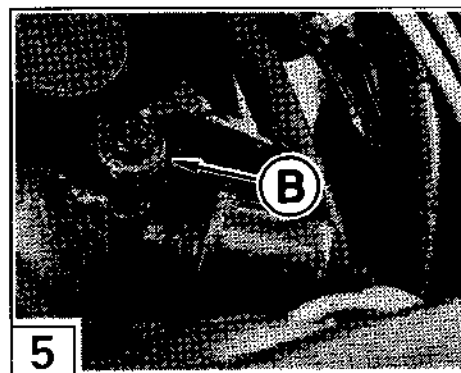
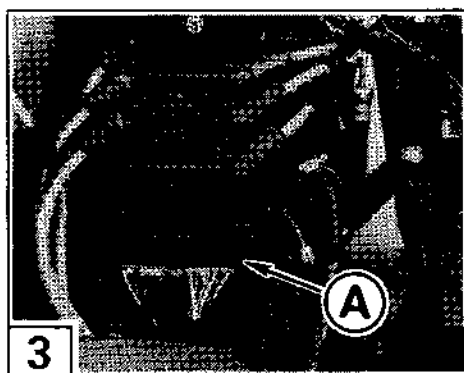




3 Ignition Coil Packs

One coil pack is mounted at the rear of the intake manifold. The coil pack contains three dual-firing coils, each having a minimum of 34 KV output. The coil pack is mounted directly on top of the ignition module.

3 Ignition Module

The ignition module (A) is located beneath the coil pack. It sends and receives electrical impulses by means of a 14-pin connector. It monitors and controls all *OMC Spitfire™* E.E.M. functions as noted in Description. The module must be grounded to operate. Modules are not interchangeable; they have specific firing orders, RPM ranges and spark advance curves. They are stamped with a part number and the litre displacement for identification.

4 Engine Knock Sensor

The knock sensor is located at the rear of the starboard cylinder head. It senses engine knock so that the ignition module can alter the spark advance curve accordingly and prevent engine damage.

5 Oil Pressure Switch

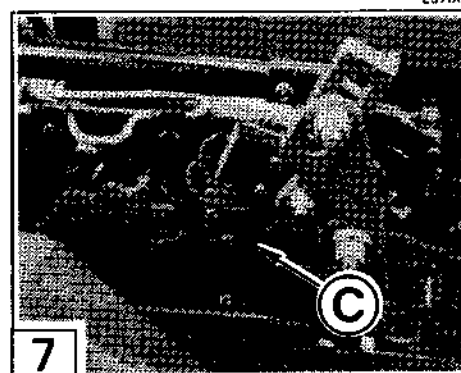
An oil pressure switch (B) is located with the oil pressure gauge sender. It's one of two switches that will trigger *S.L.O.W.* circuit operation and an audible warning signal.

6 Water Temperature Switch

The water temperature switch is mounted on top of the engine water pump separately from the water temperature gauge sender. It's the second of two switches that will activate *S.L.O.W.* circuit operation and an audible warning signal.

7 Shift Interrupt Switch

The shift interrupt switch (C) is attached to the engine shift bracket. When the switch is activated, the ignition module will disrupt spark to ease shifting loads.



8 12.5 Amp Circuit Breaker

This protection device[®] is located on the engine shift bracket. It's in the B+ circuit between the ignition switch and the ignition module.

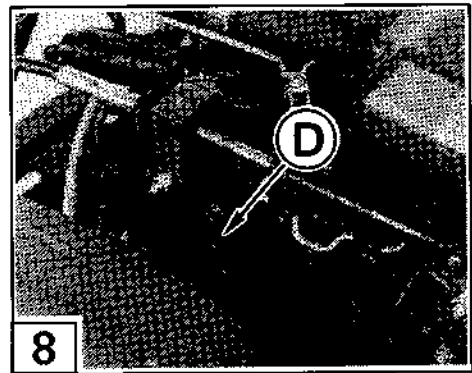
Ignition System Operation

When the key switch is turned on, 12 volt current passes through an engine-mounted 12.5 amp circuit breaker to a 14-pin connector to activate the ignition module. The module then transmits 12 volt current to the sensor assembly on the bellhousing.

The sensor assembly is composed of two Hall Effect sensors with a permanent magnet positioned between them. 12 volts are constantly present at the sensor when the key switch is on. The sensor assembly is grounded through the ignition module and operates in conjunction with the timing ring to deliver spark timing signals to the module.

The magnetic lines of force acting on the sensor assembly are controlled by the "windows" (gaps) of the timing ring. The timing ring is a stainless-steel disc having two raised concentric rings, and is attached to the crankshaft behind the engine coupler. The inner ring is solid except for a single window. The outer ring has windows equal to one-half the number of engine cylinders (e.g. an 8 cylinder engine would have 4 windows). The inner window slightly overlaps one outer window, and is the key for triggering the ignition module to fire No. 1 cylinder and its companion cylinder on start-up. After start-up, all cylinders are fired only by the outer ring windows.

The timing ring rotates as the engine is cranking, and alternately passes vanes (a solid section of the ring) and windows past the Hall sensors. One portion of the ring, that has the overlap between the inner and one outer window, allows both Hall sensors to be activated at the same time. The ignition module recognizes this dual input as the start-up firing signal.

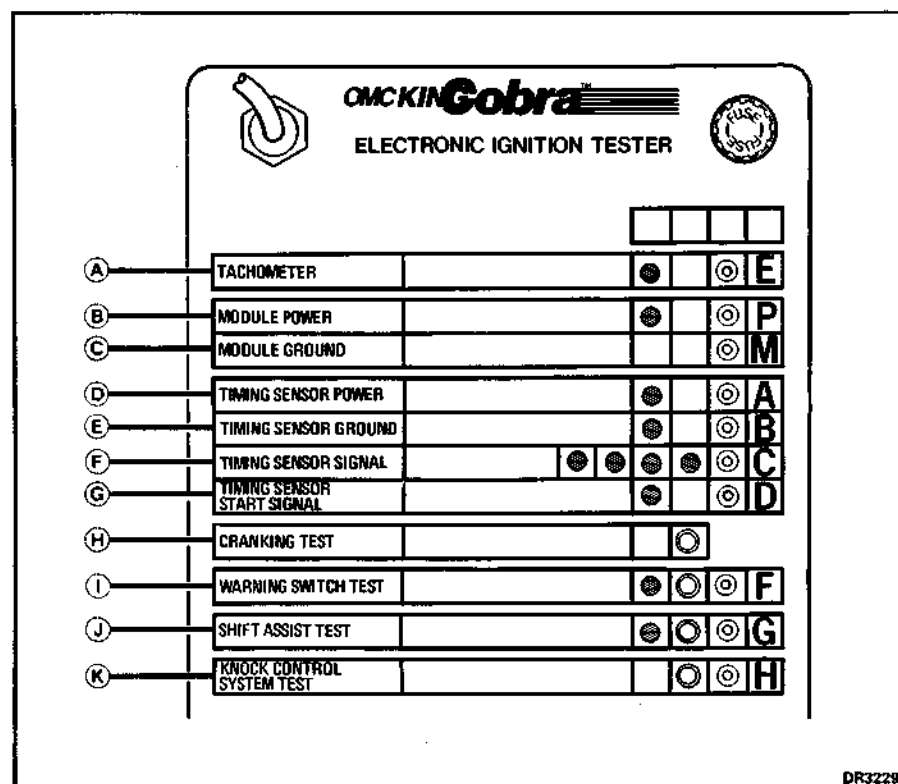


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When the module receives a timing signal, either as a single or dual input, it does not immediately fire the spark plugs. Instead, the module starts counting down a predetermined time period, and then fires two spark plugs (360° opposite in the firing order) simultaneously. Initial engine timing, $10^\circ \pm 2^\circ$, is programmed into the module along with the total spark advance curve. No. 1 cylinder and its companion cylinder always fire first, and the other cylinders follow in their proper sequence. All cylinders, except on start-up, are triggered solely by the outer timing ring, and by only one Hall sensor.

After start-up, the timing ring continues to rotate until the next window appears. As long as a solid portion of the ring is between the magnet and Hall sensor, the sensor is inactive. When a window appears, the permanent magnets field of force turns on the sensor. Upon receiving input, the module begins counting down to firing the next pair of cylinders in the firing order. When the window clears the sensor and a vane appears, the sensor is shut off.

As RPM increases, the windows pass through the sensor at a faster pace. The module senses this increase and translates this into advanced spark firing, much like the centrifugal advance in a conventional distributor. If the RPM is dropping, the reverse occurs. This cyclic firing action occurs throughout the operating RPM range, and continues until the ignition switch is shut off.



OTC Electronic Ignition Tester, P/N OMC D3200 - Operating Instructions

The Owatonna Tool Co. Electronic Ignition Tester is designed to provide quick visual checks of major *OMC Spitfire™* E.E.M. circuits to determine if they're functioning properly. It also allows isolation checks of individual circuits by attaching voltmeters, ohmmeters and tachometers to the Tester. The OTC Tester is a necessary tool when troubleshooting performance problems related to the *OMC Spitfire* E.E.M. system. Order this instrument from Owatonna Tools; it is not available from your OMC Distributor.

Following is a description of each of the Tester circuits, and what they indicate when connected to a **properly functioning engine**. Remove the 14-pin connector at the ignition module. Connect the OTC Tester in series between the connector and module. The Tester will be inactive until the boat's ignition switch is turned on.

(A) Tachometer - indicates module providing correct tach signal

- Key On - LED indicator will be off
- Engine Cranking - LED will flash
- Engine Running - LED will flash

Absence of LED light while cranking or running would indicate loss of tach signal from module.

Operational Symptom: Tachometer will not function.

(B) Module Power - indicates module is receiving battery power

- Key On - LED will light
- Engine Cranking - LED will flicker
- Engine Running - LED will be lit constantly

Absence of LED light in any situation would indicate module is not receiving battery current, or module is not grounded.

Operational Symptom: Engine cranks, but won't start. Engine quits while running.

(C) Module Ground

No LED Indicators - test point is used to verify module ground as described in Troubleshooting the *OMC Spitfire* E.E.M. System. Perform this test if Module Power LED does not light.

Operational Symptom: Engine cranks, but won't start. Engine quits while running.

(D) Timing Sensor Power - indicates module is supplying voltage to sensor

- Key On - LED will light
- Engine Cranking - LED will go out
- Engine Running - LED will be lit constantly

Absence of LED light in any situation indicates module is not supplying power to timing sensor.

Operational Symptom: Engine cranks, but won't start. Engine quits while running.

(E) Timing Sensor Ground - indicates correct sensor ground at module

- Key On - LED will light
- Engine Cranking - LED will stay lit constantly
- Engine Running - LED will stay lit constantly

Absence of LED light indicates module has lost sensor ground.

Operational Symptom: Engine cranks, but won't start. Engine quits while running.

(F) Timing Sensor Signal - indicates module is receiving sensor/timing ring spark plug firing signal

- Key On - LED's will be off
- Engine Cranking - LED's flash slowly and sequentially (3 for V-6's, 4 for V-8's)
- Engine Running - LED's flash faster or slower as RPM increases or decreases

Absence of flashing LED's while cranking or running indicates sensor or sensor wiring failure.

Operational Symptom: Engine cranks, but won't start. Engine quits while running.

(G) Timing Sensor Start Signal - indicates module is receiving sensor/timing ring start (No. 1 cylinder firing) signal

- Key On - LED will be off
- Engine Cranking - LED will flash very slowly
- Engine Running - LED flashes faster or slower as RPM increases or decreases

Absence of flashing LED while cranking or running indicates sensor or sensor wiring failure.

Operational Symptom: Engine cranks, but won't start. Engine misfires while running.

Ⓜ Cranking Test

No LED indicators - test button pushed to prevent engine starting when performing cranking only tests.

① Warning Switch Test - checks operation of module *S.L.O.W.* circuit

- Key On - LED will light (because of oil pressure switch)
- Engine Cranking - LED will stay lit unless oil pressure increases sufficiently to turn off LED
- Engine Running - LED will be off, if oil pressure and water temperature are normal
- Engine Running Above 2800 RPM and Button Pushed - LED will go on; button will simulate activation of a warning switch, and trigger ignition module *S.L.O.W.* circuit operation after an initial 5 second delay

Operational Symptom: audible warning horn will sound (if so equipped), and if engine speed is above 2800 RPM, *S.L.O.W.* circuit will drop engine to this RPM.

Ⓜ Shift Assist Test - checks operation of module shift assist circuit

- Key On - LED will be off
- Engine Cranking - LED will be off
- Engine Running - LED will be off
- Engine Running and Button Pushed - LED will go on; button will simulate activation of shift assist switch, and trigger ignition module interrupt circuit

Constant LED light indicates that shift assist switch is closed, or wiring circuit is grounded.

Operational Symptom: Unit will shift hard; ignition will not interrupt when assist switch is activated.

Ⓜ Knock Control System Test - checks operation of module knock control circuit

There are no LED indicators. Tests performed with the two test buttons will require use of a variable advance timing light.

- **First Test Button** - simulates loss of signal from knock sensor (e.g. disconnected wire, or defective knock sensor), and triggers module to default to the 86 AKI octane spark curve. See *Troubleshooting the OMC Spitfire E.E.M. System* for test procedure.
- **Second Test Button** - simulates a knock signal and triggers module to retard spark advance in programmed steps. See *Troubleshooting the OMC Spitfire E.E.M. System*.

Operational Symptom: Engine will knock (ping) heavily when engine is under load, regardless of gasoline octane rating.

