



TRUCK, LOAD HANDLING (DROPS) 15 TONNE, 8 x 6, LHD, MMLC (LEYLAND DAF)

OPERATING INFORMATION

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**UNITED KINGDOM MINISTRY OF DEFENCE
AND ARMED FORCES**

By

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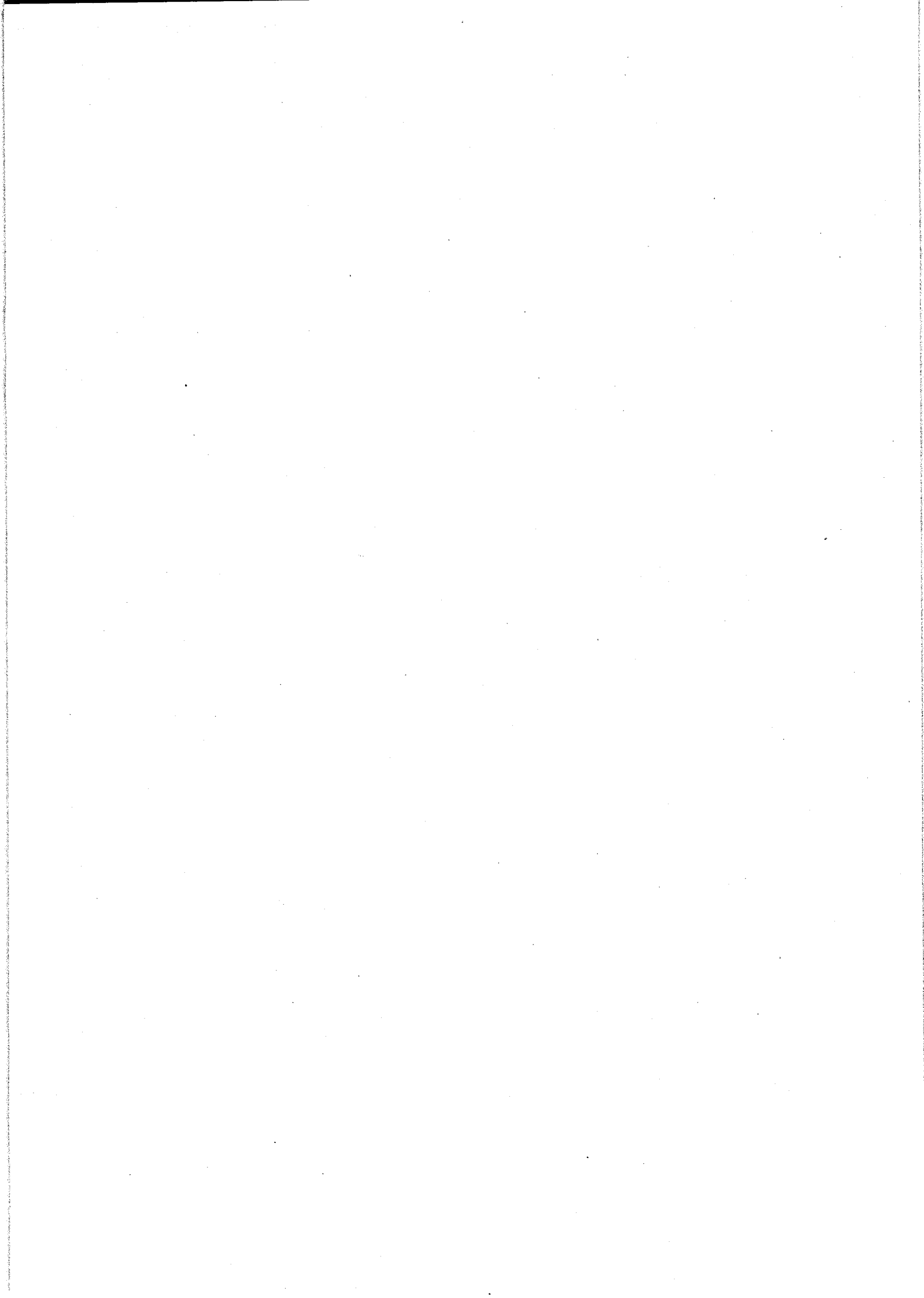
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PREFACE

SPONSOR: ES52

INTRODUCTION

1 Service users should forward any comments on this publication through the channels prescribed in AESP 0100-P-011-013. AESP form 10 is provided at the end of this publication; it should be photocopied and used for forwarding comments on this AESP.

2 AESPs are issued under Defence Council authority and where AESPs specify action to be taken, the AESP will of itself be sufficient authority for such action and also for the demanding of the necessary stores, subject to the provisions of Para 3 below.

3 The subject matter of this publication may be affected by Defence Council Instructions (DCIs), Standing 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.

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

RELATED AND ASSOCIATED PUBLICATIONS

Related publications

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

| Category/Sub-category | | | Information Level | | | |
|-----------------------|---|--|--------------------|--------------------------|---------------------------|--------------------------|
| | | | 1 User/Operator | 2 Unit Maintenance | 3 Field Maintenance | 4 Base Maintenance |
| 1 | 0 | Purpose and Planning Information | 101 | 101 | 101 | 101 |
| | 1 | Equipment Support Policy Directives | . | . | . | . |
| | 2 | Purpose and Planning Information, Medical and Dental | . | . | . | . |
| 2 | 0 | Operating Information | 201 | 201 | 201 | 201 |
| | 1 | Aide Memoire | . | . | . | . |
| | 2 | Training Aids | . | . | . | . |
| 3 | | Technical Description | 302 | 302 | 302 | 302 |
| 4 | 1 | Installation Instructions | 411 | 411 | . | . |
| | 2 | Preparation for Special Environments | 421 | 421 | 423 | . |
| 5 | 1 | Failure Diagnosis | . | 512 | 512 | 512 |
| | 2 | Repair Instructions | . | 522 | 523 | 523 |
| | 3 | Inspection Standards | . | 532 | 533 | 533 |
| | 4 | Calibration Procedures | . | . | . | . |
| 6 | | Maintenance Schedules | 601 | 601 | 601 | 601 |
| 7 | 1 | Illustrated Parts Catalogues | 711 | 711 | 711 | 711 |
| | 2 | Commercial Parts Lists | . | . | . | . |
| | 3 | Complete Equipment Schedule, Production | . | . | . | . |
| | 4 | Complete Equipment Schedule, Service Edition (Simple Equipment) | . | . | . | . |
| | 5 | Complete Equipment Schedule, Service Edition (Complex Equipment) | . | . | . | . |
| 8 | 1 | Modification Instructions | 811 | 811 | 811 | 811 |
| | 2 | General Instructions, Special Technical Instructions and Servicing Instructions | 821 | 821 | 821 | 821 |
| | 3 | Service Engineered Modification Instructions (RAF only) | . | . | . | . |

* Category/Sub-Category not published.

Associated publications

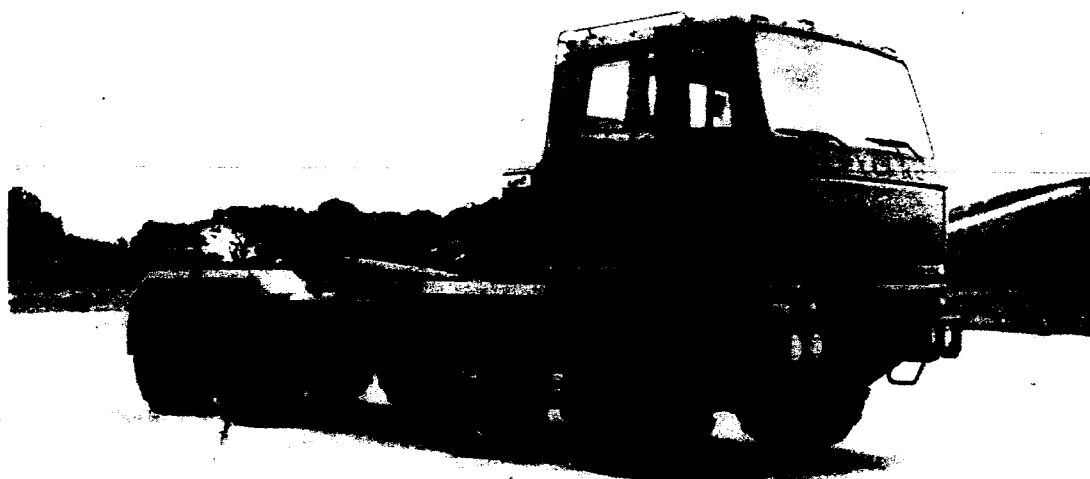
| 6 | <u>Reference</u> | <u>Title</u> |
|---|------------------|-----------------------------------|
| | AC31824 | Complete Equipment Schedule |
| | 2815-K-720 | Engine, Diesel, Perkins 350 |
| | 2520-C-116 | Gearbox, ZF Model HP600, Series 3 |
| | 3920-B-202 | Simple rail Transfer equipment |
| | 2330-S-301 | Trailer MLRS |

WARNINGS

- (1) DURING LOADING & UNLOADING CYCLES OF THE LOAD HANDLING SYSTEM (LHS), A HEIGHT OF 4.7M (15.5FT) IS REACHED THEREFORE, BEFORE ANY ATTEMPT IS MADE TO CARRY OUT THE OPERATION, A CHECK MUST BE MADE TO ENSURE THAT THERE ARE NO OVERHEAD. OBSTRUCTIONS. PARTICULARLY OVERHEAD POWER LINES.**
- (2) GROUND CONDITIONS MUST BE CHECKED FOR FIRMNESS AND EXTREME SIDEWAYS INCLINATION BEFORE MOUNTING OR PICKING UP A FLATRACK. ANY GROUND INSTABILITY BENEATH THE ROAD WHEELS COULD AFFECT THE SAFE OPERATION OF THE LOAD HANDLING SYSTEM.**
- (3) NEVER DRIVE OFF WITH THE 'NO TRANS' LAMP ILLUMINATED. ILLUMINATED LAMP MEANS LOAD LOCKS ARE NOT ENGAGED AND THE FLATRACK IS NOT FULLY STOWED**
- (4) A HYDRAULIC OIL PRESSURE IS PRESENT IN THE LOAD HANDLING SYSTEM WHEN THE TRUCK ENGINE AND POWER TAKE-OFF ARE RUNNING. DO NOT ATTEMPT TO RELEASE FILTERS WITH THE HYDRAULIC SYSTEM LIVE. SHUT OFF ENGINE.**
- (5) DO NOT REMOVE RADIATOR FILLER CAP WHILST ENGINE IS RUNNING OR IF THE SYSTEM IS STILL HOT.**
- (6) THROUGHOUT THE TYRE INFLATION PROCEDURE. BECAUSE OF THE POSSIBLE EVENT OF A TYRE BURST, PERSONNEL MUST NOT STAND IN LINE OF THE LIKELY TRAJECTORY OF ANY PART OF WHEEL OR RIM ASSEMBLY.**
- (7) ALL PERSONNEL MUST STAND CLEAR WHEN THE CAB IS BEING RAISED OR LOWERED WHEN PERFORMING THE RAISING OR LOWERING FUNCTION, STAND CLEAR OF PIVOTING CAB. NEVER WORK UNDER AN UNPROPPED CAB.**
- (8) BETA LAMPS, IN THE EVENT OF BREAKAGE IN A CONFINED SPACE, EVACUATE AND VENTILATE THE IMMEDIATE AREA.**
- (9) BRAKE LININGS CONTAIN ASBESTOS. DO NOT BLOW DUST OR USE A BRUSH TO REMOVE DUST FROM BRAKE LININGS. USE CLEAN WET RAGS TO REMOVE ASBESTOS DUST AND DEPOSIT USED RAGS, WHILE STILL WET, INTO A PLASTIC WASTE BAG FOR DISPOSAL DO NOT GRIND, DRILL OR FILE BRAKE LININGS UNLESS WORKING IN A VENTILATED BOOTH OR THE MACHINE HAS ADEQUATE FILTERED EXTRACTORS.**

CAUTIONS

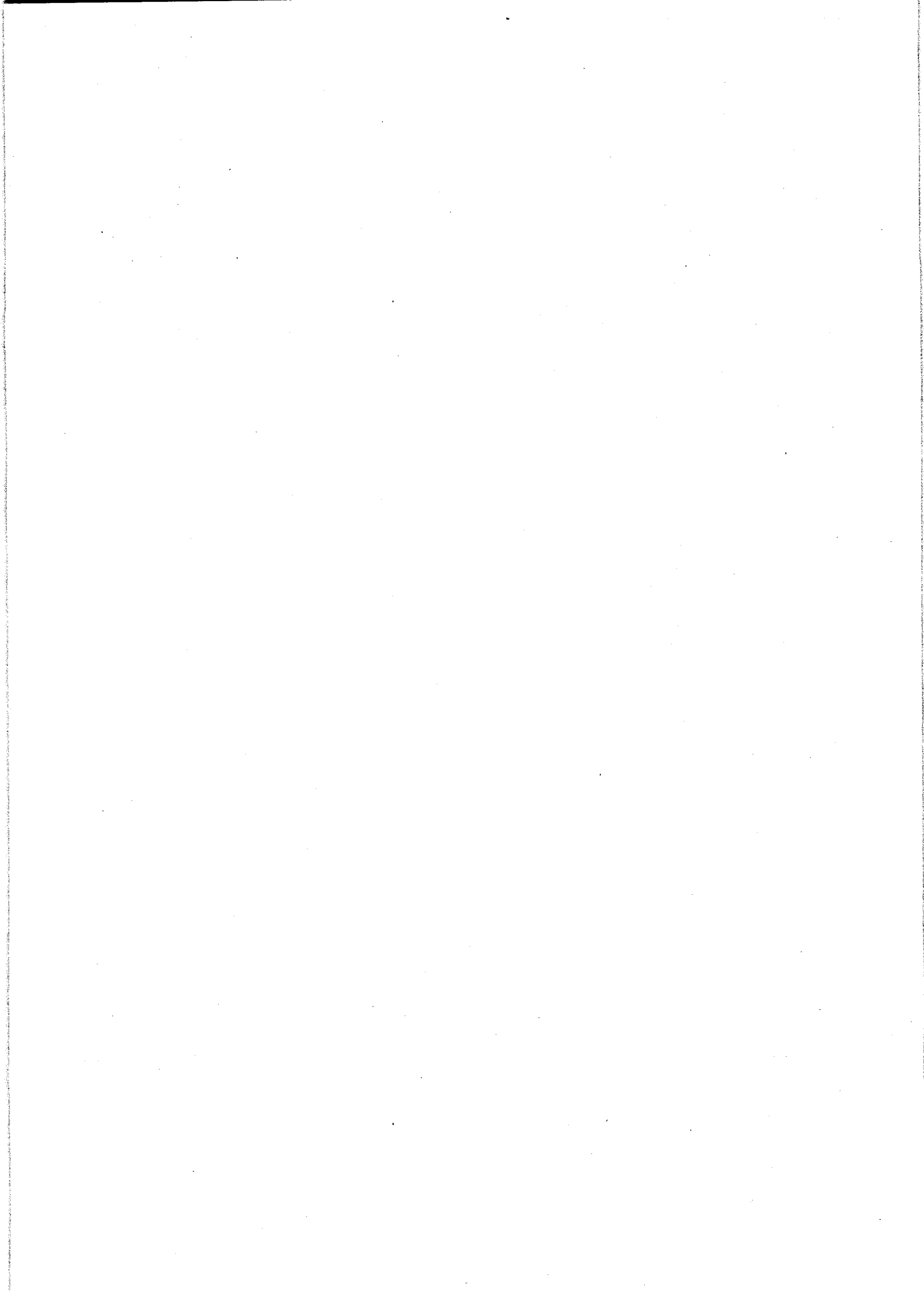
- (1) Never accelerate when operating the speed range selector switch.
- (2) The handbrake lever must be applied to the park position before vacating the vehicle cab.
- (3) The cross-axle differential and third differential lock features must only be engaged when the vehicle is stationary OR travelling at slow speeds. Never engage either system when travelling downhill or when the vehicle road speed is in excess of 3.2km/hr (2 mph).
- (4) Do not attempt to fill or top up a hot engine with cold coolant.
- (5) Any marked loss of coolant must be investigated:
- (6) Do not weld chassis rail or drill flanges.
- (7) With the cab in the raised (tilted) position, care **MUST** be exercised when opening the cab door(s) to ensure that door(s) weight is adequately supported until it is in the fully open position. Under no circumstances should the door be allowed to 'drop' to the fully open position. Failure to observe this caution will cause severe damage to the door hinges and cab structure.
- (8) Camouflage nets must not be carried on the cab roof.
- (9) **LOAD HANDLING SYSTEM.** All necessary steps must be taken to prevent the accidental ingress of contamination into the LHS due to poor hygiene/practice, particularly when using the hydraulic stave interface.



MMLC 3/4 Front View



MMLC 3/4 Rear View



CHAPTER 1
GENERAL DESCRIPTION
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| | 30 | Simple Rail Transfer Equipment |

MEDIUM MOBILITY LOAD CARRIER

1 The MMLC 8x6 Logistic Support Vehicle is designed to operate the Multilift MK IV Load Handling System (LHS) and the EKA Simple Rail Transfer Equipment (S.R.T.E.).

ENGINE

2 The engine is a Rolls Royce Eagle 350LM six cylinder turbocharged and chargecooled four stroke diesel engine rated at [REDACTED] brake horsepower. A starter motor and a cold start aid are provided. A turbocharger is fitted the charge air being water cooled.

3 An outer heavy duty standard paper element and an inner safety oil treated element are fitted to the air cleaner, which receives its air via an automatically cleaning cyclone pre-cleaner, fitted for increased efficiency in dusty conditions.

4 A high efficiency radiator with a close cowled thermostatically controlled engine driven fan is fitted. The system has a transmission oil cooler and a coolant reserve header tank.

5 The fuel tank has a total capacity of 272 litres. A filter and sedimenter are provided in the system. The sedimenter incorporates a 450 watt thermostatically controlled heater to preheat the fuel between the sedimenter and the engine. A fuel shut-off cock is mounted between the tank and sedimenter.

EXHAUST SYSTEM

6 A single silencer is mounted behind the front bumper, the exhaust discharging to the right hand side of the vehicle. The turbocharger is connected to the silencer by a fabricated steel pipe and stainless steel flexible sleeves.

GEARBOX AND AXLES

7 The engine drives a 6 speed ZF 6HP600 fully automatic gearbox, consisting of a torque converter with lock-up clutch, retarder and planetary geartrain. Gearbox operation is electro-hydraulically controlled. Gear changes are performed on receipt of signals from an electronic control unit in response to engine output, road speed and gear selector position.

8 An emergency mechanical gear selection is provided to enable 3rd or reverse gear to be selected in case of electrical failure. The gearbox also incorporates the emergency steering pump and PTO drive for the LHS hydraulic supply. An secondary oil pump integral to the gearbox enables the vehicle to be tow started, or towed forwards without propshaft removal.

9 The 20 tonne bogie unit has two axles with spiral bevel primary reduction gears and epicyclic hub reduction gearing. Input drive is split between the two axles by a third differential. The bogie is fitted with inter axle and cross differential locks. The forged steel hubs run on opposed twin taper roller bearings.

10 The first front axle is a [REDACTED] tonne capacity driven steering axle with spiral driven crown wheel and pinion driving head, final reduction is by epicyclic gearing in the swivel heads. The axle is fitted with a lockable differential. Forged steel hubs run on opposed twin taper roller bearings. The axle stub is bolted to a steering head supported by a taper roller bearing at the bottom and a plain bush at the top.

11 The driven steering axle and rear bogie unit inter axle and differential locks are selected from the cab, warning lights illuminate indicating the selection mode.

12 The second front axle is a [REDACTED] tonne dead steer axle incorporating a drop centre beam to provide clearance for the front axle drive shaft under all articulated conditions. Forged steel hubs run on opposed twin taper roller bearings. The stub axle is carried on a taper king pin, with a steep angle taper roller bearing at the top and plain phospher bronze bush at the bottom.

AUXILIARY GEARBOX

13 The auxiliary gearbox is a single speed with an input and two output shafts. It is mounted at three points on the chassis crossmember. A disengageable front axle drive is provided.

SUSPENSION AND STEERING

14 The front suspension consists of two taper leaf springs and two shock absorbers for each axle. The shock absorbers dampen the oscillation of the springs. An anti roll bar is fitted between the second front axle and chassis side members to enhance lateral stability.

15 The rear suspension consists of two taper leaf springs centrally pivoted on the fulcrum trunnions. The axles are located fore and aft by radius rods and laterally by stirrups.

16 The steering box has integral hydraulic power assistance and operates on the left hand swivel of the first axle via a drop arm and drag link. The second axle steering is controlled by a push roll rod also connected to the steering box drop arm and operates the second axle steering arm via a relay drop arm and drag link. Hydraulic power is provided by an engine driven pump. A gearbox driven emergency steering pump is also provided.

WHEELS

17 22.5 x 14 drop centre wheels in single formation are fitted to all axles. The wheels are fitted with Michelin 18R22.5 XL tyres. A set of tyre deflation valves is provided to adjust the tyre pressures for improved traction when operating off-road in sand or gravel track conditions.

BRAKING SYSTEM

18 The braking system is to EEC 2 line specification with a split service system. The two separate air circuits are controlled by a dual footbrake valve and spring brakes are provided on all driven axles for parking. Two line air connections are fitted at the front of the chassis for recovery purposes and at the rear for trailer towing. A single cylinder compressor feeds an air dryer which will prevent damage by water and freezing. A manoeuvring brake is provided to allow preset partial brake application to the rear bogie brakes. An emergency spring brake release system is operated on all driven axles. A dual tyre inflation connection is also provided inside the LH side stowage box.

ELECTRICAL SYSTEM

19 The electrical system is a 24 volt double pole with insulated negative return. Four 12 volt batteries connected in series/parallel are provided. Head, fog, side, stop, tail and reversing lights are fitted as well as turn indicators; an F.V. lighting switch is provided for convoy operations. An infra-red switch is also fitted.

20 A flood light to illuminate LHS and SRTE operation is fitted at the rear of the cab. Feed from the batteries is controlled by a master switch.

CAB

21 The steel cab is fully trimmed and incorporates noise insulating material. [REDACTED] A one piece curved windscreen of laminated glass is fitted. The rear left hand glass (behind the driver) incorporates an electrical heating element. The windscreen and rear left hand glass have a wiper and wash system.

22 There is a suspension seat for the driver, a fixed seat for the passenger, and a central platform for the hatch observer. All controls and instruments are grouped for ease of driver operation.

CAB MOUNTING

23 The cab is three point mounted by two rubber bushed pivots at the front and a transverse leaf spring at the rear, the leaf spring being controlled by hydraulic dampers at each end. A hydraulic hand pump is provided for forward tilting and lowering the cab. The cab is mechanically locked down and there is an in-cab warning of incorrect locking.

CHASSIS

24 The frame consists of two channel sidemembers and fabricated crossmembers of channel or tubular construction. Special heavy duty crossmembers are fitted front and rear. The front bumper carries two recovery eyes and a tow jaw and pin capable of accepting a NATO tow bar eye. At the rear are two recovery eyes, the rear crossmember carries a towing pintle, all comply to DEF STAN 25-6.

STOWAGE

25 The cab has a lockable glovebox, there is also a toolbox incorporated in the mates footrest. A 2.5kg BCF fire extinguisher is bracketed within the cab adjacent to the driver. Bracketed off the left chassis sidemember is a single compartment lockable box with side opening doors. Supported by brackets off the forward face of the box is a fire extinguisher container housing a 6kg extinguisher.

26 Above the rear towing pintle is a single compartment stowage locker with a downward opening door.

LOAD HANDLING SYSTEM (LHS)

27 The multilift MK IV Load Handling System is designed to mount and demount flat racks with secured loads, up to [REDACTED] from a ground level position to the back of the chassis. It is also compatible with the EKA Simple Rail Transfer Equipment.

28 The control system is electro-hydraulic with three modes of operation; automatic, manually operated unsequenced joystick, and manual push button.

29 Quick release hydraulic couplings are fitted to the main manifold for vehicle recovery situations and for operation of the EKA Simple Rail Transfer Equipment.

SIMPLE RAIL TRANSFER EQUIPMENT (SRTE)

30 The EKA Simple Rail Transfer Equipment is specially designed for the unloading and loading of laden flatracks at railhead areas.

31 The S.R.T.E. is mounted and demounted onto the vehicle using the Multilift MKIV Load Handling System.

32 Hydraulic power is supplied via the L.H.S. slave couplings and electrical power from the vehicle trailer auxiliary electrical socket.

CHAPTER 2
CONTROLS AND INSTRUMENTS

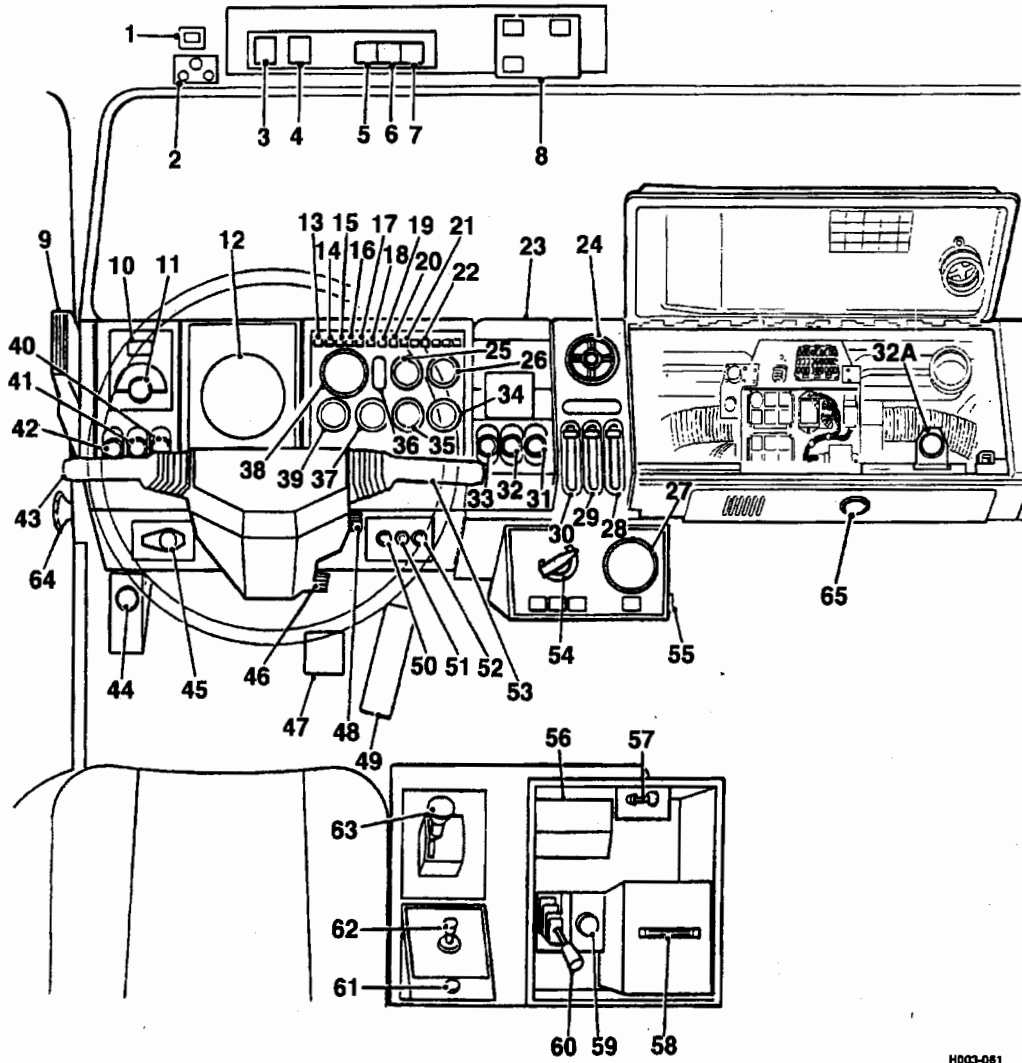
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| | 11 | Hydraulic slave couplings | 14 |
| | 12 | Sensing head gimbal assembly | 16 |

CAB CONTROLS AND INSTRUMENTS (See Figure 1)

- 1 Power steering warning (1). Illuminates when the master start switch is turned to position '2', when the vehicle is brought to a halt, (engine running), or when either hydraulic pump fails.
- 2 Earth leakage 'press to test' button and two indicator lamps (2). Both lamps must illuminate on test.
- 3 Load handling mode rotary selector switch (3). This switch has six positions for controlling the Load Handling System.
- 4 Load Handling System instruction label (4). Identifies the six positions of the rotary selector switch (3).
- 5 Load handling systems hydraulic oil warning light (5). When illuminated can indicate, high oil temperature, filter clogging and cold start conditions.
- 6 PTO engaged warning light (6). Illuminates when the PTO is engaged.
- 7 Load handling system 'NO TRANS' warning light (7). Illuminates when the hook frame is not fully down, or, during operation in the LOAD/UNLOAD modes.
- 8 Load handling system inclinometer and audible warning (8). This control includes safe operating and excessive tilt warning lights and a 'press to test' button.
- 9 Side window demister (9).
- 10 Infra-red 'ON/OFF' switch (10). When switched on will isolate electrical power to all exterior lights except the headlights.
- 11 F.V. lighting switch (11). This switch has six positions as follows:
 - C - Convoy lights
 - CS - Convoy and sidelights
 - OFF -
 - T - Tail lights
 - ST - Side, tail and dim dipped headlights
 - HST - Side, tail and dipped headlights
- 12 Speedometer (12). Indicates the speed of the vehicle and the distance covered.
- 13 Tractor left hand direction indicator warning light (13).
- 14 Trailer direction indicator warning light (14).
- 15 Tractor right hand direction indicator warning light (15).
- 16 Main beam warning light (16) illuminates when the headlamps are switched to main beam.

- 17 Low air pressure warning light (17). Illuminates when the brake air pressure is low. Stop the vehicle immediately. This light and the 'STOP' warning light (36) will illuminate and a buzzer will sound if the air pressure falls below 489-538kPa (71-78psi).
- 18 Coolant temperature warning light (18). This light and the 'STOP' warning light (36) will illuminate and a warning buzzer will sound should the coolant temperature exceed 93 degrees C (200 degrees F).
- 19 Engine low oil pressure warning light (19). If this light comes on stop the engine immediately. The 'STOP' warning light (36) will also illuminate and a warning buzzer will sound.
- 20 Cab tilt mechanism unlocked warning light (20). The 'STOP' warning light (36) will also illuminate and a warning buzzer will sound.
- 21 Alternator warning light (21).
- 22 Hand brake warning light (22). Illuminates when parking brake is applied.
- 23 Hand brake control valve (23). This is a two position valve. The first movement of the lever from 'OFF' to 'SEC' applies the brakes (tractor and trailer) progressively and may be used for emergency braking if the footbrake fails. The second movement to 'PARK' applies the parking spring brakes. The control handle and locking bar must be squeezed together before the control handle can be moved.
- 24 Face level air vent (24). This vent may be swivelled in any direction or turned off.
- 25 Air pressure gauge No.1 (25). This gauge shows the air pressure in the front service reservoir. DO NOT attempt to move the vehicle until this gauge and air pressure gauges No. 2 and 3 show air pressure of 827kPa (120psi).
- 26 Air pressure gauge No. 2 (26). This gauge shows the pressure in the rear service reservoir.
- 27 Gearbox oil temperature gauge and warning light (27). Under normal operating conditions the gauge indicator needle should remain in the 'GREEN' zone limit. Should the needle move in the 'RED' zone and/or the warning light illuminate, stop the vehicle immediately and investigate the cause.
- 28 Air distribution control (28). Slide the control lever up to direct the air on to the windscreen and down to direct it to the cab interior. This control can be placed in any position to obtain the desired air distribution.
- 29 Fan blower control (29). From the 'OFF' position slide the control downward to the central position to allow air to enter the cab by ram effect only. Further movement downwards will operate the fan at slow speed and fully down for fast speed.
- 30 Temperature control (30). Slide the control downward to obtain a progressively hotter air stream.
- 31 Rear screen heater switch (31). Illuminates when screen heater is switched on.
- 32 Load handling system floodlight switch (32). Illuminates when lamp is switched on.
- 32A Battery protection timer override switch (32A). Cancels battery timer anytime during two hour timing cycle.



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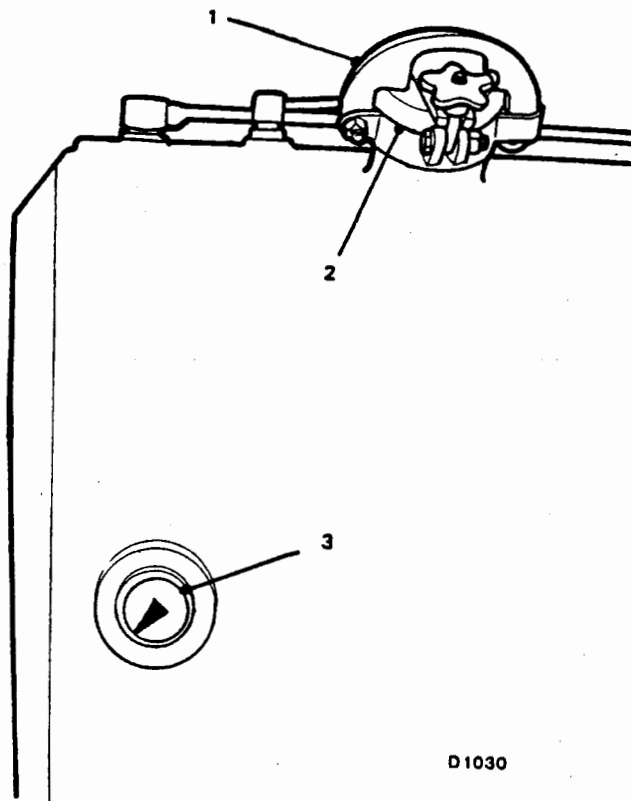
Fig 1 Cab Controls and Instruments

Key to Fig 1

| | | | |
|-----|--|----|------------------------------------|
| 1 | Power Steering warning light | 33 | Hazard warning switch |
| 2 | Earth leakage test button | 34 | Air pressure gauge No 3 |
| 3 | LHS mode rotary selector switch | 35 | Engine oil pressure gauge |
| 4 | LHS instruction label | 36 | 'STOP' warning light |
| 5 | LHS hydraulic oil warning light | 37 | Engine coolant temp gauge |
| 6 | PTO engaged warning light | 38 | Tachometer |
| 7 | LHS'NO TRANS' warning light | 39 | Fuel gauge |
| 8 | LHS inclinometer | 40 | Fuel heater switch |
| 9 | Side window demister | 41 | Rear fog light switch |
| 10 | Infra-red ON/OFF switch | 42 | Interior light switch |
| 11 | F.V. lighting switch | 43 | Multi purpose column switch |
| 12 | Speedometer | 44 | Manoeuvring brake foot valve |
| 13 | Left indicator warning light | 45 | Start pilot pump |
| 14 | Trailer indicator warning light | 46 | Steering column rake adjuster |
| 15 | Right indicator warning light | 47 | Footbrake pedal |
| 16 | Main beam warning light | 48 | Master start switch |
| 17 | Low air pressure warning light | 49 | Accelerator pedal |
| 18 | Coolant temperature warning light | 50 | Battery isolation button |
| 19 | Engine low oil pressure warning light | 51 | Engine stop override warning light |
| 20 | Cab unlocked warning light | 52 | Engine stop override button |
| 21 | Alternator warning light | 53 | Multi purpose column switch |
| 22 | Handbrake warning light | 54 | Differential lock selector |
| 23 | Handbrake control valve | 55 | Two pin socket |
| 24 | Face level air vent | 56 | Relay box boiling vessel |
| 25 | Air pressure gauge No 1 | 57 | Emergency spring brake release |
| 26 | Air pressure gauge No 2 | 58 | Boiling vessel stowage |
| 27 | Gearbox oil temp gauge | 59 | PTO emergency control button |
| 28 | Air distribution control | 60 | Emergency gear selector lever |
| 29 | Fan blower control | 61 | Gearbox retarder selector |
| 30 | Temperature control | 62 | LHS control lever |
| 31 | Rear screen heater switch | 63 | Gear selector lever |
| 32 | LHS flooding switch | 64 | Front panel release control |
| 32A | Battery protection timer override switch | 65 | 12 volt accessories socket |

- 33 Hazard warning switch (33), illuminates when switched on.
- 34 Air pressure gauge No 3 (34). This gauge shows the pressure in the secondary reservoir.
- 35 Engine oil pressure gauge (35). Registers the lubricating oil pressure in the engine.
- 36 'STOP' warning light (36). This light will illuminate and a warning buzzer will sound in the event of a malfunction in the engine oil pressure, engine coolant temperature, low air pressure or cab lock down systems. If this light comes on; stop the vehicle immediately and investigate the cause.
- 37 Engine coolant temperature gauge (37) registers the temperature of the engine coolant which should not exceed 93 degrees C (200 degrees F).
- 38 Tachometer (38). Multiply the reading by 100 to obtain the number of engine revolutions per minute.
- 39 Fuel gauge (39). Indicates the amount of fuel remaining in the fuel tank.
- 40 Fuel heater switch and warning light (40). Switch on to activate heater element in fuel sedimenter.
- 41 Rear fog light switch and warning light (41). The rear fog lights can only be energised when the headlights are operative. The fog light switch will illuminate when it is depressed and will remain illuminated whilst the rear fog lights are operative.
- 42 Interior light switch (42). Switch on to operate cab interior lights.
- 43 Multi purpose column switch - left hand (43). Operates as follows:
 - 43.1 Push arm down for headlamp - 'FULL BEAM'.
 - 43.2 Central for headlamp - 'DIP'.
 - 43.3 Pull up and release for headlamp - 'FLASH'.
 - 43.4 Push arm forward to indicate - 'RIGHT TURN'.
 - 43.5 Pull arm back to indicate 'LEFT TURN'.
 - 43.6 Press arm in towards steering column for - 'HORN'.
- 44 Manoeuvring brake foot valve (44). Supplies air pressure to the bogie brakes only.
- 45 Start pilot pump (45). Turn anti-clockwise to release plunger.
- 46 Steering column rake adjuster (46). Do not attempt to adjust rake while the vehicle is moving.
- 47 Footbrake pedal (47). The pedal operates the brakes on all wheels.
- 48 Master start switch and steering lock (48). Insert key and turn to position '1' to unlock the steering. Continue turning to position '2' to energise the auxiliary circuits. Turn the key further against spring pressure to position '3' to operate the starter motor, the key will automatically return to position '2' when released. To lock the steering, turn the key to position '0' and push it Inwards before withdrawing the key from the lock.

- 49 Accelerator pedal (49). This pedal controls the speed of the engine.
- 50 Battery isolation button (50). When pressed, switches the battery master switch to 'OFF'. The battery master switch can only be turned 'ON' again manually.
- 51 Engine stop override warning light (51). Illuminates when the override button (52) is pressed.
- 52 Engine stop override button (52). When pressed, will enable the engine to continue running with the battery master switch in the 'OFF' position. The override button must be pressed before selection of the battery isolation button (50). The warning light (51) will extinguish when the isolation button is pressed.
- 53 Multi purpose column switch - right hand (53). Operate as follows:
- 53.1 Push arm forward to '1' for windscreen 'SLOW SPEED WIPE'.
 - 53.2 Push arm on to '2' for windscreen 'FAST SPEED WIPE'.
 - 53.3 Push arm in towards steering column for 'WASH AND WIPE'.
 - 53.4 Push arm clockwise for 'INTERMITTENT WIPE'.
- 54 Differential locks and F.W.D. selector switch and warning lights (54).
- 55 Two pin socket (55). For use with map reading lamp.
- 56 Relay box (56), contains electrical socket and 'ON/OFF' switch for boiling vessel.
- 57 Emergency spring brake release and warning bell (57). On selection allows the spring brakes to be released. The warning bell will also sound.
- 58 Boiling vessel stowage point.
- 59 PTO emergency control button (59). For operation of PTO in the event of electrical failure of the LHS electronic circuits.
- 60 Emergency gear selector lever (60). For operation of gearbox in the event of electrical failure of the electronic control unit.
- 61 Gearbox retarder selector button (61). The hydraulic retarder can be used in any gear range but the accelerator must be released. Extended use of the retarder under certain conditions can cause high transmission and engine coolant temperatures.
- 62 Load handling system control lever (62). Used for controlling LOADING/UNLOADING operations of the L.H.S. spring loaded to the centre 'OFF' position.
- 63 Gear selector lever (63). Six forward speeds, neutral and one reverse gear are selected by signals sent by this lever to the gearbox electronic control unit.



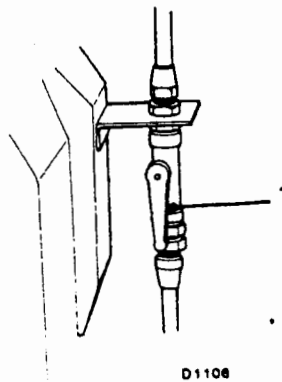
- 1 Filler locking arm
- 3 Fuel tank gauge

- 2 Filler cap

Fig 3 Fuel tank gauge

FUEL TANK ISOLATION COCK (see Figure 4)

67 A fuel tank isolation cock (1) is fitted as a fire hazard precaution. The cock is located in the space between the fuel tank and batteries. Turn the cock handle from the in line to the horizontal position to shut off the fuel supply.



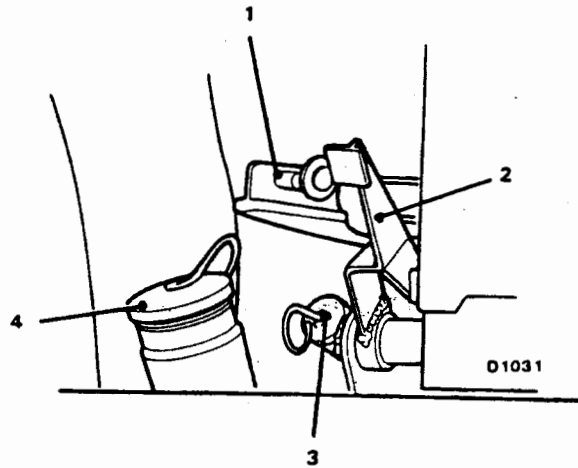
- 1 Cock handle (open position)

Fig 4 Fuel tank isolation cock

ENGINE HAND THROTTLE (see Figure 5)

68 The engine hand throttle is located under the cab front centre panel assembly. To operate, push lever (2) forward and engage lock (1) to hold in position.

69 When the hand throttle is selected, engine speed is set to run at 1500 rpm.



- | | | | |
|---|----------|---|-------------------|
| 1 | Lock | 2 | Lever |
| 3 | Dipstick | 4 | Engine oil filler |

Fig 5 Engine hand throttle'

ENGINE STOP BUTTON (see Figure 6)

70 The engine stop button is located below the cab front centre panel assembly. The face of the button is marked 'PUSH TO STOP ENGINE!'

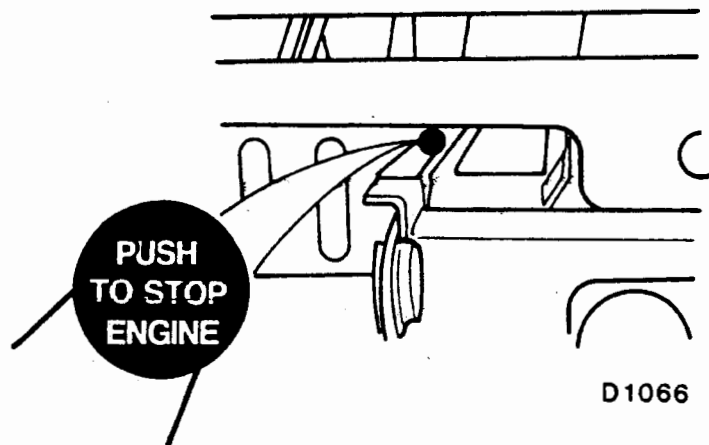
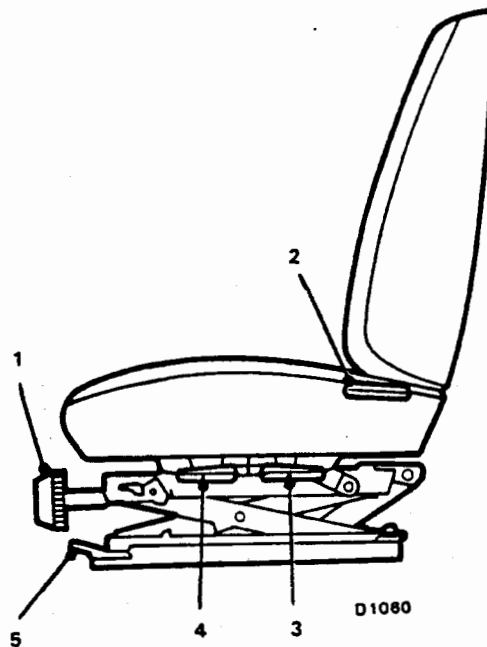


Fig 6 Engine stop button

DRIVER'S SEAT (see Figure 7)

- 71 There are five adjustments that can be made to the driver's seat.
- 72 Fore and aft adjustment - Lift control bar (5), slide seat to the desired position. Ensure mechanism is fully engaged and locked after adjustment
- 73 Weight adjustment - turn the adjuster control (1) until the indicated weight (shown in the transparent portion of the control wheel) corresponds to the driver's weight in kilograms. The optimum adjustment is for the suspension to be in the middle of the vertical stroke i.e. the 'mid-ride' position when normally seated.
- 74 Seat cushion height - after adjusting for weight the cushion height may be adjusted by lifting lever (4).
- 75 Seat cushion angle - after adjusting for weight the cushion angle may be adjusted lifting lever (3).
- 76 Back rest angle - lift lever (2), set back rest to desired angle and release lever.

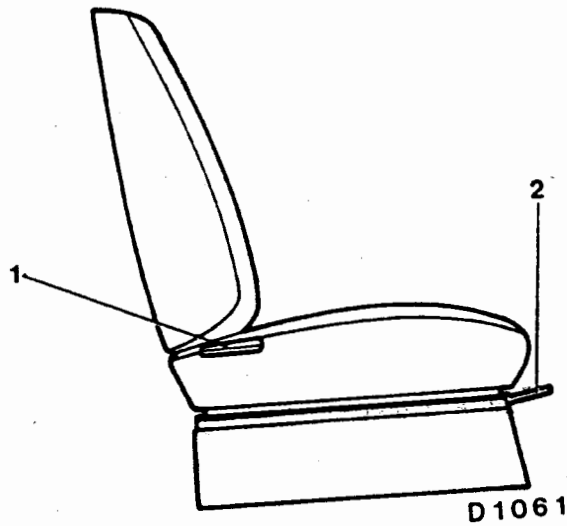


- | | | | |
|---|-------------|---|-------|
| 1 | Adjuster | 2 | Lever |
| 3 | Lever | 4 | Lever |
| 5 | Control bar | | |

Fig 7 Driver's seat

MATE'S SEAT (See Figure 8)

- 77 There are two adjustments that can be made to the mate's seat, fore and aft and back rest angle.
- 78 Fore and aft adjustment - lift the control bar (2) and slide seat to desired position. Ensure mechanism is fully engaged and locked after adjustment.
- 79 Back rest angle - lift lever (1), set back rest to desired angle and release lever.



