MERCURY MARINER

service bulletin

☐ WARRANTY INFORMATION ☑ SERVICE INFORMATION
☐ PARTS INFORMATION

Bulletin No. 2002-07

Circulate to: ☑ Sales Manager ☑ Accounting ☑ Service Manager ☑ Technician ☑ Parts Manager

Spark Plug Fouling 3.0 Liter OptiMax

Models Affected

MERCURY/MARINER

2001/2002 Model 200/225 3.0 Liter OptiMax

0T178500 Thru 0T598999

Situation

Some 2001 model year engines may continue to experience spark plug fouling after the product upgrades outlined in Service Bulletins 2001-14 and 2001-18 have been performed. In addition, some 2002 model year engines may also experience spark plug fouling. If spark plug fouling occurs, check the following systems and perform any necessary repairs or upgrades. If these engine checks, repairs and upgrades do not resolve the plug fouling condition, contact:

US Dealers – The OPTIMAX ASSISTANCE TEAM at 1-800-309-4743, enter a request for technical assistance in the service section of MercNET or complete and send a QuickFax form (90-821655) to 1-800-842-4550 for further assistance.

CANADIAN Dealers – Technical support at 905-567-6372 or enter a request for technical assistance in the service section of MercNET or complete and send a Q.sos fax form (90-824614) to 1-800-663-8334.

INTERNATIONAL Dealers – Follow instructions issued by Marine Power International Office or by your distributor.

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Inspection/Correction

SENSOR AND ENGINE INFORMATON:

The ideal tool for checking engine temperature, sensor readings, and engine data is the Digital Diagnostic Tester (DDT). When looking at engine sensor readings and engine data, not only should you look for fault codes, you should also look for readings that don't make good sense.

Examples:

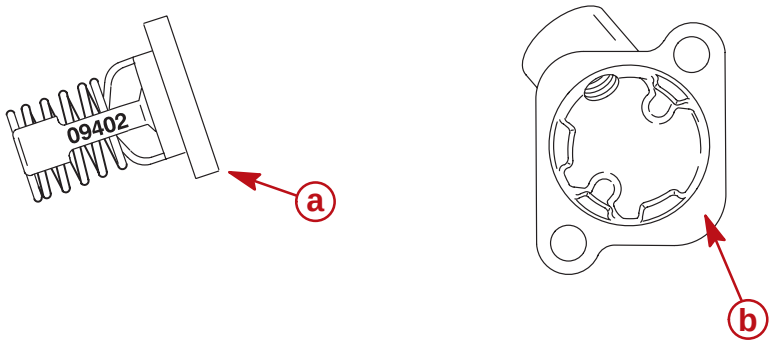
- A MAP sensor reading with the ignition key in the "ON" position prior to engine start up normally reads a higher number than when running at idle speed. MAP sensor readings that do not change with throttle changes or MAP sensor readings that keep changing when there is no change to throttle opening or engine speed are all indications of a problem.
- An air temperature sensor reading of 4° C [40° F] on a day with outside temperatures of 32° C [90° F] just does not make sense.

These are only two examples of incorrect sensor readings that would not store a fault code because the sensor is still within its normal working range. Incorrect sensor readings can contribute to spark plug fouling. Sensors furnishing incorrect readings should be replaced.

ENGINE TEMPERATURE:

A new 54° C [130° F] thermostat and new thermostat cover have been developed that will help maintain a higher engine temperature and reduce the chance of debris holding the thermostat open. A thermostat held open by debris would reduce engine temperature causing spark plug fouling. If an engine is in for a spark plug fouling condition, install thermostat kit **P/N 885599A1.** This kit includes all of the covers, thermostats and gaskets to upgrade one engine.

NOTE: *Sometimes low engine temperature at idle can be caused by water leaking past the relief/poppet valve. Check the relief/poppet valve if the new thermostats do not correct a low engine temperature condition. Normal engine temperature using the new 54° C [130° F] thermostats is 46° C - 60° C [115° F - 140° F].*



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a - Seal is bonded to the new thermostat to prevent leakage around seal
b - New covers with narrow thermostat lands, allow MOST debris to pass through the system

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SPARK PLUG and SPARK PLUG WIRES:

