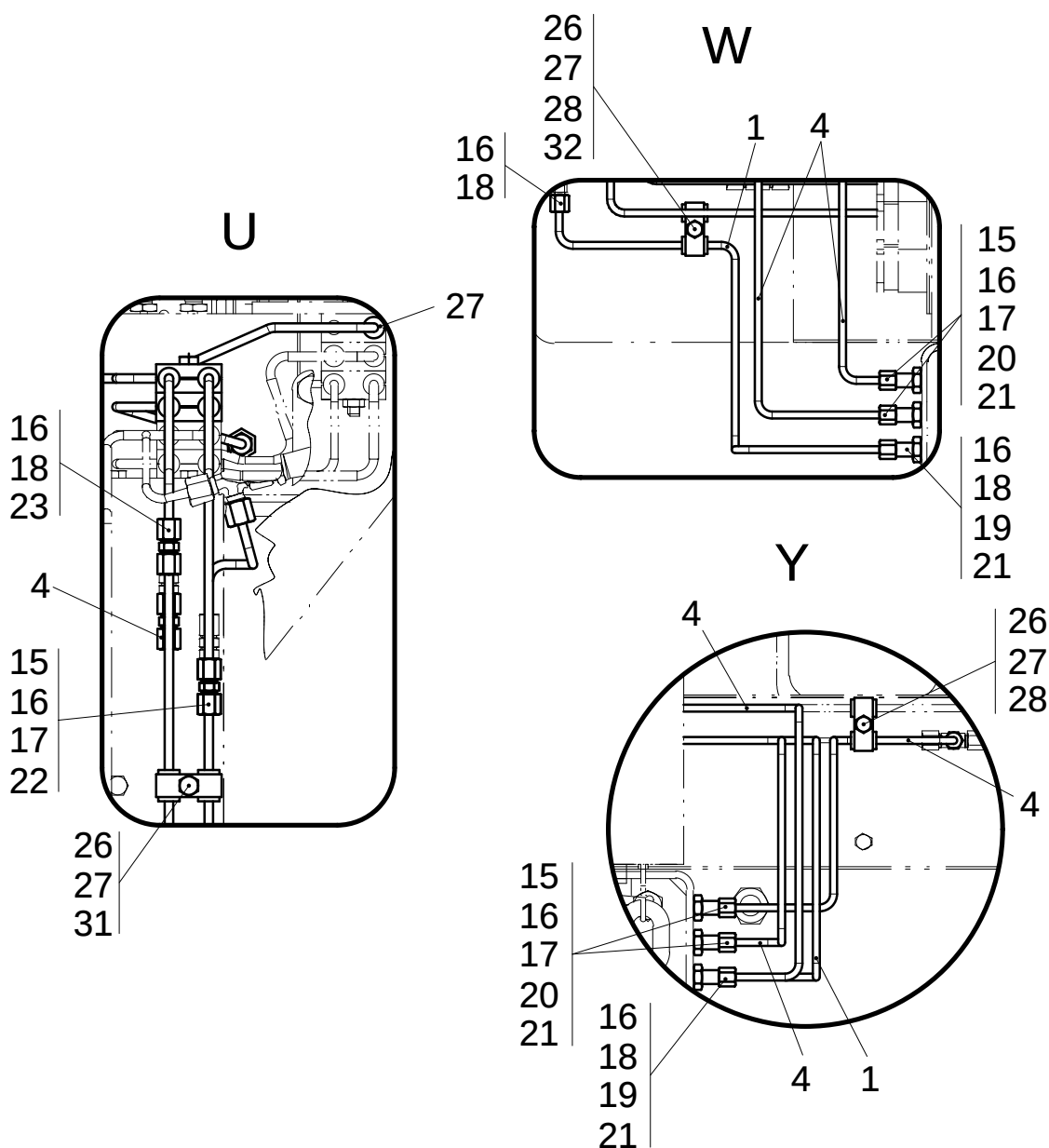
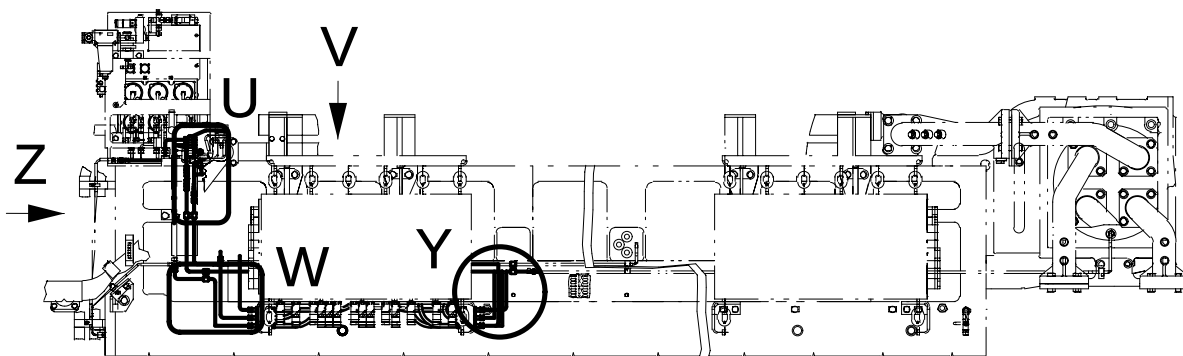
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Impulse Line for Pressure Switch

M25

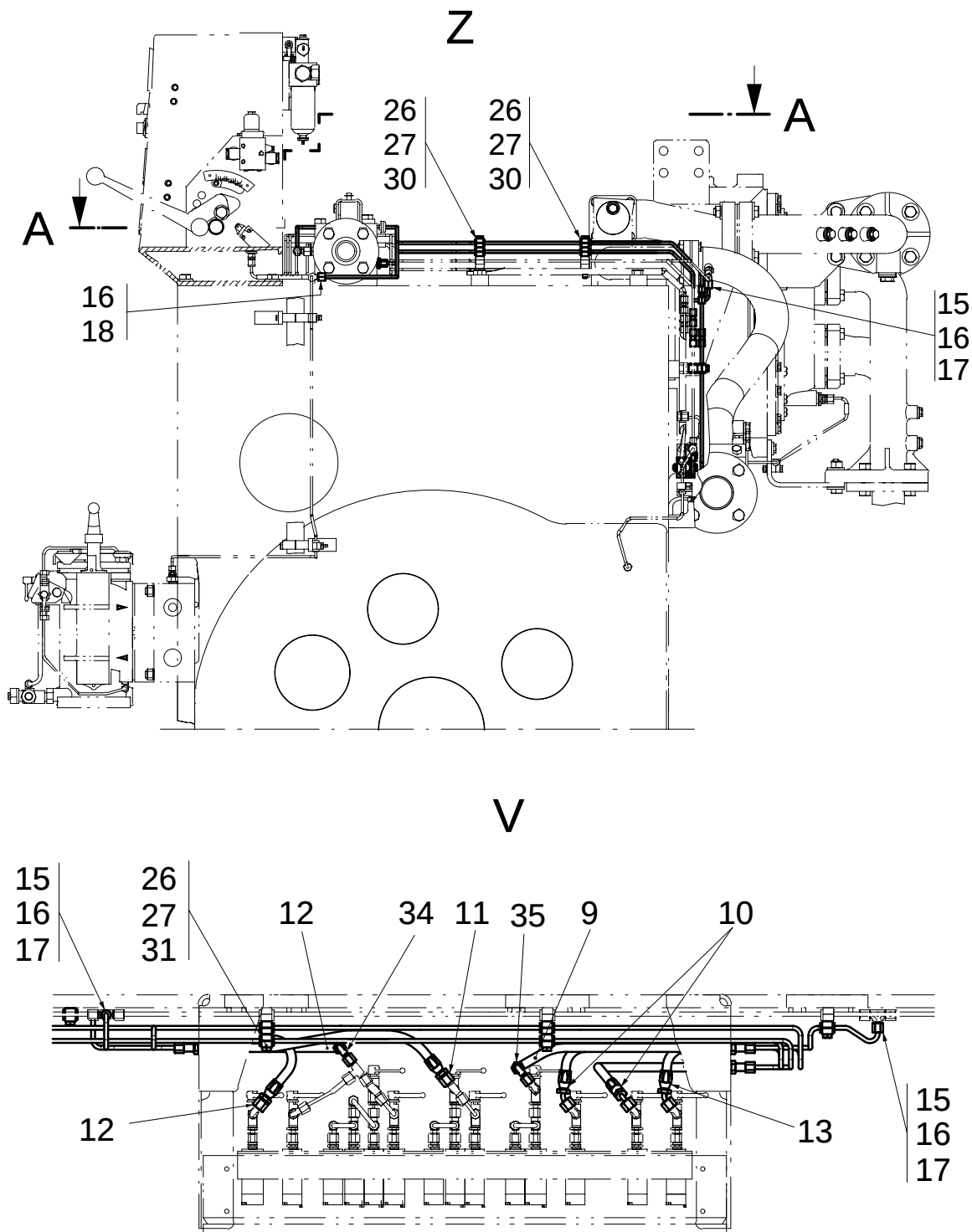
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Impulse Line for Pressure Switch

M25

11

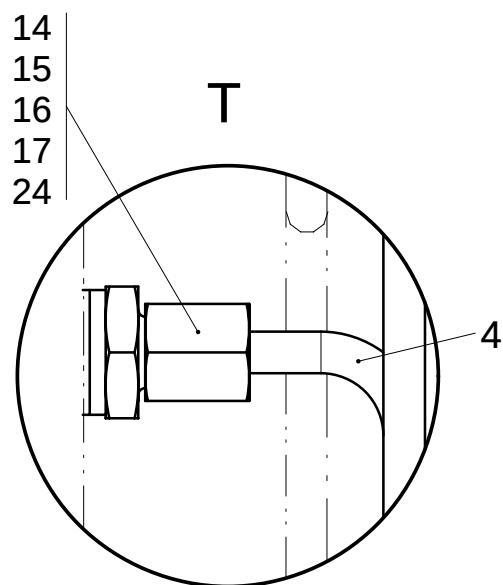
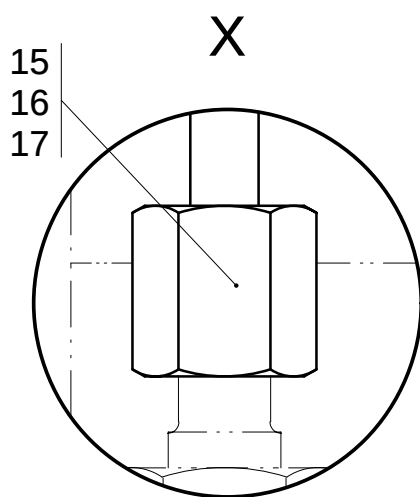
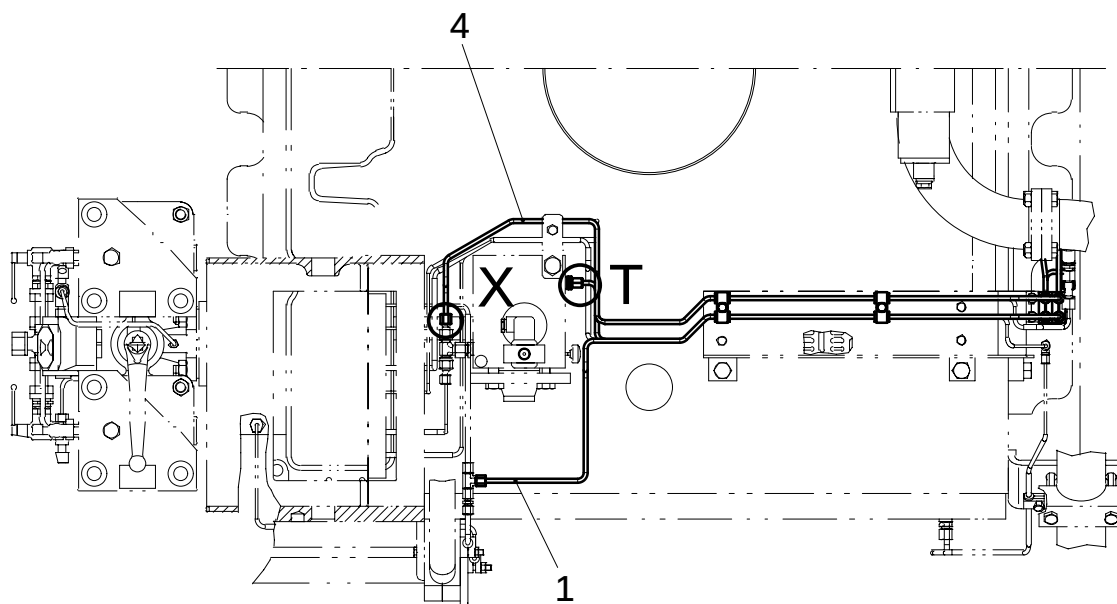


Impulse Line for Pressure Switch

M25

11

A-A



Impulse Line for Pressure Switch

M25

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	IMPULSLEITUNG, VOLLST. IMPULSE LINE ASSEMBLY	1	254830 EE
1	ROHRLEITUNG STEEL PIPE		1.9056-201
4	ROHRLEITUNG COPPER TUBE		1.9090-010
9	ELASTISCHE VERBINDUNG HOSE	1	2.4639-005
10	ELASTISCHE VERBINDUNG HOSE	1	2.4639-003
11	ELASTISCHE VERBINDUNG HOSE	1	9.4830-110
12	ELASTISCHE VERBINDUNG HOSE	1	9.4830-013
13	ELASTISCHE VERBINDUNG HOSE	1	1.8810-083
15	VERSTÄRKUNGSHÜLSE REINFORCING SLEEVE	12	1.3088-006
16	ÜBERWURFMUTTER UNION NUT	18	1.5040-114
17	SCHNEIDRING CUTTING RING	12	1.5059-084
18	SCHNEIDRING CUTTING RING	6	1.5059-208
19	STUTZEN BULKHEAD UNION	2	1.5095-640
20	STUTZEN BULKHEAD UNION	4	1.5095-620
21	MUTTER THIN NUT	6	1.2047-192
22	STUTZEN PIPE UNION	2	1.5095-040
23	STUTZEN PIPE UNION	1	1.5095-070
24	VERSCHLUSSBUTZEN PLUG	1	1.3088-541
26	ROHRKLEMME PIPE CLAMP	24	1.5011-001
27	GUMMITÜLLE RUBBER SOCKET	20	1.5011-194
28	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-315

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Impulse Line for Pressure Switch

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
30	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-249
31	SECHSKANTSCHRAUBE HEXAGON BOLT	3	1.1367-245
32	SECHSKANTMUTTER HEXAGON NUT	1	1.2007-034
34	STUTZEN PIPE UNION	1	1.5093-241
35	STUTZEN PIPE UNION	2	1.5093-220

= VERBRAUCHSTEILE
CONSUMABLES

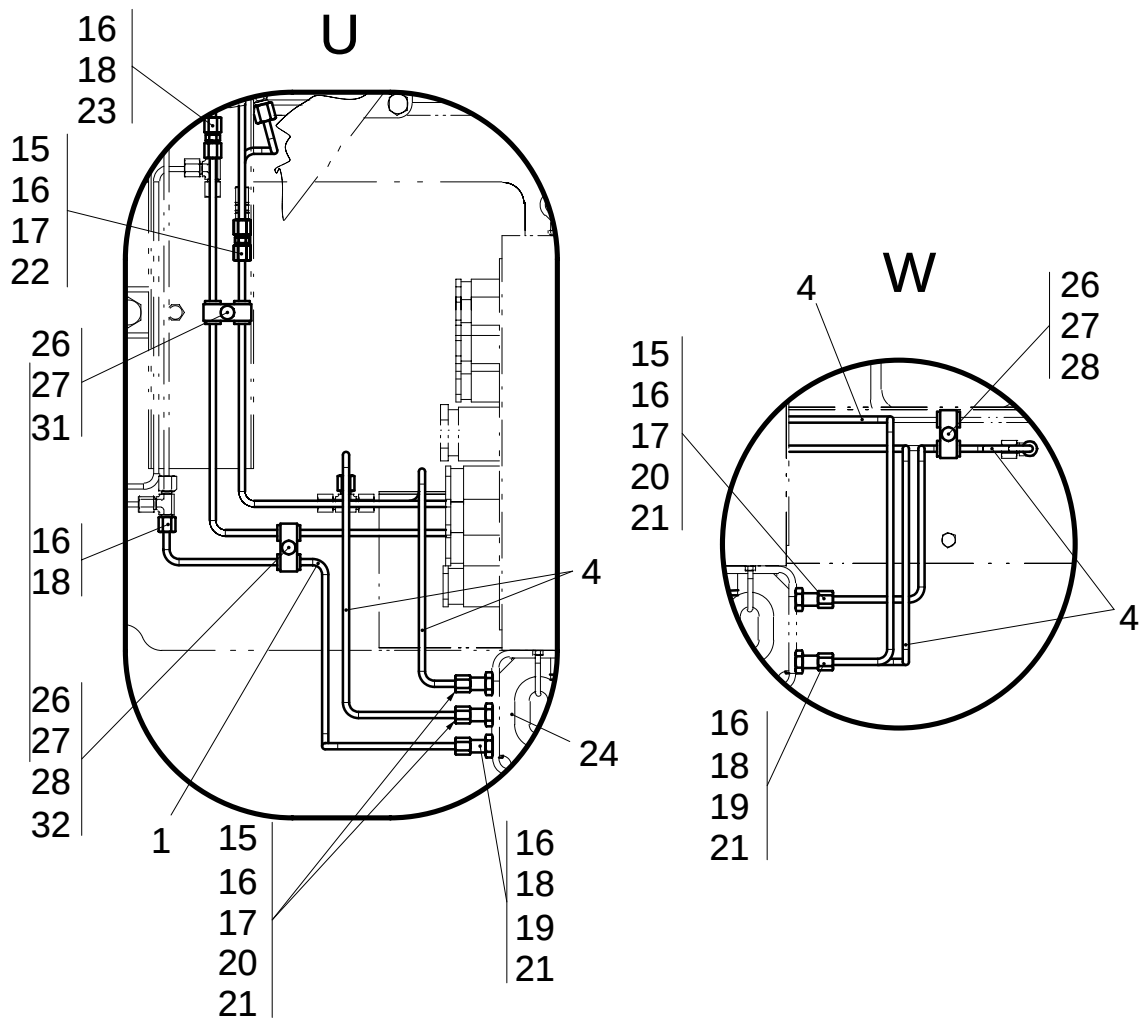
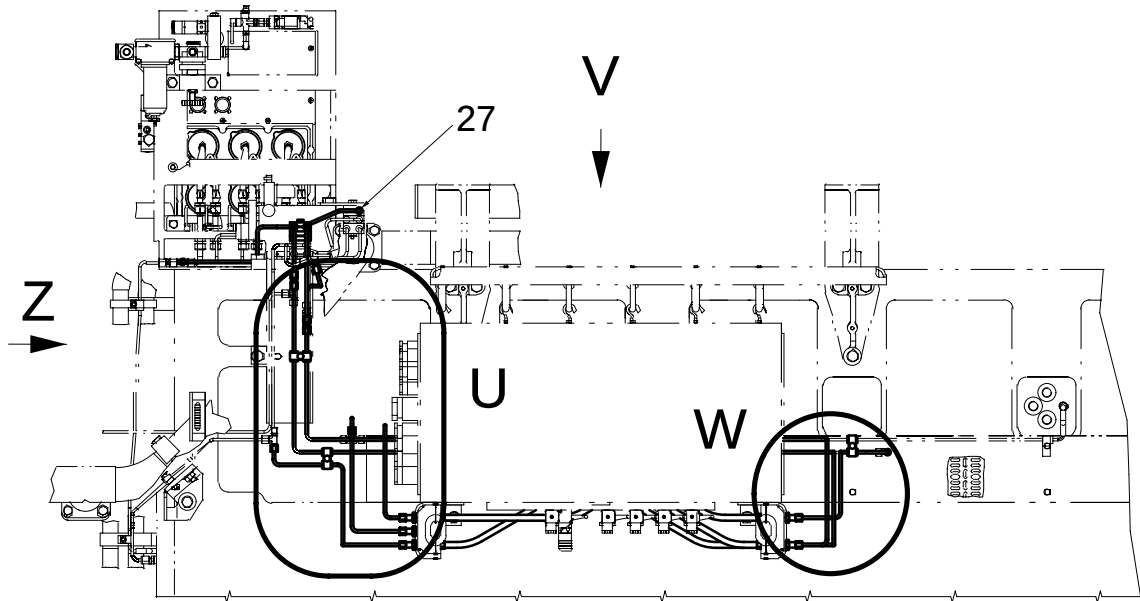
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Impulse Line for Pressure Switch

M25

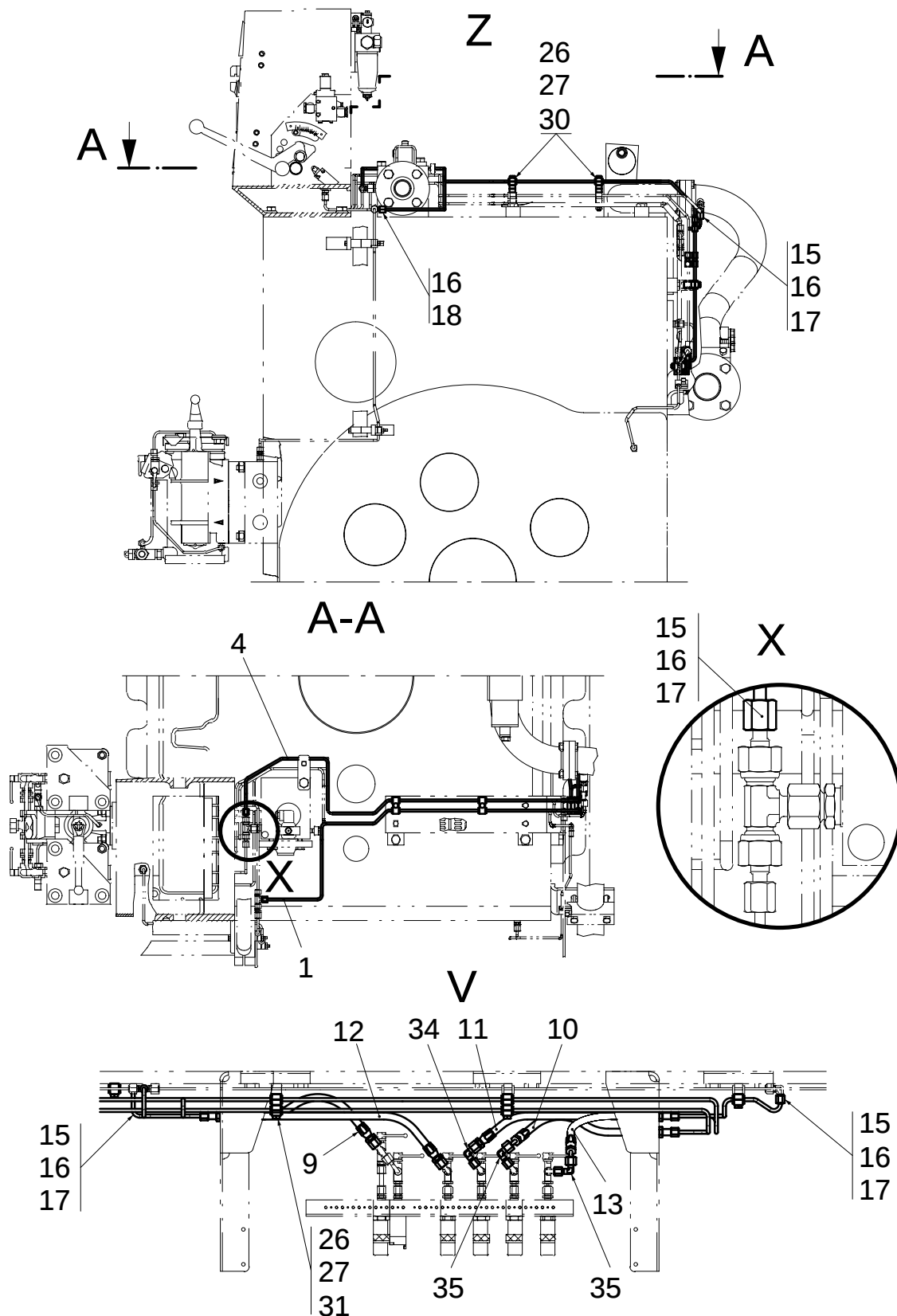
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Impulse Line for Pressure Switch

M25

11



Pressure Switch Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DRUCKWÄCHTER-ANBAU, VOLLST. PRESSURE SWITCH MOUNTING ASSEMBLY	1	254840 AA
1	DRUCKWÄCHTERPLATTE, VOLLST. PRESSURE SWITCH PLATE, COMPL.	1	SIEHE B1.05.11.254842 SEE B1.05.11.254842
4	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-205
5	SPANNSCHEIBE CONICAL SPRING WASHER	# 6	1.0068-206

= VERBRAUCHSTEILE
CONSUMABLES

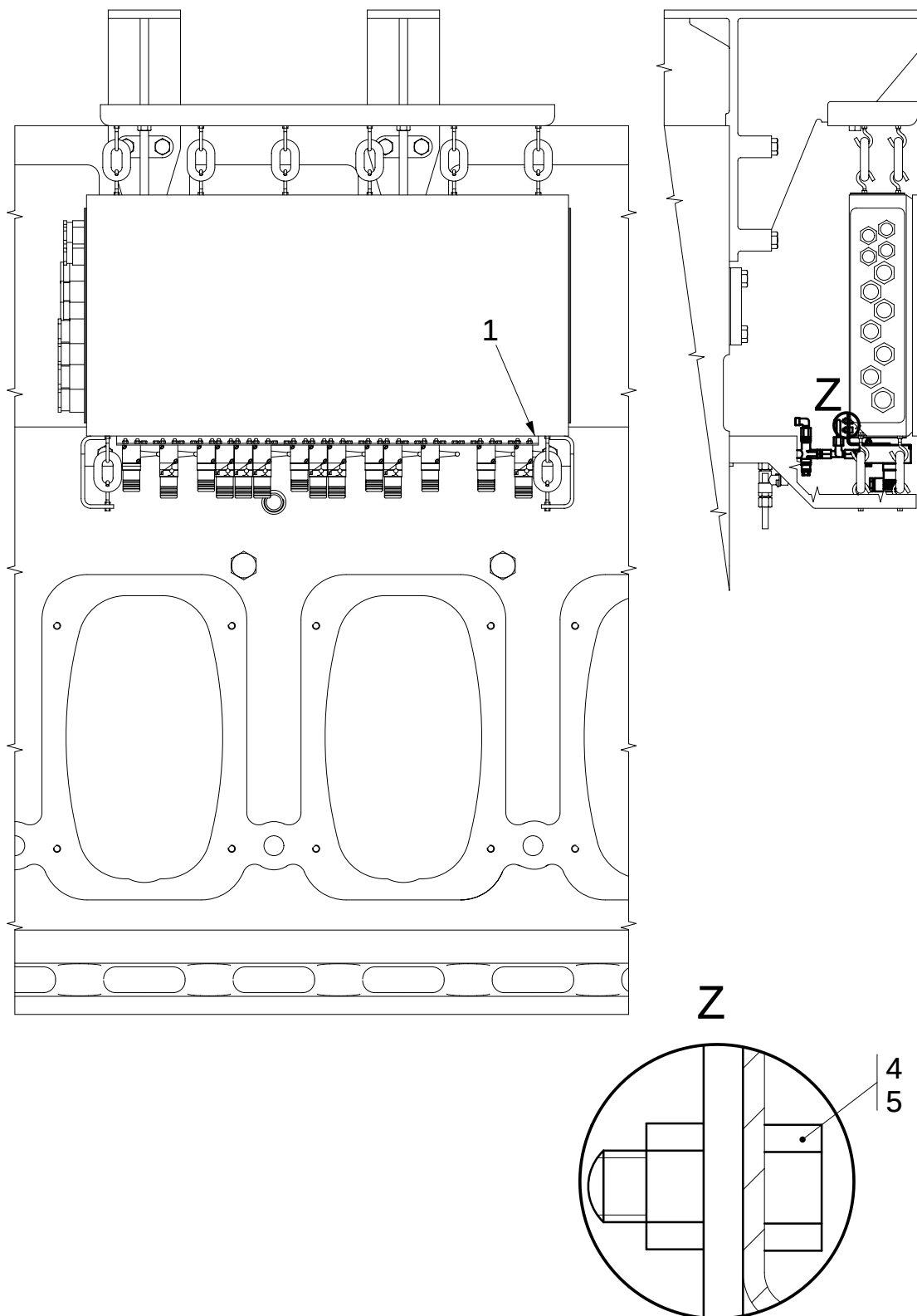
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Pressure Switch Mounting

M25

11



Pressure Switch Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DRUCKWÄCHTER-ANBAU, VOLLST. PRESSURE SWITCH MOUNTING ASSEMBLY	1	254840 BB
1	DRUCKWÄCHTERPLATTE, VOLLST. PRESSURE SWITCH PLATE, COMPL.	1	SIEHE B1.05.11.254842 SEE B1.05.11.254842
4	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1387-207
5	SPANNSCHEIBE CONICAL SPRING WASHER	# 6	1.0068-206
6	SECHSKANTMUTTER HEXAGON NUT	12	1.2007-031

= VERBRAUCHSTEILE
CONSUMABLES

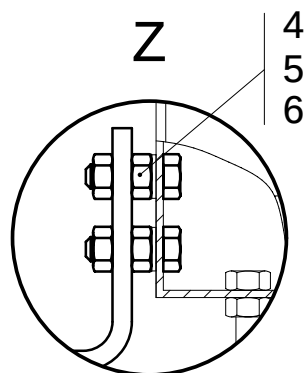
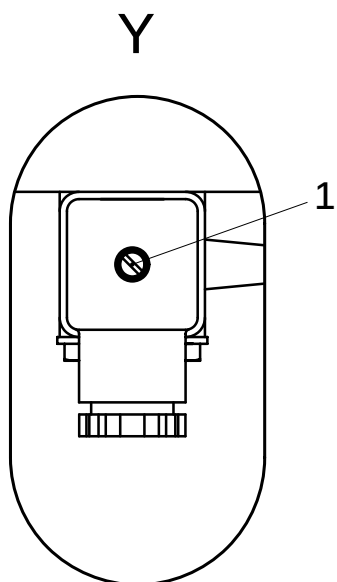
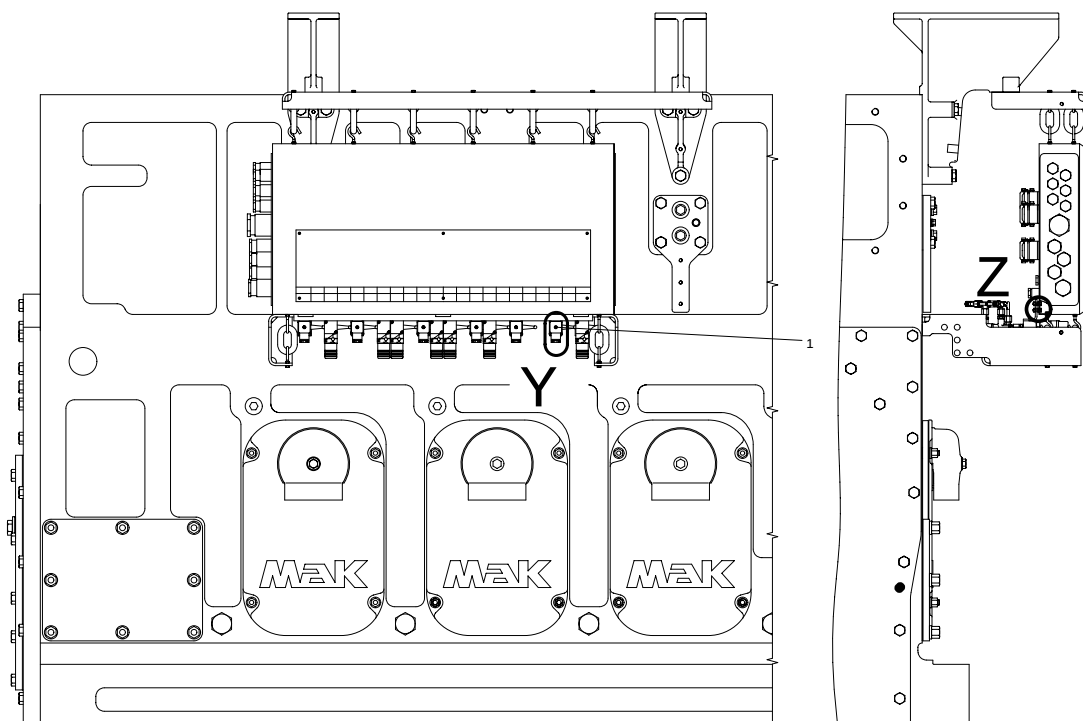
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Pressure Switch Mounting

M25

11



Pressure Switch Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DRUCKWÄCHTER-ANBAU, VOLLST. PRESSURE SWITCH MOUNTING ASSEMBLY	1	254840 CC
1	DRUCKWÄCHTERPLATTE, VOLLST. PRESSURE SWITCH PLATE, COMPL.	1	SIEHE B1.05.11.254842 SEE B1.05.11.254842
4	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-207
5	SPANNSCHEIBE CONICAL SPRING WASHER	# 4	1.0068-206
6	SECHSKANTMUTTER HEXAGON NUT	8	1.2007-031

= VERBRAUCHSTEILE
CONSUMABLES

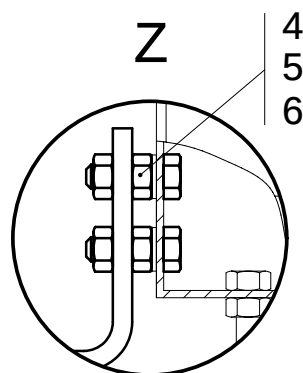
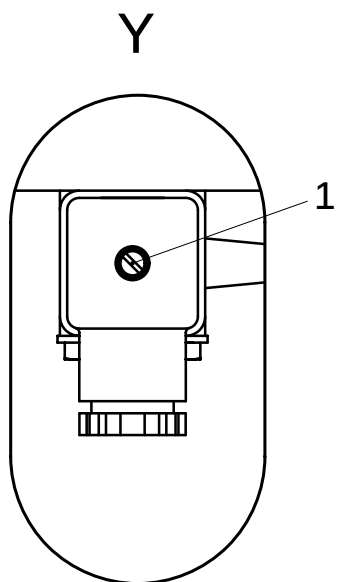
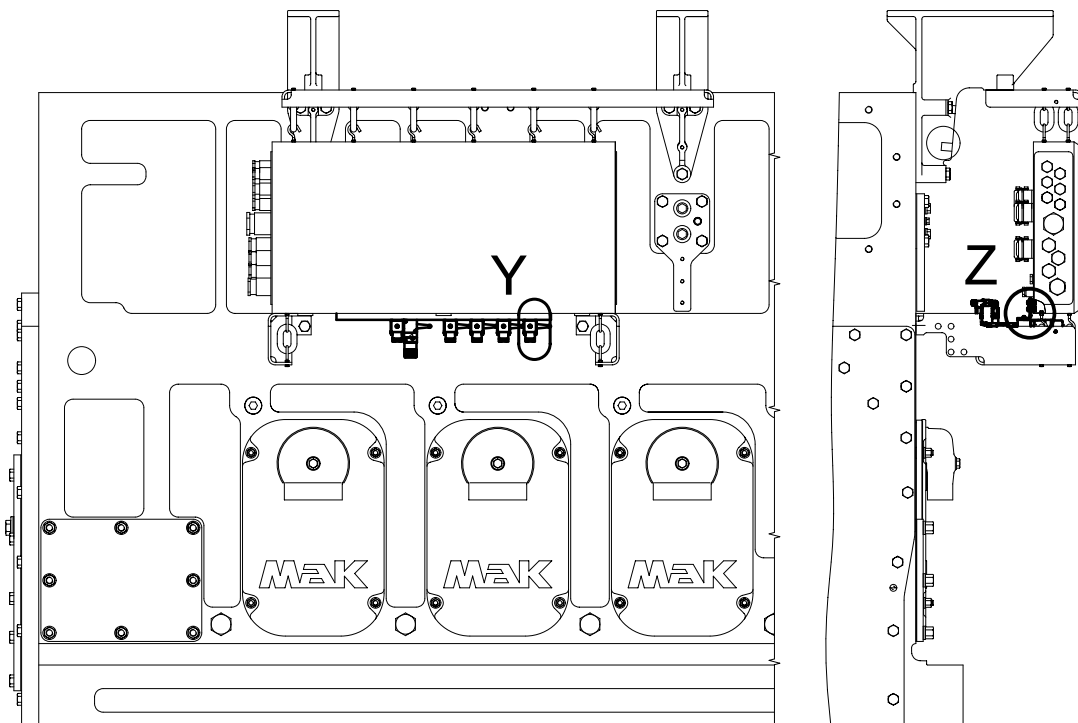
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Pressure Switch Mounting

M25

11



Pressure Switch Mounting

M25/M32

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DRUCKWÄCHTER-ANBAU, VOLLST. PRESSURE SWITCH MOUNTING ASSEMBLY	1	254842 AA
1	DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	7	2.4842-001
2	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	2.4842-201
3	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	3	2.4842-003
4	KUGELHAHN, VOLLST. THREE-WAY BALL VALVE	10	2.4523-078
5	DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	1	2.4523-014
6	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	2.4842-002
7	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-007
8	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-008
9	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-009
10	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-010
11	STUTZEN MALE CONNECTOR	13	1.5094-120
12	STUTZEN MALE CONNECTOR	9	1.5094-140
13	STUTZEN CONNECTION UNION	7	1.5096-882
14	STUTZEN CONNECTION UNION	5	1.5096-862
15	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	2	9.4842-015
16	STUTZEN ADJUSTABLE ELBOW	6	1.5093-220
17	STUTZEN ADJUSTABLE ELBOW	4	1.5093-241

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Pressure Switch Mounting

M25/M32

11

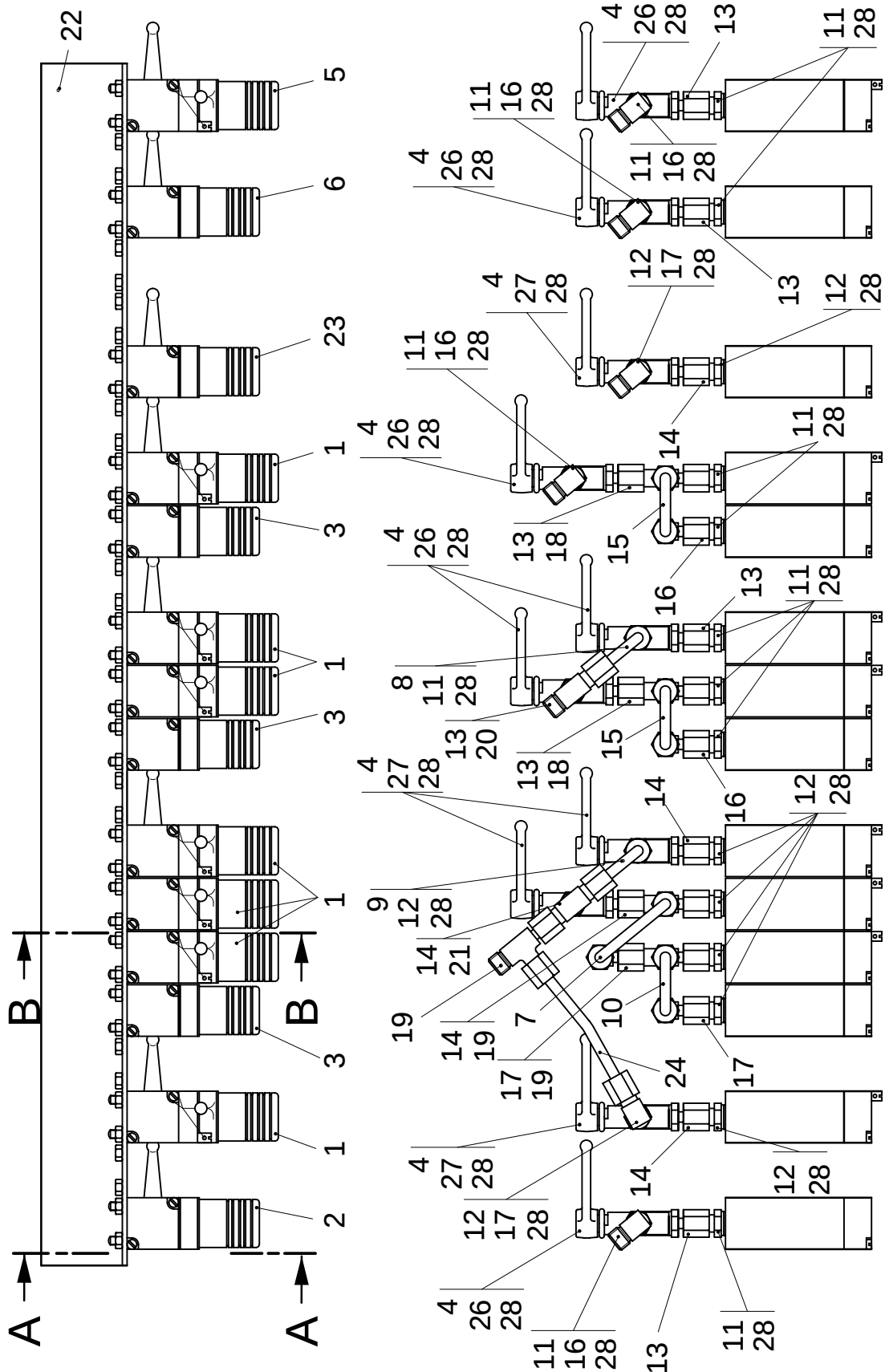
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
18	STUTZEN ADJUSTABLE L-ADAPTER	2	1.5093-342
19	STUTZEN ADJUSTABLE L-ADAPTER	4	1.5093-300
20	STUTZEN UNION TEE	1	1.5095-440
21	STUTZEN UNION TEE	1	1.5095-510
22	HALTER, VOLLST. BRACKET, COMPL.	1	254842-022
23	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	9.4842-023
24	LEITUNG, VOLLST. PIPE, COMPL.	1	254842-024
26	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	6	1.1041-626
27	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-606
28	DICHTRING JOINT RING	# 32	1.7010-029
29	SECHSKANTSCHRAUBE HEXAGON SCREW	28	1.1387-215
30	SPANNSCHEIBE CONICAL SPRING WASHER	# 28	1.0068-206

