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**4141**



**RENAULT**

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<b>General</b>	1 to 15
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# Workshop manual

hydraulic automatic  
transmission : 4141

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**R.S. 3520**

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**R1271 - R1272 - R1273 - R1275**

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Replaces and supersedes :  
R.S. 5A, 16A, 18A, 22A, 24A, 25A, 27A in M.R. 167  
Chapter F in M.R. 174 - 1st edition - Dec. 1975  
R.S. 4A, 5A, 11A, 13A, 15A in M.R. 174

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July 1977

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◆ F.A.D.Dk.E.It.N.NL.S.

The repair methods given by the manufacturer in this manual are based on the technical specifications current when it is compiled.

The methods may be modified as a result of changes introduced by the manufacturer in the production of the various component units and accessories from which his vehicles are constructed".

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Régie Nationale des Usines Renault 1976

Technical drawings by the Régie Nationale des Usines Renault. ADDOTEC  
& TECHNIQUES - BORD - BUROTEC - CASADAMONT - DONNADIEU - D.T.R.B. - EDITECHNIC - ERI  
- E.T.D.S. - GRAPHECO - I.T.E. - Ateliers MS - OGEP - SASEDD - BUROTEC - SEDI - SERTA - SOFREME  
LUGRAF



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## SPECIFICATIONS

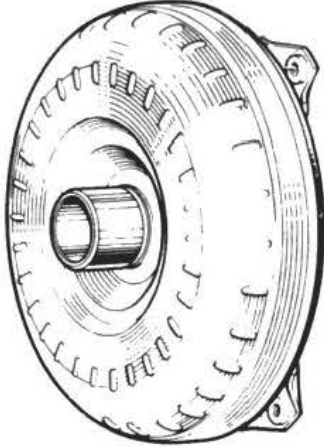
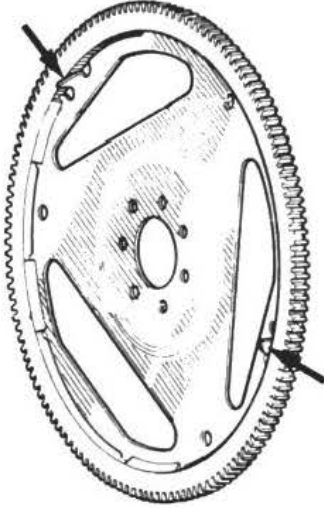
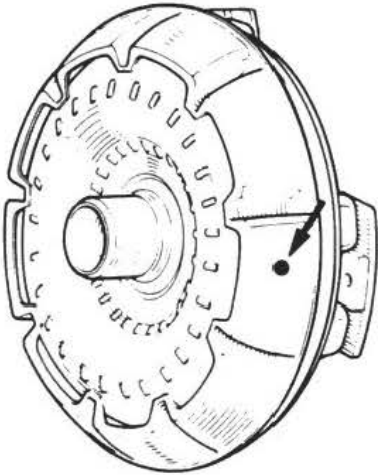
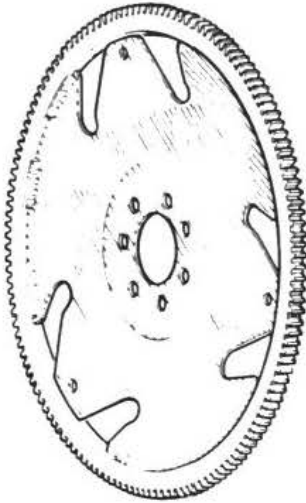
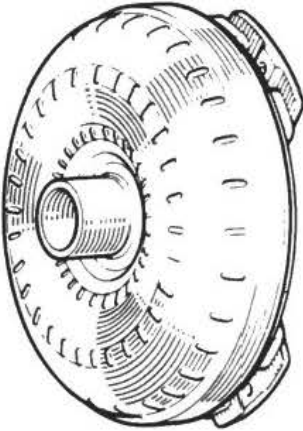
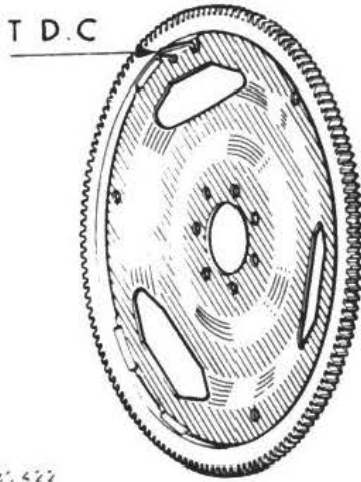


Vehicle Type	Mark	Special Features	Final drive	Speedo drive	Step-down gears
R 1273	4141-00	Replaced by 4141-30			
R 1273 R 1275	4141-30	Replaces 4141 - 00. F2 brake different. 3 F2 lined discs. instead of 4 in 4141-00	9 x 35	26 x 21	26 x 25
R 1275 "Extreme Cold"	4141-31	"Extreme Cold" bellows (white)			
R 1271	4141-10		8 x 33	26 x 23	27 x 25
	4141-11	"Extreme Cold" bellows (white)			
	4141-12		8 x 33	26 x 23	26 x 25
	4141-13	"Extreme Cold" bellows (white)			
R 1272	4141-20		*8 x 33 9 x 37	26 x 22	27 x 25
	4141-21	"Extreme Cold" bellows (white)	9 x 37	26 x 22	27 x 25

\* For some vehicles



CONVERTERS - DRIVING PLATES

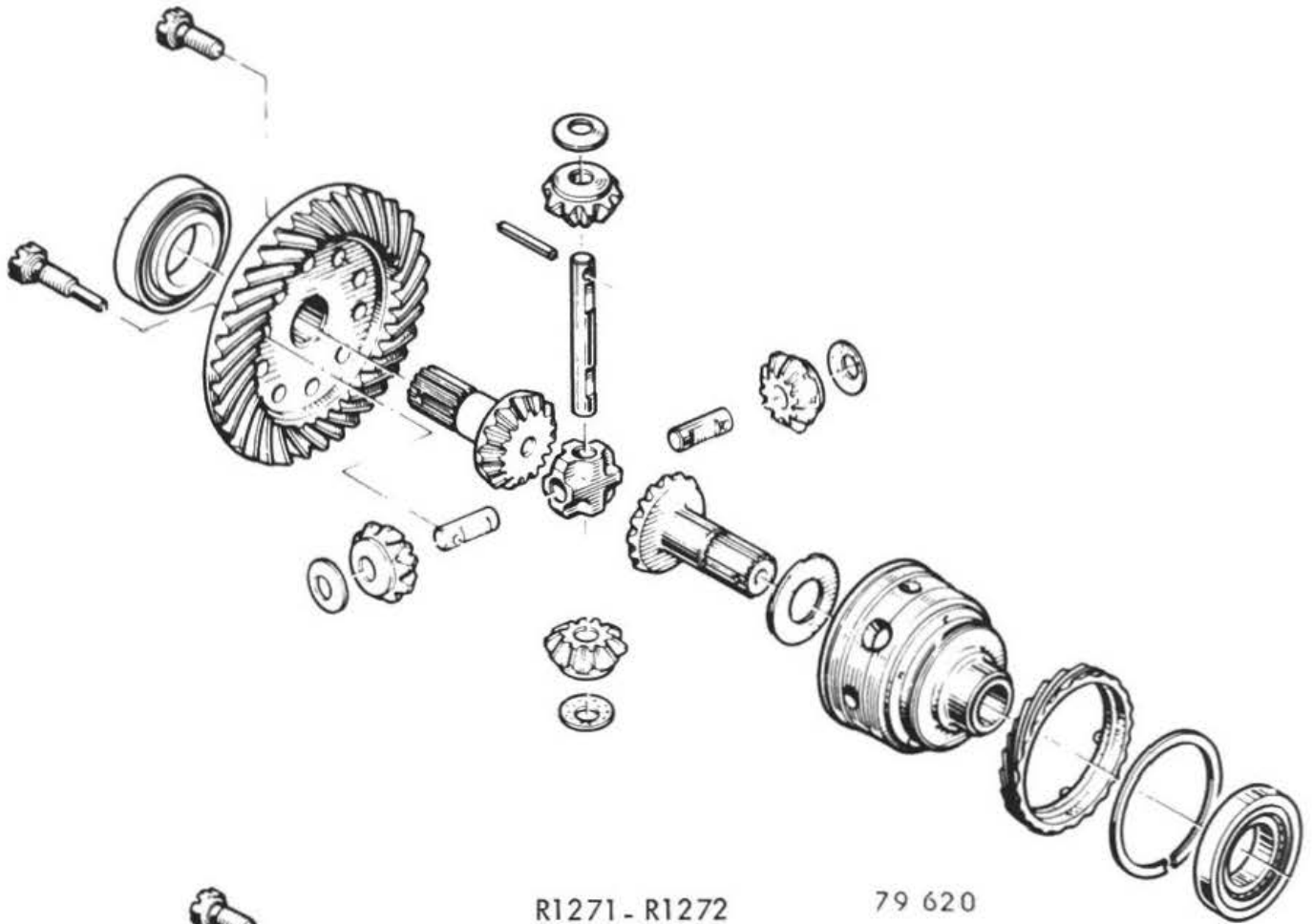
VEHICLE TYPE	CONVERTER	DRIVING PLATE	SPECIAL FEATURES
<p>R1273 R1275</p>	 <p>250</p>		<p>2 T.D.C. timing marks on driving plate</p>
<p>R1271</p>	 <p>R240</p>		<p>1 hole in converter acting as T.D.C. mark</p>
<p>R1272</p>	 <p>R240</p>	<p>T D C</p>  <p>81.422</p>	<p>1 T.D.C. timing mark on converter driving plate.</p>



DIFFERENTIAL

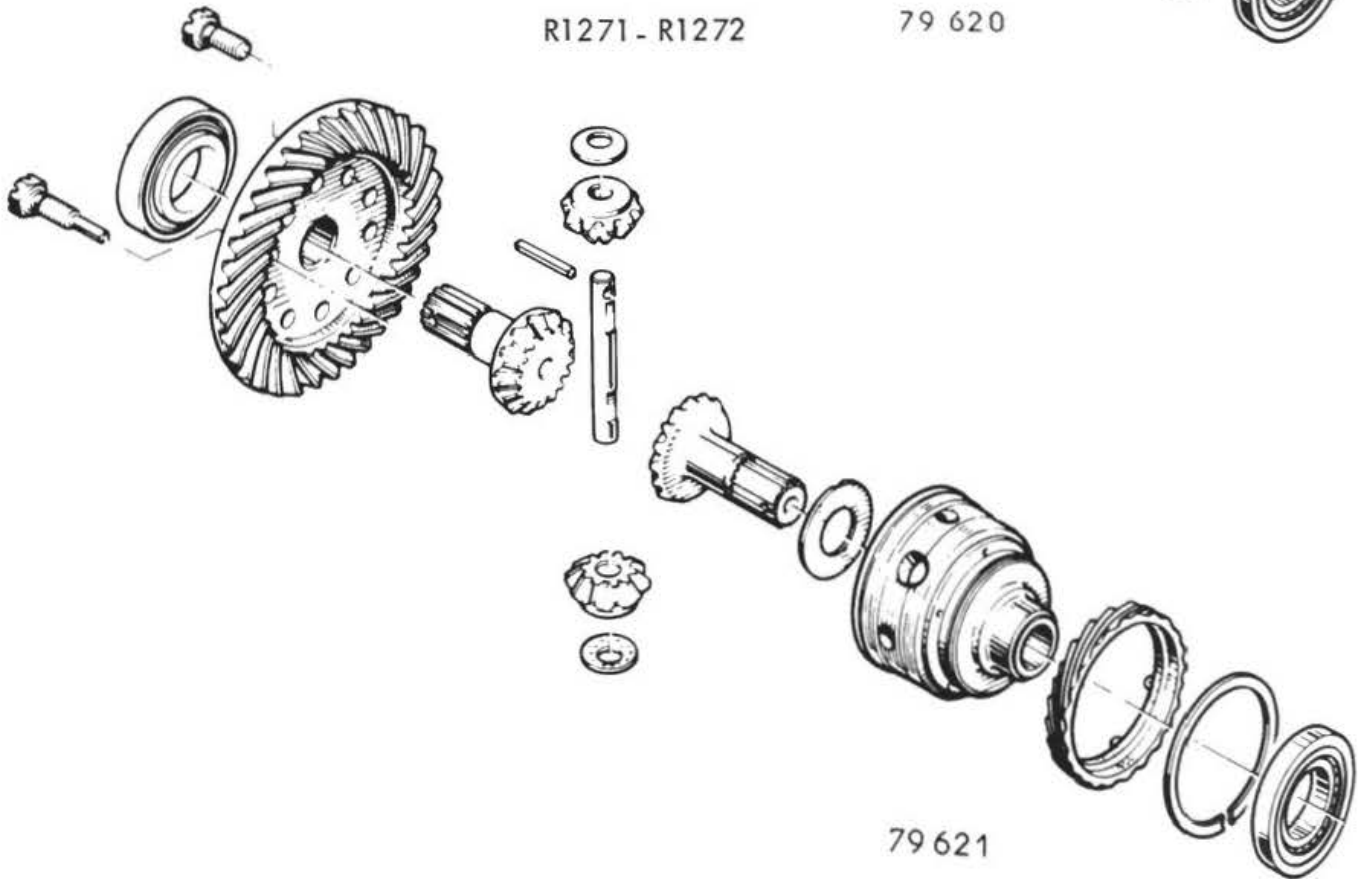


R 1273 - R 1275



R1271 - R1272

79 620



79 621



	SUFFIX		REDUCTION RATIOS			GEAR-CHANGING* SPEEDS				
			GEAR TRAIN ONLY	GEAR TRAIN + STEP-DOWN GEAR	GEAR TRAIN + STEP-DOWN GEAR + FINAL DRIVE	1 ↔ 2		2 ↔ 3		
R.1273 R.1275	4141	REV.	1,92	1,846	7,179					
	30	3	1	0,961	3,739	LT	17,6	11,4	30,3	21,1
	31	2	1,48	1,423	5,534	FT	60,0	38,7	103,4	71,8
	00	1	2,4	2,307	8,974	KD	62,8	54,2	106,7	97,2
R.1271	4141	REV.	1,92	1,777	7,330					
	10	3	1	0,926	3,819	LT	18,1	11,7	31,2	21,7
	11	2	1,48	1,370	5,653	FT	59,7	38,6	102,9	71,5
		1	2,4	2,222	9,166	KD	62,4	54,0	106,1	96,6
	4141	REV.	1,92	1,846	7,615					
	12	3	1	0,961	3,966	LT	18,6	12	32,1	22,4
	2	1,48	1,423	5,870	FT	60,1	38,8	103,4	71,9	
	1	2,4	2,308	9,519	KD	62,7	54,4	108,4	97,2	
R.1272	4141	REV.	1,92	1,777	7,330					
	20	3	1	0,926	3,819	LT	19,4	12,5	33,5	23,4
		2	1,48	1,370	5,653	FT	62,8	40,6	108	75,1
	1	2,4	2,222	9,166	KD	65,5	56,8	113,2	101,5	

LT = Light throttle - FT = Full throttle - KD = Kick-down.

\* Road speeds are given in km/h.

Gear-changing speeds

The figures shown in the table give the average theoretical moments for gear-changing (chronometer speeds).

These values may vary, depending on the tolerances allowed in the units (governor, computer, speedometer) and also on the type of tyre fitted.





## Tightening torques

Converter to driving plate fixing bolts	3 to 3,5 m.da.N (22 1/2 to 26 1/4 lb/ft)
Driving plate to crankshaft fixing bolts	6,5 to 7 m.da.N (45 1/2 to 52 1/2 lb/ft)
Converter casing fixing bolts	4 to 4,5 m.da.N (30 to 33 3/4 lb/ft)
Stator support fixing bolts	3 to 3,5 m.da.N (22 1/2 to 26 1/4 lb/ft)
Half-casing assembly bolts - 8 mm dia.	3 m.da.N (22 1/2 lb/ft)
- 10 mm dia.	4 to 4,5 m.da.N (30 to 33 3/4 lb/ft)
Final drive casing to gear casing fixing bolts	1,8 to 2,2 m.da.N (13 1/2 to 16 1/2 lb/ft)
Oil pump casing fixing bolts	1,1 m.da.N (8 1/4 lb/ft)
Sump fixing bolts	0,3 to 0,4 m.da.N (2 1/4 to 3 lb/ft)
Crown wheel fixing bolts	12 to 14 m.da.N (90 to 115 lb/ft)
Final drive pinion nut	22 to 24 m.da.N (165 to 180 lb/ft)
Output shaft (planet wheel carrier) nut	18 to 20 m.da.N (135 to 150 lb/ft)
Hydraulic distributor fixing bolts (see page 95)	1 m.da.N (7 1/2 lb/ft) + 2 bolts at 0,7 m.da.N (5 1/4 lb/ft) or all bolts 1 m.da.N (7 1/2 lb/ft)
F2 casing bolts	1,5 m.da.N (11 1/4 lb/ft)
Oil pump suction pipe	0,7 m.da.N (6 lb/ft)

## OIL COOLER

### R 1272 - R 1273 - R 1275

The oil cooler for the automatic transmission gear casing is incorporated in the engine cooling radiator.

### R 1271

Production models are not fitted with an oil cooler.

An oil cooler may be fitted to this vehicle provided that it has no air conditioning system.

When an oil cooler has been fitted to the hydraulic circuit (for mechanical components section) on an automatic transmission, the vehicle concerned may tow :

- an unbraked trailer having a gross weight not exceeding 600 kg (1323 lbs) (instead of only 450 kg (992 lbs) without an oil cooler).
- A caravan or boat braked trailer having a gross weight not exceeding 1250 kg (2756 lbs)

One single fitting kit (Part No. 77 01 459 922) available from the Parts Department is suitable for both L.H.D. and R.H.D. vehicles and for 360 mm or 460 mm (14" or 18") radiators.

### RECOMMENDED OILS

The oils used in the final drive casing and gear casing are not the same grade.

#### Final drive

API GL5 (SAE 80) or (SAE 75) oil.

#### Gear casing

ELF-Renaultmatic D1 or MOBIL ATF 220

### Capacities

Final drive : 1,6 litres (3 Imp. pts. - 3 1/2 US pts.)

Gear casing converter :

R 1271	5,5 litres (9 1/2 Imp. pts. - 11 1/2 US pts.)
R 1273	} 6 litres (10 1/2 Imp. pts. - 12 1/2 US pts.)
R 1275	
R 1272	

### CHECKING OIL LEVELS

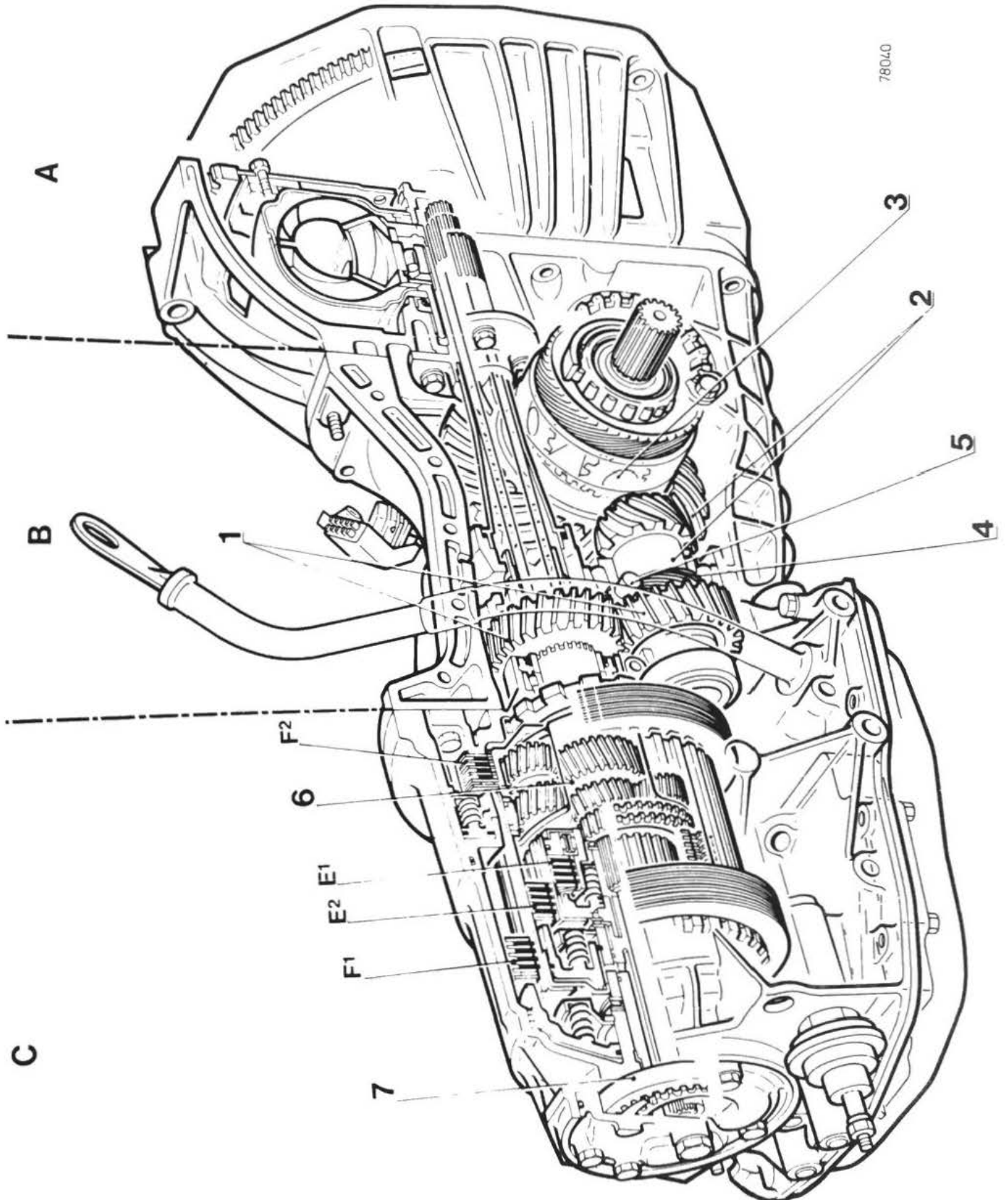
- Place the vehicle on smooth level ground.
- Move selector lever to "P" (PARK)
- Start engine and wait a minute or two for converter and oil cooler to fill.

# AUTOMATIC TRANSMISSION COMPONENTS

The automatic transmission enables the 3 forward speeds to be engaged one after the other with continuous torque action.

It comprises three main components:

- converter (A)
- final drive (B)
- and gear casing (C)





### CONVERTER (A)

#### It provides:

- a smooth connection for transmitting the engine torque to the mechanical components in the mechanism,
- automatic clutch action,
- increased torque for starting off.

### FINAL DRIVE (B)

It transmits the drive from the gear casing to the roadwheels and comprises:

- step-down gears (1) which lower the drive centreline;
- crown wheel and pinion (2) which drives differential (3);
- worm (4) which drives governor gear (5).



### MECHANICAL COMPONENTS CASING (C)

#### It provides:

- 3 reduction ratios

#### It comprises:

- epicyclic gear train (6),
- 3 different types of control elements for the above train:
  - . mechanical,
  - . hydraulic,
  - . and electric.

#### Epicyclic gear train (6)

This is an assembly of helical gears which enable different ratios to be obtained (3 forward ratios, 1 reverse ratio) depending on the pressure of the hydraulic feed to the clutches and brakes.

The train consists of:

- 2 sunwheels P1 and P2;
- 3 pairs of planet wheels S1 and S2 connected by a planet wheel carrier;
- an involute ring gear.

#### The control elements

##### Mechanical components

A freewheel which transmits torque in the engine-roadwheels direction only, no engine braking effect being available.

Multi-disc oilbath type E1 and E2 clutches and F1 and F2 brakes. These are hydraulic receivers which lock or release certain components in the epicyclic gear train depending on the pressure of the hydraulic feed (from the hydraulic distributor), thus providing the different ratios.



## Hydraulic components



### Oil pump (7)

An involute gear oil pump is driven directly by the engine and supplies oil at the required pressure:

- to the converter;
- for lubricating the gears;
- to the brakes and clutches.

The oil pump is located at the rear of the transmission casing.

### Hydraulic distributor

This ensures:

- oil pressure regulation to suit engine load (vacuum capsule and pilot valve).
- pressure feed (or release) to clutches and brakes. Ratio changes are determined by the operation of two solenoid valves E1 1 and E1 2, called solenoid ball valves. They receive their instructions from the governor-computer in the form of electrical impulses.

The capsule and pilot valve ensure circuit pressure (pilot pressure) which determines the pressure to the clutches and brakes depending on engine load and, as a result, controls gear-shifting.

## Electrical components

They comprise:

- . A unit consisting of the governor and computer together.
- . The governor is a low output alternator (about 1 watt) driven by a worm on the final drive pinion. It produces current which varies according to:
  - vehicle speed;
  - engine load (position of accelerator pedal).
- . The computer receives the following information:
  - alternating current from governor;
  - selector lever position.

Depending on the nature of the above information, the computer may or may not transmit instructions to the solenoid ball valves.

It also ensures that 1st gear "Hold" may be selected safely (it prevents this ratio being engaged at a speed of more than 35 km/h (22 m.p.h.) on light throttle.

- . The multiple switch.

The cam opens or closes various electrical circuits depending on the position of the selector lever:

- Starter circuit

Current is supplied to the starter only when the selector lever is in either position N or P.

- Reversing lights circuit (position R).
- E1 1 and E1 2 solenoid ball valve circuits.



. The kick-down switch

Operated by the accelerator pedal at the extreme end of its travel, it earths a circuit in the computer, this will cause a lower gear to be selected in certain circumstances.



The solenoid ball valves

These are solenoid operated balls. Their purpose is to open or close hydraulic passages to allow gear shifting to take place.

UNITS BROUGHT INTO OPERATION WHEN SELECTION IS MADE

Selector lever position	E1 Clutch	E2 Clutch	F2 Brake	F1 Brake	RL Freewheel	Solenoid ball valves	
						E1 1	E1 2
P						X	X
R	X			X		X	X
N						X	X
A	1		X		X	X	X
	2		X	X			X
	3	X	X				
2	1		X		X	X	X
	2		X	X			X
1	X		X			*X	X

\* Below 35 km/h (22 m.p.h.) on Light Throttle



# FAULT FINDING TABLE



Refer also to "Incidents - Remedies" chapter, page 28

FAULTS	CAUSES									
	2	3	4	11	10					
Engine stalls, rough idling	●	●	●	■	●					
Creep in "N"	17 ●	15 ■	27 ▲							
Excessive creep in "A"	2 ●	4 ●	23 ▲							
Slip when moving off in "A" and "R"	1 ●	9 ●	15 ■	31 ■	23 ▲					
Slip when moving off in "A" only	28 ▲									
Slip during gear shifting	9 ●	31 ■	15 ■	24 ▲	25 ▲	27 ▲				
Snatch on starting off	2 ●	4 ●	15 ■							
Snatch during gear shifting	5 ●	9 ●	11 ■	14 ■	15 ■	31 ■	32 ■			
Incorrect gear shifting speeds	4 ●	5 ●	6 ●	8 ●	12 ●	13 ■	30 ■	14 ▲		
No drive irrespective of gear selected	17 ●	15 ■	18 ■	19 ▲	20 ▲	21 ▲	22 ▲	23 ▲		
No drive in 1st and 2nd automatic	27 ▲									
No drive in 2nd or 3rd	25 ▲									
No drive in 3rd and no engine braking in reverse and 1st gear "Hold"	24 ▲									
No drive in reverse	26 ▲									
No drive in 1st automatic but drive in 1st gear "Hold"	28 ▲									
No 1st automatic	8 ●	12 ●	14 ■	15 ■	28 ▲					
No 2nd automatic	8 ●	12 ●	14 ■	15 ■						



FAULTS	CAUSES						
	8	12	14	15			
No 3rd automatic	8 ●	12 ●	14 ■	15 ■			
No 1st gear "Hold" No 2nd gear "Hold"	8 ●	17 ●	12 ●	16 ■	14 ■	15 ■	
Remains in 1st automatic	8 ●	12 ●	16 ■	14 ■	15 ■		
Remains in 3rd	7 ●	8 ●	12 ●	14 ■	15 ■		
Some ratios unobtainable and selector lever abnormal	17 ●	29 ■					
"Park" facility not working	17 ●	29 ■					
Starter not working	8 ●	17 ●	16 ■				
Blue exhaust smoke	11 ■						

The various faults are arranged in order of decreasing frequency and checks should be made in the numerical order shown.

#### CAUSES: For CHECKING, CHANGING or ADJUSTING

- 1 Oil level
- 2 Incorrect idling speed
- 3 Ignition: Spark plugs, contact points, ignition timing
- 4 Accelerator control
- 5 Governor cable
- 6 Kick-down switch setting
- 7 Fuses
- 8 Harness, wiring, plugs and sockets, earth
- 9 Line pressure
- 10 Carburettor: flap setting
- 11 Vacuum capsule or pipe
- 12 Governor - computer
- 13 Kick-down switch
- 14 Solenoid ball valves
- 15 Hydraulic distributor
- 16 Multiple switch
- 17 Selector control
- 18 Oil pump
- ▲ 19 Oil pump shaft
- ▲ 20 Turbine shaft
- ▲ 21 Final drive
- ▲ 22 Converter driving plate
- ▲ 23 Converter
- ▲ 24 E1 Clutch
- ▲ 25 E2 Clutch
- ▲ 26 F1 Brake
- ▲ 27 F2 Brake
- ▲ 28 Freewheel
- 29 "Park" mechanism and manual valve
- 30 Engine alternator
- 31 Pilot valve
- 32 Oil pump suction pipe

Legend:

- Adjustment made on assembled transmission
- Overhauled on assembled transmission
- ▲ Overhauled on removed or dismantled transmission



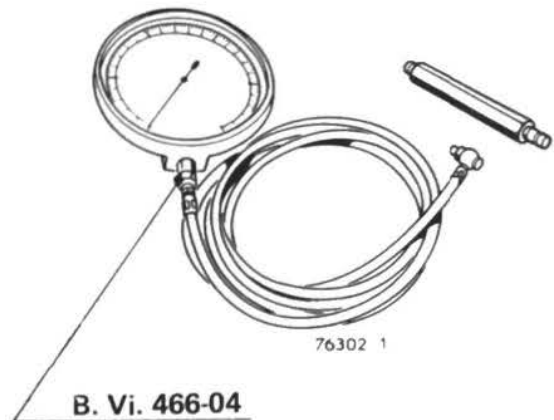
OIL PRESSURE CHECKING GAUGE

B.Vi. 466-04

It is graduated from 0 to 16 bars  
(0 to 233 psi).

It is used to measure the pressure in the hydraulic circuit with the vehicle stationary or moving, in order to find out:

- if the transmission has hydraulic power;
- the pressure of that power.



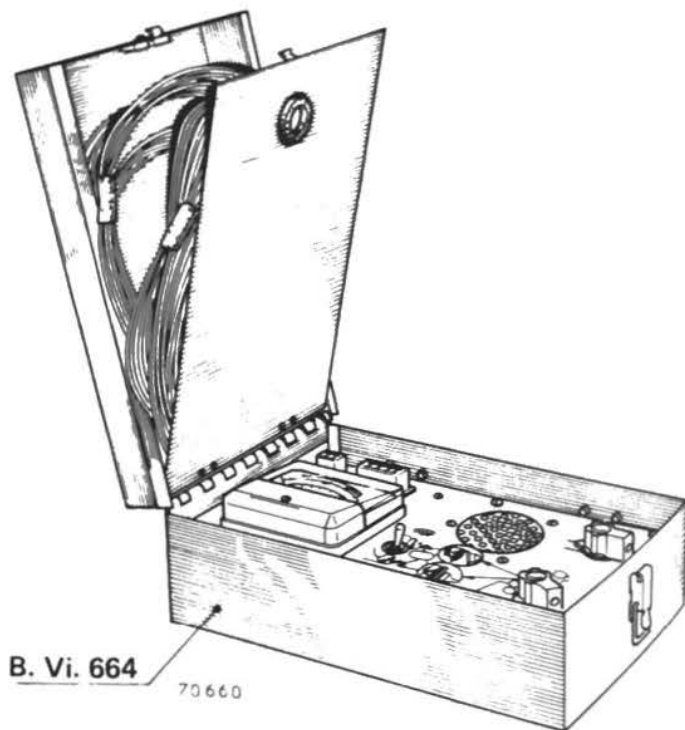
CONTROL BOX B.Vi. 454-06

It is connected to the transmission electrical circuit via intermediate harness B.Vi. 664 and enables one to find out whether the breakdown is:

- in the transmission electrical controls (governor - computer, solenoid ball valves)
- or in the internal units in the transmission itself.

If the control box is suspected of being faulty, make the necessary connections to a vehicle known to be working normally and check if all the control box functions are correct.

There is a wiring diagram if required in the bottom of the control box to assist an electronics technician.





A fuse must be fitted to the wire connecting control box B.Vi. 456-06 to the automatic transmission circuit in order to protect the control box from short-circuiting should malfunction of the solenoid ball valves (E1 1 - E1 2) occur.

Mark the earth wire belonging to the 8-pin plug and cut it in the middle, (the wire fits No.8 terminal next to one-way male locator M).

Bare and turn back each end of the wire to obtain a thicker conductor.

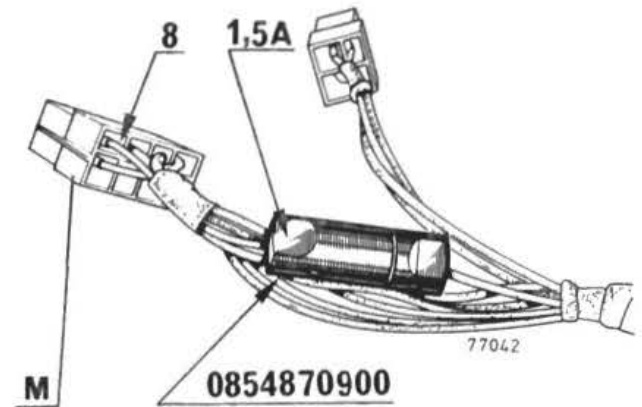
Insert fuseholder Part No. 08 54 870 900 and fit a 1,5 amp fuse (radio fuse) instead of the existing fuse.

#### TEMPERATURE PROBE B.Vi. 524

This probe cannot be inserted in the vehicle dipstick tube; it must be fitted inside a special replacement tube in order to reach the oil.

Two wires connect it to the control box wiring.

The temperature reading is taken from control box B.Vi. 454-06 itself.





## HOW TO USE THE CONTROL BOX



When connected to the transmission electrical circuit, it enables:

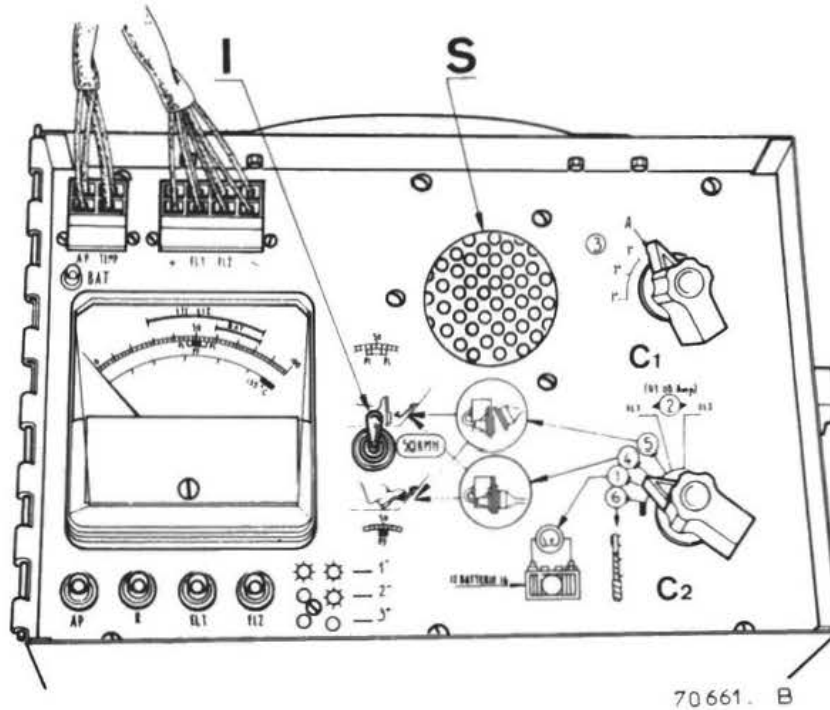
- direct control of the hydraulic distributor solenoid ball valves and, as a result, instructions to be given for the 1 ↗ 2 ↗ 3 ↘ 2 ↘ 1 gearshifts.
- a check to be made of all the transmission electrical controls.
- the transmission oil temperature to be measured.

It consists a box containing:

- a set of electrical circuits connected to various warning lights, a graduated scale and control switches.
- a double tier cover to hold the harness.



## DESCRIPTION



### WARNING LIGHTS

#### Red warning light: BAT

- it illuminates when the control box is switched on.

#### Blue warning light: E1 1

- it illuminates when current is supplied to E1 1.

#### White warning light: E1 2

- it illuminates when current is supplied to E1 2.

#### Green warning light: AP

- it indicates the moment the anti-pollution system starts to work (not used on this vehicle).

#### Orange warning light: R

- it shows the moment the kick-down switch starts to work.

#### BUZZER (S)

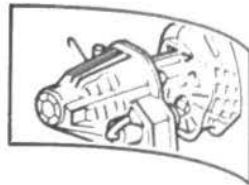
A small loudspeaker gives an audible warning when the governor current reaches its maximum.



## THE METER

It has graduated scales, enabling successive readings to be taken of:

- transmission oil temperature (the blacked out sector represents the maximum temperatures which must not be exceeded).
- governor current.
- battery current with engine switched off or running (0 to 100 scale = 20 volts).
- the current strength passing through the ball valve solenoids (the 0 to 100 scale representing 1 amp. in this case).



## THE C1 SWITCH

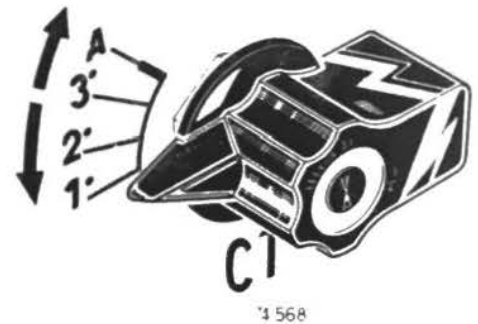
This switch can be used for 2 purposes:

### Position A

To obtain normal driving conditions by means of the selector lever.

### Positions 1 - 2 - 3

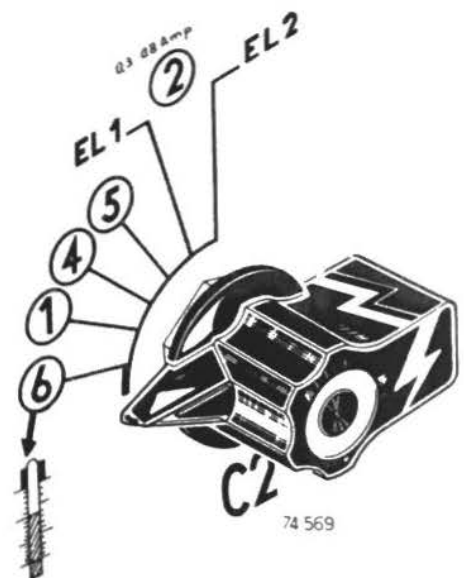
Move the selector lever to A first.  
To obtain over-riding control of ratios 1 - 2 or 3 by means of the switch.



## THE C2 SWITCH

Each one of its positions enables one or other of the following to be checked:

- battery current (1);
- current strength passing through ball valve solenoids E1 1 and E1 2 (2);
- operation of the governor-computer assembly (4);
- oil temperature (6).





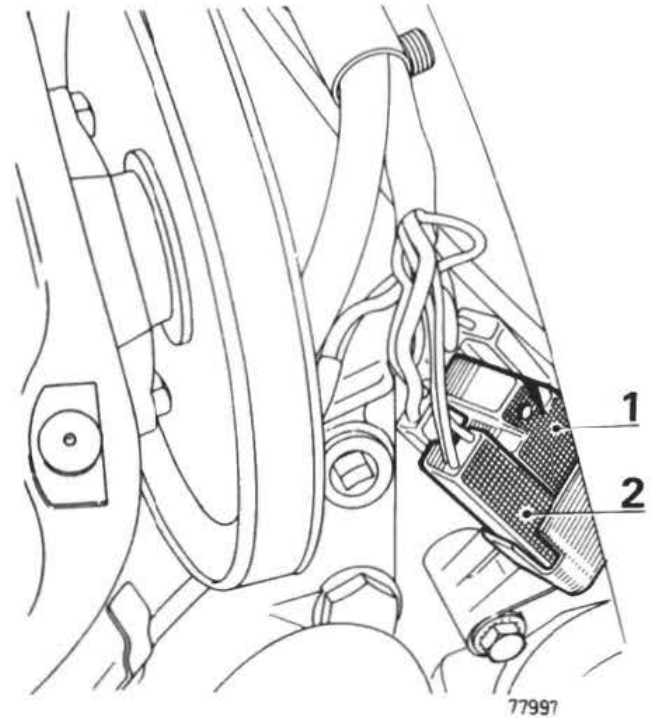
## HOW TO USE

Fit the control box to the dashboard.

### Connections to be made

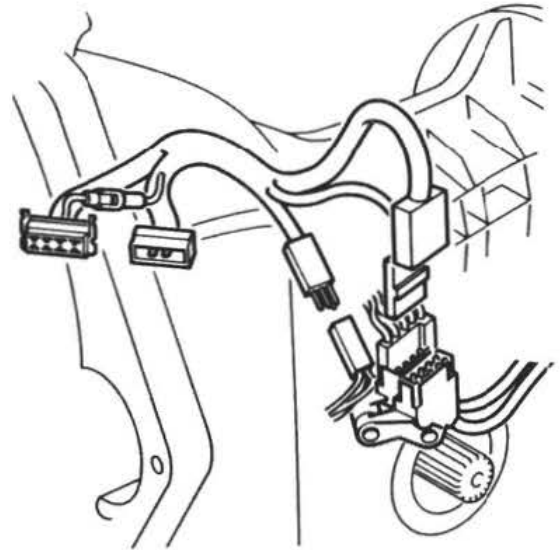
Disconnect, at the automatic transmission end:

- bridge (1);
- and junction block (2).



77997

Connect intermediate harness B.Vi.664 to the transmission socket then connect the other end to the control box.

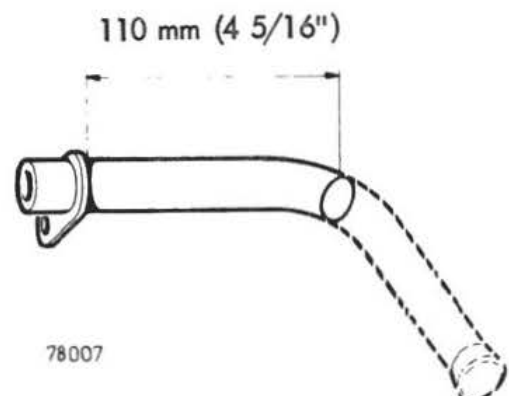


77824

- Remove dipstick.
- Obtain a dipstick tube top Part No. 77 00 579 801 and cut it to obtain the length shown.

Use this cut portion of tube to insert temperature probe B.Vi.524.

Use of the above tube is essential to make sure that the probe is immersed in the oil.



78007



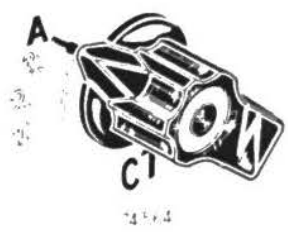
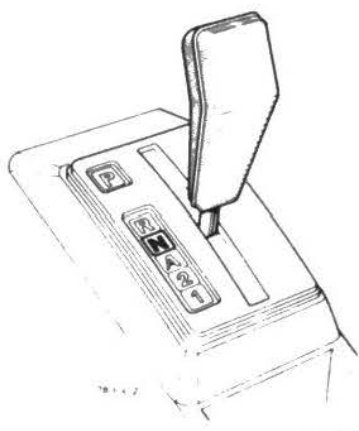
CONTROL

TO CHECK

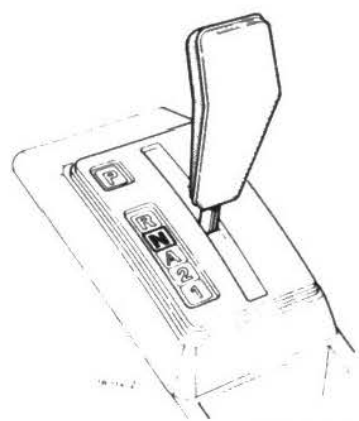
SELECTOR LEVER POSITION

C1 and C2 SWITCHES

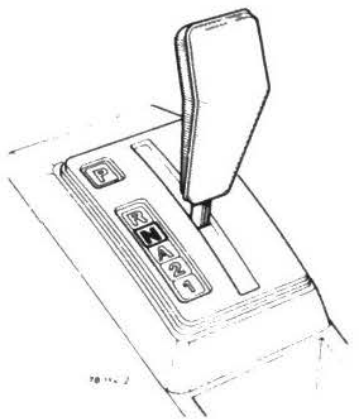
BATTERY VOLTAGE



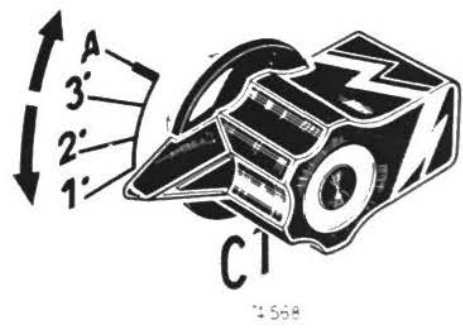
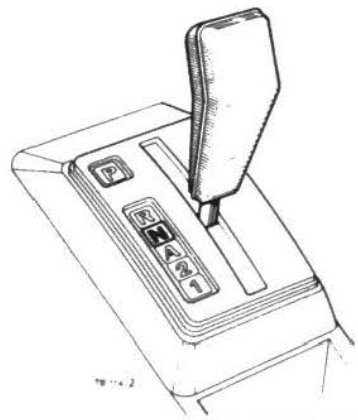
EL 1 SOLENOID BALL VALVE\*



EL 2 SOLENOID BALL VALVE\*



CURRENT FEED TO SOLENOID BALL VALVES

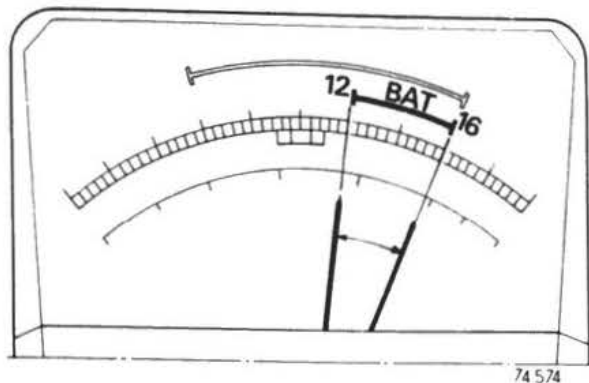




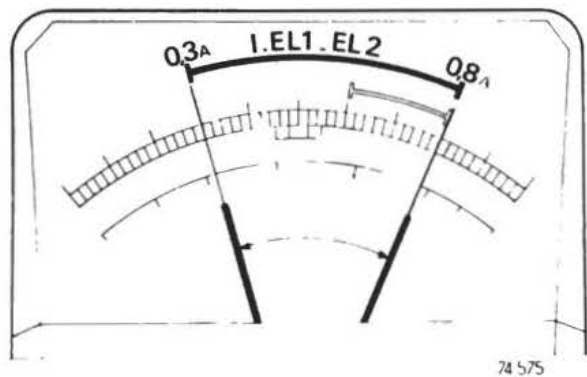
BOX

REMARKS

INFORMATION OBTAINED



Incorrect battery voltage (outside 12 to 16 V range) may cause the automatic transmission to malfunction.



