

404-5 Q.

Electrical System

Electrical System

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Electrical System

Type 404 Cars

General Data

System	12 volt Positive Earth Return
Regulator Unit	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Lucas RF95/2 (Early Type Cars) Lucas RB106/1 (Later Type Cars)
Fuse Base	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Lucas SF6 (Later Type Cars)
Battery	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Type ... Lucas GTW9A/2 Capacity ... 51 Ampere hours at 10 hr. rate
Switches	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Lighting & Ignition ... Lucas PLC6 (Early Type Cars) Lighting & Ignition ... Lucas PRS3 (Later Type Cars) Panel Light & Rheostat ... Lucas CHR1 Horn Relay ... Lucas SB40/1 Direction Indicator ... Lucas TS1 Starter ... Lucas SS5 Dipper ... Lucas FS22 Fog ... Lucas PS16 Spot ... Lucas PS16 Petrol Reserve ... Lucas PS15/1 Starter Solenoid ... Lucas ST950 Windscreen Wiper ... Lucas PRS5 Map Light ... Trico G900/B Reverse Light ... SS10 Interior ... Smiths 64811
Windscreen Wiper Motor	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Lucas 75232A Wiper Arm ... Lucas 745072 Wiper Blade ... Lucas 738735
Combined Instruments (early type cars)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Smiths X56007/31 Fuel Gauge Oil Pressure Gauge Ammeter Fuel Gauge (later type cars) ... Smiths X49422/227 Ammeter (later type cars) ... Smiths BM4 Petrol Gauge Float Unit ... Smiths EXY 12667 (Early Type Cars) Petrol Reserve Unit ... Lucas 78028A
Radio (special order alternative)	Early type cars HMV ... Model 4260 HMV (overseas) ... Model 4262 Ekco ... Type CR 152 Later type cars HMV ... Type 200X HMV (overseas) ... Type 202X Ekco ... Type CR 152

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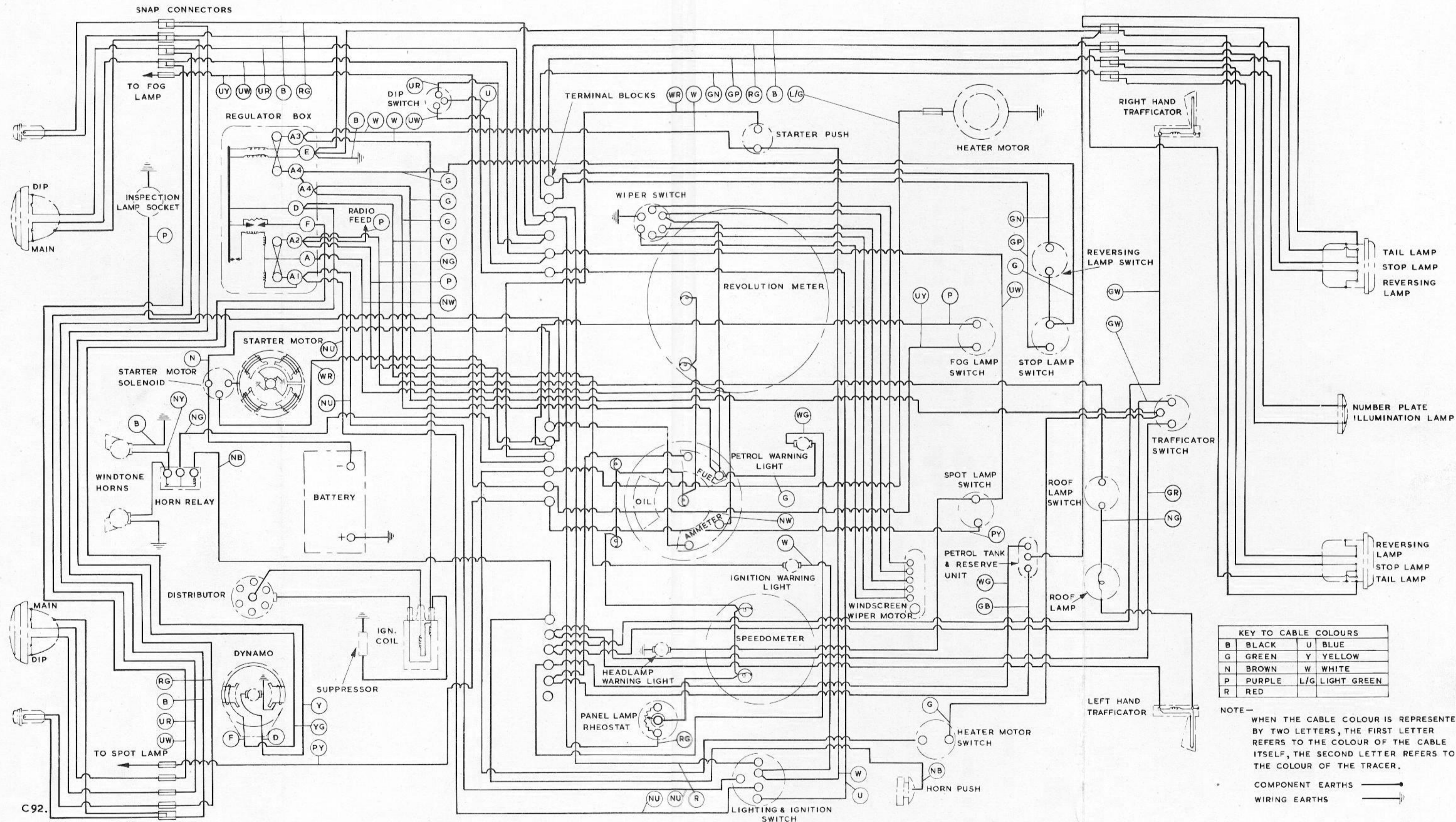


Fig. 187. Wiring diagram (early cars)

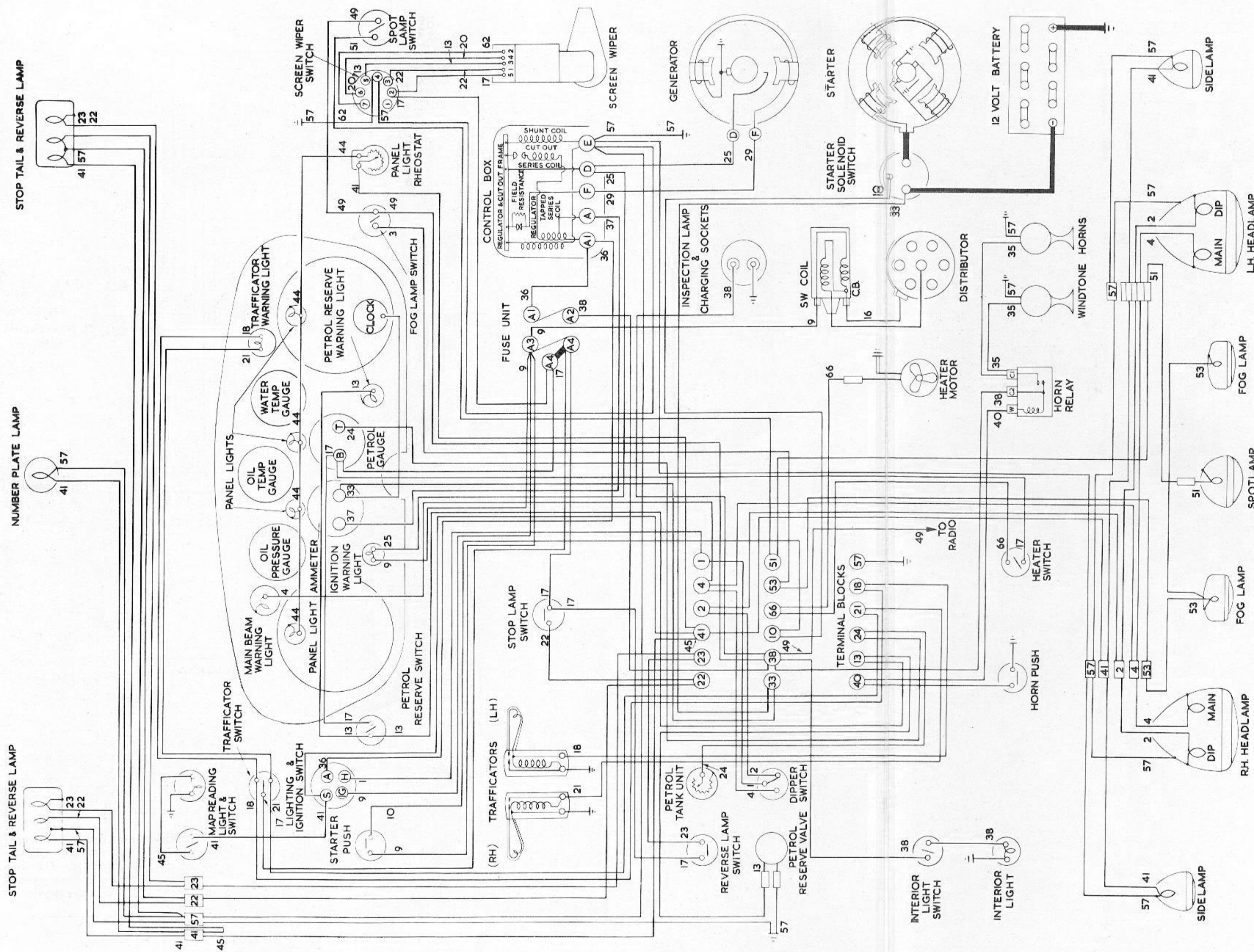


Fig. 188. Wiring diagram (later cars)

KEY TO CABLE COLOURS

1	BLUE	23	GREEN WITH BROWN	45	RED WITH GREEN
2	BLUE WITH RED	24	GREEN WITH BLACK	46	RED WITH PURPLE
3	BLUE WITH YELLOW	25	YELLOW	47	RED WITH BROWN
4	BLUE WITH WHITE	26	YELLOW WITH RED	48	RED WITH BLACK
5	BLUE WITH GREEN	27	YELLOW WITH BLUE	49	PURPLE
6	BLUE WITH PURPLE	28	YELLOW WITH WHITE	50	PURPLE WITH RED
7	BLUE WITH BROWN	29	YELLOW WITH GREEN	51	PURPLE WITH YELLOW
8	BLUE WITH BLACK	30	YELLOW WITH PURPLE	52	PURPLE WITH BLUE
9	WHITE	31	YELLOW WITH BROWN	53	PURPLE WITH WHITE
10	WHITE WITH RED	32	YELLOW WITH BLACK	54	PURPLE WITH GREEN
11	WHITE WITH YELLOW	33	BROWN	55	PURPLE WITH BROWN
12	WHITE WITH BLUE	34	BROWN WITH RED	56	PURPLE WITH BLACK
13	WHITE WITH GREEN	35	BROWN WITH YELLOW	57	BLACK
14	WHITE WITH PURPLE	36	BROWN WITH BLUE	58	BLACK WITH RED
15	WHITE WITH BROWN	37	BROWN WITH WHITE	59	BLACK WITH YELLOW
16	WHITE WITH BLACK	38	BROWN WITH GREEN	60	BLACK WITH BLUE
17	GREEN	39	BROWN WITH PURPLE	61	BLACK WITH WHITE
18	GREEN WITH RED	40	BROWN WITH BLACK	62	BLACK WITH GREEN
19	GREEN WITH YELLOW	41	RED	63	BLACK WITH PURPLE
20	GREEN WITH BLUE	42	RED WITH YELLOW	64	BLACK WITH BROWN
21	GREEN WITH WHITE	43	RED WITH BLUE	65	DARK GREEN
22	GREEN WITH PURPLE	44	RED WITH WHITE	66	LIGHT GREEN

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Type 404 Cars

Description

The 12 volt electrical system is a single wire type circuit having the positive (+) pole of the battery earthing to the engine and car. Current is supplied by a two brush dynamo in conjunction with a voltage regulator and an automatic cut out. Two 35 amp fuses are fitted in the accessories circuit.

