Service Manual

Section 4 (41-43)

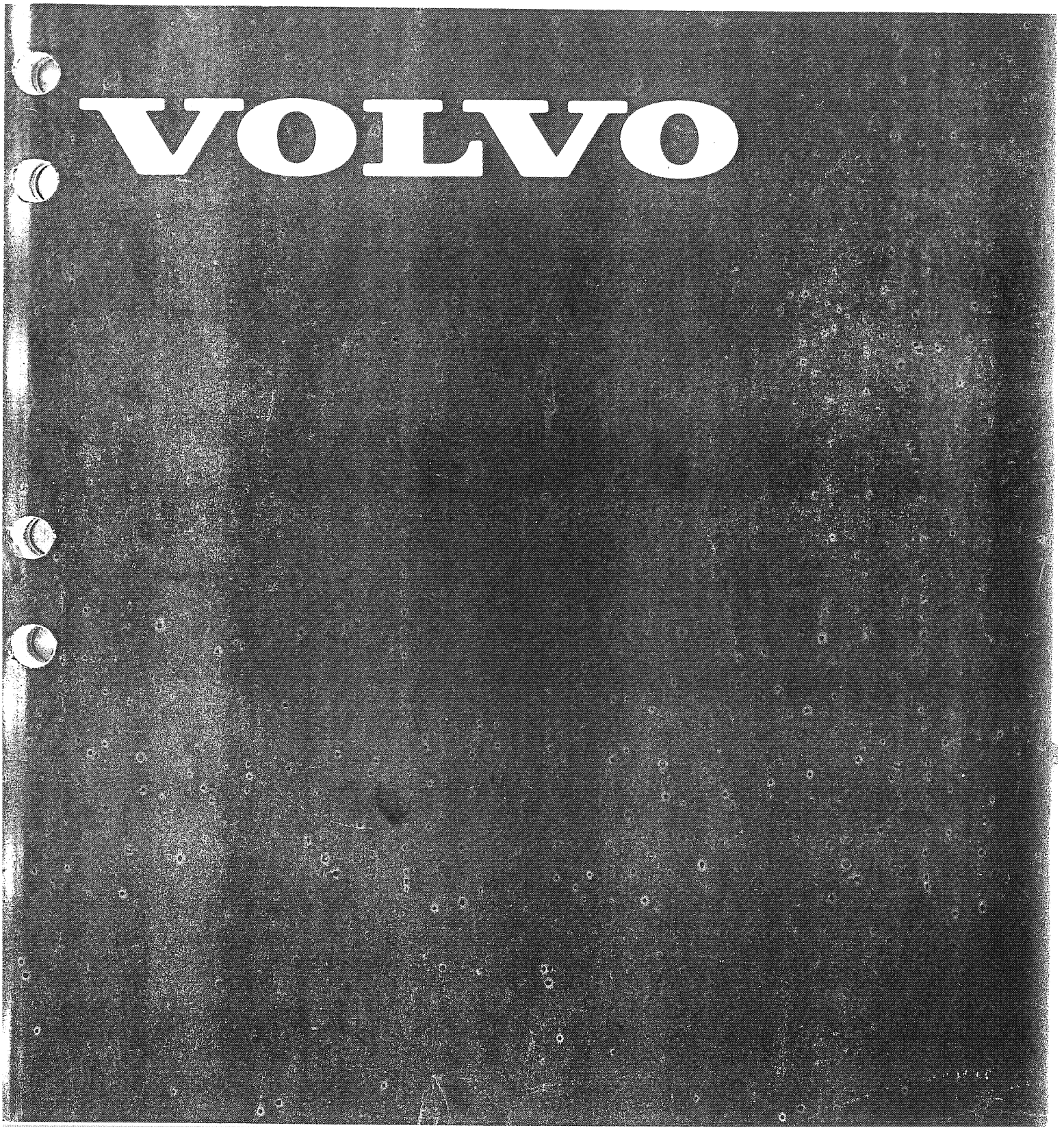
Power transmission CV

300

1976-1991

May 1991 TP 35724/1

Design and function
Fault tracing
Repairs and maintenance



Volvo passenger cars are sold in different variants adapted to the specific requirements of the various countries. This market adaptation is based on such things as legal regulations, tax limitations and specific wishes of the market concerned.

For this reason illustrations and text may appear in this Service manual which are not relevant to the cars in your own country.

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Order number 35724/1
Supersedes TP 12431/3, TP12081/1, TP 12119/1, TP35145/1 and TP 11731/1

Introduction

Specifications

Centrifugal clutch

Clutch, type		single dry plate clutch with centrifugal weights
Clutch plate diameter	mm	181.5
Engaging speed at a torque of:		
0 Nm	r/s	17.5-19.2
	r/min	1050-1150
103 Nm	r/s	39.2-42.5
	r/min	2350-2550
Clutch disengagement		by vacuum cylinder
Transmission disengaged: max. speed	r/s	33.3
	r/min	2000
Free travel of vacuum cylinder (clearance between release fork and clutch housing)	mm	1.0-1.5
Maximum permissible clearance between clutch plate and flywheel:		
reference value when checking	mm	0.5
reference value when adjusting	mm	0.1-0.3
Clutch release valve, operating pressure	kPa vacuum	40
	kg/cm^2 vacuum	0.4
Free travel of servo cylinder diaphragm	mm	7
From chassis number HC 314541		the shift fork must lie approx. 1 mm clear of the clutch housing

CVT

Type		Continuously variable automatic transmission with twin-belt drive and a differential. Transmission lock in rear cover of primary unit

Primary unit

Gear case material		cast iron
Transmission ratio (also reverse gear)		1.53:1
Maximum diameter of pulleys	mm	250
Pulley angle	°	30
Sliding pulley half travel	mm	31.5 ± 0.2
Belt operating diameters with theoretical belt width of 42 mm	mm	120.5-238.1
Weight	kg	35

Lubrication

Primary unit gear case (after the 1,000 km service)		Hypoid oil SAE 80 or SAE 80W/90 in accordance with specification API GL-4 or API GL-5 (MIL-L2105 B or C) Nordic countries: ATF, type A/A or F or Dextron
Capacity (total)	l	0.625
Capacity after draining	l	0.550
Sliding pulley halves		ATF, type A/A or F or Dextron
Capacity	l	0.100
Pinion shaft and clutch shaft splines		High Tack

Secondary unit

Gear case material		aluminium
Transmission ratio		4.51:1
Maximum diameter of pulleys	mm	265
Pulley angle	°	30
Sliding pulley half travel	mm	31.1
Belt operating diameters with theoretical belt width of 42 mm	mm	132.7-248
Gap between pulley halves with new belts	mm	1.5-2.0
Minimum permissible gap between pulley halves	mm	1.5
Weight	kg	37.8

Lubrication

Secondary unit gear case (after the 1,000 km service)		Hypoid oil SAE 80 or SAE 80W/90 in accordance with specification API GL-4 or API GL-5 (MIL-L2105 B or C) Nordic countries: ATF, type A/A or F or Dextron
Capacity (total)	l	1.120
Capacity after draining	l	1.00
Sliding pulley halves		ATF, type A/A or F or Dextron
Capacity	l	0.075

Primary and secondary units

Centre-to-centre distance between primary and secondary pulleys	mm	366 (+20/-5)
Total reduction ratio, max.		14.15:1
minimum		4.00:1
Ratio spread		3.54:1

The distance between the primary and secondary pulleys can be adjusted by moving the secondary unit.

Lubrication

Hubs of sliding pulley halves	Gleitmo 500 or Molykote BR-2S
Bearings in cover	Lithium grease NLGI 3
Oil seals	Lithium grease NLGI 00

Vacuum control system

Microswitch

Cut-in speed	r/s	40-43.3
	r/min	2400-2600
Vacuum setting of electromagnetic vacuum valve*, model year '76-'77	kPa	40-50
	kg/cm²	0.4-0.5
model year '78	kPa	43-53
	kg/cm²	0.43-0.53
Clutch release valve, vacuum setting	kPa	44

*measured at right-hand side of vacuum valve

CVT vacuum control unit

Type		Bosch 0 335 530 016
Engine speed setting	r/s	29.2-30.8
	r/min	1750-1850

Propeller shaft

Type		aluminium tube with rubber couplings in the flared ends
Overall length	mm	1160
Diameter of the tube	mm	Ø 60x2
Weight of complete propeller shaft	kg	2.3

Half-shafts

Maximum angle	°	18
Outside diameter of CV joint	mm	Ø 96
Stroke of CV joint from theoretical centre	mm	+8/-11

Lubrication

Propeller shaft coupling	Gleitmo 500 or Molykote BR-2S

Tightening torques

Clutch	**Nm**
Clutch housing assembly, hexagon socket-head screws, M7x1	18-22
Clutch housing bolts, M10x1.25	45
Bearing housing bolts, M8x1.25	23-24

CVT

Cross shaft nuts, M14x1	110-125
Drain plugs and level plugs, M18x1.5	39-45
Hexagon socket-head screws securing half-shaft to flanged axle shaft and to flange of secondary unit, M8x1	32-36
Rear cover nuts	13
Bearing housing nuts	14
Pinion shaft nut	62
Forward drive gear nut	160
Lock nut for adjustment of locking sleeve shaft	30
Nuts on subframe member	26
Gear shaft nuts	190
Gear case (halves) retaining nuts	17

Overview of CVT primary units fitted in the 300 series

Type	Volvo 343
Volvo number	3290713-1 and 3292940-8 (Part No. modification for administrative reasons only)
Exchange component number	9031028-5 (superseded by 9031044-2)
Chassis number	-
Special features	- no mounting brackets - mounting holes integrally cast in gear case and rear cover

Type	Volvo 343 and 345
Volvo number	3294150-2
Exchange component number	9031044-2
Chassis number	from 388000
Special features	- no visible difference with previous type - control parameters modified; centrifugal weight = 410 g ±4 g (previously 454 g ±4 g)

Overview of CVT secondary units fitted in the 300 series

Type	Volvo 343
Volvo number	3290540-8 (rib between rear mounting holes) 3292307-0 (lower rib between rear mounting holes due to machining)
Exchange component number	9031030-1 (superseded by 9031045-9)
Chassis number	up to 388000
Special features	oil level plug on rear end

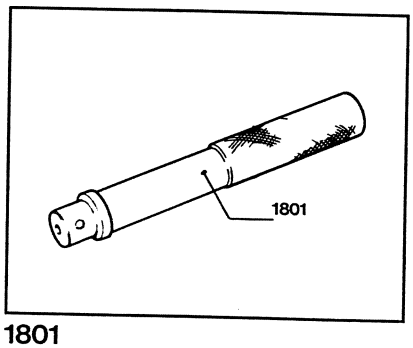
Note: not interchangeable with Part No. 3294155-1

Type	Volvo 343 and 345
Volvo number	3294155-1
Exchange component number	9031045-9
Chassis number	from 388000
Special features	- lower rib between rear mounting holes - control parameters modified; compression spring = 800 N (previously 500 N)

Note: can replace 3290540-8 and 3292307-0.

Special tools

999	Description
1801	Standard handle
2412	Drift
2413	Drift
2520	General purpose stand
2901	Hose clamp
5827	Adaptor
5830	Standard handle
5831	Clamping tool
5833	Assembly tool
5834	Press tool
5837	Pulley spreader
5842	Press tool
5843	Vacuum pump
5885	Counterhold
5886	Press tool
5887	Press tool
5888	Drift
5891	Press tool
5901	Press tool
5907	Drift
5923	Press tool
5934	Gauge
5935	Clamp
5936	Spacer segment
5939	Clamp
5943	Press tool
5944	Drift
5946	Support tool
5948	Lever
5949	Measuring jig
5951	Extractor
5954	Counterhold
9921	Monotester



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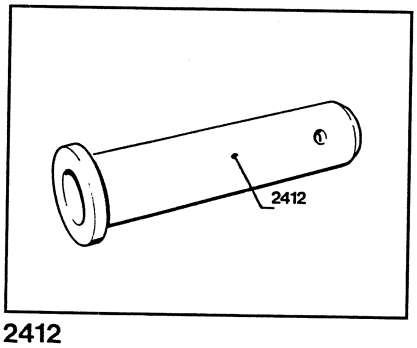

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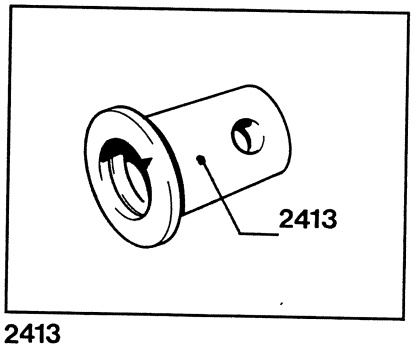

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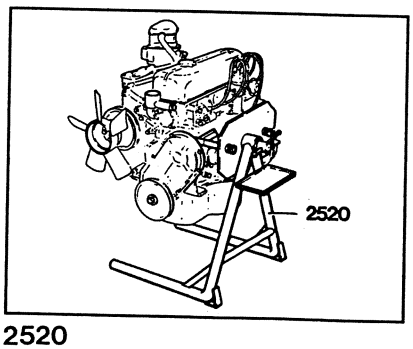

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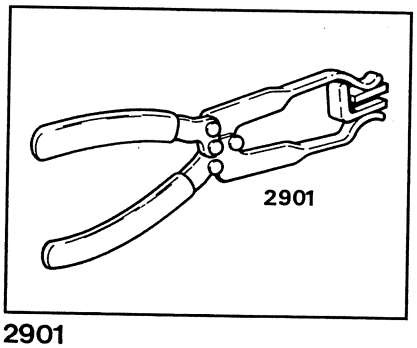

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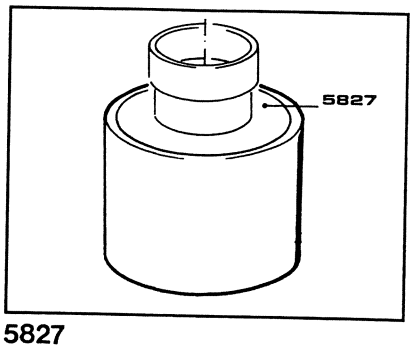

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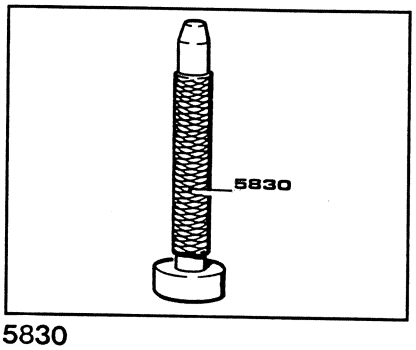

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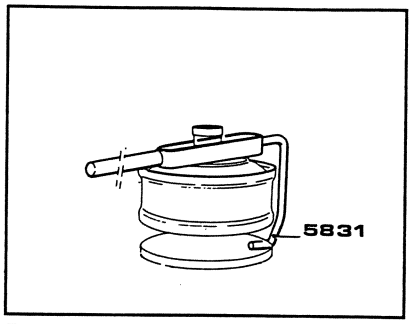

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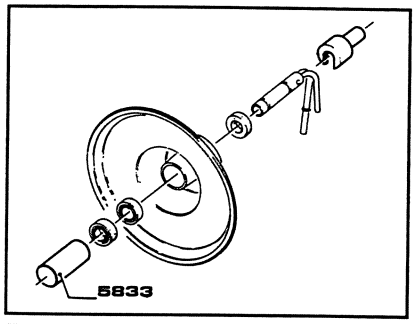

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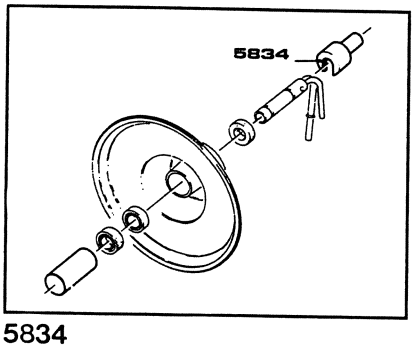

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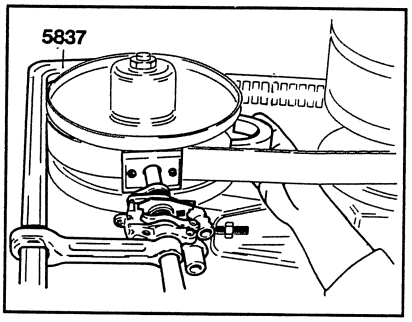

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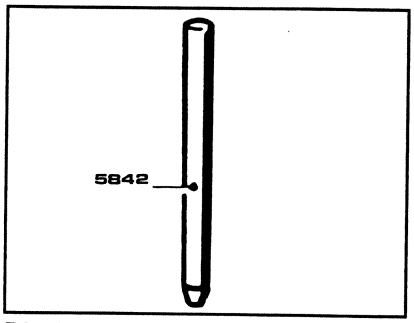

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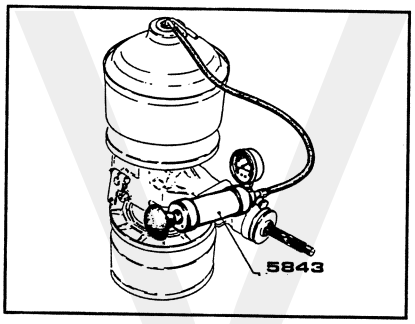

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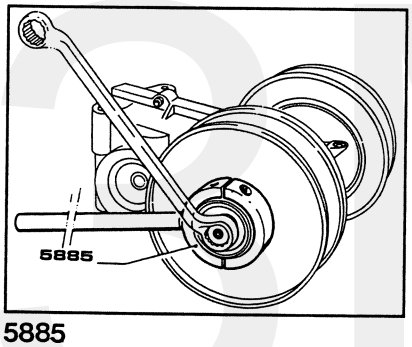

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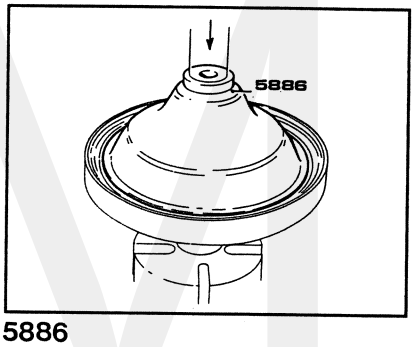

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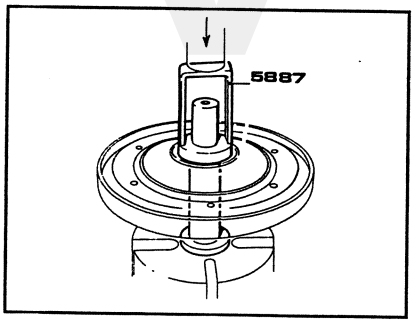

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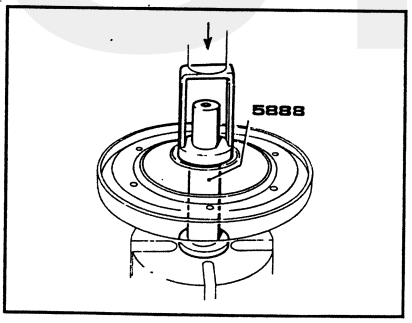

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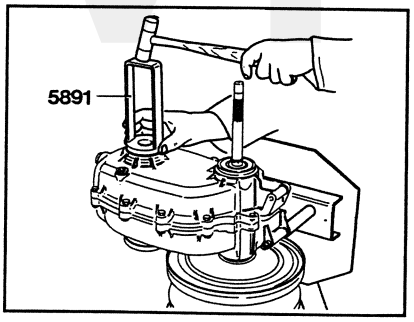

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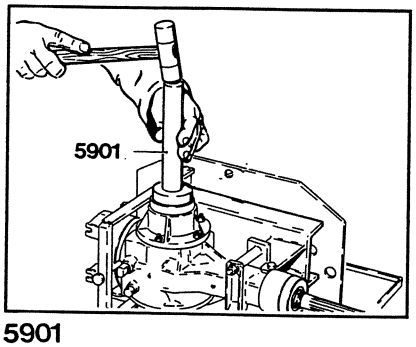

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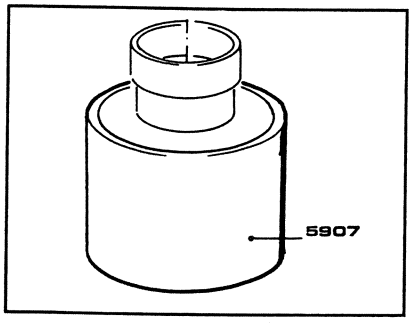

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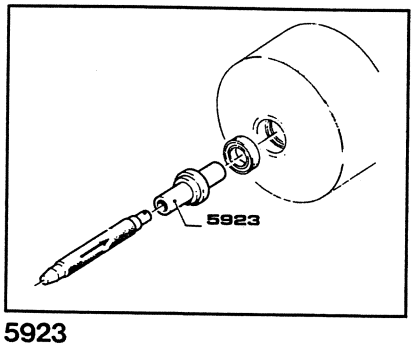

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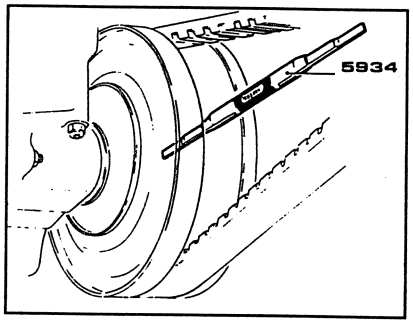

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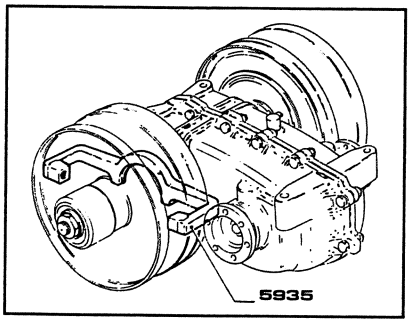

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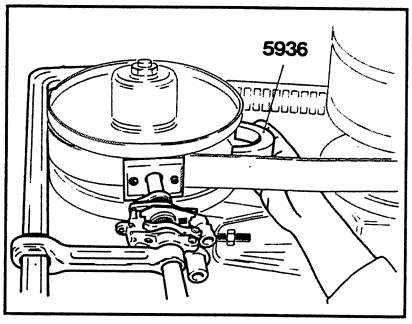

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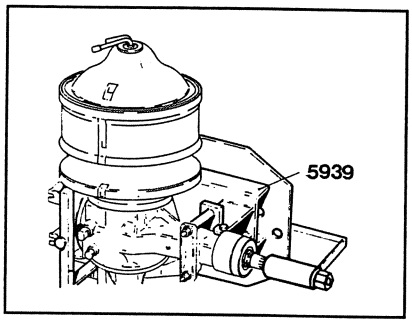

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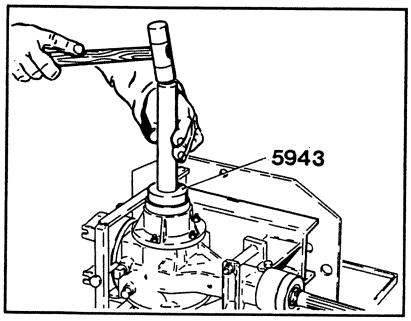

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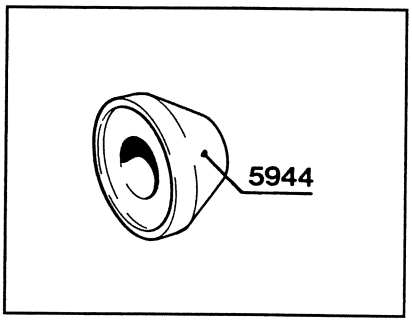

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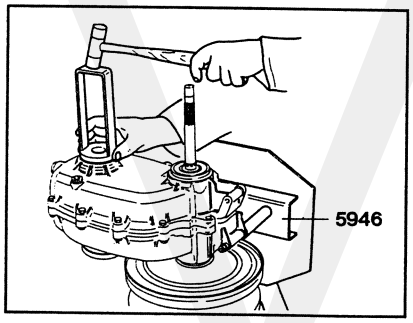

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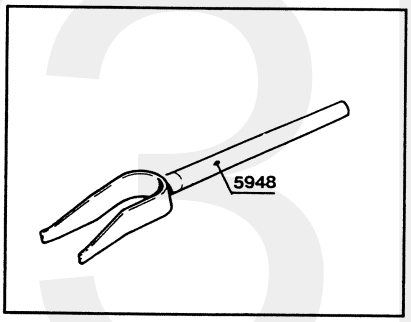

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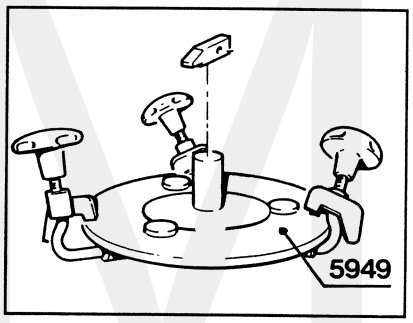

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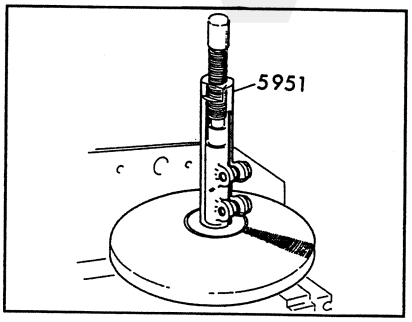

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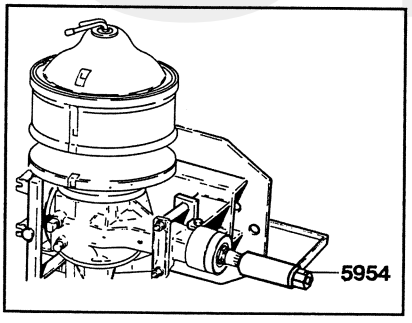

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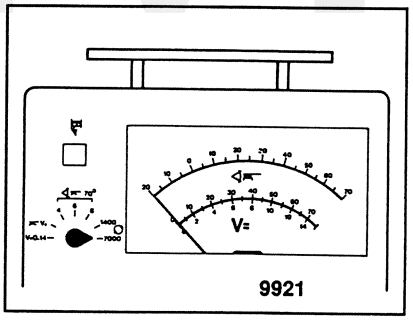

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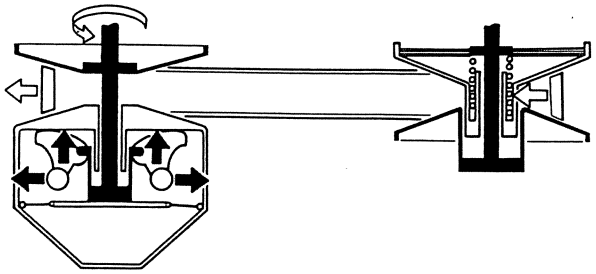
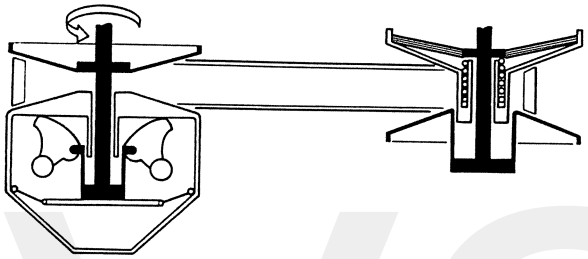
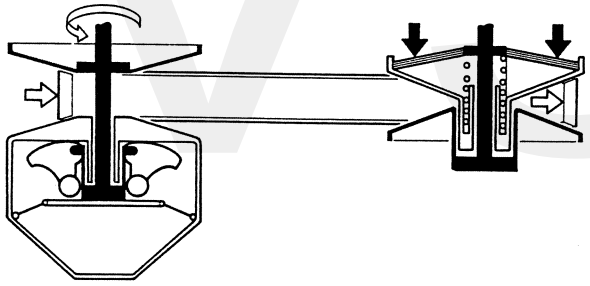


As long as the gripping force in the primary pulleys remains greater than the gripping force in the secondary pulleys, the CVT will continue to change up until the smallest possible transmission ratio has been reached.



