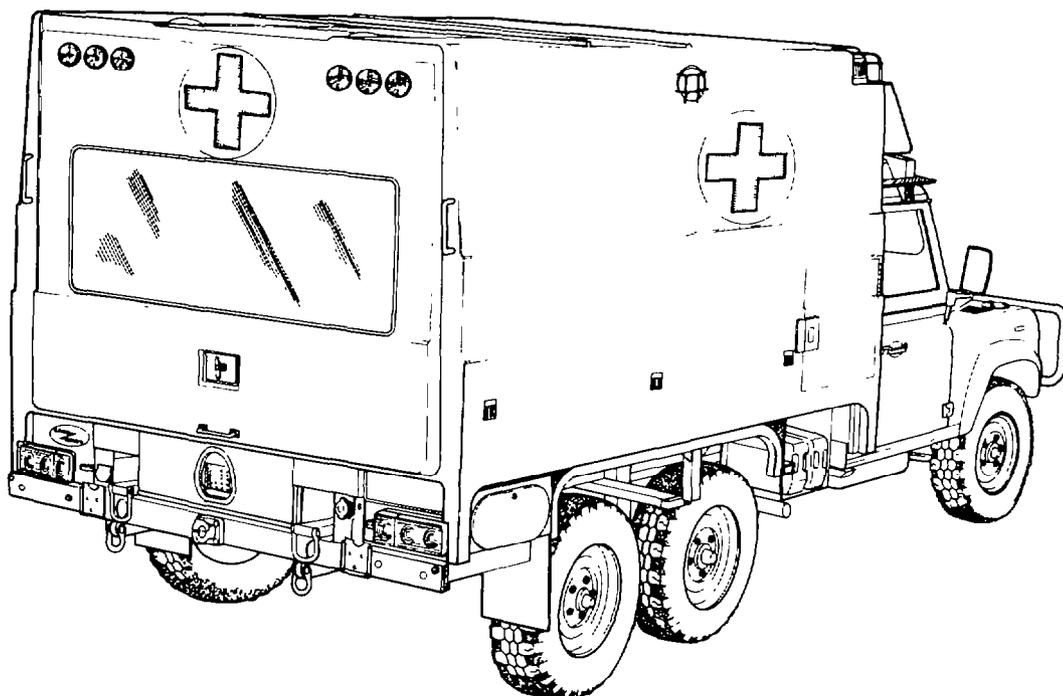
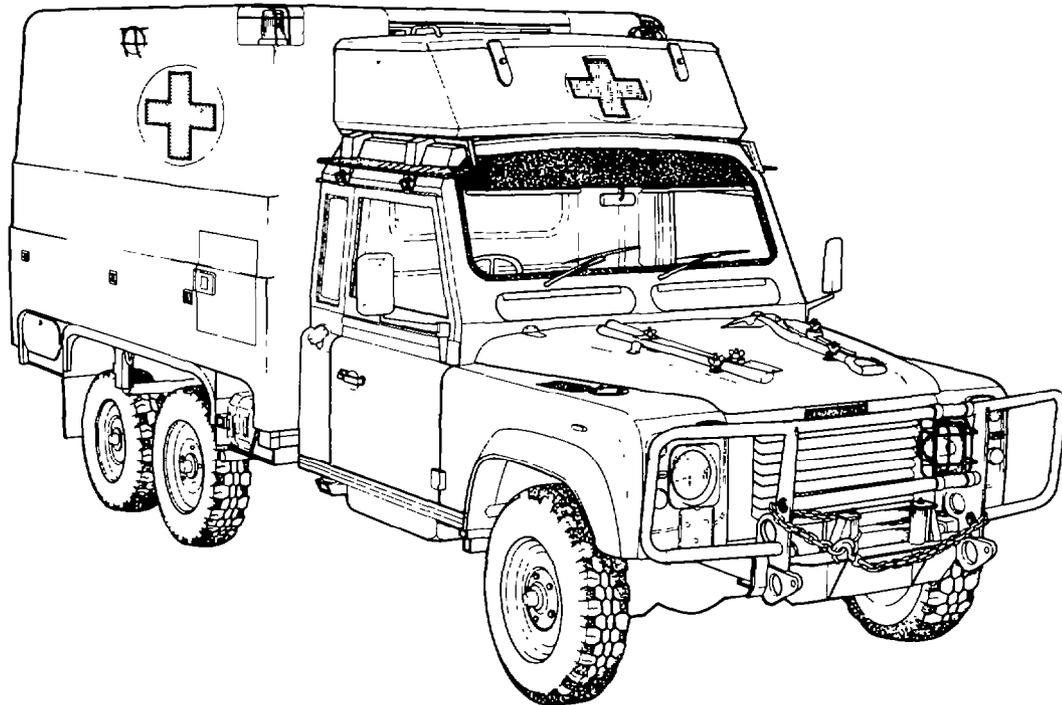


TRUCK, AMBULANCE, LIGHT, 4 LITTER, FFR, WINCH, MC2 — LAND ROVER 110 6 x 6

FIELD AND BASE REPAIR

This instruction is authorised for use by command of the Chief of the General Staff. It provides direction, mandatory controls and procedures for the operation, maintenance and support of equipment. Personnel are to carry out any action required by this instruction in accordance with GENERAL A 001.



AMENDMENT CERTIFICATE

It is certified that the amendments promulgated in the undermentioned Amendment Lists have been incorporated in this copy of the Publication:

Amendment List		Topic/Section Affected	*Amendment Effect	Amended By (Print Name)	Date
No.	Date of Issue				
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*Note: Insert EMEI amendment number and page number OR brief details of page(s) amended, inserted or cancelled.

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AMENDMENT CERTIFICATE (Continued)

Amendment List		Topic/Section Affected	*Amendment Effect	Amended By (Print Name)	Date
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ASSOCIATED PUBLICATIONS

1. Standing Orders for Vehicle Operation and Servicing (Vol. 2 — B Vehicles)
2. MEMA Vol. 3
3. Australian Army Books:
TGM 120 Record Book for Service Equipment — Army
4. Complete Equipment Schedules (CES):
(a) SCES 12100 } Truck, Ambulance, Light,
(b) Equipment Kit SCES 12068/2 } 4 Litter, FFR, Winch, MC2
5. Block Scale 2406/31 Issue 1 — Special tools for RAEME — B Vehicles —
Truck, Utility and Truck, Light, MC2 (Land Rover Model 110)
6. EMEI VEH A 029 Servicing of B Vehicles
7. EMEI VEH A 119-22 — Repair of Vehicles Under Warranty Agreement —
Policy Instruction
8. EMEI VEH G 220 — Data Summary (Truck, Ambulance, Light, FFR, Winch)
9. EMEI VEH G 202 — Technical Description (Truck, Cargo, Light)
10. EMEI VEH G 222 — Technical Description (Truck, Ambulance, Light, FFR,
Winch)
11. EMEI VEH G 203 — Unit Repair (Truck, Cargo, Light)
12. EMEI VEH G 223 — Unit Repair (Truck, Ambulance, Light, FFR, Winch)
13. EMEI VEH G 204 — Field Repair (Truck, Cargo, Light)
14. EMEI VEH G 204-1 — Base Repair (Truck, Cargo, Light)
15. EMEI VEH G 209 — Servicing Instruction (Truck, Cargo, Light)
16. EMEI WKSP D 210 — Glass Fibre/Reinforced Plastic Repair
17. EMEI WKSP E 652 — Occupational Health and Safety (Polyurethane paint)
18. Australian Change in War Materiel 31422 (Truck, Ambulance, light, FFR,
Winch)
19. Repair Parts Scale 02208 (Truck, Ambulance, Light, FFR, Winch)

MAINTENANCE SUPPLY ITEM (MSI)

IDENTIFICATION

**Table 1 — Location of Identification Numbers on
Maintenance Supply Items**

Chassis — Right hand side of chassis, forward of
the spring mounting turret

Chassis nameplate — Left hand seat box, in the cab

Engine — Left hand side of the engine block

Injection pump identification — Side of the pump

Transmission and transfer case — Rear of the transfer case

Air conditioner compressor — Front outer mounting point

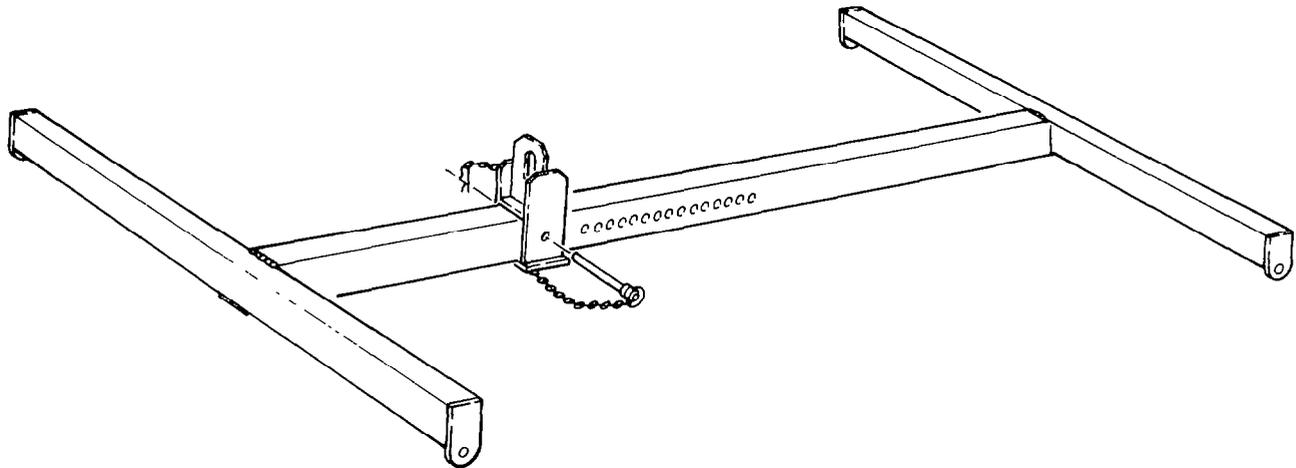
Ambulance module — Rear hand rear, opposite the heater

SPECIAL TOOLS

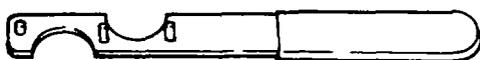
Many of the procedures described in this EMEI require the use of special tools, jigs or fixtures. The special tools are listed in Table 2 and illustrated in Fig. 1.