If the current is normal (between 0,3 and 0,8A):

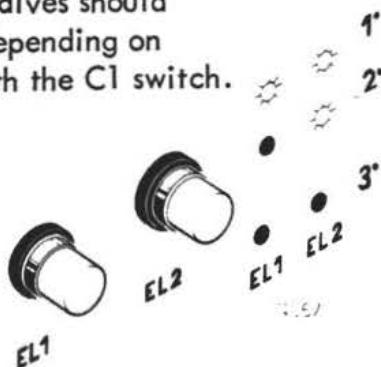
The solenoid ball valves are electrically in order :

If the current is abnormal :

- check wires and terminal blocks ;
- if the above are serviceable, then one of the solenoid ball valves is faulty.

\*The computer may be the cause if an incorrect value is read off (not within 0,3 A to 0,8 A) when making the check with C1 in A (the check with C1 in 1 having been satisfactory).

The blue and white warning lights for the solenoid ball valves should go out or illuminate depending on the selection made with the C1 switch.



- Check the wiring and electrical control units (12 - 13 - 14 - 16, refer to page 17) if the current supply to the solenoid ball valves is incorrect.

- The fault is either hydraulic or mechanical if the current supply is correct.





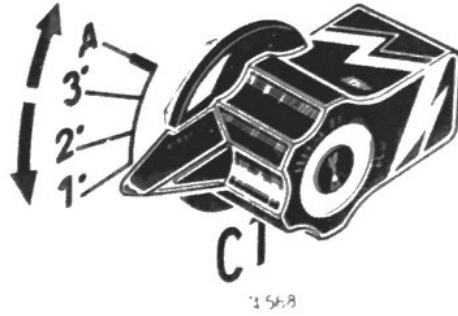
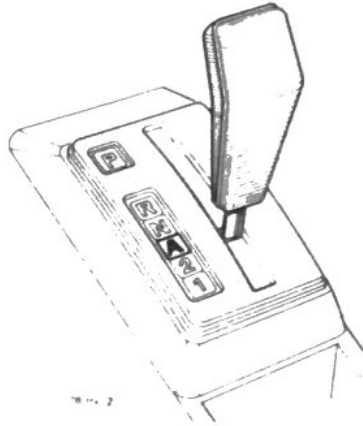
CONTROL

TO CHECK

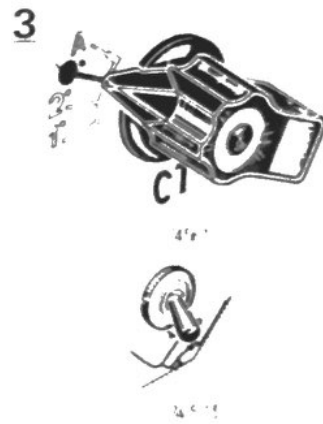
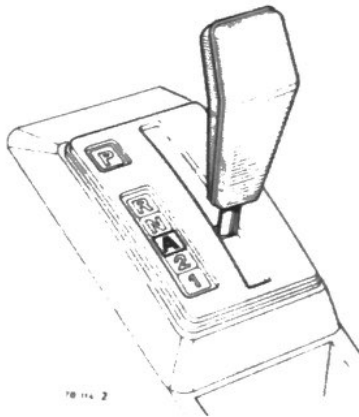
SELECTOR LEVER POSITION

C1 and C2 SWITCHES

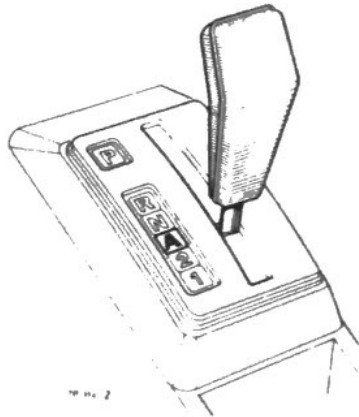
GEAR SHIFTING



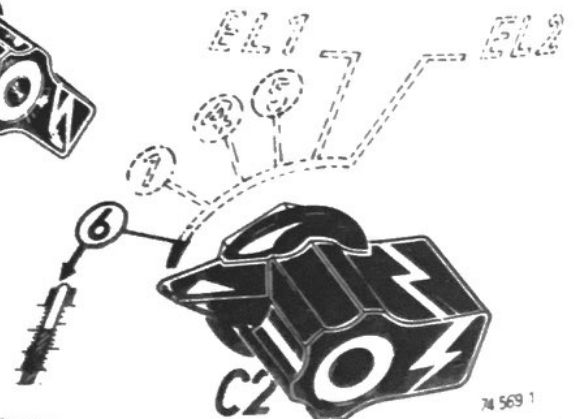
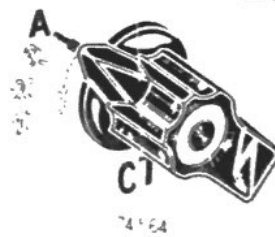
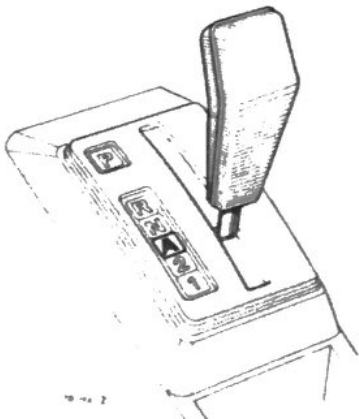
GOVERNOR-COMPUTER



KICK-DOWN SWITCH



OIL PRESSURE





BOX



REMARKS

INFORMATION OBTAINED

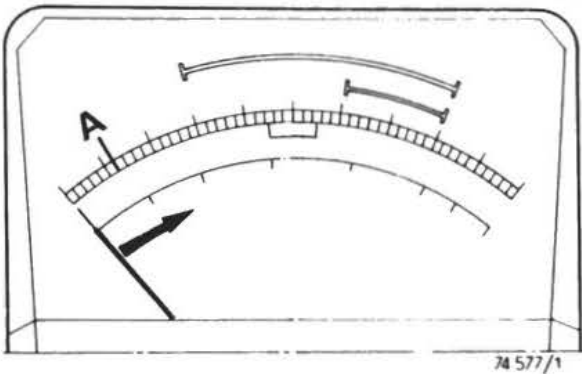
Check the speed on the speedometer.

The various ratios should be obtainable approximately at the speeds given in the table on page 7, when C1 is on A.

If the gearchanging speeds are incorrect, check:

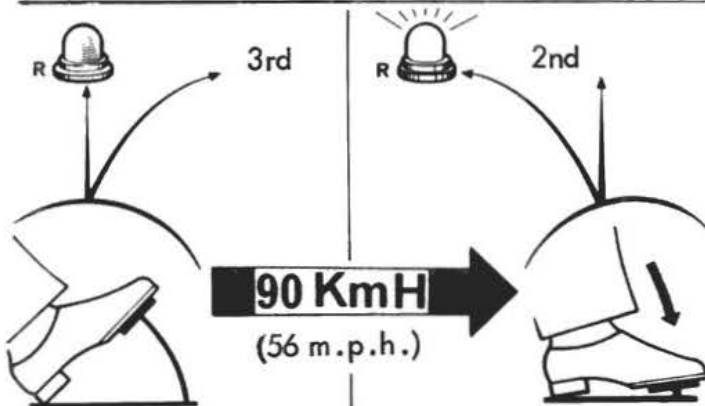
- adjustment of the governor-computer cable;
- connections;
- wiring.

The C1 switch must not be used at speeds in excess of 70 km/h (43 m.p.h.) because the 3 → 2 downshift will not function and the automatic transmission will remain in neutral.



Current should be obtained up to a value equal to graduation (A) at least.

Change the governor-computer assembly if it delivers nil current.



If the warning light fails to illuminate, check:

- adjustment of kick-down switch;
- the switch itself or connecting wire.

During upshift 2 → 3, oil temperature 80°C (176°F). Oil pressure: 7,9 bars + 0,2 (116 psi ± 3 psi).

Adjust the oil pressure if the values read off are incorrect (refer to page 50).



### HYDRAULIC INCIDENTS

- Snatch when gearshifting
  - . Snatch during all shifts on "Light Throttle"
  - . Snatch during 3 → 2 downshift with kick-down
  - . Snatch during 3 → 1 downshift (on 4141-00)
  - . Snatch when engaging N → A when cold and on "Fast Idle" (on 4141-30)
  - . Snatch during 3 → 2 downshift at about 30 km/h (19 m.p.h.) on "Light Throttle"
- Slip during gearshifting
- Judder during gearshifting
- Whistling on idling
- Whistling at approximately 3000 r.p.m.
- Pilot valve

### ELECTRICAL INCIDENTS

39

- No drive on one or more gears in "A" when cold or hot or premature/late gearshifting
- Remains in 3rd

### MECHANICAL INCIDENTS

41

- Engine over-revs during 2 → 1 or 3 → 1 downshift with kick-down
- Noisy final drive due to break up of final drive pinion bearing

### SELECTOR CONTROL INCIDENTS

42

- Premature or late gearshifting
  - . When decelerating in 3rd, transmission downshifts to 2nd at approximately 120 km/h (74 m.p.h.)
  - . Transmission changes to a higher ratio when in 1st or 2nd gear "Hold"
- Noisy selector control
- Selector control difficult to move



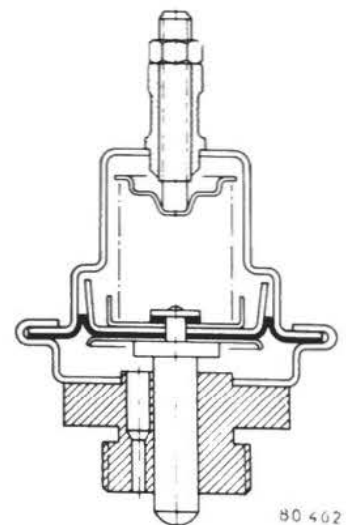
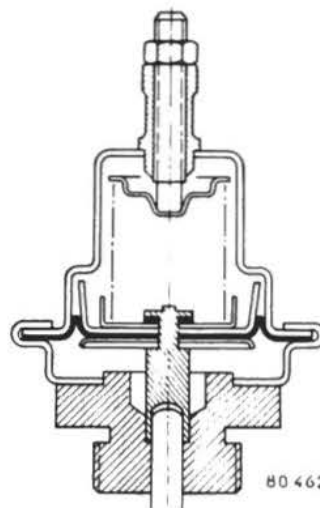
# HYDRAULIC INCIDENTS



## SNATCH WHEN GEARSHIFTING

Snatch during all shifts on "Light Throttle"

CAUSE	REMEDIAL ACTION
<ul style="list-style-type: none"> <li>- Air leak in pipe between manifold and vacuum capsule.</li> </ul>	<ul style="list-style-type: none"> <li>- <u>In production:</u> attention to pipe alignment where it leaves manifold.</li> <li>Application: Engine 144 - 7 No.13419</li> </ul>
<ul style="list-style-type: none"> <li>- Vacuum capsule punctured, leading to engine sucking in transmission oil.</li> </ul>	<ul style="list-style-type: none"> <li>- Parts Department packing methods and containers modified to prevent capsule damage during handling.</li> <li>Application: March 1977</li> <li>- 100% Quality Control inspection before assembly in production.</li> <li>Application: 4141-30 No. 8877 4141-10 No. 4880</li> <li>- Capsule specified with diaphragm guide.</li> <li>Application: 4141-30 No. 14693 4141-31 No. 2488 4141-12 No. 300 4141-13 No. 47 4141-20 No. 503</li> <li>- Design of a new capsule with extra sealing to prevent engine sucking in transmission oil if the diaphragm gets damaged.</li> </ul>





CAUSE

REMEDIAL ACTION

- Under repair:
  - check pipe for air-tightness
  - check capsule using a vacuum checking gauge. It is advisable to check the capsule sealing when the vehicle is in workshops for overhaul as the transmission might become damaged due to loss of oil.

Snatch during 3 → 2 down shift with kick-down

- Oil pump gauze and suction pipe blocked with foreign matter

Change suction pipe and gauze and retighten all hydraulic distributor bolts.

- Oil leaks from distributor joint face

In production:

- Taper washers fitted under bolt heads , bench test and bolts retorqued tightened.

Application: 4141-30 No. 4729  
 4141-31 No. 199  
 4141-10 No. 1464  
 4141-11 No. 25

Under repair:

- Change suction pipe and gauze and retighten all hydraulic distributor bolts (see page 95).

Distributor : torque tighten 2 bolts to 0,7 m.da N with cup (5 1/4 lb/ft) and remainder to 1 m.da N (7 1/2 lb/ft)

Distributor : torque tighten all bolts to 1 m.da N without cup (7 1/2 lb/ft)  
 (Part No. 77 01 516 279)

- Distributor malfunction

- New distributor fitted in production (large hole - small hole) (F2 feed modified).

Application: 4141-30 No. 8531  
 4141-31 No. 1283  
 4141-10 No. 4427  
 4141-11 No. 384

Planned: modification to transmission oil cooling system to give a lower operating temperature.



CAUSE

REMEDIAL ACTION

- Under repair:

Fit hydraulic distributor Part No. 77 01 516 279 with its seals and plate (use the washers supplied in the package) instead of the existing distributor.

Torque tighten all bolts to 1 m.da N (7½ lb/ft).

- Pilot valve malfunction

Remove vacuum capsule and check that there is no foreign matter around the adjusting screw.

Remove pilot valve (refer to page 37 for method).

Snatch during 3 → 1 down shift (on 4141-00)

- Hydraulic distributor malfunction

Fit new distributor Part No. 77 01 516 279

Snatch when engaging N → A when cold and on "Fast Idle"

F2 feed not metered when cold

In production:

New distributor fitted (large hole - small hole) with new F2 feed metering system.

Under repair:

Fit distributor Part No. 77 01 516 279.

Snatch during 3 → 2 down shift at about 30 km/h (19 m.p.h.)

This is due to the design of the hydraulic distributor

In production:

Distributor fitted (large hole - small hole) which reduces the above incident.

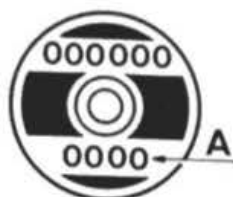
Application: 4141-30 No. 8531  
 4141-31 No. 1283  
 4141-10 No. 4427  
 4141-11 No. 384



CAUSE



REMEDIAL ACTION



79 625

"Large hole - small hole" system improved by increasing diameter of F2 regulation hole and lowering calibration of F2 spring.

Application: 4141-30 No. 13905  
4141-31 No. 2373  
4141-10 No. 8586  
4141-11 No. 1014

Note:

Identification plates numbered 723 641-20 and 21 on this distributor are marked with a figure 7 at A or the distributor has a new plate stamped with its number and marked DH type 22 or type 23.

Under repair:

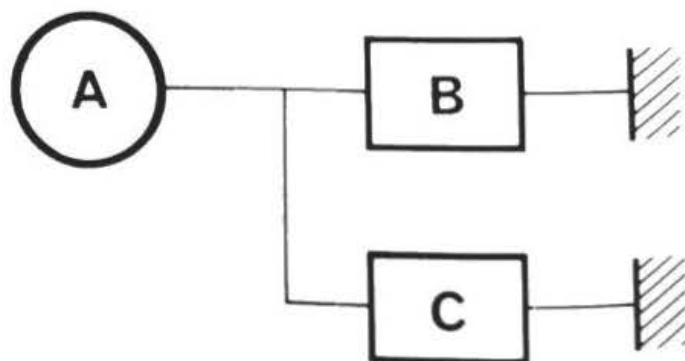
- Disconnect the kick-down switch wire on the accelerator cable.
- Connect the kick-down switch wire to earth (ground) using a jump wire.
- On deceleration, check that the 3↘2 shift takes place at approximately 35/40 km/h (22/25 m.p.h.) speedometer speed (normally the 3↘2 downshift occurs between 30/35 km/h (19/22 m.p.h.)).
- If there is no improvement in the 3↘2 downshift, fit a distributor Part No. 77 01 510 279 (select a distributor marked "7").
- If the 3↘2 downshift has become smooth, fit the "Light throttle" switch as shown below.

Modification to the kick-down switch circuit

Object

Alteration to the gearshifting instruction to initiate the downshift to 2nd at a higher vehicle road speed.

This alteration is obtained by tapping the wire between the kick-down switch and governor-computer and fitting a "Light throttle" switch activated by the moving quadrant on the governor.



KEY

- A - Governor-computer
- B - Kick-down switch
- C - "Light throttle" switch



Parts required:

- |   |                        |
|---|------------------------|
| 1 switch                                      | Part No. 77 00 552 536 |
| 2 screws                                      | Part No. 77 03 007 053 |
| 2 washers                                     | Part No. 79 03 056 034 |
| 2 nuts  | Part No. 79 03 032 001 |
| 1 bracket to be made locally to sketch below. |                        |

Fig.1  
Development

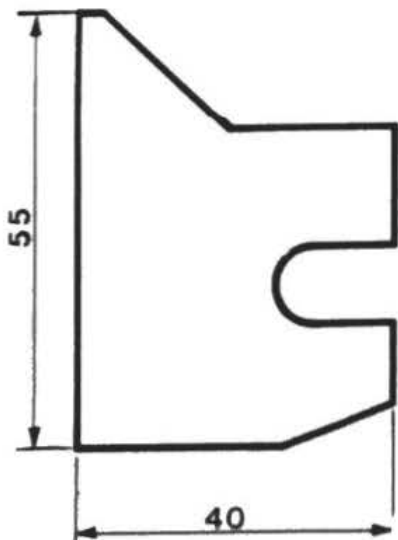
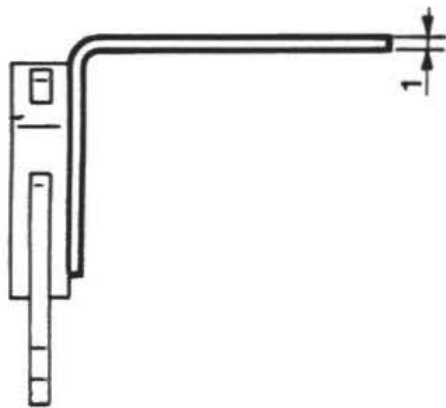
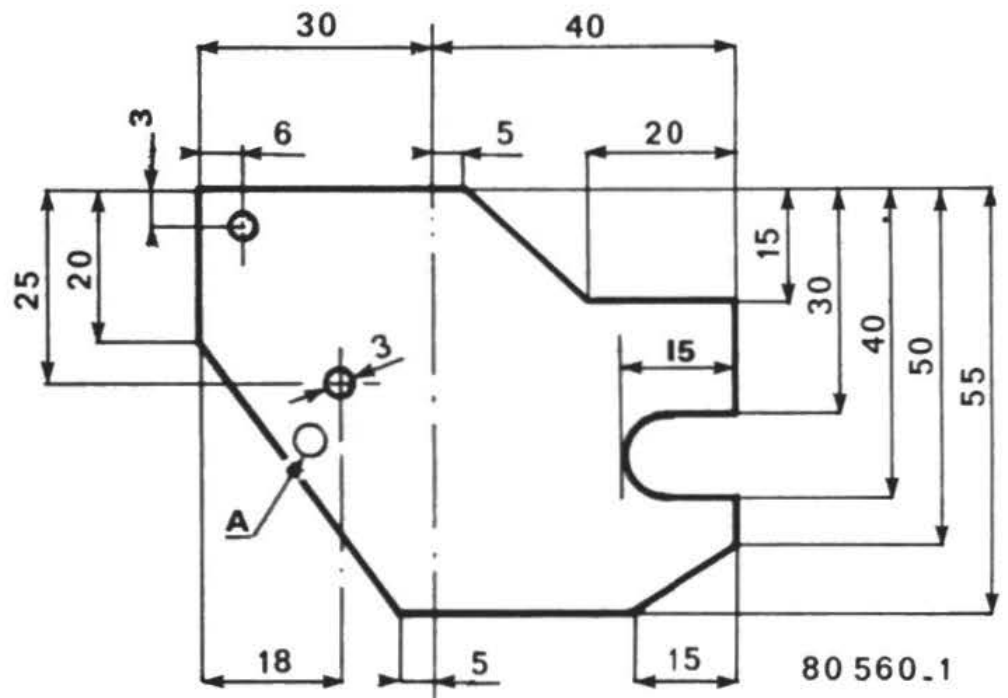
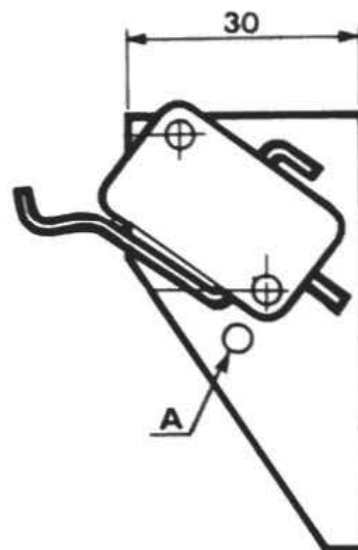
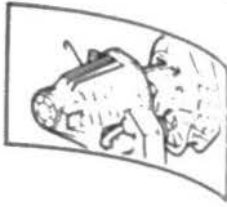


Fig.2



80 560





### Fitting the switch

- Fit the switch to the bracket as shown in Fig.2.
- Connect the switch earth wire to the bracket with a bolt (A in Fig.2).

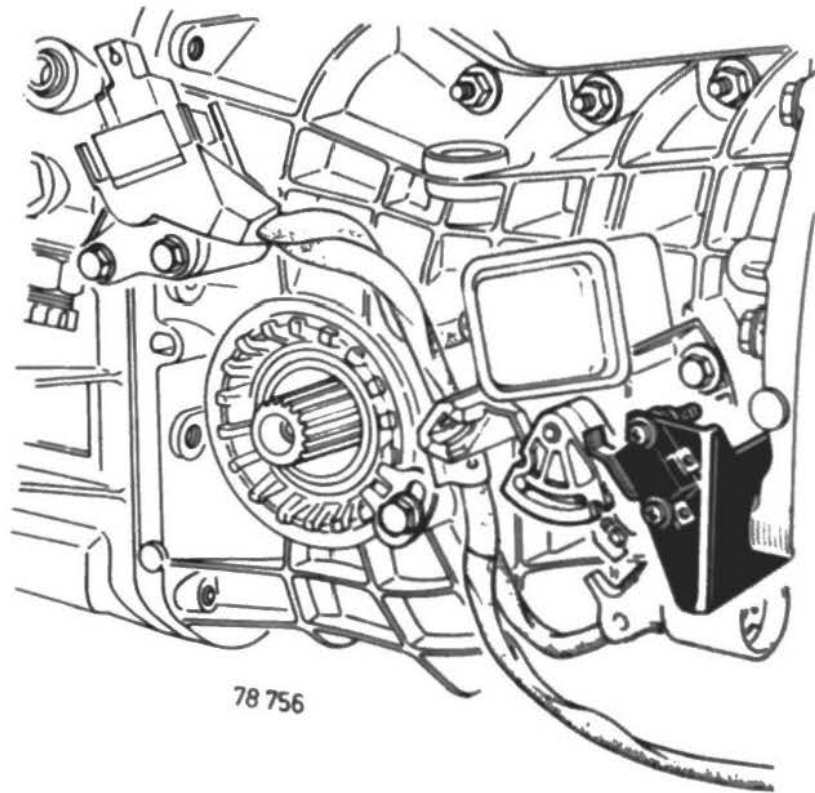


Fig.3

- Fit the bracket under the bolt head holding the final drive and gear casings near the governor-computer (see Fig.3).
- Set the switch so that the position of the operating blade is approximately halfway up the quadrant as illustrated.
- Tighten the bracket so that when the accelerator is released the circuit is alive and when it is pressed the circuit is broken.
- Connect the switch feed wire to the kick-down switch terminal using a "Y" type connector.



## SLIP DURING GEARSHIFTING



Slip during 2 → 3 shift and during 3 → 2 downshift with kick-down

### CAUSE

- Oil pump suction pipe and gauze blocked with foreign matter
- Oil leak from distributor
- Oil pressure too low
- Distributor malfunction
- Pilot valve malfunction
- F2 or E1 slipping

### REMEDIAL ACTION

Check appearance and smell of oil before any other operation. If the oil is black and smells of burnt lining, overhaul the automatic transmission (change distributor, converter and suction pipe and gauze).

If oil is normal, carry out the following in the order given:

- Change oil pump suction pipe and gauze and retighten distributor bolts
  - Old distributor: tightening torque )
  - New distributor: tightening torque ) see page 95
- Check oil pressure and adjust if necessary  
(8 bars  $\pm$  0,2 = 116 psi  $\pm$  3)  
Check that the oil pressure varies with degree of throttle opening
- Change distributor (Part No. 77 01 516 279)
- Check pilot valve (see page 37)

## JUDDER DURING GEARSHIFTING

Judder during 1 → 2 or 2 → 3 shifts

### Incident

Shifting in two stages especially with light load when hot

### CAUSE

Distributor insufficiently tightened leading to oil leaks from joint faces

### REMEDIAL ACTION

- Retighten distributor bolts
- Change the distributor if retightening results in no improvement

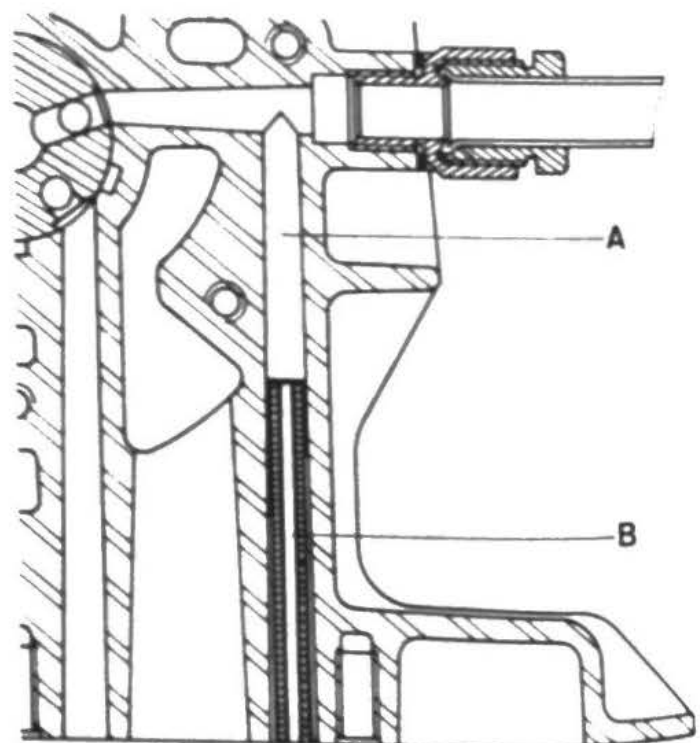
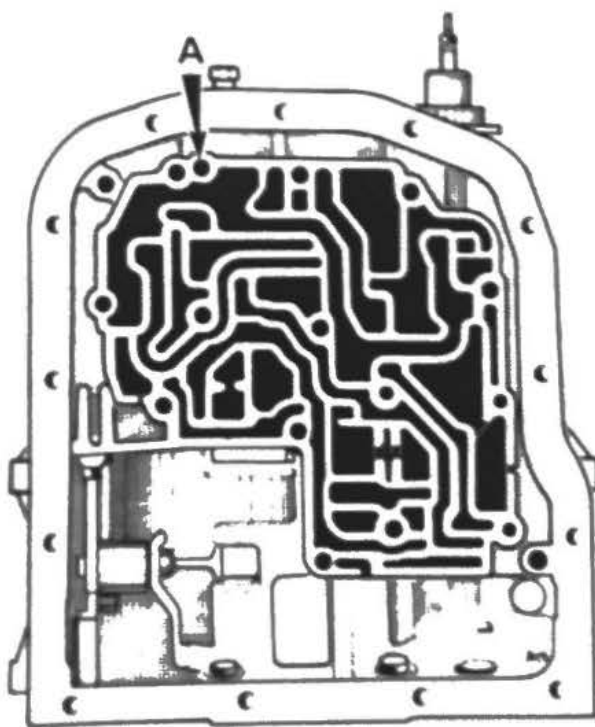


## WHISTLING ON IDLING

### Incident

Whistling noise when hot irrespective of selector lever position.  
In particular, it may be heard when stationary with engine idling.

CAUSE	REMEDIAL ACTION
Noise caused by oil flowing in a return gallery inside the casing (see A in sketch)	<p><u>1 - In production:</u></p> <p>Steel sleeve held by a clip fitted inside casing. Application: 4141-30 No. 3749 4141-10 No. 671</p> <p><u>2 - Under repair:</u></p> <ul style="list-style-type: none"><li>- cut a straight length 63 to 65 mm (<math>2\frac{1}{2}</math> to <math>2\frac{9}{16}</math>" ) long from pipe Part No. 77 00 575 249 (clutch master cylinder to slave cylinder pipe on Renault 30 with manual shift),</li><li>- remove hydraulic distributor,</li><li>- insert length of pipe (B) into the oil return hole. Tap it well home with a soft hammer.</li></ul>





WHISTLING AT APPROXIMATELY 3000 r.p.m.



CAUSE

REMEDIAL ACTION

Oil pump cavitation due to blocked suction pipe and gauze.

Change suction pipe and gauze.

PILOT VALVE

Snatch or slip

CAUSE

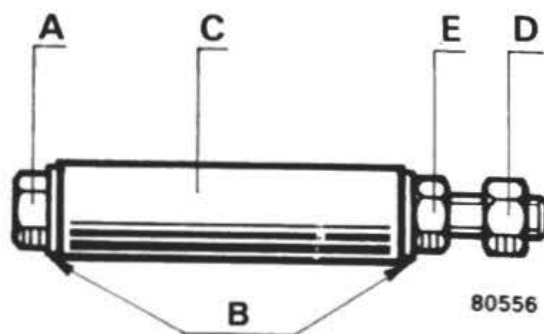
REMEDIAL ACTION

Hard spot on pilot valve leading to alteration in line pressure response time.

Checking method:

- Remove capsule, check that plunger is free to move in capsule body. Change capsule if body is worn.
- Note which way the plunger is fitted then remove it from the pilot valve with a magnet.
- Note which way the pilot valve sleeve is fitted (top, bottom) then remove it with a locally made extractor (see sketch).

- A - Bolt 5 mm dia x 80 mm (3 1/8") long
- B - 10 mm dia washers
- C - Hose 11 mm o/d x 45 mm (1 3/4") long
- D - Peen this nut with a centre punch
- E - The hose will expand when this nut is tightened





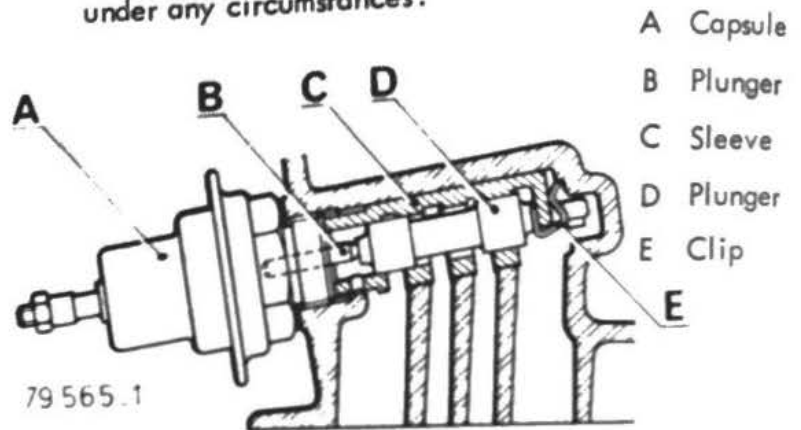
CAUSE

REMEDIAL ACTION



Two types of fitting may be found depending on transmission type. The pilot valve sleeve may be located in the transmission casing by means of a shim and spring washer (old assembly) or by a clip (new assembly).

Clean the plunger and the sleeve in petrol. If a hard spot is present on the valve after cleaning, rub it lightly with a cloth coated with an ultra fine polishing compound (i.e. rouge, T-cut) dipped in petrol. Do not use emery cloth or wet and dry paper under any circumstances.



After cleaning, reassemble the pilot valve to the transmission using the following procedure:

Shim assembly:

- Place the adjusting shim and the flexible washer at the back of the sleeve. Hold them in position with a little grease.
- Introduce the assembly into the transmission casing. Push the sleeve fully home to the bottom of the bore.
- Measure the distance between the sleeve and capsule joint face using a depth rule.
- Measure the distance between the joint face and the edge of the capsule. The clearance between the capsule and the sleeve should be between 0 and 0,2 mm (0 and .008").

Pin assembly:

- Check that the pin is still in position at the back of the sleeve.
- Insert the sleeve into the casing and push it fully home to the bottom of the bore.
- Refit capsule.

In both cases, check the oil pressure on completion.



## ELECTRICAL INCIDENTS



No drive in one or more gears in "A" when cold or hot or premature/  
late gearshifting

CAUSE	REMEDIAL ACTION
Wiring between computer and printed circuit incorrectly soldered	<u>In production:</u> Modification to governor-computer printed circuit. Application: Unit No. 24 121 (engraved on metal cover).
Faulty waterproofing of governor-computer	<u>Improved waterproofing of electrical chamber.</u>  <u>Under repair:</u> Change the governor-computer if a control box check reveals an incident in this unit.

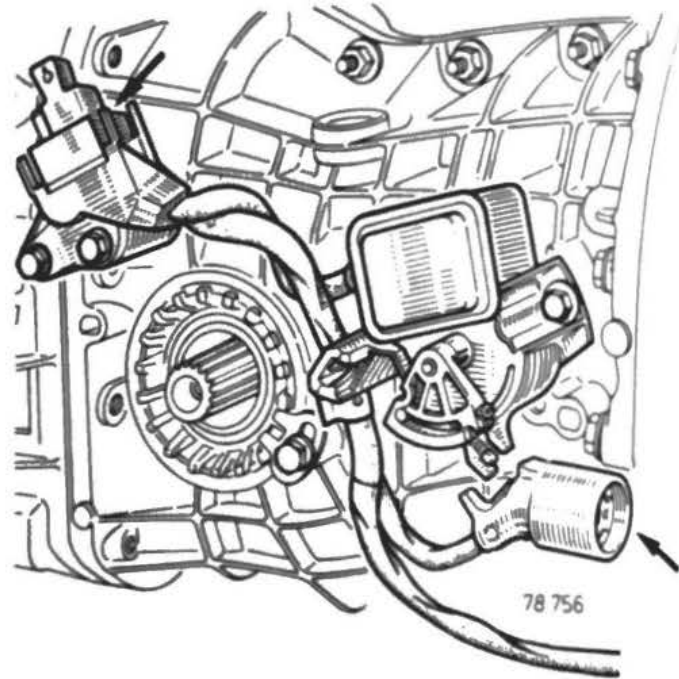


REMAINS IN 3rd.

### Incident

When the control box is connected:

- no gearshifting takes place
- no current passing E1 1 and E1 2
- the gears cannot be obtained using the box over-riding control



### CAUSE

Water or oxidation present or poor connection in transmission harness or transmission - engine harness

Faulty wiring harness.

### REMEDIAL ACTION

#### In production:

Adhesive used to seal transmission harness and multi-switch.

#### Under repair:

Disconnect the following connectors and check their serviceability:

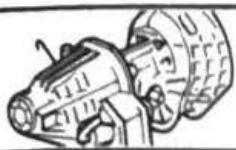
- junction - engine harness to vehicle harness
- junction - engine harness to transmission harness
- junction - transmission harness to multiple switch.

Reconnect and check transmission performance.

If necessary, look for the incident once again by a process of elimination:

- change the transmission harness first,
- then change the engine harness.

Clean the multiple switch and seal with CAF 33 sealer if it has been removed.  
(Avoid putting any sealer on the contacts).



## MECHANICAL INCIDENTS



Engine over-revs during 2 → 1 or 3 → 1 downshift with kick-down

**Incident:**

- Vehicle moves off normally in 1st automatic
- During 3 → 1 or 2 → 1 downshifts with kick-down the EL 1 and EL 2 warning lights in the control box illuminate normally but the gear does not engage.

CAUSE	REMEDIAL ACTION
Freewheel not functioning at high engine r.p.m.	Change E1 clutch assembly.

Noisy final drive due to break up of final drive pinion bearing

CAUSE	REMEDIAL ACTION												
Bearing lacking lubricant	<p><u>In production:</u> deflecting rib added to final drive casing.</p> <p>Application:</p> <table style="margin-left: 20px;"> <tr><td>4141-30 No.</td><td>14 428</td></tr> <tr><td>4141-31 No.</td><td>2 376</td></tr> <tr><td>4141-12 No.</td><td>758</td></tr> <tr><td>4141-13 No.</td><td>116</td></tr> <tr><td>4141-20 No.</td><td>997</td></tr> <tr><td>4141-21 No.</td><td>74</td></tr> </table> <p><u>Under repair:</u> remove any traces of adhesive in the bearing oilway.</p>	4141-30 No.	14 428	4141-31 No.	2 376	4141-12 No.	758	4141-13 No.	116	4141-20 No.	997	4141-21 No.	74
4141-30 No.	14 428												
4141-31 No.	2 376												
4141-12 No.	758												
4141-13 No.	116												
4141-20 No.	997												
4141-21 No.	74												





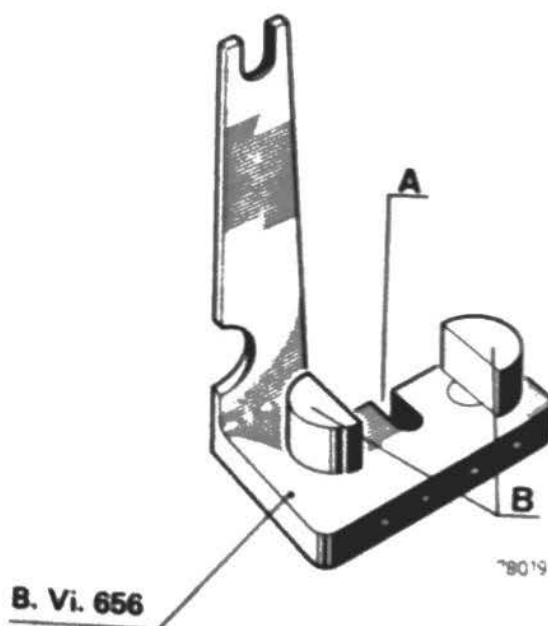
## SELECTOR CONTROL INCIDENTS



### PREMATURE OR LATE GEARSHIFTING

When decelerating in 3rd, the transmission downshifts to 2nd at approximately 120 km/h (74 m.p.h.)

CAUSE	REMEDIAL ACTION
Selector control maladjusted causing the multiple switch to give the instruction for 2nd gear "Hold" when the power unit rocks on its mountings.	Adjust selector control using tool <u>B.Vi.656</u> . The tool should locate without strain when adjustment is correct.  Rectify the following, if necessary: <u>At A:</u> file the slot for the selector lever <u>At B:</u> rub both locators which fit the link with emery cloth





The transmission changes to a higher ratio when in 1st or 2nd gear "Hold"

#### CAUSE

#### REMEDIAL ACTION

Incorrect selector control adjustment resulting in faulty operation of the multiple switch

Adjust selector control

### NOISY SELECTOR CONTROL

#### Incident:

A loud knock appears to be coming from the console between 110 and 120 km/h (68 and 74 m.p.h.)

#### CAUSE

#### REMEDIAL ACTION

Power unit vibration leading to sympathetic vibration of control and knocking of link Part No. 77 00 580 234 against washers Part No. 77 00 580 833.

#### Under repair:

- Adjust control

#### If noise persists:

- Remove shield

- Remove 2 link fixing bolts

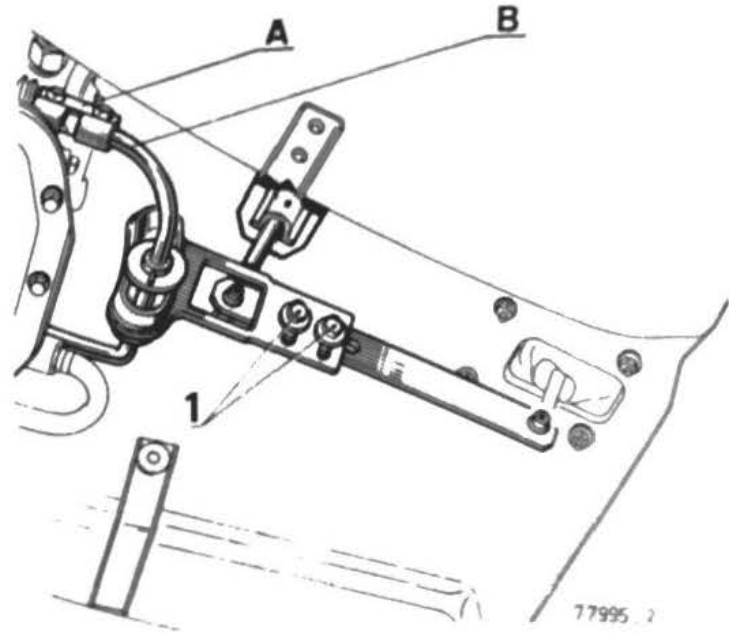
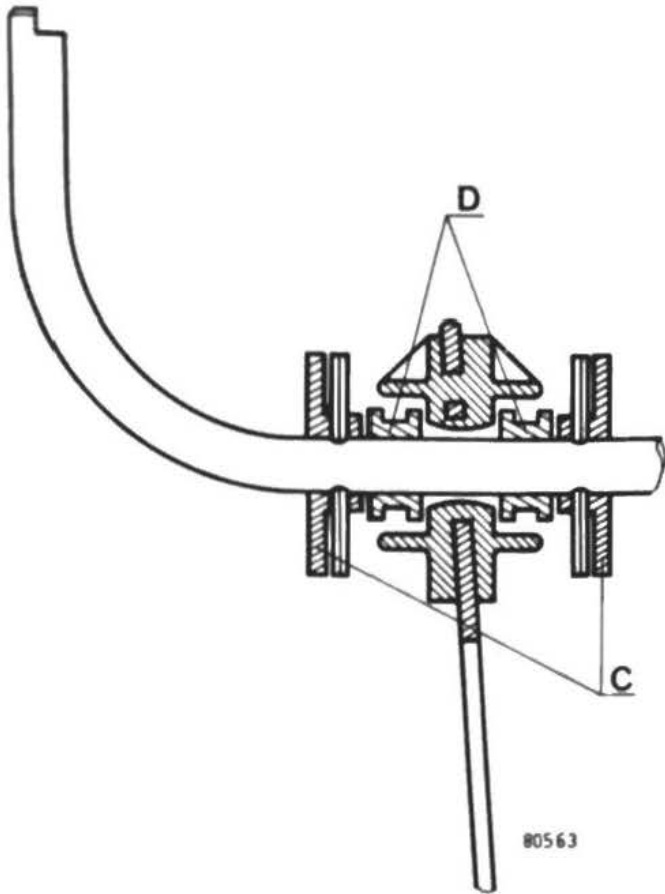
- Loosen clamp (A)

- Remove selector lever (B) together with link

- Once the selector control is removed, dismantle it entirely then re-assemble it according to the drawing (thrust washers (C) reversed) and add 2 washers (D) Part No. 06 07 855 600 (PR 877 sheet 58-75)

- Adjust selector control after fitting to vehicle

- Refit shield



SELECTOR CONTROL DIFFICULT TO MOVE

Incident:

Difficult to select positions "R" and "P"

CAUSE	REMEDIAL ACTION
<p>Selector control touching heat shield.</p> <p>Selector control rod Part No. 77 00 580 218 bent.</p>	<p><u>Under repair:</u></p> <p>Dish panel to allow clearance for control, then adjust.</p> <p>Change control rod.</p>



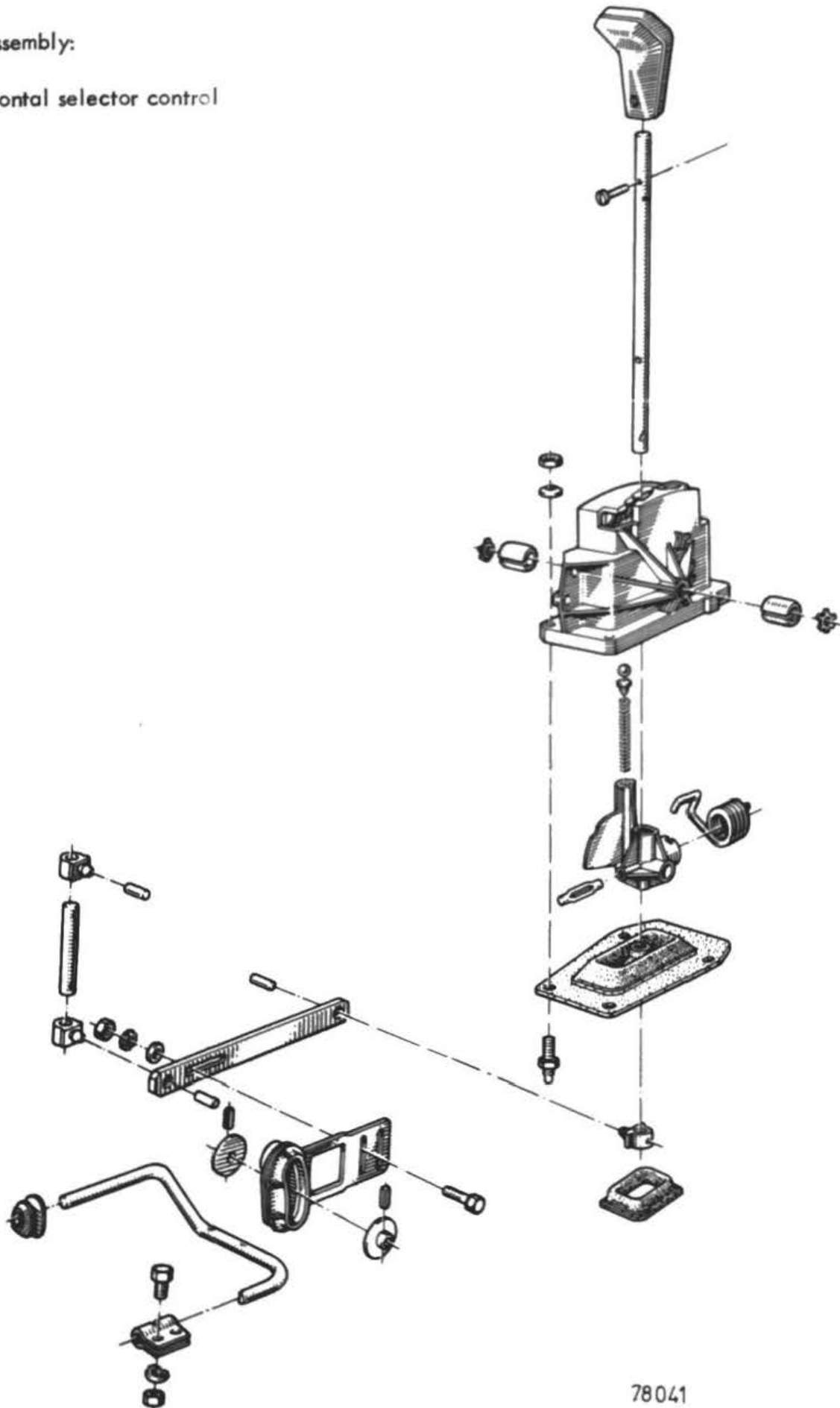
# SELECTOR CONTROL



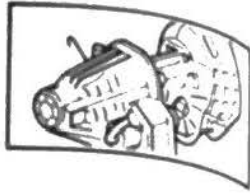
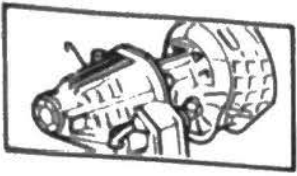
Removing - Refitting

1st Assembly:

Horizontal selector control

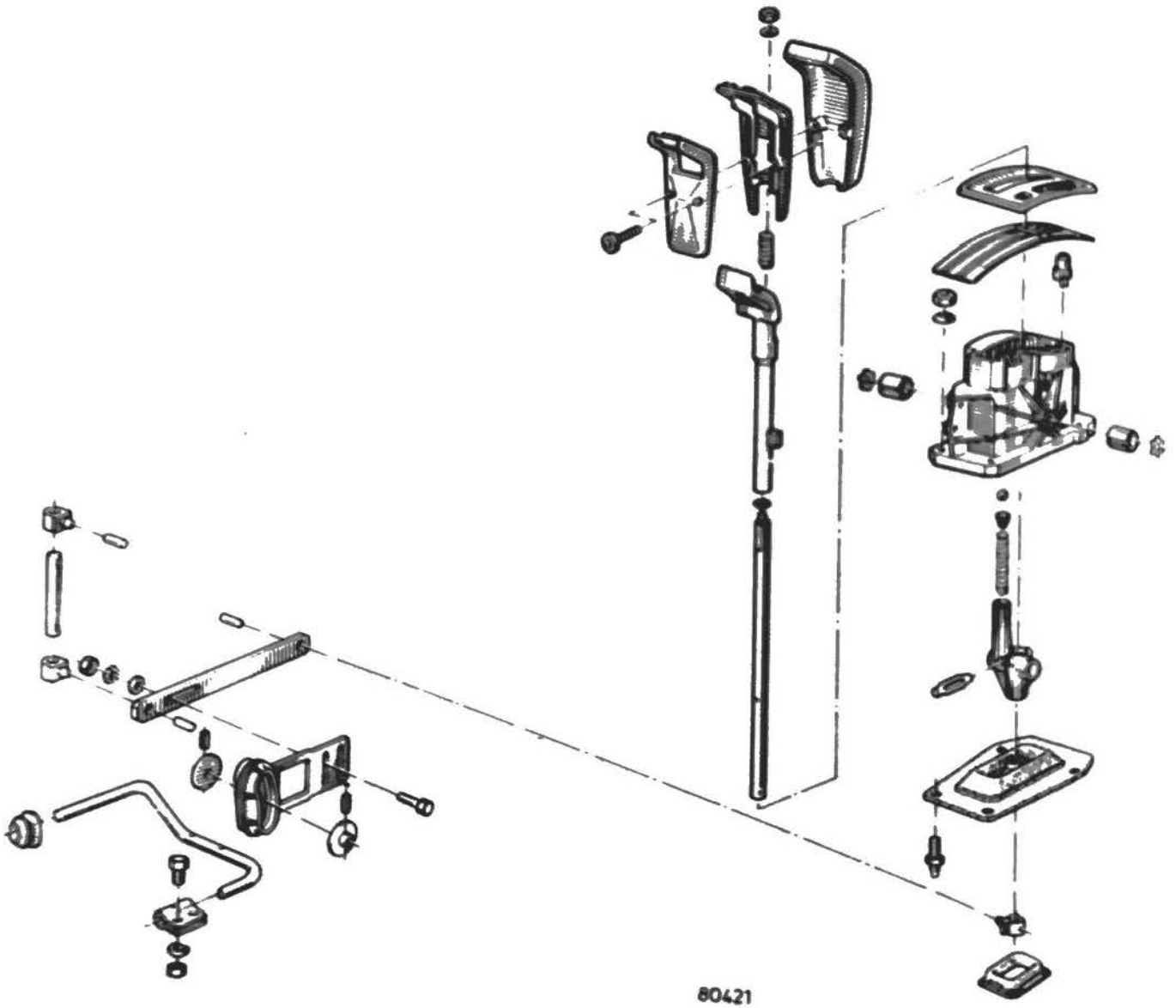


78041



2nd Assembly:

Vertical selector control



80421



## CONTROL LEVER

### Removing

Remove cover.