As soon as a state of balance exists between the forces in the primary and secondary pulleys, the CVT will stop selecting ratios (changing 'gear') and the prevailing transmission ratio will be maintained.



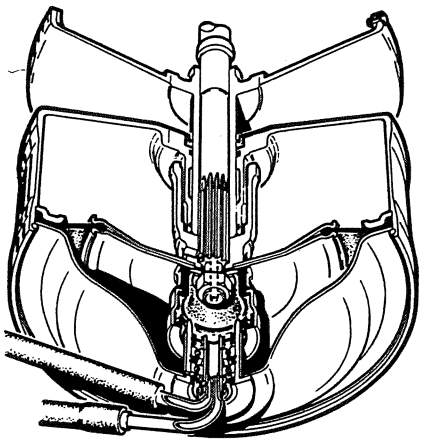
With decreasing engine speed (until the vehicle has practically come to a halt) the state of balance will be disturbed.

The greater gripping force which is now exerted on the secondary pulley halves forces them towards each other and the primary pulley halves are pulled away from each other.
The CVT then changes down until, with the vehicle practically at a halt, the maximum transmission ratio is obtained. This is essential because when the vehicle is stationary the primary pulley halves must be in the 'open' position to enable the vehicle to accelerate smoothly from rest.

Drive belt tractive effort

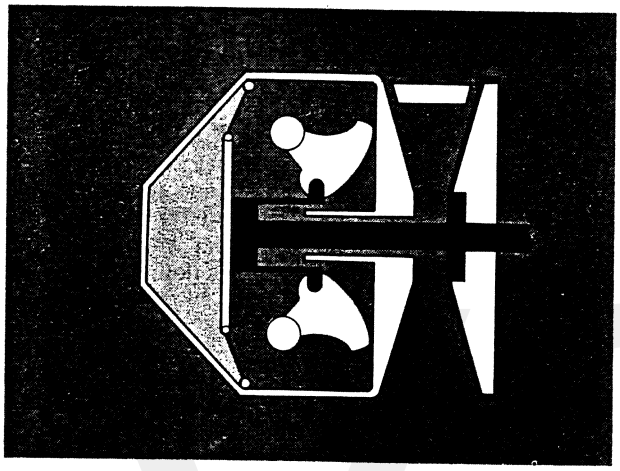
There is another very important factor which influences the reduction ratio, and that is the tractive effort in the drive belts. This is dependent on:
- the rolling resistance offered by the vehicle;
- engine torque;
- the transmission ratio of the CVT.

As long as the vehicle is moving at a constant speed along a level road, the tractive effort in the belts will be limited to supplying the required propelling force. However, when the rolling resistance increases due to changing road conditions, a greater propelling force is needed on the rear wheels and hence a greater tractive effort in the drive belts. The tractive effort in the belts is therefore rarely if ever constant.

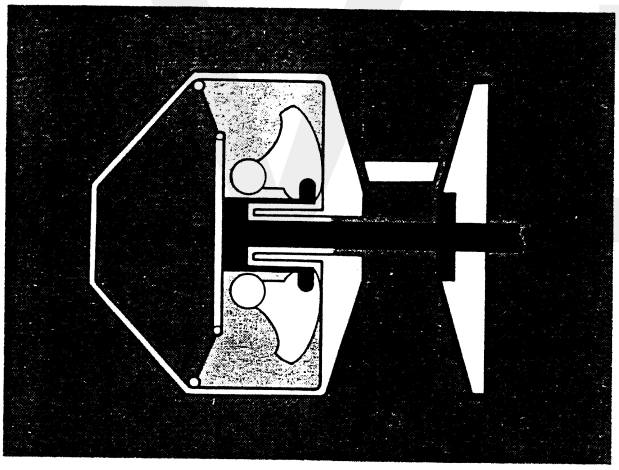


Depression (partial vacuum)

The reduction ratio of the CVT is further influenced by the depression prevailing in the inlet manifold. For this purpose, the sliding pulleys of the primary unit are divided into two halves by a diaphragm attached to the cross shaft. These separate halves are called an outer chamber and an inner chamber. The design of this system is based on the pressure difference between atmospheric and partial vacuum. Assuming that the pressure in both chambers is atmospheric, by admitting partial vacuum into one of these chambers at the right moment vacuum support can be obtained to augment the kick-down and overdrive effects.



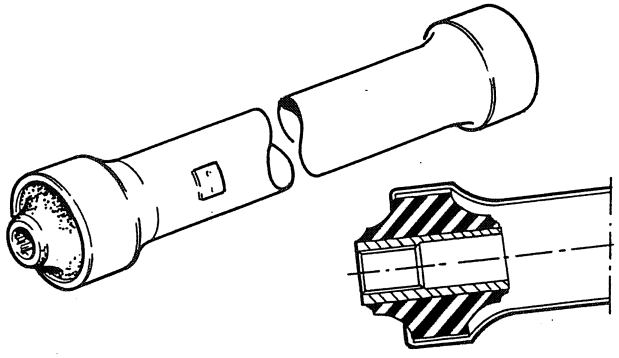
By admitting partial vacuum into the outer chamber (Fig. A), the sliding pulley half will be forced towards the fixed pulley half, causing the CVT to change up. On the other hand, by admitting partial vacuum into the inner chamber, the sliding pulley half will be pushed outwards (Fig. B), i.e. away from the fixed pulley half, causing the CVT to change down more quickly than it would without this assistance.



To sum up, there are three factors which cause the CVT to change its transmission ratio:

1. Centrifugal force (dependent on engine speed).
2. Tractive effort in the drive belts (which is primarily influenced by vehicle resistance).
3. Partial vacuum (depression) which supports the ratio selection of the CVT.

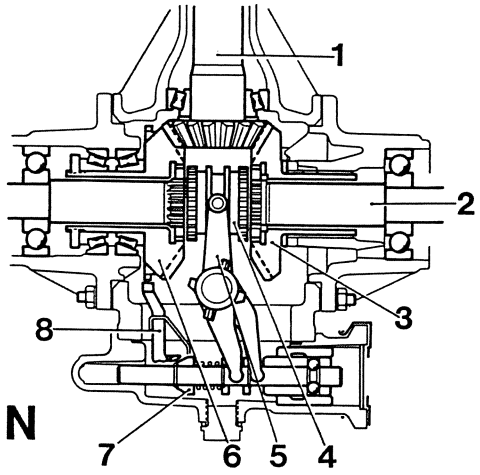
Propeller shaft

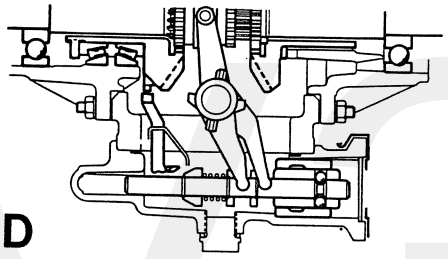


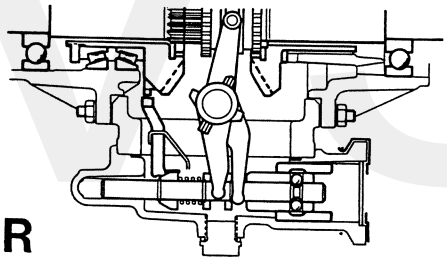
Rubber couplings

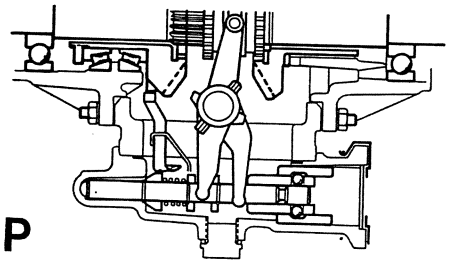
The rubber couplings of the aluminium propeller shaft consist of a metal outer ring and a splined hub, vulcanized to form a single unit. The purpose of these couplings is to absorb angular displacement and torsional forces set up in the shaft. The propeller shaft, which rotates at the same speed as the engine, has to be carefully balanced.

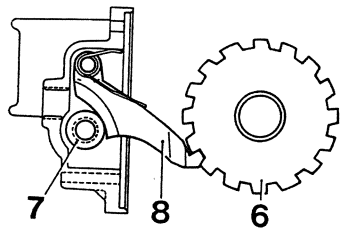
Operation











Primary unit: forward drive, neutral and reverse drive positions (D-N-R)

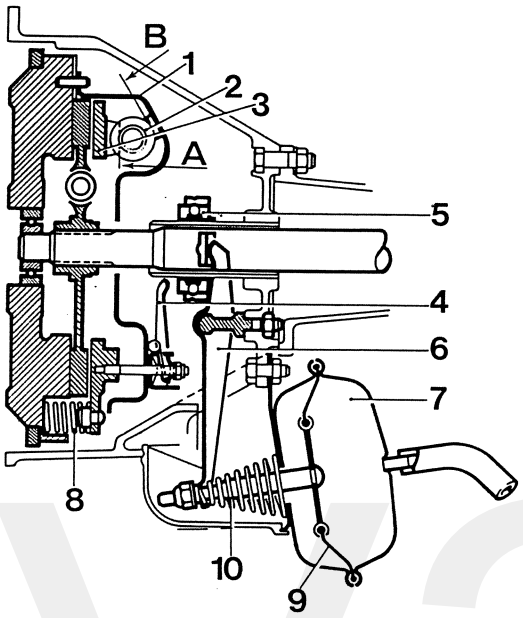
The gearshift mechanism for forward and reverse drive is centrally located in the primary unit of the CVT, which consists of a gear case, two bearing housings and a rear cover.
A pinion shaft is in constant mesh with two bevel gears (3 and 6). With the engine running and the clutch engaged, the two gear wheels turn in opposite directions to each other. Each of these gear wheels is supported on bearings in a bearing housing: the forward drive gear (6) by means of two taper roller bearings and the reverse drive gear (3) by a plain bearing.

The cross shaft (2) is supported by ball bearings in each bearing housing and runs through gear wheels (3) and (6). By moving a sliding dog (4) along the splines of the cross shaft (2) so that it engages gear wheel (3) or (6), the direction of travel of the vehicle is determined.

Parked position (P)

The principle of the transmission lock (position P) on the rear wheels is based on locking the previously mentioned gear wheels (3) and (6). To reach the P position, the selector lever must be moved past the reverse drive position R. During this movement the sliding dog (4) remains meshed with gear wheel (3) (position R). A tapered sleeve (7) pushes a locking pawl (8) - against spring pressure - into gear wheel (6).
This locks the cross shaft in position and it is no longer possible to move the vehicle forwards or backwards.

Various components: clutch, clutch release gear and electromagnetic clutch release valve



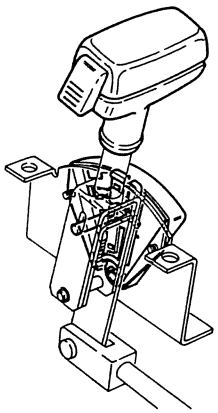
Clutch

The clutch is principally the same as a conventional single dry plate clutch. Clutch engagement is not, however, brought about by spring force but by centrifugal force supplied by three centrifugal weights.
The clutch plate is splined to the clutch shaft so that the plate can only slide along the shaft in an axial direction.
The centrifugal weights (2) consist of a spindle around which a cylinder (outer roller) rotates on needle bearings.
With the engine switched off or idling, the pressure plate (3) is pushed by the springs (8) as far as possible to the right.
In this position, the clutch shaft and clutch plate are at rest.
Depressing the accelerator pedal increases the engine speed and moves the centrifugal weights outwards. The pressure plate (3) is then pushed to the left against the pressure of the coil springs (8).
The clutch plate, and hence the clutch shaft also, is now - initially slipping relative to the flywheel and pressure plate - obliged to turn as well.

Clutch release gear

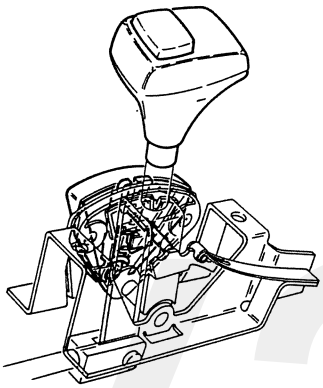
In order that the selector lever can be moved to position R or D while the engine speed is higher than the clutch engaging speed (17.5 r/s, 1,050 r/min, the clutch is equipped with a clutch release gear. For that purpose the clutch assembly has three release levers (4). The release bearing (5) and release fork (6) are housed in the two-piece clutch housing. The clutch cylinder (7) is attached to the outside of the clutch housing by means of a bracket.
When the clutch engages, the pressure plate (3) is moved to the left. To limit this movement, the diaphragm (9) with the fork (6) and release bearing (5) are kept in place by admitting vacuum into the clutch cylinder (7). This results in the pressure plate (3) being limited in its movement to the left by the three release levers (4). When the vacuum in the clutch cylinder (7) is neutralized, the diaphragm (9) moves to the left and this limitation is removed.

The vacuum in the clutch cylinder limits clutch engagement - against the force exerted by the centrifugal weights - up to a maximum speed of 33.4 r/s (2,000 r/min). Above this engine speed, the depression prevailing in the clutch cylinder will be insufficient to prevent clutch engagement because the depression in the inlet manifold reduces with increasing engine speed.
The compression spring (10) ensures that the release bearing lies clear of the release levers in the D and R positions, thus avoiding excessive wear of the release levers and the guide bush.



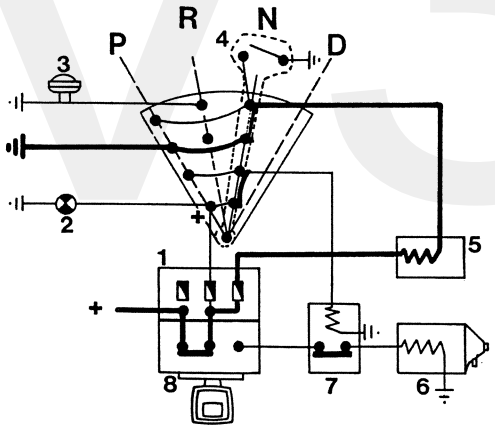
Selector lever, model year 1976

The selector lever is located on the transmission tunnel console and is connected to the gearshift mechanism in the primary unit by means of a remote control rod. The selector lever knob houses a tumbler switch and a detent button.
A selector gate with notches at various points locks the selector lever in the chosen position. The lever is released by depressing the detent button. Sliding contacts are fitted on the lower end of the selector lever.



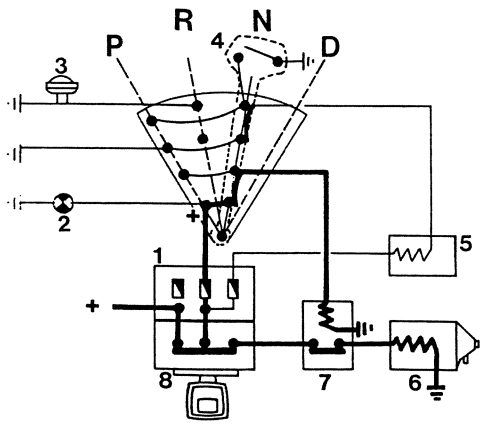
Selector lever, from model year 1978

With the 1978 model year the tumbler switch in the knob of the selector lever was replaced by a microswitch in the selector mechanism and an extra detent gear was added.



Start inhibitor

The engine can only be started with the selector lever in the N (neutral) or P (parked) position. It is only in these two positions that the starter circuit is closed via the ignition switch/steering lock.



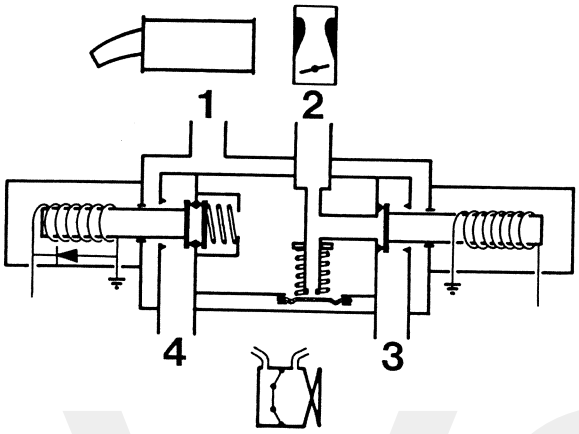
Clutch release gear

By operating the tumbler switch on the selector lever, which in turn operates the electromagnetic clutch release valve, vacuum is admitted into the clutch cylinder and the clutch engagement speed is raised by approximately 16.7 r/s (1,000 r/min). The energizing of the clutch cylinder is neutralized as soon as the selector lever knob is released with the lever in the D or R position.
In 1978 models the tumbler switch in the selector lever knob has been replaced by a microswitch in the gearshift mechanism.

Electromagnetic 4-way valve

Description

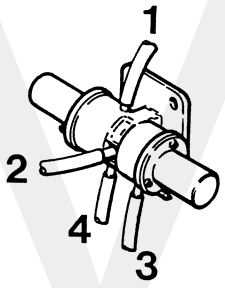
Certain components present in the operating mechanism regulate the supply of inlet manifold depression and atmospheric pressure at the appropriate time.

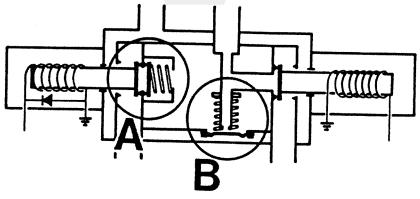


Electromagnetic 4-way valve

An electromagnetic 4-way valve regulates the atmospheric pressure and depression in the CVT. This valve consists of two parts, namely a left-hand part which assists the CVT when changing up, and a right-hand part for assistance when changing down.
Outlets 1 to 4 are connected up as follows:

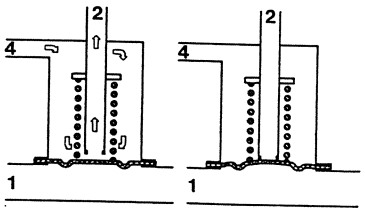
1. To the air filter; in other words an open connection to atmosphere.
2. To the inlet manifold; i.e. with the engine running it is open to the depression prevailing in the inlet manifold.
3. To the inner chambers of the sliding pulley halves.
4. To the outer chambers of the sliding pulley halves.

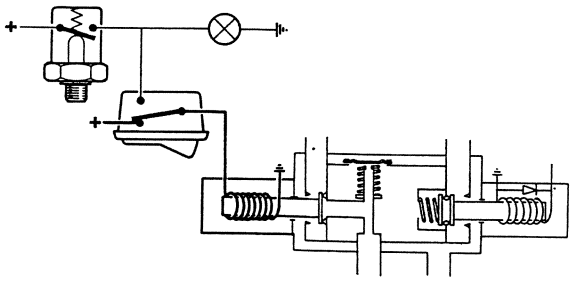




Reducing valve

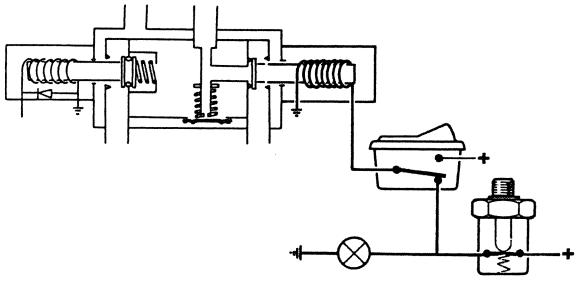
The depression in the inlet manifold is not constant but is dependent on the engine speed. However, the depression needed in the inner chamber must be constant in order to be sure of having constant assistance when changing up to new transmission ratios. This is why a reducing valve is included in the electromagnetic 4-way valve.





Brake light switch

This switch supplies the current for the downshift (right-hand) solenoid of the 4-way valve. When the brake pedal is operated, the mechanical brake light switch closes the circuit to the positive pole of the battery; this causes the brake lights to come on and, at the same time, the downshift solenoid is energized.
A hydraulic high-pressure switch is fitted on the brake master cylinder. The flow of current which this switch passes on to the electromagnetic 4-way valve - so that it is possible to brake on the engine - is now interrupted at a higher brake circuit pressure, namely 20 kg/cm^2.



Low gear hold switch

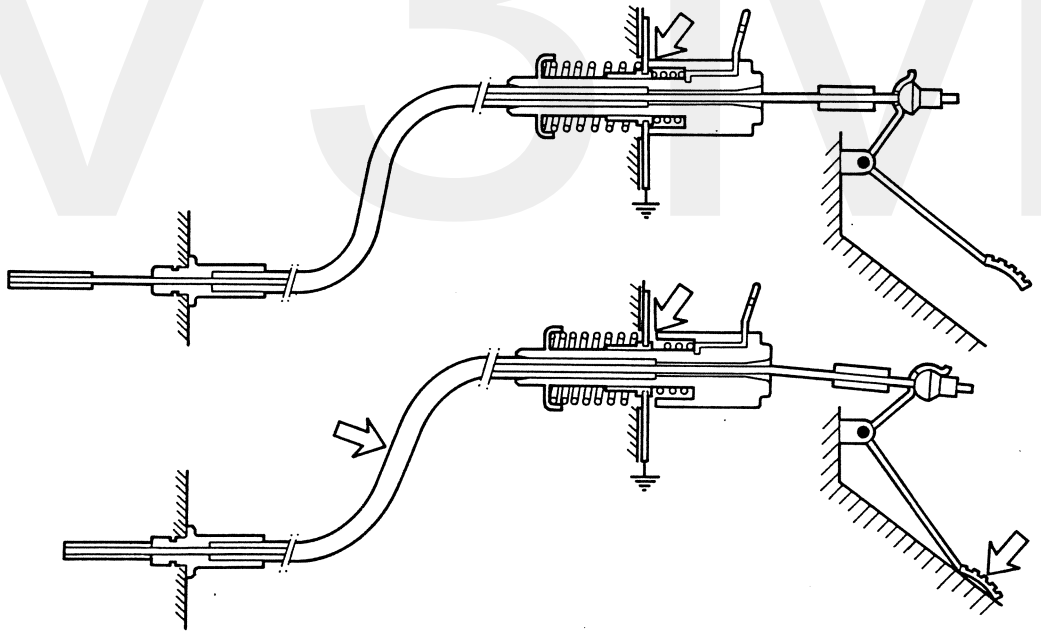
On the transmission tunnel console there is a manually operated switch for the 'low gear' hold. Actuating this switch energizes the downshift solenoid without involving the brake light switch. When the 'low gear' hold switch is operated, the CVT selects its highest transmission ratio, i.e. its lowest 'gear'.

Microswitch

A microswitch on the carburettor energizes the upshift solenoid. When the throttle valve is practically closed, a cam on the throttle valve spindle pushes a small pin on the microswitch downwards, thus opening the contact points. Further opening of the throttle valve turns the cam away from the pin and the built-in return spring closes the contact points again. The microswitch should close at an engine speed of 41.7 to 43.3 r/s (2500 and 2600 r/min). For this reason the microswitch has an adjusting facility.

Throttle cable

The earth interruption of the upshift solenoid (2) in the 4-way valve is brought about by the throttle cable (kick-down position). When the throttle valve is fully opened, further movement of the inner cable is not possible. It is, however, still possible to press the accelerator pedal down a little more; this stretches the outer jacket down and against the pressure of the spring, interrupting the earth connection at the point shown by the arrow, so that the CVT changes down ('kick-down' effect).



The CVT control parameters have been modified in 1978 models. The microswitch on the carburettor has been replaced by a vacuum control unit.
The (tachometric) switch B in this control unit cuts in or out at 30 r/s (1800 r/min).
The control unit also houses a relay which operates the overdrive or brake vacuum side of the electromagnetic 4-way valve.

CVT operating conditions

Operating condition 1: idling

When the engine is idling, no assistance is needed from inlet manifold depression. The 4-way valve is not energized because:
- the microswitch is switched off by the cam on the throttle valve spindle;
- the earth switch on the throttle cable is switched off;
- the brake pedal is not depressed so the brake light switch is off;
- the 'low gear' hold switch is not activated.

Both shut-off valves in the 4-way valve are in their rest position.
Both the inner and outer chambers of the primary pulley halves are open to the air filter via a bypass passage in the 4-way valve.

Operating condition 2: overdrive (accelerator pedal in mid-position)

In this position the CVT should change up. Assistance is needed from the centrifugal weights, and this is obtained by admitting depression from the inlet manifold into the outer chambers.
Depressing the accelerator pedal causes the cam on the throttle valve spindle to turn so that it disengages from the microswitch.

The contact points are then closed, resulting in the upshift solenoid of the 4-way valve being energized.
The relevant shut-off valve closes off the atmospheric air passage and opens the connection between the outer chambers and the inlet manifold, so that a (regulated) depression is created in the outer chambers.
Atmospheric pressure still prevails in the inner chambers.

Operating condition 3: kick-down (accelerator pedal fully depressed)

In the kick-down position the accelerator pedal is fully depressed.
The microswitch remains switched on, but the electrical circuit in the upshift side of the 4-way valve - and hence the energizing of the upshift solenoid - is now interrupted by the earth switch on the throttle cable, so that the relevant shut-off valve again returns to its rest position.
This shut-off valve closes off the manifold depression passage and again opens the outer chamber to atmosphere.
The assisting action is neutralized and the CVT changes down.

