MERCURY

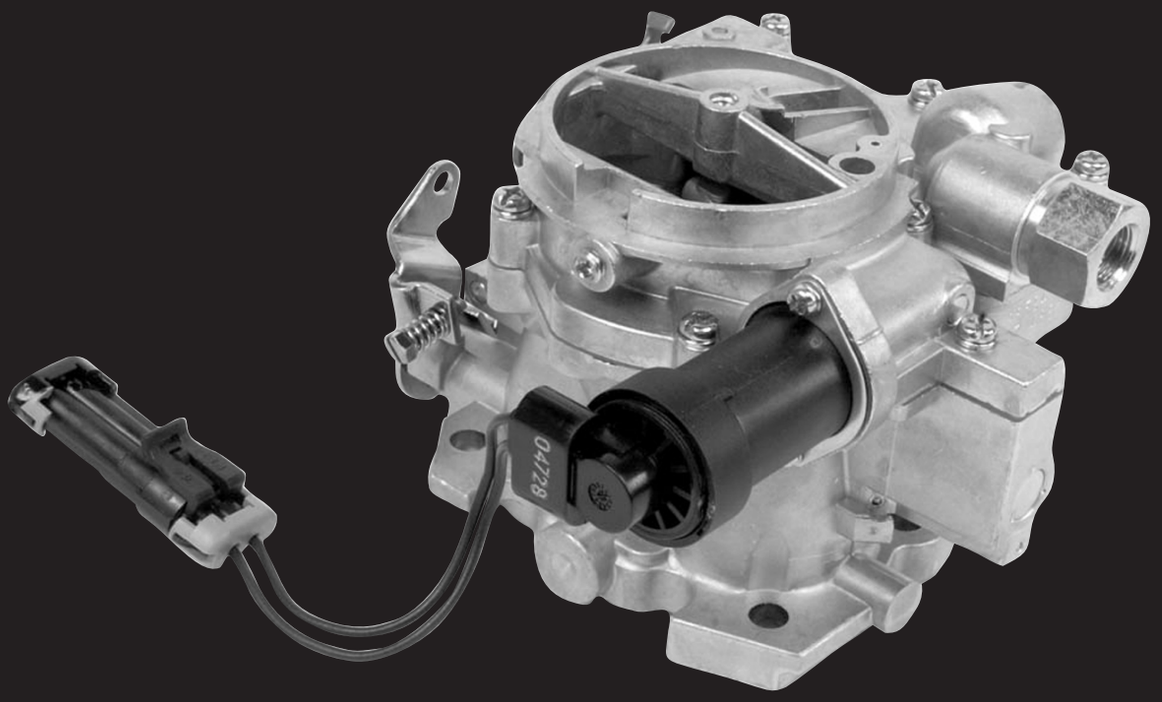
Turn Key Start Carburetor's Supplement to #25, 26, & 31

90-866202

MERCURY

MerCruiser

Service Manual #41



Turn Key Start (TKS) Carburetors
Supplement to #25, 26, & 31

Models Covered

Model	Serial Number
3.0L Alpha	0W302000
4.3L Alpha	0W300013
5.0L Alpha and Bravo	0W300010
5.7L Bravo	0W300755

Notice to Users of This Manual

Throughout this publication, Dangers, Warnings and Cautions (accompanied by the International HAZARD Symbol ⚠) are used to alert the mechanic to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly. **OBSERVE THEM CAREFULLY!**

These safety alerts alone cannot eliminate the hazards that they signal. Strict compliance to these special instructions when performing the service, plus common sense operation, are major accident prevention measures.

⚠ DANGER

DANGER - indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING - indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

⚠ CAUTION

CAUTION - indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury or property damage. It may also be used to alert against unsafe practices.

This manual has been written and published by the Service Department of Mercury Marine to aid our dealers' mechanics and company service personnel when servicing the products described herein. We reserve the right to make changes to this manual without prior notification.

It is assumed that these personnel are familiar with marine product servicing procedures. Furthermore, it is assumed that they have been trained in the recommended service procedures of Mercury Marine Power Products, including the use of mechanics' common hand tools and the special Mercury Marine or recommended tools from other suppliers.

We could not possibly know of and advise the marine trade of all conceivable procedures and of the possible hazards and/or results of each method. Therefore, anyone who uses a service procedure and/or tool, which is not recommended by the manufacturer, first must completely satisfy himself that neither his nor the products safety will be endangered.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication. As required, revisions to this manual will be sent to all dealers contracted by us to sell and/or service these products.

Refer to dealer service bulletins, operation maintenance and warranty manuals and installation manuals for other pertinent information concerning the products described in this manual.

Precautions

It should be kept in mind, while working on the product, that the electrical and ignition systems are capable of violent and damaging short circuits or severe electrical shocks. When performing any work where electrical terminals could possibly be grounded or touched by the mechanic, the battery cables should be disconnected at the battery.

Any time the intake or exhaust openings are exposed during service they should be covered to protect against accidental entrance of foreign material which could enter the cylinders and cause extensive internal damage when the engine is started.

It is important to note, during any maintenance procedure replacement fasteners must have the same measurements and strength as those removed. Numbers on the heads of the metric bolts and on the surfaces of metric nuts indicate their strength. American bolts use radial lines for this purpose, while most American nuts do not have strength markings. Mismatched or incorrect fasteners can result in damage or malfunction, or possibly personal injury. Therefore, fasteners removed should be saved for reuse in the same locations whenever possible. Where the fasteners are not satisfactory for reuse, care should be taken to select a replacement that matches the original.

Replacement Parts

Use of parts other than the recommended service replacement parts, will void the warranty on those parts that are damaged as a result.

⚠ WARNING

Electrical, ignition and fuel system components on Mercury Marine Power Products are designed and manufactured to comply with U.S. Coast Guard Rules and Regulations to minimize risks of fire or explosion.

Use of replacement electrical, ignition or fuel system components, which do not comply to these rules and regulations, could result in a fire or explosion hazard and should be avoided.

When servicing the electrical, ignition and fuel systems, it is extremely important that all components are properly installed and tightened. If not, any electrical or ignition component opening would permit sparks to ignite fuel vapors from fuel system leaks, if they existed.

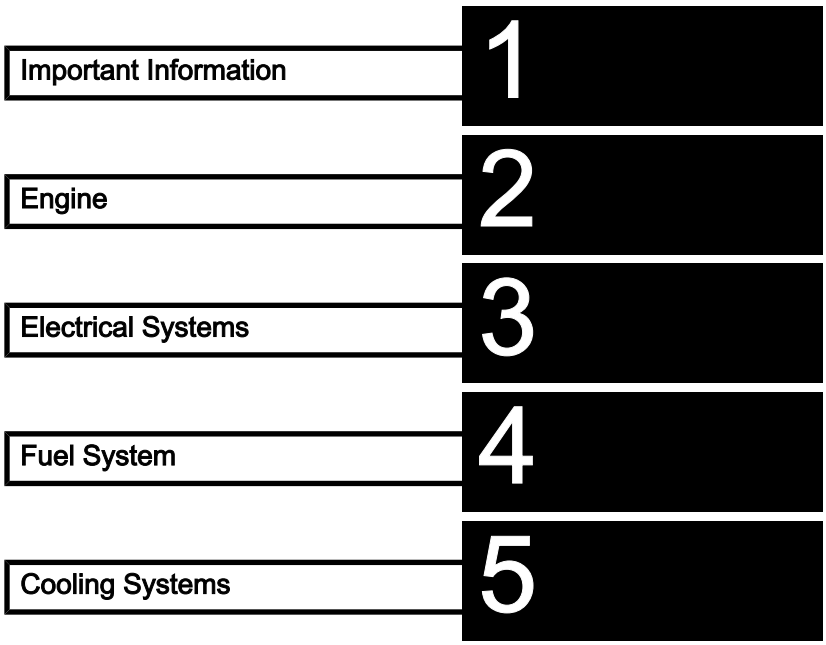
Cleanliness and Care of Product

A Mercury Marine Power Product is a combination of many machined, honed, polished and lapped surfaces with tolerances that are measured in the ten thousands of an inch/mm. When any product component is serviced, care and cleanliness are important. Throughout this manual, it should be understood that proper cleaning and protection of machined surfaces and friction areas is a part of the repair procedure. This is considered standard shop practice even if not specifically stated.

Whenever components are removed for service, they should be retained in order. At the time of installation, they should be installed in the same locations and with the same mating surfaces as when removed.

Personnel should not work on or under an engine that is suspended. Engines should be attached to work stands, or lowered to ground as soon as possible.

Manual Outline



Important Information

Section 1A - General Information

Table of Contents

Important Information

General Information

NOTICE
For information and procedures not listed, refer to the appropriate Mercury MerCruiser Service Manual.

NOTICE
Refer to appropriate Mercury MerCruiser Service Manual for engine assembly and repair.

The following sections of supplemental information have been prepared to assist in the identification and servicing of Mercury MerCruiser Turn Key Start (TKS) systems.

This supplement is intended to be used in conjunction with the appropriate Mercury MerCruiser Service Manual for your engine, and not in place of the manual. The scope of this supplement is to highlight new or different specifications, components, and procedural information as they pertain to Turn Key Start (TKS) Systems

How To Use This Manual

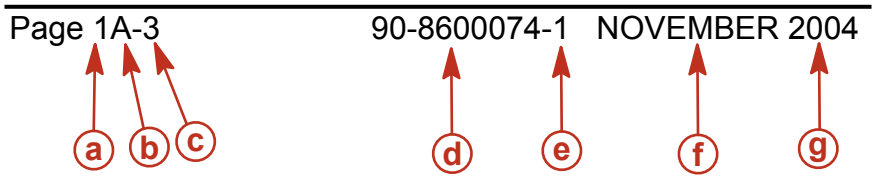
This manual is divided into sections, which represent major components and systems.

Some sections are further divided into parts that more fully describe the component.

Refer to the **Service Manual Outline** following **Models Covered** in this manual for section titles.

Page Identification

The service manual number and section title appear at the top of the page. Two number groups appear at the bottom of each page. Following is an example and a description.



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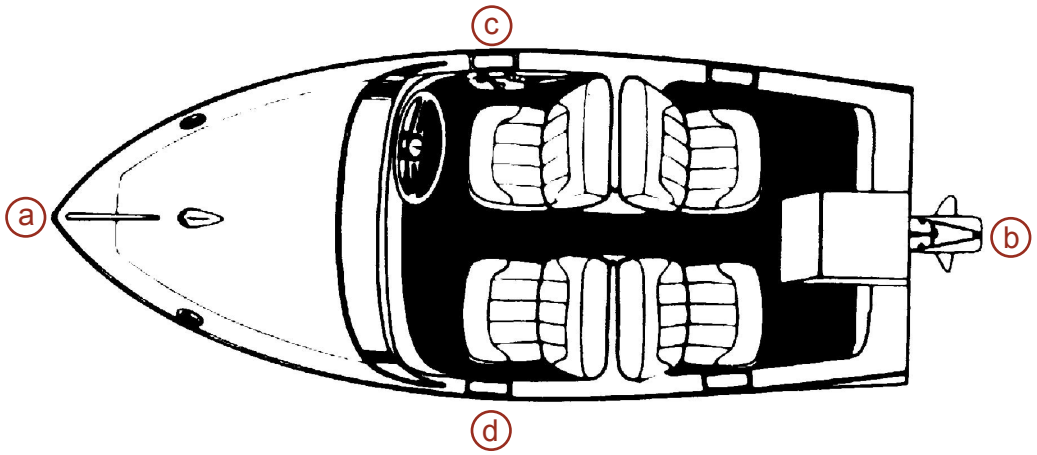
- **a -** Section number
- **b -** Section part
- **c -** Page number
- **d -** Manual number
- **e -** Revision number (if applicable)
- **f -** Month printed
- **g -** Year printed

Directional References

The front of the boat is the bow; the rear is the stern. Starboard side is the right side; the port side is the left side. In this service manual supplement, all directional references are given as they appear when viewing boat from the stern, looking toward the bow.



a - Fore or bow (front)
b - Aft or stern (rear)
c - Starboard (right)
d - Port (left)

Important Information

Section 1B - Maintenance

Table of Contents

Maintenance

Torque Specifications

NOTE: *Securely tighten all fasteners not listed below*

Description	Nm	lb. in.	lb. ft.
Carburetor To Manifold	27		20
Fuel Line to Carburetor	24		18
Fuel Inlet Filter Nut	24		18
Airhorn Attaching Screws	3.0 - 5.8	26.55 - 51.33	2.21 - 4.28
Main Metering Jet	1.0 - 2.9	8.85 - 25.67	0.74 - 2.14
Power Valve	3.0 - 6.8	26.55 - 60.19	2.21 - 5.0
TKS Module Attaching screws	.2	17.35	

Special Tools

Description	Part Number
Float gram scale	Obtain Locally
Idle mixture adjusting tool	866201
Universal carburetor gauge	91-36392
Tachometer	79-17391A1

Important Information

Section 1C - Troubleshooting

Table of Contents

Turn Key Start: Theory of Operation

The TKS system has been added to carbureted engines to:

- Provide additional fuel to air mixture when starting a cold engine. Idle speed is slightly increased by supplying the additional fuel / air mixture required to start a cold engine.
- Prevent enrichment when starting a warm engine.

COMPONENTS

1. The TKS carburetor casting allows starting fuel to be drawn from the float bowl and mixed with air in a chamber. This enriched mixture is drawn into the engine through an opening in the carburetor body below the throttle plate.
2. The TKS module mounted to the carburetor. When 12V DC is applied, the TKS module will warm internally, causing a plunger to extend from the module and close the enrichment fuel air passage in the TKS carburetor.
3. On 3.0L engines, an oil pressure switchprovides a ground (-) path for the TKS module. Positive (+) voltage is continuously supplied through a 20 amp fuse directly from the engine circuit breaker.
4. On V-6 and V-8 engines an existing oil pressure switch provides 12V positive (+) voltage to the TKS module. Ground for the TKS module is continuously supplied.

TKS SYSTEM OPERATION

The TKS Carburetor assembly provides precise fuel and air delivery during startup for all temperature conditions. An electrothermal valve, the TKS module, is installed on the carburetor assembly.

Before startup and according to ambient temperature, the TKS Module brass sleeve retracts, and the enrichment fuel and air valve is opened.

The TKS fuel / air passage is normally open, allowing fuel enrichment mixture through the carburetor continuously, unless the passage is blocked by the plunger of the TKS module.

With the key switch in the start position, the vacuum of the engine pulls the enrichment fuel and air into the intake manifold.This starts an electrical warming of the module.

With the circuit completed, the electrothermal TKS module brass plunger extends to block the enrichment passage.

Once the TKS module brass sleeve is fully extended, the enrichment fuel and valve are fully closed, and enrichment stops.

In order to keep the TKS module warming and the starting channel in the carburetor closed when engine is warm a second circuit has been added. For additional information, see the "Typical Starting System Components" in Section 4A for your particular engine type.

TKS Starting Characteristics

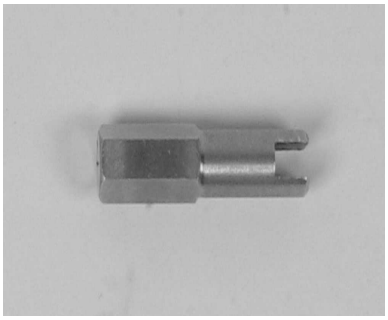
On 3.0 L models - If the engine has not run for a long period of time, it might require a couple of attempts while the fuel bowl refills. Once the engine has started, it will idle at 700-900 RPM.

On 4.3 L, 5.0 L, and 5.7L models - If the engine has not run for a long period of time, it might require a couple of attempts while the fuel bowl refills. Once the engine is started, it will idle around 650 to 700 RPM in idle stabilization mode. If the idle exceeds 700 RPM, the ECM adds spark, thinking that the operator is trying to accelerate, which could cause the engine to idle at 700-900 RPM. After the TKS module has shut off the enrichment circuit, the carburetor will function like a standard carburetor. If the engine is out of idle stabilization mode, (engine below 700 RPM), you will hear and feel a slight drop in RPM. After the TKS module has shut off the enrichment passage, the carburetor will function like a standard carburetor.

NOTE: When the ambient temperature is -17 - 55° C (0º-50ºF), normal engine idle should be 650-700 RPM in idle stabilization mode.
When the ambient temperature is 10-55° C (50º - 130 ºF), normal engine idle should be 700-900 RPM and exceed the idle stabilization mode, moving into the run spark mode. Once the enrichment circuit shuts off, the engine will idle at 650 RPM (Idle Stabilization Mode.)

TKS Special Information

1. There will be a hissing sound for 6 to 10 minutes as the module is warming and the enrichment channel is being closed.
2. The base gasket on the TKS carburetor is different from the old base gaskets
3. V-6 and V-8 engines use a spacer plate between the carburetor and manifold. The gaskets have the same part number. The plastic spacer has not been changed and still has the divider between the carburetor throats.
4. A special tool (PN 91-866201) is available to allow for adjusting the idle mixture on TKS carburetors. The new adjustable idle mixture screw has a 16º taper and the special cap has been C.A.R.B. approved to allow mixture adjustment only by dealers using the special tool. The new taper will provide a finer adjustment.

Idle Mixture Adjusting Tool	Part Number
 9668	PN-91-866201

5. Do not make any adjustments of idle speed and/or idle mixture unless engine is thoroughly warm and the TKS enrichment is completely shut off.
6. Generation 1 and Generation 2 carburetors function the same, and there is only a slight difference in the location of the TKS passage within the body.
7. 3.0L engines will only have Generation 2 carburetors, while V-6 and V-8 engines will have Generation1 and Generation 2 carburetors.
8. Refer to the parts book for proper service components.

Troubleshooting

TKS Troubleshooting

NORMAL STARTING PROCEDURE

1. Check all items listed in Operation Chart.
2. Place the remote control handle in neutral.

⚠ CAUTION

Overheating from insufficient cooling water will cause engine and drive system damage. Ensure that there is sufficient water always available at water inlet holes during operation.

⚠ WARNING

Explosive gasoline fumes collect in the engine compartment. Avoid injury or property damage, operate the bilge blower for at least 5 minutes prior to starting the engine. If the boat is not equipped with a bilge blower, open the engine hatch and leave it open while starting the engine.

3. Turn ignition key to START. Release key when engine starts and allow switch to return to ON position.
4. Allow engine to warm up (6-10 minutes on first start of the day). The engine will initially idle at 650-900 RPM and then return to normal idle RPM for the engine.

Normal Engine Idle Specifications	Idle in Neutral	Idle in Gear
3.0 L	800 RPM	750 RPM
4.3 L, 5.0 L, and 5.7 L	650 RPM	650 RPM

5. If the engine does not start after 3 attempts:
   a. Push the throttle only button and position the remote control throttle lever to the 1/4 throttle position.
   b. Turn ignition key to START. Release key when engine starts and allow switch to return to ON position.
6. If engine does not start after step 5:
   a. Move the remote control throttle lever to full throttle position, then return to the 1/4 throttle position.
   b. Turn ignition key to START. Release key when engine starts and allow switch to return to ON position.
7. Inspect the power package for fuel, oil, water and exhaust leaks.
8. To shift into gear, move control handle with a firm, quick motion forward to shift to forward gear, or backward to shift to reverse. After shifting drive unit, advance throttle to desired setting.

⚠ CAUTION

Never attempt to shift unit unless engine is at idle RPM. Damage to transmission could occur.

9. Move the remote control handle to neutral and throttle lever to idle. Allow the engine to slow to idle speed. If engine has been operated at high speed for a long period of time, allow the engine to cool at idle speed for 3 to 5 minutes.
10. Turn ignition key to the OFF position.

HARD START - COLD

1. If the engine does not start after third attempt, verify the following:
   a. There is sufficient fuel and the fuel shut off valve is open.
   b. Ignition system is functioning.

Assuming that the carburetor is the cause of the hard starting condition, the probable cause will be that the additional fuel flow path is not functioning properly. To get the engine started:

1. Push the throttle only button.
2. Move the remote control throttle lever to full throttle position and then to the idle position. Do this two times.
3. Place throttle at 1/4 position (throttle only)
4. Attempt to start engine again

5. If engine still does not start, refer to "Engine Does Not Start."

HARD START - HOT

If the engine does not start when the engine is hot, the probable cause of hard hot-restarts associated with the TKS carburetor will be the inadvertent opening of the additional fuel flow path. The temperature switch was added to the system to keep power to the TKS module to prevent the additional fuel flow path from opening during hot re-starts.

1. Check coolant temperature.
2. If the coolanttemperature is above 43º ± 3º C (110º ±8º F):
   a. Verify that 12 Volts Positive (+) and ground (-) are getting to the TKS module. See Section 4G for details.
   b. Operation of the TKS module can be confirmed by placing your finger on the end of the plastic TKS housing in the center and feeling that the electric heater is getting warm. A warm TKS module after engine has run for 6 to 10 minutes confirms that TKS is functioning electrically. See Section 4G for details.
3. Verify that the TKS Module is functioning normally. Follow procedure in Section 4G.

ENGINE DOES NOT START

The possible root causes of the fuel path not functioning include:

- The TKS Module failed in the closed position. See Section 4G and Section 5G.
- The fuel has varnished. See Section 5B.
- There is debris in the fuel path. See Section 5B.
- The float level is out of specification. See Section 5B.

If the engine does not start, check the following:

1. Check that float bowl is full of fuel.
2. Check that the mechanical fuel pump is working. Attach a fuel pressure gauge to the mechanical fuel pump to verify it is working correctly.
3. Check the enrichment jet emulsion tube, TKS enrichment jet, and the main jets for damage or debris.

ENGINE DOES NOT IDLE CORRECTLY

If the engine does not idle correctly after starting, verify that the enrichment cycle is fully closed before adjusting checking the following:

1. The engine idle RPM has been set correctly with a warm engine.
2. Verify the timing of the engine in the base timing mode.
3. Verify there is voltage on the Packard connector attached to the TKS heater.
4. Check the enrichment jet, emulsion tube, and the main jets for damage or debris.

HISSING NOISE

There is a small enrichment air passage for the TKS system in the throat of the carburetor. Air is drawn through this passage when TKS is in starting mode and does create a slight whistle or hissing noise. After 6 to 10 minutes when engine has warmed and TKS system has closed the noise will quit and will only occur again after a cold engine start. If this noise continues after 10 minutes, this could indicate a problem with the TKS module. See Section 5B.

Engine

Section 3A - Oil Pressure Switch

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3A

Oil Pressure Switch

Oil Pressure Switch Test and Inspection

INSPECT THE TKS OIL PRESSURE SWITCH

1. Look for oil leaks around the base where the oil pressure switch connects to the engine.
2. Inspect for chafed or broken wires.
3. Inspect housing for cracks or leaks.
4. Remove switch and inspect for debris or a clog of the oil pressure inlet on the switch.

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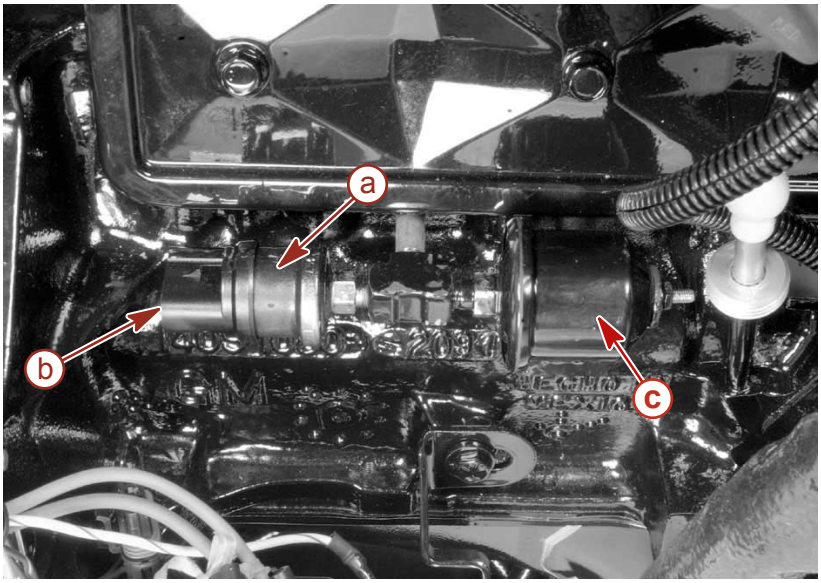
3.0L TKS Oil pressure switch shown, inlet typical

a - Inlet

5. Correct problem or replace switch as needed.

TESTING THE 3.0L OIL PRESSURE SWITCH

1. Disconnect oil pressure switch connector from harness.



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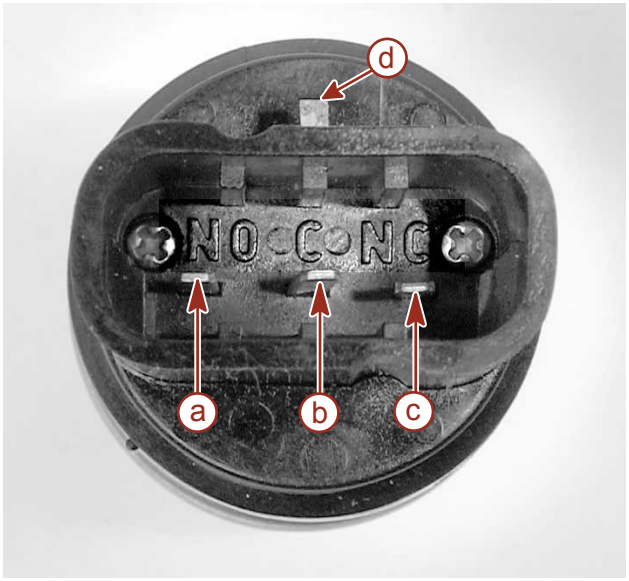
Oil pressure switch, 3.0L, typical. Shown disconnected for clarity.

a - Oil pressure switch
b - Connector
c - Oil pressure sender

2. Connect a continuity meter to the indicated oil pressure switch connector terminals. Ensure good electrical connection is made.
3. With engine not running, the meter should indicate no continuity between terminal A and terminal B, and full continuity between terminal B and terminal C.



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3.0L TKS Oil pressure switch connector terminals

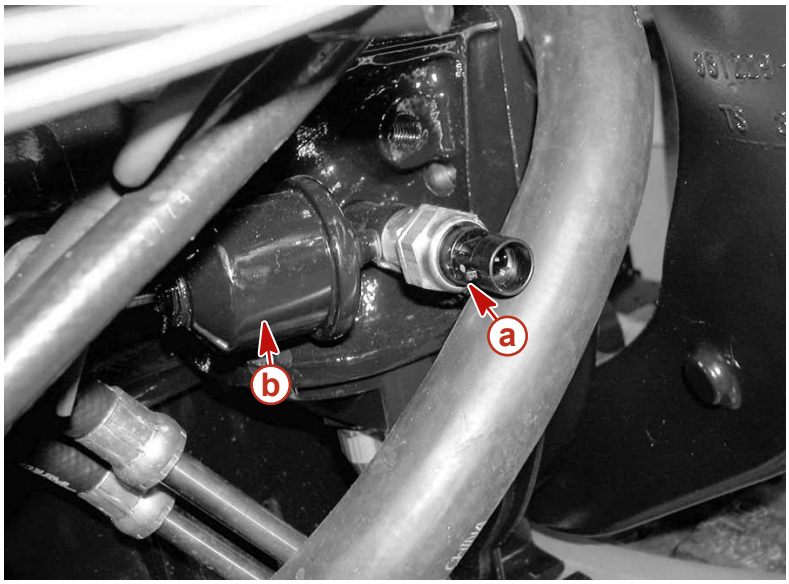
a - Terminal A - Normally open
b - Terminal B - Common
c - Terminal C - Normally closed
d - Connector retainer tab

4. With the engine running and engine oil pressure above 27 kPa (4 psi) meter should indicate full continuity between terminal A and terminal B , and no continuity between terminal B and terminal C.

5. Replace the oil pressure switch if not functioning properly.

TESTING THE V-6 AND V-8 OIL PRESSURE SWITCH

1. Disconnect the oil pressure switch connector from harness.
2. Connect the continuity meter to the oil pressure switch connector terminals. Ensure good electrical connection is made.



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Oil ressure switch. Shown disconnected for clarity.

a - Oil pressure switch **b -** Oil pressure sender

3. With the engine not running, the meter should indicate no continuity.
4. With the engine running and engine oil pressure above 27 kPa (4 psi), the meter should indicate full continuity.
5. Replace the oil pressure switch if not functioning properly.

Oil Pressure Switch Replacement

1. Locate the oil pressure switch.
   a. On the 3.0L, the switch is located on the port side of the block, on a fitting with the oil pressure sending unit.
   b. On the 4.3L, the oil pressure switch is located on the port side of the block, near the rear of the engine.
   c. On the 5.0L and 5.7L, the oil pressure switch is located near the port side of the block, towards the rear.
2. Disconnect the connector from oil pressure switch.
3. Remove the oil pressure switch with a wrench on the hex part of the base.
4. Insert a new oil pressure switch and turn until hand tight.
5. Torque with a wrench on the hex part of the base.