Disconnect linkage at (4).

Remove the selector lever handle.

### On vertical selector control:

Unscrew the 2 handle screws and the nut on the end and pull the assembly (handle shaft).

### On horizontal selector control:

- slide the selector gate to remove it,
- remove the centre bridge piece and housing,
- unscrew the fixing nuts and remove the lever.

Carry out the removing operations in reverse order to refit.



## LINKAGE

### Removing

Remove cover.

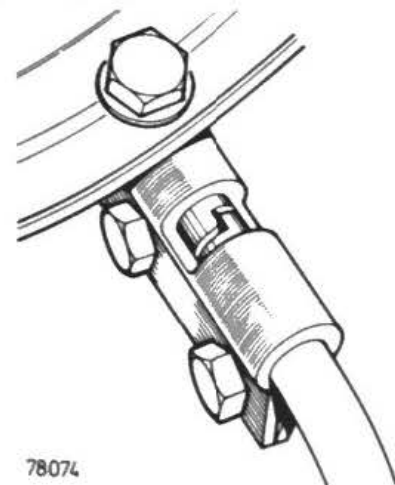
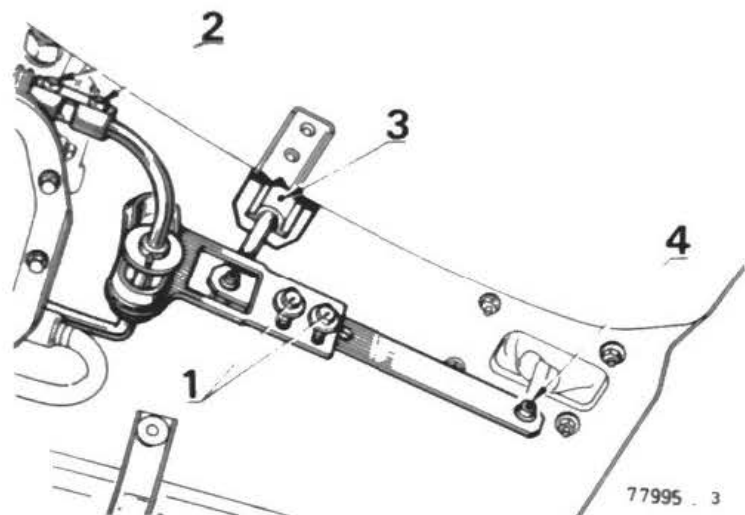
Unscrew nuts (2).

Remove rods (3) and (4) fixing the linkage to the lever and frame.

### Refitting

Make sure that the control shaft and linkage butt one against the other.

Adjust selector mechanism.





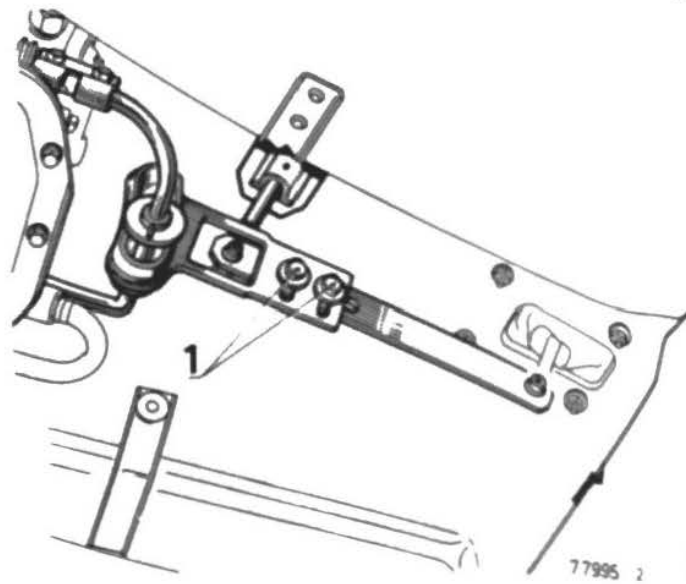
## ADJUSTING

Code 2212



Place the selector lever in "2nd gear Hold".  
Set the control shaft on the transmission to "2nd gear Hold" (push in as far as possible then withdraw one notch).

Loosen bolts (1).

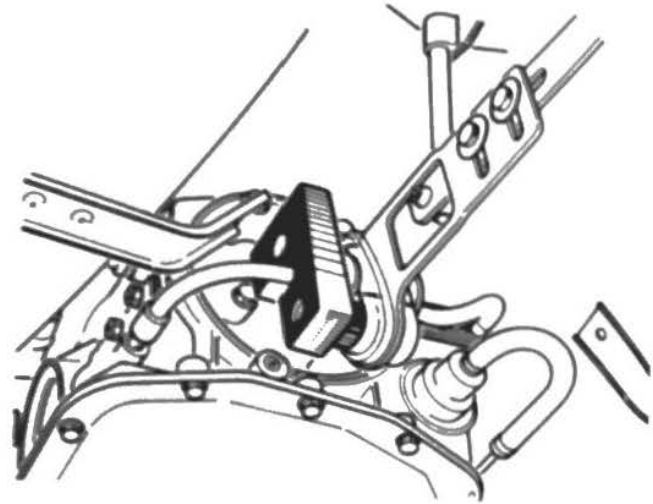


Position tool B.Vi.656 on the kidney-shaped control bar, making certain that the selector lever is still in "2nd gear Hold".

Tool B.Vi.656 must fit easily without resistance, if necessary, ease the following:

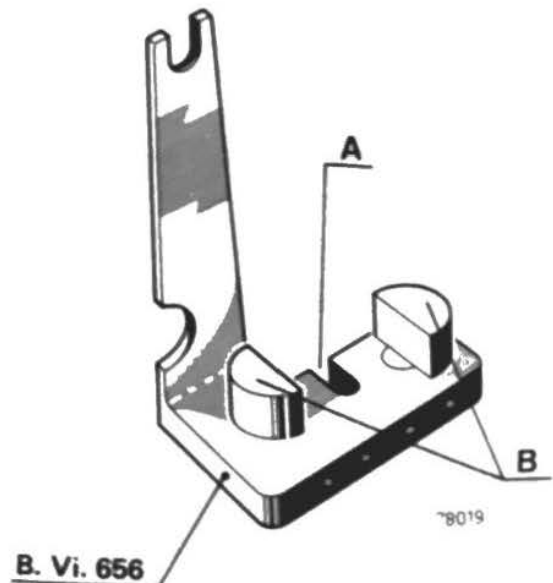
at A: file the slot for the control shaft.

at B: rub the locators which position the tool on the link with emery cloth.



Tighten the two fixing bolts (1).

Road test to check that the control adjustment is correct.





## SOLENOID BALL VALVES



Faulty ball operation

### Findings

No 1st automatic : only 2 ↗ 3 ↘ 2 operate	EL 1 remains open
No 2nd automatic : only 1 ↗ 3 ↘ 1 operate	EL 1 remains closed
3rd operates only	EL 2 remains open
No 3rd : only 1 ↗ 2 ↘ 1 operate	EL 2 remains closed

### Diagnosis

(If a sticking ball is the cause).

Connect up control box B.Vi.454-06.

Check the current passing through the ball valve solenoids.

The electrical instructions are being given normally if the current passing through the ball valve solenoids is normal and the EL 1 and 2 warning lights illuminate at the right moment.

Note: Remember, however, that these instructions may not be able to be carried out (when the solenoid ball valves are stuck).

Use the control box to select the ratios. The missing ratio cannot be obtained if a solenoid ball valve is faulty.

Furthermore, the EL 1 and 2 warning lights must go out approximately at the speeds given on page 7 in the "Light Throttle", "Full Throttle" and "Full Throttle with "Kick-Down Switch" positions.



## REMOVING - REFITTING

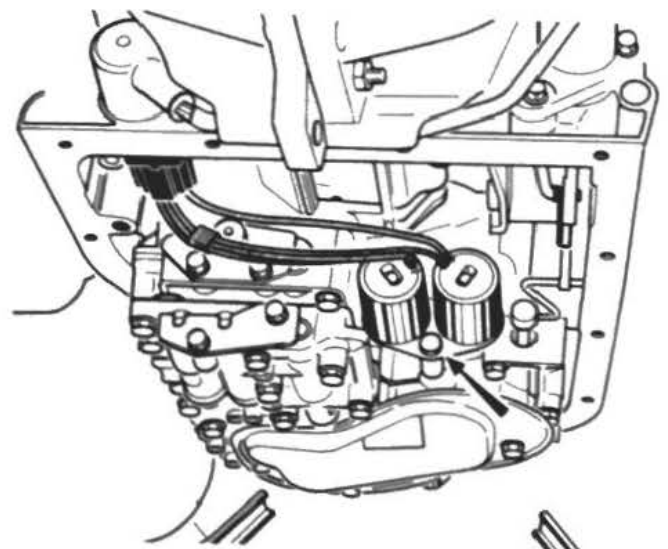
Code 2207



Drain the automatic transmission casing.

Unscrew the fixing bolts and remove the sump.

Disconnect the wires, unscrew the retaining plate bolt and remove the solenoid ball valves.



78011





## OIL PRESSURE

Code 2223

Checking - Adjusting



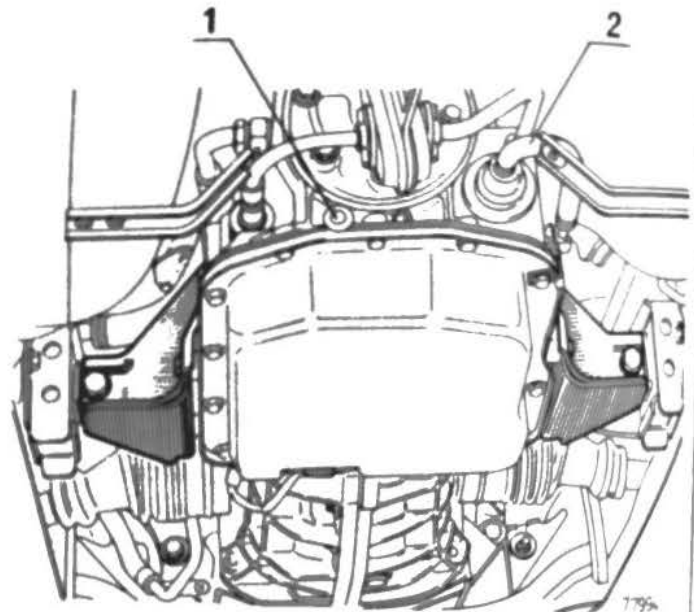
Conditions under which the pressure must be checked:

- either during a road test,
- or in the workshop.

Conditions under which measurements must be taken:

In workshops:

- Connect up the control box.
- Insert the temperature probe.
- Remove plug (1) and connect pressure checking gauge B.Vi. 466-03 in its place.
- Disconnect vacuum capsule pipe (2).
- Raise the front of the vehicle and place the sidemembers on blocks.
- Move the selector lever to "A".
- Set the C1 switch to "3rd".
- Start the engine. When the temperature of the automatic transmission oil reaches  $80^{\circ}\text{C}$  ( $176^{\circ}\text{F}$ ), run the engine at 2500 r.p.m. and read off the oil pressure:  $8 \text{ bars} \pm 0,2$  ( $118 \text{ psi} \pm 3$ ).



Adjust the oil pressure by turning the vacuum capsule screw if an incorrect reading is obtained.

One complete turn of the screw clockwise increases the pressure by about 0,1 bar (1 1/2 psi) and vice versa.



## VACUUM CAPSULE AND PILOT VALVE



### Checking

The vacuum capsule must be checked when the engine is switched off.

Connect the vacuum gauge (to vacuum pump in Diagnostic Bay for instance) to the vacuum pipe.

Apply a vacuum of 400 mm/Hg (15" of mercury) approximately to the capsule.

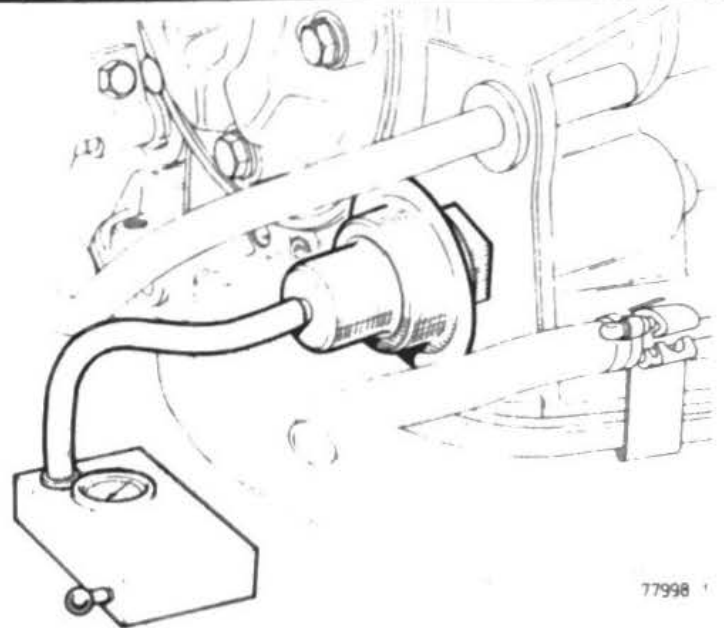
The "Light Throttle" and "Full Throttle" pressures may then be checked if the gauge needle remains steady.

On the other hand, if the needle falls, the capsule or pipe must be changed.

Also make sure that the inlet manifold connection is sound.

Check that the pipe is a tight fit on the capsule and on the union.

An air leak in the capsule or pipe will cause whistling, rough idling, too high a "Light



"Throttle" pressure and harsh gearshifting under light load.

Automatic transmission oil consumption will increase and blue smoke will issue from the exhaust pipe if a capsule is pierced.



## REMOVING - REFITTING

Code 2222



### REMOVING

Disconnect the vacuum hose.

Remove the capsule with wrench B.Vi.667.

The pilot valve and sleeve are located behind the vacuum capsule:

- both valve and sleeve must slide freely.

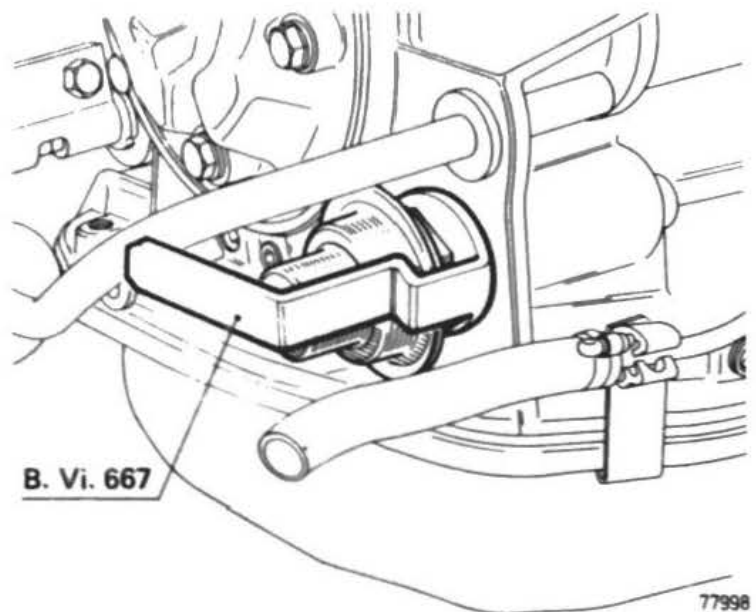
### REFITTING

Fit a new seal.

Reconnect the vacuum hose.

Refer to page 45 for refitting the linkage.

Check oil level.



77998



## GOVERNOR - COMPUTER

Code 2203

Removing - Refitting



### REMOVING

Disconnect the governor control cable.

Remove the fixing bolts.

Disconnect bridge (1) and junction block (2).

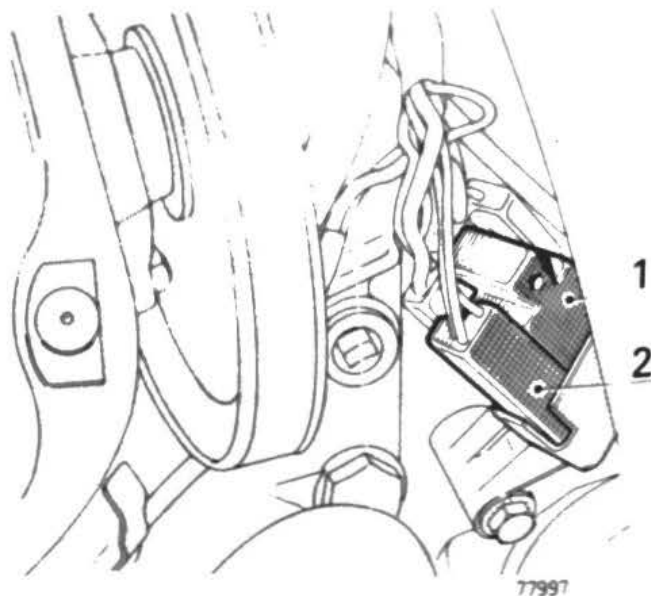
Remove both wiring fixing screws.

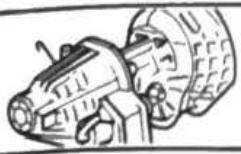
Lift out the governor - computer with its wiring.



### REFITTING

Adjust the cable after refitting.





## ADJUSTING

Code 2202

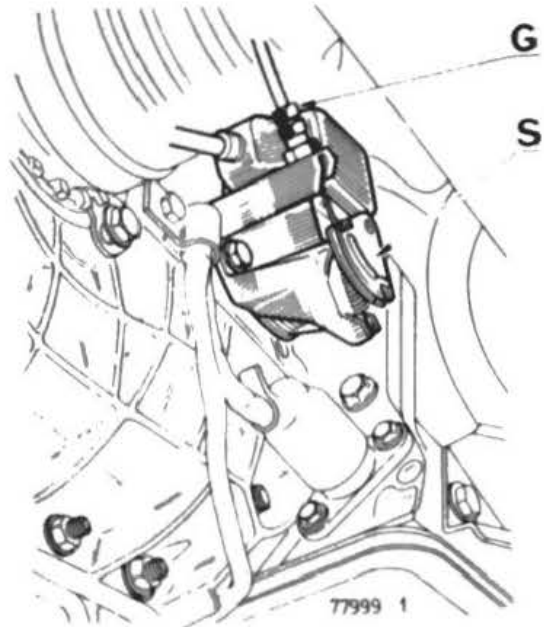


### ADJUSTING

Adjust sleeve stop (G) to the maximum extended position at the governor end.

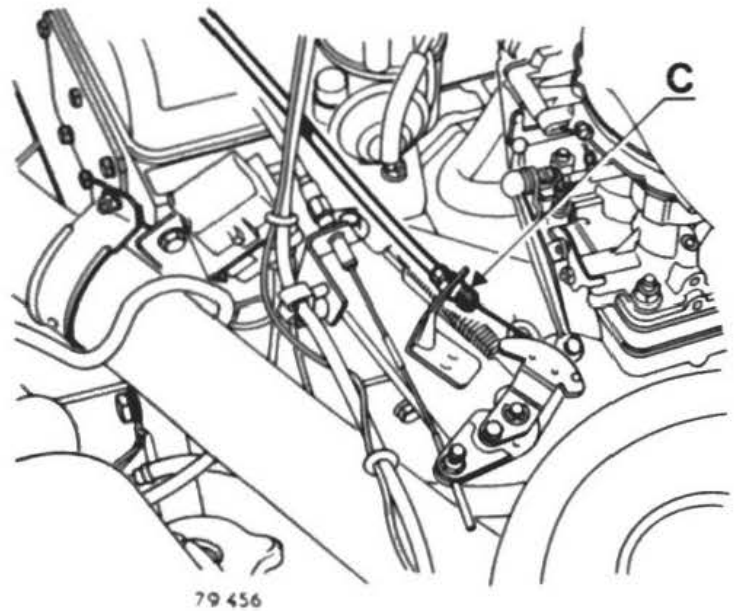
Insert the governor control cable into control quadrant (S). Make certain that the sleeve is fully home in the stop.

Hook the other end of the cable on to the cam at the carburettor end.



Press the accelerator hard down and tension the cable by adjusting the position of the sleeve in its stop (C) so that quadrant (S) is up against the stop.

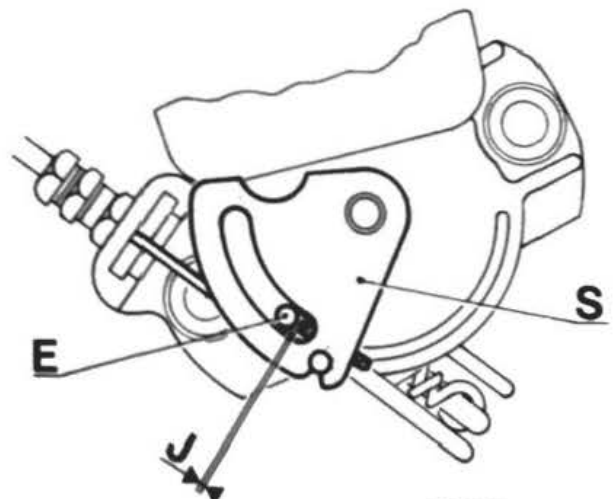
Tighten sleeve stop (C).



Slacken off sleeve stop (G) at the governor end to obtain clearance (J) between quadrant (S) and stop peg (E); make certain the throttle butterfly is in "Full Throttle" position during this operation.

$J = 0,3 \text{ to } 0,5 \text{ mm } (.012 \text{ to } .020\text{'})$ .

Tighten the locknut.





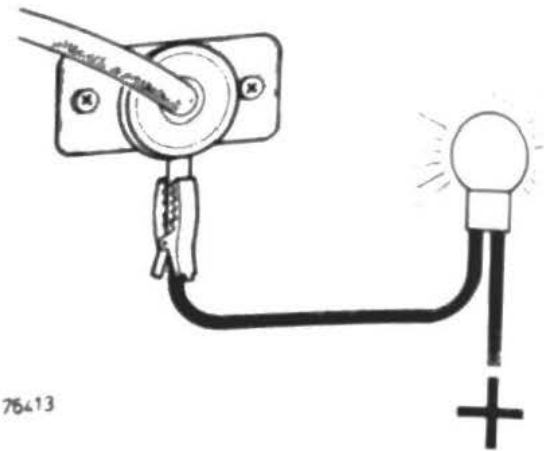
## KICK-DOWN SWITCH

Checking



The kick-down switch is checked by connecting a test bulb between the switch and the battery + post or by using the control box during a general check.

The test bulb or orange warning light in the control box will illuminate, indicating that the circuit is sound, when the accelerator is pressed hard down.



## REMOVING - REFITTING - ADJUSTING

Code 2210



### REMOVING - REFITTING

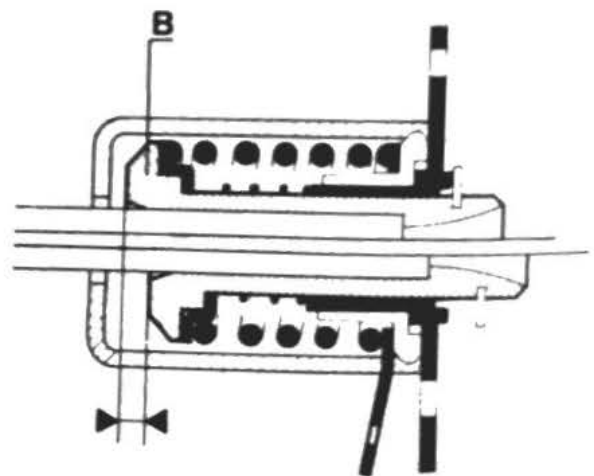
The accelerator cable must be changed as the kick-down switch is integral with it.

### ADJUSTING

The accelerator cable is used for adjustment.

Make sure that the accelerator cable has sufficient initial play to allow stop sleeve (B) movement of 3 to 4 mm (1/8 to 5/32") when the accelerator is pressed hard down.

The travel of the accelerator pedal, kick-down switch setting and governor control cable adjustment are all closely related; they must, therefore, be checked and adjusted together.





## DIFFERENTIAL ADJUSTING RING NUT

Changing the oil seal

Code 2055 - 2045



### AUTOMATIC TRANSMISSION TYPES 4141 - 00 - 20 - 30 - 31 (R 1272, R 1273, R 1275)

The oil seal may be changed in situ, without removing the differential ring nut.

Drain the final drive casing.

Withdraw the drive shaft at the gear casing end.

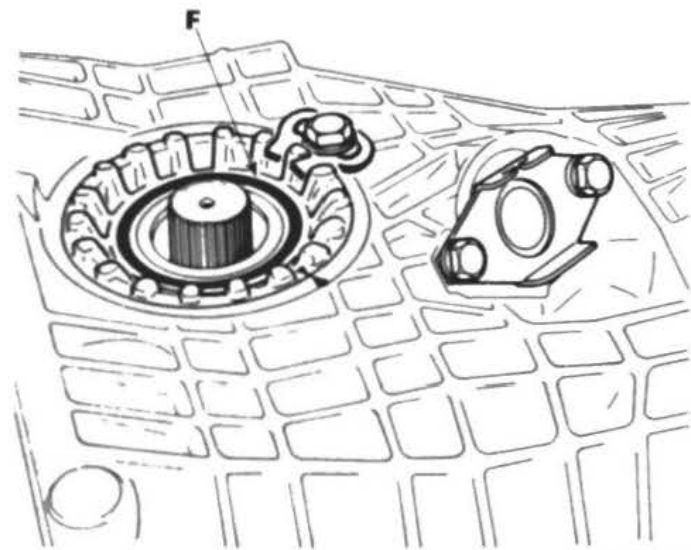
Remove the oil seal.

Lightly lubricate the new oil seal before fitting.

Use tool B.Vi.645 to insert the oil seal into the ring nut (it must be flush with face (F) on the ring nut).

Refit the drive shaft.

Fill the final drive casing with recommended oil.



77 587 . 1



## AUTOMATIC TRANSMISSION TYPES 4141 - 10 - 11 - 12 - 13 (R 1271)

The oil seal cannot be changed on its own.  
The "differential ring nut-seal" assembly must be replaced.

Drain the final drive casing.

Withdraw the drive shaft at the gear casing end.

Mark the position of the differential ring nut in relation to the casing and note the distance from the thread start on the nut to the mark just made.

Remove the lockplate.

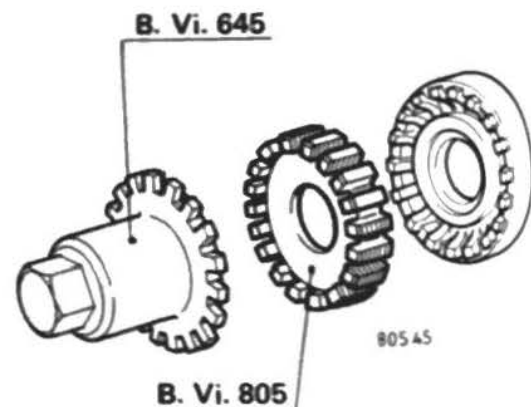
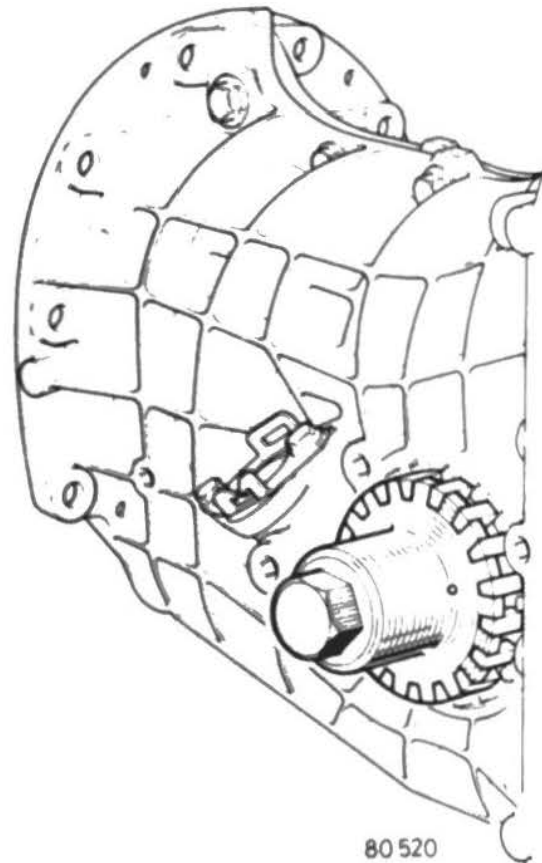
Unscrew the nut using tools B.Vi.805 and B.Vi.645.

Change the "differential ring nut - seal" assembly. Make a mark on the new ring nut the same distance from the thread start as on the old nut and screw it in. Align the mark just made with that on the casing.

Refit the lockplate.

Refit the final drive shaft.

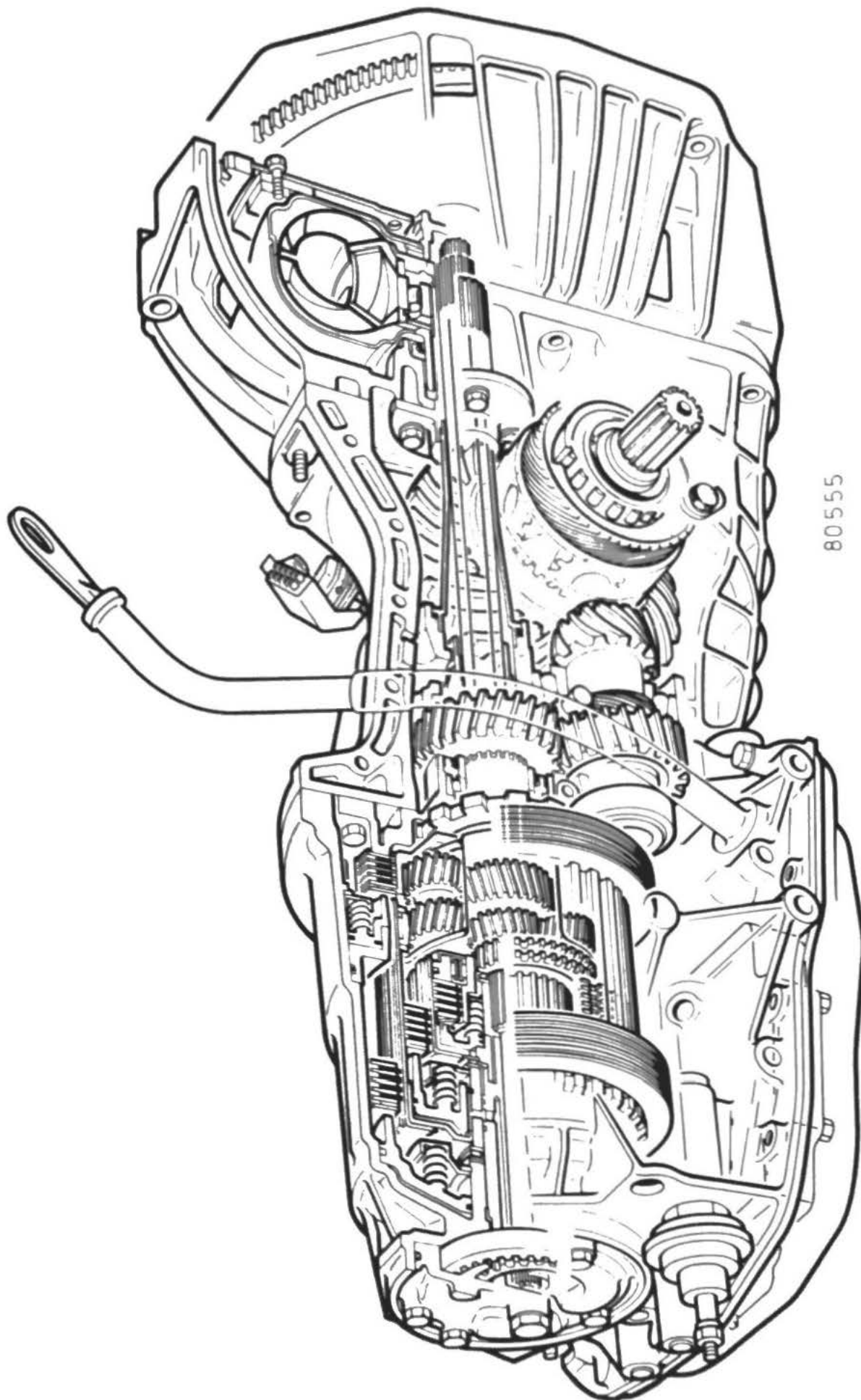
Fill the final drive casing with recommended oil.





COMPLETE OVERHAUL

Code 2237

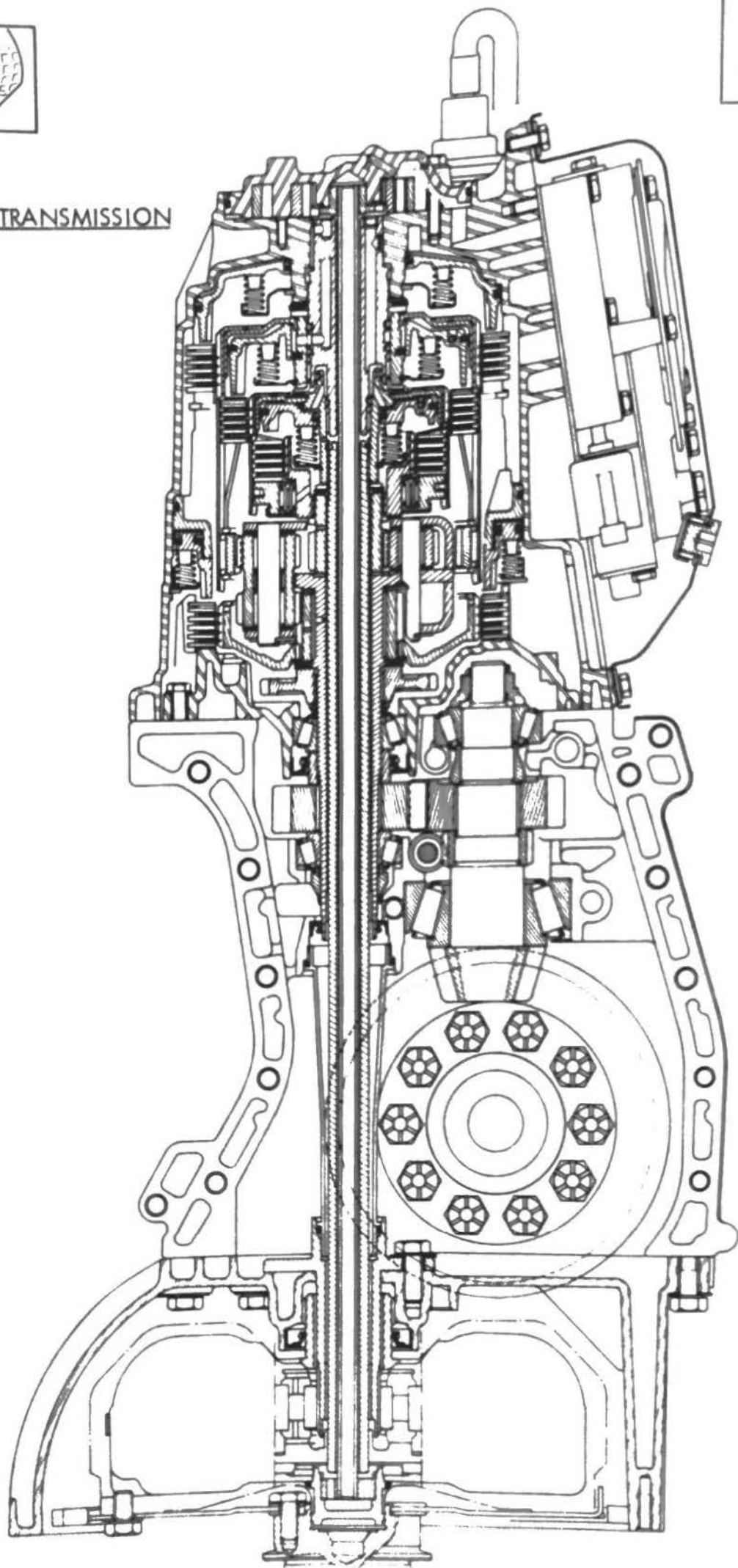


80555





SECTION OF  
AUTOMATIC TRANSMISSION



1573

This section shows a Type 4141 - 00 automatic transmission.



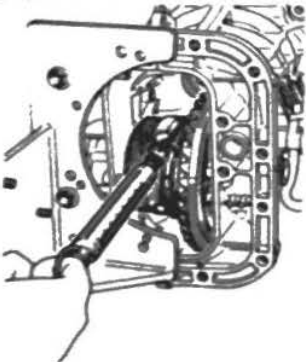
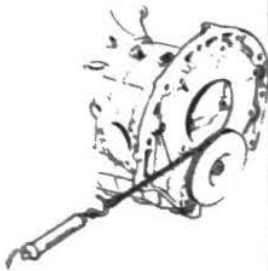

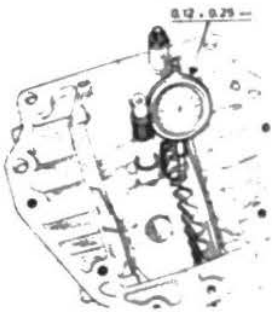
QUANTITY OF DISCS IN STACKS

	F1		F2		E1		E2	
	Steel discs	Lined discs	Steel discs	Lined discs	Steel discs	Lined discs	Steel discs	Lined discs
4141 - 00	5	4	5	4	5	4	5	4
4141 - 30 31 (1st assembly)	4	4	4	3	5	4	5	4
4141 - 30 31 (2nd assembly)	3	3	4	3	5	4	5	4
4141 - 20	3	3	4	3	4	3	4	3
4141 - 10 11 12 13	3	3	4	3	4	3	4	3



MECHANISM OPERATING CLEARANCES (in mm)

	F1	F2	E1	E2
	non-adjustable	adjustable	non-adjustable	non-adjustable
4141 - 00	1 to 3,20 (.039 to .126")	1,5 to 2 (.059 to .079")	1,05 to 3,75 (.041 to .147")	1 to 2 (.039 to .079")
4141 - 10 - 11 - 12 - 13	1,05 to 2,85 (.041 to .112")	1,1 to 1,5 (.043 to .059")	1,05 to 3,75 (.041 to .147")	0,8 to 2 (.031 to .079")
4141 - 20	1,05 to 2,85 (.041 to .112")	1 to 1,5 (.039 to .059")	0,9 to 3,3 (.035 to .130")	0,8 to 2 (.031 to .079")
4141 - 30 - 31 (1st assembly)	1 to 3,20 (.039 to .126")	1,1 to 1,5 (.043 to .059")	1,05 to 3,75 (.041 to .147")	1 to 2 (.039 to .079")
4141 - 30 - 31 (2nd assembly)	1,05 to 2,85 (.041 to .112")	1,1 to 1,5 (.043 to .059")	1,05 to 3,75 (.041 to .147")	1 to 2 (.039 to .079")

BEARING PRE-LOADS			BACKLASH
Differential	Final drive pinion	Output shaft	
 79575	 80527	 79600	 72 244-1
<b>Re-used bearing</b> <b>Free-tuning without play</b>	2 to 3,5 da. N (4 1/2 to 7 1/2 lbs)	0,5 to 1,2 da. N (1 to 2 1/2 lbs)	0,12 to 0,25 mm (.005 to .010")
<b>New Bearing</b> <b>Pre-load 1 to 3 da. N (2 1/2 to 6 1/2 lbs)</b>			



## SPECIAL FEATURES - INTERCHANGEABILITY



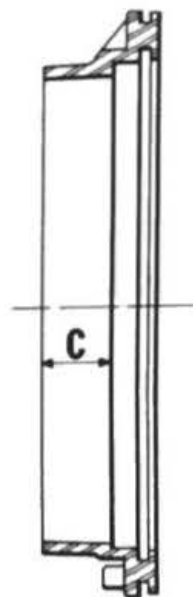
### F2 BRAKE PISTON

On type 4141 - 00 automatic transmissions, depth (C) is 21,3 mm (.838").

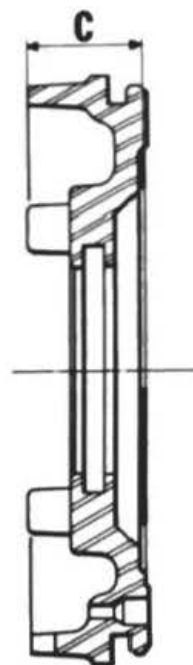
One type 4141 - 10 - 11 - 12 - 13 - 20 - 30 and 31 automatic transmissions, depth (C) is 26,5 mm (1.043").

The following action must be taken when fitting a piston housing depth (C) = 26,5 mm (1.043") to a type 4141 - 00 automatic transmission :

- change distributor
- remove :
  - . one lined disc
  - . one steel disc



79 601



79 602

### E1 CLUTCH PISTON

Check E1 piston depth (C) when rebuilding an automatic transmission.

Depth (C) on type 4141 - 00 - 30 and 31 automatic transmission is 14,4 mm (.567")

Depth (C) on type 4141 - 10 - 11 - 12 - 13 and 20 automatic transmissions is 19,4 mm (.764").

### E2 CLUTCH SPACER SLEEVE

Check spacer sleeve height (D) when rebuilding an automatic transmission

- depth (D) on type 4141 - 00, 30 and 31 automatic transmissions is 43,2 mm (1.700").
- depth (D) on type 4141 - 10, 11, 12, 13 and 20 automatic transmissions is 47 mm (1.850").



80 567



## F1 BRAKE

### Type 4141 - 00 automatic transmission

- 5 steel discs
- 4 lined discs
- 1 thrust plate 6,3 mm (.248") thick.

### Type 4141 - 30 and 31 automatic transmissions (1st assembly)

- 4 steel discs
- 4 lined discs
- 1 thrust plate 8,5 mm (.335") thick.

It is possible to transform the F1 brake in a type 4141 - 00 automatic transmission into an F1 brake suitable for type 4141 - 30 and 31 automatic transmissions (1st assembly).

Remove 1 steel disc and fit a thrust plate 8,5 mm (.335") thick to do this.

### Type 4141 - 10 - 11 - 12 - 13 and 20 auto- matic transmissions

- 3 steel discs
- 3 lined discs
- 1 thrust plate 13,2 mm (.519") thick.

### Type 4141 - 30 and 31 automatic transmissions (2nd assembly)

#### - 2nd assembly (provisional)

- . The 1st assembly gear casing is retained.
- . 3 steel discs
- . 3 lined discs
- . 1 thrust plate 13,2 mm (.519") thick.

#### - 2nd assembly (final)

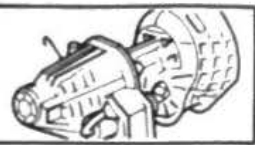
- . The gear casing differs from that used in the 1st assembly.
- . 3 steel discs
- . 3 lined discs
- . 1 thrust plate 8,5 mm (.335") thick.



## GEAR CASING

Dismantling - Re-assembling - Adjusting

Code 2272



A bench covered with rubber or thick plastic sheeting is required when dismantling and handling the components.

### SEPARATING CASINGS

Remove converter.

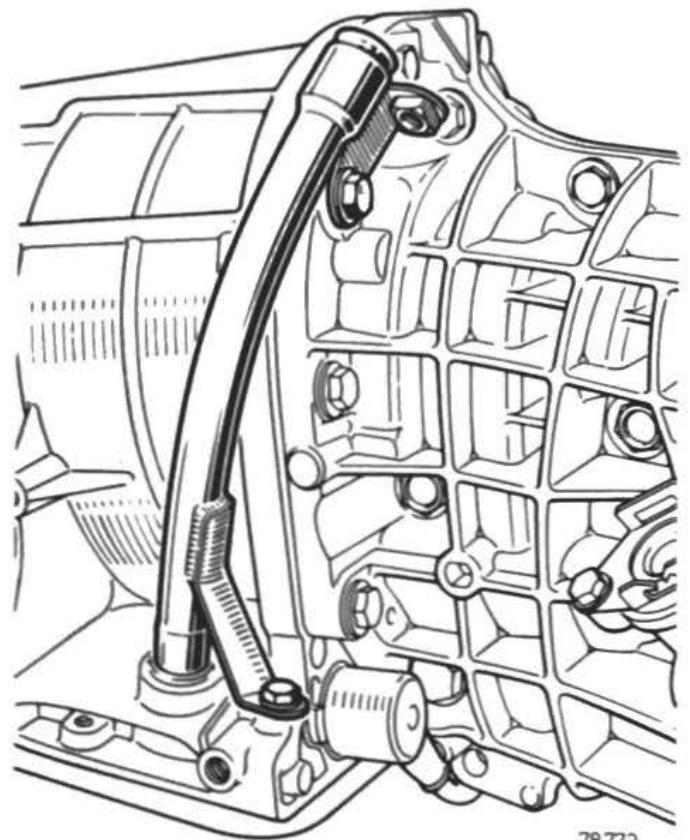
Remove pump shaft.

Place the casing vertical, resting on the converter casing.

Unscrew sump fixing screws and remove sump and gasket.

Unscrew the 2 dipstick tube bolts and remove tube.

