



### Engine Block Heater Service Kits (Tank Type) 17RY/20RZ/30RZ (LSG-423 Ford-Powered) Standby Generator Sets

Model	Voltage	Kit No.
17RY/20RZ	120	276229
17RY/20RZ	240	276230
30RZ	120	276231
30RZ	240	276232

This service kit details removal of the immersion type block heater and replacement with a tank type block heater kit including relocating the air bleed valve.

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



**Accidental starting can cause death or serious personal injury.** 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**



#### **Hot coolant can cause severe burns.**

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.

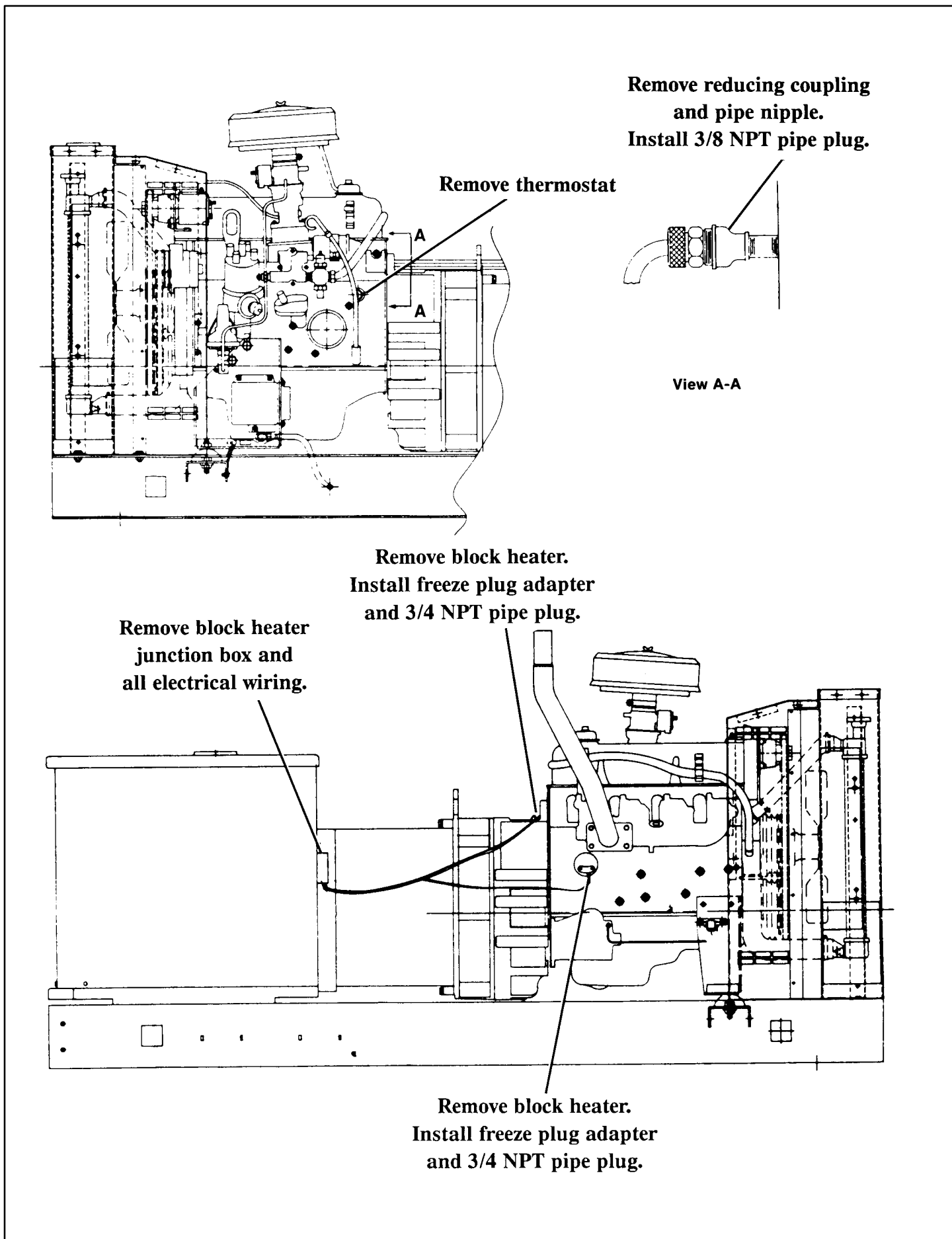
### INSTALLATION

1. Place controller master switch to OFF position. Disconnect battery of generator set, negative lead first. Disconnect power from existing block heater.
2. With generator set sufficiently cooled, drain the coolant into a suitable container.

