
INSTALLATION INSTRUCTIONS

Original Issue Date: **6/05**
 Model: **30-45 kW with Ford CSG-649 Engine**
 Market: **Industrial**
 Subject: **Sensor Manifold Service Kit GM40062**

Introduction

This instruction details replacing the 255170 sensor manifold with sensor manifold service kit GM40062 that includes replacement sensor manifold 273659. See Figure 1. The 255170 sensor manifold was typically used on 30-45 kW generator sets with the Ford 6-cylinder CSG-649 engine. These instructions deal with this engine application.

There may be instances where this kit is provided for other applications. In these cases, the instructions shown may serve only as a reference. Use the original component configuration as a guideline for installing the new kit.

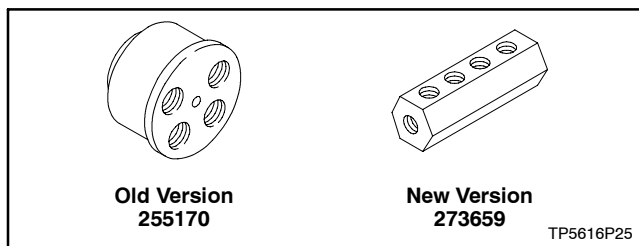


Figure 1 Sensor Manifold

Items Needed

The following items are needed beyond the typical technician tools:

- Pipe sealant
- Loctite® Threadlocker 272 (red) or equivalent
- Hardwood dowel (sized slightly smaller than the freeze plug outside diameter of 52 mm [2 in.])

Safety Precautions

Observe the following safety precaution when installing the mount kit.

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⚠ WARNING



Accidental starting.
Can cause severe injury or death.

Disconnect the battery cables before working on the generator set. Remove the negative (-) lead first when disconnecting the battery. Reconnect the negative (-) lead last when reconnecting the battery.

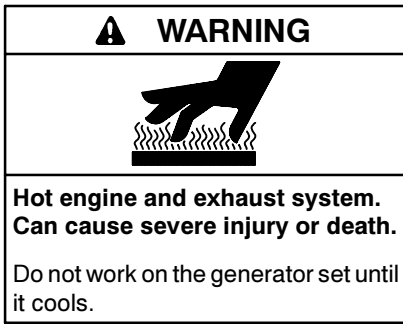
Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or connected equipment, disable the generator set as follows: (1) Move the generator set master switch to the OFF position. (2) Disconnect the power to the battery charger. (3) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent starting of the generator set by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer.

⚠ WARNING



Hot coolant and steam.
Can cause severe injury or death.

Before removing the pressure cap, stop the generator set and allow it to cool. Then loosen the pressure cap to relieve pressure.



Checking the coolant level. Hot coolant can cause severe injury or death. Allow the engine to cool. Release pressure from the cooling system before removing the pressure cap. To release pressure, cover the pressure cap with a thick cloth and then slowly turn the cap counterclockwise to the first stop. Remove the cap after pressure has been completely released and the engine has cooled. Check the coolant level at the tank if the generator set has a coolant recovery tank.

Installation Procedure

1. Remove the generator set from service.

- 1.1 Place the generator set start/stop switch in the OFF/RESET position.
- 1.2 Disconnect the power to the battery charger, if equipped.
- 1.3 Disconnect the power to the block heater, if equipped.
- 1.4 Disconnect the generator set engine starting battery(ies), negative (-) lead first.

2. Locate and remove the existing sensor manifold and components.

The sensor manifold is at the back of the engine block. See Figure 2.

- 2.1 Allow the generator set to cool if the unit was recently operating.
- 2.2 Drain the coolant into a suitable container. Open the drain petcocks located at the bottom of the engine block and/or radiator. Drain the coolant to just below the sensor manifold port location.
- 2.3 Disconnect the wires from the sensors. Mark each sensor and wire as needed for replacement later.
- 2.4 Remove the sensors from the sensor manifold.
- 2.5 **Block heater models only.** Loosen the hose clamp and disconnect the hose from the hose fitting at the sensor manifold. See Figure 2.

Remove the hose connector, pipe elbow, and pipe from the sensor manifold. Make note of the pipe elbow position for installation later.

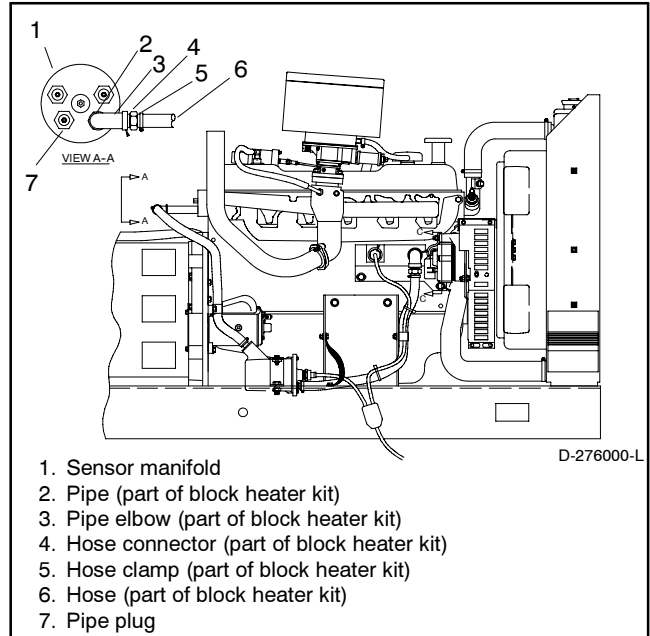


Figure 2 Coolant Temperature Sender Location (shown with block heater kit components)

- 2.6 Remove the sensor manifold and components from the engine block. The sensor manifold and components shown in Figure 3 will not be reused.

