

HR 18 TEREX Mini Excavator

Installation Instructions



1-800-267-2665

1-888-267-3745 FAX

Compressor mount: The compressor is located on the cab side of the engine in the original alternator location.

- Steps:
1. Remove the engine hood from the machine. Take the four bolts out of the hinges on the machine side of the hinge. Remove the retaining clip from the gas shock and pop it off its mount pin at the machine end of the shock. Lift the hood off over the exhaust pipe. Remove the bottom engine access panel to access the underside of the engine.
 2. Remove the engine compartment panel that sits between the cab and the engine. First unclamp and remove the air intake filter and pipes from the engine and panel. Unbolt the relay mounted on the engine compartment panel and cut the two tie wraps that hold the wiring bundles onto the panel. Unbolt the fuel filter and all clamps holding the hydraulic lines in place to the panel.

Remove the five bolts that secure the panel to the frame of the machine. There are two beside the radiator and two above the right end of the engine and one at the bottom of the panel on the right end. Lift the loose panel up and off the machine.



Engine Hood

Engine compartment panel

Sits between engine and cab.

3. Remove the alternator and alternator mount from the machine. Leave the alternator tightener bracket in place to act as the compressor tightener bracket. Retain the two M10 bolt for later use on the compressor mount. Place the alternator on top of the engine out of the way until it is time to remount it in its new location. Remove the original drive belt from the engine. It will not be reused.
4. Put protective hose wrap on the heater lines coming out of the engine block just above the original alternator location. This will protect them from rubbing on either the compressor or alternator.

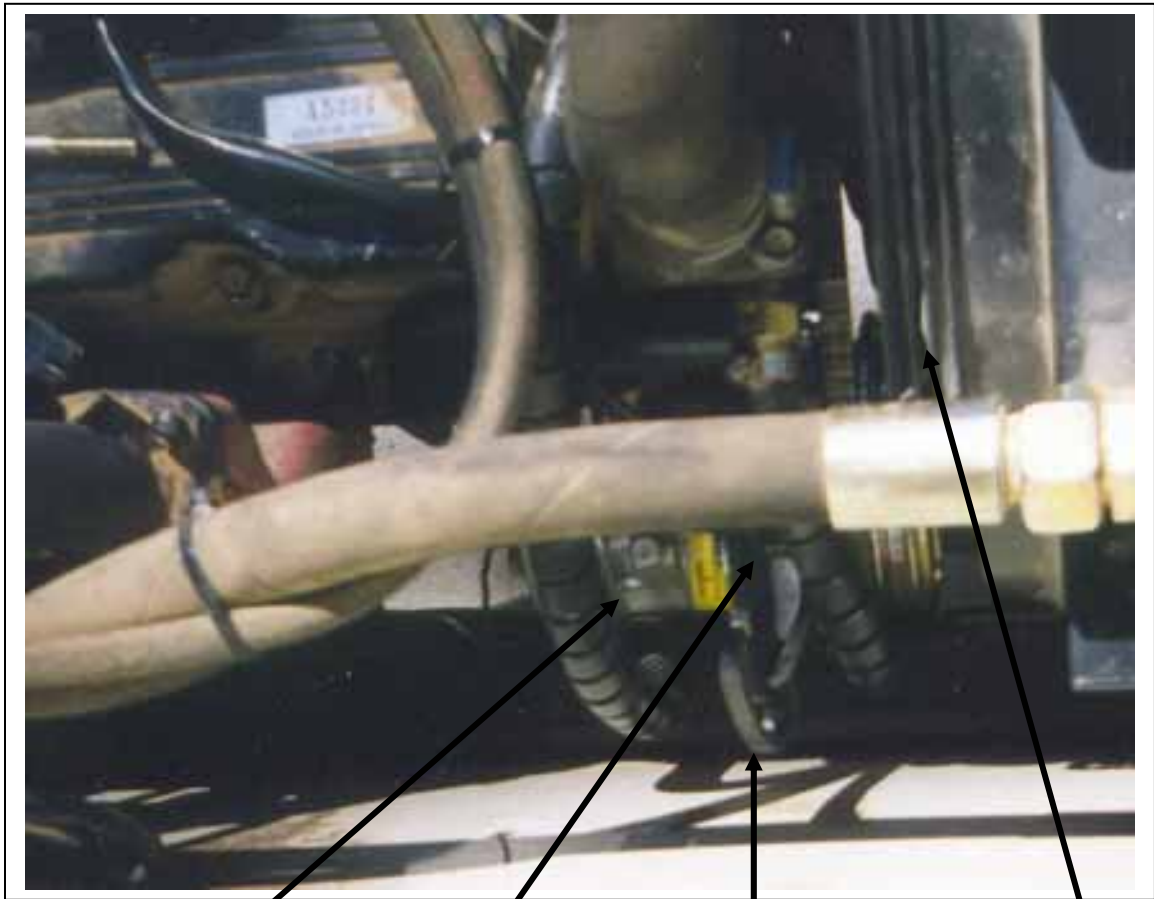


Shows hose wrapped heater lines

5. Install the compressor mount onto the original alternator mount location and bolt loosely in place using the two M10 bolts saved in step 3. This may be best done from the bottom of the engine. Leave the mount slightly loose so it can be adjusted to achieve the correct alignment of the compressor to the crank pulley. The rear groove of the compressor pulley will be lined up with the crank pulley.
6. Get the compressor, the white nylon gaskets and the rotolock fittings from the a/c kit and assemble the rotolocks to the compressor before installing the compressor onto the compressor mount. Remove the shipping caps from the compressor fittings and insert the white nylon gaskets into the recessed rings

on the end of the compressor fittings. Oil the surfaces on the rotolock fittings before installing them onto the compressor fittings. The 13/32" rotolock (smaller one) goes onto the discharge fitting on the compressor with the access port pointing up. The 1/2" rotolock (large one) goes onto the suction fitting on the compressor with the access port pointing up. Tighten the fittings in place using a 1 1/8" and 7/8" wrench.

7. From the top of the engine, place the compressor down onto the compressor mount with the two, lower, outside ears over the mount bracket. Using the long 3/8" bolt, secure the compressor loosely to the mount.
8. On the top front outside ear of the compressor, bolt the alternator tightener bracket and the compressor tightener "L" bracket onto the ear using the 3/8" x 1 1/2" bolt provided. The alternator tightener goes on the pulley side of the ear. The 3/8" x 1 1/2" bolt should pass through all three items and secure them together.



Compressor
mount location

Compressor
tightener

Alternator
tightener

Fan screen rotation

9. Loosely bolt the original alternator tightener bracket, (now the compressor tightener arm) onto the "L" bracket using the two 5/16" bolts locks and flats provided in the kit.
10. Install the longer drive belt, supplied in the kit, around the crank pulley, the fan pulley and the rear groove of the compressor pulley. Loosely tighten. Check the compressor alignment by placing a straight edge across the face of the crank pulley. Adjust the compressor and mount to make the belt run parallel to the straight edge. Once the belt is straight, tighten the compressor mount bracket in place. Double check the alignment then fully tighten all other mounting bolts and bracket.



Compressor

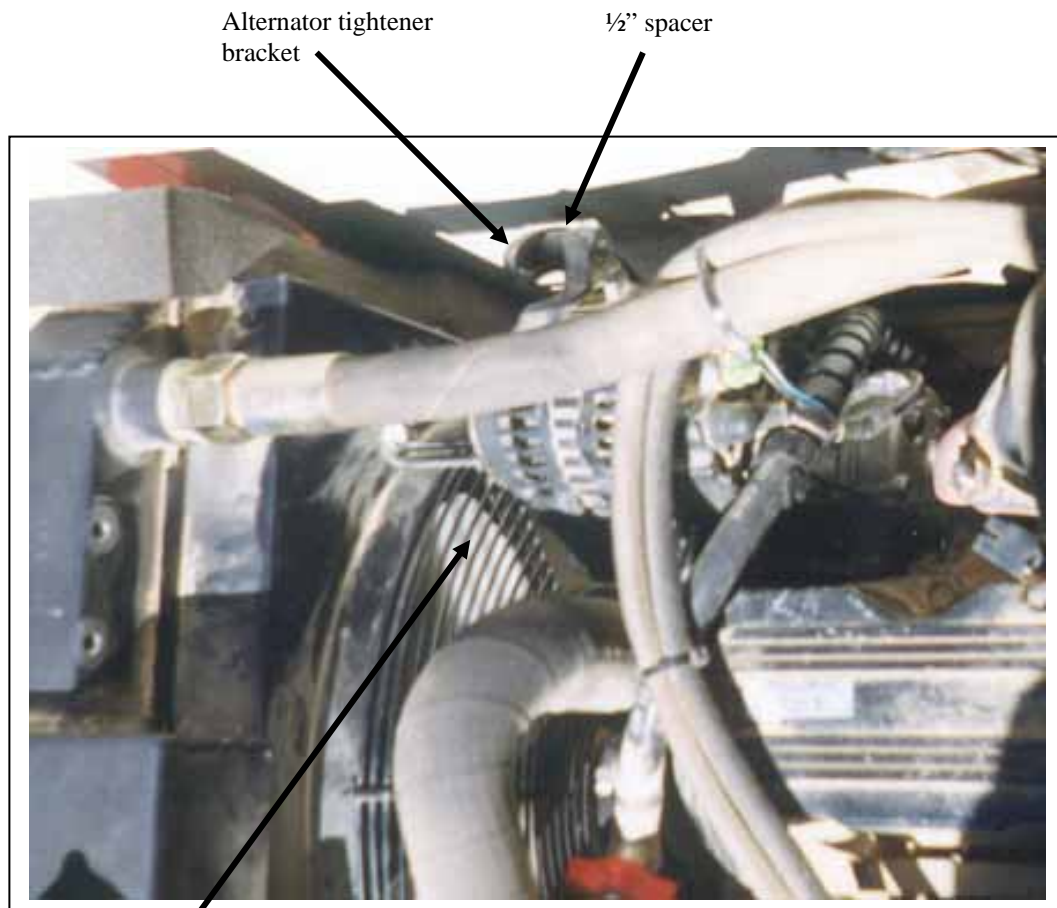
Alternator belt

Main drive belt

Looking up from the bottom of the engine

Alternator mount: The alternator is remounted above the compressor with the heater lines running between the alternator and the compressor. The mount is bolted to the engine lifting eye location. The alternator tightener bracket comes up off the front outside ear of the compressor. The alternator is driven off the front pulley of the compressor. The rpm of the alternator will remain the same as it was before the relocation.

