FLUSHING THE SYSTEM

Air conditioning systems may occasionally become contaminated with solid particles. This contamination may be the result of allowing dirt to enter the system while it was open, from aluminum corrosion or sludge, or from disintegrated compressor reed plates. Contamination of this nature can result in plugged evaporators, condensers and expansion valves.

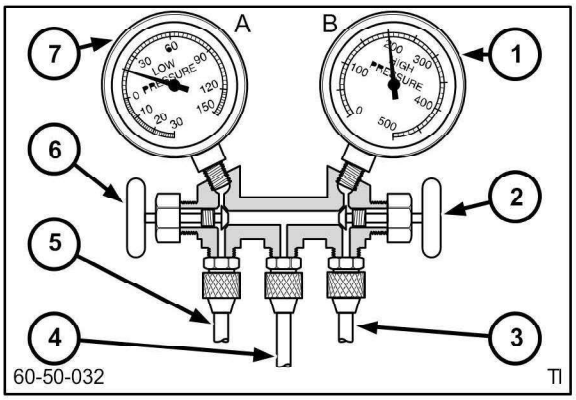
Contaminated systems must be flushed with a special flushing solvent to remove the unwanted material. Prior to flushing, the system must be discharged as described in "Discharging the System".

Each individual component must be flushed after disconnecting every hose fitting.

The compressor and expansion valve can not be flushed, therefore, the compressor should be disassembled and cleaned or replaced and the expansion valve should be replaced. When flushing the system always replace the receiver/drier.

NOTE: *Never use any solvent for flushing an air conditioning system other than a special flush solvent made specifically for air conditioning systems. Always follow the manufacturer's recommendations and directions for using the flushing equipment and solvent.*

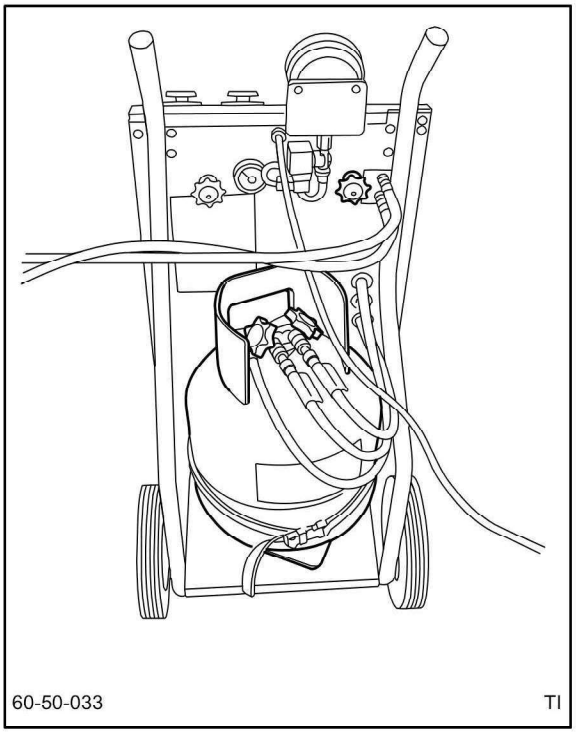
Re-assemble and evacuate the system to remove air and moisture as described in "Evacuating the System".



33

Manifold Gauge Set

1. High Side Gauge
2. High Side Shut-off Valve
3. High Side Hose
4. Centre Service Hose
5. Low Side Hose
6. Low Side Shut-off Valve
7. Low Side Gauge



34

EVACUATING THE SYSTEM

IMPORTANT: *A system in which the refrigerant has been recovered to facilitate repairs, must be evacuated before new refrigerant is installed.*

Air and moisture are removed by evacuating the system using a vacuum pump.

The automatic recycling, recharge and evacuation stations or evacuating and charging stations available throughout the air conditioning industry incorporate a vacuum pump within the assembly. If this type of equipment is not available a separate vacuum pump and manifold gauge set must be used.

As the system is evacuated the boiling point of any moisture within the system is similarly lowered. As the vacuum increases the boiling reduces to below that of the ambient temperate and the moisture is subsequently boiled away.

The relationship of system vacuum to the boiling temperature at which the water vapor is removed from the system is as follows:

System Vacuum		Temperature	
In Mercury	Cm. of Mercury	° F	° C
28.0	71.0	100	37
28.9	73.4	80	27
29.4	74.6	60	16
29.7	75.4	40	5
29.8	75.7	20	-7
29.9	75.9	0	-18

NOTE: *For every 1000 feet (305 m) above sea level, the vacuum gauge reading must be corrected by adding 1″ (2.54 cm) of mercury to compensate for the change in atmospheric pressure.*

IMPORTANT: *Be sure the system is completely discharged as refrigerant will damage the vacuum pump.*

1. If the manifold gauge set is being used connect the low and high sides of the manifold to the low and high sides of the tractor air conditioning system as described for discharging the system.

   Connect the manifold centre hose to the vacuum pump suction port as per the manufacturers instructions.

   Fully open both the low and high side gauge shutoff valves.
2. If a combined recovery/evacuation unit is to be used attach the unit to the air conditioning system in accordance with the manufacturers instructions. Be sure to read all installation and operating instructions carefully before starting the unit.
3. After starting the evacuation cycle, note the low side gauge to be sure the system pulls down into a vacuum.
4. Time the evacuation for a minimum of 20 minutes from the point when lowest vacuum is attained.
5. When the low side gauge attains the lowest steady vacuum, stop the evacuation process.

NOTE: *The vacuum pump achieves ultimate vacuum with the vented exhaust valve closed.*

6. Check the system by closing the gauge shut-off valves, turning the vacuum pump off and noting the low side gauge reading. A loss of more than 2″ (5 cm) of vacuum in 5 minutes indicates either a leak or moisture in the system.
7. If the gauge needle remains stationary and the vacuum is maintained for 3-5 minutes, close both the high and low side manifold hand valves, turn off and disconnect the center hose from the pump. The system is now ready for charging.
8. If a leak is detected, charge the system with approximately 14 ozs (400 g) of refrigerant, see charging the system and identify leak using a leak detector.
9. Once the leak is located discharge and recover the refrigerant in the system, repair the leak, then repeat the evacuation procedure.