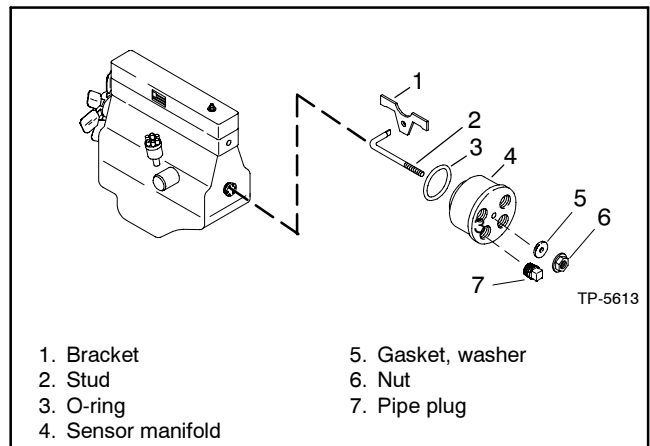


Figure 3 Existing Sensor Manifold and Components

3. Install the freeze plug.

- 3.1 Clean the freeze plug hole in the engine block and freeze plug adapter 326307.
- 3.2 Apply Loctite® threadlocker 272 (red) or equivalent to freeze plug adapter and engine block hole.

- 3.3 Install freeze plug adapter using a hardwood dowel and hammer. Drive the freeze plug adapter into the engine block so that it is flush with the outside surface of the engine block. Do NOT drive the freeze plug adapter beyond that point or it may be forced into the water jacket.
- 3.4 **Non-block heater models.** Apply pipe sealant to the threads of pipe plug X-75-3 and install into the freeze plug adapter.
- 3.5 **Block heater models.** Refer to Figure 2 and items 2–6 when replacing the existing parts.
 - 3.5.1 Apply pipe sealant to the threads of one end of the existing pipe and install into the freeze plug adapter.
 - 3.5.2 Coat the threads of the remaining end of the pipe and install the existing pipe elbow in the original position.
 - 3.5.3 Apply pipe sealant to the threads of the existing hose connector and install in the pipe elbow.
 - 3.5.4 With the hose clamp loosely on the existing hose, attach the existing hose to the hose connector. Position and tighten the hose clamp.

4. Remove the thermostat housing to water pump hose.

- 4.1 Locate the thermostat housing and loosen the hose clamp. See Figure 4.

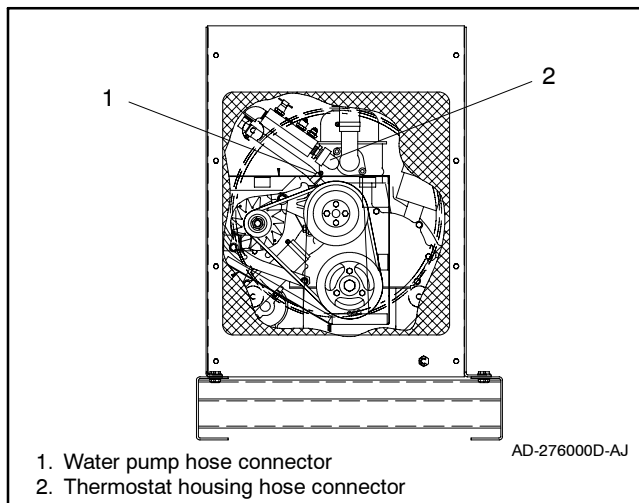


Figure 4 Thermostat Housing to Water Pump Hose Locations.

- 4.2 Remove the hose from the hose connector and remove the hose connector from the thermostat housing. The hose and hose connector will not be reused.
 - 4.3 Locate the water pump and loosen the hose clamp on the hose from the thermostat housing.
 - 4.4 Remove the hose from the water pump hose connector. The hose will not be reused.
- #### 5. Install the sensor manifold.
- 5.1 Apply pipe sealant to reducer bushing X-202-41 and install in the thermostat housing. See Figure 5.