Wiring Diagram (early type cars). Fig.187.

Wiring Diagram (later type cars). Fig.188.

Dynamo

The dynamo is belt driven and is mounted in a swivelling cradle on the left hand side of the engine and cooled by a fan at the rear of the driving pulley.

Starter Motor

The starter motor (located on the right hand side of the engine) is of normal design with a Bendix type inertia pinion on the worm shaft to engage the flywheel teeth. The direction of rotation is counter clockwise when viewed from the front of the car. Control of the starter motor is via the remote solenoid switch mounted on the right side of the bulkhead.

Voltage Regulator and Fuse Box

Early type cars.

The voltage regulator and cut out are housed on a common base (covered by a single moulded cover) mounted on the control panel in the battery bay. See Fig.189. Below the cover is the main terminal junction block. Two fuses (indicated by the markings 'Aux' and 'Aux Ign') on the regulator unit cover protect certain of the accessories.

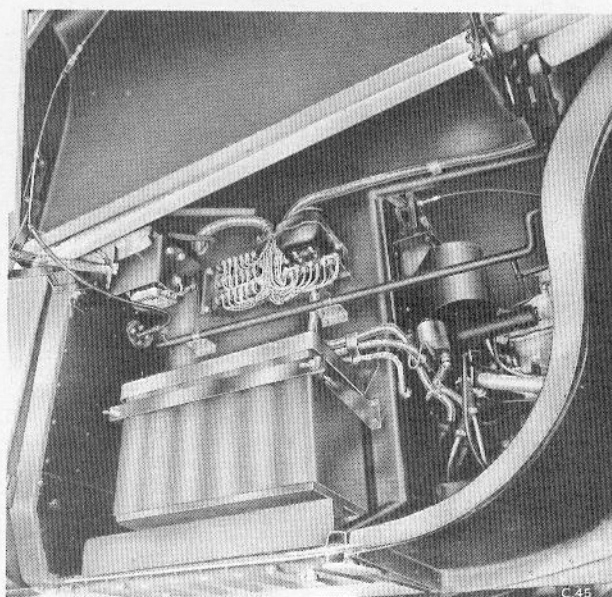


Fig. 189. Voltage regulator and cut out (early cars)

Later type cars.

The voltage regulator and cut out are housed on a common base (covered by a single moulded cover) mounted on the electrical control panel in the battery bay, see Fig.190. The main electrical terminal connections are mounted on the base adjacent to the cover. A block mounted below contains the two fuses.

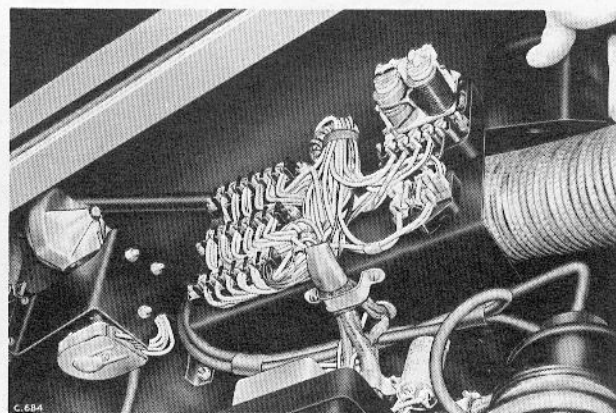


Fig. 190. Voltage regulator and cut out (later cars)

Fuse.	Independant of Ignition Switch.	Controlled by Ignition Switch.
None.	Clock, Head, Side, Tail, Number Plate Lights. Headlamp Warning Light. Panel Lamps. Map Reading Lamp.	Ignition Circuit. Ignition Warning Light. Starter Push Button.
Aux Ign		Brake Stop Lamp. Petrol Gauge. Direction Indicators. Windscreen Wiper Motor. Petrol Reserve Warning Lamp. Reversing Lamp. Demister Motor.
Aux.	Horns, Interior Light. Inspection & Trickle Charger Socket. Fog Lamp. Spot Lamp.	

The voltage regulator controls the output of the dynamo according to the load on the battery and its state of charge. When the battery is in a low state, the dynamo output is high. No adjustment to the regulator or cut out is normally required. Should however any adjustment be necessary it should be entrusted to a recognised Lucas agent.

Battery

The battery is housed in the battery bay on the right hand side of the car immediately to the rear of the front wing. Its positive terminal is earthed, while the negative terminal is connected direct to one terminal of the starter solenoid. The main feed is taken from the same solenoid terminal to the end terminal of the main terminal

junction block within the battery bay. See Fig.189.

Three different types of opening and locking arrangements are incorporated for the valance doors.

Early type cars.

Pull the knob in front door pillar, see Fig.191. Raise the valance door until supported.

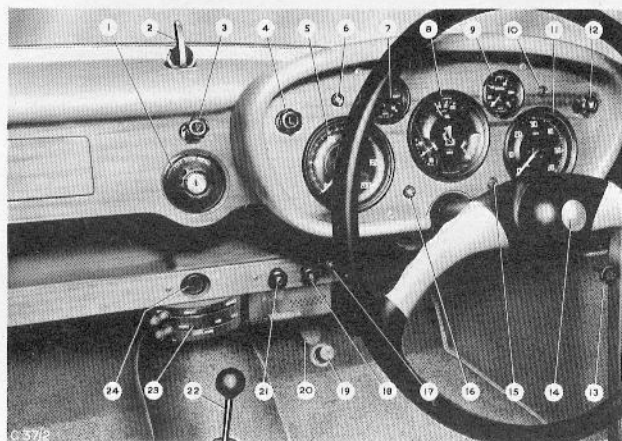


Fig. 191. Instrument panel (early cars)

Intermediate type cars.

Release the locks at each end of the valance door with the square key supplied. Raise the door until supported.

Later type cars.

Release the toggle fastener on the underside of the panel. Lift the safety catch see Fig.192 situated at the rear and raise the door until supported.

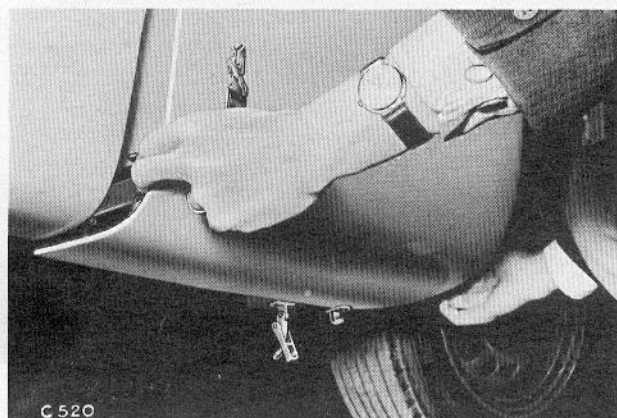


Fig. 192. Opening valance door (later cars)

Ammeter

The ammeter is in circuit with all electrical accessories with the exception of the starter motor and horn relay. The ammeter on early type cars is incorporated in the combined instrument, see Fig.191. For later cars, see Fig.193.

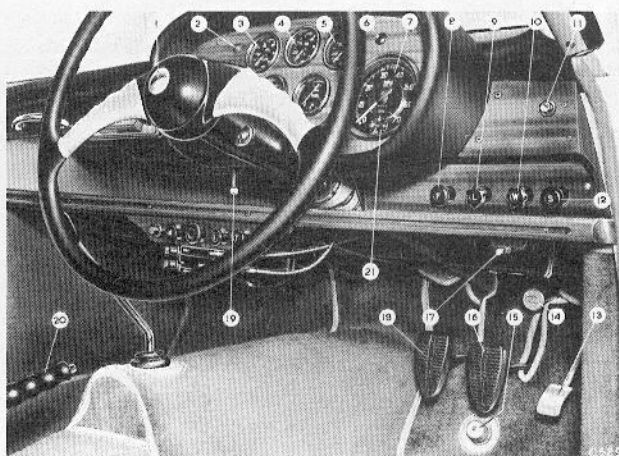


Fig. 193. Instrument panel and controls (later cars)

Brake Lamp Switch

This pressure operated switch is incorporated in the delivery connection on master cylinder as detailed in Brake System of this manual. On left hand drive cars the switch is incorporated in the feed pipe to the left hand brake immediately behind the wheel bay.

Reverse Lamp Switch

The reverse lamp switch is mounted on the right hand side of the gearbox, Fig.194, is of the plunger type and is operated by the reverse gear selector mechanism.



Fig. 194. Reverse light switch

Windscreen Wipers

The windscreen wiper motor and gearbox is mounted in the battery bay. Fig.189. A cable rack transmits motion in two wheel boxes beneath the scuttle facia which operates the wiper blades. No adjustment or lubrication is necessary as all parts are packed with lubricant on assembly.

The motor control knob (marked W) has three positions as follows:-

1 Parking. 2 Normal Running. 3 High Speed Running.

A thermostat cut out switch is built into the wiper motor to prevent overheating. However in order to avoid excessive operation of the switch, the higher speed (3) should only be used during heavy rain and never in snow or on a drying windscreen.

Horns

The push button in the centre of the steering wheel energises a solenoid relay switch situated on the inside of the right hand wheel fairing.

Instrument Panel

The instrument panel is mounted on brackets extending from the rear of the scuttle mounting and is screened by a detachable hood to eliminate reflection. The panel fitted to early type cars is illustrated in Fig.191, while the panel illustrated in Fig.193 for later types. Both panels being illuminated from the rear.

