ARMY EQUIPMENT
SUPPORT PUBLICATION

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OCTOBER 1990

TRUCK UTILITY HEAVY (T.U.H) 4 x 4, REYNOLDS BOUGHTON ALL VARIANTS

OPERATING INFORMATION

This publication contains information covering the requirements of Categories 2, and 3 at information level 1

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PRELIMINARY MATERIAL

OPERATING INFORMATION

PREFACE

Sponsor LSOR3:

INTRODUCTION

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

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

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

RELATED AND ASSOCIATED PUBLICATIONS

Related publications

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

CATEGORIES AND INFORMATION LEVELS

Category	1	2	3	4		5				6	7		8	
				1	2	1	2	3	4		1	2	1	2
1 USER/OPERATOR	101	201	201	·	·	·	·	·	·	601	711	·	·	·
2 UNIT MAINTENANCE	·	·	302	·	·	512	522	532	·	·	·		·	
3 FIELD MAINTENANCE	·	·	302	·	·	512	522	532	·	·	·		·	
4 BASE MAINTENANCE	·	·	·	·	·	512	524	532	·	·	·		·	·

1 0 Purpose & Planning Information
2 0 Operating Information
3 0 Technical Description
4 1 Installation Instructions
4 2 Prep for Special Environments
5 1 Failure Diagnosis
5 2 Repair Instructions
5 3 Inspection Standards
5 4 Calibration Procedures
6 0 Maintenance Schedules
7 1 Illustrated Parts Catalogue
7 2 Commercial Parts Lists
8 1 Modification Instructions
8 2 General Instructions

· Not Published

Reference to relevant Group Index (see AESP 0100-A-001-013) must be made to ensure the availability of the listed publications

Associated publications

5

Code No	Type	Title
2815-F-641	AESP	Perkins Engine, Phaser 110 MT
2520-C-122	AESP	Gearbox, 5 Speed, Spicer. T5-250 with T5-290 Supplement

WARNINGS

(1) UNDER NO CIRCUMSTANCES SHOULD THE VEHICLE BE DRIVEN WITH BRAKE FLUID/WARNING LAMP ILLUMINATED. IF THE WARNING LAMP ILLUMINATES WHILST DRIVING THE VEHICLE, IT SHOULD BE BROUGHT TO A HALT AS SOON AS SAFETY PERMITS.

(2) PROTECTIVE GLOVES MUST BE WORN DURING WINCH OPERATIONS WHEN PAYING OUT OR STOWING CABLE.

(3) KEEP HANDS AWAY FROM THE WINCH DRUM AND FAIRLEAD ROLLERS.

(4) ALL PERSONNEL MUST BE KEPT CLEAR OF THE ROPE WHILST UNDER TENSION DURING RECOVERY OPERATIONS.

(5) THE HAND OPERATED ENGINE SPEED CONTROL MUST NOT BE USED WHILST THE VEHICLE IS IN MOTION.

(6) WHEN RADIO OPERATIONS ARE REQUIRED WITH AN FFR VEHICLE STATIONARY, THE EXHAUST EXTENSION MUST BE USED.

Chapter 1-1

GENERAL DESCRIPTION

TRUCK UTILITY HEAVY GS CARGO (W/WINCH)

CONTENTS

GENERAL DESCRIPTION

TRUCK UTILITY HEAVY GS CARGO (W/WINCH)

INTRODUCTION

1 The general service (GS) cargo vehicle is a four wheeled type vehicle, driving through all four wheels. A third differential is provided in the transfer box to prevent inter-axle wind-up and the means for locking this is within the driver's control. Both right hand and left hand drive vehicles are available and the vehicle is suitable for sustained operation on all types of road surfaces and over broken and unpaved terrain. The vehicle weighs approximately 3.3 tonnes unladen and is capable of towing, up to 2.2 tonnes. It can be supplied with or without a 3.7 tonne capacity winch.

ENGINE

2 The engine is a four cylinder, in-line, four stroke diesel type with direct injection. The engine capacity is 4 litres, firing order 1, 3, 4, 2 and direction of rotation clockwise when viewed from the front. The air intake to the engine is turbocharged, the turbocharger being driven by the engine exhaust gases. Pressure lubrication of the engine is supplied by a rotor type oil pump with oil filtration being provided by a single full flow filter.

CLUTCH

3 The clutch is a single plate hydraulically operated unit which transfers the drive from the engine to the gearbox.

GEARBOX

4 The synchromesh gearbox gives five forward speeds including overdrive and one reverse speed.

TRANSFER BOX

5 The transfer box is a two speed, gear chain driven gearbox, incorporating a third differential with a vacuum operated lock. It provides a high and low ratio gear arrangement and a power take-off facility for the winch (where fitted).

FRONT AXLE

6 The front axle is a rigid tubular steel type and provides drive to the front wheels. It incorporates two fully floating half shafts and a hypoid bevel differential unit. Two integral pads provide location and seating for the front road springs.

REAR AXLE

7 The rear axle is a rigid tubular steel type and provides drive to the rear wheels. It incorporates two fully floating half shafts and a special differential unit which maintains traction if one wheel starts to slip.

STEERING (POWER ASSISTED)

8 The steering is power assisted and comprises a hydraulic reservoir, an engine driven hydraulic pump and a re-circulating ball steering box. The steering linkage incorporates a damper and adjustable steering stops fitted to the stub axle assemblies.

SUSPENSION

9 The suspension at each wheel station comprises semi-elliptic taper leaf springs, double acting telescopic shock absorbers and rubber bump stops.

WHEELS

10 The wheels incorporate retaining discs to facilitate helicopter slinging. The wheel stud threads are left hand on the left hand side of the vehicle and right hand on the right hand side. The tyres are tubeless.

BRAKING SYSTEM

11 The braking system is hydraulically operated with dual circuit, vacuum servo assisted drum brakes on all four wheels. A mechanical handbrake operates on the rear wheels only. A load sensing valve regulates braking effort according to load.

FUEL AND EXHAUST SYSTEM

12 The fuel system includes a tank, fuel lift pump, filter, fuel injection pump and injectors. The exhaust system comprises a manifold down pipe, silencer box and outlet pipe. A start pilot ether cold start system is also fitted for starting in extremely cold conditions.

COOLING SYSTEM

13 The cooling system provides coolant for the engine block and the lubricating oil cooler. The system incorporates an impeller-type pump, viscous fan, a wax capsule thermostat and a radiator with a separate expansion tank.

ELECTRICAL SYSTEM

14 The electrical system is 12 V dc and contains two lead acid batteries, alternator and starter motor. The alternator incorporates a voltage rectifier and suppression.

CHASSIS FRAME AND FITTINGS

15 The chassis frame is constructed of channel section side members with fitted, bolted crossmembers. A towing jaw which can be fitted at two different heights to accommodate different trailers, is mounted on the rear crossmember and a towing pin onto the front bumper.

BODY CAB AND FITTINGS

16 The cab is a two door, three seater type incorporating an external platform on the cab roof. Lashing rings, a dropside and tailgate are provided to facilitate cargo handling. Stowage lockers are fitted in the vehicle body and are accessed by means of locker doors. The doors are secured with a flush paddle latch handle. A removable polyester canopy and steel superstructure is provided. Access to the engine is by means of an external hinged bonnet and an internal detachable cowl. Cab heating and ventilation is provided by a forced convection heater, air vents and windows. The cab is fitted with sliding rear windows. Two fold down steps are fitted to each side of the cab to give access to the roof platform. Grab handles are also fitted to the roof platform.

WINCH

17 The winch (where fitted) is hydraulically driven and incorporates a dog clutch which allows free spooling when disengaged.

VEHICLE AND BODY PAINT

18 The vehicle and body paint is generally infra red reflective (NATO green) with some items painted commercial black.

SPECIFICATION PLATE

19 The specification plate carries vehicle identification, weight details and chassis number. This plate is fitted on the cab footwell on the right hand side of the vehicle.

ENGINE NUMBER

20 The engine number is stamped on an identification plate fitted to the left hand side of the cylinder block.

MANUAL GEARBOX IDENTIFICATION

21 The manual gearbox identification is mounted on the left hand side of the gearbox casing.

TWO SPEED TRANSFER BOX IDENTIFICATION

22 The two speed transfer box identification number is located on the rear of the transfer box casing.

Chapter 1-2

GENERAL DESCRIPTION

TRUCK UTILITY HEAVY FFR (HARD TOP)

CONTENTS

Note ...

This chapter to be read in conjunction with Chapter 1-1.

INTRODUCTION

1 The FFR hard top vehicle is a four wheeled type vehicle, driving through all four wheels. A third differential is provided in the transfer box to prevent inter-axle wind-up and the means for locking this is within the driver's control. Both right hand and left hand drive vehicles are available and the vehicle is suitable for sustained operation on all types of road surfaces and over broken and unpaved terrain. The vehicle weighs approximately 3.6 tonnes unladen and is capable of towing, up to 2.2 tonnes. It can be supplied with or without a 3.7 tonne capacity winch.

ENGINE

2 A hand operated engine speed control is fitted in the cab as a mechanical means of obtaining the optimum amount of engine revolutions for satisfactory radio power requirements.

FULL AND EXHAUST SYSTEM

3 A gas light exhaust extension is available for fitment during static periods with camouflage fitted and engine operating. The extension is stored underneath the radio table.

ELECTRICAL SYSTEM

4 A screened 24 V dc electrical system is fitted for radio power supply requirements. Suppression is fitted to the heater and windscreen wiper motors and radio suppression bonding leads are fitted in the rear of the vehicle. 4 x 12V batteries, an extra 24V alternator and 12V alternator suppression kit are fitted.

BODY CAB AND FITTINGS

5 A hard top canopy with a rear entry door is fitted to the vehicle body. The hard top incorporates radio antenna mounts on the roof. A radio table and an additional radio operator's seat are provided inside the canopy. Four radio batteries are housed in the forward end storage area which replaces the standard dropside.

Chapter 1-3

GENERAL DESCRIPTION

TRUCK UTILITY HEAVY FFR (SOFT TOP)

CONTENTS

Note ...

This chapter to be read in conjunction with Chapter 1-1 and 1-2.

INTRODUCTION

1 The FFR soft top vehicle is a four wheeled type vehicle, driving through all four wheels. A third differential is provided in the transfer box to prevent inter-axle wind-up and the means for locking this is within the driver's control. Both right hand and left hand drive vehicles are available and the vehicle is suitable for sustained operation on all types of road surfaces and over broken and unpaved terrain. The vehicle weighs approximately 3.5 tonnes unladen and is capable of towing, up to 2.2 tonnes. It can be supplied with or without a 3.7 tonne capacity winch.

BODY, CAB AND FITTINGS

2 The soft top variant provides antenna ground planes and bonding straps for radio operation. Tapped fixing arrangements for the tuning units are also provided.

Chapter 1-4

GENERAL DESCRIPTION

TRUCK UTILITY HEAVY FFR TCB CARRIER

CONTENTS

Notes ...

(1) This chapter to be read in conjunction with Chapter 1-1 and 1-2.

(2) Cables from the chassis mounted terminal box to the through connector on the TCB, the TCB and the TCB internal fittings and equipment are not covered by this description.

INTRODUCTION

1 The FFR TCB Carrier vehicle is a four wheeled type vehicle, driving through all four wheels. A third differential is provided in the transfer box to prevent inter-axle wind-up and the means for locking this is within the driver's control. Both right hand and left hand drive vehicles are available and the vehicle is suitable for sustained operation on all types of road surfaces and over broken and unpaved terrain. The vehicle weighs approximately 3.4 tonnes unladen and is capable of towing, up to 2.2 tonnes. It can be supplied with or without a 3.7 tonne capacity winch.

BODY, CAB AND FITTINGS

2 Provision can be made for TCB fixing to the vehicle.

Chapter 2-1

CONTROLS AND INSTRUMENTS

TRUCK UTILITY HEAVY GS CARGO (W/WINCH)

CONTENTS

CONTROLS AND INSTRUMENTS

TRUCK UTILITY HEAVY GS CARGO (W/WINCH)

INTRODUCTION

1 The driving controls, instruments and cab auxiliaries for right hand drive (rhd) vehicles fitted with or without a winch, are shown in Fig 1.

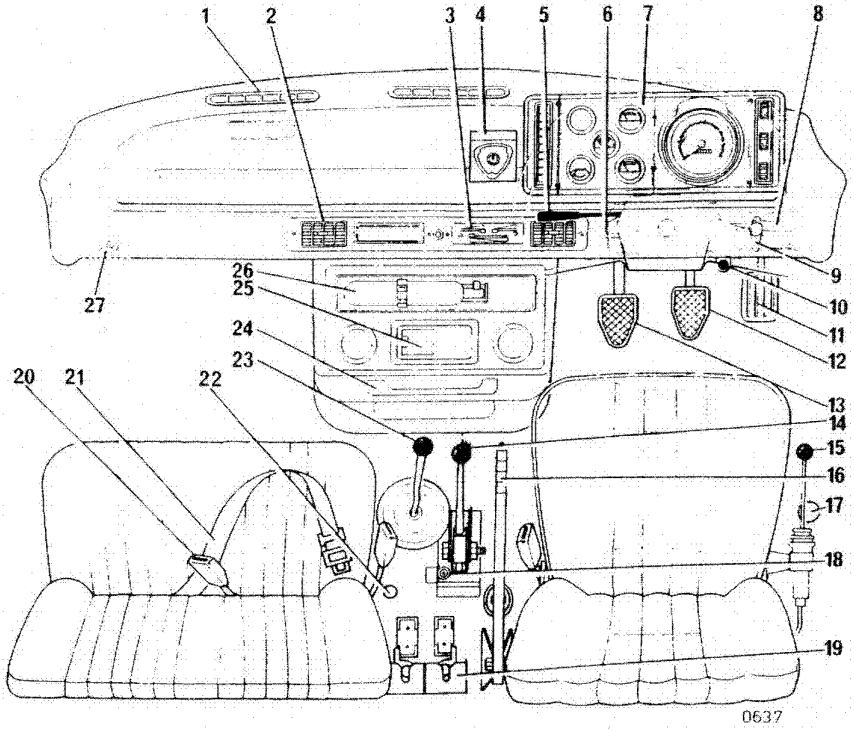

Fig 1 Instruments, gauges and controls (rhd)

Key to Fig 1

1 Windscreen vent

2 Face vent

3 Distribution and temperature controls

4 Lighting switch

5 Combined turn lamps, headlamp beam control and horn switch

6 Starter switch (key)

7 Display panel

8 Windscreen wipers and washers switch

9 Start pilot pump

10 Engine stop control

11 Accelerator pedal

12 Footbrake pedal

13 Clutch pedal

14 Transfer box ratio change lever

15 Winch control lever (where fitted)

16 Handbrake

17 Winch hydraulic oil filler (where fitted)

18 Transfer gearbox differential lock

19 Rifle rest

20 Seat belt buckle stalk

21 Lap seat belt

22 PTO control (where fitted)

23 Gearbox selector lever

24 Engine access cover handle

25 Ashtray

26 Fire extinguisher

27 Bonnet release catch

2 The driving controls, instruments and cab auxiliaries for left hand drive (lhd) vehicles fitted with or without a winch, are shown in Fig 2. The start pilot pump is on the side of the engine cowl next to the accellerator pedal.

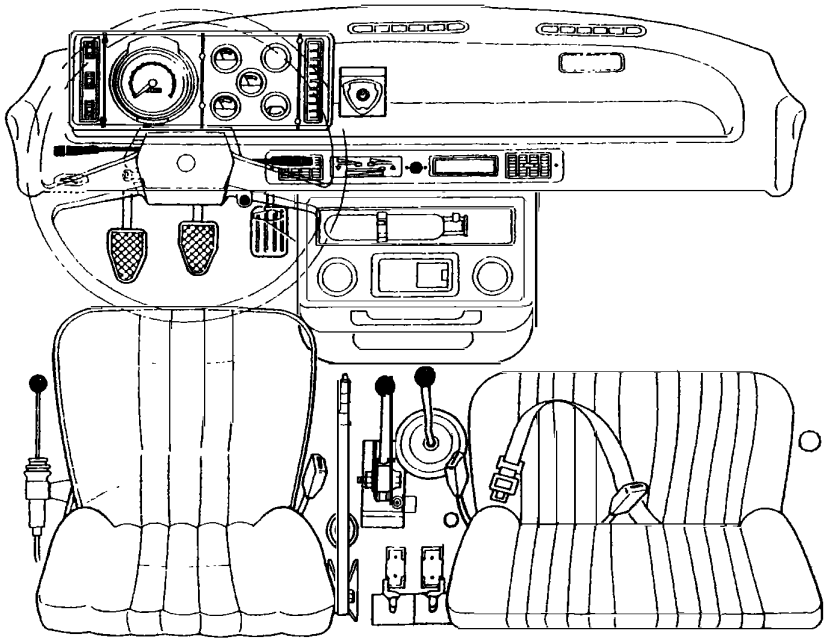

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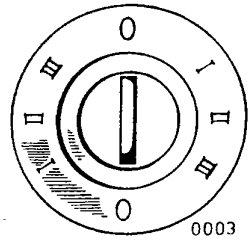
Fig 2 Instruments, gauges and controls (lhd)

STARTER SWITCH

3 The starter switch (Fig 1 (6) and Fig 3) incorporates a steering lock and is operated by a key. The key can only be inserted and removed at position '0'. Position 'I' unlocks the steering column, position 'II' initiates cab auxiliaries and is the running position, further rotation through position 'III' against a return spring, engages the starter motor. When the switch is released it returns automatically to the engine running position ie position 'II'.



0 - steering column locked (ignition off)

I - steering column unlocked (ignition off)

II - cab auxiliaries on (running position)

- turn key through position III to engage starter motor

Fig 3 Starter switch

ENGINE STOP CONTROL

4 The engine stop control (Fig 1 (10) and Fig 4) provides the only means of stopping the engine by cutting off the fuel supply. When the stop control knob is pulled outwards and held the engine will cut-out. The control is re-set by pushing the knob back towards the dashboard. The engine stop control will override the starter switch.

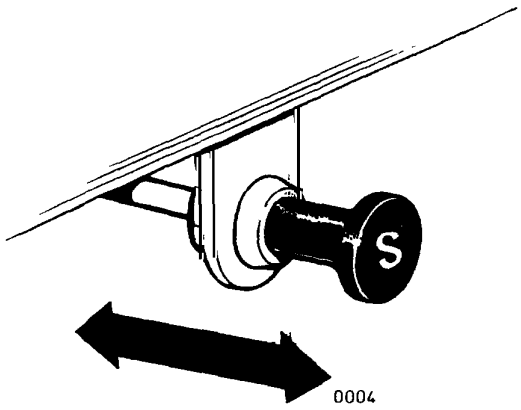


Fig 4 Engine stop control

START PILOT PUMP

5 The start pilot pump aids starting in cold conditions by enabling the driver to pump ether into the inlet manifold.

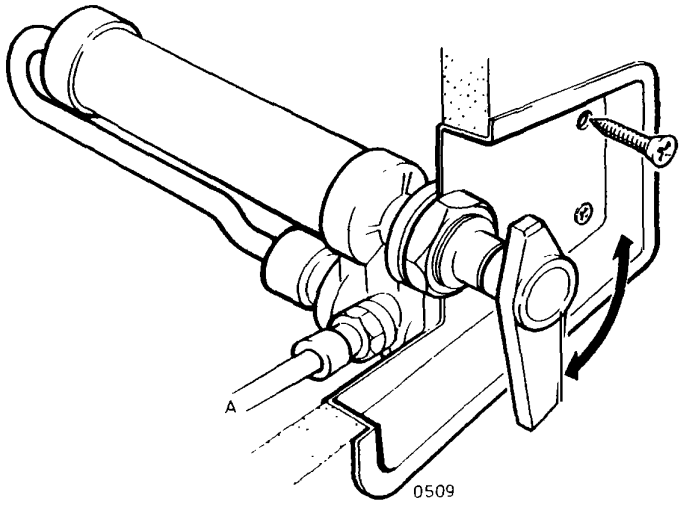
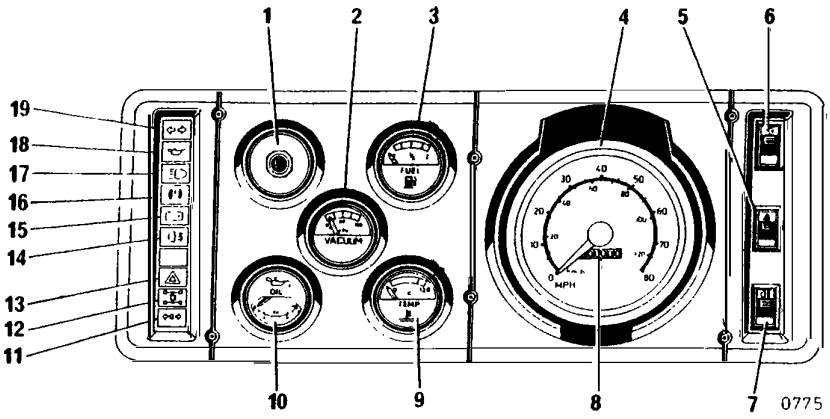


Fig 5 Start pilot pump

DISPLAY PANEL

6 The display panel for right hand drive vehicles is shown in Fig 1 (7) and Fig 6.



1 PTO warning lamp (where fitted)
2 Brake vacuum gauge
3 Fuel gauge
4 Speedometer
5 Hazard warning switch
6 Blower switch
7 Rear fog lights switch
8 Odometer
9 Temperature gauge
10 Oil pressure gauge
11 Trailer turn warning lamp
12 Differential lock engaged warning lamp
13 Hazard warning lamp
14 Rear fog lights warning lamp
15 No charge warning lamp
16 Brake fluid/handbrake on warning lamp
17 Headlamp main beam warning lamp
18 Oil pressure warning lamp
19 Truck turn warning lamp

Fig 6 Display panel (rhd)

7 The display panel for left hand drive vehicles is shown in Fig 2 and Fig 7.

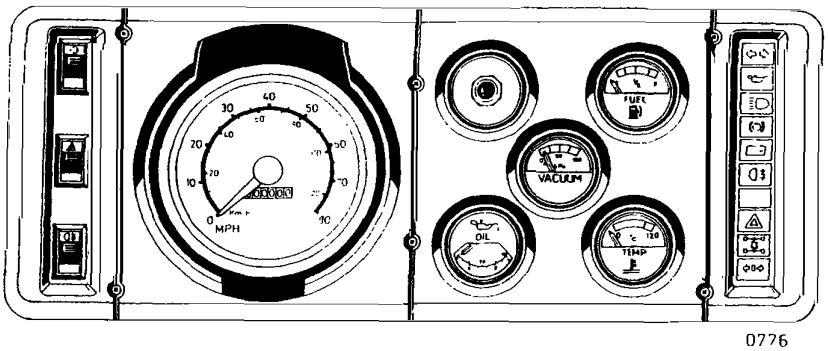


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Fig 7 Display panel (lhd)

OIL PRESSURE GAUGE

CAUTION ...

Low pressure during normal running should be investigated immediately, otherwise extensive engine damage could result.

8 The oil pressure gauge (Fig 6 (10)) indicates pressure only and not oil level. The minimum running pressure with the engine at working temperature is approximately 40 pounds per square inch. It should be noted that the pressure will drop when the engine is idling or it may be higher than normal when the engine is cold.

OIL PRESSURE WARNING LAMP

9 The oil pressure warning lamp (Fig 6 (18)) illuminates when the starter switch is turned to position 'II'. It should extinguish and remain extinguished whilst the engine is running. If the warning lamp fails to extinguish after the engine has started, the engine should be stopped immediately, the cause investigated and rectified before re-starting the engine. The lamp is operated by oil pressure through an automatic switch in the engine lubrication system and will illuminate as soon as the oil pressure falls below a safety limit. The warning lamp is not an indication of low oil level.

FUEL GAUGE

Note...

It is recommended that the fuel level should not be allowed to fall too far below the quarter full mark.