Do NOT pollute the environment. Dispose of used coolant and other contaminants in a safe and approved manner.

#### **NOTE**

Petcock valve is located on radiator bottom and/or engine bottom.



**Figure 1. Block Heater Kit Removal (Immersion Type)**

3. If an immersion type block heater was previously installed, follow Step 3. Otherwise, proceed to Step 4.

**NOTE**

If Step 3 is not required, reference Parts Listing for components not used.

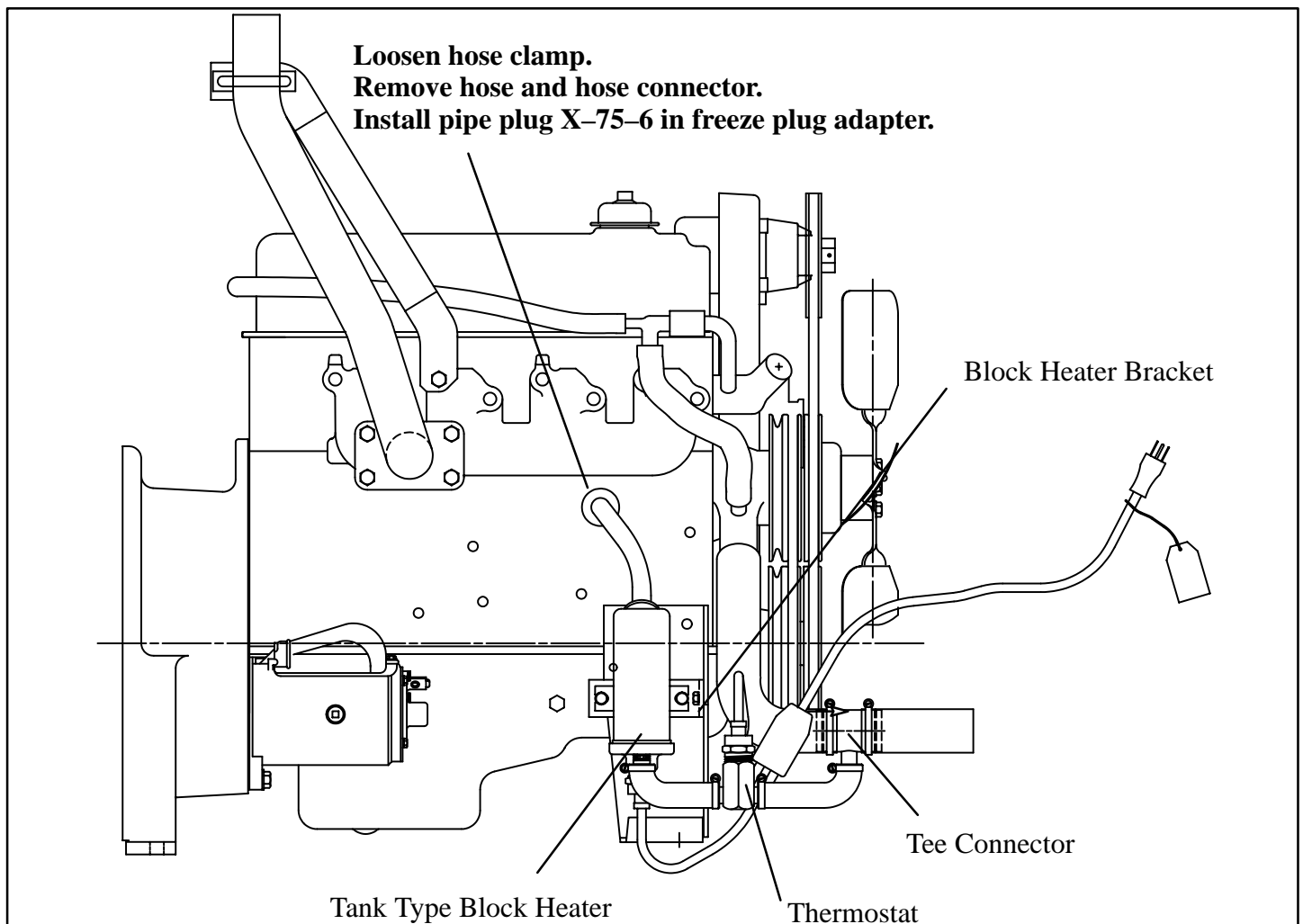
- 3a. Remove electrical connections to block heaters and thermostat. Remove block heater junction box from generator set. These parts will not be reused. See Figure 1.
- 3b. Remove thermostat, reducer coupling, and pipe nipple. These parts will not be reused.