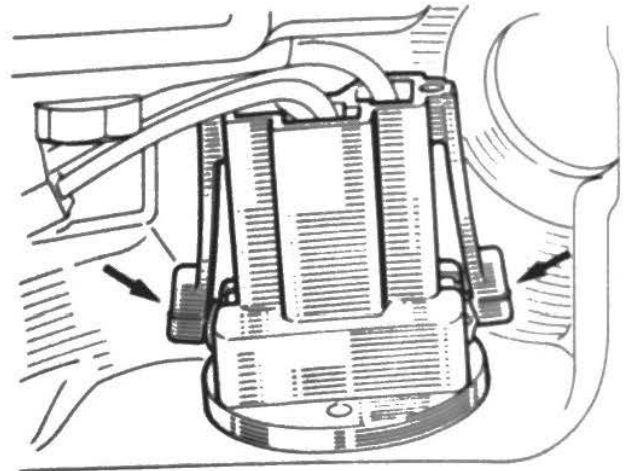
Disconnect the multiple switch harness and remove switch.



78772

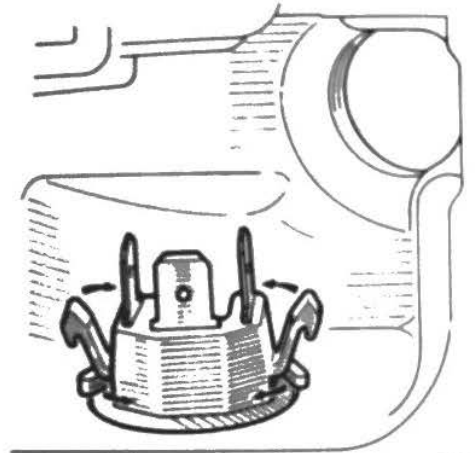


Disconnect the multiple switch harness  
after moving the retaining lugs.



78 771

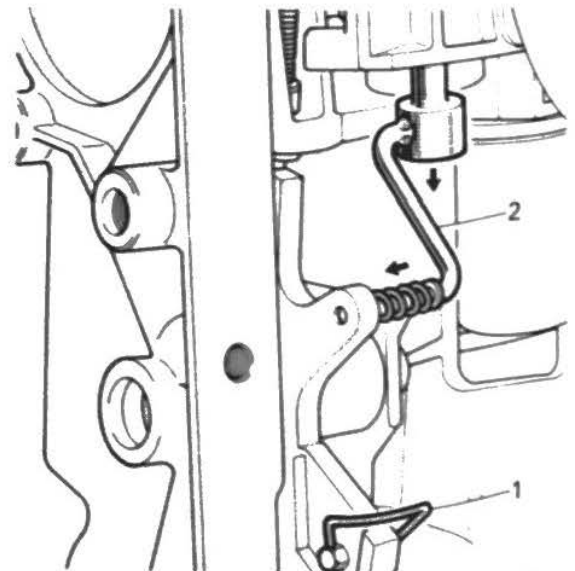
Remove sealed socket by pressing the two  
plug retaining lugs and fixing lugs together.



78 770

Remove :

- clip (1) on the toothed quadrant and remove  
the "Park" locking finger,
- manual valve control (2).

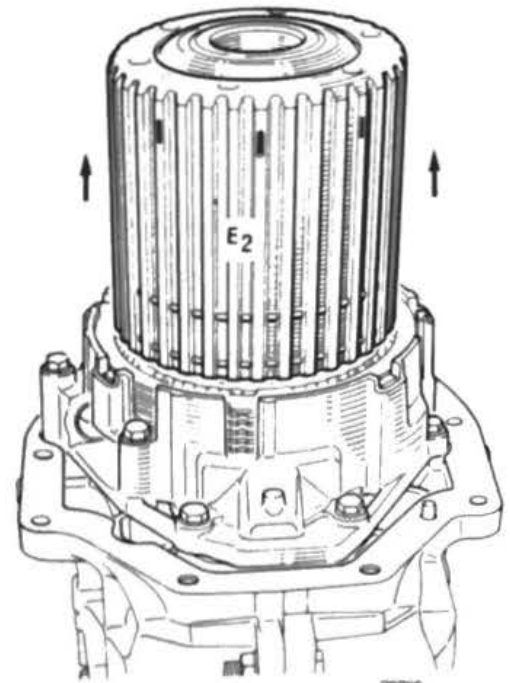


80 52'

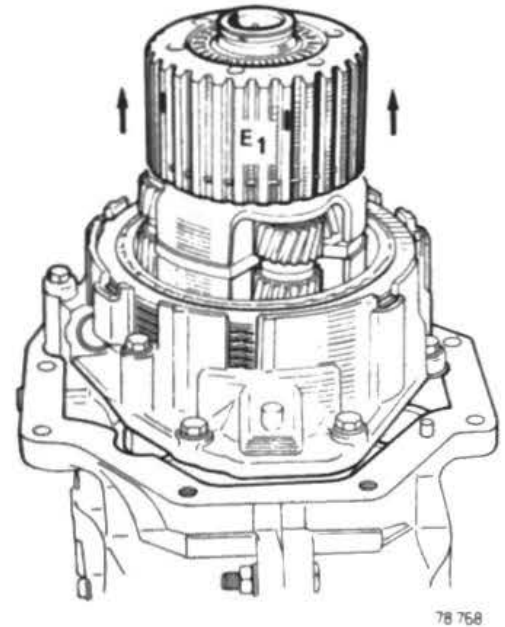


Remove the bolts securing gear casing to final drive casing and lift up gear casing to remove.

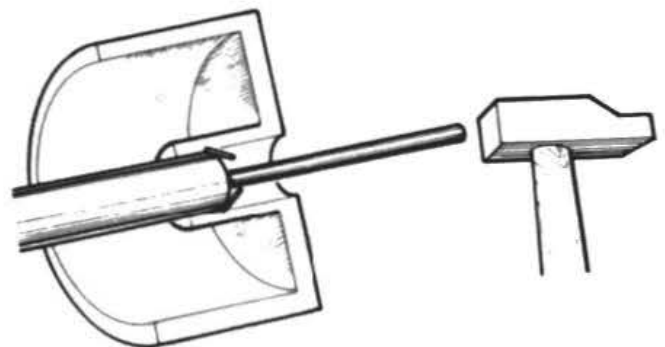
Extract the E2 clutch vertically.



Extract the E1 clutch vertically with turbine shaft after removing the needle roller bearing.



Remove the turbine shaft from the E1 clutch using a bronze drift.

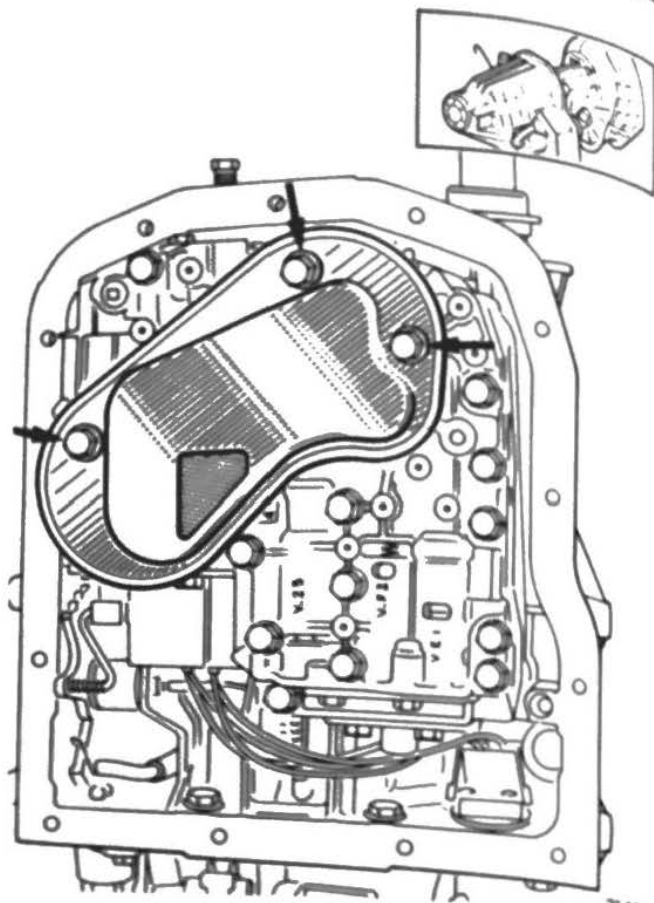






## GEAR CASING

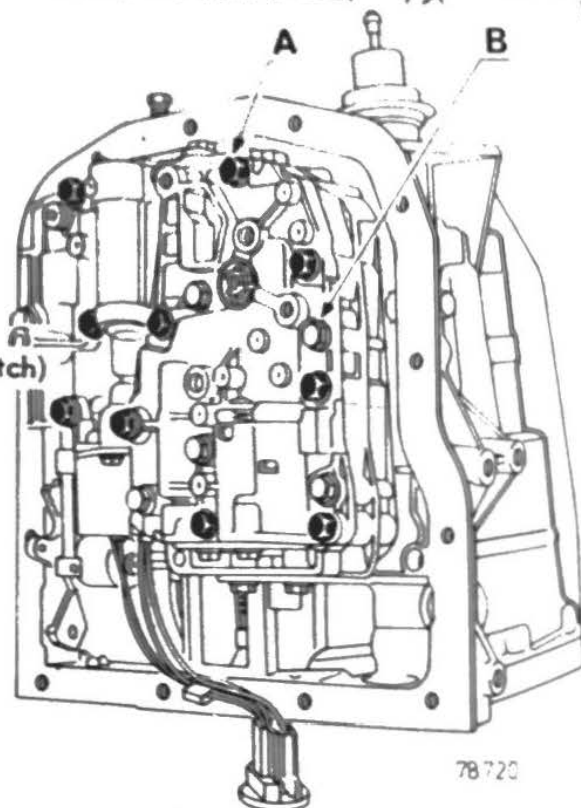
Unscrew the three bolts holding the oil pump suction assembly and remove it with its gasket.



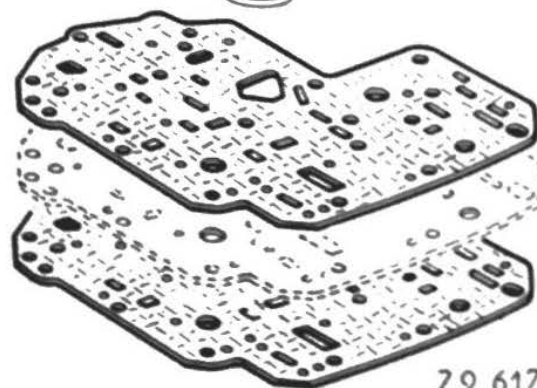
Unscrew the hydraulic distributor fixing bolts and remove it.

The five fixing bolts securing the secondary distributor to the main distributor must not be removed.

- A Bolts which may be unscrewed (shaded black on sketch)
- B Bolts not to be touched (outlined only on sketch).



Remove plate and two gaskets.





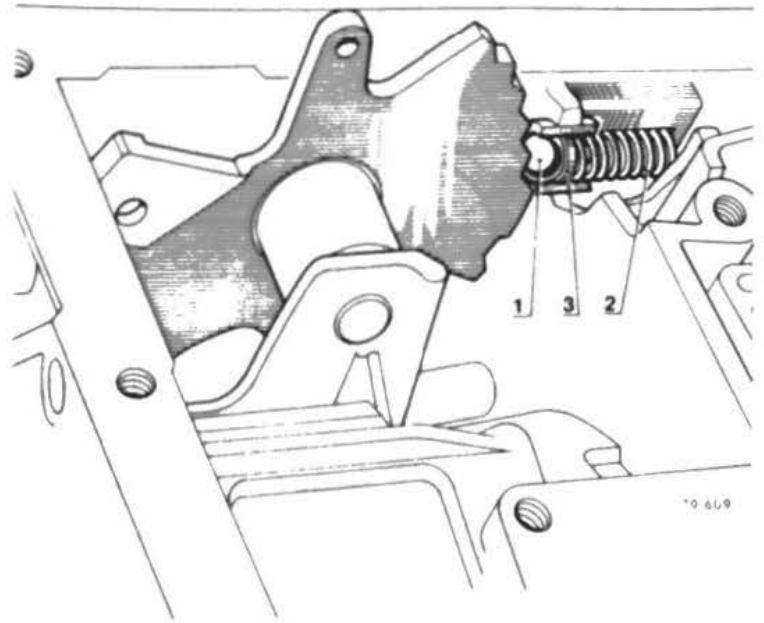
### QUADRANT AND CONTROL SHAFT

Only remove the above if it is the cause of an incident.

Tap out the quadrant spindle and retain :

- the plug
- ball (1), plunger spring (2)
- Remove control shaft.

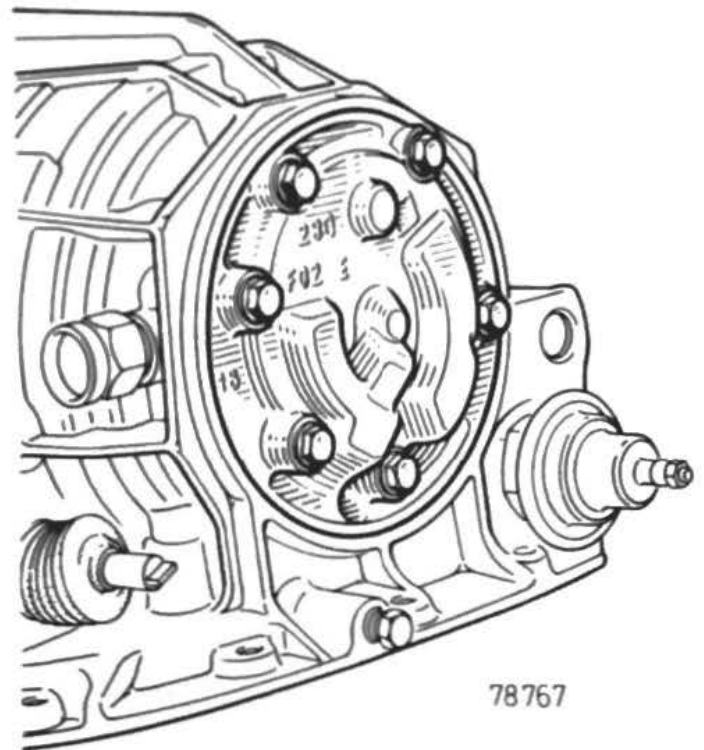
Note : Do not refit rubber damping pad (3) when re-assembling.



### OIL PUMP

Remove six securing bolts and withdraw pump with 2 gears and drive.

Mark the assembly position of the 2 gears.

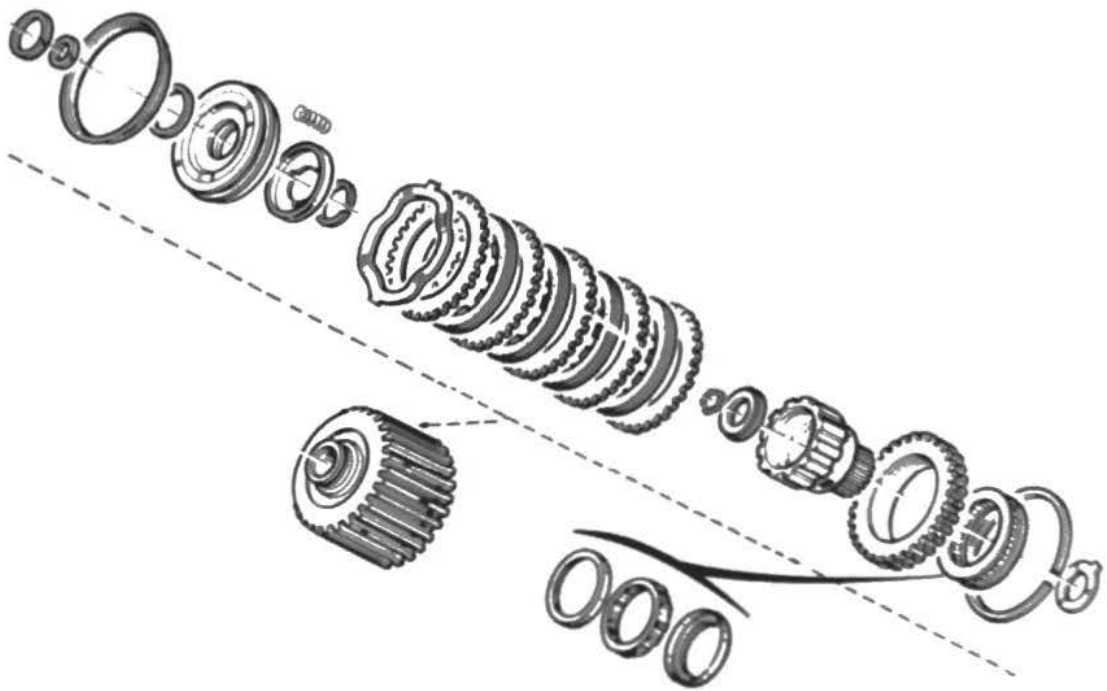




# E1 CLUTCH



## DISMANTLING

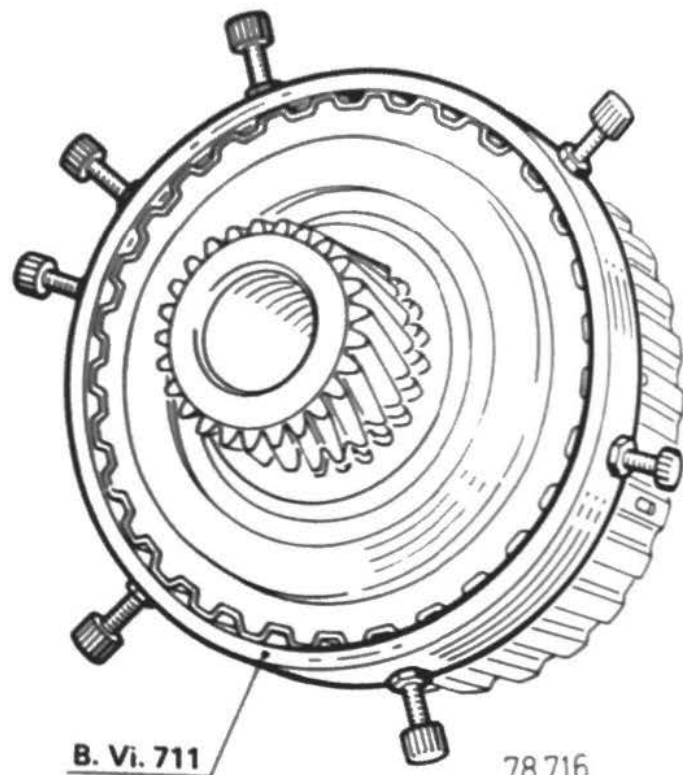


196.2 1

Use tool B.Vi.711 to compress the freewheel retaining circlip, remove freewheel and (P1) sunwheel.

Remove the needle thrust bearing.

Remove the lined discs, steel discs and wave-form disc.



B. Vi. 711

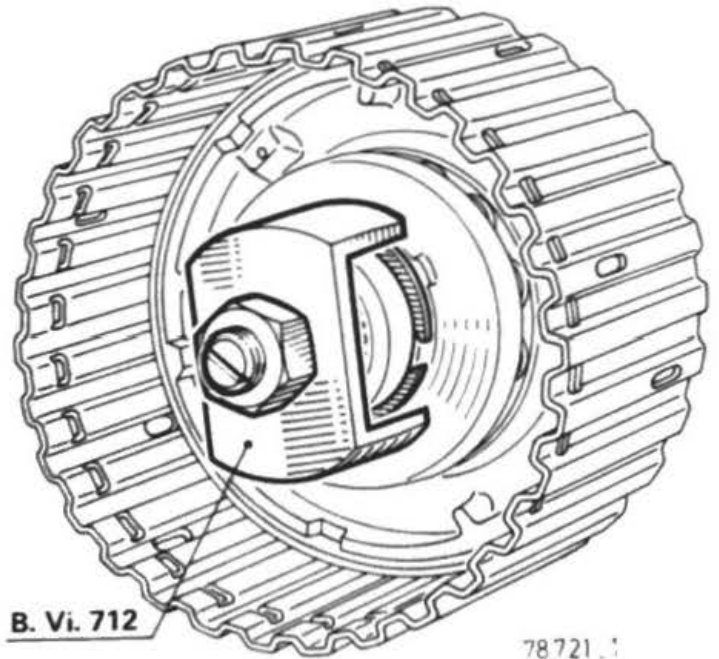
78 716



Compress the E1 piston springs with tool B.Vi.712 and remove circlip.

Remove thrust cup and retain springs.

Remove the piston by pulling on the spring locating pegs with a pair of pliers.



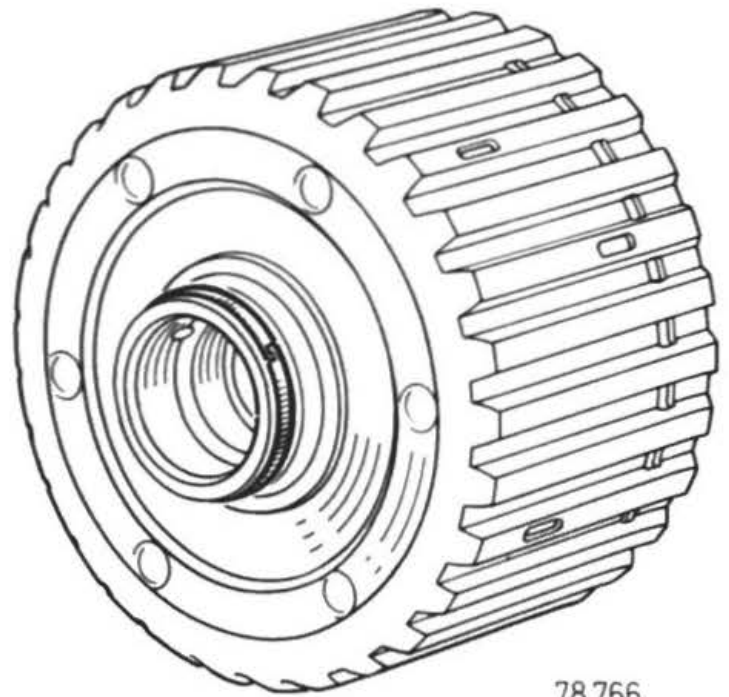
Remove the piston seals and sealing ring on housing.

### Dismantling the freewheel

Separate the E1 clutch hub from the freewheel outer track ring.

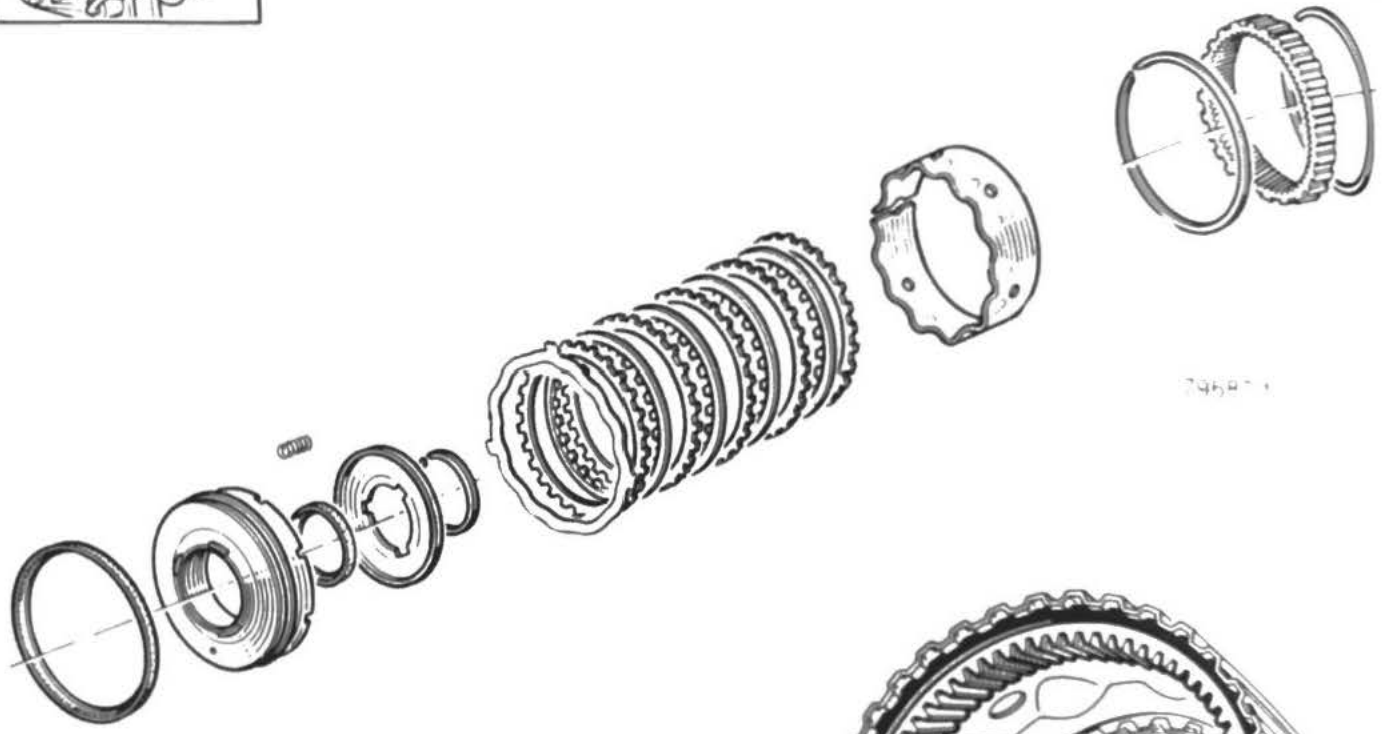
Remove the following from the outer track ring :

- thrust sleeve
- freewheel
- thrust sleeve.

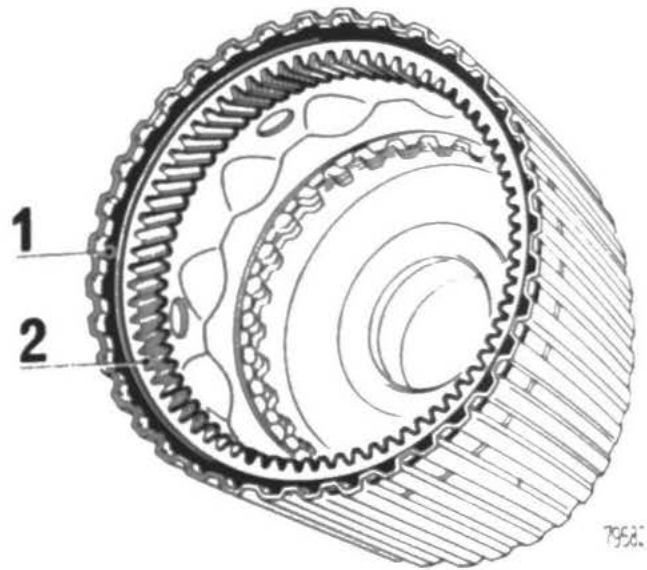




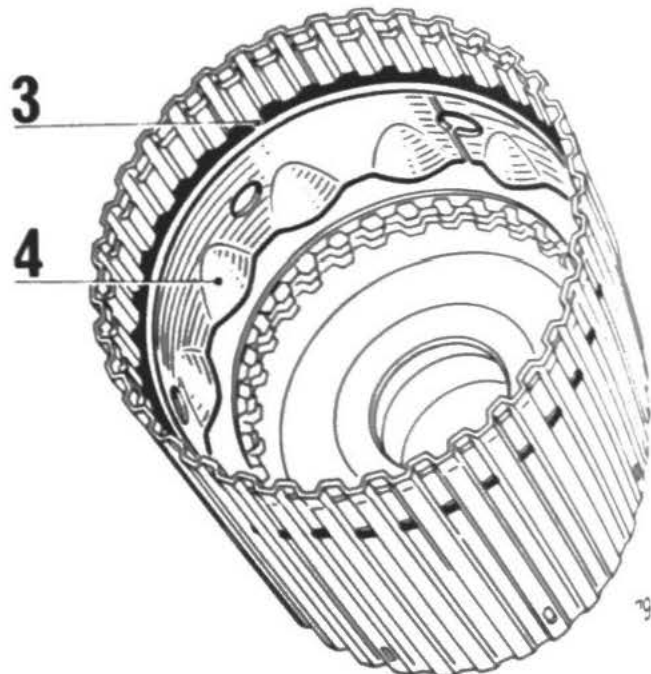
# E2 CLUTCH



Remove circlip (1) holding ring (2) and remove ring.



Remove circlip (3) and spacer plate (4).





Retain the steel discs, lined discs and wave-form disc.

Compress the E2 piston return springs with tool B.Vi.714 to free it then remove the thrust plate circlip. Slot the head of the tool screw as shown.

Hold the threaded rod stationary with a screwdriver to make the operation easier.

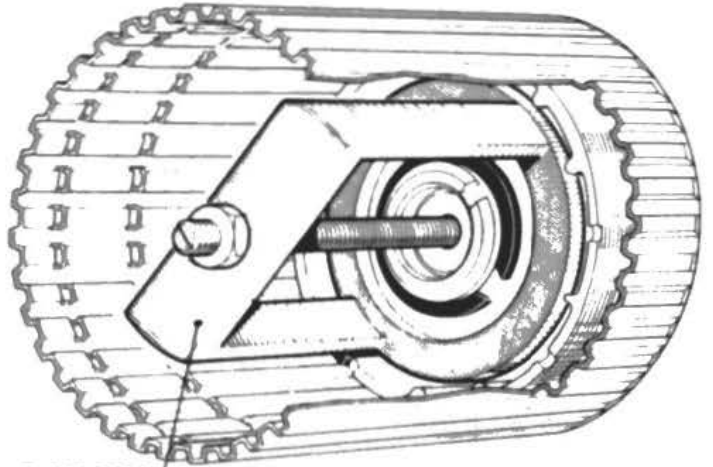
Retain the springs.

Remove the piston by hand or expel it with compressed air.

Remove piston seals.

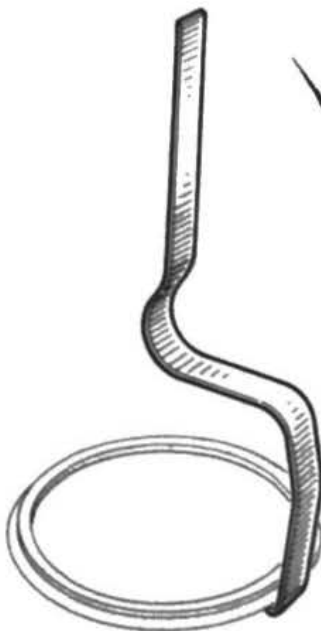
**WARNING :** The inner seal inside the bell-housing hub must only be removed if it is to be changed.

Use a hook shaped as shown to remove the seal in the hub. Insert it under the lip and ease the seal out of its groove.

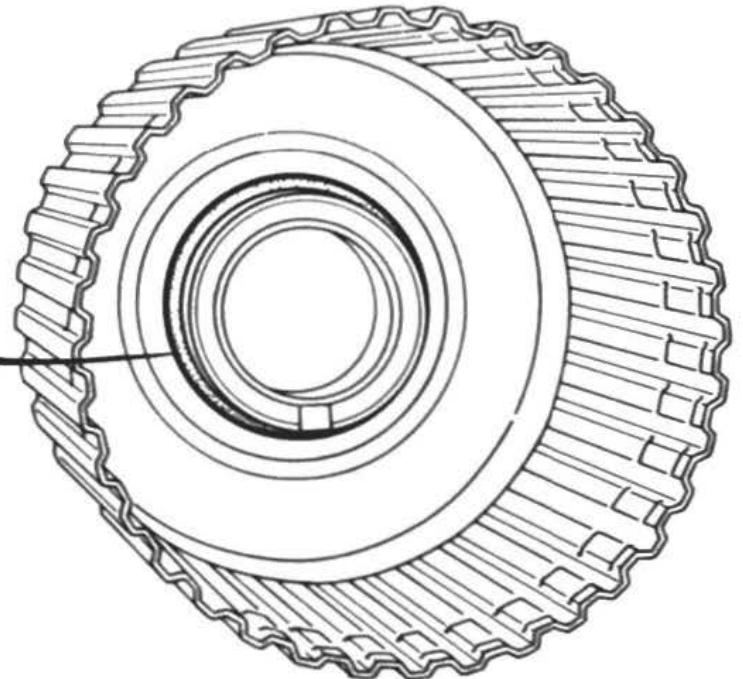


B. Vi. 714

78 745 1



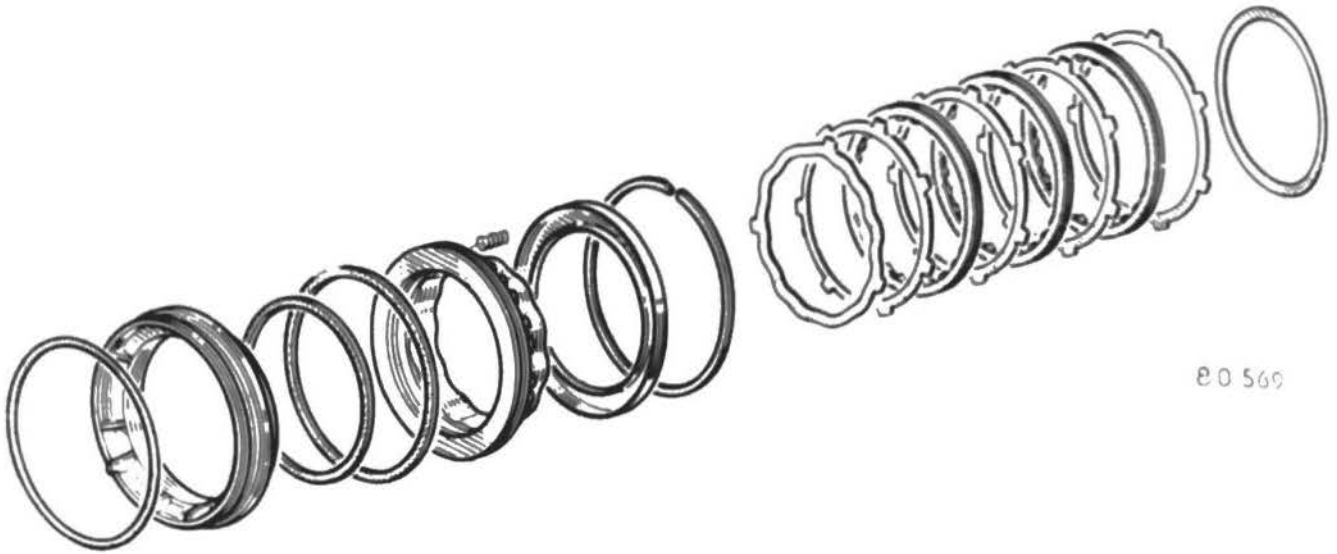
80 490



80 497



## F2 BRAKE



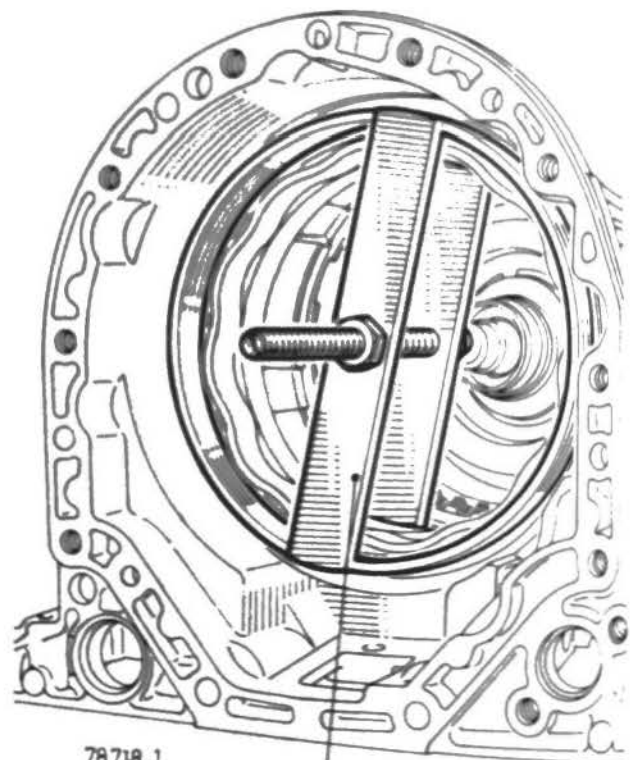
e 0 569

### IN THE GEAR CASING

Compress the F2 piston return springs with tool B.Vi.713.

- Remove the circlip
- Remove :
  - tool B.Vi.713
  - spring retaining cup
  - springs.

Remove piston.



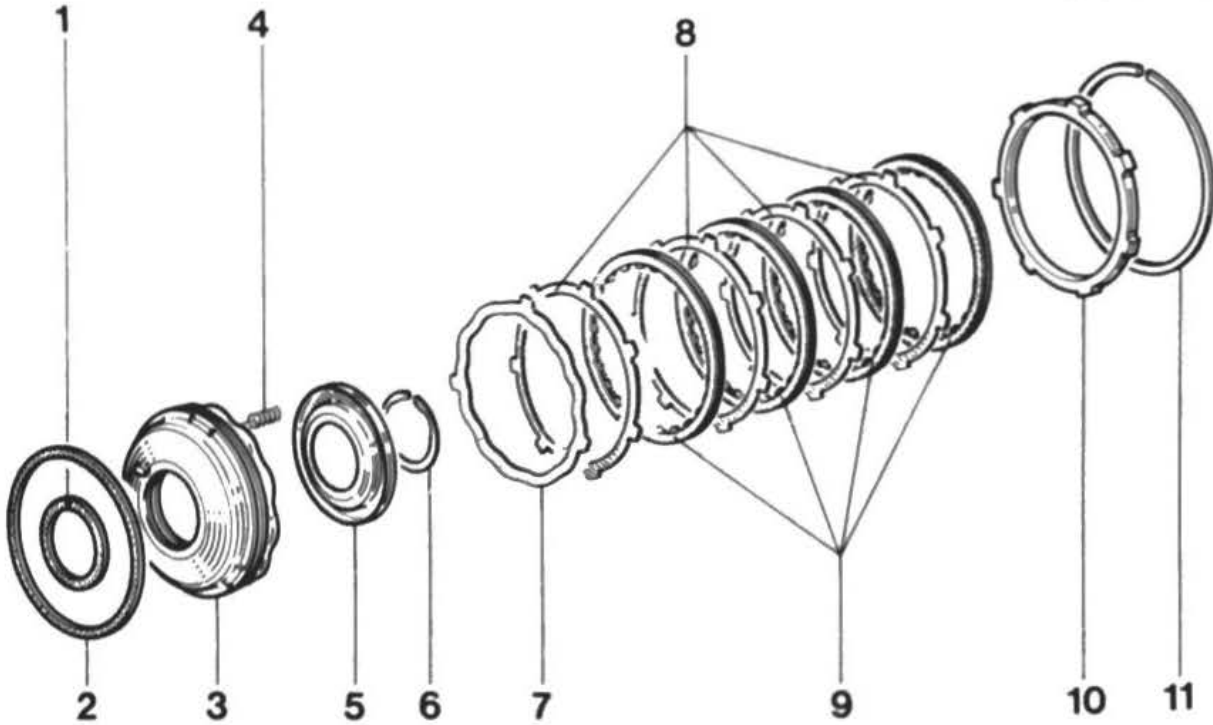
78718.1

B. Vi. 713

### IN THE FINAL DRIVE CASING

Remove the lined discs, steel discs and adjusting shims (2 shims maximum).

F1 BRAKE



80 568

Remove :

- thrust plate circlip (11)
- thrust plate (10)
- steel and lined discs.

Remove :

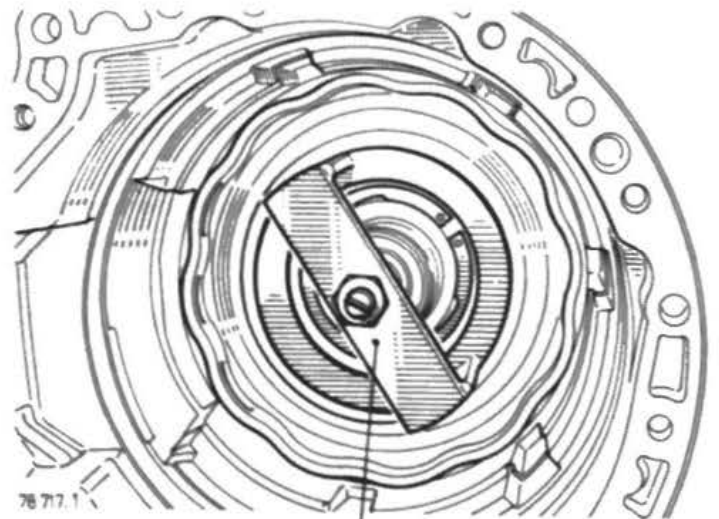
- the E1 and E2 seal rings,
- needle roller thrust bearing
- thrust washer
- and operating clearance setting shims.

Compress springs with tool B. Vi. 714 and remove circlip.

Remove tool and retain the thrust cup and springs.

Remove piston (3) by pulling on the spring locating pegs with a pair of pliers.

Remove the piston union seal (1) and outer seal (2).



B. Vi. 714





## CHECKING COMPONENTS



### Gear casing.

Make sure that the seal locating surfaces on the F1 and F2 pistons are in good condition, also those in the oil pump housing.

### LINED DISCS

Change any worn discs or those showing signs of overheating (blackened lining) or breaking up.

SEALS (Change all removed seals as a matter of course).

### OIL SEAL TIGHTNESS

0,2 to 0,7 (.008 to .028") over the diameter.

Change all oil seals which are outside tolerance.

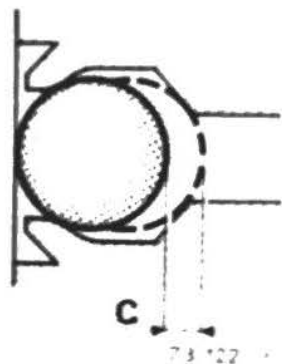
### DEPRESSURISING BALLS (E1 and E2)

The E1 clutch piston and E2 clutch are fitted with depressurising balls located by retaining tabs.

Each ball must be absolutely free in its location and must neither stick to its seat nor at the retaining tab end.

Check ball travel (C) which should be about 1 mm (.040").

Change the complete piston if operation is not satisfactory.



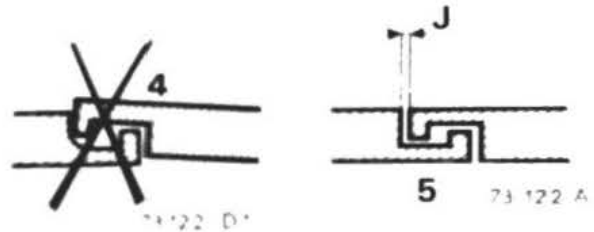
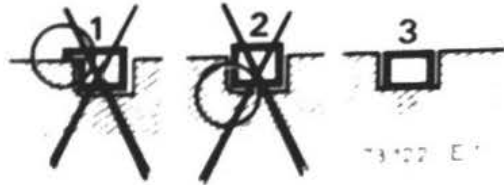


## SEALING RINGS

### Check :

- amount of wear on seal lands (1)
- condition of ring groove bottoms (2)
- they must be sharp-angled allowing the ring to bottom fully (3)
- ring gaps (4)  
They must mate correctly (5).
- gap clearance (J) must measure between 0,5 and 0,35 mm (.002 and .014").

Check the bore opposite the ring locations and, if worn, change the components, (gear casings, rings, E1 - E2 bellhousing, etc...)



## E1 CLUTCH and E2 CLUTCH

Check the piston bore inside and the surface outside.

## EPICYCLIC GEAR TRAIN

Check condition of :

- planet wheels
- sunwheels
- ring (see E2)
- P1 friction washer in planet wheel carrier.

## CLEANING

Do not use trichlorethylene which would damage the oil seals.

Use :

- cotton wool to wipe parts
- White spirit or degreaser (except on oil seals).

Blow over the parts with compressed air after cleaning, paying particular attention to all holes, feed channels and oilways.

Lubricate all parts with recommended oil after cleaning.

No liquid other than recommended oil may be used in the converter.

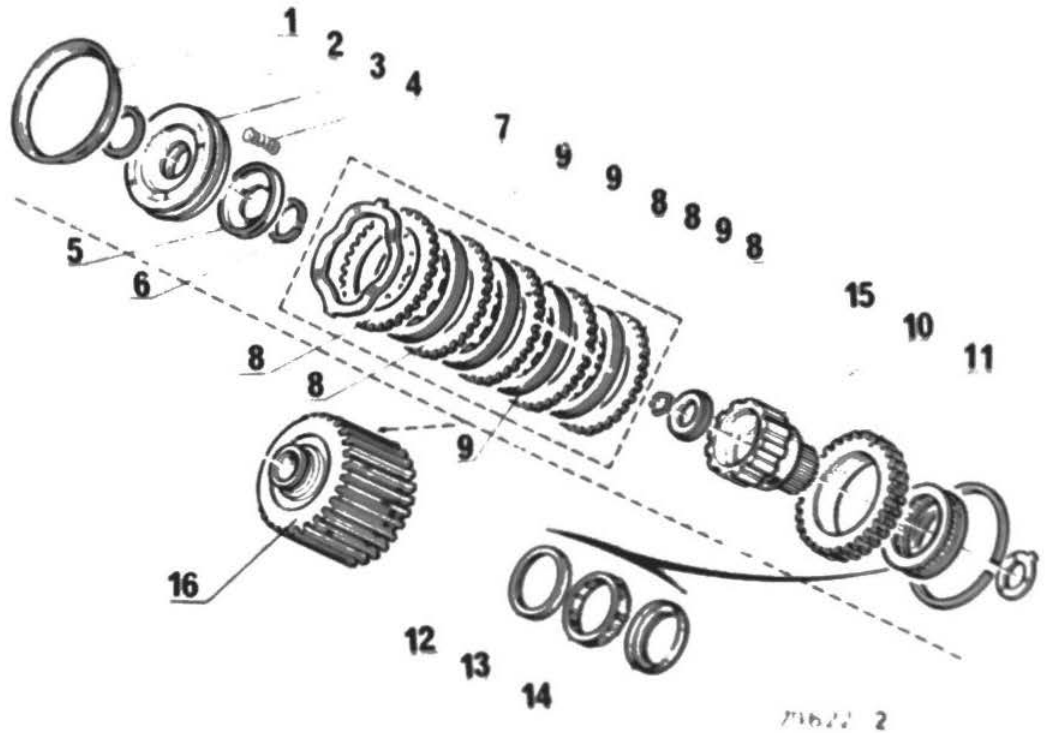
To clean it, allow it to drain for a long period, then use a syringe to pump out the centre of the turbine hub.



## RE-ASSEMBLING



### E1 CLUTCH



1 - Piston lip-type seal (outer)

2 - Square section seal (inner)

3 - Piston

4 - Springs

5 - Spring retaining cup

6 - Circlip

7 - Wave - form disc

8 - Steel discs

9 - Lined discs.

Number of discs in stack depends on automatic transmission type. Refer to page 59.

10 - E1 hub

11 - Freewheel outer track ring

12 - Freewheel thrust sleeve

13 - Freewheel

14 - Freewheel thrust sleeve

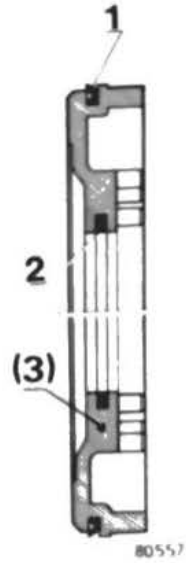
15 - Needle roller thrust bearing

16 - Bellhousing

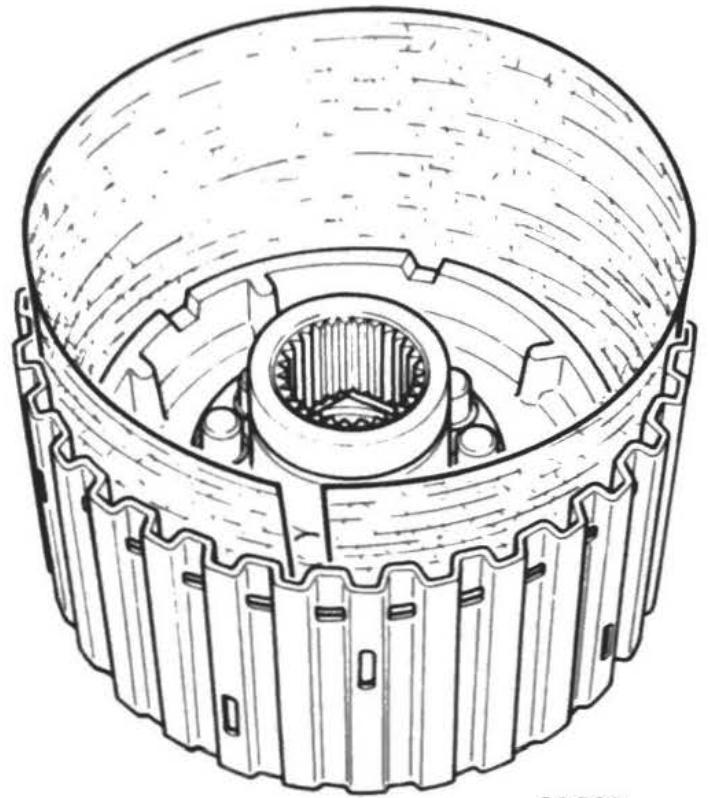


Lubricate the seals and fit them to piston (3) :

- the square section seal (2) inside,
- the lip-type seal (1) outside (with lip facing bottom of piston).



