

**Komatsu WB140 / WB150**

**Installation Instructions**



**HAMMOND AIR CONDITIONING LTD**

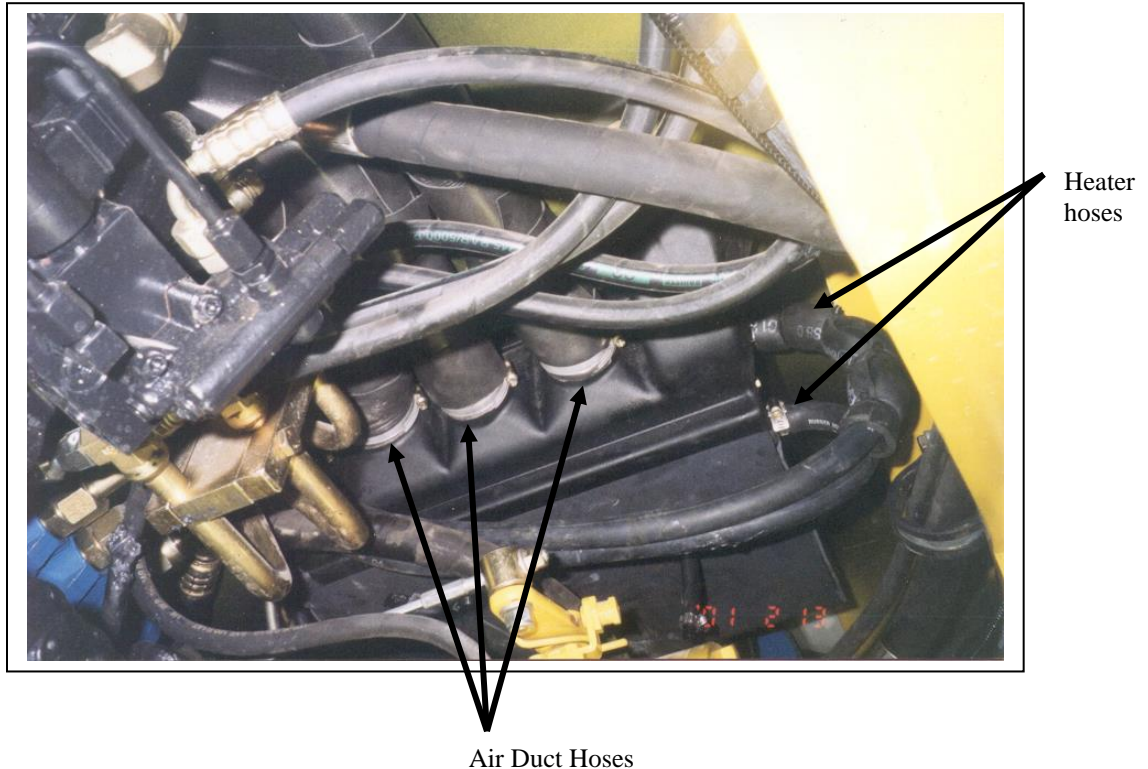
**INGERSOLL, ONTARIO**

**1-800-267-2665**

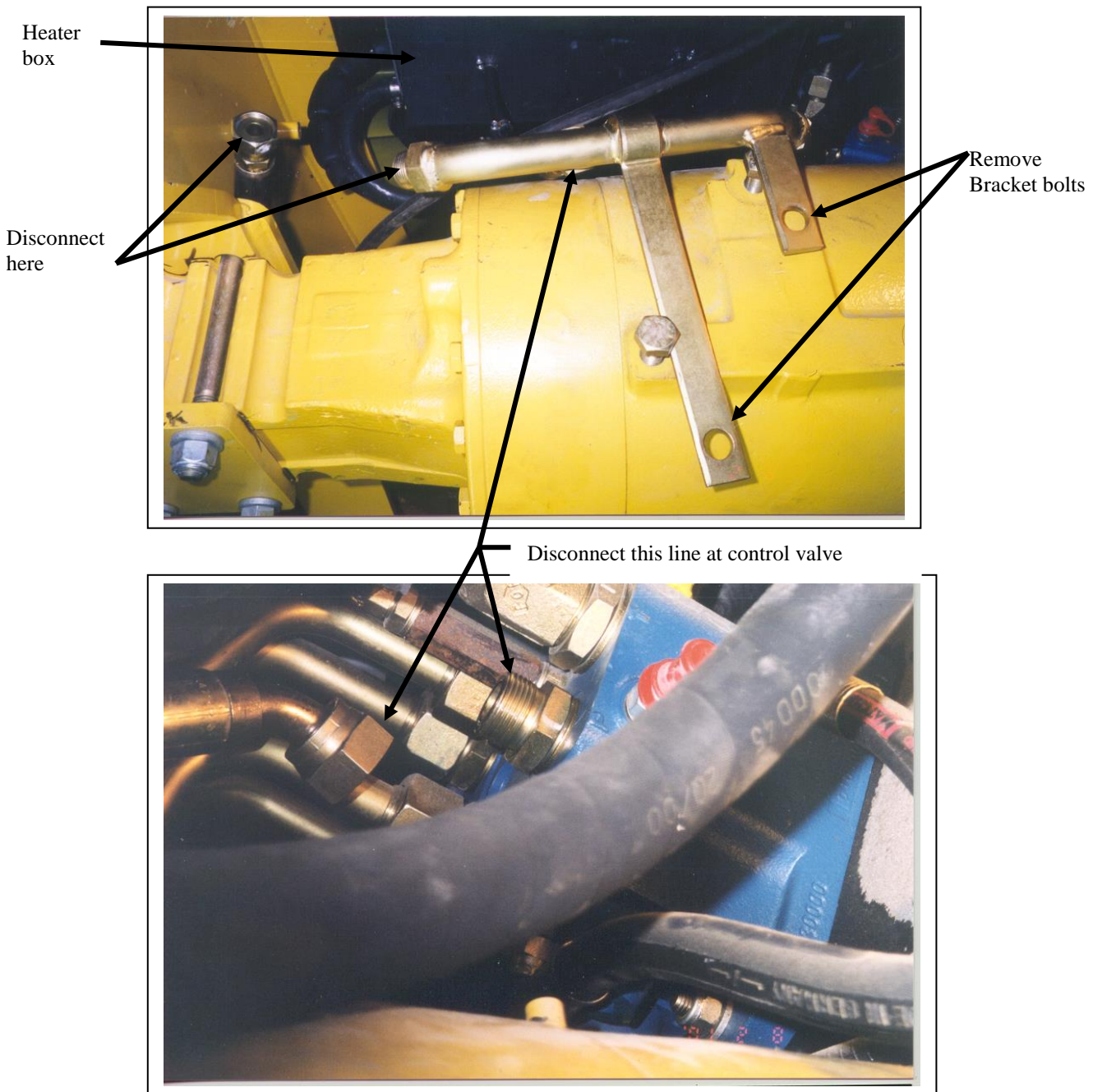
**1-888-267-3745 (FAX)**

**Evaporator:** The evaporator coil for the Komatsu backhoe is a “drop in” style design that goes in to a box mounted beneath the machine in the area approximately under the drivers seat. It uses the original heater coil, blower and blower controls. There will be some minor modification to reduce outside air intake and increase re-circulation air.

1. From beneath the equipment locate the heater box found above and in front of the rear axle. Pinch the heater lines to avoid excessive coolant loss and then remove the two heater lines from the heater box.

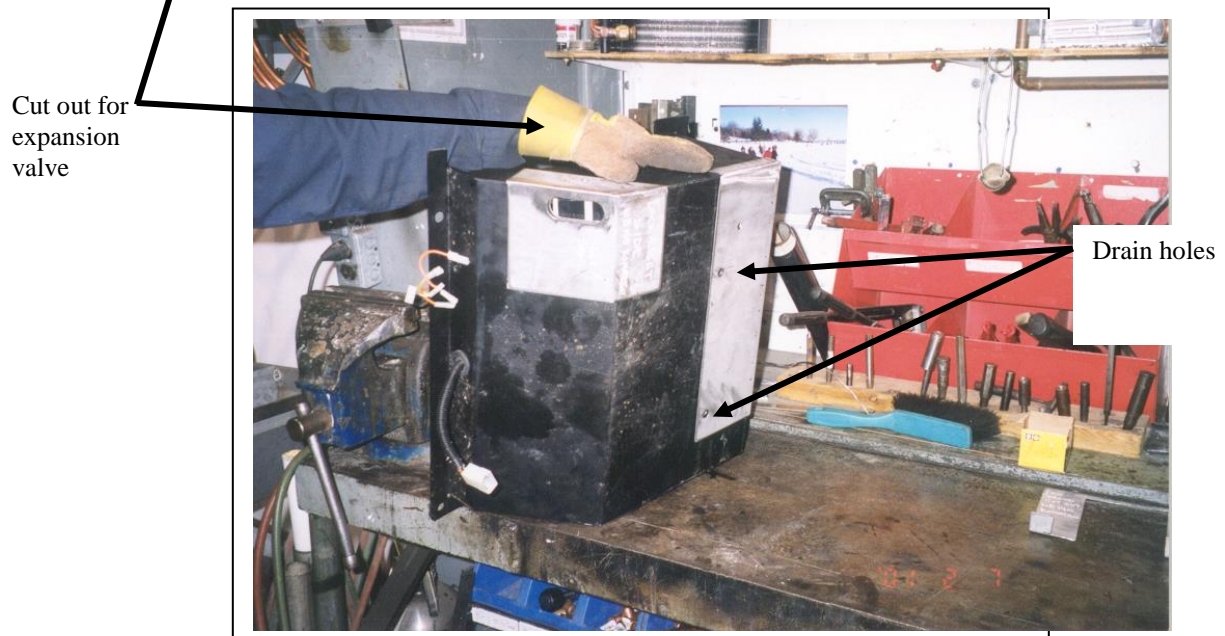
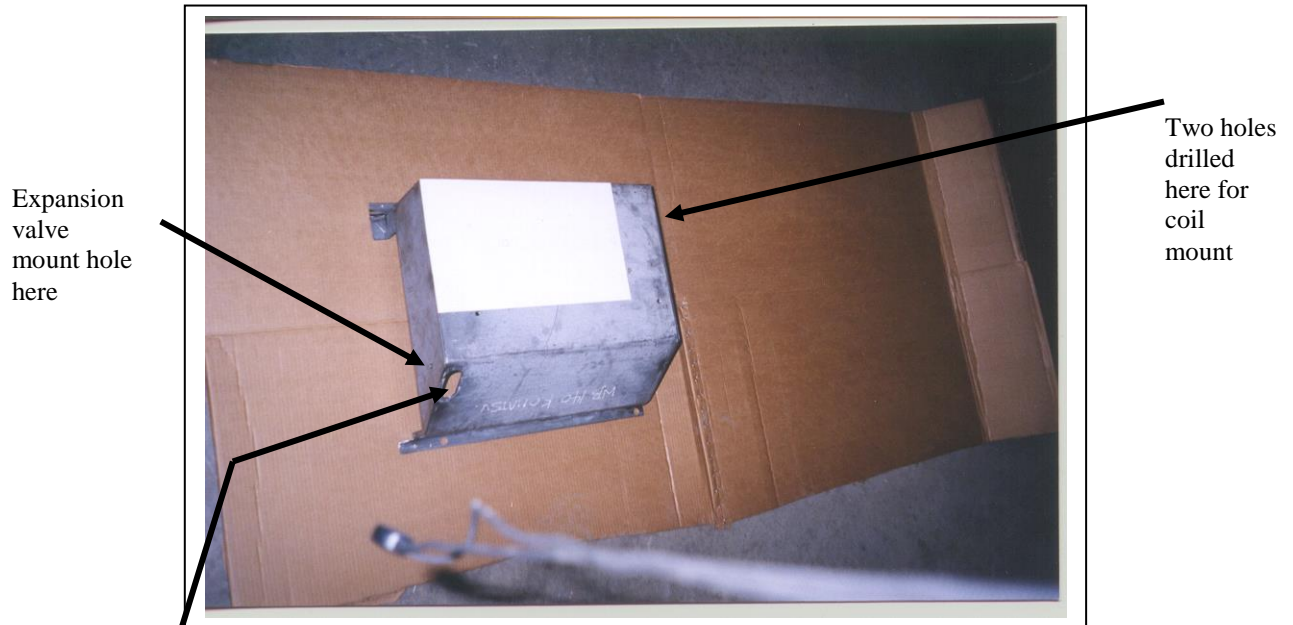


2. Remove the air duct hoses from the front of the heater box, and the electrical connector at the rear of the box, then remove the four bolts which hold the heater box up under the floor.
3. Remove the two bracket bolts which secure the large hydraulic line to the axle. Disconnect left and the center hydraulic lines from the tube.(requires 30mm wrench) You will find it a bit easier to disconnect the center line from the control valve end. Less than one cup of fluid will escape from these disconnects. The Hydraulic tube can then be moved to the right allowing you to lower the heater box (pic 2 and 3)



