

# **EC 25/35 New Holland Mini Excavator**

## **Installation Instructions**



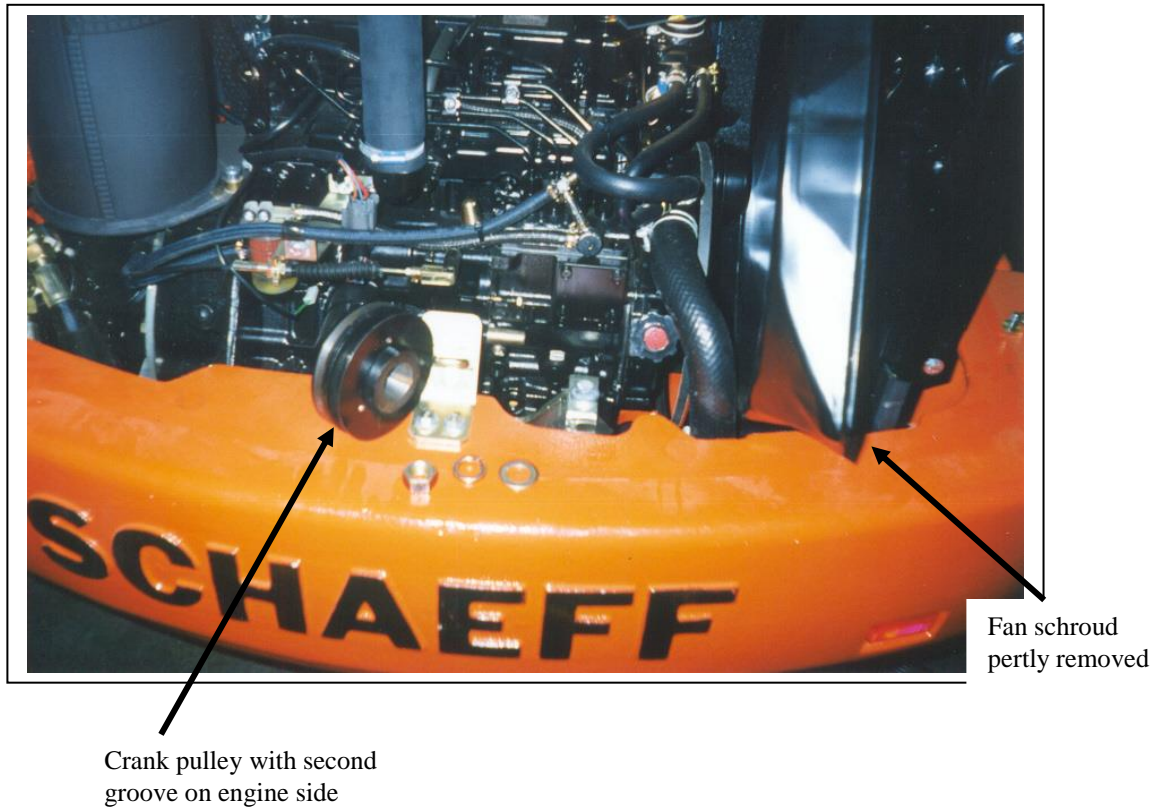
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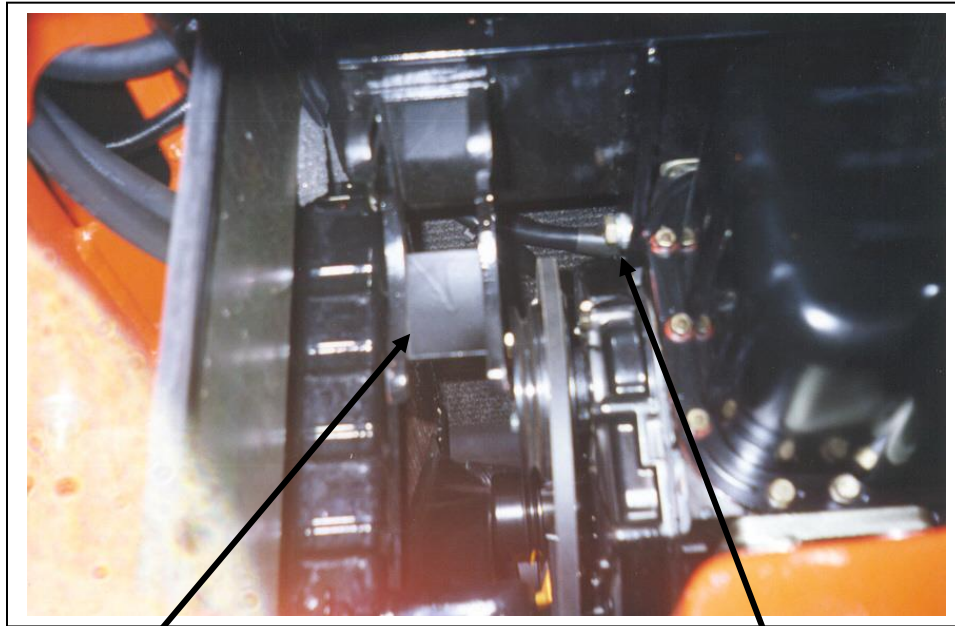
**Compressor mount:** The compressor is mounted underneath the engine on the cab side of the engine. The compressor sits backwards with its fittings under the radiator. A second pulley is added to the inside of the existing crank pulley.

Steps:

1. Remove the cover panel underneath the engine. Remove the fan screen, fan blades and fan shroud from the radiator. This will facilitate the removal and replacement of the crank pulley. Loosen the fan/alternator belt.



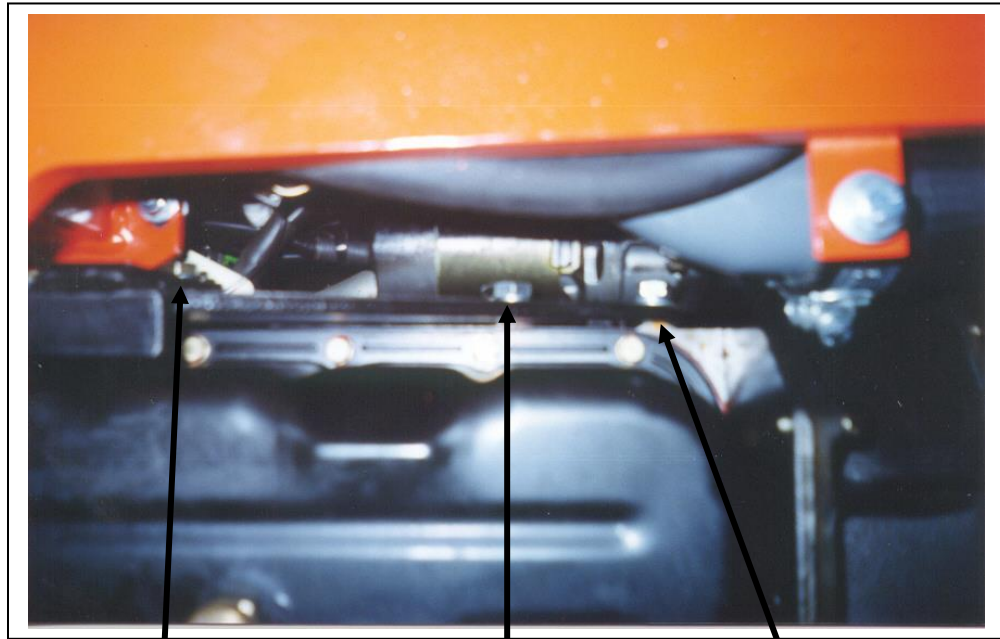
2. Remove the one nut from inside the crank pulley. The pulley mounts to the crank via a tapered shaft and a key way. It should pop off easily after the one large nut is removed.
3. Install the supplied pulley, with a second groove added to it, onto the tapered crank shaft. Bolt the pulley back down tightly. The original pulley removed from the engine **must** be returned to Schaeff at 2639 Manana Dr. Dallas, Texas 75220. If the pulley is not returned in a timely fashion a core charge of \$ will be added to the kit purchasers account.



Compressor mount  
tightener ears

Front bolt of compressor  
mount

4. The compressor mount bolts to the side of the engine block and hangs down beside the oil pan. It also extends out in front of the engine on the fan end. The mount bolts onto the engine using four M12 bolts with 1.25mm thread. Three of the holes have no bolts existing in them, the front hole and the two rear holes. The fourth hole is the rear bolt of the front backside engine mount. Remove this bolt. Lift the compressor mount bracket up into place and loosely install all the bolts. Snug all the bolts up but do not fully tighten. Tighten the front bolt and then the side three bolts.



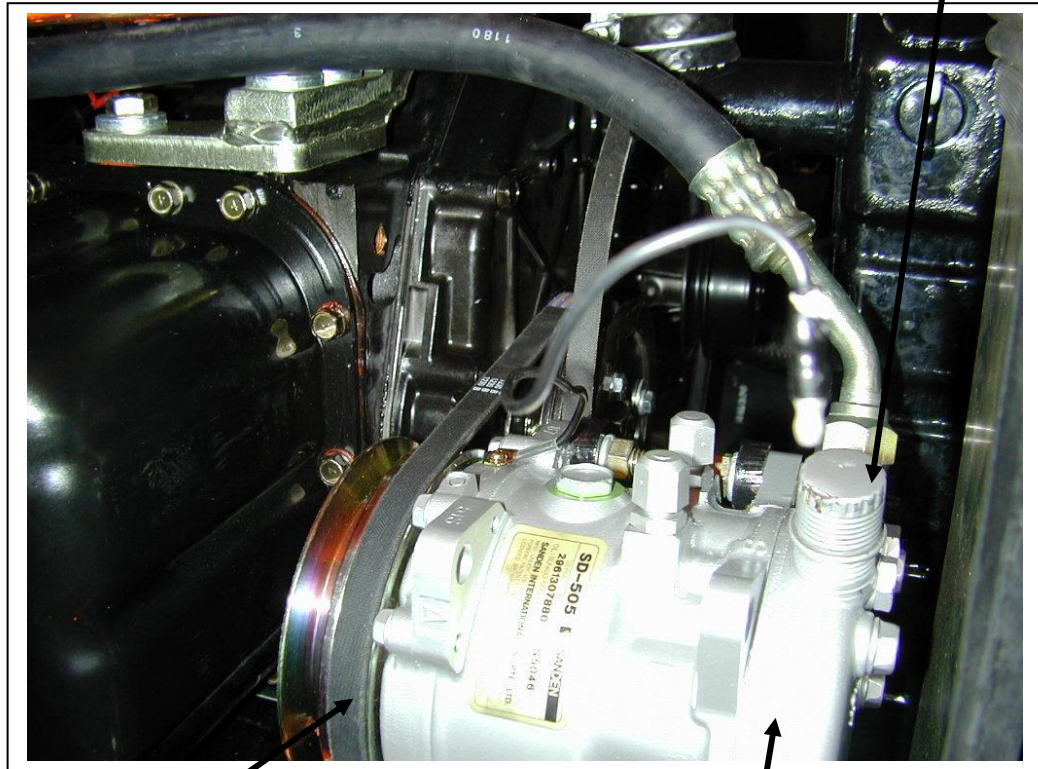
Second bolt of  
compressor mount (had  
bolt in it originally)