- Steps:
1. Remove the engine lifting eye from the back side of the engine
 2. Bolt the alternator mounting bracket to the same M8 holes as the engine lifting eye was. Use the M8 hardware supplied in the kit. The mount holes in the bracket are slotted to make aligning the belt easier.
 3. Bolt the alternator to the mount bracket using the modified 3/8" bolt and hardware provided in the kit. Make sure to bolt the non-threaded alternator ear to the mount.
 4. Bolt the curved alternator tightener arm to the alternator threaded ear using a 1/2" spacer in between the two. Use the M8 x 35mm bolt and the original large O.D. flatwasher as hardware. Leave the bolt loose until the drive belt is installed.

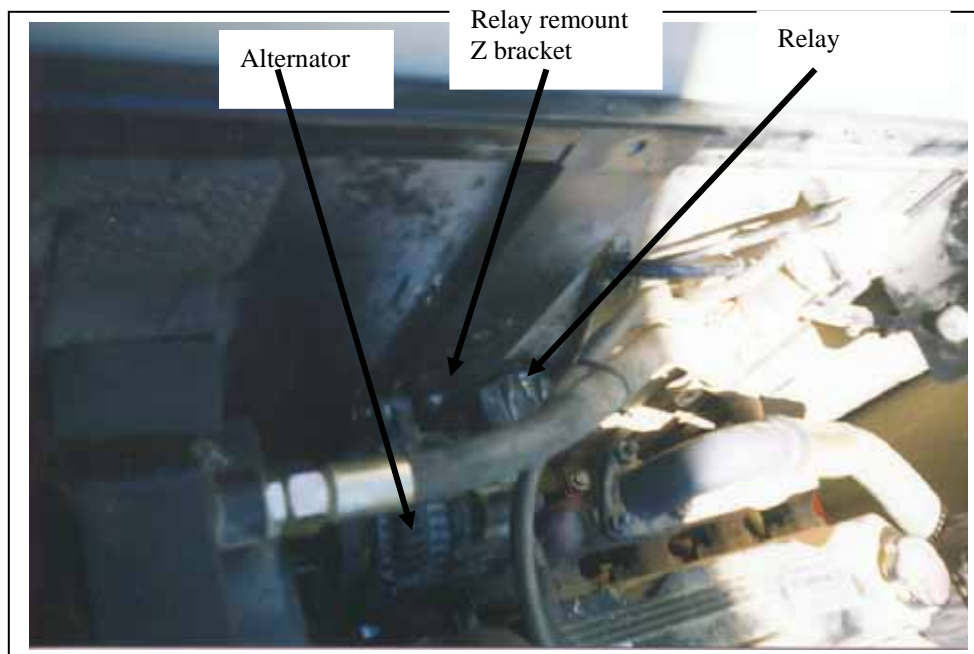


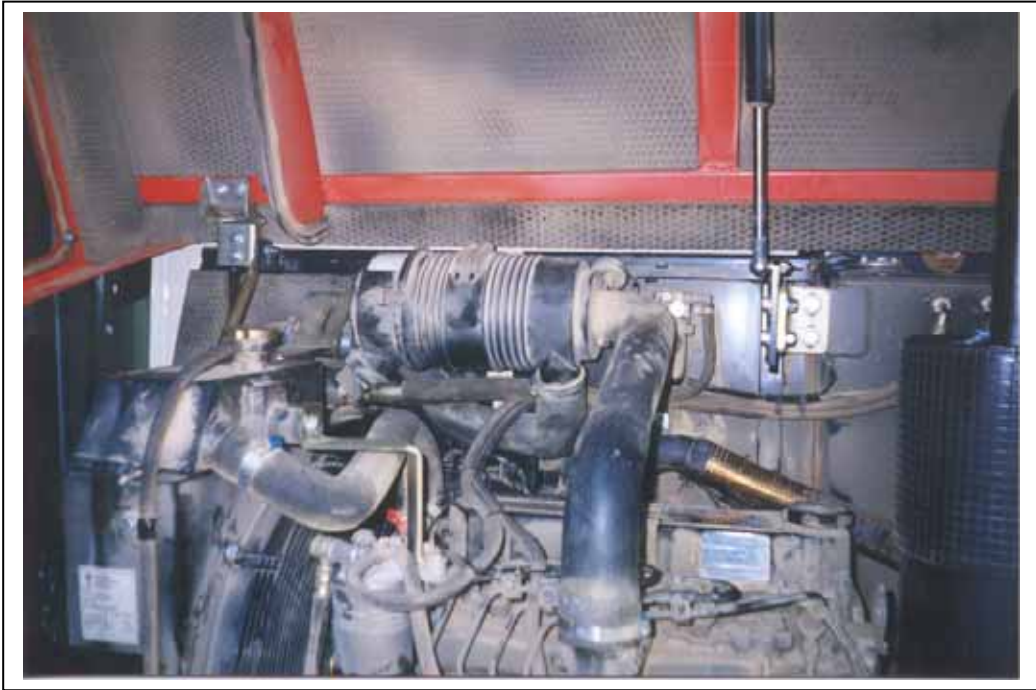
Fan screen rotated 90°
counter clock wise

5. With the tightener still loose, install the alternator drive belt over the front groove of the compressor and the alternator pulley. Tighten the belt by pivoting the alternator and secure both the tightener arm bolt and the main bracket bolt. Check the belt alignment using a straight edge across the face of the pulley. If the alignment needs to be adjusted, loosen the two M8 bolts holding the alternator mount to the engine block and relocate the mount with the slotted holes to correct the position. If the alternator needs to move ahead farther than the slots will allow, washers can be used between the bracket and the alternator ear to space the alternator ahead.
6. Once both the compressor and alternator is tightened, the engine compartment panel can be reinstalled. On some machines, the C channel on the inside of the panel that the air cleaner mounts to may have to be knotted out to give the necessary clearance to the alternator tightener. If this is the case use a cutoff blade or similar tool to remove enough metal to eliminate contact between the alternator and the panel.

****IMPORTANT NOTE**** Do **NOT** re-install the engine compartment panel until the condenser has been installed onto the radiator frame.

7. After the panel is re-installed, all hoses and components can be re-connected. The main relay is relocated from the C channel towards the right by means of the relay remount “Z” bracket supplied in the kit. Bolt the Z bracket to the 6mm clinch nut on the C channel. Mount the relay on the 6mm stud on the other end of the bracket.



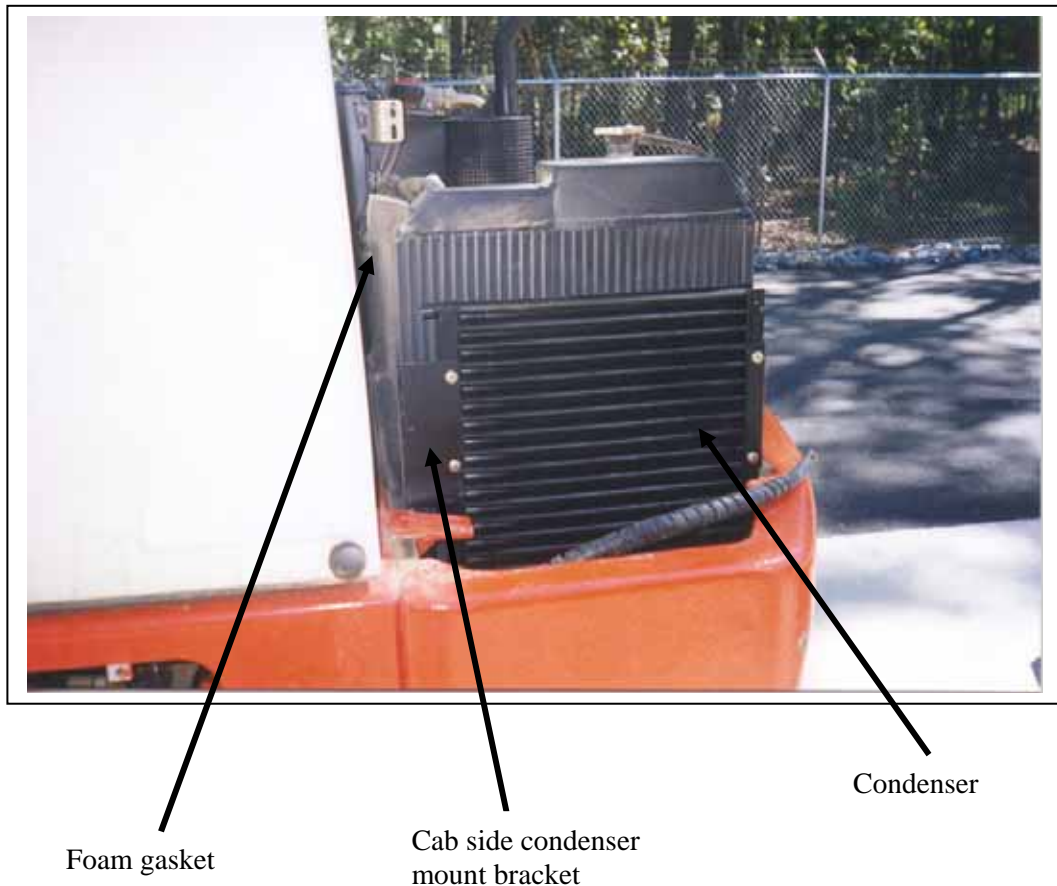


Engine compartment re-assembled

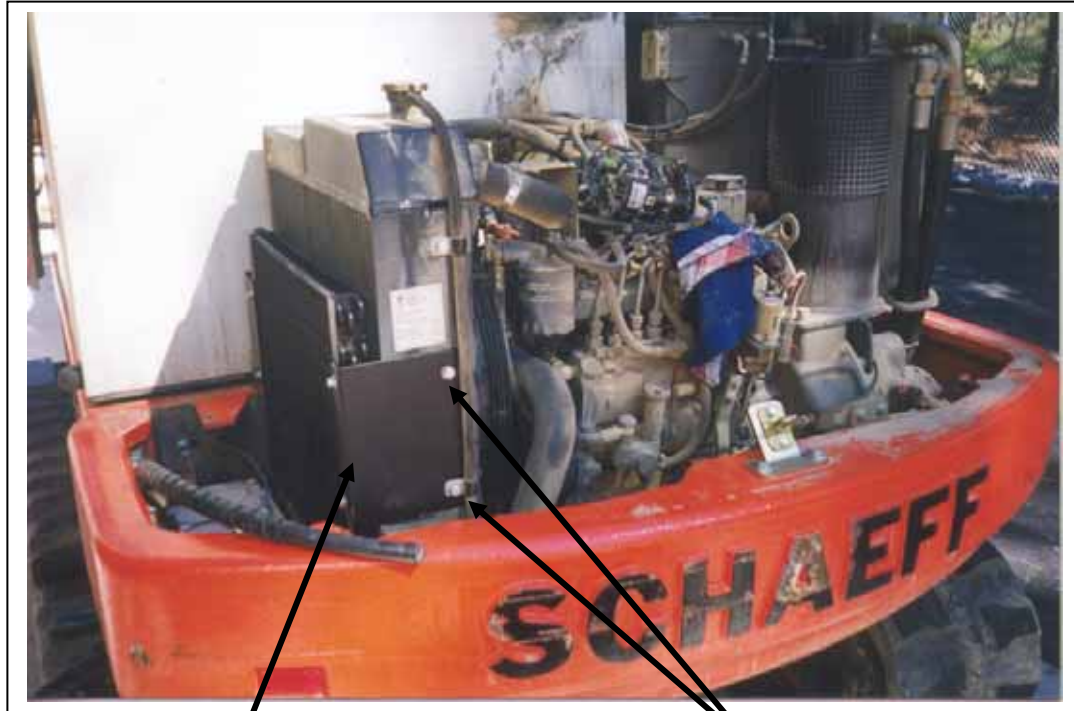
Condenser: The condenser is located on the air inlet side of the radiator between the radiator and the rear engine compartment panel brace.