1 Lever 2 Control bar

Fig 8 Mate's seat

LOAD HANDLING SYSTEM CONTROLS

Mode rotary selector switch (See Figure 9)

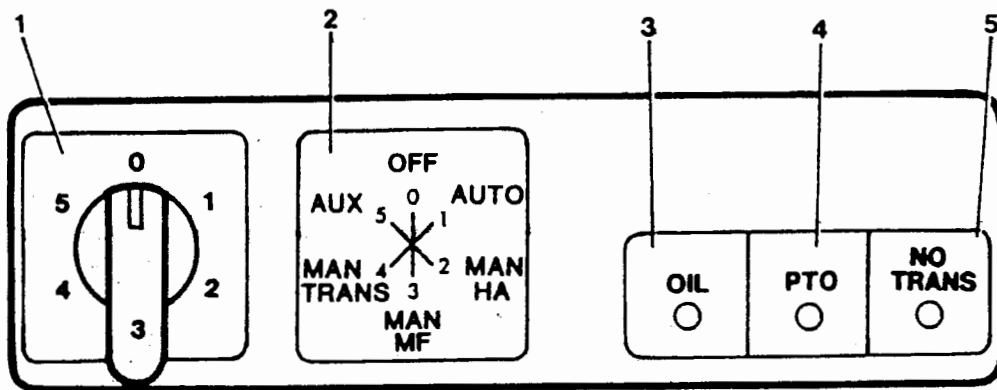
80 A six position switch with the following modes:

80.1 OFF: Must be selected for vehicle transit.

80.2 AUTO: Normal position for automatic sequencing of unloading and loading operations. Automatically engages the PTO driven hydraulic pump.

80.3 MAN HA: For individual control of the hook arm only. Normally used after failure of the electronic circuits of the 'AUTO' mode. Automatically engages the PTO driven hydraulic pump.

80.4 MAN MF: For individual control of the middle frame only. Normally used after failure of the electronic circuits of the 'AUTO' mode. Automatically engages the PTO driven hydraulic pump.



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| | | | |
|---|-------------------------|---|--------------------|
| 1 | Rotary switch | 2 | Caption for switch |
| 3 | Oil warning light | 4 | PTO warning light |
| 5 | No Trans warning light. | | |

Fig 9 Mode rotary selector switch

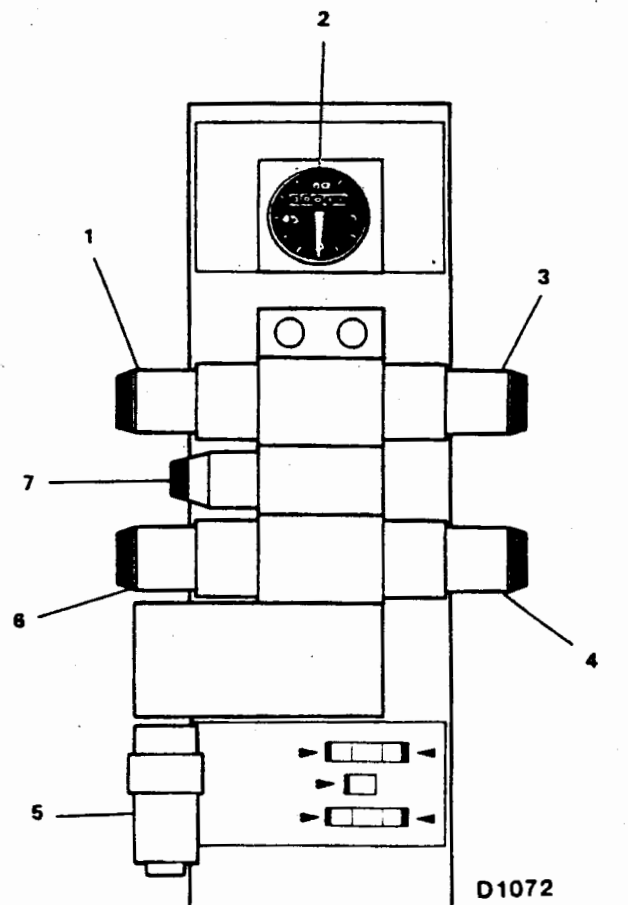
80.5 MAN TRANS: Should be selected before selecting 'OFF' after unloading or loading in the MAN HA and MAN MF modes after failure of the AUTO mode electronic circuits.

80.6 AUX: Auxiliary mode, only used to supply hydraulic power via the slave couplings, to the Simple Rail Transfer Equipment, or to a stricken LHS on another vehicle. Automatically engages the PTO driven hydraulic pump.

Manual override buttons (See Figure 10)

81 There are five push buttons that allow operation of the LHS in the event of failure of the electronic automatic circuits. The buttons are located on the main hydraulic manifold in a compartment situated on the right hand side of the vehicle immediately behind the cab. Lift the cover to gain access to the hydraulic valves and push buttons, the equipment hour run meter and the hydraulic filter.

82 The control buttons are situated on the end of each valve and allow individual movement of the hook arm and middle frame.



- | | | | |
|---|----------------------|---|-----------------|
| 1 | Middle frame load | 2 | Hour run meter |
| 3 | Middle frame unload | 4 | Hook arm unload |
| 5 | High pressure filter | 6 | Hook arm load |
| 7 | Transit button | | |

Fig 10 Manual override buttons

83 The manual override buttons control the following functions

83.1 Hook arm unload (4).

83.2 Hook arm load (6).

83.3 Middle frame unload (3).

83.4 Middle frame load (1).

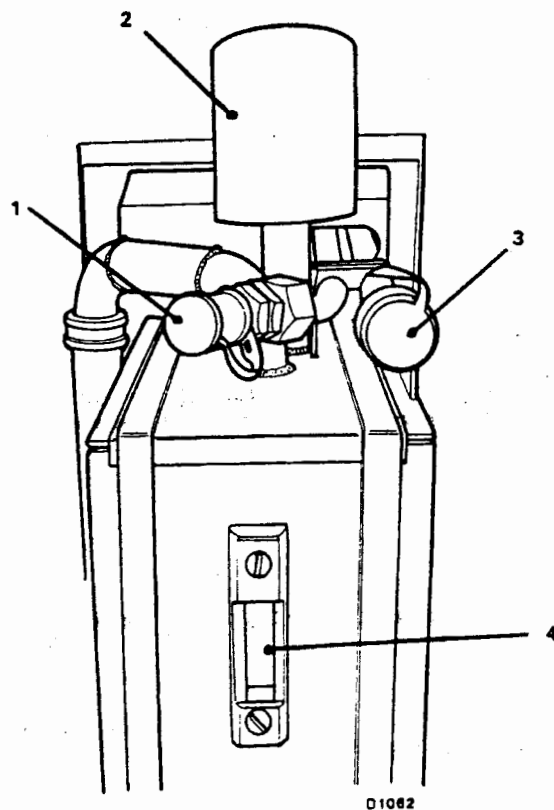
83.5 Manual transit (7). This button must be pressed after completion of loading operations before vehicle transit

Equipment hour run meter (See: Figure 10)

84 The hour run meter, (2) is located in the compartment housing the manual override buttons. This instrument indicates accumulated usage of the LHS for servicing and maintenance intervals.

Hydraulic slave couplings (See Figure 11)

85 Quick release hydraulic slave couplings (1 and 3) located adjacent to the top forward face of the, LHS hydraulic reservoir, provide a power source for operation of the EKA Simple Rail Transfer Equipment, and for the transfer of hydraulic power to or from another vehicle load handling system.



- | | | | |
|---|-------------------|---|-----------------------|
| 1 | Return coupling | 2 | Breather/filler |
| 3 | Pressure coupling | 4 | Reservoir sight glass |

Fig 11 Hydraulic slave couplings .

STRAWSON INCLINOMETER

WARNING

IF THE INCLINOMETER EXCESSIVE TILT WARNING LIGHT ILLUMINATES AND THE AUDIBLE WARNING SOUNDS, LOADING/UNLOADING OPERATIONS MUST CEASE IMMEDIATELY.

86 The Strawson Inclinator consists of two units, the sensing head housed in a gimbal assembly mounted on the rear chassis frame crossmember, and the alarm unit (See Fig 1 (8)) located in the cab header shelf above the drivers head.

87 The alarm unit will give an audible and visual warning when the sensing head detects a side tilt angle in excess of 5 degrees either side of centre in the lateral plane, or, 18 degrees tilt angle in the fore and aft planes.

88 The gimbal assembly allows the sensing head to be rotated in excess of 5 degrees either side of centre in the lateral plane and 18 degrees in the fore and aft planes to enable a non-operational test of the inclinometer function.

Alarm unit test facility

89 Energise the vehicle electrical system by turning the master start key to position "2". Turn the LHS mode rotary selector switch to position "1" (auto) (See Fig 9), this will illuminate the PTO red warning light, the inclinometer alarm unit green 'wine glass' symbol and activate the audible warning momentarily.

90 Pressing the test button below the green 'wine glass' symbol will illuminate the red 'tilted wine glass' symbol and activate the audible alarm.

Gimbal assembly functional test (See Fig 12)

91 NOTE: Only when the conditions described in Para 90 have been met, should the following tests be carried out.

92 Lateral inclination test – RH

92.1 To test the RH 5 degrees setting, slacken the two screws (5 & 6) securing gimbal bracket (3) to pivot bracket (2).

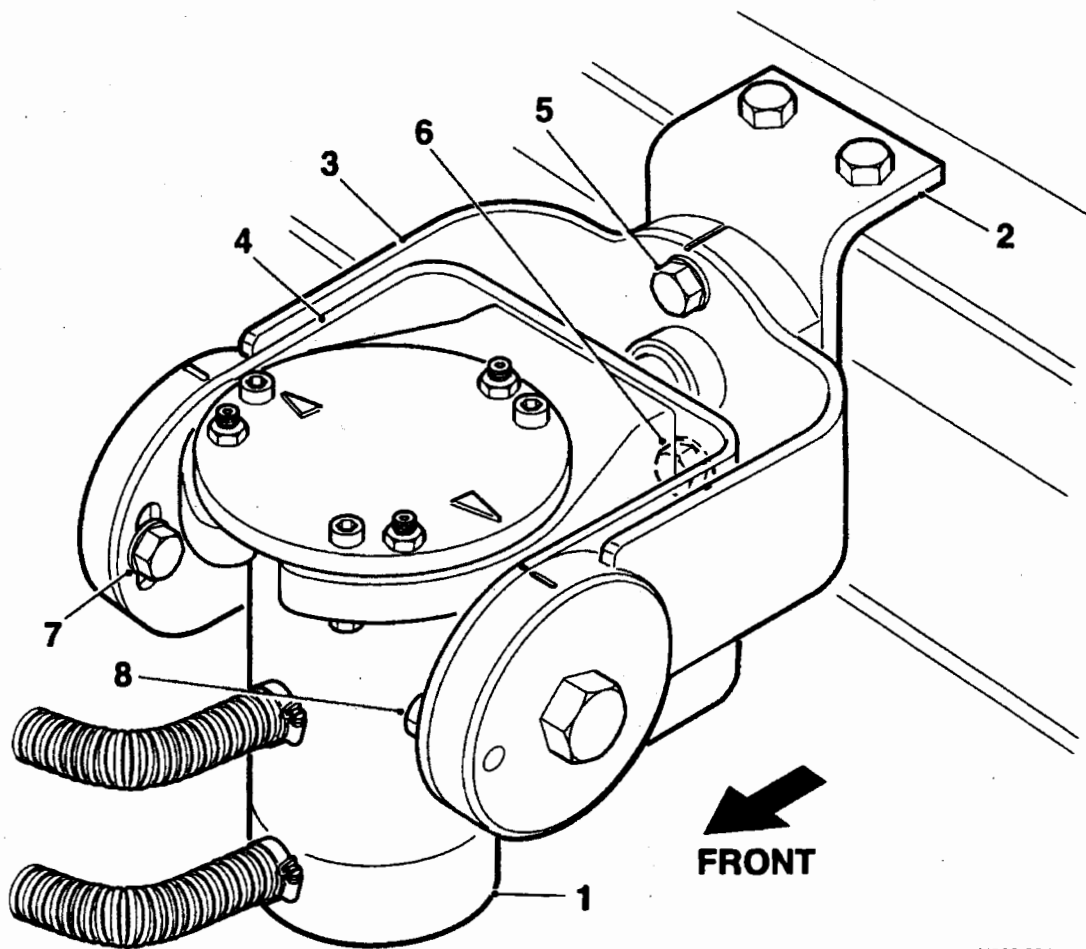
92.2 Rotate the sensing head (1) and gimbal bracket (3) clockwise (when viewed from the front) until it reaches the stop.

92.3 When the stop has been reached, the red wine glass on the alarm unit should illuminate, the audible alarm should sound and the green wine glass should be extinguished.

93 Lateral inclination test – LH

93.1 To test the LH 5 degrees setting, rotate the sensing head and gimbal bracket anti-clockwise past the alignment mark on pivot bracket until it reaches the stop on the LH side.

93.2 Again the red wine glass should illuminate, the audible alarm should sound and the green wine glass extinguish.



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| | | | |
|---|----------------|---|-------|
| 1 | Sensing head | 5 | Screw |
| 2 | Pivot bracket | 6 | Screw |
| 3 | Gimbal bracket | 7 | Screw |
| 4 | Gimbal plate | 8 | Screw |

Fig 12 Sensing head gimbal assembly

94 When both RH and LH lateral inclination tests have been successfully accomplished, rotate the sensing head until the alignment mark on the gimbal brackets aligns with the mark on the pivot bracket.

94.1 Tighten the two screws (5 & 6).

94.2 Should the green wine glass fail to extinguish as described in Sub Paras 92.3 and 93.2, slacken screw (5) and remove screw (6) and washer. Repeat Sub Paras 92.2, 92.3, 93.1 and 93.2. This allows an additional 2 degrees travel of the sensing head in both directions.

94.3 If the green wine glass is still illuminated remove the sensing head and fit a new or reconditioned unit as described in 2320-R-301-522 Chap 13.

95 Fore and Aft inclination test.

95.1 To test the fore 18 degrees setting, slacken the two screws (7 & 8) securing gimbal plate (4) to gimbal bracket (3).

95.2 Rotate sensing head (1) and gimbal plate forward until it reaches the stop.

95.3 When the stop has been reached, the red wine glass on the alarm unit should illuminate, the audible alarm should sound and the green wine glass should be extinguished.

95.4 To test the aft 18 degrees setting, rotate the sensing head and gimbal plate rearwards past the alignment marks on gimbal bracket until it reaches the stop.

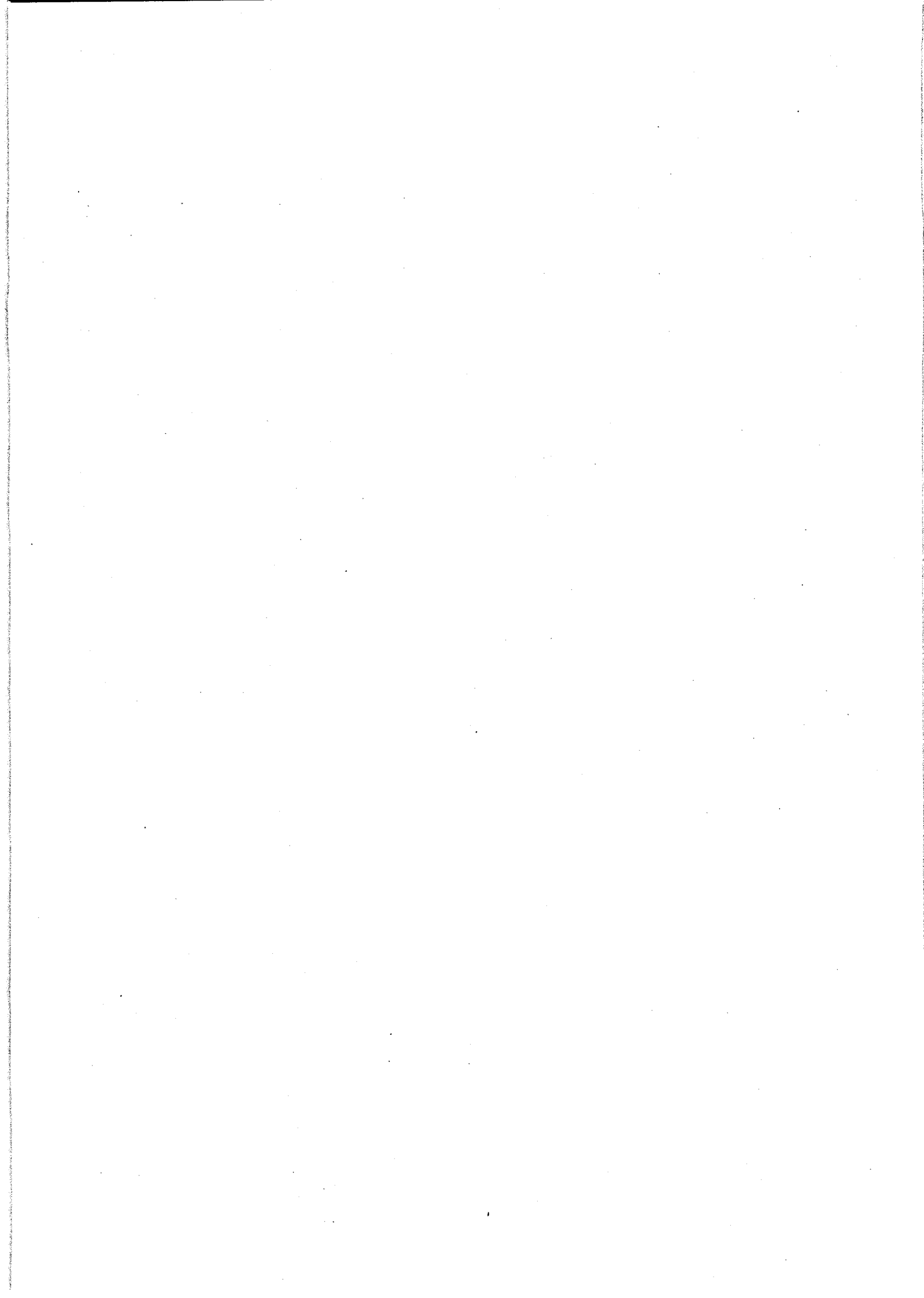
95.5 Again the red wine glass should illuminate, the audible alarm should sound and the green wine glass extinguish.

96 When both fore and aft lateral inclination tests have been successfully accomplished, rotate the sensing head forward until the alignment marks on the gimbal plate align with the marks on the gimbal bracket bosses.

96.1 Tighten the two screws (7 & 8).


96.2 Should the green wine glass fail to extinguish as described in Sub Paras 95.3 and 95.5, slacken screw (8) and remove screw (7) and washer. Repeat Sub Paras 95.2 to 95.5. This allows an additional 2 degrees travel of the sensing head in both fore and aft planes.

96.3 If the green wine glass is still illuminated, remove the sensing head and fit a new or reconditioned unit as described in 2320-R-301-522 Chap 13.



CHAPTER 3
OPERATING INSTRUCTIONS

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BEFORE STARTING THE ENGINE

WARNING - COOLANT

FLUID AL39 IS BOTH TOXIC AND HAZARDOUS. REFER TO LOCAL UNIT WARNINGS OR CURRENT DCI's FOR FULL SAFETY PROCEDURES. MINIMUM PRECAUTION AFTER USE IS TO WASH THE AFFECTED SKIN AREAS WITH SOAP AND WATER.

NOTE

The checks listed in the following operations are in addition to those detailed in JSP 351 MT DRIVERS HANDBOOK.

- 1 Before starting the engine
 - 1.1 Correct function of all warning lights audible warnings and gauges.
 - 1.2 For any fuel, oil or coolant leaks.
 - 1.3 Low air pressure warning system.
 - 1.4 Air cleaner restriction indicator.

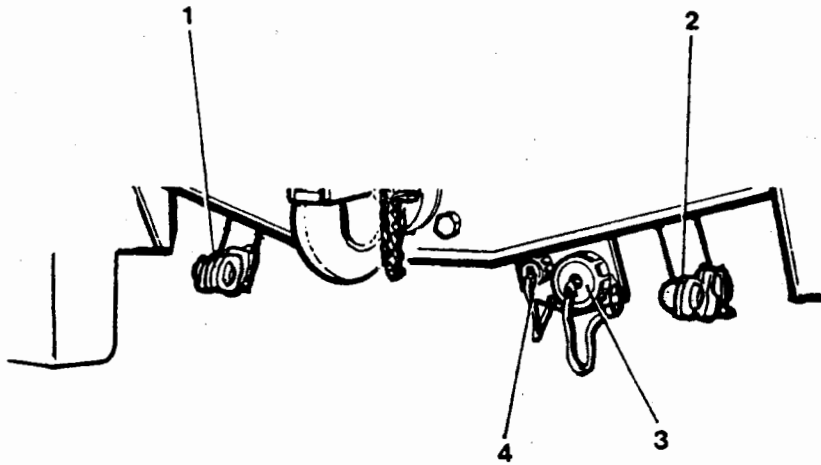
WARNING - COLD START BOTTLE

THE VAPOUR FROM THE COLD START PILOT CANISTER IS BOTH INFLAMMABLE AND EXPLOSIVE. THE CANISTER MUST NEVER BE CARRIED LOOSE IN THE VEHICLE CAB. THE VAPOUR CAN ALSO CAUSE DROWSINESS AND LOSS OF CONCENTRATION.

- 1.5 Cold start bottle (winter months only).
- 1.6 Hydraulic steering reservoir.
- 1.7 Can hydraulic tilt pump reservoir.
- 1.8 Seat belts for security of attachment, serviceability and damage.
- 1.9 Fire extinguishers for security of attachment and serviceability.
- 1.10 Ensure that the gearbox selector lever and emergency gear selector lever are in neutral position.
- 1.11 Ensure the hand throttle is disengaged and the emergency PTO control button is in the 'OUT' (disengaged) position.
- 1.12 Check the LHS mode switch is selected 'OFF':
- 1.13 Ensure the engine stop override button is selected off.
- 1.14 Ensure the spring brake emergency release is selected off.
- 1.15 The hand brake control lever is in the 'PARK' position.
- 1.16 If the engine has not been run for a month or longer, prime the turbo charger bearings with 60 cc of oil OMD 80 before starting the engine.
- 1.17 Ensure the spring brake emergency release is selected off.
- 1.18 The hand brake control lever is in the "PARK" position.

AFTER STARTING THE ENGINE AND BEFORE MOVING OFF

2 If a trailer is coupled to the tractor unit; ensure that the brake airlines (Fig 1 (1 and 2)) and the 12 pin and 2 pin electrical sockets (3 and 4) are connected.



- | | |
|----------------------------|---|
| 1 Service air coupling | 2 Emergency air coupling |
| 3 12 pin electrical socket | 4 2 pin electrical socket trailer reservoir low air |

Fig 1 Trailer connections

DURING HALTS (AFTER APPROXIMATELY FOUR HOURS RUNNING)

- 3 Check correct function of all warning lights, audible warnings and gauges.
- 4 Inspect for any fuel, oil or coolant leaks.
- 5 Check wheel hub and brake drums for overheating.

TO START ENGINE

- 6 Fully depress the accelerator pedal, turn the key in the master start switch (Chap 2, Fig 1 (48)) to position '3', release the key immediately the engine starts.
- 7 Release the accelerator to idling speed (550-600rpm).

NOTE

If the engine does not start after 30 seconds release the key and wait two minutes before making a second attempt. This will prevent damage to the starter motor and allow the batteries to recover.

- 8 After starting up, allow the engine to warm up for a few minutes before driving off.
- 9 The engine governed speed of 2100rpm should not be exceeded.

TO START ENGINE USING COLD START AID

CAUTION - Cold start aid

Do not operate the 'Start Pilot' plunger before energising the starter motor. Failure to observe this caution may result in severe engine damage.

10 Unlock and release the start pilot plunger (Chap 2, Fig 1 (45)) and fully depress the accelerator pedal. Operate the starter motor and simultaneously pump the start pilot plunger to deliver two full strokes of fluid.

NOTE

If after 30 seconds the engine fails to start, allow two minutes before attempting to restart the engine.

11 When the engine fires and runs, operate the start pilot as necessary to assist the engine until it is capable of running unaided up to a maximum engine speed of approximately 1,000rpm. When the engine is running satisfactorily turn and lock the start pilot plunger in position before driving off.

TO STOP ENGINE:

12 Allow the engine to run at idle speed (550-600rpm) in neutral for at least three minutes before stopping the engine by means of the master start switch (Chap 2, Fig 1 (48)). This will allow the turbo charger to reduce speed and temperature.

13 In an emergency, push the engine stop button in the front of the vehicle.

TO DRIVE OFF

14 Fasten seat belts.

15 Check the brake air pressure and ensure that all reservoirs are at full pressure. DO NOT attempt to drive the vehicle if the warning buzzer is sounding or the low air pressure warning lights are illuminated. The spring brakes cannot be fully released below (8 lb/sq in).

16 Ensure that there is sufficient oil pressure in the engine, 207kN/sq.m (30 lb/sq.in) at idling speed. 350-480 kN/sq.m (50-70 lb/sq.in) at normal running.

17 Check that the differential locks and front wheel drive are disengaged if the vehicle is to be driven over normal road surfaces.

TRANSMISSION

CAUTION - Transmission

Do not select reverse gear when the vehicle is moving forward or select a forward gear whilst the vehicle is moving backwards. The vehicle must be stationary and the engine at idling before making these gear selections.

18 The engine should be at idle and the vehicle stationary when any shift from neutral to a drive range is made. If a drive range is selected with engine speed above 900rpm and/or with the accelerator depressed, an interlock in the automatic control unit prevents a gear being selected.

19 With the engine at idling, select the desired speed range on the gearbox selector lever, release the parking brake and depress the accelerator.

20 Depressing the accelerator influences the automatic shifting. When the pedal is depressed as far as the contact point for the kickdown switch the transmission will automatically upshift to near the governed speed of the engine. A partially depressed position of the pedal will cause the upshifts to occur sooner, at a lesser engine speed.

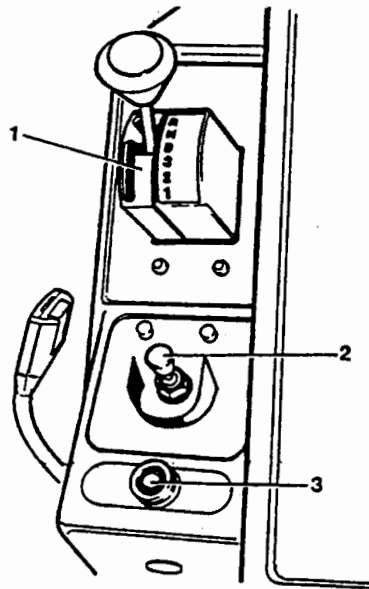
21 Depressing the accelerator to the kickdown position will effect the earliest possible change to a lower gear.

22 A lock up clutch in the torque converter provides a direct mechanical link between the engine and planetary gearbox.

23 Speed ranges are selected by moving the gear selector lever (Fig 2(1)) to the following positions:

- 23.1 R - Reverse
- 23.2 N - Neutral
- 23.3 D - Gear range 2, 3, 4, 5 and 6
- 23.4 3 - Gear range 1, 2, 3 and 4
- 23.5 2 - Gear range 1, 2 and 3
- 23.6 1 - Gear range 1

The selector lever moves in a gate, with detents, to prevent accidental selection of neutral or overshooting the desired speed range.



- 1 Gear selector lever
- 2 LHS joystick
- 3 Retarder button

Fig 2 Gear selector console

24 The hydraulic retarder is operated by button (3) mounted on the rear face of the gear selector lever console. It is designed to supplement the vehicle's main brakes not to replace them. Selection of the retarder is recommended during descent of long shallow gradients which would otherwise require constant light braking, or used with the vehicle brakes to give maximum braking effect in the event of an emergency.

25 Full retarder operation without interruption is available in all forward gears.

26 When the retarder is selected with the accelerator in the idling position, an upshift lock comes into effect. If the accelerator is depressed with the retarder selected, the retarder will automatically disengage and the upshift interlock will be removed, when the accelerator is released the retarder and interlock will come back into operation.

27 The transmission oil temperature must not be allowed to exceed 150 degrees C (300 degrees F).

28 If excessive transmission oil temperature is indicated when the retarder is in operation, the vehicle must be slowed down using the vehicle brakes until a downshift is made into a lower gear in which the oil temperature does not exceed the given limits.

29 Should the oil temperature remain in the danger zone the retarder must be switched off completely. If this does not cause the oil temperature to drop, the vehicle must be brought to a halt. Put the gearbox in NEUTRAL and depress the accelerator fully. Within a few seconds a visible decrease in oil temperature should result. Should the high temperature persist, stop the engine and have the overheating condition investigated by qualified personnel.

EMERGENCY GEAR LEVER

CAUTION

Ensure that the parking brake is applied and the engine is at idle before operating the emergency gear lever. Failure to apply the parking brake will allow the vehicle to move immediately the gear is selected.

30 The emergency gear lever (Chap 2, Fig 1 (59)) permits travel in 3rd and reverse gear only in the event of failure of the vehicle electrical system or transmission electronic control unit.

GEARBOX DRIVEN STEERING PUMP

31 The gearbox driven steering pump maintains the supply of hydraulic pressure to the power steering system, in the event of engine shutdown and vehicle coasting, when the vehicle is being towed, or, failure of the engine driven steering pump under normal vehicle operating conditions.

TOWING

32 The automatic transmission is fitted with a secondary oil pump, this allows the vehicle to be towed forwards without restriction to distance but speeds must be reduced accordingly. To tow the vehicle rearwards the gearbox to transposing box propshaft must be disconnected.

TOW STARTING - NORMAL

CAUTION

The vehicle must not be tow started at temperatures below -20 degrees C (-40 degrees F)

33 The vehicle engine may be tow-started, during this operation a rigid tow bar must be used and the following points observed.

- 33.1 Ensure the retarder is 'OFF'
- 33.2 The emergency PTO button is 'OUT'
- 33.3 The emergency gear lever is in 'NEUTRAL'
- 33.4 The load handling system is selected 'OFF'
- 33.5 The vehicle master start key is switched on
- 33.6 The transmission selector lever is at position 'D'

34 Release the parking brake and commence the tow. The engine will start at approximately 15 to 20kph towing speed.

TOW STARTING - EMERGENCY

35 In the event of electrical failure, the vehicle engine may be tow-started, during this operation a rigid tow bar must be used and the following points observed.

- 35.1 Select engine stop override 'ON'
- 35.2 The emergency PTO button is 'OUT'
- 35.3 The load handling system is selected 'OFF'
- 35.4 Select forward gear on emergency gear lever
- 35.5 The master start key switched on

36 Release the parking brake and commence the TOW. The engine will start at approximately 15-20kph towing speed.

37 To stop the engine after an emergency tow start, select engine stop override button to 'OFF'.

WARNING - ENGINE STOP OVERRIDE BUTTON

DO NOT LEAVE THE VEHICLE WITH THE OVERRIDE SWITCH ACTIVATED.

ENGINE STOP AND STOP OVERRIDE CONTROLS (See Fig 3 and 4)

38 To stop the engine under normal conditions, turn the master start key to the 'O' (OFF) position.

39 To stop the engine in an emergency (engine stop override button NOT activated), push the engine 'STOP' control (Fig 3) at the front of the cab, or, activate the cab battery isolation button (Fig 4 (1)), or turn the external battery master switch (Chap 2 Fig 2 (1)) to 'OFF'.

40 To stop the engine with the stop override button (Fig 3) activated and the vehicle electrical system inoperative, push the engine 'STOP' control, or, deactivate the stop override button

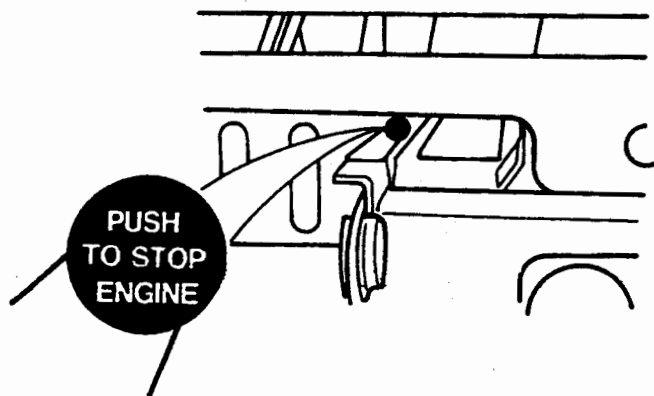
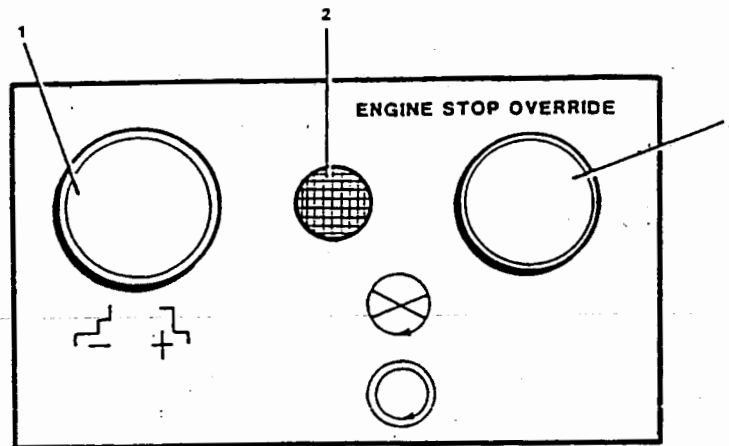


Fig 3 Engine Stop Control

41 The engine stop-override button when pressed will enable the engine to continue running after the vehicle electrical system has been rendered inoperative by either the cab battery isolation button, or the external battery master switch.

42 To keep the engine running without electrical power, the engine stop override button must be activated before the vehicle electrical system is isolated. A green warning light (Fig 4(2)) adjacent to the button will illuminate whilst the override button is activated and electrical power on.

ENGINE STOP OVERRIDE



- 1 Battery isolation button
2 Warning light
3 Engine stop override button

Fig 4 Engine stop override

43 The cab battery isolation button, when activated, will render the vehicle electrical system inoperative. The electrical system can only be re-energised by turning the external battery master switch to 'OFF', then 'ON'.

TRACTION CONTROL

CAUTION

CATASTROPHIC AXLE FAILURE. The differential locks and front wheel drive should only be engaged when the vehicle is at rest or moving at a maximum speed of 3 kph in the straight ahead position and never when the wheels are spinning.

44 The differential locks and front wheel drive are selected by a four position switch in the cab (Chap 2, Fig 1 (54)). Warning lights below the switch indicate the selection made.

45 The switch positions are as follows:

- 45.1 OFF
- 45.2 Inter axle lock (third differential)
- 45.3 Inter axle and front wheel drive
- 45.4 Inter axle, F.W.D. and cross differential locks

SPRING BRAKE ACTUATORS

To release

46 Pull out the plunger of the hand control valve and move the lever to the OFF position.

NOTE

It will be necessary to build up the air pressure in the system to a minimum of 5.8 bar (85 lb/in²) to release the brake actuators.

47 Service and emergency air couplings are fitted at the front of the vehicle to allow air pressure to be introduced from an external source.

Emergency release

48 In the case of total loss of air pressure in the braking circuits the spring brakes will be automatically applied.

49 Operation of the emergency brake release (Chap 2 Fig 1 (56)) allows air pressure from an independent reservoir to be supplied to each spring brake actuator to release the brakes. At the same time a warning bell will ring. The reservoir holds enough air pressure for one application of the emergency brake release system.

Manual release**WARNING - SPRING PRESSURE**

THE SPRING BRAKE ACTUATORS CONTAIN AN EXTREMELY POWERFUL COIL SPRING. THERE IS A RISK OF SERIOUS PERSONAL INJURY IF INEXPERIENCED PERSONNEL ATTEMPT TO RELEASE THE ACTUATORS PARTICULARLY IF THE ACTUATORS HAVE SUSTAINED ACCIDENT DAMAGE.

50 The spring brake actuators can be released mechanically as follows:

50.1 Scotch the tractor wheels.

50.2 Remove the breather cap from the end of the spring brake cylinder and unscrew the release bolt until the brake shoes are free from the drum.

NOTE

REME assistance is to be requested to carry out this operation.

MANOEUVRING BRAKE

51 The manoeuvring brake is fitted to control the vehicle movement during load handling system operations.

52 The manoeuvring brake valve (Chap 2 Fig 1 (44)) is foot operated by the driver, and will only operate with the transmission selected in '1' (first) or 'R' (reverse).

53 During this operation air is supplied only to the bogie brakes.

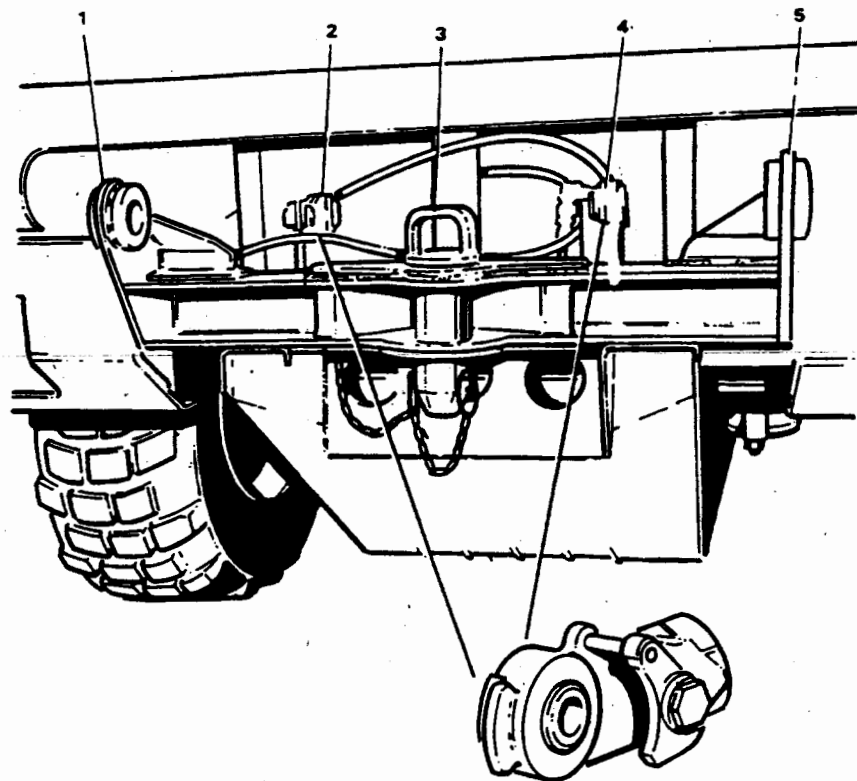
POWER STEERING WARNING LIGHT

54 The power steering warning lamp (Chap 2 Fig 1 (1)) will illuminate should one of the hydraulic pumps supply pressure fail. Hydraulic pressure will be maintained for the steering system from the serviceable pump via the automatic change over valve.

NOTE

The warning lamp will illuminate when the vehicle is brought to a halt with the engine running.

55 Should both hydraulic pumps fail the vehicle remains steerable but a considerably higher effort has to be applied to the steering. As such a situation occurs very seldom and then in most cases totally unexpectedly, the driver may erroneously come to assume that the steering system is locked up. However, this is not the case. The driver must apply the necessary increased steering effort to perform the steering manoeuvre.



- | | | | |
|---|--------------|---|------------------------|
| 1 | Recovery eye | 2 | Emergency air coupling |
| 3 | Towing pin | 4 | Service air coupling |
| 5 | Recovery eye | | |

Fig 5 Front towing pin and recovery eyes

FRONT TOWING PIN AND RECOVERY EYES (See Fig 5)

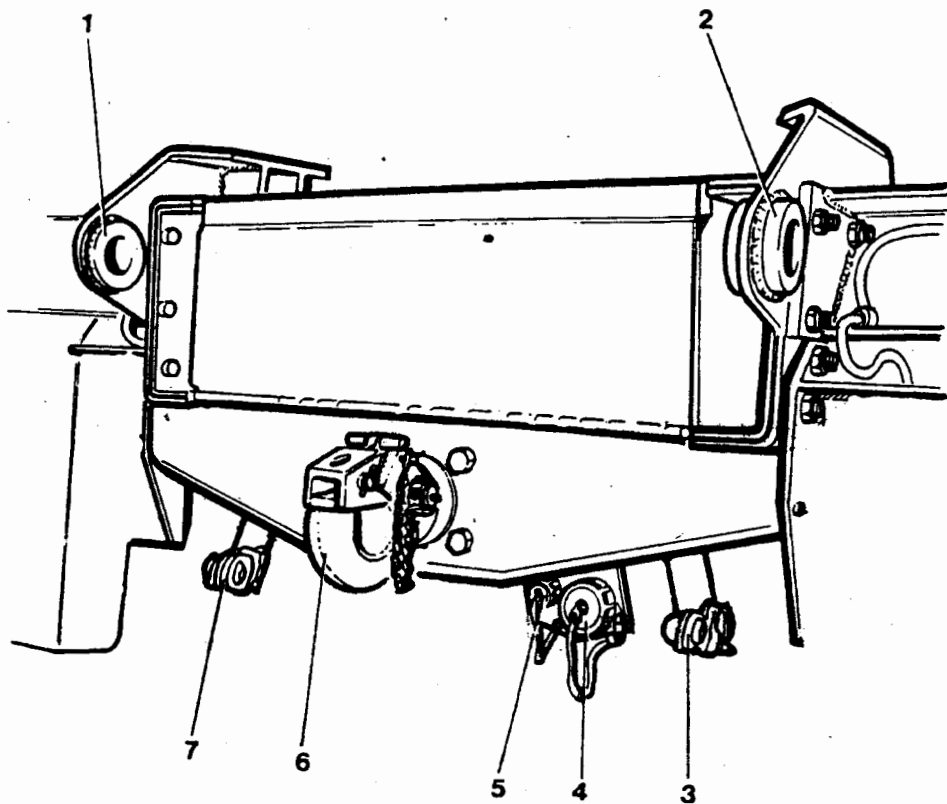
56 A towing pin (3) and two recovery eyes (1 and 5) are provided at the front of the vehicle. The towing pin jaw is capable of accepting a NATO towbar eye. The recovery eyes are used in conjunction with specialist recovery equipment.

REAR TOWING PINTLE AND RECOVERY EYES (See Fig 6)

57 A towing pintle (6) and two recovery eyes (1 and 2) are provided at the rear of the vehicle.

58 The towing pintle is solidly mounted, but is free to pivot in its housing. The upper jaw is locked in position by the articulated bolt.

59 The recovery eyes are used in conjunction with specialist recovery equipment.



- | | |
|--------------------------|-----------------|
| 1 Recovery eye | 2 Recovery eye |
| 3 Emergency air coupling | 4 12 pin socket |
| 5 2 pin socket | 6 Towing pindle |
| 7 Service air coupling | |

Fig 6 Rear towing pindle and recovery eyes

RAISING AND LOWERING THE CAB (See Fig 7)

WARNINGS - CAB TILTING

(1) BEFORE ATTEMPTING TO TILT THE CAB ENSURE THAT ALL PERSONNEL ARE STANDING CLEAR OF THE AREA IMMEDIATELY IN FRONT OF THE VEHICLE. ENSURE THERE IS ADEQUATE CLEARANCE IN FRONT AND ABOVE THE CAB. THE ENGINE SWITCHED OFF AND HANDBRAKE CONTROL VALVE IN THE PARK POSITION.

(2) DO NOT ATTEMPT TO WORK ON THE VEHICLE WITH THE CAB PARTIALLY TILTED.

CAUTIONS

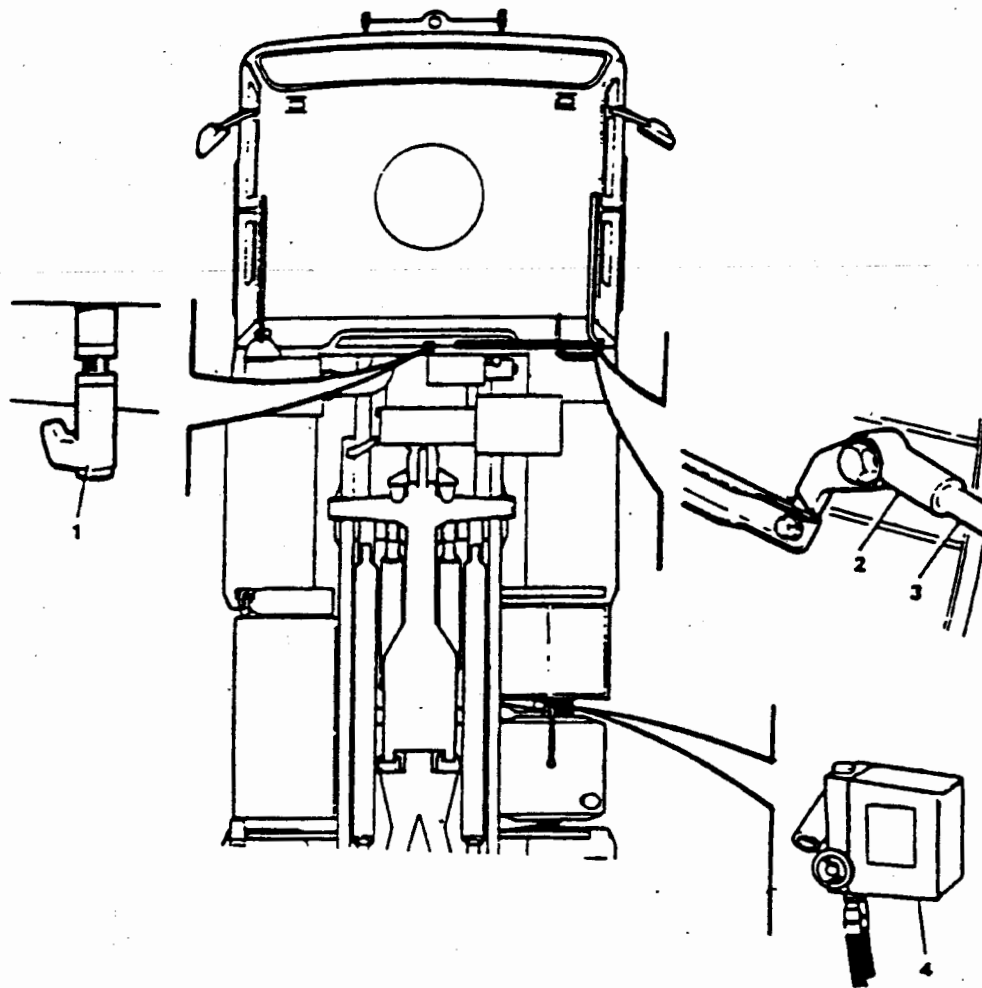
(1) Ensure that cab, lock down mechanism is disengaged and is clear of the cab mounting frame BEFORE operating the cab hydraulic pump.