Troubleshooting the *OMC Spitfire*™ E.E.M. System

Following are diagnostic steps used to isolate problems in the various operational modes of the *OMC Spitfire* Electronic Engine Management System. These tests would be conducted as necessary to solve a particular problem, and should not be part of a normal tune-up procedure. The following equipment will be needed:

- OTC Electronic Ignition Tester, p/n OMC D3200
- Ohmmeter
- Voltmeter
- Timing Light with variable timing advance feature
- Timing Light Adaptor for use with dual-fire ignition coils
- Tachometer
- Kilovolt Meter
- Jumper Leads with Amphenol pins
- OMC Test Propeller P/N 985007 (right-hand rotation), or P/N 985626 (left-hand rotation)

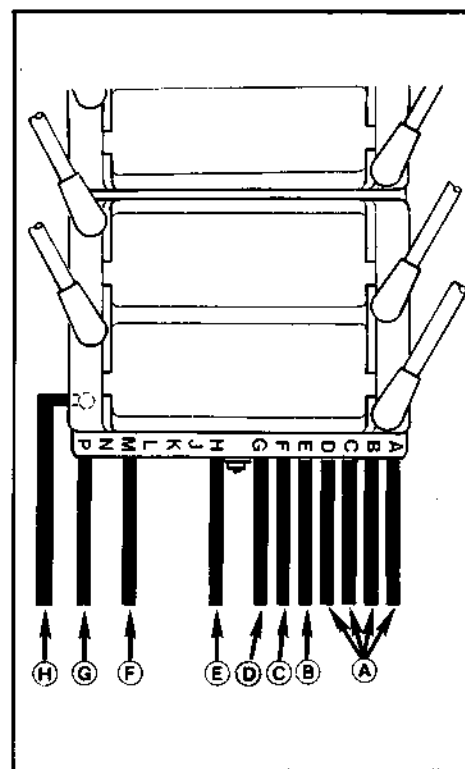
Note All running tests must be conducted with the correct test propeller to properly load engine. Do not perform tests with a flushing adaptor.

Ignition System Spark Test

1. Disconnect the No. 1 spark plug lead at the plug.
2. Connect a kilovolt meter to the plug lead, and following the meter manufacturer's instructions, test for 25 KV spark output at cranking RPM.

Test Results:

1. Spark output is okay, but engine fails to start. Check:
 - a. Does engine have correct ignition module?
 - b. Condition of spark plugs
 - c. Fuel System
 - d. Engine Compression
2. Weak spark, check:
 - a. Resistance of coil circuits with ohmmeter. See **Testing of Coil Packs**.

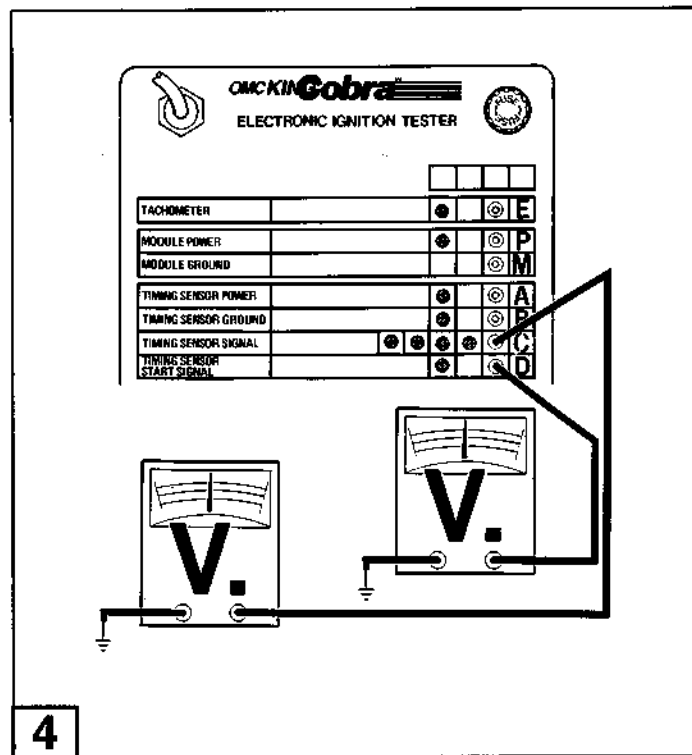
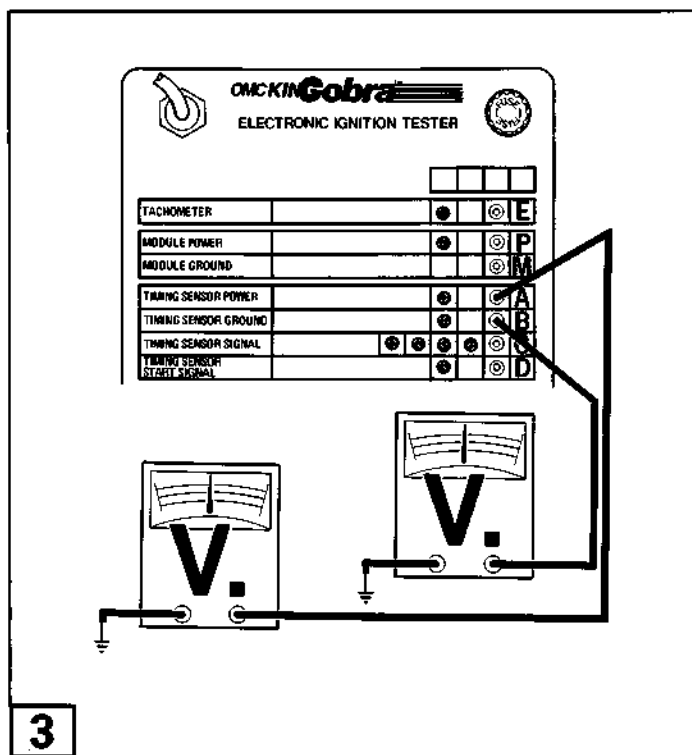


***OMC Spitfire*™
E.E.M. Circuits**

- Ⓐ Timing Sensor
- Ⓑ Tachometer
- Ⓒ S.L.O.W.
- Ⓓ Shift Assist
- Ⓔ Knock Sensor
- Ⓕ Ground
- Ⓖ 12V to Module



Cobra/eng



Crankshaft Sensor Circuit Tests

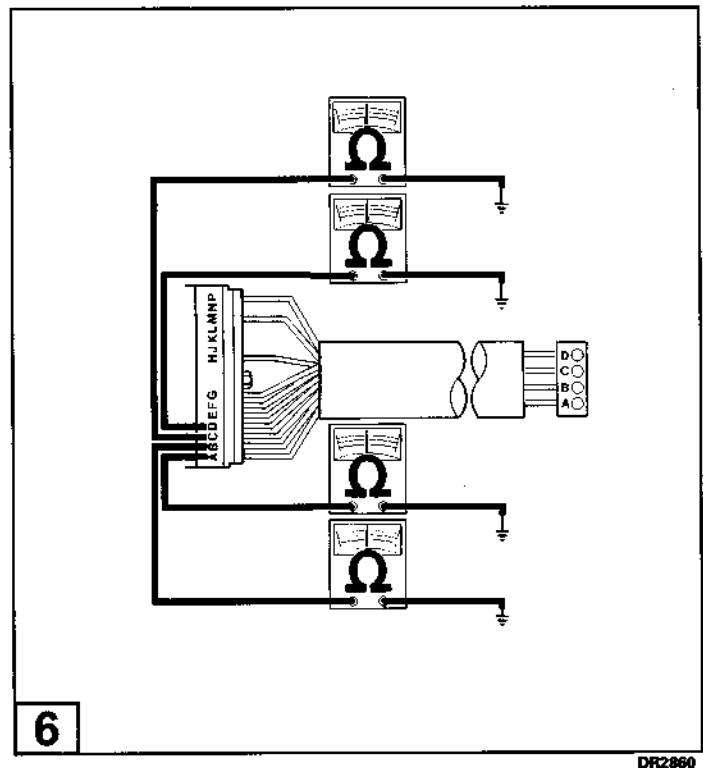
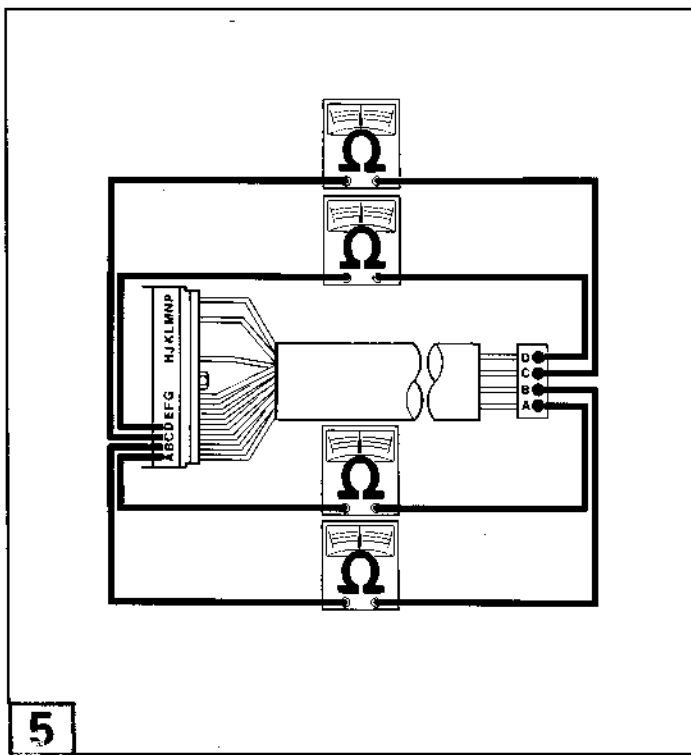
Disconnect the 14-pin connector at the ignition module. Connect an OTC Electronic Ignition Tester in series between the module and 14-pin connector. Before conducting the following tests, turn **KEY ON** to check that test point "P" LED indicator is lit, indicating module is receiving 12 volts. Perform all tests with a voltmeter connected between the appropriate test point and engine ground.

3 1. With **KEY ON**, check for voltage at test point "A". This reading should be approximately 2 volts less than a voltage check made at test point "P".

3 2. With **KEY ON**, check for ZERO (0) to 0.5 volts at test point "B".

4 3. With **KEY ON**, check for 2.5 to 5.0 volts (high) or 0.0 to 1.0 volts (low) at test point "C". **Slowly** bump engine over (do not crank continuously). Voltage should alternate from high to low 3 times per revolution (on 6 cylinder engines), or 4 times per revolution (on 8 cylinder engines).

4 4. With **KEY ON**, check for an identical 2.5 to 5.0 volts (high) or 0.0 to 1.0 volts (low) at test point "D". Again, **slowly** bump engine over. Voltage should be high for most of one revolution (345°), and should go low only one time for a short period (15°).

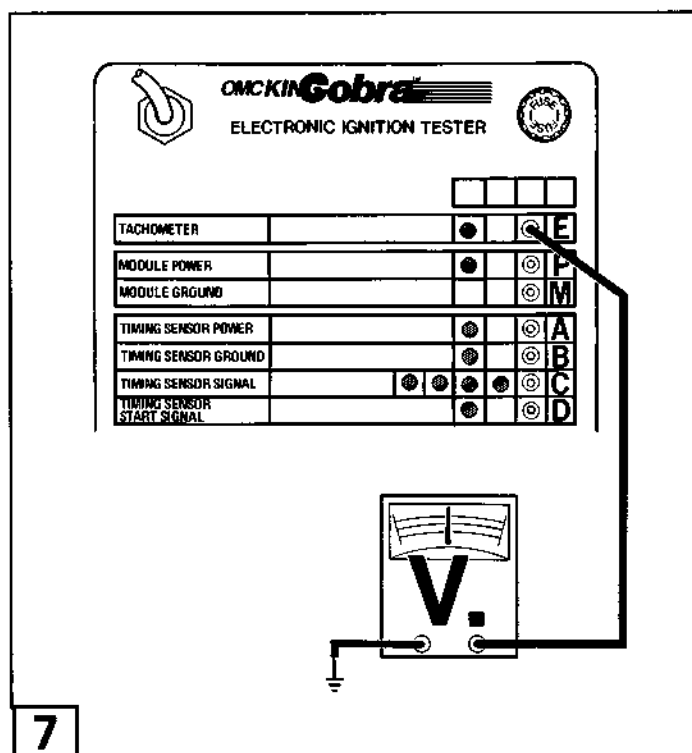


TURN KEY OFF. If engine fails **ANY** of tests No. 1 thru 4, remove the OTC Electronic Ignition Tester from the engine cable 14-pin connector. Remove 4-pin connector from sensor on bellhousing and perform the following tests:

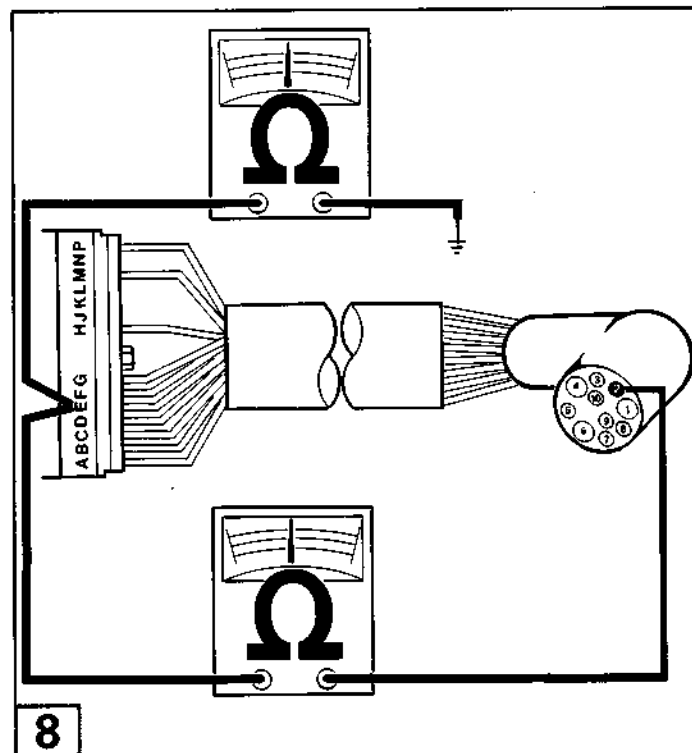
- 5** 5. Use an ohmmeter set on the high ohm scale and check for continuity between pin A of the 14-pin connector, and pin A of the 4-pin connector. Repeat these continuity checks between pins B, C, and D of the 14-pin and 4-pin connectors.
- 6** 6. Use an ohmmeter set on the high ohm scale and check for grounded circuits between pins A, B, C, D and engine ground.