Radio

Radio is an optional fitment. Provision however is made for the installation of the HMV Radiomobile or Ekco together with speaker and aerial.

The HMV radio assembly comprises the control unit and power amplifier. The control unit is mounted in the left hand side of the dashboard and the power amplifier is situated under the bonnet in the LH scuttle compartment.

The Ekco installation uses a power pack in place of the power amplifier. This being the basic difference between the two assemblies.

An inverted coil speaker (6" dia.) is fitted centrally in the roof above the windscreen.

The aerial is positioned centrally to the roof just aft of the windscreen. The aerial lead in and speaker leads pass down through the door pillar and are fitted to all cars during manufacture.

Direction Indicators

The direction indicator switch is mounted centrally under the dashboard and is connected by an extension rod to a control on the dashboard. See Fig.195. The conventional illuminated finger type signals are built into the door pillars. The length of time that the indicator is in operation is controlled by an automatic time switch.

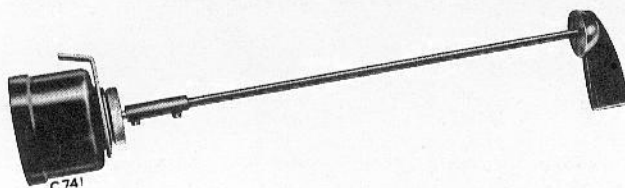


Fig. 195. Direction indicator extension

Head Lamp

Each head lamp incorporates a Lucas Light Unit which comprises a reflector and front glass assembly, provided with a mounting flange by which it is secured to the main body shell. The body shell is secured to the

front wing aperture by screws. The two filament prefocus bulb is secured in its holder by a backshell which engages the bayonet socket of the bulb holder and also provides the two electrical contacts. See Fig.196. The bulb and holder are located accurately in relation to the reflector, focusing is therefore automatic and no adjustment is required when replacing a bulb.

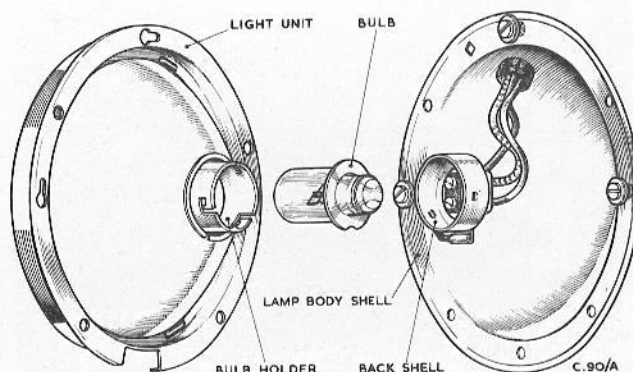


Fig. 196. Headlamp (early cars)

On later type headlamps a safety clip engages slots in the bulb holder to retain the bulb when the backshell is removed. See Fig.197.

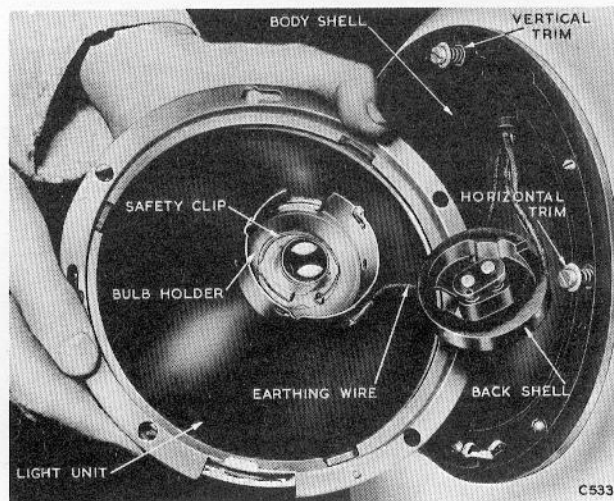


Fig. 197. Headlamp (later cars)

Side Lamps

The side lamps are faired into the wings to offer minimum air flow, the glass and rim being retained in position by a grommet type fixing. See Fig.198.

Stop Tail and Reverse Lamps

The reversing stop and tail lamps, see Fig.199 are incorporated in the same housing, one on each side of the car. The tail and stop lamp is a twin filament bulb 6 watts for the tail and 18 watts for the brake. The

reverse lamp bulb is of the same capacities with only the 18 watt filament in use. The tail and stop lamp bulb is the outer of the two and is shrouded by a red transparent cover. The stop and reversing circuits are energised only when the ignition is switched on.

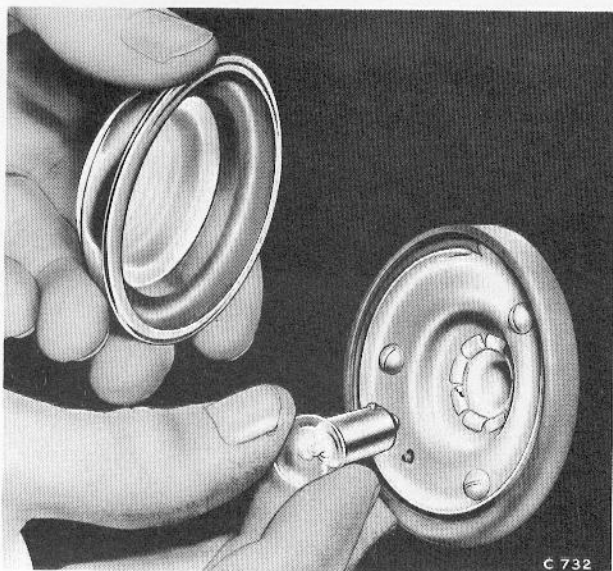


Fig. 198. Replacing sidelamp bulb



Fig. 199. Replacing stop, tail and reverse lamp bulb

Rear Number Plate Lamp

This lamp, see Fig. 200 is set horizontally in a recess along the top of the number plate, and houses a single filament bulb.

Map Reading Lamp

This lamp (when fitted) is situated beneath the fascia panel over the parcel shelf and is controlled by a push switch in the fascia panel to the left of the radio control unit.

Fog Lamp

Early type cars.

This lamp (special order only) is mounted above and on

the left hand side of the bumper and is controlled by a Push/Pull switch (Marked 'F').

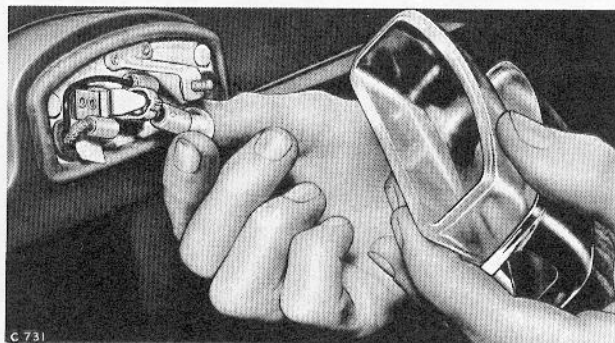


Fig. 200. Rear number plate lamp

Later type cars.

These twin lamps are each mounted on the left and right hand side beneath the bumper and controlled by a Push/Pull switch. (Marked 'F').

Spot Lamp

Early type cars.

This lamp (special order only) is mounted above and on the right hand side of the bumper and is controlled by a Push/Pull switch (Marked 'S').

Later type cars.

This lamp is mounted centrally in the radiator air intake aperture and is controlled by a Push/Pull switch (Marked 'S').

Inspection Lamp

The 'Minalite' type lamp is housed in the right hand side bulkhead compartment beneath the bonnet. When the lamp is connected to the inspection lamp/trickle charger socket the base becomes magnetised and the lamp will therefore adhere to any ferrous metal surface.

Inspection Lamp/Trickle Charger Socket

This electrical supply/feed socket see Fig. 201 is in direct electrical contact with the battery, current can be drawn from the battery, or supplied to it from a trickle charger.

Dipper Switch

This switch is mounted on the toe board and when depressed will raise or dip the head lamp beam, a red warning light coming into operation when the main beam is in circuit.

Servicing

Starter

To Free Jammed Pinion

In the event of the starter pinion becoming jammed in mesh with the flywheel ring it can usually be freed by

removing the protective cap, then apply a spanner to the squared end of the armature shaft and turning in a clockwise direction viewed from the front of the engine. Should persistent jamming occur the starter solenoid and motor should be examined in accordance with the appropriate Lucas instructions.

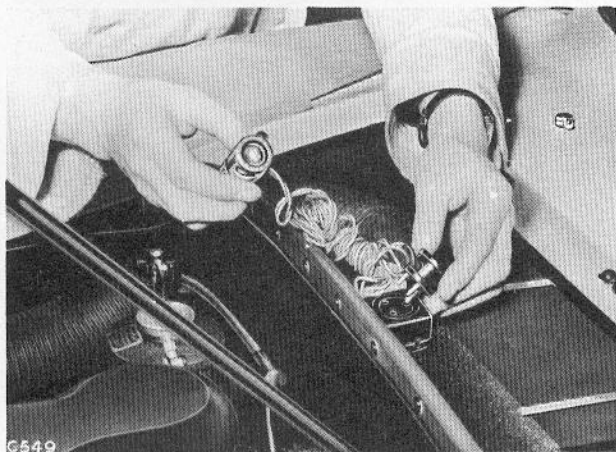


Fig. 201. Inspection lamp and trickle charger socket

Care of the Battery

Always keep the top of the battery clean and dry. Smear the cable terminals with petroleum jelly to prevent corrosion. Periodically a check should be carried out on the level of the electrolyte in each cell. The rate of evaporation of the electrolyte varies according to the use of the battery and the temperature in which it is operating. Never use a naked light over cells, since the gas is explosive. If 'topping up' is required, use only pure distilled water which must not contact metal (metal funnel or container). The tops of the plates should just be covered. Do not over fill since this will cause a violent discharge of gas when the battery is being charged by the dynamo resulting in damage to the surrounding metal work.

Occasionally take hydrometer readings to check the conditions of each cell as follows:-

Climate.	Hydrometer readings.		
	Charged.	1/2 Charged	Discharged.
Temperate Up to 80°F. (27°C.)	1.280 to 1.300	Approx. 1.210	1.150 or less.
Sub-tropical 80°F to 100°F (27°C to 38°C)	1.250 to 1.270	-	-
Tropical Over 100°F (38°C)	1.220 to 1.240	-	-

Brake Lamp Switch

Removing and refitting.

Disconnect the cables then unscrew and remove the switch from the master cylinder, see Fig. 202. Refit the switch, connect the cables and finally bleed the brakes.