10 The fuel gauge (Fig 6 (3)) indicates the amount of fuel in the fuel tank.

VACUUM GAUGE

11 The vacuum gauge (Fig 6(2)) indicates the vacuum level of the braking system. A normal reading should be approximately 50 KPa on the gauge. The brakes should not be applied more than is absolutely necessary with the engine switched off . The servo vacuum is created by the engine mounted exhauster and braking with the engine stopped will soon result in a loss of vacuum assistance. The brakes will continue to operate without vacuum assistance but pedal pressure will need to be greater.

VACUUM LOSS WARNING BUZZER

WARNING...

IF THE BUZZER SHOULD OPERATE WHILST DRIVING THE VEHICLE, GREATER PEDAL PRESSURE WILL BE REQUIRED FOR STOPPING.

12 If vacuum loss occurs a warning buzzer fitted under the dashboard will sound. The vehicle should be stopped and loss of vacuum investigated at the first opportunity.

BRAKE FLUID/HANDBRAKE ON WARNING LAMP

WARNING...

UNDER NO CIRCUMSTANCES SHOULD THE VEHICLE BE DRIVEN WITH THIS WARNING LAMP ILLUMINATED. IF THE WARNING LAMP ILLUMINATES WHILST DRIVING THE VEHICLE, IT SHOULD BE BROUGHT TO A HALT AS SOON AS SAFETY PERMITS.

13 The brake fluid/handbrake on warning lamp (Fig 6(16) illuminates when the starter switch is turned to position 'II' and indicates (1) handbrake on (2) brake fluid level low. If the lamp remains illuminated after the handbrake is released then low brake fluid level is indicated. The lamp will also illuminate each time the cab door is opened with the handbrake off if a lamp bulb functional test is required.

HANDBRAKE

CAUTION ...

Except in cases of extreme emergency the handbrake should not be applied whilst the vehicle is in motion as this may result in handbrake failure.

14 The handbrake (Fig 1(16)) operates on the rear wheels and is completely independent of the hydraulic system. The handbrake should be applied firmly but not snatched or wrenched as this will strain the linkage and make it difficult to release. When releasing the brake, the lever should be lifted slightly to release the pawl in the ratchet, the pawl release button on the end of the lever pressed and the lever moved fully downwards.

FOOTBRAKE PEDAL

15 The footbrake pedal (Fig 1 (12)) operates the self adjusting brake shoes on all four wheels.

TEMPERATURE GAUGE

WARNING...

WHEN THE ENGINE IS AT NORMAL OPERATING TEMPERATURE OR ABOVE, THE INTERNAL PRESSURE BUILT UP IN THE COOLING SYSTEM WILL BLOW OUT SCALDING FLUID AND VAPOUR IF THE HEADER TANK CAP IS SUDDENLY REMOVED. TO PREVENT THE LOSS OF COOLANT AND TO AVOID THE DANGER OF BEING SCALDED, THE COOLANT LEVEL SHOULD BE CHECKED OR COOLANT ADDED ONLY WHEN THE ENGINE IS COOL. IF THE CAP MUST BE REMOVED WHEN THE ENGINE IS HOT, A CLOTH SHOULD BE PLACED OVER IT, THE CAP SLOWLY ROTATED ANTI-CLOCKWISE TO THE FIRST STOP AND PRESSURE ALLOWED TO COMPLETELY ESCAPE. THE CAP CAN THEN BE TURNED FULLY ANTI-CLOCKWISE AND REMOVED. IT SHOULD BE ENSURED THAT THE CAP IS ROTATED FULLY CLOCKWISE WHEN REPLACED.

16 The temperature gauge (Fig 6 (9)) indicates the operating temperature of the engine coolant. If the pointer enters the red section at the right hand side of the scale during normal running, the engine should be stopped immediately. The coolant level should be examined, the system checked for leaks and the fan belt tension checked. If the pointer remains at the left hand side of the scale during normal running, this indicates that the cooling system is operating at too low a temperature. The efficiency of the thermostat should be checked.

SPEEDOMETER

17 The speedometer (Fig 6 (4)) registers road speed in miles and kilometres per hour. An odometer (Fig 6 (8)) incorporated in the instrument records total distance travelled in miles.

NO CHARGE WARNING LAMP

18 A no charge warning lamp (Fig 6 (15) illuminates when the starter switch is turned to position 'II'. It should extinguish when the engine is running and the alternator commences to charge the batteries. If the lamp stays on, this indicates a fault in the charging circuit or possibly a broken or loose alternator drive belt. The cause should be investigated as soon as possible, otherwise the batteries will become discharged.

LIGHTING SWITCH

19 The lighting switch (Fig 1 (4) and Fig 8) has six positions including OFF. Turning the switch anti-clockwise from the OFF position to the T position operates the tail and number plate illumination lamps. Rotation to the ST position operates the tail, number plate illumination and side lamps. Rotation to the HST position operates the tail, number plate, side and headlamps. The stop lamp and turn lamp circuits remain energised in the OFF or any of the anti-clockwise positions. Turning the switch clockwise from the OFF to the C position operates the convoy lamp and breaks the stop lamp and turn lamp circuits. Further rotation to the CS position turns the convoy and side lamps on.

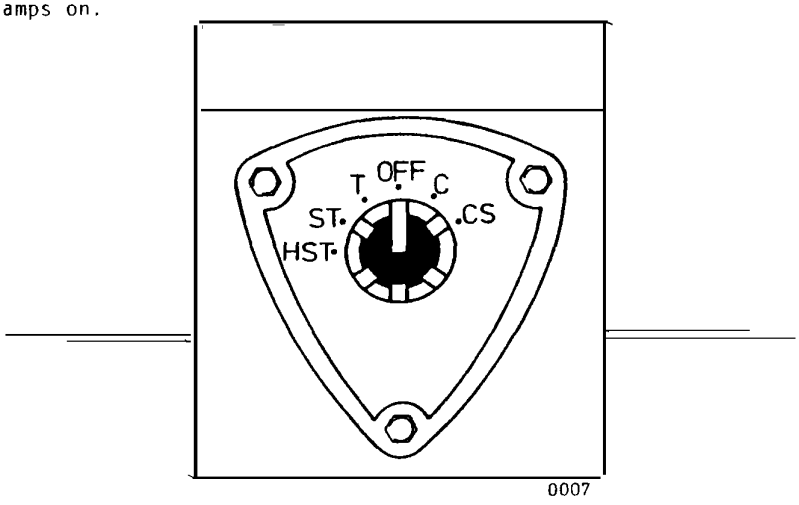

Fig 8 Lighting switch

DIM DIP

20 This vehicle conforms to EEC dim dip regulations with the lighting switch set to ST and the starter switch lock at position 'II'. A relay is energised which operates the dipped headlamp beam through a resistor to produce a lower intensity. In the HST position the main and dipped beams operate normally.

HAZARD WARNING SWITCH

21 The hazard warning switch (Fig 6 (5)) is an on/off positional switch. When switched on (down), the turn-lamps on both sides of the vehicle and on the trailer, if fitted, will come into operation. The hazard warning lamp (Fig 6 (13)) will flash on and off continuously.

REAR FOG LIGHTS SWITCH

22 The rear fog lights switch (Fig 6 (7)) is an on/off positional switch. When switched on (down), the fog lights on the rear of the vehicle are switched on. Indication of this is given by the rear fog light warning lamp (Fig 6 (14)) illuminating. These lights can only be illuminated with the lighting switch in the HST position.

COMBINED TURN LAMPS, HEADLAMP BEAM CONTROL AND HORN SWITCH

23 The combination switch (Fig 1 (5) and Fig 9) operates the signal turn lamps, headlamp flasher, horn and main beam. When moved anti-clockwise, in a plane parallel with the steering wheel, the left hand signal turn-lamps operate. Clockwise

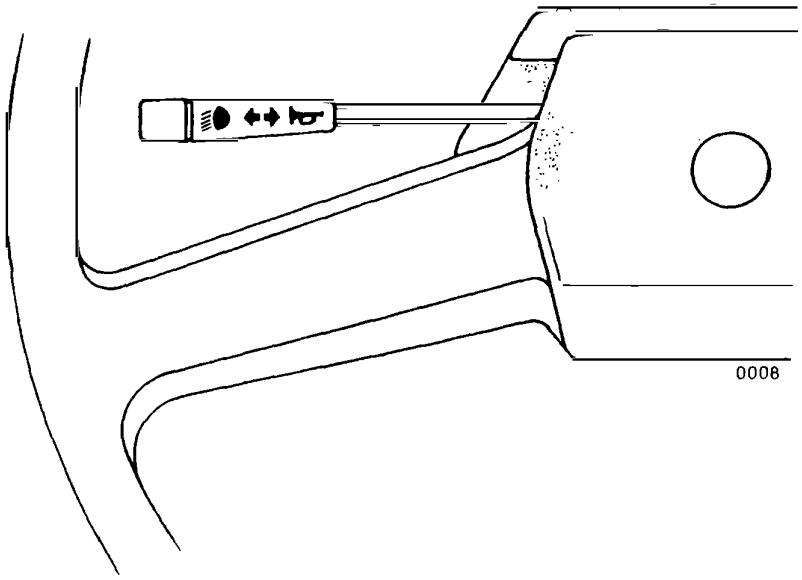

Fig 9 Combination switch

movements of the switch operate the right hand signal turn lamps. Whenever the signal lamps are in use, the vehicle turn warning lamp (Fig 6(19)) flashes continuously. When a trailer is in use, the flasher circuitry enables the trailer turn lamps and vehicle turn lamps to operate together. There is a separate warning lamp (Fig 6(11)) to indicate trailer light operation. If the warning lamp fails to flash, or flashes faster than normal, the flasher unit and bulb should be checked.

24 Headlamp full beam is locked on by moving the switch towards the dashboard. This changes the headlamps from dipped beam to full beam. If the switch is moved rearwards ie towards the operator, this also operates full-beam but in this direction the switch does not lock. A full-beam warning lamp (Fig 6 (17)) illuminates when full-beam is on.

25 The horn push on the end of the switch operates the horn when pushed inwards towards the steering column.

CAB INTERIOR LIGHTS

26 Two cab interior lights with integral switches are located above the cab doors. These lights are not courtesy lights.

WINDSCREEN WIPERS AND WASHERS

27 The two-speed, self parking, windscreen wipers and screen wash are controlled by a column switch (Fig 1 (8) and Fig 10). The switch functions when the starter switch is at position 'II'.

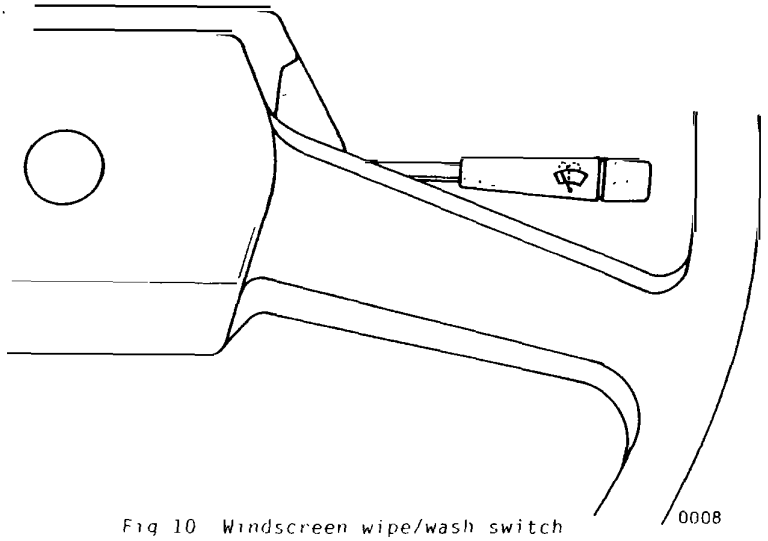

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Fig 10 Windscreen wipe/wash switch

28 The column switch has four positions, OFF, INTERMITTENT WIPE, NORMAL WIPE and FAST WIPE. A WASH and WIPE function is achieved by pressing the push button, at the end of the column switch, towards the steering column. This operates an electrical windscreen wash pump.

29 When the switch is moved clockwise from the OFF position an

INTERMITTENT WIPE function is obtained. When the switch is moved anti-clockwise from the OFF position the NORMAL WIPE function is obtained. Further rotation anti-clockwise switches the wipers to FAST WIPE.

TRANSFER BOX RATIO CHANGE LEVER

30 The transfer box ratio change lever (Fig 1 (14) and Fig 11) enables the selection of a high or low gear ratio for differing driving conditions.

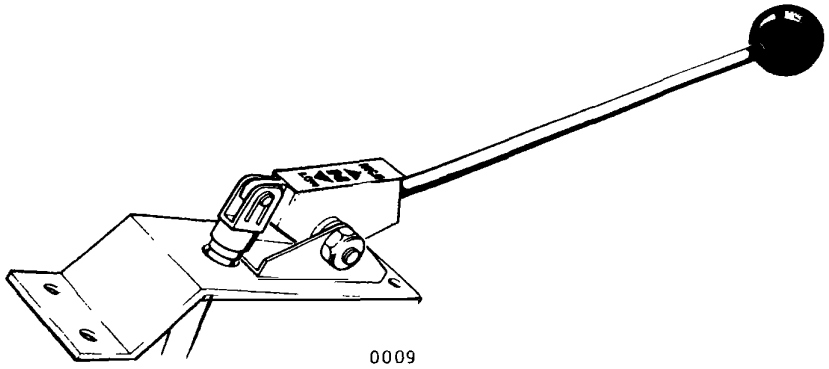


Fig 11 Transfer box ratio change lever

31 High ratio is normally selected for driving on conventional road surfaces. Low ratio is normally selected for rough terrain and adverse under-wheel conditions.

32 If adverse ground conditions are encountered unexpectedly, it is possible to select low ratio whilst travelling at speeds up to 8 miles per hour (12 kilometres per hour).

GEARBOX SELECTOR

33 The gears must be selected as shown on the gear change pattern. To select 1st or reverse gears the gear lever must be moved to the left against the spring as far as possible and then 1st or reverse gear can be selected as required.

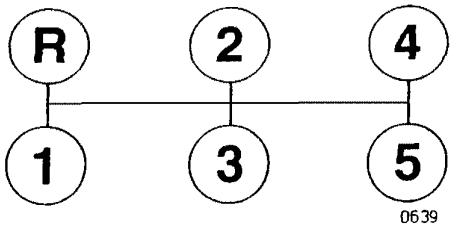


Fig 12 Gear change pattern

CLUTCH PEDAL

34 The clutch pedal must be fully depressed to release the clutch before changing gear. Never rest your foot on the clutch pedal when driving along as this could cause clutch slip.

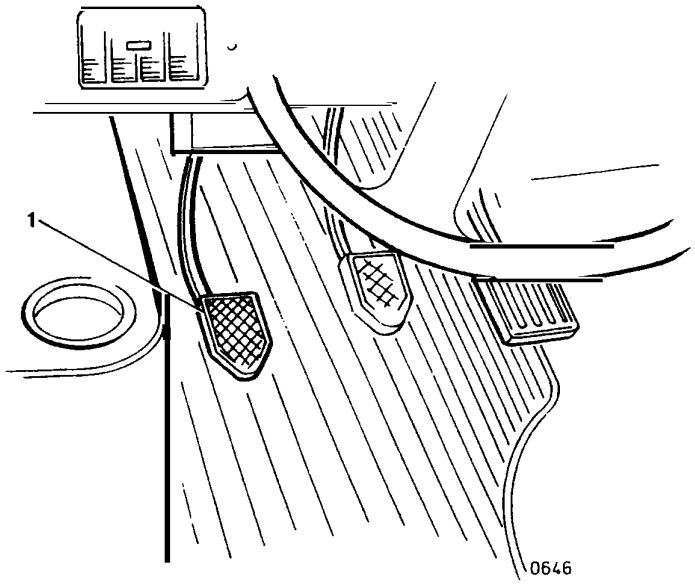


Fig 13 Clutch pedal

TRANSFER GEARBOX DIFFERENTIAL LOCK

CAUTIONS ...

(1) The differential lock must be disengaged for normal road use.

(2) The lock should not be engaged whilst the wheels are slipping and/or spinning.

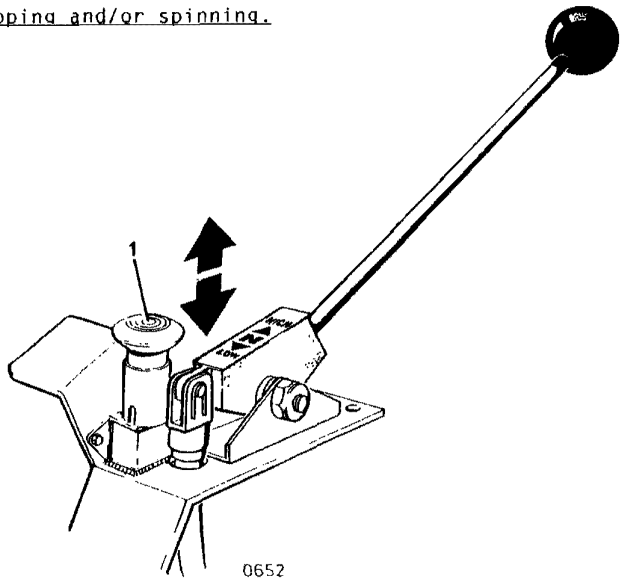


Fig 14 Transfer gearbox differential lock

35 The transfer gearbox differential lock (Fig 1 (18) and Fig 14) is a pull/push type device. It should only be engaged when encountering adverse terrain conditions where extra traction is required.

DIFFERENTIAL LOCK WARNING LAMP

36 The differential lock warning lamp (Fig 6 (12)) illuminates when the lock is engaged. This lamp should extinguish when the lock is disengaged. Should the lamp remain illuminated after the lock is disengaged, the vehicle must not be driven on normal road surfaces until the fault is rectified.

PTO CONTROL (WHERE FITTED)

37 The power take-off(PTO) control (Fig 1 (22) and Fig 15) is a pull/push control mounted on the cab floor. The control, when engaged, enables mechanical power from the transfer box to be converted and used as a hydraulic power source for the winch. When the PTO is engaged a warning lamp (Fig 6 (1)) illuminates.

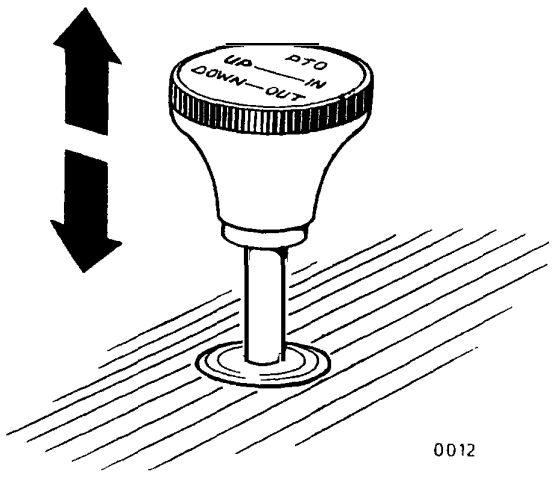


Fig 15 PTO control

ACCELERATOR PEDAL

38 The accelerator pedal (Fig 1 (11)) when used properly can optimise fuel consumption. The pedal should be applied smoothly and gently under normal driving circumstances.

WINCH CONTROL LEVER (WHERE FITTED)

WARNINGS...

(1) WHEN PAYING OUT OR STOWING CABLE ENSURE THAT PROTECTIVE GLOVES ARE WORN AND THAT HANDS ARE KEPT AWAY FROM THE ROPE DRUM AND FAIRLEAD ROLLERS.

(2) IT IS RECOMMENDED THAT THE WINCH OPERATOR SHOULD ENSURE THAT ALL PERSONNEL ARE CLEAR OF THE WINCH AREA WHILST THE CABLE IS UNDER TENSION.

39 The winch control lever (Fig 1 (15) and Fig 16) operates the hydraulic winch fitted at the front of the vehicle. Free spooling of the winch is provided by means of a dog clutch (Fig 16) fitted to the winch. When this clutch is engaged the cable drum can only be operated under power. When the dog clutch is disengaged the drive to the winch drum is disconnected. Reeling out is controlled by pushing the lever forward, and winding in by pulling the lever rearwards. A neutral position is also provided. Winch speed is controlled by the engine throttle. A filler cap (Fig 1 (17), when removed, allows access to top up hydraulic oil.

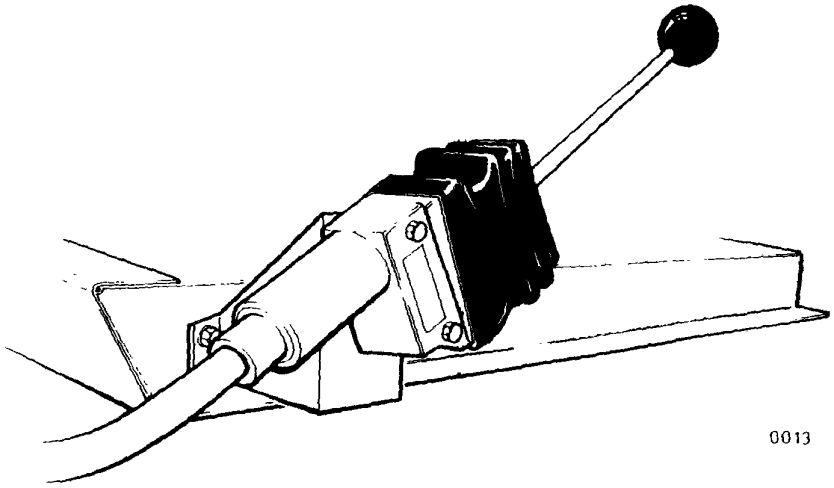


Fig 16 Winch control lever

WINCH DOG CLUTCH (WHERE FITTED)

40 The dog clutch (Fig 17) when disengaged allows free spooling of the cable. A pad brake bears on the side of the cable drum to prevent 'over-run' when pulling cable from the drum.

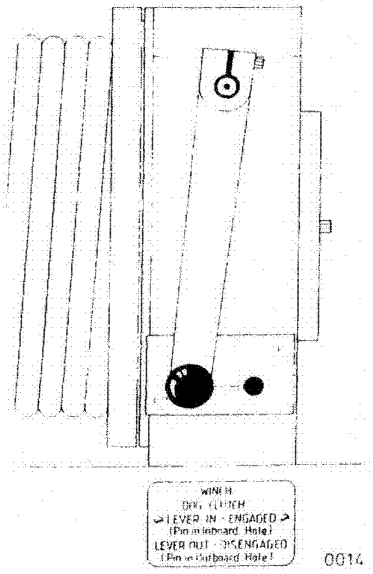


Fig 17 Winch dog clutch

VENTILATION AND HEATING

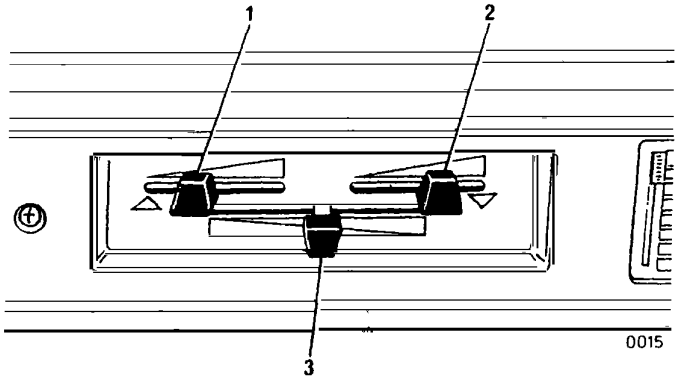
41 In addition to the ventilation provided by the cab windows, a separate ventilation and heating system is provided. It is designed to provide fresh air to the screen, cab, face or feet at varying temperatures, regulated to individual requirements.

42 Since heat is provided by the engine, warm air will be available when the engine is running.

43 Air flow will not occur until the air distribution controls have been moved from the closed positions and either the vehicle is moving or the blower fan is switched on.

Distribution and temperature controls

44 The distribution controls (Fig 18 (1) and (2)) on the facia panel regulate air flow rate to the screen and cab interior. The temperature control (Fig 18 (3)) regulates the temperature of the air entering the cab, depending on its position between the hot and cold positions.