(2) Camouflage nets must not be carried on the cab roof.

60 To raise the cab proceed as follows:

60.1 Remove the two piece pump handle (Fig 7 (3)) from the cab tool box and the secure the tool box lid. Remove all loose items from the cab interior.

60.2 Insert the pump handle into the lock down lever (2) and push the pump handle downwards to release the lock down mechanism (1), do not use any other bar or handle for this purpose.



1 Lock down mechanism
3 Pump handle

2 Lock down lever
4 Spool valve pin

Fig 7 Cab tilt mechanism

60.3 Turn the spool valve pin (4) to the up position and insert the pump handle in the pump. Operate the pump handle to raise the cab. Continue to operate the pump handle until the cab passes its centre of gravity when the cab will continue moving under its own weight.

To lower the cab

WARNING - CAB LOWER

ENSURE ALL PERSONNEL ARE STANDING CLEAR AND THAT THERE ARE NO OBSTRUCTIONS THAT WOULD IMPEDE THE LOWERING OF THE CAB.

CAUTION

The spool valve should remain in the DOWN/DRIVE position while the vehicle is in use.

61 To lower the cab proceed as follows:

- 61.1 Using the pump handle, turn the spool valve to the DOWN/DRIVE position. Operate the pump handle to lower the cab until it is fully in position.
- 61.2 Insert the pump handle into the lock down lever and push the pump handle upwards to secure the lockdown mechanism.
- 61.3 Ensure the lockdown mechanism is correctly located and engaged. Store the pump handle in the tool box.
- 61.4 Switch on the electrics and check that the cab unlocked warning light is not illuminated.

LOAD HANDLING SYSTEM**WARNINGS - LOADING AND UNLOADING**

- (1) ENSURE THAT THE AREA AROUND THE VEHICLE, IN PARTICULAR IN FRONT AND BEHIND ARE CLEAR OF PERSONNEL.
- (2) ENSURE THAT THERE IS ENOUGH FREE SPACE ABOVE, BEHIND AND IN FRONT OF THE VEHICLE TO COMPLETE THE LOADING AND UNLOADING CYCLE.
- (3) ENSURE THAT THERE ARE NO OVERHEAD POWER CABLES WHICH MAY COME INTO CONTACT WITH THE LHS DURING THE LOADING AND UNLOADING CYCLE.
- (4) ENSURE THAT THE LOAD ON THE FLATRACK IS EVENLY DISTRIBUTED AND IS ADEQUATELY SECURED BEFORE ATTEMPTING TO LOAD OR UNLOAD.
- (5) IF THE INCLINOMETER EXCESSIVE TILT WARNING LIGHT ILLUMINATES AND THE AUDIBLE WARNING SOUNDS, LOADING/UNLOADING OPERATIONS MUST CEASE IMMEDIATELY.
- (6) IN THE EVENT OF A HOSE BURST, THE LHS WILL CONTINUE MOVEMENT IN SELECTED MODE UNTIL IT COMES TO REST.
- (7) NEVER DRIVE OFF WITH THE 'NO TRANS' WARNING LIGHT ILLUMINATED. AN ILLUMINATED WARNING LIGHT MEANS THAT THE LOAD LOCKS ARE NOT ENGAGED AND THE FLATRACK NOT FULLY MOUNTED. A VISUAL CHECK MUST BE CARRIED OUT TO ENSURE THAT THE LOAD LOCKS ARE ENGAGED.
- (8) DO NOT ENTER THE AREA DIRECTLY UNDERNEATH THE FLATRACK DURING OPERATION OR IF IN THE RAISED POSITION.

CAUTIONS

- (1) Ground conditions must be checked for firmness and extreme sideways inclination before loading or unloading a flatrack. Any ground instability beneath the road wheels could affect the safe operation of the LHS.
- (2) In extremes of cold (5 degrees C or lower), run the vehicle engine until warm before engaging the pump drive and only do this at idle rpm. Engage the PTO after engine warm up (idle rpm) and leave for a minimum of two or three minutes before using the Load Handling System.
- (3) When loading and unloading the flatrack on snow and ice; be constantly aware of sideways slip of the flatrack which could cause damage or operational difficulties.
- (4) Manual power take-off (emergency PTO) must only be operated for a minimum time to enable an emergency load or unload cycle to be performed. Prolonged use in this mode can cause overheating and failure of the hydraulic pump.
- (5) All necessary steps must be taken to prevent the accidental ingress of contamination into the LHS due to poor hygiene/practice particularly when using the hydraulic slave interface.

To load a flatrack

- 62 Reverse the vehicle up to the flatrack, stopping about 5 metres from the 'A' frame hook bar.
- 63 Select mode switch to AUTO (See Chap 2, Fig 1 (3)). The PTO will automatically engage and the PTO warning light (See Chap 2 Fig 1 (6)) will illuminate.
- 64 Increase rpm using the foot throttle. (Maximum engine speed 1500rpm).
- 65 Push the L.H.S. control lever (See Chap 2 Fig 1 (62)) to the 'unload' position and the hook arm will rise and begin to move rearwards. The 'NO TRANSIT' warning light (See Chap 2 Fig 1 (7)) will illuminate indicating that the load locks have been cleared.
- 66 Continue pushing the control lever until the middle frame has also risen and the hook at the end of the hook arm is below the height of the hook bar of the 'A' frame of the flat rack.
- 67 Reverse the vehicle slowly up to the flatrack ensuring that the hook is centrally positioned to the 'A' frame. Stop the vehicle when the hook is positioned beneath the hook bar.
- 68 Leaving reverse gear engaged and the engine at idle move the control lever to 'Load' ensuring that the hook engages the hook bar and the flatrack is being lifted correctly, release the brakes to allow the vehicle to move rearwards.
- 69 Select neutral gear on the vehicle and increase engine speed. With the control lever held in the 'LOAD' position the flatrack will rise and make contact with the rear rollers.
- 70 As the vehicle and flatrack will be drawn together during the loading operation, some steering adjustments may have to be made to ensure that the flatrack runners locate securely into the rear rollers.
- 71 When the rear end of the flatrack leaves the ground apply the vehicle brakes and continue with the load cycle.

WARNING

NEVER DRIVE OFF WITH THE 'NO TRANS' WARNING LIGHT ILLUMINATED. AN ILLUMINATED WARNING LIGHT MEANS THAT THE LOAD LOCKS ARE NOT ENGAGED AND THE FLATRACK NOT FULLY MOUNTED. A VISUAL CHECK MUST BE CARRIED OUT TO ENSURE THAT THE LOAD LOCKS ARE ENGAGED.

- 72 When the flatrack is pulled fully onto the L.H.S. and the load cycle complete, the 'NO TRANSIT' warning light will extinguish. Release the control lever (spring loaded to the centre off position), and turn the mode selector switch to the 'OFF' position. The PTO will automatically disengage and the PTO warning light will extinguish.
- 73 The vehicle and flatrack are now ready for transit.

To unload a flatrack

- 74 Drive to the approximate position the flatrack is required and check there is sufficient room front, rear and overhead. (See WARNINGS and CAUTIONS preceding Para 64).
- 75 Apply vehicle brakes and select neutral gear. Select mode switch to 'AUTO', the PTO will automatically engage and the PTO warning light will illuminate.

76 Using the foot throttle increase engine speed but do not exceed 1500rpm. Push LHS control to 'UNLOAD' the flatrack and hook arm will rise and begin to move rearwards, and the 'NO TRANSIT' warning light will illuminate.

77 Continue the unloading cycle until the rear of the flatrack has touched the ground. Release the vehicle's brakes and continue the unloading cycle.

78 As the front of the flatrack approaches the ground decrease the engine speed to idle rpm. Select first gear on the vehicle and control forward movement with the vehicle brakes, continue the unloading cycle until the flatrack has grounded fully and the hook has disengaged from the hook bar.

CAUTION

Once it is evident that the vehicle rear suspension has been relieved of the flatrack load, do not continue with the control lever in the 'UNLOAD' position as the possibility of jacking up the rear of the vehicle may occur.

79 Move the vehicle clear of the flatrack and select neutral gear, apply the vehicle brakes and select the control lever to the 'LOAD' position until the LHS has returned to the stowed transit position and the 'NO TRANSIT' warning light has extinguished.

80 Release the control lever to the centre 'OFF' position, turn mode selector switch to 'OFF', the PTO will disengage and the PTO warning light will extinguish. The vehicle is again ready for transit.

MAN HA AND MAN MF MODES

Loading the flatrack

81 The 'MANUAL' mode is used in the event of a failure of the automatic electronic circuits, and for individual operation of the hook arm and middle frame.

CAUTION

Care must be exercised during operation of the 'MANUAL' mode in order that the correct sequence of events occur.

82 Reverse the vehicle towards the flatrack stopping approximately 5 metres (16 feet) from the 'A' frame hook bar, and check there is sufficient room front, rear and overhead (See WARNINGS and CAUTIONS preceding Para 63).

83 With the engine at idle rpm, select MANUAL HA on the mode selector switch. The PTO engaged warning light will illuminate. Increase engine speed to a maximum of 1500rpm and move the control lever to 'UNLOAD', the 'NO TRANSIT' warning light will illuminate, indicating the load locks have been cleared. Hold the control lever in the 'UNLOAD' position until the hook arm has completed its full range of movement.

84 Select MAN MF on the mode selector switch and move the control lever to 'UNLOAD' and hold until the lift hook achieves the required position to engage the flatrack hook bar.

85 Reverse the vehicle up to the flatrack aligning the hook to the hook bar, stop the vehicle when the hook is positioned beneath the hook bar leave the vehicle in reverse gear with the engine at idle rpm and foot brake applied.

86 With the mode selector switch still in the MAN MF position, move the control lever to 'LOAD' ensuring that the hook engages the hook bar and the flat rack is being lifted correctly, release the brakes to allow the vehicle to move rearwards.

87 Select neutral gear on the vehicle and increase engine speed. With the control lever held in the 'LOAD' position the flatrack will rise and contact the rear rollers.

88 As the vehicle and flatrack will be drawn together during the loading operation, some steering adjustments may have to be made to ensure that the flatrack runners locate securely into the rear roller.

89 When the rear end of the flatrack leaves the ground apply the vehicle brakes and continue to load in the MAN MF mode until movement stops.

90 Turn the mode selector switch to MAN HA, push the control lever to 'LOAD' and hold until the LHS and flatrack are fully stowed. The 'NO TRANSIT' warning light may extinguish (depending on the fault). Turn the mode selector switch to 'MAN TRANS'.

Unloading the flatrack

91 Drive to the approximate position the flatrack is required and check there is sufficient room front, rear and overhead. (See WARNINGS and CAUTIONS preceding Para 64).

92 Apply the vehicle handbrake and select neutral on the gearbox. Turn the mode selector switch to 'MAN HA' and move the control lever to 'UNLOAD'. The PTO warning light will illuminate.

93 Increase the engine speed (max 1500rpm), and allow the hook arm to complete its full range of movement. The 'NO TRANSIT' warning light will illuminate indicating the load locks have been cleared.

94 Turn the mode selector switch to 'MAN MF' and move the control lever to unload. As the rear of the flatrack touches the ground, release the vehicle handbrake to allow the vehicle and flatrack to push apart.

95 As the front of the flatrack approaches the ground decrease the engine speed to idle rpm. Select first gear on the vehicle and control forward movement with the vehicle brakes, continue the unloading cycle until the flatrack has grounded fully and the hook has disengaged from the hook bar.

CAUTION

Once it is evident that the vehicle rear suspension has been relieved of the flatrack load, do not continue with the control lever in the 'UNLOAD' position as the possibility of jacking up the rear of the vehicle may occur.

96 With the selector switch still in 'MAN MF' push the control lever to 'LOAD' position and hold until the main rams have completed their full range of travel.

97 Select 'MAN HA', push the control lever to 'LOAD' position and hold until the hook arm rams have completed their full range of travel. Select 'MAN TRANS' on mode selector switch.

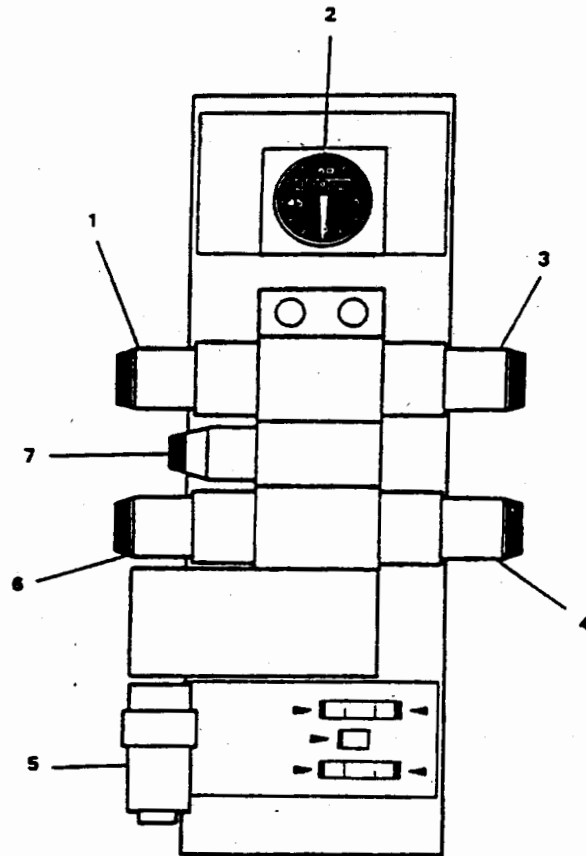
MANUAL OVERRIDE BUTTONS (See Fig 8)

WARNING - MANUAL OVERRIDE 'NO TRANSIT' BUTTON

THE MANUAL OVERRIDE 'NO TRANSIT' BUTTON MUST BE PRESSED ON COMPLETION OF LOADING AND UNLOADING OPERATIONS ONCE THE LOAD HANDLING SYSTEM IS FULLY STOWED.

98 In the event of total failure of the LHS electrical system unloading and loading operations may still be carried out by use of the manual override buttons and selection of emergency PTO.

99 The five manual override buttons are located on the sides of the main manifold of the hydraulic unit. The unit is situated on the right hand side of the vehicle immediately behind the cab. The unit also contains a diagrammatic label annotating each override button function, an hour run meter and the system hydraulic filter.



- | | | | |
|---|-----------------------|---|-----------------|
| 1 | Middle frame load | 2 | Hour run meter. |
| 3 | Middle frame unload | 4 | Hook arm unload |
| 5 | High pressure filter | 6 | Hook arm load |
| 7 | Manual transit button | | |

Fig 8. Manual override buttons

To load

CAUTION

Although the load handling system cannot be damaged by holding the manual override buttons for too long, it does cause needless strain. Depress the buttons just long enough to ensure that the middle frame and hook arm are fully home.

100 Observe all WARNINGS and CAUTIONS.

101 With the engine at idle, select PTO engage on the emergency selector button. (See Chap 2, Fig 1(59)).

102 Engage the hand throttle (See Chap 2, Fig 5), or foot throttle for two man operation.

103 Open the cover of the hydraulic unit and press the hook arm 'UNLOAD' button Fig 8 (4)) until the hook arm rams are fully extended.

104 Press the middle frame 'UNLOAD' button (3) and move the frame to the correct position for hooking on to the flatrack, then hook on as described earlier.

105 Press the middle frame 'LOAD' button (1), and pull the flatrack onto the vehicle as described earlier.

106 Press the hook arm 'LOAD' button (6), until the flatrack is fully on.

107 Press the 'MAN TRANSIT' button (7), disengage the hand throttle (if selected) and disengage the emergency PTO before moving off in the vehicle.

To unload

108 Go through the same sequence as for manual loading, but this time unloading the flatrack, disengaging the hook as described earlier.

LHS SPECIAL INSTRUCTIONS

Unloading on to higher ground (loading dock)

109 To drop a flatrack onto a loading dock or a similar situation, it is important that the height is determined by reversing up to the dock with the projection of the flatrack over the dock, check that there is a minimum of 150mm (6 in) between the bottom of the rear corner casting of the flatrack and the dock.

110 Should there be enough clearance, fit the rollers to the flatrack, unload as normal releasing the handbrake when the flatrack touches the dock and then pushing into place when it is off the vehicle.

Unloading on to lower ground

111 No special techniques are required to unload a flatrack below ground level, other than to make sure there is enough travel in the hook arm to unload. Also take care that the flatrack does not hit the rear of the vehicle.

EXTREME ANGLE BETWEEN FLATRACK AND LHS

112 Should it be impossible to approach the flatrack at a reasonable angle, the following procedure should be adhered to:

113 Hook onto the flatrack and check that the hook bar is sitting down in the hook correctly, failure to do this could twist the hook, should the bar not sit in the hook correctly, pull the flatrack out with chains between the hook and the flatrack.

114 If the bar sits correctly in the hook, follow the normal loading procedure, steering the vehicle underneath the flatrack but taking care during fitting that the rear lights do not hit the front of the flatrack - ask someone to check the clearance as the flatrack is pulled on.

115 Because of limited steering lock, difficulty may be experienced in steering under the flatrack far enough, and if this is so, pull the flatrack on as far as possible, then apply the opposite lock and push off again, then reversing the lock again pull on the flatrack which should come on to the rollers. If not, continue the process until it does.

BLACK OUT OPERATIONS

116 When operating in blackout conditions, ensure there are personnel each side at the rear, and in contact with the operator, to check that the flatrack locates on the rear rollers correctly.

RESTRICTED HEIGHT OPERATION

117 Should there be insufficient headroom to load or unload a flatrack, rear rollers should be attached to the flatrack and it should be unloaded and then pushed to the desired drop area. When pulling or pushing the flatrack the front should be lifted approximately 300mm (12 in) before moving.

118 Should the normal loading or unloading operation be unable to handle the flatrack for any particular reason, by using 'manual' mode it is possible to move the hook frame to alter the geometry and lift the flatrack that way, but the hook frame must be returned to its normal loading position before the flatrack is fully pulled on.

OPERATING ON AN INCLINE

119 When operating on a hill have the vehicle facing downhill, this will allow normal operations. Use of the manoeuvring brake when in first or reverse, or the footbrake will be necessary if the vehicle is facing up hill, or, the vehicle and flatrack are likely to move downhill.

SLAVE HYDRAULIC COUPLINGS**WARNINGS**

(1) ALL SLAVE HYDRAULIC COUPLING CONNECTIONS AND DISCONNECTIONS MUST BE MADE WITH THE VEHICLE ENGINE SWITCHED OFF. WHEN COUPLING THE PRESSURE MUST BE RELIEVED IN THE LHS FEED CIRCUIT.

(2) HIGH HYDRAULIC OIL PRESSURE IS PRESENT IN THE FLEXIBLE HOSES WHEN CONNECTED TO THE SLAVE COUPLINGS. PERSONNEL SHOULD STAND WELL CLEAR WHEN THESE HOSES ARE IN USE IN CASE OF SEPARATION OR BREAKAGE.

(3) SAFETY MUST BE PARAMOUNT WITH ALL ROUND VISIBILITY BEING MAINTAINED AT ALL TIMES, ESPECIALLY WHEN THE VEHICLES ARE MOVING IN REVERSE.

(4) ENSURE THAT THE HYDRAULIC PIPES ARE NOT ALLOWED TO DRAG ON THE FLOOR WHEN THE VEHICLES MOVE.

120 The two quick release couplings (Fig 9 (1)) located on top of the LHS reservoir are used for supplying hydraulic power to a stricken LHS on another vehicle.

121 When using the slave hydraulic couplings the mode selector switch must be in the 'AUXILIARY' position on the 'live' vehicle. On completion, the slave coupling and the mode selector must be returned to the 'OFF' position.

122 Ensure before connecting the couplings that the pressure in the LHS feed circuit is relieved. To relieve the pressure, disengage the PTO and switch the engine 'OFF', switch electrical power 'ON' and select 'AUTO' on the LHS mode selector, connect the hydraulic hoses to the slave couplings, select LHS to 'OFF', start the engine and select LHS mode to 'AUX'.

OFF LOADING A 'DEAD' DROPS VEHICLE LHS USING HYDRAULIC SLAVE COUPLINGS

123 The procedure details the operations required to off-load a flatrack from an unserviceable 'dead' vehicle, using the assistance of a serviceable 'live' vehicle. The procedure is applicable to both MMLC and IMMLC DROPS

124 The task may be performed by either a two or three person team. When using two people, a 'live' vehicle with a loaded flatrack **must** first be offloaded to ensure unrestricted visibility between the operators. Only when a third person (Banksman) relays the signals between the operators can the 'live' vehicle remain in the loaded condition.

125 Reverse the 'live' vehicle until it is aligned with the front of the 'dead' vehicle. Connect a rigid straight tow bar (Fig 9 (2)) between the two vehicles, apply the handbrake, select neutral and switch off.

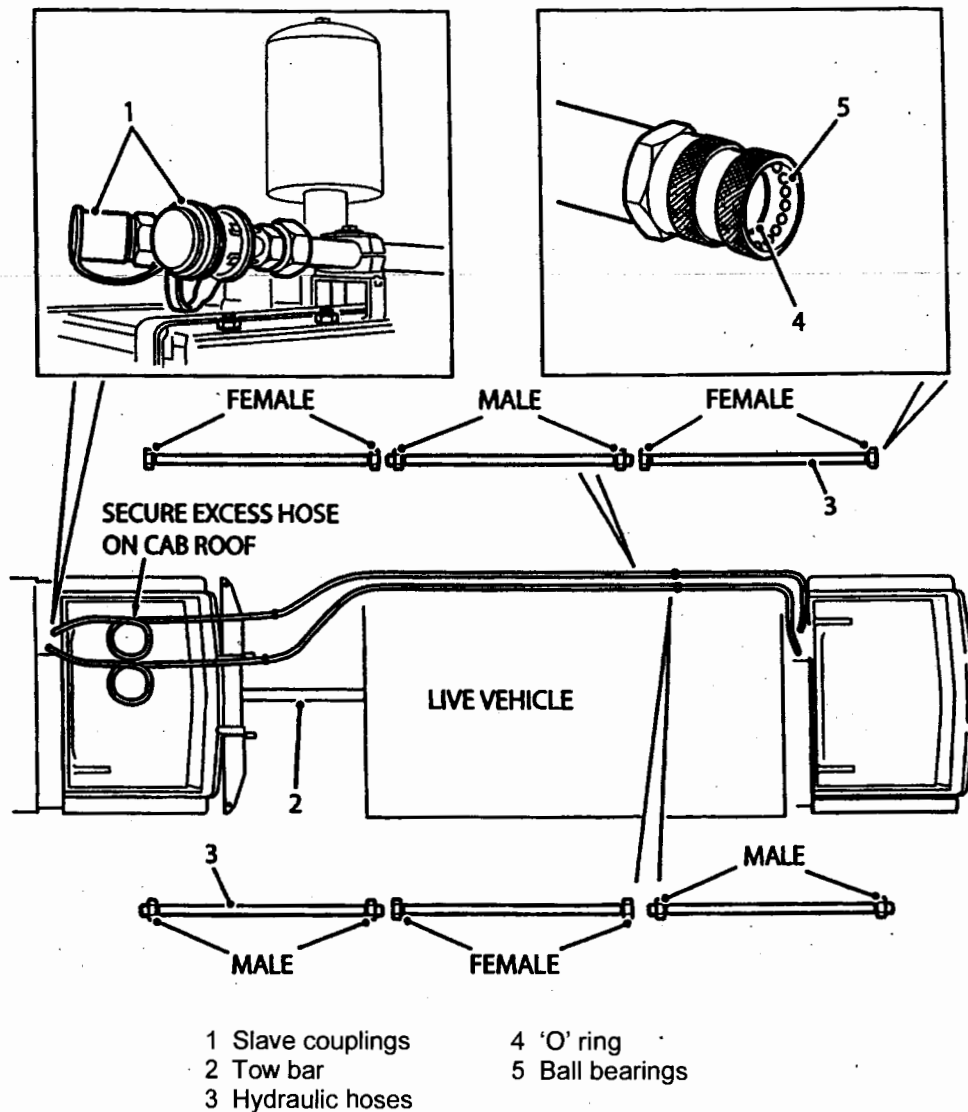


Fig 9 Slave procedure – vehicle and hose configuration

126 If the 'dead' vehicle has an air system pressure of less than 4 bar (58.8 lbf/in²) and is unable to self charge, then a slave air supply from the 'live' vehicle should be connected to allow the parking brakes to be released. This must be carried out before commencing the slave off-loading of the flatrack. If Emergency air reservoir holds sufficient air pressure, then the spring brakes may be released using the Emergency spring brake release switch.

127 Obtain the flexible high pressure hydraulic hoses (Fig 9 (3)) and inspect them as follows:

- 127.1 Ensure the outside surface of the hose is free from splits or kinks.
- 127.2 Inspect the hoses for signs of hardening, this will be seen as small splits or cracks.

128 Inspect the hydraulic couplings on both vehicle and hoses as follows:

- 128.1 Check for damage, corrosion to the mating surfaces and security of fixings.
- 128.2 Ensure both sealing 'O' rings (Fig 9 (4)) are fitted and serviceable.
- 128.3 If 25% of the ball bearings (Fig 9 (5)) are missing the coupling must be replaced. (On no account should two adjacent ball bearings be missing).

NOTE

If any of the above faults are evident then the hose/coupling must be replaced before the commencing the operation.

129 Connect the individual hoses (3) together to form the configuration shown in Fig 9. Note that each vehicle carries two hoses. The CES has been amended to enable units to hold an additional set of hoses on a ratio of 1 set per Troop. (1:6 vehicles)

130 Observing the markings, connect the high pressure hydraulic hoses (3) to the self sealing couplings (1) on both vehicles (ensure Return is to Return and Pressure to Pressure). Route the hoses between the vehicles as shown in Fig 9, do not allow the excess hose to drag on the ground during this procedure.

131 On the 'dead' vehicle. Switch the ignition 'ON', select 'AUTO' on the LHS rotary mode switch. Check that the green wine glass symbol is shown on the inclinometer and that there is no audible alarm.

132 On the 'live' vehicle. Start the engine and select 'AUX' on the LHS rotary mode switch. Check that the green wine glass symbol is shown on the inclinometer and that there is no audible alarm. Signal to operator of 'dead' vehicle when complete

133 On the 'dead' vehicle. On receipt of the signal from the 'live' vehicle operator, commence off-loading the flatrack using the joystick.

134 On the 'live' vehicle. Increase the engine speed to 1500 rpm and signal the operator of the 'dead' vehicle when this is obtained.

135 On the 'dead' vehicle. When the rear of the flatrack touches the ground, signal to the operator of the 'live' vehicle.

136 On both vehicles. Release the handbrakes.

137 On the 'dead vehicle'. Just before the front of the flatrack touches the ground, signal the operator of the 'live' vehicle that this condition has been reached. Release the LHS joystick.

138 On the 'live' vehicle. On receipt of the signal from the 'dead' vehicle operator release the accelerator and allow the engine speed to fall idle. Select first gear and signal, to the operator of the 'dead' vehicle when this is obtained. (Do not increase the engine speed above idle).

139 On the 'dead' vehicle. On receipt of the signal from the 'live' vehicle operator, continue offloading the flatrack using the joystick.

140 When the hook has disengaged from the 'A' frame bale bar, drive the 'live' vehicle forward until the 'dead' vehicle is approximately 5 metres from the flatrack. At this point, the 'live' vehicle and both vehicles are to stop. Apply the park brake on both vehicles.

141 On the 'live' vehicle. Select 'NEUTRAL' and signal to the operator of the 'dead' vehicle when this is obtained.

142 On the 'dead' vehicle. On receipt of the signal from the 'live' vehicle operator, commence to stow the LHS using the joystick in the 'LOAD' position. Signal the operator of the 'live' vehicle.

- 143 On the 'live' vehicle. Select 'NEUTRAL' and signal to the operator of the 'dead' vehicle when this is obtained. Allow the engine to idle.
- 144 On the 'dead' vehicle. On receipt of the signal from the 'live' vehicle operator, stow the LHS using the joystick in the 'LOAD' position. Signal the operator of the 'live' vehicle when the LHS is fully stowed.
- 145 On the 'live' vehicle. On receipt of the signal from the 'dead' vehicle operator, turn the rotary mode switch to 'OFF' and switch off the engine ignition.
- 146 On the 'dead' vehicle. Turn the rotary mode switch to 'OFF' and switch off the engine ignition.
- 147 Ensure the pressure within the system is relieved in accordance with Chap 3 Page 21, Para 124.
- 148 Examine the hoses and couplings for evidence of fluid leakage, replace as required. Uncouple and disassemble the hoses, fit the protective caps on all slave couplings. Stow the hoses and wipe away oil spillage.
- 149 Disconnect, and remove the slave air supply hose.
- 150 Disconnect, and remove and stow the rigid tow bar
- 151 Check, and if necessary replenish the LHS oil reservoir.

DRAWBAR TRAILER OPERATIONS

Coupling & Uncoupling of a trailer [REDACTED] LWB using a Leyland DROPS MMLC

152 GENERAL INFORMATION

152.1 The Trailer, Skeletal DROPS [REDACTED] 4 Twin Wheel, Kings LWB Trailer is a low mobility legacy vehicle primarily designed for operation with the DROPS Medium Mobility Load Carrier (MMLC). The trailer is capable of traversing prepared or semi-prepared road surfaces, but not cross country terrain. The trailer is dedicated to the transporting of purpose made flatracks (FR) loaded with either cargo or 20 ft ISO, 668 IC & ICC containers loaded to a gross weight of [REDACTED] tonnes.

152.2 The Skeletal DROPS trailer is capable of cross loading loads which must be preloaded onto a Flatrack. The vehicle and the trailer combination is not certified to carry packed or bulk fuel loads as the trailer does not meet the mandatory ADR classification for the carriage of fuel.

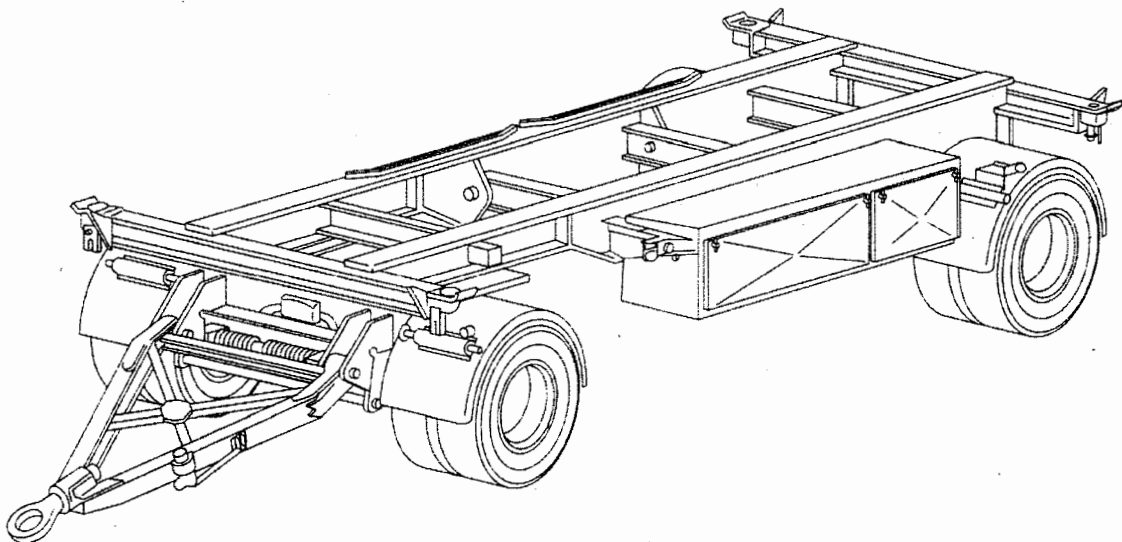


Fig 10 Kings Trailer, Cargo, Skeletal, Wheeled (Drops) [REDACTED]

153 COUPLING/UNCOUPLING THE TRAILER TO THE TOWING VEHICLE

WARNINGS

- (1) REFER TO AESP 2330-S-300-201 FOR FULL OPERATING INFORMATION FOR THE DROPS KINGS TRAILER.
- (2) RISK OF SERIOUS INJURY. ENSURE THAT AESP 2330-S-300-811 MOD INSTRUCTION NO 2 REVISED LANDING LEG, HAS BEEN EMBODIED BEFORE ATTEMPTING TO COUPLE THE TRAILER TO THE VEHICLE.
- (3) RISK OF SERIOUS INJURY. THE DRAWBAR IS COUNTER-BALANCED TO ASSIST THE OPERATORS IN COUPLING THE TRAILER TO THE VEHICLE. UNDER NO CIRCUMSTANCES SHOULD ANY INDIVIDUAL STAND BETWEEN THE VEHICLE AND THE TRAILER WHILST MANOEUVRING IS IN PROGRESS.
- (4) RISK OF INJURY. THE DRAWBAR ('A' FRAME) OF THE TRAILER IS TO BE SUPPORTED BY THE DRAWBAR SUPPORT LEG, WHICH IS TO BE ADJUSTED SO THAT THE TOWING EYE IS AT THE APPROPRIATE HEIGHT TO ACCEPT THE VEHICLE TOW HOOK.
- (5) RISK OF SERIOUS INJURY. THE SEQUENCE OF COUPLING/UNCOUPLING THE TRAILER TO THE VEHICLE IS TO BE CARRIED OUT ON FIRM LEVEL GROUND.
- (6) RISK OF SERIOUS INJURY. THE VEHICLE IS TO BE REVERSED UP TO THE TRAILER BY A MINIMUM CREW OF TWO. ONE CREW MEMBER IS TO BE POSITIONED TO THE SIDE AND TOWARDS THE REAR OF THE VEHICLE IN CLEAR VIEW OF THE DRIVER TO OBSERVE THE REAR OF THE VEHICLE AND THE FRONT OF THE TRAILER. UNDER NO CIRCUMSTANCES SHOULD ANY INDIVIDUAL STAND BETWEEN THE VEHICLE AND THE TRAILER WHILST MANOEUVRING IS IN PROGRESS.
- (7) RISK OF INJURY. WHEN THE DRAWBAR SUPPORT LEG IS DEPLOYED OR STOWED, THE LOCKING PIN IS TO BE FULLY ENGAGED AGAINST SPRING TENSION UNTIL THE DROP NOSE OPERATES TO RETAIN THE PIN IN POSITION.
- (8) RISK OF SERIOUS INJURY. CHOCK THE TRAILER ROADWHEELS IN THE DIRECTION OF TRAVEL PRIOR TO COMMENCEMENT OF COUPLING/UNCOUPLING.
- (9) RISK OF INJURY. THE 'A' FRAME FOR THE TRAILER IS HEAVY AND MUST BE RAISED AND LOWERED BY TWO PERSONNEL.
- (10) RISK OF SERIOUS INJURY. ENSURE THAT THE TRAILER IS SECURELY COUPLED TO THE VEHICLE TOW HOOK AND THE AIR LINES AND ELECTRICAL CONNECTORS ARE CONNECTED BEFORE DRIVING OFF.
- (11) RISK OF SERIOUS INJURY. MAKE SURE NO ONE IS STANDING BETWEEN THE VEHICLE AND TRAILER WHEN THE VEHICLE IS MANOEUVRING.
- (12) RISK OF SERIOUS INJURY. BEFORE DRIVING OFF ALWAYS ENSURE THE LHS NO TRANSIT LIGHT IS EXTINGUISHED.

153.1 COUPLING THE TRAILER TO THE VEHICLE

WARNING

RISK OF SERIOUS INJURY. THE SEQUENCE OF COUPLING/UNCOUPLING A TRAILER TO THE VEHICLE IS TO BE CARRIED OUT ON FIRM LEVEL GROUND WITH A MINIMUM OF TWO OPERATORS.

153.1.1 Ensure that the trailer park brake valve is applied, refer to AESP 2330-S-300-201 Fit chocks behind the rear wheels in both directions.

153.1.2 Carry out daily before use checks on the trailer in accordance with AESP 2330-S-300-601 Table 6.

153.1.3 If the drawbar is at rest on the ground raise the drawbar and support in accordance with AESP 2330-S-300-201 Chap 3.

153.1.4 Unlock the rear tow hook of the vehicle, refer to AESP 2320-R-301-201 Chap 1-5

153.1.5 With the trailer landing leg deployed and a minimum crew of two, adjust the height of the 'A' frame until the position of the tow eye is slightly higher than the open tow hook of the vehicle. Refer to AESP 2330-S-300-201 Chap 3 for landing leg operation.

WARNING

RISK OF SERIOUS INJURY. MAKE SURE NO ONE IS STANDING BETWEEN THE VEHICLE AND TRAILER WHEN THE VEHICLE IS MANOEUVRING.

153.1.6 Under guidance reverse the vehicle until it is approximately 1 metre away from the trailer, apply vehicle park brake and switch off engine.

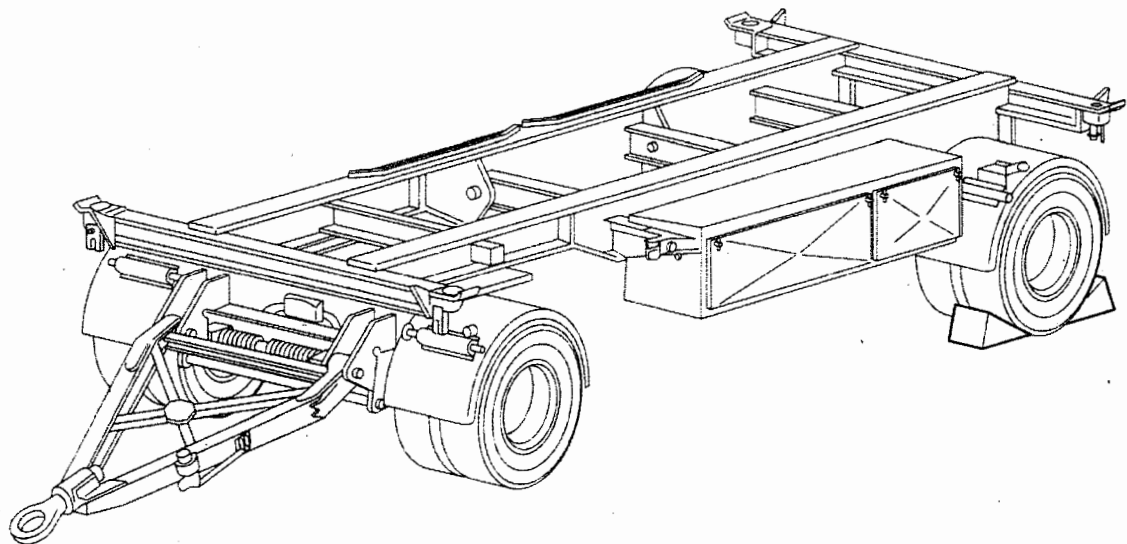


Fig 11 Showing chocks in position

153.1.7 Check trailer 'A' frame height alignment to vehicle tow hook. Check vehicle tow hitch is open. Readjust 'A' frame height if required.

153.1.8 Continue reversing, under guidance until the trailer coupling is complete. Apply vehicle park brake and switch off the engine.

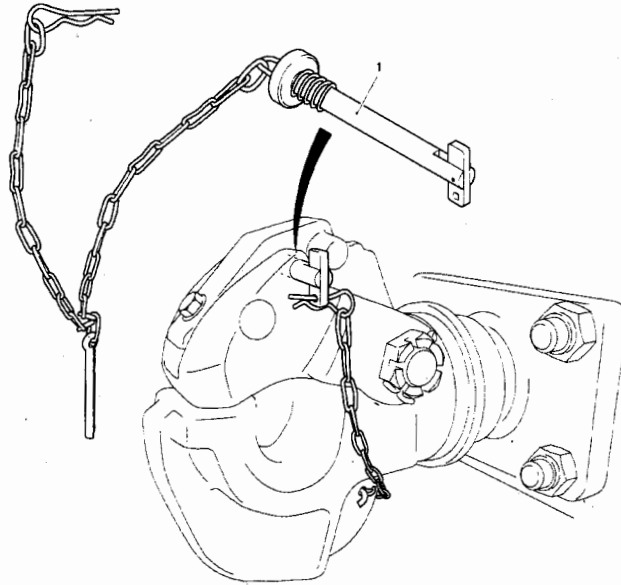


Fig 12 Tow hook locking pin location

153.1.9 Ensure tow hook is securely closed and that the locking pin is in position.

153.1.10 Raise and stow the landing leg in accordance with AESP 2330-S-300-201 Chap 3.

153.1.11 Connect the palm couplings from the trailer to the vehicle and allow the air pressure to build up.

153.1.12 Connect the electrical lighting plug, 2 pin socket and ABS cable in accordance with Fig. 13.

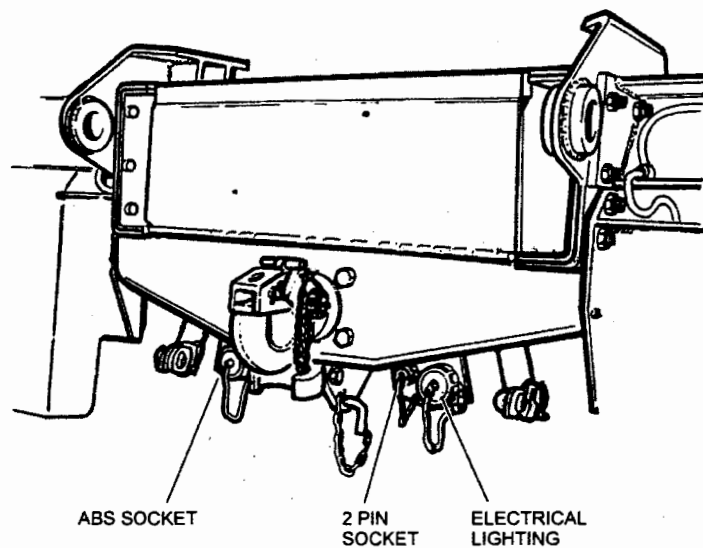


Fig 13 Electrical connection points

153.1.13 Start the vehicle engine and build up the air pressure.

153.1.14 Ensure the trailer park brake is applied and remove the chocks behind the rear wheels of the trailer.

WARNING SEVERE INJURY. ENSURE THAT THE TRAILER COUPLING IS FULLY LOCKED BEFORE TOWING THE TRAILER.

153.1.15 Complete lighting check of vehicle and trailer.

153.1.16 Disengage trailer park brake valve.

153.1.17 Complete vehicle movement check to ensure rotation of all wheel stations and operation of brakes.

153.1.18 Drive away.

154 UNCOUPLING THE TRAILER FROM THE VEHICLE.

WARNING RISK OF SERIOUS INJURY. THE SEQUENCE OF COUPLING/UNCOUPLING A TRAILER TO THE VEHICLE IS TO BE CARRIED OUT ON FIRM LEVEL GROUND WITH A MINIMUM OF TWO OPERATORS.

154.1 Park the vehicle and trailer combination on firm level ground in a suitable location to uncouple the trailer. Apply the vehicle handbrake and turn off the engine.

154.2 Apply trailer park brake valve and fit wheel chocks to rear trailer wheels in both directions.

154.3 Disconnect the electrical cables and air palm couplings and store them in accordance with AESP 2330-S-300-201.

154.4 Unlock the rear tow hook of the vehicle.

WARNING. RISK OF INJURY. THE 'A' FRAME FOR THE TRAILER IS HEAVY AND MUST BE RAISED AND LOWERED BY TWO PERSONNEL.

WARNING. RISK OF INJURY. WHEN THE DRAWBAR SUPPORT LEG IS DEPLOYED OR STOWED, THE LOCKING PIN IS TO BE FULLY ENGAGED AGAINST SPRING TENSION UNTIL THE DROP NOSE OPERATES TO RETAIN THE PIN IN POSITION.

154.5 Deploy the trailer landing leg, adjust the height of the 'A' frame until the position of the tow eye is clear of the open tow hook of the vehicle. Refer to AESP 2330-S-300-301 Chap 3 for landing leg operation.

154.6 Select Drive on the DROPS gear selector switch and under guidance drive the vehicle forward slowly until the vehicle is at least one meter clear of the trailer.

154.7 Apply the vehicle handbrake and switch off the engine. Close the rear tow hook and refit electrical socket covers.

CROSS LOADING & UNLOADING A TRAILER (REDACTED) LWB USING A LEYLAND DROPS MMLC

155 CROSS LOADING/UNLOADING A FLATRACK LOAD

WARNINGS

(1) RISK OF SERIOUS INJURY. THE TRAILER MUST BE UNCOUPLED FROM THE VEHICLE BEFORE ANY ATTEMPT IS MADE TO LOAD OR UNLOAD THE FLATRACK.

- (2) **RISK OF SERIOUS INJURY. GROUND CONDITIONS MUST BE CHECKED FOR FIRMNESS AND SIDEWAYS INCLINATION BEFORE LOADING OR OFF LOADING A FLATRACK.**
- (3) **RISK OF SERIOUS INJURY. THE VEHICLE IS TO BE REVERSED UP TO THE TRAILER BY A MINIMUM CREW OF TWO. ONE CREW MEMBER IS TO BE POSITIONED TO THE SIDE AND TOWARDS THE REAR OF THE VEHICLE IN CLEAR VIEW OF THE DRIVER TO OBSERVE THE REAR OF THE VEHICLE AND THE FRONT OF THE TRAILER. UNDER NO CIRCUMSTANCES SHOULD ANY INDIVIDUAL STAND BETWEEN THE VEHICLE AND THE TRAILER WHILST MANOEUVRING IS IN PROGRESS.**
- (4) **RISK OF SERIOUS INJURY. DO NOT ENTER THE AREA DIRECTLY UNDERNEATH THE FLATRACK DURING OPERATION OR IF IN THE RAISED POSITION.**
- (5) **RISK OF SERIOUS INJURY. CHOCK THE TRAILER ROAD WHEELS PRIOR TO THE COMMENCEMENT OF LOADING/UNLOADING A FLATRACK.**
- (6) **RISK OF INJURY. THE 'A' FRAME FOR THE TRAILER IS HEAVY AND MUST BE RAISED AND LOWERED BY TWO PERSONNEL.**
- (7) **RISK OF INJURY. WHEN THE DRAWBAR SUPPORT LEG IS DEPLOYED OR STOWED, THE LOCKING PIN IS TO BE FULLY ENGAGED AGAINST SPRING TENSION UNTIL THE DROP NOSE OPERATES TO RETAIN THE PIN IN POSITION.**
- (8) **RISK OF SERIOUS INJURY. MAKE SURE NO ONE IS STANDING BETWEEN THE VEHICLE AND THE TRAILER DURING CROSSLOADING OPERATION.**
- (9) **RISK OF INJURY. WHEN USING GP TYPE FLATRACKS ENSURE SPIGOTS ARE SECURED IN PLACE WHEN NOT IN USE.**
- (10) **RISK OF SERIOUS INJURY. ONLY LOADS WITH APPROVED TIE DOWN SCHEMES FOR EPLS MAY BE CROSS LOADED ON AND OFF THE TRAILER.**
- (11) **RISK OF SERIOUS INJURY. BEFORE DRIVING OFF ALWAYS ENSURE THE LHS NO TRANSIT LIGHT IS EXTINGUISHED IN THE CAB OF THE DROPS.**
- (12) **RISK OF INJURY. VISUALLY ENSURE DIN LOCKS ARE ENGAGED WITH FLATRACK WHEN LOADED.**
- (13) **RISK OF INJURY. NEVER OPERATE THE HOOK LIFT SYSTEM CLOSE TO ABOVE-GROUND ELECTRICITY CABLES.**

Cautions

- (6) **Ensure the 'A' frame is fully rested centrally to the trailer on the ground before attempting to reverse the vehicle into position to load/unload the Flatrack.**
- (7) **Ensure sufficient clearance between vehicle and trailer 'A' frame during all operations.**

156 CROSS LOADING – LOADING A FLATRACK FROM A DROPS ONTO AN LWB TRAILER

- 156.1 Park the vehicle and trailer combination, in a straight line, on firm level ground in a suitable location to uncouple the trailer. Carry out ALPHA checks. Apply the vehicle park brake and turn off the engine.
- 156.2 Chock rear trailer wheels in both directions. Uncouple the vehicle in accordance with AESP 2320-R-301-201.
- 156.3 Load DROPS with Flatrack load in accordance with AESP 2320-R-301-201.
- 156.4 Lower the trailer 'A' frame ensuring the support leg is stowed in its stowage port.