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Pressure Switch Mounting

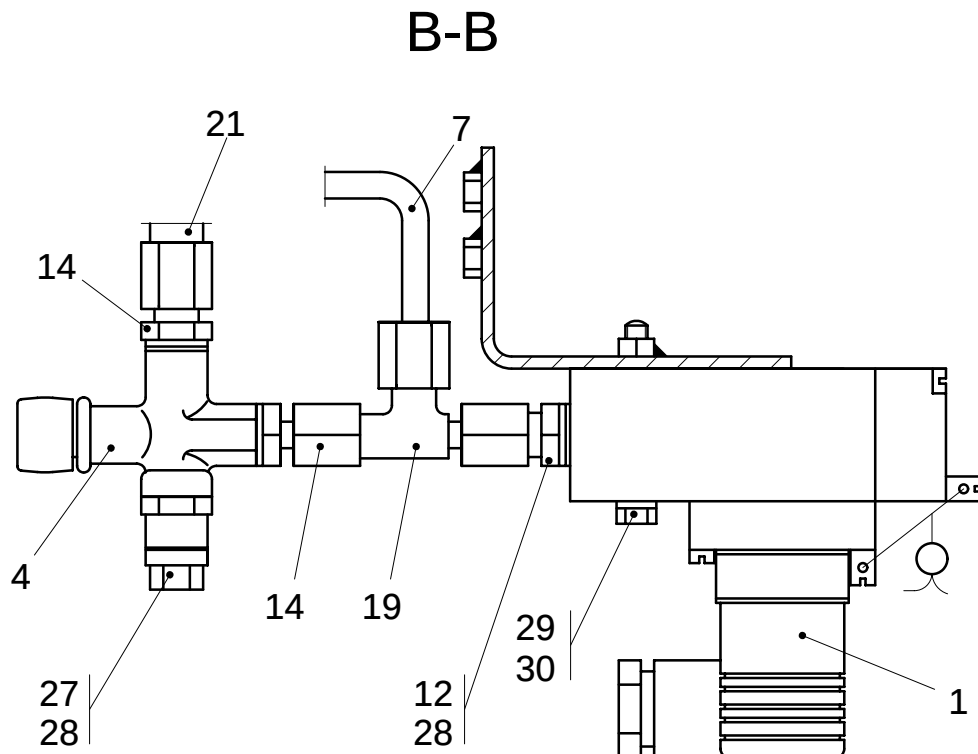
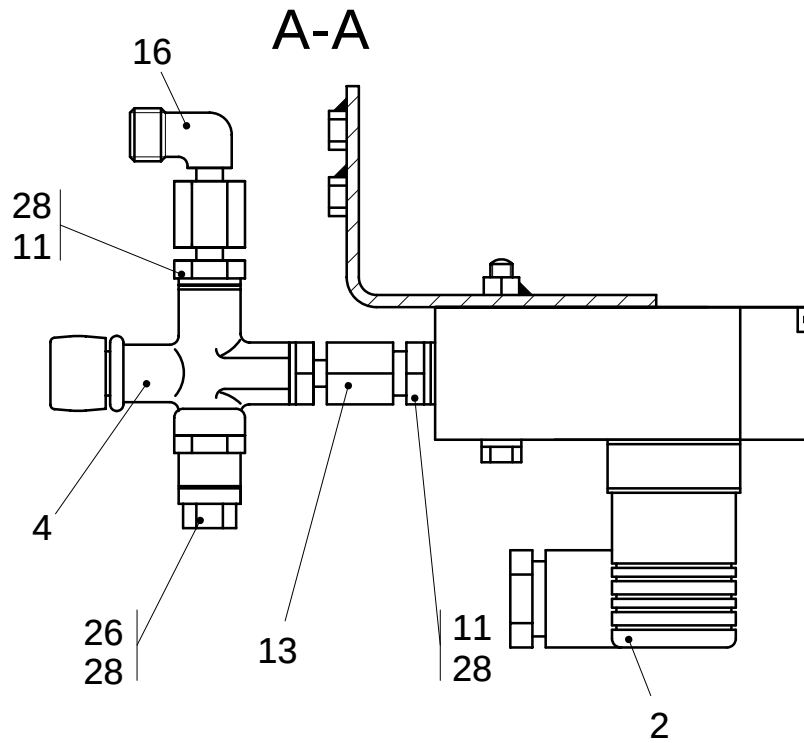
M25/M32



Pressure Switch Mounting

M25/M32

11



Pressure Switch Mounting

M25/M32

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DRUCKWÄCHTER-ANBAU, VOLLST. PRESSURE SWITCH MOUNTING ASSEMBLY	1	254842 BB
1	DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	7	2.4842-001
3	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	3	2.4842-003
4	KUGELHAHN, VOLLST. THREE-WAY BALL VALVE	9	2.4523-078
5	DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	1	2.4523-014
6	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	2.4842-002
7	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-007
8	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-008
9	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-009
10	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-010
11	STUTZEN MALE CONNECTOR	11	1.5094-120
12	STUTZEN MALE CONNECTOR	9	1.5094-140
13	STUTZEN CONNECTION UNION	6	1.5096-882
14	STUTZEN CONNECTION UNION	5	1.5096-862
15	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	2	9.4842-015
16	STUTZEN ADJUSTABLE ELBOW	5	1.5093-220
17	STUTZEN ADJUSTABLE ELBOW	4	1.5093-241

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Switch Mounting

M25/M32

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
18	STUTZEN ADJUSTABLE L-ADAPTER	2	1.5093-342
19	STUTZEN ADJUSTABLE L-ADAPTER	4	1.5093-300
20	STUTZEN UNION TEE	1	1.5095-440
21	STUTZEN UNION TEE	1	1.5095-510
22	HALTER, VOLLST. BRACKET, COMPL.	1	254842-022
23	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	9.4842-023
24	LEITUNG, VOLLST. PIPE, COMPL.	1	254842-024
26	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	5	1.1041-626
27	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-606
28	DICHTRING JOINT RING	# 29	1.7010-029
29	SECHSKANTSCHRAUBE HEXAGON SCREW	26	1.1387-215
30	SPANNSCHEIBE CONICAL SPRING WASHER	# 26	1.0068-206

= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

M25/M32

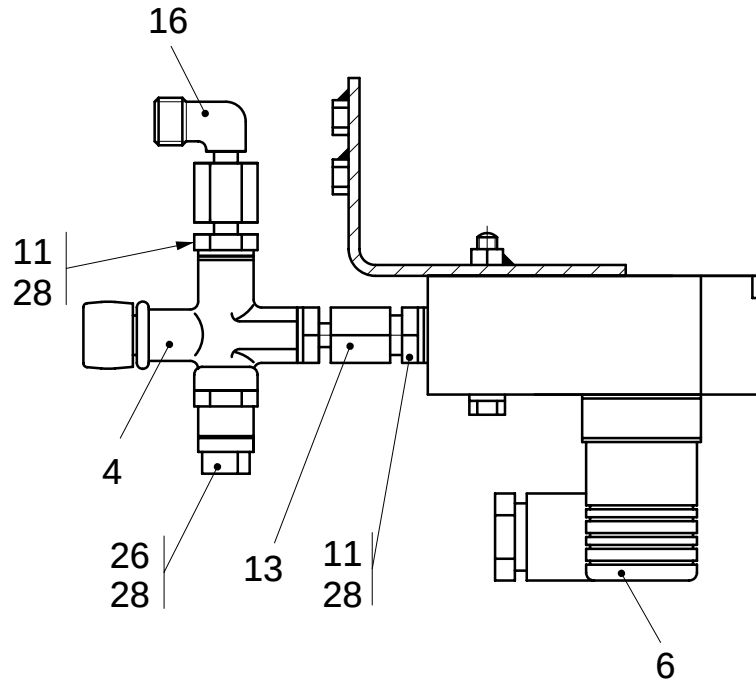


Pressure Switch Mounting

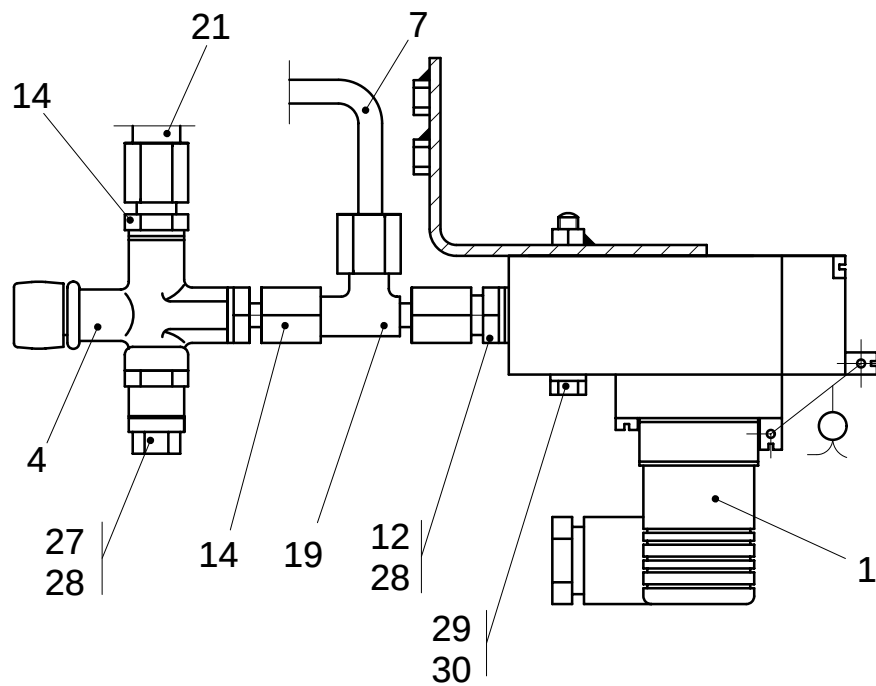
M25/M32

11

A-A



B-B



Pressure Switch Mounting

M25/M32

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DRUCKWÄCHTER-ANBAU, VOLLST. PRESSURE SWITCH MOUNTING ASSEMBLY	1	254842 CC
1	DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	11	2.4842-001
4	KUGELHAHN, VOLLST. THREE-WAY BALL VALVE, COMPL.	9	2.4523-078
5	DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	2	2.4523-014
7	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-007
8	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-008
9	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-009
10	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-010
11	STUTZEN MALE CONNECTOR	11	1.5094-120
12	STUTZEN MALE CONNECTOR	9	1.5094-140
13	STUTZEN CONNECTION UNION	6	1.5096-882
14	STUTZEN CONNECTION UNION	5	1.5096-862
15	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	2	9.4842-015
16	STUTZEN ADJUSTABLE ELBOW	5	1.5093-220
17	STUTZEN ADJUSTABLE ELBOW	4	1.5093-241
18	STUTZEN ADJUSTABLE L-ADAPTER	2	1.5093-342
19	STUTZEN ADJUSTABLE L-ADAPTER	4	1.5093-300
20	STUTZEN UNION TEE	1	1.5095-440
21	STUTZEN UNION TEE	1	1.5095-510

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Switch Mounting

M25/M32

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
22	HALTER, VOLLST. BRACKET, COMPL.	1	254842-022
24	LEITUNG, VOLLST. PIPE, COMPL.	1	254842-024
26	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	5	1.1041-626
27	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-606
28	DICHTRING JOINT RING	# 29	1.7010-029
29	SECHSKANTSCHRAUBE HEXAGON SCREW	26	1.1387-215
30	SPANNSCHEIBE CONICAL SPRING WASHER	# 26	1.0068-206

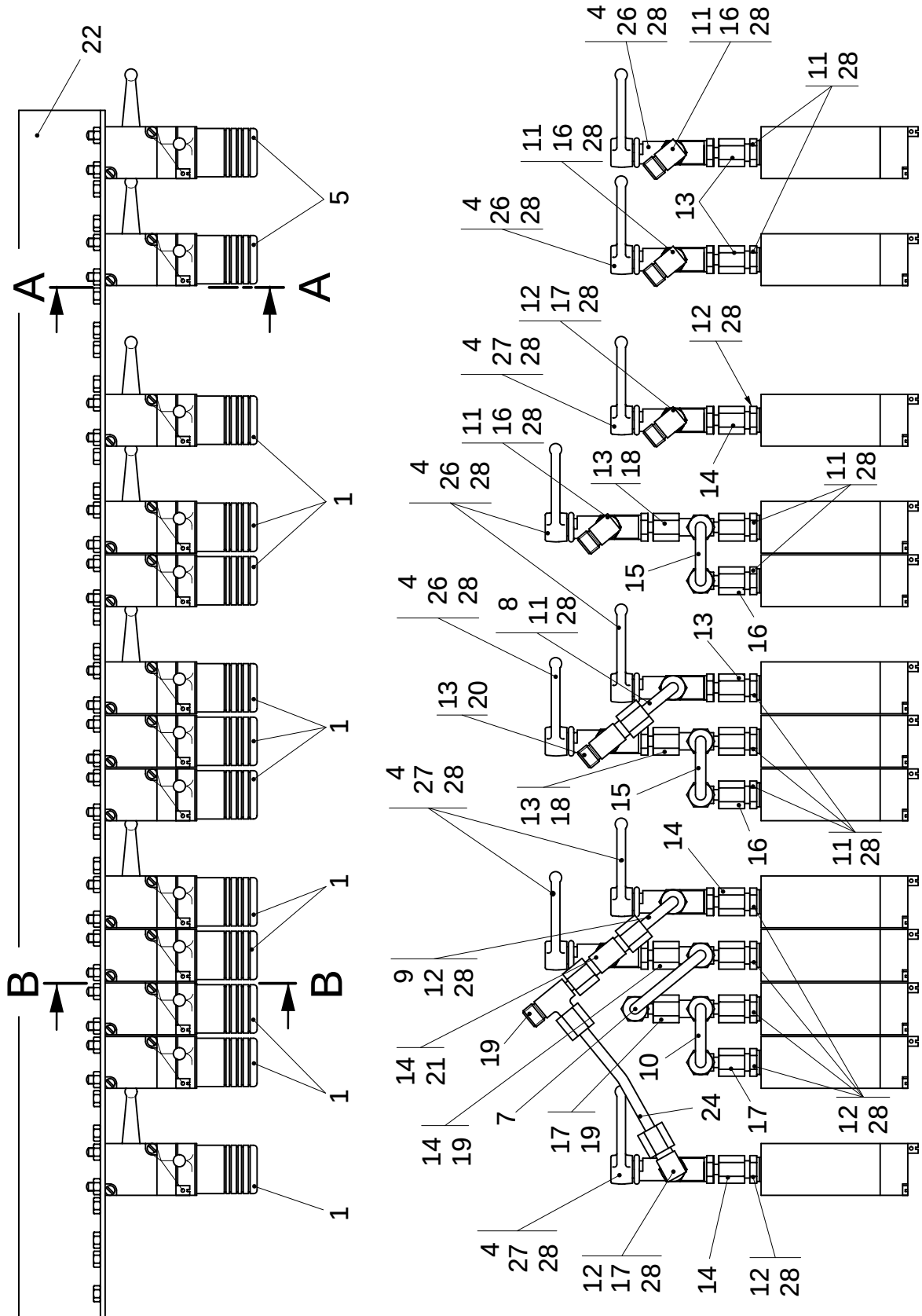
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Switch Mounting

M25/M32

11

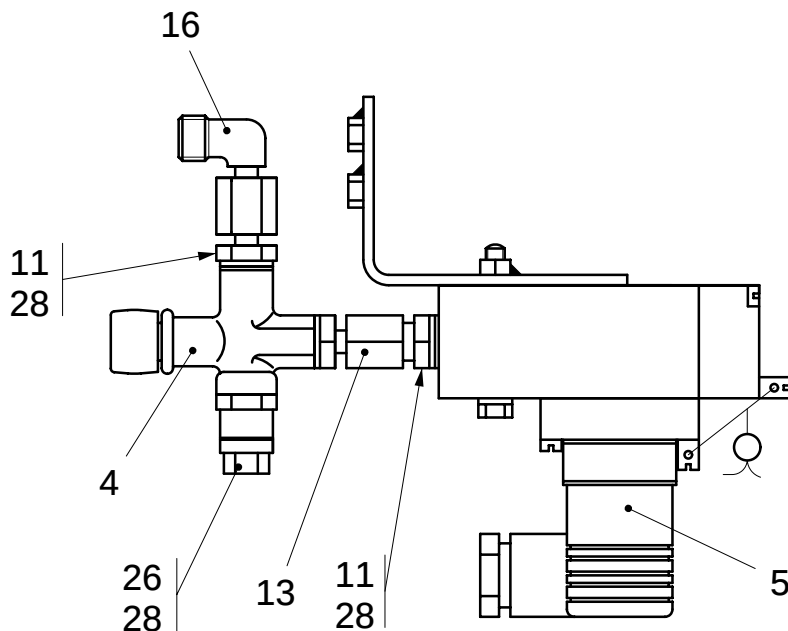


Pressure Switch Mounting

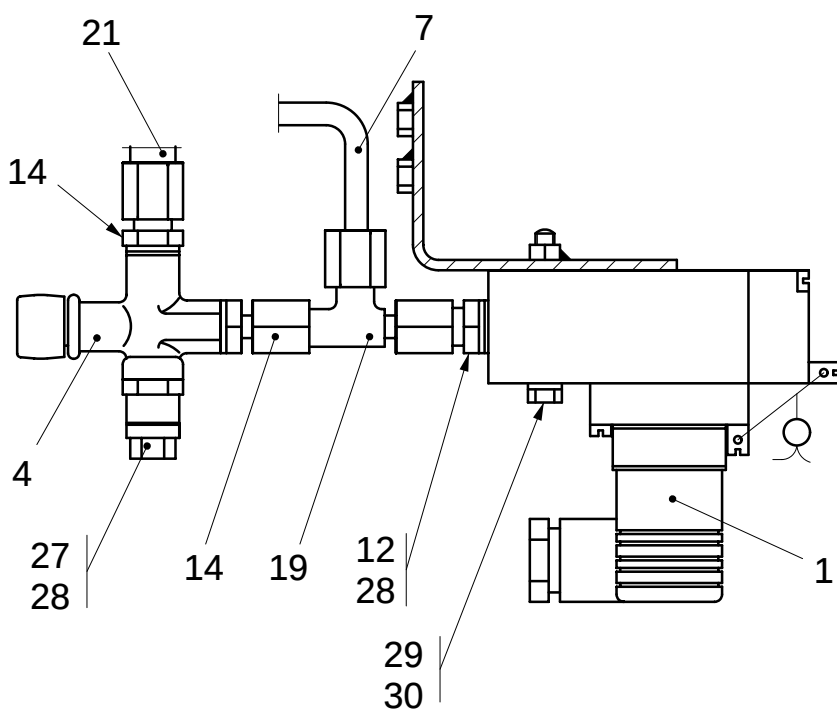
M25/M32

11

A-A



B-B



Transmitter for Charge Air Pressure

M25/M32

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TRANSMITTER, VOLLST. TRANSMITTER ASSEMBLY	1	254842 DD
1	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	2.4842-201
2	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	9.4842-015
4	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-342
5	STUTZEN ADJUSTABLE ELBOW	1	1.5093-220
6	STUTZEN MALE CONNECTOR	1	1.5094-120
9	DICHTRING JOINT RING	# 1	1.7010-029
10	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-215
11	SPANNSCHEIBE CONICAL SPRING WASHER	# 2	1.0068-206

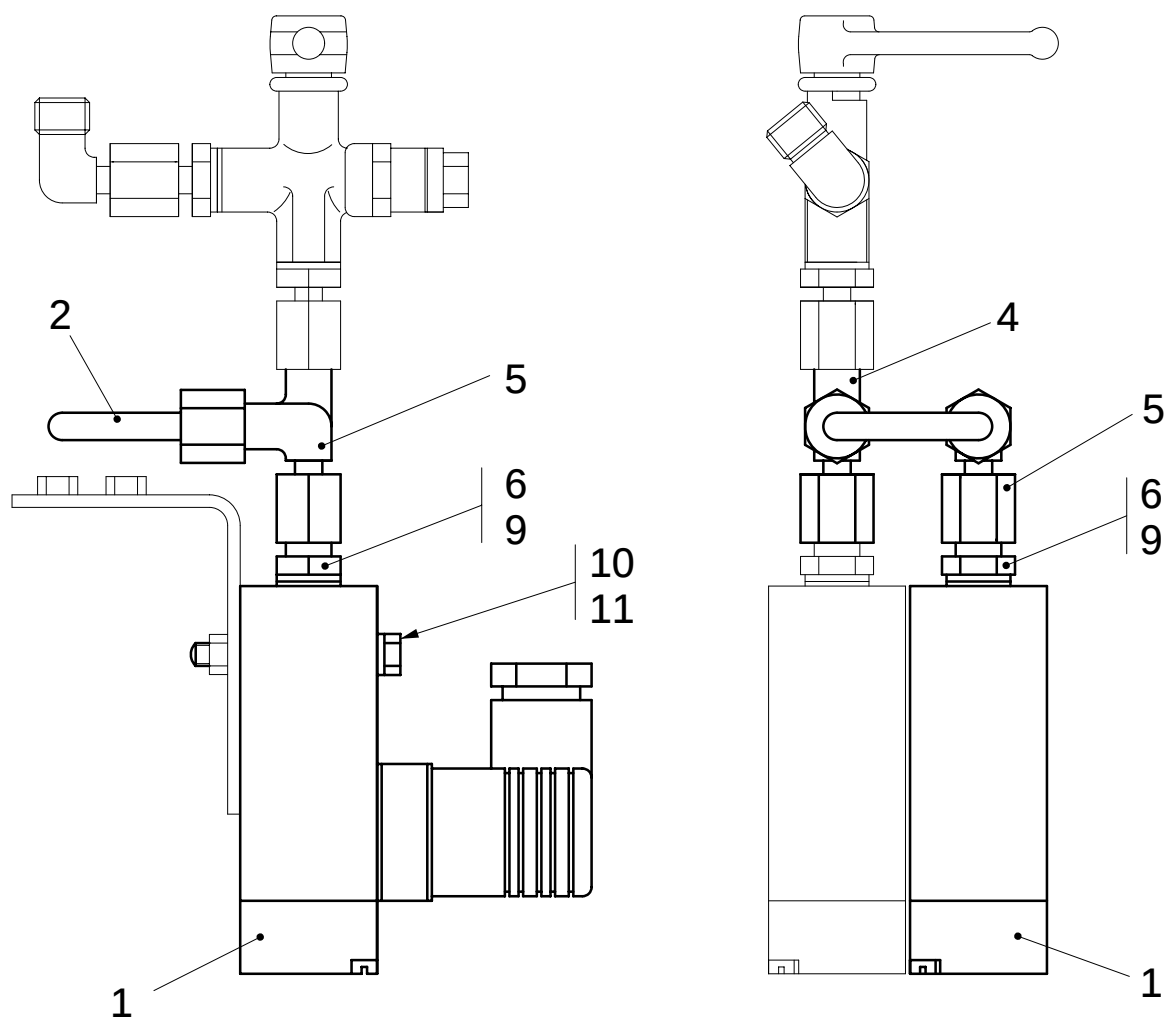
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Transmitter for Charge Air Pressure

M25/M32

11



Transmitter for Lube Oil Pressure

M25/M32

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TRANSMITTER, VOLLST. TRANSMITTER ASSEMBLY	1	254842 EE
1	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	2.4842-003
2	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-007
4	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-300
5	STUTZEN ADJUSTABLE ELBOW	1	1.5093-241
6	STUTZEN MALE CONNECTOR	1	1.5094-140
9	DICHTRING JOINT RING	# 1	1.7010-029
10	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-215
11	SPANNSCHEIBE CONICAL SPRING WASHER	# 2	1.0068-206

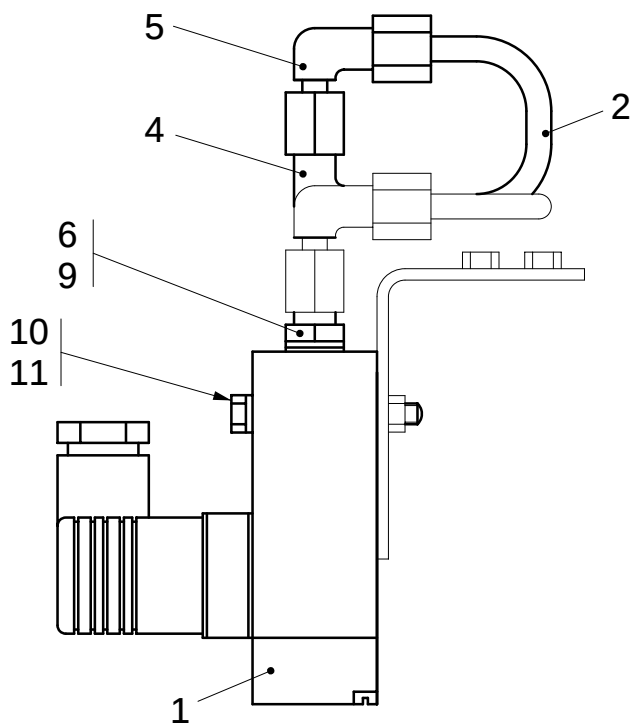
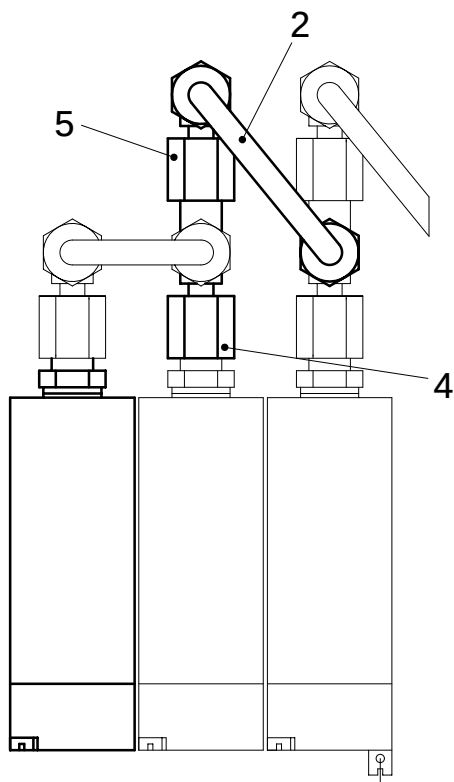
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Transmitter for Lube Oil Pressure

M25/M32

11



Transmitter for Fresh Water Pressure

M25/M32

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TRANSMITTER, VOLLST. TRANSMITTER ASSEMBLY	1	254842 GG
1	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	2.4842-003
2	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-006
4	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-342
5	STUTZEN ADJUSTABLE ELBOW	1	1.5093-220
6	STUTZEN MALE CONNECTOR	1	1.5094-120
9	DICHTRING JOINT RING	# 1	1.7010-029
10	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-215
11	SPANNSCHEIBE CONICAL SPRING WASHER	# 2	1.0068-206

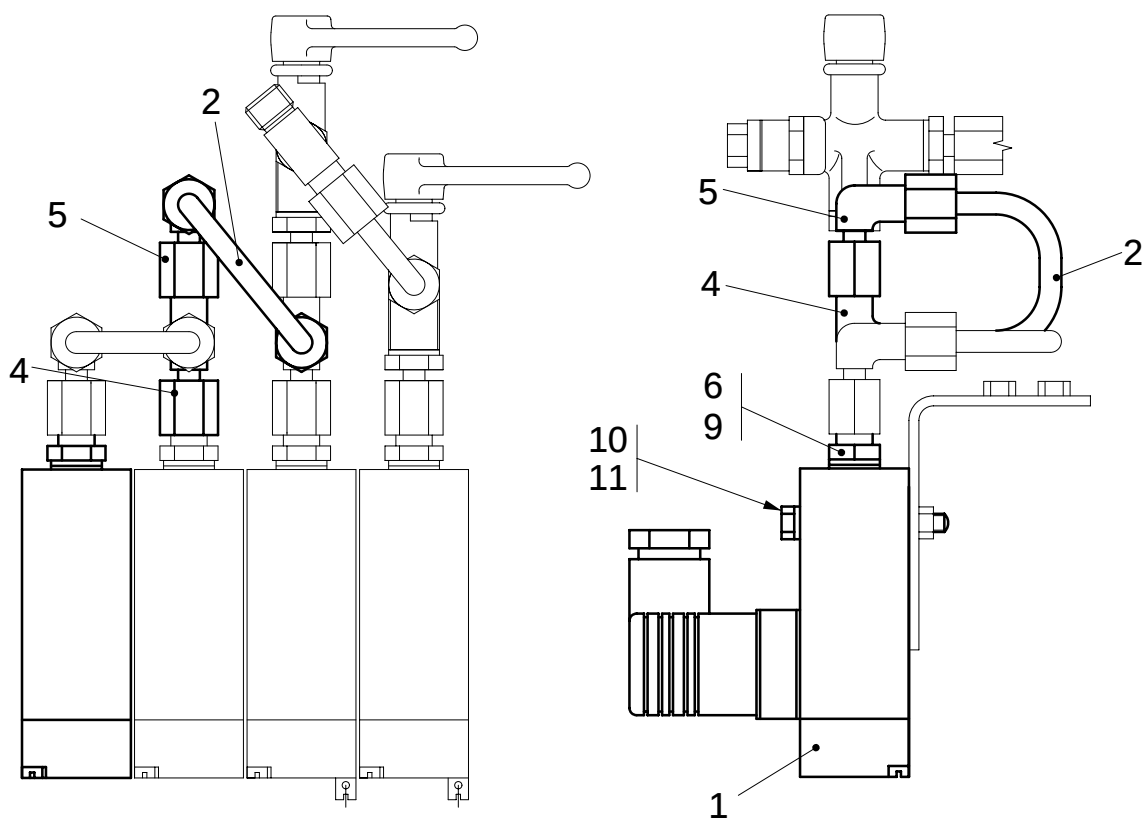
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Transmitter for Fresh Water Pressure

M25/M32

11



Transmitter for Fresh Water Pressure

M25/M32

11

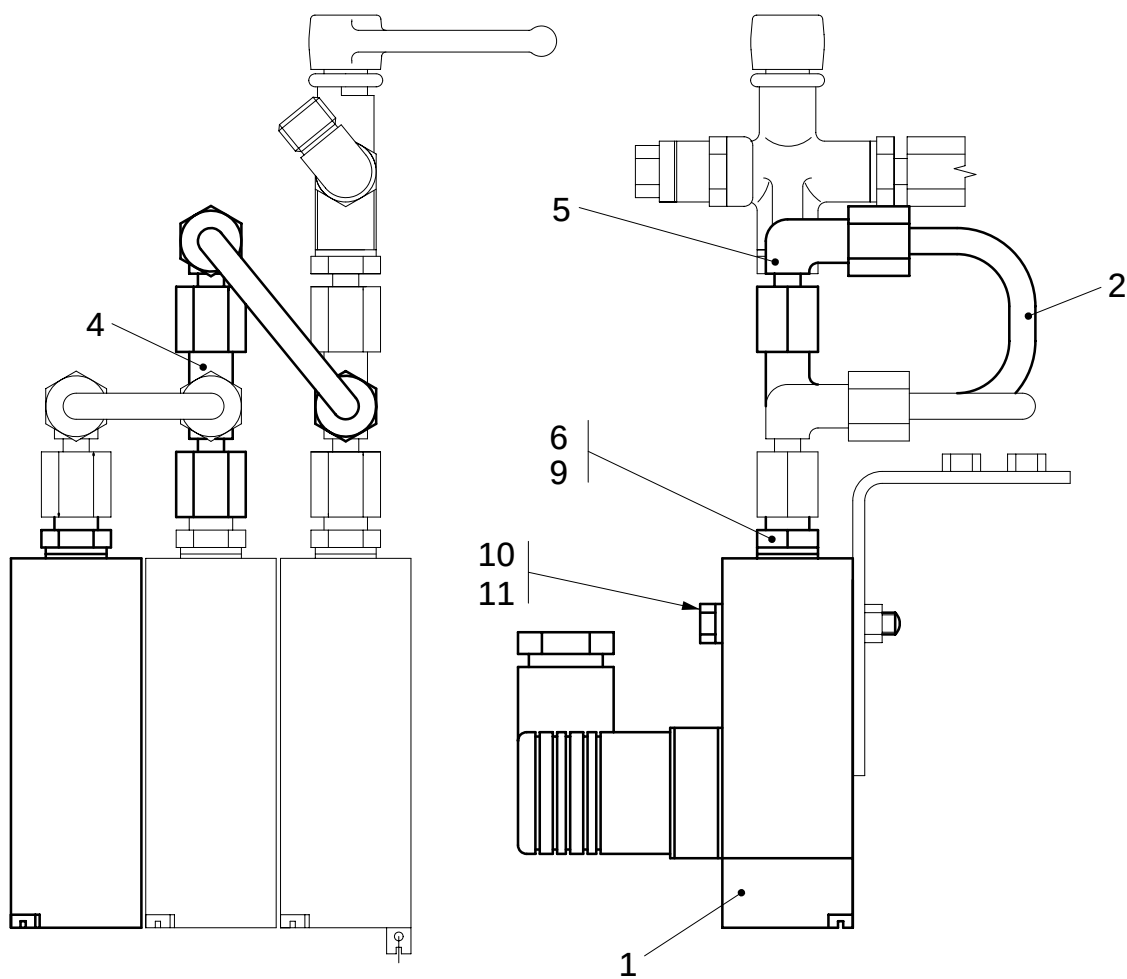
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-	TRANSMITTER, VOLLST. TRANSMITTER ASSEMBLY	1	254842 HH
1	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	2.4842-003
2	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-006
4	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-342
5	STUTZEN ADJUSTABLE ELBOW	1	1.5093-220
6	STUTZEN MALE CONNECTOR	1	1.5094-120
9	DICHTRING JOINT RING	# 1	1.7010-029
10	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-215
11	SPANNSCHEIBE CONICAL SPRING WASHER	# 2	1.0068-206

= VERBRAUCHSTEILE
CONSUMABLES

Transmitter for Fresh Water Pressure

M25/M32

11



Transmitter for Fuel Pressure

M25/M32

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TRANSMITTER, VOLLST. TRANSMITTER ASSEMBLY	1	254842 KK
1	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	9.4842-023
2	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-010
4	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-300
5	STUTZEN ADJUSTABLE ELBOW	1	1.5093-241
6	STUTZEN MALE CONNECTOR	1	1.5094-140
9	DICHTRING JOINT RING	# 1	1.7010-029
10	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-215
11	SPANNSCHEIBE CONICAL SPRING WASHER	# 2	1.0068-206

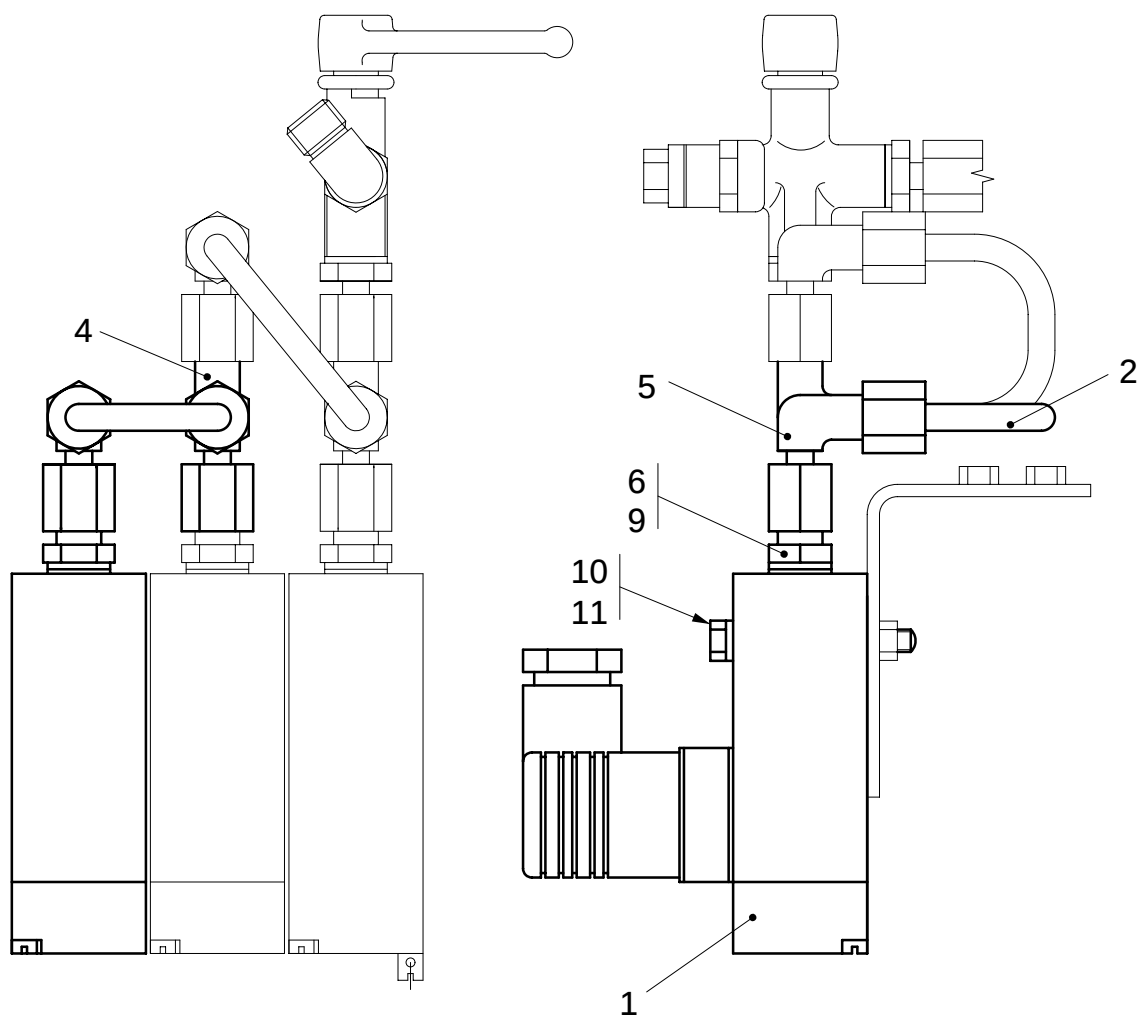
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Transmitter for Fuel Pressure

M25/M32

11



Pressure Switch for Fuel Pressure

M25/M32

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH ASSEMBLY	1	254842 LL
1	DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	1	2.4842-001
2	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-010
4	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-300
5	STUTZEN ADJUSTABLE ELBOW	1	1.5093-241
6	STUTZEN MALE CONNECTOR	1	1.5094-140
9	DICHTRING JOINT RING	# 1	1.7010-029
10	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-215
11	SPANNSCHEIBE CONICAL SPRING WASHER	# 2	1.0068-206

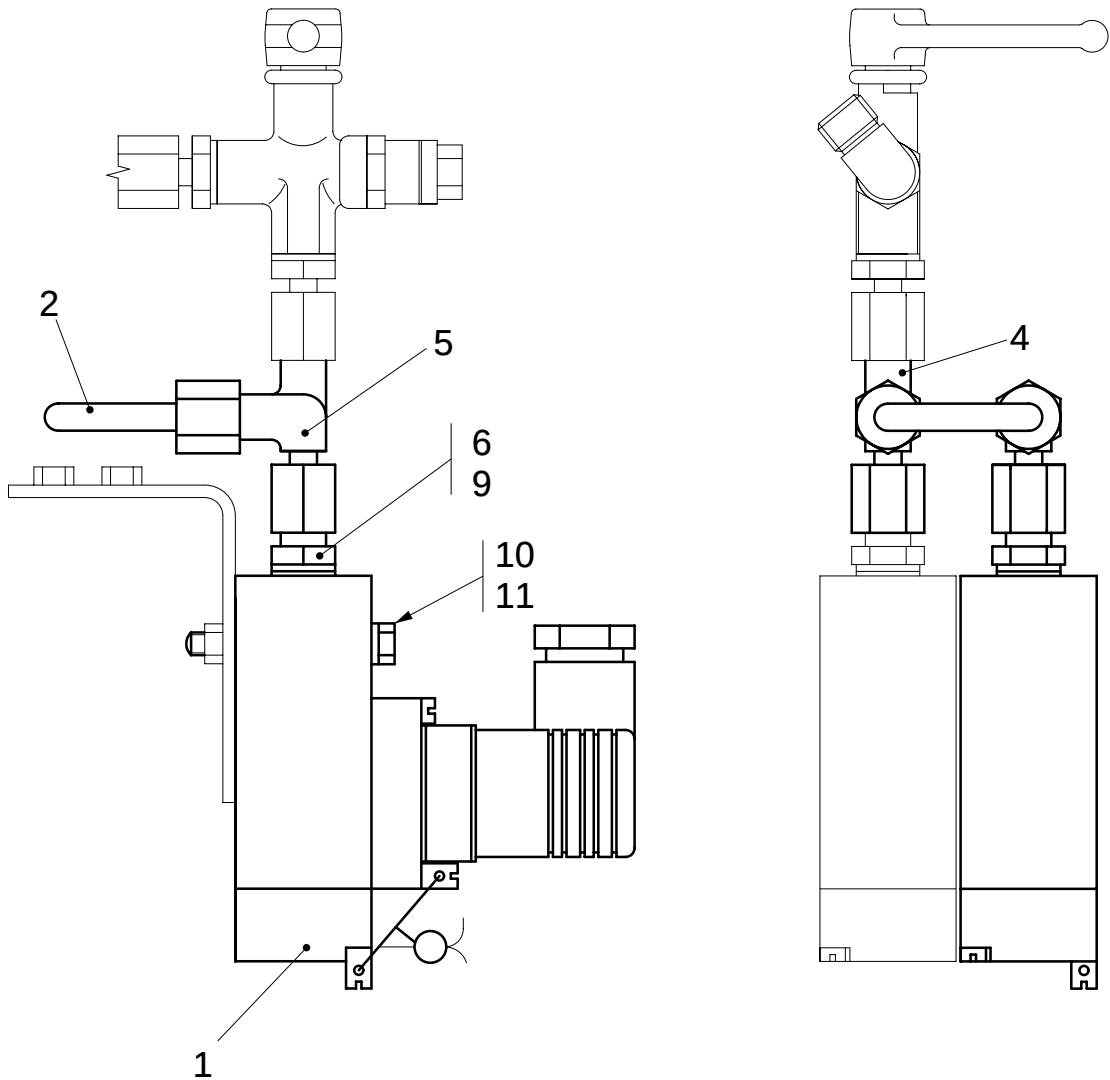
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Pressure Switch for Fuel Pressure

M25/M32

11



Pressure Switch for Fuel Pressure

M25/M32

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH ASSEMBLY	1	254842 MM
1	DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	1	2.4842-001
2	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-007
4	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-300
5	STUTZEN ADJUSTABLE ELBOW	1	1.5093-241
6	STUTZEN MALE CONNECTOR	1	1.5094-140
9	DICHTRING JOINT RING	# 1	1.7010-029
10	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-215
11	SPANNSCHEIBE CONICAL SPRING WASHER	# 2	1.0068-206

