
INSTALLATION INSTRUCTIONS

Original Issue Date: **2/98**

Model: **18RY/RZ**

Market: **Industrial**

Subject: **Engine Block Heater Kits PA-326475 and PA-326476**

The engine block heater kit heats engine coolant, making starting easier and warm-up quicker. The thermostat automatically turns off the heater when coolant temperature reaches 120°F (49°C). Observe the following safety precautions while installing the kit.

⚠ WARNING



**Accidental starting.
Can cause severe injury or death.**

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

Disabling 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) Turn the generator set master switch to OFF position.
- 2) Disconnect power to battery charger.
- 3) Remove battery cables (remove negative (-) lead first). Reconnect negative (-) lead last when reconnecting battery.

Follow these precautions to prevent starting of generator set by an automatic transfer switch or remote start/stop switch.

⚠ WARNING



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

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

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

NOTE

Pay special attention to the coolant level. After draining the coolant, allow time for complete refill of the engine water jacket. Check coolant level as prescribed in the Prestart Checklist of the Operation Manual.

NOTE

Do not turn on block heater before filling cooling system. Run engine until warm and refill radiator to purge air from the system before energizing block heater. If heater element is not immersed in water, block heater will fail.

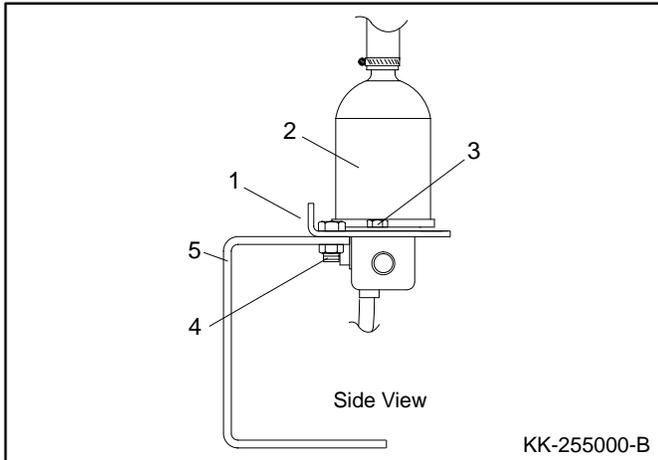
Installation

1. Place the generator set master switch in the OFF position.
2. Disconnect the generator set engine starting battery(ies), negative (-) lead first. Disconnect power to battery charger, if equipped.
3. With engine and radiator cool, drain the coolant into a suitable container. Dispose of all waste materials, (engine oil, fuel, coolant, etc.) in an environmentally safe manner. Contact local authority for procedures.

NOTE

Drain valve is located on radiator bottom and/or on side of engine crankcase.

- Secure block heater (326222 or 326224) to block heater bracket (326219) using hex cap screws (X-465-16), plain washers (X-25-40), and whiz nuts (X-6210-2). See Figure 1.



- Block heater mounting bracket (326219)
- Block heater (326228 or 326229)
- Hex cap screws (X-465-16), plain washers (X-25-40), and whiz nuts (X-6210-2)
- Hex cap screws (X-6238-3) and spirallock nuts (X-6210-9)
- Skid rail

Figure 1. Engine Block Heater

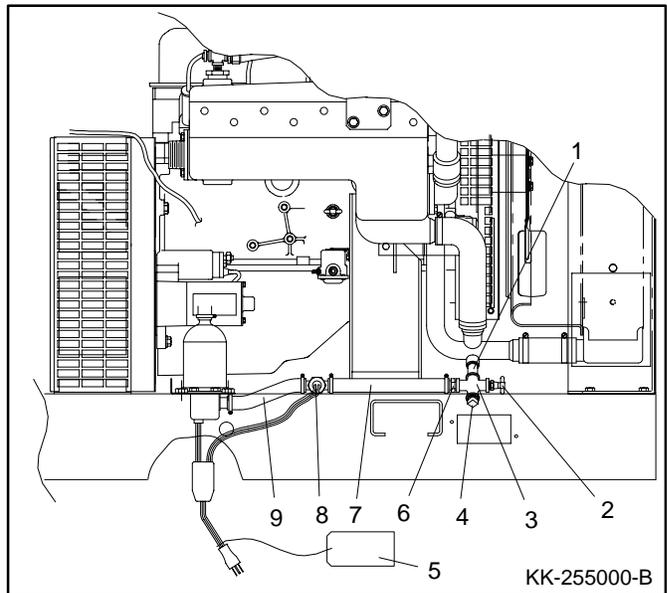
- Secure block heater assembly to generator set skid using hex cap screws (X-6238-3) and spirallock nuts (X-6210-9). See Figure 3 for mounting location.

