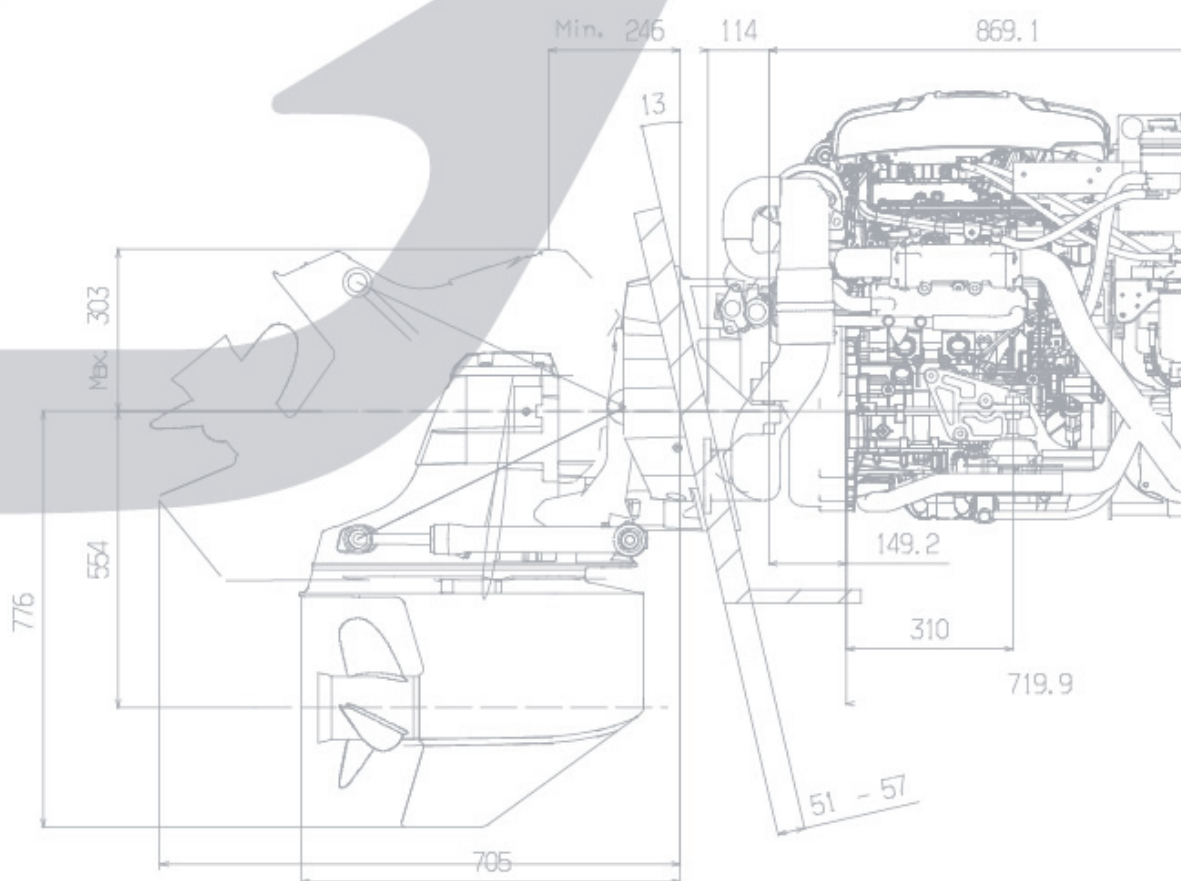




INSTALLATION & OPERATION MANUAL

S250 & S220 SERIES ENGINES



Applicable to S250S, S250P, S250J, S220S, S220P model

4th Edition

TABLE OF CONTENTS

	PAGE NUMBER
ABOUT THIS MANUAL	3
SAFETY PRECAUTIONS	4
CHAPTER 1 ENGINE OVERVIEW	5
1. ENGINE COMPONENTS	5
2. ENGINE SUSPENSION EYES	6
3. ENGINE IDENTIFICATION	7
4. SCHEMATIC DIAGRAM OF COMMON RAIL DIESEL ENGINE	8
5. TECHNICAL DATA	9
6. PERFORMANCE CURVES	10
7. ENGINE DIMENSIONS	13
CHAPTER 2 ENGINE MOUNT SYSTEM	16
1. ENGINE MOUNTING REQUIREMENTS	16
2. MOUNT DIMENSIONS	16
3. ENGINE MOUNT TOOL FOR STERNDRIVE MODEL	17
CHAPTER 3 COOLING & EXHAUST SYSTEM	18
1. SCHEMATIC DIAGRAM OF ENGINE COOLING CIRCUIT	18
2. SEAWATER FLOW.....	19
2.1 WATER PICKUP	19
2.2 SEAWATER STRAINER	19
2.3 SEAWATER PUMP	20
3. ENGINE COOLANT FLOW.....	22
3.1 ENGINE COOLANT	22
3.2 REMOVING AIR BUBBLES.....	24
3.3 CABIN HEATER CONNECTION	24
4. EXHAUST SYSTEM	25
CHAPTER 4 FUEL SYSTEM	26
1. FUEL FLOW.....	27
2. LOW PRESSURE FUEL LINE	27
3. ACCELERATION SENSOR AND CONTROL LEVER	28
4. RECOMMENDED FUEL QUALITY	29
5. DRAINING WATER FROM FUEL FILTER	29
CHAPTER 5 AIR INTAKE SYSTEM	30
1. ENGINE ROOM VENTILATION	30
2. AIR FILTER MAINTENANCE	31
CHAPTER 6 LUBRICATION SYSTEM	32
1. ENGINE OIL FLOW.....	32
2. ENGINE OIL LEVEL CHECKS	33
3. RECOMMENDED OIL QUALITY	33
4. ENGINE OIL EXTRACTION PUMP	34
5. OIL FILTER REPLACEMENT	34

TABLE OF CONTENTS

	PAGE NUMBER
CHAPTER 7 ELECTRICAL SYSTEM	35
1. BATTERY CABLE CONNECTIONS	35
2. BATTERY CHECKS	36
3. FUSE AND RELAY	37
CHAPTER 8 INSTRUMENT SYSTEM	39
1. INSTRUMENT CONNECTIONS	39
2. CUT-OUT FOR GAUGE	41
3. CUT-OUT FOR EOI SYSTEM	41
CHAPTER 9 EOI SYSTEM	42
1. OVERVIEW OF EOI SYSTEM	42
1.1 INFORMATION LCD	42
1.2 SWITCHES	43
1.3 ALARM LAMPS	43
2. EOI CONNECTIONS	44
3. EOI PIN ASSIGNMENT	45
4. NEUTRAL SWITCH AND DUAL EOI CONNECTION	47
5. TRIM WIRING CONNECTION DIAGRAM	48
6. ALARM AND DTC(DIAGNOSIS TROUBLE CODE)	49
6.1 ALARM AND DTC(DIAGNOSIS TROUBLE CODE)	50
6.2 DTC(DIAGNOSIS TROUBLE CODE) LIST.....	52
CHAPTER 10 ANTI CORROSION SYSTEM	57
CHAPTER 11 ENGINE OPERATION	58
1. ENGINE ON/OFF	58
2. ENGINE BREAK-IN	59
3. STOPPING THE ENGINE	59
4. EMERGENCY STOP	60
5. WINTER OPERATION AND STORAGE	60
CHAPTER 12 ENGINE STORAGE	61
CHAPTER 13 MAINTENANCE	62
1. PREDELIVERY INSPECTION LIST	63
2. MAINTENANCE SCHEDULE	63
3. STERNDRIVE & TRANSMISSION MAINTENANCE SCHEDULE	64
4. MAINTENANCE LOG.....	65
CHAPTER 14 TROUBLESHOOTING GUIDE	66
CHAPTER 15 WARRANTY	68
WARRANTY REGISTRATION CARD	71

ABOUT THIS MANUAL

This engine installation and operation manual is provided as guidance for the installation of Hyundai SeasAll engine in a boat, and to describe engine operation. Its purpose is to provide technical information to aid in performing an effective engine installation so as to achieve both maximum performance and service life. For information on installation, operation and maintenance of the ZF Marine Transmissions and Sterndrive Bravo Models, please see the separate booklets included in the original packaging of your Hyundai SeasAll purchase.

Hyundai SeasAll is committed to making clear and accurate information available for those who own, maintain and repair the S250 & S220 Series engines. Hyundai SeasAll values your input regarding revisions and additional information for our manuals.

- The manufacturer is not liable for any damages or losses caused by faulty installation, wrong handling of the equipment and/or deficient maintenance.
- The operator is responsible for the correct and safe operation of the engine and safety of its occupants and general public.
- It is strongly recommended that each operator read and understand this manual before installing and operating the engine.
- This manual as well as safety labels posted on the engine use the following safety alerts to draw your attention to special safety instructions that should be followed.



WARNING

DEVIATION FROM INSTALLATION INSTRUCTIONS AND OPERATION GUIDELINES MAY LEAD TO PERSONAL INJURY OR DEATH TO OPERATORS AND NEARBY PERSONNEL.



CAUTION

DEVIATION FROM INSTALLATION INSTRUCTIONS AND OPERATION GUIDELINES MAY LEAD TO IMPROPER OPERATION, DAMAGE OR DESTRUCTION OF THE ENGINE.

SAFETY PRECAUTIONS

- Read and understand this operator's manual as well as other information supplied by Hyundai SeasAll for safer use of these products. Be sure to check your engine regularly.
- Do not use the engine for a purpose other than what is intended by Hyundai SeasAll. Do not modify the performance of the supplied engine without the express permission of Hyundai SeasAll. This can be dangerous, can shorten the life of your engine and can invalidate your warranty.
- Original and genuine parts supplied from Hyundai SeasAll must be used for inspections and maintenance. Hyundai SeasAll does not guarantee any damage caused by the use of imitation parts.
- Engine inspection and maintenance should be carried out by properly trained and factory approved service engineers.
- The engine should be inspected if the electronic engine control unit shuts down the engine or puts it into the "limp home" mode.

HOT SURFACES AND FLUIDS

- There is always a risk of burns when working with a hot engine. Be aware of hot parts like the turbocharger system, the exhaust system, hot coolant hoses, etc. Wait until the engine is fully cool to do inspection and maintenance.

REFUELING

- Refuel only after the engine completely stops.
- Use only the recommended fuel. The wrong grade of fuel can cause operating problems, can cause the engine to stop and can cause engine damage.
- Pay special attention to safe practices when refueling.

PAINT DAMAGE

- Damage of the engine or parts paint during maintenance and inspection can cause corrosion. Any damage must be repainted after inspection and maintenance.

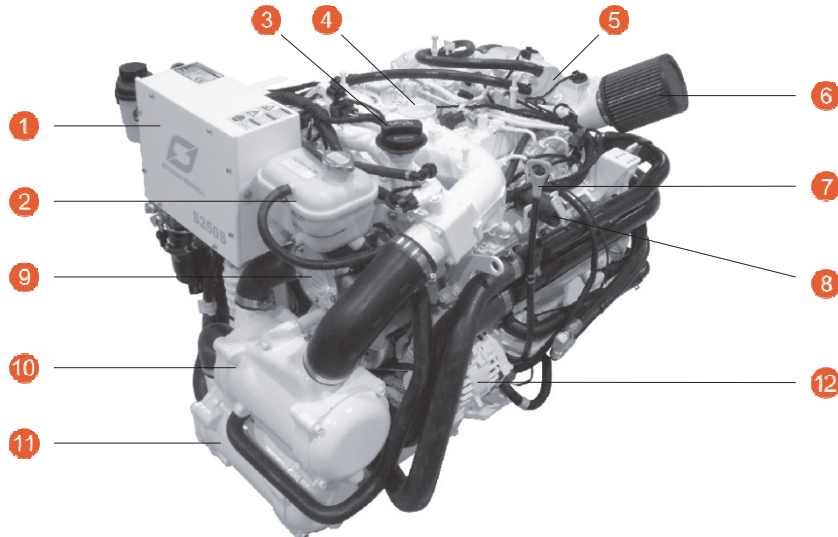
WELDING ON ENGINE

- Welding directly on the engine block can cause damage to the engine control systems. The ECU and related electronic devices must be disconnected and removed if unavoidable welding is needed.

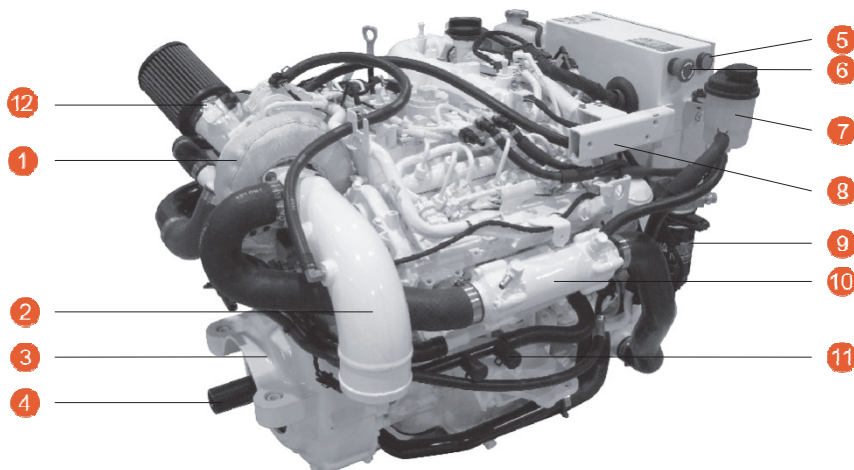
CHAPTER 1

ENGINE OVERVIEW

1. ENGINE COMPONENTS



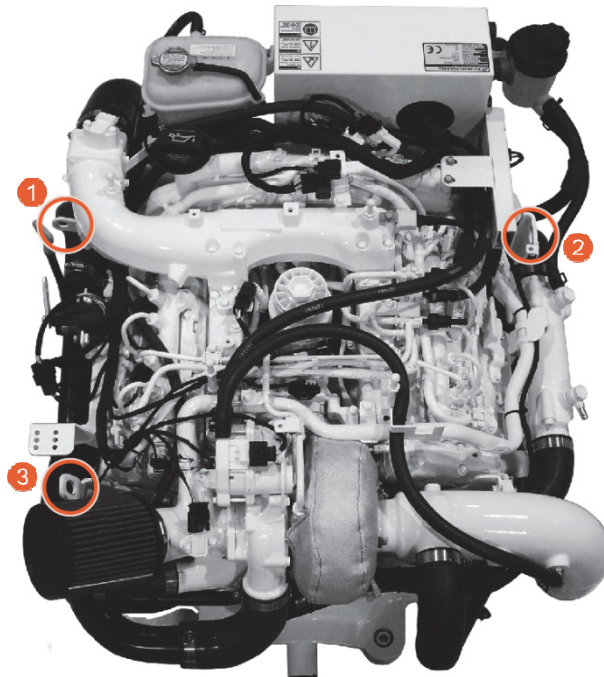
- | | |
|---------------------------|------------------------------|
| 1. ECU Box | 7. Engine Oil Gauge |
| 2. Coolant Expansion Tank | 8. Acceleration Lever Sensor |
| 3. Engine Oil Cap | 9. Seawater Pump |
| 4. Engine Oil Filter | 10. Intercooler |
| 5. E-VGT & Cooler | 11. Heat Exchanger |
| 6. Air Filter | 12. Alternator |



- | | |
|--------------------------------------|---|
| 1. Turbo Heat Protector | 7. P/STRG Oil Reservoir Tank (Sterndrive Model) |
| 2. Exhaust Elbow | 8. Shift Plate (Sterndrive Model) |
| 3. Bell Housing (Sterndrive Model) | 9. Main Fuel Filter with Water Detection Sensor |
| 4. Drive Coupler (Sterndrive Model) | 10. T/M Oil Cooler or P/STRG Oil Cooler |
| 5. Engine Oil Extraction Pump Button | 11. Cabin Heater Connector |
| 6. Engine Emergency Stop Button | 12. BPS & IATS |

2. ENGINE SUSPENSION EYES

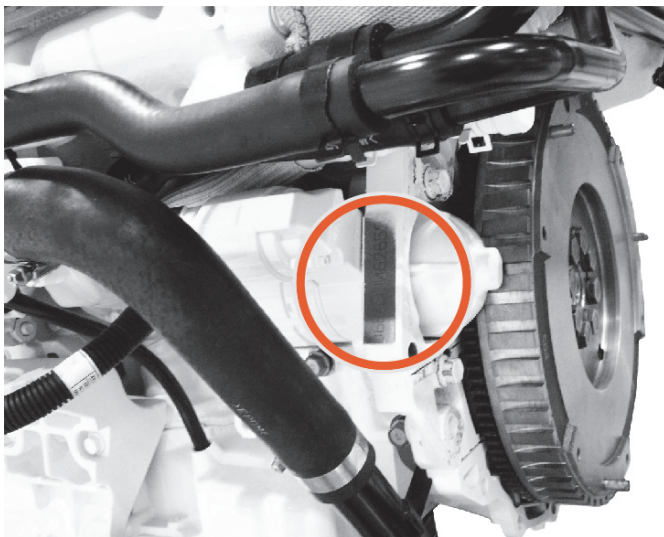
- 1) To lift the engine, first remove the engine cover. You will find three engine eyes (see figure).
- 2) To avoid engine damage, take care that engine lift chains or belts do not hit or touch surrounding parts during engine lifting.



3. ENGINE IDENTIFICATION

Engine identification is affixed to the engine block and the ECU box (see figure).

▪ SERIAL NUMBER ON THE ENGINE BLOCK



▪ NAME PLATE ON THE ECU BOX

 HYUNDAI SEASALL Hyundai SeasAll Co., Ltd.	
Engine Type	S250
Engine Family	D6EA
Rated Power	250ps/3800rpm
Engine Weight	334kg
Max RPM	4200
No. of cylinders	6
Cylinder bore (mm)	84
Piston stroke (mm)	89
Engine Serial No.	



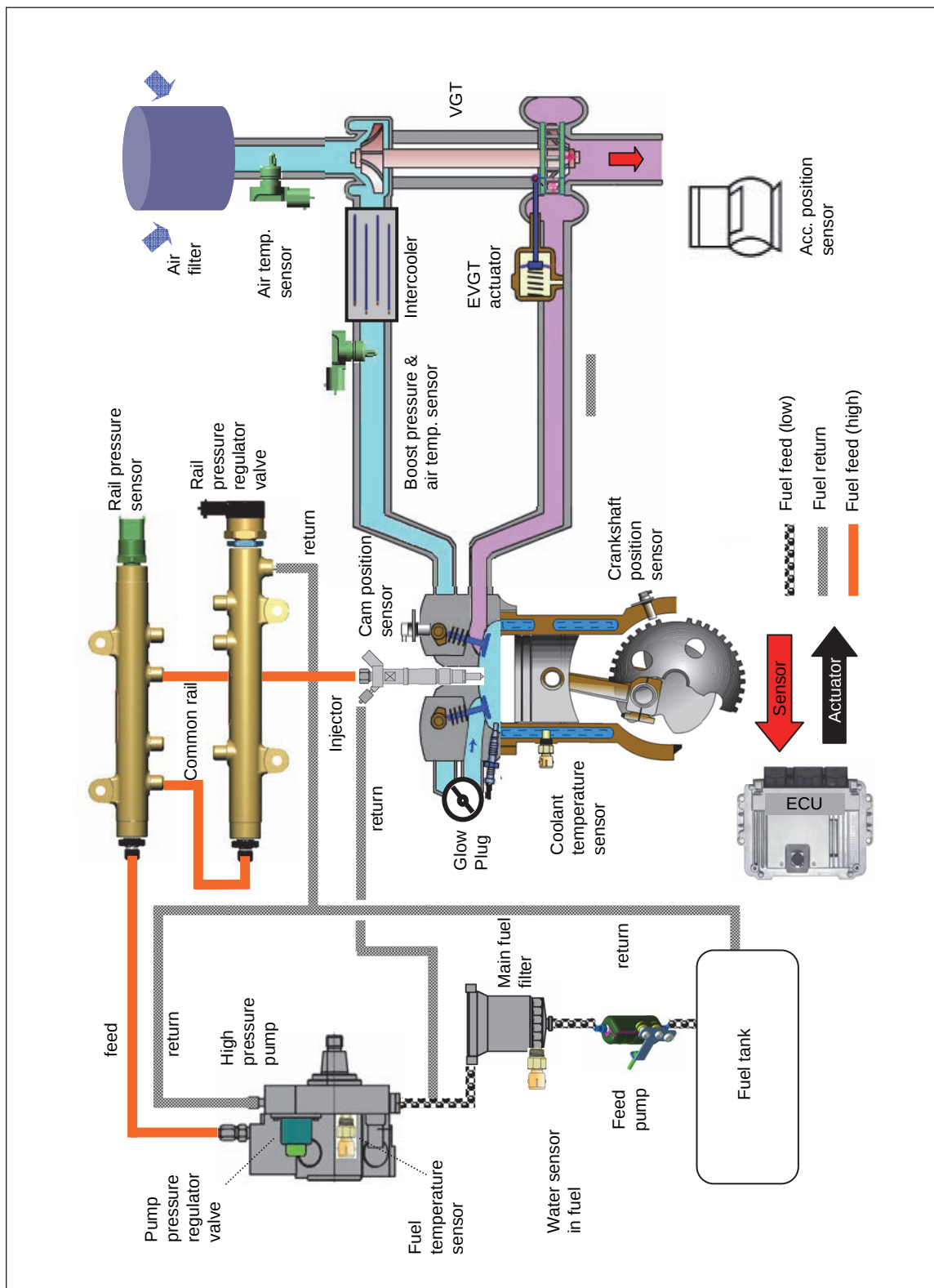
Worldwide

 HYUNDAI SEASALL MARINE ENGINE EMISSION CONTROL INFORMATION	
Conforms to	Tier 2 : NOx+THC 7.5, CO 5.0, PM 0.4 g/kWh
Model Year	2011
Engine Family	BHYSN2.96S25
Engine Model	S250S
Rated power/Speed	184 kW/3800 rpm
Idle Speed	680 rpm
Displac./Cyl	0.49 liters
Useful-life	Acc. to 94.9(a)(1)
Propulsion System	Stern drive

•This engine conforms to model year 2011 U.S. EPA Regulation 40 CFR part 94 Control of Air Pollution from Marine Compression Ignition engines.

