

**TRUCK, UTILITY, LIGHTWEIGHT, FFR, MC2 – LAND ROVER 110  
TRUCK, UTILITY, LIGHTWEIGHT, FFR, WINCH, MC2 – LAND ROVER 110  
MEDIUM AND HEAVY GRADE REPAIR**

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.

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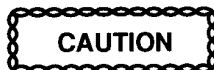
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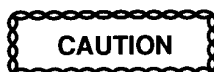
### **INTRODUCTION**

1. This EMEI contains procedures for removing, dismantling, repairing, assembling and installing various components of the Truck, Utility, Lightweight, Fitted for Radio, including Winch models. Where applicable, instructions for the adjustment, lubrication and minor servicing of these items are included. The EMEI is segregated into both Medium and Heavy Grade Repair at the appropriate paragraphs; common information is listed prior to specific repair criteria. This EMEI supersedes EMEI Vehicle G 114-1 Issue 1.



**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.**

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



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

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

4. Discard all used gaskets, seals, cotter pins, tab washers, lock pins, key washers and lock washers. Dispose of all contaminated fuel and lubricants drained from the vehicle in accordance with current local instructions.

5. Use only those fuels and lubricants specified in the Servicing Instruction, EMEI Vehicle G 109, the User Handbook and this instruction 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 Nalcool corrosion inhibitor, in water, at a ratio of 1:12.



**Precautions should be taken prior to carrying out repairs which include painting, sanding, scraping or welding. Refer to EMEI Workshop D 701 – Repair Policy for Equipment Painted in Polyurethane Paint.**

8. This vehicle is painted in polyurethane paint.

### **Associated Publications**

9. Reference may be necessary to the latest issue of the following documents:

a. Defence Road Traffic Instructions;

b. Complete Equipment Schedules (CES):

(1) Truck, Utility, Lightweight, FFR, MC2 – Land Rover 110;

(a) SCES 12038; and

(b) Equipment Kit SCES 12036;

(2) Truck, Utility, Lightweight, FFR, Winch, MC2 – Land Rover 110;

(a) SCES 12039; and

(b) Equipment Kit SCES 12036;

- c. EMEI Vehicle G 103 Truck, Utility, Lightweight, MC2, Land Rover 110 and Truck, Utility Lightweight, Winch, MC2, Land Rover 110 – Light Grade Repair;
- d. EMEI Vehicle G 104-2 Truck, Utility, Lightweight, MC2, Land Rover 110 and Truck, Utility Lightweight, W/Winch, MC2, Land Rover 110 – Heavy Grade Repair;
- e. EMEI Vehicle G 110 Truck, Utility, Lightweight, FFR, MC2, Land Rover 110 – Data Summary;
- f. EMEI Vehicle G 112 Truck, Utility, Lightweight, FFR, MC2, Land Rover 110 and Truck, Utility Lightweight, FFR, Winch, MC2, Land Rover 110 – Technical Description;
- g. EMEI Vehicle G 113 Truck, Utility, Lightweight, FFR, MC2, Land Rover 110 and Truck, Utility Lightweight, FFR, Winch, MC2, Land Rover 110 – Light Grade Repair;
- h. EMEI Workshop D 701 Painting of Army Equipment – Repair Policy for Equipment Painted in Polyurethane Paint;
- i. Repair Parts Scale 02190; and
- j. Repair Parts Scale 02191 (Winch).

10. A number of modifications and improvements have been made during the service life of the vehicle. Reference to the following publications may be required during repair activities. Any effect of these publications pertaining to the technical content of this document has been included in the text:

- a. EMEI Vehicle G 117-1 Truck, Utility, Lightweight, FFR, MC2, Land Rover 110 and Truck, Utility Lightweight, FFR, Winch, MC2, Land Rover 110 – Roll Over Protection and Fitting of Head Restraints;
- b. EMEI Vehicle G 117-4 Truck, Utility, Lightweight, FFR and FFR Winch, MC2, Land Rover 110 4X4 – Reinforcement of Rear Canopy Bow for Air Portability of Vehicles Fitted With Interim Gunnery Computer;
- c. EMEI Vehicle G 187-14 Truck, Utility, Lightweight, FFR, MC2, Land Rover 110 All Types, Truck, Utility Light, FFR, Land Rover Series 3 All Types and Truck, Cargo, Light FFR, MC2, Land Rover 110 All Types – Rewiring of the 28V Voltmeter Circuit;
- d. EMEI Vehicle G187-15 Truck, Lightweight and Truck Light, all Types, Land Rover 110 4x4 and 6x6 – Replacement of 24 V Power Distribution Box Cables Between Generator Input Plug and Battery Connections.

