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## INSTALLATION INSTRUCTIONS

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### Block Heater Kit (Tank Type) PA-292926 for 400/450/500kW (Cummins Powered) Standby Generator Sets

The block heater kit heats the engine coolant, making starting easier and warm-up quicker while reducing energy costs. The thermostat will automatically turn off the heater when the coolant temperature reaches 120° F (49° C).

#### NOTE

The block heater will fail if the heating element is not immersed in coolant. Always disconnect power to the block heater before draining coolant. Fill the engine block with coolant prior to reconnecting power to block heater. The block heater element **MUST** be immersed in engine coolant before being energized. Air must be purged from the system before energizing the block heater or the heater element may fail.



#### ⚠ WARNING

##### Accidental starting.

##### Can cause severe injury or death.

Disconnect battery cables before working on generator set (negative lead first and reconnect it last).

**Accidental starting can cause severe injury or death.** Turn generator master switch to OFF position, disconnect power to battery charger, and remove battery cables (remove negative lead first and reconnect it last) to disable generator set before working on any equipment connected to generator. The generator set can be started by automatic transfer switch or remote start/stop switch unless these precautions are followed.

#### ⚠ WARNING



##### Hazardous voltage.



##### Moving rotor.

##### Can cause severe injury or death.

Do not operate generator set without all guards and electrical enclosures in place.

**Exposed moving parts can cause severe injury or death.** Keep hands, feet, hair, and clothing away from belts and pulleys when unit is running. Replace guards, covers, and screens before operating generator set.

#### ⚠ WARNING



##### Hot coolant and steam.

##### Can cause severe injury or death.

Before removing pressure cap stop generator, allow to cool and loosen pressure cap to relieve pressure.

**Hot coolant can cause severe injury or death.** Allow engine to cool and release pressure from cooling system before opening pressure cap. To release pressure, cover the pressure cap with a thick cloth then turn it slowly counterclockwise to the first stop. After pressure has been completely released and the engine has cooled, remove cap. If generator set is equipped with a coolant recovery tank, check coolant level at tank.

## INSTALLATION

1. Place generator master switch in OFF position. Disconnect battery cables, negative lead first. Disconnect battery charger leads (if equipped).
2. With engine sufficiently cooled, drain the coolant from the radiator and engine block into a suitable container. Dispose of used engine coolant in an environmentally safe manner. **DO NOT POUR USED COOLANT ON THE GROUND, DOWN SEWERS, OR INTO STREAMS OR OTHER BODIES OF WATER.**

### NOTE

Engine coolant petcock valves are located on bottom of radiator and engine block.

3. Using the block heater bracket (282923) as a template, drill two 0.406-inch (10 mm) diameter holes in the generator skid. Locate the center of the front bracket hole 66.5 inches (1.69 m) from the front of the skid (see Figure 1).

### NOTE

Observe all appropriate safety procedures for use of power tools when drilling holes. Remove all burrs and metal chips from the work area before continuing installation procedure.

4. Install block heater bracket with two 3/8-16 x 1.25-in. hex screws (X-6238-4), plain washers (X-25-37) and whiz nuts (X-6210-9).
5. Install conduit junction box (245804) on mounting bracket with two 1/4-20 x 0.625-in. hex screws (X-465-2), plain washers (X-25-40), and whiz nuts (X-6210-2).
6. Install block heater (A-290251) on bracket with four 1/4-20 x 0.875-in. hex screws (X-465-18), plain washers (X-25-40), and whiz nuts (X-6210-2).
7. Assemble drain valve (X-256-3) and 1/4-in. street elbow (X-211-6) and install in block heater.

### NOTE

Apply thread sealant to all threaded connections to prevent leakage.

8. Assemble one pipe nipple (X-218-24) in each end of pipe tee (X-203-2), and install reducer bushing (AC-1459) in middle position. Install 90° elbow

(X-447-4) in reducer bushing. Install the assembly to block heater intake. Tighten all connections (reducer bushing should be facing up when tight).

9. Install thermostat (A-289340) on pipe nipple. Route thermostat wiring to junction box.
10. Install hose adapter (X-751-1) in thermostat.
11. Remove pipe plug from lower coolant pipe and install hose adapter (X-751-1).
12. Slide one hose clamp (X-426-8) over each end of hose (X-356-22) and then slide over hose adapters. Locate the hose clamps 1/4 inch (6 mm) from hose ends and tighten clamps.
13. Assemble one pipe nipple (X-218-24) in end of pipe tee (X-203-2) and hose adapter (X-751-1) in other end. Install reducer bushing (AC-1459) in middle position. Install the assembly in outlet of block heater. Tighten all connections (reducer bushing should be facing to the front of the engine when tight).
14. Remove pipe plug from upper coolant manifold and install pipe nipple (X-206-9).
15. Assemble one hose adapter (X-751-1) in end of pipe tee (X-203-2) and 1 to 1/2-in. NPT reducer bushing (168848) in the other end. Install 3/4 NPT pipe plug (X-75-18) in reducer bushing. Install reducer bushing (X-202-1) in middle position of pipe tee. Install the assembly on the pipe nipple. Tighten all connections (hose adapter should be facing down when tight).