•This engine is categorized as a recreational marine engine under 40 CFR part 94. Installation of this engine in any nonrecreational vessel is a violation of federal law subject to civil penalty.
HYUNDAI SEASALL Co., Ltd. Made In Korea

4. SCHEMATIC DIAGRAM OF COMMON RAIL DIESEL ENGINE

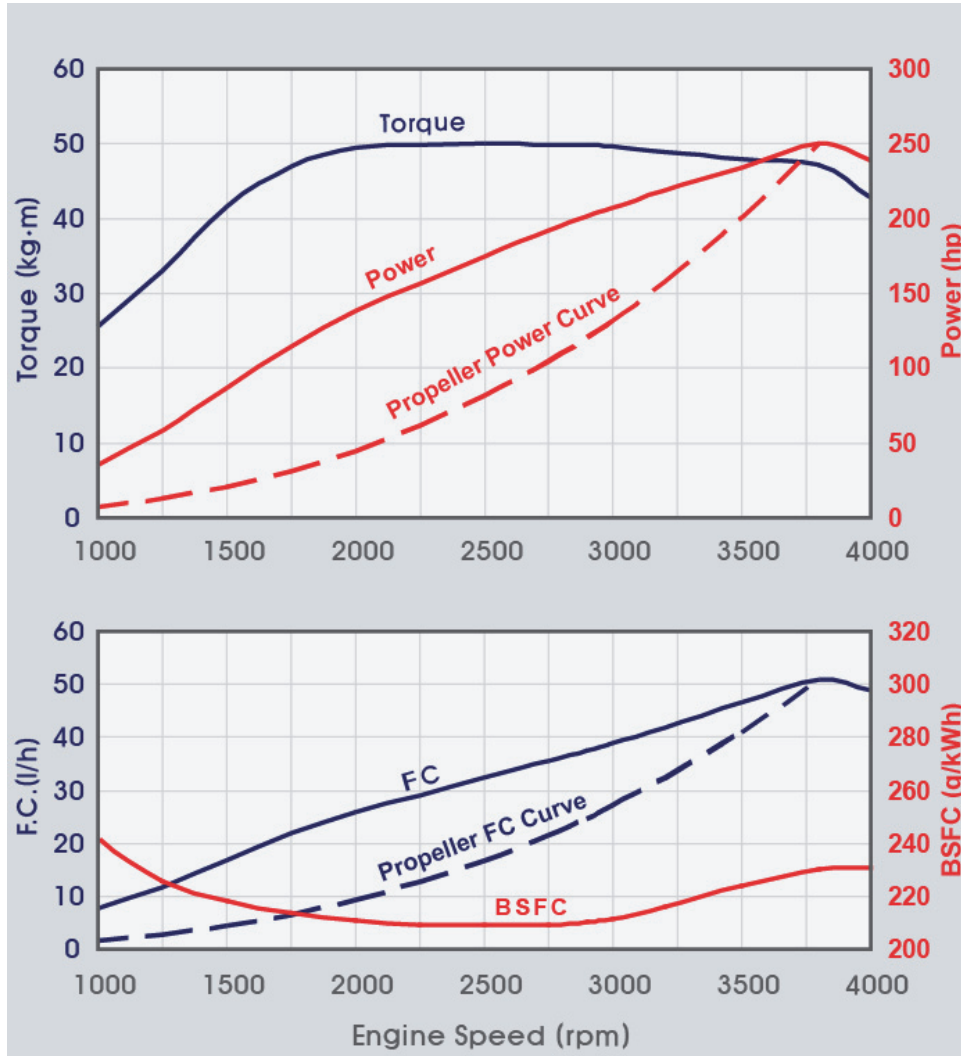


5. TECHNICAL DATA

Engine type	S250 / 220S	S250 / 220P	S250J
	4-stroke, 4-valve		
	After-cooled, direct-injection, water cooled		
Output ps(kW)	250ps (184) / 220ps (162)		
rpm at full load	3800/3200		
Cylinders	V-6		
Ignition sequence	1-2-3-4-5-6		
Displacement [cm ³]	2959		
Bore [mm]	84		
Stroke [mm]	89		
Compression ratio	17.5 : 1		
Max. torque [kgm] @ speed [rpm]	50		48
	2500		3500
Injection system	Common rail direct injection (Piezo injector)		
Diesel fuel	at least CN 51 as per DIN EN 590		
Intake air pressure (abs. bar) @ speed [rpm]	2.5	2.5	2.5
	3800/3200	3800/3200	3800
Coolant quantity (liter)	11.5		
Coolant cap opening pressure (bar)	1.1		
Engine oil (liter)	7.2		
Engine oil pressure (bar)	2~3 at 1750rpm, 100 °C(oil temp.)		
Exhaust gas pressure (kPa)	Max. 50		
Alternator [A]	150		
Engine diagnosis	Yes		
Weight(kg)	334		
Battery capacity (AH)	12V, 200AH recommended		
Thermostat opening temp. (°C)	82 (starting to open), 92 (fully open)		
Idle rpm warmed up (rev/min)	680		
Permissible engine oil temp (°C)	137		
Permissible engine coolant temp (°C)	105		
Propulsion system	Sterndrive	Shaftdrive	Waterjet

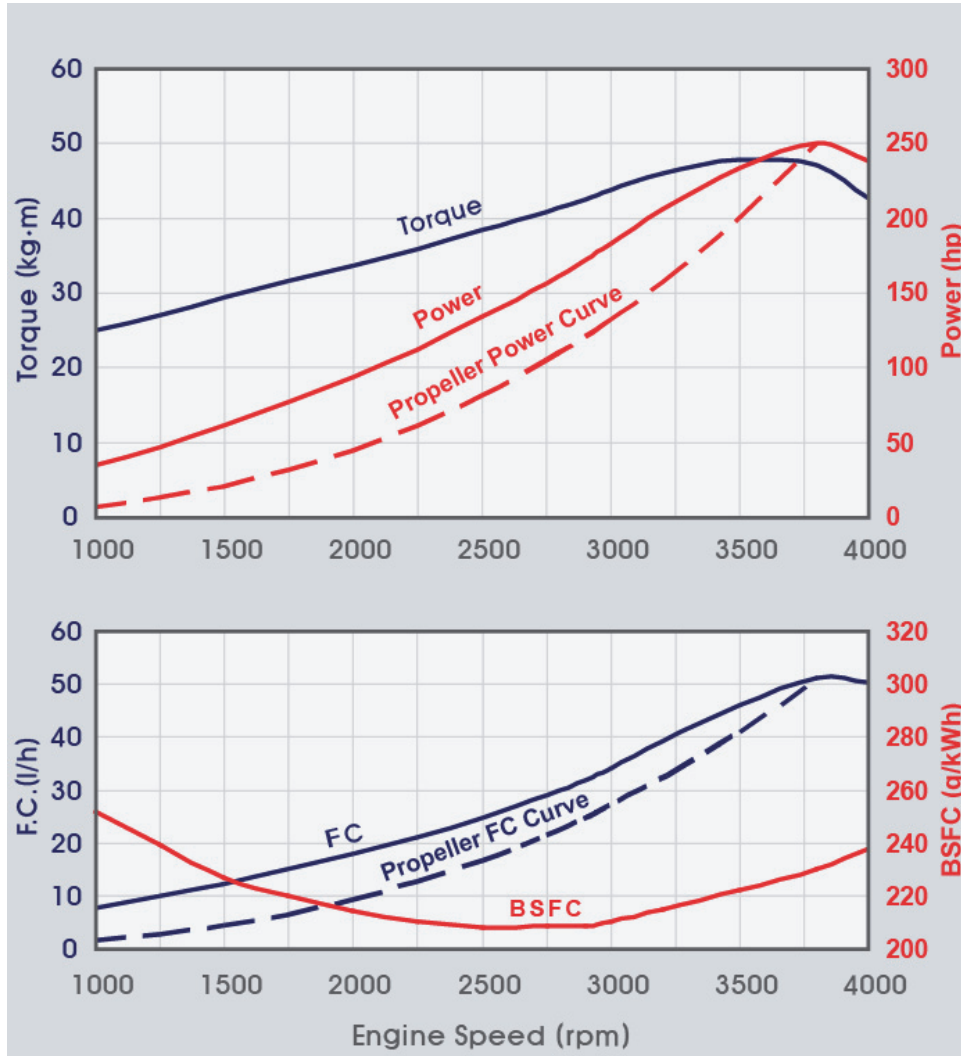
6. PERFORMANCE CURVES

▪ S250S & S250P MODEL



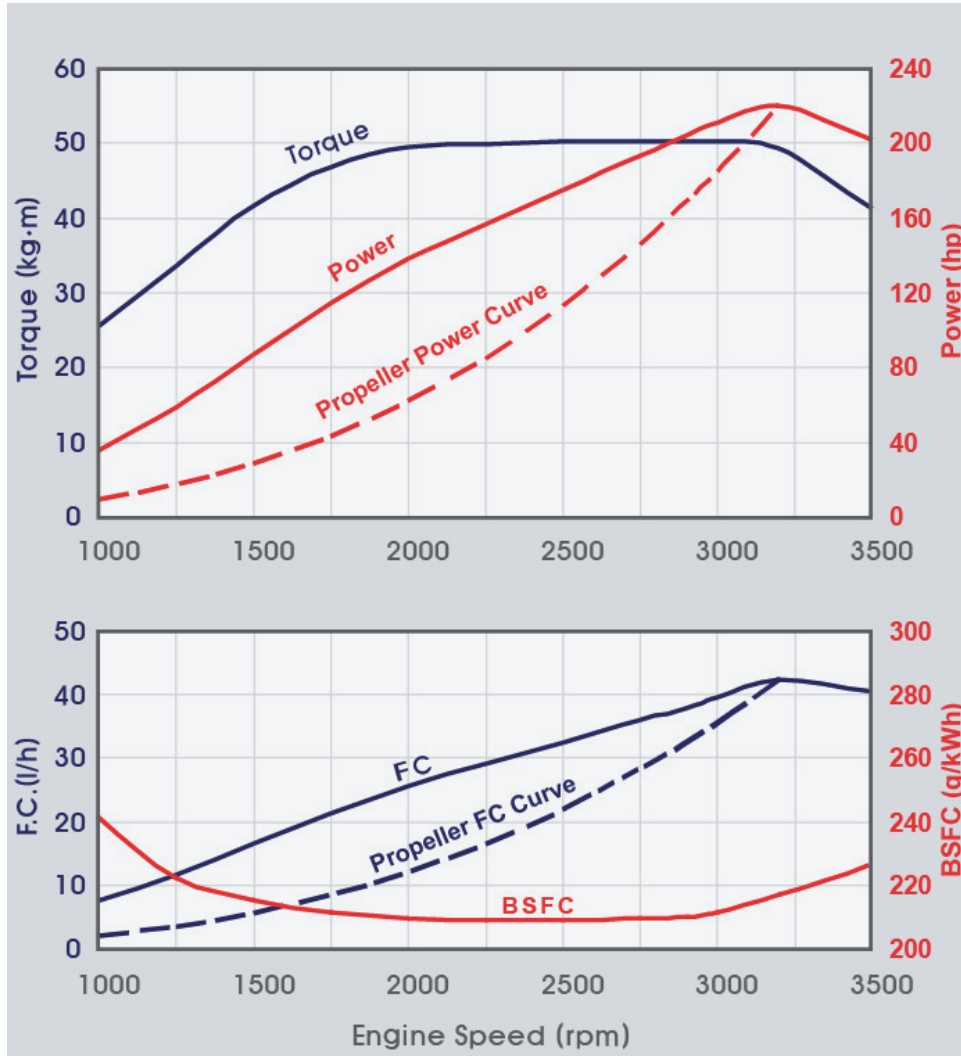
*BSFC : Brake Specific Fuel Consumption *FC : Fuel Consumption

▪ S250J MODEL



*BSFC : Brake Specific Fuel Consumption *FC : Fuel Consumption

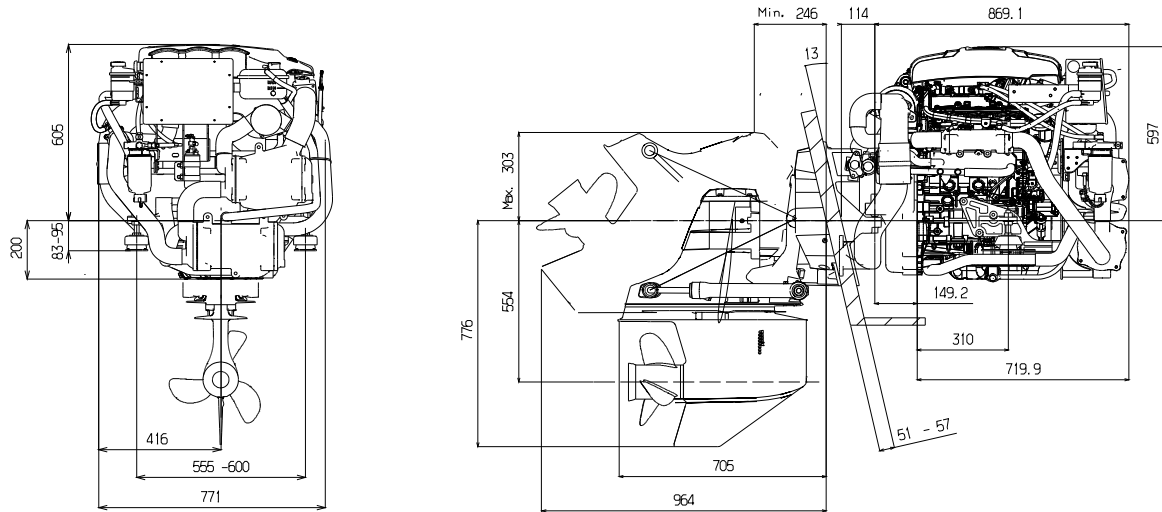
▪ S220S & S220P MODEL



*BSFC : Brake Specific Fuel Consumption *FC : Fuel Consumption

7. ENGINE DIMENSIONS

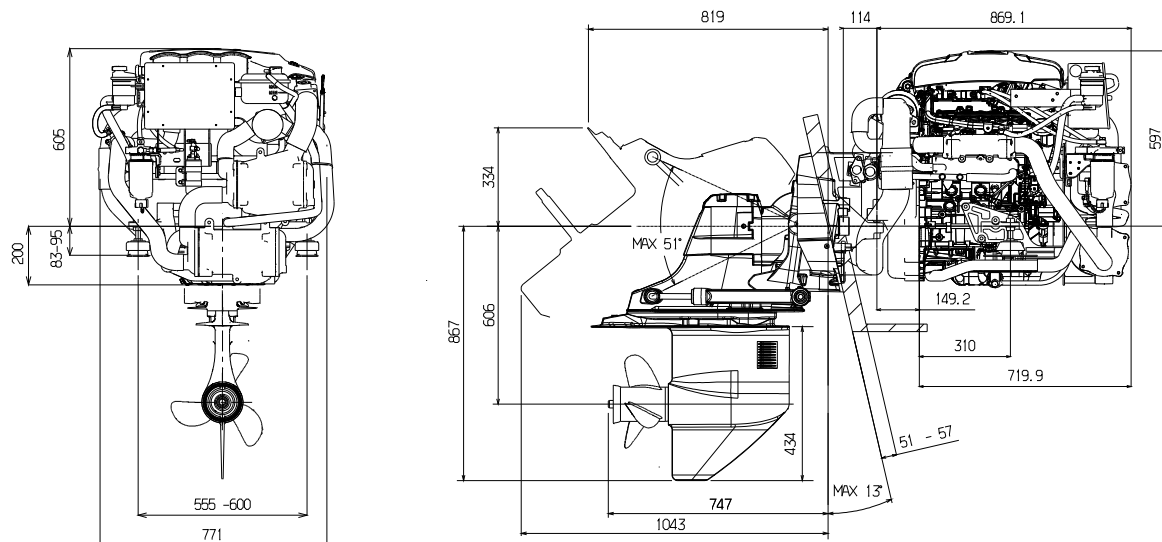
▪ MerCruiser Bravo One X Diesel



Front view

Side view

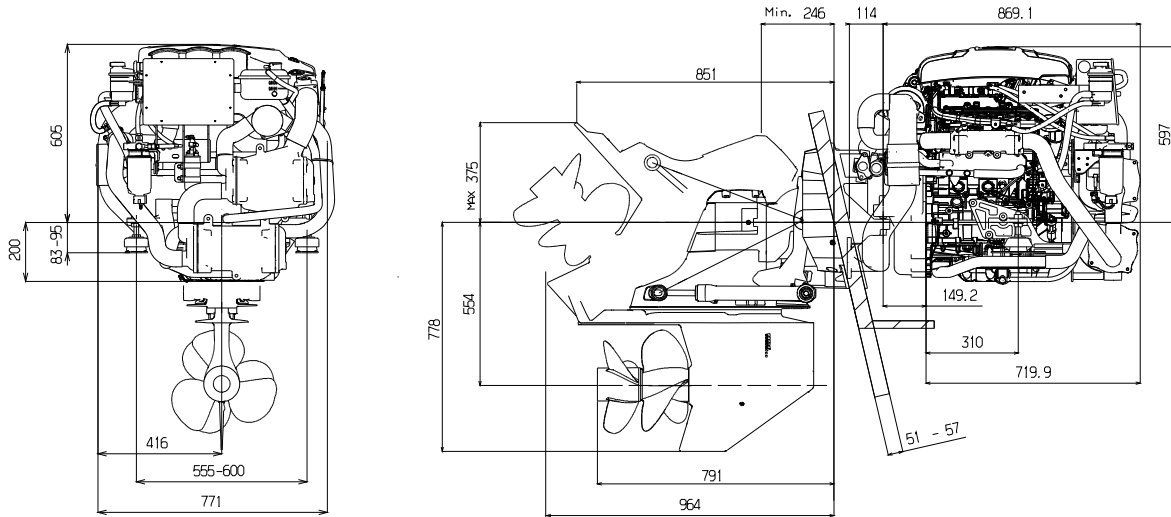
▪ MerCruiser Bravo Two X Diesel



Front view

Side view

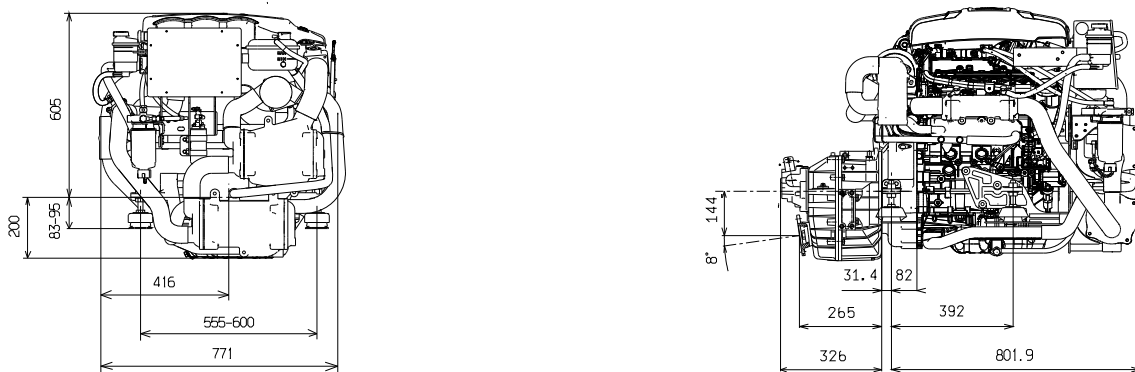
▪ MerCruiser Bravo Three X Diesel



Front view

Side view

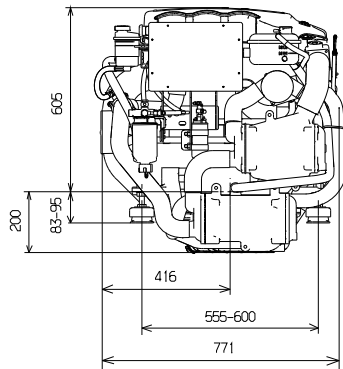
▪ ZF 63 A



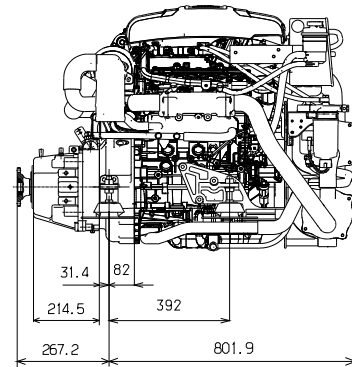
Front view

Side view

▪ ZF 63 C

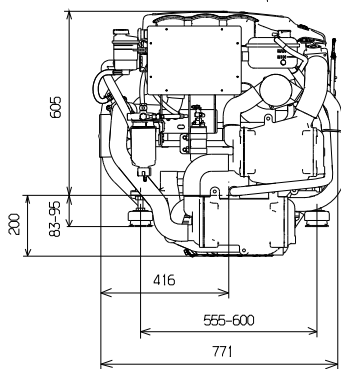


Front view

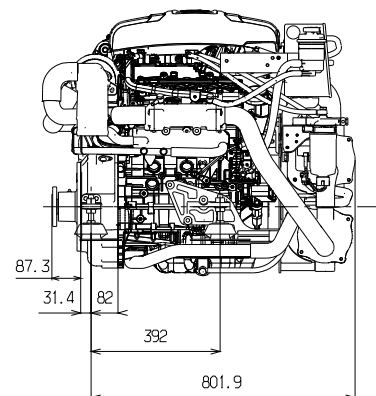


Side view

▪ Waterjet adapter without ZF 45C / ZF 63C



Front view



Side view

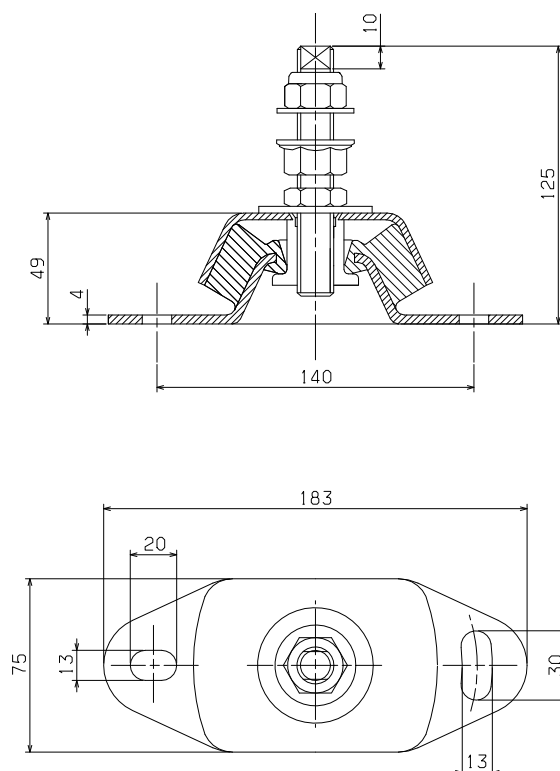
CHAPTER 2

ENGINE MOUNT SYSTEM

1. ENGINE MOUNTING REQUIRMENTS

- The mount must be strong enough to carry the loads applied by the weight and power of the engine. It also must be stiff enough that the engine does not sag or move too much when power is applied.
- The mount must position the engine at the correct height and angle so that the engine's thrust line suits the boat.