**** NOTE**** The condenser must be installed while the rear engine compartment panel is removed.

- Steps:
1. Loosen the 2nd and 3rd bolts from the top on each side of the radiator frame. Remove the bolts on the back side of the rad. They will be reinstalled once the condenser is slid into position.
 2. On the cab side of the rad there is a thick foam gasket glued to the rad frame. To accommodate the condenser mounting bracket the foam must be separated from the rad using a sharp knife from 1" above the 2nd bolt to the 1" below the 3rd bolt. This will allow the condenser mount bracket to slide onto the bolts flush with the rad frame. Once the bracket is installed the foam can be glued over the condenser bracket to return it to its original location.
 3. Remove the fitting side bracket from the condenser and install it onto the rad frame loosely.



4. Slide the condenser in between the loosely installed cab side bracket and the rad, until the rear condenser bracket line up with the two bolt holes on the rad frame. Reinstall the original bolts in the holes to secure the condenser frame. Reinstall the 1/4" bolts previously removed from cab side condenser frame and tighten the two loose M8 bolts to secure the cab side of the condenser.



Rear condenser bracket

2nd and 3rd holes

5. Check clearance around the condenser and between the condenser and radiator to ensure nothing can rub and cause damage.

***NOTE** The rear engine compartment panel can be reinstalled once the condenser, compressor and alternator are installed.



Engine compartment panel

Drier

Condenser

5/16" line condenser to drier

Receiver drier: The receiver drier is located in front of the condenser and mounts off of one of the rear engine compartment panel mounting bolts.

Steps:

1. Once the rear engine compartment panel has been reinstalled, the 90° receiver drier mount bracket can be installed on the mount bolt for the rear engine compartment panel closest to the back of the machine.
2. Secure the receiver drier to the 90° bracket using the two #48 gear clamps provided. The inlet fitting for the drier (marked –“in”-) should be pointing towards the left side of the machine. The binary pressure switch points towards the back and the outlet from the drier points towards the radiator.



90° Drier bracket



13/32" Hose condenser to
compressor discharge
rotolock

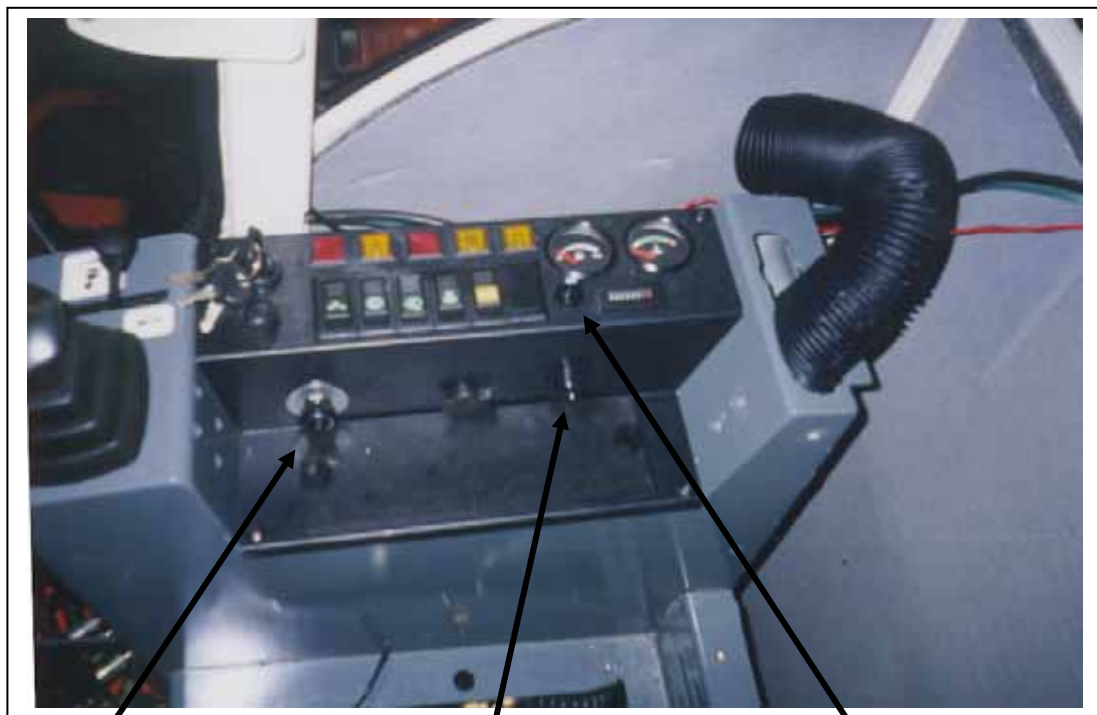
Drier

5/16" Hose drier to
evaporator

Electrical System: The electrical system for this machine has been made as simple as possible. It consists of an inline ATO fuse, an A/C on/off push button switch, a rotary thermostat, a binary pressure switch, the compressor field coil and the 14 gauge wire to connect them all.

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 Phillips 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

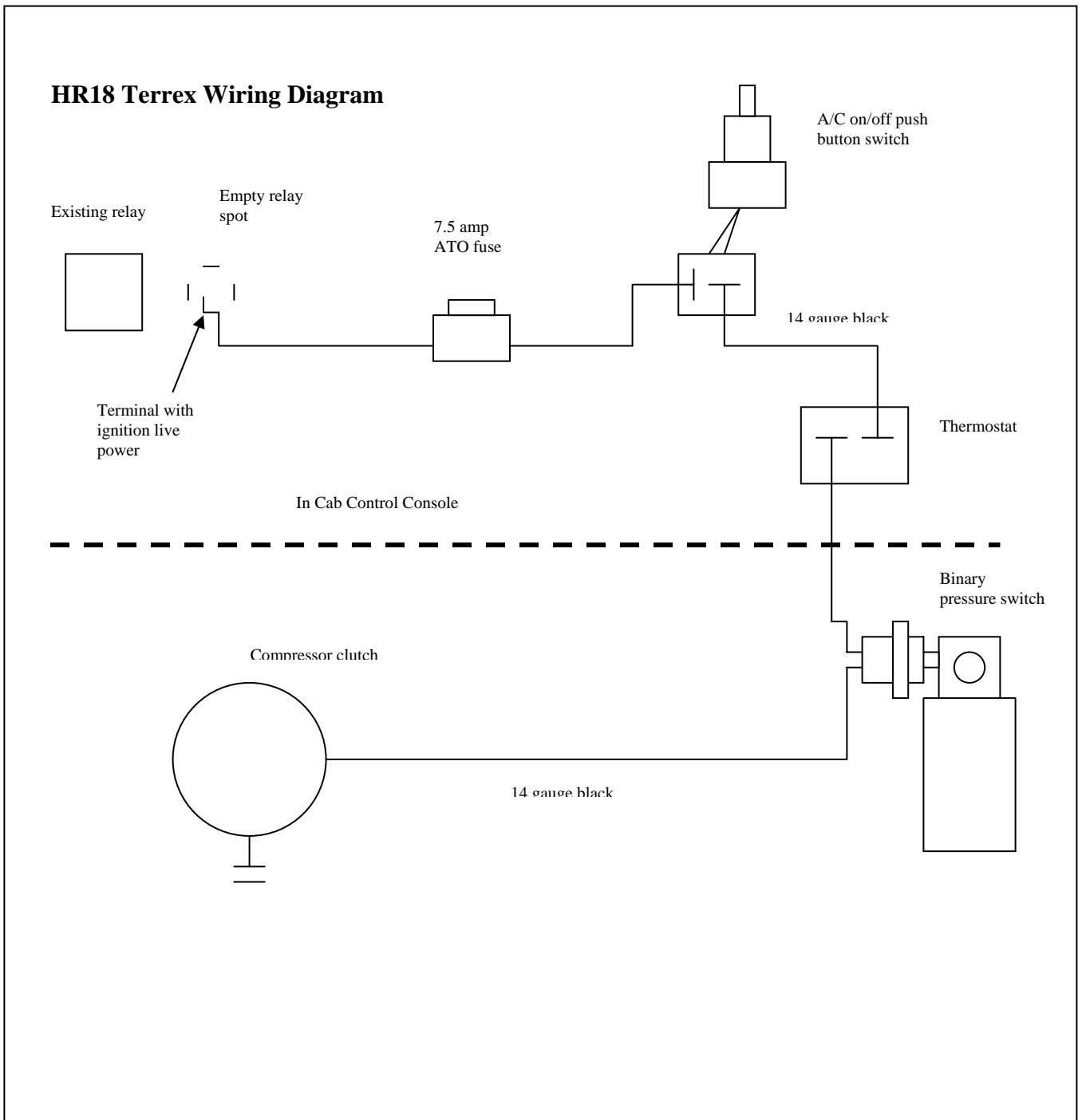
3. Draw ignition live power from the live wire on the first empty relay location from the front of the panel. Use the inline ATO fuse holder as the wire to run from ignition live power to the A/C on/off button. Use a bare male quick disconnect terminal on the end of the ATO fuse holder to connect to 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 7.5 amp fuse into the holder.