Operating condition 4: braking with the foot brake

When braking, the CVT should change down so that it is ready to accelerate again at any given moment in the correct transmission ratio.

When we release the accelerator pedal, the upshift part of the system is disengaged by the microswitch, which results in the outer chambers being opened to atmosphere. In addition to this, when the throttle valve closes the depression in the inlet manifold rises to its maximum level.
Our next action is to depress the brake pedal; the brake switch completes the circuit to the positive pole of the battery which energizes the downshift part of the system. The shut-off valve in the relevant solenoid closes off the atmospheric passage to the inner chambers and connects them directly to the inlet manifold in which, at that moment, maximum depression prevails.

This depression in the inner chambers ensures that the centrifugal weights and the drive belts - which have a certain amount of inertia - are quickly brought into their respective start positions. This causes an increase in engine speed, so that an extra braking effect is obtained on the engine.
This combination of factors causes the CVT to change down quickly.

Operating condition 5: braking on the engine ('low gear' hold switch)

When descending a hill (accelerator pedal released) we need to keep the CVT in a changed-down position in order to obtain adequate braking effect on the engine.
Manual operation of the 'low gear' hold switch energizes the downshift solenoid in the electromagnetic 4-way valve. The shut-off valve, with which it is connected, closes off the atmospheric passage leading to the inner chambers and connects them directly to the inlet manifold.
When descending the hill, the throttle valve is closed (atmospheric pressure in the outer chambers) and, consequently, maximum depression prevails in the inlet manifold. This depression is sufficiently high to keep the CVT in the changed-down position.

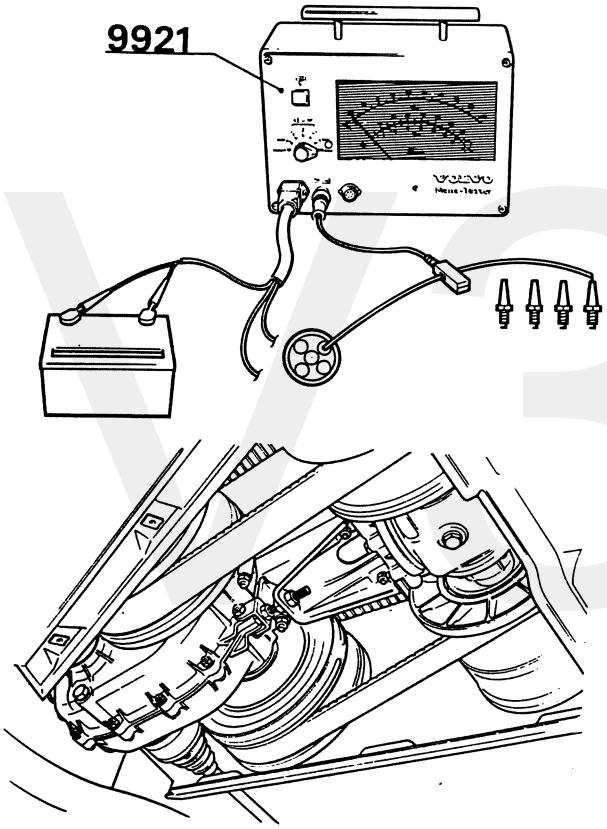
Group 41-43. Power transmission - CVT unit

A. Fault tracing and effecting repairs

Special tools: 2901, 9921, 5843, 5934

A1 - A3

Droning and/or vibration caused by imbalance in rotating parts



A1

Inspection in the workshop

Put the selector lever in **position N.**
Connect up rev-counter **9921.**
Gradually increase the engine speed to 75 r/s (4,500 r/min).
Check whether droning occurs.

Yes: see Operations *A4 - A5.*

No: continue from Operation *A2.*

A2

Inspection on the car lift

Remove the rev-counter and carry out a visual inspection of:
- the drive belts;
- the CVT mountings;
- the primary and secondary units of the CVT for wear and loose or missing balance weights.

A3

Test drive in low gear/normal gear ratio

Put the selector lever in **position D.**
Engage the **low gear hold.**
Drive away and accelerate gradually to 60 km/h.
Check whether vibrations occur.
Vibrations: see Operations *A6 - A7.*
No vibrations: disengage the low gear hold and wait a moment until the CVT has changed up.
Accelerate gradually to maximum speed.
Check whether vibrations occur.
Greatest vibration at **70-90 km/h:** renew the secondary CVT unit (see Operations *G1 - G8* and *G35 - G41*), or balance the unit.
Greatest vibration at **90-100 km/h** accompanied by radial vibrations in the steering wheel: check the front tyres for out-of-round and the wheels for warp (balance).
Greatest vibration at about **110 km/h** accompanied by vertical vibration of the steering wheel and the dashboard: check the rear tyres for out-of-round and the wheels for warp (balance).

A4 - A5

Droning

A4

Check for droning

Remove the propeller shaft; see Operation *C5.*
Put the selector lever in **position N.**
Start the engine.
Gradually increase the engine speed to 75 r/s (4,500 r/min).
Check whether droning occurs.

Droning: repair the clutch; see Operations *B* and *C.*
No droning: continue from Operation *A5.*

A5

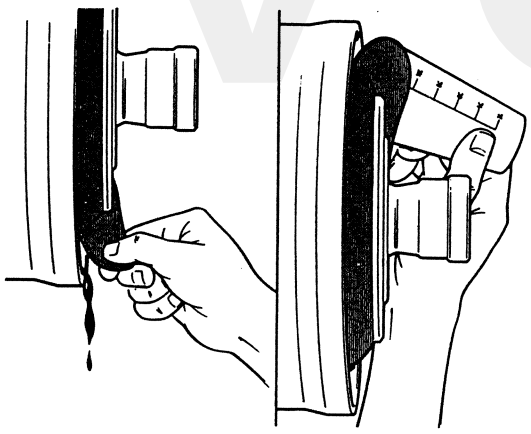
Check the propeller shaft

Switch off the engine.
Clean the propeller shaft and check it for loose or missing balance weights and for straightness.
Inspect the rubber couplings.
Fit the propeller shaft; see Operation *E33.*
Gradually increase the engine speed to 75 r/s (4,500 r/min).
Caution! The selector lever must be in **position N.**
Check whether droning occurs.

Droning: renew the propeller shaft.
No droning: end of fault *A4 - A5.*

A6 - A7

Vibrations



A6

Change the oil in the primary unit pulley halves

This applies only to vibrations occurring with a **cold** CVT up to chassis no. **322553.**
Change the oil in the pulley halves of the primary CVT unit; see Operations *H22 - H23* and *H26.*
Note: thoroughly clean the inside of the sliding pulley halves.

A7

Balance/renew the primary CVT unit

Have the primary CVT unit balanced or fit a new unit.
See the Repairs & Maintenance Service Manual 'Balancing the CVT' or Operations *F1 - F13* and *F68 - F80.*

A8

Check the vacuum control system during a test drive

Accelerate smoothly from rest.
Check the clutch engaging speed.

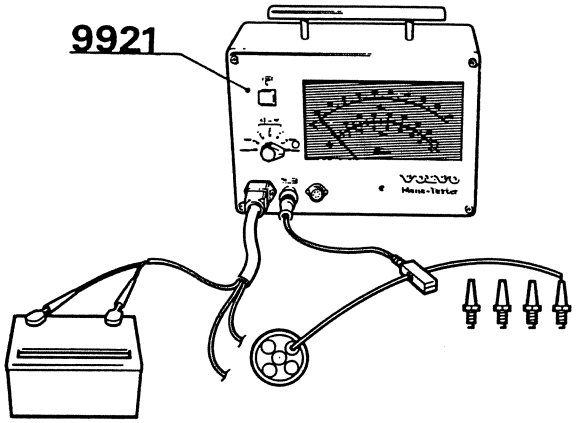
High engaging speed: see Operations *A9 - A10.*

Normal engaging speed: check the upshift and downshift action of the CVT.
Drive at varying speeds.

The CVT does not change up or down correctly: see Operations *A11 - A23.*

A9 - A10

Excessively high clutch engaging speed



A9

Preliminary operations

Put the selector lever in position **D.**
Apply the handbrake and press the brake pedal down firmly.
Start the engine.

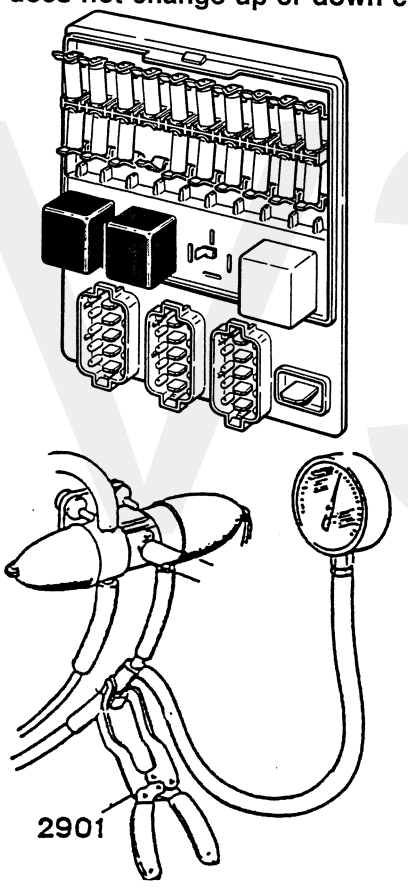
A10

Check the clutch

Depress the accelerator pedal.
Clutch engages late or slips at high engine speed.
Note: never apply full throttle for long periods because of the possibility of causing wear to the clutch.

A11 - A22

CVT does not change up or down correctly



A11

Check the fuses

Renew any defective fuses.

A12

Checking when the vacuum reading is too low with the hose clamp removed and low gear hold engaged

Connect the vacuum gauge between the vacuum valve and the low gear side of the CVT (large diameter hose).
Pinch off the hose between the gauge and the CVT with special tool **2901.**
Start the engine.

Vacuum gauge pointer deflects: leakage between the inner and outer chambers of the CVT unit.
Using vacuum pump **5843,** check which side of the CVT is leaking and remedy the leak.

Vacuum gauge pointer does not deflect: external leakage.
Check the pipes, hoses and connections; see Operation *A30.*

A13

Engage the low gear hold

Operate the low gear hold switch.
Bring the engine up to normal operating temperature.
Check the reading on the vacuum gauge.

Vacuum lower than 0.6 kPa: see Operation *A24.*

No vacuum: see Operation *A27.*

Vacuum at least 0.6 kPa: continue from Operation *A14.*

A14

Disengage the low gear hold

Disengage the low gear hold.
Vacuum gauge reading does **not** drop: continue from Operation *A15*.
Vacuum gauge reading drops: depress the brake pedal and check the value registered by the vacuum gauge.

Vacuum gauge pointer does not deflect: see Operation *A30*.

Vacuum gauge pointer deflects: continue from Operation *A15*.

A15

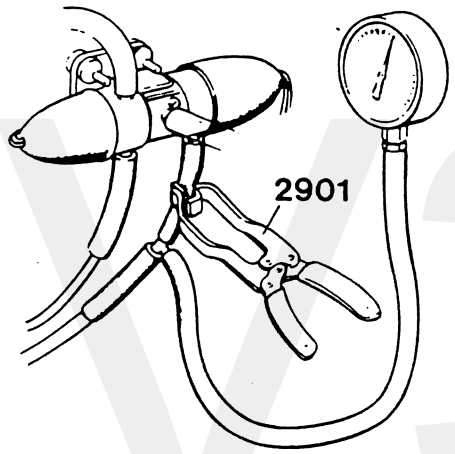
Re-engage the low gear hold

Engage the low gear hold and remove the clamp from the large diameter hose.

No vacuum or vacuum lower than 0.6 kPa: see Operation *A31*.

Vacuum at least 0.6 kPa: continue from Operation *A16*.

A16



Pinch off the hose between the gauge and the vacuum valve

Pinch off the hose.
Disengage the low gear hold.

Vacuum reading remains steady for at least 10 seconds: continue from Operation *A17*.

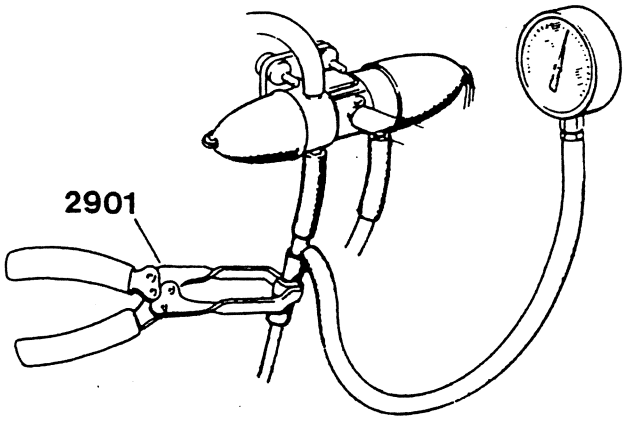
Vacuum reading drops within 10 seconds: see Operations *A31 - A33*.

A17

Connect up a rev-counter

Connect up rev-counter **9921** as shown in the illustration.

A18



Reposition the vacuum gauge

Reposition the vacuum gauge between the vacuum valve and the overdrive vacuum side (small diameter hose).
Pinch off the hose between the gauge and the CVT.
Start the engine and increase the engine speed to more than 1,850 r/min.

Vacuum reading lower than 0.40 kPa or higher than 0.52 kPa: renew the vacuum valve.
Vacuum gauge pointer does not deflect: see Operation *A21*.
Vacuum reading 0.40-0.52 kPa: continue from Operation *A19*.

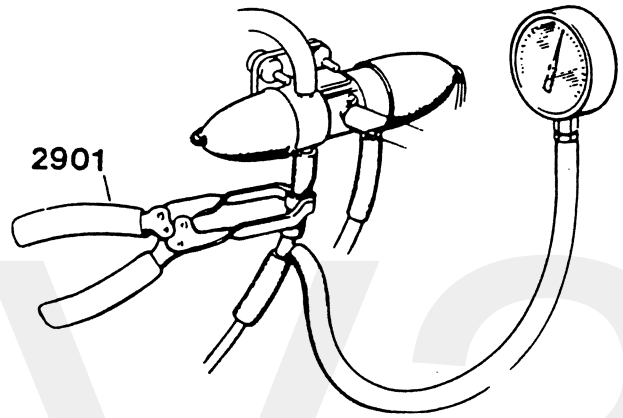
A19

Remove the hose clamp

Remove the clamp from the small diameter hose.
Increase the engine speed to 1,850 r/min and check whether the maximum value is obtained (0.40-0.52 kPa).

Vacuum reading too low or no vacuum reading: see Operation *A31.*

Vacuum reading 0.40-0.52 kPa: continue from Operation *A20.*



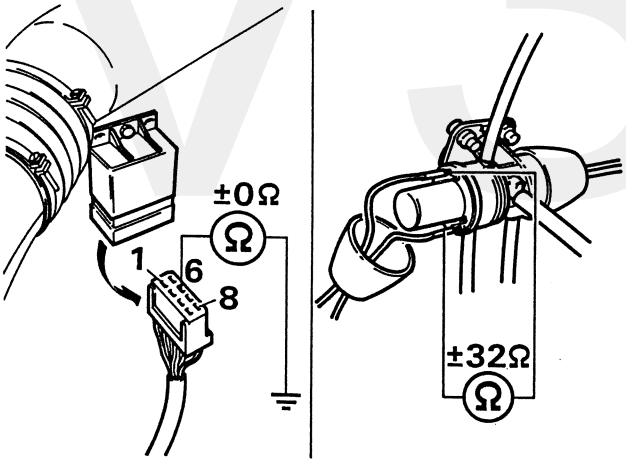
A20

Fit the hose clamp

Pinch off the hose between the vacuum valve and the vacuum gauge and release the accelerator pedal.

Vacuum reading drops: see Operation *A31.*

Vacuum reading remains steady for more than 10 sec: continue from Operation *A21.*



A21

Check the microswitch (tachometric relay)

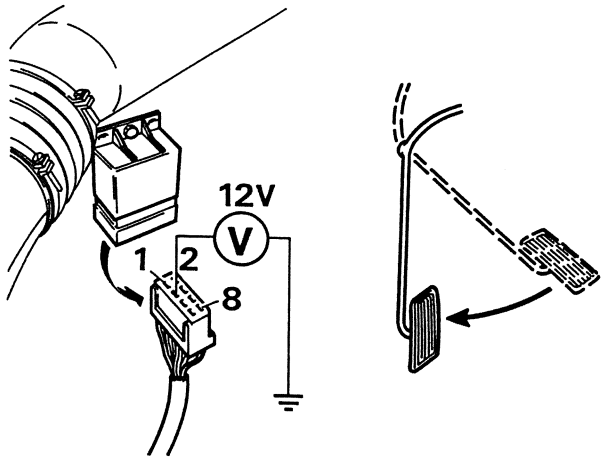
Switch on the ignition.
Check the voltage at terminals 5, 1 and 3 of the microswitch.

No voltage at terminal 5: check the fuses.

No voltage at terminal 1: check the resistance of the wiring and switches from terminal 6 to earth. The resistance should be approx. 0 ohms.

No voltage at terminal 3: check the resistance in the coil of the vacuum valve.
The resistance should be approx. 32 ohms.

The voltage at the three terminals is correct: continue from Operation *A22.*



A22

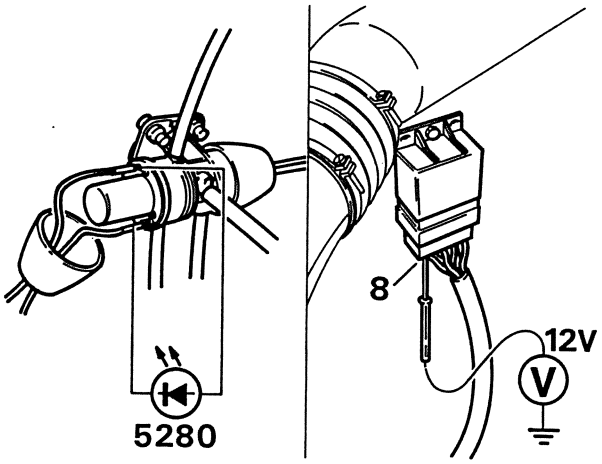
Check terminal 2 of the microswitch (tachometric relay)

Depress the accelerator pedal fully and test for voltage at the terminal.

No voltage: check the setting of the throttle cable and, if necessary, renew the cable.

Voltage present: continue from Operation *A27.*

A23



Check the cut-in speed of the microswitch (tachometric relay)

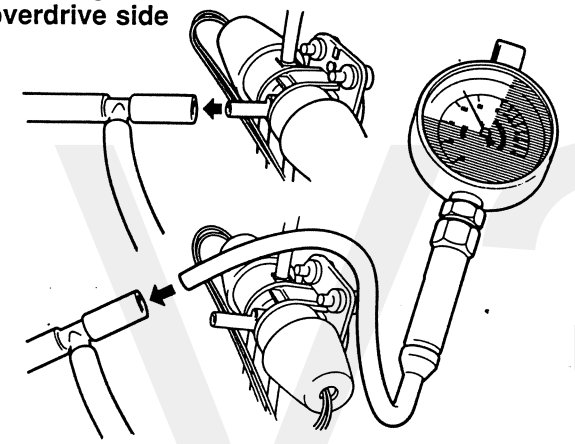
Connect a LED in circuit with the wiring of the vacuum valve coil at the overdrive side.
Start the engine and increase the engine speed to more than 1,850 r/min.

LED lights up: microswitch in order; continue from Operation *A34*.
LED does not light up: check for voltage at terminal 8 of the microswitch.

Voltage present: check with a **new** microswitch (tachometric relay).
No voltage: check the wiring to the ignition system.

A24 - A26

Checking when there is a too low vacuum reading: with the low gear hold engaged/and on the overdrive side



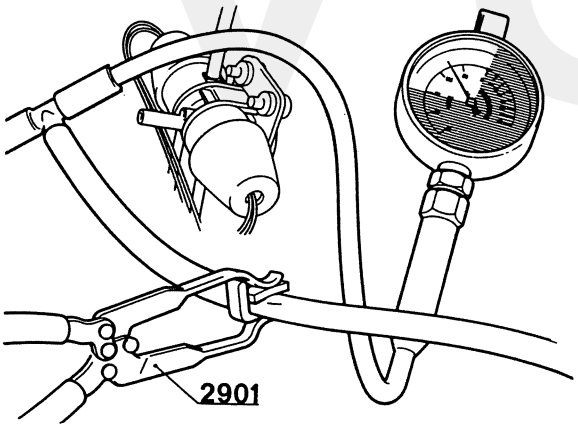
A24

Check the vacuum gauge connection

Check that the vacuum gauge is connected to the correct side of the vacuum valve.
Connect the gauge directly to engine vacuum.

Engine vacuum 0.6 kPa or higher: renew the vacuum valve.

Engine vacuum lower than 0.6 kPa: continue from Operation *A25*.



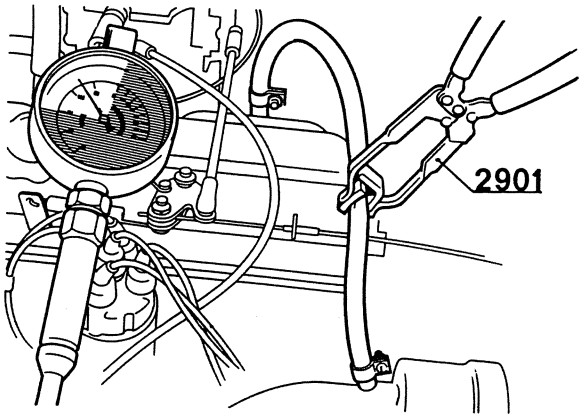
A25

Pinch off the hose to the clutch release valve

Pinch off the hose to the clutch release valve with hose clamp **2901**.

Engine vacuum 0.6 kPa or higher: renew the clutch release valve.

Engine vacuum lower than 0.6 kPa: continue from Operation *A26*.



A26

Pinch off the hose to the brake servo unit

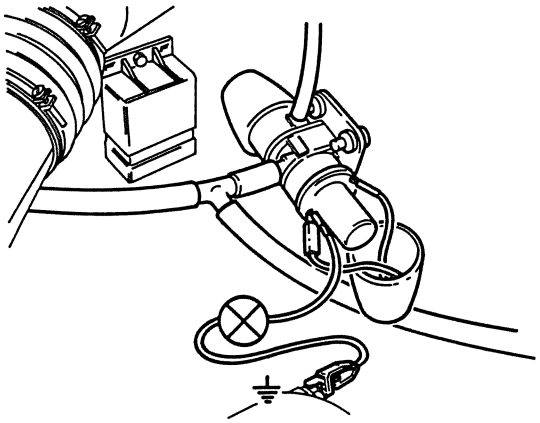
Pinch off the hose to the brake servo unit with hose clamp **2901**.

Engine vacuum 0.6 kPa or higher: repair or renew the brake servo unit.

Engine vacuum lower than 0.6 kPa: adjust the engine (idling speed).

A27 - A30

Checking when there is no vacuum reading with the low gear hold engaged



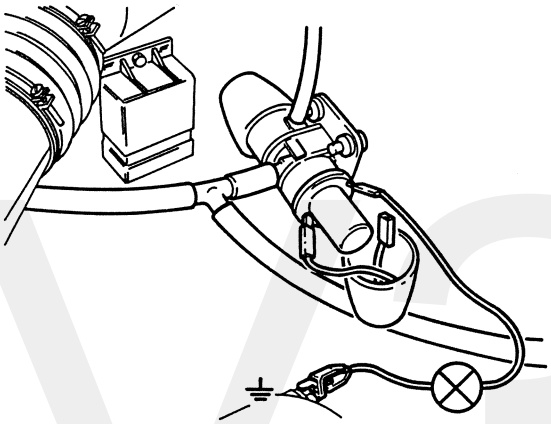
A27

Check the supply voltage

Check with a pilot lamp for supply voltage at the low gear side.

Pilot lamp does not light up: check the fuses, the wiring and the low gear hold switch.

Pilot lamp lights up: continue from Operation *A28*.



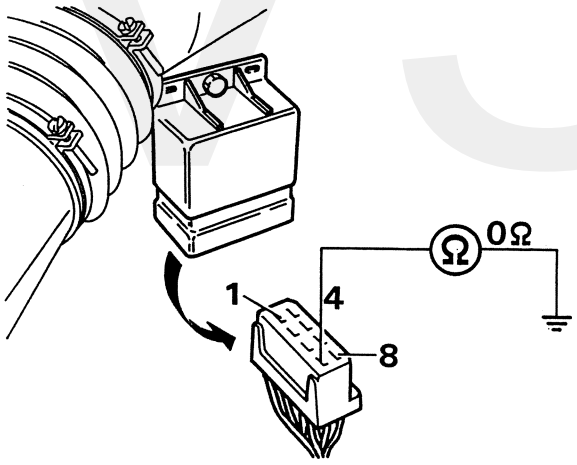
A28

Check the vacuum valve

Release the earth connection and check with a pilot lamp for voltage via the vacuum valve coil.

Pilot lamp does not light up: renew the vacuum valve.

Pilot lamp lights up: continue from Operation *A29*.



A29

Check the earth lead between the vacuum valve and the earth connection

Poor contact to earth: renew the wiring or repair the connection.

Earth connection in order: renew the electromagnetic vacuum valve.

A30

Checking when there is no vacuum reading with the brake pedal depressed

Brake lights do not come on: check the brake light switch and/or the cable between the fuse and the brake light switch.

Brake lights come on: check the brake light switch and/or the cable between the low gear hold switch and the brake light switch.

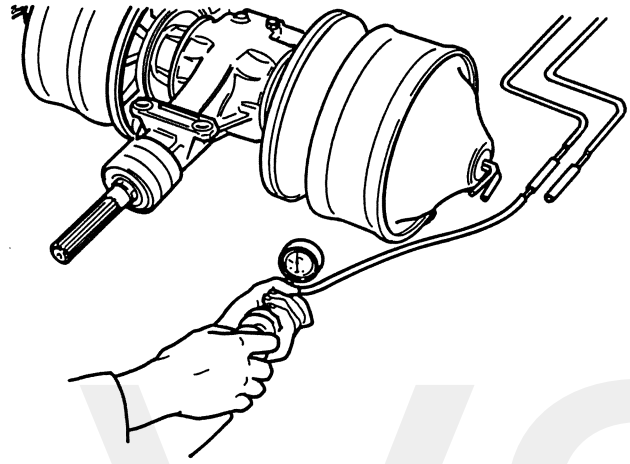
Checking with a falling vacuum gauge reading and the hose pinched off

A31

Check the pipes and hose connections.