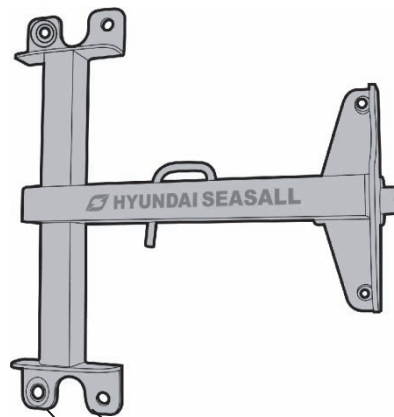
2. ENGINE MOUNT DIMENSIONS



CAUTION

USE ONLY THE ORIGINAL HYUNDAI SEASALL ENGINE MOUNTS THAT WERE SUPPLIED WITH THE INITIAL PURCHASE. AFTER INSTALLATION AND ALIGNMENT OF THE ENGINE, MAKE SURE THAT NO RESIDUAL TENSION EXISTS IN THE DRIVETRAIN.

3. ENGINE MOUNT TOOL FOR STERNDRIVE MODEL



Mounting hole for S250 and S220 model

Mounting hole for D170 and D150 model



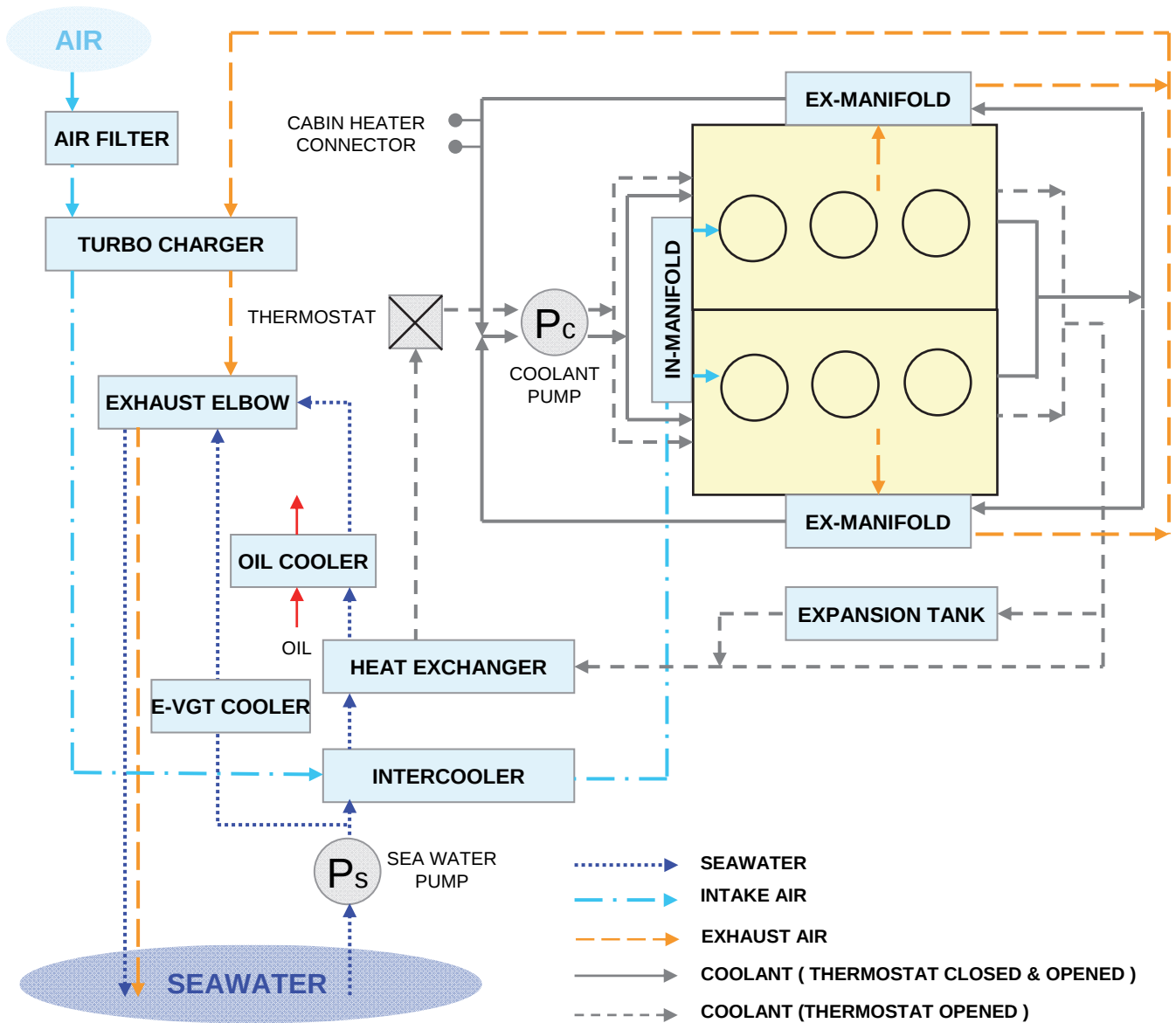
CAUTION

IT IS ESSENTIAL THAT THE ENGINE BED IS PERFECTLY FLAT BEFORE USING ENGINE MOUNT TOOL.
FOR INFORMATION ON INSTALLATION OF THE STERNDRIVE BRAVO MODELS, PLEASE SEE THE SEPARATE BOOKLETS INCLUDED IN THE ORIGINAL PACKAGING OF YOUR HYUNDAI SEASALL PURCHASE.

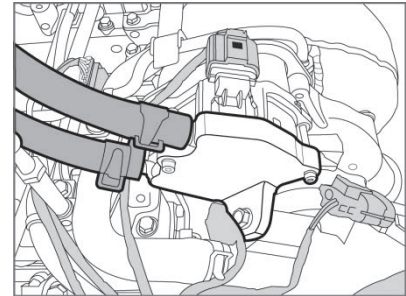
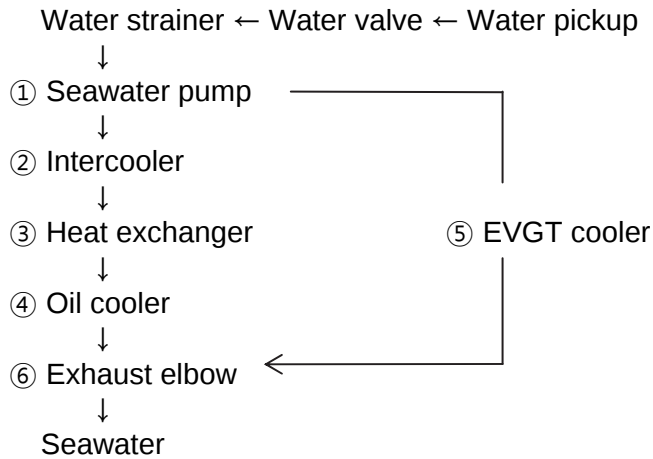
CHAPTER 3

COOLING & EXHAUST SYSTEM

1. SCHEMATIC DIAGRAM OF ENGINE COOLING CIRCUIT



2. SEAWATER FLOW – OPEN COOLING CIRCUIT



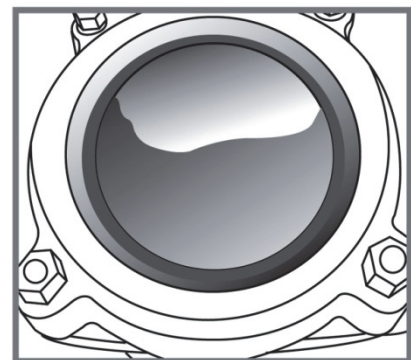
EVGT cooler

2.1 WATER PICKUP

- 1) Water pickup should be installed in an area where it won't pickup air bubbles and will access clean water during all phases of the engine operation.
- 2) For use in sterndrive models, please see the section "Installing Sterndrive Seawater Pickup" of the Bravo Sterndrive Installation Manual included in the original packaging.
- 3) For further safety, you can use an additional transom or bottom mounted clamshell-type water pickup.

2.2 WATER STRAINER

- 1) Strainer should be located in an area where it will be easily accessible for periodic seawater flow inspection and cleaning.
- 2) The size of strainer must be of sufficient capacity to pass the seawater (a flow rate over 200 liters per minute flow rate).
- 3) A water inlet shutoff valve (seacock) must be installed before the seawater strainer in order to allow user to shut off seawater when cleaning the strainer filter.



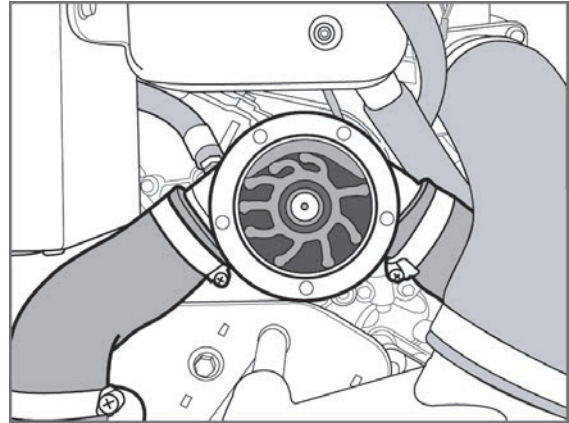
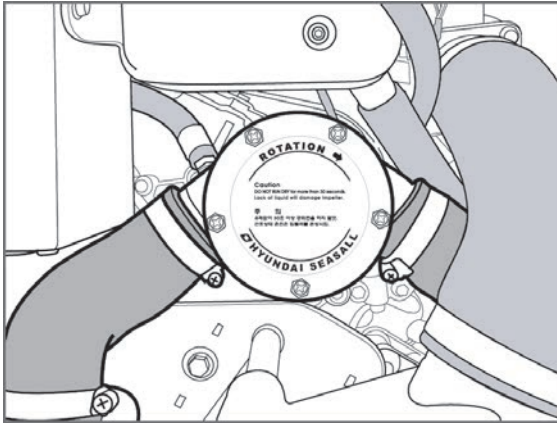
CAUTION

IF THE SEAWATER STRAINER IS NOT PROPERLY ASSEMBLED, AIR CAN BE SUCKED INTO THE COOLING CIRCUIT, DISTURBING THE VACUUM PROCESS. THIS CAN CAUSE THE ENGINE TO OVERHEAT.

4) To clean strainer filter,

- Stop the engine and close the water valve
- Remove the filter cap
- Remove the filter element, flush it thoroughly with clean water or compressed air
- Insert the cleaned filter element and screw on the filter cap
- Check the cap and the gasket for correct seating and sealing
- Open the water valve
- Start the engine and check if there is water leakage

2.3 SEAWATER PUMP



- 1) The internal diameter of the hose connected to the seawater pump inlet should be 45~46mm.
- 2) The cross section of the hose may shrink or collapse due to inlet pressure drop. Therefore, the hose from water pickup in the boat's hull to the seawater pump inlet should be as short as possible and must be made of steel wire reinforced material.
- 3) The seawater pump impeller must be checked periodically and replaced if necessary.
- 4) To check seawater pump and impeller :
 - Stop the engine and close the water valve
 - Remove the impeller housing cover
 - Remove the impeller from inside the seawater pump
 - Check the condition of impeller and bushing



CAUTION

IF THE WATERPUMP IS NOT PROPERLY ASSEMBLED, AIR CAN BE SUCKED INTO THE COOLING CIRCUIT, DISTURBING THE VACUUM PROCESS. THIS CAN CAUSE THE ENGINE TO OVERHEAT.

- Apply soapy water to impeller when assembling, and reassemble twisting the impeller in the direction of rotation
- Replace the O-ring on the impeller housing cover
- Open the water valve
- Start the engine and check for water leakage



CAUTION

DO NOT RUN THE ENGINE WITHOUT SEAWATER. THE SEAWATER PUMP IMPELLER WILL BE DAMAGED. BEFORE STARTING THE ENGINE, BE SURE TO SUPPLY SEAWATER TO THE PASSAGES.



CAUTION

IMPELLER DAMAGE MAY OCCUR IF APPROPRIATE TOOLS ARE NOT USED WHEN REMOVING THE IMPELLER. MAKE SURE TO CHECK O-RING CONDITION AFTER SEAWATER PUMP REASSEMBLY.

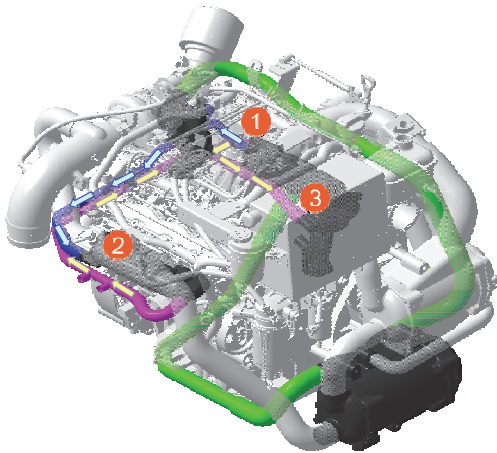


CAUTION

DO NOT INSTALL ADDITIONAL DEVICES WHICH COULD OBSTRUCT THE FLOW OF SEAWATER. THIS CAN CAUSE THE ENGINE TO OVERHEAT.

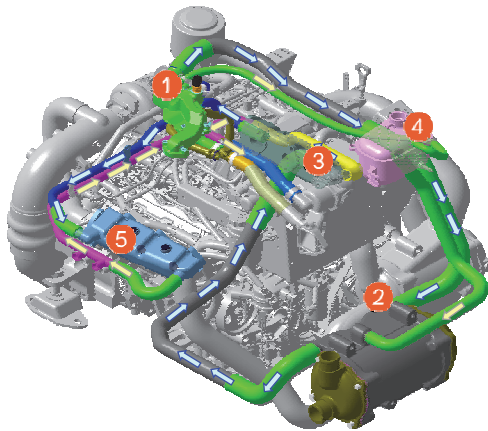
3. ENGINE COOLANT FLOW – CLOSED COOLING CIRCUIT

▪ THERMOSTAT CLOSED



- ① Engine coolant outlet
↓
② Exhaust manifold
↓
Thermostat closed (opening temp 82 °C)
↓
③ Engine coolant inlet

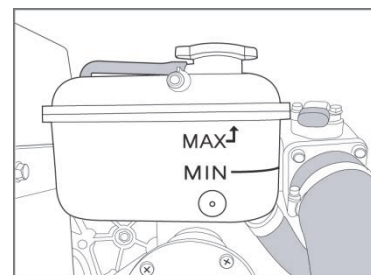
▪ THERMOSTAT OPENED



- ① Engine coolant outlet ———→ ④ Expansion tank
↓
② Heat exchanger ———→ ⑤ Exhaust manifold
↓
Thermostat open (opening temp 82 °C)
↓
③ Engine coolant inlet ←——

3.1 ENGINE COOLANT

- 1) The high-pressure cooling system has a reservoir filled with year-round antifreeze coolant. The reservoir is filled at the factory.
- 2) The coolant level should be between MAX and MIN marks on the side of the coolant reservoir when the engine is cool.

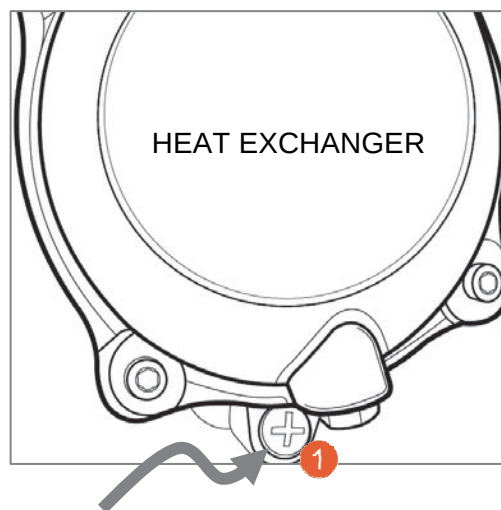


If the coolant level is low, add enough specified coolant to provide protection against freezing and corrosion. Bring the level to MAX, but do not overfill.

- 4) If frequent additions are required, see an authorized dealer for a cooling system inspection.
- 5) Use only soft (demineralized) water in the coolant mixture.
- 6) The engine has aluminum parts and must be protected by an ethylene-glycol-based coolant to prevent corrosion and freezing.
- 7) DO NOT USE alcohol or methanol coolant or mix them with the specified coolant.
- 8) DO NOT USE a solution that contains more than 60% antifreeze or less than 35% antifreeze, which would reduce the effectiveness of the solution.
- 9) For mixture percentages, refer to the following table:

Ambient Temperature	Mixture Percentage (volume)	
	Antifreeze	Water
-15°C (5°F)	35	65
-25°C (-13°F)	40	60
-35°C (-31°F)	50	50
-45°C (-49°F)	60	40

- 10) In order to drain engine coolant, use a screwdriver to loosen the drain plug ①. The drain plug is located under the heat exchanger unit.



Engine coolant drain plug

3.2 REMOVING AIR BUBBLES IN COOLANT LINE

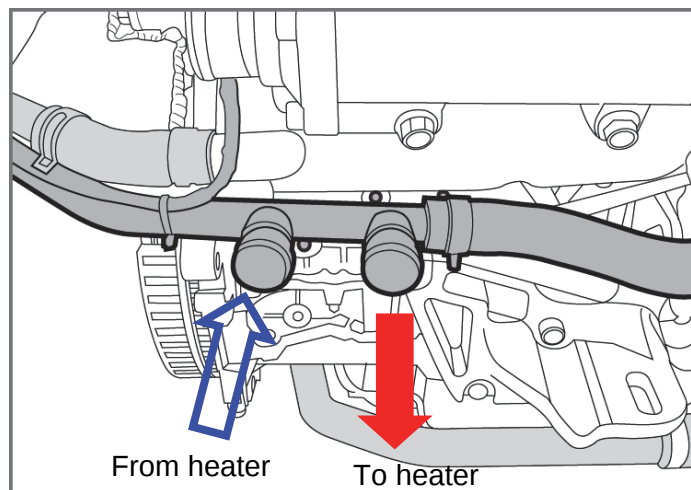
- 1) Start the engine and warm it up at a low rpm (up to thermostat opening)
- 2) Next, stop the engine and allow the engine to cool enough, and then open the cap of the expansion tank carefully.

*NOTE: NEVER open the cap when the engine is hot. Doing so may cause scalding.

- 3) Refill with coolant if needed.
- 4) Recap the expansion tank.
- 5) Check the level of expansion tank regularly while driving.

3.3 CABIN HEATER CONNECTION

- 1) In order to use cabin heater, an extra coolant circulation pump is needed.
- 2) After connecting cabin heater lines, engine coolant must be refilled and checked.
- 3) Check coolant flow direction, as shown in figure.
- 4) If in doubt, please contact your nearest Hyundai SeasAll dealer.



