

# OPERATOR'S MANUAL

SHORTS

## SHORLAND Mk.4

ARMoured  
PATROL CAR



**SPECIFICATION****DIMENSIONS**

|                    |     |     |     |     |     |                   |
|--------------------|-----|-----|-----|-----|-----|-------------------|
| Height             | ... | ... | ... | ... | ... | 90 in (2.31 m)    |
| Length             | ... | ... | ... | ... | ... | 181 in (4.6 m)    |
| Width              | ... | ... | ... | ... | ... | 70 in (1.78 m)    |
| Wheel base         | ... | ... | ... | ... | ... | 109 in (2.77 m)   |
| Track (front)      | ... | ... | ... | ... | ... | 53.5 in (1.36 m)  |
| Track (rear)       | ... | ... | ... | ... | ... | 53.5 in (1.36 m)  |
| Operational weight | ... | ... | ... | ... | ... | 7400 lb (3360 kg) |

Defined as :

- |                                          |                                         |
|------------------------------------------|-----------------------------------------|
| 1. 3 crew @ 200 lb each                  | 10 Turret mounted spotlight             |
| 2. Crew seats                            | 11 Windscreen visors                    |
| 3. Turret seat & gun mounting            | 12 Windscreen wipers                    |
| 4. Safety harnesses                      | 13 Head & tail lamps protective grilles |
| 5. Trakmark trim & insulation            | 14 Wing mirrors                         |
| 6. Interior lights                       | 15 Battery 60AH                         |
| 7. Fibreglass floor with non slip strips | 16 5 Dunlop RK 2A tyres and wheels      |
| 8. Extraction fan & armoured duct        | 17 2-14 gal. fuel tanks (full)          |
| 9. Optical periscope & mounting          | 18 Tool kit.                            |

**PERFORMANCE**

|                                       |     |     |                                     |
|---------------------------------------|-----|-----|-------------------------------------|
| Speed (average max) - Road            | ... | ... | 65 m.p.h.(104.6 k.p.h.)             |
| Speed (average max) - Cross country   | ... | ... | 30 m.p.h. (48 k.p.h.)               |
| Range of action at average max. speed | ... | ... | 320 miles (514.4 km)                |
| Gross power/weight ratio              | ... | ... | 28.75 BHP/ton (29.09 CV/metric ton) |
| Max. tractive effort, low gear        | ... | ... | 1172 lbs/ton (515 kg/metric ton)    |
| Max. climbing ability                 | ... | ... | 1 in 1.7                            |
| Max. gradient for stop and start      | ... | ... | 1 in 1.7                            |

**TECHNICAL DATA****POWER UNIT:**

|               |     |     |     |                                                          |
|---------------|-----|-----|-----|----------------------------------------------------------|
| Type          | ... | ... | ... | Rover V8                                                 |
| Displacement  | ... | ... | ... | 3528 cc                                                  |
| Gross BHP     | ... | ... | ... | 91 BHP (68 Kw) at 3500 RPM                               |
| Nett torque   | ... | ... | ... | 166 lb/ft (225.6 NM) at 2000 RPM                         |
| Ignition type | ... | ... | ... | Coil, 12 volt negative earth                             |
| Petrol        | ... | ... | ... | Refer to Rover Owner's Manual                            |
| Air cleaner   | ... | ... | ... | Paper element type.                                      |
| Fuel capacity | ... | ... | ... | 28 gal. (128 litre)                                      |
| Lubrication   | ... | ... | ... | Fuel pressure system                                     |
| Cooling       | ... | ... | ... | Water cooled, pressurised with Pump, fan and thermostat. |

## SHORLAND MK. 4

### WHEELS:

|       |     |     |     |     |       |       |
|-------|-----|-----|-----|-----|-------|-------|
| Rims  | ... | ... | ... | ... | 6".50 | x 16" |
| Tyres | ... | ... | ... | ... | 9".00 | x 16" |

### TRANSMISSION:

|                     |     |     |     |     |                                                          |  |
|---------------------|-----|-----|-----|-----|----------------------------------------------------------|--|
| Clutch              | ... | ... | ... | ... | Hydraulic single dry plate 10.5 in. dia.                 |  |
| Gearbox             | ... | ... | ... | ... | Single helical constant mesh, synchromesh top and third. |  |
| Transfer box        | ... | ... | ... | ... | Two speed reduction on main gearbox output.              |  |
| Transfer box ratios | ... | ... | ... | ... | High 1.15:1 Low 2.35:1                                   |  |
| Propeller shafts    | ... | ... | ... | ... | Open type to both axles                                  |  |
| Axle ratios         | ... | ... | ... | ... | 4.7:1 front and rear                                     |  |
| Differentials       | ... | ... | ... | ... | Spiral bevel                                             |  |

### BRAKES:

|      |     |     |     |     |                          |  |
|------|-----|-----|-----|-----|--------------------------|--|
| Foot | ... | ... | ... | ... | Hydraulic power assisted |  |
| Hand | ... | ... | ... | ... | Transmission mechanical  |  |

### STEERING:

|                |     |     |     |     |                       |  |
|----------------|-----|-----|-----|-----|-----------------------|--|
| System         | ... | ... | ... | ... | Recirculating ball    |  |
| Turning circle | ... | ... | ... | ... | 58 ft 3 in (17, 75 m) |  |

### SUSPENSION:

|                |     |     |     |     |                                        |  |
|----------------|-----|-----|-----|-----|----------------------------------------|--|
| Front          | ... | ... | ... | ... | Heavy duty semi-elliptical leaf spring |  |
| Rear           | ... | ... | ... | ... | Heavy duty semi-elliptical leaf spring |  |
| Shock absorber | ... | ... | ... | ... | Telescopic shock absorbers             |  |
|                |     |     |     |     | Anti roll bars front and rear.         |  |

### TOWING ATTACHMENTS:

Twin hooks front and rear

### ELECTRICAL EQUIPMENT:

|             |     |     |     |     |                                                      |  |
|-------------|-----|-----|-----|-----|------------------------------------------------------|--|
| Generator   | ... | ... | ... | ... | Alternator 18 ACR.                                   |  |
| Battery     | ... | ... | ... | ... | 12 Volt 60 AH                                        |  |
| Suppression | ... | ... | ... | ... | Limited for V.H.F. standard, Full suppression extra. |  |

# SECTION 1

## GENERAL EQUIPMENT

### List of Contents

#### DESCRIPTION AND OPERATION

|                                  | Page |
|----------------------------------|------|
| Driving controls and instruments | 1    |
| Front seat adjustment            | 2    |
| Seat belts                       | 2    |
| Occasional seat                  | 2    |
| Door handles and locks           | 2    |
| Door hatch                       | 3    |
| Windscreen visors                | 4    |
| Rear escape hatch                | 5    |
| Starting handle                  | 5    |
| Boot                             | 5    |
| Fuel filler                      | 6    |

#### MAINTENANCE

|                                      |   |
|--------------------------------------|---|
| Upholstery and interior trim         | 8 |
| Windscreens and visors               | 8 |
| Doors, hatches and rear escape hatch | 8 |
| Bonnet stop adjustment               | 8 |
| Run flat wheels (see section 3)      |   |

### List of Illustrations

| Fig. |                                       | Page |
|------|---------------------------------------|------|
| 1-1  | Driving controls and instruments      | 1    |
| 1-2  | Front seat adjustment                 | 2    |
| 1-3  | Door handles and locks                | 3    |
| 1-4  | Door hatch                            | 3    |
| 1-5  | Windscreen visors — emergency closing | 4    |
| 1-6  | Windscreen visors — opening           | 5    |
| 1-7  | Rear escape hatch                     | 6    |
| 1-8  | Fuel filler arrangement               | 7    |

## GENERAL EQUIPMENT

## Description and Operation

## 1. Driving controls and instruments (Fig.1-1)

For operation and maintenance of engine transmission and chassis consult the LAND ROVER manual supplied with the vehicle.

The driving controls consists of the normal LAND ROVER vehicle controls plus additional operational controls.