Description	Nm	lb. in.	lb. ft.
Oil pressure switch	55		40

6. Connect the connector to the oil pressure switch.

Electrical Systems

Section 4E - Wiring Diagrams

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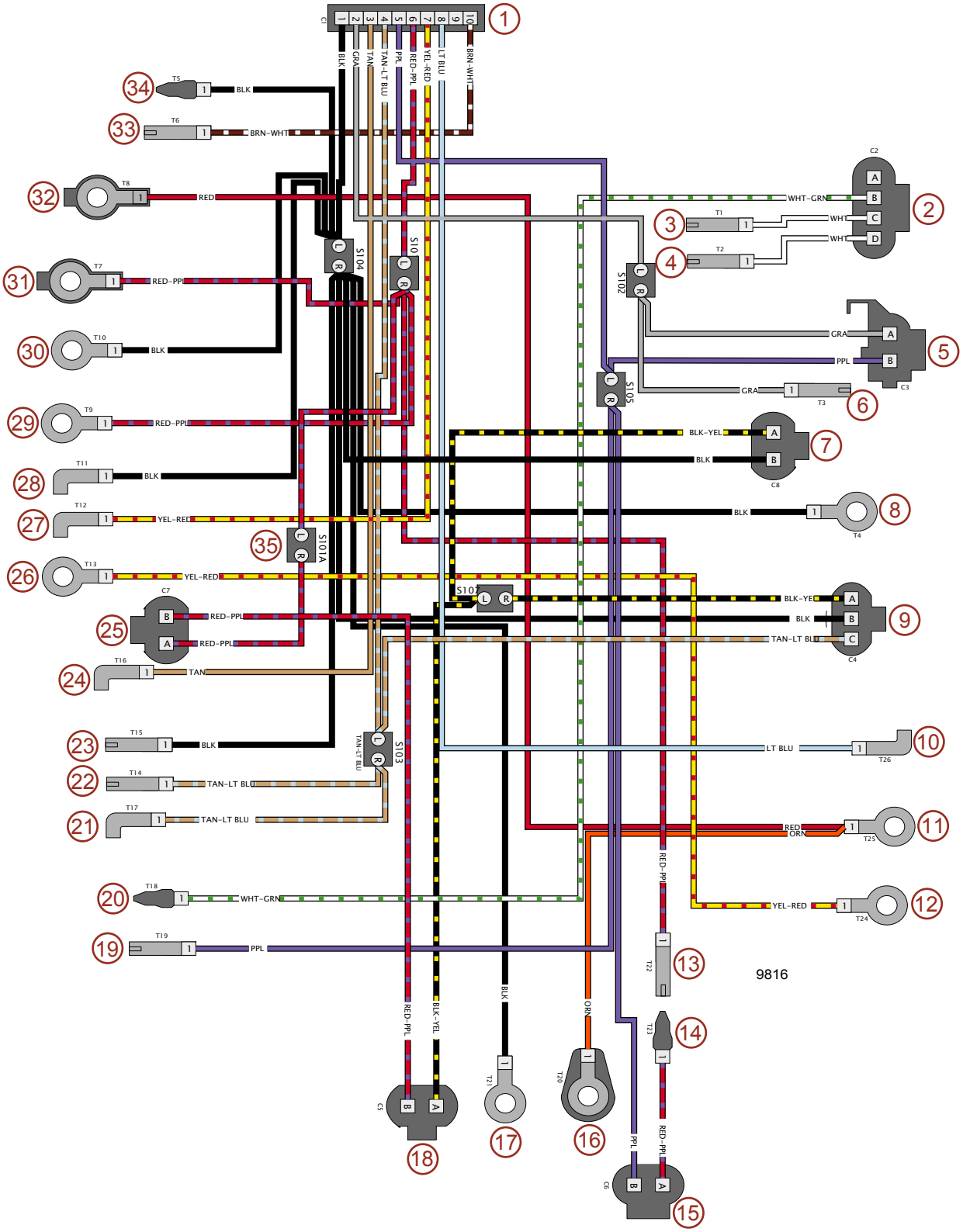
TKS Wiring Diagrams

Wire Color Code Abbreviations

Wire Color Abbreviations				
BLK	Black		BLU	Blue
BRN	Brown		GRY	Gray
GRN	Green		ORN or ORG	Orange
PNK	Pink		PPL or PUR	Purple
RED	Red		TAN	Tan
WHT	White		YEL	Yellow
LT or LIT	Light		DK or DRK	Dark

Notes:

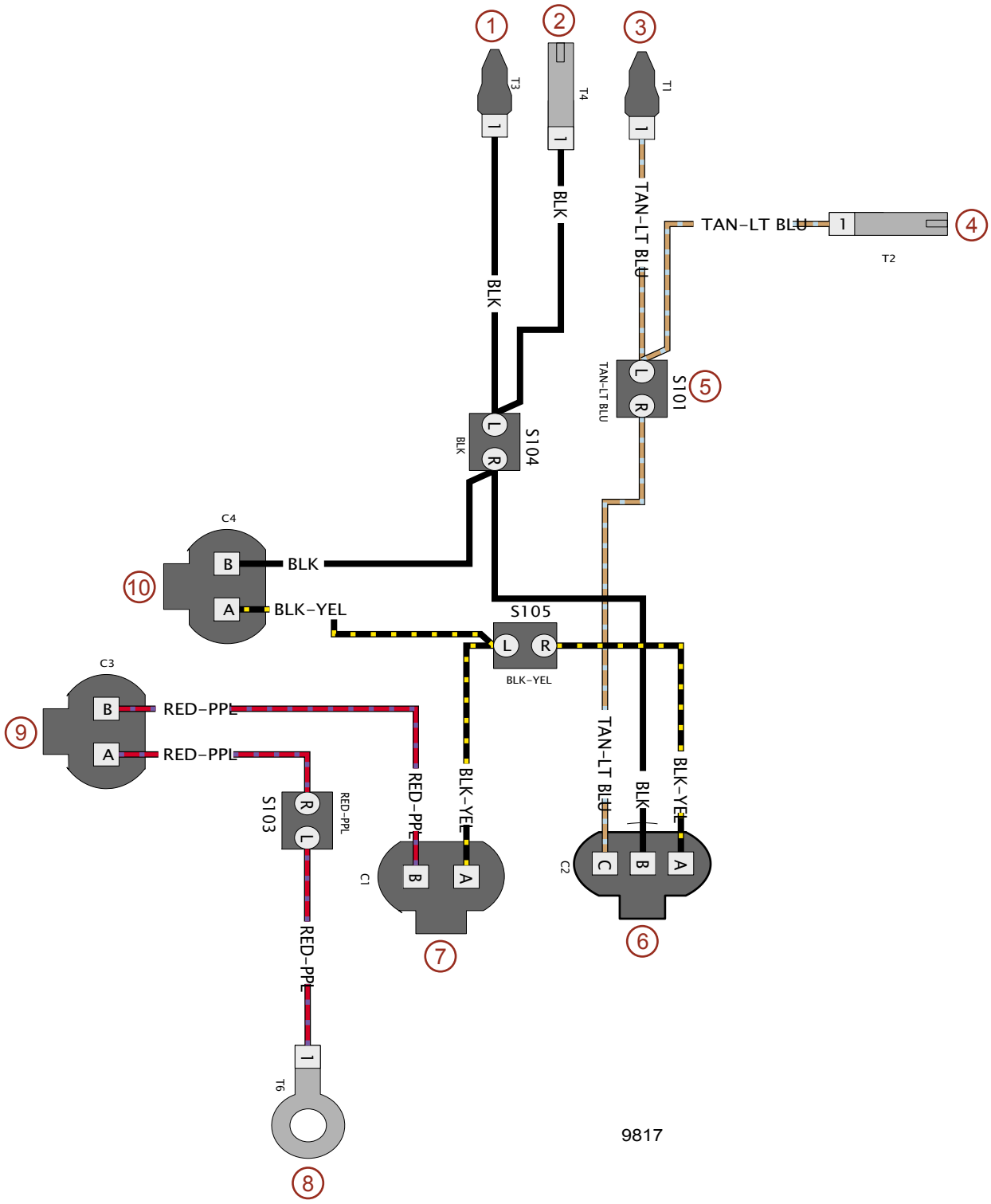
3.0L TKS Wiring Diagram



3.0L TKS Wiring Diagram

1 10 Pin
2 Distributor
3 Timing lead 1
4 Timing lead 2
5 Coil
6 Tach lead
7 Temperature switch
8 Engine ground
9 Oil pressure switch
10 Oil pressure sender
11 90 A Fuse
12 Starter solenoid "S" stud
13 Alternator disconnect
14 Alternator disconnect
15 Alternator sense / Turn on
16 Alternator output
17 Alternator ground
18 Turn key start module
19 Shift interrupt
20 Shift interrupt
21 Temperature switch alarm horn
22 Oil bottle alarm horn
23 Oil bottle alarm ground
24 Temperature sender
25 20 A Fuse
26 Slave solenoid
27 Slave solenoid coil
28 Slave solenoid coil
29 Slave solenoid
30 Ground
31 Circuit breaker
32 Circuit breaker
33 Trim sender 2
34 Trim sender 1
35 Splice - Typical

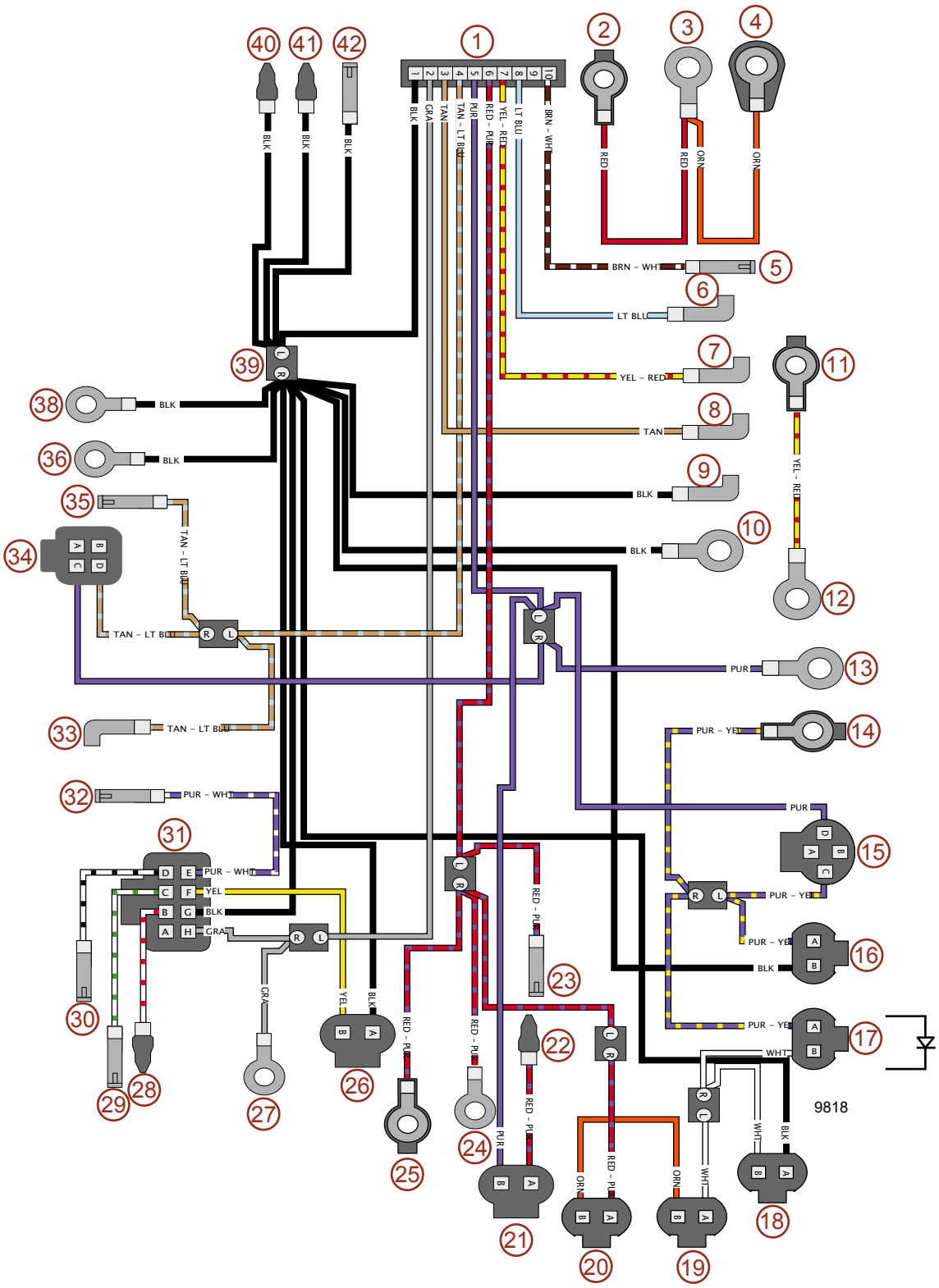
3.0L TKS Retrofit Wiring Diagram



3.0L TKS Retrofit Wiring Diagram

1 Lube bottle ground
2 Lube bottle ground
3 Lube bottle
4 Lube bottle
5 Splice - Typical
6 Oil pressure switch
7 Turn key start module
8 Start solenoid
9 20 A Fuse
10 Temp switch

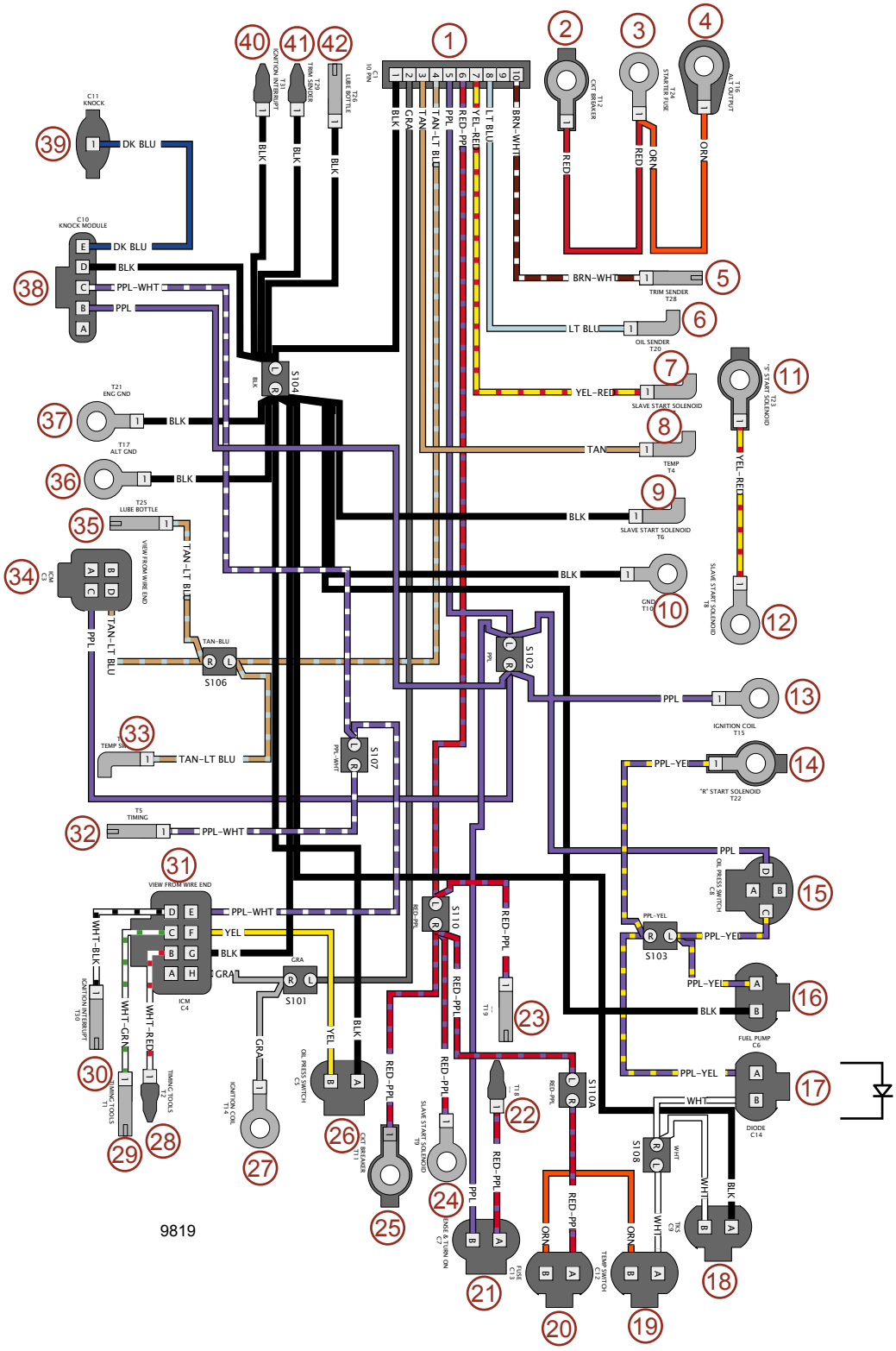
4.3L and 5.0L TKS Alpha Wiring Diagram



4.3L and 5.0L TKS Alpha Wiring Diagram

1 10 Pin connector
2 Circuit breaker
3 Starter fuse
4 Alternator output
5 Trim sensor
6 Oil sender
7 Slave start solenoid
8 Temperature
9 Slave start solenoid
10 Ground
11 "S" Start solenoid
12 Slave start solenoid
13 Ignition coil
14 "R" Start solenoid
15 Oil pressure switch
16 Fuel pump
17 Diode
18 Turn key start module
19 Temperature switch
20 20 A Fuse
21 Alternator sensor and turn on
22 Alternator disconnect
23 Alternator disconnect
24 Slave start solenoid
25 Circuit breaker
26 Oil pressure switch
27 Ignition coil
28 Timing tools
29 Timing tools
30 Ignition interrupt
31 Ignition Control Module - (View from wire end)
32 Timing
33 Temp switch
34 Ignition Control Module- (View from wire end)
35 Transmission temperature
36 Alternator ground
38 Engine ground
39 Splice - Typical
40 Ignition interrupt
41 Trim sender
42 Transmission temperature

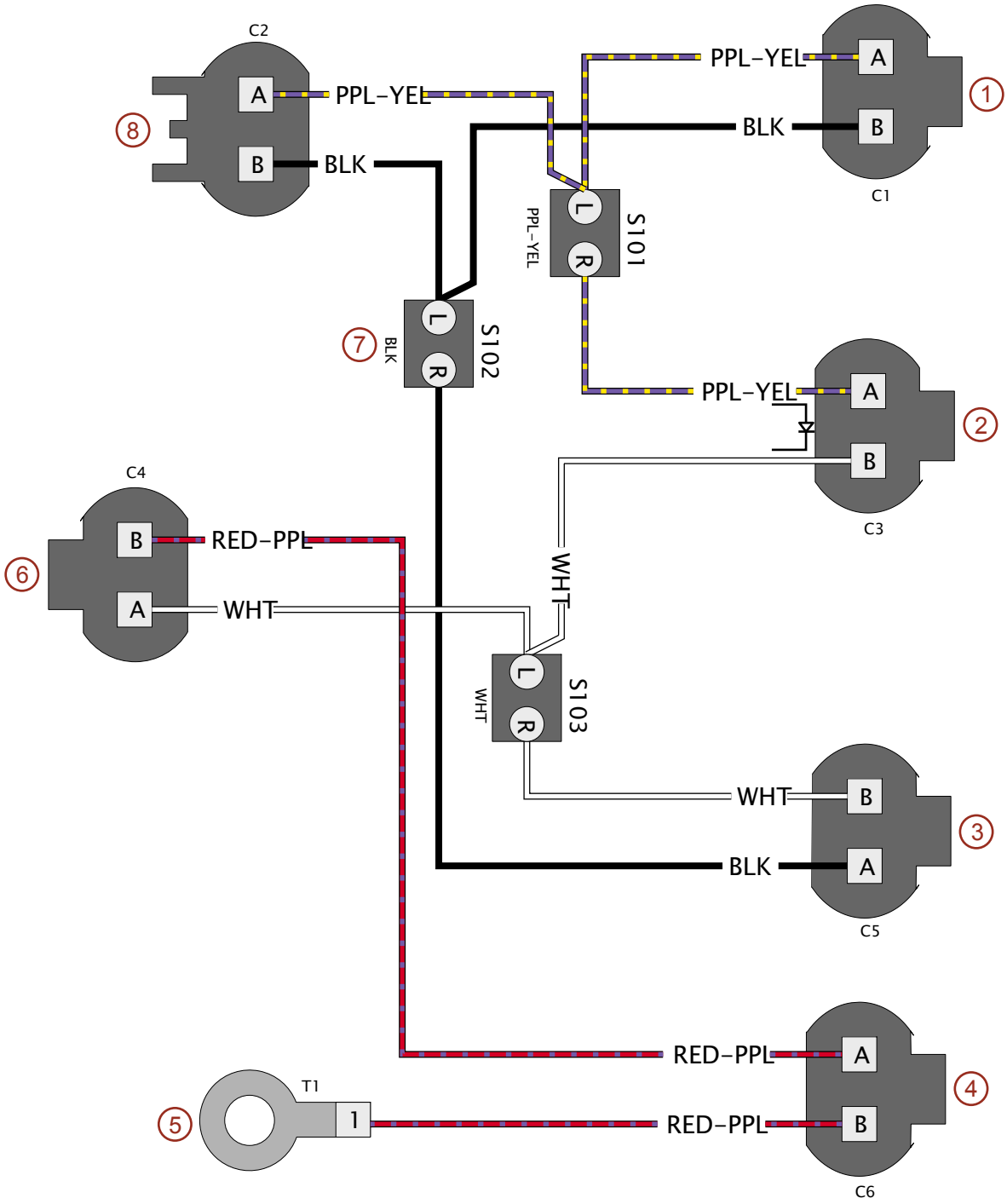
5.0L and 5.7L TKS Bravo Wiring Diagram



5.0L and 5.7L TKS Bravo Wiring Diagram

1 10 Pin
2 Circuit breaker
3 Starter fuse
4 Alternator output
5 Trim sender
6 Oil sender
7 Slave starter solenoid
8 Temperature
9 Slave starter solenoid
10 Ground
11 "S" Starter solenoid
12 Slave starter solenoid
13 Ignition coil
14 "R" Starter solenoid
15 Oil pressure switch
16 Fuel pump
17 Diode
18 Turn key start module
19 Temp switch
20 20 A Fuse
21 Alternator sense and turn on
22 Alternator disconnect
23 Alternator disconnect
24 Slave starter solenoid
25 Circuit breaker
26 Oil pressure switch
27 Ignition coil
28 Timing tools
29 Timing tools
30 Ignition interrupt
31 Ignition Control Module (View from wire end)
32 Timing
33 Temperature switch
34 Ignition Control Module (View from wire end)
35 Lube bottle
36 Alternator ground
37 Engine ground
38 Knock module
39 Knock sensor
40 Ignition interrupt
41 Trim sender
42 Lube bottle
43 Splice - Typical

4.3L, 5.0L, and 5.7L TKS Retrofit Wiring Diagram



4.3L, 5.0L, and 5.7L TKS Retrofit Wiring Diagram

1 Fuel pump
2 Diode
3 Turn key start module
4 20 A Fuse
5 Starter solenoid
6 Temp switch
7 Splice - Typical
8 Fuel pump

Fuel System

Section 5B - TKS Carburetor

Table of Contents

5
B

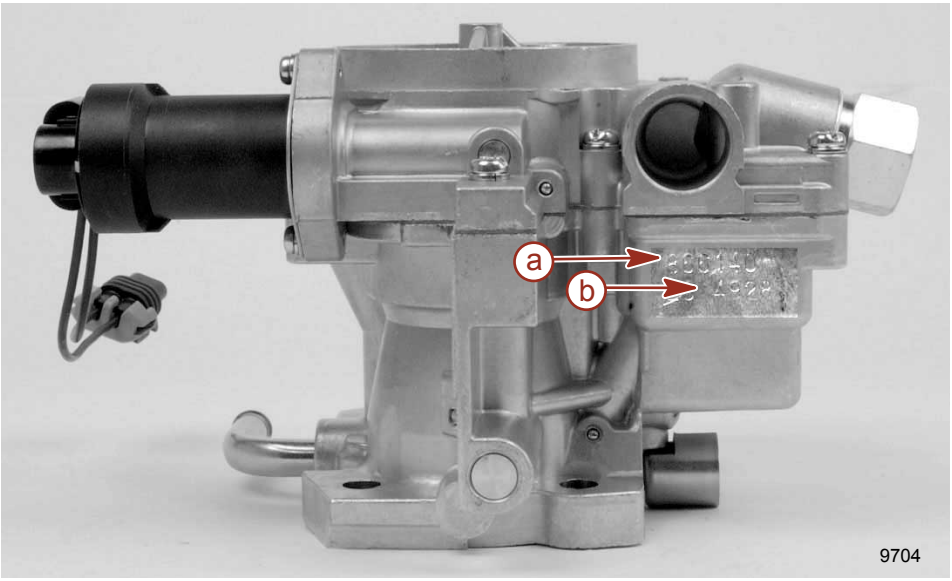
Lubricant, Sealant, Adhesives

Tube Ref No.	Description	Where Used	Part No.
66	Loctite 242 Threadlocker	TKS Module Screws	92-809821

Maintenance

Identification

TKS CARBURETOR PART NUMBER AND DATE CODE

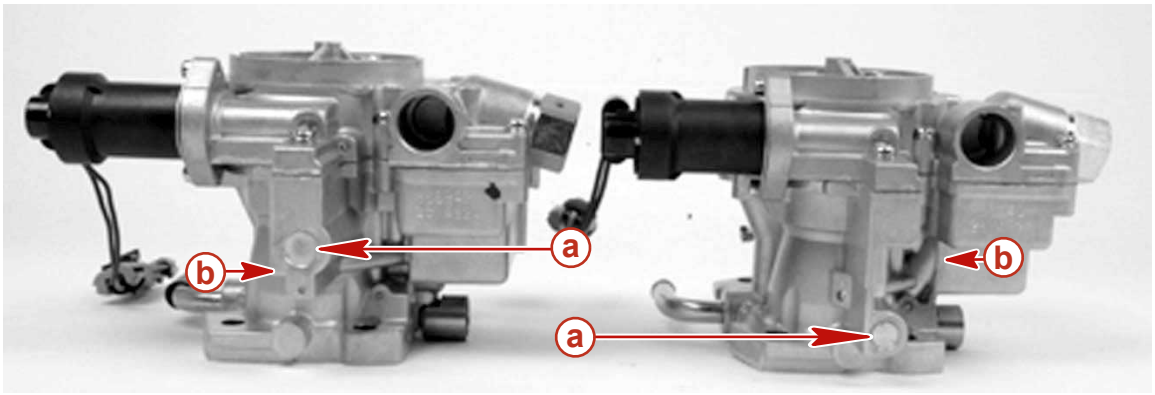


TKS Carburetor, Typical

a - Part number **b -** Date code

Date code explanation: Example - 4928
First figure is year:
4 = 2004, 5 = 2005, etc.
Second figure is Month
2 = February, 3 = March, etc.
X = October, Y = November, Z = December
Third and fourth figures are the day of the month:
01 = first day, 02 = second day, etc.
A carburetor stamped 4928 was manufactured September 28, 2004

Within the TKS line, there are two main variations, identified as Generation 1 (Gen 1) and Generation 2 (Gen 2). The differences are a minor change in the enrichment jet location and the height of the TKS enrichment fuel reservior. This difference only slightly effects the rebuild and repair procedure, and will be noted in the appropriate location.



9599

Typical Gen 1 (left) versus Gen 2 (right) carburetors

a - TKS Enrichment fuel reservior **b -** TKS Enrichment jet, not visible

VENTURI CLUSTER IDENTIFICATION

9729

Venturi cluster identification

a - Identification number (see specifications)

Replacement Parts Warning

⚠ WARNING

Avoid injury, death or property damage from fire or explosion. Electrical, ignition and fuel system components on Mercury Marine Power Products are designed and manufactured to comply with U.S. Coast Guard Rules and Regulations to minimize risks of fire or explosion.

Non-compliant replacement electrical, ignition or fuel system components, could cause a fire or explosion.

When servicing the electrical, ignition and fuel systems, ensure that all components are properly installed and tightened. If not, any electrical or ignition component opening could permit sparks to ignite fuel vapors from any possible fuel system leaks.