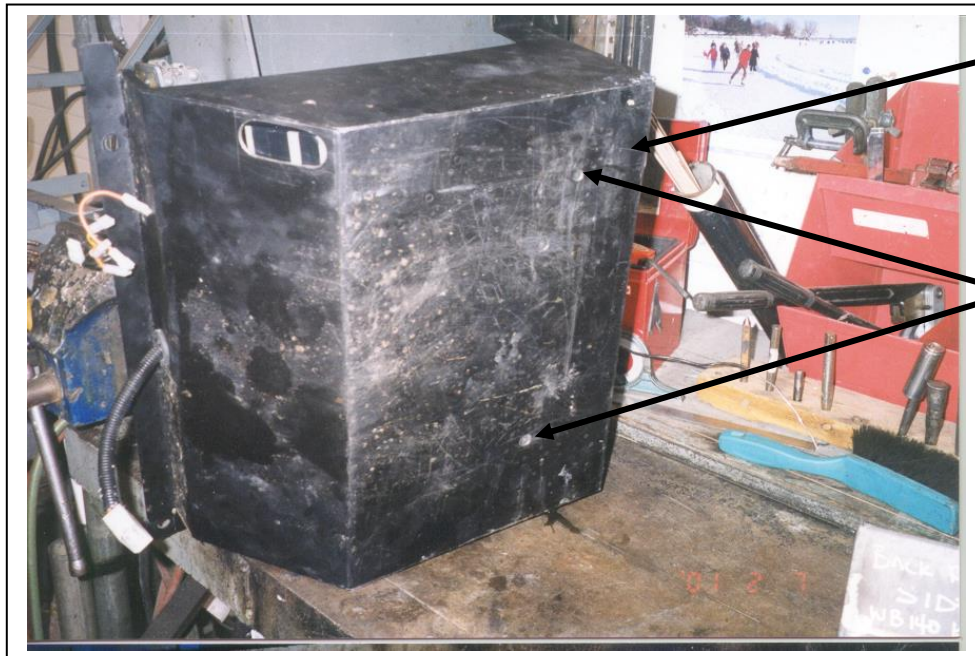
4. With heater box now on a work bench, remove the plastic heater coil cover and blower from inside the box. The evaporator coil will be installed next to the heater coil.

5. Use the paper hole location templates to determine where to drill the holes and cut outs, in the heater box.. There are a total of six holes to drill and one cut out to make.



There will be three holes drilled in the bottom of the box, one for the thermostat probe and two for drain tubes. There will be two holes required in the left side of the box to secure the coil. There will be one hole on the right side to secure the block expansion valve and one cut out to access the expansion valve.

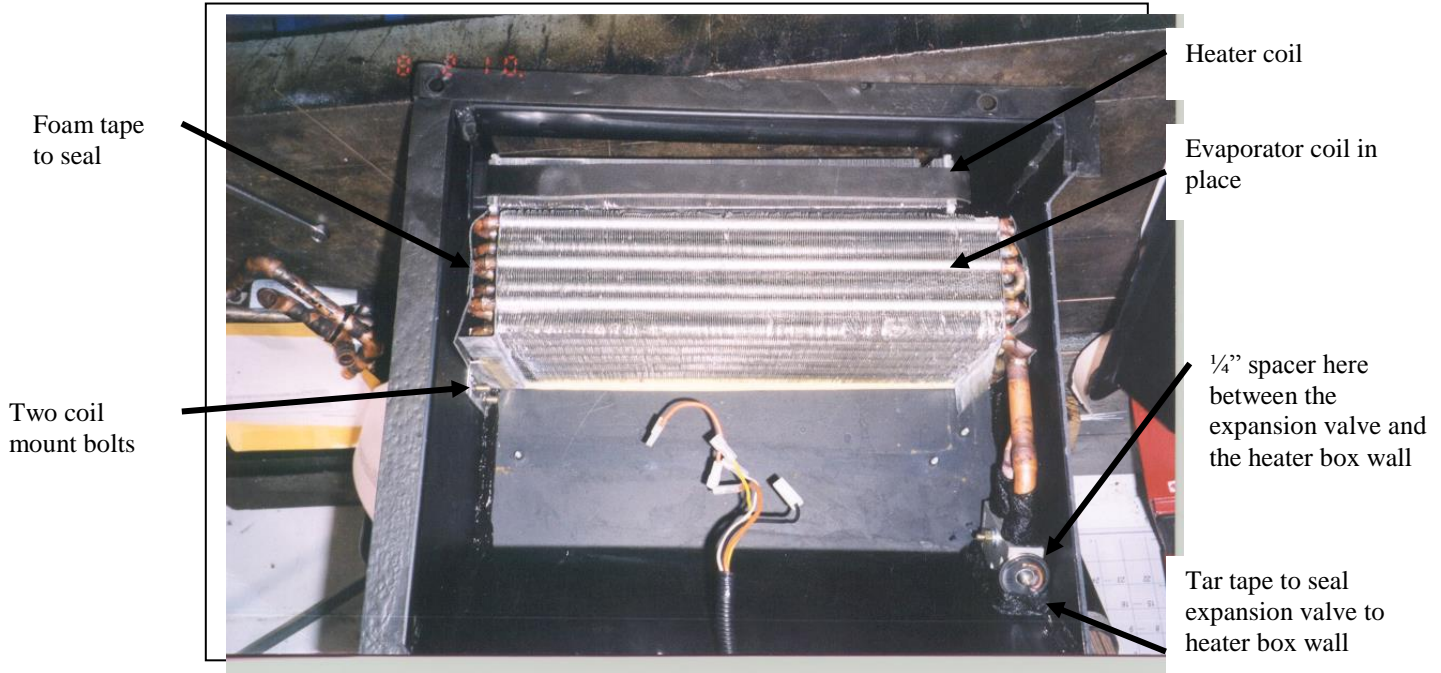
Drill here for expansion valve mount hole



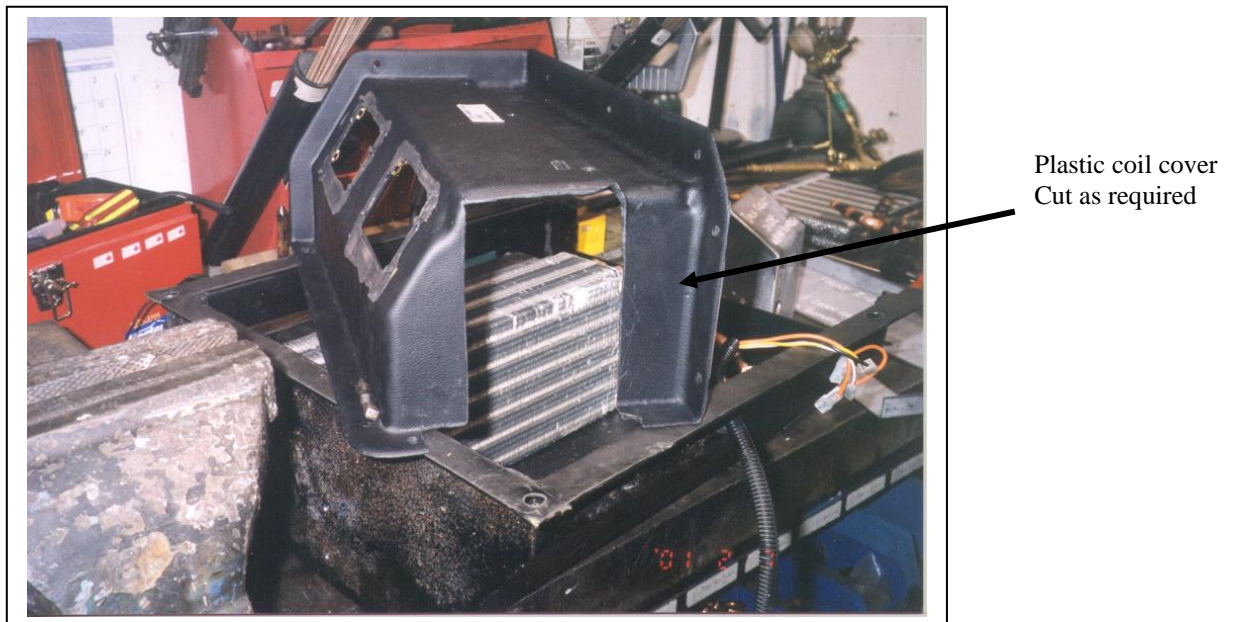
Thermostat probe insert hole

Drain holes (glue in copper drain extensions from inside of box)

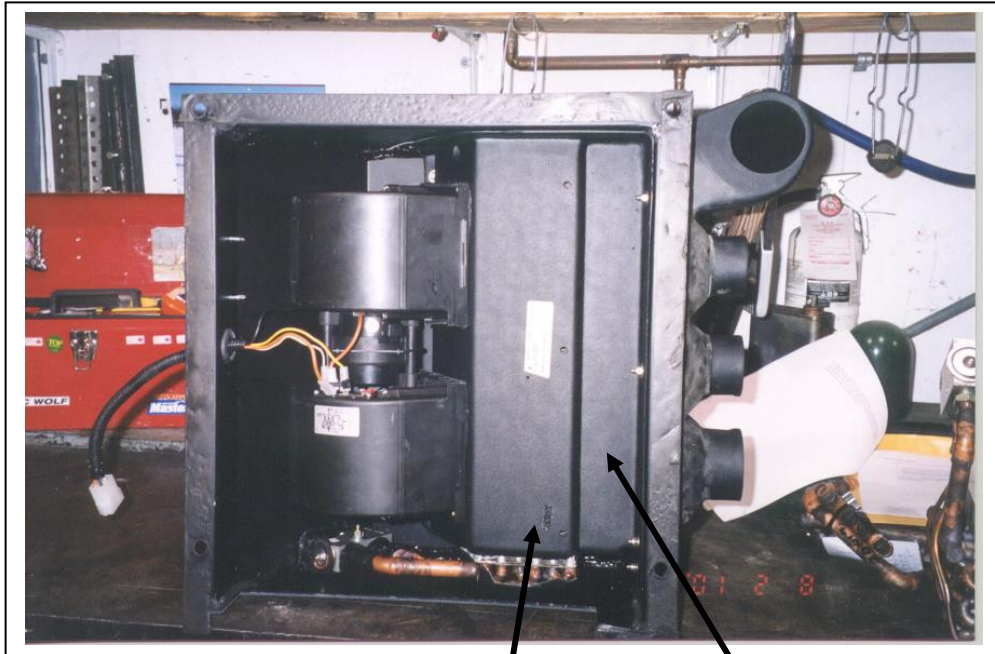
6. Install and glue the two copper drain extensions into place.
7. Install the evaporator coil into the box with hardware provided and secure into place. There is a 1/4" spacer provided to space the block expansion valve from the inside edge of the box. Use 1/4" self adhesive foam to seal each end of the coil.



