

# INSTALLATION INSTRUCTIONS

## KOMATSU PC200 LC-6 EXCAVATOR CUMMINS ENGINE DENSO HEATER



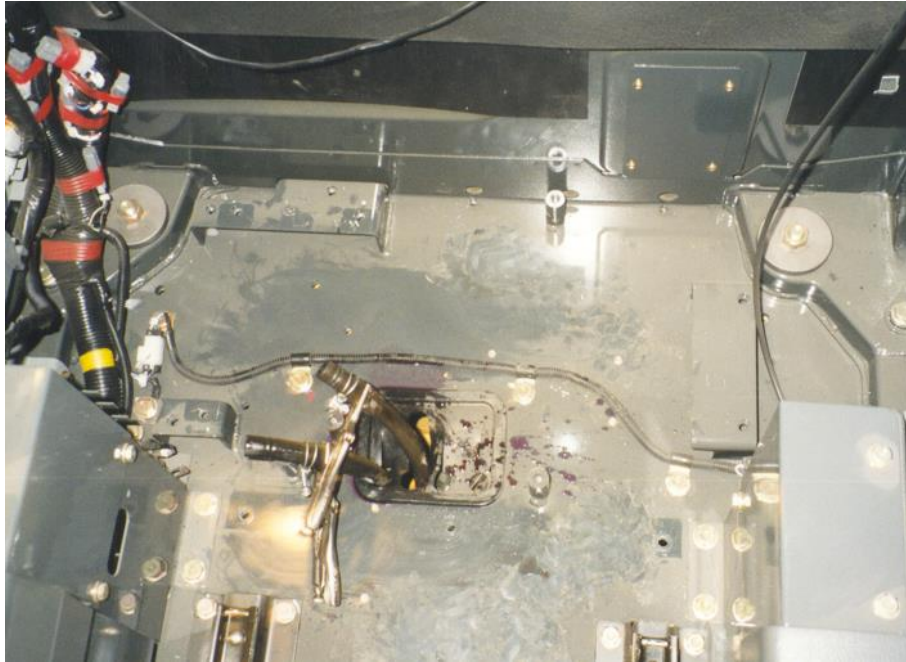
Hammond Air Conditioning Ltd.

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## EVAPORATOR:

The evaporator/heater box mounts under the 'lunch boxes' behind the seat and under the plastic moldings.



Mounting location for evaporator assembly.

1. Remove the plastic cowling and 'lunch boxes' behind the operator's seat along with the existing heater blower box.
2. Install the air plenum adapter with the two 2½" flex hoses on it onto the forward air channel and secure with self drilling screws. Seal any air gaps with tar tape sealer.
3. Place the heat/cool box in place and bolt down in place with the hardware removed from the heater mounts. Ensure that the drain hoses run out through the large grommet in the floor of the cab. In some cabs, a couple of mount holes will need to be drilled and tapped into the floor with 2" spacers under them.
4. Connect the flex hoses from the forward air plenum to the two 2½" round hose adapters on the motor side of the heater/AC box. Secure with cable ties to the hose adapters.
5. Connect the existing heater lines up to the copper heater lines out of the heat/cool box. Use the existing hardware.

