ARMY EQUIPMENT
SUPPORT PUBLICATION

2320-N-502-201
2nd Edition NOVEMBER 1990
(Superseding edition dated Dec 85)

RECOVERY VEHICLE, WHEELED (GS) 6 x 6, FODEN

OPERATING INFORMATION

REPRINTED INCORPORATING AMENDMENT 1-4

BY COMMAND OF THE DEFENCE COUNCIL

MINISTRY OF DEFENCE
Issued by
LAND SYSTEMS TECHNICAL PUBLICATIONS AUTHORITY
Royal Arsenal West, Woolwich,
London SE18 6ST

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AMENDMENT RECORD

Amdt	Incorporate by	Date
1	[redacted]	3-4-98
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PREFACE

Sponsor : LSOR3

INTRODUCTION

1 Service users should forward any comments concerning this publication through the channels prescribed in AESP 0100-P-011-013.

2 The subject matter of this publication may be affected by Defence Council Instructions (DCIs), Standard Operating Procedures (SOPs) or by Local Regulations. When any such Instruction, Order or Regulation contradicts any portion of this publication it is to be taken as the overriding authority.

3 For periods of servicing and lubricants to be used, reference must be made to the Maintenance Schedule.

RELATED AND ASSOCIATED PUBLICATIONS

Related Publications

4 The octad for the subject equipment consists of the publications shown below. All references are prefixed with the first eight digits of this publication.

CATEGORIES AND INFORMATION LEVELS

Category / Level	1	2	3	4		5				6	7		8	
				1	2	1	2	3	4		1	2	1	2
1 USER/OPERATOR	101	201	201	*	*	201	201	*	*	601	711	721	*	*
2 UNIT MAINTENANCE	*	*	302	*	*	512	522	532	*	*	*	*	*	*
3 FIELD MAINTENANCE	*	*	302	*	*	512	522	532	*	*	*	*	*	*
4 BASE MAINTENANCE	*	*	302	*	*	512	*	533	*	*	*	*	*	*

1.0 Purpose & Planning Information
2.0 Operating Information
3.0 Technical Description
4.1 Installation Instructions
4.2 Prep for Special Environments
5.1 Failure Diagnosis
5.2 Repair Instructions
5.3 Inspection Standards
5.4 Calibration Procedures
6.0 Maintenance Schedules
7.1 Illustrated Parts Catalogue
7.2 Commercial Parts List
8.1 Modification Instructions
8.2 General Instructions

* Not published

Note ...

Reference to AESP 0100-A-001-001 must be made to ensure the availability of the listed publications.

Associated publications

5	Type	Code No	Title
	EMER	Power S 600	Rolls Royce Eagle Mk III
	Army Code	22454	Rolls-Royce Eagle Mk III
	Army Code	22477	Rolls-Royce Eagle Mk III
	CES	31657	Complete Equipment Schedule

WARNINGS . . .

(1) THIS VEHICLE IS TO BE OPERATED ONLY BY SPECIALLY TRAINED AND AUTHORISED PERSONNEL.

(2) THE FOLLOWING SPEEDS AND LOADS MUST NOT BE EXCEEDED WHEN SUPPORT OR SUSPEND TOWING BRAKED OR UN-BRAKED CASUALTIES (ALL SUBJECT TO LOCAL STANDING LEGAL SPEED LIMITS):

BOOM RETRACTED		BOOM EXTENDED		BOOM EXTENDED + EXTENSION	
MAX BOOM LOAD 8 TONNE		MAX BOOM LOAD 6 TONNE		MAX BOOM LOAD 4 TONNE	
LOAD TONNES	SPEED MPH	LOAD TONNES	SPEED MPH	LOAD TONNES	SPEED MPH
3	30	3	30	3	30
4	25	4	25	4	25
5	20	5	20		
6	15	6	15		
7	10				
8	10				

MAXIMUM SPEED

SOLO RECOVERY VEHICLE: 70 km/h (43 mph)

RIGID TOW WITH BRAKED CASUALTY UP TO 58 TONNE GROSS TRAIN WEIGHT: 48 km/h (30 mph)

RIGID TOW WITH UNBRAKED CASUALTY UP TO 58 TONNE GROSS TRAIN WEIGHT: 32 km/h (20 mph)

ADDITIONALLY THE SPEED/DISTANCE LIMITATIONS EFFECTED BY AMBIENT TEMPERATURE AND TERRAIN (ON OR OFF HIGHWAY), DETAILED IN CHAPTER 4, MUST BE OBEYED WHERE APPLICABLE.

(3) BRAKING PERFORMANCE MAY BE REDUCED BY THE INGRESS OF CONTAMINANTS AT THE BRAKE DRUMS AFTER CROSS COUNTRY OERATION IN ADVERSE CONDITIONS.

(4) THE ELECTRICAL SYSTEM MASTER SWITCH IS TO BE SET TO THE 'OFF' POSITION WHEN THE VEHICLE IS NOT IN USE.

(5) REMOTE CONTROLS ARE TO BE DISCONNECTED BEFORE STOWING AWAY.

(6) DO NOT WORK UNDER AN UNPROPPED CAB.

(7) DO NOT ALLOW THE ROPE ANGLE TO EXCEED 15 DEGREES EITHER SIDE OF (FRONT) WINCH CENTRE LINE WHEN WINCHING FROM THE FRONT.

(8) OPERATIONS WITH LOADED ROPES ARE POTENTIALLY DANGEROUS, STAND WELL CLEAR OF VEHICLE DURING WINCHING OPERATIONS.

(9) CLEAR ALL UNAUTHORISED PERSONNEL FROM RECOVERY AREA BEFORE COMMENCING RECOVERY OPERATIONS.

(10) A GROUND REACTION PLATE IS A HEAVY COMPONENT AND DUE CONSIDERATION SHOULD BE GIVEN TO THE FACT WHEN HANDLING.

(11) OPERATIONS WITH LOADED WIRE ROPES ARE POTENTIALLY DANGEROUS. ONLY PERSONNEL DIRECTLY CONCERNED WITH RECOVERY ACTIONS SHOULD BE PRESENT, DUE CONSIDERATION SHOULD BE GIVEN TO POSSIBLE ROPE BREAKAGE WHEN TAKING UP STATION TO OPERATE REMOTE CONTROLS.

(12) ALL SIDE AND REAR STABILISERS MUST BE DEPLOYED WHEN SLEWING THE LIFTING (JIB) BOOM WITH A SUSPENDED LOAD.

(13) EXERCISE DUE CARE FOR SAFETY WHEN CARRYING OUT SPARE WHEEL DAVIT OPERATIONS BESIDE TRAFFIC DRIVING ON RIGHT HAND SIDE OF ROAD.

(14) DO NOT ALLOW BOTH THE TRAILER TOWING BAR EYE, AND THE TOWING VEHICLE PINTLE TO SWIVEL.

(15) BLOCK THE WHEELS OF THE CASUALTY VEHICLE TO PREVENT RUNAWAY DURING BRAKE RELEASE PROCEDURE.

(16) WITH ELECTRICAL POWER NOT AVAILABLE ON RECOVERY EQUIPMENT AND SHUT-OFF COCKS 'A' AND 'B' SET TO 'CLOSED' (TO ENABLE EQUIPMENT STOWAGE), ALL AUTOMATIC AND SWITCH-CONTROLLED SAFETY DEVICES ON RECOVERY EQUIPMENT ARE INOPERATIVE. USE HYDRAULIC FUNCTIONS UNDER STRICT SUPERVISION AND ONLY TO STOW DEPLOYED RECOVERY EQUIPMENT. DO NOT ATTEMPT RECOVERY OR LIFTING OPERATIONS.

(17) DO NOT REMOVE RADIATOR FILLER CAP WHILST ENGINE IS RUNNING. ANY MARKED LOSS OF COOLANT MUST BE INVESTIGATED.

(18) BEFORE ATTEMPTING TO WORK ON THE VEHICLES ENGINE, ENSURE THAT THE VEHICLE ELECTRICAL MASTER SWITCH IS SET TO 'OFF'.

(19) CARE MUST BE TAKEN DURING WHEEL REMOVAL/REFITTING OPERATIONS AS THE ROAD WHEEL ASSEMBLY IS A VERY HEAVY ITEM.

(20) THROUGHOUT THE TYRE INFLATION PROCEDURE, THE OPERATOR MUST NOT STAND IN THE LIKELY TRAJECTORY OF ANY PART OF THE WHEEL OR RIM, IN THE EVENT OF A TYRE BURST.

(21) IF A TYRE IS TO BE INFLATED WITH THE WHEEL OFF THE VEHICLE, STAND THE WHEEL UPRIGHT LEANING AGAINST A WALL, OR SIMILAR, WITH THE DETACHABLE COMPONENTS OF THE WHEEL ASSEMBLY FACING THE WALL.

(22) ALL PERSONNEL ARE TO STAND CLEAR WHEN CAB IS BEING RAISED OR LOWERED. WHEN PERFORMING THE RAISING OR LOWERING FUNCTION, STAND CLEAR OF PIVOTING CAB. NEVER WORK UNDER AN UNPROPPED CAB.

(23) THE REFILL CANISTERS FOR USE WITH THE START PILOT, CONTAIN A VERY VOLATILE LIQUID, THE VAPOUR OF WHICH IS HEAVIER THAN AIR AND HIGHLY FLAMMABLE. SMALL QUANTITIES OF THE VAPOUR IN AIR FORM A HIGHLY EXPLOSIVE MIXTURE. 'EMPTY' CANISTERS RETAIN AIR/VAPOUR MIX - DISPOSE OF CANISTERS CAREFULLY.

(24) DRIVERS AND OPERATORS ARE WARNED OF THE EXPLOSIVE RISK. ALSO THAT THE VAPOUR CAUSES DROWSINESS AND LOSS OF CONCENTRATION. FOR THESE REASONS THE CANISTERS MUST NEVER BE CARRIED LOOSE IN A VEHICLE (DC1 ARMY 239/79 REFERS).

(25) WHEN USING BURNING FOR EQUIPMENT DESTRUCTION, DUE CONSIDERATION SHOULD BE GIVEN TO THE HIGHLY INFLAMMABLE NATURE OF GASOLINE AND ITS VAPOUR. CARELESSNESS IN ITS USE MAY RESULT IN PAINFUL BURNS. COVER MUST BE TAKEN WITHOUT DELAY BECAUSE AN EARLY EXPLOSION OF THE FUEL TANK MAY BE CAUSED BY THE FIRE.

(26) WHEN USING GUNFIRE FOR EQUIPMENT DESTRUCTION, NOTE THAT FIRING ARTILLERY AT RANGES OF 460 METRES (500 YARDS) OR LESS, AND FIRING GRENADES OR ANTI-TANK ROCKETS, SHOULD BE FROM COVER.

(27) THE FOLLOWING MAXIMUM SPEEDS, WHERE CONDITIONS PERMIT, MUST NOT BE EXCEEDED.

SOLO RECOVERY VEHICLE:	**70 KPH (43 MPH)**
RIGID TOW WITH BRAKED CASUALTY UP TO 58 TONNE GROSS TRAIN WEIGHT:	**48 KPH (30 MPH)**
RIGID TOW WITH UNBRAKED CASUALTY UP TO 58 TONNE GROSS TRAIN WEIGHT:	**32 KPH (20 MPH)**

CAUTIONS

(1) Descending gradients over 8% (1:12) and up to a maximum of 20% (1:5); the v hicle must be stopped prior to descent and the appropriate LOW range gear selected so as to retain engine speed of 1800 - 2200 rpm.

(2) Ascending gradients, select appropriate gear prior to ascent.

(3) It is essential, when using recovery equipment, that the pulley block bush b lubricated after each application of high loading.

(4) The electrical system on this vehicle uses insulated return wiring. Checks for earth faults are to be made periodically. Earth return equipment is not to be fitted.

(5) Do not shift from high range to low range at high vehicle speeds, and do not mak range shifts with vehicle in reverse gear.

(6) Do not activate Third Diff Lock switch (push in) and engage Diff Lock while one r mor wheels are actually spinning or slipping, as damage to the gearing will result.

(7) Do not spin wheels with Third Diff Lock unlocked as 'spin out' damage will result. This can happen in a matter of seconds.

(8) When driving in good road conditions, the Third Diff Lock must always b in the unlocked condition (Disengaged).

(9) To operate the cross-axle differential locks, the vehicle must be stationary.

(10) It is important that transfer gearbox range changes are not made until the v hicl is stationary.

(11) To avoid possibl 'wind up' betwe n front and rear axles, dis ngage the front axl drive as so n as trav lling conditions p rmit.

(12) Do not operate the exhaust brake with the engine idling for more than 30 seconds.

(13) Do not operate the exhaust brake with the throttle open.

(14) A minimum air pressure of 5.7 bar (85 lbf/in^2) is required before engaging the power take-off (PTO).

(15) The cab doors must be closed before tilting the cab. It is essential to release the front toggle catches and raise the grille.

(16) Only air lines of the same colour (ie red to red) should be connected together.

(17) Ensure recovery winch rope adapter jaw is disconnected from folding boom before attempting to UNFOLD recovery boom. Reconnect rope adapter only after recovery boom is FULLY stowed.

(18) The folding recovery boom must be lowered to the end of its travel, on to its m hanical stop, before attempting to load a casualty.

(19) When using main recovery winch, never allow rope to become slack between fairlead and winch drum.

(20) Ensure that folding boom does not contact ground during winching. On completion of recovery operations, ensure that folding boom mechanical stops are free of dirt and mud.

(21) When unblocking bogie, hold switch down for a further 15 seconds after warning light has xtinguished, to ensure rams have completely cleared bogie.

(22) Do not slew main (jib) boom into raised recovery boom. Damage will result.

(23) Do not lower main (jib) boom onto raised recovery boom. Damage to floodlight cable conduit could result.

(24) Engage slew lock device prior to travelling with load on main (jib) boom hook. A swinging load could damage slewing gear.

(25) Do not hoist an unladen hook with excessive speed.

(26) The davit (spare wheel) wire rope is not to pass through any aperture on the main (jib) boom other than at the hooking point.

(27) Failure to observe the neutralising of the main and transfer gearboxes of a casualty 6x6 Foden Recovery Vehicle, when to be towed, will result in gearbox damage due to lack of lubrication. If in doubt, remove drive shaft between main and transfer gearboxes.

(28) Do not top-up engine oil above the upper mark on the dipstick.

(29) Recheck oil level after a short initial run and top-up as necessary.

(30) Do not over-tighten new fuel filter canister.

(31) Low oil level in main gearbox will cause damage to moving parts. Over-filling will cause over-heating and force oil out of the case breather, front and rear seals.

(32) Do not undo the three planet carrier plugs (in the wheel hub) as these support internal gears. the correct plug is marked 'OIL LEVEL).

(33) The most important factor in wheel fitting is that the correct torque load is applied to the wheel nuts. INSUFFICIENT TORQUE can cause wheel loss, stud damage, nut damage, cracked wheels and excessive wear to wheel and hub faces. EXCESSIVE TORQUE can cause stud and nut breakage leading to possible wheel loss.

(34) If an in-calibration torque spanner is not available when the wheel nuts are tightened, the nut torque loadings must be checked/corrected at the first available opportunity.

(35) Be careful of oncoming traffic when changing wheels at the roadside, particularly when using the spare wheel davit where traffic drives on the right hand side of the road.

(36) The tyre tread pattern is 'single directional' Incorrect fitting will cause high rate of tyre wear. When incorrect fitting is unavoidable, correct fitting is to be made at the earliest opportunity.

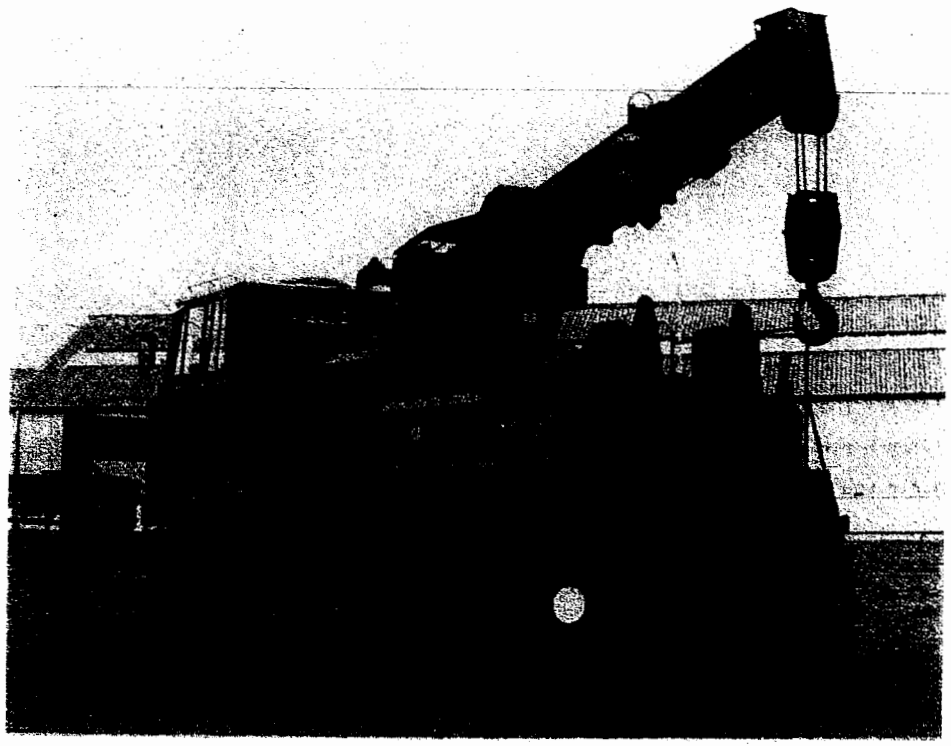
(37) If the spare wheel/tyre assembly is an approved alternative to the assembly to be removed, (ie rim size, or tubed/tubeless type), take note that mixing wheel sizes on the front axle is NOT recommended, and that mixing of tubed and tubeless types on a vehicle is NOT recommended. If, in an emergency, such mixing of wheels/tyres is unavoidable, correct fitting is to be made at the earliest opportunity.

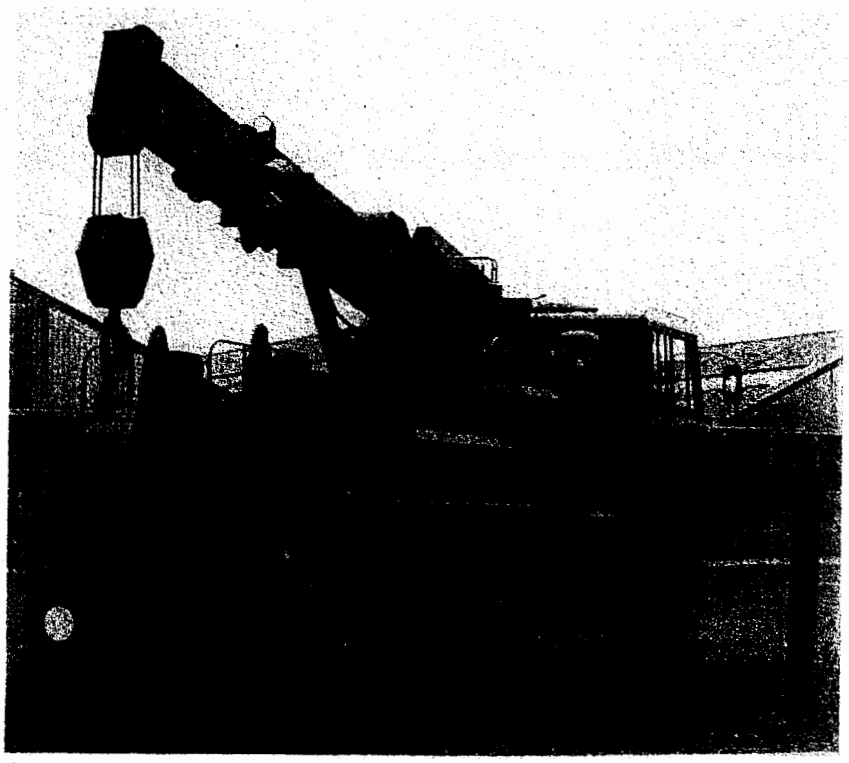
(38) Ensure that tyres are inflated to correct pressure to suit operating conditions (ie ambient temperature, on/off highway).

(39) With cab tilted and no power assistance to the steering (ie engine not running) do not attempt to move (steer) front wheels by use of steering wheel. Heavy loading could result on down shaft with possible subsequent damage.

(40) Do not handle or touch glass of replacement halogen lamps or early lamp failure will result.

(41) Do not attempt to turn beacon light reflector by hand, as damage to the motor driven gearing will result.



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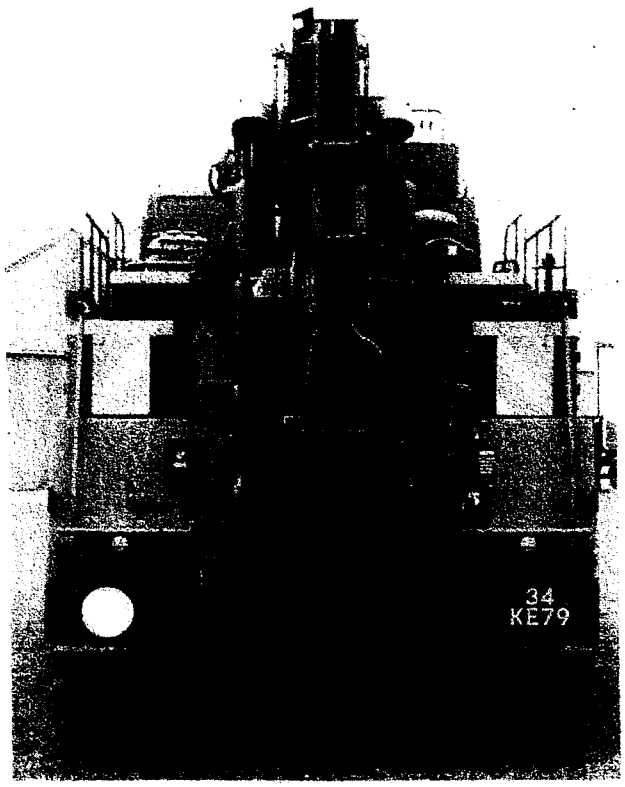
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CHAPTER 1

GENERAL DESCRIPTION

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INTRODUCTION

1 The Recovery Vehicle Wheeled (GS) 6x6 Foden offers suspended and supported towing capabilities along with a slewing boom, rear and front winch recovery functions. The recovery equipment is EKA Type AK6500 EA12 Compact Recovery Unit complete with stowage lockers and remote controls.

AIR FILTER

2 The air filter is a 16in. diameter two-stage dry element type, located behind the cab, driver's side, with trunking to engine turbocharger intake. An intake depression limit indicator is fitted to the filter casing. Modification Instruction Number 20 introduces a secondary (safety) air filter element to reduce the ingestion of debris when operating in dusty environments.

ANTI-FREEZE

3 The anti-freeze solution in the engine cooling system is a mixture of anti-freeze and water all the year round. Identification labels fitted (1) inside cab, front screen, passenger side and (2) top tank radiator.

Bogi axles

4 The leading axle is a Kirkstall D66-11-SHF, rearmost axle a Kirkstall D66-11-15. Interaxle differential fitted with selectable lock. Cross axle differential locks are also fitted and both interaxle and cross axle are provided with engagement sensing and indication in the cab, driver's side.

BRAKE SYSTEM

5 The brake system is a three line system to MOD Spec MVEE 1316. Spring brakes on all axles. Flexible piping to SAE Specification J844D. System complies generally with MVEE Specification FVRDE 1316. System pressure 877 kN/m^2 maximum with protection valves to maintain 517 kN/m^2 maximum. An air dryer and a tyre inflator are fitted.

6 All brakes are drum type, 'S' cam operated. Lining material is DURON 120. Three line trailer brake couplings are provided at front and rear of the vehicle, consisting of palm type couplings with shut-off valves on Service and Emergency lines and a female CA coupling on the secondary line.

7 Three line recovery couplings are also provided at the front of the vehicle, palm couplings fitted to the Service and Emergency lines and a male CA coupling on the Secondary line.

8 An exhaust brake is fitted for use at any time on a closed throttle. On a slight downgrade the exhaust brake alone may suffice, for steeper grades it may be used to assist the service brakes.

CAB

9 The cab is constructed of Glass Reinforced Plastic (GRP) with Right Hand Drive (RHD) forward control and divided windscreen. Cab suspension is by rubber mounts at the front and coil spring, hydraulically damped, at the rear.

10 Fully trimmed interior complete with gun clips to accommodate 3-off small arms (SA). Inertia reel seat belts fitted for driver and co-driver, static belts for passengers.

11 Fire extinguisher bracket fitted to rear of cab, right-hand (RH) Driver's side.

12 The cab roof, capable of supporting a man plus a load totalling 230 Kg is also fitted with an observation ring and machine gun mount to FV832800.

13 Forward opening aluminium cab doors trimmed below glass level and fitted with draught seals.

14 Windscreen of 6 mm laminated safety glass, the remaining windows, 4 mm toughened glass. Rear and side windows are protected by external guard.

15 Driver's seat adjustable for height and length; co-driver's seat adjustable for length only. Both adjustable for back rake.

16 Two bunks, an upper and a lower, are provided rear of front seats. Casualty vehicle crew seating provided on lower bunk with passengers facing outwards.

17 Camouflage hooks, grab handles and EEC Regulation rear view mirrors, mounted externally on cab sides.

18 Twin electric wipers, heater demister units and facilities for mounting and operating UK/VRC353 or UK/VRC321 radio stations are provided. Also fitted, a map reading light and detachable amber flashing beacon.

CAB TILT

19 The cab tilt system is hydraulically controlled and driven by a manually operated pump, located at chassis height, rear of cab driver's side. Automatic hydraulic locks retain the cab in drive position.

COLD START

20 The engine cold start facility is a Start Pilot Viso F 450G system. Two nozzles fitted to inlet manifold of engine, hand pump in cab, driver's side. Reservoir externally mounted, CES locker, driver's side.

CLUTCH

21 The hydraulically operated clutch is a 15½ in. diameter Twin Plate, self adjusting dry type. Model AS 1552.

ELECTRICAL SYSTEM

22 24 volt insulated return lighting, starting and battery charging system. Cable and conduit to suit environmental conditions MOD Publication 00-1 issue 2 Cat A2 to C1 inclusive. Two 12V UK 6 TN batteries mounted in No 3 MKI FV3432513 container are provided with provision for mounting a duplicate set of batteries for radio operation. Base insulation but no cover is provided for battery container.

22.1 Starter Motor - Butec OD 17469/2 GRM 571/129

22.2 Alternator - CAV AC90 24V OD 19074 GRM 35/62

22.3 Alternator Control Board - CAV.

23 Four European pattern headlights and two fog lights. Side lights, stop/tail lights, reversing lights, flashing direction indicators (front, rear and flank), rear, high intensity fog lights, number plate light and convoy light. All lights FV pattern. Front lights mounted in line abreast in groups of three with fog lights in the outside position and each group protected with guards. Detachable rotating yellow beacon light (stored in cab). 24 Volt (V) and 12 V FV pattern interstart sockets, lockable battery master switch. Light switching sequence in accordance with DEF STAN 2S-5/3. Suppression to MVEE specification 595 Section 4 and DEF STAN 59-41. Facilities provided for radio power supplies at radio table in cab with dummy stowage for radio cables. Power supply provided in cab for FV pattern boiling vessel. Four amber side reflectors are fitted to each side of the vehicle and diagonally striped marker boards are fitted at each side on the vehicle rear. Two rear load floodlights are fitted, one each side of the jib boom.

ENGINE

24 Perkins Engines Eagle 290L E112, monofuel, compression ignition engine, fitted with starter motor, alternator, compressor and cold start nozzles to suit Start Pilot 450G system. Turbo charger mounted at engine rear. Cooling fan 1.34X engine speed. Engine rating 290 BHP at 1950 RPM to BS AU 141A 1971.

EXHAUST

25 Oval shaped silencer, mounted below and behind front bumper. Connected to engine turbo charger outlet by solid and flexible steel piping, with exhaust gas discharge ahead of driver's side front wheel.

FRAME

26 Bolted construction high tensile carbon manganese steel pressed channel sidemembers with a 305 mm x 102 mm x 10 mm nominal section. Fully flitched, full depth crossmembers. Lift and recovery eyes to DEF STAN 25-6 front and rear. Forward frame extension incorporating front winch mounting and front bumper.

FRONT SUSPENSION

27 The front suspension has two, semi-elliptic multileaf springs and is rated at [redacted].

FRONT AXLE

28 The front axle comprises a Kirkstall Type SD66-11-1S steer drive with cross axle differential lock.

FUEL TANK

29 The fuel tank is of square section, 360 litre capacity and capable of being filled using jerry cans. Mounted transversely behind the cab, the tank is fitted with anti-surge baffles, lockable filler cap complete with gauze filter and a mechanically operated contents gauge. Beneath the tank immediately behind the cab, passenger side, and mounted on the fuel tank sub-frame, a CAV fuel sedimenter is incorporated into the system. A fuel drain tap is fitted to the bottom of the tank, driver's side, front.

GEARBOX

30 Fuller RTX11609B 9-speed constant mesh, twin countershaft gearbox. Ratio spread from 12.56:1 to 0.73:1. Inhibitor on 8th gear in low range - Transfer box.

INSTRUMENTATION

31 The in-cab instrumentation displays engine oil pressure, engine coolant temperature, engine revolutions, vehicle road speed, service brakes front axle/service brakes rear axles air pressure (dual gauge), secondary brakes/emergency brake release air pressure (dual gauge), and trailer brake air pressure (single gauge).

POWER TAKE-OFF

32 The power take-off unit is mounted beneath the main gearbox. A Chelsea 822XJAHXA3XV type, run at 0.99X engine speed and fitted with 1410 series output flange.

PROPSHAFTS

33

Main gearbox to transfer gearbox	- 1800 SERIES.
Transfer gearbox to front axle	- 1700 SERIES.
Transfer gearbox to leading rear axle	- 1800 SERIES.
Interaxle bogie shaft	- 1700 SERIES.

RADIATOR

34 The radiator is fitted with a 6 square feet, 5 row pressurised matrix. Top tank is fitted with a captive filler cap. Radiator mounted on chassis in a fixed position.

REAR SUSPENSION

35 The rear suspension is Kirkstall semi-elliptical multileaf two spring complete with Metatastik rubber bushed torque rods (6 rod arrangement).

SPARE WHEEL

36 The spare wheel is carried vertically behind the cab, passenger side. To facilitate the lowering and raising of a wheel to and from the ground, a small davit is attached to the recovery boom.

TYRES AND WHEELS

37 The wheel size is 11.25 x 20 with 6.25 offset for 10 x 7/8in. stud fixings. Tyres - Radial tubeless 16.00 R20 (425/95R20) XL 170E or 16.00 R20 XZL. 7 assemblies per vehicle (6 on-road, 1 spare).

NOTE

Later Service Replacement wheel assemblies (either spare wheel only or complete vehicle sets) may be of a different type, using 10 x 20 wheels with either tubed or tubeless tyres. Normal operation of the vehicle is not affected by this change, but the relevant WARNINGS and CAUTIONS (Chapter 4 refers) with regard to mixing wheel assembly types, are to be observed strictly.

STEERING

38 Steering box - Burman 27/54K with hydraulic assistance from engine mounted and driven pump, Sunstrand type 22.4L. The steering system has a working pressure of 2000 lbf/in^2. Non-lockable telescopic steering downshaft.

TRANSFER GEARBOX

39 The transfer gearbox is a Kirkstall AGB 7000 Mk II type. Disengageable front wheel drive, 2 speed constant mesh, ratios 2:1 & 1:1.

RECOVERY UNIT

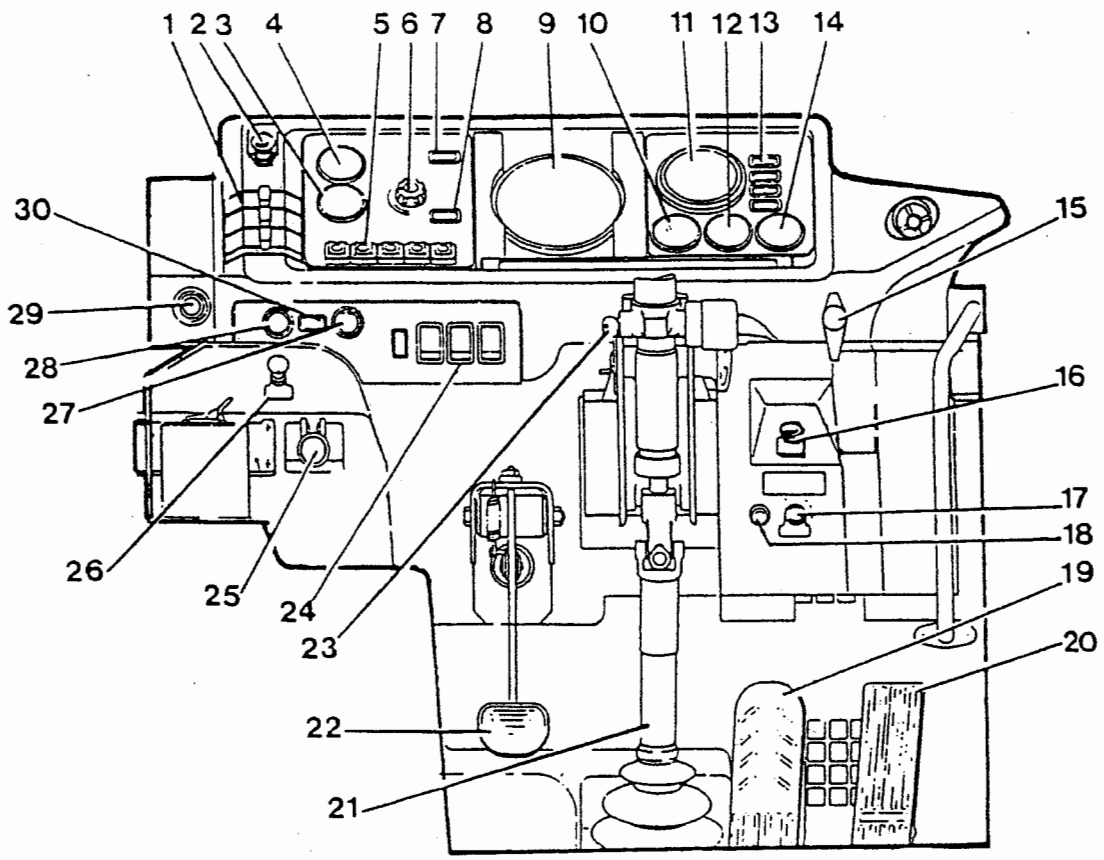
40 The recovery unit comprises main jib boom and extending folding recovery boom with swivelling fairlead. Forward extendable stabilisers and rear ground anchor spades. 25 tonne main recovery winch fitted with 80 metres of 24mm diameter rope. Job boom winch fitted with 54 metres of 16mm diameter rope. Manual controls provided above central platform for main winch and at boom operator's seat position. Remote control boxes with plug-in leads also provided. Lockers and stowage provided to accommodate all controls and full CES kit in accordance with MOD Schedule CESP/3165T/1. Bogie blocking - 5 tonne hydraulic rams fitted to sub-frame to effect blocking of rearmost axle when required. Electrical supply is 24 Volts insulated return from main vehicle.

Main Boom:	Atlas	)
Main Winch:	ROTZLER	) EKA supply
Front Winch:	Fairey	

Chapter 2

CONTROLS AND INSTRUMENTS

CONTENTS



(steering wheel omitted)

1 In-cab heating controls
2 Engine exhaust brake switch
3 Engine coolant temperature gauge
4 Engine oil pressure gauge
5 Heater fan and auxiliary light switches
6 Vehicle lighting switch
7 Rear load light warning light
8 Trailer indicator warning light
9 Speedometer
10 Air gauge 1 and 2
11 Tachometer (engine rpm)
12 Air gauge 3 and 4
13 Diff lock and diff warning lights
14 Air gauge 5
15 Cold start pump
16 3rd diff lock switch
17 PTO switch
18 PTO warning light
19 Foot brake pedal
20 Accelerator pedal
21 Steering column
22 Clutch pedal
23 Ignition key
24 Bogie blocking switches and light
25 Hand control valve lever (brake)
26 Engine stop control
27 Body 'ON' switch (electrics)
28 'ISOLATE' body switch (electrics)
29 Intermittent screen wiper switch
30 Body 'LIVE' warning light

Fig 1 In-cab controls and instruments - driver's side

STANDARD OPERATING CONTROLS

Heater controls

1 The heater sliding controls provide the driver and front seat passenger with in-cab temperature management.

Engine exhaust brake switch

CAUTION ...

Do not operate the foot brake and accelerator simultaneously with the exhaust brake engaged. This can result in engine damage.

2 This switch will disengage the engine exhaust brake. Push switch in to cancel exhaust brake effect. The exhaust brake operates when the service (foot) brake is applied.

Engine coolant temperature gauge

3 This gauge indicates the engine coolant temperature in degrees Celcius (°C).

Engine oil pressure gauge

4 This gauge indicates the engine oil pressure in kgf/cm^2 and lbf/in^2.

Heater fan and auxiliary lighting switches

5 This group of 5 switches is shown in detail in Fig 2a. Push 'ON'/ Push 'OFF' type.

Vehicle lighting switch

6 This is a rotary type switch providing selection options for the vehicle lights (Fig 2a). The function of the switch is as follows:

6.1 OFF - Interior lights and radio light will illuminate as required.

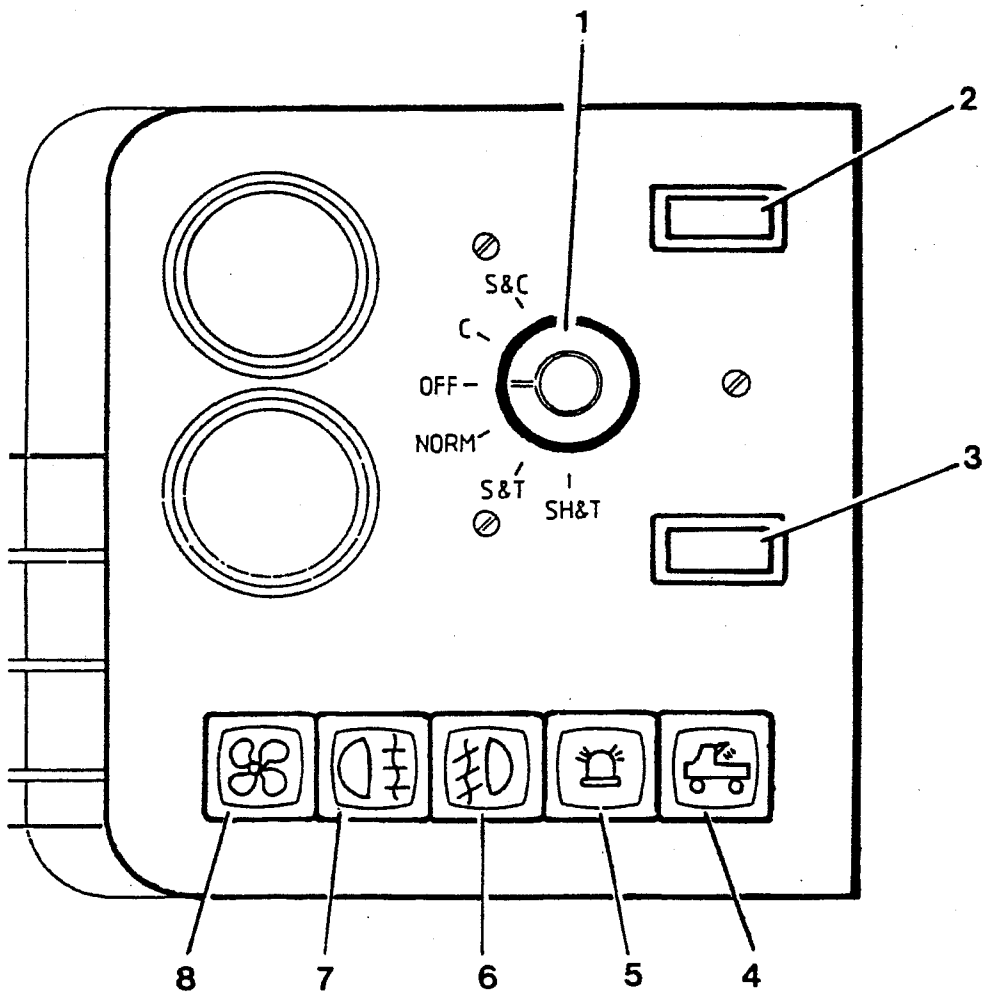
6.2 NORM - Stop lights, turn lights, reversing lights, interior lights, warning lights and radio light will illuminate as required.

6.3 S&T - Side and tail lights will illuminate. Stop lights, turn lights, reverse lights, warning lights, interior lights and radio light will illuminate as required.

6.4 SH&T - Side, head and tail lights will illuminate. Stop lights, turn lights, reverse lights, warning lights and radio light will illuminate as required.

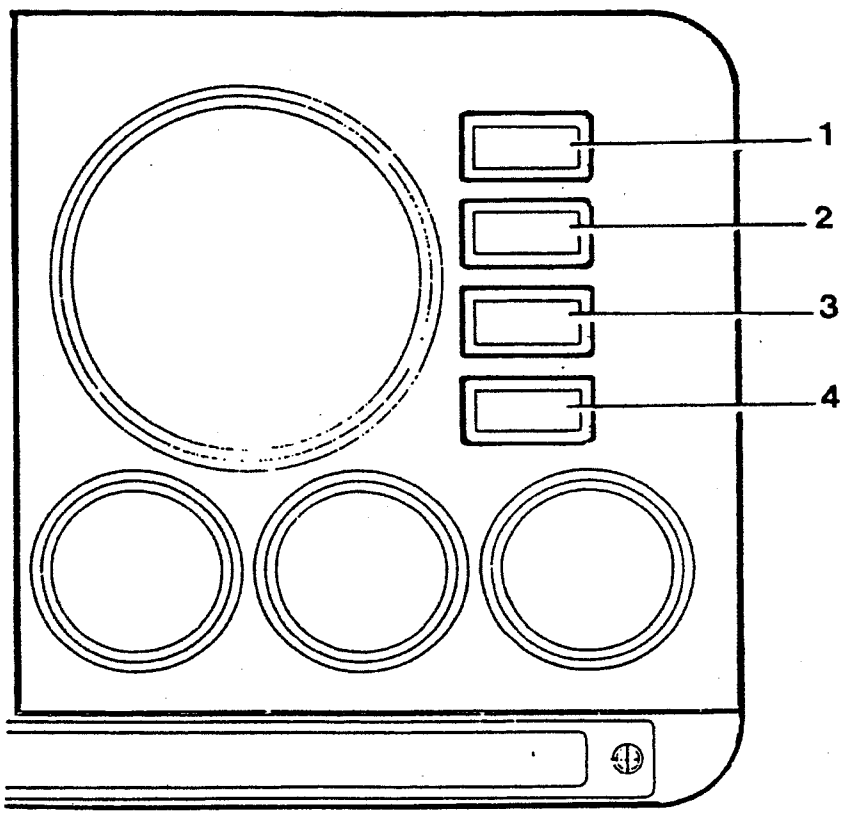
6.5 C - Convoy light will illuminate. All other lights in blackout condition except rear load (flood) lights which can be switched ON if required.

6.6 S&C - Side lights and convoy light will illuminate. All other lights in blackout condition.



1 Vehicle lighting switch
2 Rear load floodlight warning light
3 Trailer indicator warning light
4 Rear load floodlight switch
5 Rotating beacon switch
6 Front fog light switch
7 Rear fog light switch
8 Heater fan switch

Fig 2a Instrument panel switches and warning lights



1 3rd differential warning light
2 Front axle differential lock warning light
3 Foremost rear axle differential lock warning light
4 Rearmost rear axle differential warning light

Fig 2b Instrument panel warning lights

Rear load floodlight warning light

7 This warning light (Fig 2a(2)) is lit when the 'Rear Load Floodlight Switch' (4) is operated.

Trailer indicator warning light

8 This warning light (Fig 2a(3)) is lit when the trailer plug and socket are coupled.

Speedometer

9 This instrument measures the speed of the vehicle over the ground. Also includes an odometer (measuring distance covered).

Air gauges 1 and 2

10 The two pointers seen on this gauge indicate reservoir air pressure in the brake service system for axles 2 and 3 (Pointer 1) and the service system for axle 1 (Pointer 2).

Tachometer

11 This instrument indicates the engine speed in revolutions per minute (rpm). It is essential to use this instrument when the power take-off (PTO) is engaged.

Air gauges 3 and 4

12 The two pointers seen on this gauge indicate reservoir air pressure in the secondary brake system (Pointer 3) and the spring brake release system (Pointer 4).

Differential (diff) lock and 3rd diff warning lights

13 This group of 4 lights indicate when the diff locks or 3rd diff are engaged.

Air gauge 5

14 This gauge registers the air pressure in the trailer brake system.

Cold start pump

15 This is an aid to engine starting in the event of very cold weather conditions, when the engine may be reluctant to fire under normal procedures.

3rd diff lock switch

16 Push-in to engage 3rd diff lock.

Power take-off (PTO) switch

17 Pull to engage PTO.

PTO warning light

18 This light is lit when the PTO is engaged.

Foot brake pedal

19 Depress this pedal to apply the vehicle brakes.

Accelerator pedal

20 This pedal controls the engine speed. Depress to increase engine speed (rpm).

Steering column

21 Supports and connects the steering wheel to the steering mechanism.

Clutch pedal

22 Depress this pedal to disengage the clutch and raise slowly after selecting the required gear.

Ignition key

23 Turn key away from windscreen to start engine.

Bogie blocking switches and light

24 This group of 3 switches operate the bogie blocking apparatus in order to stabilize the vehicle when driving with a suspended tow. The light is lit when the bogie is blocked. (Detail in Fig 18)

Hand control valve lever

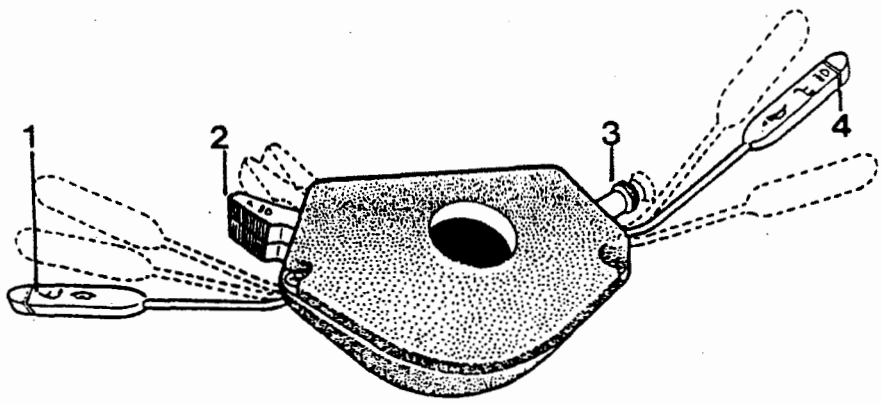
25 This lever operates the parking and secondary brake system. Lift central ring slider to unlock and so allow the lever to be moved to the 'ON' or 'OFF' position.

Engine stop control

26 This pull-out control will stop the engine when operated. Allow approximately 3 minutes for the engine to idle when vehicle comes to rest. Pull out engine stop control. Finally, turn ignition key to 'OFF' position.

Body-on switch

27 This switch controls the electrical supply to the body EKA recovery and front winch. Body 'ON' switches are also located on the EKA equipment, one at each rear mudguard and one at the manual control station.



1 Windscreen washer/wiper switch
2 Infra-red headlight switch
3 Hazard switch
4 Headlight main beam, turn indicator and horn switch

Fig 3 Steering column switch arrangement

Isolate body

28 This switch will break the electrical supply to front winch, stabilizer, bogie blocking and EKA recovery equipment. Light is extinguished when body supply is isolated. Isolate body (STOP) switches are also located on the EKA equipment, one at each rear mudguard, one at the manual control station, and at remote control units.

Intermittent screen wiper switch

29 This rotary switch will provide a variable intermittent windscreen wiper operation.

Body 'LIVE' warning light

30 The light is lit when Body-on switch is set to ON.

Windscreen Washer/wiper switch

31 Push forward to operate the windscreen wipers, first position for slow wipe, second position for fast wipe. Press end of lever to operate the windscreen washers.

Infra-red headlight switch

32 Situation shown in full line is the 'OFF', No 1 position. Push switch forward to position 2 (middle dotted line) to operate the infra-red (IR) headlights. Push switch forward again (end dotted line) to position 3 to operate the IR headlights and convoy lights.

Note ...

When this switch is operated all other lights are in the blackout condition.

Hazard switch

33 To operate this switch, pull out. Switch will glow red and all turn indicators will flash intermittently, including trailer indicator warning light (Fig 2a(3).

Headlight main beam, turn indicator and horn switch

34 Press the end of the switch to operate horn. Push down for main headlight beam. Lift up for dipped headlight beam. Push the switch forward to operate left-hand (LH) turn indicator lights and pull back to operate the right-hand (RH) turn indicator lights.

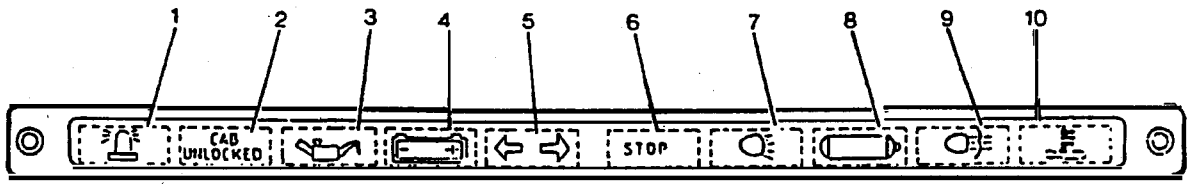
Note ...

Normal Position - Operate switches as required.
Blackout Position - Operate switches as required.
Infra-red headlight - Rotary switch in 'OFF' position and operate infra-red headlight switch as required (see Fig 3).

Warning light module

35 The colours of the warning lights are as follows:

	Warning light		Lens colour
35.1	Rotating Beacon	-	(YELLOW)
35.2	Cab Unlocked	-	(RED)
35.3	Low Oil Pressure	-	(RED)
35.4	Alternator Charge	-	(RED)
35.5	Turn Indicators	-	(GREEN)
35.6	Stop, Malfunction Light	-	(RED)
35.7	Main Beam	-	(BLUE)



1 Rotating beacon
2 Cab unlocked
3 Low oil pressure
4 Alternator charge
5 Turn indicator
6 STOP, malfunction light
7 Main beam
8 Low air pressure
9 Rear fog lights
10 High water temperature

Fig 4 Warning light module

35.8 Low Air Pressure - (RED)

35.9 Rear Fog Lights - (YELLOW)

35.10 High Water Temperature - (RED)

Note ...

In the event of abnormal conditions arising, such as low air pressure, low engine oil pressure or high engine coolant temperature, an audible buzzer is activated in conjunction with a visual 'STOP' lights (Fig 4(6)). Also a light(s) identifying the particular malfunction(s) will illuminate.

Cab controls, viewed through driver's doorway

36 The cab controls shown in Fig 5 are as follows:

36.1 Exhaust brake switch. Push in to disengage.

36.2 Airvent. Controls the direction of air flow into the cab. Rotary movement within the housing. Air flow can also be shut off by closing centre flap.

36.3 Start pilot pump (Fig 7)

36.4 Steering column adjustment knob. Turn to release, adjust rake of steering column to suit, re-tighten knob.

36.5 3rd diff switch. Push in to engage diff lock.

36.6 Power take-off (PTO) switch. Pull to engage PTO.

36.7 Accelerator pedal. Controls engine speed.

36.8 Foot brake pedal. Depress to apply vehicle service brakes.

36.9 Clutch pedal. Depress to disengage clutch.

36.10 Engine stop. Pull to stop engine.

36.11 Hand control valve lever. Controls vehicle secondary & parking brakes.

36.12 Seat adjuster for height. Lift bar to operate.

36.13 Seat adjuster for length. Lift bar to operate.

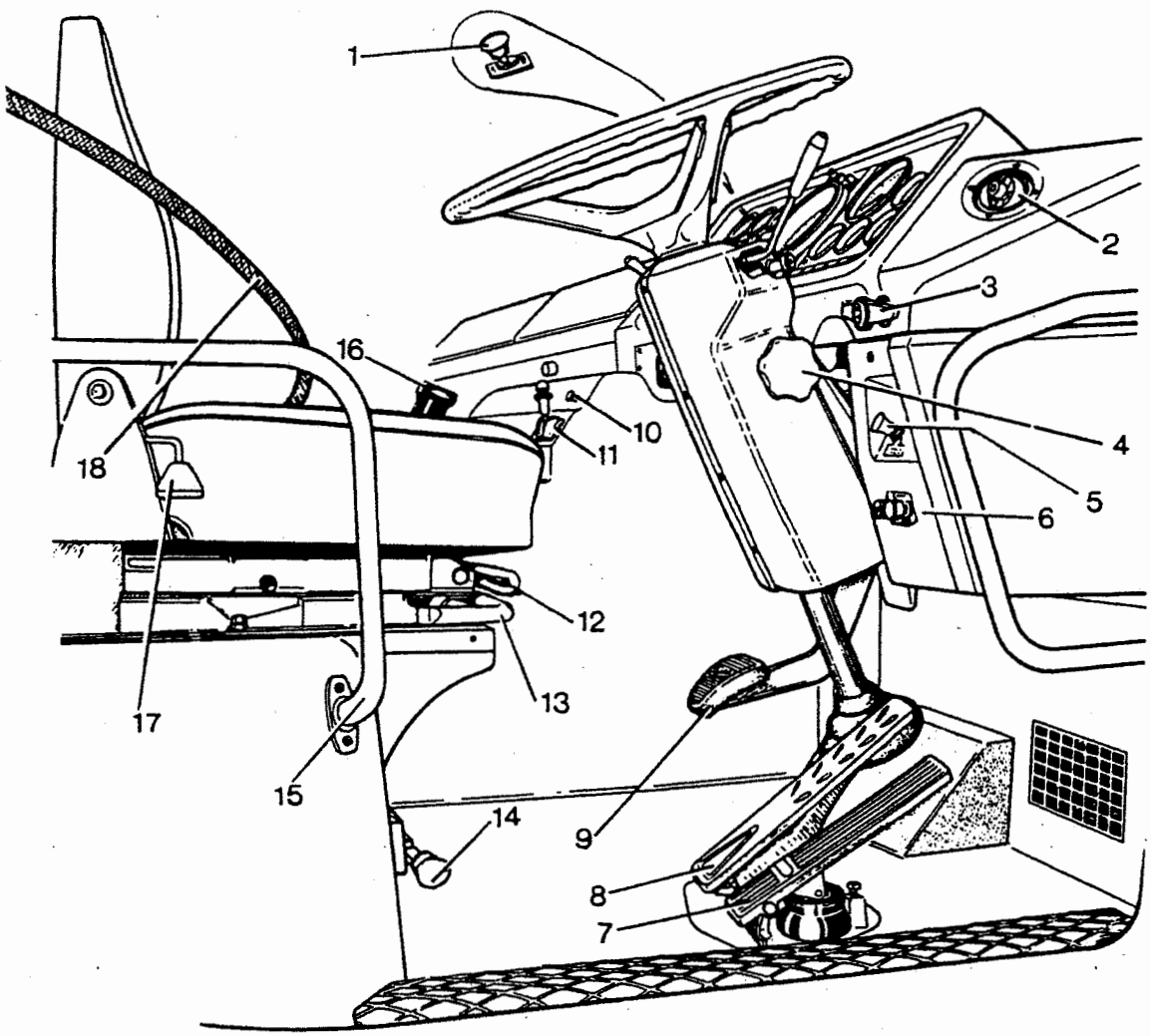
36.14 Hand control for engine speed. Used in conjunction with PTO.

36.15 Grab handle. For use when entering or leaving cab.

36.16 Gear change lever. Used for gear selection.

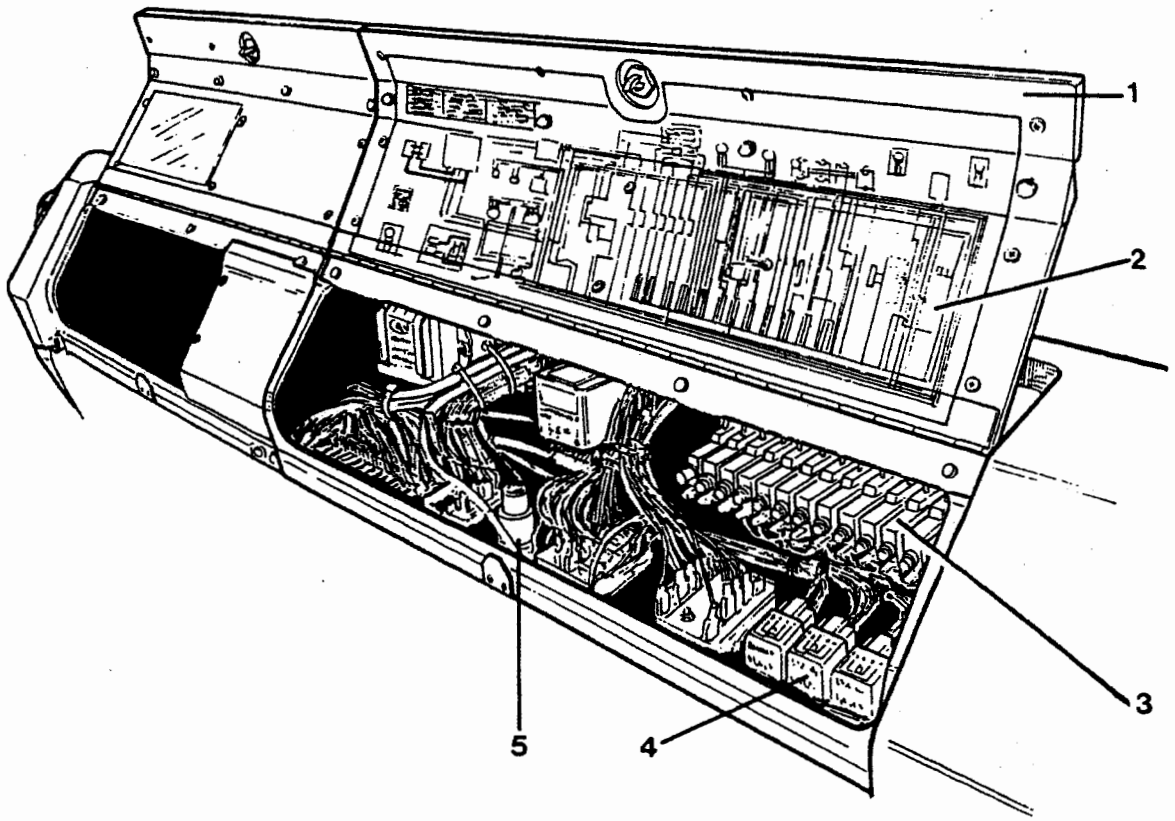
36.17 Seat back rake adjustment lever. Lift to alter seat rake and to fold the back of the seat to the forward position.