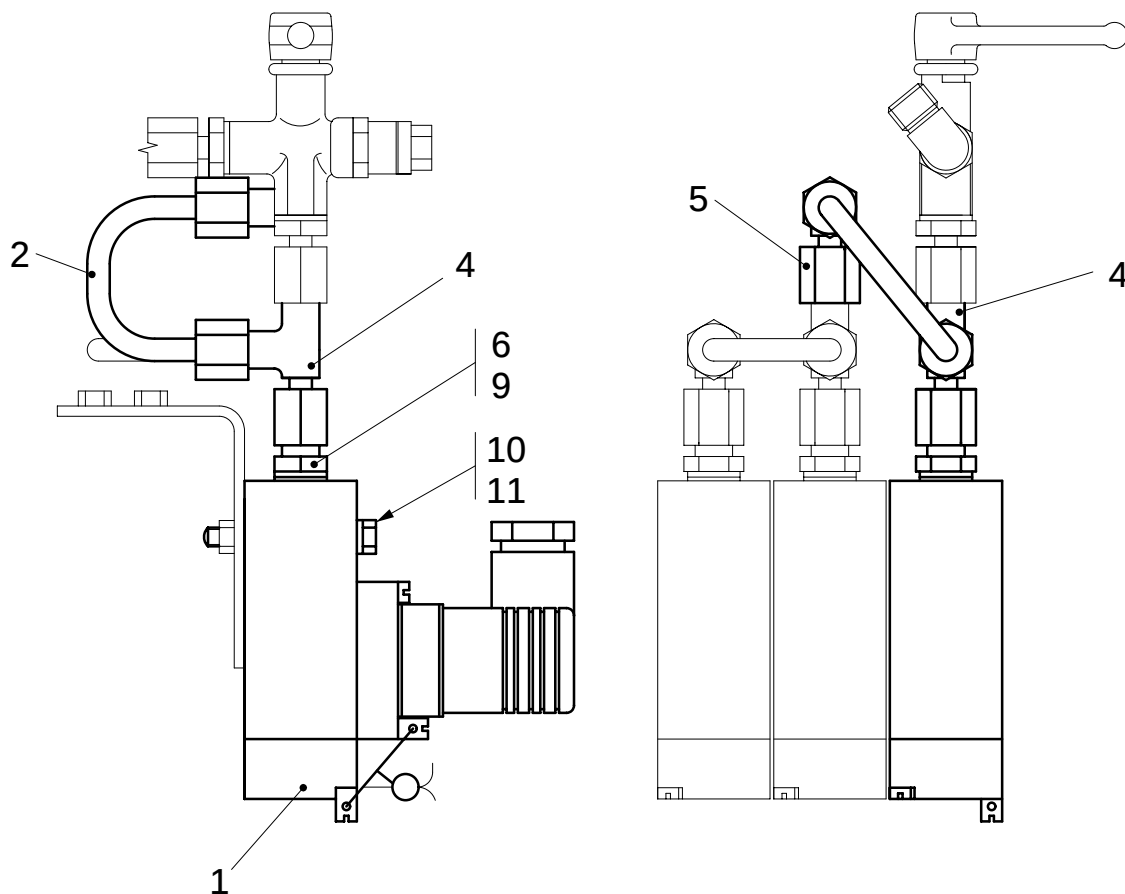
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Pressure Switch for Fuel Pressure

M25/M32

11



Transmitter for Charge Air Pressure

M25/M32

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TRANSMITTER, VOLLST. TRANSMITTER ASSEMBLY	1	254842 NN
1	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	2.4842-201
2	STUTZEN ADJUSTABLE L-ADAPTER	1	1.5093-342
3	KUGELHAHN, VOLLST. THREE-WAY BALL VALVE, COMPL.	1	2.4523-078
4	STUTZEN CONNECTION UNION	1	1.5096-882
5	STUTZEN ADJUSTABLE ELBOW	1	1.5093-220
6	STUTZEN MALE CONNECTOR	2	1.5094-120
7	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-626
9	DICHTRING JOINT RING	# 3	1.7010-029
10	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-215
11	SPANNSCHEIBE CONICAL SPRING WASHER	# 2	1.0068-206
12	ÜBERWURFMUTTER UNION NUT	1	1.5040-114
13	VERSCHLUSSBUTZEN SEALING PLUG	1	1.3088-541

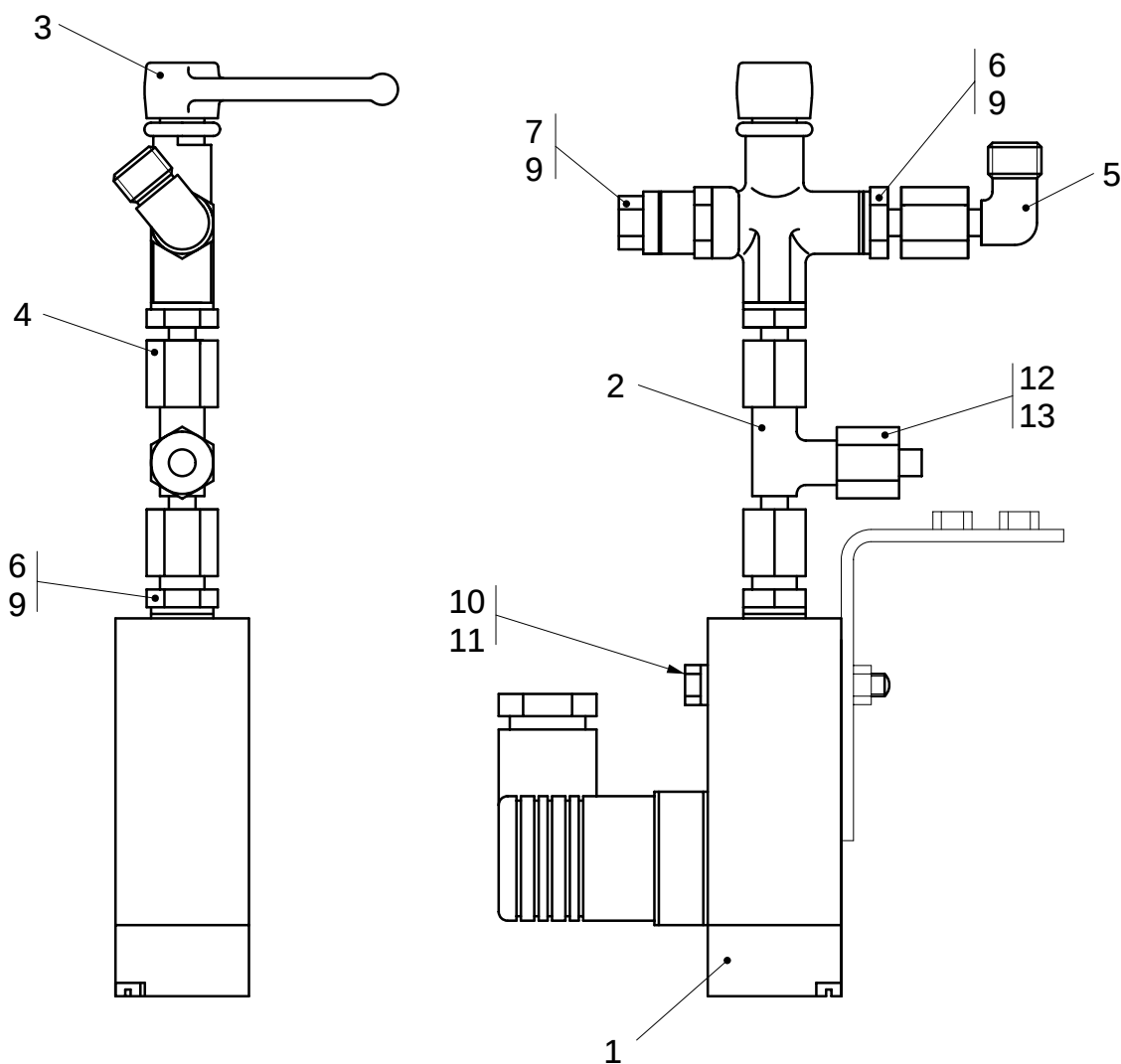
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Transmitter for Charge Air Pressure

M25/M32

11



Pressure Switch Mounting

M25/M32

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DRUCKWÄCHTER-ANBAU, VOLLST. PRESSURE SWITCH MOUNTING ASSEMBLY	1	254842 PP
1	DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	6	2.4842-001
2	DRUCKTRANSMITTER, VOLLST. PRESSURE SWITCH, COMPL.	1	9.4842-001
3	DRUCKTRANSMITTER, VOLLST. PRESSURE SWITCH, COMPL.	3	9.4842-003
4	KUGELHAHN, VOLLST. THREE-WAY BALL VALVE, COMPL.	10	2.4523-078
5	DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	1	2.4523-014
6	DRUCKTRANSMITTER, VOLLST. PRESSURE SWITCH, COMPL.	1	9.4842-005
8	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-008
9	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-009
10	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	1	2.4842-110
11	STUTZEN MALE CONNECTOR	13	1.5094-120
12	STUTZEN MALE CONNECTOR	8	1.5094-140
13	STUTZEN CONNECTION UNION	7	1.5096-882
14	STUTZEN CONNECTION UNION	5	1.5096-862
15	DRUCKWÄCHTERLEITUNG, VOLLST. PIPE BEND, COMPL.	2	9.4842-015
16	STUTZEN ADJUSTABLE ELBOW	6	1.5093-220
17	STUTZEN ADJUSTABLE ELBOW	3	1.5093-241
18	STUTZEN ADJUSTABLE L-ADAPTER	2	1.5093-342
19	STUTZEN ADJUSTABLE L-ADAPTER	2	1.5093-300
20	STUTZEN UNION TEE	1	1.5095-440
21	STUTZEN UNION TEE	1	1.5095-510

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Switch Mounting

M25/M32

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
22	HALTER, VOLLST. BRACKET, COMPL.	1	254842-122
23	DRUCKTRANSMITTER, VOLLST. PRESSURE SWITCH, COMPL.	1	9.4842-123
24	LEITUNG, VOLLST. PIPE, COMPL.	1	254842-024
25	ANSCHLUSSTÜCK CONNECTING PEACE	6	9.4842-002
26	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	6	1.1041-626
27	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	4	1.1041-606
28	DICHTRING JOINT RING	# 31	1.7010-029
29	SECHSKANTSCHRAUBE HEXAGON SCREW	26	1.1387-215
30	SPANNSCHEIBE CONICAL SPRING WASHER	# 26	1.0068-206

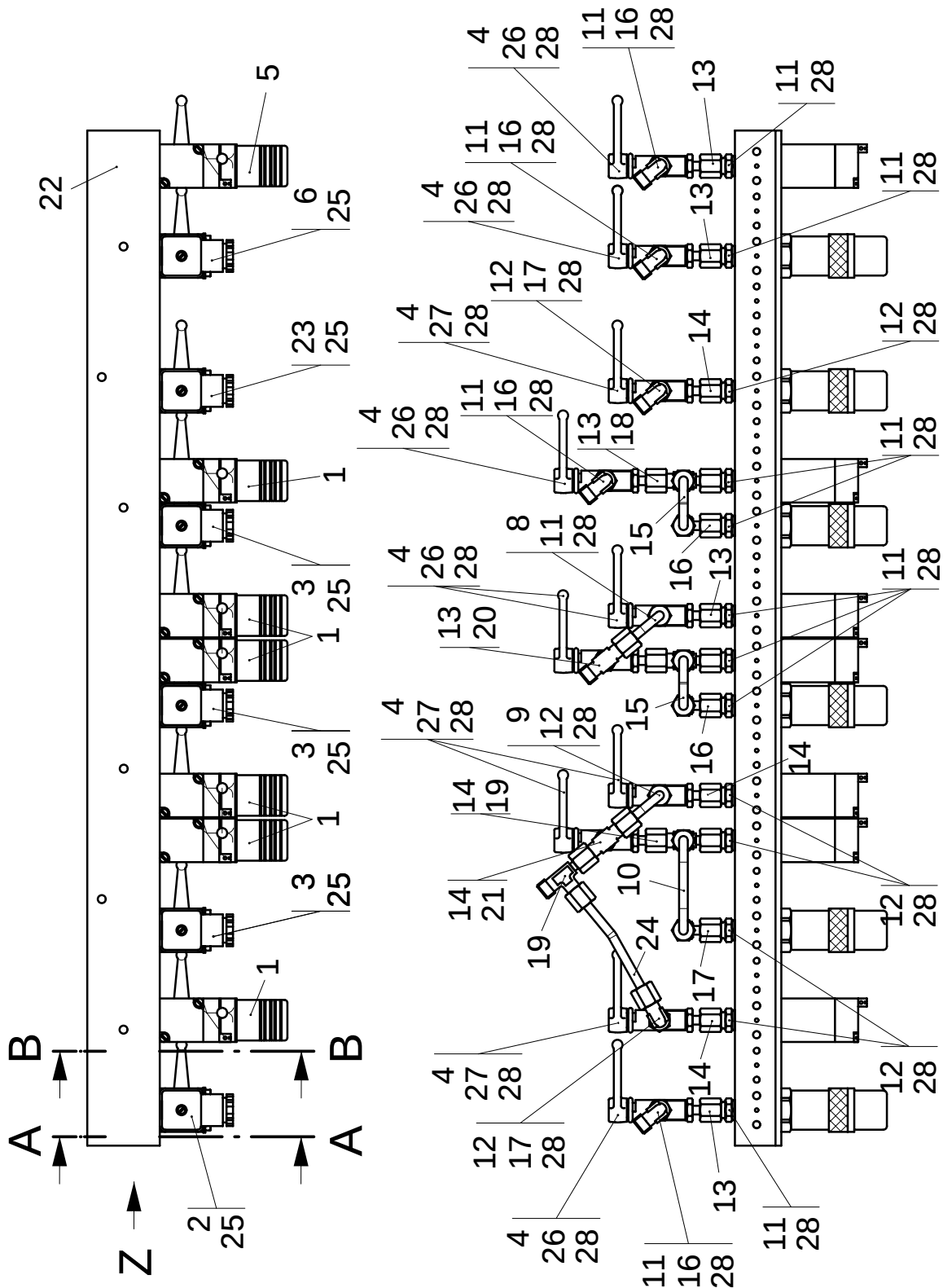
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Switch Mounting

M25/M32

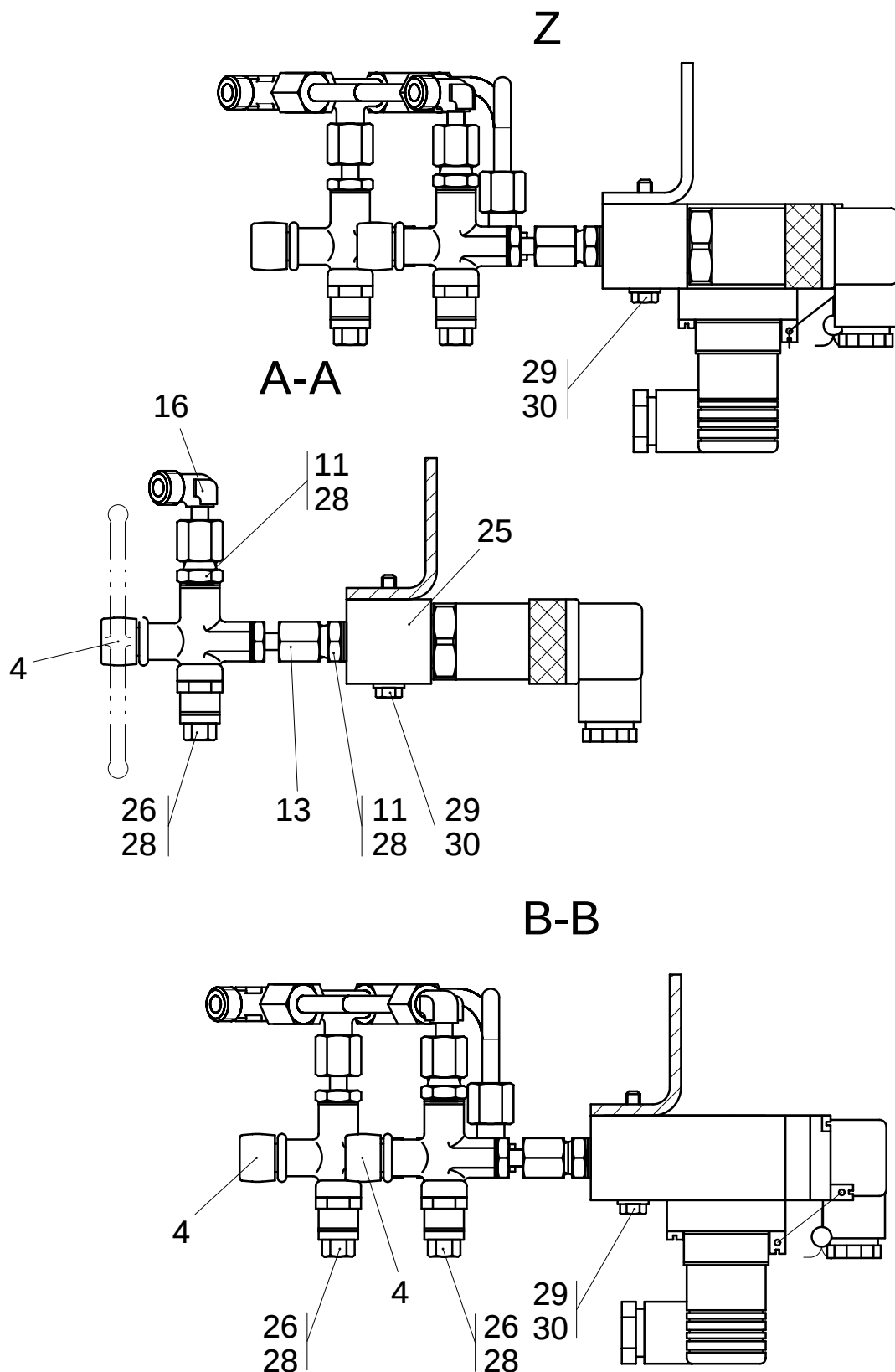
11



Pressure Switch Mounting

M25/M32

11



Transmitter for Starting Air Pressure

M25/M32

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.	
-	TRANSMITTER, VOLLST. TRANSMITTER ASSEMBLY	1	9.4842 XX		
1	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	2.4842-2		
2	ROHRBOGEN, VOLLST. PIPE BEND, COMPL.	1	9.4842-15		
4	STUTZEN ADJUSTABLE L-ADAPTER	1	L6	DIN3954	2.0540
5	STUTZEN ADJUSTABLE ELBOW	1	L6	DIN3952	2.0540
6	STUTZEN MALE CONNECTOR	1	L6A-G	DIN3901	2.0540
9	DICHTRING JOINT RING	# 1	A10X14	DIN7603	CU
10	SECHSKANTSCHRAUBE HEXAGON SCREW	2	M5X40	DIN933	8.8-A2C
11	SPANNSCHEIBE CONICAL SPRING WASHER	# 2	5	DIN6796	FST

= VERBRAUCHSTEILE
CONSUMABLES

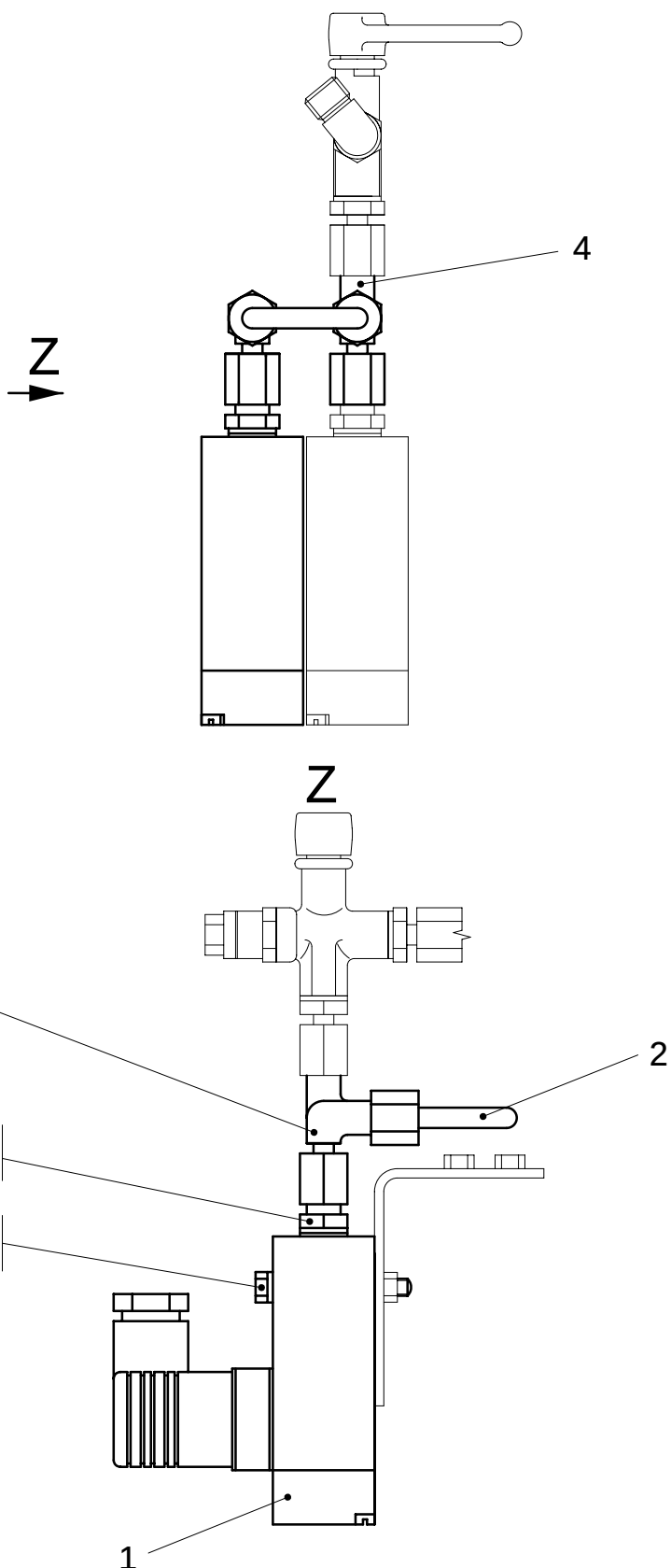
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Transmitter for Starting Air Pressure

M25/M32

11



Transmitter for Charge Air Pressure

M25/M32

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.	
-	TRANSMITTER, VOLLST. TRANSMITTER ASSEMBLY	1	9.4842 YY		
1	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	2.4842-201		
3	3-WEGE KUGELHAHN THREE-WAY BALL VALVE	1	2.4523-78		
4	STUTZEN ADJUSTABLE L-ADAPTER	1	L6E-G	DIN3955	2.0540-NBR
5	STUTZEN ADJUSTABLE ELBOW	1	L6	DIN3952	2.0540
6	STUTZEN MALE CONNECTOR	1	L6A-G	DIN3901	2.0540
7	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	G1/8A	DIN910	2.0540
9	DICHTRING JOINT RING	# 3	A10X14	DIN7603	CU
10	SECHSKANTSCHRAUBE HEXAGON SCREW	2	M5X40	DIN933	8.8-A2C
11	SPANNSCHEIBE CONICAL SPRING WASHER	# 2	5	DIN6796	FST

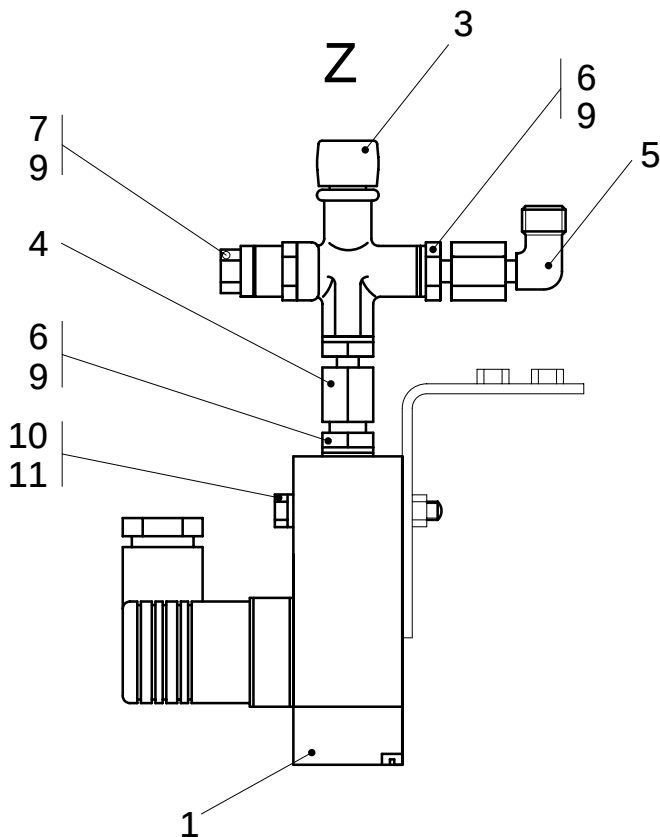
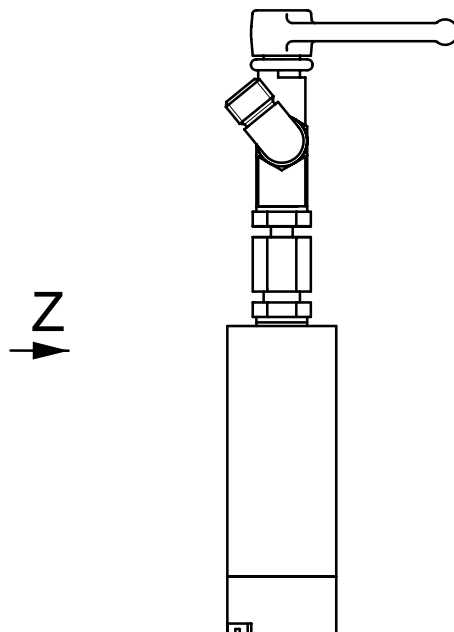
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Transmitter for Charge Air Pressure

M25/M32

11



Pressure Switch Plate

M25/M32

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.	
-	DRUCKWÄCHTERPLATTE, VOLLST. PRESSURE SWITCH PLATE ASSEMBLY	1	9.4842 ZB		
1	DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	1	2.4842-1		
3	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	3	2.4842-3		
4	3-WEGEKUGELHAHN, VOLLST. THREE-WAY BALL VALVE, COMPL.	6	2.4523-78		
5	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	2.4842-2		
9	ROHRBOGEN, VOLLST. PIPE BEND, COMPL.	1	2.4842-9		
11	STUTZEN MALE CONNECTOR	6	L6A-G	DIN3901	2.0540
12	STUTZEN MALE CONNECTOR	5	L6A-G	DIN3901	ST-A3C
13	STUTZEN CONNECTION UNION	3	L6E-G	DIN3955	2.0540-NBR
14	STUTZEN CONNECTION UNION	4	L6E-G	DIN3955	ST-A3C-NBR
16	STUTZEN ADJUSTABLE ELBOW	3	L6	DIN3952	2.0540
17	STUTZEN ADJUSTABLE ELBOW	1	L6	DIN3952	ST-A3C
19	STUTZEN ADJUSTABLE L-ADAPTER	1	L6	DIN3954	ST-A3C
21	STUTZEN UNION TEE	1	L6	DIN3908	ST-A3C
22	HALTER, VOLLST. BRACKET, COMPL.	1	2.4842-5		
23	DRUCKTRANSMITTER, VOLLST. PRESSURE TRANSMITTER, COMPL.	1	9.4842-23		

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Pressure Switch Plate

M25/M32

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.	
24	ÜBERWURFMUTTER UNION NUT	1	AL6	DIN3870	A3C
25	VERSCHLUSSBUTZEN SEALING PLUG	1	1.3088-541		
26	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	3	G1/8A	DIN910	2.0540
27	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	3	G1/8A	DIN910	ST
28	DICHTRING JOINT RING	# 17	A10X14	DIN7603	CU
29	SECHSKANTSCHRAUBE HEXAGON SCREW	12	M5X40	DIN933	8.8-A2C
30	SPANNSCHEIBE CONICAL SPRING WASHER	# 12	5	DIN6796	FST

= VERBRAUCHSTEILE
CONSUMABLES

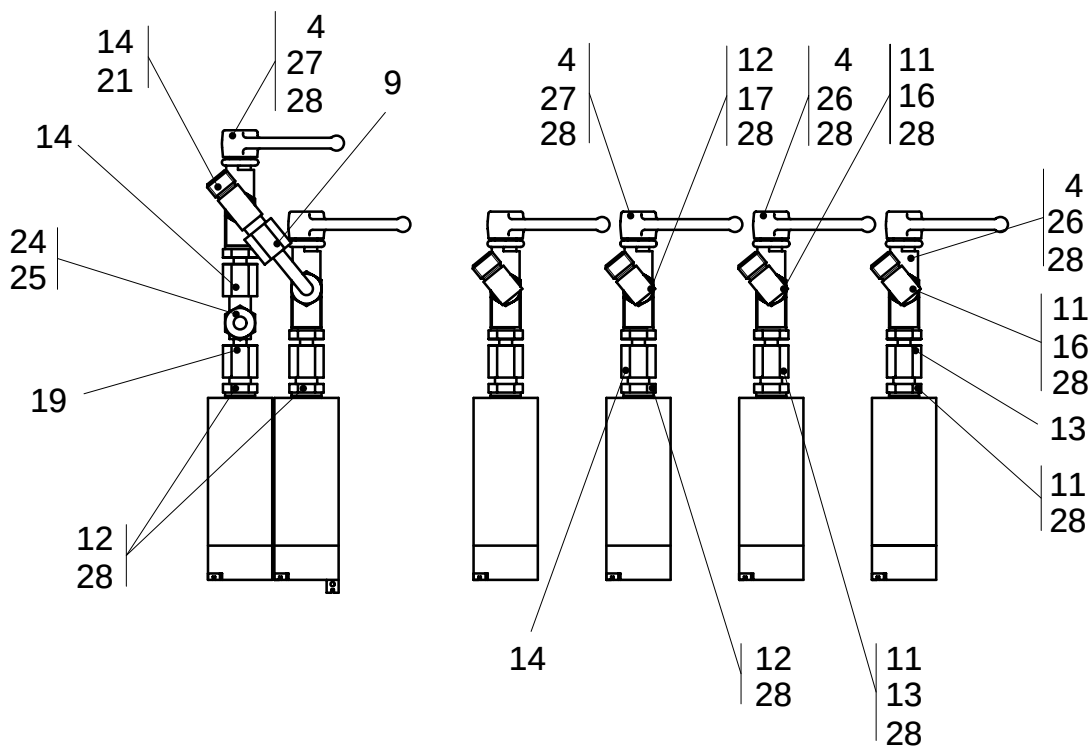
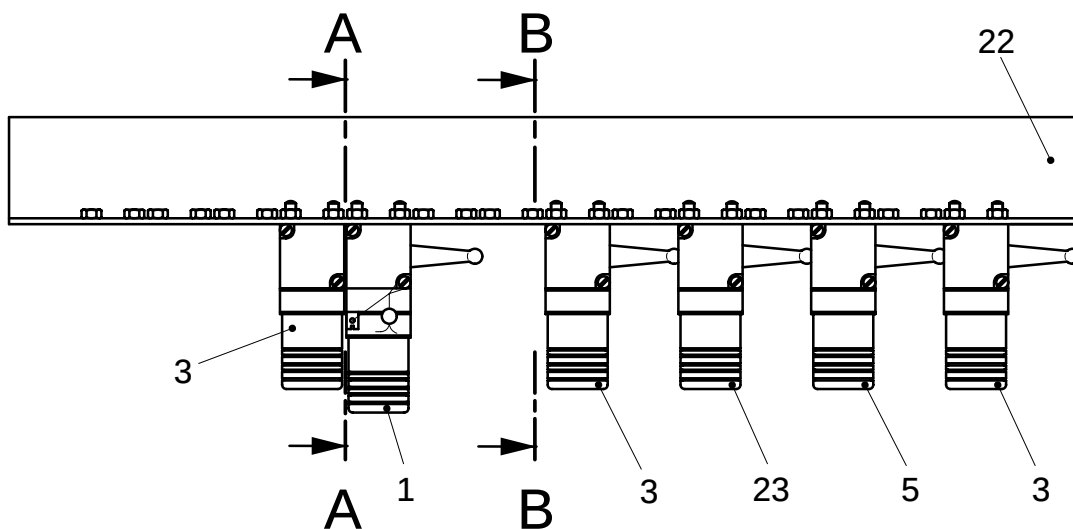
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Pressure Switch Plate

M25/M32

11

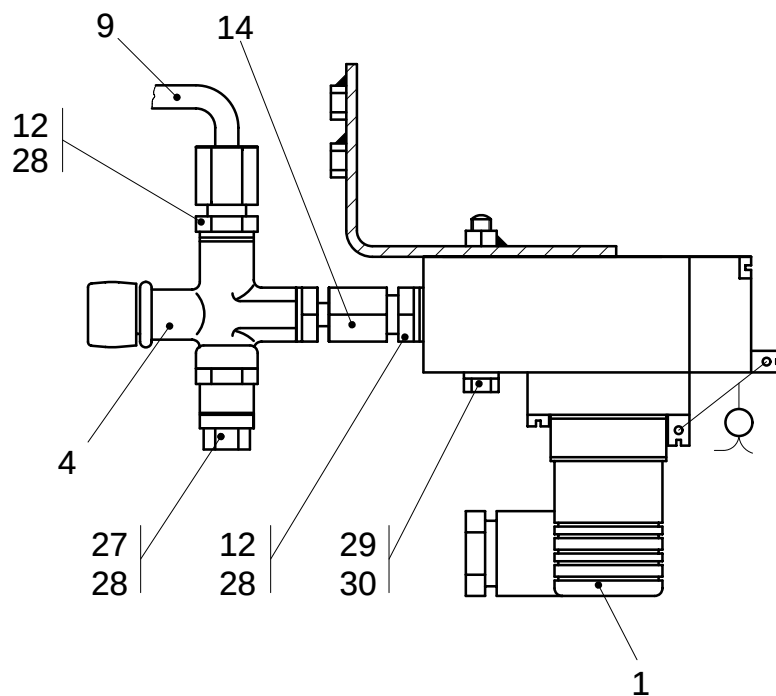


Pressure Switch Plate

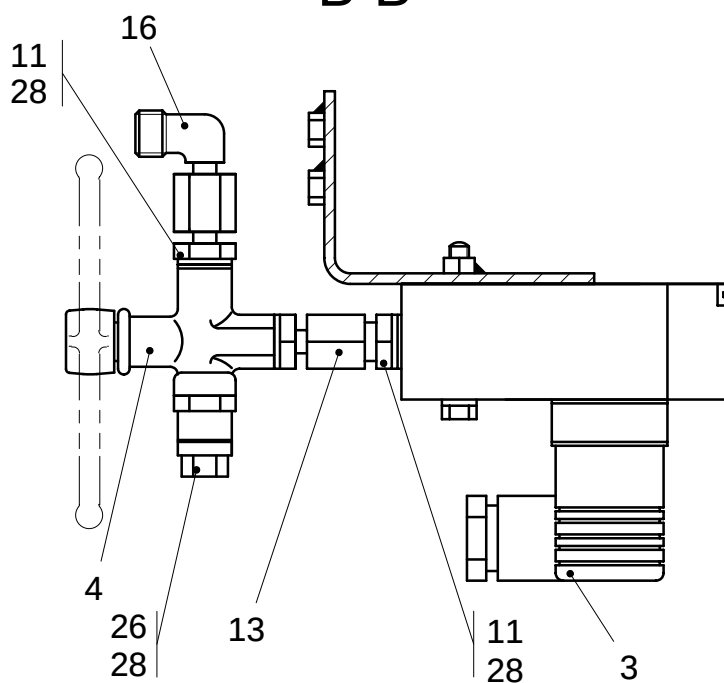
M25/M32

11

A-A



B-B



Pressure Switch

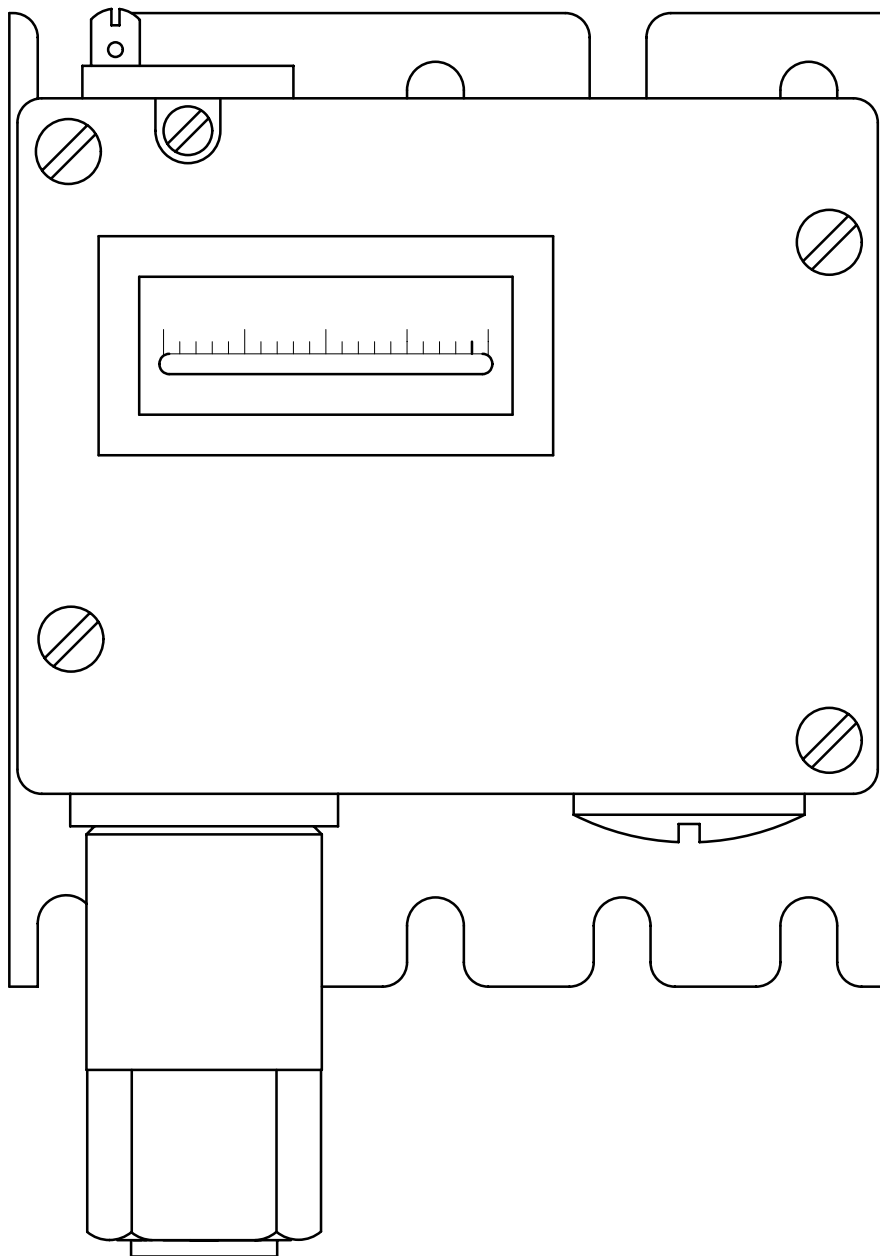
M20-M601C

BENENNUNG DESCRIPTION	DRUCKBEREICH / BAR PRESSURE RANGE /BAR	BEST.-NR PART NO.	11
DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	0,9 - 1,5	1.4843-044	
DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	0,2 - 2,5	1.4843-032	
DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	0 - 6	1.4843-033	
DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	1,0 - 16	1.4843-034	
DRUCKWÄCHTER, VOLLST. PRESSURE SWITCH, COMPL.	2,0 - 25	1.4843-048	

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Pressure Switch

M20-M601C

11

Crankcase Oil Mist Detector

M20-M601C

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
10.0	KURBELRAUMÜBERW.-GERÄT,VOLLST. CRANKCASE OIL MIST DETECTOR, ASS.	1	1.4877 GG
10.0-1	ANSCHLUSSGEHÄUSE CONNECTION BOX	1	1.4877-501
10.0-2	UNTERTEIL BOTTOM PART	1	1.4877-502
10.0-3	STECKDOSE PLUG CONNECTOR BOX	1	1.4877-503
10.0-4	VERSCHLUSSDICHTUNG SEAL	# 1	1.4877-504
10.0-5	MESSAUFSATZAUFHÄNG., UNTEN BOTTOM SUSPENSION	2	1.4877-505
10.0-6	DICHTUNG GASKET	# 1	1.4877-506
10.0-7	VERSCHLUSSSCHRAUBE SCREW PLUG	3	1.4877-507
10.0-8	DICHTUNG JOINT RING	# 3	1.4877-508
10.0-9	MESSAUFSATZAUFHÄNG., OBEN TOP SUSPENSION	2	1.4877-509
10.0-10	DICHTUNG GASKET	# 1	1.4877-510
10.0-11	FALTENBALG BELLOWS	2	1.4877-511
10.0-12	MESSAUFSATZ MEASURING UNIT	1	1.4877-512
10.0-13	SPÜLLUFTFILTER AIR FILTER	2	1.4877-513
10.0-14	SICHERUNGSRING CIRCLIP	2	1.4877-514
10.0-15	DICHTUNG JOINT RING	# 1	1.4877-515
10.0-16	VERSCHLUSSSCHRAUBE SCREW PLUG	1	1.4877-516
10.0-17	SCHUTZDECKEL COVER	1	1.4877-517
10.0-18	BEFESTIGUNGSSCHRAUBE FIXING SCREW	3	1.4877-518
10.0-19	ELEKTRONIK-MODUL ELECTRONIC MODULE	1	1.4877-519
10.0-20	SICHERUNG FUSE	1	1.4877-520

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Crankcase Oil Mist Detector

M20-M601C

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
10.0-21	SICHERUNGSKAPPE FUSE CAP	1	1.4877-521
10.0-22	SCHUTZHAUBE PROTECTION COVER	1	1.4877-522
10.0-23	DECKEL FÜR MESSAUFSATZ COVER FOR MEASURING HEAD	1	1.4877-523
10.0-24	HEIZUNGSELEMENT HEATING ELEMENT	1	1.4877-524
10.0-25	KABEL-CLIP CABLE CLIP	1	1.4877-525