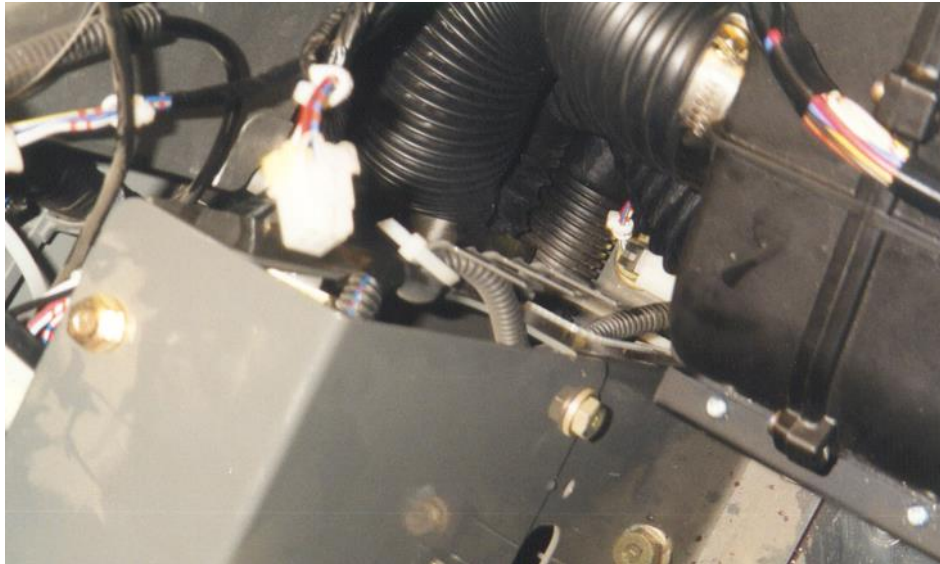
6. Connect the power for the heat/cool box to the 20A fused power source. It should be possible to use the fuse from the original heater. Connect the ground wire to any bolt grounded to the cab.
7. Connect A/C lines to the evaporator fittings and tar tape all exposed metal that could sweat from condensation.
8. Install the rectangular louvers in the factory knock out areas on the tops of the plastic cowlings. Cut and drill holes in the right hand cowling for the control panel and thermostat. Install the banjo fitting in the right hand storage box to supply warm and cool air to the inside of the box. During final assembly the 1½" flex duct coming off the heat/cool assembly will be connected to the banjo fitting.
9. Connect the flex hoses from the forward air plenum to the two 2 ½" round hose adapters on the motor side of the heater/AC box. Secure with cable ties to the hose adapters.



Evaporator assembly mounted in place.

10. Connect the existing heater lines up to the copper heater lines out of the heat/cool box. Use the existing hardware.
11. Connect the power for the heat/cool box to a 20A fused power source. It should be possible to use the fuse from the original heater.

12. When the system has been charged and tested for operation (mechanically and electrically) reassemble the cowlings and do the final hookups and mountings to them.



Flex hoses connecting to the forward air duct.