Table 2 — Special Tools

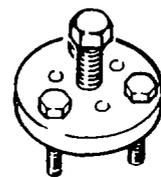
Part No./Item Name	Para. No.	Use
610010	4h, 7c	Module Lifting Beam
32409	13a	Clutch Front Plate Spanner (Air Conditioner Compressor)
32416	13b	Front Plate Puller (Air Conditioner Compressor)
32418	13e, 13f	Rotor Puller Set (Air Conditioner Compressor)
32405	13k, 15f	Seal Retainer Tongs (Air Conditioner Compressor)
32406	13l, 15e	O-ring Hook (Air Conditioner Compressor)
32425	13m, 15d	Seal Remover and Installer (Air Conditioner Compressor)
32426	15c	Seal Sleeve Protector (Air Conditioner Compressor)
32435	15j, 15k	Clutch Rotor Installer Set (Air Conditioner Compressor)
32436	15n	Shaft Protector (Air Conditioner Compressor)



610010



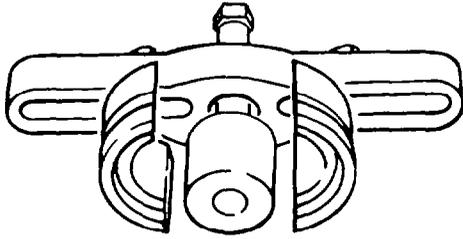
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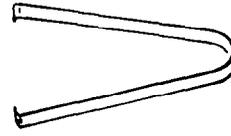
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Figure 1 — Special Tools

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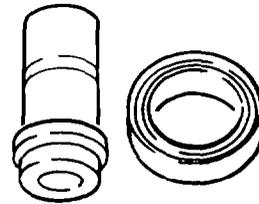
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32426



32435



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Figure 1 — Continued

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LIST OF LUBRICANTS

Table 3 — List of Lubricants

Equipment	Lubricant	Capacity (litres)
Air Conditioner Compressor Refrigerant	OM-70 FREON R12	135 cc As required

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TRUCK, AMBULANCE, LIGHT, 4 LITTER, FFR, WINCH, MC2 — LAND ROVER 110 6 x 6

FIELD AND BASE REPAIR

INTRODUCTION

1. This EMEI contains procedures for removing, dismantling, repairing, assembling, and installing various components of the Truck, Ambulance, Light, 4 Litter, FFR, Winch, MC2. Apart from the air conditioning components, the basic mechanical requirement is the same as the Truck, Cargo, Light, Winch, MC2 — 6 x 6, therefore, this EMEI should be read in conjunction with the EMEI VEH G 204 and EMEI VEH G 204-1. Because the ambulance module is largely constructed from reinforced fibreglass, the repair procedure outlined in EMEI Workshop D 210 should be strictly adhered to.

2. Prevent dirt and foreign objects from entering any component by placing clean temporary coverings over all exposed openings, including hoses, tubes and lines.

CAUTION

Do not use adhesive tapes to seal fuel or oil openings. The adhesive tape is soluble in fuel or oil and can cause contamination. Remove temporary covers before assembling

3. When disconnecting electrical connectors, hoses and fittings, remove clamps as required to gain slack and avoid damage to connectors and fittings.

CAUTION

Before removing any electrical system components, disconnect the battery leads.

4. Discard all used gaskets, seals, cotter pins, tab washers, lock pins, key washers and lock washers. Discard all contaminated fuel and lubricants drained from the vehicle.

5. Use only those fuels and lubricants specified in the Servicing Instruction, EMEI VEH G 209 and the User Handbook when replenishing fuel or lubricants.

6. Any fastenings or fittings being tightened to prescribed torques are to have dry, clean threads unless otherwise specified. When specified, thread sealants are to be applied to dry, clean, oil-free threads.

7. The engine cooling system contains Alfloc 2001 corrosion inhibitor at a concentration of 5% total volume.

8. This vehicle is painted in polyurethane paint.

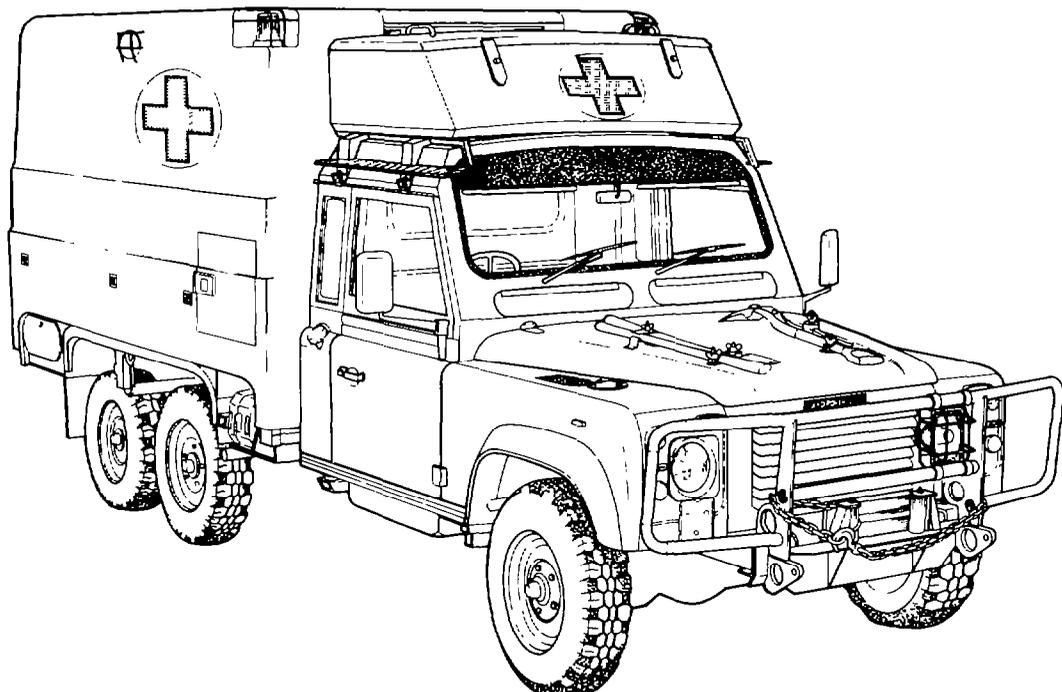


Figure 2 — Truck, Ambulance, Light, 4 Litter, FFR, Winch, MC2

WARNING

Precautions should be taken prior to carrying out repairs which include painting, sanding, scraping or welding. For safety precautions refer to Introduction Into Service Instruction, Materiel Management Policy Statement, Painting Policy for Vehicles and Equipment or relevant EMEI.

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ELECTRICAL — GROUP 15

Suction Pump

1. Disassembly
 - a. Remove the suction pump (refer to EMEI VEH G 223 — GROUP 15).
 - b. Remove the four head mounting screws, then remove the head (see Fig. 3).
 - c. Remove the diaphragm mounting plate screws, then remove the plate and diaphragm.
 - d. Remove the intake valve mounting screw, then remove the intake valve.
 - e. Turn the head upside down and remove the exhaust valve plate mounting screws.

CAUTION
Compressed air pressure is not to exceed 140 kPa.

- f. Reposition the head face down on a flat surface and carefully introduce a small amount of compressed air through the head exhaust port to dislodge the exhaust valve plate.

NOTE

If the valve plate gasket is damaged it must be replaced.

- g. Remove the exhaust valve plate gasket, the exhaust valve mounting screw, then remove the exhaust valve.
- h. Remove the front cover mounting screws then remove the front cover.
- i. Using a 1/8 in. Allen wrench slacken the eccentric clamping screw.

NOTE

Access the screws through the ports in the side of the pump housing.

- j. Using a 5/32 in. Allen wrench slacken the connecting rod clamping screw, then remove the eccentric and bearing assembly and the connecting rod.
- k. Remove the fibre spacer washer from the pump shaft.

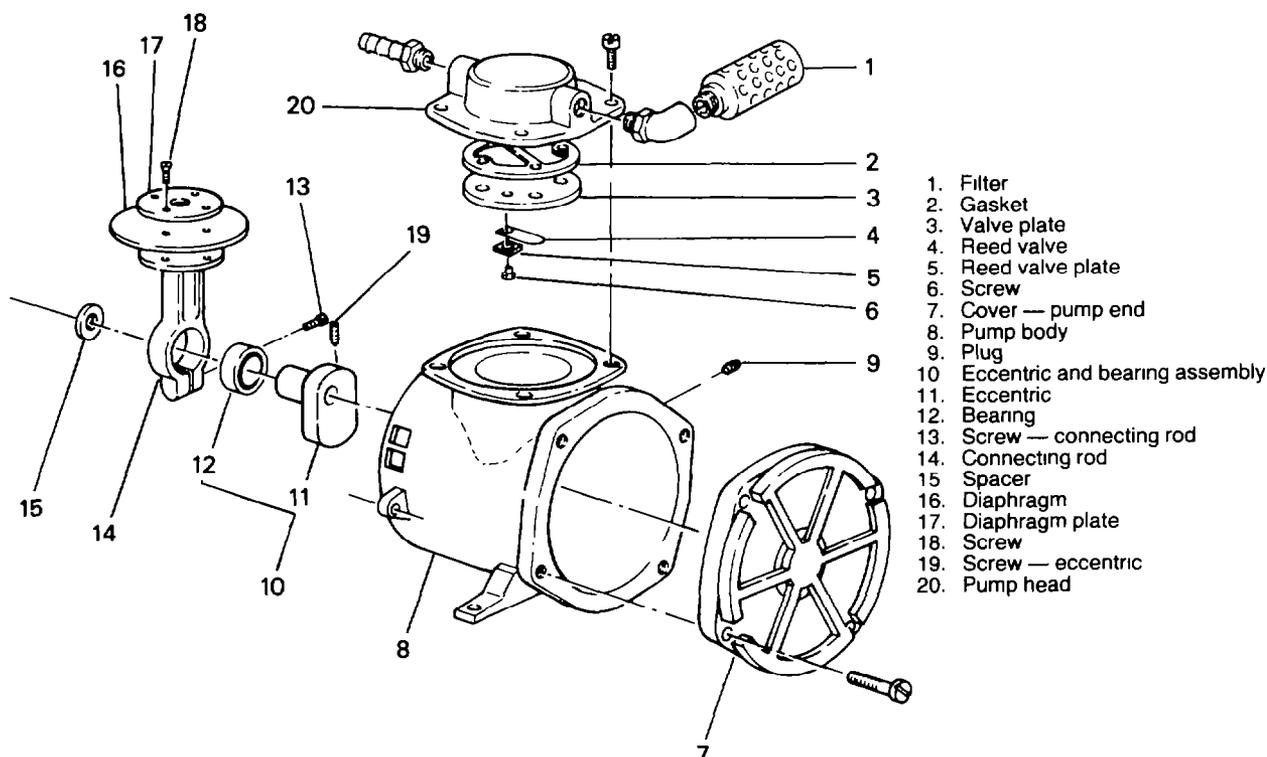


Figure 3 — Suction Pump — Exploded View

2. Cleaning and inspection

NOTE

1. The pump is equipped with permanently lubricated ball bearings. Do not clean the bearings.
2. To clean the pump body wipe over with a damp soapy disinfected cloth. Do not use abrasive cleaning agents which affect plastics.

- a. Clean and inspect valves, diaphragms, connecting rod, eccentric valve plate and gasket.
- b. Inspect the eccentric bearing for serviceability.

3. Reassembly

- a. Place the diaphragm and connecting rod in position. Fit the fibre spacer to the motor shaft, slide the eccentric with bearing onto the shaft then tighten the eccentric clamping screw to 6.8 Nm.

CAUTION
Do not overtighten the connecting rod clamping screw.

- b. Align the edge of the connecting rod with the edge of the eccentric bearing then tighten the connecting rod clamping screw to 1.7 Nm.

NOTE

Ensure the valve is aligned on the valve plate exhaust port.

- c. Fit the exhaust valve to the valve plate using the exhaust valve mounting screw.
- d. Fit the valve plate and gasket to the pump housing.
- e. Fit the intake valve to the valve plate using the intake valve mounting screw.
- f. Rotate the motor by hand until the diaphragm is fully deflected then fit the pump head, install four mounting screws and tighten securely.
- g. Replace the suction pump (refer to EMEI VEH G 223 — GROUP 15).

NOTE

To assist in fault finding refer to the voltage reducer wiring diagram on page 21.