156.5 Reverse the DROPS vehicle under guidance up to the trailer using the manoeuvring brake. The runners on the flatrack must be in line with the runners on the trailer.

156.6 Stop with the rear of the DROPS vehicle towing eye above the centre plate on the trailer 'A' frame. Apply vehicle handbrake and switch off engine. Re-check vehicle and trailer alignment (Fig 14).

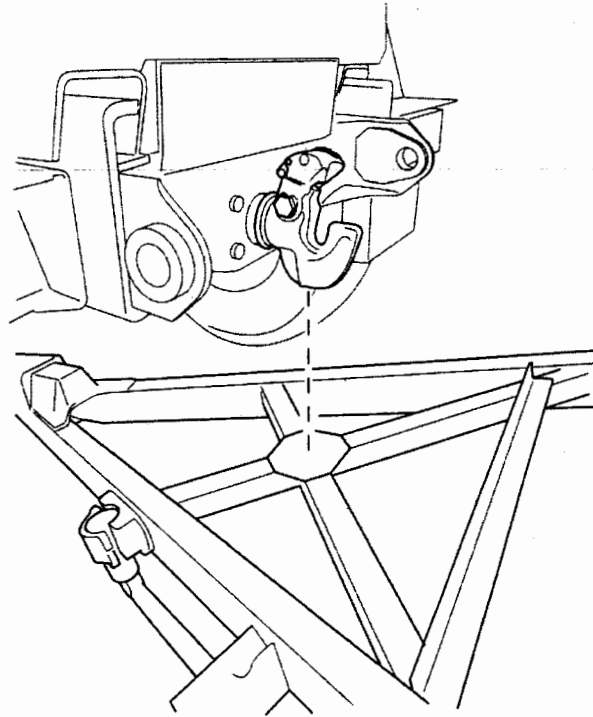


Fig 14 Positioning of 'A' frame for loading

WARNING. RISK OF INJURY. ENSURE ALL OF THE ISO TWIST LOCKS ARE FULLY DISENGAGED AND NOT PROTRUDING FROM THE LOAD BED.

156.7 Driver and operator to prepare trailer for cross-loading in accordance with AESP 2330-S-300-201.

156.8 With the vehicle engine running at idling speed select 'AUTO' (position 1) on the Rotary Mode Switch (RMS). Move the LHS joystick to the 'unload' position.

WARNING. RISK OF INJURY. NEVER OPERATE THE HOOK LIFT SYSTEM CLOSE TO ABOVE GROUND ELECTRICITY CABLES.

156.9 Execute unload cycle with the engine running at tick-over. Assistance will be required to ensure the runners on the flatrack are fully engaged with the central rails on the trailer. Once fully engaged 1500 rpm may be used (Fig 19).

156.10 Return the engine to tick-over when the rear castings of the flatrack reach the end of the centre rails, stopping before the front castings of the flatrack come into contact with the trailer front bump stops.

156.11 Select 'Manual Hook Arm' (position 2) on the RMS, select load and, on tick-over, lift the front of the flatrack 1M from the trailer bed.

156.12 Select 'Manual Mid-Frame' (position 3) on the RMS and unload on tick-over until just before the rear corner castings come into contact with the rear bump stops (do not put any undue pressure on the rear bump stops).

156.13 Select 'Manual Hook Arm' (position 2) on the RMS and, on tick-over, unload the flatrack ensuring it sits squarely on the trailer.

156.14 The ISO locks must now be placed into the 'Loose Locked' position.

WARNING RISK OF INJURY. ENSURE ALL OF THE TRAILER ISO LOCKS ARE FULLY DISENGAGED AND NOT PROTRUDING FROM THE LOAD BED

156.15 Release the hook from the bail bar by using the RMS and vehicle gears, re-stow the LHS.

156.16 Check security of the load. The vehicle can now be driven away and collect the second flatrack.

156.17 Whilst the vehicle is away the second operator fully secures the ISO locks and removes the chocks. The trailer loading procedure is now complete.

156.18 Support the 'A' frame of the trailer with its support leg ready to carry out the coupling procedure.

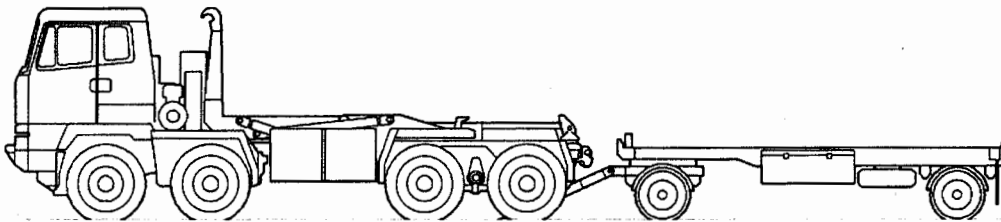


Fig 15 Vehicle at correct distance for loading

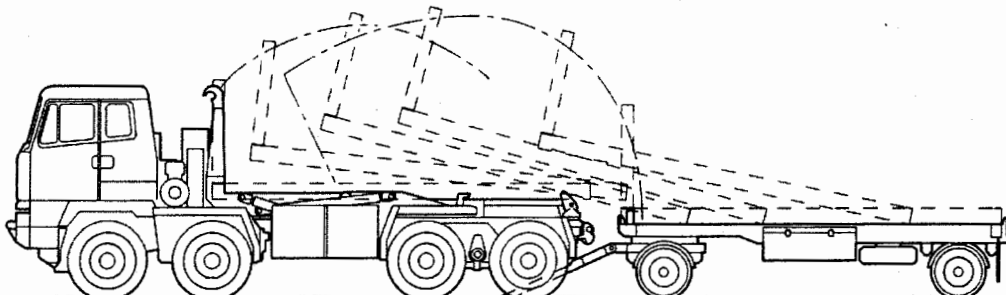


Fig 16 Cross loading onto trailer

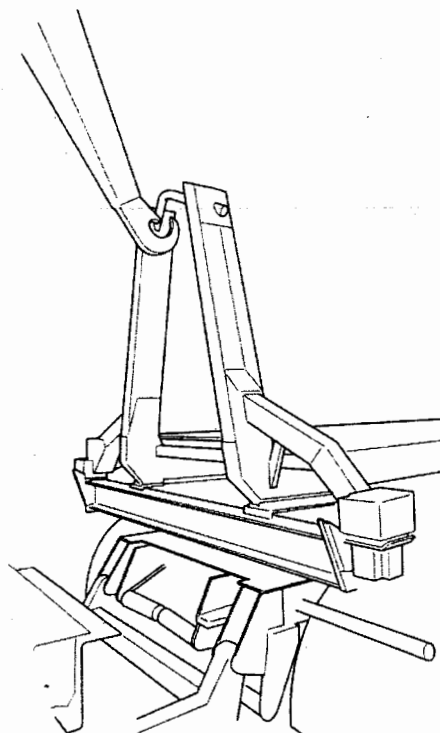


Fig 17 LHS hook clear of Flatrack 'A' frame

157 CROSS LOADING – UNLOADING A FLATRACK FROM AN LWB TRAILER ONTO A DROPS VEHICLE.

157.1 Park the vehicle and trailer combination on firm level ground in a suitable location and carry out ALPHA checks. Apply vehicle handbrake and turn off engine.

157.2 Apply the trailer parking brake and chock rear wheels in both directions. Uncouple the vehicle in accordance with AESP 2320-R-301-201.

157.3 If the DROPS vehicle is loaded, unload in accordance with AESP 2320-R-301-201.

WARNING. RISK OF INJURY. THE 'A' FRAME FOR THE TRAILER IS HEAVY AND MUST BE RAISED AND LOWERED BY TWO PERSONNEL.

WARNING. RISK OF INJURY. WHEN THE DRAWBAR SUPPORT LEG IS DEPLOYED OR STOWED, THE LOCKING PIN IS TO BE FULLY ENGAGED AGAINST SPRING TENSION UNTIL THE DROP NOSE OPERATES TO RETAIN THE PIN IN POSITION.

157.4 Lower the trailer 'A' frame ensuring the support leg is stowed in its stowage port.

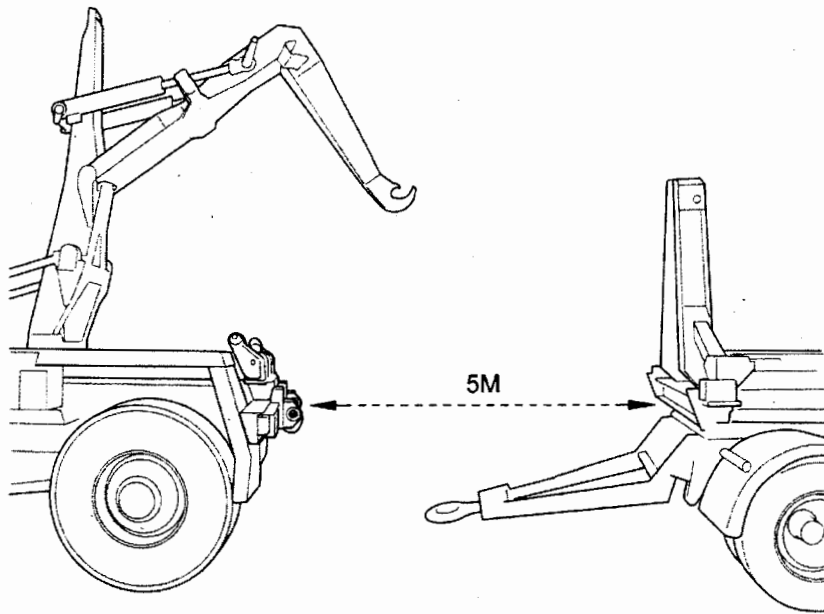


Fig 18 DROPS at required 5 metre distance

157.5 Reverse the DROPS vehicle up to the trailer and stop in a straight line, approx 5 metres away from the trailer. Carry out ALPHA checks.

157.6 With the vehicle engine running at idling speed select 'AUTO' (position 1) on the LHS rotary mode switch. The PTO will automatically engage and the warning light illuminate.

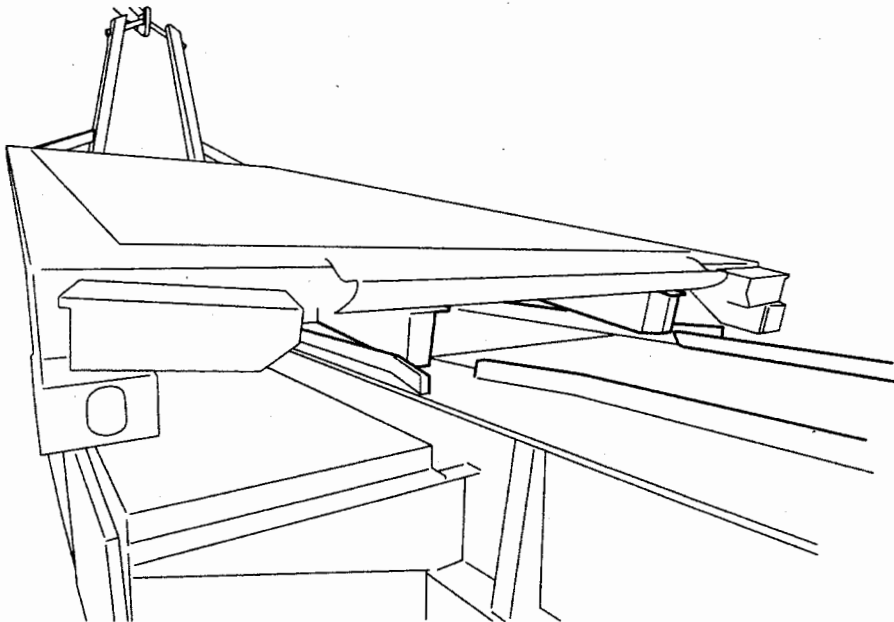


Fig 19 Flatrack engaged with centre rails

157.7 Move the LHS joystick to the unload position. The Hook Arm then the Middle Frame will rise. The 'NO TRANS' light will illuminate (once the LHS starts to move, increase to approx 1500 rpm). Release the LHS joystick when the hook is slightly lower than the 'A' frame bail bar.

157.8 Set the ISO twist locks to loose lock.

157.9 With the LHS deployed, reverse the vehicle under guidance until the LHS is approx 1M from the flatrack bail bar. Apply park brake.

157.10 Check height of the LHS in relation to the bail bar.

WARNING. RISK OF INJURY. THE BAIL BAR OF THE FLATRACK MUST BE FULLY ENGAGED BEFORE ATTEMPTING TO LIFT LOAD.

157.11 Continue to reverse the vehicle until the LHS is directly below the flatrack bail bar. Apply vehicle park brake. Operate the LHS to engage the bail bar.

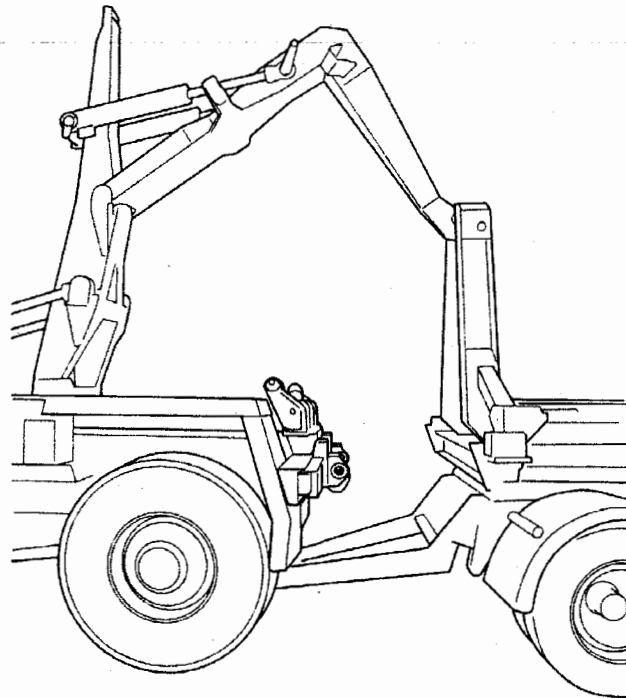


Fig 20 'A' frame prepared for cross loading

157.12 Switch off the engine. Disengage all ISO locks.

157.13 Using RMS position 2, with the engine running at idling speed, select load on the joystick. Once the front end of the flatrack is clear of the bump-stops, apply park brake, revert to position 1 on the RMS, increase vehicle engine speed to approx 1500 rpm while within the guide rails and revert to tick-over when clear.

157.14 Continue to observe the flatrack to ensure it engages with the rollers on the DROPS vehicle, paying particular attention to the rear corner castings to ensure that they miss the front trailer bump-stops.

157.15 Continue the load procedure until the flatrack is fully seated on the DROPS. Once seated and the 'NO TRANS' light has extinguished, select position '0' on the RMS.

157.16 Move the vehicle forward 5M. Apply vehicle handbrake and turn off engine. Check security of the load.

157.17 The trailer ISO locks must be stowed in the fully locked position. Remove wheel chocks and support the 'A' frame using the landing leg.

157.1 The loading procedure is now complete.

157.2 Support the 'A' frame of the trailer with its support leg ready to carry out the coupling procedure.

Coupling & Uncoupling of a trailer MLRS using a LEYLAND DROPS MMLC

158 GENERAL INFORMATION

158.1 The Trailer, Skeletal DROPS, 4 Wheel, MLRS Trailer is a medium mobility legacy vehicle primarily designed for operation with the DROPS Improved Medium Mobility Load Carrier (IMMLC). The trailer is capable of traversing prepared or semi-prepared road surfaces and cross country terrain. The trailer is dedicated to the transporting of purpose made MLRS flatracks (FR) loaded with the rocket pods which are used in by the MLRS vehicle

158.2 The MLRS Trailer is only certified to transport the MLRS Flatrack.

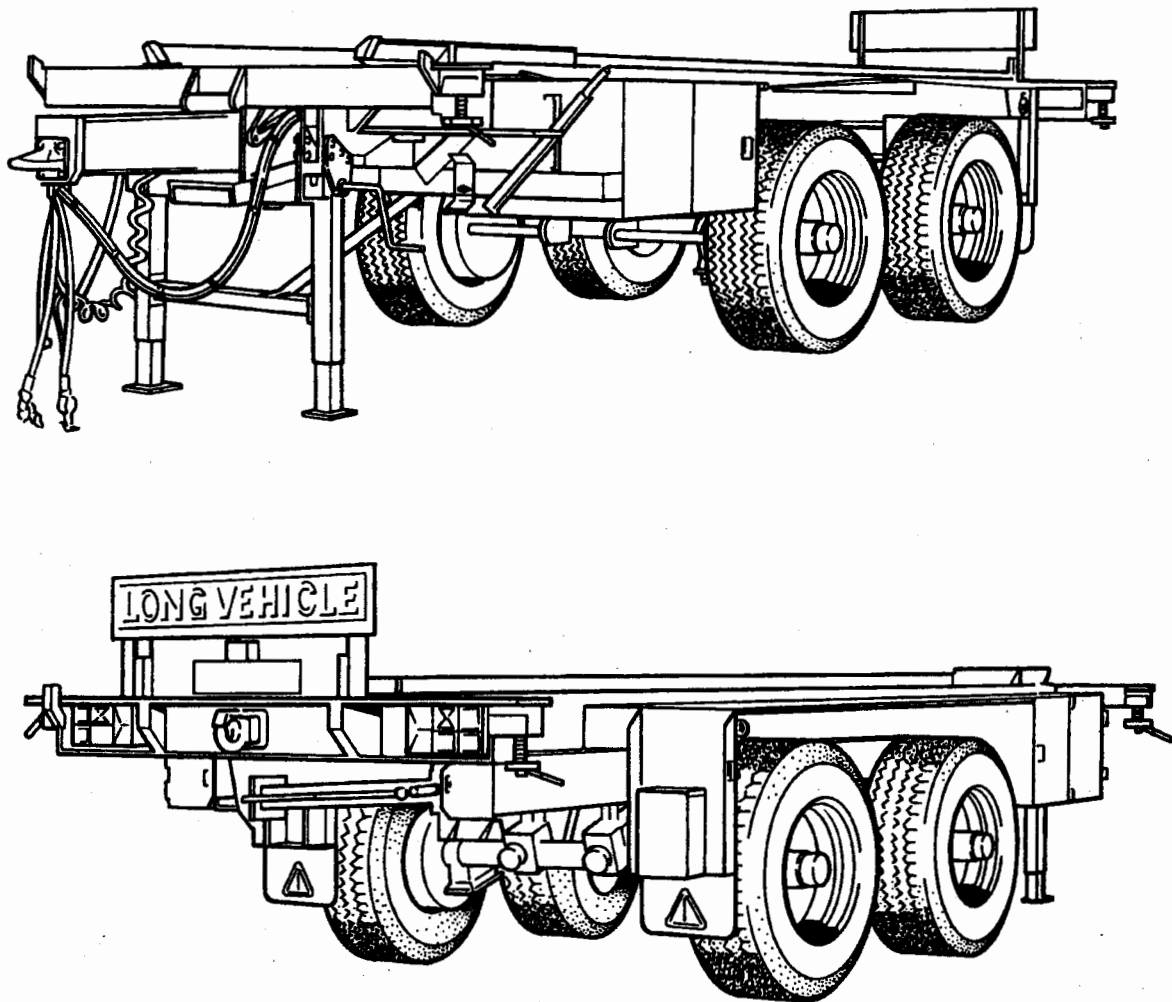


Fig 21 MLRS Trailer, Cargo, Skeletal, (DROPS)

159 COUPLING/UNCOUPLING THE TRAILER TO THE TOWING VEHICLE.

WARNINGS

- (1) REFER TO AESP 2330-S-301-201 FOR FULL OPERATING INFORMATION FOR THE DROPS MLRS TRAILER.
- (2) RISK OF SERIOUS INJURY. THE SEQUENCE OF COUPLING/UNCOUPLING A TRAILER TO THE VEHICLE IS TO BE CARRIED OUT ON FIRM LEVEL GROUND WITH A MINIMUM OF TWO OPERATORS.
- (3) RISK OF SERIOUS INJURY. MAKE SURE NO ONE IS STANDING BETWEEN THE VEHICLE AND TRAILER WHEN THE VEHICLE IS MANOEUVRING.
- (4) RISK OF SERIOUS INJURY. ENSURE THE DRAWBAR IS LOCKED IN POSITION BEFORE UN-SECURING THE VEHICLE
- (5) RISK OF SEVERE INJURY. ENSURE THAT THE TRAILER COUPLING IS FULLY LOCKED BEFORE TOWING THE TRAILER
- (6) RISK OF SERIOUS INJURY. WHEN THE TRAILER PARK BRAKE IS ENGAGED AND THE WHEELS ARE CHOCKED DO NOT REVERSE VEHICLE WHEN THE TRAILER DRAWBAR RELEASE LEVER IS NOT PULLED OUT.
- (7) RISK OF INJURY WHEN SELECTING DRIVE MANOEUVRE, SECURE VEHICLE USING FOOT BRAKE TO PREVENT VEHICLE ROLLING WHEN GEARBOX LAG IS TAKEN UP.
- (8) RISK OF SERIOUS INJURY THE A, GP, S, AND CONVERTED A TO GP FLATRACKS ARE NOT CERTIFIED TO BE TRANSPORTED ON THE MLRS TRAILER.
- (9) RISK OF SERIOUS INJURY. THE VEHICLE IS TO BE REVERSED UP TO THE TRAILER BY A MINIMUM CREW OF TWO. ONE CREW MEMBER IS TO BE POSITIONED TO THE SIDE AND TOWARDS THE REAR OF THE VEHICLE IN CLEAR VIEW OF THE DRIVER TO OBSERVE THE REAR OF THE VEHICLE AND THE FRONT OF THE TRAILER. UNDER NO CIRCUMSTANCES SHOULD ANY INDIVIDUAL STAND BETWEEN THE VEHICLE AND THE TRAILER WHILST MANOEUVRING IS IN PROGRESS.
- (10) RISK OF SERIOUS INJURY. CHOCK THE TRAILER ROADWHEEL IN THE DIRECTION OF TRAVEL PRIOR TO THE COMMENCEMENT OF COUPLING/UNCOUPLING.
- (11) RISK OF SERIOUS INJURY. ENSURE THAT THE TRAILER IS SECURELY COUPLED TO THE VEHICLE TOW HOOK AND THE AIR LINES AND ELECTRICAL CONNECTORS ARE CONNECTED BEFORE DRIVING OFF.
- (12) RISK OF SERIOUS INJURY. BEFORE DRIVING OFF ALWAYS ENSURE THE LHS NO TRANSIT LIGHT IS EXTINGUISHED.
- (13) RISK OF INJURY. DO NOT ATTEMPT TO LOAD OR OFFLOAD FROM THE TRAILER WITHOUT THE TRAILER DRAWBAR BEING COUPLED TO THE VEHICLE.

Cautions

- (8) Do not exert pressure on the handle when stowing the landing legs. Winding must stop as soon as resistance is felt when the legs are in the stowed position. The handles must, if necessary, be turned back to be secured.

160 COUPLING THE TRAILER TO THE VEHICLE.

WARNING RISK OF SERIOUS INJURY. THE SEQUENCE OF COUPLING/UNCOUPLING A TRAILER TO THE VEHICLE IS TO BE CARRIED OUT ON FIRM LEVEL GROUND WITH A MINIMUM OF TWO OPERATORS.

160.1 Ensure that the trailer park brake is applied refer to AESP 2330-S-301-201 and fit chocks behind the rear wheels.

160.2 Carry out daily before use checks on the trailer in accordance with AESP 2330-S-301-601 Table 6.

160.3 Ensure the drawbar is unlocked and in the midway position.

160.4 Ensure the rear landing leg is deployed in accordance to AESP 2330-S-301-201 Chap 2

160.5 Unlock the rear tow hook of the vehicle; refer to AESP 2320-R-301-201.

160.6 Adjust the height of the drawbar until the position of the tow eye is slightly higher than the open tow hook of the vehicle. Refer to AESP 2330-S-301-201 Chap 2 for landing leg operation.

160.7 Ensure tow hook is securely closed and that the locking pin is in position.

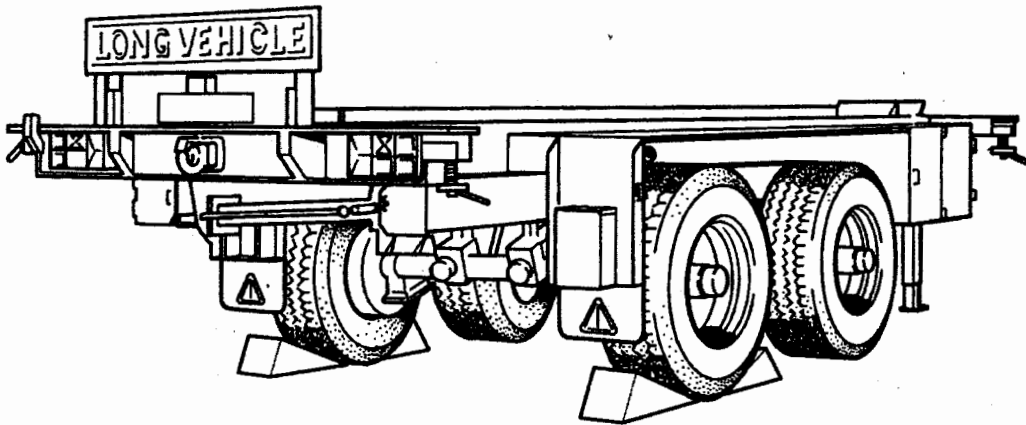


Fig 22 Showing wheel chocks in position

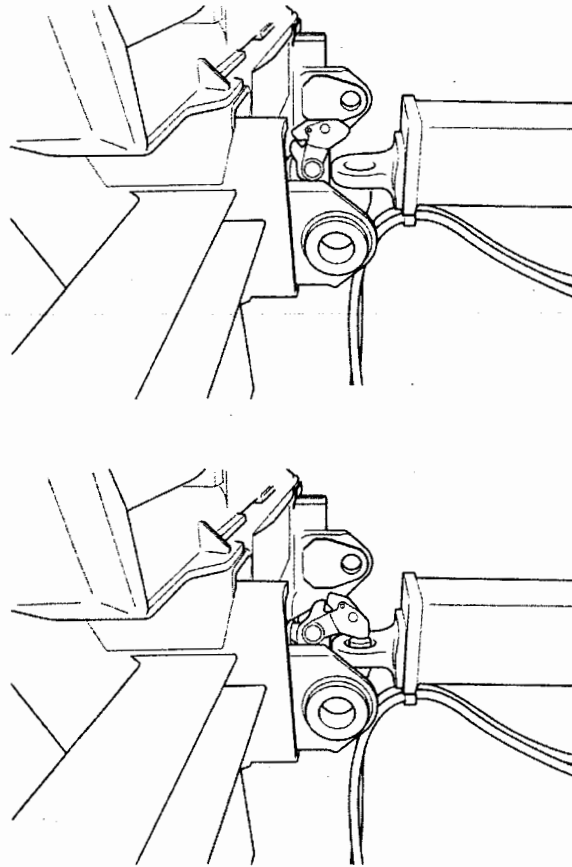


Fig 23 Drawbar positioned for coupling/uncoupling

WARNING RISK OF SERIOUS INJURY. MAKE SURE NO ONE IS STANDING BETWEEN THE VEHICLE AND TRAILER WHEN THE VEHICLE IS MANOEUVRING.

160.8 Under guidance reverse the vehicle until it is approximately 1 metre away from the trailer, apply vehicle park brake and switch off the engine.

160.9 Check trailer tow eye height and alignment to vehicle tow hook. Check vehicle tow hook is open. Readjust drawbar height if required.

160.10 Continue reversing, under guidance until the trailer coupling come into contact with the trailer tow hook. Apply vehicle park brake and switch off the engine.

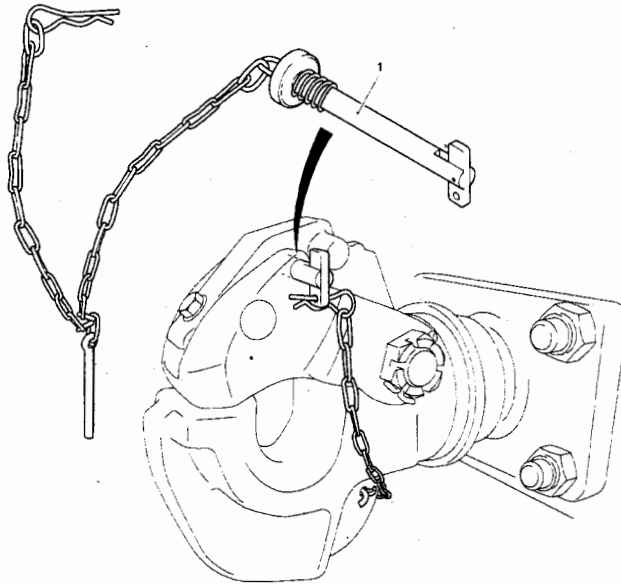


Fig 24 Tow hook locking pin location

160.11 Raise and stow the front landing legs in accordance with AESP 2330-S-301-201 Chap 2.

160.12 Connect the palm couplings and connect the electrical lighting plug, 2 pin socket and ABS cable in accordance with Fig. 6, ensuring the correct socket is used for trailer lights. Refer to AESP 2320-R-301-201.

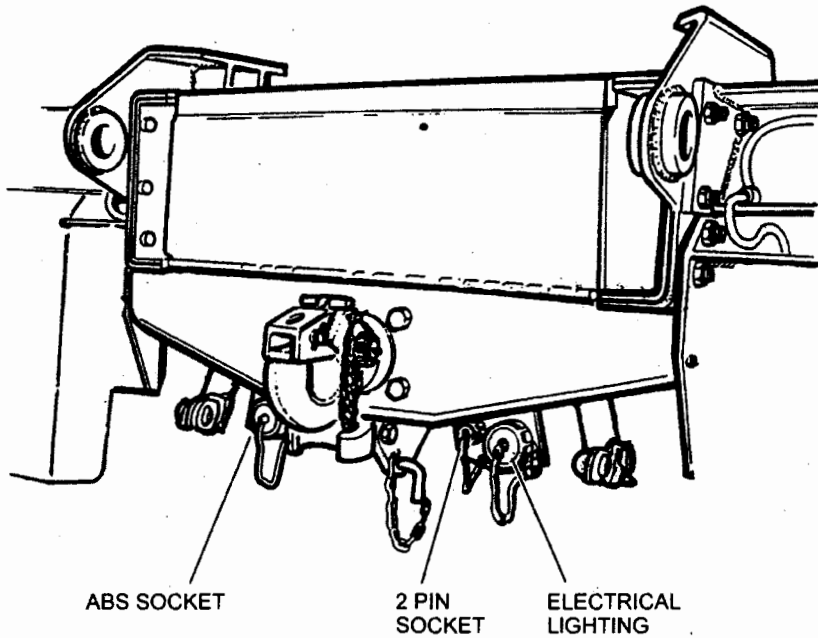


Fig 25 Electrical connection points on vehicle

- 160.13 Ensure that the trailer drawbar lock is set to couple.
- 160.14 Start the vehicle engine and build up the air pressure. Select drive, drive the vehicle forward slowly until the trailer drawbar locks out.
- 160.15 Select reverse and carry out two push tests. Ensure that the drawbar lock is engaged.
- 160.16 Remove the chocks from behind the rear wheels of the trailer.

WARNING SEVERE INJURY. ENSURE THAT THE TRAILER COUPLING IS FULLY LOCKED BEFORE TOWING THE TRAILER.

- 160.17 Complete lighting check of vehicle and trailer.
- 160.18 Release trailer park brake.
- 160.19 Complete vehicle movement check to ensure rotation of all wheel stations and operation of brakes.
- 160.20 Drive away.

161 UNCOUPLING THE TRAILER FROM THE VEHICLE.

WARNING. RISK OF SERIOUS INJURY. THE SEQUENCE OF COUPLING/UNCOUPLING A TRAILER TO THE VEHICLE IS TO BE CARRIED OUT ON FIRM LEVEL GROUND WITH A MINIMUM OF TWO OPERATORS.

- 161.1 Park the vehicle and trailer combination on firm level ground in a suitable location to uncouple the trailer. Apply the vehicle handbrake and turn off the engine.
- 161.2 Apply the trailer park brake and fit a chock either side of one of the rear trailer wheels (Fig 22).
- 161.3 Disconnect the electrical cables and air palm couplings and store them in accordance with AESP 2330-S-301-201.
- 161.4 Deploy the rear landing leg until approximately 50mm above the ground.

WARNING. RISK OF SERIOUS INJURY. WHEN THE TRAILER PARK BRAKE IS ENGAGED AND THE WHEELS ARE CHOCKED DO NOT REVERSE VEHICLE WHEN THE TRAILER DRAWBAR RELEASE LEVER IS NOT PULLED OUT.

WARNING. RISK OF SERIOUS INJURY. MAKE SURE NO ONE IS STANDING BETWEEN THE VEHICLE AND TRAILER WHEN THE VEHICLE IS MANOEUVRING.

- 161.5 Pull out the drawbar lock release lever.
- 161.6 Return to vehicle start the engine, select reverse and release park brake.
- 161.7 Under guidance reverse the vehicle until the drawbar is at midway position.
- 161.8 Apply vehicle park brake and switch off engine.
- 161.9 Deploy the trailer front landing leg until the tow eye is free in the tow hook. Unlock the tow hook and adjust the height of the drawbar until the position of the tow eye is clear of the open tow hook. Refer to AESP 2330-S-301-201 Chap 2 for landing leg operation.

161.10 Return to the vehicle, start the engine, select drive and under guidance drive the vehicle forward slowly until the vehicle is at least one metre clear of the trailer.

161.11 Apply the vehicle park brake and switch off the engine. Close the rear tow hook and refit electrical socket covers.

Cross Loading & Unloading an MLRS Flatrack Trailer Using a LEYLAND Drops MMLC

162 CROSS LOADING/UNLOADING AN MLRS FLATRACK.

WARNINGS.

- (1) REFER TO AESP 2330-S-301-201 FOR FULL OPERATING INFORMATION FOR THE DROPS MLRS TRAILER.**
- (2) RISK OF SERIOUS INJURY. THE TRAILER MUST REMAIN COUPLED TO THE VEHICLE BEFORE ANY ATTEMPT IS MADE TO LOAD OR UNLOAD THE FLATRACK.**
- (3) RISK OF SERIOUS INJURY. GROUND CONDITIONS MUST BE CHECKED FOR FIRMNESS AND SIDEWAYS INCLINATION BEFORE LOADING OR OFF LOADING A FLATRACK.**
- (4) RISK OF SERIOUS INJURY. THE VEHICLE IS TO BE REVERSED UP TO THE TRAILER BY A MINIMUM CREW OF TWO. ONE CREW MEMBER IS TO BE POSITIONED TO THE SIDE AND TOWARDS THE REAR OF THE VEHICLE IN CLEAR VIEW OF THE DRIVER TO OBSERVE THE REAR OF THE VEHICLE AND THE FRONT OF THE TRAILER. UNDER NO CIRCUMSTANCES SHOULD ANY INDIVIDUAL STAND BETWEEN THE VEHICLE AND THE TRAILER WHILST MANOEUVRING IS IN PROGRESS.**
- (5) RISK OF SERIOUS INJURY. DO NOT ENTER THE AREA DIRECTLY UNDERNEATH THE FLATRACK DURING OPERATION OR IF IN THE RAISED POSITION.**
- (6) RISK OF SERIOUS INJURY. CHOCK THE TRAILER ROAD WHEELS PRIOR TO THE COMMENCEMENT OF LOADING/UNLOADING A FLATRACK.**
- (7) RISK OF SERIOUS INJURY. MAKE SURE NO ONE IS STANDING BETWEEN THE VEHICLE AND THE TRAILER DURING CROSS LOADING OPERATION.**
- (8) RISK OF SERIOUS INJURY. ONLY MLRS FLATRACK MAY BE CROSS LOADED ON AND OFF THE MLRS TRAILER.**
- (9) RISK OF SERIOUS INJURY. BEFORE DRIVING OFF ALWAYS ENSURE THE LHS NO TRANSIT LIGHT IS EXTINGUISHED IN THE CAB OF THE DROPS.**
- (9) RISK OF INJURY. VISUALLY ENSURE DIN LOCKS ARE ENGAGED WITH FLATRACK WHEN LOADED.**
- (11) RISK OF SERIOUS INJURY. A, GP, S AND CONVERTED A TO GP TYPE FLATRACKS ARE NOT AUTHORISED TO BE TRANSPORTED ON THE MLRS TRAILER.**
- (12) RISK OF INJURY. NEVER OPERATE THE HOOK LIFT SYSTEM CLOSE TO ABOVE-GROUND ELECTRICITY CABLES.**

Cautions

- (1) Do not attempt to cross load or unload with the tow bar of the trailer fully extended**

163 CROSS LOADING – LOADING AN MLRS FLATRACK TO AN SWB TRAILER.

163.1 Park vehicle and trailer on firm level ground, ensure the trailer is coupled to the vehicle with the drawbar in the midway position and the vehicle is laden with an MLRS flatrack. Refer to AESP 2320-R-301-201.

163.2 Apply the vehicle park brake and switch off the engine. Apply trailer park brake and chock the rear wheels in both directions. Carry out ALPHA checks.

163.3 Disconnect the trailer hoses and cables and stow in their holders. Ensure the ISO locks are in the fully lowered position.

WARNING. RISK OF INJURY. ENSURE ALL OF THE TRAILER ISO LOCKS ARE FULLY DISENGAGED AND NOT PROTRUDING FROM THE LOAD BED.

163.4 Release the drawbar lock by pulling the lever firmly out.

163.5 Select reverse gear, under guidance and at idle speed reverse the vehicle until the drawbar is fully retracted. Apply the handbrake and select neutral. Dismount the vehicle and check the alignment of the vehicle and trailer.

163.6 Re-enter the vehicle, select automatic mode and, at idle speed, start to transfer the flatrack from the vehicle to the trailer. Release the LHS joystick before the flatrack has come into contact with the rear of the trailer (Fig 28).

163.7 Release the vehicle handbrake which will allow it to be pushed forward. Continue to off-load, this will ensure that the flatrack sits squarely on the trailer. Reapply the vehicle handbrake once in position.

163.8 Place the ISO locks to the 'Loose Lock' position.

163.9 At idling speed, disengage the hook from the bail bar, select first gear and, at the same time, operating the LHS joystick in the 'off-load' position.

163.10 Stop once the hook is disengaged from the bail bar, apply the vehicle handbrake and select neutral.

WARNING. RISK OF SEVERE INJURY, ENSURE THE LHS HOOK IS FULLY DISENGAGED FROM THE BAIL BAR BEFORE MOVING THE VEHICLE.

163.11 At idle speed, drive the vehicle forward until there is a minimum 1M clearance.

163.12 Stow the LHS in accordance with AESP 2320-R-301-201.

163.13 Fully engage twist locks.

163.14 Carry out lights and brakes checks and that the trailer wheels are rotating. The vehicle and trailer is now ready for road transportation.

NOTE:

(1) Before driving off with the trailer coupled, ensure that the drawbar is locked in the fully forward position, the ISO locks are fully locked and the trailer handbrake is released.

(2) Only MLRS flatracks may be carried on this type of SWB trailer.

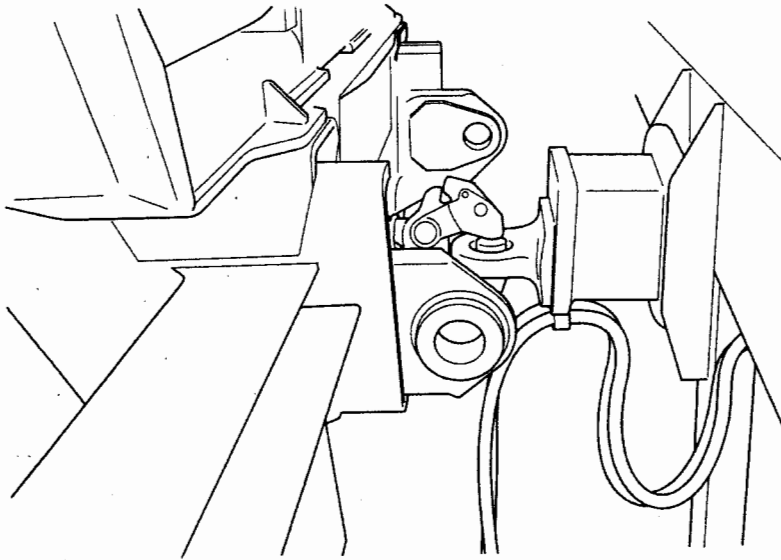


Fig 26 Vehicle at correct distance for loading

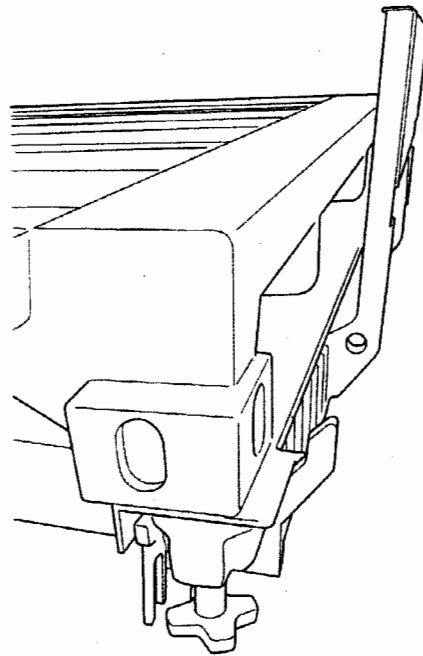


Fig 27 Flatrack in contact with trailer rear bump stops

164 CROSS LOADING - UNLOADING AN MLRS FLATRACK FROM THE SWB TRAILER.

164.1 Park vehicle and trailer on firm level ground, ensure the trailer is coupled to the vehicle with the drawbar in the midway position. Refer to AESP 2320-R-301-201.

164.2 Apply the vehicle park brake and switch off the engine. Apply trailer park brake and chock the rear wheels in both directions. Ensure the rear legs followed by the front support legs are deployed. Carry out ALPHA checks.

164.3 With the vehicle engine running at idling speed, select 'AUTO' (position 1) on the LHS rotary mode switch. The PTO will automatically engage and the warning light illuminate.

164.4 Move the LHS joystick to the unload position. The Hook Arm then the Middle Frame will rise. The 'NO TRANS' light will illuminate (once the LHS starts to move, increase to approx 1500 rpm). Release the LHS joystick when the hook is slightly lower than the 'A' frame bail bar.

164.5 Set ISO twist locks to 'Loose Lock' position.

164.6 Release the drawbar lock by pulling the lever firmly out (located on the LHS of the trailer) reverse the vehicle to release the drawbar.

WARNING. RISK OF SERIOUS INJURY. THE BAIL BAR OF THE FLATRACK MUST BE FULLY ENGAGED BEFORE ATTEMPTING TO LIFT LOAD.

164.7 With the LHS deployed reverse the vehicle under guidance until the LHS is approx 1M from the flatrack bail bar. The trailer telescopic drawbar will retract. Apply park brake.

164.8 Check height of the LHS in relation to the bail bar.

WARNING. RISK OF SERIOUS INJURY. THE BAIL BAR OF THE FLATRACK MUST BE FULLY ENGAGED BEFORE ATTEMPTING TO LIFT LOAD.

164.9 Continue to reverse the vehicle until the LHS is directly below the flatrack bail bar. Apply vehicle park brake. Operate the LHS to engage the bail bar.

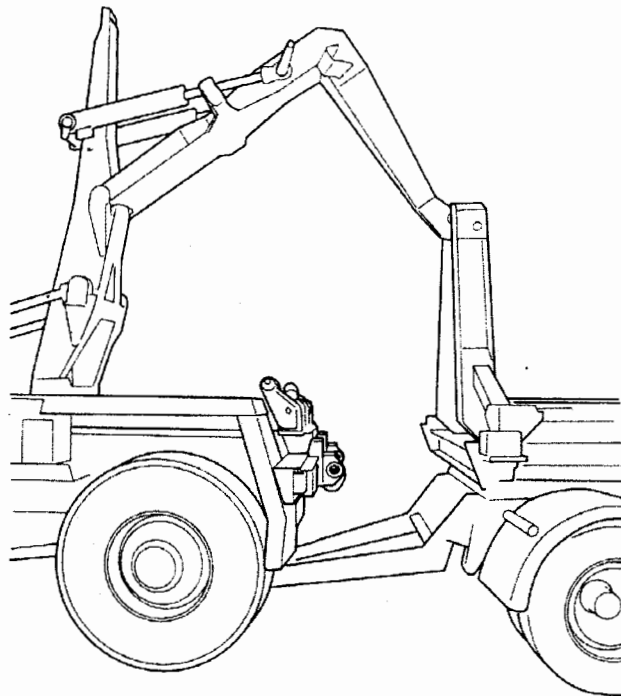


Fig 28 'A' frame prepared for cross loading

164.10 Switch off the engine. Disengage all ISO locks.

164.11 Release the vehicle handbrake. Start to load until the front corner castings are clear of the front bump-stops then stop operations and apply handbrake.

164.12 In automatic mode, restart engine apply foot brake and release park brake. Release foot brake and at engine idle speed operate the control lever to the LOAD position until the front of the flatrack is clear of the front locating lugs of the trailer. Apply vehicle park brake.