Third bolt of  
compressor mount

Fourth bolt of  
compressor mount

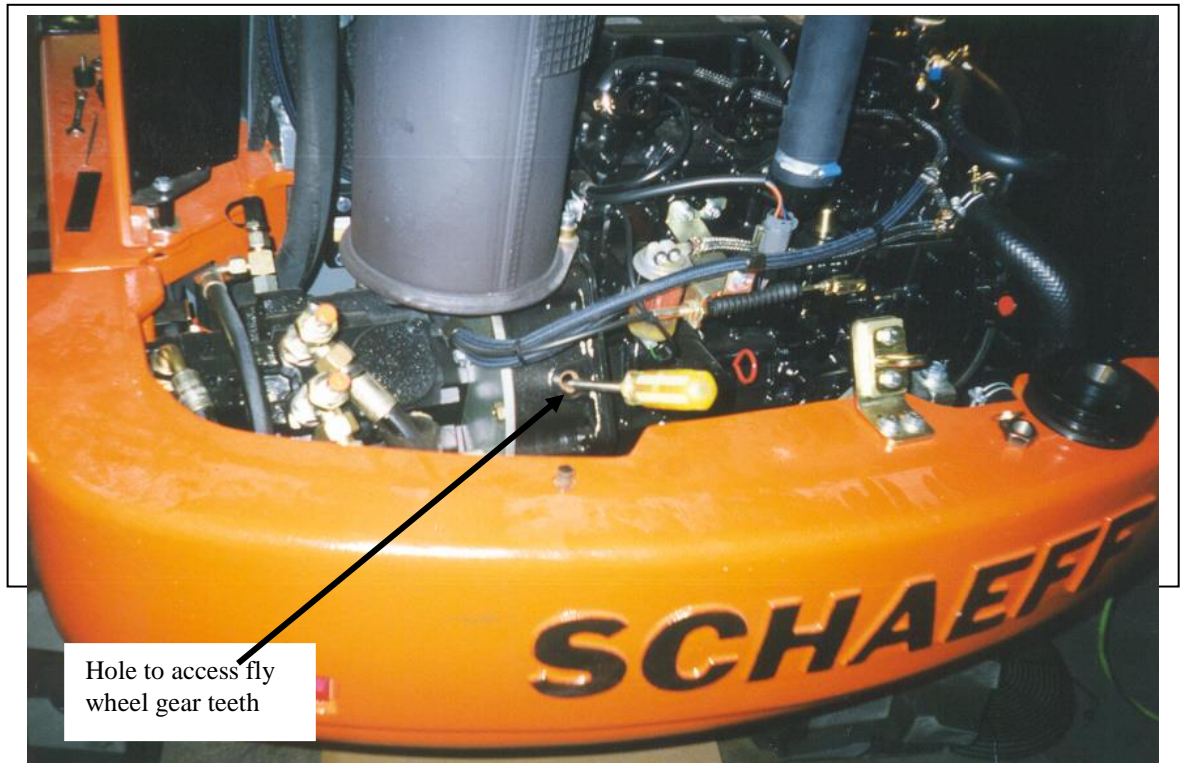
5. Install the compressor loosely onto the mount using the 3/8" hardware provided. The fittings on the compressor should be about 90° from vertical pointing towards the back of the machine.
6. Install the drive belt onto the rear groove on the crank (closest to engine block) and the rear groove on the compressor (closest to radiator). The belt will be a very tight fit to get on and will have to be jogged into place using a long flathead screwdriver to turn the teeth of the fly wheel. The fly wheel teeth are accessed through a hole in the fly wheel bell housing capped with a plastic plug. Install the belt onto the crank pulley first. Insure that the belt is in the groove all the way around the pulley and is not caught up on any obstructions. Start the belt on the front groove of the compressor and jog it fully into place using the screwdriver to move the flywheel around. Start the belt on the rear groove of the compressor and jog the belt into position. Check the alignment, tension the compressor and tighten all the 3/8" mounting bolts.

13/32" Hose attached to discharge port (\*NOTE\* fitting now a 90°)



Compressor drive belt in place

Compressor in place on mount



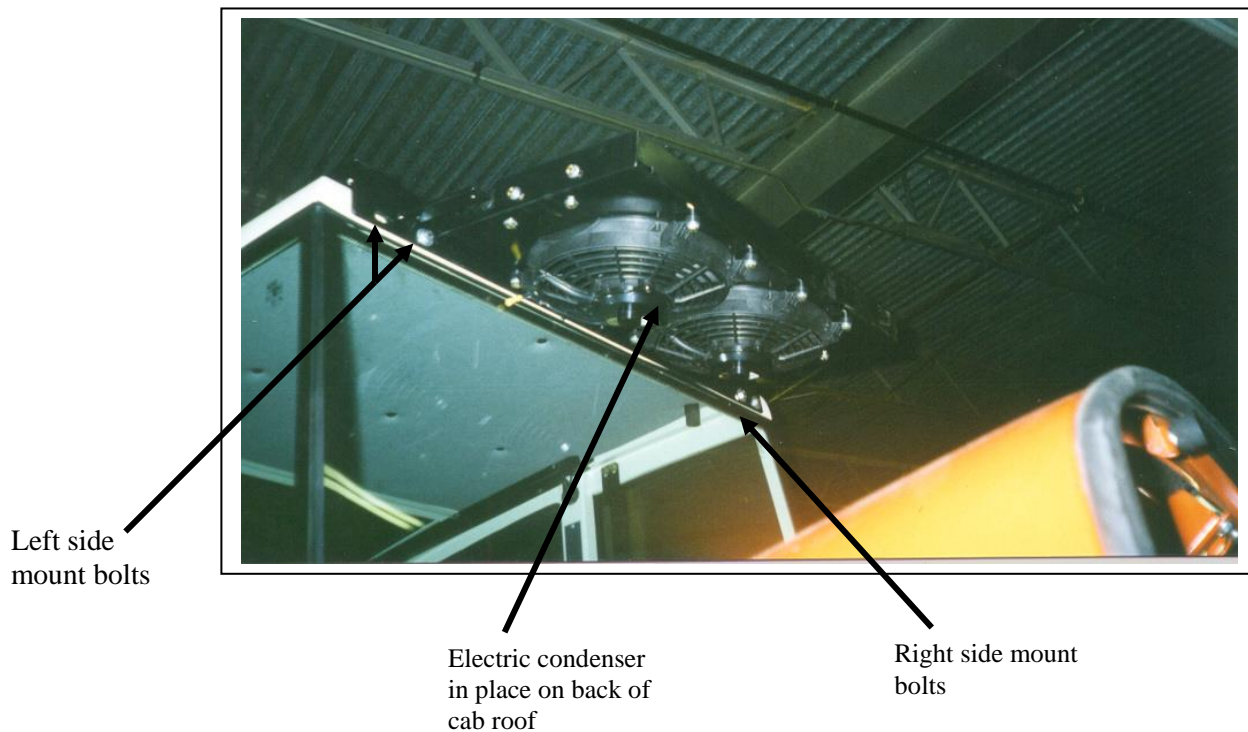
Hole to access fly wheel gear teeth

7. Put the original fan belt back into position around the original crank pulley groove, the fan pulley and the alternator. Re-install the fan shroud, fan blades and fan screen. Tension the alternator and tighten it in place.

**Condenser mount:** The condenser for this unit is an electric roof mount condenser that bolts to the steel roof of the cab and sits just below the roof line. There is a rectangular tube running up the side of the cab to enclose the hoses and wiring going to the condenser.

Steps:

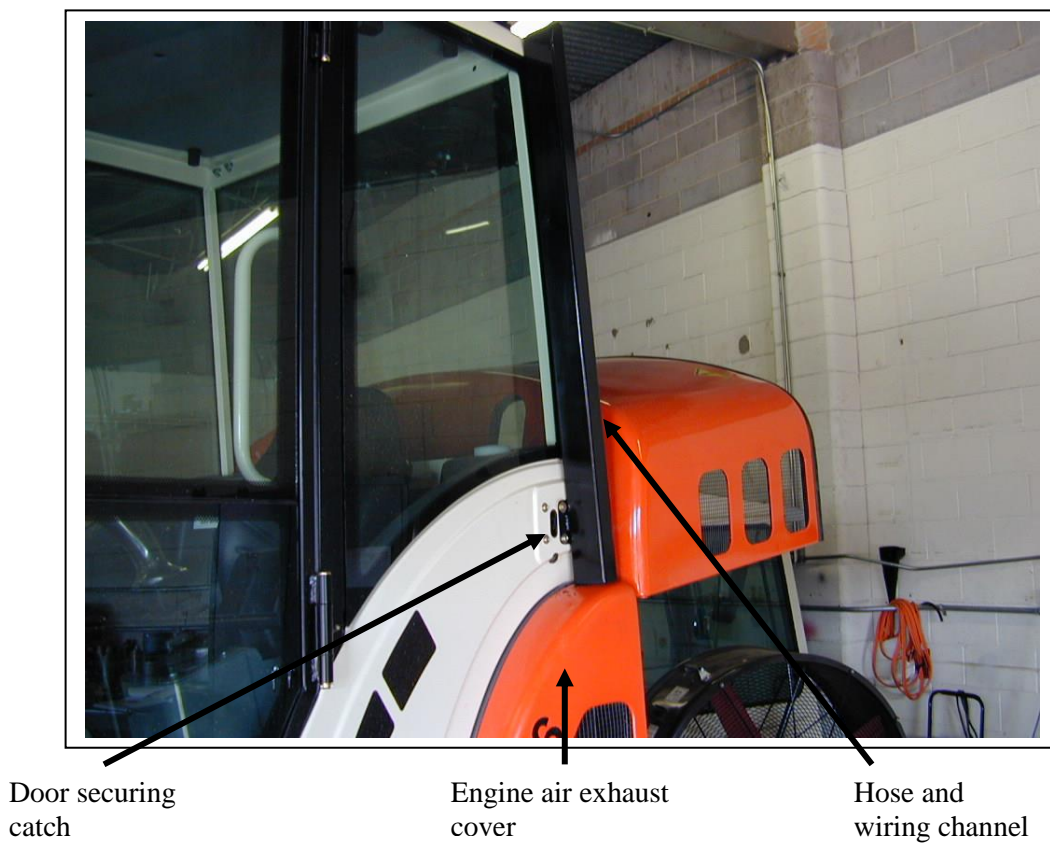
1. Remove the four M8 bolts from the back vertical steel section of the roof just above the back window. Discard the bolts. Remove the plugs from the two M12 threaded holes on top of the roof located about ½ way between the back of the cab and the sun roof.
2. Lift the condenser into place with the main mount frame against the vertical steel roof section along the back of the cab. Bolt in place using the two M8 x 25mm bolts on the left end and the M8 x 45mm bolts and nuts on the right end.