NOTE

Apply pipe sealant to male threads of all components before installation.

- Remove pipe plug from the lower radiator tube. Save pipe plug.
- Apply pipe sealant to the threads of pipe (X-204-6) and install pipe in lower radiator tube where pipe plug was removed.
- Apply pipe sealant to exposed threads of the 2.0 in. pipe installed in step 7 and install pipe cross (X-207-5). See Figure 2.
- Apply pipe sealant to the threads of drain valve (X-256-1) and install drain valve in pipe cross. See Figure 2.
- Apply pipe sealant to the threads of the pipe plug removed in step 6 from the lower radiator tube and install plug in pipe cross. See Figure 2.
- Apply pipe sealant to the threads of hose connector (X-582-2) and install hose connector in pipe tee. See Figure 2.
- Connect 10.0 in. hose (X-312-52) to hose connector installed in step 11.

- Secure hose to hose connector with hose clamp (X-426-10). Place hose clamp 0.25 in. (6 mm) from end of hose and tighten.
- Connect opposite end of hose connected in step 12 to one end of the inline block heater thermostat housing.
- Secure hose to thermostat housing with hose clamp (X-426-10). Place hose clamp 0.25 in. (6 mm) from hose end and tighten.
- Connect 4.5 in. hose (X-312-41) to inline block heater thermostat housing.
- Secure hose to thermostat housing with hose clamp (X-426-10). Place hose clamp 0.25 in. (6 mm) from hose end and tighten.
- Connect opposite end of hose connected in step 16 to the block heater inlet. See Figure 2.
- Secure hose to block heater inlet with hose clamp (X-426-10). Place hose clamp 0.25 in. (6 mm) from hose end and tighten.
- Secure hang tag (279047) to block heater power cord. See Figure 2.

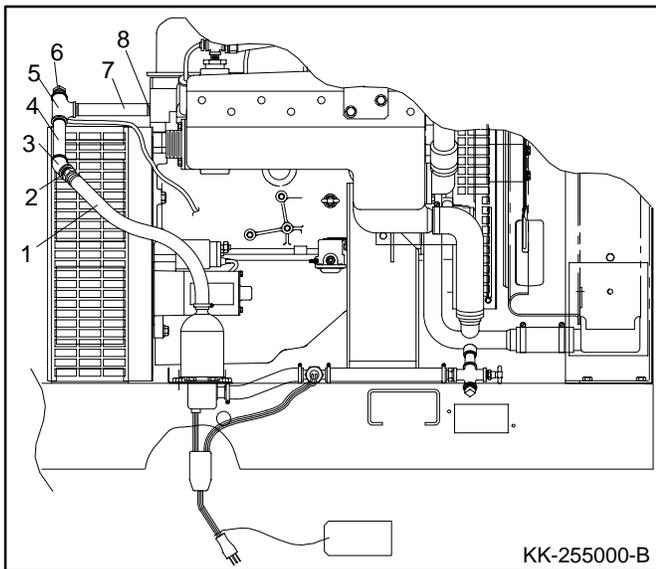


- Pipe 2.0 in. (X-204-6)
- Drain valve (X-256-1)
- Pipe cross (X-207-5)
- Pipe plug
- Hang tag (279047)
- Hose connector (X-582-2)
- Hose 10.0 in. (X-312-52)
- Thermostat
- Hose 4.5 in. (X-312-41)

Figure 2. Block Heater Inlet Connections

- Remove freeze plug from rear of engine with a freeze plug puller, or puncture center of freeze plug and pry plug out of engine block. See Figure 3 for location.
- Clean and de-burr hole where freeze plug was removed.