Leaking pipes and/or hose connections: remedy the leak(s).

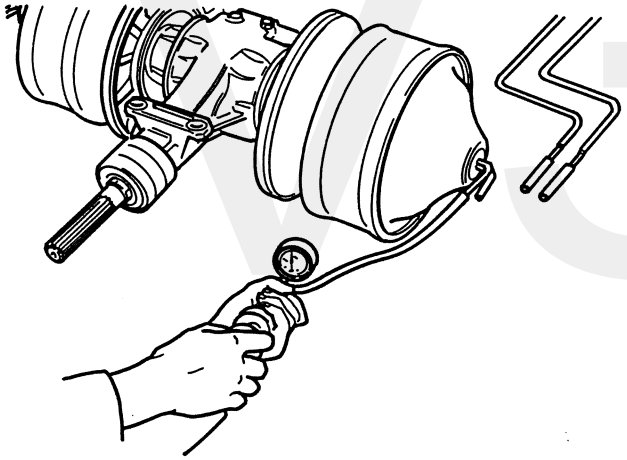
No leakage: continue from Operation *A32*.



A32

Check the CVT for leakage

Release the hoses from the vacuum connecting pipe assembly of the CVT unit.
Check the CVT for leakage with the aid of vacuum pump **5843.**
Repeat the above check on the other side.

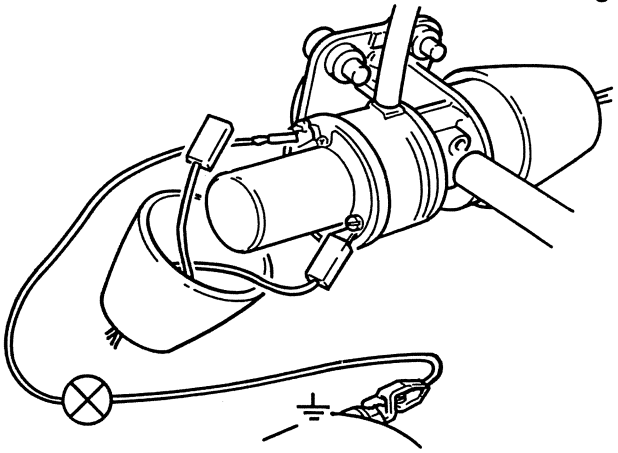


A33

Check the pipes and hose connections for leakage

Remedy the leak(s) and check the CVT with the aid of vacuum pump **5843.**

Checking when there is no vacuum with voltage present at the vacuum valve



A34

Check the coil of the vacuum valve

Pull the cable off the vacuum valve.
Check the coil with the aid of a pilot lamp.

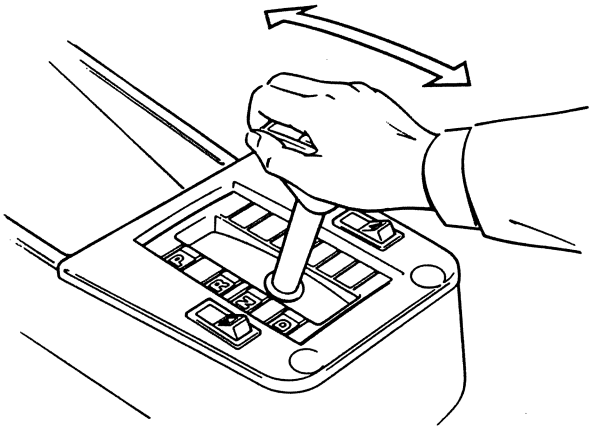
No voltage passing through the coil: renew the vacuum valve.

Coil functioning properly: continue from Operation *A24*.

A35 - A36

Faults in the gear selector controls

A35



Check the operation of the selector lever

Carry out the following check with the engine **cold** and the vehicle **at rest.**
Put the selector lever in position **N.**
Pull out the choke to its full extent.
Start the engine.
Engage positions **P-R-N-D** with the selector lever.

If gear selection is accompanied by a crunching noise: see Operations *A37 - A38.*
If gear selection is difficult: see Operations *A39 - A42.*

A36

Test-drive the vehicle

Put the selector lever in position **D.**
Push in the choke and drive away smoothly.

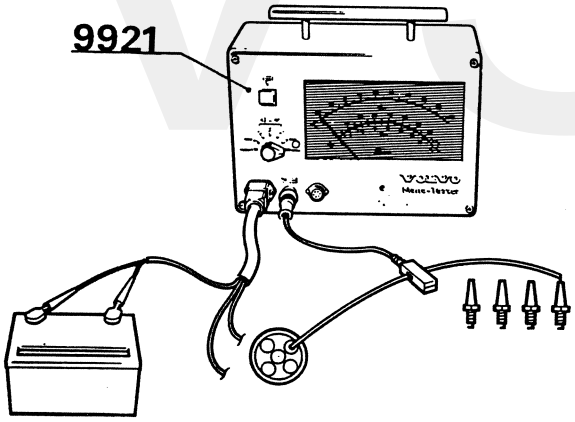
If the clutch only engages at about 2,200 r/min: repair the electrical part of the selector lever; see Operations *D* and *E.*

If the selector lever jumps out of the selected position: see Operations *A39 - A42.*

A37 - A38

Crunching noise when selecting gear

A37



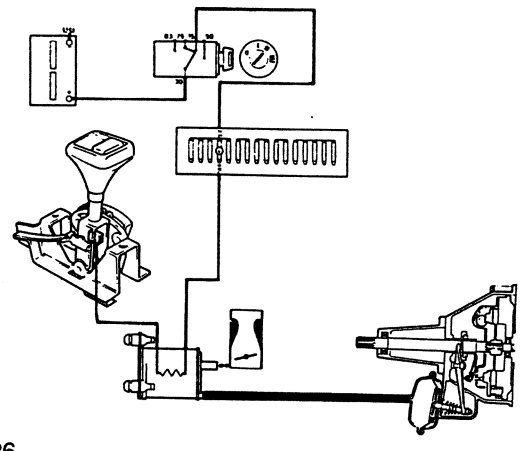
Check the choke setting

Connect up rev-counter **9921.**
The engine speed with the choke pulled out should be 30-33.3 r/s (1,800-2,000 r/min).

Setting incorrect: adjust the choke.

Setting correct: continue from Operation *A38.*

A38

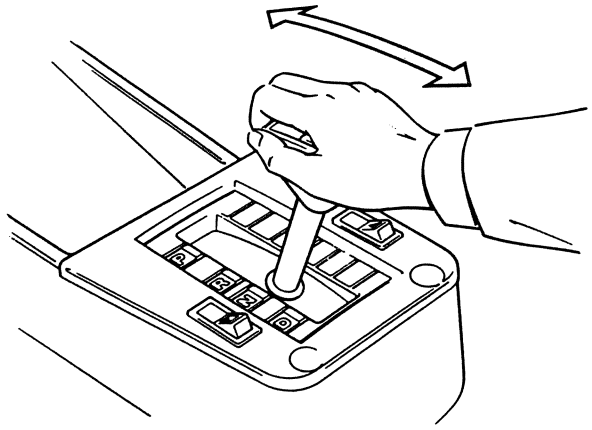


Check the clutch release gear

If necessary, repair the clutch release gear; see Operations *B* and *C.*

A39 - A42

Difficulties with gear selection



A39

Release the remote control rod from the selector lever

See Operation *E3*.

A40

Check the selector lever mechanism in the car

Check the selector lever mechanism in the car.

If the selector lever mechanism does not work correctly: see Operation *E*.

If the selector lever mechanism works correctly: continue from Operation *A41*.

A41

Adjust and fit the remote control rod

Adjust the remote control rod and fit it to the selector lever; see Operations *E31 - E32*.

A42

Check the selector lever mechanism in the car

If there are difficulties with gear selection: renew the primary CVT unit; see Operations *F1 - F13* and *F68 - F80*.

A43 - A45

Unusual noises (whining or shrill whistling noise) in the driveline units

A43

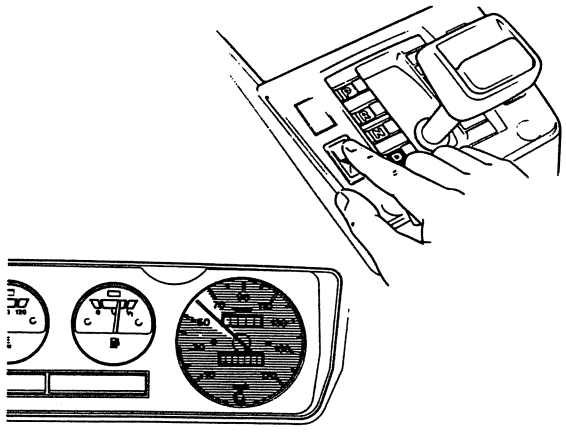
Test-drive the vehicle

Accelerate briskly from rest.

Whining or shrill whistling noise from driveline (at the front): repair the clutch; see Operations *B* and *C*.

Whining or shrill whistling noise from driveline (at the rear): see Operations *A46 - A50*.

No whining or shrill whistling noise from driveline when accelerating briskly: continue from Operation *A44*.



A44

Engage the low gear hold

Engage the low gear hold and increase speed to 60 km/h.

Whining or shrill whistling noise, increasing with engine speed: see Operations *A51 - A52*.
Whining or shrill whistling noise, not increasing with engine speed: continue from Operation *A45*.

A45

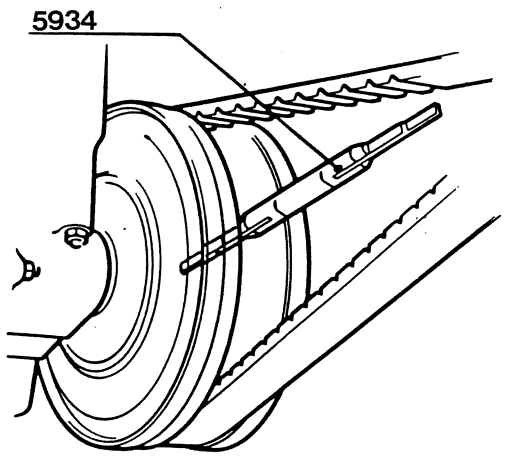
Disengage the low gear hold

Disengage the low gear hold and increase speed.

Whining or shrill whistling noise, increasing with engine speed: see Operation *A52*.

A46 - A50

Whining and shrill whistling noise (at the rear)



A46

Check the pulleys

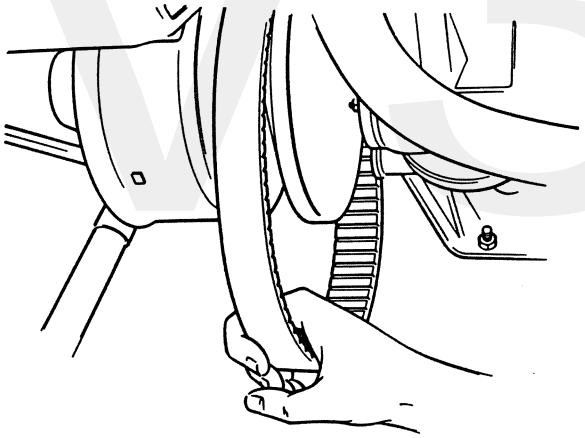
Check the pulley gap (special tool **5934**) and check the hose connections on the primary CVT unit.
If necessary, readjust the pulley gap and fit the hoses correctly; see Operations *F75 - F76*.
Correct pulley gap and connections: continue from Operation *A47*.

A47

Inspect the drive belts

If the belts are greasy: renew the belts (see Operations *H10 - H11*) and remedy any leakage.

Belts not greasy: continue from Operation *A48*.



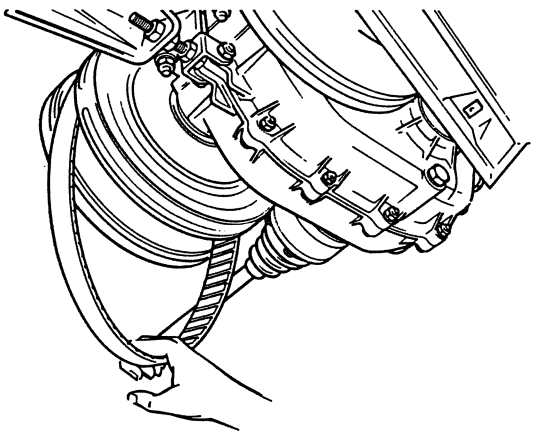
A48

Check the primary CVT pulleys

Remove the drive belts.
Pull the drive belts into the primary CVT pulleys and check whether roughly the same spring resistance is encountered.

If there is a marked difference in resistance: renew the primary CVT unit; see Operations *F1 - F13* and *F68 - F80*.

Equal resistance: continue from Operation *A49*.



A49

Check the secondary CVT pulleys

Check whether roughly the same spring resistance is encountered in each of the secondary CVT pulleys.

If there is a marked difference in resistance: renew the secondary CVT unit; see Operations *G1 - G8* and *G35 - G41*.

Equal resistance: continue from Operation *A50*.

A50

Check the vacuum control system

Check the vacuum control system; see Operations *A8 - A33*.
Fit the drive belts.

A51 - A52

Whining or shrill whistling noise, increasing with engine speed

A51

Check the oil level in the primary CVT unit

Oil level incorrect: top-up with oil.

Oil level correct: renew the primary CVT unit; see Operations *F1 - F13* and *F68 - F80*.

A52

Check the oil level in the secondary CVT unit

Oil level incorrect: top-up with oil.

Oil level correct: renew the secondary CVT unit; see Operations *G1 - G8* and *G35 - G41*.

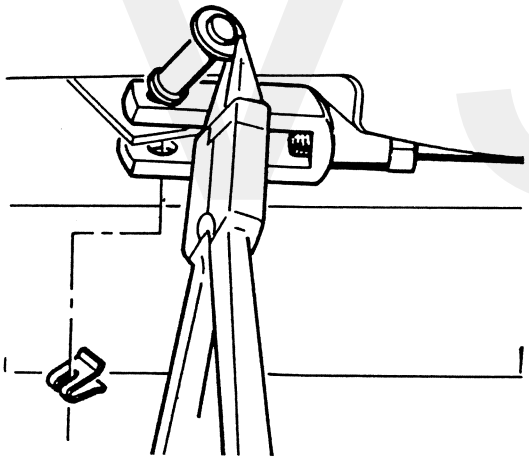
A53 - A60

Gear selection difficult in D and R positions

A53

Identify the fault

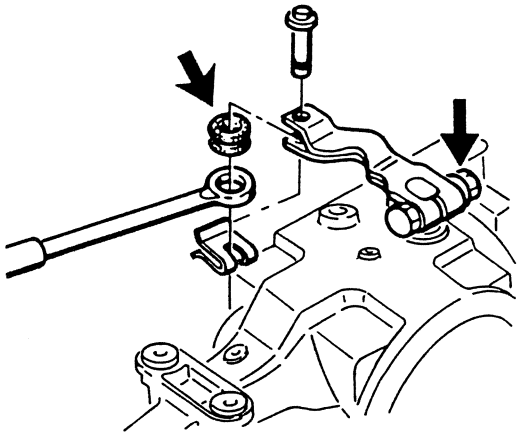
See Operations *A54 - A56* if the following symptoms are observed:
- selector lever difficult to move into positions **D** and **R**;
- primary CVT unit makes a rattling noise;
- primary CVT unit jumps out of position **D** or **R**.



A54

Release the remote control rod from the selector lever

Remove the retaining clip from the clevis pin.
Pull the clevis pin out of the fork.
Remove the remote control rod by pulling it down.

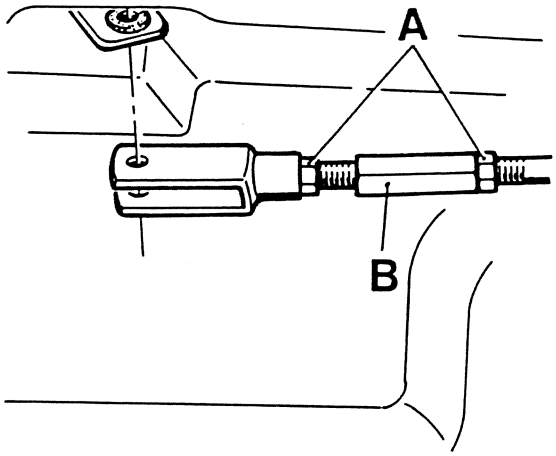


A55

Inspect the parts

Check that the selector lever is attached to the primary CVT unit without play.
If necessary, tighten the nut.
Inspect the grommet in the eye of the remote control rod for damage and renew if necessary.

A56



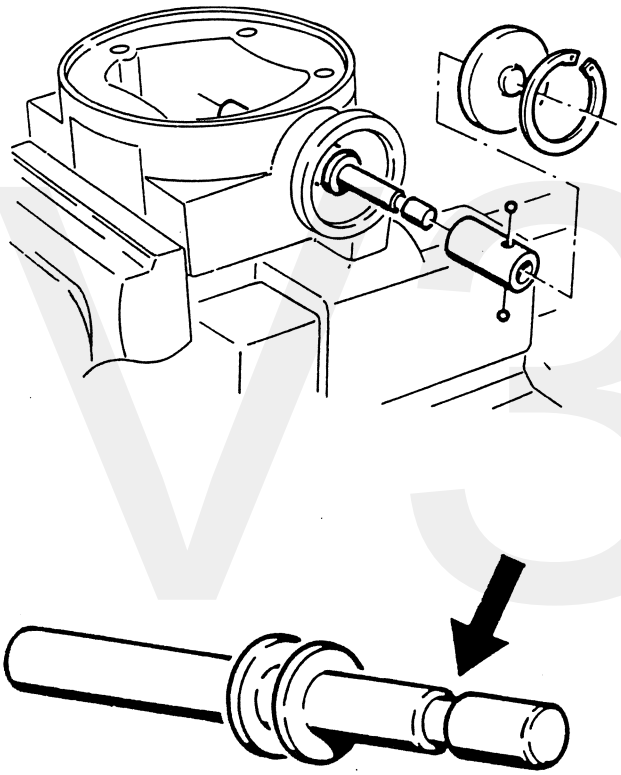
Adjust the remote control rod

Back off the lock nuts (A).
Push the selector lever and the remote control rod to the rear against their stop.
The selector lever and the primary CVT unit must remain in the **N** position.
Adjust the length of the remote control rod with the adjustment bolt (B).
The remote control rod is correctly adjusted when the clevis pin can be inserted easily through the fork and the selector lever.
Fit the clevis pin and the retaining clip.
Tighten the lock nut on the remote control rod.
Check whether the problem is still present. If so: continue with Operations *A57 - A60.*

A57

Inspect the locking sleeve shaft in the primary unit rear cover

Note: this check only applies to vehicles up to chassis no. **497657.** For vehicles with chassis numbers higher than **497657,** see Operation *A60.*



A58

Remove the locking sleeve shaft

Remove the rear cover; see Operation *F57.*
Remove the retaining clip and the cover plate.
Remove the locking sleeve shaft together with the locking sleeve and the **two** balls.

A59

Inspect the locking sleeve shaft

Check the ball groove for damage.
Damaged: renew the complete rear cover assembly (Part No. 3290723-0).

Undamaged: fit the locking sleeve and locking sleeve shaft back in the cover.

Secure the rear cover; see Operation *F61.*

Check whether the problem is still present. If so: continue from Operation *A60.*

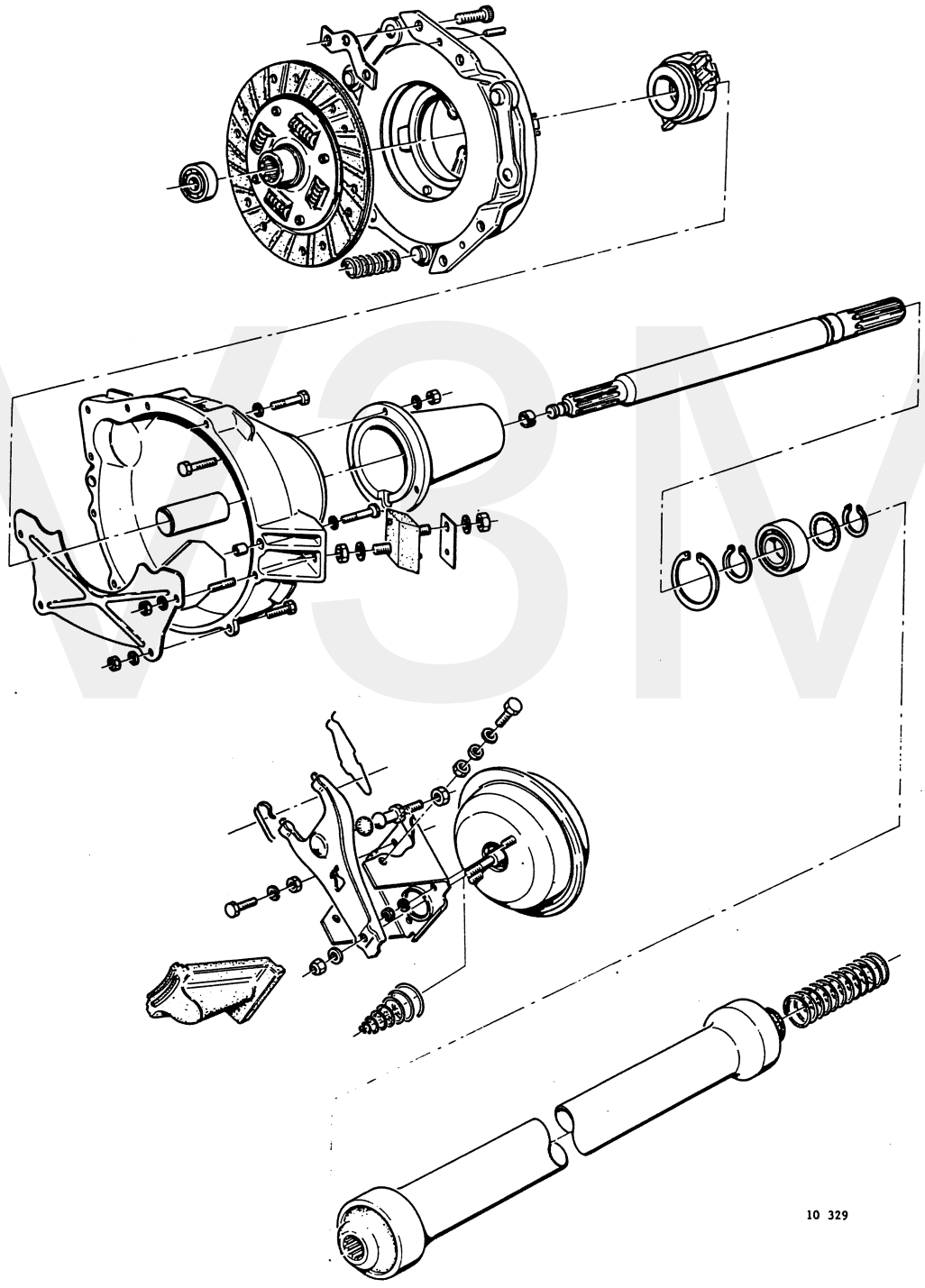
A60

Renew the primary CVT unit

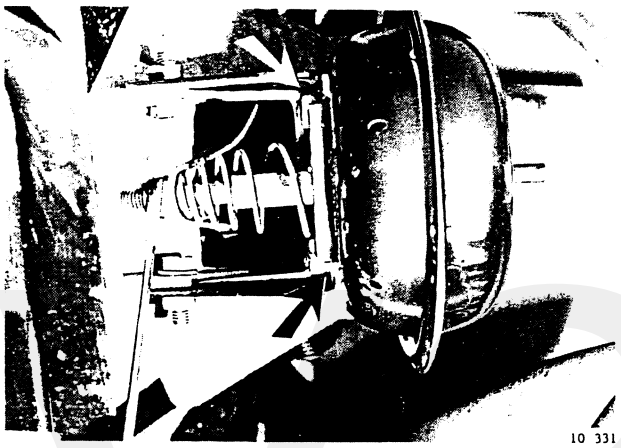
If the above-mentioned measures fail to solve the problem, then it is being caused by the sliding dog in the primary CVT unit.
In that case the primary CVT should be renewed as a complete unit.

Group 41. Clutch - CVT unit

Centrifugal clutch



B. Renewing the vacuum cylinder



10 331

B1

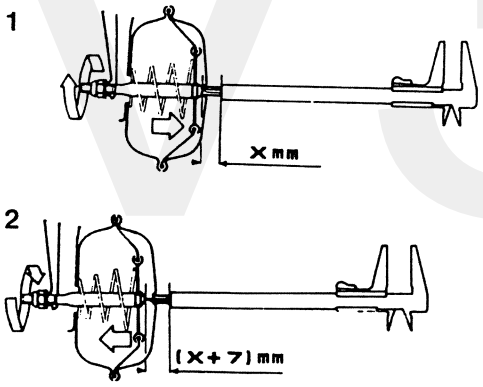
Remove the vacuum cylinder

Raise the car to working height.
Disconnect the vacuum hose.
Remove the plastic cover.
Remove the adjusting nut, washer and compression spring.
Remove the two nuts and washers.
Remove the vacuum cylinder

B2

Fit the vacuum cylinder

Fitting is in reverse order to removal.

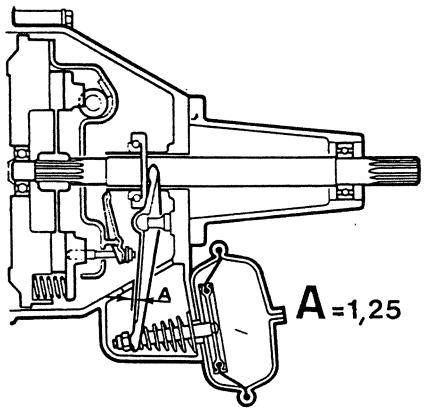


10 332

B3

Adjust the clutch

Up to chassis no. 314541 for non-modified clutch housings
Position the diaphragm against the inside wall of the vacuum cylinder (1) by means of the adjusting nut.
Measure the position of the diaphragm.
Move the diaphragm **7 mm deeper** into the cylinder by means of the adjusting nut (2).
Fit the plastic cover.

