

TRUCK, AMBULANCE, LIGHT, 4 LITTER, FFR, WINCH, MC2 – LAND ROVER 110 6X6

AIR CONDITIONER REFRIGERANT RETROFIT

MODIFICATION INSTRUCTION

This instruction is authorised for use by command of the Chief of Army. 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 EMEI General A 001.

INTRODUCTION

1. This instruction details the conversion of the air conditioner in the Land Rover Ambulance from R12 refrigerant to R134a refrigerant and incorporates the replacement of the compressor mounting bracket.
2. **Associated Publications.** Reference may be necessary to the latest issue of the following documents:
 - a. Technical Regulation of Army Materiel Manual (TRAMM) (available from DTR-A website <http://intranet.defence.gov.au/armyweb/Sites/DTRA>);
 - b. TRAMM, Volume 3, Section 2, Chapter 2, Fleet Engineering Change Management Process;
 - c. Defence Supply Chain Manual (DSCM), Volume 4, Section 3 – Supply Management Processes, Stores Accounting General (DSCM website <http://dknln009.car.defence.gov.au/dscm/index.htm>);
 - d. DSCM, Volume 6 – Manage Repairable Items;
 - e. Defence Safety Manual (SAFETYMAN); and
 - f. [EMEI Vehicle G 223](#) – Truck, Ambulance, Light, 4 Litter, FFR. Winch, MC2 – Land Rover 110 6x6, Light Grade Repair.
3. **Authority.** ECO 6x6 003 is the authority to carry out this modification.

GENERAL

4. **Modification Application.** This modification is to be applied to all stocks on issue to units, depot stocks, and stocks in storage.
5. **Items Affected.** This modification alters the following assemblies:
 - a. air conditioner refrigerant;
 - b. air conditioner oil;
 - c. air conditioner condenser configuration; and
 - d. air conditioner compressor mounting bracket.
6. **Priority – Group 1.** All applicable equipment is to be modified prior to further use of the air conditioning system

NOTE

Where modification would delay priority issues of depot or pool stock, equipment may be issued unmodified providing the equipment record book is endorsed appropriately.

7. **Action Required.** Actions detailed in this instruction are to be performed by ECN 418 (Technician Electrical) at repair agencies authorised to carry out Medium or Heavy Grade repairs or by trade repair agencies as appropriate.

NOTE

On receipt of this instruction, enter all relevant information other than date completed in the modifications section of the GM 120 – Record Book for Service Equipment.

8. Estimated Workhours. For initial planning purposes only, it is estimated that this modification will take 13 workhours to perform.

9. Stores Required. The stores required are listed in Table 1. All stores are to be demanded through normal supply channels.

Table 1 Stores Required

Item	NSN	Mfr Part No	Designation or Description	Unit of Issue	Qty per Kit	Qty per Equip
1	4130-66-144-6237	BYG2181	Kit – Condenser Retro Fit – Ambulance (comprising items 3 - 7)	ea		1
2	4130-66-145-0828	AYG0580	Air Compressor Brace Kit	ea		1
3		HYM1088	Condenser Assembly (comprising items 8 – 19)	ea	1	
4		HYM1078	Fixing Kit (comprising items 20 – 37)	ea	1	
5		AYG0566	Suction Hose (Complete to middle connection)	ea	1	
6		HYM1079	No 8 Hose (Complete to condenser) with connecting bar	ea	1	
7		HYM1080	No 8 Hose (Condenser to main hose)	ea	1	
8		HYM0617	680 x 360 x 16 'O' Condenser	ea	1	
9		HYM1077	Top Bracket	ea	2	
10		HYM1081	Bottom Bracket	ea	1	
11		HYM0645	M6 x 20 SFX Bolt	ea	8	
12		HYL9241	M6 Rivnut	ea	8	
13		HYM1082	24 Volt Electric Fan	ea	1	
14		SH303121	3/16 in Whit x 1 ½ in HHSS	ea	4	
15		HYM0641	3/16 in Flat Washer	ea	4	
16		HYM0642	¼ in x 1 ¼ in Mudguard Washer	ea	8	
17		HYM0643	¼ in x 1 ¼ in Red Fibre Washer	ea	8	
18		HYM0648	3/16 in UNC Nyloc Nut	ea	4	
19		AB610041	No 10 x ½ in Self Tapper	ea	1	
20		HYM0645	M6 x 20SFX Bolt	ea	4	
21		HYM1083	M6 Whiz Nut	ea	2	
22		HYM1084	Cable Ties Black (Thick)	ea	8	
23		HYM1085	Cable Ties Black (Thin)	ea	4	
24	4130-66-128-5930	HYL9029	Stubby Drier	ea	1	
25		HYM0274	HLPCO Switch	ea	1	
26		HYM0717	No 8 Hose saddle	ea	2	
27		HYM1089	PAG 10 Oil (250 ml)	ea	1	
28		HYM0675	Ozone Friendly Label	ea	1	