36.18 Seat belt. Safety requirement.



1 Exhaust brake switch
2 Air vent
3 Cold start pump
4 Steering column rake adjustment knob
5 3rd diff switch
6 Power take-off (PTO) switch and light
7 Accelerator pedal
8 Foot brake pedal
9 Clutch pedal
10 Engine stop control
11 Hand control valve lever
12 Seat adjuster for height
13 Seat adjuster for length
14 Hand throttle
15 Grab handle
16 Gear change lever
17 Seat back rake adjustment lever
18 Seat belt

Fig 5 Cab controls, viewed through driver's doorway



1 Main panel cover
2 Vehicle schematic wiring diagram
3 Circuit breakers
4 Relays
5 Buzzer

Fig 6 Main electrical panel - (cover raised)

Circuit breakers

37 The circuit breakers (Fig 6(3)) are installed under the instrument panel front cover (1). The circuit breakers trip out if a fault occurs in an electrical circuit, thereby protecting other electrical circuits from damage and possible fire.

38 To reset a tripped-out circuit breaker, press in the centre button, which will have extended. Should the circuit breaker trip out again, check the circuit for a fault and rectify before resetting the circuit breaker again.

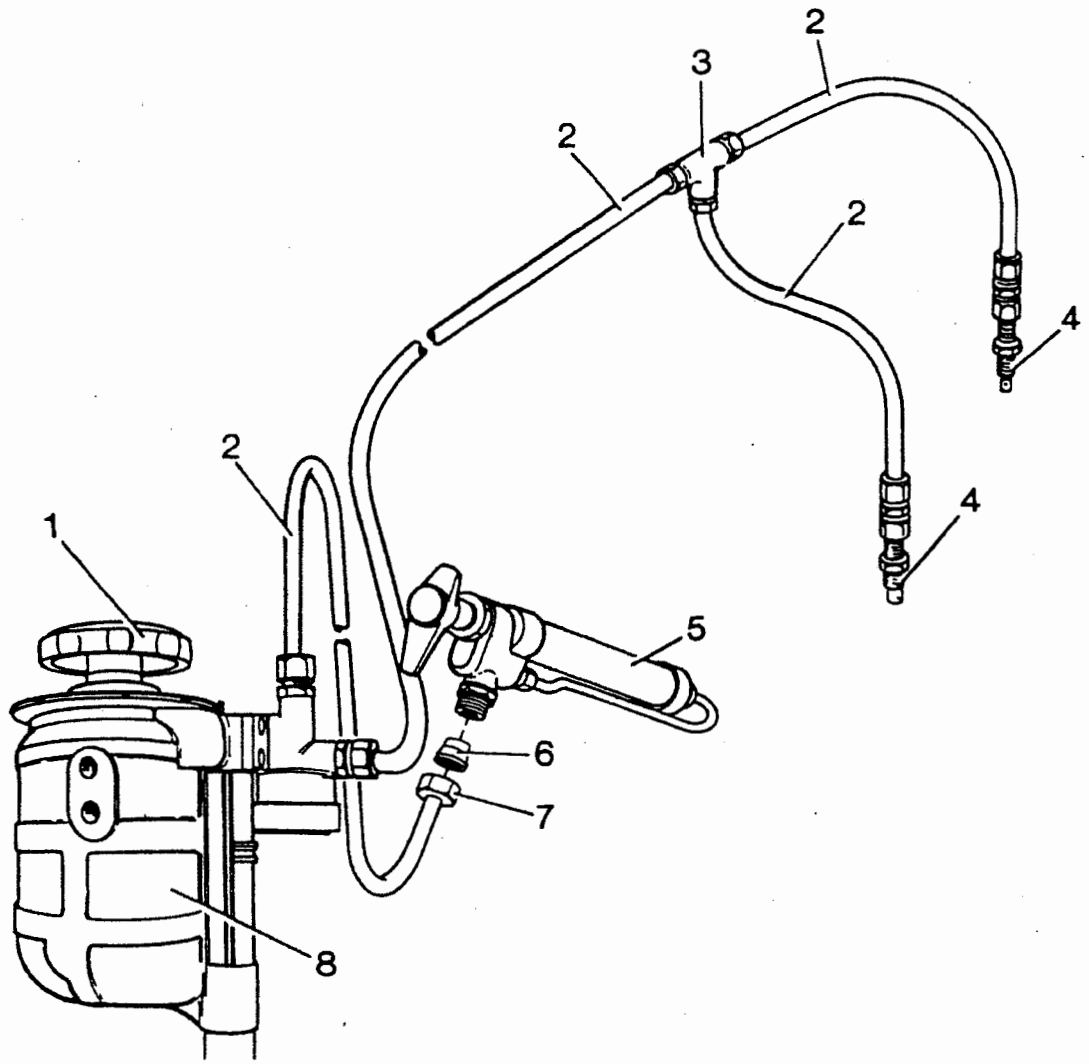
Note ...

If an electrical item fails, always check the circuit breaker first.

CIRCUIT BREAKER	SIZE (AMPS)	FUNCTION
1	10	Horn, interior lights, trailer positive.
2	10	Front and rear fog lights
3	10	Rotating beacon, rear load floodlights
4	10	Wiper and washer motor
5	10	Heater motors
6	10	Water temperature gauge and air dryer
7	10	Warning lights and reversing lights
8	10	Engine hour meter and turn indicators
9	10	Convoy light
10	10	Tail and panel lights
11	10	Side and marker lights
12	10	Nearside (N/S) dipped headlights
13	10	Offside (O/S) dipped headlights
14	10	N/S Main beam headlights
15	10	O/S Main beam headlights
16	10	Recovery equipment
17	10	Recovery equipment
18	10	Recovery equipment

Cold start system

39 In very cold weather conditions it may become necessary to assist engine starting by use of the cold start system (Fig 7).



1 Top cap
2 Pipe
3 Tee piece
4 Jet
5 Hand pump
6 Ferrule
7 Nut
8 Reservoir

Fig 7 Cold start system

Engine hour meter

40 Under the front grille to the left of the radiator header tank, can be found the engine hour meter (Fig 8). The purpose of this instrument is to record the total running time of the engine for maintenance and service records. The meter operates when the engine is used for driving the vehicle or is supplying power for front winch and EKA equipment recovery operations.

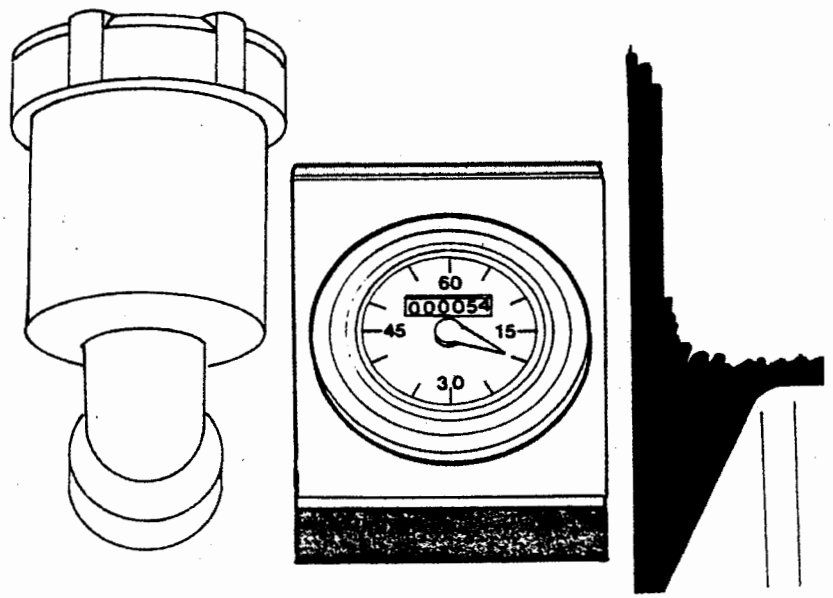
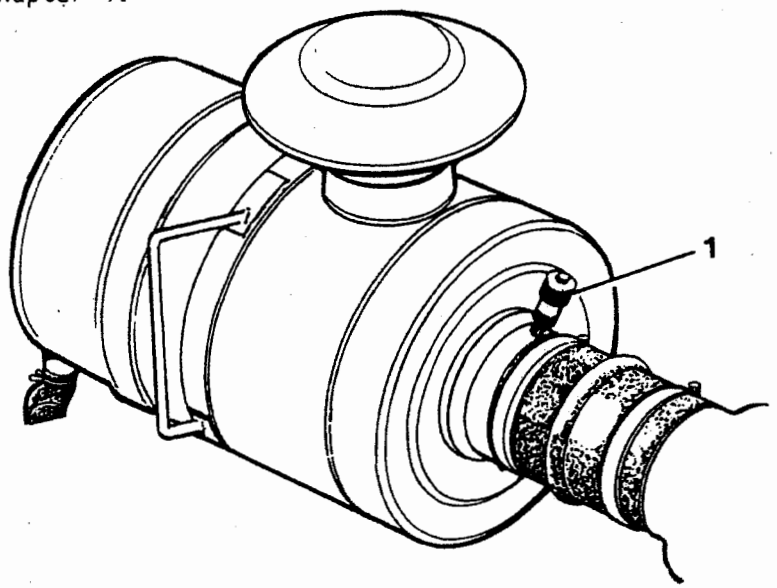


Fig 8 Engine hour meter

Air filter restriction indicator

41 An air filter restriction indicator is fitted to the outlet side of the engine air cleaner (Fig 9(1)). If the transparent body of the indicator is seen to be showing 'RED', the air filter requires attention. User maintenance is detailed in Chapter 4.



1 Indicator

Fig 9 Air filter restriction indicator

Fuel tank contents gauge

42 Fitted into the end of the fuel tank, driver's side, is a direct reading fuel gauge (Fig 10). The gauge is operated by a float mechanism within the tank. The 'F' mark on the gauge indicates that the tank's capacity of 363.3 litres (80 gallons) has been reached.

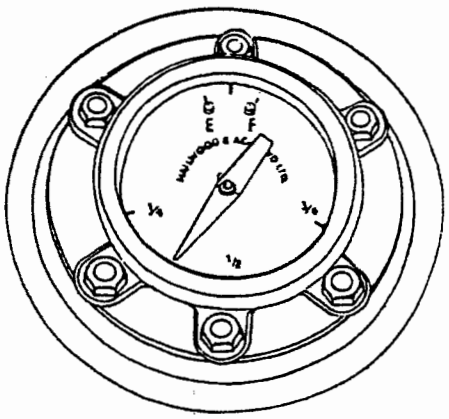
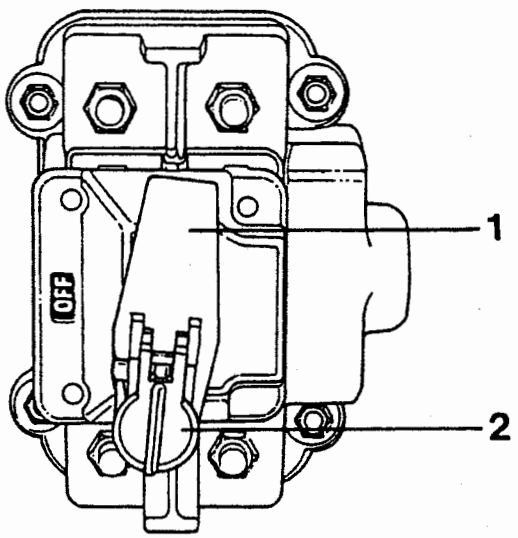


Fig 10 Fuel gauge

Electrical system master switch

43 The electrical system master switch (Fig 11(1)) is mounted on the front side of the equipment locker, driver's side. The switch handle is lockable to prevent unauthorised tampering. The handle can be locked in the 'OFF' or 'ON' position and when locked, the handle will disengage and rotate freely. A protective cap is fitted over the lock to prevent ingress of water.

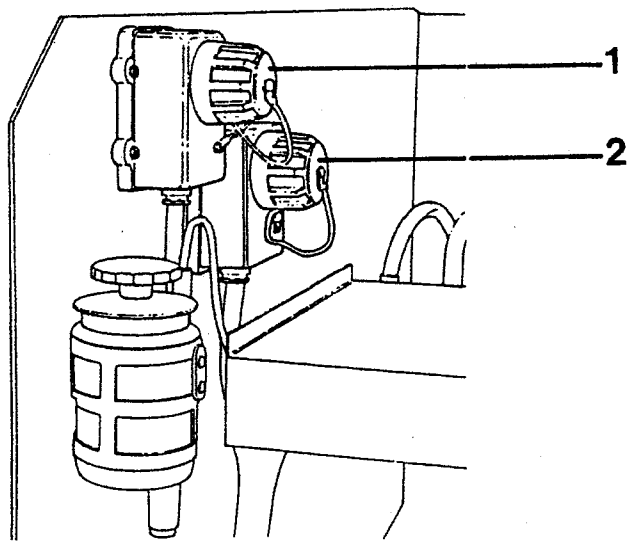


1 Switch 2 Handle lock

Fig 11 Electrical system master switch

Inter-vehicle start connections

44 Two sockets, mounted alongside the Master Switch on the front end of the equipment locker found on the driver's side, provide emergency starting facilities (Fig 12). The upper and outer socket is rated at 24 volts (1) and the lower and inner socket at 12 volts (2). Starting can be effected either way between two vehicles. Protective cap should be replaced after use.



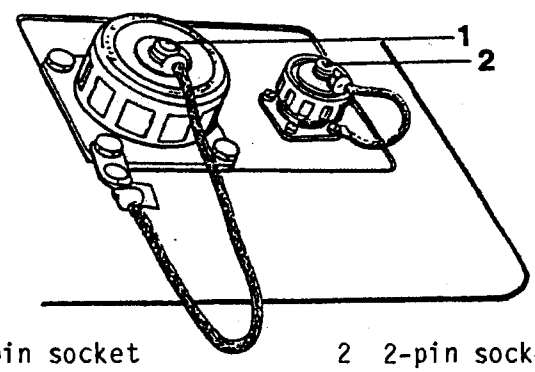
1 24 volt interstart socket 2 12 volt interstart socket

Fig 12 Interstart sockets

Rear towing electrical connections

45 A 12-pin socket is fitted at the rear of the vehicle (Fig 13(1)) which provides an interconnection of compatible electrical systems between the towing and towed vehicles. When connected, convoy, tail and stop lights, turn indicator and an auxiliary supply will be made available on the towed vehicle.

46 In addition, fitted alongside the 12-pin socket is a 2-pin socket (2). This socket, connected to the towed vehicle's system, operates the 'STOP' and low air pressure warning lights (Fig 4(6 and 8)), and a buzzer in the towing vehicle's cab when the air pressure of the towed vehicle falls below the minimum requirement.

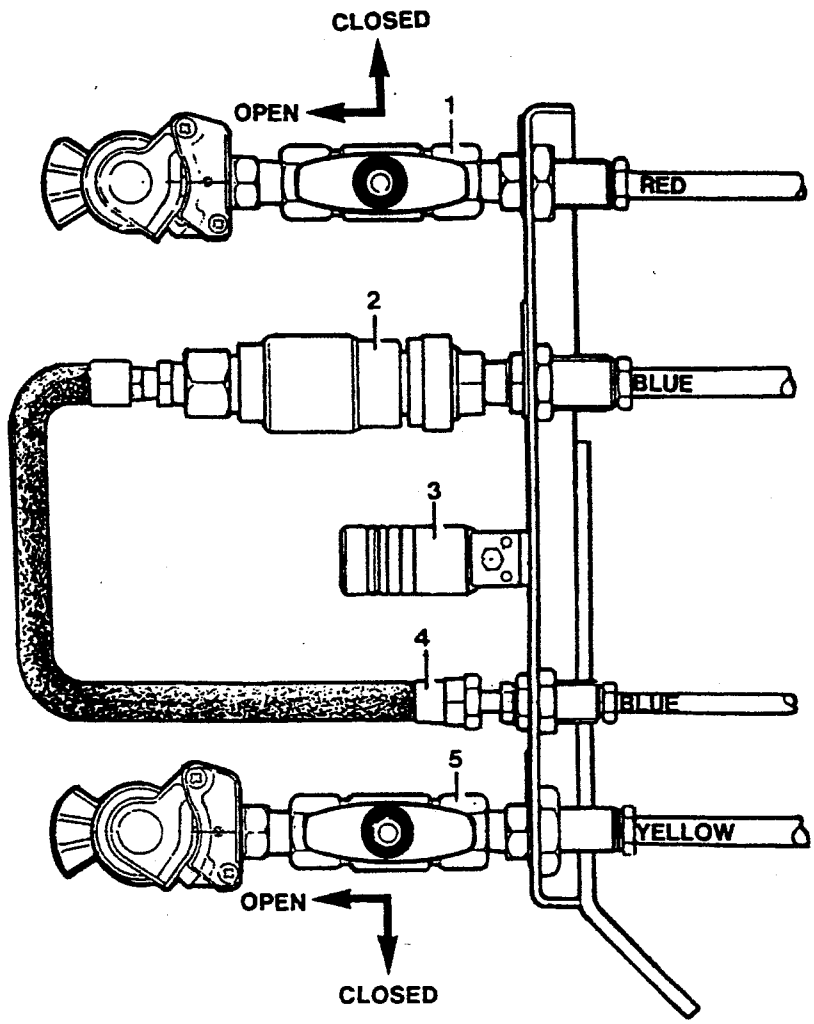


1 12-pin socket 2 2-pin socket

Fig 13 Rear towing connections

Rear towing brake couplings

47 Air pressure couplings are fitted at the rear of the vehicle to connect the air system to a second vehicle or trailer. When two vehicles or a trailer and vehicle are thus coupled, the driver of the front vehicle controls the brakes of the vehicles in train.

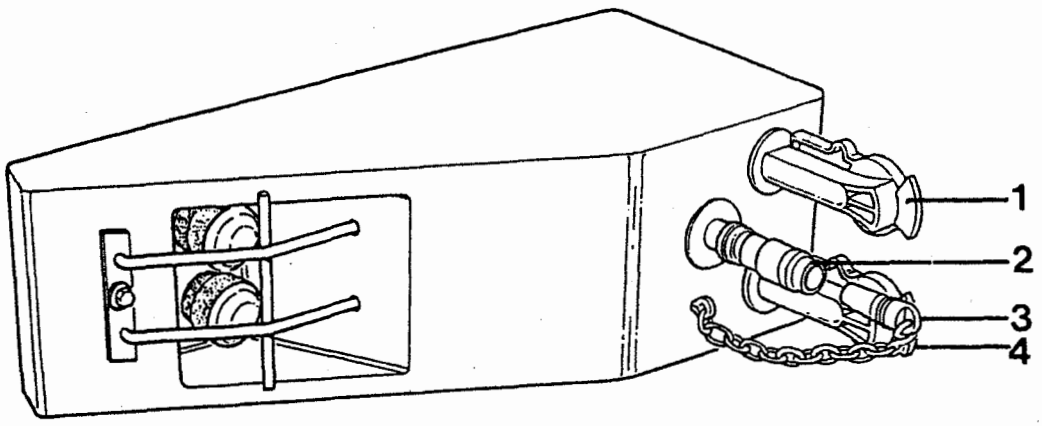


1 RED emergency line
2 BLUE secondary line
3 BLUE dummy coupling
4 BLUE 3rd line (secondary)
5 YELLOW service line

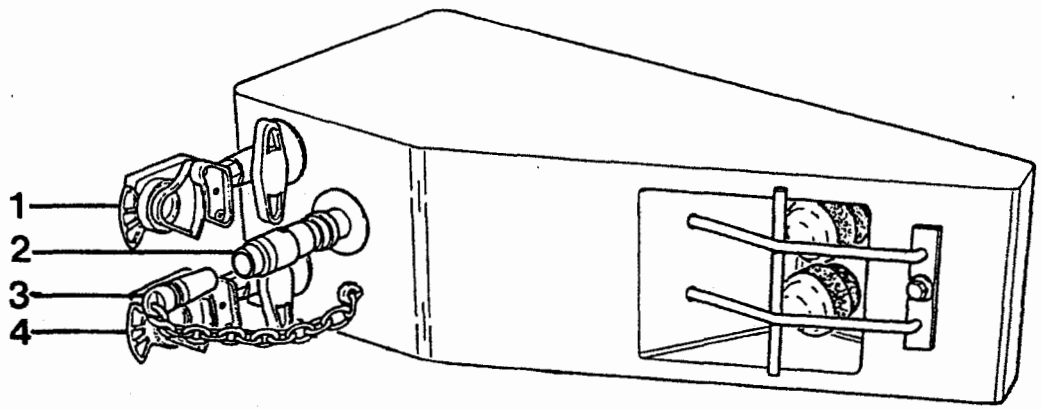
Fig 14 Rear towing brake couplings

Front Bumper Mounted Brake Couplings

48 In addition to the rear brake couplings, a duplicate set are provided at the front of the vehicle mounted either side of the winch. Both sets consist of palm type couplings for emergency and service lines, and tapered plug type for the secondary line. Chained stoppers are fitted to plug the secondary line couplings when not in use. The front mounted brake couplings provide (i) air pressure to the trailer should the trailer require to be shunted and (ii) air pressure to the recovery vehicle should itself become a casualty. The coupling group on the left-hand side, when facing the vehicle front, (ie driver's side) are the trailer connections and the group on the right-hand side (ie passenger side) are recovery casualty connections (Fig 15).



DRIVER SIDE



PASSENGER SIDE

1 RED emergency line
2 BLUE secondary line
3 Plug for secondary line socket coupling
4 YELLOW service line

Fig 15 Front brake couplings

Cooking vessel control switch

49 Mounted on the forward bulkhead of the cab, passenger side, is a switched unit fitted with a warning light and 24-volt, 4-pin, cannon type socket, for use with standard issue cooking vessel.

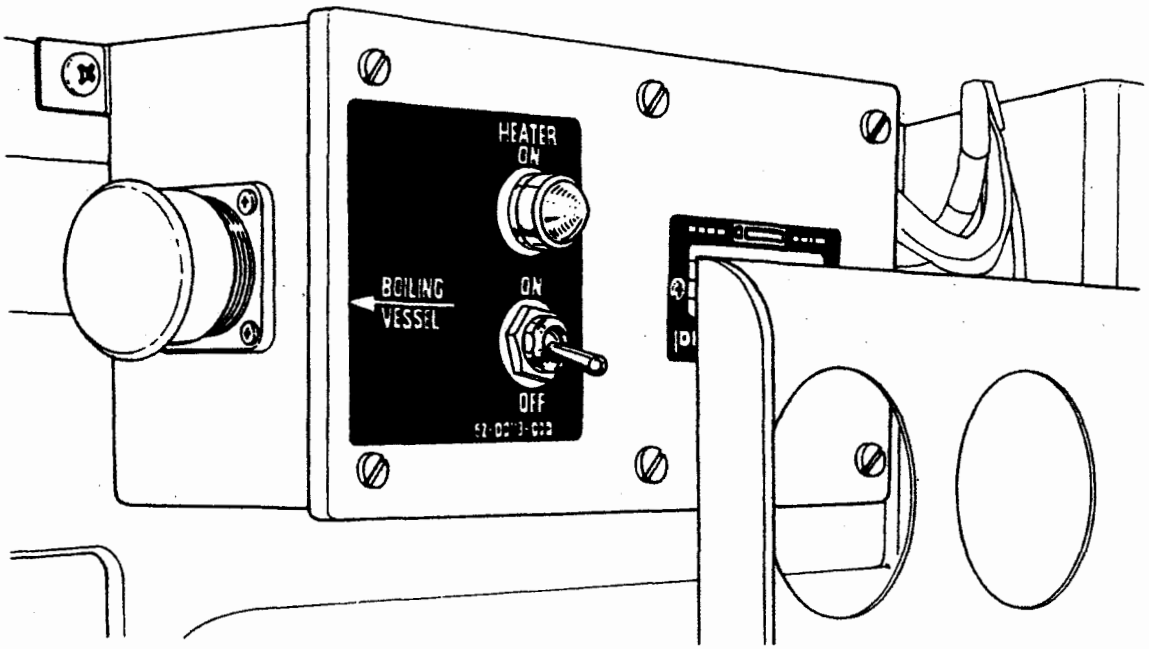
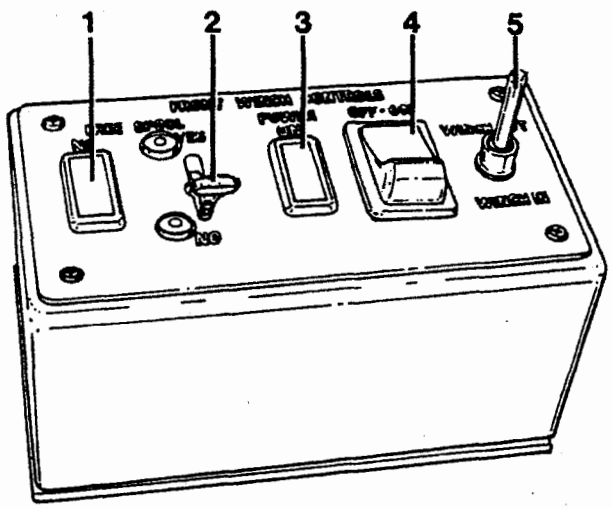


Fig 16 Cooking vessel control switch

Front winch control (electric)

50 The front winch controls are mounted on the central console to the left of and facing the driver (Fig 17). The group consists of an 'OFF-ON' electrical supply switch, 'POWER ON' lamp (green), 'FREE SPOOL' control lever and warning light (red) and 'WINCH IN - WINCH OUT' control switch. For operating details see Chapter 3.

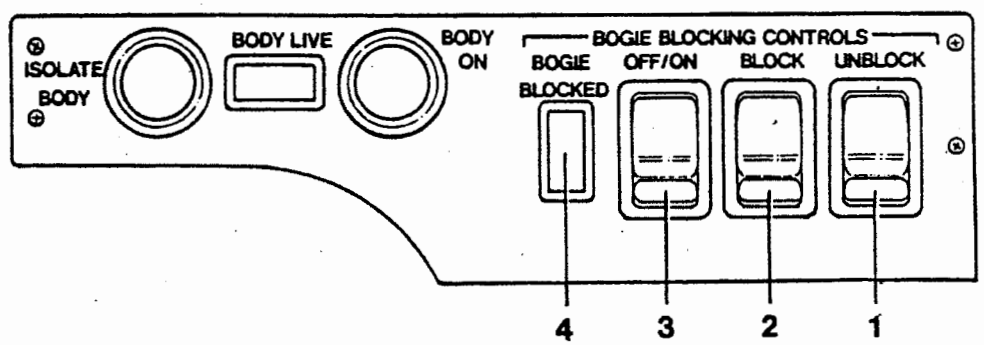


1 Warning light (FREE SPOOL)
2 Free spool lever
3 Warning light (POWER ON)
4 OFF-ON switch
5 Winch control switch

Fig 17 Front winch controls

Bogie blocking control (electric)

51 The bogie blocking controls are found on the dashboard to the left-hand side of the steering wheel. Bogie blocking of the rear axles enables a weight transfer onto the front axle, thereby improving steerability during ascent of a steep incline with a heavy casualty suspended on the boom.



1 Unblock switch 2 Block switch 3 'OFF/ON' switch 4 Warning light

Fig 18 Bogie blocking control

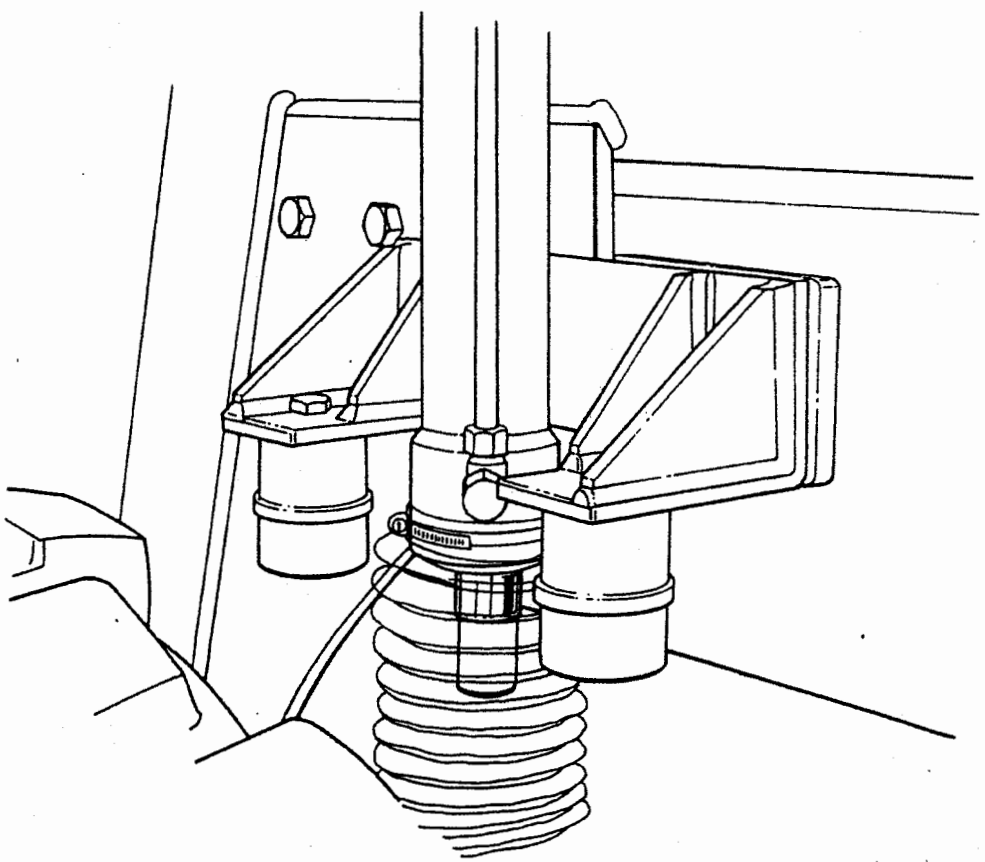


Fig 19 Rear bogie blocking ram

Controls (mechanical/hydraulic) at main boom operator's seat

52 Sitting in the boom operator's seat facing the rear of the vehicle the control levers (Fig 20), reading from left to right, perform the following functions:

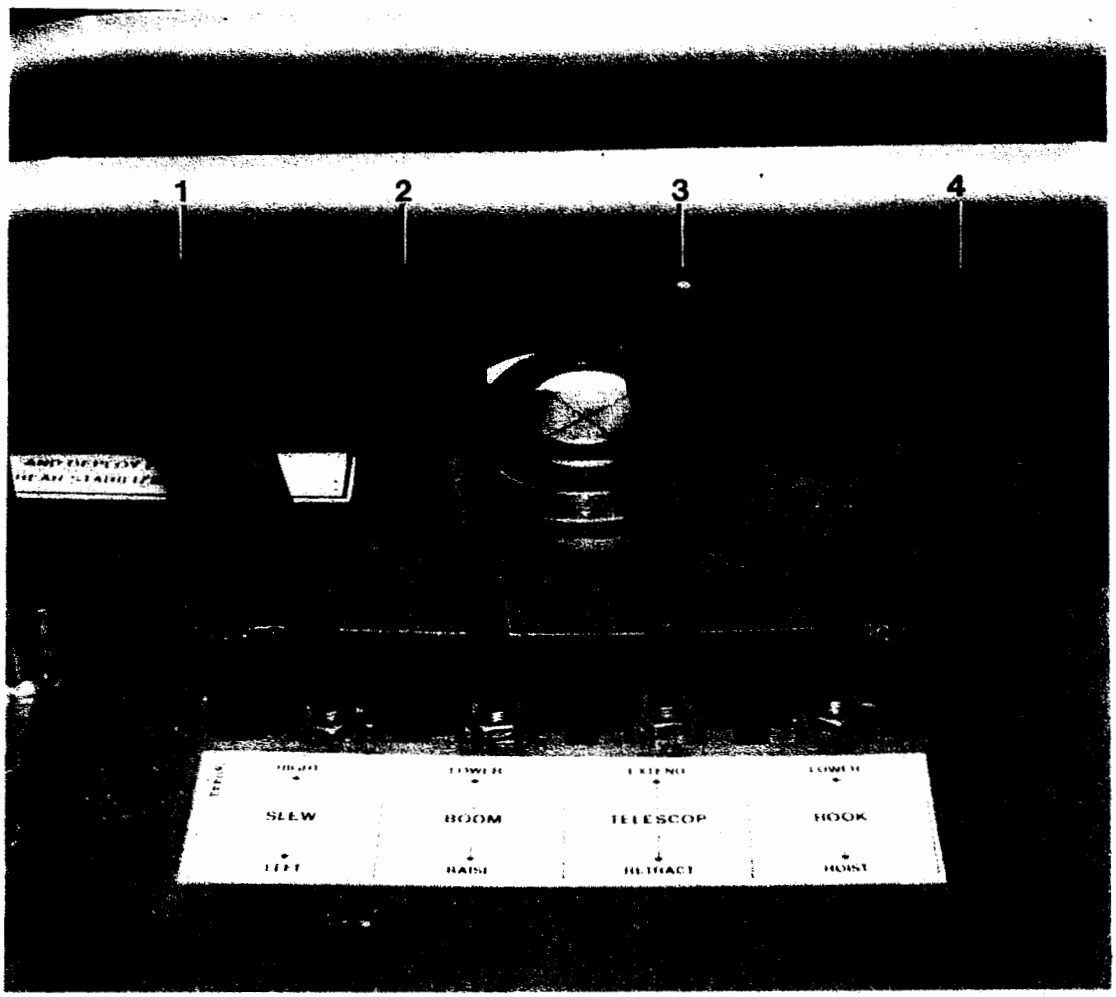
52.1 Slew the boom from side to side

52.2 Lower and raise the boom

52.3 Extend and retract the boom

52.4 Lower and raise the hook

53 In addition, to the right and beyond the four control levers, is a 'T' shaped handle which operates the turntable lock. This lock must remain in position (ie in the lower slot) at all times when in transit.



1 Slew, left and right
2 Boom, lower and raise
3 Telescope boom, extend and retract
4 Hook, lower and raise

Fig 20 Controls at main boom operator's seat

Recovery control levers (mechanical/hydraulic)

54 Immediately below the boom operator's seat, on a lower platform, can be found a group of four levers that perform the recovery operations (Fig 21). These levers control the folding recovery boom mounted at the rear of the vehicle, the recovery winch and the bogie blocking operation.

55 Reading from left to right when facing the levers, the functions are as follows:

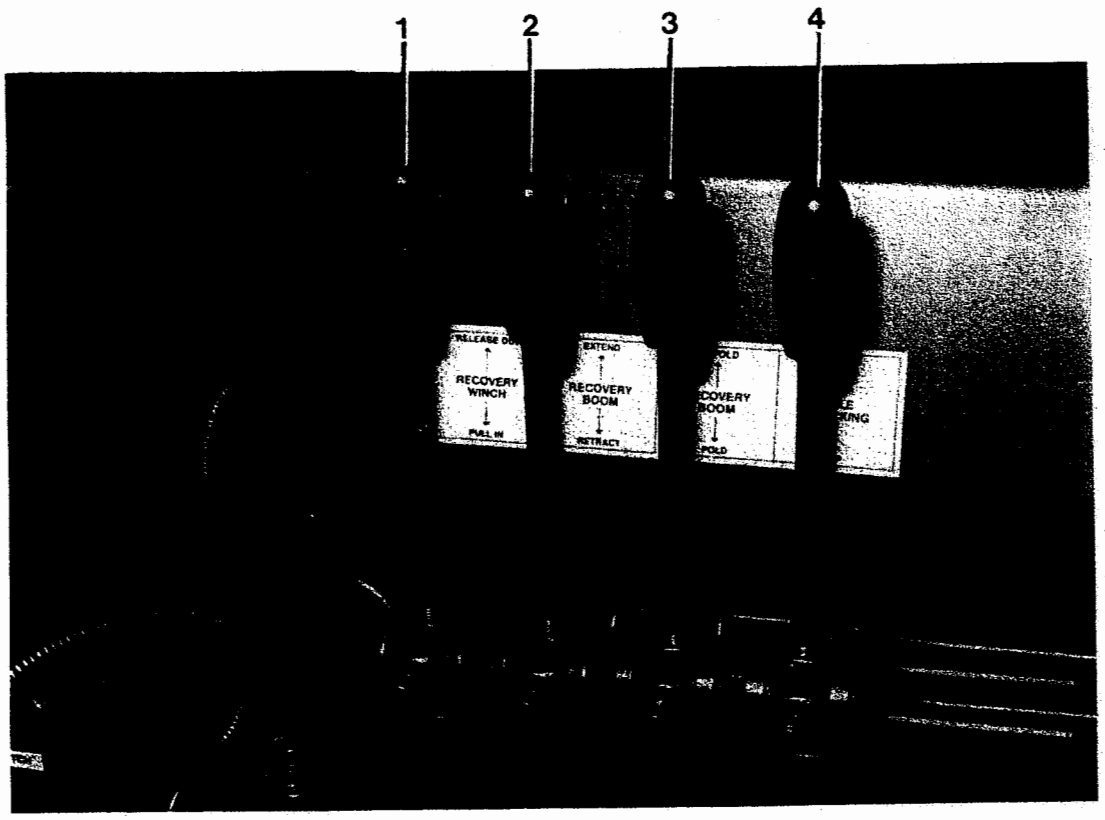
55.1 Recovery winch control, push to release rope, pull to winch in. (See Note in para 57).

55.2 Recovery boom control, push to extend boom, pull to retract.

55.3 Recovery boom control, push to unfold boom, pull to fold.

55.4 Axle blocking, push to extend boogie blocking rams, pull to retract.

56 To the left-hand side of the recovery levers is an emergency cut-out which isolates the body electrical system and a body ON switch which energises the body, (and the BODY LIVE warning light in the cab).



1 Recovery winch control
2 Recovery boom control
3 Recovery boom control
4 Axle blocking control

Fig 21 Recovery control levers

Recovery control and stabilizer control levers (mechanical/hydraulic)

57 On the square platform level and to the right (looking rearwards) of the recovery control levers (Fig 21) are a group of eight levers (Fig 22), the functions of which are:

57.1 Recovery winch control, push to spool rope out, pull to winch rope in.

Note ...

This control can be operated simultaneously with the lever shown at Fig 21(1)) to obtain high speed operation of the recovery winch.

57.2 Front winch control, push to spool rope out, pull to winch in.

57.3 Front stabilizer, left-hand (lh) control, push to lower stabilizer, pull to raise.

57.4 Front stabilizer, (lh) control, push to extend stabilizer, pull to retract.

57.5 Front stabilizer, right-hand (rh) control, push to extend, pull to retract.

57.6 Front stabilizer, (rh) push to lower stabilizer, pull to raise.

57.7 Rear stabilizer, (lh) control, push to lower stabilizer, pull to raise.

57.8 Rear stabilizer, (rh) control, push to lower stabilizer, pull to raise.

1 Recovery winch control
2 Front winch control
3 Front stabilizer (lh) control
4 Front stabilizer (lh) control (lateral)
5 Front stabilizer (rh) control (lateral)
6 Front stabilizer (rh) control
7 Rear stabilizer (lh) control
8 Rear stabilizer (rh) control

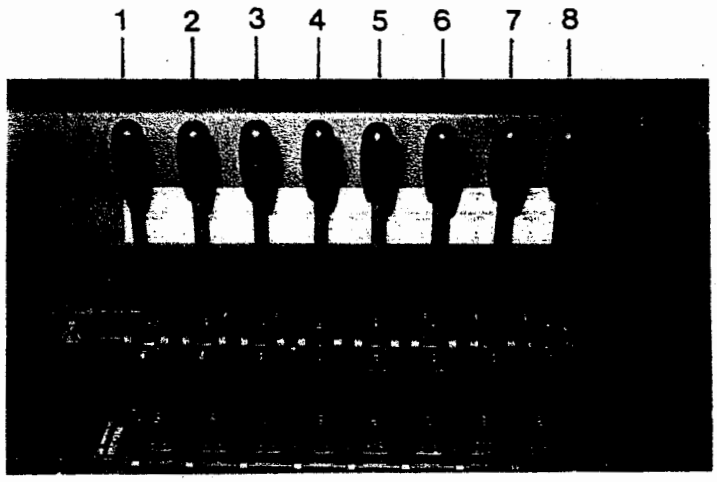


Fig 22 Recovery control and stabilizer control levers

Note ...

Left and Right-Hand are regarded as facing the levers looking to the rear of the vehicle.

Front stabilizer control (electrical)

58 Situated alongside the left and right-hand front stabilizers are the electrical controls for the lateral and up and down movements of these stabilizers. As shown in Fig 23, these toggle switches have four action positions: UP, DOWN, OUT and IN and are regarded as the prime controls.

59 To the rear of the toggle controls, and set slightly inboard of them, can be found the mechanical locks for the front stabilizers. These locks are counterbalanced and will reset when the stabilizer is fully stowed. To unlock, press down and hold before commencing first movement of stabilizer. When the stabilizer has moved approximately 20 mm, release the lever.

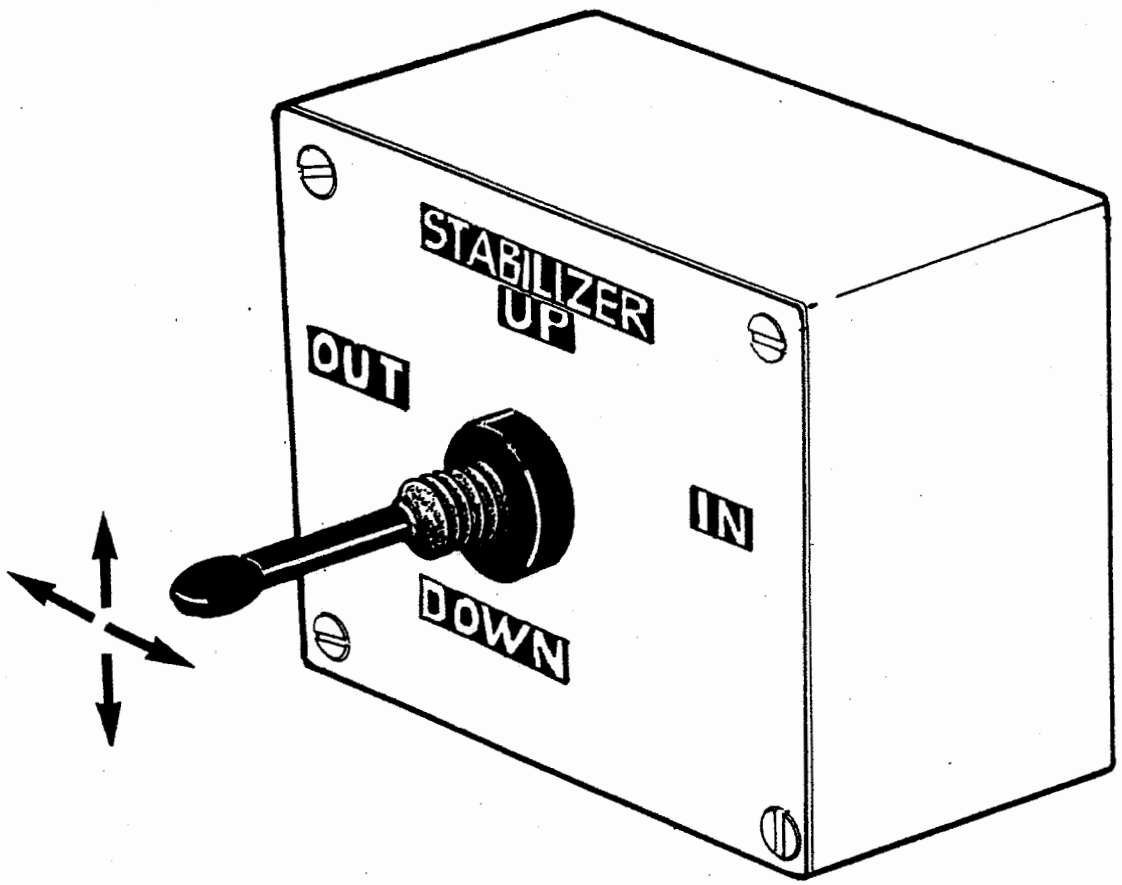


Fig 23 Front stabilizer control switch

Rear stabilizer control (electrical)

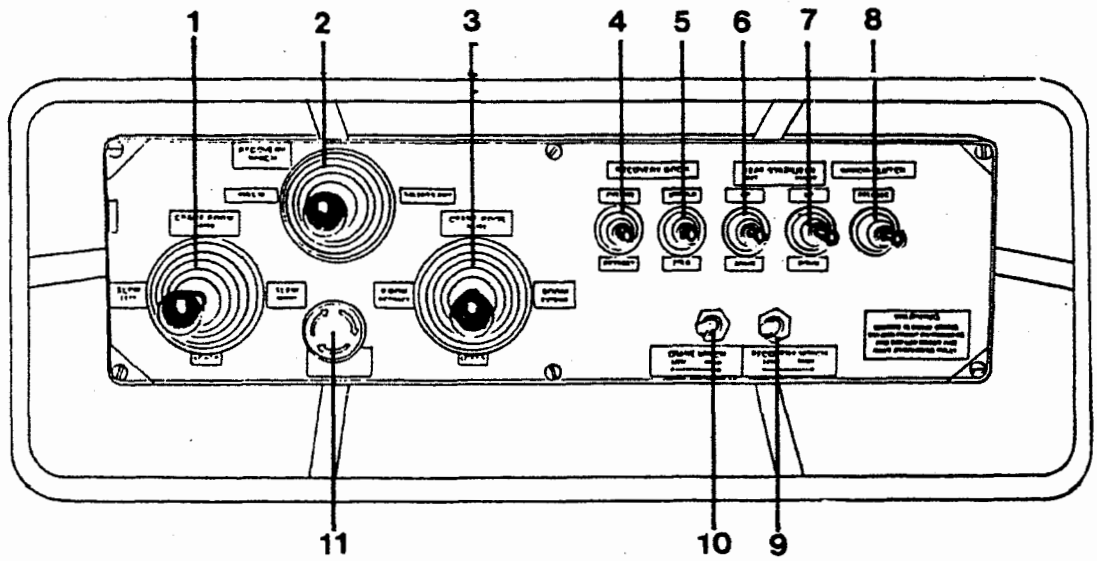
60 The rear stabilizer electrical controls incorporated in the main control box, remote control box and the main boom and winch remote control box.

Main control box (electrical)

61 The main control box (Fig 24) is stowed in the rearmost equipment locker, passenger side.

62 On removal from the locker, the control box is hooked into the two holes provided in the mudguard above the rear wheel (Fig 25).

63 The control box electrical connection is made through the multi-pin socket found on the front, inside of the locker (Fig 26). The control box plug must be clamped firmly in position. The plug must be disconnected from the socket before stowing the control box.



1 Main boom control
2 Recovery winch control
3 Main boom winch extend control
4 Recovery boom extend control
5 Recovery boom folding control
6 Rear stabilizer control, (lh)
7 Rear stabilizer control, (rh)
8 Recovery winch clutch control
9 Recovery Winch speed control
10 Main Boom winch speed control
11 Emergency stop control

Fig 24 Main control box

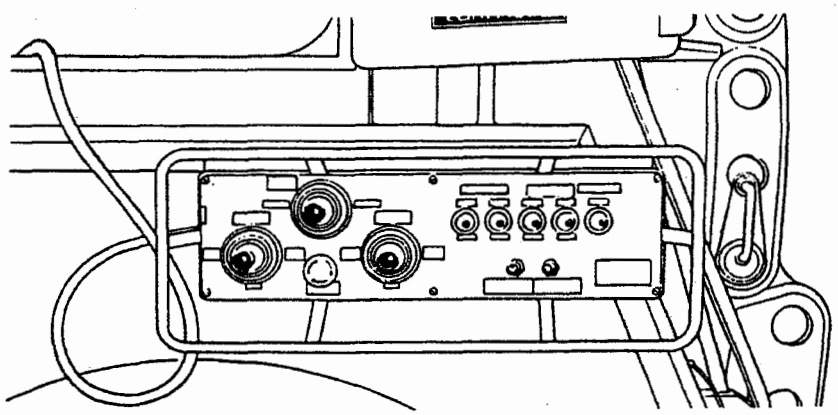


Fig 25 Main control box mounting

64 When connected, the control box (Fig 24) provides the following functions:

64.1 Push lever (1) up to raise main boom, down to lower main boom, left to slew left and right to slew right.

64.2 Push lever (2) right for recovery winch to spool rope out, left to winch in.

64.3 Push lever (3) up for main boom winch to raise hook, down to lower hook, right to extend main boom, left to retract main boom.

64.4 Push lever (4) up to extend recovery boom, down to retract boom.

64.5 Push lever (5) up to unfold recovery boom, down to fold boom.

64.6 Push lever (6) down to lower LH rear stabilizer, up to raise stabilizer.

64.7 Push lever (7) down to lower RH rear stabilizer, up to raise stabilizer.

64.8 Push lever (8) up to disengage recovery winch clutch.

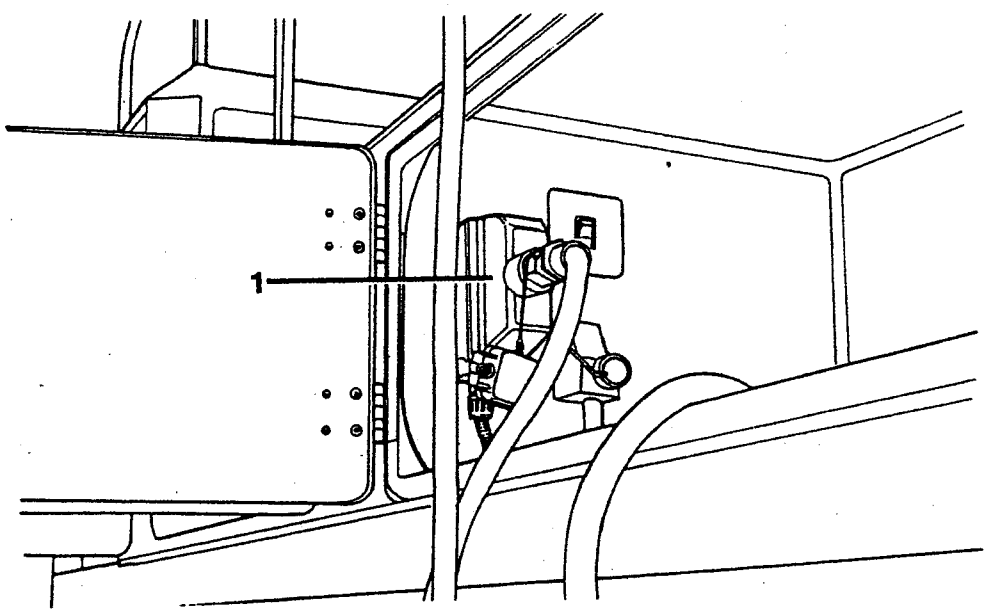
64.9 Push recovery winch switch (9) to the right for high winch speed, to the left for low speed.

64.10 Push main boom winch switch (10) to the right for high winch speed, to the left for low speed.

64.11 Press button switch (11) to 'STOP'. Button will remain in, in 'STOP' position, until twist release is operated.

Note ...

When using main, remote and main boom control boxes (electrical), left and right-hand are regarded as standing facing the rear of the vehicle.



1 Multi-pin socket

Fig 26 Multi-pin socket position (main, remote and main boom control boxes)

Remote control box (electrical)

65 When connected to the multi-pin socket (Fig 26), the following functions are provided by this remote control box (Fig 27).

65.1 Push button (1) to disengage recovery winch clutch.

65.2 Push lever (2) up to lower main boom, down to raise boom. Push lever to the right to spool rope out from the recovery winch, to the left to winch in.

65.3 Push button (3) to extend recovery boom.

65.4 Push button (4) to unfold recovery boom.

65.5 Push button (5) to raise lh stabilizer.

65.6 Push button (6) to raise rh stabilizer.

65.7 Set switch (7) up for high recovery winch speed, down for low.

65.8 Push button (8) to lower rh rear stabilizer.

65.9 Push button (9) to lower lh rear stabilizer.

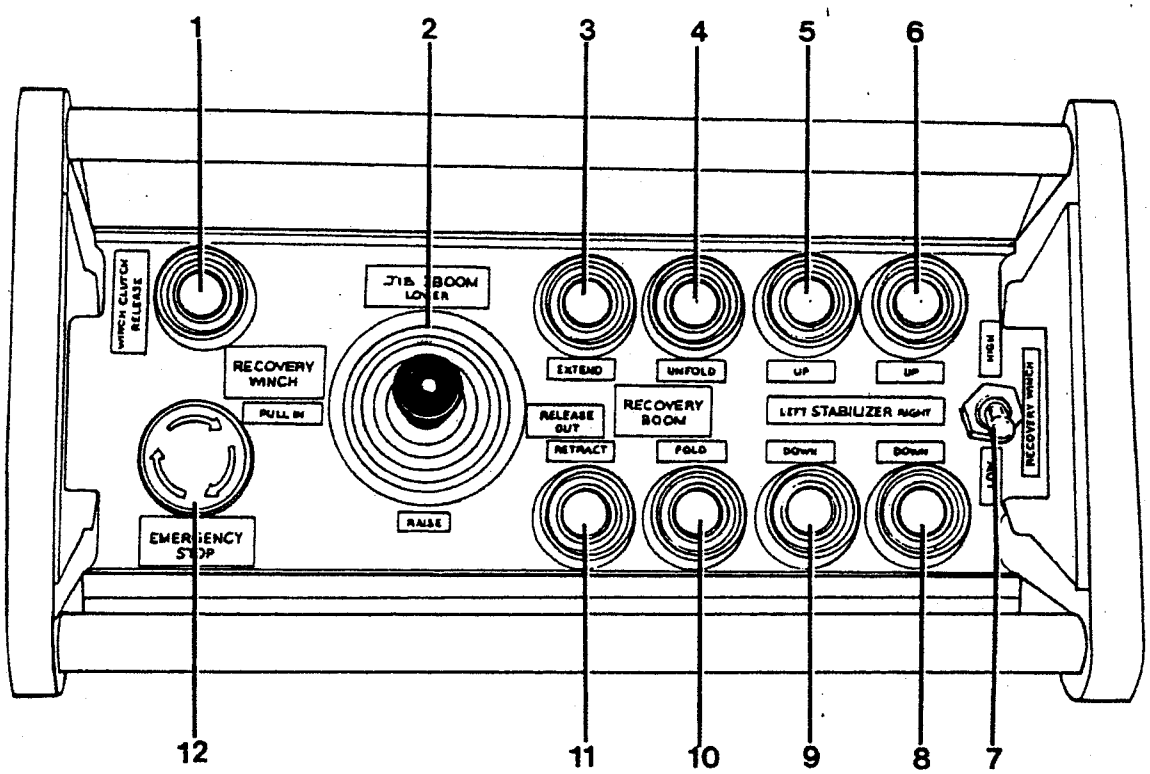
65.10 Push button (10) to fold recovery boom.

65.11 Push button (11) to retract recovery boom.

65.12 Push button (12) to STOP any function, twist to release from 'STOP' position.

Note ...

The control box plug must be disconnected from the socket before stowing the control box.



1 Recovery winch clutch control
2 Main boom and recovery winch control
3 Recovery boom control (EXTEND)
4 Recovery boom control (UNFOLD)
5 Left-hand rear stabilizer control (RAISE)
6 Right-hand rear stabilizer control (RAISE)
7 Recovery winch speed control
8 Right-hand rear stabilizer control (LOWER)
9 Left-hand rear stabilizer control (LOWER)
10 Recovery boom control (FOLD)
11 Recovery boom control (RETRACT)
12 Emergency stop control

Fig 27 Remote control box

Main boom and winch remote control box (electrical)

66 When connected to the multi-pin socket shown in Fig 26, the following functions are provided by the main boom remote control box (Fig 28):

66.1 Push lever up to lower main boom, down to raise main boom. Push lever to left to slew main boom left, push to right to slew right.

66.2 Press button to STOP any function, twist to release from 'STOP' position.

66.3 Push lever up to lower main boom hook, push down to raise hook. Push lever to left to retract main boom, to the right to extend main boom.

