Registry of Ex Military Land Rovers

7610-66-140-6653

TECHNICAL MANUAL

USER HANDBOOK

TRUCK, ASSAULT PIONEER, LIGHT, WINCH, MC2

2320-66-139-4887
(SIGC No. 2320-0159)
Specification ARMY (AUST) 6839
1996

Issued by Command
of the Chief of Army

(J.W. Kingston)
Major General
Assistant Chief of Army - Materiel

AMENDMENT RECORD

Amendment No.	Actioned by: Signature and Date

SYNOPSIS

The Truck, Assault Pioneer, Light, Winch, MC2 is a six-wheeled Army vehicle designed specifically for military use. The vehicle is based on the Land Rover 110 Series commercial vehicle, but with an extended chassis and an additional axle. The Assault Pioneer vehicle is a constant four-wheel drive (front and intermediate axles) with selective six-wheel drive for negotiating difficult terrain. Vehicle slinging, tie-down and recovery points are incorporated in the chassis.

The Assault Pioneer body is a self-contained structure which can be fitted to the cab/chassis of a Truck, Cargo, Light, MC2 in place of the standard cargo tray body.

The body is designed to carry an assault pioneer section of six, their equipment, supplies and ammunition.

The vehicle has a range of approximately 600 km on first class roads, and 480 km on second class roads. Cross country ranges vary depending on terrain. The rated Gross Vehicle Mass (GVM) and Gross Combined Mass (GCM) for both highway and cross country conditions is 5.6 tonne and 7.6 tonne respectively.

WARNING

Page No.

WARNING

Seat belts should be adjusted as firmly as possible consistent with comfort to provide the protection for which they have been designed. A slack belt will greatly reduce the protection afforded to the wearer.

Care should be taken to avoid contamination of the webbing with polishes, oils and chemicals, and particularly battery acid. Cleaning may safely be carried out using mild soap and water. The belt should be replaced if webbing becomes frayed, contaminated or damaged.

It is essential to replace the entire assembly after it has been worn in a severe impact, even if damage to the assembly is not obvious. Belts should not be worn with the straps twisted.

Each belt assembly must only be used by one occupant; it is dangerous to put a belt around a child being carried on the occupant's lap.

No modifications or additions should be made by the user which will either prevent the seat belt adjusting devices from operating to remove slack, or prevent the seat belt assembly from being adjusted to remove slack.

WARNING 32, 96

This vehicle is painted in polyurethane paint. 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, Australian Army Equipment Painting Policy DI(A) TECH 15-1, or relevant EMEI.

WARNING 51

Should the engine become overheated, park the vehicle in a safe working area and allow the engine to cool before attempting repairs to, or refilling of, the cooling system.

WARNING 53

Because of the excellent rough terrain characteristics of this vehicle, drivers are to maintain a safe speed for the conditions encountered, especially when towing a trailer or utilising tyre chains.

WARNING 53

Lock the transfer case differential to engage six wheel drive when crossing difficult terrain or when conditions may lead to loss of traction. All three axles are driven when the transfer case differential is locked. Only the front and intermediate axles are driven when the transfer case differential is unlocked.

WARNING 54

Do not work under raised vehicle unless load is supported by independent stands.

WARNING 55

The parking brake acts on the transmission, not the rear wheels. The differential lock must be engaged and the wheels chocked to enable the vehicle to be raised safely with the vehicle jack.

WARNING 55

Hi-Lift jack is only to be used in the designated lifting points. It is not to be used in any other position on the vehicle.

WARNING 58

When using rear lift recovery, extreme caution must be observed, especially when the vehicle is fully laden as front and rear axle and tyre overload can occur.

WARNING 59, 92

Always wear industrial gloves when handling steel wire rope. Do not use hands to guide the rope on or off the drum when winching.

WARNING 63

Ensure that the engine is turned off prior to engaging the compressor drive.

WARNING 64

Stop the engine prior to disengaging the compressor drive.

WARNING 69

Ensure that the bonnet support stay is properly locked into position before releasing the bonnet.

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

ASSOCIATED PUBLICATIONS

1. Standing Orders for Vehicle Operation and Servicing (Vol. 2 — B Vehicles)
2. MEMA Vol. 3
3. Australian Army Books:
   GM 120 Record Book for Service Equipment — Army
4. Complete Equipment Schedules (CES):
   SCES 12195 - Truck, Assault Pioneer, Light, Winch, MC2
5. Block Scale 2406/31 — 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 270-3— Data Summary (Truck, Assault Pioneer, Light, Winch, MC2)
9. EMEI VEH G 202 — Technical Description (Truck, Cargo, Light, MC2)
10. EMEI VEH G 272 — Technical Description (Truck, Assault Pioneer, Light, Winch, MC2)
11. EMEI VEH G 203 — Light Repair (Truck, Cargo, Light, MC2)
12. EMEI VEH G 273 — Light Repair (Truck, Assault Pioneer, Light, Winch, MC2)
13. EMEI VEH G 204 — Medium Repair (Truck, Cargo, Light, MC2)
14. EMEI VEH G 204-1 — Heavy Repair (Truck, Cargo, Light, MC2)
15. EMEI VEH G 274-1 — Medium and Heavy Repair (Truck, Assault Pioneer, Light, Winch, MC2)
16. EMEI WKSP E 652 — Use of Polyurethane Paints and Solvents
17. EMEI VEH G 209 — Servicing Instruction
18. Repair Parts Scale 02225

FRONTISPIECE

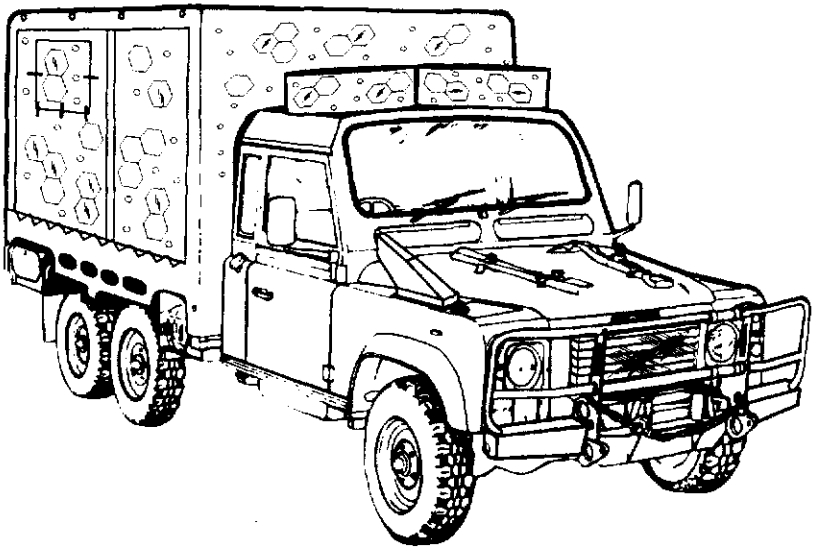


Figure 1-1 Truck, Assault Pioneer, Light, Winch, MC2 - Front View

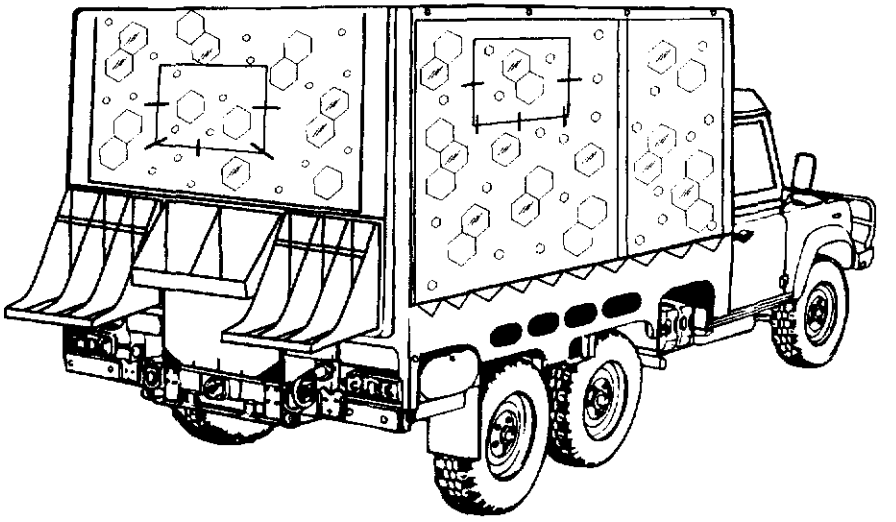


Figure 1-2 Truck, Assault Pioneer, Light, Winch, MC2 - Rear View

MAINTENANCE SUPPLY ITEM (MSI)

IDENTIFICATION

Table 1-1 Location of Identification Numbers on MSI's

Chassis No. — Outside front of the right hand side chassis rail

Nomenclature Plate — Left hand seat box, in the cab

Engine No. — Left hand side of the engine block

Injection Pump Identification — Side of the pump

Transmission and Transfer Case — Rear of the transfer case

Assault Pioneer Body — Right hand front

CHAPTER 1

GENERAL DESCRIPTION

SECTION 1 - DATA SUMMARY

SECTION 2 - SHIPPING AND TRANSPORTATION DATA

SECTION 3 - EQUIPMENT DESCRIPTION

SECTION 1
DATA SUMMARY

NOTE

Throughout this manual all references to left hand (LH) and right hand (RH) are as viewed from the rear of the vehicle looking forward.

Truck Model No.	**Land Rover 110 6 x 6**
1. Engine	
Manufacturer	Isuzu
Type	4BD1 TRB-G series, turbocharged, four cylinder in line, overhead valve four cycle direct injection diesel engine
Displacement	3.856 litres
Bore	102 mm
Stroke	118 mm
Compression ratio	17:1
Firing order	1 - 3 - 4 - 2
Power	90 kW @ 3000 rpm
Maximum torque	314 Nm @ 2200 rpm
No load maximum	3600 ± 100 rpm
Engine idle speed	650 ± 20 rpm
Oil capacity	8.5 litre including filters
Oil filters	External, full flow, spin on
Oil pressure	390-581 kPa @ 2400 rpm
Oil cooler	Water cooled, plate and tube type
Engine dry weight	322.5 kg

Turbocharger	Water cooled, Garret, model ATD-T25

2. Cooling System

Type	Pressurised spill return system with thermostat control, pump and fan assisted
Capacity	12.8 litres
Thermostat	Downward opening wax element type incorporating a by-pass shut off valve. Opening temperature 82°C
Coolant	Water with 5% Alfloc 2001 inhibitor

3. Engine Accessory Drive

12 volt system

Type	Single Vee-belt
Tension	Approximately 10-15 mm deflection, midway along the longest span using moderate thumb force

4. Fuel System

Fuel pump	Diesel Kiki (Bosch) in-line Type A model 550k with automatic timer
Governor	RLD-K mechanical
Transfer pump	KE mechanical with gauze intake filter
Injectors	Four-hole spray type
Main filter	Inlet manifold mounted, spin-on type
Sedimenter	Two chassis mounted CAV SS type sedimenters are connected in parallel

Fuel tanks	Two, 65 litre tanks connected in parallel and independent of each other, tank selection by dash mounted switch

5. Engine Starter

Manufacturer	Mitsubishi
Type	Waterproof, gear reduction (electric powered)

6. Clutch

Manufacturer	Repco/Isuzu
Type	Hydraulically operated single dry plate and diaphragm spring
Free travel (pedal)	6 mm minimum

7. Transmission

Manufacturer	Land Rover
Type	Model LT95A, four forward, one reverse, synchromesh on all forward gears. Incorporates an integral transfer case

Ratios

First gear	4.069:1
Second gear	2.448:1
Third gear	1.505:1
Fourth gear	1.000:1
Reverse gear	3.664:1

8. Transfer Case

Manufacturer	Land Rover
Type	High and low gear ratios operating on the main transmission output. The front and intermediate axles are permanently engaged via a differential in the transfer case. The rear axle is automatically engaged

	when the transfer case differential is locked - for traversing difficult terrain
Ratios	High range 0.996:1 Low range 3.321:1

9. Power Take-Off (PTO)

Manufacturer	Land Rover
Type	Variable speed, chain drive, integral with the transfer case, and incorporates a torque limiter

10. Winch

Manufacturer	Winch Industries
Type	Thomas T9000M
Ratio	45:1
Maximum cable pull	
First layer on drum	4077 kg
Second layer on drum	3488 kg
Third layer on drum	3048 kg
Fourth layer on drum	2707 kg
Fifth layer on drum (partial)	2434 kg
Winch rope	
Type	Right hand ordinary lay with an independent wire rope core
Diameter	11 mm
Length	45 metres
Minimum breaking force	76.3 kN
Oil capacity	2.1 litres

11. Front Axle

Manufacturer	Rover Australia

Type	Fully floating spiral bevel steerable drive axle with enclosed outboard constant velocity joints and four pinion differential
Ratio	4.7:1
Track	1698 mm
Design load rating	1900 kg

12. Rear Axles

Manufacturer	GKN
Type	Salisbury fully floating hypoid bevel drive, four pinion differential
Ratio	4.7:1
Track	1698 mm
Design load rating	2050 kg

13. Propeller Shafts

Type — Front	An open shaft, incorporating a Hookes type universal joint at either end. Variation in the length of the shaft is achieved by employing a splined sliding joint between the two universal joints
— Intermediate	An open shaft, incorporating a Hookes type universal joint at either end. Variation in the length of the shaft is achieved by employing a splined sliding joint between the two universal joints
— Rear	A two piece open shaft incorporating a Hookes type universal joint at either end. The centre section of the shaft is mounted via a bearing to the chassis frame and the articulation of the rear section of the shaft is

	achieved through the use of a double Hookes joint, and a splined sliding joint
14. Front Suspension	
Type	Radius arms with Panhard rod located live axle with vertically mounted double acting telescopic shock absorbers mounted inside single rate coil springs
Design load rating	1900 kg
15. Rear Suspension	
Type	Consists of two live axles located by four semi-elliptic springs. These springs are so mounted that the ends, between the axles, overlap each other and are articulated by a load sharing rocker beam connected to the chassis. Axle bump and rebound travel is controlled by chassis mounted pads and cables. Suspension dampening is by four hydraulic shock absorbers
Design load rating	4100 kg
16. Steering	
Manufacturer	Adwest
Type	Power assisted variable ratio worm and roller type utilising a gear driven pump, mounted on the engine and a remote hydraulic reservoir
Turning circle	
Between kerbs	16.8 metres (nominal)
Between walls	17.2 metres (nominal)

17. Brakes

Type	Hydraulic split system with front and rear disc brakes, foot pedal actuated
Parking brake	Cable operated, transmission mounted drum brake
Warning devices	Dash mounted globes indicating front brake pad lining depth (actuated at 3 mm thickness) a failed hydraulic circuit, and parking brake applied

18. Chassis

Type	Hot dipped galvanised welded box section steel with welded box section crossmembers
Wheelbase	
Front to intermediate axle	3040 mm
Front to rear axle	3940 mm

19. Wheels and Tyres

Rim type and size	Ventilated disc, 6F x 16
Tyre size	7.50-R-16LT 10 ply Olympic Steeltrek with 105 tread pattern
Tyre pressure (cold)	Highway: front 350 kPa (50 psi) intermediate 350 kPa (50 psi) rear 350 kPa (50 psi) Cross-country: front 275 kPa (40 psi) intermediate 275 kPa (40 psi) rear 275 kPa (40 psi) Sand: front 225 kPa (33 psi) intermediate 225 kPa (33 psi) rear 225 kPa (33 psi)

20. Electrical System

Type	The vehicle is fitted with a 12 volt electrical system
12 volt system	12 volt negative earth
Battery	12 volt cold cranking performance of approximately 410 amps, located in the engine compartment
Alternator	Hitachi, 12 volt — 70 amp

21. Lighting, External 12 volt	**Location, Quantity and Wattage**
Headlights, high/low	Front of vehicle, 2 off, 60/55 watt Halogen
Park lights	Front of vehicle, 2 off, 5 watt
Stop and tail lights	Rear of vehicle, 2 off, 21/6 watt
Turn indicator lights	Each corner of vehicle, 4 off, 21 watt
Side indicator lights	Front mudguards, 2 off, 4 watt
Reverse lights	Rear of vehicle, 2 off, 10 watt

22. Lighting, Internal 12 volt	**Location, Quantity and Wattage**
Dome light	Roof of cab, 1 off, 21 watt
Map light	Left hand side of instrument panel 1 off, 5 watt Halogen
Instrument lights - except speedo	Instrument panel, 3 off, 2 watt
Speedometer light	Instrument panel, 2 off, 3 watt
Warning lights - except low fuel	Instrument panel, 10 off, 1.2 watt
Low fuel light	Instrument panel, 1 off, 3 watt
Hazard switch warning light	Dashboard, 1 off, 0.6 watt

23. Lighting, Military	**Location, Quantity and Wattage**
Blackout lights	Front and rear of vehicle 4 off, replaceable module
Convoy light	Rear of vehicle, 1 off, 2 watt
Reduced headlights	Front of vehicle, 2 off, 18 watt
Ancillary circuits	A Coupling is provided at the rear of the vehicle to accept NATO trailer connectors
Body front cage upper doors	Front cage, 4 off, 18 watt
24. Fuses	**Rating (Continuous)**
Located inside the cab, centre console, behind protective panel	
Hazard lights	15 amp
Horn, dome, instrumentation	20 amp
Windscreen wiper, washers	15 amp
Stop, turn, reverse	15 amp
Fan	15 amp
Convoy	3 amp
B/O head	5 amp
Demister	15 amp
Not used	15 amp
Fog light	7.5 amp
Headlights	4 off, 7.5 amp
Parking lights front	5 amp
Parking lights rear	5 amp
B/O stop	3 amp

Rear body utility sockets	20 amp
Stop lights	10 amp
B/O tail light	3 amp
Located under bonnet, near brake master cylinder/booster	
Start/Stop control motor	10 amp
Located under ashtray on dash	
Twin fuel tank valve	10 amp
Cigar lighter	10 amp
Instrument dimmer switch	5 amp
Inspection light socket	15 amp
Rear body lights, inline fuse	15 amp

25. Performance

Gradeability (cross-country laden) both directions	60 per cent gradient (31 degree slope)
Range of operation	600 km (first class roads) approx.
	480 km (second class roads) approx.
Fuel consumption	22 litres per 100 km (highway laden)
	27 litres per 100 km (second class laden) Fuel tank capacity 65 litres each
Maximum Towed Load	2000 kg
26. Carrying Capacity	6 personnel (including driver)

27. Rear Body Internal Dimensions

Height	1800 mm
Width	2085 mm

Length	3100 mm

28. Air Compressor

Manufacturer	United Compressors Australia Pty Ltd
Type	Two cylinder, belt driven unit

SECTION 2
SHIPPING AND TRANSPORTATION DATA

29. Dimensions

Overall length		6300 mm
Wheelbase	- Front axle to intermediate axle	3010 mm
	- Front axle to rear axle	3950 mm
Overall width	- Over mirrors	2500 mm
	- Reduced	2165 mm
Overall height	- Laden	2520 mm
	- Unladen	2550 mm
Track - Front		1698 mm
- Rear		1698 mm
Rear axle to rear of vehicle overhang		1455 mm
Towing pintle height	- Laden	650 mm
	- Unladen	680 mm
Mass (Unladen)		
- Front		1720 kg
- Intermediate		1150 kg
- Rear		1060 kg
- Total		3930 kg
Mass (Laden)		
- Front		1835 kg
- Intermediate		1810 kg
- Rear		1955 kg
- Total (not to exceed)		5600 kg

30. Capacities

Equipment	DEF (AUST) 206	METRIC (litres)
Engine system (including filters)	OMD-115	8.5
Cooling system (including inhibitor)		12.8
Transmission	OMD-115	2.7
Transfer case	OMD-115	5.8
Front axle	OEP-220	1.7
Intermediate axle	OEP-220	2.3
Rear axle	OEP-220	2.6
Swivel pin housing (each)	OEP-220	0.35
Steering box (including reservoir)	OX 46	1.25
Fuel tank - Right hand - Left hand	Diesel	65 65

NOTE

See EMEI VEH G 209 for list of approved lubricants.