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Table 1 Stores Required (Continued)

Item	NSN	Mfr Part No	Designation or Description	Unit of Issue	Qty per Kit	Qty per Equip
29		BX606121	3/8 in UNF x 1 ½ in Bolt HT	ea	1	
30	5310-66-128-4936	WA600031	3/8 in Flat Washer	ea	1	
31		WM600031	3/8 in Flat Section Spring Washer	ea	1	
32		HYM1086	Oil Filler Plug	ea	1	
33		HYM0718	No 10 O ring	ea	1	
34		HYM0737	No 8 O ring	ea	2	
35		HYM0716	No 6 O ring	ea	1	
36		HYM9272	O ring to suit BL 1920 Fitting	ea	2	
37		HYM1087	24-volt Fan Relay & Harness	ea	1	

10. Items to be Removed. The items to be removed are listed in Table 2. All stores removed are to be processed in accordance with DSCM, Volume 4, Section 3 – Supply Management Processes, Stores Accounting General.

Table 2 Items to be Removed

Item	NSN	Mfr Part No	Designation or Description	Qty per Equip
		AYG515	Mounting, air conditioner compressor	1
			Hose assembly, non metallic, discharge line	1
	4103-66-128-5930	23-700	Filter/Drier, Refrigerant	1

11. Drawings Required. Figures 1 to 3 show the correct fitting of the replacement air conditioner mounting bracket.

DETAIL

12. Modification of Air Conditioner Assembly. The procedure for removal is as follows:

- a. Disconnect the vehicle and auxiliary batteries.
- b. Remove the 100 A alternator (EMEI VEH G 223).
- c. Remove the bolts holding the ring clamps to the engine support casing.
- d. Remove the 140 mm long bolt as shown in Figure 1.
- e. Check to ensure bolts MYH3679 and MYH3678 are torqued to 61 – 68 N.M (if replaced also use Loctite 242).
- f. Jack up the engine to allow removal of the LH front engine mount. Use an angle grinder to remove the corner of the engine mount as shown in Figure 2. This will eliminate a potential foul condition.

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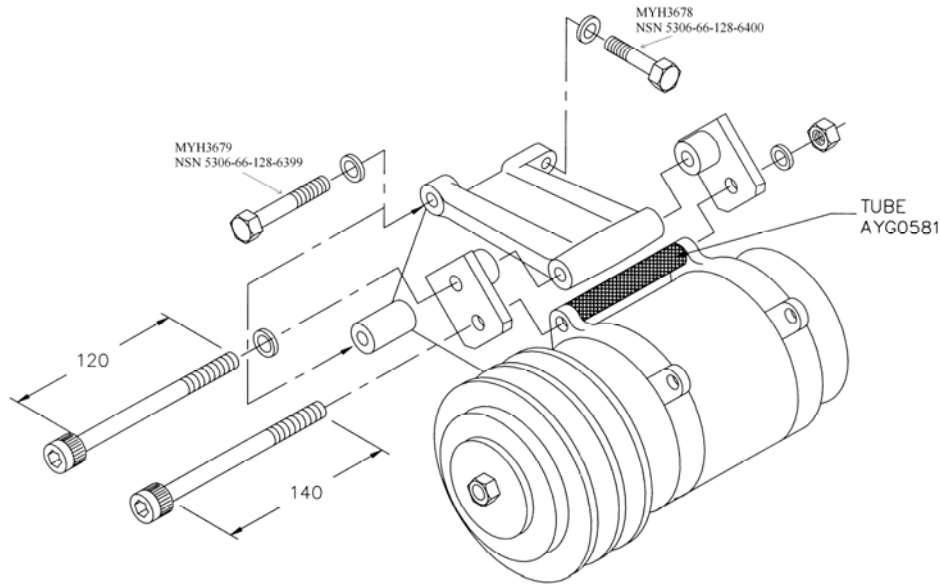