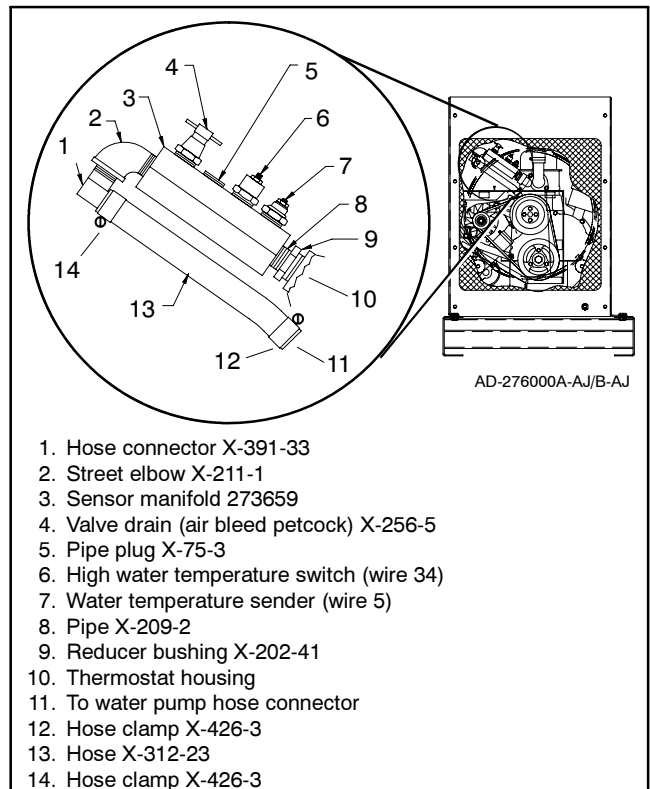


Figure 5 Installing Sensor Manifold

- 5.2 Coat one end of pipe X-209-2 with pipe sealant and install in reducing bushing.
- 5.3 Coat the remaining end of the pipe and install sensor manifold 273659. Position the sensor manifold ports as shown in Figure 5.
- 5.4 Apply pipe sealant to the male threads of street elbow X-211-1 and install in sensor manifold. Position the street elbow as shown in Figure 5.
- 5.5 Coat the threads of hose connector X-391-33 with pipe sealant and install in the street elbow. Position the hose connector as shown in Figure 5.

5.6 Attach hose X-312-23 to the hose connector. Slide hose clamp X-426-3 over the hose and tighten at hose connector location.

5.7 Slide the second hose clamp X-426-3 over the hose and attach the hose to the water pump hose connector. Position and tighten the hose clamp at the water pump hose connector position.

6. Install components in the sensor manifold.

6.1 Apply pipe sealant to the water temperature (WT) sender threads and install in the sensor manifold port nearest to the thermostat housing.

6.2 Apply pipe sealant to the high water temperature (HWT) switch threads and install in the sensor manifold port next to the WT sender.

6.3 Apply pipe sealant to pipe plug X-75-3 threads and install in the sensor manifold port next to the HWT switch.

6.4 Apply pipe sealant to valve drain (air bleed petcock) X-256-5 threads and install in remaining port of the sensor manifold. Close air bleed petcock if not already done.

6.5 Attach wire 5 to the WT sender.

6.6 Attach wire 34 to the HWT switch.

7. Fill the radiator with coolant.

7.1 Close all the drain petcocks located at the bottom of the engine block and/or radiator.

7.2 Refill the cooling system at the radiator. See the respective spec sheet for coolant capacity.

Reuse the existing drained coolant if deemed acceptable. Otherwise, mix clean distilled water and coolant according to the engine manufacturer's recommendation in the engine operation manual.

Dispose of all waste materials (engine oil, fuel, coolant, etc.) in an environmentally safe manner. Contact local authority for procedures.

7.3 Open the air bleed petcock located in the sensor manifold to remove air from the cooling system. Close the air bleed petcock when coolant starts to flow out. Use a rag to clean up all spilled coolant.

7.4 Replace the radiator cap.

8. Place the generator set into service.

8.1 Place the generator set start/stop switch in the OFF/RESET position.

8.2 Reconnect the generator set engine starting battery(ies), negative (-) lead last.

8.3 Reconnect the power to the battery charger, if equipped.

8.4 Place the generator set master switch in the RUN position to start the generator set.

8.5 Check for leaks when the unit reaches operating temperature.

8.6 Place the generator set master switch in the OFF/RESET position to stop the generator set.

8.7 After the unit cools, repair any coolant leaks. Use a rag to clean up all spilled coolant.

8.8 Open the air bleed petcock located in the sensor manifold to remove any remaining air from the cooling system. Close the air bleed petcock when coolant starts to flow out. Use a rag to clean up all spilled coolant.

8.9 Add coolant to the coolant recovery tank as needed.

8.10 Reconnect the power to the block heater, if equipped.

Parts Lists

Kit: GM40062		
Qty.	Description	Part No.
1	Manifold, temperature switch	273659
1	Elbow, street 1/2 NPTF	X-211-1
1	Elbow, 5/8 in. ID hose	X-391-33
2	Clamp, hose 1 in.	X-426-3
1	Hose, 5/8 in. ID	X-312-23
1	Nipple, pipe 1/2 NPT x 1 3/16	X-209-2
1	Bushing, reducer 1/2 F x 3/4 M	X-202-41
2	Plug, pipe 1/2 NPTF	X-75-3
1	Drain valve 1/2 NPTF	X-256-5
1	Adapter, freeze plug 1/2 NPTF	326307