If tests No. 1 thru 4 are failed, but tests No. 5 and 6 are passed, replace the crankshaft sensor. If either tests No. 5 or 6 are failed, replace the wiring harness then repeat tests No. 1 thru 4.

Note Check sensor for damage. If sensor probes show signs of contact, sensor may have been improperly positioned when installed, or timing ring on crankshaft may be bent or distorted. Timing ring vanes must be true within 0.015 in. (0,38 mm).



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Tachometer Circuit Tests

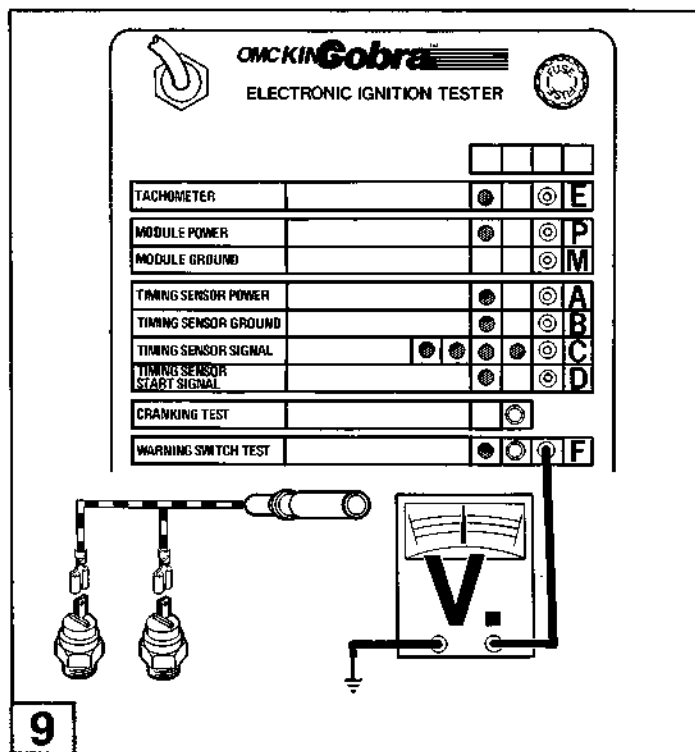
Disconnect the 14-pin connector at the ignition module. Attach an OTC Electronic Ignition Tester in series with the 14-pin connector and the module. Before performing the following tests, turn **KEY ON** to check that test point "P" LED indicator is lit, indicating module is receiving 12 volts.

7 1. Connect a voltmeter between test point "E" and engine ground. With **KEY ON**, check for 1.0 - 1.5 volts less than battery voltage (high) and 0.0-1.0 volts (low). **Slowly** bump engine over. Voltage should alternate from high to low 3 times per revolution (for 6 cylinder engines) or 4 times per revolution (for 8 cylinder engines). A grounded tachometer, or grounding of pin "E", will not disable the ignition system.

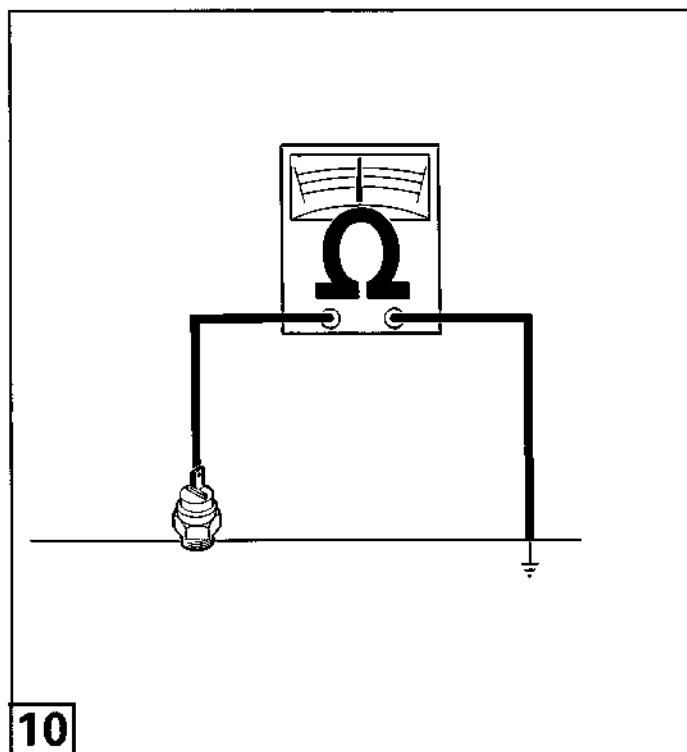
Go on to test No. 2 if there is no voltage at test point "E". If 12 volts is present, but there is no high-low variation when engine is bumped over, replace the module. If module passes test No. 1, problem lies with tachometer or in wiring from engine to dash.

8 2. Remove OTC Tester from engine cable 14-pin connector. Set an ohmmeter on the high ohm scale and check for continuity between pin "E" of the 14-pin engine cable connector, and receptacle No. 2 of the main harness plug. Make a second ohmmeter check for a grounded circuit by checking between pin "E" and engine ground.

If main wire harness fails either of the checks in test No. 2, replace the wire harness and repeat test No. 1.



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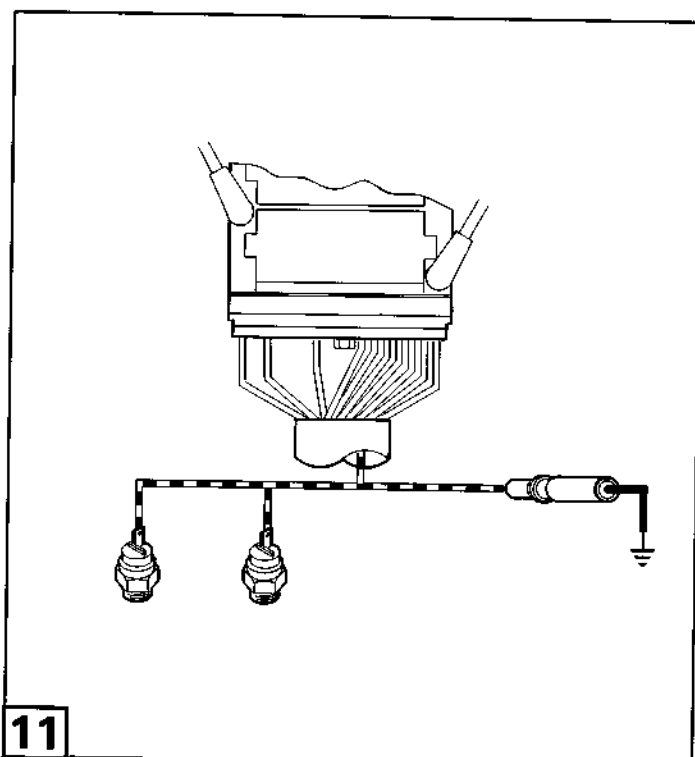
S.L.O.W. Circuit - Static Tests

Disconnect the 14-pin connector at the ignition module. Attach an OTC Electronic Ignition Tester in series between the 14-pin connector and the module. Before performing the following tests, turn **KEY ON** to check that test point "P" LED indicator is lit, indicating module is receiving 12 volts.

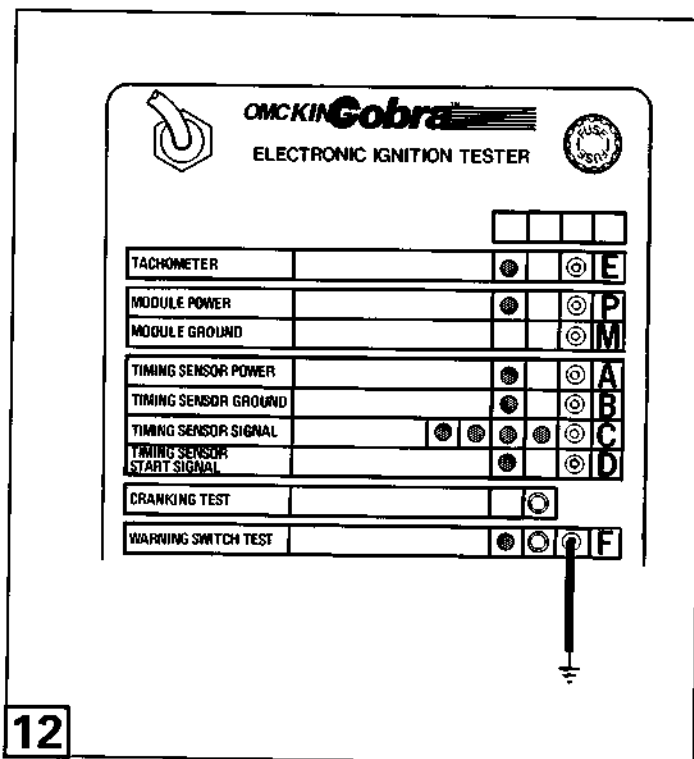
9 1. Disconnect the wiring harness at the oil pressure switch (blade terminal), the water temperature switch (blade terminal), and at the warning horn connector (single pin Amphenol connector). Connect a voltmeter between test point "F" and engine ground. With **KEY ON**, check for 0.0-1.0 volts at test point "F" when the oil pressure and water temperature switch leads are grounded one at a time to the engine block. Go on to tests No. 2 and 3 if wire harness passes this test. Replace wire harness if you fail to get the specified readings.

10 2. Set an ohmmeter on the high ohm scale and check for an open circuit (NO continuity) between water temperature switch terminal and engine block. Replace switch if meter shows continuity. If meter shows an open circuit (NO continuity), an additional switch test is necessary. Perform sender immersion test specified elsewhere in this chapter under **Oil and Water Sending Units**. If sender passes immersion test, problem lies with gauge or wiring to dash.

10 3. Set an ohmmeter on the high ohm scale and test for continuity between oil pressure switch terminal and engine block. Replace switch if there is no continuity. If switch tests okay, perform additional switch test described under **Running Test** that follows.



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S.L.O.W. Circuit - Running Tests

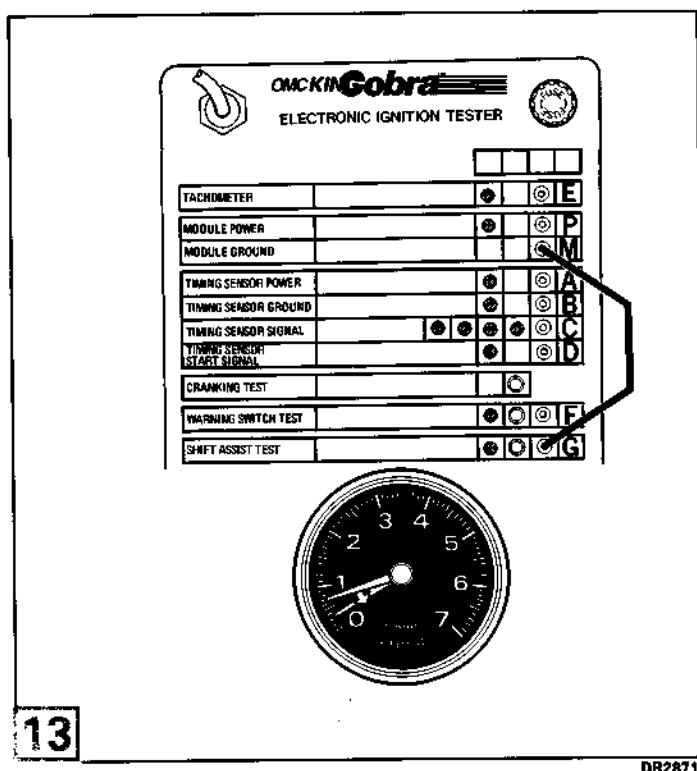
10 1. Disconnect wire harness lead from oil pressure sender (blade terminal). With **ENGINE RUNNING** at idle, use an ohmmeter on the high ohm scale to check for an open circuit (NO continuity) between the oil pressure switch terminal and the engine block. If switch passes this test, and has passed previous check described under **Static Test**, problem lies with gauge or wiring to dash. Attach sender lead after completing test.

11 2. Install the proper test wheel on the drive, and disconnect the single pin Amphenol connector on the warning horn lead. Run the engine at 3500 RPM in forward gear, and ground the Amphenol connector to the engine block. The engine RPM should drop to 2800 RPM at a rate of 200 RPM per second after an initial 5 second delay. Go on to test No. 3 if engine fails to drop RPM.

Note If test is performed with engine below 2800 RPM, engine speed will not drop. Make sure test is performed in gear at the specified RPM for accurate results. Tests may be performed on the water using a propeller; however, since engine cover may be removed for this test, **appropriate safety precautions must be taken to prevent personal injury as boat speed decreases when S.L.O.W. is activated.**

12 3. Again run the engine at 3500 RPM in forward gear. Use a jumper lead and ground test point "F" to the engine block. This will activate the S.L.O.W. circuit after an initial 5 second delay.

If engine RPM now drops as required, the warning horn/S.L.O.W. circuit wiring harness should be replaced, and test No.2 repeated. If engine still fails to drop RPM, module should be replaced. Shut engine off to reset S.L.O.W. circuit.



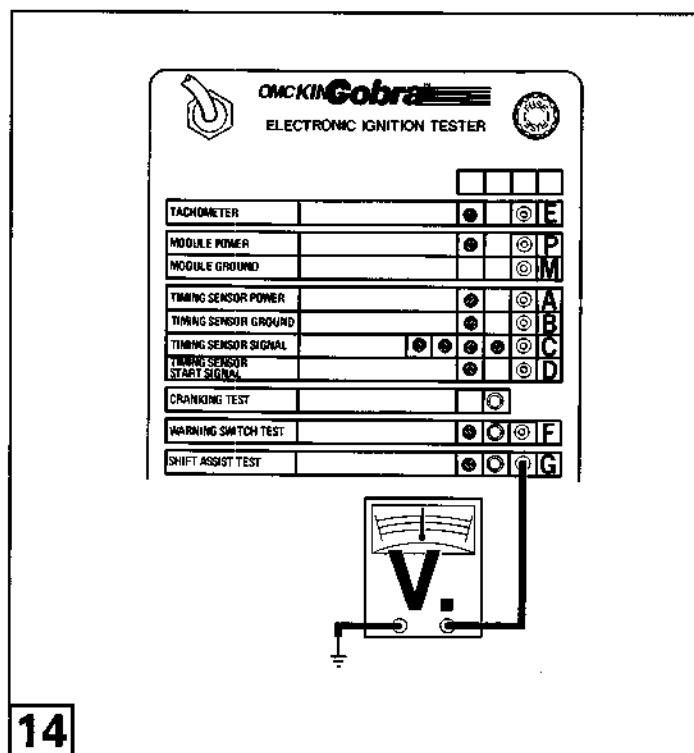
Shift Assist Circuit - Running Tests

Disconnect the 14-pin connector at the ignition module. Attach an OTC Electronic Ignition Tester in series between the 14-pin connector and the module. Before performing the following tests, turn **KEY ON** to check that test point "P" LED indicator is lit, indicating module is receiving 12 volts.