31. Fording Depth

Unprepared vehicle	1000 mm
Prepared vehicle	No facility available, as for unprepared vehicle

32. Bridge Classification

Solo unladen	6

33. Ground Clearance

Unladen	215 mm
Limiting feature	Rear differential housings

34. Transportability

Railway loading gauges (Local authorities must be consulted)

Rail Authority	Gauge	Maximum Rolling Stock Height
Commonwealth	1435 mm	2532 mm
Commonwealth	1067 mm	2532 mm
New South Wales	1435 mm	2182 mm
Queensland	1067 mm	1806 mm
South Australia	1600 mm	2075 mm
South Australia	1435 mm	2075 mm
South Australia	1067 mm	1761 mm
Tasmania	1067 mm	1992 mm
Victoria	1600 mm	2182 mm
Victoria	1435 mm	2182 mm
Western Australia	1435 mm	2532 mm
Western Australia	1067 mm	1973 mm

35. Slinging and tie-down points are illustrated in Fig. 1-3.

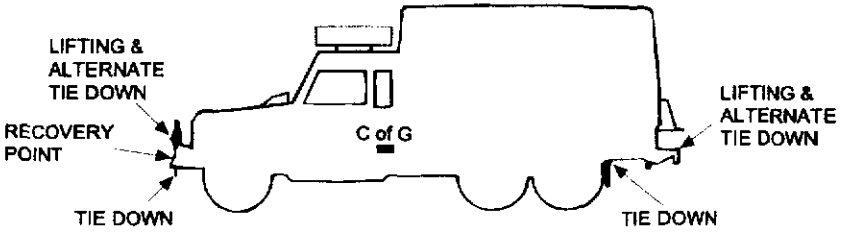


Figure 1-3 Slinging and Tie-Down Points

36. Approach and Departure Angles

Approach angle	- Unladen	45 degrees
	- Laden	41 degrees
	- Limiting feature	Tie-down points
Departure angle	- Unladen	33 degrees
	- Laden	30 degrees
	- Limiting feature	Tie-down points
Ramp breakover angle	- Unladen	148 degrees
	- Laden	152 degrees
	- Limiting feature	Chassis rail

SECTION 3
EQUIPMENT DESCRIPTION

Introduction

37. The Truck, Assault Pioneer, Light, Winch, MC2 has been designed specifically for military use and is capable of carrying an assault pioneer section with all their equipment and supplies for three days operations. The body is equipped with four outwards facing seats and stowage provisions for equipment and supplies. To meet requirements for operational use, the vehicle is fitted with permanent four wheel drive (front and intermediate axles) and selective six wheel drive for negotiating difficult terrain. The transmission has eight forward gear ratios and two reverse gear ratios which are coupled through a disc clutch to a 3.9 litre, turbo-charged, diesel engine.

Operational and Logistic Concept

38. The role of the assault pioneer is to provide transportation for an assault pioneer section, all their equipment, and supplies for three days in an operational environment.

Engine

39. The vehicle is fitted with an Isuzu 3.9 litre 4BD1 TRB-G turbo-charged, four cylinder diesel engine which produces 90 kW of power at 3000 rpm and 314 Nm of torque at 2200 rpm.

Transmission

40. The transmission is a heavy duty four-speed all-synchromesh transmission with an integral two-speed transfer case. Clutch and gear operations are manual and are without power assistance.

Transfer Case and Power Take-Off (PTO)

41. The transfer case, which is cast as part of the main transmission, provides high and low gear ratios, and four or six wheel drive capabilities. It has an integral differential fitted to prevent wind up in the drive lines during normal on road conditions and which can be locked to provide a positive drive between the front and rear axles. During off road use, the locking of this differential, by operating a dash mounted switch, automatically engages the vehicle in six wheel drive. It is imperative that

this differential is locked, when crossing difficult terrain, or when conditions may lead to a loss of traction. A high speed range and a low speed range in the transfer case can be selected by operating a floor mounted lever. The selection of a speed range will not influence the four or six wheel drive mode.

42. The parking brake operates a single drum brake which is mounted on the rear output shaft of the transfer case.

43. The transfer case also incorporates a chain-driven PTO with torque limiter, which provides the drive for the front mounted winch.

Winch

44. A Thomas T9000M winch is fitted to the front of the vehicle between the chassis rails and below the grille. Drive for the winch comes from the PTO via the torque limiter and a two-piece propeller shaft. The winch has a reduction ratio of 45:1 and is fitted with 45 metres of 11 mm diameter wire rope.

45. There are two dog-clutches in the winch drive line, one in the PTO and the other at the winch. The PTO dog-clutch is cable actuated from within the cab while the winch dog-clutch, which allows free-spooling of the cable, is lever-operated at the winch.

Steerable Front Drive Axle

46. The vehicle is fitted with a steerable front drive axle, comprising a differential carrier assembly and axles, driving through constant velocity joints to steerable drive ends fitted with hydraulically operated disc brakes.

Front Suspension

47. The front suspension utilises radius arms, a Panhard rod, vertically mounted double acting telescopic shock absorbers and single rate coil springs. Bump stops are provided to limit the upward travel of the suspension, while the shock absorbers limit the downward travel of the axle.

Rear Axles

48. The rear axles are Salisbury type, fully floating hypoid bevel drive axles with offset four pinion differentials.

Rear Suspension

49. Dual rate semi-elliptic leaf springs linked via shackles to a rubber bushed load sharing rocker beam. Axle movement is controlled by four long travel telescopic shock absorbers and steel cable rebound straps.

Service Brakes

50. The vehicle is fitted with a dual circuit hydraulic brake system consisting of two completely separate circuits. The primary circuit supplies the rear disc brakes and the secondary circuit supplies the front disc brakes.

51. Brake pad wear indicators are fitted to the front left hand calliper and will actuate a brake circuit warning light on the dashboard when brake pad lining thickness is reduced to approximately 3 mm. In addition, the warning light will illuminate if fluid loss occurs from either the primary or secondary brake circuit.

Parking Brake

52. A single drum brake is mounted on the intermediate axle output shaft of the transfer case. This brake, which is mechanically operated by the parking brake lever in the cab, is completely independent of the foot operated hydraulic brake system.

Instruments, Electrical Accessories and Controls (see Fig. 1-26)

53. Ventilator Control (Fig. 1-26 items 1 and 14)

Two ventilators are provided in the windscreen frame, which may be opened independently by pushing the appropriate control lever downward.

54. Normal, Blackout and Reduced Lighting Switch (Fig. 1-26 item 2)

This three position switch, located on the fascia panel, controls the vehicle lighting as follows:

a. In the NORMAL or left position, all vehicle lighting operates via the usual controls.

b. In the BLACKOUT or mid position, all of the NORMAL lighting, with the exception of dash instruments, warning and map reading lights, are switched off. In this mode, the blackout stop lights will function when the brakes are applied, and the blackout marker lights at the front and rear

of the vehicle are illuminated. The convoy light also operates in this mode.

c. In the REDUCED or right position, the reduced headlights are utilised in addition to the blackout lighting. The dash instrument lights and map reading light can also be used.

55. Blackout Covers

The front and rear lights and indicators are provided with camouflage canvas covers which can be secured over the lights by means of elasticised loops and hooks when travelling under blackout conditions. When not required, the covers can be tied back.

56. Auxiliary Power Socket (Fig. 1-26 item 3)

A 2-pin socket is fitted in the dash as a power supply for the vehicle trouble light lead.

57. Panel Light and Map Light Dimmer Control (Fig 1-26 item 4)

The instrument panel light and map light intensity can be adjusted by the dimmer control, which functions irrespective of which of the three modes of lighting is selected. The switch also has an ON-OFF control.

58. Heater Fan Control Switch (Fig. 1-26 item 5)

A three position rocker switch controls the heater fan as follows:

a. With the switch in the off position the heating and ventilation system is inoperative.

b. Low speed or high speed fan operation is provided when the switch is moved down to the first or second stop respectively. Air will be forced into the vehicle then ducted and heated as determined by the air distribution and heat control levers. The fan motor will only operate with the engine running or with the ignition on.

59. Air Temperature Control (Fig. 1-26 item 6)

The temperature control lever controls the temperature of the air from the heater unit. Moving the lever up in the direction of the blue arrow will cut off the heat, while moving the lever down toward the red arrow will increase the heat (see Fig. 1-4). Action is progressive between the two settings.

60. Air Distribution Control (Fig. 1-26 item 7)

The air distribution control lever controls the direction of air flow as follows (see Fig.1-4):

a. With the lever in the lower position, all air is directed to the windscreen via the demister vents.

b. With the lever in the mid position, air is directed to the foot level vents as well as the windscreen.

c. With the lever in the upper position, the air is directed to the foot level vents although a certain amount of air will continue to pass through the demister vents to the windscreen.

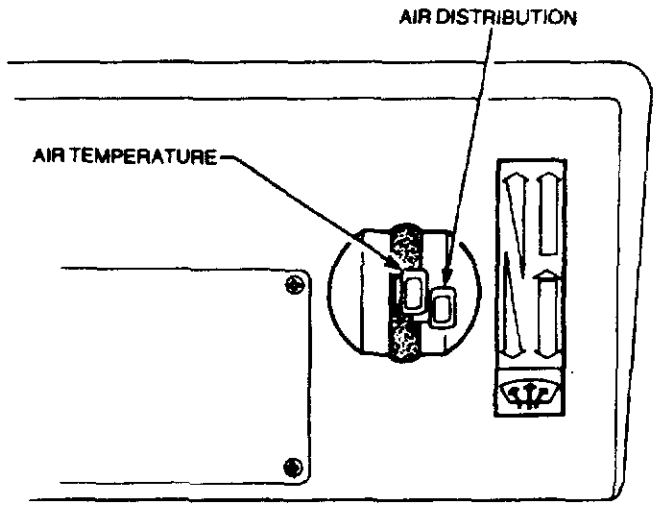


Figure 1-4 Air Temperature and Distribution Controls

61. Fuel Switch (Fig. 1-26 item 8)

A two position toggle switch is located on the dash, which when operated determines from which tank fuel will be drawn.

62. Transfer Case Control Switch (Fig 1-26 item 9)

The transfer case is fitted with a differential which allows the vehicle to be operated on road without transmission wind-up. The differential is lockable, to provide positive drive to the axles when necessary, and is controlled by a dash mounted two position switch. The switch should be

pushed in for on road use and pulled out when traction is difficult, thereby providing positive six wheel drive. When changing vehicle wheels the switch must be pulled out (refer to the warning on page 55).

63. PTO Warning Light (Fig. 1-26 item 11)

With the PTO control in the engaged position the PTO warning light is illuminated.

64. Combination Switch (Fig. 1-26 item 12)

The combination switch has six positions and provides control over the headlights, turn indicators and the horn. The combination switch functions are not available during blackout conditions. The switch operates as follows (see Fig. 1-5):

a. With the switch in the central position (A), the headlights will be dipped.

b. With the switch pushed away from the driver (B), the headlights will be on high beam.

c. Pulling the switch toward the driver (C), will flash the headlights. This operation can be achieved at any time, irrespective of other switch positions.

d. Pushing the switch knob inward (D), will operate the horn.

e. With the switch in the upper position (E), the right hand turn indicators will flash.

f. With the switch in the lower position (F), the left hand indicators will flash.

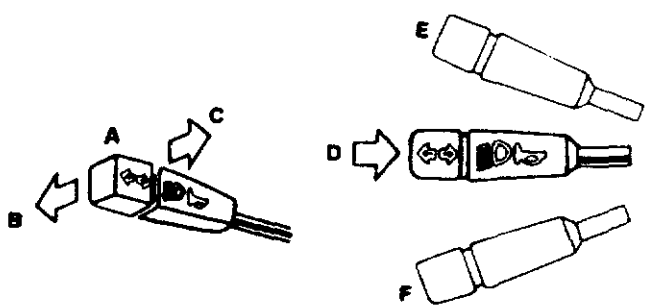


Figure 1-5 Combination Switch Operation

65. Speedometer and Odometer (Fig. 1-26 item 13)

The speedometer indicates the road speed in kilometres per hour and the total distance travelled. A trip meter is incorporated in the speedometer together with its associated reset button.

66. Fuel Gauge (Fig. 1-26 item 15)

One fuel gauge services both the left and right hand mounted fuel tanks. The approximate contents of each tank can be assessed by operating a dual purpose dash mounted switch - fuel will only be drawn from the tank indicated.

67. Warning Light Cluster (Fig. 1-26 item 16)

The warning lights provide a visual indication that a fault has occurred in one or more of the systems represented by the warning lights. A metal, perforated, flip up/down cover is fitted to the cluster for glare reduction during blackout operations.

a. The oil pressure warning light (Fig. 1-6 item 2) indicates when the oil pressure is insufficient for safe engine operation. The light should illuminate when the ignition is turned on and extinguish once normal engine oil pressure is established. If this light illuminates during normal running, the vehicle should be stopped immediately and the cause determined.

b. The ignition warning light (Fig. 1-6 item 3) indicates a malfunction in the battery charging circuit. The light should illuminate when the ignition is turned on and extinguish once the engine is running.

c. The brake circuit warning light (Fig. 1-6 item 4) indicates that leakage has occurred from either the front or rear brake circuit. In this case, the light will illuminate when the foot brake is applied. In addition, a brake pad wear indicator is fitted to the front left hand calliper and will actuate the light when the brake pad lining thickness is reduced to approximately 3 mm. Normally, the light will illuminate momentarily when the ignition is turned on, then extinguish. If the light illuminates during normal running, the vehicle should be stopped immediately and the cause determined.

d. The turn indicator warning light (Fig. 1-6 item 5) flashes when the turn indicator lights are functioning. Both arrows will flash as the turn indicator is operated by the switch on

the steering column. If the light does not flash, there may be a blown globe in the warning light or one of the turn indicators.

e. The high beam warning light (Fig. 1-6 item 6) illuminates when the headlight high beam has been selected. The light also illuminates when the headlight flasher is used.

f. The low fuel warning light (Fig. 1-6 item 7) illuminates when there is approximately nine litres of fuel left in either fuel tank and will remain illuminated until the fuel supply is replenished. When cornering, the light may flash intermittently before the fuel reaches the nine litre level.

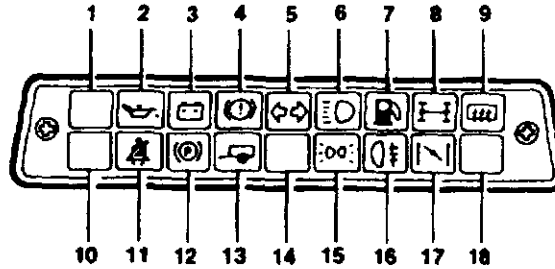
g. Both the differential lock warning light (Fig. 1-6 item 8) and the six wheel drive light (Fig. 1-6 item 1) will illuminate when the transfer case differential lock is engaged. Operation of the differential lock is necessary when traction to one or more wheels is likely to be lost.

h. The parking brake warning light (Fig. 1-6 item 12) will illuminate if the parking brake is applied while the ignition is on.

i. The trailer warning light (Fig. 1-6 item 13) provides an indication that the turn indicators on a towed trailer are functioning correctly. The light will flash simultaneously with the vehicle turn indicator warning light when a trailer is connected to the vehicle's NATO socket. When no trailer is used, the light will flash momentarily each time the combination switch is moved up or down. In addition, the trailer warning light will flash when the hazard warning switch is activated.

j. The park light warning light (Fig. 1-6 item 15) indicates when the park lights have been switched on.

k. The cold start warning light (Fig. 1-6 item 17) illuminates when the starter switch is in the glow plugs on position.



1.	Six wheel drive	Red	10.	Not used	Red
2.	Oil pressure	Red	11.	Not used	Red
3.	Ignition	Red	12.	Parking brake	Red
4.	Brake circuit	Red	13.	Trailer	Green
5.	Turn indicators	Green	14.	Not used	Green
6.	High beam	Blue	15.	Park lights on	Green
7.	Low fuel	Amber	16.	Not used	Amber
8.	Differential lock	Amber	17.	Cold start (glow plugs)	Amber
9.	Not used	Amber	18.	Not used	Amber

Figure 1-6 Warning Lights

68. Coolant Temperature Gauge (Fig 1-26 item 17)

Under normal running conditions, the temperature gauge needle should be within the green band. When operating in high ambient temperatures, with heavy loads or on steep grades at high altitudes, the operating temperature could rise. However, if the needle rises into the red band, the vehicle should be stopped and the cause determined.

69. Voltmeter - 12 Volt (Fig. 1-26 item 18)

The voltmeter measures the vehicle system voltage. With the engine running above idle speed, the needle should be within the green band (12-14 volts). A reading above this in the high red band, which continues after approximately ten minutes, is too high and should be investigated. Similarly, a reading in the low red band which continues after approximately ten minutes is too low and should also be investigated.

70. Windscreen Washer and Wiper Switch (Fig. 1-26 item 19)

The windscreen washer and wiper switch is a five position switch, which only operates when the ignition is on. Switch operation is as follows (see Fig. 1-7):

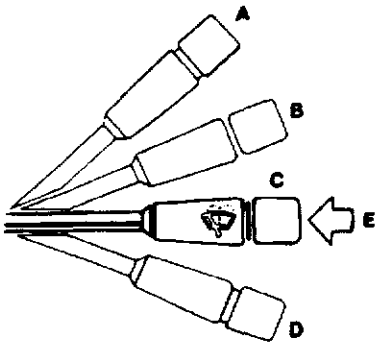


Figure 1-7 Windscreen Washer and Wiper Control

a. With the switch in the upper position (A), fast wiper action is achieved.

b. With the switch in the second position (B), slow wiper action is achieved.

c. With the switch in the third position (C), the wipers are off.

d. With the switch in the lower position (D), the wipers will operate intermittently.

e. Pushing the switch knob inward (E) will activate the windscreen washer, which will spray water on the windscreen until the knob is released. This can be achieved with the switch on or off.

71. Cab Dome Light Switch (Fig. 1-26 item 20)

The cab dome light switch is a two position rocker action switch. Pressing the lower section of the switch turns the dome light on and pressing the upper section of the switch turns the dome light off (see Fig. 1-8). The dome light will not function during blackout conditions.

72. Hazard Warning Switch (Fig 1-26 item 21)

The hazard warning switch is a two position rocker action switch. By pressing the lower section of the switch, both the left and right hand turn indicators, together with the side repeaters, flash simultaneously. A globe

in the switch also illuminates to indicate that the switch is on. In addition, the trailer warning light will flash when the hazard warning switch is activated. Pressing the upper section of the switch turns the hazard warning lights off (see Fig. 1-8). Hazard warning lights will not function during blackout conditions.

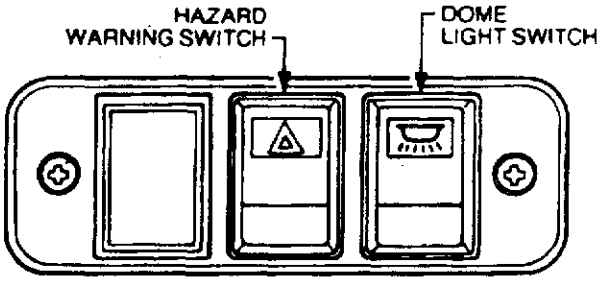


Figure 1-8 Hazard Warning and Cab Dome Light Switches

73. Hand Throttle (Fig. 1-26 item 22)

The hand throttle control can be used to over-ride the accelerator pedal to set engine speed. To utilise the hand throttle, first set the engine speed with the accelerator then pull out the hand throttle and turn the control to lock it in position. The accelerator will over-ride the hand throttle setting when increasing the engine speed. However, when the accelerator is released, the engine will return to the speed set by the hand throttle. To release the hand throttle, turn the knob and push the control fully in to the closed position.