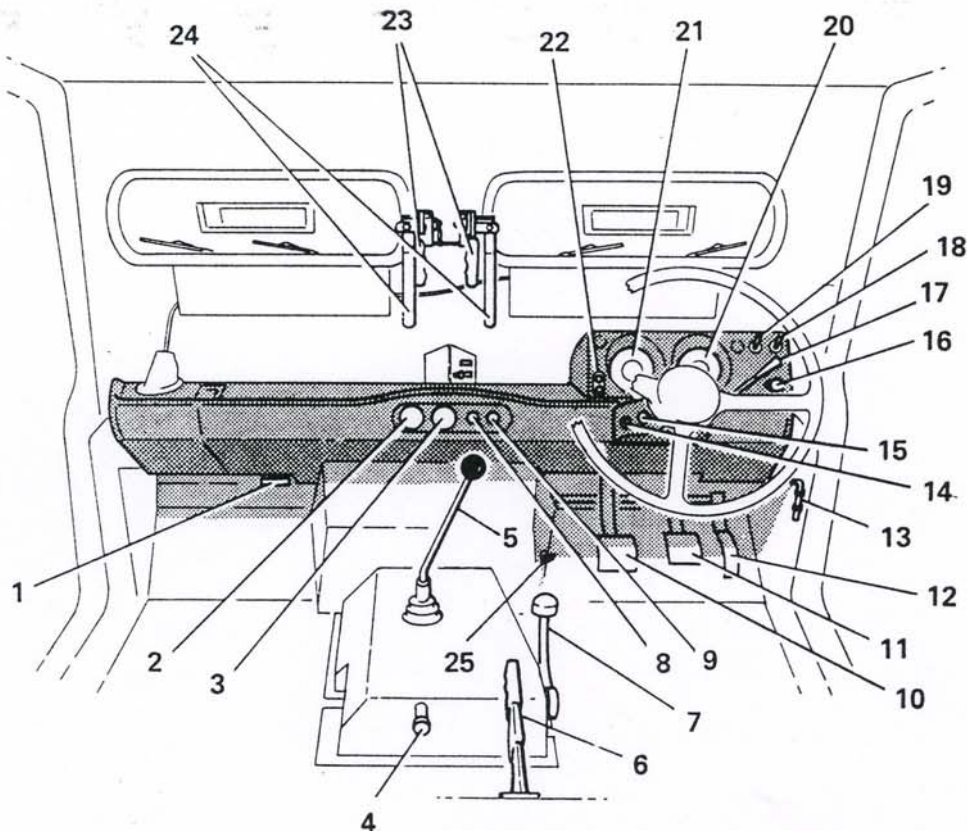


Fig. 1-1 Driving controls and instruments

- |                                                   |                                                               |
|---------------------------------------------------|---------------------------------------------------------------|
| 1. BONNET RELEASE                                 | 15. COLD START CONTROL                                        |
| 2. OIL TEMP. GAUGE                                | 16. WINDSCREEN WIPER SWITCH                                   |
| 3. OIL PRESSURE GAUGE                             | 17. HORN/DIRECTION INDICATORS/<br>HEADLIGHTS FLASH-DIP SWITCH |
| 4. FOUR WHEEL DRIVE CONTROL                       | 18. EXTERNAL LIGHTS SWITCH                                    |
| 5. MAIN GEAR LEVER                                | 19. PANEL LIGHTING SWITCH                                     |
| 6. HANDBRAKE                                      | 20. WATER TEMP. AND FUEL<br>CONTENTS GAUGES                   |
| 7. TRANSFER GEAR LEVER                            | 21. SPEEDOMETER                                               |
| 8. INTERIOR LIGHT SWITCH                          | 22. INSPECTION LAMP SOCKETS                                   |
| 9. EXTRACTION FAN SWITCH                          | 23. VISOR HANDLES                                             |
| 10. CLUTCH PEDAL                                  | 24. VISOR LOCKING LEVERS                                      |
| 11. BRAKE PEDAL                                   | 25. BATTERY MASTER SWITCH                                     |
| 12. ACCELERATOR PEDAL                             |                                                               |
| 13. BOOT KEY                                      |                                                               |
| 14. IGNITION/STARTER/AUXILIARY<br>SERVICES SWITCH |                                                               |

## 2. Front seat adjustment (Fig. 1-2)

Front seats are adjustable both for height and leg length. The height is adjusted by turning a handle at the right hand side of the seat. Fore and aft movement is controlled by a lever located at the front of the seat and downward pressure on the lever releases the locking mechanism enabling the seat to be positioned to suit the occupant.

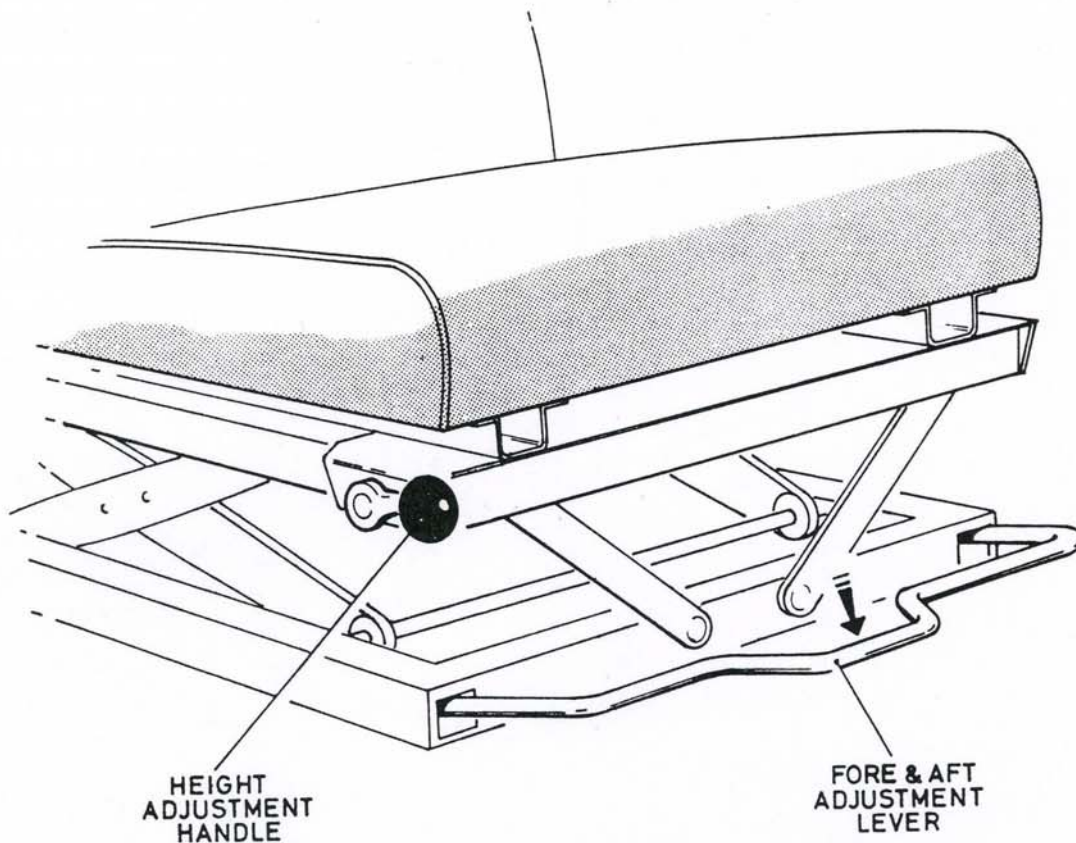


Fig. 1-2 Front seat adjustment

## 3. Seat belts

The three crew members are each provided with a quick release seat belt; that at the gunners operational station is a lap type only, the remaining two being of the diagonal/lap type.

## 4. Occasional seat

A hinged occasional seat (positioned behind front seat) is provided for the gunners use when not actively engaged in the turret.

## 5. Door handles and locks (Fig. 1-3)

Both doors are fitted with locking handles which can be locked externally with a key.

- (a) Unlike the conventional type, the handles must be lifted up to open the door.  
This impedes unauthorised access if:—

(I) The door was not locked externally by its key  
or

(II) The internal locking lever was not engaged.

- (b) Handles are effective for release mode only.

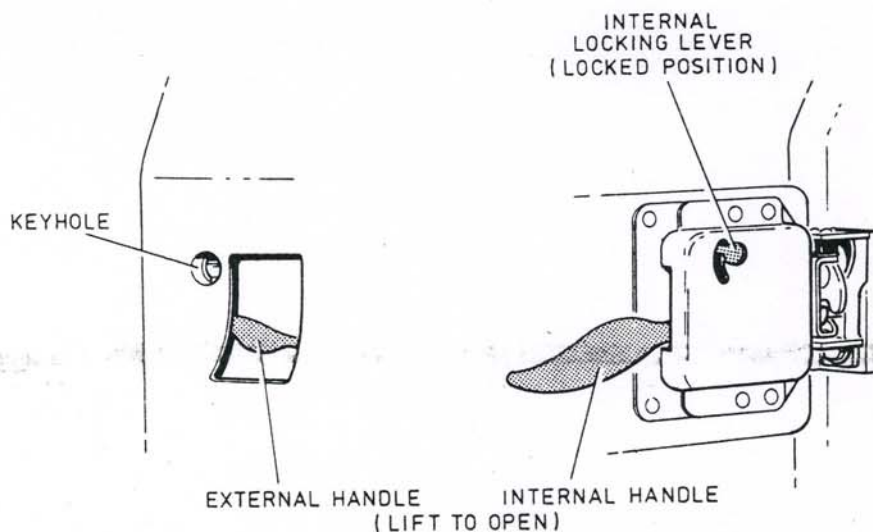


Fig. 1-3 Door handles and locks

#### 6. Door hatch (Fig. 1-4)

Both doors are provided with a hatch which provides side vision or personnel protection when open or closed respectively. Each hatch has a spring loaded latch and an integral hatch retrieval lever.

- (a) To open — Pull latch handle down and push hatch outwards.
- (b) To close — Pull hatch retrieval lever inboard. As the hatch closes the latch will automatically engage.