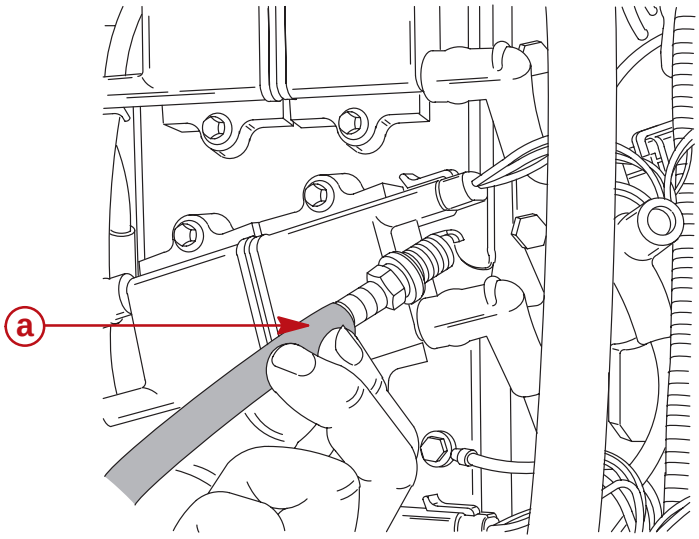
Damaged or loose spark plug wires may cause plug fouling. Most wire damage is the result of rough handling and the use of incorrect tools to remove and install wires. For more information on this see service bulletin 2001-05.

- Check that all plug wires are totally engaged onto the coil towers and the spark plugs.
- Check the spark plug wire boots for damage.

NOTE: *Slightly stretching the boot may show a cut or hole that otherwise may not be seen.*

New spark plugs are normally gapped correctly, but should be checked prior to installation (plug gap 1.1 mm [.043 in.]).

NOTE: *To prevent spark plug cross threading, use a piece of hose pushed over the plug. (Gray fuel hose with 8 mm [.315 in.] I.D. works well.) This will allow you to thread the plug into the spark plug hole by hand while avoiding cross-threading. Torque plugs to 27 Nm [20 lbs. ft.].*



a - Rubber hose slid over spark plug for installation of plug

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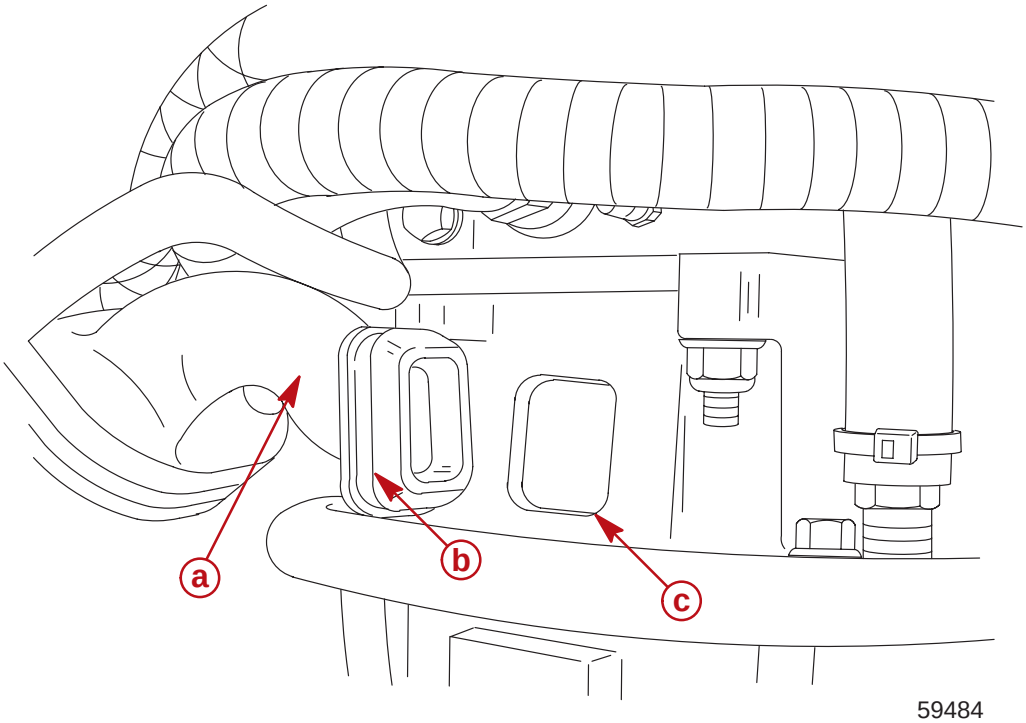
IDLE EXHAUST BOOT:

Check for exhaust or water leaking from the exhaust boot where it connects to the adapter plate. When the engine is running at idle speed, put slight side pressure on the boot near the adapter plate. If you see water or exhaust leaking/spitting out between the boot and adapter plate the boot is leaking and needs to be resealed. A leaking exhaust boot will cause exhaust gases to be ingested into the engine when running with the cowl on, contributing to spark plug fouling.

Remove the boot from the adapter plate. Clean the area of the boot and adapter plate where the two join together. Both surfaces must be clean and dry (no oily residue). Glue the boot back in using Loctite Ultra Copper RTV, available locally.