74. Accelerator Pedal (Fig. 1-26 item 23)

The accelerator pedal controls the engine speed via the accelerator cable. Depress the pedal to increase engine speed.

75. Foot Brake Pedal (Fig. 1-26 item 24)

The foot brake pedal controls the application of the service brakes to all six wheels. Depress the pedal progressively to apply increasing braking pressure.

76. Starter Switch (Fig. 1-26 item 25)

The starter switch is a four position switch, providing control over the ignition, glow plugs and starter motor. The switch is turned clockwise to activate the vehicle electrical system.

77. Main Lighting Switch (Fig 1-26 item 26)

The main lighting switch is a three position switch, providing control over the lighting as follows (see Fig. 1-9):

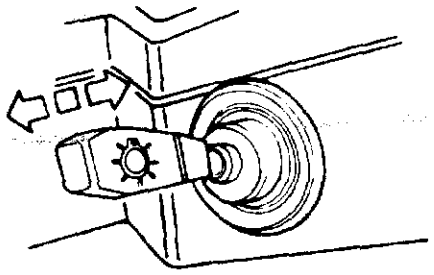


Figure 1-9 Main Lighting Switch

a. With the switch pulled toward the driver, all lights will be off.

b. With the switch in the centre position, the park lights will be illuminated.

c. With the switch pushed away from the driver, both the main and park lights will be illuminated.

78. The main lighting switch will not function during blackout conditions.

79. Clutch Pedal (Fig. 1-26 item 27)

Depress the clutch pedal to disengage the clutch.

80. Cigar Lighter (Fig. 1-26 item 29)

Push the lighter in to operate. The lighter will automatically return to the normal position when ready for use.

81. Parking Brake Lever (Fig. 1-26 item 30)

The parking brake is applied by pulling the lever up. To release the brake, pull the lever slightly up, depress the release button and push the lever down. Application of the parking brake will illuminate a warning light on the instrument panel.

82. Winch/PTO Control (Fig. 1-26 item 31)

The winch/PTO control is a push-pull cable which provides control over the PTO dog-clutch for winch drive. Lift the control lever to engage the dog-clutch or depress the lever to disengage the dog-clutch. With the

PTO control in the engaged position the PTO warning light (see Fig. 1-26 item 11) is illuminated.

83. Gear Lever (Fig. 1-26 item 32)

The gear lever is used to manually change the gear ratios in the transmission. The gear change pattern is illustrated in Fig. 1-10.

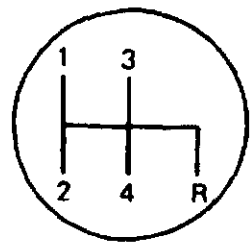


Figure 1-10 Gear Change Pattern

84. Transfer Case Shift Lever (Fig. 1-26 item 33)

The transfer case shift lever provides the manual selection of high or low gear ratios as required. The ratio shift pattern is illustrated in Fig. 1-11.

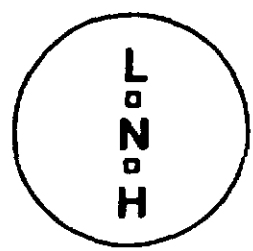


Figure 1-11 Transfer Case Shift Pattern

85. Fuse Box (Fig 1-26 item 34)

Removing the fuse box cover allows access to the fuses. The location of each fuse is provided by the decals as shown in Fig 1-12.

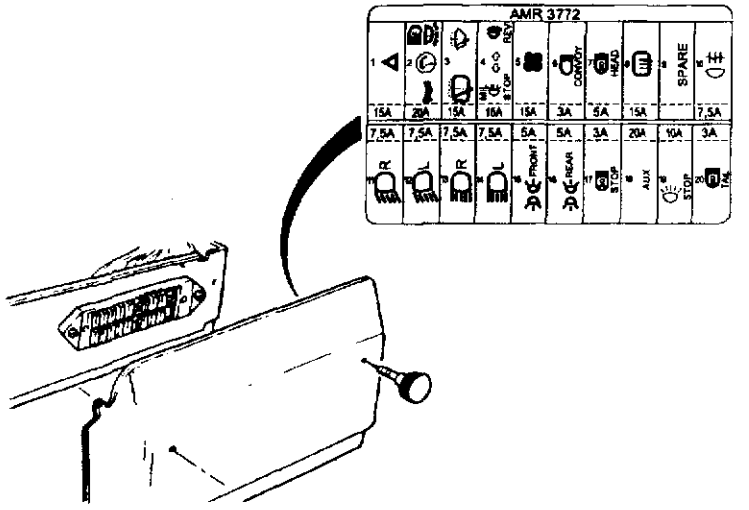


Figure 1-12 Fuses

86. The stop/start control motor is protected by a 10 amp fuse located under the bonnet to the side of the brake master cylinder.

87. In line Fuses

In line fuses are located under the ashtray on the dashboard:

Twin fuel tank valve	10A
Cigar lighter	10A
Instrument dimmer switch	5A
Inspection light socket	15A
Rear body lights	15A

88. Spare Fuses

Spare fuses of 5A, 7.5A, 10A, 15A, and 20A ratings are located inside the fuse box cover.

89. Map Reading Light (Fig. 1-26 item 35)

The map reading light switch is located on the end of the light unit. The light can only be utilised when the ignition is on.

90. Cabin Seating

The backs of the driver's and passenger's seats in the forward cabin can be tilted by means of a handwheel located at the bottom rear of the seats. Fore and aft movement can be adjusted as shown (see Fig. 1-13).

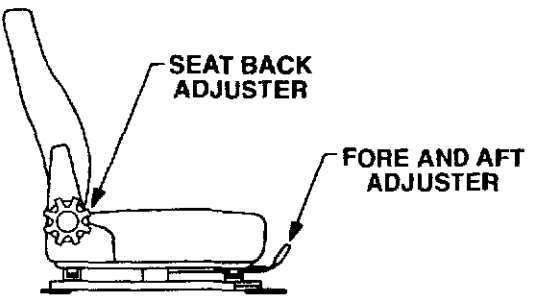


Figure 1-13 Seat Adjustment

91. Bonnet Release

The bonnet release lever is located in the right of the radiator grill at the front of the vehicle, and by pulling the lever toward the passenger side, the bonnet catch will release. Lift the bonnet safety catch lever and raise the bonnet. Pull the support stay forward to secure the bonnet in the open position. The bonnet release lever is illustrated in Fig. 1-14 and the bonnet safety catch is illustrated in Fig. 1-15.

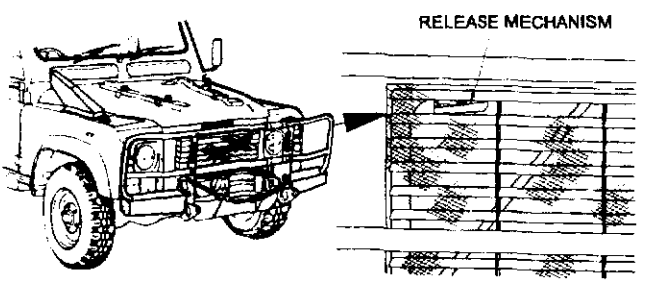


Figure 1-14 Bonnet Release Lever

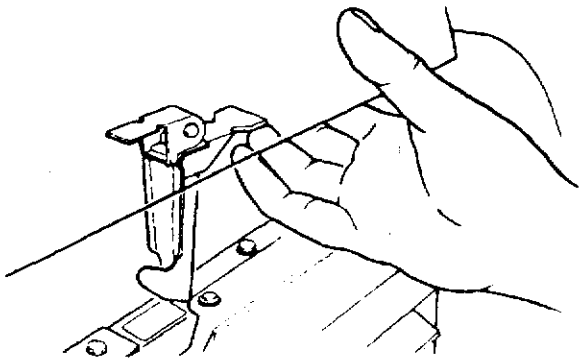


Figure 1-15 Bonnet Safety Catch

Body and Chassis Fittings

WARNING

THIS VEHICLE IS PAINTED IN POLYURETHANE PAINT. 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, AUSTRALIAN ARMY EQUIPMENT PAINTING POLICY DI(A) TECH 15-1, OR RELEVANT EMEI.

92. Vehicle Body Construction

The chassis frame is an all welded construction type, consisting of box section steel runners and crossmembers. The frame is hot dipped galvanised to prevent the formation of rust. One crossmember is detachable to simplify servicing. The cab consists of pressed aluminium and fibreglass panels that form the engine compartment bolted to a galvanised steel frame.

NOTE

The body, chassis and engine have certain common features with other variants to allow for variant transfer throughout the life of the fleet. It is not intended that this occur regularly but allows flexibility in fleet management should circumstances dictate.

93. Assault Pioneer Body Construction

The body is of aluminium construction and includes a Roll Over Protection System (ROPS) frame fabricated from heavy aluminium plate and extrusion components, to which is bonded an outer skin sheet aluminium roof. A camouflage canvas cover is fitted over the top and sides of the frame. The interior ceiling consists of foam insulation panels and the floor is constructed of aluminium sheet covered with ribbed rubber sheeting. The lower rear of the body comprises an aluminium sheet half panel to the exterior of which is fitted stowage racks for water and fuel jerry cans. The underbody provides a stowage compartment running the length of the body and accessible from the rear via a lockable door, or from the body interior where the stowage compartment is covered only by the seating. The body forward interior, comprises lockable stowage compartments fabricated from mesh and with lockable hinged doors providing access from the exterior sides. The rear body interior has upper and lower open basket shelves running through the entire interior width of the body. Side floors in front of the seating are covered with ribbed rubber sheet and a foot brace is provided at the edge of the side area in front of the passenger seats.

94. Rear Window (Fig. 1-16)

A sliding window is fitted to the rear of the cab.

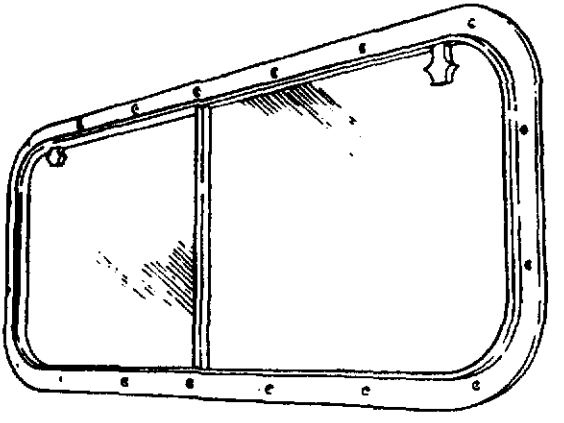


Figure 1-16 Rear Window

95. Air Intake

A 'rhino horn' air intake is fitted to the front right hand wing. This, together with other features, permits a vehicle fording depth of 1000 mm.

96. Rear Side Windows (Fig. 1-17)

Rear side windows are fitted to the cabin to provide ventilation. They may be locked in either the open or closed position by an over-centre catch.

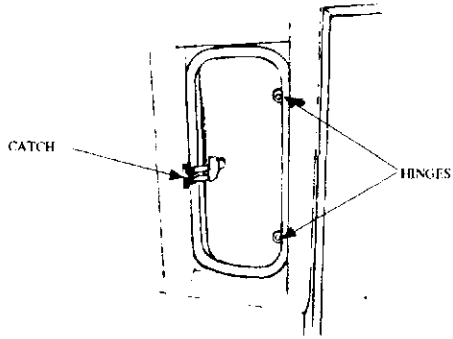


Figure 1-17 Rear Side Window

97. Rifle Clips And Butt Boxes

There are facilities to mount two rifles between the seats in the cabin.

98. Fire Extinguishers (Fig. 1-18)

Two fire extinguishers are fitted to the vehicle. A 1.5 kg dry chemical is located between the cabin seats and a 1.5 kg dry chemical is located inside the rear body.

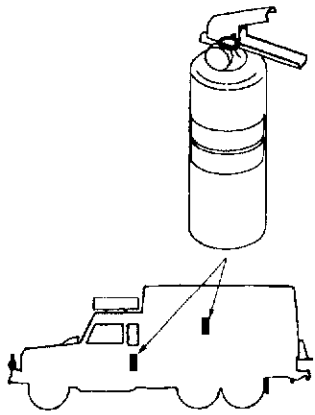


Figure 1-18 Fire Extinguishers

99. De-Ditching Tools

The de-ditching tools are mounted in brackets fitted to the bonnet. The tools comprise one axe, one shovel and one pick with handle.

100. Spare Wheel Stowage

A spare wheel is stowed under the vehicle behind the rear axle and is secured by a chain. The wheel is lowered from the stowed position by using the wheel brace to operate a winch drive (see Fig. 1-19) situated behind the left hand rear mudguard. The spare wheel is positively locked in the travelling position by a brake in the winch mechanism. When raising the spare wheel an additional resistance to movement of the wheelbrace, indicates the spare is correctly stowed. The spare wheel can be lowered by rotating the wheel brace in a counter clockwise direction. Provision is also made for the stowage of two additional spare wheels on the cab roof. These are secured by 'T' bolts and brackets which must be released and the wheels lowered to the ground by hand.

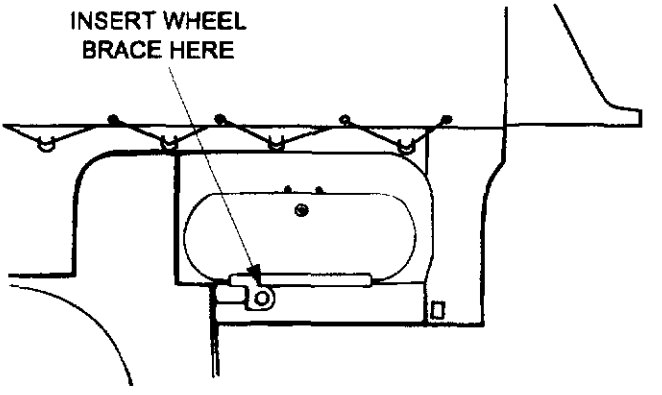


Figure 1-19 Spare Wheel Lowering

101. Electrical Trailer Connection Sockets

A 12-pin NATO trailer connection socket is fitted to the rear of the left hand chassis rail. A supplementary, 7-pin, Utilux connection is fitted to the rear of the right hand chassis rail and wired conventionally. The supplementary connector is not for use with trailers.

102. Towing Pintle

A removable towing pintle is secured to the rear crossmember of the vehicle by four bolts, washers and nuts to allow for removal if necessary.

103. Seat Belts

Inertia reel lap/sash belts are fitted to the cabin seats. Four point quick release harness belts are fitted to the rear body seats.

104. Rear Vision Mirrors

The external rear vision mirrors are hinged to fold back (inward) when knocked or bumped, thus reducing damage during cross country operations. A mirror which has an anti dazzle switch is mounted in the cab.

105. Vehicle Nomenclature Plate (Fig. 1-20)

The manufacturer's vehicle identification number is stamped on a plate that is riveted to the cabin passenger's seat box. The identification number is also stamped on the right hand side of the chassis, forward of the spring mounting turret.

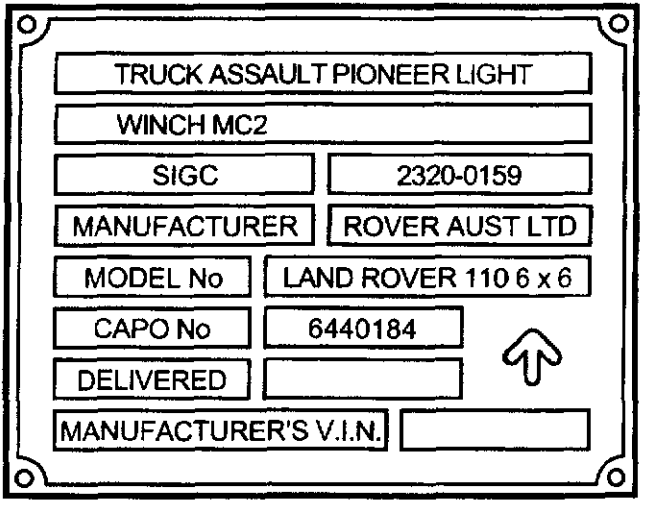


Figure 1-20 Vehicle Nomenclature Plate

106. Servicing Data Plate (Fig. 1-21)

The vehicle servicing data plate is riveted to the cabin passenger's seat box, adjacent to the vehicle nomenclature plate.

SERVICING DATA

HYG4888

		HIGHWAY	CROSS COUNTRY	SAND
COLD TYRE PRESSURES (kPa)	FRONT	350	275	225
	REAR	350	275	225

LUBRICATION - NORMAL OR TROPICAL TEMPERATURES

ENGINE	OMD 115	MASTER CYLS	OX(AUST) 8
GEARBOX	OMD 115	MANUAL STG. BOX	OEP 220
TRANSFER BOX	OMD 115	POWER STG. BOX	OX46 or OX47
AXLES	OEP 220	LUBE. NIPPLES	XG274
SWIVEL PIN H'SING	OEP 220	WINCH	OEP 220

ELECTRICAL - 12 VOLT NEGATIVE TO EARTH SYSTEM

Figure 1-21 Servicing Data Plate

107. Shipping Data Plate (Fig. 1-22)

A shipping data plate is riveted to the cabin passenger's seat base just below the servicing data plate.

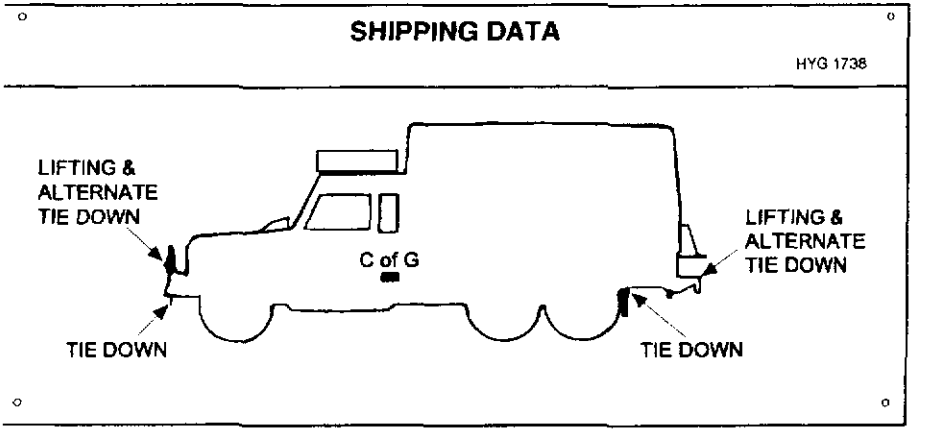


Figure 1-22 Shipping Data Plate

108. Towing and Dyno Test Data Plate (Fig. 1-23)

The towing and dyno test plate is riveted to the driver's seat box. See para. 233 for propeller shaft removal precautions.

TOWING AND DYNO TEST DATA

FLAT AND LIFT TOWING - DISTANCE UNDER 200 KM

. SET GEARBOX AND TRANSFER CASE IN NEUTRAL.
.. SET TRANSFER BOX CONTROL SWITCH IN "ON-ROAD" POSITION.
... ENSURE DIFF LOCK & 6WD WARNING LIGHTS ARE NOT ILLUMINATED.

--

FOR DISTANCE OVER 200 KM
REMOVE PROPELLER SHAFTS AND REPEAT ABOVE

DYNO TEST ON FRONT AXLE

. REMOVE PROPELLER SHAFTS FROM BOTH REAR AXLES
.. SET TRANSFER BOX CONTROL SWITCH TO "CROSS COUNTRY"
... ENSURE DIFF LOCK WARNING LIGHT IS ILLUMINATED

HYG 2951

Figure 1-23 Towing and Dyno Test Data Plate

109. Jacking Plate (Fig. 1-24)

A jacking plate, providing the standard jacking procedure, is fitted to the stowage area lid as well as to the jack itself.