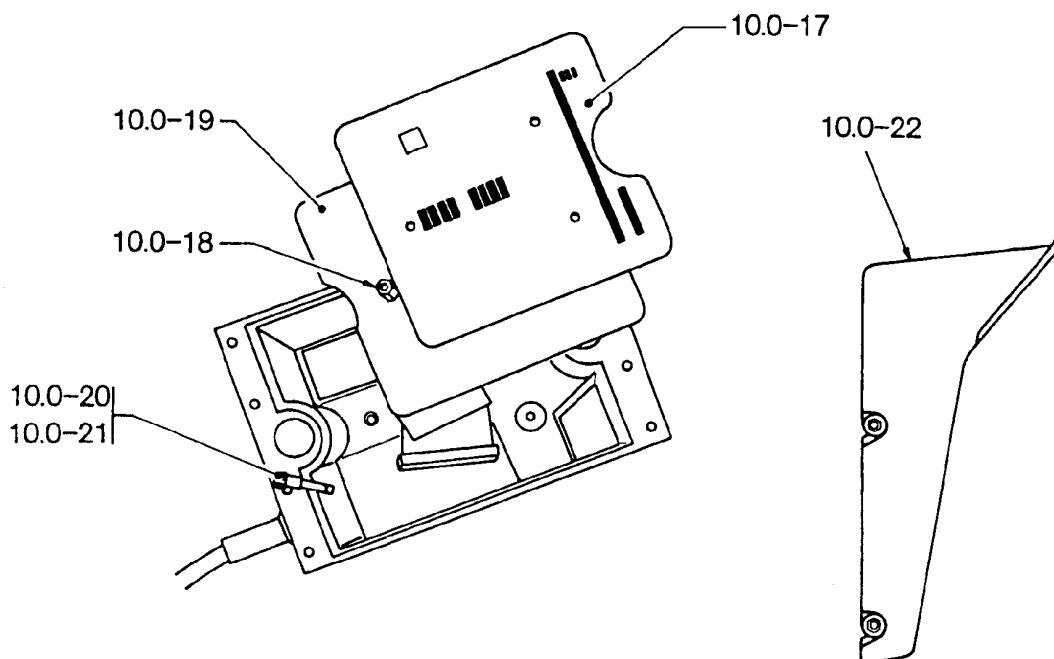
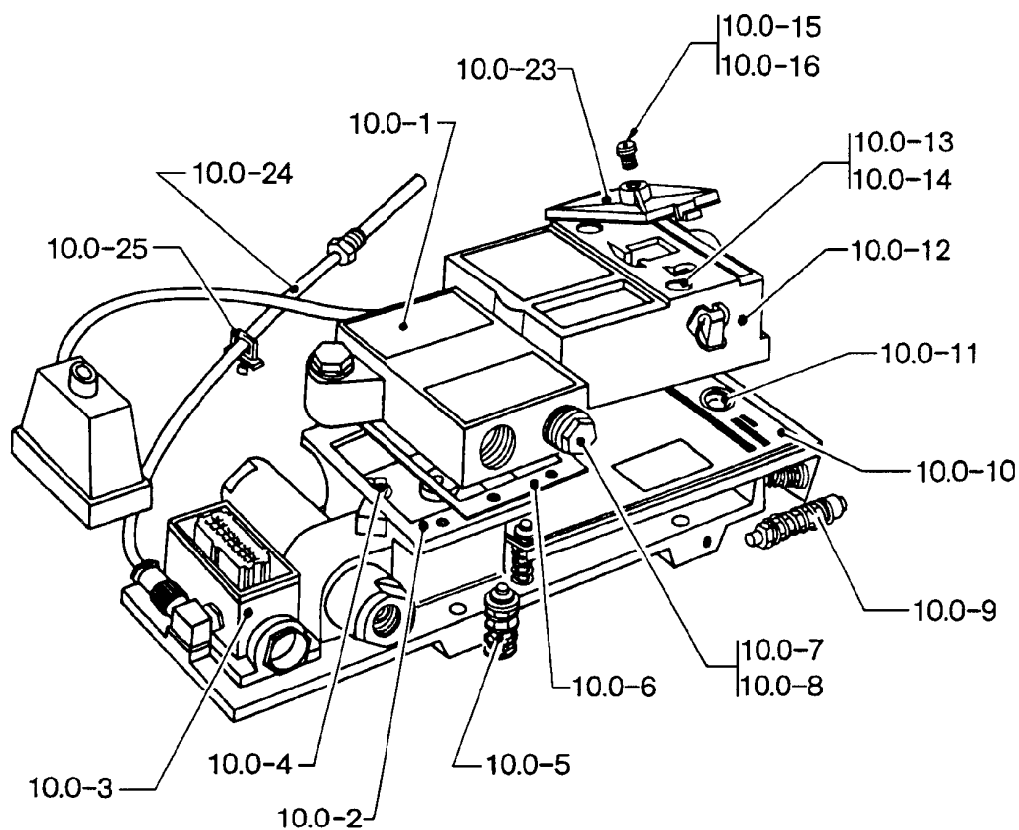
= VERBRAUCHSTEILE
CONSUMABLES

11

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Crankcase Oil Mist Detector

M20-M601C

11


Crankcase Oil Mist Detector

M25/M32/
M552C

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
-	TRIEBRAUMÜBERW.-GERÄT,VOLLST. CRANKCASE OIL MIST DETECTOR, ASS.	1	1.4877 MM	
1	TRIEBRAUMÜBERW.-GERÄT,VOLLST. CRANKCASE OIL MIST DETECTOR, COMPL.	1	SIEHE B1.05.11.1.4877 SEE B1.05.11.1.4877	
2	DRUCKREGELEINHEIT, VOLLST. PRESSURE REGULATOR , COMPL.	1	SIEHE B1.05.11.1.4817 SEE B1.05.11.1.4817	

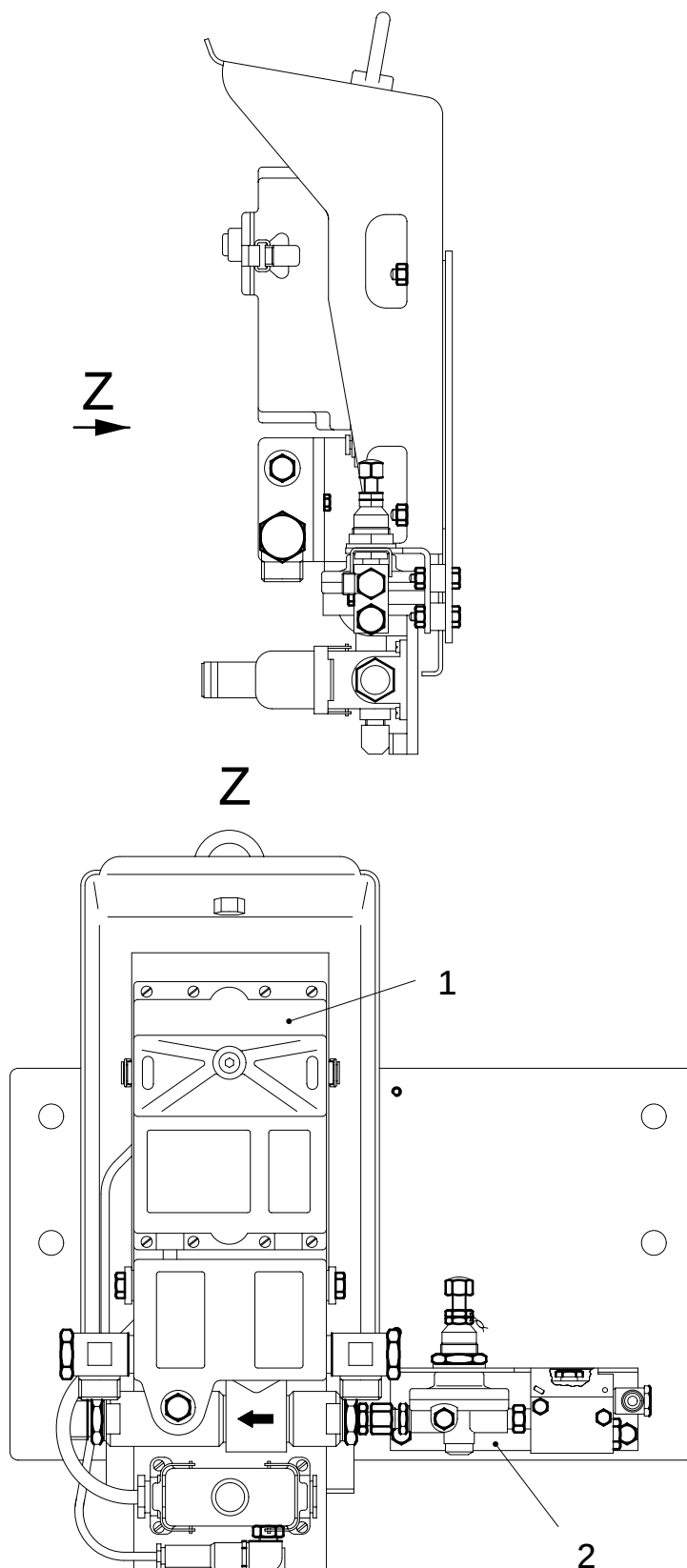
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Crankcase Oil Mist Detector

M25/M32/
M552C

11



Thermostat

M20-M601C

11

POS. ITEM	BENENNUNG DESCRIPTION			STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.			
TEMPERATURREGLER, BESTEHEND AUS: THERMOSTAT VALVE,CONSISTING OF:									
10.0-1	GEHÄUSE HOUSING	NW	50		1	1.7837-321			
			65		1	1.7837-322			
		NB	80	1	1.7837-323				
			100	1	1.7837-324				
			125	1	1.7837-325				
			150	1	1.7837-326				
10.0-2	REGLERELEMENT THERMOSTAT ELEMENT ARBEITSBEREICH TEMPERATURE								
		20-30 °C		*	1.7837-371				
		27-37 °C		*	1.7837-372				
		32-41 °C		*	1.7837-373				
		35-43 °C		*	1.7837-374				
		37-47 °C		*	1.7837-375				
		39-50 °C		*	1.7837-376				
		43-54 °C		*	1.7837-377				
		51-60 °C		*	1.7837-378				
		57-66 °C		*	1.7837-379				
		62-71 °C		*	1.7837-380				
		66-74 °C		*	1.7837-381				
		68-78 °C		*	1.7837-382				
		71-79 °C		*	1.7837-383				
		74-82 °C		*	1.7837-384				
		77-85 °C		*	1.7837-385				
		79-88 °C		*	1.7837-386				
		82-92 °C		*	1.7837-387				
		10.0-3	DICHTUNG GASKET	NW	50	#	3	50	ND40
65	3				65		ND40	DIN2690	ITMOG2
NB	80			3	80	ND40	DIN2690	ITMOG2	
	100			3	100	ND16	DIN2690	ITMOG2	
	125			3	125	ND16	DIN2690	ITMOG2	
	150			3	150	ND16	DIN2690	ITMOG2	

Thermostat

M20-M601C

11

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.	NORMTEIL STANDARD NO.
10.0-4	DICHTUNG GASKET	# *	1.7837-315	
10.0-5	DICHTUNG GASKET	# *	1.7837-318	
10.0-6	DICHTUNG SEAL	# *	1.7837-316	
10.0-7	O-RING O-RING	# *	1.7837-317	
10.0-8	O-RING O-RING	# *	1.7837-319	

XX = TEMPERATURANGABE(ARBEITSBEREICH)
TEMPERATURE INDICATION (WORKING RANGE)

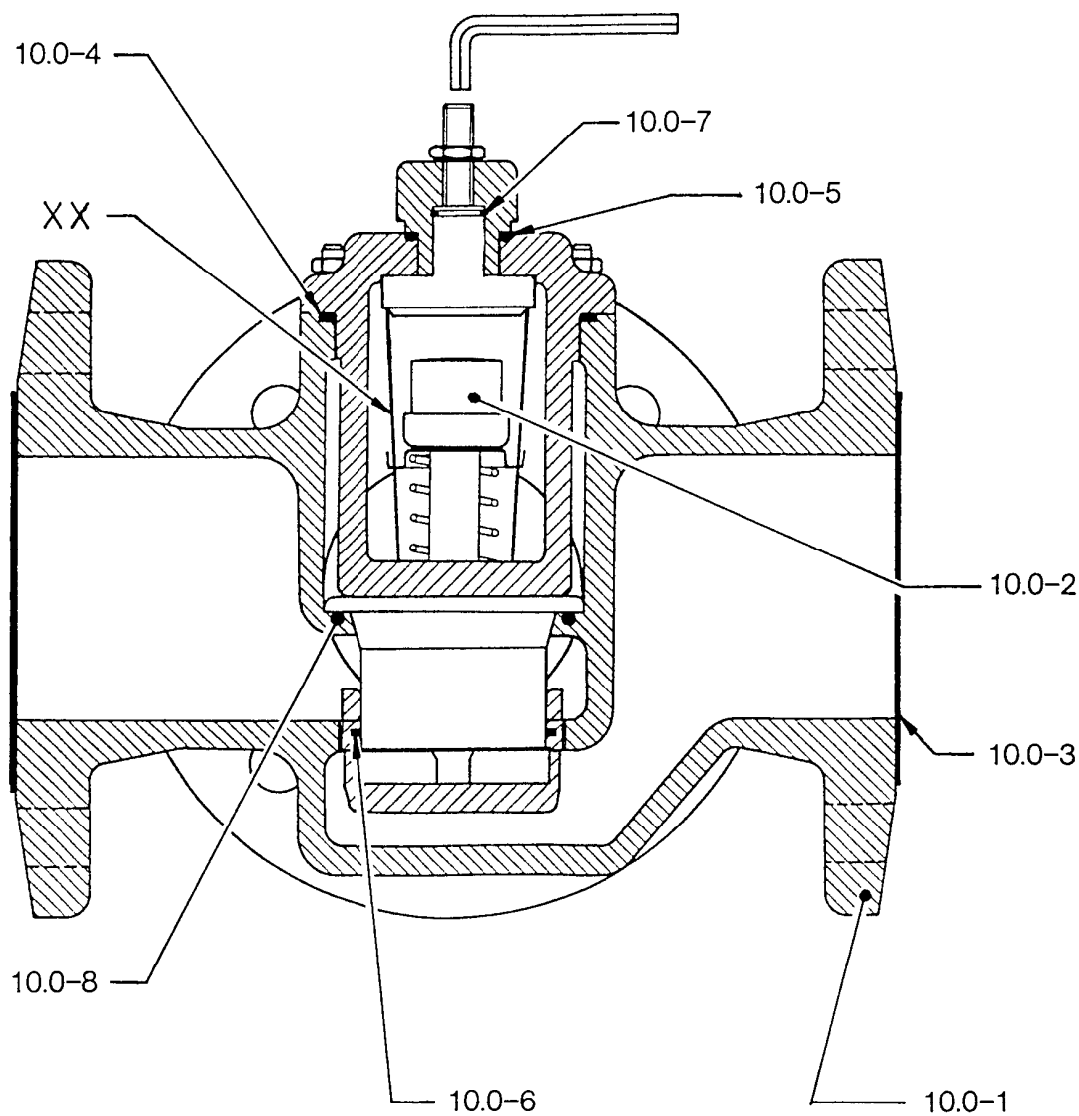
* = STÜCKZAHL NACH AUSFÜHRUNG
QUANTITY ACCORDING TO DESIGN

= VERBRAUCHSTEILE
CONSUMED PARTS

Thermostat

M20-M601C

11



Bracket Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	HALTER-ANBAU, VOLLST. BRACKET MOUNTING ASSEMBLY	1	258845 AA
1	HALTER, VOLLST. BRACKET, COMPL.	1	258845-101
2	HALTER, VOLLST. BRACKET, COMPL.	1	258845-003
3	HALTER, VOLLST. BRACKET, COMPL.	1	258845-002
4	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-370
5	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-439

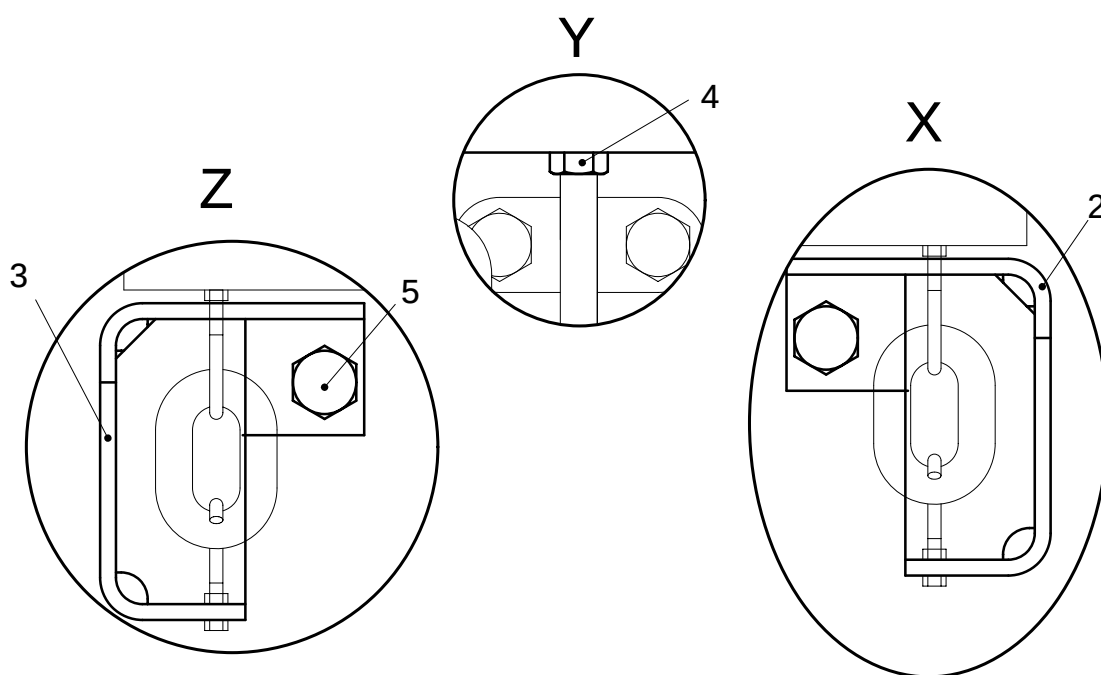
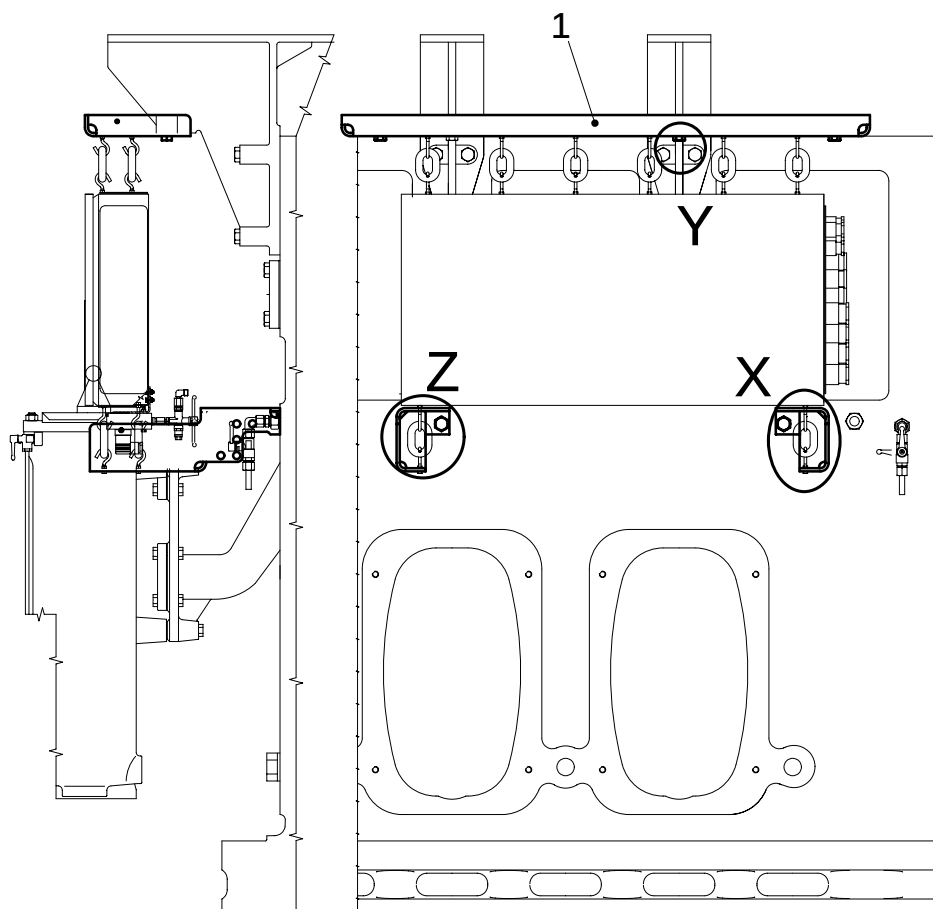
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Bracket Mounting

M25

11



Bracket Mounting

M25

11

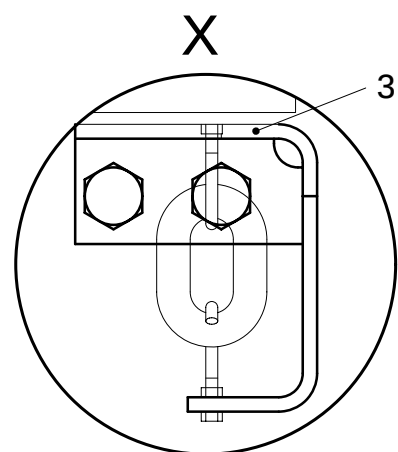
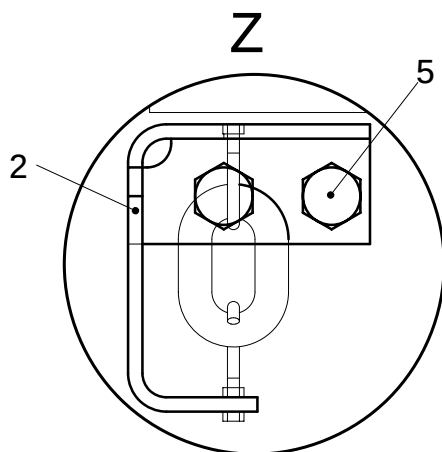
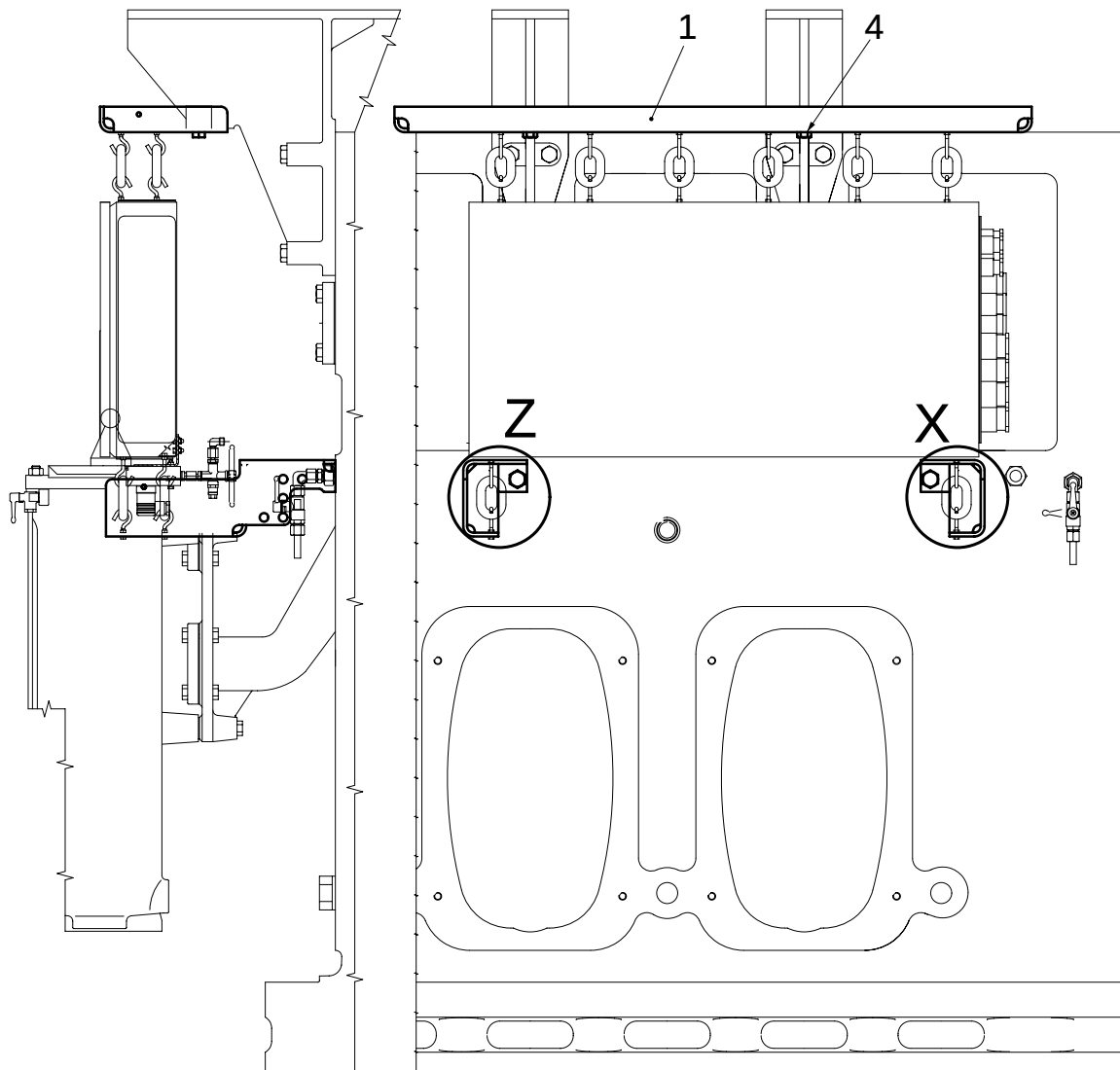
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	HALTER-ANBAU, VOLLST. BRACKET MOUNTING ASSEMBLY	1	258845 BB
1	HALTER, VOLLST. BRACKET, COMPL.	1	258845-101
2	HALTER, VOLLST. BRACKET, COMPL.	1	258845-003
3	HALTER, VOLLST. BRACKET, COMPL.	1	258845-002
4	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-370
5	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-439

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Bracket Mounting

M25

11



Bracket Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	HALTER-ANBAU, VOLLST. BRACKET MOUNTING ASSEMBLY	1	258845 CC
1	HALTER, VOLLST. BRACKET, COMPL.	1	258845-201
2	HALTER, VOLLST. BRACKET, COMPL.	1	258845-003
3	HALTER, VOLLST. BRACKET, COMPL.	1	258845-002
4	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-370
5	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-439

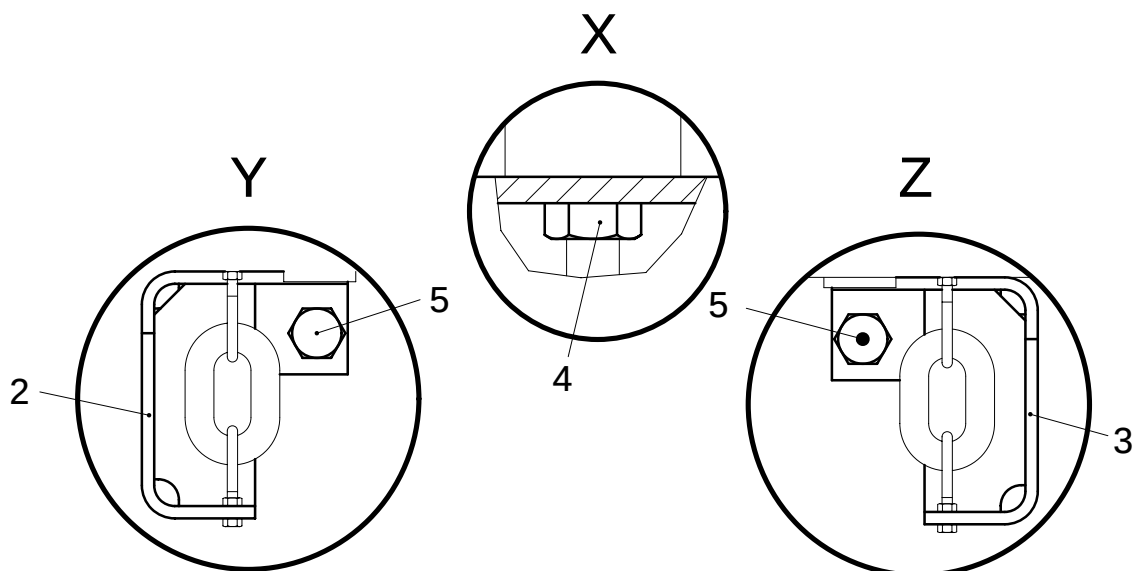
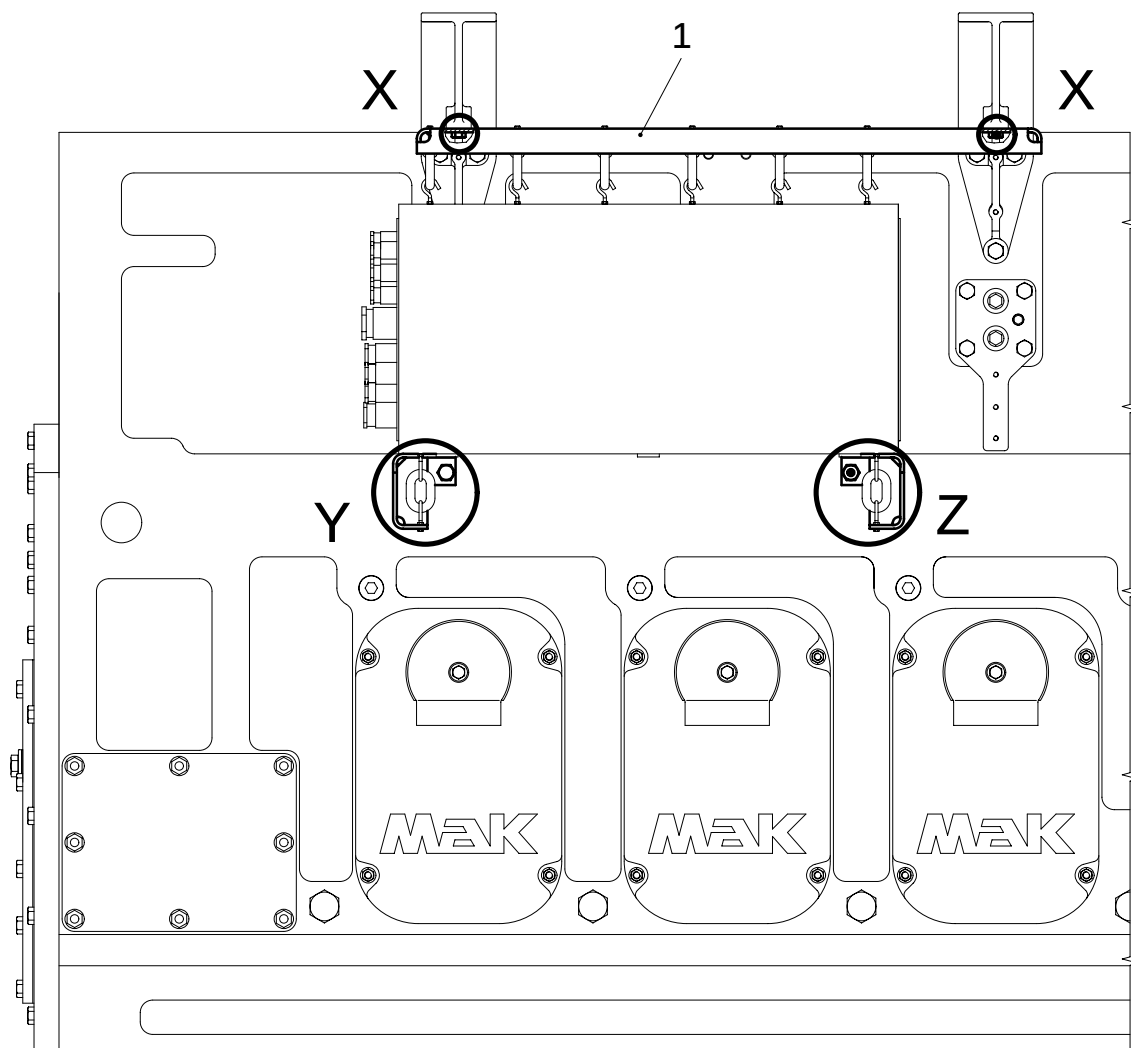
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Bracket Mounting

M25

11



Bracket Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	HALTER-ANBAU, VOLLST. BRACKET MOUNTING ASSEMBLY	1	258845 DD
1	HALTER, VOLLST. BRACKET, COMPL.	1	258845-201
2	HALTER, VOLLST. BRACKET, COMPL.	1	258845-003
3	HALTER, VOLLST. BRACKET, COMPL.	1	258845-002
4	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-370
5	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-439

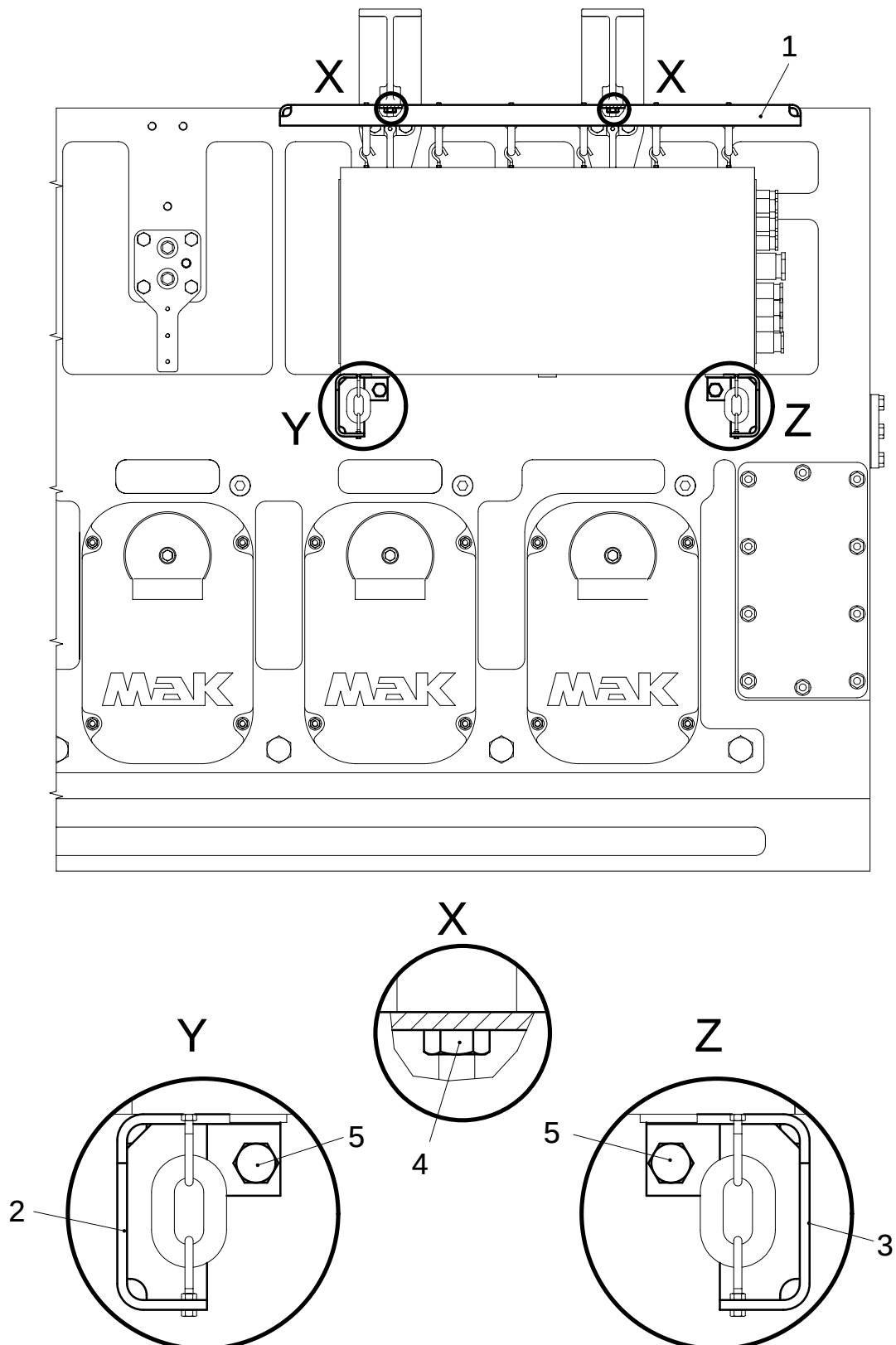
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Bracket Mounting

M25

11



Guard Cover for Vibration Damper

M25

12

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHUTZHAUBE FÜR SCHWUNGRAD, VOLLST. GUARD COVER F. VIBR. DAMPER, COMPL.	1	251550 AA
7	SECHSKANTSCHRAUBE HEXAGON SCREW	10	1.1387-444
9	SPANNSCHEIBE CONICAL SPRING WASHER	10	1.0068-240
10	RINGSCHRAUBE LIFTING EYE BOLT	1	1.1067-303

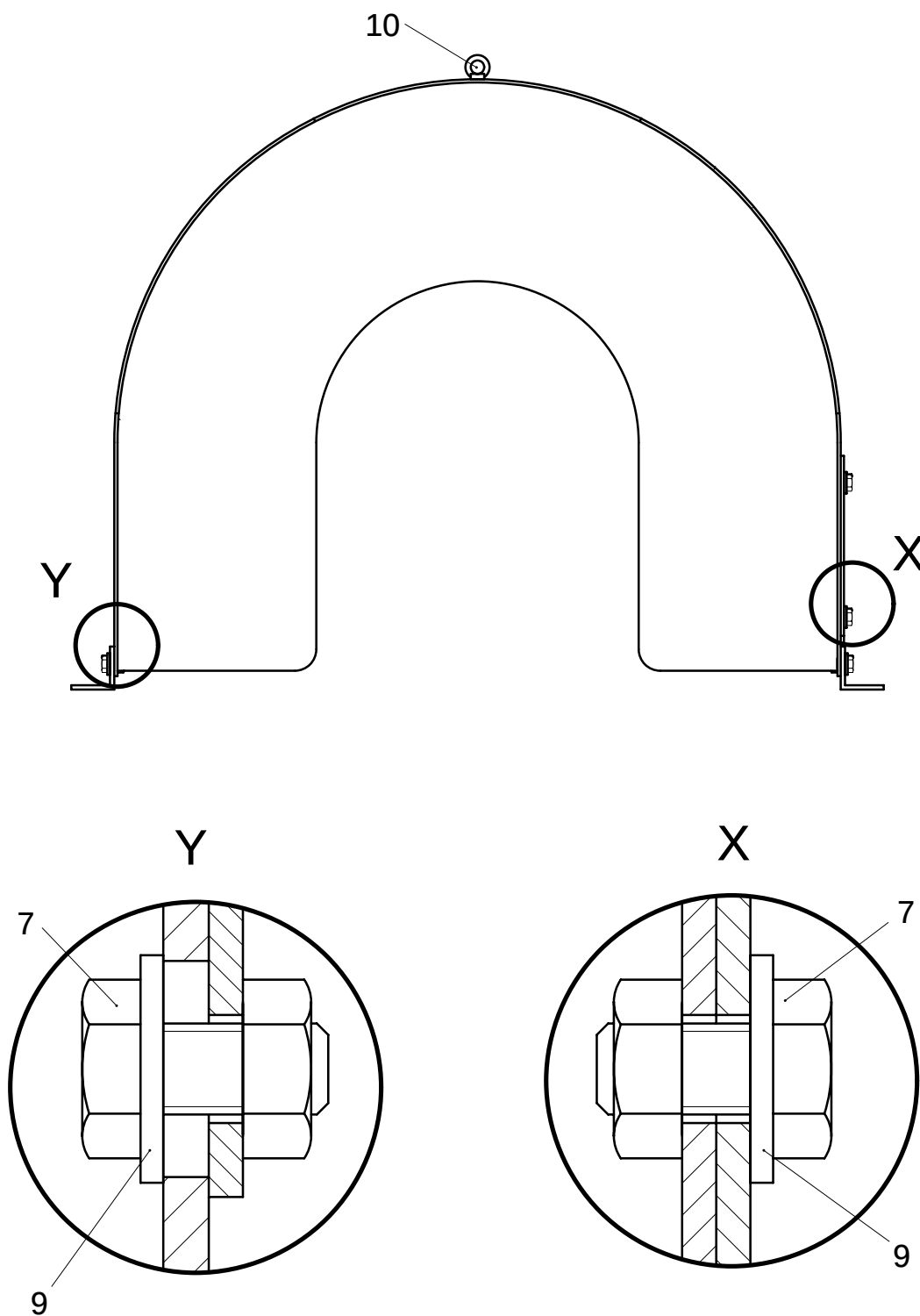
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Guard Cover for Vibration Damper

M25

12



Vibration Damper

M25

12

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHWINGUNGSDÄMPFER, VOLLST. VIBRATION DAMPER ASSEMBLY	1	1.6347 ZH
3	SEITENSCHLEIBE COVER RING	1	1.6347-503
4	SEITENSCHLEIBE COVER RING	1	1.6347-504
5	HUBBEGRENZUNGSBOLZEN SPRING STOP	5	1.6347-506
6	DÄMPFUNGSPAKET SPRING SET	10	1.6347-508
7	ANLAUFSCHLEIBE BUTTING PLATE	10	1.6347-505
8	SECHSKANTSCHRAUBE HEXAGON BOLT	20	1.1367-385
9	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-380
11	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-204
12	TELLERFEDER DISC SPRING	# 22	1.0067-461