Identification of TKS Carburetors

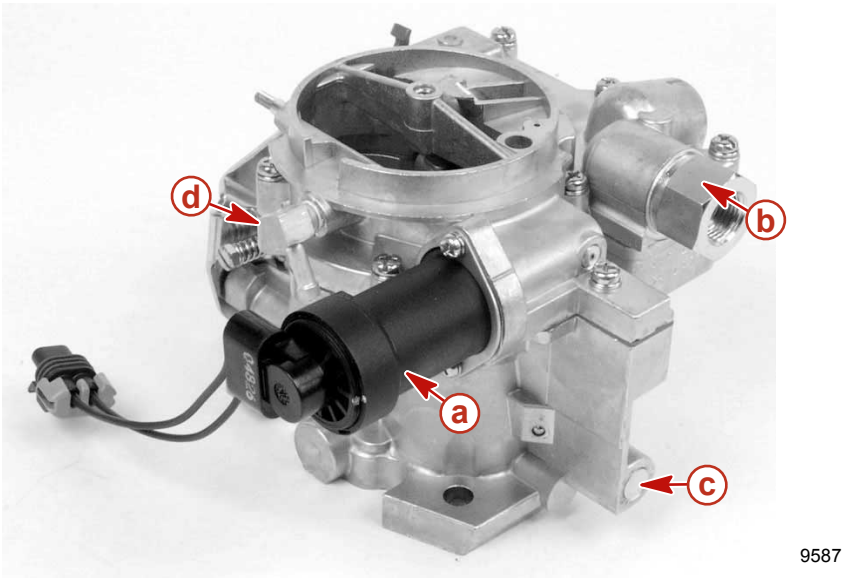
The TKS Carburetors are similar in design and function, and vary only slightly from engine to engine and generation one (Gen 1) to generation two (Gen 2). The main differences between the Gen 1 and Gen 2 are the locations of the enrichment jet and the amount of casting above it. Refer to "TKS Carb Identification," Section 5A for details. The differences between the engines are the vacuum port on the 3.0L models, and the positive crankcase ventilation (PCV) tube on the 5.0L and 5.7L engines. The 4.3L has neither a vacuum port nor a PCV tube. Use the following chart to properly identify your TKS carburetor.

THE 3.0L TKS CARBURETOR

GENERATION 2

NOTE: *The 3.0L TKS Gen 1 carburetor was never released for production.*

Note the lowered enrichment fuel reservoir and thin webbing above it typical of a Gen 2 model.



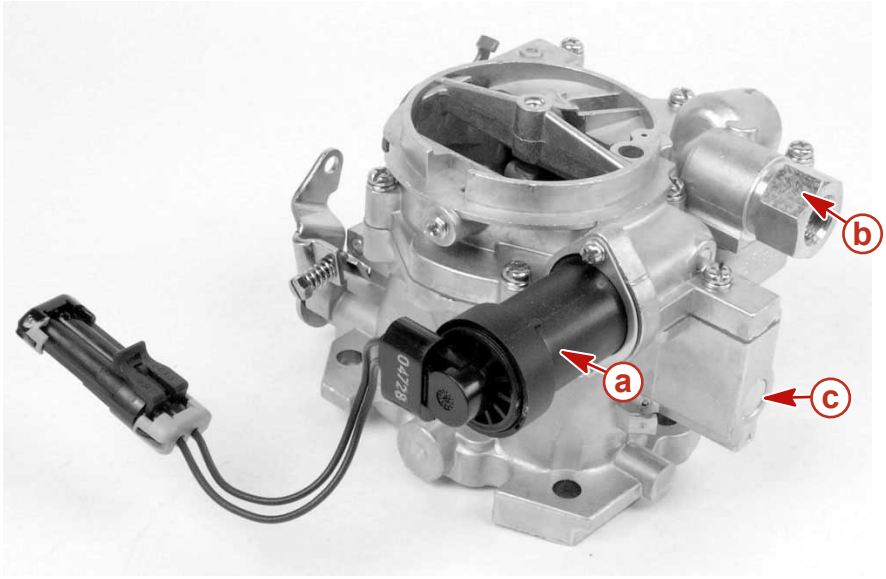
The 3.0L Gen 2 Carburetor

a - TKS Module
b - Fuel Inlet
c - Enrichment fuel reservoir
d - Vacuum port

THE 4.3L TKS CARBURETOR

GENERATION 1

Note the higher enrichment fuel reservoir and thicker webbing. The 4.3 model has neither a vacuum port nor a PCV tube on the base.

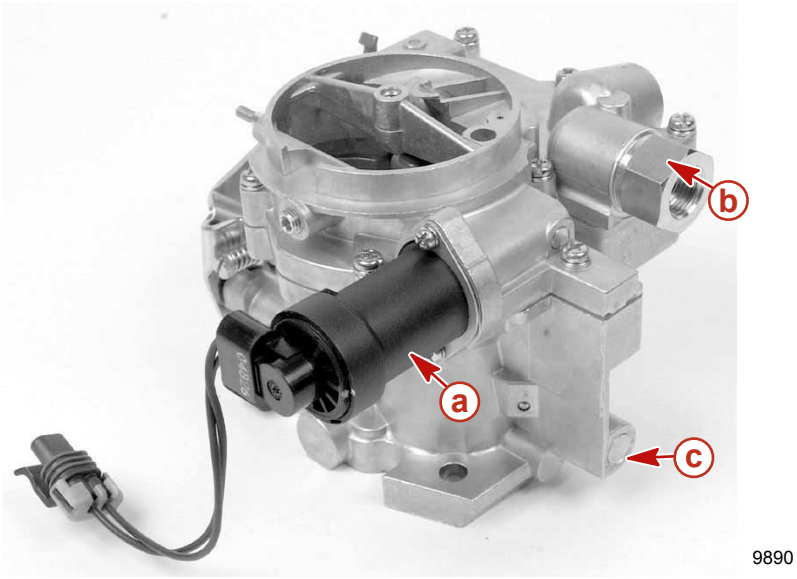


The 4.3L Gen 1 Carburetor

a - TKS Module
b - Fuel Inlet
c - Enrichment fuel reservoir

GENERATION 2

Note the lower enrichment fuel reservoir and thin webbing above it typical of a Gen 2 model. The 4.3 model has neither a vacuum port nor a PCV tube on the base.



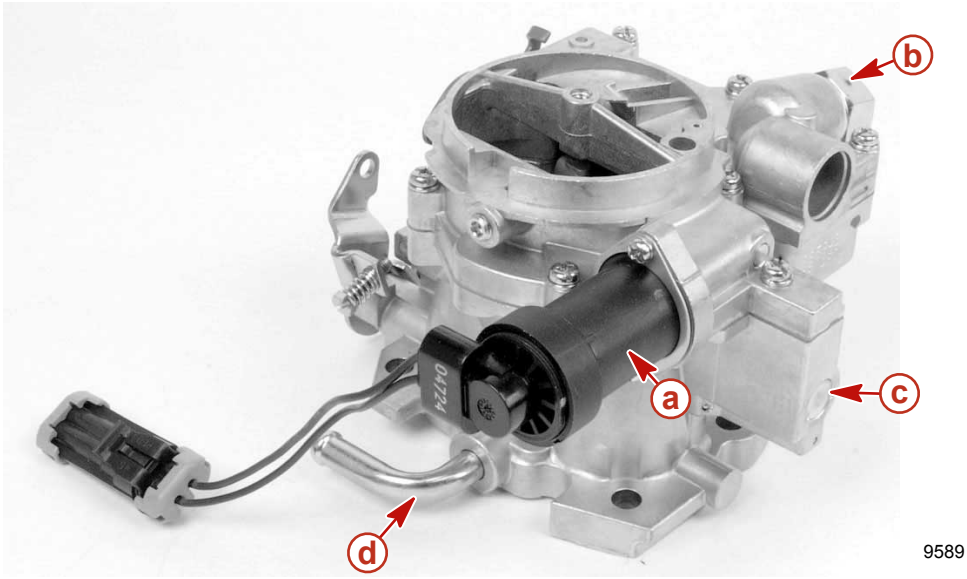
The 4.3L Gen 2 Carburetor

a - TKS Module
b - Fuel Inlet
c - Enrichment fuel reservoir

THE 5.0/5.7L TKS CARBURETOR

GENERATION 1

Note the higher enrichment fuel reservoir and the PCV tube on the base.

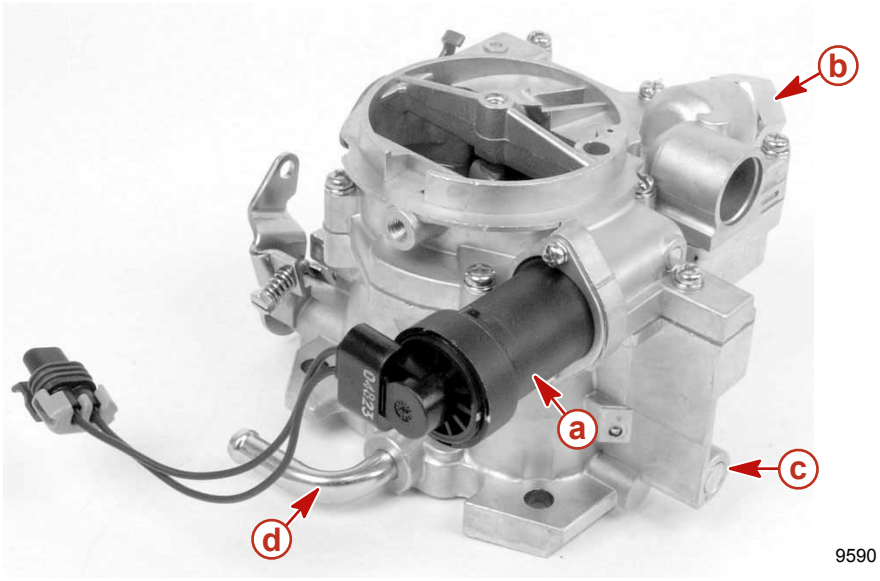


The 5.0/5.7L Gen 1 Carburetor

a - TKS Module
b - Fuel Inlet
c - Enrichment fuel reservoir
d - PCV tube

GENERATION 2

Note the lower enrichment fuel reservoir and thinner web above it, and the PCV tube on the base.



The 5.0/5.7L Gen 2 Carburetor

a - TKS Module
b - Fuel Inlet
c - Enrichment fuel reservoir
d - PCV tube

Specifications

Torque

Description	Nm	lb. in.	lb. ft.
Carburetor To Manifold	27		20
Fuel Line to Carburetor	24		18
Fuel Inlet Filter Nut	24		18
Airhorn Attaching Screws	3.0 - 5.8	26.55 - 51.33	2.21 - 4.28
Main Metering Jet	1.0 - 2.9	8.85 - 25.67	0.74 - 2.14
Power Valve	3.0 - 6.8	26.55 - 60.19	2.21 - 5.0
TKS Module Attaching screws	.2	17.35	

Tools

Description	Part number
Tachometer	79-17391A1
Universal Carburetor Gauge	91-36392
Float Gram Scale	Obtain locally
Idle Mixture Adjustment tool	866201

Gen 1 TKS Carburetors

Engine Model	3.0L	4.3L	5.0L	5.7L
Carburetor Number	Not Released	865941	865942	865943
Float Level	NA	14 mm (.550 in.) See Notes	8.9 mm (.350 in.)	
Float Drop	NA	27.4 mm (1.080 in.) See Notes	24 mm (15/16 in.)	
Pump Rod (Location)	NA	Middle Hole Of Pump Arm		
Idle Mixture Screw	NA	2 5/8 Turns out	2 1/2 Turns out	2 7/8 Turns out
Idle Speed Screw	NA	2 turns past initial contact	2 turns past initial contact	2 turns past initial contact
Float Weight	NA	9 Grams Maximum		
Main Jet Size	NA	1.55 mm	1.65 mm	1.65 mm
TKS Enrichment Jet Size	NA	0.70 mm	0.70 mm	0.70 mm
Power Valve Size	NA	0.74 mm	.90 mm	
Venturi Cluster I.D. Number	NA	472	476	475

NOTE: *Measurement taken from gasket.*

NOTE: *All measurements are +/· 1/64 in. (0.4 mm) unless otherwise listed*

NOTE: *Float level measurements are ±0.059 inches. Float drop measurements are +/- 0.075 inch*

Gen 2 TKS Carburetors

Engine Model	3.0L	4.3L	5.0L	5.7L
Carburetor Number	866140	866141	866142	866143
Float Level	14 mm (.550 in) See Notes		8.9 mm (.350 in.) See Notes	
Float Drop	27.4 mm (1.080 in.) See notes		23.8 mm (.937 in.) See Notes	
Pump Rod (Location)	Middle Hole Of Pump Arm			
Idle Mixture Screw	3 1/8 Turns out	3 1/16 Turns out	2 1/4 Turns out	3 Turns out
Idle speed screw	2 turns past initial contact	2 turns past initial contact	2 turns past initial contact	2 turns past initial contact
Float Weight	9 Grams Maximum			
Main Jet Size	1.70 mm	1.55 mm	1.65 mm	1.65 mm
TKS Enrichment Jet Size	0.70 mm	0.70 mm	0.70 mm	0.70 mm
Power Valve Size	0.65 mm	0.74 mm	0.90 mm	
Venturi Cluster I.D. Number	171	472	476	475

NOTE: *Measurement taken from gasket.*

NOTE: *All measurements are +/· 1/64 in. (0.4 mm) unless otherwise listed*

NOTE: *Float level measurements are ±0.059 inches. Float drop measurements are +/- 0.075 inch*

High Altitude Main Jet Re-Jetting

Model	Carburetor Part Number	5000 ft (1525 m) and below	5000-9000 ft (1525-2745 m)	9000 ft (2745 m) and above
3.0L	866140	1.70 mm	1.55 mm	1.45 mm
4.3L	865941	1.55 mm	1.55 mm	1.50 mm
5.0L	Gen 1: 865942 Gen 2: 866942	1.65 mm	1.50 mm, 1.60 mm, or 1.75 mm	1.45 mm, 1.55 mm, or 1.65 mm
5.7L	Gen 1: 865942 Gen 2: 866942	1.65 mm	1.50 mm	1.45 mm

NOTE: *The TKS Carburetor is more likely to need jets changed due to altitude than previous carburetors.*

Main Jet Sizes

Jet Size (mm)	Quicksilver Part Number
1.30	3302-8118498
1.35	3302-8118508
1.40	3302-8118518
1.45	3302-9050
1.50	3302-8118528
1.55	3302-8118538
1.60	3302-8109238
1.65	3302-9058
1.70	3302-9055
1.75	3302-8818548
1.80	3302-8118558
1.85	3302-8118568
1.90	3302-8118578

TKS Enrichment Jets

TKS Enrichment Jet Size (mm)	Carburetor Generation	Quicksilver Part Number
0.70	Gen 1	3310-866283
0.70	Gen 2	3310-866292

Power Valves

Power Valve Size (mm)	Quicksilver Part Number
0.65	3302-850424
0.74	3302-9435
0.90	3302-9059

Important Service Information

8 POINT CARBURETOR CHECK LIST

To ensure that the carburetor is the cause of the problem, make the following checks before ordering and installing a new carburetor. If questions 1, 2, 3, 5, 6 and 7 are YES and 8 is NO, the carburetor may not be the problem.

8 Point Carburetor Check List

	Check	Yes	No
1	Does the TKS module flow extra fuel at warm-up?		
2	Does the TKS module stop extra fuel flow when engine is warm?		
3	Is idle mixture screw set correctly? (Engines with Thunderbolt V ignition must have module locked in Base Timing Mode)		
4	What is the idle mixture screw setting?	# Turns_____	
5	Is the engine idle speed RPM correct?		
6	Is venturi cluster discharging fuel by 2000 RPM?		
7	Is a good stream of fuel being discharged by both discharge holes in venturi cluster when throttle lever is moved repeatedly while the engine is off.		
8	Does the engine flood at idle?		

FLOODING AT IDLE RPM

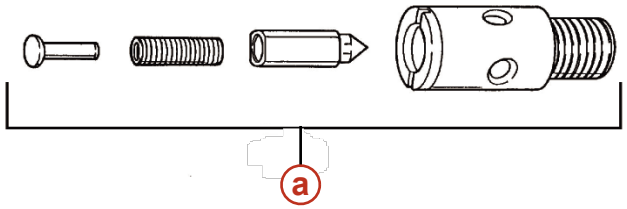
If your engine floods at idle RPM, check the following:

1. Problem in ignition system causing engine to run rough.
2. Verify the TKS module is working properly and causes the enrichment circuit to shut.
3. Verify temperature switch is working properly and causes the TKS module to shut the enrichment circuit.
4. Idle mixture screw adjusted correctly.
5. Bad needle and seat.
6. Incorrect float level or drop.
7. High fuel pressure.

NEEDLE / SEAT CHANGE

IMPORTANT: Float needle and needle seat are factory matched and tested, and should be replaced as a set only.

MerCarbs are factory equipped with a spring loaded needle.



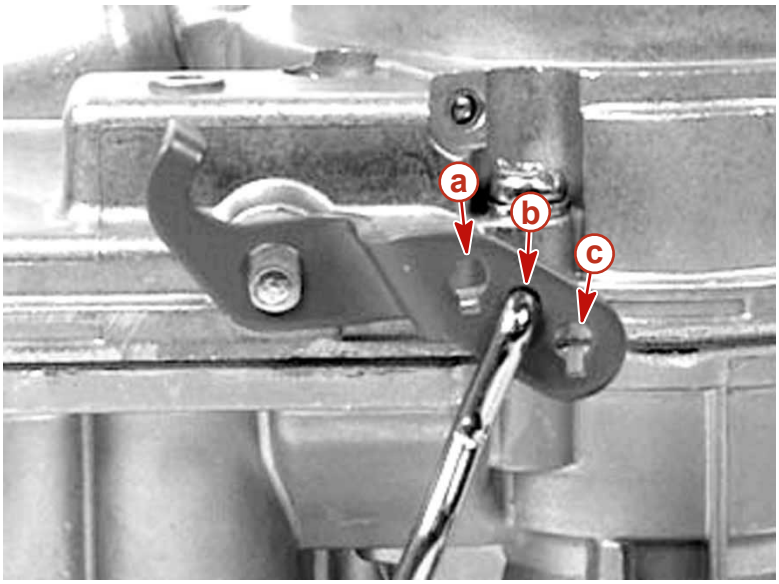
9549

Needle and seat assembly

a - Spring Loaded Type Needle (Kit 3302-9029)

ADJUSTABLE ACCELERATOR PUMP LEVER

The adjustable accelerator pump lever is a three hole lever that allows you to change the amount of fuel delivered to the engine by the accelerator pump. Accelerator pump delivery will increase / decrease 0.8cc per hole.



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Adjustable Accelerator Pump Lever

a - Third hole - Richer

b - Second hole - Center

c - First hole - Leaner

When installing the 3-hole lever, ensure that the duration spring on the accelerator pump is stock and hasn't had coils removed. Ensure that the correct venturi cluster is being used.

DESCRIPTION

This MerCarb carburetor is a two bore carburetor that has a separate fuel feed for each venturi. This model is equipped with a TKS Module. A removable venturi cluster (secured to float bowl assembly) has the calibrated main well tubes and pump jets built into it. The venturi cluster is serviced as a unit. The serviceable main metering jets are bleeds to properly meter the correct fuel / air mixture to the engine.

FLAME ARRESTOR WITH CARBURETOR COVER

NOTE: *Refer to "TKS Precautions" in section 5A before proceeding.*

REMOVAL

1. Remove nut.
2. Remove sealing washer.
3. Remove carburetor cover.
4. Remove crankcase ventilation hose from flame arrestor and starboard rocker arm cover.
5. Remove Positive Crankcase Vent (PCV) hose to carburetor tube and port rocker arm PCV Valve connection.
6. Remove flame arrestor.

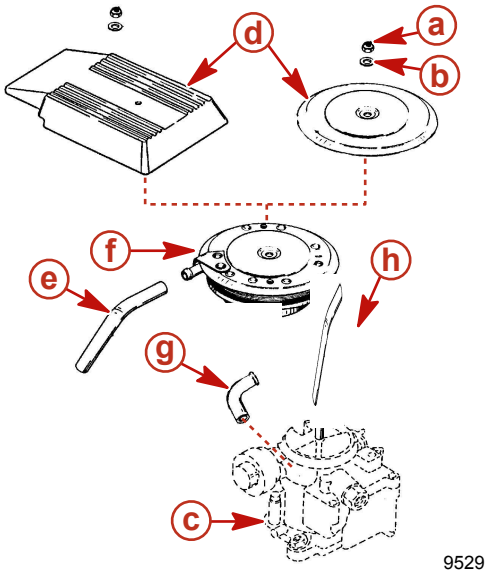
CLEANING AND INSPECTION

1. Clean flame arrestor in solvent and blow dry with compressed air.
2. Clean crankcase ventilation and PCV hoses.
3. Inspect hoses for cracks or deterioration, and replace if necessary.

INSTALLATION

1. Install flame arrestor.
2. Install crankcase ventilation hose to flame arrestor and starboard rocker arm cover.
3. Install positive crankcase vent (PCV) hose from port rocker arm PCV valve connection to carburetor tube.
4. Install carburetor cover.
5. Install sealing washer.

6. Install nut. Tighten securely.



a - Nut
b - Sealing Washer
c - Carburetor
d - Cover (Depending On Model)
e - Crankcase Ventilation Hose
f - Flame Arrestor
g - Positive Crankcase Vent (PCV) Hose (On Carburetor)
h - Positive Crankcase Vent (PCV) Hose-

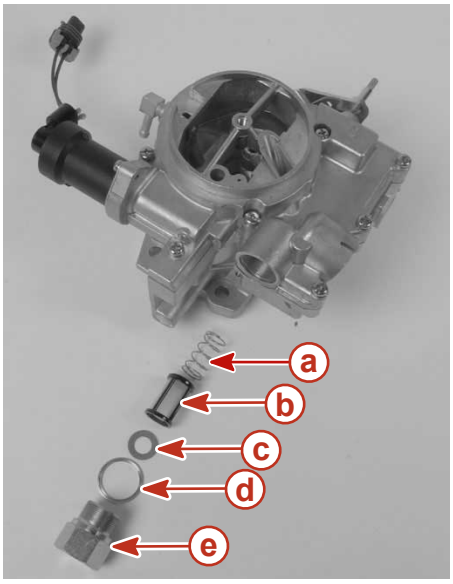
FUEL INLET FILTER

NOTE: *Refer to "TKS Precautions" in section 5A before proceeding.*

REMOVAL

1. Remove fuel line from fuel inlet filter nut.
2. Remove fuel inlet filter nut and small gasket.
3. Remove large gasket.
4. Remove filter.
5. Remove spring.

6. Remove small gasket from inside filter nut.



9530

a - Spring
b - Filter
c - Gasket (small)
d - Gasket (larger)
e - Fuel inlet filter nut

CLEANING

1. Clean filter nut and spring in solvent and dry with compressed air.

INSTALLATION

1. Install spring in carburetor body.
2. Install filter, open end to inlet filter nut.
3. Install small gasket inside filter nut.
4. Install large gasket over filter nut threads.
5. Install fuel inlet filter nut. Torque inlet filter nut.

Description	Nm	lb. in.	lb. ft.
Inlet filter nut	24		18

IMPORTANT: Hold filter nut with wrench while torquing fuel line.

6. Install fuel line. Torque fuel line fitting.

Description	Nm	lb. in.	lb. ft.
Fuel line fitting	24		18

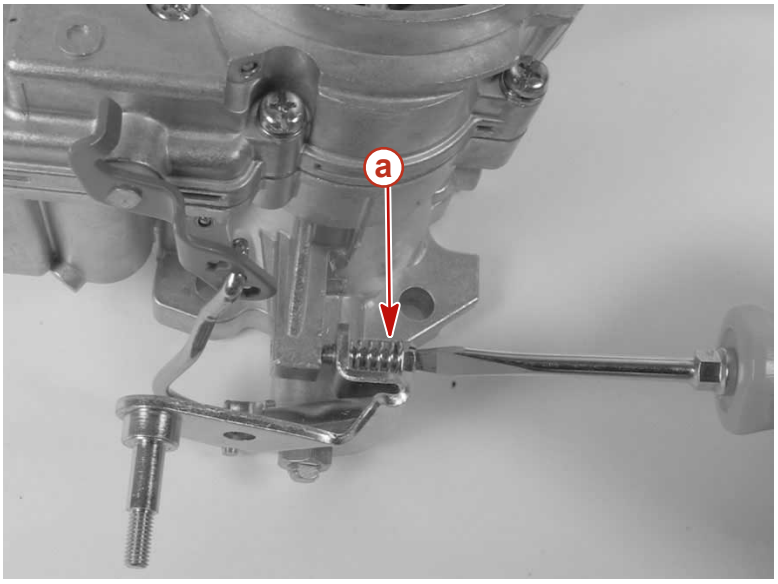
Adjustments

NOTE: *Refer to "TKS Precautions" in section 5A before proceeding.*

INITIAL IDLE SPEED AND MIXTURE

IMPORTANT: The following adjustments will provide a sufficient idle speed and mixture for starting engine. Final adjustments must be made with the engine running and warm, and the TKS enrichment system fully closed.

1. Loosen idle speed screw until it no longer contacts idle speed screw block.



a - Idle speed screw

2. Turn idle speed screw in until it just contacts idle speed screw block, then turn screw in as specified for the particular carburetor as found in the **Idle Speed Screw Settings** table.

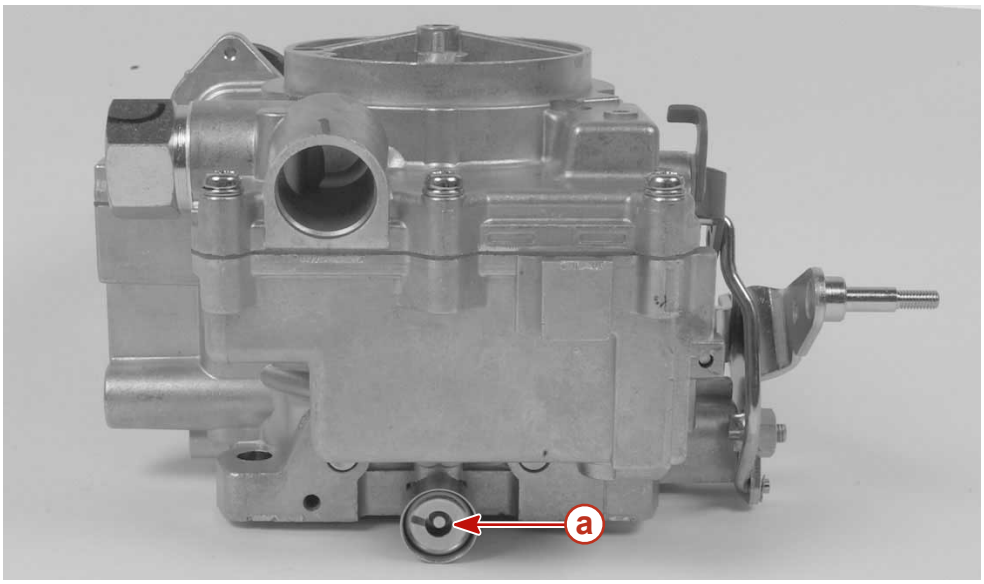
NOTE: *All settings are from the initial contact of the screw to the block.*

Idle Speed Screw Settings

Generation \ Engine	3.0 L	4.3 L	5.0 L	5.7 L
Gen 1	NA	2 Turns	2 Turns	2 Turns
Gen 2	2 Turns	2 Turns	2 Turns	2 Turns

IMPORTANT: Do not turn idle mixture needle tightly against seat (in the following step), as damage to seat and/or needle may result.

3. Turn idle mixture screw in until lightly seated, then loosen the screw as found in the **Idle Mixture Screw Settings** table below.



9536

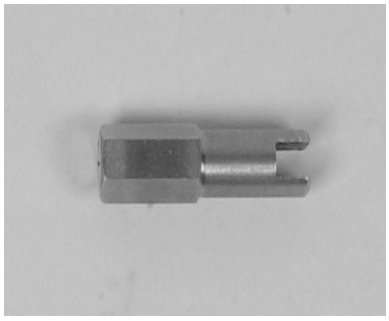
a - Idle mixture screw

NOTE: *The idle mixture screw can only be accessed with a special tool. See the the* ***Idle speed mixture settings*** *table below for your engine's specifications.*

NOTE: *All settings are from the idle mixture screw being lightly seated.*

Idle Mixture Screw Settings

Generation \ Engine	3.0 L	4.3 L	5.0 L	5.7 L
Gen 1	NA	2 5/8 Turns out	2 1/2 Turns out	2 7/8 Turns out
Gen 2	3 1/8 Turns out	3 1/16 Turns out	2 1/4 Turns out	3 Turns out

Idle mixture adjusting screw		
 9668	For adjusting idle mixture	PN 91-866201

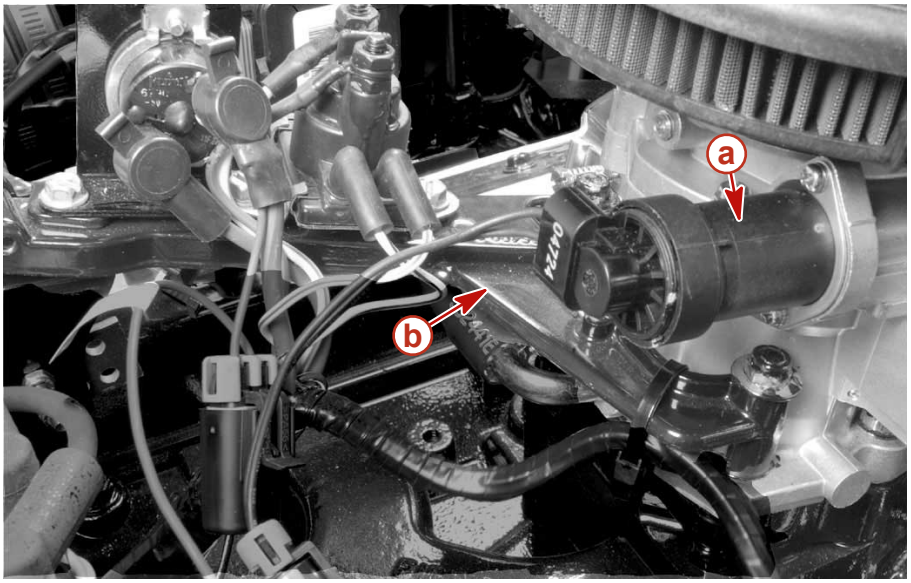
Replacing Carburetor

NOTE: *Refer to "TKS Precautions" in Section 5A before proceeding.*

IMPORTANT: First follow the steps in "8 Point Carburetor Check List" to decide if the problem is with the carburetor.