3. Install the two stiffener brackets that run from the M12 holes on the roof to the 10mm threaded holes on the top ends of the main mount frame. Bolt the brackets to the roof using the M12 hardware provided. Bolt the other end of the brackets to the main mount frame using the M10 hardware provided.



4. Set the condenser hose and wiring channel into place down the left, rear corner of the cab. The channel bolts into place at the bottom using the two rear bolts on the door securing catch. At the top, the channel is bolted to the left outside M8 bolt that also secures the condenser main mount frame. Remove the M8 bolt, slide the channel into place and re-bolt.





5. Before bolting the channel into place, mark the outline of the channel on the engine air exhaust cover with pencil. Cut out a hole in the engine air exhaust cover that is  $\frac{1}{4}$ " smaller in all dimensions than the outline of the hose and wiring channel.



Engine air exhaust  
cover

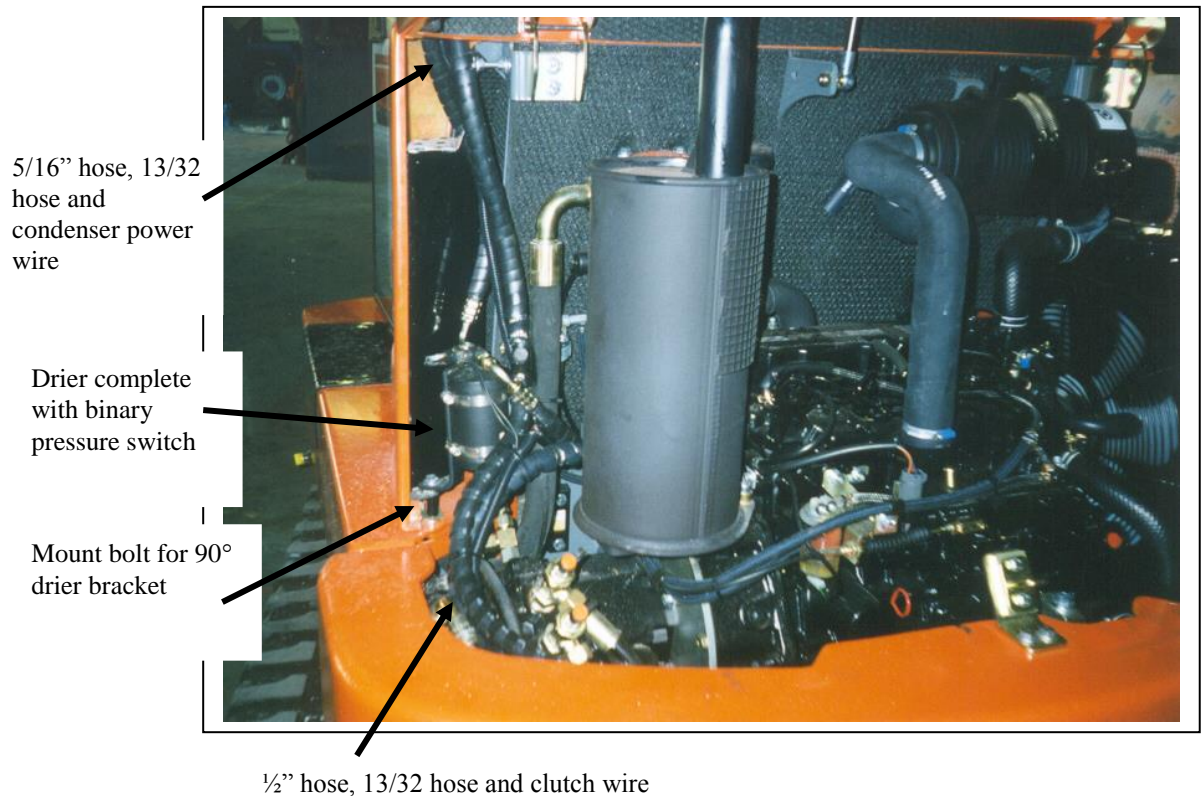
Hole matching hose and  
wiring channel

6. After the hole is cut out on the engine air exhaust cover, the hose and wiring channel can be bolted in place permanently.

**Receiver drier:** The drier is located on the left side of the engine compartment. The driers 90° support bracket is mounting off of the existing lower rear mount bolt for the engine air exhaust cover.

Steps:

1. Remove the M8 bolt from the lower rear mount of the engine air exhaust cover.
2. Place the 90° drier bracket on top of the lower rear mount and bolt in place using the original M8 bolt.

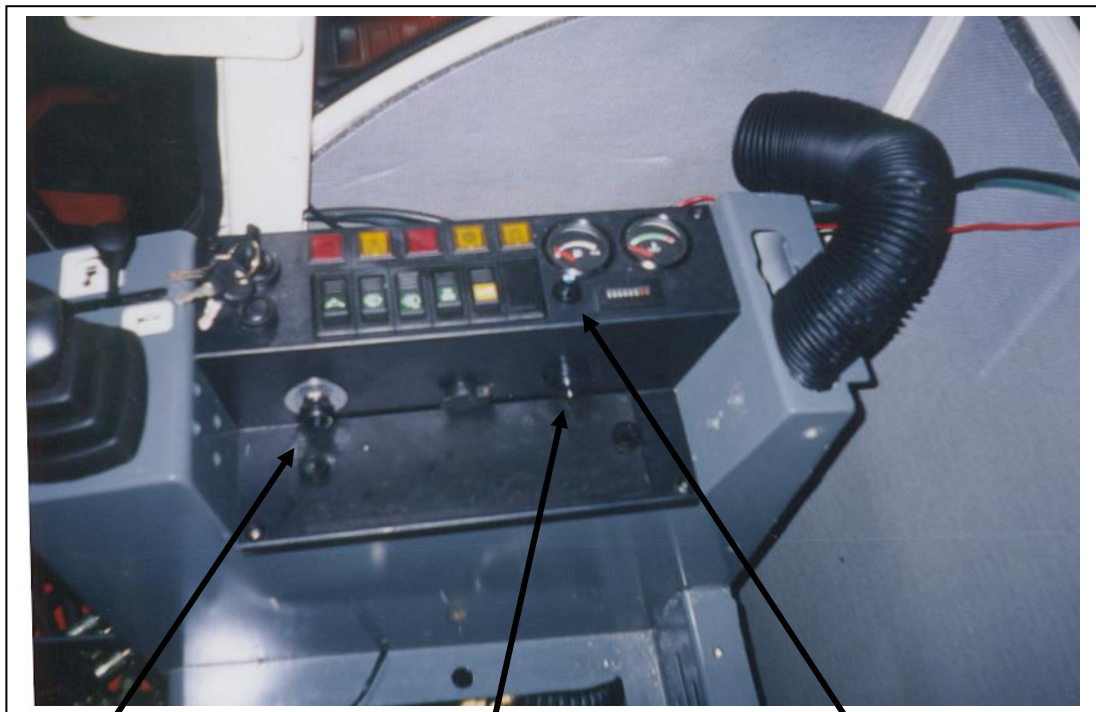


3. Install the drier onto the mount bracket using the two #48 gear clamps provided. The drier inlet fitting should be pointing forward, the binary pressure switch should point to the left side of the machine and the drier outlet fitting should point to the rear of the machine.

**Electrical system:** The electrical system for this machine is designed to accommodate the electric condenser as well as all the usual electrical components found on an A/C system.

Steps:

1. The A/C on/off push button switch and the rotary thermostat are installed onto the control panel on the right side of the operators seat. The push button switch is mounted between the last rocker switch cap and the hour meter in about 1" from the edge of the control panel. Drill a 9/16" hole centered between the last switch cap and the hour meter. Remove the 4 philps screws from the panel so it can be lifted up to gain access to the back of it. From the backside of the panel slide the switch up through the hole and secure it in place with the retaining nut supplied on the switch. The noise maker mounted below this hole may have to be temporarily removed to allow the push button switch past it. Make sure the switch is mounted with the "AC" in a readable position.
2. The rotary thermostat is mounted in an existing hole on the vertical surface of control panel above the fuse board. Remove the black plastic plug from the hole. Insert the threaded stem of the thermostat through the hole from the back side of the panel. Slip the large flatwasher over the stem from the outside of the panel and secure it in place with the retaining nut supplied on the thermostat. Apply the thermostat decal to the large washer then install the thermostat knob onto the thermostat.



Thermostat

Noise maker

A/C on/off push button

3. Draw ignition live power from the live wire on the first empty relay location from the front of the panel. Use the inline ATO fuse holder as the wire to run from ignition live power to the A/C on/off button. Use a bare male quick

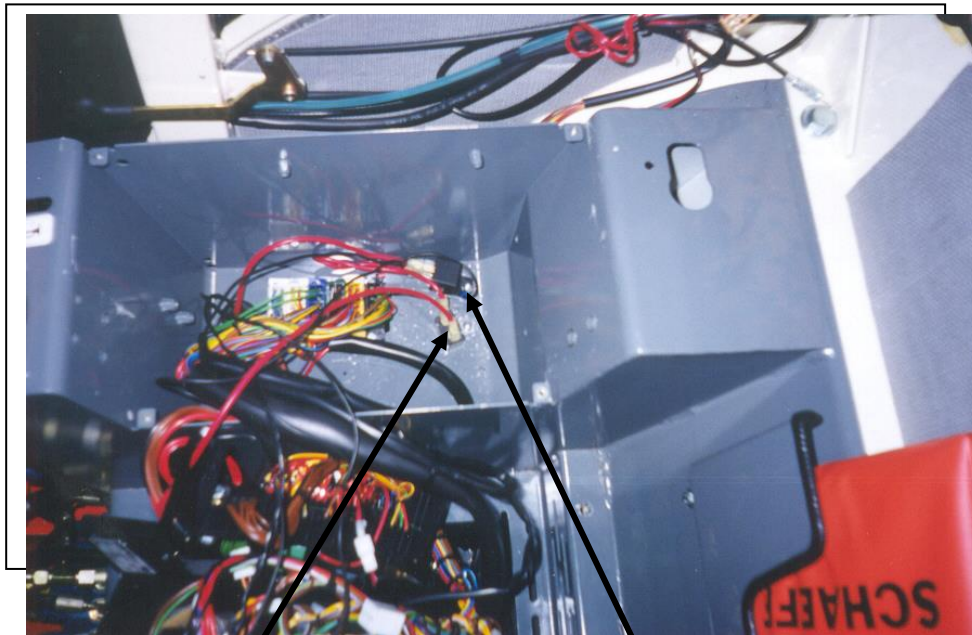
disconnect terminal on the end of the ATO fuse holder to connect to the terminal at the relay. Use a female QDT on the other end of the ATO fuse holder to connect to the A/C on/off switch. Install the 3 amp fuse into the holder.