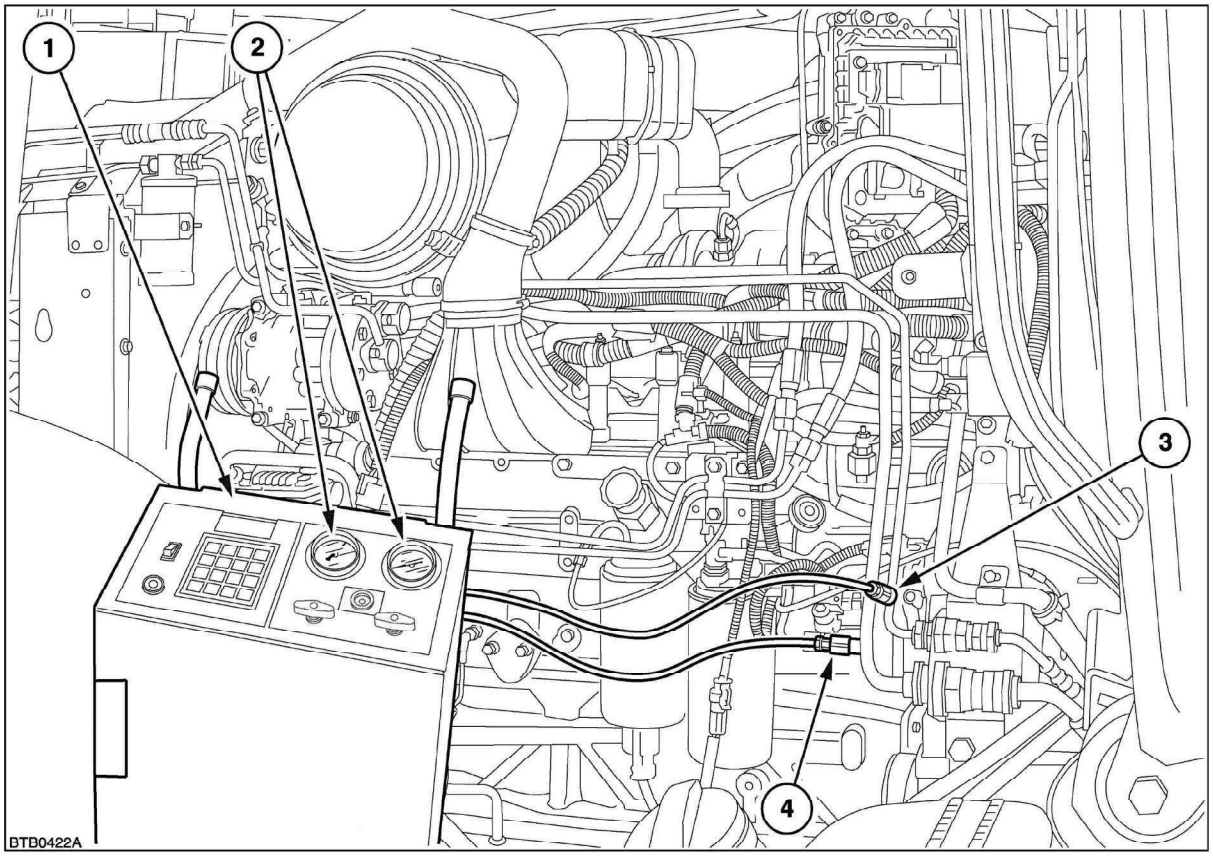
CHARGING THE SYSTEM

IMPORTANT: *Be sure there are no leaks in the system and the system has been fully evacuated. Observe all safety recommendations when handling refrigerant R-134a, see "Precautions when Handling Refrigerant R-134a" in this Section.*

1. Ensure the charging unit is correctly connected to the tractor air conditioning system in accordance with the manufacturers instructions.
2. If a charging unit, in conjunction with the manifold gauge set is used, open the high and low side hand valves on the manifold.
3. Charge the system with 1.1kg (2.4lbs) of refrigerant as per the manufacturers instructions.
4. If the charging rate becomes very slow close the high side valve, start the tractor and set engine speed to idle. Turn 'ON' the air conditioning so that the compressor can pull the remainder of the refrigerant into the system.
5. If the refrigerant charge will not completely transfer to the air conditioning system, recover and recharge the system.
6. Close the high and low side valves on the units control panel, or manifold gauge set if being used and test the air conditioning as detailed in Performance Testing The Air Conditioning System on Page 15.

NOTE: *After charging a system use the following start up procedure to ensure the lubricating oil is properly dispersed around the system:*

- Ensure air conditioning is switched OFF.
- Start the engine and bring speed down to idle.
- Turn the air conditioning ON and allow system to operate for at least one minute before increasing engine speed.



35

Connecting Recovery Evacuation and Recycling/Charging Station to the Tractor

1. Recovery/Recharging Unit
2. Built In Manifold Gauge Set
3. High Side Service Valve (Red Hose)
4. Low Side Service Valve (Blue Hose)

COMPONENT OVERHAUL (EXCLUDING COMPRESSOR)

GENERAL

⚠ WARNING ⚠

Before disconnecting components in the air conditioning system the refrigerant gas must be discharged and recovered using a certified recovery system. Refer to Discharging the system on Page 32. ***Do Not*** *discharge the gas into the atmosphere.*

If an air conditioning component is to be replaced during a system overhaul it is necessary to drain any refrigerant oil that has collected in the component being replaced into a clean calibrated container.

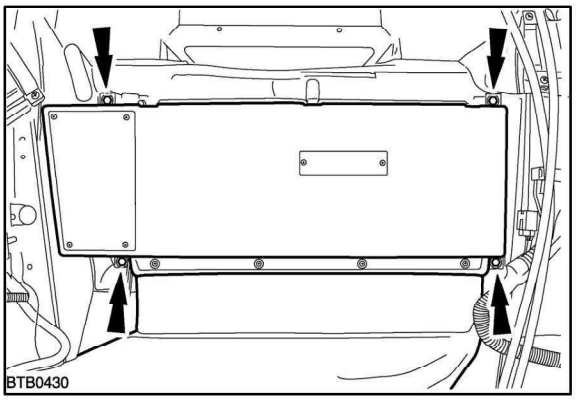
A volume of clean refrigerant oil equivalent to that removed from the replaced component must then be added to the new item before being installed onto the tractor.

Upon completion of the repair evacuate, recharge, leak test and performance test the system to ensure correct operation.

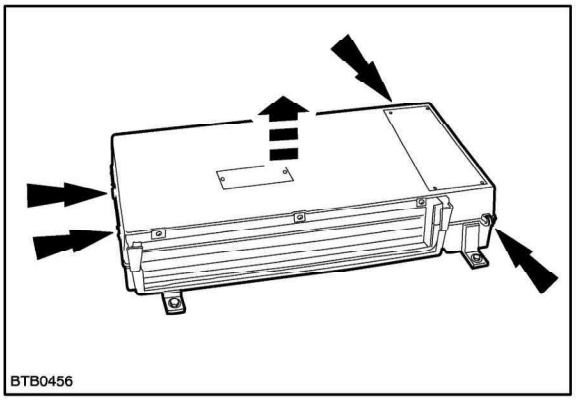
EXPANSION VALVE

The expansion valve is not a serviceable item and must be replaced if defective.