8. Cut the plastic coil cover using the paper template.



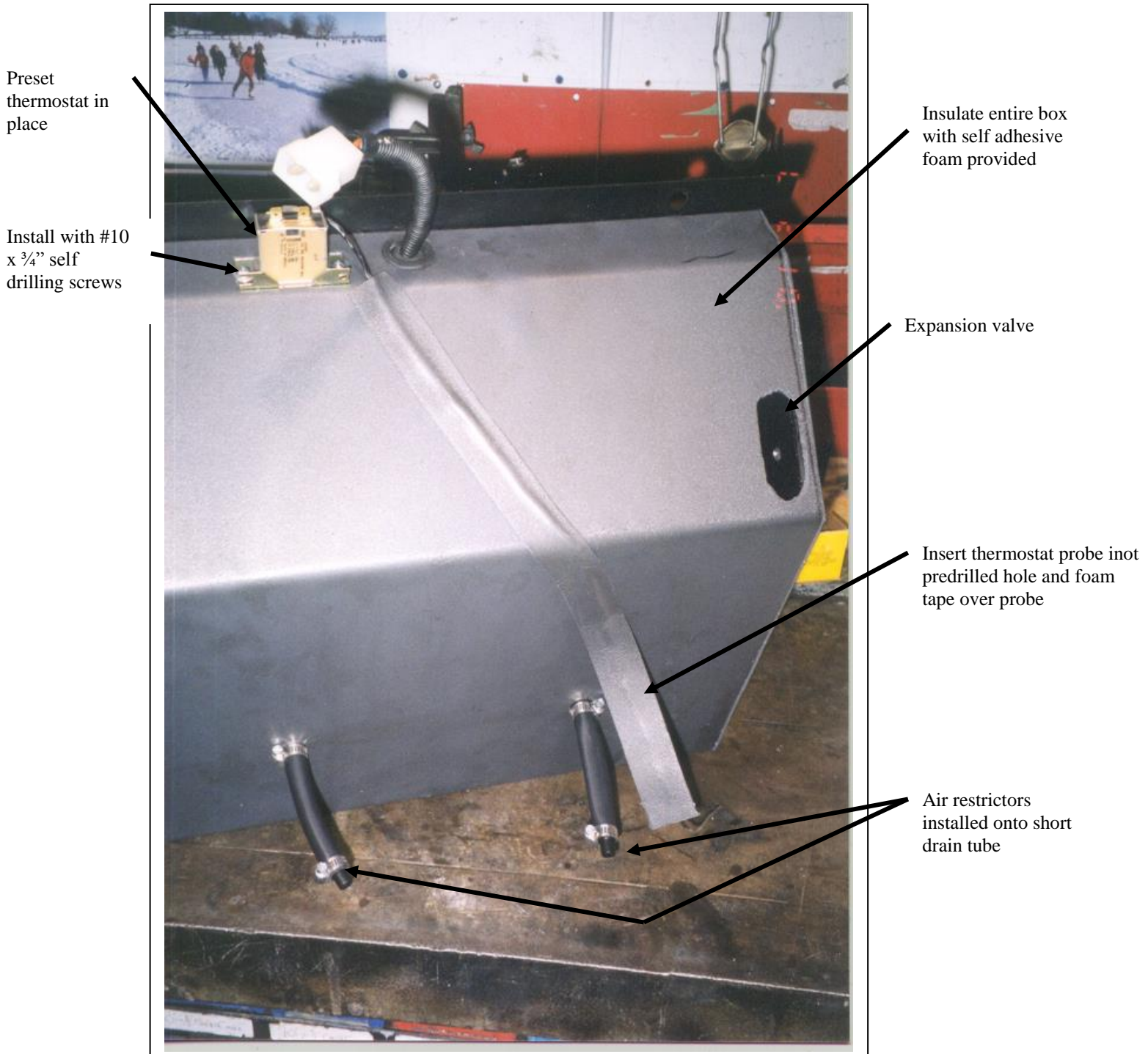
9. Re-install the plastic cover and blowers Seal with tar tape or silicon around the expansion valve and wherever sealing is required.



Seal with tar tape

Plastic cover and blower in place

10. Apply the gray insulating foam provided in kit to the entire outside of box.
11. Install short drain tubes and air restrictors provided in kit to the copper drain extensions.
12. Install preset thermostat near electrical connector as shown in picture. Use the self drilling screws provided to secure the thermostat to the box.





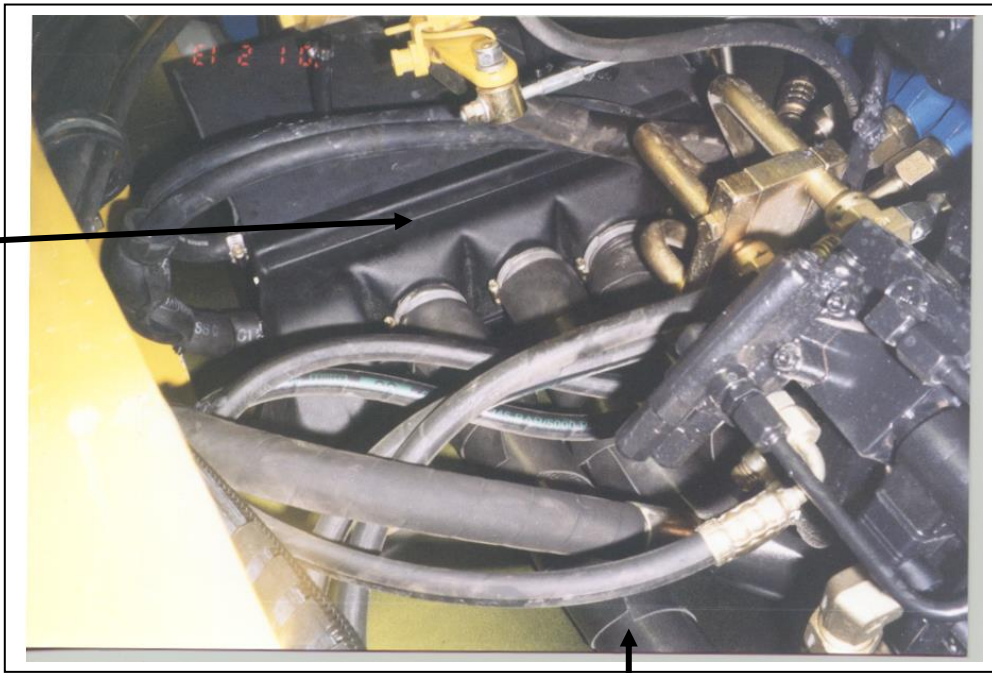
13. Insert thermostat probe approximately 4 inches into coil through the predrilled hole at the bottom of box. Tar tape where probe enters the box to prevent the probe from rubbing a sharp edge. Foam tape over the thermostat lead as shown in picture 9 and 10.

Insert the probe  
into the coil



14. Use the self adhesive foam tape provided in the kit to insulate around the three exposed flexible tubes under the backhoe from the heater / evaporator box to the area where they enter the cab. Also foam tape the plastic diffuser where three flex hoses connect to the box. Once the tape is installed on the ducts, it can be held in place with tie wraps or mechanics wire to prevent it from unraveling in the future.

Foam tape  
plastic  
diffuser



Gray foam tape entire flex hoses

15. Install the evaporator/ heater box into the backhoe.
16. Re-connect flex hose, heater hose and electrical to box. Re-connect the hydraulic line and fasten the bracket once again to the axle.

**Compressor mount:** The compressor mounts on the front left side of the engine directly above the alternator. The compressor drives off an add on pulley on the crankshaft.

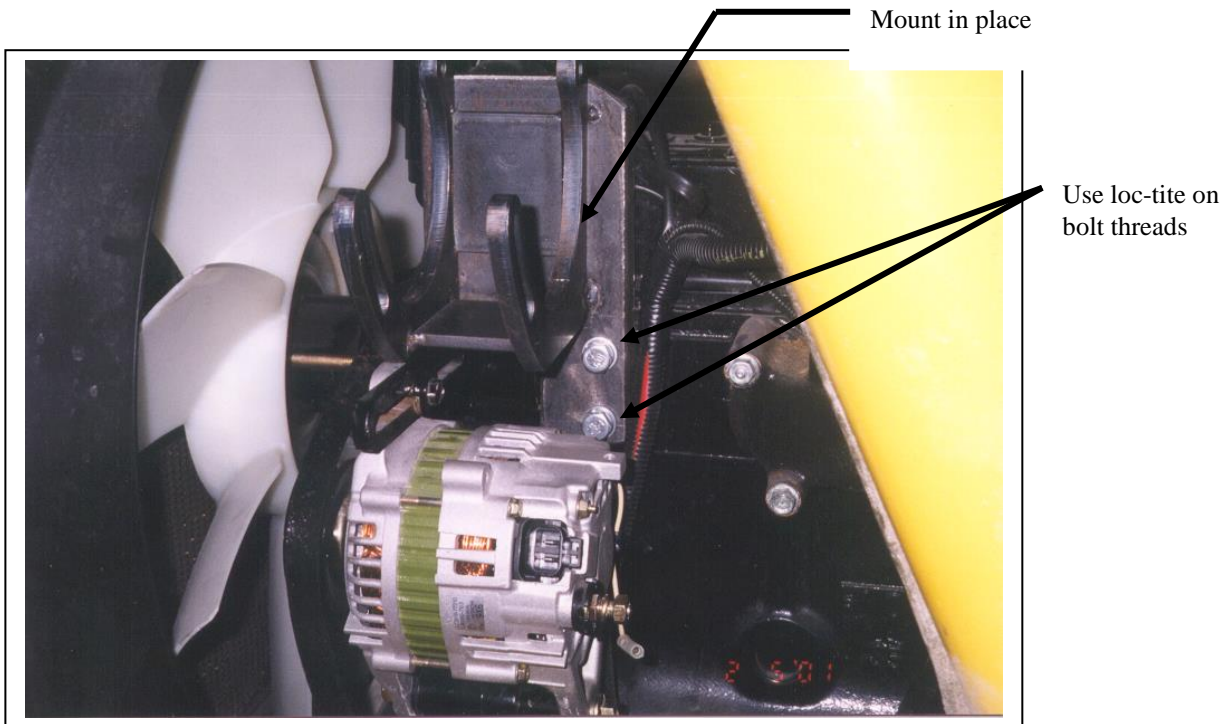
Steps;

1. Disconnect the electrical power supply at the battery.
2. Disconnect the gas shocks at the clip end so the hood can open to it's maximum.
3. Remove the safety guard from around the fan to give access to the belt.
4. Install the add on pulley onto the crank pulley using three M10 x 35mm bolts, locks and flat washers provided. Use blue loc-tite on the threads
5. Loosen the alternator belt and remove the alternator tightening bracket bolt that fastens the bracket to the engine.
6. Raise the adjustable air filter to it's highest level.

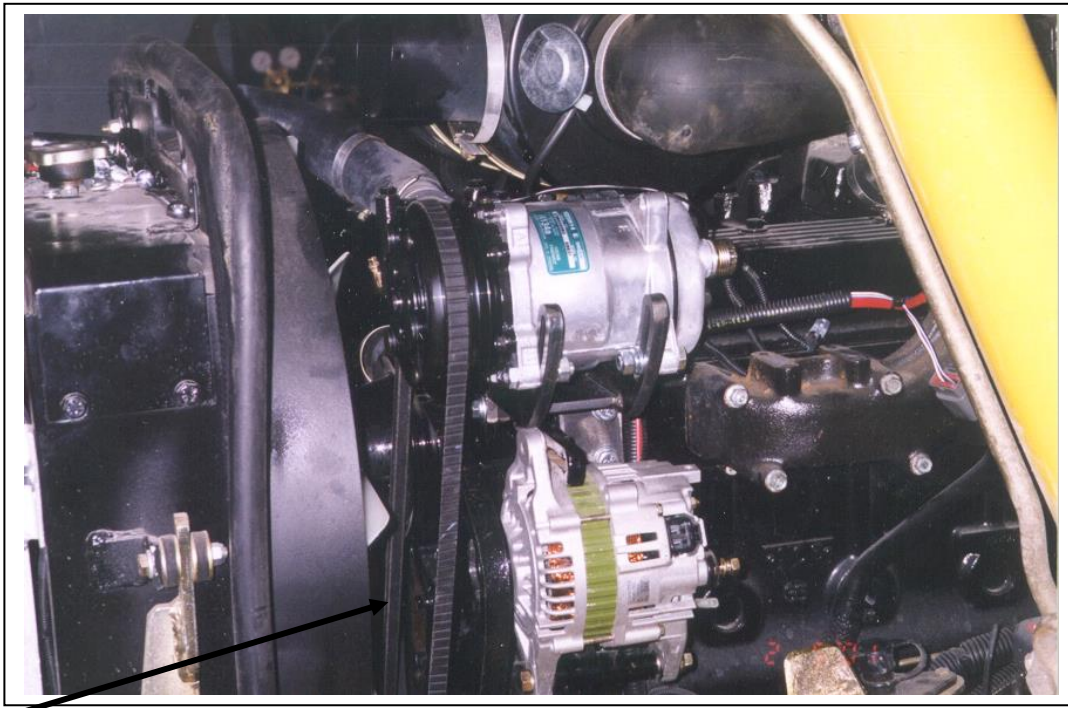


Raise the  
air filter to  
max

7. Install compressor mount using the hardware supplied in kit. The alternator bracket bolt removed at step 5 will be replaced with a M8 x 35mm bolt now that the new compressor mount straddles it. The other two mounting bolts are M10 x 40mm installed as shown in (picture 13) Use blue loc-tite on the threads and tighten mount into place.