66.4 Push button to raise rh rear stabilizer.

66.5 Push button to lower rh rear stabilizer.

66.6 Set switch right for high recovery winch speed, left for low speed.

66.7 Push lever right to spool rope out from recovery winch, left to winch in.

66.8 Push button to disengage recovery winch clutch.

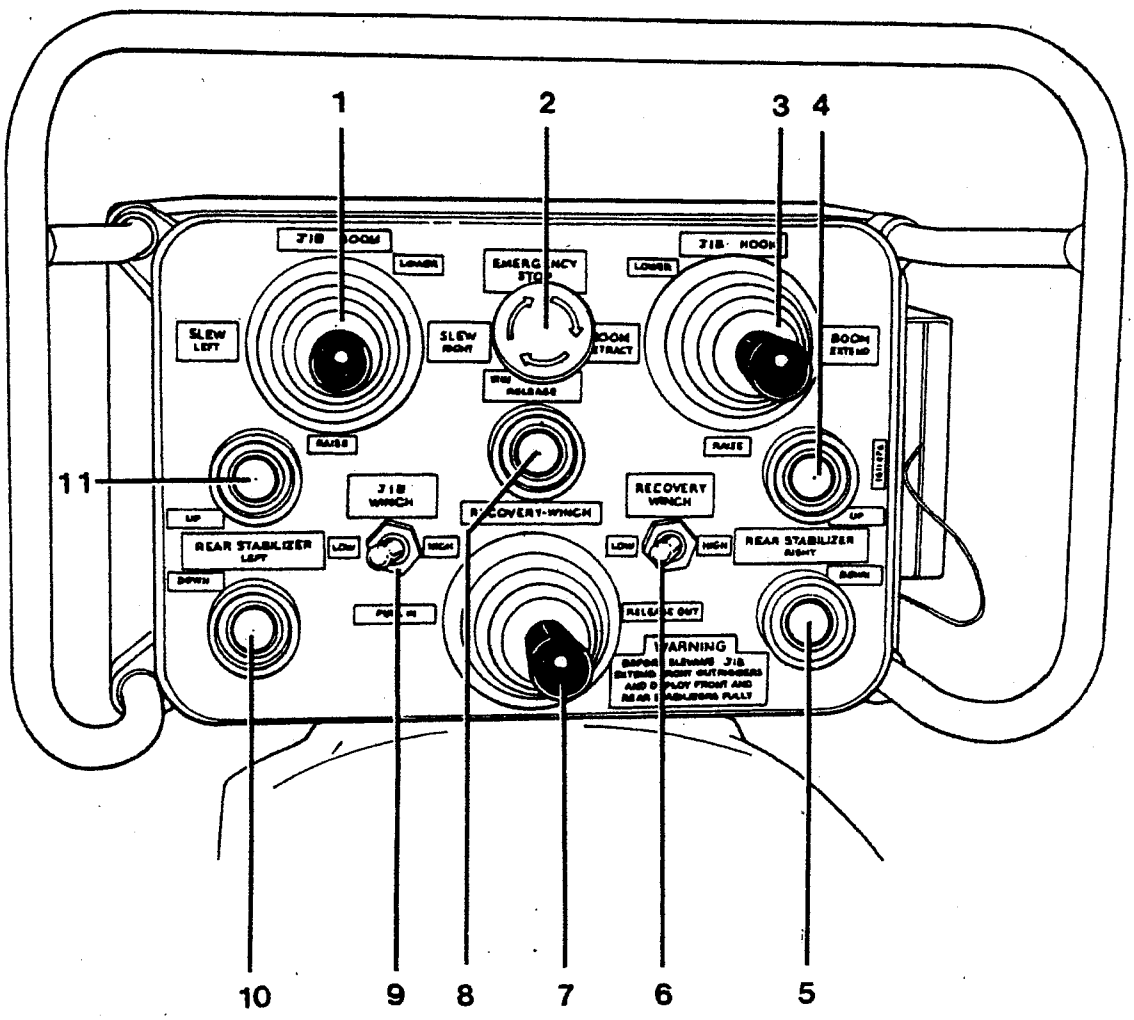
66.9 Push switch up for high main boom winch speed, push down for low speed.

66.10 Push button to lower lh stabilizer.

66.11 Push button to raise lh stabilizer.

Note ...

The control box plug must be disconnected from the socket before stowing the control box.

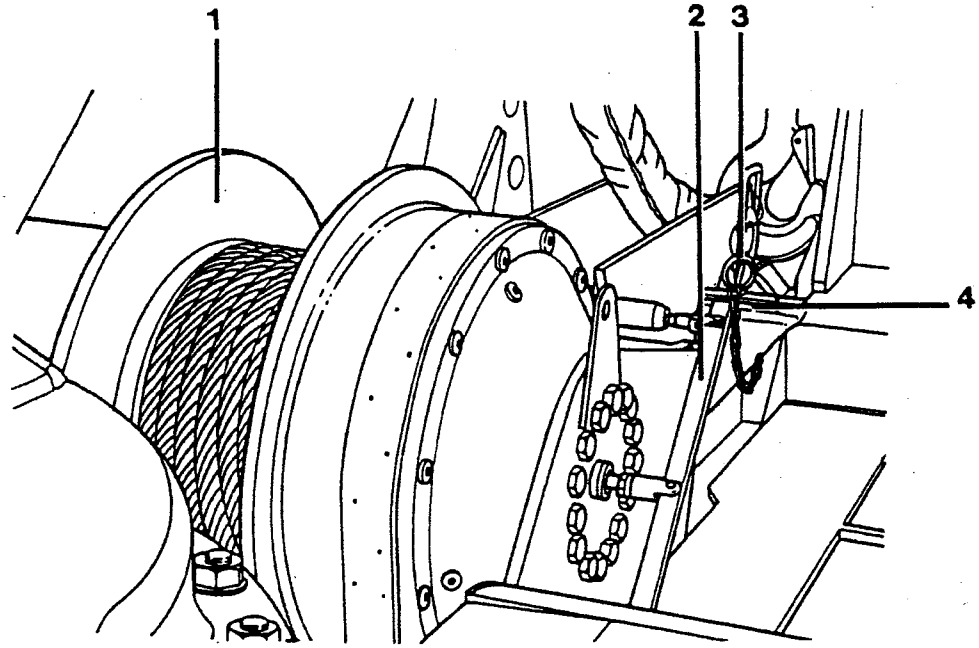


1 Main boom control
2 Emergency stop control
3 Main boom hook control
4 Right-hand rear stabilizer control (RAISE)
5 Right-hand rear stabilizer control (LOWER)
6 Recovery winch speed control
7 Recovery winch control
8 Recovery winch clutch control
9 Main boom winch speed control
10 Left-hand rear stabilizer control (LOWER)
11 Left-hand rear stabilizer control (RAISE)

Fig 28 Main boom and winch remote control box

Manually operated clutch lever for recovery winch

67 The manually operated clutch lever (Fig 29(2)) is used to engage/disengage the winch clutch. With the ringed locking pin (hairpin lock for clevis pin) (4) removed, the clutch lever (2) can be moved to the outer position, to disengage the winch clutch. With the clutch disengaged, and the fairlead tensioner disengaged, the winch rope can be spooled off the winch drum by hand. The locking pin can be inserted in either of two positions to lock the clutch lever in the inner (engaged) or outer (disengaged) position.



1 Recovery winch
2 Clutch lever
3 Clevis pin, lever lock
4 Hairpin lock for clevis pin

Fig 29 Manually operated clutch lever

EKA recovery equipment hour meter

68 Mounted on the forward panel of the main electrical junction box for the recovery equipment, found on the driver's side, is an hour meter. The purpose of this instrument is to record the total running time for maintenance and service records of the EKA recovery equipment.

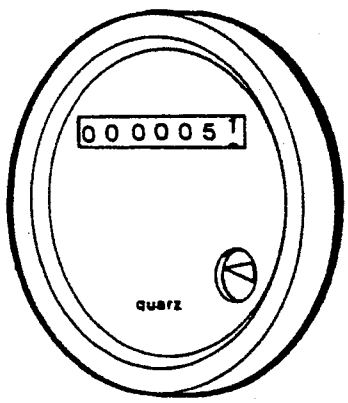
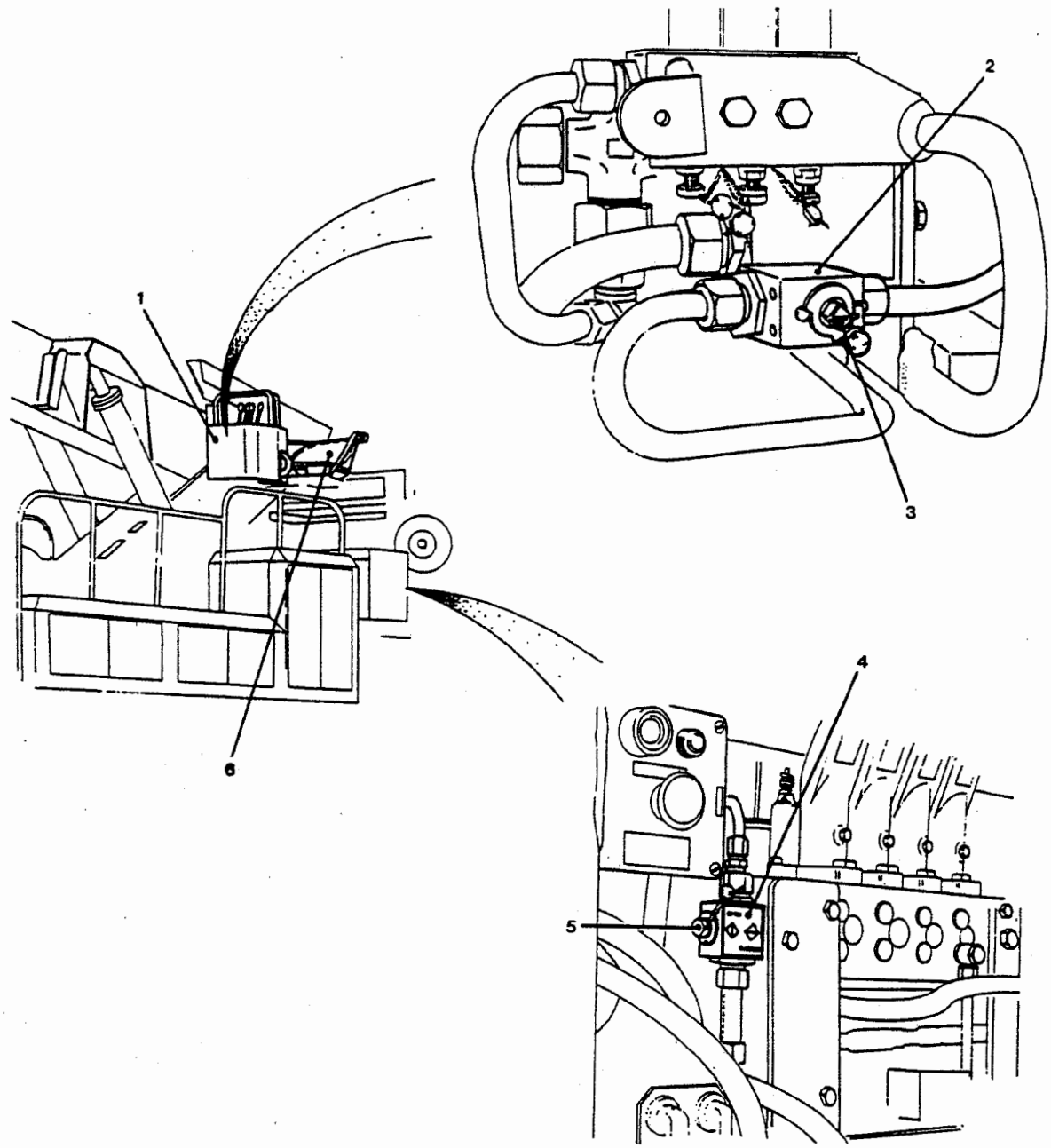


Fig 30 EKA recovery equipment hour meter

EMERGENCY CONTROLS - RECOVERY EQUIPMENT

69 Two 'emergency-only' controls on the recovery equipment can be operated under strict supervision, when electrical power has been lost, to enable deployed recovery facilities to be stowed and so allow the vehicle to be moved. The controls concerned are the normally-'OPEN' hydraulic shut-off valve cocks 'A' and 'B' (Fig 31). Cock 'A' (3) is located behind a removable hood (1) covering the manual control valves at the jib boom operator's seat (6). Cock 'B' (5) is located to the left (facing rearward) of the two banks of manual hydraulic valves below the jib boom operators seat.

70 Both valves have square-section stub spindles to fit removable handles and are wire-locked in the 'OPEN' position so that safety control of recovery equipment hydraulic pressure is provided by the emergency stop solenoid valve. Operation of any of the system emergency stop buttons, opens the solenoid valve to allow system pressure to dissipate as oil flows back to the reservoir. When cocks 'A' and 'B' are set to the 'CLOSED' position IN AN EMERGENCY, the safety effect of the emergency stop solenoid valve and the automatic safety devices are nullified and the hydraulic system remains pressurised (live). This retained pressure can be used to return recovery facilities to the 'stowed' position to allow the vehicle to be moved. With cock 'B' operated to the 'CLOSED' position, the pressure return route to the reservoir via the emergency solenoid valve is cut off and the main jib boom safety features are nullified. Setting cock 'A' to 'CLOSED' prevents system pressure loss via the bank of solenoid shut-off valves (normally operated by system automatic safety devices).



1 Hood
2 Upper shut-off valve
3 Cock 'A'
4 Lower shut-off valve
5 Cock 'B'
6 Operator's seat

Fig 31 Emergency shut-off valves - cocks 'A' and 'B'

CHAPTER 3

OPERATING INSTRUCTIONS

CONTENTS

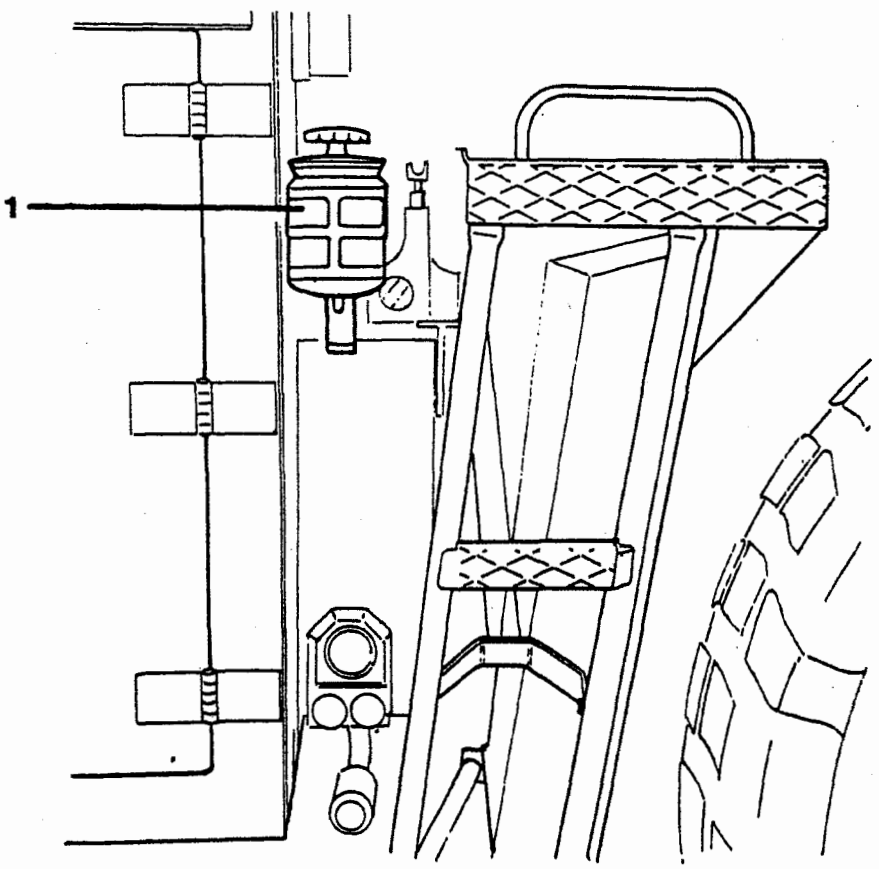
COLD START (START PILOT)

1 To start the engine in very cold conditions, proceed as follows:

1.1 Turn the pump handle (Chapter 2, Fig 7) to unlock and withdraw the plunger.

1.2 Fully depress the accelerator pedal and turn the ignition key to crank the engine. Operate the plunger of the cold start pump at approx. one inward stroke per second, continue pumping with the engine cranking until the engine starts. To sustain running in extreme cold conditions, it may be necessary to continue pumping at a reduced rate for a short period after the engine has fired.

1.3 When the engine achieves sustained running, even if all cylinders are not firing, discontinue pumping. When the engine is running satisfactorily, fully depress the plunger and twist clockwise to lock in position. The start pilot reservoir is positioned on the driver's side (RHS) of the vehicle attached to the lower CES locker (Fig 1 (1)).



1 Reservoir

Fig 1 Start pilot reservoir location

CLUTCH OPERATION

2 Incorporated in the clutch assembly is a clutch brake disc, (clutch stop), the purpose of which is to stop the gears in the gearbox from rotating in order to engage the selected gears easily and quickly when stationary.

3 The clutch brake operates during the final 1/5 of clutch pedal travel. Therefore, only the first 4/5ths of clutch pedal movement should be used for upshifting and downshifting during travelling. The clutch pedal should never be fully depressed before the gearbox is put into neutral. If the clutch brake is applied with the gearbox still in a gear, a reverse load will be applied to the gears, thereby making it difficult to get the gearbox out of the engaged gear. At the same time, it will have the effect of trying to stop or decelerate the vehicle, consequently, rapid wear of the friction discs will result necessitating frequent replacement. In addition, considerable heat will be generated which will be detrimental to the release bearing and the transmission front bearing.

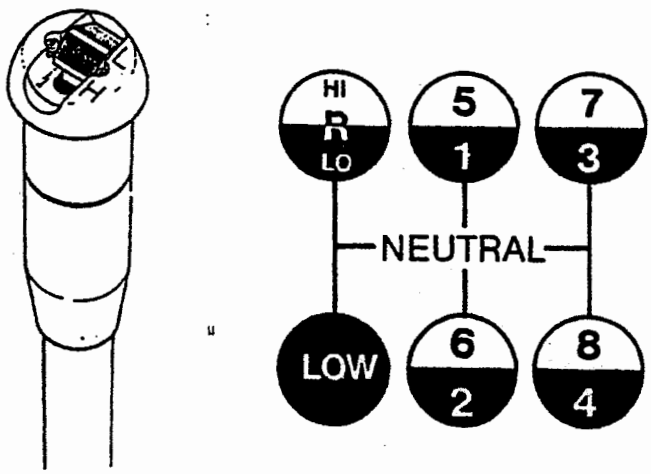
GEAR LEVER

4 The gear lever has an air switch, (Range Change) white in colour, incorporated into the lever knob. This is a pre-select switch to operate the range change control.

GEARBOX

General

5 The Fuller gearbox has nine progressive forward ratios and two reverse. It consists of a five-speed front section and a synchronised two-speed range section. One ratio ('LOW' Fig 2) in the front section is used only in 'LO' range as a starting gear. The remaining four ratios are used once with the transmission in 'LO' range, and once again with the transmission in 'HI' range. All shifts are made with the gear lever. The Range Change switch is used only once while shifting from 4th 'LO' to 1st 'HI' (ie 4th to 5th); and only once during the downshift sequence (1st 'HI' to 4th 'LO'). In effect, the gearbox is an 8+1 transmission, 8 highway ratios + a low or starting gear. The 8 highway ratios are shifted in a repeat 'H' pattern.



L = 'LO' position H = 'HI' position
Shift to 1-2-3-4 in 'LO' position
Shift to 5-6-7-8 in 'HI' position

Fig 1 Gear change lever and shift pattern

WARNING

THE FOLLOWING MAXIMUM SPEEDS, WHERE CONDITIONS PERMIT, MUST NOT BE EXCEEDED:

SOLO RECOVERY VEHICLE:	**70 KPH (43 MPH)**
RIGID TOW WITH BRAKED CASUALTY UP TO 58 TONNE GROSS TRAIN WEIGHT:	**48 KPH (30 MPH)**
RIGID TOW WITH UN-BRAKED CASUALTY UP TO 58 TONNE GROSS TRAIN WEIGHT:	**32 KPH (20 MPH)**

Upshifting

6 To upshift, proceed as follows:

6.1 Ensure that the gearshift is in neutral.

6.2 Start engine.

6.3 Wait for the vehicle's air system to achieve normal line pressure.

6.4 Ensure that the Range Change switch is in 'LO' (Low range) position; this is important.

6.5 Shift gear lever to LOW gear ratio and start the vehicle moving.

6.6 Shift progressively through 1st, 2nd, 3rd and 4th gear ratios.

6.7 When in 4th gear and ready for the next upshift, move the Range Change switch to the 'HI' (High range) position and shift the gear lever to the 5th gear ratio position.

NOTE As the gearshift lever passes through the neutral position, the gearbox will automatically shift from low range to high range.

6.8 With the gearbox in high range, make progressive gear shifts upwards from 5th to 6th to 7th and 8th.

7 Downshifting

To downshift, proceed as follows:

7.1 When downshifting, move the lever from 8th gear through each successive lower ratio to 5th gear.

7.2 When in 5th gear and ready for the next downshift, move the Range Change switch to 'LO' (Low range) and move gear lever to the 4th gear position.

NOTE

As the gearshift lever passes through the neutral position, the gearbox will automatically shift from high range to low range.

7.3 With the gearbox in low range, downshift through the remaining ratios, 4th, 3rd, 2nd and 1st.

CAUTION

Do not shift from high range to low range at high vehicle speeds and do not make range shift with vehicle in reverse gear.

NOTE

Pre-select all 'Range Changes'. Range will not change if selected when gear lever is in the selected gear.

G ar changing - general

8 General instructions for gear changing are as follows:

8.1 Always use 'LOW' gear to start vehicle.

8.2 Use normal double-clutch action between shifts.

8.3 Range changes are automatic following pre-selection.

8.4 Range changes are made only when shifting from 4th ratio to 5th ratio or from 5th ratio to 4th ratio.

8.5 Use a light touch when shifting - do not slam or jerk the lever.

8.6 When shifting into 'LOW' or 'R' (Reverse) with the vehicle stationary, quickly engage and disengage the clutch to facilitate gear engagement.

NOTE

Allow for an extended time lapse when range changing from 'HIGH' to 'LOW', to minimise the possibility of a 'false neutral' occurring. In the event of a 'false neutral' occurring immediately reduce the road speed by applying the Service brakes, select neutral and re-select the correct gear.

GEAR	RATIO's	% STEP
8	0 73	37
7	1 00	38
6	1 38	41
5	1 95	43
4	2 79	37
3	3 82	38
2	5 28	41
1	7 47	68
LOW 12 56		
HI REVERSE 3 43		
LOW REVERSE 13 14		

Fig 2 Gear ratios

THIRD DIFFERENTIAL LOCK

CAUTIONS

(1) Do not activate switch (push in) and engage the differential 'lock' while one or more wheels are actually spinning or slipping as damage to the gearing will result.

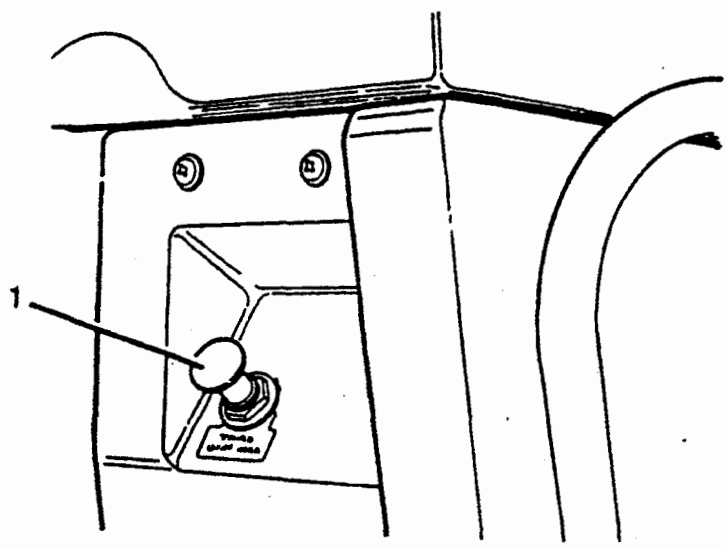
(2) Do not spin wheels with third diff lock unlocked as 'spin out' damage will result. This can happen in a matter of seconds.

(3) When driving in good road conditions, the third diff lock must always be in the un-locked condition (disengaged).

9 The third differential lock is DRIVER CONTROLLED and is used on double drive axles to provide a FIXED DRIVE between the two axles. The interaxle differential (3rd diff) can be 'locked out' providing additional traction for the vehicle when negotiating or approaching rough and slippery terrain.

NOTE

With the inter-axle differential 'locked out', no differential action occurs between the two axles.



1 'THIRD DIFF LOCK' switch

Fig 4 Third differential lock switch

10 To operate third diff lock when vehicle is stationary, proceed as follows:

10.1 Select low gear.

10.2 Press in the switch marked 'THIRD DIFF LOCK' (Fig 4(1)). A warning light will illuminate on instrument panel (Chapter 2, Fig 2b(1)).

10.3 Commence driving in low range.

11 To operate third diff lock when vehicle is moving and approaching slippery or poor road conditions, proceed as follows:

11.1 Press in the switch marked 'THIRD DIFF LOCK' (Fig 4(1)). The red warning light will illuminate on instrument panel (Chapter 2, Fig 2b(1)).

11.2 At the same time ease off momentarily on accelerator pedal (this action will engage the diff lock).

11.3 Proceed with caution.

12 To disengage (unlock) the third diff lock, proceed as follows:

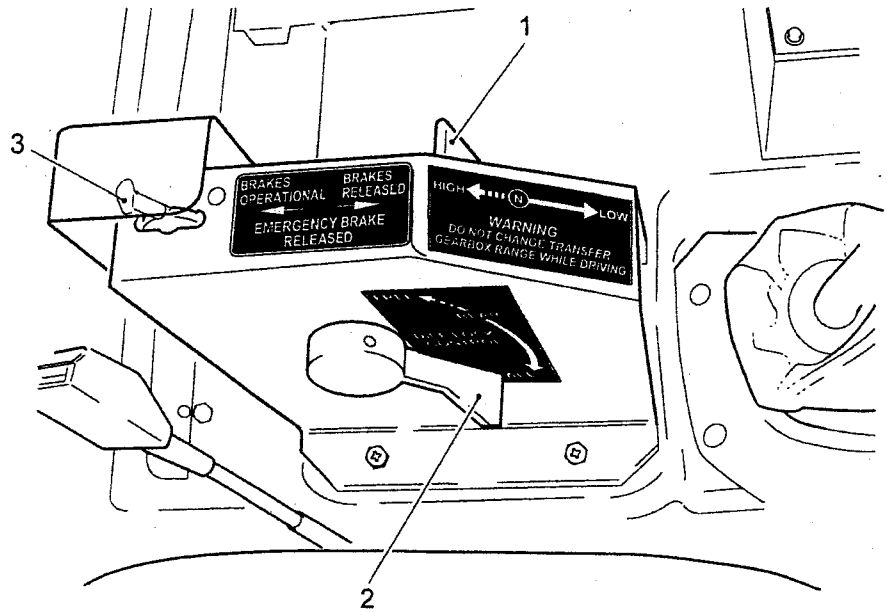
12.1 Pull out the switch marked 'THIRD DIFF LOCK' (Fig 4(1)). The red warning light will be extinguished on the instrument panel (Chapter 2 Fig 2b(1)) when the diff lock disengages.

12.2 Ease off momentarily on accelerator pedal (this action will disengage the diff lock).

12.3 Resume safe speed.

DIFFERENTIAL LOCK

3 A differential lock (cross-axle) is provided on the front axle and both rear axles. Its purpose to prevent wheel spin under adverse operating conditions by locking out the differential earing and providing a solid drive to both wheels. Operation of the differential lock is initiated sing the Diff Lock Control lever (Fig 5 (2)).



1 Transfer gearbox control lever
2 Diff Lock Control lever
3 Emergency Brake Release lever

Fig 5 Differential lock control lever

Differential lock operation

CAUTION

To operate cross-axle differential locks the vehicle must be stationary.

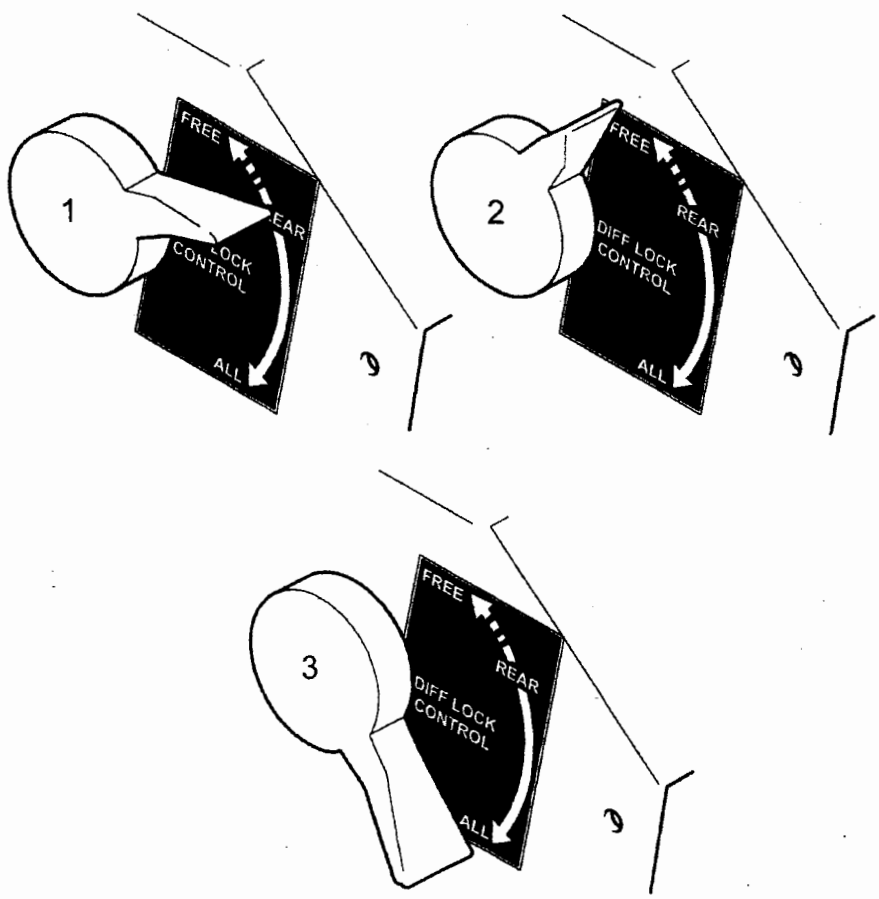
14 To operate the differential lock, proceed as follows:

14.1 STOP vehicle and engage low gear.

14.2 Select diff lock requirement. With the control lever fully up in position 2 (Fig 6), the diff lock is disengaged and all axles are FREE. With the control lever in position 1 (Fig 6), the rear axle diff locks are engaged and warning lights will illuminate on instrument panel (Chapter 2, Fig2b (3 and 4)). When the lever is fully down in position 3 (Fig 6), all axle diff locks are engaged and a further warning light will illuminate on the instrument panel (Chapter 2, Fig 2b (2)).

14.3 Commence driving in low range, proceeding cautiously over poor road conditions.

14.4 Return Diff Lock Control lever to disengaged ('FREE') position (2 in Fig 6) as soon as possible.



1 Diff lock on rear axles only position
2 Diff lock disengaged. 'FREE'
3 Diff lock on all axles

Fig 6 Diff lock control lever movement

TRANSFER GEARBOX CONTROL

CAUTIONS

(1) It is important that range changes are not made until the vehicle is stationary.

(2) To avoid possible 'wind up' between front and rear axles, disengage the front axle drive as soon as travelling conditions permit.

15 The transfer gearbox control lever (Fig 7 (1)) is used to engage/disengage from the front axle wheels, proceed as follows:

15.1 For 'OFF ROAD' use STOP the vehicle and move control lever to 'LOW' position to engage front axle drive.

15.2 For 'HIGHWAY' use STOP vehicle and move control lever to 'HIGH' position to disengage front axle drive.

NOTE

When in transfer gearbox 'LOW' range, 8th gear is inhibited.

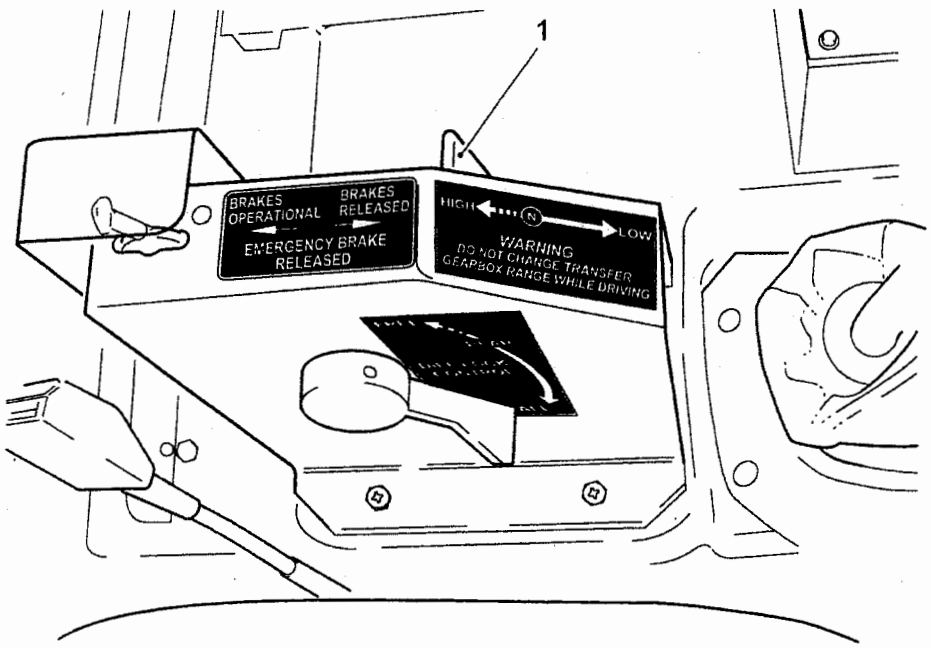


Fig 7 Transfer gearbox control

EMERGENCY BRAKE RELEASE

16 In the event of a failure or fault condition in the spring brake system, the vehicle brakes will be applied and will remain on. To release the spring brakes, move the Emergency Brake Release lever (Fig 8 (1)) to the 'BRAKES RELEASED' position. The hand control valve lever (Fig 9) now becomes inoperative.

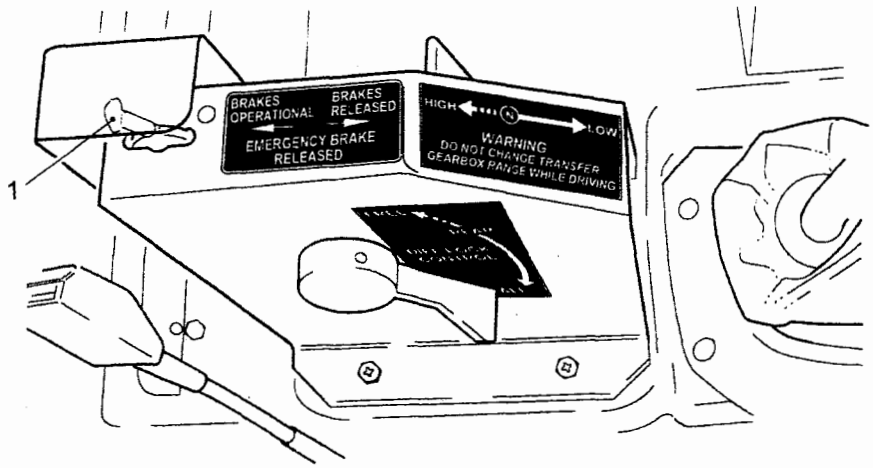


Fig 8 Emergency brake release

HAND CONTROL VALVE LEVER

17 The hand control valve lever (Fig 9) is installed to the left and below the steering wheel and when in the horizontal position, the vehicle brakes are 'ON'. To release brakes, lift centre detent ring and raise lever to full extent of quadrant.

18 Graduated secondary braking is also obtained with this lever. Move towards 'PARK' for increased secondary braking.

EXHAUST BRAKE

CAUTIONS

(1) Do not operate the exhaust brake with engine idling for more than 30 seconds.

(2) Do not operate the exhaust brake with the throttle open.

19 The exhaust brake is actuated by the initial movement of the Service (footbrake) pedal and can be isolated using the switch on the dashboard.

NOTE

The exhaust brake will not prevent the engine overspeeding.

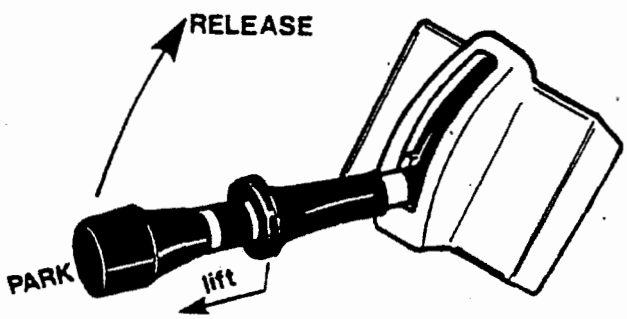


Fig 9 Hand control valve lever

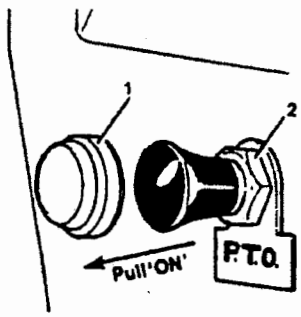
POWER TAKE OFF

CAUTION

A minimum air pressure of 5.7 bar (85 lbf/in^2) is required before engaging the power take-off (PTO).

20 The PTO switch (Fig 10(2)) can be found below and to the right of the steering wheel. Before engaging the PTO, ensure that the vehicle hand control valve lever (Fig 9) is in the 'PARK' position and the gear change lever in neutral. The body main hydraulic feed line valve must be open.

21 Start the engine, depress the clutch pedal and pull out the PTO switch (Fig 10(2)). The PTO warning light (1) will illuminate to show that the PTO pump is engaged and the clutch pedal can be released.



1 Power take-off warning light (RED) 2 Power take-off switch

Fig 10 Power take-off light and switch

22 To increase the PTO pump speed, operate the engine speed hand throttle lever (Fig 11) mounted below the driver's seat. Lift the hand throttle lever until 1200 rpm is indicated on the engine tachometer (Chapter 2, Fig 1(11)). Then engage 'BODY LIVE'. The EKA winching equipment and front mounted winch can now be operated after release of all safety locks.

23 When the recovery equipment and/or front winch are no longer required and are secured back into the vehicle's travelling mode, disengage 'BODY LIVE', throttle back engine (press lever down) to normal tick-over RPM, disengage clutch, press in the PTO switch to disengage the PTO. Note that the PTO warning light extinguishes, and switch off.

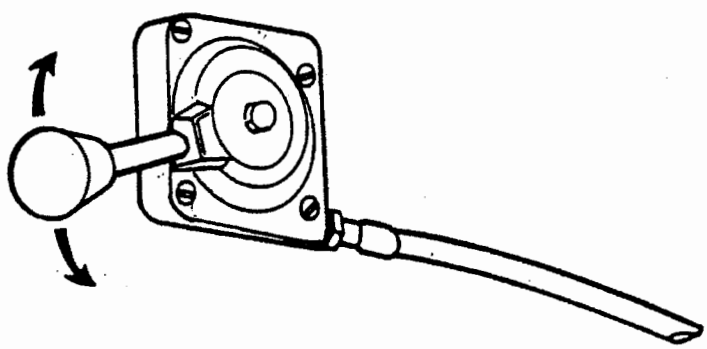


Fig 11 Hand throttle for engine speed (rpm)

TILTING THE CAB

WARNING ...

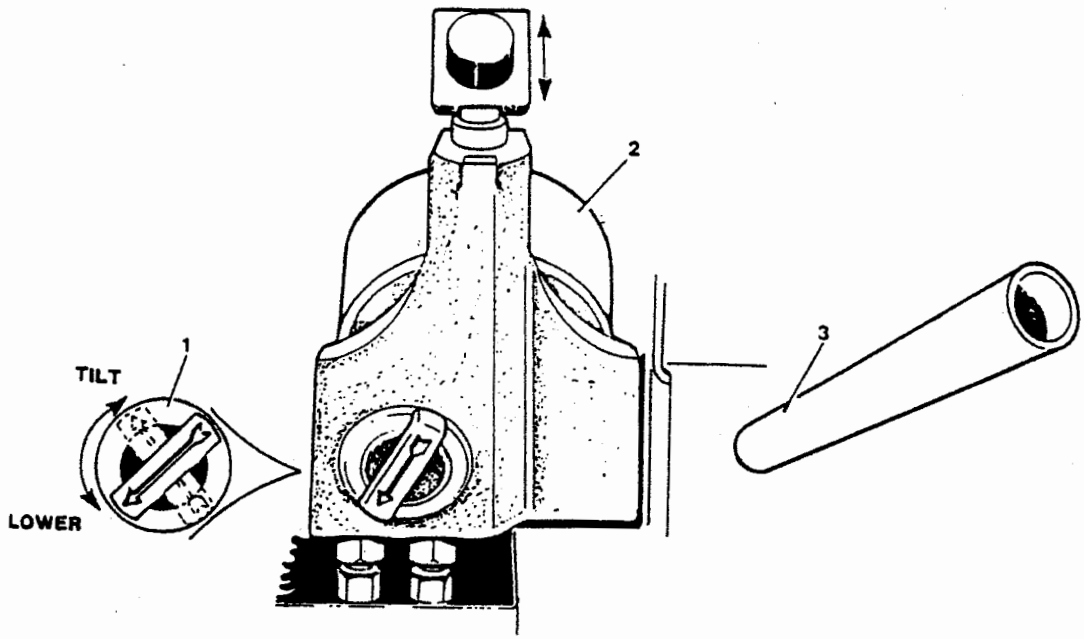
DO NOT WORK UNDER AN UN-PROPPED CAB.

CAUTION ...

The cab doors must be closed before tilting. It is essential to release the front toggle catches and raise the grille (Fig 13(1)).

24 To tilt the cab, proceed as follows:

24.1 Stop engine, select neutral, and ensure that parking brake is applied. Remove the cab tilt pump handle (Fig 12(3)) from beneath the passenger's seat.



1 Pump valve positions 2 Cab tilt pump 3 Cab tilt pump handle

Fig 12 Cab tilt pump

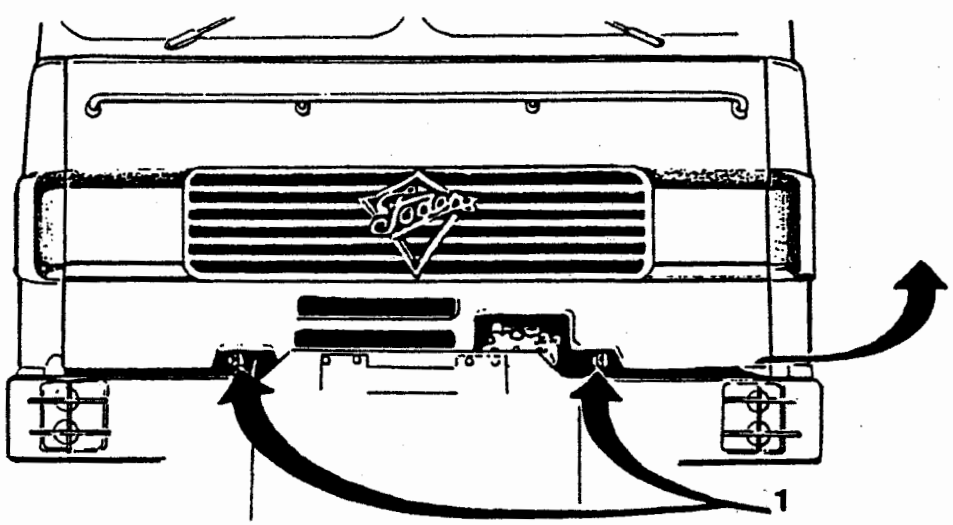


Fig 13 Location of cab toggle catches

24.2 Fit the handle to the pump mounted between the ladder and locker, driver's side. Turn the pump control valve to the tilt position, (Fig 12(1)) clockwise (pointing upwards), and operate the pump handle. The locks securing the cab rear suspension units (Fig 14) will open and the cab will rise.

24.3 Pumping should continue until the cab reaches the required angle which should coincide with any of the three setting holes seen in the cab safety prop (Fig 15). This prop is located between the front wheel, passenger side, and the chassis alongside the front ram.

24.4 With the cab locked into the lowered position, the prop clevis pin is stowed in the lowest hole of the prop (Fig 15).

24.5 Withdraw the chained clevis pin from the stowed position, line up the appropriate hole with the fixed hole seen at the top of the ram and re-insert clevis pin. The clevis pin has a spring loaded detent catch and must be pushed fully home to secure it.

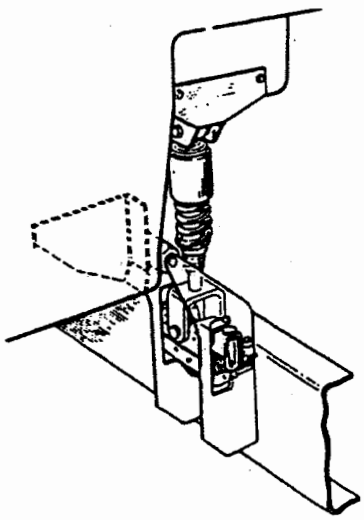


Fig 14 Cab suspension lock

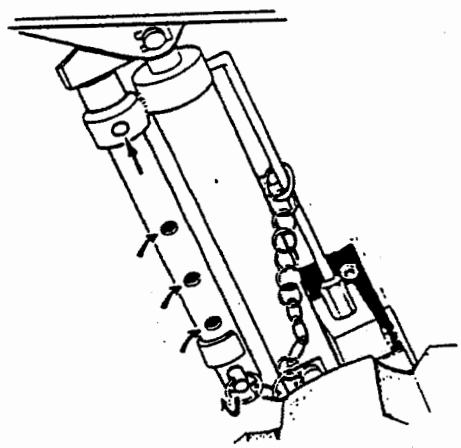


Fig 15 Cab tilt safety prop

LOWERING THE CAB

25 To lower the cab, proceed as follows:

25.1 Release the safety prop. and stow the clevis pin. Select 'Lower' on the cab tilt pump (Fig 12(2)) (ie pointing downwards), and operate the pump. When the cab has returned to the horizontal, operate the pump handle gently until the cab locks are fully closed.

25.2 Using grille strap provided, lower the front grille and secure with the toggle catches (Fig 13).

TYRE INFLATOR

WARNINGS ...

(1) THROUGHOUT THE TYRE INFLATION PROCEDURE, THE OPERATOR MUST NOT STAND IN THE LIKELY TRAJECTORY OF ANY PART OF THE WHEEL OR RIM IN THE EVENT OF A TYRE BURST.

(2) IF A TYRE IS TO BE INFLATED WITH THE WHEEL ASSEMBLY OFF THE VEHICLE, STAND THE WHEEL UPRIGHT LEANING AGAINST A WALL, OR SIMILAR, WITH THE DETACHABLE COMPONENTS OF THE WHEEL ASSEMBLY FACING THE WALL, THEN PROCEED WITH TYRE INFLATION.

CAUTION ...

Ensure that tyres are inflated to correct pressure to suit operating conditions.

26 The vehicle is equipped with a tyre inflator (Fig 16) mounted on the chassis, driver's side, between the bottom locker and ladder. A flexible hose, also supplied, is stowed in a locker. Operate inflator as follows:

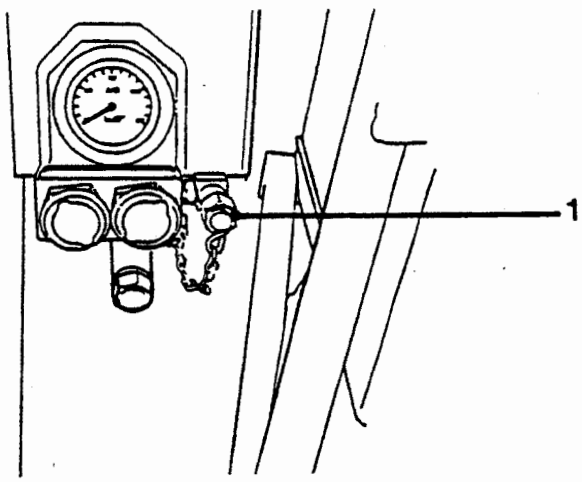
26.1 Unscrew the chained cap from the connection.

26.2 Connect the air hose, by screwing onto connection (1).

26.3 Start the engine and set the hand throttle (Fig 11) to enable the engine speed to maintain sufficient pressure in the air system to inflate the tyre to the recommended pressure (Chapter 4 refers).

26.4 Press the 'INFLATE' button on the RHS of the tyre inflator until the correct tyre pressure is reached. This will be indicated on the gauge when the 'INFLATE' button is released. Should the pressure be too high, press the 'DEFLATE' button on the LHS until the correct pressure is reached, (indicated when 'DEFLATE' button is released).

26.5 On completion of inflation, remove the flexible air pipe and replace the cap. Throttle back engine speed to normal tick-over rpm.



1 Inflator hose connection

Fig 16 Tyre inflator

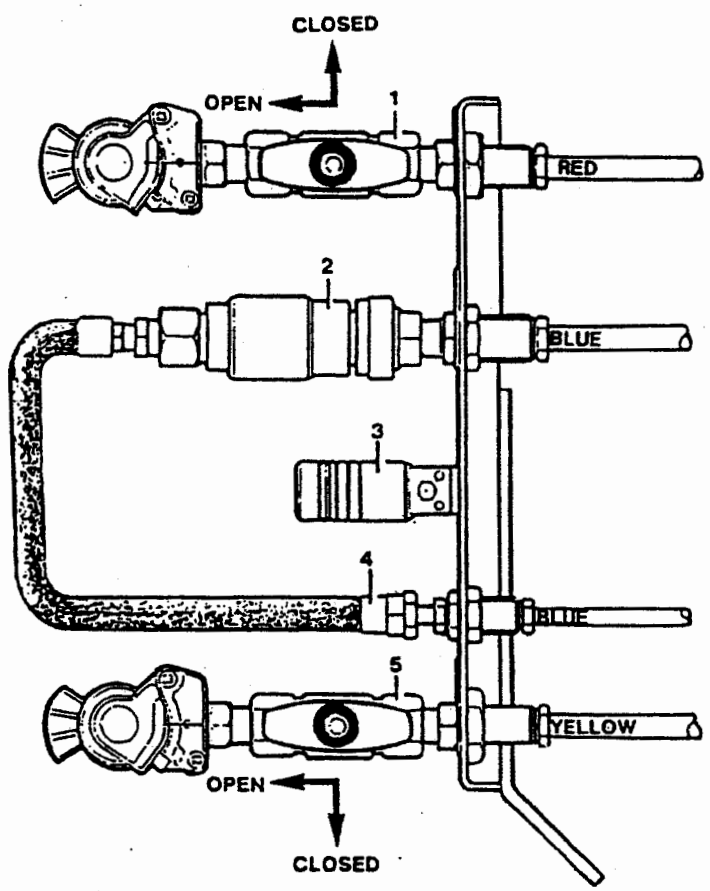
REAR TRAILER BRAKE COUPLINGS

CAUTION ...

Only air lines of the same colour (ie red to red) should be connected together.

27 Air pressure couplings are fitted at the rear of the vehicle to connect the air system to a second vehicle or trailer. When two vehicles or a trailer and vehicle are thus coupled, the driver of the front vehicle controls the brake of the vehicles in train.

27.1 When the towed vehicle or trailer has a 2-line system, the emergency (red) and service (yellow) couplings are used (Fig 17(1 and 5))). The 3rd line, (4) secondary (blue) coupling must be left in position, otherwise the secondary braking system is not effective. The emergency and service lines are fitted with palm type couplngs. To make a connection, first swivel the protective cover away from the seal, offer the palm end attached to the flexible air line at 90 degrees to the fixed palm end. Lead the spigot of the 'free' palm end behind the retaining plate of the fixed palm end and turn through 90 degrees until the spigot abuts onto the stop of the fixed coupling. Turn the shut-off cock handle until it is aligned to the air line (Fig 17) and ensure that coupling is air tight.



1 RED - emergency line
2 BLUE - secondary line
3 BLUE - dummy coupling
4 BLUE - 3rd line (secondary)
5 YELLOW - service line

Fig 17 Rear trailer brake couplings

27.2 To disconnect the couplings, close the shut-off cocks (handles at right angles with pipe - Fig 17), and break the seal by turning the spigot of the 'free' palm end from behind the plate of the fixed palm end. Return the cover plate.

Note ...

A small amount of compressed air will be expelled when the couplings are disconnected. If the leak is persistent, the cocks have not been closed correctly.

27.3 If a towed vehicle or trailer has a 3-line system, the 3rd line (blue) (2 and 4) couplings must be connected in addition to the emergency and service lines. Disconnect the return hose from the secondary line (2) trailer coupling and make a connection with the dummy coupling (3). Connect the towed vehicle's secondary line (blue) male coupling into the towing vehicle's now empty female socket. Secondary line connections are of the tapered, self-sealing plug type. To release (or re-connect), align outer sleeve groove with fixed peg and push sleeve onto peg stop. Withdraw (or insert) tapered plug and release outer sleeve. If a re-connection is being made, give the outer sleeve a slight turn to mis-align peg and groove to ensure that the tapered plug insert is secure. This type of coupling is self-sealing and when connected, the air supply is made.

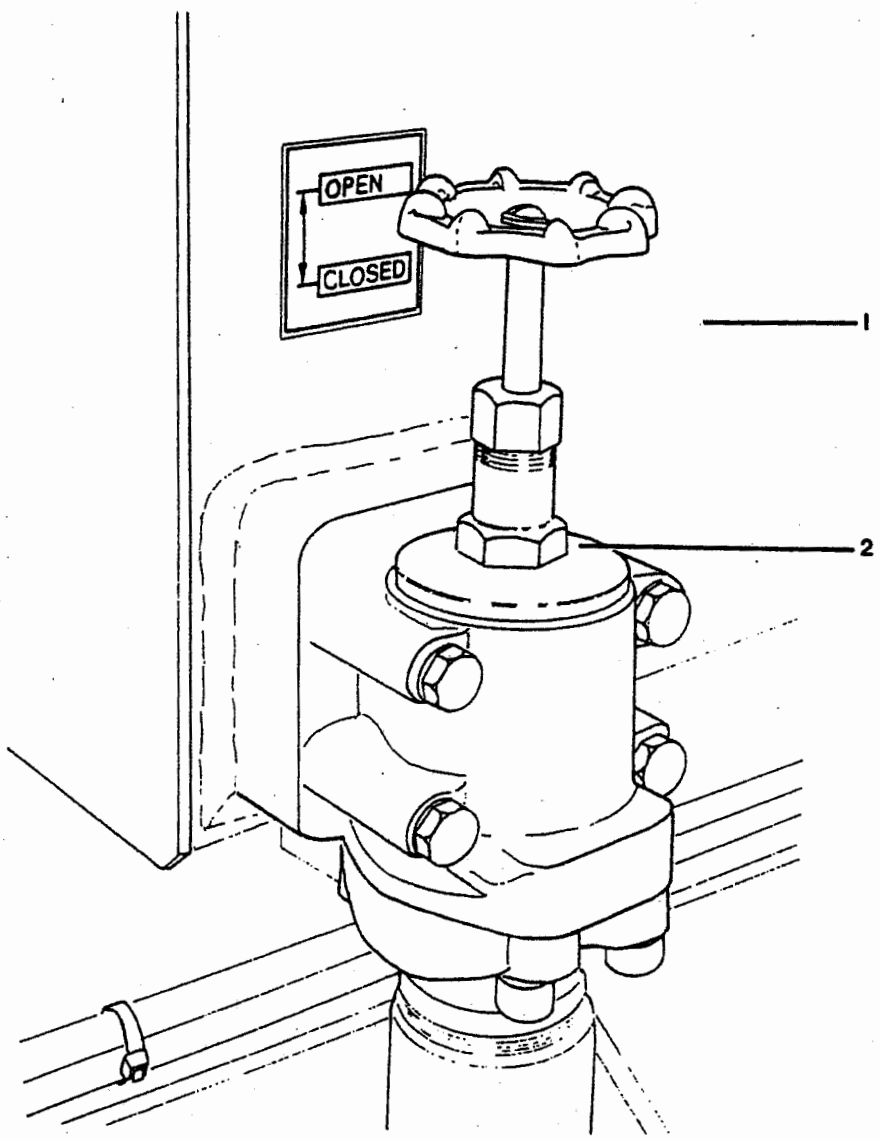
FRONT WINCH OPERATION

WARNINGS ...

(1) DO NOT ALLOW THE ROPE ANGLE TO EXCEED 15 DEGREES EITHER SIDE OF THE WINCH CENTRE LINE WHEN WINCHING FROM THE FRONT.

(2) OPERATIONS WITH LOADED ROPES ARE POTENTIONALLY DANGEROUS. STAND WELL CLEAR OF VEHICE DURING WINCHING OPERATIONS.

