INSTALLATION INSTRUCTIONS

Original Issue Date: **9/05**
Model: **80–125 kW with GM 8.1 L Engine and 550 Controller**
Market: **Industrial**
Subject: **Coolant Temperature Sender Relocation Service Kit GM42168-KP1**

Introduction

This instruction details relocation of the coolant temperature sender. The coolant temperature sender location above the engine thermostat tends to be lower than the actual engine temperature until the engine thermostat opens. This condition occurs only in ambient temperatures that fall below –1°C (30°F).

The service kit relocates the coolant temperature sender to the engine side of the thermostat and adds a low coolant temperature switch. The instruction deals with a unit equipped with a block heater. The actual instruction will vary if the respective unit does not have a block heater.

Items Needed

The following items are needed beyond the typical technician tools:

- PC (see System Requirements following)
- See TT-1285 or go to TechTools on the KOHLERnet for Program Loader software information. Use your SecurID to access the KOHLERnet, click on the TechTools button, and follow the instructions to request files.
- Select TP-6200 or MP-6200, 550 Controller Operation Manual for *Software Version 2.10 or Higher*
- Select TP-6083 or MP-6083, 550 Controller Operation Manual for *Software Versions Prior to 2.10*
- Pipe sealant
- Cable ties
- Electrical tape

Note: Refer to Section 6 in this document to determine software code version.

System Requirements

- 100% IBM®PC compatible with a 133 MHz or higher Pentium®compatible CPU.
- Microsoft®Windows®98, Windows NT®Workstation Version 4.0, Windows®2000 Professional, Windows®Me, or Windows XP®operating system.
- CD-ROM drive and minimum of 4 MB hard drive space for installation.
- One 57.6k baud RS-232 serial port, numbered between COM1 and COM16.
- Computers running Windows®2000 and communicating through USB ports may require a serial adapter card to connect the PC to the ATS controller. (The Socket™ [product of Socket Communications, Inc.] PCMCIA Serial Adapter card is one example).
- Stable power supply. A laptop system with a fully charged battery or desktop system running with a battery backup system is recommended.
- Null modem RS-232 cable with a 9-pin male plug on the controller end (GM16657).

Monitoring Software

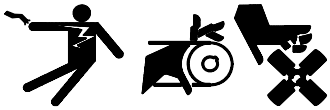
Note: Monitor II or Monitor III software and manual are required only if Step 7.7 is selected.

- Monitor II Software and TP-6194/MP-6194 Operation Manual
- Monitor III Software and TP-6347/MP-6347 Operation Manual

Safety Precautions

Observe the following safety precaution when installing the mount kit.

⚠ 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.

⚠ WARNING

Hot engine and exhaust system.
Can cause severe injury or death.

Do not work on the generator set until it cools.

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 master 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.

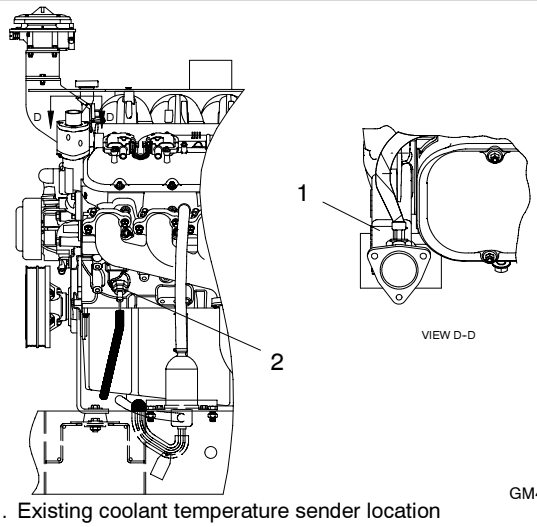
2. Remove the existing components and install the kit.

2.1 Allow the generator set to cool if the unit was recently operated.

2.2 Drain coolant into a suitable container. Open the drain petcocks located at the bottom of the engine block and/or radiator. Drain all of the coolant from the generator set.