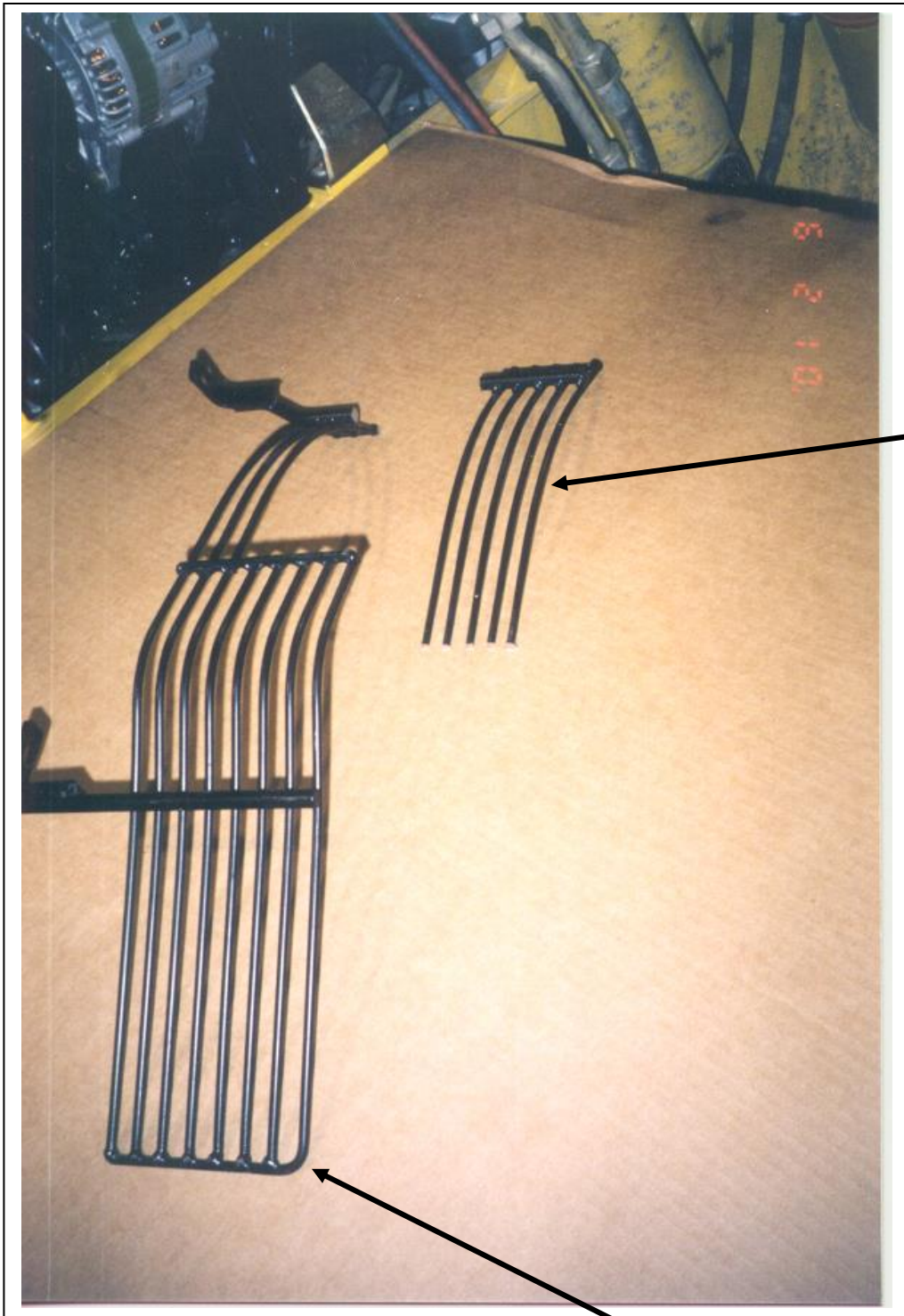


8. Ensure the alternator belt is properly seated in the grooves and re-tighten it.
9. Install the 17XXX compressor drive belt around the add on crank pulley and the front compressor pulley. Bolt the compressor in place using the 3/8" hardware provided and then check the belt alignment by using a straight edge across the pulley face. Once the alignment has been verified, tighten the compressor fully and secure the bolts.



Compressor installed & belt tightened check belt alignment

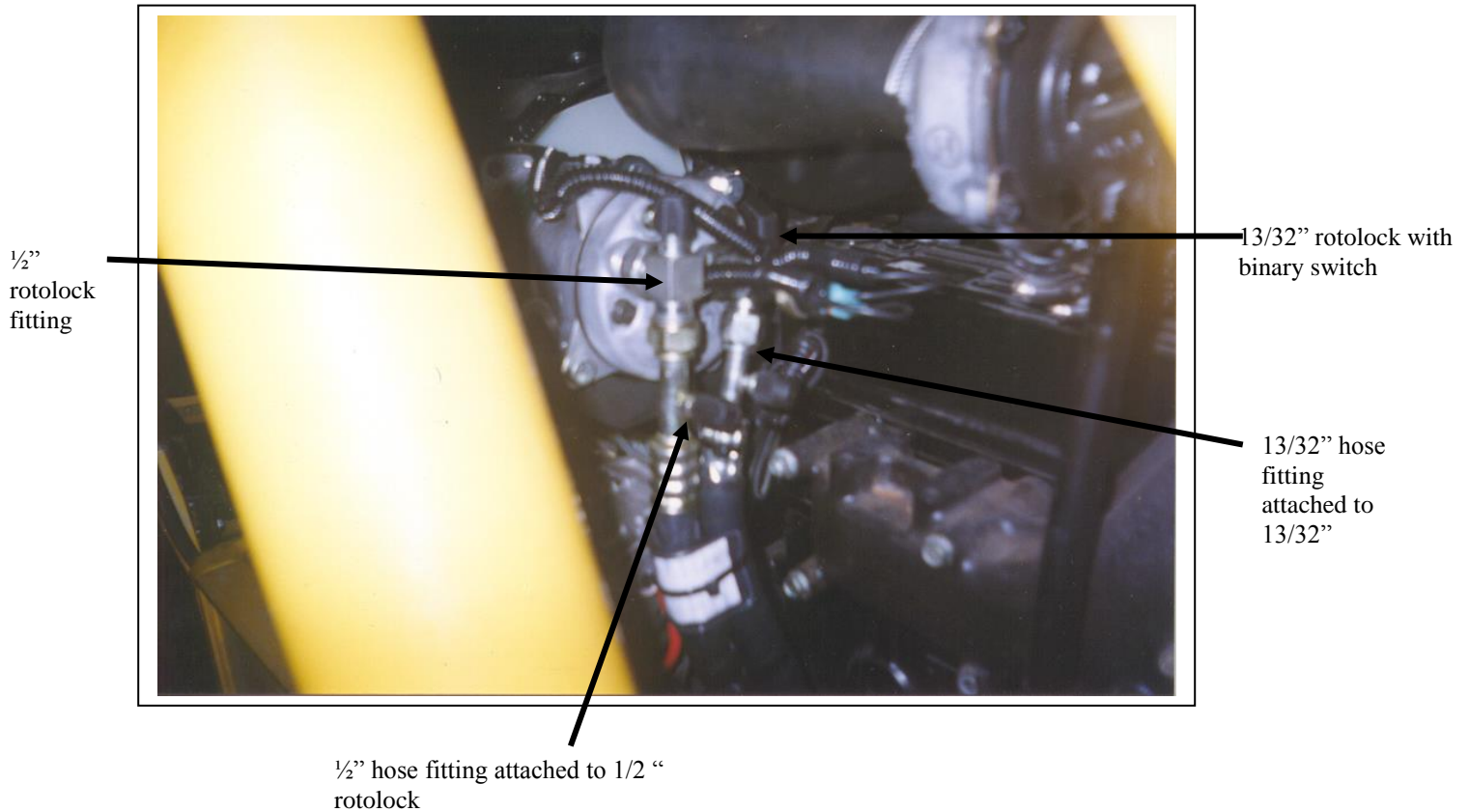
10. Remove the five wires on the top left section of the fan safety guard and then reinstall it.



Cut off and discard

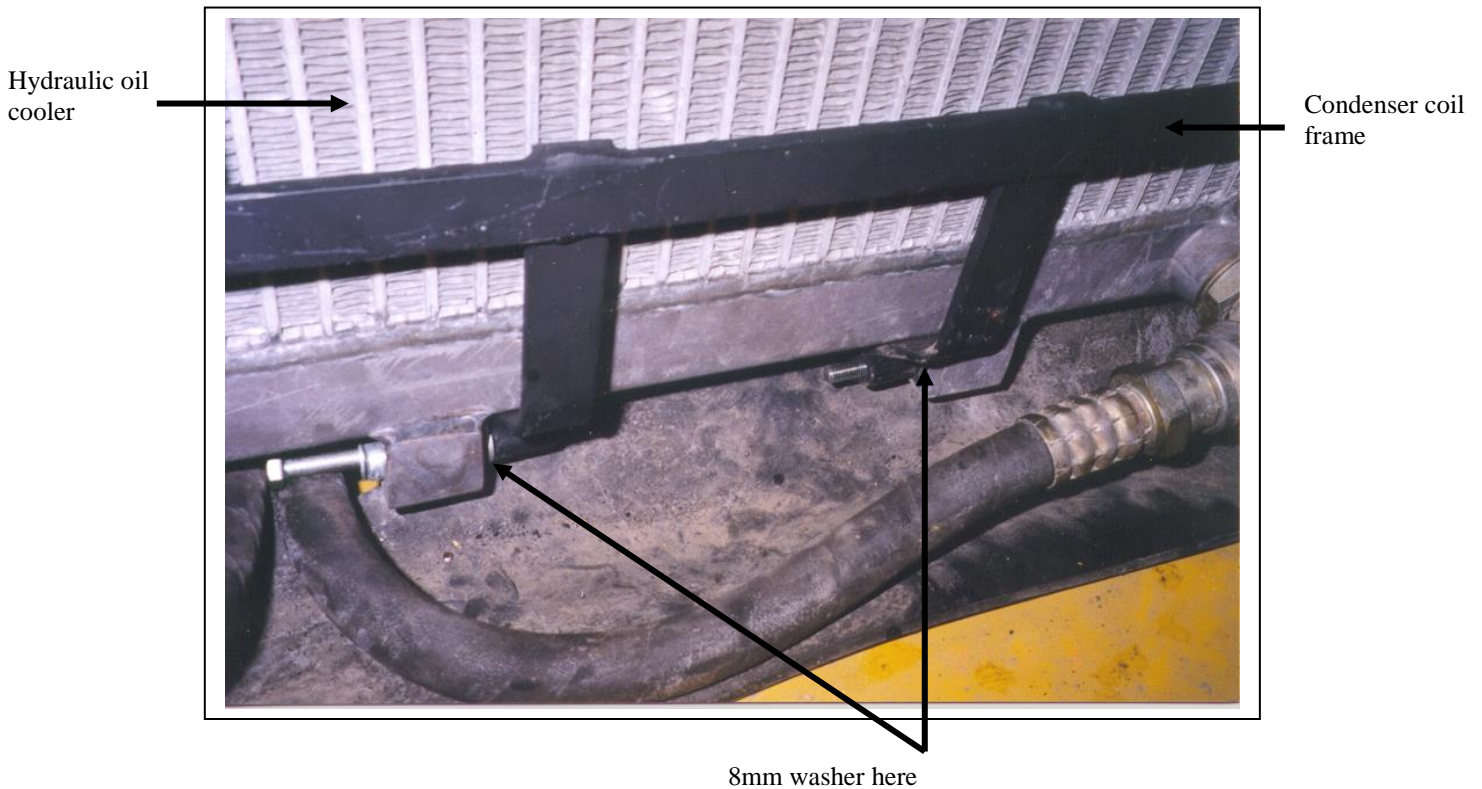
Replace on radiator  
shroud

11. Install the rotolock fittings onto the fitting ports on the back of the compressor. Remove the caps from the compressor ports, and install the white nylon gaskets into the grooves in the ends of the fitting ports. Be sure to oil all contact surfaces on the rotolocks with PAG refrigerant oil before installing them. Attach the 13/32" rotolock fitting onto the discharge port (closest to the engine) marked "dis" or "D". The binary switch located on this 13/32" rotolock should be pointed up and tilted slightly towards the engine. Attach the 1/2" rotolock fitting (large one) onto the suction port of the compressor. (marked "suc" or "S"). The 134a access port on this rotolock should be pointed up.