— SPECIFICATIONS —

Connecting Rod Clamping Screw	
Tightening Torque	1.7 Nm
Eccentric Clamping Screw	
Tightening Torque	6.8 Nm
Motor voltage	12 V DC
Power	75W
Suction	0 to -75 kPa (0 to -570 mm Hg at sea level)
Net weight.....	2.8 kg

— FAULT FINDING —

Suction Pump

Symptom	Probable Cause	Action
1. Failure to achieve specified vacuum.	<ol style="list-style-type: none"> a. Blocked filter. b. Leaking diaphragm. c. Faulty exhaust valve plate gasket. d. Faulty inlet or exhaust valve. e. Leaking system or line blockages. f. Broken connecting rod due to ingress of liquid. 	<ol style="list-style-type: none"> a. Replace filter. b. Replace diaphragm. c. Replace exhaust valve plate gasket. d. Replace inlet or exhaust valve. e. Check all connections for security and lines for blockage. f. Replace connecting rod. Check one way valve and filter.

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BODY — GROUP 17

Module Assembly

4. Removal

WARNING

Chock the wheels and engage the transmission differential lock prior to commencement of the ambulance module removal.

- a. Remove and store safely, all loose articles from the module e.g. blankets, medical stores.
- b. Disconnect the batteries.
- c. Drain the coolant from the engine cooling system, then loosen the heater hose clamps securing the module hoses to the tee piece connectors (see Fig. 4), located adjacent to the heater.

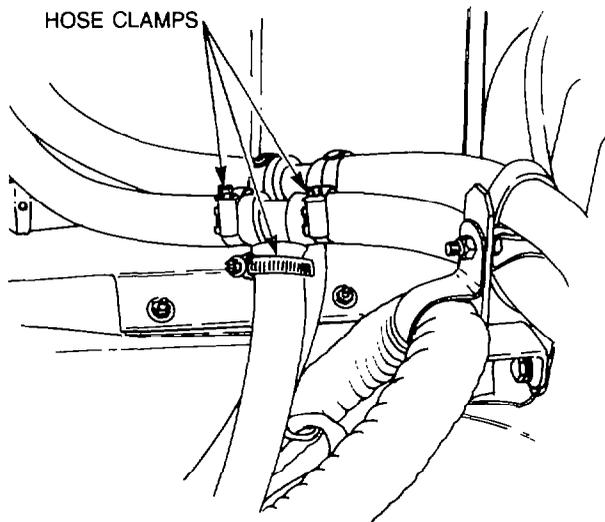


Figure 4 — Heater Hoses — Removal

- d. Disconnect and plug the hoses with suitable plastic plugs, then roll up the hoses and attach to the module.
- e. Discharge the air conditioning system (refer to para. 22). Disconnect the suction and discharge hoses from the compressor (see Fig. 5), remove the hose clamp from the bracket, then withdraw the hoses from beneath the cab floor. Plug the lines with suitable plastic plugs then roll up the hoses and attach to the module.

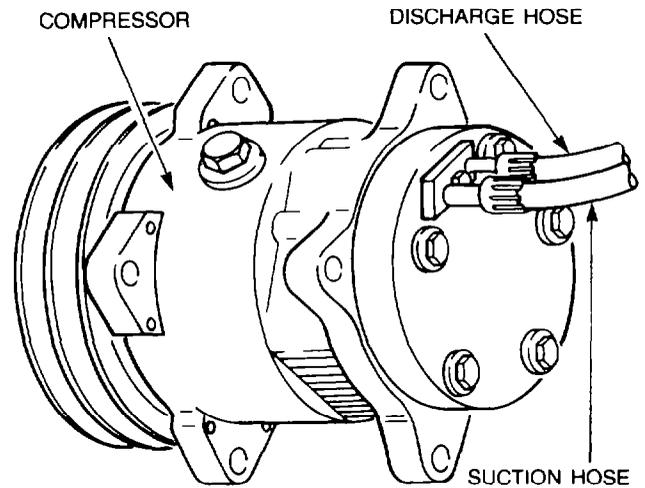


Figure 5 — Air Conditioner Hoses — Removal

- f. Disconnect the four electrical connectors on the left hand rear of the cab and the one connector at the right hand rear of the chassis (see Fig. 6).

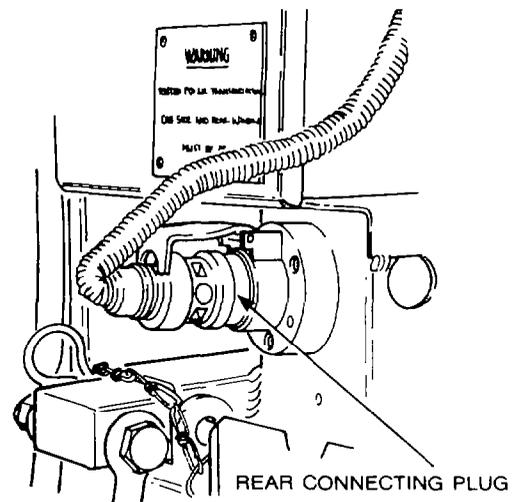


Figure 6 — Module Wiring — Disconnection

- g. Remove the screws from the cab rear window surround, then remove the surround to allow the communications membrane to be removed (see Fig. 7).

WARNING

The overhead lifting equipment must have a minimum safe working load of 2000 kg.

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- h. Install the four lifting eyes in the four locations provided on the module (see Fig. 8), then attach special tool 610010 lifting beam to suitable overhead lifting equipment and attach the four slings with the 'D' shackles to the lifting eyes.
- i. Raise the lifting sling until the slack is taken up, then remove the bolts, washers and nuts securing the rear mudguards. Remove the mudguards.
- j. Remove the bolts, washers and nuts securing the module to the mounting points on the frame (see Fig. 9), then remove the nuts and bolts securing the mounting to the outriggers.

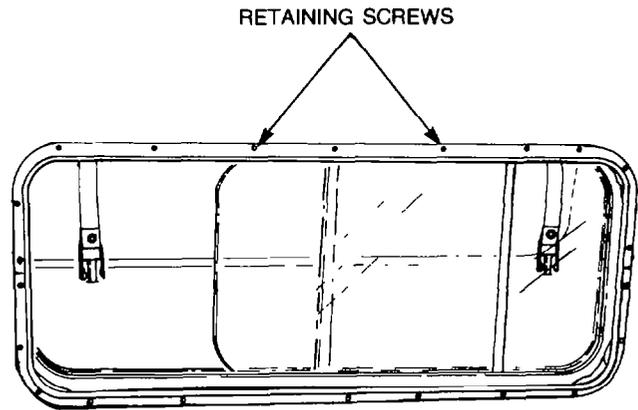


Figure 7 — Module Membrane — Removal

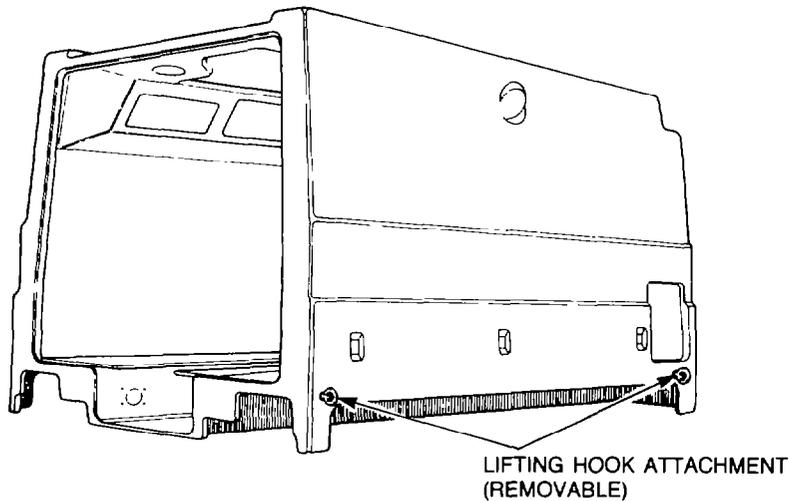


Figure 8 — Module Lifting Points — Location

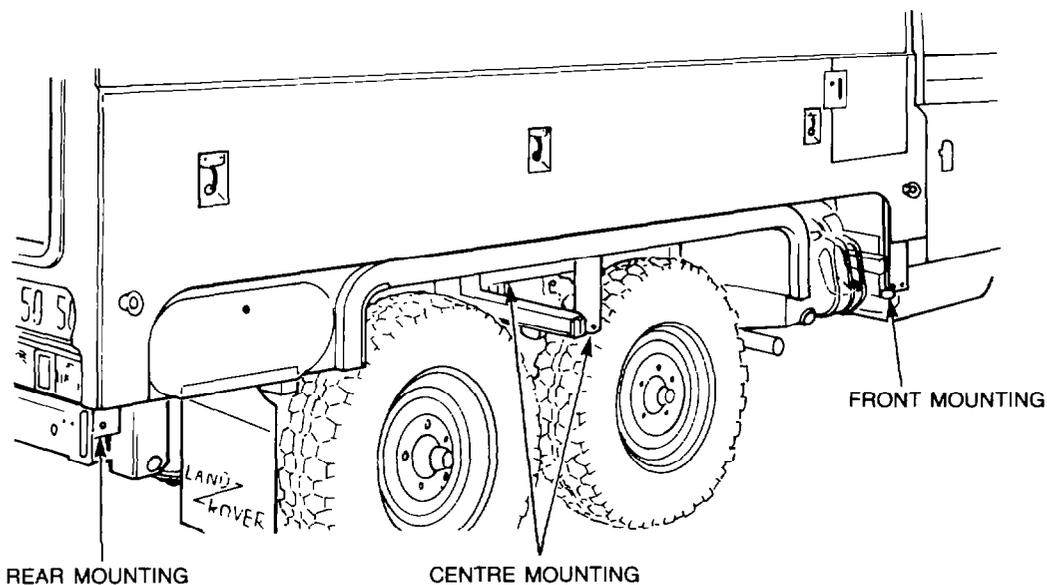


Figure 9 — Module Mounting — Removal

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- k. Remove the bolts and nuts securing the module frame to the chassis frame located beneath the walkway.
- l. Remove the spare wheel, then remove the bolts securing the bridge tie which forms part of the under-frame.
- m. Operate the lifting equipment, and carefully lift the module off the mounting points until the module is above the rear wheels, then disengage the transmission differential lock, remove the chocks from the wheels and roll the vehicle forward far enough to allow the module to be carefully lowered onto suitable support stands.

NOTE

All air conditioning and heater hoses must be rolled up and secured to the module prior to module removal.

5. Disassembly

- a. Remove the rear step and kick plate (refer to EMEI VEH G 223 — GROUP 17).
- b. Remove the rear door gas struts (refer to EMEI VEH G 223 — GROUP 17).
- c. Remove the rear door assembly (refer to EMEI VEH G 223 — GROUP 17).
- d. Remove the tumble out bins (refer to EMEI VEH G 223 — GROUP 17).
- e. Remove the upper and lower litter frame assemblies (refer to EMEI VEH G 223 — GROUP 17).
- f. Remove the medical assistants seat and oxygen cylinder bracket (refer to EMEI VEH G 223 — GROUP 17).
- g. Remove the main medical stores locker door (refer to EMEI VEH G 223 — GROUP 17).
- h. Remove the exhaust vents (refer to EMEI VEH G 223 — GROUP 17).
- i. Remove the communications opening blackout curtain (refer to EMEI VEH G 223 — GROUP 17).
- j. Remove the heater unit (refer to EMEI VEH G 223 — GROUP 17).
- k. Remove the heater control valve (refer to EMEI VEH G 223 — GROUP 17).
- l. Remove the air conditioning evaporator unit (refer to para. 20).
- m. Remove the suction inlet hose and adapter from the side of the soiled linen compartment, then in a twist/pull action

remove the two hoses from the suction bottles.