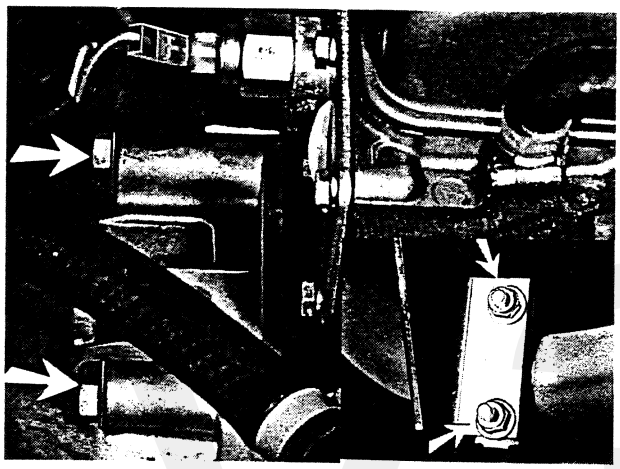


10 333

From chassis number 314541
Adjust distance (A) between the release fork and the clutch housing to **1.25 mm** by means of the adjusting nut.
Fit the plastic cover.

C. Reconditioning the centrifugal clutch

Special tools: 1801, 2412, 2413, 4090, 5944, 5948, 5949



C1 - C3

Operations in the engine compartment

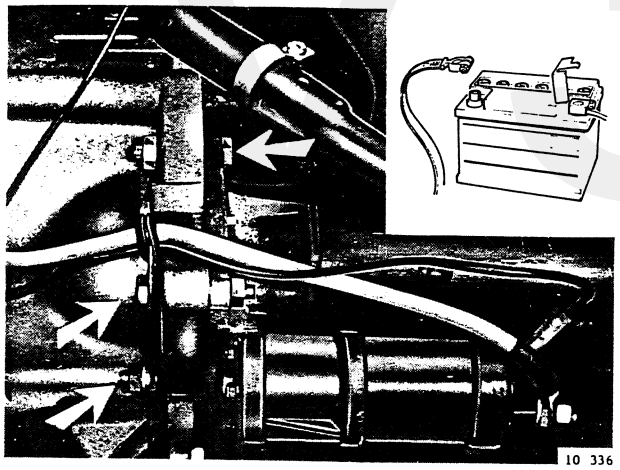
C1

Remove the upper two bolts from the clutch housing

Remove the drain hose from the air intake unit.

C2

Up to model year 1981: release the exhaust mounting strap.

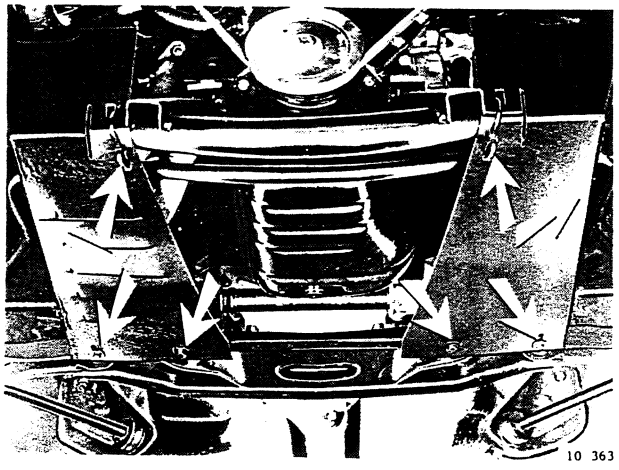


10 336

C3

Remove the starter motor attachment bolts

Disconnect the negative cable from the battery.
Remove the exhaust mounting bracket.



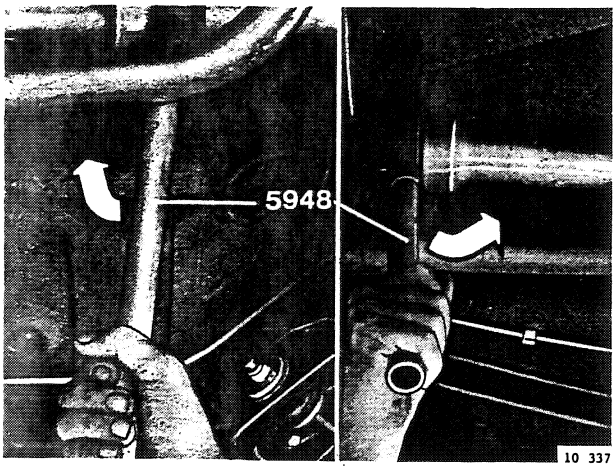
10 363

C4 - C23

Operations under the car

C4

Remove both engine splash guards



C5

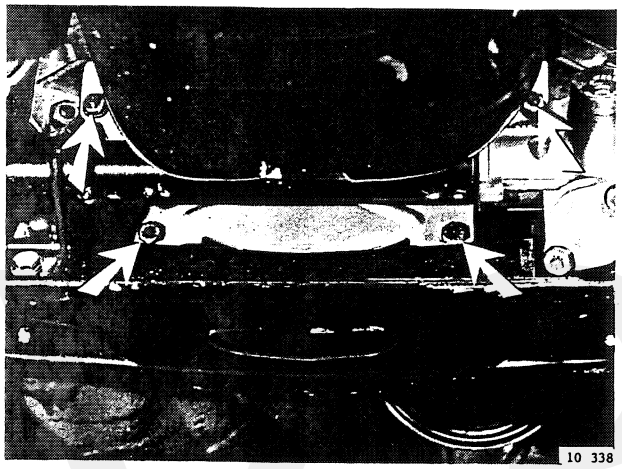
Remove the propeller shaft

Remove the heat shield (if fitted).
First press the propeller shaft off the clutch shaft with special lever **5948** and then off the pinion shaft.
Note: apply activator to the clutch shaft and pinion shaft front section in order to remove the High Tack.

C6

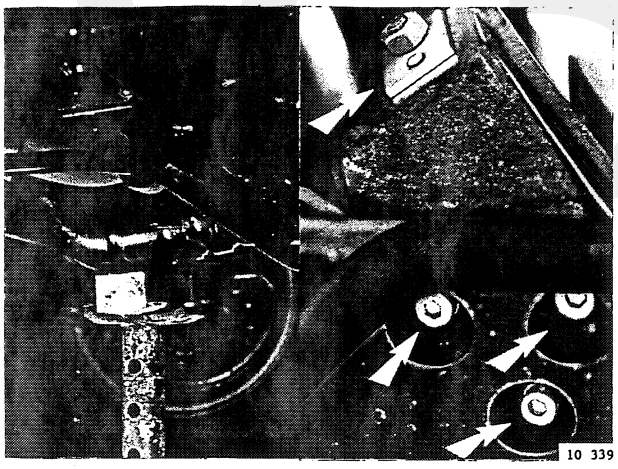
Disconnect the vacuum hose from the vacuum cylinder

See Operation *B1*.



C7

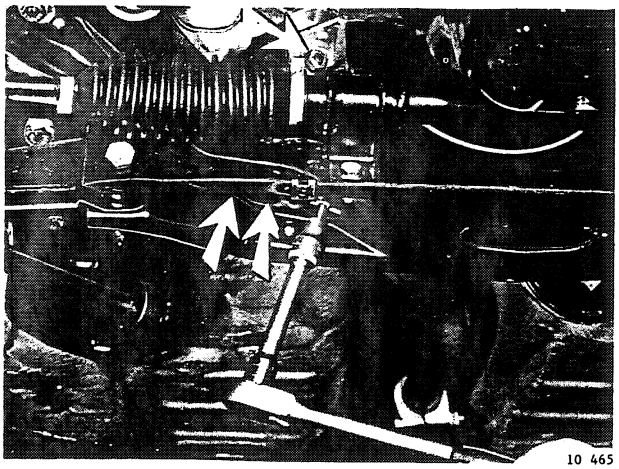
Remove the flywheel guard



C8

Remove the left-hand engine mounting bracket

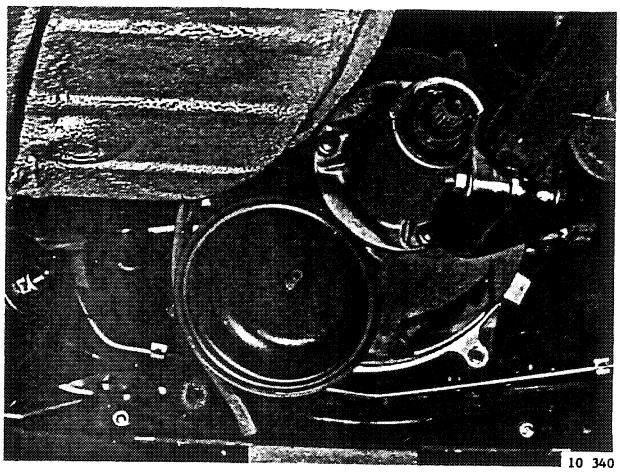
Support the engine with a stand and a block of wood.
Remove the nut, spring washer and retainer plate at the rear end of the engine mounting bracket.
Remove the three hexagon socket-head screws and spring washers.
Remove the engine mounting bracket.



C9

Remove the right-hand engine mounting bracket

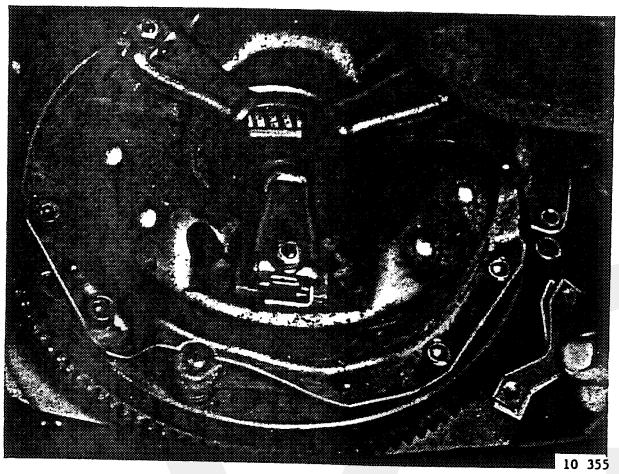
Remove the nut, washer and retainer plate at the front end of the engine mounting bracket.
Remove the three hexagon socket-head screws and spring washers.
Remove the engine mounting bracket **together with** the mounting block.


10 340

C10

Remove the clutch housing

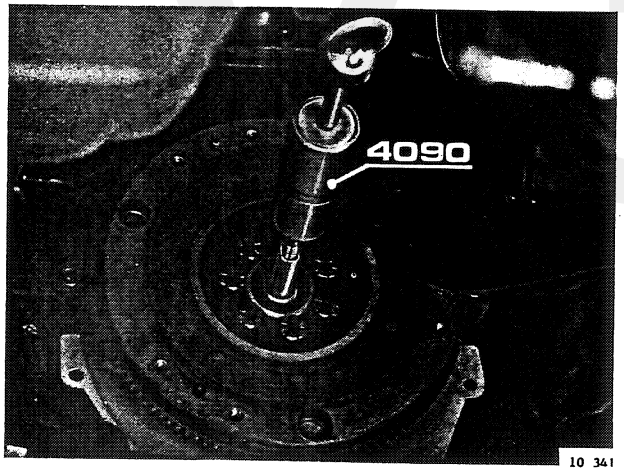
Remove the remaining bolts.
Pull the clutch housing to the rear and remove it from the car.


10 355

C11

Remove the clutch cover assembly and clutch plate

Remove the six hexagon socket-head screws and the set of shims.
Remove the three compression springs from the flywheel.

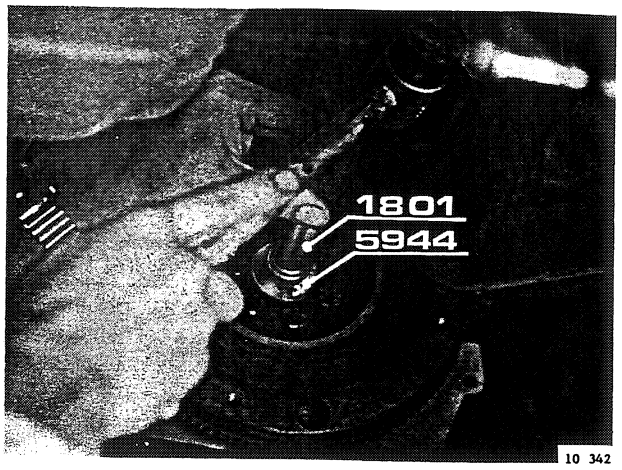


10 341

C12

Remove the pilot bearing

Remove the pilot bearing with extractor **4090**.
Note: align the bolt heads with a flat facing towards the bearing (if necessary).
(Always turn clockwise!)

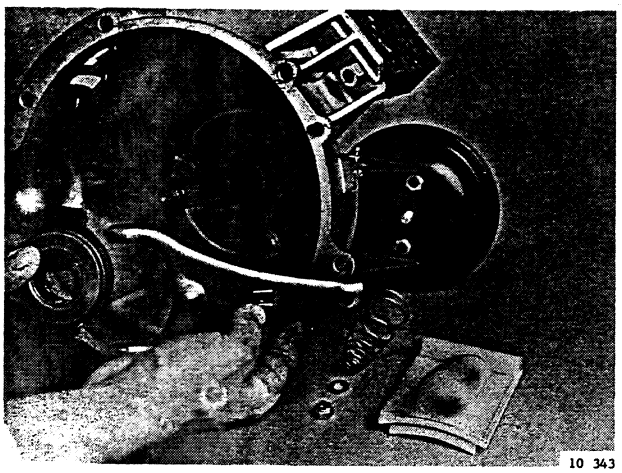


10 342

C13

Fit a new pilot bearing

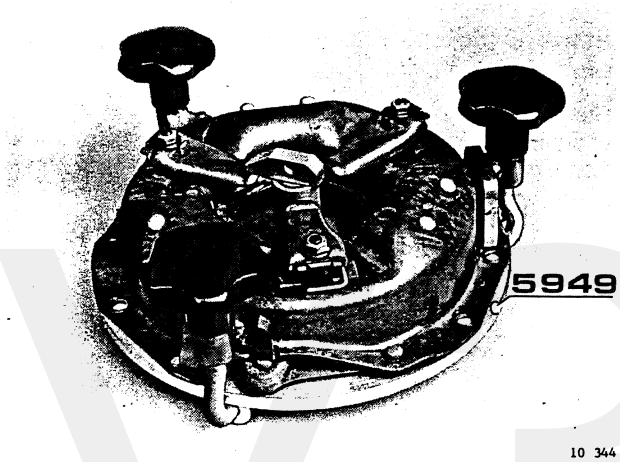
Use drift **5944** and handle **1801**.


10 343

C14

Remove the release fork together with the release bearing from the clutch housing

Remove the plastic cover.
Remove the adjusting nut and washer from the tie-bolt.
Remove the compression spring.
Take out the release fork and the release bearing.

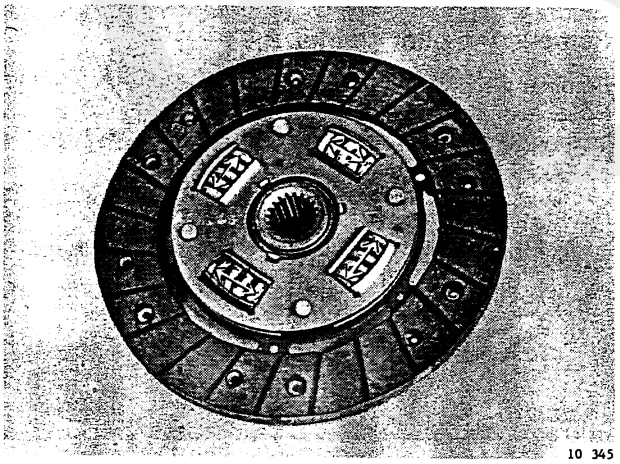


10 344

C15

Check and if necessary adjust the release levers

Check the release levers with measuring jig **5949**.
If necessary, readjust with the self-locking adjusting nut.
Note: the upper surface of the levers must abut the tolerance recess of the measuring jig.


10 345

C16

Clean and check the clutch plate and flywheel

The lining of the clutch plate and the friction faces of the clutch cover assembly and the flywheel must be free of grease. Also check for wear and damage.
The compression springs of the clutch plate must not be loose.


10 346

C17

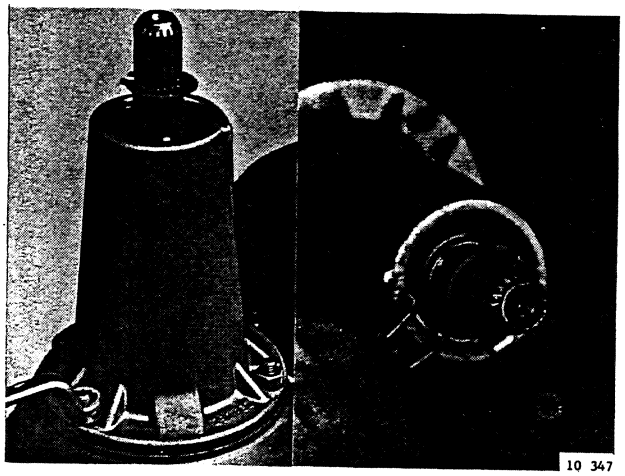
Check the release bearing

Rotate the release bearing while applying light pressure. The bearing should turn smoothly without resistance and without unusual noise.

C18 - C25

Renew the clutch and/or clutch bearing

These operations can also be carried out under the car. In that case, first remove the propeller shaft; see Operation *C5*.


10 347

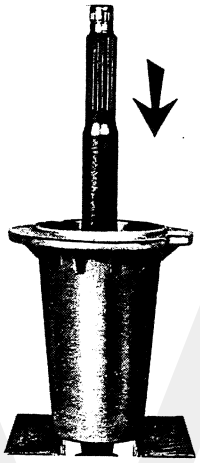
C18

Remove the bearing housing from the clutch housing

Remove the nuts and spring washers.

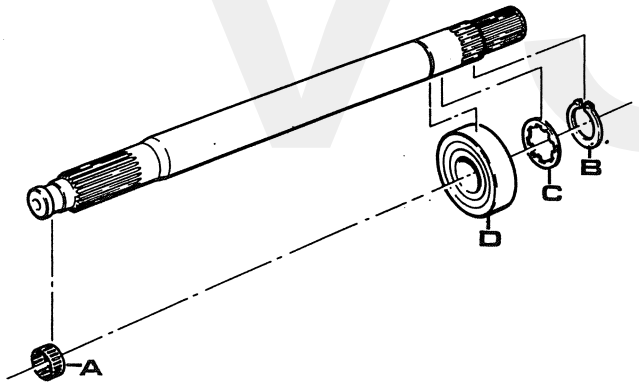
C19

Remove the circlip from the bearing housing


10 348

C20

Press the clutch shaft together with the bearing out of the bearing housing

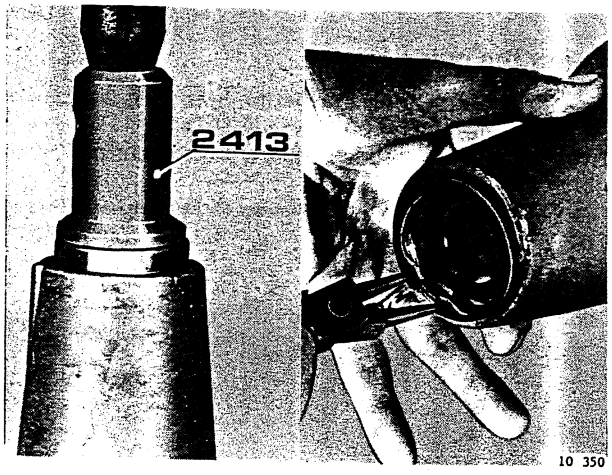


10 349

C21

Disassemble the clutch shaft and inspect the component parts

Remove the collet (A).
Remove the stop collar (B).
Remove the serrated washer (C).
Press the bearing (D) off the shaft.
Inspect the parts for wear and damage.



10 350

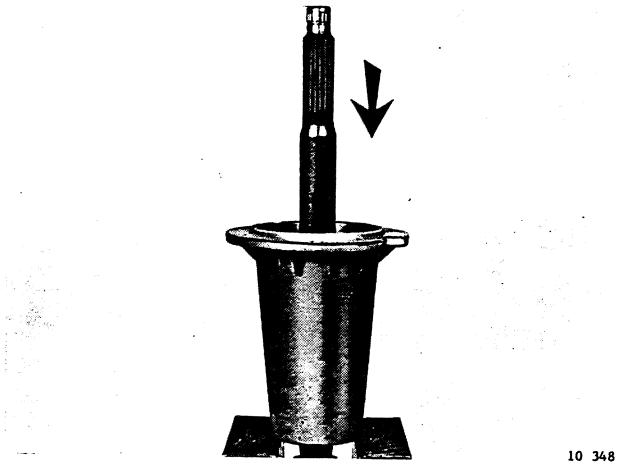
C22

Press the bearing into the bearing housing

First smear Lubrikote A/1040 CR (Part No. 1161006) in the bearing bore.
Press in the bearing with drift **2413.**

C23

Fit the circlip in the bearing housing


10 348

C24

Press the clutch shaft into the bearing housing

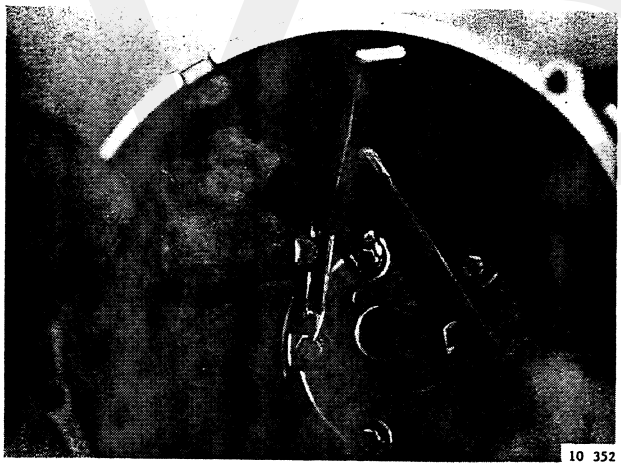
Press the shaft into the bearing.
Note: make sure that the circlip is not damaged.
Fit the serrated washer with the aid of a 26 mm ring spanner.
Fit the stop collar.


10 351

C25

Fit the collet

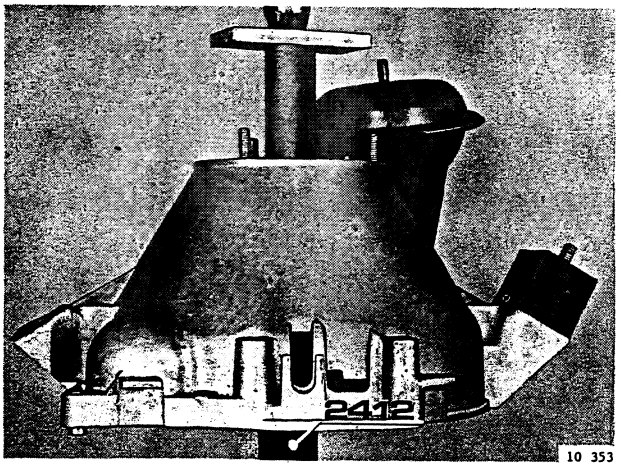
Note: the collet must be renewed each time the clutch is reconditioned.


10 352

C26

Renew the clutch housing

If a new clutch housing is being fitted, the following parts must be transferred or renewed:
- studs;
- bolts: these must be staked with a centre punch;
- vacuum cylinder with bracket;
- mounting block;
- fitted sleeves;
- ball pin with cover.

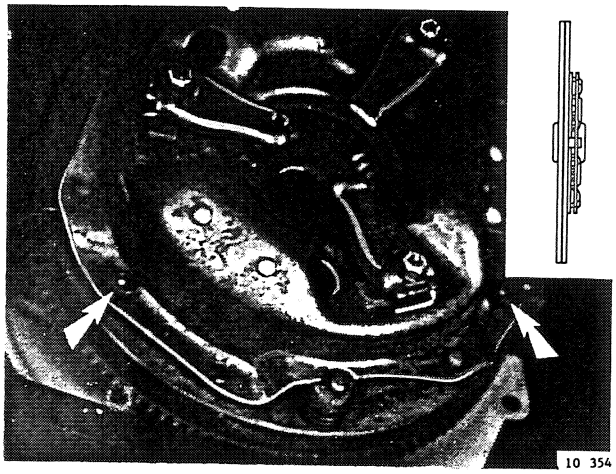


10 353

C27

Renew the guide bush

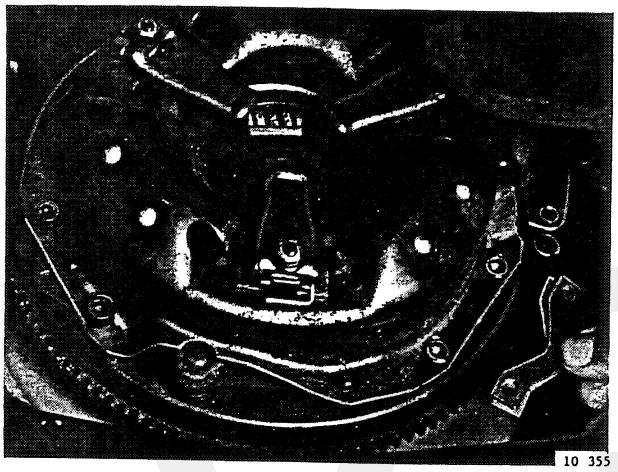
Locate the clutch housing over the lower drift **2412.**
Locate the new guide bush on the old one.
Press the new guide bush into the clutch housing.


10 354

C28

Fit the clutch plate and clutch cover assembly

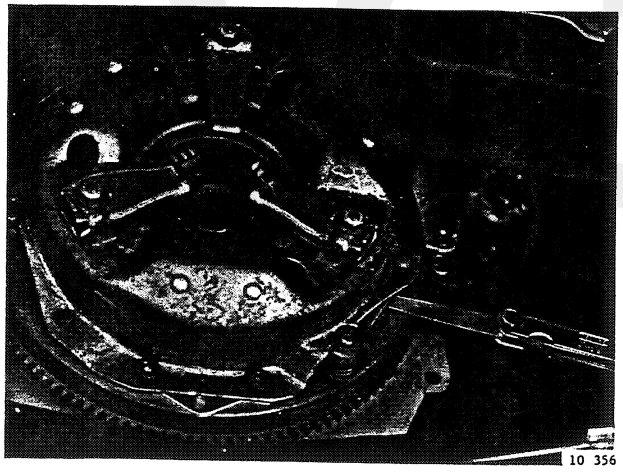
Fit the compression springs.
Fit the clutch plate and clutch cover assembly.
Fit two hexagon socket-head screws and secure finger-tight.
Note: fit the clutch plate with the raised side facing towards the clutch cover assembly (A).