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a - Idle exhaust relief boot
b - Apply sealant completely around this area of exhaust boot
c - Idle exhaust boot opening in adapter plate, clean prior to installation

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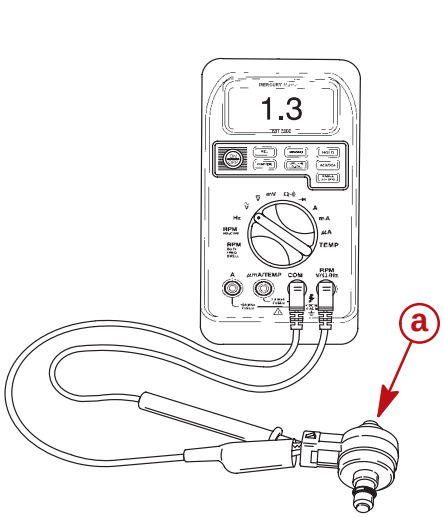
DIRECT INJECTORS:

Check the resistance (ohms value) of the direct injector coil winding and determine if there is a short-circuit between the winding and engine ground. Incorrect ohms reading or a shorted winding will cause an incorrect fuel/air spray pattern, contributing to spark plug fouling. The correct reading should be between 1.0 and 1.6 ohms. If the reading is inaccurate replace the injector.



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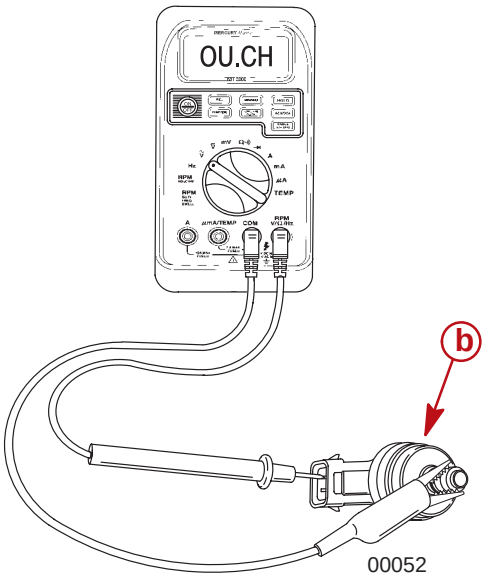

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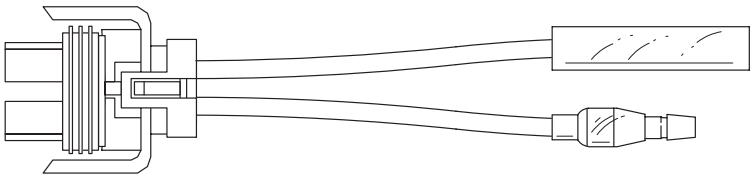
a - Direct injector ohm test between the two connector pins (1.0 - 1.6 ohms)
b - Direct injector short to ground ohm test (no continuity), check between either connector pin and the metal portion of the injector

NOTE: *Making resistance checks on a direct injector while still installed in the engine can be difficult. An easy and fast way to make resistance (ohms value) checks on direct injectors is to use service harness end P/N 84-858781A2, shown below. This harness is normally used as a service replacement part for the direct injector connector if it becomes damaged, but also works well to make the required resistance and ground test while the injector is in place between the cylinder head and fuel rail.*

Disconnect the harness connector going to the specific direct injector that you are testing, and connect the service harness to that injector. Next make the resistance (ohms value) check (1.0 - 1.6 ohms) between the two wires and the ground check between either wire and a good engine ground.



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PROPPING:

Boats that are over propped (using propellers with too high a pitch for the application) may experience spark plug fouling. Most of us think of over propping to be a Wide Open Throttle (WOT) issue. But an over propped engine will also cause heavier loads at lower speeds. These heavier loads require more fuel, contributing to spark plug fouling. Verify that the engine is propped to the top end of its recommended RPM range under the normal running conditions/boat load.

Warranty

Mercury Marine will credit the dealer for the cost of parts and labor for one year from the issuance of this bulletin. Please note the month and year located at the lower left corner of the front page of this document.

Complete a warranty claim listing:

- Outboard serial number
- Parts as required
- Flat Rate Code: NJC and total labor allowance
- Part Code: 320
- Failure Code: 00

Labor Time Chart	
Description of repair or test	**Labor time allowed**
DDT diagnostic time (sensors & engine temperature)	0.5
Thermostat and thermostat cover replacement	0.3
Spark plugs/wire inspection and replacement	0.6
Idle exhaust boot inspection	0.1
Idle exhaust boot reseal	0.5
Direct injector resistance (ohms) test	0.1
Direct injector replacement (one)	0.6

US and Canada – Tag and hold parts for 60 days after the warranty credit is received.

International – Hold parts for inspection/disposal by a Marine Power International technical representative.

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