1 Screen control 2 Floor control 3 Temperature regulator

Fig 18 Distribution and temperature controls

Face level vents

45 Controllable face level vents (Fig 1 (2) and Fig 19) direct a selected rate of unheated air flow to suit individual requirements. Operating the vertical moving lever (Fig 19 (1)) controls air flow volume whilst the centrally positioned button wheel (Fig 19 (2)) controls direction. The heater blower may be used to boost the flow.

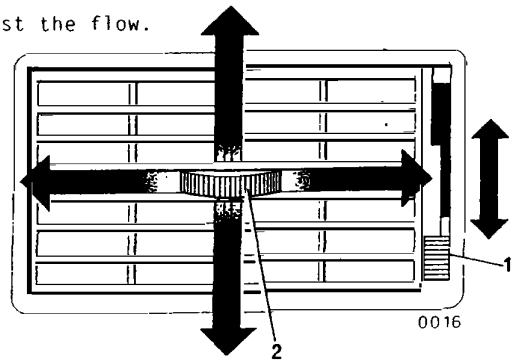


Fig 19 Face level vent

Foot level vents

46 The foot level vents (Fig 20) are located in the outer side panels of the foot wells. The shutter type controls can be regulated to admit air flow as required.

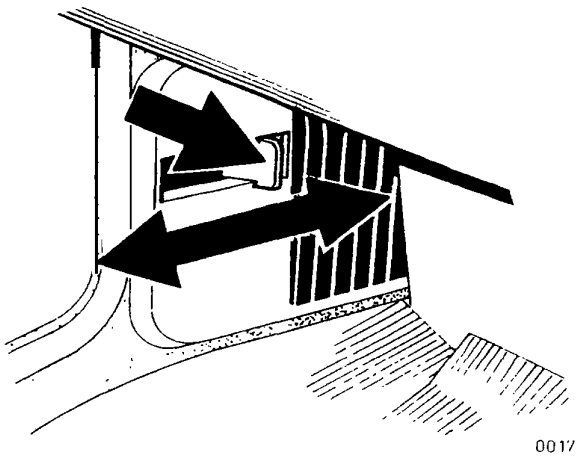


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Fig 20 Foot level vent

Heater blower switch

47 The heater blower switch (Fig 6 (6)) is a three positional switch. The positions are off, slow speed and fast speed. Moving the switch downwards activates the heater blower thereby boosting air flow to the screen or cab as required. Further movement downwards increases the blower speed.

SEAT ADJUSTMENTS

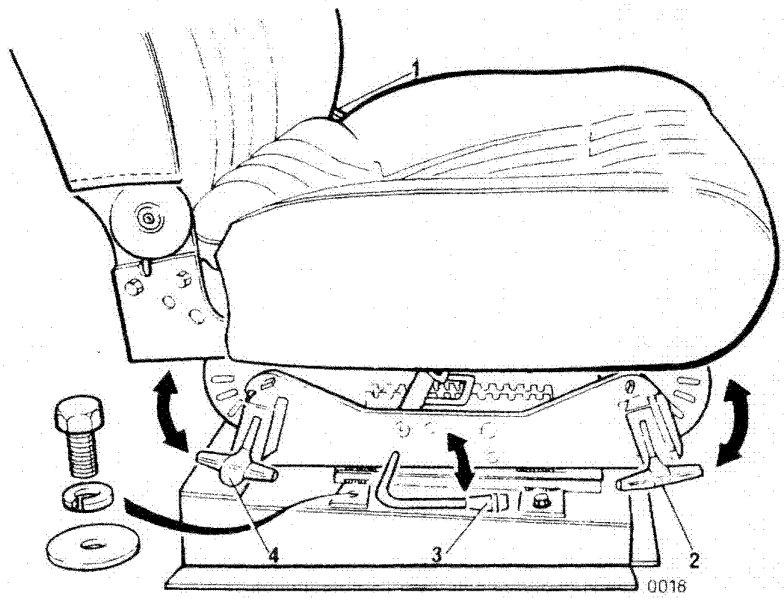
WARNING ...

DO NOT MAKE SEAT ADJUSTMENTS WHILST THE VEHICLE IS IN MOTION. THE SEAT COULD MOVE UNEXPECTEDLY CAUSING LOSS OF VEHICLE CONTROL. BEFORE MOVING OFF ENSURE THAT THE SEAT IS SECURELY LOCKED IN POSITION.

48 The seat can be moved either forwards or backwards by moving the lever (Fig 21 (3)) upwards whilst pushing the seat to the desired position. The lever then should be released to lock the seat securely. Passenger seats are not adjustable.

49 The back rest angle can be adjusted by operating the lever (Fig 21 (4)) at the side of the squab and pushing at the top. The lever should be released to lock the back-rest in the desired position. Passenger seats are not adjustable.

50 The height of the drivers seat can be adjusted by means of the levers (Fig 21 (2 & 4). Ensure that the seat is securely locked in the desired position. The passenger seats are not adjustable.



1 Back rest adjustment
2 Cushion front adjustment
3 Forward/rear adjustment
4 Cushion rear adjustment

Fig 21 Seat adjustments

SEAT BELTS

51 Two inertia (automatic) reel seat belts are provided for the driver and doorside passenger. This type of belt stores neatly away when not in use, provides automatic adjustment and allows the user sufficient freedom for normal driving. The second passenger seat is provided with a lap belt.

52 To fasten the belt, grip the belt tongue and slowly pull the webbing through the upper attachment point. The belt should pass over the right shoulder in the right hand seat and over the left shoulder on the left hand seat. The lower part of the belt should restrain across the hip. Push the belt tongue into the buckle stalk nearest the user until a positive engagement click is heard. This should indicate that the tongue is securely locked.

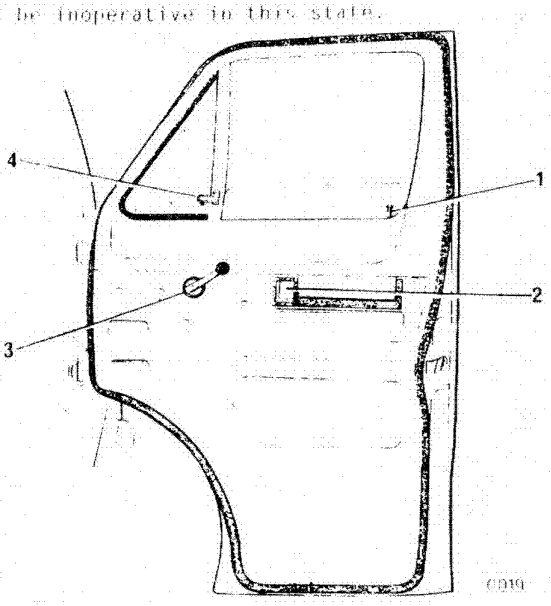
53 The upper part of the belt passes over the convex portion of the clavicle (collar bone) and the lap part of the belt should be located below the bony part of the hips. Ensure when the belt is used that the lap portion does not ride up on the lower part of the abdomen and the webbing is not twisted but lays flat.

54 To release the belt, depress the catch marked 'PRESS' on the buckle stalk and the belt will automatically release and rewind into the reel.

55 The lap belt for the third passenger will be found lying across the seat. The buckle stalk for this belt is next to the seat. To fasten or release the belt proceed as directed for the inertia reel belt. The belt is adjustable and the correct tension should allow the hand to be inserted between the belt and the bony part of the hip.

CAB DOORS

56 Both cab doors are fitted with locks which are operated with the key provided. The cab door can be locked from inside by depressing the interior locking knob (Fig 22 (1)). The door handle will be inoperative in this state.



1 Locking knob
2 Handle
3 Window winder
4 Quarter light catch

Fig 22 Cab door locks and controls

57 Locking the door from the outside is achieved by inserting the key and rotating it approximately 45 degrees clockwise on the left hand door and approximately 45 degrees anti-clockwise on the right hand door. Unlocking cab doors is the reverse

procedure. A key may only be inserted or withdrawn from the lock when the key slot is in the vertical position.

58 Alternatively, a door may be locked from the outside by depressing the interior locking knob whilst the door is ajar and closing it firmly. It can then be unlocked from the outside using the key. Care should be taken to prevent locking the key inside the cab if this method is used.

59 Pulling the recessed door handle (Fig 22(2)) will automatically release the door lock from the inside and door operation from the outside is by depressing the push button on the door handle.

60 Door windows are regulated by means of the window winder handle (Fig 22(3)). The quarter light can be opened by pressing the catch button (Fig 22 (4)) and rotating the catch upwards.

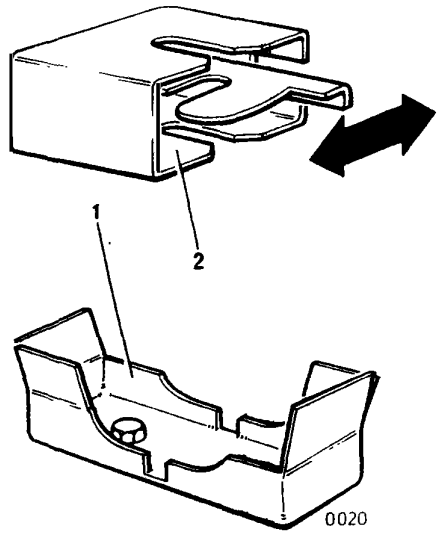
61 Each door is fitted with a two stage door opening check catch operating at approximately 30 degrees and 70 degrees to the body side line.

EXTERNAL REAR VIEW MIRROR

62 Each door is fitted with an external rear view mirror. These mirrors are hand adjusted from the cab to the desired position.

RIFLE RESTS

63 Rifle rests (Fig 1 (19) and Fig 23) are provided to locate rifles during transit periods. Floor inserts (Fig 23 (1)) are located on the cab floor to house the rifle butts and spring clips (Fig 23 (2)) on the cab rear bulkhead to restrain the barrels. Two rests are provided.



1 Floor insert 2 Spring clip

Fig 23 Rifle Rest

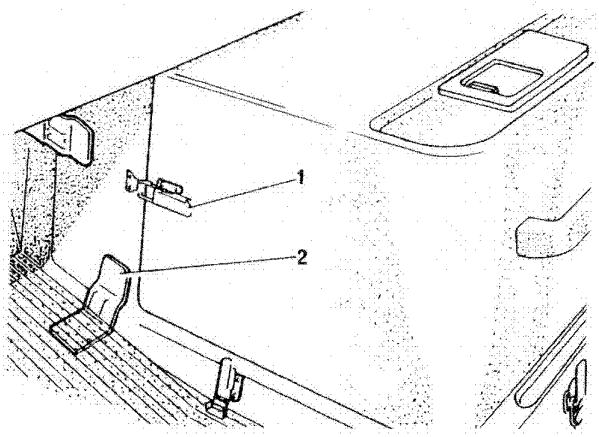
ENGINE ACCESS

64 All engine service operations carried out from within the cab will necessitate removal of the engine cover (Fig 24). When removing, release the toggle catches (Fig 24 (1) securing the rear engine cover to the floor and front cover.

Note ...

It is recommended that the fire extinguisher is removed and stowed safely until the cover is replaced. It should then be reinstated.

65 Additional access to the engine from the cab can be gained by removing the four setscrews (2) securing the front cover.



1 Toggle catch 2 Engine cover bracket

Fig 24 Engine Cover

66 For access to the front of the engine pull the bonnet release handle (Fig 1 (27)) underneath the dashboard. Press the bonnet safety catch lever at the front of the vehicle, lift the bonnet and retain by its stay.

FIRE EXTINGUISHER

67 The fire extinguisher (Fig 1 (26)) is suitable for all types of fires and instructions for usage are detailed on the cylinder. The extinguisher is retained by a simple spring lever clip and is removed by pulling the canvas strap towards the rear of the cab.

CAB AUXILIARIES

68 The grab handles located on the forward door pillars are provided to assist the driver or passenger when stepping up into the cab. Drivers should note that it is bad practice to use the steering wheel for this purpose.

69 Sun visors mounted above the windscreen are provided to reduce glare through the screen. Pull the visor downwards when required.

70 The ash tray (Fig 1 (25)) is located in the top of the engine cover. The tray is opened and closed by a sliding type shutter. To remove for cleaning open the lid and pull the ash container upwards.

Chapter 2-2

CONTROLS AND INSTRUMENTS

TRUCK UTILITY HEAVY FFR VARIANTS

CONTENTS

Note ...

This chapter to be read in conjunction with Chapter 2-1.

INTRODUCTION

1 The driving controls, instruments and cab auxiliaries for the Truck Utility Heavy FFR (Hard Top) and Truck Utility Heavy FFR (Soft Top) are identical to those for the GS Cargo vehicle, described in chapter 2-1, with the following additions :

1.1 Engine speed control

1.2 Battery master switch

1.3 Ammeter

1.4 Generator warning light

2 The driving controls, instruments and cab auxiliaries for the Truck Utility Heavy FFR TCB Carrier are identical to those for the GS Cargo vehicle described in chapter 2-1 with the following additions :

2.1 Engine speed control

2.2 Battery master switch

ENGINE SPEED CONTROL

WARNING ...

THE ENGINE SPEED CONTROL MUST NOT BE USED WHILST THE VEHICLE IS IN MOTION.

3 The engine speed control (Fig 1) is situated under the left dashboard on right hand drive vehicles and under the right dashboard on left hand drive vehicles. The control is a hand operated device with a rotational movement of 90 degrees. It is designed to be used whilst the vehicle is stationary and the radio operational. Moving the lever clockwise from the off position, gradually increases engine speed until the optimum number of revolutions for radio operation is achieved. The hand accelerator stop screw is fitted to ensure that the engine speed cannot be increased to above 1500 revolutions per minute.

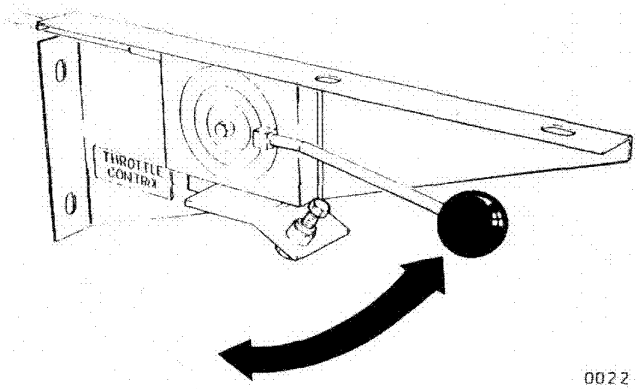


Fig 1 Engine speed control

BATTERY MASTER SWITCH

4 The battery master switch (Fig 2) is situated in the one of the left hand lockers of the FFR vehicle. The switch is in the direct battery line and when radio operations are required it should be switched to the 'on' position.

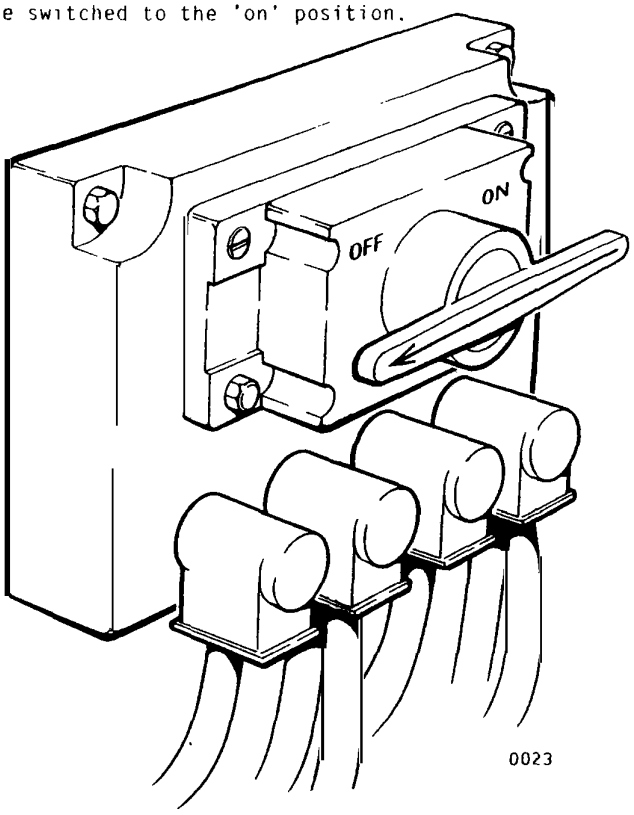
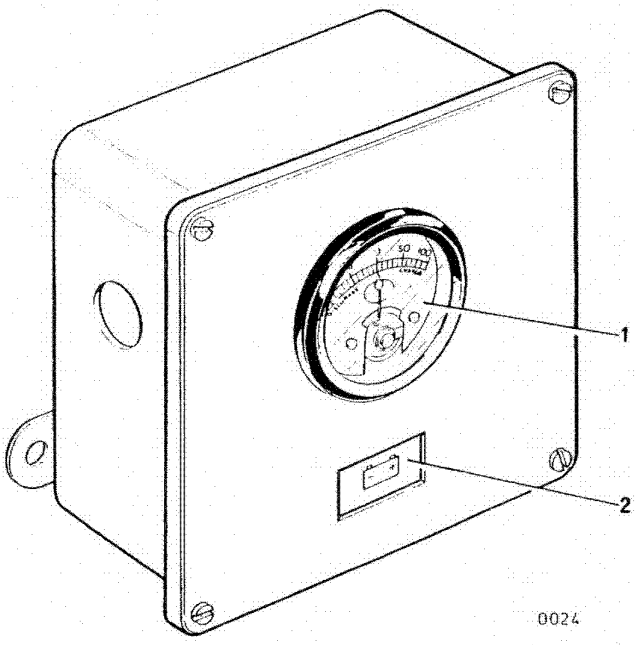


Fig 2 Battery master switch

AMMETER AND WARNING LAMP (If fitted)

5 The ammeter (Fig 3(1)) gives an indication of the current through the vehicle batteries. A generator warning lamp (Fig 3(2)) illuminates if the batteries are not charging.



1 Ammeter 2 Warning lamp

Fig 3 Ammeter and warning lamp

Chapter 3-1

OPERATING INSTRUCTIONS

TRUCK UTILITY HEAVY GS CARGO (W\WINCH)

CONTENTS

PRIOR TO STARTING THE ENGINE

1 Ensure that the fuel, oil, brake fluid and coolant levels are normal and top up as necessary. Ensure that the engine stop control is fully pressed home.

STARTING THE ENGINE

WARNING...

DO NOT START AND RUN THE ENGINE IN A SMALL, ENCLOSED AND UNVENTILATED AREA. ENSURE ADEQUATE VENTILATION IS PROVIDED TO ALLOW EXHAUST GASES TO ESCAPE.

Running in

2 A gradual running in of a new or exchange diesel engine is not necessary. Full load can be applied to a new engine as soon as the engine is put into service and the coolant is at operating temperature. Avoid operating the engine at high, no load speeds or in an overload condition.

Warning light checks

3 Before starting the engine ensure that the gearbox selector is in neutral. Turn the starter key to position 'II' and ensure that the no charge, oil pressure and brake warning lamps illuminate. Apply the footbrake and momentarily release the handbrake and the brake warning lamp should extinguish.

Before starting the engine

4 Ensure that the handbrake is applied and the gearbox selector is in neutral.

Starting from cold

5 With the accelerator fully depressed turn the starter key fully clockwise and pump the start pilot pump. Release the starter key as soon as the engine starts but continue pumping the start pilot pump until the engine runs smoothly.

CAUTION...

Do not operate the starter continuously for longer than 20 seconds and then wait at least 30 seconds before using the starter again.

Starting from warm

6 To start a warm engine it should not be necessary to use the start pilot. With the accelerator pedal fully depressed, turn the starter key fully clockwise. Release the key as soon as the engine starts and ease back on the accelerator pedal.

7 If the engine fails to start ensure that the starter motor has stopped revolving before attempting to start it again.

To drive off

8 Ensure that the power take-off is disengaged and handbrake is engaged, depress clutch pedal and select 1st gear, release the clutch pedal, gently depress the accelerator pedal and release the handbrake.

8.1 Change up to a higher gear as soon as a suitable road speed has been reached.

8.2 Do not allow the engine to labour. Select a lower gear as necessary.

To change down to a lower gear

9 Depress the clutch pedal and move the gear selector into neutral. Depress the accelerator pedal for a moment and then depress the clutch pedal and select the next lower gear, release the clutch pedal and depress accelerator pedal.

STOPPING THE ENGINE

CAUTION...

Before stopping the engine always allow the engine speed to return to idle for approximately 3 minutes to allow lubricating oil to transfer heat away from the turbocharger shaft, bearings and seals. Never stop the engine immediately from full throttle as damage to the turbocharger may occur.

10 Ease back on the accelerator pedal and allow the engine to idle for a period of 3 minutes. Pull out the engine stop control and hold out until the engine stops. Ensure that the stop control is pushed fully home after use. Turn the starter switch to the 'O' position.

USE OF BRAKES

WARNING ...

UNDER NO CIRCUMSTANCES SHOULD THE VEHICLE BE DRIVEN WITH THE BRAKE WARNING LAMP ON. IF THIS WARNING DEVICE SHOULD OPERATE WHILST DRIVING THE VEHICLE, IT SHOULD BE BROUGHT TO A HALT AS SOON AS SAFETY PERMITS.

11 Except in cases of emergency do not apply the brakes violently or leave braking late. This increases fuel consumption, tyre wear and brake wear.

USE OF TRANSFER BOX

CAUTION ...

Always select high ratio with the transfer gearbox lever for normal road use.

12 The transfer box is a 3 positional gearbox with high ratio, low ratio and neutral selections. High ratio is normally selected for conventional road use, low ratio is selected for adverse underwheel driving conditions and neutral during winch operations.

13 Should adverse conditions be encountered unexpectedly it is possible to select low ratio whilst travelling at speeds of up to 8 mph (12 Km/h).

14 Reduce the vehicle speed to 8 mph or less, momentarily release the throttle and pull the lever back through neutral into the low position.

15 To change from low ratio to high ratio reduce the vehicle speed to 8 mph or less, momentarily release the throttle and push the lever forward through neutral into the high ratio position.

16 If difficulty is experienced when engaging high or low ratio stop the vehicle. Move the gear selector lever from neutral to 1st gear whilst simultaneously operating the high\low ratio lever to engage the required selection.

USE OF DIFFERENTIAL LOCK

CAUTIONS ...

(1) The differential lock must be disengaged for road use and only used during adverse underwheel conditions otherwise transmission and tyre damage may occur.

(2) Do not engage the differential lock whilst the wheels are slipping and/or spinning.

17 The differential lock enables the operator to lock the front and rear axles to give added traction when encountering adverse underwheel conditions.

Engaging differential lock

18 Reduce the vehicle speed to 20 mph (32 Km/h) or less, pull out the control knob and momentarily relieve the drive by use of the throttle or brake. Successful engagement is indicated by the illumination of the differential lock warning lamp.

Disengaging differential lock

19 Reduce the vehicle speed to 20 mph or less, push the differential lock control knob in and momentarily relieve the drive by use of the throttle or brake. When the differential lock has disengaged the warning lamp should extinguish.

WINCH OPERATION (WHERE FITTED)

WARNINGS...

(1) WHEN HANDLING CABLE, WEAR PROTECTIVE GLOVES AND ENSURE THAT DURING OPERATIONS, HANDS ARE KEPT CLEAR OF THE ROPE DRUM AND FAIRLEAD ROLLERS.

(2) THE WINCH OPERATOR MUST ENSURE THAT ALL PERSONNEL ARE CLEAR OF THE WINCH AREA WHILST THE CABLE IS UNDER TENSION.

CAUTIONS...

(1) Ensure that the gearcase is filled with oil to the correct level prior to operating the winch.

(2) Loose bottom turns will reduce cable life when winching under load.

Free spooling

20 Free spooling of the winch cable is by means of a dog clutch fitted to the winch. When this clutch is engaged the cable drum can only be operated under power. When the dog clutch is disengaged free spooling can be carried out and the drive to the winch drum rendered inoperative.

Attaching the cable

21 Attach the cable to an anchorage in such a way as to ensure that direct strain only is applied to the cable when winching in. The vehicle should be positioned parallel to the line of pull whenever possible so as to minimise rope drag on the rope flanges. Do not use side rollers more than is necessary.