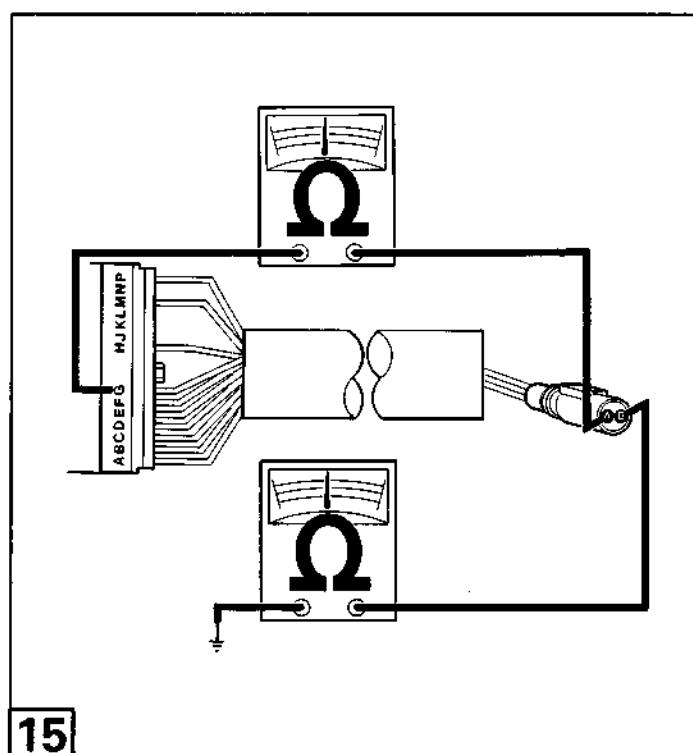
1. Install the correct test wheel on the drive. Run engine at 700 RPM in gear, and close (actuate) the shift assist switch. With switch held closed, engine will misfire for 1-2 seconds, then return to normal operation. If the ignition fails to interrupt, go on to test No. 2.

13 2. Use a jumper wire and connect test point "G" to test point "M". This will activate the shift assist circuit. Engine will misfire for 1-2 seconds, then return to normal operation.

If ignition still fails to interrupt, module should be replaced. If ignition interrupts as specified, conduct the following static tests to isolate problem in switch or wiring.



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Shift Assist Circuit - Static Tests

14 1. Connect a voltmeter between test point "G" and engine ground. Turn **KEY ON** and check for 2.5-5.0 volts when the shift assist switch is open (NOT actuated).

14 2. Close shift assist switch (depress button) and check for 0.0-1.0 volts.

If voltage is not as specified in tests No. 1 and 2, go on to test No. 3.

15 3. Disconnect OTC Tester from engine cable 14-pin connector. Disconnect two-way plug at the interrupter switch. Set an ohmmeter on the high ohm scale and check continuity of the assist circuit wiring from pin G to pin A. Next, check for continuity between interrupter switch connector pin B and engine ground.

Replace wiring if it fails either check in test No. 3, and repeat tests No. 1 and 2. **If wiring tests okay, use an ohmmeter on high ohm scale to test continuity of shift assist switch.** Replace switch if it fails test.

Knock Sensor Circuit Test

This test will require the use of a timing light with an adjustable advance feature, and a timing light adaptor suitable for use with dual-firing ignition coils. A shop tachometer can be connected to test point "E" if an OTC Electronic Ignition Tester is attached to the ignition module.

 **Wear Safety Glasses.** Install the proper test wheel on the drive. **Take care to avoid moving belts and pulleys while engine is running.** Run engine at 2000 RPM in neutral and observe timing mark on balancer with timing light. Engine timing should be figure shown in chart below. Repeatedly strike block or cylinder head near knock sensor with a medium size steel hammer. Timing will retard in steps as long as you continue to strike the engine. When striking stops, timing will stop retarding and remain at a reduced spark setting. Timing will retard to a base figure of 10° if knocking continues long enough. The second knock control button on the OTC tester simulates this check. When engine RPM is altered up or down by 50 RPM or more, spark advance will slowly increase up to the normal 2000 RPM setting specified below.

2000 RPM Timing Figure with 89 AKI Octane Gas

- 4.3 Litre HO (4V) *OMC Cobra* 14.5°

2000 RPM Timing Figure with 86 AKI Octane Gas

- 4.3 Litre HO (4V) *OMC Cobra* 11.5°

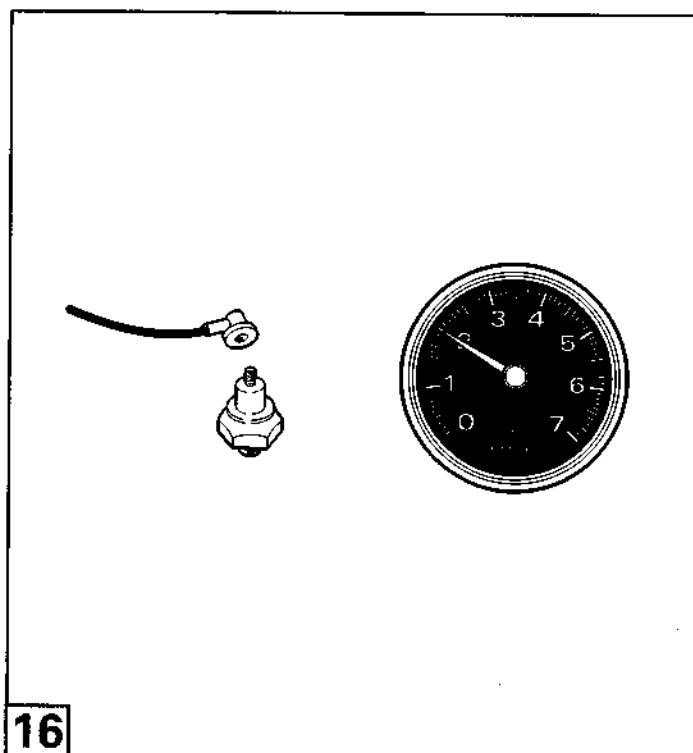
Note The knock control system is designed with proprietary circuitry which is self-adjusting for engine background noise. As the engine wears and gets looser, the knock sensing capability is not affected.

Disabled Knock Sensor Test

This test will require the use of a timing light with an adjustable advance feature, and a timing pick-up adaptor suitable for use with dual-firing ignition coils. A shop tachometer can be connected to test point "E" if an OTC Electronic Ignition Tester is attached to the ignition module.

1. Install the correct test wheel on the drive. Run the engine at 2000 RPM in neutral, and with a timing light, verify that the timing advance is correct for this RPM. Refer to the appropriate **2000 RPM Timing Figure** chart for the correct timing degrees.

16 2. With engine running at 2000 RPM, remove lead from knock sensor. The spark advance should retard to the figure listed below **Disabled Knock Sensor Timing Figure**. The first knock control button on the OTC tester simulates this check. If spark advance does not retard to the specified figure, reconnect the knock sensor lead and perform test No. 3.



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Note If engine being tested is running on 86 AKI gasoline, the timing shown at 2000 RPM may already be that shown in chart below, and will not retard when knock sensor lead is removed. Checking disabled knock sensor circuit will require running engine on a known 89 AKI gasoline.

3. Disconnect the 14-pin connector at the ignition module. Connect an OTC Electronic Ignition Tester in series between the 14-pin connector and the module. Run the engine at 2000 RPM in neutral, and push first knock sensor test button. This will activate the knock sensor circuit, and retard the timing to the figure specified in the **Disabled Knock Sensor Timing Figure** chart.

If engine fails to respond properly, replace the ignition module. If spark retards as specified, problem is with knock sensor or wiring. Using an ohmmeter on the high ohm scale, check wire continuity between pin H of engine cable connector and molded connector at knock sensor. If circuit checks okay, replace knock sensor.

Disabled Knock Sensor Timing Figure - 2000 RPM

Note When the knock sensor is disabled by removing wire or pushing first knock sensor test button, the ignition module defaults to the 86 AKI spark curve, and engine power decreases accordingly. Replace ignition module if spark advance does not retard to these figures:

- 4.3 Litre HO (4V) *OMC Cobra* $11.5^{\circ} \pm 1^{\circ}$

Cruising Speed Spark Advance Test

This is a test for the supplemental spark advance that occurs in the cruising speed range from 2200 RPM to 3400 RPM. This test will require the use of a timing light with an adjustable advance feature, and a timing light adaptor suitable for use with dual-firing ignition coils. A shop tachometer can be connected to test point "E" if an OTC Electronic Ignition Tester is attached to the ignition module.

1. Install the proper test wheel on the drive. Watch the timing mark with a timing light, and run the engine up to 2500 RPM in neutral. Record the degrees of advance seen at 2500 RPM in neutral. Record the degrees of advance seen at 2500 RPM.

Note Engine must maintain 2500 RPM, without a 50 RPM change, for 3-4 seconds before the advance will begin. An engine constantly fluctuating 50 RPM or more will not go into the cruising spark advance mode.

2. After a 3-4 second delay at this RPM, the spark advance will increase to the cruising speed advance. Refer to the following chart for the amount of **additional** (not total) advance.

Additional Cruising Speed Spark Advance

- 4.3 Litre HO (4V) OMC Cobra. 11°

The engine will stay at this increased advance until there is a 50 RPM or more change, either up or down. If engine speed remains in the cruising RPM range after the 50 RPM change, the module will again seek the cruising speed advance curve. When engine RPM moves out of the cruising RPM range, the module returns to normal operation, and seeks the best power spark advance for the present fuel, load and operating condition. If the spark timing fails to advance as specified, replace the ignition module.

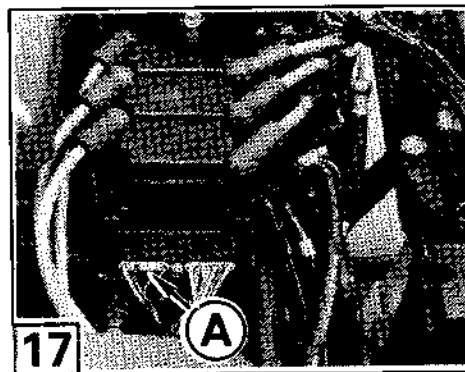
Coil Pack or Ignition Module Replacement

Removal

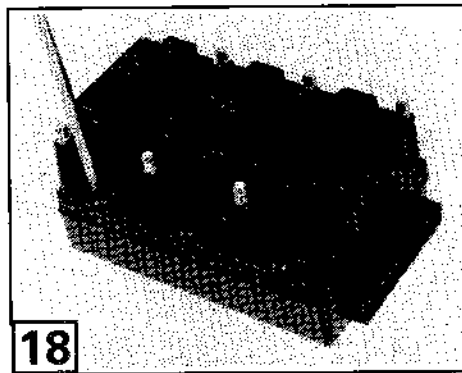
17 1. Unscrew and remove connector **A** from ignition module. Remove spark plug leads from coil pack.

2. Remove module and coil pack assembly from mounting bracket aft of carburetor.

18 3. Use a T25 torx screwdriver and unscrew ignition coil pack.



23451



23450

- 19** 4. Lift coil pack off module. Disconnect module leads from underside of coil pack. Make careful note of lead colors and which terminals they connect to. Remove and discard module gasket **(B)**.

Note If module leads are not attached to the correct coil terminals, the ignition firing order will be disrupted, and engine will exhibit an erratic firing or no-start condition.

Testing Coil Pack

- 20** 1. Set an ohmmeter on the low ohm scale, and check the primary resistance of the coils at the tabs underneath them. Proper resistance is $.7 \text{ ohms} \pm .1 \text{ ohm}$. If any coil in the pack fails this test, replace the entire pack.

- 21** 2. Set an ohmmeter on the high ohm scale, and check the secondary resistance of each coil at the terminals on top of the coil. Proper resistance is 11,000-13,000 ohms. If any coil in the pack fails this test, replace the entire pack.

3. Check for an open circuit between any primary tab under the coil, and any secondary terminal on top of the coil. Meter should give an infinity (∞ - **no continuity**) reading. If test shows any resistance value, replace coil pack.

Testing Ignition Module

The ignition module is a solid-state component and cannot be checked with normal test instruments. Replace the module if it fails the specific tests described under Troubleshooting the *OMC Spitfire* E.E.M. System. Modules are stamped with a part number and the liter displacement for identification. Do not install the wrong module.

Installation

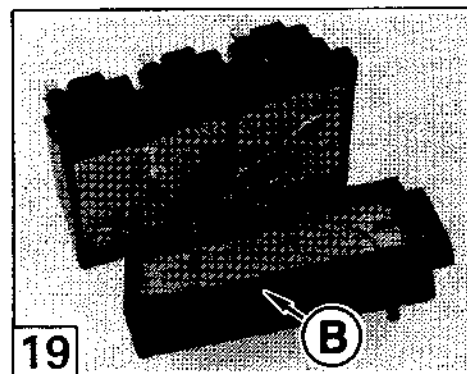
- 19** **22** 1. Install a new gasket **(B)** on module. Make correct terminal connections underneath coil pack.