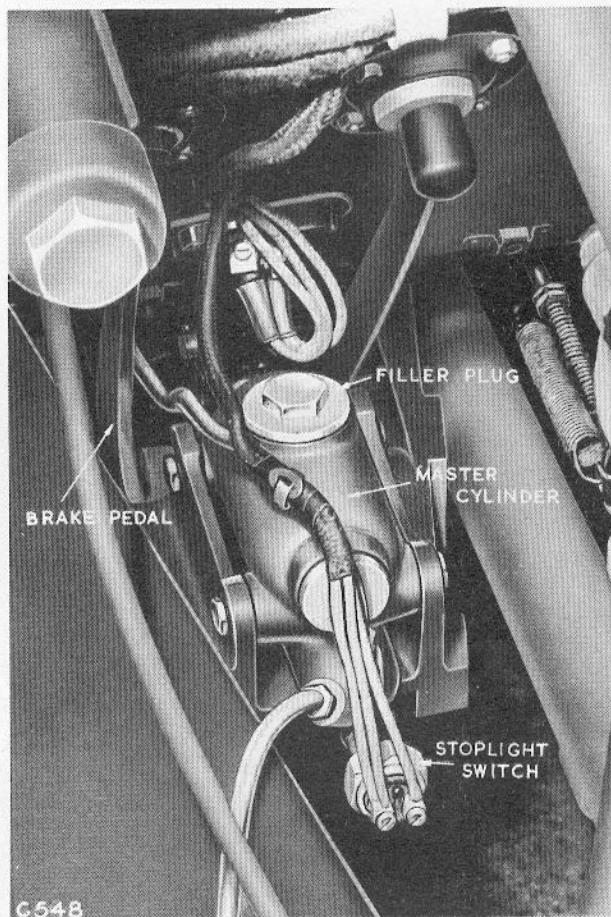


Fig. 202. Brake lamp switch

Windscreen Wiper Motor

Removing and refitting.

Remove the wiper arms and blades, disconnect the battery and then the five cables from the wiper motor.

Remove the screws attaching the wiper motor mounting bracket to the car body and unscrew the nut attaching the cable casing to the motor. Withdraw the motor complete with the mounting bracket and the cable. Detach the mounting bracket from the motor.

Should it be possible to obtain a replacement motor with an identical length cable the existing cable need not be detached. Failing this it will be necessary to transfer the cable from the faulty motor to the replacement.

To refit the motor from this stage, fit the mounting bracket, smear the cable with grease and feed it through

the cable casing, finally screwing on the nut to secure the casing to the motor. Attach the mounting bracket to the car body and reconnect the five cables to the motor.

Reconnect the battery and with the wiper spindles in the stationary position, refit the wiper arms and blades and check the arc of wipe.

Horns

Adjustment and refitting.

The horns will give long periods of service without attention under normal circumstances. If however the performance of one or both horns becomes uncertain, make sure that some outside source is not the cause of the trouble, ie, a loose connection, blown fuse or any loose metal parts in the vicinity of the horns which will vibrate when the horn is energised.

The adjustment provided in each horn will take up wear in the moving parts but will not affect the note pitch.

To gain access to the horns, remove the bonnet, disconnect the supply lead from one horn remove the central fixing screw of the other and detach the domed cover. Then remove the cover securing bracket by springing it from its mounting. Slacken the locknut of the fixed contact and turn the adjusting nut until the contacts are just separate, see Fig.203.

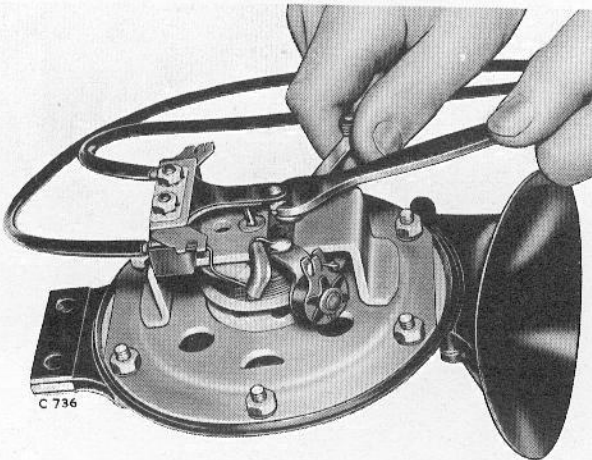


Fig. 203. Horn adjustment

The correct initial setting is when the horn just fails to sound when the button is depressed, then turn the adjusting screw 1/2 turn in the opposite direction, then lock in position. Test the horn, if it fails to sound correctly re-assemble it and return it to a Lucas Service Depot. If satisfactory the procedure for refitting is reversed.

Radiomobile Radio

Removing and Refitting.

1. Disconnect the battery.

Control Unit

2. To remove the control unit from the dashboard, disconnect the connector link (the cable loom from the control unit to the amplifier unit), fuse holder and aerial, remove the four screws supporting the control unit and withdraw the unit through the dashboard.

If it is necessary at any time to replace a control unit it should be noted that the original chromium plated bezel, dial and spring loaded control knob be retained and re-assembled to the new unit.

3. For refitting the procedure is reversed.

Power Amplifier

4. To remove the amplifier unit disconnect the connecting link, speaker plug and the two bolts attaching the unit to its mounting bracket. A waterproof cover is fitted over the unit, and attached by four bolts.

If it is necessary to replace an amplifier the original waterproof cover and the mounting bracket must be transferred.

5. For refitting the procedure is reversed.

Echo Radio

Removing and Refitting.

1. Disconnect the battery.

Control Unit

2. To remove the control unit from the dashboard disconnect the connector link (the cable loom from the control unit to the power pack) fuse holder and aerial. Remove the screws supporting the control unit and withdraw the unit through the dashboard.

3. For refitting the procedure is reversed.

Power Pack

4. To remove the power pack disconnect the connector link, speaker plug and the two attachment screws.

5. For refitting the procedure is reversed.

Speaker

Removing and Refitting.

1. Disconnect the battery.
2. Remove the screws securing the speaker grille ring and remove the rings and grille.
3. Remove the screws securing the speaker board then lower the speaker and detach the leads.
4. For refitting the procedure is reversed.

Aerial

Removing and Refitting.

To remove the aerial, carry out the instructions

for removing the speaker, then disconnect the aerial lead and remove the hexagonal screw securing the aerial. Remove the aerial and insulating grommet.

For refitting the procedure is reversed.

Direction Indicators

Removing and Refitting.

Release the quarter light fillet screws, remove the door aperture fillet and interior roof light switch (RH side pillar only). Remove the indicator trimming panel, remove the two screws securing the indicator bracket to the door pillar. Disconnect the single wire from the indicator and remove the screw securing the indicator to the bracket.

For refitting the procedure is reversed.

Direction Indicator Switch

Removing and Refitting.

1. Working from beneath and to the rear of the dashboard remove the 6 BA screw securing the extension shaft to the sleeve, see Fig.195.
2. Remove the ring nut and washer.
3. Disconnect the cables and remove the switch from its support bracket.
4. For refitting the procedure is reversed.

Note. If a replacement switch is fitted the sleeve must be transferred.

Removing and Refitting Instruments

Speedometer and Revolution Counter

Early type cars. See Fig. 204.

Working from beneath the instrument panel detach the flexible drive by releasing the hand nut. Remove the two hand nuts either side of the instruments followed by the earthing cables on the inner stud. Remove the clamping plate. The instrument can then be withdrawn from the face of the panel.

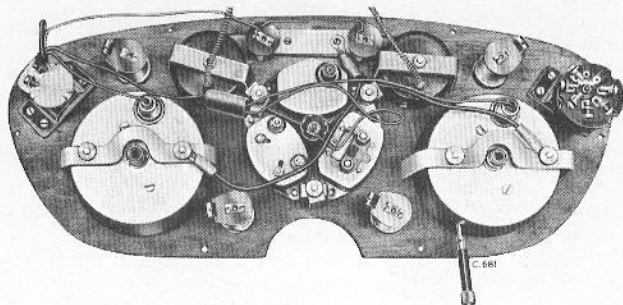


Fig. 204. Instrument panel - rear view (early cars)

For refitting the procedure is reversed.

Oil Temperature Gauge

To remove the oil temperature gauge first drain the oil sump and disconnect the bulb from the left hand side of the sump. Release the necessary securing clips and grommets from the capillary.

Remove the speedometer. Using the speedometer aperture in the panel release the hand nut clamping plate. The instrument can then be withdrawn from the face of the panel.

For refitting the procedure is reversed.

Water Temperature Gauge

The instructions for removing the water temperature gauge are similar to that for the oil temperature gauge the differences being, drain the water system, disconnect the bulb from the right hand side of the cylinder block, remove the revolution counter.

Combined Instrument

To remove the combined instrument disconnect the battery, remove the speedometer and disconnect the oil pressure pipe from the rear of the oil pressure gauge. Remove the six screws securing the panel. Withdraw the panel to rest upon the steering column. The combined instrument can then be removed, after disconnecting and identifying the various cables and connections.

For refitting the procedure is reversed.

Replacing Bulbs

Ignition and Fuel Reserve Warning Lights. Speedometer and Revolution Counter Illuminating Lamps

These bulbs can be removed and replaced by working from beneath with the instrument panel in situ.

Head Lamp Warning Lamp

This bulb can be removed and replaced by first removing the speedometer.

Oil and Water Temperature and Combined Instrument Illumination Lamps

To remove and replace these bulbs it will be necessary to remove the instrument panel.

Removing and Refitting Instruments

Speedometer

Later Type cars. See Fig. 205.

Working from beneath the instrument panel detach the flexible drive by releasing the hand nut. Remove the two hand nuts either side of the instrument followed by the earthing cables on the inner stud. Remove the clamping plate. The instrument can then be withdrawn from the face of the panel.

For refitting the procedure is reversed.

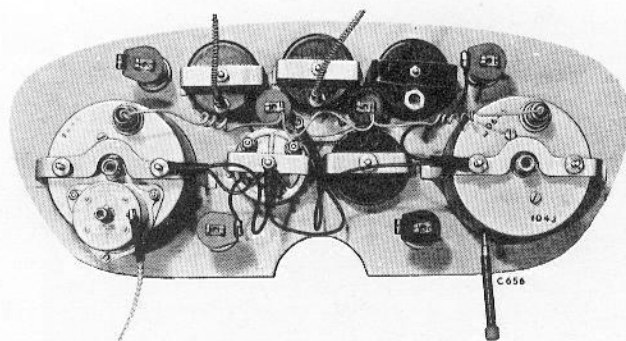


Fig. 205. Instrument panel - rear view (later cars)

Revolution Counter

The instructions for removing the revolution counter are similar to that for the speedometer. In addition disconnect the battery, the hand winder and electric supply feed to the clock, prior to withdrawing the instrument from the panel.

For refitting the procedure is reversed.