Driving the winch

WARNING...

DO NOT DISENGAGE WINCH CLUTCH WHILE ROPE IS UNDER TENSION WITH LOAD

CAUTION...

Do not operate the winch with the vehicle gearbox in 4th or fifth gear.

Note ...

It may be necessary to engage 1st gear or reverse momentarily whilst engaging the PTO control knob, but do not operate the winch and drive the vehicle at the same time. The vehicle should be stationary and as far as away as possible from the object to be winched.

22 To drive the winch carry out the following:

22.1 Remove the towing bar from the front bumper.

22.2 Select neutral in the vehicle gearbox.

22.3 Select neutral position in the transfer gearbox with the high/low ratio lever.

22.4 Pull up the PTO control knob to engage.

22.5 Select second gear in the vehicle gearbox.

22.6 Engage the winch dog clutch.

22.7 Pull the winch lever rearwards to reel in the cable (push lever forward to reel out).

22.8 Operate the winch slowly initially to take up any slack.

22.9 Control the winch drum speed only by use of the hand accelerator.

22.10 To stop the winch drum return the winch lever to the neutral position.

22.11 Release the cable tension and disconnect.

23 When winching operations are complete carry out the following:

23.1 Reel in any excess cable and secure.

23.2 Select neutral with the winch lever.

23.3 Disengage the PTO by pushing the control knob downwards.

Rope coiling

24 Hitch the eye end of the cable to a suitable strong point and lay the rope in a straight line on ground free of excess dirt or sand. Fit the cable to the winch drum. Set the winch in motion and allow the vehicle to be pulled whilst the cable coils evenly and tightly onto the drum under tension. Loose bottom coils are detrimental to rope life when winching heavy loads.

25 Alternatively hitch the eye end of the cable to a suitable load and lay the cable in a straight line on ground free from dirt or sand. Fit the cable to the winch drum. Set the winch in motion and allow the load to be pulled whilst the cable coils evenly and tightly onto the drum under tension. Loose bottom coils are detrimental to rope life when winching heavy loads.

26 If the winch has been supplied with cable pre-wound it is advisable to rewind it as factory coiled cable is wound by hand and may be loose.

27 Do not allow all the rope to build up on one side of the drum. Coil it as evenly as possible between the drum flanges.

FIRE PRECAUTIONS

28 A BCF (bromochlorodifluoromethane) type fire extinguisher is secured on top of the engine cowling in the vehicle cab. It is retained by a quick release clip. Fire precautions should be strictly observed in accordance with current standing orders.

TOWING

CAUTIONS...

(1) Always select the neutral pdsition with the transfer gearbox high/low ratio lever before towing.

(2) If there has been a malfunctioh in the transfer gearbox, disconnect the propshafts from the front and rear axles before towing.

(3) Do not tow the vehicles for any distance with the front or rear wheels on the ground and the propshafts connected as transfer box damage may occur.

(4) Always use a rigid towing device. Rope or chain towing should only be used in an emergency.

Towing

29 If the vehicle is to be towed for any distance the front and rear axle propellershafts must be disconnected from the transfer box, as otherwise the transfer box oil pump will not be operating and therefore damage to the transfer may occur. When braking is necessary in a towed vehicle greater foot pedal pressure is required due to the loss of brake vacuum assistance. The steering will also be very heavy as there will be no hydraulic assistance to the steering.

30 The towing procedure with all four wheels on the ground is as follows :

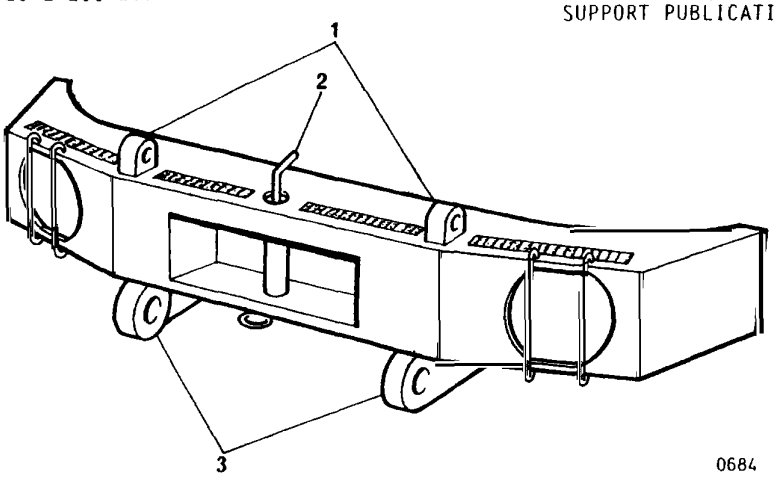
30.1 Two towing eyes (Fig 1(3)) are fitted to the front of the vehicle to facilitate connection of an "A" frame.

30.2 Turn the starter key to position 'II', to unlock the steering and enable direction indicators, stop and tail lights to be operated.

30.3 Select neutral in the vehicle gearbox.

30.4 Select neutral in the transfer gearbox.

30.5 Ensure that the differential lock control knob is disengaged.



1 Lifting eyes 2 Towing bar

3 Towing eyes

Fig 1 Front bumper towing attachments

Procedure for front end support tow

31 The procedure for a front end support tow is as follows :

31.1 Select neutral in the vehicle gearbox.

31.2 Select neutral in the transfer gearbox.

31.3 Ensure that the differential lock control knob is disengaged.

31.4 If the transfer gearbox is damaged remove the rear propshaft.

31.5 The front end of the vehicle can be lifted by means of the two lifting eyes (1) on top of the front bumper or a hydraulic arm with a clamped beam under the front axle tubes.

Procedure for rear end support tow

32 The procedure for rear end support tow is as follows :

32.1 Select neutral in the vehicle gearbox.

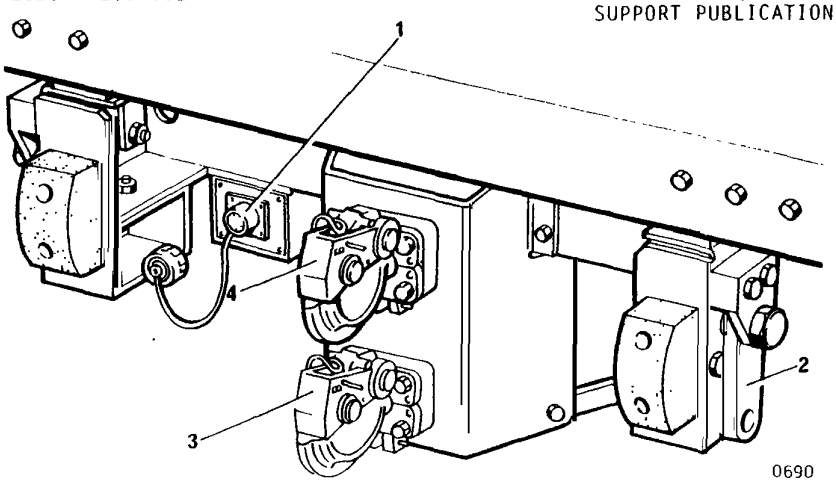
32.2 Select neutral in the transfer gearbox.

32.3 Ensure that the differential lock control knob is disengaged.

32.4 Ensure that the front wheels are locked in a central position.

32.5 If the transfer gearbox is damaged remove the front propshaft.

32.6 The rear end of the vehicle can be lifted by locating a hydraulic lifting arm under a wooden crossbeam beneath the rear recovery brackets, or by lifting with an 'A' frame attached to the rear end chassis lifting lugs (Fig 2(1)).



1 Trailer socket 2 Lifting lug

3 Towing hook (alternative position) 4 Towing hook

Fig 2 Rear end towing attachments.

Equipment towing

33 The vehicle is fitted with a towing hook (Fig 2(4)) mounted on the rear chassis which can be fitted in either of two positions to accommodate trailers of different heights. The towing hook can be used as either a rigid or swivelling coupling according to the type of tow bar fitted to the towed equipment. It should be locked rigid when coupled to a swivelling type tow bar and unlocked when coupled to a solid tow bar. As a swivelling coupling, the hook is free to rotate about a horizontal axis which allows the towed equipment to tilt on uneven ground. To change a rigid coupling, swing the swivel lock up to engage the bottom of the hook. The eye of the towed equipment tow bar is prevented from being released out of the hook by the lock jaw which is secured by a release pin.

34 A trailer socket (3) is mounted on the rear crossmember to facilitate trailer electrical connections.

CANOPY AND SUPERSTRUCTURE

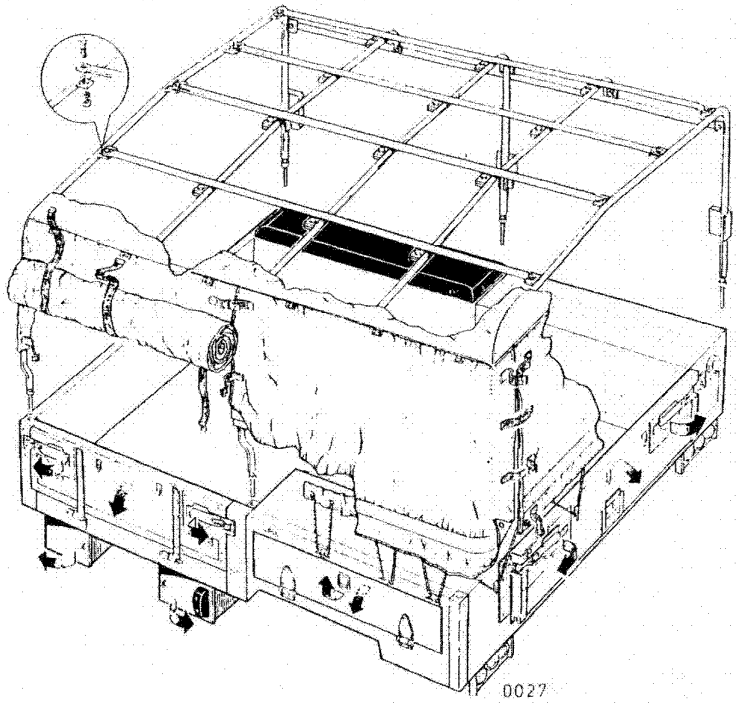


Fig 3 Canopy and superstructure

35 The canopy and aluminium superstructure are removable as shown in Fig 3 and the canopy is also adjustable by means of clips, straps and cords.

VEHICLE BODY

CAUTION...

The locker door cannot be closed by slamming.

36 Cargo handling is facilitated by a dropside and tailgate with stowage lockers provided on both sides of the vehicle. Cargo lashing rings are incorporated into the floor of the vehicle cargo body. The stowage locker doors incorporate a paddle latch handle which when pulled outwards releases the locker door catch. To secure, the handle must be held out to depress the catch, the door closed flush with the vehicle body, and the handle then released. The catch should then engage and secure the door.

SHALLOW FORDING

37 The vehicle is capable of shallow fording to a depth of 0.6m without special protection. The breather on each axle vents through a tube which exits clear of the axle case.

HELICOPTER SLINGING

Note...

It is important that 15 litres of fuel remain in the tank during slinging.

38 Retaining discs are attached to each wheel nave for helicopter sling attachment points. The following items may be stripped prior to helicopter slinging with the vehicle remaining battleworthy :

38.1 Canvas superstructure.

38.2 Canvas canopy.

38.3 Tailgate.

38.4 Dropside.

38.5 Cab roof platform.

FUEL TANK

39 The fuel tank is situated on the right hand side of the vehicle on the chassis sidemember. It is fitted with a telescopic filler neck to facilitate filling from fuel cans.

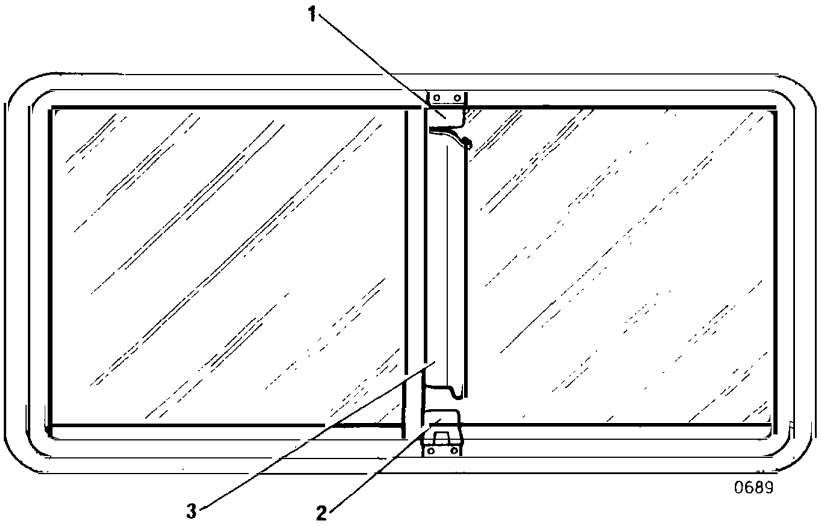
40 To remove the filler cap push down and twist anti-clockwise to release. Reverse this procedure to re-fit.

STEERING

WARNING...

THE DRIVER SHOULD BE AWARE OF THE FACT THAT HIS VEHICLE REMAINS STEERABLE IN THE EVENT OF A SUDDEN LOSS OF HYDRAULIC POWER ASSISTANCE, EG FAILURE OF PUMP DRIVE. BUT THE EFFORT REQUIRED IS THEN VERY MUCH GREATER. SINCE SUCH A SITUATION OCCURS VERY RARELY AND WITHOUT WARNING, THE DRIVER MAY ASSUME THE STEERING HAS LOCKED. THIS IS NOT THE CASE. THE DRIVER MUST SIMPLY EXERT CONSIDERABLY MORE EFFORT TO TURN THE STEERING WHEEL.

CAB REAR SLIDING WINDOW



1 Locking flap (top) 2 Locking flap (bottom)
3 Sliding window

Fig 4 Cab rear sliding window

41 Lift the top flap (1) up and the bottom flap (2) down prior to opening the sliding window.

42 To close the window slide it closed and secure by lifting bottom flap up and top flap down.

ACCESS STEPS TO ROOF PLATFORM

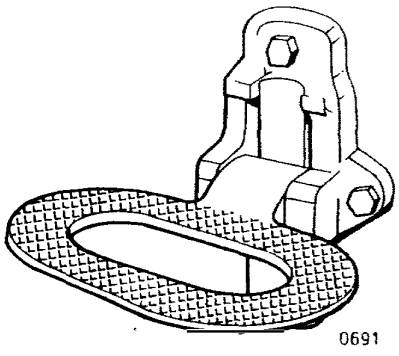


Fig 5 Access step (down)

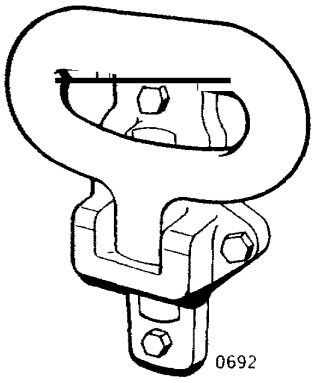


Fig 6 Access step (stowed)

44 The two access steps to the roof platform must be folded down (Fig 5) before attempting to climb up to the roof platform for hand support.

45 Before driving off ensure that steps are in the stowed position.

Chapter 3-2

OPERATING INSTRUCTIONS

TRUCK UTILITY HEAVY FFR VARIANTS

CONTENTS

Note ...

This chapter to be read in conjunction with Chapter 3-1.

BATTERY MASTER SWITCH

1 The battery master switch, situated in one of the left hand storage lockers, should be switched to the 'on' position when the batteries require charging or the radio requires to be operated using the batteries as a power source.

ENGINE SPEED CONTROL

WARNING ...

WHEN RADIO OPERATIONS ARE REQUIRED WITH THE VEHICLE STATIONARY AND UNDER CAMOUFLAGE, THE EXHAUST EXTENSION, STORED UNDER THE RADIO TABLE, MUST BE FITTED TO DIRECT FUMES AWAY FROM THE COVERED AREA.

2 The engine speed control, fitted under the dashboard, should be used when the vehicle is stationary and radio power/battery charging is required. With the engine running and the vehicle stationary, adjust the hand throttle to give the optimum generator output as indicated by the ammeter fitted in the supply line. A generator warning lamp is housed beneath the ammeter to indicate low battery charge.

Chapter 4-1

USER MAINTENANCE

TRUCK UTILITY HEAVY GS CARGO (W/WINCH)

CONTENTS

Para

ENGINE

1 Regular oil and filter changing is essential if engine life is not to be considerably curtailed. Diesel engines are particularly prone to sludging, if the oil is not of the correct specification or not changed regularly. Under normal operating conditions (ie good roads in temperate climates), the engine oil and filter should be changed in accordance with the maintenance schedule. However, there are certain instances where this should be done more regularly, such as (1) consistent stop/start driving, (2) running at continual low engine speeds, (3) consistent operation in the intermediate gears.

2 Regularly inspect the engine for signs of fuel, oil and water leaks and rectify if evident. Leaks will be more obvious if the engine and its surroundings are kept clean.

Checking/topping up engine oil

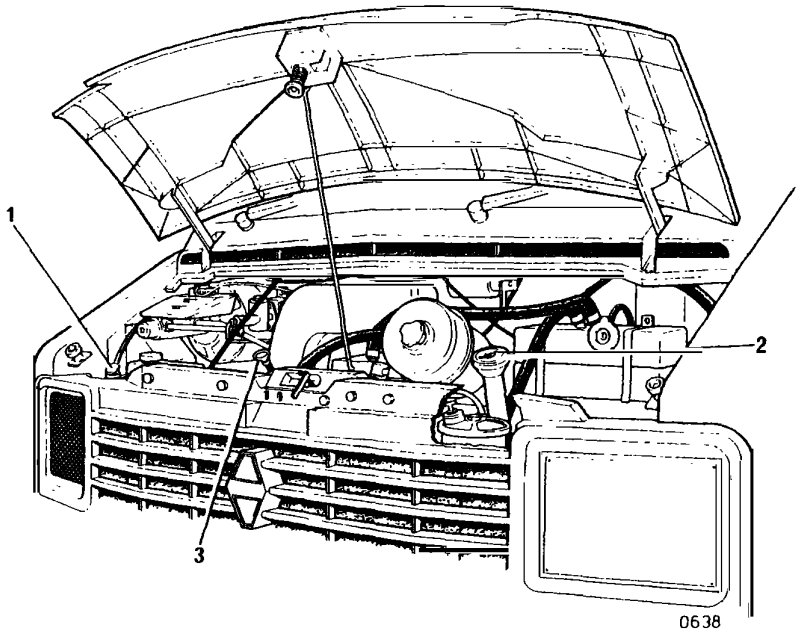
CAUTION...

Never allow the engine oil level to fall below the low level mark on the dipstick.

3 The engine oil level should be checked daily and topped up as necessary. Ensure that the vehicle is parked on level ground and if the engine has been running, allow several minutes for the oil to drain back into the sump.

4 Remove the dipstick (Fig 1 (1)) and wipe it clean, noting the high and low markings at its lower end. Refit the dipstick

ensuring that it is pushed fully home and then withdraw it once more. Note the level in relationship to the dipstick markings and top up through the filler (Fig 1 (2)) as necessary to the high mark using the correct grade of oil. When adding oil to the engine allow sufficient time for the oil to flow down through the engine into the sump before further checks are made.



1 Cold start reservoir 2 Oil filler cap 3 Dipstick

Fig 1 Oil filler cap and dipstick

Engine oil change

5 Before draining the engine sump ensure a suitable container is available in which to drain the old oil. If possible drain after the engine has been running when the oil is warm and will flow freely. Remove the sump plug(s) (Fig 2) as required, taking care to avoid spillage as the plug is being extracted (there are two plugs on opposite sides of the engine block). Allow adequate time for complete drainage before refitting the sump plug(s). Add the correct amount of the correct grade of engine oil.

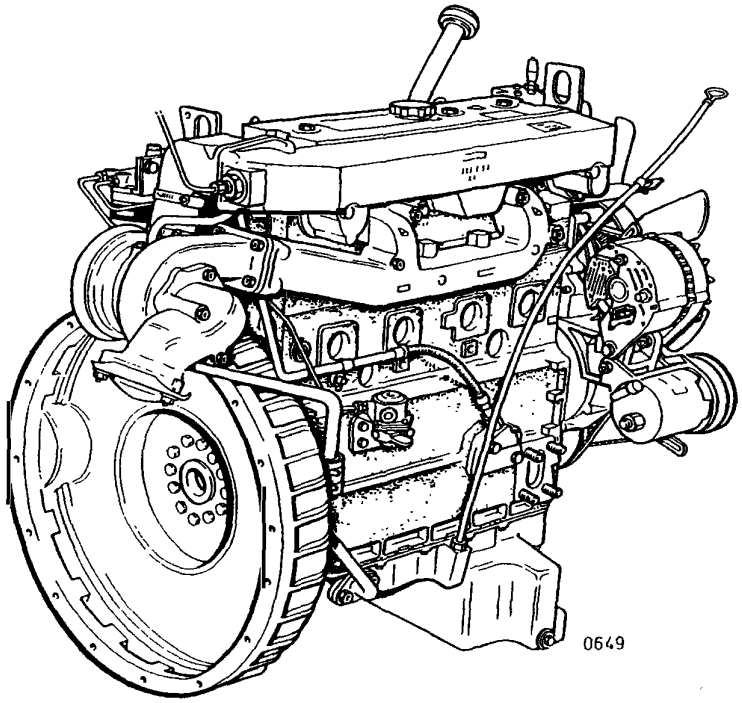


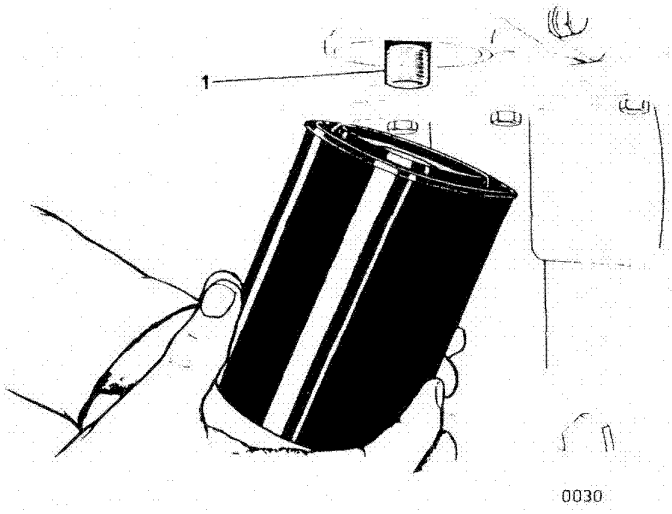
Fig 2 Engine sump drain plug (rhs)

Note ...

After the filter has been changed, run the engine for a short period to allow the oil to circulate through the system. After stopping the engine allow a few minutes before finally checking and topping up.

Engine oil filter change

6 Place a suitable container below the filter to contain any spillage. Remove the filter canister with a strap wrench or similar tool whilst ensuring that the adaptor (Fig 3 (1)) is secure in the filter head and then discard the canister. Clean



1 Adaptor

Fig 3 Oil filter replacement

the filter head. Add clean engine lubricating oil to the new canister and give the oil sufficient time to fill the canister through the filter element. Lubricate the top of the canister seal with clean engine lubricating oil. Install the new canister and tighten it by hand only, do not use a strap wrench. After lubricating oil has been added to the sump, operate the engine and check for leakage from the filter. When the engine has cooled, check the oil level on the dipstick and top up as necessary.

COOLING SYSTEM

WARNING...