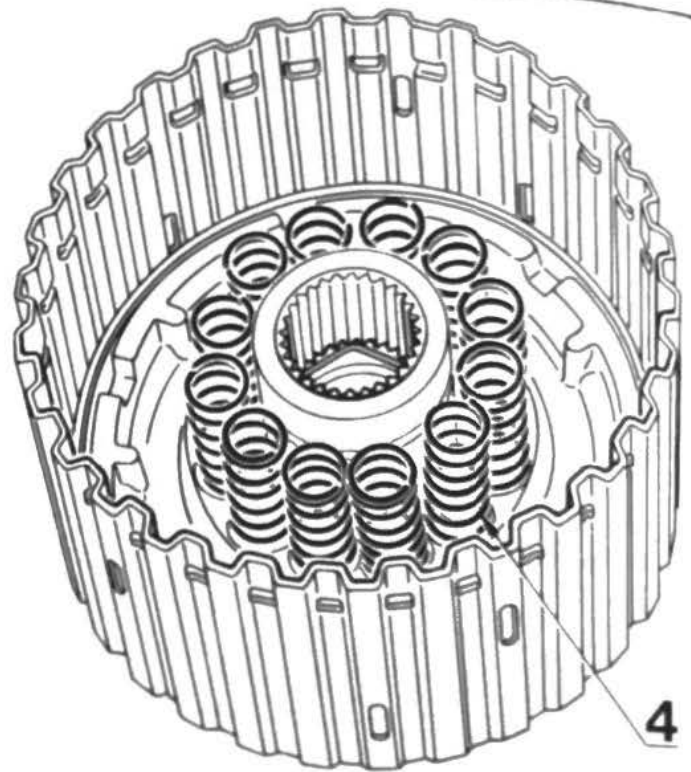
Use a strip of thin plastic sheet when inserting the piston to prevent the seal lip bending back (a piece of plastic sheet is supplied with each set of seals).



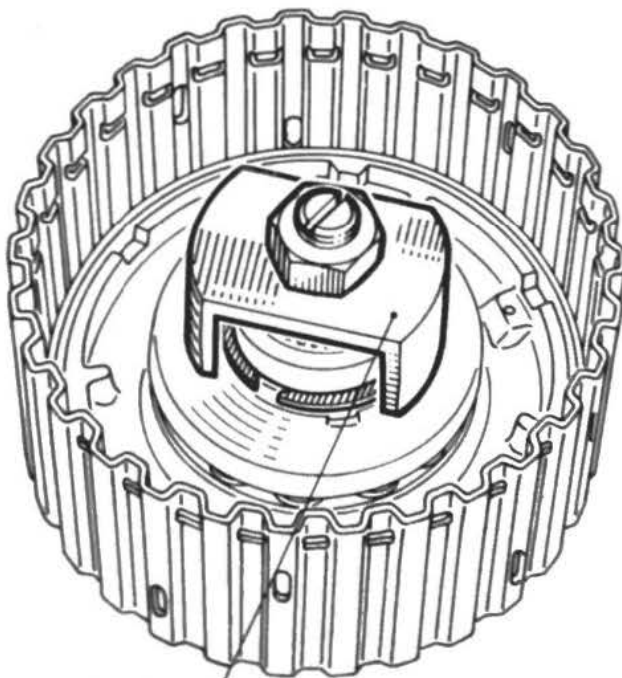


Fit all the return springs (4), thrust cup (5) and circlip (6) to the piston.

Compress the springs with tool B.Vi.712 and insert the circlip in its location.

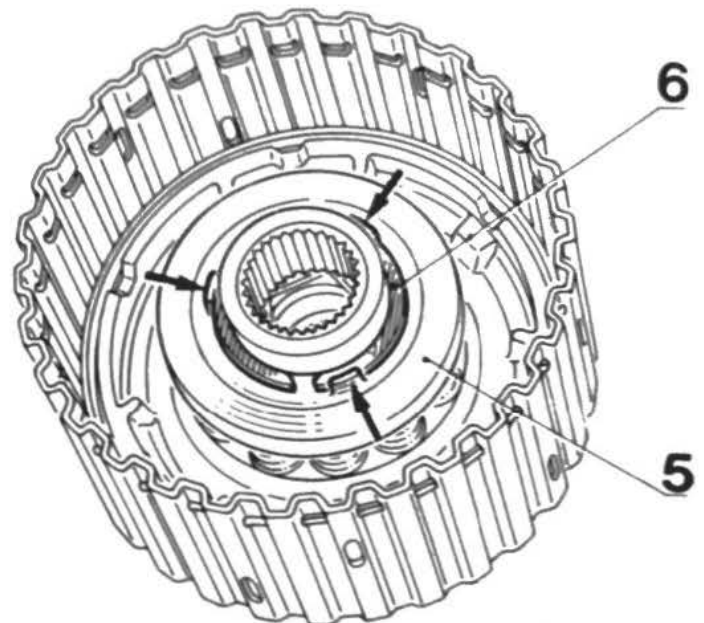


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B. Vi. 712

78721.1



78765.1

Make sure that the three lugs on the thrust cup are holding the stop ring in position once the tool has been removed.



Assemble the following in the housing in the order given :

- the wave-form disc (7)
- 1 steel disc (8)
- 1 lined disc (9)
- 1 steel disc (8) and so on.

4141 - 10 - 11 - 12 - 13 - 20

4 steel discs (8)

3 lined discs (9).

4141 - 00 - 30 - 31

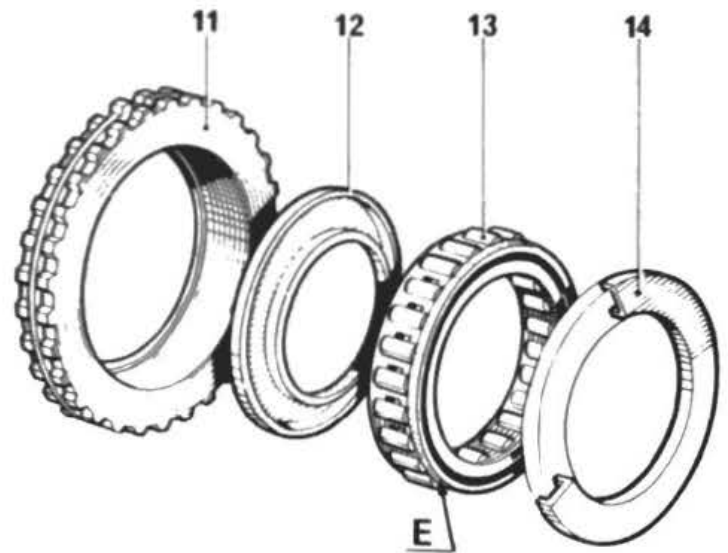
5 steel discs (8)

4 lined discs (9)

#### Assembling the freewheel

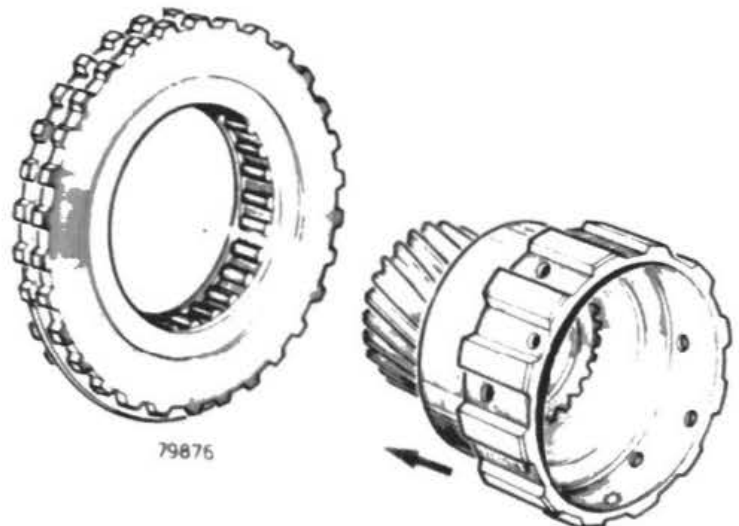
- Assemble the following to the freewheel outer track ring (11) :

- thrust ring (2)
- freewheel (13) with shoulder (E) to outside,
- thrust ring (14).



79 875.1

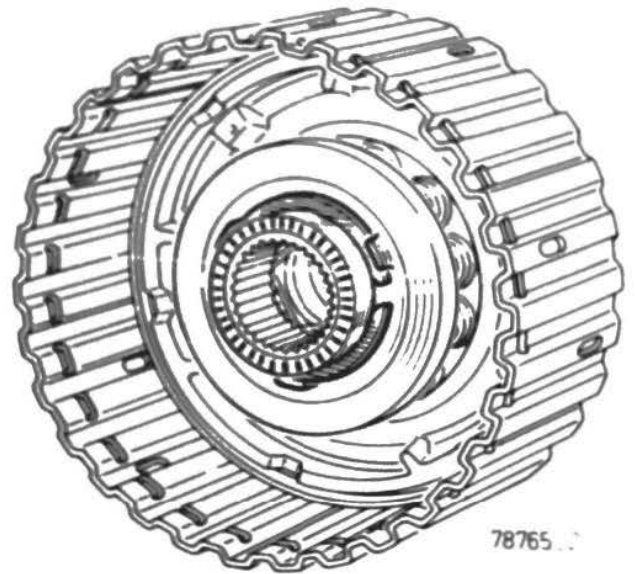
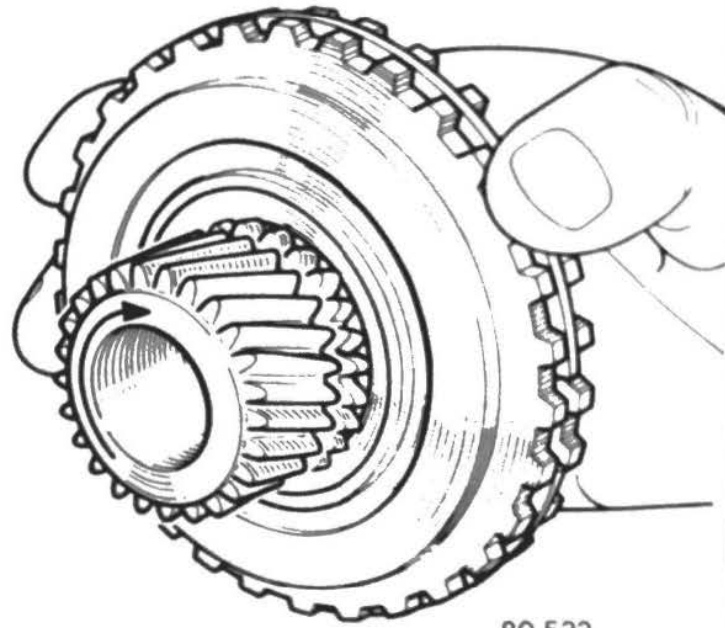
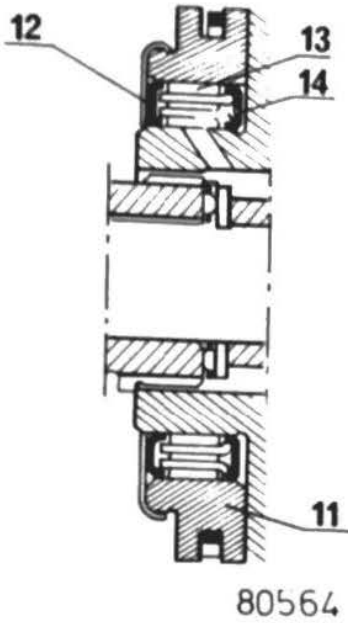
Fit the above assembly to the E1 hub.



79875



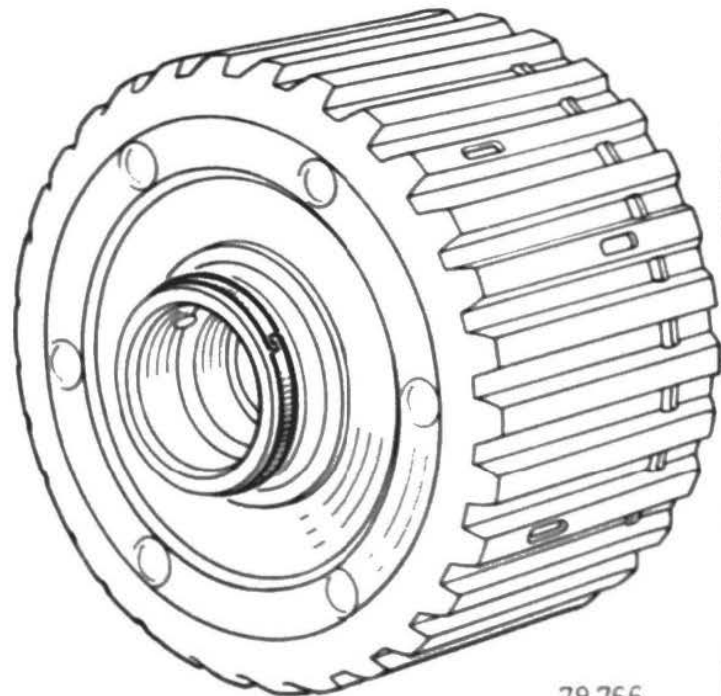
When assembled, and holding the freewheel outer track ring stationary, the P1 sunwheel must be free to rotate clockwise and lock itself when an attempt is made to turn it anti-clockwise.



Fit the needle roller thrust bearing in E1 with the needles facing towards P1.

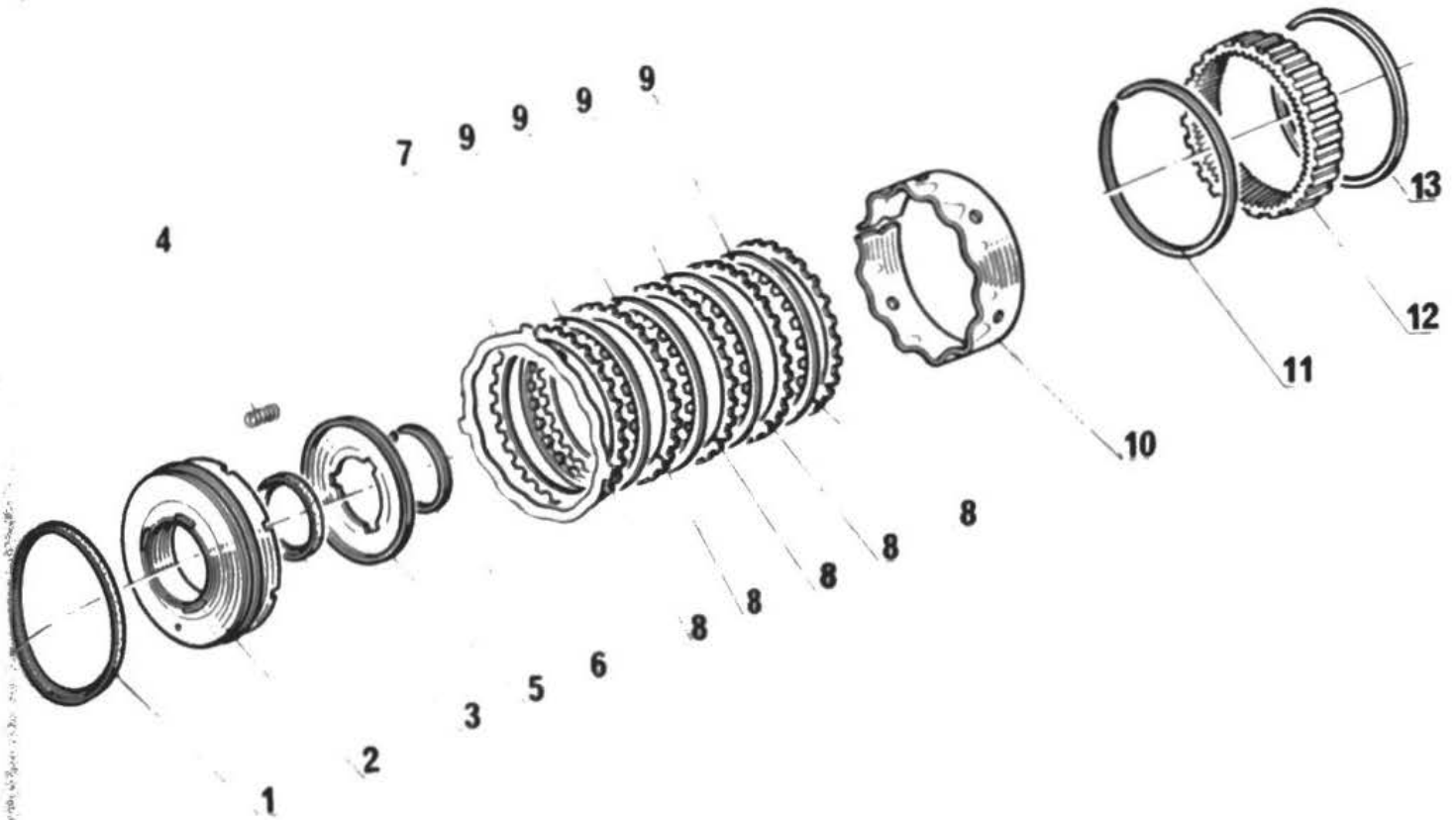
Insert the "P1 sunwheel - freewheel" assembly in the E1 clutch.

Fit the seal ring to the housing.





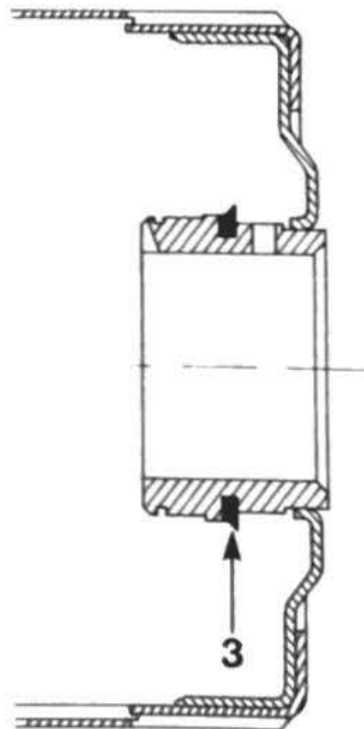
# E2 CLUTCH



79687 1

- 1 - Piston lip-type seal (outer)
  - 2 - Piston
  - 3 - Lip-type seal on bellhousing hub
  - 4 - Springs
  - 5 - Spring thrust plate
  - 6 - Circlip
  - 7 - Wave-form disc
  - 8 - Steel discs
  - 9 - Lined discs
  - 10 - Distance sleeve
  - 11 - Circlip
  - 12 - Ring
  - 13 - Circlip
- Number of discs in stack depends on automatic transmission type. (refer to page 59).

Fit lip-type seal (3) to the bellhousing hub (lip facing bottom of bellhousing).







Lubricate lip-type seal (1) and fit it to piston (2) (with lip facing bottom of piston).

Use a strip of thin plastic sheet when inserting the piston on the the bellhousing to prevent damaging the seal lip (a piece of plastic sheet is supplied with each set of seals).

Fit all springs (4), retaining cup (5) and circlip (6) to the piston.

Position tool B.VI.714 and compress the springs.

Fit circlip (6), making certain that it is fully home in its groove before the tool is removed.

#### Assemble

- the wave-form disc (7)
- 1 steel disc (8)
- 1 lined disc (9)
- 1 steel disc (8)

and so on :

4141 - 10 - 11 - 12 - 13 and 20

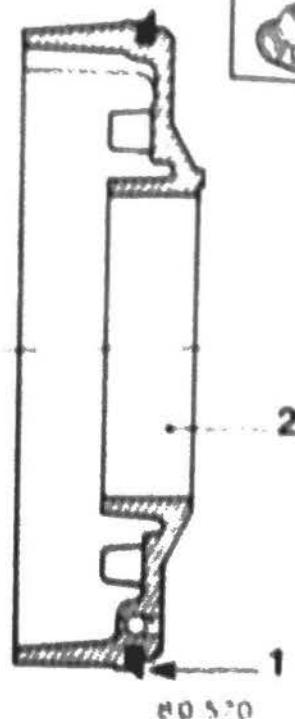
4 steel discs (8)

3 lined discs (9)

4141 - 00 - 30 - 31

5 steel discs (8)

4 lined discs (9).



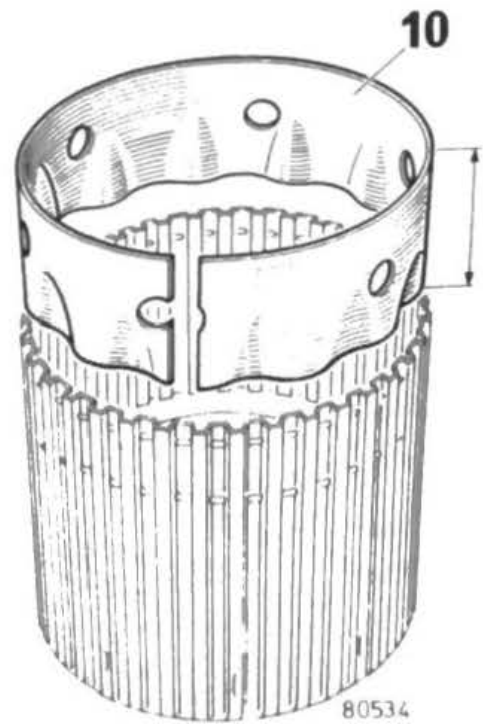


Fit distance sleeve (10)

Sleeve height depends on automatic transmission type.

4141 - 10 - 11 - 12 - 13 - 20 = 47 mm (1.850")

4141 - 00 - 30 - 31 = 43,2 mm (1.700")

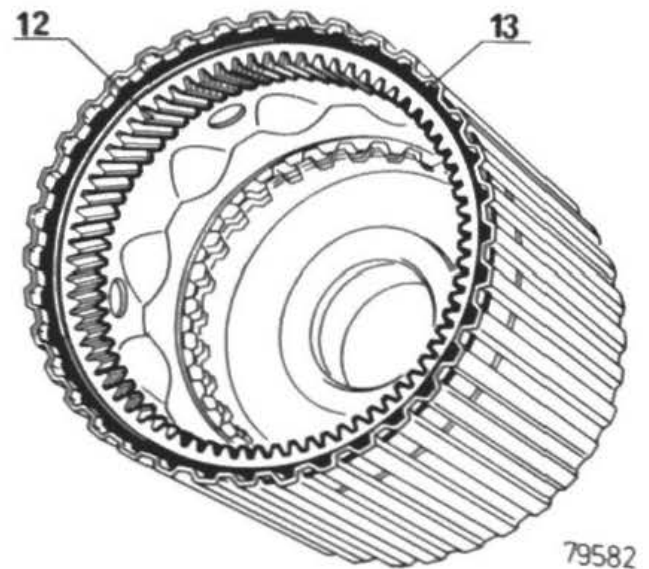
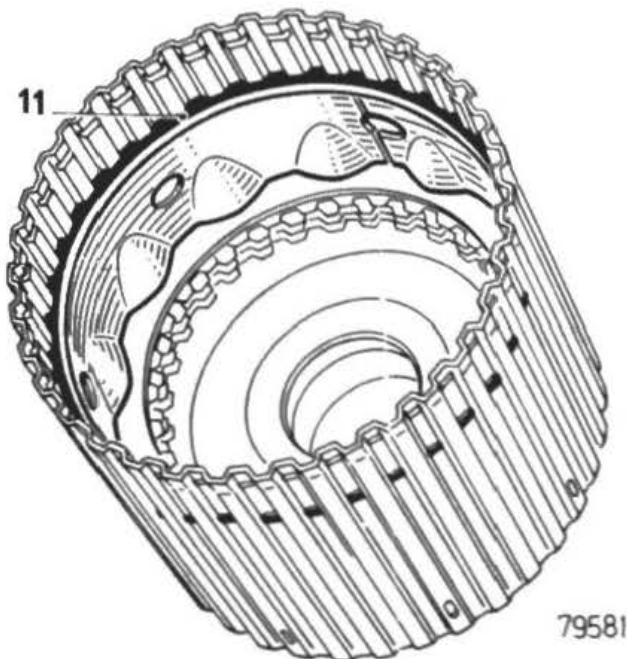


Fit :

circlip (11)

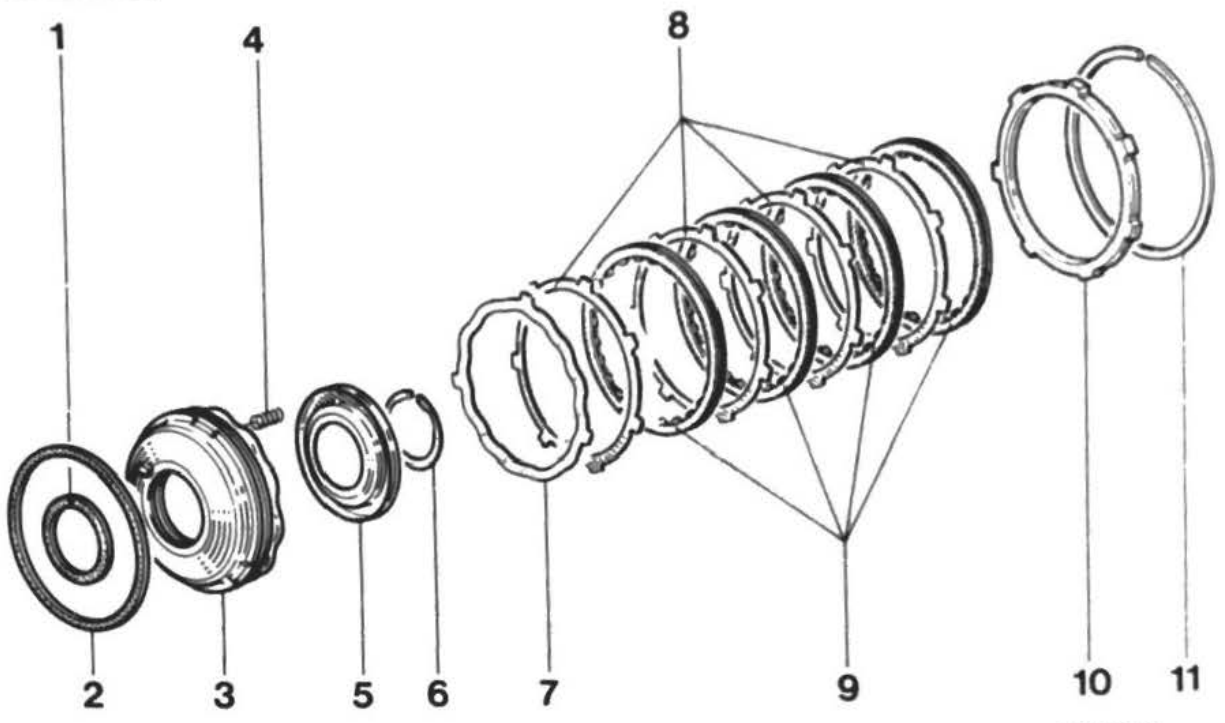
ring (12)

circlip (13)





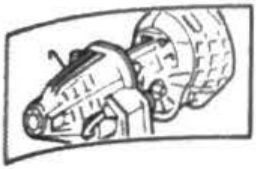
# F1 BRAKE



80 568

- 1 Square section seal (inside F1 piston)
- 2 Square section seal (outside F1 piston)
- 3 F1 piston
- 4 Springs
- 5 Spring retaining cup
- 6 Circlip
- 7 Wave-form disc

- 8 Steel discs
  - 4141 - 00 and 30 - 31 (1st assembly) 4 discs
  - 4141 - 30 - 31 (2nd assembly) 3 discs
  - 4141 - 10 - 11 - 12 - 13 - 20 : 3 discs
- 9 Lined discs
  - 4141 - 00 and 30 - 31 (1st assembly) 4 discs
  - 4141 - 30 - 31 (2nd assembly) 3 discs
  - 4141 - 10 - 11 - 12 - 13 - 20 : 3 discs
- 10 Thrust plate
  - 4141 - 00 (with 5 steel discs) : 6,3 mm (.248") thick
  - 4141 - 00 (with 4 steel discs) : 8,5 mm (.334") thick
  - 4141 - 30 - 31 (1st assembly) : 8,5 mm (.334") thick
  - 4141 - 30 - 31 (2nd assembly) :
    - Provisional (The 1st assembly gear casing is retained) : 13,2 mm (.519") thick
    - Final (The gear casing differs from that used in the 1st assembly) : 8,5 mm (.334") thick
  - 4141 - 10 - 11 - 12 - 13 - 20 : 13,2 mm (.519") thick
- 11 Circlips

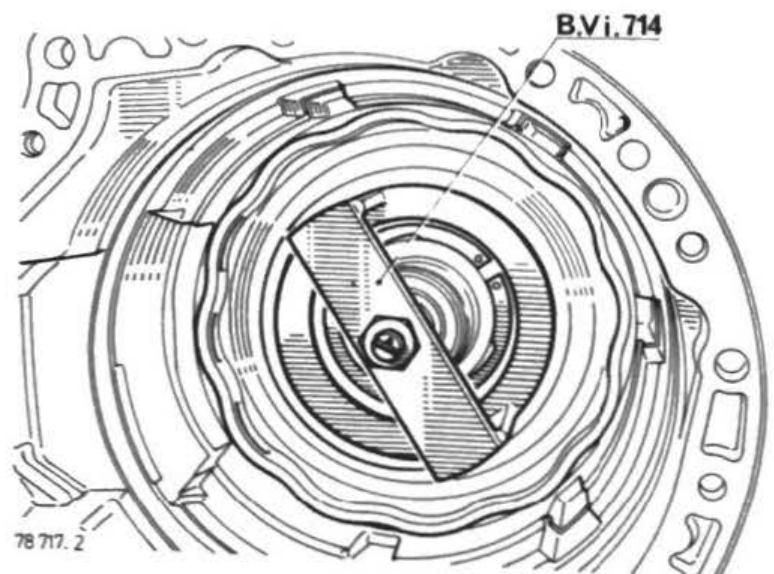
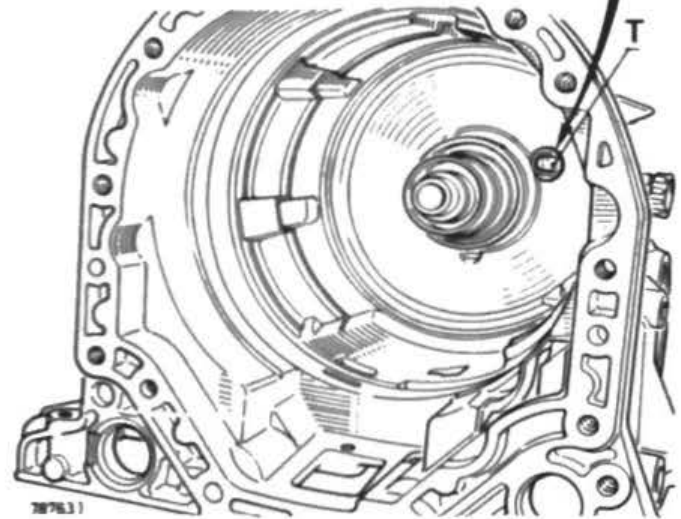
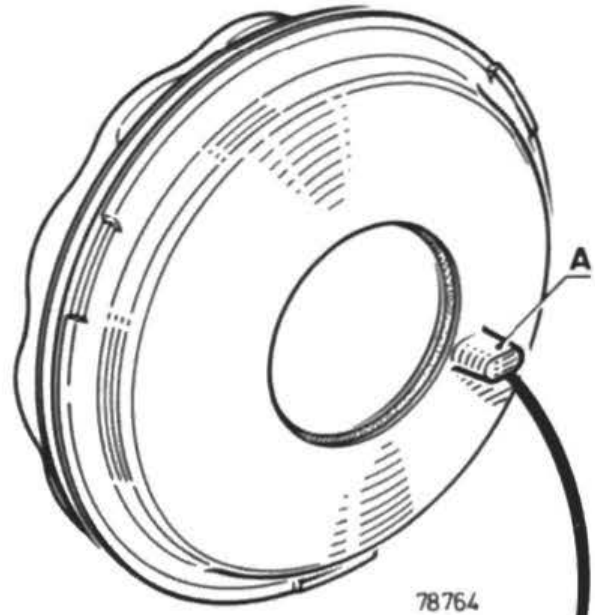


Lubricate square section oil seals (1) and (2) and fit them to F1 piston (3).



Fit the piston using a piece of plastic sheet to help the outer seal to slide (this sheet is supplied with the set of seals).

Make sure that boss (A), which locates the piston, enters hole (T) in the casing.

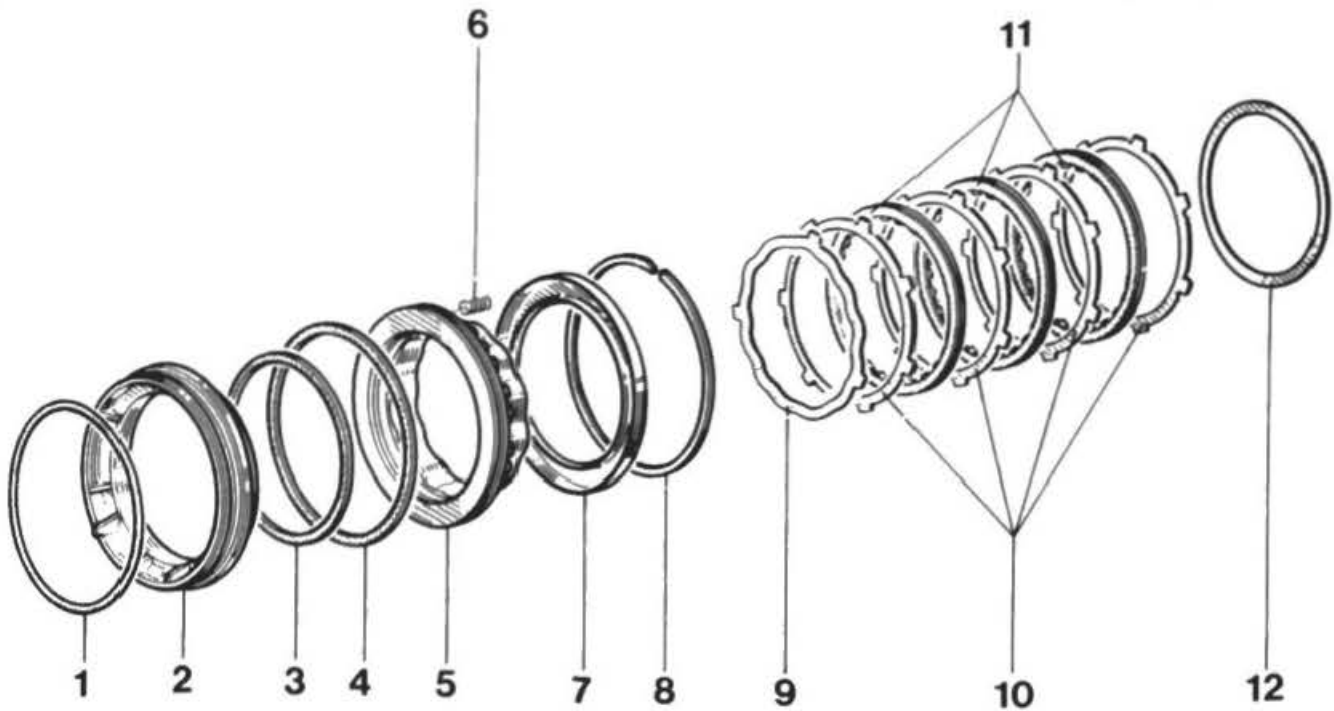


Fit the springs and thrust plate to the piston and compress the springs with tool B.Vi.714 to insert circlip (pass the tool screw through the circlip before fitting the tool).





## F2 BRAKE



80 569

- 1 Piston carrier outer seal ('O' ring or square section depending on assembly)
- 2 Piston carrier
- 3 Square section seal (inner)
- 4 Square section seal (outer)
- 5 Piston
- 6 Springs

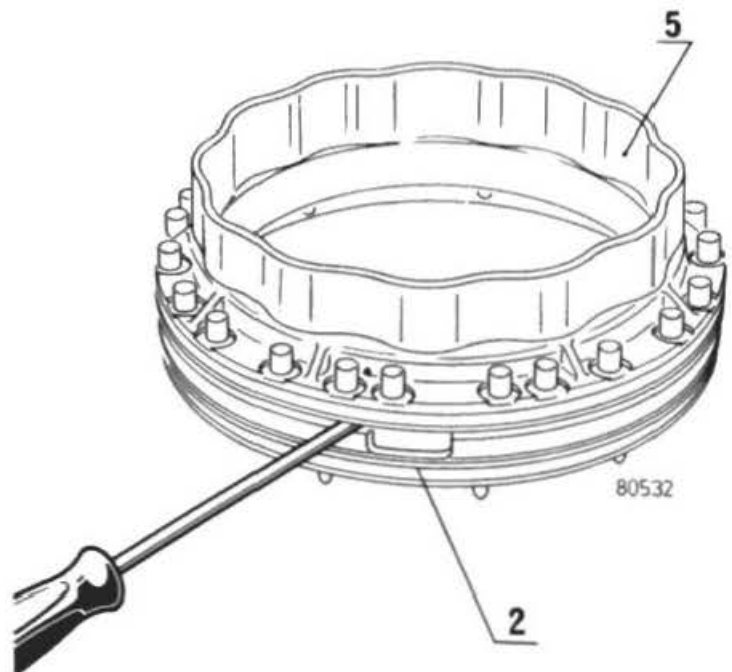
- 7 Spring retaining cup
- 8 Circlip
- 9 Wave-form disc
- 10 Steel discs (4)
- 11 Lined discs (3)
- 12 F2 operating clearance adjusting shim.

Separate piston (5) from its carrier (2) and change the seals.

If an 'O' ring is fitted (1st assembly), refit an identical 'O' ring in its place.

If the carrier has a square section seal (2nd assembly) refit an identical seal (it is similar to seal (3) fitted inside the piston).

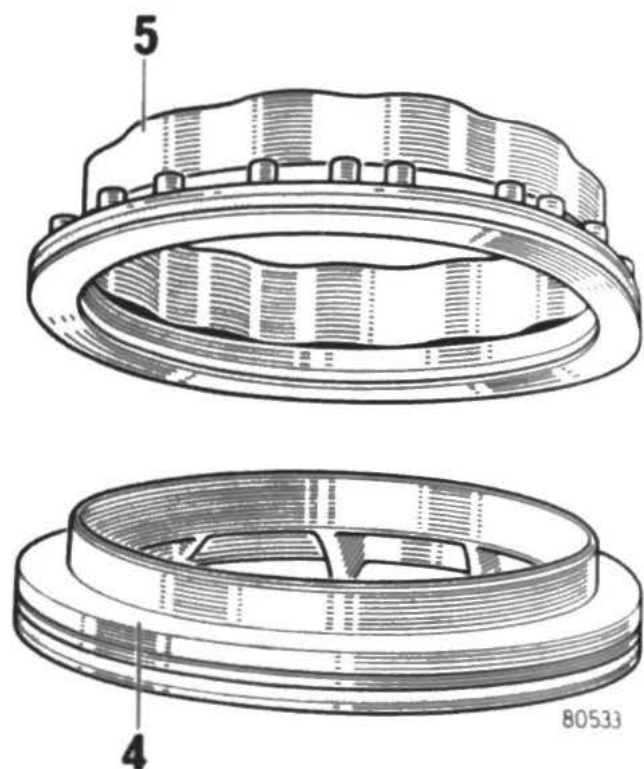
Fit square section seals (3) and (4) to piston (5).



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Lubricate carrier (4) and insert it in piston (5).



Fit the above assembly to the gear casing, making certain that the 3 lugs on the carrier mate with the groove in the casing.

Fit :

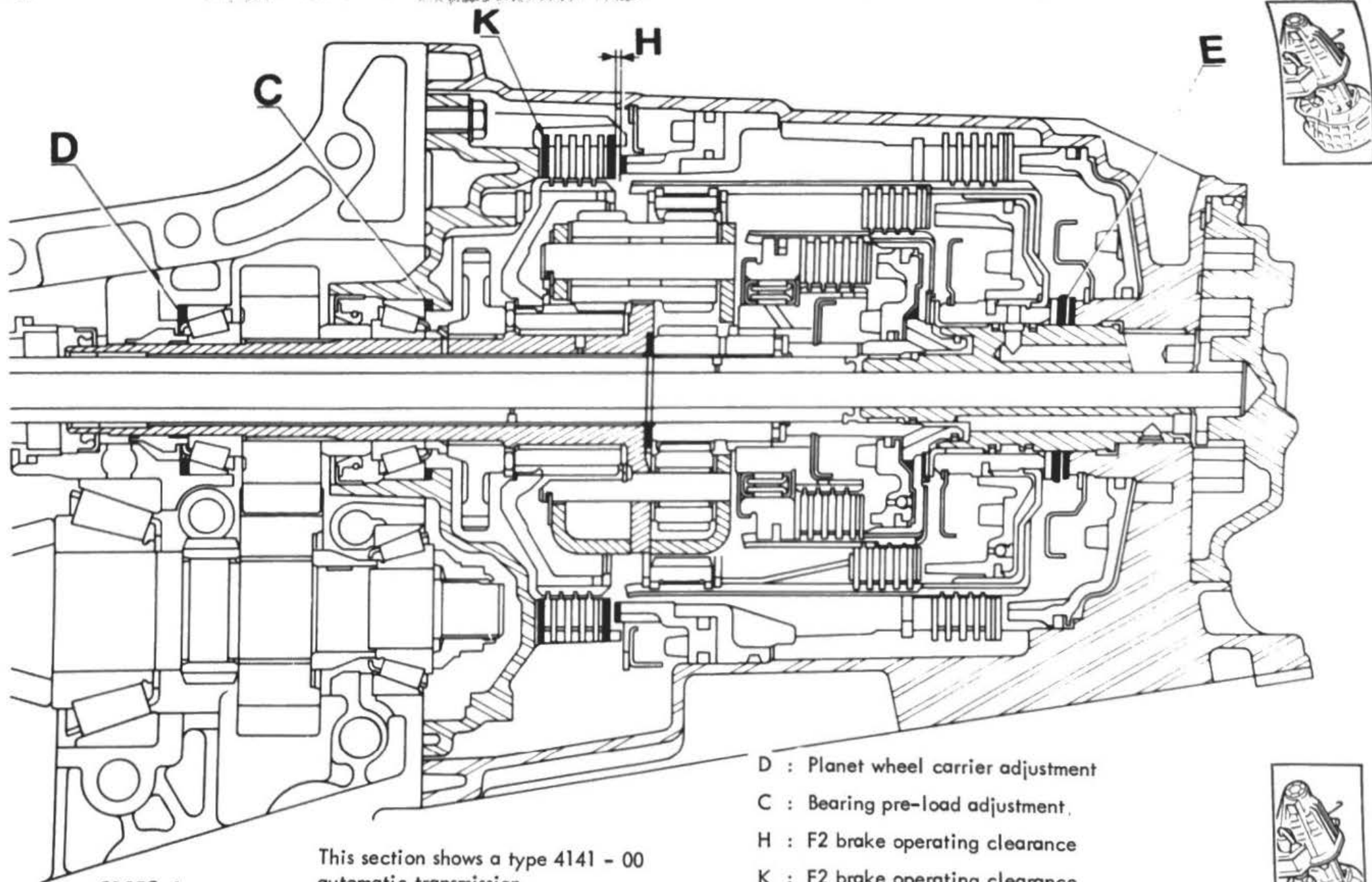
- springs (6) to the piston
- spring retaining cup (7).

Compress the springs using tool B.Vi.713.

Fit circlip (8).

Remove tool B.Vi.713

Make certain that the F2 piston is fully home.



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This section shows a type 4141 - 00  
automatic transmission

- D : Planet wheel carrier adjustment
- C : Bearing pre-load adjustment.
- H : F2 brake operating clearance
- K : F2 brake operating clearance  
adjustment
- E : Transmission operating clearance.



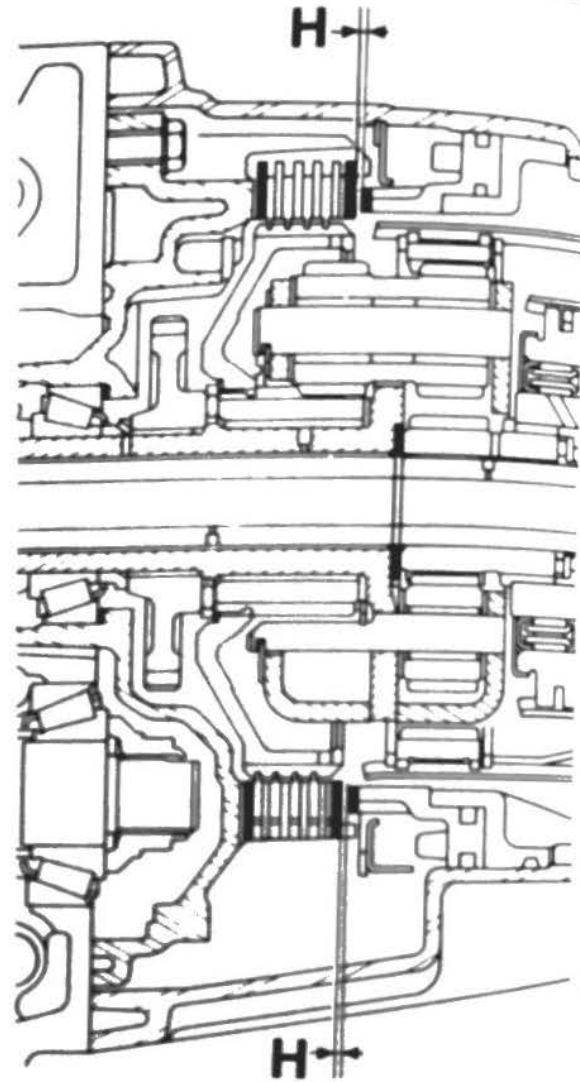




## CHECKING AND ADJUSTING F2 OPERATING CLEARANCE



There must be a clearance (H) between the F2 piston in the gear casing and the last F2 disc in the planet wheel carrier to allow the F2 brake to function correctly.



79 873

### METHOD OF OPERATION

1 - Measuring dimension (A1) on the final drive casing.

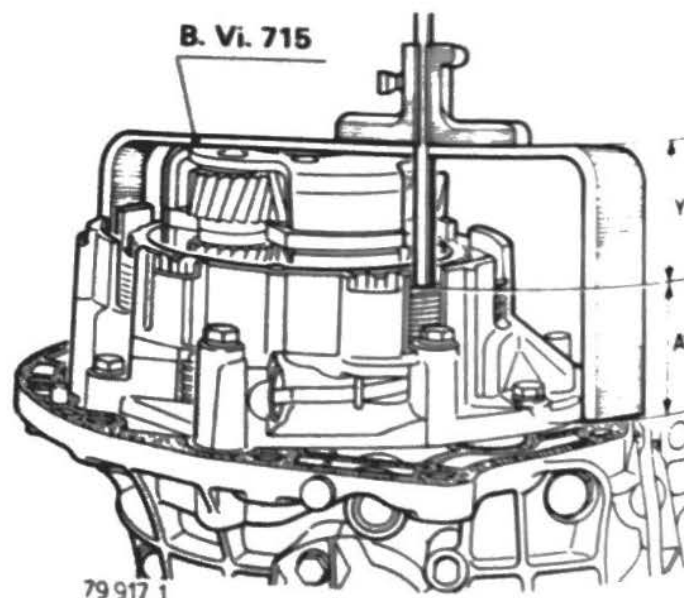
Fit the paper gasket to the final drive casing, position tool B. Vi. 715 and measure dimension (Y) between the top face of the tool and the last F2 disc.

