KIM HOTSTART SINCE 1942

INSTALLATION INSTRUCTIONS
TANK TYPE ENGINE HEATERS

CL Model (Caterpillar Replacement Heater)

READ CAREFULLY FOR PROPER INSTALLATION & OPERATION

ABOUT THE HEATER

This product line is a replacement for a specific heater supplied by Caterpillar. Following is a cross reference for the Kim Hotstart product vs. the original Caterpillar part number:

Kim Hotstart Part #	Caterpillar Part #	Wattage	Voltage	Pre-wired at Assembly
CL130DA2-000	**7E-6247**	3kw	120/240 VAC	120V
CL160EA2-000	**7E-6248**	6kw	240/480 VAC	240V
CL160CA2-000	**7E-6249**	6kw	120 VAC	2-120V Circuits
CL140EA2-000	**—**	4kw	240/480 VAC	240V

After verifying that you have the correct Kim Hotstart model, the heater will fit directly into the current installation. If the heater hoses are also being replaced, it is recommended that the same 1" ID hose size be used. Similar to the original heater, the Kim Hotstart model **must be mounted vertically with the electrical enclosure oriented upward (see Figure 1 & 1A)**. Two 5 inch stainless steel hose clamps are provided to secure the heater to the existing bracket. The enclosure features both 1/2" and 3/4" conduit knockouts for incoming power.

Figure 1

Tank Heater Orientation

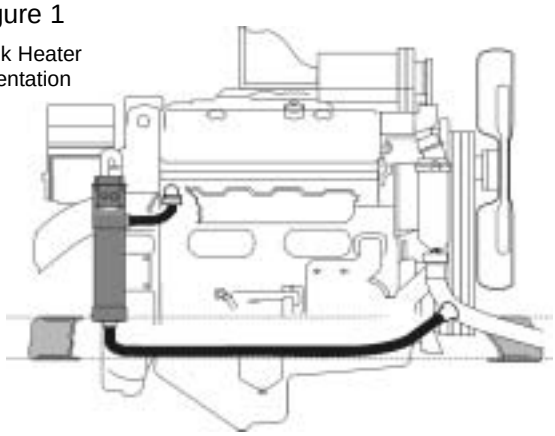
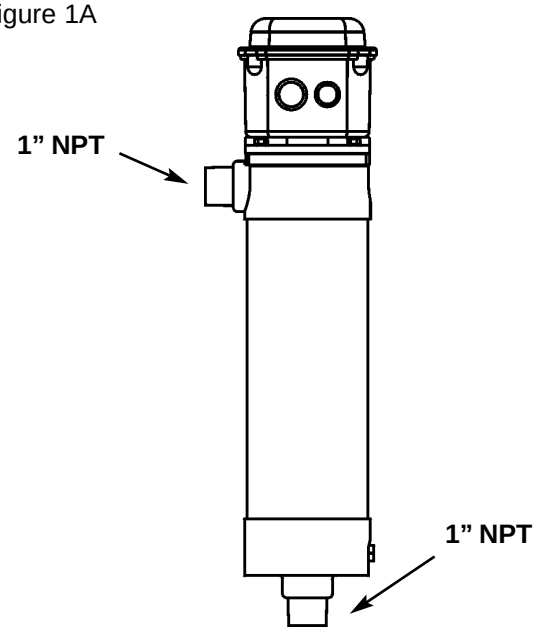


Figure 1A



INSTALLATION RECOMMENDATIONS AND HEATER OPERATION

CAUTION

Prior to heater installation, check the cooling system. Poor coolant conditions will interfere with proper function of the heater and can also cause element failure. If there is sediment or foreign matter present or the coolant does not meet the engine manufacturer's specifications, the system should be drained, cleaned, flushed and refilled with a 50/50 mixture of low silicate antifreeze, deionized or distilled water, and low silicate supplemental coolant additives. Do not exceed a concentration of more than 60% antifreeze, as element failure will result. A cooling system containing anti-leak additive will also result in element failure.