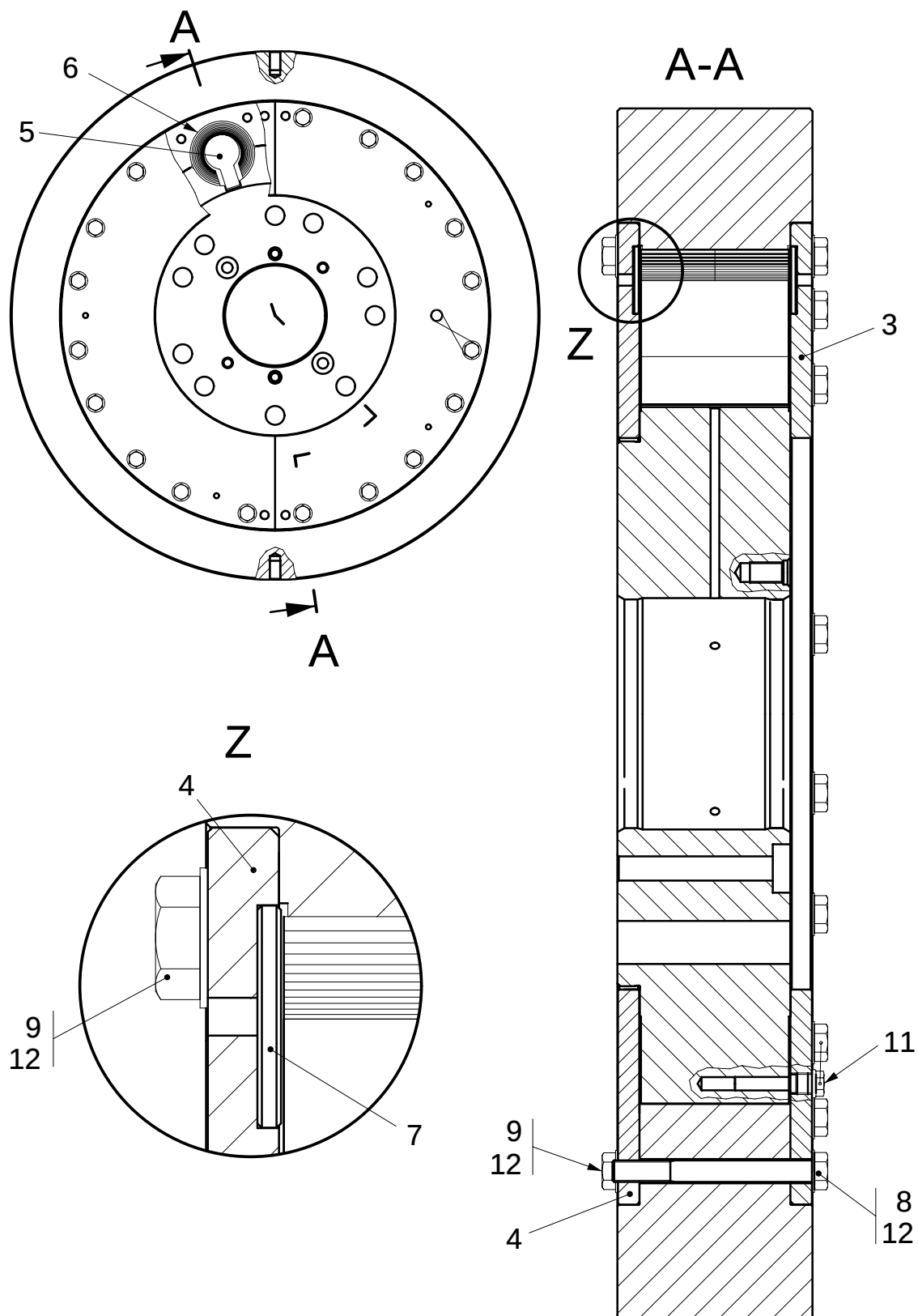
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Vibration Damper

M25

12



Vibration Damper

M25

12

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHWINGUNGSDÄMPFER, VOLLST. VIBRATION DAMPER ASSEMBLY	1	1.6347 ZS
3	SEITENSCHLEIBE COVER RING	1	1.6347-503
4	SEITENSCHLEIBE COVER RING	1	1.6347-504
5	HUBBEGRENZUNGSBOLZEN SPRING STOP	12	1.6347-555
6	DÄMPFUNGSPAKET SPRING SET	24	1.6347-508
7	ANLAUFSCHLEIBE BUTTING PLATE	24	1.6347-505
8	SECHSKANTSCHRAUBE HEXAGON BOLT	16	1.1367-385
9	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-380
11	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-204
12	TELLERFEDER DISC SPRING	# 18	1.0067-461
17	O-RING O-RING	# 2	1.7084-653

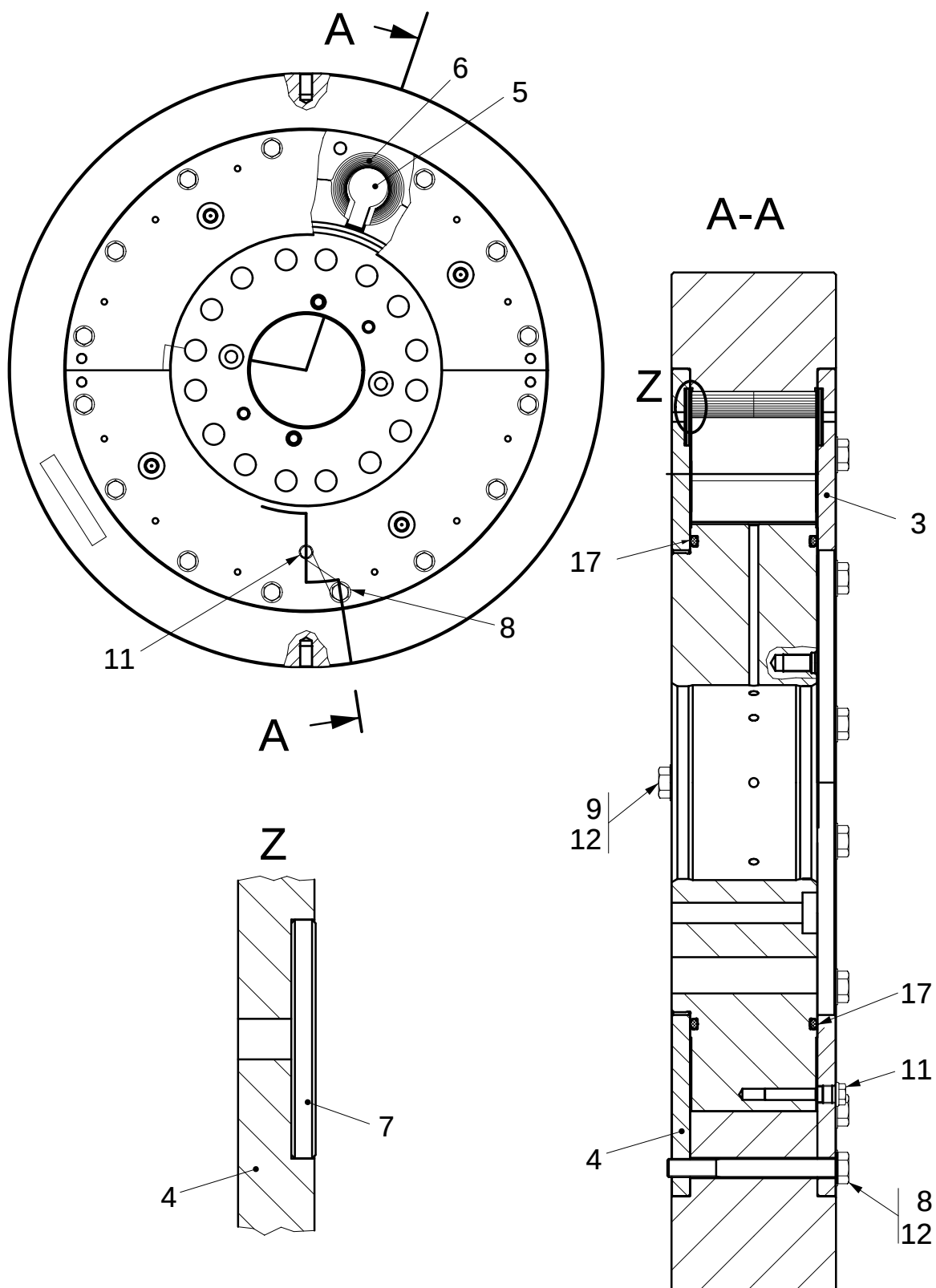
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Vibration Damper

M25

12



Vibration Damper

M25

12

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHWINGUNGSDÄMPFER, VOLLST. VIBRATION DAMPER ASSEMBLY	1	1.6347 ZT
3	SEITENSCHLEIBE COVER RING	1	1.6347-503
4	SEITENSCHLEIBE COVER RING	1	1.6347-504
5	HUBBEGRENZUNGSBOLZEN SPRING STOP	12	1.6347-555
6	DÄMPFUNGSPAKET SPRING SET	24	1.6347-508
7	ANLAUFSCHLEIBE BUTTING PLATE	24	1.6347-505
8	SECHSKANTSCHRAUBE HEXAGON BOLT	16	1.1367-385
9	SECHSKANTSCHRAUBE HEXAGON BOLT	2	1.1367-380
11	VERSCHLUSSSCHRAUBE HEXAGON HEAD SCREW PLUG	1	1.1041-204
12	TELLERFEDER DISC SPRING	# 18	1.0067-461

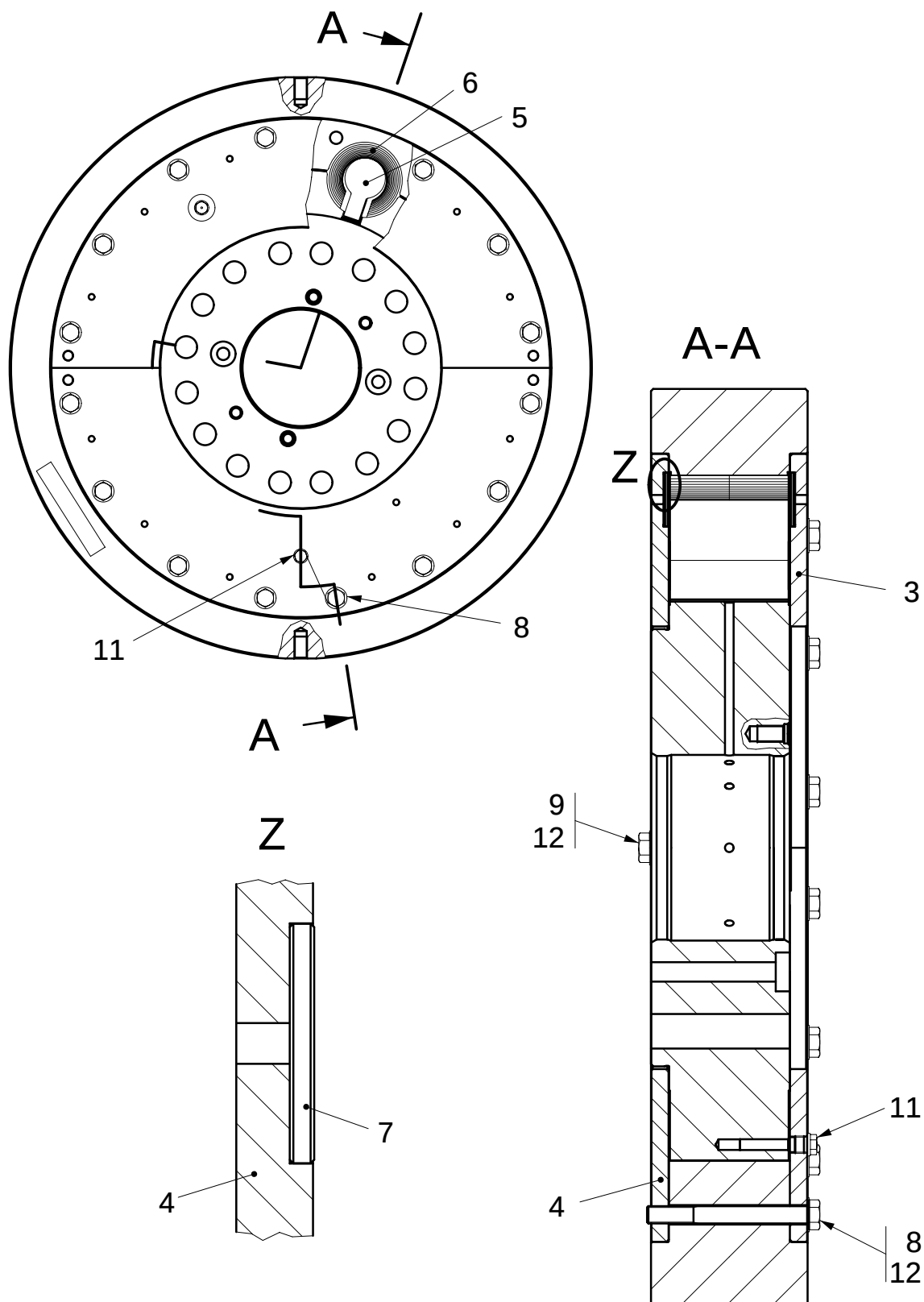
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Vibration Damper

M25

12



Flywheel Mounting

M25

12

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	SCHWUNGRAD-ANBAU, VOLLST. FLYWHEEL MOUNTING ASSEMBLY	1	257310 AA
1	SCHWUNGRAD FLYWHEEL	1	257310-001
2	ABSCHLUSSDECKEL COVER	1	257310-002
3	SPRITZRING SPLASH RING	1	257310-003
5	SECHSKANTMUTTER HEXAGON NUT	10	1.2011-035
6	STIFTSCHRAUBE STUD	10	1.1247-575
7	SECHSKANTSCHRAUBE HEXAGON SCREW	13	1.1387-446
9	SPANNSCHEIBE CONICAL SPRING WASHER	# 10	1.0068-225
10	SPANNSCHEIBE CONICAL SPRING WASHER	# 13	1.0068-240
11	SPANNSTIFT SPRING DOWEL PIN	2	1.0039-642

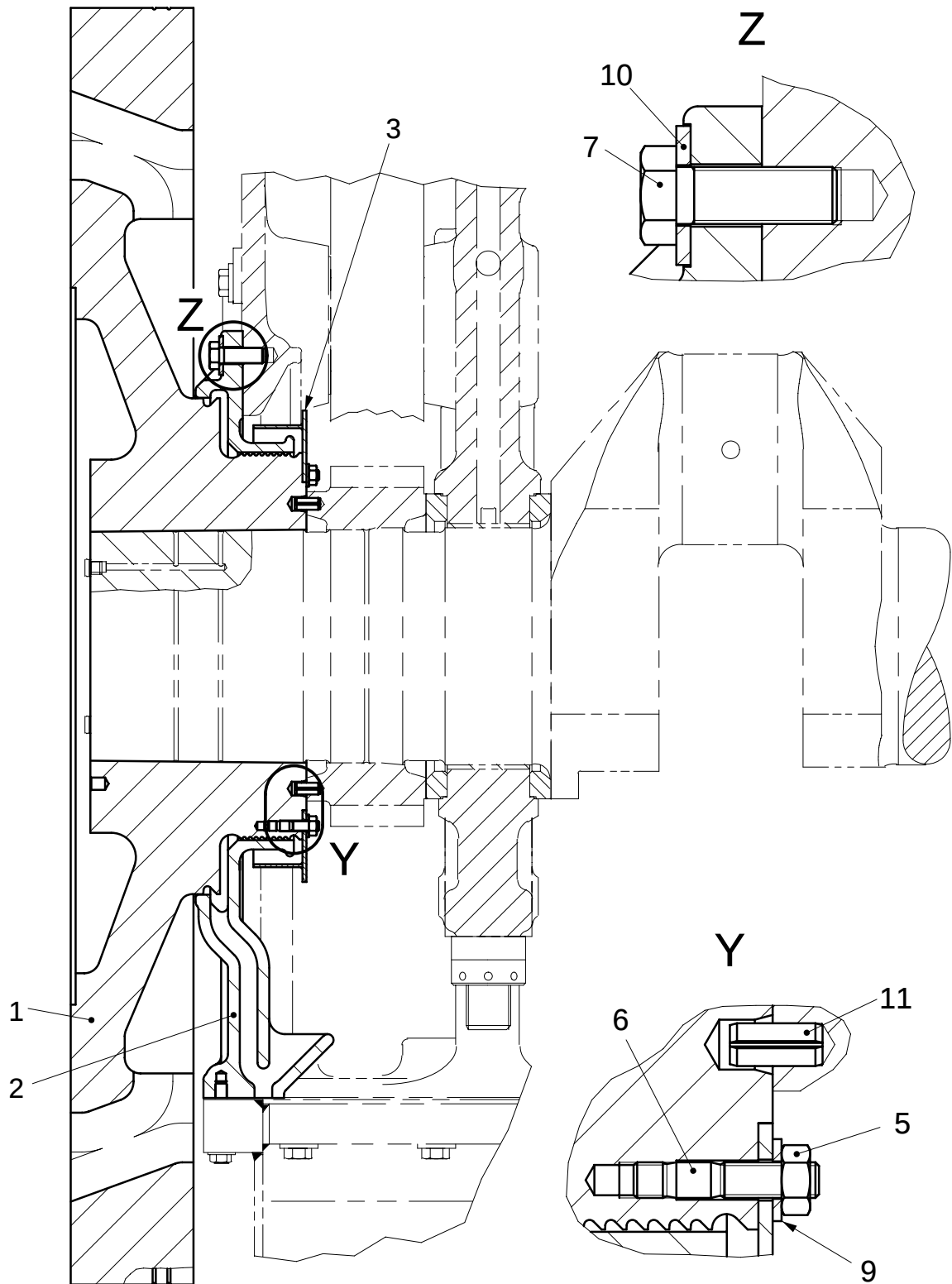
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CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part sheet No./Part No.**

Flywheel Mounting

M25

12



Barring Gear

M25

12

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TÖRNVORRICHTUNG, VOLLST. BARRING GEAR ASSEMBLY	1	257330 AA
1	AUFNAHMEBLECH SUPPORTING PLATE	1	257330-001
2	TÖRNBOCK, VOLLST. BARRING GEAR PEDESTAL, COMPL.	1	257330-002
3	DECKEL COVER	1	257330-003
5	POSITIONSSCHALTER SWITCH	1	1.4246-003
6	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-457
7	SECHSKANTSCHRAUBE HEXAGON SCREW	3	1.1387-447
8	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	4	1.1152-086
9	SCHEIBE WASHER	3	1.0040-227
11	SCHEIBE WASHER	4	1.0041-220

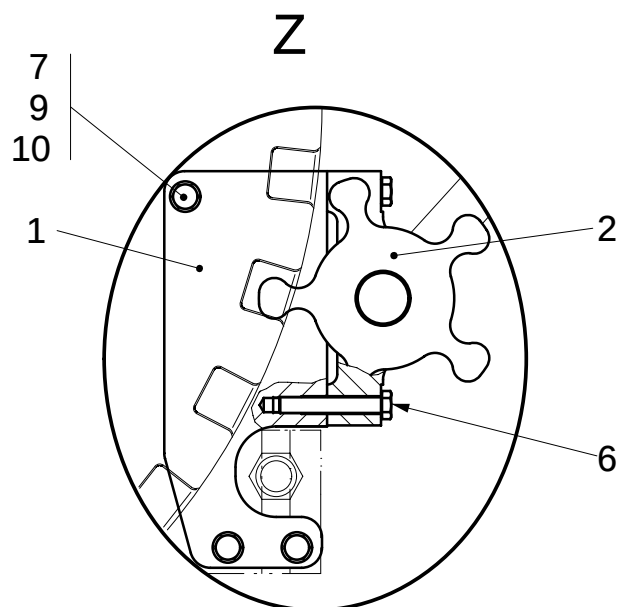
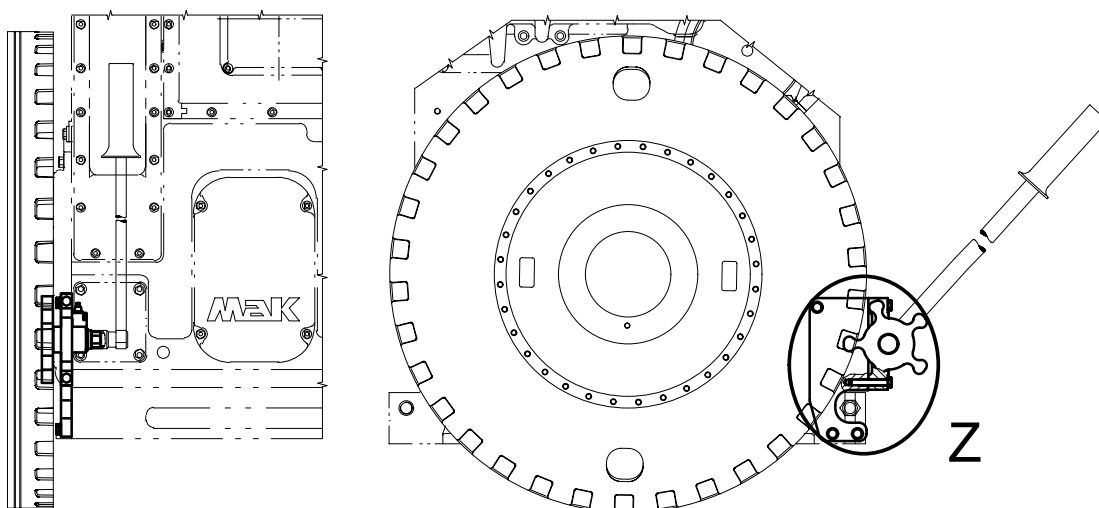
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Barring Gear

M25

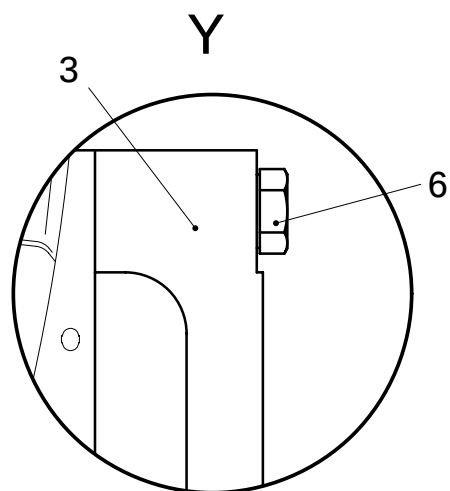
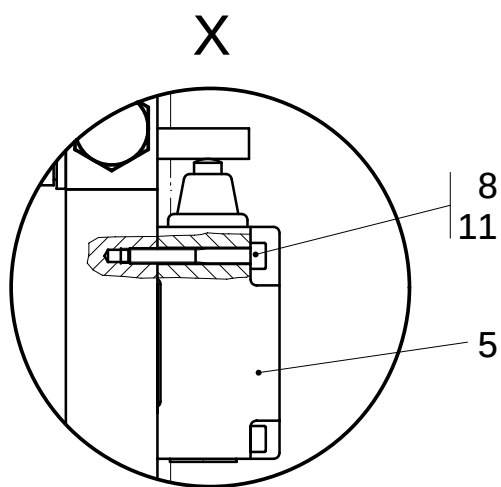
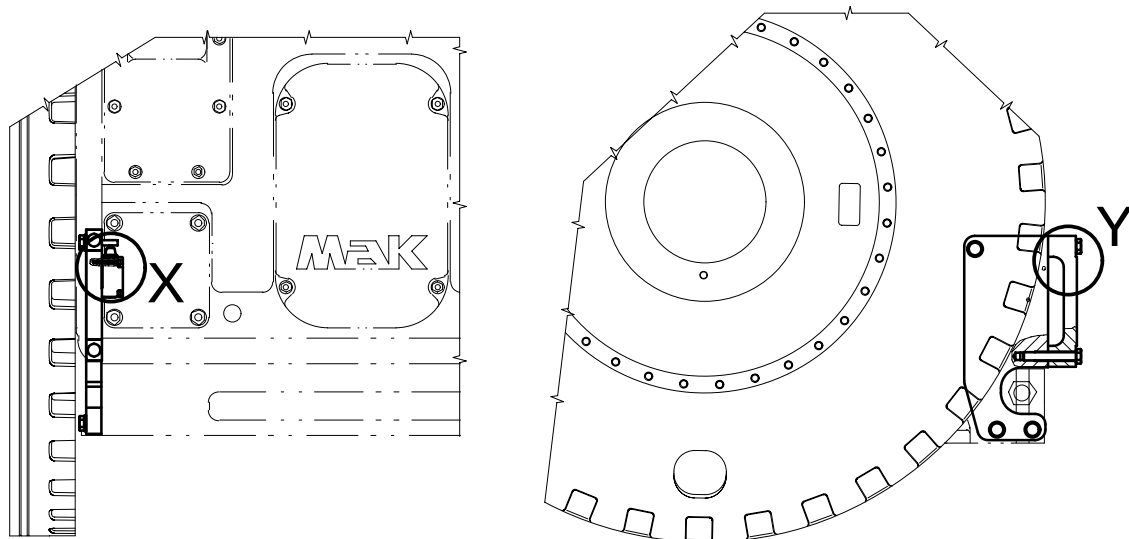
12



Barring Gear

M25

12



Barring Gear

M25

12

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TÖRNVORRICHTUNG, VOLLST. BARRING GEAR ASSEMBLY	1	257330 BB
1	AUFNAHMEBLECH SUPPORTING PLATE	1	257330-101
2	TÖRNBOCK, VOLLST. BARRING GEAR PEDESTAL, COMPL.	1	257330-102
3	KONTAKTBLECH KONTAKT PLATE	1	257330-103
5	GRENZTASTER SWITCH	1	1.4246-003
6	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-457
7	SECHSKANTSCHRAUBE HEXAGON SCREW	5	1.1387-447
8	ZYLINDERSCHRAUBE HEXAGON SOCKET HEAD CAP SCREW	4	1.1152-086
9	SCHEIBE WASHER	3	1.0040-227
11	SCHEIBE WASHER	4	1.0041-220

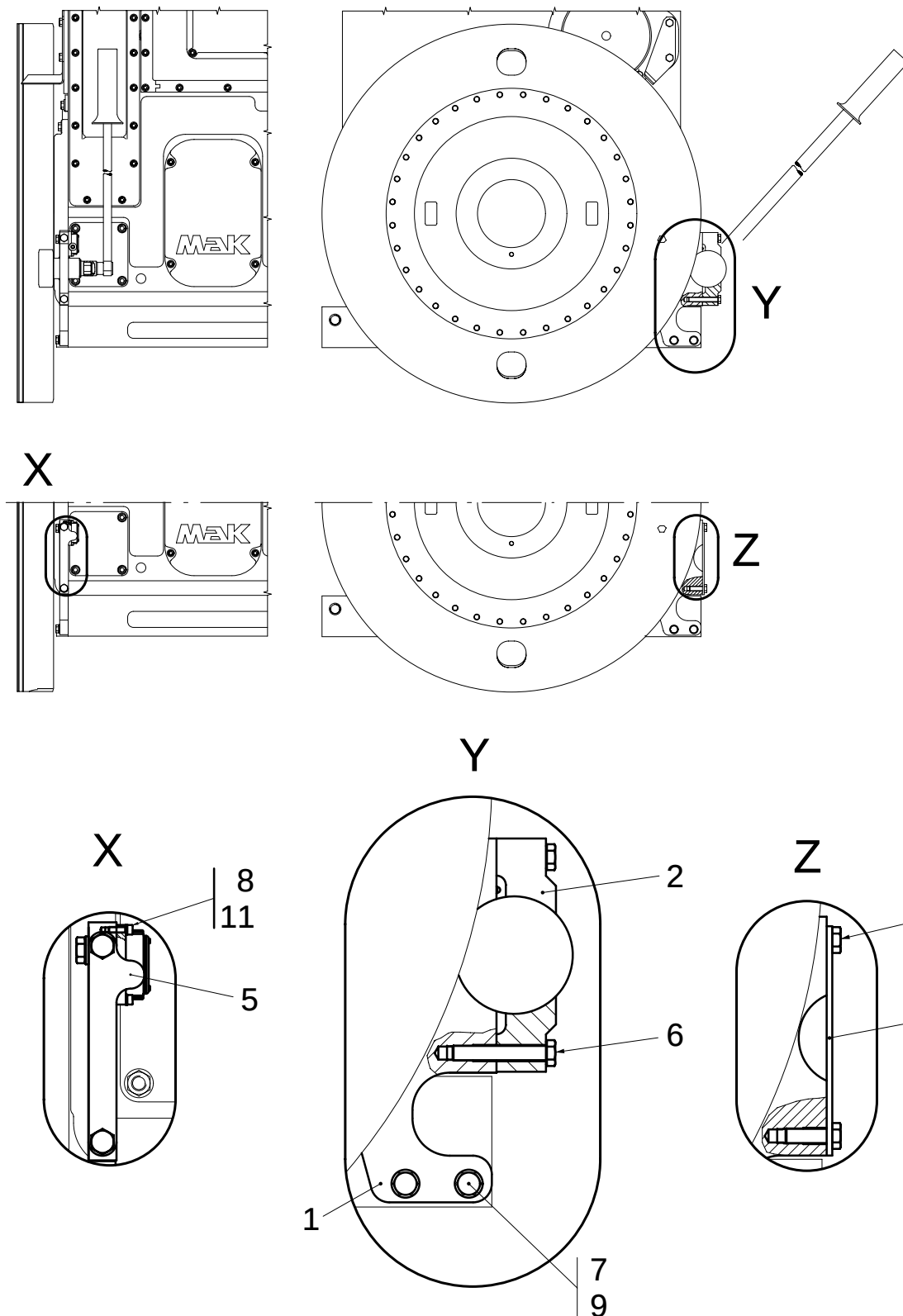
= VERBRAUCHSTEILE
CONSUMABLES

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Barring Gear

M25

12



Barring Gear

M25

12

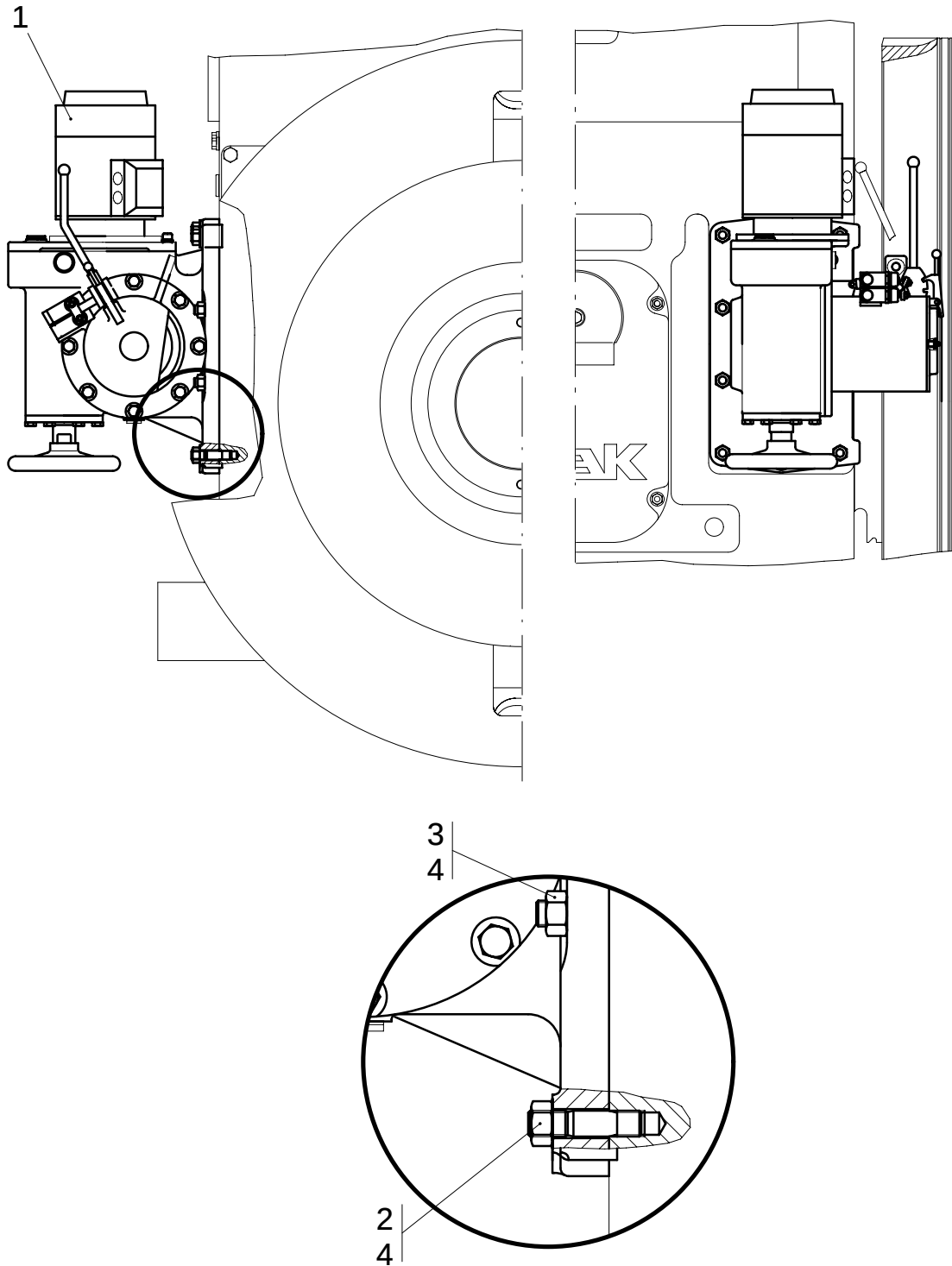
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TÖRNVORRICHTUNG, VOLLST. BARRING GEAR ASSEMBLY	1	257330 CC
1	TÖRNMASCHINE, VOLLST. BARRING GEAR MOTOR, COMPL.	1	SIEHE BUCH C SEE BOOK C
2	STIFTSCHRAUBE STUD BOLT	8	1.1234-359
3	STIFTSCHRAUBE STUD BOLT	2	1.1230-358
4	SECHSKANTMUTTER HEXAGON NUT	10	1.2011-038

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Barring Gear

M25

12



Dead Centre Indicator Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TOTPUNKTANZEIGER-ANBAU, VOLLST. DEAD CENTRE INDICATOR MOUNTING ASSEMBLY	1	257350 AA
1	TOTPUNKTANZEIGER DEAD CENTRE INDICATOR	1	257350-001
2	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-445

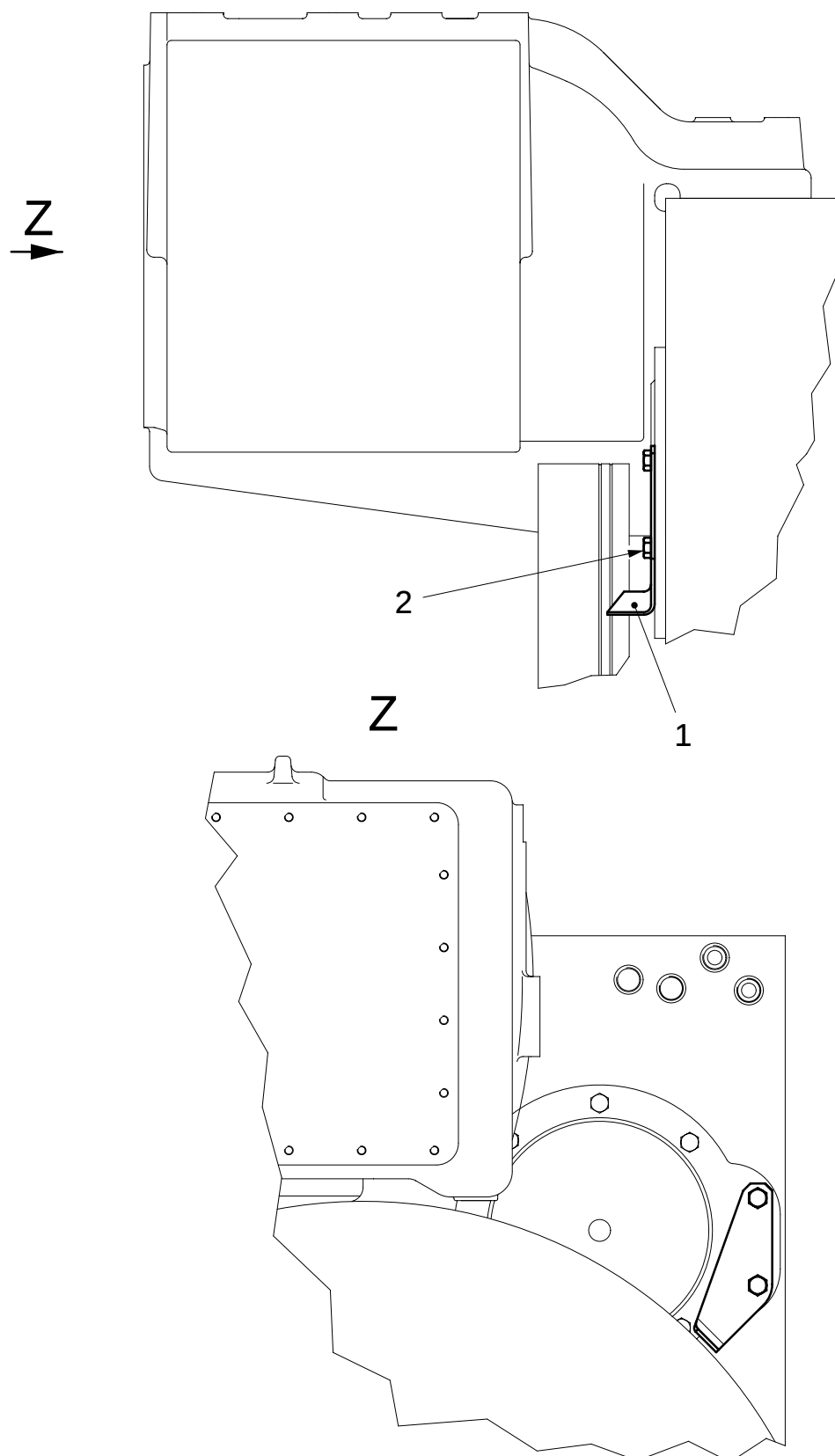
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Dead Centre Indicator Mounting

M25

12



Dead Centre Indicator Mounting

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	TOTPUNKTANZEIGER-ANBAU, VOLLST. DEAD CENTRE INDICATOR MOUNTING ASSEMBLY	1	257350 BB
1	TOTPUNKTANZEIGER DEAD CENTRE INDICATOR	1	257350-101
2	SECHSKANTSCHRAUBE HEXAGON SCREW	2	1.1387-445

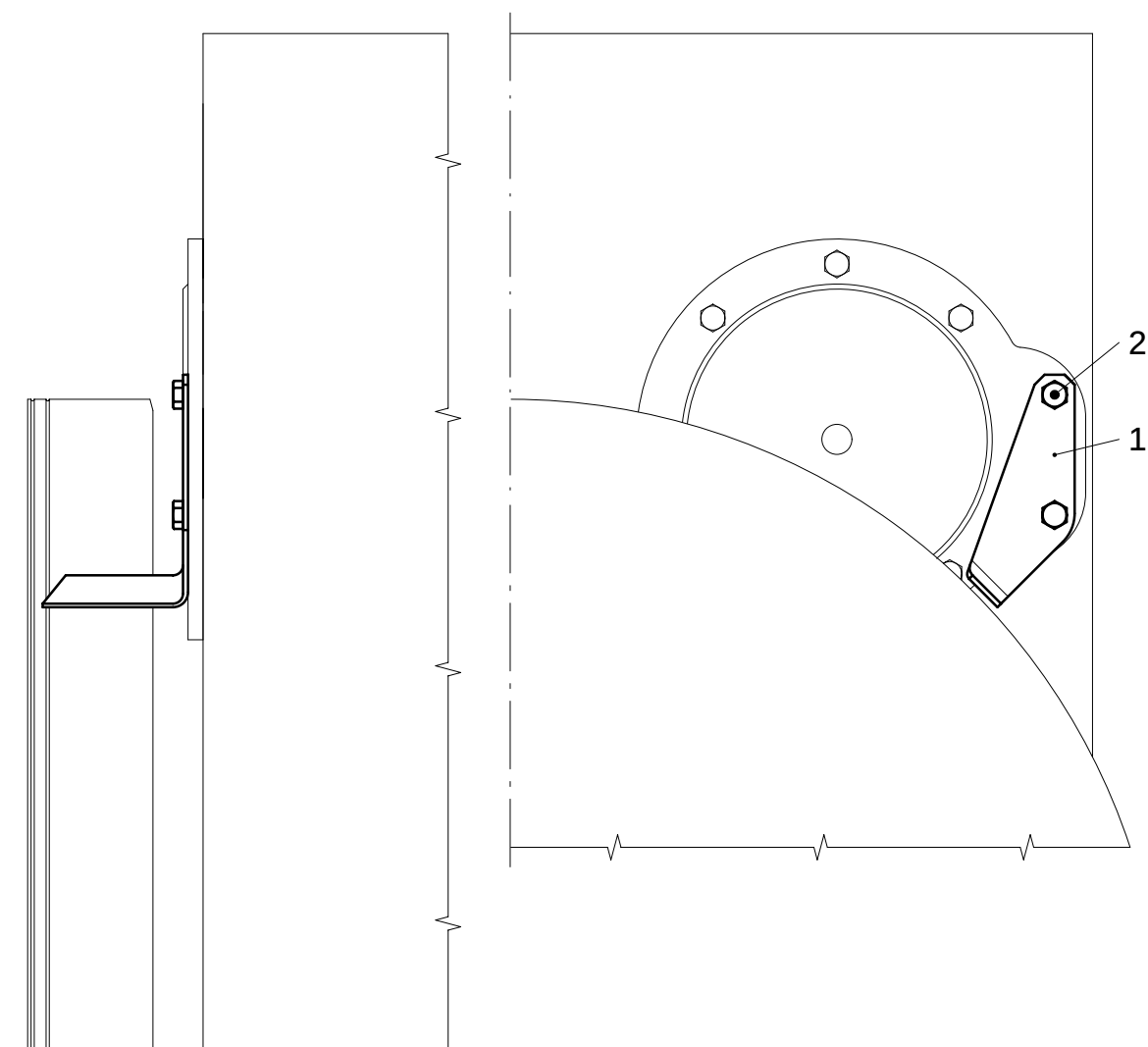
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare part No./Order No.**