Oil Pressure Gauge

To remove the oil pressure gauge first remove the speedometer. Using the speedometer aperture in the panel disconnect the oil pressure pipe from the rear of the instrument. Remove the hand nut and clamping plate. The instrument can then be withdrawn from the face of the panel.

For refitting the procedure is reversed.

Oil Temperature Gauge

To remove the oil temperature gauge first drain the sump and disconnect the bulb from the left hand side of the sump. Detach the necessary clips and grommets from the capillary. Remove the revolution counter in order to remove the adhesive tape securing the two capillaries (oil & water) to each other. Remove the six screws attaching the panel shroud and pull the shroud forward to rest upon the steering column. Working from the top of the instrument panel remove the hand nut and clamping plate. The instrument can then be withdrawn from the face of the panel.

For refitting the procedure is reversed.

Water Temperature Gauge

To remove the water temperature gauge, drain the water system and disconnect the bulb from the right hand side of the cylinder block. Disconnect the necessary clips and grommets from the capillary. Remove the revolution counter, using the revolution counter aperture in the panel, remove the hand nut and clamping plate, the instrument can then be withdrawn from the face of the panel.

For refitting the procedure is reversed.

Fuel Gauge

To remove the fuel gauge remove the revolution

counter. Using the revolution counter aperture in the panel remove the hand nut and earthing cable followed by the clamping plate. Withdraw the fuel gauge just forward of the panel and disconnect the feed and return lead from the back of the gauge.

For refitting the procedure is reversed.

Ammeter

To remove the ammeter disconnect the battery, remove the speedometer, using the speedometer aperture in the panel remove the hand nut and clamping plate. Withdraw the ammeter just forward of the panel and disconnect the feed and return leads from the back of the instrument.

For refitting the procedure is reversed.

Replacing Bulbs

Fuel and Ignition Warning Lights, Speedometer and Revolution Counter Illuminating Lamps

These bulbs can be removed and replaced from beneath with the instrument panel in situ.

Headlamp Warning Lamp.

This bulb can be removed and replaced by removing the speedometer and working through the aperture in the panel.

Direction Indicator Warning Lamp

This bulb can be removed and replaced by removing the revolution counter and working through the aperture in the panel.

Oil and Water Temperature, Oil Pressure, Fuel and Ammeter Illuminating Lamps

These two lamps can be removed and replaced after removing the panel shroud.

Headlamps

Replacing a Bulb.

Early type cars.

Remove the rim and seal by releasing the securing screw at the bottom of the rim, see Fig.206. Press and twist anticlockwise to withdraw the light unit. From the rear of the light unit press and twist anticlockwise on the back shell, then withdraw it as shown in Fig.196. Lift the bulb from its holder be careful that it does not fall out.

When refitting, the bulb and back shell can only be assembled in the correct position. Refit the complete light unit, front seal and rim. Finally tighten the pinch screw positioned at the bottom.

Later type cars.

Remove the rim and rubber seal by releasing the securing screw at the bottom of the rim. Press and twist anticlockwise to withdraw the light unit. From

the rear of the light unit press and twist anticlockwise on the back shell, then withdraw it as shown in Fig.197. Remove the earth wire, safety clip and lift out the bulb.

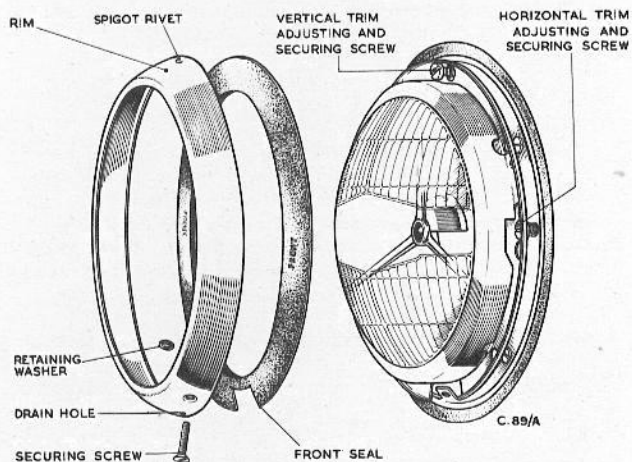


Fig. 206. Replacing headlamp bulb

When reassembling ensure that the slot in the rubber seal coincides with the screw in the rim.

Setting the Beam

No adjustment is necessary under normal conditions of use, even after fitting a new bulb, but vertical and horizontal adjustment is provided.

To effect adjustment proceed as follows:

1. Set the car on level ground at an approximate distance of 20 to 30ft from and face a blank wall.
2. Remove the lamp rims and seals.
3. Switch on the lights and note the position of the light circles on the wall in relation to the spacing of the lamps on the car.
4. To raise the beam screw the vertical trim adjusting screw clockwise or vice versa.
5. To turn the beam horizontally manipulate the sprung loaded horizontal trim adjusting screw as necessary.

When adjustment is satisfactory see Fig.207. Refit the seals and rims.

Replacing Bulbs

Side Lamps

To replace a side lamp bulb, ease the glass and rim from the grommet fixing see Fig.198.

Stop Tail and Reverse Lamps

Obtain access to the bulbs by removing the rim attachment screws. The reverse lamp bulb is then exposed. To gain access to the stop and tail light bulb pull off the red transparent cover, see Fig.199.

Rear Number Plate Lamp

Release the central cover attachment screw and

withdraw the cover downwards see Fig.200.

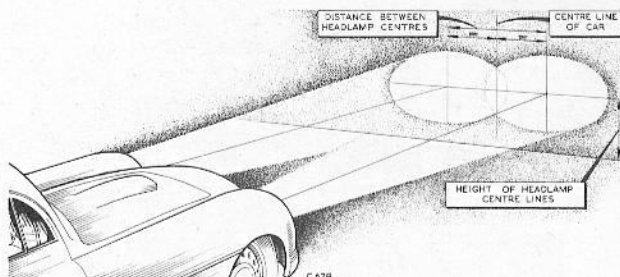


Fig. 207. Setting headlamp beam

Direction Indicators

Move the direction indicator switch to energise the solenoid. Prevent the arm locking in the closed position. Remove the screw from the end of the arm and slide off the metal cover to gain access to the bulb. See Fig.208.

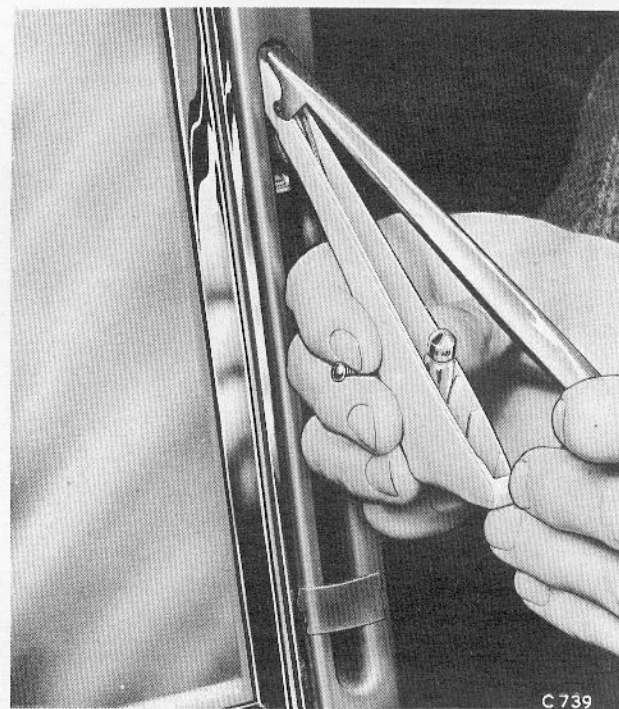


Fig. 208. Replacing direction indicator bulb

Map Reading Lamp Interior Lamp

Remove the screws securing the rim, and cover glass and remove the bulb.

Spot Lamp and Fog Lamp

Replacing a bulb (early type cars).

Remove the rim and front seal by releasing the securing screw at the bottom. Press and twist anticlockwise to withdraw the light unit. From the rear of

the light unit remove the circlip followed by the bulb and the shield.

When fitting a new bulb, first fit the shield, (this can only be fitted one way) insert the bulb, (either way) assemble the circlip, light unit, front seal and rim. Finally tighten the pinch bolt which must be positioned at the bottom.

Adjusting the Beam (Early Type Cars)

The lamp is provided with a spherical seating and is therefore adjustable in all directions. To adjust loosen the securing nut below the mounting bracket, adjust as required, then retighten the nut.

Fog Lamp

Replacing a bulb (later type cars).

Remove the two screws securing the rim to the body then lift out the rim complete with the reflector assembly. Turn the bulb holder anticlockwise and remove from the rear of the reflector see Fig.209. Remove the bulb.

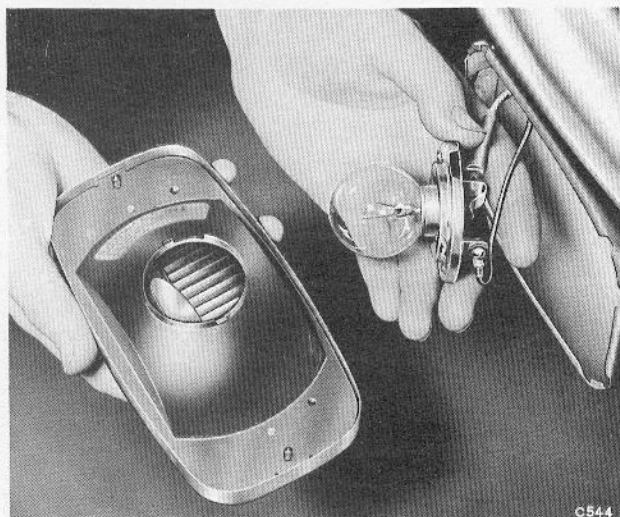


Fig. 209. Replacing fog lamp bulb later cars

For refitting the procedure is reversed.

Adjusting the Beam (Later Type Cars)

The lamps are provided with a spherical seating and is therefore adjustable in all directions. To adjust, loosen the securing nut above the mounting bracket, adjust as required, then retighten the nut.

Spot Lamp

Replacing a bulb (later type cars).

Remove the front rim by releasing the captive clamp screw at the top. Lift out the light unit, see Fig.210. Remove the circlip retaining the bulb holder in the rear of the reflector and withdraw the holder and bulb. Remove the bulb.