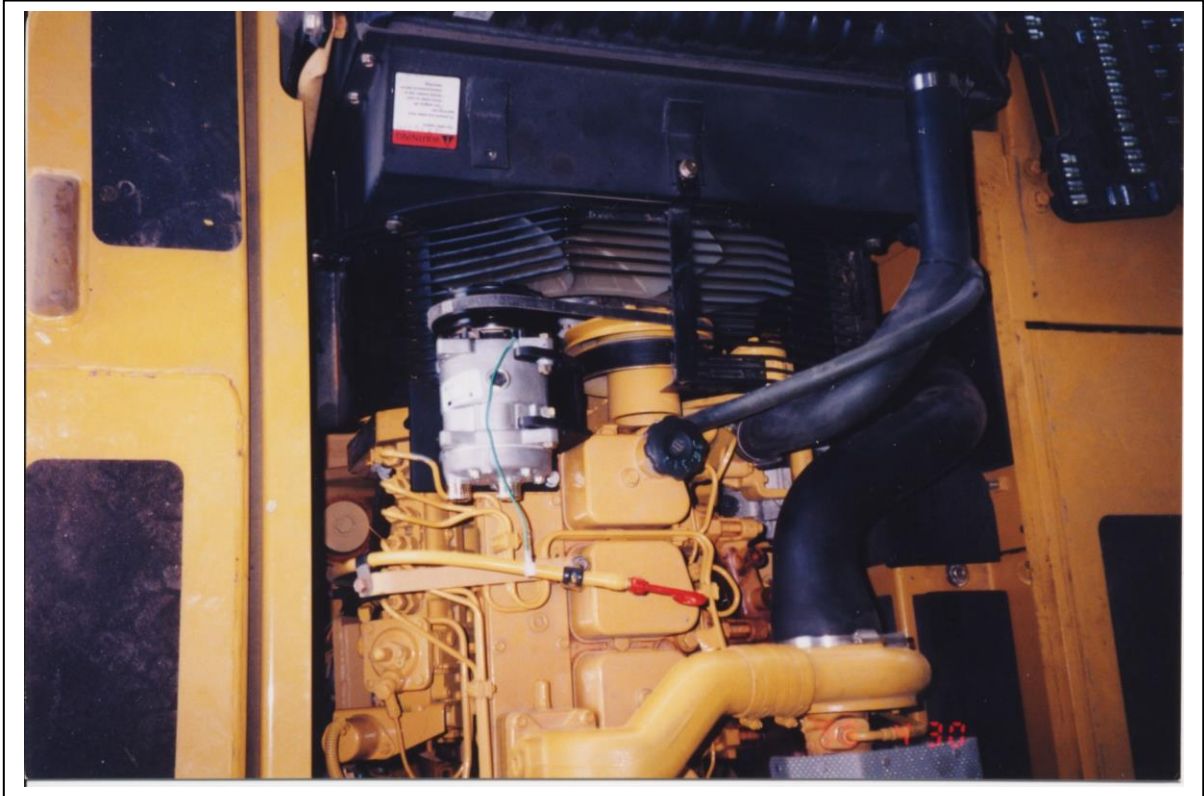


Louvers and controls in place.



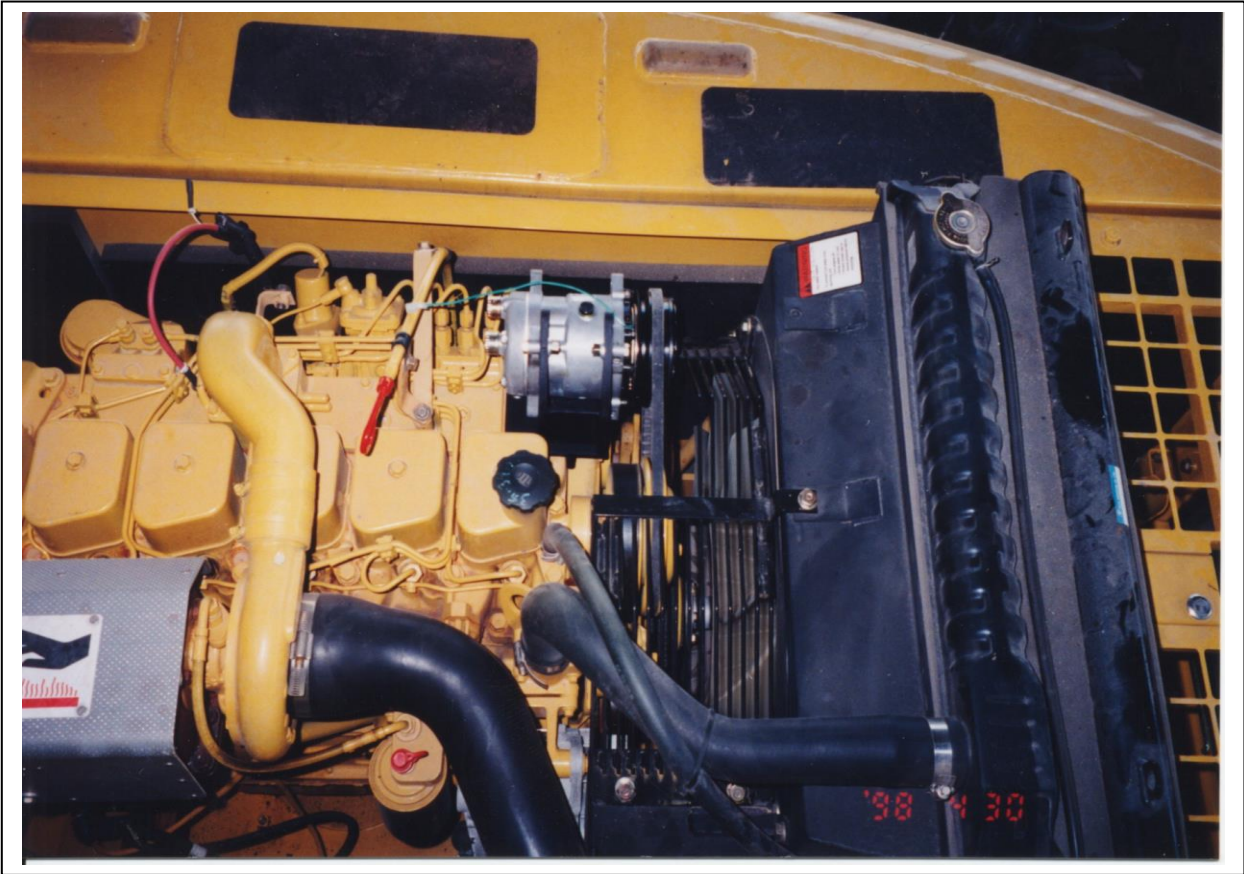
COMPRESSOR CUMMINS ENGINE:

The compressor mounts to the engine on the location shown in the pictures, on the upper left when facing down the engine toward the fan.