10 355

C29

Fit the shim set and secure the clutch cover assembly

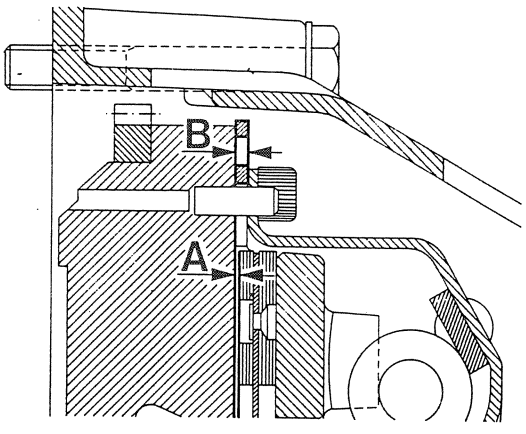
When a new clutch plate is fitted, the thickness of the shim set is 2 x 1.5 = 3.0 mm.
Fit the six hexagon socket-head screws and alternately tighten two opposing screws; tightening torque: 20 Nm.


10 356

C30

Check the clearance between the flywheel and the clutch plate

Check the clearance with a feeler gauge at three points around the circumference.
The specified clearance is **0.2 ± 0.1 mm.**



10 357

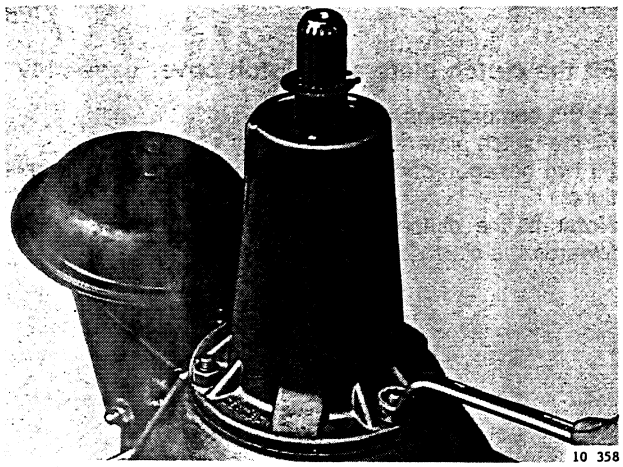
C31

Calculate the required shim set

Example:

Measured clearance **A**	1.0 mm
Nominal specification	-0.2 mm
Variation	0.8 mm
Measured shim set	2.7 mm
Variation found	-0.8 mm
New shim packet **B**	1.9 mm

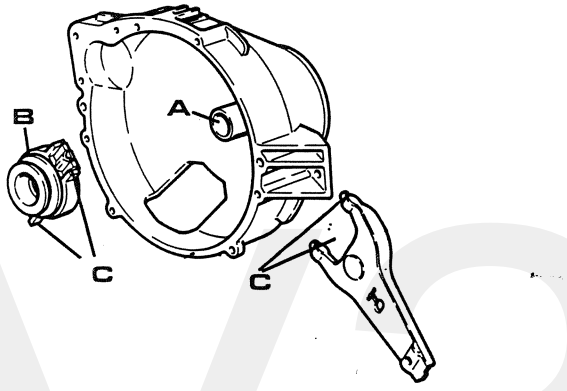
Shims are available in thicknesses of 0.5, 1.2, 1.5, 1.8, 2.1 and 2.4 mm.
Select shims with a thickness of: 1 x 1.8 mm.
The clearance is then 0.1 mm.


10 358

C32

Secure the bearing housing to the clutch housing

Fit and tighten the spring washers and nuts; tightening torque: 24 Nm.

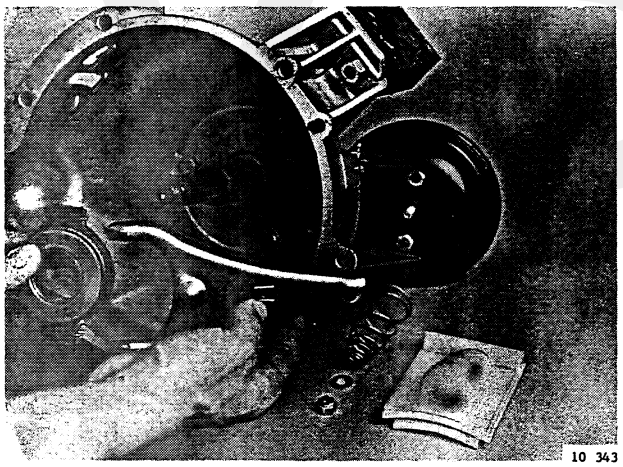


10 359

C33

Lubricate the parts

Before assembly, smear or pack the following parts with Molykote BR2 (Part No. 1161029):
- the guide bush (A);
- the grease chamber in the release bearing (B);
- the contact surfaces of the release fork and the release bearing (C).


10 343

C34

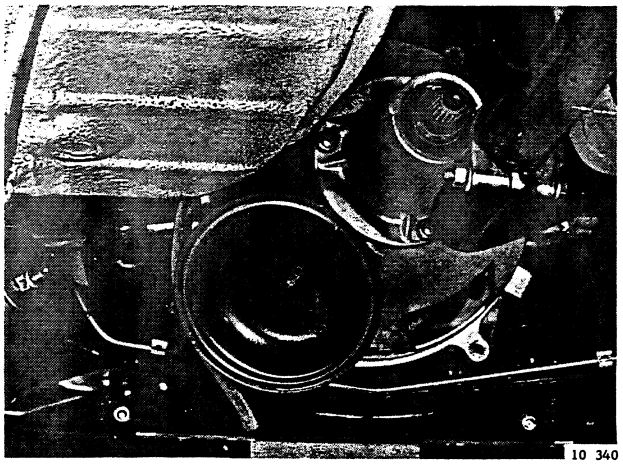
Fit the release fork and release bearing

Introduce the release fork in the clutch housing and at the same time slide the release bearing over the guide bush.
Locate the lock ring behind the plastic cap.
Fit the compression spring between the vacuum cylinder and through the release fork.
Fit the washer and a **new** self-locking adjusting nut.

C35

Adjust the clutch

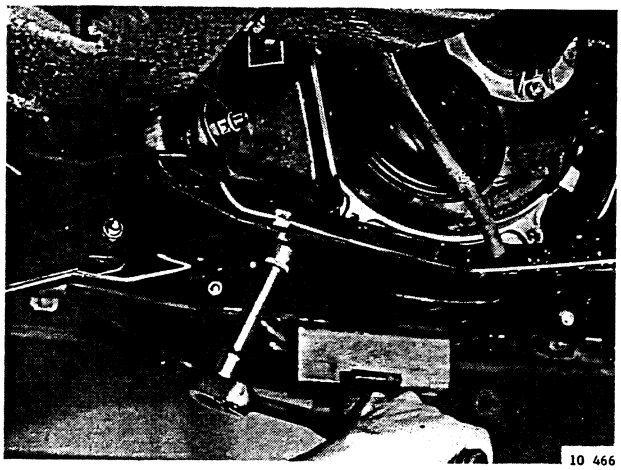
(only from chassis no. 314541)
See Operation *B3*.


10 340

C36

Secure the clutch housing

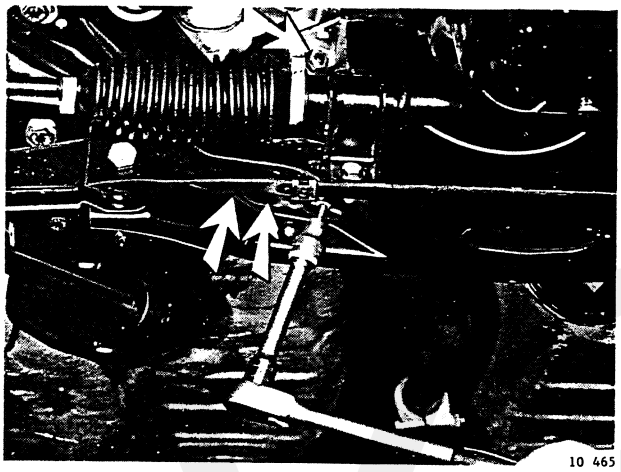
Coat the clutch shaft splines at the clutch end with Molykote 32R.
Locate the clutch housing and tighten the lower two attachment bolts; tightening torque: 45 Nm.
Note: check that the three fitted sleeves are present.
Make sure that the three fitted sleeves slide in easily, paying special attention to the fitted sleeve for the starter motor.


10 466

C37

Secure the left-hand engine mounting bracket

Fit and tighten the three hexagon socket-head screws and spring washers.
Fit the retainer plate, spring washer and nut at the rear end of the engine mounting bracket and secure finger-tight.


10 465

C38

Secure the right-hand engine mounting bracket

Fit and tighten the three hexagon socket-head screws and spring washers.
Fit and tighten the spring washer and nut at the front end of the engine mounting bracket.
Remove the stand and the block of wood.
Tighten the nut on the left-hand engine mounting bracket.

Tightening torque of nuts on engine mounting brackets:
- clutch housing end: 30 Nm;
- engine mounting end: 47 Nm.

C39

Further assembly operations

Further installation is completed in reverse order to removal; see Operations C7 to C1.
Note: smear the splines of the propeller shaft, clutch shaft and pinion shaft with an adhesive agent (Part No. 1161077).
Up to model year 1981: make sure that the exhaust is fitted stress-free.

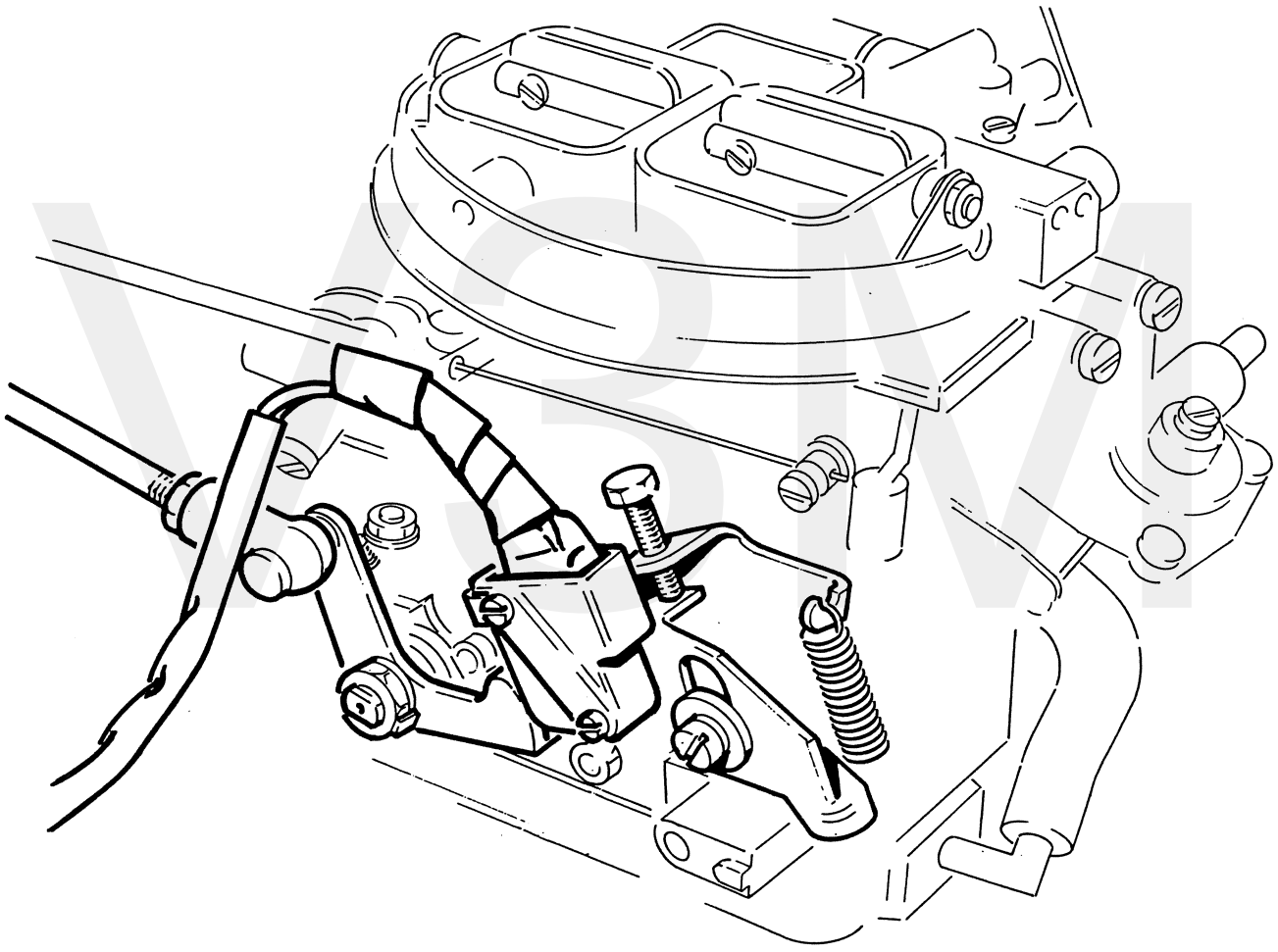
C40

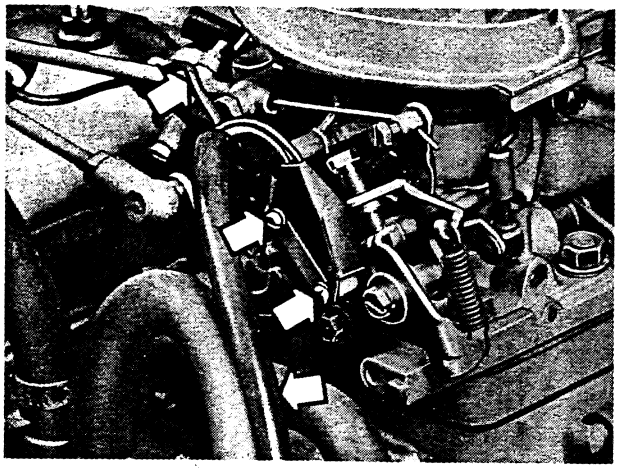
Adjust the clutch

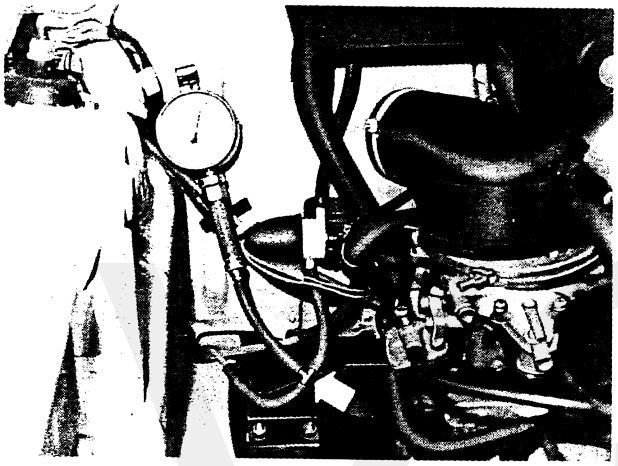
(only up to chassis no. 314541)
See Operation *B3*.

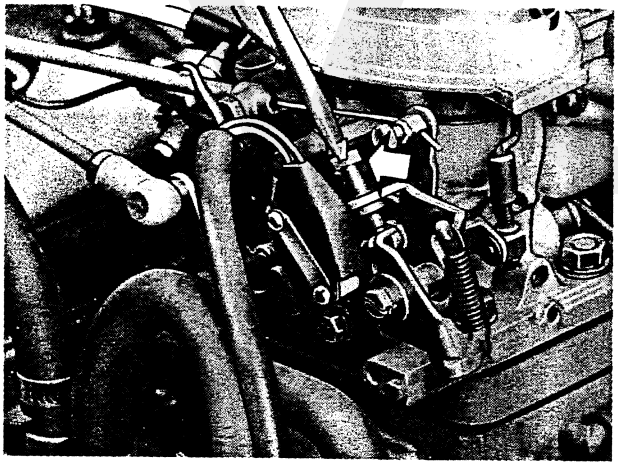
Group 43. Primary and secondary CVT units

D. Operation of the vacuum control system









D1 - D2

Renew the microswitch

D1

Remove the microswitch

Disconnect the wiring from the idle solenoid and the microswitch.
Remove the microswitch attachment screws and bracket.

D2

Fit the microswitch

Fit the microswitch in the correct position.
Fit the microswitch bracket and attachment screws.
Connect the wiring to the lower surface of the microswitch and the idle solenoid.

D3 - D4

Adjust the microswitch

D3

Check the setting of the microswitch

Connect up a vacuum gauge and a rev-counter.
Put the selector lever in position **N**.
Apply the handbrake.
Run the engine warm.
Gradually increase the engine speed to 2,640 r/min.
The vacuum gauge should now show a reading.

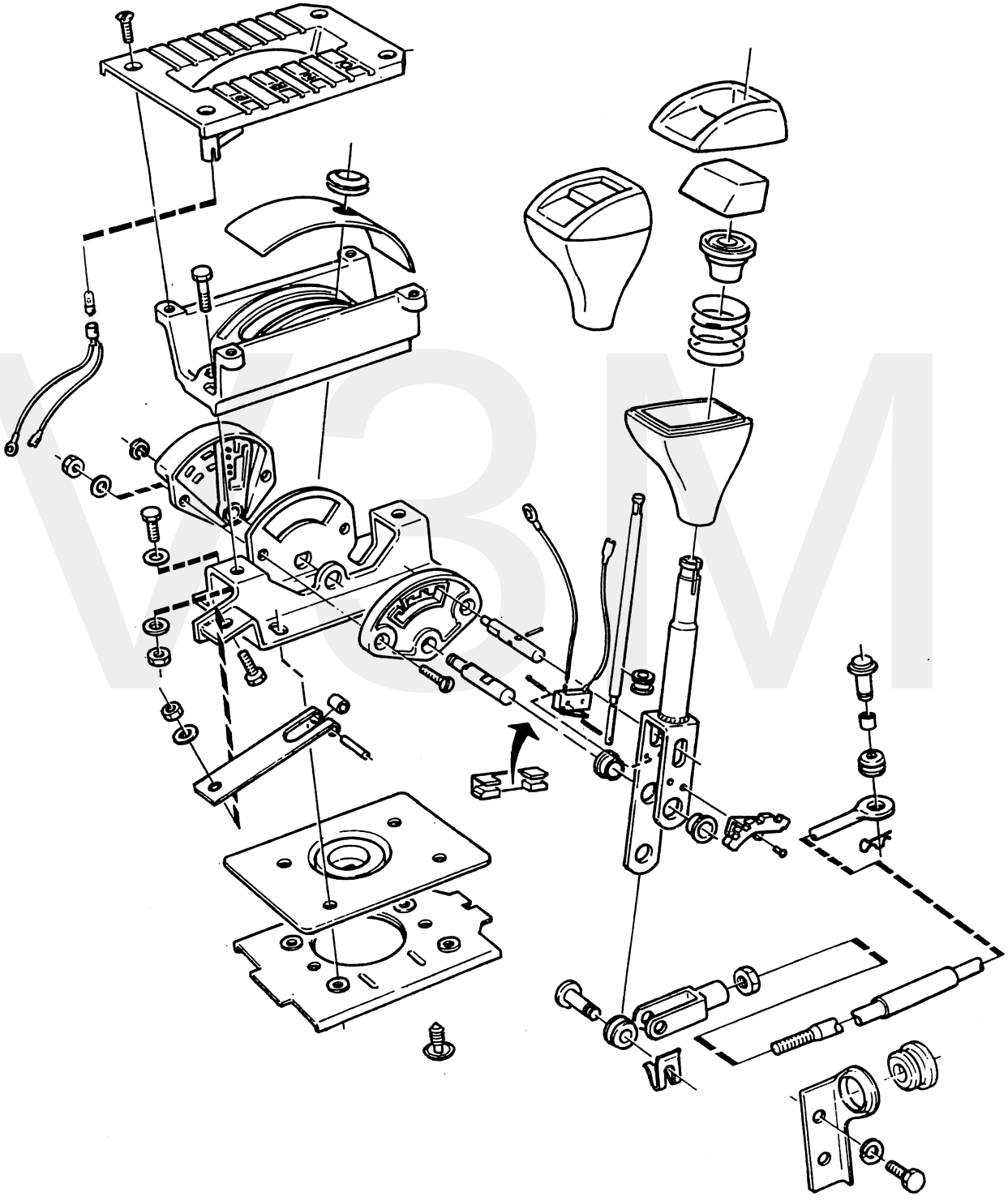
D4

Adjust the microswitch

Adjust the microswitch when there is a vacuum reading above or below 2,640 r/min. Turn the adjusting screw (1) in or out.
Again check the setting.
Remove the test equipment.

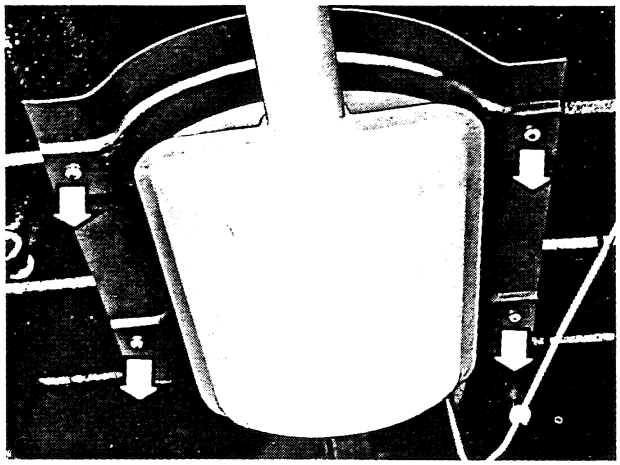
E. Gear selector mechanism

Special tools: 5948



E1 - E6

Removing various parts of the gear selector mechanism



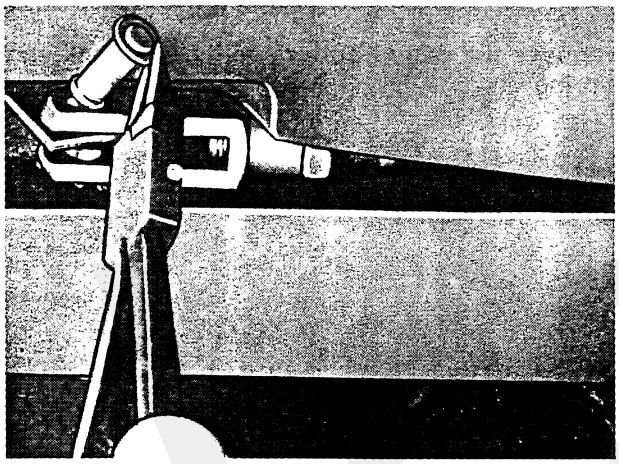
E1

Remove the heat shield

E2

Remove the propeller shaft

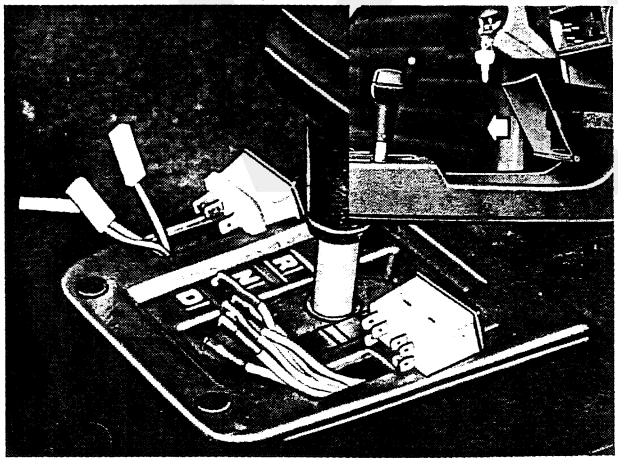
See Operation *C5*.



E3

Release the remote control rod from the selector lever

Remove the retaining clip from the clevis pin.
Pull the clevis pin out of the fork.
Remove the remote control rod by pulling it down.



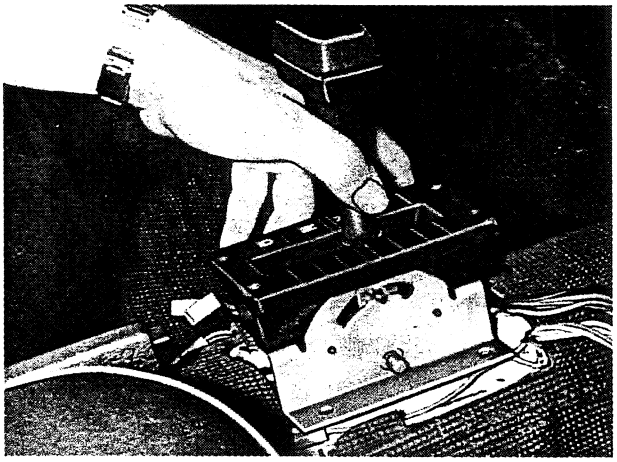
E4

Remove the oddments tray from the tunnel console

E5

Remove the tunnel console

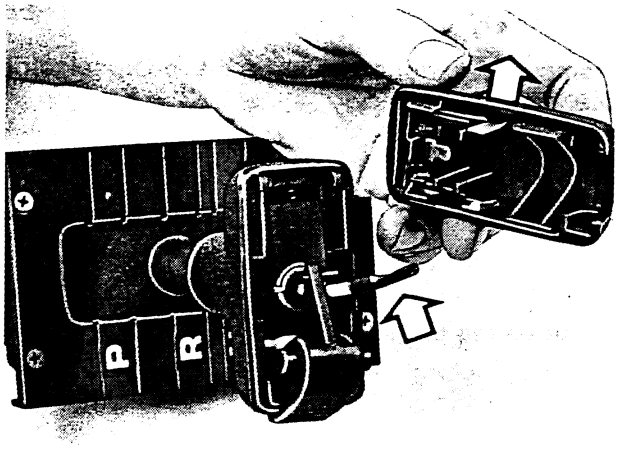
Remove the switches from the console.
Put the selector lever in position **R**.
Remove the self-tapping screws.



E6

Remove the selector lever

Remove the microswitch from the gear selector mechanism.
Remove the retaining screws from the gear selector mechanism.
Disconnect the wiring from the selector scale lighting and from the switch.