Terminal with ignition live power

Main power terminal

4. On the bottom of the electrical compartment to the rear of the row of connector plugs, mount the relay and 30 amp self resetting circuit breaker using the self drilling screws provided.

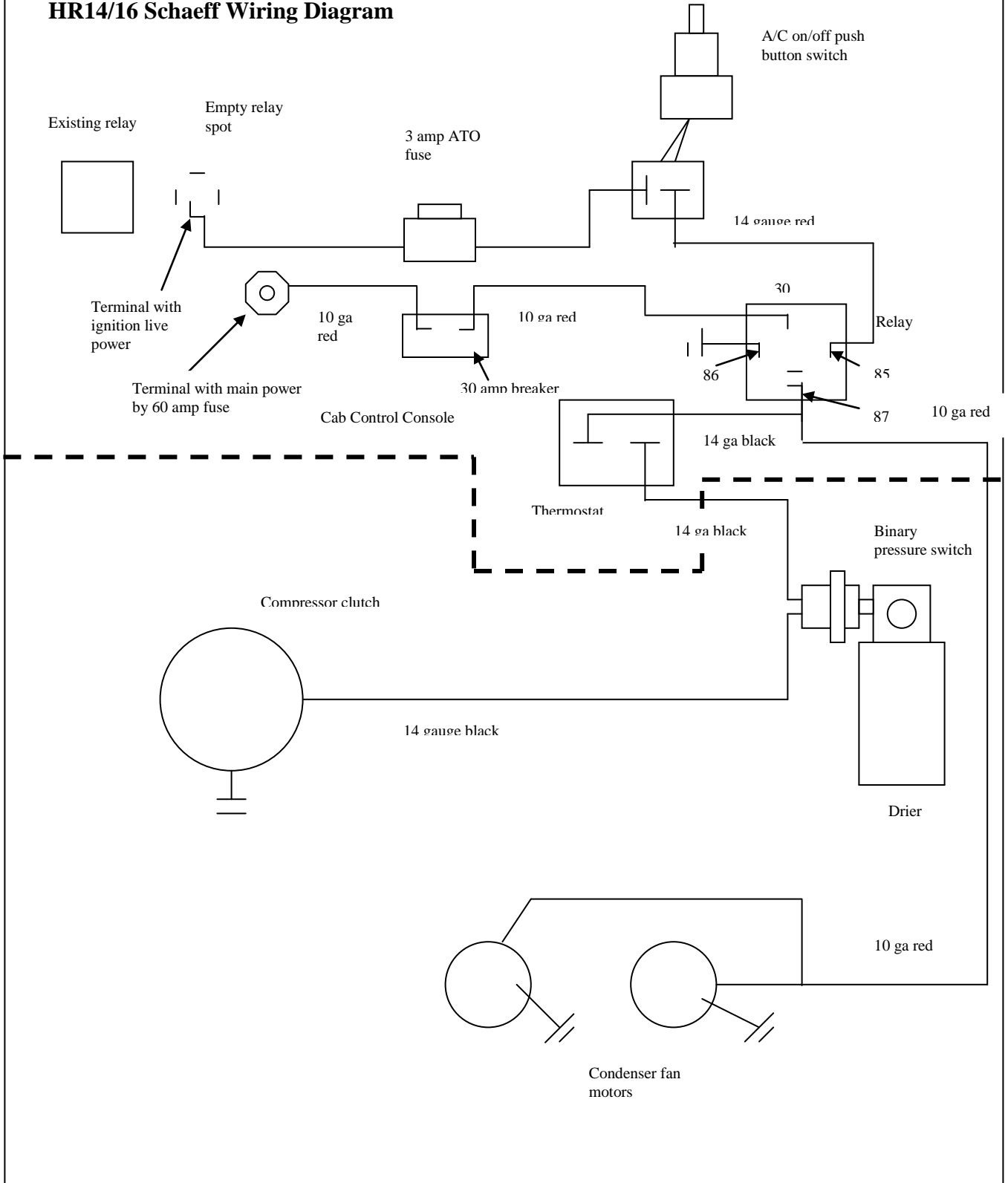


30 amp self resetting  
circuit breaker

30 amp 12 volt relay

5. From terminal 86 on the relay, run a 14 gauge black wire to ground (use screw that mounts relay). From terminal 85 on the relay, run a 14 gauge red wire to the open terminal on the A/C on/off push button switch. The relay will now energize whenever the key is on and the A/C push button switch is pushed in.
6. From the fused main power terminal located ahead of the fuses, run a 10 gauge red wire down to the 30 amp self resetting breaker. From the breaker go to terminal #30 on the relay using a 10 gauge red wire.
7. From terminal 87 on the relay run two wires, a 10 gauge red to the condenser and a 14 gauge black wire to the thermostat. It is possible to put both wires into a yellow female quick disconnect terminal.
8. From the open terminal on the thermostat run a 14 gauge black wire in loom, along with the 10 gauge red wire going to the condenser, into the heater/A/C box area by using the same route as the blower wires. Run the two wires in loom out with the A/C hoses following the 5/16" A/C hose up to the binary switch on the drier. At that point split the 14 gauge black wire out of the loom and connect it to a terminal on the binary switch.
9. Continue to run the 10 gauge red wire in loom up to the hose and wiring channel following the 13/32" A/C hose. Route the 10 gauge red wire up through the hose and wiring channel and connect it to the condenser fans on the back of the cab.
10. From the open terminal on the binary switch run a 14 gauge black wire in loom along with the A/C hoses to the compressor or clutch wire. Connect the two wires together to complete the A/C system wiring.
11. Test all circuits to ensure that the proper components engage at the proper time. With the key on, the condenser fans should only come on when the A/C button is pushed in. The compressor should only come on when the A/C button is pushed in, the thermostat is turned on and there is enough pressure in the system to engage the binary switch

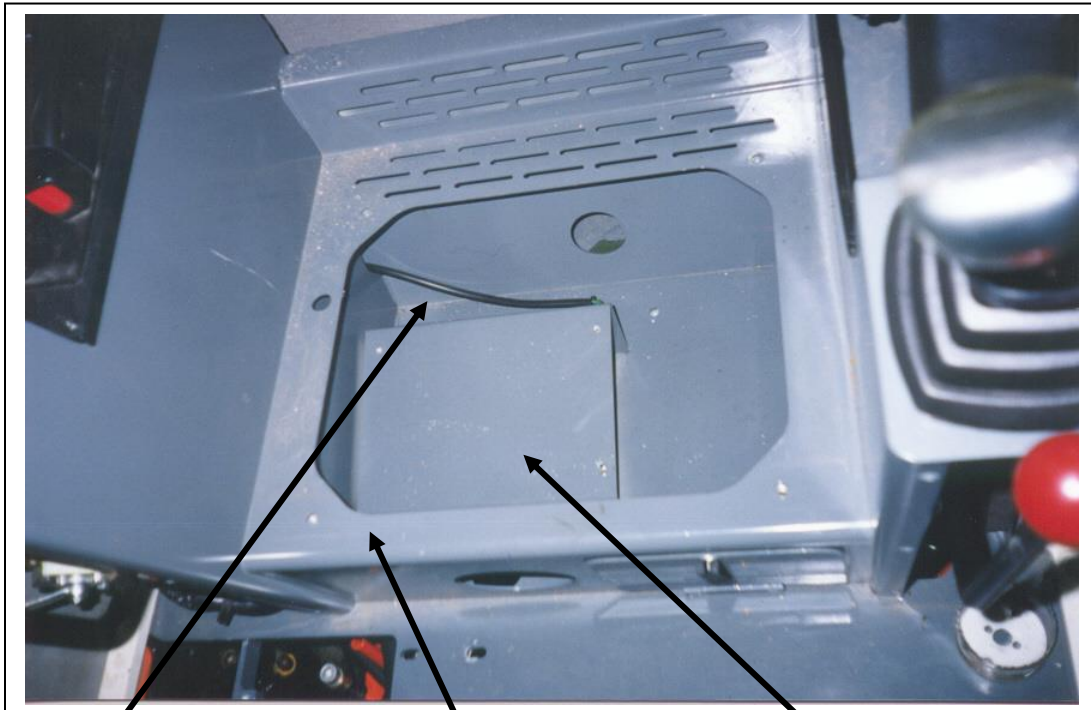
# HR14/16 Schaeff Wiring Diagram



**Evaporator Heater Box:** The evaporator heater box is located under the operators seat in the location of the original heater box. Air flow passes through the original louver and defrost pipe as well as two extra louvers mounting to either side of the operators seat. The blowers are controlled by the existing blower switch and wiring.

Steps:

1. Remove the operators seat from the cab by unbolting the metal plate that the seat sits on. Remove the four, M8 bolts, two in front of the seat and two behind the seat. Lift the seat and plate out through the cab door. Remove the arm rests from both sides of the cab. Remove the right seat belt mount. Remove the rear storage tray from between the left and right consoles. Remove the plastic radio cover from the right rear corner of the cab. Remove the floor mat. Remove the floor access plate from the front of the cab. Remove the front access panels from both the left and right consoles.



Existing blower  
wiring harness

Seat removed

Heater removed

Front access panel removed



Floor access plate removed (HR18 – complete floor is removed on HR14/16 models)

2. Remove and discard the perforated panel that divides the small storage area from the heater box. Unbolt the heater box from its mount plate. Disconnect the defrost flex duct from the pipe on the bottom of the heater box. This must be done through the floor access panel previously removed. Loosen the gear clamp securing the flex duct and slide the flex duct off the pipe.