**WARNING**

**All industrial safety, work practices and equipment operating and maintenance instructions pertaining to this EMEI are to be adhered to.**

**The handling, storage and use of chemical substances is to be in accordance with SAFETYMAN, MSDS and EMEI Workshop series requirements.**

**GENERAL**

**Location of Identification Numbers**

11. The locations of identification numbers on components of the vehicle are described in Table 1.

**Table 1 Location of Identification Numbers**

Serial	Identification Number	Location
1	Chassis	Right-hand side of the chassis, forward of the spring mounting turret
2	Chassis nameplate	Left-hand seat box, in the cab
3	Engine	Left-hand side of the engine block
4	Injection pump identification	Side of the pump
5	Transmission and transfer case	Rear of the transfer case
6	Front axle	Adjacent to the axle breather
7	Rear axle	Adjacent to the axle breather

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**Special Tool**

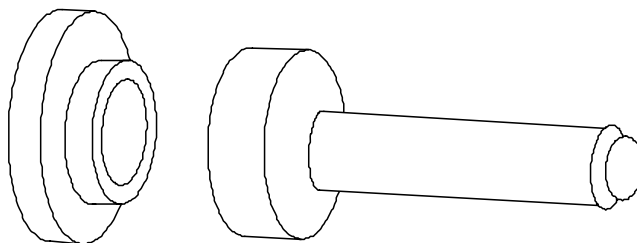
12. The following special tool, as detailed in Table 2 and illustrated in Figure 1, is required.

**NOTE**

NSN and Manufacturer's part numbers and designations used in this EMEI were current at the date of issue. If twelve months or more have expired since issue, the NSN and Manufacturer's part number should be checked for supersession.

**Table 2 Special Tool**

Part No.	NSN	Item Name	Use
18GA092	5120-66-128-4312	Insertor, Seal	Installing crankshaft front oil seal



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**Figure 1 Special Tool**

13. The list of lubricants is detailed in Table 3.

**Table 3 List of Lubricants**

Serial	Equipment	Lubricant	Capacity (litres)
1	Engine (including filter)	OMD-115	8.5
2	Transmission	OMD-115	2.7
3	Transfer case (without PTO)	OMD-115	3.2
4	Transfer case (with PTO)	OMD-115	5.8
5	Front differential	OEP-220	1.7
6	Rear differential	OEP-220	2.3
7	Swivel pin housings	Molytex grease	EP00 Sachet
8	Brake master cylinder	OX (Aust) 8	Fill to level
9	Clutch master cylinder	OX (Aust) 8	Fill to level
10	Steering box	OEP-220	0.45
11	Fanbelt jockey pulley	XG-291	As required
12	Wheel bearings	XG-291	As required
13	Winch rope	Rocol wire rope lube NSN 9150-99-337-1498	As required
14	Radiator inhibitor	Nalcool	As required (1:12 ratio)
15	Propeller shaft	XG-291	As required
16	Winch drive line	XG-291	As required
17	Winch	OEP-220	1.3

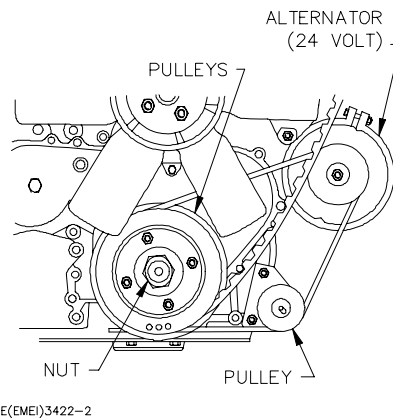
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## MEDIUM GRADE REPAIR