JACKING PROCEDURE

HYG 1764

DUE TO THE FITMENT OF A TRANSMISSION HANDBRAKE TO THIS VEHICLE, THE JACKING PROCEDURE MUST BE FOLLOWED BEFORE JACKING ANY WHEEL CLEAR OF THE GROUND.

1. APPLY HANDBRAKE.
2. ENGAGE DIFFERENTIAL LOCK (WARNING LIGHT WILL ILLUMINATE).
3. SELECT 1ST GEAR - LOW RANGE.
4. CHOCK BOTH SIDES OF WHEEL FURTHEST FROM WHEEL BEING RAISED.
5. SLACKEN WHEEL NUTS (5).
6. FRONT WHEELS: POSITION JACK UNDER AXLE CASING IMMEDIATELY BELOW ROAD SPRING BETWEEN END FLANGE AND SUSPENSION BRACKET.
   REAR WHEELS: POSITION JACK UNDER AXLE CASING IMMEDIATELY BELOW ROAD SPRING NEAR DAMPER.
7. REPLACE WHEEL AND TIGHTEN NUTS.
8. LOWER VEHICLE.
9. TORQUE NUTS: 100-115 Nm (75-85 lb. ft.).
10. DISENGAGE DIFFERENTIAL LOCK BEFORE MOVING OFF.

Figure 1-24 Jacking Procedure Plate

110. Winch Operation Decal (Fig. 1-25)

A winch operation decal is affixed to the fuse box lid.

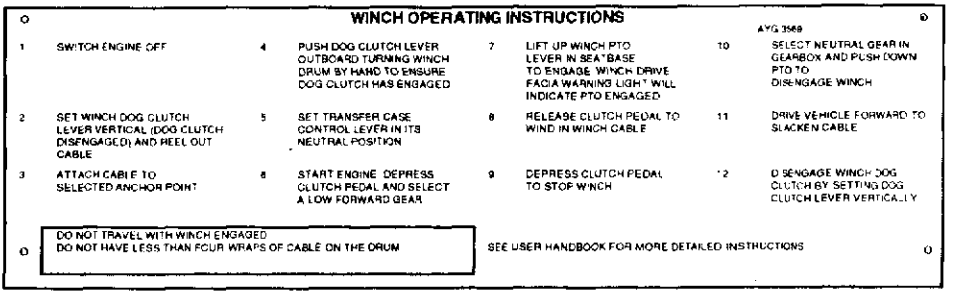


Figure 1-25 Winch Operation Decal

111. Centre of Gravity (C of G) Designation Plate

A "C of G" plate designating the longitudinal point of balance of the unladen vehicle is fitted to the left hand sill panel.

112. Unit/Formation Signs

Four unit/formation sign holders are fitted to the vehicle. Two are riveted just below the headlights and the other two are riveted to brackets on the rear crossmember.

113. Bridge Classification Sign

Due to the size and weight of this vehicle, no bridge classification sign is fitted.

114. Camouflage Net Lashing Rings

Lashing rings are provided on each side of the body roof for securing camouflage equipment. These are in the form of four rings bolted to each side of the body roof.

NOTE

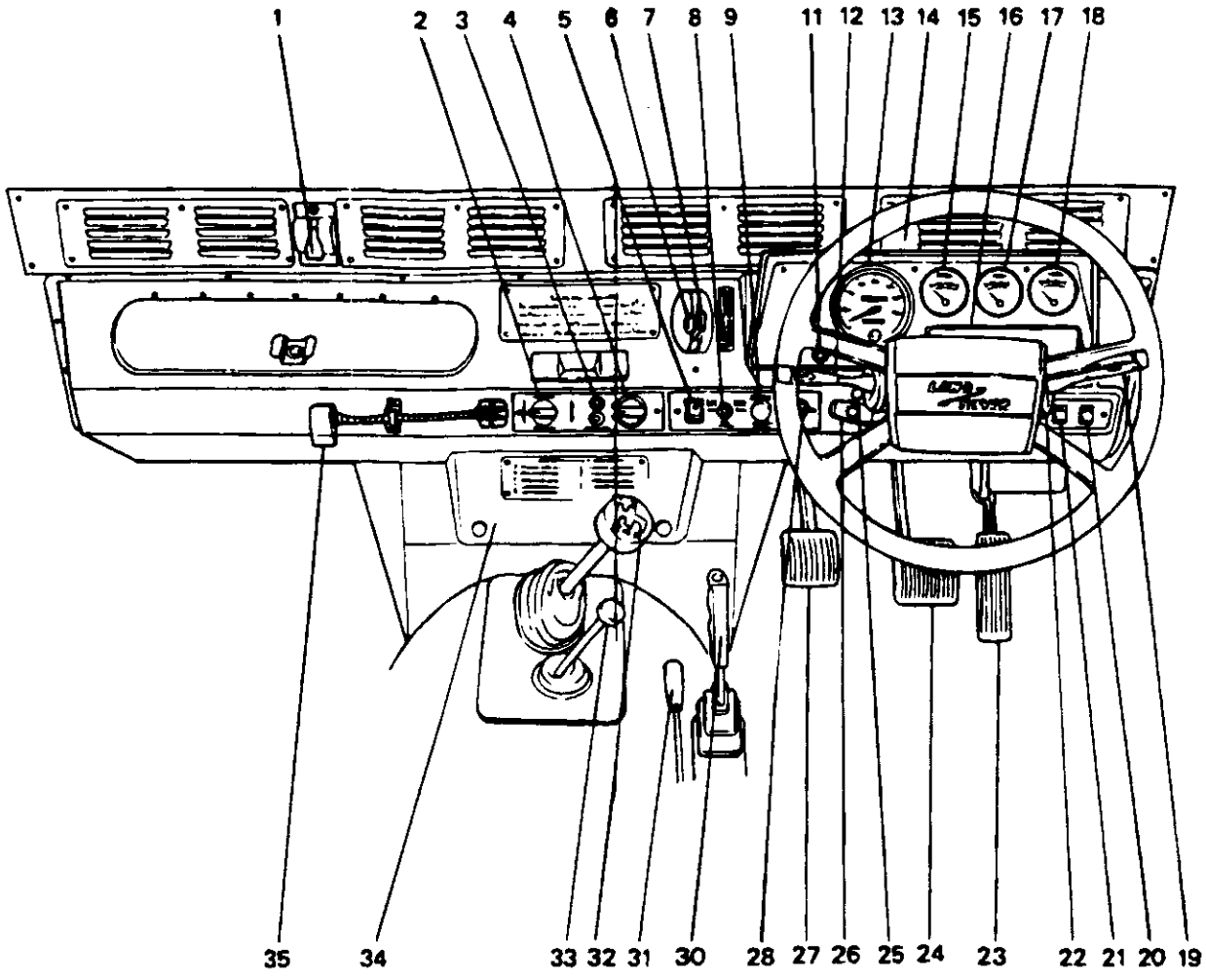
These lashing rings are not to be subjected to high tension loadings.

115. Front Steering Protector

The brushguard at the front of the vehicle includes a hot dip galvanised steel undersling which is bolted to the brushguard and to the chassis sides. The purpose of the undersling is to protect the front steering and Panhard rods from damage.

116. *Radio Provision*

Provision is made for the aerial mountings on the front right hand wing and the upper right hand rear ROPS. A Pintail radio kit is fitted in the front cab.



1. Ventilator control
2. Lighting control
3. Auxiliary power
4. Panel light dimmer control
5. Heater fan control
6. Air temperature control
7. Air distribution control
8. Fuel switch
9. Transfer case control
10. Not used
11. PTO warning light
12. Combination switch
13. Speedometer
14. Ventilator control
15. Fuel gauge
16. Warning light cluster
17. Temperature gauge
18. Voltmeter (12V)
19. Windscreen washer and wiper switch
20. Cab dome light switch
21. Hazard warning switch
22. Hand throttle
23. Accelerator pedal
24. Brake pedal
25. Starter switch
26. Main lighting switch
27. Clutch pedal
28. Cigar lighter
29. Not used
30. Parking brake lever
31. Winch/PTO control
32. Gear lever
33. Transfer case shift lever
34. Fuse box
35. Map reading light

Figure 1-26 Instruments, Electrical Accessories and Controls

CHAPTER 2

OPERATING INSTRUCTIONS

SECTION 1 - WARRANTY AND REPAIR

SECTION 2 - VEHICLE OPERATION

SECTION 1
WARRANTY AND REPAIR

Warranty Provisions

201. The Contractor Rover Australia (RA) accepts responsibility for warranty in respect to the whole vehicle (except GFE items other than the mounting of such items) for a period of 12 months or 20 000 km, whichever occurs first from the time of issue of vehicle to user unit. Where vehicles are delivered to supply depots for extended storage, the depot becomes the user unit.

202. Where a vehicle is delivered into storage, provision is made for the warranty to be suspended for up to two years. Should the vehicle enter service during the two year period, then a pro-rata warranty applies in accordance with Table 2-1.

Table 2-1 Pro-Rata Warranty

Time of Withdrawal from Storage (measured from day of delivery into storage)	Period of Warranty after Withdrawal from Storage (whichever expires first)	
	Distance (km)	Time (mths)
First day of 1st month - last day of 3rd month	20 000	11
First day of 4th month - last day of 6th month	18 000	10
First day of 7th month - last day of 9th month	16 000	9
First day of 10th month - last day of 12th month	14 000	8
First day of 13th month - last day of 15th month	12 000	7
First day of 16th month - last day of 18th month	10 000	6
First day of 19th month - last day of 21st month	8 000	5
First day of 22nd month - last day of 24th month	6 000	4*
First day of 25th month - last day of 27th month	3 000	3*

***NOTE:** The warranty finally expires after twenty-seven (27) months irrespective of any outstanding distance or time pro-rata warranty.

Special Provisions

203. The warranty shall not apply where failure arises from:

a. Vehicle not being maintained in accordance with User Handbook or EMEI manuals.

b. EMEI storage procedures not being effectively applied.

c. Misuse or neglect.

d. The fitting of non-genuine parts, and where it is mutually agreed as a contributing factor.

e. The use of equipment not normally or reasonably associated with the operation of the supplies.

f. Supplies that have been altered in form or function without consultation with and approval of the Contractor.

g. Any part or parts of which the specification has been altered by the Commonwealth without the Contractor's approval.

h. Any part or parts from which the identification marks or numbers have been altered or removed by the Commonwealth.

i. Repairs which involved or resulted from either direct or indirect use of non-genuine parts.

j. Incorrect tuning, adjustments or maintenance operations which are associated with periodic servicing requirements.

k. Parts or equipment which have not been supplied by the Contractor or by a supplier approved by the Contractor and any problems which may arise, either directly or indirectly, from the fitment of such equipment.

l. The consequences of the supplies having been repaired by a non-approved repairer. For the purpose of this clause, approved repairer shall include Army vehicle maintenance personnel.

Application of Warranty

204. The application of the warranty will be by repair or replacement of the defective component at no cost to the Commonwealth.

205. Provision is made for warranty repairs to be carried out by RA Limited authorised Land Rover dealers.

206. However, if for reasons of distance, location etc., it is not practical to have the necessary repairs carried out by a RA Limited authorised Land Rover dealer, then an Army tradesman is approved to carry out the repair. This procedure should be adopted in the case of emergency or essential repairs only (eg. for safety, prevention of further damage or an operational requirement).

207. In such circumstances, RA Limited will reimburse the Army for parts used at cost and labour at standard repair times and the prevailing Land Rover dealer warranty hourly labour rate.

208. The information required to be documented by the Army unit in such circumstances is:

a. Identify the vehicle by chassis and or Army registration number.

b. Date vehicle entered service (if known).

c. Current odometer reading.

d. Nature of failure (brief explanation).

e. Nature of repair necessary.

f. Parts replaced by designation and part number.

g. Time taken or Standard Repair Time (SRT) and operation number (refer to EMEI VEH A 119-22).

h. If parts were procured through a Land Rover dealer, then documentation identifying purchase and price paid.

i. RA Authority Number (if applicable).

209. The procedure for submitting a claim to RA Limited to obtain reimbursement is defined in EMEI VEH A 119-22.

Prior Consultation

210. Where a vehicle is presented to an authorised RA Limited Land Rover dealer for warranty repairs, the Army need not be concerned as the dealer has adequate authority to deal with most situations and the necessary procedure to obtain authority in the case of major repairs.

211. In circumstances where the Army are themselves undertaking a warranty repair, this may proceed without authority provided the estimated total material and labour cost is less than $500. If the cost is estimated to be in excess of $500, then the appropriate RA Limited State Office listed in Table 2-2 should be contacted for authority and guidance.

212. The person making the contact should have the following information available:

a. Vehicle chassis and Army registration number.

b. Date in service (if known).

c. Current odometer reading.

d. Knowledge of the problem encountered.

Continuance of Warranty Following a Warranty Repair

213. Any supplies corrected or furnished by way of replacement under warranty claim, whether it be an initial equipment supply or replacement part, will enjoy the balance of any existing warranty.

Warranty on Replacement Parts and MSI's

214. Except when fitted in the execution of a warranty repair, replacement parts and MSI's enjoy the same warranty as the vehicle and in general terms as applicable the same special provisions apply (see para 203).

Pre-Expiration Warranty Checks

215. Vehicles are to be inspected by a qualified Tradesman prior to expiry date of the warranty. Refer EMEI VEH A 119-22.

Table 2-2 RA State Offices

ROVER AUSTRALIA (RA) STATE OFFICES			
HEAD OFFICE			
PO Box 3846, PARRAMATTA NSW 2124 Unit 12 Riverside Centre, 148-308 James Ruse Drive PARRAMATTA NSW 2150			
NSW Regional Service Managers			
Tony Martin	Phone	02 9685 5140	NSW - Southern Region
David Dean	Phone	02 9685 5180	NSW - Northern Region
	Fax	02 9687 2180	
Warranty Manager			
Jan Ellis	Phone	02 9685 5115	

QLD REGIONAL OFFICE

Suite 18, Level 1,
Chancellor Corporate Centre
15 Leichhardt St
SPRING HILL QLD 4000

Regional Service Manager

Barry Solomon
Phone 07 3834 4890
Fax 07 3831 0036

VIC REGIONAL OFFICE

Level 1, 58 Clarke St
SOUTHBANK VIC 3006

Regional Service Manager

Fred Waniczek
Phone 03 9690 0510
Fax 03 9690 0350

WA REGIONAL OFFICE

Level 23 St Martins Tower
49 St Georges Terrace
PERTH WA 6000

Regional Service Manager

Malcolm Taylor
Phone 09 268 2571
Fax 09 268 2575

SECTION 2
VEHICLE OPERATION

216. General

Proper operation determines the service life and operating economy of the vehicle. This includes, careful driving, normal road speeds, reasonable rates of acceleration and braking and changing gears in a manner which avoids shock loading and labouring.

217. Before Starting

Carry out a first parade service as detailed in Chapter 3 Section 1.

218. Before Starting the Engine

Ensure that the parking brake is applied. Depress the clutch pedal fully to disengage the clutch then move the gear lever to neutral.

219. Starting the Engine

CAUTION

DO NOT ACCELERATE THE ENGINE IMMEDIATELY AFTER STARTING, OTHERWISE DAMAGE TO THE TURBOCHARGER WILL RESULT THROUGH LACK OF LUBRICATION.

NOTE

The glow plugs need only be used to start the engine when the vehicle is operating continually in low ambient temperatures (below 5°C), and then for no longer than five seconds.

Depress the accelerator pedal approximately half way and hold the pedal in this position while turning the ignition switch clockwise to start the engine. As the switch is turned to the first position (see Fig. 2-1), the oil pressure, battery charge and parking brake warning lights will illuminate. In the next switch position the glow plug light illuminates, but do not hold the switch in this position unless cold operating conditions are experienced. Turn the switch fully to engage the starter motor, then release the switch and return the accelerator pedal to the idle position

once the engine has started. All warning lights except the parking brake light should now be extinguished.

NOTE

Do not operate the starter motor continuously for longer than ten seconds without a pause.

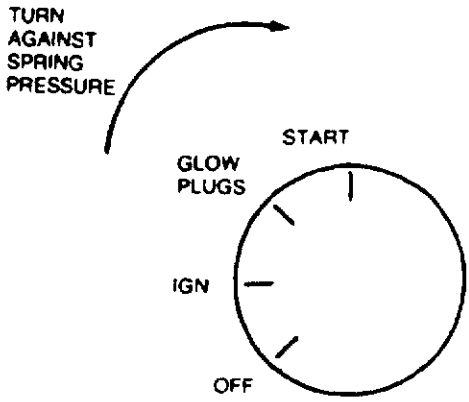


Figure 2-1 Starter Switch Positions

220. Moving the Vehicle

a. With the engine operating, disengage the clutch by pushing the pedal to the floor. Select high ratio or low ratio on the transfer case shift lever, depending on the vehicle load and terrain.

NOTE

Changing from high to low or low to high ratio should only be attempted when the vehicle is stationary. Should difficulty be encountered when engaging high or low ratio, do not force the lever. With the engine running, engage a gear with the main gear lever and release the clutch momentarily, then return the main gear lever to neutral and try the transfer case shift lever again.

b. Select first gear on the gear lever then release the parking brake. If the parking brake warning light does not extinguish, do not attempt to move the vehicle.

c. Engage the clutch smoothly by releasing the clutch pedal and simultaneously depressing the accelerator pedal the amount necessary for the engine to move the load.

NOTE

Never allow the foot to RIDE the clutch pedal with the clutch engaged. This causes premature clutch wear.

d. As the vehicle gains speed, continue changing gear until cruising speed is achieved and the transmission is in the highest gear possible without labouring the engine.

Good Driving Habits

221. Engine Temperature

Allow the engine to reach normal operating temperature before engaging in high speeds or hauling heavy loads.

WARNING

SHOULD THE ENGINE BECOME OVERHEATED, PARK THE VEHICLE IN A SAFE WORKING AREA AND ALLOW THE ENGINE TO COOL BEFORE ATTEMPTING REPAIRS TO, OR REFILLING OF, THE COOLING SYSTEM.

222. Instruments

Glance at the instruments frequently. If a fault is indicated, assess the corrective action required and stop the vehicle as necessary.

223. Clutch

To avoid damage, engage the clutch with a smooth action. Do not RIDE the clutch.

224. Gear Changing

Ensure that the correct gear is selected for the terrain, vehicle load and speed.

225. Braking

Avoid sudden stops. When stopping on slippery surfaces, smoothly apply and release the brakes alternately, to prevent skidding. When slowing to a halt, leave the clutch engaged as long as possible to utilise the engine braking effect. Before descending steep slopes, select first gear, low ratio with the differential locked to provide maximum engine braking.

226. Stopping the Engine

CAUTION

BEFORE SHUTTING DOWN THE ENGINE, ALLOW THE ENGINE TO IDLE FOR TWO TO THREE MINUTES TO ALLOW THE TURBOCHARGER TEMPERATURE TO STABILISE AND THE ROTATIONAL SPEED OF THE TURBINE TO SLOW DOWN, OTHERWISE DAMAGE TO THE TURBOCHARGER WILL RESULT THROUGH LACK OF LUBRICATION.

Allow the engine to return to the normal idle speed before turning the ignition off.

227. Parking

Use the parking brake when parking the vehicle. Check frequently to ensure that the brake is adjusted to lock and hold the vehicle when parked. Do not use the parking brake when the vehicle is in motion, except in an emergency. When parking on an incline, leave the vehicle in gear.