### NOTE

When anticipatory alarm kit (291626) is used, pipe plug (X-75-18) is not required.

16. Slide one hose clamp (X-426-8) over each end of hose (X-356-31) and then slide over hose adapters. Locate clamps 1/4 inch (6 mm) from hose ends and tighten clamps.
17. Connect 1/4-in. ID x 16-in. flexible line (285639) to pipe tee fittings.
18. Install instruction tag (279047) on block heater housing cap.
19. With the surface clean and dry apply water drain decal (280561) to skid rail below drain valve.

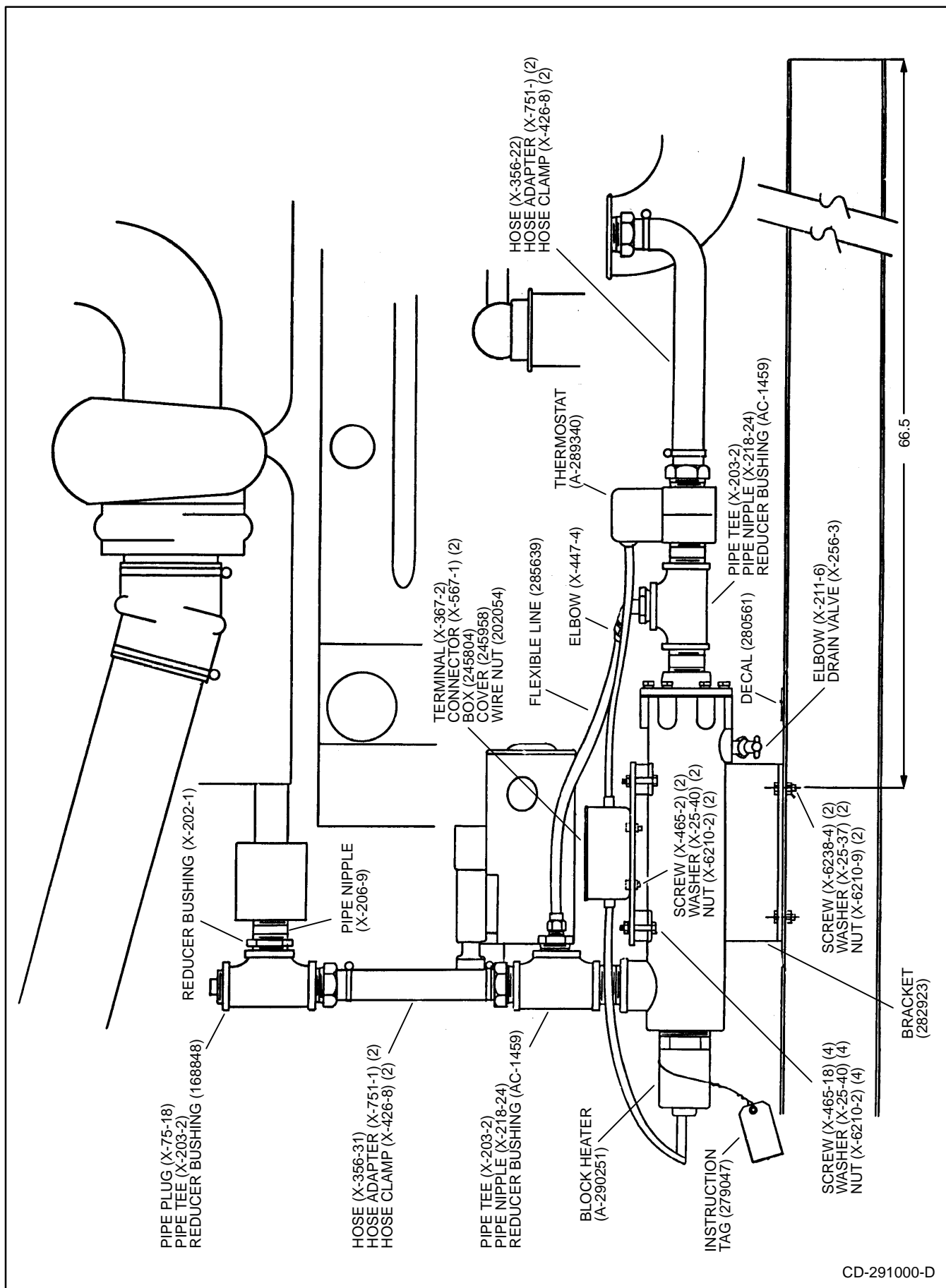
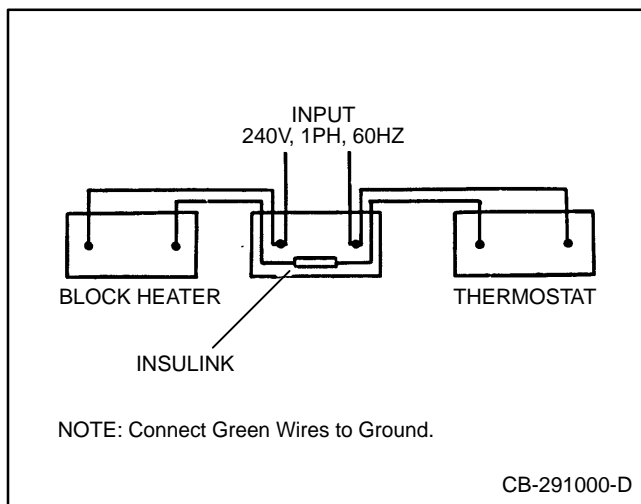