- n. Loosen the suction bottle cradle clamp bolt, then remove the bottle from the cradle and remove the screws securing the cradle to the soiled linen cabinet. Remove the cradle. Repeat the removal procedure for the opposite side.
- o. Operate the quick release latch and remove the fire extinguisher from the bracket, then remove the screws retaining the bracket to the main medical supplies locker and remove the bracket.
- p. Remove the screws retaining the water container shelf to the overhead stowage locker, then remove the shelf. Repeat the removal procedure for the opposite side.
- q. Remove the soiled linen bin, suction pump, pipes and fittings (refer to EMEI VEH G 223 — GROUP 15).
- r. Remove the module fuse and relay panel (refer to EMEI VEH G 223 — GROUP 15).
- s. Remove the module communication switch (refer to EMEI VEH G 223 — GROUP 15).
- t. Remove the individual litter light switches (refer to EMEI VEH G 223 — GROUP 15).
- u. Remove the casualty observation stalk light assemblies (refer to EMEI VEH G 223 — GROUP 15).
- v. Remove the module interior blackout light assemblies (refer to EMEI VEH G 223 — GROUP 15).
- w. Remove the module interior ceiling light assemblies (refer to EMEI VEH G 223 — GROUP 15).
- x. Remove the main switch panel and wiring (refer to EMEI VEH G 223 — GROUP 15).
- y. Remove the secondary switch panel and wiring (refer to EMEI VEH G 223 — GROUP 15).
- z. Remove the scan light assemblies (refer to EMEI VEH G 223 — GROUP 15).
- aa. Remove the beacon lights (refer to EMEI VEH G 223 — GROUP 15).
- ab. Remove the air conditioning condenser and the receiver/drier units (refer to paras. 9 and 17).

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- ac. Remove the screws securing the exterior locker door hinges to the module. Remove the locker doors.

6. Reassembly

- a. Install the air conditioning condenser and the receiver/drier units (refer to paras. 11 and 19).
- b. Install the beacon lights (refer to EMEI VEH G 223 — GROUP 15).
- c. Install the scan light assemblies (refer to EMEI VEH G 223 — GROUP 15).
- d. Install the secondary switch panel and wiring (refer to EMEI VEH G 223 — GROUP 15).
- e. Install the main switch panel and wiring (refer to EMEI VEH G 223 — GROUP 15).
- f. Install the module interior ceiling light assemblies (refer to EMEI VEH G 223 — GROUP 15).
- g. Install the module interior blackout light assemblies (refer to EMEI VEH G 223 — GROUP 15).
- h. Install the casualty observation stalk light assemblies (refer to EMEI VEH G 223 — GROUP 15).
- i. Install the individual litter light switches (refer to EMEI VEH G 223 — GROUP 15).
- j. Position the water container shelf on the overhead stowage locker, then install the attaching screws, tighten securely. Repeat this procedure on the opposite side.
- k. Position the fire extinguisher bracket, then install and tighten the attaching screws. Secure the fire extinguisher in the bracket by operating the quick release latch.
- l. Install and tighten securely the screws retaining the suction bottle cradle to the soiled linen cabinet, then position the suction bottle in the cradle and secure with the clamp bolt. Repeat this procedure on the opposite side.
- m. Install the inlet hose and adapter on the side of the soiled linen compartment, then in a twist/push action connect the hoses to the suction bottles.
- n. Install the suction pump, pipes and fittings and soiled linen bin (refer to EMEI VEH G 223 — GROUP 15).

- o. Install the module fuse and relay panel (refer to EMEI VEH G 223 — GROUP 15).
- p. Install the module communication switch (refer to EMEI VEH G 223 — GROUP 15).
- q. Install the air conditioning evaporator unit (refer to para. 21).
- r. Install the heater control unit (refer to EMEI VEH G 223 — GROUP 15).
- s. Install the heater unit (refer to EMEI VEH G 223 — GROUP 15).
- t. Install the communications opening blackout curtain (refer to EMEI VEH G 223 — GROUP 17).
- u. Install the exhaust vents and secure with six screws (refer to EMEI VEH G 223 — GROUP 15).
- v. Install the main medical stores locker door (refer to EMEI VEH G 223 — GROUP 17).
- w. Install the medical assistants seat and oxygen cylinder bracket (refer to EMEI VEH G 223 — GROUP 17).
- x. Install the upper and lower litter frame assemblies (refer to EMEI VEH G 223 — GROUP 17).
- y. Install the tumble out bins (refer to EMEI VEH G 223 — GROUP 17).
- z. Install the rear door assembly (refer to EMEI VEH G 223 — GROUP 17).
- aa. Install the rear door gas struts (refer to EMEI VEH G 223 — GROUP 17).
- ab. Install the rear step and kick plate (refer to EMEI VEH G 223 — GROUP 17).
- ac. Position the exterior locker doors on the module, then install the retaining screws and tighten securely.

7. Installation

WARNING
The overhead lifting equipment must have a minimum safe working load of 2000 kg.

- a. Attach the four lifting slings to the lifting hook attachments on the module frame (see Fig. 8), then connect the lifting beam to suitable overhead lifting equipment.
- b. Chock the wheels, engage the transmission differential lock, then lower the module onto the mounting points and in-

stall the bolts, washers and nuts. Tighten the bolts securely (see Fig. 9).

- c. Unhook the lifting beam (special tool 610010) from the overhead lifting equipment, then remove the lifting slings from the hook attachments on the module frame. Remove the lifting hook attachments.
- d. Position the communications membrane and the surround on the cabin, then install and tighten the screws.
- e. Connect the four electrical connectors on the left hand rear of the cab and the one connector at the rear of the chassis.
- f. Connect the earth cable to the chassis frame adjacent to the battery carrier.
- g. Remove the plastic plugs from the air conditioning suction discharge hoses, then connect the hoses to the compressor and tighten the retaining bolt securely.
- h. Remove the plugs from the heater hoses, then feed the hoses under the cab floor and connect the hoses to the heater unit tee piece connectors. Tighten the clamps securely.
- i. Using approximately 12.8 litres of coolant with a mixture concentrate of 5% Alfloc 2001, fill the cooling system.
- j. Connect the batteries and switch on the master switch on the main switch panel.
- k. Recharge the air conditioning system (refer to para. 23).
- l. Check the operation of the module air conditioning, heating, lighting and control switches.

Fibreglass Damage — Minor Repair

8. Procedure

WARNING

Personnel using sanding or grinding equipment on polyurethane painted surfaces must use a highly efficient toxic dust respirator, disposable or re-usable cloth overalls, gloves and eye protection in the form of a face shield, safety goggles or safety glasses with side shield.

NOTE

The following repair procedure applies only to minor fibreglass repair. For major fibreglass repair procedure refer to EMEI WKSP D 210 — Glass Fibre/Reinforced Plastic Repair.

- a. Using a hand grinder with sanding discs, grind out all the weakened fibreglass around the damaged area. Increase the size of the hole approximately 5-8 cm (refer to Fig. 10).

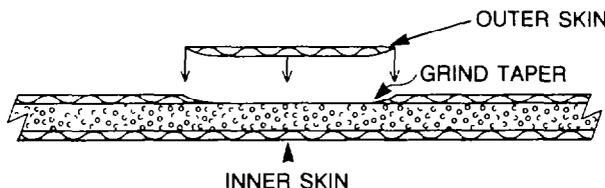


Figure 10 — Structural Damage to Outer Fibreglass Skin Only

- b. Inspect the foam for damage, if crushing of the foam has occurred, use a suitable knife to cut a neat square or rectangle, then cut a piece of foam to size, apply a mixture of resin and talcum powder to the new foam and insert in the opening (refer to Fig. 11). Apply pressure to remove air pockets

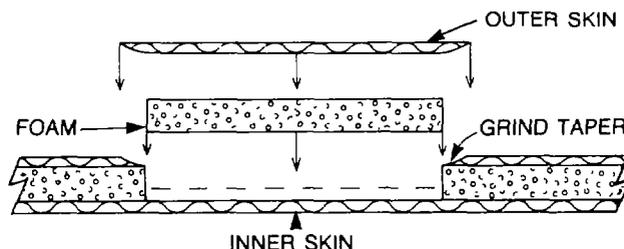


Figure 11 — Structural Damage to Outer Fibreglass Skin and Foam Core

- c. Inspect the inner fibreglass skin for damage, if damage has occurred, it will be necessary to enlarge the hole in the outer skin to enable the inner skin to be ground (refer to Fig. 12).

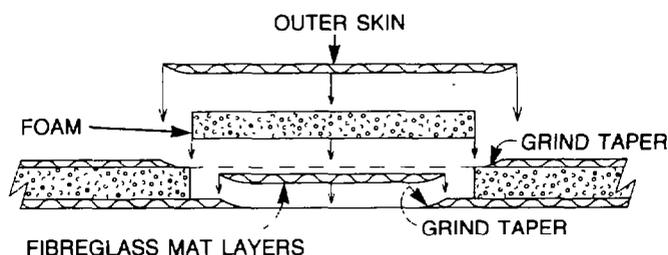


Figure 12 — Structural Damage to Both Fibreglass Skins

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- d. Operating through the hole in the outer skin, repeat the grinding procedure as in para. a.
- e. Prepare a series of fibreglass chopped strand mat patches, ensuring that the smallest patches just fill the hole and the remainder of the patches extend 5 cm over the outside edge of the hole and to the outer edge of the taper.
- f. Build up the patch with layers of catalysed resin-impregnated chopped strand mat, taking care to squeeze out entrapped air by rolling the area with a small grooved roller.
- g. Build up the patch with fibreglass chopped strand mat, then feather the edges by removing excess fibreglass strands from the edge with the fingers, before wetting with catalysed resin.
- h. Impregnate the fibreglass chopped

strand mat, then using a grooved roller, squeeze out any entrapped air. Ensure the surface is flush with the existing fibreglass skin.

- i. Prepare a filler material by mixing glass fibre chopped strands (3-5 mm long) with catalysed resin and Aerosil or talc, then apply the filler material to define the patch shape closer to the surface contour.
- j. Allow the filler to cure overnight, then using a medium sandpaper, sand the patch until the original surface shape is achieved.
- k. Using a suitable sandpaper, taper the patch area to allow space for a light covering of gelcoat, then carefully clean the surface with a cloth dampened with acetone.

MODULE COOLING — GROUP 18

Air Conditioner Condenser

9. Removal

NOTE

The only repair that can be carried out to the condenser cooling core is to the copper tubing using normal workshop practices.

- a. Remove the condenser guard, the motor and the fan assembly (refer to EMEI VEH G 223 — GROUP 18).

WARNING

To avoid personal injury when discharging the air conditioning system refrigerant gas, wear suitable eye protection and protective clothing. Do not allow contact with the skin.

NOTE

When performing removal or installation functions on the area around the condenser, it is necessary to utilize an elevated construction to access the area.

- b. Discharge the refrigerant gas from the air conditioning system (refer to para. 22).
- c. Disconnect the discharge and suction pipes from the condenser (see Fig. 13), plug the pipes with suitable plastic plugs.

