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Section T5
CONTROL LINKAGE

It is recommended that the controls be checked before a car is road tested. If any symptoms exhibited during a road test are shown by fault diagnosis to be attributable to controls, another check should be made before proceeding further.

Before altering transmission controls, ensure that the engine controls (throttle and choke) have been correctly adjusted and are operating freely.

Manual linkage—To adjust

1. Remove the split pin and clevis pin from the gearchange operating rod at the actuator end.
2. Select 'P' on the selector. Push the lower end of the gearchange lever fully forward ('P' position).
3. Connect the gearchange operating rod; fit the clevis pin but not the split pin.
4. Measure the gap between the neutral start and height switch lever and the adjacent pillar; the gap should measure 0·050 in. (1,27 mm.). If necessary adjust the jaw to obtain the required gap. Ensure that there is still clearance when the 3° overrun on the actuator, beyond the Park position, is used up.
5. Select 'L' on the actuator then select 'P'. Adjust the operating rod so that the clevis pin will slide into the jaw and through the lever.
6. Select each of the gear positions in turn, and at each position, ensure that the clevis pin will slide easily into the jaw.
7. Again, check that the pin will slide easily into the jaw when 'L' is selected after 'P' and when 'P' is selected immediately after 'L'.

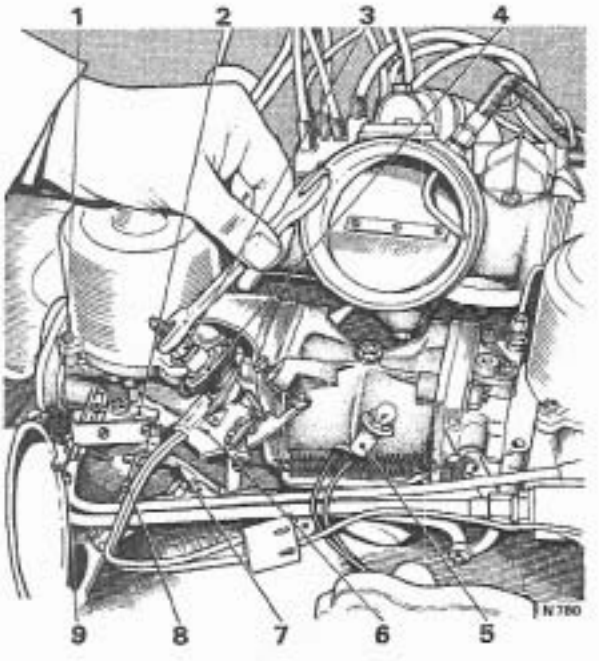

FIG. T138 ADJUSTING THE DAMPER AND SWITCH (EARLY CARS)

1 Throttle stop screw
2 Stator solenoid switch
3 Adjusting nut
4 Throttle damper
5 Test lamp
6 Stator solenoid switch (closed throttle)
7 Stator solenoid switch actuating cam
8 Detent solenoid switch
9 Detent solenoid micro-switch

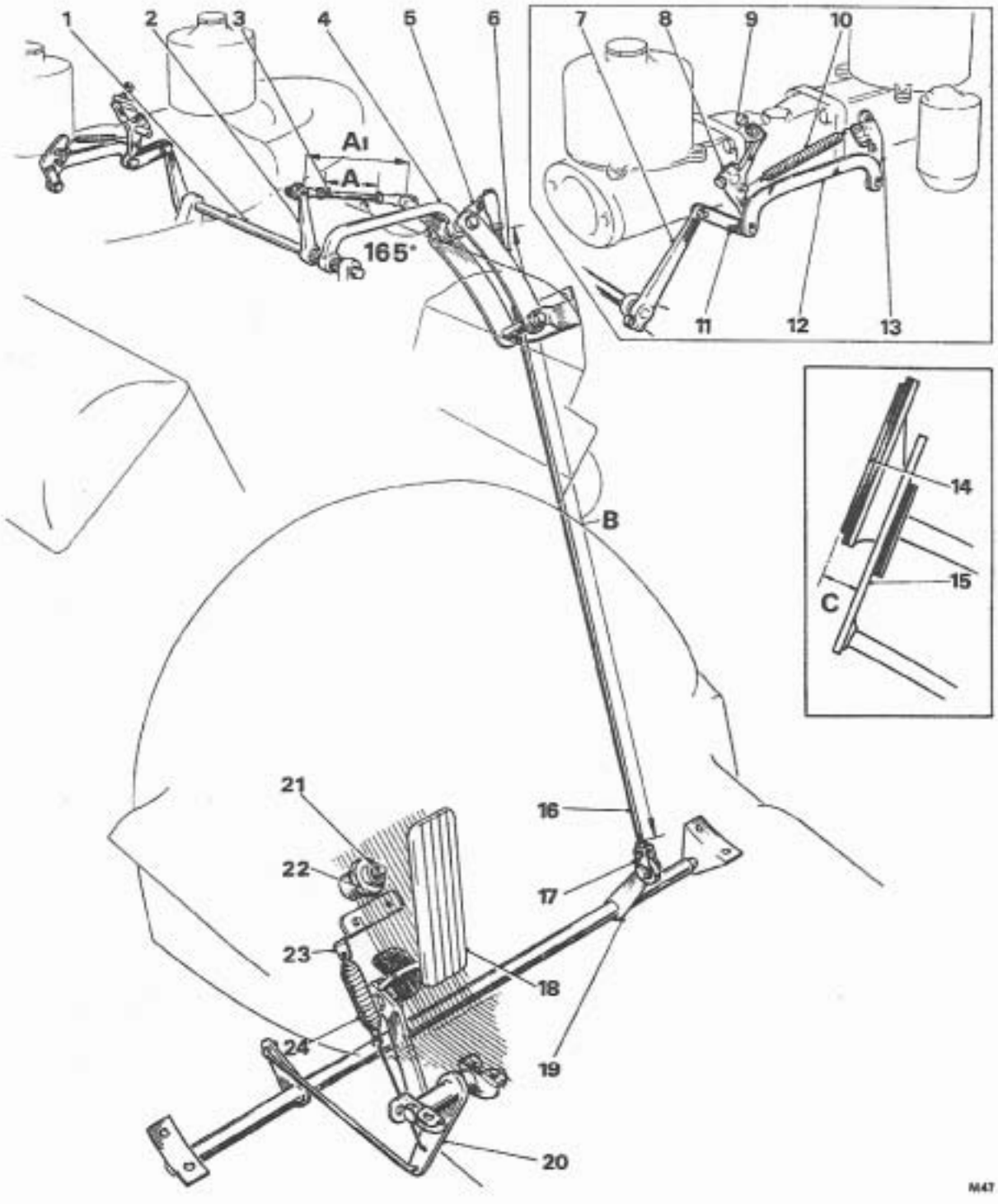

FIG. T139 THROTTLE CONTROL LINKAGE—EARLY LH DRIVE CARS

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FIG. T139 THROTTLE CONTROL LINKAGE—EARLY LH DRIVE CARS

A1 = 4·125 in. (10,478 cm.)
A = 2·175 in. (5,526 cm.)
B = 22·0 in. (55,88 cm.)
C = 0·250 in. to 0·500 in. (0,63 cm. to 1,27 cm.)
1 'A' Bank control shaft
2 Lever — 'A' Bank control shaft to control rod
3 Control rod — 'A' Bank manifold lever to fulcrum lever
4 Tie-rod
5 Fulcrum lever
6 Compensator link
7 Lever — manifold to carburetter
8 Throttle lever — 'A' Bank
9 Slow running throttle stop screw
10 Return spring
11 Coupling link (one link elongated when refrigeration is fitted)
12 Coupling link
13 Throttle lever — 'B' Bank
14 Brake pedal
15 Accelerator pedal
16 Control rod — accelerator to compensator linkage
17 Jaw
18 Accelerator pedal
19 Lever — accelerator pedal cross-shaft
20 Accelerator pedal lever
21 Kick-down button
22 Lock-nut
23 Bracket
24 Pull-off spring

8. If, in any position, the pin will not pass through the jaw and lever, adjust the length of the rod and use up the elongated hole in the jaw.

9. Finally, lubricate the clevis pin, fit the pin and secure it with a new split pin.

Neutral start and height control switches—To adjust

The neutral start and height control switches are housed in an aluminium case, fitted to the left-hand side of the transmission. The switches are actuated whenever Neutral or Park is selected. This enables the engine to be started either in Neutral or Park and also sets the height control to **fast** levelling.

To adjust the switches, proceed as follows.

1. Disconnect the white and red lead at the starter relay. The relay is fitted to the compensating linkage bracket at the rear of the engine compartment, at the right-hand side.

2. Unclip the rubber retainer then remove the left-hand valance plug from the socket. The plug and socket are secured to the valance, directly below the hydraulic system reservoir.

3. Connect a lamp and battery between the White/red lead and the White/black lead in the plug.

4. When either Neutral or Park is selected, the lamp should light.

5. Select Reverse and Drive. Ensure that the lamp does not light in either of these positions.

6. If necessary, adjust the switch actuating rod to obtain the correct lever position. Ensure that the 0·050 in. (1,27 mm.) clearance is maintained between the lever and the pedestal.

7. Remove the lamp and battery then connect the leads.

Accelerator pedal linkage—To adjust

Refer to Chapter K.

Transmission control switches

Initial production cars
Refer to this section.

Cars prior to Car Serial Number SRH 8742
Refer to Chapter K.

Cars from Car Serial Number SRH 8742 and onwards
Refer to Chapter K.

Initial production cars

The stator and detent solenoids in the transmission are actuated by three micro-switches which are in turn actuated by the engine throttle controls.

The damper and micro-switch assembly signals a change in stator blade angle. High angle is signalled when the throttle is closed and low angle is signalled when the throttles are just off the closed throttle stop.

The damper part of the assembly ensures that the throttles close slowly over the last few degrees of travel.

A second micro-switch actuates the stator solenoid also. This switch is operated by a cam on the manifold shaft lever and re-introduces the stator blade high angle at approximately 45 degrees of throttle opening.

The third micro-switch actuates the detent solenoid. This switch is operated at nearly full throttle by the 2 B.A. setscrew in the manifold shaft lever and signals a kick-down gearchange.

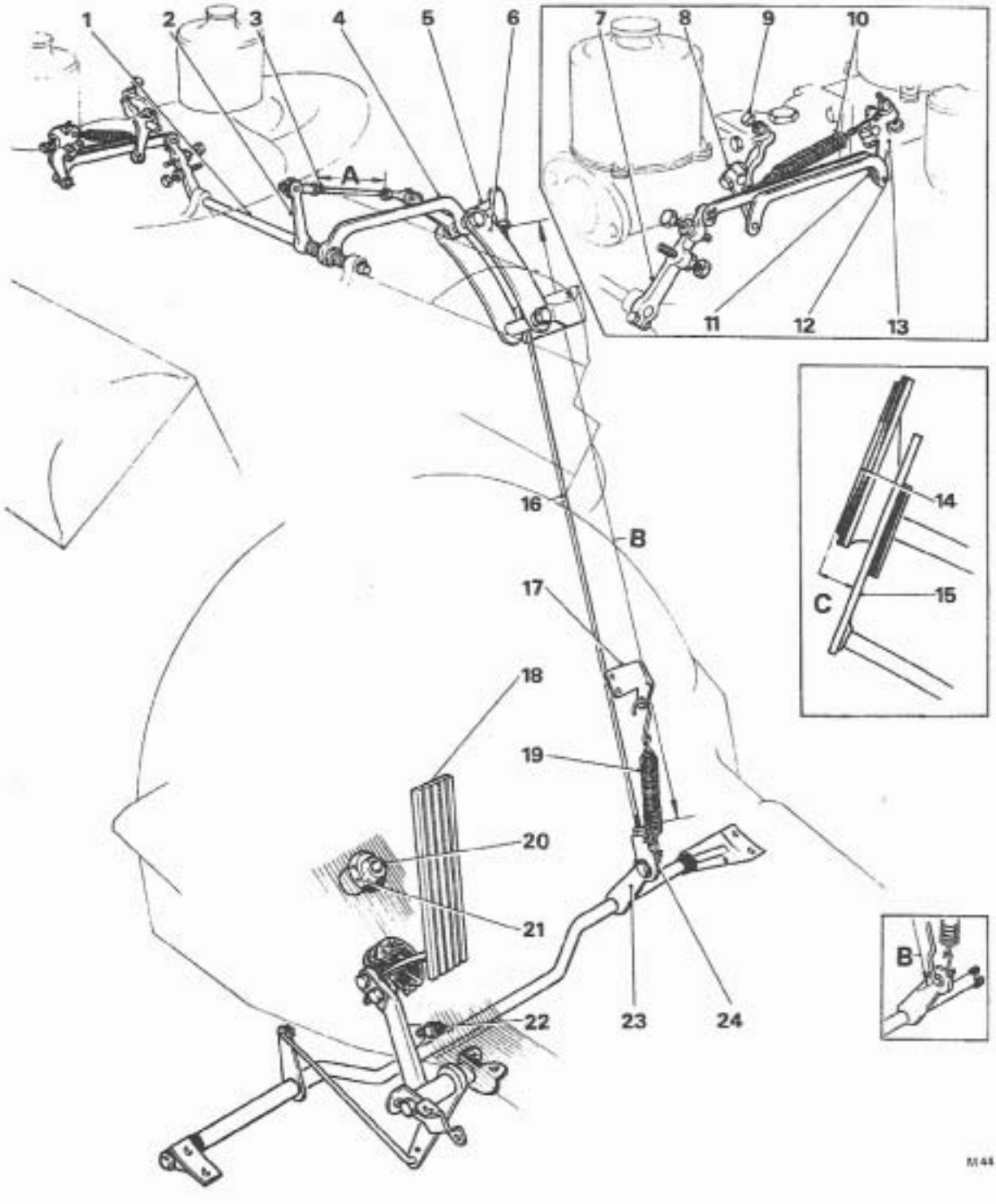

FIG. T140 THROTTLE CONTROL LINKAGE—LATE LH DRIVE CARS

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FIG. T140 THROTTLE CONTROL LINKAGE—LATE LH DRIVE CARS

A 2·265 in. to 2·300 in. (5,75 cm. to 5,84 cm.)
B 18·575 in. (47,18 cm.)
C 0·250 in. to 0·500 in. (0,63 cm. to 1,27 cm.)
1 'A' Bank control shaft
2 Lever — 'A' Bank control shaft to control rod
3 Control rod — 'A' Bank manifold lever to fulcrum lever
4 Tie-rod
5 Fulcrum lever
6 Compensator link
7 Lever — manifold to carburetter
8 Throttle lever — 'A' Bank
9 Slow running throttle stop screw
10 Return spring
11 Coupling link (one hole elongated when refrigeration is fitted)
12 Coupling link
13 Throttle lever — 'B' Bank
14 Brake pedal
15 Accelerator pedal
16 Control rod — accelerator to compensator linkage
17 Bracket
18 Accelerator pedal
19 Pull-off spring
20 Kick-down button
21 Lock-nut
22 Stop — accelerator pedal
23 Lever — accelerator pedal cross-shaft
24 Jaw

Assuming that the engine throttle controls have been correctly set and the choke and slow running controls are correct, proceed to adjust the micro-switches.

Damper and switch assembly

1. Disconnect the air ducting at the choke body end and move the ducting clear of the switches.
2. Disconnect the Yellow lead from the switch at its Lucar connector.
3. Connect one side of a test lamp to the Yellow lead and the other side to earth.
4. Switch on the ignition.
5. Ensure that the fast-idle cam is in the hot idling position (i.e. choke fully open).
6. Slacken the two $\frac{5}{16}$ in. U.N.F. nuts on the switch mounting spindle (*see Fig. T138*). Adjust the position of the switch and damper assembly so that the test lamp lights just before the throttle closes completely and extinguishes when the throttle is just clear of its off-stop. Tighten the nuts in this position.

Note The damper slows down the throttle during the last few degrees of movement as it is closing.
Allow time for the throttle to rest on its off-stop when determining the throttle closed position.

7. Switch off the ignition, remove the lamp and connect the Yellow lead.

Stator micro-switch

1. The stator micro-switch is non-adjustable.
2. It can be checked for correct operation by connecting a test lamp and checking to see if the lamp lights when the switch is contacted by the cam on the lever, with the ignition switched on.

Kick-down micro-switch

1. Disconnect the White/purple lead from the kick-down micro-switch.
2. Connect one side of a test lamp to the White/purple lead on the switch and the other side to earth.
3. Switch on the ignition.
4. Slacken the lock-nut on the 2 B.A. setscrew in the manifold lever shaft.
5. Adjust the 2 B.A. setscrew in the lever so that the test lamp lights when the lever is 0·025 in. (0,63 mm.) from the full throttle stop. Whilst carrying out this adjustment, ensure that the micro-switch has some over-travel when the lever is contacting the full throttle stop.
6. Tighten the 2 B.A. lock-nut.
7. Connect the air ducting.
8. Adjust the under-pedal kick-down button and full throttle stop so that the button must be depressed before kick-down is obtained. This should be done as follows.