After mounting, plumbing, and wiring the heater, refill the engine with coolant (energizing the heater without coolant may cause element failure). It is recommended that the engine be operated after plumbing the heater to eliminate possible air pockets in the water jacket. Prior to energizing the heater, the thermostat setting can be adjusted by removing the electrical enclosure cover and rotating the knob to the desired setting (see Figure 6).

Guidelines For New Installations

If you are performing an original installation with this product, review the following guidelines:

1. As shown in Figure 1, the heater must be oriented in the vertical position with the electrical enclosure up.

2. In the event that the original Caterpillar mounting bracket is not present, U-bolt mounting brackets are available to mount this product to a flat plate (order Kit No. ***FK9)***. Mount the heater as low as possible relative to the bottom of the engine's water jacket.

3. Plumb the heater using 1" ID hose and the largest available openings in the block. Connect the heater intake hose to the lowest available point in the water jacket (see fig. 2A). If a connection point is unavailable in the water jacket area, connect the heater intake line to the casting or piping for the lower radiator hose as close to the engine block as possible (see fig. 2B).

4. Connect heater outlet to the engine's water jacket at a point away from the engine's thermostat. The heater outlet line must be connected to the engine at a higher point than the heater outlet as there must be adequate vertical rise for the coolant leaving the heater.

C A U T I O N

DO NOT route outlet hose above engine block connection, or loop or kink hoses (fig 3). This will cause air locks in the hose and stop circulation of the coolant by the heater.

Kim Hotstart recommends that you follow the minimum plumbing sizes listed below. Smaller hose will reduce performance. If engine openings are smaller than the recommended minimum size, reduce the plumbing at the engine, not the heater.

Minimum Plumbing Sizes:

500-3000 Watt — 1/2 NPT Fittings, 3/4" ID Hose
3750-6000 Watt — 3/4 NPT Fittings, 1" ID Hose

Figure 2A

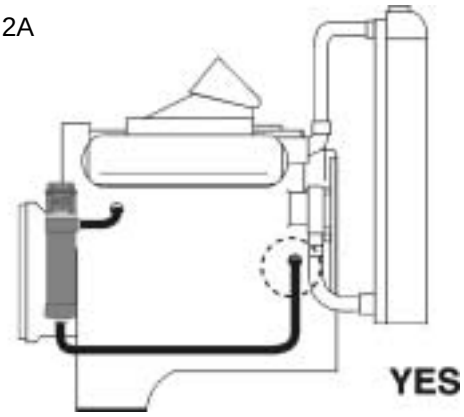


Figure 2B

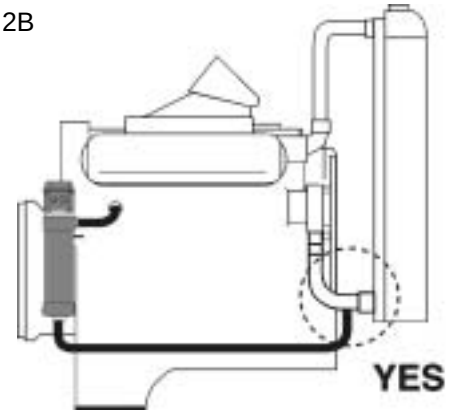
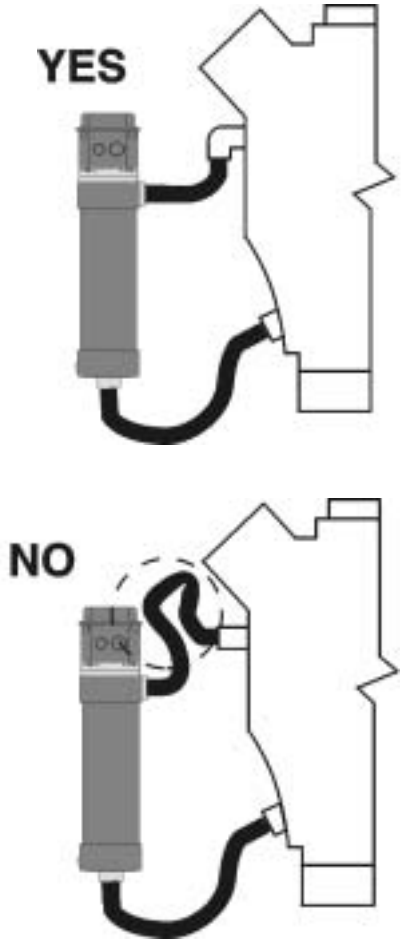