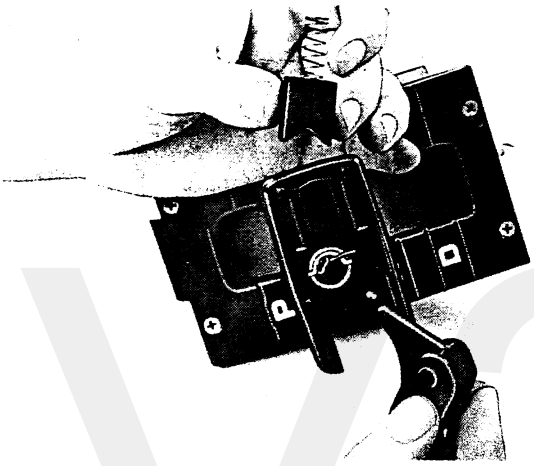
E7 - E14

Disassemble the selector lever

E7

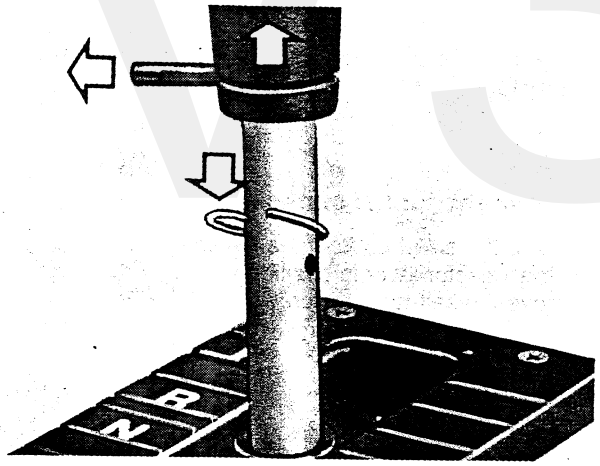
Remove the upper part of the selector lever knob

Disconnect the wiring from the upper part of the selector lever knob.



E8

Remove the detent button, centering block and spring



E9

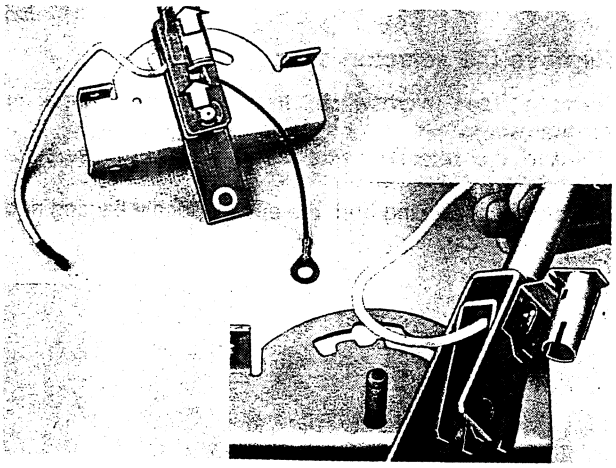
Remove the selector lever knob

Remove the lock ring and spring pin.

E10

Remove the selector scale housing

Remove the cover panel.
Remove the curved cover plate.
Remove the selector scale housing.



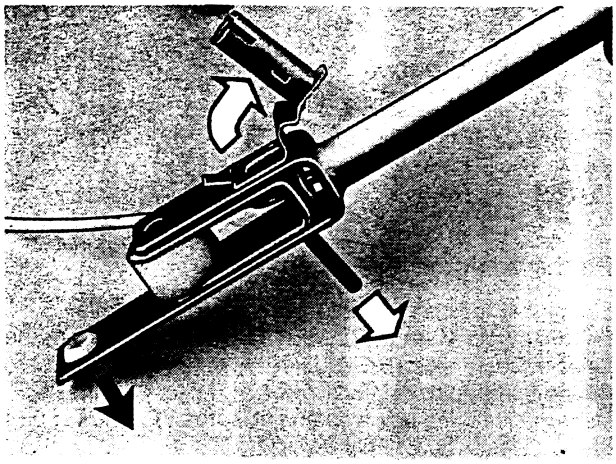
E11

Remove the earth lead together with the fitting and the bulb

E12

Remove the selector lever

Remove the retaining clip.
Remove the selector lever.
Remove the tension spring.



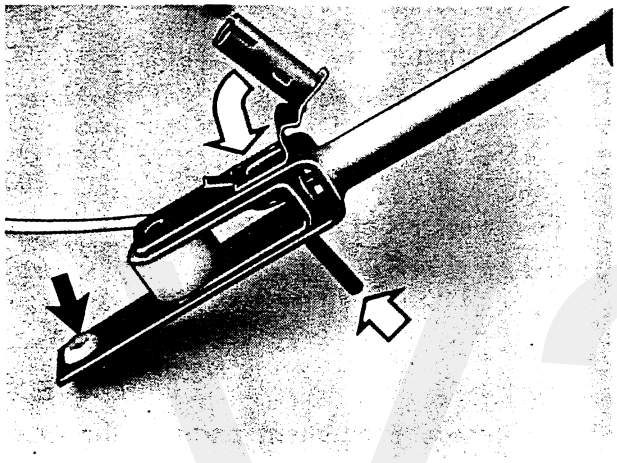
E13

Remove the pull rod

Insert a suitable block in the middle of the locking bracket.
Remove the spring pin.
Remove the locking bracket.
Withdraw the pull rod and cable from the locking bracket.

E14

Remove the grommet from the selector lever



E15 - E23

Assembling the selector lever

E15

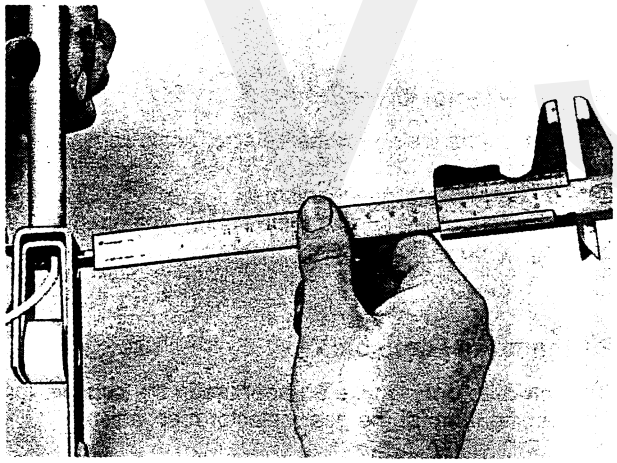
Fit the grommet in the selector lever

If necessary, fit a new grommet.

E16

Fit the pull rod

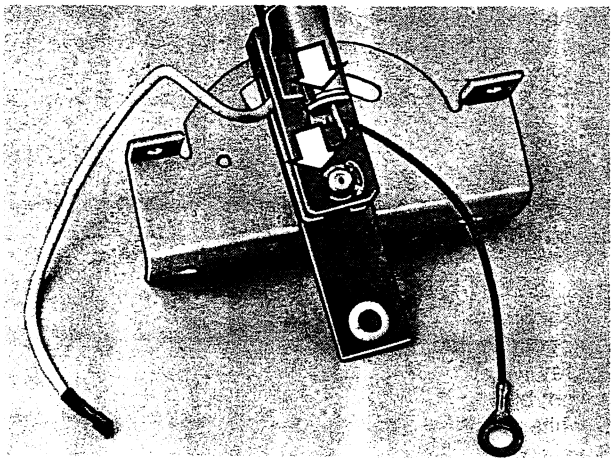
Locate the cable and the pull rod in the locking bracket.
Locate the locking bracket in the selector lever.
Insert a suitable block in the middle of the locking bracket.
Fit the spring pin so that it passes through the eye of the pull rod.



E17

Adjust the spring pin

Protruding length: 4 ± 0.3 mm plus the thickness of the selector gate.



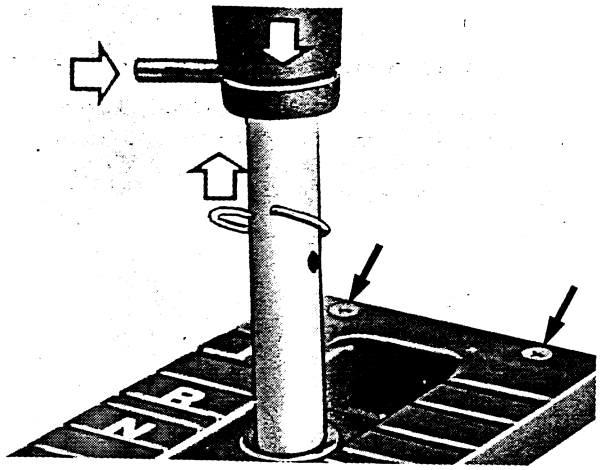
E18

Fit the selector lever

Remove the block.
Hook the tension spring over the spring pin.
Locate the selector lever on the selector gate.
Fit the lock ring.

E19

Fit the earth lead together with the fitting and the bulb



E20

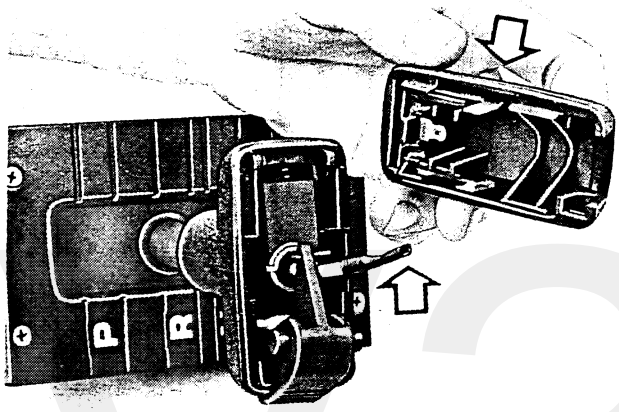
Fit the cover panel

Fit the curved cover plate.
Fit the selector scale housing.
Fit the cover panel.

E21

Fit the selector lever knob

Locate the lock ring (loose) over the selector lever.
Fit the knob with the detent button aperture on the selector scale side (P-R-N-D).
Fit the spring pin.
Slide the lock ring upwards and fit it around the lower part of the selector lever knob.



E22

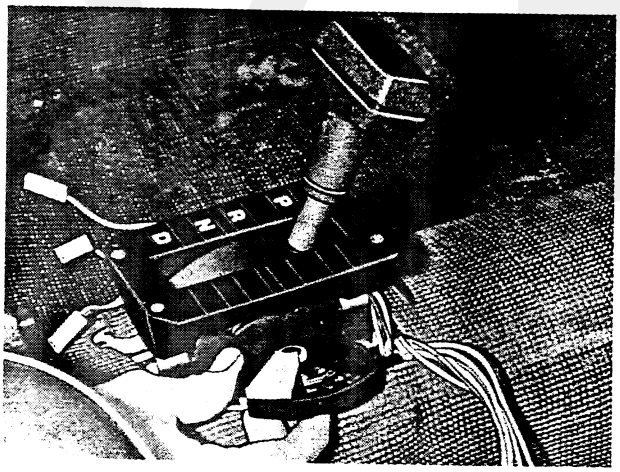
Fit the detent button

Fit the centering block with the spring and the detent button in the lower part of the selector lever knob.

E23

Fit the upper part of the selector lever knob

Connect up the wiring.



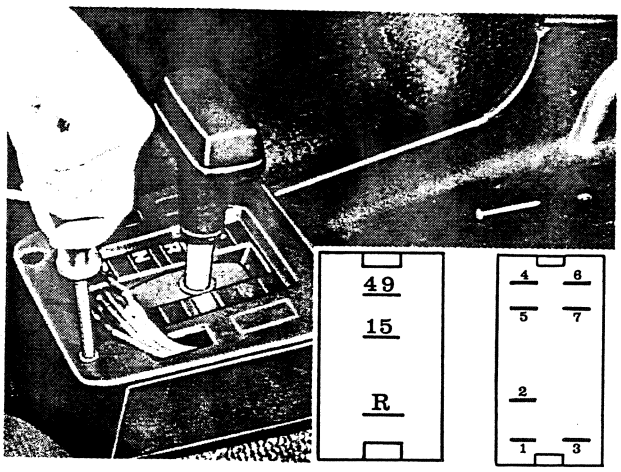
E24 - E26

Fitting various component parts of the gear selector mechanism

E24

Fit the selector lever

Connect up the wiring for the selector scale lighting and the microswitch.
Fit the gear selector mechanism.
Fit the switch; make sure that the spring pin engages the opening in the switch.



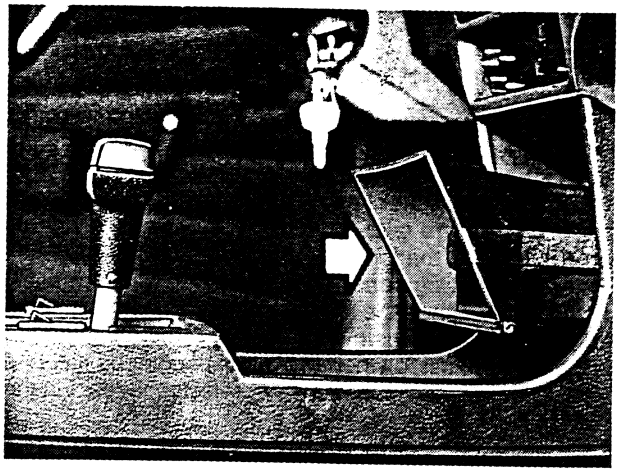
E25

Fit the tunnel console

RHD models only: make an aperture in the console for the warning lamp of the gear selector mechanism.

Put the selector lever in position **R**.
Tighten the self-tapping screws.
Connect up the wiring of the switches according to the following diagram.
Fit the switches (and, if applicable, the warning lamp) in the console.

Switch Code Cable colour
Low gear switch R light brown
15 dark green and green/yellow
49 lilac
Hazard warning lights
1 light brown
2 not connected
3 grey
4 light blue
5 white
6 yellow
7 orange



E26

Fit the oddments tray in the tunnel console

RHD models only: fit the warning buzzer for the gear selector mechanism and connect up the wiring.
Check the warning buzzer and lamp for correct operation. If any drive position of the selector lever is not correctly engaged with the detent button pressed in fully or part-way, then the lamp should flash and the buzzer should give an intermittent warning signal.

E27 - E29

Removing/fitting the remote control rod

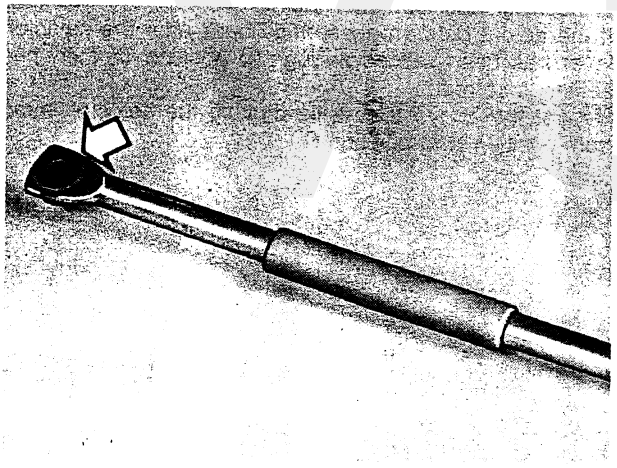
E27

Remove the transmission guard plate

E28

Release the remote control rod

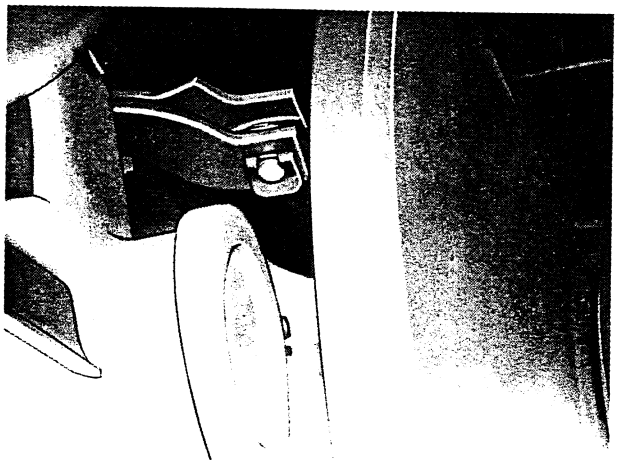
Disconnect the remote control rod from the selector lever; see Operation *E3*.
Disconnect the remote control rod from the primary CVT unit:
Remove the retaining clip.
Withdraw the clevis pin from the fork.
Remove the remote control rod.



E29

Renew the grommet in the remote control rod

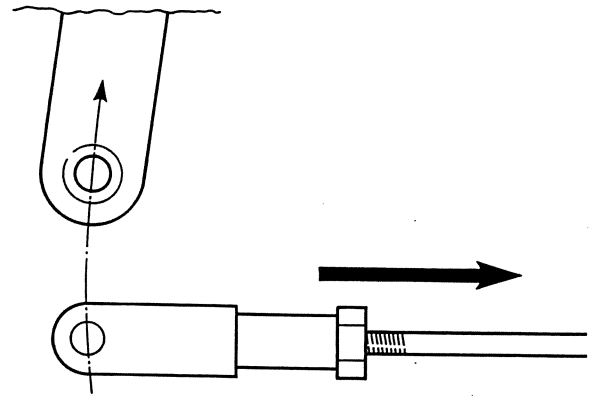
If necessary, fit a new grommet in the remote control rod.



E30

Fit the remote control rod to the primary CVT unit

Put the selector lever in position **N**.
Secure the remote control rod in the fork with the clevis pin and the retaining clip.
Fit the transmission guard plate.

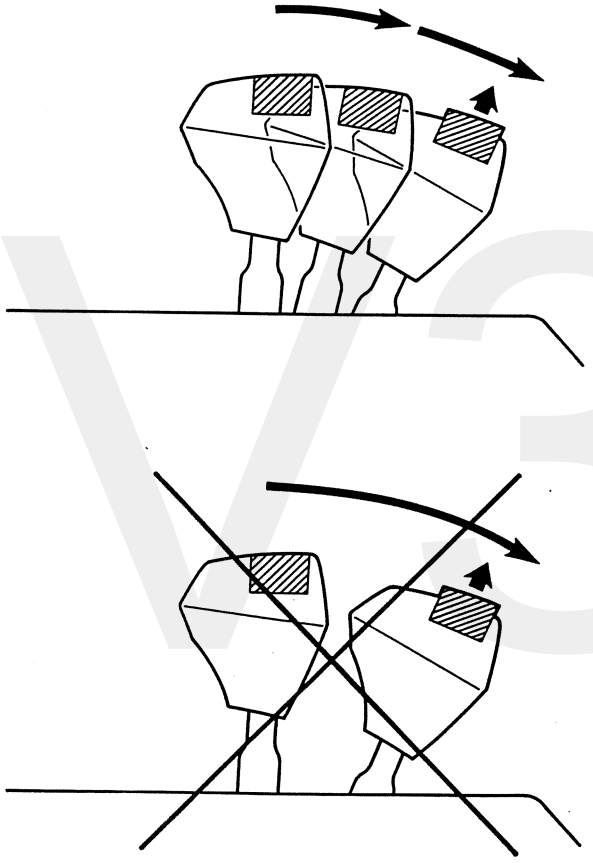


42 615

E31

Adjust the remote control rod

Put the selector lever in position **N** and push it forwards against the stop of the **R** position without depressing the detent button.
Pull the remote control rod to the rear (in the direction of the **R** position) to take up the play between the remote control rod and the fork on the primary CVT unit.
Smear the moving parts with grease.
Adjust the length of the remote control rod with the aid of the fork and the adjustment bolt. The remote control rod is correctly adjusted when the clevis pin can be inserted easily through the fork and the selector lever. Fit the clevis pin and retaining clip.
Tighten the lock nut on the remote control rod.

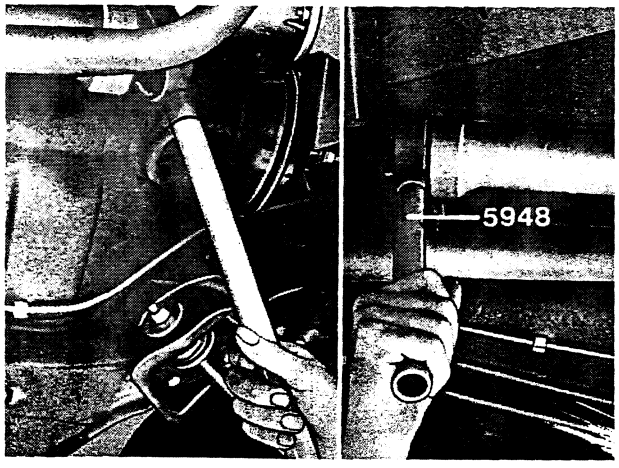


42 616

E32

Check the operation of the selector lever mechanism

Sit behind the wheel of the car with the doors and windows closed.
Move the selector lever between positions **N** and **D** (not to **R**) a few times.
Depress the detent button and move the selector lever from position **N** to position **D**; release the detent button **immediately** after starting to move the selector lever and continue to move it slowly.
Stop the movement of the selector lever as soon as the gears in the primary CVT unit are heard to engage (position A).
If the detent button has already sprung back at this moment, then the setting of the selector lever mechanism is incorrect; see Operation *E31*.
If the detent button only springs back after the selector lever has been moved through to position **D**, then the setting is correct.
Repeat the above test while moving the selector lever from position **N** to position **R**.



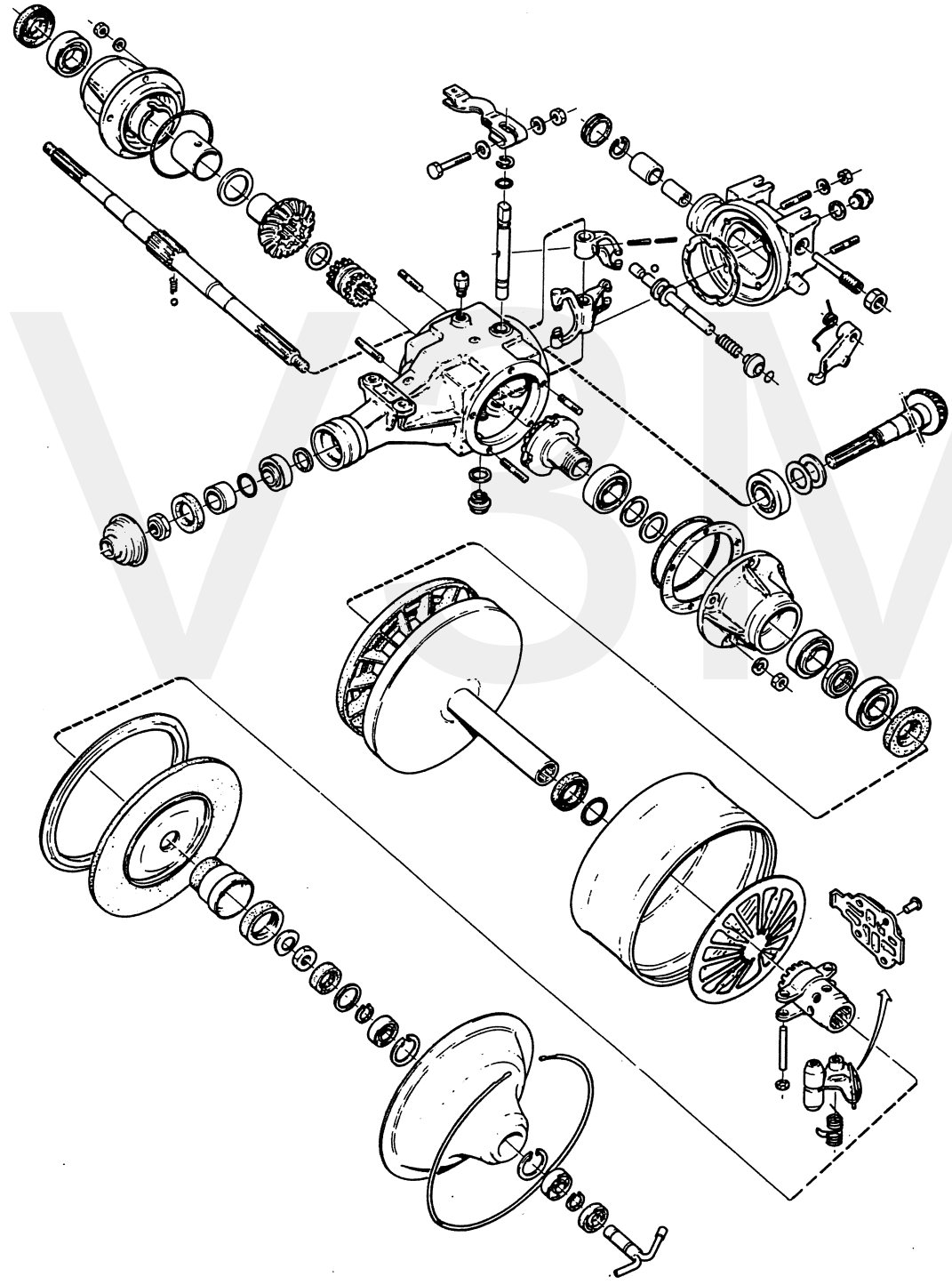
E33

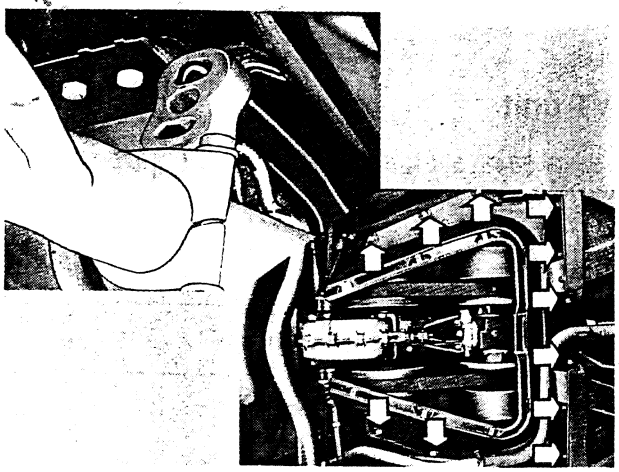
Fit the propeller shaft

Clean the old High Tack from the splines.
Apply High Tack to the splines.
Fit the propeller shaft with special tool **5948**.
Fit the heat shield.

F. Primary CVT unit

Special tools: 2520, 5800, 5827, 5828, 5830, 5833, 5834, 5837, 5842, 5843, 5901, 5907, 5923, 5936, 5939, 5943, 5954





F1

Remove the transmission guard plate

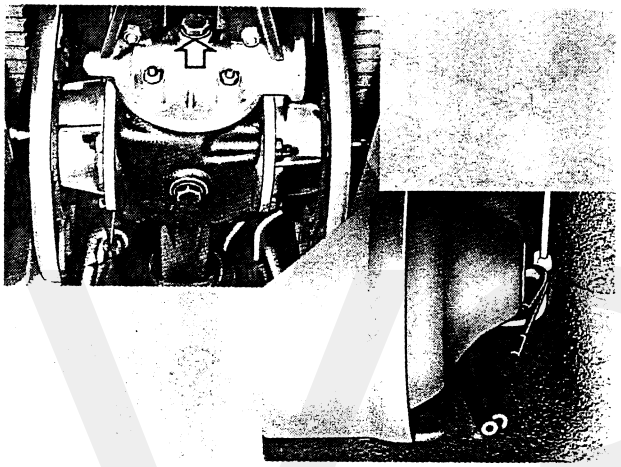
F2

Release the exhaust pipe

Unhook the exhaust pipe front mounting strap.