WHEN THE ENGINE IS AT NORMAL TEMPERATURE OR ABOVE, THE INTERNAL PRESSURE BUILT UP IN THE COOLING SYSTEM WILL BLOW OUT SCALDING FLUID AND VAPOUR IF THE RADIATOR CAP IS SUDDENLY REMOVED. TO PREVENT LOSS OF COOLANT AND TO AVOID THE DANGER OF BEING SCALDED, THE COOLANT LEVEL SHOULD BE CHECKED OR COOLANT ADDED ONLY WHEN THE ENGINE IS COOL. IF THE CAP MUST BE REMOVED WHEN THE ENGINE IS HOT, PLACE A CLOTH OVER THE CAP AND ROTATE THE CAP SLOWLY ANTI-CLOCKWISE TO THE FIRST STOP AND THEN ALLOW PRESSURE TO ESCAPE COMPLETELY. THEN TURN THE CAP AGAIN SLOWLY ANTI-CLOCKWISE TO REMOVE IT. ENSURE THAT THE CAP IS TURNED FULLY CLOCKWISE WHEN IT IS INSTALLED. THE FLUID IN THE SYSETEM IE ANTI-FREEZE/WATER IS TOXIC AND HAZARDOUS AND FULL SAFETY PROCEDURES MUST BE OBSERVED.

7 The radiator header tank (Fig 4) is situated to one side of the engine compartment beneath the bonnet. Radiator drain plugs or taps are not provided within the cooling system.

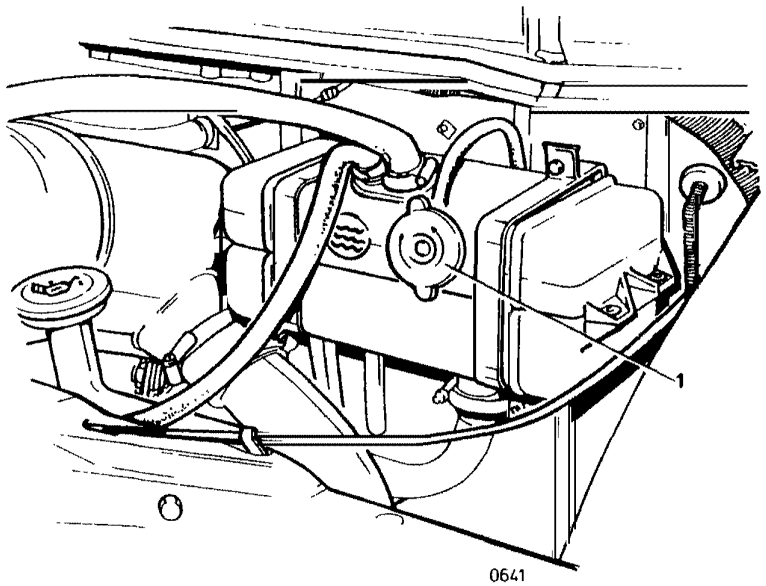


Fig 4 Radiator header tank

Checking/topping-up the cooling system

8 The coolant level should be checked daily before starting the engine. The level should be within approximately 0.5 inches (1cm) below the header tank filler neck. Top up with the correct proportion of clean, preferably soft, water and anti-freeze.

Draining the cooling system

9 Two cylinder block drain plugs are fitted on opposite sides of the engine and the left hand side (lhs) plug is shown in Fig 5. To drain the cooling system proceed as follows :

9.1 Set the heater control to 'hot' and remove the header tank cap.

9.2 If the coolant is required for re-use place a suitable container beneath the drain plug(s).

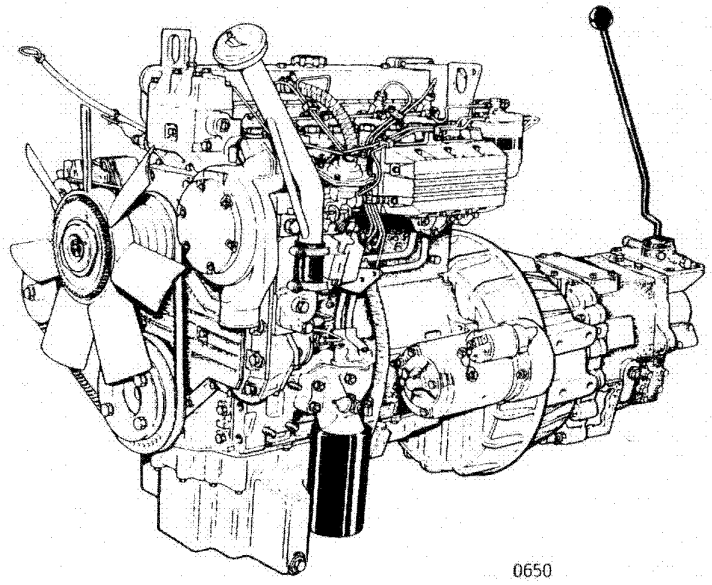


Fig 5 Cylinder block drain plug (lhs)

9.3 Taking care with a hot engine, remove the cylinder block drain plug(s) and disconnect the bottom radiator hose at the radiator and allow to drain.

Flushing the cooling system

10 It is advisable to occasionally flush out the cooling system to remove any sediment or sludge which may affect the efficiency of the system. The best time to do this is when refilling the system with anti-freeze. Proceed as follows :

10.1 Drain the system as described previously.

10.2 Insert a cold water supply hose in the header tank filler neck, and regulate the flow of water so that overflow does not occur. Flush the system until clean water is seen to flow from the bottom hose and cylinder block.

10.3 Fill the system.

Filling the cooling system

11 To fill the cooling system proceed as follows :

11.1 Set the heater control to 'hot'.

11.2 Refit the bottom hose and replace the cylinder block drain plug(s).

11.3 Fill the system with clean (soft where possible) water and anti-freeze mixture in the correct proportions.

11.4 Run the engine for a short time to disperse any air locks and check for leakage.

11.5 Check the coolant level and top up as necessary.

Radiator external cleaning

12 In conditions where the radiator may get clogged externally i.e. dusty conditions, the core should be kept clear by periodic cleaning using a pressurised water hose. DO NOT use high pressure water..

Hoses

13 Check the coolant and heater hoses regularly for signs of deterioration and renew where necessary. Oil contaminated hoses should be thoroughly cleaned and if found swollen should be renewed. Where there is evidence of chafing the cause should be rectified immediately.

Anti-freeze

14 A coolant mixture of anti-freeze and water as stated in the maintenance schedule should be used. The mixture can remain in the system for up to two years but the concentration should be closely monitored, especially during cold periods.

FUEL SYSTEM

Venting the fuel system

WARNING ...

WHEN CARRYING OUT THIS PROCEDURE GREAT CARE MUST BE TAKEN TO PREVENT FUEL UNDER PRESSURE FROM CONTACTING THE SKIN SINCE IT WILL PENETRATE WITH EASE. FUEL IS A HAZARDOUS FLUID AND SAFETY PROCEDURES MUST BE OBSERVED.

15 Although the fuel filter is self-venting through a 0.5mm diameter hole, it is quicker to fill an empty filter by operating the fuel lift pump priming lever (Fig 8 (1)), after first loosening the fuel return banjo bolt (Fig 6). When fuel, free from air bubbles, appears around the banjo bolt, tighten the bolt.

Note ...

It may be necessary to turn the engine until the priming lever is at the bottom of its stroke to obtain full movement.

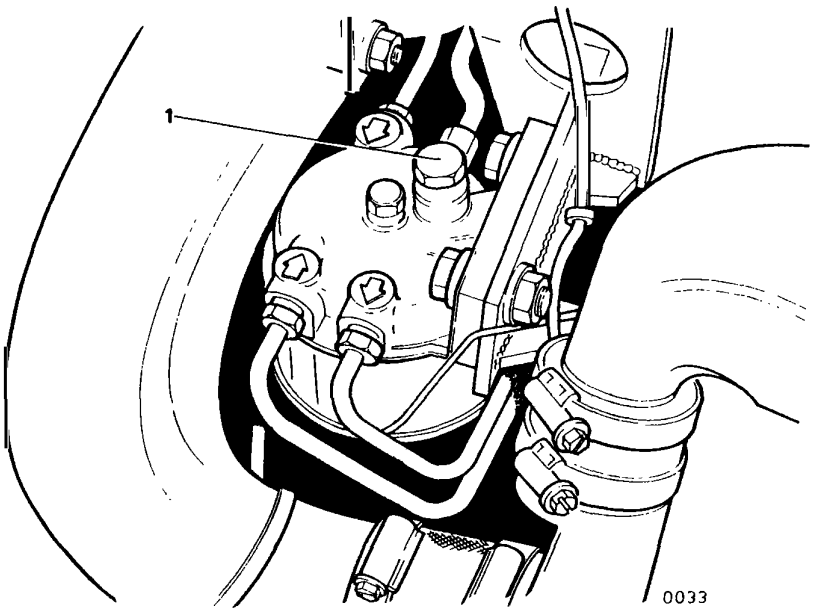


Fig 6 Fuel return banjo connection

16 To vent the system proceed as follows :

16.1 Ensure that the engine manual stop is pushed fully inwards towards the dashboard.

16.2 Loosen the pipe union nut (Fig 7(1)) at the fuel injection pump inlet. Operate priming lever (Fig 8 (1)) until fuel, free from air bubbles, appears from the loose connection. Tighten the union nut.

16.3 Loosen any two high pressure pipe unions at the injector end.

16.4 Operate the starter motor until fuel, free from air bubbles, issues from both pipes. Tighten both pipe unions.

16.5 Start the engine. If the engine stops after a short running period, there may still be some air in the system. Reprime the complete system.

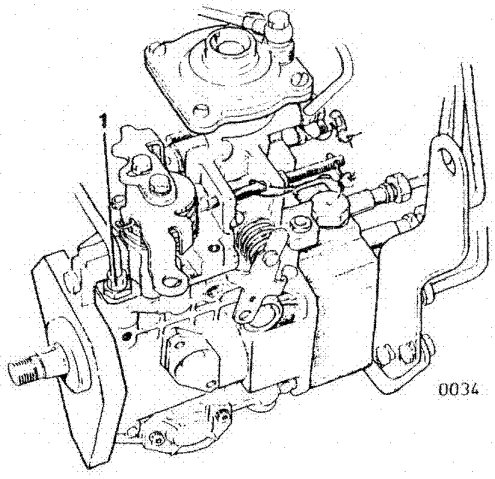
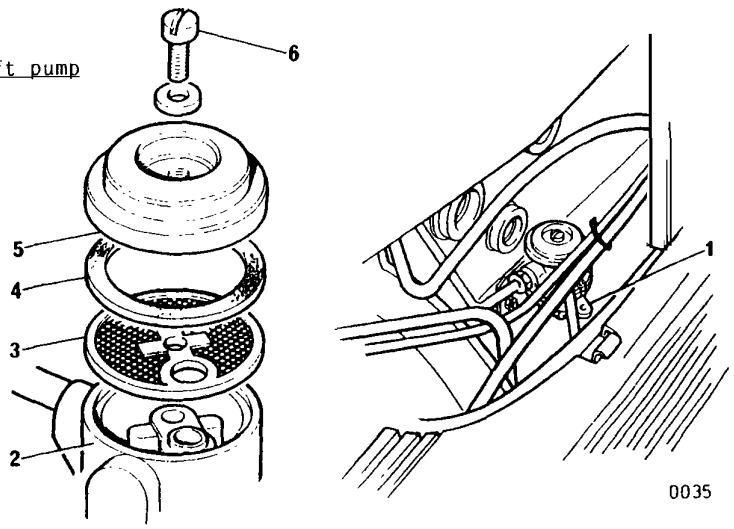


Fig 7 Fuel injection pump inlet union nut

Fuel lift pump



1 Priming lever 3 Filter 5 Cover
2 Chamber 4 Gasket 6 Setscrew

Fig 8 Fuel lift pump

17 The fuel lift pump (Fig 8) is situated on the right hand side of the engine below the exhaust manifold. To maintain proceed as follows :

17.1 Release the setscrew (6) on the cover (5) and remove the cover.

17.2 Lift out the gauze filter (3) and wipe it clean using a lintless cloth.

17.3 Clean the sediment chamber (2), cover (5). Ensure dirt does not enter the pump.

17.4 Ensure that the gasket (4) is in good condition and renew if necessary.

17.5 When assembling, ensure that an airtight joint is made between the cover and pump body.

17.6 Vent the system of air.

Final fuel filter element change

18 The filter (Fig 9) is located to the rear of the engine. Access to the unit is made by removing the rear engine cover. The element cannot be cleaned but should be renewed in accordance with the maintenance schedule.

18.1 Place a protective cover over the starter motor to protect it from any fuel spillage.

18.2 Clean the exterior of the fuel filter assembly.

18.3 Unscrew the centre bolt (Fig 9 (1)) securing the filter bowl to the top cover.

18.4 Drop the filter bowl (Fig 9 (5)) clear and discard the filter element (Fig 9 (4)).

18.5 Clean the bowl with paraffin or diesel.

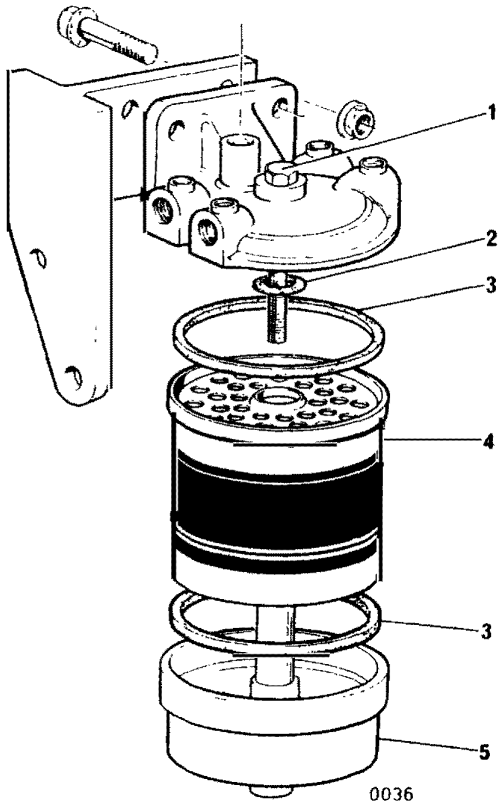
18.6 Renew the 'O' ring (Fig 9 (2)) located in the filter head and the upper and lower sealing rings (Fig 9 (3)).

18.7 Place the bowl on the base of the new filter element and offer up the assembly squarely to the filter head so that the top rim of the element is centrally located against the sealing ring in the filter head.

18.8 Hold the assembly in this position and locate and tighten the securing bolt.

18.9 Prime and vent the fuel system as described in Para 15.

18.10 Remove the protective cover from the starter motor.



1 Bolt
2 'O' ring
3 Sealing ring
4 Filter element
5 Bowl

Fig 9 Final fuel filter

Sedimenter

19 Any water or dirt should be drained from the sedimenter (Fig 10) at the periods shown in the maintenance schedule, unless fuel or operating conditions require more frequent attention.

19.1 Remove the drain plug (6) and drain the contents of the bowl into a suitable container.

19.2 Remove the four setscrews securing the bowl clamp ring (5) to the head casting (1), and remove the clamp ring and bowl (4).

19.3 Clean the bowl and conical deflector plate (3).

1 Head casting
2 Sealing ring
3 Deflector plate
4 Bowl
5 Clamp ring
6 Drain plug

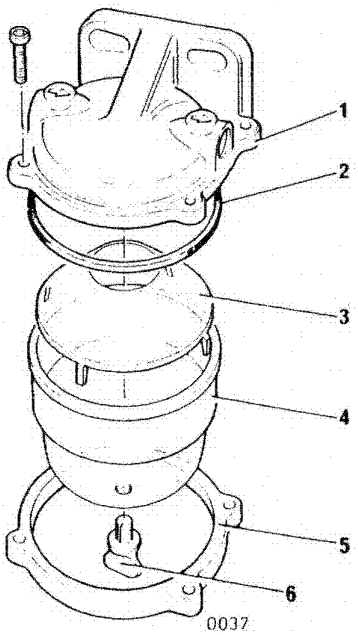


Fig 10 Sedimenter

19.4 Check the sealing ring (2) in the head casting and renew if necessary.

19.5 Fit the deflector plate in the bowl and fill with clean fuel prior to refitting and ensure an airtight joint is obtained. Vent the fuel system.

Fuel tank - draining sediment

20 If necessary the fuel tank should be drained of any sediment. The fuel tank drain plug is located at the base of the fuel tank.

21 Place a suitable container beneath the drain plug. Remove the plug and allow about half a pint of fuel to drain off before replacing the plug. Do not re-use the fuel.

Fuel injection pump

22 The fuel injection pump (Fig 7) meters and delivers diesel to the injectors. It is built to extremely fine limits. Any mishandling or the entry of the smallest particles of dirt will impair its operation and could cause damage. It is, therefore, important that clean fuel be used and that attention only be given by suitably qualified personnel.

Injectors

23 Providing that good quality fuel is used and the fuel filtration system is properly maintained the fuel injectors will require minimal attention.

24 Cleaning and testing of injectors must only be carried out by suitably qualified personnel.

25 A faulty injector is indicated by one or more of the following symptoms :

25.1 Knocking in one or more cylinders

25.2 Engine overheating

25.3 Loss of power

25.4 Smoky (black) exhaust

25.5 Increased fuel consumption

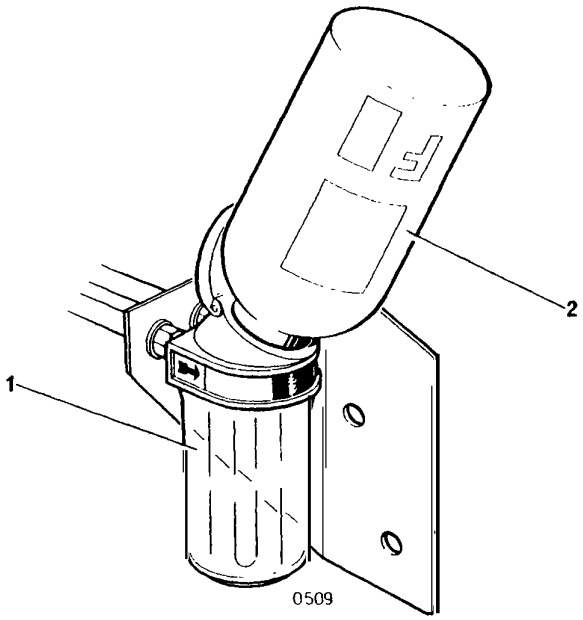
25.6 Misfiring

Start pilot reservoir - to refill

WARNING...

THE START PILOT FLUID IS HIGHLY INFLAMABLE AND TOXIC. SAFETY PRECAUTIONS MUST BE OBSERVED.

26 Open reservoir cap, invert refill bottle and push down into reservoir. On completion close reservoir cover and put cap on refill bottle.



1 Reservoir 2 Refill bottle

Fig 11 Refilling start pilot reservoir

Engine speed adjustment

27 Adjustments should only be altered by suitably qualified personnel.

BATTERIES

WARNINGS ...

(1) NEVER EXPOSE A BATTERY TO A NAKED FLAME.

(2) DO NOT ALLOW BATTERY FLUID TO CONTACT EYES, SKIN, FABRICS OR PAINTED SURFACES. OBSERVE SAFETY PRECAUTIONS.

(3) REMOVE ANY METAL JEWELLERY AND WATCH BANDS BEFORE WORKING ON OR NEAR A BATTERY.

(4) BE CAREFUL WHEN USING METAL TOOLS OR EQUIPMENT ON OR NEAR A BATTERY.

(5) DO NOT TRANSFER ELECTROLYTE FROM ONE CELL TO ANOTHER.

(6) ALWAYS DISCONNECT BATTERIES PRIOR TO WORKING ON ELECTRICAL UNITS.

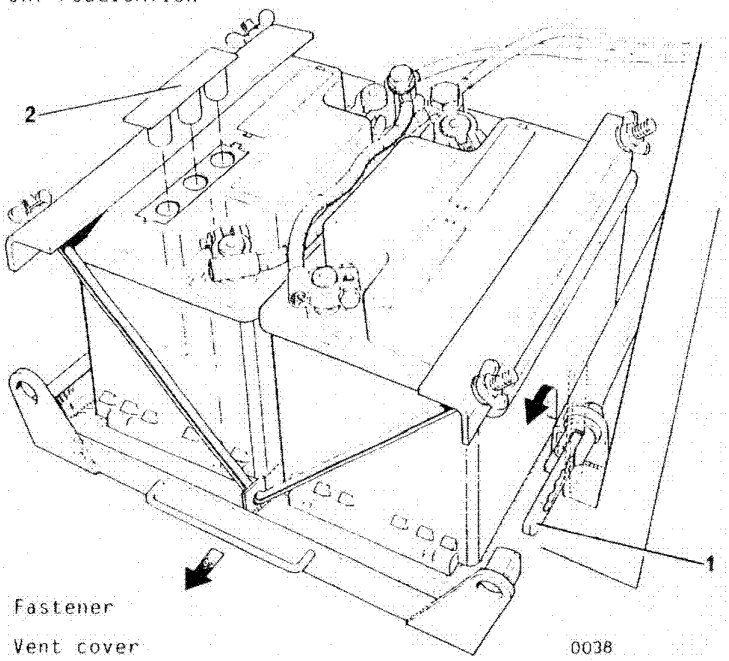
CAUTIONS ...

(1) The vehicle batteries must never be disconnected whilst the engine is running.

(2) Disconnect the batteries if electric arc welding is to be carried out on the vehicle.

(3) Disconnect the batteries prior to boost charging.

(4) If using a slave battery to aid starting, observe the precautions detailed in 'jump starting'.



1 Fastener
2 Vent cover

Fig 12 Vehicle batteries (12v)

28 Two 12 volt batteries are mounted on a sliding tray housed within the forward most compartment on the right hand side of the vehicle (Fig 12). The tray is secured in position by two anti-loose fasteners (1). To withdraw the batteries for maintenance or replacement release the two fasteners and pull the sliding tray, with batteries, from the compartment. After maintaining or replacing the batteries ensure that the batteries are secured to the tray and push the tray into the compartment as far as it will go. Engage both fasteners to secure the tray in the stowed position.

29 At the recommended maintenance intervals the battery terminal posts must be protected from corrosion. Remove each terminal in turn, clean the posts and smear the inside of the terminal with petroleum jelly. Refit the terminal and tighten the securing bolt with medium force only. Cover the surface with petroleum jelly.

30 Examine the earth connections to the body and engine to ensure that they are tight, clean and free from rust and corrosion.

Note ...

When two batteries are fitted always renew them in pairs.

31 Low maintenance batteries are fitted and under normal operating conditions the battery electrolyte level should be checked in accordance with the maintenance schedule.

32 With the battery on a level surface, check the electrolyte level by removing the vent plugs, raising the vent cover (2) or viewing through the container, depending on the type of battery. If the level is below the tops of the separators or splash guards, topping up is required. Do not top up unnecessarily as this may overfill the battery, as a general rule, if you can see liquid above the separators, do not add any. If the battery is flat, recharge it before checking the electrolyte level. Always try to top up when the battery is fully charged.

Jump starting

CAUTION...

When temperatures are below freezing point, electrolyte in a discharged battery may freeze. If electrolyte is not visible in the battery or appears frozen, do not attempt jump starting as the battery may rupture or explode. Battery temperatures must be brought up above freezing point and water added (if necessary) before attempting jump starting.

33 If it becomes necessary to use a booster battery and jump cables or a mains operated engine starter to start a vehicle engine, the following procedure should be used :

33.1 Switch off the ignition and headlights.

33.2 Remove the filler caps from the booster battery and the vehicle batteries. Ensure that the electrolyte is at the correct level.

33.3 Cover the filler openings of all the batteries with cloths.

33.4 If the booster battery is fitted to another vehicle, ensure the two vehicles do not touch.

33.5 Connect one jump cable between the POSITIVE (+) POSTS of the batteries.

33.6 Connect one end of the other jump cable to the NEGATIVE (-) POST of the booster battery. Connect the other end of the cable to the engine end of the battery earth cable. DO NOT CONNECT TO THE NEGATIVE POST OF THE DISCHARGED BATTERY, as a flash may occur on connection or disconnection.

33.7 Switch on the ignition and operate the starter.

33.8 After the engine is started, or it fails to start, the cables must be disconnected in the following order :

(1) Negative cable at the battery earth cable.

(2) Negative cable at the negative post on the booster battery.