* Outer diameter of line is Ø17.3 mm

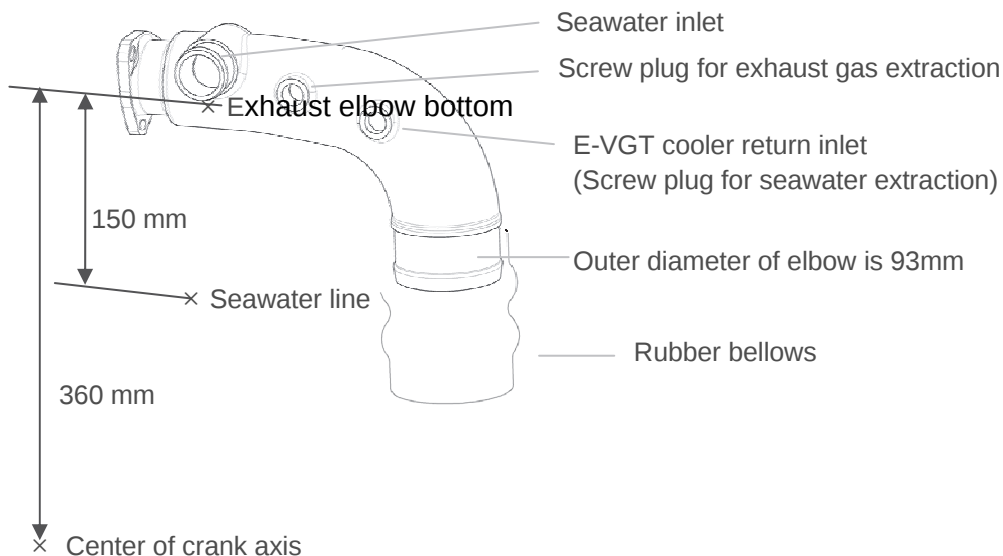


WARNING

NEVER OPEN THE EXPANSION TANK CAP WHEN THE ENGINE IS OPERATING OR HOT. IT COULD RESULT IN SERIOUS PERSONAL INJURY AND MAY CAUSE ENGINE DAMAGE.

4. EXHAUST SYSTEM

- 1) Your Hyundai Seasall engine's exhaust system consists of a coolant-cooled exhaust manifold and a seawater-cooled exhaust elbow (water injected wet exhaust system).
- 2) The vessel's exhaust line should not be made too long and should have as few bends as possible. The maximum back pressure of the exhaust gas should be under 360 mbar.
- 3) Make sure that the shortest height between bottom of the exhaust elbow and the center of the crank axis is 36cm.
- 4) If the distance between the bottom of the exhaust elbow and the waterline is less than 15cm, or if the waterline is above the water injection point, there is a risk of back flowing (siphoning when the engine stops and outside seawater enters through the exhaust system).
- 5) In order to avoid this risk, a vacuum breaker and an exhaust riser are needed. If in doubt about exhaust system installation, please contact your nearest Hyundai SeasAll dealer.



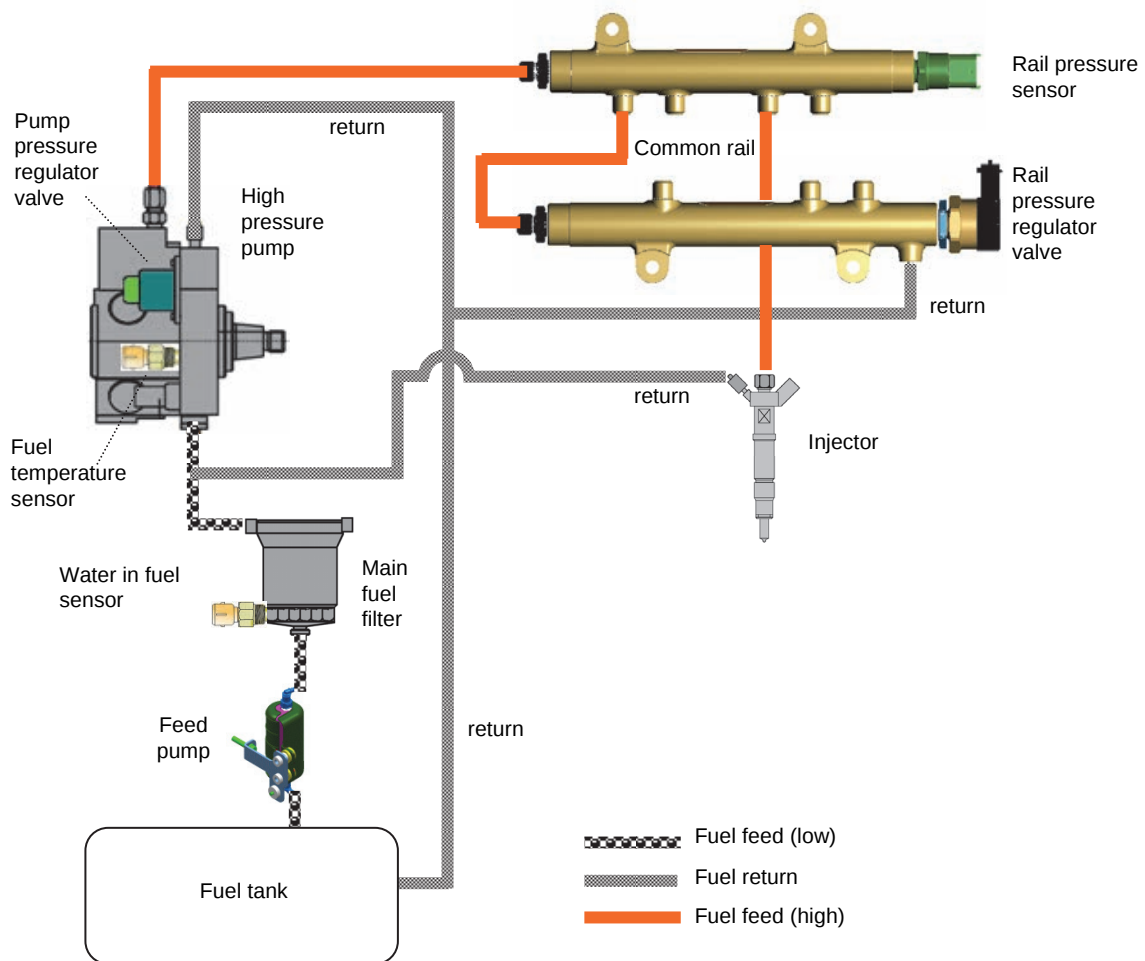
CAUTION

IF IN DOUBT ABOUT EXHAUST SYSTEM INSTALLATION, PLEASE CONTACT YOUR NEAREST HYUNDAI SEASALL DEALER.

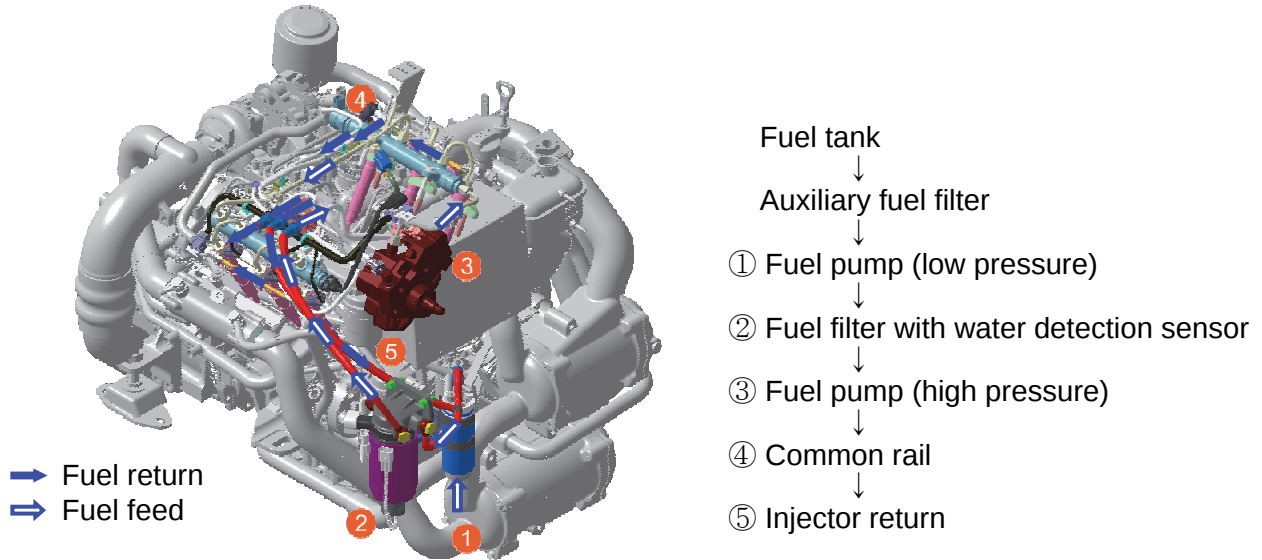
CHAPTER 4

FUEL SYSTEM

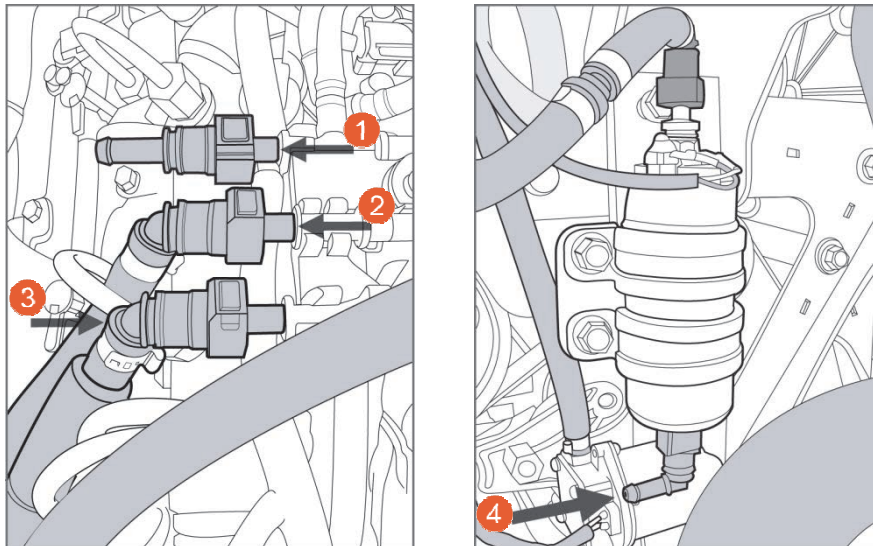
The fuel supply system of this engine is diesel common rail direction injection. In order to optimize engine combustion, maximum injection pressure is up to 1600 bar. Multi-injection is possible thanks to the quick response of the piezo type injector.



1. FUEL FLOW



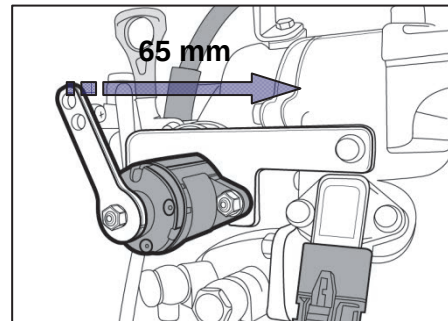
2. LOW PRESSURE FUEL LINE



- ① Return line to fuel tank (engine out)
- ② Return line from injector to main fuel filter (engine out)
- ③ Feed line from main fuel filter
- ④ Feed line from fuel tank to electric feed pump (low pressure pump)
- ※ The internal diameter of all fuel lines must be at least 8 mm.

3. ACCELERATION SENSOR AND CONTROL LEVER

When installing control lever cable to acceleration sensor, be sure that the acceleration sensor lever is fully released at the idle position and fully pulled at the full-load position. The swing distance of lever between idle and full-load position is 65mm.



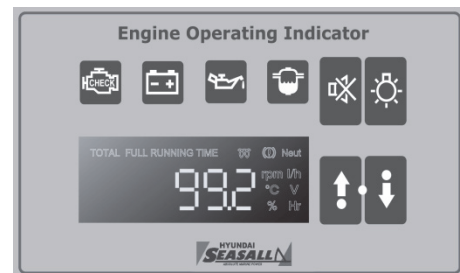
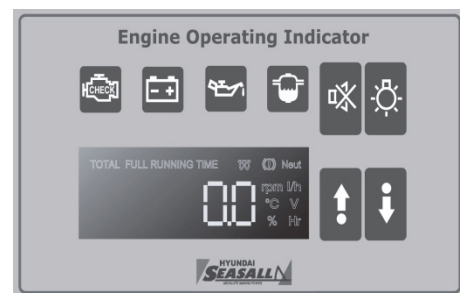
The procedures for control lever installation

1) Idle position setting

Make sure that the position value (%) indicates 0% in neutral position.

2) Full load position setting

Make sure that the position value (%) indicates full load range (90~99.2%) at full forward lever position. If not, disassemble and adjust the base neutral position of the control lever by moving it to the rear until the conditions are met.



CAUTION

YOU SHOULD PERFORM ABOVE PROCEDURES AFTER CONTROL LEVER INSTALLATION WITH THE ENGINE NOT RUNNING BUT WITH THE IGNITION KEY ON.

4. RECOMMENDED FUEL QUALITY

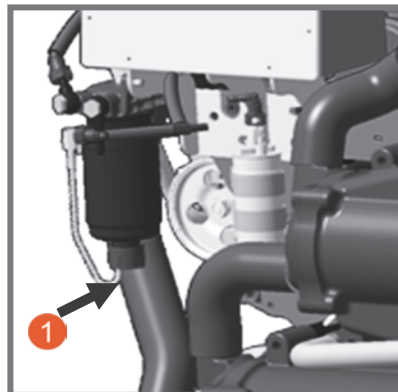
The following fuels should be used for engine operation:

- Standard summer / winter diesel fuel according to DIN EN 590 (classes A-F)
- Diesel fuel according to DIN EN 590 (classes 0-4) in arctic climates
- Summer diesel fuel according to California and U.S. federal regulations
- Winter diesel fuel if lubricity is comparable to diesel fuel according to DIN EN 590
- Mixture of diesel fuel with 5 Vol.% RME according to DIN 51606
- Other admixing or additional use of additives, gasoline or special fuels is not permitted

5. DRAINING WATER FROM FUEL FILTER

- 1) The fuel filter for a diesel engine plays the important role of separating water from fuel and accumulating the water in its base. If water accumulates in the fuel filter, a warning light comes on when the ignition switch is in the ON position.
- 2) If the water in the fuel filter is over the limit, the Water Sensor Lamp on the EOI will light up. If this happens, you must stop the engine and drain the water in the fuel filter yourself or ask the nearest workshop to do this.
- 3) Water and a little fuel will drain at the same time. Therefore, avoid flames or any other source of ignition in your workspace.
- 4) If your fuel is not well suited to your engine, more frequent drainage will be required.
- 5) To check and drain the water in the fuel filter:

- Loosen the drain plug① and drain water. 100 ~ 120cc drainage is normal
- After water is drained, securely tighten the drain plug
- After starting the engine, check to make certain the fuel filter warning light is off



CAUTION

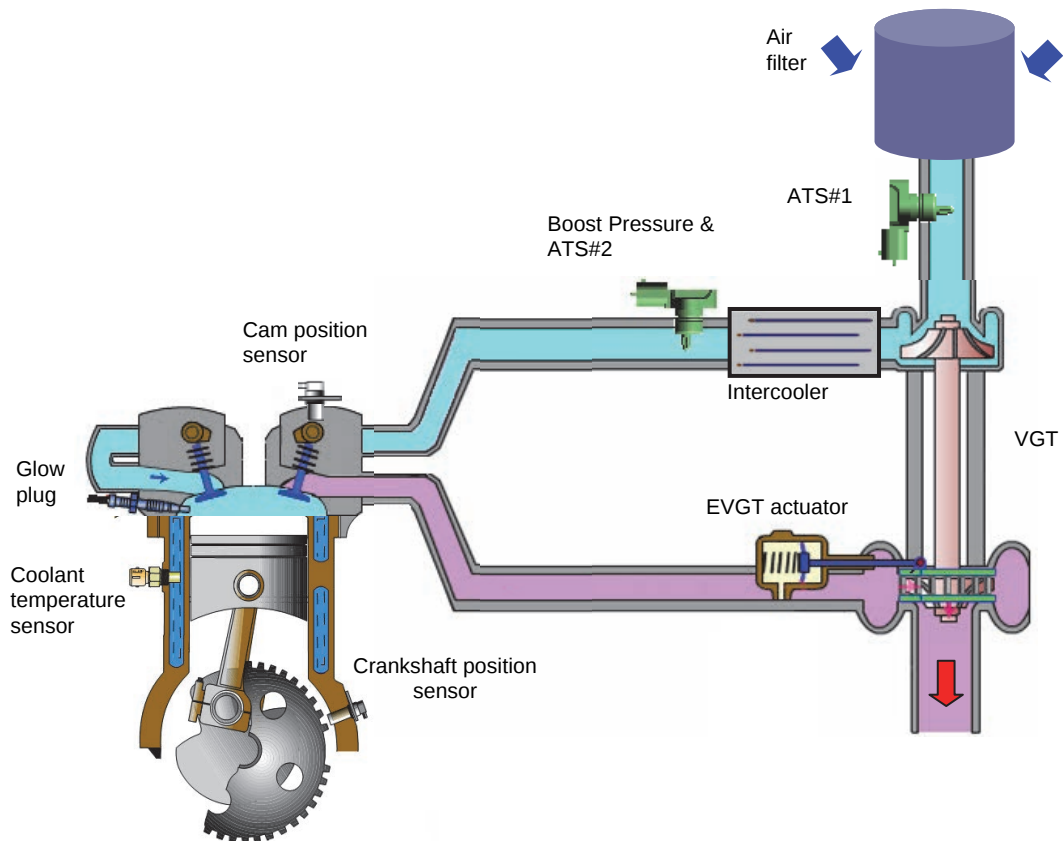
HYUNDAI SEASALL'S GUARANTEES OR WARRANTIES ARE VOID IN CASES WHERE DAMAGE TO FUEL INJECTOR COMPONENTS (HIGH PRESSURE PUMP, INJECTORS, ETC.) CAN BE ATTRIBUTED TO THE USE OF UNQUALIFIED FUELS.

IF WATER ACCUMULATED IN THE FUEL FILTER IS NOT DRAINED AT PROPER TIMES, DAMAGE TO MAJOR ENGINE PARTS MAY OCCUR. WHEN REPLACING THE FUEL FILTER CARTRIDGE, USE ONLY GENUINE HYUNDAI SEASALL PARTS.

CHAPTER 5

AIR INTAKE SYSTEM

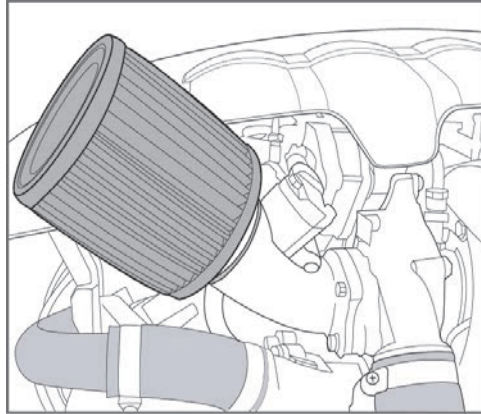
The intake air system of this engine is optimized by EVGT and a highly efficient intercooler system. The pressure of the air system is up to abs. 2.5 bar in order to optimize engine combustion.



1. ENGINE ROOM VENTILATION

- 1) Engines with turbocharger air inlet systems require much more cool fresh air than non-turbocharged engines.
(Maximum air consumption is 800kg/h, minimum engine room vent area is 50cm².)
- 2) The cool fresh air must be pumped into the engine in order to perform at normal power and fuel consumption.
- 3) The temperature at the air inlet should be as low as possible. A high temperature of inlet air may reduce engine performance.

2. AIR FILTER MAINTENANCE



- The original Hyundai SeasAll air cleaner may be cleaned and reused.
- If the air filter is very dirty, it can increase airflow resistance and reduce flow of air to the engine. This can result in reduced power and fuel efficiency.
- Cleaning the air filter should be carry out periodically according to the procedure below.
- Do not clean the filter element with gasoline or other solvent cleaners.
- Remove the air filter from engine.
- Put the air filter on a flat surface and shake dust out.
- Liberally spray K&N Air Filter Cleaner onto both sides the of filter and allow to soak for 10 minutes to loosen the dirt.
- Wash out the dust with running water of low pressure from the inside toward the outside.
- Dry the wet air filter in the shade for 2 ~3 hour. You can reduce drying time by blowing with a hair dryer on COLD or by blowing with low pressure compressed air.

(CAUTION) Do not use high pressure air, high pressure water or hot air to clean and/or dry the air filter. These can damage the performance of the air filter.

- Apply air cleaner oil over the outside of the filter. If too much oil is applied, it will reduce performance.
- Reassemble air filter to engine.