Location of compressor on engine.

1. The compressor mount is bolted on the engine just ahead of the injector lines. Use the hardware supplied in the kit to mount the assembly.
2. Depending on the injector set up, spacers may have to be placed under the mount bracket to allow for compressor clearance.
3. Cut any fan screen away that is in the way of the compressor and belt.
4. Install the belt supplied around the compressor and the drive pulley on the fan hub. Tighten the belt using the integrated tensioning arms on the mount.



Top view of the compressor in place.  
Hose connections and tailplate may be different  
Compressor mount and drive with hoses extending down.

### CONDENSER MOUNTING:

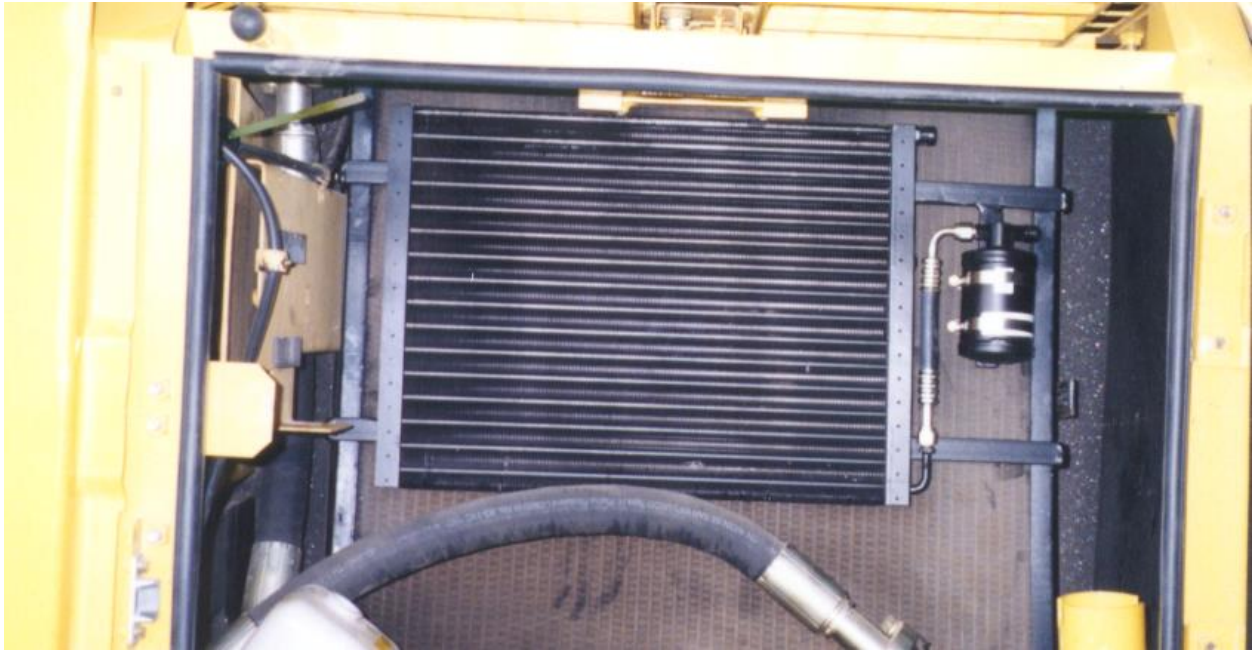
The condenser is configured for mounting on the radiator using bolt points to be drilled and tapped into the radiator frame.

1. Open the access to the radiator face and remove any screens in front of the radiator.
2. Hold the condenser assembly up to the radiator and mark the holes in the side of the radiator frame. Drill and tap for the 1/4" hardware provided in the kit.
3. Using the 1/4" hardware provided in the kit bolt the condenser assembly to the frame of the radiator as shown.
4. The drier is pre-mounted to the condenser frame and connected to the condenser with the 5/16" hose.
5. Make sure the radiator screen has clearance to slide out if present.