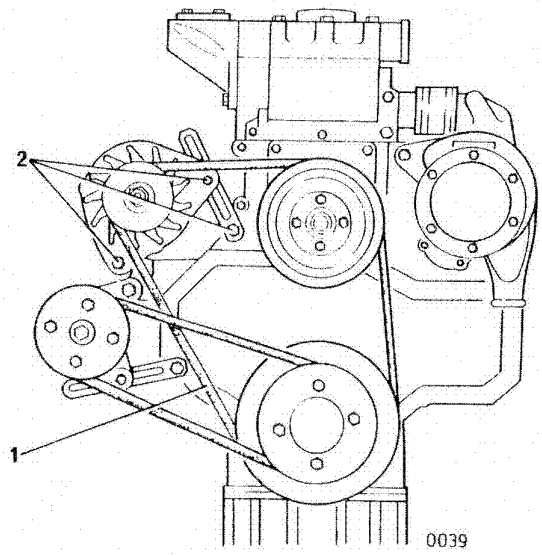
(3) Cable between the positive posts of the batteries.

33.9 Remove the cloths from all the batteries and refit the filler caps. Cloths that have been exposed to sulphuric acid fumes must be discarded safely.

34 If a mains operated engine starter is used in place of a boost battery, ensure that it is set at 12 volts.

FAN BELT ADJUSTMENT

35 The belt Fig 13 (1) should never be allowed to become loose enough to slip which can cause overheating, nor should it be overtightened as this may cause overloading on the alternator bearings. Renew a belt if it is worn or damaged.



1 Fan belt

2 Alternator fastener

Fig 13 Fan belt adjustment

36 To check belt tension apply a light thumb pressure to the belt midway along the longest unsupported length and measure the deflection.

Notes ...

(1) When fitting a new belt, the adjustment should be checked after a short period of running to allow for initial stretch and bedding in (800 km (500 miles) or 20 hours operation).

(2) Removal and installation of a new belt will necessitate the removal of the power steering belt for access.

37 Belt tension is adjusted by altering the position of the alternator. To adjust the belt tension proceed as follows :

36.1 Loosen the alternator mounting and adjustment link fasteners (2).

36.2 Change the alternator position to give the correct tension (12 mm (0.5 in) belt deflection) and tighten the alternator and adjustment link fasteners.

36.3 Check the belt tension once more to ensure that it is still correct.

CLUTCH

Checking/topping-up hydraulic fluid

38 At regular intervals as stated in the maintenance schedule check the hydraulic fluid level and if necessary top up as follows :-

38.1 The hydraulic fluid level in the reservoir (Fig 14) should be to within 12mm (1/2in) from the filler aperture.

38.2 Do not overfill otherwise clutch slip could occur when the fluid expands in hot weather.

38.3 Check that the breather hole in the top edge of the filler cap is clear.

38.4 Frequent necessity for topping-up indicates a fluid leak which must be rectified immediately.

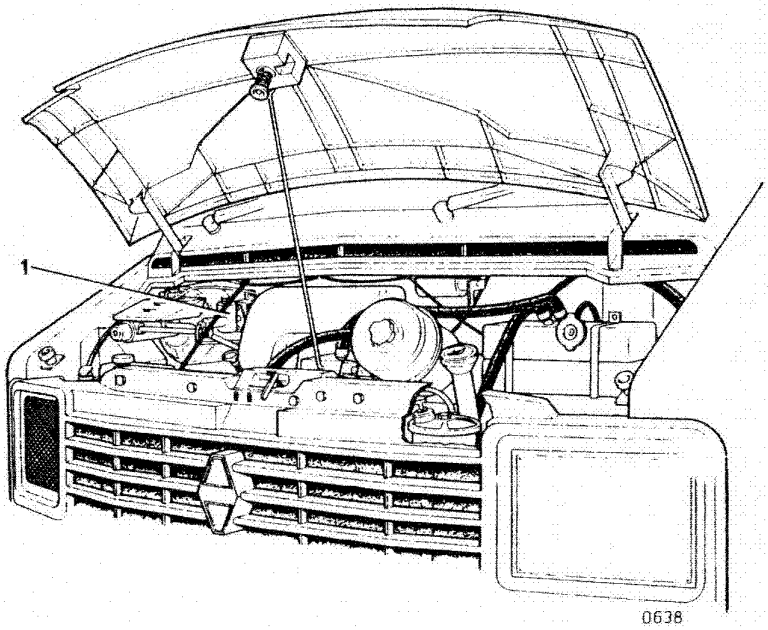


Fig 14 Clutch hydraulic fluid reservoir

GEARBOX

Checking/topping-up lubricating oil

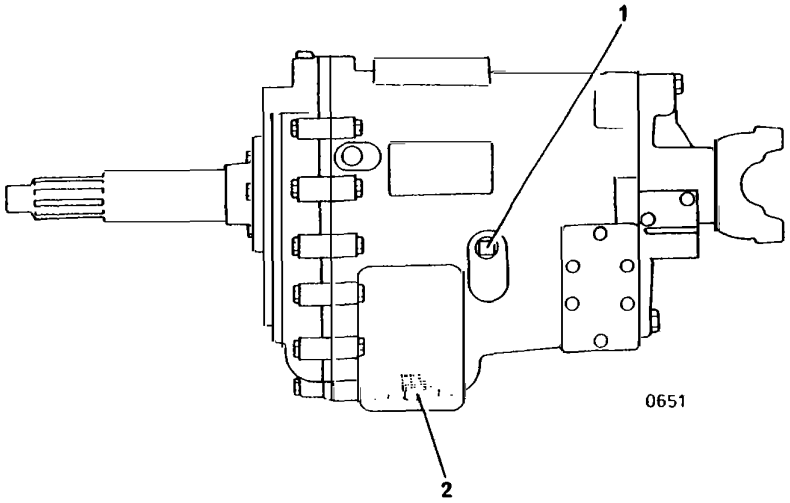
39 The level of the gearbox lubricating oil must be checked at regular intervals as stated in the maintenance schedule and if necessary topped-up as follows :-

39.1 Ensure the vehicle is standing on level ground.

39.2 Wipe the filler/level plug (Fig 15(1)) and the surrounding area clean, to avoid ingress of dirt when removing the plug.

39.3 Remove the filler/level plug and top up with the correct grade of oil to the point of overflow. Do not overfill as this could damage the gearbox or the clutch.

39.4 Refit filler/level plug.



1 Level/filler plug 2 Drain plug

Fig 15 Gearbox oil level/filler and drain plugs

Gearbox lubricating oil changing

40 The gearbox lubricating oil should be changed at regular intervals as stated in the maintenance schedule.

40.1 It is advisable to drain the gearbox just after the vehicle has been running and with the gearbox oil warm.

41 To drain the gearbox oil proceed as follows :-

41.1 Ensure that the vehicle is standing on level ground.

41.2 Wipe the filler/lever plug (1) and the drain plug (2) and the areas surrounding these two plugs clean.

41.3 Remove the drain and filler/level plugs and drain the lubricating oil into a suitable receptacle.

41.4 When the oil has been drained completely refit the drain plug.

42 To fill the gearbox with flushing oil proceed as follows :-

42.1 Fill the gearbox to the level of the level/filler plug with a light flushing oil to the correct level and refit level/filler plug.

42.2 Rotate the transmission for a short period in neutral without load. This washes out the old oil clinging to the transmission.

42.3 Then drain the flushing oil into a suitable receptacle.

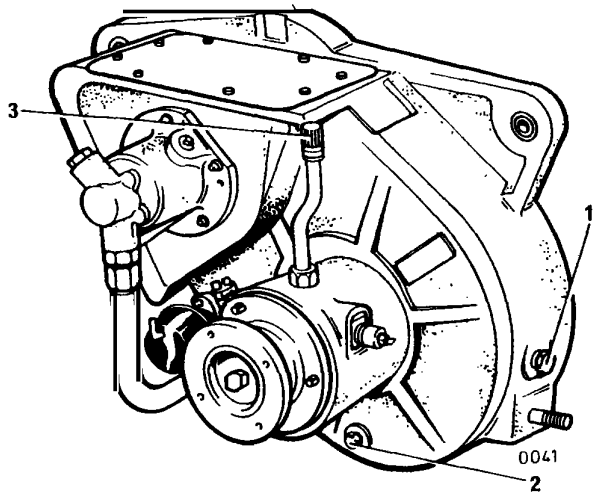
42.4 When the flushing oil has drained completely, refit the drain plug.

43 To refill the gearbox with new oil of the correct grade as stated in the maintenance schedule proceed as follows :-

43.1 Fill the gearbox to the correct level through the level/filler plug and refit plug. Do not overfill as this could damage the gearbox or the clutch.

TRANSFER GEARBOX

44 Check the unit for leaks and rectify if evident by tightening the appropriate nuts or bolts. A persistent leak should be dealt with immediately. Keep external surfaces as clean as possible and check that the differential lock engages and dis-engages when operated. Check the high/low ratio selection and adjust the control cable if necessary, this should be carried out by suitably qualified personnel.



1 Filler plug
2 Drain plug
3 Breather

Fig 16 Transfer gearbox filler, drain plug and breather

Checking/topping-up transfer gearbox oil

45 Check the gearbox oil level regularly and top up if necessary. A combined oil level and filler plug (Fig 16 (1)) on the right hand side of the gearbox is accessible from beneath the vehicle.

46 Check the oil level after the vehicle has been standing for several minutes and if possible ensure that the vehicle is standing on level ground. Top up until the oil reaches the filler plug aperture.

Transfer gearbox oil change

47 The oil must be completely renewed at the intervals stated in the maintenance schedule.

48 If possible, change the oil when the vehicle has returned from a run and whilst the oil is still warm. The drain plug (2) which is magnetic, will be found located in the bottom face of the unit. Ensure the plug is cleaned, refitted and tightened securely when draining is completed.

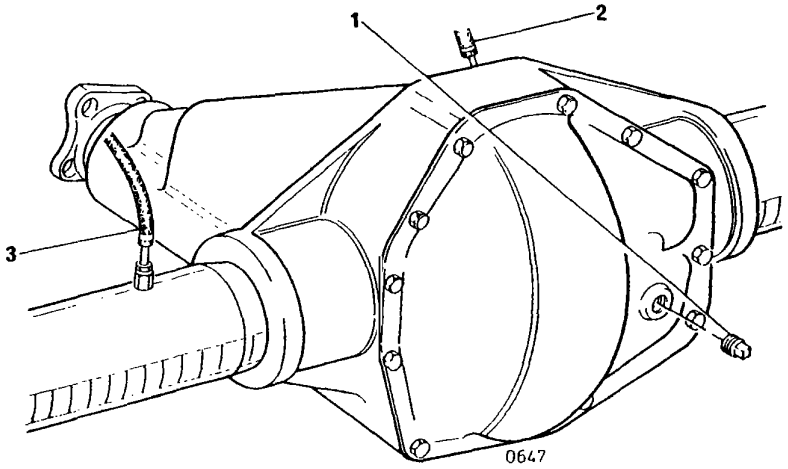
Breather

49 The breather (3) must be removed and cleaned at the intervals stated in the maintenance schedule.

50 Failure to clean the breather could result in excessive pressure build up within the gearbox with subsequent oil leaks.

AXLE LUBRICATION

51 The level of the oil in the front and rear axle differential housings must be checked regularly and topped up if necessary.



1 Level and filler plug 2 Breather (front axle)

3 Breather (rear axle)

Fig 17 Front and rear axle oil level, and breather

52 Check the unit for leaks and rectify if evident by tightening appropriate nuts or bolts. A persistent leak or a leak from the front of the differential should be dealt with immediately.

Checking/topping-up axle oil

53 A combined oil filler and level plug (Fig 17 (1)) is fitted in the rear cover. With the vehicle on level ground clean the area

around the filler plug, remove the plug and top up with the correct grade of oil until level with the plug aperture. Replace the plug.

Axle oil change

54 The axle oil need only be changed if oil contamination is suspected owing to broken breather pipe or faulty oil seal etc.

54.1 Remove the rear cover after placing a large oil tray under the axle casing.

54.2 Allow the oil to drain completely.

54.3 Replace the end cover see AESP 2320-E-200-522 Chapter 5 or 6.

54.4 Wipe the area around the filler plug and remove it.

54.5 Fill with the correct grade of oil until level with the filler plug aperture. Replace the plug.

Breather

55 The front axle breather (Fig 17 (2)) located at the top of the axle differential casing and the rear axle breather (3) must be removed and cleaned at the intervals stated in the maintenance schedule.

WHEEL HUBS

Hub bearing end float

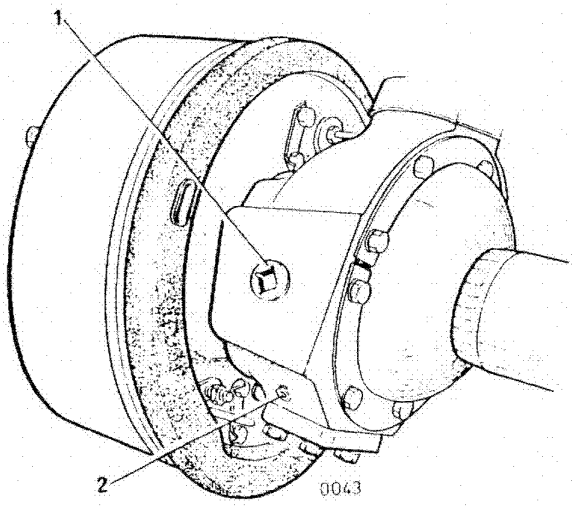
56 The wheel bearing end float should be checked by suitably qualified personnel at the intervals stated in the maintenance schedule.

Rear wheel hubs

57 The rear hubs and bearings are lubricated by axle oil which has free passage along the axle shafts.

Front wheel hubs

58 The front hub bearing should be cleaned and repacked with new grease by suitably qualified personnel at the intervals stated in the maintenance schedule. The front wheel hub, steering knuckle and constant velocity joint are lubricated by oil and should be filled/drained using the filler (Fig 18 (1) and drain plug (2).



1 Filler plug 2 Drain plug

Fig 18 Front hub filler and drain plug

POWER STEERING

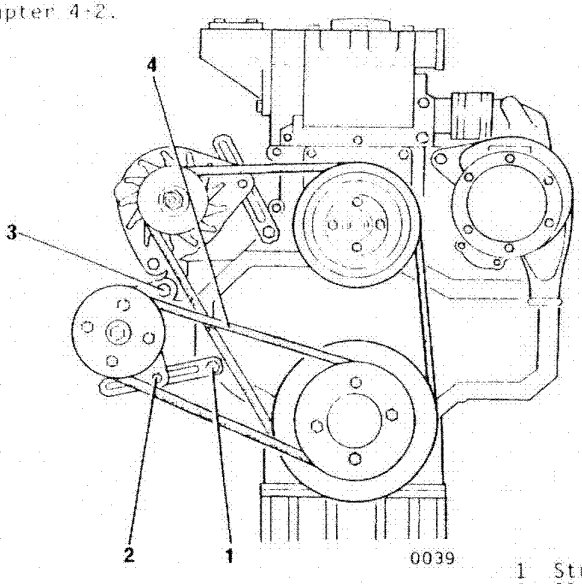
Steering free play

59 Excessive free movement at the steering wheel is not permitted and this should therefore be checked regularly. If evident, the movement should be corrected by suitably qualified personnel.

Belt adjustment

Note ...

The power steering belt adjustment for FFR vehicles is slightly different from GS Cargo and reference should be made to Chapter 4-2.



1 Strap pivot
2 Slide bolt
3 Pivot bolt
4 Steering pump belt

Fig 19 Power steering belt adjustment

60 From below slacken off the strap pivot (Fig 19 (1)) and slide bolt (2), then from above slacken the pump pivot bolt (3). Swing the unit outward away from the engine until a deflection of 10 mm (0.4 inches) is obtained midway along the longest span (4). Holding it in this position retighten the slide bolt followed by the remaining two bolts.

Belt replacement

61 When a new belt has been fitted re-adjust the tension after a short period of running to take up the initial stretch.

Checking/topping-up steering fluid reservoir

62 The reservoir (Fig 20) is located under the bonnet and has a dipstick (Fig 21 (2)) fitted to the filler cap. Before removing the cap clean the outside thoroughly. If necessary top up the reservoir to the level mark on the dipstick.

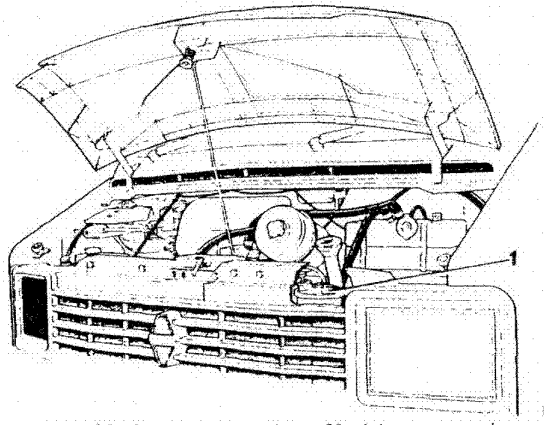


Fig 20 Power steering fluid reservoir

Steering fluid filter change

63 The filter which is located within the reservoir unit, must be renewed at the intervals stated in the maintenance schedule. Proceed as follows :

63.1 Thoroughly clean the outside of the reservoir.

63.2 Remove the washer bolt (1) and lift off the cover.

63.3 Remove the spring (4) and spring seat (5) and lift out the element (6).

63.4 Examine the cover and filler cap seals and renew if necessary.

63.5 Fit the new element and locate the spring seat and spring on the centre stud.

63.6 Fit and secure the cover, do not overtighten.

63.7 With the wheels in a straight ahead position check the fluid level and top up if required.

1 Washer bolt
2 Dipstick and filler
3 Seal
4 Spring
5 Spring seat
6 Element

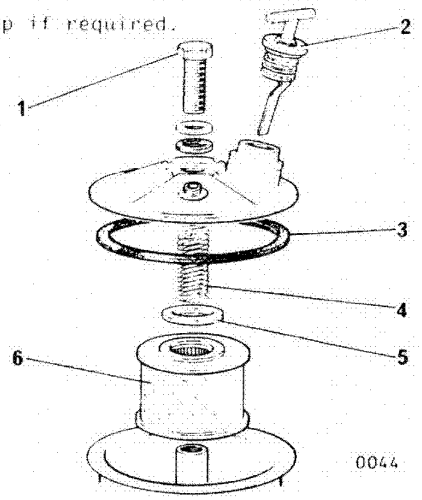


Fig 21 Power steering reservoir assembly

Draining the steering fluid system

WARNING...

NEVER GET BENEATH THE VEHICLE WHEN IT IS SUPPORTED SOLELY BY A JACK. DO NOT START OR RUN THE ENGINE WHILST THE VEHICLE IS SOLELY JACK SUPPORTED.

64 If for any reason it becomes necessary to drain the system, it should only be done by suitably qualified personnel, as follows :

64.1 Apply the handbrake, select neutral in the vehicle gearbox, jack-up and securely support the front axle.

64.2 Remove the reservoir cover (for filter renewal).

64.3 Place a suitable container beneath the steering box and disconnect the two pipes from the unit.

Note ...

The fluid will run out of the box and it is therefore advisable to use a tray type container to collect the fluid.

64.4 Operate the steering from lock to lock several times until fluid ceases to flow.

64.5 Immobilise the fuel system by pulling out the engine stop control and turn the engine over using the starter (using short applications) to drain any fluid which is trapped in the power steering system.

64.6 When the fluid ceases to flow reconnect the pipe unions.

Filling and venting the steering fluid system

65 Having fitted a new element in the reservoir refill with fresh fluid until the element is just covered. Proceed as follows:

65.1 Disconnect drag link from drop arm.

65.2 Start the engine and allow it to idle.

65.3 As soon as the fluid in the reservoir starts to drop, top up to maintain the level.

65.4 Bleed the system by turning the steering from lock to lock topping-up as necessary.

65.5 Continue until the level remains constant and air bubbles cease to appear in the reservoir.

65.6 Stop the engine.

65.7 Refit the reservoir cover and top up to the correct level on dipstick.

65.8 Refit drag link to drop arm.

Steering column grease nipples

66 Three grease nipples are located on the steering linkage directly above the steering box and are accessible from beneath the cab. These nipples are for the lower and upper steering column universal joints and the lower steering column sliding spline and should be greased occasionally as stated in the maintenance schedule.

BRAKE SYSTEM

WARNINGS ...

(1) REGULARLY CHECK ALL VISIBLE PARTS OF THE SYSTEM FOR SIGNS OF LEAKS. RECTIFY AS NECESSARY IMMEDIATELY.

(2) ENSURE THAT THE BRAKE FLUID RESERVOIR IS KEPT TOPPED UP TO ITS CORRECT LEVEL.

(3) INSPECT ALL PIPELINES, BRAKE HOSES AND EXTERNAL RUBBER BOOTS FOR SIGNS OF WEAR, DAMAGE AND DETERIORATION.

(4) HAVE THE BRAKE SYSTEM INVESTIGATED IMMEDIATELY BY SUITABLY QUALIFIED PERSONNEL IF ANY OF THE FOLLOWING OCCURS: EXCESSIVE BRAKE PEDAL TRAVEL: PEDAL FEELS SPONGY: BRAKES FEEL LESS EFFICIENT THAN USUAL: PULLING TO ONE SIDE WHEN THE BRAKES ARE APPLIED.

(5) ON FIRST PARADE, CHECK THE VACUUM SYSTEM, BY RUNNING THE ENGINE FOR 2 MINUTES AT APPROXIMATELY 1500 REVS TO ACHIEVE FULL VACUUM. THE ENGINE SHOULD THEN BE SWITCHED OFF AND THE VACUUM GAUGE OBSERVED FOR 10 MINUTES. ANY LOSS OF VACUUM IN THIS TIME AND THE VEHICLE MUST BE PLACED VOR.

67 The foot brake system is hydraulically operated with vacuum assistance to the front and rear drum brake assemblies. The handbrake is cable operated and acts on the rear wheels only.

Hydraulic System

68 The hydraulic system operates with two independent circuits, one supplying the front and the other the rear brakes. If a leak develops in one circuit the other is unaffected. Regularly check the hydraulic system for leaks, damage, chafing or corrosion.

Checking/topping-up the brake fluid

69 The brake fluid reservoir (Fig 22 (1)) is located beneath the bonnet. The translucent container allows the level to be seen without removing the cap. The correct fluid level is indicated at the top of the reservoir and marked 'MAX', do not fill above this level. Never allow the fluid level to fall below the 'MIN' mark.

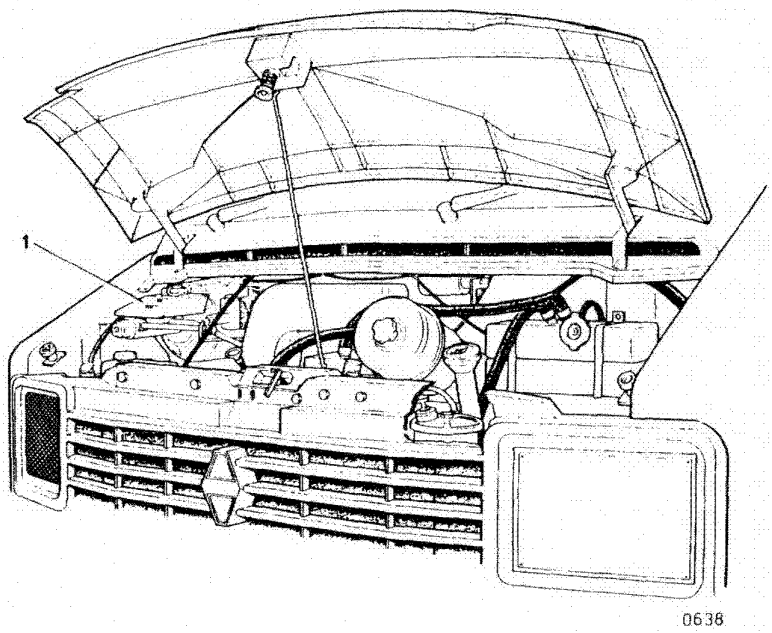


Fig 22 Brake fluid reservoir

70 Fluid levels should be checked at regular intervals as stated in the mainentance schedule. Frequent necessity for topping up indicates a fluid leak which must be rectified immediately.