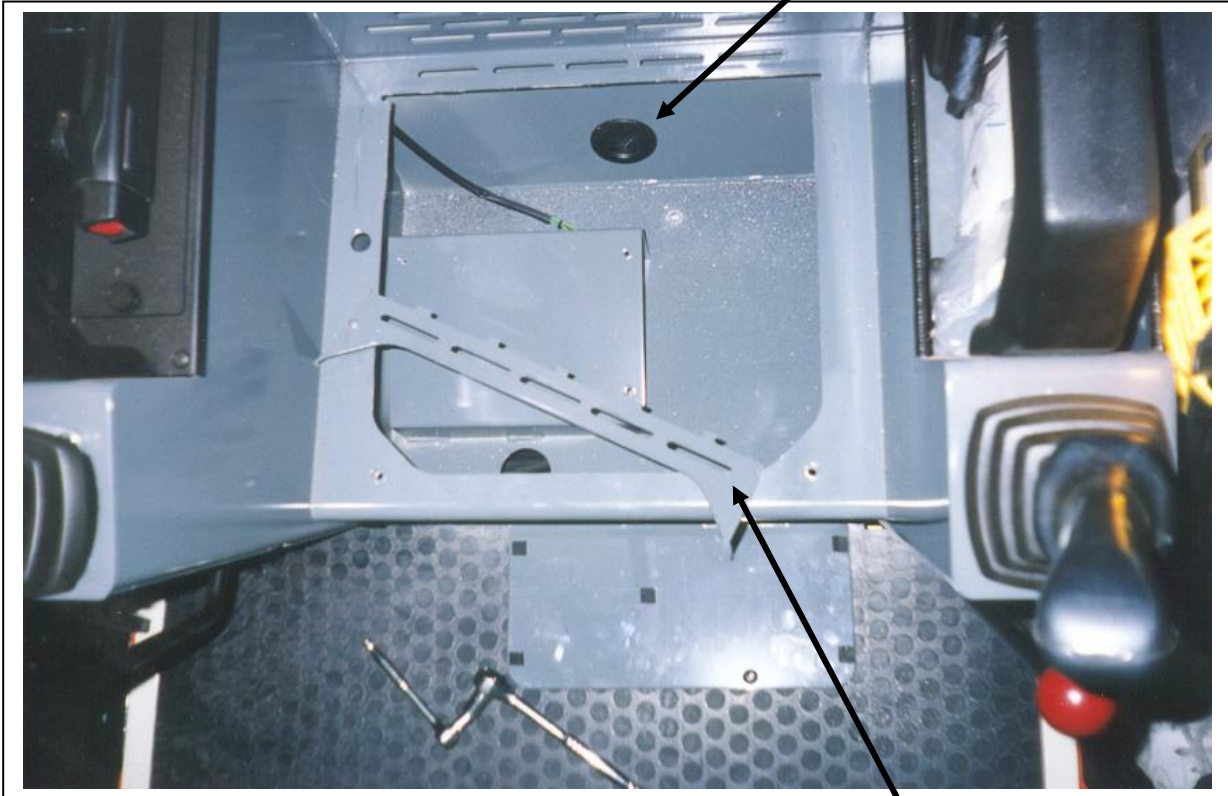


Defrost pipe hole  
in floor

Heater lines  
clamped off

3. Unplug the blower wires from the heater box then remove the heater box from the machine. The heater and mounting hardware are not reused.
4. Before installing the heat/A/C box, some of the perforated metal at the back of the lower section of the seat platform must be removed. Cut straight back from the sides of the existing hole below the seat to the back of the second row of long slotted holes. Cut along the back of the second row of slotted holes to remove enough metal to install the new heat/A/C box.

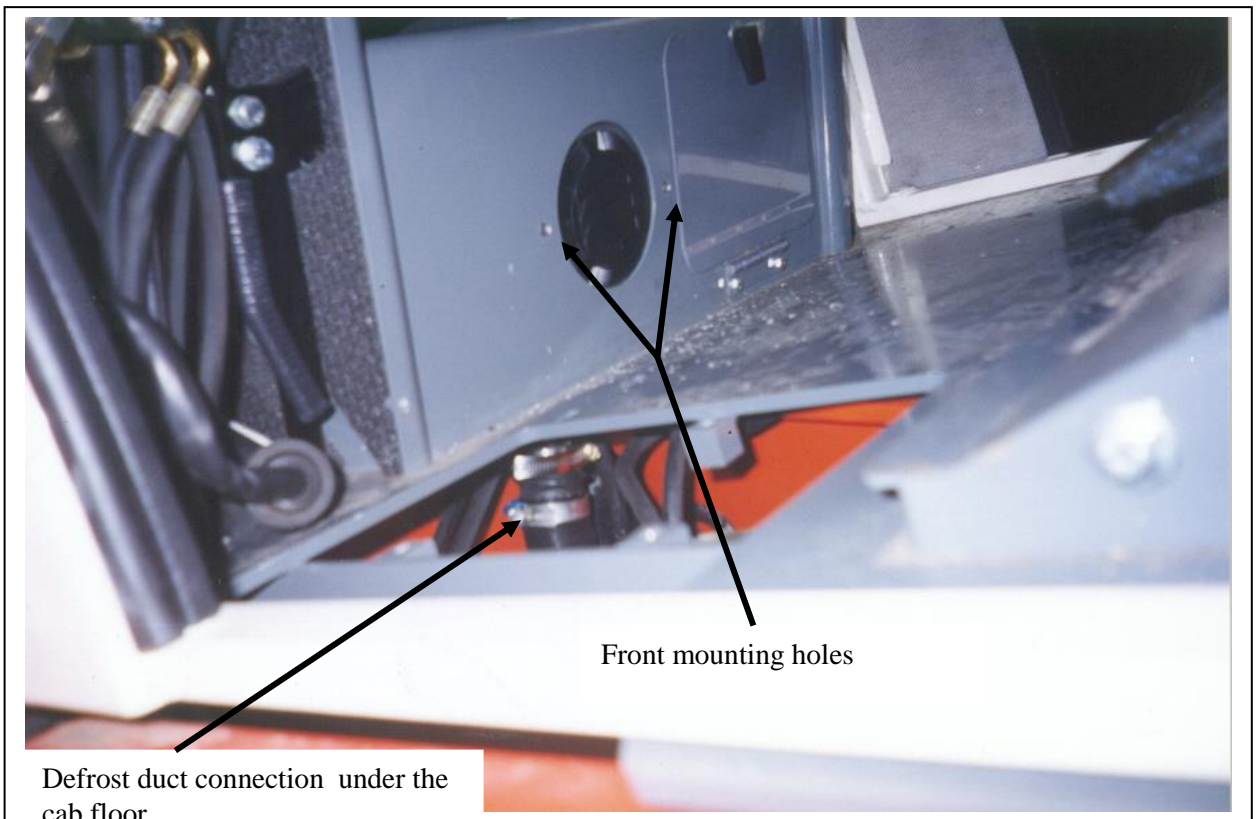
Hose grommet in back wall



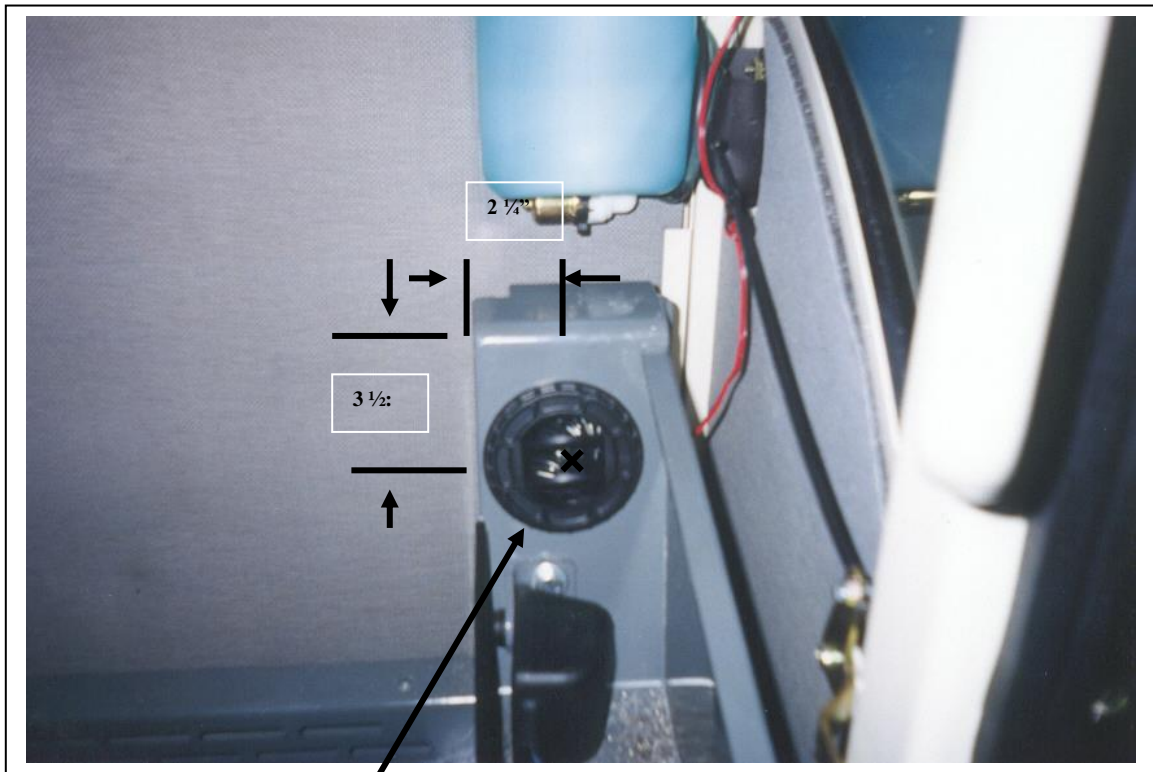
Metal piece removed  
from lower seat frame

5. Using the supplied template mark and drill two 3/8" holes in the front louver face of the seat platform. The holes go to either side of the original front louver hole situated in front and below the seat. The right edge of the template butts up against the right side console and sits tight to the floor of the cab. Ensure any dirt buildup is removed from the floor so the template sits correctly.

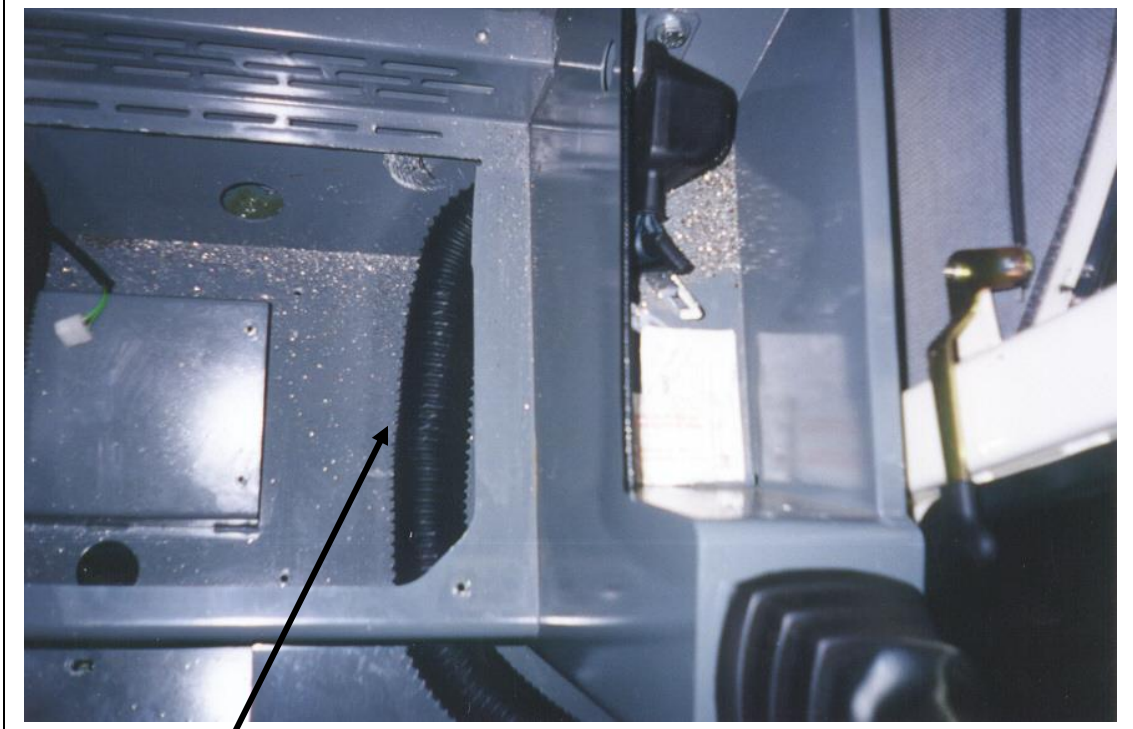
Front mounting hole template in place



- The 2 1/2" flex duct must be run on each side of the heat/A/C box area before the box is installed. On the left side console, just below the plastic side cover, a 3" hole must be drilled approximately 3 1/2" to center from the top of the metal console, 2 1/4" in from the inside edge, to center. Feed the flex duct down through the 3" hole and fish it through into the heater/A/C box area. The round hose must be squeezed through an oval shaped slot in the lower back corners of the heat/A/C box area. Pull the hose through until the louver can be attached to the flex hose and snapped into the hole. The flex duct can be cut to length and connected to the hose adapter on the left side of the heater/A/C box once the box is loosely in place.