Condenser mounting positions indicated with hardware.





Condenser assembly in place on radiator.



## HOSE RUNS:

One end of the hoses for the system is pre-crimped. The other ends will have to be cut to length and the appropriate fitting crimped on using an ATCO (or similar) Beadlock crimper.

### 5/16" Hose Drier to Evaporator:

The 5/16" hose runs from the drier back behind the radiator into the engine compartment and forward under the cab with the suction line from the compressor. Both hoses go under the cab of the excavator and up through the large grommet in the floor. The 5/16" hose connects to the inlet fitting on the expansion valve. One 90o fitting (start with the pre-crimped on here) is connected at the drier. Cut the hose to length and crimp on the other 90o fitting supplied. Connect this fitting at the expansion valve.

### 13/32" Hose Compressor to Condenser:

The 13/32" hose is run from the compressor to the condenser out of the engine compartment alongside the radiator and out to the condenser. The compressor fitting is the 90o fitting with the integral charging port and is pre-crimped on the line. Connect the discharge side rotolock fitting making sure the white nylon seal is properly in place. The high pressure switch (black leads) will be on this fitting. Connect the pre-crimped hose end fitting to the rotolock and run out to the condenser. Cut to length and crimp on the 90o fitting supplied. Connect the 90o fitting to the upper fitting on the condenser.

### 1/2" Hose Compressor to Evaporator

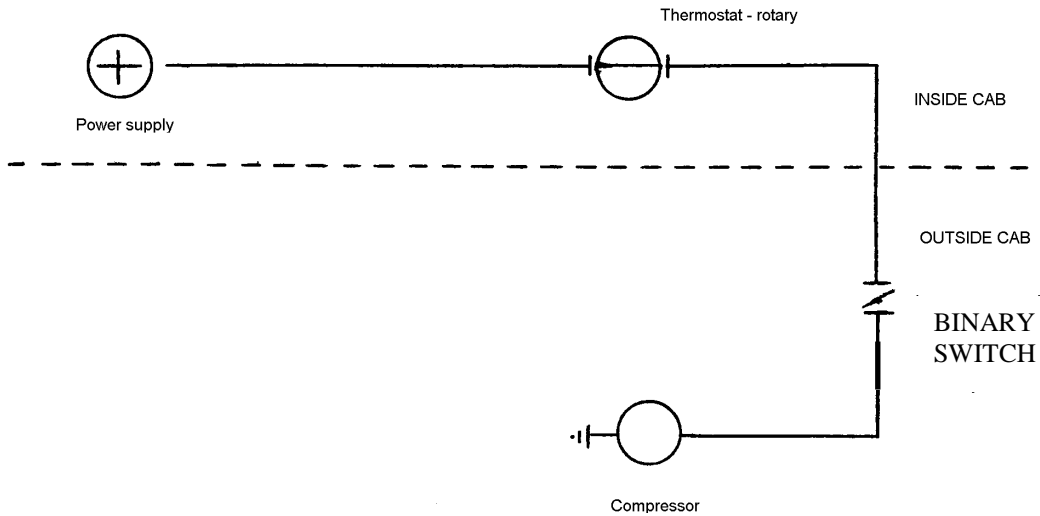
The 1/2" hose runs from the compressor to the evaporator through the engine compartment, under the cab and up to the evaporator fitting through the large floor grommet.

Connect the rotolock fitting on the suction side of the compressor. This fitting will have the pressure switch oriented 'up' instead of 'out the end' as on the discharge port. The 90o fitting at the compressor end of the hose has already been crimped in place and has the 134a charging port in place. Connect to the rotolock fitting at the compressor and run out under the cab and up to the suction fitting of the evaporator. Connect the 45o fitting to the evaporator coil suction fitting.

Hose-wrap exposed sections and any places the hoses may rub. Secure using cable ties and clamps where necessary. Use refrigerant oil on the O-rings at the sealing surfaces to ensure a proper seal.