**CAUTION** To prevent injury, personnel should keep clear of the hatch and its retrieval lever.

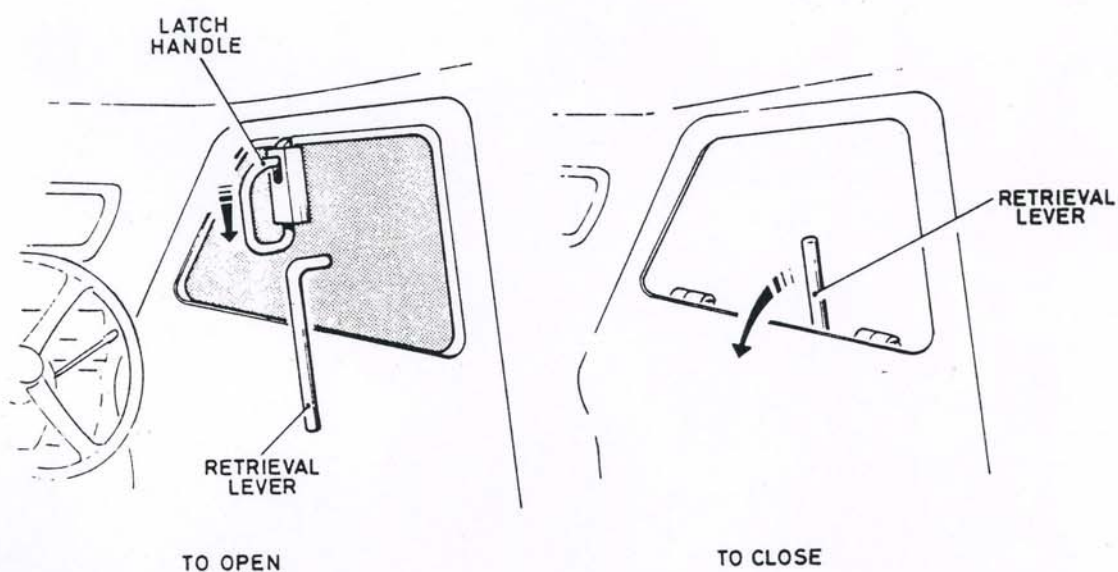


Fig. 1-4 Door hatch

## 7. Windscreen visors (Figs. 1-5 & 1-6)

Under normal conditions, forward vision is through two windscreen panels fitted with wipers. In operational conditions the windscreens are each protected by manually operated visors constructed of armour plate having bullet-proof glass inserts.

The operating mechanism is positioned centrally between the windscreens and is co-ordinated to operate the visors together or independently.

The mechanism consists of two visor handles (having plastic hand grips) for raising or lowering the visors and two locking handles for engaging or releasing the locking mechanism.

- (a) To close — In an emergency, press the two locking handles together using one hand. This releases the locking mechanism and both visors will simultaneously fall into position re-engaging the locking mechanism. It is preferable however to manually lower each visor separately by gripping the visor handle with one hand and, after disengaging the locking mechanism via locking handle with the other, control the downward movement of the visor. When the visor is fully down, release the locking handle to lock the visor in position.

**CAUTION** Ensure all personnel are clear of the vicinity of the visors and visor handles before releasing locking handles, as for example when cleaning windscreens or carrying out maintenance.

- (b) To open — Similar to that of closing, each visor should be operated separately. Grip the visor handle with one hand, disengage the locking handle with the other and push the visor handle forward as far as possible. Retain it in this position and release the locking handle, to the locked position.

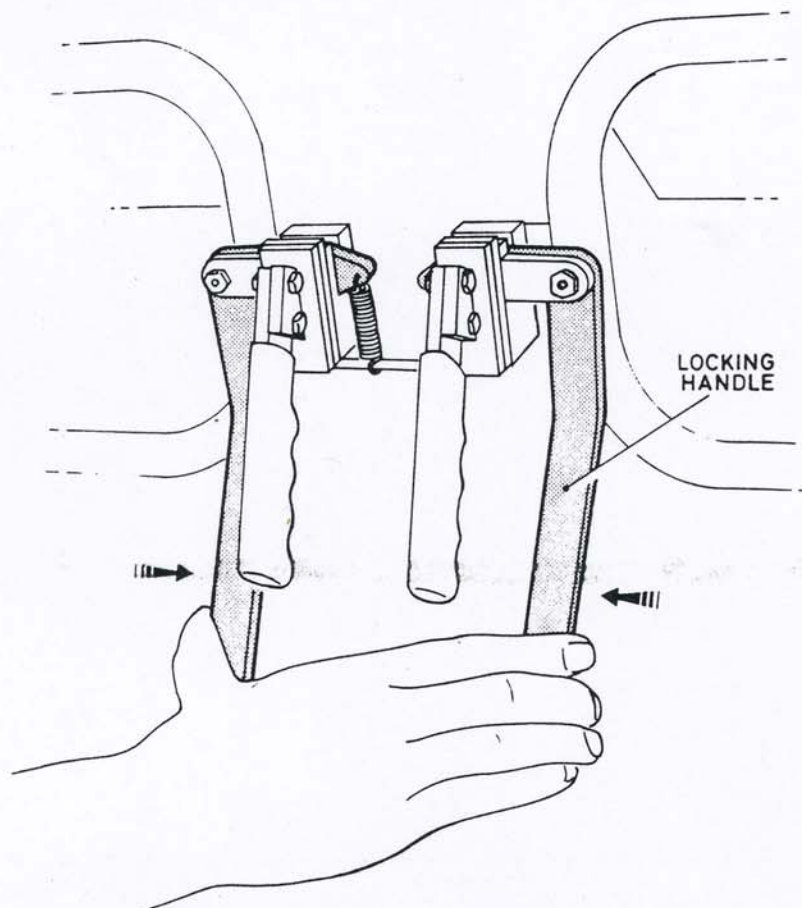


Fig. 1-5 Windscreen visors - emergency closing

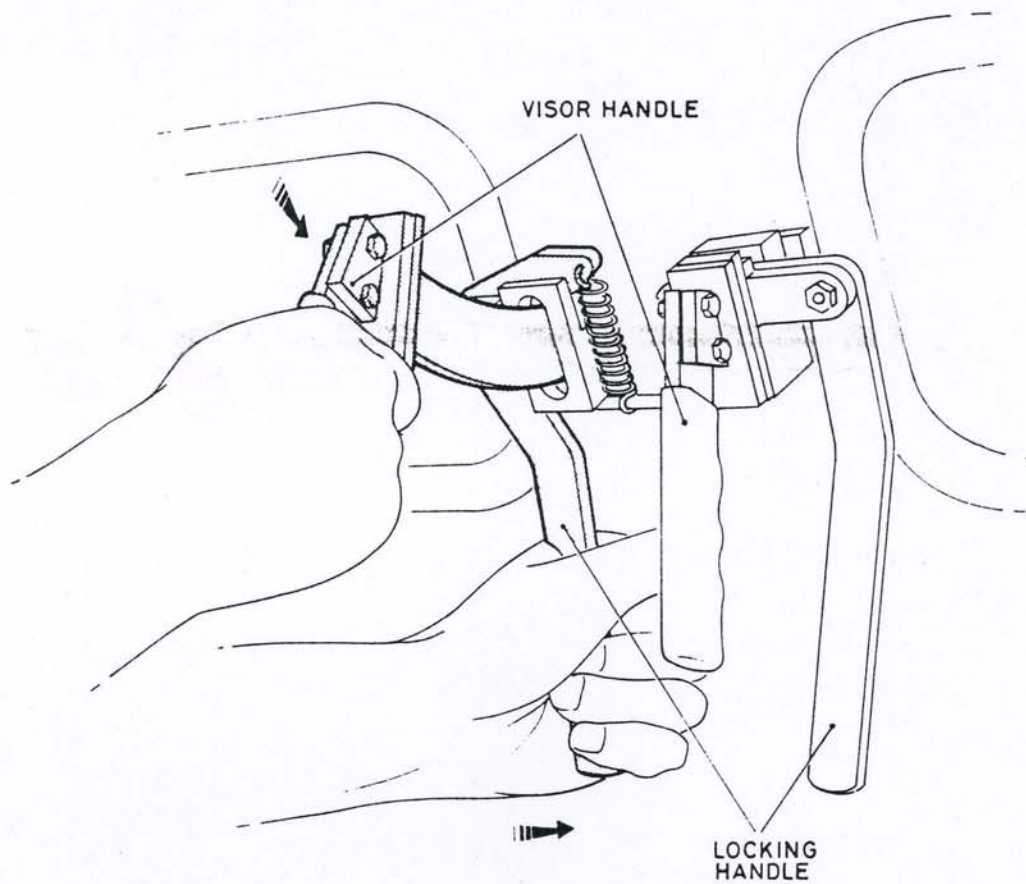


Fig. 1-6 Windscreen visors - opening

#### 8. Rear escape hatch (Fig. 1-7)

Under normal conditions the hatch may be left open for ventilation or rear vision. An extraction fan incorporated into the hatch is operated by a switch located on the dash panel (Fig.1-1). The hatch is provided with two spring loaded latches interconnected by a common release handle.