1. Fully discharge the air conditioning system.
2. Remove main seat, remove front and rear floor mats and remove rear floor to gain access to the HVAC unit.
3. Undo 4 securing bolts and remove HVAC unit complete with rear ducting, Figure 36.
4. The ducts on the rear of the HVAC unit can then be removed and the unit serviced out of the vehicle.
5. Access to the evaporator is obtained by removing the 4 spring clips on the housing and lifting out the evaporator/heater assembly, to access the expansion valve, Figure 37.
6. The unit needs to be removed from the vehicle to access the expansion valve.

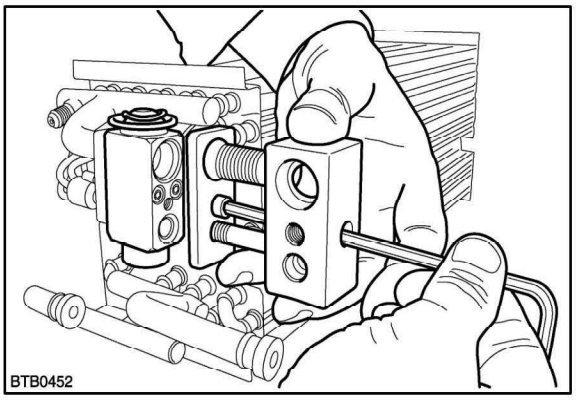


36



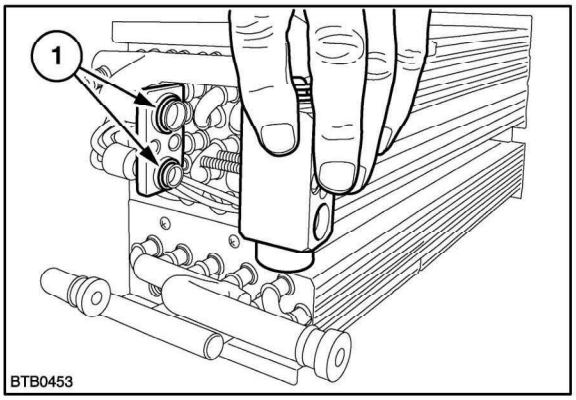
37

7. Remove Allen screw securing the inlet and outlet connection to the valve, and remove inlet/outlet assembly, Figure 38.



38

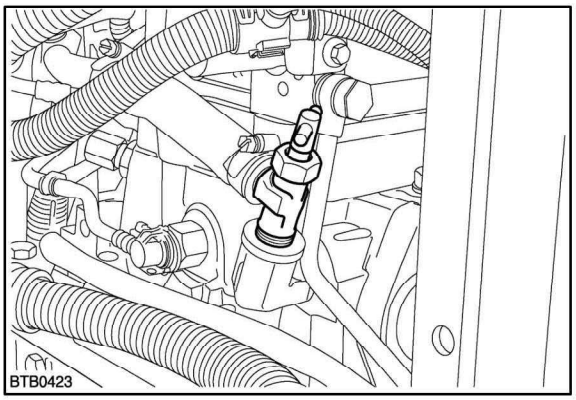
8. Remove expansion valve and replace the 'O' ring seals, (1) Figure 39 and lubricate with refrigerant oil prior to installing the valve using disassembly procedure in reverse.
9. Evacuate, leak test and recharge the system.



39

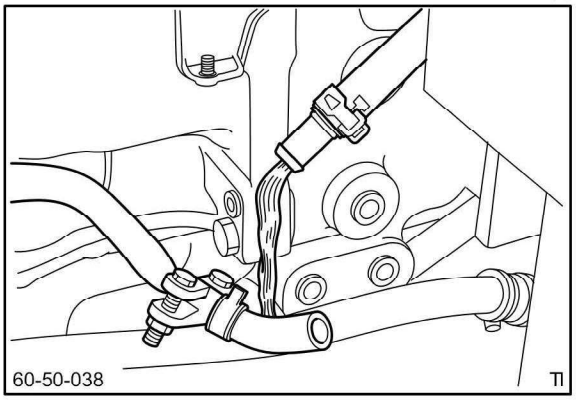
EVAPORATOR

1. Close the heater shut-off valve on the rear of the inlet manifold, Figure 40.
2. Turn the cab heater temperature control to maximum heat.



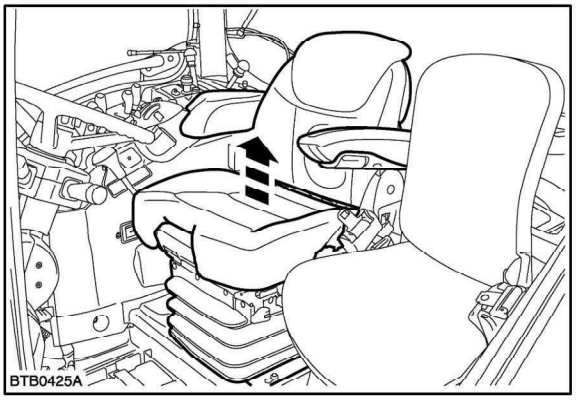
40

3. Apply a clamp to the heater return hose at the left side of the engine. Disconnect the hose and drain the heater system of coolant, Figure 41.
4. Discharge and reclaim refrigerant gas using certified recovery systems.
5. Remove aircon and water hoses under cab (removal of rear wheel first helps).



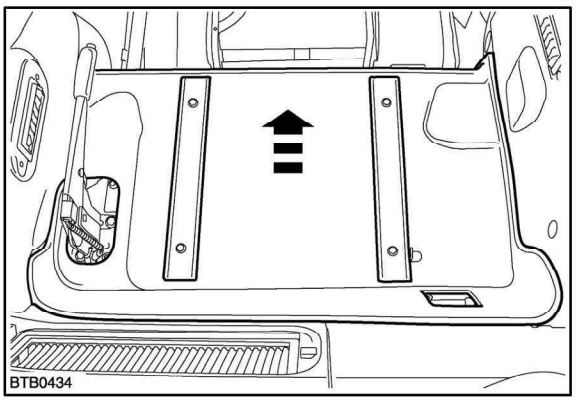
41

6. Remove main seat to the gain access to the front and rear floor mats. Figure 42.



42

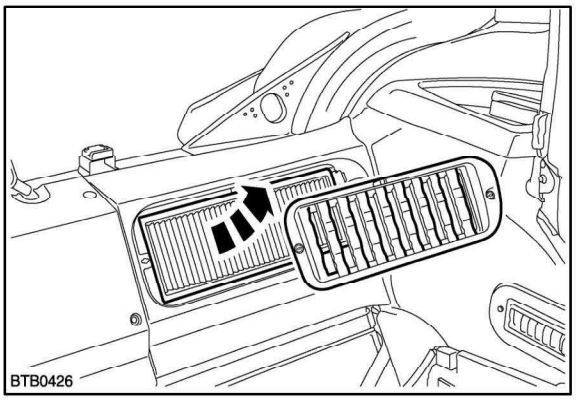
7. Remove front and rear floor mats to gain access to front and rear floor plates, Figure 43.