WIRING:

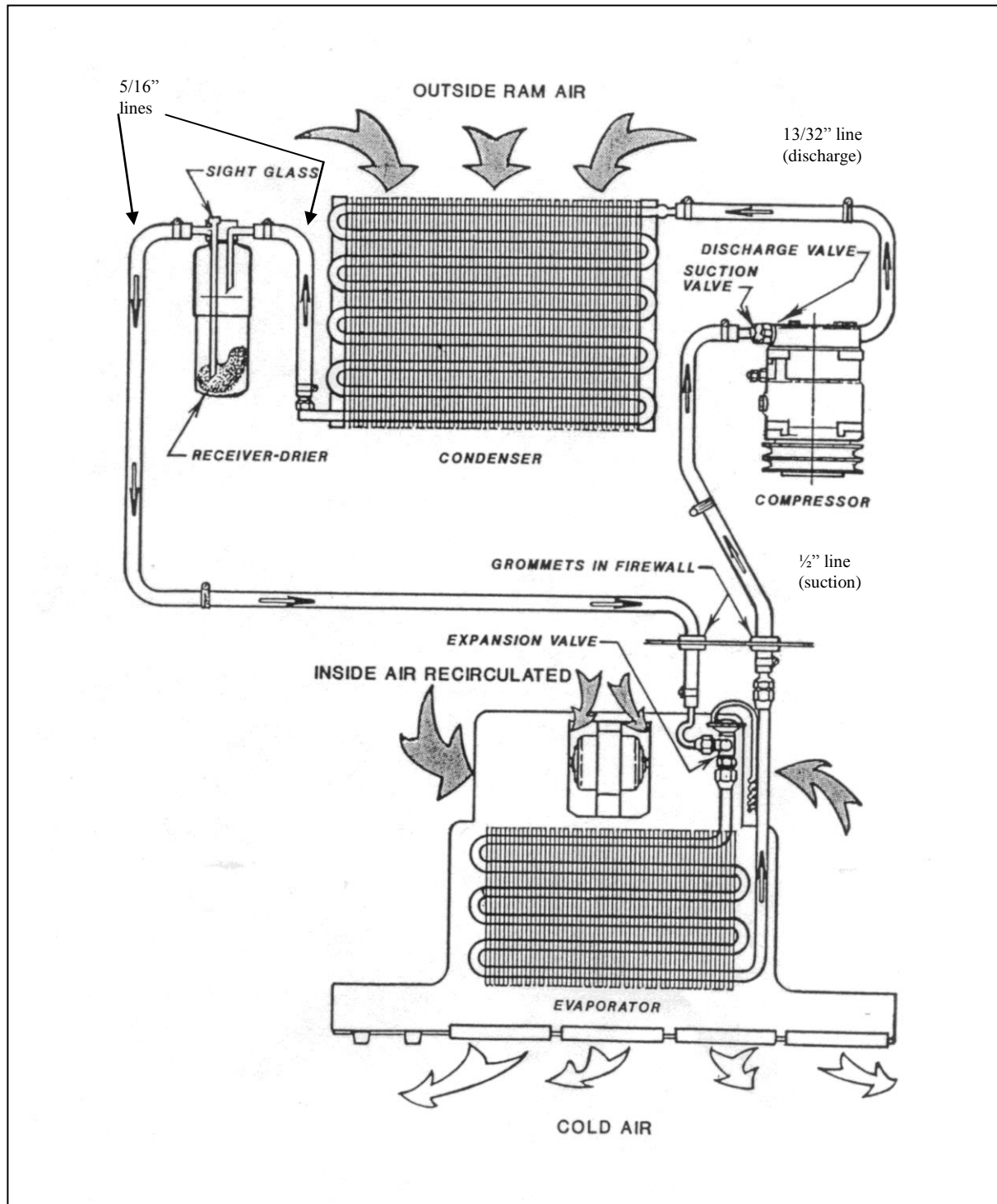
Wiring for the PC300 LC-6 Excavators in this engine/heater configuration is set up using the thermostat as the primary A/C controller. Take supply power off the blower switch and ensure that the power is on only when the blowers are on. Run a 14ga wire from the blower power and into the thermostat. Run the 14ga black clutch wire out to the compressor with the hoses and connect the switches in series and then the compressor.