Kick-down button—To adjust

Carburetter mounted micro-switch

1. Remove the floor covering from the toe board on the driver's side of the car. The kick-down button can be seen beneath the accelerator pedal.
2. Slacken the large lock-nut, then adjust the body by screwing it up or down as required; tighten the lock-nut.
3. When setting the kick-down, care must be taken not to confuse part throttle down-changes and stator changes with the forced down-change (kick-down).
4. If, when adjusting the kick-down button, its position is such that it is in danger of being hidden by the carpet, an improvement can be made by shorten-

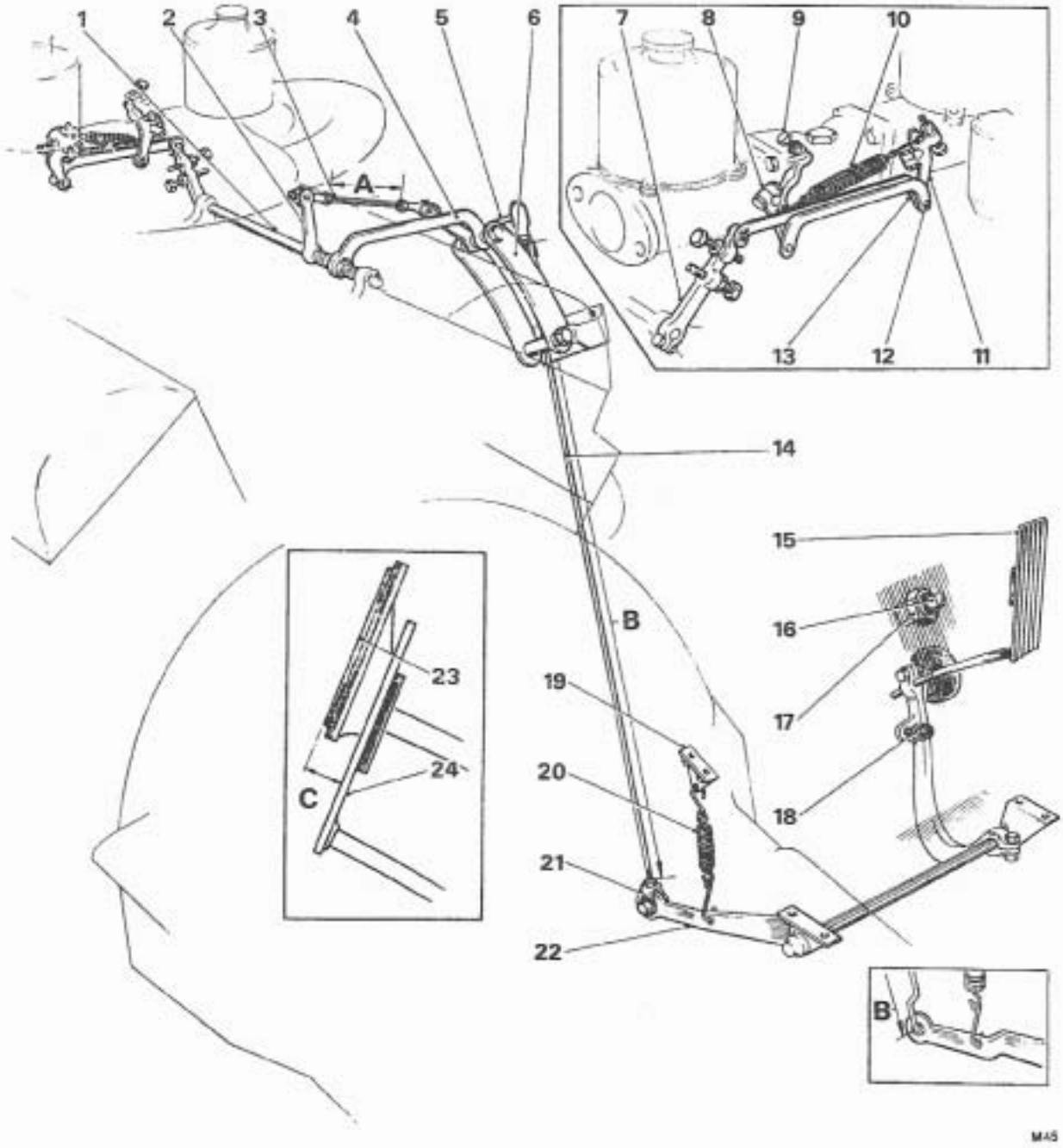

**FIG T141 THROTTLE CONTROL LINKAGE—
RH DRIVE CARS**

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FIG. T141 THROTTLE CONTROL LINKAGE— RH DRIVE CARS

A 2·265 in. to 2·300 in. (5,75 cm. to 5,84 cm.)
B 18·575 in. (47,18 cm.) inset 19·50 in. (50,00 cm.)
C 0·250 in. to 0·500 in. (0,63 cm. to 1,27 cm.)
1 'A' Bank control shaft
2 Lever — 'A' Bank control shaft to control rod
3 Control rod — 'A' Bank, manifold lever to fulcrum lever
4 Tie-rod
5 Fulcrum lever
6 Compensator link
7 Lever — manifold to carburetter
8 Throttle lever — 'A' Bank
9 Slow running throttle stop screw
10 Return spring
11 Throttle lever — 'B' Bank
12 Coupling link
13 Coupling link (one hole elongated when refrigeration is fitted)
14 Control rod — accelerator to compensator linkage
15 Accelerator pedal
16 Kick-down button
17 Lock-nut
18 Stop — accelerator pedal
19 Bracket
20 Pull-off spring
21 Jaw
22 Lever — accelerator pedal cross-shaft
23 Brake pedal
24 Accelerator pedal

ing the accelerator to compensator link control rod (*see Figs. T139, T140 and T141*). This will throw the pedal further away from the toe board, thus allowing the kick-down button to be raised.

5. The accelerator lever stop-bolt will have to be adjusted to suit.

6. Ensure that the closed throttle condition is still available.

Kick-down button—To adjust

Toe board mounted micro-switch

See Chapter K or Chapter U.

Stator and detent solenoid circuits— To check

The stator and detent solenoids can be checked for correct operation whilst the car is being driven on the road. This will enable the tester to determine whether or not the stator is changing its angle and also whether kick-down is obtainable at full throttle.

Stator solenoid—To check

1. Disconnect the White/brown lead from the Lucar connector on the solenoid case connector in the left-hand side of the transmission.

2. Connect a 12 volt test lamp between the lead and the connector. Position the test lamp so that it is visible from the driver's seat.

3. Drive the car and observe the test lamp.

4. The test lamp should light when the ignition is switched on and remain so until the accelerator pedal is moved sufficiently to 'crack' the throttles, then become extinguished above this speed.

5. At approximately 45 degrees of throttle opening the test lamp should again be illuminated and remain so regardless of any further throttle opening.

6. If the test lamp fails to light, check the solenoid micro-switch and controls for correct operation, and the circuit for continuity.

7. The solenoid itself can be checked by using a lamp and battery. Touch the solenoid case with one lead and the connector with the other lead; the lamp should light.

8. Remove the test lamp and connect the stator lead.

Detent solenoid—To check

All cars

1. Disconnect the White/green lead from the case Lucar connector.

Note On early cars the detent lead is White/purple. Connect a test lamp between the lead and the connector.

2. Drive the car in Drive range – third gear at a speed below approximately 70 m.p.h. (113 k.p.h.).

3. Depress the accelerator pedal so that the detent button on the toe board is felt. Press the pedal further to move the button. The lamp should light as the solenoid enforces the down-change.

4. If the lamp does not light, check the micro-switch and the controls for correct operation, also check the circuit for continuity.

5. The solenoid can be checked in a similar manner to the stator solenoid.

6. Check the detent lead inside the transmission case.

Checking controls with test box RH 7932

If actuator test box RH 7932 is available it can be used to check both the stator and detent solenoids as well as selecting the gear range positions. Proceed as follows.

1. Remove the stator and detent leads from the case connector, then position the test box where it can be seen by the driver.
2. Fit the stator and detent leads from the test box to the Lucar connections on the case connector. Ensure that the leads are correctly positioned.
3. Fit the transmission detent and solenoid leads onto the pick-a-back connectors on the test box leads.
4. Remove the multi-pin plug from the electric gearchange actuator and fit the plug from the test box in its place.
5. Pick up a positive power supply from the facia of the car (an old cigar lighter suitably wired would suffice) and connect it to the inlet side of the test box.
6. The transmission will then be isolated from the selector switch on the column and all the selector positions can be obtained by selecting the appropriate range as shown by the marked dial on the test box cover.
7. Drive the car and check the selection of the gear ranges and the operation of the stator and detent solenoids by observing the lamps on the test box.
8. The gearchange actuator can be checked by inserting the test box between the actuator and the feed from the multi-pin plug. The car multi-pin plug must be fitted to the test box, and the test box plug fitted to the actuator.
9. By operating the switch on the box and observing the lamps, the actuator can be operated and checked for correct operation.

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Section T6
REMOVAL OF UNITS

Removable units—Transmission in car

The following units can be removed from the transmission without the transmission being removed from the car.

The removal procedure for all the units is described in the appropriate section, with the exception of the pressure regulator valve, details of which are included in this Section.

1. Gearchange actuator (*see Section T7*).
2. Neutral start and height control switches (*see Section T7*).
3. Vacuum modulator and valve (*see Section T11*).
4. Governor assembly (*see Section T12*).
5. Speedometer drive (*see Section T13*).
6. Sump, strainer and intake pipe (*see Section T14*).
7. Control valve unit (*see Section T15*).
8. Rear servo (*see Section T16*).
9. Detent solenoid, connector, control valve spacer and front servo (*see Section T17*).
10. Rear extension (*see Section T18*).
11. Control rods, levers and parking linkage (*see Section T20*).

Pressure regulator valve—To remove (Transmission in car)

The current type of pressure regulator valve is a solid type and does not contain oil holes and an orifice cup plug as previous pressure regulator valves. This solid type of valve must only be used in the pump cover with the squared pressure regulator boss (*see Fig. T142*).

The previous pressure regulator valve with the oil holes and orifice cup plug can be used to service either type of pump cover.

1. Run the car onto a ramp or over an inspection pit. Drain the oil from the sump.
2. Remove the sump as described in Section T14.
3. Withdraw the intake pipe and strainer assembly.
4. Remove and discard the intake pipe 'O' ring.
5. Remove the setscrew which secures the detent roller spring; remove the spring and roller.
6. Slacken the lock-nut which secures the detent lever to the manual shaft.

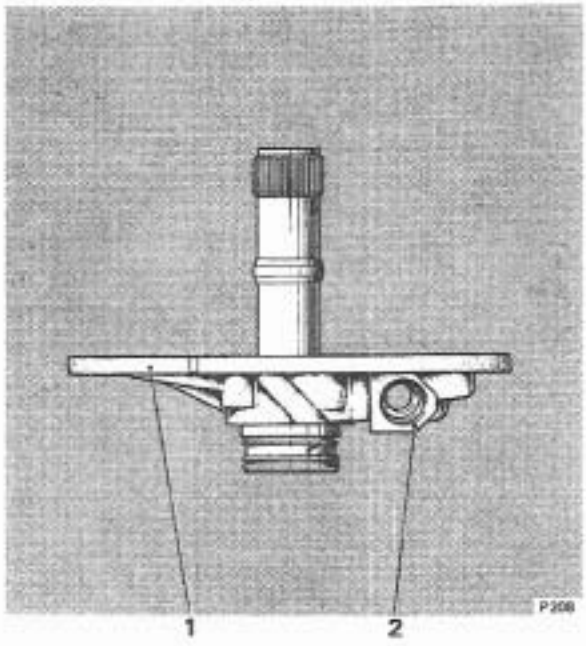

FIG. T142 SOLID TYPE REGULATOR VALVE

1 Regulator valve
2 Squared-off pressure regulator boss

FIG. T143 REMOVING THE PRESSURE REGULATOR VALVE

1 Rod
2 Sleeve
3 Circlip
4 Circlip pliers

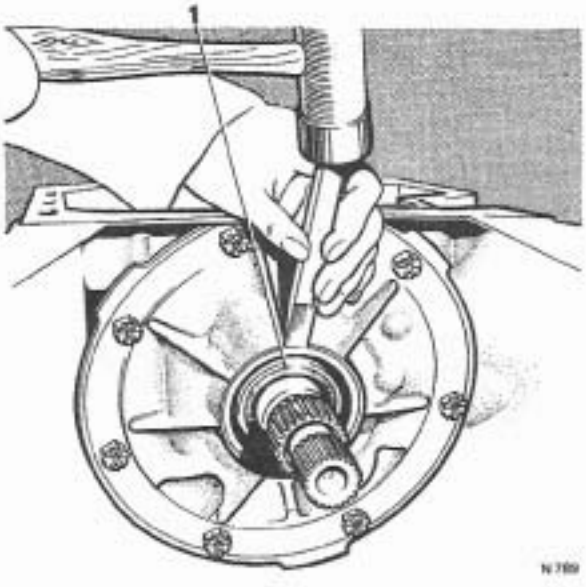

FIG. T144 REMOVING THE OIL PUMP SEAL

1 Oil seal

7. Remove the manual shaft pin from the case.
8. Remove the gearchange lever from the manual shaft.
9. Prise the detent lever from the manual shaft then remove the parking actuator rod and detent lever.
10. Ensure that the manual valve does not slide out of its bore in the control valve unit.
11. Push the manual shaft through the bore in the case in order to gain access to the pressure regulator valve bore.
12. Using a screwdriver or a steel rod, push the regulator boost valve sleeve against the pressure regulator spring (*see Fig. T143*).

Caution The pressure regulator spring is under extreme pressure and will force the valve sleeve out of its bore when the circlip is removed unless the sleeve is firmly held.

13. Continue to exert pressure on the valve sleeve then remove the circlip. Gradually relax the pressure on the valve sleeve until the spring pressure is released.
14. Carefully remove the regulator boost valve sleeve and valve, then withdraw the regulator spring.
15. Take care not to drop the valves, as they will fall out if they are not held.
16. Remove the pressure regulator valve and spring retainer. Remove the spacers (if fitted).

Pressure regulator valve—To fit

Before fitting, wash and examine all parts as described in Section T19.

1. Fit the spring retainer onto the pressure regulator spring. Fit any spacers which were previously removed.
2. Fit the pressure regulator valve onto the spring, stem end first.
3. Fit the boost valve into the sleeve with the valve stem outward then hold together all the parts so that the pressure regulator spring is against the valve sleeve.
4. Fit the complete assembly into the pressure regulator valve bore, taking care that the parts do not fall during the operation.
5. Using a screwdriver or a steel rod, push the regulator boost valve sleeve against the regulator spring pressure until the end of the sleeve has passed beyond the circlip groove.
6. Fit the circlip then relax the pressure on the sleeve.

Note To facilitate fitting the circlip, encircle it around the screwdriver or steel rod, compress the circlip, then push it upward into the groove in the valve bore.

7. Fit the parking actuator rod and the detent lever, ensuring that the rod plunger is under the parking brake bracket and over the parking pawl.
8. Slide the manual shaft into the case and through the detent lever.
9. Fit the gearchange lever.
10. Fit the lock-nut onto the manual shaft. Torque tighten the nut.
11. Ensure that the manual valve is engaging with the pin on the detent lever.
12. Retain the manual shaft with the pin. Straighten the pin to lock it in position.
13. Fit the detent spring and roller assembly; torque tighten the setscrew.
14. Fit the intake pipe and strainer assembly and the sump as described in Section T14.
15. Top-up the transmission with an approved fluid as required.

Oil pump seal—To renew

1. Remove the transmission from the car (*see Section T9*).
2. Carefully drive the point of a chisel under the lip of the seal then prise the seal out of the pump body (*see Fig. T144*).
3. Before fitting a new seal, ensure that the body bore is clean and free from burrs and that the garter ring is on the seal.
4. Check the finish of the converter neck and the bearing surface in the pump body.

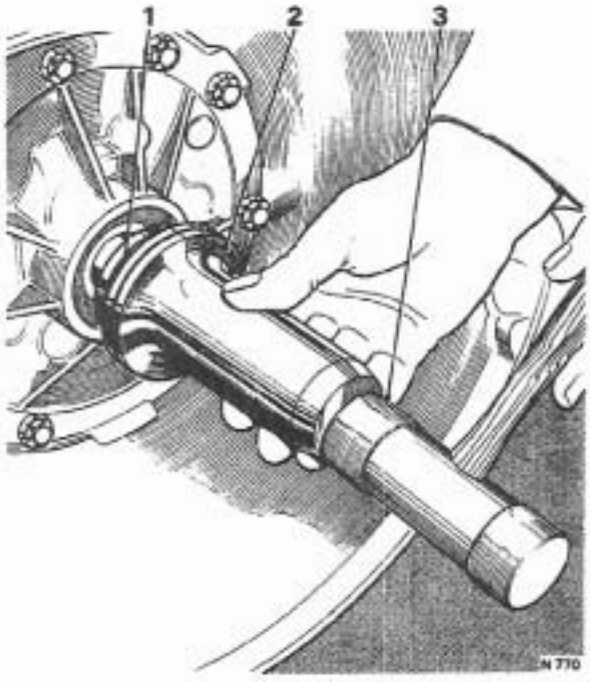

FIG. T145 FITTING THE OIL PUMP SEAL

1 Oil seal
2 Seal fitting tool
3 Mallet

5. Lightly smear the outer edge of the seal case with 'Wellseal' then fit the seal to the pump using tool RH 7953 (J–21359) as shown in Figure T145.
6. Fit the transmission to the car (*see Section T9*).

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Section T7
GEARCHANGE ACTUATOR, NEUTRAL and HEIGHT CONTROL SWITCHES

The electric gearchange actuator (*see Figs. T146 or T147*) is mounted on a bracket secured to the transmission rear extension.

When the ignition is switched on and the selector lever on the steering column is moved to one of the gear range positions, current is allowed to flow to the actuator motor via a relay.

The motor rotates and turns the worm shaft through the flexible coupling. As the worm gear rotates, the slip ring which is secured to the worm gear also rotates until an insulated slot in the slip ring is aligned with the live contact. When this position is reached, the current is cut off and the motor ceases to rotate.

The electric actuator is wired so that should the driver stop the car in a gear range other than Park then switch off the ignition, he can still lock the transmission by moving the selector lever on the steering column to the parking 'P' position.

Having done this, if he then moves the lever out of this position, or if the lever is accidentally moved to a drive position, the actuator will not respond until the ignition is switched on again.

The neutral start switch is actuated only when the transmission is in Neutral or Park; the engine cannot be started until the micro-switch is in its operating position. Also actuated when in Neutral or Park is the height control switch which selects fast levelling whilst the car is stationary (*for information concerning the operation of the levelling switch see Chapter G – Section G9 – Solenoid valve – T.S.D. 2476 Workshop Manual*).

Actuator—To test
(Cars prior to car serial number SRX 9001)

The two tests described are designed to prove if a fault lies within the gearbox actuator or elsewhere in the gearchange electrical circuit.

The first test is designed to discover whether the pins of the actuator loom socket receive the correct electrical signal in sequence, as dictated by the position of the gear range selector lever.

1. Ensure that the gearchange thermal cut-out switch on the distribution board (fuse panel) has not cut-out. This can be done by depressing the Red button. The position of the button will not change whether the switch has tripped or not, however a tripped switch will click on pressing the button.
2. Ensure that fuse number 12 is intact.
3. Disconnect the low tension wire from the distributor and turn the ignition switch to the 'on' position.
4. Slightly loosen the actuator loom socket and check the actuator function. This will reveal any poor contact which may exist between the plug and socket.
5. Unscrew and withdraw the loom socket from the plug of the gearchange actuator.
6. Connect the negative side of a suitable voltmeter to a good earth point. The positive side should be connected in turn to the various pins of the loom socket (*see Test Chart — Actuator Socket*).
7. Move the gear range selector lever to the 'Reverse' position and check that all the pins of the

loom socket are of the correct polarity or are neutral, as indicated in the 'Test Chart'.