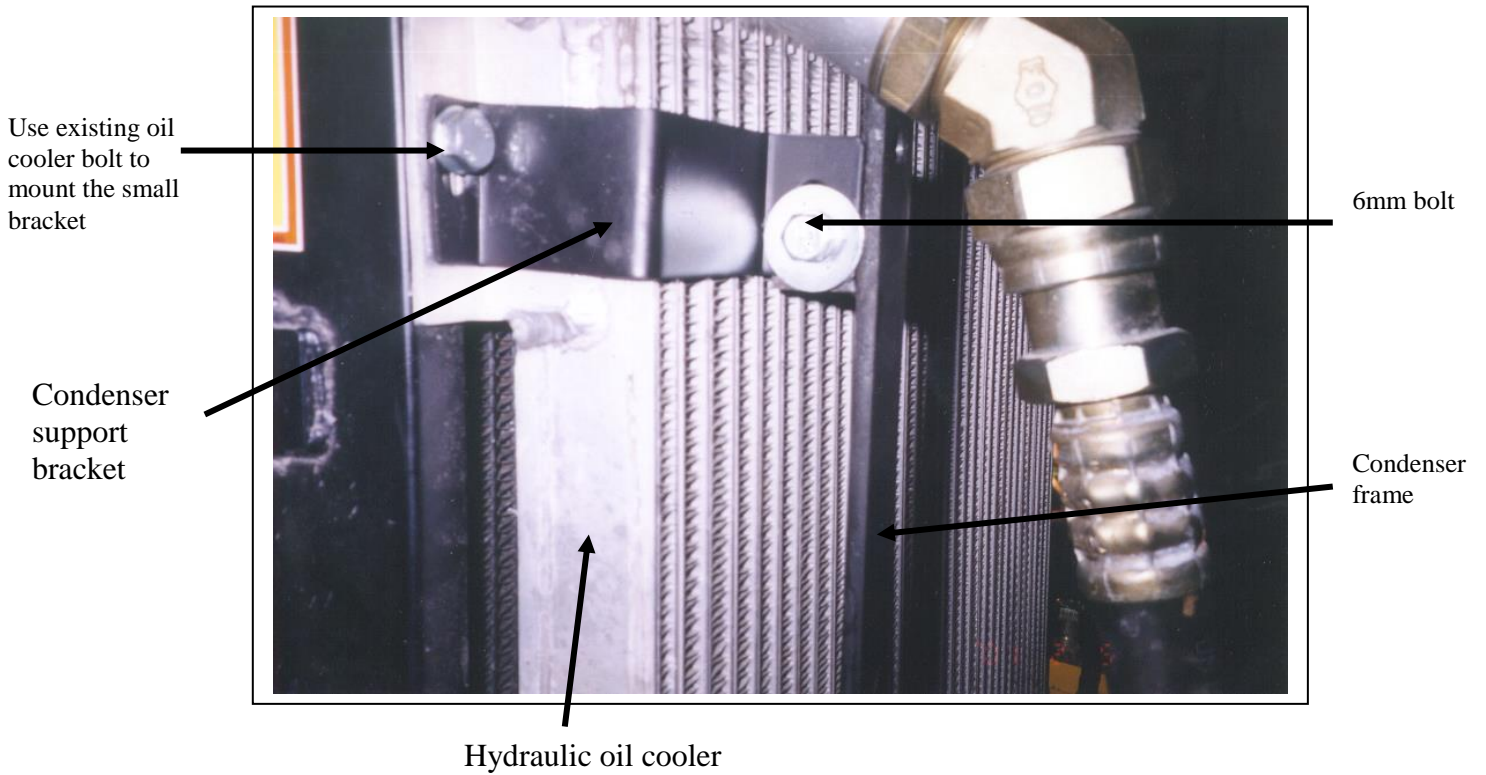


**Condenser installation:** The hinged condenser is to be mounted about 1-1/2" ahead of the hydraulic oil cooler in front of the radiator

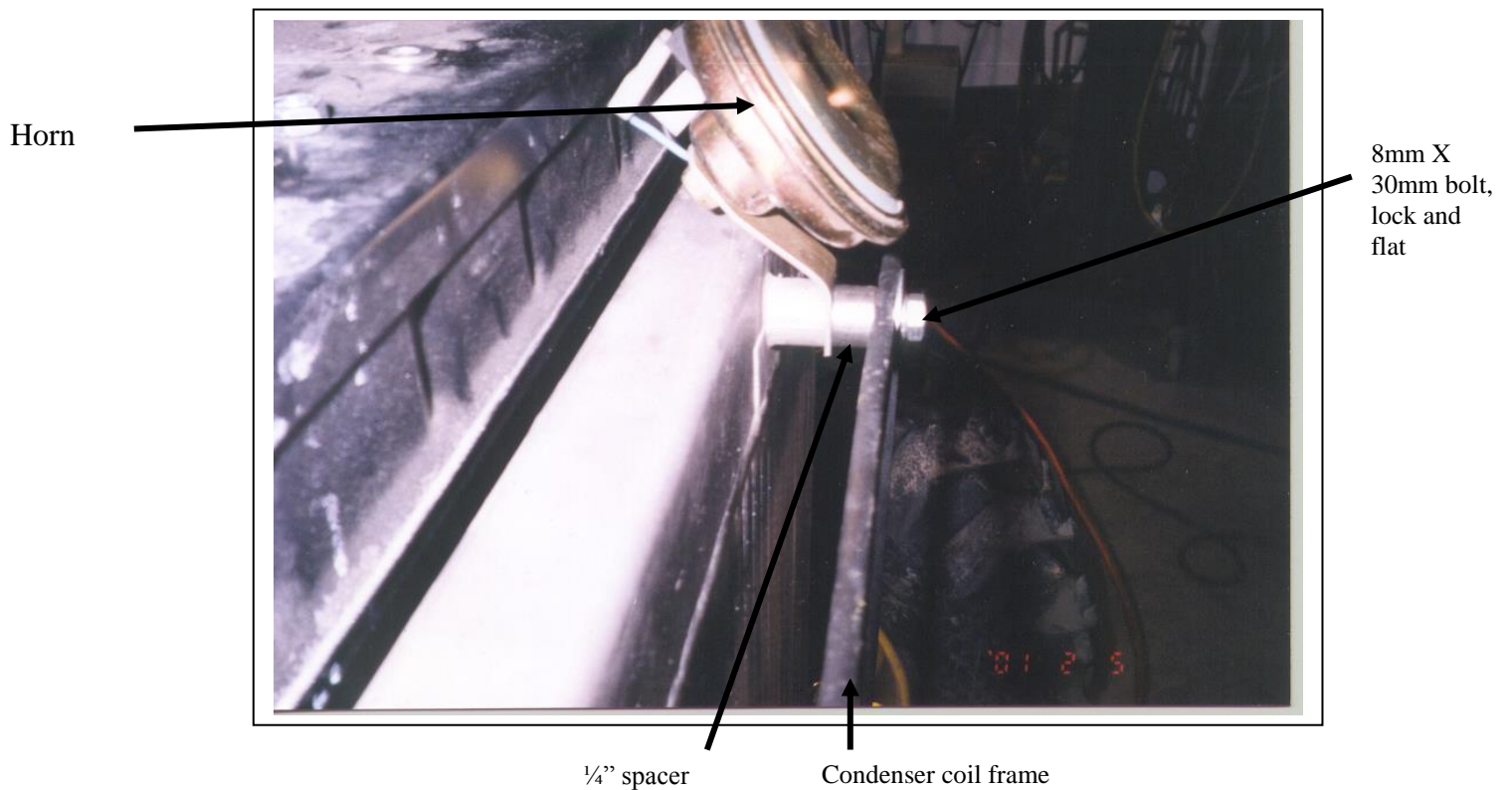
1. Remove the two 8mm nuts and bolts at the hinge end (lower) of the hydraulic oil cooler. Replace with 8mm x 90mm bolts provided in the kit, and then install an 8mm washer on the inside.
2. Remove the horn and set it on top of the oil cooler for the time being.
3. Install the lower condenser frame between the lower two pivots for the hydraulic cooler. The 8mm x 90mm bolts will need to be pulled back somewhat until the condenser frame can slide in. Install one more set of flat washers and then replace the original 8mm nuts to secure the hinge bolts in place



4. Bolt the condenser coil to the condenser frame with 1/4" x 3/4" countersunk bolts provided in kit. The condenser coil may come mounted to the frame.
5. Remove top right 8mm oil cooler bolt and install condenser support bracket. Use the original 8mm hardware. Use the 6mm hardware to secure the upper right corner of the condenser frame to the condenser support bracket.



6. Install the 8mm x 30mm bolt, washer and lock washer into the top left condenser frame mount point (original horn mount). Between condenser frame and oil cooler, place a 1/4" spacer and the horn mounting bracket. Bend horn back slightly toward the radiator.





**Drier installation:** The drier mounts right in front of the condenser using an 90 degree drier bracket.

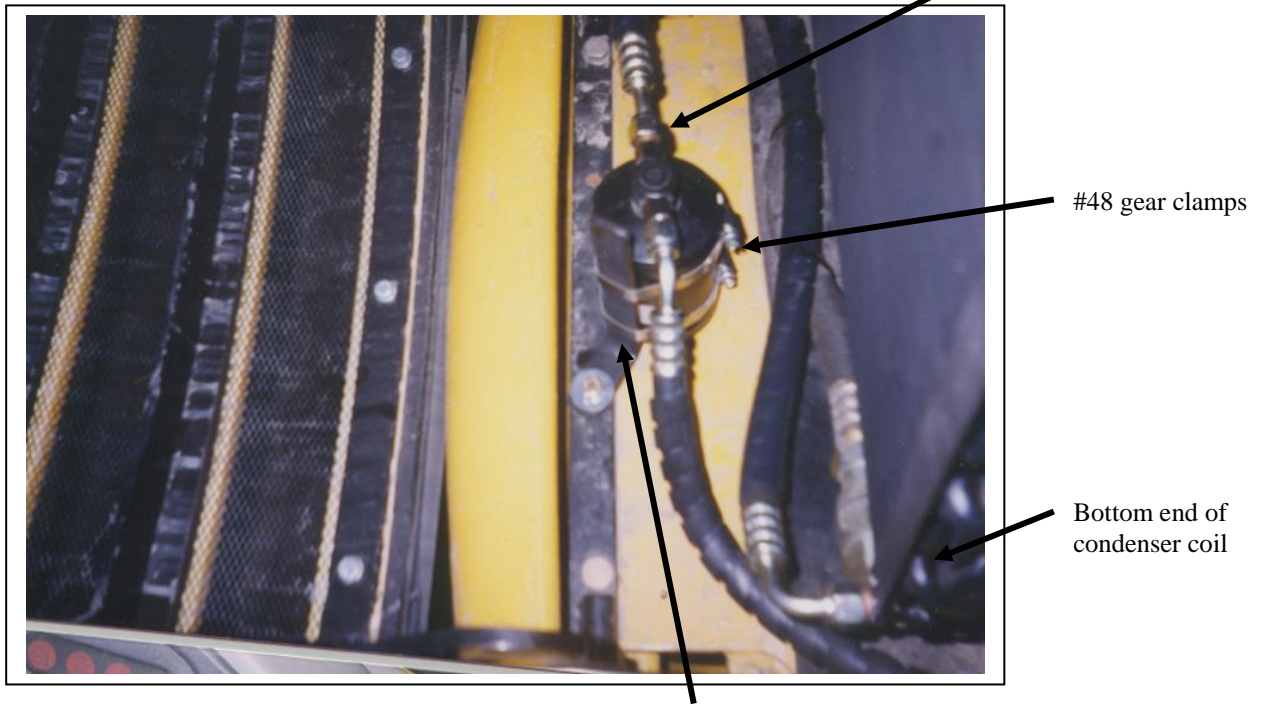
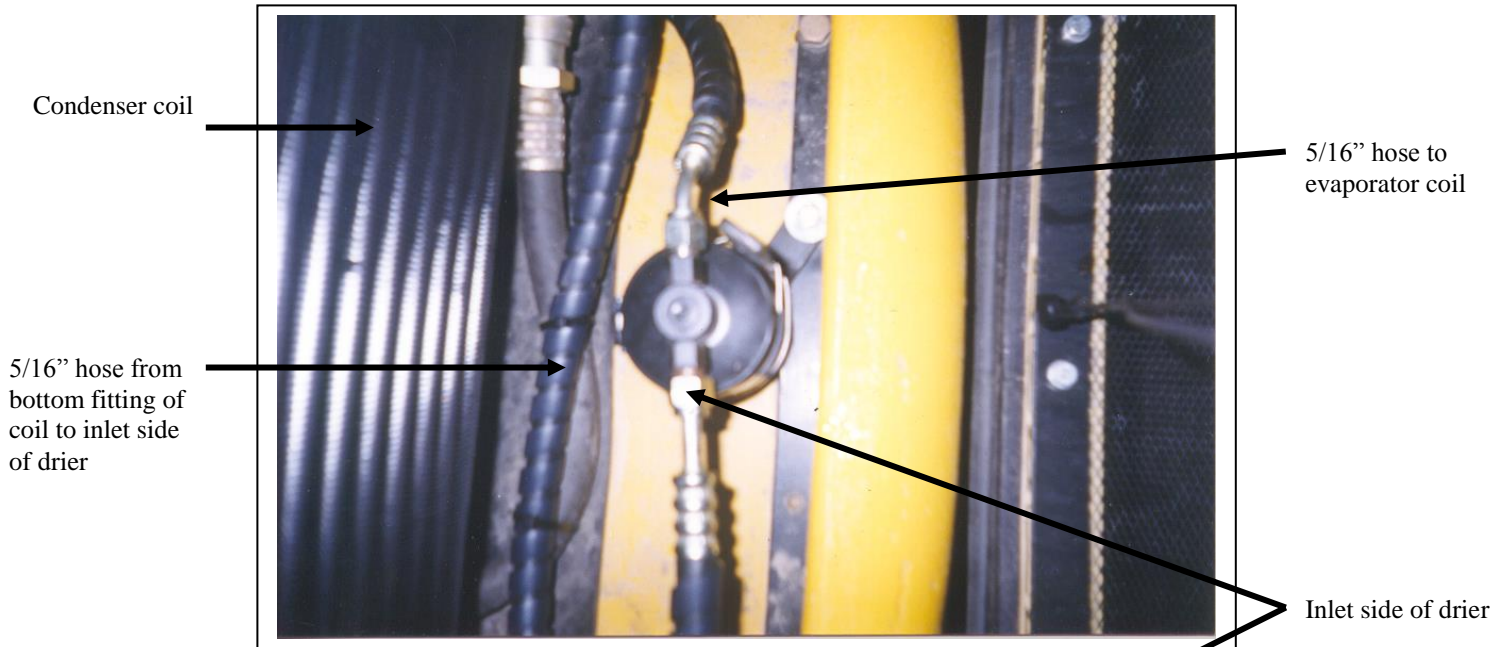
Steps:

1. Using the 8mm x 25mm bolt, washer and lock washer, install the drier bracket just inside the front counter weight. Use the existing threaded 8mm hole on the left side. Tighten with the drier bracket turned slightly towards the center of the condenser coil. This will allow the condenser to tilt further forward for easier cleaning.



