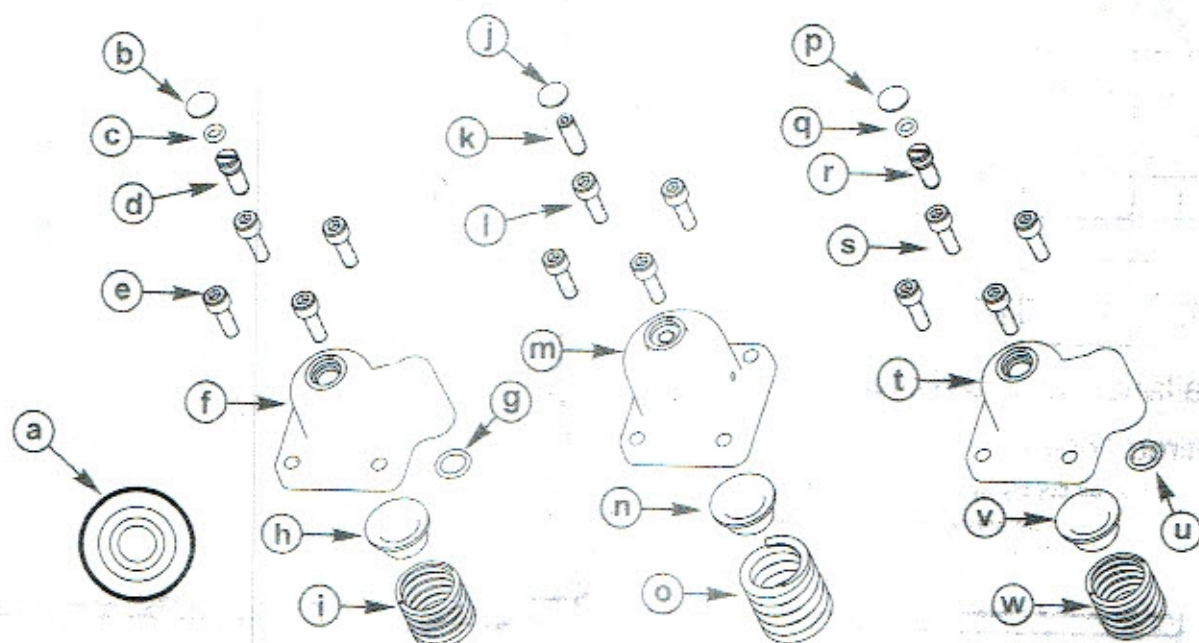


OPTIMAX FUEL/AIR DIAPHRAGM KIT

IMPORTANT: This document guides our dealers, boatbuilders, and company service personnel in the proper installation or service of our products. If you have not been trained in the recommended servicing or installation procedures for these or similar Mercury Marine products, have the work performed by an authorized Mercury Marine dealer technician. Improper installation or servicing of the Mercury product could result in damage to the product or personal injury to those installing or operating the product.

NOTE: After completing installation, place these instructions with the product for the owner's future use.

Components Contained in Kits



57118

Diaphragm Service Kit 8M6002988

Ref.	Qty.	Description	Part Number
a	1	Diaphragm	NSS

Fuel Regulator Service Kit 8M6002989

Ref.	Qty.	Description	Part Number
b	1	Expansion plug	NSS
c	1	O-ring	NSS
d	1	Fuel regulator adjusting screw	NSS
e	4	Stainless steel screw	NSS
f	1	Regulator cover	NSS
g	1	O-ring	NSS
h	1	Spring retainer	NSS
i	1	Spring	NSS

Air Regulator Service Kit 8M6002991

Ref.	Qty.	Description	Part Number
j	1	Expansion plug	NSS
k	1	Air regulator adjusting screw	NSS

Ref.	Qty.	Description	Part Number
l	4	Stainless steel screw	NSS
m	1	Regulator cover	NSS
n	1	Spring retainer	NSS
o	1	Spring	NSS