(Change the wave-form disc for a plain disc to obtain an exact measurement).

Subtract dimension (Y) from the total tool height (120 mm = 4.724") to obtain dimension (A1).

Dimension A1 = 120 mm (4.724") - (Y)

Remember to retain the wave-form disc to its correct position in the stack after the measurement has been taken.



79 912 1

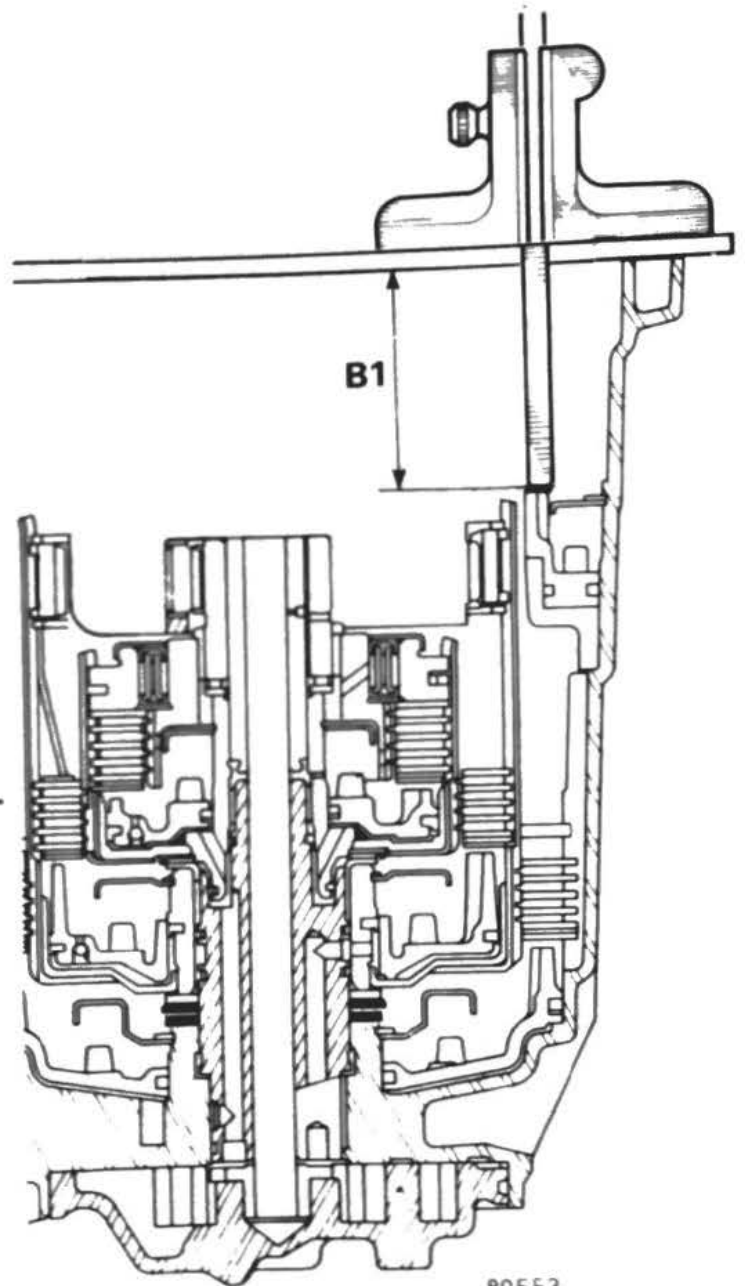


2 - Measuring dimension (B1) on the gear casing.

Measure dimension (B1) between the piston and the gear casing joint face with a ruler and depth rule (dimension B1 = dimension as read less thickness of depth rule).

Calculate the difference between dimension (A1) and (B1) ( $H = A1 - B1$ ) and fit shims under the F2 discs to obtain the correct operating clearance. (Refer to page 60).

**DO NOT USE MORE THAN 2 SHIMS.**



80553



## ADJUSTING TRANSMISSION OPERATING CLEARANCE



The transmission operating clearance is the endplay existing in the gear casing.

This endplay (J) exists at (E) and is obtained by measuring dimensions (A2) and (B2) and calculating the difference. The above measurements are taken in two stages.

- 1) Measuring dimension (A2) on the final drive casing

Position tool B.Vi.715 on the final drive casing and measure dimension (X) between the top face of tool and the planet wheel carrier shaft (without the gasket).

**REMEMBER TO REMOVE THE FRICTION WASHER.**

Calculate the difference between the tool dimension (120 mm = 4.724") and dimension (X) to find dimension (A2).

$$A2 = 120 \text{ mm (4.724")} - (X).$$

Example :

$$\begin{aligned} X &= 46,2 \text{ mm (1.819")} \text{ (as read)} \\ A2 &= 120 \text{ mm} - 46,2 \text{ mm} = 73,8 \text{ mm} \\ &\quad (4.724" - 1.819" = 2.905"). \end{aligned}$$

Dimension (A2) should be as near as possible to 73,6 mm (2.898").

A shim (C) 0,2 mm (.0079") thick must therefore be fitted to obtain this dimension :

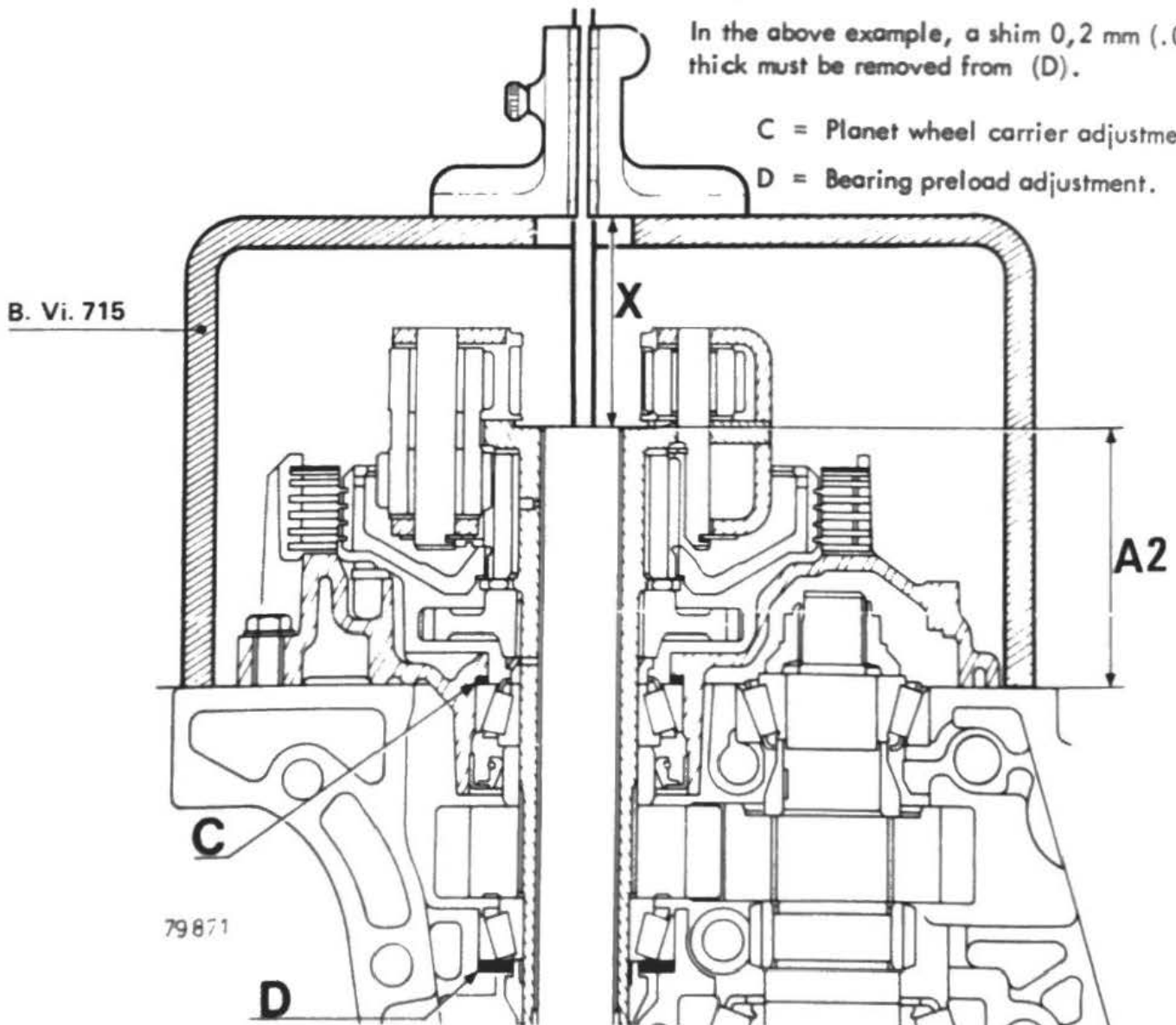
$$\begin{aligned} 73,8 \text{ mm} - 73,6 \text{ mm} &= 0,2 \text{ mm} \\ (2.905" - 2.898" &= .007"). \end{aligned}$$

Shim (D) must be increased by the same amount as shim (C) in order to retain the correct bearing preload.

In the above example, a shim 0,2 mm (.0079") thick must be removed from (D).

C = Planet wheel carrier adjustment

D = Bearing preload adjustment.





2 - Measuring dimension (B2) in the gear casing.

Place the following in the gear casing :

- E2 clutch,
- E1 clutch,
- the friction washer between the planet wheel carrier shaft and the P1 hub on the hub.

Measure dimension (B2) between the paper gasket and hub washer with a straight edge and depth rule (deduct thickness of straight edge).

Example :

Value is read : 79,8 mm (3.141")

Thickness of straight edge : 5,2 mm (.204")

$$B2 = 79,8 \text{ mm} - 5,2 \text{ mm} = 74,6 \text{ mm}$$

$$(3.141" - .204" = 2.937")$$

Clearance J is equal to

$$J = B2 - A2$$

$$J = 74,6 \text{ mm} - 73,6 \text{ mm} = 1 \text{ mm}$$

$$(2.937" - 2.897" = .040")$$

Clearance (J) must be between 0,27 and 0.74 mm.

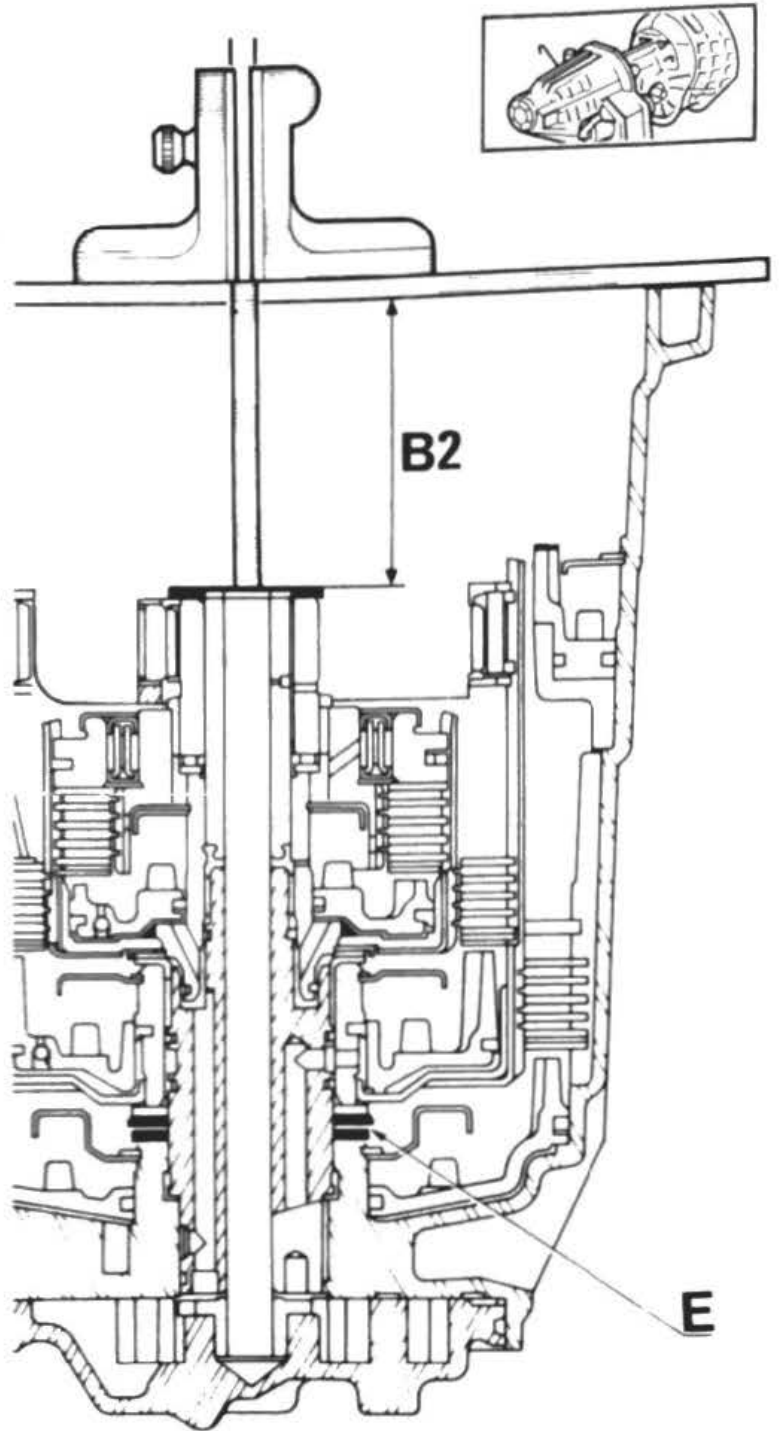
In the above example, which has a clearance of 1 mm (.040"), a shim 0,5 mm (.020") thick must be inserted at E to keep within tolerance.

Shims are available in the following thicknesses :

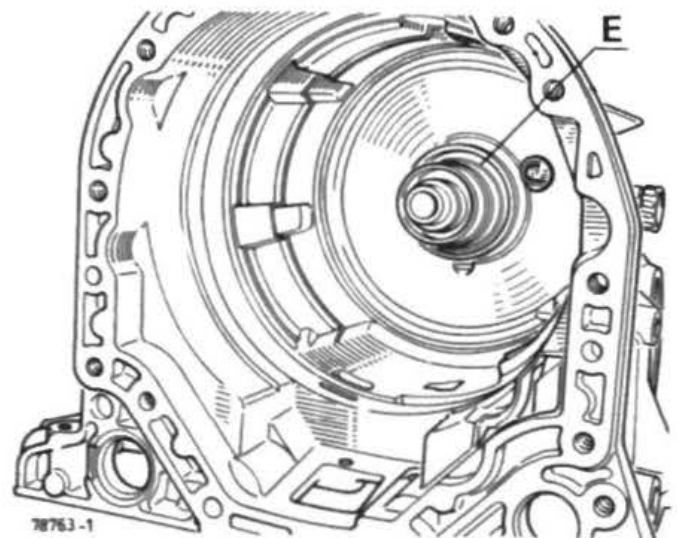
0,25 - 0,5 - 0,7 and 0,8 mm  
(.010" - .020" - .028" and .031").

Check and refit :

- the needle roller thrust bearing (needles uppermost)
- thrust washer
- and the 2 E2 seal rings.



79 874



78763-1



## ASSEMBLING THE FINAL DRIVE CASING AND GEAR CASING

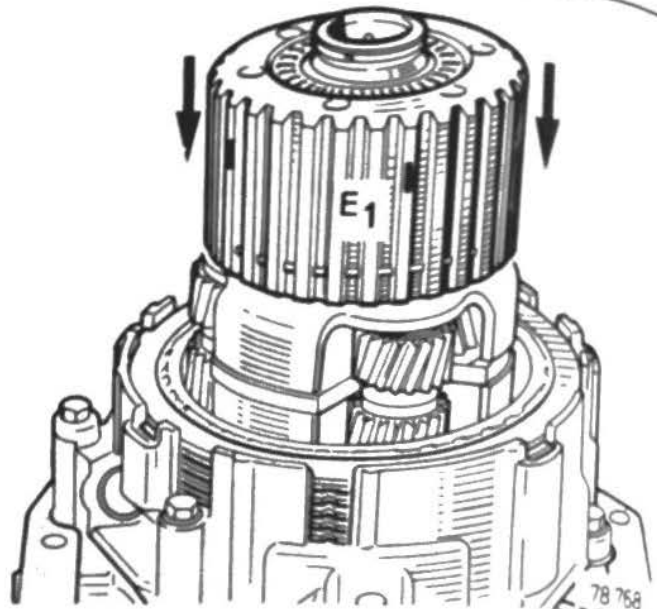


Place the final drive casing in a vertical position.

Position : the friction washer on the planet wheel carrier shaft (grooves facing planet wheel carrier shaft) : the seal between the final drive casing and gear casing.

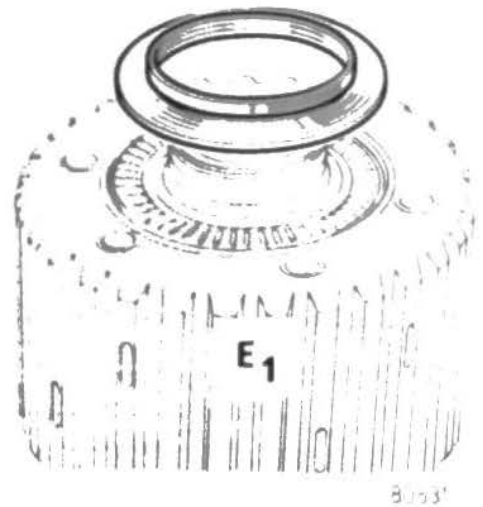
Make certain that all the F2 discs are stacked correctly.

Fit the E1 clutch with its turbine shaft.



Fit the following to E1 :

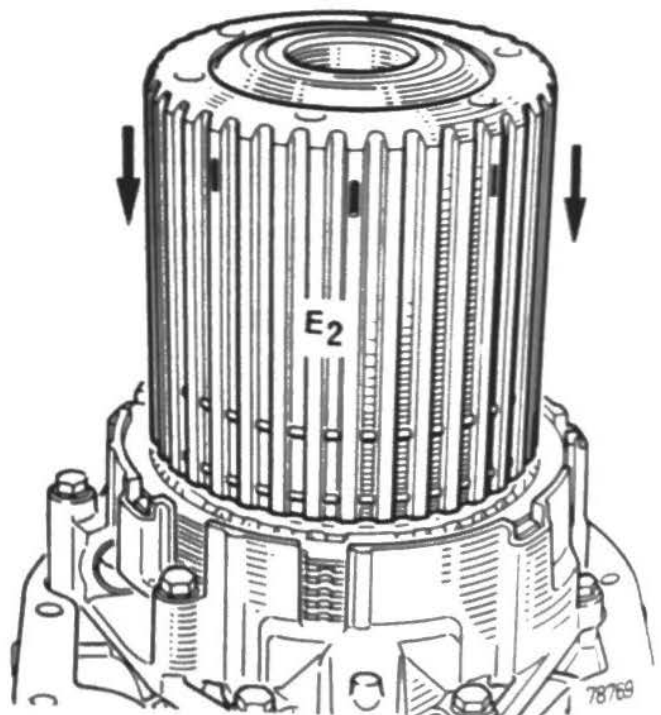
- needle thrust bearing (needles uppermost)
- and thrust washer (flange uppermost).



Fit the E2 clutch followed by the gear casing.

(Align the F1 disc splines to make it easier to fit the gear casing).

Fit the bolts and torque tighten them to 1,8 to 2,2 m. da.N (13 1/2 to 16 1/2 lb/ft).





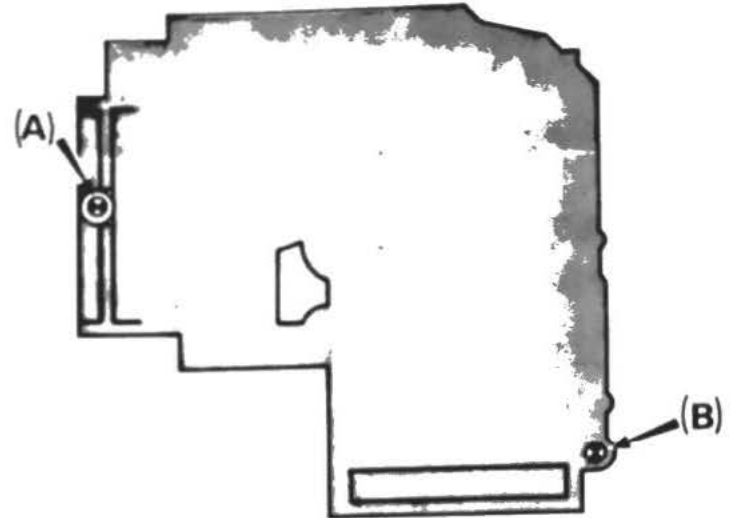
# HYDRAULIC DISTRIBUTOR



It is essential to fit the paper gaskets and plate supplied with the new distributor.

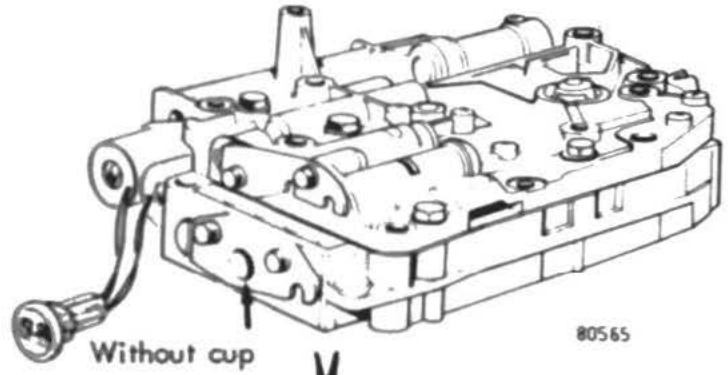
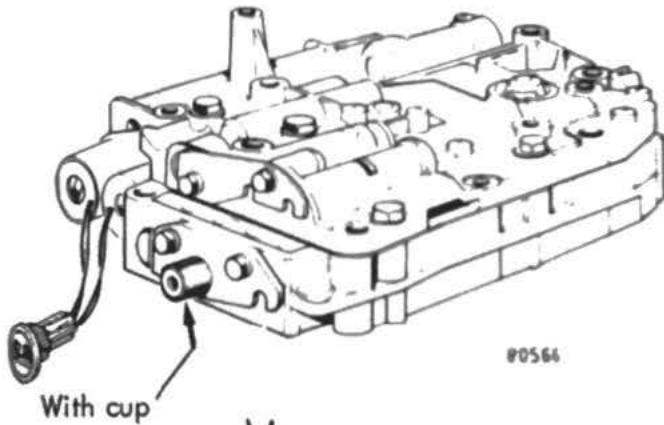
Centralise the distributor and paper gaskets at (A) and (B) with M7 125 x 60 bolts, cutting off the heads and sawing slots for a screwdriver.

Torque tighten the bolts in the correct sequence :



OLD DISTRIBUTOR

NEW DISTRIBUTOR 794.62

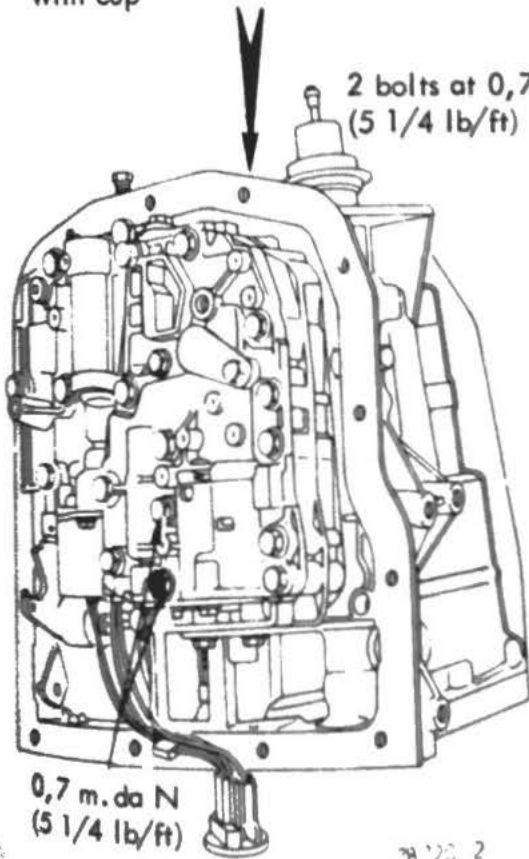


With cup

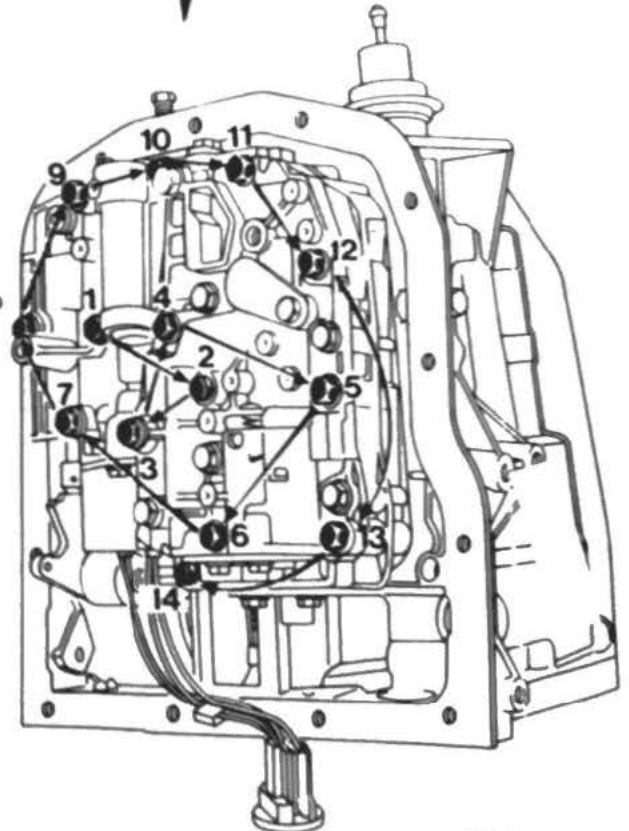
Without cup

2 bolts at 0,7 m. da N (5 1/4 lb/ft)

All bolts to 1 m. da N (7 1/2 lb/ft)



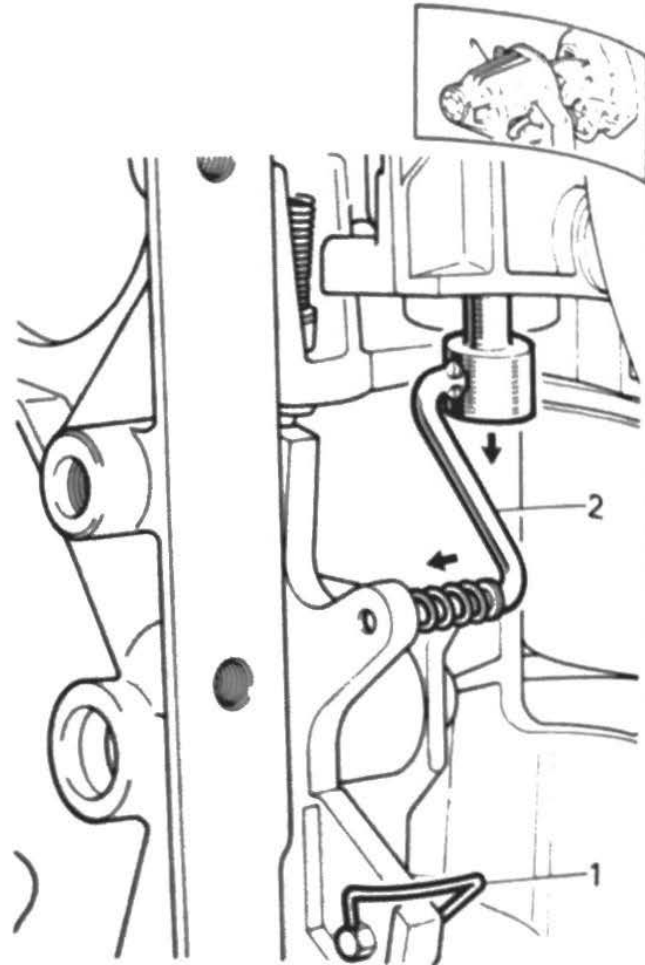
Other bolts to 1 m. da N (7 1/2 lb/ft)





Refit the "Park" locking finger and clip (1).

Refit the manual valve and its control (2) to the hydraulic distributor.



80521

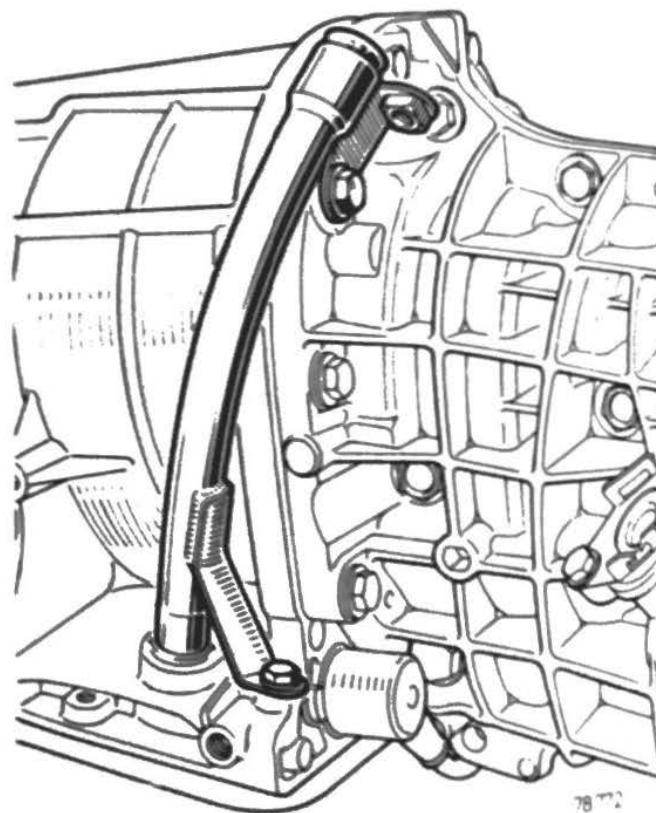
Refit the multiple switch and gasket.

Refit the cables and sealed socket.

Connect the solenoid ball valves.

Refit the sump with a new gasket and torque tighten the bolts to between 0,3 and 0,4 m. da N (2 1/4 to 3 lb/ft).

Refit the dipstick tube and washer.



78772



## FINAL DRIVE CASING

Dismantling - Re-assembling - Adjusting

Code 2273



The following must be removed before the final drive casing may be overhauled :

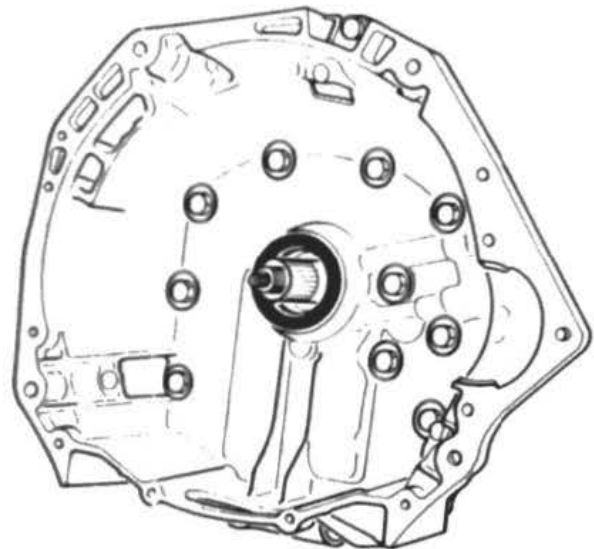
- gear casing,
- converter casing.

After removing the gear casing,  
withdraw :

- the E2 clutch,
- E1 clutch,
- and F2 brake discs.

Remove :

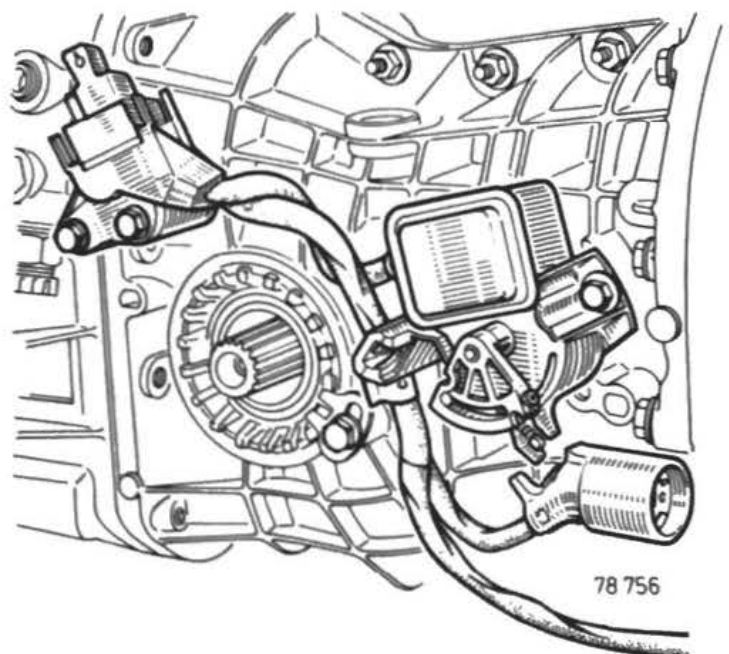
- the converter casing bolts and take off the converter.



77996

- bolts holding the governor-computer
- bolts holding the connectors.

Remove assembly.



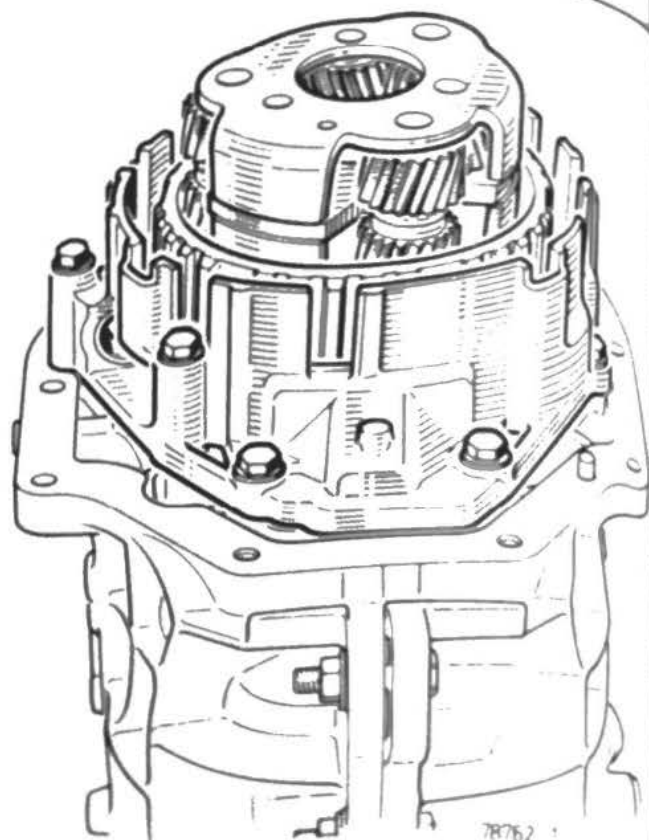
78 756



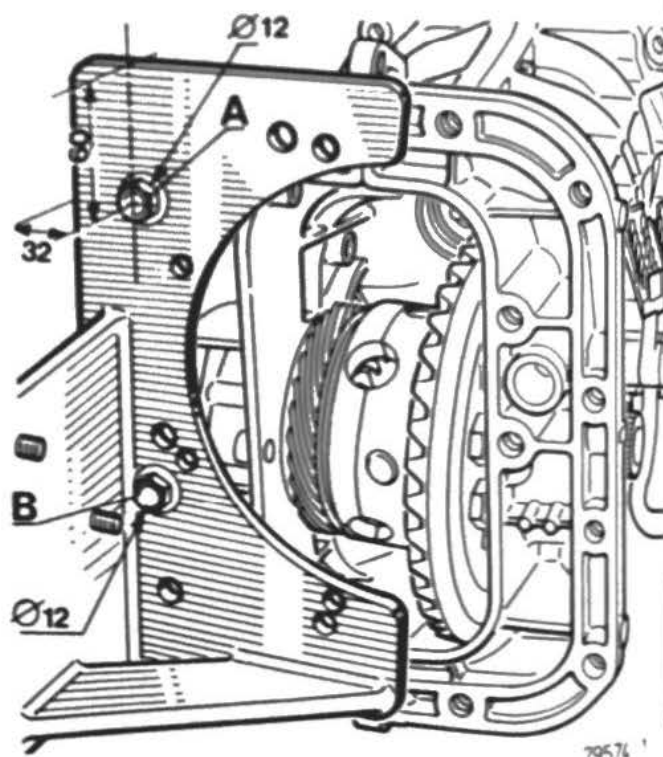


Remove the output shaft bellhousing bolts and take out the assembly.

Remove gasket.



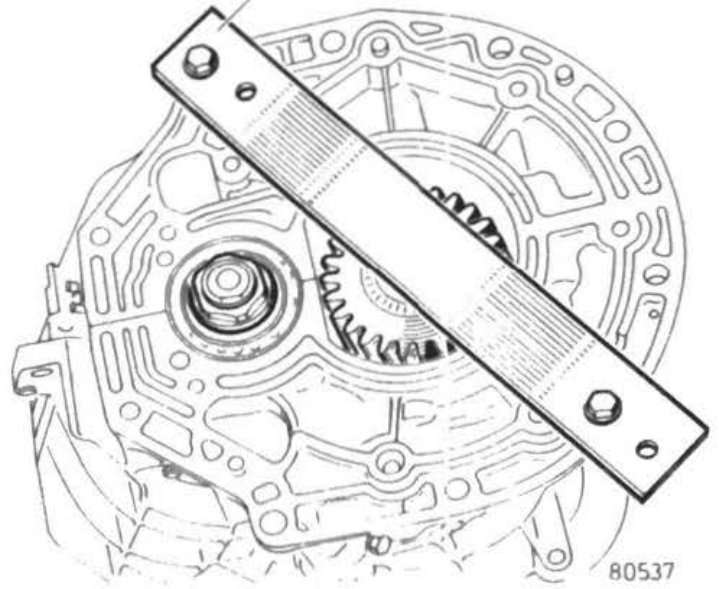
Attach the final drive casing to tool B.Vi.16-01 after drilling hole (A) to the dimensions given in the sketch and enlarge the diameter of hole (B).



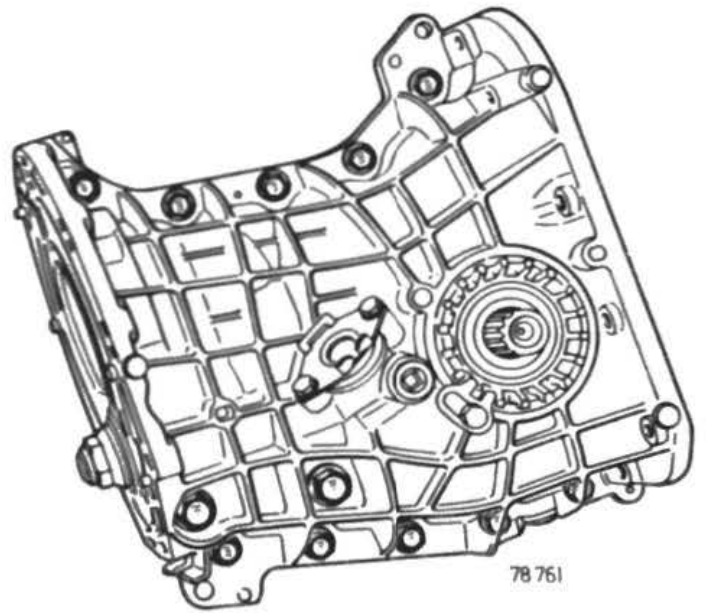


**B.Vi 806**

Fit tool B.Vi.806, unlock the final drive pinion nut and unscrew it.

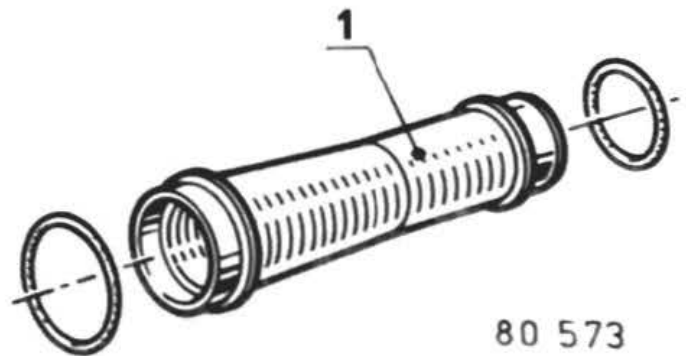


Remove the half-casing assembly bolts.



Separate the half-casings and take out :

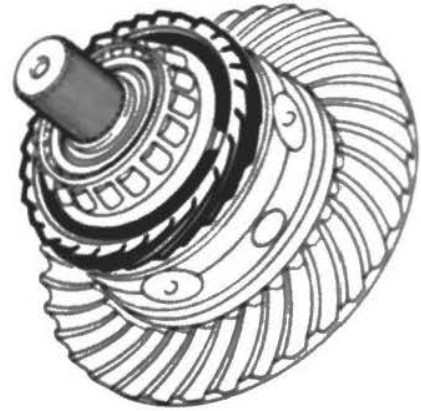
- the differential
- spacer sleeve (1)
- and final drive pinion.





## DIFFERENTIAL

Remove the speedo drive gear circlip and remove gear.



77 584

Remove 3 crown wheel fixing bolts to enable the extractor jaws to fit.

Remove the sunwheel "O" rings.

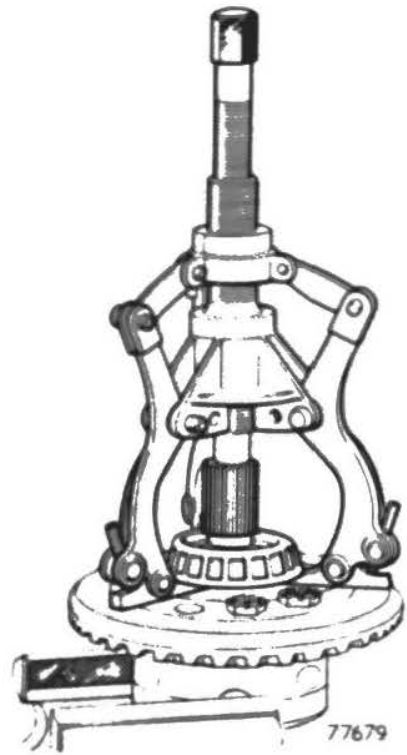
Extract the bearing at the crown wheel end with a 3-jaw puller.

Use tools T.Av.65 and B.Tr.02 to extract the second bearing.

Remove the remaining crown wheel fixing bolts (self-locking bolts - not to be re-used).

Punch out the rollpin from the longer planet wheel shaft.

Separate the various parts.



77679

## HALF-CASINGS

Unscrew the differential adjusting ring nut on the R.H. half-casing after removing the lock-tab. Remove the oil seal.

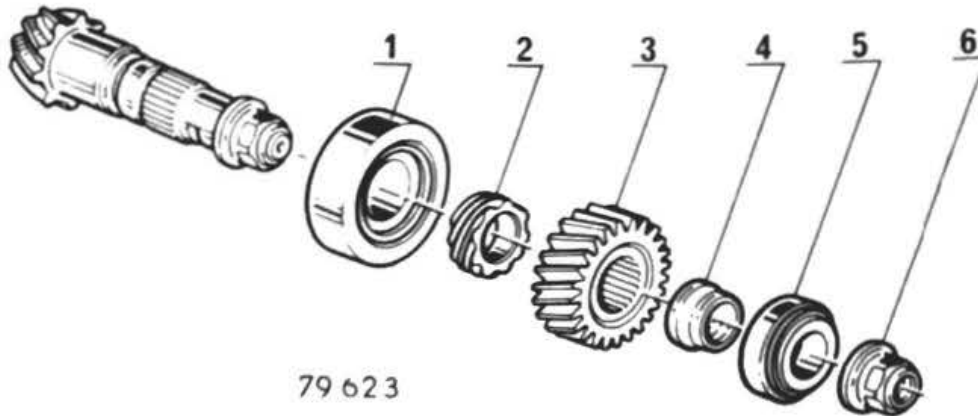
Remove the 2 speedometer worm retaining plate bolts and take out the worm.

Remove the differential adjusting ring nut on the L.H. half-casing followed by the oil seal.

Extract the bearing outer track ring.



## FINAL DRIVE PINION



1 - Bearing

2 - Governor drive gear

3 - Stepdown gear (25 teeth-diameter may vary depending on ratio).

4 - Pre-load adjusting sleeve

5 - Bearing

6 - Nut

### Dismantling

Remove :

- nut (6)
- bearing (5)
- pre-load adjusting sleeve (4)
- stepdown gear (3)
- governor drive gear (2)
- the bearing under the final drive pinion using the WILMONDA tool (Ref: TOYEA) and a press.

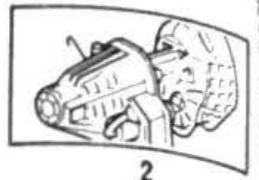
### Re-assembling

Fit the following to the final drive pinion in this order :

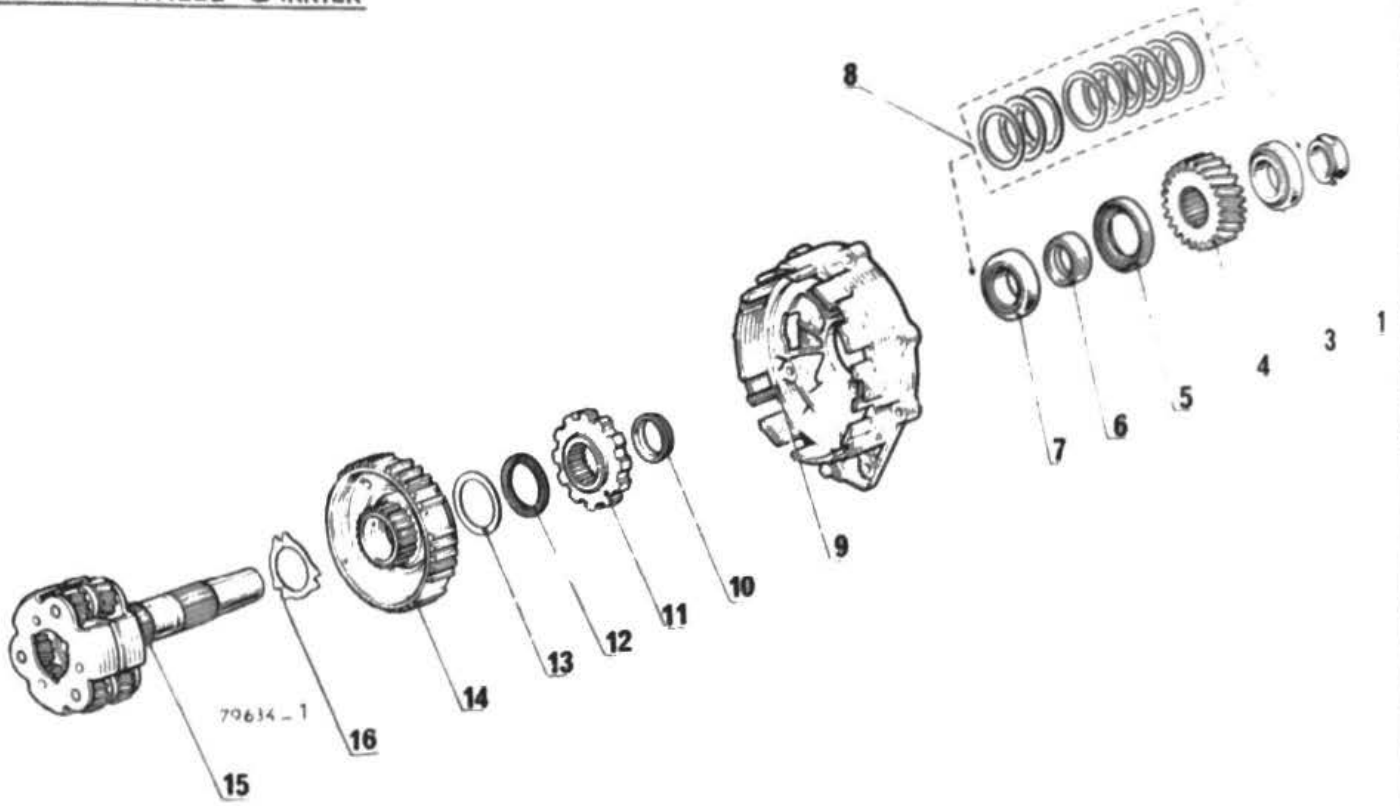
- bearing (1) under head using a press and length of suitable tube,
- governor drive gear (2)
- stepdown gear (3) (flat face towards final drive pinion head)
- pre-load adjusting sleeve (4) removed on dismantling (taper facing nut end).
- outer track ring
- bearing

Screw a new nut (6) on the final drive pinion.