### ENGINE – GROUP 1

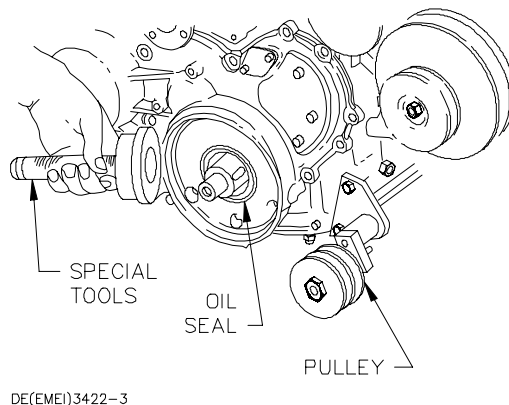
#### Crankshaft Oil Seal – Front

14. **Removal.** Remove the crankshaft front oil seal as follows:
- Remove the radiator in accordance with EMEI Vehicle G 103 – Group 2.
  - Clean the crankshaft pulley and surrounding area with a recommended cleaning agent and blow the area dry with compressed air.
  - Slacken the adjusting bolt on the pulley arm, then detach the two fanbelts from the crankshaft pulley and the 28-volt alternator.
  - Loosen the 12-volt alternator adjusting and mounting bolts and move the alternator towards the engine. Remove the fanbelt.
  - Ensure that the parking brake is applied, low gear is selected and all the wheels are chocked. Remove the crankshaft front nut and washer (Figure 2), then remove the pulley.
  - Remove the oil seal using a lever or seal puller as required.



**Figure 2 Removing the Crankshaft Pulley**

15. **Installation.** Install the crankshaft front oil seal as follows:
- Lubricate the outer surface of a new seal with clean engine oil, then position the seal on the timing case cover. Install the seal using special tool 18GA092 (Figure 3).



**Figure 3 Installing the Crankshaft Front Oil Seal**

- Ensure that the seal rubbing surface on the pulley is not grooved or worn, then install the pulley, washer and nut. Torque the nut to 382 to 480 N.m (282 to 354 lbf.ft).
- Install the fanbelt, then adjust the 12-volt alternator for a 10 to 15 mm deflection on the longest span of the fanbelt when depressed with the thumb.

- d. Fit the two 28-volt alternator fanbelts in the pulley grooves, then position the pulley arm to allow a deflection of 5 to 10 mm on the longest span of the belts, and tighten the locknut securely.
- e. Install the radiator in accordance with EMEI Vehicle G 103 – Group 2.

**Table 4 Engine Group Specifications**

Serial	Item	Specification
1	12-volt alternator - fanbelt deflection	10 to 15 mm
2	28-volt alternator - fanbelt deflection	5 to 10 mm
3	Crankshaft front nut tightening torque	382 to 480 N.m (282 to 354 lbf.ft)