164.13 Set the engine to run at a maximum of 1000 rpm until the loading operation is finished.

164.14 Engage first gear and pull forward at idle speed, the drawbar will automatically extend. Apply vehicle handbrake, turn off engine.

164.15 Disconnect the trailer in accordance with AESP 2320-R-301-201.

164.16 The loading procedure is now complete.

VEHICLE RECOVERY INSTRUCTIONS

CAUTIONS

- (1) Ensure the engine start key is fitted in the steering column switch to release the steering lock. Due to the high front axle load care must be exercised during towing using the recovery eyes when negotiating tight bends.
- (2) Care should be exercised when towing across country using a rigid tow bar as the front pin jaw will only allow limited vertical movement.

(3) Ensure that the front emergency (red) and service (yellow) air couplings are connected between the recovery vehicle and the casualty. A minimum air pressure of 5.8 bar (85 lbs/sq in) is required to release the spring brakes.

(4) If the casualty electrical system is inoperative the recovery vehicle lighting set should be used.

(5) Ensure that all differential locks and front wheel drive are disengaged before commencing towing.

Cab control positions - before towing away

165 The gear selector (See chap 2 Fig 1 (63)) should be in the neutral position.

166 The retarder button (See chap 2 Fig 1 (61)) should be off.

167 Raise the lid of the platform for the hatch observer and ensure that the emergency PTO button (See chap 2 Fig 1 (59)) is 'OUT' and the emergency gear selector lever (See chap 2 Fig 1 (60)) is in the neutral position.

168 Also in the hatch observer platform is the emergency spring brake release lever (See chap 2 Fig 1 (57)). In the case of the total loss of air pressure in the casualty braking circuits, operation of this lever will allow air from an independent reservoir to release the spring brakes for one application only.

NOTE

A warning bell will sound with the casualty electrics switched on when emergency spring brake release is selected

169 A secondary oil pump incorporated in the gearbox allows, forward towing without disconnection of propshaft.

170 The casualty may be towed without restriction to distance but speeds must be reduced accordingly.

171 Should the casualty engine be inoperative, a gearbox driven emergency steering pump will provide hydraulic power to the steering system while the casualty is moving in either direction.

172 In the case of failure of either the gearbox, steerdrive axle, or rear bogie axles the stricken component should be isolated by removing the appropriate propshafts.

Front and rear towing points

173. The front bumper incorporates a towing pin and jaw, the rear chassis cross member a towing pintle. Recovery eyes to DEF STAN 25-6/3 are fitted to the front and rear of the vehicle. Recovery eyes can only be used for suspend tows.

Rigid towing, front

174 The casualty can be towed laden or unladen.

Rigid towing, rear

175 The casualty can be towed laden or unladen for a minimum distance after disconnection of the gearbox to transposing box propshaft. Power assisted steering will not be available with the engine inoperative.

SUSPEND/SUPPORT TOWING - FRONT AND REAR

CAUTIONS

(1) The casualty MUST NOT be suspend/support towed rearwards laden.

- (2) Ensure that lifting equipment is kept clear of the cab front panel and windscreen.
- (3) When fitted with a flatrack, the flatrack overhang could cause an obstruction to the lifting equipment.
- (4) When fitted with LHS (Load Handling System) with a laden or unladen flatrack mounted, the flatrack must be dismounted, if the casualty is inoperative for this procedure, then another MMLC or IMMLC should be used as the power source

176 The casualty may be suspend/support towed laden or unladen observing CAUTIONS 1, 2, 3 and 4.

Hook lift weight

177 The hook lift weight is [redacted] tonnes.

Vehicle weight unladen

178 The vehicle unladen weight with LHS, and 'A' type flatrack mounted, two crew with full kit and full fuel load is [redacted] tonnes.

179 The vehicle weight unladen with LHS mounted, two crew and full fuel load is [redacted] tonnes.

Vehicle all up weight

180 The vehicle all up weight with LHS and fully laden flatrack mounted is [redacted] tonnes.

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USER MAINTENANCE
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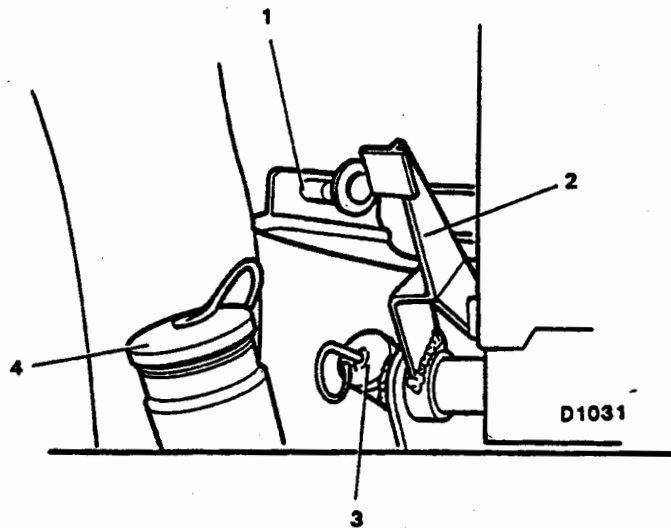
ENGINE**CAUTION**

Never operate the engine with the dipstick oil level below the 'L' mark or above the 'H' mark.

1 The engine is a Rolls Royce Eagle 350LM six cylinder turbocharged and chargecooled four stroke diesel engine.

Engine oil level (See Fig 1)

2 Check the engine oil level with one of the dipsticks, one is mounted on the left hand side of the engine and one is accessible from the front of the vehicle (3). For an accurate reading the oil level should not be checked for approximately 30 minutes after engine shutdown.



- | | | | |
|---|---------------------|---|----------------------|
| 1 | Locking catch | 2 | Hand throttle |
| 3 | Engine oil dipstick | 4 | Secondary oil filler |

Fig 1 Engine oil filler and dipstick

Draining and refilling engine oil

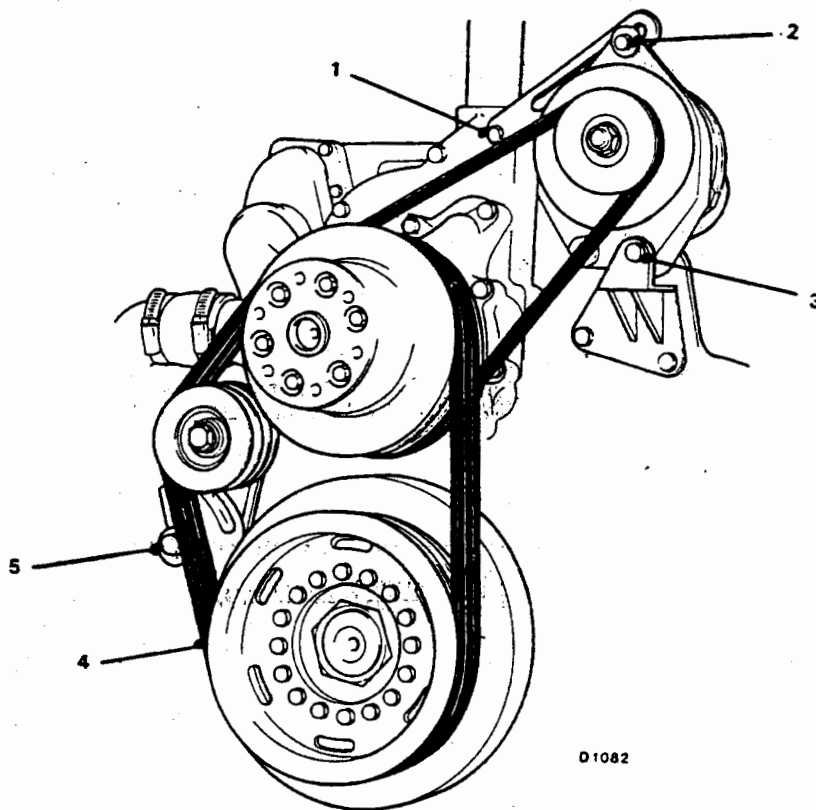
3 Remove the sump drain plug and allow the oil to drain completely (preferably while the engine is warm).

4 Refit the sump drain plug with a new sealing washer and tighten to 115Nm (851 bfft). Wire lock the plug.

5 Refill with oil in accordance with the Maintenance Schedule, AESP 2320-R-301-601.

Engine oil filters (See Fig 2)

6 The Twin expendable element engine oil filters are mounted at the front right hand side of the engine at sump level.



- | | | | |
|---|----------------------|---|----------------------|
| 1 | Pivot bolt | 2 | Alternator damp bolt |
| 3 | Locking nut and bolt | 4 | Locking bolt |
| 5 | Pivot bolt | | |

Fig 3 Drive belt adjustment

11 To adjust alternator belt slacken the pivot bolt (1), the damp bolt (2) and the locking nut and bolt (3). Position the alternator to obtain the correct belt tension, then tighten all nuts and bolt's.

12 To adjust the coolant pump drive belt slacken the locking bolt (4) and the pivot bolt (5). Swing the idler wheel around its pivot and tighten pivot bolt and locking bolt when the desired belt tension has been obtained.

Fuel injection pump control linkage

13 Lubricate the fuel injection pump control linkage as recommended in the Maintenance Schedule AESP 2320-R-301-601.

Throttle load sensor (See Figs 4 and 5)

14 The throttle load sensor is located on a bracket immediately above the fuel pump.

15 The setting marks on the load sensor lever and housing are to be used for checking the setting at the 'FULL LOAD' and 'IDLE' positions.

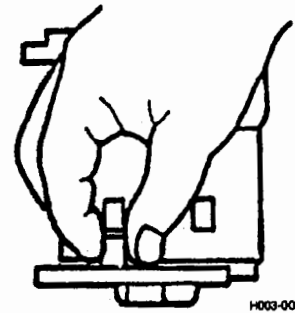
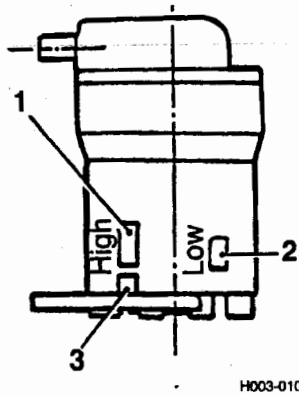
16 With the engine switched 'OFF' slowly depress the accelerator until it touches the kickdown switch. Do not 'FLATTEN' the accelerator.

17 In this position the lever on the infection pump should just reach the full load stop. Check that the mark on the load sensor lever coincides with the full load (high) mark on the housing.

18 Release the accelerator and check the setting of the lever at the idle position. The mark on the load sensor lever should coincide with the idle (low) mark on the housing.

NOTE

It is possible to check the alignment of the marks by using the fore finger and thumb as shown in Fig 4 and 5.



- 1 Full throttle mark
- 2 Idle mark
- 3 Sensor lever mark

Fig 4 Throttle load sensor

Fig 5 Checking the alignment

Start pilot reservoir – to top up (See Fig 6)

WARNINGS – INFLAMMABLE LIQUID

(1) THE CANNISTERS FOR USE IN THE START PILOT CONTAIN A HIGHLY VOLATILE LIQUID. THE VAPOUR OF WHICH IS HEAVIER THAN AIR AND HIGHLY INFLAMMABLE. SMALL QUANTITIES OF THE VAPOUR IN AIR FORM A HIGHLY EXPLOSIVE MIXTURE.

WARNINGS - CONTINUED

(2) DRIVERS AND OPERATORS ARE WARNED OF THE EXPLOSIVE RISK. ALSO THAT VAPOUR CAUSES DROWSINESS AND LOSS OF CONCENTRATION. FOR THESE REASONS THE CANNISTERS MUST NEVER BE CARRIED LOOSE IN A VEHICLE CAB. CANNISTERS ARE PRESSURISED. DO NOT PUNCTURE OR INCINERATE.

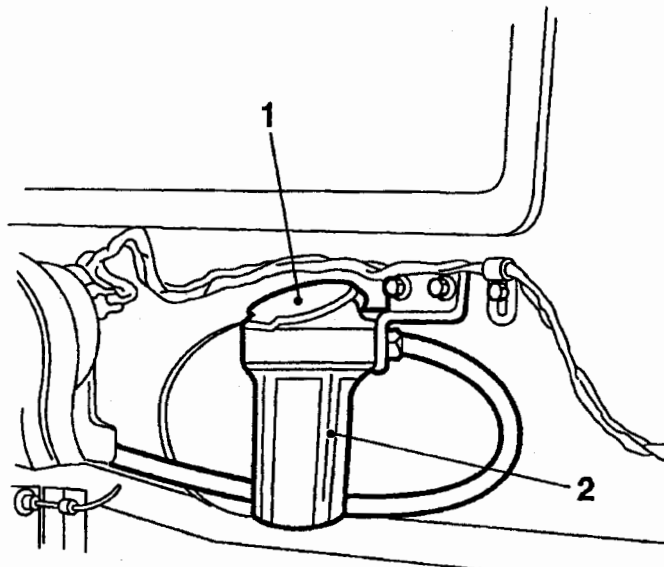
19 Daily or as used during cold weather conditions and before starting the engine, check the fluid level in the reservoir situated under the bonnet adjacent to the cab heater unit, top it up if level is below the red MAXI mark on the outside of the reservoir.

CAUTION

Do not allow the fluid level to rise above the red MAXI mark indicated on the reservoir.

20 To fill VISO F reservoir lift the hinged cover and fit the multi-fill canister, head down, onto the filler valve. Press down firmly keeping the canister square to valve and allow the fluid to flow into the reservoir.

21 Use only 'Start Pilote Viso F' pressurised refill canisters.



H003-074

1 Hinged cover

2 Reservoir

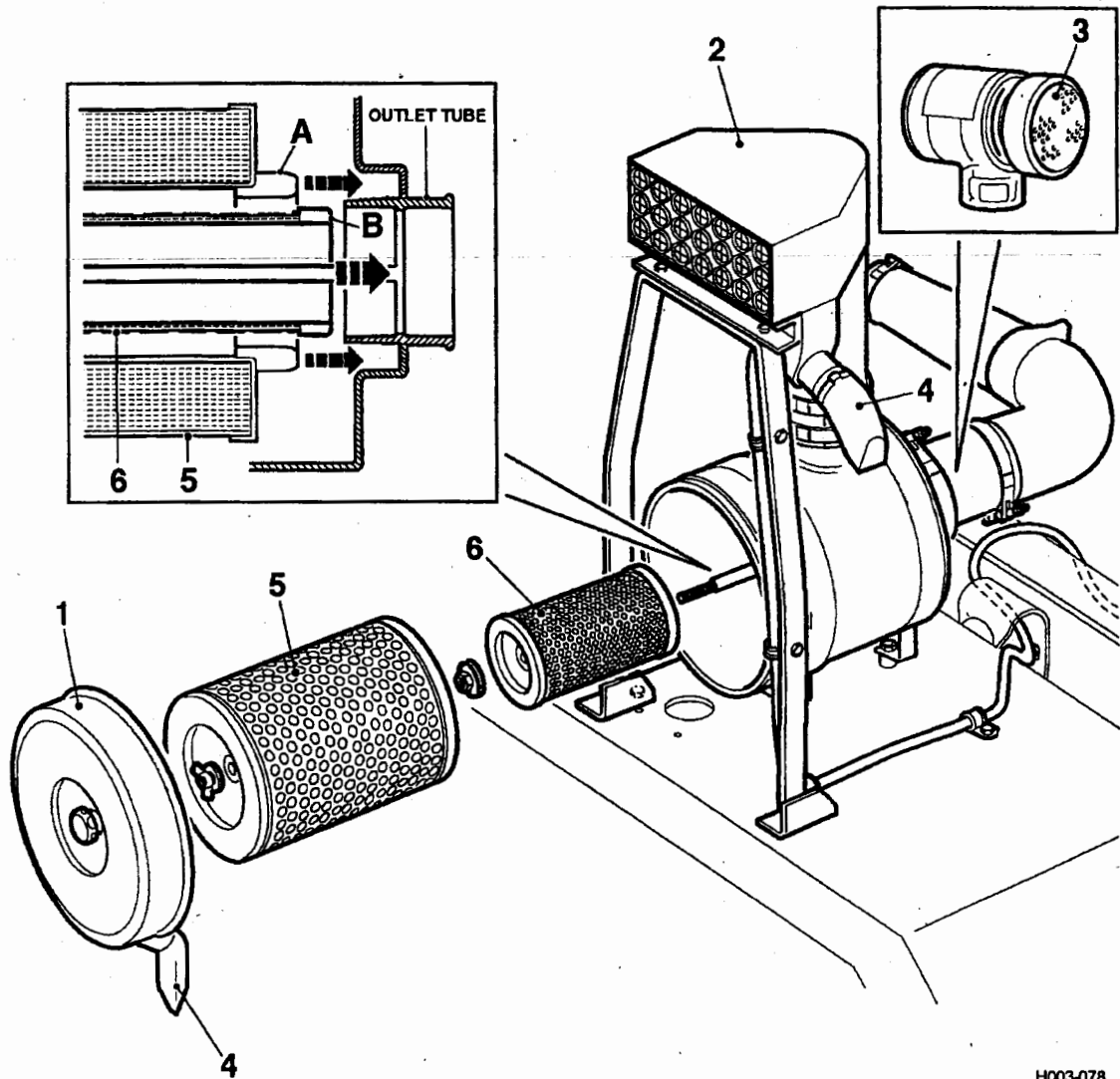
Fig 6 Cold start reservoir

Engine air cleaner (See Fig 7)

22 A two element (one dry, one oil treated) air cleaner with a cyclone pre-cleaner air intake is installed on the left hand mudguard immediately behind the cab. A restriction indicator is fitted in the outlet manifold to the turbocharger.

23 The restriction indicator (3), displays a red signal inns window while the engine is running. If the red signal locks into position and remains visible when the engine has stopped, the filter element(s) must be renewed.

24 Rubber discharge valves (4), are fitted on the bottom of the cyclone pre-cleaner and the air cleaner. Check that the lips of the valves are pliable and with the engine running, the valve on the pre-cleaner exhausts an intermittent short blast of air and the lips of the valve on the air cleaner are closed.



H003-078

- | | | | |
|---|-----------------------|---|------------------|
| 1 | End cover | 4 | Discharge Valve |
| 2 | Cyclone pre-cleaner | 5 | Standard element |
| 3 | Restriction indicator | 6 | Safety element |

Fig 7 Engine air filtration system

To renew the element(s)

- 25 Unscrew the hand wheel holding the end cover (1) and remove the cover.
- 26 Unscrew the wingnut and gasket assy retaining the standard element (5) and remove the element.
- 27 Unscrew the nut and gasket assy retaining the safety element (6) and remove the element.
- 28 Inspect the inside of the cleaner housing and ensure it is clean and free from all foreign matter, especially the outlet tube to the turbocharger and the standard element sealing channel.
- 29 Installation of new element(s).

NOTE

It is recommended that the safety element (6) is renewed at every fifth renewal of the standard element (5).

29.1 Check the safety element (6) for damage prior to installation, paying particular attention to the radial seal (open end).

29.2 Lubricate the radial seal 'B' around its outer circumference with a thin layer of silicone grease or alternatively a small amount of clean engine oil or clean water with a clean damp cloth.

29.3 Insert the safety element into the cleaner housing keeping it as central as possible to align the hole in its end cover with the fixing stud in the cleaner housing.

29.4 Keeping the radial seal end central, push the element into the housing until the seal locates inside the outlet tube to the turbocharger.

29.5 Applying firm pressure to the outer rim of the element (not the flexible centre) ensure the element is fully seated in the outlet tube.

29.6 Secure the element with nut and gasket assy. Tighten nut sufficient to eliminate all lateral movement of element plus an additional half turn.

29.7 Check standard element (5) for damage prior to installation, paying particular attention to the radial seal.

29.8 Lubricate the radial seal 'A' around both its inner and outer circumferences with a thin layer of silicone grease or alternatively, a small amount of clean engine oil or clean water with a clean damp cloth.

29.9 Insert the standard element into the cleaner housing keeping it as central as possible to align the hole in its end cover with the fixing stud in the cleaner housing.

29.10 Keeping the radial seal end central, push the element into the housing until the seal locates in its sealing channel.

29.11 Applying firm pressure to the outer rim of the element (not the flexible centre) ensure the element is fully engaged in the channel.

29.12 Secure the element with wingnut and gasket assy. Tighten wingnut sufficient to eliminate all lateral movement of element plus an additional half turn.

29.13 Check the condition of the end cover seal. Renew if damaged.

29.14 Refit the end cover, ensuring that all debris has been released from the discharge valve and it is positioned at the bottom for relocation in the mudwing hole. Screw down the handwheel until resistance to turning is felt, and then tighten an additional half turn.

30 Reset the restriction indicator.

31 Not used

32 Not used

ENGINE COOLING SYSTEM

WARNINGS

(1) VERY HOT COOLANT

DO NOT REMOVE THE HEADER TANK FILLER CAP WHILE THE ENGINE IS HOT AS THERE IS A POSSIBILITY OF VERY HOT COOLANT BEING FORCED OUT OF THE SYSTEM.

(2) TOXIC LIQUID

FLUID AL39 IS BOTH TOXIC AND HAZARDOUS. REFER TO LOCAL UNIT PRECAUTIONS OR CURRENT D.C.I.s. FOR FULL SAFETY PROCEDURES. MINIMUM PRECAUTION AFTER USE IS TO WASH ANY AFFECTED SKIN AREAS WITH SOAP AND WATER.

33 The cooling system is pressurised to 7lb/sq in. A combined pressure and vacuum relief valve incorporated in the filler cap of the header tank is situated behind the cab. DO NOT ADD cold coolant to the system while the engine is hot.

Daily maintenance

34 Check the coolant level in the header tank (Fig 8) and top up if necessary, to the bottom of the filler neck.

35 A drain tap is provided in the radiator bottom pipe for coolant draining and flushing operations.

Coolant

36 Always mix anti-freeze and water before putting into the system, and when topping up use the same anti-freeze as that already in the system, as sludging may otherwise occur.

NOTE

The normal water /AL 39 mixture used in the cooling system will be a 50/50 mix unless special unit instructions have been issued.

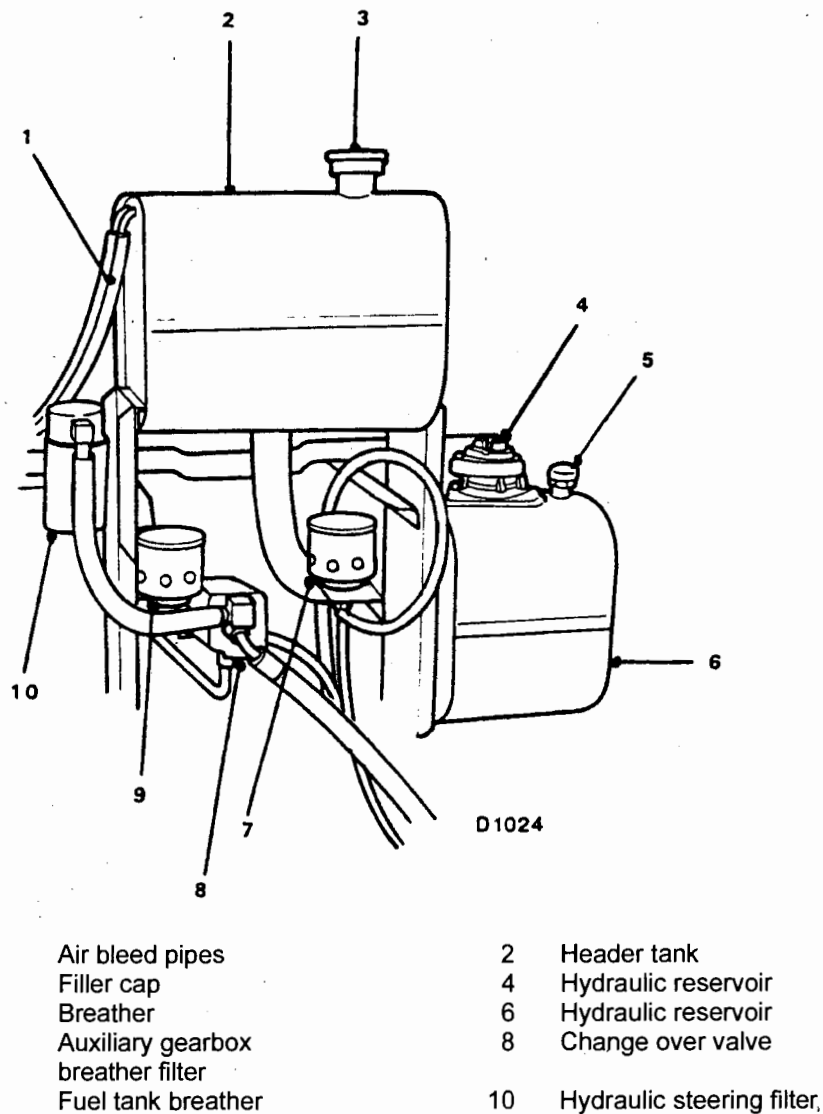


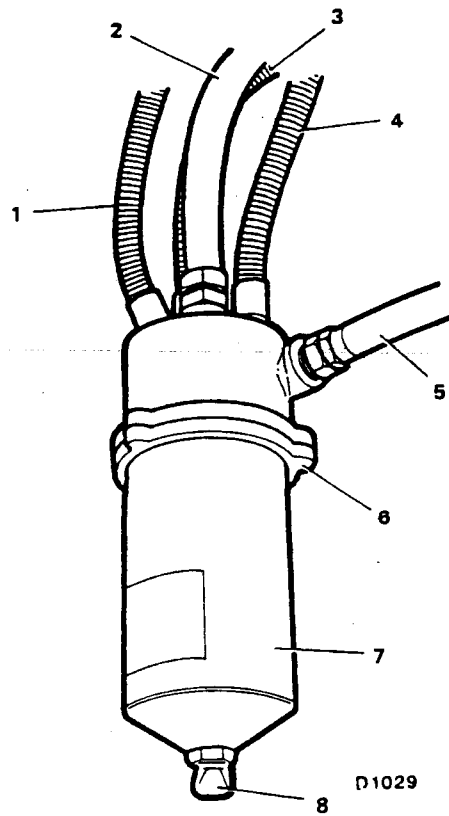
Fig 8 Radiator header tank

FUEL SYSTEM

37 The fuel system incorporates a fuel tank fitted to the right hand side of the chassis, a combined sedimenter and fuel heater is fitted to a bracket between the fuel tank and batteries. An engine fuel filter fitted to the engine block above the fuel injection pump.

To drain sedimenter (See Fig 9)

38 Drain off any deposits which may have collected in the sedimenter at least weekly by releasing the drain tap (8) at the bottom of the sedimenter, close the tap on completion of draining.

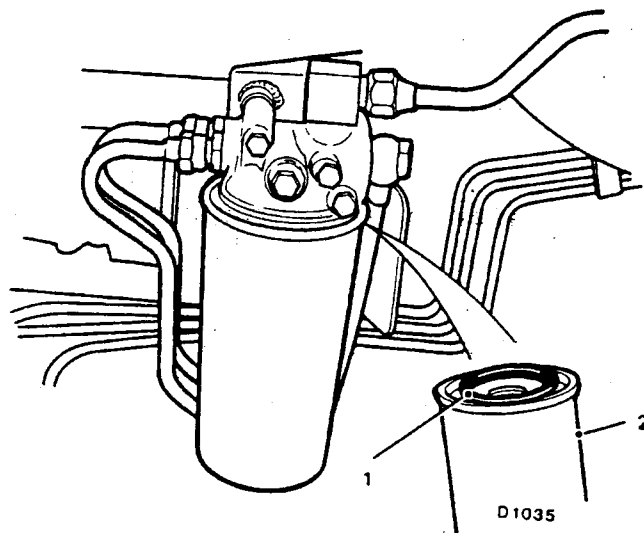


- 1 Fuel heater lead
- 2 Fuel outlet pipe
- 3 Thermostat lead
- 4 Fuel heater lead
- 5 Fuel inlet pipe
- 6 Retaining screw
- 7 Filter bowl
- 8 Drain tap

Fig 9 Sedimeter and fuel heater

To replace fuel filter element (See Fig 10)

39 Replace the fuel filter element at the intervals quoted in the Maintenance Schedule AESP 2320-R-301-601.



- 1 Seal ring
- 2 Fuel filter element

Fig 10 Engine fuel filter

To replace the fuel filter element (2) unscrew and discard the spin-on canister. Check the seal ring (1) is correctly fitted on the new canister and clean the contact face of the filter header bracket

40 Lightly smear the face of the seal ring with fuel oil and screw on the canister until the joint faces are just in contact. Tighten further by hand for a maximum of three quarters of a turn. DO NOT overtighten.

STEERING

CAUTION

The engine should never be run without oil in the system as both hydraulic pumps rely on this fluid for lubrication.

41 The steering box is hydraulically power assisted with reversion to manual steering should all hydraulic power fail. Hydraulic pressure is available from an engine driven pump and an emergency pump driven from the gearbox.

To top up the hydraulic reservoir (See Fig 11)

42 The hydraulic reservoir is situated adjacent to the header tank behind the cab.

43 Remove the reservoir filler cap (2) and top up until the fluid is level with the min fill line on the sight glass (3).

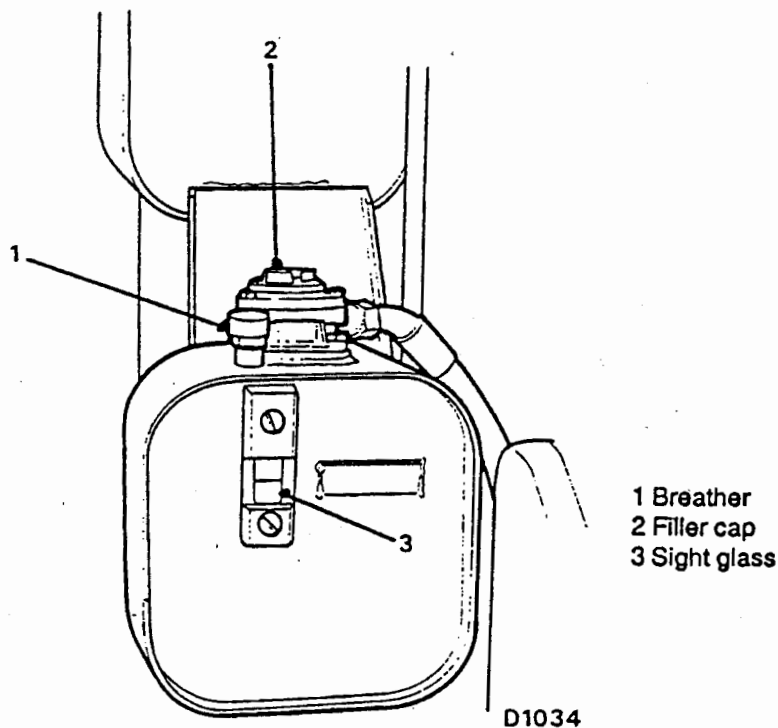


Fig 11 Hydraulic reservoir

44 Clean the breather filter (1) at the intervals quoted in the Maintenance Schedule AESP 2320-R-301-601.

GEARBOX

45 The six speed automatic gearbox consists of a torque converter with lock up clutch, retarder and a planetary geartrain.

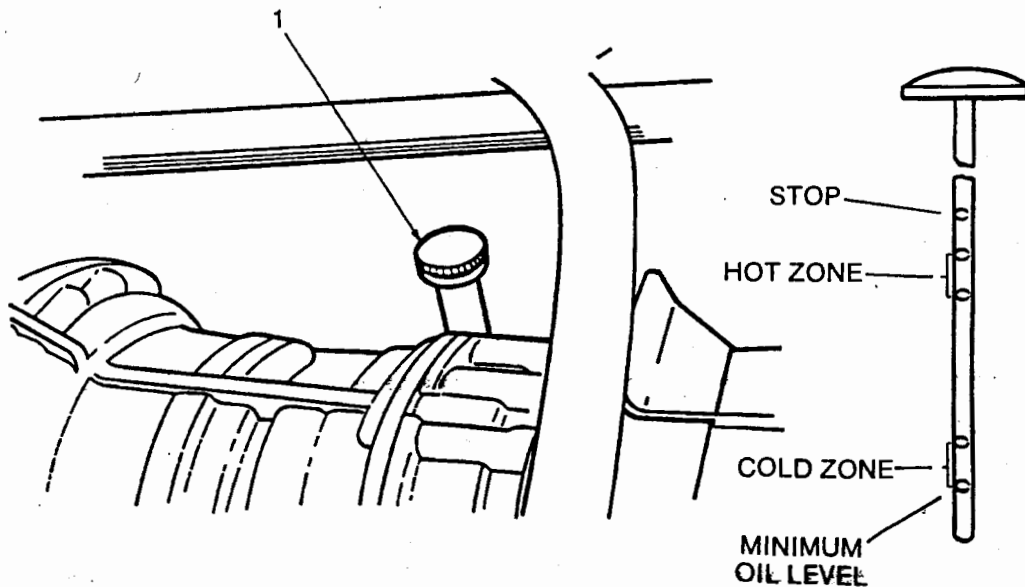
CAUTION

GEARBOX SAFETY. The maintenance of the correct oil level is of great importance for an automatic gearbox. Low oil level will result in gearbox defects and malfunction. Too high an oil level results in the transmission overheating. Oil level checks must be carried out at regular intervals (weekly). Vehicle must be on a level standing. Gearbox must be in neutral position with the engine running at idle, speed. The transmission and oil must be hot for accurate oil level checks. The purpose of the cold level marks are only to determine if it is safe to run the vehicle until an oil level check can be made at normal operating temperature.

To check gearbox oil level (See Fig 12)

46 The gearbox dipstick (Fig 12(1)) is housed in the oil filler spout located on the right hand side of the gearbox housing.

46.1 The dipstick is marked with an upper, high level, STOP mark and two zones or operating ranges. The upper zone indicates the level range at operating temperature (HOT) and the lower zone, the cold oil level. The bottom mark of the cold zone also indicates the minimum oil level.



U5957/1

1 Dipstick and oil filler

Fig 12 Gearbox oil dipstick

Oil level check before starting the engine

CAUTION

GEARBOX SAFETY. When a vehicle has been parked and stationary for several hours the main gearbox oil level should be higher than the 'hot zone' marks on the dipstick but below the STOP mark. If this is not the case; oil must be added before starting the engine.

47 When the vehicle has been stationary for a period of time the transmission oil drains out of the convertor. As a result, a high reading between the top hot zone mark and the STOP mark is indicated on the dipstick.

47.1 Do not drain any oil because of this result. A high oil level is normal for a cold transmission before the engine is started. See CAUTION.

Cold oil level check

48 To make a cold oil level check of the main gearbox, start the engine. After approximately two or three minutes of running at idle speed check the main gearbox oil level; the correct oil level is within the 'cold zone'. The colder the oil temperature, the lower the oil level.

48.1 If the oil level is below the 'minimum level' mark, then oil must be added immediately. Only when the oil is within the 'cold zone' mark should the engine be warmed up or the vehicle driven.

48.2 Due to the churning effect of cold oil, an "excessive" oil level may be found. However, do not drain any oil because of the result of the cold oil level check. The transmission and oil must be hot in order to achieve an accurate oil level check. The purpose of the 'cold level' marks are only to determine if it is safe to run the vehicle until an oil level check can be made at a normal operating temperature.

48.3 Finally, make a further oil level check at operating temperature and adjust level accordingly.

Operating temperature (hot) oil level check

49 To carry out an operating temperature (hot) oil level check on the main gearbox, run the engine at idle speed until the oil temperature reaches between 80° - 90°C (175° -195°F). The correct oil level is between the high and the low marks of the 'hot zone'.

49.1 If the initial check shows that the oil level is not in the 'hot zone', repeat the level check again and ensure that the dipstick cap seats firmly into the bayonet fitting when the dipstick is inserted. In addition, check that the oil and transmission are at the correct temperature.

To add oil to the gearbox.

50 Oil is added to the main gearbox through the filler spout (See Fig 12) which also houses the dipstick. Do not allow the level to go above the STOP mark.

To drain the gearbox oil

51 If possible, operate the gearbox until normal operating temperature (80° to 90°C, 175° to 195°F) is reached prior to draining the oil.

51.1 Place a suitable container beneath the sump drain plug (Fig 13(3)) ready to receive the drained oil. Main gearbox oil capacity is approximately 25 litres (5 1/2 galls).

51.2 Remove the drain plug (3) from the base plate of the gearbox and wipe clean.

51.3 Renew the drain plug seal, fit plug and tighten to 50Nm (37 ft lbf). DO NOT overtighten drain plug.

51.4 Proceed to change the gearbox oil filter before filling the gearbox with new oil.

Gearbox oil suction filter element renewal

52 The gearbox suction filter should be changed at the intervals quoted in the Maintenance Schedule AESP 2320-R-301-601. To change the filter proceed as follows:

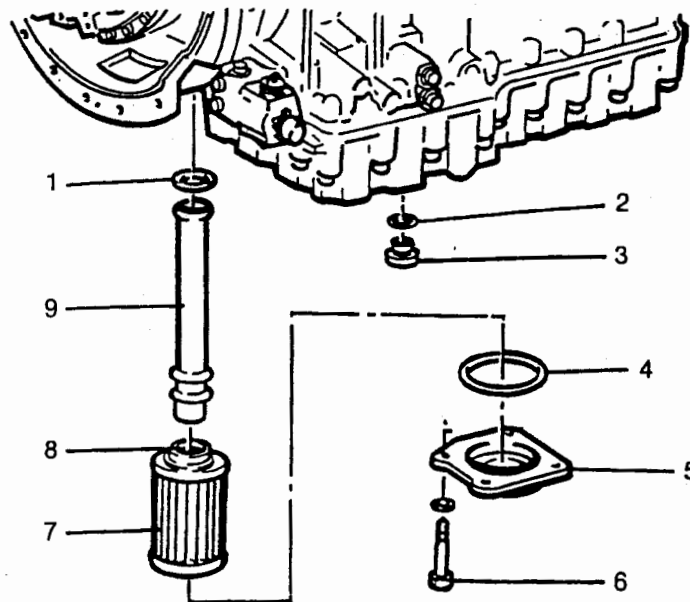
52.1 Clean the area around the filter cover Fig 13(5) and remove the four bolts (6) attaching the cover to the sump. Remove the cover and discard the cover 'O' ring (4).

52.2 Withdraw element (7) from the suction tube (9) and discard. Remove suction tube complete with 'O' ring (1), discard the 'O' ring.

52.3 Attach a new 'O' ring to the suction tube and lubricate with clean transmission fluid, insert the tube assembly into the housing.

52.4 Lubricate the seal (8) of the new element and replace the element over the suction tube.

52.5 Lubricate a new 'O' ring (4) and insert into the filter cover. Refit the cover to the sump and tighten the bolts to 25Nm (18 ft lbf).



- | | |
|-------------------------|------------------|
| 1 Suction tube 'O' ring | 6 Bolt |
| 2 Drain plug seal | 7 Filter element |
| 3 Drain plug | 8 Element seal |
| 4 Cover 'O' ring | 9 Suction tube |
| 5 Cover | |

U5957/2

Fig 13 Gearbox suction filter

To fill the gearbox with oil

53 To fill the main gearbox with oil, proceed as follows:

53.1 Through the filler spout (Fig 12) add clean transmission fluid as stated in Maintenance Schedule AESP 2320-R-301-601, to the 'STOP' zone on the dipstick.

53.2 Carry out cold oil and operating temperature level checks as detailed in paras 49 and 50, adding more oil as required until the correct operating level is reached.

Paras 55 to 59 inclusive not taken up.

Emergency gear selector lever

60 Check the operation of the emergency gear selector lever at the intervals quoted in the Maintenance Schedule AESP 2320-R-301-601.

AUXILIARY GEARBOX (SEE FIG 14)**To top up**

61 At intervals quoted in the Maintenance Schedule AESP 2320-R-301-601 top up the auxiliary gearbox as follows:

62 Remove the filter/level plug (2) and top up to the point of overflow. Replace the filler/level plug.

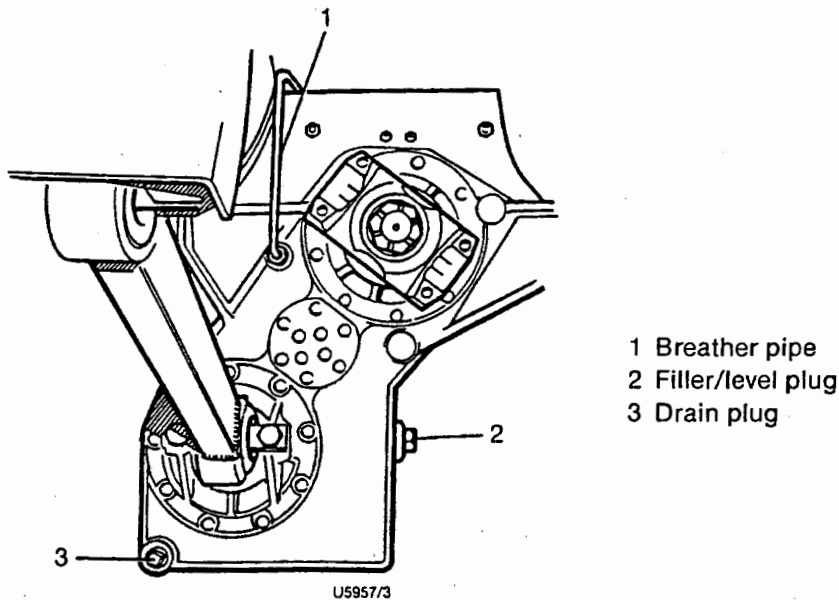


Fig 14 Auxiliary gearbox

To drain and refill

63 At intervals quoted in the Maintenance. Schedule drain the auxiliary gearbox as follows:

64 Remove the drain plug (3) and allow oil to drain into a suitable container.

65 Refit the drain plug and remove the filler/level plug (2) and refill to the point of overflowing. Refit the filler/level plug.

FRONT AXLE

To top up steer drive axle hub (See Fig 15)

- 66 Ensure the vehicle is standing on level ground.
- 67 Position the axle hub so that the line inscribed 'STEER' is in the horizontal position.
- 68 Remove the filler/level plug (1) and top up to the point of overflow with the oil specified in the Maintenance Schedule AESP 2320-R-301 -601. Replace the plug.

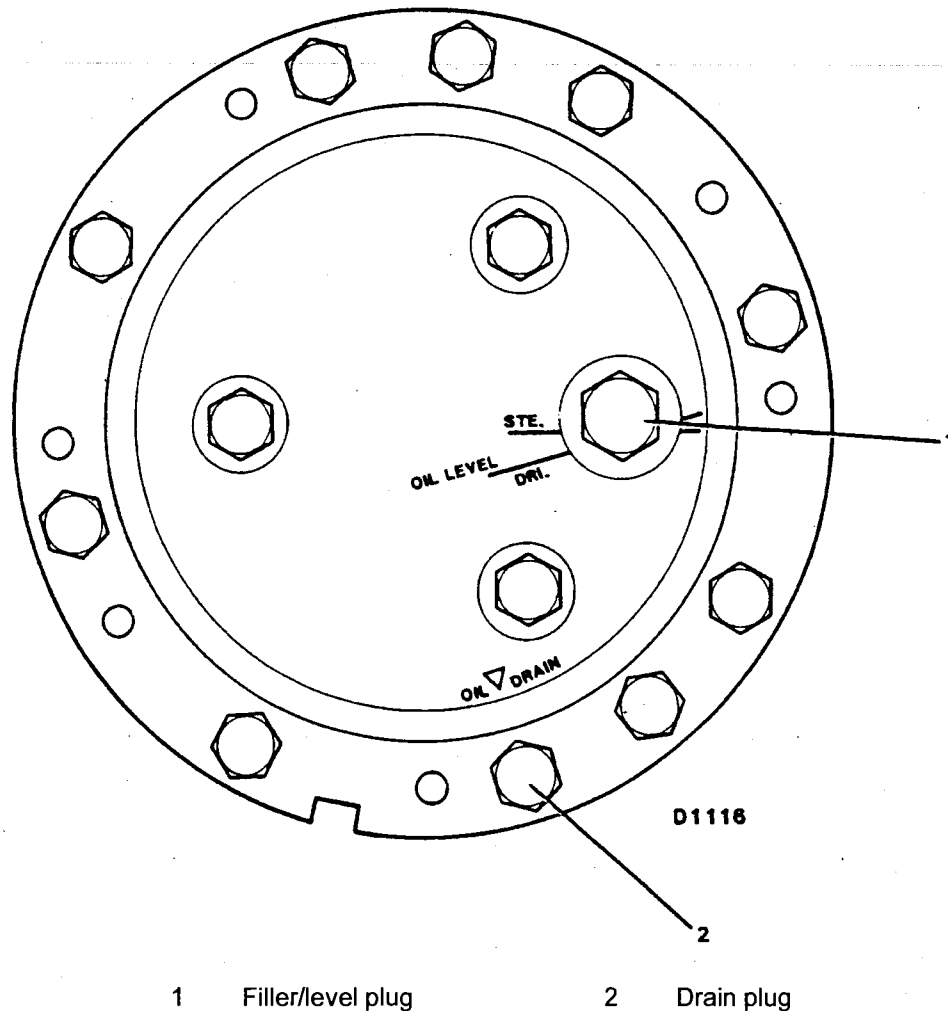


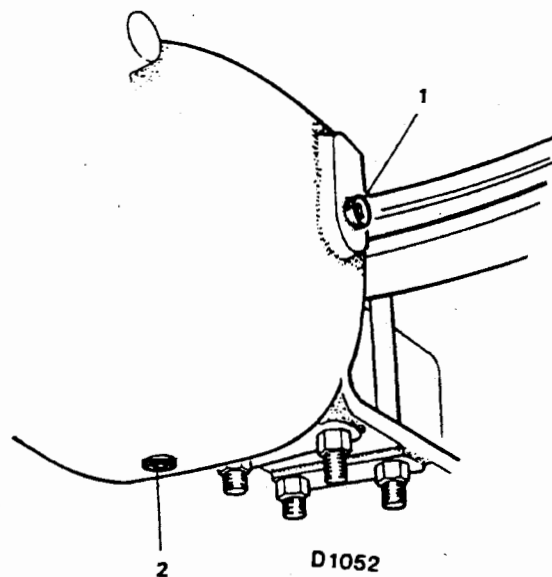
Fig 15 Steer drive axle hub

To top up steer drive axle centre casing (See Fig 16)

- 69 Remove the filler/level plug (1) in the main casing and top up to the point of overflow. Replace the plug.

To drain and refill steer drive axle (See Fig 16 and 17)

- 70 Draining the axle is best carried out after vehicle use while the oil is still warm.
- 71 Oil changes are to be carried out at the intervals laid down in the Maintenance Schedule.



1 Filler/level plug 2 Drain plug

Fig 16 Steer drive axle casing

72 Stand the vehicle on level ground and position the wheels so that the hub drain plugs (2) are to the bottom. Place suitable containers below the hubs and centre casings drain plugs.