1. Remove the battery cables.
2. Shut off fuel supply at the gas tank.

3. Disconnect the fuel line at the carburetor filter nut.
4. Disconnect TKS connector from wiring harness.
5. Remove nuts and washers holding carburetor.
6. **On 4.3L, 5.0L, and 5.7L models:** Remove circuit breaker bracket on the rear of the carburetor as the carburetor is being lifted off the studs and place to the side.



4.3L, 5.0L, and 5.7L Circuit breaker bracket

a - TKS Module **b -** Circuit breaker bracket

7. Remove the carburetor.
8. Clean gasket surfaces.
9. Use new gasket(s) and install the carburetor.
10. **On 4.3L, 5.0L, and 5.7L models:** As the carburetor is being installed, replace the circuit breaker bracket on the studs on the rear of the carburetor as it is being lowered.
11. Replace the washers and nuts on the studs. Torque nuts.

Description	Nm	lb. in.	lb. ft.
Carburetor to manifold nuts	27		20

12. Connect the fuel line. Hold the carburetor filter nut with a wrench and tighten fuel line fitting securely.

Description	Nm	lb. in.	lb. ft.
Fuel line to carburetor	24		18

13. Reconnect TKS connector, vent hoses and flame arrestor.
14. Adjust throttle cable.

IMPORTANT: Use the recommended adjustments in the "Initial Idle Speed and Mixture" instructions in this section to set the initial idle speed and idle mixture. They will provide a sufficient idle speed and mixture for starting the engine. Final adjustments must be made with the engine running and warm, and the TKS enrichment system is fully closed.

15. Adjust carburetor.

Repair

NOTE: *Refer to "TKS Precautions" in section 5A before proceeding.*

REMOVAL

IMPORTANT: Carburetor problems are, in many cases, caused by the presence of dirt, water or other foreign matter in the carburetor. To aid in diagnosis, carefully remove the carburetor from the engine without draining fuel from bowl. Contents of fuel bowl may then be inspected for contamination as carburetor is disassembled.

1. Remove the battery cables.
2. Remove the crankcase ventilation and PCV hose from the flame arrestor.
3. Remove the flame arrestor.

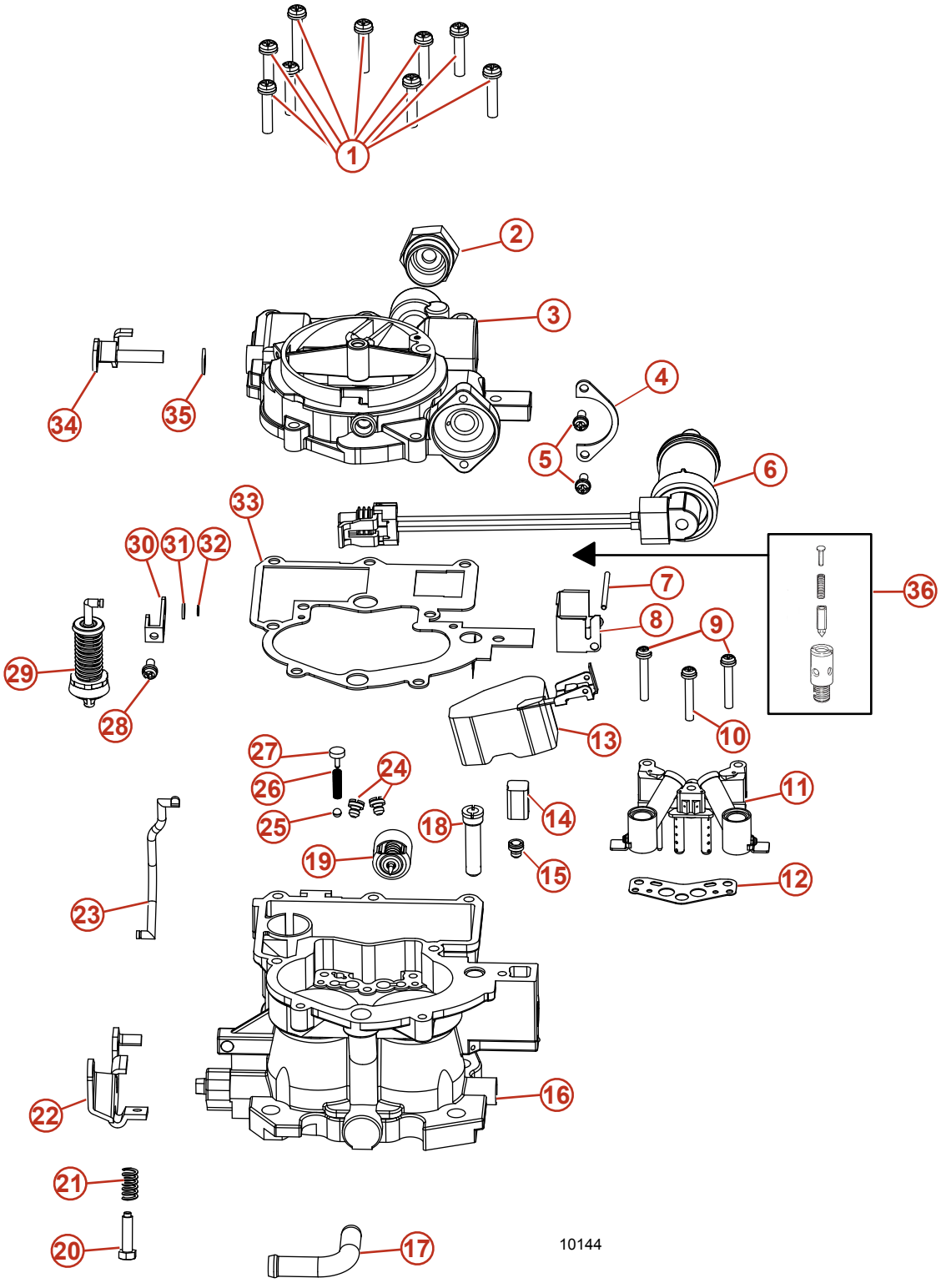
IMPORTANT: Place a clean cloth in bores of carburetor to prevent dirt and foreign material from falling into bores.

4. Turn fuel supply off at fuel tank.
5. Disconnect throttle cable from carburetor.
6. Remove fuel line from fuel inlet nut, using wrench to stabilize fuel inlet nut.
7. Disconnect the TKS module.
8. Remove the carburetor attaching nuts and washers and remove carburetor.

IMPORTANT: Place a clean cloth over intake manifold opening to prevent dirt or foreign material from entering manifold.

9. Remove and discard gaskets.

Exploded View Generation 1

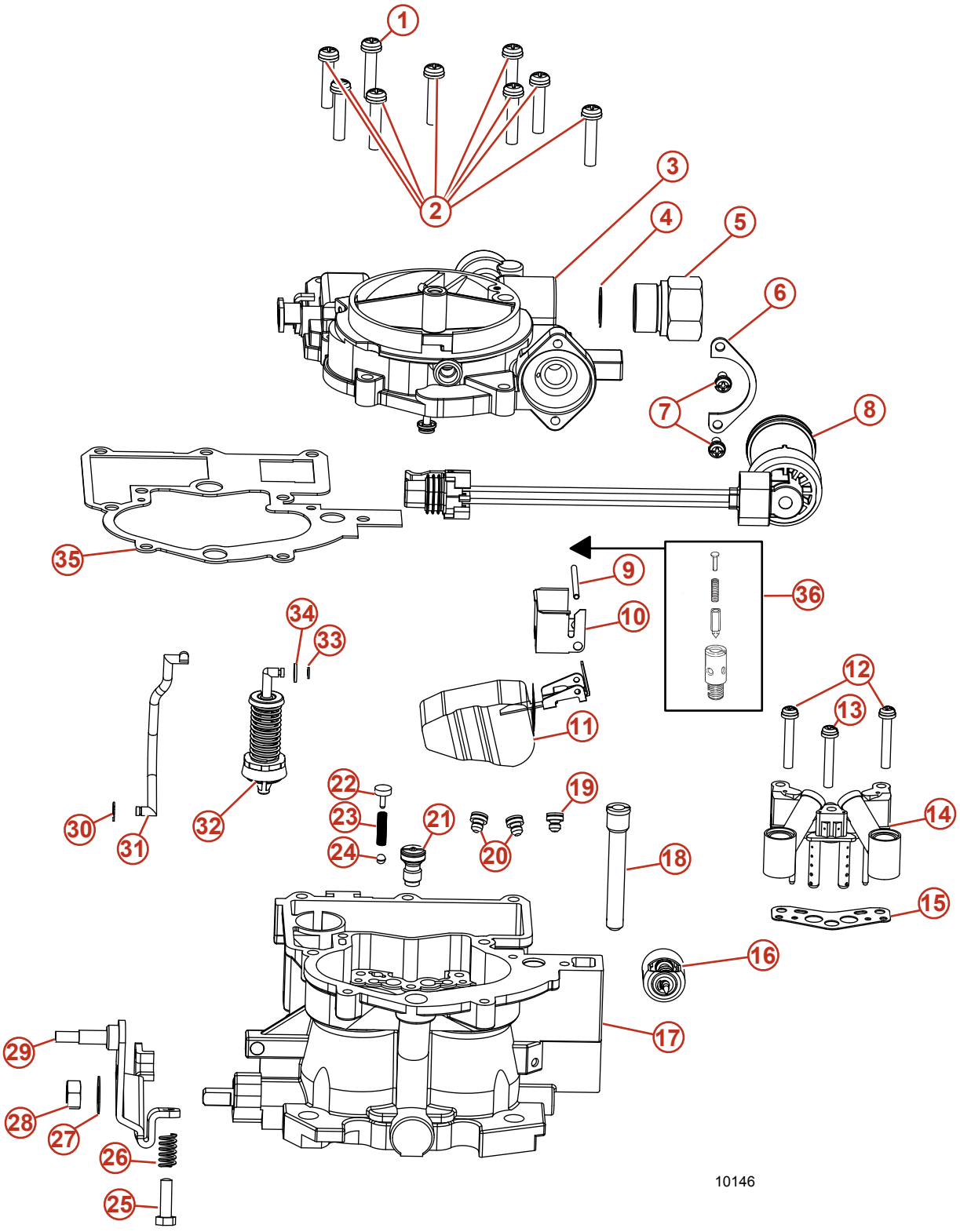


Exploded View Generation 1

Exploded View Parts List

Item	Description
1	Air horn screw
2	Nut-Fuel Inlet
3	Air horn
4	C Clip for TKS Module
5	Screw
6	TKS Module
7	Float pin
8	Baffle Plate
9	Venturi screws w/ metal washer
10	Venturi screw with fiber washer
11	Venturi Cluster
12	Gasket
13	Float
14	Volume reduction plug
15	TKS Enrichment jet
16	Carburetor Body
17	PCV Tube Connection Fitting (5.0 and 5.7 only)
18	Emulsion tube
19	Idle Mixture Adjusting Needle
20	Idle Speed Adjustment Screw
21	Idle Speed Adjustment Spring
22	Throttle Lever
23	Rod - Accelerator Pump and Retainer Clip
24	Main jets
25	Check Ball
26	Spring
27	Retainer
28	Set screw
29	Spring accelerator pump assembly
30	Accelerator pump assembly lever
31	Washer
32	C-clip-Pump Rod
33	Gasket
34	Accelerator pump lever
35	Washer
36	Inlet Needle and Seat (Spring Loaded)
	Not Visible on this drawing:
	Fuel Inlet filter and spring
	Fuel inlet gasket
	Power Valve Assembly
	Accelerator pump return spring

Exploded View Generation 2



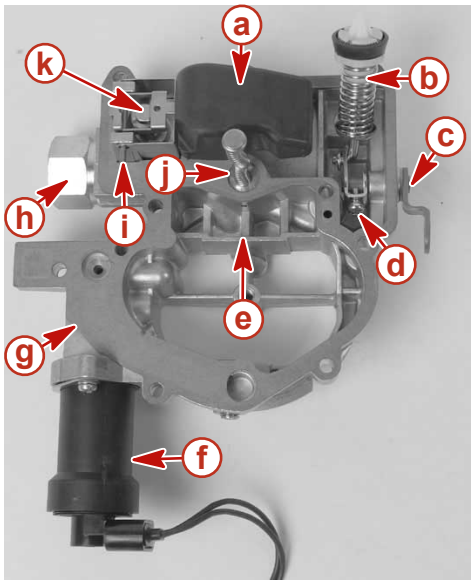
Exploded View Generation 2

Exploded View Parts List

Item	Description
1	Air horn screws - long
2	Air horn screw - short
3	Air Horn
4	Gasket
5	Nut-Fuel Inlet
6	TKS Module C-Clip
7	Screws
8	TKS Module
9	Pin
10	Baffle
11	Float
12	Outer venturi screws
13	Center venturi screw with fiber washer
14	Venturi Cluster
15	Gasket
16	Idle Mixture Adjusting Needle
17	Carburetor Body
18	Emulsion tube
19	TKS Enrichment jet
20	Main jets
21	Power Valve Assembly
22	Retainer
23	Spring
24	Screw - Idle Speed Adjustment
25	Spring
26	Check Ball
27	Washer
28	Nut
29	Throttle Lever
30	Clip-Pump Rod
31	Rod - Accelerator Pump
32	33A34ccelerator Pump Shaft and Lever Assembly
33	Clip - Retainer
34	Washer
35	Gasket
36	Inlet Needle and Seat (Spring Loaded)
	Not visible on this drawing:
	Fuel inlet filter and spring
	Connection Fitting (5.0L and 5.7L only)PCV
	Lever Assembly with set screw
	Vacuum fitting (3.0L only)

SERVICEABLE PARTS

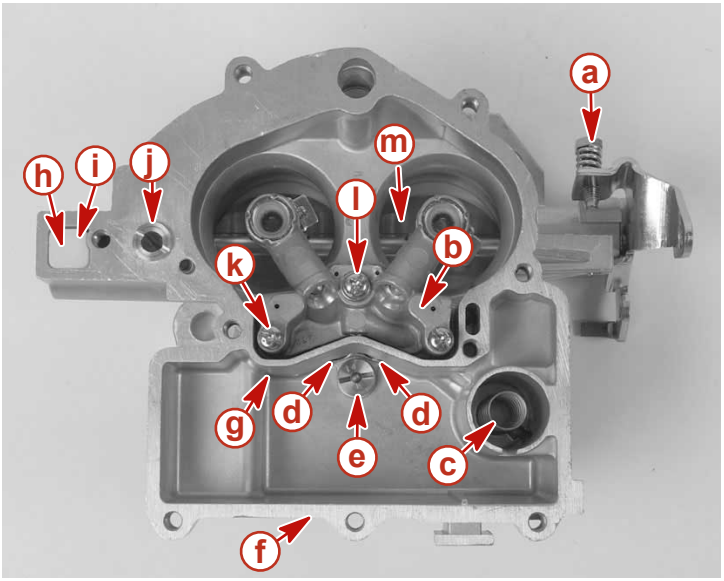
AIR HORN ASSEMBLY



Air horn assembly, Gen 1 and Gen 2

a - Float
b - Accelerator pump assembly
c - Accelerator pump lever
d - Set screw
e - Air horn (not available seperately)
f - TKS Module
g - Air horn gasket
h - Fuel inlet nut
i - Baffle
j - Power valve assembly
k - Needle and seat assembly

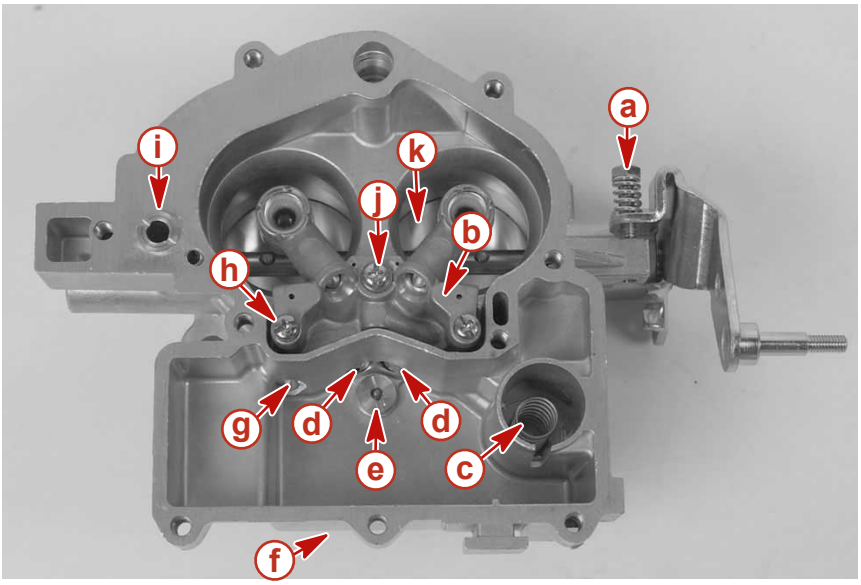
FLOAT BOWL ASSEMBLY, GEN 1



Gen 1 Float Bowl Assembly

- **a -** Idle speed screw and spring
- **b -** Venturi
- **c -** Accelerator pump return spring
- **d -** Main jet
- **e -** Power valve
- **f -** Idle mixture screw (under float bowl)
- **g -** Fuel inlet for TKS fuel enrichment reservoir
- **h -** Volume reduction plug
- **i -** TKS fuel enrichment metering jet (under plug)
- **j -** Emulsion tube
- **k -** Venturi screw with washer and lockwasher
- **l -** Venturi screw with washer and fiber washer
- **m -** Throttle plates (not serviceable)

FLOAT BOWL ASSEMBLY, GEN 2



Gen 2 Float Bowl Assembly

- **a -** Idle speed screw and spring
- **b -** Venturi
- **c -** Accelerator pump return spring
- **d -** Main jet
- **e -** Power valve
- **f -** Idle mixture screw (under float bowl)
- **g -** TKS fuel enrichment metering jet
- **h -** Venturi screw with washer and lockwasher
- **i -** Emulsion tube
- **j -** Venturi screw with washer and fiber washer
- **k -** Throttle plates (not serviceable)

Disassembly

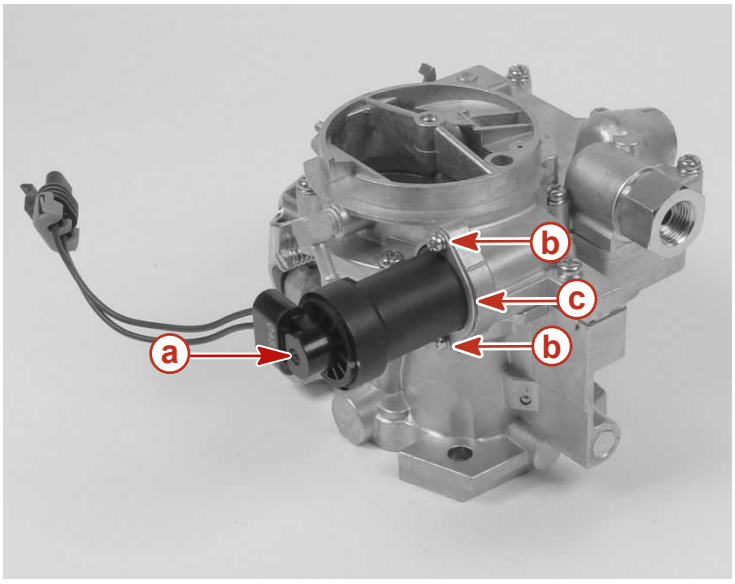
IMPORTANT: Before performing any service on the carburetor, it is essential that the carburetor be placed in a holding fixture to prevent possible damage to throttle valves.

The following is a step-by-step procedure for completely overhauling the carburetor removed from engine. Complete overhaul is not always necessary. You should perform only those steps required to repair the carburetor malfunction. Read the instructions carefully to prevent unnecessary steps.

TKS MODULE

The TKS module is not a serviceable part. It is adjusted at the factory for proper performance. If the TKS module is not working properly, replace the unit.

1. Remove the two screws and c-clip holding the TKS module.



9630

a - TKS module
b - Screws
c - C-clip

2. Carefully remove the TKS module from the carburetor body by pulling the module straight out using a slight twisting motion, being careful not to damage the O-ring.

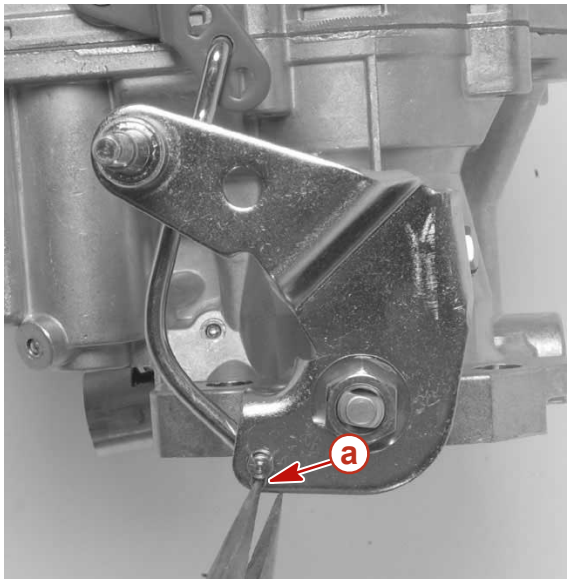
9633

a - O-ring on TKS module

AIR HORN

1. Remove fuel inlet filter nut, washers, spring, and filter, as outlined previously.

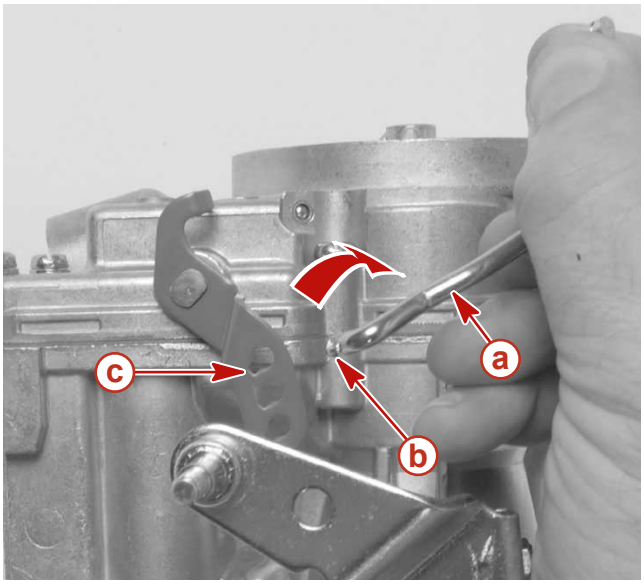
2. Remove accelerator pump rod retaining clip.



9586

a - Retaining clip

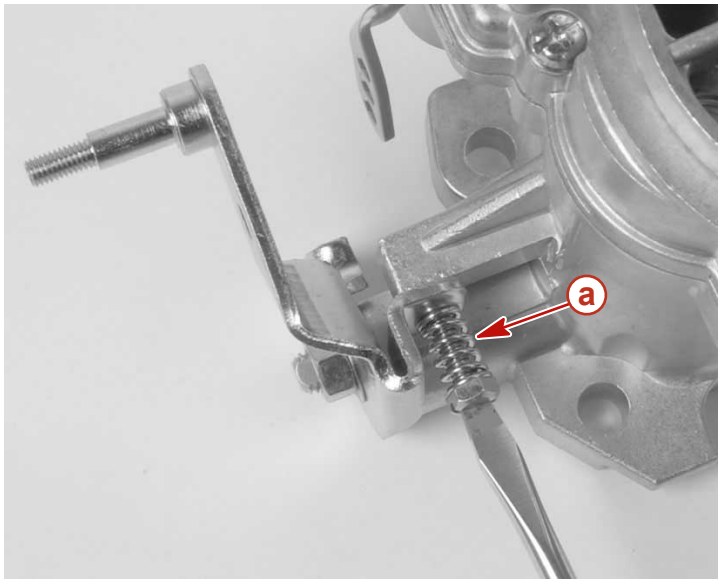
3. Pivot rod (as required) until retaining ear on rod and slot in pump shaft and lever assembly align, allowing rod to be pulled out.



9540

a - Accelerator pump rod
b - Retaining ear
c - Pump shaft and lever slot

4. Remove idle speed adjustment screw and spring, if replacement is necessary.

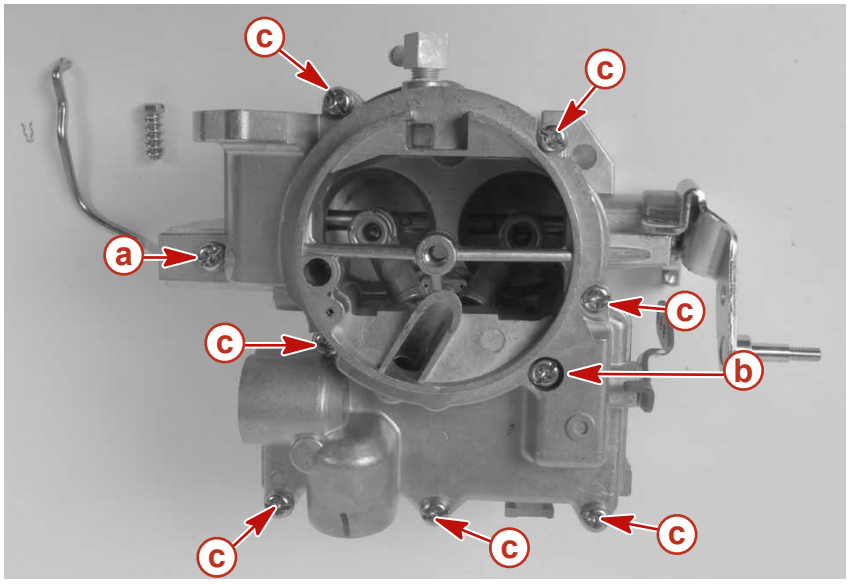


9558

a - Idle speed screw and spring

IMPORTANT: Do not remove throttle valves. If any of the throttle parts are found to be worn or damaged, complete carburetor body assembly MUST BE replaced. Assembly can be cleaned in carburetor cleaner.

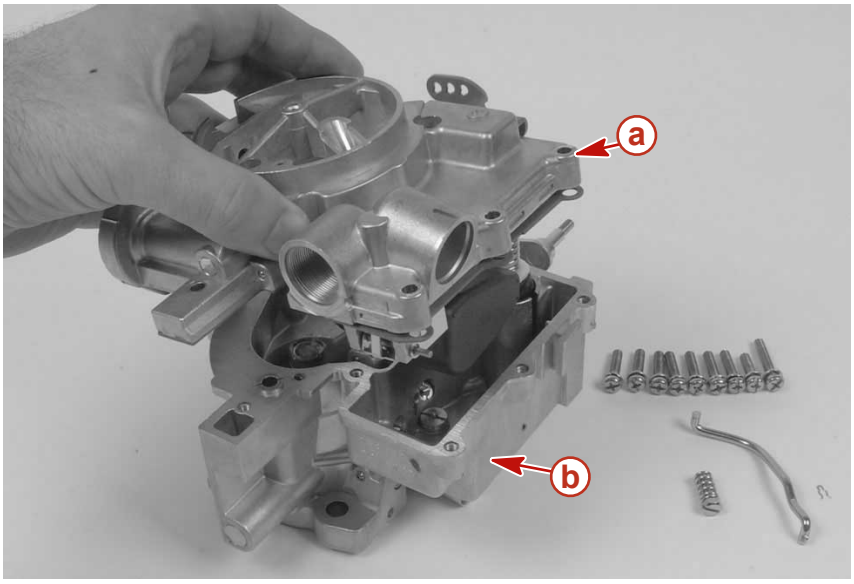
5. Remove the air horn attaching screws. Note lengths and locations for reassembly.