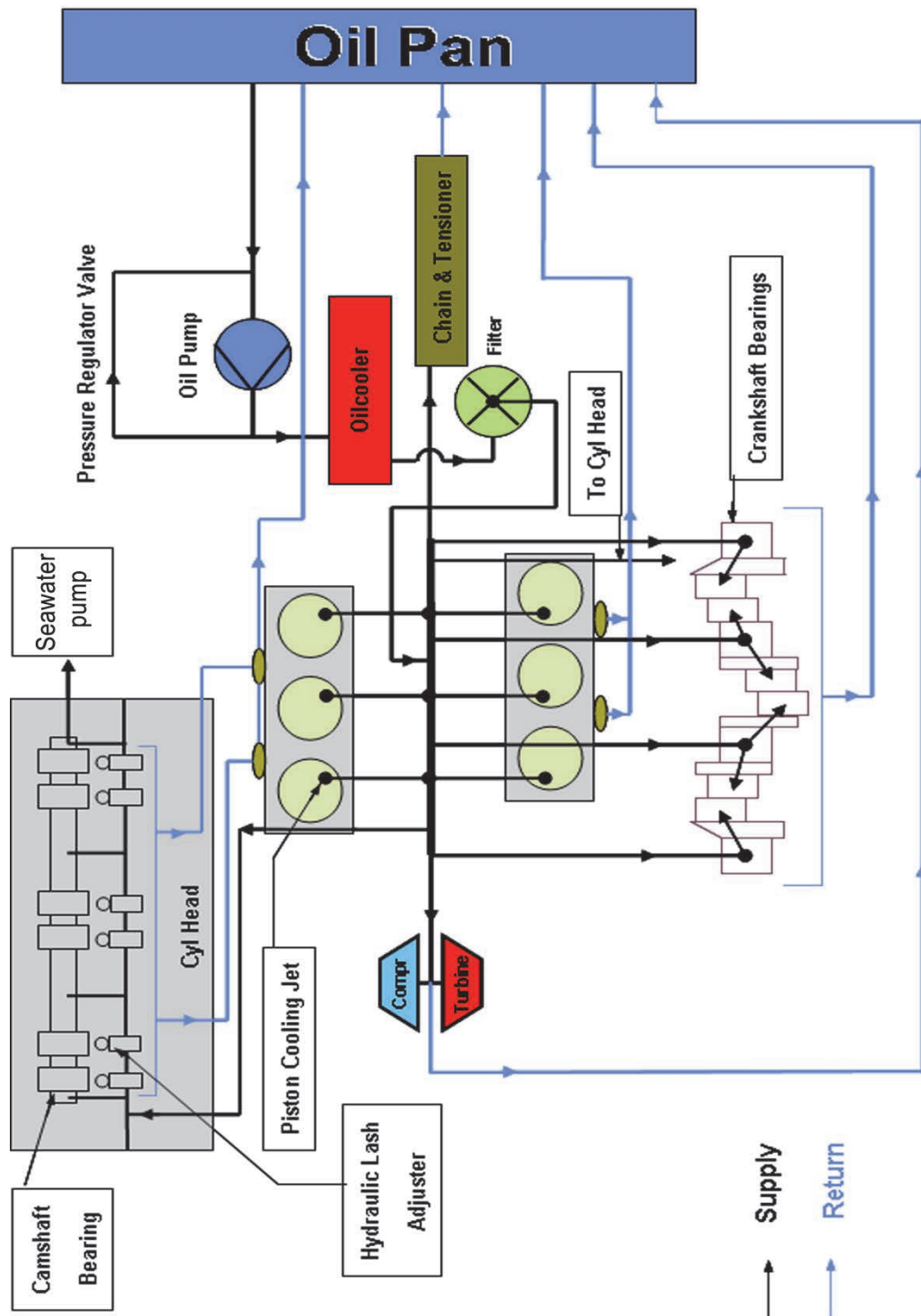
CAUTION

WHEN REMOVING THE AIR FILTER, BE CAREFUL THAT DUST OR DIRT DOES NOT ENTER THE AIR INTAKE, OR DAMAGE MAY OCCUR. DO NOT RUN WITHOUT THE AIR CLEANER. THIS COULD RESULT IN EXCESSIVE ENGINE WEAR.
USE OF NON-GENUINE PARTS COULD DAMAGE THE TURBOCHARGER OR ENGINE.

CHAPTER 6

LUBRICATION SYSTEM

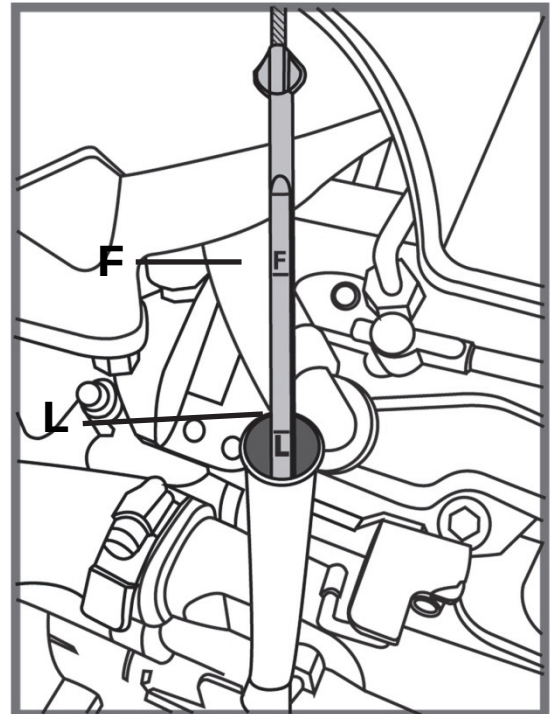
1. ENGINE OIL FLOW



2. ENGINE OIL LEVEL CHECKS

The engine oil level must be checked at regular intervals.

- Be sure the boat is level.
- Start the engine and allow it to reach normal operating temperature.
- Turn the engine off and wait about 5 minutes, until the oil has returned to the oil pan.
- Pull the dipstick out, wipe it clean, and re-insert it fully.
- Pull the dipstick out again and check the level. The level should be between F and L. If it is near or at L, add enough oil to bring the level to F. Do not fill with engine oil above the F mark.



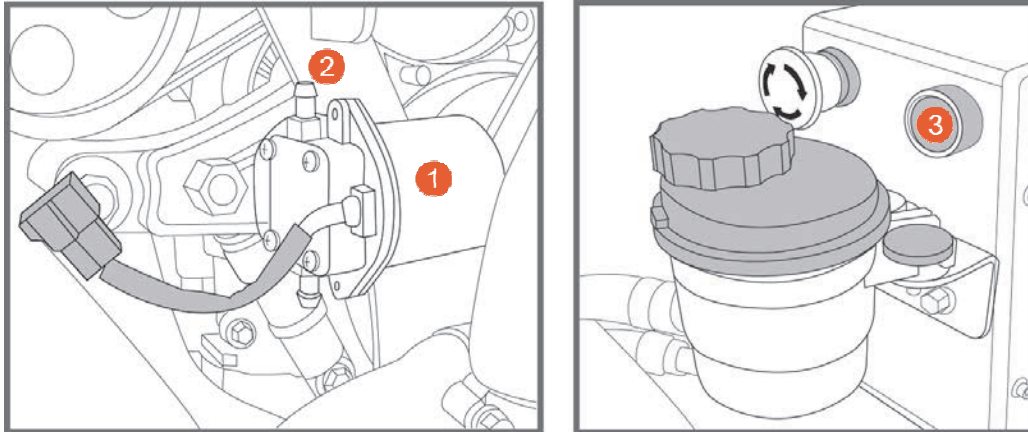
3. RECOMMENDED OIL QUALITY

For best performance and maximum protection during all types of operation, select only those lubricants which :

- 1) Satisfy the requirement of the API or ACEA classification.
- 2) Have proper SAE grade number for expected ambient temperature range.

Description		Specifications	Limit
Oil quality	ACEA	Above B4	Service oil quality should conform to ACEA or API classification.
	API	Above CH - 4	
	SAE	15W-40	-15°C above
		10W-30	-20°C ~ 40°C
		5W-30	-25°C ~ 40°C
		0W-30	10°C below

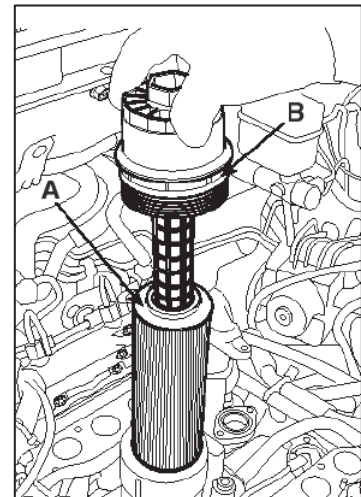
4. OIL EXTRACTION PUMP



- 1) Allow the engine to warm up at least 5 minutes.
- 2) Remove the engine oil inlet cap and oil filter.
- 3) The oil drain hose is connected to the oil extraction pump ①, route the loose end of the hose into the container being used for the oil change ②.
- 4) Turn the ignition key on (but do NOT start the engine) then press and hold the button ③ on the side of the ECU box with the ignition switched on until the engine oil (about 7.2liters) is completely pumped out.

5. OIL FILTER REPLACEMENT

- 1) Remove the oil filter cap by using a 36mm wrench; loosen the oil filter cap slowly. Be careful not to drop engine oil while the oil filter paper is removed with its cap.
- 2) Remove the oil filter element (A) and its O-ring (B) from the cap.
- 3) Replace the filter element assembly and O-ring with the new ones that are supplied in the service kit. Do not reuse the removed O-ring.
- 4) Assemble the oil filter cap with the filter fixed. The tightening torque is 24.5Nm (2.5kgf·m, 18.1lb-ft).



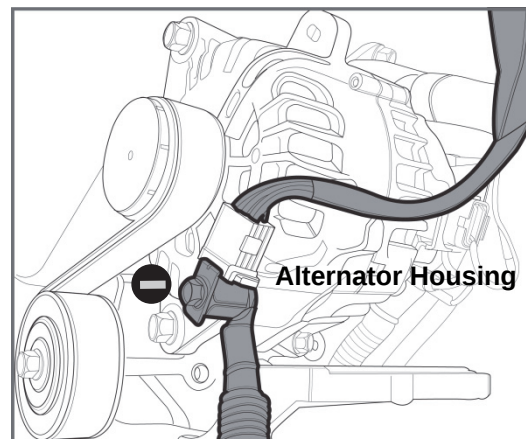
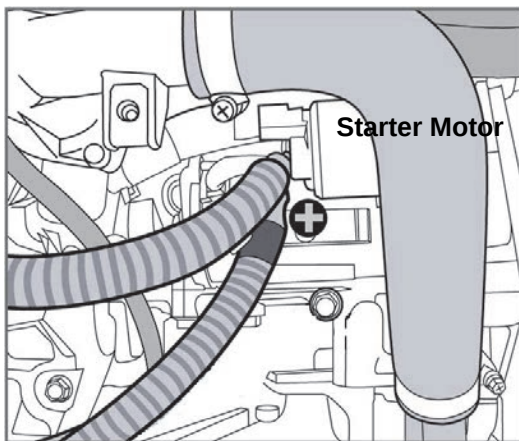
WARNING

USED OIL MUST BE STORED IN A SAFE PLACE AWAY FROM CHILDREN AND SOURCES OF IGNITION. IF YOU HAVE A USED OIL DISPOSAL PROBLEM, PLEASE HAVE THE ENGINE OIL CHANGED BY YOUR NEAREST HYUNDAI SEASALL SERVICE DEALER.

CHAPTER 7
ELECTRICAL SYSTEM

1. BATTERY CABLE CONNECTIONS

- 1) The size of battery cable should be at least 40mm² and no longer than 4m.
- 2) If the cable is longer than 4m, the size should be at least 50mm².
- 3) Recommended battery capacity is at least 200 amperes.
- 4) Connect the battery (+) cable from the battery to the starter motor with the cable from alternator (+) cable.
- 5) Connect the battery (-) cable and system ground connector to alternator housing.
- 6) Battery cables connectors should be clean and tightly fastened.



CAUTION

DO NOT TOUCH OR REMOVE ELECTRICAL PART WHEN STARTING OR DURING OPERATION.
KEEP HAND, HAIR, AND CLOTHES AWAY FROM THE FLYWHEEL AND OTHER ROTATING PARTS WHILE THE ENGINE IS RUNNING.

2. BATTERY CHECKS

Battery inspection is very important in electronically controlled engines: You must check the battery condition regularly.

LOAD TEST

- 1) Perform the following steps to complete the load test procedure for maintenance-free batteries.
- 2) Connect the load tester clamps to the terminals and proceed with the test as follows:
 - a. If the battery has been charged, remove the surface charge by connecting a 300 ampere load for 15 seconds.
 - b. Connect the voltmeter and apply the specified load.
 - c. Read the voltage after the load has been applied for 15 seconds.
 - d. Disconnect the load.
 - e. Compare the voltage reading with the minimum acceptable voltage shown in the table below. If the voltage is greater than shown in the table, the battery is good. If the voltage is less than shown in the table, replace the battery.

Voltage	Temperature
9.6	20°C (70°F) and above
9.5	16°C (60°F)
9.4	10°C (50°F)
9.3	4°C (40°F)
9.1	-1°C (30°F)
8.9	-7°C (20°F)
8.7	-12°C (10°F)
8.5	-18°C (0°F)



WARNING

**BATTERY MUST BE STORED AND TREATED IN A SAFE PLACE AWAY FROM CHILDREN AND SOURCES OF IGNITION..
FLUID IN THE BATTERY IS A CORROSIVE ACID AND MUST BE HANDLED WITH CARE. IF SPILLED ON ANY PART OF BODY, FLUSH IMMEDIATELY WITH WATER.**



CAUTION

DO NOT LOOSEN OR DETACH BATTERY TERMINALS WHILE ENGINE IS RUNNING. DOING SO WILL DAMAGE THE CHARGING SYSTEM AND OTHER ELECTRONIC COMPONENTS.

3. FUSES AND RELAYS

3.1 FUSES

An engine's electrical system is protected from electrical overload damage by fuses.

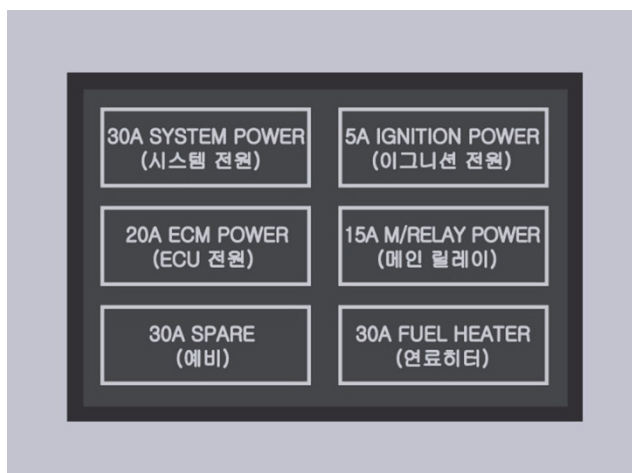
If a fuse has blown, the element inside the fuse will be melted. If the electrical system does not work, first check the fuses in the ECU box. Always replace a blown fuse with one of the same rating.



If the replacement fuse blows, this indicates an electrical problem. Avoid using the system involved and immediately consult an authorized Hyundai SeasAll dealer.

Fuses in the ECU Box

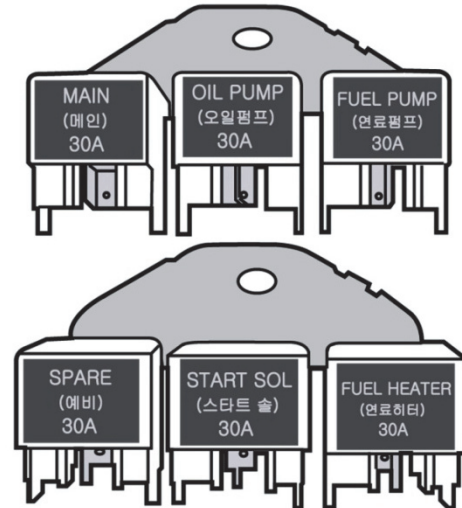
- 1) System Power: 30Amp
- 2) Ignition Power: 5Amp
- 3) ECM(ECU) Power: 20Amp
- 4) Main Relay Power: 15Amp
- 5) Spare: 30Amp
- 6) Fuel Heater Power: 30Amp



3.2 RELAYS

Relays in the ECU Box

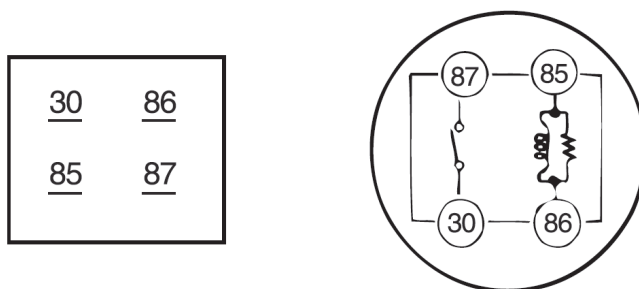
- 1) Main Relay: 30 Amp
- 2) Oil Extraction Pump Relay: 30 Amp
- 3) Fuel Pump Relay : 30 Amp
- 4) Spare : 30 Amp
- 5) Start Solenoid Relay: 30 Amp
- 6) Fuel Heater Relay: 30 Amp



Using an ohmmeter, check that there is continuity between each terminal.

Terminal	Continuity
30 - 87	NO
85 - 86	YES

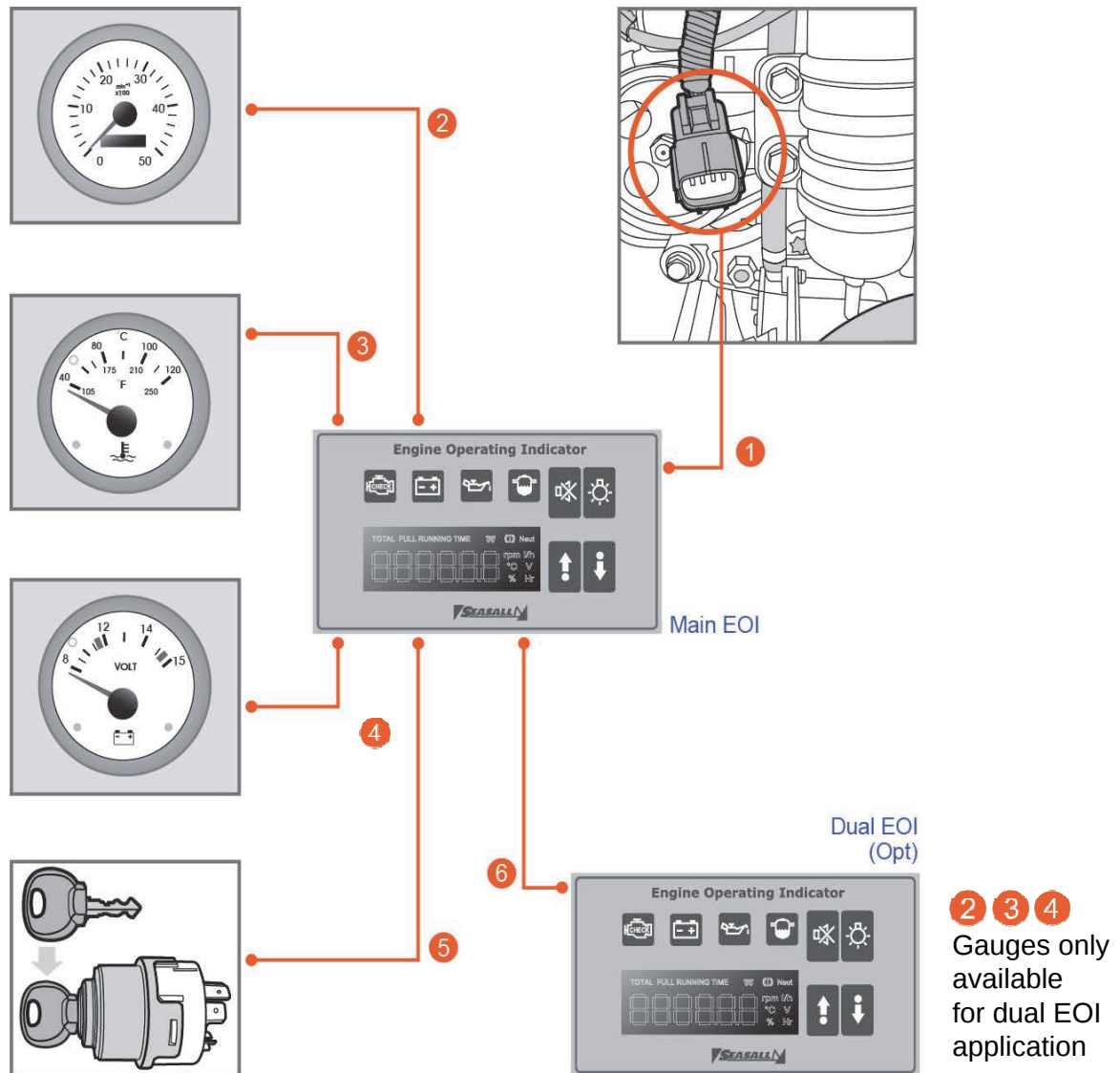
Apply 12V to terminal 85 and ground to terminal 86. Check for continuity between terminals 30 and 87. Always replace a damaged relay with one of the same rating.