Terminal with ignition live power

4. From the second terminal on the A/C on/off switch run a 14 gauge wire to the thermostat terminal. Use female QDT's on both ends of the wire. From the other terminal on the thermostat run the long bundle of 14 gauge black wire in loom around and out the back of the right hand console through the existing grommet. Between the console and the rear cab wall the wire should meet up with the A/C hoses and heater hoses. Follow the 5/16" A/C hose all the way out to the binary switch on the drier. Connect the 14 gauge black wire to the binary switch using a female QDT. From the binary switch the wire should

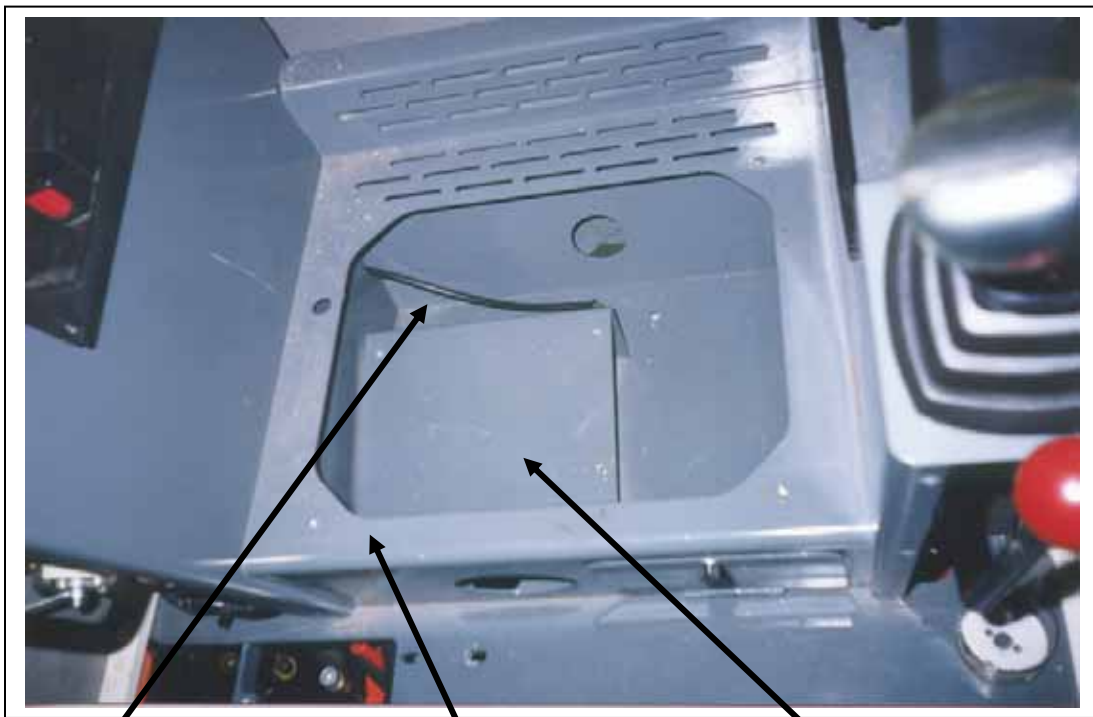
double back on its route until it can follow the 13/32" hose up to the compressor. At the compressor connect the 14 gauge black wire to the clutch wire using a female QDT. If there is not a male QDT already on the clutch wire at the compressor, cut the bullet connector off and install a male QDT. Secure the wiring along its route by tie wrapping it to the A/C hoses or any other appropriate items.



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 right side of the cab. Slide the plate out through the right side under the door frame. 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

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 small floor access panel previously removed. To give better access to this area unbolt the control linkage frame just to the left of the access hole. This will allow the control linkage frame to be moved down and to the side. Loosen the gear clamp securing the flex duct and slide the flex duct off the pipe.



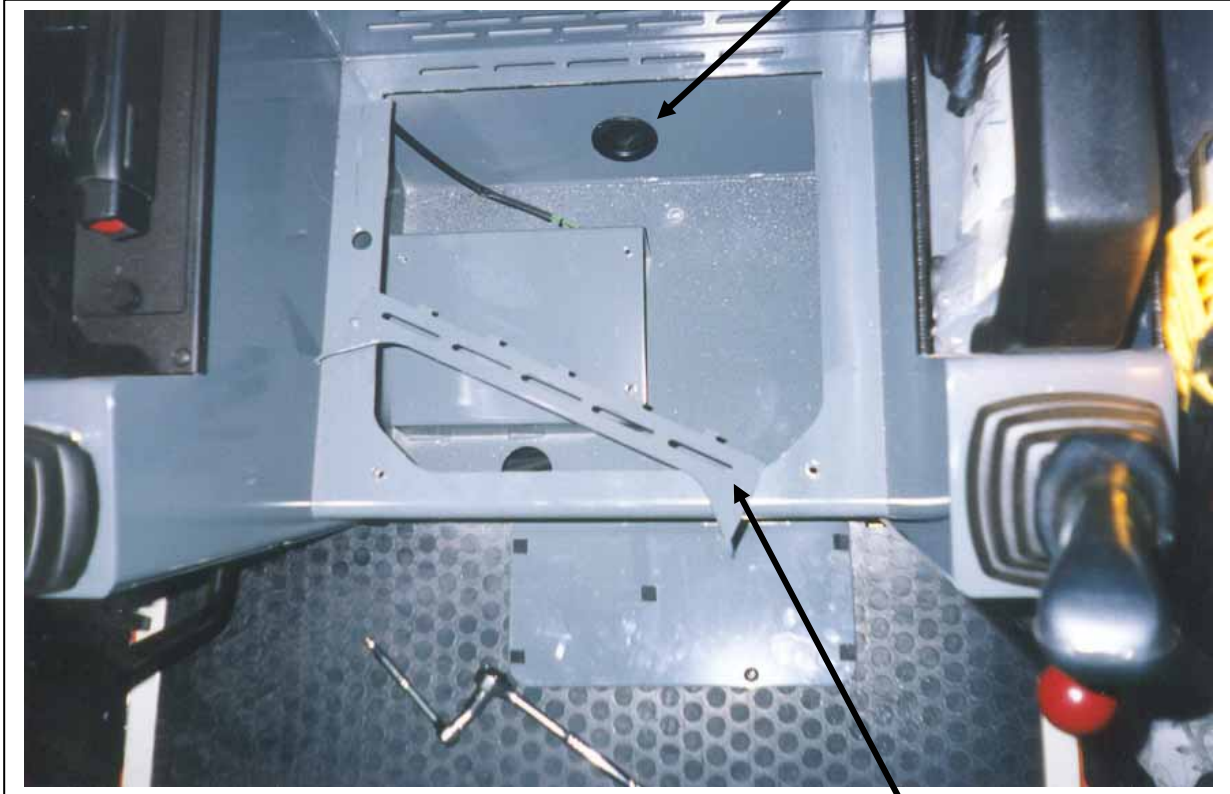
Control linkage
bolts

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.

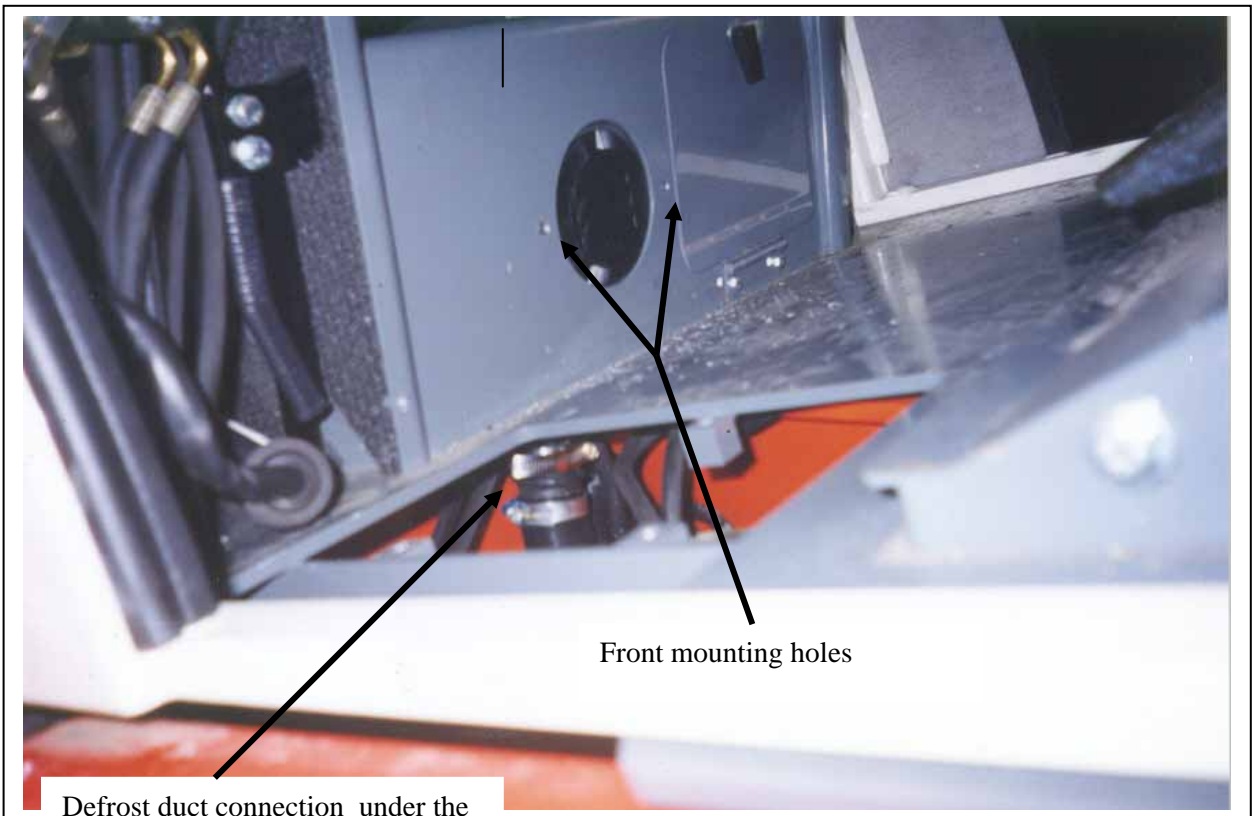
Hose grommet in back wall



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.