Figure 1 Compressor Mounting Configuration

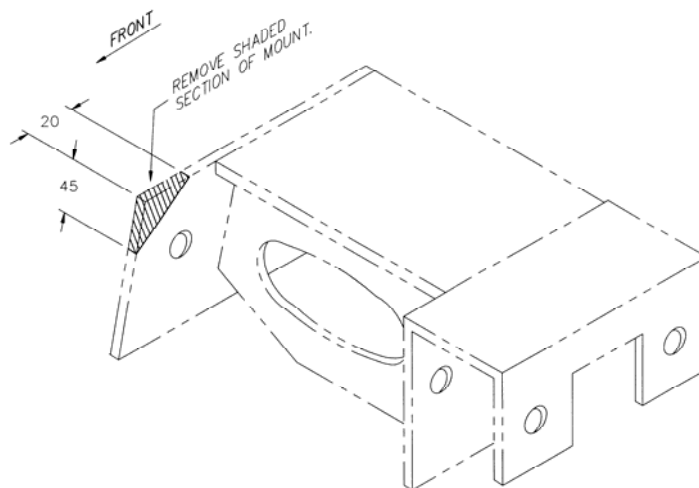


Figure 2 LH Engine Mount To Chassis

- g. Refit the engine mount and lower the engine.
 - h. Reclaim the refrigerant charge from the air conditioner system.
 - i. Disconnect the siren wiring at the rear of the siren.
 - j. Remove the eight retaining screws from the radiator grille and remove the grille.
 - k. Remove the six retaining screws and six retaining bolts and remove the radiator grill support panel.
 - l. Remove the two cross support braces and disconnect the bonnet latch return spring.
 - m. Disconnect the horn.
 - n. Remove the radiator top support bracket and clean the front of the radiator.
13. **Assembly.** Begin assembly of the new condenser as follows:
- a. Position the new condenser assembly with the thermofan facing outwards and align the bottom brackets with the original lower mount holes and place the original bolts through as guides (hold in position).
 - b. Position the radiator top support bracket.

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- c. Position the condenser parallel with the radiator, hold it in position, and mark the drill hole position in the top support bracket from underneath.
 - d. Remove the top support bracket, centre punch, and drill the marked holes with a 6.5 mm drill.
 - e. Secure the top support panel to the new condenser.
 - f. Route the power wire (red) to the positive of the starter motor following the positive battery lead.
14. **Compressor.** The retrofit procedure for the compressor is as follows:

- a. Loosen the rear pipe-retaining bracket bolt on the compressor. Remove the lower two mounting bolts of the compressor.

NOTE

Ensure there is sufficient clearance. For ease of removal of the compressor, use a jack to raise the body.

- b. Remove the retaining bracket bolt and place pipes out of the way. Remove the compressor.
- c. Inspect the internal refrigerant piping. If contaminated, the system should be flushed with dry nitrogen.
- d. The compressor should be drained of all mineral oil, and ideally be flushed twice with the type of oil recommended for this retrofit procedure (PAG 10). When this is completed, charge the compressor with the correct amount of oil (200 ml) and seal it. The sump plug O ring should be replaced with a HNPR type suitable for R134a refrigerant.
- e. Fit the spacer tube between the mounting lugs of the compressor. Discard the spacer and fit the spacer block AYG0584.