CHAPTER 8

INSTRUMENT SYSTEM

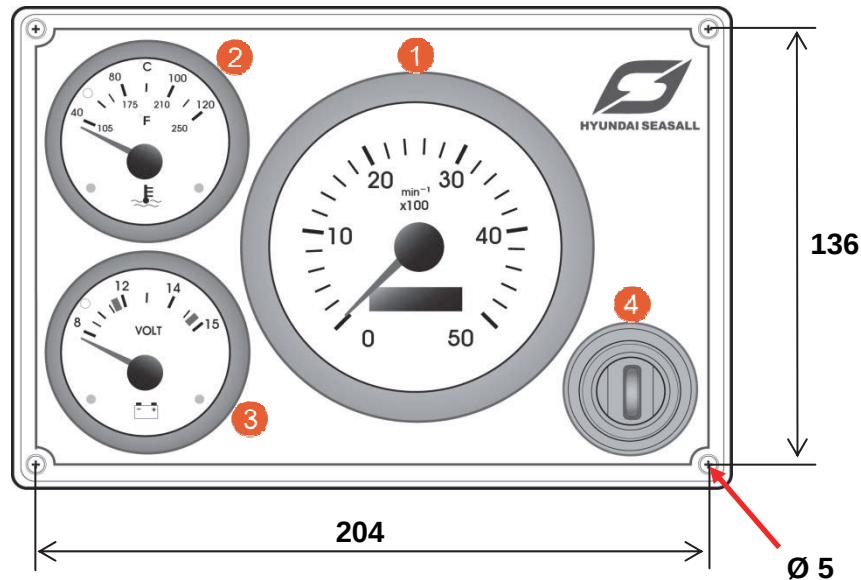
1. INSTRUMENTS CONNECTION



- ① Engine to EOI wiring (standard: 7m, option: 10m)
- ② EOI to RPM gauge(Ø 85) wiring
- ③ EOI to coolant temp gauge(Ø 52) wiring
- ④ EOI to volt gauge(Ø 52) wiring
- ⑤ EOI to ignition key switch(Ø 21.4) wiring
- ⑥ Dual EOI wiring (option for dual stage)

※ For information about the installation and operation of the EOI (Engine Operating Indicator) system, please refer to Chapter 9.

1.1 GAUGE PANEL (Option)

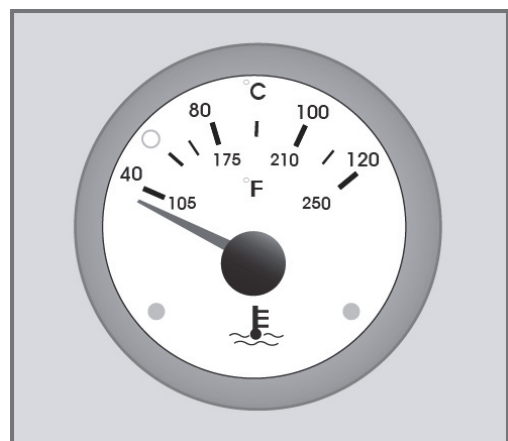


- ① RPM Gauge
- ② Coolant Temperature Gauge
- ③ Battery Volt Meter Gauge
- ④ Ignition Key switch

NOTE: Gauge panel (show above) is not standard but available as an option

1.2 COOLANT TEMPERATURE GAUGE

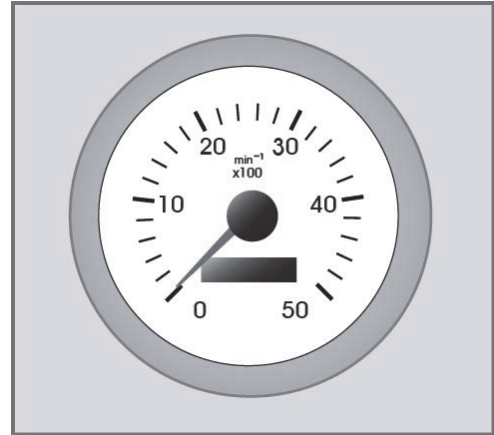
- 1) This gauge will work when the key is in the "ON" position.
- 2) Avoid max. rpm and WOT (Wide Open Throttle) before a cold engine is fully warmed up as it can harm the engine.
- 3) The gauge needle should be in proper range. If the outside temperature is high, the gauge needle may sit at a higher range. As long as the alarm doesn't sound, the engine is normal.



- 4) If the gauge blinks and an alarm sounds in the EOI, check the coolant temperature and level. If the coolant is low, refill it.
- 5) If the temperature of the engine coolant is higher than 105°C, the engine power will decrease. You should check the engine cooling system.

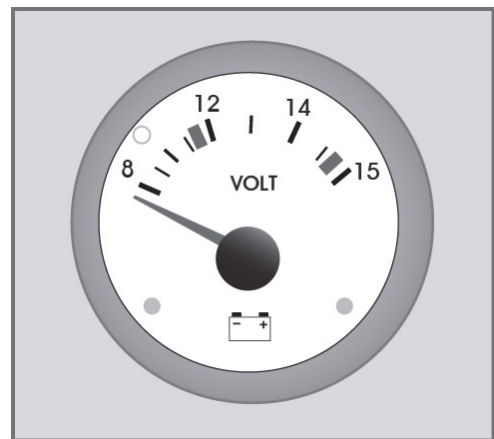
1.3 RPM GAUGE

- 1) This gauge will work when the key is in the "ON" position.
- 2) This gauge indicates real-time engine rpm.
- 3) Avoid max. rpm and WOT (Wide Open Throttle) before a cold engine is fully warmed up, as it can harm the engine.



1.4 BATTERY VOLT METER GAUGE

- 1) This gauge will work when the key is in the "ON" position.
- 2) This gauge indicates real-time battery voltage.
- 3) If battery voltage is not sufficient, the engine can not be started.
- 4) For a working engine, 12~16V volts is normal. If the battery voltage is under 12V, you should check battery and alternator.
- 5) At the moment of engine ignition, the voltmeter needle may momentarily drop to 8V. This is normal.



2. CUT-OUT FOR MOUNTING GAUGES

- RPM Gauge : Ø 86 mm
- Coolant Temperature Gauge : Ø 53 mm
- Battery Volt Meter Gauge : Ø 53 mm
- Ignition Key : Ø 27 mm

3. CUT-OUT FOR MOUNTING EOI SYSTEM

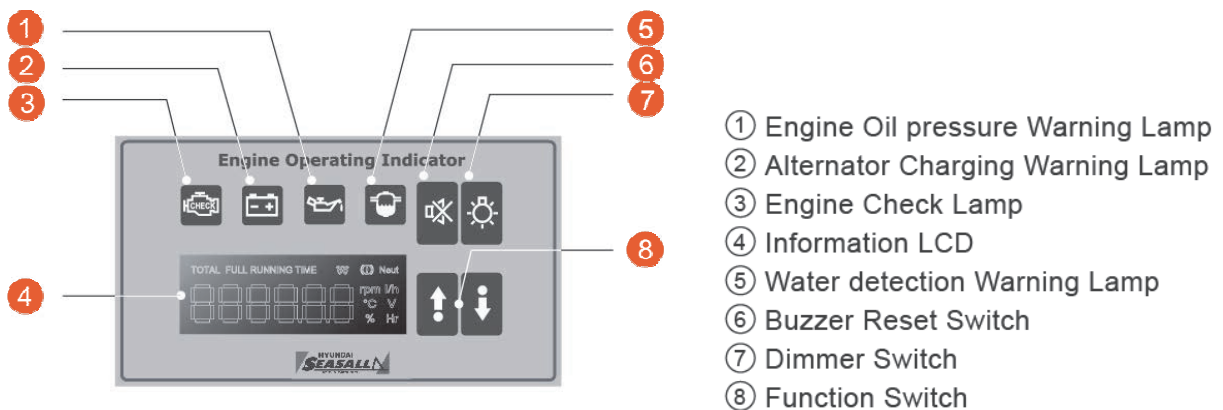
You can use the installation template enclosed with EOI for a cut-out.

CHAPTER 9

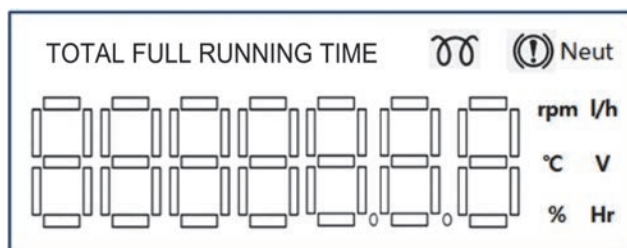
EOI SYSTEM

The Engine Operating Indicator (EOI) system gives you a lot of information about the engine's current status. You can hear alarm beeps, or see information including RPM, coolant temperature, warning lamps, error codes and engine working time. If the switch is on, warning lamps for battery, engine oil and so on will flash. When the engine starts normally, the lamps all go off. If there is a problem, the specific lamp will come on. You should contact your nearest dealer and have the engine checked as soon as possible.

1. OVERVIEW OF EOI SYSTEM



1.1 INFORMATION LCD



- | | |
|--------------------------------|----------------------------------|
| 1) Engine rpm (RPM) | 6) Running Time (Hr) |
| 2) Engine Coolant Temp. (°C) | 7) Total WOT Running Time (Hr) |
| 3) Throttle Lever Position (%) | 8) Glow Plug Indicator |
| 4) Fuel Consumption (ℓ /h) | 9) Neutral Lever Alarm lam |
| 5) Battery Voltage (V) | 10) DTC (Diagnosis Trouble Code) |

1.2 SWITCHES

- 1) Buzzer Reset Switch - This switch is used for turning off the alarm temporarily.
- 2) Dimmer Switch - This switch is used for controlling brightness of the other gauges connected to the EOI.
- 3) Function Switch - This switch is used for changing the information display on the LCD.

1.3 ALARM LAMPS

Alarm may sound when alarm lamps flicker.

WATER SENSOR LAMP



- This lamp informs you to extract water from fuel filter.
- If the lamp is on, you should stop the engine immediately and drain the water in the fuel filter.
- It is recommended to check and drain the water in the fuel filter at regular periods before the lamp turns on.
- It can be harmful to drive your engine with this lamp on.

ALTERNATOR LAMP



- This lamp informs you to recharge your battery.
- If this lamp is turned on, you should stop the engine and eliminate electric load, as well as check the alternator, alternator drive belt system and wiring system.

ENGINE OIL LAMP



- This lamp informs you that the engine oil pressure is low.

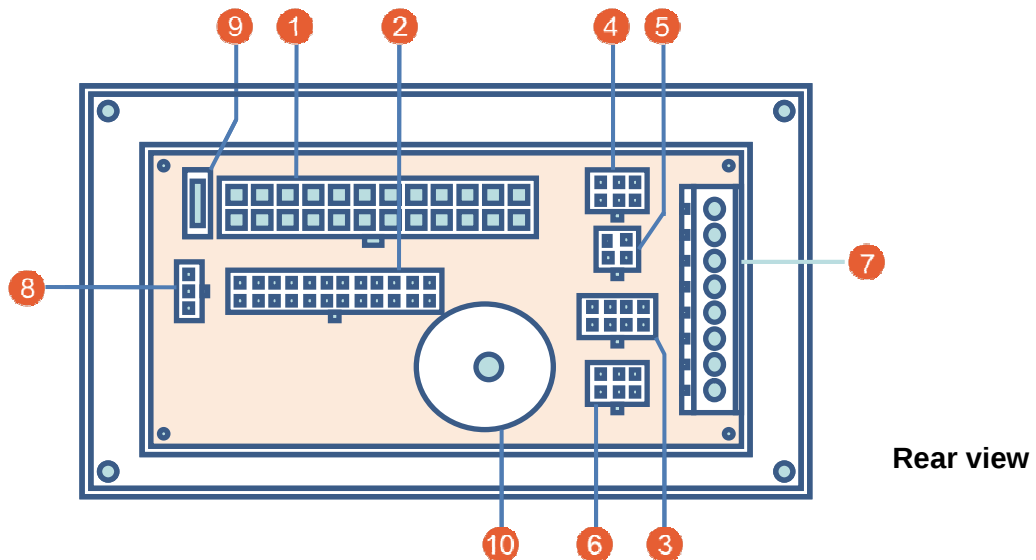
If this lamp is on, you should stop the engine and check the oil level with the oil dipstick. If the oil is low, refill it. If you refill the oil and the lamp still does not turn off, you should not use your engine and you should ask your local service shop for maintenance.



CHECK ENGINE LAMP

- This lamp informs you that the engine has a serious problem.
- You can see the DTC on the LCD of the EOI .
- It is possible to drive at limited rpm. The ECU will control the functions to protect the engine. You should immediately have the engine checked at the nearest service shop.

2. EOI CONNECTIONS



- | | |
|--|---|
| 1. Connection plug – CN1 (from engine) | 6. Connection plug – CN6 (service tool) |
| 2. Connection plug – CN2 (to dual EOI) | 7. Connection plug – CN7 (external) |
| 3. Connection plug – CN3 (tachometer) | 8. Connection plug – CN8 (key switch) |
| 4. Connection plug – CN4 (coolant temp. gauge) | 9. System power fuse (3 amp) |
| 5. Connection plug – CN5 (voltmeter) | 10. Buzzer |



WARNING

LISTEN FOR A CLICK WHEN FASTENING CONNECTORS. THIS SOUND INDICATES THAT THEY ARE SECURELY LOCKED

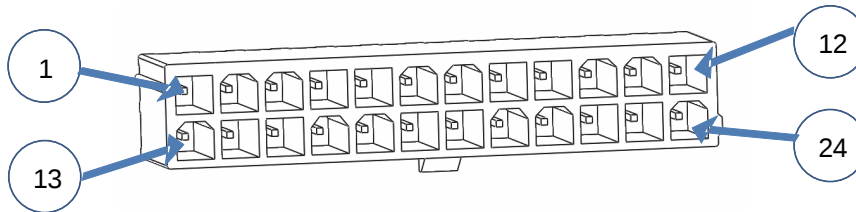


CAUTION

DON'T CONNECT EXTRA INSTRUMENTS WITH DRAW MORE THAN 1 AMPERE. THE E.O.I WILL BE OVERLOADED AND DAMAGED

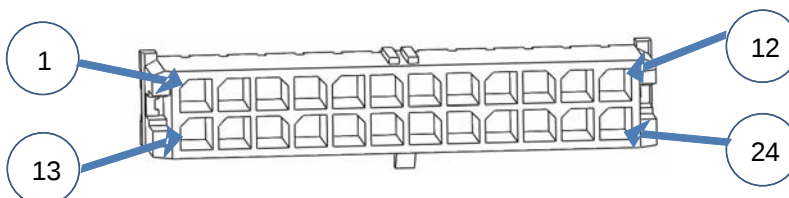
3. EOI PIN ASSIGNMENT

CN1 (MAIN EOI CONNECTOR FROM ENGINE)



- | | |
|-------------------------------|---------------------|
| 1. Ignition power | 13. RPM signal |
| 2. Main relay power | 14. Spare |
| 3. Permanent power | 15. Spare |
| 4. Not used | 16. Spare |
| 5. Not used | 17. Neutral signal |
| 6. Coolant temperature signal | 18. K line |
| 7. Not used | 19. CAN_L |
| 8. Check lamp | 20. Changing signal |
| 9. Oil pressure signal | 21. CAN_H |
| 10. Ground | 22. Not used |
| 11. Not used | 23. Ground |
| 12. Water detection signal | 24. Not used |

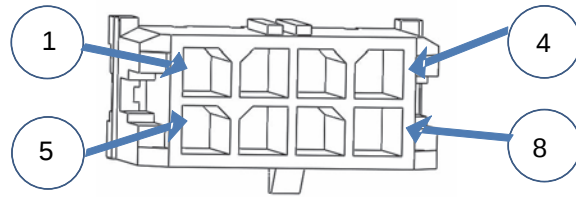
CN2 (DUAL EOI CONNECTOR)



- | | |
|----------------------------|---------------------|
| 1. Ignition power | 13. RPM signal |
| 2. Main relay power | 14. Spare |
| 3. Permanent power | 15. Spare |
| 4. Not used | 16. Spare |
| 5. Not used | 17. Neutral signal |
| 6. Not used | 18. K line |
| 7. Not used | 19. CAN_L |
| 8. Check lamp | 20. Changing signal |
| 9. Oil pressure signal | 21. CAN_H |
| 10. Ground | 22. Not used |
| 11. Not used | 23. Ground |
| 12. Water detection signal | 24. Not used |

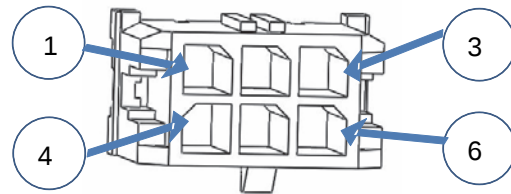
CN3 (TACHOMETER)

1. Main relay power
2. RPM signal
3. Ground
4. Illumination
5. Illumination
6. CAN_H
7. CAN_L
8. Not used



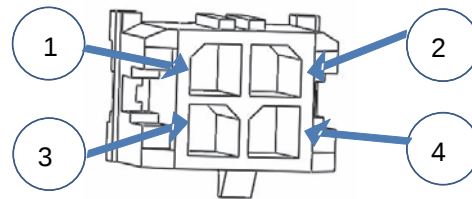
CN4 (COOLANT TEMP. GAUGE)

1. Coolant temperature signal
2. Ignition power
3. Ground
4. Illumination
5. Illumination
6. Not used



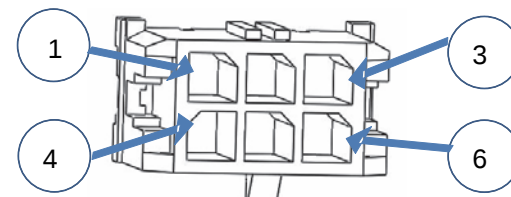
CN5 (VOLTMETER)

1. Ignition power
2. Ground
3. Illumination
4. Illumination



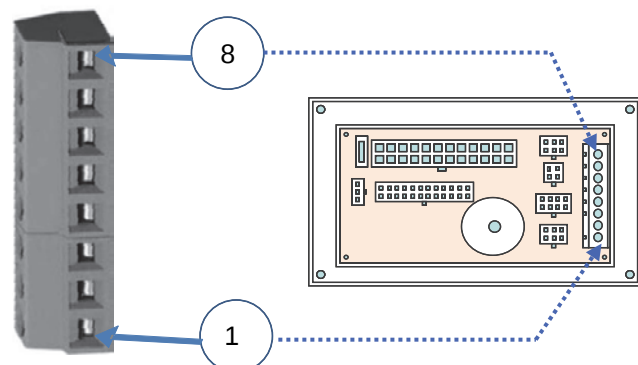
CN6 (SERVICE TOOL)

1. CAN_H
2. CAN_L
3. K line
4. Ground
5. Main relay power
6. Not used



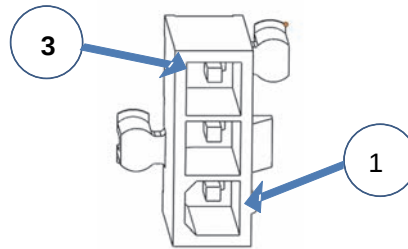
CN7 (EXTERNAL)

1. Ground
2. Permanent power
3. Ignition power
4. Neutral switch
5. Neutral switch
6. Charging signal
7. RPM signal
8. Dimmer



CN8 (KEY SWITCH)

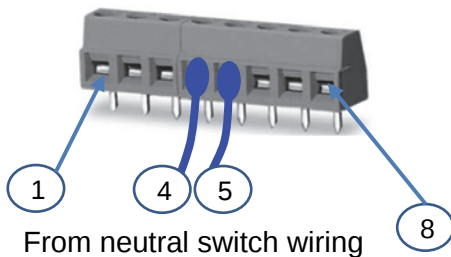
1. Ignition power
2. Start power
3. Permanent power



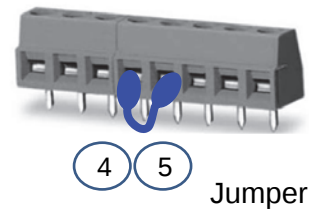
4. NEUTRAL SWITCH AND DUAL EOI CONNECTION

- 1) Neutral switch wires should be connected at pin #4 and #5 of the external connector of the EOI. If there is no neutral switch, jumper #4 and #5 with a short jumper wire.