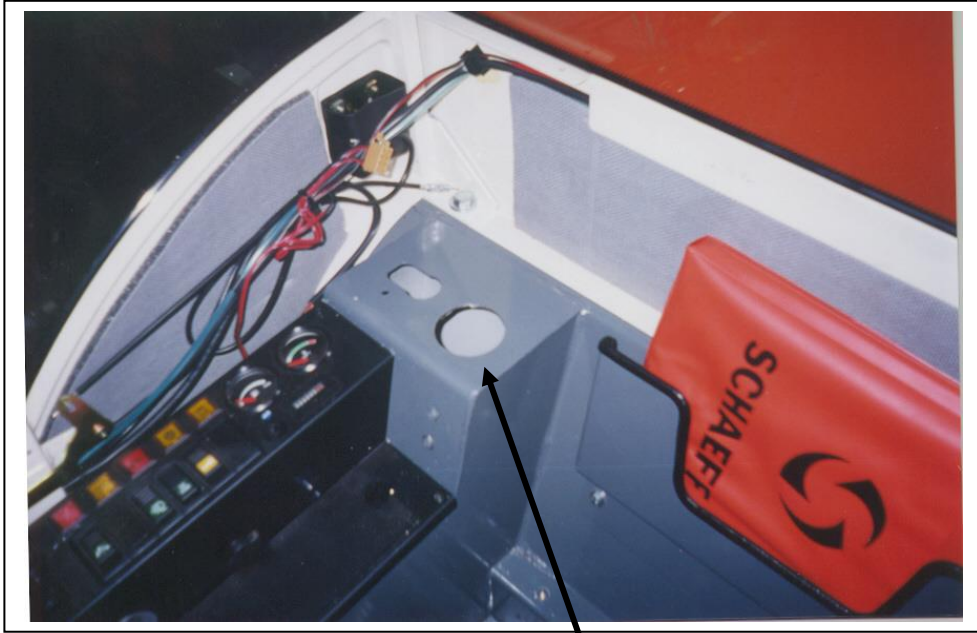


Left hand louver  
in place

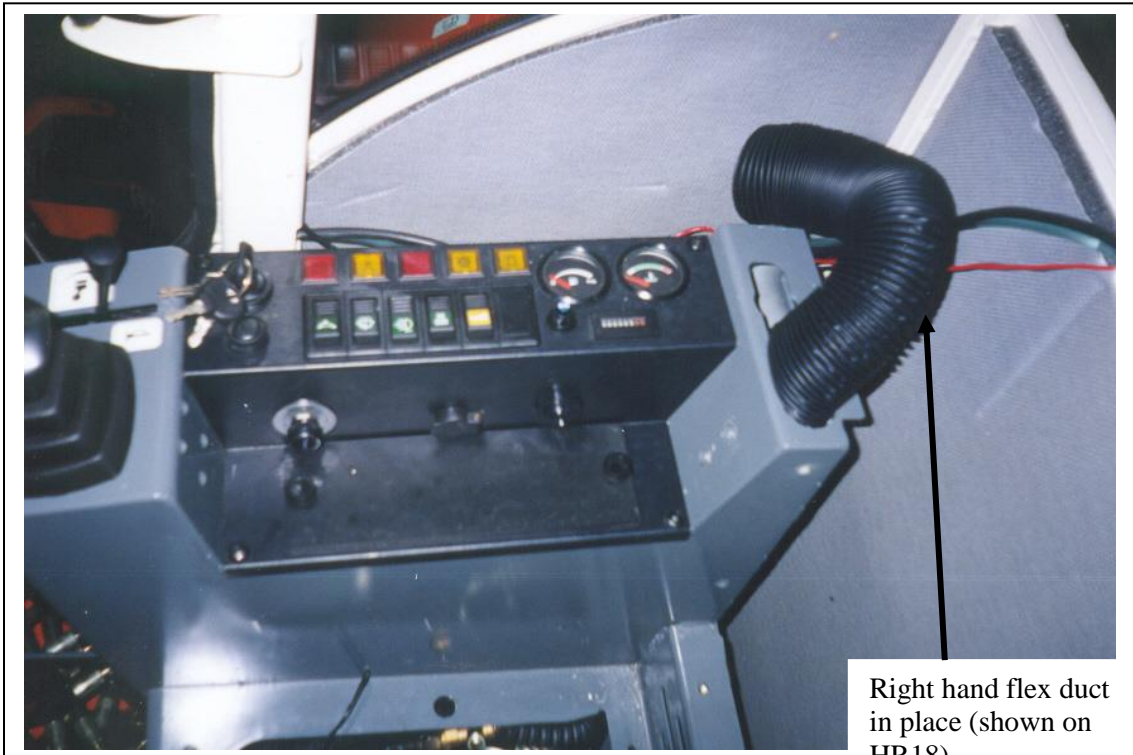


Left hand flex duct run  
in place

7. The 2 ½” flex duct for the right side console mounts up in the plastic radio cover above the metal console. Mark the limit of the plastic cover with a pencil on the top of the metal console at the back of the cab. Just inside the mark, cut a 2 ¾” hole so the edge of the hole is a ¼” in from the pencil marks. File the sharp edges on the hole because the flex duct must be run through this hole. The hoses can be fed either from the top hole or the bottom slot. Once the hose is in place from the front of the heat/AC box area up through the top hole of the right hand console, the heat/AC box can be placed into position.



2 3/4" Hole to run flex duct through (HR14/16)

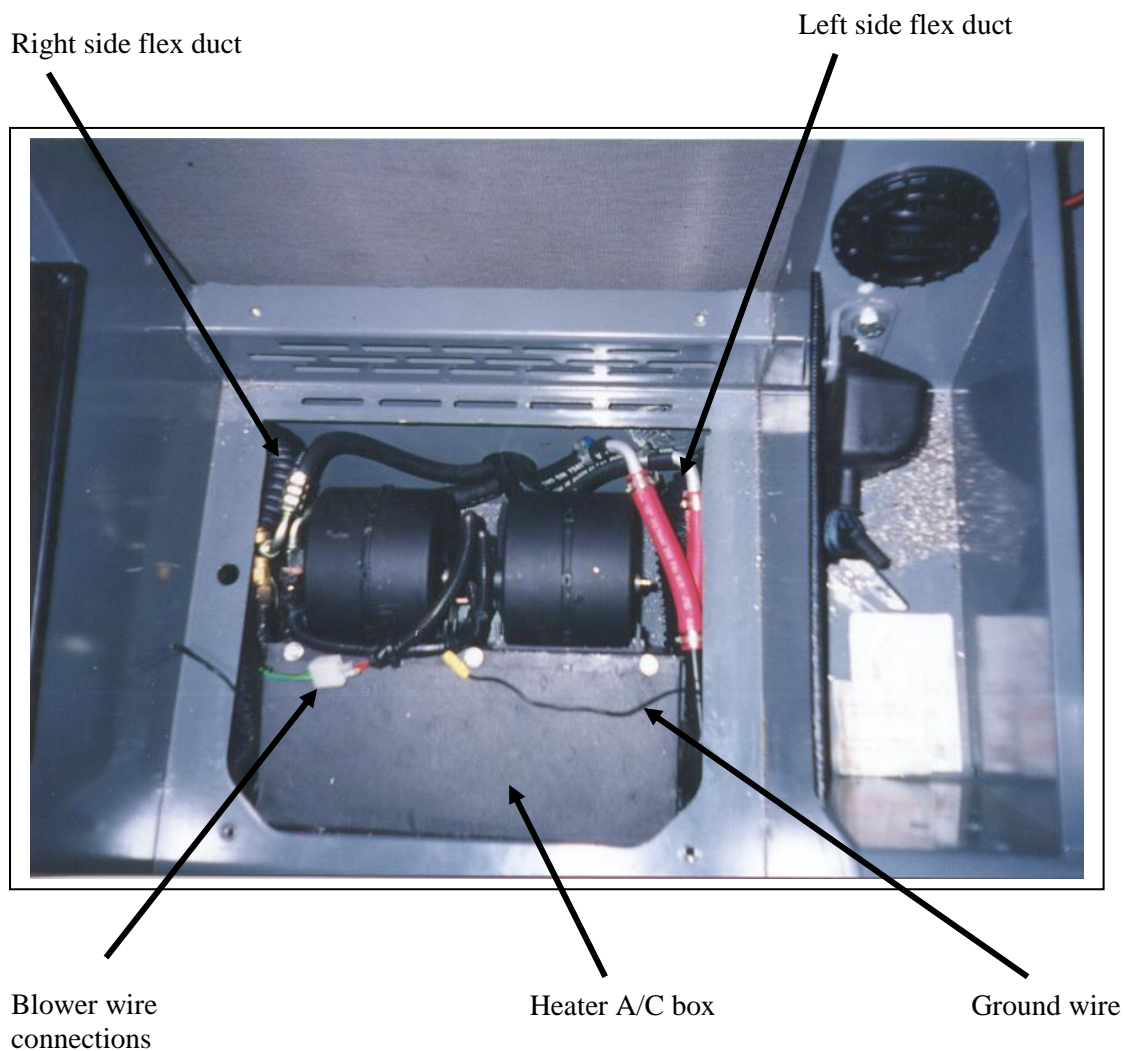


Right hand flex duct in place (shown on HR18)