9581

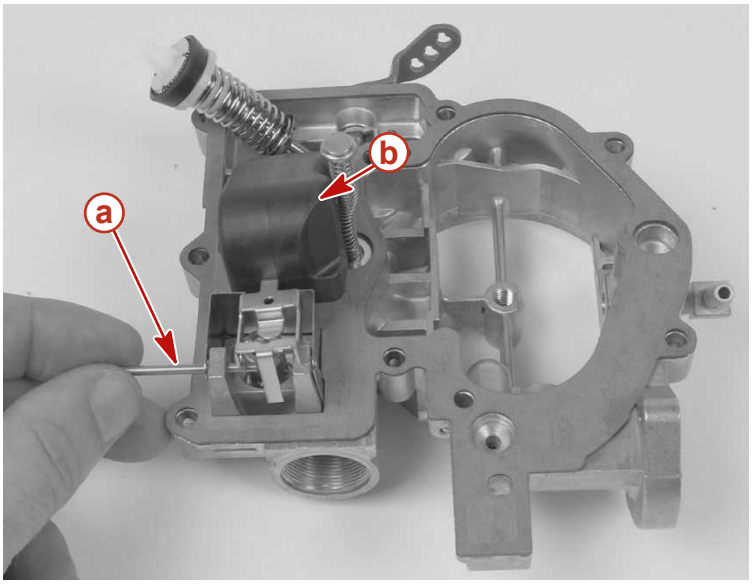
a - Short screw (Gen 1 only)
b - Long screw
c - Screws

6. Carefully lift air horn from float bowl assembly.



a - Air horn assembly **b -** Float bowl assembly

7. Invert air horn and carefully lay on bench.
8. Remove float hinge pin and lift float assembly from air horn.



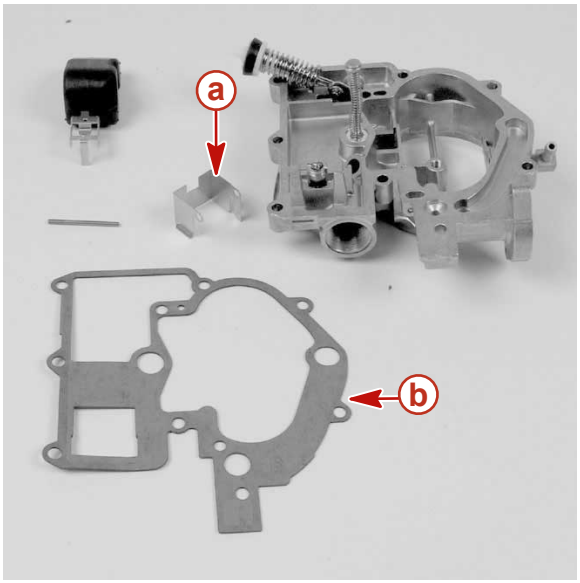
a - Float hinge pin **b -** Float assembly

9. Check float weight. Replace if it weighs more than specification in table at the front of this section.

10131

a - Float

10. Remove air horn gasket and baffle.

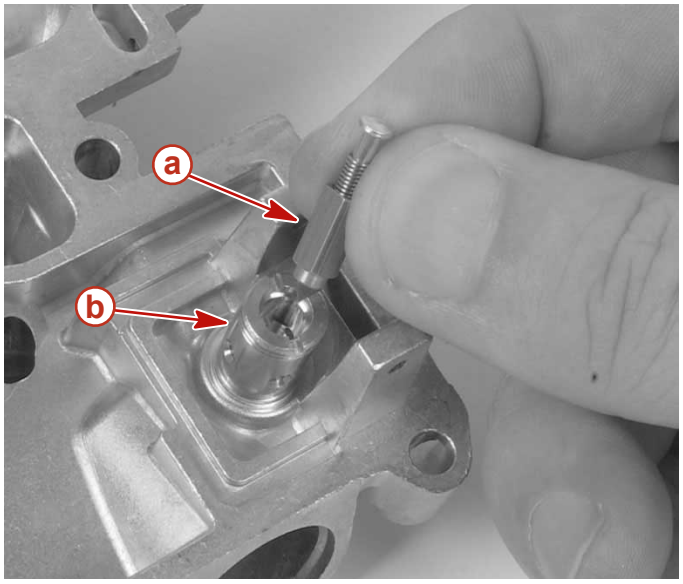


9573

a - Baffle

b - Air horn gasket

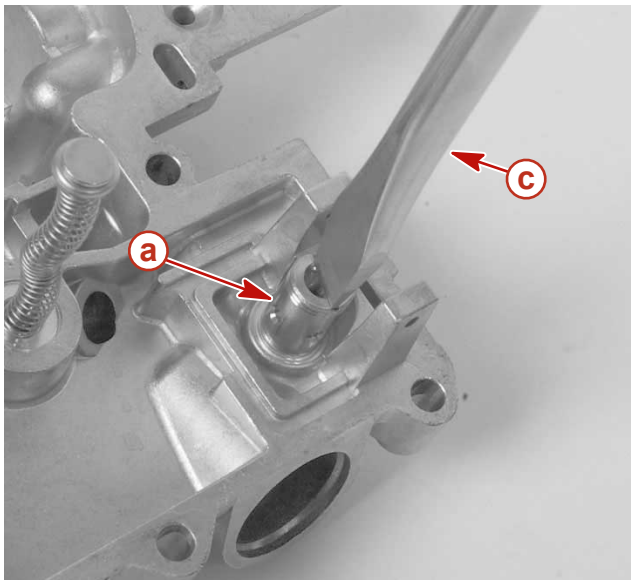
11. Remove needle assembly.



9547

a - Needle assembly **b -** Needle seat

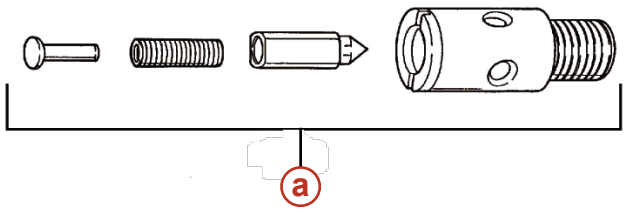
12. Remove needle seat.



9548

a - Needle seat **b -** Screwdriver

13. Keep needle and seat assembly together as a set, as they are matched from the factory and should be replaced as a set if necessary.

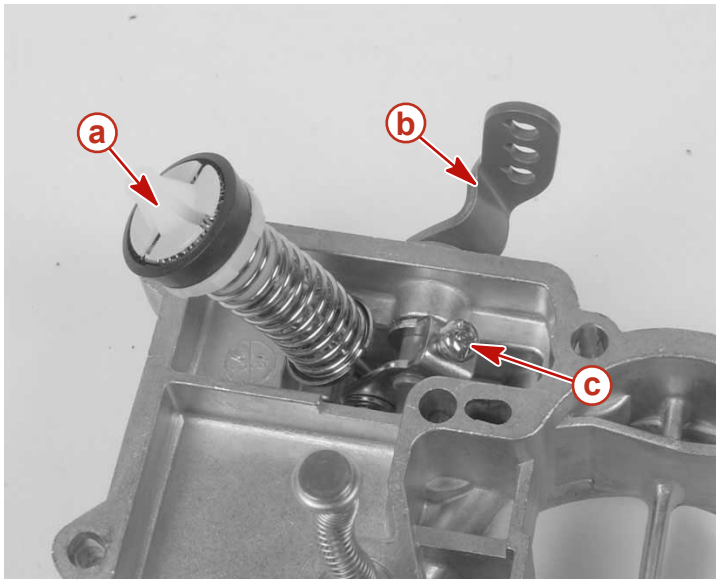


9549

Needle and Seat Assembly

a - Spring loaded type needle (Kit 3302-9029)

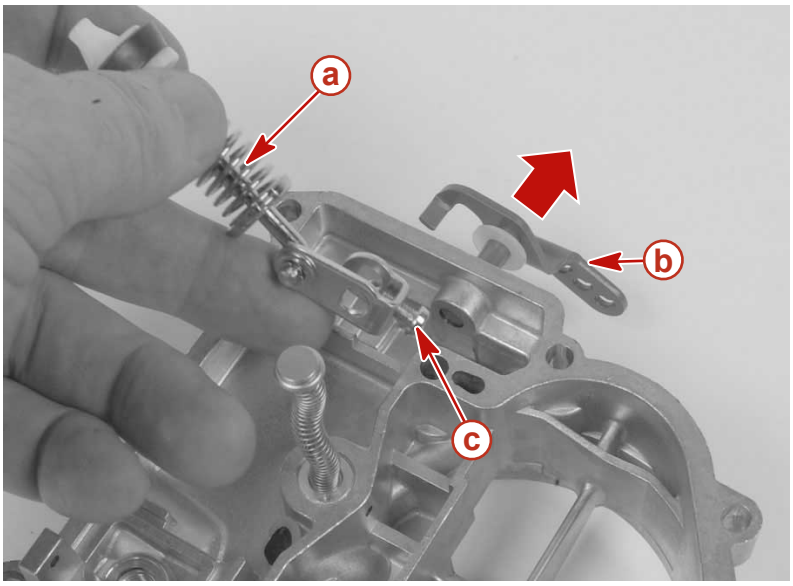
14. Loosen accelerator pump screw.



9550

a - Accelerator pump assembly
b - Accelerator pump lever
c - Set screw

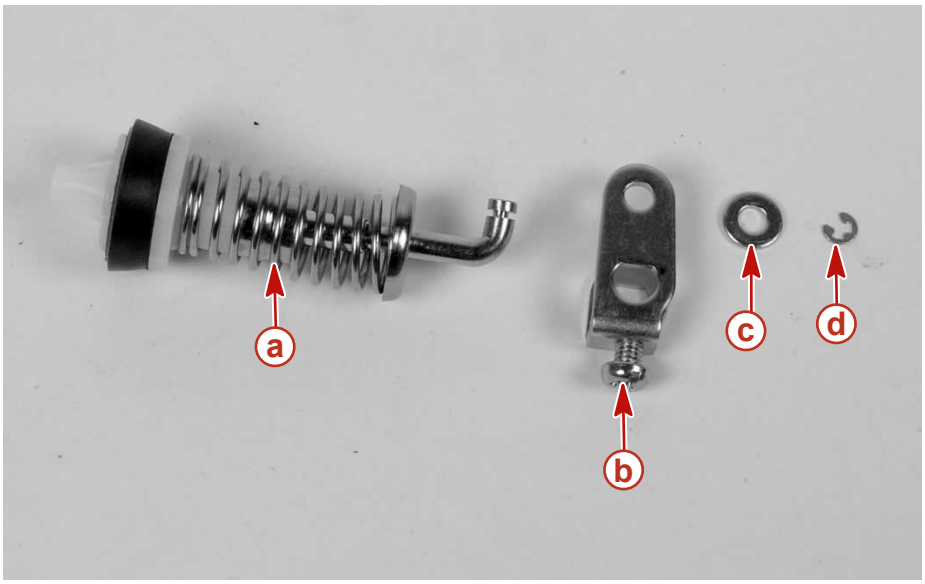
15. Slide pump shaft and lever assembly (and washer) out of air horn.
16. Remove accelerator pump assembly.



9539

a - Accelerator pump assembly
b - Accelerator pump lever
c - Set screw

17. Remove retainer clip and washer from pump shaft and lever assembly, then remove accelerator pump assembly.

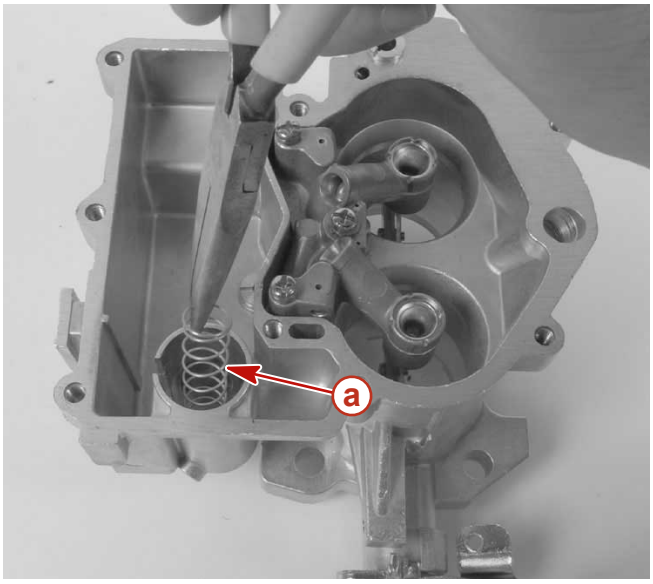


9551

a - Pump assembly
b - Lever assembly
c - Washer
d - Retainer clip

FLOAT BOWL

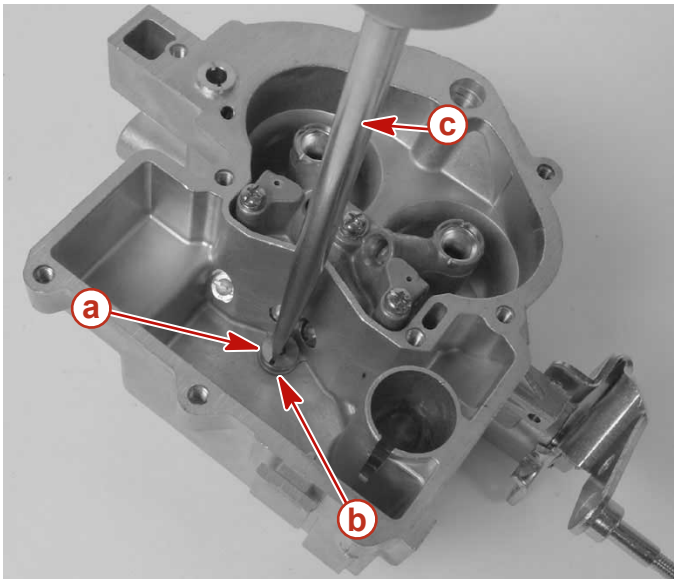
1. Remove accelerator pump return spring from pump well.



9552

a - Accelerator pump spring

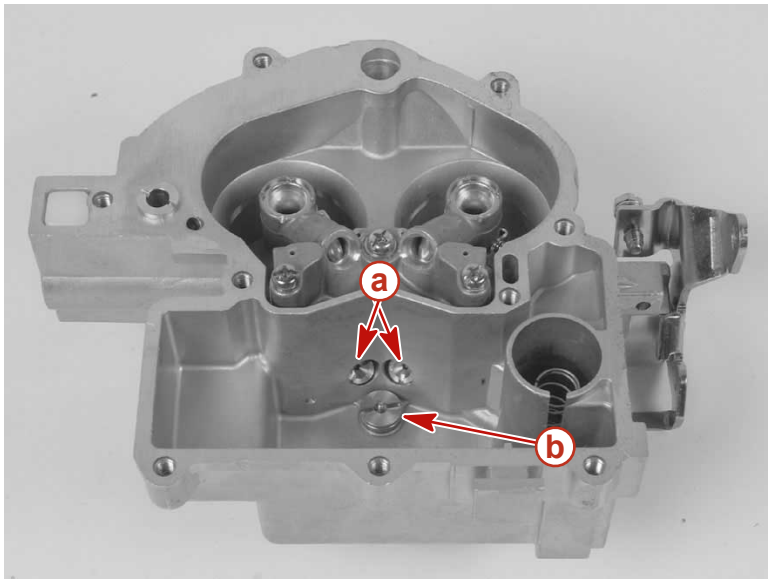
2. Remove power valve assembly and gasket.



Gen 2 carburetor shown, Typical

a - Power valve assembly
b - Gasket (not shown)
c - Screwdriver

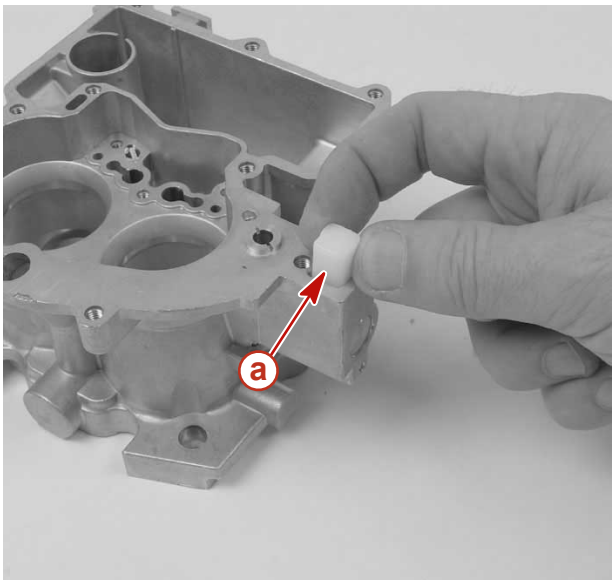
3. **Generation 1** Remove metering jets. Note sizes to keep main jets separate from TKS fuel enrichment metering jet.
   a. Remove main jets.



Generation 1 float bowl

a - Main jets
b - Power valve

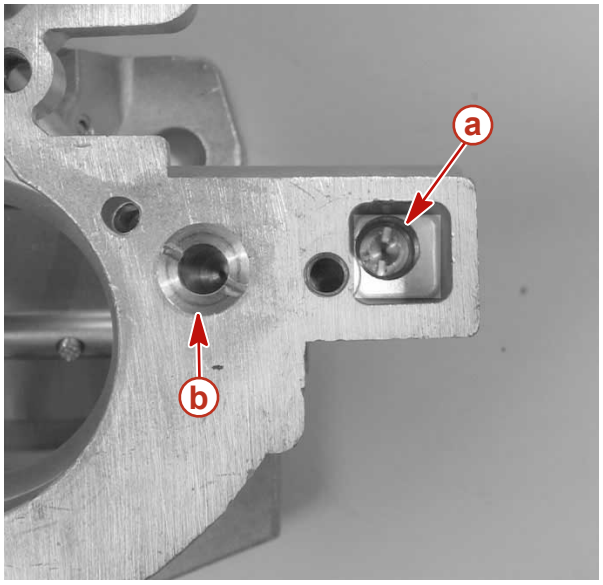
b. Remove volume reduction plug. Pry loose with a small screwdriver, then turn float bowl over to drop out.



9883

a - Volume reduction plug

c. Remove TKS enrichment jet at bottom of well.

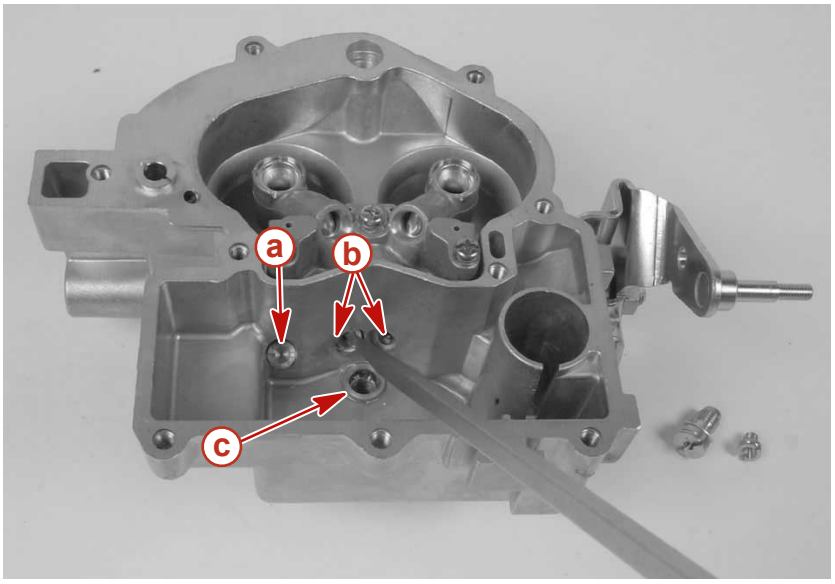


9884

a - TKS fuel enrichment jet **b -** Emulsion tube

4. **Generation 2:** Remove metering jets. Note sizes to keep main jets separate from TKS fuel enrichment jet.

a. Remove main jets.

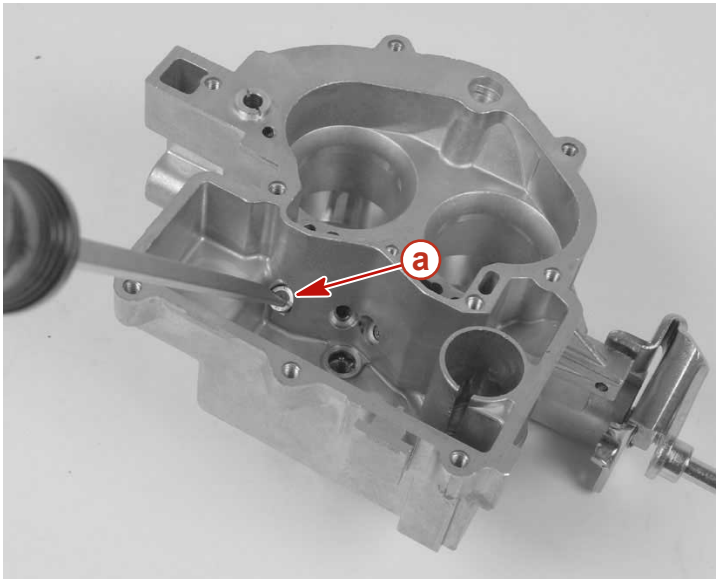


9554

Generation 2 float bowl

a - TKS fuel enrichment jet
b - Main jets
c - Power valve port

b. Remove TKS enrichment jet. Note size to keep separate from main jets.

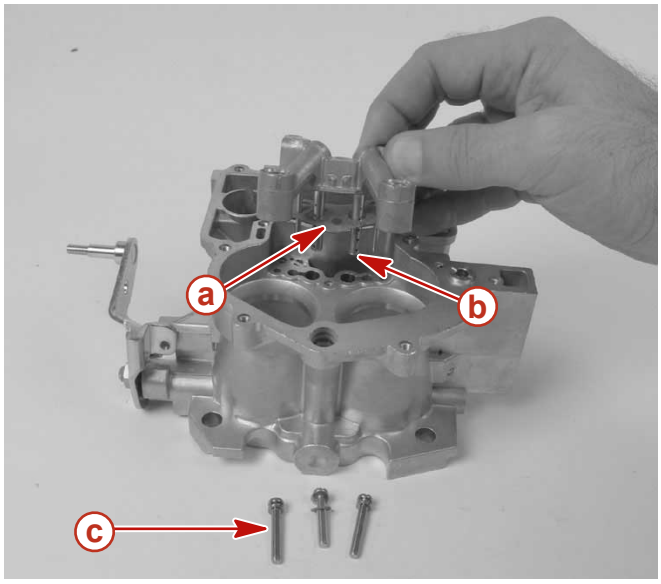


9666

a - TKS enrichment jet

IMPORTANT: Use care when removing venturi cluster to prevent damaging brass tubes which protrude from bottom of cluster. Do not remove tubes. These tubes are permanently pressed into the venturi cluster and are not replaceable.

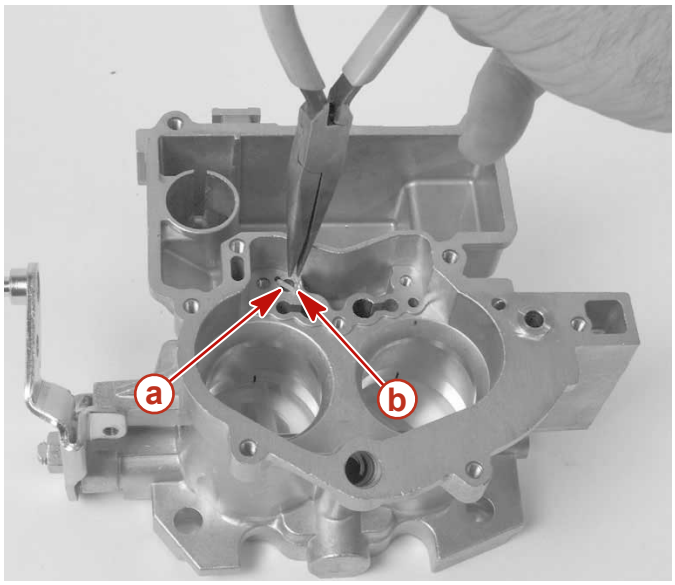
5. Remove venturi cluster screws, and carefully lift cluster and venturi gasket straight up.



9555

a - Venturi cluster brass tubes
b - Gasket
c - Screws

6. Using needle-nose pliers, remove accelerator pump check ball spring retainer. Turn float bowl over to remove spring and check ball.

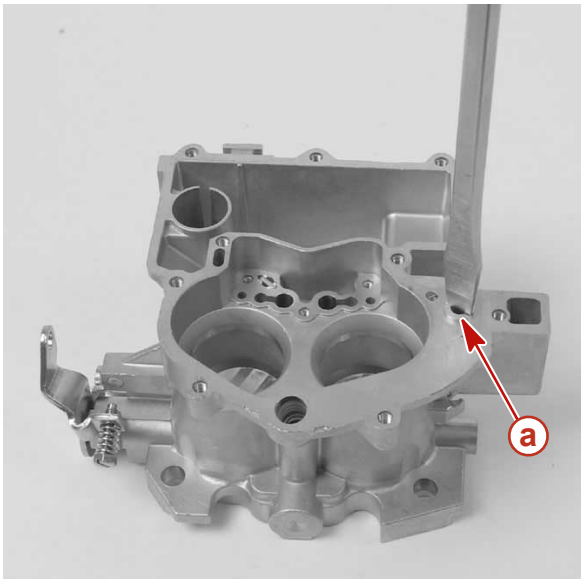


9556

a - Spring retainer
b - Spring and check ball (not shown)

IMPORTANT: Use extreme care when handling carburetor body, so as not to damage throttle valves.

7. Remove emulsion tube.

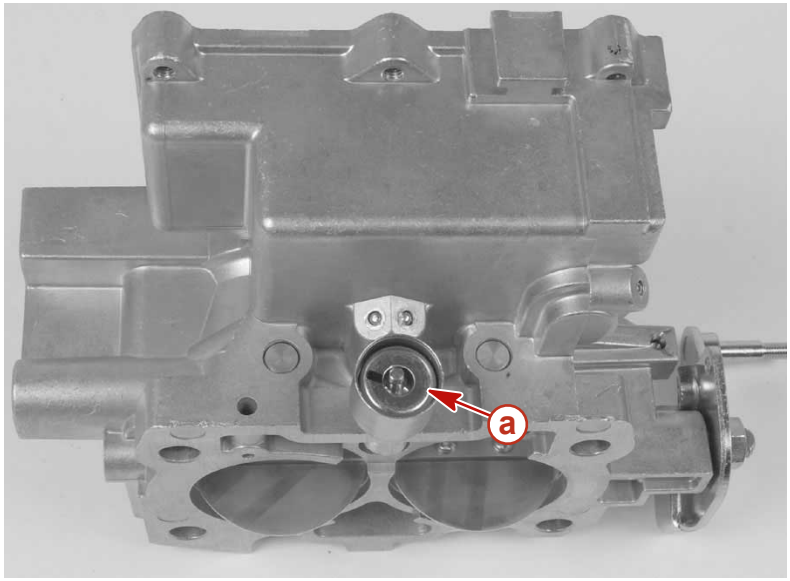


9885

Gen 1 shown, Typical

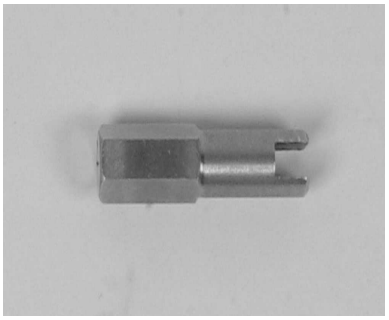
a - Emulsifier tube

8. Remove idle mixture adjusting needle assembly using the special idle mixture adjusting tool.



9557

a - Idle mixture adjusting needle

Idle mixture adjusting tool		
 9668	For adjusting idle mixture	PN 91-866201

Cleaning and Inspection

IMPORTANT: Do not use a wire or drill to clean jet passages or tubes in carburetor, as this may enlarge orifices and seriously affect carburetor calibration.

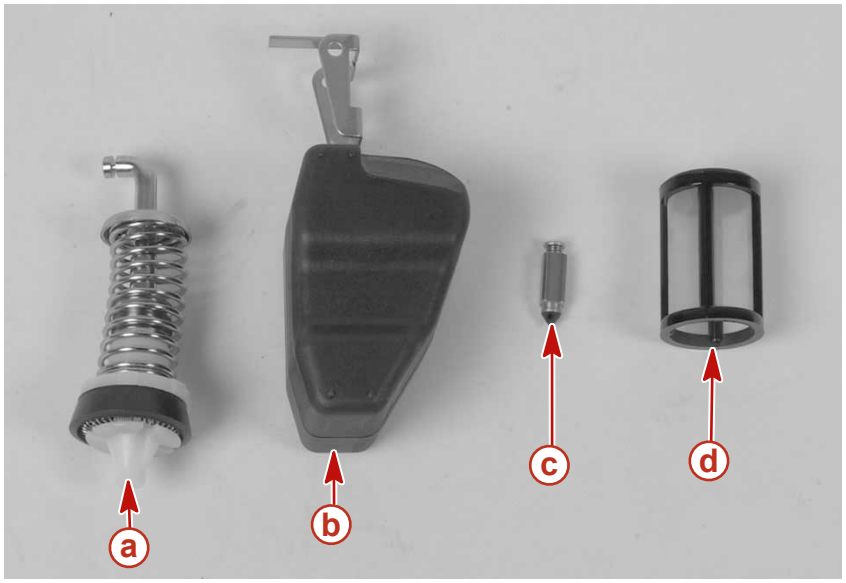
⚠ CAUTION

To avoid damage to carburetor, do not leave carburetor in immersion type carburetor cleaner for more than two hours.