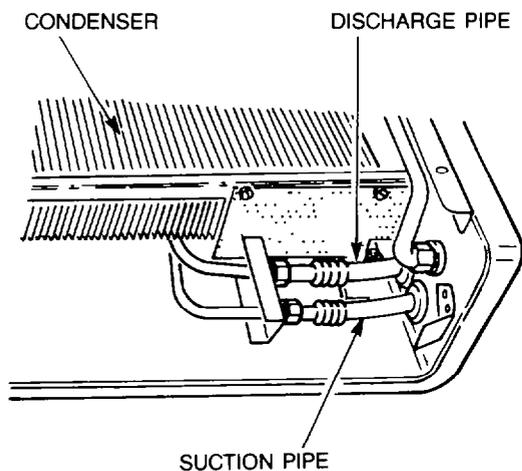


Figure 13 — Discharge and Suction Pipes — Removal (Condenser)

- d. Remove the six bolts securing the condenser turret support to the module roof, then remove the support (see Fig. 14).

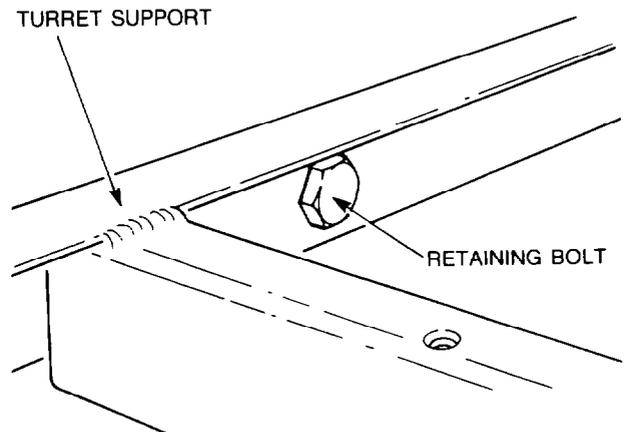


Figure 14 — Condenser Turret Support — Removal

- e. Remove the lock nuts retaining the condenser assembly to the rubber mounting points (see Fig. 15), then with the aid of an assistant, lift the condenser unit up and out of the condenser recess. Discard the lock nuts.

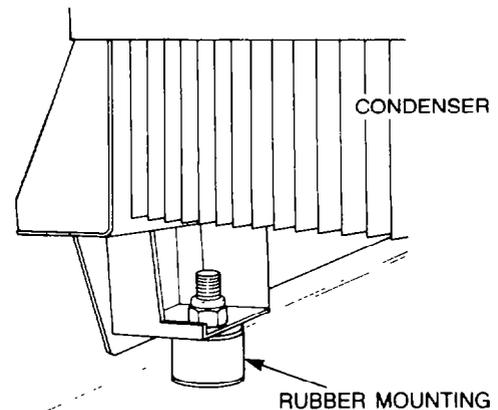


Figure 15 — Condenser Mounting — Removal

10. Cleaning and Inspection

- a. Clean any build-up of debris from the condenser core cooling fins, using a suitable cleaning agent, and blow dry with compressed air.
- b. Check the condenser assembly for damage to the core or fins.
- c. Inspect the condenser assembly for leaks, cracks or holes and replace as required.

- d. Inspect the mounting brackets for cracks, wear or damage and replace if necessary.

11. Installation

- a. Position the condenser unit on the rubber mountings on the module roof, then install the new lock nuts and tighten securely.
- b. Position the condenser turret support frame, then install the bolts and washers and tighten securely.
- c. Remove the plastic plugs from the pipes and apertures, then connect the suction and discharge hoses to the condenser and the receiver/drier, tighten the connections securely.
- d. Recharge the air conditioning system with refrigerant gas (refer to para. 23).
- e. Install the motor, fan assembly and the condenser guard, (refer to EMEI VEH G 223 — GROUP 18).
- f. Start the engine and test the air conditioning system for correct operation and leaks. Rectify any faults found.

Air Conditioner Compressor

12. Removal

- a. Discharge the air conditioning refrigerant (refer to para. 22).
- b. Remove the bolt from the locking plate securing the suction and discharge lines to the compressor, then pull the lines from the apertures in the compressor (see Fig. 16). Discard the O-rings.

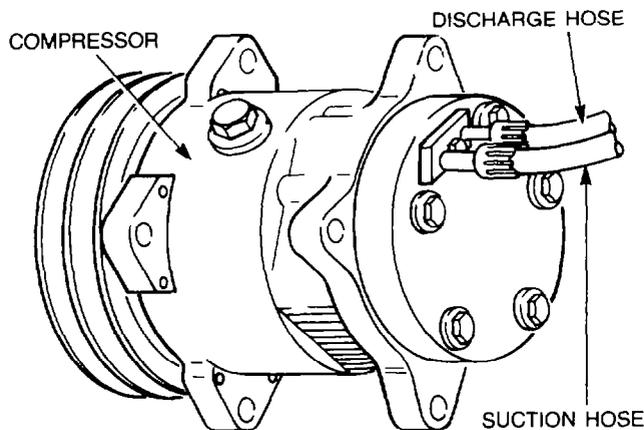


Figure 16 — Suction and Discharge Lines — Removal (Compressor)

- c. Switch off the master switch at the main switch panel.
- d. Remove the bolts, washers and nuts securing the compressor to the mounting bracket, lower the compressor and remove the drive belt and the clutch electrical lead. Remove the compressor.

13. Disassembly

- a. Using special tool 32409 to secure the clutch front plate pulley (see Fig. 17) remove the pulley retaining nut.
- b. Using special tool 32416, install the three bolts into the threaded holes in the clutch front plate, then position the centre bolt of the tool on the compressor shaft, turn the centre bolt clockwise until the front plate is loose, then remove the clutch front plate (see Fig. 18).

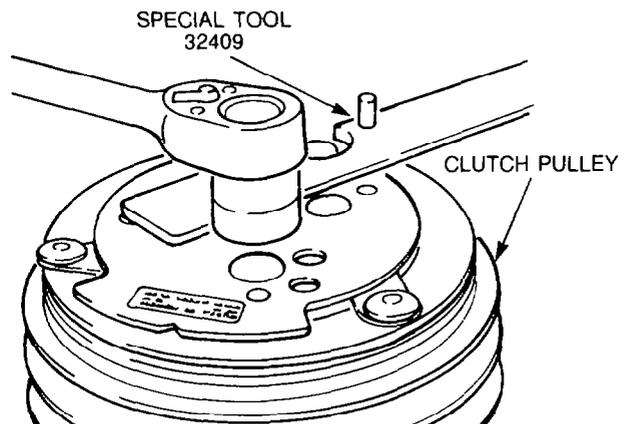


Figure 17 — Clutch Front Plate Pulley Retaining Nut — Removal

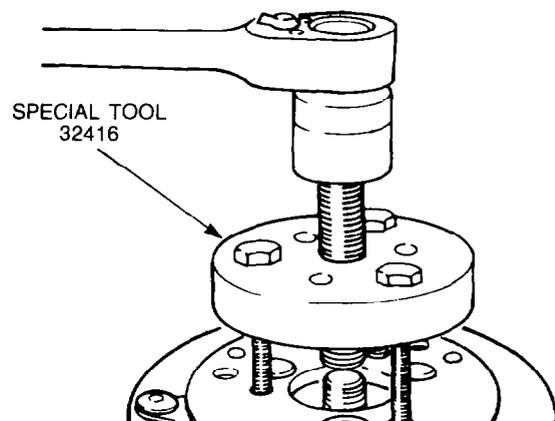


Figure 18 — Clutch Front Plate — Removal

- c. Lightly tap the Woodruff key from the shaft, then using suitable circlip pliers, remove the internal bearing circlip from the housing (see Fig. 19).

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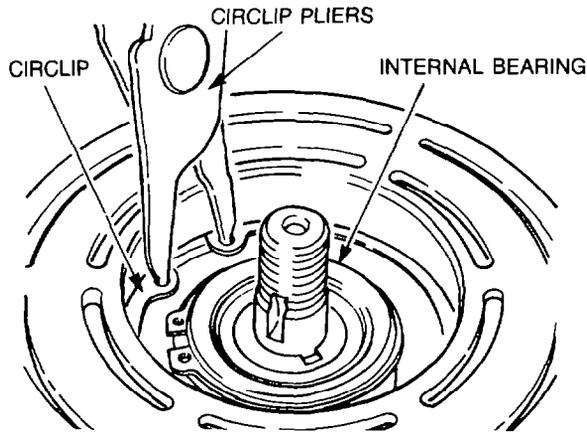


Figure 19 — Rotor Pulley Internal Circlip — Removal

- d. Using suitable circlip pliers, remove the external bearing circlip from the housing (see Fig. 20).

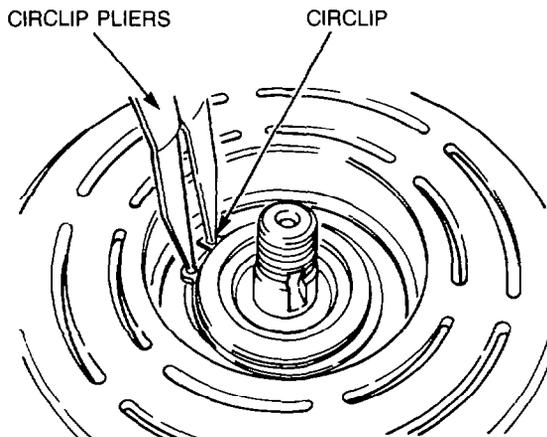


Figure 20 — Pulley External Circlip — Removal

- e. Using the jaws from special tool set 32418 insert the lugs into the internal circlip groove, then position the protector piece (also part of special tool set 32418) over the shaft (see Fig. 21).

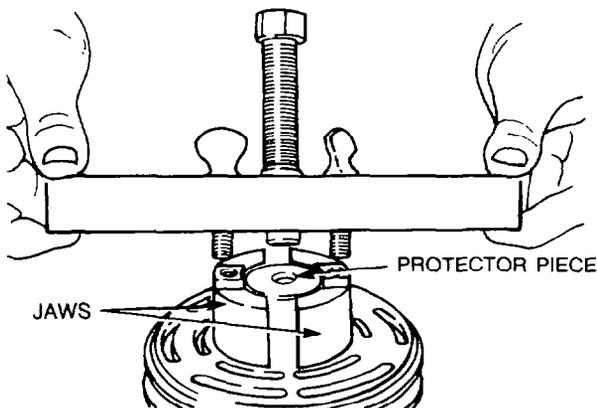


Figure 21 — Rotor Pulley Tool — Installation

- f. Install the screws of the puller (part of special tool set 32418) into the threaded holes in the jaws, then turn the centre bolt of the puller in a clockwise direction and remove the rotor pulley (see Fig. 22).

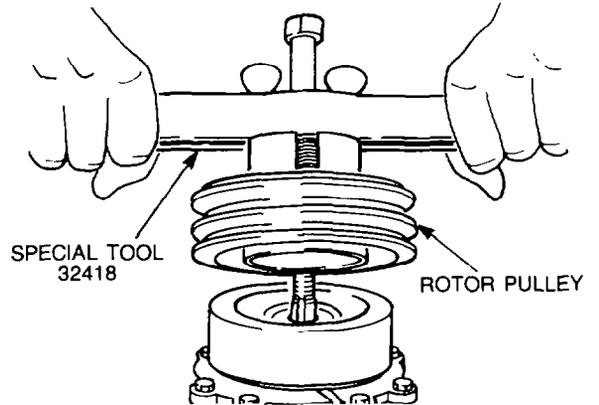


Figure 22 — Rotor Pulley — Removal

- g. Disconnect the coil lead from the connector on the top of the compressor front housing, then using suitable circlip pliers, remove the circlip retaining the field coil to the shaft. Remove the field coil (see Fig. 23).