43

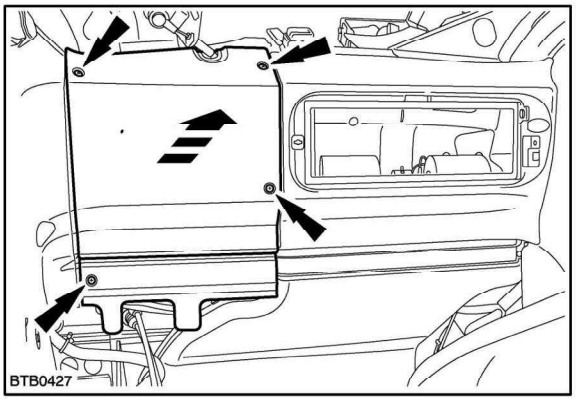
EVAPORATOR (CONT).

1. Remove the recirculation grill and filter to gain access to the screws at the top of the blower assembly, Figure 44.



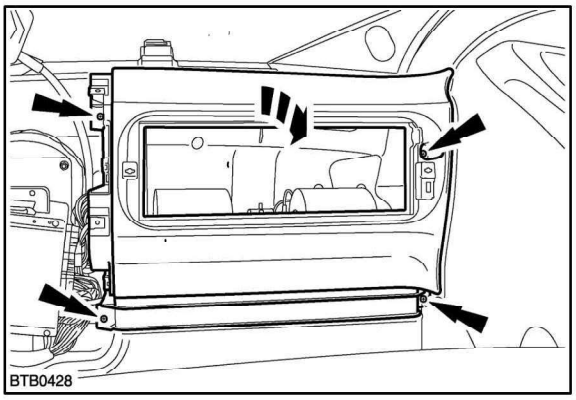
44

2. Undo securing screws and remove rear module cover beside blower housing, Figure 45.



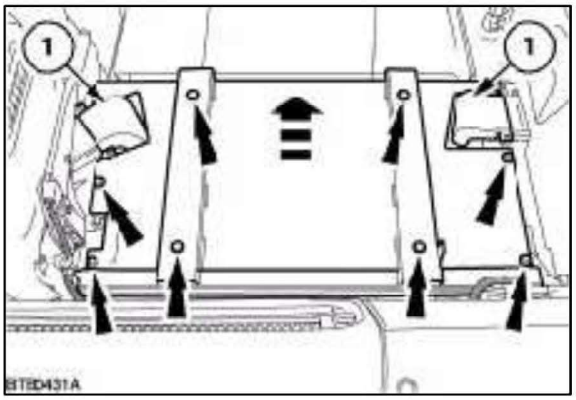
45

3. Undo securing screws on blower housing and tilt forward for access. Disconnect wiring multiplug at the bottom of housing and remove, Figure 46.



46

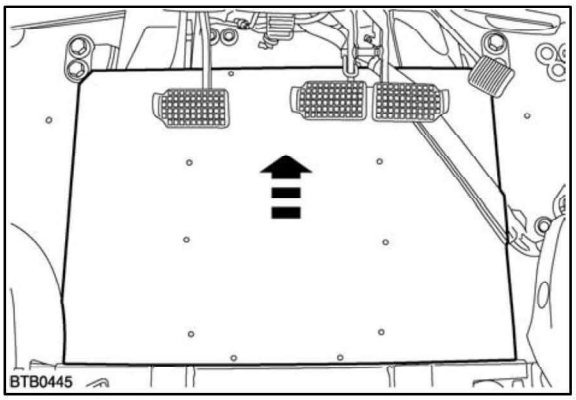
4. Unscrew and remove lower side ducts (1) and remove rear floor plate, Figure 47.



47

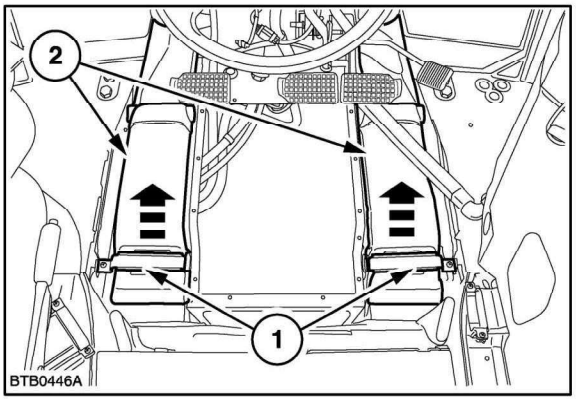
EVAPORATOR (CONT).