SYSTEM WITH A NEUTRAL SWITCH



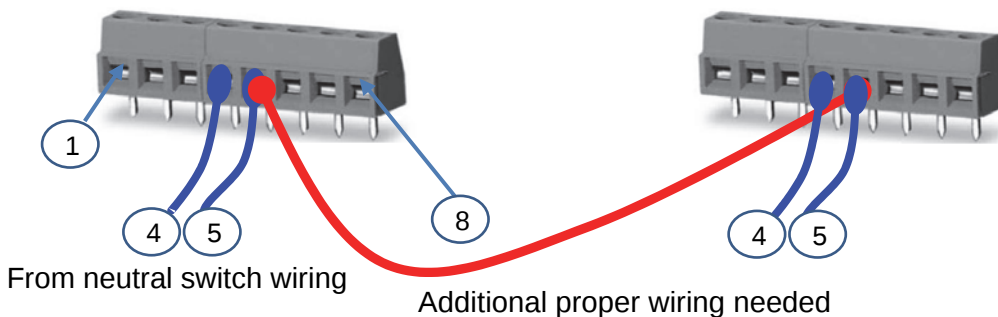
SYSTEM WITH NO NEUTRAL SWITCH



- 2) If there is a dual EOI, you should connect the wiring between #5 (external connector of the main EOI) and #5 (external connector of the dual EOI)

Main EOI external connector

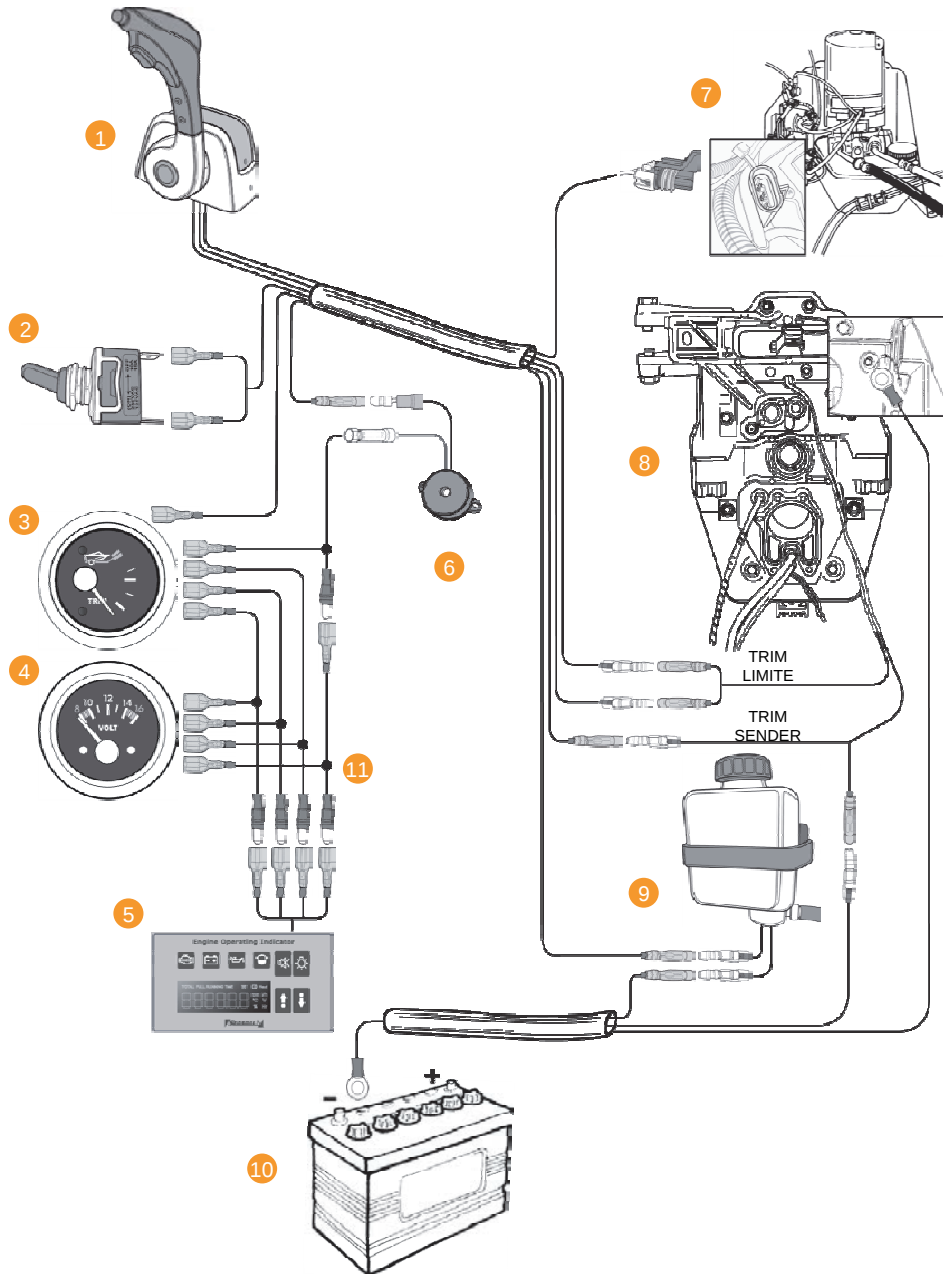
Dual EOI external connector



CAUTION

FOR USER'S SAFETY, ENGINE WILL NOT CRANK OR START IF GEAR POSITION LEVER IS NOT IN NEUTRAL OR NOT CONNECTED TO THE EOI EXTERNAL CONNECTION.

5. TRIM WIRING CONNECTION DIAGRAM (STERNDRIVES ONLY)



- | | |
|--|------------------------------|
| 1 REMOTE CONTROL | 7 TRIM PUMP |
| 2 TRAILER SWITCH (SIDE MOUNT TYPE ONLY) | 8 TRANSOM PLATE |
| 3 GAUGE-TRIM | 9 GEAR LUBE MONITOR |
| 4 GAUGE-VOLTMETER | 10 BATTERY |
| 5 E O I | 11 GAUGE & LAMP POWER |
| 6 BUZZER (DRIVE OIL) | |

6. ALARM AND DTC(DIAGNOSIS TROUBLE CODE)

If there is a problem in the engine, the EOI display (audible or visible) alarm and related DTC (diagnosis trouble code) will give you information about it. The DTC display is only for initial assistance and to aid communication with a Hyundai SeasAll dealer if there is an emergency. You should contact your nearest Hyundai SeasAll dealer as soon as possible if a system problem arises.

6.1 ALARM LIST

Item	DTC	Description	Fail safety		Alarm		Possible Cause(s)
			Fuel cut off	Note 1) RPM limit	Lamp	Buzzer	
VGT variable geometry turbocharger	P2263	EVGT controller overheat, learning error, feedback line error	-	○		√	• Overload, VGT cooling circuit • VGT actuator adaption error • VGT actuator performance error
	P2563	PWM failure					
	P0048	Short circuit battery	-			√	• VGT actuator circuit • VGT actuator
	P0047	Short circuit ground No Load					
	P0234	Boost pressure higher than target value	-			√	• VGT actuator performance error
	P0299	Boost pressure lower than target value					• Air leakage check • Intercooler • VGT actuator performance error
APS1 acceleration position sensor1	P2138	Plausibility With Aps2 Violated	-	1250 rpm fixed		√	• APS1/2 sensor circuit • APS sensor • ECM (engine control module)
	P2127	Voltage Above Lower Limit					
	P2123	Voltage Above Upper Limit					
	P0643	Supply Voltage Above Upper Limit					
	P0642	Supply Voltage Below Lower Limit					
APS2 acceleration position sensor2	P2128	Voltage above upper limit	-	1250 rpm fixed		√	• APS1/2 sensor circuit • APS sensor • ECM (engine control module)
	P0653	Supply voltage above upper limit					
	P0652	Supply voltage below lower limit					
CMPS cam position sensor	P0340	No camshaft signal	√ (at starting)	●		√	• CMPS circuit • CMPS
	P0341	Wrong camshaft signal					
CKPS crank position sensor	P0335	No crankshaft signal (engine running)	√	-		√	• CKPS circuit • CKPS • Target wheel check
	P0336	Wrong crankshaft signal (restart)					
Water detection in fuel	P2264	Water in fuel is detected	-	●		√	• Water in fuel, fuel filter (drain out water and check the fuel in fuel tank) • Warning lamp circuit • Water detection sensor error
Cylinder1 injector	P0201	Open load		○		√	• Injector circuit • Injector
	P0261	Short circuit ground	√	-			
	P0262	Short circuit battery					
	P0263	Defect resistance cylinder1, Charging/discharging energy error	-				
Cylinder2 injector	P0202	Open load			○		√
	P0264	Short circuit ground	√	-			
	P0265	Short circuit battery					
	P0266	Defect resistance cylinder1, Charging/discharging energy error	-				

INSTALLATION & OPERATION MANUAL

S250 and S220 Series Engines

Item	DTC	Description	Fail safety		Alarm		Possible Cause(s)	
			Fuel cut off	Note 1) RPM limit	Lamp	Buzzer		
Cylinder3 injector	P0203	Open load		○		√	• Injector circuit • Injector	
	P0267	Short circuit ground	√					
	P0268	Short circuit battery						
	P0269	Defect resistance cylinder1, Charging/discharging energy error	-	-				
Cylinder4 injector	P0204	Open load		○		√	• Injector circuit • Injector	
	P0270	Short circuit ground	√					
	P0271	Short circuit battery						
	P0272	Defect resistance cylinder1, Charging/discharging energy error	-	-				
Note 2) Cylinder5 injector	P0205	Open load		○		√	• Injector circuit • Injector	
	P0273	Short circuit ground	√					
	P0274	Short circuit battery						
	P0275	Defect resistance cylinder1, Charging/discharging energy error	-	-				
Note 3) Cylinder6 injector	P0206	Open load		○		√	• Injector circuit • Injector	
	P0276	Short circuit ground	√					
	P0277	Short circuit battery						
	P0278	Defect resistance cylinder1, Charging/discharging energy error	-	-				
Injector Bank Error	P062D	Bank 1 error	√	-		√	• Charging system (battery, alternator check) • ECM	
	P062E	Bank 2 error						
Injectors Circuit	P0611	Error path for short circuit of charging switch is detected	√	-		√	• Injectors circuit • ECM	
	P0200	Injector circuit error						
RPS rail pressure sensor	P0193	Voltage above upper limit	-	●		√	• PRS circuit • PRS • APS 2 power supply circuit • BPS power supply circuit • ECM	
	P0192	Voltage below lower limit						
	P0653	Supply voltage above upper limit						
	P0652	Supply voltage below lower limit						
Rail pressure Monitoring	P0087	Maximum positive deviation of rail pressure exceeded	-	○		√	• Fuel filter • RPS check • P-PRV , PRV check(stuck)	
	P0088	Maximum negative deviation of rail pressure exceeded						
	P1171	Minimum rail pressure exceeded	√	-				
	P1172	Maximum rail pressure exceeded	-	○				
BPS boost pressure sensor	P0238	Voltage above upper limit	-	●		√	• BPS circuit • BPS • RPS power supply circuit • APS 2 power supply circuit • ECM	
	P0237	Voltage below lower limit						
	P0069	Not plausible with atmospheric pressure sensor		-	-	-		
	P0653	Supply voltage above upper limit		●		√		
	P0652	Supply voltage below lower limit						

INSTALLATION & OPERATION MANUAL

S250 and S220 Series Engines

Item	DTC	Description	Fail safety		Alarm		Possible Cause(s)
			Fuel cut off	Note 1) RPM limit	Lamp	Buzzer	
PPRV pump pressure regulator valve	P0254	Short circuit to battery of metering unit output	-	○		√	• P-PRV circuit • P-PRV
	P0253	Short circuit to ground of metering unit output	√	-			
		Open load of metering unit output	-	○			
	P0252	Powerstage error	-	○			
PRV (rail) pressure regulator valve	P0092	Short circuit to battery of pressure control valve output	√	-		√	• PRV circuit • PRV
	P0091	Short circuit to ground of pressure control valve output					
		Open load of pressure control valve output					
	P0089	Powerstage error					
OPS oil pressure sensor	-	Oil pressure low (below 0.8 bar)	-	-		√	• Oil switch, Oil level, Circuit check
Charging Error	-	Charging system error	-	-		√	• Alternator, Charging circuit check
E(C)TS engine coolant temp. sensor	-	Coolant temperature high (above 110℃)	-	Depending temp.	EOI LCD Blinking	√	• ECTS circuit • ECTS • Cooling line check
Note 1) RPM Limit : ● (Rated rpm - 500rpm), ○ (Rated rpm - 800rpm)							
Note 2),3) would be applied to S250/220 models							

6.2 DTC(DIAGNOSIS TROUBLE CODE) LIST

NO	P code	DESCRIPTION
1	P0016	Crankshaft Position – Camshaft Position Correlation
2	P0047	Turbocharger Boost Control Solenoid Circuit Low
3	P0048	Turbocharger Boost Control Solenoid Circuit High
4	P0069	Manifold Absolute Pressure – Barometric Pressure Correlation
5	P0087	Fuel Rail/System Pressure - Too Low
6	P0088	Fuel Rail/System Pressure - Too High
7	P0089	Fuel Pressure Regulator 1 Performance
8	P0091	Fuel Pressure Regulator 1 Control Circuit Low
9	P0092	Fuel Pressure Regulator 1 Control Circuit High
10	P0097	Intake Air Temperature Sensor 2 Circuit Low
11	P0098	Intake Air Temperature Sensor 2 Circuit High
12	P0107	Atmospheric Pressure Sensor Voltage Lower Limit
13	P0108	Atmospheric Pressure Sensor Voltage Upper Limit
14	P0112	Intake Air Temperature Sensor1 Circuit Low Input
15	P0113	Intake Air Temperature Sensor1 Circuit High Input
16	P0116	Engine Coolant Temperature Circuit Range / Performance
17	P0117	Engine Coolant Temperature Circuit Low Input
18	P0118	Engine Coolant Temperature Circuit High Input
19	P0182	Fuel Temp Sensor A Circuit Low Input
20	P0183	Fuel Temp Sensor A Circuit High Input
21	P0192	Fuel Rail Pressure Sensor Circuit Low input
22	P0193	Fuel Rail Pressure Sensor Circuit High Input
23	P0194	Fuel Rail Pressure Sensor Circuit Intermittent
24	P0201	Cylinder 1 Injector Open Load
25	P0202	Cylinder 2 Injector Open Load
26	P0203	Cylinder 3 Injector Open Load
27	P0204	Cylinder 4 Injector Open Load
28	*P0205	Cylinder 5 Injector Open Load
29	*P0206	Cylinder 6 Injector Open Load
30	P0231	Fuel Pump Secondary Circuit Low

INSTALLATION & OPERATION MANUAL

S250 and S220 Series Engines

NO	P code	DESCRIPTION
31	P0232	Fuel Pump Secondary Circuit High
32	P0234	Turbocharger Over boost Condition
33	P0237	Turbocharger Boost Sensor "A" Circuit Low
34	P0238	Turbocharger Boost Sensor "A" Circuit High
35	P0252	Pump Pressure Regulation Valve Circuit
36	P0253	Pump Pressure Regulation Valve Circuit Low
37	P0254	Pump Pressure Regulation Valve Circuit High
38	P0261	Cylinder 1 - Injector Circuit Low
39	P0262	Cylinder 1 - Injector Circuit High
40	P0263	Cylinder 1 Contribution/Balance
41	P0264	Cylinder 2 - Injector Circuit Low
42	P0265	Cylinder 2 - Injector Circuit High
43	P0266	Cylinder 2 Contribution/Balance
44	P0267	Cylinder 3 - Injector Circuit Low
45	P0268	Cylinder 3 - Injector Circuit High
46	P0269	Cylinder 3 Contribution/Balance
47	P0270	Cylinder 4 - Injector Circuit Low
48	P0271	Cylinder 4 - Injector Circuit High
49	P0272	Cylinder 4 Contribution/Balance
50	*P0273	Cylinder 5 - Injector Circuit Low
51	*P0274	Cylinder 5 - Injector Circuit High
52	*P0275	Cylinder 5 Contribution/Balance
53	*P0276	Cylinder 6 - Injector Circuit Low
54	*P0277	Cylinder 6 - Injector Circuit High
55	*P0278	Cylinder 6 Contribution/Balance
56	P0299	Turbocharger Under boost
57	P0300	Random/Multiple Cylinder Misfire Detected
58	P0335	Crankshaft Position Sensor A Circuit
59	P0336	Crankshaft Position Sensor A Circuit Range/Performance
60	P0340	Camshaft Position Sensor A Circuit Malfunction

INSTALLATION & OPERATION MANUAL

S250 and S220 Series Engines

NO	P code	DESCRIPTION
61	P0341	Camshaft Position Sensor A Circuit Range/Performance
62	P0381	Glow Plug/Heater Indicator Circuit
63	P0562	System Voltage Low
64	P0563	System Voltage High
65	P0601	Internal Control Module Memory Check Sum Error
66	P0602	Control Module Programming Error
67	P0604	Internal Control Module Random Access Memory (RAM) Error
68	P0605	Internal Control Module Read Only Memory(ROM) Error
69	P0606	ECM/PCM Processor
70	P0611	Injector Circuit Error
71	P062D	Injector Bank1 Error
72	P062E	Injector Bank2 Error
73	P0642	Sensor Reference Voltage "A" Circuit Low
74	P0643	Sensor Reference Voltage "A" Circuit High
75	P0650	Malfunction Indicator Lamp(MIL) Control Circuit
76	P0652	Sensor Reference Voltage "B" Circuit Low
77	P0653	Sensor Reference Voltage "B" Circuit High
78	*P0670	Glow Plug Module Control Circuit
79	*P0671	Cylinder 1 Glow Plug Circuit
80	*P0672	Cylinder 2 Glow Plug Circuit
81	*P0673	Cylinder 3 Glow Plug Circuit
82	*P0674	Cylinder 4 Glow Plug Circuit
83	*P0675	Cylinder 5 Glow Plug Circuit
84	*P0676	Cylinder 6 Glow Plug Circuit
85	*P0683	Glow Control Module Signal
86	*P0684	Glow Control Module Performance
87	P0685	ECM/PCM Power Relay Control Circuit /Open
88	*P0698	Variable Swirl Actuator Voltage Lower Limit
89	*P0699	Variable Swirl Actuator Voltage Upper Limit
90	P1145	Overrun Monitoring

INSTALLATION & OPERATION MANUAL

S250 and S220 Series Engines

NO	P code	DESCRIPTION
91	P1171	Minimum Rail Pressure Exceeded
92	P1172	Maximum Rail Pressure Exceeded
93	P1173	Set Value of PCV not in Plausibility Range
94	P1185	Maximum Pressure Exceeded
95	P1186	Minimum Pressure at Engine Speed Too Low
96	P1187	Regulator Valve Stuck
97	P1188	Leakage
98	P1307	Acceleration Sensor Range/Performance
99	P1308	Acceleration Sensor Circuit Low Input
100	P1309	Acceleration Sensor Circuit High Input
101	P1325	Glow Relay Malfunction
102	P1636	Voltage Regulator for Injector
103	P1652	Ignition Key No Signal
104	P1653	After-Run Check Error
105	P1655	Tachometer Output Fault
106	P1670	Invalid Injector IQA/C2I
107	P1671	Injector IQA Checksum Error
108	P1679	EMS Data Fail (Data frame, CS, Message error)
109	P1694	EMS Message Error
110	P1695	EMS Memory Error
111	P1697	HI-SCAN message Error
112	*P2009	Variable Swirl Actuator Control Circuit Low(Bank 1)
113	*P2010	Variable Swirl Actuator Control Circuit High(Bank 1)
114	*P2015	Variable Swirl Actuator Position Sensor/Switch Circuit Range/Performance
115	*P2016	Variable Swirl Actuator Position Sensor/Switch Circuit Low
116	*P2017	Variable Swirl Actuator Position Sensor/Switch Circuit High
117	P2122	Throttle/Pedal Position Sensor/Switch "D" Circuit Low Input
118	P2123	Throttle/Pedal Position Sensor/Switch "D" Circuit High Input
119	P2127	Throttle/Pedal Position Sensor/Switch "E" Circuit Low Input
120	P2128	Throttle/Pedal Position Sensor/Switch "E" Circuit High Input

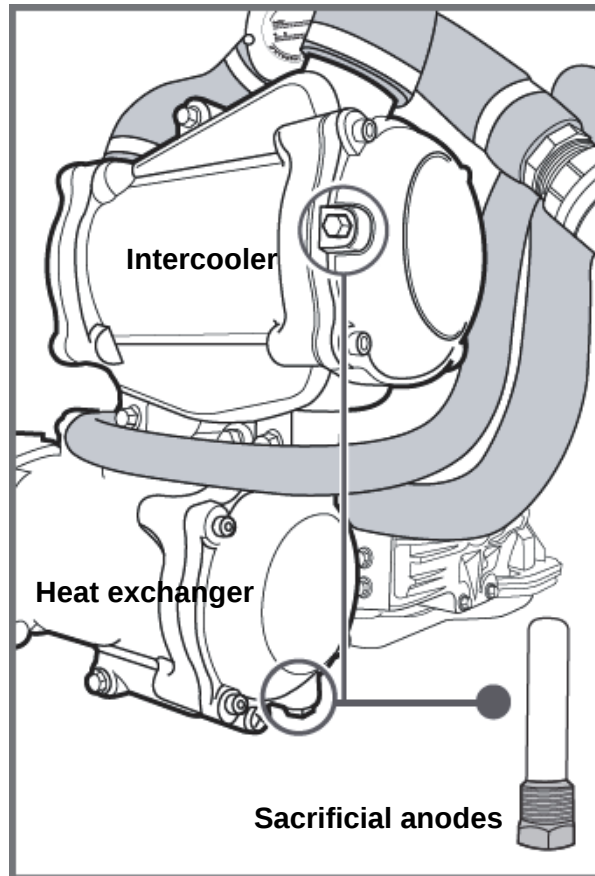
INSTALLATION & OPERATION MANUAL

S250 and S220 Series Engines

NO	P code	DESCRIPTION
121	P2138	Throttle/Pedal Position Sensor/Switch "D" / "E" Voltage Correlation
122	P2228	Barometric Pressure Circuit Low Input
123	P2229	Barometric Pressure Circuit High Input
124	P2262	Turbocharger Boost Pressure Not Detected - Mechanical
125	P2263	Turbocharger Boost System Performance
126	P2264	Water in Fuel Sensor Circuit
127	*P2562	Turbocharger Boost Control Position Sensor "A" Circuit
128	*P2563	Turbocharger Boost Control Position Sensor "A" Circuit Range/Performance
129	*P2564	Turbocharger Boost Control Position Sensor "A" Circuit Low
130	*P2565	Turbocharger Boost Control Position Sensor "A" Circuit High
131	*P2566	Turbocharger Boost Control Position Sensor "A" Circuit Intermittent
132	U0001	High Speed CAN Communication Bus
133	U0100	Faults in CAN a Transmit Messages

*Pxxxx codes would be applied to only S250/220 models

CHAPTER 10
ANTI CORROSION SYSTEM



A sacrificial anode must be replaced when more than 50% of it has been used. Check especially frequently when used in saltwater. It is recommended to replace the sacrificial anodes at the start of each season.