2.3 Disconnect lead 5 from the coolant temperature sensor.

2.4 Remove the coolant temperature sensor from the aluminum spacer above the engine thermostat. See Figure 1.



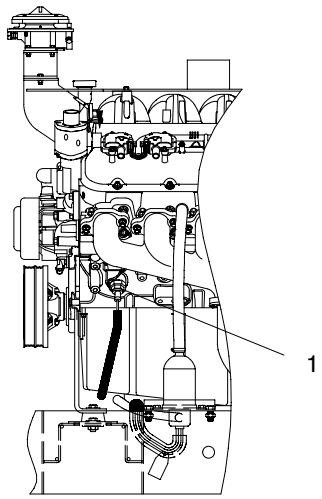
1. Existing coolant temperature sender location
2. New coolant temperature sender location

Figure 1 Coolant Temp. Sender Existing Location

2.5 Apply pipe sealant to pipe plug X-75-28 and install in threaded hole at engine thermostat.

2.6 Unplug the block heater cord from the block heater thermostat.

2.7 Remove the existing block heater thermostat from thermostat well in the 28 mm port in the lower left front of the engine block. The existing block heater thermostat will not be reused. See Figure 2.



1. Existing block heater thermostat location

Figure 2 Existing Block Heater Thermostat Location (28 mm port)

2.8 Remove the existing thermostat well (adapter) from the 28 mm port in the lower left front of the engine block. The existing thermostat well will not be reused.

2.9 Install adapter bushing with washer GM42166 in the 28 mm port of the engine block. See Figure 3.

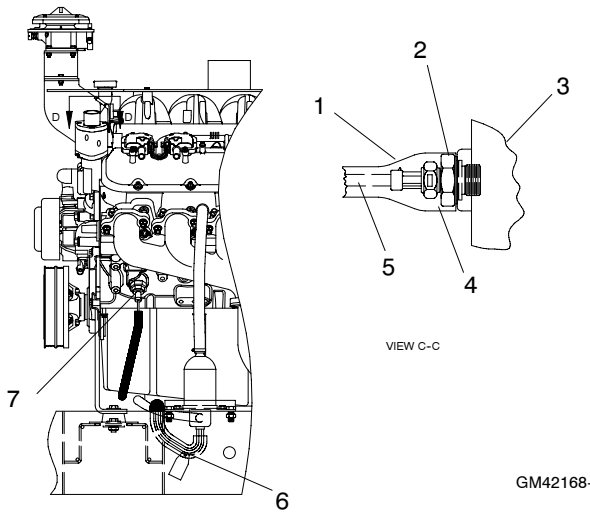
2.10 Apply pipe sealant to the existing coolant temperature sender and install in the adapter bushing.

2.11 Locate the existing pipe tee on the right side of the engine where the block heater hose emerges from the center of the cylinder head. See Figure 4.

2.12 Remove the pipe plug from the existing pipe tee. The existing pipe plug will not be reused.

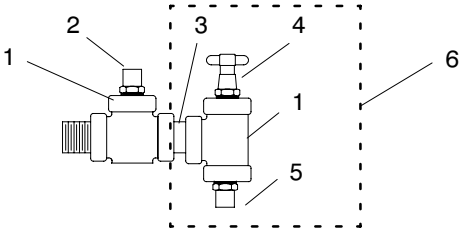
2.13 Remove the pipe nipple, air bleed valve, pipe tee, and pipe plug as an **assembly** from the existing pipe tee. See Figure 4.

2.14 Remove only the existing pipe tee from the engine block and leave the existing pipe nipple attached to the engine block. The existing pipe tee will not be reused.



1. Heat shield GM23718
2. Adapter bushing with washer GM42166
3. Engine block
4. Existing coolant temperature sender
5. Shielded cable
6. Route block heater thermostat cord
7. New coolant temperature sender location

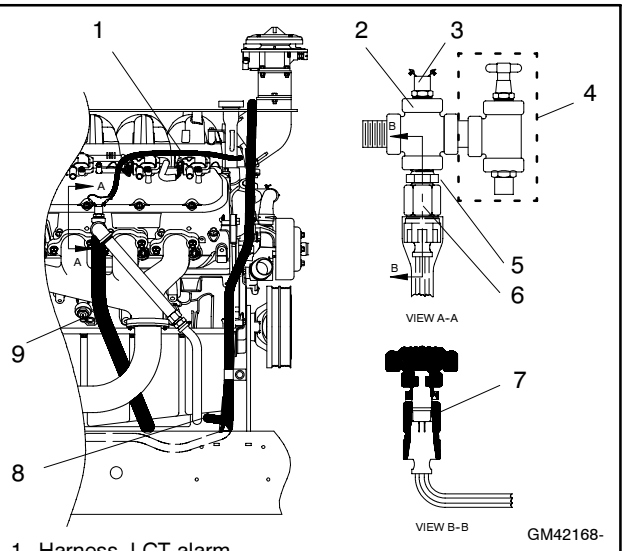
Figure 3 New Coolant Temperature Sender Location (28 mm port)