71 If topping up is necessary, clean the area surrounding the cap thoroughly before removal. Top up with clean unused fluid to the correct specification, until the level is seen to be just contacting the lower part of the 'MAX' mark, replace the cap.

Bleeding the brake fluid system

72 This is not a routine maintenance item and should only be necessary when air has entered the system. This maintenance should be carried out by suitably qualified personnel.

Hydraulic pipe connections

73 Check for leaks and damage to any of the pipe lines, unions, flexible hoses etc. If tightening of unions is necessary, over tightening must be avoided, therefore, this work should be carried out by suitably qualified personnel. It is important that brake pipes are checked (without dismantling) for corrosion at the intervals stated in the maintenance schedule.

Changing the brake fluid, seals and hoses

74 In the interests of safety the hydraulic fluid, seals and flexible hoses should be renewed at the intervals stated in the maintenance schedule. This work should be carried out by suitably qualified personnel.

Vaccum system

75 The vacuum supply is provided by the exhauster unit. The vacuum servo unit is mounted immediately behind the brake fluid reservoir and all hose connections should be periodically checked for leaks and deterioration (see Warning 5, Page 46). Tighten joints where required and have any apparent loss of vacuum rectified by suitably qualified personnel.

Brake adjustment

WARNING ...

THE DANGERS TO HEALTH CAUSED BY INHALATION OF BRAKE LINING DUST MUST ALWAYS BE BORNE IN MIND. NEVER BLOW OR BRUSH DUST AWAY. THE DUST CLOUD CREATED COULD CAUSE PERMANENT DAMAGE TO LUNGS. THE SAFEST METHOD IS TO REMOVE THE DUST WITH A VACUUM BRUSH.

76 Front and rear brakes and self-adjusting, but do require manual adjustment on set up.

NOTE:

The self-adjusting mechanism on the rear brakes will only operate whilst the vehicle is being driven in reverse.

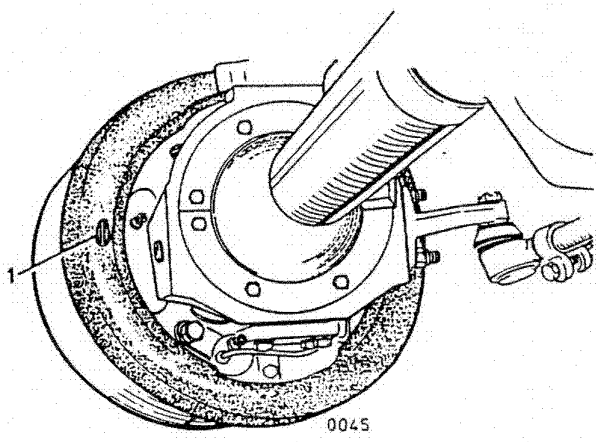
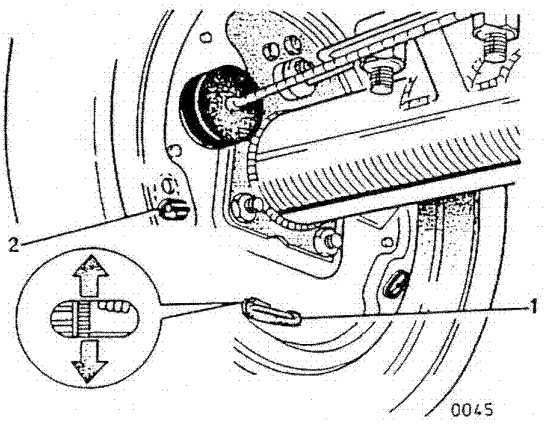


Fig 23 Front brake and inspection aperture



1 Brake adjuster 2 Inspection aperture bung

Fig 24 Rear brake easement and inspection apertures

77 When drums have been removed, shoes eased back or new shoes have been fitted, the brakes will require manual adjustment. Subsequent adjustment to compensate for brake lining wear will be carried out automatically, providing the vehicle is not only driven in forward gears as the automatic adjustment occurs only when driving in reverse direction.

78 This work should be carried out by suitably qualified personnel.

Brake Inspection

79 Lining thickness should be checked at the intervals specified in the maintenance schedule. Inspection apertures (Figs 23 and 24 (2)) are provided in the backplate or this purpose and these are sealed by rubber bungs.

80 A more thorough inspection of the lining condition is also required occasionally and this will necessitate the removal of the brake drums. This work should be carried out by suitably qualified personnel.

Load sensing valve

81 The load sensing valve regulates the braking pressure passing to the rear brakes so that maximum pressure is only available when the vehicle is fully laden. As the vehicle load is reduced the valve automatically lowers the braking pressure.

82 Accurate setting of the valve is essential and should be carried out by suitably qualified personnel.

83 A brake data plate is located on the door stop well vertical panel. Input and output pressures can be checked at the test points provided. (See AESP 2320-E-200-522 Chapter 10).

84 The valve is carefully set before the vehicle is delivered to the operator.

Handbrake

85 Occasionally, as stated in the maintenance schedule, apply oilcan lubrication to the handbrake pivot, ratchet and pawl assembly. Also lubricate all clevis pins in the cable linkage, and apply grease to the rear linkage grease nipples (2 off).

86 Normal handbrake travel should be 5-7 clicks of the ratchet as the lever is applied. Excessive travel indicates stretch in the cable linkage which must be dealt with by suitably qualified personnel.

AIR CLEANER

87 The air cleaner element (Fig 25 (1)) must be changed or cleaned at regular intervals as stated in the mainentance schedule. The frequency will be dependent upon the type of conditions under which the vehicle is used.

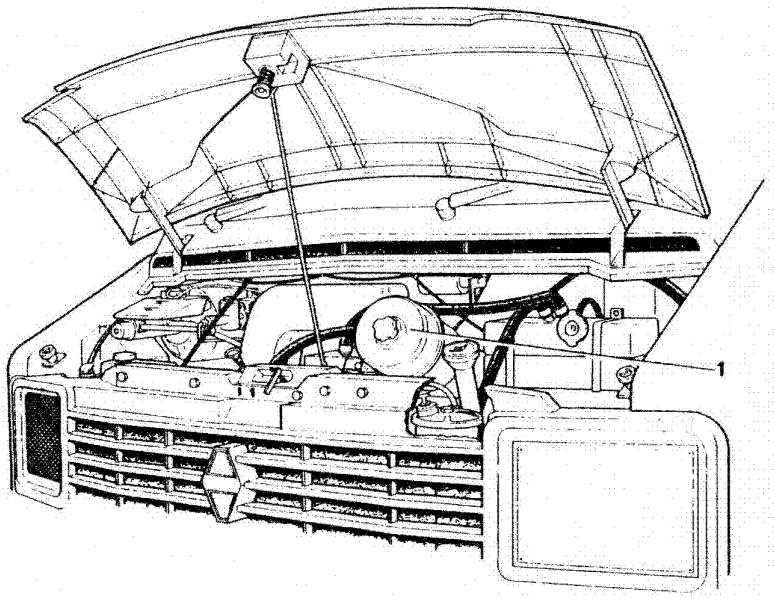


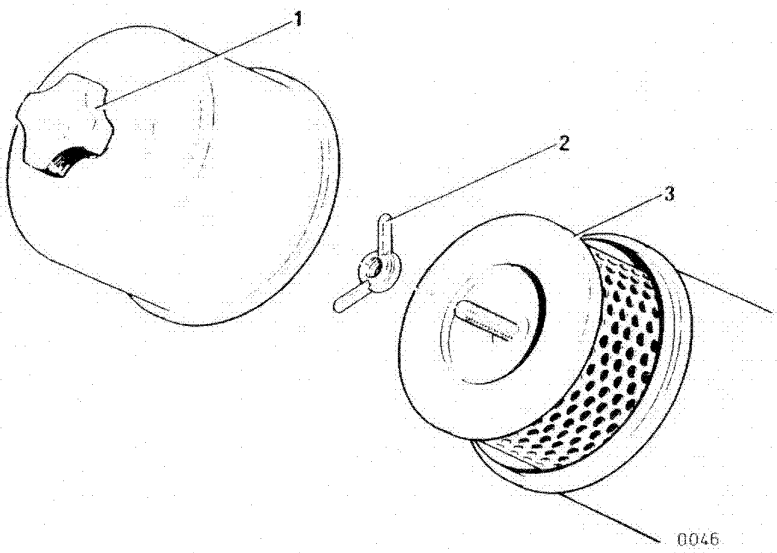
Fig 25 Air cleaner element

0638

88 The cylindrical, cleanable element (Fig 26) is accessible from beneath the bonnet. Change the element at regular intervals as stated in the maintenance schedule. The procedure for changing or cleaning is as follows :

88.1 Lift the bonnet panel, unscrew the knob of the cleaner top cover (Fig 26 (1)) and remove the cover.

88.2 Unscrew the wing nut (2) securing the element (3) and remove the element. Note the rubber sealing ring under the wing nut.



1 Cover knob 2 Wing nut 3 Element

Fig 26 Air filter assembly

88.3 The element 'clean air side' and inside the cleaner body must be checked for unusual accumulations of dust indicating a rupture in the element. If there is an accumulation of dust renew the element.

88.4 Examine for contamination by oil. If present the element must be renewed.

88.5 Examine the element sealing ring for damage, detachment or distortion. If damaged renew the element.

88.6 To clean the element, carefully tap the side of the element against the palm of the hand to remove surplus dust.

88.7 Blow out any loose dirt or sand with compressed air, blowing along the pleats and in the opposite direction of the normal operating air flow through the element. Pressures in excess of 7 kgf per square centimetre (100 lbf per square inch) should be avoided otherwise rupture of the pleats could occur.

88.8 Examine the element for damage ie pin holes etc by using a light inside the element.

88.9 Wipe the inside of the cleaner body with a clean damp cloth.

88.10 Refit the cleaned or new element and top cover.

WINCH LUBRICATION AND BRAKE ADJUSTMENT (WHERE FITTED)

89 A filler hole (Fig 27 (1)), level plug (4) and drain plug (3) are provided as shown in the winch gearcase. The gearcase should be regularly checked for oil leaks.

Winch grease points

90 All grease points should be serviced regularly as stated in the maintenance schedule. Each of the four winch rollers have a grease nipple fitted and the winch drum has one either side of the barrel. The winch drum grease nipples (two) are only exposed when the cable is unwound.

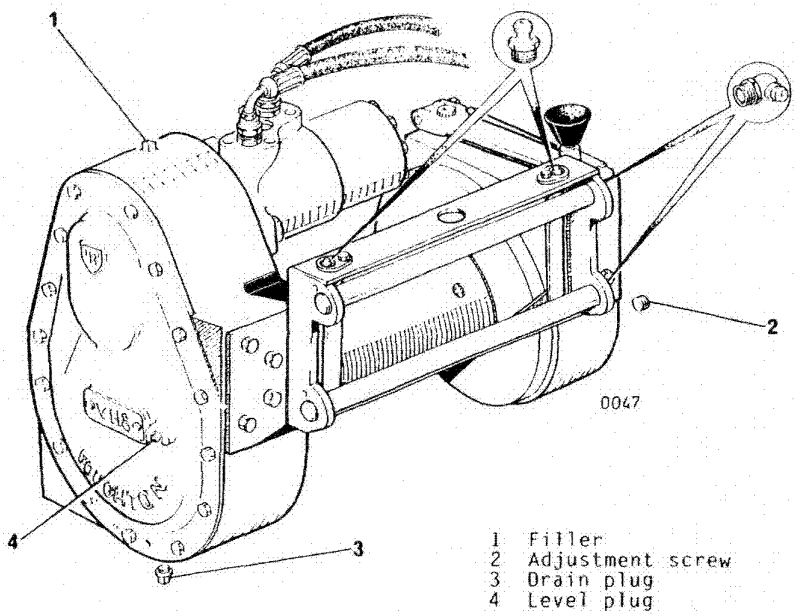


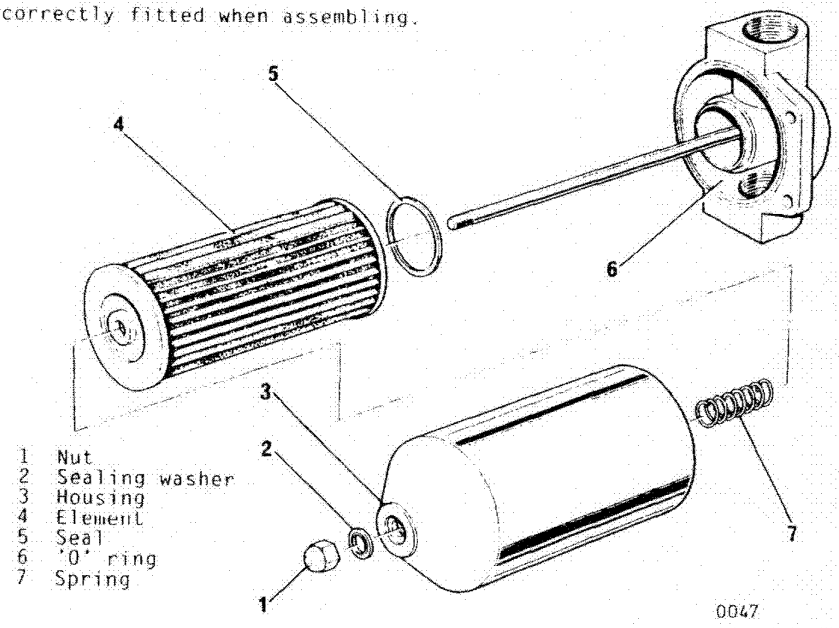
Fig 27 Winch lubrication and brake adjustment

Checking/topping-up winch hydraulic system

91 The hydraulic tank is located beneath the right hand side of the vehicle cab. The hydraulic oil level gauge is mounted on the rear of the tank and should be regularly inspected. The oil level should be topped up as necessary using the filler situated on the right hand side of the cab floor. The tank incorporates a drain plug accessible from beneath the vehicle.

Winch hydraulic filter change

92 A hydraulic filter (Fig 28), situated on a chassis crossmember immediately behind the tank, is a paper element replaceable type. Remove the nut (1), filter housing (3) and spring (7) to replace filter element (4). When fitting new element ensure that the filter housing sits squarely on the filter head '0' ring (6). Ensure the sealing washer (2) and filter head seal (5) are correctly fitted when assembling.



1 Nut
2 Sealing washer
3 Housing
4 Element
5 Seal
6 '0' ring
7 Spring

Fig 28 Winch hydraulic filter

Pad brake adjustment

93 The pad brake prevents over run when the dog clutch is disengaged a screw adjustment is provided (Fig 27 (2)).

ACCELERATOR LINKAGE

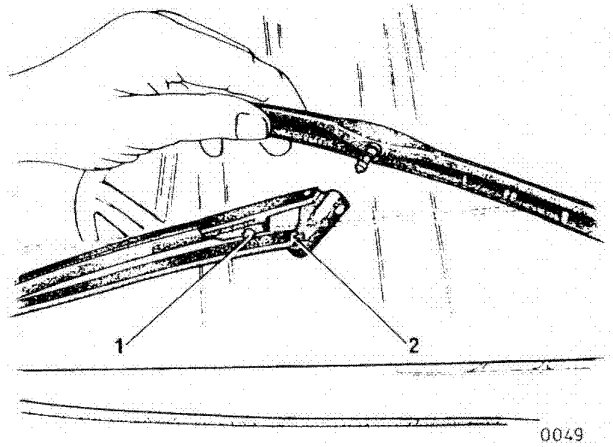
94 Occasionally, as stated in the maintenance schedule lubricate the linkage pivot points with clean engine oil applied by oilcan. Ensure that the linkage works smoothly and does not stick. Also lightly lubricate the pedal pivot.

WINDSCREEN WIPERS

95 The windscreen wiper blades should be renewed as soon as they become inefficient.

96 The drivers' wiper arm assembly is of a pantograph construction and gives a greater screen swept area on the drivers side.

97 Although both wiper arms are hinged to allow them to be lifted clear of the glass when it becomes necessary to clean the screen, the driver's arm does not lock in this position. Do not pull wipers across the screen as this may damage the mechanism.



1 Washer jet 2 Wiper catch

Fig 29 Windscreen wipers

98 Washer jets (Fig 29 (1)) are located at the outer extremity of each arm, the supply tube being taped beneath the arm.

99 Arc of wipe or position of park may be altered slightly by repositioning the arm assembly on the serrated taper of the drive spindle. Care must be taken not to dislodge the washer jet tube if this is done.

Wiper blade replacement

100 Lift the blade and carrier away from the screen. Depress the catch (2) to release the blade carrier and withdraw from the arm. Renew the blade or blade carrier assembly as required.

Checking/topping up windscreen washer reservoir

101 The washer reservoir (Fig 30) provides water for the windscreen wash/wipe system.

102 Examine the water level in the reservoir frequently as stated in the maitenance schedule and top up when necessary. If possible use soft water for filling and topping up as this will reduce lime deposits in tubes and jets.

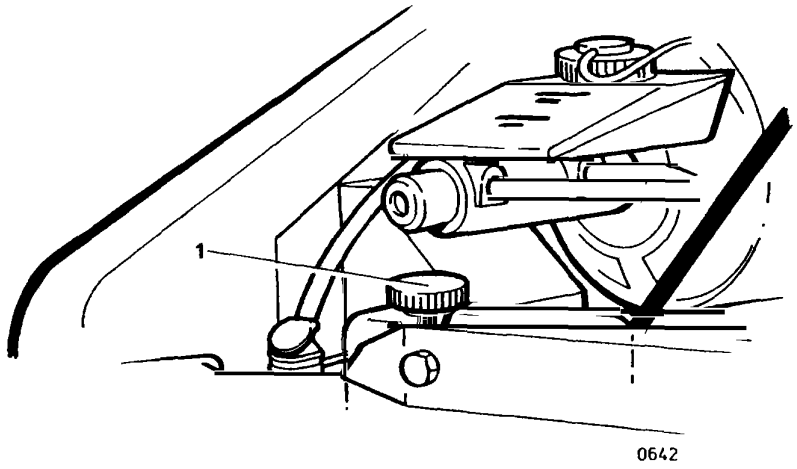


Fig 30 Washer reservoir

103 Occasionally remove the reservoir, drain and swill out all sediment. At the same time inspect electrical connections at the pump.

104 Refill with clean water and a suitable cleaning aid to prevent freezing.

Washer jets

105 Windscreen jets are located at the outer ends of wiper arms. No adjustments are necessary but jet holes should be kept clear of obstruction.

PROPSHAFTS

106 Lubrication nipples are incorporated in the universal joints and sliding sleeves. Apply grease of the correct grade at intervals stated in the maintenance schedule. Check the tightness of coupling flange nuts.

SUSPENSION

Leaf springs

107 Normally these require only periodic cleaning to allow visual checks with respect to spring condition, eg cracks, breaks.

Shock absorbers

108 Telescopic type shock absorbers require no attention except for periodic checks for leakage.

DOOR LOCKS AND HINGES

109 Hinges, locks and catches should receive regular oilcan attention. Remove the rubber grommets in the door edge, adjacent to the door lock and handle to gain access for mechanism lubrication. Smear the door striker plates with grease and wipe off any surplus.

ELECTRICAL UNITS

110 Regularly as stated in the maintenance schedule check the operation of all electrical units including wipers, washers, switches, lamps and instruments. Rectify any fault at the earliest opportunity.

111 Occasionally check cable connections for security and also check the cables for chafing. In particular check that grommets are correctly fitted where cables pass through metal panels.

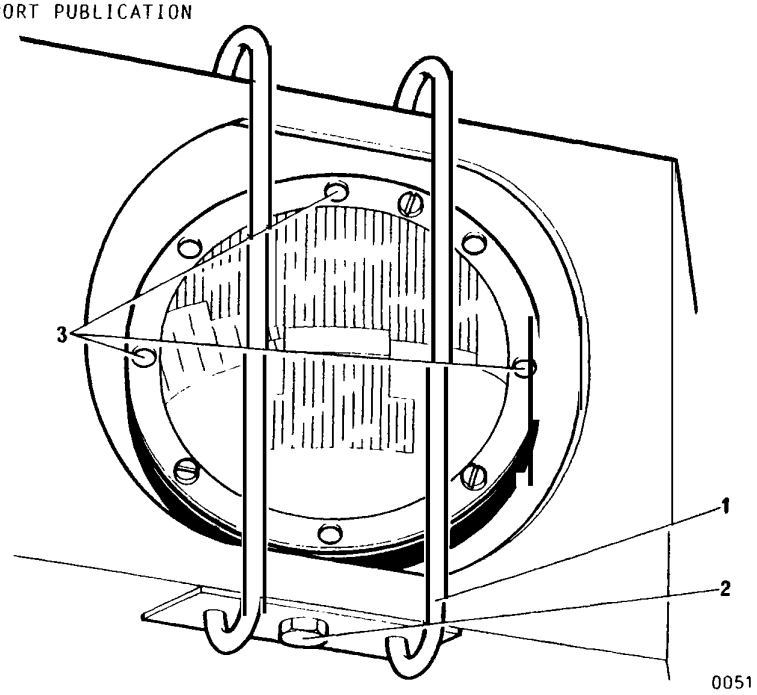
HEADLIGHTS

Lamp replacement

CAUTION ...

When handling a halogen lamp never touch the lamp glass, always hold by the base.

112 The headlight lamps are accessible after removing the glass protection bars (Fig 31(1)). To remove the bars, release the lower bolt (2), lift the bar assembly upwards and withdraw it from the location holes.



1 Protection bar 2 Bolt 3 Adjuster cut-out

Fig 31 Headlight alignment and lamp replacement

113 The light unit can be withdrawn after firmly pressing inwards and turning it anti-clockwise. Release the lamp connector and remove the lamp.

Alignment

114 Two horizontal and one vertical adjustment screws are fitted for headlight alignment. The adjusters are accessible through cut-outs (3) on the panel.

REAR TURN SIGNAL/HAZARD WARNING LIGHT

115 Access to the rear turn signal/hazard warning lamp is achieved by unscrewing the threaded lens (Fig 32). The lamp can be removed by pushing in and turning anti-clockwise.

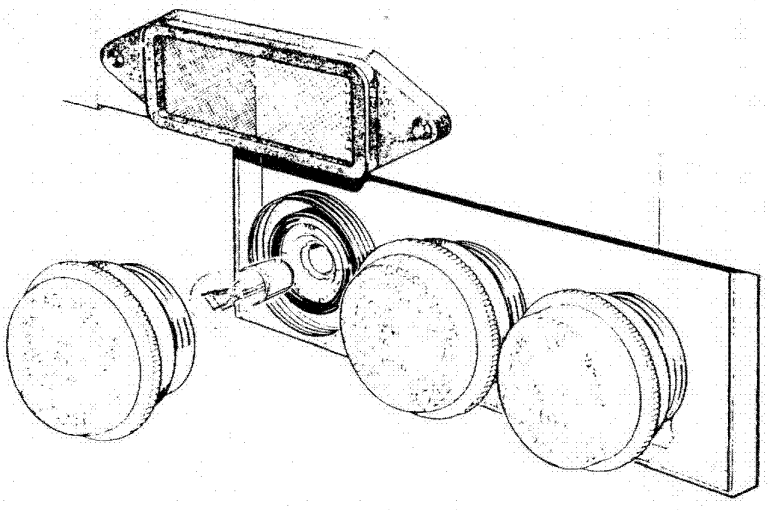


Fig 32 Rear light cluster 0052

STOP AND TAIL LIGHT

116 Unscrew the threaded lens for lamp access (Fig 32). The lamp can be removed by pushing in and turning anti-clockwise.

REAR GUARD FOG LIGHT

117 Unscrew the threaded lens for lamp access (Fig 32). The lamp can be removed by pushing in and turning anti-clockwise.