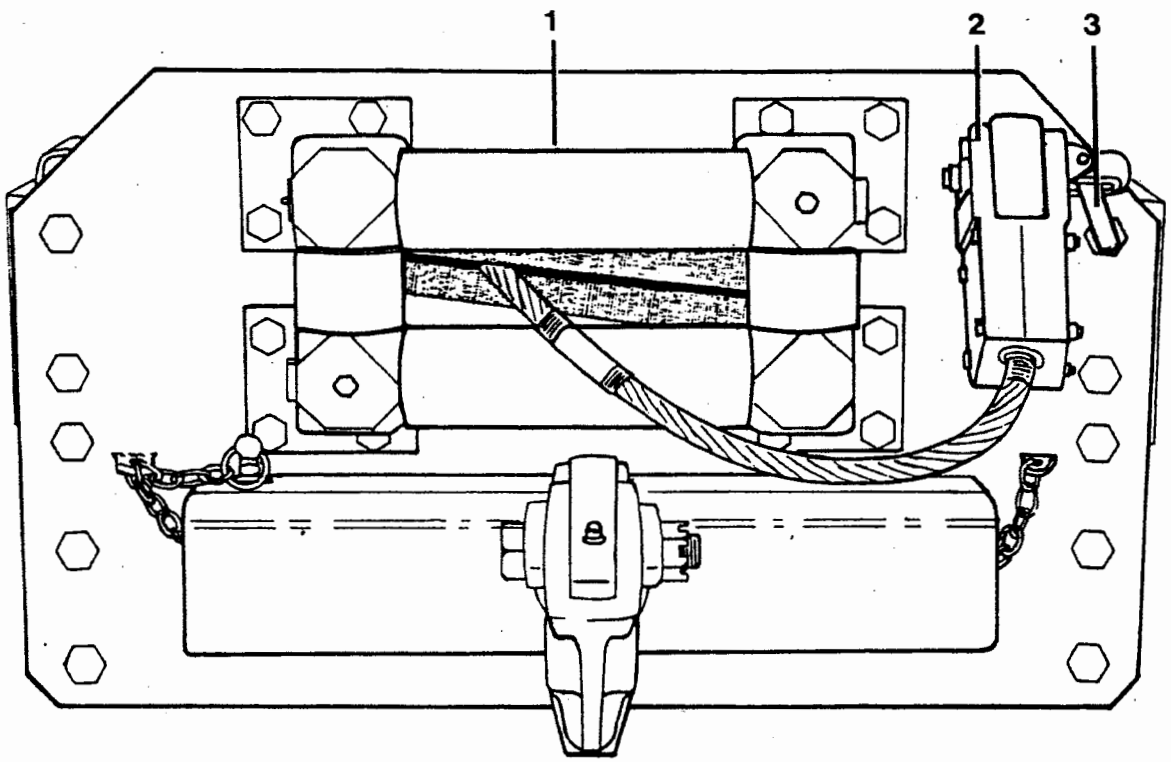
28 Ensure that the body main hydraulic feed line valve is fully 'OPEN' (Fig 18). This valve is mounted on the forward side of the hydraulic oil tank, passenger side of vehicle.



1 Hydraulic oil tank 2 Main hydraulic valve

Fig 18 Main hydraulic valve location

28.1 Release winch rope from anchorage by withdrawing jaw locking pin (Fig 19(3)).



1 Winch 2 Winch rope jaw 3 Winch rope jaw locking pin

Fig 19 Front winch

28.2 With engine idling, parking brakes applied and main gearbox in neutral position. Depress clutch pedal and pull PTO button switch on and note PTO warning light illuminates (Fig 10).

28.3 Release clutch pedal gently and set hand throttle control (Fig 11) until 1200 rpm is seen on the engine tachometer.

28.4 Press 'BODY ON' switch mounted in cab (Chapter 2, Fig 1(27)), note green 'BODY LIVE' light is lit.

28.5 Switch on front winch panel (Chapter 2, Fig 17) and note that green 'POWER ON' light illuminates.

28.6 To pay out winch rope, select 'FREE SPOOL' 'YES' position on front winch control panel and 'FREE SPOOL' warning light will extinguish.

Note ...

When selecting 'FREE SPOOL', the winch clutch will not disengage if there is any tension on the rope. To release clutch, operate 'WINCH OUT' switch intermittently with 'FREE SPOOL' 'YES' selected.

28.7 To winch out, put 'FREE SPOOL' switch in 'NO' position. Move toggle switch to 'WINCH OUT' position. The red 'FREE SPOOL' 'NO' light illuminates.

Note ...

Do not winch out unless there is sufficient tension on the rope to prevent loose coils forming.

28.8 To winch in, put 'FREE SPOOL' switch in 'NO' position and move toggle switch to 'WINCH IN' position.

28.9 The following points are to be observed when using the front recovery winch:

28.9.1 Always align the vehicle to the anchor point whenever possible.

28.9.2 Never leave less than five (5) full turns of rope on the bottom layer.

28.9.3 Use the winch controls smoothly, avoid snatching the rope.

28.9.4 Do not leave the rope spooled badly and under tension. Run the rope off and respool evenly to avoid kinking.

28.9.5 Only personnel directly connected with recovery operation to be present.

29 The front winch is fitted with a multiplate brake, spring applied and hydraulically released when hydraulic power is applied to the winch motor. A spring-applied, air pressure released clutch must be operated (released) to enable winch 'FREE SPOOL'.

MAIN RECOVERY WINCH OPERATION USING MAIN CONTROL BOX

WARNINGS ...

(1) CLEAR ALL UNAUTHORISED PERSONNEL FROM RECOVERY AREA DURING RECOVERY OPERATIONS.

(2) OPERATIONS WITH LOADED ROPES ARE POTENTIALLY DANGEROUS. STAND WELL CLEAR OF VEHICLE DURING WINCHING OPERATIONS.

CAUTIONS ...

(1) Ensure the winch rope adaptor jaw is disconnected from the folding boom before attempting to unfold the recovery boom. Reconnect rope adaptor only after recovery boom is fully stowed.

(2) The folding recovery boom must be lowered to the end of its travel, on to its mechanical stop, before attempting to load a casualty.

(3) When retracting recovery boom extension box, carry out retraction slowly and only until the extension lock can be inserted through rh side of folding boom. Failure to observe this procedure could result in over-retraction, permitting the locking bar caps to clash, with possible consequential damage to the equipment.

(4) When using main recovery winch, never allow rope to become slack between fairlead and winch drum.

(5) Ensure that folding boom does not contact ground during winching. On completion of recovery operations, ensure that folding boom mechanical stops are free of dirt/mud.

30 To operate the main winch (Fig 20), proceed as follows:

Note ...

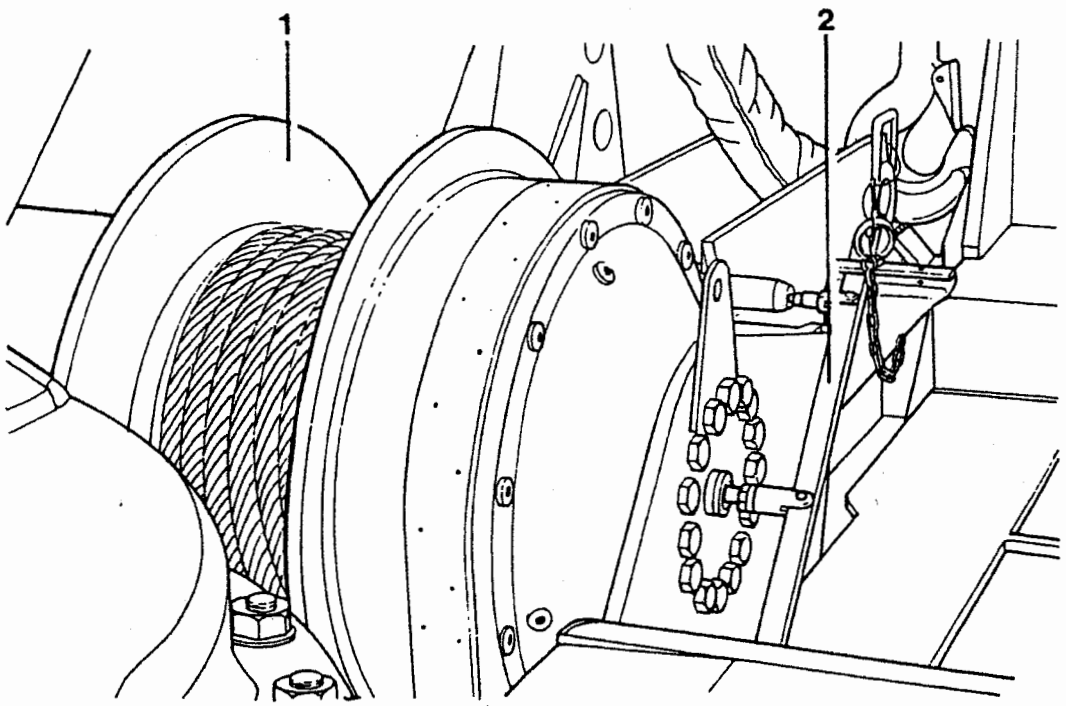
When using the main control box hung onto the rear passenger side mudguard, left and right-hand is defined as facing the rear of the recovery vehicle.

30.1 Ensure that the body main hydraulic feed line valve is fully open (Fig 18).

30.2 With engine idling, parking brakes applied and main gearbox in neutral position. Depress clutch pedal and pull PTO button switch ON and note PTO warning light illuminates (Fig 10).

30.3 Release clutch pedal gently and set hand throttle control (Fig 11) until 1200 rpm is seen on the engine tachometer.

30.4 Release recovery extending boom lock (Figs 21 and 22) by twisting through 90°.

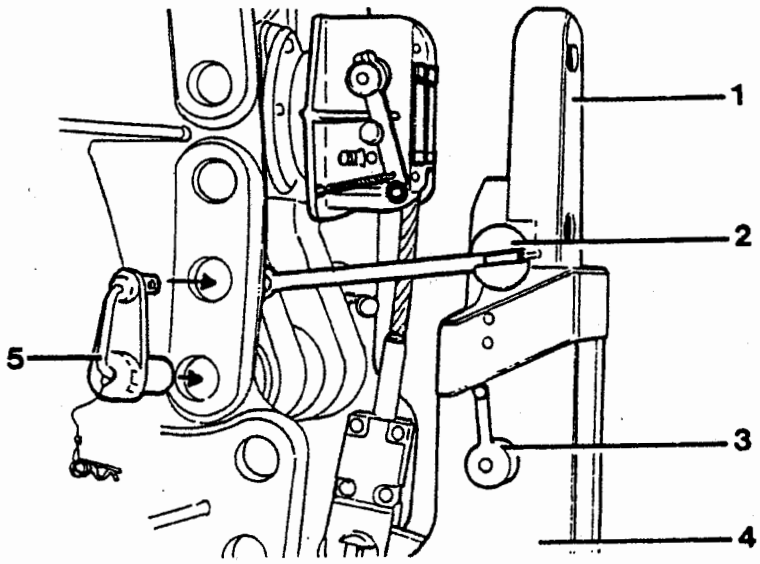


1 Winch 2 Manually operated clutch

Fig 20 Main winch

30.5 Remove main control box (Chapter 2, Fig 24) from rear locker mount on left rear mudguard and connect multi-pin plug.

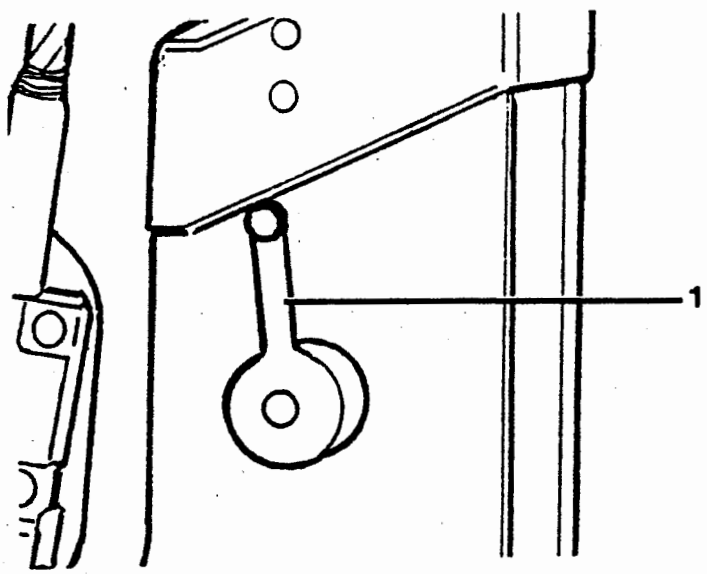
30.6 Press one of the three 'BODY ON' switches and note that the green 'BODY LIVE' light is lit. (Chapter 2, Fig 1(30)).



1 Extending boom
2 Extending boom locking bar
3 Extending boom lock
4 Folding boom
5 Recovery boom quadrant locking pin

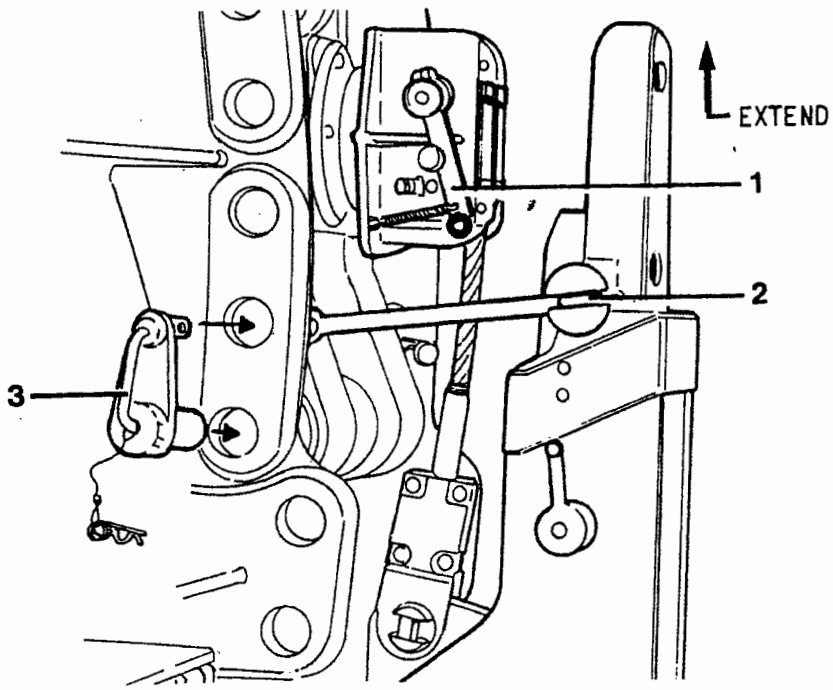
Fig 21 Recovery boom lock position

30.7 With power now connected to control box, extend recovery boom to release locking bar (Fig 23(2)) from cup.



1 Boom lock

Fig 22 Recovery extending boom lock



1 Rope fairlead tensioner
2 Boom extension locking bar
3 Recovery boom quadrant locking pin

Fig 23 Recovery extending boom locking bar

30.8 Operate the 'UNFOLD' switch on the main control box and lower recovery boom to horizontal position (Fig 24).

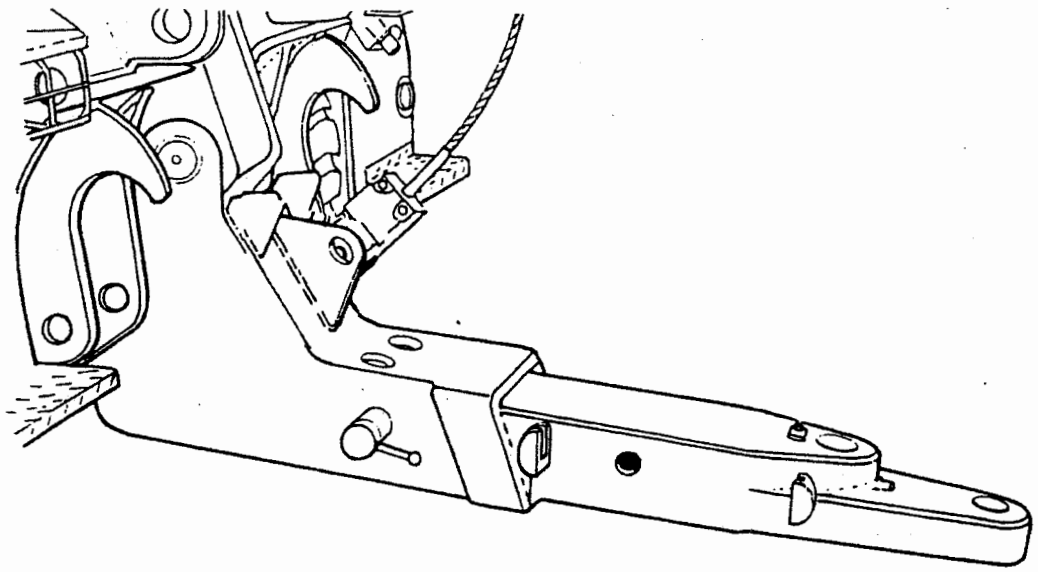


Fig 24 Recovery boom extended and grounded

30.9 Disengage rope tensioner on fairlead (Fig 25) (when winching-in, rope tensioner should be engaged).

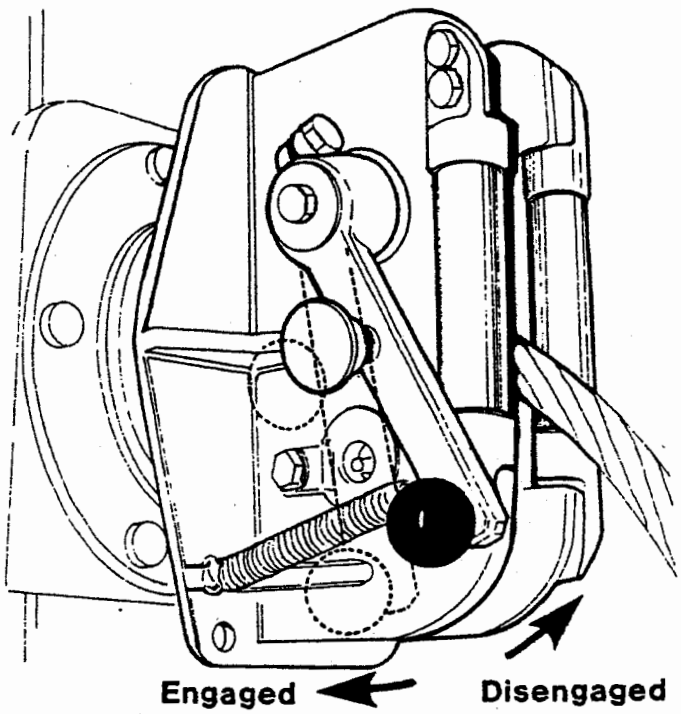


Fig 25 Rope tensioner on fairlead

30.10 Release winch rope end adaptor (Fig 26). This is achieved by freeing the centre pin spring-loaded catch from the slot, rotating the centre pin through 90° to align the pin end dog with corresponding gap, and withdrawing centre pin.

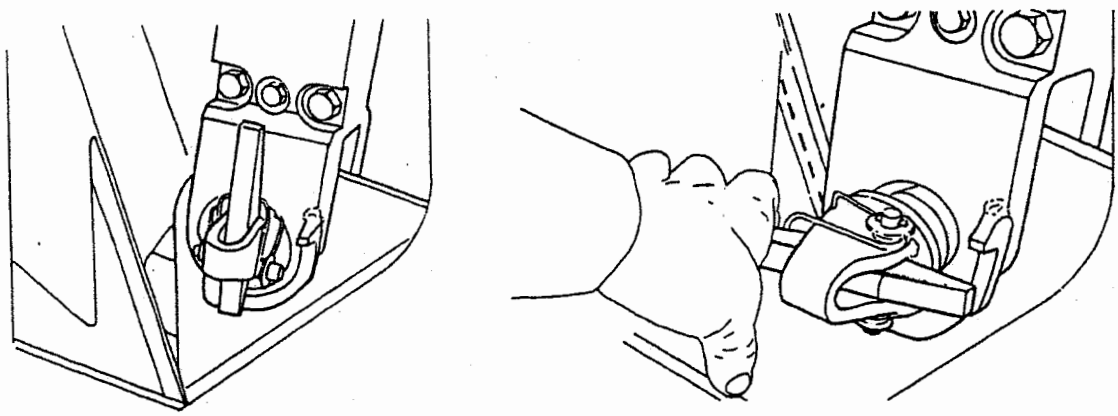
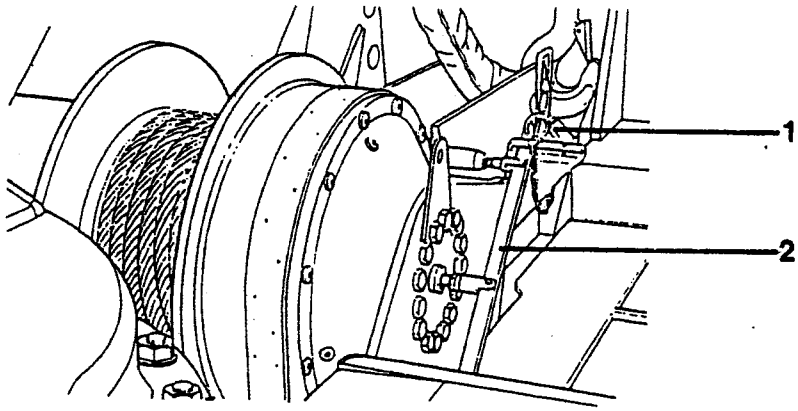


Fig 26 Winch rope end adaptor and locking pin

30.11 The main recovery winch should now be put into the free spool condition (Fig 27). This operation can be performed by two methods:

30.11.1 Pull the ringed locking pin (1) from the lever (2) and hold lever in the outside position, or lock lever in outside position using ringed locking pin.

30.11.2 Fit ringed locking pin in outside position, leave lever in inside position, descend to main control box and operate 'WINCH/CLUTCH' release switch.

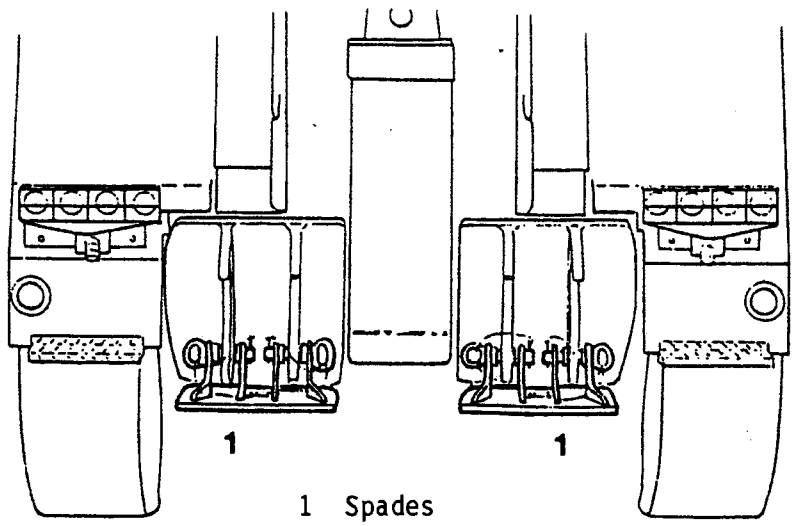


1 Locking pin 2 Lever

Fig 27 Main recovery winch clutch lever

30.12 Release the rope tensioner (Fig 25). The freed rope can now be pulled out and connected to the casualty, the recovery vehicle should not be positioned more than 80 metres away from the casualty. When paying out the wire rope, ensure that at least three coils remain on the main winch drum. Maximum tonnage is pulled on the bottom layer of the drum with correspondingly lower tonnages as layers of rope are wound on. To ease the effort of pulling the rope out, release the tension on the rope cleaner brushes by slackening off the self locking nut with a 17 mm spanner.

30.13 Deploy rear spades (Fig 28(1)).



1 Spades

Fig 28 Rear spades

30.14 Re-engage main winch clutch lever (Fig 27) and relocate locking pin in inner hole. Ensure rope is tight between fairlead and winch, engage rope tensioner. If tensioner has been slackened, tighten. Winch in, using 'Recovery Winch' joystick at the 'PULL IN' position. On completion, disconnect and stow main control box if not required further.

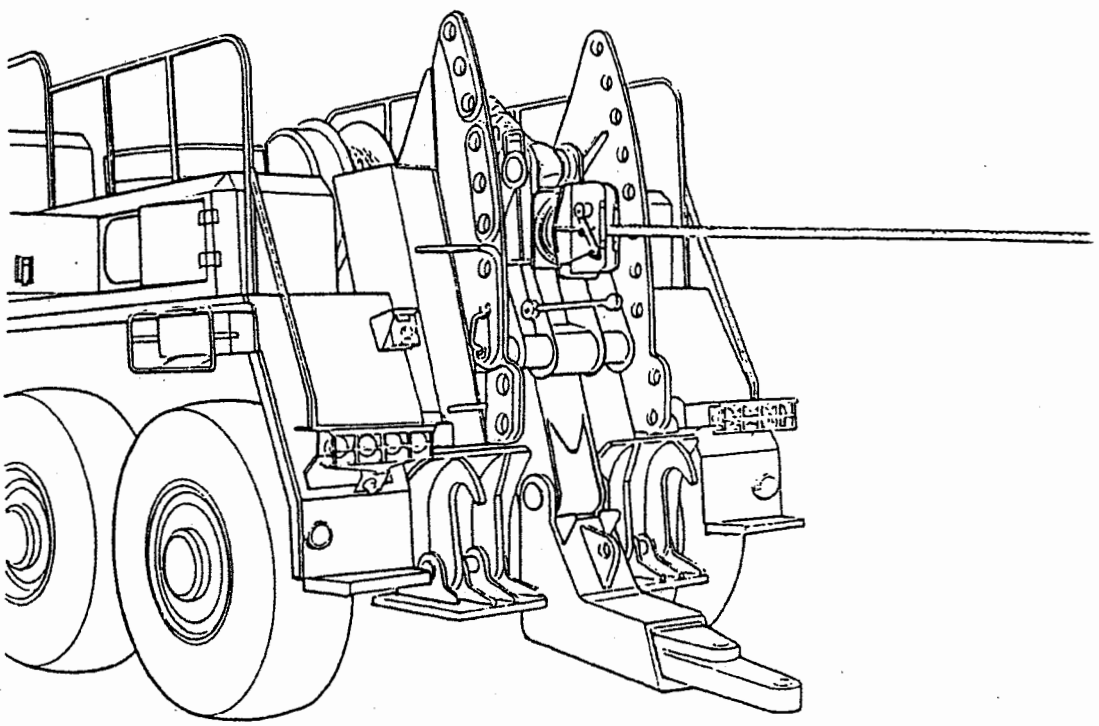


Fig 29 Winching in

SUPPORTED TOW WITH REMOTE CONTROL OPERATION

WARNING ...

WHEN SUPPORT OR SUSPEND TOWING, IT IS POTENTIALLY DANGEROUS TO EXCEED THE SPEED LIMITS FOR THE SPECIFIC LOAD CONDITION (DETAILED IN TABLE, PAGE (vii)).

CAUTION ...

When unblocking bogie, hold switch down for a further 15 seconds after warning light has extinguished, to ensure rams have completely cleared bogie.

31 With casualty winched in, or in other circumstances, a supported tow may be contemplated. If the supported tow is a continuation of the main winching operation (para 30), the main control panel (Chapter 2, Fig 24) can continue in use for the following functions. For the purpose of this Chapter however, the remote control box is to be considered (Fig 30).

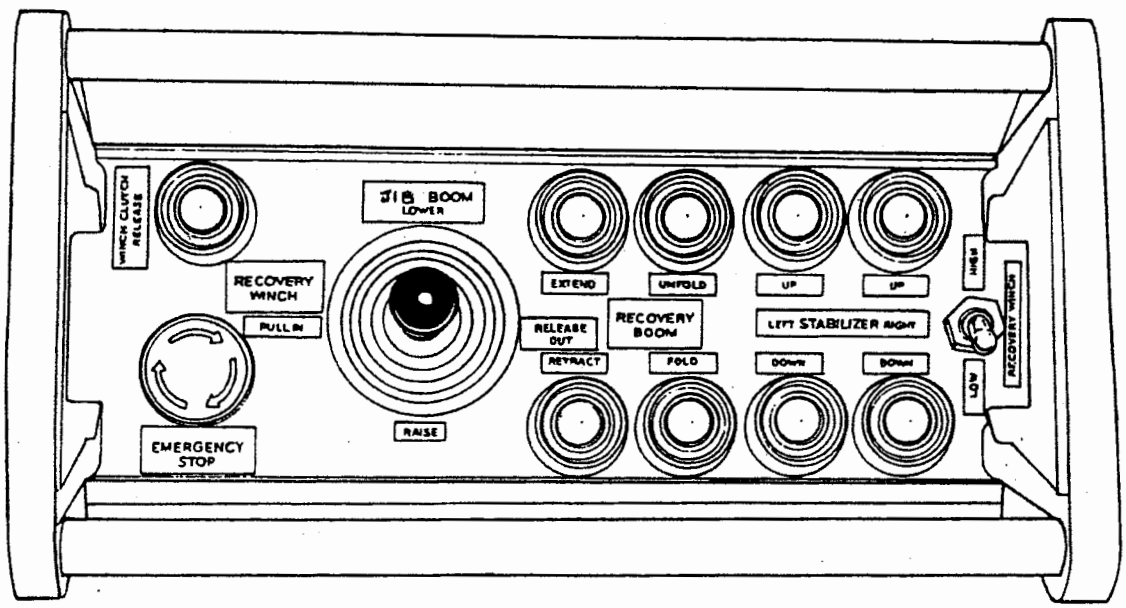
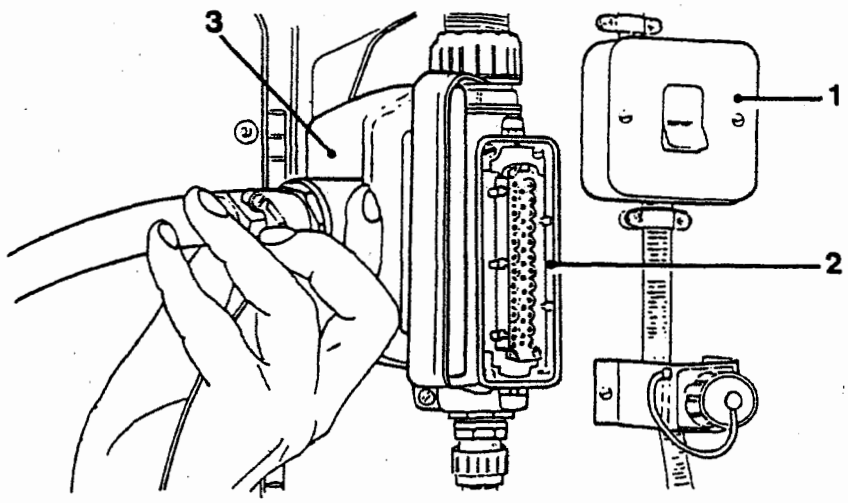


Fig 30 Remote control box

31.1 Ensure that folding boom is fully deployed onto mechanical stops. Re-stow recovery winch rope end adaptor to recovery boom, if released previously (para 30.10) (Fig 26).

31.2 Connect remote control box to multi-pin socket found in the rearmost locker, passenger side (Fig 31(2)). Ensure that the plug and sockets attached to the wandering lead are clamped securely in position.



1 Locker light switch 2 Multi-pin socket 3 Wandering lead multi-pin plug

Fig 31 Connecting multi-pin power plug to locker mounted socket

31.3 If deployed, raise and stow rear spades.

31.4 If not already performed, the following actions should be undertaken:

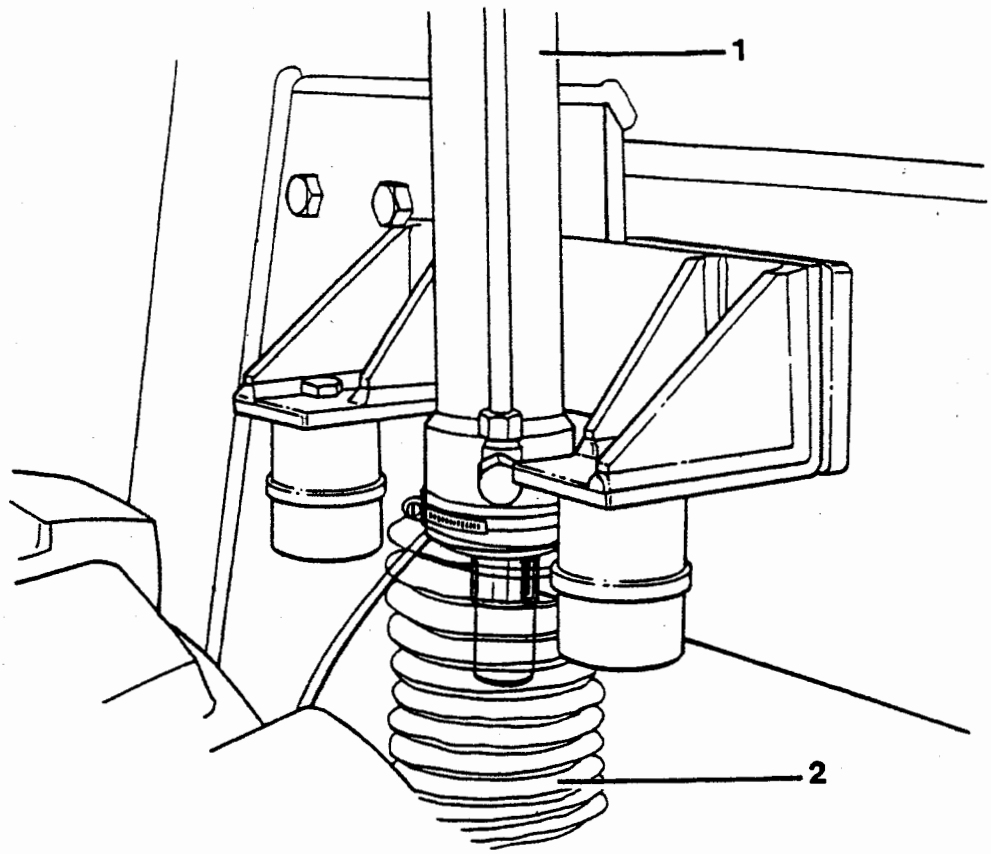
31.4.1 Open hydraulic feed line valve (para 30.1).

31.4.2 Press 'BODY ON' switch (para 30.2)

31.4.3 Engage PTO (paras 30.3 and 30.4).

31.4.4 Lower recovery boom.

31.5 The rear bogie should be blocked before casualty is coupled. Press 'BOGIE BLOCKING' ON/OFF switch to 'ON' (Chapter 2, Fig 1(24)). Press 'BLOCK' switch to operate blocking rams (Fig 32(1)). The red warning light will illuminate to indicate that the rams have deployed, a slight rocking movement by the recovery vehicle will be felt as the rams abut the bogie. Warning light will remain 'ON' until bogie is unblocked.



1 Ram cylinder 2 Protective sleeve

Fig 32 Bogie blocking ram

31.6 Connect canvas covered strop (Fig 33(3)) to main boom (1). It may be necessary to raise the main boom to permit strop to be fitted. Remove hairpin locking pin (4) from strop pin, partially withdraw strop pin and offer up strop loop. Insert strop pin and refit locking pin.

1 Main boom
2 Strop pin
3 Strop
4 Hairpin locking pin

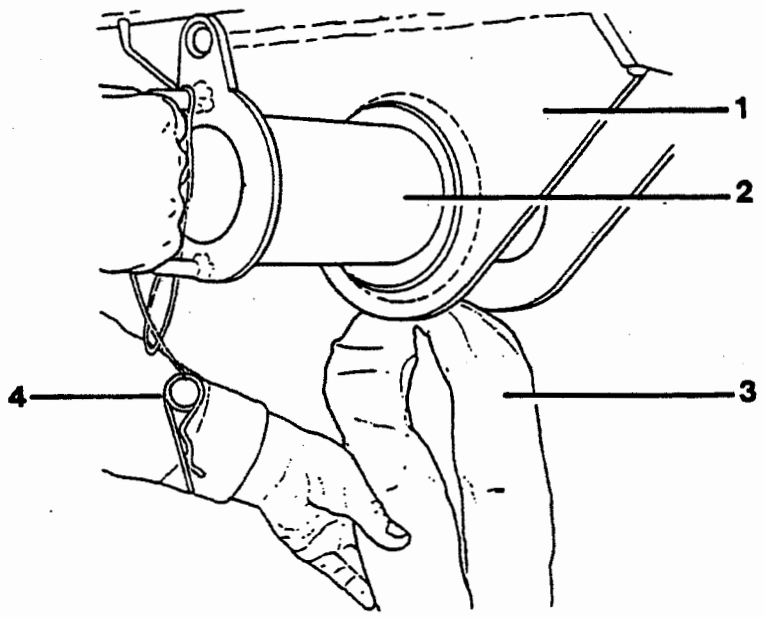
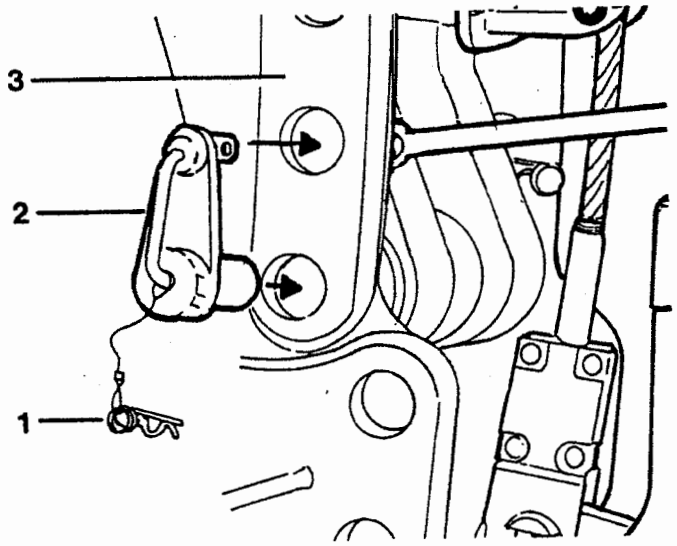


Fig 33 Lifting strop connection

31.7 Select from CES equipment the appropriate lifting bar and forks/ adaptors and fit to recovery boom.



1 Hairpin locking pin 2 Locking pins 3 Quadrant

Fig 34 Recovery boom quadrant locking pins

31.8 Using the joystick control, raise the main boom slightly to take the weight off the recovery boom locking pins (Fig 34(2)). Remove hairpin locking pins (1) from the boom locking pins situated either side of the quadrant (3) and withdraw boom locking pins (2).

31.9 Secure casualty to recovery boom and raise to the required height, bearing in mind that the suspended load should be kept as low as possible. A suitable ground clearance is approximately 250 mm (10 in.).

31.10 Raise or lower the main boom to align suitably placed locking pin holes in the quadrant and recovery boom. Insert locking pins and refit hairpin locking pins.

31.11 Release strop from main boom and replace strop pin into main boom and lock with hairpin.

31.12 Lift main boom slewing lock (Fig 35), (found between the main boom and operator's seat), to allow the main boom to slew. Slew the main boom to the left-hand side (when facing rear of recovery vehicle) of the recovery boom quadrant and lower main boom. This achieves the most suitable height for travelling. The turntable will have rotated some 15° and the slewing lock will have to align with the hole, relevant to this position. Some slight manoeuvring of the main boom may be necessary to achieve the re-entry of the slewing lock.

31.13 Switch off, disconnect and stow remote control box and wandering lead. Disengage PTO and reset engine hand throttle. 'BOGIE BLOCK' will remain 'ON'.

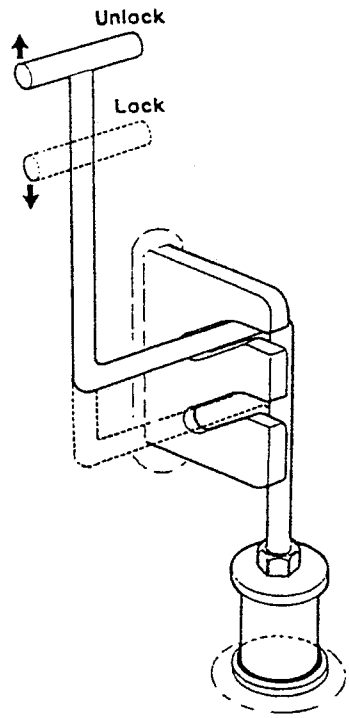


Fig 35 Main boom slewing lock

MAIN BOOM OPERATION WITH MAIN BOOM REMOTE CONTROL BOX

WARNINGS ...

(1) GROUND REACTION PLATE IS A HEAVY COMPONENT AND DUE CONSIDERATION SHOULD BE GIVEN TO THIS FACT WHEN HANDLING.

(2) OPERATIONS WITH LOADED WIRE ROPES ARE POTENTIALLY DANGEROUS. ONLY PERSONNEL DIRECTLY CONCERNED WITH RECOVERY ACTIONS SHOULD BE PRESENT. DUE CONSIDERATION SHOULD BE GIVEN TO POSSIBLE ROPE BREAKAGE WHEN TAKING UP STATION TO OPERATE REMOTE CONTROLS.

(3) ALL SIDE AND REAR STABILIZERS MUST BE DEPLOYED WHEN SLEWING THE LIFTING BOOM WITH A SUSPENDED LOAD.

CAUTIONS ...

(1) Do not slew main boom into raised recovery boom. Damage will result.

(2) Engage slew lock device (para 31, Fig 35) prior to travelling with load on main boom hook. A swinging load could damage slewing gear.

(3) Slew speed of lifting boom must be commensurate with the weight and type of suspended load.

(4) Do not hoist an unladen hook with excessive speed.

32 The functions described in the forthcoming paragraphs can also be duplicated with the main control box. In this instance, the main boom remote control box is described (Figs 36 and 37).

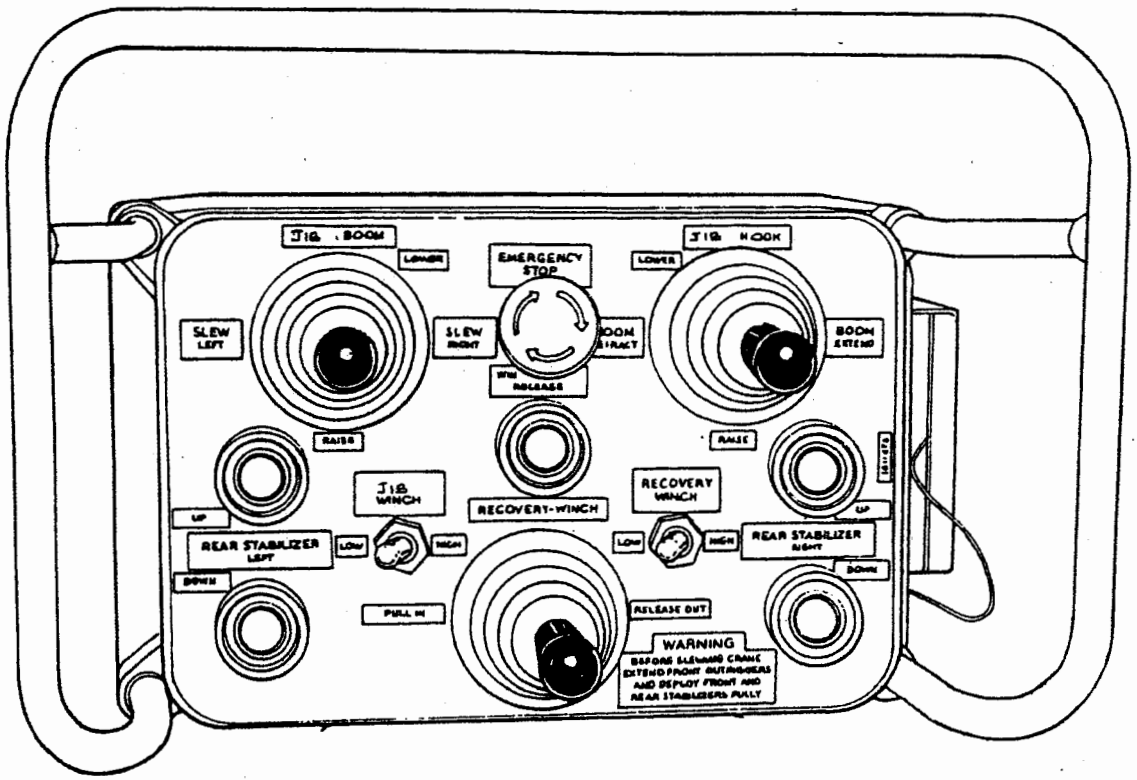


Fig 36 Main boom remote control box

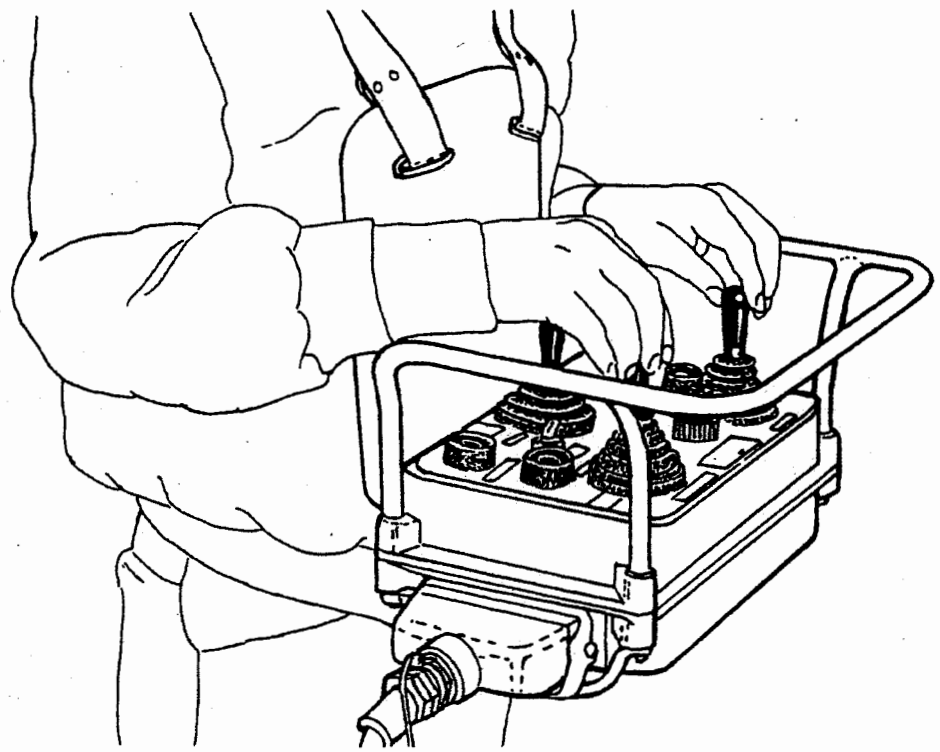


Fig 37 Main boom remote control box, chest supported

32.1 Care should be taken when removing the main boom remote control box from stowage locker, otherwise damage could result. Ideally, the box should be taken from the locker horizontally, tilting the chest plate as it is passed through the locker opening (Fig 38).

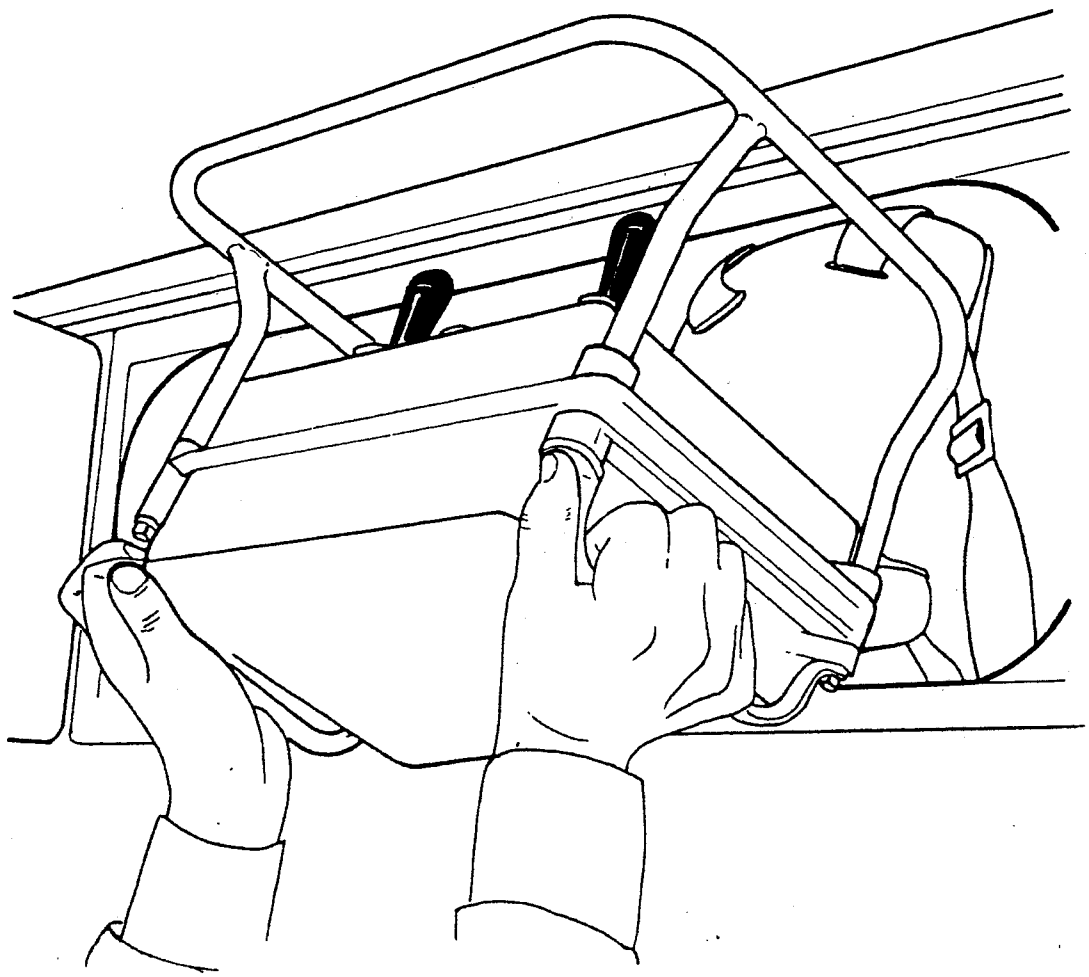


Fig 38 Removal of main boom remote control box from locker

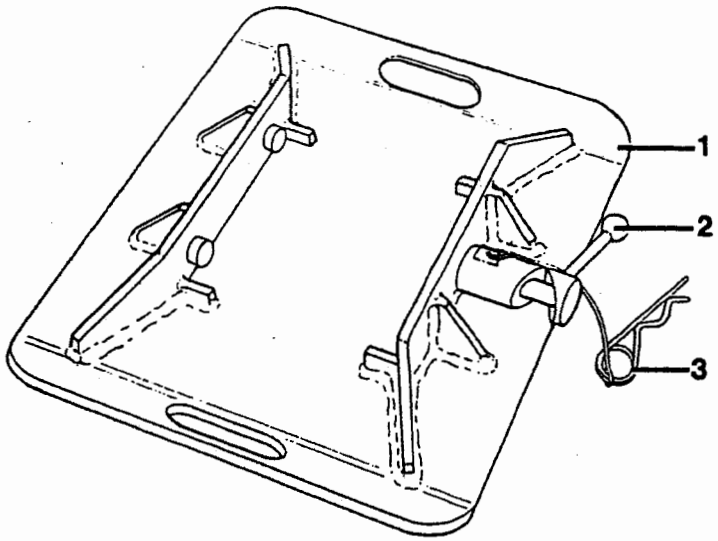
32.2 Manoeuvre recovery vehicle into required position and:

32.2.1 Open hydraulic feed line valve (para. 30.1).

32.2.2 Press 'BODY ON' switch (para.30.2).

32.2.3 Engage PTO (paras 30.3 and 30.4).

32.3 It may be necessary to fit the base plates (Fig 39) to the front left and right stabilizers. Remove base plates from stowage locker and place beneath stabilizers. Operate stabilizer control switches found alongside each front stabilizer (Fig 40) and lower the leg until just above base plate.



1 Base plate 2 Base plate lock 3 Hairpin locking pin

Fig 39 Front stabilizer base plate

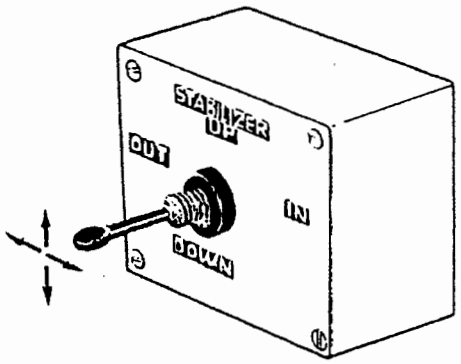
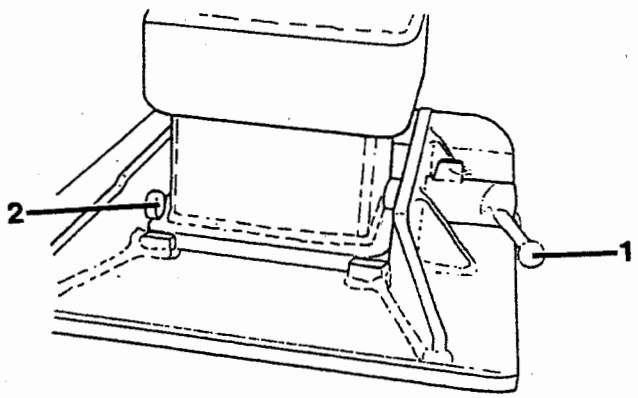


Fig 40 Front stabilizer control switch



1 Base plate lock 2 Support dowels

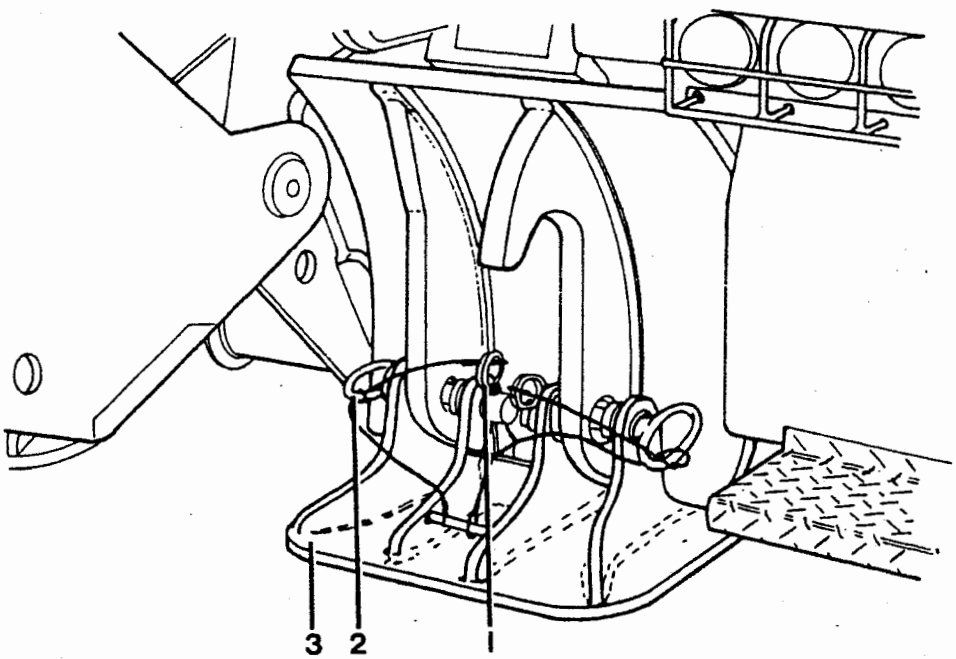
Fig 41 Front stabilizer base plate fitted

32.4 Withdraw hairpin locking pin (Fig 39(3)) from base plate locking pin (2) and rotate handle of pin until cam is fully open.

32.5 Offer base plate up to stabilizer leg flange leading with the support dowels, (Fig 41(2)). Bring the base plate up level with the leg flange when support dowels are located and release base plate locking pin (1). Replace hairpin locking pin.

32.6 Unlock stabilizer by lifting the counter-balance lock arm situated at the side of the stabilizer. There may be some residual hydraulic pressure making the lock difficult to release, if this is the case, direct the stabilizer 'IN', simultaneously holding the handle in the unlock position. When disengaged, the stabilizer can be deployed and the lock handle released. When stabilizers are re-stowed, the locks engage automatically.

32.7 Deploy rear spades. If recovery vehicle is on hard standing (ie road surface) then the spade end (Fig 28) will have to be protected to prevent surface damage by fitting the ground reaction plates (Fig 42). The ground reaction plates are stowed at the rear of the vehicle at walkway level (Fig 43).



1 Hairpin lock 2 Ringed clevis support pin 3 Ground reaction plate

Fig 42 Ground reaction plates fitted to rear spades

32.8 Pull captive retention pin from ground reaction plate stowage stub and lift plate out of bracket.

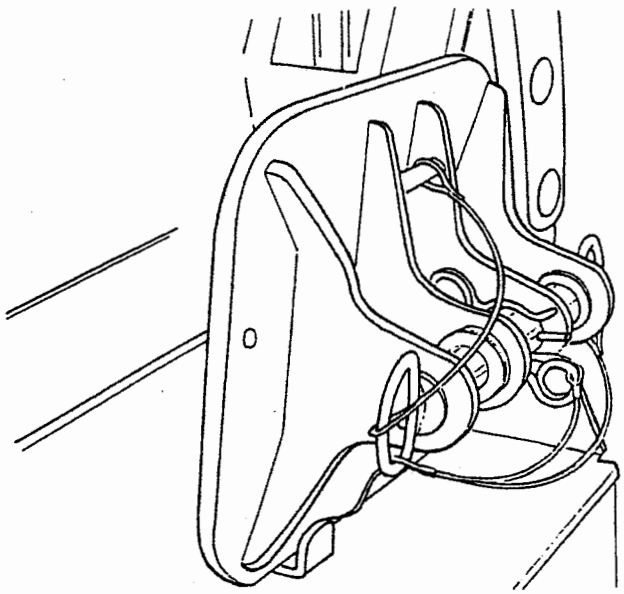


Fig 43 Rear ground reaction plate stowage

32.9 When all four stabilizers are deployed, the recovery vehicle should be brought to a level condition by manoeuvring the stabilizers as required. This is aided by the use of spirit levels (Fig 44).