1. Existing pipe tee
2. Existing pipe plug
3. Existing pipe nipple
4. Existing air bleed valve
5. Existing pipe plug
6. Assembly

Figure 4 Existing Pipe Tee Configuration

2.15 Apply pipe sealant to the male threads of the existing pipe nipple and attach pipe cross X-207-7. See Figure 5.



1. Harness, LCT alarm
2. Pipe cross X-207-7
3. Low coolant temperature switch 290090
4. Existing assembly
5. Pipe adapter X-202-46
6. Thermostat well GM42164
7. Thermostat GM42165
8. Shielded cable and heat shield to coolant temp. sender
9. Heat shield GM23718

Figure 5 Attaching Pipe Cross

2.16 Apply pipe sealant to threads of low coolant temperature switch 290090 and install in the pipe cross top port.

2.17 Apply pipe sealant to the male threads of the pipe nipple, air bleed valve, pipe tee, and pipe plug assembly and install in the pipe cross side port as shown in Figure 5.

2.18 Apply pipe sealant to the threads of pipe adapter X-202-46 and install in the pipe cross bottom port.

2.19 Apply pipe sealant to the threads of thermostat well GM42164 and install on the pipe adapter.

2.20 Place block heater thermostat GM42165 in the thermostat well.

3. Complete the electrical connections.

3.1 Route the existing block heater thermostat cord under the oil pan to the engine right side and attach to the thermostat well. Torque the plastic nut on block heater thermostat cord to 2.7 Nm (25 in. lb.).

3.2 Use the existing heat shield on the block heater thermostat cord to protect the cord from the exhaust manifold area.

3.3 Install heat shield GM23718 over wiring harness GM42167 and connect leads 35A and N to the low coolant temperature switch. The low coolant temperature switch terminals are not polarized.

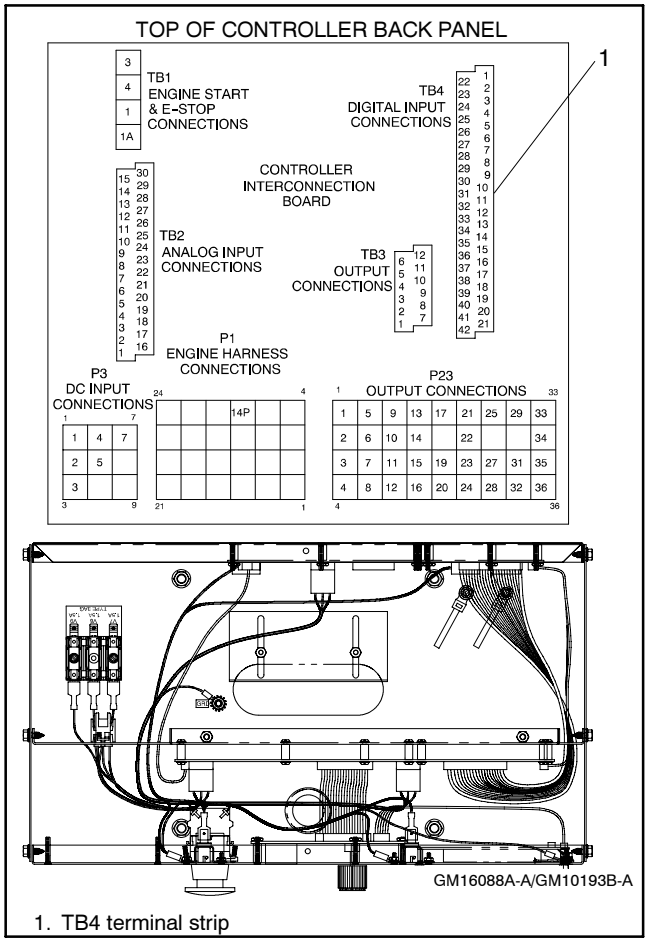
3.4 Position the heat shield to protect the leads from the exhaust manifold.

3.5 Remove the controller screws and cover.

3.6 Connect the remaining leads of wiring harness GM42167 by attaching lead N to an available engine block ground.

3.7 Connect lead 35A to TB4-10 in the controller. Run lead 35A along the existing engine wiring harness, through the junction box grommet, and through the controller bottom grommet to terminal block TB4-10. See Figure 6.