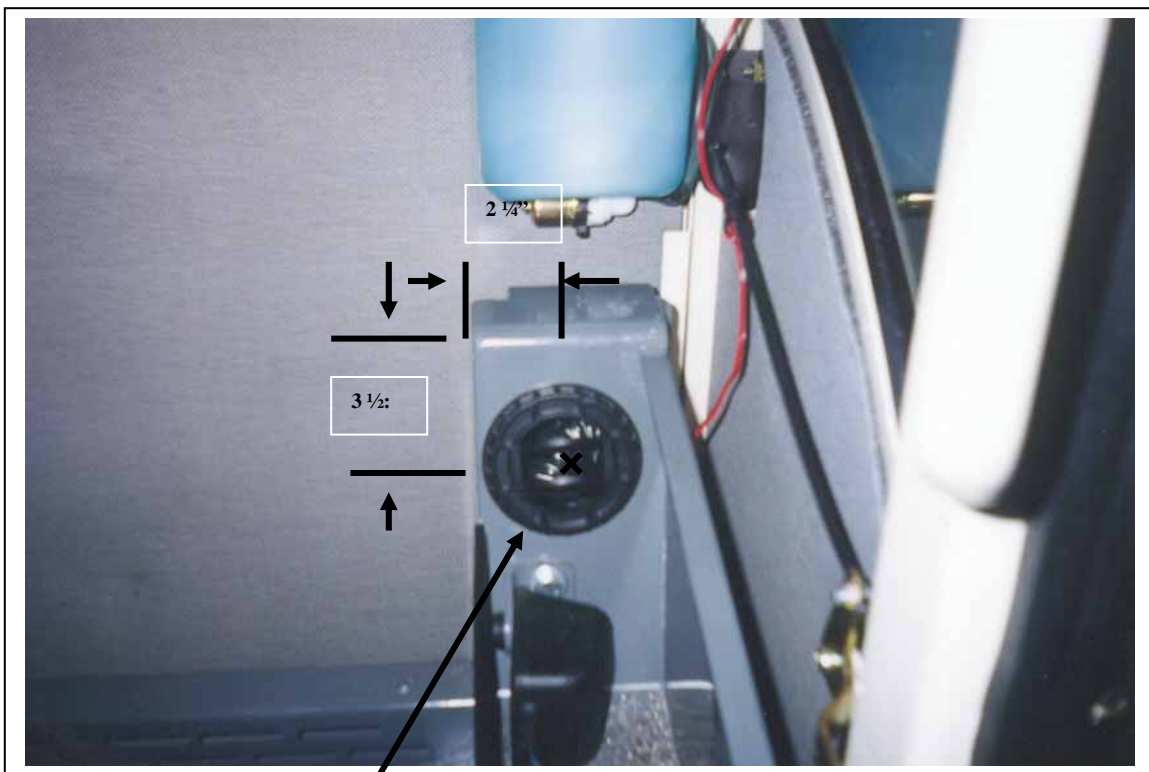
Front mounting hole template in place



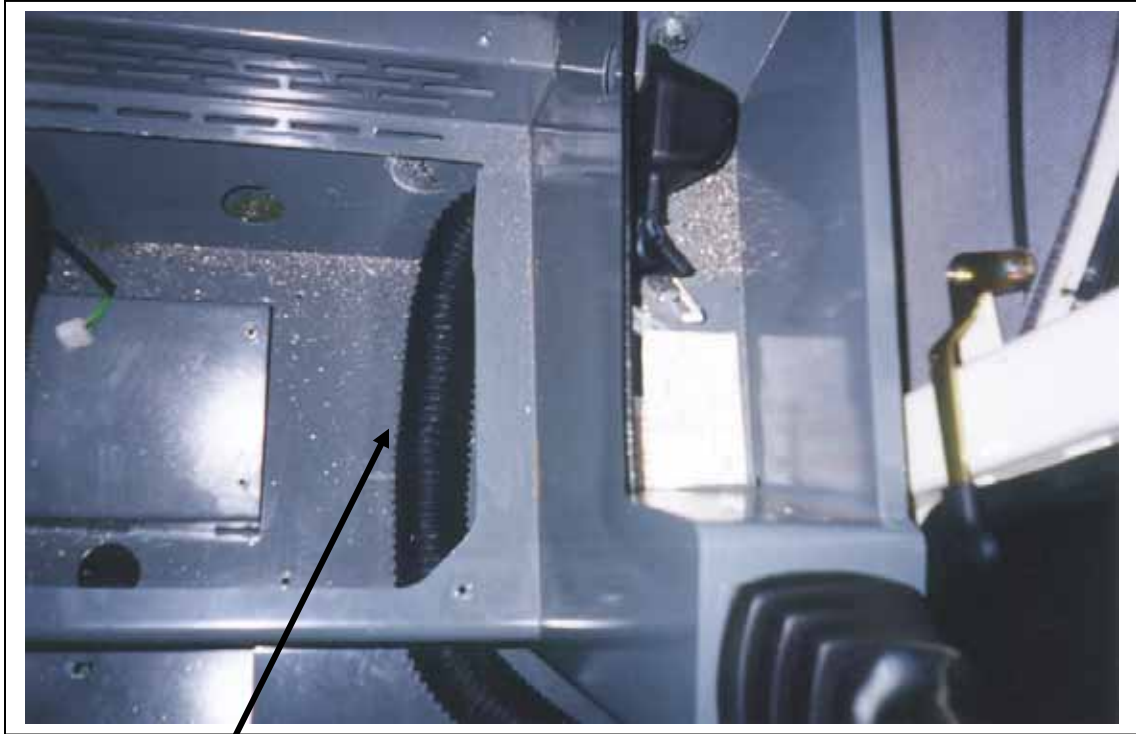
Defrost duct connection under the cab floor

Front mounting holes

- A 2 ½” 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 ½” to center from the top of the metal console, 2 ¼” in from the inside edge, to center. The flex duct and louver for the left side has been pre-assembled due to special modifications necessary to accommodate the narrow space behind the left console. 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 snapped into the hole. The tapered side of the hose adapter in the louver must be pointed down in order to achieve the proper airflow through the duct. 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

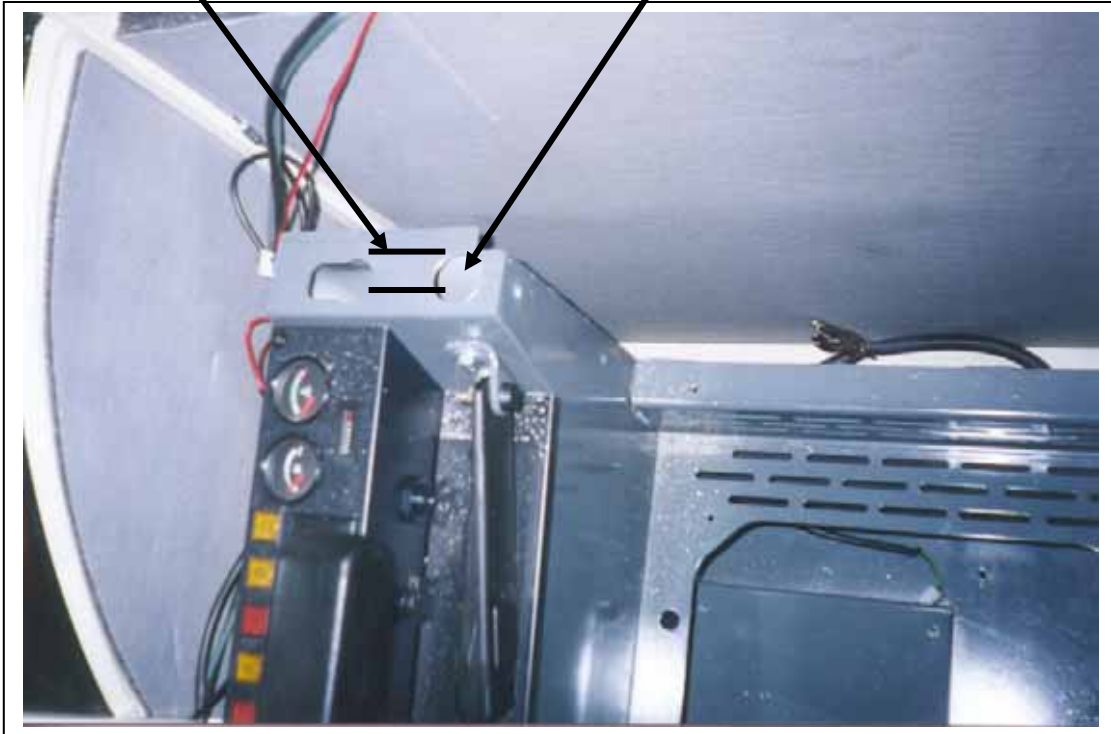


Left hand flex duct run
in place

7. The 2 1/2" flex duct for the right side console doesn't have the louver pre-assembled to it and 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 1 3/4" hole so the edge of the hole is a 1/4" in from the pencil marks. Use a saw to slot this hole over to the pre-existing hole towards the right edge of the cab. File the sharp edges on the hole because the flex duct must be squeezed through this slot. The hoses can be fed either from the top slot or the bottom slot. Once the hose is in place from the front of the heat/AC box area up through the top slot of the right hand console, the heat/AC box can be placed into position.