The nut will not be torque tightened until after the half-casings have been assembled.



PLANET WHEEL CARRIER



- 1 - Nut
- 2 - Sunwheel carrier adjusting shim
- 3 - Bearing
- 4 - Stepdown gear
- 5 - Lip-type oil seal
- 6 - Distance sleeve
- 7 - Bearing
- 8 - Bearing pre-load adjusting shim.

- 9 - F2 bellhousing
- 10 - Distance sleeve
- 11 - "Park" sprocket
- 12 - Needle roller thrust bearing
- 13 - Needle roller bearing
- 14 - F2 hub
- 15 - Sunwheel carrier shaft
- 16 - Sunwheel reaction thrust washer



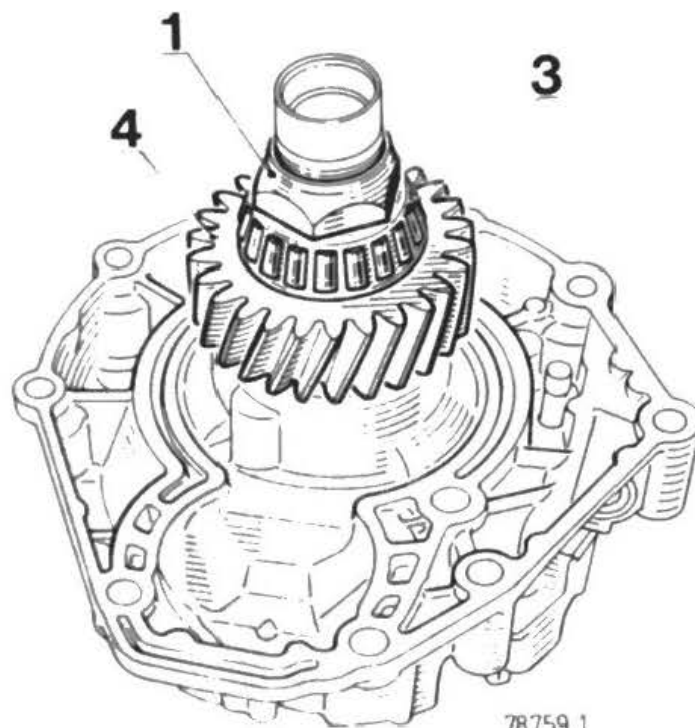
## Dismantling

Hold the output shaft stationary with the stepdown gear.

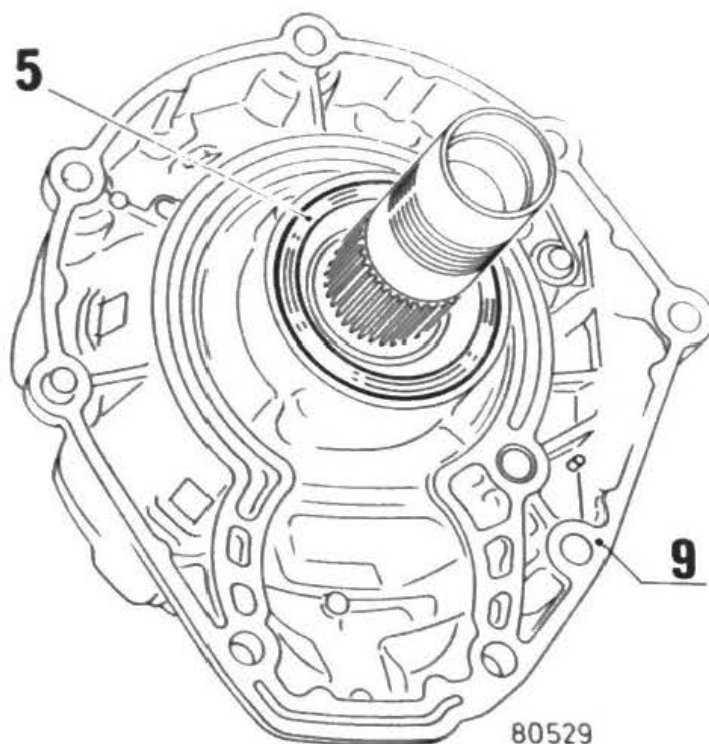
Unlock and unscrew nut (1) on the end of the shaft.

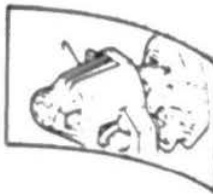
Remove :

- bearing (3)
- stepdown gear (4)
- and spacer sleeve (6).



Remove the output shaft, bearing and seal (5) from bellhousing (9).

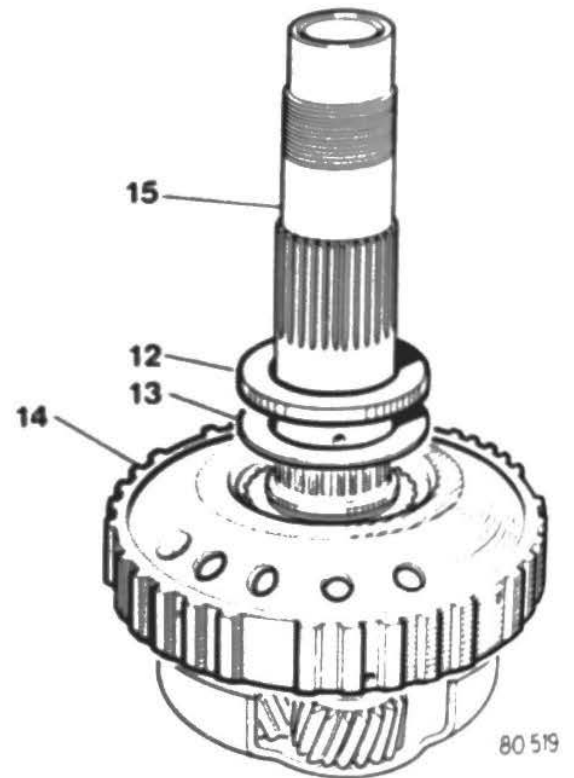
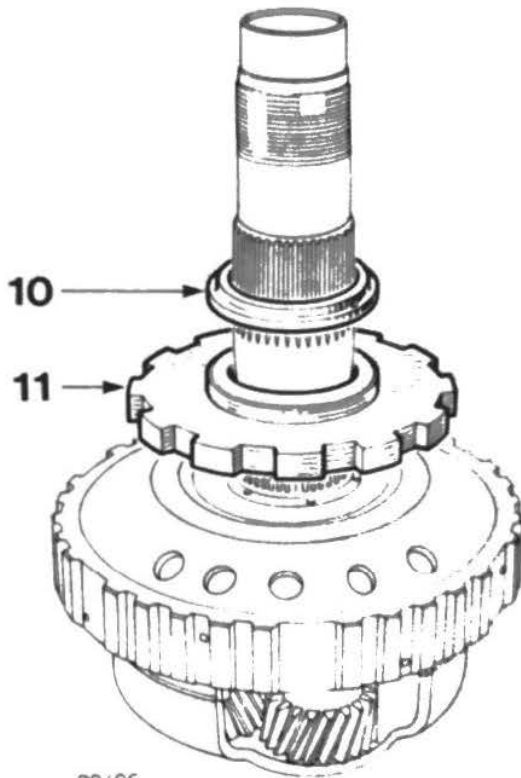




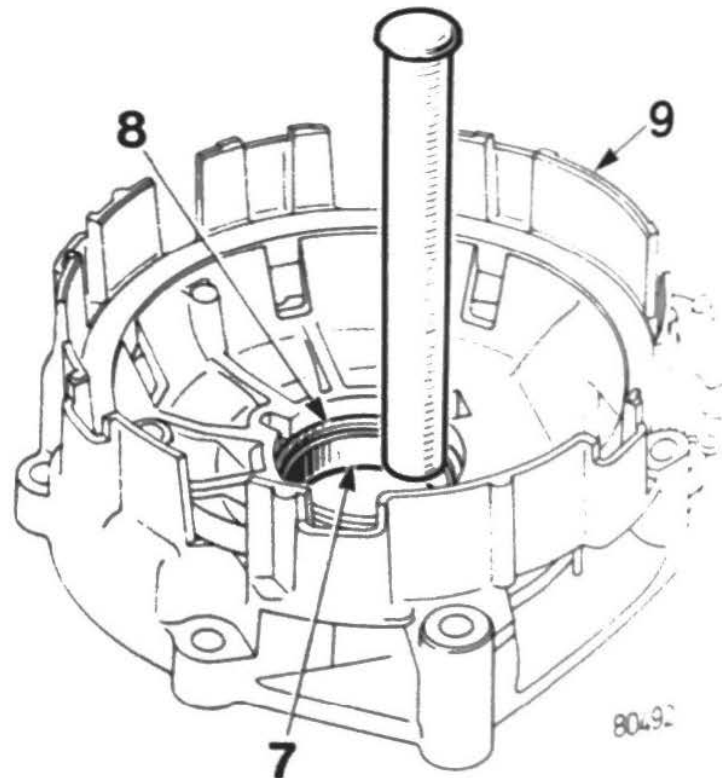
Remove the following from the shaft \_

- distance sleeve (10)
- "Park" sprocket (11)
- thrust (12)

- thrust washer (13)
- F2 hub (14)
- and sunwheel reaction thrust washer (16)



Remove bearing outer track ring (7) and adjusting shims (8) from bellhousing (9).

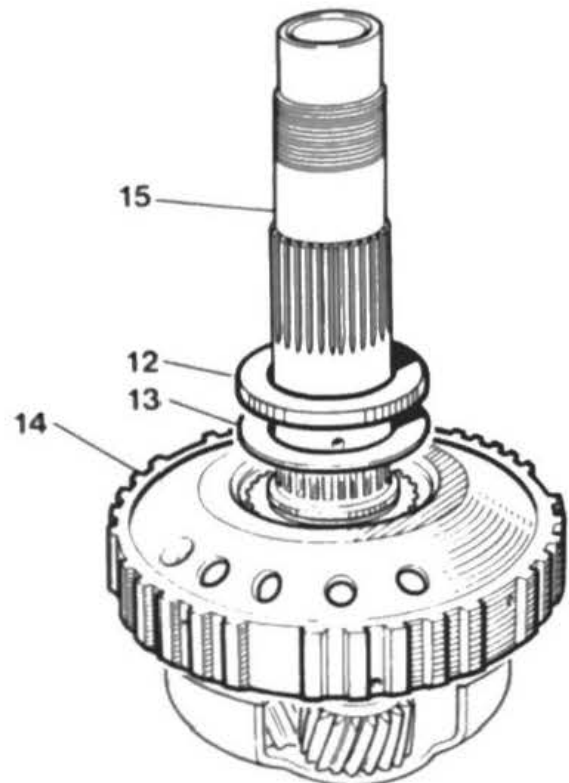




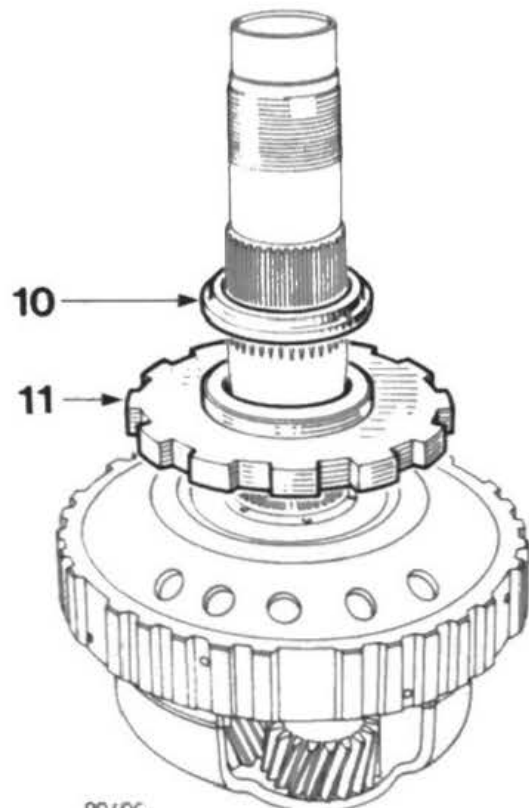
### Re-assembling

Fit the following to sunwheel carrier shaft (15)  
in the order shown :

- sunwheel reaction thrust washer (16)
- F2 hub (14)
- needle bearing thrust washer (13)
- needle thrust bearing (12) (needles facing thrust washer),
- "Park" sprocket (11) (larger diameter flange facing needle thrust bearing)
- and distance sleeve (10) (larger diameter facing "Park" sprocket).



80 519

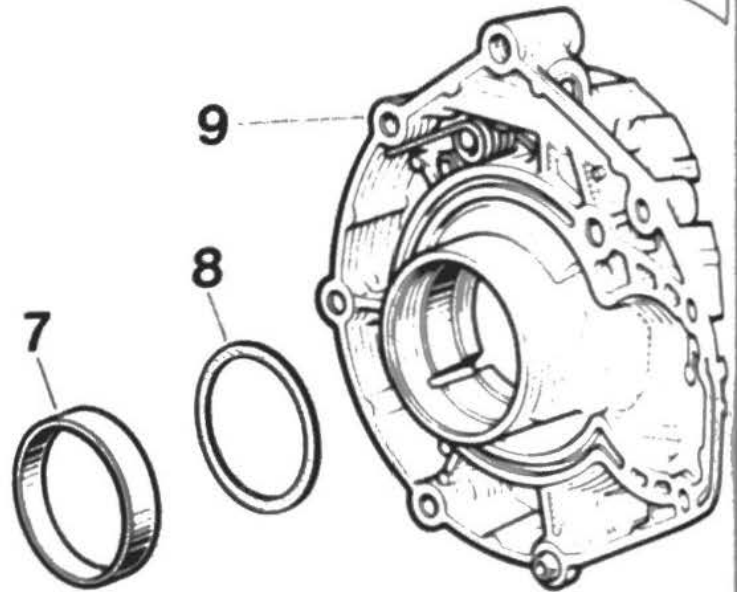


80496





Fit the adjusting shims (8) and bearing outer track ring (7) to F2 brake housing (9).



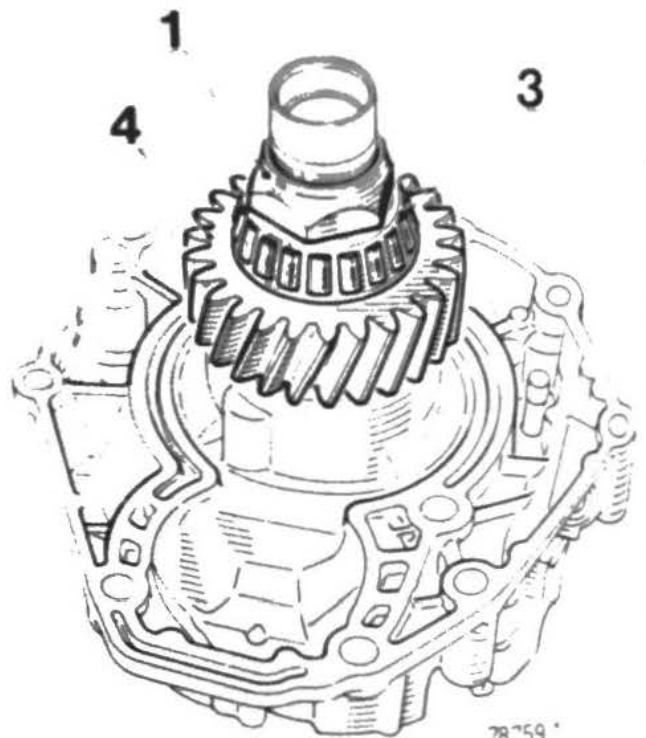
80491

Adjustments must be carried out before a new oil seal is fitted. Pass the planet wheel carrier shaft through the brake housing before fitting the following :

- bearing (7)
- seal retaining sleeve (6)
- stepdown driving gear (4) (groove facing nut)
- and second bearing (3).

Fit a new nut (1) on the end of the shaft and torque tighten to :  $\frac{18 \text{ to } 20 \text{ m. da. N}}{(135 \text{ to } 150 \text{ lb/ft})}$ .

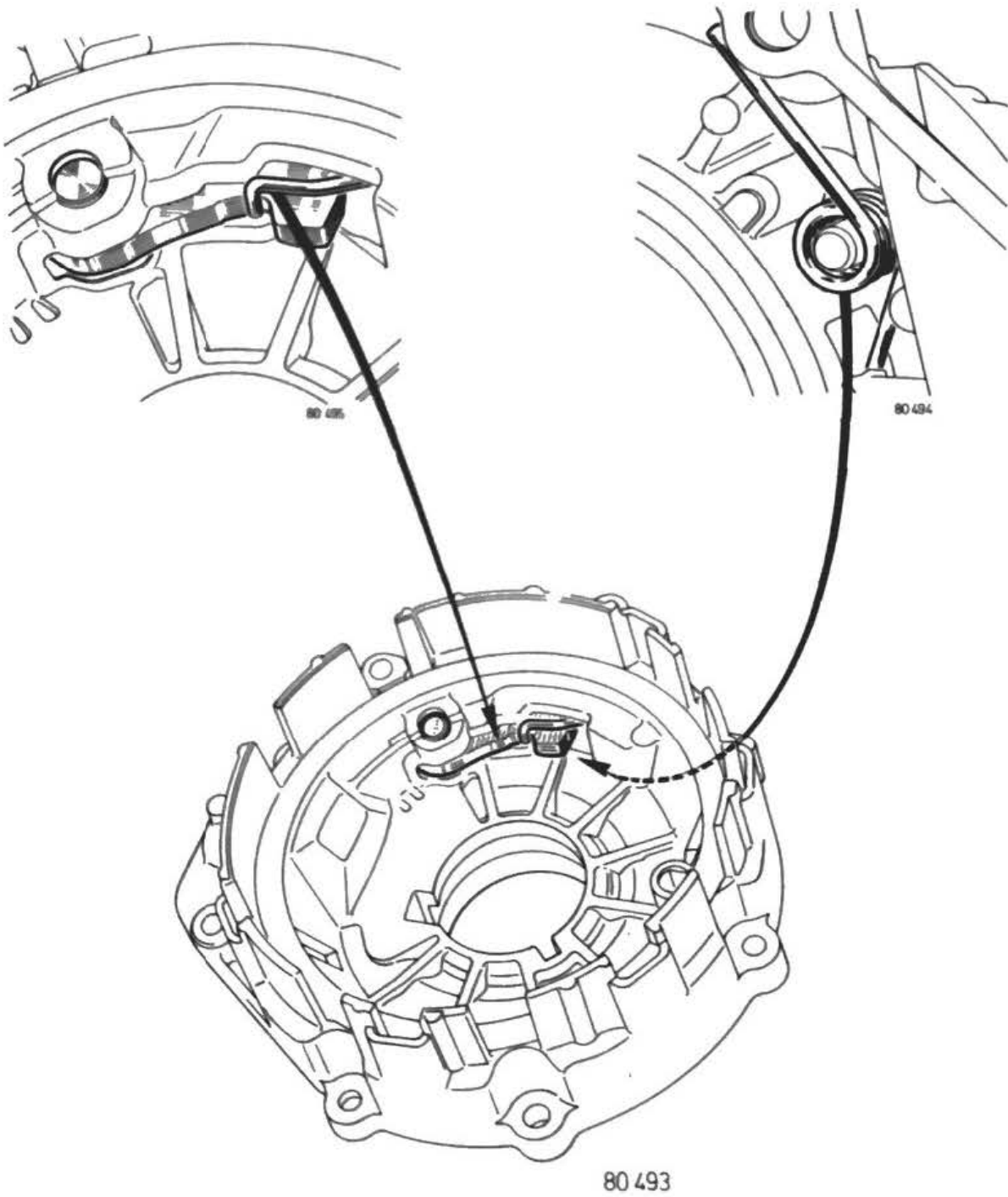
Do not lock nut at this stage.



78 59



Fitting the "Park" finger spring

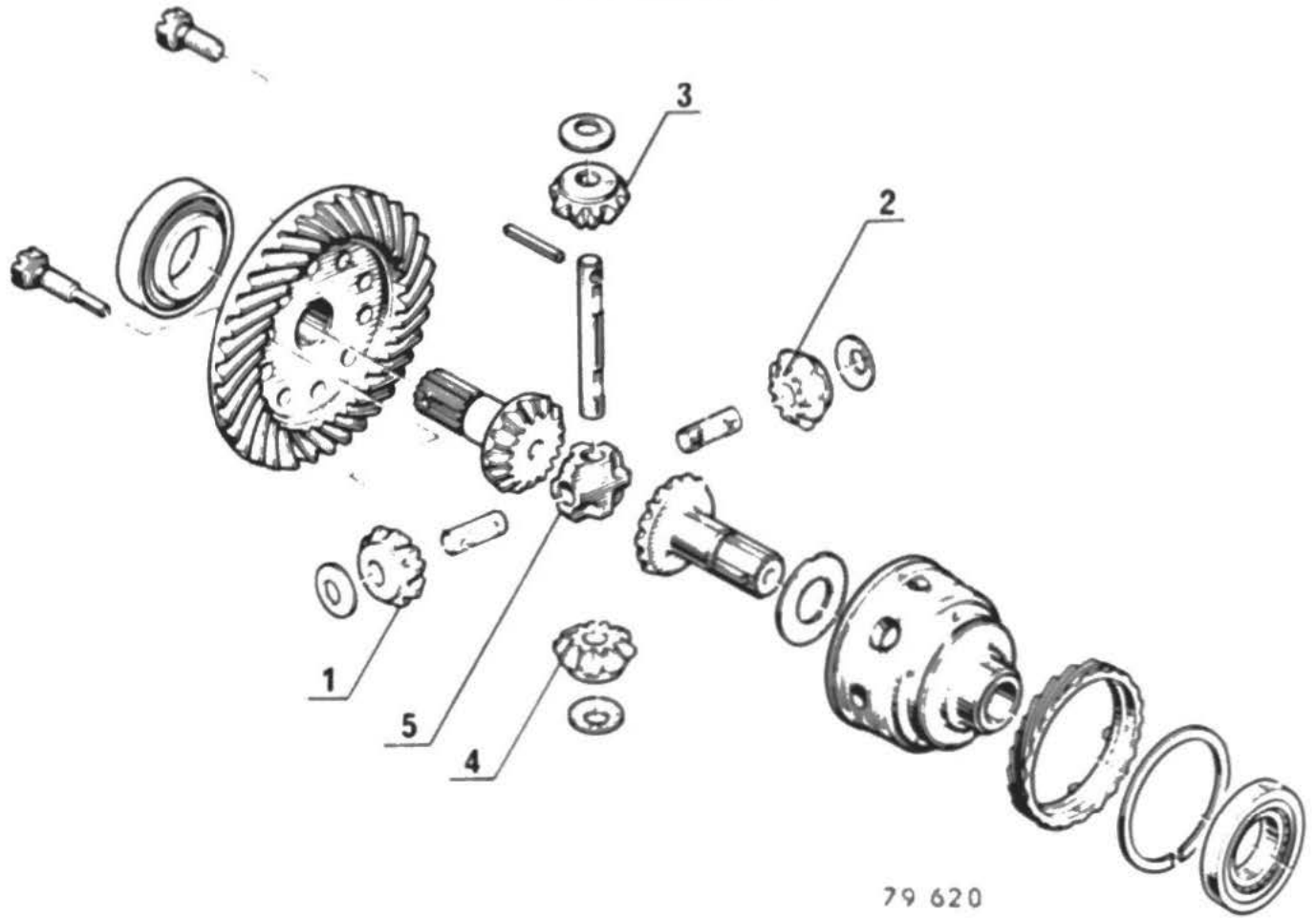




# DIFFERENTIAL

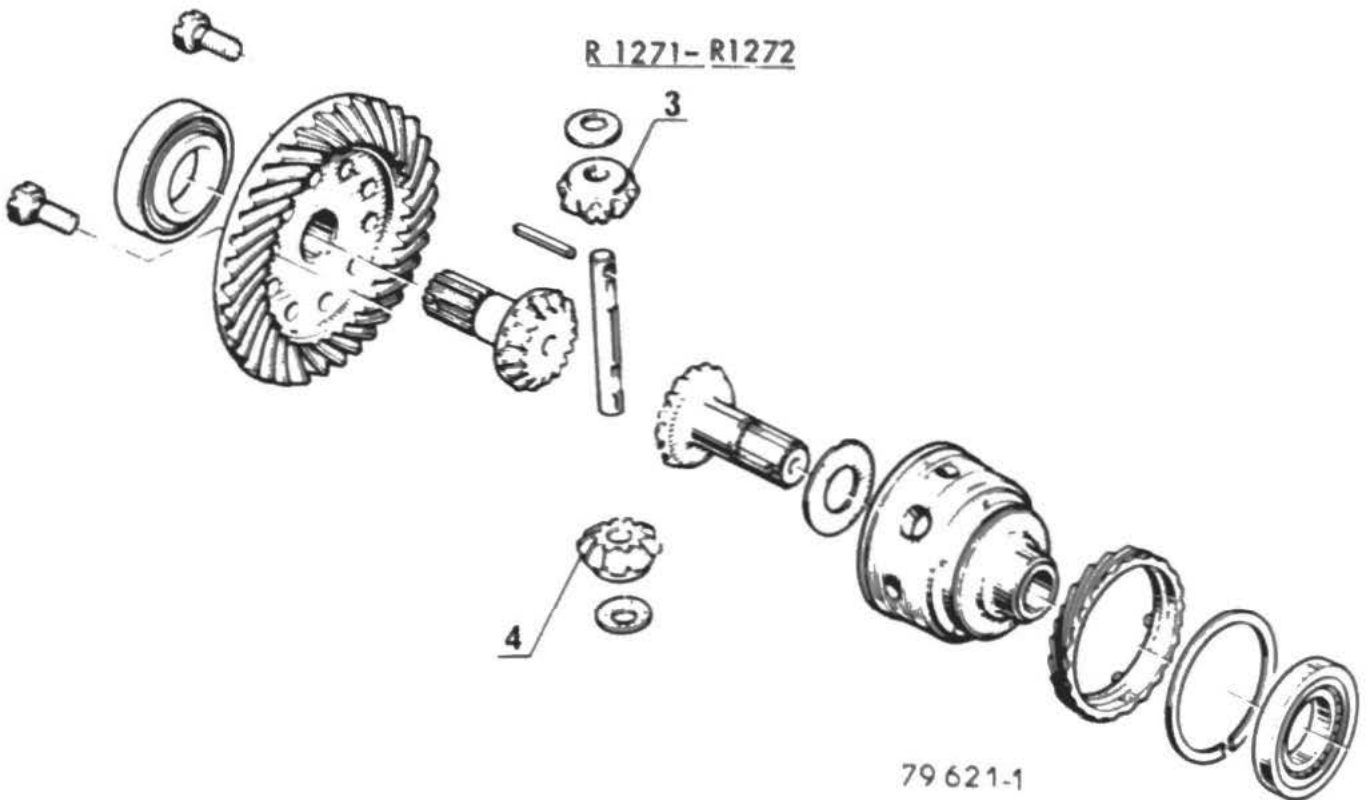


R1273 - R1275



79 620

R 1271- R1272



79 621-1



Place the following in the housing :

- the bakelite impregnated washer, lubricating groove facing sunwheel : use the washer 1,96 to 2 mm (.077 to .079") thick. The washer 2,3 mm (.090") thick will only be used when there is excess play between the sunwheel and planet wheel gear teeth.
- one sunwheel dipped in API GL5 (SAE 80) oil.
- and, depending on the type of automatic transmission :
  - planet wheels (1 and 2) and their thrust washers ; push the shaft in so that they do not protrude from planet wheels(3).
  - planet wheels (3 and 4) and their thrust washers ; push the shaft in so that it does not protrude from planet wheel (3)
  - cross (5).

The cross is rectangular and must be fitted so that the longer side matches the long shaft.

- push all 3 shafts fully home in the housing so that their holes match those in the housing.
- rollpin the long shaft.

Dip the second sunwheel in API GL5 (SAE 80) oil and insert in the housing.

Fit the crown wheel to the housing with new self-locking bolts : the bolts with spigot ends hold the short shafts.

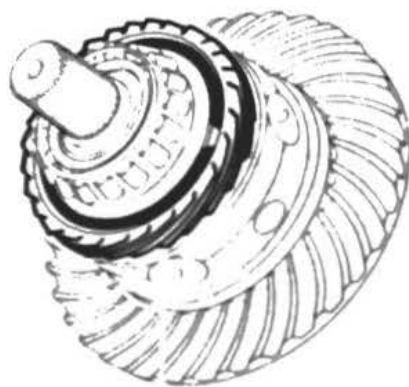
Torque tighten the crown wheel fixing bolts to :  
12 to 14,5 m.da.N (90 to 115 lb/ft).

The differential assembly may be slightly hard to turn after assembly.

Press in both bearings.

Fit 'O' rings to the sunwheels.

Fit the speedometer drive gear and circlip.



77 584



## HALF-HOUSINGS

Fit the speedometer driven worm in the R.H. half-casing and fasten the retaining plate.

Fit the bearing outer track rings to match the bearing in the half-casings so that they are slightly recessed in relation to the inside face of the housings.

Use wrench B.Vi.645 or B.Vi.805 to screw up the ring nuts until they contact the bearing outer track rings.

## ADJUSTING FINAL DRIVE PINION PRE-LOAD

Fit the final drive pinion and assemble the half-housings together.

Fit all the assembly bolts and torque tighten them as follows :

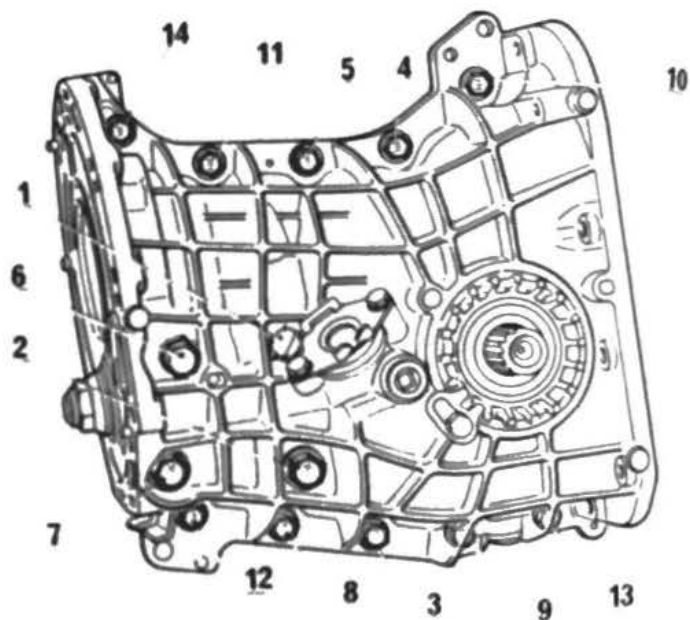
8 mm dia. bolts : 3 m.da.N (22 1/2 lb/ft)  
 10 mm dia. bolts : 4 to 4,5 m.da.N (30 to 33 3/4 lb/ft).

Rotate the final drive pinion several times to settle the bearings.

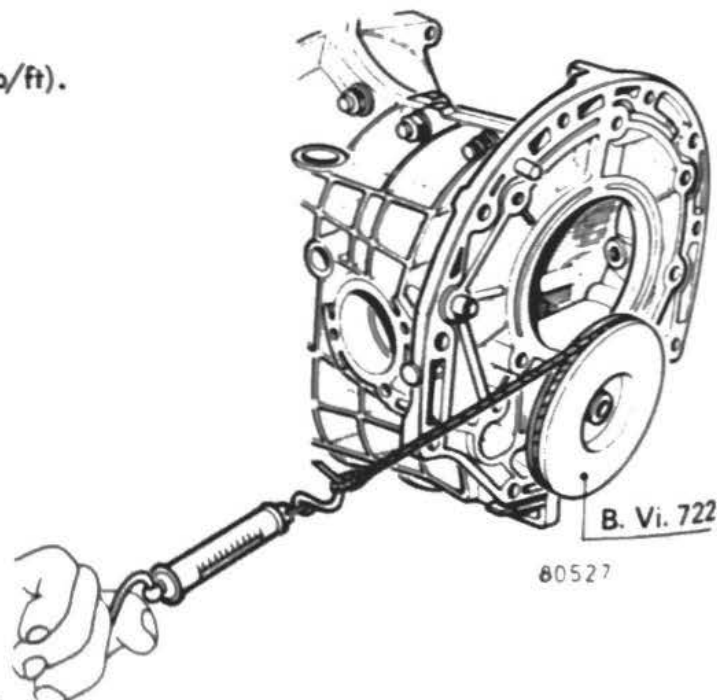
Use tool B.Vi.806 to tighten the final drive pinion nut.

Torque tighten the nut to between 22 and 24 m.da.N (165 to 180 lb/ft).

Do not lock the nut at this stage.



78.75



B. Vi. 722

80527



### RE-USED BEARINGS

The final drive pinion must turn freely without play.

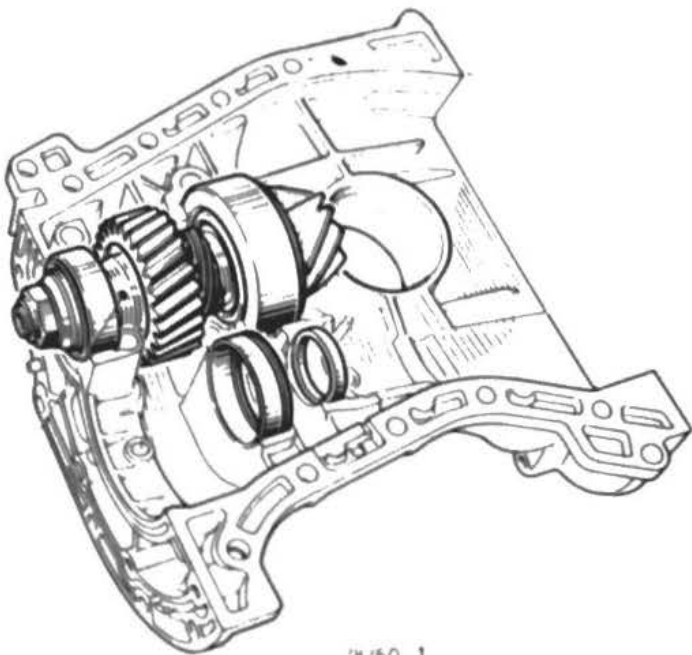
### NEW BEARINGS

Fit tool B.Vi.722 to the final drive pinion nut and measure the pre-load with a spring balance : 2 to 3,5 da N (4 1/2 to 7 lbs). Adjust by increasing or reducing the thickness of sleeve (4).

Loosen the nut using tool B.Vi.806 after adjusting bearing pre-load.

Open the half-casings and remove the final drive pinion.

4



78760 .1

### ADJUSTING THE PLANET WHEEL CARRIER AND THE DIFFERENTIAL AND PLANET WHEEL CARRIER BEARING PRE-LOADS

Adjustments to be carried out on the planet wheel carrier are as follows :

- planet wheel carrier operating clearance
- bearing pre-load.

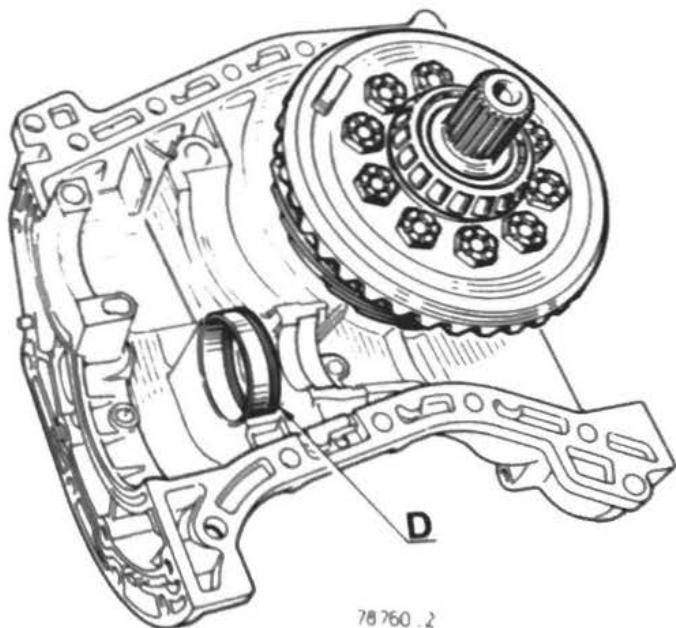
It is advisable to keep to the above order.

Fit the bearing outer track ring, adjusting shims (D) (planet wheel carrier adjustment) removed on dismantling and the differential in one of the half-casings.

Fit all the casing bolts and torque tighten them in the correct sequence (see page 110).

8 mm dia. bolts : 3 m. da N (22 1/2 lb/ft)

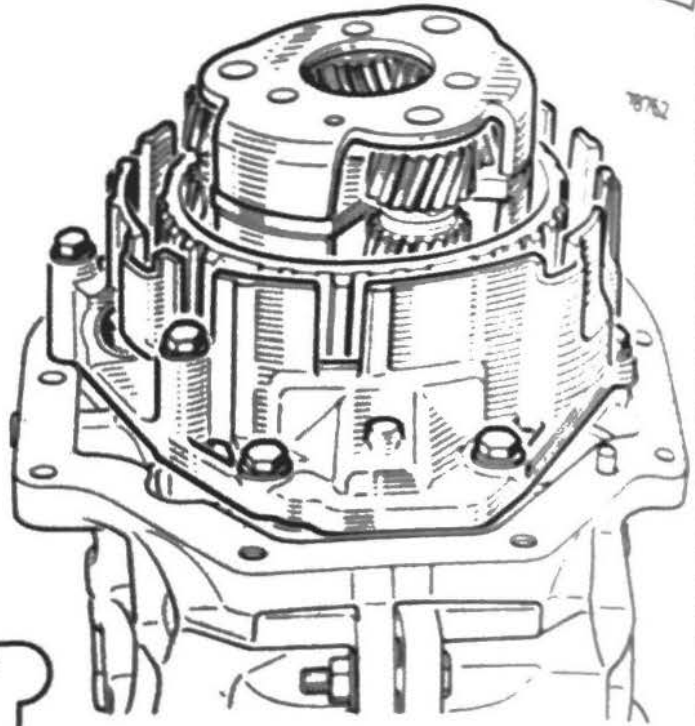
10 mm dia. bolts : 4 to 4,5 m. da N (30 to 33 3/4 lb/ft).



78760 .2



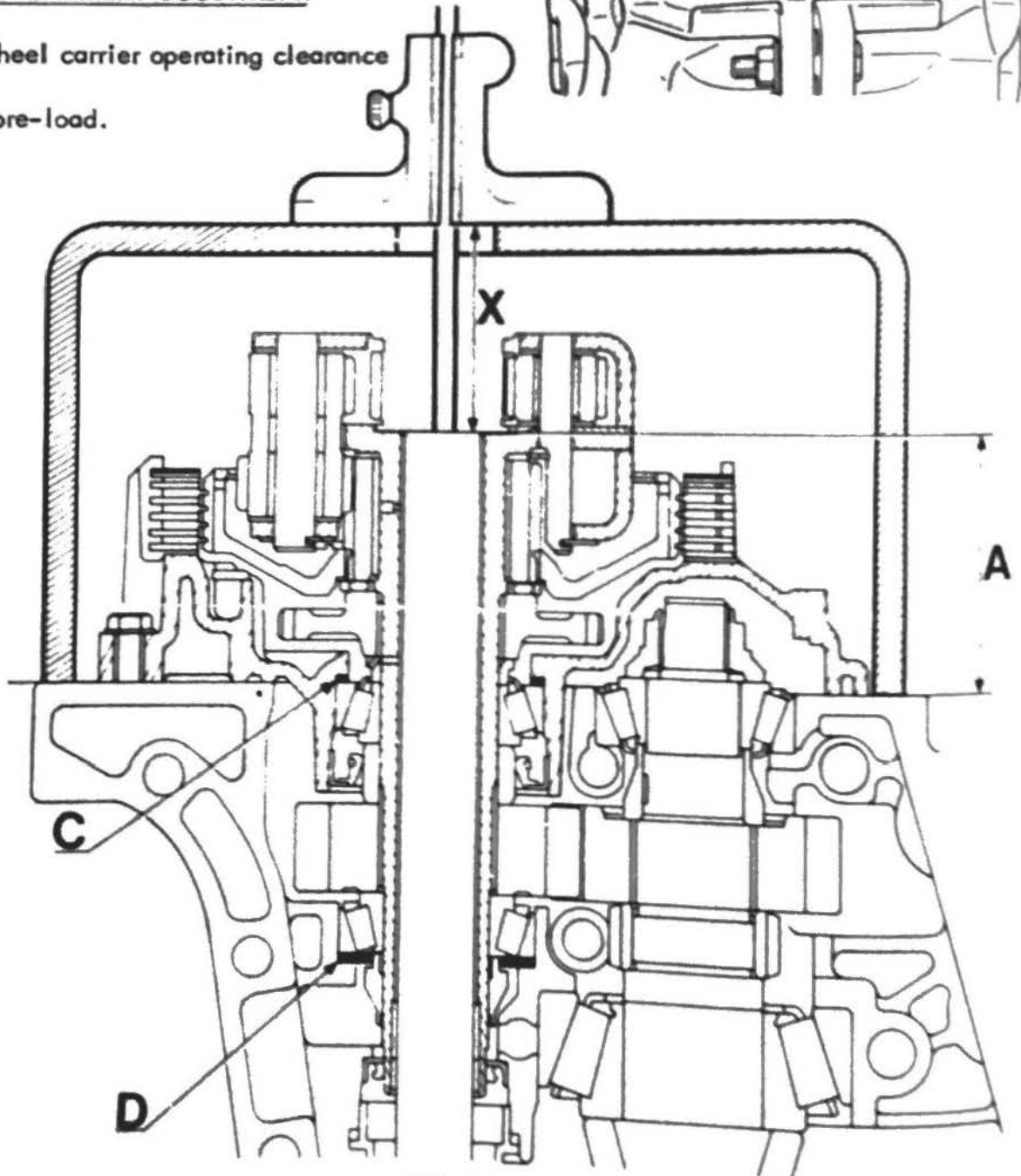
Fit the planet wheel carrier shaft to the assembled final drive casing and fit the F2 brake housing and paper gasket. Use all the bolts and torque tighten them to : 1,5 m.da N (11 1/4 lb/ft).



### PLANET WHEEL CARRIER ADJUSTMENT

C = Planet wheel carrier operating clearance

D = Bearing pre-load.





The method is the same as that for adjusting the operating clearance in the gear casing, obtaining a dimension as near as possible to 73,6 mm (2.898").

Proceed in the same way as for adjusting the operating clearance in the gear casing :

with the planet wheel carrier in the final drive casing, position tool B.Vi.715 on the casing and measure dimension (X) between the top face of the tool and the planet wheel carrier shaft.

(REMEMBER TO REMOVE THE FRICTION WASHER).

Calculate the difference between the tool dimension (120 mm = 4.724") and dimension (X) to find dimension (A).

$$A = 120 \text{ mm (4.724")} - (X).$$

Example :

$$X = 46,2 \text{ mm (1.819") (as read)}$$

$$A = 120 \text{ mm} - 46,2 \text{ mm} = 73,8 \text{ mm} \\ (4.724" - 1.819" = 2.905").$$

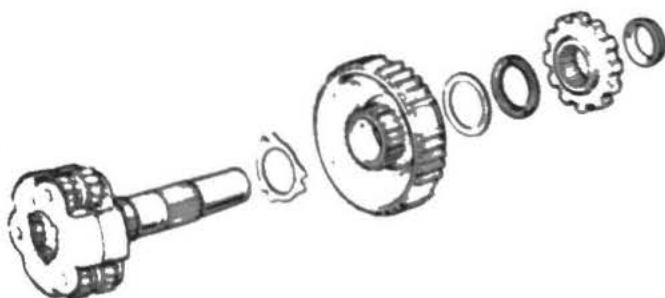
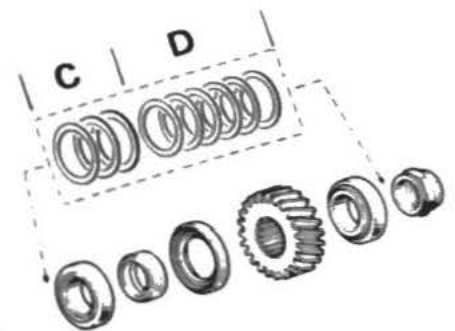
Dimension (A) must be as near as possible to 73,6 mm (2.898").

A shim (C) 0,2 mm (.0079") thick should therefore be fitted to obtain this dimension :

$$73,8 \text{ mm} - 73,6 \text{ mm} = 0,2 \text{ mm} \\ (2.905" - 2.898" = .007").$$

**NOTE :** Dimension (A) is used to calculate the transmission operating clearance.

Remove the planet wheel carrier shaft to change a shim and place the new one behind the bearing track ring in the F2 bellhousing.



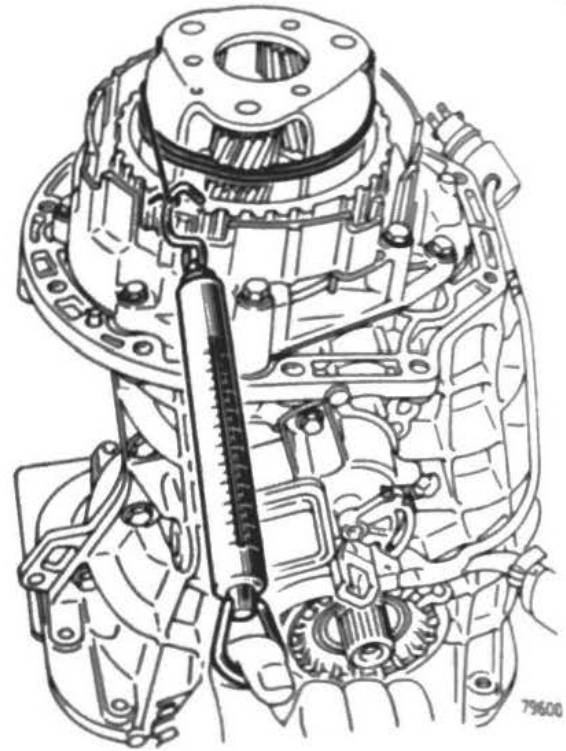




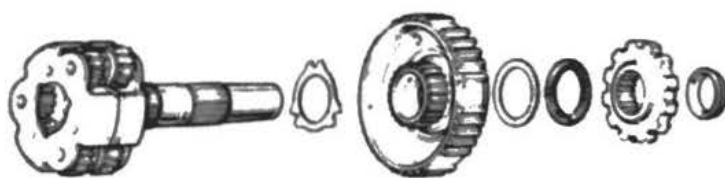
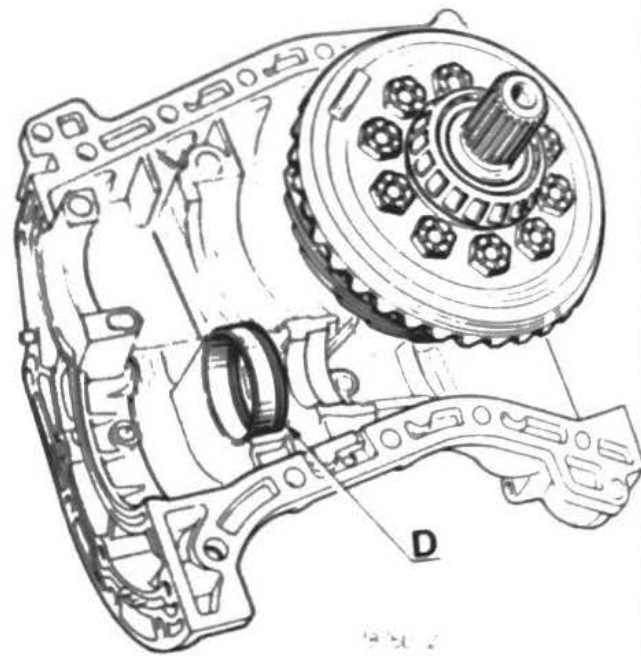
## BEARING PRE-LOAD

Rotate the planet wheel carrier shaft to settle the bearings.