228. Fording

The maximum advisable fording depth is 1000 mm. When fording is to be undertaken, ensure that the flywheel housing drain plug is securely fitted (see Fig. 2-2). If deep water is anticipated, loosen the fanbelt to prevent damage to the fan or radiator, and saturation of the electrical system. Avoid excessive speed.

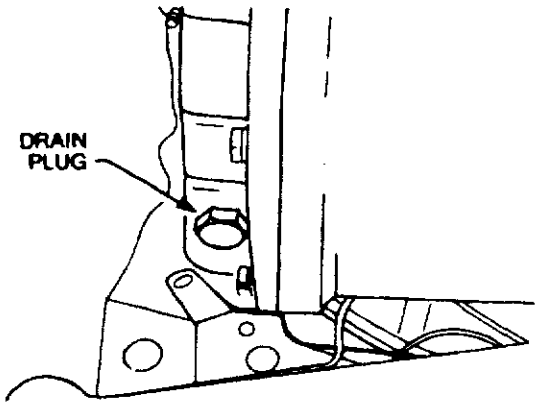


Figure 2-2 Flywheel Housing Drain

229. Once the crossing has been accomplished, drain the flywheel housing and tighten the fanbelt. Ensure that the brakes are dry and fully effective before proceeding.

NOTE

After fording, check the oil in the engine, transmission, transfer case and swivel pin housing for signs of water contamination. Change contaminated oils as soon as possible.

230. Cross Country Driving

WARNING

BECAUSE OF THE EXCELLENT ROUGH TERRAIN CHARACTERISTICS OF THIS VEHICLE, DRIVERS ARE TO MAINTAIN A SAFE SPEED FOR THE CONDITIONS ENCOUNTERED, ESPECIALLY WHEN TOWING A TRAILER OR UTILISING TYRE CHAINS.

NOTE

The mobility of this vehicle is greatly enhanced if correct tyre pressures are maintained, six wheel drive is engaged, and in extreme conditions, tyre chains are used.

The transfer case differential lock should be utilised for cross country driving, ie. off formed roads and tracks. When activated, the differential lock warning light will illuminate indicating that the dog-clutch in the transfer case is fully engaged. Although the differential lock can be engaged while the vehicle is moving, no power should be applied to the transmission during this operation.

WARNING

LOCK THE TRANSFER CASE DIFFERENTIAL TO ENGAGE SIX WHEEL DRIVE WHEN CROSSING DIFFICULT TERRAIN OR WHEN CONDITIONS MAY LEAD TO LOSS OF TRACTION. ALL THREE AXLES ARE DRIVEN WHEN THE TRANSFER CASE DIFFERENTIAL IS LOCKED. ONLY THE FRONT AND INTERMEDIATE AXLES ARE DRIVEN WHEN THE TRANSFER CASE DIFFERENTIAL IS UNLOCKED.

NOTE

Under some conditions, a slight delay may be experienced before the warning light illuminates. This is due to the time required for the dog-clutch to align with its mating splines and become fully engaged.

231. On reaching normal road conditions, the differential lock must be disengaged.

NOTE

Under some conditions, a slight delay may be experienced before the warning light extinguishes after the switch is pushed in. If the warning light does not extinguish, this indicates that the dog-clutch is not fully disengaged. This is usually due to transmission wind-up which jams the dog-clutch. If the warning light does not extinguish within 100 metres of the switch being pushed in, the vehicle should be stopped and reversed a few metres to unwind the transmission. The warning light should now extinguish. If not, do not continue as serious damage may occur.

Changing a Wheel

WARNING

DO NOT WORK UNDER RAISED VEHICLE UNLESS LOAD IS SUPPORTED BY INDEPENDENT STANDS.

232. To replace a flat tyre with the spare wheel, proceed as follows:

a. Engage the differential lock and check that the differential lock warning light illuminates.

NOTE

If the vehicle has been stationary prior to changing the wheel, the differential lock may not engage when selected. In this case, it will be necessary to start the engine, engage a gear and release the clutch sufficiently to allow slight movement of the gears, until the warning light is illuminated. Switch off the engine.

b. Engage first gear in the transmission and low range in the transfer case.

WARNING

THE PARKING BRAKE ACTS ON THE TRANSMISSION, NOT THE REAR WHEELS. THE DIFFERENTIAL LOCK MUST BE ENGAGED AND THE WHEELS CHOCKED TO ENABLE THE VEHICLE TO BE RAISED SAFELY WITH THE VEHICLE JACK

c. Ensure that the parking brake is applied and that the wheels are chocked.

WARNING

HI-LIFT JACK IS ONLY TO BE USED IN THE DESIGNATED LIFTING POINTS. IT IS NOT TO BE USED IN ANY OTHER POSITION ON THE VEHICLE.

d. If using the Hi-Lift jack, position the jack as follows:

(1) Front wheel. Position the jack in the front lifting point (see Fig. 2-3).

(2) Rear or intermediate wheel. Position the jack in the rear lifting point (see Fig. 2-4).

(3) Adjust the jack so that the foot rests on the ground, insert the 'L' pin into the jack tongue to secure the jack in place, and insert the 'R' pin (see Fig. 2-3 or Fig. 2-4).

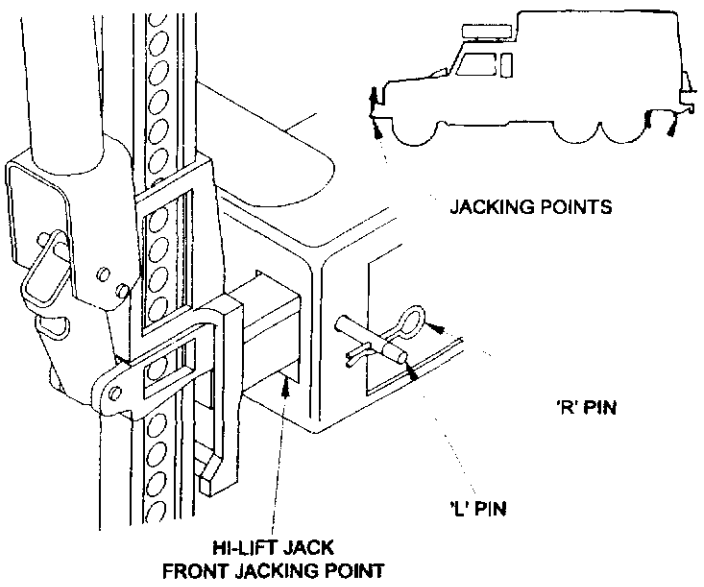


Figure 2-3 Hi-Lift Front Jacking Point and Insertion of Safety Pin

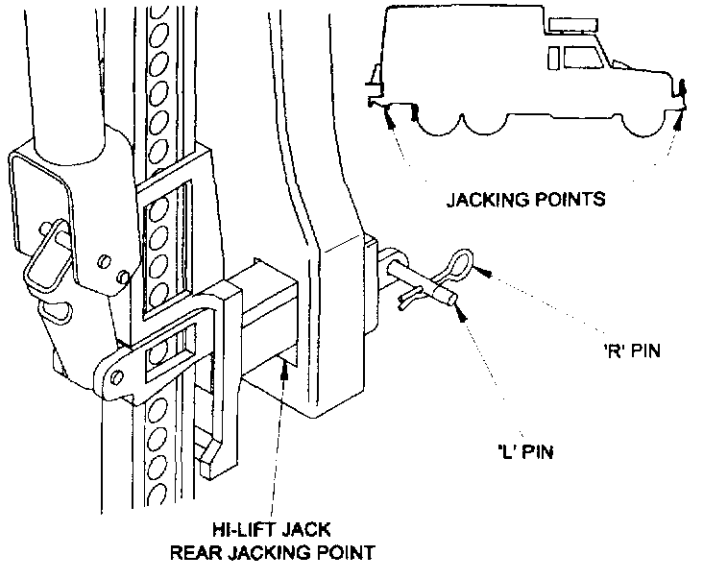


Figure 2-4 Hi-Lift Rear Jacking Point and Insertion of Safety Pin

e. If using the vehicle jack, remove the hydraulic jack, handle and jack base plate, from the stowage bin, and position the jack under the vehicle as follows:

(1) Front wheel. Position the jack so that when raised, it will engage with the front axle casing immediately below the coil spring, where it will locate between the flange at the end of the axle casing and the large bracket to which the front suspension members are mounted (see Fig. 2-5).

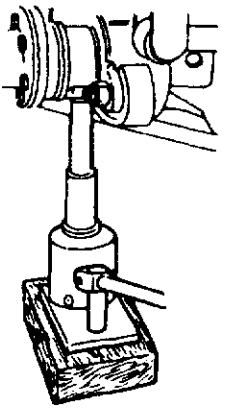


Figure 2-5 Jack Position - Front Wheels

(2) Rear wheel. Position the jack so that when raised, it will contact the axle tube between the spring and the shock absorber bracket (see Fig. 2-6).

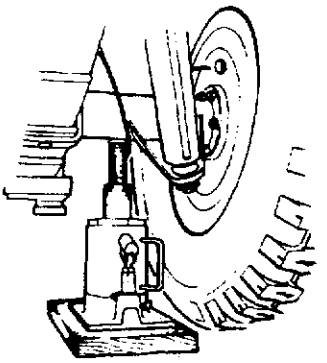


Figure 2-6 Jack Position - Rear Wheels

f. Before raising the vehicle, remove the spare wheel from the vehicle, then using the wheel brace, initially slacken the nuts on the wheel to be removed.

g. Jack up the appropriate wheel. When the wheel is clear of the ground, remove the wheel nuts and lift off the wheel.

h. Ensure that the wheel nuts and studs are clean then fit the spare wheel and secure with the wheel nuts. Tighten the wheel nuts.

i. Lower the vehicle to the ground and torque the wheel nuts to 100-115 Nm (75-85 lb.ft) in the correct sequence (diagonally opposite). Use hand pressure only. Do not use foot pressure or extension tubes as this could overstress the wheel studs.

j. Remove the jack and the wheel chocks then disengage the differential lock.

Towing the Vehicle

233. The following precautions must be taken before this vehicle is towed:

WARNING

WHEN USING REAR LIFT RECOVERY, EXTREME CAUTION MUST BE OBSERVED, ESPECIALLY WHEN THE VEHICLE IS FULLY LADEN AS FRONT AND REAR AXLE AND TYRE OVERLOAD CAN OCCUR.

a. Set the transmission and transfer case to neutral.

b. Set the transfer case control switch to the on-road position.

c. Ensure that the differential lock warning light is extinguished. If the warning light fails to extinguish, both the front and rear propeller shafts are to be removed.

d. When the front propeller shaft is to be removed, as detailed in para 108, the flange mounting bolts must be secured with nuts or wire to prevent damage to the transmission casing. Follow the towing instructions provided on the decal attached to the driver's seat box.

e. Welded to the brushguard and the rear crossmember are two towing eyes which are used as fixed mounting points to

allow for the attachment of an A frame to facilitate vehicle recovery.

Winch Operation

234. The following precautions must be observed:

WARNING

ALWAYS WEAR INDUSTRIAL GLOVES WHEN HANDLING STEEL WIRE ROPE. DO NOT USE HANDS TO GUIDE THE ROPE ON OR OFF THE DRUM WHEN WINCHING.

a. The winch rope must be lubricated regularly and used correctly to maintain the rope in a serviceable and easy to handle condition.

b. The winch rope should be wound tightly and evenly on the winch drum, otherwise pressure on the top layer will force the rope down between the lower layers, causing entanglements and serious damage could result.

c. Do not continue winching if a kink is noticed in the winch rope. Release the tension and remove the kink.

d. The winch rope should not be looped around a load or anchor point. The CES chain should be used for this purpose.

e. The winch rope should not be paid out under power except when circumstances offer no alternative.

f. Do not disengage the winch dog-clutch under load.

g. Do not leave less than four wraps of winch rope on the drum.

h. Do not travel with the winch engaged.

i. Do not use the winch rope for towing under any circumstances.

235. To release the winch rope manually:

a. Ensure that the engine is switched OFF, then set the winch dog-clutch lever to the vertical position (see Fig. 2-7) to disengage the dog-clutch. Reel out the winch rope as required.

NOTE

Do not leave less than four wraps of winch rope on the drum.

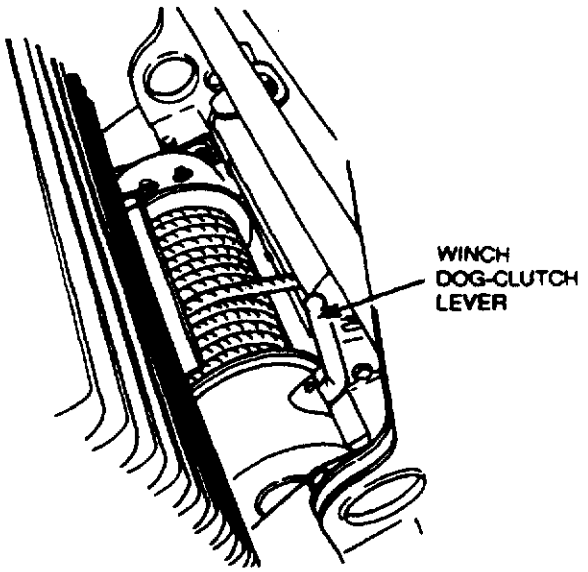


Figure 2-7 Winch Dog-Clutch Operation

236. Attach the winch rope to the selected anchor point.

NOTE

The winch rope should not be looped around a load or anchor point. Use suitable chains for this purpose.

237. To winch out under power:

a. Push the winch dog-clutch lever outward, while turning the winch drum by hand to ensure that the winch dog-clutch has engaged.

b. Place the transfer case control lever in the neutral position, then start the engine.

NOTE

Ensure that a load is always applied to the winch rope when winching out.

c. Depress the clutch pedal and select reverse gear, then pull up the winch/PTO control in the seat base (see Fig. 2-8) to engage the winch drive. Increase engine speed to approximately 1300 rpm then slowly release the clutch pedal to begin winching out the rope.

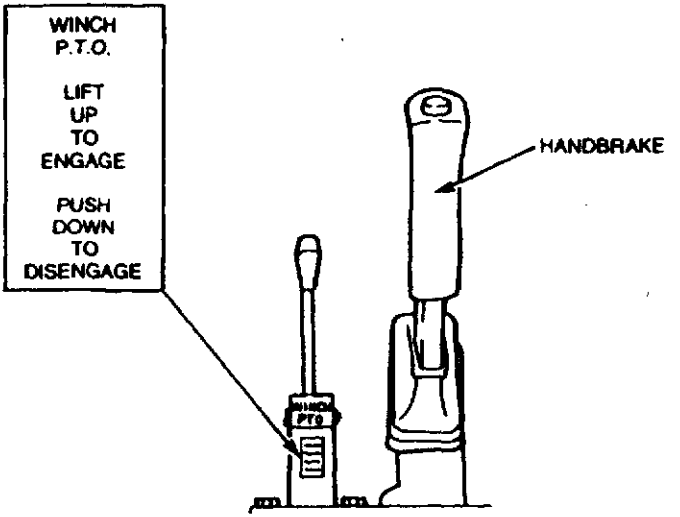


Figure 2-8 Winch/PTO Control Operation

d. To stop the winch during operating procedures, depress the clutch pedal. The worm gearing will ensure that the winch load is held until winching is resumed.

238. Attach the winch rope to the selected anchor point.

NOTE

The winch rope should not be looped around a load or anchor point. Use suitable chains for this purpose.

239. To winch in:

a. Push the winch dog-clutch lever outward, while turning the winch drum by hand to ensure that the winch dog-clutch has engaged.

b. Place the transfer case control lever to the neutral position, then start the engine.

NOTE

Ensure that a load is always applied to the winch rope when winching in.

c. Depress the clutch pedal and select a low forward gear, then pull up the winch/PTO control in the seat base (see Fig. 2-8) to engage the winch drive. Increase engine speed to approximately 1300 rpm then slowly release the clutch pedal to begin winching in the rope.

d. To stop the winch during operating procedures, depress the clutch pedal. The worm gearing will ensure that the winch load is held until winching is resumed.

NOTE

1. The winch oil will overheat and rapidly lose its lubricating properties if the winch is used continuously at its maximum capacity. Under these circumstances, time should be allowed for the winch lubricant to cool before resuming winching. The maximum allowable temperature of the winch oil is 120°C, but operation below 100°C is preferable.

2. An automatically re-setting torque limiter is incorporated in the winch power take-off. This is pre-set to release at an input torque corresponding to the rated capacity of the winch, and will be indicated by a loud rattling sound from the transmission area. When this occurs, winching should immediately be stopped and the means found to reduce the winch rope load, for instance by relocating the rope anchor point. Extensive use of the power take-off with the torque limiter continuously released will cause excessive wear of the torque limiter, and will not assist in the winch operation.

240. On completion of the winching task:

a. Depress the clutch pedal to stop the winch and allow the engine to idle.

b. Place the transmission in neutral and push down the winch/PTO control to disengage the winch drive.

c. Drive the vehicle forward to slacken the winch rope and remove the winch rope from the anchor point. Winch the remaining rope in under light load, ensuring that the winch rope is correctly rolled, then secure the chain to the front of the vehicle.

d. Disengage the winch dog-clutch by turning the dog-clutch lever to the vertical position.

Compressor Operation

241. To operate the compressor proceed as follows:

WARNING

ENSURE THAT THE ENGINE IS TURNED OFF PRIOR TO ENGAGING THE COMPRESSOR DRIVE.

a. Depress the pin on the front of the clutch (see Fig. 2-9), then rotate the clutch head until the pin locates in one of the four drive slots in the drive pulley.

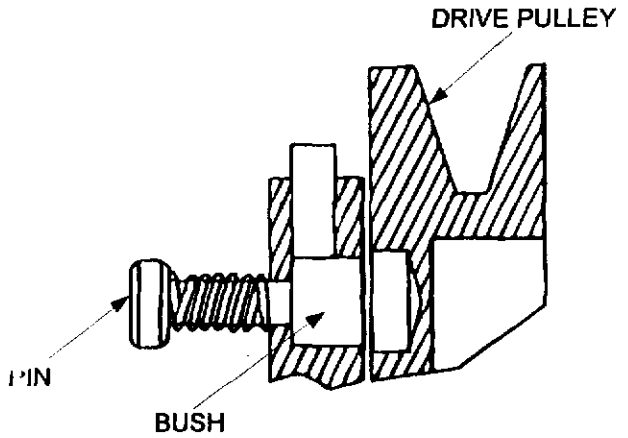


Figure 2-9 Air Compressor Drive

b. Ensure that the compressor relief valve setting is set to 60 psi and check the belt tension. Re-tension if required.

c. Start the engine and set the engine idle speed to 1000 rpm with the hand throttle.

d. Connect the air hose to the compressor outlet and carry out the required task.

WARNING

STOP THE ENGINE PRIOR TO DISENGAGING THE COMPRESSOR DRIVE

NOTE

A centrifugal clutch is incorporated in the compressor drive that will disengage the drive if the engine is over revved. Manual dis-engagement of the drive is the preferred method.

e. Stop the engine and disengage the drive pin by raising the lever on the front of the compressor. The drive pin will return to a neutral position thereby disconnecting the compressor clutch to the drive pulley.

CHAPTER 3

OPERATOR SERVICING

SECTION 1 - SERVICING

SECTION 2 - LUBRICATION

SECTION 1
SERVICING

First Parade Servicing

301. Before moving off with a loaded or unloaded vehicle, carry out the inspections, checks and tests as laid down in this section. Inspect for damage, security and serviceability.

302. Check the wheels and tyres for the following:

a. Loose wheel nuts.

b. Correct tyre pressure (see page 74).

c. Cuts, weak spots, uneven wear, exposed cords, or clogged tyres.

303. Check the following fittings:

a. All cabin and body fittings.

b. Spare wheels.

c. Stowage space, doors and lids.

d. Windscreen, driving mirrors, door windows, hinges, catches and latches for security.

e. All light lenses, driving mirrors and windscreens and clean as necessary.

f. Tow hook, coupling and security.

g. Winch disengaged and rope secured.