5. Undo securing bolts and remove front floor plate, Figure 48.



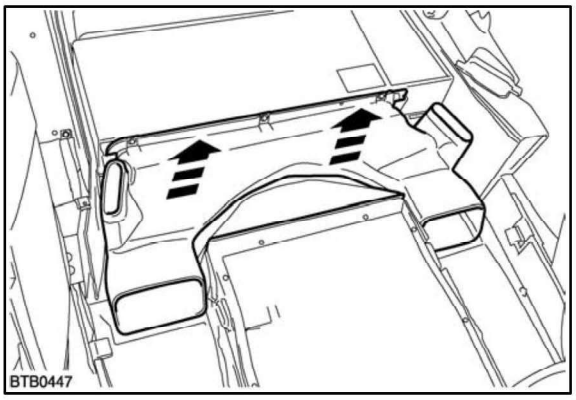
48

6. Unscrew securing brackets (1) and remove front ducts (2), Figure 49.

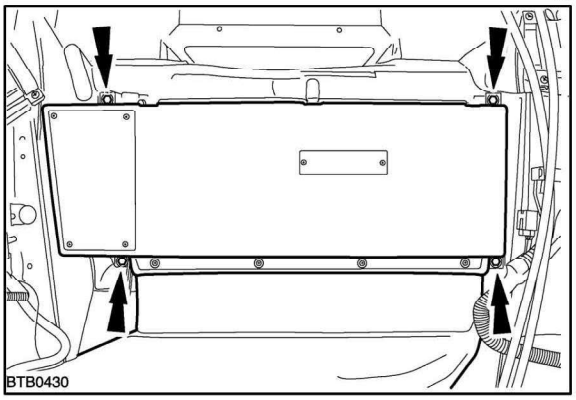


49

7. Undo securing screws and remove outlet duct on front of the HVAC unit, Figure 50.
8. Undo the 4 securing bolts on the HVAC unit and remove complete with the rear ducting, Figure 51.
9. The ducting on the rear of the HVAC unit can then be removed and the unit serviced out of the vehicle.
10. Check the evaporator assembly fins for damage. Straighten fins if necessary.
11. Clean the evaporator core of all foreign material to be sure it is free of obstructions.
12. Check the evaporator assembly for indications of refrigerant leakage. If damage or leaks are evident, replace the evaporator core.
13. If a new evaporator is to be installed drain the refrigerant oil in the evaporator into a clean calibrated container. Measure the quantity of oil obtained and add the same quantity of new refrigerant oil directly into the replacement evaporator core.
14. Install evaporator using disassembly procedure in reverse.
15. Evacuate, leak test and recharge the system.



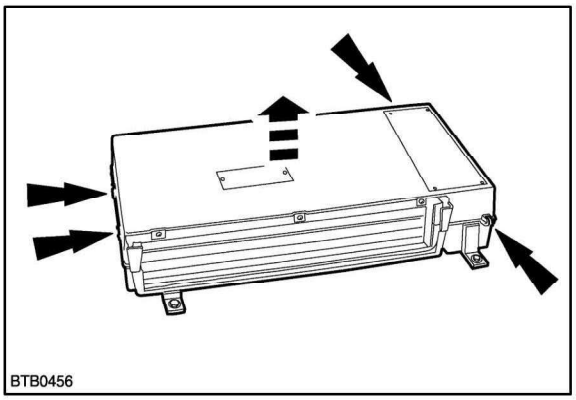
50



51

EVAPORATOR (CONT)

16. Access to the evaporator/heater is obtained by removing the 4 spring clips on the housing and lifting out the evaporator/heater assembly, Figure 52.
17. Install evaporator using disassembly procedure in reverse.



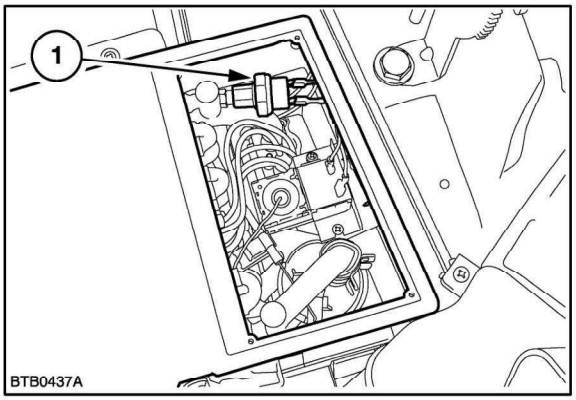
52

LOW PRESSURE CUT-OUT SWITCH

1. With the engine 'Off' check continuity across the switch contacts, (1) Figure 53. If the switch shows 'Open Circuit' replace as detailed below.

NOTE: *The switch can be replaced without discharging the system.*

2. Remove switch, (1), by unscrewing from self sealing schrader valve.

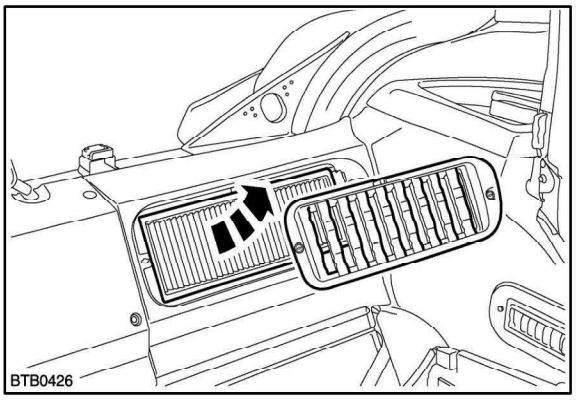


53

BLOWER MOTOR and FAN ASSEMBLY

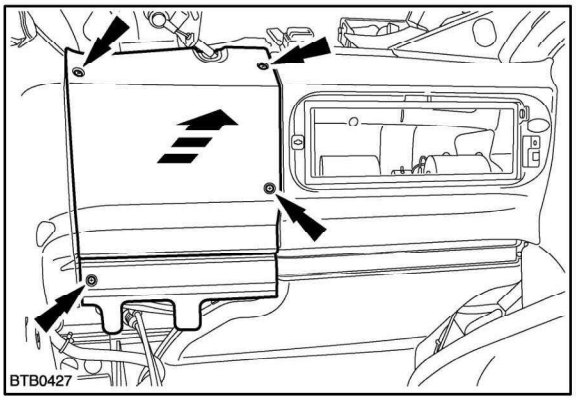
1. Remove the recirculation grill and filter to gain access to the screws at the top of the blower assembly.

The blower motor can if required be removed without discharging the system as follows:-



54

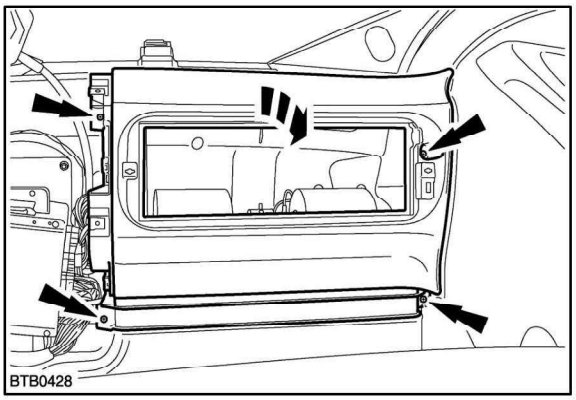
2. Undo securing screws and remove rear module cover beside blower housing, Figure 55.