Clean threads on engine and apply pipe sealant to 3/8 NPT pipe plug X-75-10 and install into block.

- 3c. Remove block heaters from engine block. These items will not be reused.

With components clean and dry, apply Loctite® threadlocker 290 (green) or equivalent to freeze plug and hole. Install two freeze plug adapters 276212 using hardwood dowel and hammer. Drive freeze plug adapter into engine block so that it is flush with outside surface of block. Do NOT drive freeze plug adapter beyond that point or it may be forced into the water jacket. Apply pipe sealant to two 3/4 NPT pipe plugs X-75-6 and install into freeze plug adapters. Torque pipe plugs to 15 ft. lbs. (20 Nm).

4. If an early version tank type block heater was installed, follow Step 4. See Figure 2. Otherwise, proceed to Step 5.



**Figure 2. Removal of Early Version Tank Type Block Heater Kit**

### NOTE

If Step 4 is not required, reference Parts Listing for components not used.

- 4a. Loosen hose clamp and remove hose from hose connector. Remove hose connector from freeze plug adapter.
- 4b. Apply pipe sealant to pipe plug X-75-6 and install into freeze plug adapter. Torque pipe plug to 15 ft. lbs. (20 Nm).
- 4c. Remove remaining block heater components.
- 5.1. Removing air bleed valve (**for units without anticipatory alarm kit**). See Figure 3.

### NOTE

Pipe tee X-203-15 is not used in this application.

- 5.1a. Remove air bleed valve from upper hole in intake manifold. Air bleed valve will be reused in Step 6.
- 5.1b. Disconnect lead from high water temperature (HWT) cutout.
- 5.1c. Loosen hose clamp at tee fitting and remove hose.
- 5.1d. Remove pipe tee with HWT switch from pipe nipple. Remove pipe nipple from intake manifold.

### NOTE

Original pipe nipple will not be reused.

- 5.1e. Coat threads of one end of pipe nipple X-204-6 and install in upper hole of intake manifold.
- 5.1f. Coat threads of remaining end of pipe nipple with pipe sealant and install pipe tee with HWT switch onto pipe nipple. Locate pipe

tee with HWT switch downward.

- 5.1g. Apply pipe sealant to pipe plug X-75-10 and install in lower hole of intake manifold.
- 5.1h. Reconnect lead to HWT switch.
- 5.1i. Install hose to hose connector on pipe tee. Locate hose clamp 1/4 in. (6 mm) from end of hose and tighten.
- 5.2. Removing air bleed valve (**for units with anticipatory alarm kit**). See Figure 3.
  - 5.2a. Remove air bleed valve from cross pipe. Air bleed valve will be used in Step 6.
  - 5.2b. Disconnect lead 34 to high water temperature (HWT) shutdown switch. Disconnect lead 40A anticipatory high water temperature switch. Disconnect leads 35A and N to low water temperature switch.
  - 5.2c. Loosen hose clamp at cross pipe and remove hose.
  - 5.2d. Remove anticipatory high water temperature switch from cross pipe. Remove hose connection from cross pipe. Remove cross pipe. Pipe nipple between pipe tee and cross pipe should remain with pipe tee.