Figure 1. Block Heater Installation



**Figure 2. Electrical Connections**

### **ELECTRICAL CONNECTIONS**

1. Open power source circuit breaker.
2. Remove one knock-out from each end of the conduit junction box and install conduit connectors (X-567-1).
3. Route leads from block heater and thermostat through connectors and make electrical connections as shown in Figure 2 with insulink terminals (X-367-2) and wire nut (202054). Tighten connector clamps.
4. Install conduit junction box cover (245958).

### **REFILL COOLING SYSTEM**

1. Verify that all drain valves on engine and radiator are closed.
2. Fill cooling system to proper level with fresh coolant. A solution of 50% ethylene glycol and 50% clean, softened water is recommended to inhibit rust/corrosion and provide freezing protection. Ensure that all air is bled from the cooling system before energizing the block heater.

#### **NOTE**

Coolant mixtures exceeding 50% ethylene glycol may cause block heater element failure. Failure to bleed all air from system may cause block heater element failure.

3. Check that generator master switch is OFF. Reconnect battery cables, negative lead last. Reconnect battery charger (if equipped).
4. Test run generator for a few minutes to check for leaks. Stop generator set and allow to cool. Check coolant level to insure that all air is purged from the system. Add coolant as necessary to fill system.

#### **NOTE**

Special attention should be given when checking for proper coolant level. After a radiator has been drained, it normally requires some time before complete refill of air cavities takes place. Failure to purge all air from the coolant system may cause damage to the block heater element.

| Parts List |   |             |
|------------|---|-------------|
| Qty.       | Description                                       | Part Number |
| 1          | Thermostat  | A-289340    |
| 1          | Heater  | A-290251    |
| 2          | Bushing, reducer, 1 to 1/8 in. NPT                | AC-1459     |
| 2          | Washer, plain, 0.406 x 0.812 x 0.064 in.          | X-25-37     |
| 6          | Washer, plain, 0.281 x 0.625 x 0.065 in.          | X-25-40     |
| 1          | Bushing, reducer, 1 to 3/4 in. NPT                | X-202-1     |
| 3          | Tee, pipe, black iron, 1 x 1 x 1 in. NPT          | X-203-2     |
| 1          | Nipple, pipe, 3/4 in. NPT x 1.38 in.              | X-206-9     |
| 1          | Elbow, street, black iron, 1/4 in. NPT            | X-211-6     |
| 3          | Nipple, pipe, 1 in. NPT x 1.50 in.                | X-218-24    |
| 1          | Valve, drain, 1/4 in. NPT                         | X-256-3     |
| 1          | Hose, radiator, 1 in. ID x 16.0 in.               | X-356-22    |
| 1          | Hose, radiator, 1 in. ID x 26.0 in.               | X-356-31    |
| 3          | Insulink terminal, 10- 12-gauge                   | X-367-2     |
| 4          | Clamp, hose, 0.81-1.75 in. x 0.56 in.             | X-426-8     |
| 1          | Elbow, oil line connection, 90°, 1/2-20 x 1/8 in. | X-447-4     |
| 2          | Screw, hex, GR5, 1/4-20 x 0.625 in.               | X-465-2     |
| 4          | Screw, hex, GR5, 1/4-20 x 0.875 in.               | X-465-18    |
| 2          | Connector, non-metallic conduit                   | X-567-1     |
| 6          | Nut, whiz, 1/4-20                                 | X-6210-2    |
| 2          | Nut, whiz, 3/8-16                                 | X-6210-9    |
| 2          | Screw, hex, GR5, 3/8-16 x 1.250 in.               | X-6238-4    |
| 1          | Plug, pipe, 3/4 in. NPT                           | X-75-18     |
| 4          | Adapter, hose, 1 in. OD x 1 in. NPT x 2.75 in.    | X-751-1     |
| 1          | Bushing, reducer, black iron, 1 to 1/2 in. NPT    | 168848      |
| 1          | Nut, wire   | 202054      |
| 1          | Box, conduit junction                             | 245804      |
| 1          | Cover, conduit box                                | 245958      |
| 1          | Tag, instruction                                  | 279047      |
| 1          | Decal, water drain                                | 280561      |
| 1          | Bracket, block heater                             | 282923      |
| 1          | Line, flexible 1/4 ID x 16 in.                    | 285639      |