**ELECTRICAL – GROUP 15**

**Power Distribution Box (PDB)**

16. Test the PDB as follows:

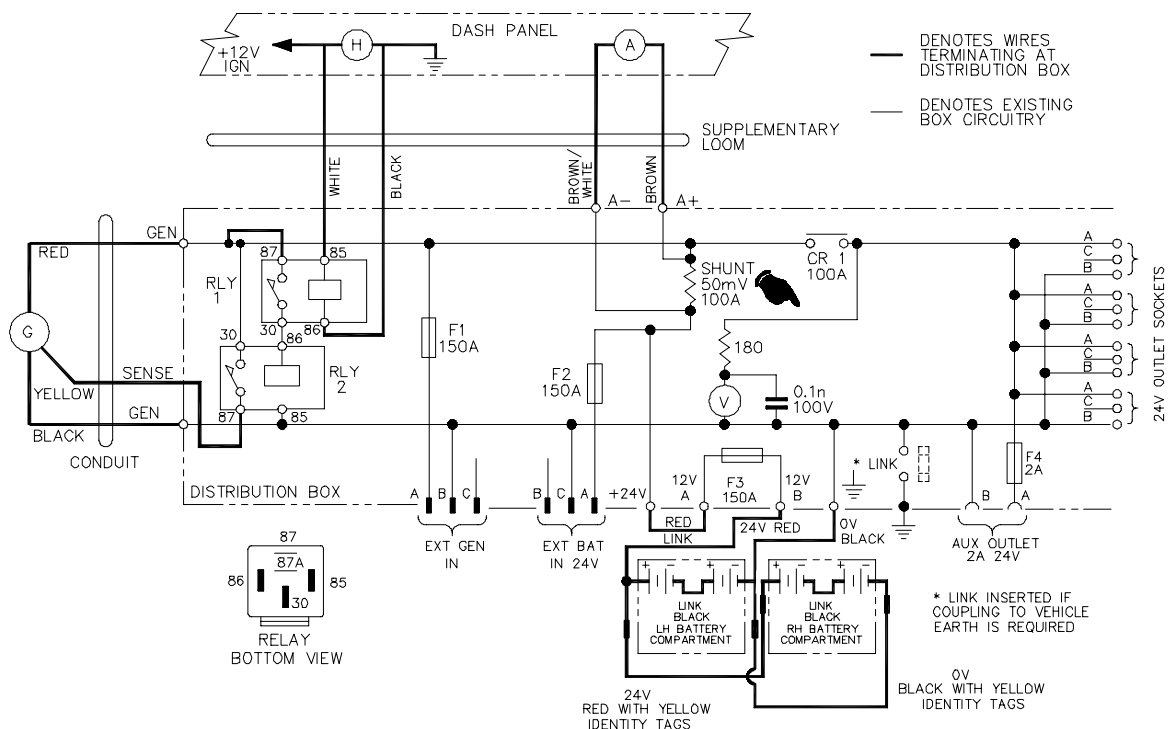
- a. Position the Master Switch on the PDB to the ON position and check the reading on the battery condition indicator. The voltage reading should be approximately 24 volts.

**NOTE**

If the battery condition indicator continues to indicate when the Master Switch is in the OFF position, modify the PDB in accordance with EMEI Vehicle G 187-14.

- b. Start the engine and set the hand throttle for approximately 1500 rpm.
- c. Check that the dash mounted ammeter indicates that the batteries are being charged, and that the battery condition indicator now reads approximately 28 volts.
- d. Reduce engine speed to idle and switch off the ignition.
- e. Switch the Master Switch on the PDB to the OFF position.
- f. The circuit diagram is shown in Figure 4.

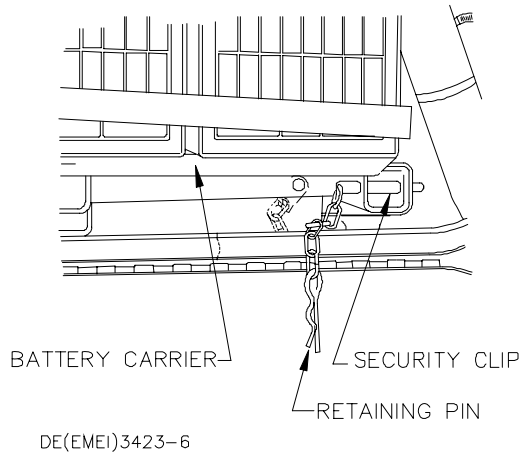
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**Figure 4 24-volt Circuit Diagram**

17. **Removal.** Remove the PDB as follows:
- a. Ensure the master switch on the PDB is in the OFF position.
  - b. Disconnect any plugs connected to the PDB outlets/inlets.
  - c. Remove the security clip and pin from the left-hand battery carrier (Figure 5), then slide the batteries and carrier clear of the vehicle body until the small bridging cable is exposed.