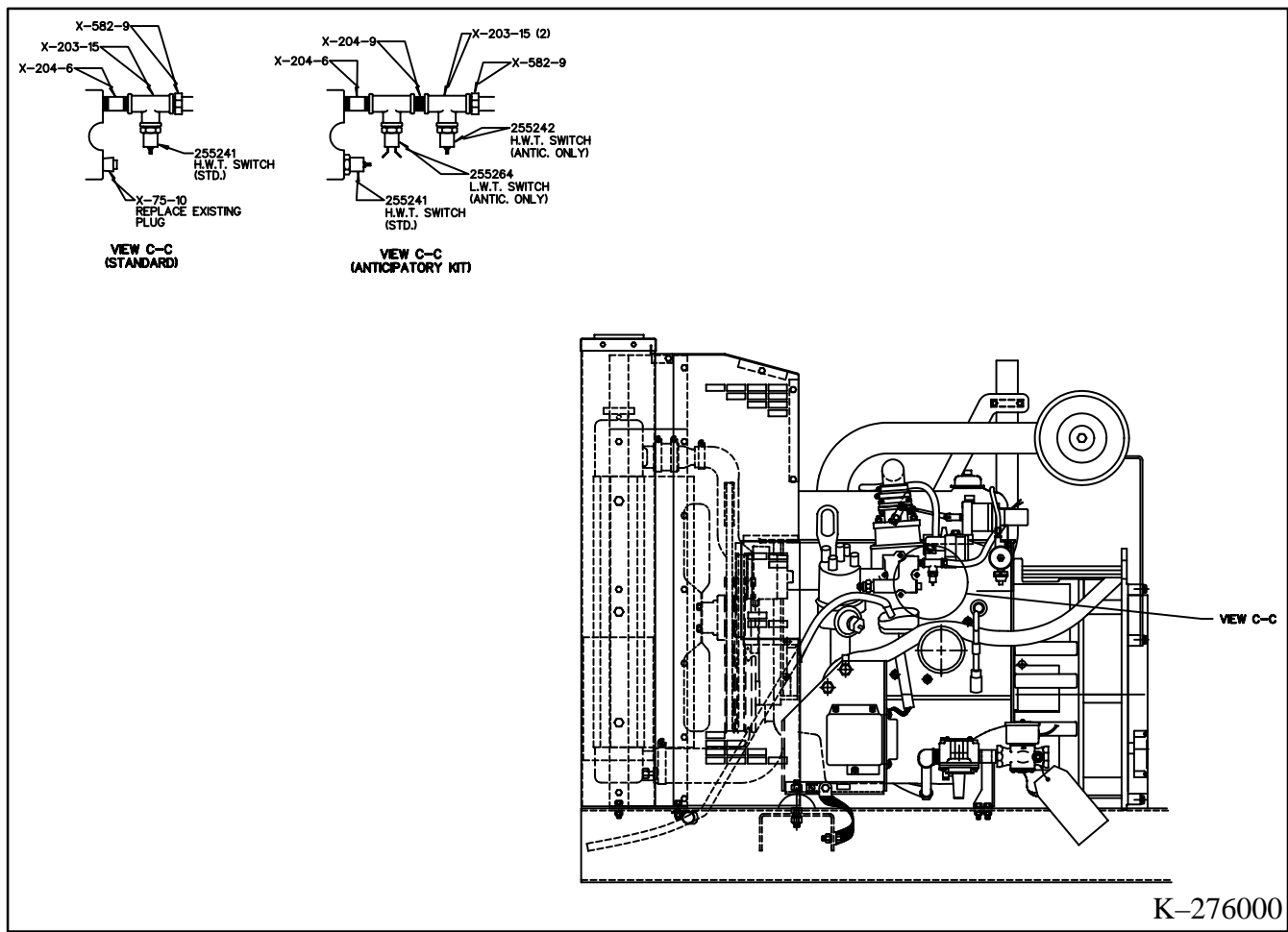
### NOTE

Cross pipe will not be reused.