- ① Blue Leads
- ② Blue/Black Stripe Lead
- ③ Green/Black Stripe Lead
- ④ Yellow/Black Stripe Lead

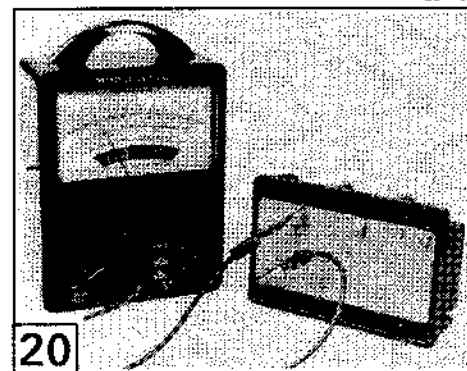
- 18** 2. Place coil pack on module. Install screws and tighten securely.

3. Install coil pack and module assembly on engine mounting bracket. Tighten nuts securely.

- 17** 4. Attach 14-pin connector **(A)** to module. Install spark plug leads on coil terminals making sure firing order is correct.



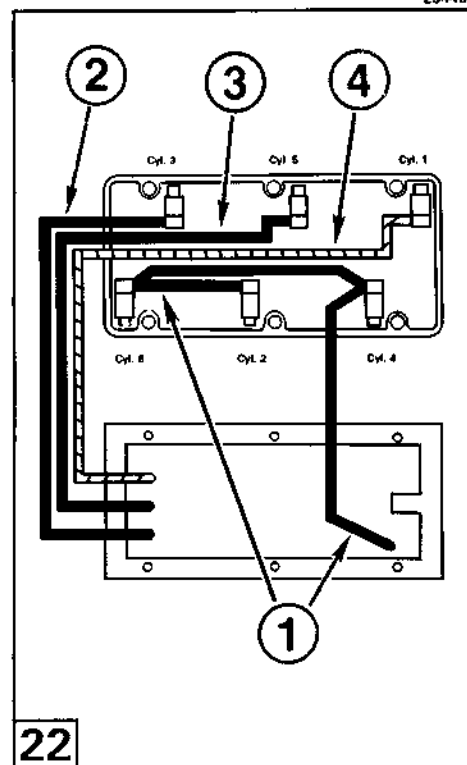
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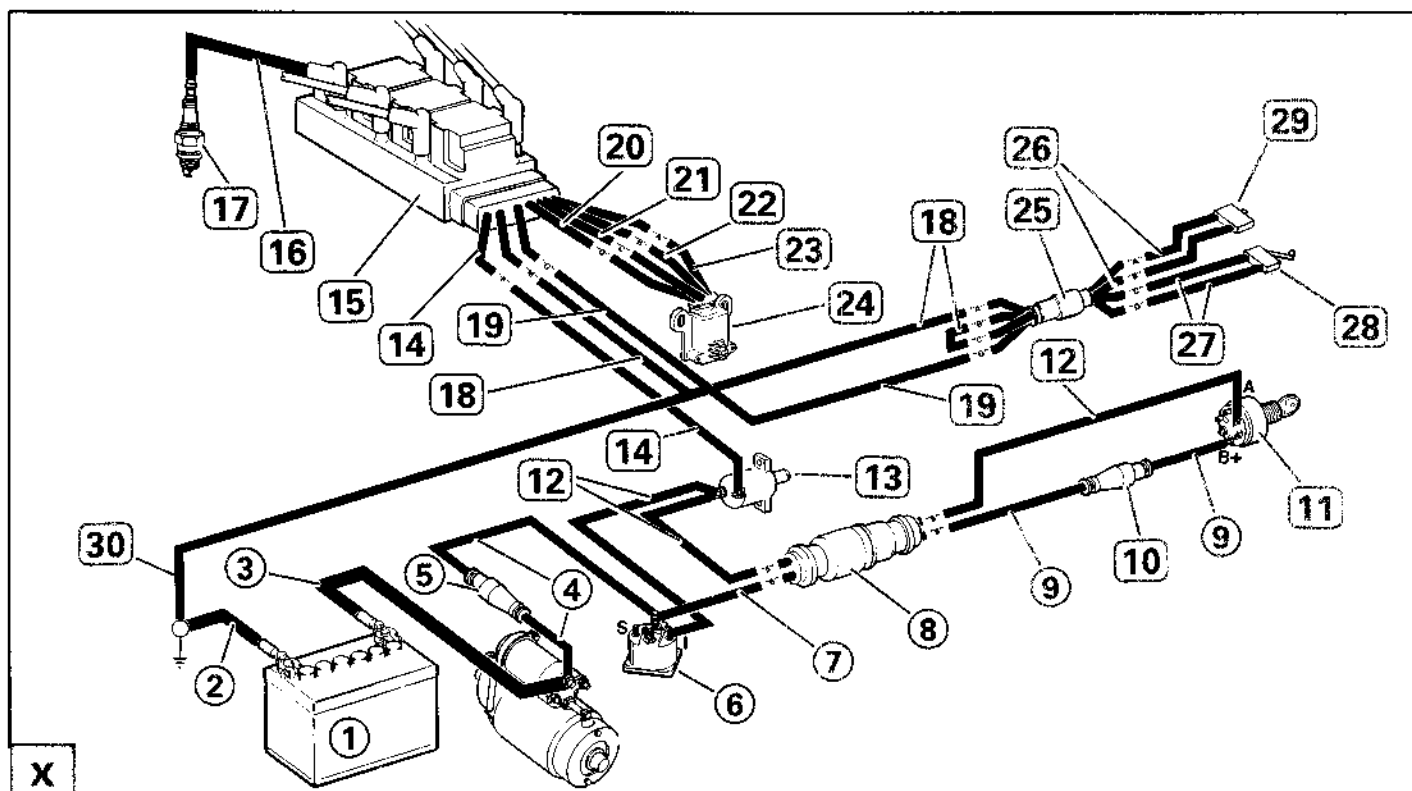
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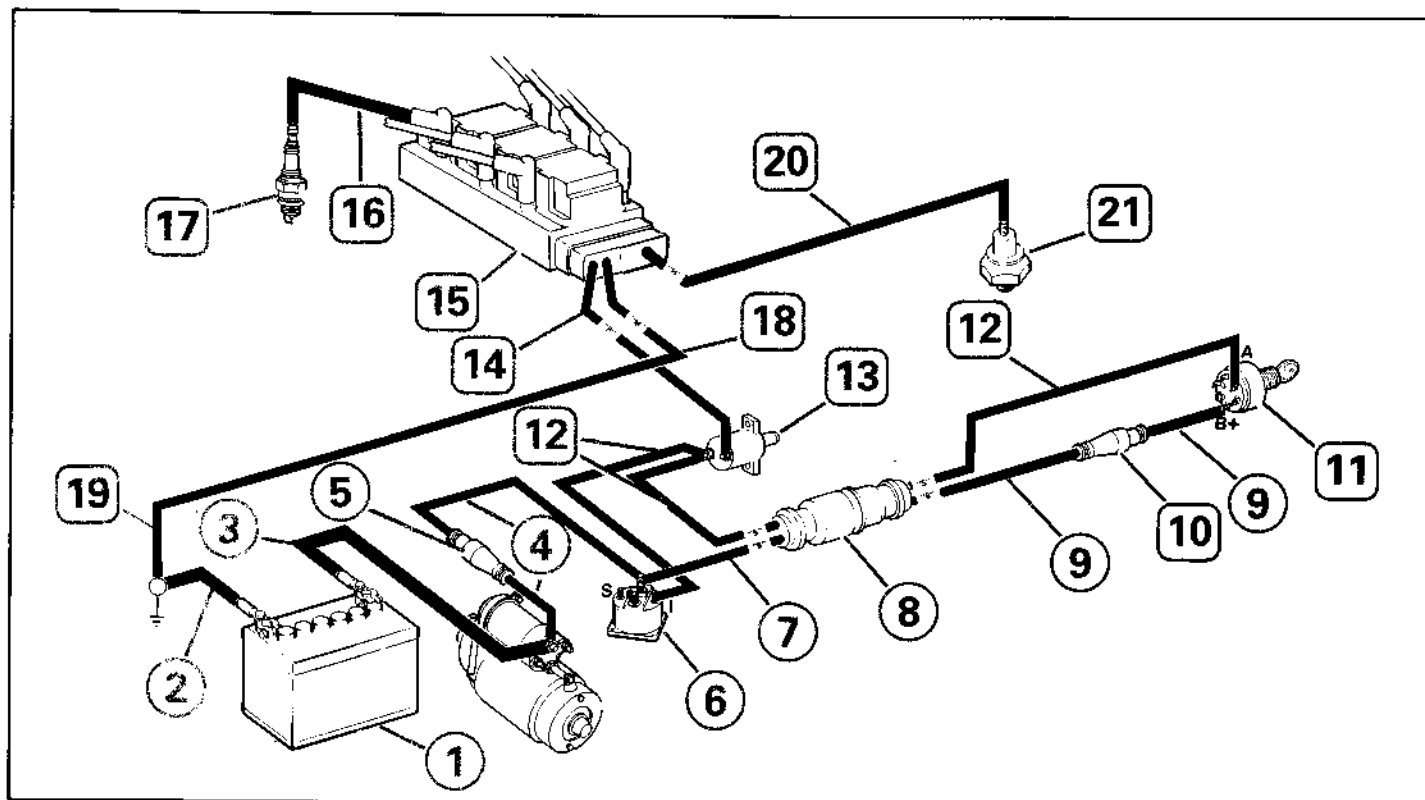
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DR2852

OMC Spitfire™ Ignition Circuit

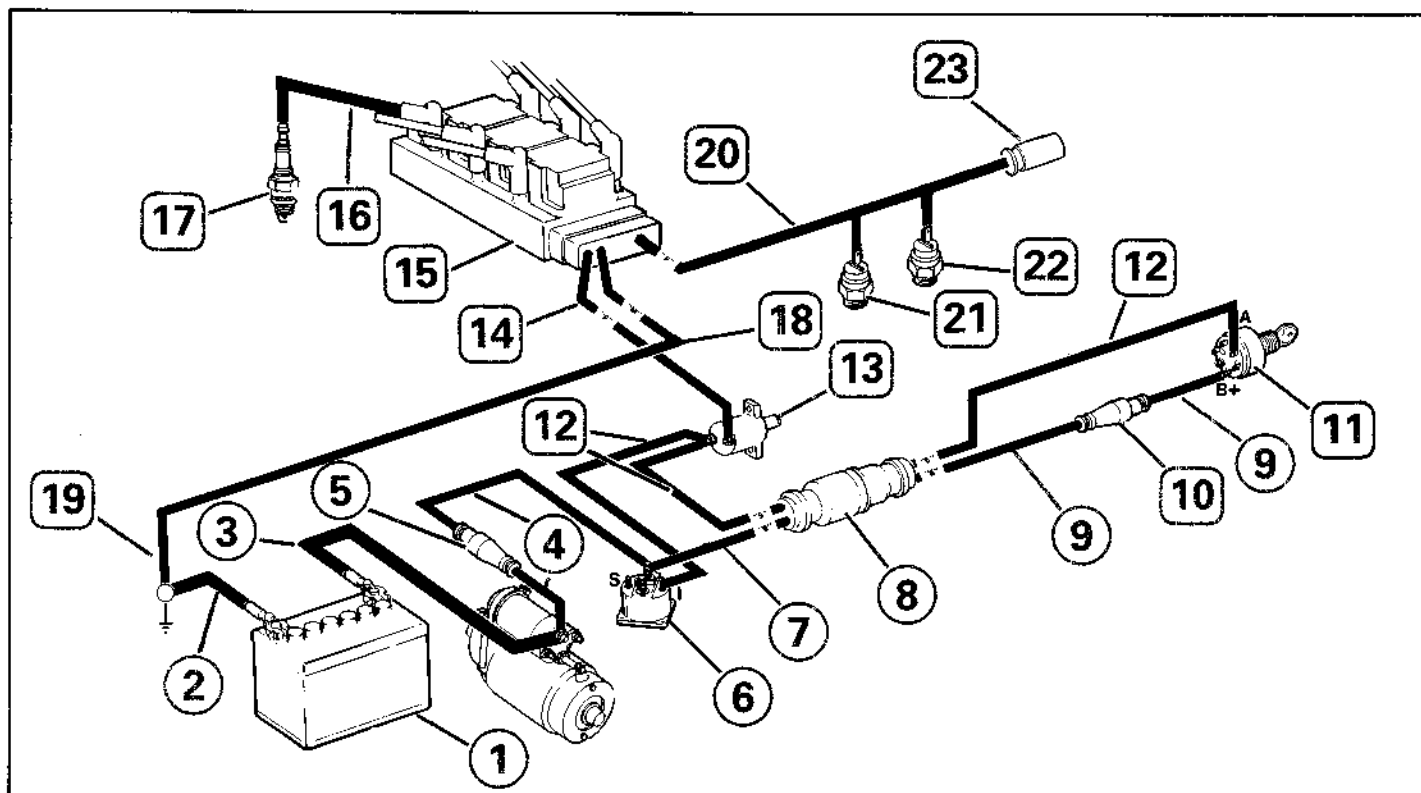
- | | |
|---------------------------------|-----------------------------|
| ① Battery | ①6 Spark Plug Lead |
| ② Black 4 Ga. | ①7 Spark Plug |
| ③ Red 4 Ga. | ①8 Black 18 Ga. |
| ④ Red 10 Ga. | ①9 White 18 Ga. |
| ⑤ 50 Amp Fuse | ②0 Green 18 Ga. |
| ⑥ Assist Solenoid | ②1 Purple/Green 18 Ga. |
| ⑦ Red/Purple 10 Ga. | ②2 Black/White 18 Ga. |
| ⑧ Main Cable Connector | ②3 Purple/Yellow 18 Ga. |
| ⑨ Red/Purple 12 Ga. | ②4 Timing Sensor |
| ⑩ 20 Amp Fuse | ②5 Connector |
| ⑪ Ignition Switch | ②6 Black 16 Ga. |
| ⑫ Purple 16 Ga. | ②7 Blue 16 Ga. |
| ⑬ 12.5 Amp Circuit Breaker | ②8 Shift Interrupter Switch |
| ⑭ Purple/Black 18 Ga. | ②9 Shift Overstroke Switch |
| ⑮ Coil Pack and Ignition Module | ③0 Black 10 Ga. |