## **CHARGING AND TESTING**

- 1) Pressure test the system using nitrogen to a pressure of 250 psi. Check for leaks.
- 2) Add 2oz of SP20 Sanden PAG oil to the system.
- 3) Vacuum the system for at least ½ hour.
- 4) Check that the vacuum holds.
- 5) Fill the system with 3 lbs of R134a refrigerant. **DO NOT USE ANY OTHER TYPE OF REFRIGERANT OR IT WILL VOID THE WARRANTY.**
- 6) Test the system. Check the cycling temperature of the thermostat. Adjust the thermostat settings if required to avoid coil freeze up problems. See the thermostat setting procedures at the end of these instructions.

## Refrigerant Flow Pattern in a Standard Air Conditioning System





## Thermostat Setting Procedures

- 1) Thermostat types
  - a) preset
  - b) adjustable
    - a) A preset thermostat is adjusted to its specific cut in and cut out temperatures when manufactured and does not have a rotary adjustment for the operator.
    - b) An adjustable or rotary thermostat has been manufactured to a predetermined cut in and cut out temperatures, but it is also operator adjustable to achieve the desired comfort level.

Both types of thermostats can have their factory settings adjusted by turning the setting screws on the body of the thermostat. One body type has the setting screws mounted externally and labeled for direction of rotation. The other body type requires the removal of the plastic end plate to expose the set screw.

- 2) Thermostat probe location: The location of the thermostat probe in an evaporator coil can be very important to achieve the maximum cooling potential of the coil while also preventing coil freeze-up. There is no set location for the thermostat probe to be put that will be optimum for all systems, but several rules of thumb may be followed:
  - a) Insert the probe in the coldest area of the evaporator coil.
  - b) Insert the probe from the top of the coil down, if possible.
  - c) Make sure that at least the last 3" of the thermostat probe are in the coil.

To find the most likely area where the coil is the coldest, consider these factors:

- 1) Direction of air flow through the coil.
  - 2) The coil area likely to have the lowest air flow.
  - 3) The inlet locations of the refrigerant into the coil.
  - 4) The inlet of the hotter outside air into the coil area.
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- 1) Usually the coldest side of the evaporator coil will be the air outlet side. Often the thermostat probe can be inserted between the last and second last row of tubes.
  - 2) The lower air flow area of the evaporator coil in most systems tends to be near either end of the coil. These areas will be colder
  - 3) The area of the coil that the refrigerant inlet tube(s) occupy should be the coldest part of the coil.
  - 4) If the system is equipped with an outside air intake, where and how that air is brought into the evaporator area can have a large effect on the coil temperature. If all the outside air is piped into the evaporator in one area, that area will be considerably warmer in hot weather.

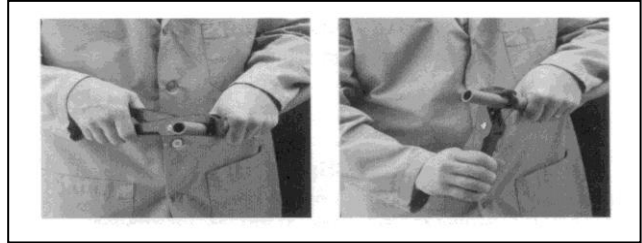
By looking at all these different factors, the area of an evaporator coil most likely to be the coldest can be determined.

Once the probe is inserted, the A/C system needs to be tested. Run the system to ensure that the thermostat is cycling the compressor off at the appropriate temperature. A core temperature ranging between 25° and 30° F should cause the thermostat to cycle off. The air temperature at the vent outlet closest to the evaporator coil should be between 38° F and 45° F when the compressor cycles off.

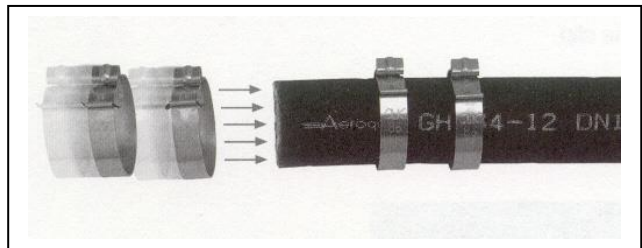
If the thermostat doesn't cycle off after a reasonable cool down period, and the air outlet temperature has dropped below 40° F, the cut in and cut out settings should be adjusted until the compressor is cycling on and off regularly. Let the system run for a decent time period (at least 15 min) and then check the evaporator coil for any signs of freezing.