- (a) To open — Pull release handle down and push hatch outwards.
- (b) To close — By means of the handle, pull hatch inboard (as the hatch closes the latches will automatically engage).

#### 9. Starting handle

A starting handle is provided with each vehicle and is retained by clips behind the driver's seat.

#### 10. Boot

A boot provided at the rear of the vehicle contains a jack, jack handle, tool kit and spare wheel. The boot door is secured by two cap head screws, the key for which is retained by spring clips at the right hand side of dash panel (fig. 1-1).

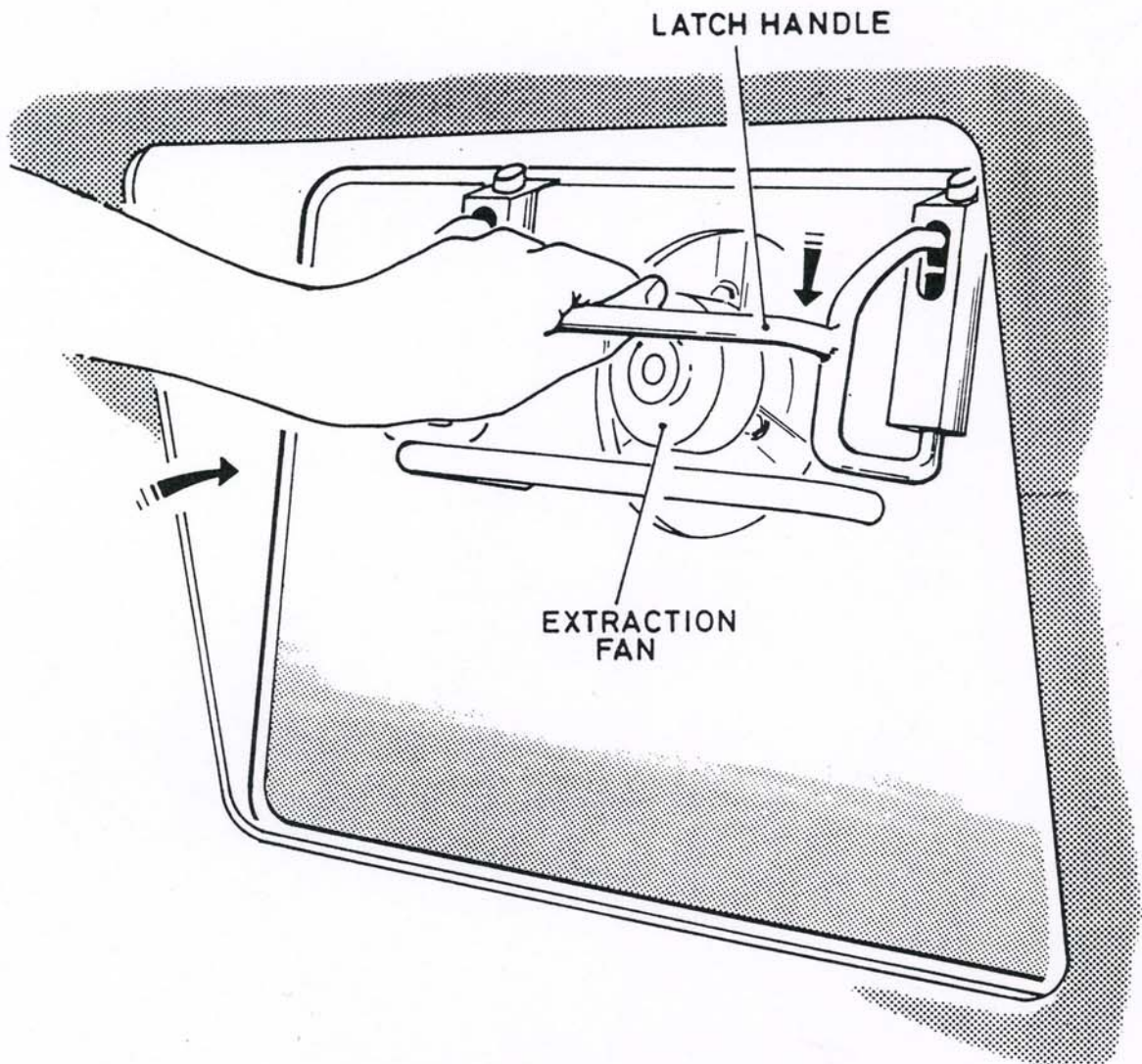


Fig. 1-7 Rear escape hatch

#### 11. Fuel filler arrangement (Fig. 1-8)

Each fuel tank is provided with a refuelling arrangement comprising a removable filler tube incorporating a gauze filter, a screw cap and a protective hinged cover. The cover is secured internally by a shoot bolt linked to a release knob located inside the vehicle left and right of the rear panel.

Procedure when refuelling is as follows.

- (a) Pull the cover release knob to disengage the shoot bolts thus permitting access to the fuel filler.

- (b) Remove screwcap by turning in an anti-clockwise direction.

NOTE: If hand-refuelling, partially retract filler tube to employ as funnel.

CAUTION: Ensure protective cover is properly secured after refuelling has been completed.

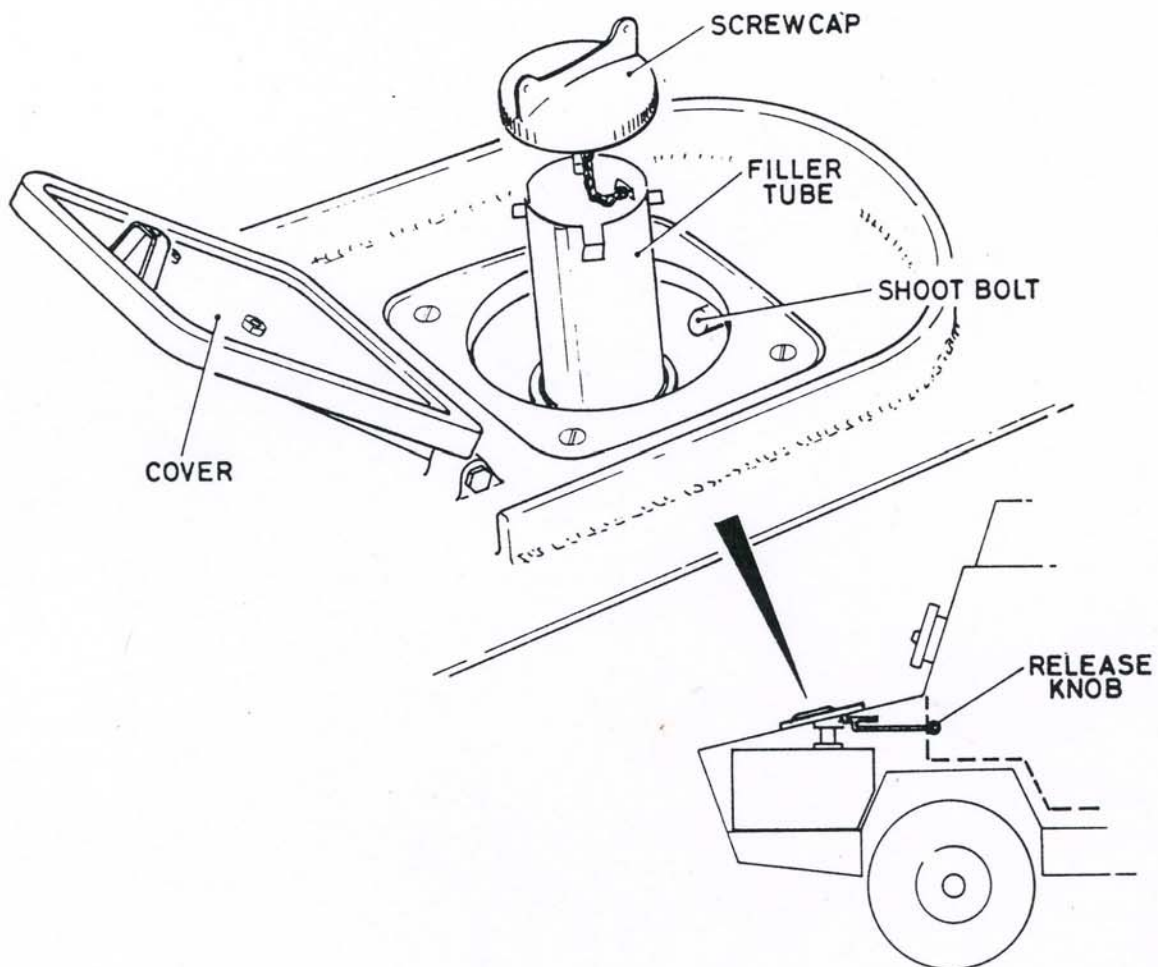


Fig.1-8 Fuel filler arrangement

## MAINTENANCE

The maintenance listed below is only suggested for vehicles operating in temperate climate. Under other conditions the vehicle should be maintained in accordance with local vehicle maintenance practice.