Cut metal out here

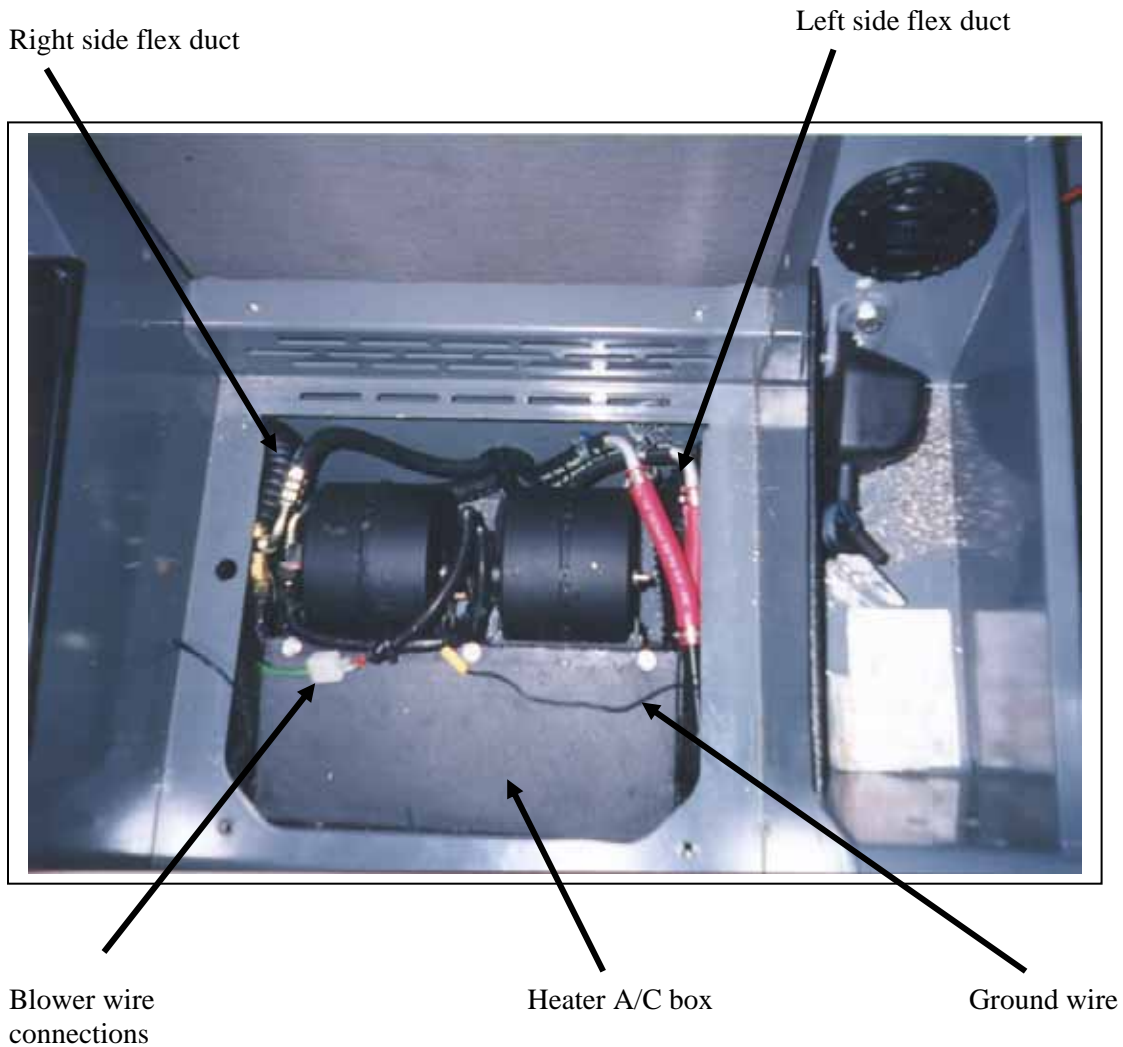
1 3/4" hole





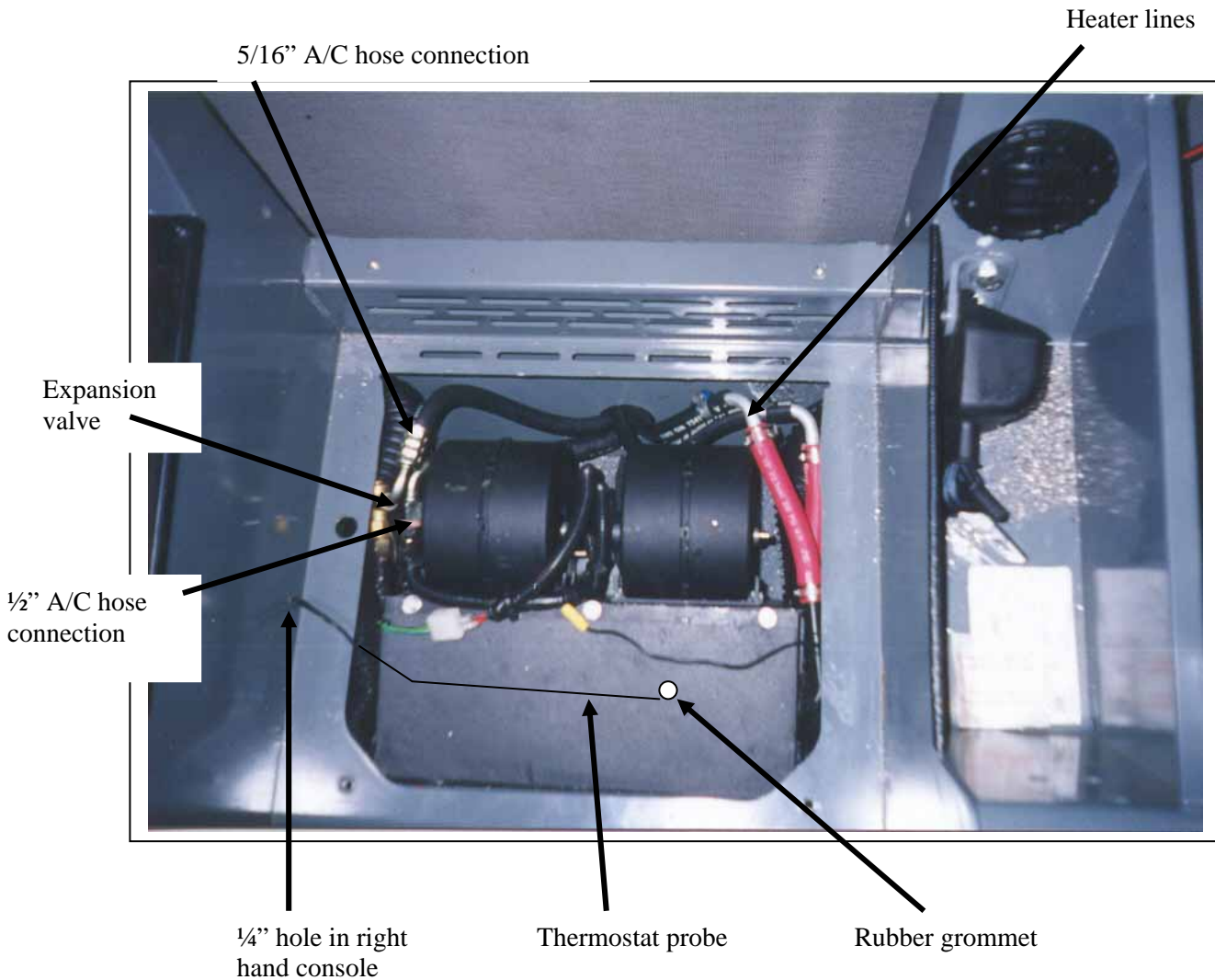
Right hand flex hose lower section

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 its 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/ac 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/ac 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/ac 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/ac box area and connect them to the 90° splices existing on the heater/ac box.
14. The thermostat probe needs to be routed over to the heat/ac box and inserted 5" deep into the ac coil through the rubber grommet in the lid of the heater/ac 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 1/2" 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. Once all these steps have been accomplished and the system tested the cab can have all of its components re-installed.

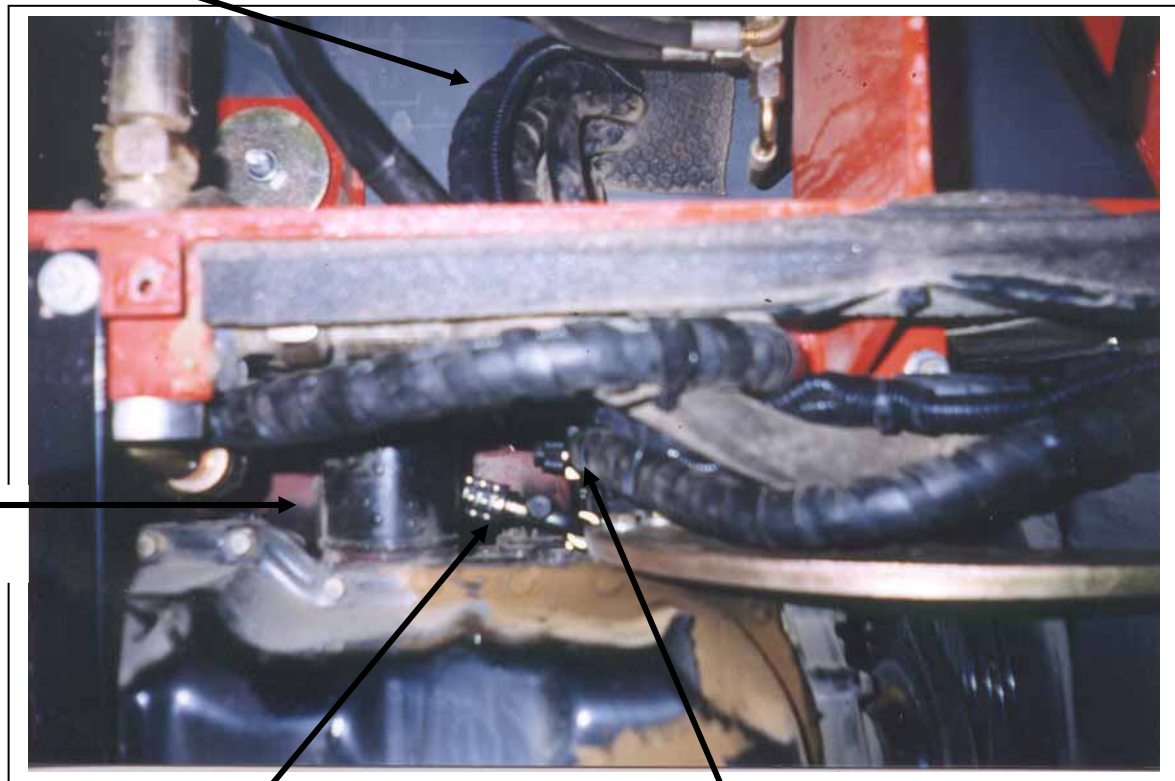
****NOTE**** If a machine doesn't have a heater originally, heater hoses will have to be run and connected to the engine by the dealer or installer. The blower switch will also have to be installed but the wiring harness for the blower exists.

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 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° fitting and 134a access port on it connects to the suction side rotolock (closest to the engine). From the rotolock, the hose runs back over the top of the engine oil filter and loops down around and back towards the rad and then through a hole in the engine compartment wall. From there the hose travels upward through another hole in the floor of the cab following the heater lines. The hose is now just behind the heater/ac box area. Run it through the grommet and connect it to the evaporator outlet as described in the heater/ac box installations instruction.