Note Each pin in the socket is identified by a letter which is moulded in the rubber body adjacent to each pin.

8. Carry out the above operation in each of the gear range selector lever positions, checking each pin in turn with the information given in the 'Test Chart'.

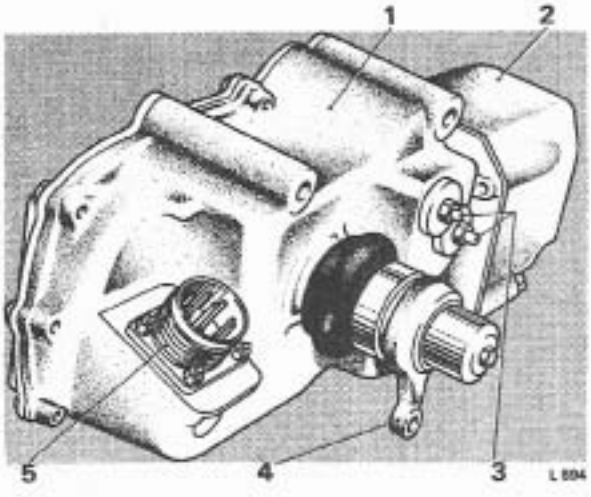

FIG. T146 ELECTRIC GEARCHANGE (Cars prior to Car Serial number SRX 9001)

1 Actuator casing
2 Motor cover
3 Solenoid securing nuts
4 Actuating lever
5 Plug socket

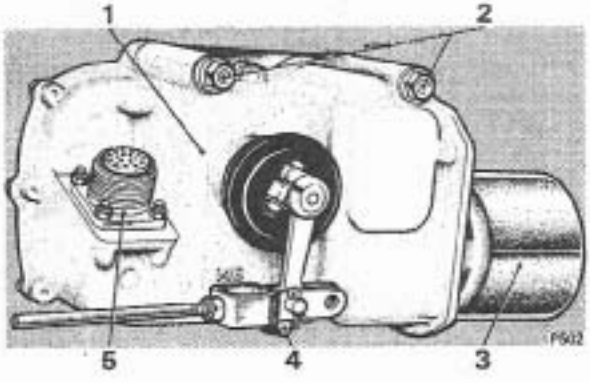

FIG. T147 ELECTRIC GEARCHANGE ACTUATOR (Car Serial Number SRX 9001 and onwards)

1 Actuator casing
2 Actuator securing bolts
3 Motor cover
4 Actuating lever
5 Plug socket

9. Switch off the ignition and ensure that pin number G of the actuator socket is now neutral.

10. Reconnect the socket to the actuator and refit the distributor low tension cable.

Note If an incorrect reading is obtained during any of the above tests, this will indicate that the gearchange circuit is probably at fault and not the actuator.

It should be noted that the voltage readings obtained must not be more than 0·25 Volts less than the battery voltage. However, if the test sequence does not reveal a discrepancy, then the fault may be either inside the transmission actuator or in the transmission and neutral start switch linkage.

Before removing the actuator the transmission linkage should be disconnected from the actuator output lever and checked for excessive stiffness.

The transmission linkage should move into any gear when a load of approximately 10 lb. (4,53 kg.) is applied to the disconnected rod.

If the linkage operation is satisfactory then it will be necessary to remove, recondition and test the actuator as described later in this Section.

After fitting the reconditioned actuator to the car, it should be finally tested as follows.

1. Disconnect the earth cable from the battery negative terminal, or from the boot quick release terminal when fitted.

2. Connect an ammeter capable of reading at least 20 Amps. between the battery negative terminal and the loose end of the earth cable.

3. Ensure that all accessories such as the rear window demister and blower motors are switched off and then switch on the ignition. Note the reading shown on the ammeter.

4. Move the gear range selector lever between 'Neutral' and 'Reverse' gear positions and check that the extra reading on the ammeter caused by the operation of the actuator does not exceed 10 Amps.

5. Check that the actuator moves smoothly and quietly to each position selected and that the output lever stops in the correct position and does not 'hunt' about that position more than once before finally stopping.

6. Remove the ammeter and connect the battery negative cable.

Actuator—To Test (Car serial number SRX 9001 and onwards)

The gearbox actuator contains a series of cams which operate micro-switches to fulfil the functions of the neutral start switch, the fast levelling switch and the Park anti-theft switch. In view of this, the test procedures for the actuator and for the switch circuits have been segregated.

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TEST CHART — ACTUATOR SOCKET
(Cars prior to Car Serial Number SRX 9001)

Socket Pin No.	Gear Range Lever Position						General Notes
	P	R	N	D	I	L	
A	N	N	Pos	N	N	N	
B	Pos	N	N	N	N	N	
C	N	N	N	Pos	N	N	
D	N	N	N	N	Pos	N	
E	N	N	N	N	N	Pos	
F	N	Pos	N	N	N	N	
G	Neg	Neg	Neg	Neg	Neg	Neg	This pin is Negative when the ignition is ON, and Neutral when the ignition is OFF.
H	Pos	Pos	Pos	Pos	Pos	Pos	This pin is directly connected to the thermal cut-out switch.
I	Neg	Neg	Neg	Neg	Neg	Neg	This pin is fixed to the valance earth point.

Key

Pos. Common with the battery positive terminal
Neg. Common with the battery negative terminal
N Neutral — no connection to either battery terminal

Test procedure for micro-switch circuits

Before conducting these tests ensure that fuse number 11 and 12 are intact.

Switch the ignition on.

Battery voltage should now be available at pin 'T' of the loom socket.

'Park' anti-theft switch circuit

1. Using a suitable length of cable connect pin 'P' of the actuator loom socket to earth. This action should produce an audible 'click' as the anti-theft relay at the rear of the switchbox operates.

'Neutral' start switch circuit

1. Place the gear range selector lever in the 'Neutral' position.
2. Check that each time the ignition key is turned to the 'Start' position, battery voltage is available at pin 'S' of the loom socket.
3. Repeat operation 2 with the gear range selector lever in the 'Park' position.
4. Disconnect the thin Brown cable from the 'Lucar' connector of the starter motor solenoid.
5. Using a suitable length of cable connect pins 'S' and 'K' together. The starter relay on the longeron should now operate each time the ignition key is turned to the 'Start' position.
6. Fit the Brown cable to the starter motor solenoid.

'Fast level' switch circuit

1. Using a suitable length of cable connect pins 'T' and 'J' together. This action should cause the fast levelling solenoid to operate.

If a fault is discovered in the switch circuits during any of the three tests, the fault should be traced and rectified and the test repeated.

If no fault is evident in the switch circuits this would indicate that the actual switches in the gearbox actuator are in need of adjustment or renewal.

The procedure for renewal and/or adjustment of these switches is illustrated in Figure T157.

Actuator test

1. Ensure that the gearchange thermal cut-out switch on the distribution board (fuse panel) has not cut-out. This can be done by depressing the red button on the thermal cut-out switch.
2. Disconnect the low tension cable from the distributor and turn the ignition switch to the 'on' position.
3. Slightly loosen the actuator loom socket and re-check the actuator function. This will reveal any poor contact which may exist between the plug and the socket.
4. Unscrew and withdraw the loom socket from the plug of the gearbox actuator.
5. Move the gear range selector lever to the 'Park'

TEST CHART — ACTUATOR SOCKET
(Car Serial Number SRX 9001 and onwards)

Socket Pin No.	Gear Range Lever Position						General Notes
	P	R	N	D	I	L	
A	N	Pos	N	N	N	N	
B	N	N	Pos	N	N	N	
C	N	N	N	Pos	N	N	
D	N	N	N	N	Pos	N	
E	N	N	N	N	N	Pos	
F	Neg	Neg	Neg	Neg	Neg	Neg	This pin is Neg. when ignition is switched ON and Neutral when ignition is OFF.
H	Neg	Neg	Neg	Neg	Neg	Neg	This pin is permanently connected to earth.
M	Pos	N	N	N	N	N	
N	Pos	Pos	Pos	Pos	Pos	Pos	This pin is connected to the thermal cut-out switch.

Key
Pos. Common with the battery Positive terminal
Neg. Common with the battery Negative terminal
N Neutral — no connection to either terminal

position and check that the pins of the actuator loom socket are of the correct polarity or are neutral. (*see Test Chart — Actuator Socket*).

Note Each pin in the socket is identified by a letter which is moulded into the rubber body adjacent to each pin.

6. Carry out Operation in each of the gear range selector lever positions checking each pin in turn with the information given in the chart.

7. Switch off the ignition and ensure that pin 'F' is now neutral.

8. Connect the socket to the actuator and fit the distributor low tension cable.

Note If an incorrect reading is obtained during any of the above tests, this will indicate that the gearchange circuit is at fault and not the actuator.

It should also be noted that the voltage reading obtained must not be more than 0·5 Volt less than the battery voltage. However, if the test sequence does not reveal a fault then the problem must be caused by a fault within the transmission actuator.

Before removing the actuator, the gearbox linkage should be disconnected from the actuator output lever and checked for excessive stiffness.

The transmission linkage should move into any gear when a load of approximately 10 lbs. (4,53 kg.) is applied to the disconnected rod.

If the linkage operation is satisfactory then it will be necessary to remove, re-condition and test the actuator as described later in this section.

After fitting the reconditioned actuator to the car, it should be finally tested as follows.

1. Disconnect the earth cable from the battery.
2. Connect an ammeter capable of reading at least 15 amps between the battery negative terminal and the loose end of the earth cable.
3. Ensure that all accessories such as the rear window demister and blower motors are switched off and then switch on the ignition. Note the reading shown on the ammeter.
4. Move the gear range selector lever progressively through each gear position and check that the extra reading on the ammeter caused by the operation of the actuator does not exceed 7·50 amps.
5. Check that the actuator moves smoothly and quietly to each position selected and that the output lever stops in the correct position and does not 'hunt' about that position before finally stopping.
6. Remove the ammeter and reconnect the battery negative cable.

Gearchange electric actuator—To remove (All cars)

Should the electric gearchange actuator fail to operate it should be noted that the system includes a thermal cut-out. This device prevents the motor from being

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overloaded should the gearchange linkage become obstructed and as a result, gives the impression of actuator failure.

Before removing the actuator, ensure that the controls are free and adequately lubricated, also that the actuator electrical system is cool enough for the thermal cut-out to permit the motor to operate. Press the reset button in the main fuse box to reset the cut-out.

It is recommended that the easiest and quickest method of dealing with actuator failure, is by substituting the faulty actuator for a service exchange unit. If a service exchange unit is not obtainable but adequate repair facilities are available, proceed as follows.

1. Disconnect the negative lead from the battery situated in the luggage compartment.
2. Remove the split pin and clevis pin from the actuating lever on the electric actuator; disconnect the rod from the lever.
3. Unscrew and remove the 'multi-pin' plug.
4. Disconnect the breather pipe from the governor cover plate and the actuator side cover.
5. Remove the three bolts which secure the actuator to the rear extension bracket then remove the actuator.

Gearchange electric actuator—To fit (All cars)

1. Fit the actuator to the rear extension of the transmission.
2. Torque tighten the bolts.
3. Fit the 'multi-pin' plug and tighten the knurled nut.
4. Fit the breather pipe to the actuator cover and to the top rearmost setscrew of the governor cover plate.

Cars produced after Car Serial Number SRX 3254 — **other than Coachbuilt** and CRH 3399 — **Coachbuilt** are fitted with a modified actuator breather system.

Originally, the breather system consisted of a steel breather pipe which connected the actuator to atmosphere. The modified system, incorporates a flexible plastic tube as an extension to the early system and connects the open end of the steel breather pipe to an adapter in the cross-member.

It is **essential,** that the **early** type of system is vented to atmosphere at the end of the steel pipe and that the **later** type of system is connected to the adapter in the cross-member by the flexible pipe.

Gearchange electric actuator—To dismantle (Cars prior to car serial number SRX 9001)

1. Unscrew the setscrew in the centre of the actuating lever cover then remove the cover.
2. Using spring compressing tool (RH 7843) compress the coil spring sufficiently to enable the hardened steel pin to be removed; drive out the pin.
3. Remove the spring compressing tool then withdraw the operating lever, spring and spring retaining cup from the shaft.
4. Remove the nuts and washers which secure the side cover to the main casing; remove the cover.

Note The cover gasket is sealed initially with jointing compound on both sides, as a result, the cover may not be easily removable. Use a hardwood wedge to loosen the cover. Do **not** use a screwdriver between the joint faces in an effort to remove the cover as this may cause damage to the joint faces and destroy the waterproofing effect. Discard the gasket.

5. Disconnect the motor feed to the relays.
6. Disconnect the leads from the motor earth and solenoid feed.
7. Remove the four nuts which secure the motor cover to the main casing; remove the cover.
8. The gasket is sealed with jointing compound and care should be taken when removing the cover.
9. Discard the gasket.
10. Withdraw the motor from the four long studs. The motor is secured to a mounting plate and this will be removed with the motor.
11. Remove the rubber grommet and withdraw the leads.
12. Discard the gasket.
13. Remove the coupling dog from the motor output shaft.
14. Remove the flexible rubber coupling from the brake drum.
15. Remove the nuts and washers which secure the motor to its mounting plate.

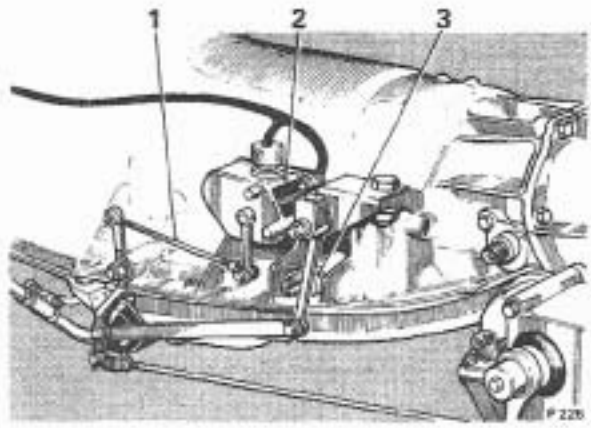

FIG. T148 DETENT AND STATOR SOLENOID CONNECTIONS (INITIAL PRODUCTION CARS)

1 Link rod
2 Micro-switch casing
3 Detent and stator solenoid connections

16. Remove the motor from the mounting plate, withdraw the leads from the grommet and through the hole in the plate.
17. Remove the nuts and washers which secure the plug leads to the connection on the insulated base plate; detach the leads from the connections.
18. Unscrew the nuts and washers which secure the plug assembly to the actuator casing.
19. Remove the plug and withdraw the leads from the casing; retain the rubber gasket which fits between the casing and the plug.
20. Remove the nuts and washers which secure the insulated base plate to the main casing. Carefully lift the base plate from the studs.

Note Care should be exercised when handling the baseplate assembly to avoid damaging the relays and contacts.

21. Using tool (RH 7841) remove the roll pin which secures the brake drum to the worm shaft. Push the pin through the drum and shaft until it can be removed; discard the pin.
22. Remove the drum from the worm shaft. It will be necessary to hold the brake shoe away from the drum whilst the drum is being removed.
23. Mark the top of the brake shoe in pencil to facilitate correct assembly.
24. Unscrew the dome nuts which secure the brake solenoid assembly to the main casing; remove the cup washers and the rubber washers. Remove the assembly from the casing.
25. Secure the brake shoe assembly and spring to the solenoid with adhesive tape to retain them as a unit.
26. Remove the circlip and washers from the outer side of the seal which fits over the actuator casing and around the output shaft; remove the seal.
27. Remove the circlip which locates the output shaft and slip ring assembly in the main casing then remove the washer.
28. Withdraw the slip ring and shaft from the bush in the actuator casing; remove the washer from the shoulder behind the slip ring.
29. Remove the circlip which locates the worm shaft and bearings in the actuator casing.
30. Remove the adjusting washer and label it to ensure that the correct washer is fitted during assembly.
31. Gently tap the worm shaft and the bearings from the casing. The bearings are a push fit in the casing bores and no difficulty should be experienced when removing them.

It is recommended that no further dismantling of the actuator be attempted. If necessary, the following components should be renewed as separate assemblies, the base plate, plug, brake shoe, solenoid, brake solenoid and the output shaft and slip ring. The motor should be renewed as an assembly also although it may be dismantled for inspection.

Gearchange electric actuator—To dismantle (Car serial number SRX 9001 and onwards)

It should be noted that there are differences between the actuators fitted to cars with or without Automatic Speed Control. The differences are in the type and terminations of the micro-switches and in one of the cables to the height control switch.

1. Disconnect the transmission linkage, the actuator loom plug and breather pipe; then remove the actuator from the car.
2. Remove the eight 2 B.A. nuts and washers and carefully withdraw the side casing.
3. Remove the 0·250 in. (6,35 mm.) nut and washer and withdraw the cam noting the relative position between the cam and the output lever.
4. Disconnect all terminals on the contact plate, the dual relay and the micro-switches.
5. Remove the four 3 B.A. nuts and withdraw the contact plate. It should be noted that on early actuators, two of the four studs are sleeved and these sleeves should be removed together with the contact plate.
6. Remove the nuts and bolts which secure the micro-switches and the dual relay to the contact plate. Discard the micro-switches, relay and contact plate.
7. Slacken the clamping bolt and remove the output lever.
8. Remove the washer and rubber boot; discard the boot.
9. Remove the circlip and thrust washer.
10. Withdraw the slip ring and gear assembly from the actuator case.
11. Remove and discard the contact segments from the slip ring.
12. Remove the three 0·250 in. (6,35 mm.) setscrews from the side of the actuator casing and carefully remove the motor assembly and drive collars. Remove the sealing ring from the actuator case.
13. Remove the internal circlip holding the bearing into the case and push the wormshaft and bearings out of the casing.
14. Remove the loom socket from the actuator casing.

Note It will now be necessary to inspect and prepare certain components for re-use.

Gearchange electric actuator—To inspect (All cars)

1. Examine the magnesium casing for cracks or other damage.
2. Ensure that the joint faces are clean and free from burrs.
3. Wash the gearchange operating lever, spring and covers in clean paraffin then examine them for general wear.

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4. Ensure that the breather pipe is clear and free from damage.
5. Examine the driving dog slot for excessive wear, also the mating shaft on the drive end of the motor armature shaft. The dog should be an easy sliding fit on the shaft but without excessive side play.
6. Examine the general condition of the plug assembly.
7. Ensure that no strands of wire are broken where they enter the pins. In the event of the plug being considered unserviceable, it is recommended that the whole assembly be renewed, rather than an individual connection. Special crimping tools and 'Cannon' insert tools are required for assembly purposes and unless these are available the work should not be attempted.
8. Examine the eight spring contacts for security on the insulated base.