## Aeroquip E-Z Clip Assembly Instructions

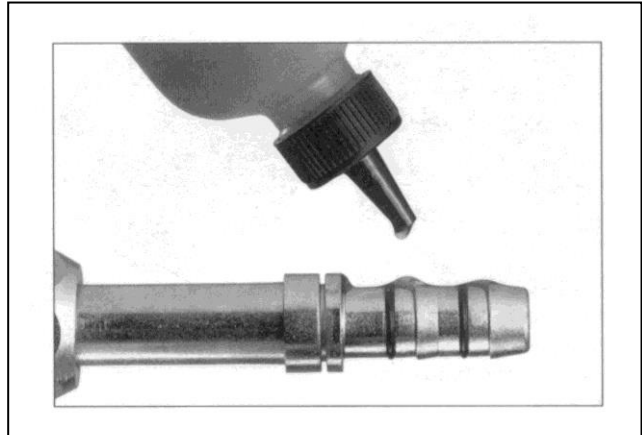
Step 1. Cut the hose to proper length with an appropriate cutting tool. Aeroquip's hand held hose cutter has been specially designed for cutting all non-wire reinforced hose, such as GH-134 Multi-Refrigerant hose. Be sure the cut is made square to the hose length.



Step 2. Install two proper-sized clips onto the cut end of the hose. Orientation of the clips does not affect the performance of the connection. However, for ease of assembly, both clips should have the same orientation. NOTE: Failure to slide the clips over the hose at this time will require the clips to be stretched over the hose or fitting later. This may permanently damage the clip.



Step 3. Lubricate the nipple with a generous amount of the refrigeration or A/C system's compressor lubricating oil. This MUST be done to lower the force of nipple insertion.



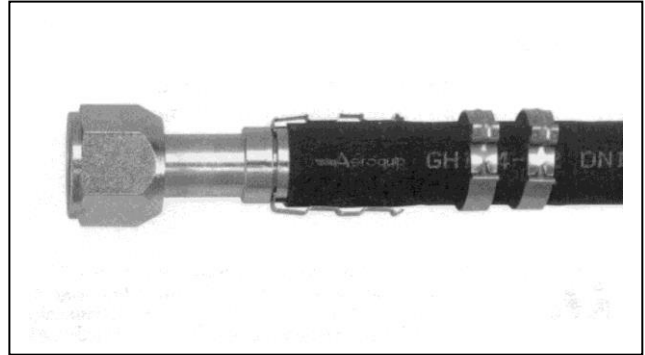
Step 4. Insert the nipple into the hose. To ensure that the nipple is fully inserted, check the gap between the cut end of the hose and the shoulder on the nipple. Care should be taken to avoid kinking or other damage to the hose during nipple insertion.

NOTE: Be sure to wipe excess oil from the nipple and hose.

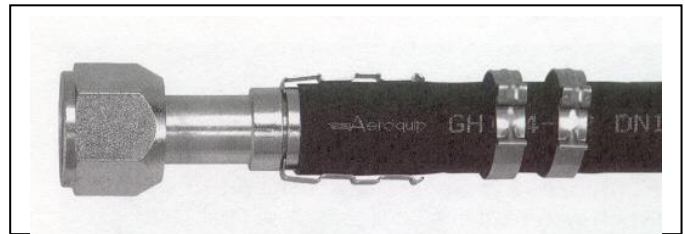


Step 5. Snap the cage into the groove on the nipple. The arms should extend over the hose length. When the cage has been correctly installed in the cage groove, the cage will be able to rotate in the groove. This step **MUST** be performed to ensure:

1. The clips will be located over the O-rings on the nipple.
2. The connection will be compatible with the connection's pressure rating.



Step 6. Slide the clips over the cage arms and into the channels on each arm.



Step 7. Use the pliers to close the clips. The pliers should be positioned squarely on the clip connection points and should remain square during the closing of the clip.

**NOTICE:** E-Z Clip components should not be reused.