Dead Centre Indicator Mounting

M25

12



Resilient Mounting

M25

13

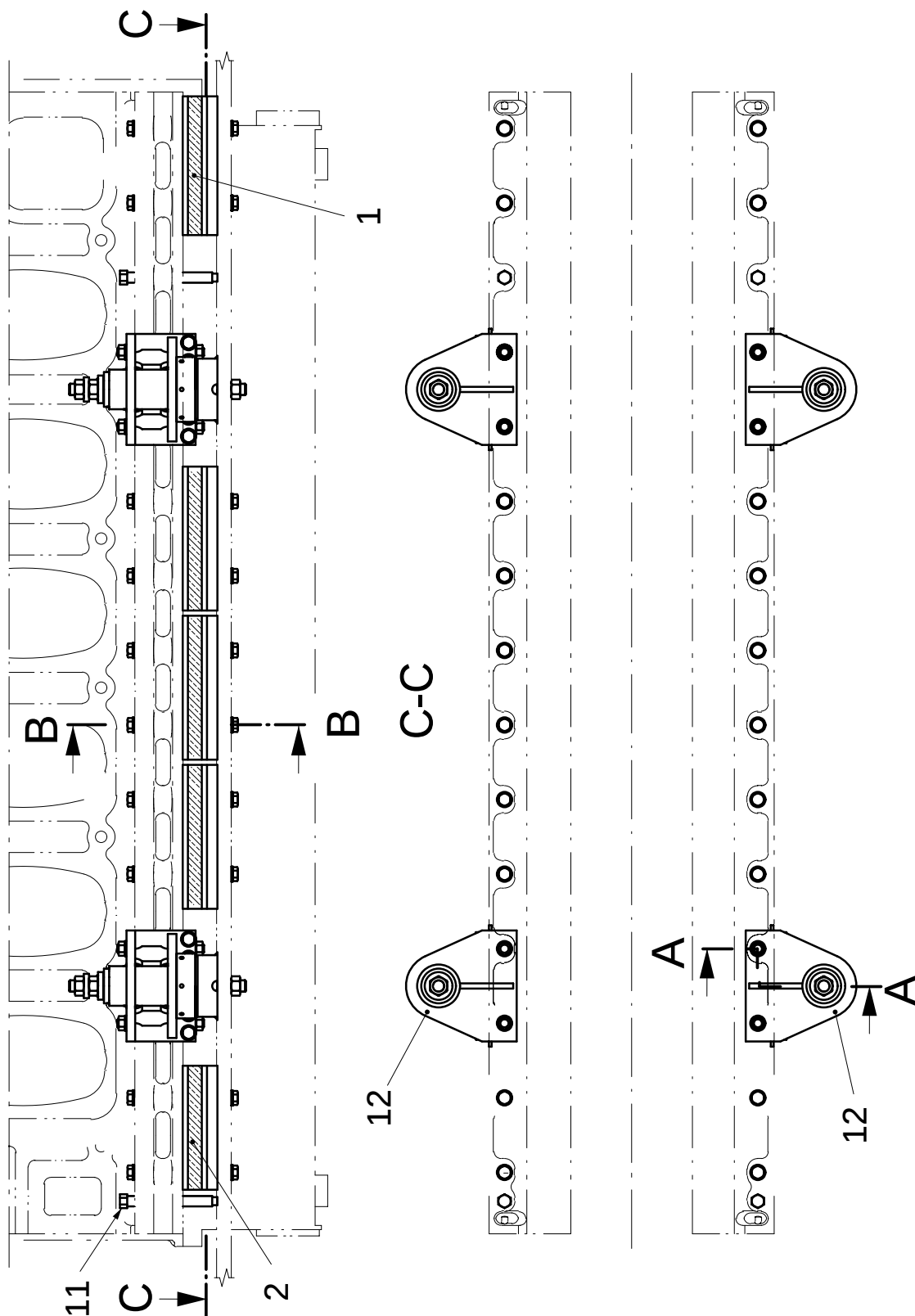
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ELASTISCHE LAGERUNG, VOLLST. RESILIENT MOUNTING ASSEMBLY	1	251510 AA
1	SCHWINGMETALLSCHIENE BONDED RUBBER RAIL	8	251510-001
2	SCHWINGMETALLSCHIENE BONDED RUBBER RAIL	2	251510-002
3	VERBUNDGUMMI RUBBER CUSHION	4	2.1510-003
4	STOPPER, VOLLST. STOPPER, COMPL.	4	251510-004
5	HALTER BRACKET	4	251510-005
6	SECHSKANTSCHRAUBE HEXAGON BOLT	20	1.1301-418
7	STIFTSCHRAUBE STUD BOLT	8	251510-007
8	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1396-578
9	SCHEIBE WASHER	52	1.0041-531
10	SECHSKANTMUTTER HEXAGON NUT	16	1.2011-105
11	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1352-305
12	GEWINDESTIFT GRUB SCREW	8	1.1100-085

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Resilient Mounting

M25

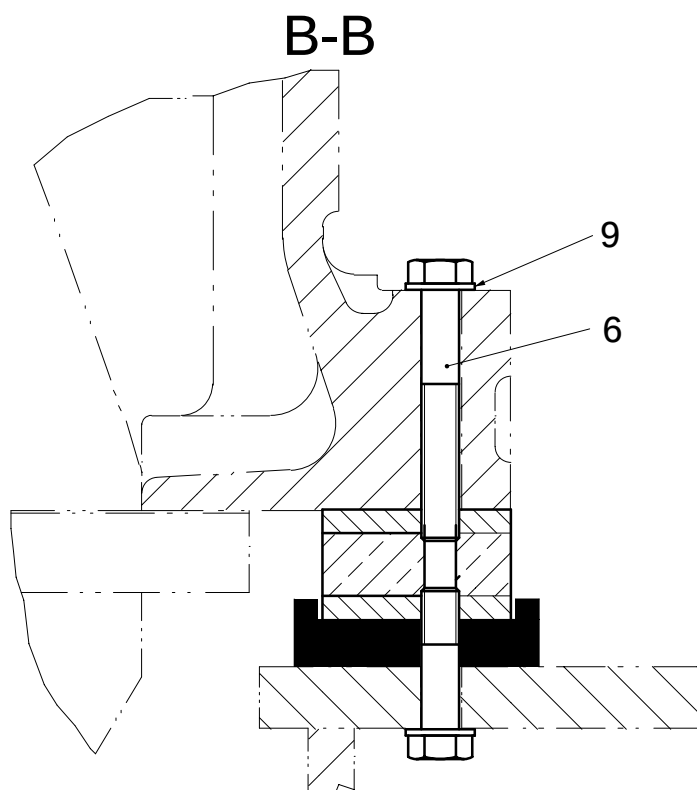
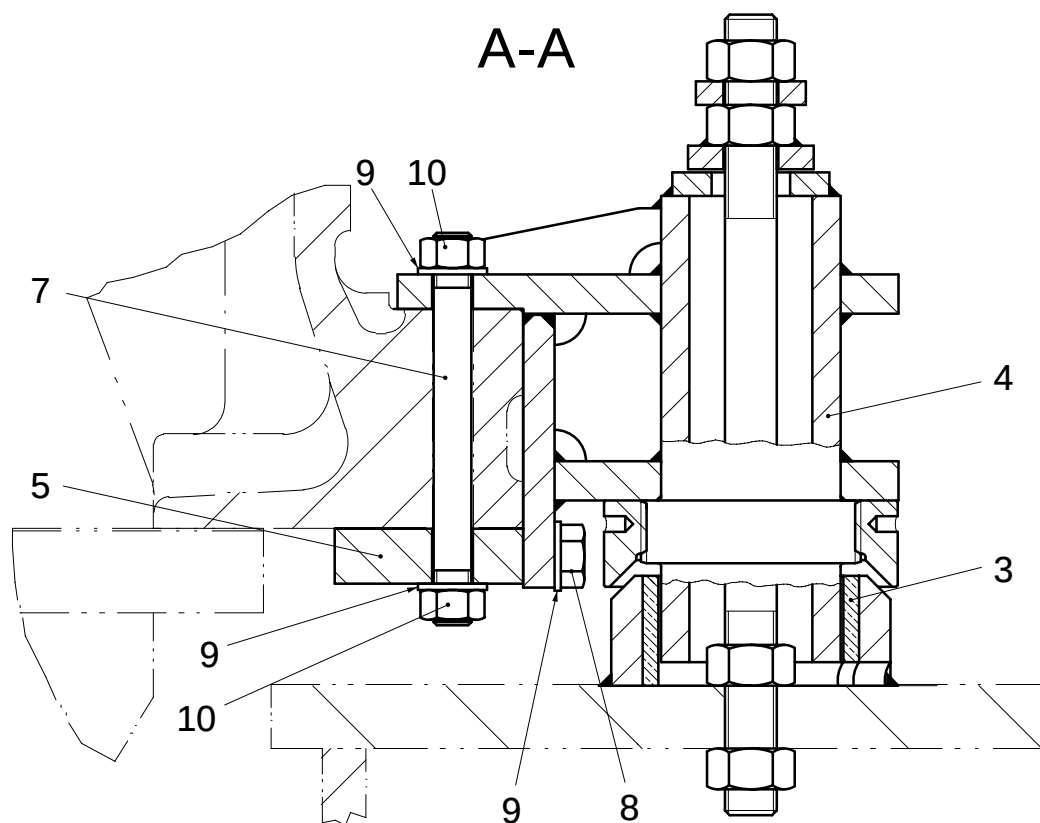
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Resilient Mounting

M25

13



Resilient Mounting

M25

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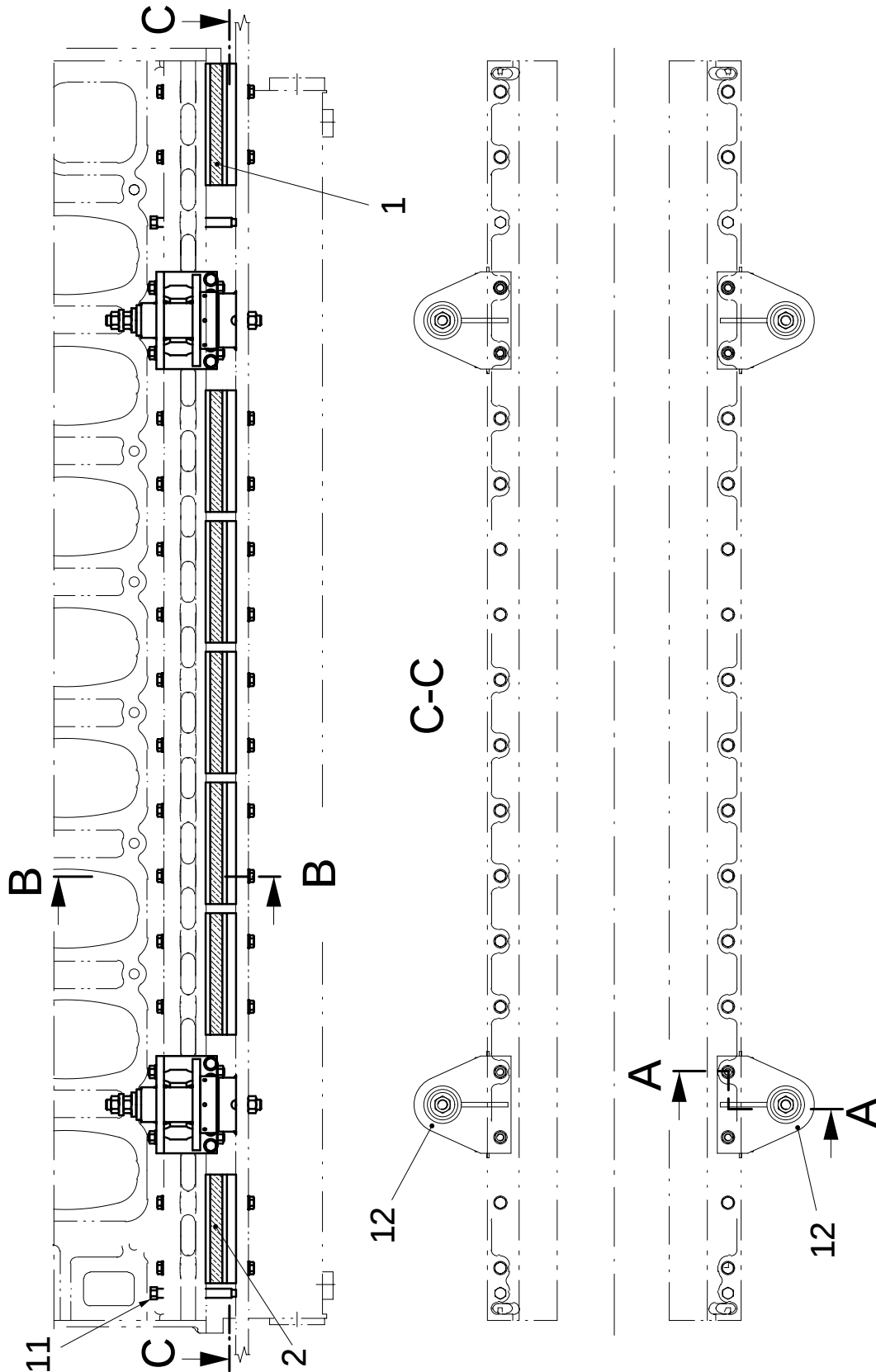
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ELASTISCHE LAGERUNG, VOLLST. RESILIENT MOUNTING ASSEMBLY	1	251510 BB
1	SCHWINGMETALLSCHIENE BONDED RUBBER RAIL	12	251510-001
2	SCHWINGMETALLSCHIENE BONDED RUBBER RAIL	2	251510-002
3	VERBUNDGUMMI RUBBER CUSHION	4	2.1510-003
4	STOPPER, VOLLST. STOPPER, COMPL.	4	251510-004
5	HALTER BRACKET	4	251510-005
6	SECHSKANTSCHRAUBE HEXAGON BOLT	28	1.1301-418
7	STIFTSCHRAUBE STUD BOLT	8	251510-007
8	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1396-578
9	SCHEIBE WASHER	60	1.0041-531
10	SECHSKANTMUTTER HEXAGON NUT	16	1.2011-105
11	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1352-305
12	GEWINDESTIFT GRUB SCREW	8	1.1100-085

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Resilient Mounting

M25

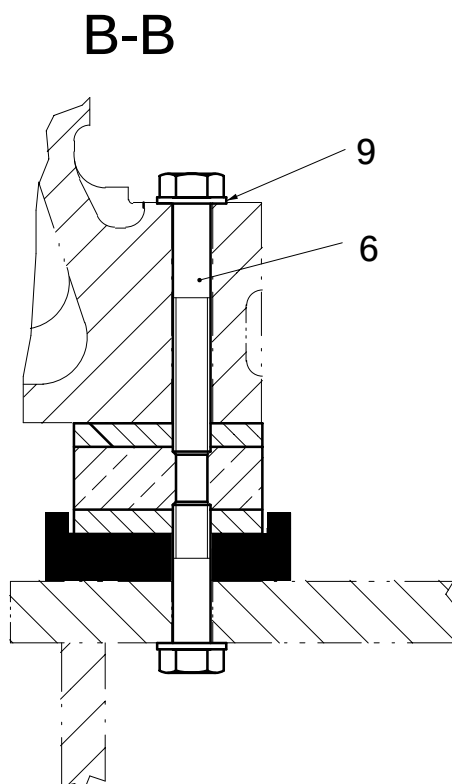
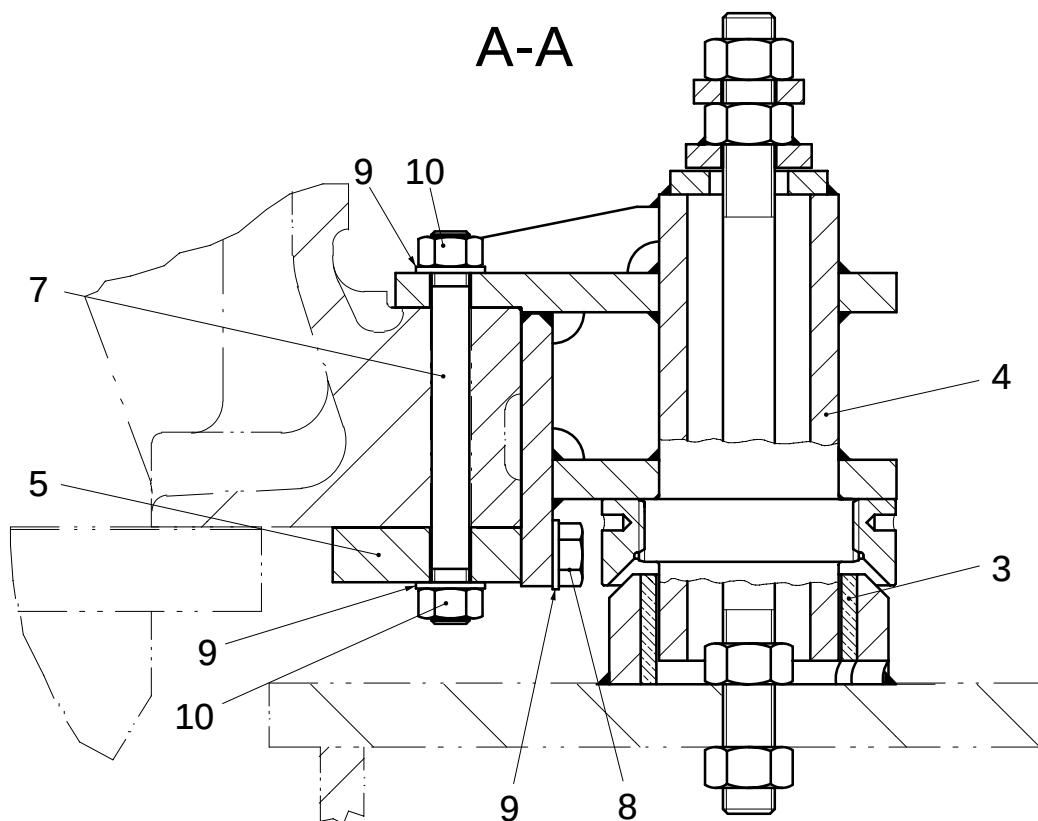
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Resilient Mounting

M25

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Resilient Mounting

M25

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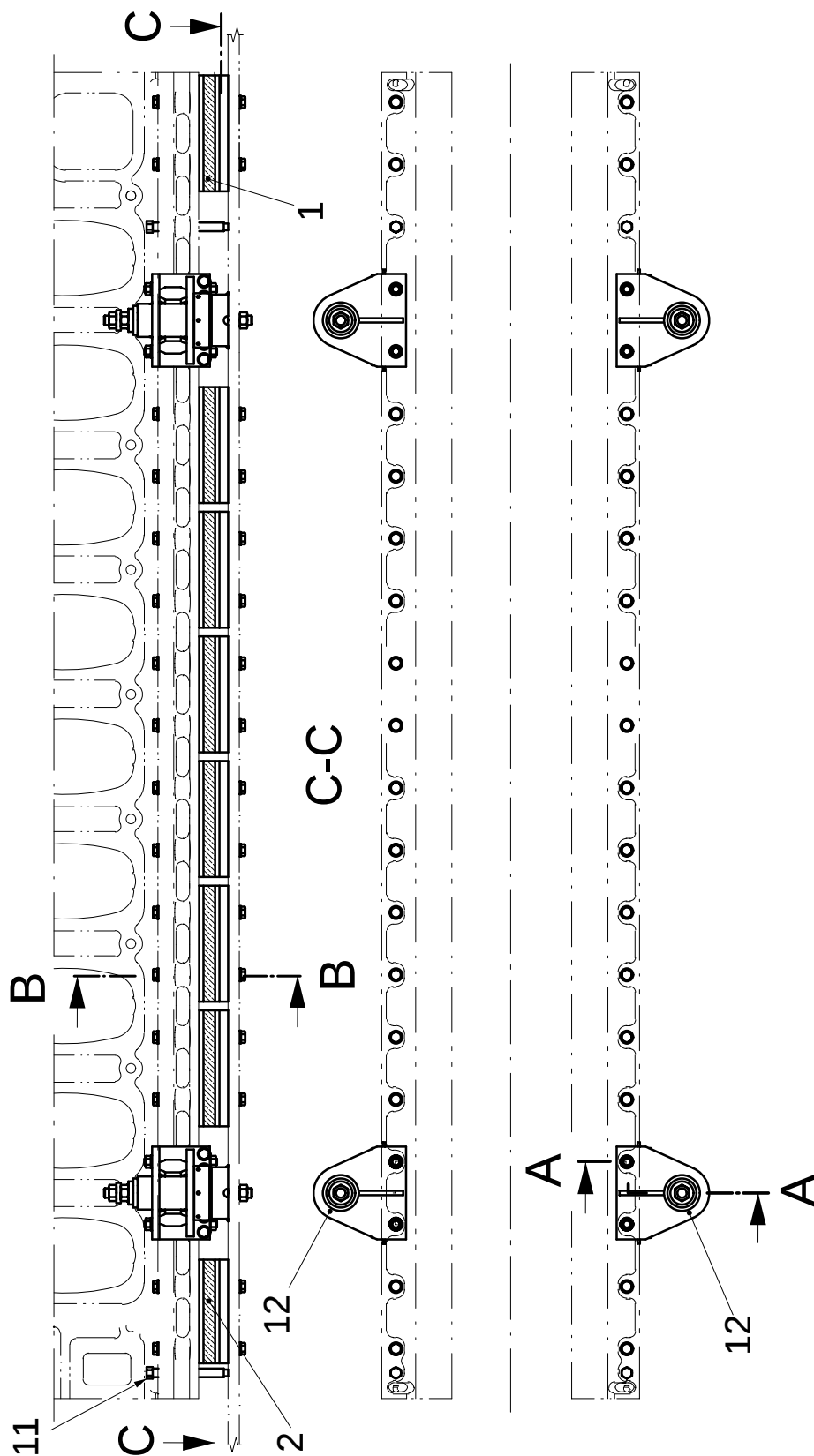
POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	ELASTISCHE LAGERUNG, VOLLST. RESILIENT MOUNTING ASSEMBLY	1	251510 CC
1	SCHWINGMETALLSCHIENE BONDED RUBBER RAIL	14	251510-001
2	SCHWINGMETALLSCHIENE BONDED RUBBER RAIL	2	251510-002
3	VERBUNDGUMMI RUBBER CUSHION	4	2.1510-003
4	STOPPER, VOLLST. STOPPER, COMPL.	4	251510-004
5	HALTER BRACKET	4	251510-005
6	SECHSKANTSCHRAUBE HEXAGON BOLT	32	1.1301-418
7	STIFTSCHRAUBE STUD BOLT	8	251510-007
8	SECHSKANTSCHRAUBE HEXAGON SCREW	16	1.1396-578
9	SCHEIBE WASHER	64	1.0041-531
10	SECHSKANTMUTTER HEXAGON NUT	16	1.2011-105
11	SECHSKANTSCHRAUBE HEXAGON BOLT	4	1.1352-305
12	GEWINDESTIFT GRUB SCREW	8	1.1100-085

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Resilient Mounting

M25

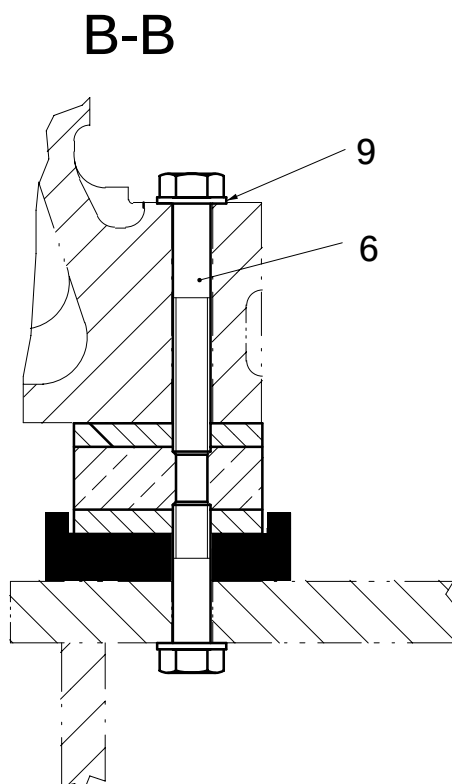
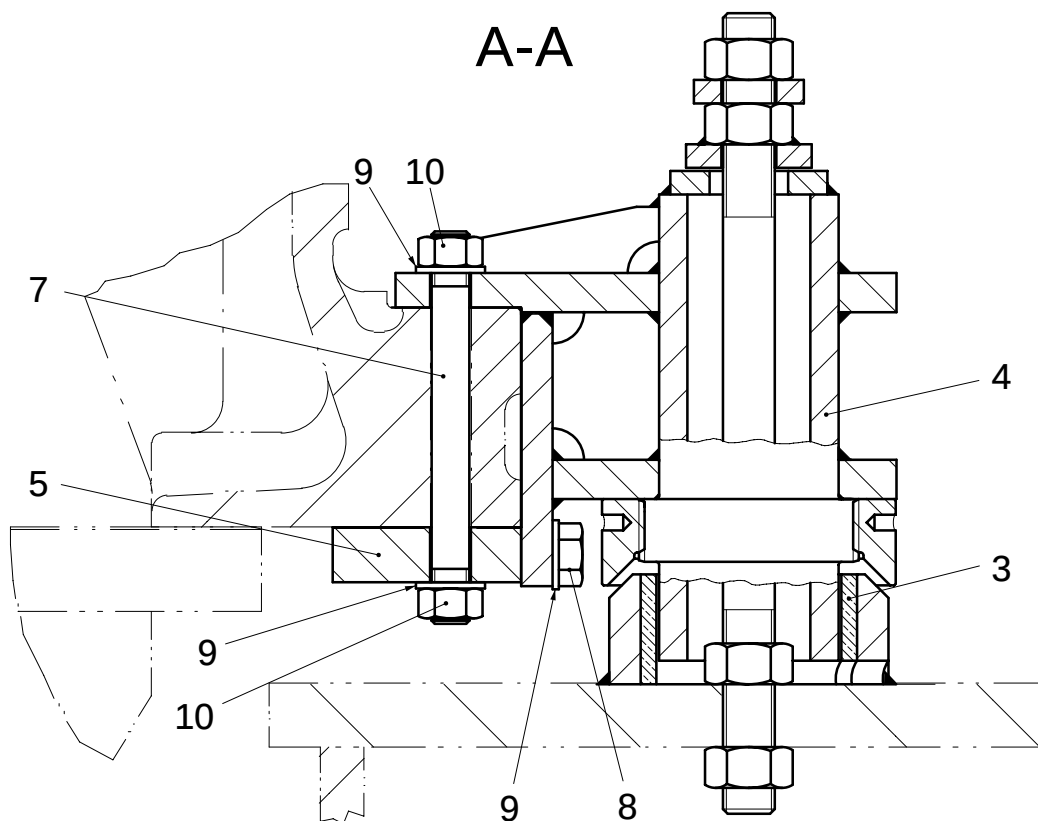
13



Resilient Mounting

M25

13



Diesel Generator Set

M25

13

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DIESEL-GENERATOR- SET, VOLLST. DIESEL GENERATOR SET ASSEMBLY	1	251530 AA
2	GENERATOR GENERATOR	1	SIEHE BUCH C SEE BOOK C
4	SCHUTZHAUBE FÜR SCHWUNGRAD GUARD COVER FOR VIBR. DAMPER	1	SIEHE B1.05.12.251550 SEE B1.05.12.251550
5	ELASTISCHE WELLENKUPPLUNG ELASTIC SHAFT COUPLING	1	SIEHE BUCH C SEE BOOK C
6	VORSCHMIERPUMPEN-AGGREGAT PRELUBRICATING-PUMP-AGGREGATE	1	SIEHE BUCH C SEE BOOK C
7	KW-VORWÄRMGERÄT COOLING WATER PREHEATER	1	SIEHE BUCH C SEE BOOK C
8	FUNDAMENTIERUNGSELEMENT FOUNDATIONSELEMENT	8	251530-008
9	DRUCKWÄCHTER PRESSURE SWITCH	1	1.4843-032
10	DICHTUNG GASKET	# 1	1.1322-005
11	SECHSKANTSCHRAUBE HEXAGON SCREW	44	1.1301-421
13	FLANSCH FLANGE	2	1.5340-115
15	FLANSCH FLANGE	1	1.5341-340
16	FLANSCH FLANGE	1	1.5341-339
18	FLANSCH FLANGE	2	1.5340-120
19	FLANSCH FLANGE	2	1.5340-137
20	RÜCKSCHLAGVENTIL NON-RETURN VALVE	1	251530-020
22	KOMPENSATOR KOMPENSATOR	1	SIEHE BUCH C SEE BOOK C
24	ROHR STEEL TUBE		1.9050-190
25	ROHR STEEL TUBE		1.9050-217
26	ROHR STEEL TUBE		1.9050-171
27	ROHR STEEL TUBE		1.9050-116

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel Generator Set

M25

13

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
31	ROHR STEEL TUBE		1.9050-025
33	DICHTUNG GASKET	# 2	1.7073-357
34	DICHTUNG GASKET	# 2	1.7073-353
35	DICHTUNG GASKET	# 1	1.7073-356
36	SCHEIBE WASHER	16	251530-036
37	DICHTUNG GASKET	# 1	1.7073-731
38	DICHTUNG GASKET	# 1	1.7073-723
39	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1372-668
40	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-376
41	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1367-376
42	SECHSKANTSCHRAUBE HEXAGON SCREW	48	1.1372-373
44	SECHSKANTSCHRAUBE HEXAGON SCREW	28	1.1387-443
45	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-344
46	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-239
49	SCHEIBE WASHER	16	1.0040-227
50	FEDERRING SPRING WASHER	4	1.0065-209
51	SPANNSCHEIBE CONICAL SPRING WASHER	# 8	1.0068-240
52	SPANNSCHEIBE CONICAL SPRING WASHER	# 4	1.0068-225
53	SECHSKANTMUTTER HEXAGON NUT	8	1.2011-044
54	SECHSKANTMUTTER HEXAGON NUT	60	1.2011-038
55	SECHSKANTMUTTER HEXAGON NUT	4	1.2011-035

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel Generator Set

M25

13

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
57	ABZWEIGSTUTZEN MALE CONNECTOR	1	1.5030-522
58	ABZWEIGSTUTZEN MALE CONNECTOR	2	1.5030-537
59	STUTZEN MALE CONNECTOR	2	1.5094-177
60	STUTZEN MALE CONNECTOR	1	1.5095-512
61	STUTZEN MALE CONNECTOR	2	1.5095-274
62	STUTZEN MALE CONNECTOR	1	1.5096-880
63	STUTZEN MALE CONNECTOR	1	251530-063
64	DICHTRING JOINT RING	# 1	1.7010-064
65	DICHTRING JOINT RING	# 2	1.7010-252
66	VERSCHLUSSBUTZEN SEALING PLUG	1	1.3088-543
67	ÜBERWURFMUTTER UNION NUT	3	1.5040-116
68	ÜBERWURFMUTTER UNION NUT	2	1.5040-143
69	SCHNEIDRING CUTTING RING	5	1.5059-207
70	SCHNEIDRING CUTTING RING	2	1.5059-233
71	SCHWENKVERSCHRAUBUNG BANJO	1	1.5093-607
72	KUGELHAHN BALL COCK	1	1.4840-054
73	SPANNSCHEIBE CONICAL SPRING WASHER	# 9	1.0068-222
75	SPANNSCHEIBE CONICAL SPRING WASHER	# 7	1.0068-240
76	SPANNSTIFT SPRING PIN	2	1.0039-537
79	SCHEIBE WASHER	44	251530-079
81	ROHRKLEMME PIPE CLAMP	4	1.5011-035

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel Generator Set

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
82	FLANSCH FLANGE	4	251220-105
83	DICHTUNG GASKET	# 5	1.7073-355
85	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1367-308
86	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1367-372
87	FLANSCH FLANGE	1	1.5340-322
88	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1367-279
89	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-035
90	HALTER BRACKET	1	251530-190

= VERBRAUCHSTEILE
CONSUMABLES

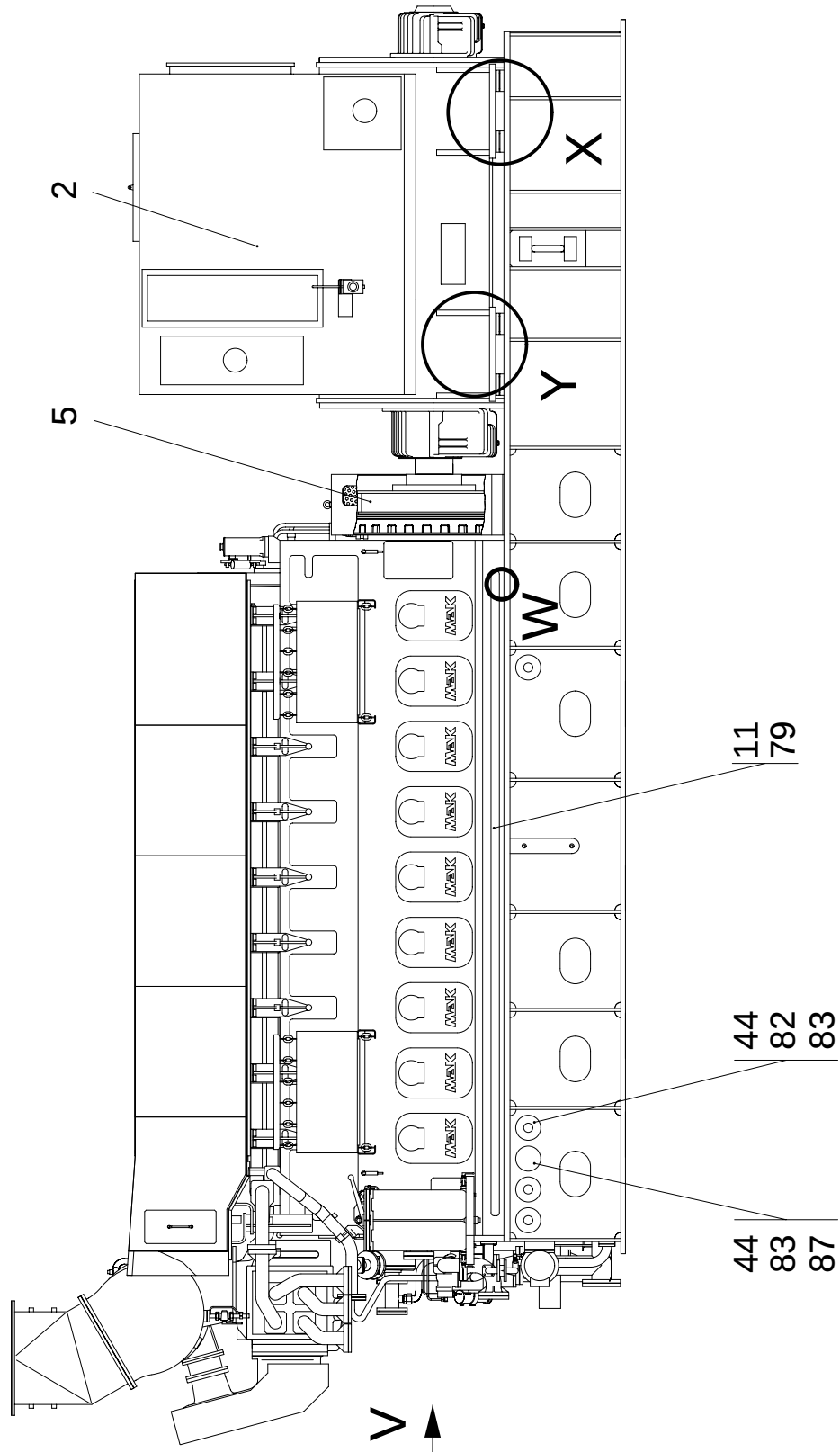
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel Generator Set

M25

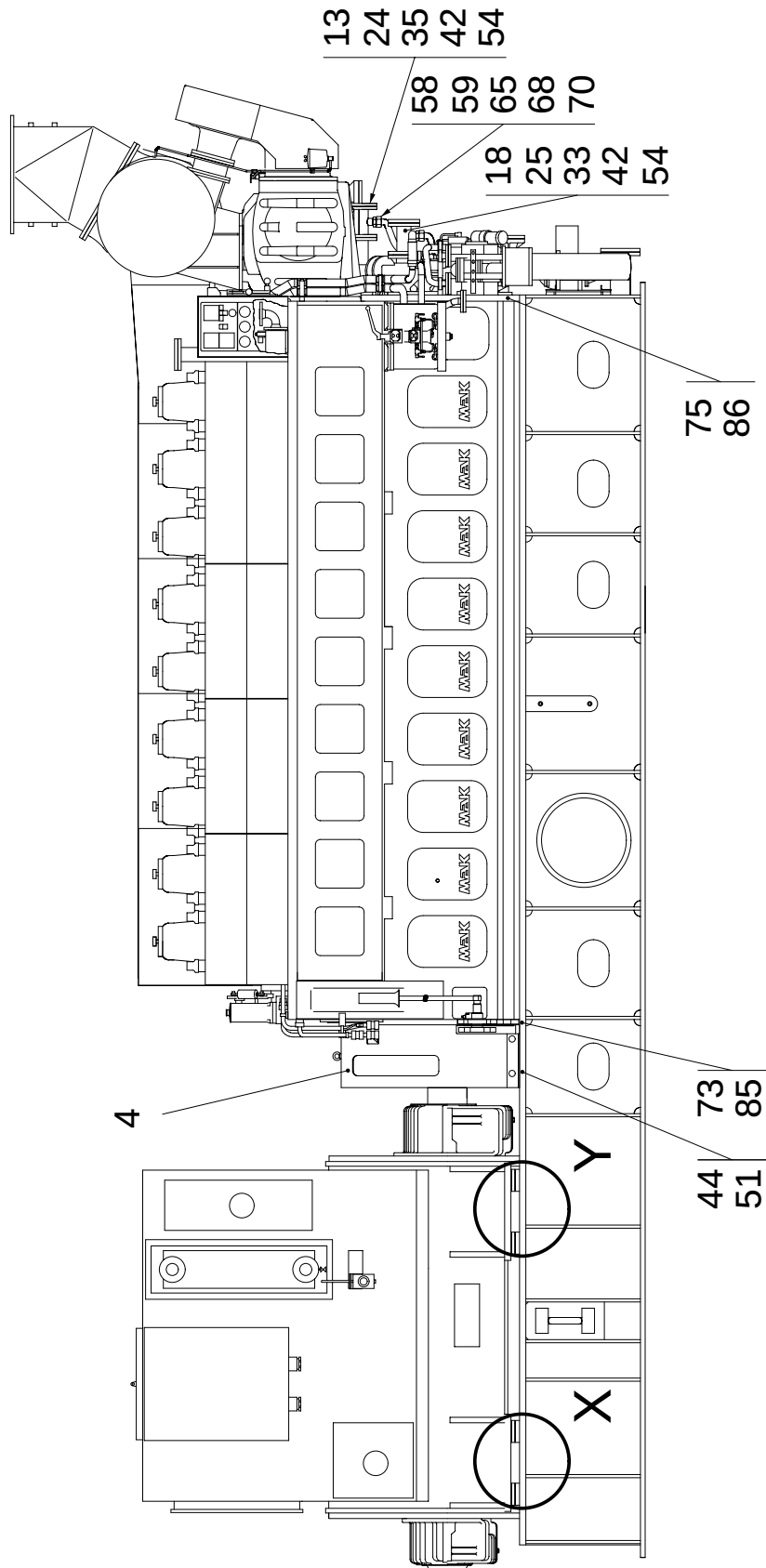
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Diesel Generator Set

M25

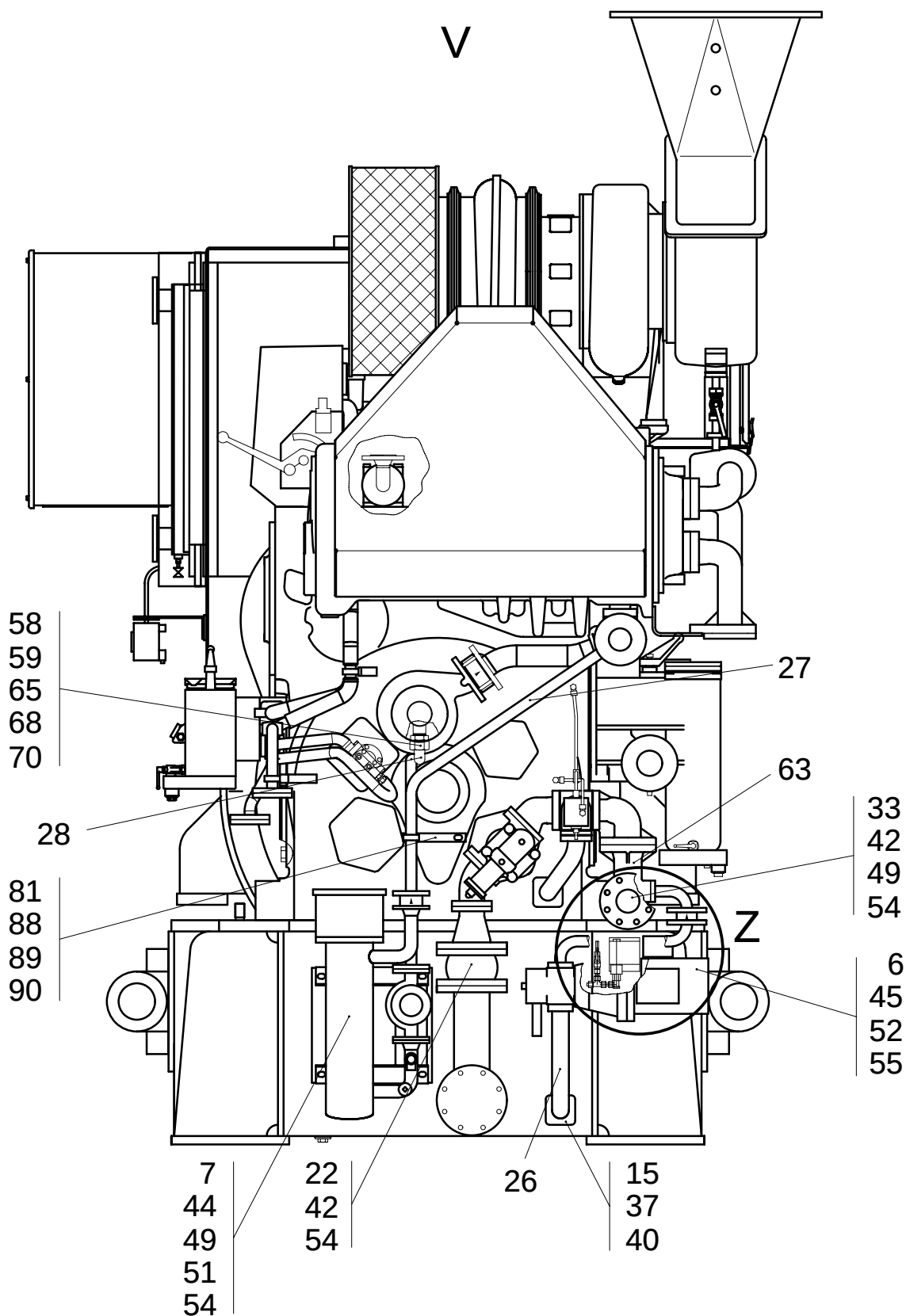
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Diesel Generator Set