304. Check the stowed items as follows:

a. Completeness of equipment and correct stowage.

b. For loose items in cabin or rear section.

c. De-ditching tools.

d. Fire extinguishers, fully charged and correctly stowed.

305. Check the battery, fuel, lubricants and coolant as follows:

a. Fuel level in tanks. Replenish as necessary.

b. Check jerry cans and refill if necessary.

c. Engine oil level using dipstick. Top-up as necessary.

d. Coolant level in radiator expansion tank. Top-up if necessary.

e. Water cans in stowage. Top-up if necessary.

f. For fuel, lubricant and coolant leaks. Examine major assemblies and the ground below the vehicle for evidence.

g. Battery. Check electrolyte level - fill to 10 mm above plates. Check that the terminals are clean and tight.

Start the Vehicle

306. Start the vehicle as detailed in Chapter 2 Section 2 and check the following:

a.	Voltmeter	Any irregular reading indicates battery or charging system requires checking.
b.	Horn	Check operation of the horn.
c.	Lights	Check operation of all lights.
d.	Windshield wipers/washers	Check operation. Add water, if needed.
e.	Parking brake	Check release, holding ability and application.
f.	Clutch pedal	Check for free travel.
g.	Seat adjustment	Ensure that seat is correctly adjusted.

Moving Off and Running

307. Check the following:

a. Load - make a final check of the security of load and lashings, if applicable.

b. Moving off - Release the parking brake. DO NOT move off if the parking brake warning light remains illuminated. Check correct operation of steering and brakes.

c. Keep a running check on all instruments.

d. Check the fuel level, coolant temperature, warning lights, charging rate and speedometer at intervals.

Halts on the March

308. At halts on the march check that:

a. The cargo and lashings are secure, if applicable.

b. No tyre is soft, punctured or overheated.

c. Wheel hubs and brakes are not overheated.

d. There are no oil, fuel or coolant leaks.

309. At halts or after approximately four hours running:

a. Check tyre pressures. If low, inflate. (If high, check later when tyres are cold, before deflating).

b. Ensure that all wheel nuts are secure.

c. Test all lights (especially if there is a possibility that they will be required).

d. Check generally for loose bolts or fittings. Tighten as necessary.

e. Ensure security of stowed items.

f. Inspect for security and correct operation any parts on which recent repairs or adjustments have been carried out.

Last Parade Servicing

310. Carry out the following:

a. Clean the vehicle.

b. Carry out "halts on the march" servicing.

c. Draw fuel and lubricants, as required and top-up fuel tanks, engine oil and radiator expansion tank coolant. If operating under very dusty conditions, the air cleaner should be removed and cleaned.

d. If vehicle has been subjected to deep water crossings during daily exercise, the oil in the swivel pin housings, front, intermediate and rear axles, transmission and transfer case, should be checked for signs of water contamination. If any traces of water are found, the oil should be drained and replenished with correct type as soon as possible.

e. Check radiator core for insects, mud, etc., clean as required with compressed air or water.

f. Clean radiator insect screen and inspect for damage.

g. Complete documentation.

h. Close the doors and windows.

Opening Bonnet for Servicing Access

311. To open the bonnet, proceed as follows:

a. Pull the bonnet release lever towards the passenger side.

b. Release the safety catch at the front of the bonnet.

c. Lift the bonnet up and pull the support stay forward.

WARNING

ENSURE THAT THE BONNET SUPPORT STAY IS PROPERLY LOCKED INTO POSITION BEFORE RELEASING THE BONNET.

312. To close the bonnet, proceed as follows:

a. Hold the bonnet open and push the support stay back.

b. Gently lower the bonnet then push the bonnet down firmly to lock in position. Do not allow the bonnet to drop from the open position.

Radiator coolant

313. Normal cooling system replenishment is via the expansion tank. However, in the event of excessive coolant loss or drainage, the following radiator filling procedure is to be adopted:

a. Remove the expansion tank pressure cap and move the heater controls to the highest temperature position.

b. Remove the brass filler plug from the thermostat housing (see Fig. 3-1).

c. Using coolant with a mixture concentration of 5% Alfloc 2001, top-up the system through the filler hole, then replace the plug.

d. With the pressure cap removed, run the engine for a minimum of two minutes.

e. Stop the engine and remove the plug from the thermostat housing. Top-up as required, then install and tighten the plug securely.

f. Fill the expansion tank to the correct level and install the cap.

g. Run the engine and check for leaks.

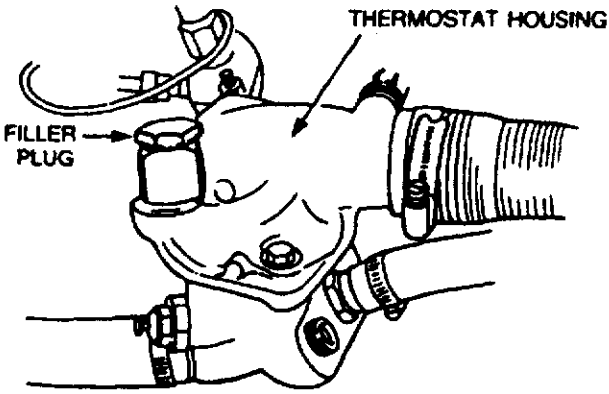


Figure 3-1 Thermostat Housing

Bleeding the Fuel System

314. To bleed the fuel system, proceed as follows:

a. Loosen the screw cap on the transfer pump and operate the primer.

b. Loosen the overflow valve on the fuel filter adaptor (see Fig. 3-2) and continue operating the primer until a solid stream of fuel flows from the valve.

c. Tighten the overflow valve and continue operating the primer. Loosen the air bleed screw on the fuel injection pump and continue operating the primer until a solid stream of fuel flows from the air bleed screw. Tighten the air bleed screw.

d. Secure the primer screw cap and start the engine. Ensure that the engine runs smoothly.

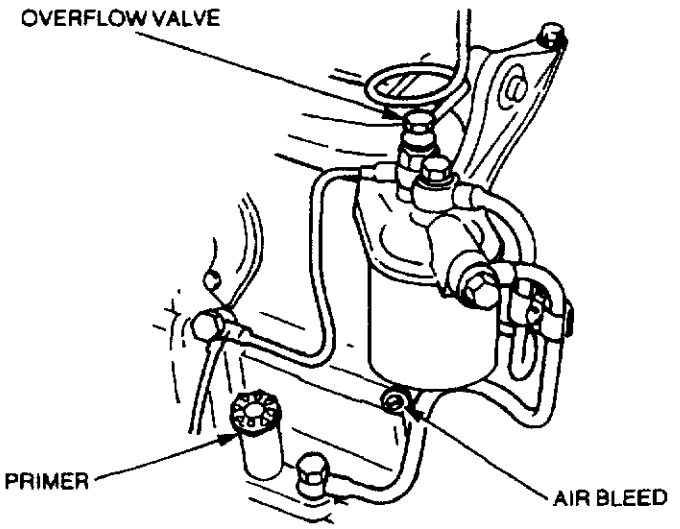


Figure 3-2 Bleeding the Fuel System

315. Periodical Maintenance

a. To ensure that the vehicle is correctly maintained and prepared for operational tasks, it is necessary to carry out regular maintenance.

b. Daily and fortnightly Servicing in accordance with Tables 3-1 and 3-2 is to be carried out by operators and is the responsibility of owner units.

c. Initial service should be carried out after the vehicle has been in service for a period of three months, or having travelled 1600 km, whichever occurs first. The service is the responsibility of RA Limited and will be carried out by arrangement with any Rover franchised Dealer at no charge to the Army, except for the cost of replacement lubricants and filters. Alternatively this service can be carried out by an Army tradesman in accordance with Table 3-3, should it not be convenient for the vehicle to be returned to the authorised Rover Dealer at the time.

d. Minor and Major Servicing is to be carried out by RAEME with assistance from operators working under RAEME supervision in accordance with Table 3-3. The vehicle is to

be serviced in accordance with the intervals in EMEI Veh G 209.

(1) **Minor Service.** Every twelve months or 10 000 km of operation (except during warranty when six months interval used).

(2) **Major Service.** Every twenty four months or 20 000 km of operation, whichever occurs first (except during warranty when 12 months interval used).

Special Requirements

316. During the early life of a vehicle the working parts settle down, with the result that various clearances and adjustments need to be corrected. Operators should report problems for rectification at the earliest opportunity.

317. The Initial Service includes a warranty inspection which must be reported to Rover Australia in accordance with EMEI VEHICLE A 119-22.

318. Vehicles are to be inspected by a qualified Tradesman prior to expiry date of the warranty. Refer EMEI VEH A 119-22.

Table 3-1 Daily Tasks

The following operations are to be performed by the driver:

1. Check engine oil level, top-up if necessary.
2. Check coolant level, top-up if necessary.
3. Check power steering reservoir, top-up if necessary.
4. Check tyres and wheels. Inflate tyres if necessary, inspect wheel nuts for evidence of looseness.
5. Check for fuel, oil and coolant leaks.
6. Check fuel supply and operation of fuel gauge.
7. Check voltmeter reading. With ignition switch on and engine off, reading indicates battery condition. With engine running, reading indicates condition of charging system.
8. Check operation of horn.
9. Check all lights for correct operation and report any defects.

10. Check operation of footbrake, parking brake and clutch.
11. Check coolant temperature gauge reading.
12. Check operation of windscreen wipers and washers, top-up washer reservoir if required.
13. Check air cleaner restriction gauge reading. If locked in "red" position, the air cleaner elements must be changed. Under dusty conditions, remove and clean elements.
14. Check seats and set belts for operation and security.
15. Check driving mirrors, door windows, catches and latches.
16. Check winch rope is properly secured.

Table 3-2 Fortnightly Tasks

The following operations are to be performed by the driver:

1. Check condition and tension of fanbelts. Approximately 10-15 mm deflection on longest span using moderate thumb pressure for both alternator belts.
2. Check battery electrolyte levels (10 mm above plates), top-up if necessary, examine terminals for cleanliness and security. Check for leaks and security, clean outside of batteries if required.
3. Check radiator external condition for restriction, clean if required.
4. If operating in dusty conditions, remove air cleaner elements and clean.
5. Check operation of hand throttle and stop control.
6. Check operation of differential lock control.
7. Check operation of transfer case control.
8. Check condition of wheel rims, tyres and valve stems.
9. Check wheel nuts are torqued correctly.
10. Check operation and security of spare wheel carriers.

11. Check security of fuel tanks and lines.
12. Check fuel, oil and coolant systems for leaks.
13. Drain water from sedimenters.
14. Check winch rope is properly secured.

Tyre Pressure (Cold)

Highway:	
front	350 kPa (50 psi)
intermediate	350 kPa (50 psi)
rear	350 kPa (50 psi)
Cross-country:	
front	275 kPa (40 psi)
intermediate	275 kPa (40 psi)
rear	275 kPa (40 psi)
Sand:	
front	225 kPa (33 psi)
intermediate	225 kPa (33 psi)
rear	225 kPa (33 psi)

319. Table 3-3 details the servicing instructions for this vehicle. However, refer to EMEI VEH G 209 for the complete servicing instructions.

Table 3-3 Servicing Instructions (Extract from EMEI Vehicle G 209)

Designation	Initial 3 Mths/ 1600 km	Minor 6 Mths/ 10 000 km	Major 12 Mths/ 20 000 km	Alt Major 24 Mths/ 40 000 km	Capacity (litres)	Lubricant
DRIVER TASKS (under RAEME supervision)						
Engine oil	D	D	D	D	8.5	OMD-115
Engine oil filters	R	R	R	R		
Fuel filter	R	R	R	R		
Engine breather filter	C	C	C	C		
Water pump (if nipple fitted)	L	L	L	L		XG-274
Air cleaner	C	R	R			
Air cleaner dust vacuator valve	C	C	C	C		
Radiator coolant	K	K	D	D	12.5	Water and inhibitor
Fuel transfer pump strainer	C	C	C	C		
Windscreen washer bottle	K	K	K	K		
Brake fluid reservoir	K	K	-	-		OX(AUST)8
Clutch fluid reservoir	K	K	-	-		OX(AUST)8
Power steering system	K	K	D	D	1.25	OX-46

Table 3-3 Servicing Instructions (Cont'd)

Designation	Initial 3 Mths/ 1600 km	Minor 6 Mths/ 10 000 km	Major 12 Mths/ 20 000 km	Alt Major 24 Mths/ 40 000 km	Capacity (litres)	Lubricant
Bonnet locks and hinges	L	L	L	L		OMD-115
Heater intake dump valve	C	C	C	C		
Accelerator control linkage and pedal pivot	L	L	L	L		OMD-115
Hinges, catches and latches	L	L	L	L		OMD-115
Fan belt jockey pulley bearing (if fitted)	L	L	L	L		XG-274
Battery electrolyte level (10 mm above plates), security and cleanliness of terminals	KI	KI	KI	KI		
Seat slides	L	L	L	L		OMD-115
Driving mirrors and window glasses	CI	CI	CI	CI		
Tyres (inflate if necessary including spares)	K	K	K	K		
Wheel nut security	Y	Y	Y	Y		
Fuel sedimenters	C	C	C	C		
Winch gearbox	K	K	K	D	2.1	OEP-220
Front axle	D	K	K	D	1.7	OEP-220
Intermediate axle	D	K	K	D	2.3	OEP-220
Swivel pin housings	D	K	K	D	0.35 ea	OEP-220
Transmission	D	K	K	D	2.7	OMD-115
Transfer case (with PTO)	D	K	K	D	3.2 (5.8)	OMD-115
Rear axle	D	K	K	D	2.6	OEP-220
Park brake and PTO linkage	L	L	L	L		XG-274

Table 3-3 Servicing Instructions (Contd)

Designation	Initial 3 Mths/ 1600 km	Minor 6 Mths/ 10 000 km	Major 12 Mths/ 20 000 km	Alt Major 24 Mths/ 40 000 km	Capacity (litres)	Lubricant
Axle and transmission breathers	C	C	C	C		
Axle rebound cables	I	I	I	I		
Propeller shafts, support bearings, sliding and universal joints	L	L	L	L		XG-274
Propeller shaft bolts	Y	Y	Y	Y		
Winch fairleads and rollers	L	L	L	L		OMD-115
Winch propeller shaft and support bearings	L	L	L	L		XG-274
Winch dog-clutch	L	L	L	L		XG-274
Winch rope	L	L	L	L		ZX-8
Spare wheel carrier operation	I	I	I	I		
Pintle hook	L	L	L	L		XG-274
Vehicle cleanliness (as directed by supervising tradesman)	C	C	C	C		
Body to chassis mounting bolts	Y	Y	Y	Y		
Step and platform mounting bolts	Y	Y	Y	Y		
Rear door mount latches and catches	YL	YL	YL	YL		OMD-115
Report defects						
VEHICLE MECHANIC TASKS						
Air compressor operation (if fitted)	I	I	I	I		
Fuel injection pump and lines	I	I	I	I		
Engine idle	A	A	A	A		

Table 3-3 Servicing Instructions (Cont'd)

Designation	Initial 3 Mths/ 1600 km	Minor 6 Mths/ 10 000 km	Major 12 Mths/ 20 000 km	Alt Major 24 Mths/ 40 000 km	Capacity (litres)	Lubricant
Fanbelts	IA	IA	IA	IA		
Fanbelt jockey pulley (if fitted)	IA	IA	IA	IA		
Alternator mounting bolts	Y	Y	Y	Y		
Intake and exhaust manifold bolts	Y	Y	Y	Y		
Turbocharger bolts	Y	Y	Y	Y		
Engine mounting and earth strap	I	I	I	I		
Valve clearances	A	-	A	A		
Fuel injectors	-	-	-	I		
Engine compression	-	-	-	I		
Glow plugs electrical circuit	I	-	I	I		
Engine stop control and hand throttle connection and operation	I	I	I	I		
Water pump condition	I	I	I	I		
Radiator and hose condition	I	I	I	I		
Flywheel housing	DI	DI	DI	DI		
Oil, coolant and fuel leaks	I	I	I	I		
Exhaust system leaks, damage and security	I	I	I	I		
Windscreen wipers, wiper blades and washers	I	I	I	I		
Windscreen and side windows, glass and seals	I	I	I	I		
Brake, fuel and clutch pipes, chafing, leaks, or corrosion	I	I	I	I		
Brake master cylinder leaks	I	I	I	I		

Table 3-3 Servicing Instructions (Contd)

Designation	Initial 3 Mths/ 1600 km	Minor 6 Mths/ 10 000 km	Major 12 Mths/ 20 000 km	Alt Major 24 Mths/ 40 000 km	Capacity (litres)	Lubricant
Brake servo filter	-	-	-	R		
Brake servo hose condition and operation	I	I	I	I		
Front and rear hub bearings	A	A	A	ILA		XG-274
Front and rear brake pads for wear, callipers for leaks and condition of discs	I	I	I	I		
Brake hydraulic system	-	-	DB	DB		OX(AUST)8
Clutch master and slave cylinder leaks	I	I	I	I		
Clutch hydraulic system	-	-	DB	DB		OX(AUST)8
Transmission mountings and earth strap	I	I	I	I		
Propeller universal joint and sliding joint	I	I	I	I		
Winch propeller shaft and support bearing	I	I	I	I		
Park brake, PTO linkage and cable	IA	IA	IA	IA		
Steering box adjustment and security	IA	IA	IA	IA		
Steering linkages and tie-rod ends	I	I	I	I		
Steering damper	I	I	I	I		
Steering protection plate for damage and security	I	I	I	I		
Shock absorbers and springs	I	I	I	I		
Front radius arm bushes and bolts	I	I	I	I		
Panhard bushes and bolts	I	I	I	I		
Swivel pin bushes	I	I	I	I		
Rear spring shackles and equalisers	I	I	I	I		
Tyre wear and rim damage	I	I	I	I		

Table 3-3 Servicing Instructions (Cont'd)

Designation	Initial 3 Mths/ 1600 km	Minor 6 Mths/ 10 000 km	Major 12 Mths/ 20 000 km	Alt Major 24 Mths/ 40 000 km	Capacity (litres)	Lubricant
Wheel alignment	I	I	I	I		
Panel damage	I	I	I	I		
Canopy and bows	I	I	I	I		
Seat belts, mountings and inertia reel operation	I	I	I	I		
Bonnet lock operation and adjustment	IA	IA	IA	IA		
Bonnet hinges	I	I	I	I		
Headlight alignment	IA	IA	IA	IA		
Operation of lights, gauges, warning lights and horn	I	I	I	I		
Operation of foot brake, hand brake and clutch	I	I	I	I		
Winch operation	I	I	I	I		
NATO plug	I	I	I	I		
Pintle hook	I	I	I	I		
Gun ring nipples			L	L	As required	XG-274

LEGEND

A - Adjust	D - Drain and Refill	L - Lubricate
B - Bleed	I - Inspect	R - Replace
C - Clean	K - Check/Top-up	Y - Tighten

SECTION 2
LUBRICATION

320. Table 3-4 details the lubricants required for vehicle servicing. However, refer to EME! VEH G 209 for the approved list of lubricants and servicing instructions.