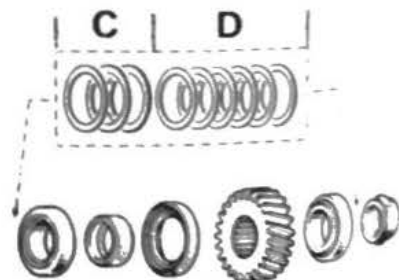
- re-used bearings : the shaft should turn freely and without play,
- new bearings : measure pre-load with a spring balance and a piece of string. It should be between 0,5 and 1,2 da N (1 and 3 lbs).



Pre-load adjustment is made by increasing or reducing the thickness of shims (D) at the nut end. When these two adjustments have been made, fit the lip-type oil seal in the F2 brake housing, torque tighten the nut on the end of the shaft to 20 m. da N (150 lb/ft) and lock it.



79634 - 1





## ADJUSTING DIFFERENTIAL BEARINGS

Screw up the ring nut at the differential housing end to obtain slightly more backlash than normal when making the adjustment.

### - Re-used bearings :

Screw up the ring nuts gradually, turning the differential at the same time, to obtain free turning without play.

### - New bearings :

Screw up the ring nuts until the differential is slightly hard to turn.

Check bearing pre-load with a spring balance and piece of string : 1 to 3 da.N (2 1/4 to 6 1/2 lbs).

Mark the position of the ring nuts in relation to the half-casings when the final setting has been obtained.

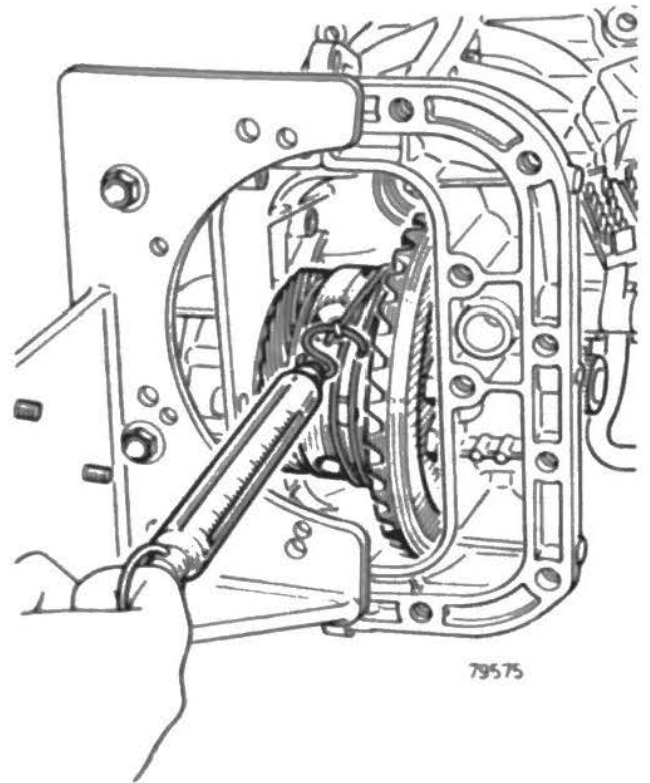
Once all the adjustments have been made, open the final drive casing and fit the final drive pinion in the half-casing.

Smear "Curtylon" paste on all casing joint faces and assemble the casings.

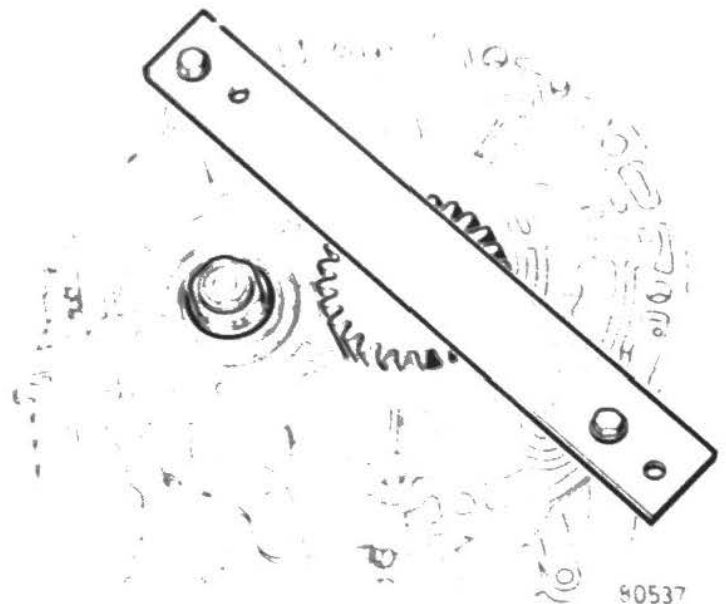
Torque tighten the assembly bolts.

Fit tool B.Vi.806 and torque tighten the final drive pinion nut to between 22 and 24 m.da N (165 and 180 lb/ft) then lock it.

Fit the planet wheel carrier shaft with its seal and attach the F2 brake housing.



## B.Vi 806





## ADJUSTING BACKLASH

Feel the amount of backlash present by hand.  
If it is excessive, turn the ring nuts to reduce.

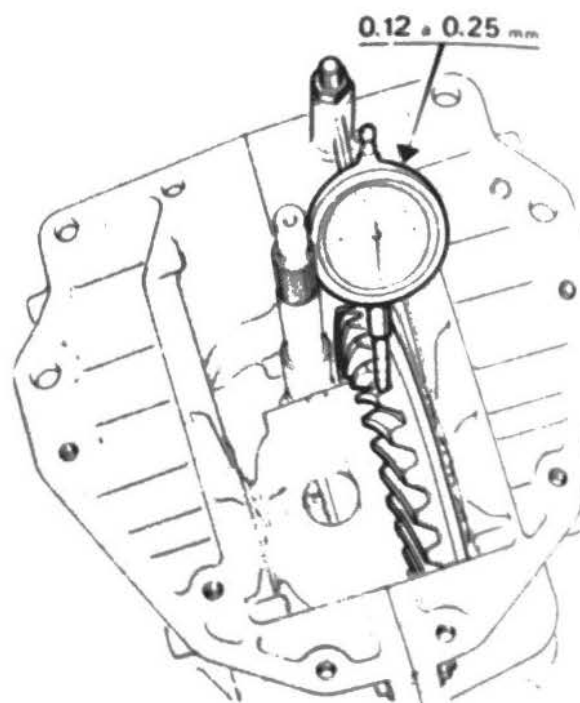
When the ring nut on the crown wheel side is screwed in, the ring nut on the differential housing side must be unscrewed by the same amount in order to retain the degree of bearing pre-load adjusted previously.

Attach a clock gauge to one of the half-casings at right angles to a tooth flank as close as possible to the outer edge of the crown wheel.  
Check backlash : 0,12 to 0,25 mm (.005 to .010").

If excessive, screw in the ring nut on the crown wheel side and unscrew the ring nut on the differential housing side by the same amount.

If insufficient, reverse the process.

Lock the ring nuts with locktabs after the correct backlash has been obtained.





# CONVERTER CASING

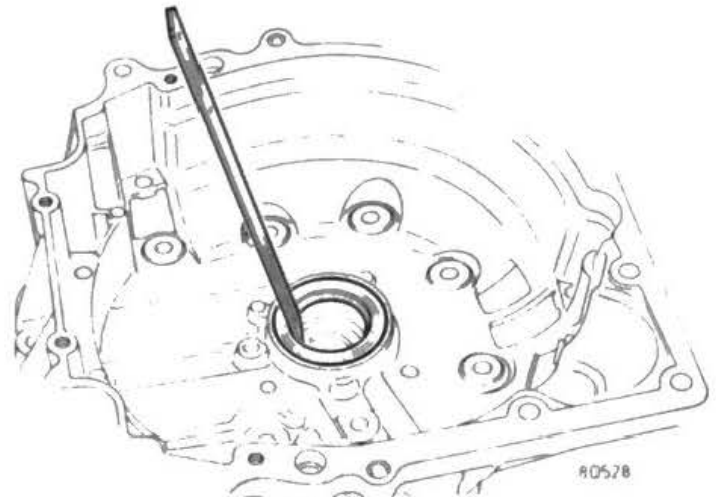
## Dismantling - Re-assembling



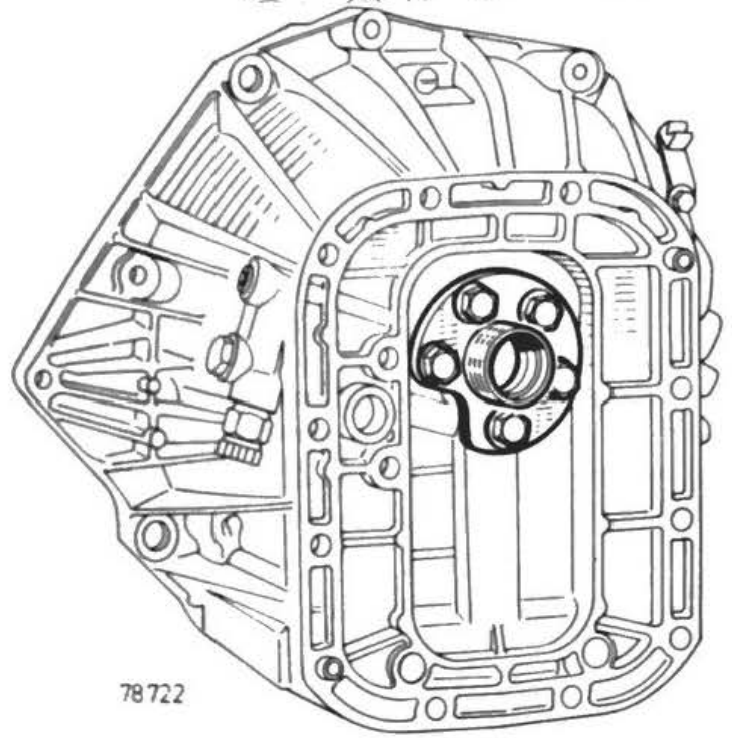
### DISMANTLING

Remove the bolts securing the converter casing to the final drive casing and remove it.

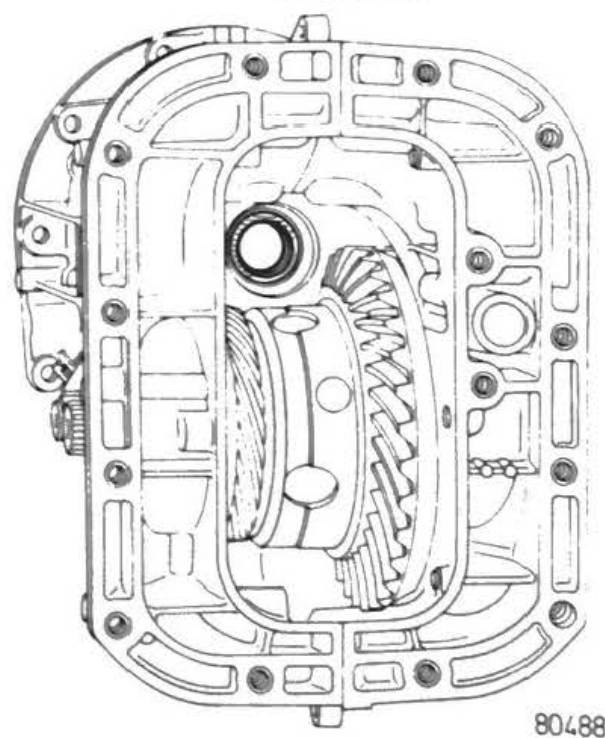
Remove the oil seal, taking care not to make any burrs in the housing.



Remove the stator shaft and seal.



Remove the distance tube and seal in the final drive casing.



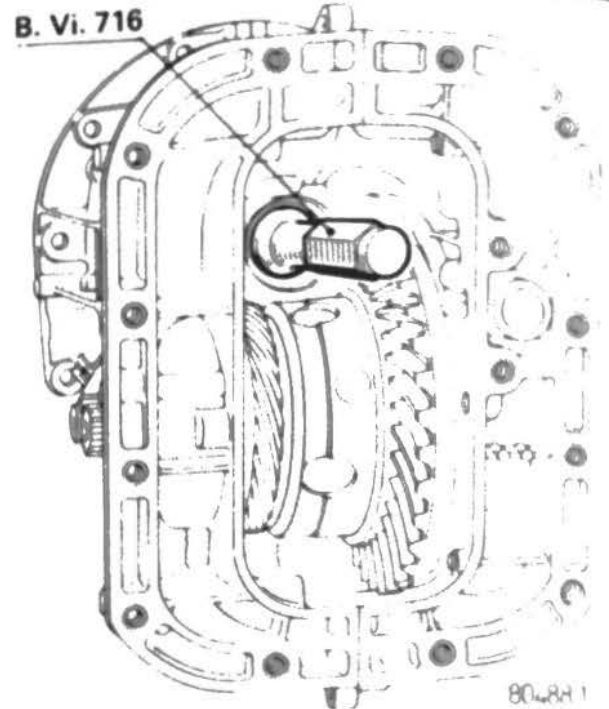


## RE-ASSEMBLING

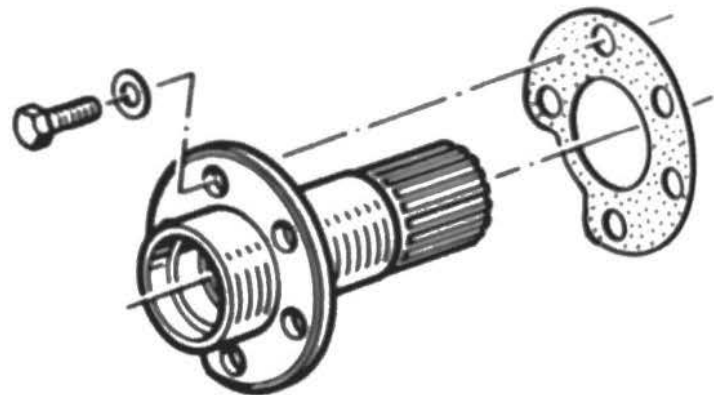
Use tool B.Vi.716 to fit the oil seal to the final drive casing.

Make sure that the oil seal is fully home.

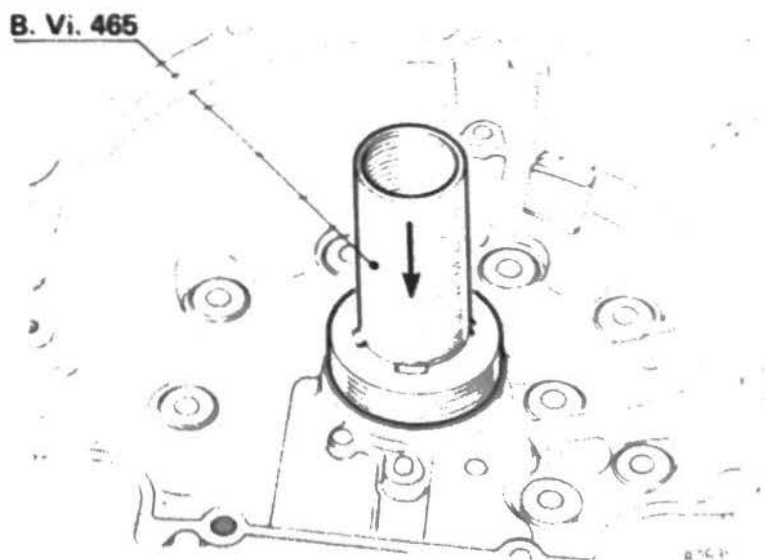
(ONLY FIT THIS OIL SEAL AFTER THE CASING HAS BEEN ASSEMBLED).



Refit the stator shaft to the converter casing with its gasket and torque tighten the bolts to between 3 and 3,5 m. da N (22 1/2 and 26 1/4 lb/ft).



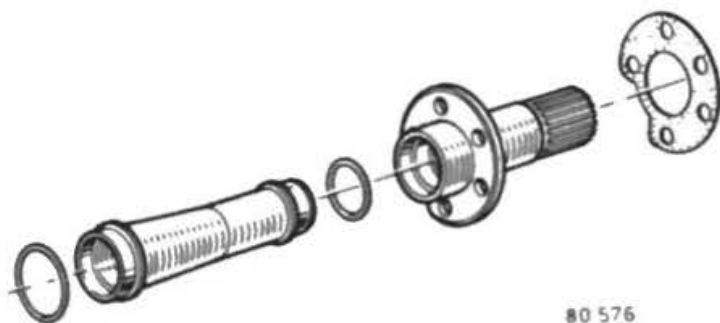
Insert the oil seal into the converter casing using tool B.Vi.465.





Fit the distance sleeve with its 2 seals :

- 1 seal in the stator shaft
- and 1 seal in the final drive casing.

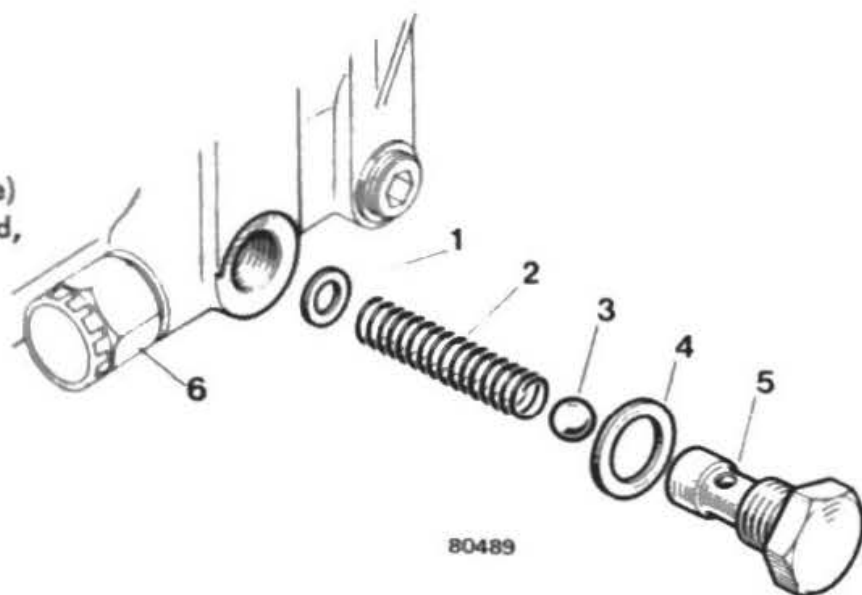


80 576

Fit the converter casing with its gasket (dry) then torque tighten the bolts to between 4 and 4,5 m.da N (30 and 33 3/4 lb/ft).

If the valve (converter return safety device) in the converter casing has been dismantled, re-assemble it as follows :

- washer (1)
- spring (2)
- ball (3)
- valve (5) with seal (4)



80489

(Plug (6) enables ball (3) to be recovered).

## OIL PUMP

Fit the following to the oil pump casing :

- larger gear (chamfer facing pump body)
- small gear
- drive.

Fit the circular seal on the oil pump body before positioning the pump on the gear casing.

**FOLLOW THE ALIGNMENT MARKS MADE ON DISMANTLING WHEN REFITTING THE OLD PUMP.**



## PILOT VALVE

Refer to "Hydraulic Incidents" chapter for dismantling instructions.

### 1st Assembly : with shims

Insert the the setting shim and spring washer behind the sleeve. Use grease to hold them in place.

Insert the assembly into the transmission case. Push the sleeve fully home.

Measure the distance between the sleeve and the capsule joint face with a depth rule.

Measure the difference between the seal and the edge of the capsule. The clearance between the capsule and sleeve should be between 0 and 0,2 mm (0 and .008").

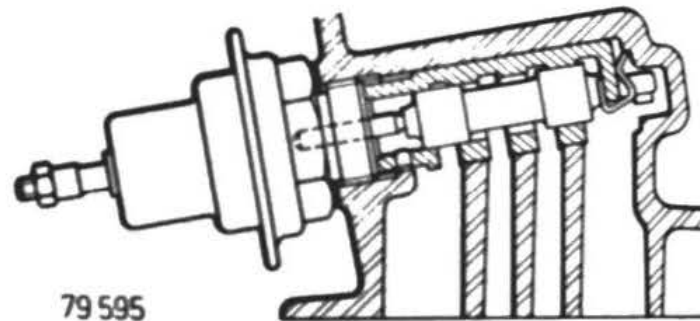
If it is not, check the shim stack.

### 2nd assembly : with clip

Check that the clip is in position at the back of the sleeve.

Insert the sleeve and push it fully home.

Refit the capsule.



79 595



## FITTING AN OIL COOLER

Code 9536



R 1271

One single fitting kit (Part No. 77 01 459 922) available from the Parts Department is suitable for both L.H.D. and R.H.D. and for vehicles with either the 360 mm (14") or 440 mm (17 1/4") radiator.

An oil cooler may be fitted to a vehicle provided that it has no air conditioning system.

### FITTING INSTRUCTIONS

Place the vehicle on a lift.

#### ENGINE COOLING RADIATOR ON L.H. SIDE (up to and including 1977 model).

##### a - Cutting out the front end panel cardboard

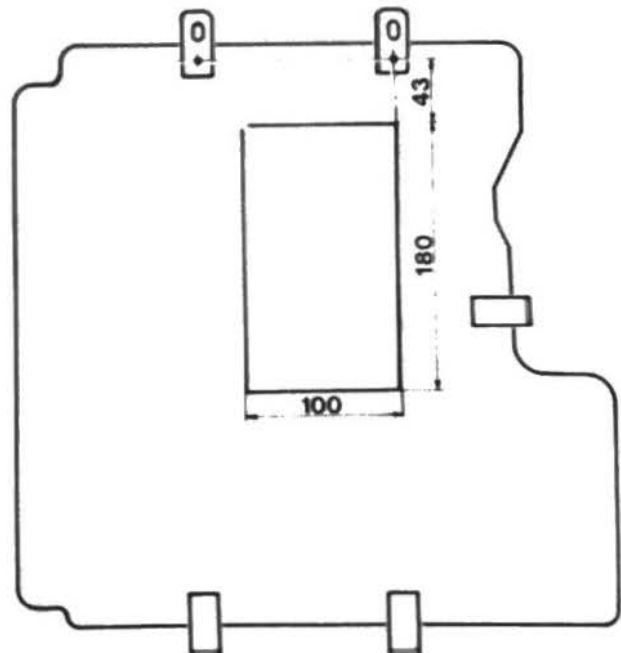
Cut a rectangle in the cardboard following the dimensions given in the drawing.

The cardboard is fixed to the front end panel in one of two ways :

- either by clips
- or by blind rivets.

In the case of the former, the cardboard will be easier to cut if it is removed first.

In the latter, it can be cut out in situ.



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### b - Installing the oil cooler

(up to and including the 1977 model)

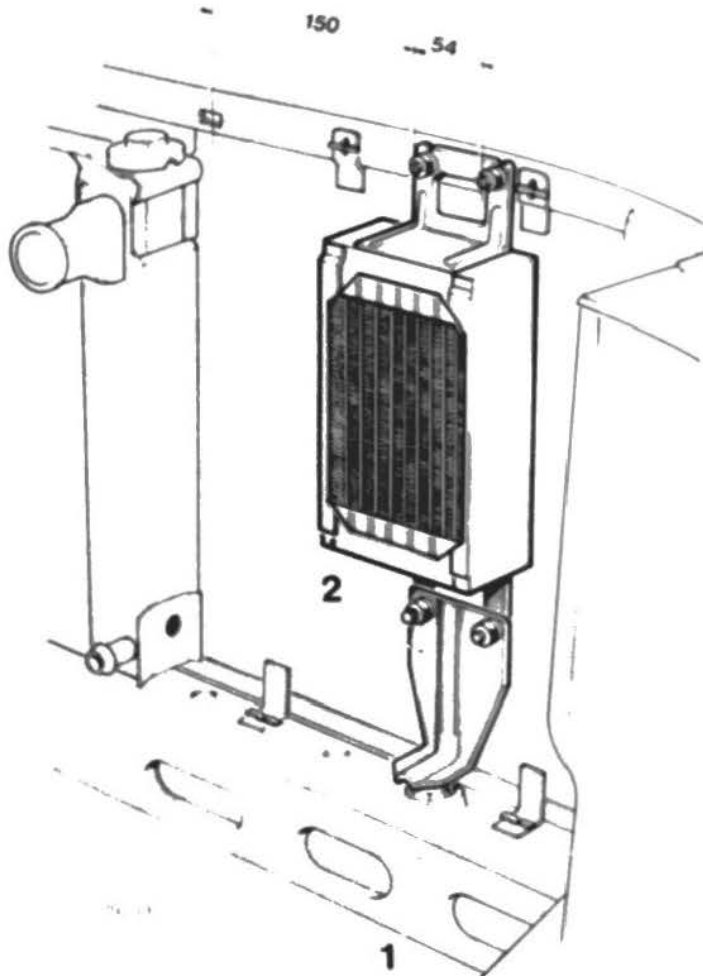
Drill 2 x 7 mm dia. holes in the top crossmember at the distances given on the right.

Use hole (1) on the front end panel crossmember to locate the mounting pad.

Screw bottom bracket (2) onto the oil cooler.

Insert the bottom bracket into the mounting pad and fix the oil cooler at the top.

(It may be necessary to remove one or two rivets along the top of the cardboard to insert the bolts, depending on the method used to hold the cardboard).



### ENGINE COOLING RADIATOR ON R.H. SIDE (1978 model onwards).

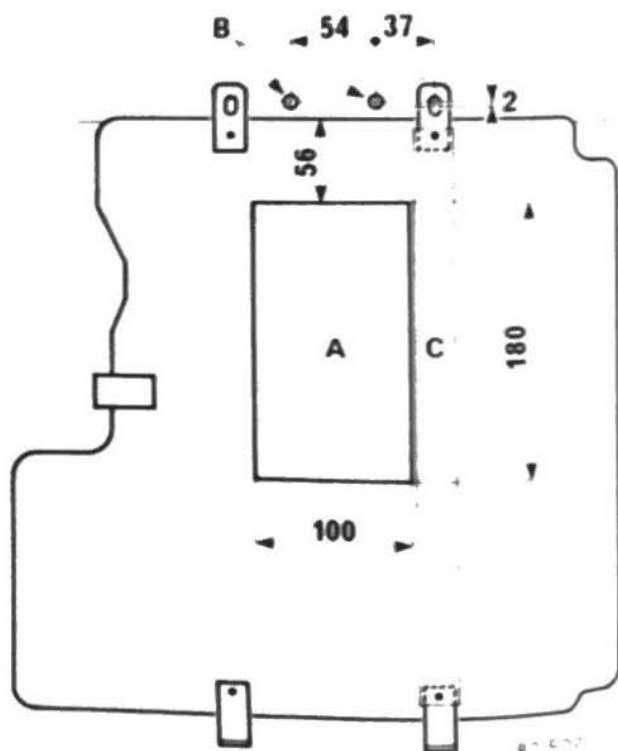
#### a - Cutting out the front end panel cardboard.

When the engine cooling radiator is inserted on the R.H. side, the oil cooler must be fitted to the L.H. side of the front end panel cardboard.

- Cut rectangle A out of the cardboard. The R.H. vertical side should be flush with the edge of stiffener (C).
- Drill 2 x 7 mm dia. holes (B) in the top crossmember at the distance given on the right.
- Remove stiffener (C).

#### b - Installing the oil cooler.

The methods for fitting an oil cooling radiator on the R.H. or L.H. side of the engine cooling radiator are similar.





## FITTING HOSES AND PIPES

Remove :

- engine undertray
- exhaust downpipe.

### On the automatic transmission

Remove :

- oil return pipe between converter and casing  
(oil may run out, the quantity involved depending on how long the vehicle has been standing).
- 2 unions and seals.

Fit unions (3) with their new seals instead of the old unions and torque tighten them to 3 m.da N (22 1/2 lb/ft).

### Pipe and hose connections :

Connect :

- Pipe (4) to pipe (5)
- Pipe (6) to pipe (7)

Fit the clips temporarily without tightening to allow for lining up correctly later on.

Offer up the pipes to the vehicle

Start the union threads on the following but do not tighten :

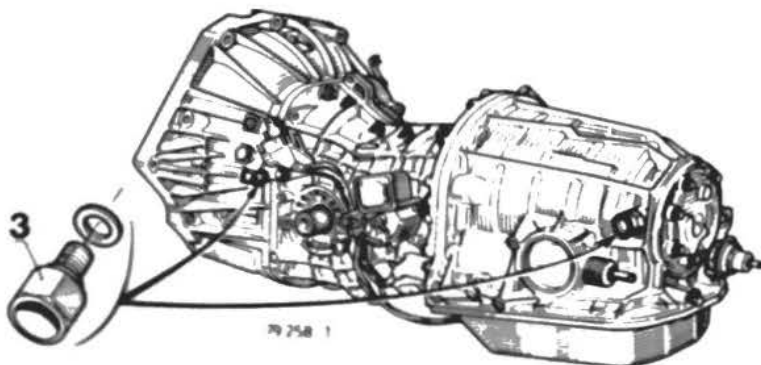
- end of pipe (4) into union (3a)
- end of pipe (6) into union (3b).

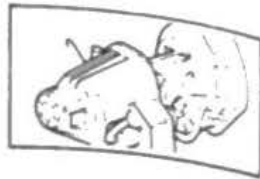
If a 2nd assembly is concerned, cut pipe (5) and (7) at the radiator end, leaving :

- 430 mm (17") of hose for pipe (5)
- 280 mm (11") of hose for pipe (7).

Connect the rubber portion of pipe (5) to the oil cooler top pipe and the rubber portion of pipe (7) to the oil cooler bottom pipe.

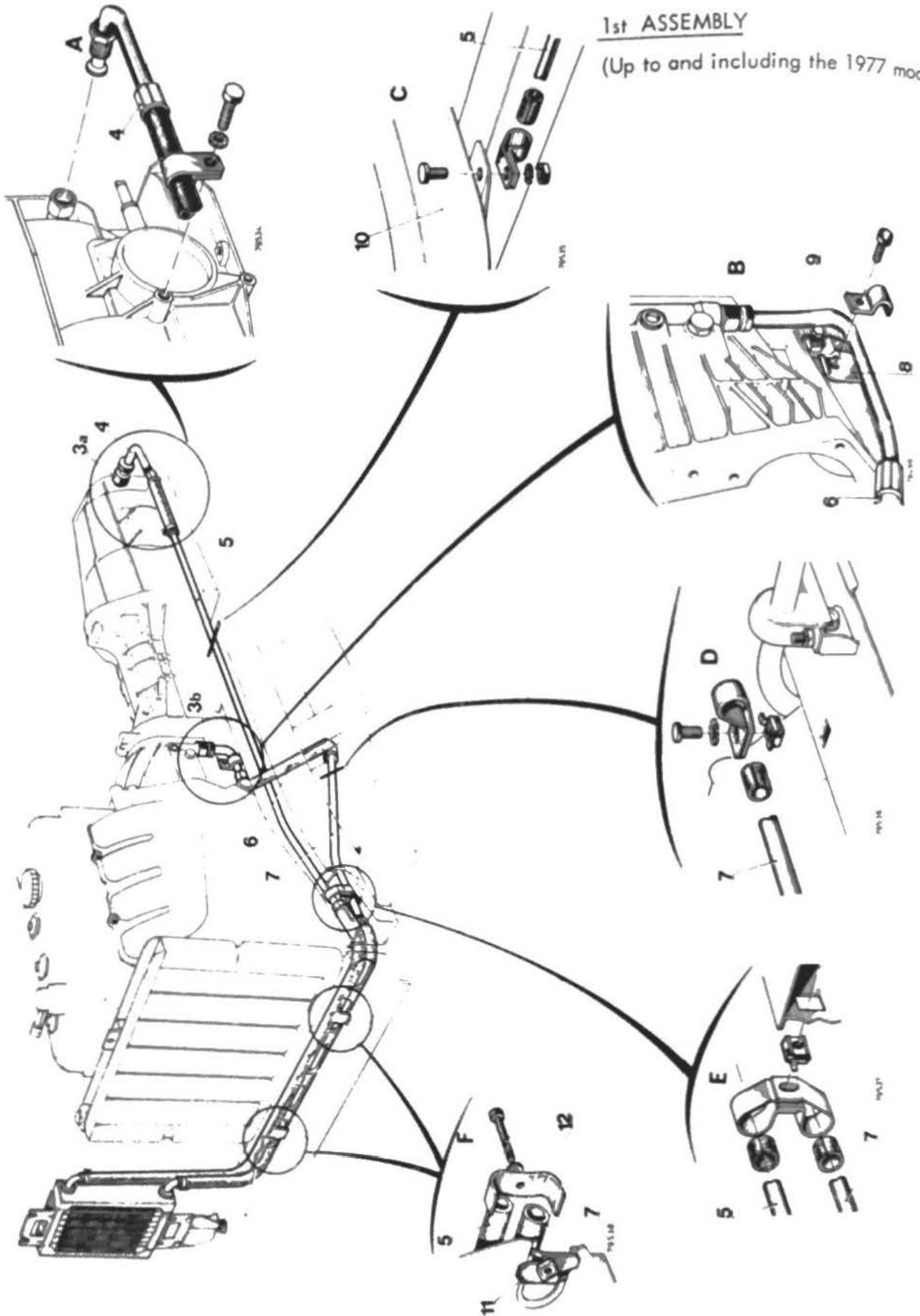
Fit the clips but do not tighten at this stage.





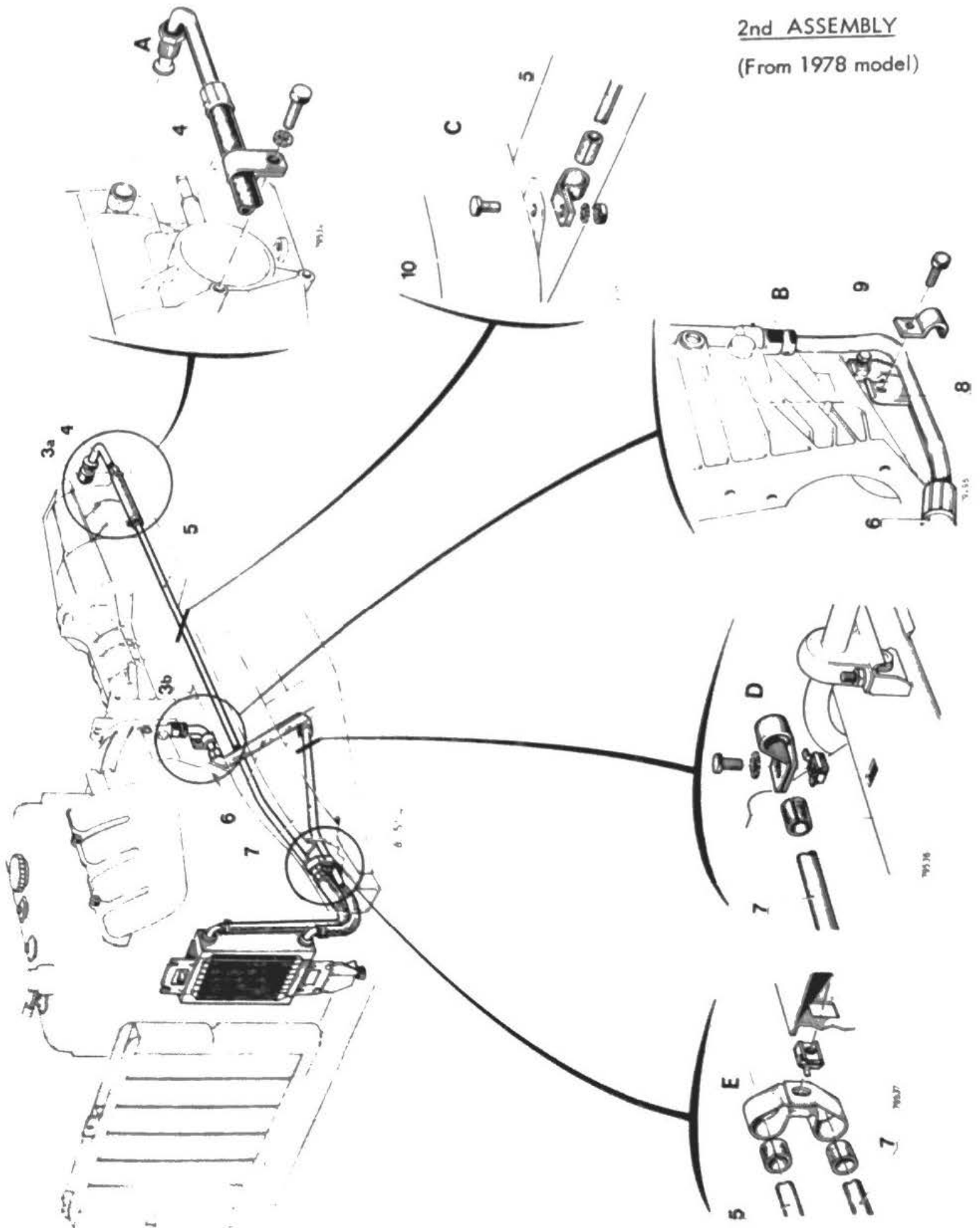
### 1st ASSEMBLY

(Up to and including the 1977 model)





2nd ASSEMBLY  
(From 1978 model)





## OIL TEMPERATURE WARNING LIGHT

Code 9303

R 1273 - R 1275

The towable weight of the Renault 30 TS Automatic has been increased commencing with 1977 models.

It is advisable to fit an oil temperature warning light on the dashboard of this vehicle so as to be able to check that the oil temperature does not exceed 135°C (275°F) when towing a caravan.

This fitment is also recommended for pre-1977 vehicles being driven in

hot or mountainous countries and towing a caravan.

Details are given below of the parts required to fit the warning light and the method of assembly.

Description :	Part No.
Sump	77 01 460 250
Sump gasket	77 00 632 285
Thermal switch	77 00 637 424
Thermal switch seal	79 03 062 001
Bulb holder	77 00 577 827

### METHOD OF OPERATION

- Disconnect battery
- Drain the automatic transmission gear casing
- Remove sump
- Fit the new sump with the union for the thermal switch
- Fit the thermal switch and seal
- Refill gear casing with ELF Renaultmatic D1 or MOBIL ATF 220 oil.

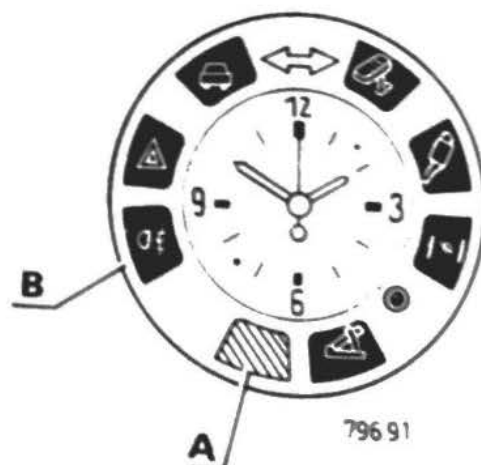
### ELECTRICAL CONNECTIONS

- 1 - Instrument panel fitted with headlight main beams "On" warning light (B).

Use spare lens (A) and fit a bulb holder and 12 V 1.2 W bulb.

Connect a wire between the thermal switch and terminal (U) on the instrument panel multiple connector, routing the wire through a existing grommet in the scuttle.

- 2 - Instrument panel fitted with headlight main beams "On" warning light on one side of the coolant temperature gauge and dipped beams "On" warning light on the other side.



796 91



Use spare lens (D).

There are three possibilities :

a - the instrument panel has no bulb in the spare position.

Fit a bulb holder and 12 V 1.2 W bulb behind spare lens (D).

Connect a wire between the thermal switch and terminal (B) on the multiple connector, routing the wire through an existing grommet in the scuttle.

b - the instrument panel is fitted with a bulb.

Make the same connection as above.

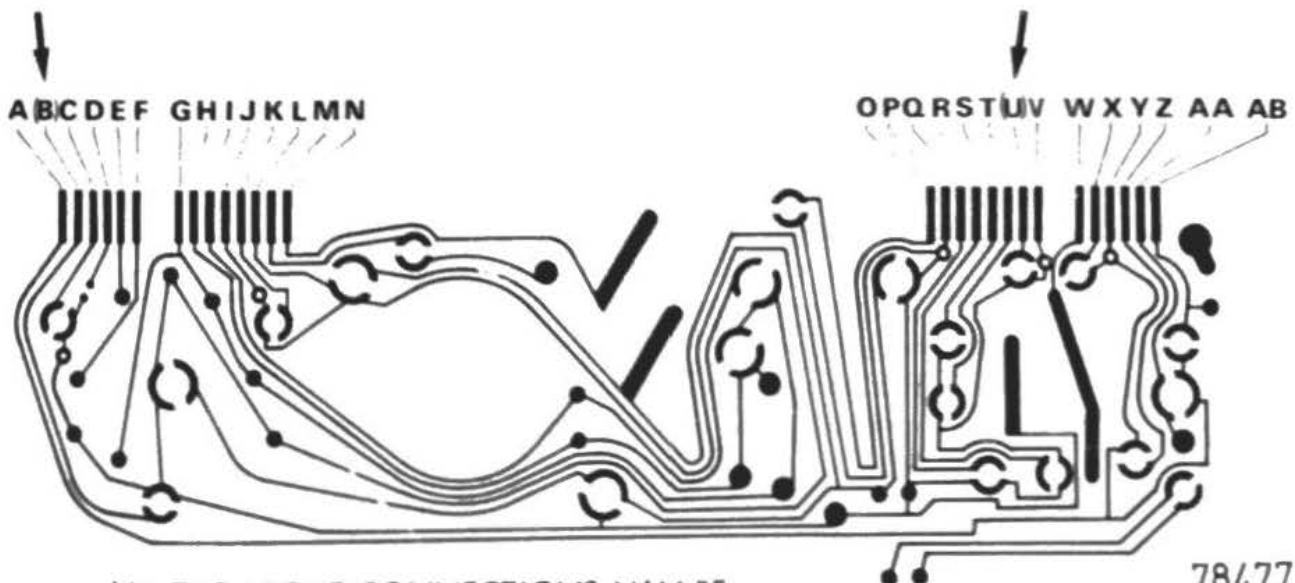
c - during 1977, vehicles will be fitted in production with a wire running from a switch on the instrument panel to a point in the engine compartment near the R.H. shock absorber mounting.

Connect this end to a wire running to the thermal switch.

Re-connect the battery.



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ALL THE ABOVE CONNECTIONS MAY BE MADE WITHOUT REMOVING THE INSTRUMENT PANEL.



## AUTOMATIC TRANSMISSION WIRING DIAGRAM



### WIRE IDENTIFICATION

Each wire is identified by a number followed by a letter(s) indicating the colour, a further number indicating the wire diameter and then the number of the unit to which the wire is connected.

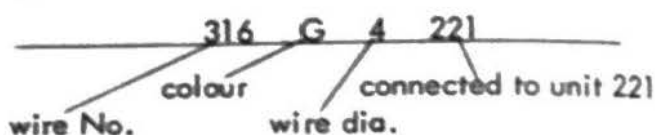
It will be identified as follows :



#### Example :

Take wire 316 G 4 41 in connector 221.

On connector 41, therefore, we find wire 316 G 4 221 :



#### Wire colours :

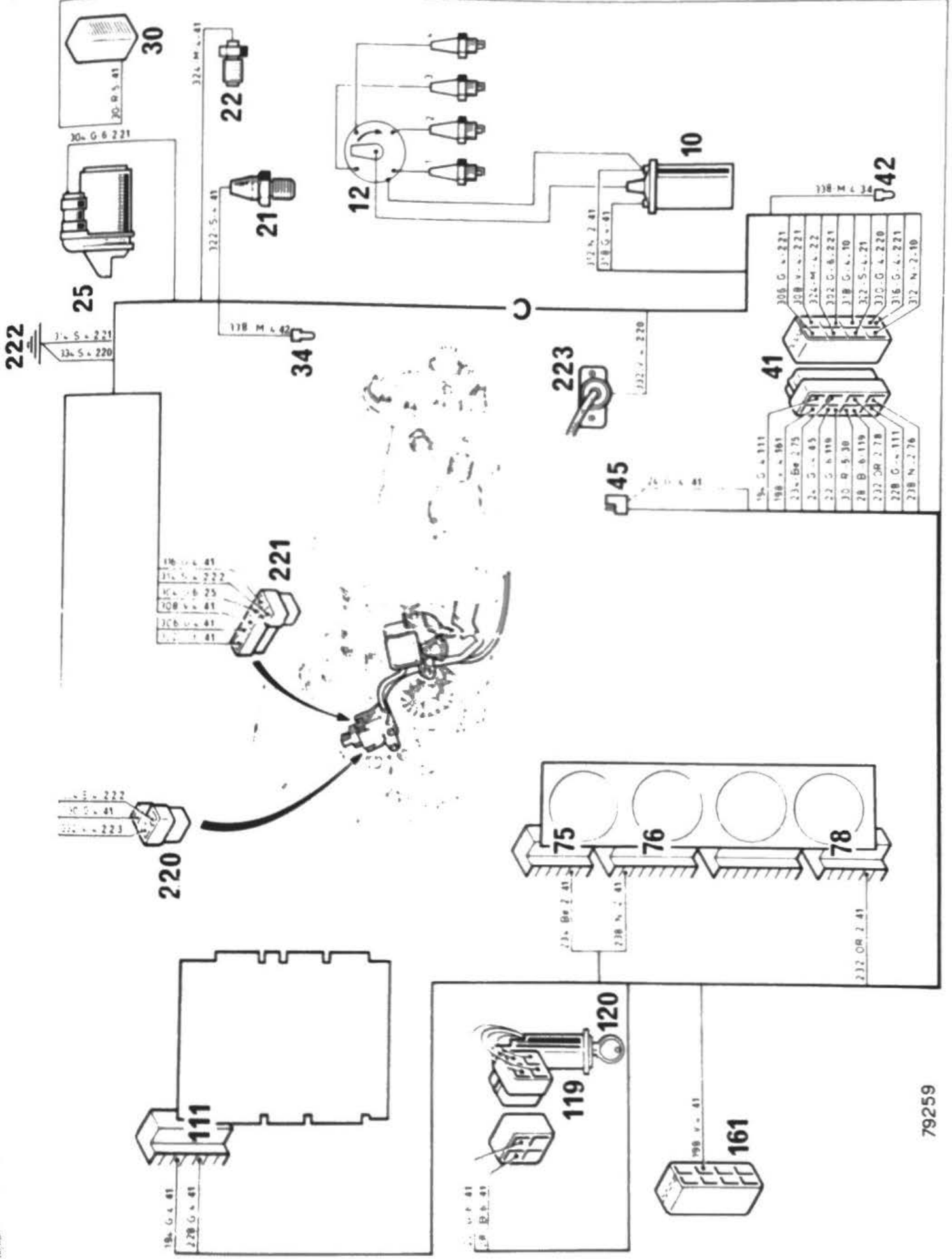
Beige	White	Blue	Clear	Grey	Yellow	Black	Pink	Red	Green	Maroon	Violet	Orange
Be	Bc	B	C	G	J	N	S	R	V	M	Vi	Or

#### Wire diameters :

No.	1	2	3	4	5	6	7	8	9
mm	7/10	9/10	10/10	12/10	16/10	20/10	25/10	30/10	45/10

### LIST OF UNITS

- 10 - Ignition coil
- 12 - Distributor
- 21 - Oil pressure switch
- 22 - Thermal switch
- 25 - Starter
- 30 - Regulator
- 34 - Push-in terminal for air conditioning magnetic clutch
- 41 - Junction block - front harness to engine harness
- 42 - Push-in terminal for air conditioning magnetic clutch
- 45 - Push-in terminal for brake pad wear warning light
- 75 - Connector No. 1 on instrument panel
- 76 - Connector No. 2 on instrument panel
- 78 - Connector No. 4 on instrument panel
- 111 - Junction block - front harness to auxiliaries plate
- 119 - Junction block - front harness to ignition-starter switch wiring
- 120 - Ignition-starter switch
- 161 - Junction block - front harness to rear harness
- 220 - Junction block - engine harness to automatic transmission harness
- 221 - Junction block - engine harness to automatic transmission harness
- 222 - Earth (ground)
- 223 - Kick-down switch on accelerator cable



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