SIDE LIGHT

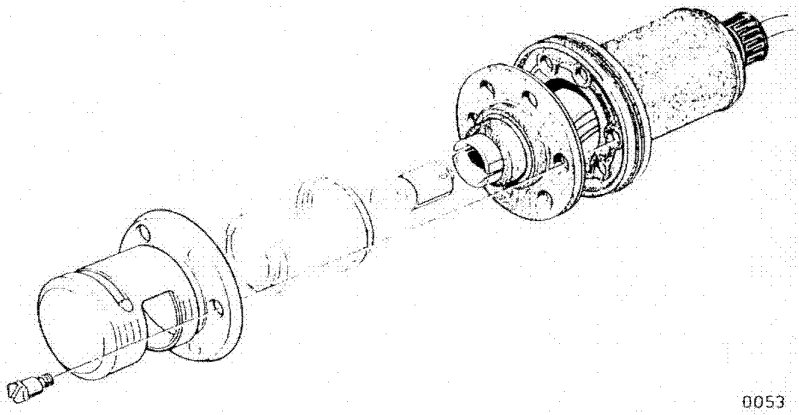
118 Unscrew the threaded lens for lamp access, similar to that shown in (Fig 32). The bulb can be removed by pushing in and turning anti clockwise.

FRONT TURN SIGNAL/HAZARD WARNING LIGHT

119 Unscrew the threaded lens for lamp access, similar to that shown in (Fig 32). The bulb can be removed by pushing in and turning anti clockwise.

REAR NUMBER PLATE LIGHT

120 To gain access to the lamp remove the lens and cover (Fig 33) which is secured by three screws. The lamp can be removed by pushing in and turning anti clockwise.



0053

Fig 33 Rear number plate light

CONVOY LIGHT

121 Access to, and removal of the lamp is similar to the rear number plate lamp.

SIDE REPEATER FLASHER LIGHT

122 The lamp cover (Fig 34) is clipped to the housing and can be removed by carefully inserting a thin screwdriver or similar implement through the small aperture (top or bottom) and prising off. To remove the lamp push in and turn

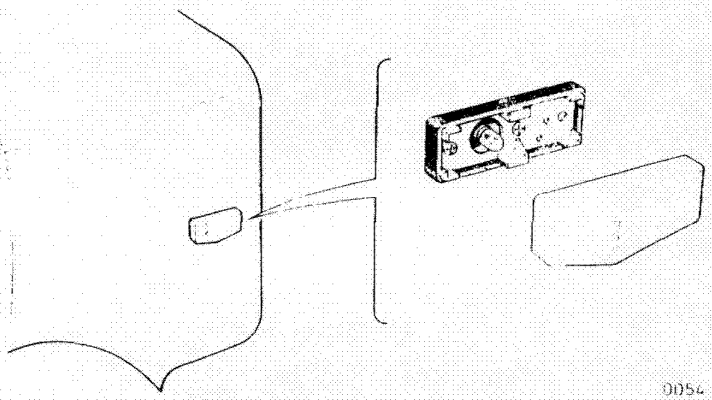


Fig 34 Side repeater flasher light

POWER TAKE OFF WARNING LIGHT (WHERE FITTED)

123 Access to the lamp can be gained by unscrewing the protective cap. The lamp can be withdrawn by pushing in and turning anti-clockwise.

DISPLAY PANEL LAMPS

124 Warning light lamps are retained in press fit plastic holders behind the light symbols and instrument light lamps in push fit holders at the rear of the instruments. To replace any bulbs disconnect the battery, remove the six securing screws from the panel to binnacle. Draw the panel carefully away.

125 To renew a lamp, first pull the holder away from behind the warning light or instrument concerned. Refit to the binnacle ensuring the holder is pushed fully home. Ensure lamps being fitted are of the correct rating (refer to Chap 5). The lamps housed in the display panel are as follows :

125.1 Vacuum gauge illumination
125.2 Fuel gauge illumination
125.3 Temperature gauge illumination
125.4 Oil gauge illumination
125.5 Speedometer illumination
125.6 Hazard warning switch illumination
125.7 Trailer turn warning light
125.8 Differential lock engaged warning light
125.9 Hazard warning light
125.10 Brake fluid/handbrake on warning light
125.11 Rear fog lights warning light
125.12 No charge warning light
125.13 Headlamp main beam warning light
125.14 Oil pressure warning light
125.15 Truck turn warning light

CAB INTERIOR LIGHT

126 Remove the cross headed screw securing the lens. Withdraw the lens assembly and renew the lamp. When refitting, engage the short tongue on the lens into the rear end of the aperture and secure with the screw.

HEATER CONTROL PANEL ILLUMINATION

127 Removal and replacement of these lamps necessitates the removal of the rear engine cover, the auxiliary facia panel surrounding the heater control panel, face level vents and air ducts, the heater control bracket and finally the lamps from their holders. This work should be carried out by suitably qualified personnel.

FUSES

128 Eighteen fuses are carried in a separate fuse unit mounted below the facia and to the left of the steering column (Fig 35). The fuses are retained by means of spring clips and are accessible when the fuse unit cover is pulled off.

129 It is important that replacement fuses are of the correct type and the rating is as specified. If a fuse burns out almost immediately after renewal do not renew or substitute a fuse which carries a heavier current(Refer to Chap 5 for fuse chart).

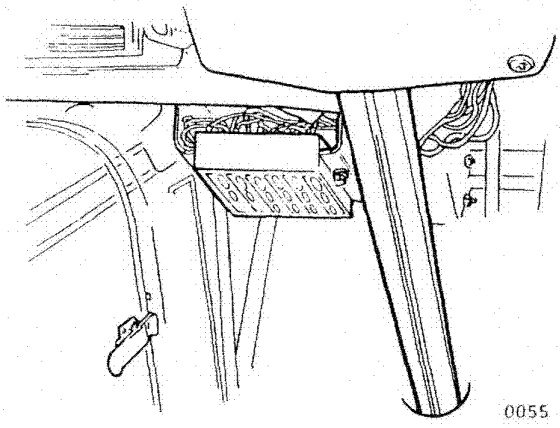


Fig 35 Fuse box

WHEELS

CAUTION ...

This vehicle is fitted with spherical seat wheels. The stud threads are left hand on the left hand side and right hand on the right hand side of the vehicle.

Tool location

130 Wheelbrace, tommy bar and spare wheel spanner are located in the tool bag at the side of the drivers seat. The jack is located behind the drivers seat.

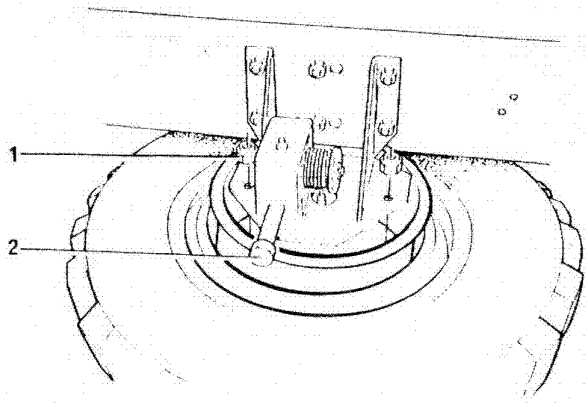
Spare wheel removal/installation

131 The spare wheel is carried in a winch-type carrier located on the left hand chassis sidemember (Fig 36). Before attempting to remove the spare wheel from its carrier ensure that the cable of the winch is fully wound up. Using the spanner and short tommy bar provided remove the two nuts (Fig 36 (1)) holding the wheel to the carrier. Turn the winch bar screw (2) anti-clockwise to lower the spare wheel to the ground. When installing a wheel to the carrier turn the winch bar clockwise until the wheel support bar studs engage the carrier and the nuts can be started on the studs. Securely tighten nuts.

Wheel changing

WARNING ...

THE JACK IS DESIGNED FOR USE WHEN CHANGING A WHEEL. NEVER GET BENEATH THE VEHICLE WHEN IT IS SUPPORTED SOLELY BY A JACK. DO NOT START OR RUN THE ENGINE WHILST THE VEHICLE IS SOLELY JACK SUPPORTED.



1 Securing nut 2 Winch bar screw

Fig 36 Spare wheel location

132 Park the vehicle on a firm, level surface, activate the hazard warning system and apply the handbrake (if removing a rear wheel, chock the front wheels).

133 Place the jack under the appropriate axle beneath or adjacent to the spring pad and raise the jack until it just touches the axle.

134 Release the wheelnuts half a turn. Raise the jack until the wheels are just clear of the ground. Remove the wheelnuts and wheel.

135 Ensure that the mating surfaces on the nut and wheel are free of foreign matter. Failure to observe this point could result in the nuts not seating properly and slackening off during service. Tighten the wheel nuts to 298 Nm (220 lb.ft) (dry).

136 Lower and remove the jack then re-check the wheel nut torques.

137 Whenever a wheel has been removed and replaced the wheel nut torques should be checked after approximately 800 km (500 miles) running. It is also good engineering practice to occasionally check the torque of all wheel nuts.

138 It is important to note that when a wheel and tyre are to be replaced, the correct direction of tread pattern is installed to the appropriate side of the vehicle.

139 However, as only one spare wheel is carried on the vehicle, it may not be possible in an emergency to install the correct wheel assembly. If this situation arises the spare should be fitted and the tread direction corrected as soon as possible.

140 If a torque wrench is not available tighten the wheel nuts as far as possible using the wheel brace only. Drive the vehicle for approximately three miles and re-check the tightness of the wheel nuts. Have the torque checked using a torque wrench set to 298 Nm (220 lb.ft) at the first opportunity.

Tyre pressure

141 Tyre pressure should be checked regularly. The front tyre pressures should be 3.5 bar (51 psi) and the rear 4.0 bar (58 psi.

Tyre wear

142 Examine tyres regularly for wear, cuts, breaks etc. and renew as necessary.

SEAT BELTS

Cleaning the belt

143 The most suitable cleaning agent for the belt is a mild soap and warm water solution.

Accident damage

144 In the event of an accident any safety belt which has been subjected to a shock load should be renewed. The anchorages must also be inspected.

Regular safety checks

145 It is important that the safety belt is inspected at regular intervals for cuts, chafing and twisting arising from normal use. The adjusters and their plastic housings should also be closely examined for damage. Any safety belt that has become excessively chafed or cut must be renewed. Also check the security of the fixings.

146 To simulate an emergency stop, drive the vehicle at 10-12 mph and apply the footbrake sharply. If the belt operation is satisfactory the occupant will be restrained from moving forward.

Alterations and additions

147 Safety belts are designed and tested and conform to official standards. No alterations or additions must be made.

BODY AND TRIM CARE

Paintwork

148 Frequent washing will remove those elements which accelerate corrosion. If necessary a mild detergent may be added to the washing water to help remove heavy dirt.

149 It is advisable to high pressure hose underneath the vehicle to remove dirt, particularly in the wheel arch areas.

150 Whilst washing, note any damage found to the paintwork and have this rectified as soon as possible to prevent further deterioration.

Windows

151 Use a chamois leather and clean water to clean windows. When cleaning the outside of the windscreen do not push the wiper blades across the screen.

Trim

152 Seats and roof linings should be cleaned using a mild solution of soap and water applied with a damp cloth.

Chapter 4-2

USER MAINTENANCE

TRUCK UTILITY HEAVY FFR VARIANTS

CONTENTS

Note ...

This chapter to be read in conjunction with Chapter 4-1

BATTERIES

WARNINGS ...

(1) NEVER EXPOSE A BATTERY TO A NAKED FLAME.

(2) DO NOT ALLOW BATTERY FLUID TO CONTACT EYES, SKIN, FABRICS OR PAINTED SURFACES. OBSERVE SAFETY PRECAUTIONS.

(3) REMOVE ANY METAL JEWELLERY AND WATCH BANDS BEFORE WORKING ON OR NEAR A BATTERY.

(4) BE CAREFUL WHEN USING METAL TOOLS OR EQUIPMENT ON OR NEAR A BATTERY.

(5) DO NOT TRANSFER ELECTROLYTE FROM ONE CELL TO ANOTHER.

(6) ALWAYS DISCONNECT A BATTERY PRIOR TO WORKING ON ELECTRICAL UNITS.

CAUTIONS ...

(1) Ensure the battery master switch is set to off before disconnecting the batteries with or without the engine running.

(2) Disconnect the batteries if electric arc welding is to be carried out on the vehicle.

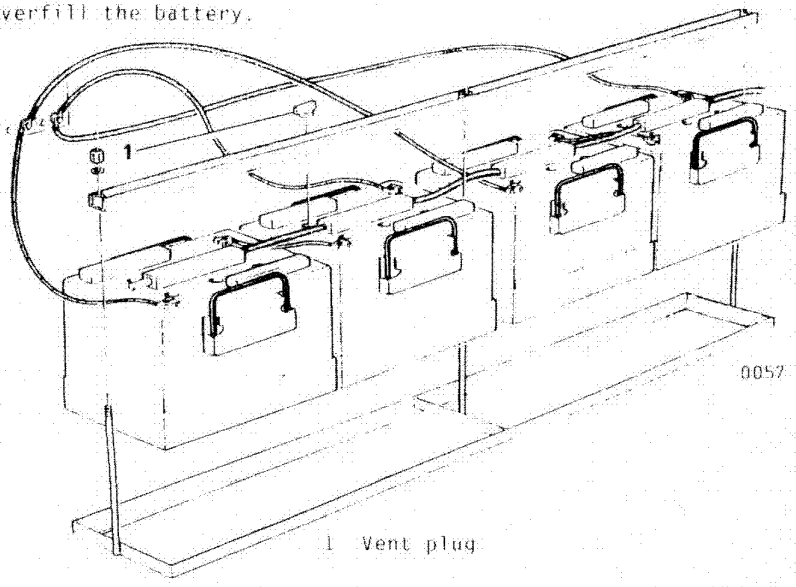
(3) Disconnect the batteries prior to boost charging.

1 Four 12 V batteries (Fig 1) are mounted within the stowage compartment on the left hand side of the vehicle.

2 At the recommended intervals the battery terminal posts should be protected from corrosion. Remove the terminal post protective

caps. Remove each terminal in turn, clean the posts and smear the inside of the terminal with petroleum jelly. Refit the terminal and tighten the securing bolt with medium force only. Cover the surface with petroleum jelly. Replace the protective caps. Examine all battery connections and ensure that they are tight, clean and free from rust or corrosion.

3 With the battery on a level surface, check the electrolyte level by removing the vent plugs (1) (If batteries as fig 1 are fitted). If the level is below the tops of the separators, topping up is required. Do not top up unnecessarily as this may overfill the battery.



1 Vent plug

Fig 1 Radio batteries (24V)

GENERATOR DRIVE BELT ADJUSTMENT

4 The 24 V generator is belt driven using twin belts. The belts should never be allowed to become loose enough to slip which can cause overheating, nor should they be overtightened as this may cause overloading on the generator bearings. Renew a belt if it is worn or damaged. It is recommended that belts are renewed in pairs.

5 To check belt tension apply light thumb pressure to the belt midway along the longest unsupported length and measure the deflection (Fig 2 (1)).

Notes ...

(1) When fitting a new belt, the adjustment should be checked after a short period of running to allow for initial stretch and bedding in (1000 km (600 miles) or 20 hours operation).

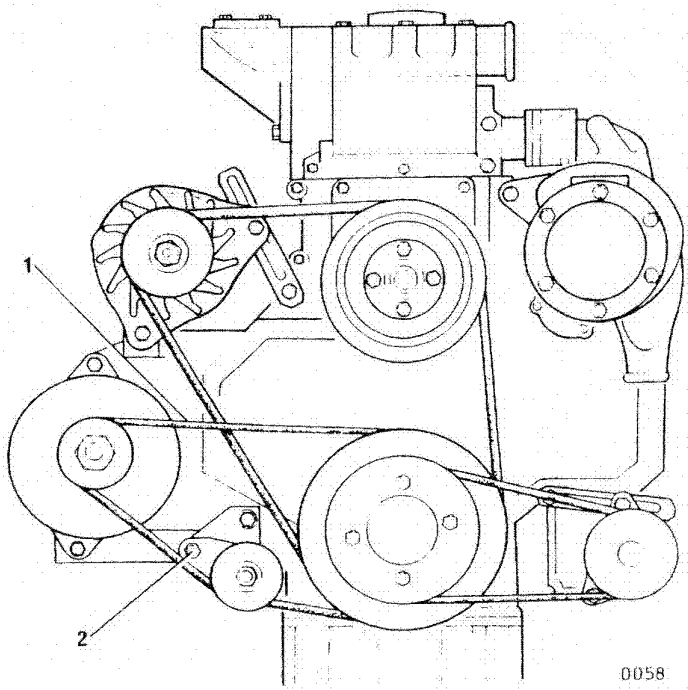
(2) The power steering belt will have to be removed before the generator drive belts can be taken off.

6 Belt tension is adjusted by altering the position of the generator idler pulley. Adjust the belt tension as follows :

6.1 Loosen the idler pulley pivot bolt (2) and adjustment bolt (not shown).

6.2 Change the idler pulley position to give the correct tension (12 mm (0.5 in) belt deflection) and tighten the pivot and adjustment bolts.

6.3 Check the belt tension once more to ensure that it is still correct.



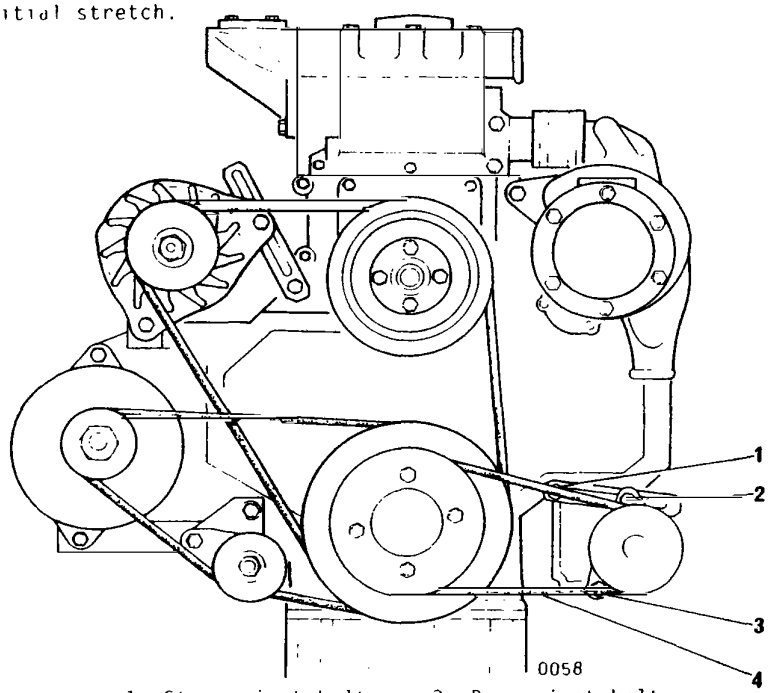
1 Generator belt 2 Pivot bolt

Fig 2 Generator drive belts (24V)

POWER STEERING BELT ADJUSTMENT

7 From above slacken off the strap pivot (Fig 3 (1)) and slide bolt (2), then from below slacken the pump pivot bolt (3). Swing the unit outward away from the engine until a deflection of 8 mm (0.3 inches) is obtained midway along the longest span. Holding it in this position retighten the slide bolt followed by the remaining two bolts.

8 When a new belt has been fitted it is advisable to re-adjust the tension after a short period of running to take up the initial stretch.



1 Strap pivot bolt
2 Slide bolt
3 Pump pivot bolt
4 Drive belt

Fig 3 Power steering drive belt

FAN BELT REMOVAL

9 Fan belt removal necessitates firstly removing the power steering and generator drive belts. Otherwise removal and adjustments are similar to those described in Chap 4-1.

Chapter 5

USER SPARES DATA

TRUCK UTILITY HEAVY GS CARGO (W/WINCH)/FFR VARIANTS

CONTENTS

TABLE 1 - LAMP DATA

Lamp	Volts	Watts	Type	Lamp no
Headlamp	12	60/55	Halogen	012
Side light	12	5.0	Small centre contact	207
Side flasher	12	4.0	Small bayonet cap	233
Front turn signal	12	21.0	Small bayonet cap	382
Rear turn signal	12	21.0	Small bayonet cap	382
Rear fog lamp	12	21.0	Small bayonet cap	382
Stop/tail lamp	12	21.5	Small bayonet cap(index)	380
Rear no. plate lamp	12	5.0	Small centre contact	207
Convoy lamp	12	5.0	Small centre contact	207
Interior lights	12	6.0	Festoon	239
Warning lights	12	2.2	BA7	281
Gauge illumination	12	2.2	BA9S MCC	643
PTO warning lamp	12	1.2	Capless	286
Heater control bezel	12	1.2	Capless	286
Hazard warning	12	1.2	Capless	286

TABLE 2 - FUSE DATA

Fuse No.	Size	Circuits protected
A1	5A	Gauges
A2	20A	Heater Blower
A3	10A	Screenwiper
A4	5A	Stop lamps
A5		Spare
A6		Spare
B1	10A	12 Pin supply
B2	20A	Horn
B3	10A	Interior lamps
B4	10A	Turn signal lamps
B5	10A	Rear fog lamps
B6	5A	Convoy lamp
C1	10A	Headlamp dipped beam (right hand)
C2	10A	Headlamp dipped beam (left hand)
C3	5A	Sidelamps
C4	5A	Taillamps
C5	10A	Headlamp main beam (left hand)
C6	10A	Headlamp main beam (right hand)

TABLE 3 - CONSUMABLE ITEMS

Description	Part no.
Fuel filter	0005038883
Oil filter	0075065703
Air filter	5430021516
Power steering reservoir filter element	7451
Hydraulic filter element (where fitted)	BW23507
Fan drive belt	BW207330
Generator drive belt (FFR)	BW205922
Power steering drive belt	0034463900
Power steering drive belt (FFR)	BW206102
Wiper blades	5430040399
Fuse (5 amp)	5010090730
Fuse (10 amp)	5010090732
Fuse (20 amp)	5010090733
Fire extinguisher	4210-99-881-4724
Cold start fluid refill	BW206613

Chapter 6

DESTRUCTION OF EQUIPMENT TO PREVENT ENEMY USE

CONTENTS

DESTRUCTION OF EQUIPMENT TO PREVENT ENEMY USE

MANDATORY DIRECTIVE

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

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

Degree of damage

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

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

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

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

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

Spare parts

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

MEANS AND PROCEDURES

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

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

6.2 Observance of appropriate safety precautions.

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

Mechanical

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

Burning

WARNING

DUE CONSIDERATION SHOULD BE GIVEN TO THE HIGHLY FLAMMABLE NATURE OF GASOLINE AND ITS VAPOUR. CARELESSNESS IN ITS USE MAY RESULT IN PAINFUL BURNS.

9 This requires gasoline, oil or other flammables.

9.1 Remove and empty the portable fire extinguishers.

9.2 If quantities of combustibles are limited, smash all vital elements, such as switches, instruments and control levers.

9.3 Place ammunition and charges in and about the equipment so that the greatest damage will result from the explosion.

9.4 Pour gasoline and oil over the equipment. Ignite by means of an incendiary grenade fired from a safe distance, by a burst from a flame thrower, by a combustible train of suitable length or other appropriate means. Take cover immediately.

Gunfire

WARNING

FIRING ARTILLERY AT RANGES OF 500 YARDS OR LESS, AND FIRING GRENADES OR ANTI-TANK ROCKETS SHOULD BE FROM COVER.

10 When destroying the equipment by gunfire, proceed as follows:

10.1 Remove and empty the portable fire extinguishers.

10.2 Smash all vital elements as outlined in sub-paragraph 9.2

10.3 Destroy the equipment by gunfire, using tank guns, self-propelled guns, artillery, rifles using the rifle grenades or launchers using anti-tank rockets.

PRIORITIES

11 The priorities for destruction should be considered as follows :

11.1 Priority must be given to the destruction of classified equipment and associated documents.

11.2 When lack of time and/or means prevents complete destruction of equipment, priority is to be given to the destruction of essential parts and the same parts are to be destroyed on all like equipment.

11.3 A guide to priorities for destruction of the equipment is shown in Table 1 - PRIORITIES.

TABLE 1 - PRIORITIES FOR DESTRUCTION

Priority	Component
1	Fuel pump and injectors
2	Engine block and cooling system
3	*Tyres and suspension*
4	Braking system
5	Axles
6	Chassis