Care must be exercised when handling the assembled base plate so that the contacts and the relays are not damaged in any way.

9. Check the height of the contacts from the base plate. The contact point should be approximately 0·485 in. (12,3 mm.) from the contact (lower) side of the base. If excessive wear has occurred on the contact points the base assembly should be renewed.
10. If the dual relay assembly is faulty, it is recommended that a new assembly be fitted rather than attempt rectification. The relays are precision units and are accurately set to give the correct operating times. The spring-loaded adjusting screw is set during the initial build of the relay and the setting should not be altered.
11. Ensure that the terminals and the terminal blocks are secure on the insulated base.

Cars prior to car serial number SRX 9001

12. Examine the brake drum for scoring or damage. The brake drum should be a push fit on the worm shaft. If the drum is slack on the shaft, examine the drum bore and the shaft for signs of fretting.
13. Remove the adhesive tape from the brake shoe and solenoid assembly.
14. Ensure that the assembled plunger and brake shoe will slide freely into the solenoid.
15. If either the brake shoe assembly or the solenoid is unserviceable they should not be renewed separately. The components are tested as one complete assembly during initial build and must remain as such, unless equipment is available that will enable separate assemblies to be tested and 'paired' (*see Dimensional Data at the end of this Section*).
16. Examine the brake linings for wear.

(All cars)

17. Examine the general condition of the wiring.
18. If the components are satisfactory, retain them with adhesive tape until they are required for final assembly.
19. Check the tightness of the four 5 B.A. screws which secure the slip ring assembly to the shaft.
20. Ensure that a 0·025 in. (0,64 mm.) air gap exists on each side of the silver plated segments which are secured to the slip ring.
21. Ensure that the edges of the slip ring around the air gap are free from burrs.
22. Examine the slip ring face for signs of tracking. This should not normally occur but, if signs of tracking are found, the slip ring assembly must be renewed.
23. Examine the teeth on the worm gear and the worm for damage or uneven wear.
24. Examine the ball bearing bores in the main casing for signs of fretting. The bearing should be a light push fit in the casing. Reject the casing if the push fit cannot be obtained.
25. Examine for wear the bush which supports the output shaft. The shaft should be a running fit in the bush, without excessive clearance i.e. the shaft should not rock in the bush (*see Dimensional Data at the end of this Section*).

Actuator socket and cable assembly

1. Inspect the cables where they enter the pins of the plug.
2. Ensure that no corrosion exists and that none of the individual cable strands are broken.

Actuator casing

1. Inspect all the sealing faces and the actuator casing and the side cover.
2. Remove all traces of sealing joint and sealing compound.

Wormwheel

1. Inspect the wormwheel for abnormal wear of the teeth.

Wormshaft bearings

1. Inspect the bearings for undue wear or signs of roughness when rotated.

Gearchange electric actuator—To assemble (Cars prior to car serial number SRX 9001)

1. Wash the bearings and shaft assembly in clean paraffin (kerosene) then dry them with compressed air.
2. Lightly lubricate the bearings with Esso Beacon grease.
3. Ensure that the actuator casing is clean and dry, then fit the shaft and bearings. Do not use force to fit the bearings to the casing.
4. Fit the adjusting washer and the circlip.
5. Mount a dial test indicator so that the plunger rests on the end of the worm shaft (*see Fig. T149*).
6. Move the worm shaft backward and forward, noting the clock reading. If necessary, adjust the

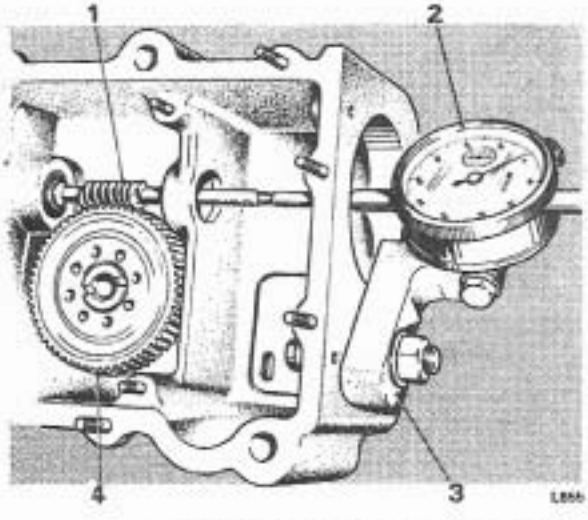

FIG. T149 CHECKING WORM SHAFT END FLOAT

1 Worm shaft
2 Dial indicator gauge
3 Gauge arm
4 Slave gear

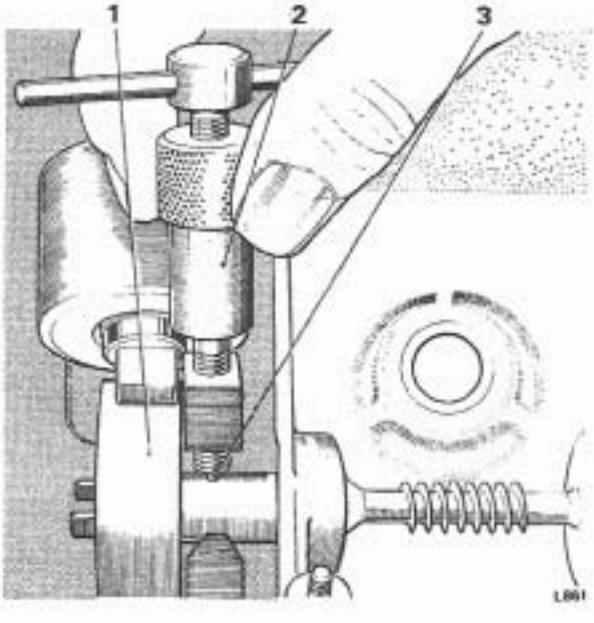

FIG. T150 FITTING THE BRAKE DRUM ROLL PIN (EARLY CARS)

1 Brake drum
2 Tool
3 Roll pin

washer to give an end float of between 0·002 in. and 0·005 in. (0,05 mm. and 0,13 mm.). It should be appreciated that the bearings must be no more than a light push fit in the casing to achieve this end float (*see Dimensional Data at the end of this Section*).

7. Ensure that both the output shaft and the porous bronze bush are clean; **do not wipe the bush with a degreasing agent.**

8. Lightly lubricate the shaft with Shell Tonna E oil. Fit a washer over the shaft then fit the shaft into the bush in the casing.

9. Fit a washer over the end of the output shaft then to the circlip.

10. Lightly lubricate the nylon worm gear with Esso Beacon grease.

11. Fit the rubber seal to the casing. A light smear of Esso Beacon grease applied to the inside of the seal will make this operation easier.

12. Fit the remaining washer and circlip to the shaft.

13. Ensure that the worm shaft will turn freely.

14. Rotate the output shaft until the open circuit sections are parallel with the worm shaft.

Note If the open circuits are at 90° to the worm shaft, the actuator will not operate when switched on initially

15. Ensure that the pencil mark on the brake shoe is at the top.

16. Remove the adhesive tape from the brake shoe and solenoid assembly.

17. Fit the assembly into the actuator casing.

18. Fit the seal washers, cup washers and dome nuts. **Do not** tighten the nuts at this stage.

19. Push down the brake drum onto the worm shaft until the pin holes are aligned. If either the drum or the shaft is a new component, ensure that the drum can be pushed onto the shaft, otherwise it will be difficult to align the holes. It will be necessary to hold the brake shoe in, against spring pressure, whilst the drum is fitted.

20. Fit a new roll pin to the shaft and drum, using tool (RH 7841) as shown in Figure T150.

21. Remove the tool, ensuring that the pin protrudes equally on each side.

22. The brake should be set in relation to the brake drum and solenoid as follows.

23. Obtain a smooth strip of soft metal e.g. aluminium, 0·048 in. (1,22 mm.) thick, 0·75 in. (19,0 mm.) wide and bend it into half circle, 1·00 in. (25,4 mm.) radius.

24. Slide the metal onto the outside of the drum.

25. Push the solenoid assembly in the direction of the brake drum until the brake shoe abuts the metal strip (*see Fig. T151*).

26. Tighten the two dome nuts.

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27. Remove the metal strip. When the solenoid is operated, the plunger will then travel a distance of 0·035 in. (0,89 mm.).

28. Fit the insulated base plate with the eight contacts and the relays. Care should be taken with this operation so that the settings of the relays and the position of the contacts are not disturbed.

29. Evenly tighten the four 3 B.A. nuts.

30. Ensure that a gap of approximately 0·050 in. (1,3 mm.) exists between each contact. The slip ring and contacts can be seen through the motor mounting orifice.

31. View the contacts through the gaps in the contact plate and ensure that the contacts touch the slip ring centrally, between the outside diameter of the slip ring and the outer perimeter of the rivet heads. There should be a clearance of approximately 0·062 in. (1,6 mm.) on each side (*see Fig. T152*).

32. Fit the rubber gasket to the plug assembly mounting face on the actuator casing.

33. Fit the plug assembly, ensuring that the two largest pins are lowermost. It is advisable to contain the leads with adhesive tape before attempting to thread them through the casing and the contact assembly.

34. Remove the tape, then run all the leads to their respective connections (*see Fig. T153*).

35. Fit the nuts and washers then tighten them, starting at the one furthest away from the plug and progressing toward the plug.

Caution Do not fit any nuts which are tight on the threads of the studs in the terminal blocks. If a tight nut is fitted there is a danger that the terminal screw will turn and the terminal block will become loose, resulting in a loose connection between contact and screw. If in doubt about the firmness of a contact, remove the base plate and tighten the terminal screw.

36. Secure the actuator motor to its mounting plate studs with the three 2 B.A. half nuts and spring washers.

37. Feed the motor supply leads through the bore of the mounting plate, then through the grommet. The longer end of the grommet fits into the casing.

38. Ensure that the rear face of the actuator casing and the front face of the mounting plate are clean and free from burrs, then apply a thin coat of Wellseal to the faces.

39. Fit a new gasket to the rear face.

40. Fit the flexible coupling onto the brake drum.

41. Fit the coupling dog onto the drive end of the motor armature shaft.

42. Fit the motor onto the four long studs.

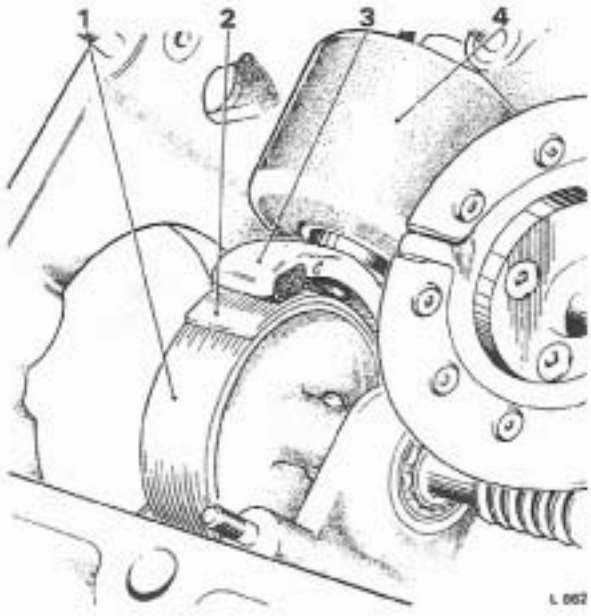

FIG. T151 SETTING THE SOLENOID BRAKE (EARLY CARS)

1 Brake drum
2 Spacer
3 Brake shoe
4 Solenoid

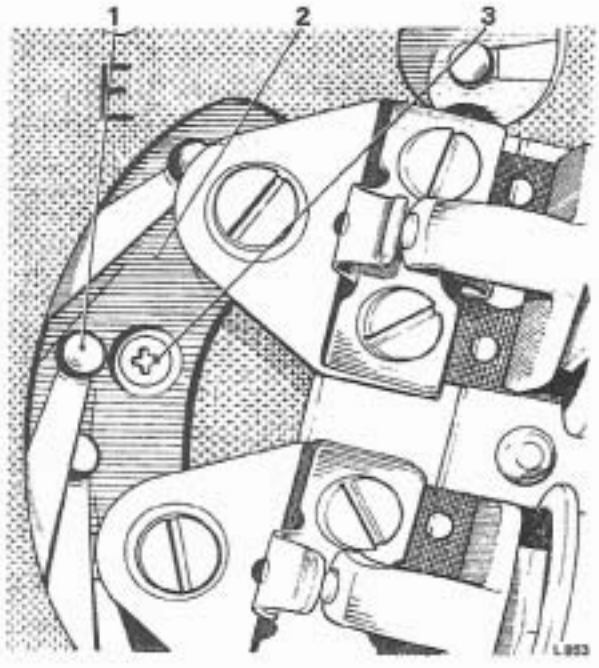

FIG. T152 CHECKING CONTACT POSITION

1 Contact
2 Slip ring
3 Securing screw

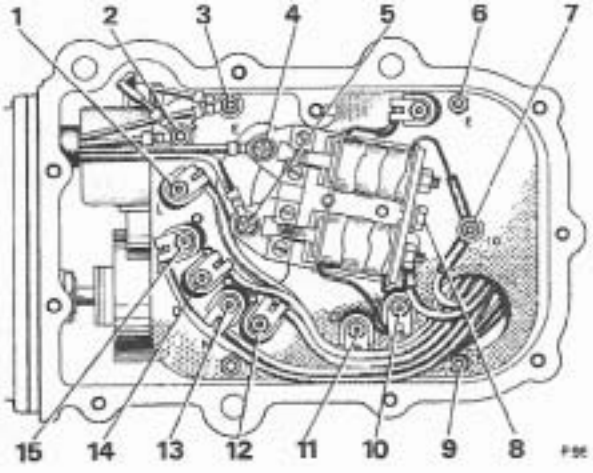

FIG. T153 WIRE CONNECTIONS
(Cars prior to Car Serial Number 9001)

1 Black/White from plug to terminal L
2 Green from both solenoid and motor to terminal S
3 Black from solenoid and black/green from motor to terminal E
4 Red/Green from motor to F1 relay terminal
5 Blue/Green from motor to F2 relay terminal
6 Black from relay coil motor end to terminal F2
7 Black from relay coil end and green/black from plug to terminal 1G
8 Brown/black from plug to relay positive feed terminal
9 Black from plug and red from relay coil plug end to terminal E
10 Red from relay coil motor end to terminal F1
11 Black/brown from plug to terminal P
12 Black/red from plug to terminal R
13 Black/blue from plug to terminal N
14 Black/green from plug to terminal D
15 Black/yellow from plug to terminal I

43. Feed the leads through to the actuator casing, at the same time position the grommet.

44. Push the motor forward, align the driving dog with the rubber coupling, then push the motor fully home.

45. Ensure that the rubber grommet fits correctly into its recess in the casing and has not become trapped.

46. Ensure that the rear face of the mounting plate and the joint face of the motor cover are clean and free from burrs.

47. Apply a thin smear of Wellseal to the faces, fit a new gasket to the mounting plate then fit the motor cover.

48. Fit and tighten the four 2 B.A. nuts and washers.

49. Connect the motor feed and the solenoid feed leads (*see Fig. T153*).

50. Fit the solenoid leads first with the lead ends to the eyelets lowermost.

51. Fit the motor earth and the solenoid connection with the lead to the eyelet uppermost.

52. Fit the motor feed leads to the relays.

53. Examine all connections to ensure that they are all correctly connected.

54. Ensure that the slip ring is positioned with the open circuit sections parallel with the worm shaft, as described earlier.

55. Ensure that the joint faces of the actuator casing and the cover are clean and free from burrs.

56. Apply a thin smear of Wellseal to both faces then fit a new gasket to the casing.

57. Fit the cover and secure it with the eight 2 B.A. nuts and washers.

58. Fit the spring retaining cup onto the output shaft.

59. Liberally apply Rocol M 204 G Ragosine to the inside of the cup and to the output shaft.

60. Smear both ends of the spring with the same lubricant then fit the spring over the shaft and into the cup.

61. Lubricate the spring housing in the lever then fit the lever to the shaft with the lever pointing downward.

62. Smear the detent face of the lever, again using Rocol M 204 G Ragosine.

63. Using tool No. (RH 7843) compress the spring then fit the hardened steel pin.

64. Coat the inside of the cover with the same lubricant, then fit the cover and secure it with a setscrew.

65. To test the lever to ensure that the torque required to make the lever slip is correct, proceed as follows.

66. Operate the lever at least three times in each direction to relieve any initial stiffness.

67. Fit a spring balance to the lever, with one end of the spring balance located in the clevis pin hole in the end of the lever.

68. Move the lever forward until it slips; note the reading on the spring balance.

69. Move the lever in the opposite direction, again noting the reading. The lever should slip at a load of between 60 lb. and 75 lb. (27,2 kg. and 34 kg.).

70. If the load required to move the lever does not comply with the figures quoted, check the spring poundage (*see Dimensional Data at the end of this Section*) then renew either the spring or the lever to obtain the correct slipping load.

71. If rig testing facilities are available, test the actuator to the specification given in 'Dimensional Data' at the end of this Section.

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Gearchange electric actuator—To assemble (Car serial number SRX 9001 and onwards)

1. Press the output shaft bearing into the actuator casing. The bearing should be fitted such that it is slightly proud on both the inside and outside of the casing.

Note This bearing is an oil retaining type and should **not** be soaked in any solvent.

2. Fit the wormshaft bearings to the wormshaft ensuring that the bearings are adequately lubricated with Esso Beacon grease.

3. Assemble the wormshaft and bearings into the actuator case. The bearings must be a slide fit in the casing bores. Adjust the end float of the wormshaft to between 0·002 in. and 0·005 in. (0,005 mm. and 0,012 mm.) using a suitable thickness of packing washer. Fit the circlip.

4. Fit new contact segments to the slip ring. Ensure that the edges of the segments are free of burrs.

5. Fit the slip ring and gear assembly into the main bush checking that the shaft is a slide fit in the bush.

Lubricate the gear teeth with Esso Beacon grease.

Use only the minimum amount of grease as any excess is liable to be thrown off.

6. Fit the thrust washer and circlip to the output shaft.

7. Fit the rubber gaiter, washer and output lever to the shaft. Noting the position of the output lever.

8. Check that the wormshaft can rotate freely. Rotate the wormshaft until the open circuit sections of the slip ring are at 90° to the wormshaft and the flat side of the 'O' section of the output shaft inner end is uppermost.