- 5.2e. Remove high water temperature shutdown switch from upper hole in intake manifold.
- 5.2f. Remove pipe tee with low water temperature switch from intake manifold. Remove pipe nipple from intake manifold.

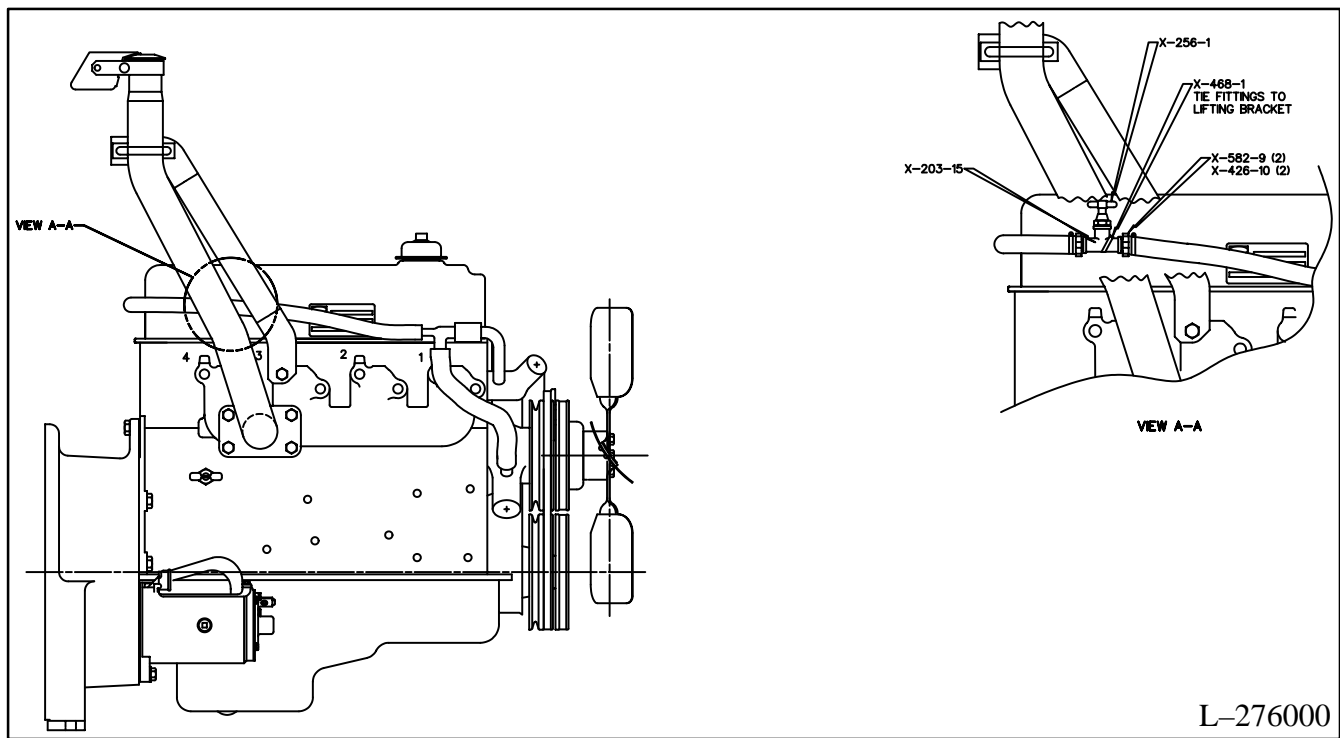
### NOTE

Pipe nipple in intake manifold will not be reused.



**Figure 3. Removing Air Bleed Valve**

- 5.2g. Coat one side of threads of pipe nipple X-204-6 with pipe sealant and install in upper hole of intake manifold.
- 5.2h. Coat remaining threads of pipe nipple with pipe sealant and install pipe tee with low water temperature switch. Locate pipe tee with low water temperature switch downward.
- 5.2i. Coat second pipe nipple threads with pipe sealant and install pipe tee X-203-15. Locate pipe tee with open end downward.
- 5.2j. Coat threads of hose connector and install in pipe tee.
- 5.2k. Coat threads of anticipatory HWT switch with pipe sealant and install in pipe tee.
- 5.2l. Coat threads of HWT switch with pipe sealant and install in lower hole of intake manifold.
- 5.2m. Connect hose to hose connector on pipe tee. Locate hose clamp 1/4 in. (6 mm) from end of hose and tighten.
- 5.2n. Reconnect leads 35A and N to low water temperature switch. Leads can be connected to either terminal. Reconnect lead 40A anticipatory HWT switch. Reconnect lead 34 to HWT shutdown switch.