3.8 Use cable ties and/or electrical tape (not supplied) to secure the wiring.



1. TB4 terminal strip

Figure 6 Terminal Strips on Controller Interconnection Circuit Board (controller back panel folded down)

3.9 On units with a customer connection circuit board, move Relay Drive Output leads K5A and 35 from TB6, RD05 to TB8, RD021

3.10 Replace the controller cover and screws.

4. Fill the radiator with coolant.

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

4.2 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.

4.3 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.

4.4 Replace the radiator cap.

5. Place the generator set into service.

5.1 Place the generator set master switch in the OFF/ RESET position.

5.2 Reconnect the generator set engine starting battery(ies), negative (–) lead last.

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

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

5.5 Check for leaks when the unit reaches operating temperature.

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

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

5.8 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.

5.9 Add coolant to the coolant recovery tank as needed.

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

6. Install the new personality profile.

6.1 Attach the user-supplied null modem RS-232 cable with a 9-pin male plug on the controller end (GM16657) to the controller and user-supplied PC.

6.2 Go to Menu 14—Programming Mode and enable remote programming.

6.3 Install the supplied personality profile CD in the user-supplied PC.

6.4 Follow the instructions with the supplied CD to download the personality profile using Program Loader.

7. Program the 550 controller.

7.1 Go to Menu 20—Factory Setup and determine the software (code) version.

550 Controller *version 2.10 or higher,* use TP-6200 or MP-6200, 550 Controller Operation Manual.

550 Controller *version prior to 2.10,* use TP-6083 or MP-6083, 550 Controller Operation Manual.

7.2 Go to Menu 14—Programming Mode and enable local programming.

7.3 Go to Menu 6—Time and Date to establish day of week, time, and date.

7.4 Go to Menu 9—Input Setup to configure to sender and switch setup.

7.4.1 Press the down arrow key to Setup Digital Auxiliary Inputs.

7.4.2 Continue to press the down arrow key to Digital Input 10 Warning.

7.4.3 Press the right arrow key.

7.4.4 Display shows Digital Input 10 Warning Yes.

7.4.5 Press the right arrow key to Digital Input 10 Enabled—XX.

7.4.6 If the display indicates Digital Input 10 Enabled—**Yes**, go to step 7.4.9.

If the display indicates Digital Input 10 Enabled—**No**, go to the next step.

7.4.7 Press the Yes key and Enter key.

7.4.8 Display shows Digital Input 10 Enabled—Yes.

7.4.9 Press the right arrow key to Digital Input 10 Inhibit Time 0:00. If the display does not show 0:00. press 0 and then Enter.

7.4.10 Press the right arrow key to Digital Input 10 Delay Time 0:00. If the display does not show 0:00. press 0 and then Enter.

7.4.11 Press the right arrow key to return to Digital Input 10 Warning.

7.5 Go to Menu 10—Output Setup.

7.5.1 Press the down arrow key twice to Relay Driver Output (RDO) 01.

7.5.2 Press 21 and press Enter.

7.5.3 Continue to press the right arrow key to Digital Inputs.

7.5.4 Continue to press the down arrow key to D10.

7.5.5 Press the Yes key.

7.5.6 Press the Enter key.

7.6 The controller currently configures the Low Coolant Temperature (LCT) fault as a *Warning* display.

If the user requires the display to show *Low Coolant Temp Warning*, go to step 7.7.

If the display *Warning* is acceptable, go to step 7.8.

7.7 Go to Menu 14—Programming Mode and select programming remote.

7.7.1 Open **Monitor II (TP-6194/MP-6194**) or **Monitor III (TP-6347/MP-6347)** software on the user's PC and follow the instructions. Use the Operation Manual as needed.

7.7.2 Open the Digital Input data window for the 550 controller.

7.7.3 **Monitor II.** Select Data Window>Setup.

Monitor III. Double left mouse click on the line for Digital Input 10 in the display window.

7.7.4 In the box next to ID type *Low Coolant Temp.*

7.7.5 Click OK to save the settings.

7.8 Go to Menu 14—Programming Mode and select programming off.

Parts List

Kit: GM42168-KP1		
Qty.	**Description**	**Part No.**
1	Plug, 1/2 NPTF pipe	X-75-28
1	Adapter, pipe	X-202-46
1	Cross, 1/2 NPT pipe	X-207-7
1	Low coolant temperature switch	290090
1	Heat shield	GM23718
1	Well, thermostat	GM42164
1	Thermostat, block heater 49°C-60°C (120°F-140°F)	GM42165
1	Bushing, adapter M28 F x 1/2 NPT M	GM42166
1	Harness, wiring	GM42167
1	CD, personality profile (based on generator set serial number)	—