9. Fit the splined collar and coupling onto the wormshaft.

10. Fit the new sealing ring provided to the groove in the case and pass the motor cables through the hole.

11. Mate the splined collar on the motor shaft with the nylon coupling.

12. Fit the three 0·250 in. (6,35 mm.) motor mounting bolts.

13. Check that the wormshaft is free to rotate.

14. Fit the dual relay provided to the new contact assembly and check the tightness of the 5 B.A. terminal screws on the contact assembly.

Note This dual relay is a precision component and its internal settings can easily be upset by maltreatment.

15. Loosely fit the micro-switches to the contact plate assembly ensuring that the spring washers are fitted under the heads of the long 6 B.A. screws in the slotted holes or under the nuts adjacent to the contact plate in the plain holes.

16. Loosely fit the contact plate assembly into the casing locating the sleeves, if fitted, on the studs and taking care not to damage the relay assembly and guiding the motor feed wires between the casing and the indentation in the contact base plate.

17. Fit the four 3 B.A. nuts and washers to the contact plate and connect the motor feed cables and the suppressor across the relay mounting bolts as shown in Figure T154. All slack in the motor cables should be taken up by rotating the eyelets about the terminal posts.

18. View the layout of the contacts onto the slip ring through the elongated hole in the contact plate and ensure that there is a minimum of 0·50 in. (1,27 mm.) between adjacent contacts as well as being approximately 0·062 in. (1,58 mm.) from either the edge of the segments or the countersinkings for the retaining screws.

19. Fit the rubber gasket and the socket assembly, guiding the cables through the casing and the aperture in the contact plate.

The socket should be fitted so that the locating tong adjacent to pin A is uppermost on the sloping mounting face of the casing.

20. Fit all cables to their respective connections in accordance with Figures T154 and T156.

The longer cables to the contact plate should be fitted first, followed by the shorter cables and finally the micro-switch and relay connection.

If the actuator was fitted with black micro-switches it will be necessary to suitably alter the cable connections to suit the new grey micro-switches provided.

It is helpful to sort out the wires into their respective positions before attachment. It should be noted that when making connections to the 5 B.A. terminal screws on the contact plate extreme care should be used when fitting the terminal securing nuts as if these are tight the first nut on the terminal will be loosened resulting in a poor connection.

Note On the pre-automatic speed control type of actuator the Yellow/black wire is replaced by a Green/black one and the Green/blue wire is deleted.

21. Fit the actuator onto the gearbox mounting bracket and refit the loom plug to the actuator.

Neutral start and height control switches—To remove (Cars prior to car serial number SRX 9001)

1. Remove the split pin and clevis pin which secures the link rod to the switch actuating lever; disconnect the link rod.

2. Disconnect the two leads at the Lucar connections on the detent and stator solenoid case connector; note the position of the leads to ensure correct assembly (*see Fig. T155*).

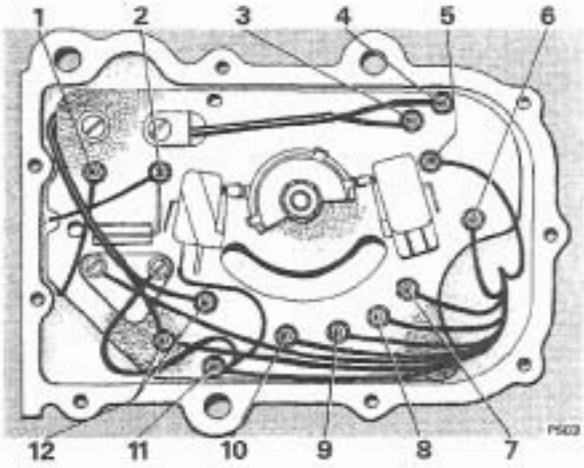

FIG. T154 WIRE CONNECTIONS
(Car Serial Number SRX 9001 and onwards)

1 Blue/green to motor
2 Red/green to motor
3 Red to relay
4 Red to relay
5 Black/brown from plug to terminal P
6 Black/red from plug to terminal R
7 Black/blue from plug to terminal N
8 Black/green from plug to terminal D
9 Black/yellow from plug to terminal I
10 Black/white from plug to terminal L
11 Black from plug to earth terminal
12 Green/black from plug to 'ignition' terminal

3. Remove the two bolts which secure the switch cover to the bracket on the left-hand side of the transmission; remove the cover.

Note Before the switches can be removed from the car, the switch assembly must be partially dismantled and the leads disconnected (*see Neutral start and height control switches — To dismantle*).

Neutral start and height control switches— To dismantle

(Cars prior to car serial number SRX 9001)

If the transmission has been removed from the car, the switch cover will have been removed from the transmission but it will still be connected to the car by the wire leads. Dismantle the switches in the same way as described for dismantling the switches when the transmission is in position in the car.

To dismantle the neutral start and height control switches, proceed as follows.

1. Remove the four screws which secure the cover to the casing.

2. Remove the cover and discard the joint. The gasket is sealed with jointing compound on both sides during initial assembly and this may make separation of the cover and casing difficult. Do **not** use a screwdriver blade between the joint faces otherwise the waterproofing may be impaired.

3. Unscrew the knurled nut at the top of the cover.

4. Unscrew the two 6 B.A. screws which secure the micro-switches to the casing.

5. Remove the switches and separator, disconnect the leads, then remove the leads and rubber grommet from the casing.

6. It should not be necessary to remove the operating cam and shaft which is secured in the casing by the lever. The lever is positioned and secured on the shaft by a roll pin.

Neutral start and height control switches— To assemble

(Cars prior to car serial number SRX 9001)

1. Ensure that the lever and cam assembly is free to rotate.

2. Examine the cork seal and should it require renewal, press out the roll pin using tool No. (RH 7841), remove the lever and washer, then renew the seal. Fit the lever using a new roll pin.

3. If the cam and shaft assembly has been removed from the casing, lubricate the shaft with Rocol M 204 G Ragosine when fitting the shaft to the casing.

4. Feed the leads into the casing then connect them to the micro-switches as shown in Figure T155.

5. Fit the micro-switches and separator to the casing. The insulated separator fits between the two switches.

6. When the cam actuates the switches, ensure that a gap of 0·050 in. (1,27 mm.) exists between the flat on lever and the stop on the cover.

7. Draw the rubber sealing plug down the loom until it fits into the tapered bore in the casing. Tighten the knurled nut.

8. Ensure that the joint faces of the casing and cover are clean and free from burrs then apply a thin smear of Wellseal to both faces.

9. Fit a new gasket to the casing then secure the cover, using four 3 B.A. screws.

Neutral start and height control switches— To fit

(Cars prior to car serial number SRX 9001)

1. Fit the switch to the bracket on the side of the transmission. Torque tighten the nuts.

2. Connect the control rods to both units, then adjust the controls as described in Section T5 – Control Linkage.

3. Fit the leads to the Lucar connections on the detent and stator solenoid (if fitted) connection.

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Neutral start and height control switches—To dismantle

(Car serial number SRX 9001 and onwards)

Refer to Page T199—Gearchange electric actuator—To dismantle.

Neutral start and height control switches—To assemble

(Car serial number SRX 9001 and onwards)

1. Remove the low tension cable from the ignition distributor, switch on the ignition and check that the actuator will select all six gear stations correctly.
2. Move the gear selector lever to 'D' and fit the micro-switch cam to the actuator output shaft. When tightening the 0·250 in. (6,35 mm.) nut, the torque reaction should be taken by gripping the output lever such that the tightening force is not absorbed by the nylon teeth of the wormwheel.
3. Move the gear range selector lever to the 'Park' position.
4. Locate the two micro-switches adjacent to the actuator socket (Neutral start and Height control switches).

Move the switches towards the peak of the cam until the switch plungers are in the centre of the peak and are depressed to within 0·020 in. (0,51 mm.) of the switch body as shown in Figure T157. When both switches are in the correct position, tighten the mounting bolts.

5. Repeat this procedure on the left-hand micro-switch which operates the 'Park' anti-thief device.
6. Select 'Reverse' gear and check that all three switches are clear of the cams.
7. Select 'Neutral' and ensure that the right-hand pair of switch plungers are correctly depressed and that the right-hand micro-switch is clear of the cam.
8. Switch off the ignition and fit the distributor low tension cable.
9. Remove the actuator from the car and fit the casing side cover, painting both sides of the new gasket provided with a suitable jointing compound. Fit the actuator to the transmission, connecting the loom plug and the actuator linkage.

Gearchange actuator motor—To dismantle

(Cars prior to car serial number SRX 9001)

1. Unscrew and withdraw the two through-bolts.
2. Remove the end covers.
3. Withdraw the armature from the drive end. Retain the shim washers which fit between the shoulder on the drive end of the armature shaft and the drive end bush.
4. Note the side and the position of each brush to

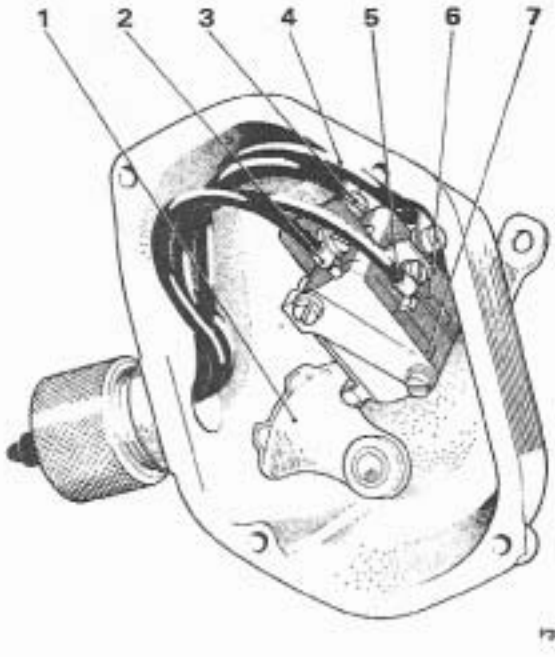

FIG. T155 MICRO-SWITCH CONNECTIONS (Cars prior to Car Serial Number SRX 9001)

1 Actuating cam
2 Red/white lead
3 Green/black lead
4 Green lead
5 White/black lead
6 Height control switch
7 Neutral start switch

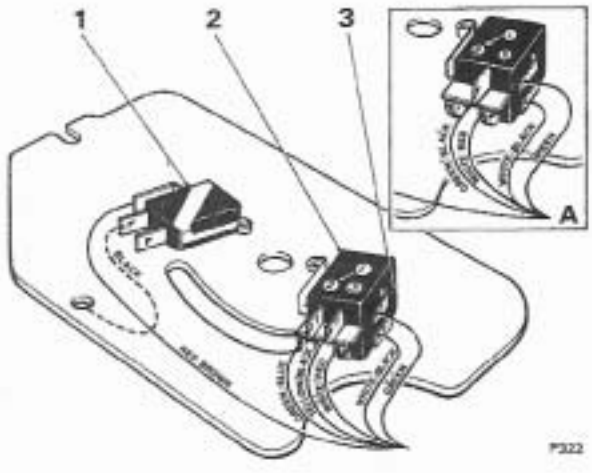

FIG. T156 MICRO-SWITCH CONNECTIONS (Car Serial Number SRX 9001 and onwards)

1 'Park' micro-switch
2 Height control switch
3 Neutral start switch

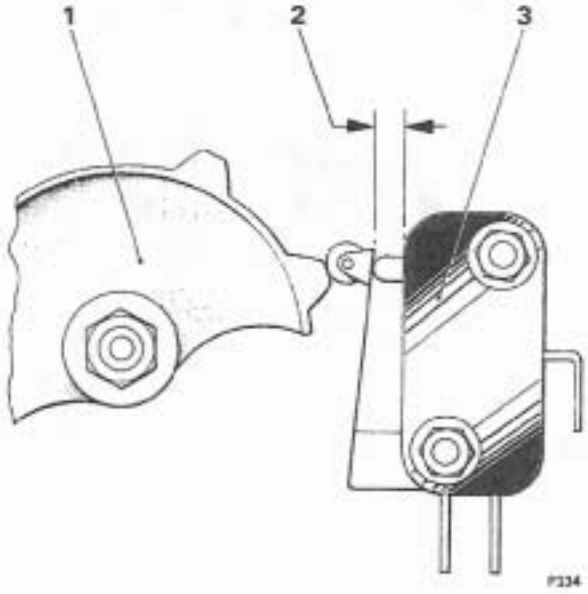

FIG. T157 ADJUSTMENT OF MICRO-SWITCHES (Car Serial Number 9001 onwards)

1 Cam
2 Gap 0.020 in. (0,51 mm.)
3 Micro-switch

ensure correct assembly then remove the brushes, taking care not to stretch excessively the brush tension spring.

5. Should the pole piece require removal, mark the pole piece and the two retaining screws so that they can be fitted in their original positions.

Gearchange actuator motor—To inspect (Cars prior to car serial number SRX 9001)

Under normal operating conditions the gearchange actuator motor should need no attention. The porous bronze bearings are impregnated with oil and the brushes are carbon copper.

Details of motor tests and performance are given in 'Dimensional Data' at the end of this Section.

Gearchange actuator motor—To assemble (Cars prior to car serial number SRX 9001)

Assemble the gearchange actuator motor as follows (*see Fig. T158*).

1. Fit the pole pieces and the two self-tapping screws, ensuring that the marks made during dismantling are correlated.

2. Fit the brushgear assembly, ensuring that the brushes are fitted in their original position. Take care not to overstretch the brush tension springs. Ensure

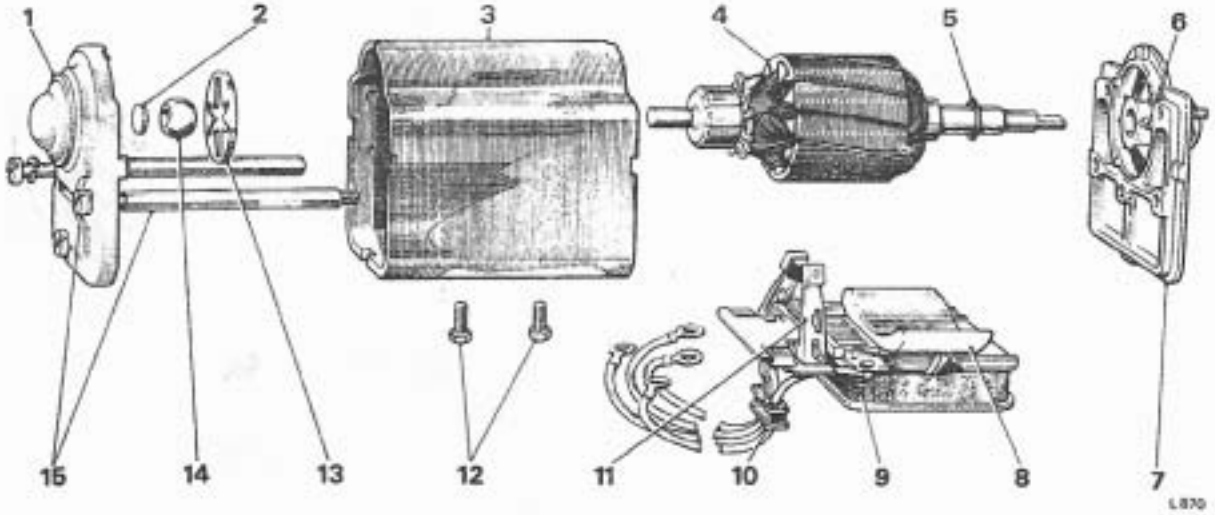

FIG. T158 GEARCHANGE ACTUATOR MOTOR (Cars prior to Car Serial Number SRX 9001)

1 Commutator end bracket
2 Thrust pad
3 Yoke
4 Armature
5 Shim
6 Bearing retainer
7 Drive end bracket
8 Pole piece
9 Field coil
10 Grommet
11 Brushgear
12 Pole piece securing screw
13 Bearing retainer
14 Self aligning bearing
15 Through-bolts and insulators

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September 1971

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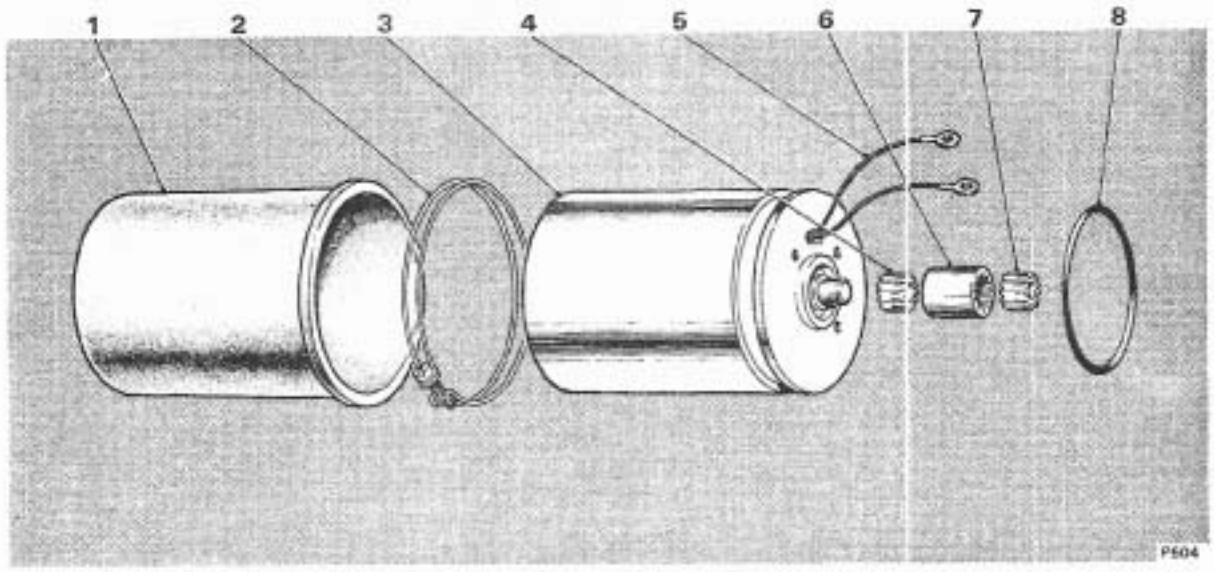

FIG. T159 GEARCHANGE ACTUATOR MOTOR (Car Serial Number SRX 9001 and onwards)

1 Motor cover
2 Motor cover securing clip
3 Motor
4 Motor flying leads
5 Motor drive shaft
6 Coupling (splined)
7 Splined drive
8 'O' ring

that the brush arms pivot freely on the terminal plate locations.