- (1) Upholstery and interior trim.  
Clean with soap and warm water only as some detergents are detrimental when used on P.V.C. covering.
- (2) Windscreens and visors.  
The windscreens and visors should only be cleaned with a wet chamois leather. Avoid using a dirty leather or any other material as this could scratch the surface of the glass.  
To remove a damaged visor glass block simply remove the four retaining bolts.
- (3) Doors, hatches and rear escape hatch.  
Doors are fitted with grease hinges and should be grease injected as required. All other hinges should be occasionally lubricated with a light oil.  
Before operational duty, escape hatch must be checked for free operation as this is essential for the safety of the crew.

CAUTION: If the vehicle is being operated in dusty or sandy locations, lubrication is not recommended.

- (4) Bonnet stop adjustment  
The engine is protected by armoured plating and care should be taken when raising or lowering the bonnet as it is much heavier than conventional bonnets.  
An adjustable bolt fitted to the front underside of the bonnet protects the radiator header tank. The bolt head locates a pad fixed on the armoured radiator mounting.  
For correct adjustment maintain a  $\frac{1}{4}$  in (6.35 m.m.) gap between the bonnet plate and the top of the radiator armour.
- (5) Run flat wheels (see section 3)

## SECTION 2

### TURRET CONTROLS AND EQUIPMENT

#### List of Contents

| <u>DESCRIPTION AND OPERATION</u>              | Page |
|-----------------------------------------------|------|
| Controls ... ..                               | 1    |
| Spotlight ... ..                              | 1    |
| Periscope ... ..                              | 2    |
| Interior light ... ..                         | 2    |
| Ammunition tray ... ..                        | 2    |
| Empties bag ... ..                            | 2    |
| Gun shoulder rest adjustment ... ..           | 2    |
| Ammunition stowage ... ..                     | 3    |
| Seat adjustment ... ..                        | 3    |
| Top and rear hatches ... ..                   | 4    |
| <br><u>MAINTENANCE</u>                        |      |
| Turret ring ... ..                            | 5    |
| Hatches ... ..                                | 5    |
| Gun, periscope and spotlight alignment ... .. | 5    |

#### List of Illustrations

| Fig.                                     | Page |
|------------------------------------------|------|
| 2.1 Turret controls and equipment ... .. | 1    |
| 2.2 Gun shoulder rest adjustment ... ..  | 2    |
| 2.3 Ammunition stowage ... ..            | 3    |
| 2.4 Seat adjustment ... ..               | 3    |
| 2.5 Top and rear hatches ... ..          | 4    |

## TURRET CONTROLS AND EQUIPMENT

### Description and Operation

#### 1. Turret controls and equipment (Fig.2-1)

##### (1) Controls

The turret revolves on a ball bearing turntable and directional movement is attained manually. The turret is locked in a non-operational position by means of a locking bolt positioned forward of the right hand.

A brake, positioned forward of the left hand and fixed to the turret ring, enables the turret to be retained in any desired position. The brake is applied by pulling downwards a spring loaded handle and upwards for release.

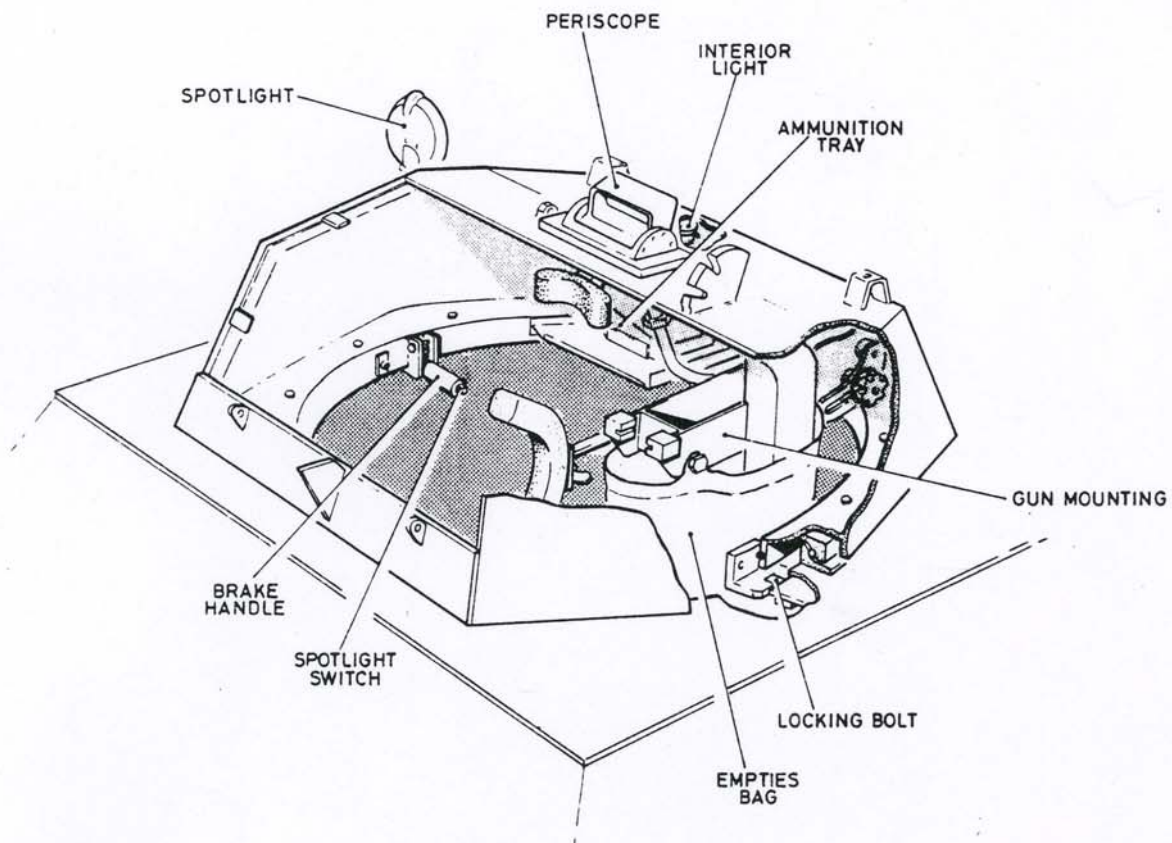


Fig. 2-1 Turret controls and equipment

##### (2) Spotlight

The spotlight mounted on the side of the turret is operated by depressing a button switch located on the end of the brake handle. The button must be held depressed to maintain illumination.

The spotlight is synchronised with the periscope and gun and the alignment procedure is described in para (3) of maintenance, at the end of this section.

(3) Periscope

The centrally mounted periscope is synchronised with the gun and spotlight and the alignment procedure is described in, para (3) of maintenance, at the end of this section.

(4) Interior light

An interior light incorporating an on/off switch is mounted on the turret top forward of the periscope.

(5) Ammunition tray

An ammunition tray is mounted at the left hand side of the gun and accepts a standard box of 250 rounds with lid removed.

(6) Empties bag

To facilitate the collection of spent cartridge cases and clips, an empties bag is provided attached at both sides of the gun mounting.

**CAUTION:** It is essential that the empties bag is fitted as serious injury may occur if the floor is littered with spent cartridge cases and clips.

2. Gun shoulder rest adjustment (Fig. 2-2)

Provision is made for fore-and-aft adjustment to meet individual requirements. Simply slacken the two wingscrews, slide the rest to the desired position and re-tighten wingscrews.

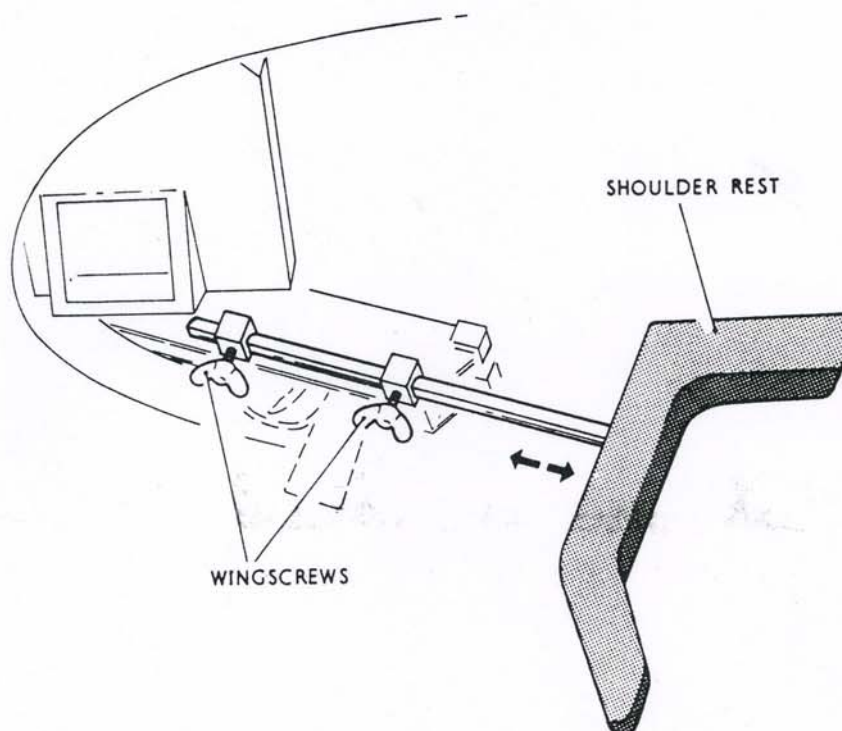


Fig. 2-2 Gun shoulder rest adjustment

### 3. Ammunition stowage (Fig.2-3)

Ammunition boxes are accommodated in stowage trays fixed to the cabin floor. Each tray accepts one box and is retained in position by means of a bungee cord.