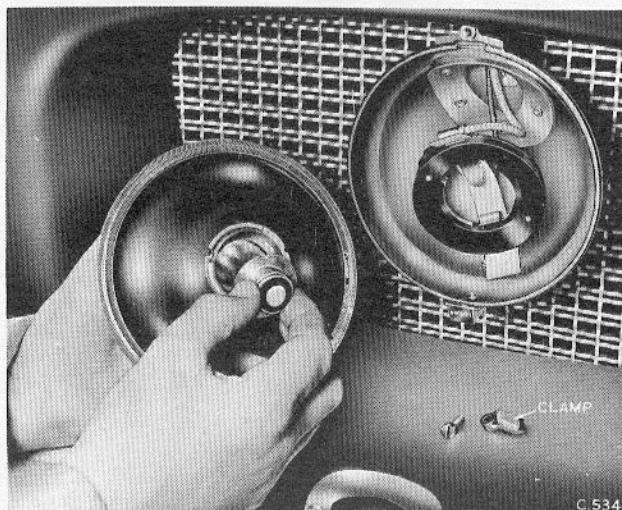


Fig. 210. Replacing spot lamp bulb

For refitting the procedure is reversed.

Adjusting the Beam (Later Type Cars)

The lamp is provided with a spherical seating and is therefore adjustable in all directions. To adjust first remove the bonnet, loosen the securing nut on top of the mounting bracket, adjust as required, retighten the nut and assemble the bonnet.

Regulator Unit	Lucas RB106/1. (Early Type Cars) Lucas RB320. (Later Type Cars)
Fuse Base	Lucas SF6
Battery	Type	Lucas GTW9A/2
						Capacity	51 Ampere hours at 10 hr. rate.
Switches	Lighting & Ignition	Lucas PRS3
						Panel Light Rheostat	Lucas CHR1
						Horn Relay	Lucas SB40/1
						Flasher Unit	Lucas FL5
						Double Relay for Flashers	DB10
						Petrol Reserve	Lucas PS15/1
						Interior...	Wilmot Breedon 8715B
						Starter	Lucas SS5
						Dipper	Lucas FS22
						Fog	PS16
						Spot	PS16
						Reverse..	SS10
						Starter Solenoid	ST 950
						Windscreen Wiper	Lucas PRS5
						Map Light	Trico G900/B
						Relay (Fog & Spot)	Lucas LIR. (Later Type Cars)
						Boot Light	Lucas 94
						Overdrive	Lucas 31500B
Windscreen	Motor & Gearbox	Lucas 75232A
						Wiper Arm	Lucas 741837
						Wiper Blade	Lucas 738735
Lamps	Head	Lucas P.700
						Side	Lucas 539
						Combined Stop, Rear, Direction Indicator & Reflector	Lucas 551
						Number Plate & Reverse	Lucas 469
						Fog..	Marchal Rectilux 650
						Spot	Lucas SLR576 S
						Interior	Wilmot Breedon 12136
						Boot.	Desmo 244
						Map Reading	Desmo 244
						Inspection	Minalite
Warning Lamps	Main Beam (Red)	Lucas WL12
						Ignition (Amber)...	Lucas WL12
						Petrol Reserve (Blue)	Lucas WL12
						Direction Indicator	Lucas WL12
Fuel Gauge	Smiths X49422/232
Ammeter	Smiths BM4
Petrol Gauge Float Unit	Smiths Y86049
Petrol Reserve Unit	Lucas 78029A
Panel Light	Lucas PL31

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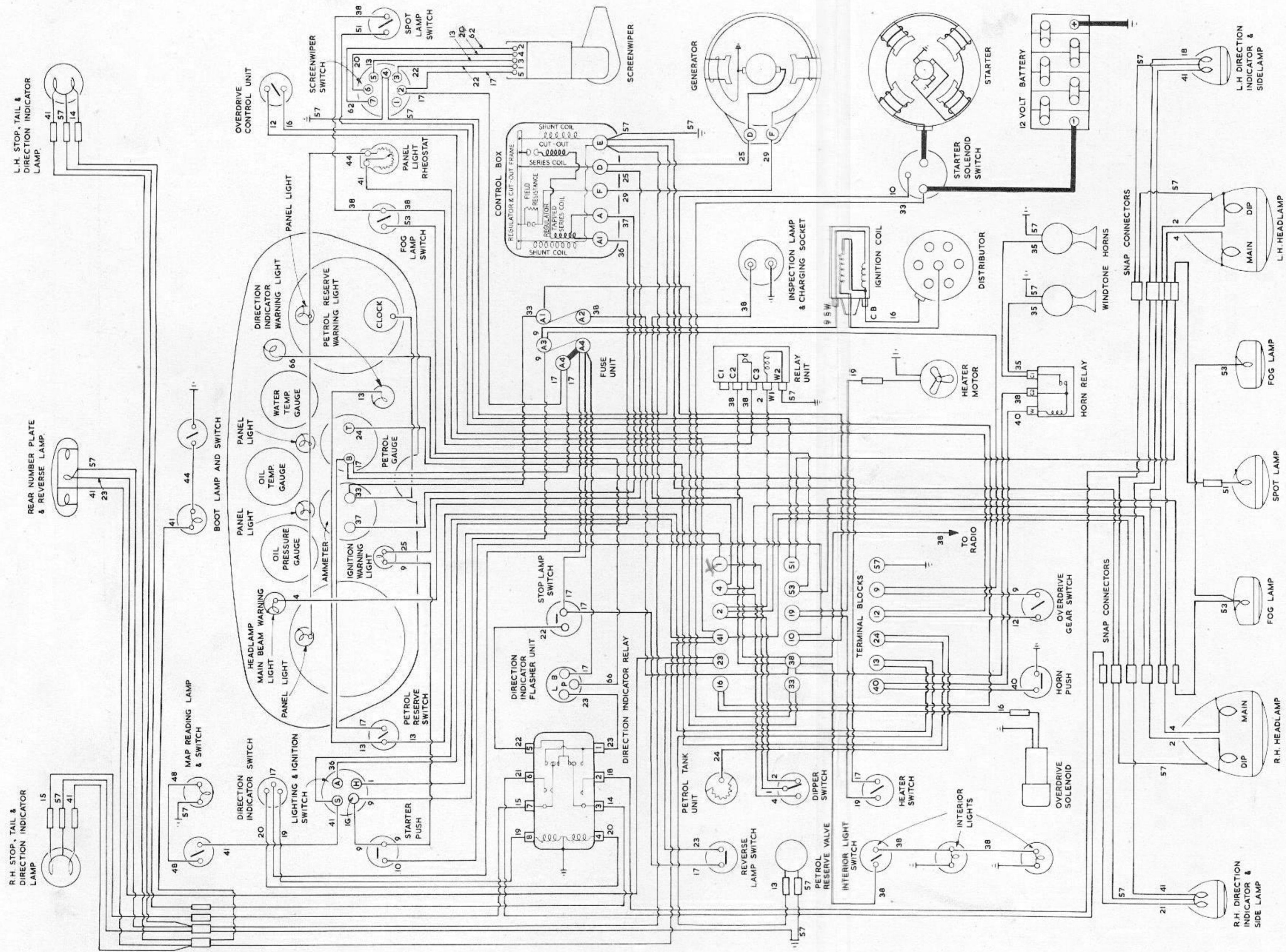
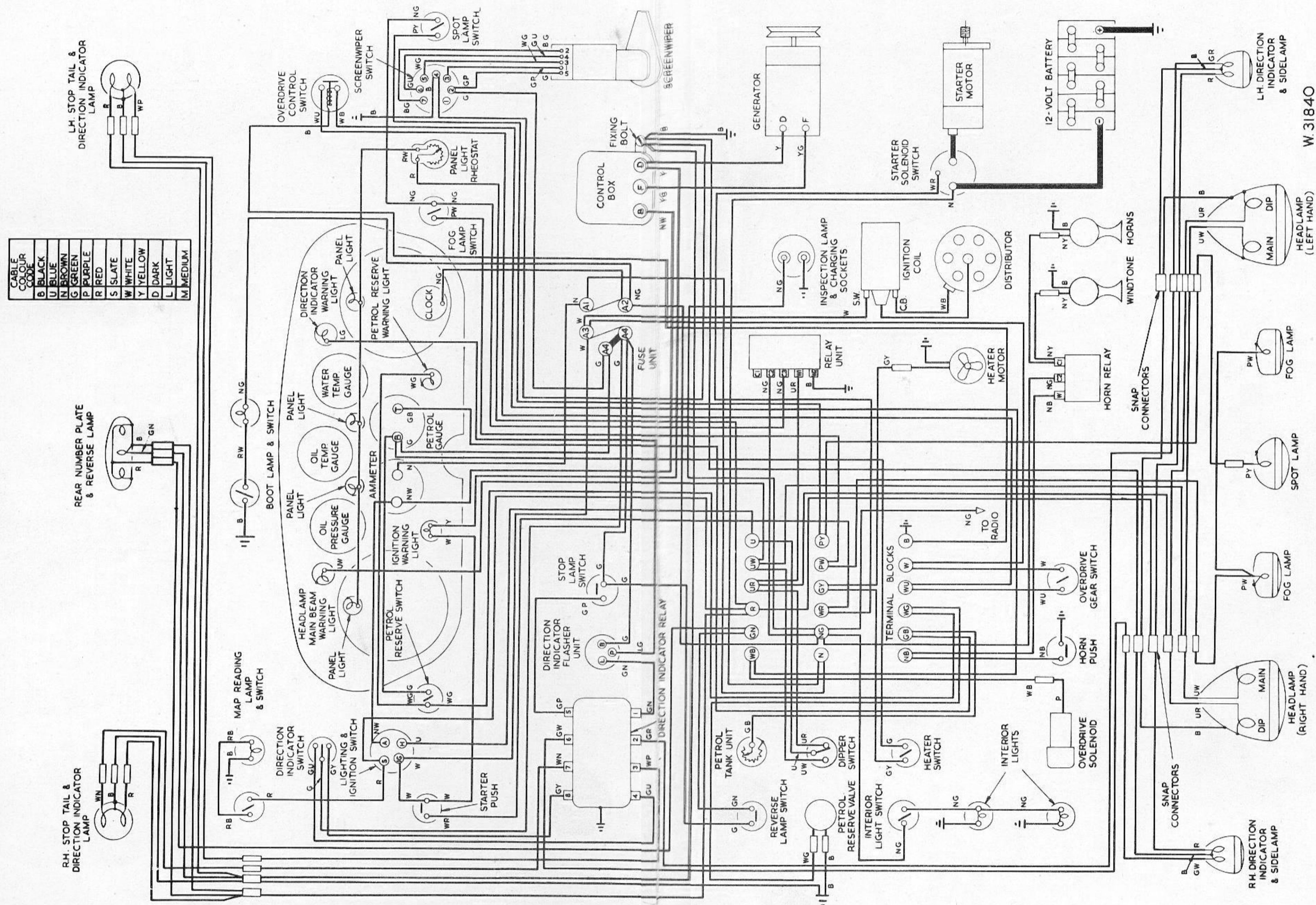