3. Lightly smear the armature shaft with Shell Turbo 41 oil, taking care to prevent any oil from reaching the commutator.

4. Fit the armature.

5. Fit the shim(s) to the drive end of the armature shaft.

6. Fit the end covers and secure them with the through-bolts.

7. Check the end float of the armature. The end float should be between 0·002 in. and 0·012 in. (0,05 mm. and 0,30 mm.). If the end float does not conform to these figures remove the drive end bracket and adjust the shim(s) to suit.

Gearchange actuator motor—To dismantle (Car serial number SRX 9001 and onwards)

1. Using a suitable puller remove the drive gear from the motor.

2. Unscrew and withdraw the 2 bolts securing the motor housing, remove the housing.

3. Remove the armature from the end plate.

Gearchange actuator motor—To inspect (Cars serial number SRX 9001 and onwards)

1. Examine the magnets for any damage, cracks or fractures.

2. Examine the brushes for wear; fit new brushes if necessary.

3. Examine the armature commutator for wear or damage, if scored polish with fine emery cloth. If scores are heavy and cannot be removed with light polishing, fit a new armature.

4. After polishing carefully clean commutator slots to remove particles of carbon.

5. Examine bearing bushes for wear, replace if necessary.

6. Examine the armature shaft for wear on the bearing diameter.

Gearchange actuator motor—To assemble (Car serial number SRX 9001 and onwards)

Assemble the actuator motor (*see Fig. T159*) by reversing the proceeds given previously. Test the motor after assemble, if the current consumption exceeds 7·5 amps. the armature has an electrical fault and should be renewed.

DIMENSIONAL DATA FOR GEARCHANGE ACTUATOR, NEUTRAL START AND HEIGHT CONTROL SWITCHES

DESCRIPTION	DIMENSION	PERMISSIBLE WORN DIMENSION	REMARKS
Output shaft bearing bush i/d.	0·6273 in. — 0·001 in. (15,932 mm. — 0,025 mm.)	——	The bush is oil impregnated phosphor bronze and should not be cleaned with a degreasing agent.
Output shaft o/d.	0·6245 in. — 0·0005 in. (15,863 mm. — 0,013 mm.)	——	——
Clearance.	0·0018 in. to 0·0033 in. (0,045 mm. to 0,083 mm.)	——	——
Front bearing bore — actuator casing.	0·7480 in. + 0·0005 in. (19,0 mm. + 0,013 mm.)	——	——
Front bearing o/d.	0·7480 in. — 0·0004 in. (19,0 mm. — 0,010 mm.)	——	——
Clearance.	0·000 in. to 0·0009 in. (0,00 mm. to 0,023 mm.)	——	——
Rear bearing bore — actuator casing.	0·7497 in. + 0·0005 in. (19,041 mm. + 0,013 mm.)	——	——
Rear bearing o/d.	0·7497 in. — 0·0004 in. (19,041 mm. — 0,010 mm.)	——	——
Clearance.	0·000 in. to 0·0009 in. (0,00 mm. to 0,023 mm.)	——	——
Front bearing i/d.	0·2362 in. — 0·0004 in. (6 mm. — 0,010 mm.)	——	——
Worm shaft front bearing diameter.	0·2363 in. — 0·0005 in. (6,001 mm. — 0,013 mm.)	——	——
Interference or clearance.	0·0005 in. tight to 0·0004 in. clear (0,013 mm. tight to 0,010 mm. clear)	——	——
Rear bearing i/d.	0·250 in. + 0·0002 in. (6,35 mm. + 0,005 mm.)	——	——
Worm shaft rear bearing diameter.	0·250 in. — 0·0005 in. (6,35 mm. — 0,013 mm.)	——	——
Interference or clearance.	0·0002 in. tight to 0·0007 in. clear (0,005 mm. tight to 0,018 mm. clear)	——	——
Brake drum — shaft diameter.	0·2485 in. + 0·0005 in. (6,312 mm. + 0,013 mm.)	——	——
Wormshaft — drum diameter.	0·2485 in. — 0·0005 in. (6,312 mm. — 0,013 mm.)	——	——
Interference or clearance.	0·000 in. tight to 0·001 in. clear (0,000 mm. tight to 0,025 mm. clear)	——	——
Worm gears backlash.	0·002 in. to 0·007 in. (0,05 mm. to 0,18 mm.)	——	——
Worm shaft end float.	0·002 in. to 0·005 in. (0,05 mm. to 0,13 mm.)	0·005 in. (0,13 mm.)	Adjust end float by selecting suitable adjusting washer.
Motor armature end float.	0·002 in. to 0·012 in. (0,05 mm. to 0,03 mm.)	0·012 in. (0,03 mm.)	Adjust end float by selecting suitable adjusting washer.
Pressure of brushes on commutator.	4·4 oz. to 5·6 oz. (125 g. to 160 g.)	——	Renew spring or brushes to maintain pressure.
Solenoid brake spring — free length.	1·287 in. (approx.) (32,69 mm.) (approx.)	——	——
Load required to compress spring to a length of 1·045 in. (26,55 mm.)	6 lb. 8 oz. to 7 lb. (2,95 kg. to 3,18 kg.)	——	——

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DESCRIPTION	DIMENSION	PERMISSIBLE WORN DIMENSION	REMARKS
Dimensional Data—continued			
Operating spring free length.	1·00 in. (approx.) (25,4 mm.) (approx.)	——	——
Load required to compress spring to a length of 0·70 in. (17,8 mm.)	100 lb. (45,4 kg.)	——	——
2 B.A. half nuts — motor to mounting plate.	Torque tighten to between 30 lb.in. and 36 lb.in. (0,34 kg.m. and 0,41 kg.m.)	——	——
Remainder of 2 B.A. nuts.	Torque tighten to between 48 lb.in. and 60 lb.in. (0,55 kg.m. and 0,69 kg.m.)	——	——
Pole piece screws.	Torque tighten to between 6 lb.ft. and 8 lb.ft. (0,83 kg.m. and 1,11 kg.m.)	——	——
Bolts — actuator to rear extension.	Torque tighten to between 16 lb.ft. and 18 lb.ft. (2,21 kg.m. and 2,49 kg.m.)	——	——

ACTUATOR MOTOR TEST DATA		
	Cars prior to Car Serial Number SRX 9001	Car Serial Number SRX 9001 and onwards
Nominal operating voltage	12.	12.
Torque developed in either direction of armature rotation at 20°C.	40 oz. in. at 200 r.p.m. (min.) at 16·5 amp. (max.) and 20 oz. in at 700 r.p.m. (min.) at 14·5 amp. (max.)	50 oz. in. (min) at 200 r.p.m. at 8 amp. (max.) and 12·5 oz. in. (min.) at 1 000 r.p.m. at 2·75 amp. (max.)

DUAL RELAY TEST DATA		
	Cars prior to Car Serial Number SRX 9001	Car Serial Number SRX 9001 and onwards
Contact gap	0·020 in. to 0·025 in. (0,51 mm. to 0,64 mm.)	0·025 in. to 0·030 in. (0,64 mm. to 0,76 mm.)
Core gap (contacts open)	0·030 in. to 0·035 in. (0,76 mm. to 0,89 mm.)	0·040 in. to 0·045 in. (1,02 mm. to 1,14 mm.)
Contact pressure (closed)	5·1 oz. to 6·8 oz. (145 g. to 195 g.)	3·5 oz. min. (100 grms. min.)
Cut-in volts	4 volts to 9 volts	9 volts max.
Drop-off volts	2·5 volts (min.)	——
Relay winding resistance	17 ohms. to 19 ohms. (at 20°C.)	17·5 ohms. to 20 ohms. (at 20°C.)

Cars prior to car serial number SRX 9001

The volt drop across the contacts should not exceed 100 milli-volts when a current of 10 amps. is flowing through them and the relay coil is supplied with a nominal 12 volts.

Car serial number SRX 9001 and onwards

The volt drop across the contacts should not exceed 50 milli-volts when a current of 6 amps. is flowing through them and the relay coil is supplied with a nominal 12 volts.

ACTUATOR TEST DATA
(All cars)

Voltage required to operate actuator — temperature range 70°C. to minus 17·8°C.	9 volts (min.)
Time taken to rotate a 2 in. (50,8 mm.) lever through 80° 15' with a torque of 15·0 lb. in. (0,17 kg.m.) applied to the lever	1·5 seconds (max.)

With 9 volts applied at the motor and an ambient temperature of 20°C. the stall torque on the end of the lever must be 40 lb. in. (0,46 kg.m.).

With 12 volts applied at the motor and an ambient temperature of 20°C. the stall torque on the end of the lever must be 70 lb. in. (0,81 kg.m.).

With 12 volts applied to the motor and 10 lb. in. (0,12 kg.m.) load applied to the lever the actuator must select to within 3° of the correct position.

With 14 volts applied at the motor and no load on the lever, the actuator must not 'hunt' between selector positions. It is permissible for the lever to move slightly past a selected position then return to that position before halting. It is not permissible for the actuator lever to move forward and backward past the selected position before finally halting in the position required.

SOLENOID TEST DATA
(Cars prior to car serial number SRX 9001)

Voltage required to withdraw plunger against spring loading from a set distance of 0·075 in. (1,91 mm.) ...	5·0 volts (max.)
Voltage required to hold plunger back against spring pressure	1·0 volts (min.)

Note When the plunger and solenoid assembly has been satisfactorily tested the components should be kept together and fitted as a complete unit.

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Section T8
REMOTE GEARCHANGE SELECTOR

The remote gearchange selector is clamped to the steering column assembly just below the steering wheel.

An exploded view of the selector is shown in Figures T160 and T161.

Movement of the selector lever moves a pointer over an indicator scale which is marked 'P', 'R', 'N', 'D', 'I' and 'L' representing Park, Reverse, Neutral and three forward gear ranges.

The selector is in the form of a switch. When the lever is moved from Neutral, an electrical signal is transmitted to the electric actuator which is mounted on the transmission rear extension and connected to the gearchange lever on the transmission. On receiving the signal, the electric actuator will automatically select the required gear range. The transmission will remain in the selected range until the lever is again moved.

The electric actuator is wired so that, should the driver stop the car in a gear other than 'Park' then switch off the engine, he can still lock the transmission by moving the selector lever to the 'Park' position.

Having done this, if he moves the selector lever out of this position or the lever is accidentally moved to a drive position, the actuator will not respond until the ignition is switched on.

Remote gearchange selector—To remove

1. Remove the screws retaining the upper and lower halves of the cowling. These halves should always be retained as a set. Carefully remove the upper half of the cowling.
2. Remove the screw retaining the lower half of the cowling to its clamping bracket; remove the lower half of the cowling.
3. Disconnect the indicator lamp.
4. Disconnect the micro-switch.
5. Remove the screw securing the switch insulating plate.
6. Remove the gearchange selector.

Remote gearchange selector--To dismantle

1. Remove the screws securing the micro-switch(es) to the rear face of the base assembly and remove the micro-switch(es).
2. Remove the operating arm from the spindle of the quadrant.
3. Remove the single 5 B.A. screw securing the pointer to the quadrant boss and remove the pointer; take care not loose the washer(s) from beneath the head of the 5 B.A. screw.

Note Care must be taken not to scratch the pointer or the indicator scale.

4. Remove the two 5 B.A. screws and shake-proof washers securing the indicator support bracket to the two bosses on the base assembly, then remove the indicator support bracket assembly.
5. Remove the two hexagon-headed 3 B.A. screws securing the gate assembly to the underside of the base.
6. Remove the circlip, clevis pin and spring securing the gearchange selector lever to the quadrant, then remove the lever with the gate assembly attached.

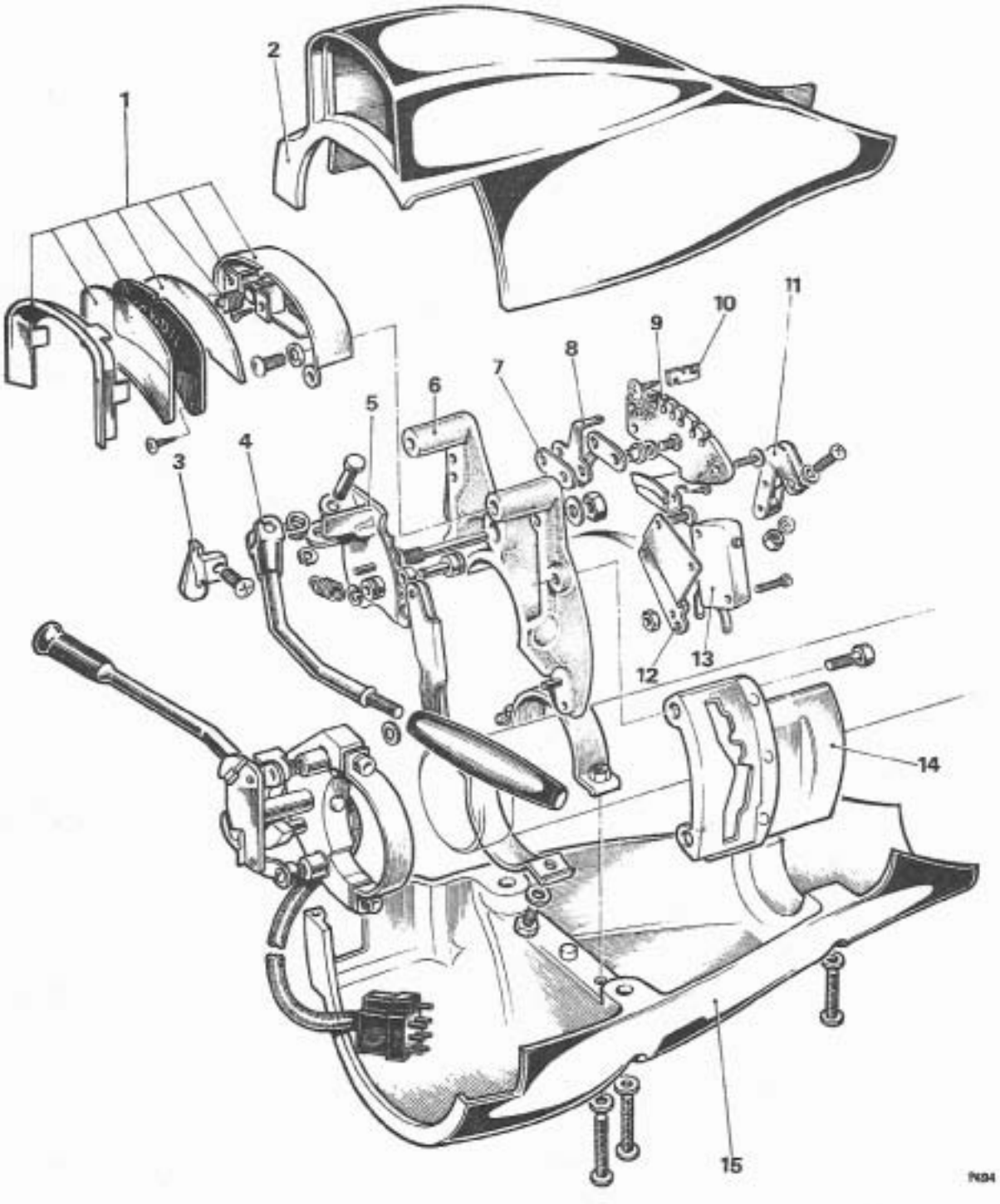

FIG. T160 REMOTE GEARCHANGE SELECTOR (EARLY CARS)

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FIG. T160 REMOTE GEARCHANGE SELECTOR (EARLY CARS)

1 Gear position indicator scale components
2 Upper half of steering column cowl
3 Pointer — gear range selector
4 Gear range selector lever
5 Quadrant assembly
6 Base assembly
7 Insulating piece
8 Spring — contact — gear range selector
9 Insulating plate
10 Contact
11 Reverse lamps operating lever
12 Micro-switch mounting plate — reverse lamps
13 Micro-switch — reverse lamp
14 Support assembly bracket
15 Lower half of steering column cowl

7. Remove the two 5 B.A. screws and washers securing the phosphor-bronze contact, two insulating strips and two insulating dowels to the quadrant and remove these items.
8. Remove the retaining clip from the rocking arm.
9. Remove the tension spring from the rocking arm and quadrant, and remove the rocking arm assembly.
10. Remove the eccentric stud which forms the rocking arm assembly pivot.
11. Remove the ¼ in. UNF nut and washer from the quadrant spindle and remove the quadrant assembly from the base assembly.

Remote gearchange selector—To assemble

1. Fit the quadrant assembly onto the base and nip the ¼ in. UNF nut and washer onto the spindle. Check that the quadrant is free to rotate.
2. Remove the quadrant and lubricate the spindle with Ragosine 204G. Refit the quadrant and finally tighten the ¼ in. UNF nut.
3. Do not overtighten the nut, since the bearing boss tends to spread slightly and a tight bearing may be formed.
4. Fit the eccentric stud to the base plate, fit the retaining nut and temporarily tighten.
5. Temporarily fit the gear change selector lever and the gate; ensure that when the roller lines up with the quadrant, the selector lever seats in the correct position in the gate. Adjust by rotating the eccentric stud.
6. Tighten the stud retaining nut.
7. Fit the rocking arm assembly, then check to ensure that the roller lines up correctly with the quadrant with respect to height above the base.
8. Remove the selector lever and gate.
9. Remove the rocking arm and hook the tension spring onto the anchor pin roller on the underside of the quadrant and onto the spring anchor on the underside of the rocking arm.
10. This operation is made easier by rotating the quadrant anti-clockwise beyond its normal travel, so that the spring is not under tension. Rotate the quadrant clockwise whilst holding the rocking arm clear, then allow the roller to locate on the detent forms. Fit the spring on the top side of the quadrant and rocking arm.
11. Fit the circlip.

Note Do not fit the pivot retaining clip to the rocking arm at this stage. (They are difficult to remove, should the need arise).

12. Move the quadrant to a mid-way selection and fit the phosphor-bronze contact. This contact is assembled between two insulating strips and all are located by two insulating dowels. This sandwich assembly is then secured to the quadrant by two 5 B.A. screws and washers.

Note Extreme caution must be taken with the moving contact, so that it is not bent or damaged in any way. This contact has a deflection imposed upon it by fitting the fixed contacts and it is **extremely important** that the pressure between the contacts which the deflection produces is correct (*see Remote gearchange selector – To test*).