55

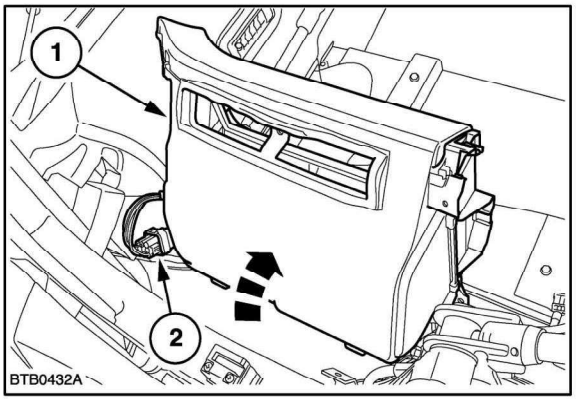
BLOWER MOTOR and FAN ASSEMBLY (CONT).

3. Undo securing screws on blower motor housing and tilt forward for access, Figure 56.



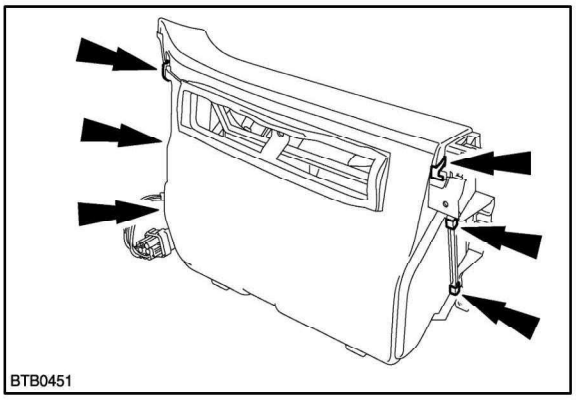
56

1. Disconnect wiring multiplug (2) Figure 57. at the bottom of the housing (1) and remove blower motor assembly.



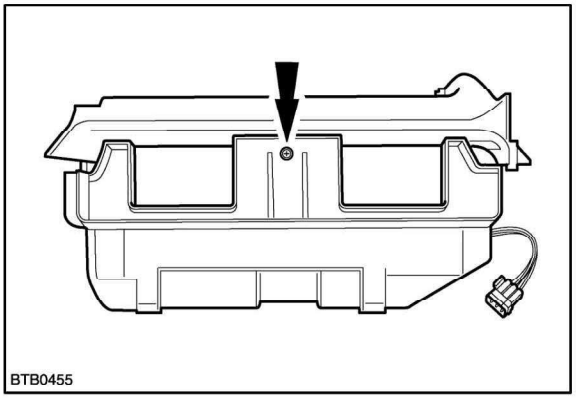
57

2. To Gain access to the blower motor , remove the 6 spring clips that hold the 2 halves of the blower housing together Figure 58.



58

3. Undo the single screw on the underside of the lower half of the blower housing that secures the blower in place, the blower will then slide out. Figure 59.



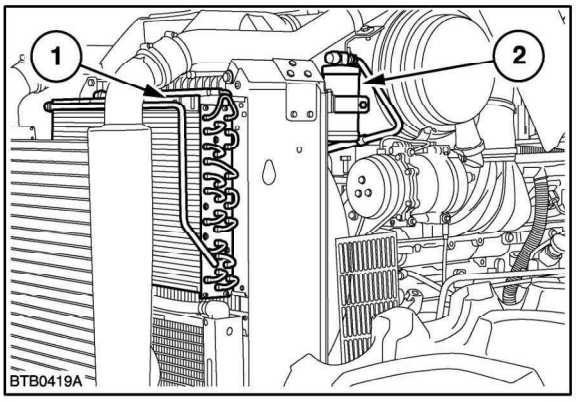
59

RECEIVER DRYER and CONDENSER

The receiver/dryer, (2) Figure 60, cannot be overhauled and must be replaced as an assembly. The receiver/dryer assembly should be replaced if it is suspected that moisture is in the system.

The receiver dryer must also be replaced if the system has been discharged and the air conditioning joints disconnected.

1. Discharge and reclaim refrigerant gas using certified recovery systems.
2. Disconnect the hose fittings from the dryer and then release the clamp around the body of the drier and remove the drier from the tractor.
3. Slide condenser, (1) Figure 60, to side of tractor.
4. Disconnect the connections to the condenser.
5. Cap and plug all fittings to prevent any dirt entering the system.
6. Remove condenser from tractor.
7. Inspect the condenser assembly fins for damage and be sure they are not plugged.
8. Check the condenser for signs of leakage. If the condenser is damaged or leaking, install a new condenser assembly.
9. Drain the refrigerant oil from the receiver dryer into a clean calibrated container. Measure the quantity of oil obtained and add the same quantity of new refrigerant oil directly into the new item.
10. If the condenser is to be replaced, drain the refrigerant oil from the condenser into a clean calibrated container. Measure the quantity of oil obtained and add the same quantity of new refrigerant oil directly into the new condenser.
11. Soak new tubing connector 'O' rings in clean refrigerant lubrication oil and install onto tubing
12. Install condenser and a new receiver dryer.
13. Evacuate, leak test and recharge the system.



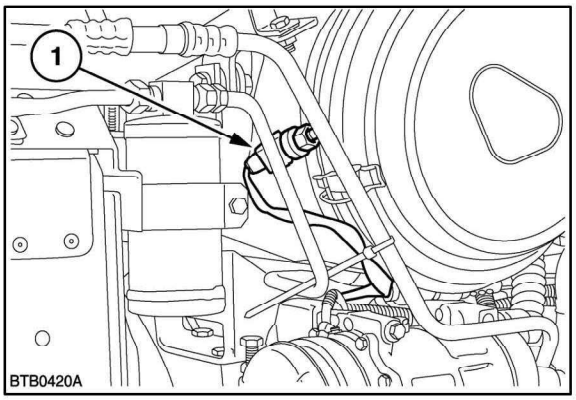
60

COMPRESSOR HIGH LOW CUT-OUT SWITCH

1. With the engine 'Off' check continuity across the switch contacts, (1), Figure 61. If the switch shows 'Open Circuit' replace as detailed below.