73 Remove the filler/level and drain plugs and allow both hubs and centre casing to drain completely.

74 Replace the drain plugs and reposition the hub so that the line inscribed 'STEER' is in the horizontal position. Refill hubs and casing using oil as laid down in the Maintenance Schedule. Replace the filler/level plugs.

REAR BOGIE AXLES (See fig 17, 18 and 19)

75 The rear bogie consists of two axles and the rear suspension.

To top up

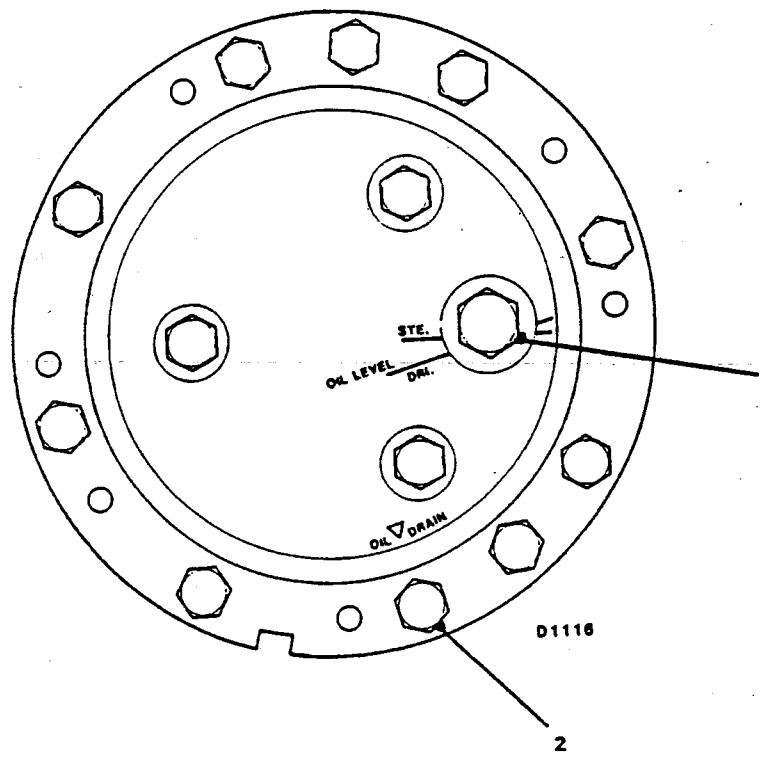
76 For topping up purposes the oil level need only, be checked at the axle casing filler/level plug.

77 Remove the casing filler/level plug (1) and top up to the point of overflow with the oil specified in the Maintenance Schedule AESP 2320-R-301-60.

To drain and refill

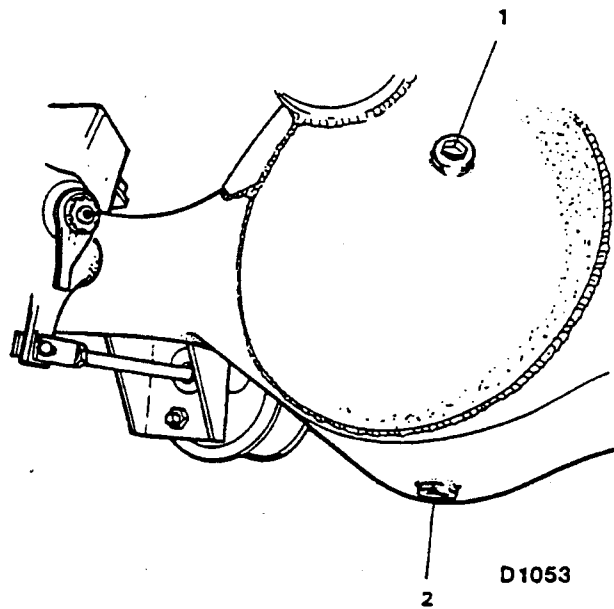
78 Oil changes are to be carried out as laid down in the Maintenance Schedule. Draining is best carried out after vehicle use while the oil is still warm.

79 Stand the vehicle on level ground and position the wheels so that the hub drain plugs are to the bottom. Place suitable containers below the hub and centre drain plugs.



1 Filler/level plug 2 Drain plug

Fig 17 Rear axle hubs



1 Filler/level plug 2 Drain plug

Fig 18 First rear axle casing

80 Remove the filler/level drain plugs and allow both hubs and centre casing to drain completely.

81 Replace the drain plugs and reposition the hubs so that the line inscribed 'DRIVE' is in the horizontal position. Using oil as laid down in the Maintenance Schedule AESP 2320-R-301-601, fill the hubs through the filler/level plug to the point of overflow. Replace the plugs.

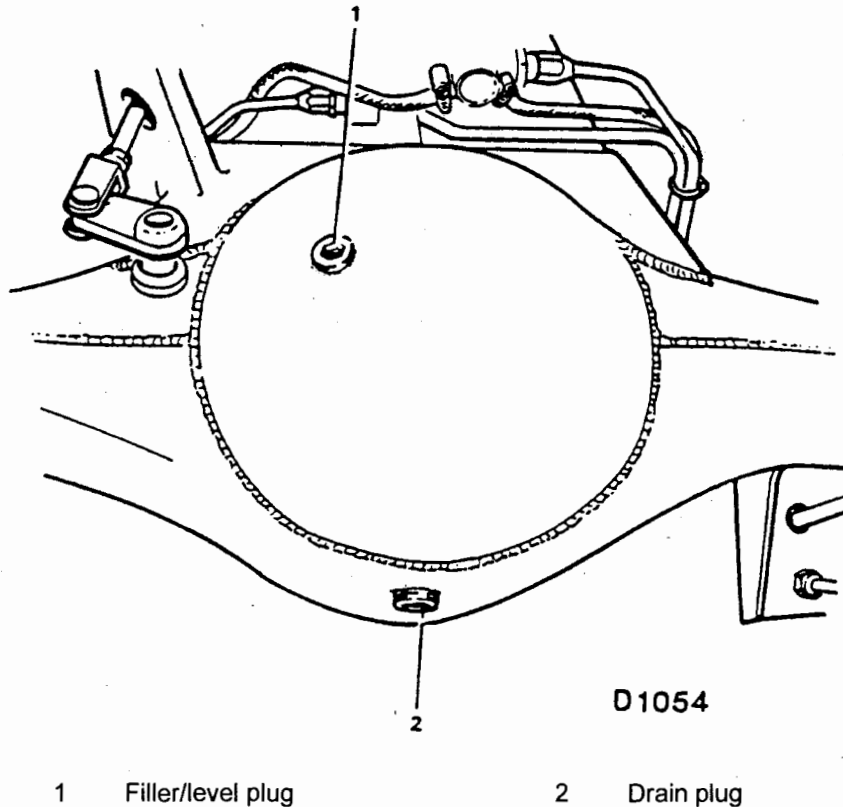


Fig 19 Second rear axle casing

82 Fill the main casing through the filler/level plug to the point of overflow. Replace the plug.

To top up rear suspension fulcrum (See Fig 20)

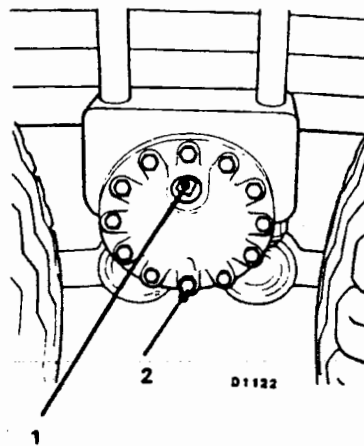
83 Remove the filler plug (1) and add oil OEP 220 as quoted in the Maintenance Schedule AESP 2320-R-301-801 to the point of overflow. Replace plug.

To drain and refill rear suspension fulcrum

84 At intervals stated in the Maintenance Schedule change the oil OEP 220 in the rear suspension fulcrums.

85 Remove the fulcrum and cap retaining bolts and remove the cap, allow the oil to drain into a suitable container.

86 Replace the end cap using a new gasket and refill the fulcrum to the point of overflowing.



1 Filler/level plug 2 End cap

Fig 20 Rear suspension fulcrum

BRAKES

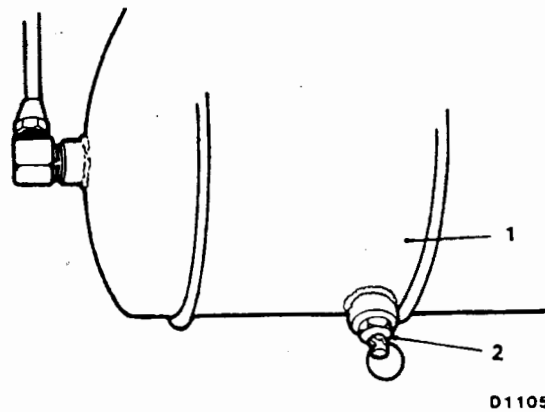
WARNING

KEEP FACE CLEAR OF RESERVOIR DRAIN VALVE WHEN RELEASING AIR PRESSURE.

87 The braking system is air pressure operated with air being supplied by an engine driven compressor.

88 An air dryer is fitted in the compressor discharge line to the reservoirs and is designed to remove water, oil, carbon and dirt from the compressed air before it enters the braking system.

89 The air reservoirs can be drained or system pressure released by means of the manually operated drain valves (Fig 21(2)). Pull the ring sideways to operate.



1 Reservoir 2 Reservoir drain valve

Fig 21 Reservoir drain valve

Brake adjustment**WARNING**

BRAKE LININGS CONTAIN ASBESTOS. SEE WARNING No9 PRELIMINARY PAGES.

CAUTION

After the fitment of new brake linings the braking efficiency may be impaired until the linings are fully 'bedded in'.

90 The brakes fitted to this vehicle are self adjusting and no further adjustment is required.

Emergency spring brake release

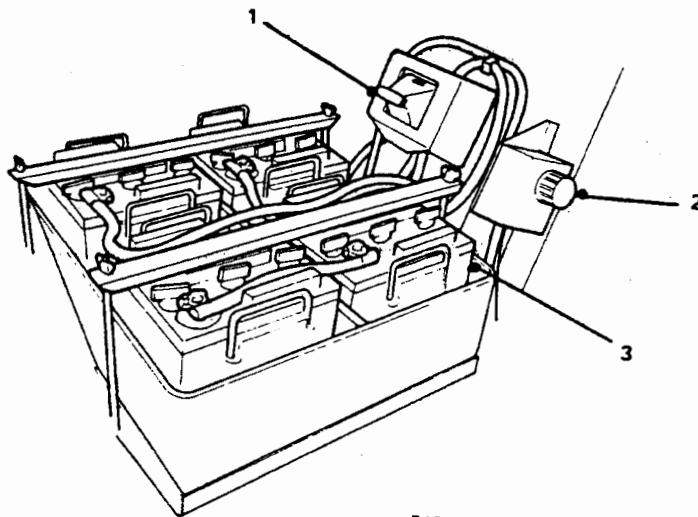
91 Check the operation of the emergency spring brake release system and warning bell at the intervals stated in the Maintenance Schedule AESP 2320-R-301-601.

Manoeuvring brake

92 Check the operation of the manoeuvring brake system at the. Intervals stated in the Maintenance Schedule AESP 2320-R-301-601.

ELECTRICAL SYSTEM**WARNINGS**

- (1) **NEVER EXPOSE A BATTERY TO AN OPEN FLAME OR ELECTRIC SPARK.**
- (2) **DO NOT ALLOW BATTERY ELECTROLYTE (FLUID) TO CONTACT EYES, SKIN, FABRICS OR PAINTED SURFACES.**
- (3) **WEAR EYE PROTECTION WHEN WORKING ON OR NEAR A BATTERY.**



D1014

1 Battery master switch 2 Inter vehicle socket 3 Battery

Fig 22 Battery installation

WARNINGS – CONTINUED

(4) FLUSH ANY CONTACTED AREA WITH WATER IMMEDIATELY AND THOROUGHLY. IF CONTACT HAS BEEN MADE WITH EYES OR SKIN, AFTER FIRST AID TREATMENT SEEK MEDICAL ATTENTION.

93 The 24 volt electrical system uses four 12 volt batteries wired in series/parallel and charged by an engine driven alternator. The batteries are located on the right hand side of the vehicle adjacent to the fuel tank.

To top up battery electrolyte

94 Top up each cell if necessary with distilled water or colourless, and odourless drinking water until the level of electrolyte is just over the separator plates.

95 Ensure that the batteries are dry and dean on top and secure in their mountings. Also check that the terminal connections are tight, free from corrosion and coated with petroleum jelly or electrical grease.

To replace a headlight tamp (See Fig 23)

96 Turn the battery master switch to 'OFF'.

97 Remove the two setscrews (1) securing the protective bars over the twin headlight assembly.

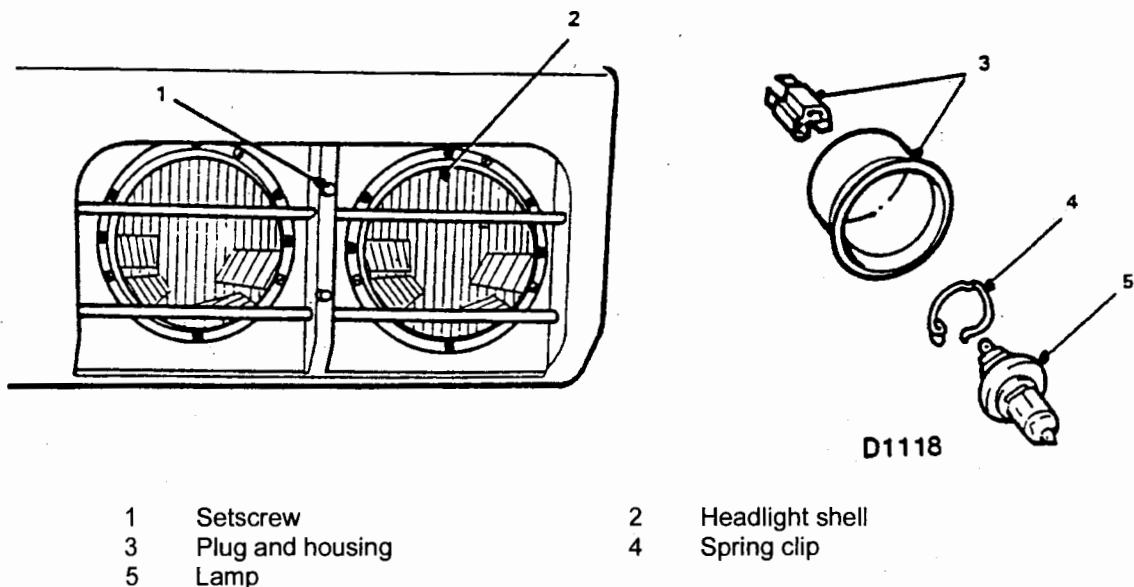


Fig 23 Headlight assembly

98 Lightly depress and rotate the headlight shell (2) anti-clockwise until it is released.

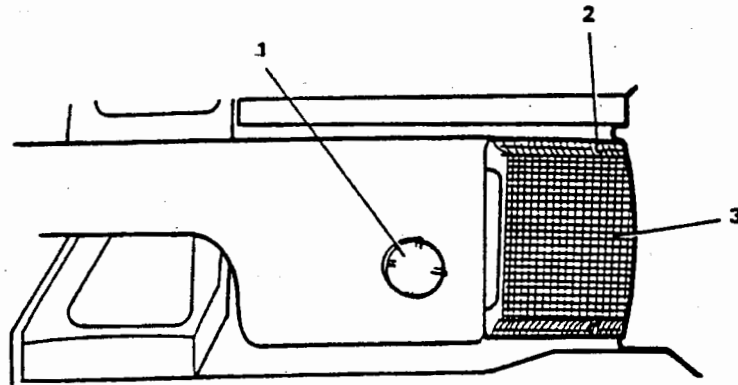
99 Withdraw the headlight and detach the rubber housing containing the mufti pin plug (3).

100 Release the spring clip (4) and withdraw the lamp (5).

101 Refitment is the reverse of removal.

To replace a direction indicator lamp (front) (See-Fig 24)

102 Remove the screws (2) and detach the direction indicator lens (3). Lightly depress and rotate the lamp anti clockwise to remove.



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- | | | | |
|---|-----------|---|-------|
| 1 | Sidelight | 2 | Screw |
| 3 | Lens | | |

Fig 24 Direction indicator light (front)

To replace a direction indicator repeater light lamp

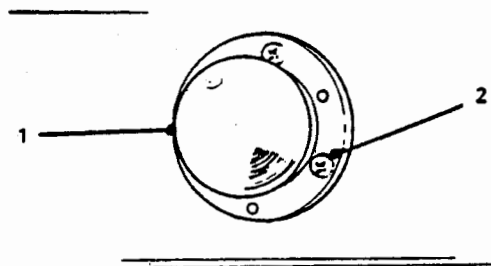
103 Carefully prise the lens from the rubber moulding. Lightly depress and rotate the lamp anti-clockwise to remove. (The repeater lights are located below each cab door on the outer face of the first front axle mudguards).

To replace a convoy light lamp (See Fig 25)

104 Remove the three screws (2) securing the cover (1). Remove the cover complete with glass lens. Lightly depress and rotate the lamp anti-clockwise to remove.

Rear light assembly (See Fig 26)

105 The rear light assemblies. (left and right hand), are one piece units containing, direction indicator, rear tail lamp, stop lamp, reverse lamp and fog lamp.



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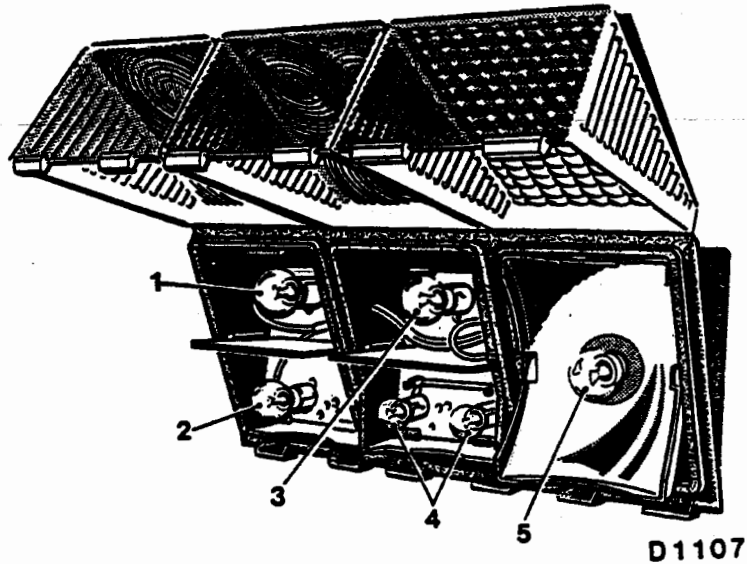
- | | | | |
|---|------------|---|------------------|
| 1 | Lens cover | 2 | Retaining screws |
|---|------------|---|------------------|

Fig 25 Convoy light

106 To gain access to the lamps, depress the securing catch on the moulded rubber housing to release the lens hinged retaining frame and remove the lens from the housing.

To replace any lamp in the rear light assembly (See Fig 26)

107 Carefully prise the base of the lenses and lift upwards to gain access to the rear Indicator lamp (1), brake lamp (2), reverse lamp (3), rear lamp (4) and rear fog lamp (5). Lightly depress and rotate any lamp anti-clockwise to remove. Refitment is the reverse of removal.

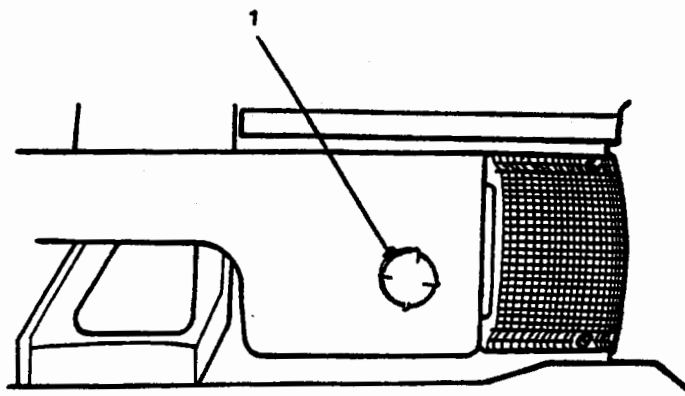


- | | | | |
|---|---------------------|---|---------------|
| 1 | Rear indicator lamp | 4 | Rear lamp |
| 2 | Brake lamp | 5 | Rear fog lamp |
| 3 | Reverse lamp | | |

Fig 26 Rear light assembly

To replace a sidelight lamp (See Fig 27)

108 Unscrew the lens (1). Lightly depress and rotate the lamp anti-clockwise to remove.

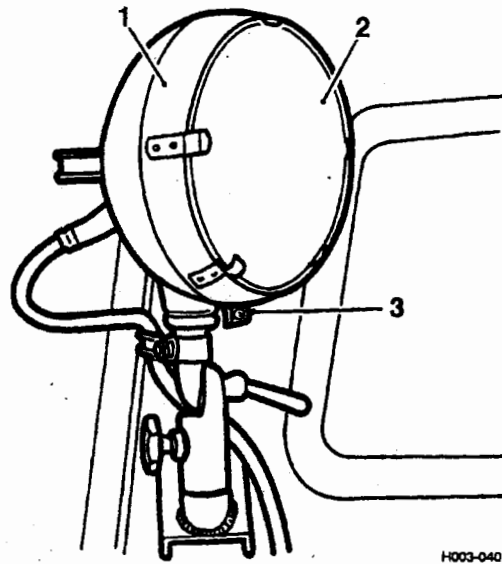


- 1 Lens

Fig 27 Side light

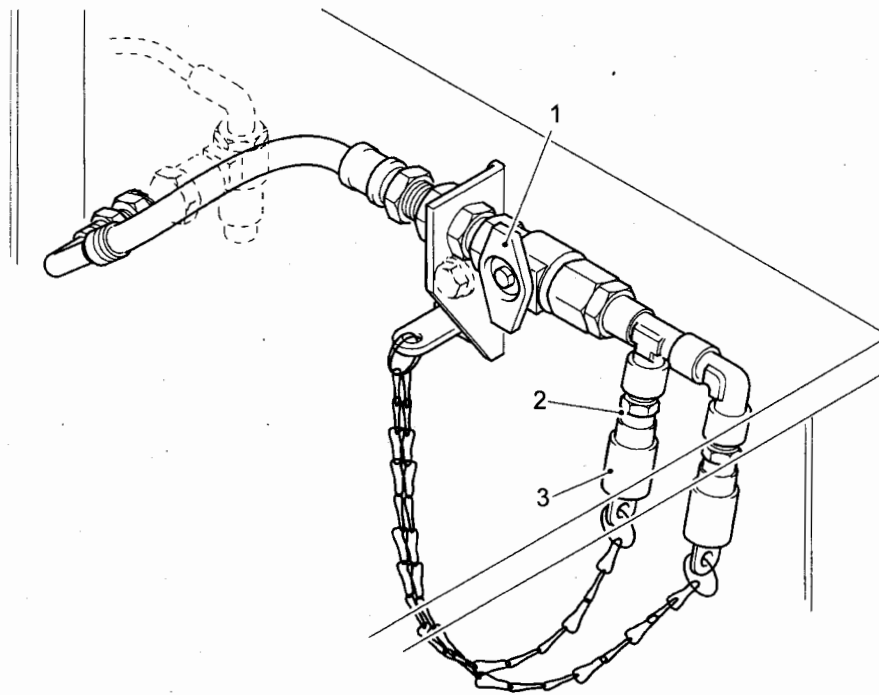
To replace the cab mounted spotlight lamp (See Fig 28)

109 Undo the screw (3) and remove the rim (1) complete with lens (2) to gain access to the lamp.



1 Rim 2 Lens 3 Phillips screw

Fig 28 Cab mounted spotlight



1 Inflation cock handle (off position) 2 Quick release adaptor 3 Blanking socket

Fig 29 Dual tyre inflator

WHEELS AND TYRES

110 It is not sufficient to make a visual examination of the tyres for correct inflation. They should be checked regularly and maintained at the pressure recommended in the Maintenance Schedule.

111 The tyres should be inspected regularly for damage and depths of tread. If a tyre is damaged or the depths of tread is below the legal minimum THE TYRE MUST BE REPLACED.

To inflate a tyre (See Fig 29)

112 A dual tyre inflator controlled by a two way cock, situated in the LH side stowage box, is provided to make tyre inflation possible from the vehicle air system. The inflator is equipped with two self sealing quick release adaptors to allow the inflation of one or two tyres simultaneously. The method of inflation is as follows:

113 Start the engine and set to run using the hand throttle. Operate the brakes to exhaust some air from the system. This will ensure that the governor is not unloading. Connect the tyre inflation hose(s) firstly to the inflator by pushing upwards the knurled sleeve on the quick release adaptor(s) (2) and firmly inserting the hose quick release coupling(s) into the adaptor(s). Release the sleeve to lock the coupling then attach the other end of the hose(s) to the tyre(s).

114 Turn the handle on the inflation cock (1) to the 'INLINE' position to admit air to the tyre(s).

115 On completion of tyre inflation turn the handle to the 'OFF' position.

116 When disconnecting the inflation hose, always remove it first from the tyre then from the inflator connection, otherwise a loss of air will result. To disconnect from the inflator reverse the connection procedure.

To deflate a tyre (off-road conditions) (See Fig 29A)

WARNING

WHEN DEFLATING TYRES TAKE CARE TO KEEP THE BODY, PARTICULARLY BARE SKIN AND EYES, CLEAR OF THE AIR STREAM; SAFETY GOGGLES MUST BE WORN.

117 A set of four deflation valves in a black leather wallet are provided for this purpose. There are two valves with knurled head plungers for the front tyres and two with hexagon head plungers for the rear tyres. The deflation method is as follows:

118 Select the appropriate valve, front or rear, and decide which of the valve settings relates to the type of terrain on which the vehicle will be operating.

119 Set the valve by holding the knurled fixed ring between the thumb and forefinger of one hand and the operating plunger between the thumb and the forefinger of the other hand. Push the plunger down and turn it clockwise for sand terrain and anti-clockwise for gravel track terrain. Release the plunger to engage the selected slot.

120 Remove the tyre valve adaptor cap and store safely. Using a small clean screwdriver or similar implement, momentarily depress the valve core and allow a discharge of air to dispel any dust or grit particles which may be present.

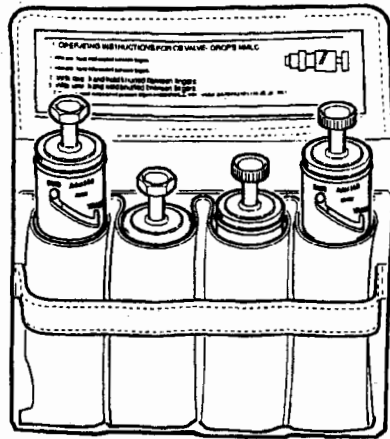
121 Making sure that the valve adaptor thread is clean, screw the deflation valve onto the adaptor. Resistance will be felt when the sealing washer in the valve contacts the adaptor. Continue to tighten using light finger pressure only until a loud noise of escaping air is evident. Do not overtighten.

122 When the sound of escaping air has reduced to a gentle hiss, press and release the plunger. Unscrew the deflation valve and replace the valve adaptor cap using reasonable finger and thumb force.

123 Repeat Paras 117 to 122 for the other tyres.

124 When all the tyres have had their pressures adjusted, return the deflation valve(s) to the 'SAND' setting, replace them in their wallet and store safely in the vehicle.

125 When low pressure running is complete and the vehicle rejoins metalled roads, stop and re-inflate tyres in accordance with current safety procedures and to the pressure detailed in AESP 2320-8-301-601.



H003-049

Fig 29A Tyre deflation valve set

ROADWHEEL

WARNINGS

(1) THE CORRECT TORQUE LOAD MUST BE APPLIED TO THE ROAD WHEEL NUTS. INCORRECT TORQUE LOADING OF THE WHEEL NUTS COULD RESULT IN THE FOLLOWING

- 1.1 **INSUFFICIENT TORQUE LOAD: CAN CAUSE WHEEL LOSS. STUD DAMAGE. NUT DAMAGE. CRACKED WHEELS AND EXCESSIVE WEAR TO WHEEL AND HUB FACES.**
- 1.2 **EXCESSIVE TORQUE LOAD: CAN CAUSE STUD AND/ OR NUT BREAKAGE LEADING TO POSSIBLE LOSS OF WHEEL.**

(2) IF CIRCUMSTANCES ARE SUCH THAT AN IN-CALIBRATION TORQUE SPANNER IS NOT AVAILABLE WHEN WHEEL NUTS ARE TIGHTENED. THE WHEEL NUT TORQUE LOADING MUST BE CHECKED SPECIFICALLY AT THE NEXT AVAILABLE OPPORTUNITY.

(3) THROUGHOUT THE TYRE INFLATION PROCEDURE. PERSONNEL MUST NOT STAND IN THE LIKELY TRAJECTORY OF COMPONENTS OF THE WHEEL. RIM OR TYRE IN THE EVENT OF A TYRE BURST.

(4) THE MMLC ROAD WHEEL ASSEMBLY WEIGHS [REDACTED]. WHEN REMOVING OR FITTING A ROAD WHEEL. DUE REGARD IS TO BE GIVEN TO REGULATIONS FOR LIFTING HEAVY OBJECTS.

(5) BEFORE ATTEMPTING TO JACK UP A VEHICLE. ALWAYS CHOCK THE WHEELS THAT ARE TO REMAIN ON THE GROUND. DO NOT RELY ON JACKS ALONE TO SUPPORT A VEHICLE.

(6) WHEN CHANGING WHEELS DO NOT WORK BENEATH THE VEHICLE WHILST IT IS SUPPORTED BY THE JACK. DO NOT START NOR RUN THE ENGINE WHILST THE VEHICLE IS ON THE JACK.

(7) THE ROAD WHEELS AND WHEEL NUTS USED ON THIS VEHICLE ARE BASED ON THE SPIGOT MOUNTING SYSTEM AS OPPOSED TO THE CONVENTIONAL BRITISH STANDARDS CONICAL FIXING SYSTEM. THE WHEELS AND NUTS OF THESE FIXING SYSTEMS ARE NOT COMPATIBLE AND MUST NOT BE INTERCHANGED.

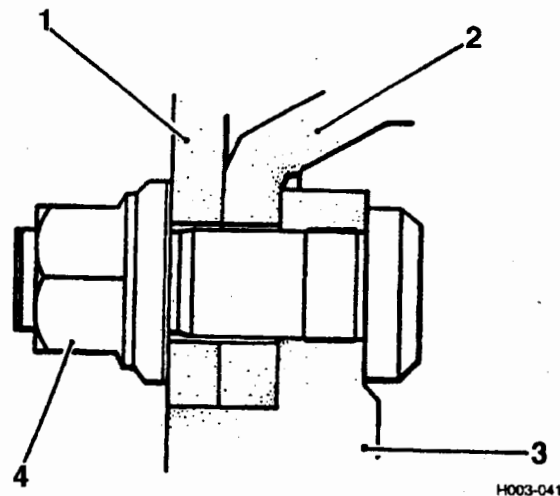
Removal from hub

126 Apply the parking brake, and chock the road wheels that are to remain on the ground. Jack up the axle of the wheel to be removed and fit additional axle supports.

CAUTION

The lack must be placed under the hub end of the axle case, not under the centre casing.

127 Clean the nuts and protruding ends of the wheel studs and remove the ten nuts (Fig.30 (4)) securing the wheel to hub, support the wheel, weight [REDACTED] sufficiently to prevent dragging across and damaging the wheel stud threads.



- | | | | |
|---|------------|---|-----------|
| 1 | Wheel | 3 | Hub |
| 2 | Brake drum | 4 | Wheel nut |

Fig 30 Wheel/Hub arrangement

NOTE

Wheel nuts are left and right hand threaded.

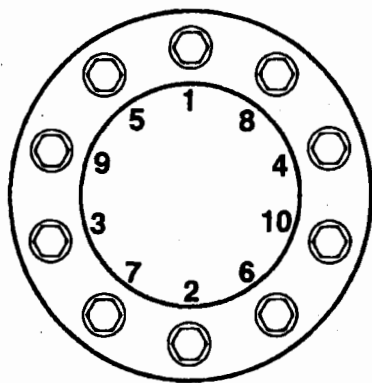
128 Clean the hub studs and the mating surfaces of the wheel to hub. Examine the surfaces for signs of fretting and damage. Examine the studs for damage and looseness, replace studs as detailed in AESP 2320-R-301-522 Chap 6, Paras 9, 10 and 11.

Refitment to hub (See Fig.31)

129 Check that the hub is clean and smooth and that the stud threads are clean and undamaged. Lightly lubricate the hub studs, do not allow oil onto the contact faces of the wheel and hub. Place the wheel onto the studs taking great care not to damage the threads, lightly secure with ten wheel nuts.

130 Refer to Fig.31 and tighten the nuts a little at a time by diagonal selection. Finally tighten the nuts to the torque figures detailed in AESP 2320-R-301-601.

131 Recheck all nuts after lowering the vehicle and removing the jacks.



H003-044

Fig 31 Wheel nut tightening sequence

NOTE

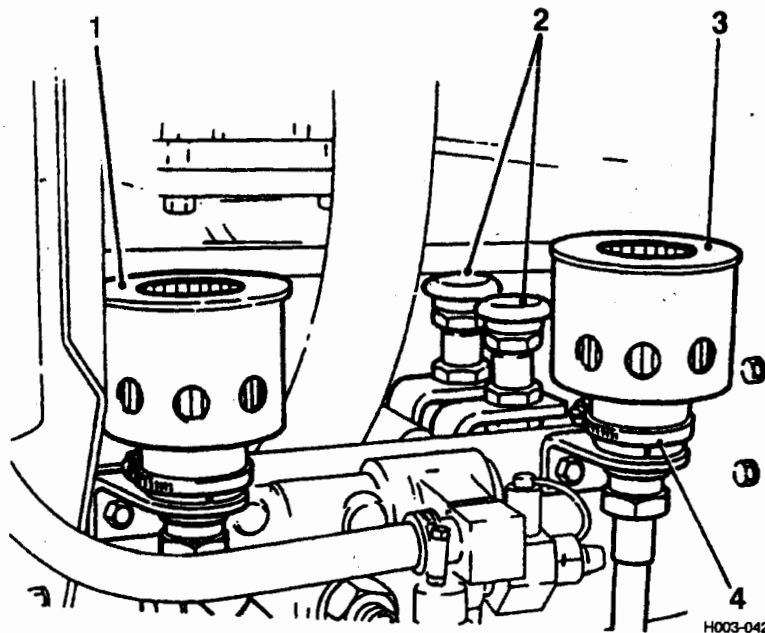
It is important after changing a wheel the nuts are checked for tightness every 16 kilometres (10 miles) until they have bedded down.

AUXILIARY GEARBOX AND FUEL TANK BREATHER FILTERS

To renew (See Fig.32)

132 The breather filters (1 and 3) should be removed at intervals quoted in the Maintenance Schedule AESP 2320-R-301-601.

133 Undo the hoseclips (4) remove and discard filters.



H003-042

1 Fuel tank breather 2 Axle breathers 3 Auxiliary gearbox breather 4 Hoseclip

Fig 32 Auxiliary gearbox and fuel tank breather filters

134 Replace with new filters and secure the hoseclips.

FRONT AXLE AND BOGIE AXLE BREATHERS

135 Breathers for the front drive axle and rear bogie axles are situated immediately behind the auxiliary gearbox breather filter (Fig 32 (2)).

GEARBOX RETARDER EXHAUST

136 The outlet for the retarder air exhaust is situated immediately behind the fuel tank breather filter.

CAB TILT PUMP RESERVOIR

137 Check the oil level in the cab hydraulic tilt pump reservoir weekly. The correct oil level is to the bottom of the filter neck with the cab in the down and locked position. Top up with the oil specified in the Maintenance Schedule AESP 2320-R-301-601.

SEAT BELTS

138 Examine the seat belts for security of attachment, serviceability and damage daily or as used.

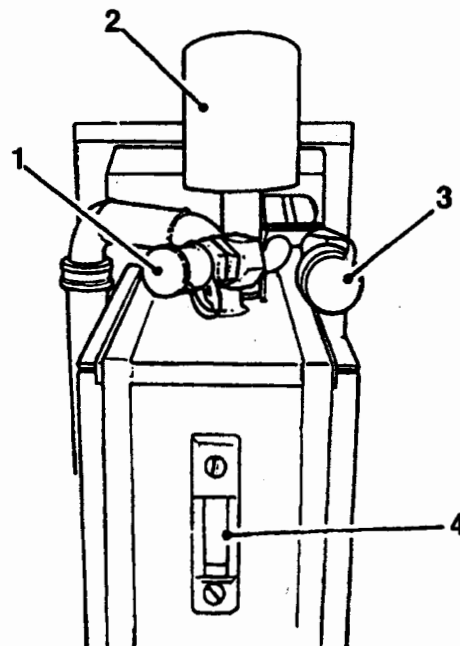
LUBRICATION (See lubrication diagram end of this chapter)

139 Lubricate the components at the intervals stated in the Maintenance Schedule AESP 2320-8-301-601.

LOAD HANDLING SYSTEM

Hydraulic reservoir (See Fig 33)

140 Check the hydraulic reservoir fluid level daily or as used. The correct oil level should be to the black line in the middle of the sight glass (4) with the LHS in the transit position.



H003-043

- | | | | |
|---|-------------------|---|-----------------|
| 1 | Return coupling | 2 | Breather filter |
| 3 | Pressure coupling | 4 | Sight glass |

Fig 33 LHS Hydraulic reservoir

To top up

141 Clean the area around the filling point. Unscrew the breather filter from its stack pipe on top of the reservoir. Top up to the correct level through the stack pipe orifice with the oil grade quoted in the Maintenance Schedule AESP 2320-R-301-601. Replace the breather filter to hand tight.

Proximity switches

142 Check the proximity switches before and after use, ensure that they are free from mud, dirt and debris.

Functional checks

143 Operate the load handling system daily, or as used, through its full cycle, without a flatrack or SRTE mounted, carry out a visual inspection for any structural or component damage and hydraulic leaks.

Engine hand throttle adjustment

144 Lift up the cab front centre panels and slacken the locknut securing the operating rod to fork end. Disconnect fork end from hand throttle.

145 Start vehicle engine, adjust the fork end to operating rod and temporarily reconnect to hand throttle with throttle locked in run condition.

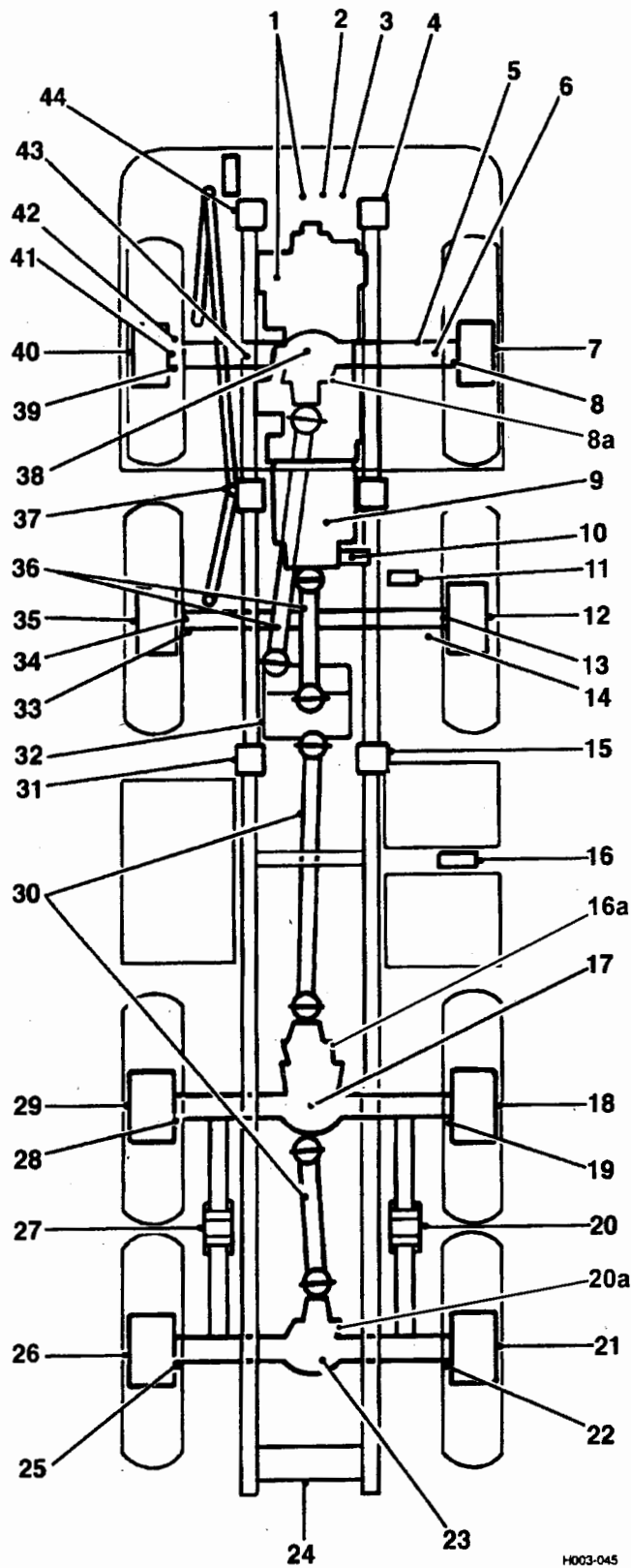
146 Check tachometer in cab reads 1500 rpm. Adjust fork end until this reading is obtained. On completion tighten operating rod nut to fork end and the clevis pin securing the fork end to throttle.

Key to lubrication/replenishment chart

| | | | |
|-----|---|----|----------------------------------|
| 1 | Engine filler points | 21 | Rear bogie axle hub |
| 2 | Windscreen washer bottle | 22 | Brake cross shaft |
| 3 | Cold start reservoir | 23 | Rear bogie axle drive head |
| 4 | Front spring | 24 | Rear towing pintle |
| 5 | Steer/drive axle king pin | 25 | Brake cross shaft |
| 6 | Steer/drive axle universal joint | 26 | Rear bogie axle hub |
| 7 | Steer/drive axle hub | 27 | Rear suspension fulcrum |
| 8 | Brake cross shaft and track rod | 28 | Brake cross shaft |
| 8a | Forward axle drivehead clevis pin | 29 | Front bogie axle hub |
| 9 | Gearbox oil filler | 30 | Rear propshafts |
| 10 | Header tank | 31 | Second front spring |
| 11 | Steering hydraulic reservoir | 32 | Transposing box |
| 12 | Second axle hub | 33 | Brake cross shaft and trackrod |
| 13 | Second axle king pin | 34 | Second axle king pin |
| 14 | Brake cross shaft and track rod | 35 | Second axle hub |
| 15 | Second front spring | 36 | Front propshafts |
| 16 | Cab tilt pump reservoir | 37 | Steering relay lever |
| 16a | Leading rear axle drivehead clevis pin | 38 | Steer/drive axle drive head |
| 17 | Front bogie axle drive head | 39 | Brake cross shaft and track rod |
| 18 | Front bogie axle hub | 40 | Steer/drive axle hub |
| 19 | Brake cross shaft | 41 | Steer/drive axle universal joint |
| 20 | Rear suspension fulcrum | 42 | Steer/drive axle king pin |
| 20a | Trailing rear axle drivehead clevis pin | 43 | Front spring 'U' bolt |
| | | 44 | Front spring |

Grease points

| Serial | No of grease nipples |
|-----------------|---------------------------|
| 4 and 44 | 1 each |
| 5 and 42 | 2 each |
| 6 and 41 | 2 each |
| 8 and 39 | 3 each |
| 8a, 16a and 20a | 1 each |
| 13 and 34 | 2 each |
| 14 and 33 | 3 each |
| 15 and 31 | 3 each |
| 19 and 28 | 2 each |
| 22 and 25 | 2 each |
| 24 | 3 |
| 30 and 36 | 6 each |
| 37 | Pack bearings with grease |
| 43 | 2 |



H003-045

20609/27

Fig 34 Vehicle lubrication diagram

CHAPTER 5
SIMPLE RAIL TRANSFER EQUIPMENT
CONTENTS

Frame Para

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| 1 | General description (Warnings and Cautions) |
| 3 | Controls and instruments |
| 4 | Gantry controls |
| 10 | Remote control unit |
| 19 | SRTE Operating instructions |
| 20 | Visual checks |
| 24 | Procedure |
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| | Hydraulic reservoir |
| 59 | Rotary stop valve |
| 60 | Sight glass |

USER MAINTENANCE

| | |
|----|---|
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| | Hydraulic reservoir filter element, |
| 67 | To replace |
| | Hydraulic pump pressure filter element, |
| 70 | To replace |
| | Hydraulic motor pressure filter element, |
| 73 | To replace |
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| 75 | Stop/tail and indicator lamps, to replace |
| 78 | Rear fog lamps, to replace |
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| 82 | Chains and shoes |
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| 3 | Reservoir rotary stop valve | 7 |
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| 5 | Reservoir filter | 9 |
| 6 | Pump pressure filter | 9 |
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GENERAL DESCRIPTION

1 The EKA Simple Rail Transfer Equipment is specially designed for the unloading and loading of flatrack loads at rail head areas.

WARNINGS

- (1) ENSURE THAT PERSONNEL ARE CLEAR OF THE VEHICLE AND LIFTING AREA.
- (2) ENSURE THERE ARE NO OVERHEAD POWER CABLES OR OBSTRUCTIONS THAT MAY COME INTO CONTACT WITH THE BOOMS THROUGHOUT THEIR RANGE OF MOVEMENT.
- (3) ALL SLAVE HYDRAULIC COUPLING CONNECTIONS AND DISCONNECTIONS MUST BE MADE WITH THE VEHICLE ENGINE SWITCHED OFF. WHEN COUPLING THE PRESSURE MUST BE RELIEVED IN LHS FEED CIRCUIT.
- (4) ENSURE PALLET LOAD LASHINGS AND SIMMO ARE IN GOOD CONDITION AND LOAD SECURE TO PREVENT SLIP.
- (5) VALVE CHEST AND PIPELINES POSITIONED BELOW LEVEL OF SRTE CHASSIS ARE VULNERABLE EQUIPMENT. THE SRTE MUST ONLY BE DISMOUNTED FROM BEARER VEHICLE ON TO A SMOOTH FLAT SURFACE.