13. Before fitting the selector lever assembly carry out the following checks.
14. Check that the clevis pin will slide through both the fork end on the lever and the holes in the mounting bosses on the quadrant, then check that the fork end will slide between these bosses.
15. Lightly smear Ragosine 204G on the outside of the fork end, the inside of the bosses, the clevis pin and the clevis pin holes, then locate the fork end in the bosses by the clevis pin and fit the spring inside the fork end and over the clevis pin.
16. Push home the pin and fit the circlip and washer.
17. Check that the lever will return easily under the load of the spring.
18. Fit the retaining clip to rocking arm pivot.
19. Fit the bulb holder and support bracket.
20. Secure the gate assembly to the underside of the base by means of the two hexagon-headed 3 B.A. screws.
21. Check that, when the position of the lever is controlled by the detents, it lines up with the profile of the gate liner and that the extreme positions of the lever are not limited by the gate.

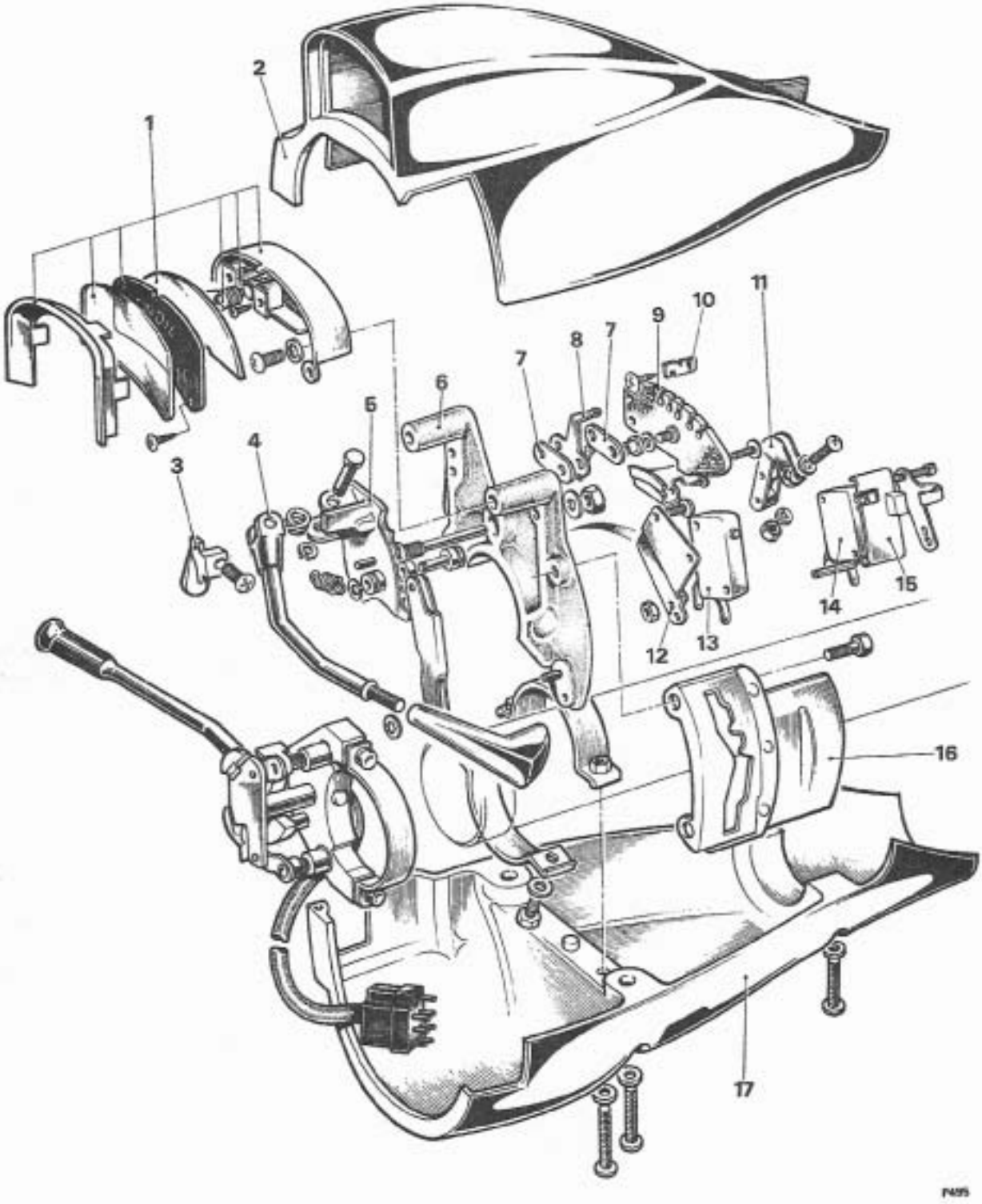

FIG. T161 REMOTE GEARCHANGE SELECTOR (LATER CARS)

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FIG. T161 REMOTE GEARCHANGE SELECTOR (LATER CARS)

1 Gear position indicator scale components
2 Upper half of steering column cowl
3 Pointer — gear range selector
4 Gear range selector lever
5 Quadrant assembly
6 Base assembly
7 Insulating piece
8 Spring — contact — gear range selector
9 Insulating piece
10 Contact
11 Reverse lamps operating lever
12 Micro-switch mounting plate — reverse lamps
13 Micro-switch — reverse lamps
14 Micro-switch — fast-idle
15 Lever and buffer assembly
16 Support assembly bracket
17 Lower half of steering column cowl

22. Fit the insulating plate complete with the feed and supply contacts fitted to it.
23. When the unit is screwed down by the three 5 B.A. screws, check that the inside leg of the moving contact is pressing onto the supply contact and that at the extremities of its travel the hemispherical head is still making good contact with supply contact (*see Remote gearchange selector — To test*).
24. Each selection should then be made in turn, checking that the outside leg on the moving contact lines up correctly with each of the feed contacts.
25. Mount this assembly on the two bosses on the base by means of the two 5 B.A. screws and shake-proof washers.
26. Fit the blue filter with its flattened end in front of the bulb and behind the bracket mounting screw heads. Bend the top radiused end over the bulb and check that it follows the contours of the support bracket.
27. Hold the filter in this position by means of a 0·025 in. (0,64 mm.) feeler gauge held from the front of the unit, fit the indicator scale over the support bracket and secure it with two self-tapping screws. The scale should drop onto the bracket and its lip must not be forced down.
28. Feed the pointer under the indicator scale, then with 'I range' selected, use a thin-bladed Phillips head screwdriver, to feed the single 5 B.A. screw through the pointer leg and screw it into the quadrant boss. Care should be taken not to scratch either the pointer or the indicator scale.
29. Each selection should then be made and the alignment of the pointer checked. Packing washers fitted to the 5 B.A. screw will give the adjustment necessary to correctly 'line-up' the pointer.
30. Screw the micro-switch onto the two bosses on the rear face of the base assembly.
31. Fit the operating arm onto the spindle of the quadrant.
32. **On an early car, not fitted with refrigeration** set the operating arm so that the single micro-switch is depressed when the selection is 'R'.
33. **On a car fitted with refrigeration** the two micro-switches require setting so that the fast-idle micro-switch is depressed just as the selector is engaging 'N'.
34. Check that the 'R' micro-switch is operated satisfactorily. The screw is 5 B.A., therefore it should not be overtightened.
35. Fit the retaining clip to the rocking arm pivot.
36. Lightly smear Ragosine 204G on the quadrant detents, then operate the switch several times to ensure that the Ragosine is spread evenly.

Remote gearchange selector—To fit

1. Fit the remote gearchange selector onto the steering column, locating the dowel in the hole in the column outer tube. The two $\frac{1}{4}$ in. UNF screws which pass through the clamping bracket and into the base are fitted with spring washers.
2. Connect the selector switch and the micro-switch wiring so that the looms leave clearance for fitting the cowling.
3. Fit the lower half of the cowling onto its clamping bracket then fit the upper half of the cowling.

Note Care must be taken when tightening the cowling retaining screws, since the unit, being made of plastic, will crack if over-stressed.

4. Check the clearance between the steering wheel hub and the cowling.

Remote gearchange selector contacts—To set

Whenever the moving or fixed contacts have been disturbed or after the remote gearchange selector have been dismantled and assembled always test the assembly as follows:

When the remote change selector is assembled on the production line the moving contact is shaped such that fitting the fixed contact insulating plate against its machined stops deflects the fixed contact by between 0·050 in. and 0·100 in. (1,27 mm. and 2,54 mm.). This produces the correct pressure between

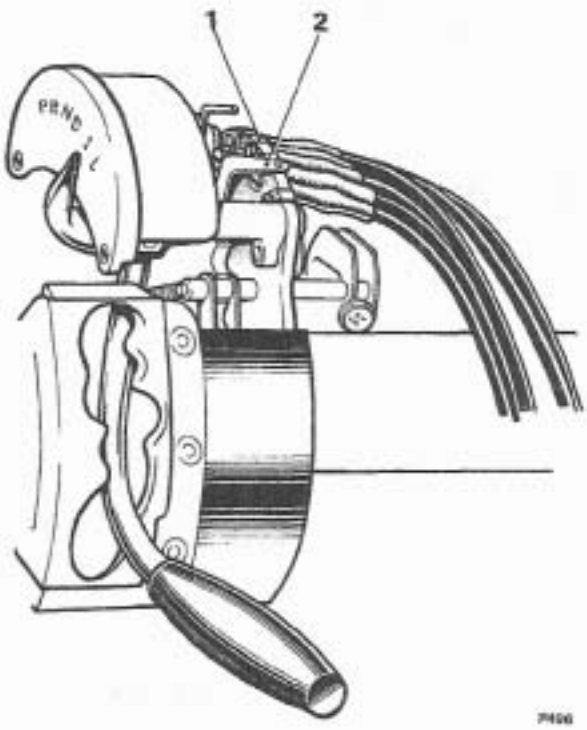

FIG. T162 MOVING AND FIXED CONTACTS (FRONT VIEW)

1 Stationary contacts
2 Moving contacts

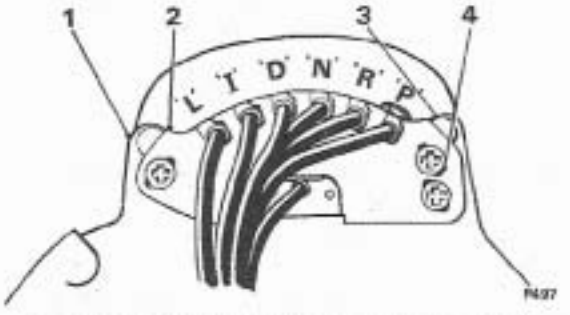

FIG. T163 MOVING AND FIXED CONTACTS (REAR VIEW)

1 Casting
2 Insulating plate
3 Stop — to which insulating plate (2) must abut
4 Elongated hole

the two contacts and is checked in the following procedure using a 0·001 in. (0,025 mm.) thick piece of paper (e.g. cigarette paper or typists carbon paper). The pressure is correct when the paper is 'nipped' by the contacts. What constitutes sufficient degree of 'nip' can be established by assessment on a car that has had its contacts correctly set.

1. Ensure the handbrake is applied and the ignition switch turned to the 'Lock' position.
2. Remove the top half of the steering column cowl.

Note On Corniche cars it may be found necessary to slacken the two screws retaining the lower half of the cowl in order that the top half be removed without damage.

3. Operate the selector lever and ensure that when the lever is in its detent for all of the 'P', 'R', 'N', 'D', 'I', and 'L' positions, the moving contact is positioned on the relevant fixed contact.

Note Radial adjustment of the fixed contact insulating plate is provided by elongated holes used to attach it to the casting (*see Fig. T163*).

4. Check that the moving contact is exerting sufficient pressure on each of the fixed contacts by feeling the amount of 'nip' on a 0·001 in. (0,025 mm.) thick piece of paper placed between the contacts.
5. Carefully remove the paper without lifting the moving contact.
6. If this check reveals insufficient contact pressure on any of the fixed contacts ensure that the insulating plate is in its uppermost position. This is when the plate end stops are touching the machined lugs as shown in Figure T163.
7. When adjustment is necessary the contact pressure should be rechecked after this has been carried out.
8. If the contact pressure is still too low it will be necessary to reshape the moving contact such that the deflection produced when fitting the fixed contact insulating plate against its stops is between 0·050 in. and 0·100 in. (1,27 mm. and 2.54 mm.).

Note The fixed contact insulating plate **MUST** be removed when reshaping the moving contact.

9. Ensure that the moving contact is not running on the edge of the fixed contacts.
10. Fit the steering column cowl and test the assembly.

Remote gearchange selector—To test

1. Switch on the ignition with the gear range selector in 'P'.
2. Move the selector slowly to 'R', 'N', 'D', 'I' and 'L' ensuring that the transmission responds correctly by listening for its operation at each position.

3. Select 'P' and 'N' in turn and check that the engine will start.
4. Switch off the engine and select 'R', 'D', 'I', 'L' and at each position ensure that the engine will **NOT** start.
5. Refit the top half of the steering column cowl.
6. With **CARE** ensure that the car:

(i) Reverses when 'R' is selected.
(ii) Parks when 'P' is selected.
(iii) Drives forward when 'D', 'I', 'L' are selected.

Note These checks to be done first by slow deliberate selection of each gear position and secondly by fast operation of the gear selector.

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September 1971

T.S.D. 2476

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Section T9
TRANSMISSION—TO REMOVE AND FIT

Transmission—To remove

The following procedure is applicable to **all cars** fitted with the Torque Converter Transmission except where divided for either **early** or **later cars.**

1. Drive the car onto a ramp or over a pit; this will enable the transmission to be lowered as it is removed from the car.
2. Ensure that both front road wheels and one rear road wheel are suitably 'chocked' to prevent the car moving.
3. Switch on the ignition and select the 'Neutral' position with the gearchange selector lever; this will ensure that the transmission and propeller shaft are not 'locked' in the 'Park' position.
4. Switch off the ignition and remove the transmission thermal cut-out from the fusebox; refer to the fuseboard identification plate for location.
5. Disconnect the negative lead from the battery, situated in the luggage compartment.
6. Jack up the 'un-chocked' rear road wheel to enable the propeller shaft to be rotated.
7. Disconnect and remove the propeller shaft (*see Propeller shaft — To remove, Chapter F, Section F1*).
8. Lower the rear road wheel of the car and suitably 'chock' as the other three road wheels.
9. Raise the bonnet.
10. Drain the engine coolant (*see Cooling system — To drain, Chapter L, Section L1*).
11. Drain the transmission fluid (*see Section T2 — Servicing*).
12. Remove the dipstick and filler tube. Blank off the hole in the sump to prevent any remaining transmission fluid from running out as the transmission is removed.
13. Disconnect the speedometer cable from the transmission case. Suitably mask both transmission connection and cable end to prevent the ingress of dirt.
14. Unscrew and remove the multi-pin plug from the socket on the gearchange actuator. Suitably mask both the actuator connection and cable end to prevent the ingress of dirt.
15. On **early cars,** remove the nuts and washers securing the neutral start and height control switches to the mounting bracket on the side of the transmission case.
16. Tie the switch and lead assembly to a convenient point so that it will not be damaged.
17. Remove the Lucar connection from the solenoid connection on the side of the transmission case. On **early cars** note the colour of the leads to assist correct assembly; there are two leads, one to the detent solenoid and the other to the stator solenoid. On **later cars** there is only one (Green/white) wire to the side of the transmission case and this operates the detent solenoid. Tie the lead to a convenient point so that it will not be damaged.
18. Disconnect and remove the actuator breather pipe. On **later cars** also disconnect the flexible tube end of the breather from the adapter in the crossmember. Mask all open connections.

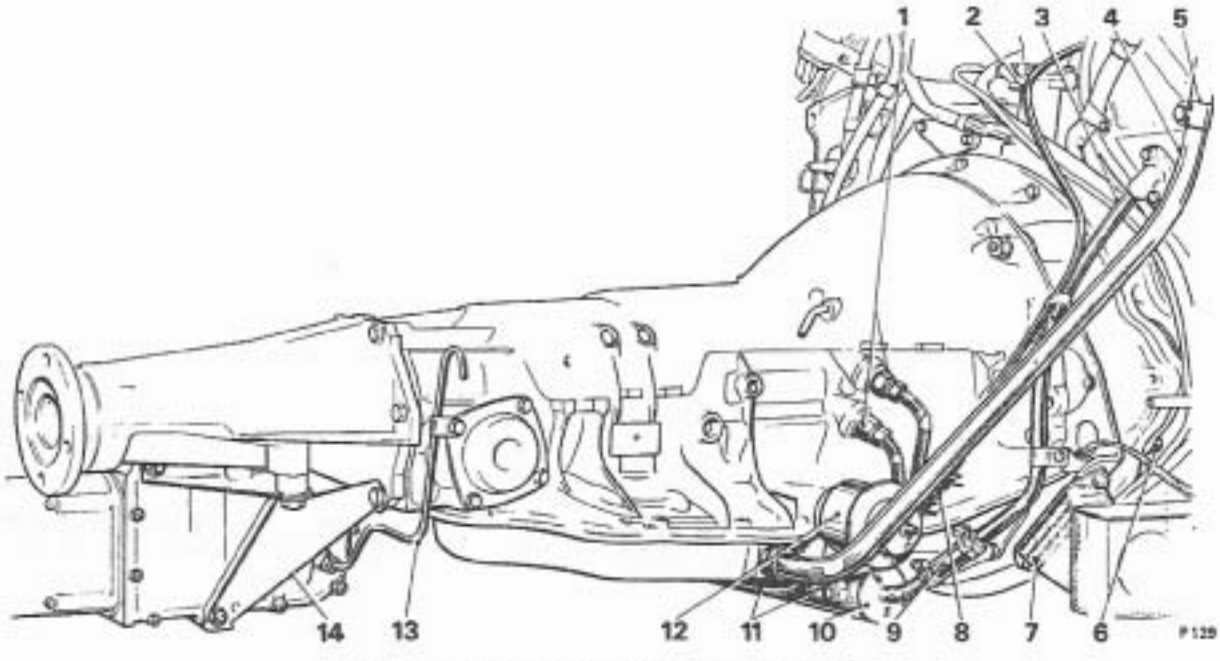

FIG. T164 TRANSMISSION DISCONNECTING POINTS—OFF-SIDE (EARLY CARS)

1 Transmission fluid feed and return pipes
2 Vacuum pipe
3 Coolant feed pipe to heat exchanger
4 Dipstick and filler tube
5 Dipstick and filler tube clip
6 Starter motor bottom bolt
7 Right-hand flexible mount
8 Vacuum pipe connection
9 Coolant pipe connection
10 Heat exchanger
11 Transmission fluid pipes (heat exchanger end)
12 Vacuum modulator
13 Electric actuator breather pipe
14 Actuator mounting brackets

19. Disconnect and remove the various operating rods and levers from the side of the transmission case (*see Figs. T165 and T167*).