NOTE: *The switch can be replaced without discharging the system.*

2. Remove switch by unscrewing from self sealing schrader valve.
3. Replace with new switch and connect the harness.



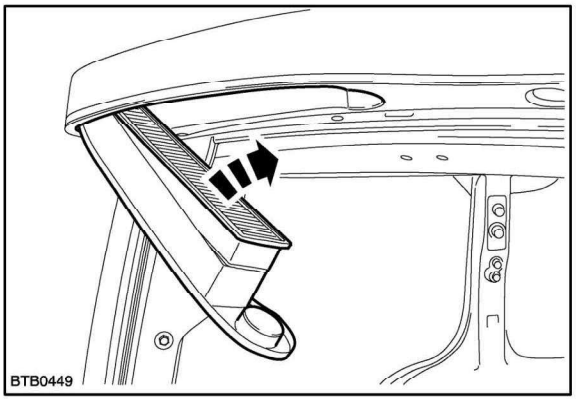
61

CAB AIR FILTERS

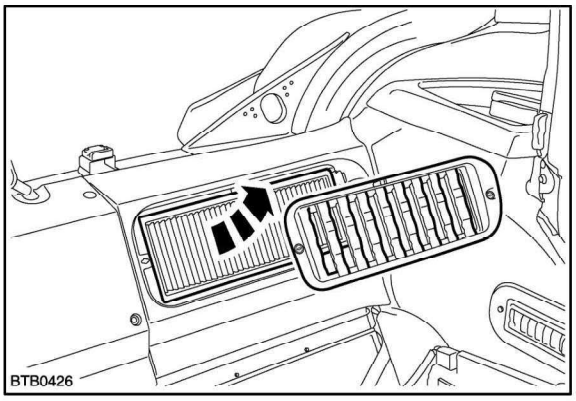
1. Before servicing the filters, switch off the blower and close the roof hatch, all windows and one door. Slam the final door closed and the resulting back pressure will dislodge most of the loose dirt from the underside of the filters.
2. Remove filter elements. The fresh air filters, Figure 62, have a prefilter element fitted that is designed to catch most of the dust/chaff. This prefilter is part of the filter and should be pulled out from the underside and cleaned first, then pushed back in.
3. The recirculation filter, Figure 62 is fitted with a pull tab. This should be used to remove the filter. The filter pleats should never be used to remove the filter as damage will result.

   Blow the dust from the upper surface through the element to the underside. Clean by blowing with compressed air not exceeding 2 bar 30 (lbf/in^2). Hold the nozzle at least 12 in (300 mm) from the element to prevent damage to the pleats.

   Care should be taken when using compressed air as this may damage to the filter.
4. Clean all filter chambers with a damp, lint free cloth.
5. Replace the filter elements with the rubber seal uppermost and re-install the covers.



62

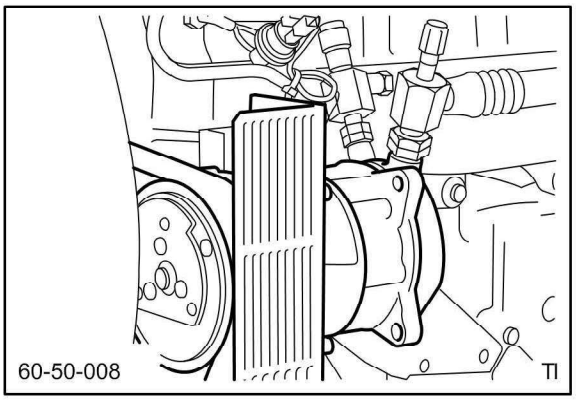


63

COMPRESSOR - OVERHAUL

Compressor Removal

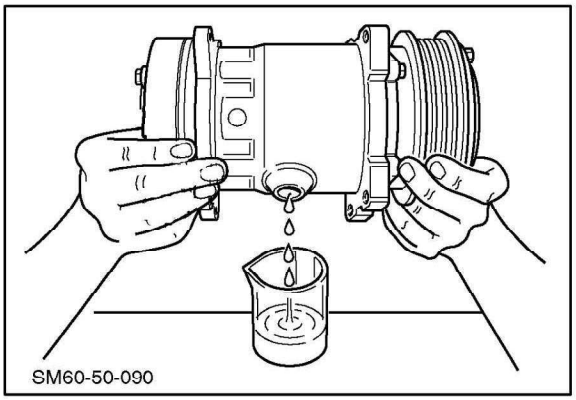
1. Discharge and reclaim refrigerant gas using certified recovery systems. Record the amount of oil discharged as (**X**).
2. Disconnect tubing to compressor.
3. Disconnect wiring connector to compressor clutch.
4. Disconnect drive belt, remove the four mounting bolts and remove compressor from tractor.



64

5. Drain the refrigerant oil from the old compressor into a clean calibrated container. Measure and record the quantity of oil as (**Y**). This information is required during installation of the new or overhauled unit.

NOTE: *It is necessary to rotate the compressor drive shaft several times to completely expel all the oil.*



65

Compressor Installation

1. Installation is the reversal of the removal but the following points should be noted:-

- Torque the mounting bolts to 40-51Nm (29-38lbf.ft).

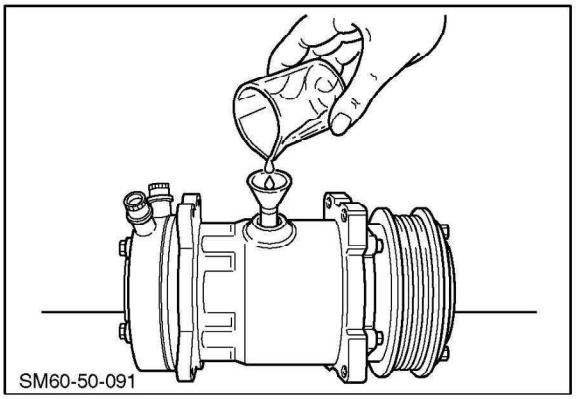
NOTE: *It is recommended that a new receiver / drier assembly is installed after any system component replacement or any repair that requires entry into the system.*

- Drain the oil from the new compressor to be fitted into a clean container, or if the old compressor is to be refitted, obtain a new can of refrigerant oil.
- Calculate the amount of oil to be installed as, **(x)+(y)**. Add this quantity of the new oil into the fill port on top of the compressor.

NOTE: *Refer to the following page regarding* ***Oil Level Measurement*** *to determine if the system oil quantity is correct.*

After charging a system use the following start up procedure to ensure the lubricating oil is properly dispersed around the system:

- Ensure air conditioning is switched OFF.
- Start the engine and bring speed down to idle.
- Turn the air conditioning ON and allow system to operate for at least five minutes before increasing engine speed.



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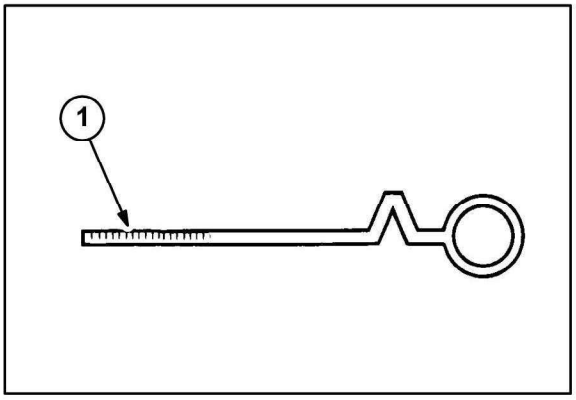
Oil Level measurement (on vehicle)

Oil level in the compressor should be checked when a system component is removed or replaced or when an oil leak is suspected.