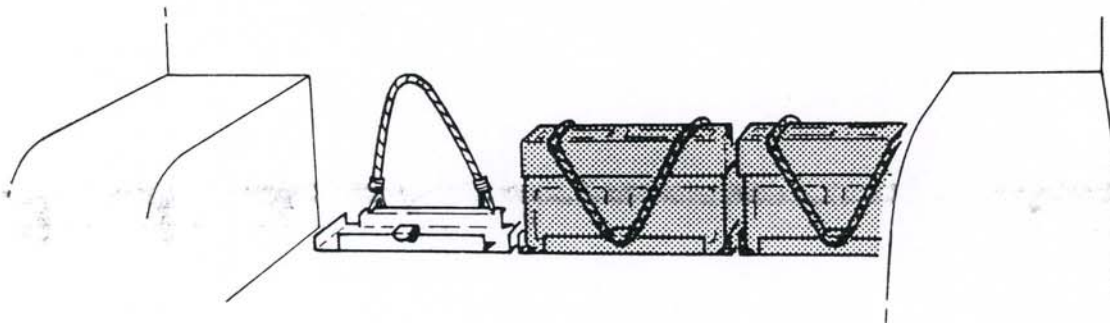


Fig. 2-3 Ammunition stowage

### 4. Seat adjustment (Fig.2-4)

The seat frame is fixed to the turret so that both are co-ordinated for operational use. The seat can be tipped back when not in use to provide more space.

Before making adjustments, rotate the turret to face aft so as to present the back of the seat frame for easier access to the adjusting mechanism.

To adjust the seat height pull the plunger wire to withdraw the locking pins, raise or lower the seat to the required height then release the plunger wire to re-engage the locking pins.

CAUTION: Do not sit on seat when making adjustments.

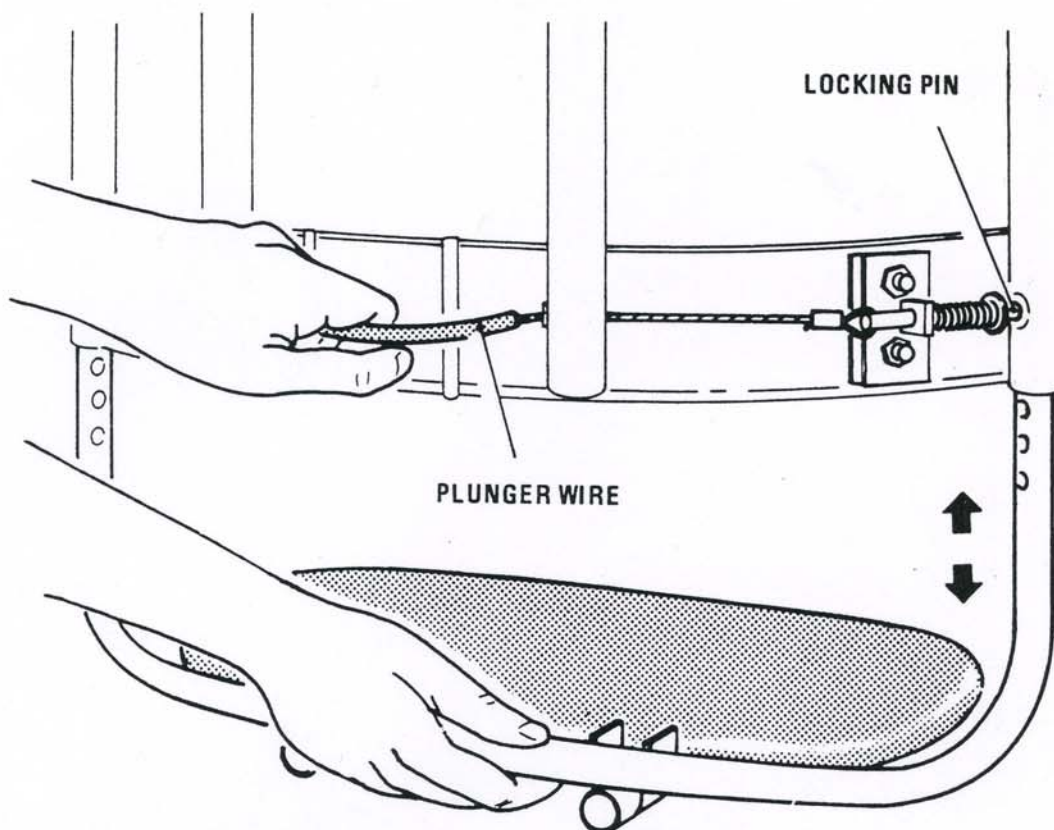


Fig. 2-4 Seat adjustment

5. Top and rear hatches (Fig.2-5)

The turret is provided with a top and rear hatch each fitted with locking handles. In addition the top hatch is fitted with a spring latch, the bolt of which locates into a slotted bracket mounted on top of the turret to retain the hatch open at one of three positions i.e.  $35^{\circ}$ ,  $75^{\circ}$  and fully open, depending on the amount of visibility required. The  $35^{\circ}$  position affords best possible protection while giving direct vision.

Under normal circumstances both hatches may be left open to provide the gunner with direct vision.

The rear hatch opens to the horizontal position and can be used as a seat while carrying out maintenance to the turret. Operationally the rear hatch should be closed.

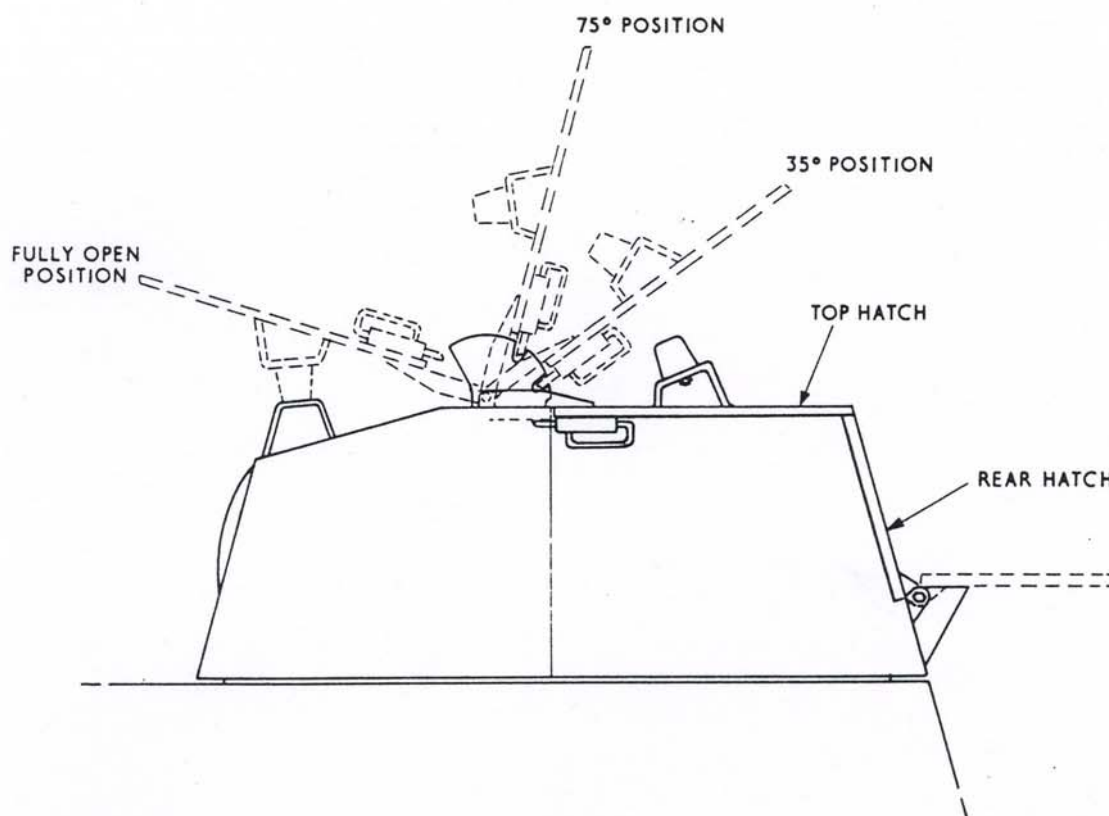


Fig. 2-5 Top and rear hatches

## MAINTENANCE

### 1. Turret ring

Normally it is not necessary to lubricate the turret ring. However when certain locational conditions require it, lubricate with a little light oil or grease via the lubricating nipple located at the forward rim of the turret.