**Figure 4. Relocating Air Bleed Valve**

6. Relocating air bleed valve.
  - 6a. Cut cooling hose between intake manifold and thermostat housing near engine lifting bracket. Remove approx. a 3 in. (76 mm) section of hose and discard.
  - 6b. Coat threads of two hose connectors X-582-9 with pipe sealant and install into pipe tee X-203-15.
  - 6c. Apply pipe sealant to threads of air bleed valve and install into pipe tee.
  - 6d. Place hose clamps X-426-10 on each end of hose. Install air bleed valve/pipe tee assembly in hose ends with air bleed valve pointing upward. Locate hose clamps 1/4 in. (6 mm) from ends of hose and tighten.
  - 6e. Secure air bleed valve/pipe tee assembly to engine lifting bracket using cable tie X-468-1. Position air bleed valve so that it is the highest point in hose.

7. Remove freeze plug from engine. See Figure 5 for location. To remove freeze plug, use a freeze plug puller, or puncture center with punch and pry out. Clean hole and remove burrs.

#### NOTE

Be careful not to damage sealing surface.

8. With components clean and dry, apply Loctite® threadlocker 290 (green) or equivalent to freeze plug and hole. Install freeze plug adapter 276212 using hardwood dowel and hammer. Drive freeze plug adapter into engine block so that it is flush with outside surface of block. Do NOT drive freeze plug adapter beyond that point or it may be forced into the water jacket.
9. Apply pipe sealant to male threads of pipe elbow SA-472 and install into freeze plug adapter. Pipe elbow should be pointing to the 7 o'clock position (as viewed from the generator end). Torque pipe elbow to 15 ft. lbs. (20 Nm). Apply pipe sealant to hose connector X-582-3 and install into pipe elbow.

#### 10.1. Kits 276229 and 276230 (17RY/20RZ)

Loosen hose clamps on lower radiator hose and remove hose. Place existing hose clamps over each end of lower radiator hose 276186 and install new hose. Locate hose clamps 1/4 in. (6 mm) from end of hose and tighten.

#### NOTE

Original lower radiator hose will not be reused.

Mark hose at 4-1/2 in. (114 mm) and 5-1/2 in. (140 mm) from radiator outlet. Cut at these marks to remove 1 in. (25 mm) from hose.

#### 10.2. Kits 276231 and 276232 (30RZ)

Locate lower radiator hose and mark hose at

4-1/2 in. (114 mm) and 5-1/2 in. (140 mm) from radiator outlet. Cut at these marks to remove 1 in. (25 mm) from hose.

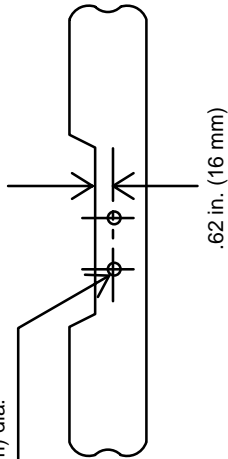
11. Place two *large* hose clamps 250081/X-426-4 on cut radiator hose (one on each end). Install tee hose connector 276205/276222 with nipple pointing to the 4 o'clock position (as viewed from the radiator end). Locate hose clamps 1/4 in. (6 mm) from end of hose and tighten.
12. Attach block heater bracket 276311 to skid using two screws X-465-18, split-lock washers X-20-1, and nuts X-81-1.