20. Remove the three bolts which secure the actuator to the rear extension; remove the actuator.

21. Disconnect the throttle operating rod (*see Figs. T139, T140 and T141 — Control rod — accelerator to compensator linkage*), at the compensating linkage. On right-hand drive cars, also disconnect the throttle operating rod at the lower end and remove the complete rod. On left-hand drive cars, remove the setscrews which secure the accelerator cross-shaft brackets to the underside of the body; remove the brackets, shaft, levers and rods, including the rod connecting the accelerator lever to the cross-shaft lever.

22. Remove the starter motor (*see Starter motor — To remove, Chapter M, Section M4*).

23. Disconnect the vacuum modulator pipe at the modulator end and at the induction manifold; remove the pipe and mask the open connections.

24. On **early cars,** disconnect the two short rubber hoses, one on each side of the heat exchanger.

Note There will be coolant in the heat exchanger and associated pipes which will not drain until the rubber hoses are disconnected. Therefore, it is advisable for the operator to ensure that a suitable container is available.

25. On **early cars,** disconnect the heat exchanger coolant feed pipe from the rear of 'A' bank cylinder head. Remove the various clips and bolts which secure the coolant pipe to the transmission and the vacuum pipe; remove the coolant pipe. Disconnect the coolant return pipe from the junction above 'B' bank rocker cover. Remove the various clips and bolts which secure the coolant return pipe; remove the pipe.

26. On **early cars,** disconnect and remove the heat exchanger transmission fluid pipes; these are located on the dipstick side of the transmission. Remove the setscrews which secure the heat exchanger to the bell

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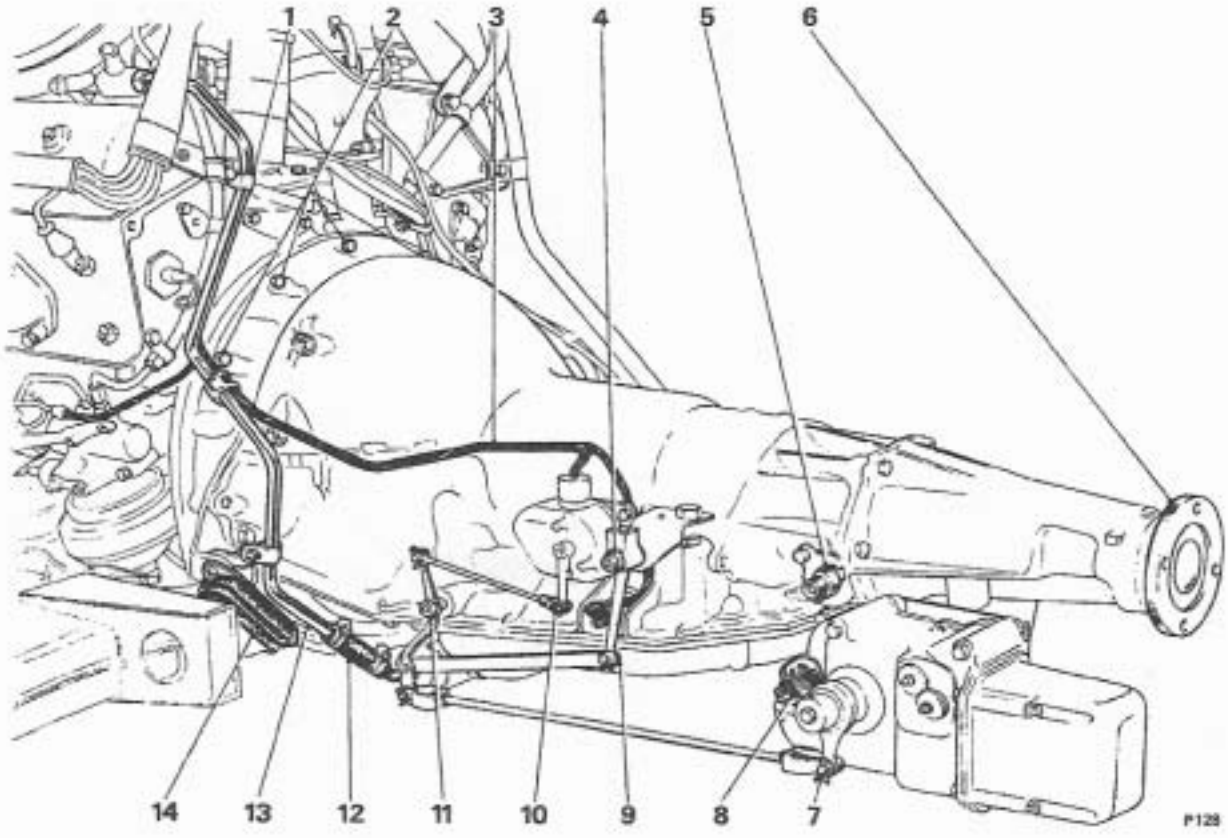

FIG. T165 TRANSMISSION DISCONNECTING POINTS—NEAR-SIDE (EARLY CARS)

1 Coolant return pipe clip
2 Transmission top securing setscrews
3 Micro-switch and solenoid leads
4 Emergency (get-you-home) lever
5 Speedometer drive
6 Coupling flange
7 Actuator lever clevis pin
8 Jack plug socket
9 Detent and stator lead contents
10 Micro-switch lever clevis pin
11 Gearchange lever lock-nut
12 Heat exchanger cooling connection
13 Heat exchanger coolant return pipe
14 Near-side flexible mount

housing bottom cover; remove the heat exchanger and mask the open connections.

27. On **later cars,** disconnect the two transmission fluid flexible pipes leading to and from the heat exchanger situated in the engine coolant radiator. The pipes should be disconnected at a point by the dipstick side of the transmission case where the flexible pipe joins the solid metal pipe.

Note There may be a small quantity of transmission fluid in the pipes which will drain out when the pipes are disconnected, therefore, ensure a suitable container is available.

28. Remove the setscrews which secure the front cover plate and the bell housing bottom cover; remove the plate and cover.

29. Remove the setscrews which secure the engine flexplate to the torque converter.

Note Take care when turning the torque converter to reach the setscrews; do not lever on the flexplate or starter ring as they may become damaged.

30. On **early cars** the transmission is secured to the adapter plate by through bolts and therefore, the adapter plate must be removed with the transmission. **In these instances proceed as follows.**

31. Position a jack under the rear of the engine sump. Ensure that the load is spread evenly by placing a piece of soft wood between the sump and the head of the jack.

32. Raise the jack to take the weight of the engine and transmission.

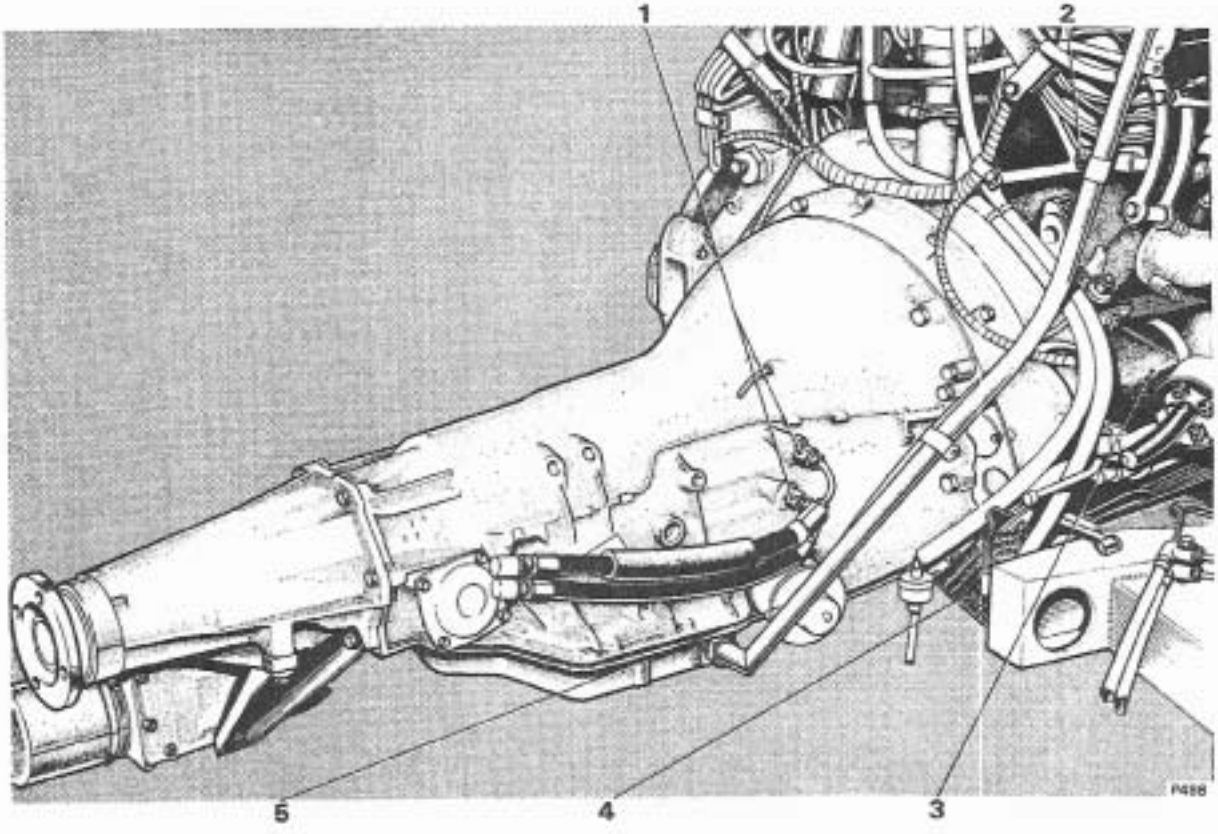

FIG. T166 TRANSMISSION DISCONNECTING POINTS—OFF-SIDE (LATER CARS)

1 Transmission oil cooler pipe connections
2 Dipstick/filler tube clip
3 Starter motor setscrews
4 Offside flexible mount
5 Vacuum modulator pipe

33. Remove any dirt around the mounting brackets, then scribe correlation marks on the transmission feet and the sub-frame around the mounting brackets.

Note Scribing the correlation marks on the mounting brackets will enable the transmission to be correctly positioned when it is fitted.

34. Support the transmission with the aid of a trolley jack and extension, using a suitable platform to fit around the transmission sump.

35. Remove the bolts which secure the rubber mountings to the transmission.

36. Remove the setscrews which secure the brackets to the sub-frame. Remove the mounting brackets and rubber mounts.

37. Unscrew the eight setscrews which secure the transmission to the engine. It may be necessary to lower the engine and transmission slightly to gain access to some of the setscrews; the uppermost setscrews can be reached from the engine compartment.

Note It may not be possible to remove all setscrews completely owing to the close proximity of the adjacent components, however, the setscrews may be unscrewed sufficiently to clear their mating threads. **Do not** remove the five large nuts and one setscrew which secure the transmission to the adapter.

38. Carefully move the transmission towards the rear of the car, disengaging the adapter from the engine crankcase. The adapter is dowelled to the crankcase.

39. On **later cars,** the transmission is secured to the adapter plate by setscrews, and can be removed from

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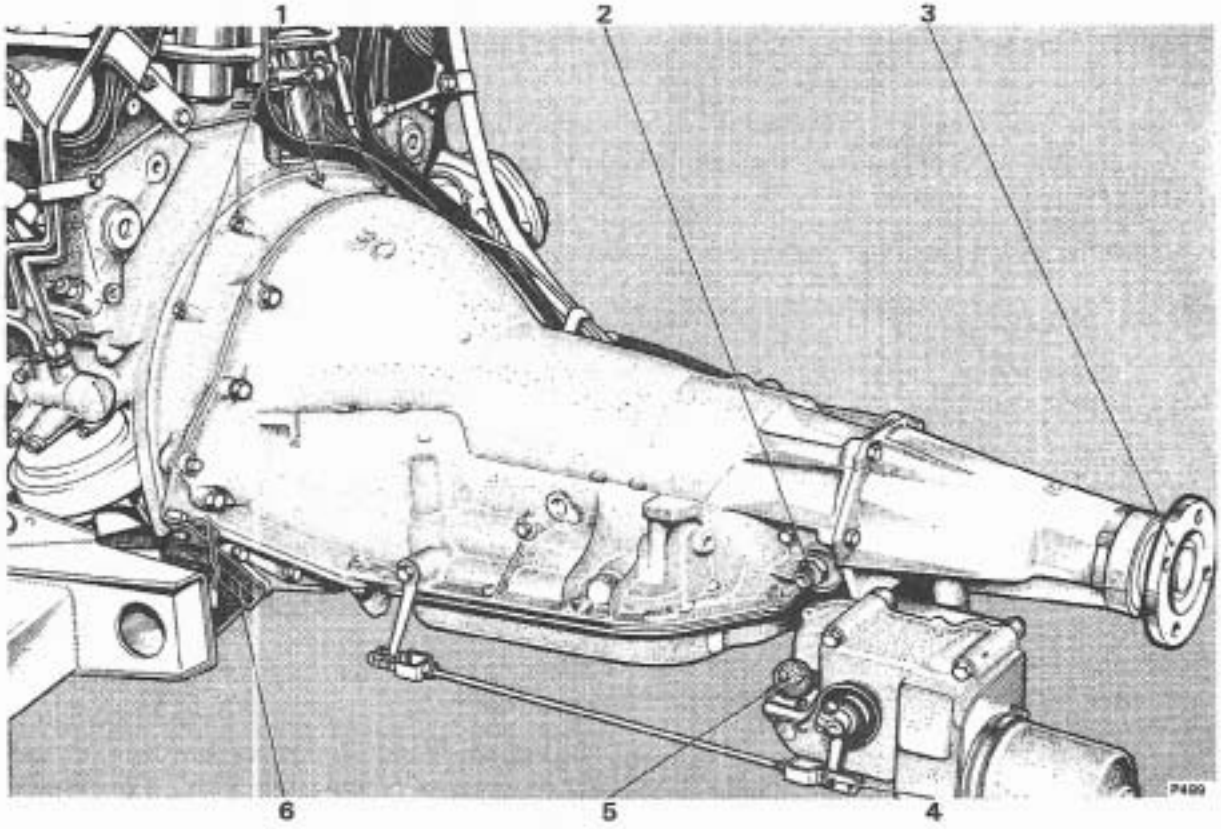

FIG. T167 TRANSMISSION DISCONNECTING POINTS—NEAR-SIDE (LATER CARS)

1 Transmission top securing setscrews
2 Speedometer drive
3 Coupling flange
4 Actuator lever clevis pin
5 Actuator socket
6 Near-side flexible mount

the car whilst leaving the adapter and the mounting plate in position.

40. Support the transmission with the aid of a trolley jack and extension, using a suitable platform to fit around the transmission sump.

41. Unscrew the five setscrews which secure the transmission to the adapter.

42. Carefully move the transmission towards the rear of the car until the dowels in the transmission are clear of the mounting plate.

43. **The remaining procedure is applicable to all cars.**

44. Fit the retaining clamp RH 7952 (J–21366) to prevent the converter from becoming disengaged from the transmission.

Note The retaining clamp must be used, otherwise the converter may fall as the transmission is being removed.

45. Lower the jack until the transmission is clear of the body then remove the transmission from the car.

46. Remove the retaining clamp then withdraw the converter.

Note A converter with oil weighs approximately 50 lb. (22,7 kg.).

47. If overhaul work is to be carried out, fit the transmission into the holding fixture RH 7956 (J–8763–20) as shown in Figure T168.

Transmission—To fit

Fit the transmission by reversing the procedure given for the removal, noting the following points.

1. Torque tighten the various nuts, bolts, setscrews etc. to the figures quoted in Chapter P.

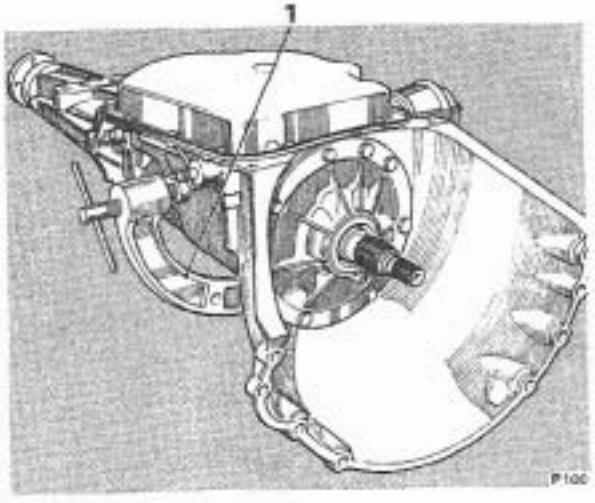

FIG. T168 TRANSMISSION IN HOLDING FIXTURE

1 Holding fixture

2. On **early cars,** ensure that the mating faces of the transmission adapter and the engine crankcase are clean and free from damage.

Note It is advisable to fit the setscrews into those holes which are difficult to reach once the transmission is in position.

3. On **later cars,** ensure that the mating faces of the transmission and the mounting plate are clean and free from damage.

Observe the following notes carefully when securing the torque converter to the engine flexplate.

1. Rotate the converter until two of the three weld nuts on the converter line up with the two bolt holes in the flexplate.

2. Position the converter so that the weld nuts are flush with the flexplate. Ensure that the converter is not tilted and that the pilot in the centre of the converter is correctly located in the crankshaft.

3. Fit two setscrews from the front of the flexplate and torque tighten them to 28 lb. ft. (3,9 kg. m.).

Note The two bolts must be tightened at this stage to ensure that the converter is correctly aligned with the flexplate and crankshaft.

4. Insert a screwdriver or pinch bar under one of the converter weld nuts.

5. Rotate the converter until the third setscrew can be fitted. Torque tighten this setscrew. **Do not** lever on the starter ring when rotating the converter.

6. If the adapter and mounting plate have been removed raise the transmission slightly higher than its normal position and fit the mounting brackets and rubber mounts. Before tightening the brackets to the sub-frame and transmission, ensure that the correlation marks which were scribed during removal, are aligned.

7. Ensure the earthing lead is fitted to the top bolt on the right-hand mounting foot.

8. Connect the throttle operating rod; ensure that the joints are adequately lubricated and that the throttles open fully when the accelerator pedal is depressed and return to the closed position immediately the pedal is released.

9. After completion of the fitting operation, fill the engine cooling system and the transmission system with their respective fluids.

10. Finally road test the car for satisfactory operation.