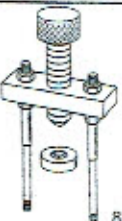
Fuel Regulator Service Kit 8M6002990

Ref.	Qty.	Description	Part Number
p	1	Expansion plug	NSS
q	1	O-ring	NSS
r	1	Fuel adjusting screw	NSS
s	4	Stainless steel screw	NSS
t	1	Regulator cover	NSS
u	1	O-ring	NSS
v	1	Spring retainer	NSS
w	1	Spring	NSS

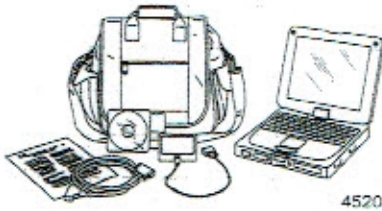
Installation and Calibration

Required Tools

- A shop air supply system capable of supplying at least 689.5–758.4 kPa (100–110 psi)
- The appropriate service manual for the outboard being serviced
- Air regulator installation tool

Air Regulator Installation Tool	91-889431
 8291	Compresses the air regulator spring to allow installation of assembly screws.

- A laptop computer equipped with the Mercury computer diagnostic system (CDS)

Computer Diagnostic System (CDS)	Order through Bosch Automotive Service Solutions, LLC
 4520	Monitors all electrical systems for proper function, diagnostics, and calibration purposes. For additional information, pricing, or to order the computer diagnostic system contact: Bosch Automotive Service Solutions, LLC 28635 Mound Rd. Warren, MI 48092 or call: USA - 1-800-345-2233 Canada - 800-345-2233 Europe - 49 6182 959 149 Australia - (03) 9544 6222

- A gearcase flush attachment, test tank, or a suitable body of water for in-the-water testing
- The pressure transducer kit is required to connect to the CDS and accurately measure the regulator pressures. The digital pressure meter and dual fuel/air pressure gauge kit diagnostic tools are not suitable for the sensitive calibration requirements of this procedure.

Pressure Transducer Kit	8M6003390
 57975	Used in conjunction with the computer diagnostic system (CDS) to precisely measure fuel and air rail pressures.

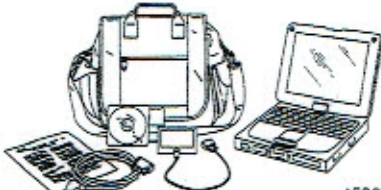
IMPORTANT: The pressure transducer kit must be used to correctly calibrate and verify the fuel and air rail pressures to meet emissions regulations. Engine running issues or spark plug fouling issues will not be covered under warranty if this transducer is not used during the repair process.

Diaphragm Replacement Only

IMPORTANT: Refer to the following instructions when only the diaphragms require replacement, and no other parts were replaced or adjusted.

IMPORTANT: Refer to the appropriate outboard service manual for the pressure specifications of the outboard being serviced.

1. Refer to the appropriate outboard service manual to replace the damaged diaphragm and install the fuel/air rails.
2. Connect the pressure transducer to a laptop computer equipped with the Mercury computer diagnostic system (CDS).

Computer Diagnostic System (CDS)	Order through Bosch Automotive Service Solutions, LLC
 4520	Monitors all electrical systems for proper function, diagnostics, and calibration purposes. For additional information, pricing, or to order the computer diagnostic system contact: Bosch Automotive Service Solutions, LLC 28635 Mound Rd. Warren, MI 48092 or call: USA - 1-800-345-2233 Canada - 800-345-2233 Europe - 49 6182 959 149 Australia - (03) 9544-6222