DR3347

OMC Spitfire™ Knock Sensor Circuit

- ① Battery
- ② Black 4 Ga.
- ③ Red 4 Ga.
- ④ Red 10 Ga.
- ⑤ 50 Amp Fuse
- ⑥ Assist Solenoid
- ⑦ Red/Purple 10 Ga.
- ⑧ Main Cable Connector
- ⑨ Red/Purple 12 Ga.
- ⑩ 20 Amp Fuse
- ⑪ Ignition Switch
- ⑫ Purple 16 Ga.
- ⑬ 12.5 Amp Circuit Breaker
- ⑭ Purple/Black 18 Ga.
- ⑮ Coil Pack and Ignition Module
- ⑯ Spark Plug Lead
- ⑰ Spark Plug
- ⑱ Black 18 Ga.
- ⑲ Black 10 Ga.
- ⑳ Black/Green 18 Ga.
- ㉑ Knock Sensor



DR3348

OMC Spitfire™ S.L.O.W. Circuit

- ① Battery
- ② Black 4 Ga.
- ③ Red 4 Ga.
- ④ Red 10 Ga.
- ⑤ 50 Amp Fuse
- ⑥ Assist Solenoid
- ⑦ Red/Purple 10 Ga.
- ⑧ Main Cable Connector
- ⑨ Red/Purple 12 Ga.
- ⑩ 20 Amp Fuse
- ⑪ Ignition Switch
- ⑫ Purple 16 Ga.
- ⑬ 12.5 Amp Circuit Breaker
- ⑭ Purple/Black 18 Ga.
- ⑮ Coil Pack and Ignition Module
- ⑯ Spark Plug Lead
- ⑰ Spark Plug
- ⑱ Black 18 Ga.
- ⑲ Black 10 Ga.
- ⑳ Tan/Black 18 Ga.
- ㉑ Water Temperature Sender
- ㉒ Oil Pressure Sender
- ㉓ Audible Warning Connector

[illegible]

Engine Cable Wiring Diagram

3.0 Litre PWC models; 4.3L, 5.7 Litre PWS Models

- | | |
|------------------------------|------------------------------------|
| ① Red/Purple 16 Ga. | ②⑤ Blue 10 Ga. |
| ② Green/White 16 Ga. | ②⑦ Alternator |
| ③ Yellow/Red 12 Ga. | ②⑧ Spark Plug |
| ④ Black 4 Ga. | ②⑨ Distributor |
| ⑤ Spark Plug Lead | ③① Coil |
| ⑥ High Tension Wire | ③① E.S.A. Module |
| ⑦ Red 10 Ga. | ③② Overstroke Switch |
| ⑧ Black 10 Ga. | ③③ Interrupter Switch |
| ⑨ Battery | ③④ Splice |
| ⑩ Starter Motor | ③⑤ E.S.A. Module Blue 16 Ga. |
| ⑪ Solenoid | ③⑥ Black 16 Ga. |
| ⑫ Main Cable Connector | ③⑦ Blue 16 Ga. |
| ⑬ 10 Amp Circuit Breaker | ③⑧ Green 10 Ga. |
| ⑭ Assist Solenoid | ③⑨ Purple 16 Ga. |
| ⑮ Relay Control Box | ④① Orange 10 Ga. |
| ⑯ 50 Amp Fuse | ④① Gray 16 Ga. |
| ⑰ Trim/Tilt Connector | ④② Red/Purple 10 Ga. |
| ⑱ Trim/Tilt Motor | ④③ Vacant |
| ⑲ Purple/White 16 Ga. | ④④ Tan 16 Ga. |
| ⑳ Electric Choke, Carburetor | ④⑤ Light Blue 16 Ga. |
| ㉑ Trim Sending Unit | ④⑥ Red 4 Ga. |
| ㉒ Blue/White 16 Ga. | ④⑦ Brown/White 16 Ga. |
| ㉓ Oil Sender | ④⑧ Purple/Black 16 Ga. |
| ㉔ Connector | ④⑨ Purple/Red Resistor Wire 20 Ga. |
| ㉕ Water Temperature Sender | ⑤① Yellow/Red 16 Ga. |

Section 4

Fuel System

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Safety Warnings

- Before working on any part of the fuel system, read the section called **Safety** at the beginning of this manual.
- The original mounting, support and routing of the fuel system parts conform with U. S. Coast Guard requirements. It is important to maintain the original mounting, support and routing after servicing the fuel system.
- Gasoline is extremely flammable and highly explosive under certain conditions. Ensure good ventilation. Do not smoke or allow open flames or sparks near fuel system or in engine compartment while servicing.
- When adjusting a carburetor while the engine is running or being cranked, use extreme care to avoid getting hands, fingers or clothing caught in the alternator and water pump belts, pulleys and other moving parts.

Carburetor Operation

The carburetor is a metering device for mixing fuel and air. At idle speed, an engine requires a mixture of about 8 parts air to 1 part fuel. High speed mixture is about 12:1.

A small chamber (float bowl) holds the fuel. A float valve admits fuel from the fuel tank to replace fuel as it is consumed by the engine. Metering jets in the carburetor fuel chamber control the volume of fuel entering the carburetor fuel passages.

1 **2** The intake stroke of the pistons in the engine cylinders creates a suction that draws air through the carburetor throat. A restriction in the carburetor throat, called a venturi **A**, has the effect of reducing air pressure **B** at this point by increasing air velocity.

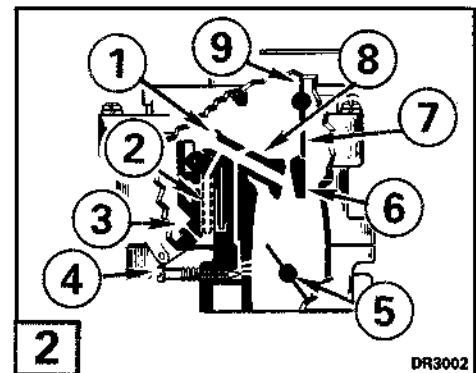
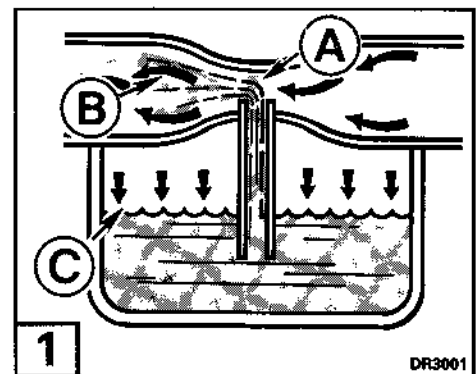
The differential in throat and chamber air pressures **C** causes the fuel to be pushed out of the metering jets through fuel passages and into the air stream. Here it mixes with the air to form a combustible mixture for burning in the engine cylinders.

In order to mix fuel and air in the right proportions for all engine speeds, the carburetor design includes idle, off-idle, accelerator, main, power, choke, and where applicable, secondary fuel systems.

To regulate engine speeds, a throttle valve controls the volume of fuel/air mixture drawn into the engine. To compensate for the extra amount of fuel required to start a cold engine, a choke valve is placed above the main venturi on top of the air horn.

When the choke valve is closed, a very rich fuel mixture is drawn into the engine. As the engine starts and warms up, the choke is opened to restore the normal ratio required.

The carburetor throat is frequently called the "barrel." Carburetors with four barrels (BBL.) have individual metering jets, throttle and choke plates for each barrel.



- ① Fuel Nozzle
- ② Main Well Tube
- ③ Main Jet
- ④ Idle Mixture Needle
- ⑤ Throttle Valve
- ⑥ Main Venturi
- ⑦ Boost Venturi
- ⑧ High Speed Passage
- ⑨ Choke Valve

Fuel Pump and Transparent Hose

Special tools required:

Fuel Line Pressure Gauge (obtain locally)
OMC Vacuum Tester, P/N 390954

Note Under normal operation, the transparent overflow hose should not contain fuel or oil. Any evidence of fuel in this hose is an indication of a ruptured fuel pump diaphragm. If fuel or oil is visible, replace the fuel pump immediately.

If the fuel pump is suspected of not delivering the proper amount of fuel to the carburetor, it should be inspected and tested as follows:

 **When performing the procedure below, be careful of gasoline vapor build-up in the engine compartment. Gasoline is very explosive. Before starting engine, always make sure compartment is free of fuel vapors to prevent possible fire and explosion.**

Pressure Testing

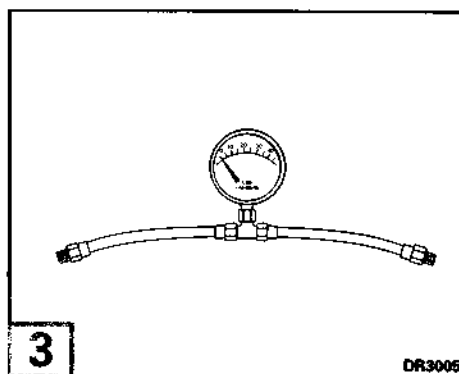
1. Make certain that there is gasoline in the fuel tank.
2. Inspect the fuel pump filter on 3.0 Litre PWC models and the fuel filter cartridge on all other models for dirt, and varnish. It is recommended the filter cartridge be replaced once a year.
3. Inspect the carburetor inlet filter element for dirt, gum, and varnish. It is recommended that the filter element be replaced (if of replaceable type) or cleaned once a year.
4. Disconnect fuel line from fuel pump outlet. Install pressure gauge in fuel line.
5. Start engine and let it run at idle speed. If the pressure gauge readings are as specified, see Boat Fuel System Troubleshooting for additional problem areas. If the pressure is too low or too high, replace the fuel pump.

Note A boat fuel system that is restricted or has an air leak on the suction side of the fuel pump, can cause an erroneous fuel pump diagnosis.



Vacuum Testing

-  1. Disconnect boat fuel line at inlet side of fuel filter canister. Cap end of line to prevent fuel leakage.
-  2. Attach OMC Vacuum Tester P/N 390954 to fuel filter canister inlet. Make sure all line connections are airtight.
-  3. Securely ground ignition coil high tension lead to engine block to prevent engine from starting.
4. Crank engine and read gauge. Replace fuel pump if gauge does not register specified amount of vacuum.



Fuel Pump Specifications

All Models	5¾ to 7 PSI (39,6 to 48,3 KPA)*
Vacuum at Cranking Speed	9 to 10 in. of mercury (30 to 34 KPA)

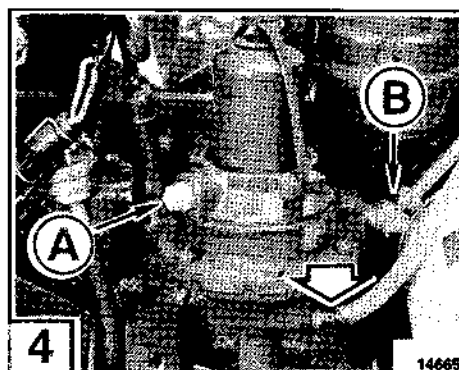
* At pump outlet, at idle speed

Fuel Pump Replacement - 3.0 Litre PWC Models

Removal

 To prevent fire and explosion, the following replacement procedures must be performed with the battery disconnected.

-   1. Remove fuel tank line (A) at fuel pump. Plug line securely to prevent leakage of fuel.
-  2. Disconnect carburetor fuel line (B) at fuel pump.
-  3. Remove and discard overflow hose tie strap. Remove overflow hose from fuel pump.
4. Remove two fuel pump retaining screws and lockwashers.
7. Remove fuel pump and gasket from engine; discard gasket. Note orientation of pump elbows, then unscrew and use on new pump.



Safety Related

Installation

- 5** 1. Apply *OMC Pipe Sealant with Teflon* to old pump elbows. Install elbows and orient in original position when tight.

Note Do not use *Teflon* tape on elbow threads. Pieces can break loose and clog fuel system components.

2. Apply *OMC Gasket Sealing Compound* to both sides of a new fuel pump gasket. Position gasket on fuel pump.

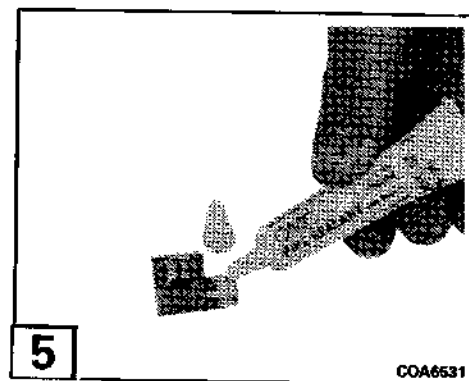
3. Install fuel pump on engine using two retaining screws with lockwashers. Tighten screws to a torque of 12-14 ft. lbs. (16-19 N·m).

-  4. Install vent hose onto fuel pump nipple. **Secure using a new tie strap.**

-  5. Connect carburetor fuel line to fuel pump. **Tighten line nut securely.**

-  6. Connect fuel tank hose to fuel pump. **Tighten clamp securely.**

-  **After completing replacement procedures, make sure engine compartment is free of fuel vapors, then start engine and check entire fuel system for leaks.**



Safety Related

Fuel Pump Replacement - 2.3, 3.0, 3.0 HO, 4.3, 4.3 HO, and 5.7 Litre PWS Models

Removal

 To prevent fire and explosion, the following replacement procedures must be performed with the battery disconnected.

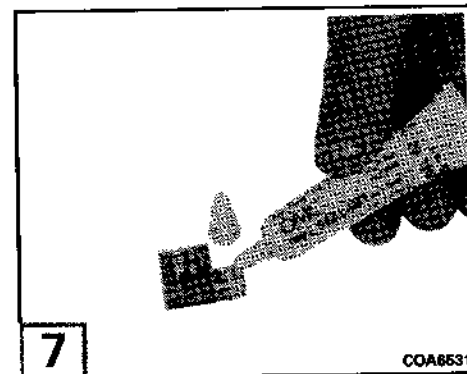
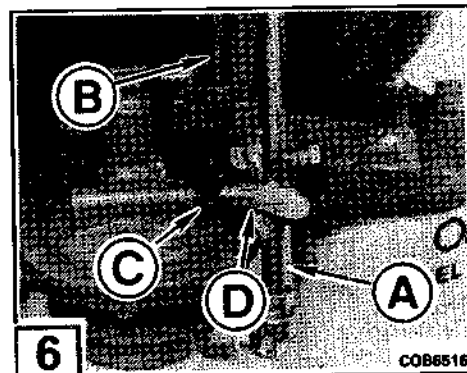
  1. Remove fuel filter line at fuel pump . Be sure fuel shutoff is closed or fuel system is plugged to prevent leakage of fuel.