Use the following procedure to determine if the oil quantity is correct.

1. Start the engine and allow to idle. Switch on air conditioning and run the compressor for 10 minutes.
2. Recover the refrigerant from the system, very slowly so as not to lose any oil.
3. Carefully remove the oil filler plug. Turn the armature retaining nut to allow full insertion of the oil dipstick (1) Figure 67, supplied with kit NH.50-100.
4. Remove the dipstick and count the notches covered by the oil. An acceptable level of oil is when 5-7 notches are covered.
5. Add or subtract oil through the filler plug to obtain the correct level.
6. Ensure the filler hole seat and filler plug seal are clean and not damaged and Install the oil plug. Tighten to 15-25Nm (11-18lbf.ft).



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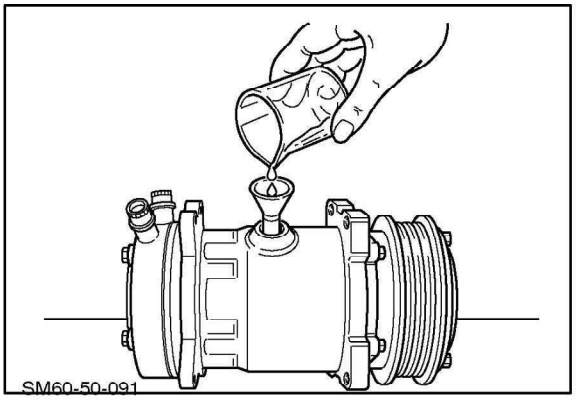
Oil Retained in System Components

After replacement of individual system components it will be necessary to add some oil to the system to make up the amount lost in the removed component. The table, on the right, shows some typical volumes for the components. It is, however, still recommended that the on vehicle oil level measurement procedure, described above, is carried out after a new component has been installed to establish correct oil quantity.



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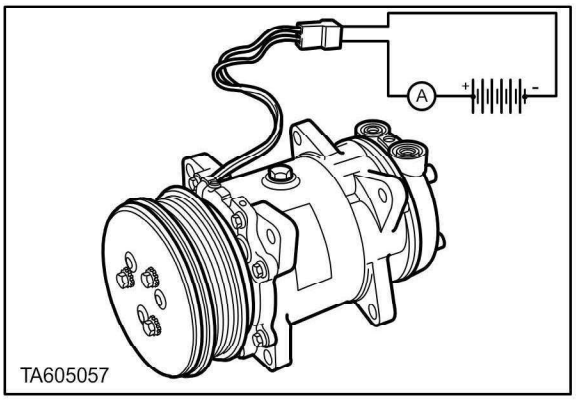
Component	Typical oil amount	
	fl.oz.	cc
Evaporator	2.0	60
Condenser	1.0	30
Receiver / drier	0.5	15
Hoses	0.3	10

Preliminary Inspection

1. Rotate the compressor shaft. Use a suitable socket on the hub centre bolt or by hand using the rubber dampers.

   If severe roughness is felt while rotating the hub, the compressor should be disassembled.

2. Using a 12 volt battery check current drawn by the field coil which should be between 3.6- 4.2 Amps.



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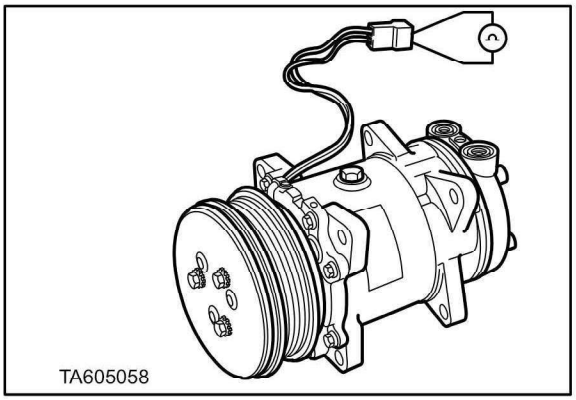
   Very high current readings indicate a short circuit in the field coil and no current reading indicate an open circuit. Replace coil with either fault. Resistance of the coil using an ohmmeter should be approximately 3.0Ω at 20°C.

   A poor earth (ground) connection of the field coil will result in a low voltage.

3. Ensure clutch is disengaged and rotate pulley by hand. If roughness in the bearing is felt, it will be necessary to replace the pulley and bearing as an assembly.



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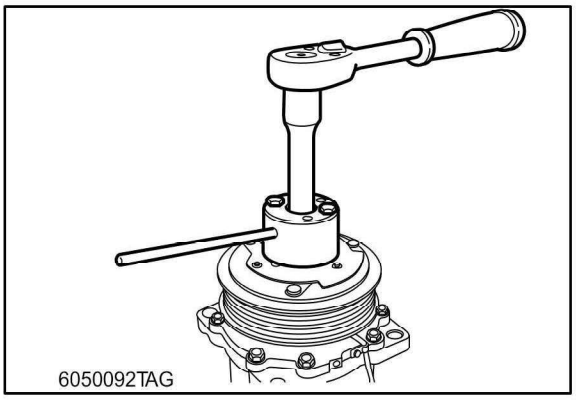
Clutch Disassembly

Removal

All clutch servicing should be done with the compressor removed from the vehicle:

1. Support the compressor. If using a vice, do not hold on to the housing.
2. Remove the cover on the front of the clutch plate.
3. Using the front plate tool hold the clutch plate stationary and remove the retaining nut from the end of the shaft. Figure 71.



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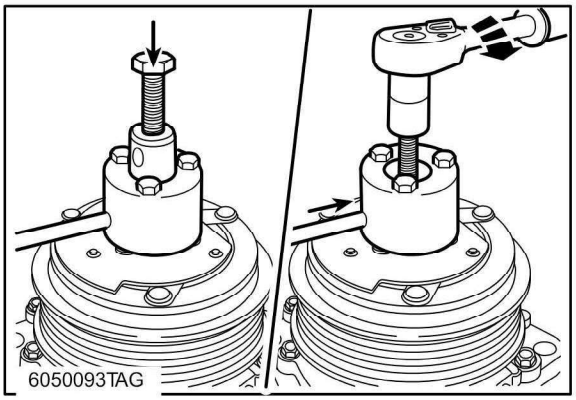
4. Place a thread protector over the end of the driveshaft and using a puller remove the clutch front plate, Figure 72.



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