3. Connect the pressure transducer to the air or fuel side Schrader valve (depending on which diaphragm was replaced).
4. Provide the engine with cooling water for a running test using a gearcase flush attachment, test tank, or lake.
5. Start the engine and allow it to reach operating temperature.
6. With the engine in neutral, advance the throttle until the engine reaches 1000 RPM $\pm$ 100 RPM.
7. Check the pressure reading on the computer screen. Record the pressure reading.
8. Adjust the regulator adjusting screw as needed to meet the specifications for the engine being worked on. If the screw is set in place with Loctite and cannot be adjusted, replace the regulator cover, spring, and spring retaining cup. Refer to **Regulator and Diaphragm Replacement** and the appropriate outboard service manual.
 - a. If the air regulator diaphragm was replaced, remove the transducer fitting from the air side Schrader valve and install it onto the fuel side Schrader valve to measure the fuel pressure. Record the pressure reading.
 - b. If the fuel regulator diaphragm was replaced, remove the transducer fitting from the fuel side Schrader valve and install it onto the air side Schrader valve to measure the air pressure. Record the pressure reading.

IMPORTANT: The resulting delta pressure (pressure difference) should be 72.4 kPa (10.5 psi) for engines with blue or black air injector systems, or 97.2 kPa (14.1 psi) for engines with gray air injector systems.

IMPORTANT: Refer to the appropriate outboard service manual for the pressure specifications of the outboard being serviced.

CAUTION

Failure to release pressure from the fuel system will result in fuel spraying out, which can cause a fire or explosion. Allow the engine to cool completely and release all fuel pressure before servicing any part of the fuel system. Always protect eyes and skin from pressurized fuel and vapors.

IMPORTANT: Bleed the fuel pressure off in a safe manner before disconnecting the transducer fitting from the fuel side Schrader valve. Collect any excess fuel in an environmentally friendly manner.

- c. If the fuel or air delta pressures do not meet specification, refer to **Regulator and Diaphragm Replacement**.

9. Return the engine to idle speed, then stop the engine.
10. Remove the pressure transducer fitting from the fuel or air side Schrader valve.
11. Disconnect the transducer from the computer.
12. Start the engine and verify the engine running quality.

Regulator and Diaphragm Replacement

IMPORTANT: Refer to the following instructions if the regulator cover, spring, retainer, and diaphragms require replacement or adjustment.

IMPORTANT: Refer to the appropriate outboard service manual for the pressure specifications of the outboard being serviced.

NOTE: Use a 2.5 mm hex Allen wrench to adjust the air pressure regulator screw, and a straight-blade screwdriver to adjust the fuel pressure regulator screw. Clockwise rotation of the adjusting screws increases the fuel or air pressure.

1. Remove the engine air compressor inlet line from the fuel rail on V6 OptiMax engines. For 3-cylinder OptiMax engines, remove the plug on the top of the fuel rail (do not discard) and insert an air compressor inlet rail fitting.
2. Using the shop air regulator, regulate the shop air pressure to the rail using a laptop computer equipped with the Mercury computer diagnostic system (CDS) and the pressure transducer. The transducer should be located 25.4–40.6 cm (10–16 in.) from the engine air compressor inlet on the fuel rail.

3. Adjust the shop air supplied to the rail to 689.5–758.4 kPa (100–110 psi) deadheaded. A shutoff valve will be needed to deadhead the air at the rail inlet.

4. Connect the pressure transducer to the air side Schrader valve on the fuel rail.

5. Connect the shop air to the engine air compressor inlet fitting on the fuel rail.

NOTE: Shop air must be regulated to obtain the correct bypass air flow. You may hear a humming sound in the fuel/air rail system when the regulator on the fuel/air rail is open and bypassing excess air.

6. If air pressure regulator adjustment is required, use a 2.5 mm hex Allen wrench to adjust the air pressure to the specified pressure.

NOTE: If the air pressure supply from the shop compressor drops below the regulated pressure, or if the shop compressor cycles, stop the adjustment process until the shop air stabilizes.

7. Record the air pressure reading.

8. Remove the transducer fitting from the air side Schrader valve.

9. If only adjusting the air regulator, skip ahead to step 17.

10. For fuel pressure adjustment, leave the shop air pressure connected to the air side to obtain the correct air flow through the air regulator.