 2. Disconnect carburetor fuel line  at fuel pump.

 3. Remove and discard overflow hose tie strap . Remove overflow hose  from fuel pump.

4. Remove two fuel pump retaining screws and lockwashers.

5. Remove fuel pump and gasket from engine; discard gasket. Note orientation of pump elbows, then unscrew and save for use on new pump.



Installation

 1. Apply *OMC Pipe Sealant with Teflon* to old pump elbows. Install elbows and orient in original position when tight.

 Do not use *Teflon* tape on elbow threads. Pieces can break loose and clog fuel system components.

2. Apply *OMC Gasket Sealing Compound* to both sides of a new fuel pump gasket. Position gasket on fuel pump.

3. Install fuel pump on engine using two retaining screws and lockwashers. Tighten screws to a torque of 20-25 ft. lbs. (27-34 N·m)

  4. Install overflow hose  onto fuel pump. Secure with a new tie strap.

  5. Connect carburetor fuel  line to fuel pump. Tighten line nut securely.

  6. Connect boat fuel filter line  to fuel pump. Tighten line nut securely.

 After completing replacement procedures, make sure engine compartment is free of fuel vapors, then start engine and check entire fuel system for leaks.



Fuel Pump Replacement - 5.0, 5.0 HO, 5.8 Litre Models

Removal

 To prevent fire and explosion, the following replacement procedures must be performed with the battery disconnected.

-  1. Disconnect and plug boat fuel line at filter . Unscrew fuel filter. **Be careful not to spill fuel.**
-  2. Cut tie strap and pull vent hose  off pump.
-  3. Unscrew both lines  at fuel pump.
-  4. Unscrew two mounting screws and lockwashers. Remove pump and discard gasket. Note orientation of pump elbows , then remove and save for use on new pump.

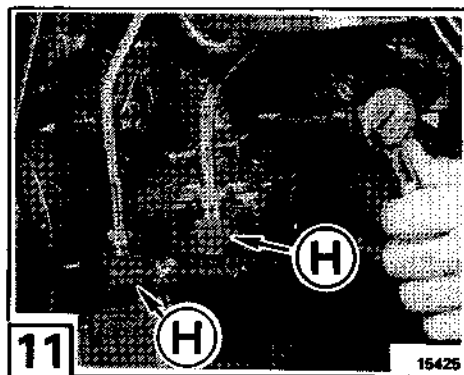
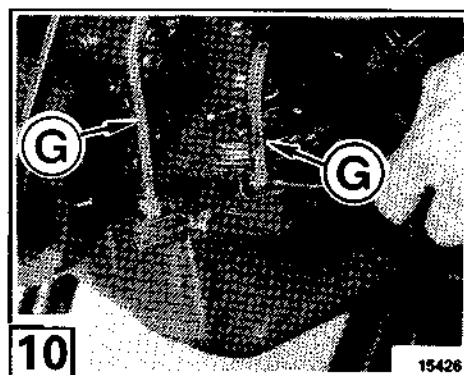
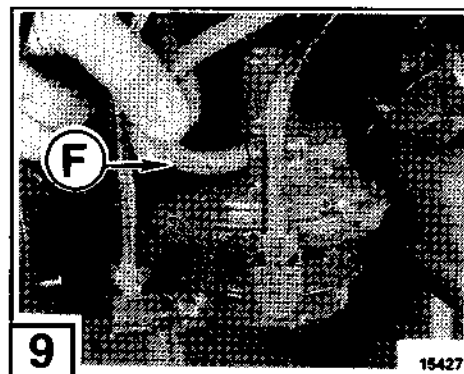
Installation

-  1. Apply *OMC Pipe Sealant with Teflon* to old pump elbows. Install elbows and orient in original position when tight.

 Do not use *Teflon* tape on elbow threads. Pieces can break loose and clog fuel system components.

2. Apply *OMC Gasket Sealing Compound* to both sides of a new pump mounting gasket. Place gasket on block and install pump. Install screws and lockwashers and torque screws to 18-20 ft. lbs. (24-27 N-m).

-  3. Attach both fuel lines  at the pump and **tighten securely.**
-  4. Attach vent hose  and **secure with tie strap.**
-  5. Lubricate filter gasket , then screw on fuel filter. Tighten filter one-half turn after gasket contacts seat. Attach boat fuel line. **After completing replacement procedures, make sure engine compartment is free of fuel vapors, then start engine and check entire fuel system for leaks.**



In-Line Fuel Filters

⚠ To prevent fire and explosion, the following replacement procedures must be performed with the battery disconnected. After completing replacement procedures, make sure engine compartment is free of fuel vapors, then start engine and check entire fuel system for possible leaks.

Note 3.0 Litre PWC Models are equipped with a fuel filter located on top of the fuel pump. All PWS Models have a fuel filter connected in the line before the fuel pump.

Filter Replacement - Fuel Pump - 3.0 PWC models

12 **⚠** 1. Wrap a cloth around the bowl **A** to catch fuel that may spill when bowl is removed. Loosen the yoke screw and remove the filter bowl and the filter retaining spring **B**.

12 2. Remove and discard the fuel filter element **C** and the bowl gasket **D**.

⚠ 3. Wash the filter bowl thoroughly with clean solvent and blow dry. Replace the bowl if bowl is dented, damaged or corroded.

4. Install new bowl gasket and new filter element.

5. Install filter retaining spring and filter bowl.

⚠ 6. Tighten filter bowl screw securely. Start engine and check for leaks.

Filter Replacement - Canister - All PWS Models

13 1. Unscrew (turn counterclockwise) fuel filter **E** to remove and discard. Check to make sure the original gasket is not stuck on the filter housing. If so, remove and discard the gasket.

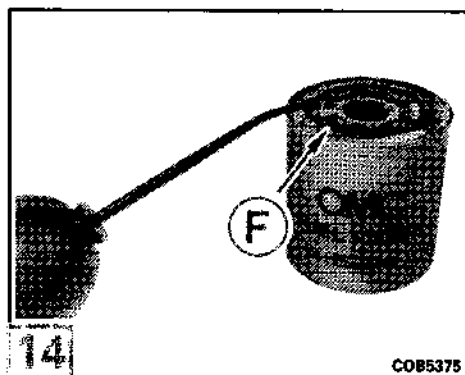
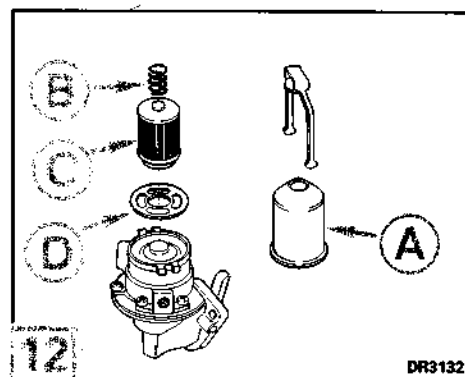
14 2. Lubricate new fuel filter gasket **F** with clean oil.

3. Install new fuel filter onto fuel filter bracket. Tighten approximately one-half turn after gasket makes contact with bracket.

⚠ 4. Start engine and check for leakage.

Carburetor Fuel Filters

⚠ To prevent fire and explosion, the following replacement procedures must be performed with the battery disconnected. After completing replacement procedures, make sure engine compartment is free of fuel vapors, then start engine and check entire fuel system for possible leaks.



Carburetor Filter Replacement - All Models

Note Some OMC Cobra® models have non replaceable fuel filters. In this case the inlet nut contains a screen that should be cleaned periodically.

1. Disconnect the fuel line at the carburetor.
- 15** 2. Remove fuel inlet nut **G**, gasket **H**, filter element **I** (if carburetor has one), filter element gasket **J**, and spring **K**.
- 16** 3. Clean inlet filter screen (non replaceable) or replace filter element.
- !** 4. To reassemble, install spring, new filter element and gasket, and filter nut and gasket. **Tighten inlet nut securely.**
- !** 5. **Connect fuel line and tighten securely. Start engine and check for leaks.**

Tanks, Lines, Valves and Fittings

! Check for water and dirt in system. **Examine complete fuel system for leaks and loose connections.** Check operation of all fuel shutoff valves. Make sure fuel lines are securely fastened to craft to eliminate possible damage from vibration. **Check for leaks in tank pickup assembly or a plugged pickup screen.**

If fuel system appears to block the proper flow of fuel, disconnect the lines at different points and blow compressed air through the suspect sections.

Note Do not blow air through sections connected to components - fuel pump, carburetor, tank. Check tank for open air vent and clean sediment screen.

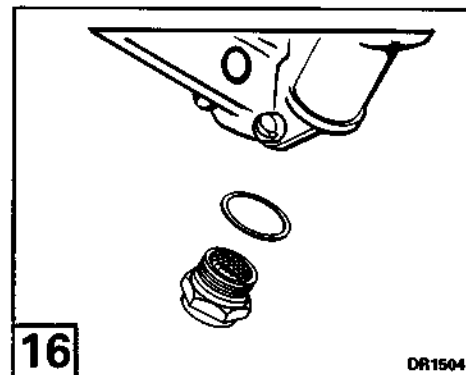
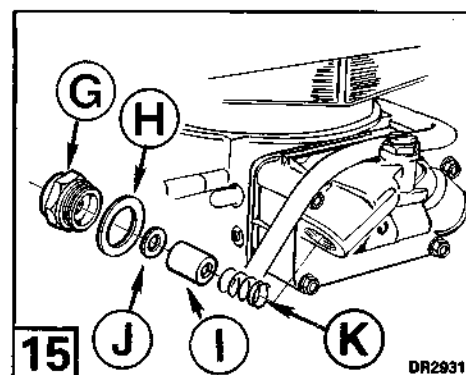
! **Replace all connections which leak and cannot be tightened.**

Boat Fuel System Troubleshooting

Fuel systems must be checked for restrictions as part of normal troubleshooting procedure.

Fuel systems can use anti-siphon valves, elbows, lines, filters, etc., that may present restrictions greater than can be tolerated by the engine fuel pump. Too great a restriction could reduce fuel flow to the engine resulting in poor performance and stopping at higher speed. An air leak on the suction side of the fuel pump can also cause erratic operation.

1. Disconnect fuel supply line from tank and fuel filter inlet. Blow air through it to make sure it is clear.



Safety Related

17 2. Check fuel anti-siphon valve (A):

The marine industry recommends permanently installed fuel systems meet safety standards A.B.Y.C. H-24 and I.C.O.M.I.A. No. 17. These require such systems to have some form of anti-siphon protection. An anti-siphon valve prevents fuel spillage in case of a break or leak in the distribution system below the level of fuel in the tank.

Anti-siphon protection may also be afforded by keeping all parts of the fuel distribution system above the level of the tank top when the boat is in its normal, unloaded, static floating position. If it is not possible to keep all lines above the tank, then an anti-siphon valve is required and each tank pickup tube must be so equipped.

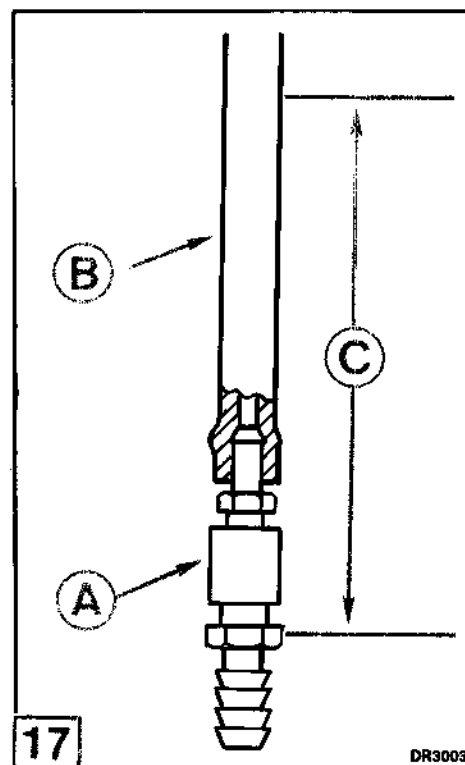
Anti-siphon valves must have a flow restriction pressure drop of no more than 35 in. (890 mm) of water at a fuel flow rate of 20 gallons (80 litres) per hour. The following OMC valves meet these requirements:

- P/N 173273 for $\frac{5}{16}$ in. (7,9 mm) I.D. Hose
- P/N 173274 for $\frac{3}{8}$ in. (9,5 mm) I.D. Hose
- P/N 173275 for $\frac{3}{8}$ in. (9,5 mm) O.D. Copper Tube

17 If there is any question that an anti-siphon valve is suitable, then the following test should be made using a transparent hose:

- Remove anti-siphon valve from tank and install test fittings and test hose.
- Fill test hose (B) with water to a vertical height of 20 in. (500 mm) (C). Water must not run from valve. An occasional drop is acceptable. A continuous drip is not acceptable.
- Add more water. Water must run from valve before the water height is 25 in. (630 mm).

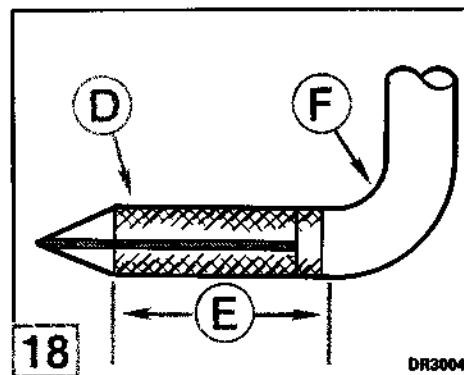
An anti-siphon valve passing this test will provide anti-siphon protection for a maximum of 28½ in. (720 mm) fuel head and also open fully with pump suction. An anti-siphon valve that does not meet these requirements must be replaced with one which does. This test does not check the ability of the anti-siphon valve to meet the flow requirements.