### 2. Hatches

Before operational duty, hatches must be checked for free operation as this is essential for the safety of the crew.

Hinges should be occasionally lubricated with a light oil.

CAUTION: If the vehicle is being operated in dusty or sandy locations lubrication is not recommended.

### 3. Gun, periscope and spotlight alignment

Inter-related adjustment of all three units is to be procedurally accomplished in the sequence given below.

- (1) Place vehicle at required range from a wall or temporary erected screen on which a sighting point is marked.
- (2) Remove breech block from gun and align with sighting point by looking down the barrel. Apply turret brake and maintain gun alignment employing locking hand-wheel.
- (3) Adjust periscope until its white circle coincides with sighting point.

#### NOTE:

- (a) For up/down adjustment, appropriately employ respective clockwise or anti-clockwise rotation of positioning turnbuckle followed by fine adjustment by means of the screw located at the top of the turnbuckle.
  - (b) For lateral adjustment, use knurled screw below periscope.
- (4) With spotlight selected ON (operating switch depressed), slacken positioning locknut and swing unit laterally until beam wash is concentric with sighting point. Re-tighten locknut.

### SECTION 3

### OPTIONAL EQUIPMENT

## List of Contents

|                        |     |     |     |     |     |     |     | Page |
|------------------------|-----|-----|-----|-----|-----|-----|-----|------|
| Radio equipment        | ... | ... | ... | ... | ... | ... | ... | 1    |
| Additional battery     | ... | ... | ... | ... | ... | ... | ... | 1    |
| Siren ...              | ... | ... | ... | ... | ... | ... | ... | 1    |
| Recirculating air fans | ... | ... | ... | ... | ... | ... | ... | 1    |
| Smoke dischargers      | ... | ... | ... | ... | ... | ... | ... | 1    |
| Run flat wheels        | ... | ... | ... | ... | ... | ... | ... | 2    |
| PKM installation       | ... | ... | ... | ... | ... | ... | ... | 3    |

## Illustrations

|          |                                 |     |     |     |     |     |   |
|----------|---------------------------------|-----|-----|-----|-----|-----|---|
| Fig. 3-1 | Smoke dischargers               | ... | ... | ... | ... | ... | 1 |
| Fig. 3-2 | Installation of run flat wheels | ... | ... | ... | ... | ... | 2 |
| Fig. 3-3 | PKM installation                | ... | ... | ... | ... | ... | 3 |

## OPTIONAL EQUIPMENT

The equipment listed below can be supplied to meet customers requirements and specifications.

1. Radio equipment
2. Additional battery (90AH)
3. Siren
4. Recirculating air fans

Two variable speed recirculating air fans are mounted on the dashboard and individually controlled by switches on centre dash panel.

5. Smoke dischargers (Fig.3-1)

Mounted on either side of the turret the smoke dischargers are independently operated by means of firing buttons located inside the turret.

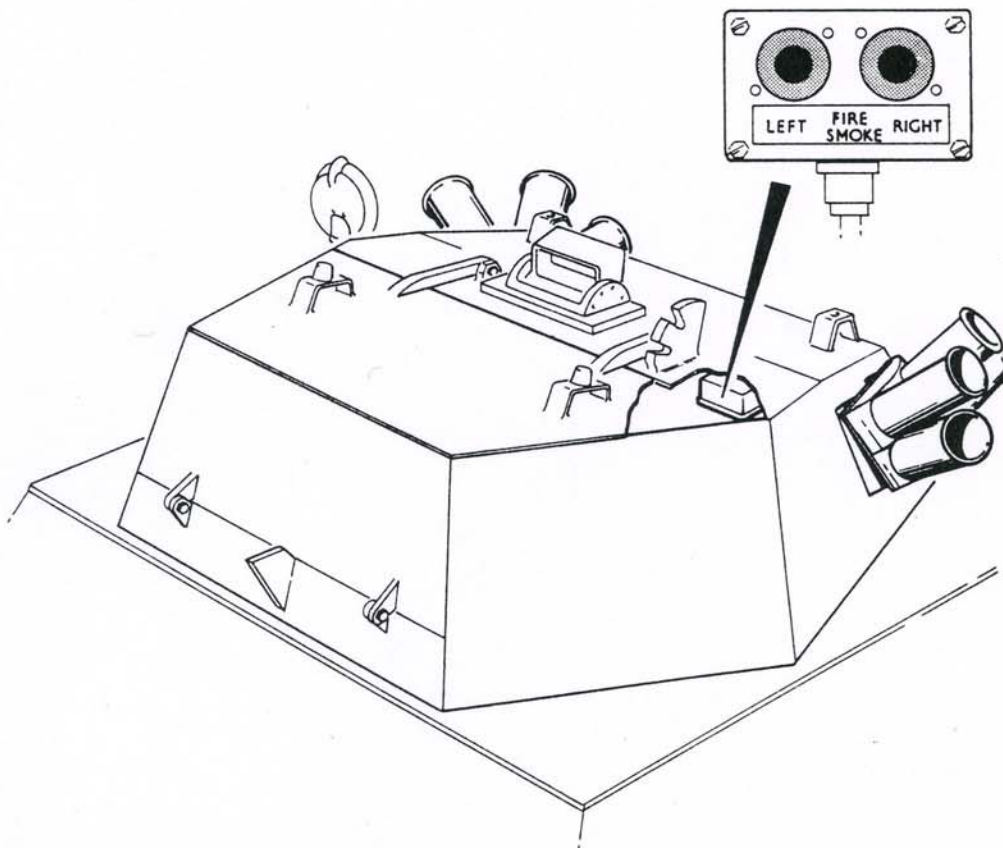


Fig.3-1 Smoke dischargers

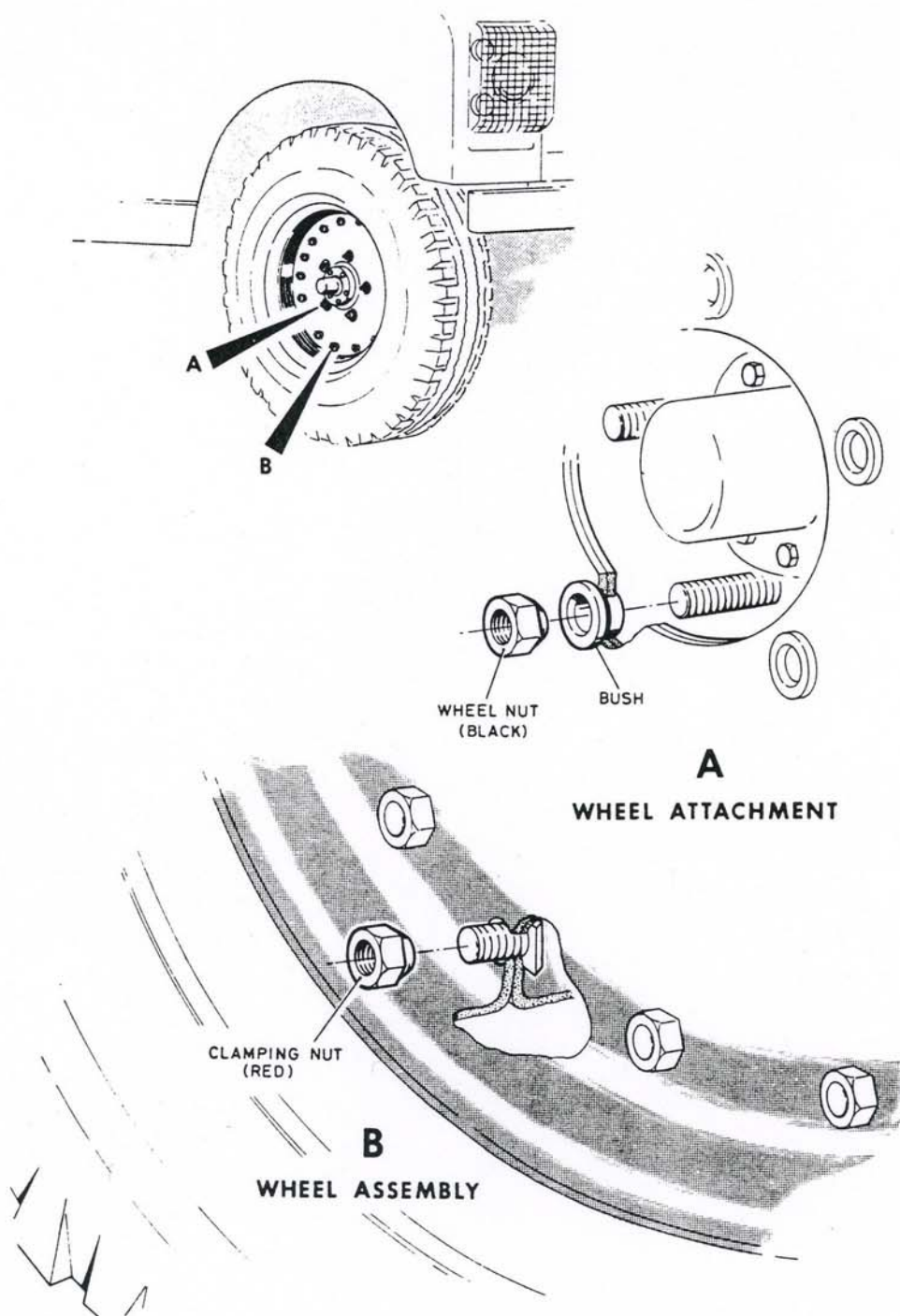


Fig.3-2 Installation of run flat wheels

#### 6. Run flat wheels (Fig.3-2)

Vehicles fitted with run flat wheels require maintenance as defined below:—

- (1) After the first 100 miles (160 kilometers) all wheel nuts and clamping nuts must be checked and tightened to a torque of 85 lb ft and subsequently checked after 500 miles (800 kilometers) and 1,000 miles (1,600 kilometers) and thereafter each subsequent 1,000 miles.