Right hand flex hose lower section

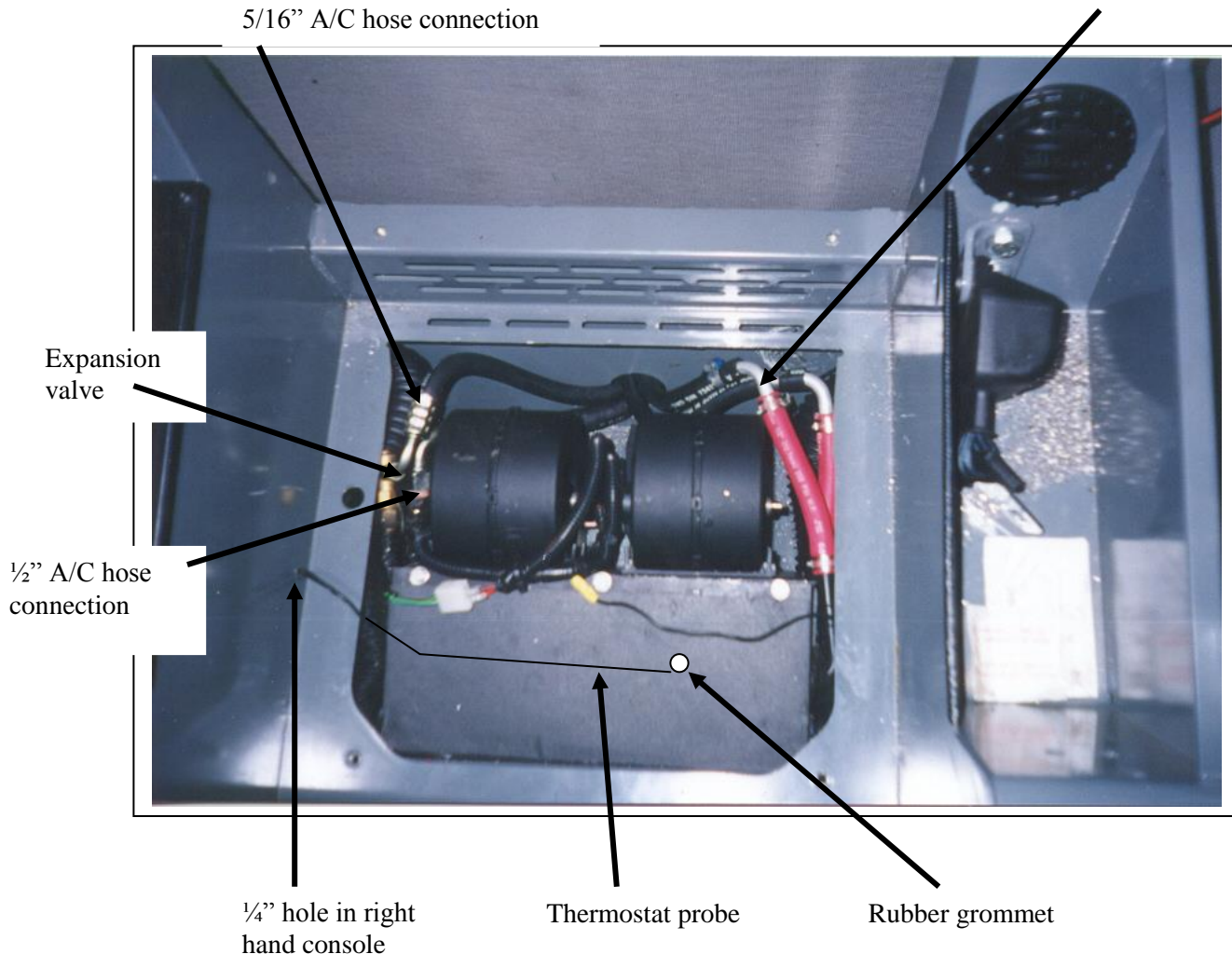
8. The heat/AC box slides into place by tilting the right side of the box down under the side of the hole and sliding to the right and forward. Before sliding the box into place, connect the right flex duct to the right hose adapter and secure in place with a tie wrap. It is not possible to do this after the box is in it's final location. As the box is being slid into position, the 2" flex duct and the 1/2" drain tube must be directed down through the round hole in the cab floor where the original heater defrost pipe had been. When the box is settled into place, check that the three mounting holes for the heat/ac box will line up. Do not bolt the box into place until the A/C lines have been connected to the evaporator.



9. Cut to length and connect the left side flex duct to the left hose adapter and secure into place with a tie wrap. This can be done through the access door on the seat frame.
10. Run the A/C hoses into the heater/ac box compartment through the existing grommet in the back wall of the compartment. Connect the 1/2" line to the large fitting on the evaporator. Use a 1/2" O- ring and oil all contact surfaces of the fittings using PAG refrigerant oil. Connect the 5/16" line to the expansion valve outlet. Use a 5/16" O- ring and oil all contact surfaces of the fittings using PAG refrigerant oil.
11. Once the A/C lines are connected, the heater/A/C box can be bolted into place using the 1/4" hardware supplied in the kit for the front two holes and an existing M8 bolt for the rear holes.
12. The wiring for the blower motors can now be connected. Using a test light or similar tool, determine which wire is the low speed wire from the blower switch and plug the orange wire from the heater/A/C box into it. Determine

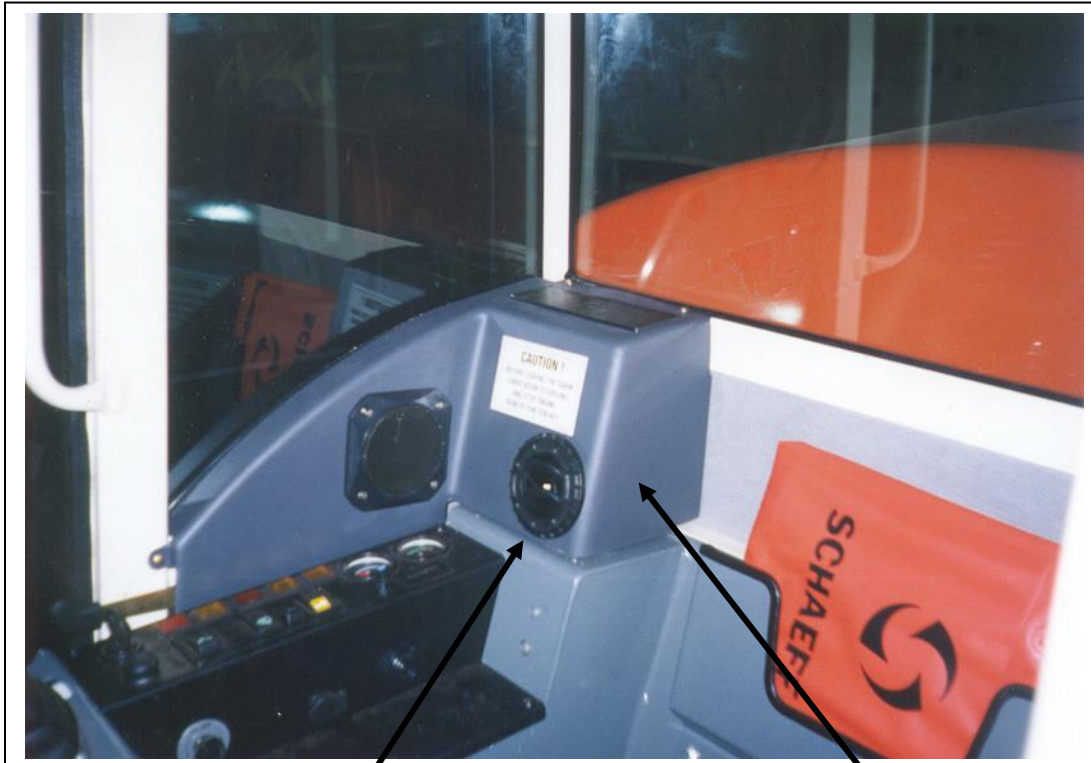


the high speed wire from the blower switch and plug the red wire from the heat/ac box into it. Connect the ground wire from the heater/A/C box to any bolt on the cab. The rear mount bolt for the heater/ac box is a convenient location for the ground.



13. Route the heater lines back through the grommet into the heater/A/C box area and connect them to the 90° splices existing on the heater/A/C box.
14. The thermostat probe needs to be routed over to the heat/A/C box and inserted 5" deep into the A/C coil through the rubber grommet in the lid of the heater/A/C box. A 1/4" hole needs to be drilled in the right hand console just above the ledge of the seat frame. Run the thermostat probe from the thermostat through the 1/4" hole in the side of the console and across the top of the heater/ac box. Insert the probe 5" deep into the coil through the rubber grommet.
15. To mount the air louver in the plastic radio cover drill a 3" hole in the plastic cover with the center of the hole 4" up from the bottom of the cover and 4" in

from the left edge. Re-install the plastic cover and pull the 2 ½” flex duct through the 3” hole. Cut the duct to length and secure it to the hose adapter with a tie wrap. A short screw can be used to eliminate the possibility of the duct slipping off the adapter. Snap the louver assembly into place in the 3” hole.



3” Louver snapped into place

Plastic radio cover

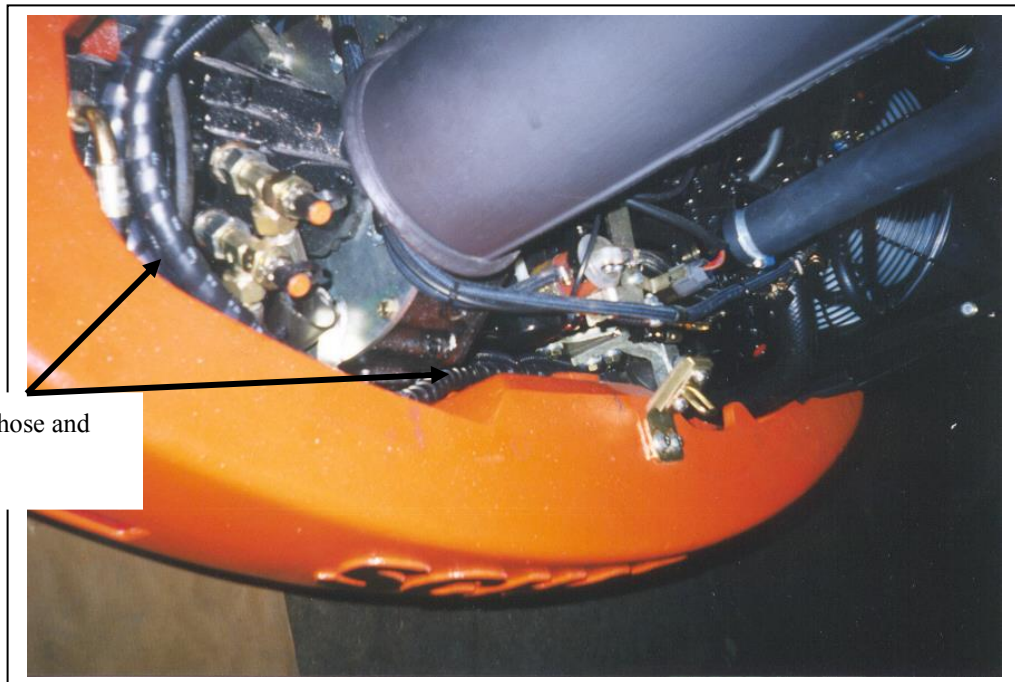
16. To connect the defrost air flex duct to the flex duct coming off the bottom of the heat/A/C box use the short piece of 1 ½” O.D. pipe supplied in the kit. Use the gear clamp supplied in the kit to connect the pipe to the flex duct from the heat/A/C box. Use the gear clamp originally on the defrost air flex duct to re-clamp it onto the 1 ½” pipe. This connection can be seen on the second picture after step 5 of the heater/A/C box installation.
17. Once all these steps have been accomplished and the system tested the cab can have all of its components re-installed.