#### NOTE

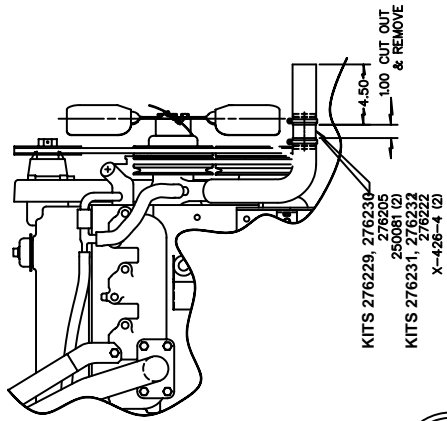
Early generator sets may not have pre-drilled holes in skid. Use bracket as a template and drill two 19/64 in. (7 mm) dia. holes in skid. See Figure 5 and View B-B for location.

13. Install block heater 276208/276209 to bracket using two screws X-465-18, plain washers X-25-40, split-lock washers X-20-1, and nuts X-81-1.
14. Place two hose clamps X-426-10 on each end of hose X-577-24. Connect hose to hose connector on engine block and to block heater outlet. Locate hose clamps 1/4 in. (6 mm) from end of hose and tighten.
15. Place two hose clamps X-426-10 on hose X-577-28. Connect hose to tee hose connector and thermostat. Thermostat can be installed with either end toward radiator. Place electrical connector to the top. Locate hose clamps 1/4 in. (6 mm) from end of hose and tighten.
16. Cut molded hose 276206, see Figure 5. Place two hose clamps X-426-10 on molded hose. Connect short end of molded hose to block heater inlet and the other end to thermostat. Locate hose clamps 1/4 in. (6 mm) from end

Drill .281 in. (7 mm) dia.  
2-Holes



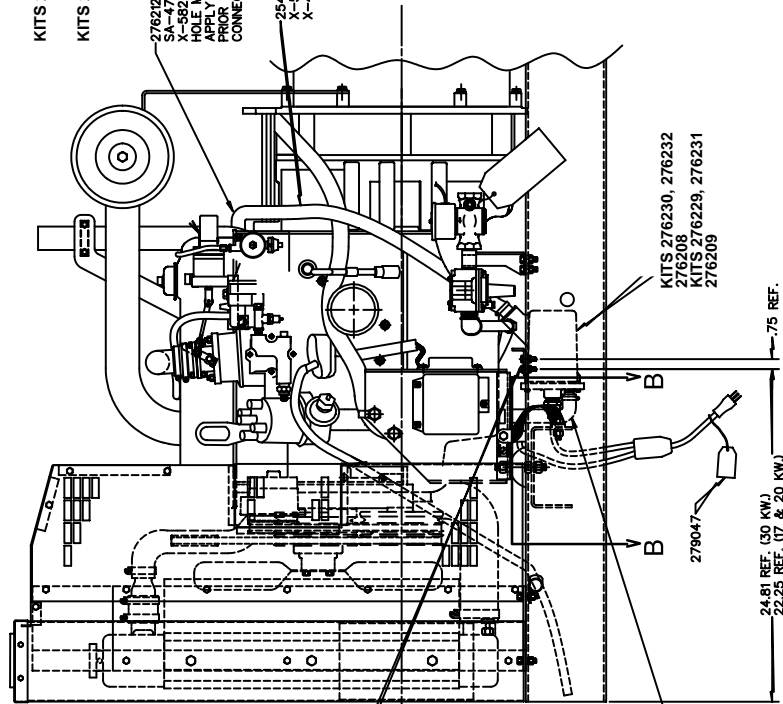
View B - B



HOLE MUST BE FREE OF FOREIGN MATERIAL.  
APPLY LOCTITE 290 TO BOTH HOLE & PLUG  
PRIOR TO INSTALLATION. TORQUE  
CONNECTOR TO 15 FT. LBS.