IMPORTANT: Do not clean float bowl gasket surfaces with a gasket scraper or knife, as sealing bead will be damaged and float bowl replacement will be necessary.

⚠ CAUTION

The float assembly, float needle, accelerator pump plunger, and fuel filter must not be immersed in carburetor cleaner, as they will swell, harden, and/or distort.



9559

Items to not be immersed in carburetor cleaner

a - Accelerator pump plunger
b - Float assembly
c - Float needle
d - Fuel filter

⚠ WARNING

Avoid personal injury by always wearing safety goggles when using compressed air.

1. Clean all metal parts in a commercial carburetor cleaner until all deposits have been removed. Follow cleaner manufacturers instructions for proper cleaning and rinsing procedure. Dry parts with compressed air.
2. Using compressed air, blow out all passages in the carburetor to remove any foreign material.
3. Wipe off all parts that cannot be cleaned in carburetor cleaner with a clean, dry cloth.
4. Carefully inspect all carburetor parts for wear and damage. Pay particular attention to the following:
   a. Float Needle and Seat: If float needle or seat is worn or damaged, replace with new needle and seat assembly.

IMPORTANT: Float needle and seat are factory matched and tested and should be replaced as a set only.

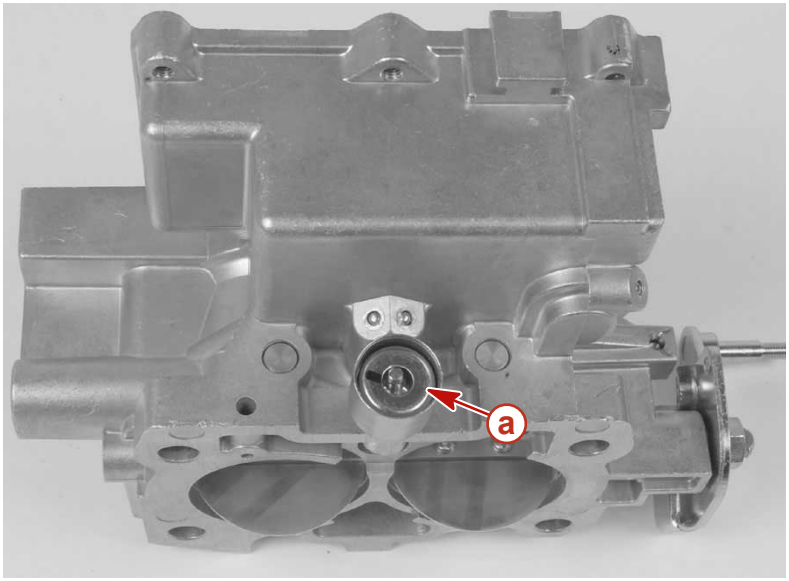
   b. Float assembly and hinge pin: Check float density (to see if it is saturated with fuel) by comparing weight of float with specifications. If weight is high, float assembly must be replaced. Check hinge pin and holes for wear.
   c. Fuel and air passages: Passages must be perfectly clean for proper carburetor operation.
   d. Accelerator pump plunger and return spring: Inspect pump plunger cup, pump plunger spring (on pump assembly) and return spring.
   e. Power piston spring: Check power piston spring for weakness or distortion.
   f. Idle mixture needle: Inspect idle mixture needle. If damaged, needle must be replaced.
   g. Levers and linkages: Check levers, links and rods for wear.
   h. Throttle valve and shaft: Check throttle shaft for excessive looseness in throttle body. Ensure throttle valve and shaft open and close completely. Throttle body assembly must be replaced if throttle valve and shaft are worn or damaged.
   i. TKS Module operation: Follow diagnostic tests listed in section 5G.
   j. Inspect casting for visible damage. Inspect gasket surfaces. Inspect accelerator pump plunger well for scoring or deposits.

Reassembly

CARBURETOR BODY

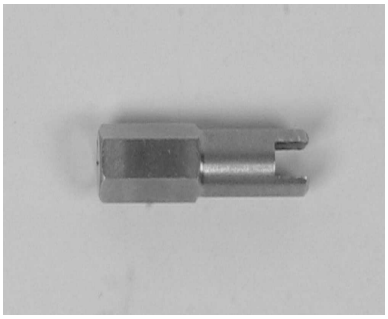
IMPORTANT: Do not force idle mixture needle against seat as damage to needle and/or seat will result.

1. Screw idle mixture needle and spring into throttle body until it lightly seats, then back out the idle mixture screw as specified for your model to attain the preliminary idle mixture setting.

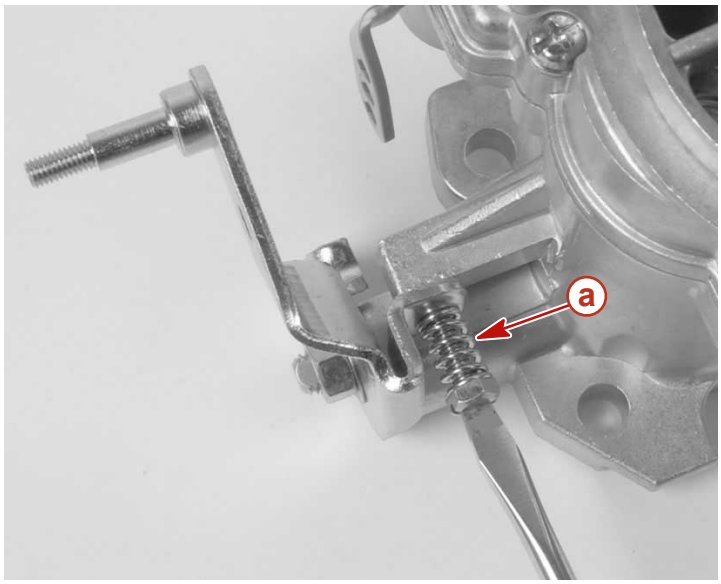


9557

a - Idle mixture screw assembly

Idle mixture adjusting tool		
 9668	For adjusting idle mixture	PN 91-866201

2. Thread idle speed adjustment screw and spring into throttle lever, and adjust to specification.



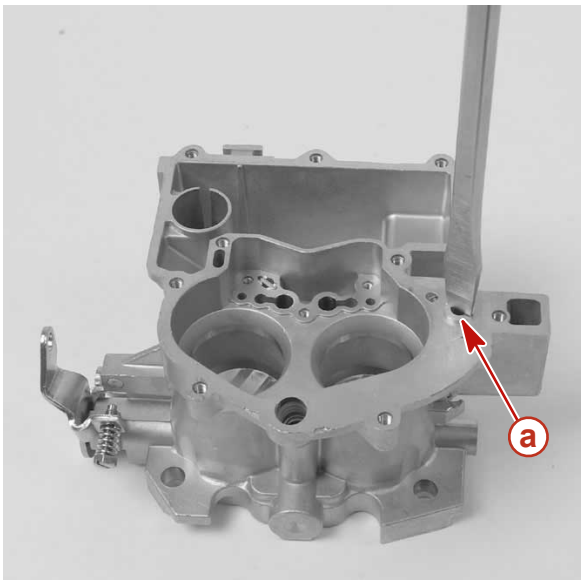
9558

a - Idle speed screw and spring

FLOAT BOWL

IMPORTANT: Place float bowl and throttle assemblies in holding fixture to prevent throttle valves from being damaged.

1. Install emulsion tube.

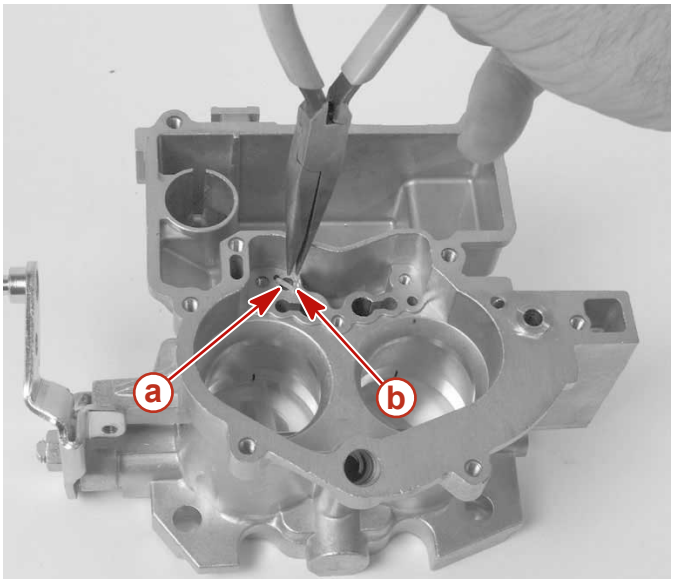


9885

Gen 1 shown, Typical

a - Emulsifier tube

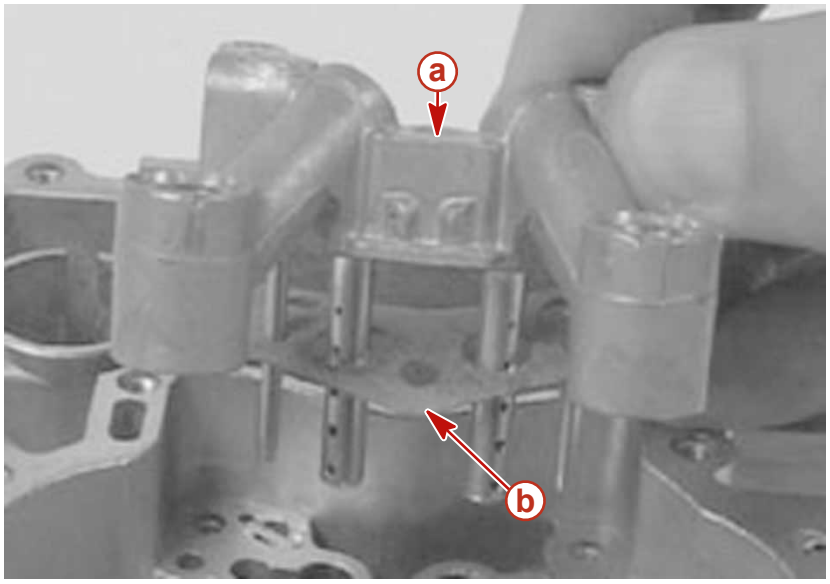
2. Install check ball, spring, and retainer in passage. Push retainer firmly into slots.



9556

a - Spring retainer **b -** Spring and check ball (not shown)

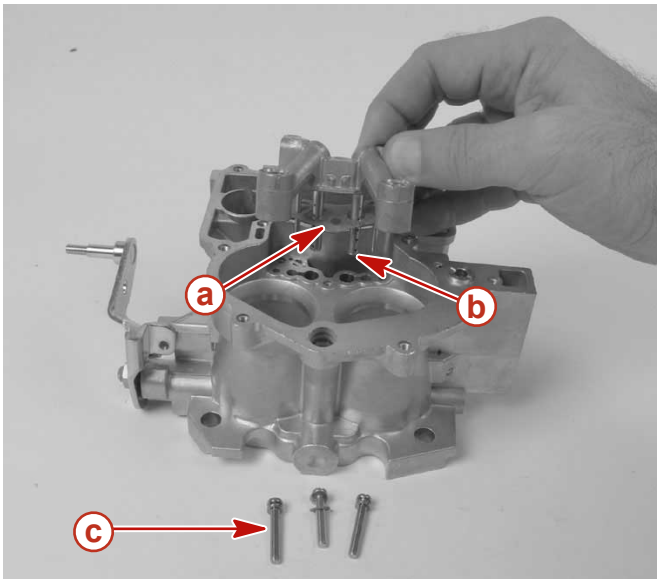
3. Install new gasket on venturi cluster.



9563

a - Venturi cluster **b -** Gasket

4. Install venturi cluster in carburetor.

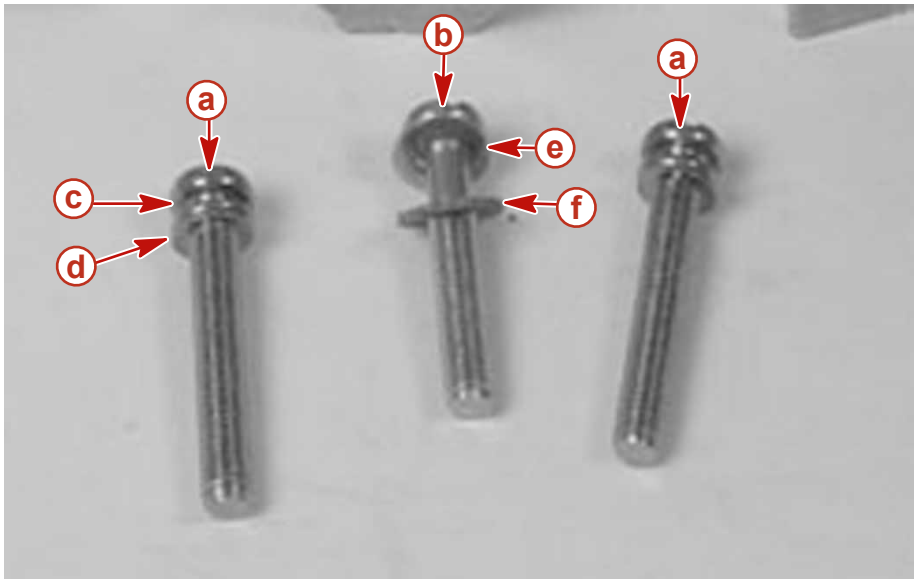


9555

a - Venturi cluster brass tubes
b - Gasket
c - Screws

5. Install flat washer and new fiber washer on center screw. Lockwashers and flat washers are used on outer screws. Tighten screws evenly and securely.

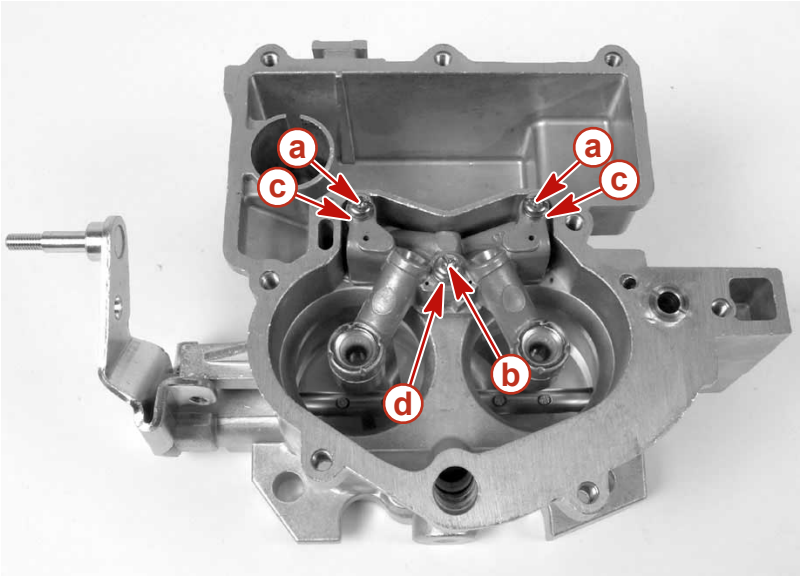
IMPORTANT: Do not damage the fiber washer. A damaged washer will cause improper engine operation.



9565

a - Outer screws
b - Center screw
c - Flat washer
d - Lock washer (both sides)
e - Flat washer
f - Fiber washer

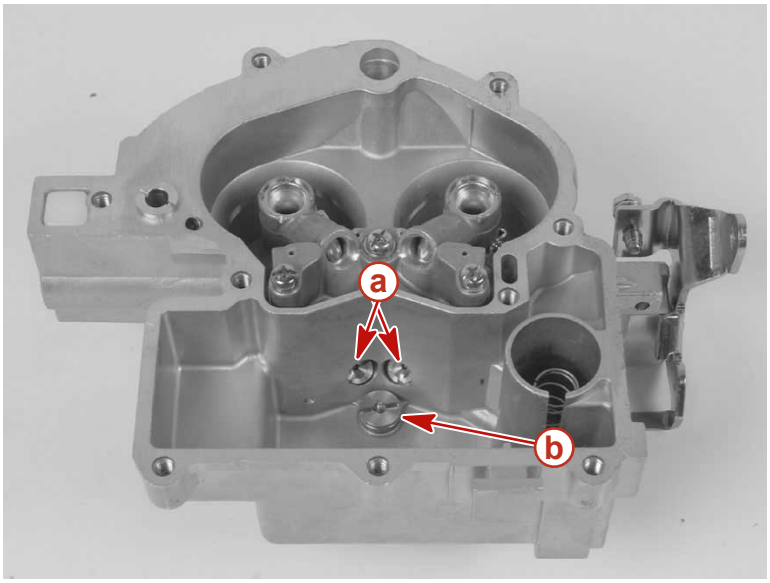
6. Ensure venturi screws are in the proper locations with the proper washers and lock washers.



10026

a - Outer screws
b - Center screw
c - Flat washer and lock washer (not visible)
d - Flat washer and fiber washer (not visible)

7. **Generation 1** Install metering jets. Note sizes to keep main jets separate from TKS fuel enrichment jet.
   a. Install main jets.

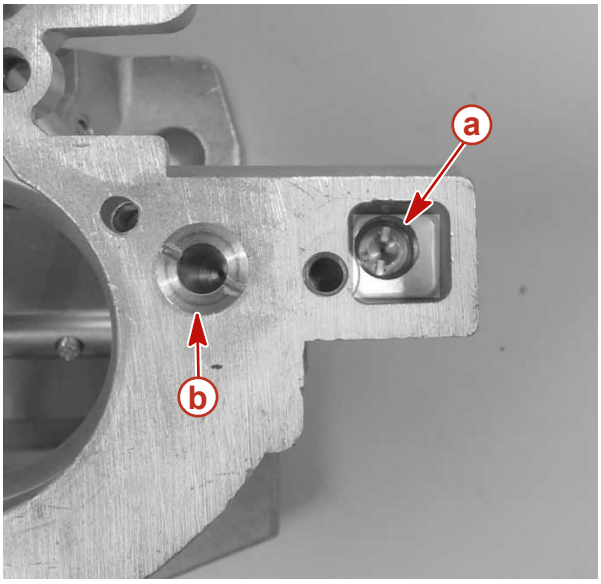


9669

Generation 1 float bowl

a - Main jets
b - Power valve

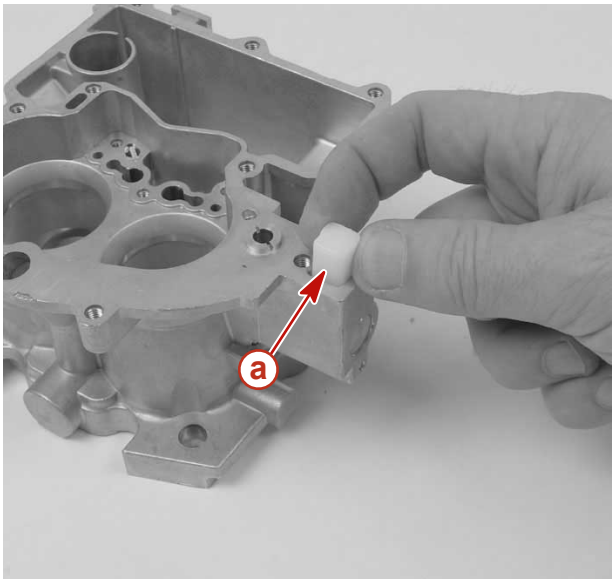
b. Install TKS fuel enrichment jet at bottom of well.



9884

a - TKS fuel enrichment jet **b -** Emulsion tube

8. Install volume reduction plug. Note relief in one side to go around screw hole.

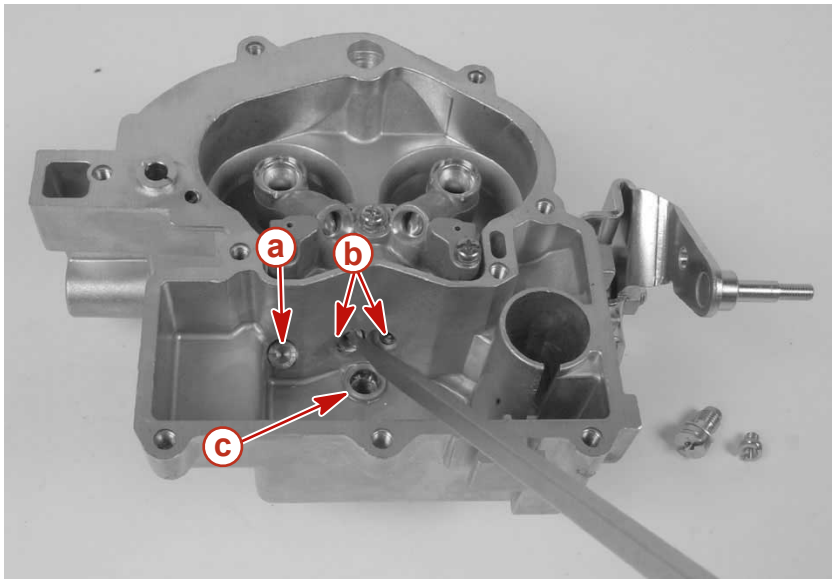


9883

a - Volume reduction plug

9. **Generation 2:** Install metering jets. Note sizes to keep main jets separate from TKS fuel enrichment jet.

a. Install main jets.

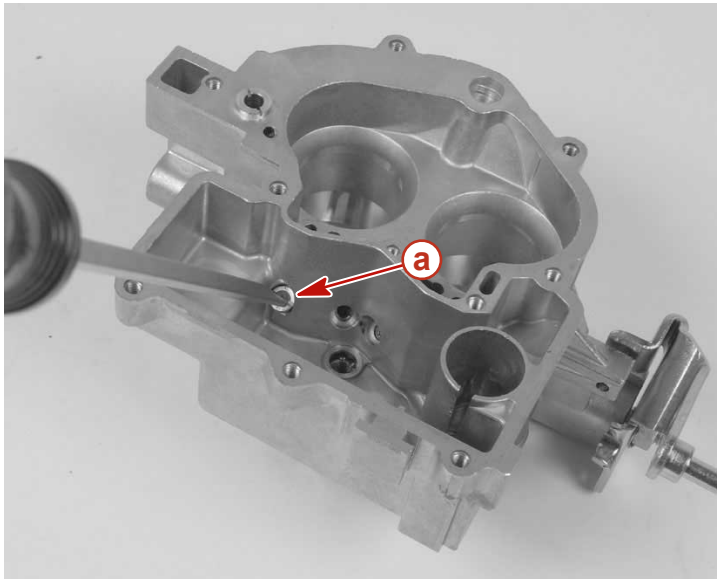


9554

Generation 2 float bowl

a - TKS fuel enrichment jet
b - Main jets
c - Power valve port

b. Install TKS enrichment jet. Note size to keep separate from main jets.

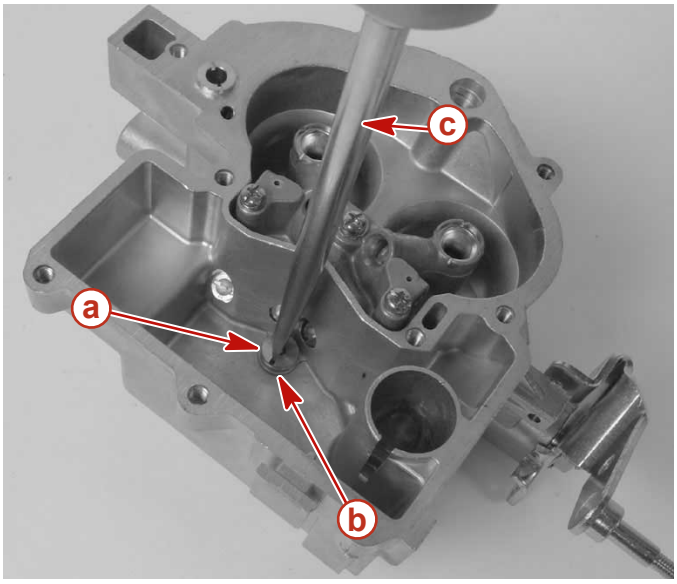


9666

a - TKS fuel enrichment jet

IMPORTANT: Use care when removing venturi cluster to prevent damaging brass tubes which protrude from bottom of cluster. Do not remove tubes. These tubes are permanently pressed into the venturi cluster and are not replaceable.

10. Install power valve with new gasket. Tighten securely.

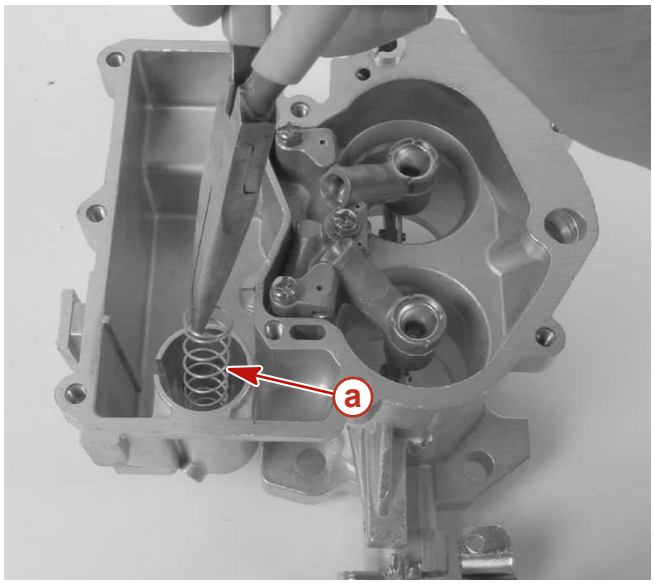


9553

Gen 2 carburetor shown, Typical

a - Power valve assembly
b - Gasket (not shown)
c - Screwdriver

11. Place accelerator pump spring in pump well.



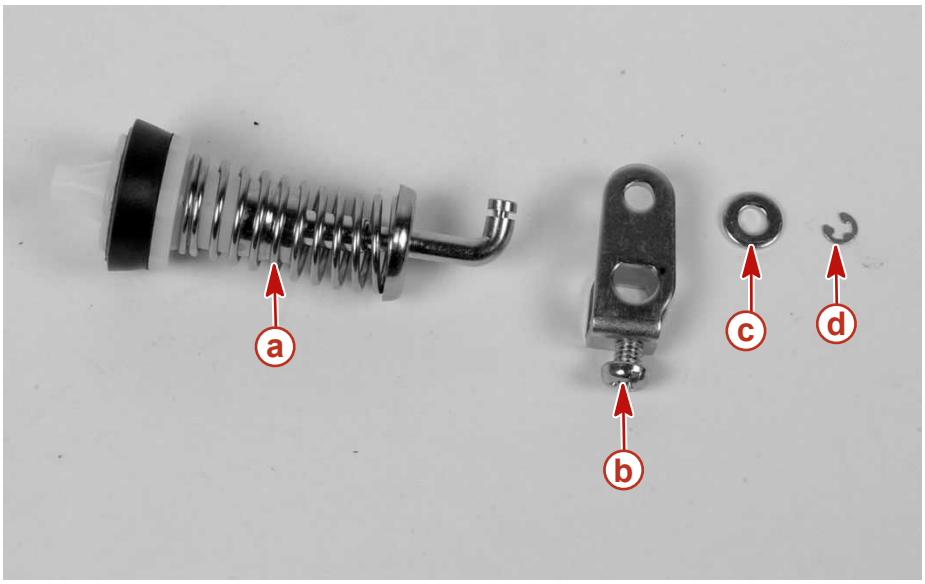
9552

a - Accelerator pump spring

AIR HORN

IMPORTANT: Accelerator pump assembly must be installed correctly. If pump assembly is installed incorrectly, top of pump assembly will contact air horn casting.

1. If accelerator pump assembly was removed from pump lever, secure pump assembly to pump lever with washer and retainer clip.