32.10 Three are provided, one each mounted alongside the left and right-hand stabilizers and one at the main boom operator's seat position. When main boom operations are in progress, the spirit level bubble should be kept in view in the inner circle.

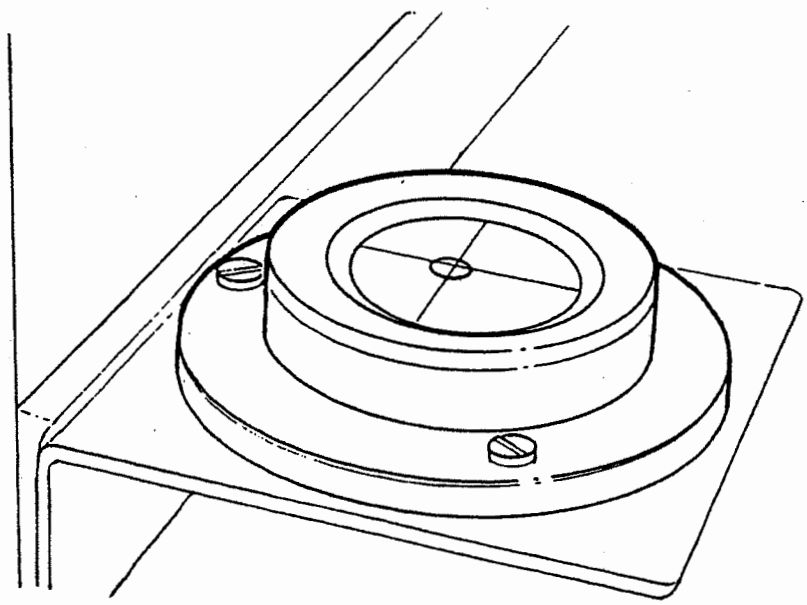
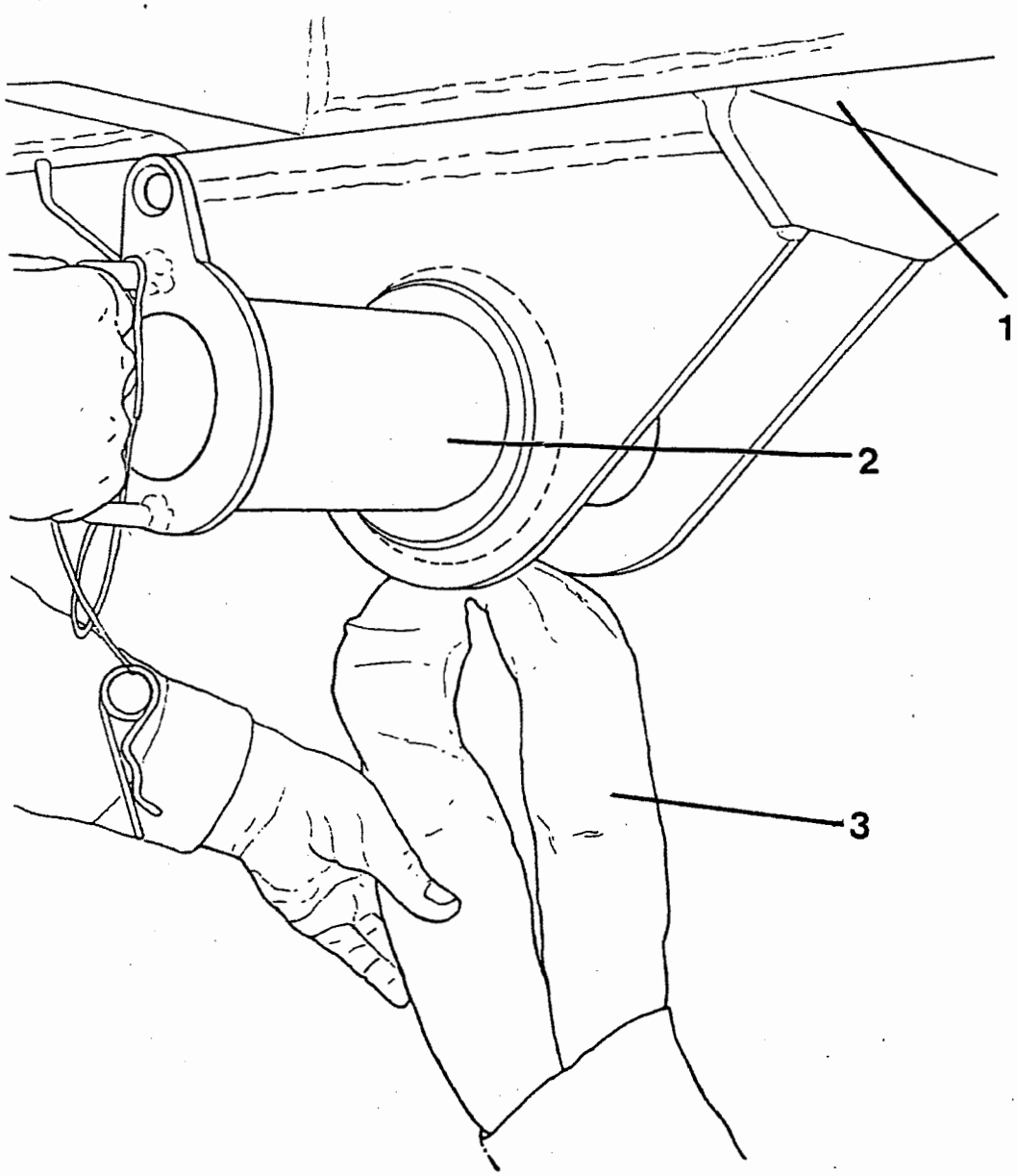


Fig 44 Spirit level

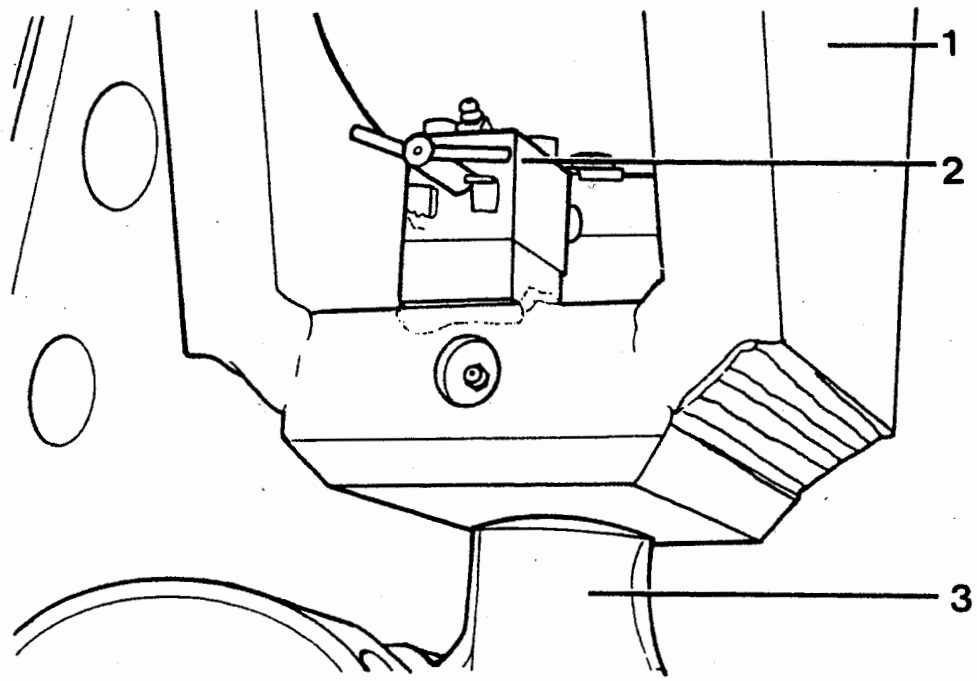
32.11 Ensure that the boom strop is disconnected (Fig 45) and slewing lock (para 31 and Fig 35) disengaged if the boom is to be slewed.

32.12 In addition, release the main boom hook locking pin (Fig 46) by pulling pin outwards, turning through 90° and relocating in groove provided. The purpose of this lock is to keep the hook rigid and at right angles to the block while vehicle is travelling, in order to prevent consequential damage being sustained to adjacent components.



1 Boom 2 Strop pin 3 Boom strop

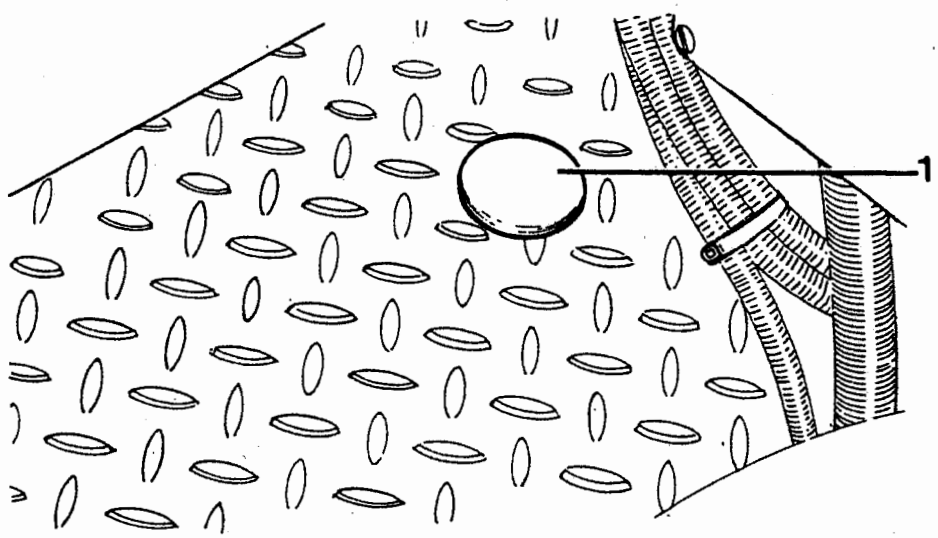
Fig 45 Boom strop disconnection



1 Main boom sheave block 2 Main boom hook lock 3 Main boom hook

Fig 46 Main boom hook locking pin

32.13 Mounted on the foot plate at the main boom operator's seat position can be found a red painted, mushroom-shaped knob (Fig 47). This knob, foot operated, will lubricate the main boom turntable gear teeth. Oiling frequency at the discretion of operator



1 Foot operated knob

Fig 47 Turntable lubricator

32.14 The recovery vehicle is now prepared for main boom operations (Fig 48).

Note ...

Do not lower or extend main (jib) boom with hook rope tight. Main boom function will cut out.

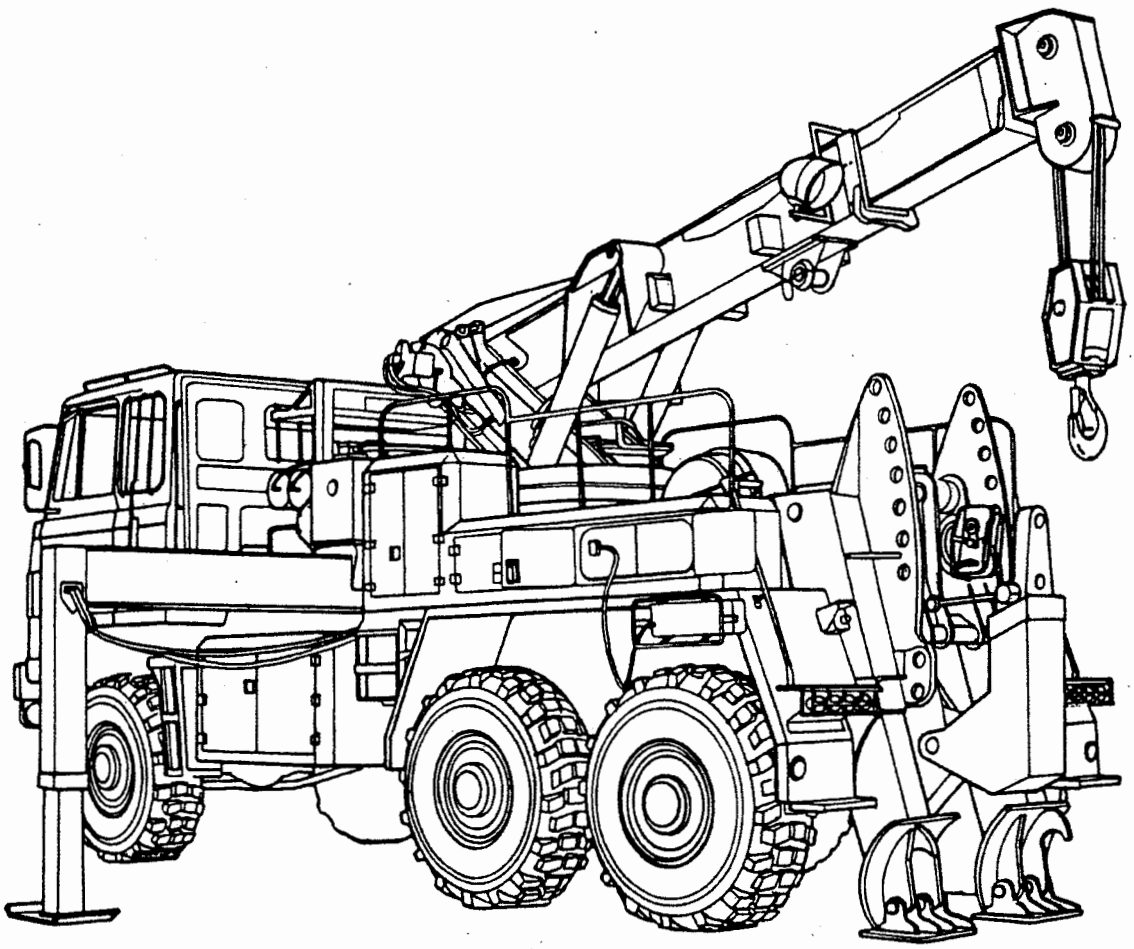


Fig 48 Prepared for main boom operations

32.15 Situated at the left and right-hand side at the rear of the vehicle and at the front stabilizer, driver's side, are emergency 'STOP' buttons (Fig 49).

32.16 The operation of any one of the three emergency 'STOP' buttons will trip the 'BODY ON' electrical supply. Consequently, following an emergency stop, the 'BODY ON' switch (Chapter 2, Fig 1) will require resetting.

32.17 Once pushed in, the emergency 'STOP' button has to be released by a twisting action. Note should be taken, that if the green 'POWER-ON' light does not illuminate on the dashboard mounted 'BODY ON' switch and the three remote control boxes when called upon for use, then an initial check should be made to ensure that an emergency 'STOP' button has not been left in an 'OFF' position.

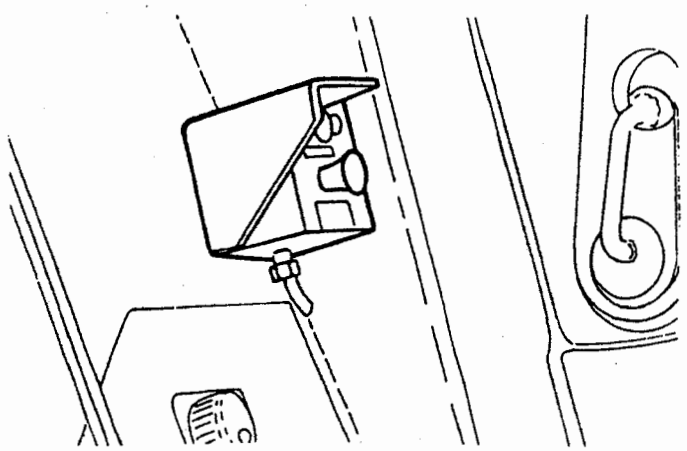


Fig 49 Emergency stop button (typical of three)

DEMOUNTING AND REMOUNTING SPARE WHEEL ASSEMBLY

WARNING ...

EXERCISE DUE CARE FOR SAFETY WHEN CARRYING OUT SPARE WHEEL DAVIT OPERATIONS BESIDE TRAFFIC DRIVING ON RIGHT HAND SIDE OF ROAD.

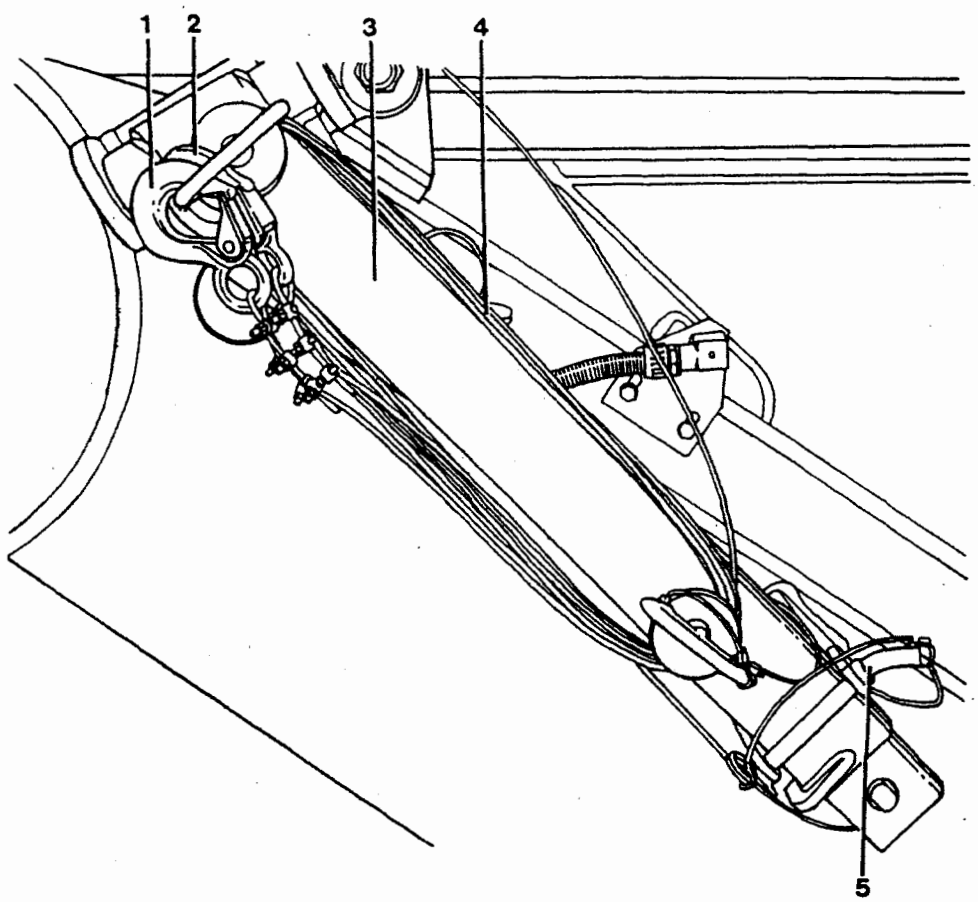
CAUTION ...

The Davit wire rope is not to pass through any aperture on the main (jib) boom other than at the hooking point (Fig 52(3)).

33 Mounted on the main boom casing is a small davit used in conjunction with the main jib boom for lowering and lifting the spare wheel assembly to and from the ground (Fig 50).

33.1 Remove davit locking pin (Fig 50(5)) from main boom storage position. Swing davit boom outwards and rotate slightly to permit the withdrawal of the outrigged locking pin (Fig 51(4)). Replace davit locking pin (Fig 50(5)) in bracket and secure.

33.2 Replace pin (Fig 51(4)) to lock davit boom in the outrigged position (Fig 51) and secure with hairpin (5).

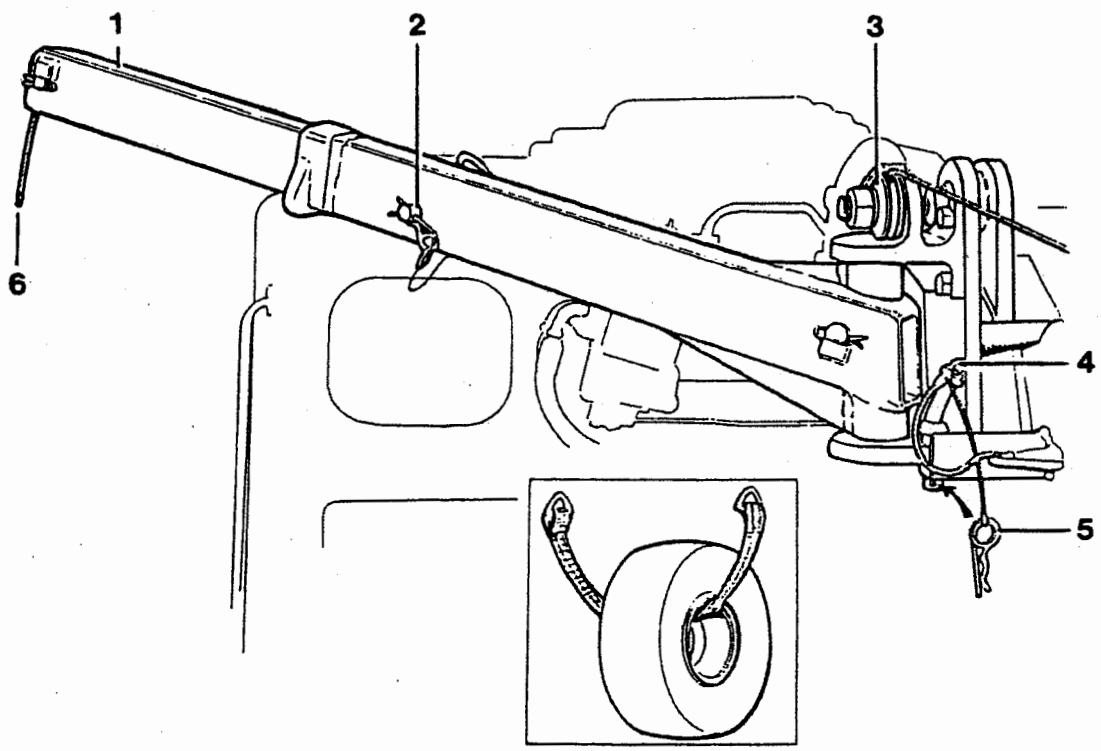


1 Davit rope hook (1)
2 Davit rope hook (2)
3 Davit boom
4 Davit wire rope
5 Davit locking pin

Fig 50 Davit for spare wheel assembly

33.3 Pull out davit boom extension ringed locking pin (Fig 51(2)), extend davit (1), replace locking pin and secure with hairpin.

33.4 Uncoil the davit wire (6) rope and allow the end to hang from davit extension. Place the wire rope over the guide pulley (3) mounted at the davit base and run the hook end to the end of the main jib boom. Secure hook into the hole provided (Fig 52(3)). Ensure that wire rope is clear of boom floodlights.



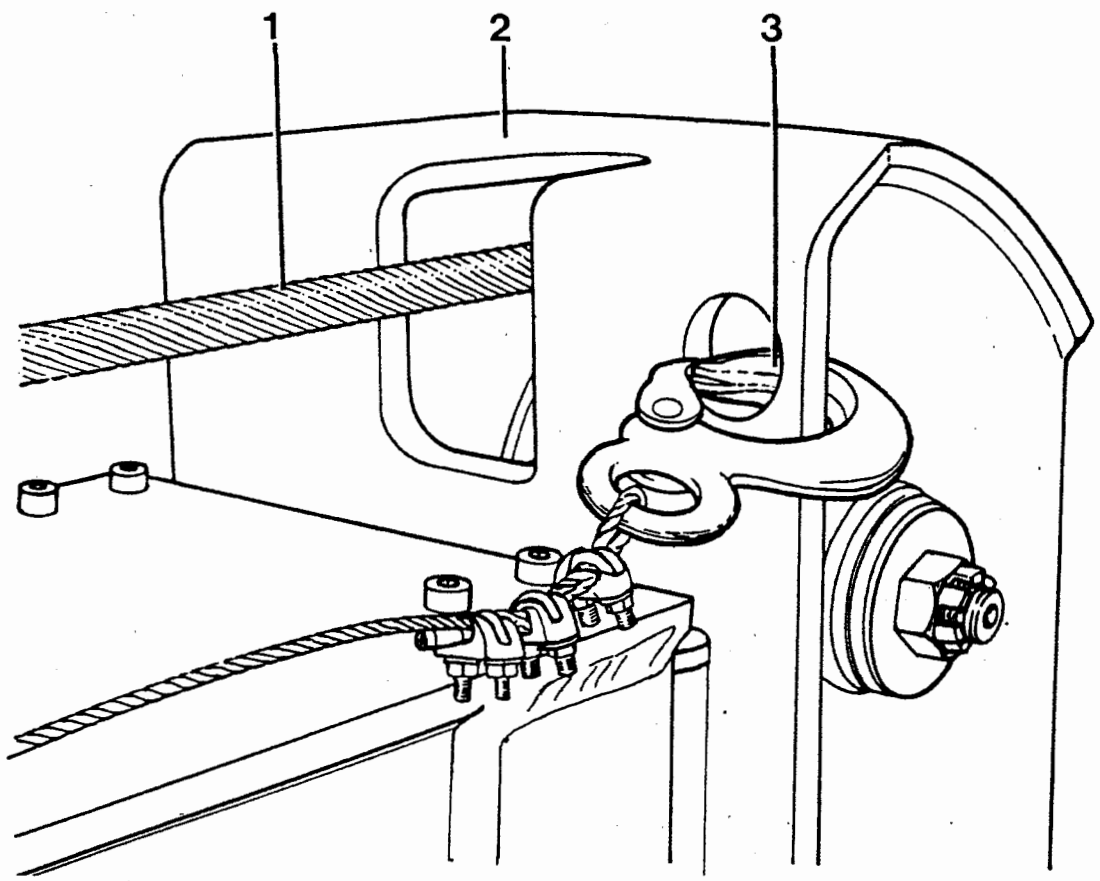
1 Davit extension
2 Davit extension locking pin
3 Davit rope guide pulley
4 Outrigged locking pin
5 Outrigged locking pin hairpin lock
6 Davit wire rope

Fig 51 Davit extended and outrigged (spare wheel assembly)

33.5 Obtain lifting strop from stowage locker and secure to spare wheel, hook up davit rope to strop. Extend main jib boom only until slack is taken out of wire rope and strop. (Do not extend main boom with hook rope tight). Lower main boom hook about 500 mm prior to extending main boom, otherwise, main boom cut-out will operate. If main boom hook rope appears to be tightening as boom is extended, lower hook again.

33.6 Release the four nuts and bolts holding the spare wheel to mounting bracket and lower spare wheel assembly to the ground by retracting the main boom.

33.7 To lift spare wheel assembly to return it to stowage position, extend main boom. Stowage of davit is a reversal of procedure described for outrigging.



1 Main boom wire rope 2 Main boom 3 Davit wire rope securing point

Fig 52 Davit wire rope hook main boom location (spare wheel assembly)

TRAILER COUPLING

WARNING ...

DO NOT ALLOW BOTH THE TRAILER TOWING BAR EYE, AND THE TOWING VEHICLE PINTLE TO SWIVEL.

34 Rear towing of a drawbar trailer, normal casualty towing, and hollebone towing, require the fitting of a pintle adaptor to the lower-most holes (2 each side) of the recovery boom quadrant. Obtain pintle beam from stowage locker and proceed as follows:

34.1 Connect canvas covered strop (Fig 33(3)) to main jib boom and recovery boom (para 31.6 refers). Ensure that strop pin locking pin is refitted.

34.2 Raise main jib boom just enough to take weight of recovery boom to enable removal of quadrant pins (Fig 34). Remove hairpin locking pins from both sides of quadrant and remove quadrant pins.

34.3 Raise the recovery boom (using main jib boom) sufficiently to enable fitting of the rear tow pintle assembly.

34.4 Fit the quadrant pins to the next convenient holes in the quadrant and fit hairpin locking pins.

34.5 Ensure that there is clearance between pintle and base of folding recovery boom, and that pins and safety locking pins are refitted.

34.6 Lower main jib boom to enable strop removal. Remove strop, refit strop pin and locking hairpin.

34.7 Release slew lock (Fig 35) and slew main jib boom towards vehicle rh (driver's) side, approximately 15°. Engage slew lock in the next convenient position.

34.8 Lower main jib boom to its transit position.

34.9 Fit pintle beam to lowest pairs of quadrant holes, using the two, double locking pins provided with the beam. Fit safety locking pins.

34.10 On the pintle (Fig 53), withdraw the chained split pin (1), release the rocking catch (2), and open pintle jaws (3).

34.11 When trailer is mechanically coupled, connect air lines and open shut-off valves (Fig 17).

34.12 Remove captive covers from the 2 and 12-pin sockets (Chapter 2, Fig 13) and connect trailer leads.

34.13 Check air pressure in the trailer and towing vehicle systems as indicated on the cab dashboard instruments. If the pressure is less than 7.4 to 8.4 Kg/cm^2 (106 to 120 lbf/in^2), run engine to charge the system until at least the minimum pressure is reached.

34.14 Test that all trailer lights are functioning. If air pressure and electrical systems are satisfactory, release trailer parking brake prior to moving off.

34.15 If a semi-trailer is to be towed, obtain relevant equipment (eg key-hole adaptor plates) from stowage locker and fit to the end of the recovery boom. When mechanically coupled, carry out procedures as for drawbar trailer, using relevant Army recovery procedures.

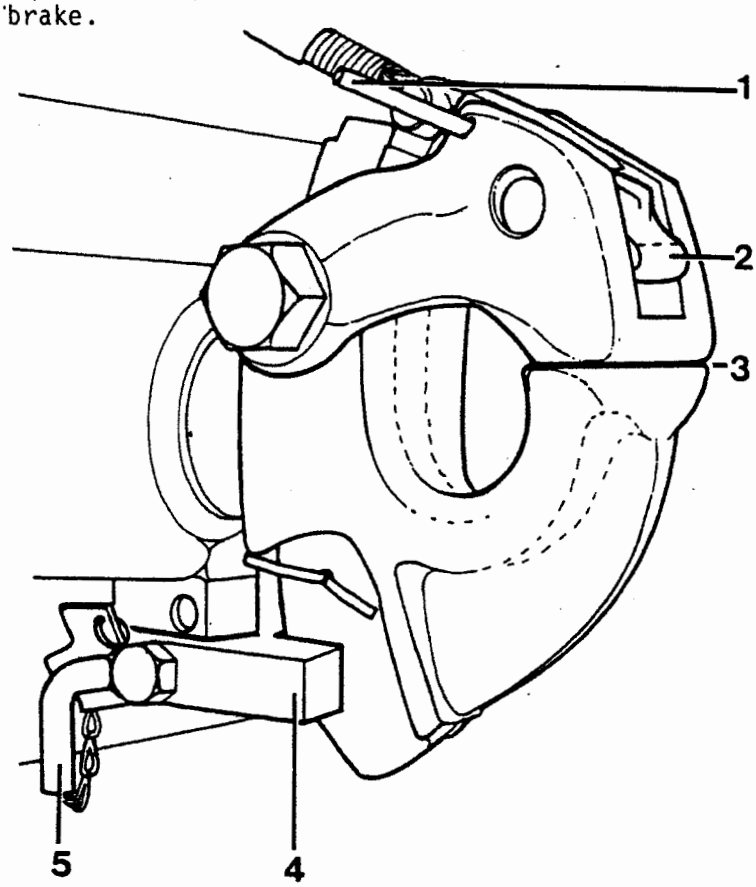
34.16 Should a drawbar trailer be required to be shunted from the front of the vehicle, open the jaws on the front bumper mounted pintle (Fig 53). Withdraw the chained split pin (1) and release the rocking catch (2).

34.17 If the drawbar is fitted with a swivelling eye, leave the swivel check catch of the pintle engaged.

34.18 Should it be necessary for the pintle to swivel, remove the hairpin locking pin from the locking pin for the swivel catch (5) and withdraw pin. The catch jaw will swing down and allow pintle to swivel through 360 degrees. Refit pin in upper hole in catch jaw block to secure catch jaw.

34.19 Couple trailer to recovery vehicle and connect the air lines to the three connections mounted at the rh of the pintle (when facing towards vehicle front) (ie driver's side). No electrical connections are provided for trailer shunting.

34.20 Ensure that the required air pressure is available (para 34.13) and release trailer parking brake.



1 Chained split pin
2 Rocking catch
3 Pintle jaws
4 Swivel check catch jaw
5 Locking pin for swivel check catch

Fig 53 Towing pintle

TOWING A RECOVERY VEHICLE WHEELED (GS) 6X6 FODEN

WARNING ...

BLOCK THE WHEELS OF THE CASUALTY VEHICLE TO PREVENT RUNAWAY DURING BRAKE RELEASE PROCEDURE.

CAUTION ...

Failure to observe the neutralising of the main and transfer gearboxes of casualty when under tow will result in gearbox damage due to lack of lubrication. If in doubt, remove driveshaft between main and transfer boxes.

35 Should the 6x6 Foden recovery vehicle itself become a casualty, the following procedure must be strictly adhered to when towing this vehicle.

35.1 The transfer gearbox lever must be in the neutral position.

35.2 The main gearbox lever must be in neutral position.

35.3 Check that the propshaft between the main gearbox and transfer box does not rotate when the vehicle is under tow.

35.4 All axle locks must be disengaged.

35.5 Couple the air lines from rear of the recovering vehicle to the front bumper mounted, driver side, connections of the casualty vehicle. These connections are recognised by the fact that they have no shut-off cocks fitted.

35.6 Check air pressure in the now coupled brake systems and charge to at least the minimum recommended pressure of 7.4 to 8.4 Kg/cm^2 (106 to 120 lbf/in^2).

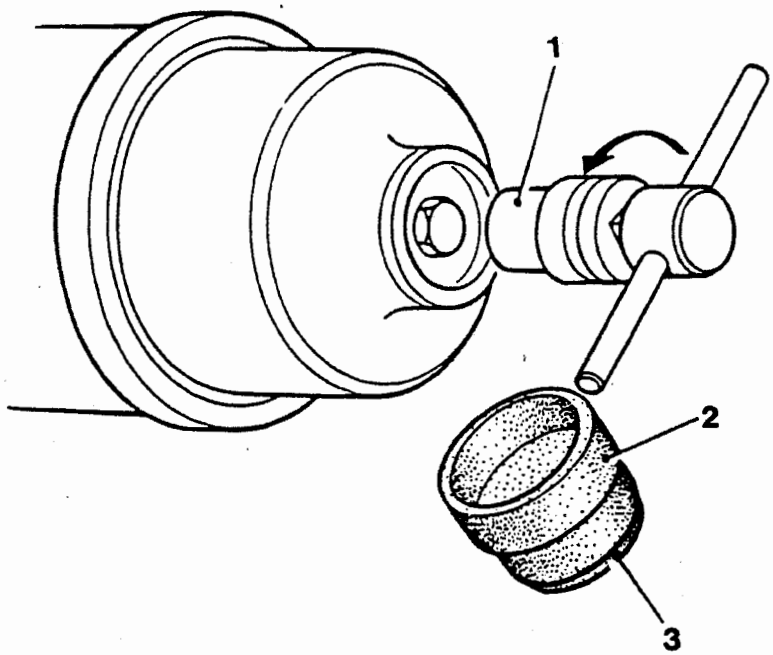
35.7 Should the casualty vehicle have suffered a complete failure of the air brake system the emergency brake release control (Chapter 2, Fig 12) will not operate and the casualty vehicle's brakes will remain locked on. To release the brakes, the following procedure must be undertaken.

35.7.1 Chock casualty vehicle wheels ready for brake release.

35.7.2 Remove end cover dust cap (Fig 54(3) of (2) fitted at the end of the actuator.

35.7.3 Use a ¾ in. AF socket spanner (1) to turn the release bolt anti-clockwise until the brake shoes are clear of the brake drum. Repeat on all spring actuators. Reclose end covers of actuator(s) dust caps.

35.7.4 When all brakes are free, carry out recovery procedure.



1 ¾ in. AF socket spanner 2 Actuator dust cap 3 Dust cap end cover

Fig 54 Spring brake actuator

EMERGENCY CONTROLS - STOWING RECOVERY EQUIPMENT

WARNING ...

WITH ELECTRICAL POWER NOT AVAILABLE ON THE RECOVERY EQUIPMENT AND SHUT-OFF COCKS 'A' AND 'B' SET TO 'CLOSED' (TO ENABLE EQUIPMENT STOWAGE); ALL AUTOMATIC AND SWITCH-CONTROLLED SAFETY DEVICES ON THE EQUIPMENT ARE INOPERATIVE. USE HYDRAULIC FUNCTIONS UNDER STRICT SUPERVISION AND ONLY TO STOW DEPLOYED RECOVERY EQUIPMENT. DO NOT ATTEMPT RECOVERY OR LIFTING OPERATIONS.

36 When electrical power has been lost in an emergency situation and it is essential to stow deployed recovery equipment, to permit the vehicle to be moved, proceed as follows:

36.1 Contact relevant superior authority to report situation and obtain permission/supervision for procedure.

36.2 Ensure that all uninvolved personnel are well clear of operating area.

36.3 Take note of the WARNING detailed above.

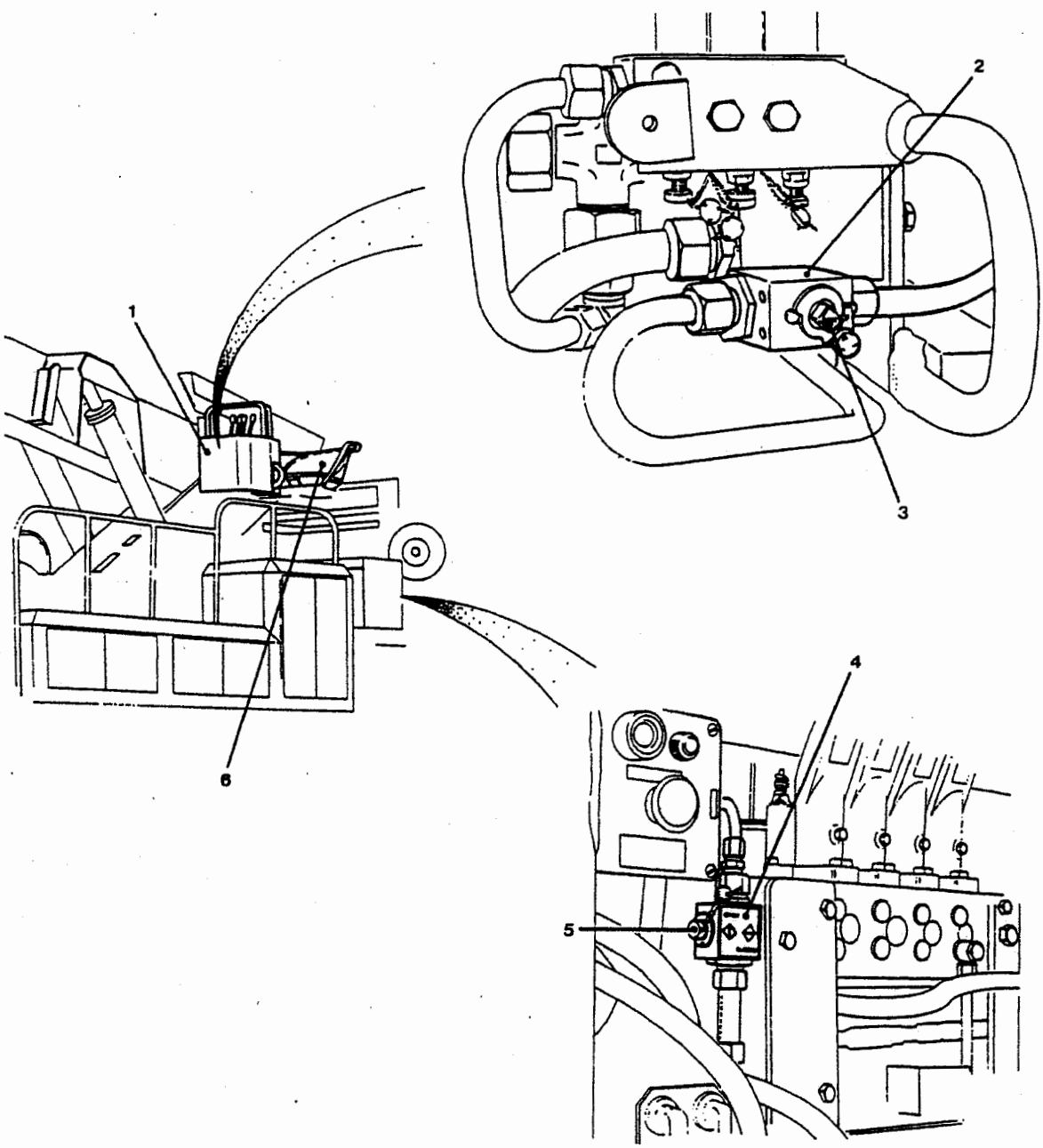
36.4 At location of lower shut-off valve (Fig 55(4)), cut and remove the lockwire from cock 'B' (5).

36.5 Using handle provided (stowed separately on vehicle) rotate cock 'B' to the 'CLOSED' position.

36.6 If required to close cock 'A' (3), remove five screws retaining hood (1) in position and operate cock 'A' as detailed for cock 'B'.

36.7 Using all necessary care, operate manual hydraulic controls to return deployed recovery equipment to the stowed position.

36.8 On completion of stowing operation, return both cocks to the 'OPEN' position and fit lockwire. Stow handle.



1 Hood
2 Upper shut-off valve
3 Cock 'A'
4 Lower shut-off valve
5 Cock 'B'
6 Operator's seat

Fig 55 Emergency shut-off valves - cock 'A' and 'B'

Chapter 4

USER MAINTENANCE

CONTENTS

INTRODUCTION

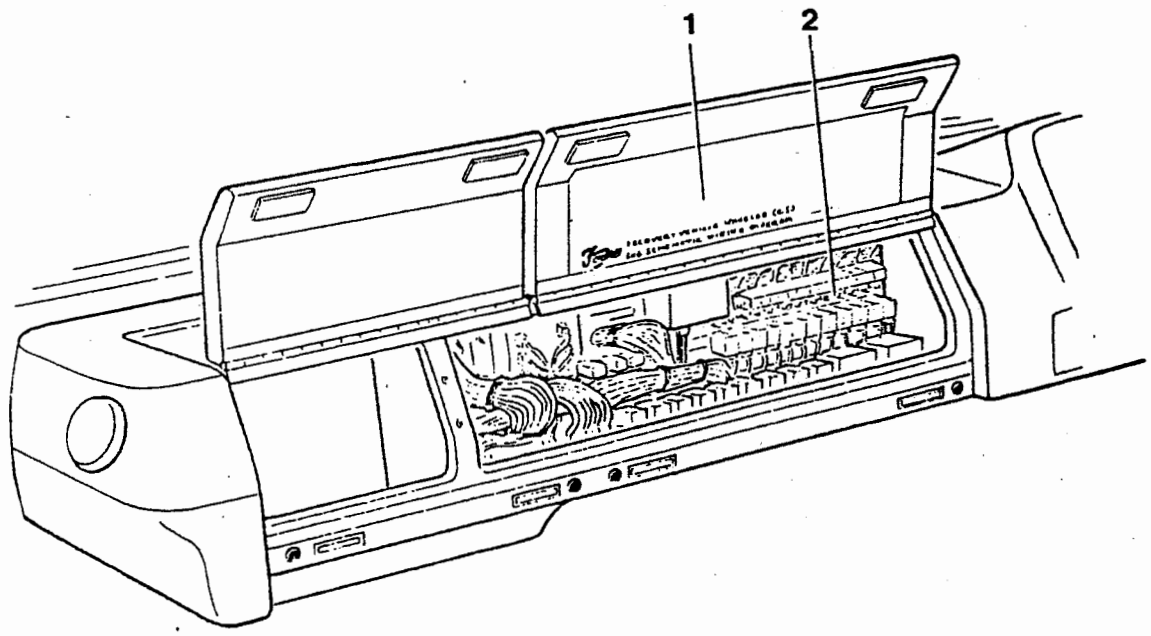
1 The authority for carrying out all maintenance duties on this equipment is the Maintenance Schedule 2320-N-502-601. No interval periods are given in this chapter for the tasks listed. These should be obtained from the above mentioned Maintenance Schedule. Diagrams showing the vehicle air brake system, vehicle and recovery equipment greasing points, and vehicle wiring, are given at the end of this Chapter.

CAB

2 Maintenance by the user in the cab area, when required, is as follows:

Circuit breaker

3 Should an overloading of an electrical circuit occur, the appropriate circuit breaker will trip out. To reset the breaker, press in the centre button. If the breaker trips again, this will indicate that a fault is present and the circuit should be checked. (See pages 46/47 Fig 46 for circuit details).



1 Wiring diagram 2 Circuit breakers

Fig 1 Main electrical panel

Windscreen wiper blades

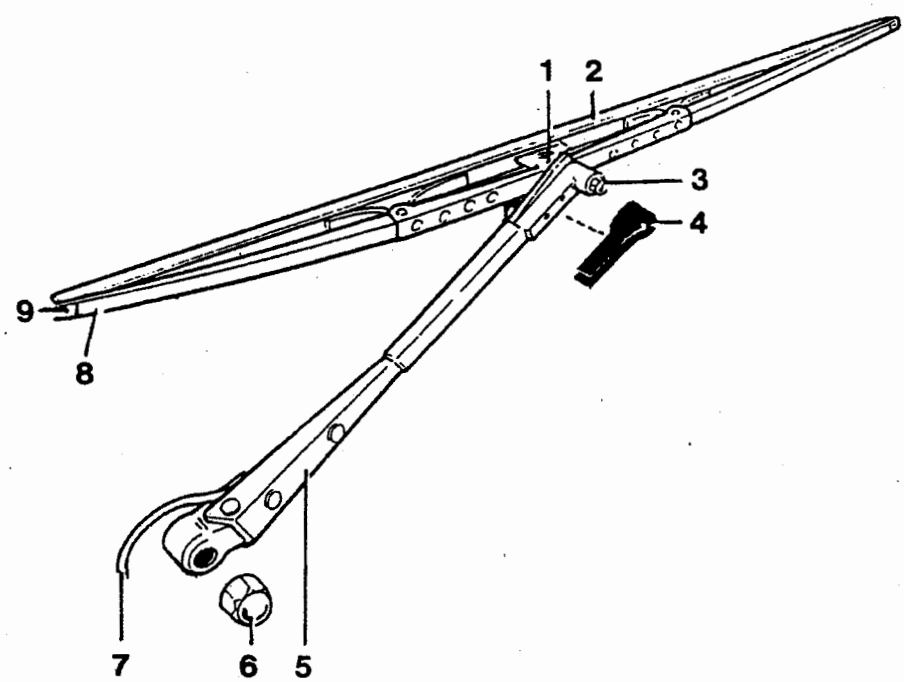
4 To remove and replace, proceed as follows:

4.1 To remove blade rubber (Fig 2(2)) release end clips (9) and slide worn rubber out of support guides. Reverse procedure for re-fitment.

4.2 To remove blade rubber and support (8), release screw and nut (1).

4.3 To remove blade rubber and support along with washer jets, remove spindle nut cover (4), disconnect jet feed pipe (7) from 'T' piece beneath front grille and release blade support assembly retaining nut (3).

4.4 To remove blade assembly complete with arm, disconnect windscreen jet feed pipe from 'T' piece beneath front grille, release arm retaining nut (6) from drive spindle and pull the whole blade assembly and arm off the serrated drive spindle.



1 Blade assembly screw and nut
2 Blade rubber
3 Blade support assembly retaining nut
4 Retaining nut cover
5 Blade arm
6 Blade arm retaining nut (spindle)
7 Washer jet feed pipe
8 Blade support
9 Rubber retaining clip

Fig 2 Windscreen wiper blade assembly

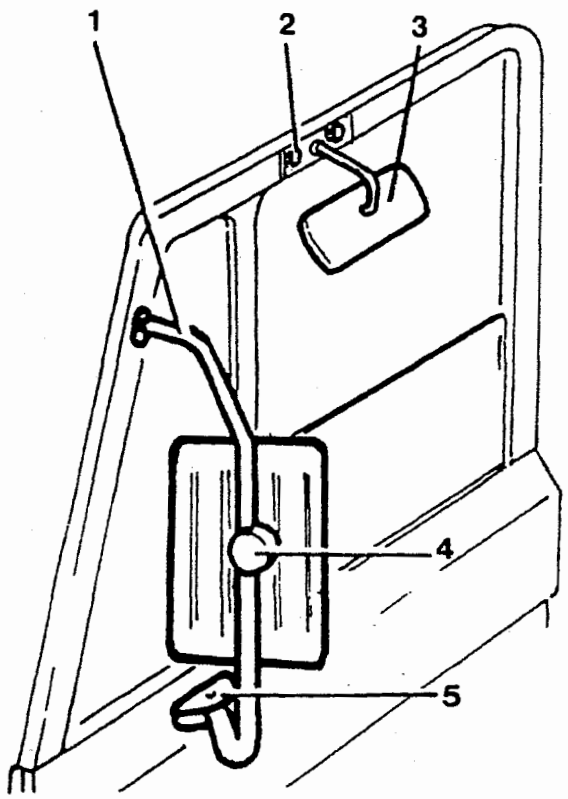
Mirrors

5 To remove rear view mirror, proceed as follows:

5.1 To remove mirror base, unscrew the two 'Pozidrive' screws from mirror base clamp (Fig 3(4)).

5.2 To remove rear view mirror assembly from cab, undo the bolt at top of arm (1) and the bolt at the bottom of the arm passing through the quadrant bracket (5).

5.3 To remove kerbside mirror assembly, unscrew the two mounting bolts (2) securing mirror base to cab.



1 Passenger side rear view mirror arm
2 Kerbside mirror mounting bolts
3 Kerbside mirror assembly
4 Rear view mirror base adjustment clamp
5 Bottom quadrant bracket

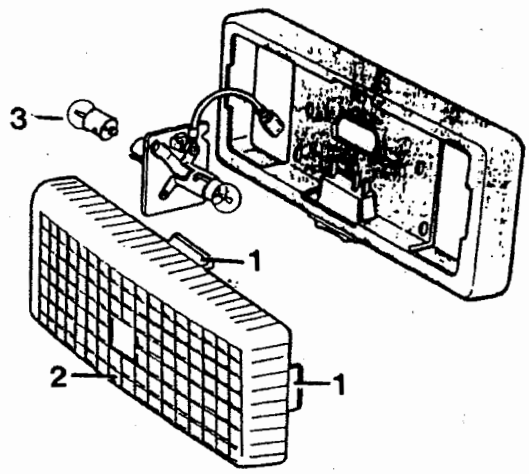
Fig 3 Rear and kerbside mirror mountings

Cab lights and lamps replacement

6 To replace lamps, proceed as follows:

Rear bulkhead lights

6.1 Depress indent tabs (Fig 4(1)) on reflector (2) and remove. Replace defective lamp(s) (3), (bayonet type fitting). Check lamp function before refitting cover.



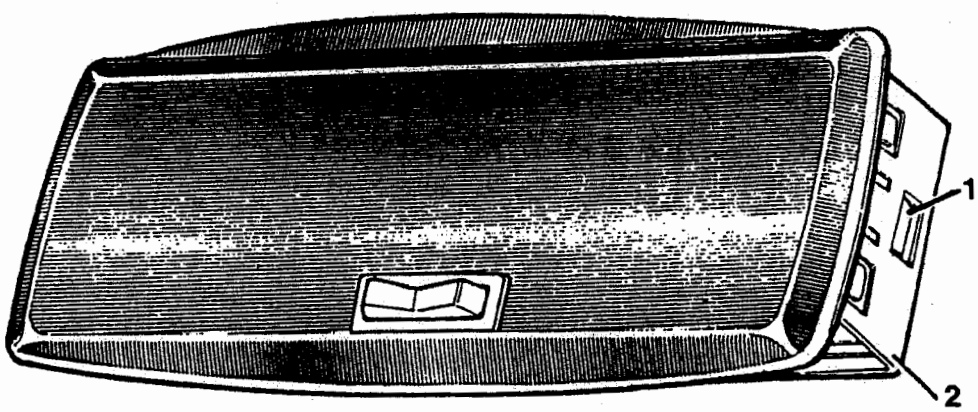
1 Reflector indent tabs 2 Reflector 3 Bayonet type lamp

Fig 4 Rear bulkhead light

Courtesy light

6.2 Mounted above each door. Push reflector to one side and lift out locating tab (Fig 5(1)) on opposite side and remove reflector. Replace faulty bayonet cap type lamp(s).

6.3 Check light function before refitting reflector.



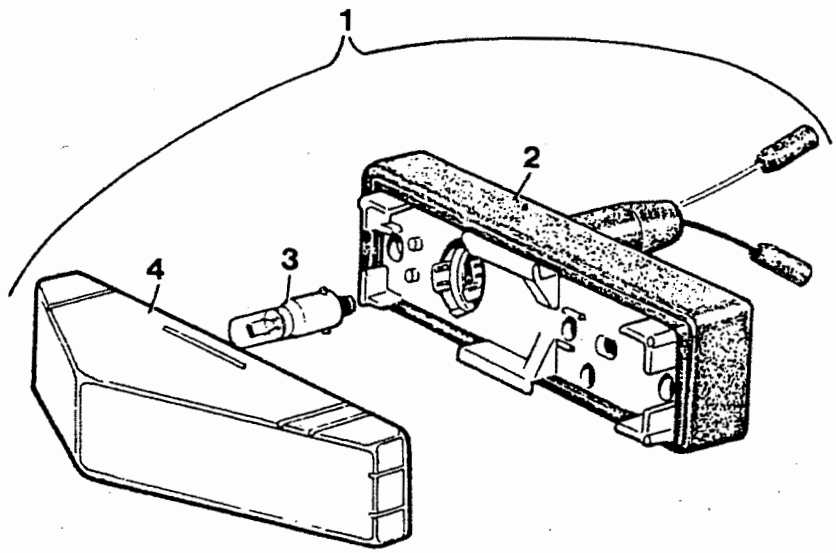
1 Reflector locating tab 2 Light assembly

Fig 5 Courtesy light

Cab side turn indicator lights

6.4 Gently prise rubber base (Fig 6(2)) from the reflector (4). Replace faulty bayonet cap type bulb (3). Check light now functions correctly.

6.5 Refit reflector by easing the rubber base with a small screwdriver or similar implement. Ensure that the rubber is seated firmly on the reflector and is water tight.