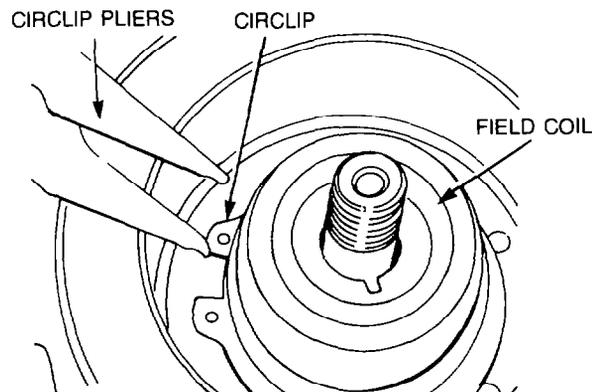


Figure 23 — Field Coil — Removal

- h. Using suitable circlip pliers, remove the felt ring metal retainer and lift the felt ring from the housing (see Fig. 24).

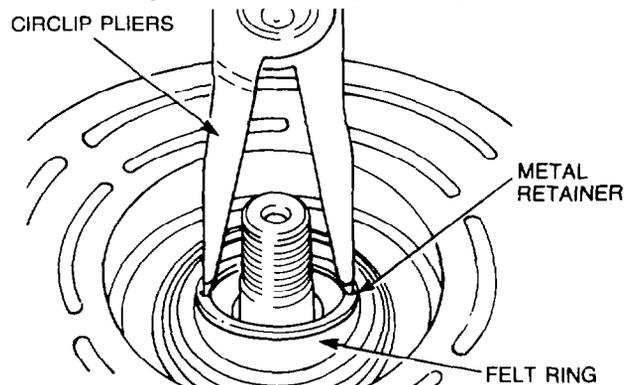


Figure 24 — Felt Ring Retainer — Removal

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- i. Using a small screwdriver, remove the clutch shims from the shaft (see Fig. 25).

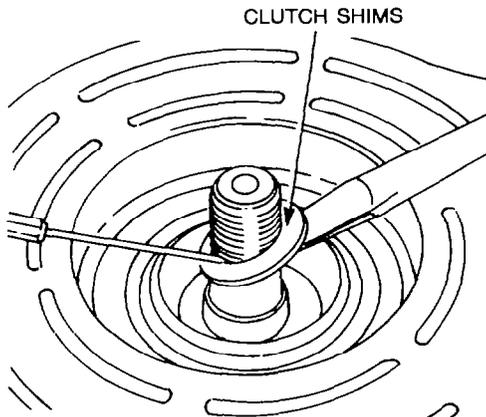


Figure 25 — Clutch Shims — Removal

- l. Using special tool 32406, remove the O-ring from the front housing (see Fig. 28).

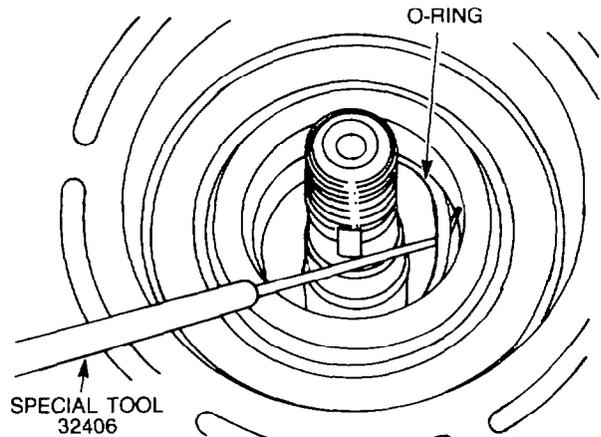


Figure 28 — Front Housing O-ring — Removal

- j. Using suitable circlip pliers, remove the shaft seal seat retaining circlip (see Fig. 26).

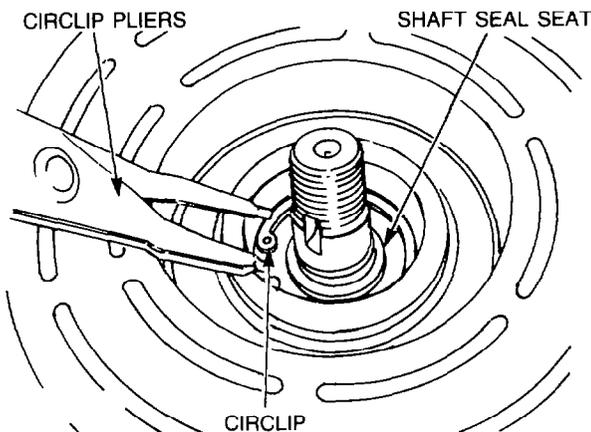


Figure 26 — Shaft Seal Seat Circlip — Removal

- k. Install the lugs of special tool 32405 under the shaft seal seat and with a sharp upward movement remove the shaft seal seat (see Fig. 27).

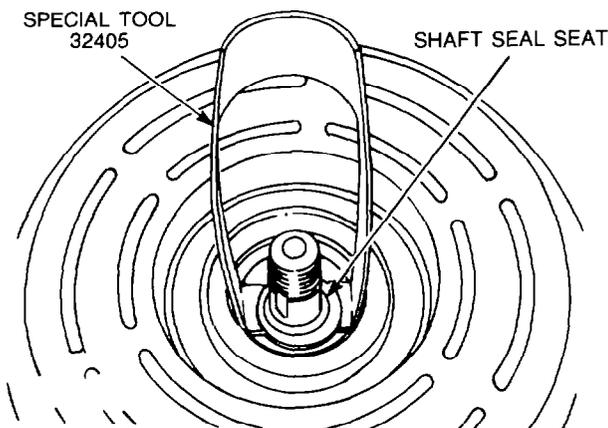


Figure 27 — Shaft Seal Seat — Removal

- m. Insert the seal remover and installer (special tool 32425) against the seal assembly, then press down against the seal spring and twist the tool until it engages the slots in the seal cage, with a sharp upward movement of the tool, remove and discard the seal (see Fig. 29).

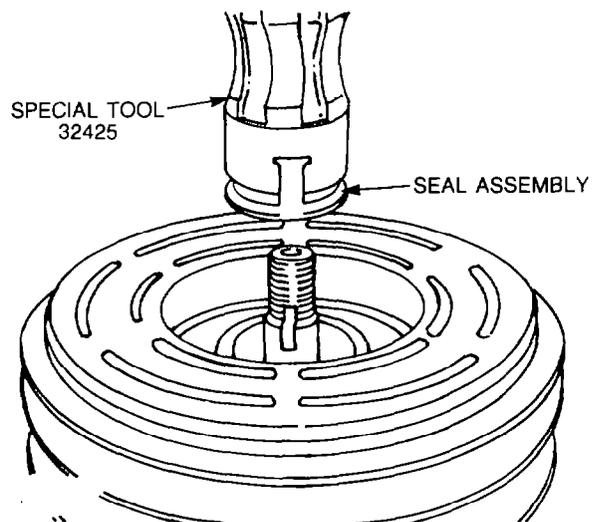


Figure 29 — Shaft Seal — Removal

- n. Remove the five cylinder head bolts, then remove the cylinder head (see Fig. 30), it may be necessary to lightly tap the cylinder head with a soft faced hammer to assist in removal.

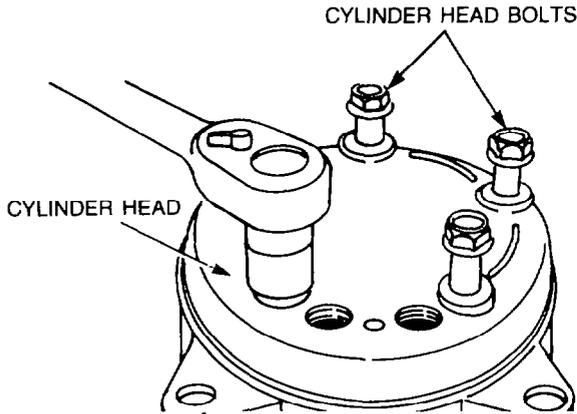


Figure 30 — Cylinder Head — Removal

- o. Remove the two gaskets and the valve plate from the compressor housing (see Fig. 31).

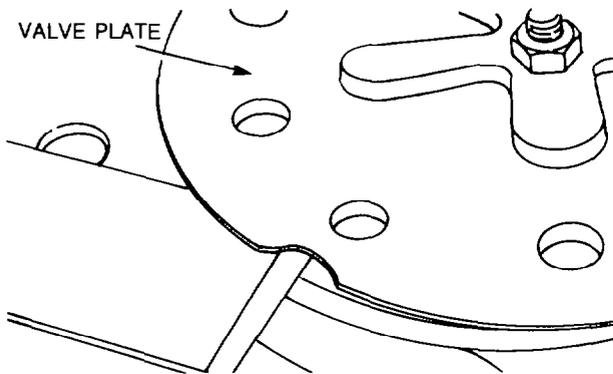


Figure 31 — Valve Plate — Removal

- p. Remove the bolts securing the front cover to the front housing, then remove the pistons, cam rotor and the planet plate as an assembly from the compressor housing.

14. Cleaning and Inspection

- a. Clean all components thoroughly with lint free or synthetic cloth and clean refrigerant oil, then blow dry with moisture free compressed air.
- b. Due to the extremely fine tolerances of the internal components, the compressor must be replaced if cracks, scores or signs of excessive wear are observed.
- c. Replace the compressor if any signs of internal leakage are evident.

15. Reassembly

- a. Install the pistons, cam rotor and the planet plate as an assembly into the compressor housing, then position the gasket and the front cover on the compressor housing, install the bolts and tighten securely.

- b. Position the two gaskets, the valve plate and the cylinder head on the locating pins, ensure that the gasket holes align with the oil equalizer and the orifice openings and the hose connecting apertures are correctly positioned, then install the five cylinder head bolts and torque to 30-34 Nm (22-25 lb.ft) in the sequence shown in Fig. 32.

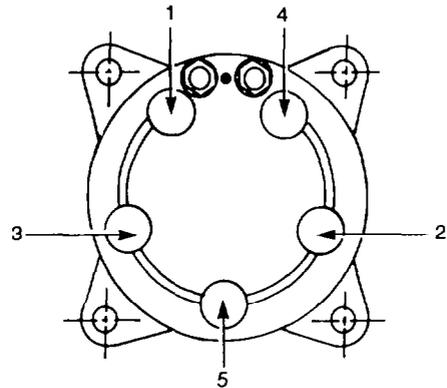


Figure 32 — Cylinder Head — Tightening Sequence

- c. Invert the compressor housing, clutch side up and secure by the mounting ears in a vice, then install special tool 32426 over the protruding end of the compressor shaft (see Fig. 33).

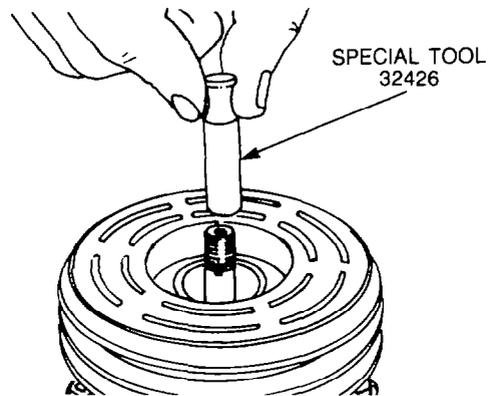


Figure 33 — Shaft Protector Tool — Installation

- d. Engage the slots of special tool 32425 to the cage of the new seat seal, then lightly tap the tool until the seal is correctly located in the seal cavity. Remove the tool by twisting in a counter-clockwise direction, apply a small amount of refrigerant oil to the lip of the seal.
- e. Apply a small amount of clean refrigerant oil to the O-ring, then carefully position in the ring groove using special tool 32406.
- f. Apply a liberal amount of oil to the seal retainer, then using special tool 32405,

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press lightly until the retainer is against the seal. Install the circlip.