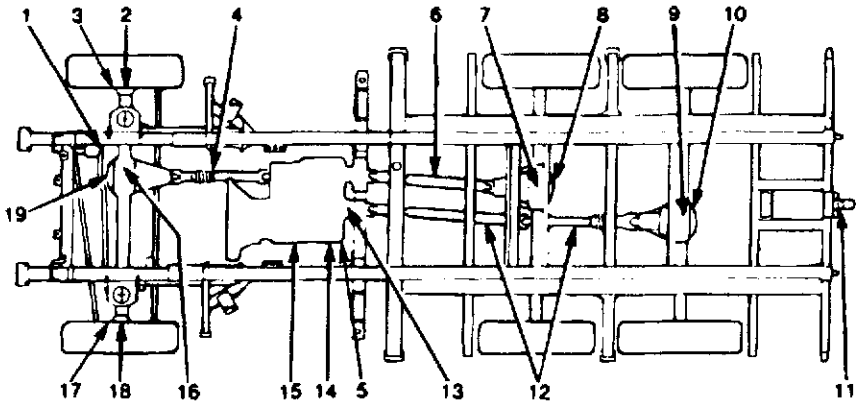
Table 3-4 List of Lubricants

Equipment	Lubricant	Capacity (litres)
Engine (including filters)	OMD-115	8.5
Transmission	OMD-115	2.7
Transfer Case (with PTO)	OMD-115	5.8
Front Axle	OEP-220	1.7
Intermediate Axle	OEP-220	2.3
Rear Axle	OEP-220	2.6
Swivel Pin Housings	OEP-220	0.35 (each)
Brake Master Cylinder	OX(Aust)8	Fill to level
Clutch Master Cylinder	OX(Aust)8	Fill to level
Steering Box (including reservoir)	OX 46	1.25
Chassis Lubrication	XG-274	As required
Wheel Bearings	XG-274	As required
Winch	OEP-220	2.1
Winch Rope	ZX-8	As required

321. Fig. 3-3 illustrates the location of various lubrication and oil drainage/refill points around the vehicle.

NOTE

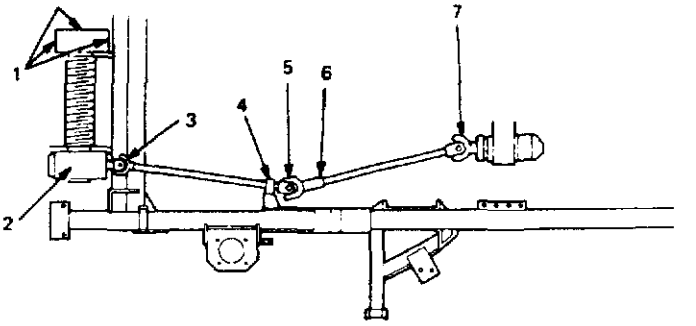
Run the engine or drive the vehicle as appropriate to warm oils before draining.



1. Power steering reservoir
2. Right hand swivel pin housing drain plug
3. Right hand swivel pin housing fill plug
4. Front propeller shaft grease nipples
5. Transfer case drain plug
6. Intermediate propeller shaft grease nipples
7. Intermediate axle drain plug
8. Intermediate axle fill plug
9. Rear axle drain plug
10. Rear axle fill plug
11. Pintle
12. Rear propeller shaft
13. Transfer case fill plug
14. Transmission fill plug
15. Transmission drain plug
16. Front axle drain plug
17. Left hand swivel pin housing fill plug
18. Left hand swivel pin housing drain plug
19. Front axle fill plug

Figure 3-3 Lubrication and Oil Drain/Refill Points

322. Fig. 3-4 illustrates the location of lubrication and oil drainage/refill points on the winch and winch drive line.



1. Winch grease points
2. Winch drain and fill plugs
3. Universal joint grease nipple
4. Pillow block bearing grease nipple
5. Universal joint grease nipple
6. Slip joint grease nipple
7. Universal joint grease nipple

Figure 3-4 Winch and Winch Drive Line

Engine Oil and Oil Filter Change Procedure

323. Run the engine until the engine coolant reaches normal operating temperature then shut down the engine. Remove the engine oil pan drain plug (see Fig. 3-5) and drain the oil into a suitable receptacle before the engine cools. Fit a new sealing washer on the drain plug and install the drain plug.

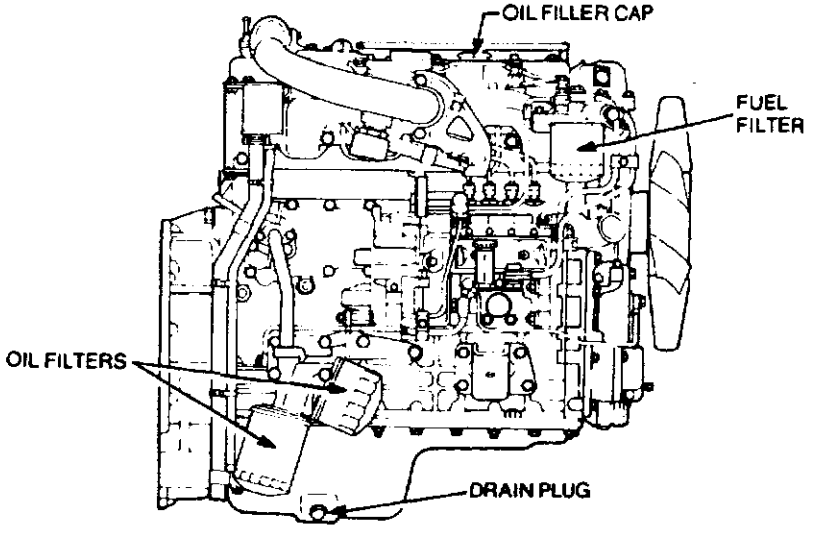


Figure 3-5 Engine - Right Hand Side

324. Unscrew each oil filter cartridge counter-clockwise, using a suitable oil filter removing tool if necessary (see Fig. 3-6). Apply a film of clean engine oil on the rubber seal of each new filter cartridge and install each filter. After the filter seal contacts the adaptor, tighten the filter a further half a turn by hand only.

325. Fill the engine with the correct quantity of the recommended lubricant. Do not overfill. Check the level on the dipstick, then run the engine for about five minutes. Stop the engine and check the oil level on the dipstick. Add additional oil as required and check for leaks at the filters.

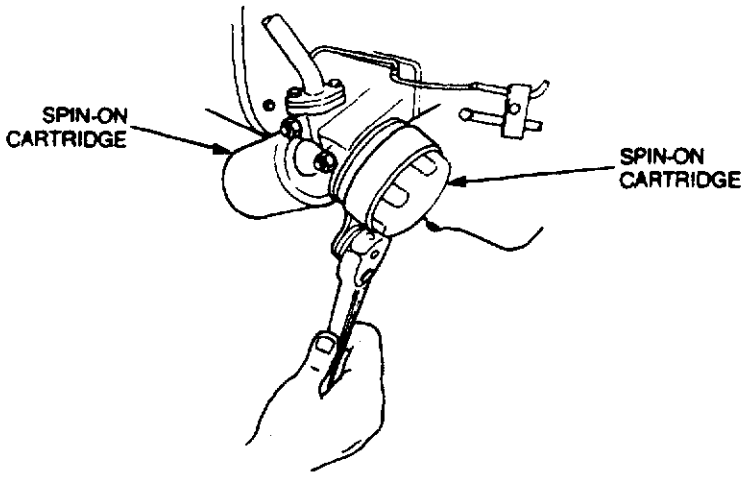


Figure 3-6 Oil Filter Removal

Transmission

326. The transmission drain plug is located on the left hand side of the transmission. Behind the drain plug is a filter which should be washed in clean fuel each time the transmission oil is drained. Allow the filter to dry completely before installing. Remove and wash the magnetic plug and remove all metallic particles. Install the plug.

327. The transmission fill plug is adjacent to the drain plug (see Fig. 3-7). Fill the transmission with the recommended lubricant to the bottom of the fill hole.

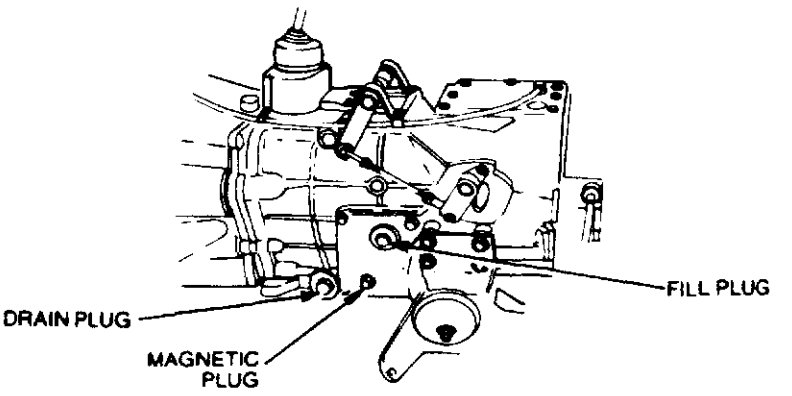


Figure 3-7 Transmission Drain and Fill Plugs

Transfer Case

328. The transfer case drain plug is located in the bottom of the PTO housing (see Fig. 3-8). The plug should be cleaned each time the transfer case oil is drained. Use a new sealing washer on installation.

329. The transfer case fill plug is located on the rear of the housing (see Fig. 3-8). Fill the transfer case with the recommended lubricant to the bottom of the fill hole.

330. Ensure that the transfer case breather is not restricted.

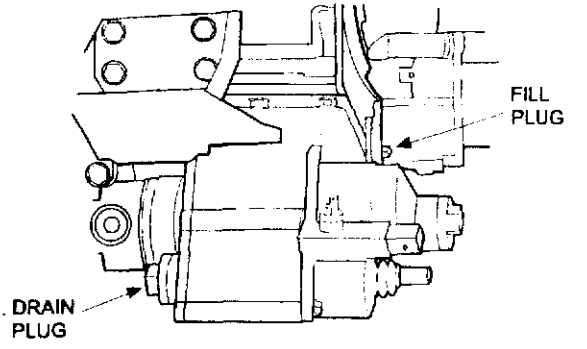


Figure 3-8 Transfer Case Drain and Fill Plugs

Intermediate axle

331. The drain plug is located on the bottom of the housing, while the fill plug is located on the rear cover (see Fig. 3-9). Fill the differential with the recommended lubricant to the bottom of the fill hole. Ensure that the intermediate axle breather is not restricted.

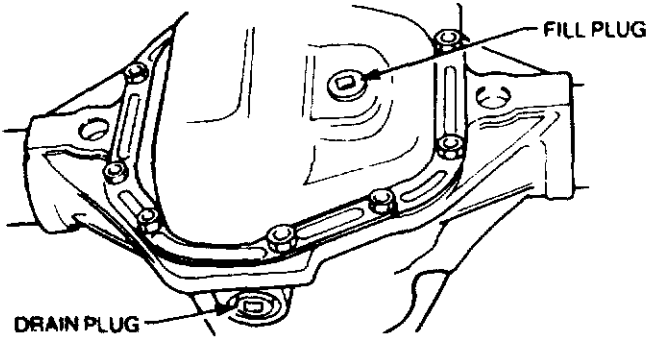


Figure 3-9 Intermediate Axle Drain and Fill Plugs

Rear Axle

332. The drain plug is located on the bottom of the housing, while the fill plug is located on the rear cover (see Fig. 3-10). Fill the differential with the recommended lubricant to the bottom of the fill hole.

333. Ensure that the rear axle breather is not restricted.

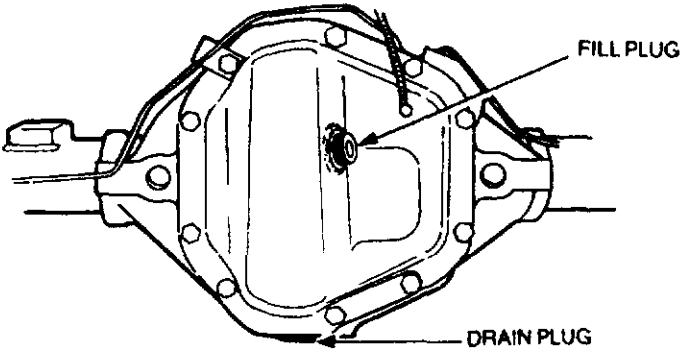


Figure 3-10 Rear Axle Drain and Fill Plugs

Front Axle

334. The drain plug is located on the bottom of the housing, while the fill plug is located on the front of the housing. Fill the differential with the recommended lubricant to the bottom of the fill hole.

335. Ensure that the front axle breather is not restricted.

Steering Reservoir/Box

336. The steering reservoir/box are filled by removing the cap on top of the reservoir and filling the reservoir to the prescribed mark on the dipstick. No drain plug is fitted.

Swivel Pin Housings

337. The location of the drain plug and the fill plug is shown in Fig 3-11. To drain the swivel pin housing, remove both the fill and drain plugs and drain the oil into a suitable receptacle. Fill the swivel pin housing with the recommended lubricant to the bottom of the fill hole.

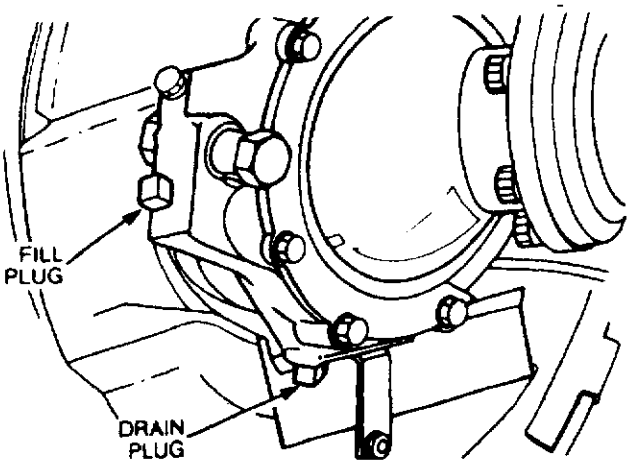


Figure 3-11 Swivel Pin Housing Drain and Fill Plugs

Propeller Shafts

338. The propeller shafts and universal joints are each fitted with a grease nipple (see Fig. 3-3 items 4, 6 and 12) and lubrication is required each service.

Towing Pintle

339. The towing pintle is fitted with one grease nipple and lubrication is required each service.

Fuel Filter

340. Place a suitable container beneath the fuel filter, then, using a suitable filter-removing tool, remove the filter (see Fig. 3-12). Remove the filter rubber seal from the cover. Smear clean fuel on the rubber seal of a new filter and install the new filter on the cover. Tighten the filter by hand until the rubber seal touches the cover face, then tighten a further half a turn. Bleed the fuel system as detailed in Chapter 3 Section 1.

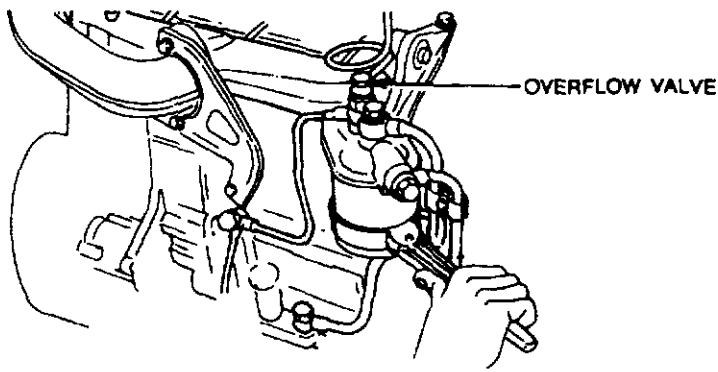


Figure 3-12 Fuel Filter

Fuel Sedimenters

341. Two fuel sedimenters, are located on the cabin rear crossmember forward of the rear spring mounting. A drain plug is fitted to allow the contents to be drained (see Fig. 3-13). Bleed the fuel system as detailed in Chapter 3 Section 1.

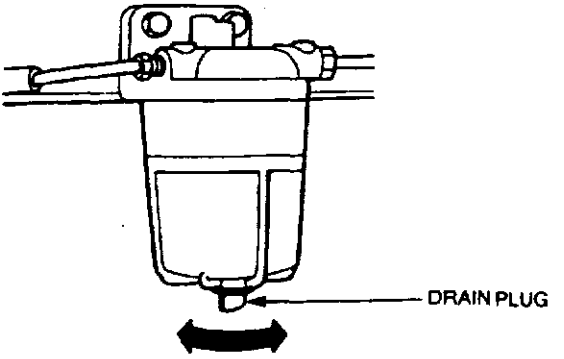


Figure 3-13 Fuel Sedimenters

Air Cleaner

342. The air cleaner elements will require cleaning or replacement when the signal indicator shows red. To clean or replace the air cleaner elements, proceed as follows:

a. Remove the hose clamps securing the air inlet and outlet hoses to the air cleaner housing (see Fig. 3-14) then remove the two wing nuts from the clamp bolts. Disconnect the compressor feed hose and carefully lift the air cleaner out of the mounting brackets.

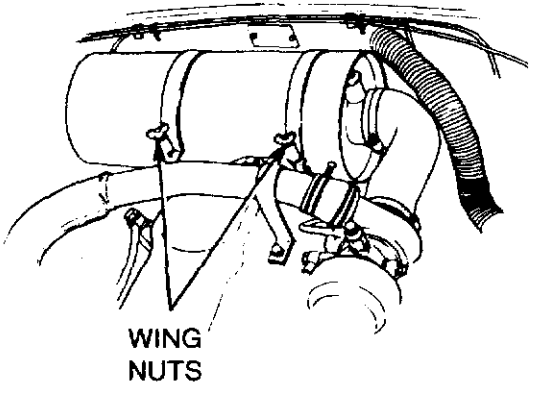


Figure 3-14 Air Cleaner Removal

b. Remove the wing nuts securing the end cover and elements.

c. Wipe out the air cleaner housing with a clean damp cloth. Remove and clean the dust valve (see Fig. 3-15).

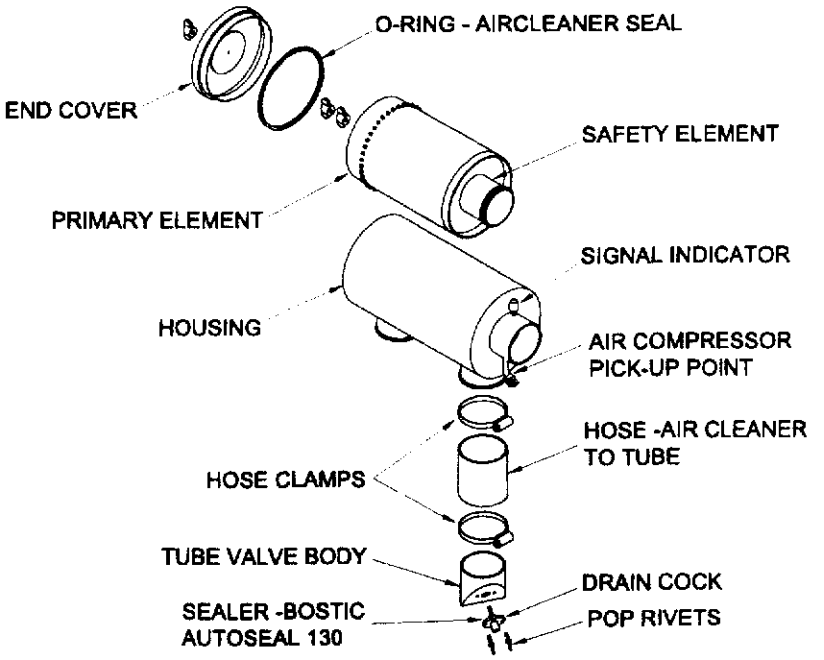


Figure 3-15 Air Cleaner Elements

d. Clean or discard the primary element. If the element is to be cleaned, this can be achieved with compressed air or washing with a non-sudsing general purpose detergent (see EMEI VEH A 591-1). If washing, ensure that the element is dry before installing. Do not clean the safety element.

e. Install and secure the new or cleaned element, then secure the end cover.

f. Install the air cleaner assembly and connect the air inlet and outlet hoses. Secure the hose clamps and tighten the wing nuts. Reconnect the compressor feed hose.

g. Depress the reset button on the signal indicator to enable the red signal to be released.

Brake Reservoir

343. Check the fluid level in the brake reservoir against the level marked on the reservoir. If necessary, remove the reservoir top and top-up with clean brake fluid OX(Aust)8. See Fig. 3-16 for reservoir location.