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3. Check fuel tank pickup filter screen [Ⓓ]:

Recommendations: Use stainless steel, No. 304 wire cloth, 30 mesh, with wire size 0.010-0.012 in. (0,25-0,30 mm) diameter. A cylindrical screen [Ⓔ] equal to pickup tube outside diameter and 1 in. (25,4 mm) long will provide a screen with the required flow area. The screen should be horizontal and set slightly above the bottom so that the maximum amount of fuel can be used. Make sure the screen is not partially restricted by solder and is not bent or kinked.



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4. Check fuel tank pickup tube [Ⓕ]:

Pickup tube must have an I.D. measuring:

- 5/16 in. (7,9mm) for 2.3 and all 3.0 Litre Models;
- 3/8 in. (9,5 mm) for 4.3 thru 5.8 Litre Models.

Dual engines require two separate pickup tubes, one for each engine.



Fuel System Troubleshooting

ENGINE DOES NOT START - IMPROPER STARTING PROCEDURE USED

1. Check fuel level in tank, check fuel tank vent, check fuel in carburetor.
2. Check choke for proper operation.
3. Check for acceleration pump discharge.
4. Check fuel pump for output (refer to specification sheet).
5. Check fuel lines for blockage, tank to pump fuel line for air leaks, fuel filters for blockage.
6. Check idle mixture and idle speed adjustment.
7. Remove carburetor, check float level, inlet valve operation, check for dirt, water, varnish in passages, worn parts.

ENGINE WILL START WHEN PRIMED BUT WILL NOT CONTINUE TO RUN

1. Check fuel supply
2. Check idle mixture and idle speed.
3. Check fuel lines for blockage, air leaks.
4. Check for plugged fuel filters.
5. Check fuel pump for output (refer to specification sheet).
6. Remove carburetor and check for dirt, water, varnish deposits, check float level, float inlet valve operation.
7. Vacuum qualification adjustment.

ENGINE HARD STARTING, COLD

1. Check choke for proper operation.
2. Check for acceleration pump discharge.
3. Check fuel pump for output (refer to specification sheet).
4. Check for blockage in fuel lines, air leaks in fuel line from tank to fuel pump.
5. Remove carburetor, check float level, inlet valve operation, check for dirt, water, varnish deposits, check for worn parts, leaking gaskets.

ENGINE HARD STARTING, HOT

1. Check carburetor for flooding (smell of raw gas).
2. Check choke for sticking, not open fully.
3. Remove carburetor, check float level, float inlet valve operation, condition.
4. Check for fuel line on or near hot surfaces, causing percolating in lines.
5. Check for correct carburetor base gasket.

ENGINE RUNS ROUGH, LOW SPEED

1. Check choke for proper operation, check idle mixture, speed.
2. Check for dirt or water in fuel, excessive or insufficient fuel pump pressure.
3. Remove carburetor and check for proper float level, internal blockage, defective parts, varnish deposits in passages.
4. Check other systems; PCV valve, intake manifold for vacuum leaks, sticking valves, overheating, etc.
5. Check setting of secondary throttle plate opening.

(continued on next page)

Fuel System Troubleshooting

ENGINE RUNS ROUGH, HIGH SPEED

1. Check for sufficient fuel in tank, blocked tank vent, proper fuel.
2. Check choke for proper operation.
3. Check for water or dirt in fuel - fuel pump output (refer to specification sheet), blockage or air leaks in fuel line.
4. Remove carburetor and check float level, float inlet valve operation, proper high speed jet and power valve, internal blockage, varnish, worn parts.
5. Check for plugged fuel filters.
6. Check shift system overstroke cam positions.

ENGINE DIES (ON INITIAL ACCELERATION) OR HAS ACCELERATION FLAT SPOT

1. Check idle speed and idle mixture adjustment, manifold for leaks.
2. Check or vacuum diaphragm for premature opening.
3. Check fuel lines for fuel, leaks or partially plugged tank vent.
4. Check carburetor accelerator pump for output and adjustment.
5. Check for water or dirt in fuel, check fuel pump for output (refer to specification sheet).
6. Remove carburetor and check for dirt and water, check float level and float inlet valve for operation, check for varnish in passages, worn parts, check for proper high speed jet.
7. Check float level.

ENGINE WILL NOT TURN RECOMMENDED RPM

1. Check throttle linkage adjustments to be sure throttle opens fully.
2. Check fuel lines for leaks, fuel pump for sufficient output (refer to specification sheet).
3. Check choke for proper operation.
4. Remove carburetor and check float level, proper high speed jet and power valve, check passages for dirt and varnish.
5. Check boat for proper trim, propeller, check hull for marine growth.
6. Check ignition system components.
7. Check engine and drive unit for partial seizure.
8. Check fuel tank for plugged vent and pickup tube for vacuum leaks.
9. Check for plugged fuel filters.
10. Check for full opening of secondary throttle or check vacuum diaphragm function.
11. Check exhaust system for restrictions.
12. Check for restricted air intake.
13. Check that secondary throttle plates are free to rotate when diaphragm stem is compressed.
14. Check that secondary diaphragm is not leaking and preventing throttle plates from opening correctly.

Rochester 2 BBL Service 3.0 Litre PWC Models

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OMC Special Tools

Idle Mixture Socket P/N 910835

Safety Warning

- When replacement parts are required, use genuine OMC parts or parts with equivalent characteristics including type, strength and material. Failure to do so may result in product malfunction and possible injury to the operator and/or passengers.
- After any fuel system maintenance or repairs, always check for leaks.
- Always ensure backfire flame arrestor fins (and gasket 3.0 Litre PWC Models) are undamaged, and arrestor is in place and secured before starting engine.

Removal and Installation of Carburetor

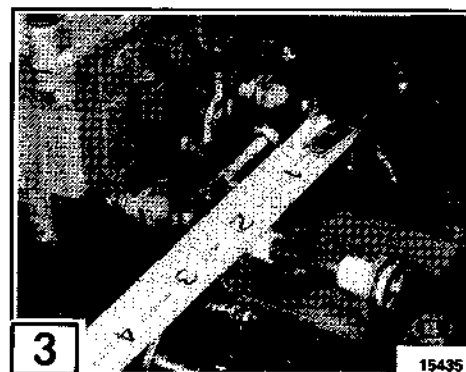
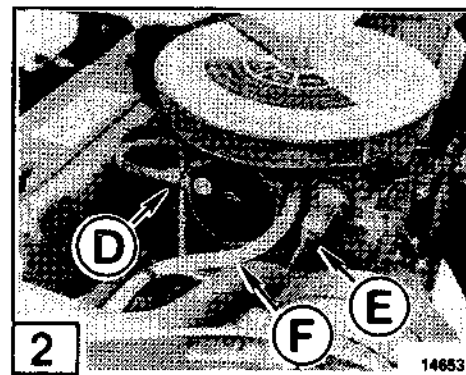
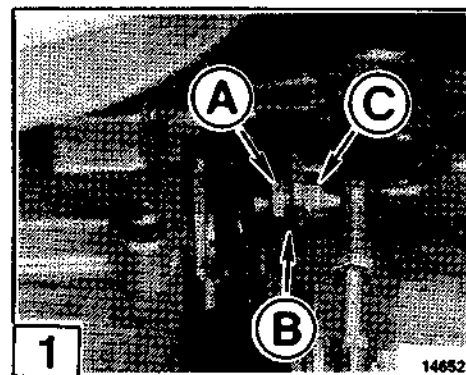
⚠ To prevent fire and explosion in the engine compartment, the flame arrestor (with gasket on 3.0 Litre PWC Models) must be installed before starting the engine.

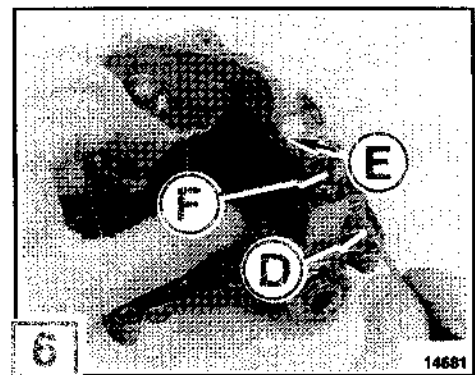
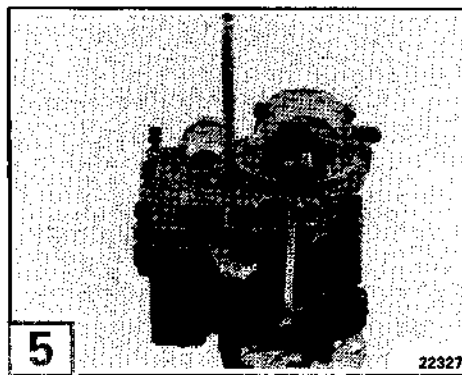
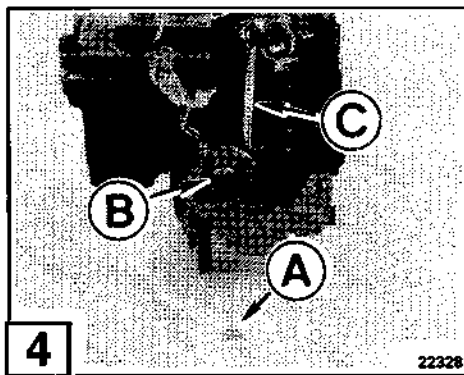
Removal

- 1** 1. Remove cotter pin, washer and throttle cable from throttle lever. Remove nut **A** and lockwasher **B** from ball joint stud **C** at throttle lever.
2. Remove locknut, cover, vent hose bracket, flame arrestor and gasket from carburetor.
- 2** **⚠** 3. Disengage heat exchanger nut **D** from choke housing and fuel line nut **E** from carburetor. **Do not spill fuel.**
- 2** 4. Cut tie strap and remove overflow hose **F** from carburetor.
5. Remove the four carburetor mounting screws and lockwashers. Remove carburetor and gasket from intake manifold. Discard gasket.

Installation

1. Position a new gasket on intake manifold and install carburetor. Tighten screws and lockwashers to 12-15 ft. lbs. (16-20 N·m).
- 2** **⚠** 2. Attach overflow hose **F** to carburetor. **Secure using a new tie strap.**
- 1** **⚠** 3. Connect heat exchanger tube **D** and fuel line **E** to carburetor. **Tighten nuts securely.**
- ⚠** 4. If flame arrestor gasket is damaged, replace it. Position gasket, flame arrestor, vent hose bracket and cover on carburetor. Install retaining nut and tighten securely.
- 3** 5. Insert ball joint stud into throttle lever. Secure stud with nut and lockwasher. Check distance between ball joints as shown. With ball joint studs secured in place, measure between center of studs. Measurement must be 2 1/4 in. (57,2 mm) to obtain correct throttle operation.
- ⚠** 6. Install throttle cable, washer and cotter pin. Check for correct full-throttle and idle adjustments. Apply *OMC Triple-guard®* grease to carburetor external linkages. Run engine and check for fuel leaks.





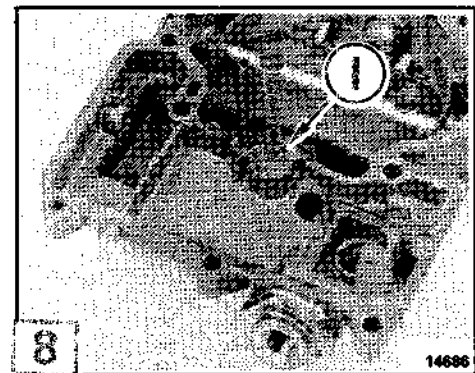
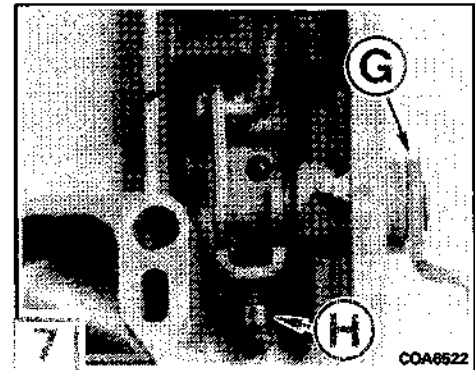
Disassembly of Rochester 2 BBL. Carburetor

⚠ This carburetor is designed for marine use. Do not substitute an automotive carburetor because it can emit fuel vapor into the engine compartment creating a fire and explosion hazard.

Refer to Carburetor Specifications and check carburetor model number. If the wrong model carburetor is used, both high and low speed operation will be affected.

Removal of Air Horn Assembly

- 4 1. Remove retaining clip **A** from pump rod. Rotate and remove pump rod from carburetor.
- 4 2. Remove idle cam screw **B**. Rotate idle cam and rod assembly until lug of choke rod **C** passes through slot in upper choke lever. Remove choke rod from hole in idle cam in the same manner.
- 5 3. Remove eight air horn attaching screws and lockwashers. Lift air horn straight up from float bowl to avoid damaging accelerator pump.



Disassembly of Air Horn

- 6 1. Pull out float hinge pin **D** and lift float assembly **E** from air horn.
- 6 2. Remove inlet needle and clip assembly **F** from float arm.

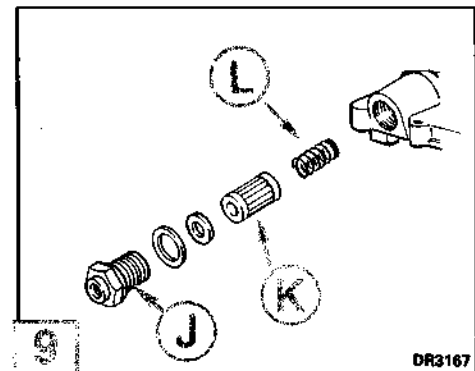
Note Be careful not to distort pull clip.

3. Remove air horn gasket. Remove inlet needle seat and gasket from air horn.

- 7 4. Remove pump lever **G** by loosening set screw **H** on inner pump arm. Pull pump lever from air horn and lift out accelerator pump and arm assembly.

Note Do not remove choke components from air horn.

- 8 5. Remove staking from power piston retaining washer **I**. Remove power piston by repeatedly depressing shaft and allowing spring to snap piston out.



Safety Related