Figure 3



CAUTION

A high temperature hose should be used. Use red jacket EPDM type hose (Goodyear Contender, Gates 1B or equal).

5. To eliminate air locks in the heater and hoses, refill the engine with the heater outlet line disconnected at the engine until outlet line is full of coolant (fig 4). Then connect the outlet line to the engine and finish filling the engine.

CAUTION

DO NOT energize the heater at this point! All air must be bled out of the system by running the engine. If not, air could be trapped in the heater or engine, preventing the heater from operating.

6. Run the engine until it reaches operating temperature and the engine thermostat opens. this will purge air from the cooling system. Check installation for leaks, shut down the engine and allow it to cool down.

7. After engine is cool, check coolant level and top off as needed.

Wiring The Kim Hotstart Engine Heater

Figures 5A through 5C illustrate the proper wiring configurations for each heater. The dual voltage models (CL130DA2-000 and CL160EA2-000) are wired to the parallel configuration by Kim Hotstart. To wire these models to the series configuration, the adjustable thermostat and holder must be removed (see Figure 6).

Testing The Kim Hotstart Engine Heater Installation

Step 1
Energize the Kim Hotstart engine heater.

Step 2
Feel the outlet hose at the engine connection. It should get hot.

Note: If tank is hot and the top of the outlet is not, disconnect power to the heater. Disconnect and bleed the outlet line at the engine (reference Step 4 of the plumbing instructions).

Step 3
If the outlet hose is hot, the block and intake hose should begin to warm up as the circulation back to the heater is completed.

Figure 4

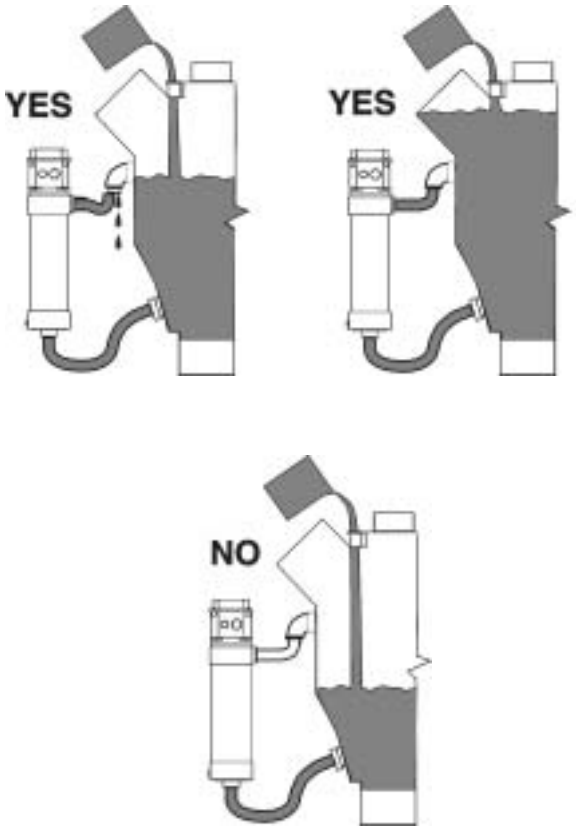
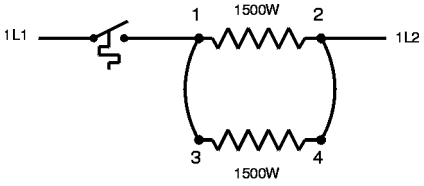
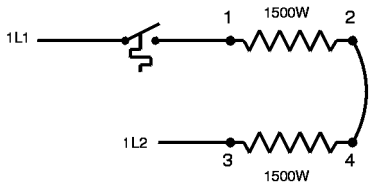