A/C lines and wiring following heater lines into the cab

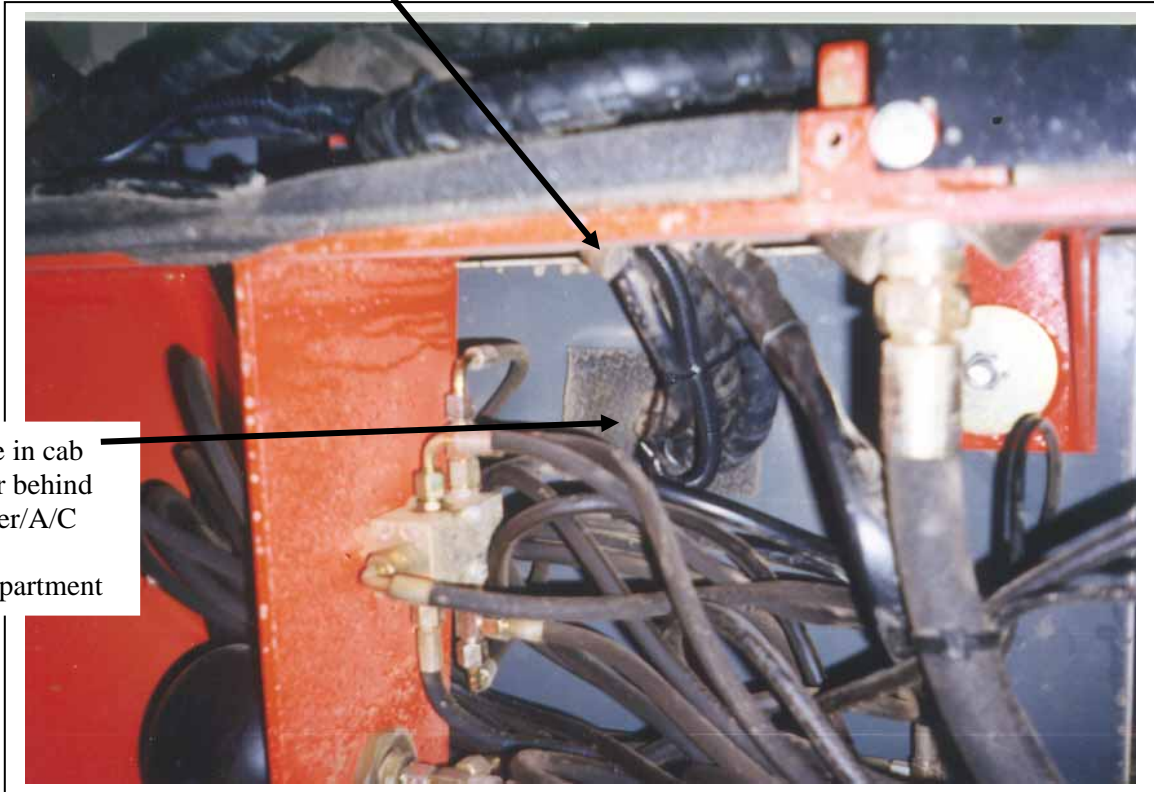


Oil
filter

½" 90° fitting
with 134a access
port

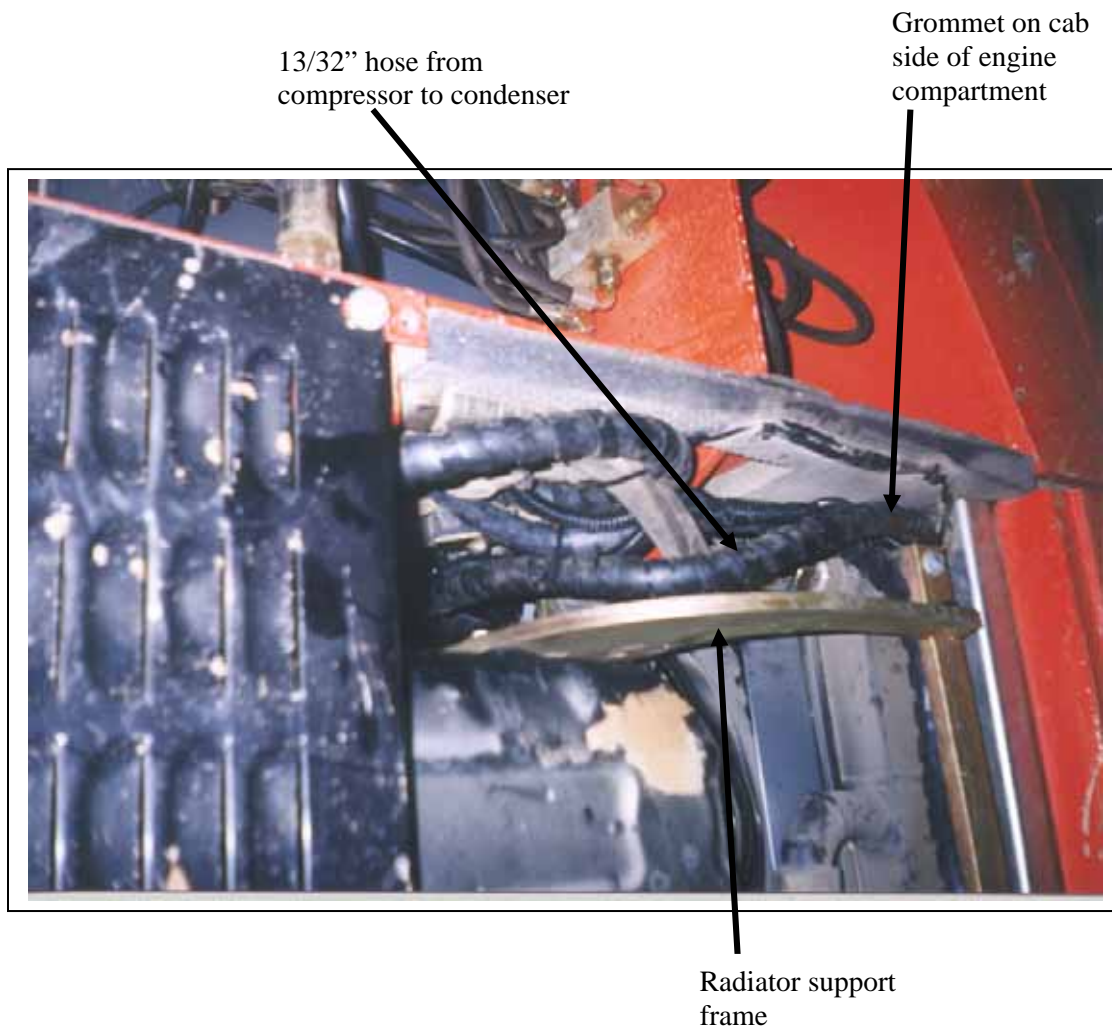
13/32" straight fitting with 134a
access port

Hole in engine compartment wall



Hole in cab floor behind heater/A/C box compartment

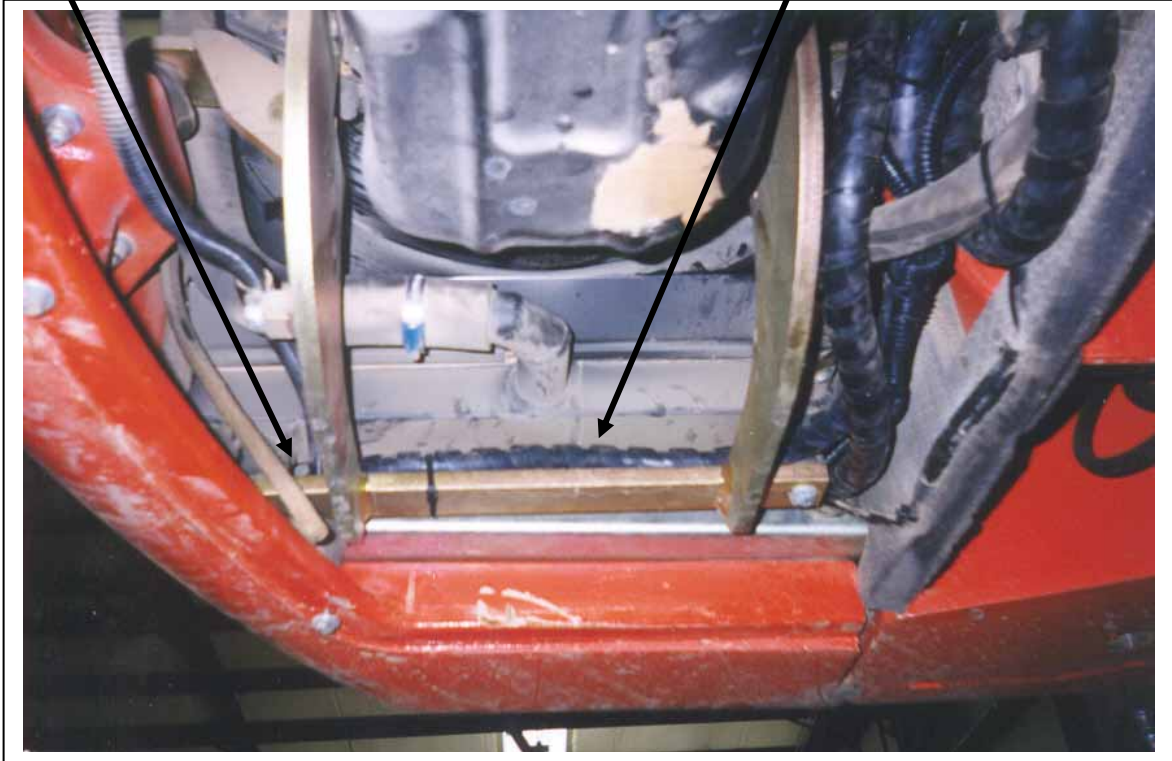
2. The 13/32" line attached to the discharge rotolock at the compressor (closest to cab). The straight fitting with the 134a access port attached to the discharge rotolock and goes straight down to the bottom of the engine and then is routed along the radiator support frame and through the grommet just to the cab side of the support frame. The 13/32" hose is run up beside the battery, to the outside of the receiver drier and back in to attach to the top fitting of the condenser.



3. The 5/16" line (short one with 2- 90° fittings) is connected to the bottom fitting on the condenser and loops up to the outside of the drier and attaches to the inlet fitting on the drier (marked IN)
4. The long 5/16" line attached to the outlet side of the drier (closest to the condenser coil) and is run down and across the back of the battery, It then passes through an existing grommet on the lower outside end of the radiator compartment and loops back to the cab side of the engine along the radiator frame. At that point it loops up to the same route into the heat/ac box. The 5/16" hose is then connected to the expansion valve as described in the heater/ac box installation instructions.