M25

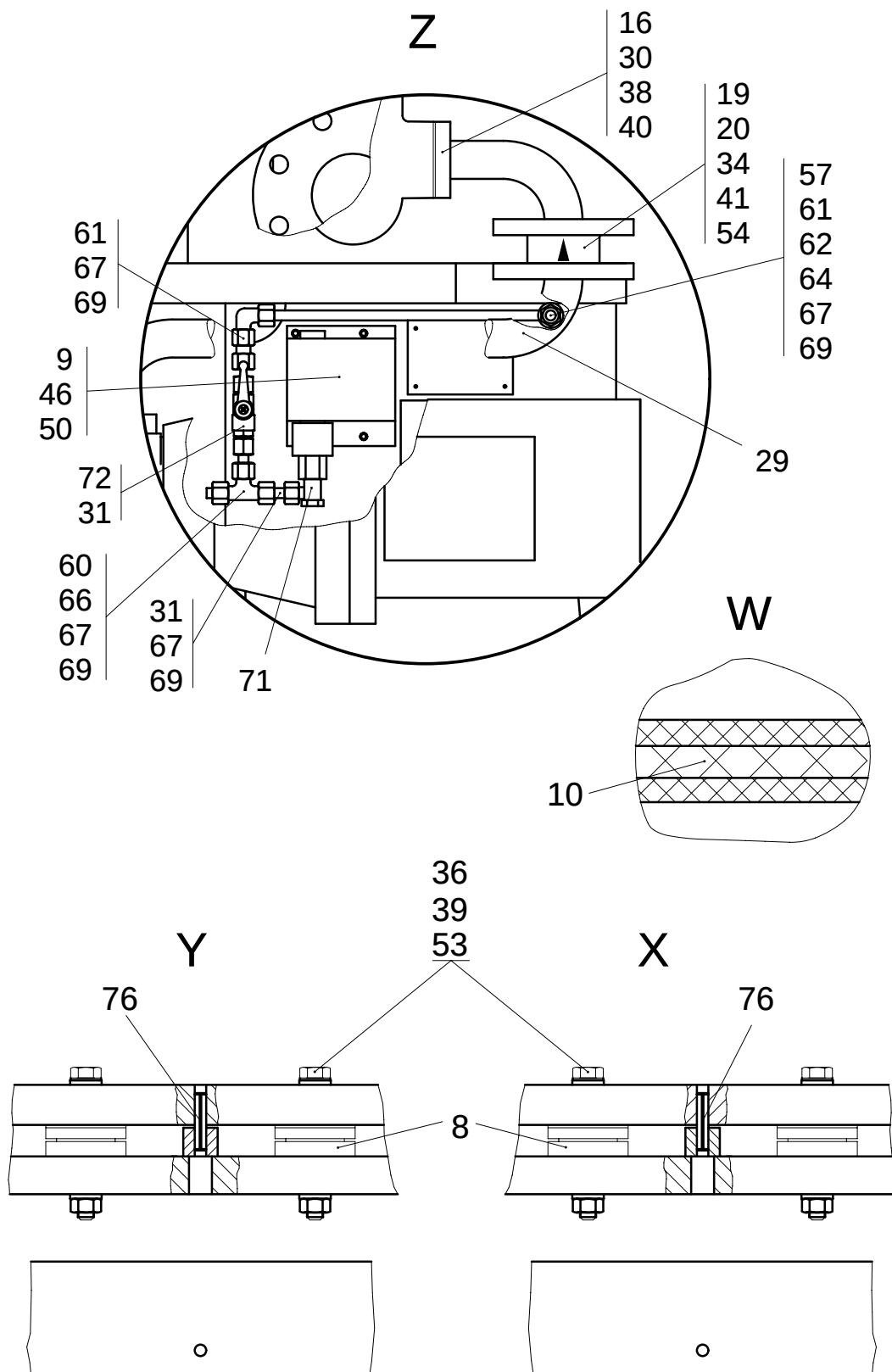
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Diesel Generator Set

M25

13



Diesel-Generator-Set

M25

13

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DIESEL-GENERATOR- SET, VOLLST. DIESEL GENERATOR SET ASSEMBLY	1	251530 BB
2	GENERATOR GENERATOR	1	SIEHE BUCH C SEE BOOK C
4	SCHUTZHAUBE FÜR SCHWUNGRAD GUARD COVER FOR VIBR. DAMPER	1	SIEHE B1.05.12.251550 SEE B1.05.12.251550
5	ELASTISCHE WELLENKUPPLUNG ELASTIC SHAFT COUPLING	1	SIEHE BUCH C SEE BOOK C
6	VORSCHMIERPUMPEN-AGGREGAT PRELUBRICATING-PUMP-AGGREGATE	1	SIEHE BUCH C SEE BOOK C
7	KW-VORWÄRMGERÄT COOLING WATER PREHEATER	1	SIEHE BUCH C SEE BOOK C
8	FUNDAMENTIERUNGSELEMENT FOUNDATIONSELEMENT	8	251530-008
9	DRUCKWÄCHTER PRESSURE SWITCH	1	1.4843-032
10	DICHTUNG GASKET	# 1	1.1322-005
11	SECHSKANTSCHRAUBE HEXAGON SCREW	44	1.1301-421
15	FLANSCH FLANGE	1	1.5341-340
16	FLANSCH FLANGE	1	1.5341-339
17	FLANSCH FLANGE	1	1.3461-022
18	FLANSCH FLANGE	2	1.5340-120
19	FLANSCH FLANGE	2	1.5340-137
20	RÜCKSCHLAGVENTIL NON-RETURN VALVE	1	251530-020
22	KOMPENSATOR KOMPENSATOR	1	SIEHE BUCH C SEE BOOK C
26	ROHR STEEL TUBE		1.9050-171
27	ROHR STEEL TUBE		1.9050-116
31	ROHR STEEL TUBE		1.9050-025
33	DICHTUNG GASKET	# 2	1.7073-357

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel-Generator-Set

M25

13

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
34	DICHTUNG GASKET	# 2	1.7073-353
36	SCHEIBE WASHER	16	251530-036
37	DICHTUNG GASKET	# 1	1.7073-731
38	DICHTUNG GASKET	# 1	1.7073-723
39	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1372-671
40	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-376
41	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1367-376
42	SECHSKANTSCHRAUBE HEXAGON SCREW	44	1.1372-373
44	SECHSKANTSCHRAUBE HEXAGON SCREW	28	1.1387-443
45	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-344
46	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-239
49	SCHEIBE WASHER	16	1.0040-227
50	FEDERRING SPRING WASHER	4	1.0065-209
51	SPANNSCHEIBE CONICAL SPRING WASHER	# 8	1.0068-240
52	SPANNSCHEIBE CONICAL SPRING WASHER	# 4	1.0068-225
53	SECHSKANTMUTTER HEXAGON NUT	8	1.2011-044
54	SECHSKANTMUTTER HEXAGON NUT	56	1.2011-038
55	SECHSKANTMUTTER HEXAGON NUT	4	1.2011-035
57	ABZWEIGSTUTZEN MALE CONNECTOR	1	1.5030-522
58	ABZWEIGSTUTZEN MALE CONNECTOR	2	1.5030-537
59	STUTZEN MALE CONNECTOR	2	1.5094-177

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel-Generator-Set

M25

13

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
60	STUTZEN MALE CONNECTOR	1	1.5095-512
61	STUTZEN MALE CONNECTOR	2	1.5095-274
62	STUTZEN MALE CONNECTOR	1	1.5096-880
63	STUTZEN MALE CONNECTOR	1	251530-063
64	DICHTRING JOINT RING	# 1	1.7010-064
65	DICHTRING JOINT RING	# 2	1.7010-252
66	VERSCHLUSSBUTZEN SEALING PLUG	1	1.3088-543
67	ÜBERWURFMUTTER UNION NUT	3	1.5040-116
68	ÜBERWURFMUTTER UNION NUT	2	1.5040-143
69	SCHNEIDRING CUTTING RING	5	1.5059-207
70	SCHNEIDRING CUTTING RING	2	1.5059-233
71	SCHWENKVERSCHRAUBUNG BANJO	1	1.5093-607
72	KUGELHAHN BALL COCK	1	1.4840-054
73	SPANNSCHEIBE CONICAL SPRING WASHER	# 9	1.0068-222
75	SPANNSCHEIBE CONICAL SPRING WASHER	# 7	1.0068-240
76	SPANNSTIFT SPRING PIN	2	1.0039-537
79	SCHEIBE WASHER	44	251530-079
81	ROHRKLEMME PIPE CLAMP	4	1.5011-035
82	FLANSCH FLANGE	4	251220-105
83	DICHTUNG GASKET	# 5	1.7073-355
85	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1367-310

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel-Generator-Set

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
86	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1367-374
87	FLANSCH FLANGE	1	1.5340-322
88	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1367-279
89	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-035
90	HALTER BRACKET	1	251530-090

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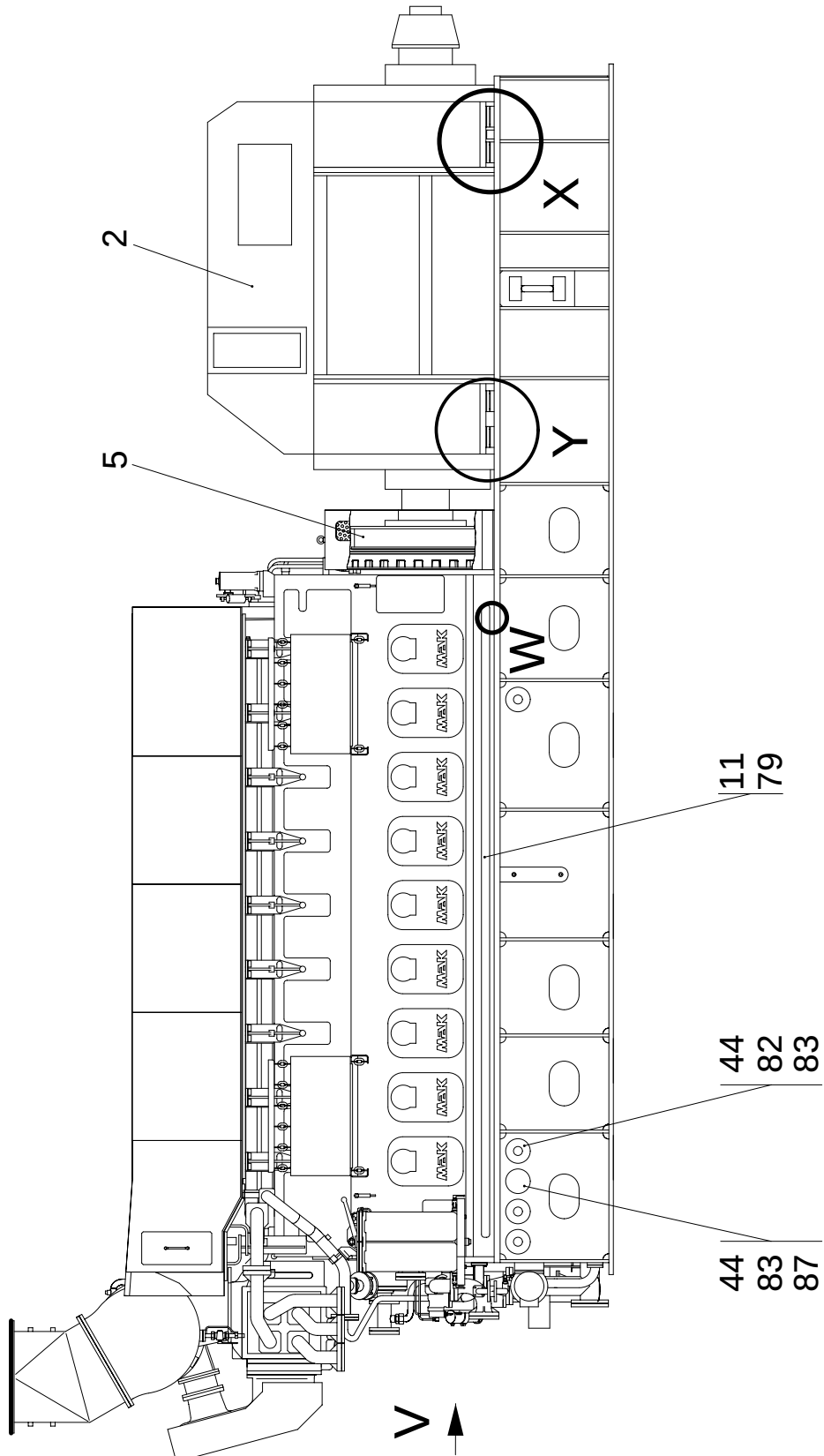
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Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel-Generator-Set

M25

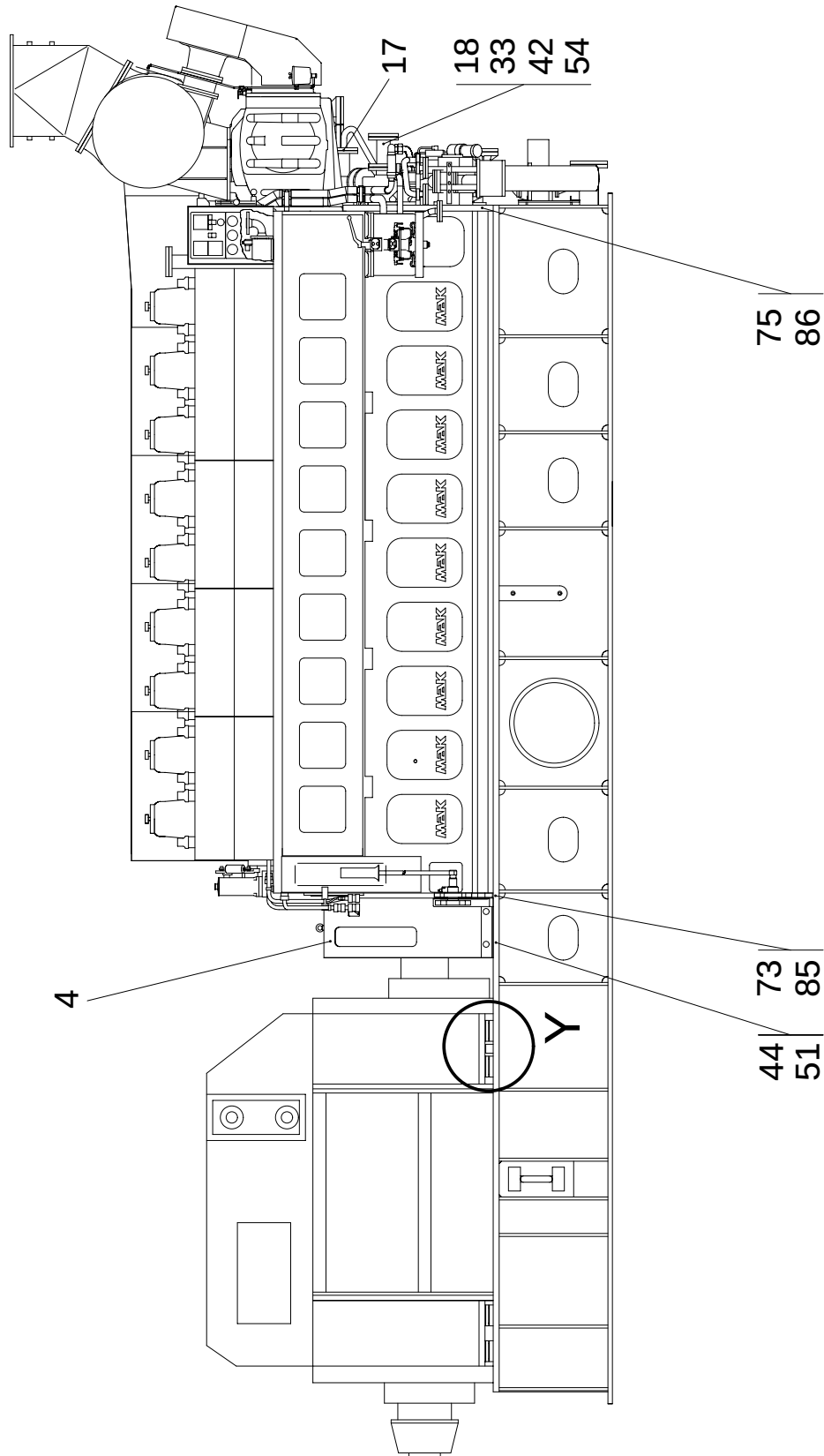
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Diesel-Generator-Set

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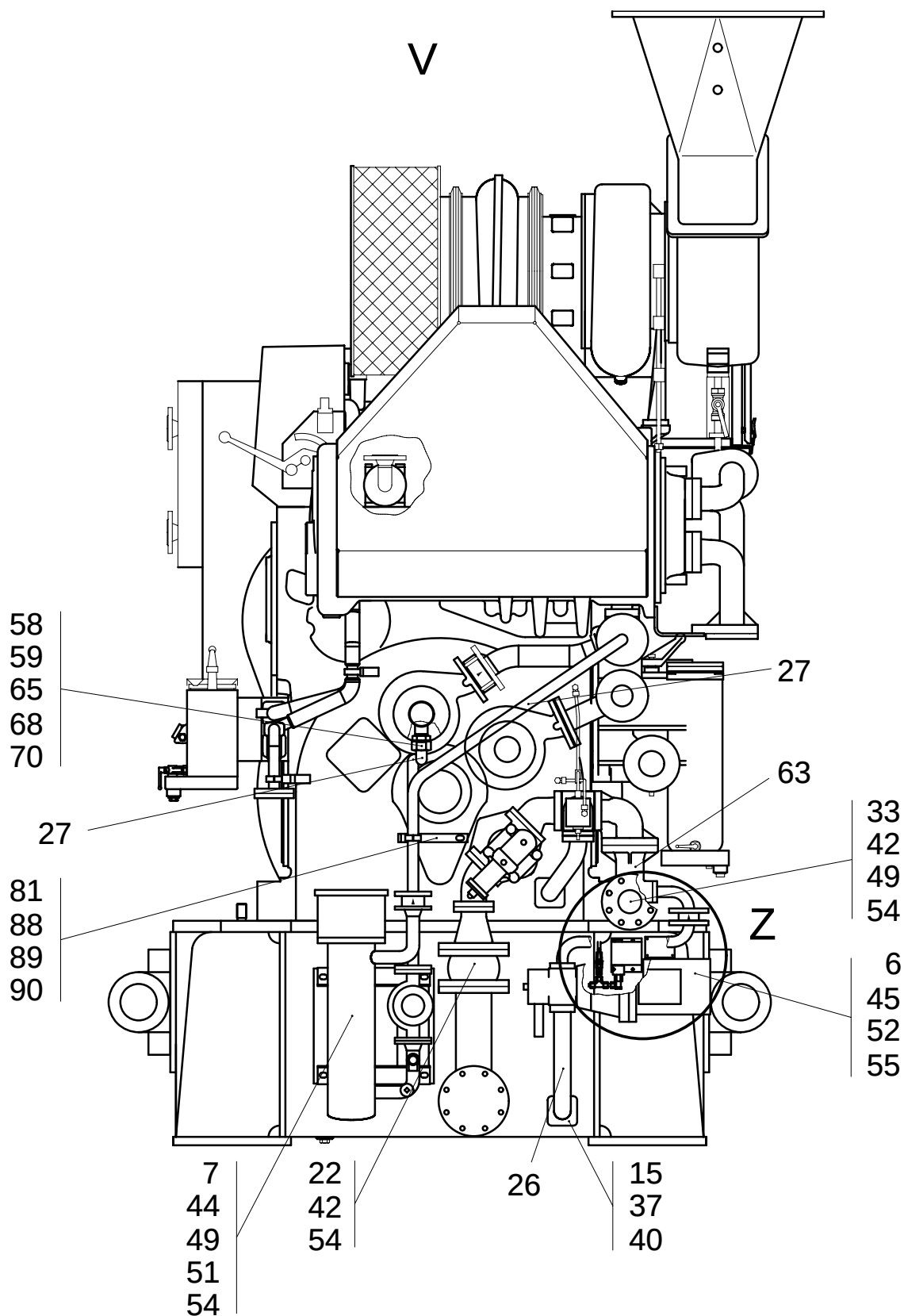
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Diesel-Generator-Set

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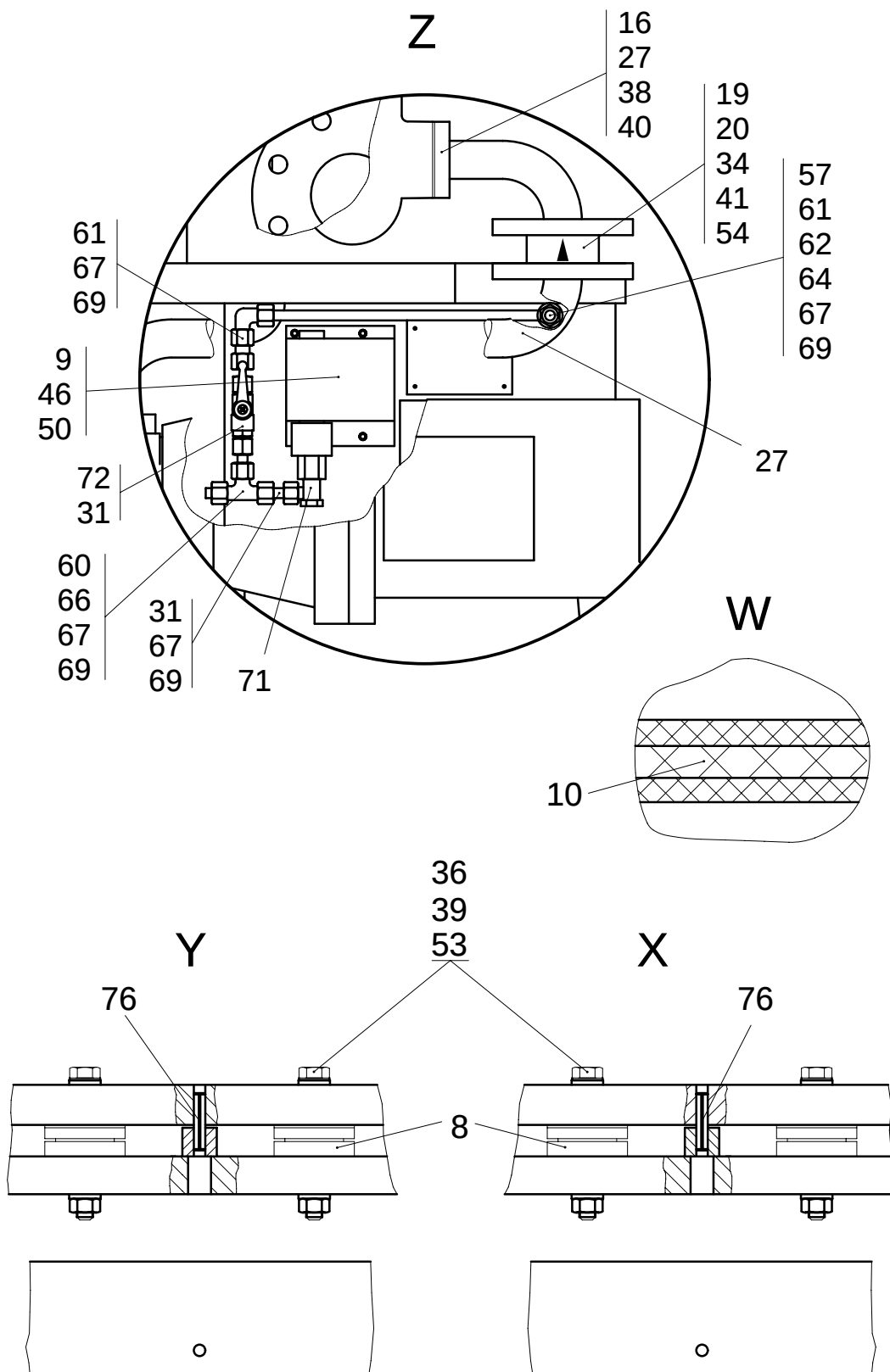
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Diesel-Generator-Set

M25

13



Diesel Generator Set

M25

13

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DIESEL-GENERATOR- SET, VOLLST. DIESEL GENERATOR SET ASSEMBLY	1	251530 CC
2	GENERATOR GENERATOR	1	SIEHE BUCH C SEE BOOK C
4	SCHUTZHAUBE FÜR SCHWUNGRAD GUARD COVER FOR VIBR. DAMPER	1	SIEHE B1.05.12.251550 SEE B1.05.12.251550
5	ELASTISCHE WELLENKUPPLUNG ELASTIC SHAFT COUPLING	1	SIEHE BUCH C SEE BOOK C
6	VORSCHMIERPUMPEN-AGGREGAT PRELUBRICATING-PUMP-AGGREGATE	1	SIEHE BUCH C SEE BOOK C
7	KW-VORWÄRMGERÄT COOLING WATER PREHEATER	1	SIEHE BUCH C SEE BOOK C
8	FUNDAMENTIERUNGSELEMENT FOUNDATIONSELEMENT	8	251530-008
9	DRUCKWÄCHTER PRESSURE SWITCH	1	1.4843-032
10	DICHTUNG GASKET	# 1	1.1322-005
11	SECHSKANTSCHRAUBE HEXAGON SCREW	40	1.1301-421
15	FLANSCH FLANGE	1	1.5341-340
16	FLANSCH FLANGE	1	1.5341-339
17	FLANSCH FLANGE	1	1.3782-052
18	FLANSCH FLANGE	2	1.5340-120
19	FLANSCH FLANGE	2	1.5340-137
20	RÜCKSCHLAGVENTIL NON-RETURN VALVE	1	251530-020
22	KOMPENSATOR KOMPENSATOR	1	SIEHE BUCH C SEE BOOK C
25	ROHR STEEL TUBE		1.9050-217
26	ROHR STEEL TUBE		1.9050-171
27	ROHR STEEL TUBE		1.9050-116
31	ROHR STEEL TUBE		1.9050-025

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel Generator Set

M25

13

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
33	DICHTUNG GASKET	# 2	1.7073-357
34	DICHTUNG GASKET	# 2	1.7073-353
36	SCHEIBE WASHER	16	251530-036
37	DICHTUNG GASKET	# 1	1.7073-731
38	DICHTUNG GASKET	# 1	1.7073-723
39	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1372-671
40	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-376
41	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1367-376
42	SECHSKANTSCHRAUBE HEXAGON SCREW	44	1.1372-373
44	SECHSKANTSCHRAUBE HEXAGON SCREW	28	1.1387-443
45	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-344
46	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-239
49	SCHEIBE WASHER	16	1.0040-227
50	FEDERRING SPRING WASHER	4	1.0065-209
51	SPANNSCHEIBE CONICAL SPRING WASHER	# 8	1.0068-240
52	SPANNSCHEIBE CONICAL SPRING WASHER	# 4	1.0068-225
53	SECHSKANTMUTTER HEXAGON NUT	8	1.2011-044
54	SECHSKANTMUTTER HEXAGON NUT	56	1.2011-038
55	SECHSKANTMUTTER HEXAGON NUT	4	1.2011-035
57	ABZWEIGSTUTZEN MALE CONNECTOR	1	1.5030-522
58	ABZWEIGSTUTZEN MALE CONNECTOR	2	1.5030-537

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel Generator Set

M25

13

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
59	STUTZEN MALE CONNECTOR	2	1.5094-177
60	STUTZEN MALE CONNECTOR	1	1.5095-512
61	STUTZEN MALE CONNECTOR	2	1.5095-274
62	STUTZEN MALE CONNECTOR	1	1.5096-880
63	STUTZEN MALE CONNECTOR	1	251530-063
64	DICHTRING JOINT RING	# 1	1.7010-064
65	DICHTRING JOINT RING	# 2	1.7010-252
66	VERSCHLUSSBUTZEN SEALING PLUG	1	1.3088-543
67	ÜBERWURFMUTTER UNION NUT	3	1.5040-116
68	ÜBERWURFMUTTER UNION NUT	2	1.5040-143
69	SCHNEIDRING CUTTING RING	5	1.5059-207
70	SCHNEIDRING CUTTING RING	2	1.5059-233
71	SCHWENKVERSCHRAUBUNG BANJO	1	1.5093-607
72	KUGELHAHN BALL COCK	1	1.4840-054
73	SPANNSCHEIBE CONICAL SPRING WASHER	# 9	1.0068-222
75	SPANNSCHEIBE CONICAL SPRING WASHER	# 7	1.0068-240
76	SPANNSTIFT SPRING PIN	2	1.0039-537
79	SCHEIBE WASHER	40	251530-079
81	ROHRKLEMME PIPE CLAMP	4	1.5011-035
82	FLANSCH FLANGE	4	251220-105
83	DICHTUNG GASKET	# 5	1.7073-355

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel Generator Set

M25

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
85	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1367-310
86	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1367-374
87	FLANSCH FLANGE	1	1.5340-322
88	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1367-279
89	SECHSKANTMUTTER HEXAGON NUT	4	1.2007-035
90	HALTER BRACKET	1	251530-090

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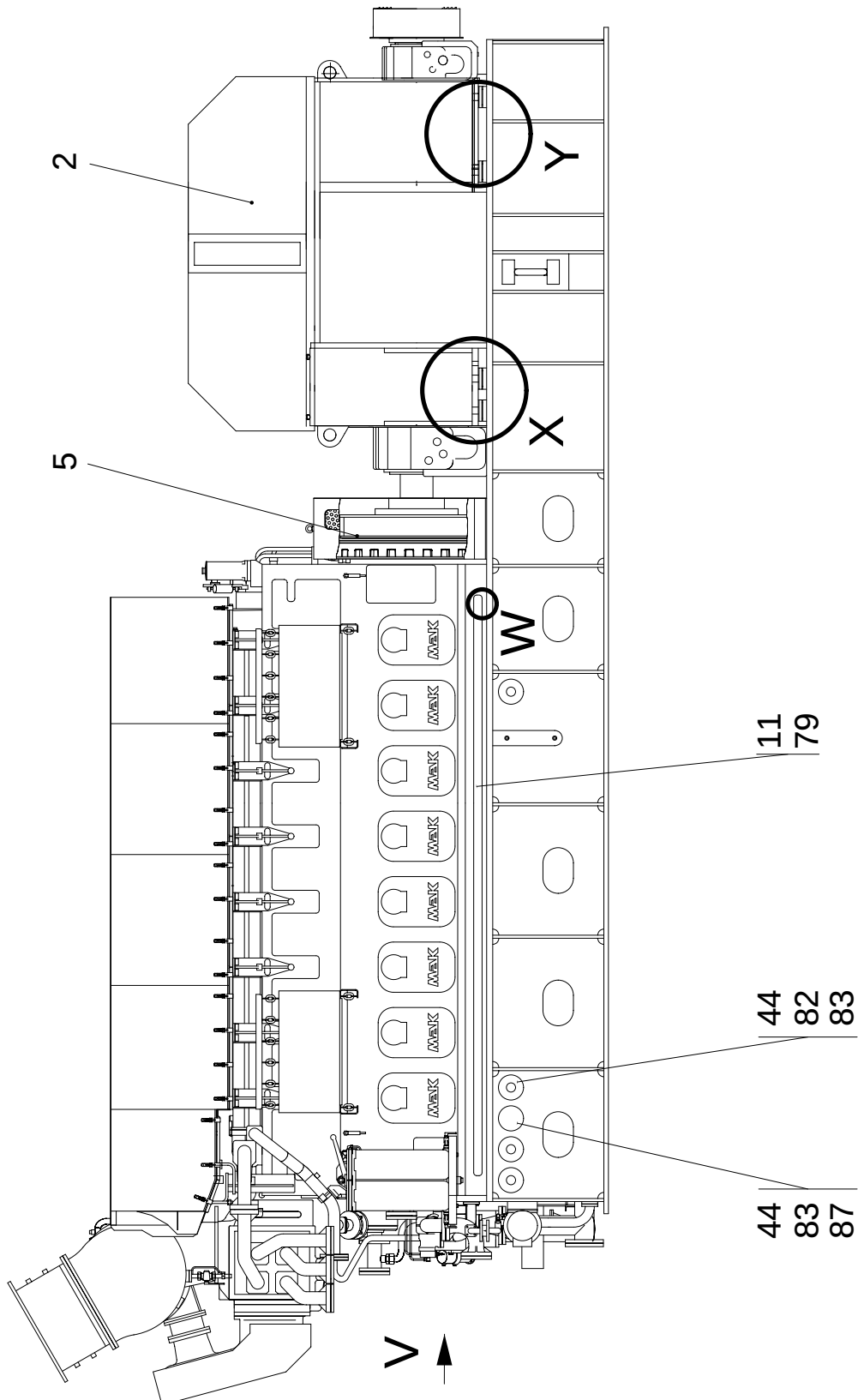
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel Generator Set

M25

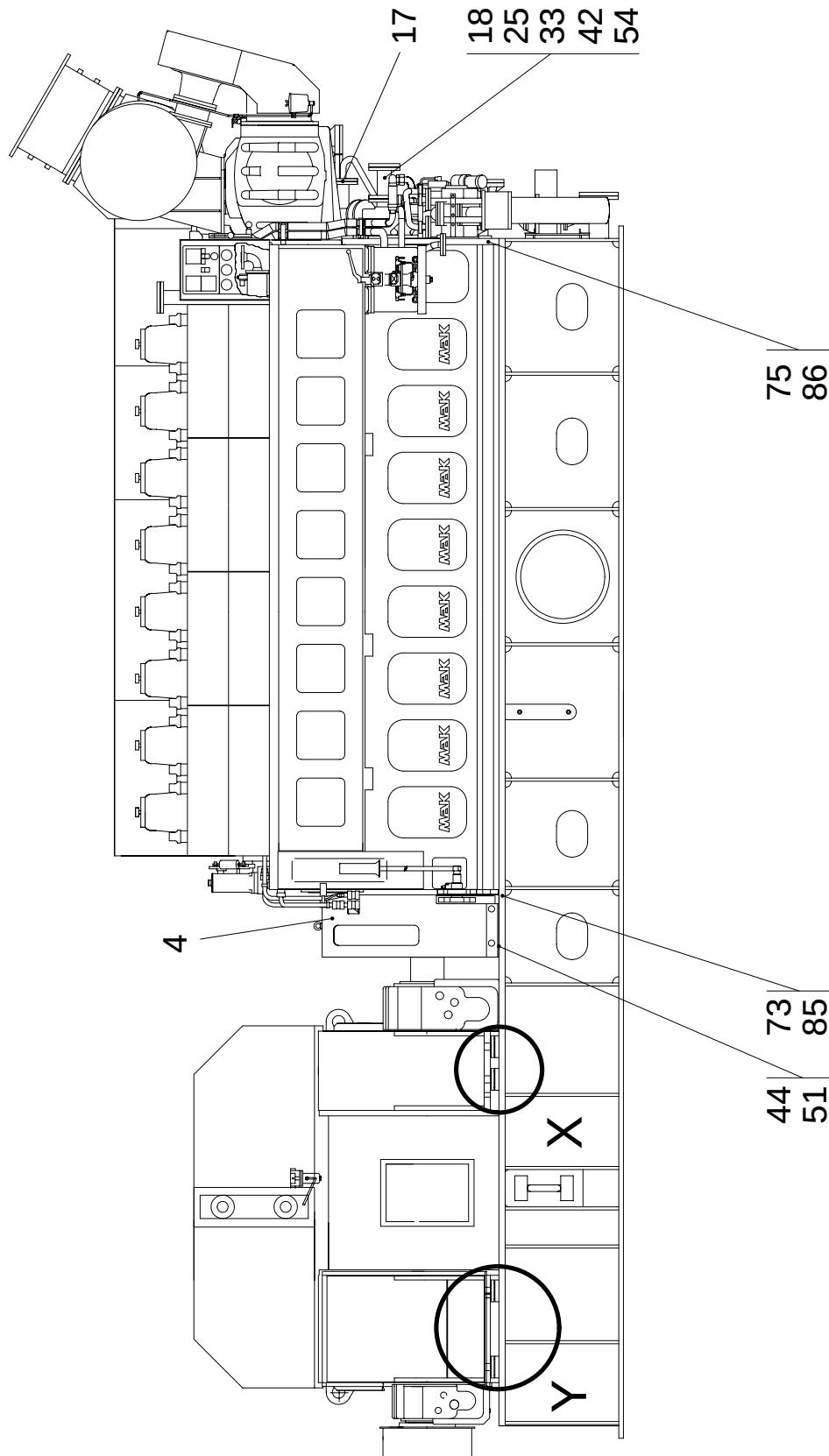
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Diesel Generator Set

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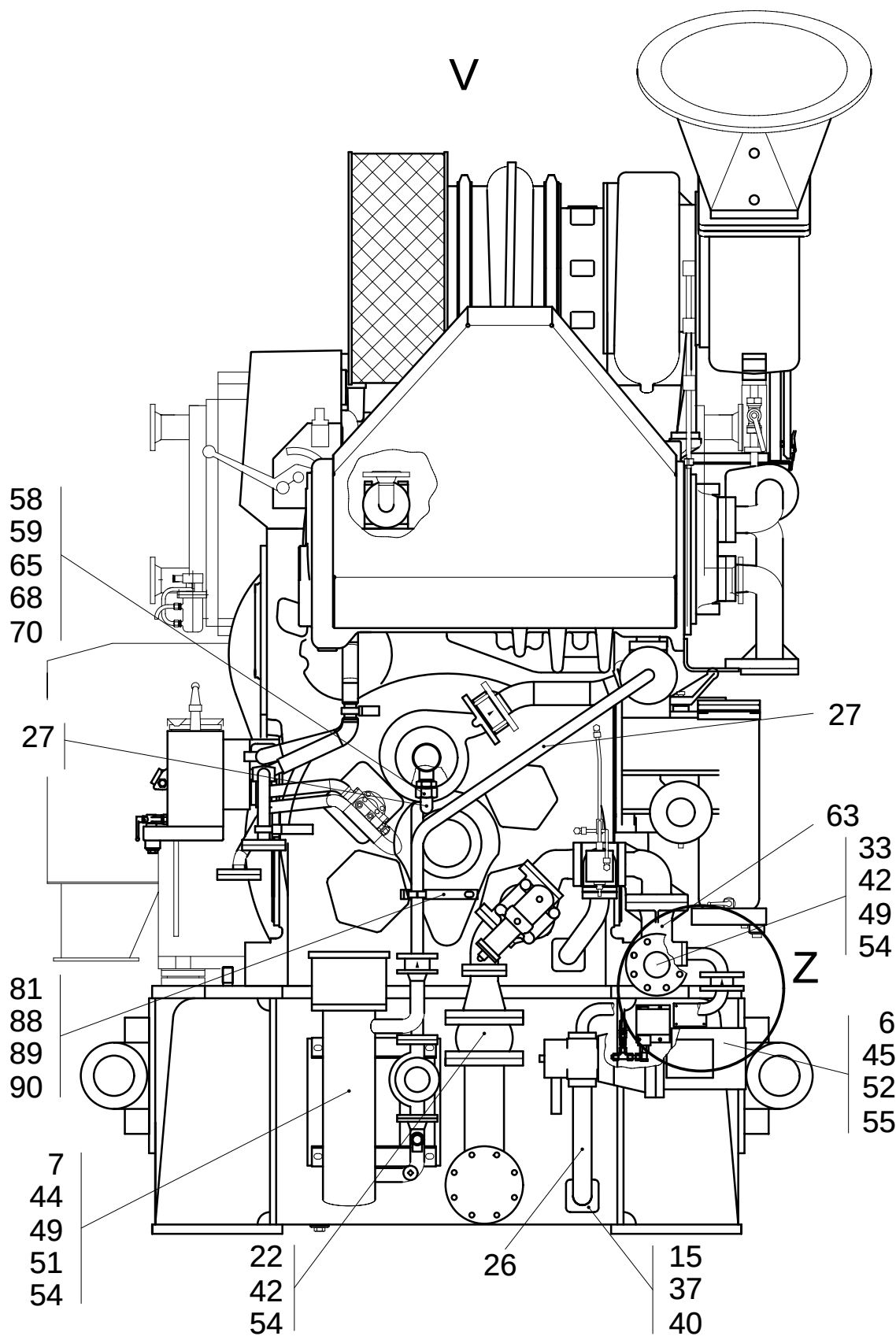
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Diesel Generator Set

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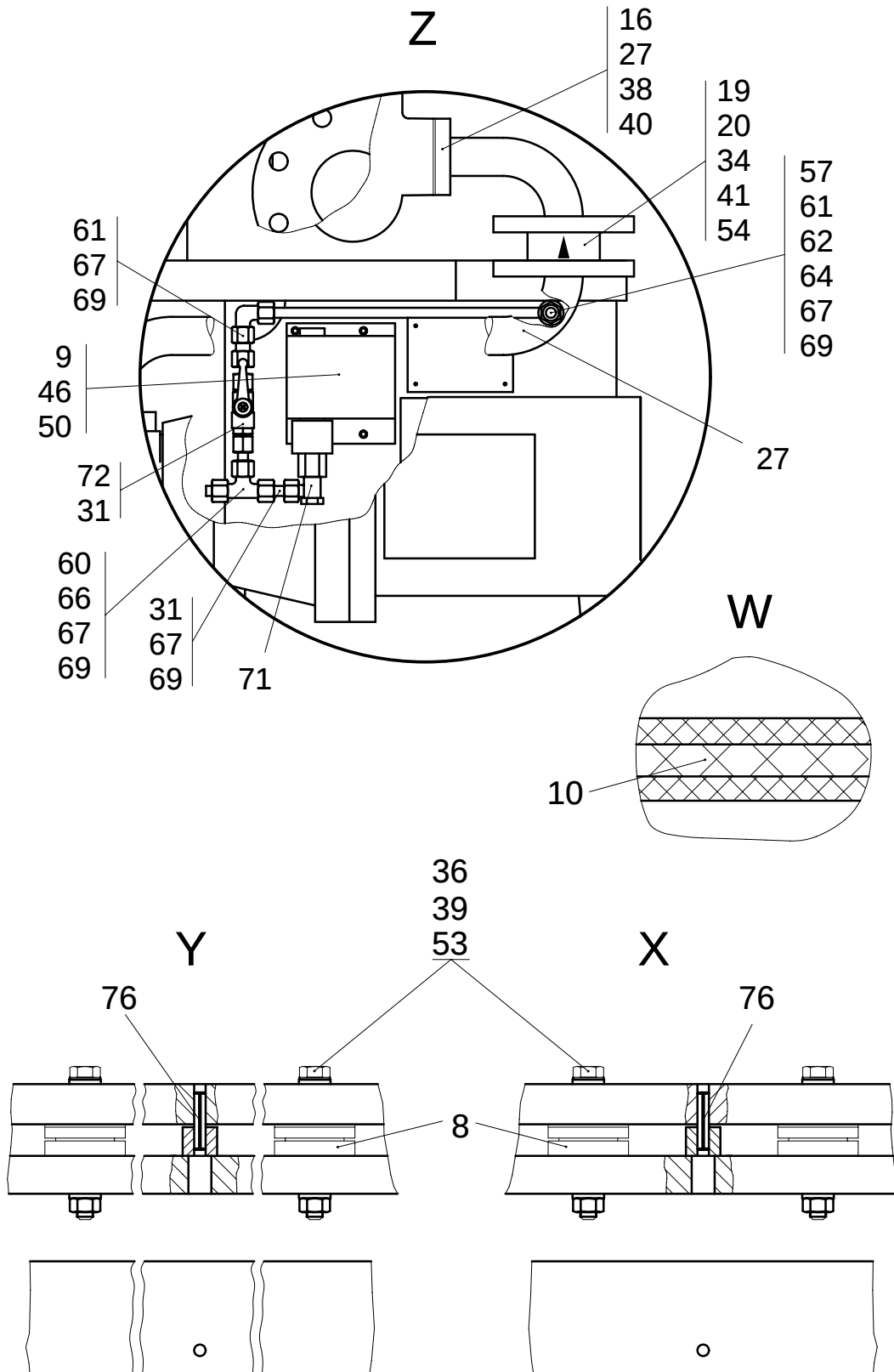
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Diesel Generator Set