\*\*\*\*NOTE\*\*\*\* If a machine doesn't have a heater originally, heater hoses will have to be run and connected to the engine by the dealer or installer. The blower switch will also have to be installed but the wiring harness for the blower exists.

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

Steps:

1. Starting at the compressor, the ½” hose with the 90° female fitting on one end and 50” to the access “T”, attaches to the ½” suction port on the compressor. This is the lower port on the compressor marked “suc” or “S”. From the compressor the hose runs to the left between the engine and the counter weight, up over the top of the hydraulic pump just in front of the drier and around behind the engine (cab side) to the right. It enters the heater/A/C box compartment through the same hole in the cab wall as the heater hoses. Route it over to the ½” male fitting on the evaporator outlet and connect it there.



½” hose, 13/32” hose and  
clutch wire

2. Starting at the compressor, the 13/32” hose with the 90° female fitting on one end and 54” to the access “T”, attached to the 32/32” discharge port on the compressor. This is the upper port on the compressor marked “dis” or “D”. This hose follows the same route as the ½” hose up to the drier area. The 13/32” hose runs vertically to the inside of the drier and up through the hole cut in the engine air exhaust cover. The hose continues up the hose and wiring channel and is connected to the 13/32” male fitting at the condenser. This is the fitting closest to the cab.



5/16" hose, 13/32" hose and the condenser power wire

3. The 5/16" hose with a straight fitting on one end runs from the drier inlet up to the 5/16" fitting on the condenser. The 90° fitting attached to the drier inlet fitting. The 5/16" hose is routed up with the 13/32" hose and condenser power wire, through the hose and wire channel and over to the 5/16" fitting on the condenser. Once both fittings are connected at the condenser, the 1/4" x 1" bar is used to clamp the hoses firmly just outside the condenser box. Use the long 1/4" hardware to clamp the two hoses in place between the two bars.

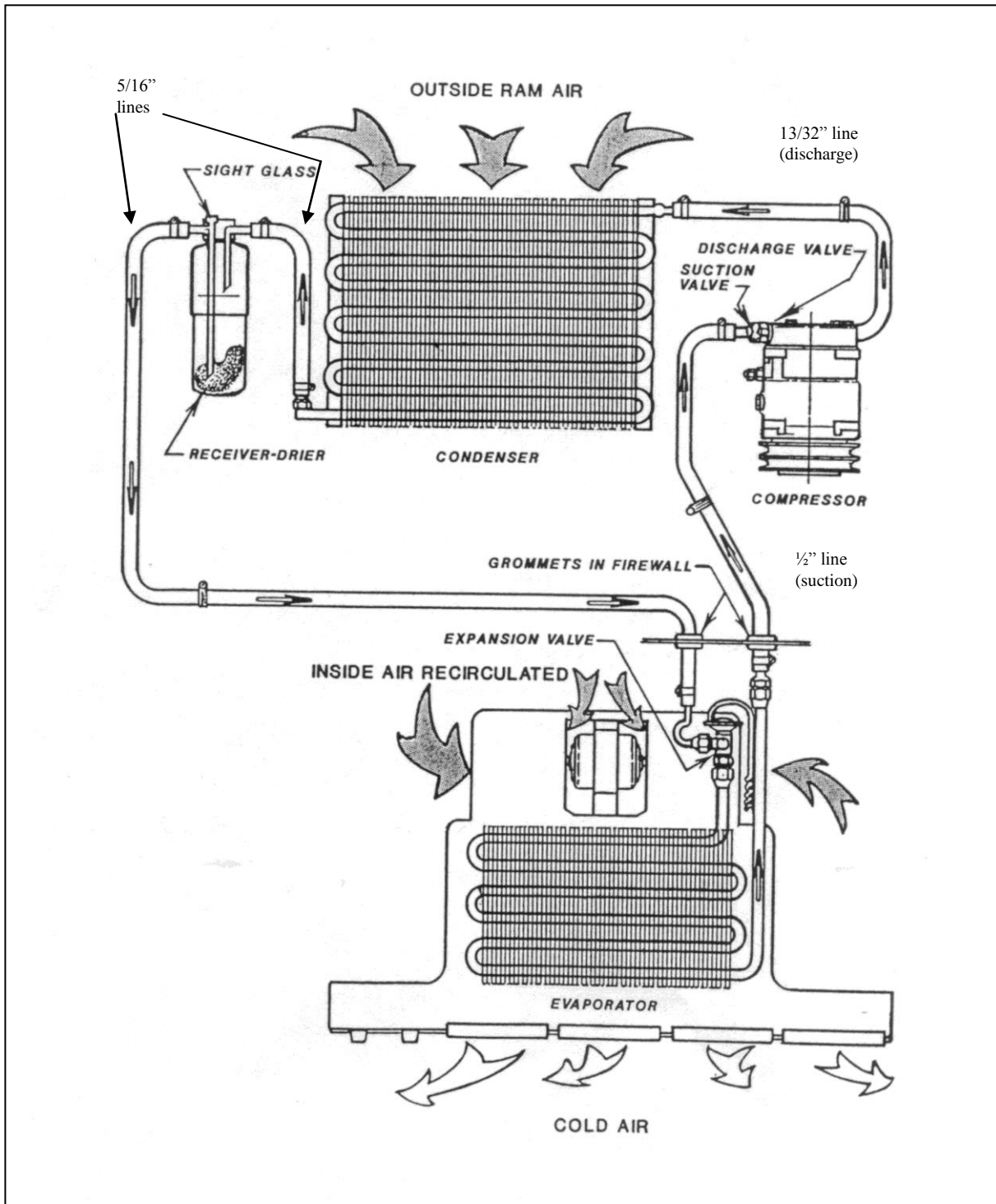


5/16" AND 13/32" HOSE

Hose clamping bracket

4. The 5/16" hose with a 90° fitting on each end runs between the drier outlet and the expansion valve at the heat/A/C box. Connect on 5/16" 90° fitting to the outlet fitting on the drier and run the hose down and over to the 1/2" hose. Follow the 1/2" hose all the way onto the heat/A/C box and connect the other 5/16" 90° fitting to the expansion valve.
5. When all the hoses are connected the system should be pressure tested to 250 psi using nitrogen and checked for leaks.
6. Vacuum the system for 1/2 hour and charge with 2.35lb(±0.1 lb) of 134a refrigerant. Any other type of refrigerant use will void all warranties on the system.

# 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.

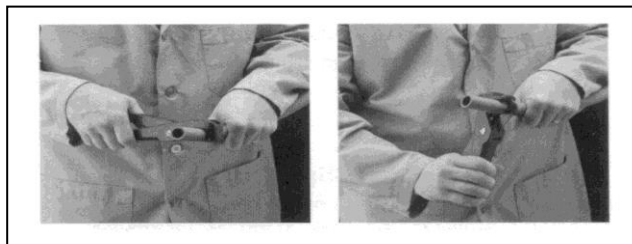
Once the probe is inserted, the A/C system needs to be tested. Run the system to ensure that the thermostat is cycling the compressor off at the appropriate temperature. A core temperature ranging between 25° and 30° F should cause the thermostat to cycle off. The air temperature at the vent outlet closest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

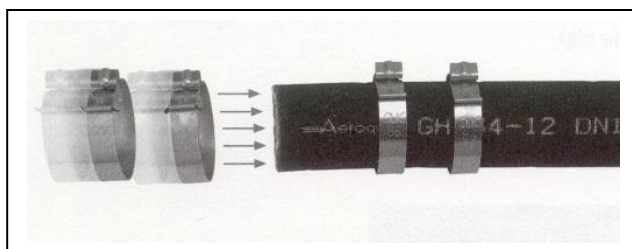


## Aeroquip E-Z Clip Assembly Instructions

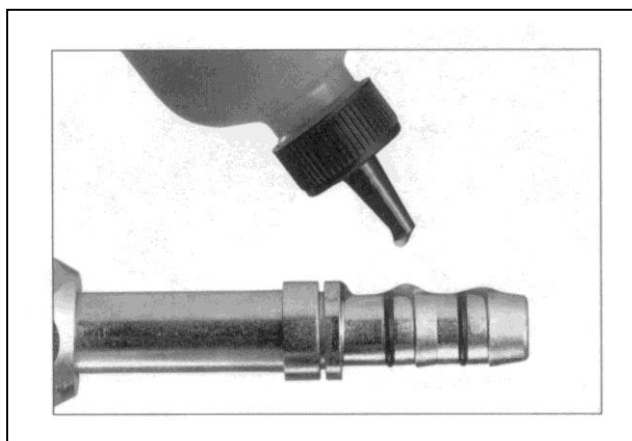
Step 1. Cut the hose to proper length with an appropriate cutting tool. Aeroquip's hand held hose cutter has been specially designed for cutting all non-wire reinforced hose, such as GH-134 Multi-Refrigerant hose. Be sure the cut is made square to the hose length.



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.



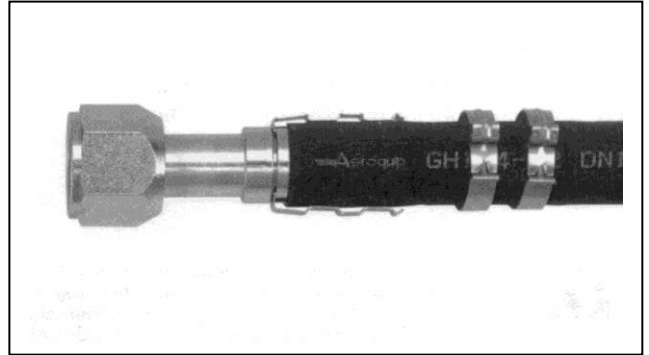
Step 4. Insert the nipple into the hose. To ensure that the nipple is fully inserted, check the gap between the cut end of the hose and the shoulder on the nipple. Care should be taken to avoid kinking or other damage to the hose during nipple insertion. NOTE: Be sure to wipe excess oil from the nipple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



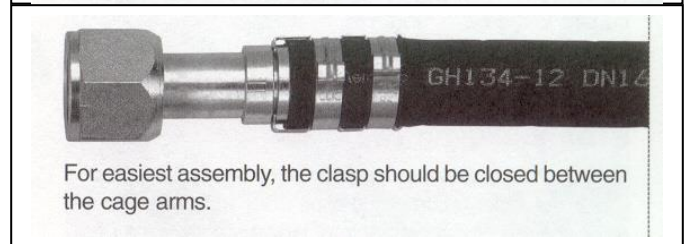
Step 5. Snap the cage into the groove on the nipple. The arms should extend over the hose length. When the cage has been correctly installed in the cage groove, the cage will be able to rotate in the groove.

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.