2. Fasten the drier to the bracket with the two #48 gear clamps. The inlet fitting on the drier should point to the right side of the machine.

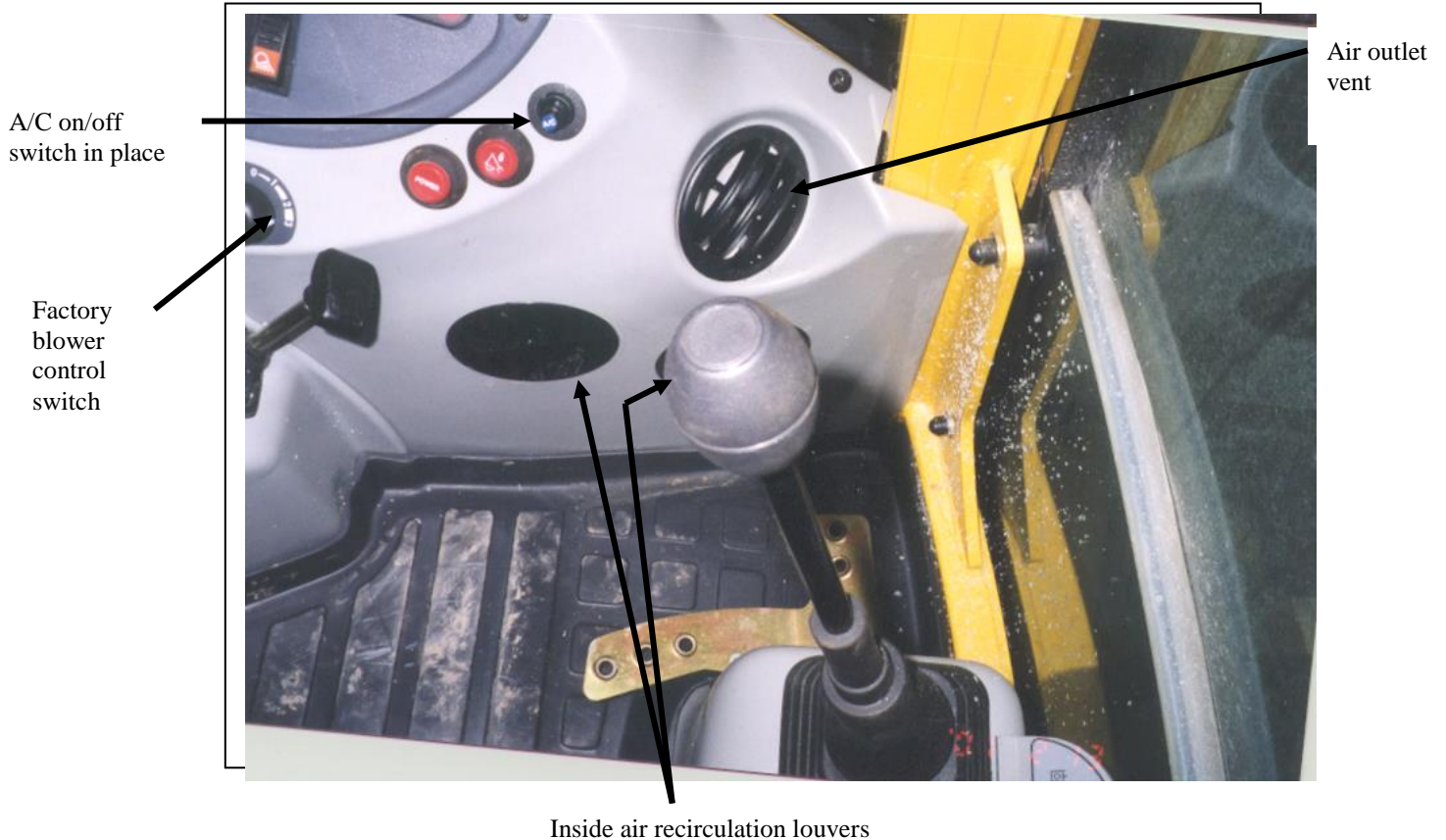
Top view



**Electrical:** The electrical system for the A/C is very straight forward. Power is taken from the blower switch wiring, through an A/C on-off switch and then to the thermostat. From there it is routed along with the A/C hoses to the compressor.

Steps:

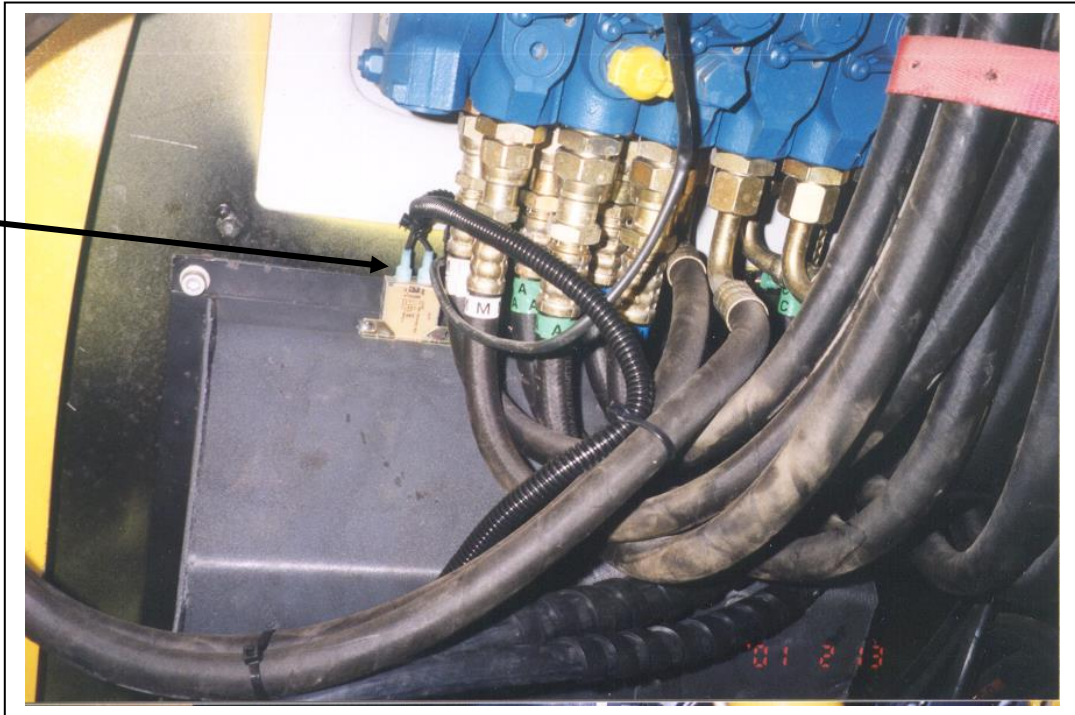
1. Remove the outside air filter on the right side of the cab. This will give access to the rear of the electrical panel.
2. Drill a 5/8" hole and install the A/C on/off switch into the open plug to the right end of the electrical control panel.



3. Install a blue female quick disconnect terminal to one wire of the ATO fuse holder and connect that to the open clutch terminal on the back of the blower switch.
4. With a blue female quick disconnect attach the other lead from the ATO fuse holder to one side of the A/C on/off switch. Insert the 5 amp ATO fuse.
5. From under the machine, feed the 14 gauge black wire in loom into the area behind the electrical control panel. There is a small opening near the place where the blower wires are fed through.
6. Connect this wire with a blue female quick disconnect to the other lead from the A/C on/off switch. Tie these wires so that they are kept safe of shorting against other switches.

7. Cut enough length of 14 gauge black wire to comfortably reach the thermostat, and connect to one side of the thermostat using a female blue quick disconnect.

Wires  
connected to  
thermostat



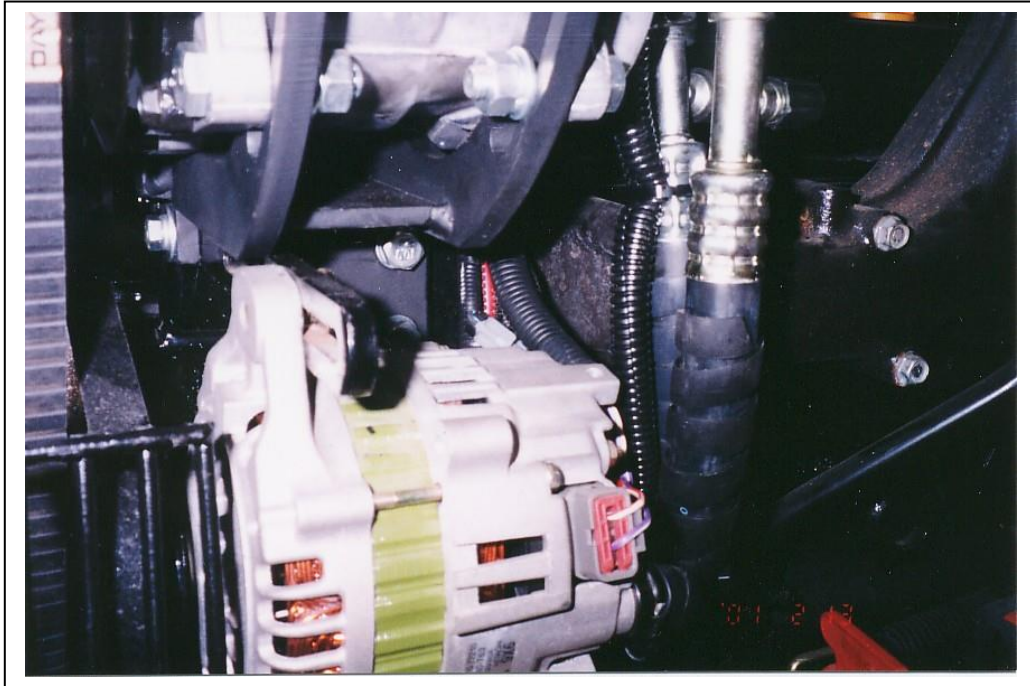
8. From the other side of the thermostat connect with another female blue quick disconnect, the remainder of the 14 gauge black wire in loom.
9. Run this wire with the hose run to the compressor area where it should be connected to one side of the binary switch. The other side of the binary switch shall be connected to the compressor clutch wire.
10. Be sure to secure the wire with cable ties wherever possible.

**Hose runs:** The A/C hoses connect all the major components of the system together. They are all pre-cut and crimped. All the fittings require the proper sized “O” ring to be installed on the them and all the contact surfaces to be lightly oiled with refrigerant oil before final assembly on the machine.

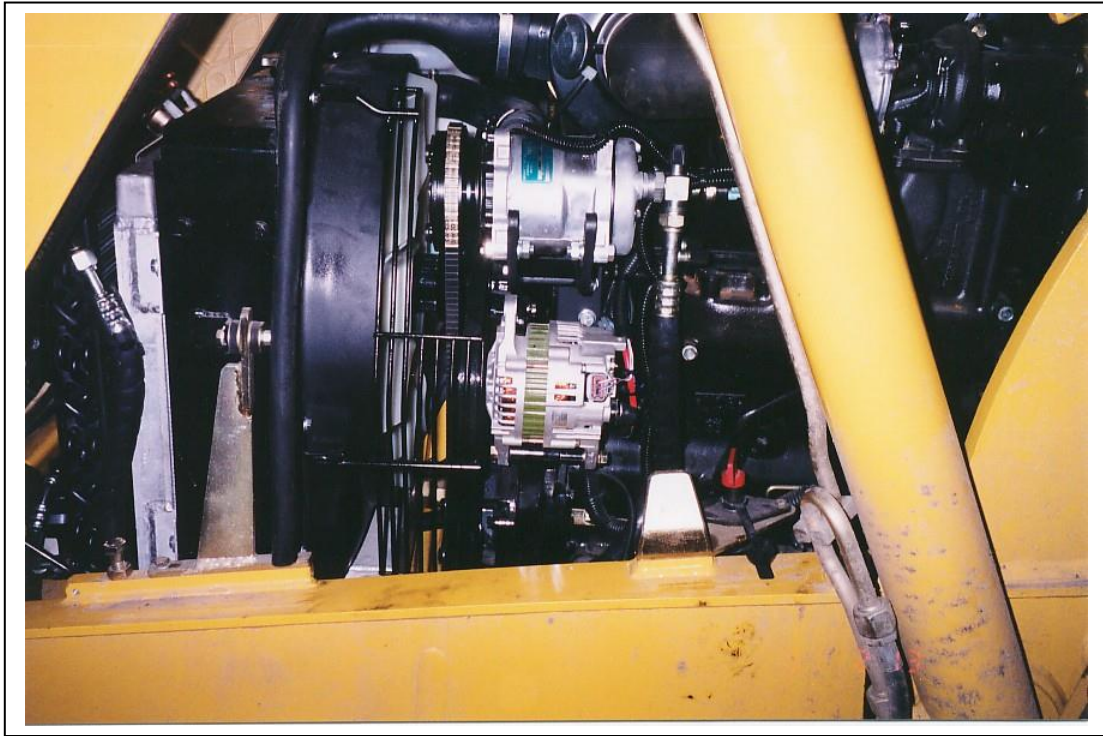
All A/C hose should be wrapped with omni wrap supplied in the kit.