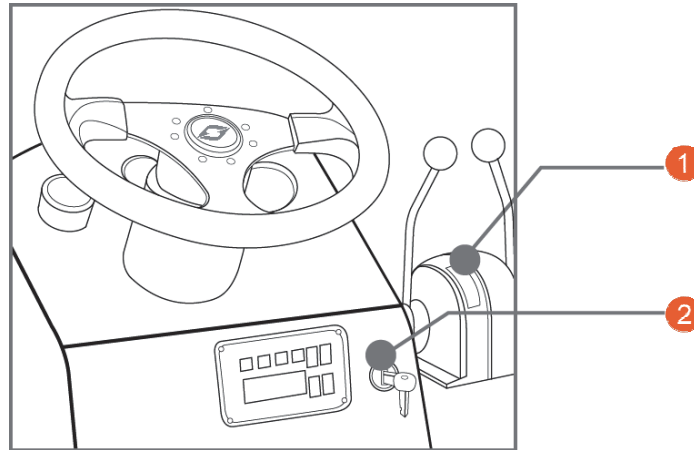


CAUTION

- DON'T OPERATE ENGINE WITHOUT ANODES. IT IS HARMFUL TO YOUR ENGINE.
- CLOSE THE SEAWATER VALVE BEFORE REMOVING ANODES.
- MAKE SURE TO CHECK THE ANODE PLUG IN ACCORDANCE WITH THIS MANUAL; DON'T LOOSEN COOLANT DRAIN PLUG.

CHAPTER 11
ENGINE OPERATION

1. ENGINE ON/OFF



- 1) Before starting the engine, you should check engine oil, coolant, gearbox oil, fuel gauge, raw water pump, battery, seacocks and so on.
- 2) When you start the engine, check that the engine throttle lever① is in the neutral position. If not, the engine may not start or there is possibility of the boat moving inadvertently. If your boat is equipped with a neutral safety switch, the engine will only crank when the engine throttle lever is in the neutral position. You can also check this on the EOI.
- 3) After starting the engine, release the key② immediately to prevent damage to the starter motor.
- 4) Avoid maximum rpm and WOT (Wide Open Throttle) before the cold engine is fully warmed up.
- 5) When cold starting, it may take a few more seconds to start the engine.
- 6) If the engine does not start in 10 seconds, release the key and wait 10 seconds. After 10 seconds try again. This method can help avoid starter motor damage.



WARNING

DO NOT OPERATE THE ENGINE IN SPACES WHERE THERE IS NO AIR CIRCULATION. EXHAUST GAS IS HARMFUL.

2. ENGINE BREAK-IN

Initial Break-in Procedure

The first 20 hours of operation is the engine break-in period. During this period, it is important that the engine is operated as outlined below.

- 1) DO NOT operate engine at idle rpm for extended periods of time during the first 10 hours.
- 2) DO NOT operate at any one constant speed for extended periods of time.
- 3) DO NOT exceed 75% of full throttle during the first 10 hours except during the engine initial Break-In Procedure. After the next 10 hours, occasional operating at full throttle (5 minutes at a time maximum) is permissible.
- 4) AVOID full throttle accelerations from neutral position.
- 5) DO NOT operate at all full throttle until engine reaches normal operating temperature.
- 6) FREQUENTLY CHECK engine oil level and add oil if necessary.

3. STOPPING THE ENGINE

The engine should be run for a few minute at idle (in neutral) before turning it off. This will avoid boiling the cooling system and even out the temperature.

This is especially important if the engine has been operated at high engine speeds and/or with heavy loads.

Shutting down the engine in this fashion will extend the life of your engine.

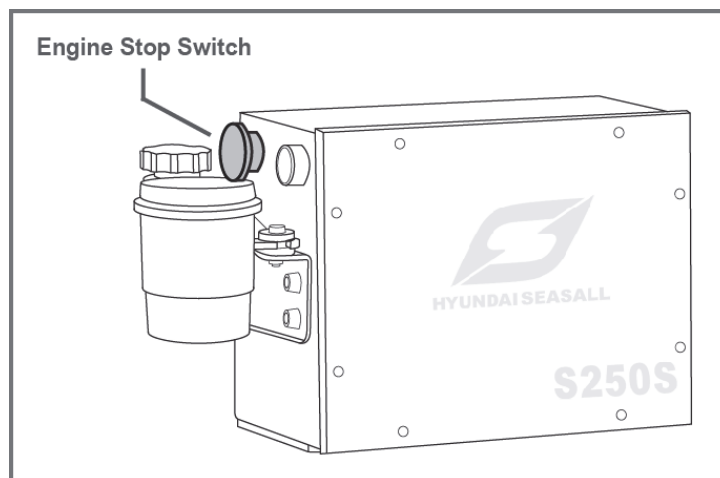


WARNING

**DO NOT OPERATE IN SPACES WHERE THERE IS NO AIR CIRCULATION.
EXHAUST GAS IS HARMFUL.**

4. EMERGENCY STOP

- 1) You can stop the engine by pushing this button. After releasing the switch by twisting the button, you can start the engine again. (Normally, the button should be in the “out” position.)
- 2) When the button is pressed or if it doesn't work normally, the engine doesn't crank. We recommend that you check this switch first if there is any cranking problem.
- 3) You can use this switch to avoid unexpected engine starting during maintenance.
- 4) You can use this switch in any emergency situation.



5. WINTER OPERATION AND STORAGE

- 1) When using or storing your engine under 0°C, protect all parts exposed to seawater (seawater pump, intercooler, heat exchanger, cooling lines, seawater strainer, valves and hoses) from freezing. Sterndrive models should be trimmed down fully to prevent trapping water in the gear case which could then freeze and cause damage.
- 2) The battery capacity decreases as the temperature drops. We recommend recharging the battery frequently. Check and clean all battery cable connections, as oxidized connections lead to voltage drops and starting difficulties.

CHAPTER 12

ENGINE STORAGE

The major consideration in preparing your engine for storage is to protect it from rust, corrosion, and damage caused by freezing of trapped water.

The following storage procedures should be followed to prepare your engine for out-of-season storage or prolonged storage (two months or longer or winter storage) :

CHECK LIST
• Visual inspection for leaks and damage
• Change engine oil and oil filter
• Replace fuel filter
• Check air filter element and clean if necessary
• Check engine coolant level and top up if necessary
• Check impeller and replace if necessary
• Check anodes and replace if necessary
• Clean the engine
• Flush and drain seawater cooling system
• Fill fuel tank until full and inspect the fuel system
• Remove the battery and store in a cool, dry place



CAUTION

FOR WINTER STORAGE, SEAWATER SHOULD BE DRAINED FULLY BY LOOSENING THE HEAT EXCHANGER ANODE REFER TO CHAPTER 10.

CHAPTER 13

MAINTENANCE

1. PREDELIVERY INSPECTION CHECK LIST

1.1 BEFORE THE WATER TEST

-ENGINE CHECKS	Y	N
Seawater inlet valve open		
Engine coolant level		
Cooling system hose clamps tight		
Engine oil level		
Power steering fluid level		
Drive belt tension		
All electrical connections tight		
EOI warning system operating		
Battery fully charged and secured		
All fuel connection tight		
Exhaust system hose clamps tight		
Engine mount s tight		
Engine alignment		
Fuel level		
Engine coolant and oil drain plug closed		
Throttle, shift and steering system fasteners tightened properly		

-PROPULSION CHECKS

Stern drive unit oil level		
Power trim oil level (stern drives)		
Drive unit fasteners torque		
Power trim cylinders fasteners tight		
Propeller nut torque		
Transmission fluid level		

1.2 ON THE WATER TEST

-ENGINE CHECKS	Y	N
Boat drain plug in place (Check before putting boat in water)		
Seawater pump operation		
Seawater strainer correctly mounted , Clean and tightly closed		
Engine alignment		
Fuel leaks		
Oil leaks		
Coolant leaks		
Water leaks		
Exhaust leaks		
EOI and gauges operation		
Engine emergency stop switch operation		
Idle RPM, within specifications		
WOT RPM, within specifications (in forward gear)		

-PROPULSION CHECKS

Steering operation throughout range		
Power trim operation (stern drives)		
Shift operation		
Drive oil leaks		

1.3 AFTER THE WATER TEST

Fuel, oil, coolant, water and fluid leaks		
Oil and fluid level		
Propeller nut torque		

2. MAINTENANCE SCHEDULE

Maintenance item \ Maintenance intervals		Whichever comes first		
		Daily	200h / 1year	400h / 2years
Cooling system	Check the coolant level and for leaks	●		
	Replace the seawater pump impeller		●	
	Inspect the thermostat		●	
	Clean the heat exchanger tube bundle			●
	Check and clean the seawater strainer	●		
Exhaust system	Check for leaks	●		
	Replace the exhaust rubber bellows			●
Fuel system	Check for leaks	●		
	Replace the fuel filter		●	
	Replace the secondary fuel filter		●	
Air intake system	Clean the air filter		●	
	Clean the intercooler tube bundle			●
Lubrication system	Check the level and for leaks	●		
	Change the engine oil and filter		●	
Electrical systems	Check for tight connections / contamination		●	
Anti corrosion system	Check the sacrificial anodes ¹⁾		●	
Drive belt	Check the belt condition		●	
Battery	Check the operating voltage	●		
Check tightness of the bolts, nuts and other fasteners			●	
Check tightness and for corrosion of hose clamps		●		
Steering system	Check the oil level and for leaks	●		
Propulsion system ²⁾	Check the fluid levels and for leaks	●		

1) If corroded over 60%, replace.

2) More detailed maintenance, follow manufacturer's specifications.



CAUTION

YOU SHOULD EXERCISE THE UTMOST CARE TO PREVENT INJURY TO YOURSELF OR ENGINE DAMAGE WHENEVER PERFORMING ANY MAINTENANCE OPERATIONS.

3. STERNDRIVE & TRANSMISSION MAINTENANCE SCHEDULE

Maintenance item	Maintenance intervals	Whichever comes first	
		Daily	100h / 1year
Check sterndrive unit oil level (Transmission)		●	
Trim pump oil level		●	
Power steering fluid level		●	
Check water pickups for debris or marine growth		●	
Check water strainer and clean		●	
Inspect sterndrive unit anodes and replace if 50% eroded		●	
Lubricate propeller shaft and re-torque nut			●
Touch-up power package paint. Spray with Corrosion Guard (Transmission)			●
Change sterndrive unit oil (Transmission)			●
Re-torque connection of gimbal ring to steering shaft			●
Check steering system and remote control for loose, missing or damaged parts			●
Lubricate cables and linkages			●
Inspect U-joints, splines and bellows. Lubricate U-joints splines			●
Check engine alignment			●
Check gimbal bearing and engine coupler			●
Check continuity circuit for loose or damaged connections			●
Check MerCathode unit			●

Filter replacement (Transmission)

- 1) The first replacement must be performed after 25 hours of operation.
- 2) The oil must be changed whenever the filter is replaced.



CAUTION

YOU SHOULD EXERCISE THE UTMOST CARE TO PREVENT INJURY TO YOURSELF OR ENGINE DAMAGE WHENEVER PERFORMING ANY MAINTENANCE.

[illegible]

CHAPTER 14

TROUBLESHOOTING GUIDE

■ Starter motor does not crank the engine

Possible Causes	
•Engine stop switch “ON” position •Safety Stop Switch activated	•Engine is not shifted to neutral position •Wrong neutral switch connection to EOI
•Weak battery or battery connections are loose or corroded	•Starter motor solenoid or slave solenoid failure
•Ignition key switch failure	•Blown fuse at EOI
•Wiring or electrical connection fault	•Defective ECU

■ Engine cranks but does not start

Possible Causes	
•Weak battery or bad starter motor	•Low fuel pressure
•No fuel	•Low compression pressure
•ECU not functioning	•Crank position sensor not functioning
•Incorrect starting procedure	•Fuel is not reaching the engine
•Faulty fuel filter or electric fuel pump	•Bad fuel quality or water in fuel
•Faulty fuse	•Faulty injector

■ Engine starts with difficulty or starts and stalls

Possible Causes	
•Low fuel pressure in fuel rail	•Fuel return line not connected at injector
•Leakage in high pressure fuel circuit	•Faulty alternator or voltage regulator
•Faulty fuse	•No engine coolant temperature sensor signal
•No rail pressure sensor signal	•Low battery voltage
•Oil level too high or too low	•Low compression pressure
•ECU program error or hardware fault	•Clogged fuel filter

■ Engine idle is rough

Possible Causes	
•Fuel return line not connected at injector	•Low compression pressure
•No rail pressure sensor signal	•Injector clamp poorly tightened
•Wiring harness open or poor connection	•Faulty high pressure fuel pump
•Bad fuel quality or water in fuel	•Faulty injector
•Clogged fuel filter / air filter	•Carbon deposit on the injector

■ Engine rattling, noisy engine

Possible Causes	
•Compensation of individual injector not adapted	•No engine coolant temperature sensor signal
•Low compression pressure	•Clogged injector return line
•No rail pressure sensor signal	•Faulty injector
•Poor injector O-ring	•Carbon deposit on the injector

■ Uneven acceleration / deceleration

Possible Causes	
•Intermittent faulty fuel line connection	•Oil suction
•No rail pressure sensor signal	•ECU program error or hardware fault
•Leakage in intake system	•Damaged turbocharger or leakage in vacuum line
•Clogged fuel filter	•Low compression pressure
•Leakage in high pressure fuel circuit	•Injector needle stuck

■ Engine stops

Possible Causes	
•Run out of fuel / Safety Stop Switch activated	•Crank signals missing
•Not connected fuel feed line	•Fuel pressure regulator valve contaminated, stuck, jammed
•Leakage in high pressure fuel circuit	•Rail pressure regulator valve contaminated, stuck, jammed
•Fuel out of specification	•Faulty alternator or voltage regulator
•Bad fuel quality or water in fuel	•Faulty high/low pressure fuel pump
•Clogged low pressure fuel circuit	•ECU program error or hardware fault

■ Performance loss

Possible Causes	
•Compensation of individual injector not adapted	•Leakage at the injector
•Clogged air filter	•Fuel or intake air temperature too high
•Oil level too high or too low	•Engine coolant temperature too high
•Damaged turbocharger or intake air leakage	•Low compression pressure
•Clogged fuel filter	•Poor valve clearance

CHAPTER 15

WARRANTY

WHAT IS COVERED

Hyundai SeasAll warrants its new products to be free of defects in material and workmanship during the period described below.

DURATION OF COVERAGE

This Limited Warranty provides coverage for two (2) years from the date the product is first sold to a recreational use retail purchaser or when the Product has been operated for 1000 hours, whichever occurs first. This Limited Warranty provides coverage for one (1) year from the date the product is first sold to a commercial use retail purchaser or when the Product has been operated for 1000 hours, whichever occurs first. This limited warranty is transferable to a subsequent purchaser, but only for the remainder of the unused portion of the limited warranty. To transfer the warranty to the subsequent owner, send or fax a copy of the bill of sale or purchase agreement, new owner's information and engine serial number to Hyundai SeasAll's distributor or dealer. Upon processing the transfer of warranty, Hyundai SeasAll will send registration verification to the new owner of the product by mail.

WARRANTY REGISTRATION

Your selling dealer fills out the Warranty Registration Card and mails it to the distributor responsible for administering the warranty registration for your country. Warranty Registration must be made no later than 15 days from the date of sale after purchase from authorized dealer. The Warranty Registration Card identifies information on customer and product, models and serial numbers, date of sale, type of use and the selling dealer.

The distributor or dealer also certifies that you are the original purchaser and user of the product. A copy of the Warranty Registration Card, designated as the Purchaser's Copy, must be given to you immediately after the card has been completely filled out by the selling distributor or dealer.

This card represents your registration identification, and should be retained by you for future use when required. Should you ever require warranty service on this product, your dealer may ask you for the Warranty Registration Card to verify date of purchase and to use the information on the card to prepare the warranty claim forms.

CONDITIONS THAT MUST BE MET TO OBTAIN WARRANTY COVERAGE

Warranty coverage is available only to retail customers who purchase from a dealer authorized by Hyundai SeasAll to distribute the product in the country in which the sale occurred, and then only after the Hyundai SeasAll specified pre-delivery inspection process is completed and documented. Warranty coverage becomes available upon proper registration of the product by the authorized dealer. Routine maintenance outlined in the Installation and Operation Manual must be performed in a timely fashion in order to obtain warranty coverage. Hyundai SeasAll reserves the right to make any warranty coverage contingent upon proof of proper maintenance.

WHAT HYUNDAI SEASALL WILL DO

Hyundai SeasAll will pay for all parts and labor needed to repair the damage to the product resulting from a defect in materials or factory workmanship.

The warranty does not apply to any damage or defect that is the result of abnormal use or carelessness.

The repair or replacement of parts, or the performance of service under this warranty does not extend the life of this warranty beyond its original expiration date.

OWNER'S OBLIGATIONS

It is the owner's obligation to install, operate, maintain and care for his/her Hyundai SeasAll engines in accordance with the instruction and requirements stated in the Installation and Operation Manual.

The owner is responsible for providing enough time and cooperation to get the engine repaired by an authorized dealer, and to deliver it to a proper facility for repair.

The owner is responsible for the cost for warranty inspection, including landing, launching and transport.

HOW TO OBTAIN WARRANTY COVERAGE

The customer must provide Hyundai SeasAll with a reasonable opportunity to repair the engine, as well as reasonable access to the product for warranty service. Warranty claims shall be made to a Hyundai SeasAll Authorized Repair Facility to service the product. Purchaser shall not, unless requested by Hyundai SeasAll, ship the product or parts of the product directly to Hyundai SeasAll. The warranty registration card is the only valid registration identification and must be presented to the dealer at the time warranty service is requested in order to obtain coverage.

LIMITATIONS – EXPENDABLE PARTS

- Filters : fuel filter, engine oil filter, air filter
- Engine oil and coolant and other fluids such as power steering fluid and hydraulic trim fluid
- Rubber products : seawater pump impeller, rubber hoses, drive belt
- Gaskets, anode, thermostat

WHAT IS NOT COVERED

- Fuel injector or filter cleaning
- Belt or control adjustments or lubrication checks made in connection with normal services.
- Damage caused by neglect, lack of maintenance, accidents, abnormal operation, improper installation or service, unapproved modification or freezing temperatures.
- Haul-out, launch or towing charges; removal and/or replacement of boat partitions or material for necessary access to the product when such service is due to boat design; all related transportation charges and/or travel time, etc.
- All incidental and/or consequential damages (storage charges, telephone or rental charges of any type, inconvenience or loss of time or income) are the owner's responsibility.
- Use of other than Hyundai SeasAll genuine replacement parts when making warranty repairs.
- Participating in or preparing for racing or other competitive activity.
- Water entering the engine via the air inlet filter or exhaust system or submersion. Water in the starter motor.
- Failure of any parts caused by lack of cooling water.
- Use of fuels and lubricants that are not suitable for use with or on the product. Please refer to Installation and Operation Manual.

TRANSMISSION AND STERNDRIVE WARRANTIES

The ZF Marine Transmissions and CMD/Mercury/MerCruiser Diesel Sterndrive Bravo Models are covered under separate warranties, and serviced by those companies. For information on those warranties, please see the separate booklets included in the original packaging of your Hyundai SeasAll purchase.

WARRANTY REGISTRATION CARD

Date of sale

Check box if Warranty Transfer ☐

Please fill out the following registration card in English.

Month	Day	Year

OWNER'S INFORMATION

Name/Company		ZIP Code/Post Code	
Street/P.O. Box			
City		State/Province	
Country		E-Mail	
Telephone		Mobile Phone	

DEALER INFORMATION

Dealer Name		Dealer Code	
City		State/Province	
Country		E-Mail	
Telephone		Mobile Phone	

ENGINE INFORMATION

Number of Engines	Single ☐ Dual ☐
Engine Model	
Engine Serial No.	
Engine Model	
Engine Serial No.	

BOAT INFORMATION

REPOWER ☐

Manufacturer		Material	Steel ☐ Alu. ☐ FRP ☐ Wood. ☐
Model		LOA	ft Beam ft
Boat Type		Hull ID	
Type of Use	Pleasure ☐ Commercial ☐	Planing ☐ Semi Disp. ☐	Displacement ☐

Dealer's Instructions: Dealers must complete this card to register the warranty. Please return the copy to your national Importer/Distributor immediately. Unregistered engines are subject to warranty rejection.

Revised 2012

ABSOLLUTE MARINE POWER



HYUNDAI SEASALL

www.hyundai-seasall.com

460-26 Sam-dong, Uiwang-si, Gyeonggi-do 437-815, Korea
Fax : +82-70-8244-8555 | Tel : +82-70-8620-8035 | seasall.info@hyundai-seasall.com

ISSUED January 2012

Copyright © 2012 Hyundai SeasAll Co., Ltd. All rights reserved.