11. Install the transducer fitting onto the fuel side Schrader valve to measure the fuel pressure.

12. Ensure that there is fuel in the fuel system. Run the fuel pumps using the CDS.

13. Use a flat blade screwdriver to adjust the fuel pressure to the correct delta pressure specification, using the previously recorded air pressure measurement as a reference.

IMPORTANT: The resulting delta pressure (pressure difference) should be 72.4 kPa (10.5 psi) for engines with blue or black air injector systems, or 97.2 kPa (14.1 psi) for engines with gray air injector systems.

IMPORTANT: Refer to the appropriate outboard service manual for the pressure specifications of the outboard being serviced.

NOTE: If the air pressure supply from the shop compressor drops below the regulated pressure, or if the shop compressor cycles, stop the adjustment process until the shop air stabilizes.

IMPORTANT: Do not run the fuel pumps for more than one minute, as the fuel system may overheat without the engine running. If necessary to restart the fuel pumps, allow the fuel to cool for 2–3 minutes before restarting the fuel pumps.

14. Stop the fuel pumps.

15. Remove the air supply from the fuel/air rail.

▲ CAUTION

Failure to release pressure from the fuel system will result in fuel spraying out, which can cause a fire or explosion. Allow the engine to cool completely and release all fuel pressure before servicing any part of the fuel system. Always protect eyes and skin from pressurized fuel and vapors.

16. Bleed the fuel pressure off in a safe manner before disconnecting the transducer fitting from the fuel side Schrader valve. Collect any excess fuel in an environmentally friendly manner.

17. Disconnect the transducer fitting from the fuel side Schrader valve.

18. Install the engine air compressor inlet line onto the fuel rail (on V6 OptiMax engines). For 3-cylinder OptiMax engines, remove the air compressor inlet rail fitting and install the plug into the top of the fuel rail.

19. Install the transducer fitting onto the air side Schrader valve.
20. Provide the engine with cooling water for a running test using a gearcase flush attachment, test tank, or lake.
21. Start the engine and allow it to reach operating temperature.
22. With the engine in neutral, advance the throttle until the engine reaches 1000 RPM $\pm$ 100 RPM.
23. Compare the air pressure measurement to the fuel pressure measurement.
IMPORTANT: The resulting delta pressure (pressure difference) should be 72.4 kPa (10.5 psi) for engines with blue or black air injector systems, or 97.2 kPa (14.1 psi) for engines with gray air injector systems.
24. If the air pressure is not correct, repeat steps 1–12 in **Diaphragm Replacement Only**.
25. Install the transducer fitting onto the fuel side Schrader valve to measure the fuel pressure.
26. Start the engine and allow it to reach operating temperature.
27. With the engine in neutral, advance the throttle until the engine reaches 1000 RPM $\pm$ 100 RPM.
28. Check the fuel pressure.
29. If the fuel pressure is not correct, repeat step 8 in **Diaphragm Replacement Only**.

⚠ CAUTION

Failure to release pressure from the fuel system will result in fuel spraying out, which can cause a fire or explosion. Allow the engine to cool completely and release all fuel pressure before servicing any part of the fuel system. Always protect eyes and skin from pressurized fuel and vapors.

30. Bleed the fuel pressure off in a safe manner before disconnecting the transducer fitting from the fuel side Schrader valve. Collect any excess fuel in an environmentally friendly manner.
31. Disconnect the transducer fitting from the fuel side Schrader valve.
32. Disconnect the transducer from the computer.
33. Start the engine and verify the engine running quality.
34. Apply Loctite 290 to the top of the regulator adjusting screws in the regulator covers.

Tube Ref No.	Description	Where Used	Part No.
 67	Loctite 290	Top of the screws in the regulator covers	Obtain Locally

35. Install expansion plugs in the top of the regulator covers.

Products of Mercury Marine
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Fond du Lac, WI 54936-1939

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