**Steps:**

1. Starting at the compressor the ½” hose connects to the ½” rotolock fitting on the compressor. Connect the straight female fitting with the 134a access port on it to the ½” rotolock. (the one without the binary switch) Run the hose down the side of the engine and then back along the left frame member of the backhoe to the evaporator box.



2. Starting at the compressor, the 13/32” hose connects to the rotolock with the binary switch. (the one closest to the engine) Connect the straight female fitting with the 134a access port to the rotolock. Run the hose down the side of the engine and then up the lower left side of the oil cooler. Run the hose straight up beside the oil cooler to the top fitting on the condenser.



3. At the lower fitting of the condenser, connect the 90 degree fitting of the 30" long 5/16" hose. The hose should make a loop along side the large lower oil cooler hose and then connect the straight fitting to the inlet side of the drier.



13/32" hose connected to condenser coil (from discharge side of compressor)

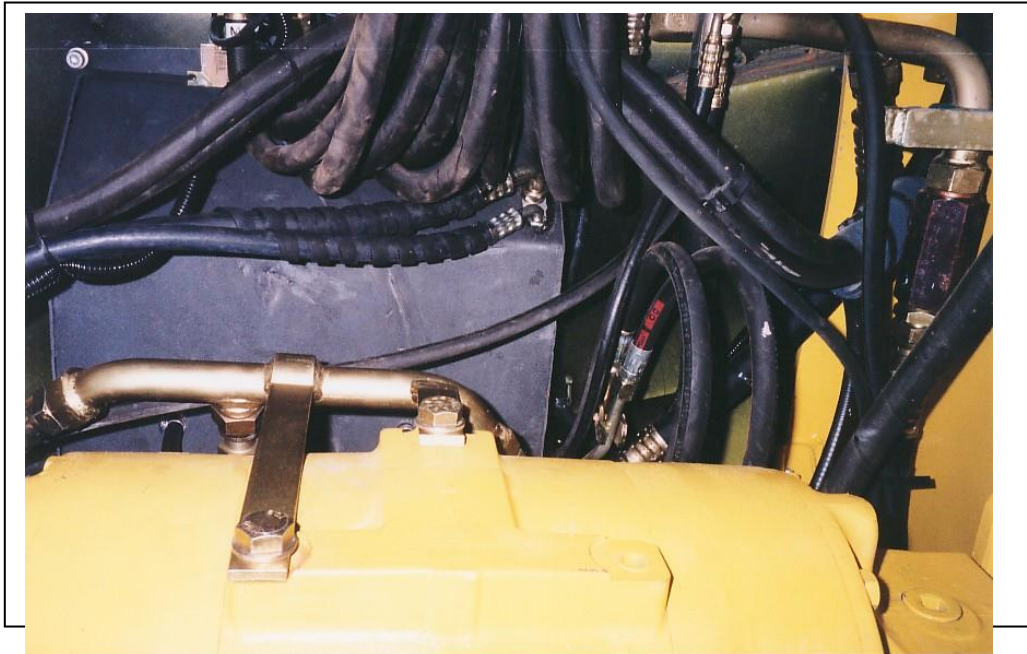
Hose wrapped

5/16" 45o fitting on the outlet side of the drier

5/16" 90o fitting attached to the lower fitting on the condenser

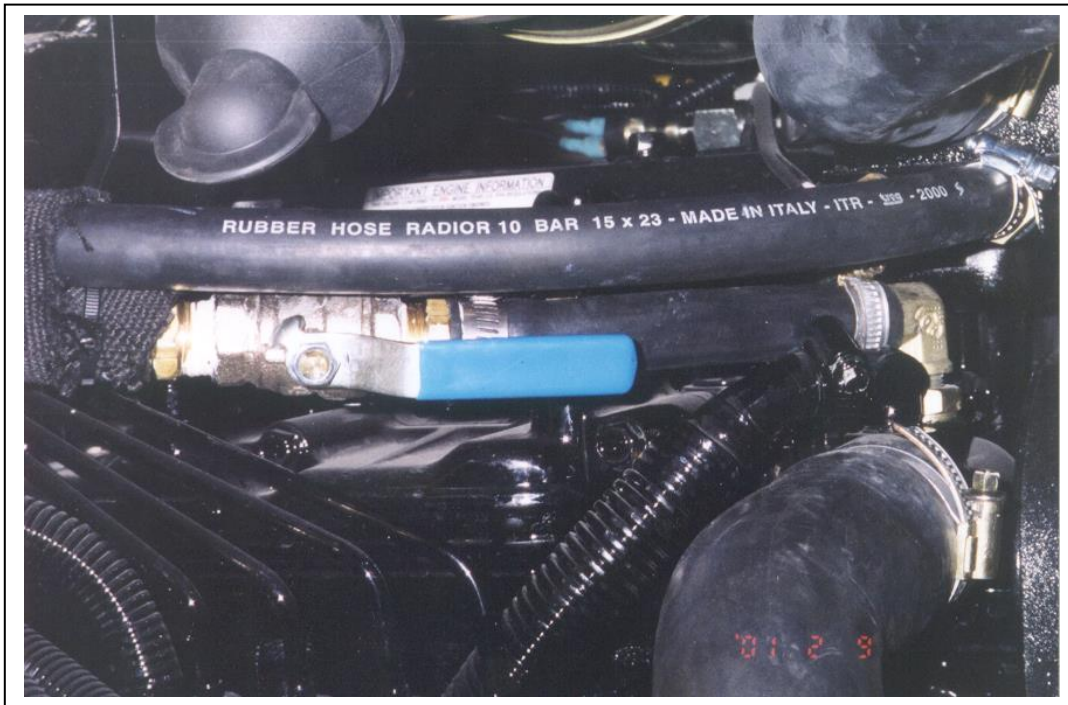
4. Run the 140" of 5/16" hose from the drier to the evaporator along side the 13/32" that ran from the compressor to condenser and then along with the 1/2" hose the rest of the way. The 45 ° fitting connects at the drier and the 90 ° male fitting at the evaporator expansion valve.

A/C hoses with clutch wire secured along frame (left side of equip.)





5. Protect hoses from chaffing and rubbing using hose wrap, and then tighten all hose fittings and secure hoses and wiring using tie-wraps provided.
6. On many machines, the factory heater control valve does not close very tight and will leak a small amount of radiator fluid past the valve. This can greatly reduce the cooling performance of the A/C system. To solve this problem a heater line shut-off tap has been included in the kit. It should be installed simply by pinching off the heater hose which feeds the heater coil on the right side of the engine, and cutting out a short piece of the hose and installing the tap.



Water shut off tap installed

**Air Re-circulation Diffusers:** The diffusers are added to increase the amount of cab air re-circulation and minimize the amount of outside air intake therefore removing the maximum amount of humidity from the air and increase cooling capacity.

Steps:

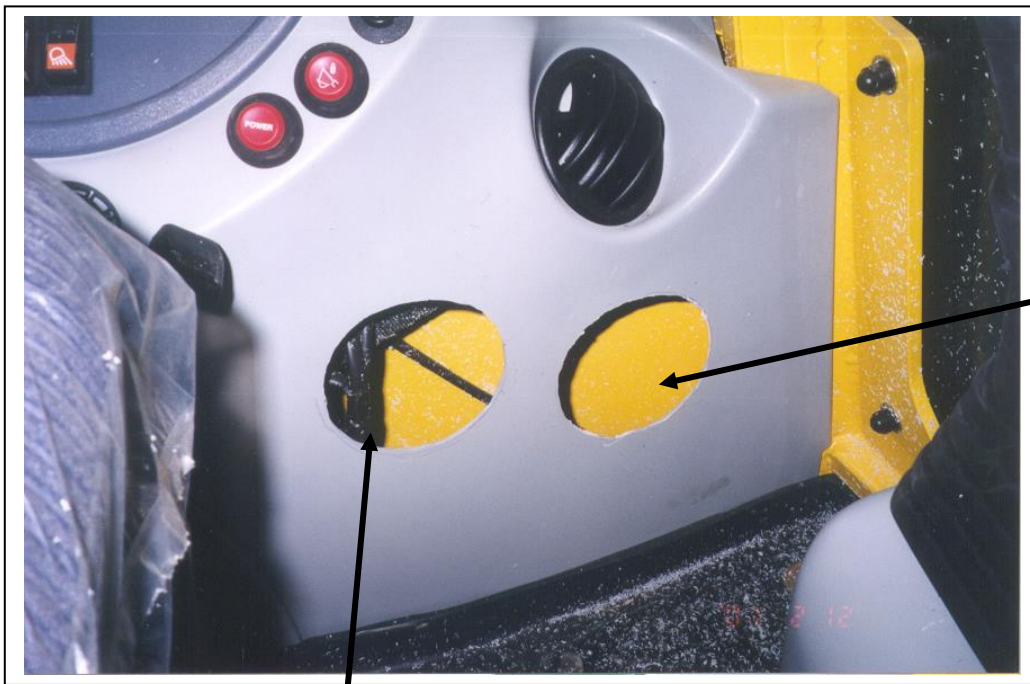
1. Remove the outside air filter on the right side of the cab.

Outside air intake cover



2. With strips of 1/8" foam tape, block off every other slit on the inside of the plastic cover.

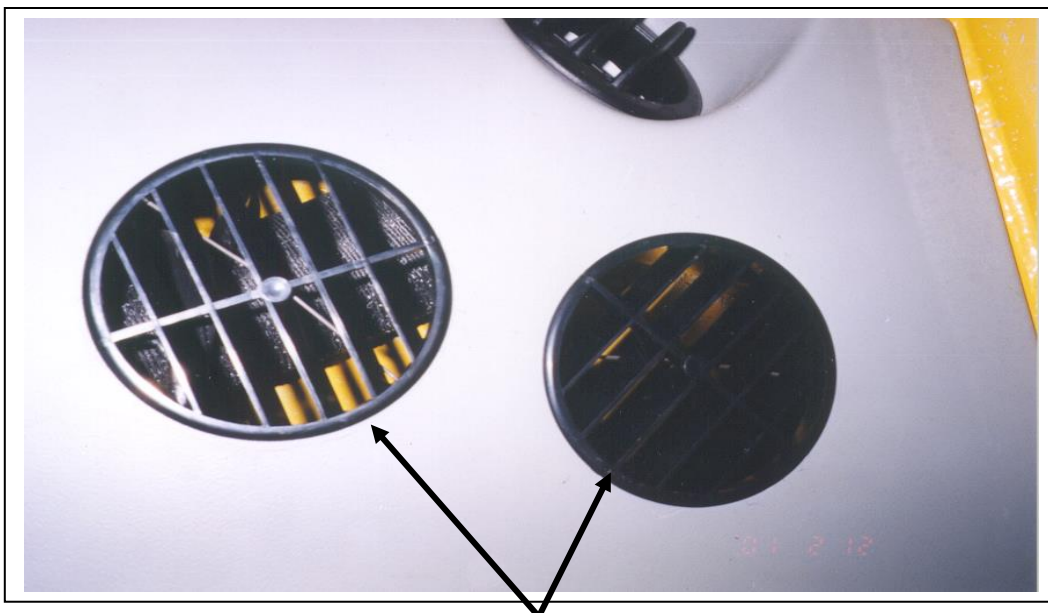




Old air recirculation hole

New air recirculation hole

3. Remove a 3-3/4" return air louver located in the cab about 6" directly below the new A/C on-off switch. Grind or hole saw this hole to become a 4-1/2" circle. Then add one more 4-1/2" hole to the right and about 2" lower than the first hole. This hole should be located beneath the outlet air louver.
4. It will be necessary to vacuum the dust from the cutting to prevent them from getting sucked into the evaporator coil. The inside of the duct is easier to vacuum from the air filter side. Then install the 4-1/2" diffusers.