CAUTIONS

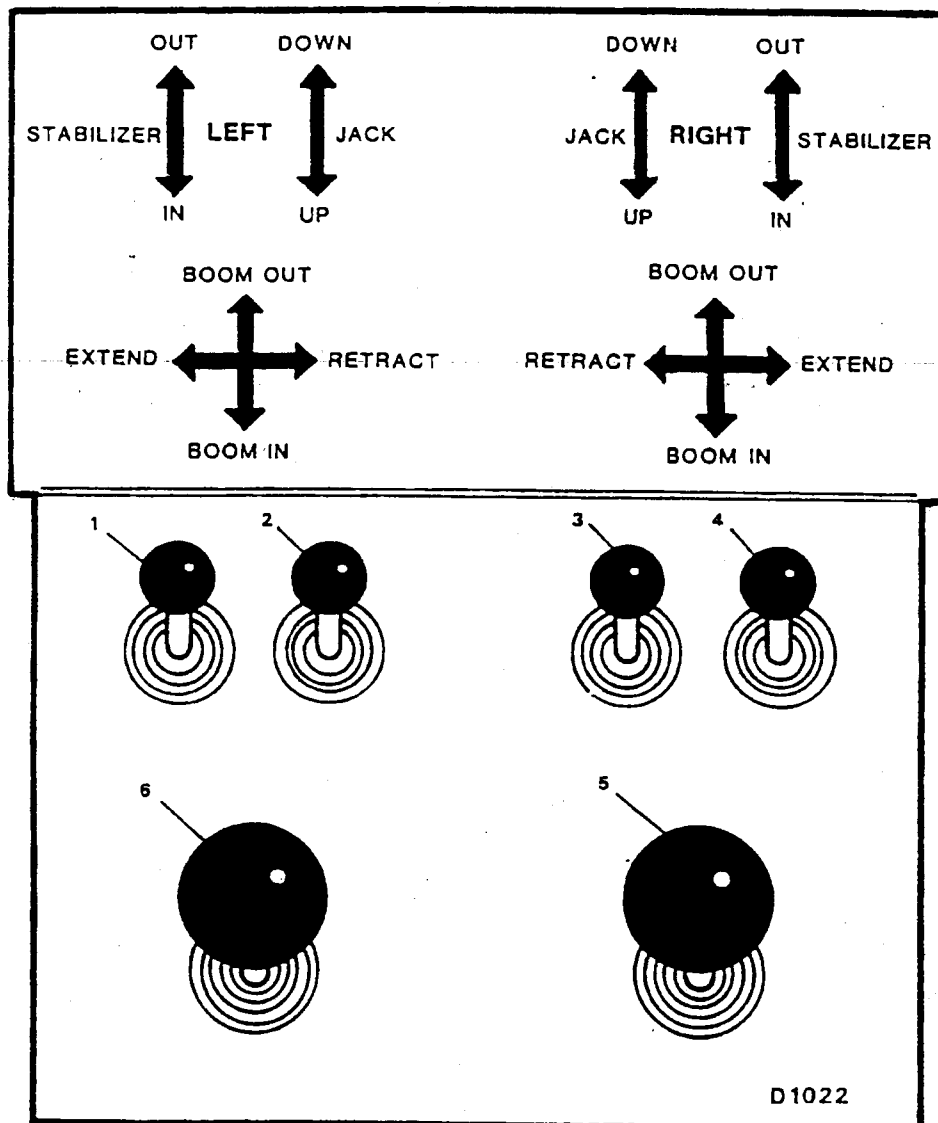
- (1) Check the around conditions for firmness and inclination. Any around instability beneath the stabiliser feet or vehicle wheels could affect the safe operation of the Simple Rail Transfer Equipment.
 - (2) The S.R.T.E. chassis overhangs the rear of the vehicle by approximately 1850 mm.
 - (3) Ensure that the hydraulic hoses do not get trapped between the rear rocking arm and stabiliser extension housing when retracting stabiliser.
 - (4) The S.R.T.E chassis when mounted increases the vehicle overall width by approximately 175 mm either side. Care should be exercised when passing vehicles, buildings or similar obstructions.
 - (5) All self sealing hose couplings, connectors and stowage dummy couplings must be maintained in a clean and serviceable condition. Weatherproof blanking caps must be fitted when this equipment is not in use.
- 2 Ensure before connecting the couplings that the pressure in the LHS feed circuit is relieved. To relieve the pressure, disengage the PTO and switch the engine 'OFF', switch electrical power 'ON' and select 'AUTO' on the LHS mode selector, connect the hydraulic hoses to the slave couplings, select LHS to 'OFF', start the engine and select LHS mode to 'AUX'.

CONTROLS AND INSTRUMENTS

3 The S.R.T.E. can be operated either by the gantry control panel or the remote control unit.

Gantry controls (See Fig 1)

- 4 Left stabiliser control lever (1). This two position lever controls the extension and retraction of the stabiliser.
- 5 Left stabiliser foot control lever (2). This two position lever controls the raise and lower of the stabiliser foot.



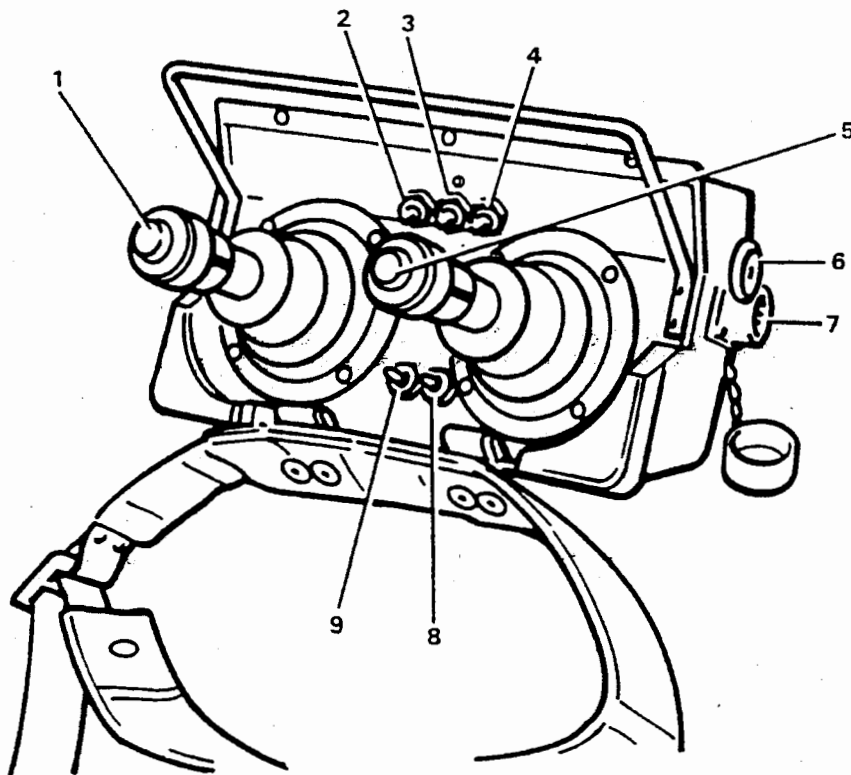
- | | | | |
|---|-------------------------------------|---|---------------------------------|
| 1 | Left stabiliser control lever | 4 | Right stabiliser control lever |
| 2 | Left stabiliser foot control lever | 5 | Right boom/rocking ram joystick |
| 3 | Right stabiliser foot control lever | 6 | Left boom/rocking ram joystick |

Fig 1 Gantry control panel

- 6 Right stabiliser foot control lever (3). This two position lever controls the raise and lower of the stabiliser foot
- 7 Right stabiliser control lever (4). This two position lever controls the extension and retraction of the stabiliser.
- 8 Right boom/locking ram joystick (5). This four position lever controls the extension and retraction of the boom extension ram and rocking ram.
- 9 Left boom rocking ram joystick (6). This four position lever controls the extension and retraction of the boom extension ram and rocking ram.

Remote control unit (See Fig 2)

- 10 Rear rocking arm and boom extension joystick (1). This four position lever controls the movement of the rear rocking arm and the extension and retraction of the rocking arm boom.
- 11 Toggle switch (2). This switch controls the raising and lowering of the rear stabiliser jack foot.
- 12 'ON/OFF' switch and warning light (3). When switched to 'ON' it electrically energises the remote control function and illuminates the warning lamp.
- 13 Toggle switch: (4): This switch controls the raising-and lowering of the- front stabiliser jack foot.
- 14 Front rocking arm and boom extension joystick (5). This four position lever controls the movement of the front rocking arm, and the extension and retraction of the rocking arm boom.
- 15 Stop button (6). Push, in to de-energise the remote control function. Rotate the button a quarter of a turn to release it from the locked position.
- 16 Socket (7). For connection of wander lead plug.
- 17 Toggle switch (8). This switch controls the extension and retraction of the front stabiliser.



D1023

- | | | |
|-----------------------------------|-----------------------------|-----------------------------------|
| 1 Joystick rear boom | 4 Toggle switch, front jack | 7 Wander lead socket |
| 2 Toggle switch, rear jack | 5 Joystick, front boom | 8 Toggle switch, front stabiliser |
| 3 ON/OFF switch and warning light | 6 STOP' button | 9 Toggle switch, rear stabiliser |

Fig 2 Remote control unit controls

- 18 Toggle switch (9). This switch controls the extension and retraction of the rear stabiliser.

SRTE OPERATING INSTRUCTIONS

- 19 The S.R.T.E. should be loaded and unloaded using the load handling system as for loading/unloading a flatrack (See Chapter 3 Paras 63 to 74) observing all WARNINGS and CAUTIONS.

Visual checks

- 20 Inspect SRTE equipment for damage.
- 21 Check the SRTE is free from oil leaks.
- 22 Check the reservoir has hydraulic oil. in the sight glass (OM18) (all rams retracted) and that the stopcock is turned on.
- 23 Check all lifting chains and shoes are serviceable.

Procedure

NOTE

When connecting up to 'A' frame, ensure vehicle is directly in line with SRTE chassis.

- 24 Mount SRTE fully onto MMLC.
- 25 Connect NATO plug and socket then check lights as per First Parade maintenance.
- 26 Connect hose couplings, ensure both are fully connected by pulling hose against couplings.
- 27 Ensure LHS has hydraulic oil in sight glass of reservoir.

NOTE

It may be necessary to turn engine master start key switch to position '2' and select position one (auto) on LHS mode selector. This will release any pressure build up at pressure hose coupling of LHS.

- 28 Start up engine of MMLC with gear selector lever in neutral.
- 29 Position vehicle to railway flatbed and flatrack about 400 mm away from, but parallel to flatrack with co-driver crewman lining upfront or rear load pegs on SRTE. Up to 150 mm misalignment is acceptable.
- 30 Select neutral in gearbox and apply handbrake of MMLC.
- 31 Select position five (aux) on LHS mode selector switch.
- 32 Leave cab and set hand throttle at front of radiator.
- 33 Check that correct length of chains is selected (use long chains if the rail wagon is too high or there is no overhead wire clearance problem).
- 34 Mount operator platform or plug in remote control (stowed under right hand side walkway) at rear end socket. (NATO socket must be connected for remote control to work).
- 35 At operator platform, using hand levers, deploy stabilisers out and stabiliser jack feet to ground or deck of the flatbed chassis. Ensure that the stabiliser foot is located over a main chassis member of the flatbed and that it cannot slip over the deck surface. See SRTE instruction plate.

NOTE

If stabiliser jacks fail to reach ground, fit extension legs but ensure legs touch ground. Check that the whole of the foot area is fully supported by the ground.

- 36 Disconnect shoe stowage straps (4 off). Using the two-joysticks, fully extend rocking arm extension.
- 37 Deploy fully out the rocking arms.
- 38 Retract rocking arm extensions to enable shoes to be fitted to flatrack, lock handles when connected.
- 39 Lift up flatrack by first tensioning the lifting chains by extending and retracting rocking arms. When chains are equally tight, retract rocking arms, extend rocking arms as necessary to prevent flatrack fouling MM chassis. Load onto locating pegs on SRTE frame. When load correctly located, stow arms fully, lift stabiliser jacks and retract stabiliser extensions.
- 40 Disengage PTO and move MMLC, SRTE and load to unloading point,
- 41 Engage PTO.
- 42 Deploy stabilisers out and jacks fully down to ground (fit extension feet if necessary).
- 43 Extend and deploy rocking arms till lift chains are tight (must be on long chain to lower to ground).
- 44 Deploy rocking arms out till flatrack clears edge of frame by 295 mm (12 inches).
- 45 Lower flatrack by retracting rocking arm extension until flatrack is close to chassis, then deploy rocking arm out until the flatrack is approximately 250 mm (10 inches) from side of vehicle. Retract rocking arm extension. Use this procedure till flatrack is grounded.
- 46 With chains slack, disconnect lifting shoes (lock handle stowed in keep).
- 47 Stow rocking arms by fully extending extension, then bring 'in' rocking arm fully. Retract extensions to stowed position.
- 48 Lift and retract stabilisers fully.
- 49 Climb onto SRTE frame and strap spreader bar down to chassis.
- 50 Select LHS rotary selector switch to 'OFF'.
- 51 Move to next lift.

USE OF THE EXTENSION FEET AND LOAD; SPREADERS'**Extension feet**

- 52 If the stabiliser jacks are fully extended but do not reach the ground, or if it is not possible to level the SRTE by extending the jacks, the extension feet must be fitted.
- 53 These are intended for use when the surface onto which the stabilisers must bear is up to 300 mm below the road surface on which the vehicle is standing.
- 54 Whilst the extension feet may be left attached to the stabilisers during transfer operations in a rail yard, they must be removed and stowed prior to road travel, as the SRTE is over legal width when the stabilisers are retracted with the extension feet fitted.

Load spreading device

55 It is essential for the safe operation of the SRTE that the stabiliser jacks are only allowed to bear on a surface which will not sink or collapse under load during the transfer operation.

56 When transferring a flatrack from a rail wagon the stabilisers will normally bear on the wagon deck and it is essential that one of the wagon main sidemembers is directly beneath each of the stabiliser feet. If the planking over the chosen sidemember is damaged or uneven, a load spreader must be placed beneath each of the stabiliser jacks.

57 Similarly, when the SRTE is transferring the load to the ground the stabilisers should normally bear onto a flat concrete surface. However, if the ground is uneven, or of a compacted soil or if there is any risk of the surface 'giving way' under load, the load spreaders must also be used.

58 The load spreaders must be such that with the maximum stabiliser jack load applied they should not unduly distort or crack. A typical spreader would be about 600 mm square made of cross-bolted hardwood 100 mm thick, or sheet of 20 mm thick steel plate.

HYDRAULIC RESERVOIR

Rotary stop valve (See Fig 3)

59 59. A rotary stop valve is mounted on the rear of the reservoir. The valve is fitted in the reservoir supply line to the hydraulic pump. The stop valve should be closed when the S.R.T.E. is not in use and when servicing to the hydraulic system is carried out.

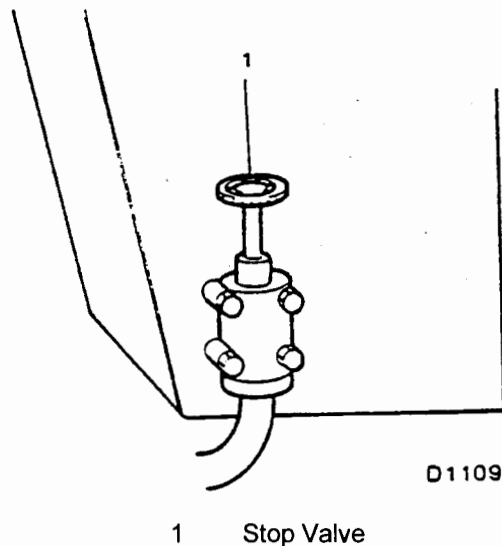


Fig 3 Reservoir rotary stop valve

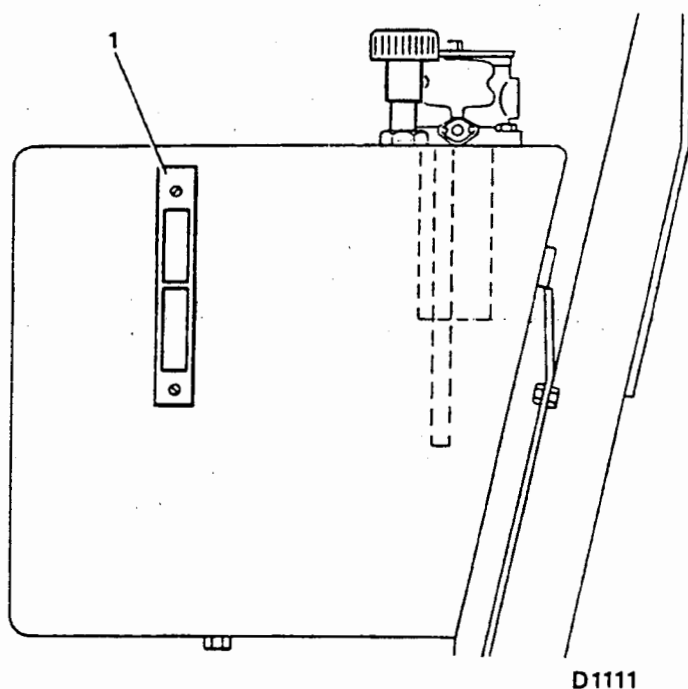
Sight glass (See Fig 4)

60 A sight glass is fitted to the forward face of the tank for checking the hydraulic fluid level.

USER MAINTENANCE

HYDRAULIC SYSTEM

61 Check for any hydraulic leaks at the intervals quoted in the Maintenance Schedule AESP 3930-B-202-601.



1 Sight glass

Fig 4 Reservoir sight glass

62 Check the filter clogging indicator at the intervals quoted in the Maintenance Schedule AESP 3930-8-202-801.

63 Check the hydraulic dry seal couplings for ingress of dirt and damage at the intervals quoted in the Maintenance Schedule AESP 3930-B-202-601.

64 Check the hydraulic flexible hoses for chafing and damage at the intervals quoted in the Maintenance Schedule AESP 3930-B-202-601.

65 Check the hydraulic reservoir fluid level and top up as necessary at the intervals and with oil grade quoted in the Maintenance Schedule AESP 3930-B-202-601.

66 To top up the reservoir unscrew and remove the breather filter, pour the hydraulic fluid into the reservoir via the breather filter stack pipe orifice. Refit the breather filter on completion.

To replace hydraulic reservoir filter element

67 The filter element should be replaced at the intervals quoted in the Maintenance Schedule AESP 3930-B-202-601.

68 Unscrew the filter cover plate (Fig 5 (1)), remove the element and discard.

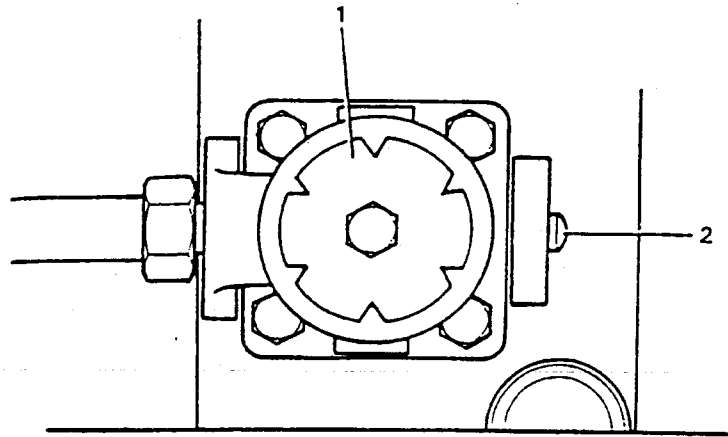
69 Fit a new element and replace the cover plate.

To replace hydraulic pump pressure filter element

70 The filter element should be replaced at the, intervals quoted in the Maintenance Schedule AESP 3930-B-202-601.

71 Unscrew the filter bowl (Fig 6 (1)), remove element and discard.

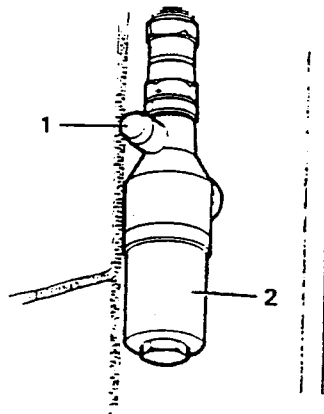
72 Fit a new element and replace the filter bowl.



D1113

- 1 Filter cover plate 2 Clogging indicator

Fig 5 Reservoir filter



D1112

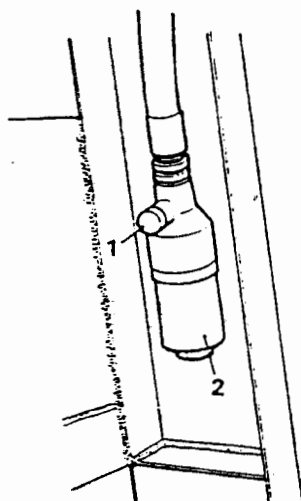
- 1 Clogging indicator 2 Filter bowl

Fig 6 Pump pressure filter

To replace a hydraulic motor pressure filter element

73 The filter element should be replaced at the intervals quoted in the Maintenance Schedule AESP 3930-B-202-601.

74 Element replacement is the same as for the hydraulic pump (paras 70 - 72).



D1110

1 Clogging indicator 2 Filter bowl

Fig 7 Motor pressure filter

ELECTRICAL**To replace stop/tail and indicator lamps**

75 Remove the three setscrews securing the protective guard over the rear light cluster and remove the guard.

76 Unscrew the lens.

77 Depress and rotate the lamp anti-clockwise to remove.

To replace a rear tog lamp

78 Remove the three setscrews securing the protective guard over the rear light cluster and remove the guard.

79 Remove the two phillips screws attaching the lens and remove the lens.

80 Depress and rotate the lamp anti-clockwise to remove.

Electrical plugs and sockets

81 Check for the ingress of dirt and damage to the electrical plugs and sockets at the intervals quoted in the Maintenance Schedule AESP 3930-B-202-601.

CHAINS AND SHOES

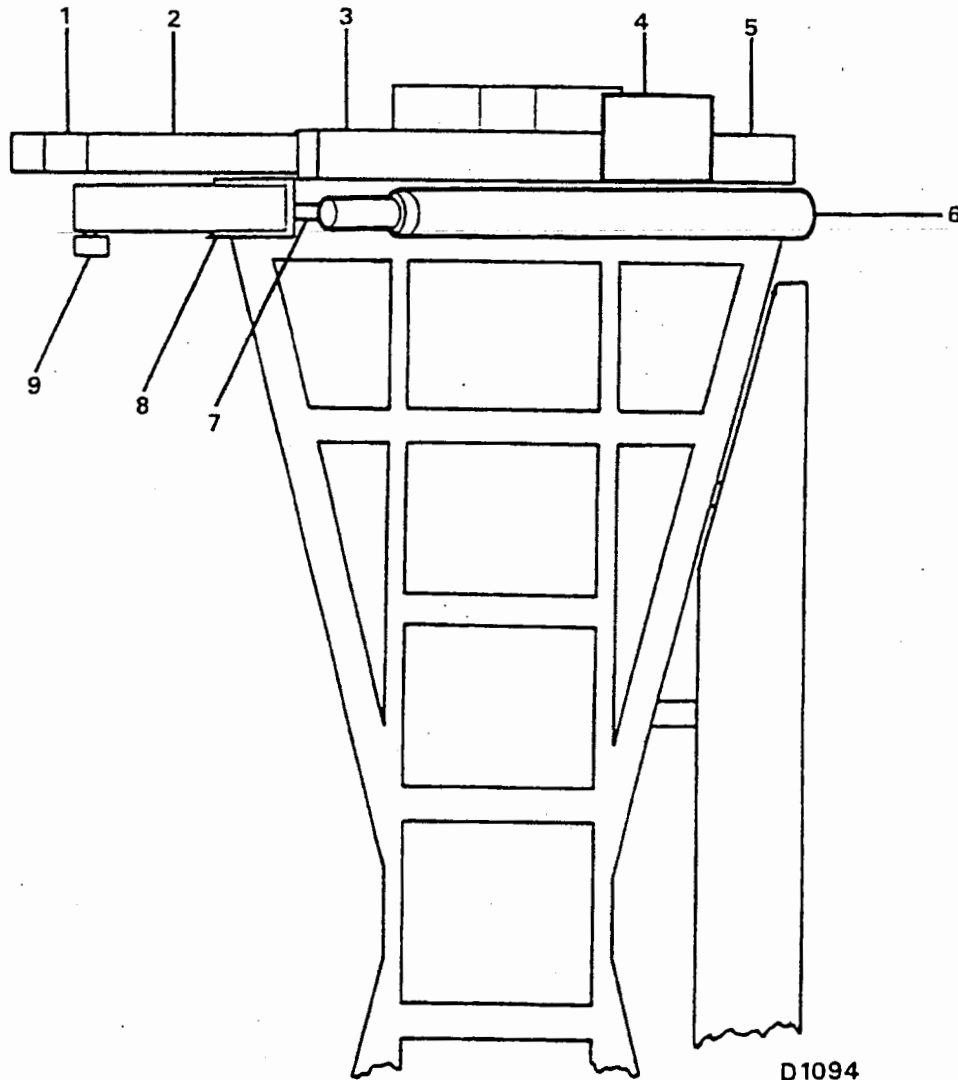
82 Inspect the lifting chains, spreader arms and shoes for damage at the intervals quoted in the Maintenance Schedule AESP 3930-B-202-601.

LUBRICATION (See fig 8)

83 Lubricate all grease points at the intervals quoted in the Maintenance Schedule AESP 3930-B-202-601.

NOTE

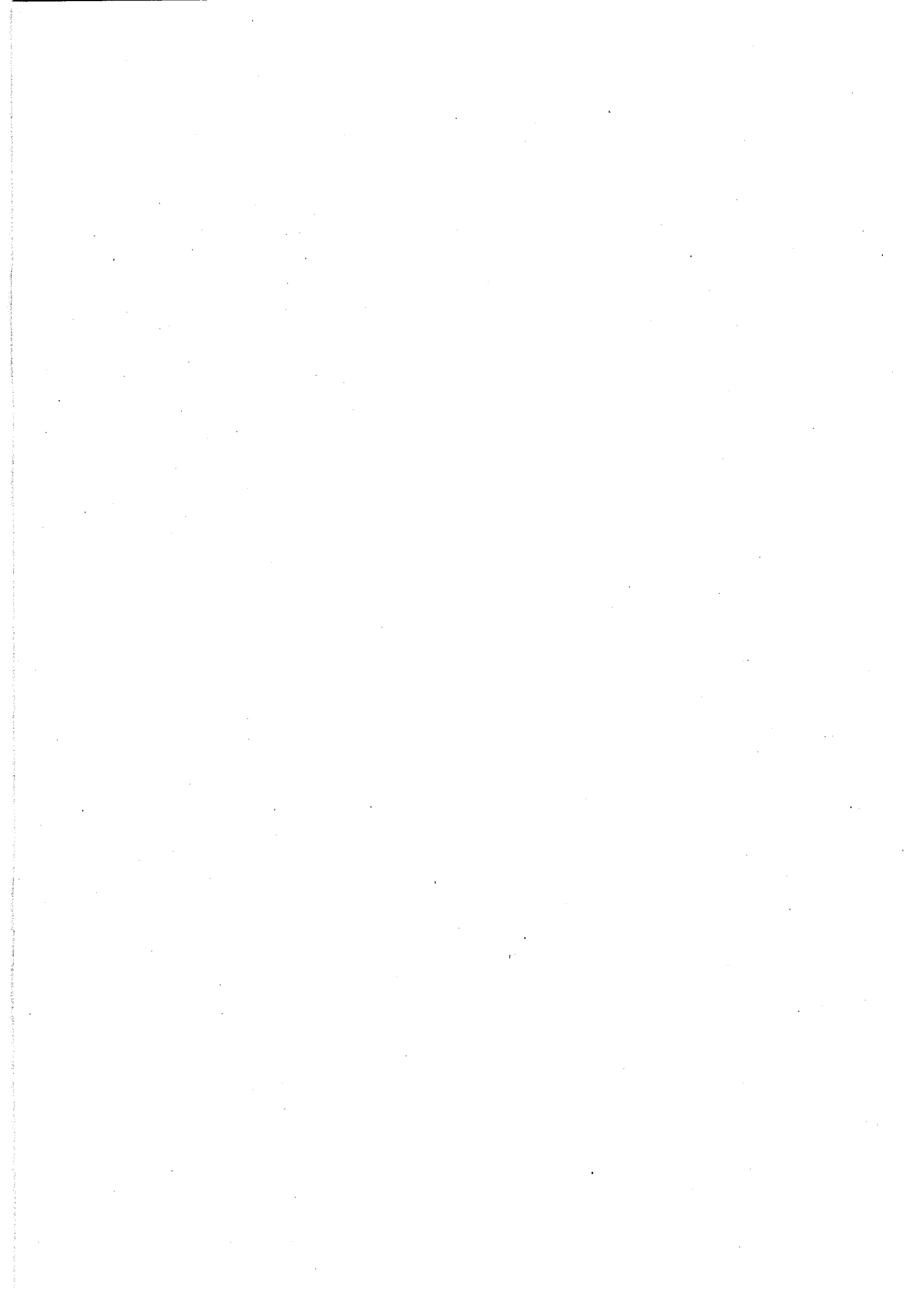
The lubrication points shown in Fig 8 are for the forward ram assemblies. The lubrication points for the rear ram assemblies are identical with the exception of the hydraulic reservoir.



D1094

| Ser | Item | No of grease points |
|-----|----------------------------------|---------------------|
| 1 | Stabilizer jack | 9 |
| 2 | Stabilizer extension | 1 |
| 3 | Stabilizer extension housings | 3 |
| 4 | Hydraulic reservoir | - |
| 5 | Stabilizer extension ram housing | 4 |
| 6 | Rocking ram end attachment | 1 |
| 7 | Rocking ram swivel bearing | 1 |
| 8 | Boom extension housing | 6 |
| 9 | Swinging block | 1 |

Fig 8 Key to lubrication diagram



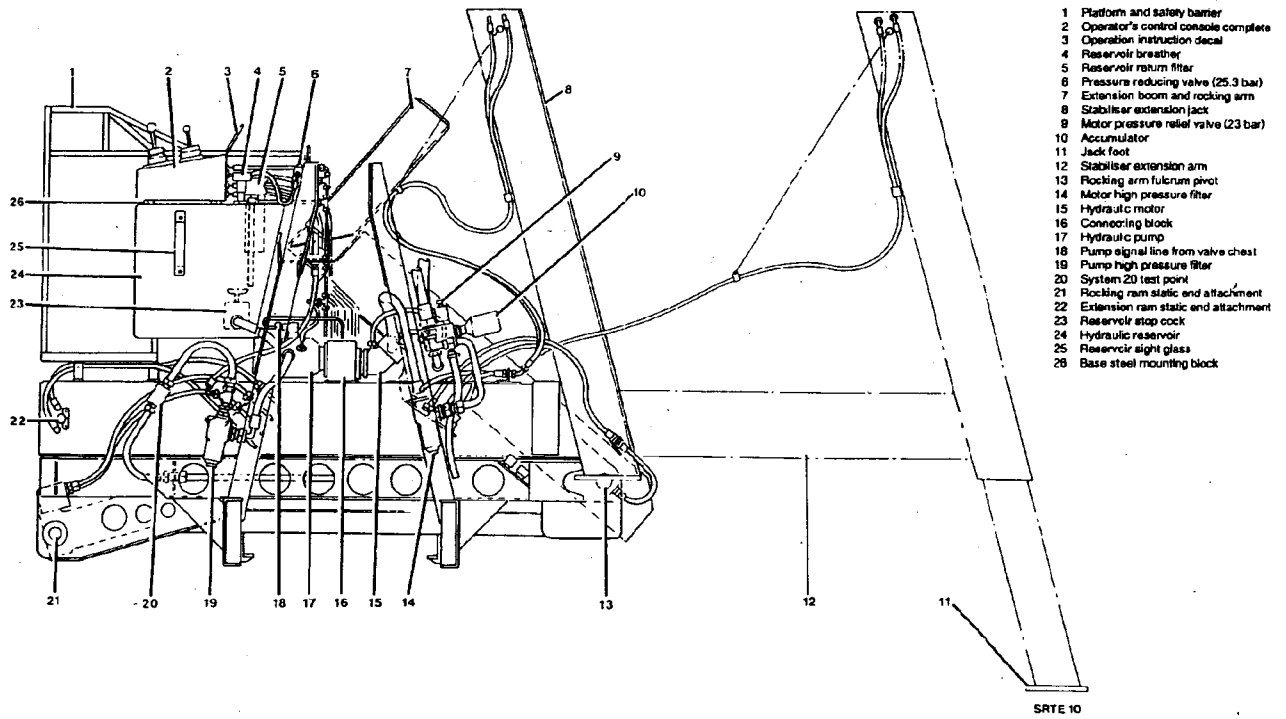
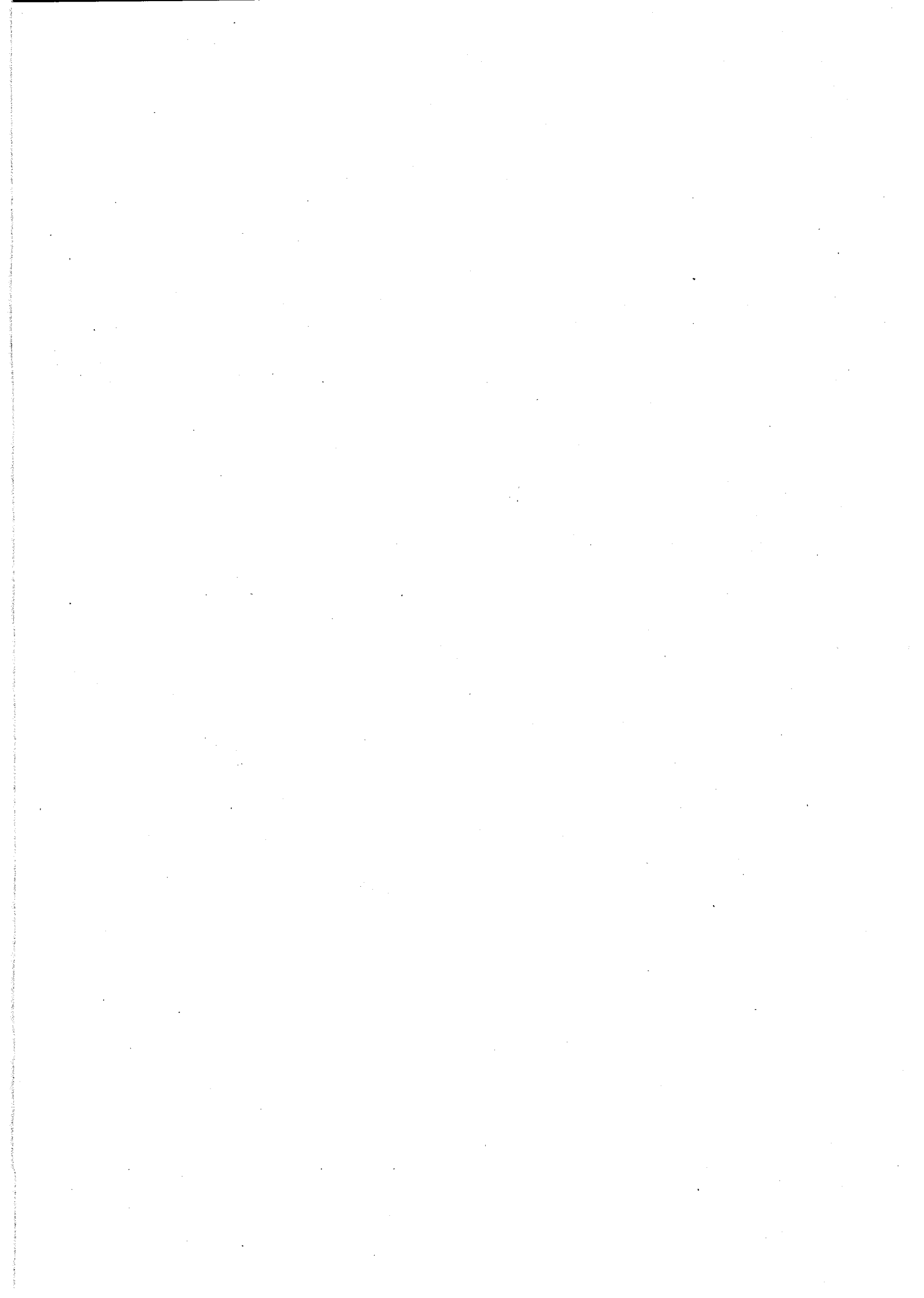


Fig 9 Forward end view of SRTE showing hydraulic component location



CHAPTER 6
USER SPARES DATA
CONTENTS

Frame Para

- 1 Battery protection timer fuse
To replace
- 5 24 volt to 12 volt converter unit fuse
To replace

Table

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| 1 | Lamp Data | 3 |
| 2 | Fuse Data | 4 |
| 3 | Operator Replaceable Items | 5 |
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| 1 | Battery protection timer | 2 |
| 2 | 24 volt to 12 volt converter unit | 2 |

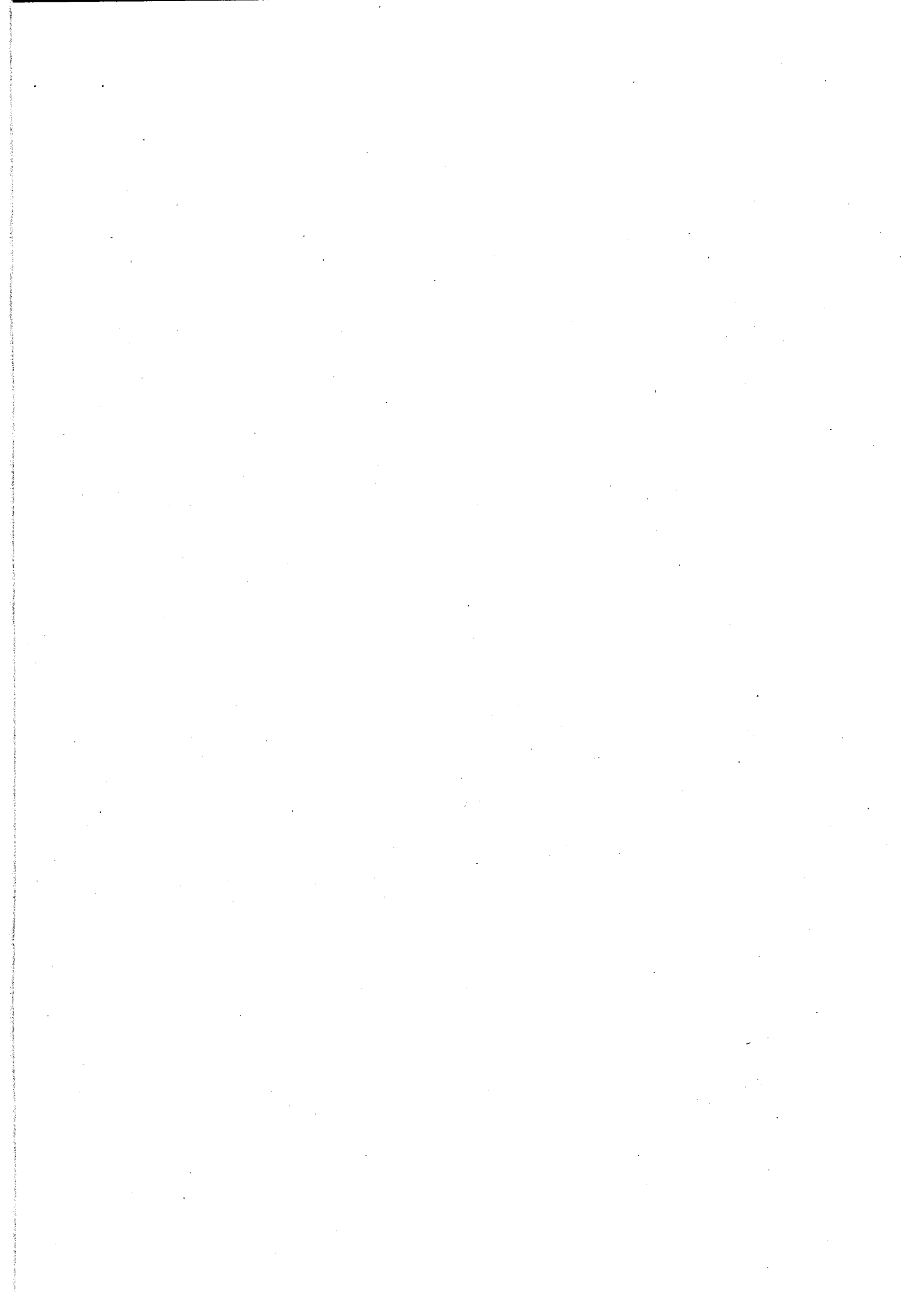
| TABLE 1 - LAMP DATA | | | | |
|----------------------------|--|--------------|--------------|---------------------------|
| Makers Part No. | Lamp | Volts | Watts | Type |
| 40018977 | Headlamp | 24 | 75/70 | Q.H.4. No 475 |
| 40010970 | Convoy, No plate and Side Lamp | 24 | 5 | S.C.C. No 149 |
| MBU241 | Direction Indicator | 24 | 21 | S.C.C. No 241 |
| 40010970 | Direction Ind Repeater | 24 | 5 | S.C.C. No 149 |
| MBU241 | Rear Fog and Reversing Lamps | 24 | 21 | S.C.C. No 241 |
| MBU241 | Stop Lamps | 24 | 21 | S.C.C. No 241 |
| MBU149 | Rear Tail Lamp | 24 | 5 | S.C.C. No 149 |
| MBU246 | Cab Interior | 24 | 10 | S.C.C. No 246 |
| MBU246 | Front Marker Lamps | 24 | 10 | S.C.C. No 246 |
| MBU249 | Rear Marker Lamps | 24 | 4 | M.C.C. No 249 |
| 40002910 | Searchlight | 24 | 100 | BOSCH 8787/510 /003 |
| MBU508 | Main Instrument Panel Lamps | 24 | 1.2 | WEDGE No 508 |
| MBU650 | Engine Stop Override Lamp | 24 | 2.8 | M.E.S. No 650 |
| NDK4884 | Traction Control Warning Lamps | 24 | 2 | M.C.C. No 289 |
| NDK4884 | Gearbox Oil Temp Warning | 24 | 2 | M.C.C. No 289 |
| NDK4884 | Power Steering Warning | 24 | 2 | M.C.C. No 289 |
| NDH1844 | Retarder Button Warning Lamp | 24 | 2 | M.C.C. No 289 |
| MBU5086 | Illuminated Switch Lamps | 24 | 1.2 | LES No 687 |
| S.R.T.E. | | | | |
| 2052 | Stop/Tail Lamp | 24 | 21/5 | O.S.P. No 294 |
| 2053 | Direction Indicator and Rear Fog Lamps | 24 | 21 | S.C.C. No 149 |

TABLE 2 FUSE DATA

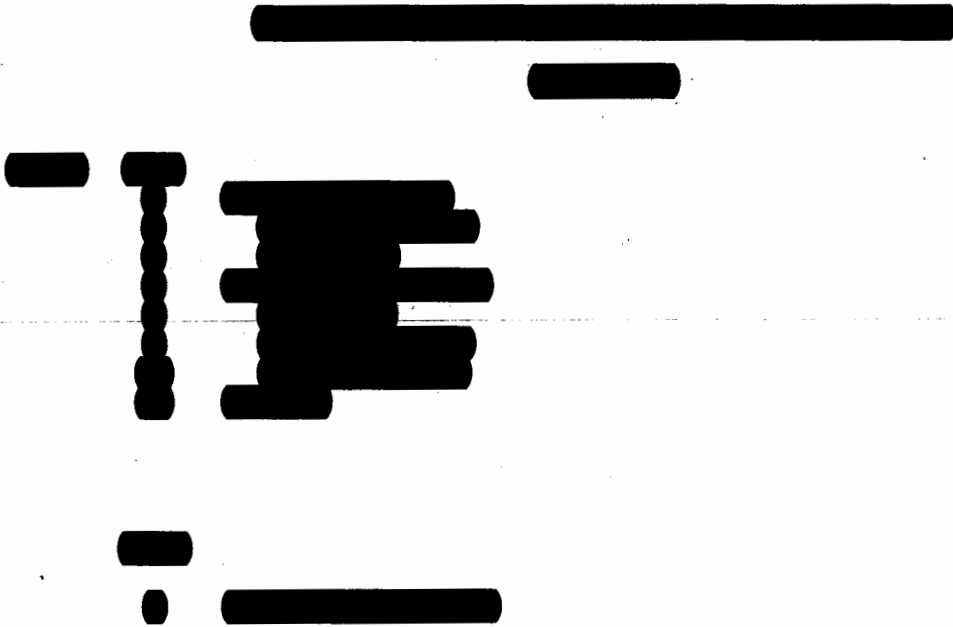
| Fuse No | Amp Rating | Circuits Protected |
|---------|------------|-----------------------------------|
| Row A | | |
| 1 | 5 | 2 Pin trailer socket |
| 2 | 10 | Rear Fog Lights |
| 3 | 10 | Left Hand Headlight Main Beam |
| 4 | 10 | Right Hand Headlight Main Beam |
| 5 | 10 | Headlight Outer Dipped Beam |
| 6 | 10 | Headlight Inner Dipped Beam |
| 7 | 10 | Tail Lights |
| 8 | 10 | Side Lights |
| 9 | 10 | Convoy Lights |
| Row B | | |
| 1 | 10 | Engine Stop |
| 2 | 10 | Gearbox |
| 3 | 10 | Air Dryer |
| 4 | 10 | Load Handling System |
| 5 | 10 | Instruments and Audible Warnings |
| 6 | 10 | Stop and Reverse Lights |
| 7 | 10 | Front Screen Wipers and Wash |
| 8 | 10 | Direction Indicators |
| 9 | 10 | Cab Heater |
| Row C | | |
| 1 | 15 | Rear Screen Heater/Rear Wash Wipe |
| 2 | | Not Used |
| 3 | 10 | Headlight Dim-Dip |
| 4 | 10 | Trailer Auxiliary |
| 5 | 10 | Floodlight |
| 6 | 10 | Cab Courtesy Lights |
| 7 | 10 | Horn |
| 8 | 15 | Hazard Warning Lights |
| 9 | 25 | Fuel Heater |

TABLE 3 REPLACEABLE ITEMS

| VEHICLE | |
|-----------------------------|---------------------------------------|
| Makers Part No | Description |
| CV2473 | Engine Oil Filter Elements |
| OD19596 | Engine Fuel Filter Element |
| 41033296 | Engine Air Cleaner Element |
| 0750 131 003 | Gearbox Oil Filter Element |
| OE49888 | Fan Belts |
| OE49882 | Alternator Drive Belt |
| ACU1404 | Wiper Blades (Front Screen) |
| NDK8795 | Wiper Blade (Rear Screen) |
| FBU3481 | Air Dryer Desiccant Spin-Off Canister |
| FBU1028 | Mirror Head Assembly (Drivers) |
| FBU1028 | Mirror Head Assembly (Passengers) |
| HAH6386 | Mirror Head Assembly Close Proximity |
| FBU3864 | Mirror Head Assembly Trailer Swing |
| LOAD HANDLING SYSTEM | |
| 0060090 | Hydraulic Pressure Filter |
| 0060091 | Hydraulic Return Filter |
| S.R.T.E. | |
| 8610 | Pressure Filter Hydraulic Pump |
| 8610 | Pressure Filter Hydraulic Motor |
| 8609 | Return Filter Hydraulic Reservoir |



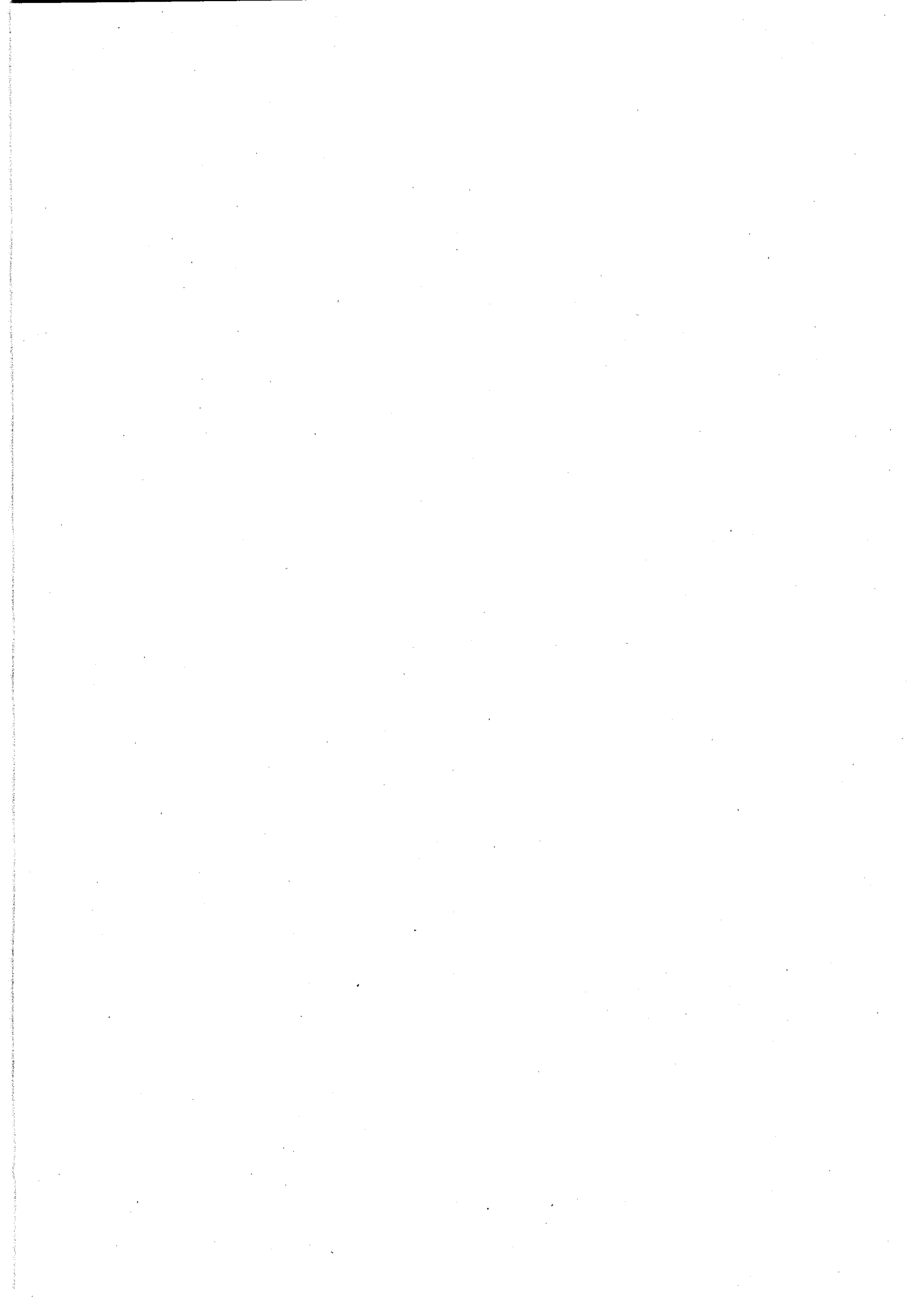
CHAPTER 7





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| | |

ANNEX A
ABS SUPPLEMENT



CONTENTS

This supplement is to be read in conjunction with corresponding chapters within the main body of this AESP.

| | Page |
|--------------------------|----------|
| Preliminary material | |
| Front cover (title page) | (i)/(ii) |
| Contents (this list) | (iii) |
| Introduction | (iii) |
| Abbreviations | (iii) |
| Warnings and cautions | (iii) |

OPERATING INFORMATION

CHAPTERS

- 1 General description - ABS IMPLICATIONS
- 2 Controls and instruments - ABS IMPLICATIONS
- 3 Operating instructions - ABS IMPLICATIONS
- 4 User maintenance
- 5 Simple rail transfer equipment
- 6 User spares data -ABS IMPLICATIONS
- 7 [REDACTED]

INTRODUCTION

1 This supplement provides information about the ABS variant of the Truck, Load Handling, (DROPS) 15 Tonne 8 x 6, LHD, MMLC (Leyland DAF) and must be read in conjunction with the existing non-ABS manual (2320-R-301-201).