Fig. 211. Wiring diagram early cars

KEY TO CABLE COLOURS

1	BLUE WITH RED	23	GREEN WITH BROWN	45	RED WITH GREEN
2	BLUE WITH RED	24	GREEN WITH BROWN	46	RED WITH GREEN
3	BLUE WITH RED	25	YELLOW WITH RED	47	RED WITH GREEN
4	BLUE WITH RED	26	YELLOW WITH RED	48	RED WITH GREEN
5	BLUE WITH RED	27	YELLOW WITH RED	49	PURPLE WITH RED
6	BLUE WITH RED	28	YELLOW WITH RED	50	PURPLE WITH RED
7	BLUE WITH RED	29	YELLOW WITH RED	51	PURPLE WITH RED
8	BLUE WITH RED	30	YELLOW WITH RED	52	PURPLE WITH RED
9	WHITE WITH RED	31	YELLOW WITH RED	53	PURPLE WITH RED
10	WHITE WITH RED	32	YELLOW WITH RED	54	PURPLE WITH RED
11	WHITE WITH RED	33	BROWN WITH RED	55	PURPLE WITH RED
12	WHITE WITH RED	34	BROWN WITH RED	56	PURPLE WITH RED
13	WHITE WITH RED	35	BROWN WITH RED	57	PURPLE WITH RED
14	WHITE WITH RED	36	BROWN WITH RED	58	BLACK WITH RED
15	WHITE WITH RED	37	BROWN WITH RED	59	BLACK WITH RED
16	WHITE WITH RED	38	BROWN WITH RED	60	BLACK WITH RED
17	GREEN WITH RED	39	BROWN WITH RED	61	BLACK WITH RED
18	GREEN WITH RED	40	BROWN WITH RED	62	BLACK WITH RED
19	GREEN WITH RED	41	RED WITH YELLOW	63	BLACK WITH RED
20	GREEN WITH RED	42	RED WITH YELLOW	64	BLACK WITH RED
21	GREEN WITH RED	43	RED WITH YELLOW	65	DARK GREEN
22	GREEN WITH RED	44	RED WITH YELLOW	66	LIGHT GREEN



Type 405 Cars

Description

The 12 volt electrical system is a single wire type circuit having the positive (+) pole of the battery earthed to the engine and body, see Fig.211 for early type cars and Fig.212 for later type cars. Current is supplied by a two brush dynamo in conjunction with a voltage regulator (on later type cars combined current/voltage regulator) and an automatic cut out. Two 35 Amp. fuses are fitted in the accessories circuit.

Dynamo

The dynamo is belt driven and is mounted in a swivelling cradle on the left hand side of the engine and cooled by a fan at the rear of the dynamo.

Starter Motor

The starter motor (located on right hand side of the engine) is of normal design with a 'Bendix' type inertia pinion on a worm shaft to engage the flywheel teeth. The direction of rotation is counter clockwise when viewed from the front of the car. Control of the starter motor is via the remote solenoid switch mounted on the right hand side of the bulkhead.

Voltage Regulator and Fuse Box

The voltage regulator (later cars combined current/voltage regulator) and cut out are housed on a common base (covered by a single cover) mounted on the electrical control panel in the battery bay, see Fig.213. The main electrical connections are mounted on the base adjacent to the cover. Two fuses (indicated by the markings ('Aux and Aux Ign')) are contained on a block mounted immediately below the regulator. These fuses protect certain accessories as follows:

Fuse. None.	Independant of Ignition Switch. Clock. Head. Side Tail. Number Plate Lamps. Headlamp Warning Light. Panel & Map Reading Lamps. Boot Lamp (early type cars).	Controlled by Ignition Switch Ignition Circuit and Warning Light. Starter Push Button.
Aux.Ign.		Brake Stop. Petrol Gauge. Flasher Indicators. Flasher Indicator Warning Light. Windscreen Wiper Motor. Petrol Reserve Warning Lamp. Reversing Lamp. Demist Motor.
Aux.	Horns. Interior Light. Inspection & Trickle Charger Socket. Fog & Spot Lamp. Boot Lamp. (later cars).	

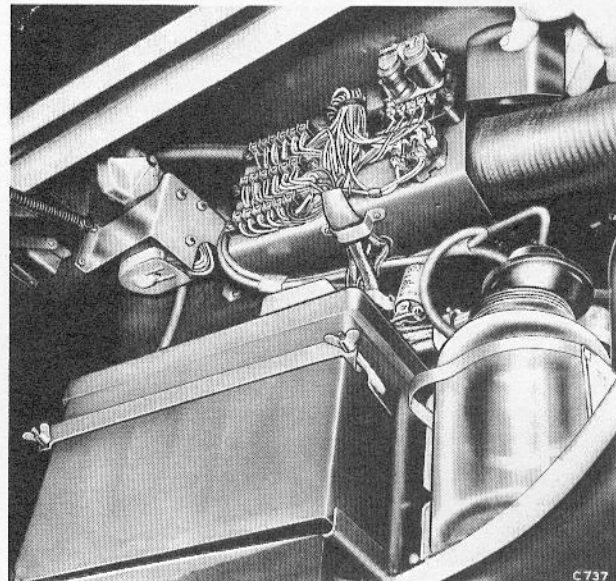


Fig. 213. Voltage regulator and fuse box

The regulator controls the output of the dynamo according to the load on the battery and its state of charge. When the battery is in a low state, the dynamo output is high.

No adjustment to the regulator or cut out is normally required should however any adjustment become necessary it should be entrusted to a recognised Lucas agent.

Battery

The battery is housed in the battery bay on the right hand side of the car immediately to the rear of the front wing. Its positive terminal is earthed while the negative terminal is connected direct to one terminal of the starter solenoid. The main feed is taken from the same solenoid terminal to the end terminal junction box within the battery bay.

To open the valance door see Fig.192. Release the toggle fastener on the underside of the panel. Lift the safety catch at the rear and raise the door until supported.

Ammeter

The ammeter is positioned on the dashboard and is in circuit with all electrical accessories except the starter motor and horn relay.

Brake Lamp Switch

The pressure operated switch is incorporated in the delivery connection of the master cylinder as detailed in Brake System of this manual. On left hand drive cars the switch is incorporated in the feed to the L.H. front brake immediately behind the wheel bay.

Reverse Lamp Switch

The reverse lamp switch is mounted on the right hand side of the gearbox, is of the plunger type and is operated by the reverse gear selector mechanism.

Overdrive Switch (Gearbox Operated)

The overdrive switch is mounted on the gear box top cover forward of the gear change turret assembly. The switch is of the plunger type and is only operative in top gear, when the manual switch on the dashboard is in the 'on position'.

Windscreen Wipers

The windscreen wiper motor and gearbox are mounted on the electrical control panel in the battery bay. A cable rack transmits motion to two wheel boxes beneath the scuttle fascia, which operates the wiper blades. No adjustment or lubrication is necessary as all parts are packed with lubricant on assembly.

The windscreen wiper control knob (Marked W) is on the right hand side of the instrument panel and has three positions as follows:

1. Fast 2. Slow. 3. Parking.

A thermostatic cut out switch is built into the motor to prevent overheating. However in order to avoid excessive operation of the switch the fast speed (1) should only be used during heavy rain, and never in snow, or on a drying windscreen.

Horns

The push button in the centre of the steering wheel energises a solenoid relay switch situated on the inside of the right hand wheel fairing to the rear of the radiator. The horns on early cars are fitted one on each side between the radiator core and the front grille, and on later cars one above the other on the left hand side.

Instrument Panel

The instrument panel see Figs.214 & 215, is mounted on brackets extending from the rear of the scuttle mounting and is screened by a detachable hood to eliminate reflection.

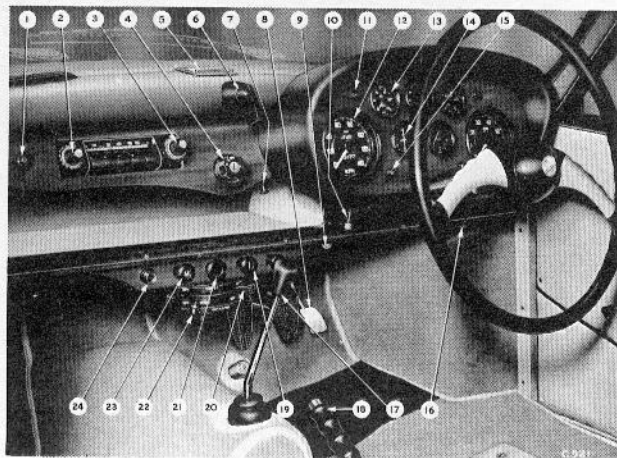


Fig. 214. Instrument panel and controls

The panel light rheostat (Marked L) controls four 2.2 watt bulbs. The bulbs being positioned as follows:- one behind both the speedometer and rev. counter, the remaining two being shared by the remaining instruments.

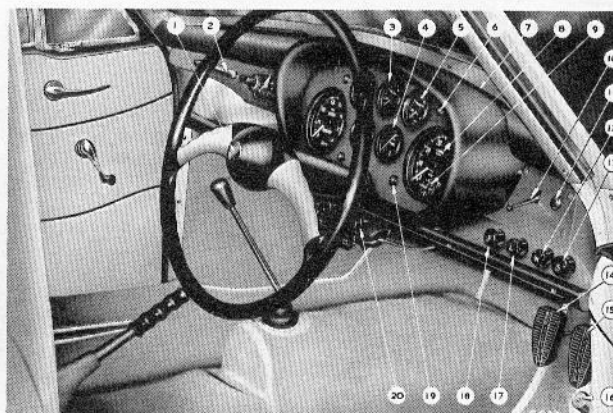


Fig. 215. Instrument panel and controls

Radio

Radio is an optional fitment, provision however is made for the installation of the HMV Radiomobile or Ekco together with speakers and aerial. The HMV radio assembly comprises the control unit and power amplifier. The control unit is mounted into the left hand side of the dashboard, the power amplifier being situated under the bonnet in the left hand scuttle compartment.

The Ekco installation uses a power pack in place of the power amplifier unit, this being the basic difference between the two assemblies.

Two speakers are used, one fitted well forward in the roof and a second in the rear squab shelf.

The aerial is located centrally on the roof just aft of the windscreen.

The aerial and speakers leads are fitted to all cars during manufacture.

Flashers

The flasher type direction indicators are housed in the multi-purpose side and rear lamps and are controlled by the indicator switch mounted centrally on the scuttle panel and is connected by an extension rod to a control on the dashboard see Fig.195. The switch is connected through a flasher unit and relay housed in the battery bay, to the side and rear lamps. The length of time that the indicator is in operation is controlled by an automatic time switch. When the direction indicator is in operation a warning light on the instrument panel is energised.