4 1/2" diffusers installed



A/C on/off switch

4 1/2" difusers installed

## Extra cab air vents

All the air outlet in the cab of the backhoe are mounted down low in the cab. The cooling performance can be greatly improved by adding in additional louvers up high in the cab. The new louver channel mounts on the cab post just behind the right hand door.

### Steps:

- 1) Remove the instrument cluster from the plastic console on the right of the cab. Remove the plastic divider panel from inside the control console , located just forward of the instrument cluster. This divider panel will have to be modified and reinstalled once the louver channel is installed.
- 2) Place the louver channel on the cab post and mark the area of plastic console that must be removed to allow the channel to pass through it.



Notch out the plastic to allow the air channel to fit through.

- 3) Cut out the plastic console as marked. Slide the louver channel through the hole until the hose adapter is below the plastic console.

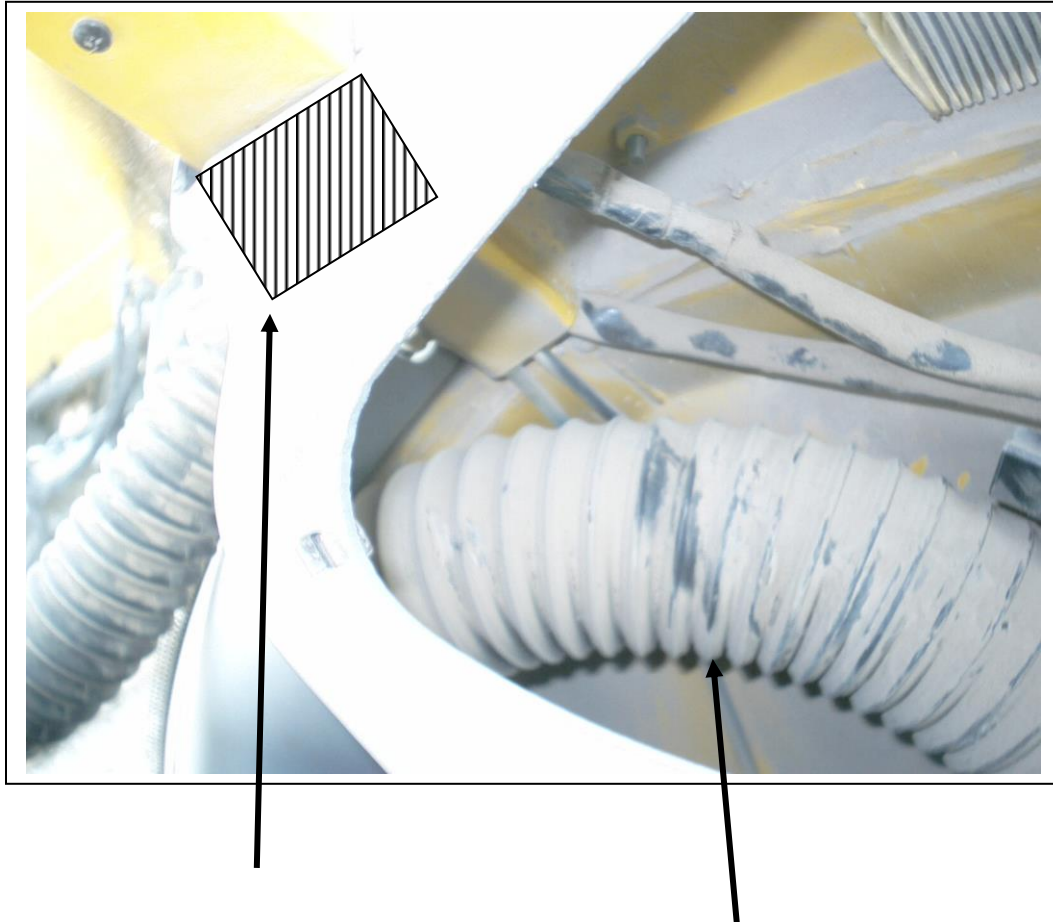
4) Use self drilling screws to mount the louver channel to the cab post.

Use self drilling screws to mount



Use self drilling screw to mount inside louver

- 5) Splice the supplied “Y” hose adapter into the flex duct running just below the louver channel. Connect the louver channel to the “Y” hose adapter using a short piece of flex duct supplied in the kit.

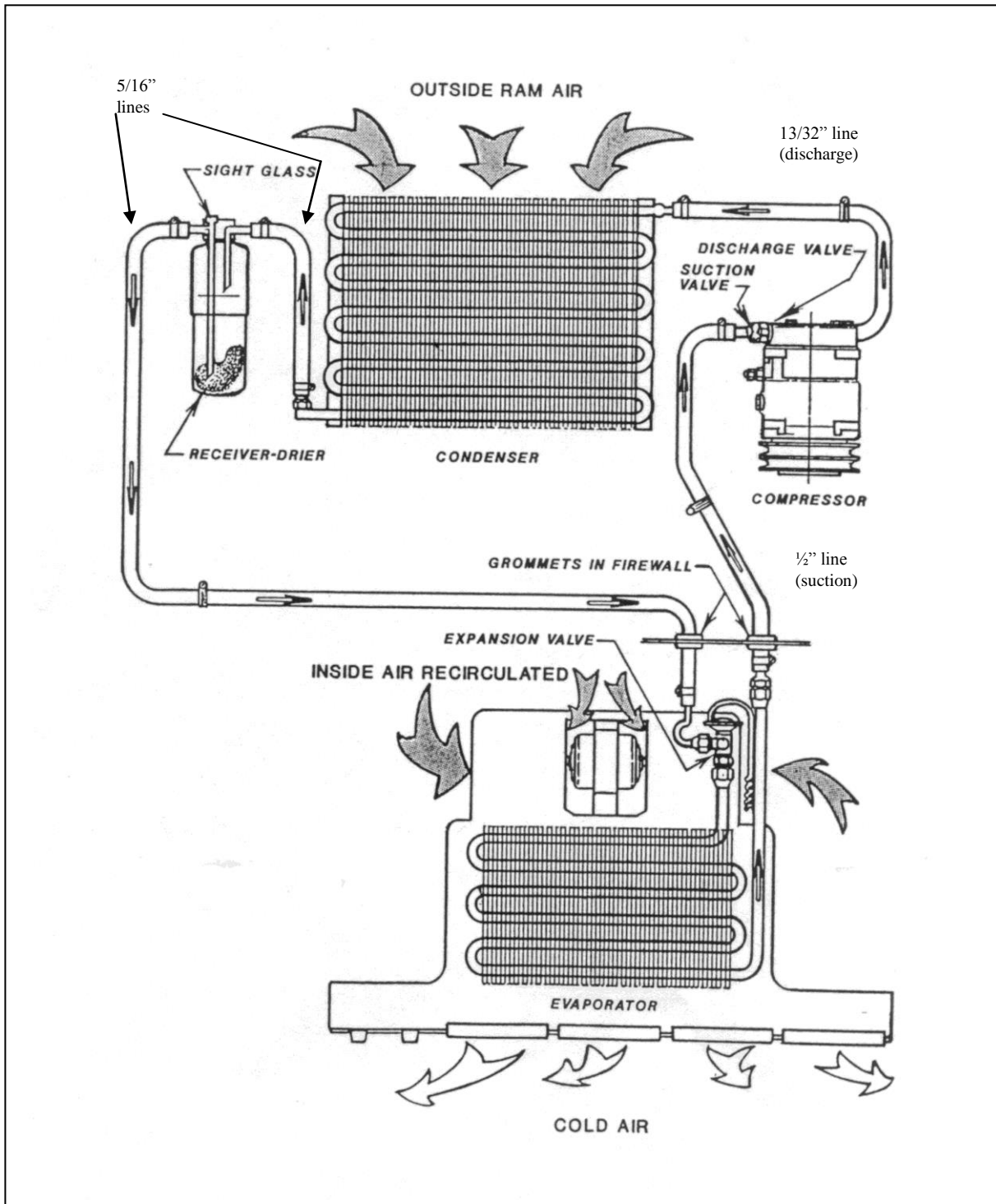


Notch out plastic to allow the air channel to fit through

Cut the flex hose and install the 3 way hose splice

- 6) Reinstall the plastic divider and instrument cluster.

# 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.
- 
- 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.

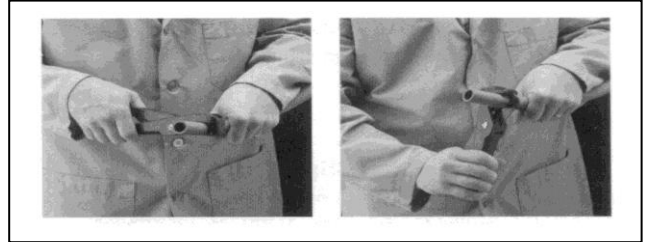
By looking at all these different factors, the area of an evaporator coil most likely to be the coldest can be determined.

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.

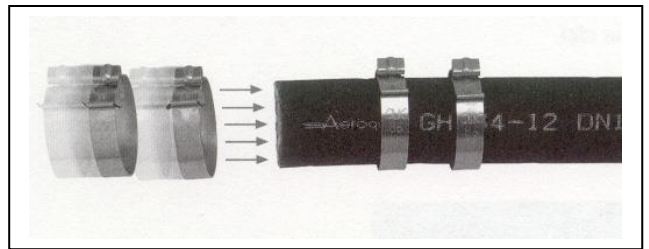
If the thermostat doesn't cycle off after a reasonable cool down period, and the air outlet temperature has dropped below 40° F, the cut in and cut out settings should be adjusted until the compressor is cycling on and off regularly. Let the system run for a decent time period (at least 15 min) and then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

## Aeroquip E-Z Clip Assembly Instructions

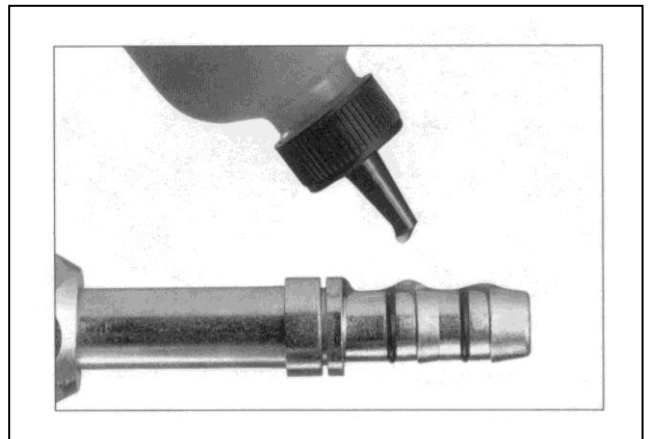
Step 1. Cut the hose to proper length with an appropriate cutting tool. Aeroquip's hand held hose cutter has been specially designed for cutting all non-wire reinforced hose, such as GH-134 Multi-Refrigerant hose. Be sure the cut is made square to the hose length.



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.



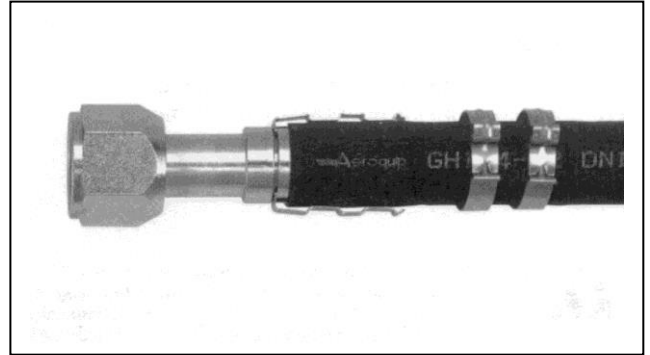
Step 4. Insert the nipple into the hose. To ensure that the nipple is fully inserted, check the gap between the cut end of the hose and the shoulder on the nipple. Care should be taken to avoid kinking or other damage to the hose during nipple insertion. NOTE: Be sure to wipe excess oil from the nipple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



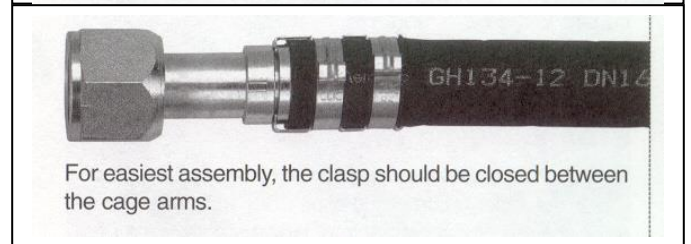
Step 5. Snap the cage into the groove on the nipple. The arms should extend over the hose length. When the cage has been correctly installed in the cage groove, the cage will be able to rotate in the groove.

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.