- (2) Wheel nuts and clamping nuts must also be tightened to the required torque after each wheel change and during each maintenance inspection.

**WARNING:** DO NOT SLACKEN THE OUTER RING OF CLAMPING NUTS (RED) UNLESS THE WHEEL IS REMOVED AND THE TYRE FULLY DEFLATED OR SEVERE PERSONAL INJURY MAY RESULT.

- (3) At each wheel change, ensure that all bushes are inserted before attachment to hub and retightening of wheel nuts.
- (4) Wheel nuts and clamping nuts are of similar size but with different threads; for this reason they are respectively painted black and red to avoid error in fitting.

## 7 PKM installation (Fig.3-3)

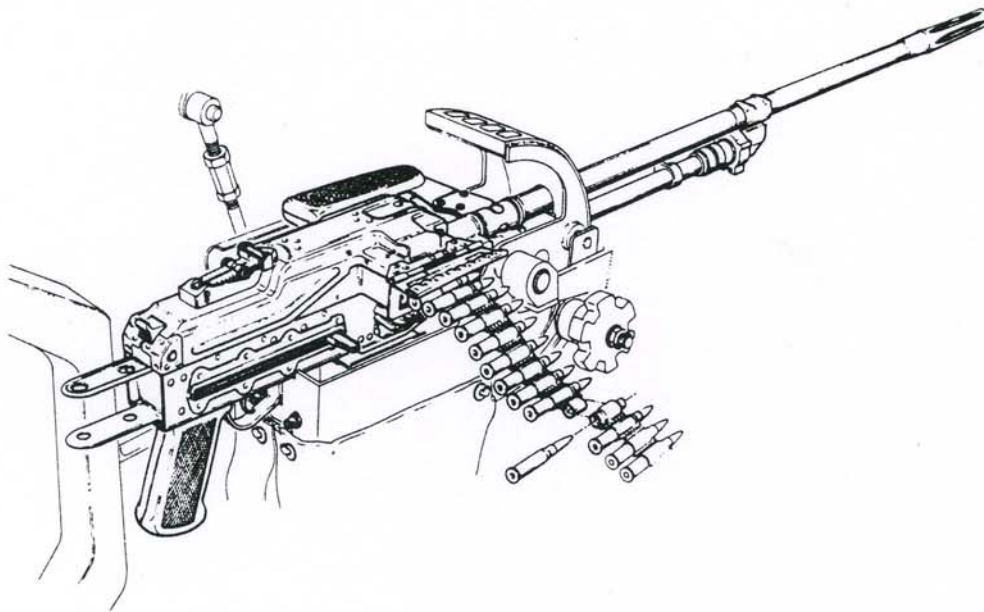


Fig.3-3 PKM Installation

## SECTION 4 ELECTRICAL

### List of Contents

| <u>DESCRIPTION AND MAINTENANCE</u> | Page |
|------------------------------------|------|
| Battery ... ..                     | 1    |
| Interior lights ... ..             | 1    |
| External lights ... ..             | 1    |

### List of Illustrations

| Fig.                       | Page |
|----------------------------|------|
| 4.1 Circuit diagram ... .. | 2    |

## ELECTRICAL

### Description and maintenance

#### 1. Battery

The 60 AH battery is encased in a box situated at the right hand side directly behind the drivers seat and is provided with its own ventilation and drainage.

Access to the battery is obtained by releasing two over-centre type clamps and removing the top cover.

A master switch is positioned on the bulkhead below the dash panel (Sect.1 Fig.1-1).

#### 2. Interior lights

A. The cabin interior light is mounted on the left side panelling and is operated by a switch located on the dash panel (fig.1-1). Access for unit or bulb replacement is obtained by removing the screw at the lower part of the rim and swinging the unit upwards on its hinge.

B. The turret interior light incorporating an on/off switch is mounted on the turret top forward of the periscope.  
For replacement purposes twist and pull to remove cover.

#### 3. External lights

Remove protective grilles before carrying out the following maintenance:-

##### A. Headlamps.

Access for unit or bulb replacement is obtained by pressing the outer rim of the headlamp inwards and rotating anti-clockwise. The complete unit can be pulled forward permitting the bulb connector to be detached.

##### B. Side, brake and indicator lights.

These are screw on type fittings. To gain access to replace bulb rotate anti-clockwise.

##### C. Number plate light.

Simply slacken cover screw to gain access for bulb replacement.

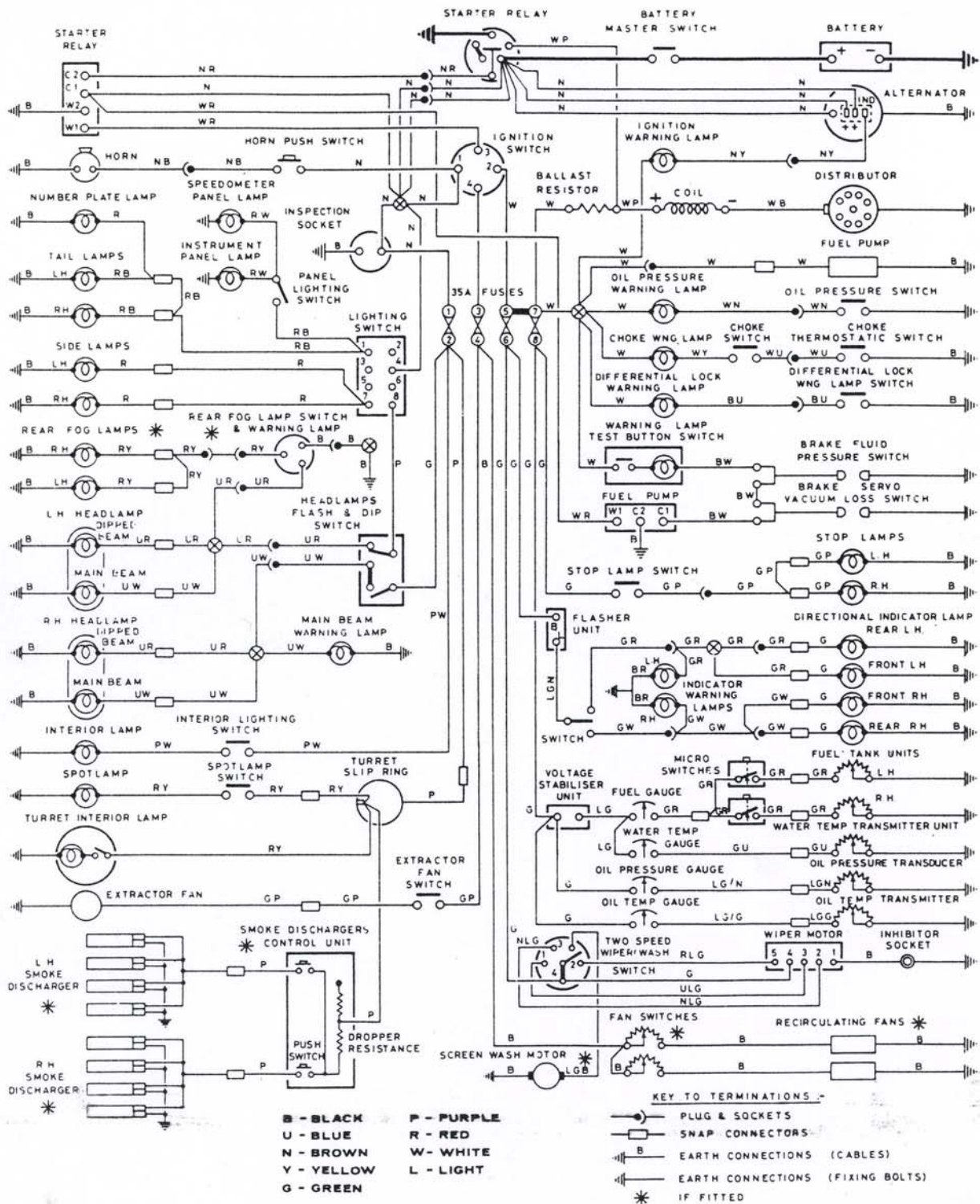


Fig. 4-1 Circuit diagram