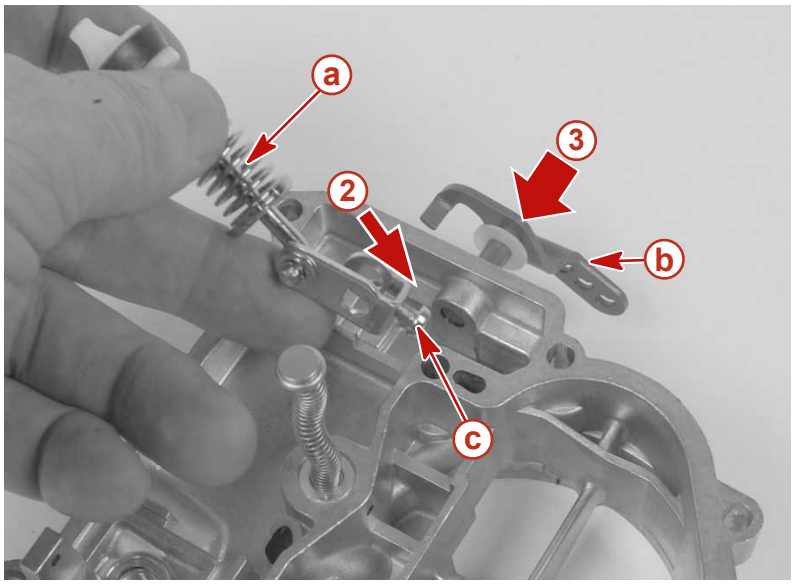


9551

Order for reassembly, see pictures for part orientation

a - Pump assembly
b - Lever assembly
c - Washer
d - Retainer clip

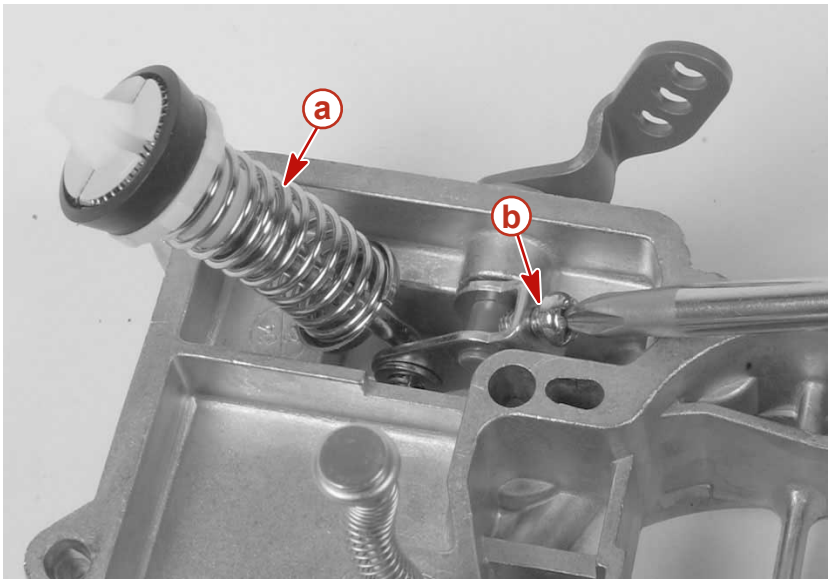
2. Insert pump shaft and lever assembly (and washer) into air horn.
3. Align indexed hole in pump lever with shaft and lever assembly and slide shaft all the way into lever so that shoulder on shaft is hitting lever.



9569

a - Pump shaft assembly
b - Accelerator pump shaft and lever
c - Set screw

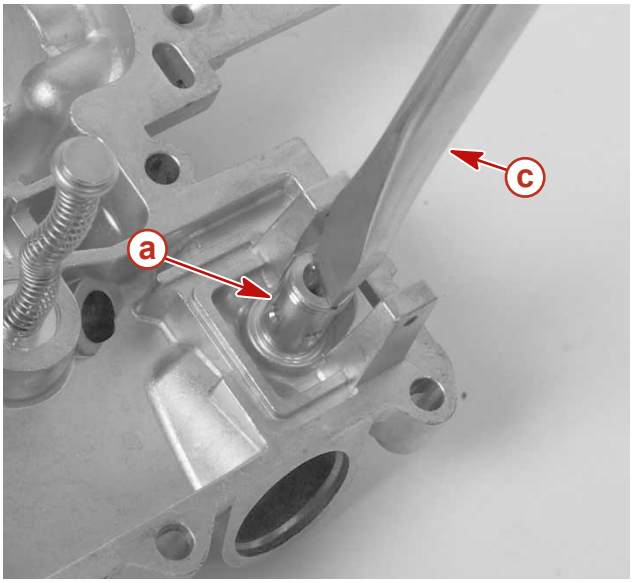
4. Tighten set screw securely.



9570

a - Pump assembly **b -** Set screw

5. Install needle seat. Tighten securely.

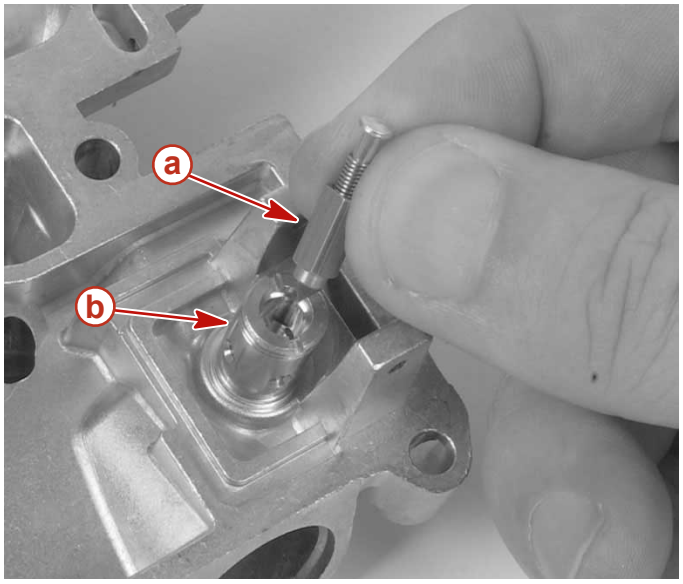


9548

a - Needle seat **b -** Screwdriver

IMPORTANT: Float needle and needle seat are factory matched and tested and should be replaced as a set only.

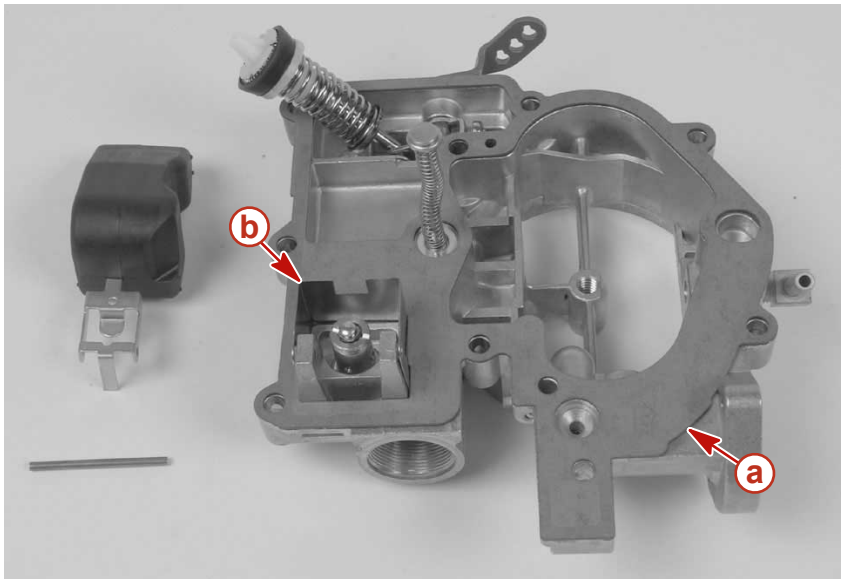
6. Place needle assembly in needle seat.



9547

a - Needle assembly **b -** Needle seat

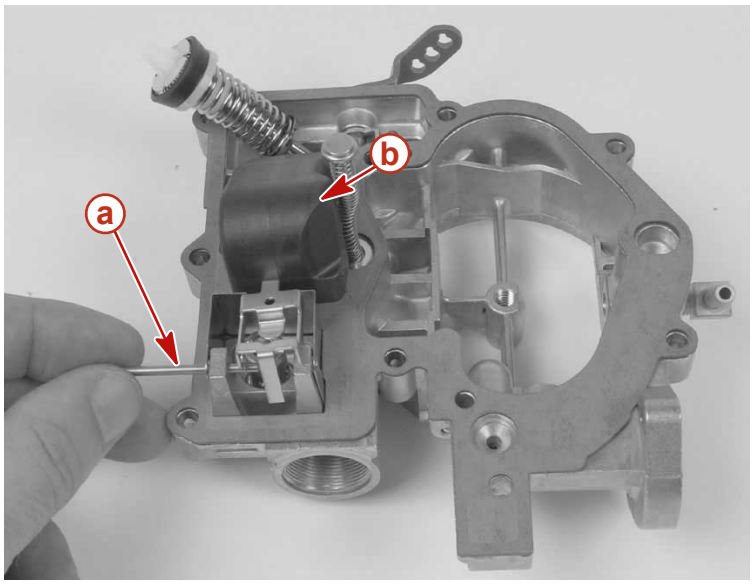
7. Install baffle and gasket.



9546

a - Airhorn gasket **b -** Baffle

8. Install float assembly and hinge pin. Pivot float assembly up and down on hinge pin to ensure it moves freely.



9544

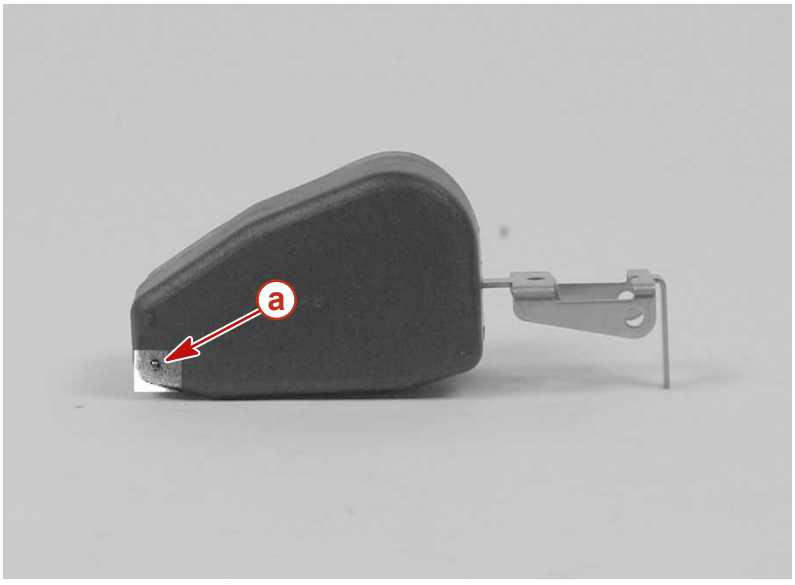
a - Float hinge pin **b -** Float assembly

FLOAT LEVEL

1. Turn air horn upside down. Pivot float assembly up and down on hinge pin to ensure it moves freely.

IMPORTANT: Before checking float level, raise float and allow it to fall; however, do not force downward by hand.

2. Measure float level using **Universal Carburetor Gauge (91-36392)**. Measure from gasket to the dot on the toe of the float.

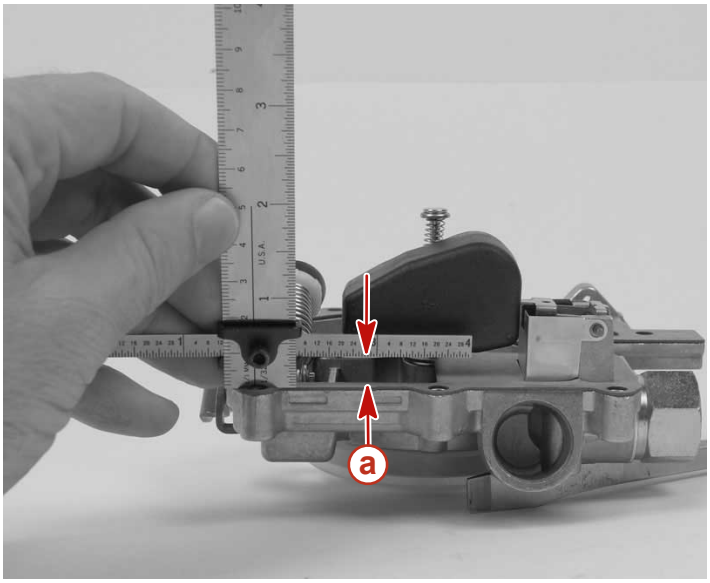


9967

Carburetor Float

a - Measure from this point (Dot) to gasket

Universal Carburetor Gauge		
 9756	Measure dimensions on a carburetor.	91-36392

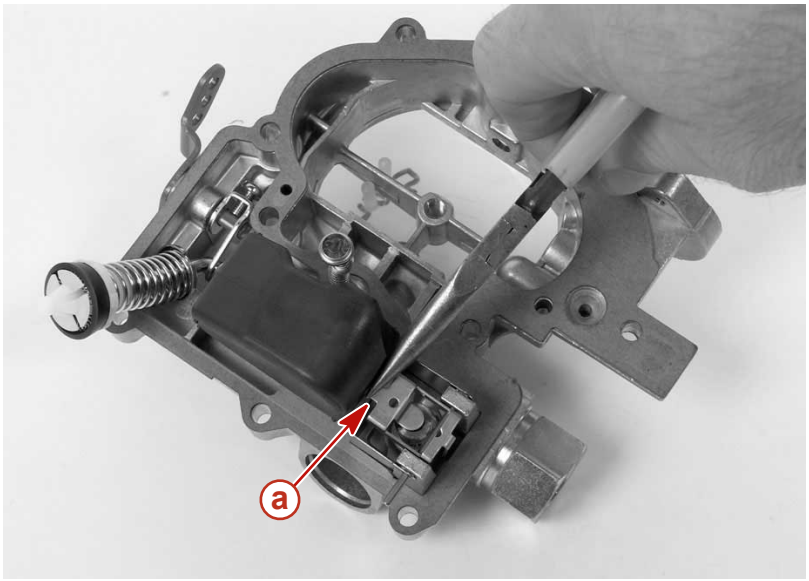


9968

a - Measurement

Needle type	Measurement
Spring loaded inlet needle	9 mm (11/32 in)

3. Bend float arm up or down at point shown to obtain specified dimension.



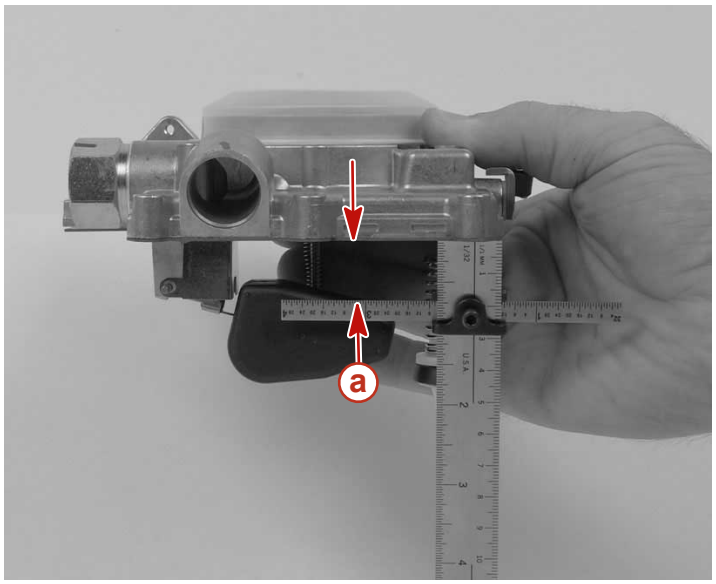
9975

a - Bend float arm at this point

4. Visually check float alignment after adjustment.

FLOAT DROP

1. Hold air horn right side up to allow float to hang free.
2. Measure float drop using **Universal Carburetor Gauge (91-36392)**. Measure from gasket (air horn) to "dot" on float.



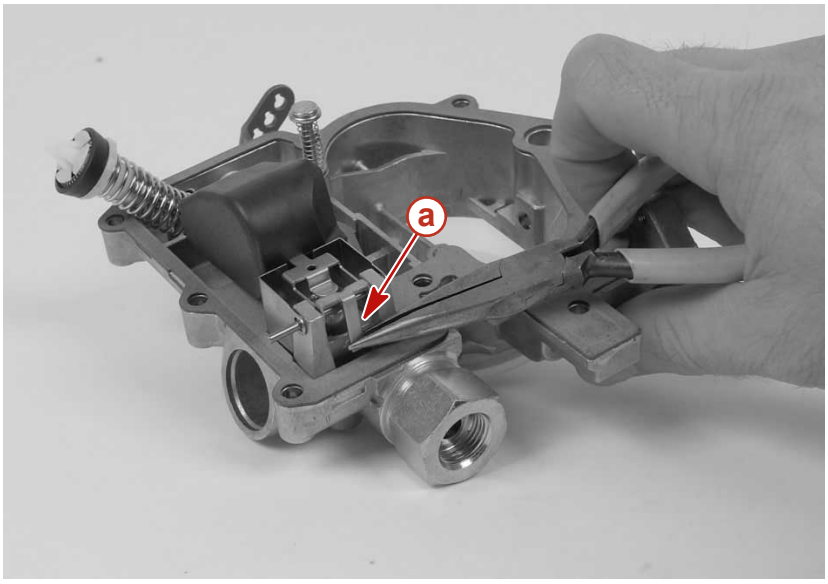
9977

a - Measurement

Needle type	Measurement
Spring loaded inlet needle	24 mm (15/16 in).

Universal Carburetor Guage		
 9756	Measure dimensions on a carburetor.	91-36392

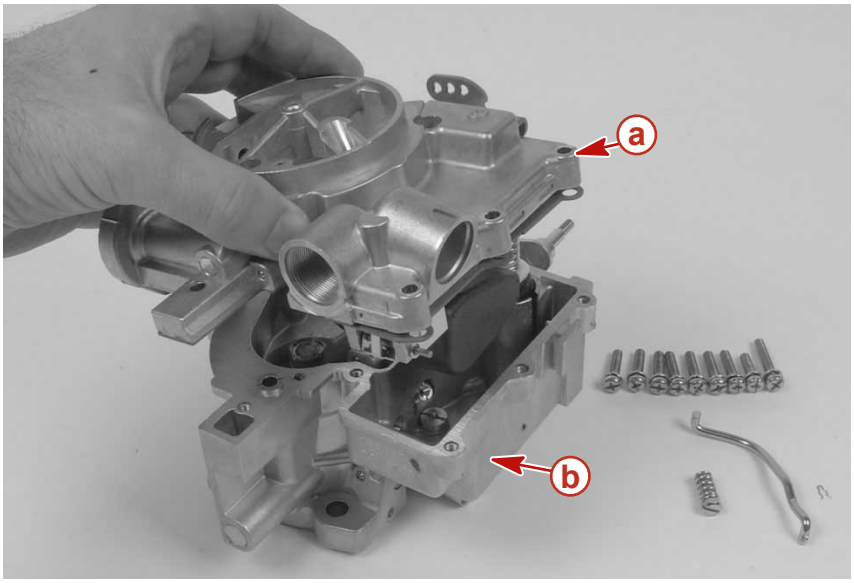
3. Bend float assembly tang, as shown, to obtain specified dimension.



9978

a - Float assembly tang

4. Recheck both float level and float drop.
5. Place air horn on float bowl, making sure the accelerator pump is correctly positioned in fuel well. Lower air horn straight down to install.

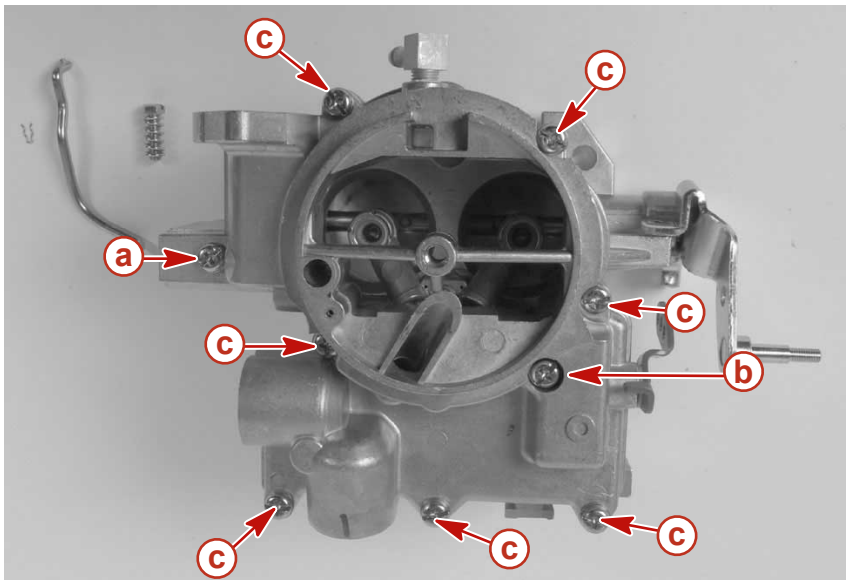


9543

a - Air horn assembly

b - Float bowl assembly

6. Install seven medium, one short, and one long air horn attaching screws as indicated below. Torque screws.

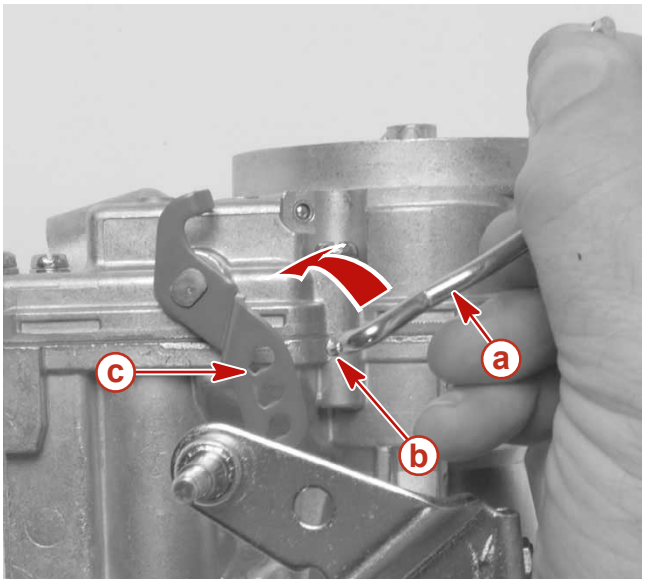


9581

a - Short screw (Gen 1 only) - 5M X 22mm
b - Long screw - 5M X 32mm
c - Screws - 5M X 25mm

Description	Nm	lb. in.	lb. ft.
Air horn attaching screws	3 - 6	27 - 51	

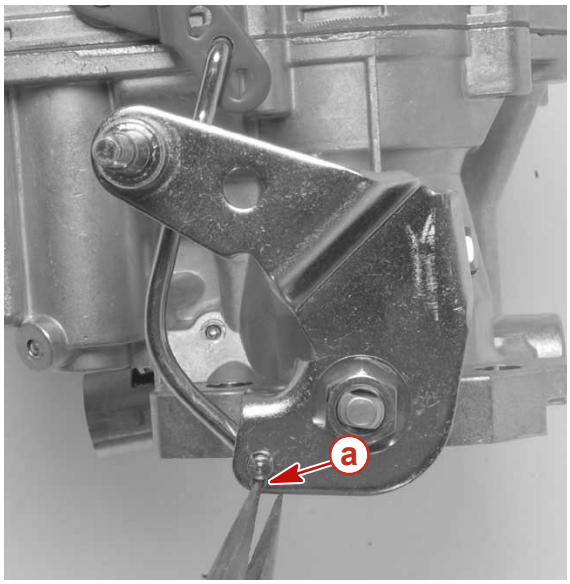
7. Align retaining ear on rod with slot in accelerator pump shaft, allowing rod to be inserted. Pivot rod around until aligned with throttle lever hole.



9585

a - Accelerator pump rod
b - Accelerator pump rod retaining ear
c - Retaining ear slot in accelerator pump shaft

8. Insert other end of accelerator pump rod into hole in throttle lever and secure with retainer clip.



9586

a - Retaining clip

9. Install fuel inlet filter nut, washers, spring, and filter, as outlined previously.

TKS MODULE

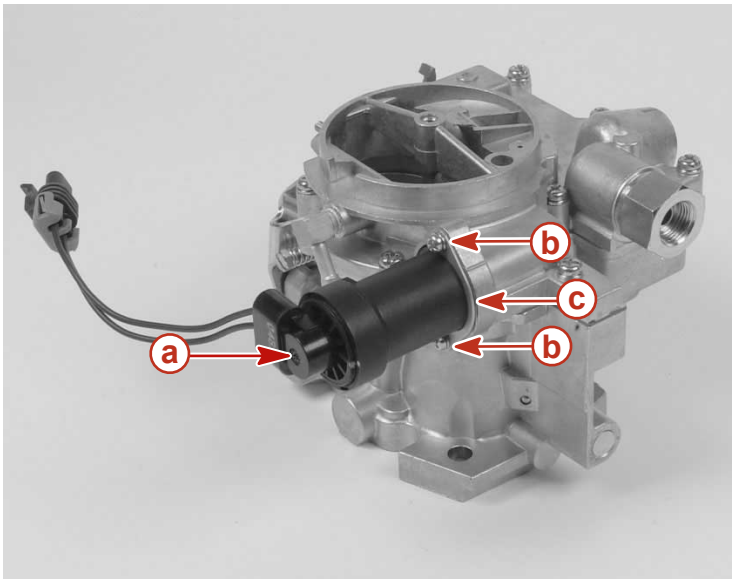
The TKS module is not a serviceable part. It is adjusted at the factory for proper performance. If the TKS module is not working properly, replace the unit.

1. Insert TKS module into carburetor body, being careful not to damage the O-ring.

9633

a - O-ring on TKS module

2. Place c-clip into position and torque screws. Use Loctite on threads.



9630

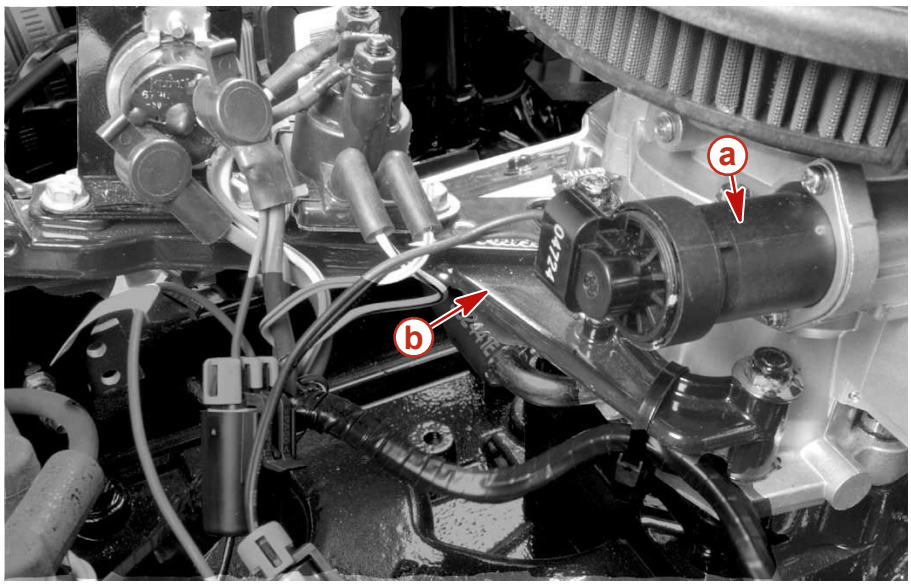
a - TKS module
b - Screws - 4M X 10mm
c -
d - C-clip

Description	Ncm	lb. in.	lb. ft.
TKS module C-clip screws	20	17.5	

Tube Ref No.	Description	Where Used	Part No.
66	Loctite 242 Threadlocker	TKS Module Screws	92-809821

Carburetor Installation

1. Thoroughly clean gasket surfaces and install new gaskets.
2. Place new carburetor base gasket on intake manifold.
3. **On 4.3L, 5.0L, and 5.7L models:** As the carburetor is being installed, replace the circuit breaker bracket on the rear of the carburetor.



9942

4. Install carburetor and secure with nuts and washers. Torque nuts.

Description	Nm	lb. in.	lb. ft.
Carburetor to manifold nuts	27		20

5. If fuel inlet filter nut was disturbed, remove, clean all threads with brush and carburetor cleaner or Quicksilver Leveler, and replace.
6. Connect fuel line to fuel inlet filter nut. Hold filter nut with wrench, torque fuel line fitting.

Description	Nm	lb. in.	lb. ft.
Fuel line nut to fuel inlet filter	24		18

7. Connect TKS module connector to appropriate connector on wiring harness.
8. Install throttle cable. Refer to SECTION 2 of the appropriate MerCruiser Service Manual.
9. Install flame arrestor, crankcase ventilation and PCV hose.
10. Reconnect battery cables to battery.
11. Ensure that water is supplied to cooling system.
12. Turn on fuel supply at tank.

⚠ WARNING

Electrical, ignition and fuel system components on Mercury Marine Power Products are designed and manufactured to comply with U.S. Coast Guard Rules and Regulations to minimize risks of fire or explosion.

Use of replacement electrical, ignition or fuel system components, which do not comply to these rules and regulations, could result in a fire or explosion hazard and should be avoided.

When servicing the electrical, ignition and fuel systems, it is extremely important that all components are properly installed and tightened. If not, any electrical or ignition component opening would permit sparks to ignite fuel vapors from fuel system leaks, if they existed.

13. Start engine.

⚠ WARNING

Be careful when working on fuel system. Gasoline is extremely flammable and highly explosive under certain conditions. Do not smoke or allow spark or open flame in area. Wipe up any spilled fuel immediately.