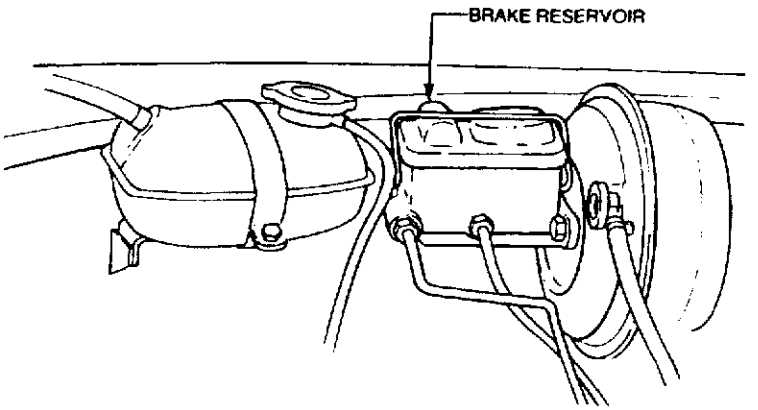


Figure 3-16 Brake Reservoir

Clutch Reservoir

344. Remove the reservoir cap and check that the fluid level in the clutch reservoir is up to the bottom of the filler neck. If necessary, top-up with clean brake fluid OX(Aust)8. See Fig. 3-17 for reservoir location.

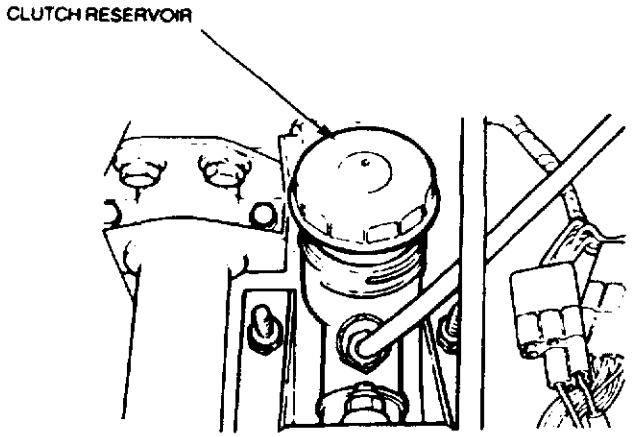


Figure 3-17 Clutch Reservoir

Winch

345. Remove the winch gearbox fill plug (see Fig. 3-18) and check that the oil level is up to the bottom of the fill plug. Top-up if necessary.

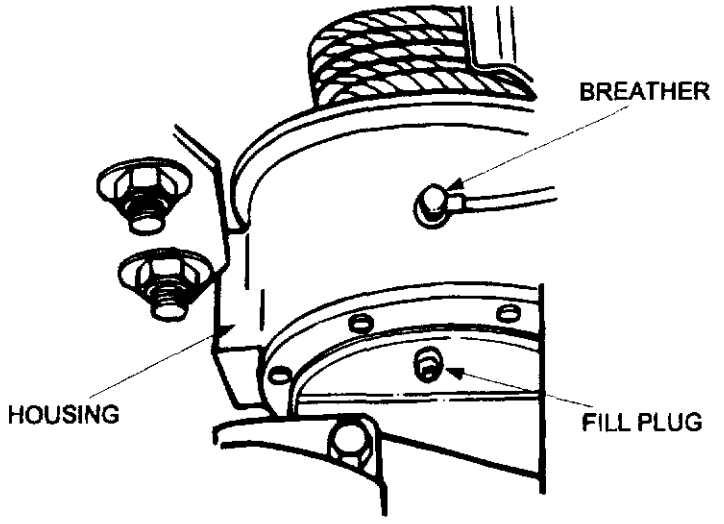


Figure 3-18 Winch Fill Plug

346. The winch drive line is fitted with five grease nipples which require lubrication each service.

WARNING

ALWAYS WEAR INDUSTRIAL GLOVES WHEN HANDLING STEEL WIRE ROPE. DO NOT USE HANDS TO GUIDE THE ROPE ON OR OFF THE DRUM WHEN WINCHING.

347. The winch rope should be pulled out, checked, cleaned and greased at every service. Ensure that a load is maintained on the winch rope when rewinding.

348. To drain the winch gearbox, remove the fill plug, then remove the drain plug which is located on the bottom of the gearbox housing. Drain the oil into a suitable container, then clean and install the drain plug. Top-up the gearbox with clean oil to the bottom of the fill plug hole, then install the fill plug.

349. Ensure that the winch breather is not restricted.

Compressor

350. Prior to use, check connections to the compressor for security and serviceability. Check the idler pulley for freedom of movement and check the drive belt tension by applying moderate thumb pressure to the longest belt span. Belt deflection should be in the range 7 to 12 mm. Adjust tension if required.

CHAPTER 4

ASSAULT PIONEER BODY

SECTION 1 - ASSAULT PIONEER BODY DESCRIPTION

SECTION 1
ASSAULT PIONEER BODY DESCRIPTION

Introduction

WARNING

THIS VEHICLE IS PAINTED IN POLYURETHANE PAINT. 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, AUSTRALIAN ARMY EQUIPMENT PAINTING POLICY DI(A) TECH 15-1, OR RELEVANT EMEI.

401. The assault pioneer body is a self contained unit which is mounted on the chassis of the Truck, Light, MC2, (Land Rover 6x6) in place of a cargo tray (see Fig. 4-1). The body is of aluminium frame construction with an aluminium plate roof. A camouflaged canvas canopy covers the roof and sides of the body. The body can be mounted onto the chassis of the Truck, Light, MC2 (Land Rover 6x6), by two tradespersons in a fully equipped workshop in two days.

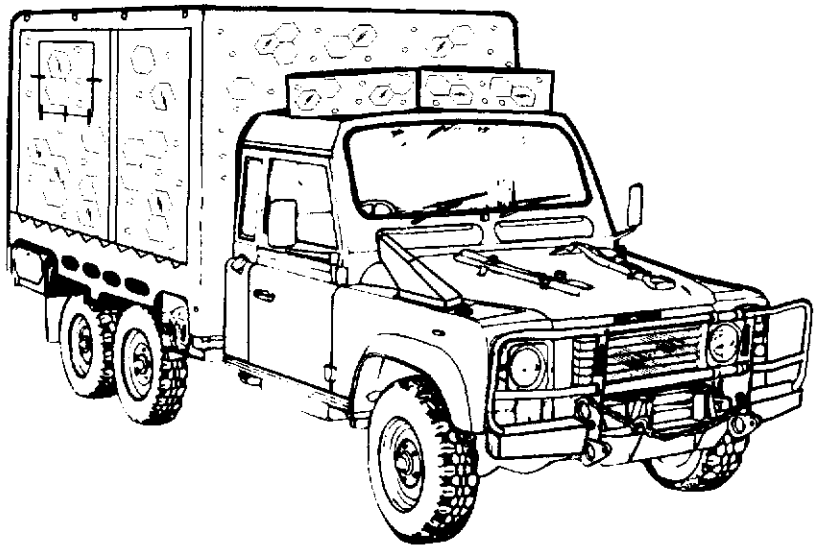


Figure 4-1 Truck, Assault Pioneer, Light, Winch, MC2 Body Configuration

Operational and Logistics Concepts

402. This body provides a facility for the transportation of six fully equipped assault pioneer personnel, their supplies, weapons, ammunition and engineering equipment, for three days in an operational environment.

Roll Over Protection Structure

403. The Roll Over Protection Structure (ROPS) has been strengthened to provide roll over protection by the incorporation of front and rear rollover frames constructed of 25 mm aluminium plate. The ROPS is symmetrical about the longitudinal centreline of the vehicle. The height of the ROPS lower surface is 1750 mm at the centre line of the body, and 1500 mm at the sides of the body.

Seating

404. The assault pioneer body provides secure seating for four troops in a two seat by two seat back to back configuration facing the sides of the body (see Fig. 4-2). Each seat provides full back and thigh support, is designed for comfort on long journeys and is padded to provide maximumattenuation of vehicle vibration. A foot brace and Jesus hanging strap is provided for each seat position.

405. All seats are fitted with a quick release "full" harness retractable type seat belt, which can be reduced to lap belt configuration for tactical movements. The seat belts are bolted to the seat structure and the seat mounting frame.

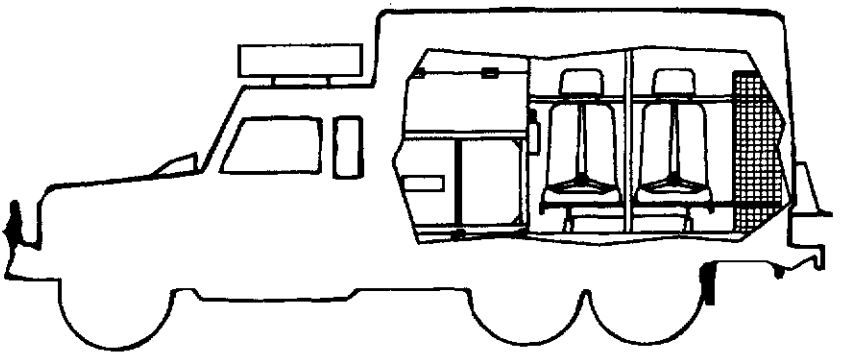


Figure 4-2 Seating Arrangement

Stowage

406. Provision is made for stowage of personal equipment, rations, water, ammunition and additional vehicle equipment comprising fire extinguisher, fuel jerry cans, camouflage nets, medical kit, 2100 rounds of 5.56 mm ball ammunition, 30 kg of 18 mm manilla rope, 40 lt of lube oil, 10 kg roll of tie wire, 100 sand bags and miscellaneous equipment not exceeding 100 kg.

407. Provision is also made for stowage of engineering equipment and tools comprising rock paving breaker, minefield breach accessory kit, carpenters tool kit, pulling lifting machine, earth holdfast anchor, mine detecting set, chainsaw and accessories, and miscellaneous pioneer tools weighing 192 kg.

408. The stowage areas are in three locations. One area is at the front of the body interior in the form of enclosed, secured baskets which can only be accessed via hinged lockable doors located on either side of the body exterior. There are also two smaller lockers at the top, accessible via hinged doors from the body interior, see Fig. 4-5. The second area is under the seats and accessible from the body or from the vehicle rear via a lockable hinged door, see Fig. 4-3 and Fig. 4-4. The third area is at the rear of the body interior in the form of upper and lower open basket shelves running the entire interior width of the body and with securing

straps for equipment, see Fig. 4-6. Stowage for water and fuel is provided by eight jerry can holders mounted on the rear of the body and two jerry can holders mounted under the body to the rear of the cabin on the driver's side.

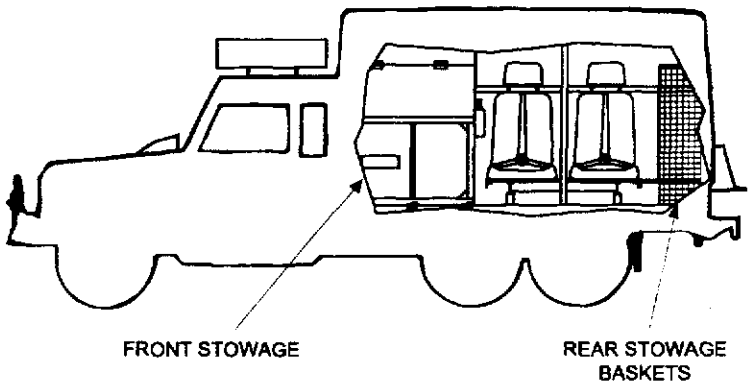


Figure 4-3 Interior Stowage

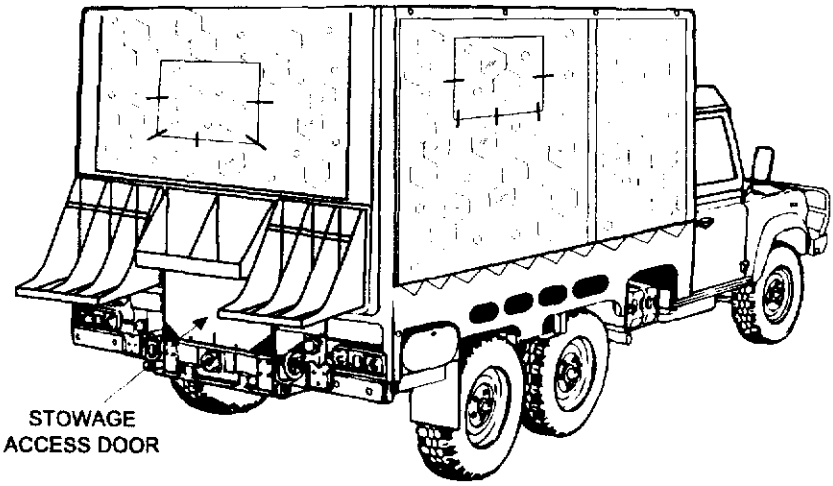


Figure 4-4 Stowage Access Door - Rear

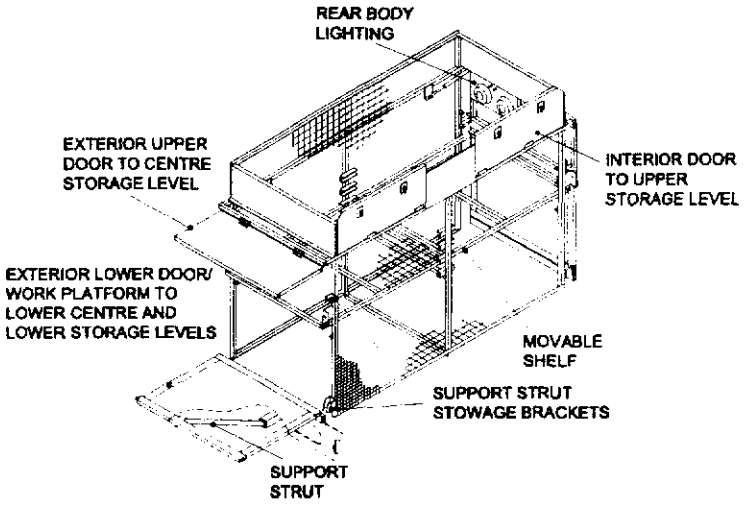


Figure 4-5 Interior Stowage - Front

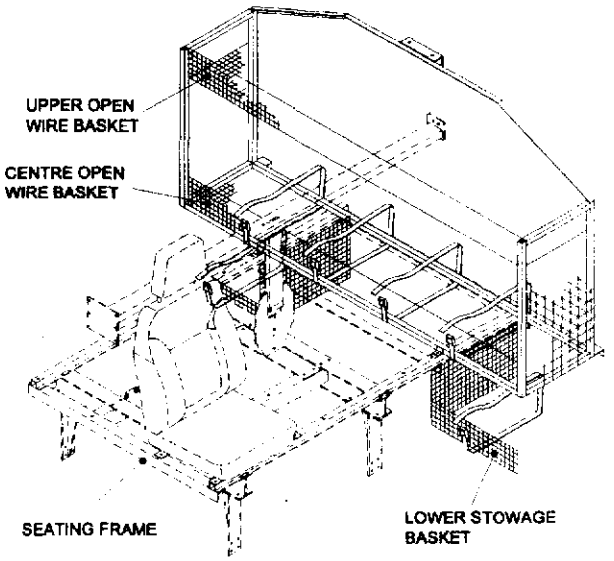


Figure 4-6 Interior Stowage - Rear

409. The fire extinguisher is secured to the LHS interior of the front cage enclosure in the seating area of the body.

Canopy

410. The roof of the body is covered by aluminium sheeting which has foam rubber insulation glued to the underside. The roof and all sides of the body are covered by camouflaged canvas canopy, the sides of which can be rolled and secured to provide maximum field of view for the seated soldiers. Windows are provided in the sides and rear of the canopy.

Roof Lashing Rings

411. The roof of the body is equipped with lashing rings along its sides which are bolted to the roof structure. The lashing rings are designed to be used to secure the vehicle's cam nets and poles.

Side Mounting Steps

412. The bottom sides of the body have extended aluminium plates into which is cut four mounting steps for easy access to the body. Provision is also made on these plates for securing the canopy when in the fully down position.

Intercom

413. An intercom system is provided to enable communication between the cabin crew and personnel in the rear body.

Rear Body Lighting

414. Normal and Blackout lighting is incorporated inside the top side stowage doors. With the door raised, the lights are on the underside of the door and illuminate the working table provided by the open lower door. They are operated by pull switches and controlled by the cabin Normal/Blackout lighting switch. Fig. 4-7 shows the lighting arrangement.

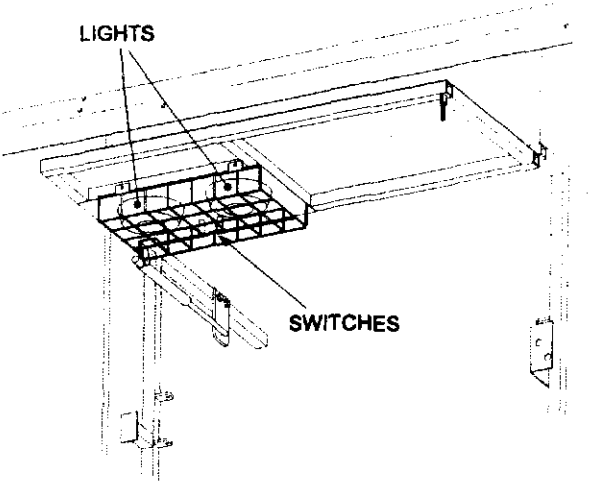


Figure 4-7 Rear Body Lighting Arrangement

Vice Mounting Bracket

415. The front brushguard has a vice mounting bracket attached to the front left hand side by six bolts, two in the front face of the fender and four in the top face. The vice is fitted to a mounting/carrying plate which slots into the bracket and is secured in place by a single bolt. The bracket is illustrated in Fig. 4-8.

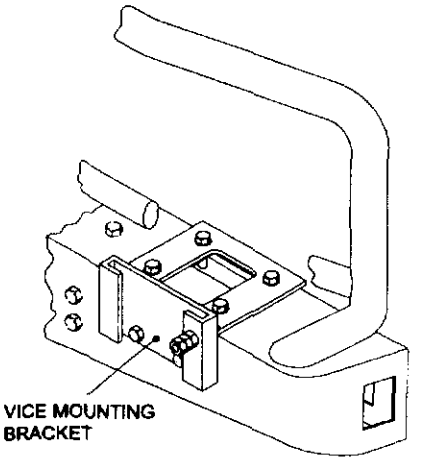


Figure 4-8 Vice Mounting Bracket

Cigarette Lighter Sockets

416. Two cigarette lighter utility 12 volt sockets are mounted on the seating frame below the left hand and right hand rear seats, see Fig. 4-9. These utility sockets are limited to 8 amp maximum current drain.

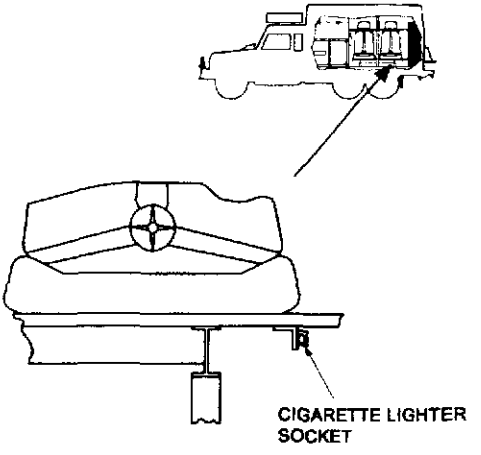


Figure 4-9 Cigarette Lighter - Rear Body, Passenger Side

INDEX

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W

X

Y

Z

NOTES

NOTES

NOTES

NOTES

NOTES