23. Apply Loctite® threadlocker 272 (red) or equivalent material to freeze plug adapter (276212) and freeze plug hole.
24. Drive freeze plug adapter into engine block with a hardwood dowel and hammer. Keep adapter flush with the outside surface of the engine block. Do not force freeze plug adapter beyond outside surface of engine block into engine water jacket.
25. Apply pipe sealant to male threads of reducer bushing (X-202-41) and install bushing in freeze plug adapter installed in step 24.
26. Apply pipe sealant to threads of 4.5 in. pipe (X-209-21) and install pipe in reducer bushing.
27. Apply pipe sealant to male threads of pipe installed in step 26 and install pipe tee (X-203-13). Position pipe tee as shown in Figure 3.
28. Apply pipe sealant to threads of pipe plug (X-75-28) and install pipe plug in pipe tee. See Figure 3.
29. Apply pipe sealant to threads of 7.5 in. pipe (X-209-19) and install pipe in pipe tee. See Figure 3.
30. Apply pipe sealant to exposed threads of pipe installed in step 29 and install pipe elbow (X-225-7). See Figure 3.
31. Apply pipe sealant to threads of hose connector (X-582-1) and install hose connector in pipe elbow.
32. Connect 17.0 in. hose to hose connector installed in step 31.
33. Secure hose to hose connector with hose clamp (X-426-10). Place hose clamp 0.25 in. (6 mm) from hose end and tighten.
34. Connect opposite end of hose connected in step 32 to the block heater outlet. See Figure 2.
35. Secure hose to block heater outlet with hose clamp (X-426-10). Place hose clamp 0.25 in. (6 mm) from hose end and tighten.
36. Close all coolant drain valves on radiator and/or engine block.
37. Fill cooling system with fresh coolant consisting of a mixture of 50% ethylene glycol and 50% clean, softened water. This mixture provides the necessary freeze protection and inhibits corrosion.



1. Hose 17.0 in. (X-312-17)
2. Hose connector (X-582-1)
3. Pipe elbow (X-225-7)
4. Pipe 7.5 in. (X-209-19)
5. Pipe tee (X-203-13)
6. Pipe plug (X-75-28)
7. Pipe 4.5 in. (X-209-21) and reducer bushing (X-202-41)
8. Freeze plug adapter (276212)

Figure 3. Block Heater Outlet Connections

NOTE

Coolant mixtures exceeding 50% ethylene glycol may cause the block heater element to fail.

38. Check that the generator master switch is in the OFF position.
39. Reconnect the generator set engine starting battery, negative (–) lead last. Reconnect power to battery charger, if equipped.
40. Connect block heater to main power source.
41. Test run generator set for a few minutes to check for coolant leaks and to purge air from the system.
42. Stop generator set.
43. Check and correct any leakage after the engine and radiator have cooled.

NOTE

Failure to purge trapped air may cause block heater element to fail.

44. Recheck coolant level after allowing engine and radiator to cool. After draining the cooling system, allow time for all air cavities to refill in the system. Add coolant as necessary.

Block Heater

Parts List				
Kits: PA-326475, PA-326476			Unique Parts	
Qty.	Description	Common Parts	PA-326475	PA-326476
4	Washer, plain	X-25-40		
1	Plug, pipe	X-75-28		
1	Bushing, reducer	X-202-41		
1	Tee, pipe 1/2"	X-203-13		
1	Pipe, 3/8 NPT x 2.0 in.	X-204-6		
1	Cross, pipe	X-207-5		
1	Pipe, 1/2 NPT x 7.5 in.	X-209-19		
1	Pipe, 1/2 NPT x 4.5 in.	X-209-21		
1	Elbow, 45° 1/2"	X-225-7		
1	Valve, drain	X-256-1		
1	Hose, 5/8 x 17.0 in.	X-312-17		
1	Hose, 5/8 x 4.5 in.	X-312-41		
1	Hose, 5/8 x 10.0 in.	X-312-52		
6	Clamp, hose	X-426-10		
4	Screw, hex cap 1/4-20 x 0.75	X-465-16		
2	Tie, cable	X-468-1		
1	Connector, hose	X-582-1		
1	Connector, hose	X-582-2		
4	Nut, whiz 1/4-20	X-6210-2		
2	Nut, spiralock 3/8-16	X-6210-9		
2	Screw, hex cap 3/8-16 x 0.875	X-6238-3		
1	Adapter, freeze plug	276212		
1	Tag, hang	279047		
1	Bracket, block heater mounting	326219		
1	Heater, block		326222	326224