NOTE

The casting taper on mounting AYG0465 may require light grinding adjacent to the flat on the spacer tube to allow fitting of the tube.

- f. Refit the 140 mm long bolt (Figure 2).
- g. Position the brace between the front alternator mount clamp ring and engine mount casting (Figure 3). Refit the two 12 mm bolts. The lower leg of the brace will be adjacent to the compressor mount bracket and should be clamped via the new tapped spacer block. Leave all bolts and brackets loose. Check the complete assembly for alignment before locking up fixings to brackets.

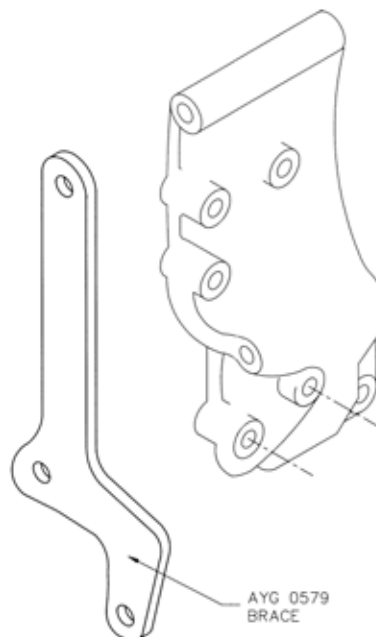


Figure 3 Brace

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- h. Replace the compressor in the reverse order to which it was removed. Adjust the V belts in accordance with EMEI Vehicle G 223.
 - i. Disconnect the discharge hose at the union located under the front passenger firewall, and remove the old discharge hose. Connect the new discharge hose to the condenser outlet (top connection), connect the other end to the union, and route the hose between the radiator and the inner guard.
 - j. Connect the other discharge hose to the new condenser inlet (lower connection), and route the hose between the radiator and the inner guard. Loop the hose along the inner guard and connect it on to the compressor. Secure the hoses to the inner guard with the hose saddles supplied; use the existing bracket off the engine mounting to support the hoses connected to the compressor.
 - k. Position the radiator top support panel (ensure that the bonnet latch is realigned). Tighten the lower cross-support brace bolts and reinstall the radiator grille support panel and the radiator grille. Replace the bonnet latch return spring.
 - l. Route the control wire from the relay along the discharge hose from the compressor. Connect the relay control wire to the compressor clutch wire (when the clutch cycles, the electric fan runs).
 - m. Remove the condenser grille cover on top of the vehicle. Remove the old filter drier and install the new filter drier; carefully checking the flow direction of the gas (Ref EMEI VEH G 223).
 - n. Install the R134a charging access fittings. No R12 access ports should be left as available charging ports.
 - o. The system is now fully assembled. Evacuate the system for 10 minutes, conduct a leak test, and then evacuate for two hours. After evacuation, charge the system with 1.2 kg of R134a refrigerant.
 - p. Inspect the evaporator filter. Remove and clean it if required.
- 15. Post Modification Testing.** Leak check and performance test the refrigeration system. Test the 100 A alternator output voltage and adjust in accordance with EMEI Electrical P 410 series if required.
- 16. Recording Action.** On completion of the modification, the following action is to be taken in accordance with TRAMM, Volume 3, Section 2, Chapter 2, Annex D:
- a. Deface the number 15 on the modification record plate.
 - b. Complete the modification details in the GM 120 – Record Book for Service Equipment.
 - c. Forward the modification completion details using form GM 119 – Advice of Change in Build State (TRAMM, Volume 3, Section 2, Chapter 3, Annex C) to:
NFM Lt B Vehicles
LV SPO, DMO
Victoria Barracks, St Kilda Rd
SOUTHBANK VIC 3006

END

Distribution List: **VEH G 20.2 – Code 4** (Maint Level)
(Sponsor: LV SPO, Lt B Veh)
(Authority: MEA Job No 9600297)