Headlamps

Each headlamp incorporates a Lucas Light Unit which comprises a reflector and front glass assembly with a mounting flange by which it is attached to a body shell. The body shell is secured to the front wing aperture by screws. The twin filament prefocus bulb is secured in its holder by a backshell which engages the bayonet socket of the bulb holder and also provides the two electrical contacts for the bulb, a safety clip engages slots in the bulb holder to retain the bulb when the backshell is removed see Fig.197.

Side Lamps

Each sidelamp housing is built into the front wing the cover glass and integral rim protruding beyond the wing surface. The lamp is fitted with a twin filament bulb, 6 watt for the side lamp and 21 watt for the 'Flasher' direction indicator. The glass and rim is retained by a bayonet type fixing See Fig.216.

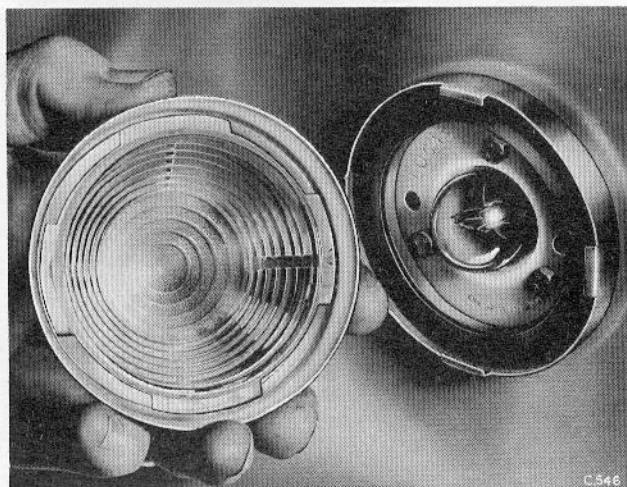


Fig. 216. Sidelamp

Stop Rear and Direction Lamps and Reflectors

The multi-purpose lamps each incorporate a twin filament bulb, 6 watt for the rear light and 21 watt for the flasher and stop light. The regulation type reflector is incorporated within the moulded glass cover. The glass and rim is retained by a bayonet type fixing see Fig.217.



Fig. 217. Stop, rear and direction lamps and reflectors

Rear Number Plate Illumination and Reverse Lamp

Mounted on the Boot Door this lamp houses three bulbs, the two outer bulbs each of 4 watt illuminate the number plate, and the centre 21 watt bulb is mounted behind a translucent (white glass) indicates rearward

movement of the car. See Fig.218.



Fig. 218. Rear number plate and reverse lamp

Map Reading Lamp

This lamp is situated beneath the fascia panel over the parcel shelf and is controlled by a push switch in the fascia panel to the left of the radio control unit.

Fog Lamp

These lamps are mounted on brackets beneath the front bumper and are controlled by a push/pull switch (marked F).

Spot Lamp

The spot light is mounted in the radiator cowl entry, it comprises a detachable light unit and back shell and is controlled by a push/pull switch (marked S).

Inspection Lamp

The 'Minalite' type inspection lamp is housed in the right side bulkhead compartment beneath the bonnet. When the lamp is connected to the inspection lamp/trickle charger socket the base becomes magnetic and the lamp will therefore adhere to any ferrous metal surface.

Inspection Lamp/Trickle Charger Socket

The electrical supply/feed socket see Fig.201 is in direct electrical contact with the battery, current can be drawn from the battery, or supplied to it from a trickle charger.

Dipper Switch

The dipping switch is mounted on the toeboard to the rear of the brake and clutch pedal, when depressed will raise or dip the headlamp beam.

Boot Lamp

The boot lamp on early cars is wired in circuit with the side lamps, a micro switch causes the lamp to light when the door is opened. On later models the lamp is wired in direct circuit and will light independent of the side lamps.

Warning Lamps

Ignition Warning Lamp

This is situated on the bottom of the instrument panel to the left of the steering column. The bulb is fitted behind the amber glass and comes into operation when the ignition is switched 'ON'.

Head Lamp Warning Lamp

This is situated on the top left hand side of the steering column. The bulb is fitted behind a red glass and comes into operation when headlamps are on main beam.

Fuel Warning Lamp

This is situated on the bottom right hand side of the steering column. The bulb is fitted behind a blue glass and only appears when the petrol reserve switch and ignition is switched on.

Direction Indicator Warning Lamps

This is situated on the top right hand side of the steering column. The bulb is fitted behind a green glass and winks simultaneously with the flashing indicators.

Overdrive Switch (Manual) (See Fig.219.)

This is mounted in a panel to the right of the instrument panel. Overdrive is only incorporated in top gear, the switch is self cancelling when changing down from top gear.

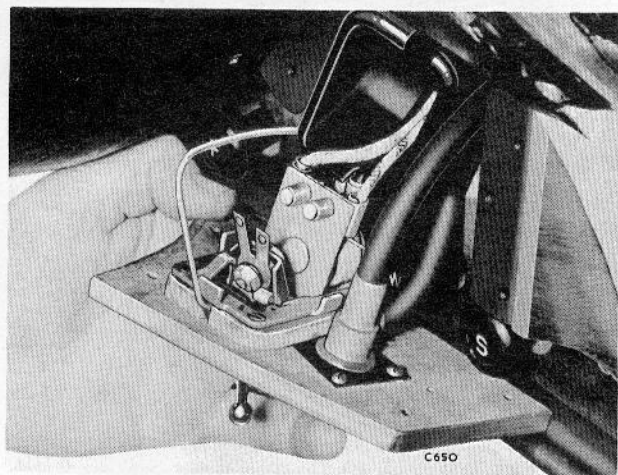


Fig. 219. Overdrive switch (manual)

Servicing

<u>Starter.</u>	As for Type 404.
<u>Care of the Battery.</u>	As for Type 404.
<u>Brake Light Switch.</u>	As for Type 404.
<u>Windscreen Wiper Motor.</u>	As for Type 404.

Horns

Adjustment and Refitting.

The horns will give long periods of service without attention under normal circumstances. If however the performance of one or both horns becomes uncertain, make sure that some outside source is not the cause of the trouble ie, a loose connection, blown fuse or any loose parts in the vicinity of the horns which will vibrate when the horn is energised.

The adjustment provided in each horn will take up wear in the moving parts but will not affect the noise pitch.

To adjust the horns the following procedure should be carried out:-

Early type cars.

1. Remove the bonnet.
2. Remove the central fixing screw and domed cover from one horn and detach the supply lead. Care to be taken not to short circuit the wiring.
3. Remove the central fixing screw and domed cover from the other horn and then remove the cover securing bracket by springing it from its mounting.
4. Slacken the locknut of the fixed contact and turn the adjusting nut until the contacts are just separate, see Fig.203.
5. The correct initial setting is when the horn just fails to sound when the button is depressed, then turn the adjusting screw 1/2 turn in the opposite direction, then lock in position. Test the horn. If it fails to sound correctly re-assemble it and return it for examination to a Lucas agent.
6. If satisfactory the procedure for refitting is reversed.

Intermediate type cars.

To remove the central fixing screw and domed cover from the right hand side horn, first unscrew the securing clip and remove the inlet cowl from the blower unit. The adjustment for horns is then as stated for early type cars.

Later type cars.

Due to their location it will be necessary to remove the horns from their mounting in the following manner.

1. Remove the bonnet.
2. Disconnect the Battery.
3. Release the two attachment nuts and bolts from each of the horn mountings.
4. Detach the supply lead.
5. Test and adjust the horn by coupling a supply lead to a spare battery.
6. If satisfactory the procedure for refitting is reversed.

<u>Radiomobile Radio.</u>)
<u>Ekco Radio.</u>)
<u>Front Speaker.</u>	) As for Type 404.
<u>Aerial.</u>)
<u>Removing and Refitting.</u>)

Rear Speaker

Removing and Refitting.

To remove the heavy duty speaker from the rear squab, disconnect the battery from within the boot compartment turn back the felt masking the speaker. Release the four screws securing the speaker to the squab shelf, lower the speaker and detach the leads.

For refitting the procedure is reversed care being taken that the dust screen is positioned immediately behind the speaker grille.

Instruments

Removing and Refitting.

Instrument Panel Lamps and Warning Lamp Bulbs.

) As for later Type 404.

Removing and Refitting.

Headlamp, Spotlamp and Fog Lamps.

Replacing a Bulb and setting the beam.

Direction Indicator Switch.

Removing and Refitting.

) As for Type 404.

Replacing Bulbs

Stop, Rear and Direction Indicator Lamps. Side and Direction Indicator Lamps

To replace this bulb push in and twist the cover glass anticlockwise using the finger grip moulded on the cover glass, withdraw the glass see Fig. 216 and Fig. 217 the bulb is designed to permit correct fitment only.

Rear Number Plate Illumination and Reverse Lamp

Remove the two screws securing the cover, remove the cover to expose the bulbs see Fig. 218.

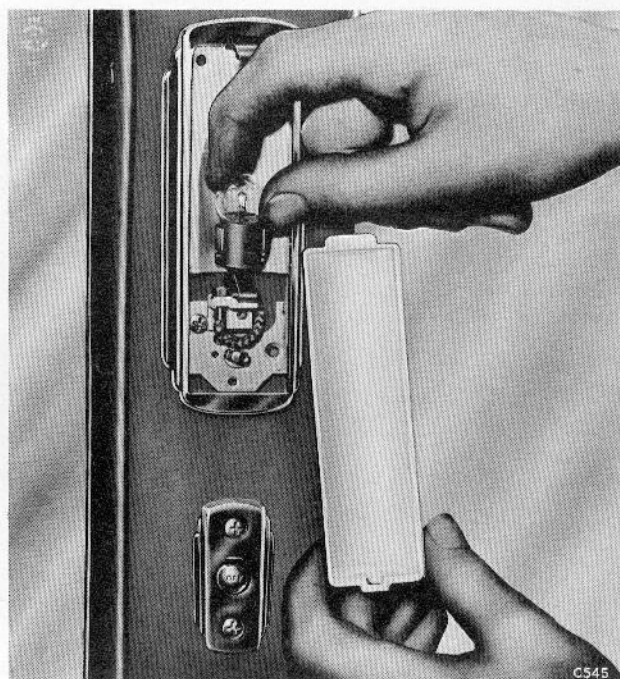


Fig. 220. Replacing bulb - interior lamp

Interior Lamp

Remove the plastic 'snap-on' cover to expose the bulb, then pull the bulb from the clip see Fig. 220.

Map Reading Lamp

As for Type 404.

Boot Illumination Lamp

Remove the two screws securing the rim, and cover glass to expose the bulb.