2 The structure and layout of this supplement is similar to that of the existing manual. It contains both new information about the ABS system and shows where changes have occurred in the existing manual due to the ABS system.

ABBREVIATIONS

3 Abbreviations used in this publication, other than those considered to be standard, or engraved/etched as identification for gauges/controls, are listed below:

- ABS Anti-lock Braking System
- ECU Electronic Control Unit

WARNINGS

- (1) **THE "ABS" AND "ABS TRLR" WARNING LAMPS WILL BE DISABLED WHENEVER THE FV LIGHTING SWITCH IS IN THE "C" (CONVOY) OR "CS" (CONVOY/SIDELIGHT) POSITIONS.**
- (2) **FAILURE OF "ABS" AND "ABS TRLR" WARNING LAMPS TO ILLUMINATE INDICATES A POSSIBLE MAJOR MALFUNCTION OF THE ABS ELECTRONIC CONTROL UNIT (ECU).**
- (3) **A PRIME MOVER FITTED WITH ABS CAN TOW A SUITABLE TRAILER, WITH OR WITHOUT ABS FITTED.**
- (4) **A PRIME MOVER NOT FITTED WITH ABS CANNOT TOW A TRAILER WHICH IS FITTED WITH ABS, UNLESS THE PRIME MOVER HAS THE ABILITY TO TRIGGER THE TRAILER ABS THROUGH AN APPROVED INTER-VEHICLE SOCKET.**
- (5) **DO NOT ABUSE THE ANTI-LOCK BRAKING SYSTEM BY BRAKING HARSHLY OR BY A DELAYED APPLICATION OF THE SERVICE BRAKES.**

- (6) DO NOT RELY UPON THE ABS TO SHORTEN THE OVERALL STOPPING DISTANCE OF THE VEHICLE. DEPENDENT UPON THE ROAD CONDITIONS, THE OVERALL VEHICLE STOPPING DISTANCE CAN BE INCREASED.
- (7) TO MAXIMISE THE EFFICIENCY OF THE ABS SYSTEM, DO NOT USE A CADENCE BRAKING TECHNIQUE (I.E. RAPID AND REPETITIVE APPLICATIONS OF THE SERVICE BRAKES). WHEN BRAKING, ENSURE THAT A CONTINUOUS PRESSURE IS APPLIED TO THE FOOTBRAKE PEDAL.
- (8) IN THE EVENT OF A VEHICLE COMBINATION ABS FAILURE THE DRIVER MUST COMPENSATE HIS DRIVING TECHNIQUES ACCORDINGLY.
- (9) ALL VEHICLES EQUIPPED WITH ABS HAVE BRAKE SHOE LININGS THAT ARE COMPOSED OF A NON-ASBESTOS BRAKE FRICTION MATERIAL. IT IS ESSENTIAL THAT ALL WARNINGS LISTED FOR ASBESTOS RELATED PRODUCTS ARE STRICTLY OBSERVED.
- (10) ALWAYS FIT NEW BRAKE SHOES IN MATCHED PAIRS TO BOTH SIDES OF THE AFFECTED AXLE.
- (11) IT IS ESSENTIAL THAT ALL REPLACEMENT BRAKE SHOE LININGS ARE COMPOSED OF NON-ASBESTOS BRAKE FRICTION MATERIAL. DO NOT ATTEMPT TO INTER-MIX BRAKE SHOES WITH ASBESTOS AND NON-ASBESTOS FRICTION MATERIALS.
- (12) ENSURE THAT ALL REPLACEMENT BRAKE SHOE ASSEMBLIES ARE EQUIPPED WITH AN ABS SENSOR ACCESS HOLE.
- (13) TO AVOID OVERLOADING THE ELECTRICAL CIRCUITS AND THE SUBSEQUENT POSSIBILITY OF FIRE, DO NOT FIT A FUSE THAT EXCEEDS THE RECOMMENDED RATING.
- (14) REPEATED FAILURE OF THE SAME FUSE INDICATES A CIRCUIT FAULT WHICH MUST BE INVESTIGATED AND RECTIFIED.

CAUTIONS

- (1) The blink code system is intended as a Workshop diagnostic aid and must only be operated by authorised workshop personnel. Comprehensive operating instructions are contained in AESP 2320-R-301-512, Annex A, Chap 10.
- (2) The ABS diagnostic socket must only be used in conjunction with the WABCO Diagnostic Controller. The use of any other electronic test equipment may cause irreparable damage to the ABS electronic control unit (ECU).
- (3) The multimeter is an integral component of the diagnostic controller and has been designed for the measurement of the vehicle specific range (low voltage). It must not be used beyond its quoted measuring range.
- (4) Damage sustained to the ABS trailer socket or protective hinged cover will necessitate the renewal of the complete socket assembly and the entire ABS trailer wiring harness.
- (5) Do NOT use the ABS exciter ring as a lever (fulcrum) point.
- (6) Do NOT strike or dent the ABS exciter ring; protect the ring from damage.
- (7) Do NOT support the hub on the ABS exciter ring.
- (8) To prevent damage to the ABS sensor when fitting the hub, push the sensor into the mounting bracket until flush with the bottom face of the sensor bore.
- (9) The ABS exciter rings are non-serviceable components. In the event of accidental damage to any exciter ring, the affected hub assembly must be renewed.

CHAPTER 1
GENERAL DESCRIPTION
CONTENTS

| | |
|------|--|
| Para | |
| 1 | Axles |
| | Brake system |
| 3 | Foundation brake assemblies |
| 6 | Pneumatic brake system |
| 9 | Anti-lock braking system (ABS) (CAUTION) |
| 14 | ABS electrical system |

AXLES

- 1 Each hub on the front steer driven axle and each hub on both rear axles is fitted with an anti-lock braking system (ABS) exciter ring.
- 2 The brake brackets on the front steer driven axle and both rear axles are fitted with ABS sensor mounting brackets. Each sensor is held in position by a special spring clamp bush.

BRAKE SYSTEM

Foundation brake assemblies

- 3 In accordance with current EEC legislation, the brake shoe linings are manufactured from a non-asbestos friction material.
- 4 The brake shoes used on all ABS equipped vehicles, have a 12 mm access hole machined in each brake shoe to enable the ABS wheel sensor to be adjusted.
- 5 The brake drum assemblies on the drive steer front axle are fitted with a 2-piece brake drum dust cover assembly. Removal of the upper dust cover will expose the brake shoe ABS sensor access hole.

Pneumatic brake system

- 6 Additional relay valves are fitted to the front and rear brake circuits to enable the vehicle braking system to achieve rapid brake response times in accordance with current EEC directives.
- 7 The vehicle air system is equipped with a revised multi-circuit protection valve that incorporates a full feedback function. The full feedback function is an inherent safety feature that ensures that there is sufficient service brake pressure before the handbrake (park) brake can be released.
- 8 The second steer axle is equipped with type 24 service brake chambers. The revised brake chambers are used to enhance the braking performance and achieve a balance brake response.

Anti-lock braking system (ABS)

- 9 All vehicles are, equipped with a WABCO 'D' type (six-channel) anti-lock braking system (ABS).
- 10 The primary function of the ABS is to prevent the wheels of the vehicle locking due to brake applications whilst travelling on low adhesion road surfaces (e.g. ice, water, loose gravel etc.). The ABS is a fully automatic system and does not require any action on part of the driver to operate or select the ABS operation.
- 11 The operational-integrity of the vehicle ABS and, when applicable, trailer anti-lock braking systems are monitored by ABS warning lamps which are mounted in the instrument panel (see Para 15).
- 12 An ABS trailer socket is fitted adjacent to the standard towing couplings on the rear towing cross-member. The ABS trailer socket-conforms to the requirements of ISO 7638.
- 13 The ABS incorporates a rudimentary fault diagnostic system. This system utilises the 'ABS' warning lamp to transmit a coded message (*'blink code'*) indicating the operational integrity of the vehicle ABS components.

CAUTION

The blink code system is intended as a Workshop diagnostic aid and must only be operated by authorised workshop personnel: Comprehensive operating instructions are contained in AESP 2320-R-301-512, Annex A, Chap 10.

ABS ELECTRICAL SYSTEM

14 The vehicle ABS electrical circuits are protected by three plug-in blade type fuses which are attached to the main electrical component board beneath the centre fascia

15 The instrument panel incorporates two additional warning lamps that monitor the operational integrity of the anti-lock braking system (ABS). The 'ABS' warning lamp monitors the vehicle ABS whilst the 'ABS TRLR' monitors the trailer ABS.

NOTE

The 'ABS TRLR' warning lamp will only function whilst the vehicle is connected to an ABS equipped trailer.

16 The vehicle electrical system incorporates five additional electrical wiring harnesses for the anti-lock braking system (ABS).

CHAPTER 2
CONTROLS AND SWITCHES
CONTENTS

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| Para | Instrument panel warning lamps (WARNINGS) |
| 1 | 'ABS' (vehicle) warning lamp |
| 2 | 'ABS TRLR' (<i>trailer</i>) warning lamp |
| | Cab controls and switches |
| 3 | ABS blink code switch (CAUTION) |
| | Trailer components |
| 4 | Trailer ABS electrical socket (WARNINGS) |
| | ABS electrical inhibit circuits |
| 6 | Gearbox hydraulic retarder circuit |
| 7 | FV lighting switch circuit |

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|-----|-------------------------------|------|
| 1 | ABS warning lamps | 5 |
| 2 | Blink code switch | 6 |
| 3 | Trailer ABS electrical socket | 7 |

INSTRUMENT PANEL WARNING LAMPS

WARNING

(1) IN THE EVENT OF A VEHICLE COMBINATION ABS FAILURE THE DRIVER MUST COMPENSATE HIS DRIVING TECHNIQUES ACCORDINGLY.

(2) THE "ABS" AND "ABS TRLR" WARNING LAMPS WILL BE DISABLED WHENEVER THE FV LIGHTING SWITCH IS IN THE "C" (CONVOY) OR "CS" (CONVOY/SIDELIGHT) POSITIONS.

(3) FAILURE OF "ABS" AND "ABS TRLR" WARNING LAMPS TO ILLUMINATE INDICATES A POSSIBLE MAJOR MALFUNCTION OF THE ABS ELECTRONIC CONTROL UNIT (ECU).

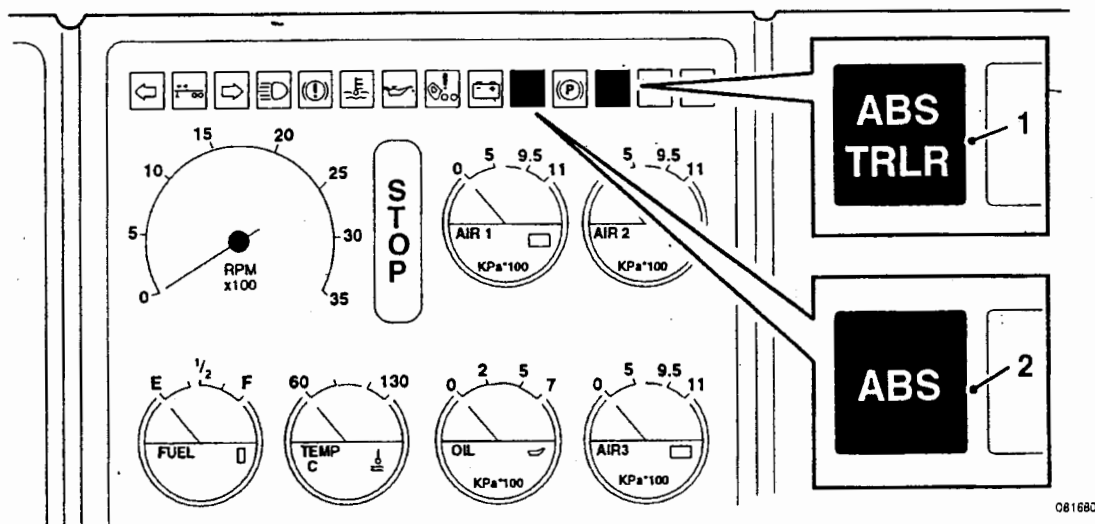
'ABS' (vehicle) warning lamp, Fig.11

1 This amber warning lamp monitors the vehicle anti-lock braking system (ABS) and will illuminate for the following conditions:

1.1 *Bulb check* - With the master/start key switch in position 2 (auxiliary circuits energised), this warning lamp will illuminate for approximately 2 seconds and then extinguish.

1.2 *ABS fault detected*. With the master/start key switch in position 2 (auxiliary circuits energised), the warning lamp will illuminate continuously whenever a system fault is detected in the vehicle ABS. The conventional braking system will remain operative but the vehicle must be driven with extreme care and the ABS fault warning must be reported at the earliest opportunity.

1.3 *ABS rectified fault*: The warning lamp will illuminate continuously and will extinguish when the vehicle road speed exceeds 6 km/h. This indicates that a previously detected fault in the ABS that has been satisfactorily rectified; all faults are subsequently recorded and stored in the ABS electronic control unit (ECU) memory.



1 "ABS TRLR" (trailer) warning lamp

2 "ABS" (vehicle) warning lamp

Fig 1 ABS warning lamps

'ABS TRLR' (trailer) warning lamp, Fig. 1

2 This amber warning lamp monitors the trailer anti-lock braking system (ABS) and is only operational whilst the vehicle is connected to an ABS equipped trailer. This warning lamp will illuminate for the following conditions:

2.1 Bulb check: With the master/start key switch in position 2 (auxiliary circuits energised), this warning lamp will illuminate continuously and will extinguish when the vehicle combination road speed exceeds 6 km/h.

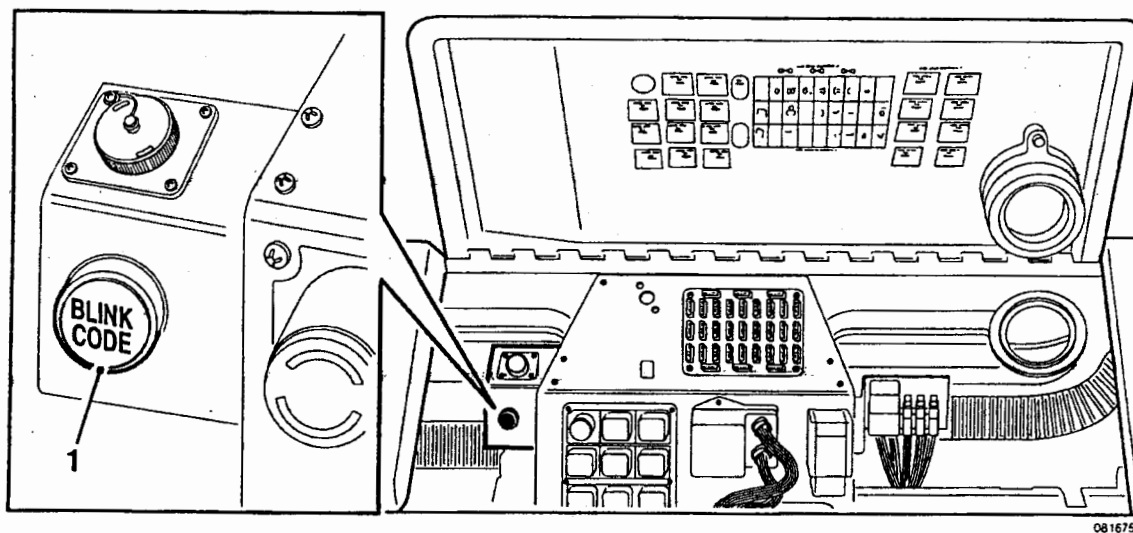
2.2 Trailer ABS fault: The warning lamp will illuminate continuously whenever a system fault is detected in the trailer ABS. The conventional braking system will remain operative but the vehicle combination must be driven with extreme care and the ABS fault warning must be reported at the earliest opportunity.

CAB CONTROLS AND SWITCHES**ABS blink code switch, Fig.2**

3 The blink code switch is used to activate the ABS blink code fault diagnostic system and is used to identify a fault in the ABS electronic circuits. The blink code switch is attached to the main electrical component board beneath the centre fascia panel.

CAUTION

The ABS blink code fault diagnostic system is intended as a workshop diagnostic aid and must only be operated by authorised workshop personnel. Comprehensive operating instructions are contained in AESP 2320-R-301-521, Annex A, Chap 10.



1 Blink code switch

Fig 2 ABS blink code switch location

TRAILER COMPONENTS

Trailer ABS electrical socket, Fig.3

WARNINGS

(1) A PRIME MOVER FITTED WITH ABS CAN TOW A SUITABLE TRAILER, WITH OR WITHOUT ABS FITTED.

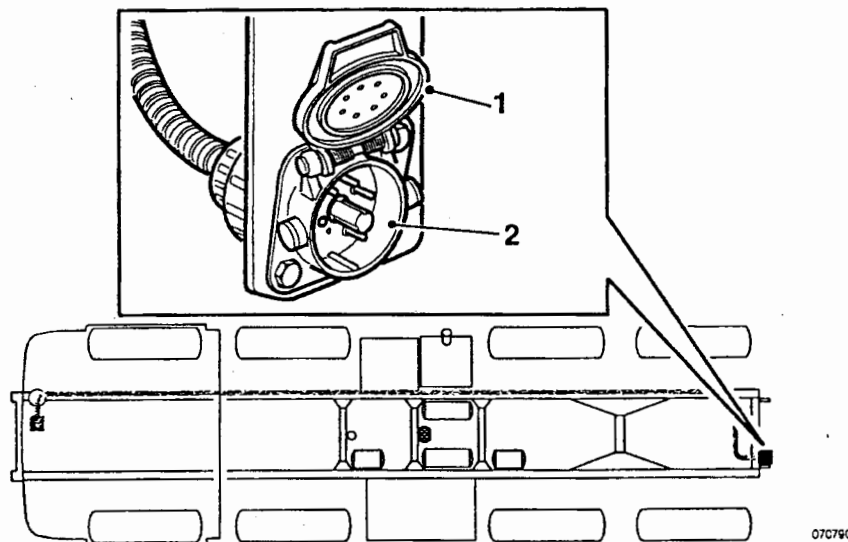
(2) A PRIME MOVER NOT FITTED WITH ABS CANNOT TOW A TRAILER WHICH IS FITTED WITH ABS, UNLESS THE PRIME MOVER HAS THE ABILITY TO TRIGGER THE TRAILER ABS THROUGH AN APPROVED INTER-VEHICLE SOCKET.

4 The trailer ABS electrical socket is secured to a mounting bracket which is attached to the left-hand side of the rear chassis trailer cross-member.

5 The trailer ABS electrical socket is fitted with a spring-loaded protective cover to minimise environmental degradation of the electrical pins. When connecting the ABS trailer socket, ensure that the hinged protective cover is handled with extreme care.

CAUTION

Damaged sustained to the ABS trailer socket or protective hinged cover will necessitate the renewal of the complete socket assembly and the entire ABS trailer wiring harness.



1 Protective cover

2 Trailer ABS socket

Fig 3 Trailer ABS electrical socket

ABS ELECTRICAL INHIBIT CIRCUITS**Gearbox hydraulic retarder circuit**

6 The ABS electrical circuits incorporate a gearbox retarder inhibit circuit. This electrical inhibit circuit will automatically disable/disengage the gearbox retarder whenever an ABS wheel slip condition is detected. Normal operation/re-engagement of the gearbox retarder will be automatically resumed when normal tyre adhesion is established.

FV lighting switch circuit

7 The ABS electrical circuits incorporate an FV lighting switch inhibit circuit. This electrical inhibit circuit will automatically disable the "ABS." and "ABS TRLR" warning lamps whenever the FV lighting switch is in the "C" (convoy) or "CS" (convoy/sidelight) lighting positions.

CHAPTER 3
OPERATING INSTRUCTIONS
CONTENTS

Para

- 1 ABS driving instructions (WARNINGS)
- 5 ABS blink code switch (CAUTION)
- 6 Trailer ABS socket (WARNINGS)

Fig

- 1 Blink code switch
- 2 Trailer ABS electrical socket

Page

- 11
- 12

ABS DRIVING INSTRUCTIONS**WARNINGS**

(3) DO NOT ABUSE THE ANTI-LOCK BRAKING SYSTEM BY BRAKING HARSHLY OR BY A DELAYED APPLICATION OF THE SERVICE BRAKES.

(4) DO NOT RELY UPON THE ABS TO SHORTEN THE OVERALL STOPPING DISTANCE OF THE VEHICLE. DEPENDENT UPON THE ROAD CONDITIONS, THE OVERALL VEHICLE STOPPING DISTANCE CAN BE INCREASED.

(5) TO MAXIMISE THE EFFICIENCY OF THE ABS SYSTEM, DO NOT USE A CADENCE BRAKING TECHNIQUE (i.e. RAPID AND REPETITIVE APPLICATIONS OF THE SERVICE BRAKES). WHEN BRAKING, ENSURE THAT A CONTINUOUS PRESSURE IS APPLIED TO THE FOOTBRAKE PEDAL.

(6) FAILURE OF THE VEHICLE OR TRAILER ABS WARNING LAMPS TO ILLUMINATE INDICATES A POSSIBLE MAJOR MALFUNCTION OF THE ABS ELECTRONIC CONTROL UNIT (ECU).

(7) IN THE EVENT OF A VEHICLE COMBINATION ABS FAILURE THE DRIVER MUST COMPENSATE HIS DRIVING TECHNIQUES ACCORDINGLY.

1 The anti-lock braking system (ABS) prevents the vehicle road wheels from locking during an emergency stop or when braking on a slippery road surface. The ABS will enable the driver to retain full control of the vehicle and maintain directional stability during an ABS detected wheel lock condition.

2 It is essential that the vehicle be driven in a safe and conventional manner. Do not adapt your normal driving style when driving a vehicle equipped with ABS.

3 If during the 'first parade service' an ABS warning light remains illuminated the fault must be reported; do not proceed until authorised.

NOTE

When towing a DROPS trailer fitted with ABS, the trailer warning lamp will remain illuminated and will extinguish when the vehicle combination road speed exceeds 6 km/h. If the warning lamp does not extinguish, carry out the same action as with a vehicle fault.

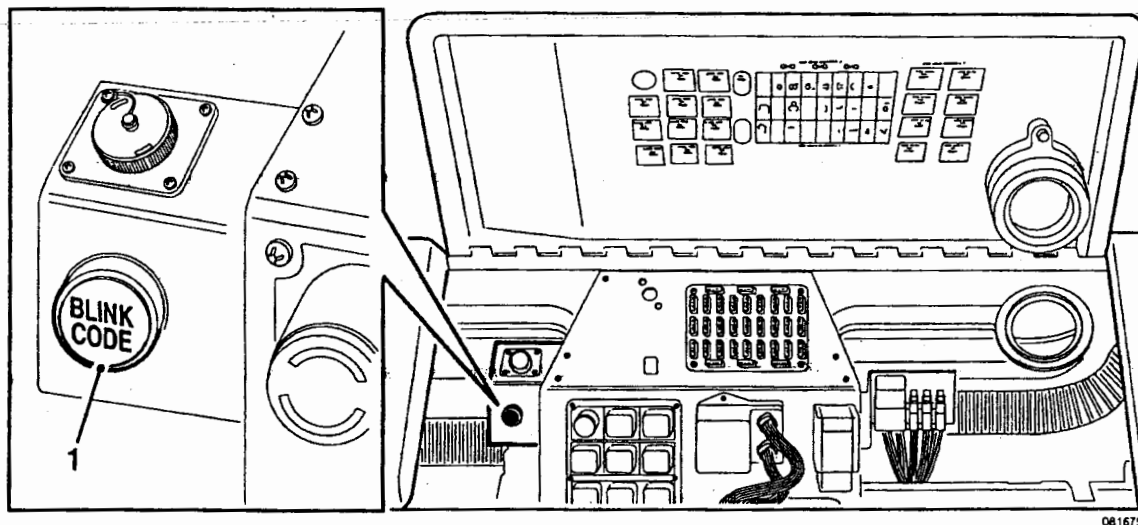
4 If during the journey an ABS warning light illuminates this indicates, an ABS fault has occurred which, will return the vehicle to a conventional braking system. Missions can be completed as the conventional braking system remains fully operational. On completion of the mission the fault must be reported.

ABS blink code switch, Fig.1

5 The blink code switch is used to activate the ABS blink code fault diagnostic system and is used to identify a fault in the ABS electronic circuits. The blink code switch is attached to the main electrical component board beneath the centre fascia panel.

CAUTION

The ABS blink code fault diagnostic system is intended as a workshop diagnostic aid and must only be operated by authorised workshop personnel. Comprehensive operating instructions are contained in AESP 2320-R-301-521, Annex A, Chap 10.



1 Blink code switch

Fig 1 Blink code switch location

Trailer ABS socket, Fig.2**WARNINGS**

(8) A PRIME MOVER FITTED WITH ABS CAN TOW A SUITABLE TRAILER, WITH OR WITHOUT ABS FITTED.

(9) A PRIME MOVER NOT FITTED WITH ABS CANNOT TOW A TRAILER WHICH IS FITTED WITH ABS, UNLESS THE PRIME MOVER HAS THE ABILITY TO TRIGGER THE TRAILER ABS THROUGH AN APPROVED INTER-VEHICLE SOCKET.

6 The trailer ABS electrical socket is secured to a mounting bracket that is attached to the left-hand side of the rear chassis trailer cross-member.

7 The trailer ABS electrical socket is fitted with a spring-loaded protective cover to minimise environmental degradation of the electrical pins. When connecting the ABS trailer socket, ensure that the hinged protective cover is handled with extreme care.

CAUTION

Damaged sustained to the ABS trailer socket or protective hinged cover will necessitate the renewal of the complete socket assembly and the entire ABS trailer wiring harness.

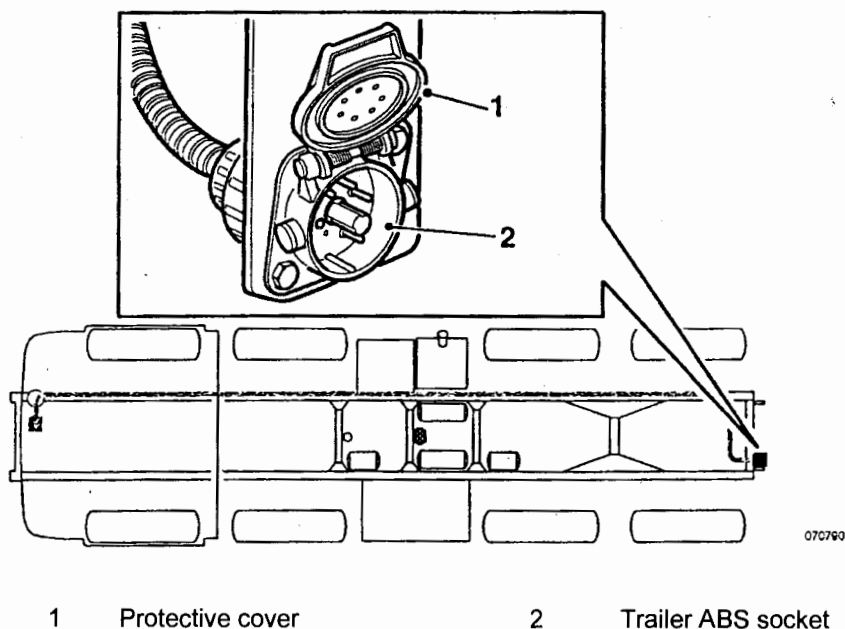


Fig 2 Trailer ABS socket

CHAPTER 6
USER SPARES DATA
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| Table | | Page |
|-------|-------------------|------|
| 1 | Replacement bulbs | 14 |
| 2 | ABS fuse data | 14 |

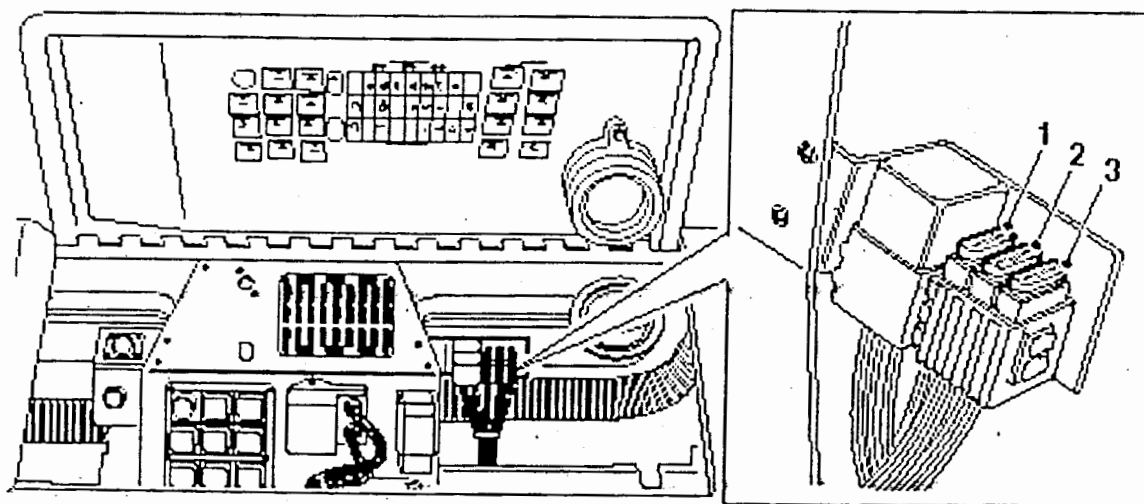
| Fig. | | Page |
|------|------------------------------|------|
| 1 | ABS circuit protection fuses | 14 |

TABLE 1 REPLACEMENT BULBS

| Serial | Lamp | Volts | Watts | Type | Part No. |
|--------|-----------------------------------|-------|-------|-----------------------|----------|
| (1) | (2) | (3) | (4) | (5) | (6) |
| 1 | 'ABS' (vehicle) warning lamp | 24 | 1.2 | Fused bulb and holder | FBU 3581 |
| 2 | 'ABS TRLR' (trailer) warning lamp | 24 | 1.2 | Fused bulb and holder | FBU 3581 |

TABLE 2 ABS FUSE DATA

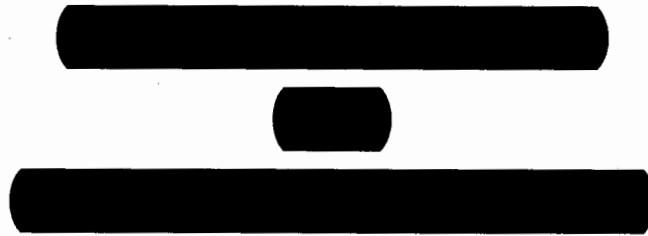
| Serial | Fuse No. | Amperage Rating | Circuits Protected |
|--------|-----------|-----------------|-----------------------------------|
| (1) | (2) | (3) | (4) |
| 1 | Fig 1 (1) | 10 amps | Vehicle ECU |
| 2 | Fig 1 (2) | 10 amps | Vehicle ECU and diagnostic socket |
| 3 | Fig 1 (3) | 10 amps | Trailer ECU |



- 1 ECU (10 amps)
- 2 ECU and diagnostic socket (10 amps)
- 3 Trailer ECU (10 amps)

Fig 1 ABS circuit protection fuses

ANNEX B







CHAPTER 1
GENERAL DESCRIPTION
CONTENTS



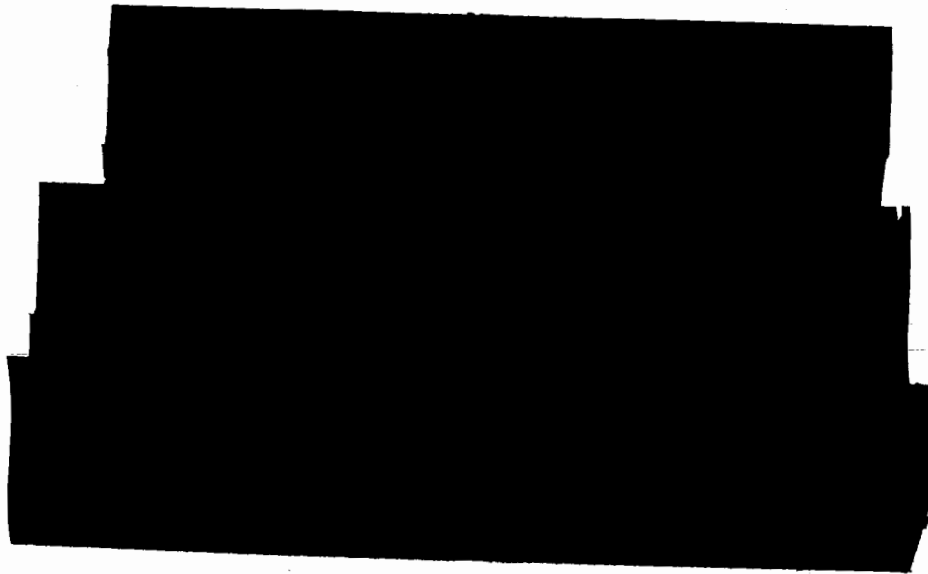
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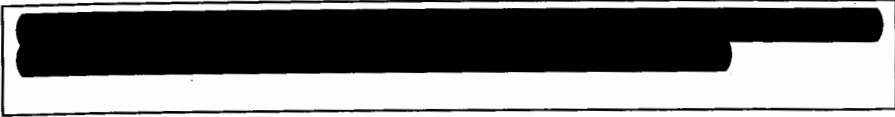
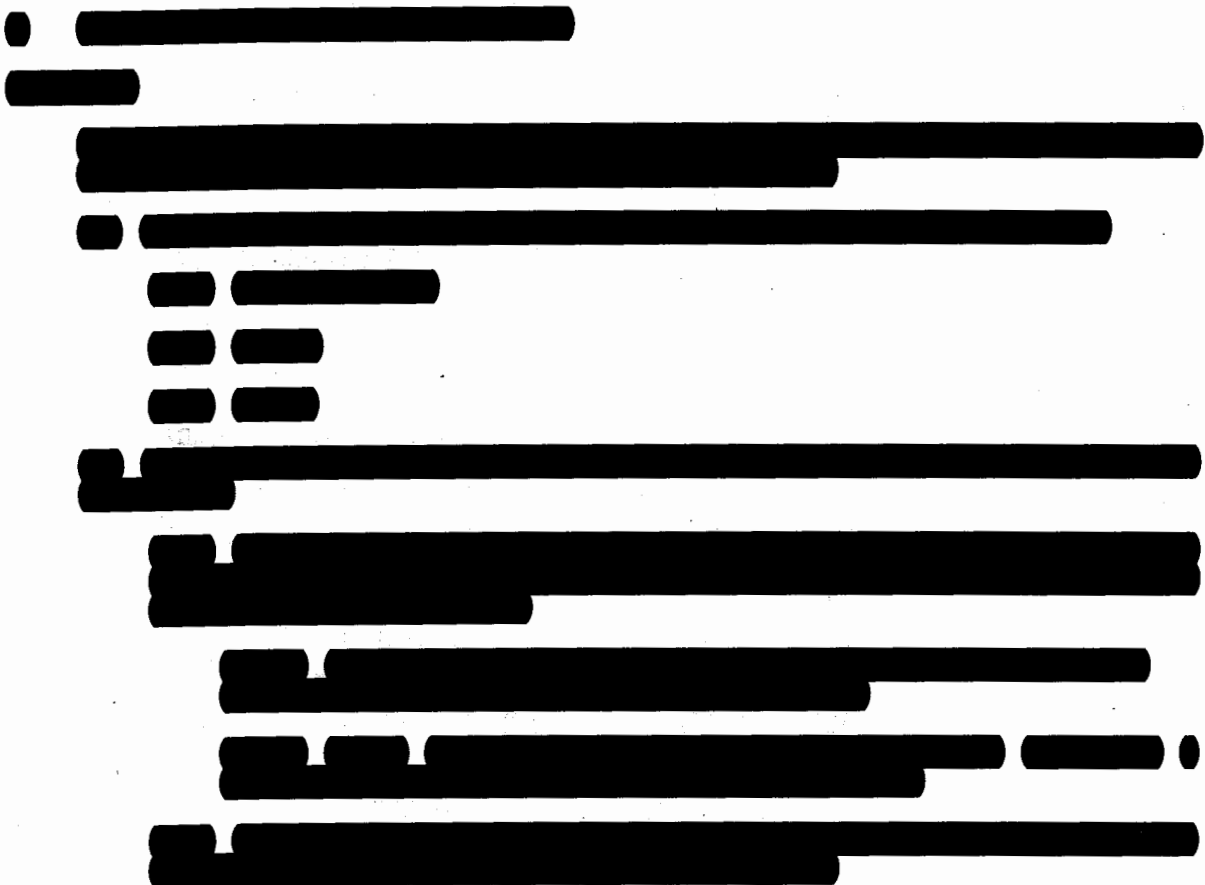
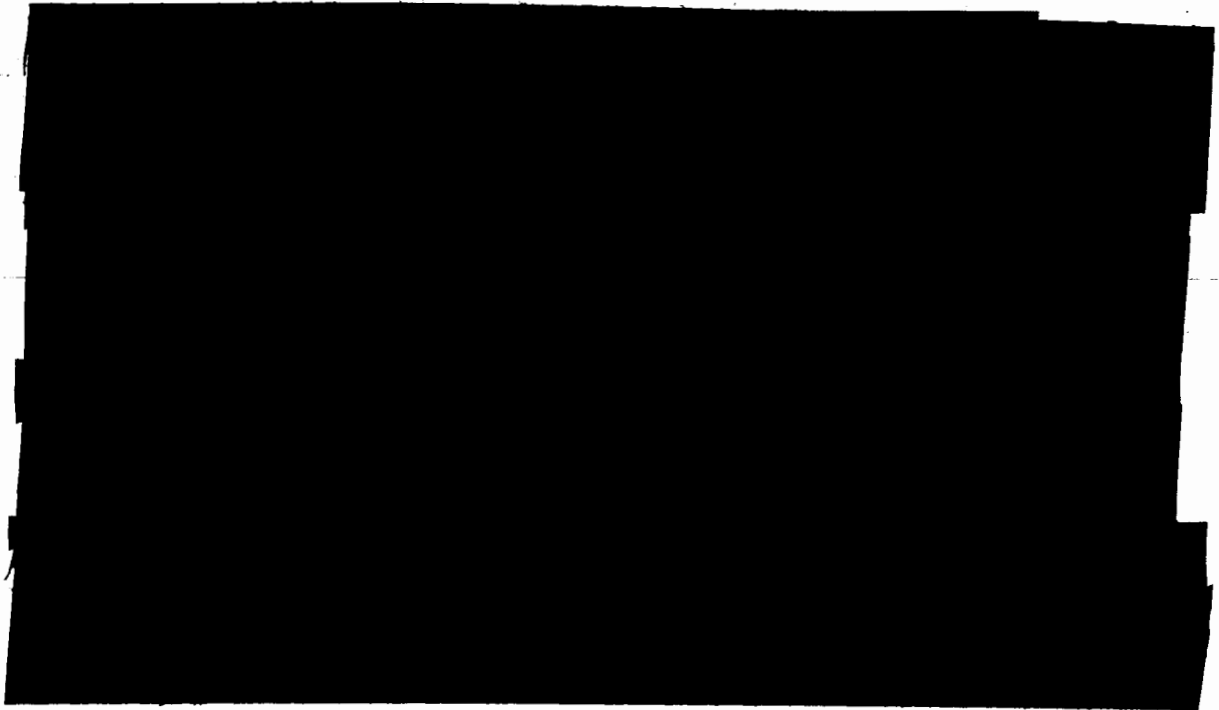


Fig 2. [Redacted]








ARMY EQUIPMENT AND SUPPORT PUBLICATION (AESP) AND ELECTRICAL AND MECHANICAL ENGINEERING REGULATIONS (EMER) - FORM 10

| | | | | | | |
|---------------------------|--|---------------------------------|-----|--------------------------|----|--------------------------|
| *AESP/EMER NUMBER: | | *IS THIS SAFETY RELATED? | YES | <input type="checkbox"/> | No | <input type="checkbox"/> |
|---------------------------|--|---------------------------------|-----|--------------------------|----|--------------------------|

| | | | |
|--|---|----------------|---|
| Send Form 10 via the Email or Post address. However email is preferred. | | Tel | 030 679 71141 or 9679 71141 |
| Email: |  | Post to | Form 10 Cell FRAGAS BFPO 794 |

| | | | |
|-----------------------------|--|--|--------------------------------------|
| ORIGINATORS DETAILS: | | | |
| *Address | | | *Name |
| | | | Rank / Grade |
| | | | *Phone |
| | | | *Senders Reference |
| | | | *Date Raised |
| * E-Mail | | | Eqpt Asset Code if applicable |

| | | | | | | | |
|--|-------------------|-----------------|-------------------|--------------|---------------|--------------------|--------------|
| AESP/EMER DETAILS: | | | | | | | |
| *Full Title of AESP/EMER (Not the AESP/EMER Number) | | | | | | | |
| *Edition | *Amendment | *Chapter | *Paragraph | *Page | Figure | Instruction | Other |
| | | | | | | | |
| *Comments: If additional information is to be supplied, please e-mail with the Form 10 as separate attachments. | | | | | | | |
| | | | | | | | |

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|-------------------------------|--|----------------------------|--|
| FORM 10 CELL USE: | | | |
| *Date Received | | *Form 10 Reference | |
| *Date Sent to PT / SME | | TDOL Problem Report | |

| | | | |
|---|--------------|---|----------------------|
| PROJECT TEAM / SME RESPONSE TO COMMENTS: | | | |
| Project Team (PT) / SME | | Sponsors Name | |
| *Phone | | Rank / Grade | |
| *Email | | *Date Received | |
| *The following action is to be carried out: | | Mark: | Mark: |
| Issue a revised/amended AESP/EMER: | | | Under investigation: |
| Incorporate comment(s) in future amendments: | | | No action required: |
| Remarks: | | | |
| | | | |
| SPONSOR/PT FINAL CLOSURE STEPS | Mark: | Form 10 Cell notified of Date action taken | Date: |
| Form 10 Originator notified of the action taken: | | | |

AESP Form 10 (Issue 6.0 dated January 13 (JAMES))

* Fields are mandatory for form initiator

* Fields are required to complete