Figure 5A

Wiring Diagram for CL130DA2-000



120VAC SINGLE PHASE PARALLEL



240VAC SINGLE PHASE SERIES

If the block and intake hose do not begin to warm up, the coolant is not circulating freely due to one or more of the following reasons:

A. Airlocks may be present in the engine or there may be a airlock in the hose due to loops, routing over the top of the engine, excessive lengths, or kinks in hose.
B. Heater is mounted too high. Heated coolant can't rise enough for proper circulation.
C. Heater is not mounted properly. Check all installation guidelines.
D. Flow problems can occur due to contamination or restrictions. Check the flow path.

Preventive Maintenance For The Kim Hotstart Engine Heater

Step 1
Periodically check hoses and replace as required.

Step 2
Once per year:
1. Remove electrical box cover and inspect the electrical connections.

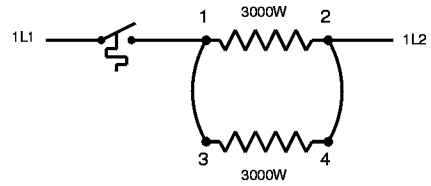
2. Remove the heating element of the Kim Hotstart engine heater. Be careful not to damage the O-rings. Clean and flush the interior of the tank and clean the element's surface of any coolant deposits.

Replace damaged and worn parts with Kim Hotstart replacement parts. Reassemble the heater with the O-rings and four 1/4-20 bolts.

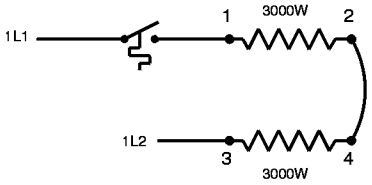
NOTE: Before energizing the engine heater, refer to step 5, 6 and 7 of "Guidelines For New Installations".

Figure 5B

Wiring Diagram for CL160EA2-000



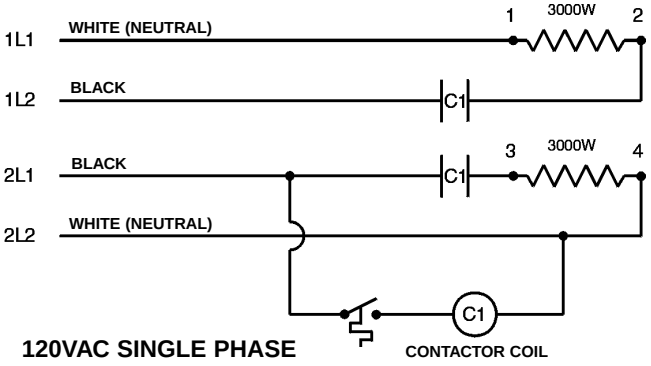
240VAC SINGLE PHASE PARALLEL



480VAC SINGLE PHASE SERIES

Figure 5C

Wiring Diagram for CL160CA2-000

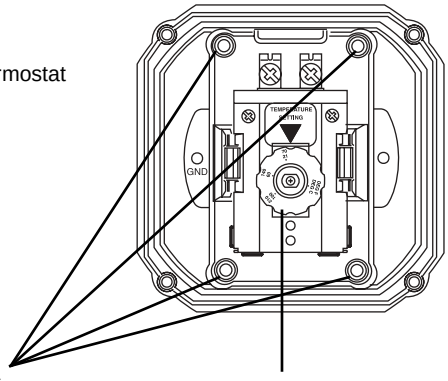


120VAC SINGLE PHASE 2 SEPARATE CIRCUITS

CONTACTOR MUST BE USED DUE TO HIGH AMPERAGE (TYPICAL WIRING DIAGRAM SHOWN)

Figure 6

Adjustable Thermostat Configuration



Remove these four screws to pull thermostat assembly.

Thermostat Temperature Setting Adjustment (70°F - 210°F)