- g. Install the clutch spacer shims on the shaft, then lightly tap the felt seal into position (see Fig. 34).

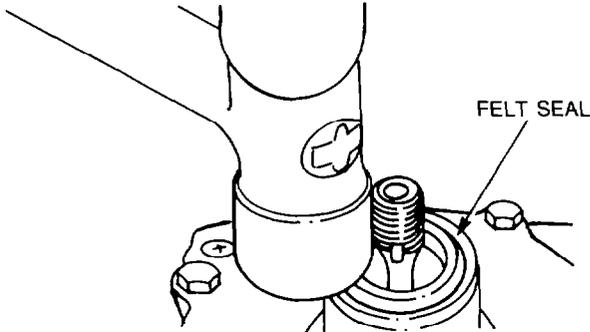


Figure 34 — Felt Seal — Installation

- h. Position the field coil over the shaft, then using suitable circlip pliers install the circlip. It may be necessary to lightly tap the circlip with a screwdriver to ensure correct positioning.

NOTE

The coil flange protrusion must match the hole in the front housing, to prevent coil movement and correctly locate the lead wire.

- i. Support the compressor on the four mounting ears at the rear of the compressor in a vice, then align the rotor pulley on the front housing hub.
- j. Position the ring (part of special tool 32435) into the bearing cavity, ensure the outer edge rests firmly on the rotor pulley bearing outer race (see Fig. 35).

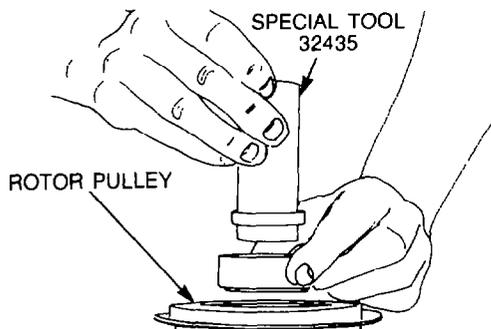


Figure 35 — Rotor Pulley Ring Tool — Installation

- k. Position the driver tool (part of special tool 32435), into the ring, tap the driver until the rotor pulley bottoms against the compressor front housing hub. Listen for a distinct change of sound dur-

ing the tapping process, this will indicate that the rotor pulley has bottomed.

- l. Install the internal bearing circlip using suitable circlip pliers, then install the external front housing circlip using suitable circlip pliers.
- m. Ensure that the clutch shims are in place, then tap the Woodruff key into the shaft, then align the front plate keyway with the Woodruff key in the shaft.
- n. Using the shaft protector (special tool 32436) tap the front plate onto the shaft until a distinct change of sound is noted, indicating the front plate has bottomed.
- o. Install the shaft nut and torque to 34-40 Nm (25-30 lb.ft).
- p. Check the air gap with a feeler gauge (see Fig. 36), the measurement should be 0.040-0.078 mm (0.0016-0.0031 in.) consistent around the circumference, if not, lightly pry up at the minimum variations. Lightly tap down at points of maximum variations.

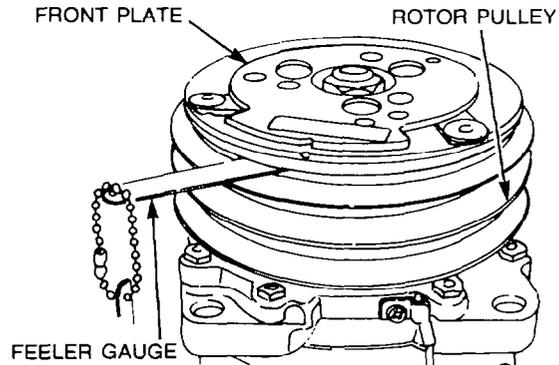


Figure 36 — Front Plate Air Gap — Checking Measurement

- q. To achieve the correct air gap, it is necessary to add or subtract the clutch shims accordingly.

NOTE

The shims are available in sizes 0.12, 0.50 and 1.00 mm (0.005, 0.020 and 0.040 in.).

16. Installation

- a. Position the compressor in the mounting bracket on the vehicle and install the securing bolts finger tight. Install the drive belt on the pulley and connect the clutch electrical lead, then place a suitable lever between the compressor base and the mounting bracket, raise the com-

pressor to adjust the belt and tighten the bolts.

- b. Push the discharge and suction hose into the apertures in the compressor, then position the lock plate and install and tighten the retaining bolt securely.
- c. Remove the oil filler plug and fill the compressor with approximately 4.6 fl. oz. (135 cc) of OM-70.
- d. Recharge the air conditioning system with refrigerant gas (refer to para. 23).

Air Conditioner Receiver/Drier

NOTE

The only servicing requirement for the receiver/drier is replacement at two yearly intervals.

17. Removal

- a. Remove the condenser fan guard (refer to EMEI VEH G 223 — GROUP 18).
- b. Discharge the refrigerant gas from the air conditioning system (refer to para. 22).
- c. Switch off the master switch at the main switch panel, then tag and disconnect the wiring harness at the receiver/drier.
- d. Crack open the union nuts connecting the suction and liquid pipes to the receiver/drier, then fully unscrew the nuts and disconnect the pipes.
- e. Loosen the bolt securing the clamp to the receiver/drier, then remove the receiver/drier from the clamp (see Fig. 37).

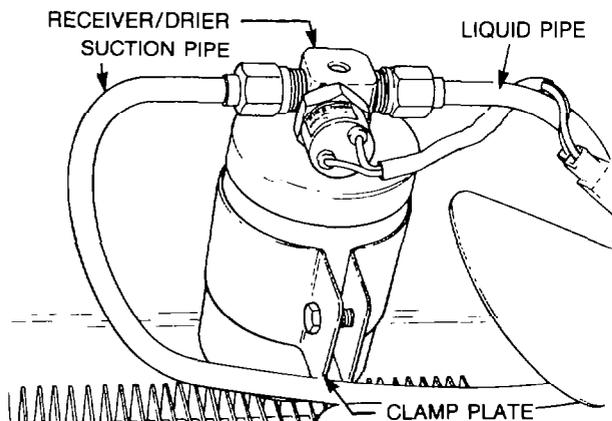


Figure 37 — Receiver/Drier — Removal

18. Inspection

- a. Inspect the receiver/drier for correct sealing, no leaks should be evident, replace as necessary.

19. Installation

- a. Position the receiver/drier into the clamp, but do not tighten the clamp.
- b. Align the suction and liquid pipes with their respective unions, then connect and tighten the pipes securely to the receiver/drier.
- c. Tighten the receiver/drier clamp retaining bolt securely.
- d. Connect the receiver/drier harness to the connector, then switch on the master switch at the main switch panel.
- e. Recharge the air conditioning system with refrigerant gas (refer to para. 23).
- f. Install the condenser fan guard (refer to EMEI VEH G 223 — GROUP 18).

Air Conditioner Evaporator Unit

NOTE

The only repair that can be carried out to the evaporator cooling core is to the copper tubing using normal workshop practices.

20. Removal

- a. Discharge the refrigerant gas from the air conditioning system (refer to para. 122).
- b. Disconnect the negative cable from the battery, then tag and disconnect the wiring harness from the evaporator unit connector.
- c. Disconnect the suction and liquid hoses from the evaporator unit.
- d. Support the evaporator, then remove the six nuts and washers securing the evaporator unit to the module ceiling (see Fig. 38) and remove the evaporator unit.

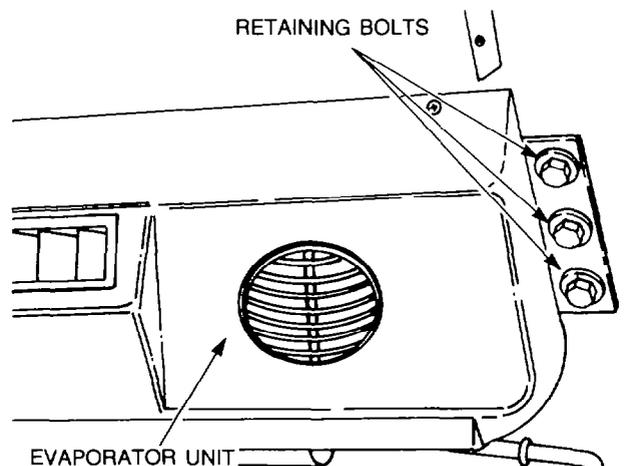


Figure 38 — Evaporator Unit — Removal

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21. Installation

- a. Position the evaporator on the mounting points on the module ceiling, then install the six washers and nuts, tighten securely.
- b. Connect the suction and liquid hoses to the evaporator unit, tighten the connections securely.
- c. Remove the tags from the wiring and connect the wiring to the evaporator connector.
- d. Connect and tighten the negative cable on to the battery terminal.
- e. Recharge the air conditioning system with refrigerant gas (refer to para. 23).
- f. Start the engine and test the air conditioning system for operation and leaks, rectify as necessary.

Air Conditioning System

WARNING

Always wear suitable eye protection and protective clothing. Contact of the liquid refrigerant with skin will cause frostbite. Ensure that the area is well ventilated, as the refrigerant gas is both colourless and odourless and may cause breathing difficulties in confined spaces due to a lack of oxygen. The refrigerant gas is non-flammable. However, ensure that there are no naked flames within the vicinity as toxic phosgene gas is produced when the refrigerant gas comes in contact with fire. Do not clean the air conditioning condenser with steam cleaning equipment as the expansion of the refrigerant gas within, may cause excessively high pressures in the air conditioning system that may result in an explosion.

22. Discharging

- a. Clean around the suction and discharge hoses located in the engine compartment (see Fig. 39) with a suitable cleaning agent, then blow dry using compressed air.

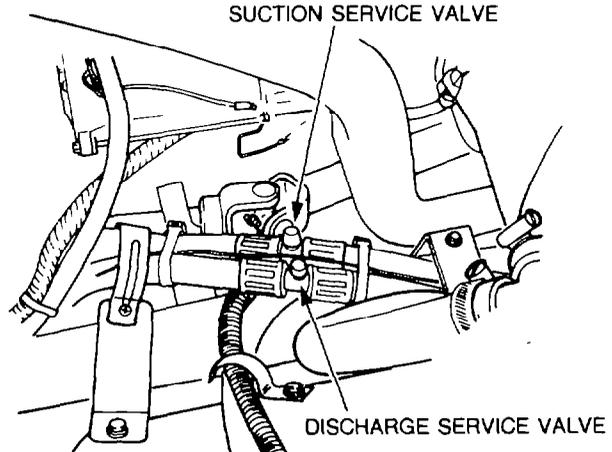


Figure 39 — Suction and Discharge Service Valves — Location

- b. Remove the caps from the air conditioning suction and discharge service valves, then connect a suitable manifold gauge set to the suction and discharge service valves and the centre manifold gauge line to the vacuum pump inlet.
 - c. Ensure that the high and low sides of the manifold hand valves are closed, then start the vacuum pump and slowly open the high side manifold hand valve to prevent oil being drawn from the compressor crankcase.
 - d. At this point of discharging, the compound gauge should register vacuum and the high side gauge should show a reading slightly below zero. If the compound gauge fails to register, check the system for a possible blockage.
 - e. Open the low side manifold hand valve until the compound gauge reads approximately 98.19 kPa (29 in.Hg), then shut both manifold hand valves, the low side gauge should remain stationary for several minutes.
 - f. If the reading holds, and ambient temperatures are above 32°C resume pump down for 30 minutes, if the ambient temperature is below 32°C or high humidity conditions prevail, continue pump down for 45-65 minutes.
 - g. On completion of discharge, close both manifold hand valves.
- ## 23. Recharging
- a. Discharge the air conditioning system completely (refer to para. 22).
 - b. Connect the centre manifold gauge line to a refrigerant can or drum, then purge the system by slackening the fittings on

the manifold and expel the gases for a few seconds.