1 Light assembly
2 Rubber base
3 Bayonet cap bulb
4 Reflector

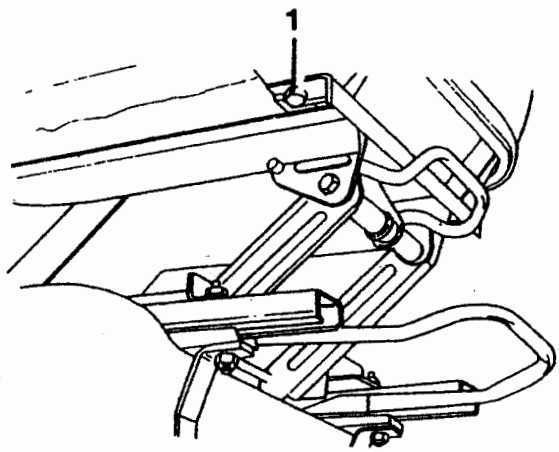
Fig 6 Cab side turn indicator light

Seats

7 To remove seat squab with back, proceed as follows:

Driver's seat squab and back

7.1 Unscrew the 4 set screws (Fig 7(1)) from captive nuts. Lift off seat from frame.

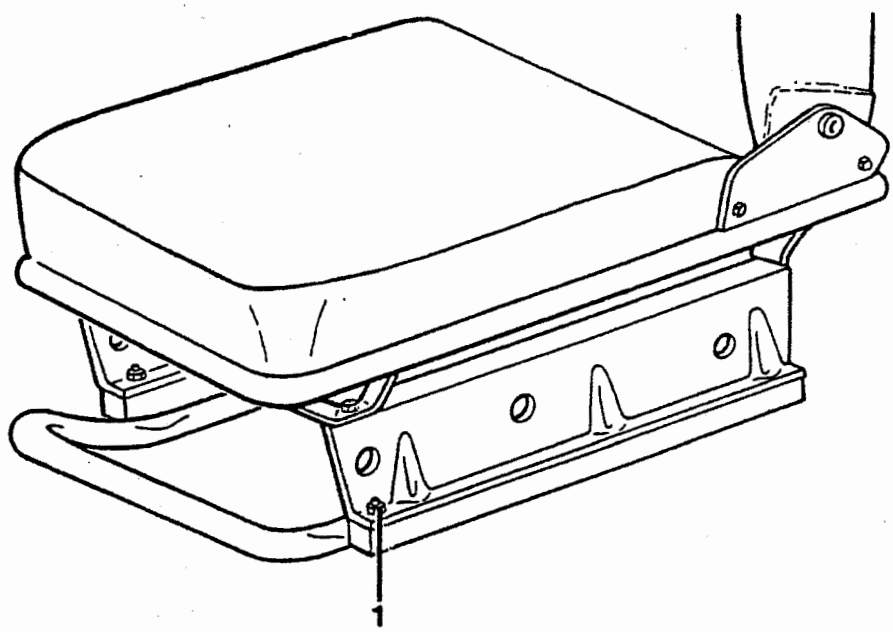


1 Squab retaining set screws

Fig 7 Driver's seat

Passenger's seat squab and back

7.2 Unscrew the 4 nuts and bolts (Fig 8(1)) holding the base frame to the seat. Lift off seat squab/back and frame.

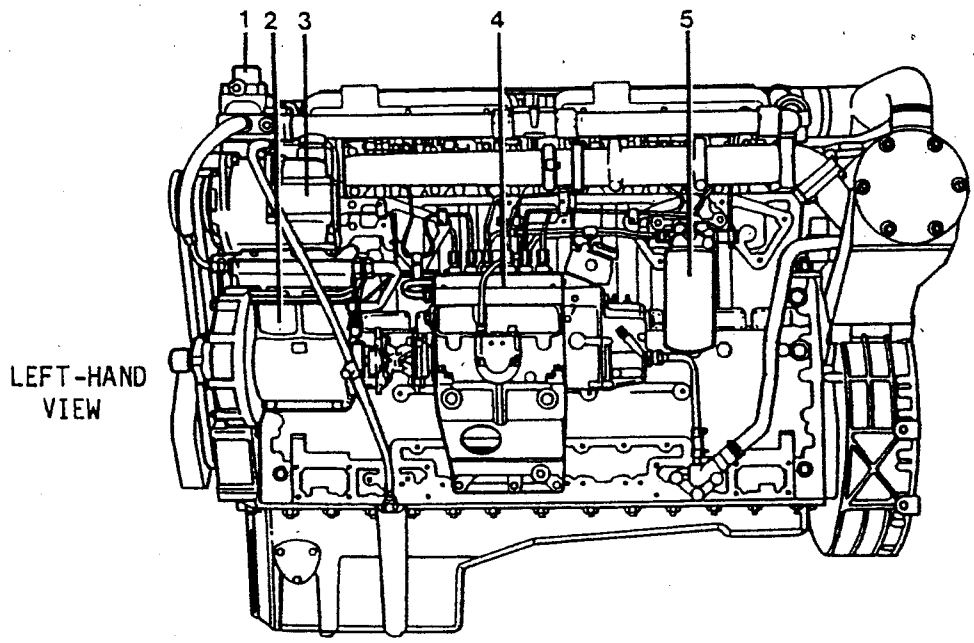


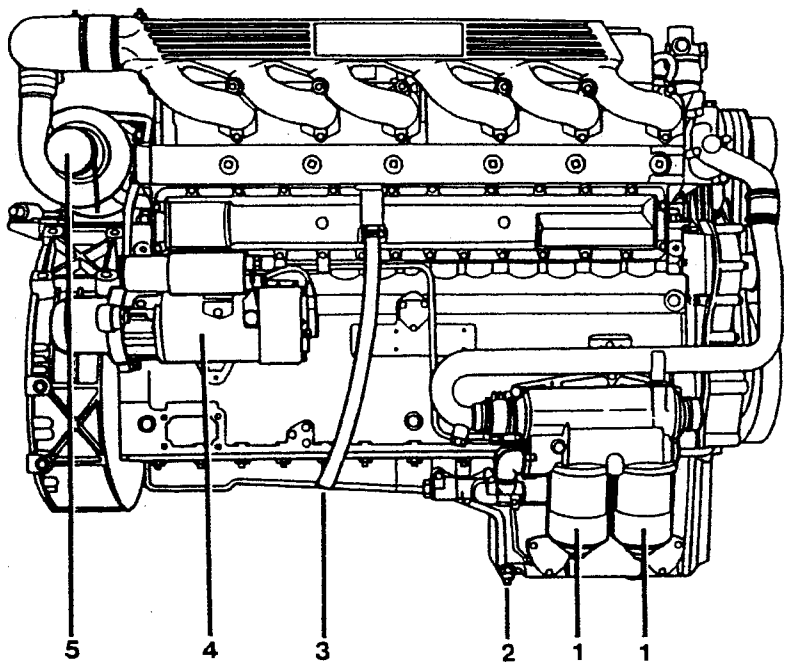
1 Frame retaining bolts

Fig 8 Passenger seat squab

ENGINE

8 The engine (Fig 9) is a Perkins Eagle 290L turbocharged diesel and user maintenance is as follows:





LH view			RH view		
1 Thermostat	4 Fuel pump		1 Oil filters	4 Starter motor	
2 Compressor	5 Fuel filter		2 Sump drain plug	5 Turbocharger	
3 Alternator			3 Crankcase breather pipe		

Fig 9 Perkins Eagle 290 L engine

Routine engine starting

WARNING ...

DO NOT REMOVE RADIATOR FILLER CAP WHILST ENGINE IS RUNNING. ANY MARKED LOSS OF COOLANT MUST BE INVESTIGATED.

9 For engine starting routine, proceed as follows:

9.1 Check that coolant level is about 76 mm (3 in.) below filler neck on radiator (ie up to the overflow in the filler neck). Top up if necessary with the correct coolant mix (see Maintenance Schedule AESP2320-N-502-601).

9.2 Check oil level in sump. Replenish if necessary to the 'full' mark on dipstick (see Maintenance Schedule AESP2320-N-502-601 for correct oil specification).

9.3 Check that fuel tank contains an adequate supply of fuel.

9.4 Ensure that the parking brake is on and that the main gearbox lever is in the neutral position. Check that the electrical master switch is turned on.

9.5 Turn the ignition switch key firmly and depress the accelerator fully. If the engine does not fire within 20 seconds, pause for 20 seconds to allow the battery to recover before making a further attempt. If after four unsuccessful attempts, investigate the cause.

9.6 After starting, run engine at 600 to 800 rpm until coolant temperature and oil pressure are suitable for higher loads and speeds.

9.7 For use of cold starting aid, see Chapter 3. Refer to para 39 for Cold Start System Servicing.

Adjustment of fan belts

WARNINGS ...

(1) DO NOT WORK UNDER AN UNPROPPED CAB.

(2) BEFORE ATTEMPTING ANY WORK ON THE VEHICLE'S ENGINE, ENSURE THAT THE VEHICLE ELECTRICAL MASTER SWITCH IS SET TO 'OFF'.

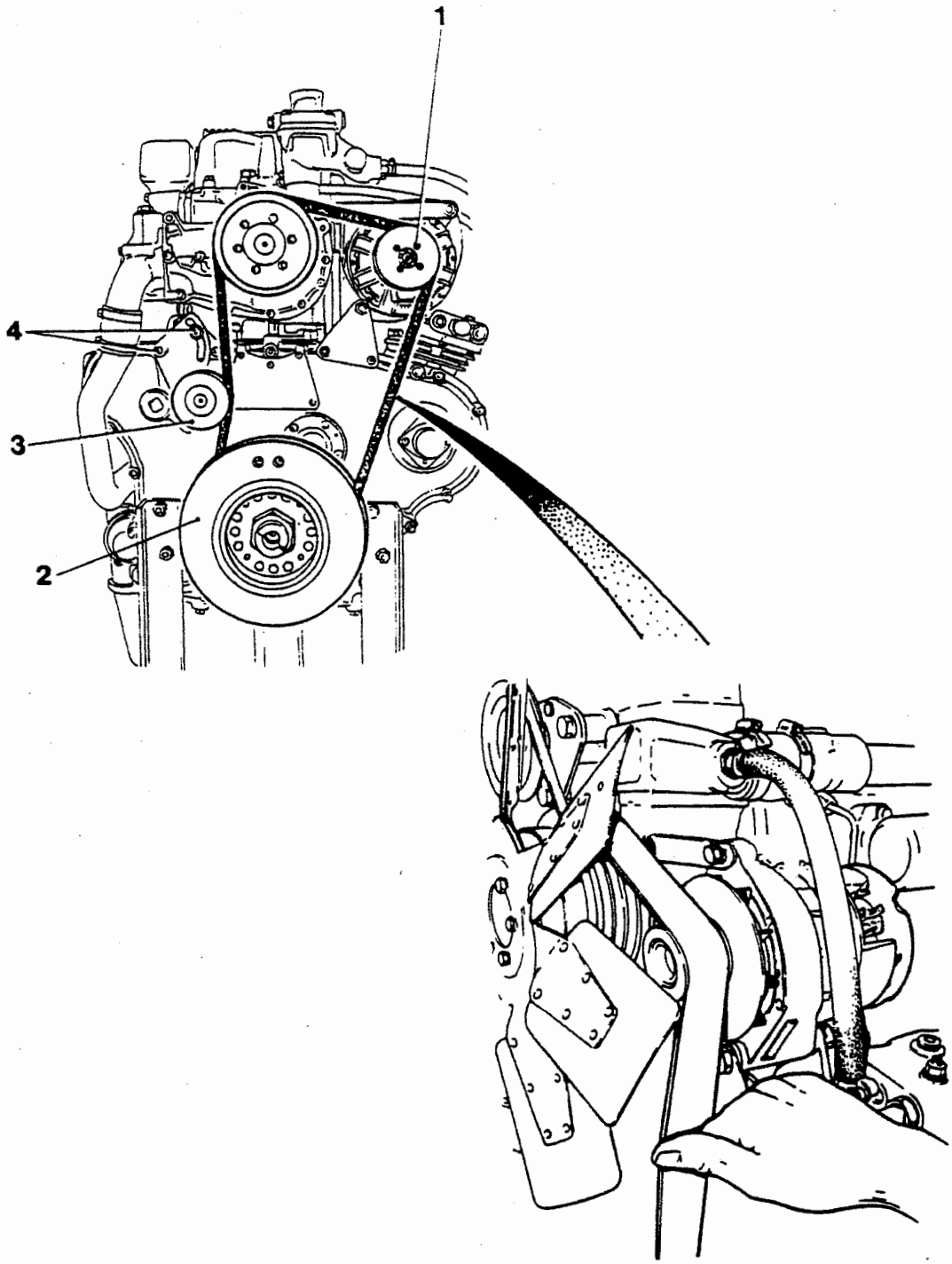
10 To adjust tension of fan belt(s) (either matched set of three - existing stock, or single, banded, 3 in 1 type - latest stock) as follows:

10.1 Slacken clamping nuts (Fig 10(4)) of jockey pulley (3) quadrant.

10.2 Rotate pulley quadrant to obtain correct belt tension. At correct tension a deflection of 0.5 in. is obtained at the mid point between the alternator and crankshaft pulleys (1 and 2), using moderate 'thumb pressure' (approximately 15 lbf). Tighten quadrant clamping nuts (4).

Note ...

Fan belt(s) removal/refitting (including fitting of new belts) is carried out at Level 2, using a belt tensioning gauge (where available) and tightening new belts to a higher initial tension.



1 Alternator pulley
2 Crankshaft pulley
3 Jockey pulley
4 Clamping nuts

Fig 10 Fan belt adjustment

Lubrication system

CAUTIONS ...

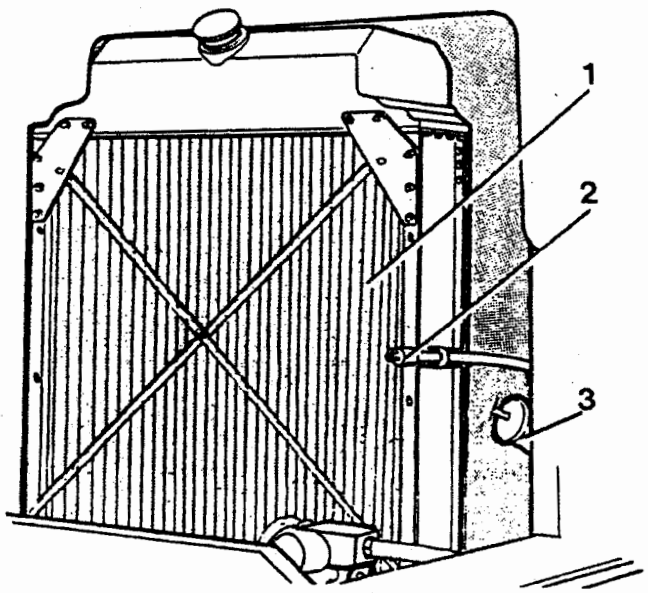
(1) Do NOT top up engine oil above the upper mark on the dipstick.

(2) Re-check oil level after a short initial run and top up as necessary.

11 To check engine oil level and change oil and filter, proceed as follows:

Engine oil level

11.1 Raise the cab front grille and to the right-hand side, when facing the radiator, (Fig 11(1)) will be seen the engine dipstick (2) and engine oil filler cap (3).



1 Radiator 2 Dipstick 3 Oil filler spout

Fig 11 Engine dipstick and oil filler positions

11.2 Remove the dipstick and wipe the blade end clean and replace.

11.3 Remove the dipstick again as soon as the full length has been inserted and note the oil level. Should the oil level be low, remove the filler cap and top up engine sump as required. The filler cap (3) is of an expanding bung type and is unscrewed by rotating the 'T' bar anti-clockwise (after wiping clean of any loose dirt).

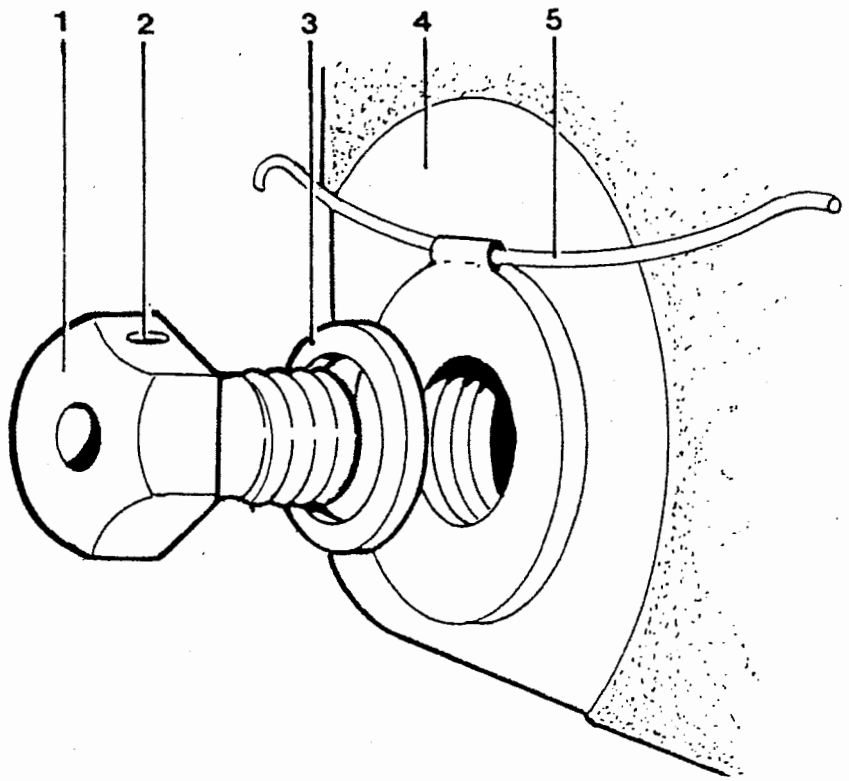
11.4 When re-capping the filler spout, tighten 'T' bar until the bung is felt to be gripping the spout.

11.5 Consult Maintenance Schedule 2320-N-502-601 for recommended lubricant.

Engine oil change

11.6 Before changing oil, ensure that vehicle is on level standing. A hexagonal drain plug (Fig 12(1)) is fitted to the base of the sump. Undo the locking wire (5), remove the plug and drain the hot oil after engine shutdown, before deposits have settled. Remove and discard joint washer (3).

11.7 Refit drain plug complete with new joint washer. Tighten to the recommended torque figure given in Maintenance Schedule AESP 2320-N-502-201. Fasten the locking wire to the plug, renewing the wire if necessary.



1 Drain plug
2 Plug hole for locking wire
3 Joint washer
4 Engine sump
5 Locking wire

Fig 12 Sump oil drain plug

11.8 Wipe the area around the filler cap (Fig 11(3)) before removal to prevent dirt from entering lubrication system. Use a clean container and funnel, pause periodically during filling and check level on the dipstick. For correct oil type, see Maintenance Schedule AESP 2320-N-502-601.

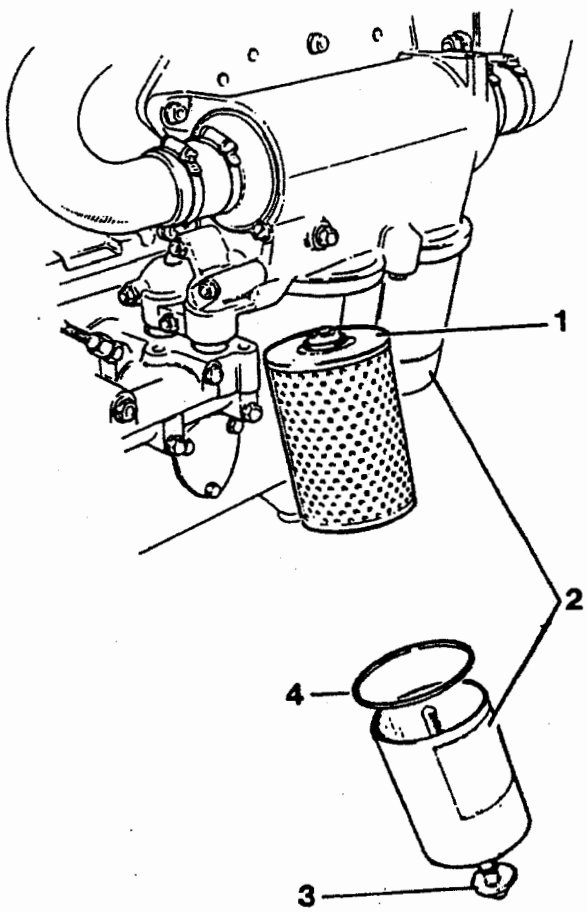
Oil filter change

11.9 During an oil change the two oil filters should be changed. These are mounted on the right-hand side of the engine (ie driver's side) (Fig 13). Each filter bowl (2) houses an expendable element (1) and is secured by a central fixing bolt (3). To change the filter, proceed as follows:

11.10 Remove the filter bowls by unscrewing the central bolts. Discard the used elements and clean the bowl components.

11.11 Fit new elements and joint rings (4), fill the bowls with clean engine oil and reassemble them onto the headers. Tighten the central bolts to the recommended torque figure given in Maintenance Schedule AESP 2320-N-502-601.

11.12 Run engine and check for oil leaks.



1 Expendable element 2 Filter bowls 3 Centre fixing bolt 4 Joint ring

Fig 13 Oil filter bowls

Fuel system

Main fuel filter change

CAUTION ...

Do not over-tighten the new fuel filter canister.

12 To maintain fuel system components, proceed as follows:

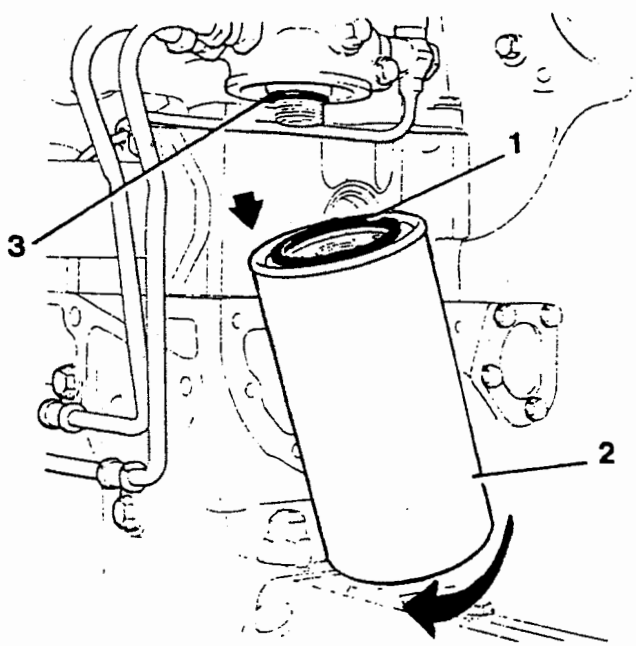
12.1 The fuel filter element is a spin-on type mounted on a header bracket situated on the left-hand side of the engine (ie passenger side) (Fig 14).

12.1.1 If possible, drain fuel from the header by removing the ¼ in. BSP plug. Unscrew the canister (2) (using the special wrench, No GA 5074), if difficult to remove. Discard canister. Have replacement filter to hand in order to avoid fuel syphoning from system.

12.1.2 Clean the seal contact faces and fit new seals (1 and 3).

12.1.3 Screw on the new canister (2) until joint faces are just in contact with seals, then tighten by hand, a further three quarter turn.

12.1.4 Venting is automatically provided by an internal stack pipe, although it is advantageous to charge the new filter with fuel oil as an aid to venting. Run engine and check for fuel leaks. Engine should be run on throttle, not tick-over.



1 Seal ring 2 Element canister 3 Seal ring

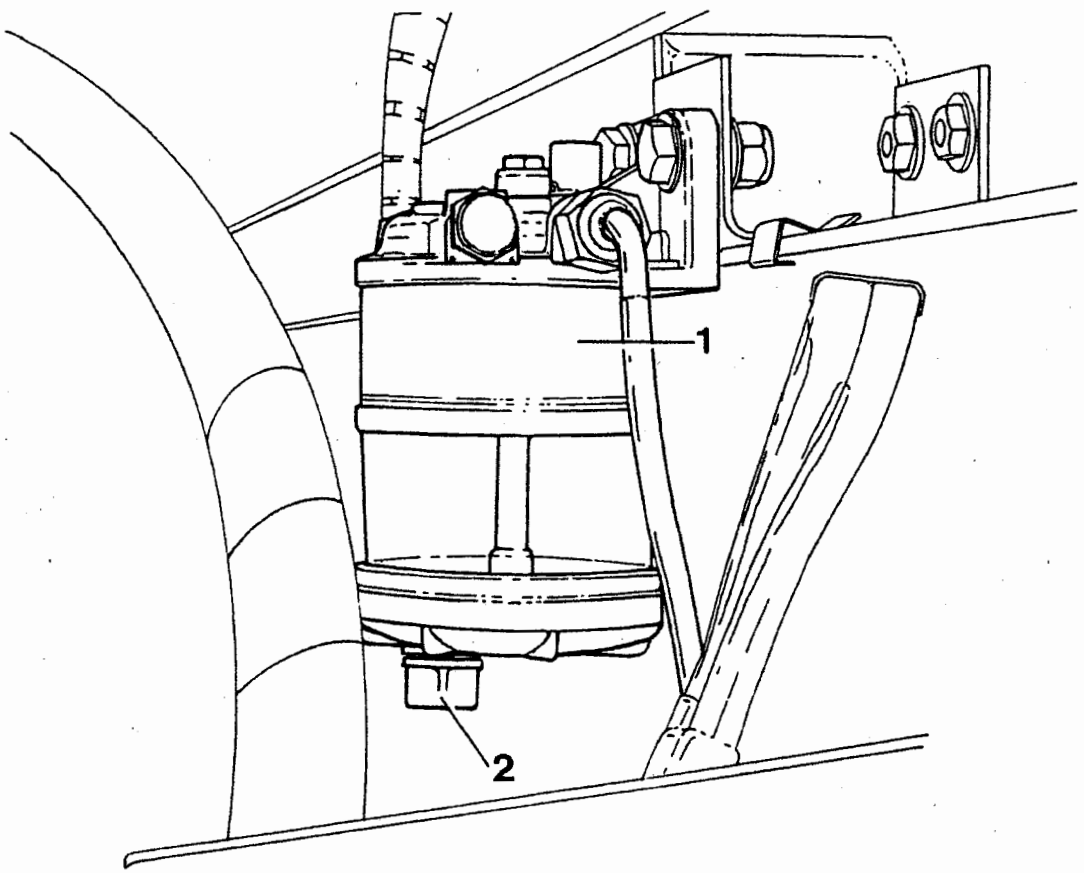
Fig 14 Main fuel filter

Sedimenter

12.2 Behind the cab, passenger side, and mounted on the fuel tank sub-frame, is the fuel sedimenter (Fig 15).

12.2.1 The purpose of the sedimenter is to separate any moisture suspended in the fuel contained in the system.

12.2.2 The collected moisture should be drained from the sedimenter at regular intervals in accordance with Maintenance Schedule AESP 2320-N-502-601. This is done by turning the drain plug (2) found at the base of the bowl (1).



1 Sedimenter 2 Drain plug

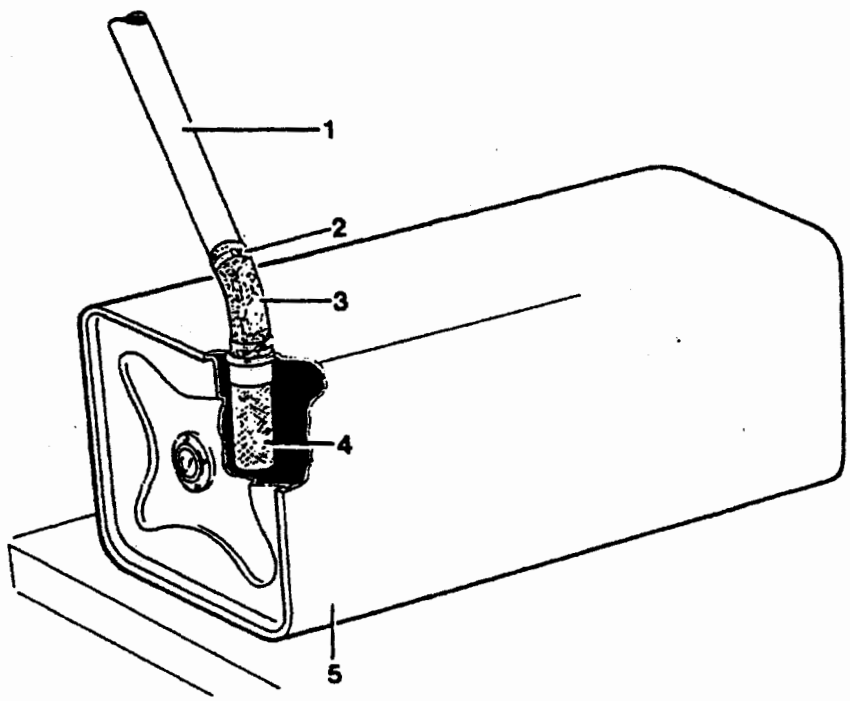
Fig 15 Fuel sedimenter

Fuel tank strainer

12.3 In accordance with the Maintenance Schedule AESP 2320-N-502-601, the fuel tank strainer should be removed and cleaned.

12.3.1 To remove the strainer (Fig 16(4)) from the fuel tank (5), slacken off the 2 hose clips (2) holding the rubber bend (3) to the filler pipe (1) and tank.

12.3.2 Pull the rubber bend (3) away from the tank top and lift out the filter by hooking the small bar seen on the inside of the filter barrel.



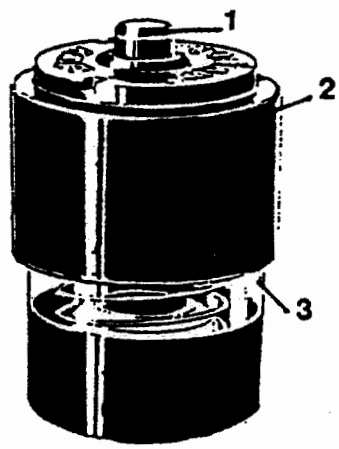
1 Filling pipe
2 Hose clips
3 Rubber bend
4 Fuel strainer
5 Fuel tank

Fig 16 Fuel tank filler strainer

Engine air cleaner

Servicing

13 During regular inspection of the air filter restriction indicator, if the red sleeve (Fig 17(3)) is visible the air cleaner must be serviced immediately, proceed as follows:



1 Reset button 2 Indicator assembly 3 Observation sleeve

Fig 17 Air cleaner restriction indicator

13.1 To service air cleaner, remove end cover (Fig 18(4)) by unscrewing centre hand wheel. Note end cover ring seal (3) and take care this is not damaged during removal.

13.2 Release element wing nut assembly (2) and carefully withdraw the standard element (1). Damaged elements must be replaced immediately.

13.3 Release element nut assembly (6) and carefully withdraw the secondary element (5). Damaged elements must be replaced immediately.

NOTE

The secondary element requires change only at every third change of the standard element.

13.4 Direct air pressure through both elements in reverse direction to normal flow (i.e. blowing through element middle outwards).

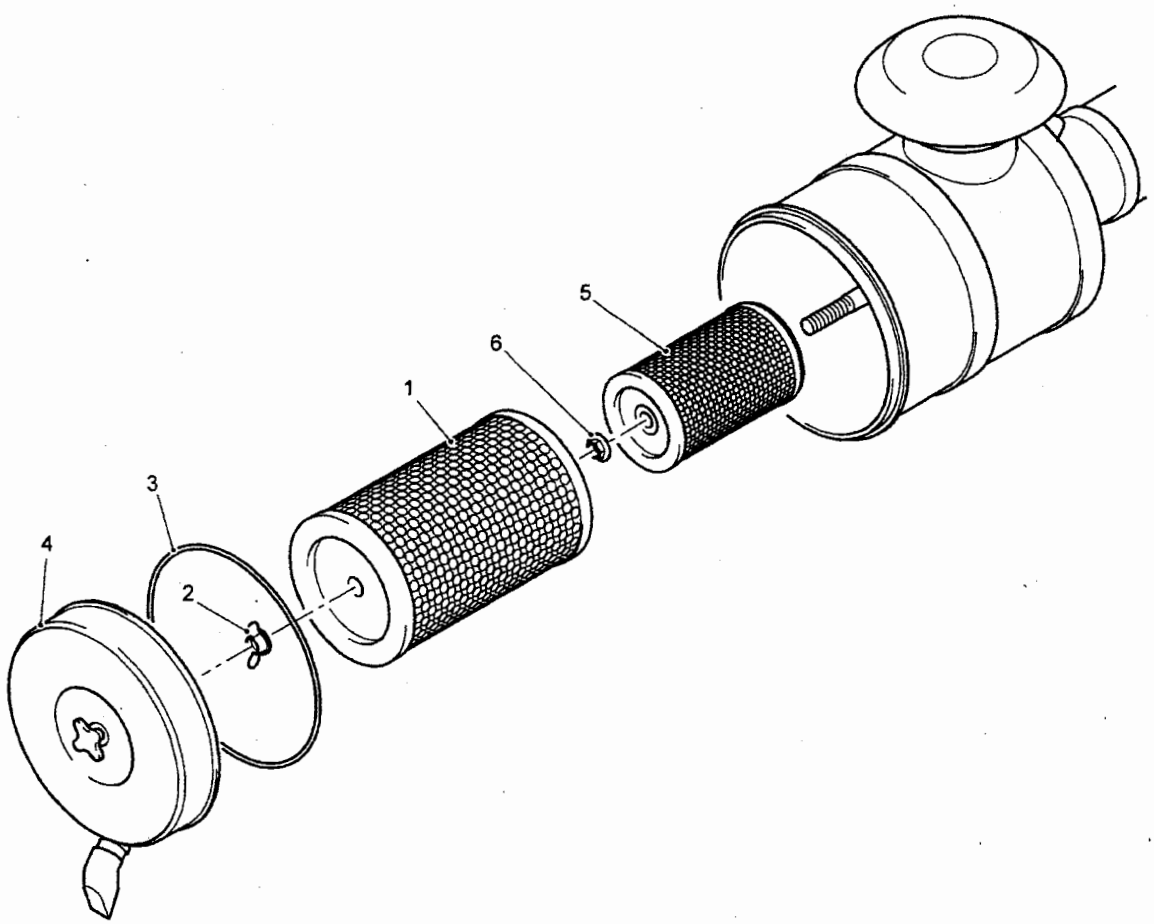
13.5 Move air nozzle up and down pleats whilst slowly rotating element. Keep the air nozzle at least 25 mm (1 in.) from pleated paper. Air pressure must not exceed 5.6 kg/cm^2 (80 lbf/in^2). Otherwise the elements will be damaged.

13.6 Following cleaning, inspect elements by placing a bright light inside and examine for thin spots, pin holes or slight breaks. Any such fault will render the element unfit for service.

13.7 After removal of elements, wipe the inside of the body clean with a damp cloth, taking care not to knock any residual dust into the engine intake pipework.

13.8 Re-assemble cleaner, examining end cover ring seal (Fig 18(3)) to ensure condition is satisfactory.

13.9 Re-set restriction indicator (Fig 17) by pressing button (1) situated at the top. The indicator function can be tested by applying mouth suction at its base. The red sleeve will appear and is reset again by the button.



1 Standard element
2 Wing nut assembly
3 End cover ring seal
4 End cover
5 Secondary element
6 Nut assembly

Fig 18 Air cleaner

TRANSMISSION

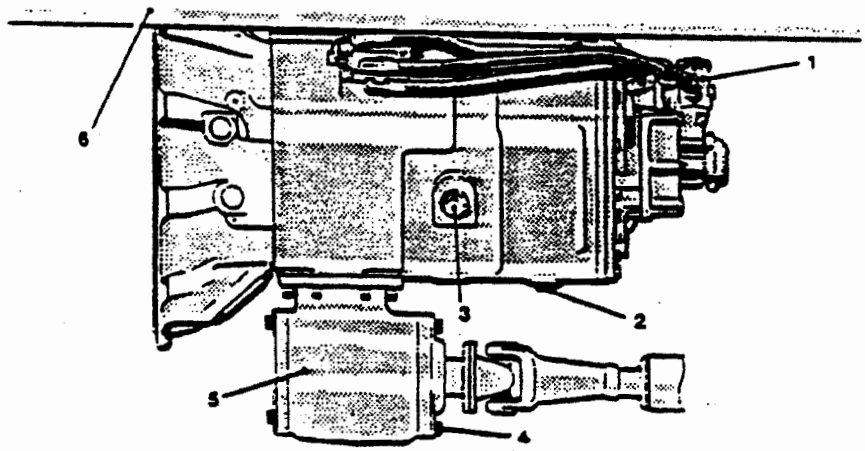
14 The maintenance of the main transmission components is as follows:

MAIN GEARBOX

CAUTION

Low oil level in main gearbox will cause damage to moving parts, overfilling will cause overheating and force oil out of the case breather, front and rear seals.

15 Drain gearbox (Fig 19) while oil is warm by removing the 3/4in. Dryseal drain plug (2) at the bottom rear of the gearbox. Remove PTO bolt (4) to allow oil to drain from PTO (5). Refit drain plug (2) and PTO bolt (4).



1 Air filter	3 Filler plug	5 PTO
2 Drain plug	4 PTO bolt	6 Chassis sidemember

Fig 19 Main gearbox and PTO

15.1 Flush the gearbox with flushing oil or petroleum spirits. Fill the gearbox with flushing fluid, idel engine with the clutch engaged and gearbox in neutral for one minute. Drain the flushing fluid, wipe removed drain plug and PTO bolt of any residual dirt and re-install.

15.2 Refill the gearbox with the recommended oil (See Maintenance Schedule AESP 2320-N-502-601) to the level of the filler plug (3). Ensure oil is level with the filler opening. It is possible to reach the oil with an index finger but this does not mean oil is at proper level. Correct oil level is achieved when slight overflow takes place at filler plug hole, vehicle on level standing.

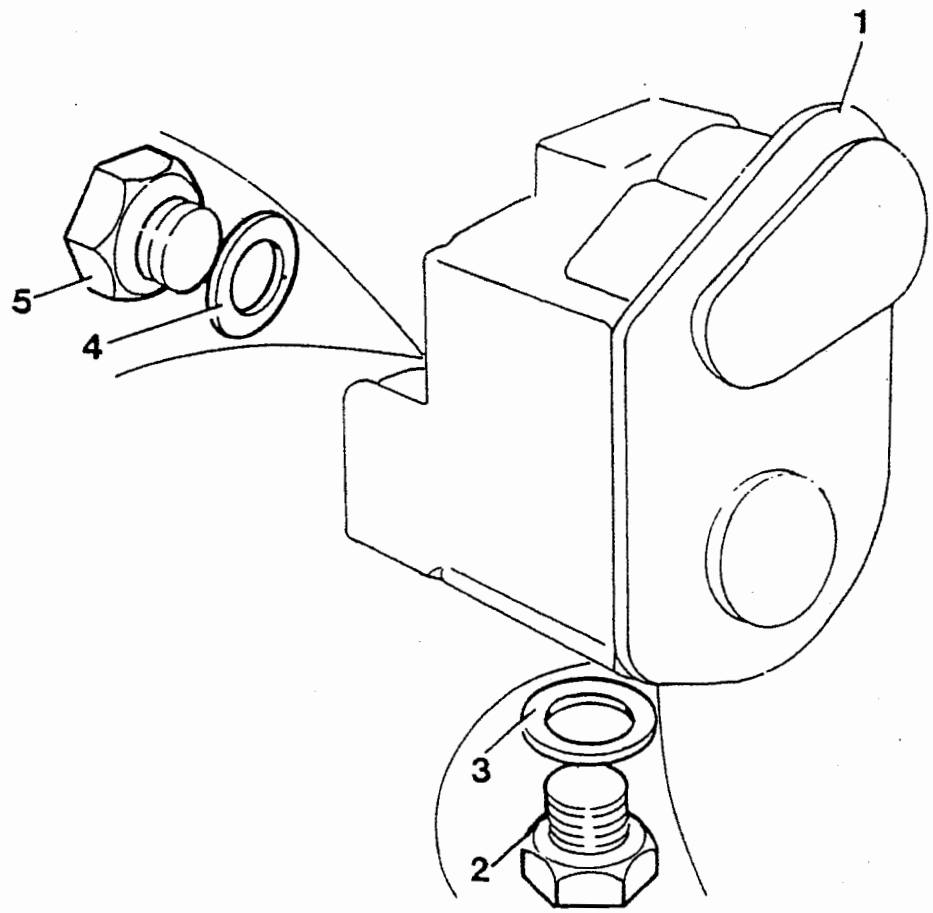
15.3 When changing the gearbox oil, it is recommended that the element of the air filter (1) (fitted to the regulator valve on the back plate of the gearbox) is changed at the same time.

15.4 To remove element, unscrew hexagonal cap from top of filter and remove element. Renew cap screw and element 'O' rings if necessary.

Transfer gearbox

16 To drain oil from transfer gearbox, proceed as follows:

16.1 Drain transfer gearbox while oil is warm and vehicle is on level standing, by removing the drain plug from the bottom of the case (Fig 20(2)). No flushing agent is required.



1 Transfer gearbox case
2 Drain plug
3 Drain plug washer
4 Filler plug washer
5 Filler plug

Fig 20 Transfer gearbox

16.2 Clean off any residual dirt from the drain plug and refit, renewing the sealing washer if necessary. Remove the oil filler/level plug (Fig 20(5)) found at the front of the transfer gearbox, driver's side and refill with new oil. For correct lubricant refer to Maintenance Schedule AESP 2320-N-502-601. Correct oil level is when the tapped hole for the filler plug is reached.

16.3 Wipe clean the filler/level plug, renew the sealing washer if necessary and refit plug.

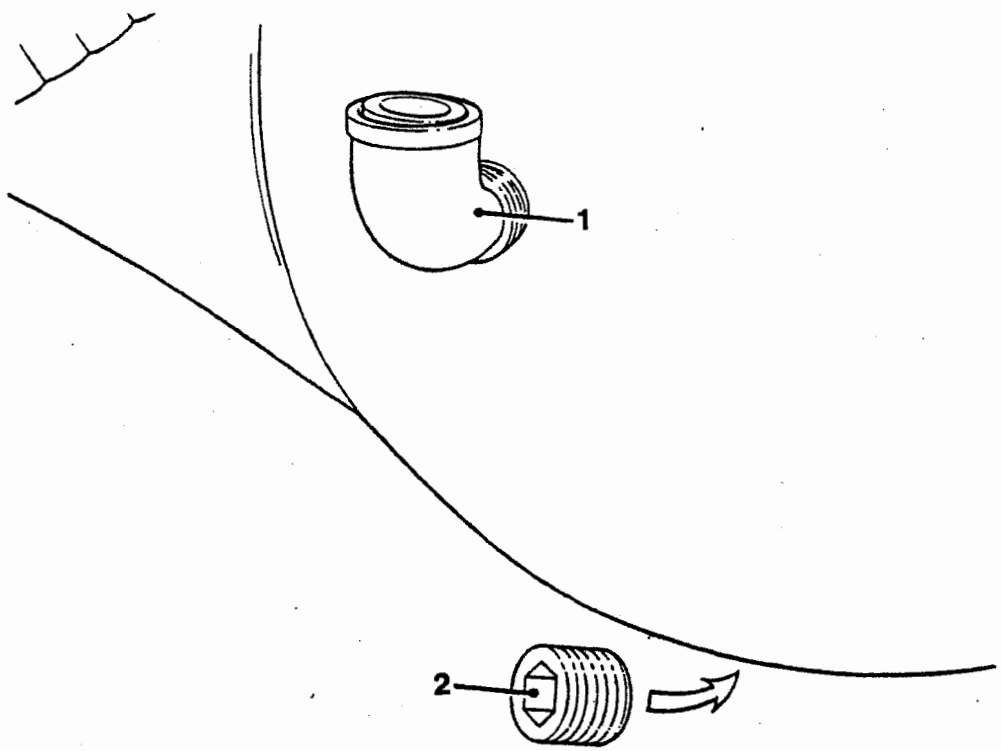
Axles

17 To drain oil from bogie axles and steer axles proceed as follows:

17.1 Drain axle while oil is warm by removing the drain plug (Fig 21(2)). This will require a 15 mm (9/32 in.) socket wrench. Wipe clean the drain plug and replace.

17.2 Remove filler plug (1) with 15 mm socket wrench from axle casing spout and refill with new oil as specified in the Maintenance Schedule AESP 2320-N-502-601. The correct level is achieved when oil is seen just entering the bottom of the filler spout, vehicle on level standing.

17.3 Clean off any dirt from filler spout plug and refit.



1 Filler spout and plug 2 Drain plug

Fig 21 Axle casing filler and drain plugs

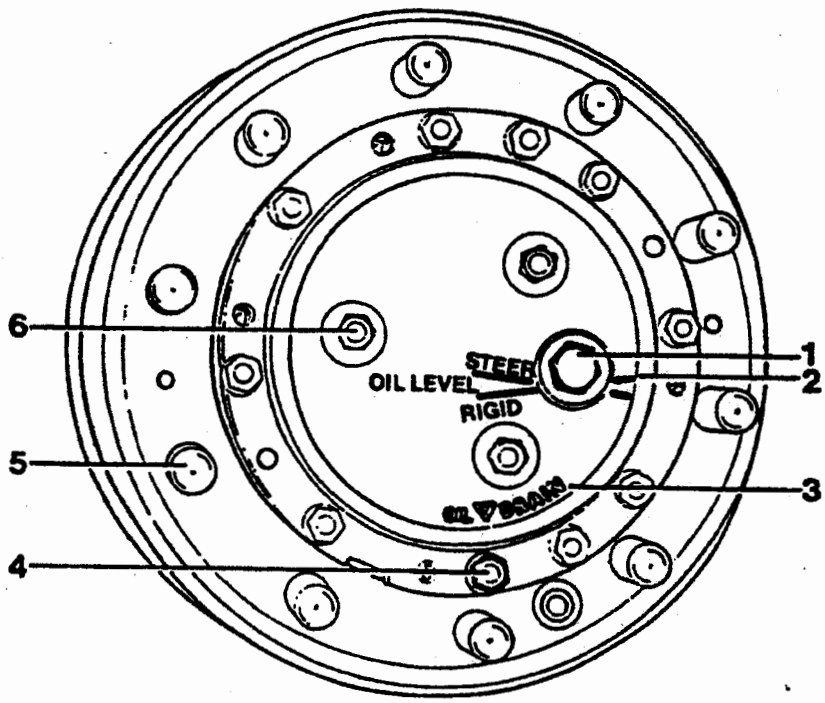
Hub reduction units

CAUTION

Do not undo the three planet carrier plugs (Fig 22(6)) as these support internal gears. The correct plug (1) is marked 'OIL LEVEL'.

18 To drain the oil, proceed as follows:

18.1 Preferably drain hub when oil is warm. Apply parking brake and chock wheels that are to remain on the ground. Jack up vehicle and deploy suitable supports.



1 Filler/level plug
2 Oil level marks
3 Oil drain indication
4 Oil drain plug
5 Wheel nut studs
6 Planet carrier plugs

Fig 22 Hub reduction unit oil drain and filler plugs

18.2 Release parking brake and rotate hub until the planet drain plug (4) is at the lowest point. Note arrow and indication (3).

18.3 Using a 1.16in. AF socket, remove the planet level plug (1) and washer.

18.4 Using a 3/4in. AF socket, remove the drain plug (4) and drain oil. Clean plug and refit, tighten to torque loading figures given in Maintenance Schedule AESP-2320-N-502-601.

18.5 Move hub until the appropriate oil level line is horizontal (i.e. 'RIGID' for bogie axles and 'STEER' for front axles). Refill with new oil in accordance with the specification given in Maintenance Schedule AESP 2320-N-502-601. It will be noted that the oil capacities are identical for the axle differentials, this is because there is a common passage between hub and differential on rear axles. Front axle hub and differential are separate. Hub and differential oil changes obviously take place at the same time, but it is important that when recharging the axle with oil, some of the capacity is poured through the hub filler. Approximately 1.5 litres (2.5 pints) is retained in the hub. Wipe clean and refit oil filler/level plug and washer, tighten to figures given in Maintenance Schedule AESP 2320-N-502-601.

Wh Is and tyres

Wheel mounting and tightening

WARNING

CARE MUST BE TAKEN DURING THIS OPERATION AS THE ROAD WHEEL ASSEMBLY IS A VERY HEAVY ITEM

CAUTIONS

(1) The most important factory in wheel fitting is that the correct torque load is applied to the wheel nuts. INSUFFICIENT TORQUE can cause wheel loss, stud damage, nut damage, cracked wheels and excessive wear to wheel and hub faces. EXCESSIVE TORQUE can cause stud and nut breakage leading to possible wheel loss.

(2) If an In-calibration torque spanner is not available when the wheel nuts are tightened, the nut torque loadings must be checked at the first availabl opportunity.

(3) Be careful of oncoming traffic when changing wheels at the roadside, particularly when using the spare wheel davit where traffic drives on the right hand side of the road.

(4) The tyre tread pattern on the XL tyre is single directional (Fig 26). The tyre tread pattern on the XZL tyre is multi-directional. (Fig 26a) The vehicle may be fitted with either XL or XZL pattern tyres. XZL tyres must be fitted to the front axle. XL and XZL tyres must not be mixed on the same axle. Incorrect fitting will cause high rat of tyre wear and may cause uneven braking. Where incorrect fitting is unavoidable, correct fitting is to be made at the earliest opportunity.

(5) If the spare wheel/tyre assembly is an approved alternative to the assembly to be removed, (ie different rim size, or tubed/tubeless tyre), take note that mixing wheel sizes on the front axle is NOT recommended and that mixing of tubed and tubeless tyres on a vehicle is NOT recommended. If, in an emergency, such mixing of wheels/tyres is unavoidable, correct fitting is to be made at the earliest opportunity.

19 With vehicle jacked up and suitably supported and chocked, ensure that the hub is clean and smooth and the wheel stud threads are clean and undamaged, proceed as follows:

19.1 Place wheel onto hub and studs, taking care not to damage the stud threads. Offer the 10 wheel nuts onto the studs and tighten in three stages as follows, and in the sequence shown in Fig 23.

NOTE

Driver's side wheel nuts are right hand (rh) thread and passenger side wheel nuts are left hand (lh) thread.

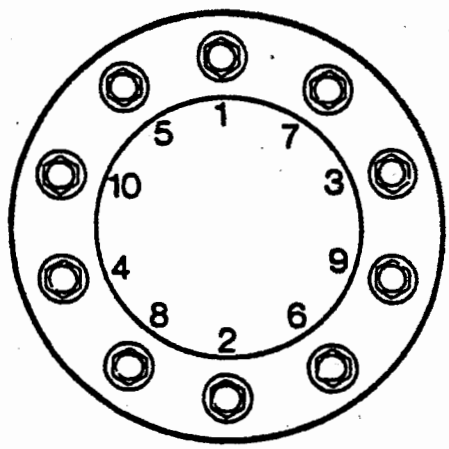


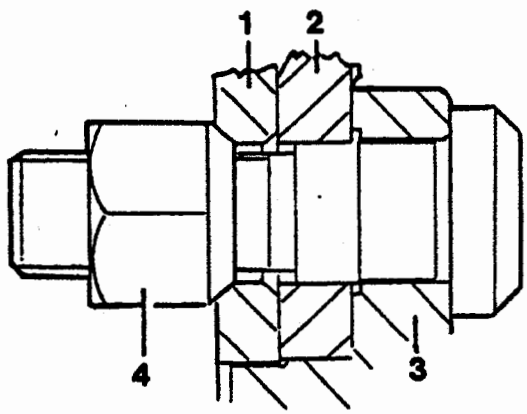
Fig 23 Wheel nut tightening sequence

19.2 Tighten wheel nuts slightly until wheel rim is in full contact with brake drum (Fig 24).

19.3 Then tighten wheel nuts (dry) to 258-290 Nm (190-210 lbf ft).

19.4 Finally, tighten wheel nuts (dry) to 515-569 Nm (380-420 lbf ft).

19.5 Run the vehicle for approximately 50 Km and subsequently check wheel nut torque and retighten if required.



1 Wheel 2 Brake drum 3 Hub 4 Wheel nut

Fig 24 Wheel/hub arrangement

Tyre inflation

WARNINGS

(1) THROUGHOUT THE TYRE INFLATION PROCEDURE, THE OPERATOR MUST NOT STAND IN THE LIKELY TRAJECTORY OF ANY PART OF THE WHEEL OR RIM IN THE EVENT OF A TYRE BURST.

(2) IF A TYRE IS TO BE INFLATED WITH THE WHEEL ASSEMBLY OFF THE VEHICLE, STAND THE WHEEL UPRIGHT LEANING AGAINST A WALL, OR SIMILAR, WITH THE DETACHABLE COMPONENTS OF THE WHEEL ASSEMBLY FACING THE WALL, THEN PROCEED WITH TYRE INFLATION.

CAUTION

Ensure that tyres are inflated to correct pressure to suit operation conditions.

20 Heat is generated in tyres due to flexing. Excessive flexing results from under-inflation, over-inflation and overloading. Tyre temperatures can soar to dangerously high levels on a vehicle at sustained high speeds if overloading and under-inflation are present (Fig 25). Observe correct inflation and use requirements as follows:

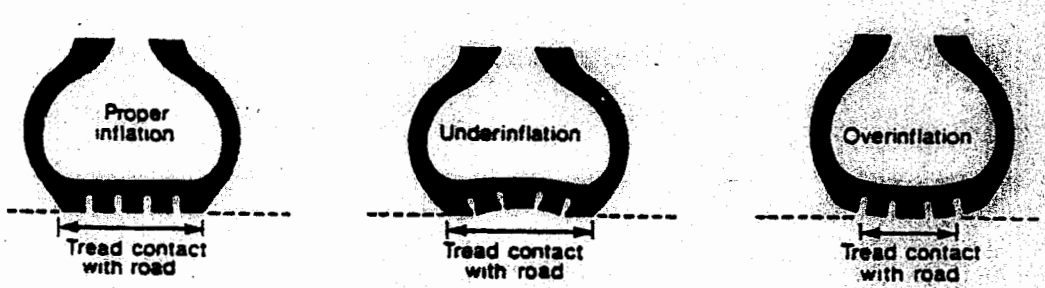


Fig 25 Tyre inflation condition

20.1 The speed limitations for the tyres on this vehicle are as follows:

Ambient temperature	Maximum speed
Up to 30°C	70 km/h (43 mile/h)
Over 30°C up to 50°C	60 km/h (37 mile/h) or 70 km/h (43 mile/h) for 70 km (43 miles) followed by 1 hours stop.

20.2 The tyre pressures (speeds as above note) are as follows:

Sustained highway use 6.75 bar (98 lbf/in2).

Mixed highway and off highway 4.0 bar (58 lbf/in2) at 65 km/h (40 mile/h) maximum journey length 50 km (31 miles).

20.3 The pattern tread of the XL tyres fitted to this vehicle are single directional and should only be fitted in the correct way (Fig 26). Incorrect fitting will cause high rate of tyre wear and uneven braking.

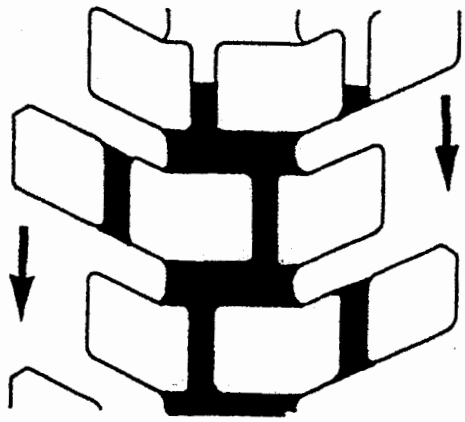


Fig 26 XL pattern tyre - correct direction

20.4 The pattern tread of the XZL tyres fitted to this vehicle are Multi-directional (Fig 26A). XZL pattern tyres **must** be fitted to the front axle at all times. The rear axles may be fitted with either XL or XZL tyres but are not to be mixed on the same axle. Incorrect fitting will cause high rate of tyre wear and uneven braking. Note should be taken of this fact when using the spare wheel. Where incorrect fitting is unavoidable, correct fitting is to be made at the earliest opportunity.

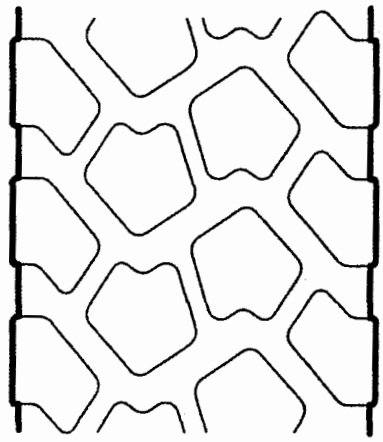


Fig 26A XZL pattern tyre

CONTROLS

WARNING

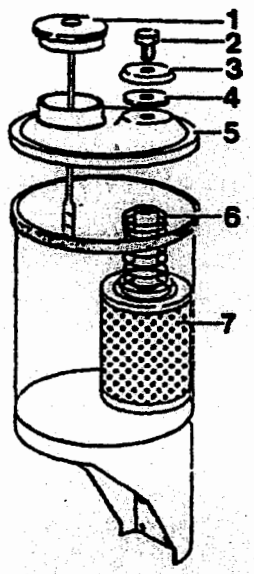
ALL PERSONNEL ARE TO STAND CLEAR WHEN CAB IS BEING RAISED OR LOWERED. WHEN PERFORMING THE RAISING OR LOWERING FUNCTION, STAND CLEAR OF PIVOTING CAB. NEVER WORK UNDER AN UNPROPPED CAB (SEE CHAPTER 3, PARA 24).

Hydraulic steering system

CAUTION

With cab tilted and no power assistance to the steering, (i.e. engine not running) do not attempt to move (steer) front wheels by use of steering wheel. Heavy loading could result on downshaft with possible subsequent damage.

21 The hydraulic oil reservoir for the steering system is chassis mounted beneath the cab, driver's side (Fig 27). To check oil level and change filter element, ensure that front wheels are in the 'straight ahead' steering position, then proceed as follows:



1 Filler cap/dipstick
2 Filter element securing screw
3 Washer
4 Washer
5 Cap
6 Element spring
7 Filter element

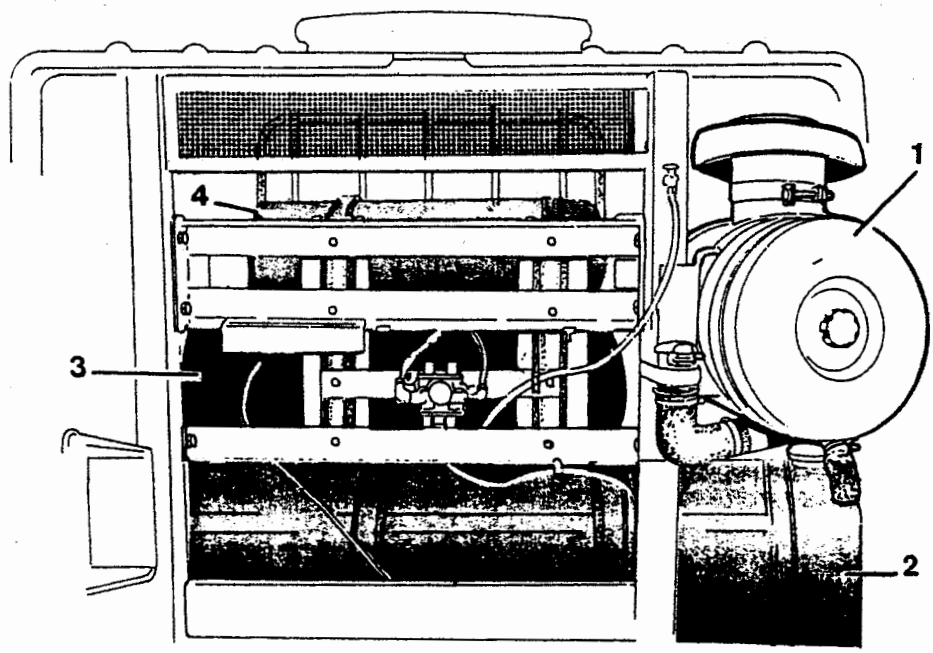
Fig 27 Hydraulic oil reservoir (steering system)

21.1 Tilt the cab and when clear, prop in position. Unscrew the reservoir filler cap (Fig 27(1)), wipe the attached dipstick clean, re-dip the oil and note oil level indicated. Top up if necessary. The need for any large or frequent additions of oil should be investigated (ie possible leak).

21.2 To remove oil filter element (7), unscrew the securing set screw (2) which will allow the cap assembly (5) to be removed. Lift off element spring (6) and remove filter element (7). Clean element with a suitable fluid, shake or blow off any surplus liquid and refit in reverse order to removal.

Air system

22 The general routine maintenance for the air system is to purge the air reservoirs mounted behind the cab (Fig 28) of residual moisture.



1 Air cleaner 2 Fuel tank 3 Air reservoir 4 Air reservoir

Fig 28 Air reservoirs - mounting position

22.1 The action is facilitated by centrally located remote controls for the reservoir purge valves (Fig 29).

22.2 Mounted at the rear of the cab, driver's side, behind the steps, will be seen a block with 5 yellow painted tug cord rings. Pull the wire cords and hold for several seconds to purge air reservoirs (refer to the adjacent instruction label). Purge valves will return automatically on release of cords.