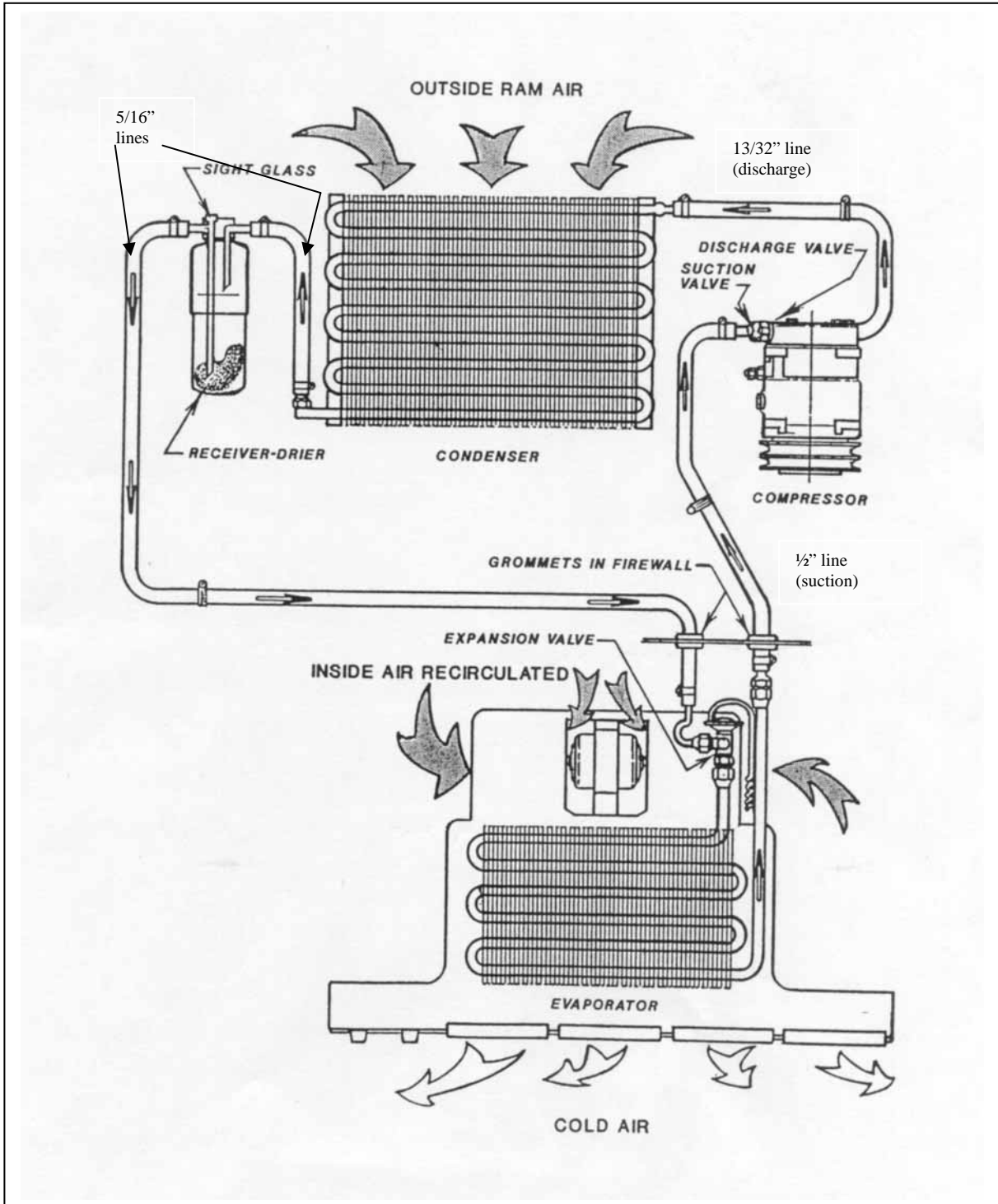
Grommet in the lower
outside end of the
radiator compartment

5/16" line from the drier
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 ½ 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

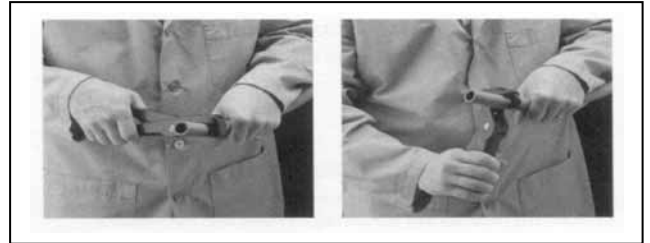
the coldest can be determined.

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.

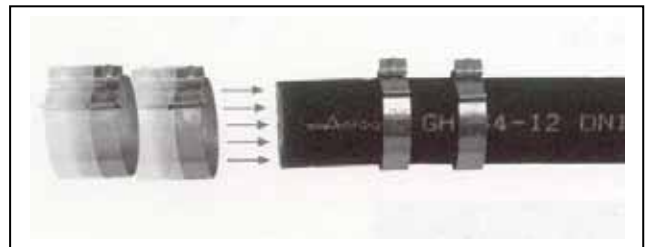
If the thermostat doesn't cycle off after a reasonable cool down period, and the air outlet temperature has dropped below 40° F, the cut in and cut out settings should be adjusted until the compressor is cycling on and off regularly. Let the system run for a decent time period (at least 15 min) and then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

Aeroquip E-Z Clip Assembly Instructions

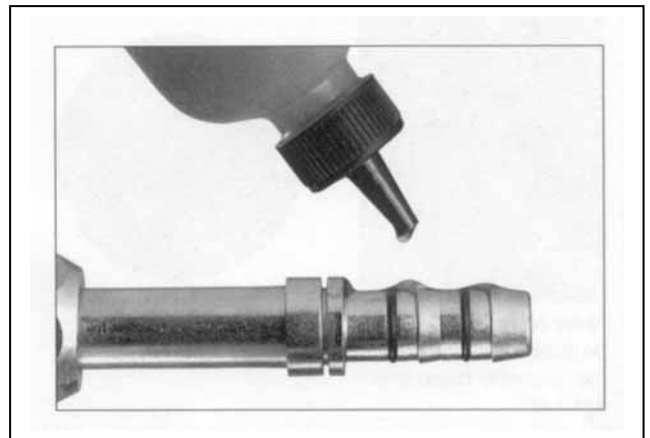
Step 1. Cut the hose to proper length with an appropriate cutting tool. Aeroquip's hand held hose cutter has been specially designed for cutting all non-wire reinforced hose, such as GH-134 Multi-Refrigerant hose. Be sure the cut is made square to the hose length.



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.

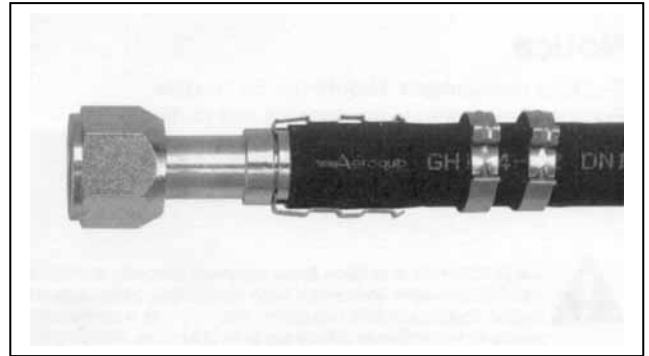


Step 4. Insert the nipple into the hose. To ensure that the nipple is fully inserted, check the gap between the cut end of the hose and the shoulder on the nipple. Care should be taken to avoid kinking or other damage to the hose during nipple insertion. NOTE: Be sure to wipe excess oil from the nipple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

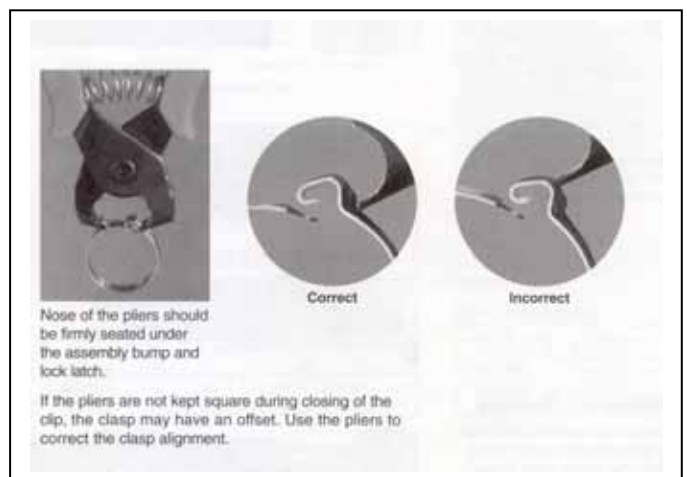


Step 6. Slide the clips over the cage arms and into the channels on each arm.



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.



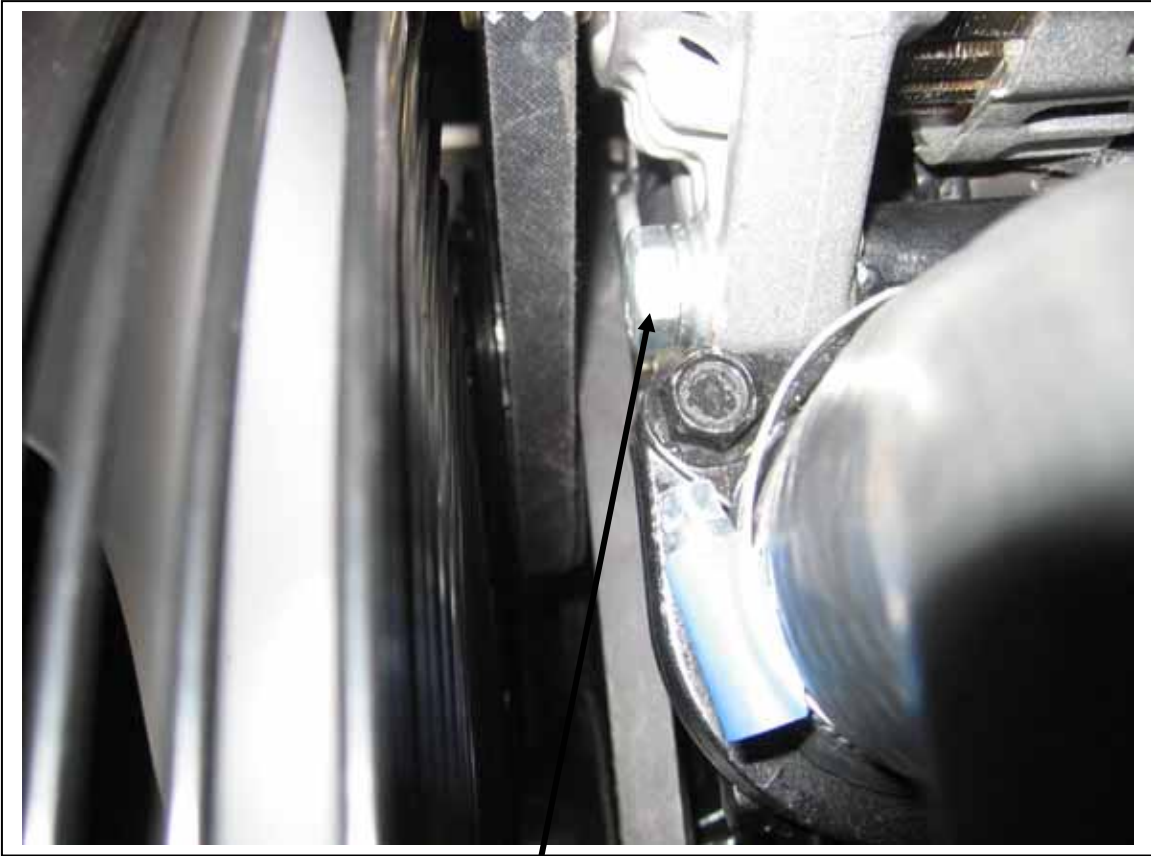
HR18 ALTERNATOR STIFFENER BRACKET
UPGRADE

M10 bolts and 5/8" spacer goes here.



Rough location of stiffener
bracket.

M8 bolt and 3/4" spacer here.



Replace with 5/8" spacer and longer bolt on the stiffener mount. The stiffener end with the round hole goes on this end.



The end of the stiffener bracket with the slot bolts on this point using the $\frac{3}{4}$ " spacer and the long M8 bolt.

TOP VIEW, LOOKING DOWN