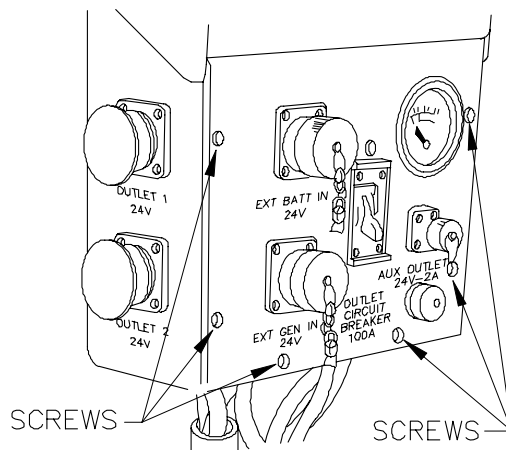


**Figure 5 Left Side Battery Compartment**



**When removing the bridging cable, extreme care must be taken to prevent the cable ends shorting out on the vehicle body.**

- d. Disconnect the bridging cable from both the positive and negative terminals on the batteries. Remove the cable.
- e. Repeat the procedure for the batteries installed on the right side of the vehicle.
- f. Disconnect the main vehicle battery located under the front passenger seat.
- g. Remove the screws securing the front panel and hinged top section of the PDB. Withdraw the front panel from the PDB to allow the power terminals to be exposed. Tag and disconnect all cables, then remove all cables from the bottom of the PDB (Figure 6).



**Figure 6 Removing the Power Distribution Box**

- h. Remove the hexagonal headed screws securing the PDB to the vehicle body. Remove the PDB.



- 18. Installation.** Install the PDB as follows:

**NOTE**

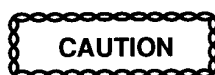
Ensure the cables connecting the generator input connector to the battery connections, inside the PDB, have been modified in accordance with EMEI Vehicle G 187-15.

- a. Position the PDB on the vehicle body and secure it with the hexagonal headed screws.
- b. Feed all the power cables through the bottom of the PDB ensuring that all grommets are fitted correctly.
- c. Connect all the power cables to the correct terminals, as tagged on removal, then fit the front and hinged sections on the PDB. Secure them with screws.
- d. Connect the bridging cable between the positive and negative battery terminals fitted to the right side of the vehicle, then stow the batteries and carrier. Secure the carrier with the pin and security clip. Repeat the procedure for the batteries installed on the left side of the vehicle.
- e. Connect the battery installed under the front passenger seat.

**Fuse Replacement**

- 19.** Replace the fuses as follows:

- a. Ensure the master switch on the PDB is in the OFF position.
- b. Disconnect any plugs connected to the PDB outlets/inlets.
- c. Remove the screws securing the PDB lid and open the lid.
- d. Check the fuses using a continuity tester.
- e. Remove faulty fuses by loosening the nuts securing the fuse terminals to the posts, then removing the fuse.



**Replace fuses with fuses of the same size and type. Determine the cause of failure of the fuse and rectify as necessary.**

- f. Fit the new fuse to the terminal posts and tighten the nuts securely.
- g. Close the PDB lid and secure it with the screws.

**BODY – GROUP 17**

**Roll Over Protection**

**20.** The vehicle is fitted with a roll over protection structure (ROPS). Refer to EMEI Vehicle G 117-1 for fitting instructions.

**21.** Some vehicles have had the rear canopy bow reinforced to enhance air portability of vehicles fitted with the Interim Gunnery Computer. Refer to EMEI Vehicle G 117-4 for reinforcement instructions.

**WARNING**

**The roll over protection assembly is to be replaced if the vehicle has been involved in a roll over accident.**

**The roll over protection assembly is to be replaced where distortion has occurred to the roll over structure or capping rails.**

**The roll over protection assembly is to be replaced if any welds are cracked or have failed.**



The roll over protection is **NOT** to be modified or repaired by drilling, grinding or welding the structure. The ROPS is to be repaired by replacement.

Loose/damaged rivnuts used for mounting the camouflage net carrier are authorised to be repaired in accordance with the procedure detailed in EMEI Vehicle G 199-2.

### HEAVY GRADE REPAIR

#### ELECTRICAL – GROUP 15

##### Alternator (28-volt)

22. **Overhaul Procedure.** Overhaul the 28-volt alternator in accordance with EMEI Electrical P 414-2.

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**END**

Distribution List: **VEH G 16.2 – Code 3** (Maint Level)  
(Sponsor: LV SPO, Light B Vehicles)  
(Authority: TRAMM)