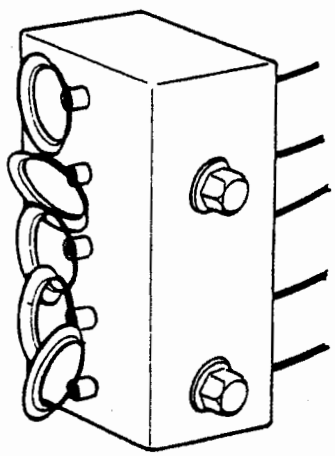


Fig 29 Air reservoir drains

22.3 Fitted into the compressor discharge air line to the reservoirs is an air dryer (Fig 30). The dryer is chassis mounted, to the rear of the cab, driver's side, behind the lower equipment locker.

22.4 The purpose of this dryer is to remove water vapour, oil, carbon and dirt from compressed air before the air enters the braking system air reservoirs.

22.5 The dryer is self-purging and the desiccant absorbing material regenerates, consequently there is no maintenance required at 'Operating' level. However, when air reservoir drains are being operated, any expellation of moisture seen at the drains (mounted at the bottom of each reservoir) will indicate that the dryer requires attention.

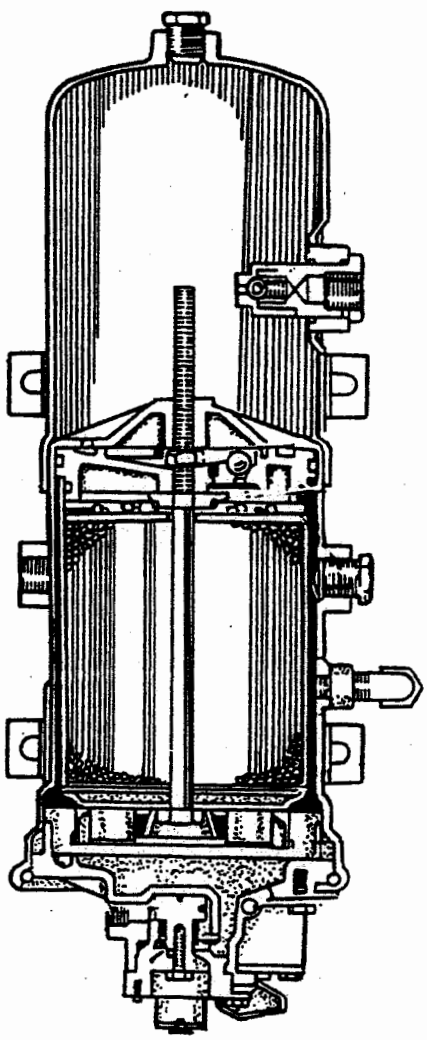


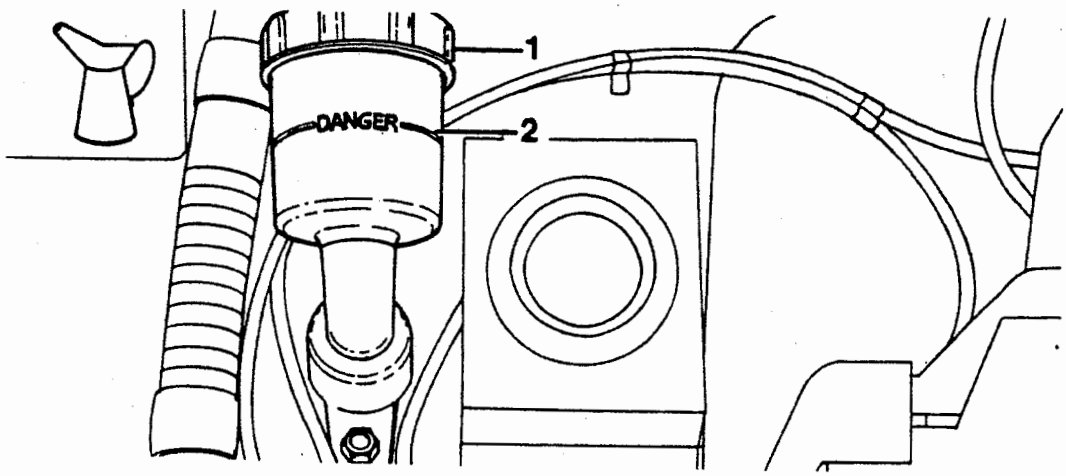
Fig 30 Compressed air dryer

Hydraulic clutch reservoir

23 To top up reservoir (Fig 31), refer to Maintenance Schedule AESP 2320-N-502-601 for correct type of hydraulic oil and proceed as follows:

23.1 Lift the front grille and when facing the radiator, the reservoir will be seen at the upper left-hand side (Fig 31).

23.2 Remove the cap (1) and replenish as required. It should be noted that there is a 'danger' level mark (2) indicated on the reservoir body; oil level must not be allowed to fall below this mark.

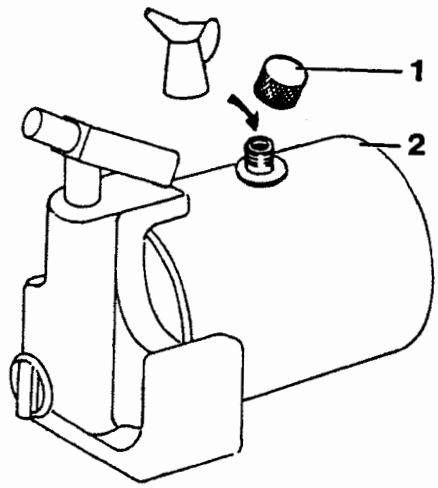


1 Reservoir cap 2 'Danger' mark oil level

Fig 31 Clutch pedal oil reservoir

Cab tilt pump reservoir

24 To top up the pump with hydraulic oil, (refer to Maintenance Schedule AESP 2320-N-502-601 for correct type), unscrew the knurled cap (Fig 32(1)) from the filler spout and replenish as required.



1 Filler cap 2 Cab tilt pump

Fig 32 Cab tilt pump filling spout

ELECTRICAL SYSTEM

25 Battery removal and lamp replacement are as follows:

Battery removal

26 The batteries are mounted at chassis level, behind the fuel tank, and between the main boom hydraulic controls. Turn off master switch before battery removal. To remove batteries, proceed as follows:

26.1 A transverse channel section will be seen held by winged nuts. Remove winged nuts and bar, lift off the two light weight alloy covers and disconnect battery terminals. Slacken off the winged nuts from the battery clamping bars, remove bars, allowing the wing nut bolts to swing down and clear. Lift off batteries. Vehicle batteries are fitted to the fore, radio batteries to the rear.

Headlight (and rear load floodlight) - lamp replacement

CAUTION ...

Do not handle or touch glass of replacement halogen lamps, or early lamp failure will result.

27 Headlights and floodlights are of similar construction but the latter incorporates a cowl in the rim assembly. To replace a lamp proceed as follows:

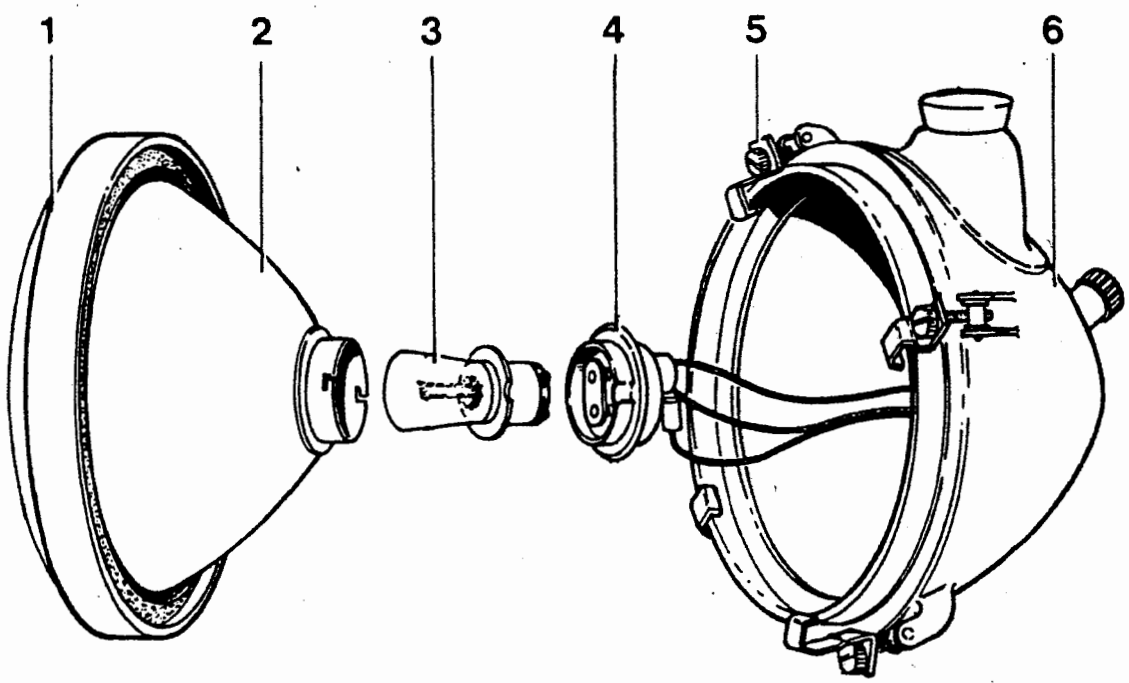
27.1 Slacken the headlight rim clamp screws (Fig 33(5)) and release the rim clamps. The front lens section (1) can now be pulled away and the lamp removed.

27.2 Ensure that replacement lamp is 'correct hand' (ref Chapter 5, Table 1).

27.3 Avoiding hand contact with glass of halogen lamp, replace lamp and check that the light functions correctly. Re-clamp lens to light body (6).

27.4 Floodlight lamp (non-halogen) exchange is generally as detailed for headlight lamps.

27.5 Access to the front headlights and fog lights can be made easier by the removal of the light guard.



1 Lens holder
2 Reflector
3 Lamp
4 Lamp holder
5 Rim clamp screws
6 Light body

Fig 33 Front headlight assembly

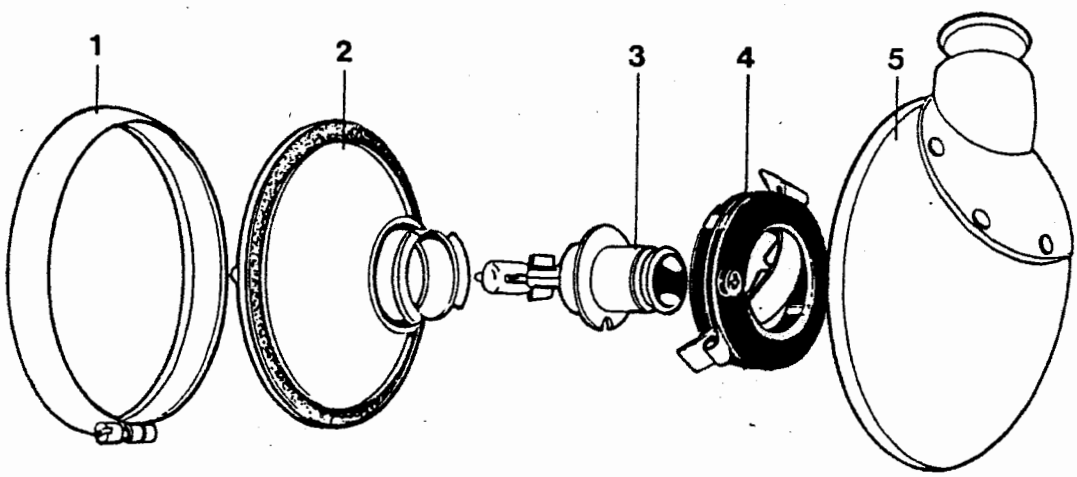
Front fog lights - lamp replacement

28 To replace lamp, proceed as follows:

28.1 Slacken off rim clamp screw (Fig 34(1)) and remove rim. Lens and reflector assembly (2) can now be lifted out. If assembly is a little difficult to remove, this is probably due to seal 'sticktion', therefore do not snatch lens assembly away, as consequential damage will result to the seal mounted behind the reflector.

28.2 Gently ease the assembly away from the light body (5). When clear, twist the lamp clamp/contact plate (4) away from the assembly and lift out the halogen lamp (3).

28.3 Do not touch glass of replacement halogen lamp. Fit lamp and reassemble light.



1 Lens/reflector rim
2 Lens/reflector assembly
3 Halogen bulb
4 Lamp clamp/contact
5 Light body

Fig 34 Front fog light assembly

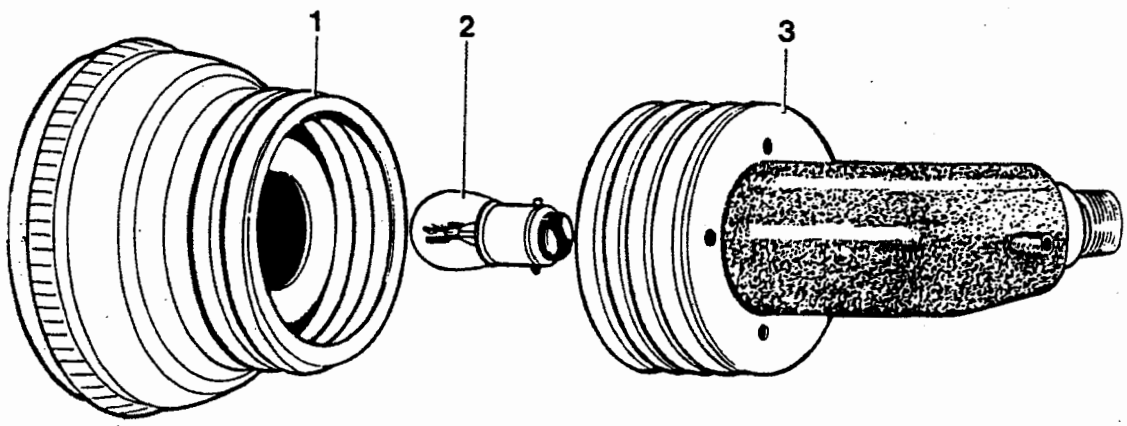
Side, reversing, stop/tail, rear fog, turn indicator lights - lamp replacement

29 The assembly of the lights is identical, they differ only in lens and lamp type. Before attempting to replace lamps in any of these lights, the protective guard will have to be removed.

29.1 To remove front guard, undo set screw, and slide the guard out of slots.

29.2 To remove rear guard, undo set screw and swivel guard upwards.

29.3 To replace lamp, unscrew lens cap (Fig 35(1)), twist and lift the bayonet cap type lamp (2) from light body (3).



1 Lens holder and cap 2 lamp 3 Light body

Fig 35 Side, reversing, stop/tail, rear fog and turn light assembly

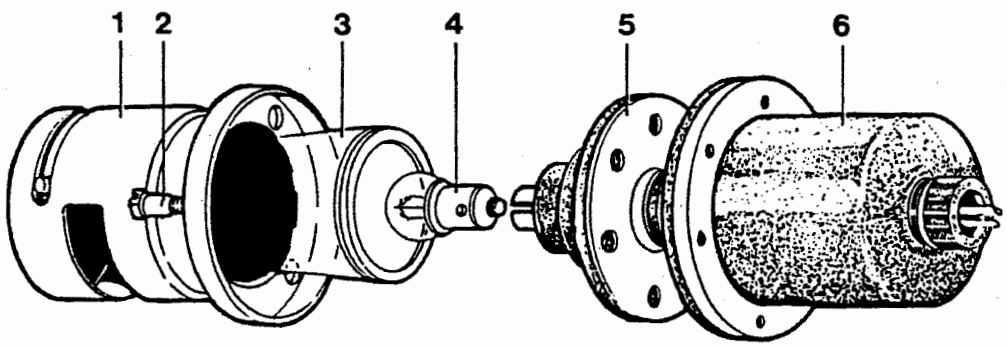
Convoy light - lamp replacement

30 To replace lamp, proceed as follows:

30.1 Unscrew the 3 set screws (Fig 36(2)) and lift off the swivel cover (1), taking care not to damage the joint and to allow the glass lens (3) to fall out.

30.2 Take out the lamp holder (5) from the light body (6) and remove bayonet cap type lamp (4).

30.3 Re-assembly is the reverse of the procedure described above, bearing in mind that the 3 set screw holes in the swivel cover have to be re-aligned with 3 of the 6 holes in the lamp holder and light body flange.



1 Swivel cover 3 Lens 5 Lamp holder
2 Set screw (2) 4 Lamp 6 Light body

Fig 36 Convoy light

Beacon light - lamp replacement

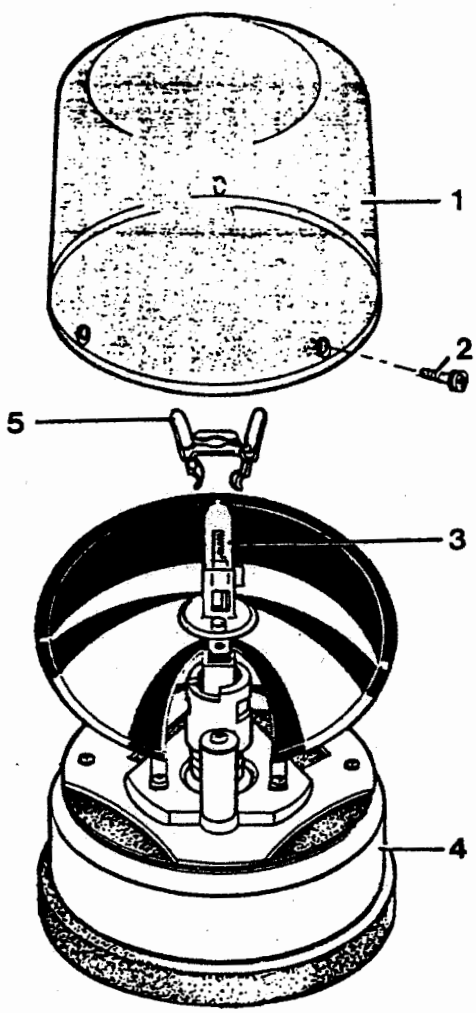
CAUTION ...

Do not attempt to turn reflector by hand as damage to the motor driven gearing will result.

31 To replace lamp, proceed as follows:

31.1 Unscrew the 3 pozidrive screws (Fig 37(2)) from around the lens cover (1). Using forefinger and thumb, spread the lamp retaining clip (5) and lift off.

31.2 The lamp (3) can now be lifted out. The lamp holder may have to be held while the lamp is being removed.



1 Lens cover
2 Pozidrive screw (3)
3 Halogen lamp
4 Reflector base
5 Lamp retaining clip

Fig 37 Beacon light

RECOVERY EQUIPMENT

32 The maintenance requirement for the recovery equipment consists of oil and filter changes, and greasing (refer to Fig 47).

Front winch

33 The front winch drive mechanism is contained in two housings mounted at either side of the rope barrel (Fig 38), consequently, oil changes have to be made separately to each housing. To drain oil from housings, proceed as follows:

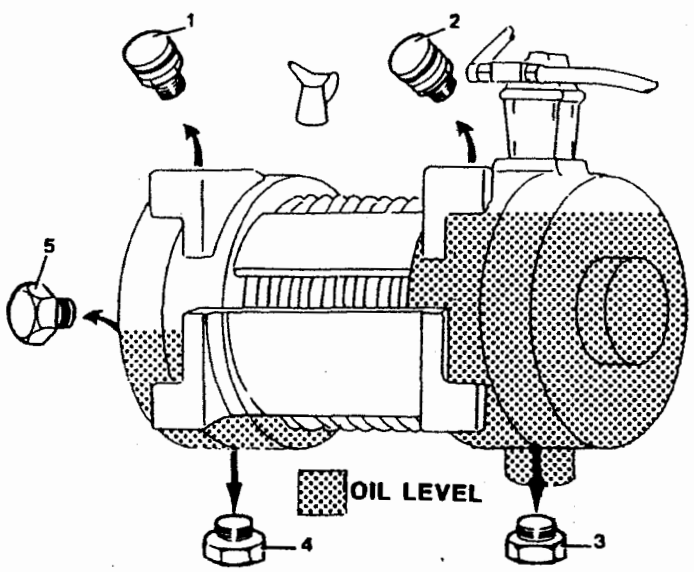
33.1 Remove the left-hand (4) and right-hand (3) housing drain plugs. Left and right-hand being defined, in this instance, as when facing the front of the vehicle.

33.2 When oil has drained, wipe plugs and re-fit, replacing sealing washers if necessary.

33.3 Remove the oil level plug (5) from the side of the left-hand housing and recharge with oil of the type recommended in the Maintenance Schedule AESP 2320-N-502-601. Refilling of the housing is made through the gear case breather (1) tapped hole, the breather having been removed for this purpose.

33.4 Correct oil level is achieved when oil has reached the level plug tapped hole (vehicle on level standing.).

33.5 The right-hand housing, further identified by the pump mounted on the top, is filled through the breather plug (2) tapped hole, the correct oil level, however, has to be taken within 50 mm (2 in.) of the bottom of the breather plug hole.



1 LH Breather/filler plug
2 RH breather/filler plug
3 RH Housing drain plug
4 LH housing drain plug
5 LH Housing oil level plug

Fig 38 Front winch oil levels (viewed from front)

Main winch

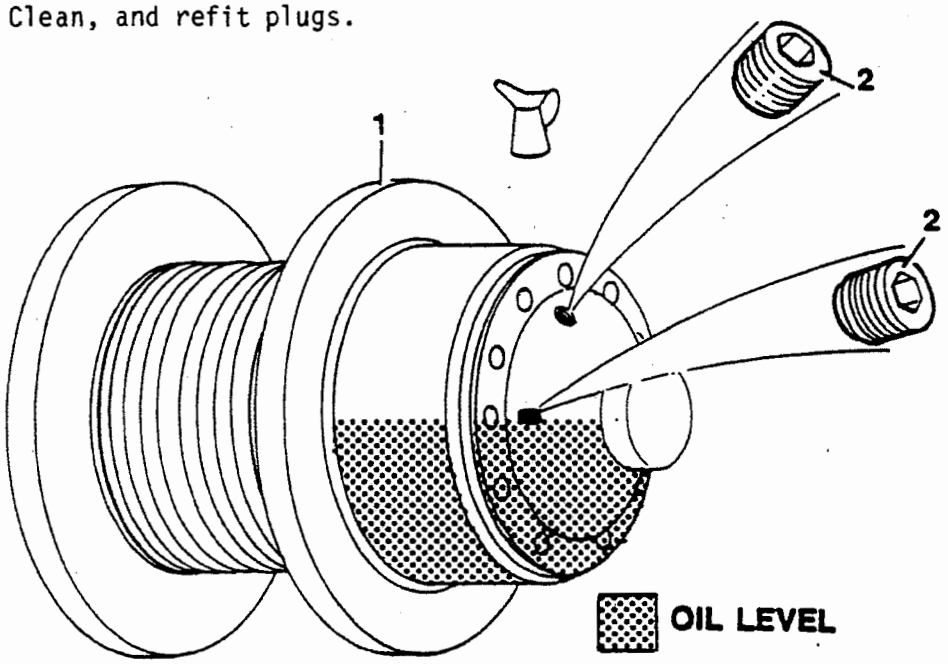
34 To drain oil from Main Winch housing, rotate barrel until one of the drain/filler plugs (Fig 39(2)) is located at the bottom, then proceed as follows:

34.1 Using a 10 mm socket wrench, remove plug and drain oil. When empty, rotate the barrel a half turn (180°) until the plug hole is at the top dead centre (ie 12 o'clock position).

34.2 Remove the second of the plugs (2), which will now be lying at approximately 90° relative to the plug hole at TDC (top dead centre).

34.3 Refill the housing through the hole at TDC with oil type as recommended in the Maintenance Schedule AESP 2320-N-502-601. The correct level will be achieved when oil is seen to trickle from the plug hole situated at 90° to TDC (ie at 9 o'clock or 3 o'clock positions).

34.4 Clean, and refit plugs.



1 Main winch

2 Filler/drain plugs

Fig 39 Main winch oil level

Main jib boom winch

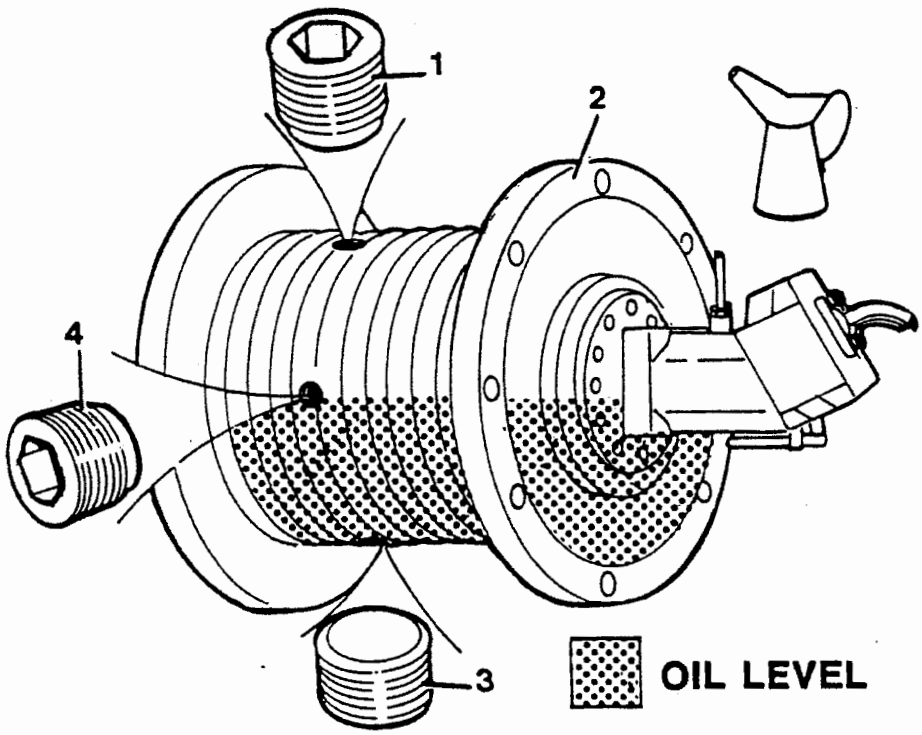
35 To change or top up the oil in the main jib boom winch (Fig 40), the hook rope will have to be paid out sufficiently to expose the rope barrel and the location of the three oil level control plugs.

35.1 Set the main boom winch rope barrel so that one plug is at top dead centre (TDC) and a second plug is at bottom dead centre (BDC). The third plug will then be at 90° to the other two (ie 9 o'clock or 3 o'clock position).

35.2 If it is intended to top up the oil level of the winch, it is only necessary to remove the plug at the TDC (Fig 40(1)) and the plug at the 3 or 9 o'clock position (4).

35.3 To carry out a complete oil change, the plug at the BDC (3) should be removed as well and the oil drained into a suitable receptacle.

35.4 Clean and refit plug at the BDC position (3) and refill winch through the plug hole at the TDC position, until oil is seen to trickle from the plug hole at the 9 or 3 o'clock position. The correct oil type is specified in Maintenance Schedule AESP 2320-N-502-601.



1 Filling plug position
2 Main boom winch
3 Drain plug position
4 Oil level plug position

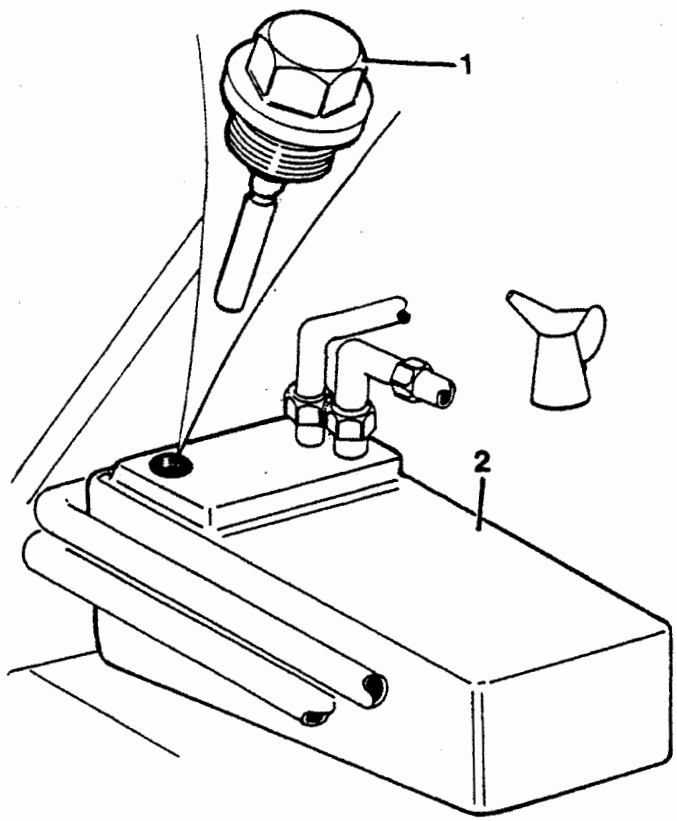
Fig 40 Main jib boom winch

Main jib boom slew ring lubricator reservoir

36 The slew ring lubricator reservoir is situated under the main boom between the hydraulic rams.

36.1 The topping up requirement will depend on frequency of operation of the lubricator. To check the oil level of the tank (Fig 41(2)) remove the filler plug/dipstick (1). There is a maximum level mark on the dipstick.

36.2 The correct oil is specified in the Maintenance Schedule AESP 2320-N-502-601.



1 Filler plug/dipstick 2 reservoir

Fig 41 Main jib boom slew ring lubricator

Hydraulic system reservoir

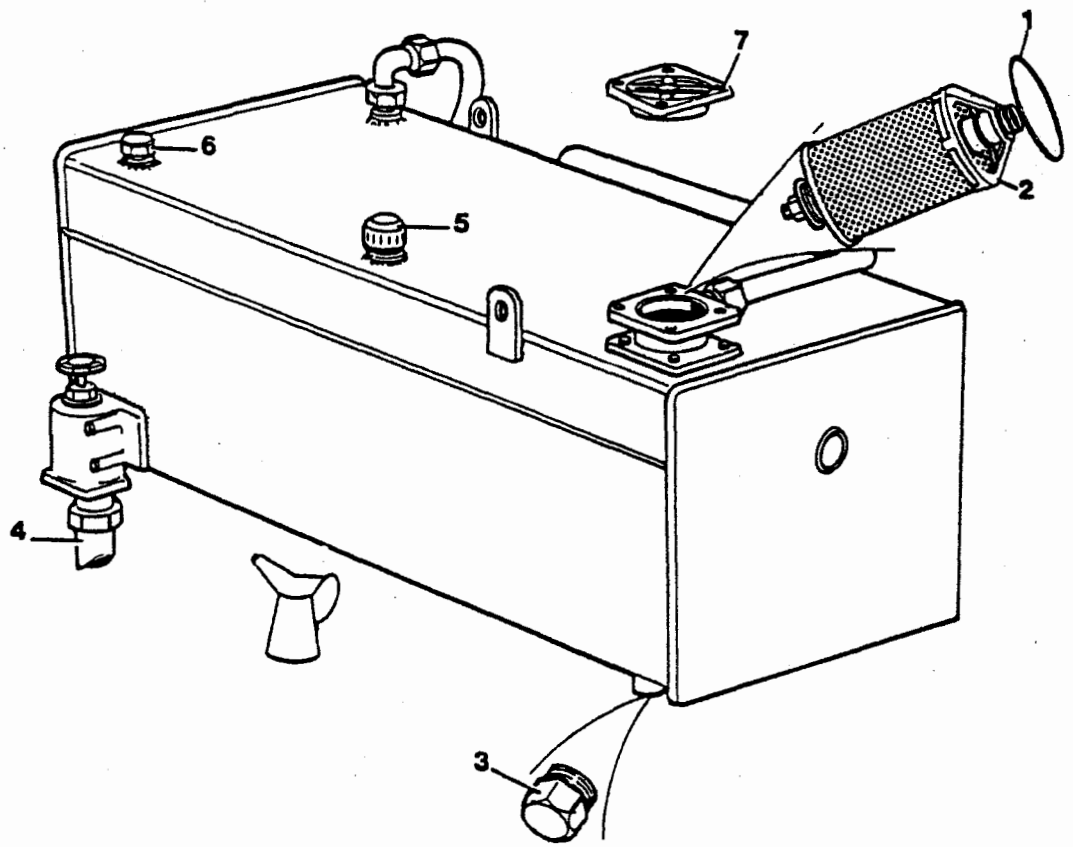
37 To top up the main hydraulic system reservoir (Fig 42), ensure that all hydraulic apparatus is retracted and at rest. Remove the 4 nuts and bolts securing the filter cover plate (7) and remove plate. Pour oil through the filter.

37.1 Replenish reservoir oil level until the sight glass mounted on the side is just completely covered (ie about ¾ full tank).

37.2 The correct oil type is specified in the Maintenance Schedule AESP 2320-502-601.

37.3 There is no requirement or need to remove the oil filter during reservoir replenishment. In fact, it is essential that it remains in position. However, should some necessity arise to cause it to be removed, then the following procedure should be undertaken.

37.4 Carefully remove the cover plate sealing ring (1). (It is possible to inadvertently knock the sealing ring into the reservoir when removing the filter assembly). Hook fingers under the bars of the filter top (2) and withdraw filter assembly.



1 Filter cover plate sealing ring	3 Drain plug	6 Blank plug
2 Filter assembly	4 Main feed valve	7 Filter cover plate
	5 Reservoir breather	

Fig 42 Hydraulic system reservoir

Pressure line filters

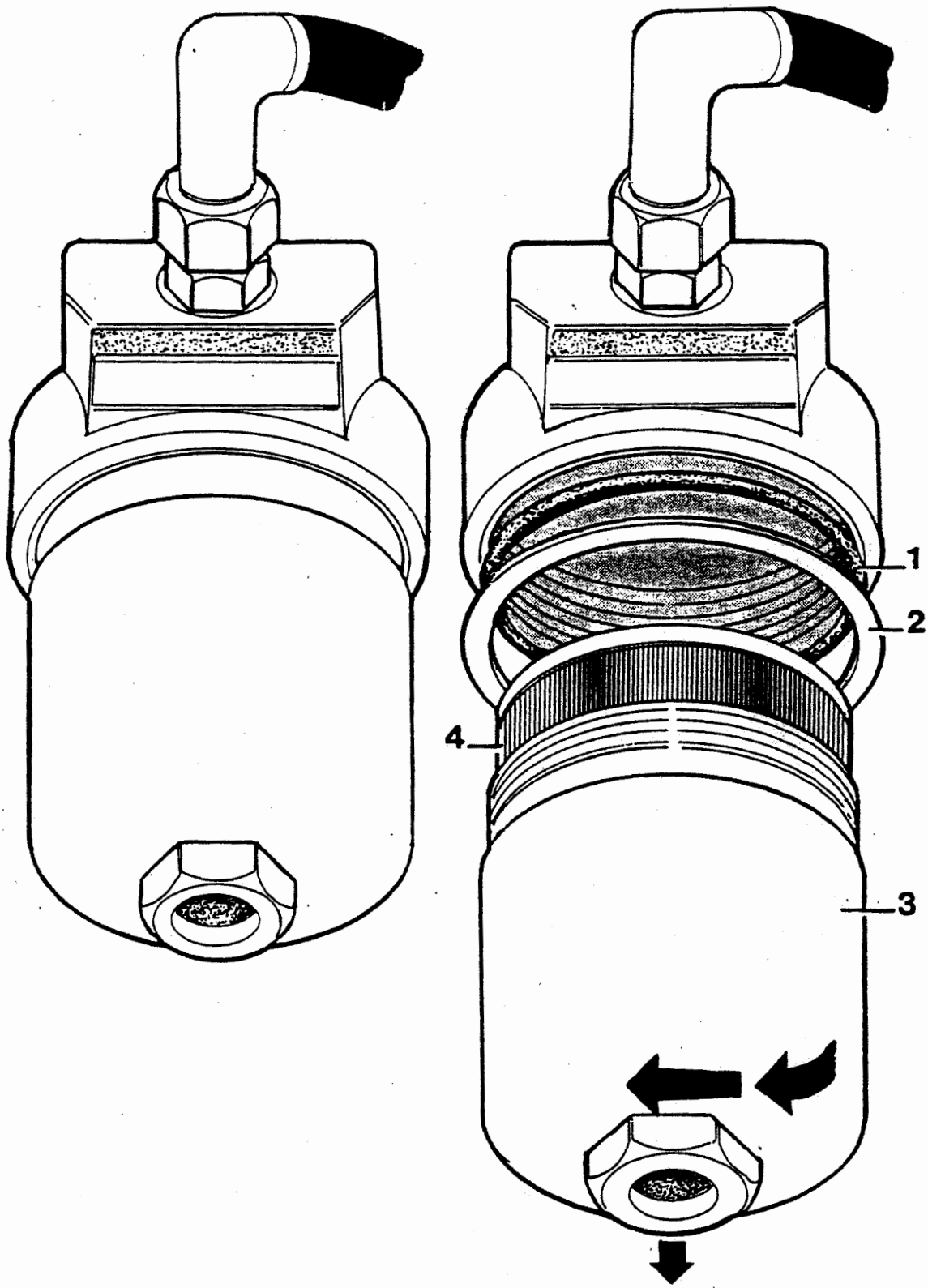
38 Mounted beneath the chassis, above and behind the main gearbox position can be found duplex filters covering the discharge side of the hydraulic oil pump. To renew the filter elements proceed as follows:

38.1 Unscrew filter bowl (Fig 43(3)) by the large nut attached to the bowl.

38.2 Lift out used filter element (4) and discard. Examine bowl sealing 'O' ring (1) and back-up ring (2) and replace if necessary.

38.3 It should also be noted that an element receiver or spigot is attached to the centre of the filter head. This spigot is also fitted with a sealing ring and this too should be checked and, if necessary, replaced.

38.4 Fit new element cartridges, refit and tighten filter bowls.



1 Filter bowl 'O' sealing ring
2 Back-up ring
3 Filter bowl
4 Filter element

Fig 43 Hydraulic oil system line filters

VEHICLE SYSTEMS

Cold start aid (start pilot) - refilling

WARNINGS ...

(1) THE REFILL CANISTERS FOR USE WITH THE START PILOT, CONTAIN A VERY VOLATILE LIQUID, THE VAPOUR OF WHICH IS HEAVIER THAN AIR AND HIGHLY FLAMMABLE. SMALL QUANTITIES OF THE VAPOUR IN AIR FORM A HIGHLY EXPLOSIVE MIXTURE. 'EMPTY' CANISTERS RETAIN AIR/VAPOUR MIX - DISPOSE OF CANISTERS CAREFULLY.

(2) DRIVERS AND OPERATOR'S ARE WARNED OF THE EXPLOSIVE RISK. ALSO THAT THE VAPOUR CAUSES DROWSINESS AND LOSS OF CONCENTRATION. FOR THESE REASONS THE CANISTERS MUST NEVER BE CARRIED LOOSE IN A VEHICLE (DCI ARMY 239/79 REFERS).

39 To refill the cold start system reservoir (Fig 44), take note of the above WARNINGS and, working in a well ventilated area, proceed as follows:

39.1 Release the centre clamping screw (1).

39.2 Turn the reservoir lid (2) clockwise, then lift away from reservoir.

Note ...

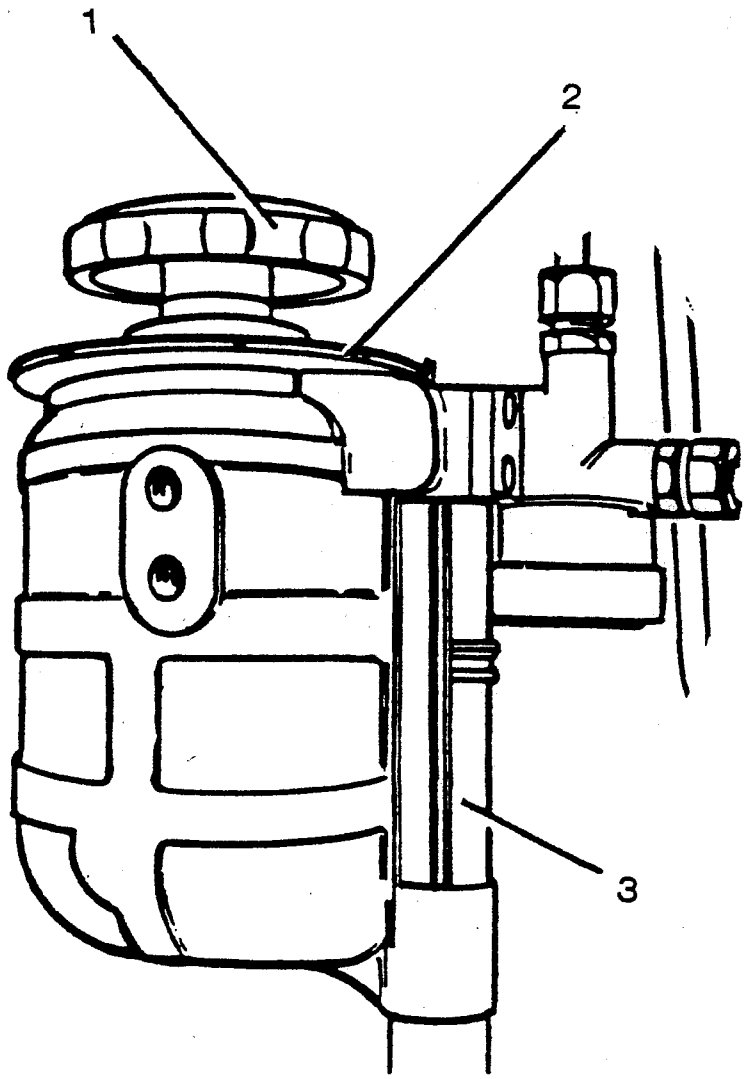
The lid has a bayonet-type fitting and a slot to align with a peg mounted in the reservoir body.

39.3 Taking care to avoid hand contact with the sharp-ended standpipe in the reservoir, insert the refill canister (foil end down) fully into the reservoir.

39.4 When the liquid level reaches the mark on the sight glass (3) (canister empty) withdraw the empty canister. Discard into a suitable waste container, (until last of the vapour has dispersed, the 'empty' canister holds a potentially explosive mixture of vapour and air).

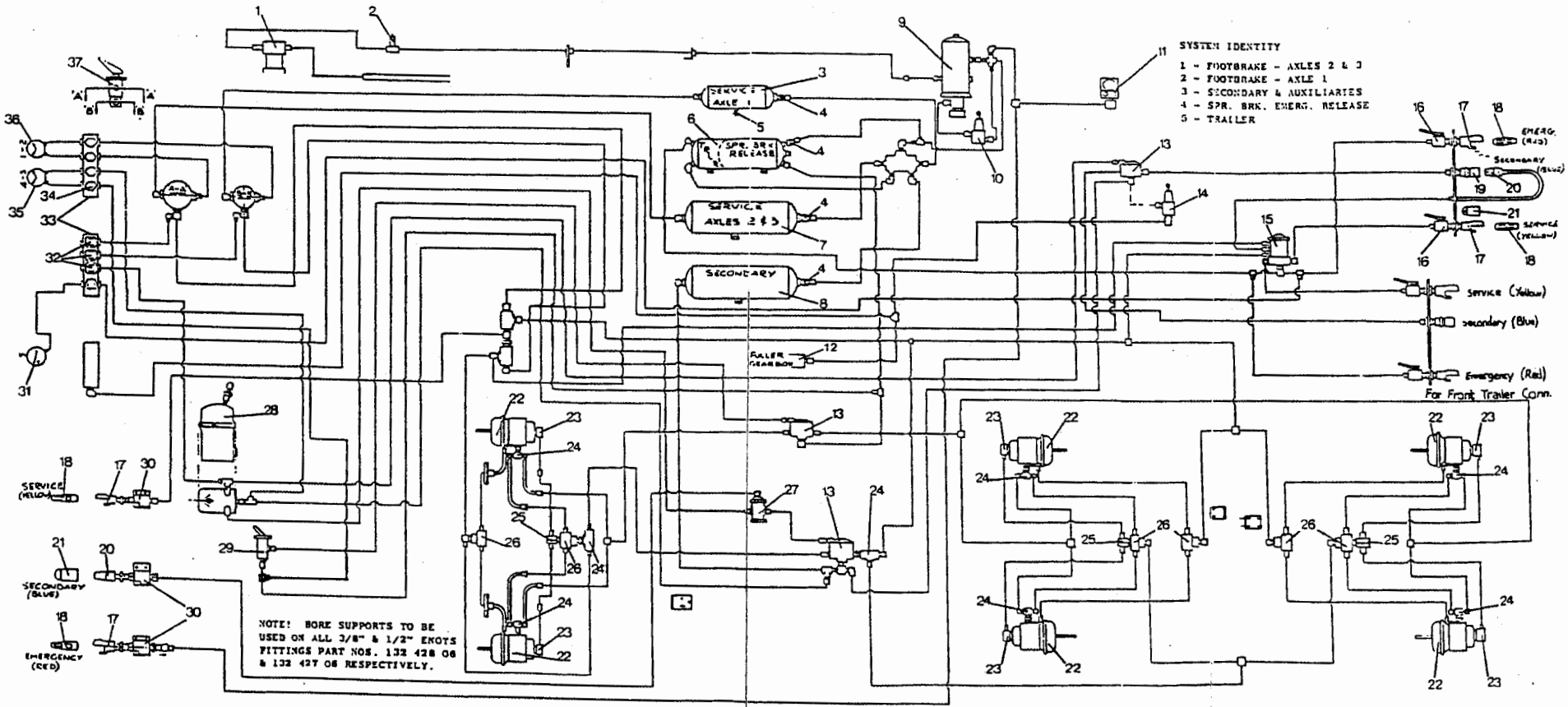
39.5 Offer the reservoir lid into position, aligning the slot in the lid to the peg in the body, and rotate lid counter-clockwise to engage the bayonet catches.

39.6 Holding lid against rotation, tighten centre clamping screw (1) sufficiently to achieve a satisfactory seal.



1 Clamping screw 2 Lid 3 Sight glass

Fig 44 Cold start aid reservoir



1 Air compressor
2 Safety valve
3 Air reservoir (20 litres)
4 Pipe connection
5 Drain valve
6 Air reservoir (26.6/12.8 litres)
7 Air reservoir (47.2 litres)
8 Air reservoir (47.2 litres)
9 Air dryer
10 Governor valve
11 Tyre inflator
12 Supply to main gearbox
13 Relay valve
14 Pressure regulating valve
15 Trailer relay valve
16 Shut-off cock
17 Palm connector
18 Dummy coupling
19 Plug connector
20 Line connection
21 Plug
22 Spring brake actuator
23 Hose connection
24 Double check valve
25 Exhaust check valve
26 Quick release valve
27 Anti-compound valve
28 Hand brake valve
29 Control valve spring release
30 Front recovery filters
31 Air pressure gauge
32 Low pressure switches
33 Junction blocks
34 Low pressure switches
35 Air pressure gauge
36 Air pressure gauge
37 Foot brake valve

Fig 45

Air brake system

Fig 45

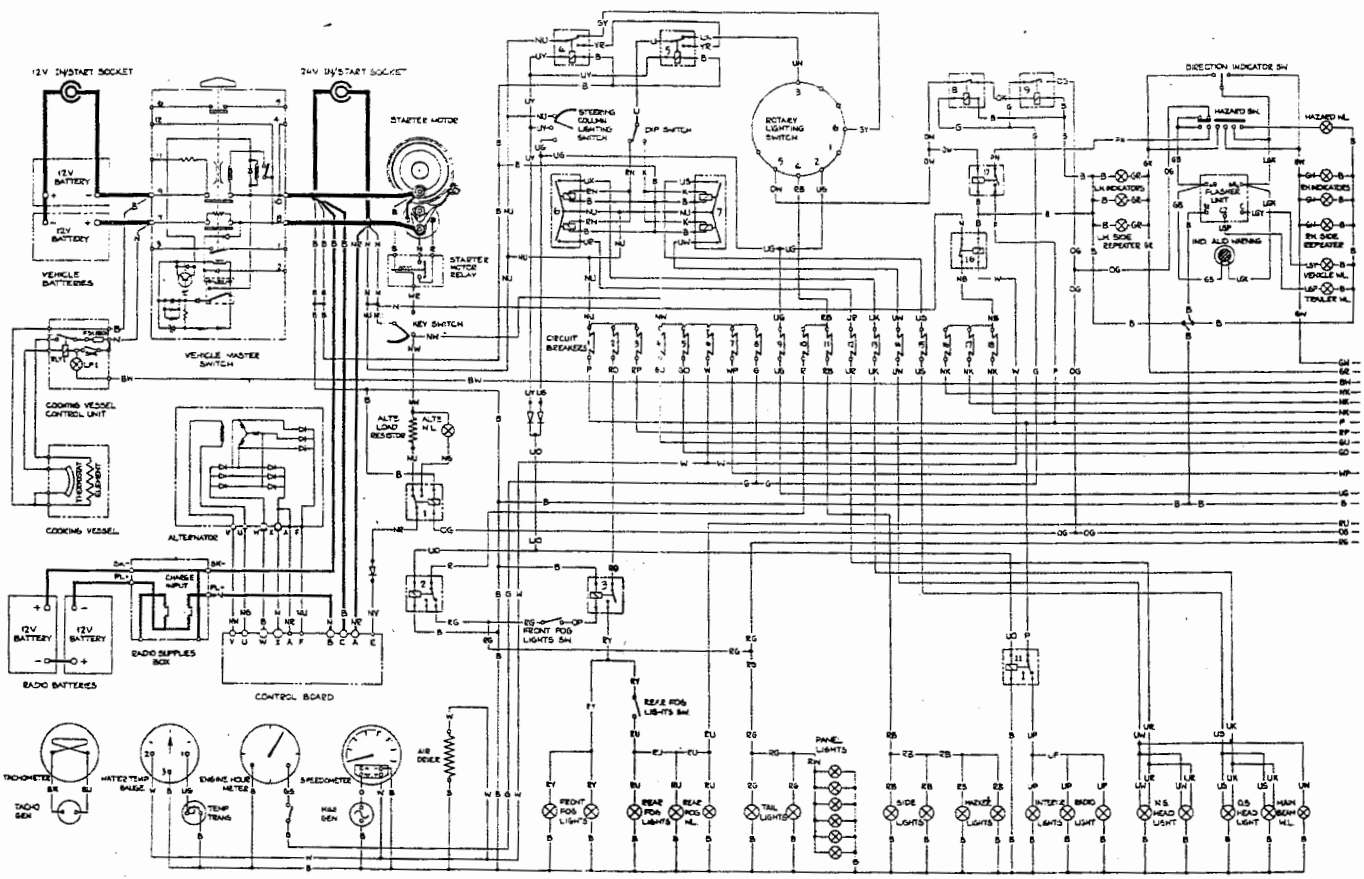
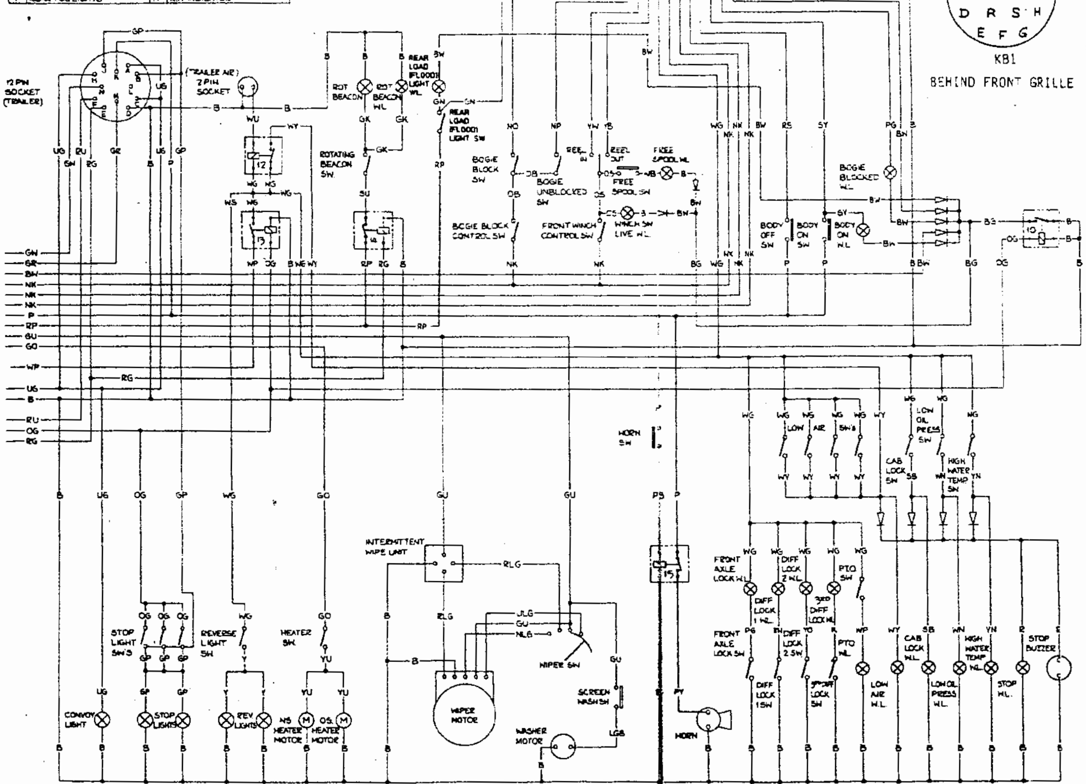


Fig 46 Vehicle wiring diagram (sheet 1 of 2) Fig 46

TRAILER CONNECTIONS AS STATED IN DEF STAN 25-5/2 ANNEX 'D'

PIN	CIRCUIT	PIN	
A	CONVOY LIGHT	H	INTERCONNECTED WITH A&C
B	L.H. STOP LIGHT	J	R.H. STOP LIGHT
C	INTERCONNECTED WITH A&H	K	PURPLE AUXILIARY FEED
D	NEGATIVE	L	RESERVED
E	TAIL LIGHTS	M	L.H. INDICATOR
F	REAR FOG LIGHTS	N	R.H. INDICATOR



CABLE COLOUR CODE

CODE	COLOUR	CODE	COLOUR
R	RED	P	PURPLE
Y	YELLOW	O	ORANGE
U	BLUE	W	WHITE
G	GREEN	S	SLATE
N	BROWN	K	PINK
B	BLACK	LG	LIGHT GREEN

INFRA-RED N/LIGHT SW 1A	INFRA-RED N/LIGHT SW 2A	CIRCUIT	ROTARY SWITCH POSITION NORMAL 3	2	1	BLACKOUT OFF	4	5
X	X	HEADLIGHTS *	X	—	—	—	—	—
—	—	SIDELIGHTS *	X	X	—	—	—	X
—	—	TAIL LIGHTS *	X	X	—	—	—	—
—	—	FEED TO STOPLIGHTS *	X	X	X	—	—	—
—	—	FEED TO TURNLIGHTS *	X	X	X	—	—	—
—	—	REGISTRATION PLATE LIGHT *	X	X	—	—	—	—
—	X	CONVOY LIGHT *	—	—	—	—	X	X
—	—	SIDE MARKER LIGHTS *	X	X	—	—	—	—
—	—	REAR FOG LIGHTS *	X	X	—	—	—	—
—	—	REVERSE LIGHTS FEED	X	X	X	—	—	—
—	—	WARNING LIGHTS FEED	X	X	X	—	—	—
—	—	INTERIOR LIGHTS FEED	X	X	X	X	—	—
—	—	RADIO LIGHTS FEED	X	X	X	X	—	—
—	—	ROTATING BEACON	X	X	—	—	—	—
X	X	REAR LOAD(FLOOD) LIGHTS	X	X	X	X	X	X

THE ABOVE TABLE GIVES DETAILS OF THE LIGHTING REQUIREMENTS AS STATED IN DEF STAN 25-5/3 ANNEX C (THOSE MARKED BY AN ASTERISK) ALSO SHOWN ARE OTHER FUNCTIONS AVAILABLE BUT NOT STATED THE FOLLOWING PROCEDURE STATES HOW THESE CAN BE OBTAINED

NORMAL POSITION
OPERATE SWITCHES AS REQUIRED

BLACKOUT POSITION
OPERATE SWITCHES AS REQUIRED

INFRA-RED HEADLIGHT
ROTARY SWITCH IN OFF POSITION & OPERATE INFRA-RED HEADLIGHT SWITCH AS REQUIRED

RELAY	FUNCTION
1	ALTERNATOR WARNING LIGHT BLACKOUT
2	TAIL LIGHTS BLACKOUT
3	FRONT & REAR FOG LIGHTS BLACKOUT
4	INFRA-RED HEAD LIGHTS
5	INFRA-RED HEAD LIGHTS
6	DIPPED BEAM HEAD LIGHTS
7	MAIN BEAM HEADLIGHTS
8	INDICATORS & STOPLIGHTS BLACKOUT
9	INDICATORS & STOPLIGHTS BLACKOUT
10	BOGIE BLOCK & WINCH WARNING LIGHT BLACKOUT
11	RADIO & INTERIOR LIGHTS BLACKOUT
12	TRAILER LOW AIR
13	REVERSE & WARNING LIGHTS BLACKOUT
14	ROTATING BEACON BLACKOUT
15	HORN
16	RECOVERY EQUIPMENT
17	HAZARD FLASHER BLACKOUT

CIRCUIT BREAKER	FUNCTION
1	HORN INTERIOR LIGHTS & TRAILER POSITIVE (10A)
2	FRONT & REAR FOG LIGHTS (10A)
3	ROTATING BEACON & REAR LOAD(FLOOD) LIGHTS (18A)
4	WIPER & WASHER MOTOR (10A)
5	HEATER MOTORS (10A)
6	WATER TEMP GAUGE & AIR DRIER (10A)
7	WARNING LIGHTS & REVERSE LIGHTS (10A)
8	ENGINE HOUR METER & INDICATORS (10A)
9	CONVOY LIGHT (10A)
10	TAIL & PANEL LIGHTS (10A)
11	SIDE & MARKER LIGHTS (10A)
12	N.S. DIPPED HEAD LIGHTS (10A)
13	O.S. DIPPED HEAD LIGHTS (10A)
14	N.S. MAIN BEAM HEAD LIGHTS (10A)
15	O.S. MAIN BEAM HEAD LIGHTS (10A)
16	RECOVERY EQUIPMENT (10A)
17	RECOVERY EQUIPMENT (10A)
18	RECOVERY EQUIPMENT (10A)

Fig 46 Vehicle wiring diagram (sheet 2 of 2)

Fig 46

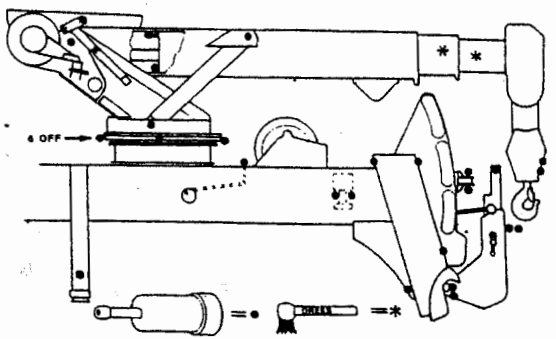


Fig 47 Recovery equipment greasing points

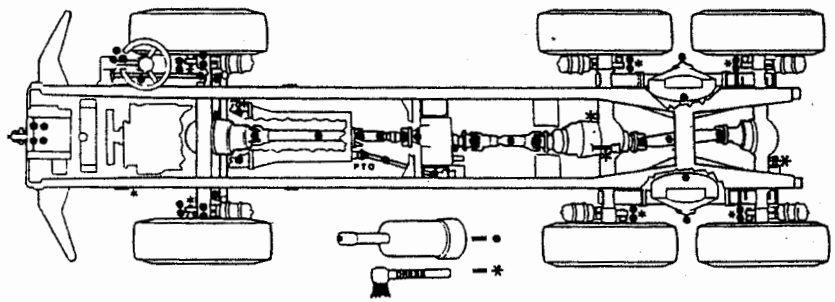


Fig 48 Greasing points - chassis

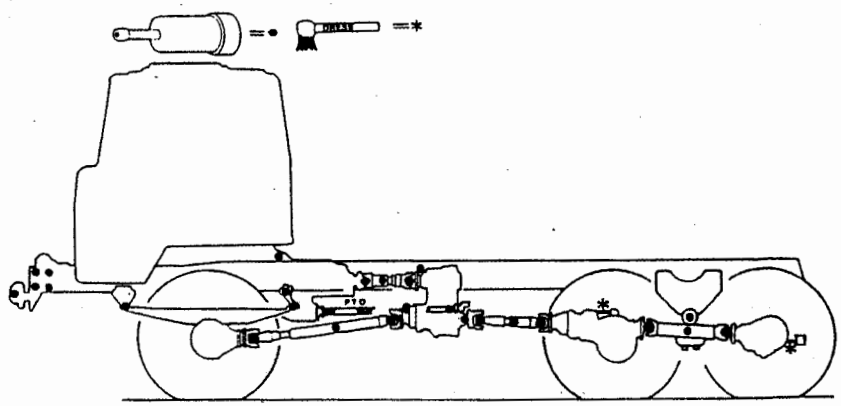


Fig 49 Greasing points - chassis (continued)

Chapter 5

SPARES

CONTENTS

INTRODCUTION

1 The spares detailed in this chapter are for guidance only. The method of fitting is described in Chapter 4 and the part numbers are given in AESP 2320-N-502-711. When replacing a lamp, verify that the voltage and wattage are as shown in Table 1.