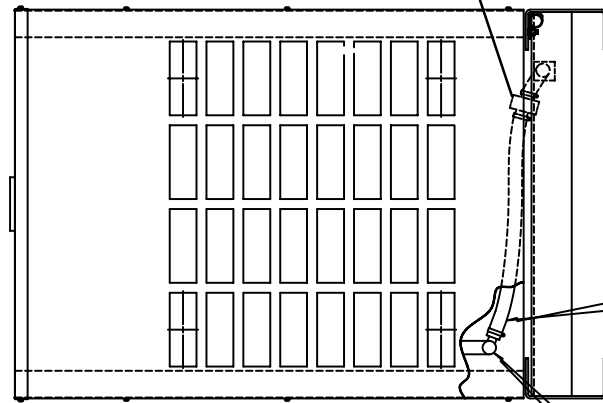
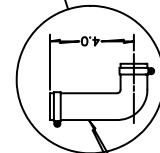
276212  
X-426-3  
X-582-3

25465 00062 (1.8 FT.)  
X-577-24 REF.  
X-426-10 (2)



276311  
X-465-18 (4)  
X-25-40 (2)  
X-20-1 (4)  
X-81-1 (4)

THERMOSTAT



25465 00062 (1.4 FT.)  
X-577-28 (1) REF.  
X-426-10 (2)

NOTE:  
TEE MUST  
BE ROTATED 45°  
SO THAT THE  
FACES OF THE  
DIRECTION OF THE  
BLOCK HEATER HOSE  
SEE VIEW A-A.

Figure 5. Block Heater Installation



of hose and tighten.

17. Use cable ties, as necessary, to protect and secure wiring from sharp objects, exhaust system, and any moving parts.
18. Close petcock drain valves on bottom of radiator and/or engine block. Open air bleed valve located on top right side of engine (as viewed from the generator end).
19. 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. See Table 1 for coolant capacities. Close air bleed valve.
20. Check that the controller master switch is in the OFF position. Reconnect battery, negative lead last.
21. Test run the generator set for a few minutes and check for leaks.
22. Connect block heater electrical plug to proper voltage outlet.

#### **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 all air cavities takes place.

#### **NOTE**

Coolant mixtures exceeding 50% ethylene glycol may cause block heater element failure.

<b>Model</b>	<b>Standard Radiator</b>	<b>Remote Radiator</b>	<b>City-Water Cooled</b>
17RY	2 (7.6)	3.5 (13.25)	3 (11)
20RZ	2 (7.6)	3.5 (13.25)	3 (11)
30RZ	4 (15.1)	3.5 (13.25)	4 (14.7)

**NOTE:** Capacities shown may vary from model to model and are subject to change.

**Table 1. Coolant Capacities – U.S. Gal. (L)**

## Parts Listing

Qty.	Description	Common Parts	Kit Numbers			
			276231	276232	276229	276230
1	Elbow, pipe	SA-472				
4	Washer, 1/4 split lock	X-20-1				
2	Tee, 3/8 NPT black iron	X-203-15				
1	Nipple, 3/8 NPT pipe	X-204-6				
2	Washer, 9/32 x 5/8 x 1/16 plain	X-25-40				
8	Clamp, 1 in. hose	X-426-10				
2	Clamp, 2-1/4 in. hose		—	—	X-426-4	X-426-4
4	Screw, 1/4-20 x 7/8, Gr. 5	X-465-18				
1	Tie, cable	X-468-1				
1	Hose, 5/8 in. ID x 21 in.	X-577-24				
1	Hose, 5/8 in. ID x 17 in.	X-577-28				
1	Connector, 5/8 NPT hose	X-582-3				
2	Connector, 3/8 NPT hose	X-582-9				
1 *	Plug, 3/8 NPT pipe	X-75-10				
1	Plug, 3/8 NPT pipe	X-75-10				
1 **	Plug, 3/4 NPT pipe	X-75-6				
2 *	Plug, 3/4 NPT pipe	X-75-6				
4	Nut, 1/4-20	X-81-1				
2	Clamp, 3 in. hose		250081	250081	—	
1	Hose, lower radiator		—	—	276186	276186
1	Connector, tee hose		276205	276205	276222	276222
1	Hose, molded	276206				
1	Heater, block		276209	276208	276209	276208
1	Adapter, freeze plug	276212				
2 *	Adapter, freeze plug	276212				
1	Bracket, mounting	276311				

\* Items used only if Step 3 applies.

\*\* Items used only if Step 4 applies.