CAUTION

Do not open the high pressure valve or operate the engine while charging the air conditioning system.

- c. Partially charge the system with 170 g (6 oz.) of Freon R12 or equivalent R12 (Dichlorodifluoromethane) by slowly opening the high side manifold hand valve, the compound gauge should register a pressure, if not, check the system for blockage.

WARNING

Damage to the compressor will occur if the following instruction is not strictly adhered to.

- d. Shut the high side manifold hand gauge, then using a suitable hand tool, rotate the compressor clutch plate for 12 revolutions to ensure that no refrigerant in liquid form is trapped in the suction side of the compressor. Check for leaks in the system.

WARNING

Do not operate the compressor without refrigerant in the system as the compressor lubrication relies on refrigerant flow.

- e. Start the engine and allow operating temperature to be achieved, then via the air conditioning switch, engage the compressor clutch and select high speed and ventilation (see Fig. 40).

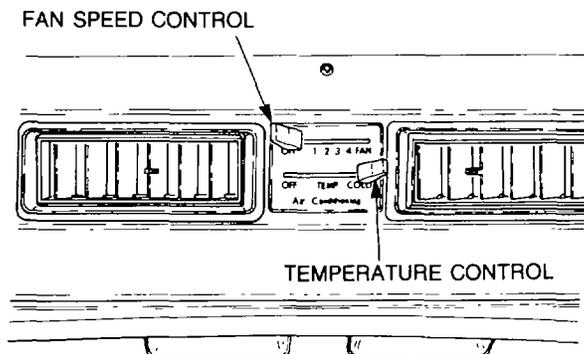
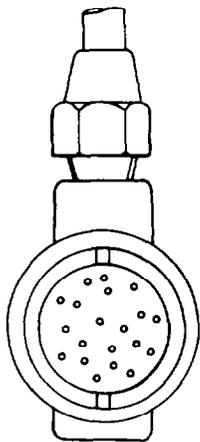
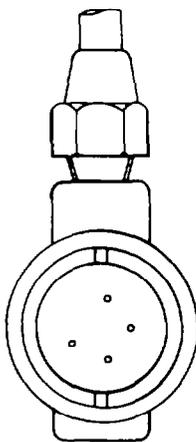
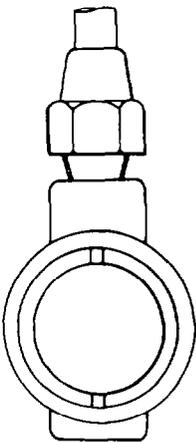


Figure 40 — Air Conditioner Controls

- f. To complete charging of the system, slowly open the low side manifold hand valve until the compound glass reads 275-345 kPa (40-50 lb./in²), then observe the receiver/drier sight glass for conditions as indicated in Table 4. When foam disappears add approximately 113 g (4 oz.) of refrigerant.
- g. Check that the unit operates satisfactorily, then stop the engine, disconnect the gauges and replace the protective caps.

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Table 4 — Receiver/Drier Sight Glass Condition

	Almost No Refrigerant	Insufficient Refrigerant	Adequate Refrigerant	Too Much Refrigerant
Temperature of high pressure and low pressure lines.	Almost no difference between discharge and suction side temperature.	Discharge side is warm and suction side is fairly cold.	Discharge side is hot and suction side is cold.	Discharge side is abnormally hot.
State in sight glass.	Bubbles flow continuously. Bubbles will disappear and something like mist will flow when refrigerant is nearly gone. 	The bubbles are seen at intervals of 1-2 seconds. 	Almost transparent. Bubbles may appear when engine speed is raised and lowered. No clear difference exists between these two conditions. 	No bubbles can be seen.
Pressure of system.	Discharge side is normally low.	Both pressures on discharge and suction sides are slightly low.	Both pressures on discharge and suction sides are normal.	Both pressures on discharge and suction sides are abnormally high.
Action required.	Stop compressor immediately and conduct an overall check.	Check for gas leakage, repair as required. Replenish and charge system.	Nil.	Discharge refrigerant from service valve of suction side.

— SPECIFICATIONS —

Compressor Cylinder Head Bolts	
Tightening Torque.....	30-34 Nm (22-25 lb.ft)
Rotor Pulley Shaft Nut	
Tightening Torque.....	34-40 Nm (25-30 lb.ft)
Front Plate Air Gap.....	0.040-0.078 mm (0.0016-0.0031 in.)
Compressor Oil Capacity (OM-70).....	Approx. 4.6 fl. oz. (135 cc)

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— FAULT FINDING —

Air Conditioning

Symptom	Probable Cause	Action
1. Sweating or frosted expansion valve.	a. Clogged or restricted expansion valve. b. Damaged or inoperative expansion valve.	a. Replace expansion valve and recharge system. b. Replace expansion valve and recharge system.
2. Sweating or frosted suction hose.	a. Faulty expansion valve. b. Damaged or inoperative expansion valve.	a. Replace expansion valve and recharge system. b. Replace expansion valve and recharge system.
3. Warm air being discharged from air conditioning system.	a. Receiver/drier is saturated with moisture.	a. Discharge air conditioning system, replace the receiver/drier (twice if necessary), completely evacuate the system (repeat 1 hour evacuation three times), then recharge system.
4. Excessively hot suction hose.	a. Restricted or damaged condenser surface. b. Excessive amount of refrigerant gas. c. Internal restriction in the condenser.	a. Clean and check condenser cooling fins. b. Discharge and recharge system to specification. c. Replace condenser and recharge system.
5. Frosted discharge hose.	a. Restriction in receiver/drier. b. Restriction in high pressure line.	a. Replace receiver/drier and recharge system. b. Discharge system, replace hose and recharge system.
6. Inadequate cooling action.	a. Damaged or inoperative air conditioning compressor.	a. Report condition.
7. Insufficient air.	a. Air inlet blocked. b. Blocked evaporator core.	a. Remove obstruction b. Clean evaporator core with compressed air.
8. Compressor does not run.	a. Air conditioner fuse blown. b. Pressure switch inoperative. c. Compressor drive belt loose. d. Low battery voltage. e. Excessive air gap in compressor. f. Faulty air conditioner relay.	a. Replace fuse. b. Replace switch. c. Adjust belt. d. Recharge battery. e. Adjust air gap. f. Replace the relay.
9. Low pressure too high.	a. Internal malfunction of compressor. b. Faulty expansion valve.	a. Repair or replace the compressor. b. Replace the expansion valve.
10. Low pressure too low.	a. Insufficient refrigerant. b. Clogged receiver/drier. c. Frosted piping.	a. Discharge and recharge the system. b. Replace. c. Clean or replace piping.

Air Conditioning (continued)

Symptom	Probable Cause	Action
11. High pressure is too high.	a. Excessive refrigerant.	a. Discharge the excess refrigerant.
12. High pressure too low	a. Insufficient refrigerant. b. Compressor malfunction.	a. Charge with refrigerant. b. Repair or replace the compressor.

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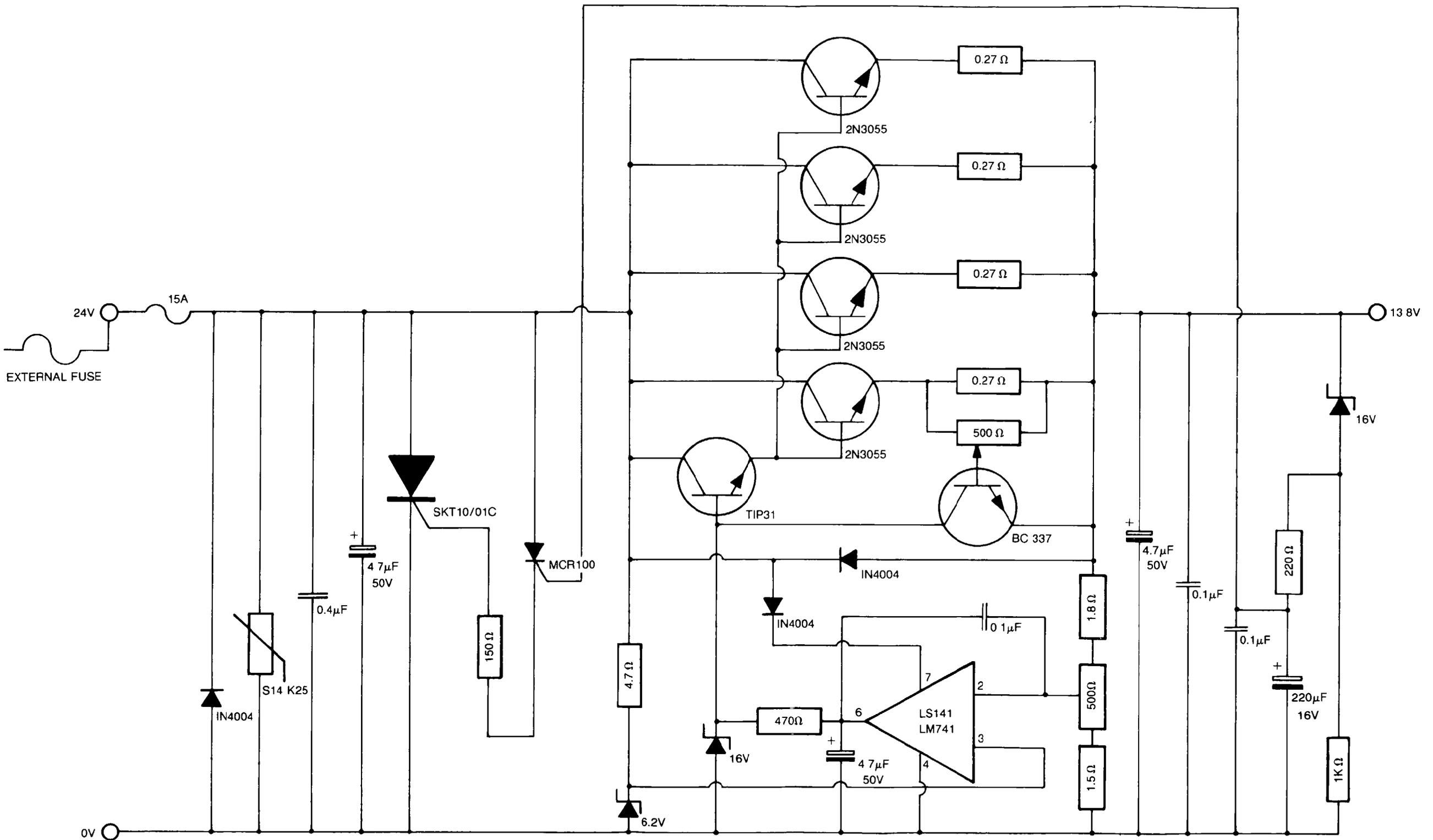


Figure 41 — Wiring Diagram — Voltage Reducer V10 A-B

END

List VEH G 06.1 Code 5