WINDSCREEN WIPER ARM BLADE

2 The windscreen wiper arm rubber blade (Fig 1) can be replaced as a separate item.

Fig 1 Windscreen wiper arm rubber blade

OIL FILTERS

3 The two oil filters (Fig 2) are cartridge-type expendable elements and each is complete with a new sealing ring.

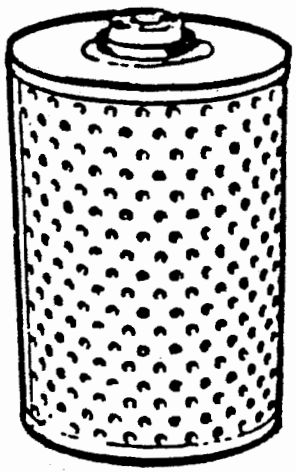


Fig 2 Oil filter

FUEL FILTER

4 The fuel filter (Fig 3) is an expendable canister type supplied with two sealing rings and is mounted on the left-hand side of the engine.

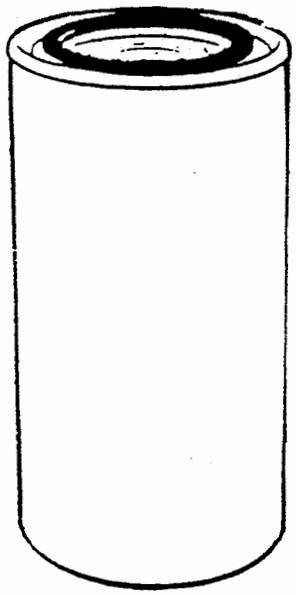


Fig 3 Fuel filter

AIR CLEANER

5 The air cleaner (Fig 4) is a re-usable element that may be cleaned if in sound condition. The sealing ring is a separate item.

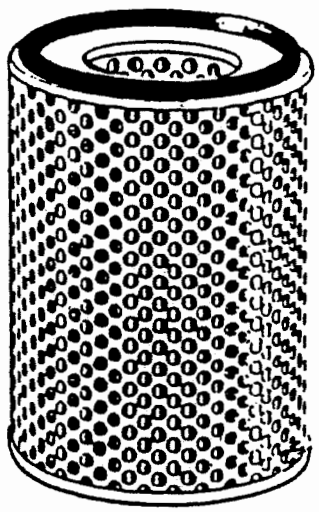


Fig 4 Air cleaner

LAMPS

6 The lamp voltage, wattage and type is detailed in Table 1, the lamp type is shown in Fig 5.

TABLE 1 LAMP DATA

Lamp	Volts	Watts	Type (Ref Fig 5)
(1)	(2)	(3)	(4)
Hazard warning	24	3	1
Warning light module	24	1	1
Warning lights (except illuminated switches)	24	1	1
Illuminated switches	24	1.1	2
Panel lights	24	1	3
Tachometer	24	1	3
Water temperature gauge	24	1	3
Engine hour meter	24	1	3
Speedometer	24	1	3
Radio light	24	5	3
Side repeater	24	4	4
Side lights	24	5	5
Cab marker	24	5	5
Rear convoy	24	5	5
Cab interior	24	10	5
Turn indicators	24	21	6
Reversing lamps	24	21	6
Rear foglights	24	21	6
Rotating beacon (halogen lamp)	24	70	7
Stop/Tail lights	24	21/5	8
Head lights (halogen lamp)	24	70/75	9
Front Foglights (halogen lamp)	24	70	10
Rear load floodlights	24	50/50	11

Note ...

Headlight halogen lamps are handed left or right, (left or right dipping) to suit 'rule of road.

FV 817243 (Foden part No 62-00470-500) for use where driving on left,
FV 817244 (Foden part No 62-00470-600) for use where driving on right.

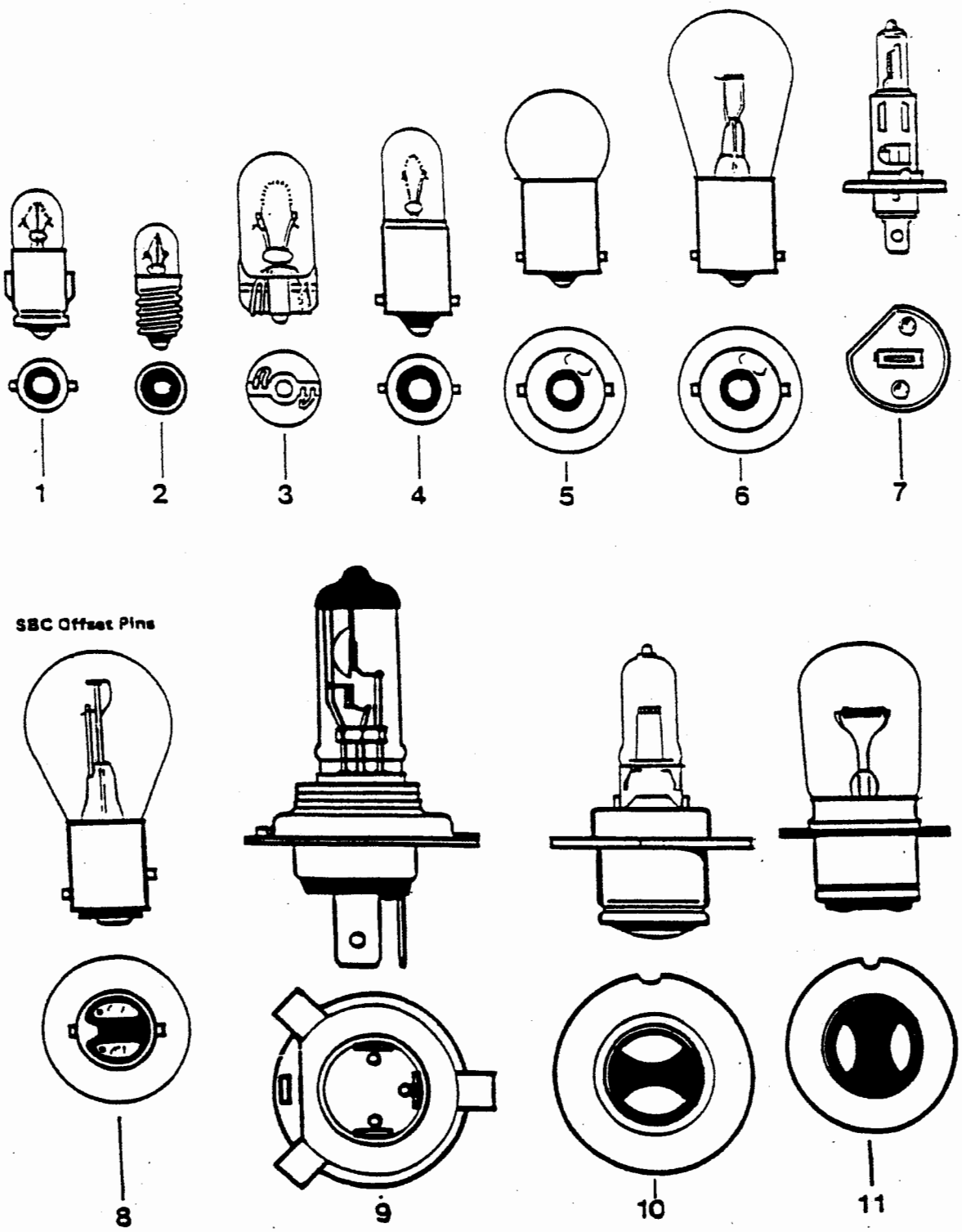


Fig 5 Lamp types

Chapter 6

CES EQUIPMENT

CONTENTS

INTRODUCTION

1 The following chapter covers the loose equipment stowed on board and the contents of the lockers. It also identifies the position of the lockers and other stowage points. It does not purport to indicate the equipment usage, merely to identify.

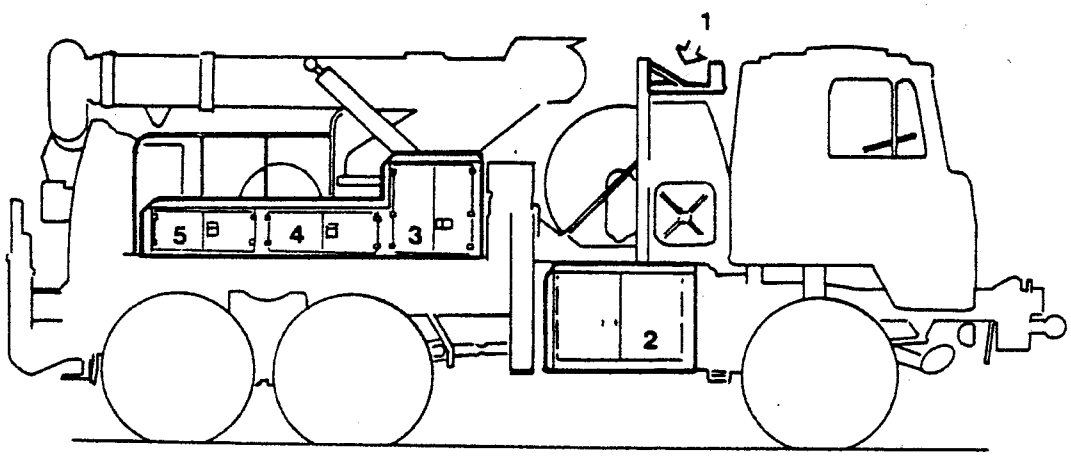


Fig 1 Locker positions and numbers, driver's side

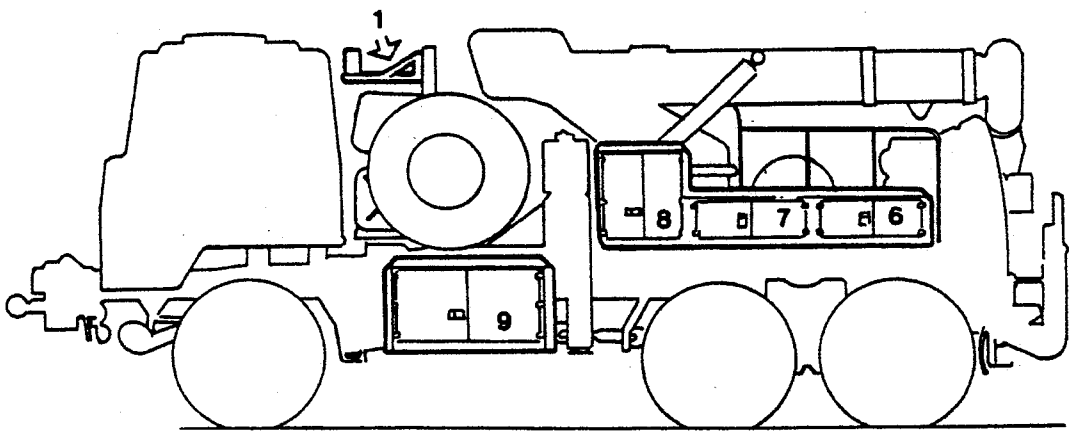
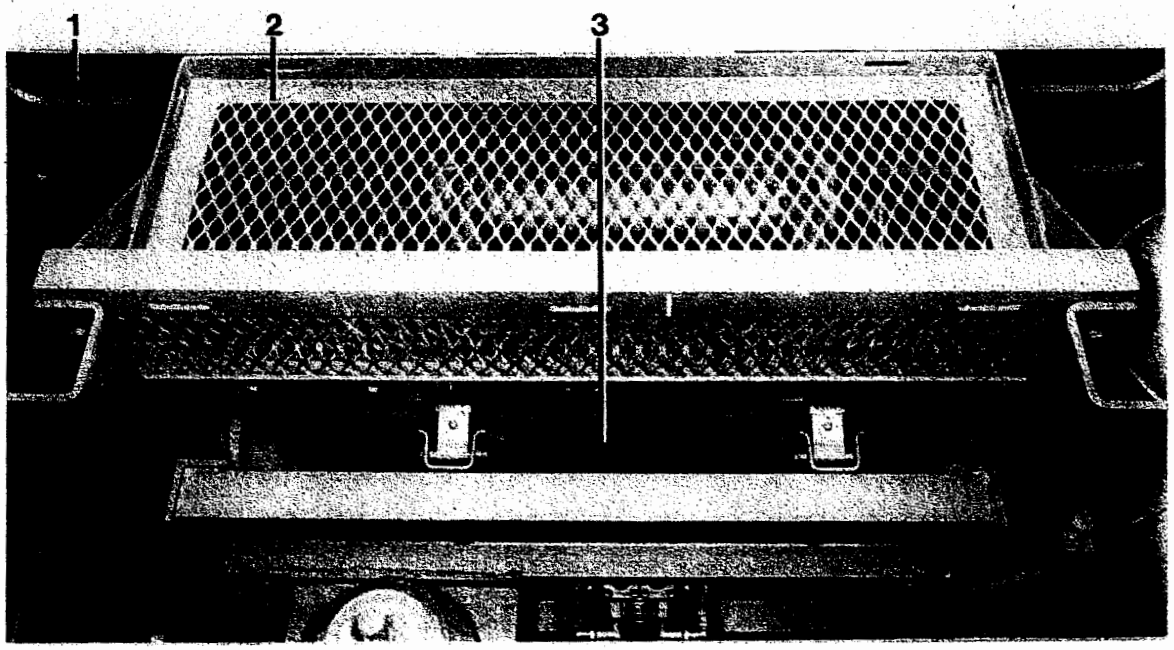


Fig 2 Locker positions and numbers, passenger side

NO 1 LOCKER

2 The number 1 locker (Fig 3(2)) is on an open platform, situated immediately behind the cab (1) , above air reservoirs (3) for stowage of the camouflage net.



1 Cab 2 No 1 locker 3 Air reservoirs

Fig 3 No 1 locker

NO 2 LOCKER

3 The number 2 locker (Fig 4) is a closed locker, situated behind front wheel driver's side (RH) at chassis level.

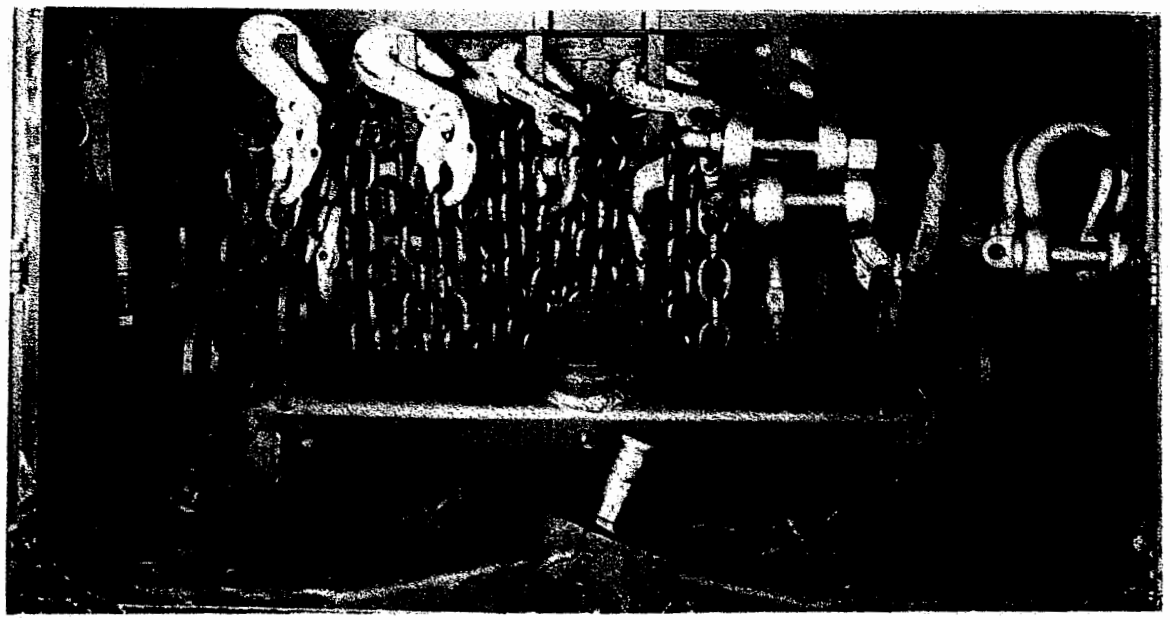


Fig 4 No 2 locker stowage

3.1 Contents:

Chain, 16 mm x 4 m long	2 off
Herc alloy chains, 5/8 in.	2 "
Herc alloy chains with egg link at both ends	2 "
Towing pintle	1 "
EKA lifting bar (swivelling)	1 "
Winch rope end adaptor	1 "
1.5T 'D' shackles	3 "
3T bow shackles	6 "
15T double links	2 "
20T bow shackles	2 "
30T plate shackles	2 "
40T bow shackles	2 "
EKA lifting eyes L/R	2 "

NO 3 LOCKER

4 The number 3 locker is a closed locker, situated behind stabilizer, driver's side (RH), walkway level.

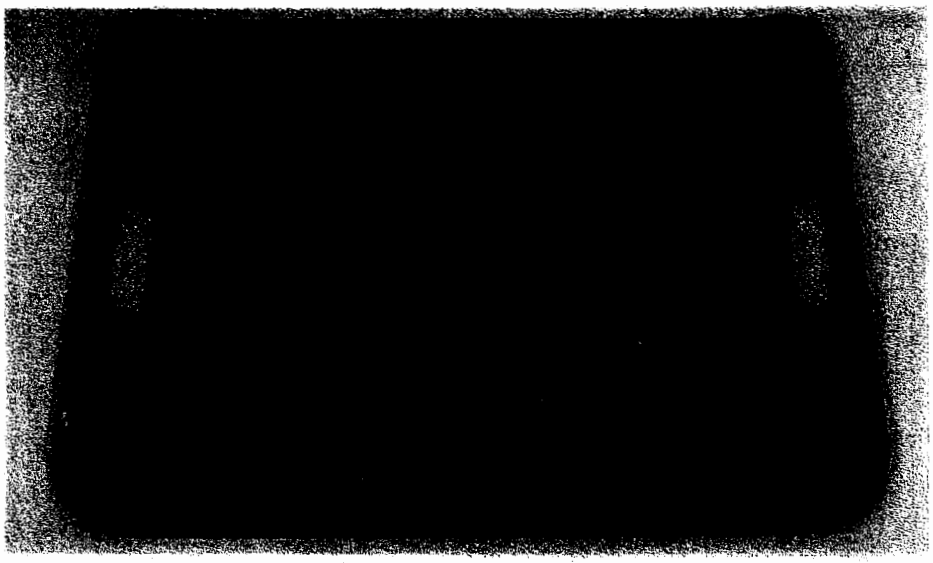


Fig 5 No 3 locker stowage

4.1 Contents (Fig 5):

Stabiliser leg foot	1 off
Personal kit required.	

NO 4 LOCKER

5 The number 4 locker is a closed locker, situated above rear bogie, driver's side (RH), walkway level.

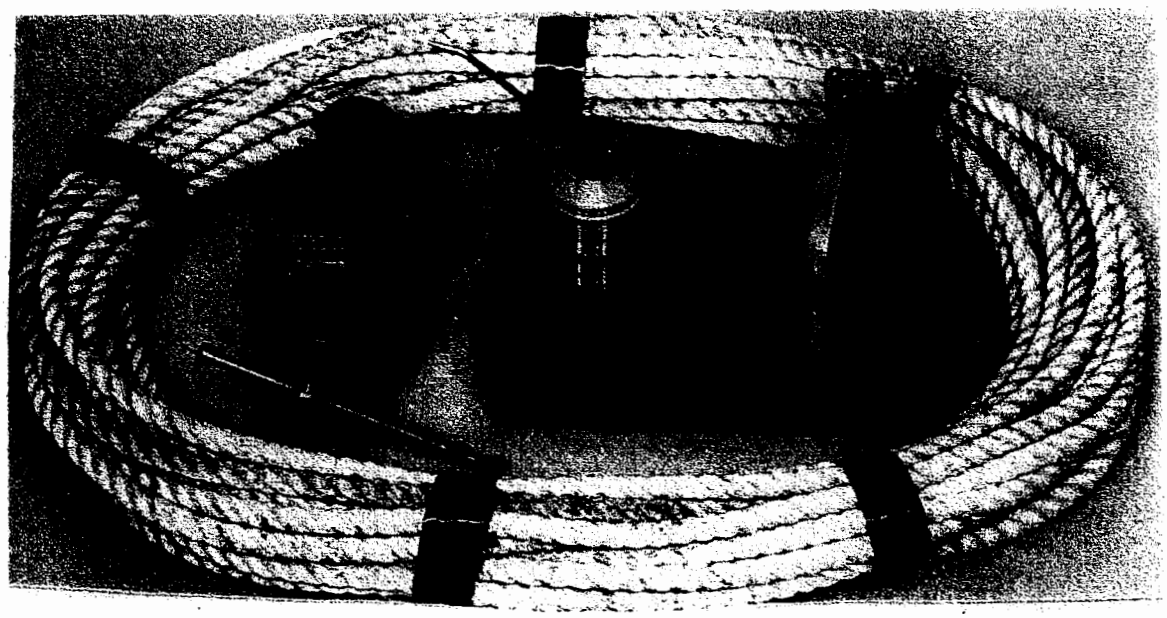


Fig 6 No 4 locker stowage

5.1 Contents (Fig 6):

Tool box complete	1 off
Vice	1 "
Grease gun	1 "
Oil can	1 "
Rope 120 ft	

NO 5 LOCKER

6 The number 5 locker is a closed locker, rearmost position, situated above rear bogie, driver's side (RH) walkway level.

Fig 7 No 5 locker stowage

6.1 Contents (Fig 7):

Lighting set	1 off
Air line connections	3 "
Slave leads	2 "
Strap for steering wheel	2 "
Tyre inflator hose connection	1 "
Wooden scotches	2 "
Spare air line adaptor set	1 "
'ON TOW' plate	1 "
'RADIO ACTIVE' triangle	1 "
'BREAKDOWN' triangle	1 "

NO 6 LOCKER

7 The number 6 locker is a closed locker, rearmost position, situated above rear bogie, passenger side (LH), walkway level.

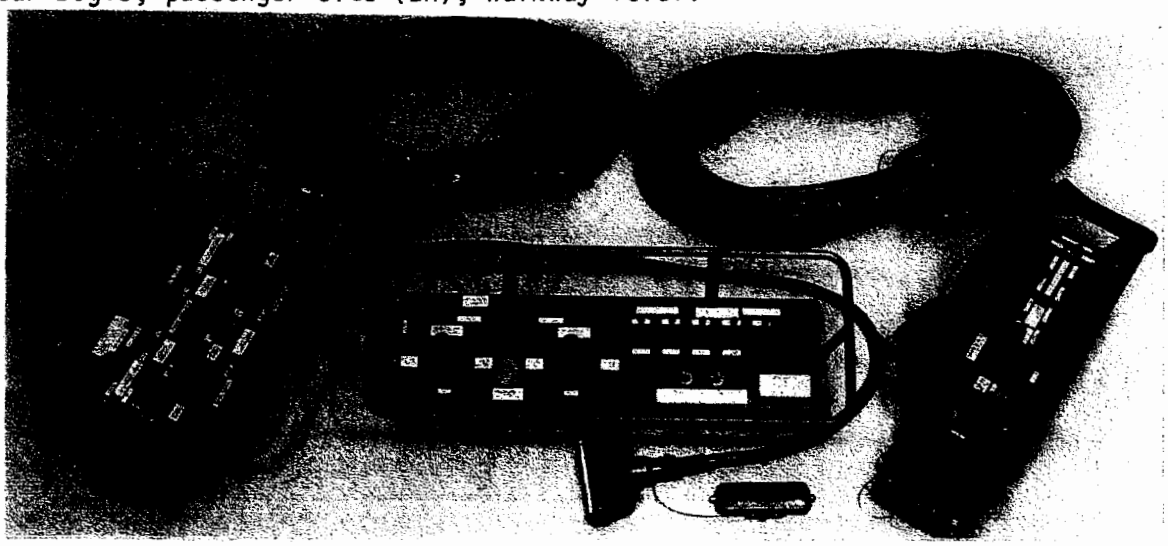


Fig 8 No 6 locker stowage

7.1 Contents (Fig 8):

Remote control boxes	3 off
Extension cables	2 off

NO 7 LOCKER

8 The number 7 locker is a closed locker, situated above rear bogie passenger side (LH), walkway level.

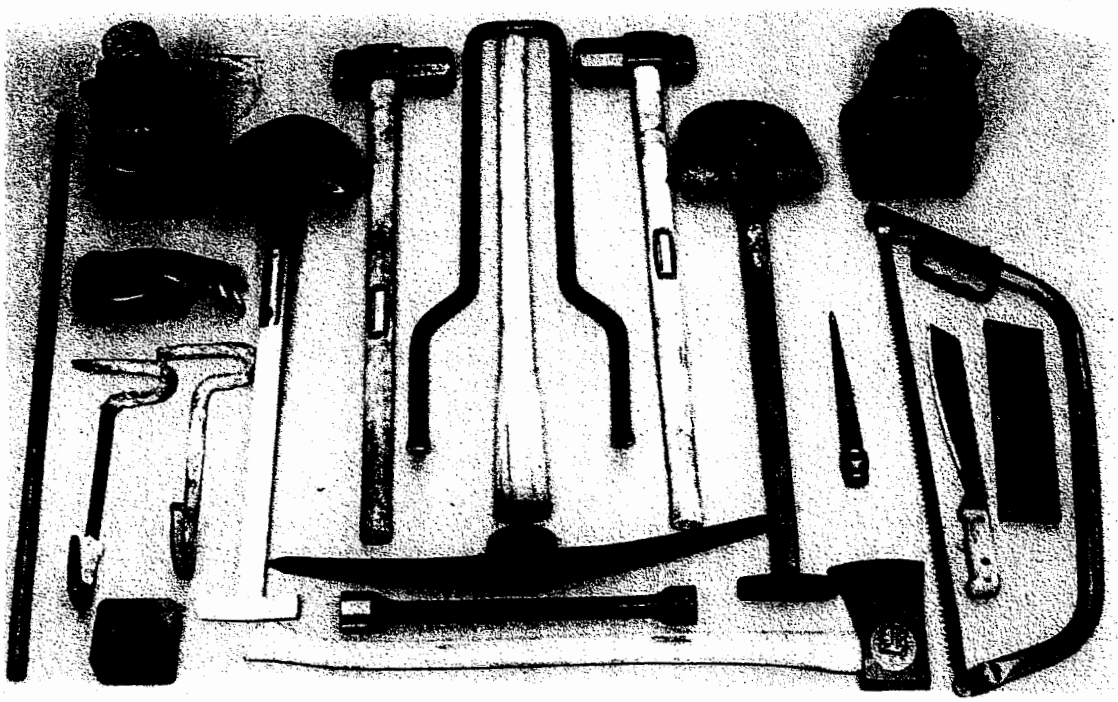


Fig 9 No 7 locker stowage

8.1 Contents (Fig 9):

Shovel	2 off
Sledge hammer	2 "
Pick handle	1 "
Pick head	1 "
Axe	1 "
Woodman's saw	1 "
Jack handle	2 "
Marlin spike	2 "
Hacksaw	1 "
Complete machet	1 "
Mechanic's recovery tools	2 "
Marker canes	2 "
Bush	2 "
Vehicle jack	2 "

NO 8 LOCKER

9 The number 8 locker is a closed locker, situated behind stabilizer, passenger side (LH) walkway level..

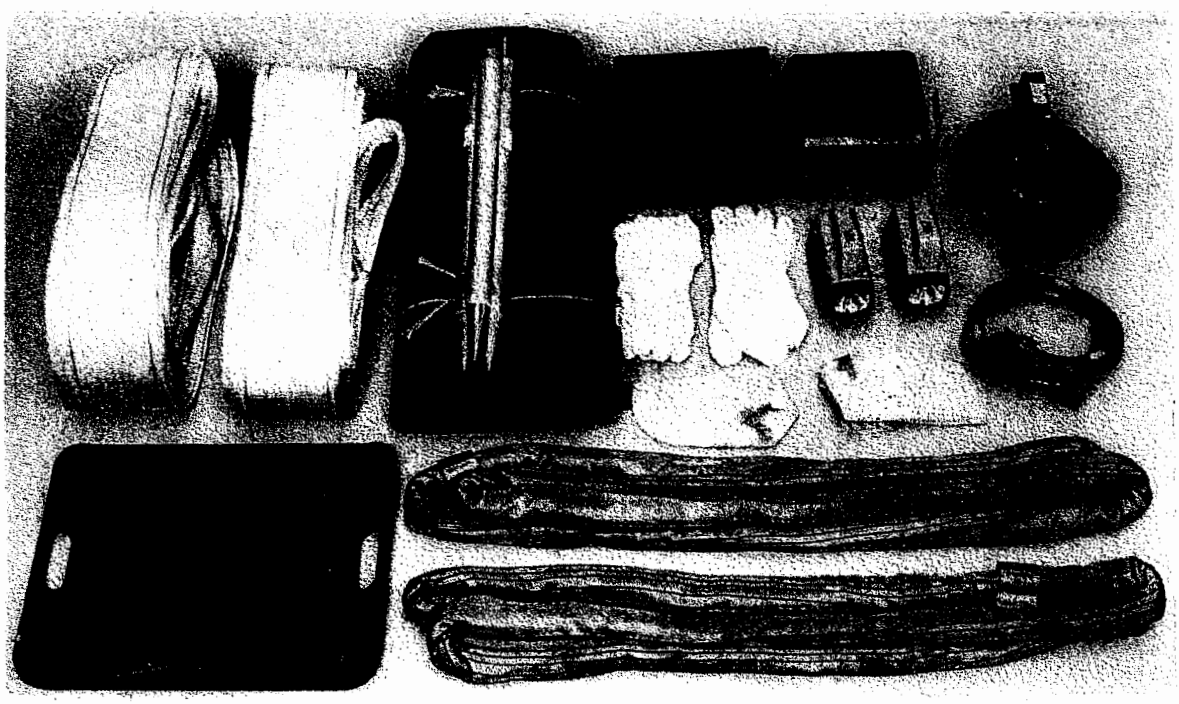


Fig 10 No 8 locker stowage

9.1 Contents (Fig 10):

Endless sling (9.6 ton WLL)	2 off
Strap (9.6 ton WLL)	2 "
Portable cooker complete	1 "
Search light	1 "
Bivouac complete	1 "

Side stabilizer foot plate	1 "
Gloves	2 pairs
Glove guards	2 off
Hand torch	2 "

NO 9 LOCKER

10 The number 9 locker is a closed locker, situated behind front wheel, passenger side (LH).

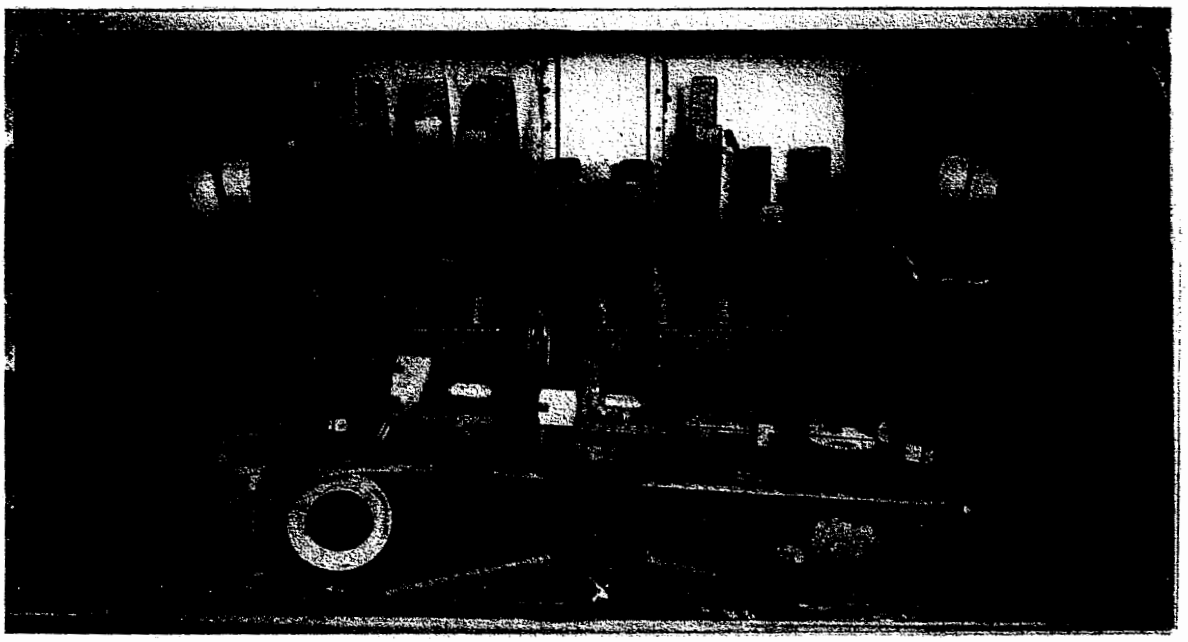


Fig 11 No 9 locker stowage

10.1 Contents (Fig 11):

Lifting forks A	2 off
" " B	2 "
" " C	2 "
" " D	2 "
" " E	2 "
" " F	2 "
Lifting bolts	2 "
Rigid lifting bar	1 "
Key hole plates	2 "
Towing adaptors A	2 "
" " B	2 "
" " C	2 "
" " D	2 "
Boom extension	1 "
Boom locking pin	1 "
Washer	1 "
Pulley block (not shown)	1 "

OPEN LOCKER, PASSENGER SIDE (LH)

11 An open locker (Fig 12), situated behind stabilizer at chassis level, contains 2 plastic water cans.

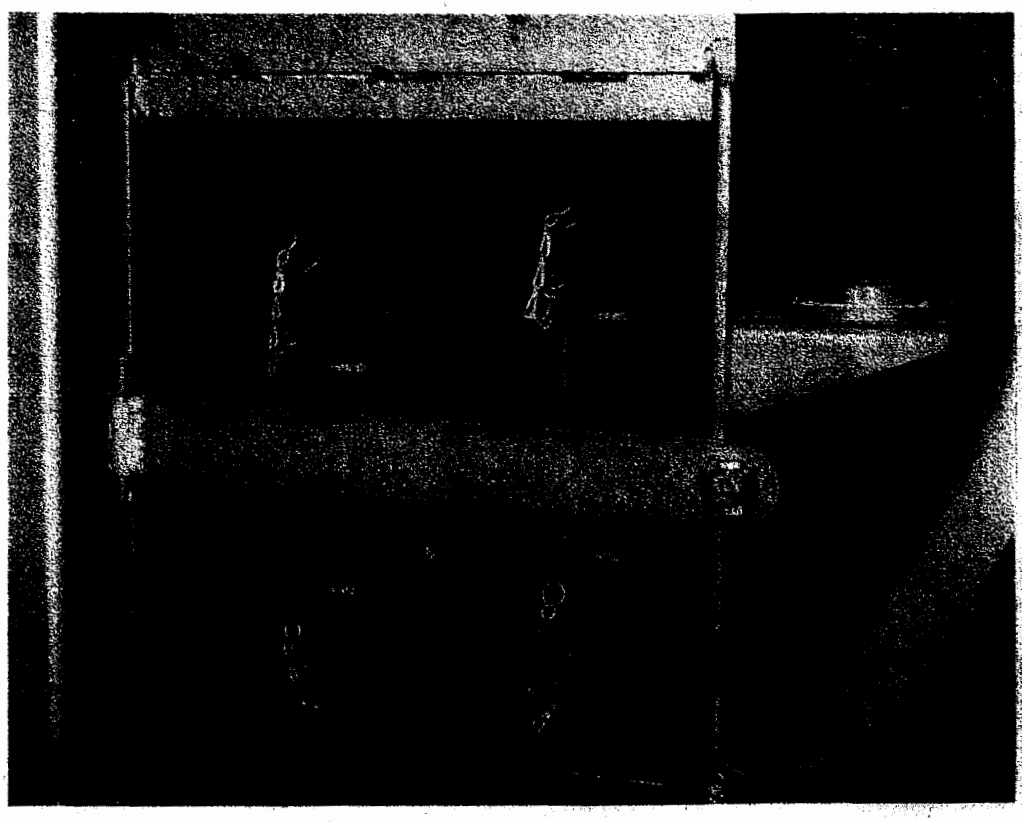


Fig 12 Open locker stowage

OPEN LOCKER, DRIVER'S SIDE (RH)

12 An open locker (Fig 13), situated behind stabilizer at chassis level, contains 3 steel gasoline cans.

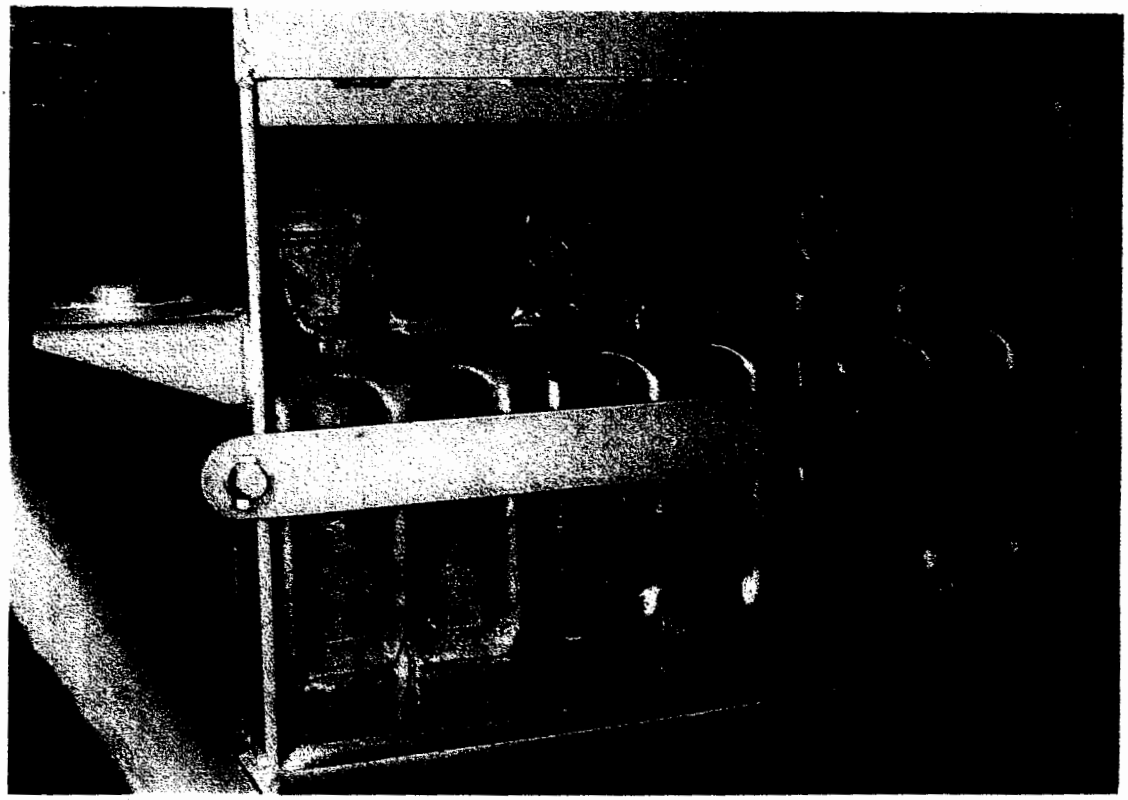


Fig 13 Open locker stowage

BOX, PASSENGER SIDE (LH)

13 A lockable steel box (Fig 14), situated to the rear of No. 8 locker at walkway level, contains the Hydraulic Rescue Kit.

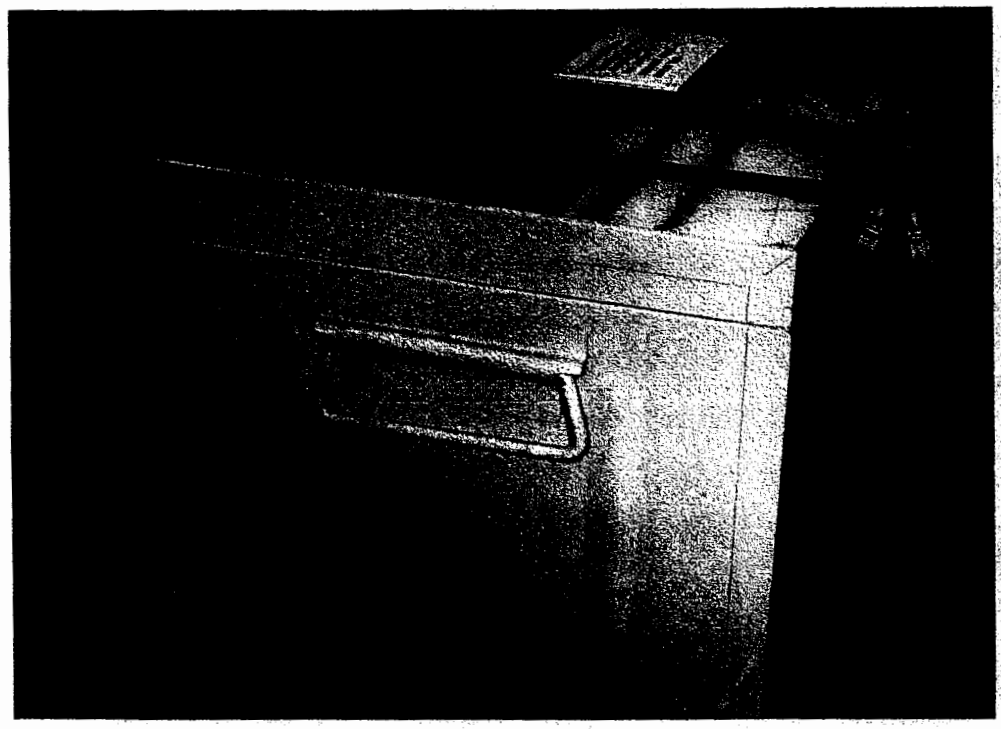


Fig 14 Hydraulic rescue kit stowage

GROUND REACTION PLATES

14 The ground reaction plates (Fig 15) are stowed at walkway level, vehicle rear, driver (RH) and passenger (LH) sides.

Fig 15 Ground reaction plate stowage

STRAIGHT CROW BAR

15 A wooden straight crow bar (Fig 16) is stowed between lockers 6, 7 and 8, passenger side (LH) and sub frame.

Fig 16 Straight crow bar stowage

HOLLEBONE DRAWBAR AND STRAIGHT DRAWBAR

16 A hollebone drawbar and a straight drawbar (Fig 17) are stowed at walkway level, driver's side.

Fig 17 Hollebone drawbar and straight drawbar stowage

GUN MOVING PLANKS AND GROUND ROLLERS

17 Gun moving planks are stowed on top of closed lockers, driver (RH) and passenger (LH) sides, and ground rollers are stowed either side of main recovery boom, to the rear of the hydraulic rams. (Refer to Figs 18 and 19).

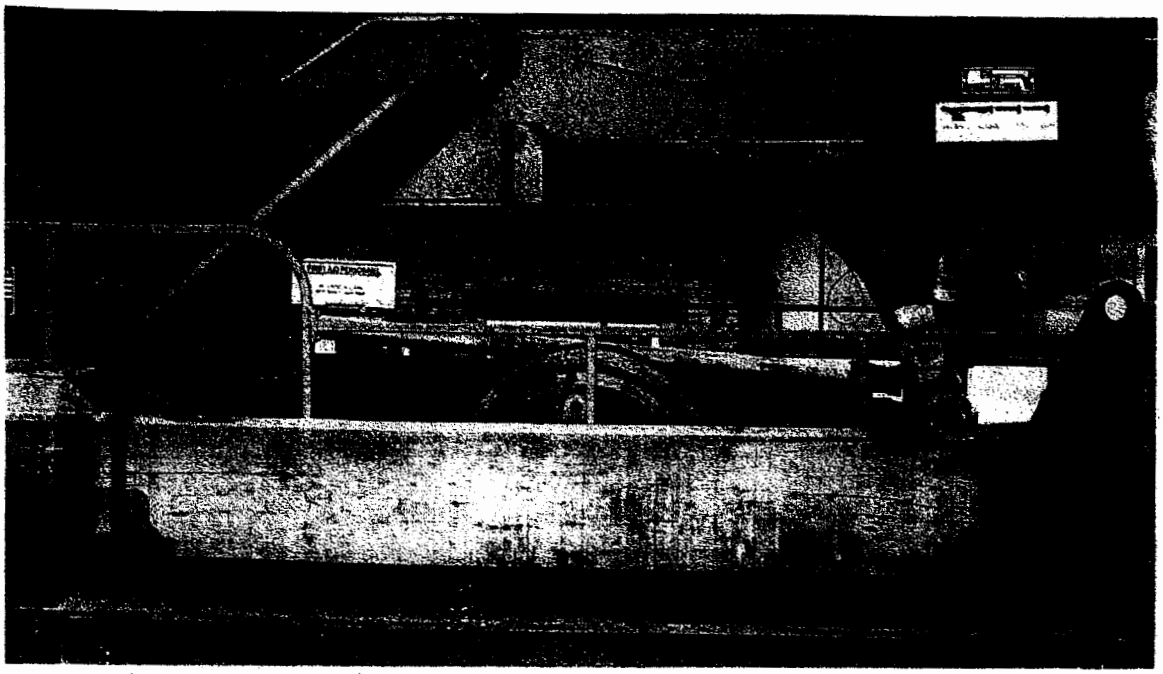


Fig 18 Gun moving planks and ground roller stowage passenger side (LH)

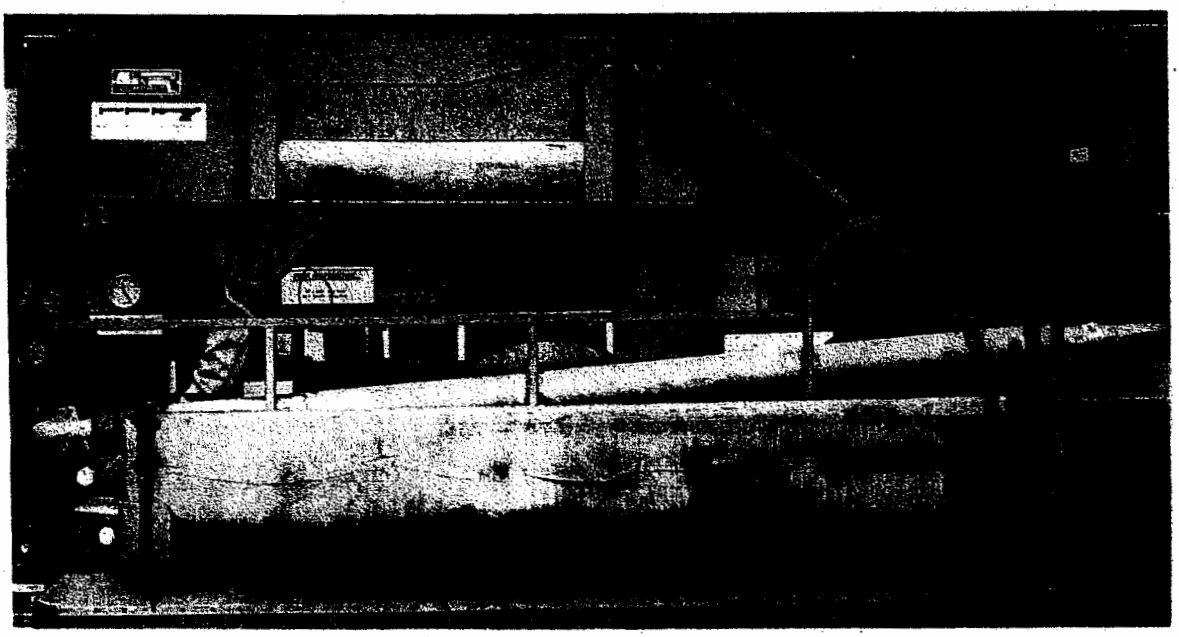


Fig 19 Gun moving planks and ground roller stowage driver side (RH)

CAB STOWAGE

18 Contents:

First aid kit	1 off
Electric lantern	2 "
Plastic map case	1 "
Electric cooking pot	1 "
Cab tilt pump handle	1 "

BCF FIRE EXTINGUISHERS

19 Fire extinguishers (3 off) (Fig 20) are located:

19.2 In cab, rear bulkhead, driver side.

19.2 Side panel of No 9 closed locker, to the rear of front wheel, passenger side.

19.3 Rear of No 5 closed locker, walkway level mounted on sub frame, driver side.

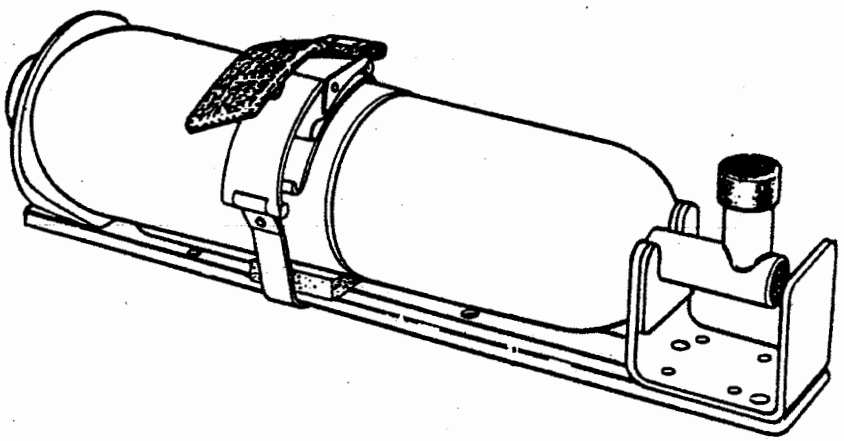


Fig 20 BCF fire extinguisher

Chapter 7

DESTRUCTION OF EQUIPMENT TO PREVENT ENEMY USE

CONTENTS

MANDATORY DIRECTIVE

1 Destruction of the equipment, when subject to capture by the enemy, will be undertaken by the user arm, ONLY WHEN, in the judgement of the unit commander concerned, such action is necessary in accordance with orders of, or policy established by the Army or Divisional Commanders.

2 The reporting of the destruction of the equipment is to be done through command channels.

DEGREE OF DAMAGE

3 The degree of damage inflicted, to prevent the equipment being used by an enemy, shall be as follows:

3.1 Methods of destruction should achieve such damage to equipment and essential spare parts, that it will not be possible to restore the equipment to a usable condition in the combat zone either by repair or by cannibalization.

3.2 Classified equipment must be destroyed in such degree as to prevent, whenever possible, duplication, or determination of operation or function by the enemy.

3.3 Any classified documents, notes, instructions or other written material pertaining to function, operation, maintenance or employment, including drawings or parts lists, must be destroyed in a manner to render them useless to the enemy.

4 In general, destruction of essential parts, followed by burning will usually be sufficient to render the equipment useless. However, selection of the particular method of destruction requires imagination and resourcefulness in utilization of the facilities at hand under the existing conditions. Time is usually critical.

EQUIPMENT INSTALLED IN VEHICLES

5 Equipment installed in vehicles should be destroyed in accordance with the priorities for the equipment itself, taking into account the relative importance of the installed equipment and the vehicle itself.

SPARE PARTS

6 The same priority, for destruction of component parts of a major item necessary to render the item inoperable, must be given to the destruction of similar components in spare parts storage areas.

MEANS AND PROCEDURES

7 If destruction is ordered, due consideration should be given to:

7.1 Selection of a point of destruction that will cause greatest obstruction to enemy movement and also prevent hazard to friendly troops from fragments or richocheting projectiles which may occur incidental to the destruction by gunfire.

7.2 Observance of appropriate safety precautions.

8 The following information is for guidance only. Of the several means of destruction, those most generally applicable are as follows:

MECHANICAL

9 This requires an axe, pick, crowbar or similar implement. The equipment should be destroyed in accordance with the priorities given in Table 1 - PRIORITIES.

BURNING

WARNING ...

DUE CONSIDERATION SHOULD BE GIVEN TO THE HIGHLY INFLAMMABLE NATURE OF GASOLINE AND ITS VAPOUR. CARELESSNESS IN ITS USE MAY RESULT IN PAINFUL BURNS. COVER MUST BE TAKEN WITHOUT DELAY BECAUSE AN EARLY EXPLOSION OF THE FUEL TANK MAY BE CAUSED BY THE FIRE.

10 This requires gasoline, oil or other flammables.

10.1 Remove and empty the portable fire extinguishers.

10.2 Smash all vital components, such as fuel pump, injectors, lamps, switches, instruments and control levers.

10.3 Smash the engine block, engine cylinders, gearbox and hydraulic steering pump.

10.4 Drain or puncture the fuel tank. Collect fuel for use as outlined in sub-paragraph (5) below.

10.5 With all hatches and windows open to admit air for combustion, pour gasoline and oil in and over the entire vehicle. Ignite by means of an incendary grenade fired from a cover at safe distance, by a burst from a flame thrower, by a combustible train of suitable length or by other appropriate means. Take cover immediately.

GUNFIRE

WARNING ...

FIRING ARTILLERY AT RANGES OF 460 METRES (500 YARDS) OR LESS, AND FIRING GRENADES OR ANTI-TANK ROCKETS SHOULD BE FROM COVER.

11 When destroying the equipment by gunfire, proceed as follows:

11.1 Remove and empty the portable fire extinguishers.

11.2 Smash all vital elements as outlined in sub-paragraph 10.2.

11.3 Drain or puncture the fuel tank.

11.4 Destroy the equipment by gunfire, using tank guns, self-propelled guns, artillery, rifles using rifle grenades or launchers using anti-tank rockets.

PRIORITIES

12 The priorities for destruction should be considered as follows:

12.1 Priority must be given to the destruction of classified equipment and associated documents.

12.2 When lack of time and/or means prevents complete destruction of equipment, priority is to be given to the destruction of essential parts, and the same parts are to be destroyed on all like equipment.

12.3 A guide to priorities for destruction of the equipment is shown in TABLE 1 - PRIORITIES.

TABLE 1 PRIORITIES FOR DESTRUCTION

Parts	Priority
(1)	(2)
Fuel pump and injectors	1
Engine block and cooling system	2
Tyres and suspensions	3
Braking system	4
Axles	5
Chassis frame	6