M25

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Diesel-Generator-Set

M25

13

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
-	DIESEL-GENERATOR- SET, VOLLST. DIESEL GENERATOR SET ASSEMBLY	1	251530 DD
2	GENERATOR GENERATOR	1	SIEHE BUCH C SEE BOOK C
4	SCHUTZHAUBE FÜR SCHWUNGRAD GUARD COVER FOR VIBR. DAMPER	1	SIEHE B1.05.12.251550 SEE B1.05.12.251550
5	ELASTISCHE WELLENKUPPLUNG ELASTIC SHAFT COUPLING	1	SIEHE BUCH C SEE BOOK C
6	VORSCHMIERPUMPEN-AGGREGAT PRELUBRICATING-PUMP-AGGREGATE	1	SIEHE BUCH C SEE BOOK C
8	FUNDAMENTIERUNGSELEMENT FOUNDATIONSELEMENT	8	251530-008
9	DRUCKWÄCHTER PRESSURE SWITCH	1	1.4843-032
10	DICHTUNG GASKET	# 1	1.1322-005
11	SECHSKANTSCHRAUBE HEXAGON SCREW	40	1.1301-421
15	FLANSCH FLANGE	1	1.5341-340
16	FLANSCH FLANGE	1	1.5341-339
17	FLANSCH FLANGE	1	1.3782-052
19	FLANSCH FLANGE	2	1.5340-137
20	RÜCKSCHLAGVENTIL NON-RETURN VALVE	1	251530-020
22	KOMPENSATOR KOMPENSATOR	1	SIEHE BUCH C SEE BOOK C
26	ROHR STEEL TUBE		1.9050-171
29	ROHR STEEL TUBE		1.9050-116
31	ROHR STEEL TUBE		1.9050-025
33	DICHTUNG GASKET	# 1	1.7073-357
34	DICHTUNG GASKET	# 2	1.7073-353
36	SCHEIBE WASHER	12	251530-036

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel-Generator-Set

M25

13

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
37	DICHTUNG GASKET	# 1	1.7073-731
38	DICHTUNG GASKET	# 1	1.7073-723
39	SECHSKANTSCHRAUBE HEXAGON SCREW	6	1.1372-668
40	SECHSKANTSCHRAUBE HEXAGON SCREW	8	1.1387-376
41	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1367-376
42	SECHSKANTSCHRAUBE HEXAGON SCREW	36	1.1372-373
44	SECHSKANTSCHRAUBE HEXAGON SCREW	24	1.1387-443
45	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-344
46	SECHSKANTSCHRAUBE HEXAGON SCREW	4	1.1387-239
49	SCHEIBE WASHER	16	1.0040-227
50	FEDERRING SPRING WASHER	4	1.0065-209
51	SPANNSCHEIBE CONICAL SPRING WASHER	# 8	1.0068-240
52	SPANNSCHEIBE CONICAL SPRING WASHER	# 4	1.0068-225
53	SECHSKANTMUTTER HEXAGON NUT	6	1.2011-044
54	SECHSKANTMUTTER HEXAGON NUT	56	1.2011-038
55	SECHSKANTMUTTER HEXAGON NUT	4	1.2011-035
57	ABZWEIGSTUTZEN MALE CONNECTOR	1	1.5030-522
60	STUTZEN MALE CONNECTOR	1	1.5095-512
61	STUTZEN MALE CONNECTOR	2	1.5095-274
62	STUTZEN MALE CONNECTOR	1	1.5096-880
63	STUTZEN MALE CONNECTOR	1	251530-063

Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel-Generator-Set

M25

13

POS. ITEM	BENENNUNG DESCRIPTION	STCK NUMBER	BEST.-NR PART NO.
64	DICHTRING JOINT RING	# 1	1.7010-064
66	VERSCHLUSSBUTZEN SEALING PLUG	1	1.3088-543
67	ÜBERWURFMUTTER UNION NUT	3	1.5040-116
69	SCHNEIDRING CUTTING RING	5	1.5059-207
71	SCHWENKVERSCHRAUBUNG BANJO	1	1.5093-607
72	KUGELHAHN BALL COCK	1	1.4840-054
73	SPANNSCHEIBE CONICAL SPRING WASHER	# 9	1.0068-222
75	SPANNSCHEIBE CONICAL SPRING WASHER	# 7	1.0068-240
76	SPANNSTIFT SPRING PIN	2	1.0039-537
79	SCHEIBE WASHER	40	251530-079
82	FLANSCH FLANGE	4	251220-105
83	DICHTUNG GASKET	# 5	1.7073-355
85	SECHSKANTSCHRAUBE HEXAGON SCREW	9	1.1367-308
86	SECHSKANTSCHRAUBE HEXAGON SCREW	7	1.1367-372
87	FLANSCH FLANGE	1	1.5340-322

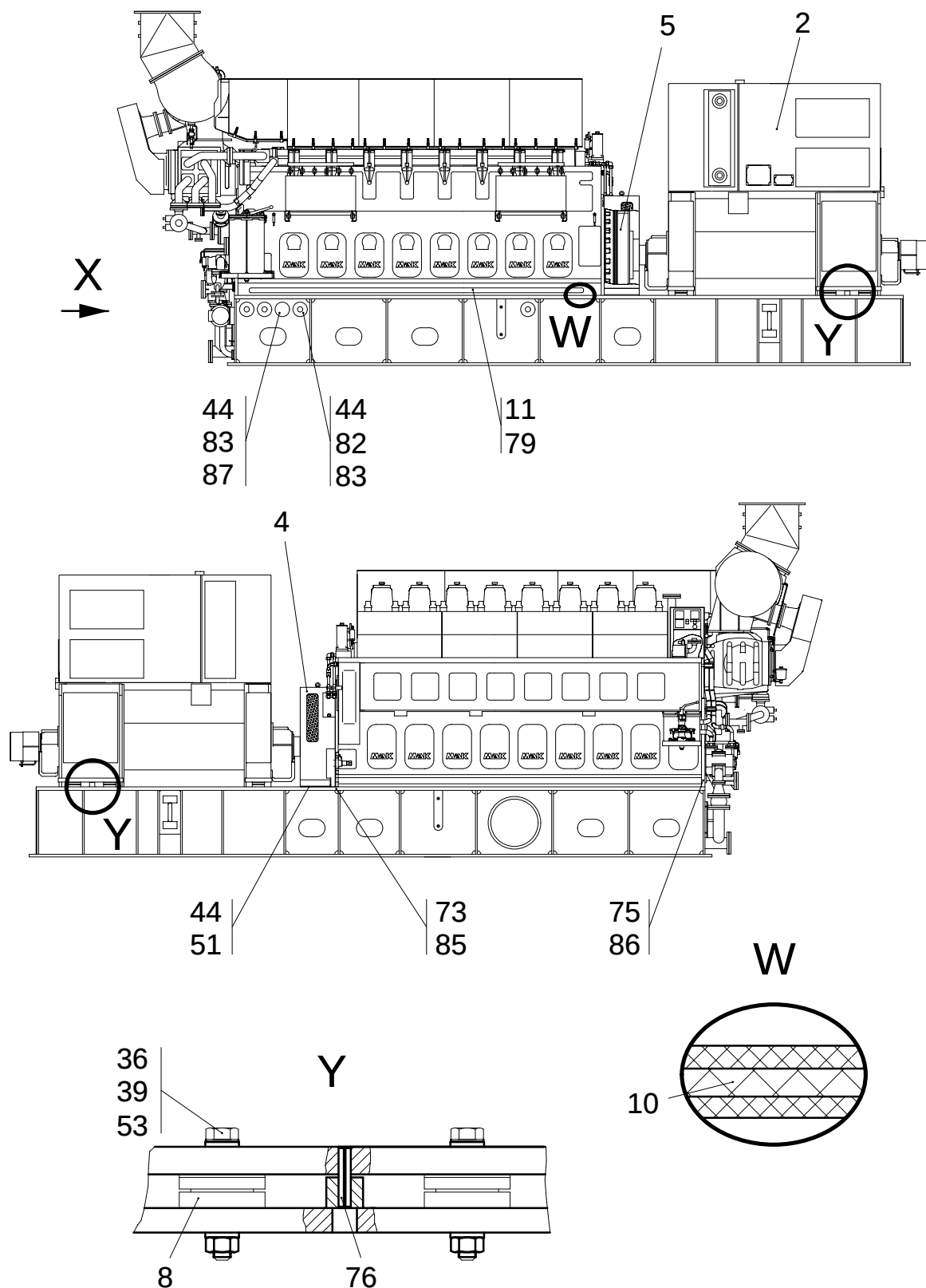
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Jede Bestellung muß folgende Angaben enthalten: **Motor-Nr. / Ersatzteilblatt-Nr. / Bestell-Nr.**
Each order must include the following: **Engine No./Spare parts sheet No./Part No.**

Diesel-Generator-Set

M25

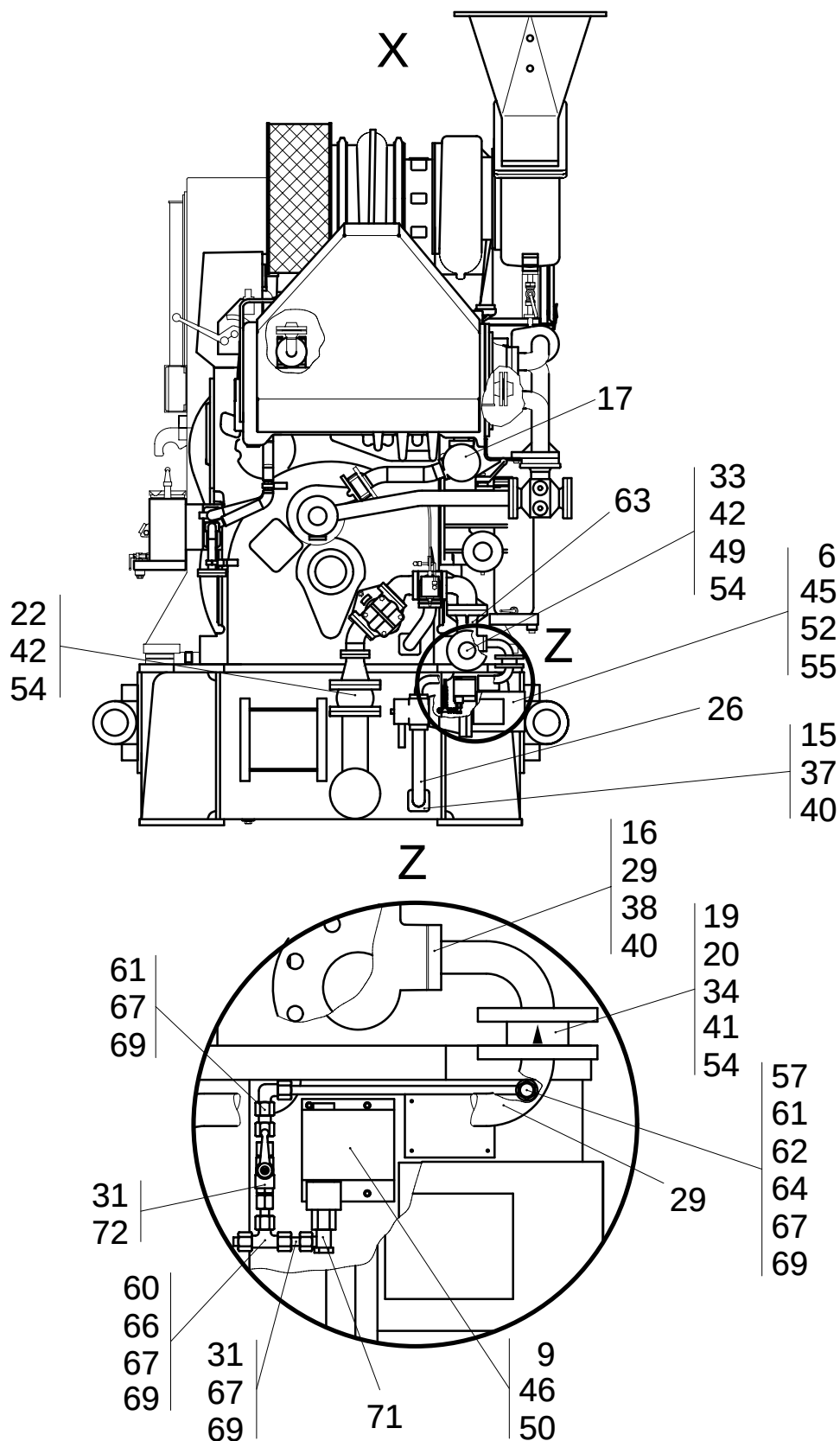
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Diesel-Generator-Set

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Stand-by parts

M25

General- External documentation

Typ M25

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Engine operating instructions	A0
<i>Total Index Book A, B and C</i>	<i>A0.01</i>
<i>Introduction</i>	<i>A0.02</i>
<i>Safety instructions</i>	<i>A0.03</i>
Technical engine data	A1
<i>Governor-data</i>	<i>A1.04</i>
<i>Working pressures of auxiliary equipment</i>	<i>A1.05</i>
<i>Temperatures of operating media</i>	<i>A1.06</i>
<i>Torsional vibration calculation</i>	<i>A1.09</i>
<i>Acceptance Test Records</i>	<i>A1.10</i>
Operating instructions	A3
<i>Table of contents</i>	<i>A3.01</i>
<i>Introduction</i>	<i>A3.02</i>
<i>Safety instructions</i>	<i>A3.03</i>
<i>Instructions for heavy fuel operation</i>	<i>A3.04</i>
<i>Initial operation</i>	<i>A3.05</i>
<i>Operational supervision</i>	<i>A3.06</i>
<i>Removal from operation</i>	<i>A3.07</i>
<i>Danger of frost</i>	<i>A3.08</i>
<i>Running-in</i>	<i>A3.10</i>
<i>Fault tracing</i>	<i>A3.11</i>
<i>Emergency operation</i>	<i>A3.12</i>
Operating media	A4
<i>Table of contents</i>	<i>A4.01</i>
<i>Introduction</i>	<i>A4.02</i>
<i>Safety instructions</i>	<i>A4.03</i>
<i>Regulations and care</i>	<i>A4.05</i>
Maintenance	A5
<i>Table of contents</i>	<i>A5.01</i>
<i>Introduction</i>	<i>A5.02</i>
<i>Safety instructions</i>	<i>A5.03</i>
Tools	A6
<i>Table of contents</i>	<i>A6.01</i>
Spare parts catalogue	B0
<i>Total Index Book A, B and C</i>	<i>B0.01</i>
<i>Introduction</i>	<i>B0.02</i>
Spare Parts	B1
<i>Table of contents</i>	<i>B1.01</i>
<i>Safety instructions</i>	<i>B1.03</i>
Stand-by parts	B2

-

External documentation

C0

Total Index Book A, B and C

C0.01

Table of contents

C5.01

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- B1.05.01.252107 AA
- B1.05.01.252107 BB

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- B1.05.01.252144 FF

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Please select target document for B1.05.01.252107 ??:

- B1.05.01.252107 AA
- B1.05.01.252107 BB

-

Please select target document for A5.05.01.07.01.nn:

- A5.05.01.07.01.00
- A5.05.01.07.01.01

-

Please select target document for B1.05.01.252107 ??:

- B1.05.01.252107 AA
- B1.05.01.252107 BB

-

Please select target document for A5.05.01.07.01.nn:

- A5.05.01.07.01.00
- A5.05.01.07.01.01

-

Please select target document for B1.05.01.252107 ??:

- B1.05.01.252107 AA
- B1.05.01.252107 BB

-

Please select target document for B1.05.01.252107 ??:

- B1.05.01.252107 AA
- B1.05.01.252107 BB

-

Please select target document for B1.05.01.252107 ??:

- B1.05.01.252107 AA
- B1.05.01.252107 BB

-

Please select target document for B1.05.01.252107 ??:

- B1.05.01.252107 AA
- B1.05.01.252107 BB

-

Please select target document for B1.05.01.252107 ??:

- B1.05.01.252107 AA
- B1.05.01.252107 BB

-

Please select target document for B1.05.01.252107 ??:

- B1.05.01.252107 AA
- B1.05.01.252107 BB

-

Please select target document for A5.05.01.07.01.nn:

- A5.05.01.07.01.00
- A5.05.01.07.01.01

-

Please select target document for A5.05.01.09.02.nn:

- A5.05.01.09.02.00
- A5.05.01.09.02.01
- A5.05.01.09.02.02
- A5.05.01.09.02.03

-

Please select target document for B1.05.01.252107 ??:

- B1.05.01.252107 AA
- B1.05.01.252107 BB

-

Please select target document for A5.05.01.07.01.nn:

- A5.05.01.07.01.00
- A5.05.01.07.01.01

-

Please select target document for A5.05.01.09.02.nn:

- A5.05.01.09.02.00
- A5.05.01.09.02.01
- A5.05.01.09.02.02
- A5.05.01.09.02.03

-

Please select target document for B1.05.01.252107 ??:

- B1.05.01.252107 AA
- B1.05.01.252107 BB

-

Please select target document for A5.05.03.04.01.nn:

- A5.05.03.04.01.00
- A5.05.03.04.01.01

-

Please select target document for A5.05.06.01.01.nn:

- A5.05.06.01.01.00
- A5.05.06.01.01.01
- A5.05.06.01.01.02
- A5.05.06.01.01.03
- A5.05.06.01.01.04
- A5.05.06.01.01.05
- A5.05.06.01.01.06
- A5.05.06.01.01.07
- A5.05.06.01.01.08

-

Please select target document for B1.05.01.252107 ??:

- B1.05.01.252107 AA
- B1.05.01.252107 BB

-

Please select target document for A5.05.04.04.01.nn:

- A5.05.04.04.01.00
- A5.05.04.04.01.01
- A5.05.04.04.01.02

-

Please select target document for B1.05.03.251112 ??:

- B1.05.03.251112 AA
- B1.05.03.251112 BB
- B1.05.03.251112 CC
- B1.05.03.251112 DD
- B1.05.03.251112 EE
- B1.05.03.251112 FF
- B1.05.03.251112 GG
- B1.05.03.251112 HH
- B1.05.03.251112 KK
- B1.05.03.251112 LL
- B1.05.03.251112 MM
- B1.05.03.251112 NN
- B1.05.03.251112 PP

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for A5.05.02.04.01.nn:

- A5.05.02.04.01.00
- A5.05.02.04.01.01

-

Please select target document for A5.05.02.05.01.nn:

- A5.05.02.05.01.00
- A5.05.02.05.01.01
- A5.05.02.05.01.02
- A5.05.02.05.01.03

-

Please select target document for A5.05.02.09.01.nn:

- A5.05.02.09.01.00
- A5.05.02.09.01.01

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for A5.05.02.05.01.nn:

- A5.05.02.05.01.00
- A5.05.02.05.01.01
- A5.05.02.05.01.02
- A5.05.02.05.01.03

-

Please select target document for A5.05.02.05.02.nn:

- A5.05.02.05.02.00
- A5.05.02.05.02.01

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for A5.05.02.06.01.nn:

- A5.05.02.06.01.00
- A5.05.02.06.01.01
- A5.05.02.06.01.02
- A5.05.02.06.01.03

-

Please select target document for A5.05.02.06.01.nn:

- A5.05.02.06.01.00
- A5.05.02.06.01.01
- A5.05.02.06.01.02
- A5.05.02.06.01.03

-

Please select target document for A5.05.02.04.01.nn:

- A5.05.02.04.01.00
- A5.05.02.04.01.01

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for A5.05.02.05.01.nn:

- A5.05.02.05.01.00
- A5.05.02.05.01.01
- A5.05.02.05.01.02
- A5.05.02.05.01.03

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for A5.05.02.05.01.nn:

- A5.05.02.05.01.00
- A5.05.02.05.01.01
- A5.05.02.05.01.02
- A5.05.02.05.01.03

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for A5.05.02.07.01.nn:

- A5.05.02.07.01.00
- A5.05.02.07.01.01

-

Please select target document for A5.05.03.04.01.nn:

- A5.05.03.04.01.00
- A5.05.03.04.01.01

-

Please select target document for A5.05.02.07.01.nn:

- A5.05.02.07.01.00
- A5.05.02.07.01.01

-

Please select target document for A5.05.03.04.01.nn:

- A5.05.03.04.01.00
- A5.05.03.04.01.01

-

Please select target document for A5.05.02.07.01.nn:

- A5.05.02.07.01.00
- A5.05.02.07.01.01

-

Please select target document for A5.05.03.04.01.nn:

- A5.05.03.04.01.00
- A5.05.03.04.01.01

-

Please select target document for A5.05.02.07.01.nn:

- A5.05.02.07.01.00
- A5.05.02.07.01.01

-

Please select target document for A5.05.03.04.01.nn:

- A5.05.03.04.01.00
- A5.05.03.04.01.01

-

Please select target document for A5.05.02.06.01.nn:

- A5.05.02.06.01.00
- A5.05.02.06.01.01
- A5.05.02.06.01.02
- A5.05.02.06.01.03

-

Please select target document for A5.05.02.07.01.nn:

- A5.05.02.07.01.00
- A5.05.02.07.01.01

-

Please select target document for A5.05.02.09.01.nn:

- A5.05.02.09.01.00
- A5.05.02.09.01.01

-

Please select target document for A5.05.02.06.01.nn:

- A5.05.02.06.01.00
- A5.05.02.06.01.01
- A5.05.02.06.01.02
- A5.05.02.06.01.03

-

Please select target document for A5.05.02.10.01.nn:

- A5.05.02.10.01.00
- A5.05.02.10.01.01
- A5.05.02.10.01.02

-

Please select target document for A5.05.02.06.01.nn:

- A5.05.02.06.01.00
- A5.05.02.06.01.01
- A5.05.02.06.01.02
- A5.05.02.06.01.03

-

Please select target document for A5.05.02.10.01.nn:

- A5.05.02.10.01.00
- A5.05.02.10.01.01
- A5.05.02.10.01.02

-

Please select target document for A5.05.02.06.01.nn:

- A5.05.02.06.01.00
- A5.05.02.06.01.01
- A5.05.02.06.01.02
- A5.05.02.06.01.03

-

Please select target document for A5.05.02.09.01.nn:

- A5.05.02.09.01.00
- A5.05.02.09.01.01

-

Please select target document for A5.05.02.06.01.nn:

- A5.05.02.06.01.00
- A5.05.02.06.01.01
- A5.05.02.06.01.02
- A5.05.02.06.01.03

-

Please select target document for A5.05.02.07.01.nn:

- A5.05.02.07.01.00
- A5.05.02.07.01.01

-

Please select target document for A5.05.02.06.01.nn:

- A5.05.02.06.01.00
- A5.05.02.06.01.01
- A5.05.02.06.01.02
- A5.05.02.06.01.03

-

Please select target document for A5.05.02.07.01.nn:

- A5.05.02.07.01.00
- A5.05.02.07.01.01

-

Please select target document for A5.05.02.06.01.nn:

- A5.05.02.06.01.00
- A5.05.02.06.01.01
- A5.05.02.06.01.02
- A5.05.02.06.01.03

-

Please select target document for A5.05.02.07.01.nn:

- A5.05.02.07.01.00
- A5.05.02.07.01.01

-

Please select target document for A5.05.02.04.01.nn:

- A5.05.02.04.01.00
- A5.05.02.04.01.01

-

Please select target document for A5.05.02.06.01.nn:

- A5.05.02.06.01.00
- A5.05.02.06.01.01
- A5.05.02.06.01.02
- A5.05.02.06.01.03

-

Please select target document for A5.05.03.03.01.nn:

- A5.05.03.03.01.00
- A5.05.03.03.01.01

-

Please select target document for A5.05.03.04.01.nn:

- A5.05.03.04.01.00
- A5.05.03.04.01.01

-

Please select target document for A5.05.03.04.02.nn:

- A5.05.03.04.02.00
- A5.05.03.04.02.01

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for A5.05.02.06.01.nn:

- A5.05.02.06.01.00
- A5.05.02.06.01.01
- A5.05.02.06.01.02
- A5.05.02.06.01.03

-

Please select target document for A5.05.03.04.01.nn:

- A5.05.03.04.01.00
- A5.05.03.04.01.01

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for A5.05.02.06.01.nn:

- A5.05.02.06.01.00
- A5.05.02.06.01.01
- A5.05.02.06.01.02
- A5.05.02.06.01.03

-

Please select target document for A5.05.03.04.01.nn:

- A5.05.03.04.01.00
- A5.05.03.04.01.01

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for A5.05.02.06.01.nn:

- A5.05.02.06.01.00
- A5.05.02.06.01.01
- A5.05.02.06.01.02
- A5.05.02.06.01.03

-

Please select target document for A5.05.03.03.01.nn:

- A5.05.03.03.01.00
- A5.05.03.03.01.01

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for A5.05.02.06.01.nn:

- A5.05.02.06.01.00
- A5.05.02.06.01.01
- A5.05.02.06.01.02
- A5.05.02.06.01.03

-

Please select target document for A5.05.03.03.01.nn:

- A5.05.03.03.01.00
- A5.05.03.03.01.01

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for A5.05.03.03.01.nn:

- A5.05.03.03.01.00
- A5.05.03.03.01.01

-

Please select target document for A5.05.03.04.01.nn:

- A5.05.03.04.01.00
- A5.05.03.04.01.01

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for A5.05.03.03.01.nn:

- A5.05.03.03.01.00
- A5.05.03.03.01.01

-

Please select target document for A5.05.03.04.01.nn:

- A5.05.03.04.01.00
- A5.05.03.04.01.01

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for B1.05.07.258510 ??:

- B1.05.07.258510 AA
- B1.05.07.258510 BB
- B1.05.07.258510 CC
- B1.05.07.258510 DD
- B1.05.07.258510 EE
- B1.05.07.258510 FF

-

Please select target document for A5.05.04.04.01.nn:

- A5.05.04.04.01.00
- A5.05.04.04.01.01
- A5.05.04.04.01.02

-

Please select target document for A5.05.04.09.01.nn:

- A5.05.04.09.01.00
- A5.05.04.09.01.01

-

Please select target document for B1.05.04.253120 ??:

- B1.05.04.253120 AA
- B1.05.04.253120 BB
- B1.05.04.253120 CC

-

Please select target document for A5.05.04.09.01.nn:

- A5.05.04.09.01.00
- A5.05.04.09.01.01

-

Please select target document for B1.05.04.253120 ??:

- B1.05.04.253120 AA
- B1.05.04.253120 BB
- B1.05.04.253120 CC

-

Please select target document for A5.05.04.09.01.nn:

- A5.05.04.09.01.00
- A5.05.04.09.01.01

-

Please select target document for B1.05.04.253120 ??:

- B1.05.04.253120 AA
- B1.05.04.253120 BB
- B1.05.04.253120 CC

-

Please select target document for A5.05.04.09.01.nn:

- A5.05.04.09.01.00
- A5.05.04.09.01.01

-

Please select target document for B1.05.04.253120 ??:

- B1.05.04.253120 AA
- B1.05.04.253120 BB
- B1.05.04.253120 CC

-

Please select target document for B1.05.03.251110 ??:

- B1.05.03.251110 AA
- B1.05.03.251110 BB
- B1.05.03.251110 CC

-

Please select target document for B1.05.03.251112 ??:

- B1.05.03.251112 AA
- B1.05.03.251112 BB
- B1.05.03.251112 CC
- B1.05.03.251112 DD
- B1.05.03.251112 EE
- B1.05.03.251112 FF
- B1.05.03.251112 GG
- B1.05.03.251112 HH
- B1.05.03.251112 KK
- B1.05.03.251112 LL
- B1.05.03.251112 MM
- B1.05.03.251112 NN
- B1.05.03.251112 PP

-

Please select target document for B1.05.04.253140 ??:

- B1.05.04.253140 AA
- B1.05.04.253140 BB

-

Please select target document for B1.05.03.251112 ??:

- B1.05.03.251112 AA
- B1.05.03.251112 BB
- B1.05.03.251112 CC
- B1.05.03.251112 DD
- B1.05.03.251112 EE
- B1.05.03.251112 FF
- B1.05.03.251112 GG
- B1.05.03.251112 HH
- B1.05.03.251112 KK
- B1.05.03.251112 LL
- B1.05.03.251112 MM
- B1.05.03.251112 NN
- B1.05.03.251112 PP

-

Please select target document for B1.05.04.253140 ??:

- B1.05.04.253140 AA
- B1.05.04.253140 BB

-

Please select target document for B1.05.04.254110 ??:

- B1.05.04.254110 AA
- B1.05.04.254110 BB
- B1.05.04.254110 CC
- B1.05.04.254110 DD

-

Please select target document for B1.05.10.258610 ??:

- B1.05.10.258610 AA
- B1.05.10.258610 BB

-

Please select target document for B1.05.10.25861n ??:

- B1.05.10.258610 AA
- B1.05.10.258610 BB
- B1.05.10.258614 AA
- B1.05.10.258614 BB
- B1.05.10.258617 AA
- B1.05.10.258617 BB
- B1.05.10.258617 CC
- B1.05.10.258617 DD
- B1.05.10.258617 EE
- B1.05.10.258617 FF

-

Please select target document for B1.05.06.257210 ??:

- B1.05.06.257210 AA
- B1.05.06.257210 BB
- B1.05.06.257210 CC
- B1.05.06.257210 DD

-

Please select target document for B1.05.06.257260 ??:

- B1.05.06.257260 AA
- B1.05.06.257260 BB
- B1.05.06.257260 CC
- B1.05.06.257260 DD
- B1.05.06.257260 EE

-

Please select target document for B1.05.06.257210 ??:

- B1.05.06.257210 AA
- B1.05.06.257210 BB
- B1.05.06.257210 CC
- B1.05.06.257210 DD

-

Please select target document for B1.05.06.257260 ??:

- B1.05.06.257260 AA
- B1.05.06.257260 BB
- B1.05.06.257260 CC
- B1.05.06.257260 DD
- B1.05.06.257260 EE

-

Please select target document for B1.05.06.257210 ??:

- B1.05.06.257210 AA
- B1.05.06.257210 BB
- B1.05.06.257210 CC
- B1.05.06.257210 DD

-

Please select target document for B1.05.06.257260 ??:

- B1.05.06.257260 AA
- B1.05.06.257260 BB
- B1.05.06.257260 CC
- B1.05.06.257260 DD
- B1.05.06.257260 EE

-

Please select target document for B1.05.06.257260 ??:

- B1.05.06.257260 AA
- B1.05.06.257260 BB
- B1.05.06.257260 CC
- B1.05.06.257260 DD
- B1.05.06.257260 EE

-

Please select target document for B1.05.06.257260 ??:

- B1.05.06.257260 AA
- B1.05.06.257260 BB
- B1.05.06.257260 CC
- B1.05.06.257260 DD
- B1.05.06.257260 EE

-

Please select target document for B1.05.06.257210 ??:

- B1.05.06.257210 AA
- B1.05.06.257210 BB
- B1.05.06.257210 CC
- B1.05.06.257210 DD

-

Please select target document for B1.05.06.257240 ??:

- B1.05.06.257240 AA
- B1.05.06.257240 BB
- B1.05.06.257240 CC
- B1.05.06.257240 DD

-

Please select target document for B1.05.06.257280 ??:

- B1.05.06.257280 AA
- B1.05.06.257280 BB
- B1.05.06.257280 CC
- B1.05.06.257280 DD
- B1.05.06.257280 EE

-

Please select target document for B1.05.06.257240 ??:

- B1.05.06.257240 AA
- B1.05.06.257240 BB
- B1.05.06.257240 CC
- B1.05.06.257240 DD

-

Please select target document for B1.05.06.257280 ??:

- B1.05.06.257280 AA
- B1.05.06.257280 BB
- B1.05.06.257280 CC
- B1.05.06.257280 DD
- B1.05.06.257280 EE

-

Please select target document for B1.05.06.25725n ??:

- B1.05.06.257250 AA
- B1.05.06.257250 BB
- B1.05.06.257250 CC
- B1.05.06.257250 DD
- B1.05.06.257250 EE
- B1.05.06.257255 AA
- B1.05.06.257255 BB
- B1.05.06.257255 CC
- B1.05.06.257255 DD
- B1.05.06.257255 EE
- B1.05.06.257259 AA
- B1.05.06.257259 BB
- B1.05.06.257259 CC
- B1.05.06.257259 DD
- B1.05.06.257259 EE
- B1.05.06.257259 FF
- B1.05.06.257259 GG
- B1.05.06.257259 HH
- B1.05.06.257259 KK
- B1.05.06.257259 LL
- B1.05.06.257259 MM
- B1.05.06.257259 NN
- B1.05.06.257259 PP
- B1.05.06.257259 RR
- B1.05.06.257259 SS
- B1.05.06.257259 TT

-

Please select target document for B1.05.06.257259 ??:

- B1.05.06.257259 AA
- B1.05.06.257259 BB
- B1.05.06.257259 CC
- B1.05.06.257259 DD
- B1.05.06.257259 EE
- B1.05.06.257259 FF
- B1.05.06.257259 GG
- B1.05.06.257259 HH
- B1.05.06.257259 KK
- B1.05.06.257259 LL
- B1.05.06.257259 MM
- B1.05.06.257259 NN
- B1.05.06.257259 PP
- B1.05.06.257259 RR
- B1.05.06.257259 SS
- B1.05.06.257259 TT

-

Please select target document for B1.05.06.257259 ??:

- B1.05.06.257259 AA
- B1.05.06.257259 BB
- B1.05.06.257259 CC
- B1.05.06.257259 DD
- B1.05.06.257259 EE
- B1.05.06.257259 FF
- B1.05.06.257259 GG
- B1.05.06.257259 HH
- B1.05.06.257259 KK
- B1.05.06.257259 LL
- B1.05.06.257259 MM
- B1.05.06.257259 NN
- B1.05.06.257259 PP
- B1.05.06.257259 RR
- B1.05.06.257259 SS
- B1.05.06.257259 TT

-

Please select target document for B1.05.06.257259 ??:

- B1.05.06.257259 AA
- B1.05.06.257259 BB
- B1.05.06.257259 CC
- B1.05.06.257259 DD
- B1.05.06.257259 EE
- B1.05.06.257259 FF
- B1.05.06.257259 GG
- B1.05.06.257259 HH
- B1.05.06.257259 KK
- B1.05.06.257259 LL
- B1.05.06.257259 MM
- B1.05.06.257259 NN
- B1.05.06.257259 PP
- B1.05.06.257259 RR
- B1.05.06.257259 SS
- B1.05.06.257259 TT

-

Please select target document for B1.05.06.257259 ??:

- B1.05.06.257259 AA
- B1.05.06.257259 BB
- B1.05.06.257259 CC
- B1.05.06.257259 DD
- B1.05.06.257259 EE
- B1.05.06.257259 FF
- B1.05.06.257259 GG
- B1.05.06.257259 HH
- B1.05.06.257259 KK
- B1.05.06.257259 LL
- B1.05.06.257259 MM
- B1.05.06.257259 NN
- B1.05.06.257259 PP
- B1.05.06.257259 RR
- B1.05.06.257259 SS
- B1.05.06.257259 TT

-

Please select target document for A5.05.07.03.01.nn:

- A5.05.07.03.01.00
- A5.05.07.03.01.01

-

Please select target document for A5.05.07.15.01.nn:

- A5.05.07.15.01.00
- A5.05.07.15.01.01

-

Please select target document for B1.05.07.258510 ??:

- B1.05.07.258510 AA
- B1.05.07.258510 BB
- B1.05.07.258510 CC
- B1.05.07.258510 DD
- B1.05.07.258510 EE
- B1.05.07.258510 FF

-

Please select target document for B1.05.07.258540 ??:

- B1.05.07.258540 AA
- B1.05.07.258540 BB
- B1.05.07.258540 CC
- B1.05.07.258540 DD
- B1.05.07.258540 EE
- B1.05.07.258540 FF
- B1.05.07.258540 GG
- B1.05.07.258540 HH
- B1.05.07.258540 KK
- B1.05.07.258540 LL
- B1.05.07.258540 MM
- B1.05.07.258540 NN

-

Please select target document for B1.05.08.258480 ??:

- B1.05.08.258480 AA
- B1.05.08.258480 BB
- B1.05.08.258480 CC

-

Please select target document for B1.05.07.253597 ??:

- B1.05.07.253597 AA
- B1.05.07.253597 BB

-

Please select target document for B1.05.07.253597 ??:

- B1.05.07.253597 AA
- B1.05.07.253597 BB

-

Please select target document for B1.05.01.252107 ??:

- B1.05.01.252107 AA
- B1.05.01.252107 BB

-

Please select target document for A5.05.07.09.01.nn:

- A5.05.07.09.01.00
- A5.05.07.09.01.01

-

Please select target document for B1.05.07.252267 ??:

- B1.05.07.252267 AA
- B1.05.07.252267 BB

-

Please select target document for B1.05.07.252267 ??:

- B1.05.07.252267 AA
- B1.05.07.252267 BB

-

Please select target document for B1.05.07.252267 ??:

- B1.05.07.252267 AA
- B1.05.07.252267 BB

-

Please select target document for B1.05.07.n.7667 ??:

- B1.05.07.9.7667 AA
- B1.05.07.9.7667 BB
- B1.05.07.9.7667 CC
- B1.05.07.1.7667 FF

-

Please select target document for B1.05.07.1.7668 ??:

- B1.05.07.1.7668 DD
- B1.05.07.1.7668 GG

-

Please select target document for B1.05.07.256487 ??:

- B1.05.07.256487 AA
- B1.05.07.256487 BB

-

Please select target document for B1.05.07.25648n ??:

- B1.05.07.256480 AA
- B1.05.07.256485 AA
- B1.05.07.256487 AA
- B1.05.07.256487 BB

-

Please select target document for B1.05.07.258510 ??:

- B1.05.07.258510 AA
- B1.05.07.258510 BB
- B1.05.07.258510 CC
- B1.05.07.258510 DD
- B1.05.07.258510 EE
- B1.05.07.258510 FF

-

Please select target document for B1.05.07.258510 ??:

- B1.05.07.258510 AA
- B1.05.07.258510 BB
- B1.05.07.258510 CC
- B1.05.07.258510 DD
- B1.05.07.258510 EE
- B1.05.07.258510 FF

-

Please select target document for B1.05.08.25641n ??:

- B1.05.08.256410 AA
- B1.05.08.256410 BB
- B1.05.08.256414 AA
- B1.05.08.256414 BB
- B1.05.08.256415 AA
- B1.05.08.256415 BB
- B1.05.08.256417 AA
- B1.05.08.256417 BB
- B1.05.08.256417 CC
- B1.05.08.256417 DD
- B1.05.08.256417 EE
- B1.05.08.256417 FF

-

Please select target document for B1.05.08.256417 ??:

- B1.05.08.256417 AA
- B1.05.08.256417 BB
- B1.05.08.256417 CC
- B1.05.08.256417 DD
- B1.05.08.256417 EE
- B1.05.08.256417 FF

-

Please select target document for B1.05.08.256417 ??:

- B1.05.08.256417 AA
- B1.05.08.256417 BB
- B1.05.08.256417 CC
- B1.05.08.256417 DD
- B1.05.08.256417 EE
- B1.05.08.256417 FF

-

Please select target document for B1.05.08.256417 ??:

- B1.05.08.256417 AA
- B1.05.08.256417 BB
- B1.05.08.256417 CC
- B1.05.08.256417 DD
- B1.05.08.256417 EE
- B1.05.08.256417 FF

-

Please select target document for B1.05.08.257657 ??:

- B1.05.08.257657 AA
- B1.05.08.257657 BB

-

Please select target document for B1.05.09.9.6437 ??:

- B1.05.09.9.6437 AA
- B1.05.09.9.6437 BB

-

Please select target document for B1.05.09.256440 ??:

- B1.05.09.256440 AA
- B1.05.09.256440 BB

-

Please select target document for B1.05.05.254241 ??:

- B1.05.05.254241 AA
- B1.05.05.254241 BB
- B1.05.05.254241 CC

-

Please select target document for B1.05.11.9.4842 ??:

- B1.05.11.9.4842 XX
- B1.05.11.9.4842 YY
- B1.05.11.9.4842 ZB

-

Please select target document for B1.05.11.254842 ??:

- B1.05.11.254842 AA
- B1.05.11.254842 BB
- B1.05.11.254842 CC
- B1.05.11.254842 DD
- B1.05.11.254842 EE
- B1.05.11.254842 GG
- B1.05.11.254842 HH
- B1.05.11.254842 KK
- B1.05.11.254842 LL
- B1.05.11.254842 MM
- B1.05.11.254842 NN
- B1.05.11.254842 PP

-

Please select target document for B1.05.11.1.4877 ??:

- B1.05.11.1.4877 GG
- B1.05.11.1.4877 MM

-

Please select target document for A5.05.08.03.02.nn:

- A5.05.08.03.02.00
- A5.05.08.03.02.01

-

Please select target document for B1.05.12.1.6347 ??:

- B1.05.12.1.6347 ZH
- B1.05.12.1.6347 ZS
- B1.05.12.1.6347 ZT

-

Please select target document for A5.05.08.03.02.nn:

- A5.05.08.03.02.00
- A5.05.08.03.02.01

-

Please select target document for B1.05.12.1.6347 ??:

- B1.05.12.1.6347 ZH
- B1.05.12.1.6347 ZS
- B1.05.12.1.6347 ZT

-

Please select target document for A5.05.08.03.02.nn:

- A5.05.08.03.02.00
- A5.05.08.03.02.01

-

Please select target document for B1.05.12.1.6347 ??:

- B1.05.12.1.6347 ZH
- B1.05.12.1.6347 ZS
- B1.05.12.1.6347 ZT

-

Please select target document for B1.05.12.1.6347 ??:

- B1.05.12.1.6347 ZH
- B1.05.12.1.6347 ZS
- B1.05.12.1.6347 ZT

-

Please select target document for B1.05.12.1.6347 ??:

- B1.05.12.1.6347 ZH
- B1.05.12.1.6347 ZS
- B1.05.12.1.6347 ZT

-

Please select target document for B1.05.12.257330 ??:

- B1.05.12.257330 AA
- B1.05.12.257330 BB
- B1.05.12.257330 CC

-

Please select target document for B1.05.12.257330 ??:

- B1.05.12.257330 AA
- B1.05.12.257330 BB
- B1.05.12.257330 CC