14. Check for gasoline leaks. If leaks exist, stop engine immediately and recheck connections.
15. Adjust idle speed and idle mixture screws when the engine is warm and in the base timing mode.

Fuel System

Section 5G - Diagnostics

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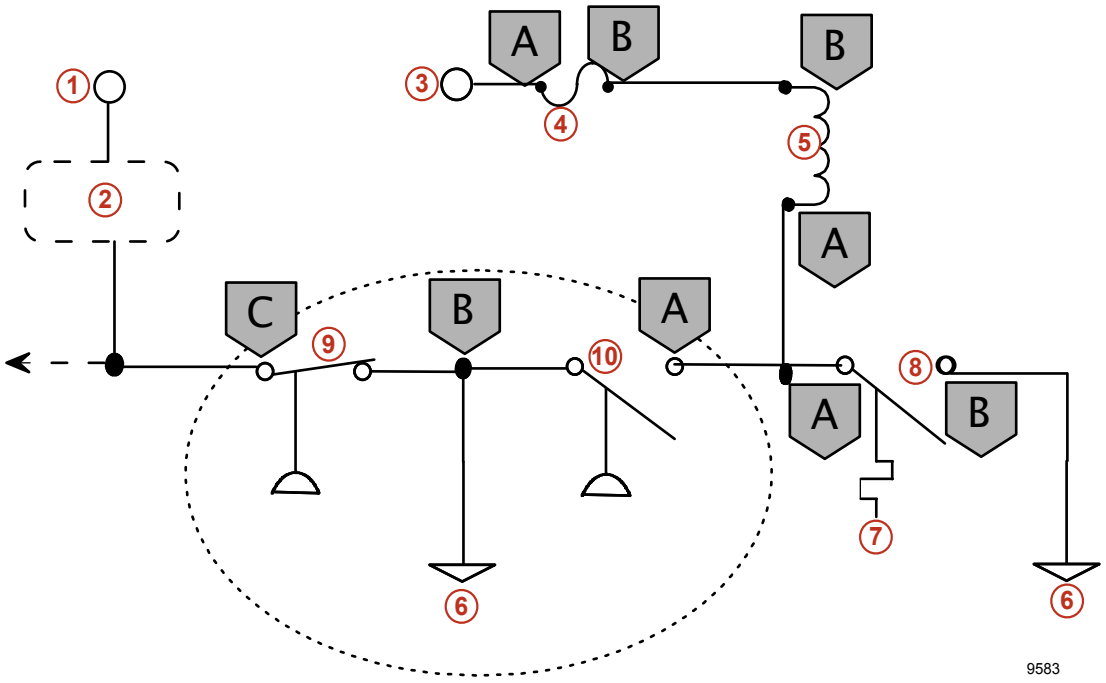
5
G

3.0L TKS General Diagnostics



3.0L TKS General Diagnostics

Callouts

1	12 volts switched	7	Engine coolant
2	Alarm horn	8	Engine coolant temperature switch (normally open)
3	12 volts	9	Engine oil pressure switch (normally closed)
4	Fuse (20 amp)	10	Engine oil pressure switch (normally open)
5	TKS Module (on carburetor)	11	Additional alarm switches
6	Ground	A, B, C	Connector terminal identification (See wiring diagram for wire colors)

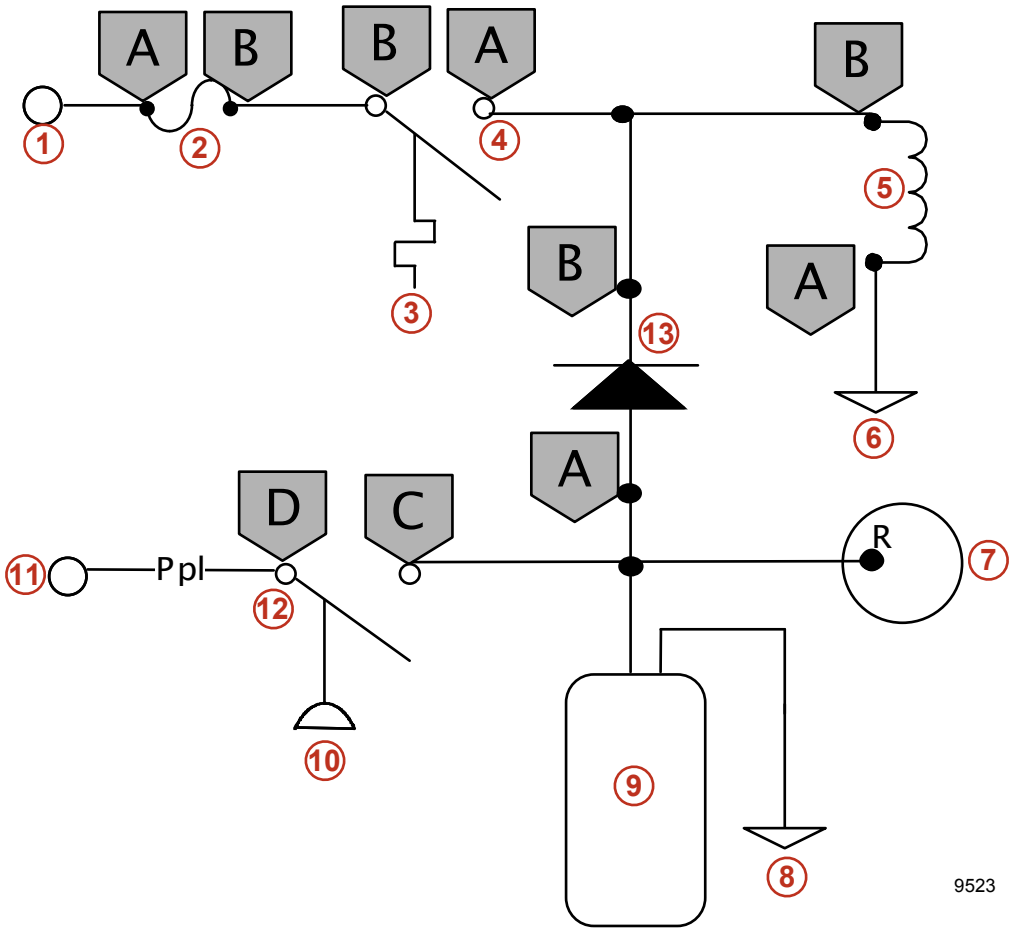
Component Characteristics

Component	Characteristic	Function
Engine oil pressure switch (normally closed)	Closed 0 to 4 PSI Open above 4 PSI.	Turns on alarm when oil pressure is below 4 PSI.
Engine oil pressure switch (normally open)	Open 0 to 4 PSI Closed above 4 PSI.	Turns on TKS heater when oil pressure is above 4 PSI.
Engine coolant temperature switch (normally open)	Open at room temp. Closes at 130°F Re-opens at 110°F.	Used to keep the TKS module energized when the engine is warm.

General Diagnostics Tests

3.0L Voltage Checks - With key switch OFF, and engine stopped.			
Remove connector to	**Test harness connector identification**	**Normal voltage**	**What to check if the voltage is not correct**
20A Fuse	Fuse "A"	12	Battery connection, Battery Switch set to on
TKS connector	TKS "B"	12	Fuse
N.O. Temperature Switch and Dual Oil Pressure Switch	Temperature Switch "A"	12	TKS Module
	Oil Pressuure Switch "A"	12	TKS Module

V6-V8 TKS General Diagnostics



V6-V8 TKS General Diagnostics

Callouts

1	12 Volts	8	Ground
2	Fuse (20 amp)	9	Fuel pump
3	Engine coolant	10	Oil pressure
4	Engine coolant temperature switch (normally open)	11	12 Volts, switched
5	TKS Module (on carburetor)	12	Engine oil pressure switch (normally open)
6	Ground	13	Diode
7	Starter engagement solenoid	A, B, C	Connector terminal identification (See wiring diagram for wire colors)

Component Characteristics

Component	Characteristic	Function
Engine oil pressure switch (normally open)	Open 0 to 4 PSI Closed above 4 PSI.	Turns on TKS heater when oil pressure is above 4 PSI.
Engine coolant temperature switch (normally open)	Open at room temp. Closes at 130°F, Re-opens at 110°F.	Used to keep the TKS module energized when the engine is warm.
Diode	Passes current in one direction	Allows the engine coolant temperature switch to energize the TKS module without energizing the fuel pump, ignition, gauges, etc.

General Diagnostics Tests

V6 - V8 Voltage Checks - With key switch OFF, and engine stopped, and engine cold			
Remove connector to	**Test harness connector identification**	**Normal voltage**	**What to check if the voltage is not correct**
20A Fuse	Fuse "A"	12	Battery connection, Battery Switch set to on
N.O. Temperature Switch	N.O. Temperature Switch "B"	12	Fuse
TKS Module	TKS Coil "B"	0	N.O. Temp Switch

V6 - V8 Voltage Checks - With key switch ON, and engine stopped, and engine cold			
Remove connector to	**Test harness connector identification**	**Normal voltage**	**What to check if the voltage is not correct**
N.O. Oil Press Sw	N.O. Oil Pressure Switch "D"	12	Battery connection, Battery Switch set to on, Key Switch

V6 - V8 Voltage Checks - With key switch ON, and engine operating			
Remove connector to	**Test harness connector identification**	**Normal voltage**	**What to check if the voltage is not correct**
Diode	Diode "A"	12	N.O. Oil Pressure Switch
20A Fuse and TKS module	TKS Coil "B"	12	Diode

TKS Fuel System Diagnostics

Troubleshoot the Fuel System

The TKS Carburetor is similar to other carbureted engines, and troubleshooting procedures will follow closely the procedures already established in the appropriate MerCruiser Service Manual. However, the TKS System will add these checks:

TEST POWER TO THE FUEL PUMP

1. Test that power is reaching the fuel pump when the key switch is turned on.
2. If the pump is not getting power, use the appropriate wiring diagram in Section 4E to trace power supply.
3. Inspect for chafed or broken wires or disconnected connectors. Repair or replace as necessary.

TEST TKS ENRICHMENT CIRCUIT

1. Test the TKS module plunger function as outlined in "TKS Module" in "Electrical Systems Diagnostics" in this section.

CLEAN CARBURETOR ENRICHMENT CIRCUIT

1. Inspect and clean the enrichment circuit in the carburetor as outlined in Section 5B of this manual.
2. Pay particular attention to the enrichment jet and related fuel pathways, ensuring that they are clear and free of damage or residual buildup.

Replacement Parts Warning

⚠ WARNING

Electrical, ignition and fuel system components on Mercury Marine Power Products are designed and manufactured to comply with U.S. Coast Guard Rules and Regulations to minimize risks of fire or explosion.

Use of replacement electrical, ignition or fuel system components, which do not comply to these rules and regulations, could result in a fire or explosion hazard and should be avoided.

When servicing the electrical, ignition and fuel systems, it is extremely important that all components are properly installed and tightened. If not, any electrical or ignition component opening would permit sparks to ignite fuel vapors from fuel system leaks, if they existed.

TKS Electrical System Diagnostics

Electrical System Diagnostics

Follow these tests in order. If these tests are all passed, the problem is not in the electrical portion of the TKS system.

TKS Coolant Temperature Switch

1. Test the coolant temperature switch as outlined in Section 6A of this manual.
2. Replace as necessary as outlined in Section 6A of this manual, as dictated by your engine.

TKS Oil Pressure Switch

1. Test the oil pressure switch as outlined in Section 3A of this manual.
2. Replace as necessary as outlined in Section 3A of this manual.

TKS Module

Follow these tests in order. If the TKS module passes these tests, the problem is elsewhere.

ELECTRICAL SUPPLY

1. Check the in-line fuse to the TKS module. Replace if faulty.
2. Use the wiring diagrams (Section 4E) to determine the wire colors for your particular application.
3. With a digital voltage ohmmeter (DVOM), check the voltage in the wires going to and from the TKS module connector on the wiring harness.
4. With the key switch on and engine running (oil pressure greater than 27 kPa (4 psi)), the positive wire (either Red / Purple or White) should indicate 12V.
5. With the key switch on and engine running (oil pressure greater than 27 kPa (4 psi)), the negative wire (either Black / Yellow or Black) should have continuity to ground (-).
6. If these conditions do not exist, correct electrical supply problem and retest.

HEATER FUNCTION

1. If TKS unit is getting power, turn on engine for 8-10 minutes.
2. Feel back of TKS module, (where wires enter the unit) with a finger.
3. The TKS unit should feel warm to the touch.
4. If the TKS module is not warm, replace TKS module as described in Section 5B.

TKS MODULE RESISTANCE CHECK

1. Disconnect TKS connector from wiring harness.
2. Measure the TKS module resistance.
3. Replace if out of specification.

TKS Module Resistance		
Ambient temperature	21° C (70° F)	35-45 Ohms
	-6.6 ° C (20° F)	55-70 Ohms

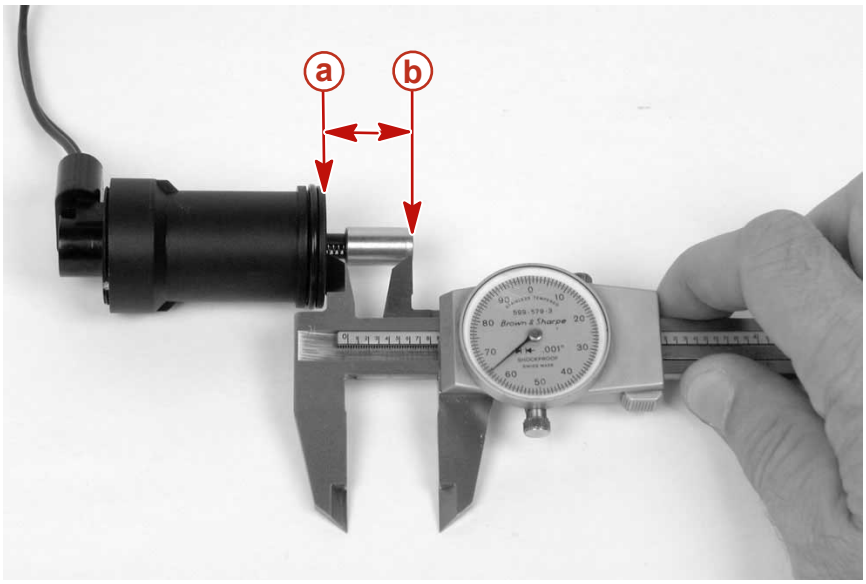
TKS MODULE BENCH TEST

⚠ WARNING

Be careful when working on fuel system. Gasoline is extremely flammable and highly explosive under certain conditions. Do not smoke or allow spark or open flame in area. Wipe up any spilled fuel immediately.

1. Close fuel shut off valve.
2. Remove TKS module from the carburetor as outlined in Section 5B, and detach connector.
3. Inspect brass plug and rubber disc in end of plunger. Replace TKS unit if worn or damaged.
4. Attach TKS connector terminals to a 12V power supply.

5. With TKS module cold, the plunger should extend 20.6 mm to 22.2 mm (13/16 in to 7/8 in) from the face of the TKS module.



10133

a - Face **b -** End of plunger

6. As the TKS module warms up, the plunger should start to extend.
7. After 8-10 minutes, the plunger should extend approximately 31.75 mm (1 1/4 in) from the face of the TKS module.
8. If plunger does not extend, or extend fully, replace the TKS module as described in Section 5B.
9. Reinstall TKS Module as outlined in Section 5B.

Cooling Systems

Section 6A - Cooling System

Table of Contents

6
A

Raw Water Cooled

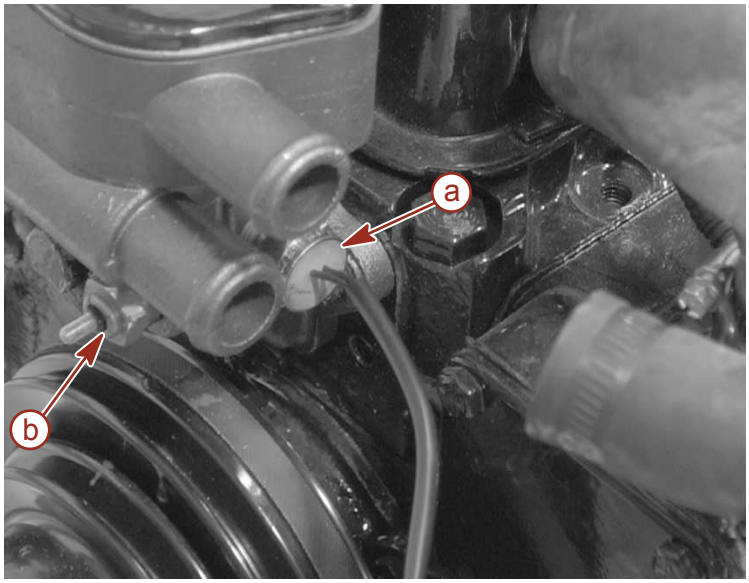
3.0L TKS Thermostat Housing Removal

1. Disconnect negative battery cable.
2. Drain coolant from cylinder block and exhaust manifolds.
3. Remove hoses from the thermostat housing.
4. Disconnect the temperature audio warning switch (production model), temperature sending unit, and TKS temperature switch.
5. Remove the thermostat housing and related components.

Replace the 3.0L TKS Temperature Switch

NOTE: *This procedure can be done with the thermostat housing either on or off the engine. If the thermostat housing is off, connect the connector after the housing has been installed and the hoses are secured. (See Install the TKS Thermostat Housing)*

1. Remove the lower hose on the port side of the thermostat housing, if attached.
2. Disconnect the TKS temperature switch connector from the wiring harness.
3. Remove the TKS temperature switch.



9454

Retrofit thermostat housing shown, production similar - both hoses removed for clarity

a - TKS Temperature switch

b - Temperature sending unit (for temperature gauge)

4. Replace with a new TKS temperature switch unit.
5. Connect the lower hose to the thermostat housing, if procedure is being done with the housing on the engine.
6. Connect the temperature sending unit connector to the wiring harness.
7. Refill cooling system as necessary.

Test the TKS Coolant Temperature Switch

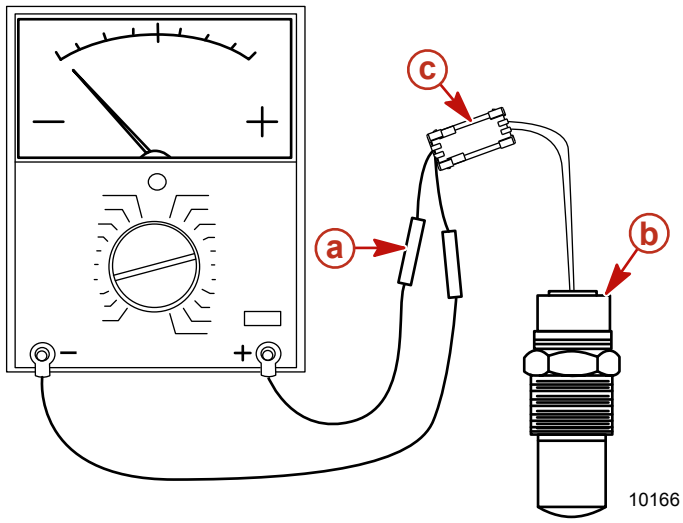
ON-ENGINE TEST

1. Allow engine and switch to cool.
2. When engine and switch reach 43º C ± 4º (110°F ± 8°), check continuity.
3. If there is continuity, replace switch.

4. Start engine and allow engine to reach 55ºC ± 4º (130°F ± 8°).
5. Disconnect coolant temperature switch connector and check for continuity again.
6. If there is no continuity, replace switch.

BENCH TEST

1. Connect an ohmmeter to the connector terminals of the coolant temperature switch.



a - Ohmmeter leads
b - Water temperature switch
c - Connector

2. Switch should read no continuity.

⚠ WARNING

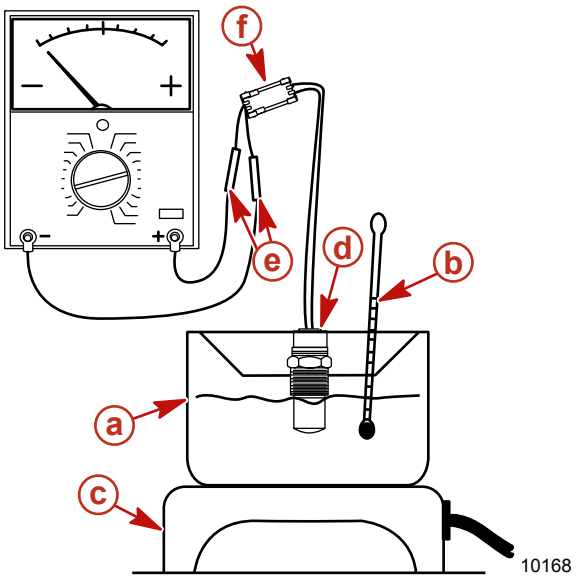
The following test involves the use of intense heat. Failure to follow appropriate procedures or warnings can cause burns which can result in severe personal injury. While performing the following test, observe these general precautions:

- **Wear personal protective clothing such as rubber gloves, a non-flammable apron, and eye protection - preferably full face shield or safety glasses.**
- **The appropriate heat source should only be electric. Heat source should be operated by a qualified person. Be sure to follow all instructions of the manufacturer of the heat source. The heat source should be checked each time it is used to be sure it is functioning properly.**
- **The thermometer used in the test should be a high- temperature thermometer with a maximum reading of at least 3005F (1505C). Under no circumstances should the operator allow temperatures to exceed test specifications.**
- **Perform test only in a well ventilated area.**
- **Use a suitable container, such as metal, to hold the sand. Avoid use of glass containers unless the operator first confirms for himself/herself that the glass container is an appropriate high-temperature vessel.**
- **Because the components will reach high temperatures do not handle materials or components until completely cooled.**

⚠ WARNING

Use only clean, dry sand such as used for general sandblasting purposes. Use of sand containing contaminants could result in hazards such as fire, short circuiting, hot-spots, or other hazards.

3. Follow these instructions:
   a. With an ohmmeter connected as shown and using a suitable container, thermometer and heat source, suspend sender with tip in sand.



a - Suitable container
b - Thermometer
c - Heat source
d - Water temperature switch
e - Ohmmeter leads
f - Connector

   b. Heat sand and observe temperature on thermometer.
   c. As temperature rises, switch will close and ohmmeter will indicate continuity. Refer to chart below for specifications.

Switch condition	Temperature
Closes	54º ± 4º C (130º ± 8º F)
Opens	43º ± 4º C (110º ± 8º F)

4. Turn heat source off. Allow sand to cool. Note thermometer reading to ensure switch "opens" up at the specified temperature.
5. Replace switch if switch fails to either open or close within the specified temperatures.

Install the TKS Thermostat Housing

1. Clean gasket surfaces on thermostat housing and intake manifold.
2. Position new thermostat housing gasket on intake manifold.
3. Install thermostat housing and torque bolts and lockwashers.

Description	Nm	lb. in.	lb. ft.
Thermostat housing bolts	41		30

4. Connect hoses to thermostat housing. Tighten hose clamps securely.
5. Connect TKS temperature sending unit connector to TKS harness.
6. **Production models:** Connect temperature alarm switch to temperature alarm switch connector.
7. Connect temperature sending unit connector to temperature sending unit connector.

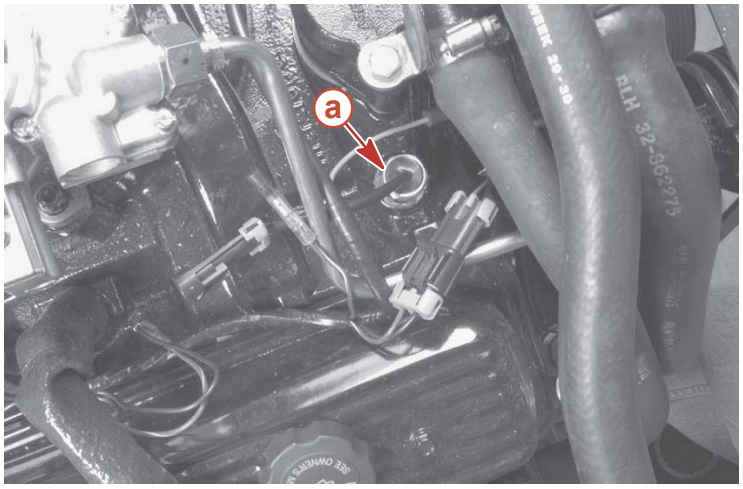
⚠ CAUTION

Overheating from insufficient cooling water will cause engine and drive system damage. Ensure that there is sufficient water always available at water inlet holes during operation.

8. Fill cooling system (See "Filling Closed Cooling Section" in the Service Manual.
9. Connect battery.
10. Start engine and inspect for leaks.

Replace the V-6 and V-8 TKS Temperature Switch

1. Locate the TKS temperature switch on the front of the intake manifold.
2. Disconnect the TKS temperature switch connector from the wiring harness.
3. Unscrew the TKS temperature switch unit from the thermostat housing.



9616

TKS Temperature switch, typical

a - TKS Temperature switch

4. Replace with new TKS temperature switch unit.
5. Connect the temperature sending unit connector to the wiring harness.
6. Refill cooling system as necessary.

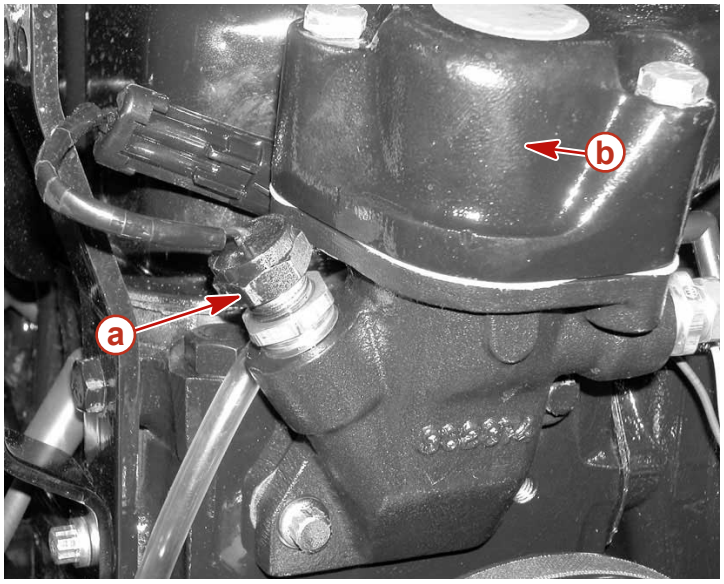
Close Cooled

Replace the Close Cooled 3.0L TKS Temperature Switch Unit

NOTE: *This procedure can be done with the thermostat housing either on or off the engine. If the thermostat housing is off, connect the connector after the housing has been installed and the hoses are secured. (See Install the TKS Thermostat Housing)*

1. Disconnect the TKS temperature switch connector from the wiring harness.

2. Unscrew the TKS temperature switch unit from the thermostat housing.



10132

Closed cooled temperature switch

a - TKS Temperature switch **b -** Thermostat housing

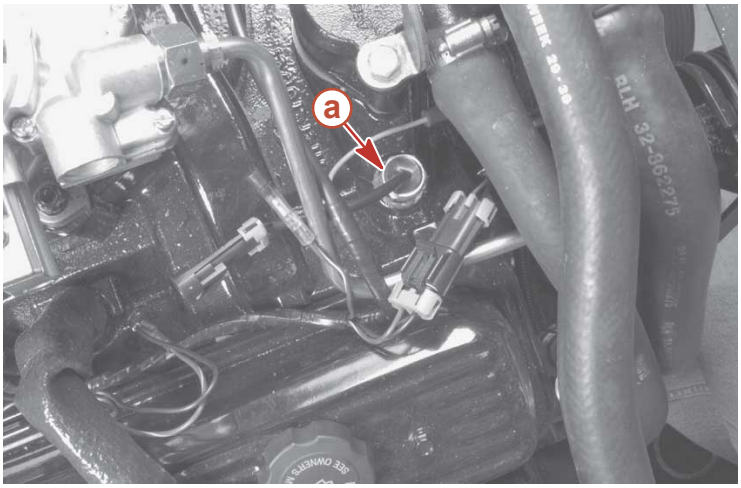
3. Replace with new TKS temperature switch unit.
4. Connect the temperature switch connector to the wiring harness.
5. Refill cooling system as necessary.

TEST THE TKS COOLANT TEMPERATURE SWITCH

Follow the procedure outlined in **"Test the TKS Coolant Temperature Switch"** in the **Raw Water Cooled** part of this section.

Replace the Close Cooled V-6 and V-8 TKS Temperature Switch

1. Locate the TKS temperature switch on the front of the intake manifold.
2. Disconnect the TKS temperature switch connector from the wiring harness.
3. Unscrew the TKS temperature switch unit from the thermostat housing.



9616

TKS Temperature switch, typical

a - TKS Temperature switch

4. Replace with new TKS temperature switch unit.

5. Connect the temperature switch connector to the wiring harness.
6. Refill cooling system as necessary.