F3

Release the transmission guard plate outer rim



F4

Remove the propeller shaft

See Operation *C5*.
Rest the propeller shaft on the heat shield.

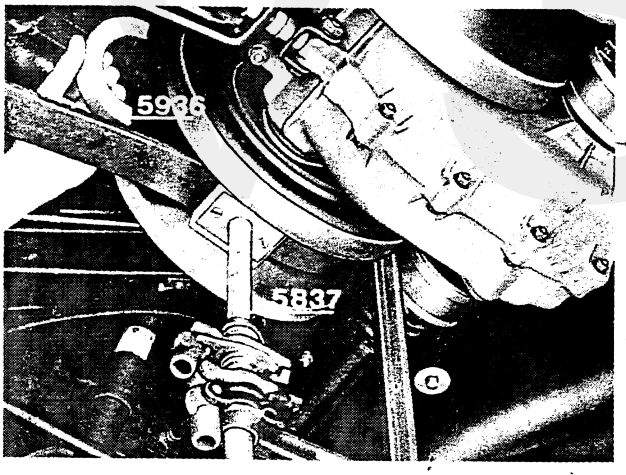
F5

Drain the oil from the primary CVT unit

After draining the oil, fit the drain plug back in the primary CVT unit with a **new** washer.

F6

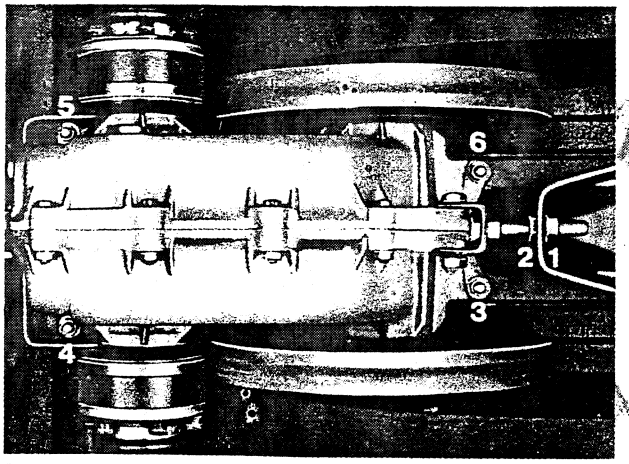
Release the vacuum hoses from the vacuum connecting pipe assembly



F7

Spread the secondary unit pulley halves

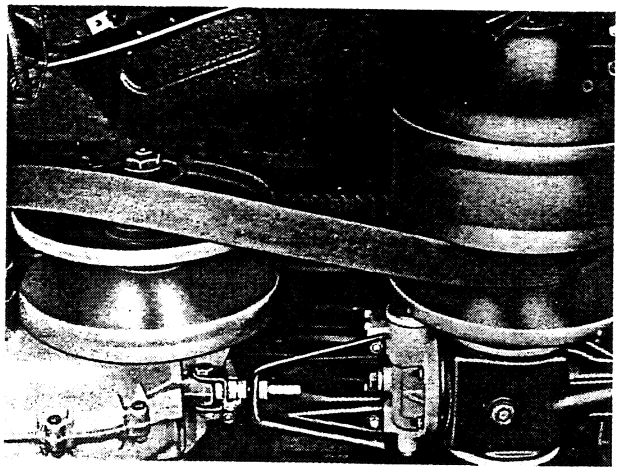
Push the pulley halves away from each other.
Use special tool **5837**.
Insert spacer blocks **5936** between the pulley halves.
Remove special tool **5837**.



F8

Slacken the drive belts

Back off lock nut 1 a short distance.
Fully release adjusting nut 2.
Release nuts 3, 4, 5 and 6.
Slide the secondary CVT unit forwards.



F9

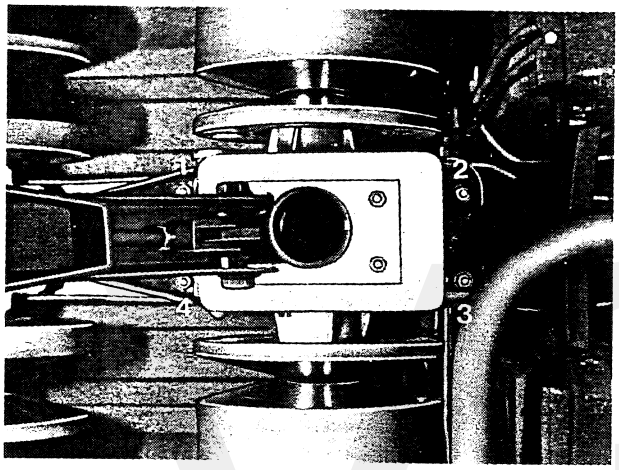
Remove the drive belts

Pull the belts in between the primary pulley halves.
Remove the belts from the secondary CVT unit.
Remove the belts from the primary CVT unit.

F10

Release the remote control rod from the primary CVT unit

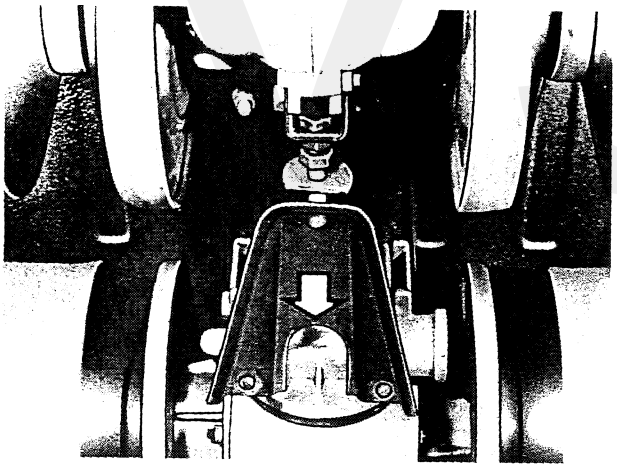
See Operation *E29*.



F11

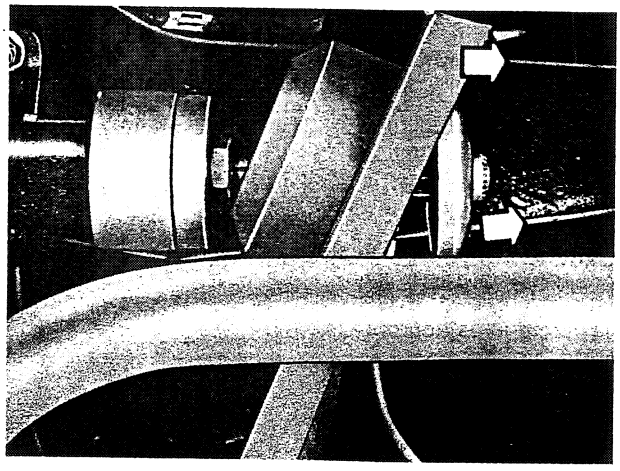
Release the primary CVT unit

Place a stand under the primary CVT unit.
Remove retaining bolts 1, 2, 3 and 4.



F12

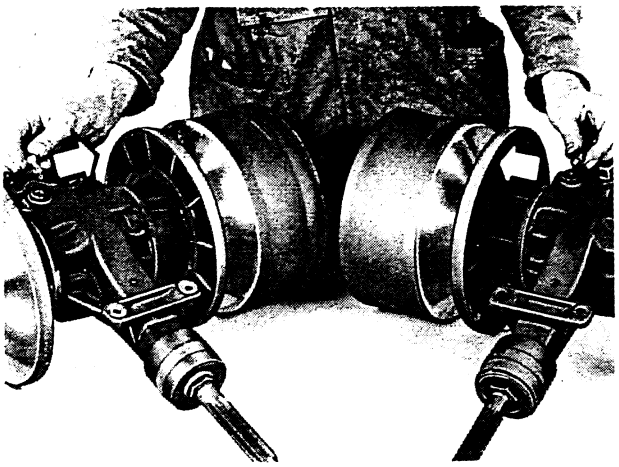
Remove the adjusting bracket



F13

Remove the rubber moulding

Lower the primary CVT unit a short distance.
Remove the spring.
Remove the dust cover.
Slide the rubber moulding off the pinion shaft.
Lower the primary CVT unit.
Remove the primary CVT unit from the stand.



F14 - F15

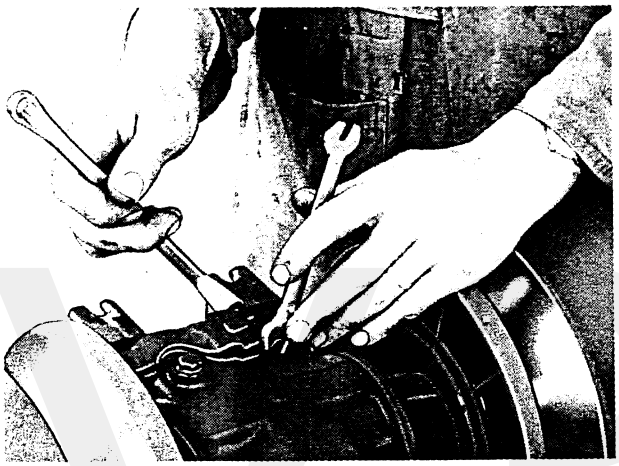
Transferring component parts

(when an exchange unit is being installed)

F14

Exchange the plug

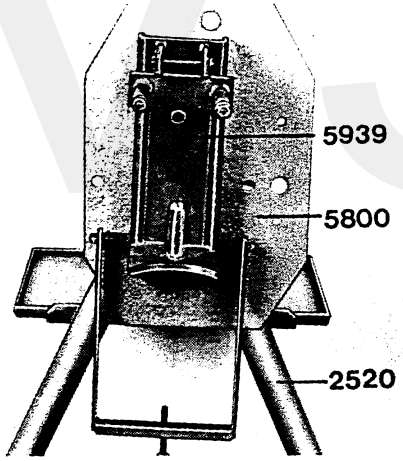
Remove the plug from the new CVT unit and replace it with the vent nipple from the old unit.



F15

Fit the shift lever

Remove the shift lever from the old CVT unit and fit it on the new unit.



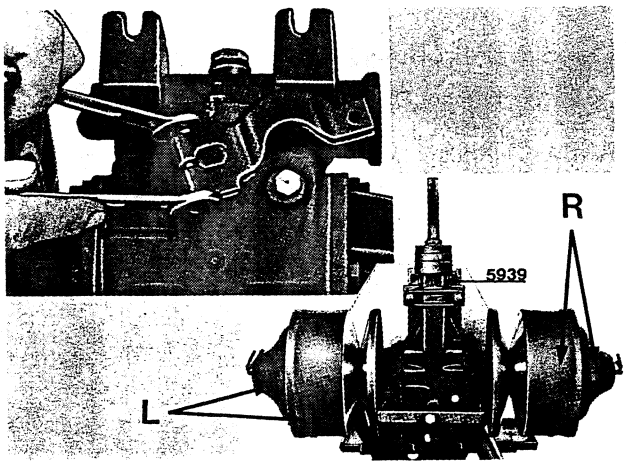
F16 - F67

Reconditioning the primary CVT unit

F16

Assemble the mounting fixture

Fit mounting plate **5800** and clamp **5939** on stand **2520.**



F17

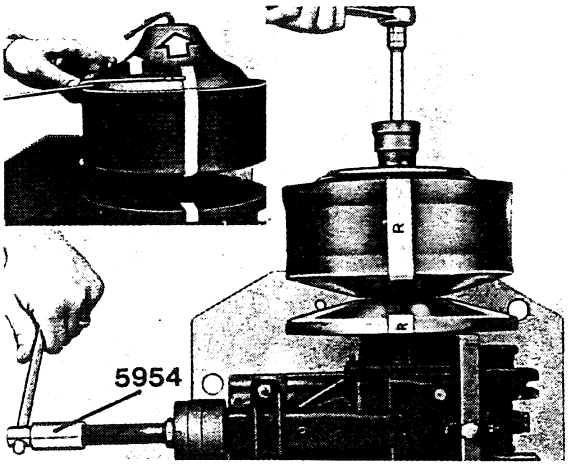
Remove the shift lever

Disengage the shift lever.
Put the shift lever in position **D** (forward drive).
Remove the shift lever.

F18

Secure the primary CVT unit in clamp 5939

Mark the pulley halves and side covers with 'L' for left and 'R' for right, as appropriate.



F19

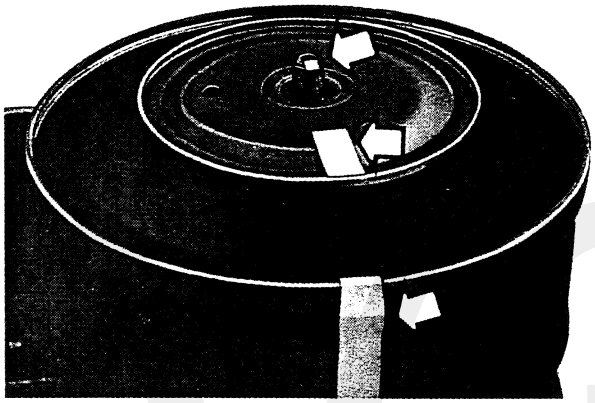
Remove the side cover

Remove the lock ring and then the side cover.

F20

Remove the sealing sleeve

Use special tool **5954** to stop the pinion shaft from turning.
Remove the nut.



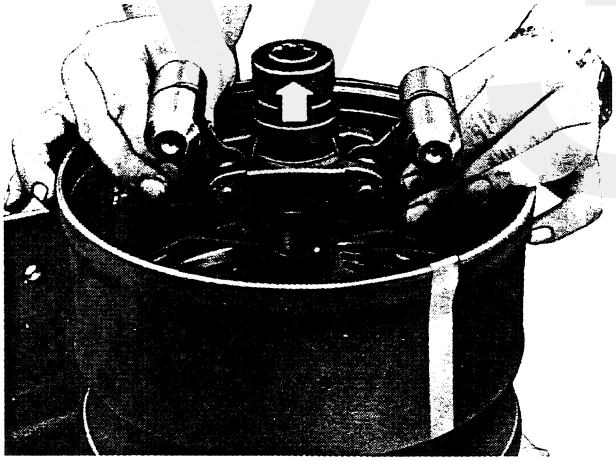
F21

Mark the cross shaft and diaphragm

Mark the cross shaft and diaphragm to correspond with the marks on the pulley halves.

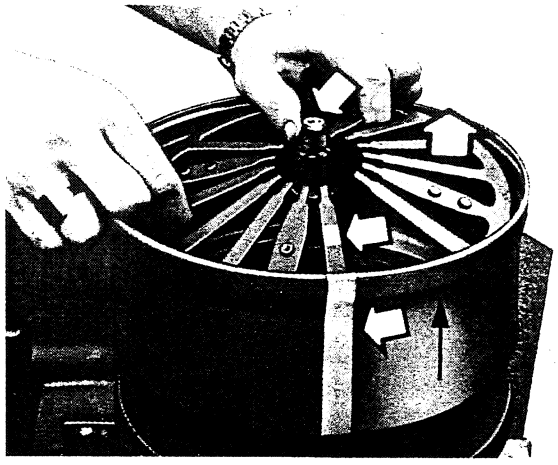
F22

Remove the diaphragm and the support ring



F23

Remove the centrifugal weight carrier together with the weights



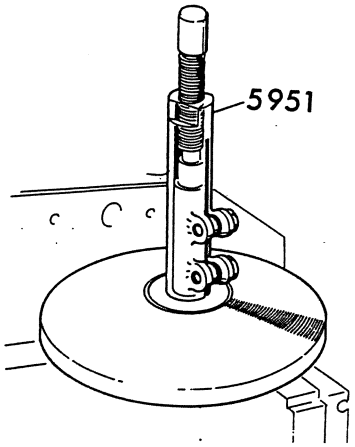
F24

Remove the diaphragm spring

Mark the diaphragm spring to correspond with the marks on the pulley halves.
Remove the diaphragm spring from the sliding pulley half.

F25

Remove the sliding pulley half

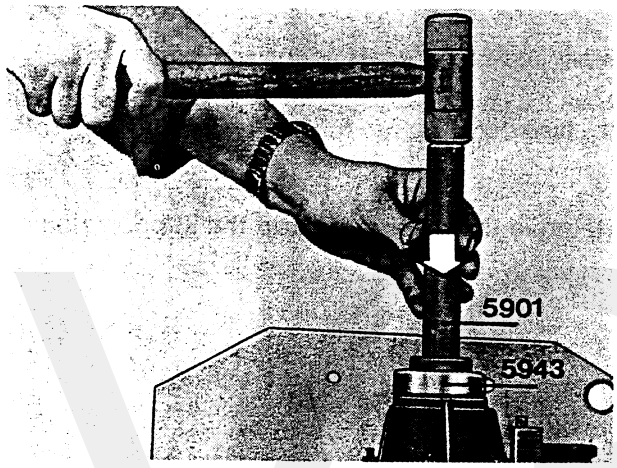


F26

Remove the fixed pulley half

Slide extractor **5951** over the output shaft until it abuts the hub.
Tighten the two bolts.
Screw in the spindle until the pulley half is released.

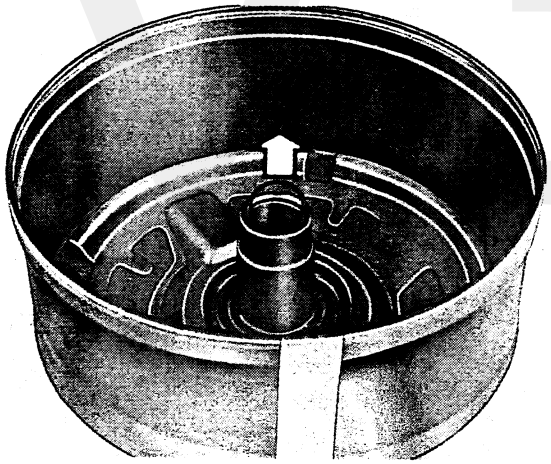
Note: the jaw-type gear puller must no longer be used because of the possibility of damaging the pulley.



F27

Renew the oil seal in the bearing housing

Before fitting, lightly grease the sealing edge of the new oil seal.
Use special tools **5943** and **5901** to fit the seal.



F28

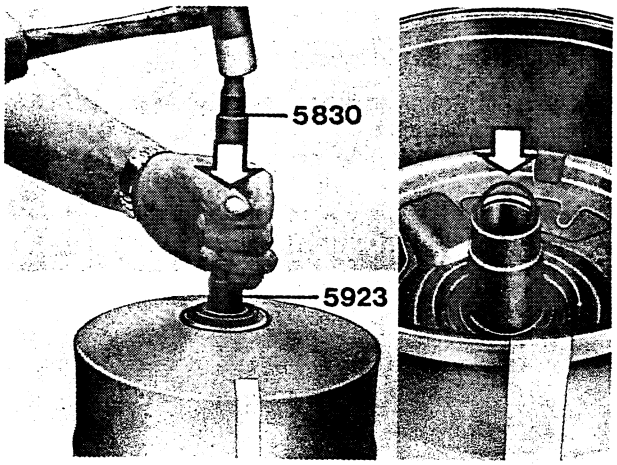
Remove the grease and oil from the sliding pulley half

Remove the oil still remaining oil in the pulley half.
Remove the grease retainer and the two O-rings from the hub.
Remove the grease from the hub.

F29

Clean and inspect all parts

Clean all the parts thoroughly.
Inspect all parts for wear and damage.



F30

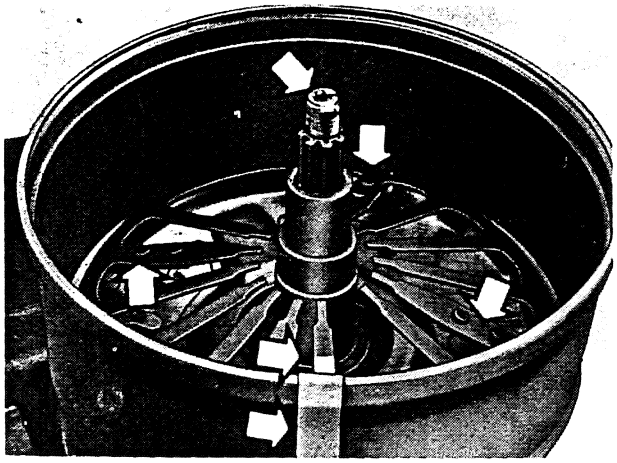
Fit the grease retainer and the outer O-ring

Use special tools **5830** and **5923**.
Pack the hub with 7 grams of grease (Gleitmo 500 or Molykote BR 2-S).

F31

Fit the inner O-ring

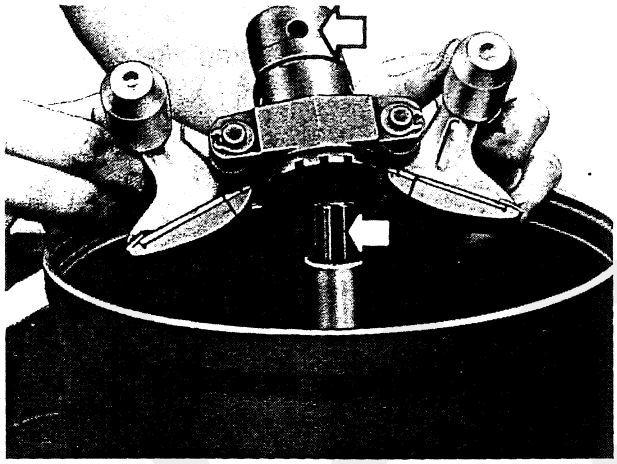
Fill the pulley half with 100 cc of Automatic Transmission Fluid, type A/A.



F32

Fit the pulley halves and the diaphragm spring

Fit the fixed and sliding pulley halves on the cross shaft.
Fit in accordance with the marks made during disassembly.
Fit the diaphragm spring (note the marks).
The prongs of the diaphragm spring must engage the recesses in the pulley half.



F33

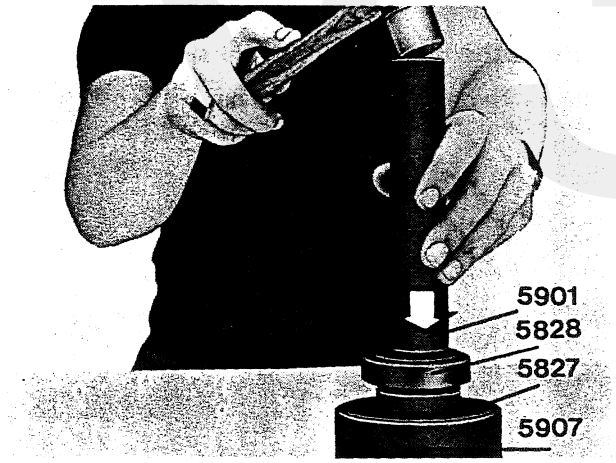
Fit the centrifugal weight carrier

The hole in the centrifugal weight carrier must align with the hole in the cross shaft.

F34

Fit the support ring and the diaphragm

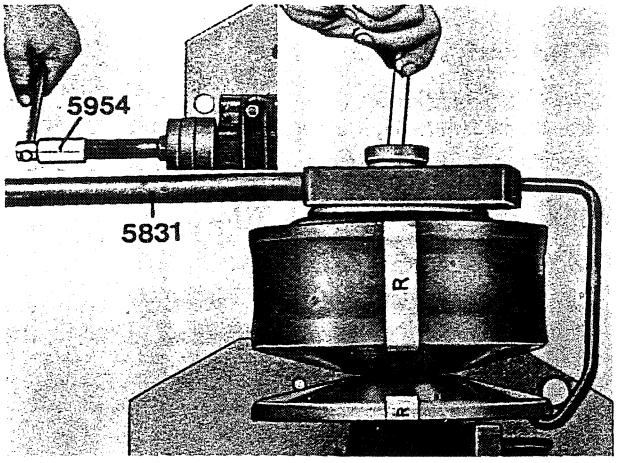
Fit in accordance with the marks made during disassembly.



F35

Renew the seal ring on the sealing sleeve

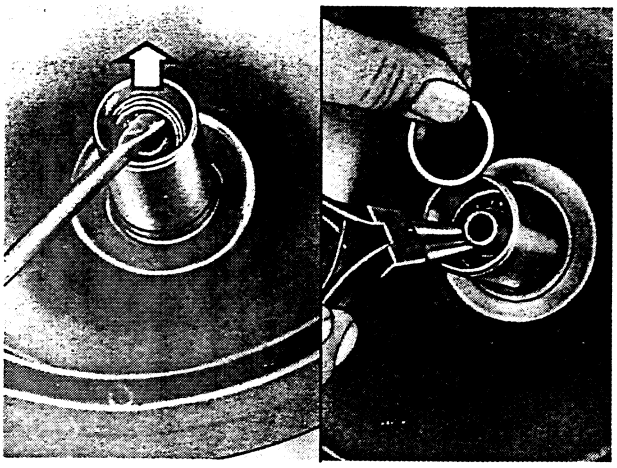
Remove the seal ring with special tools **5827** and **5907**.
Fit a new seal ring using special tools **5901, 5828, 5827** and **5907.**



F36

Fit the sealing sleeve

Press the diaphragm down with special tool **5831.**
Use special tool **5954** to stop the pinion shaft from turning.
Tighten the sealing sleeve; tightening torque: 110-125 Nm.
Smear the sealing sleeve with a thin film of grease.



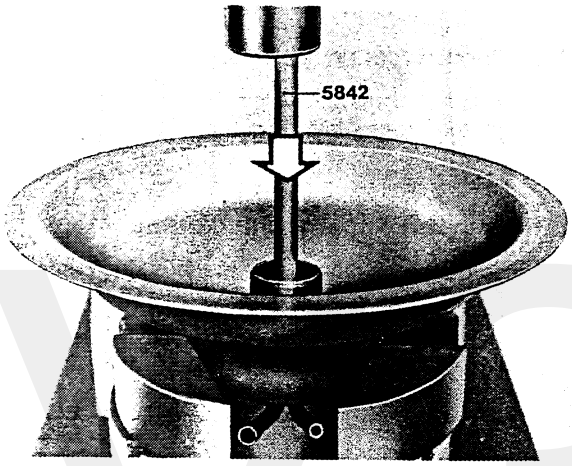
F37

Remove the grease retainer from the cover

Pierce the grease retainer with a screwdriver and prise it out.

F38

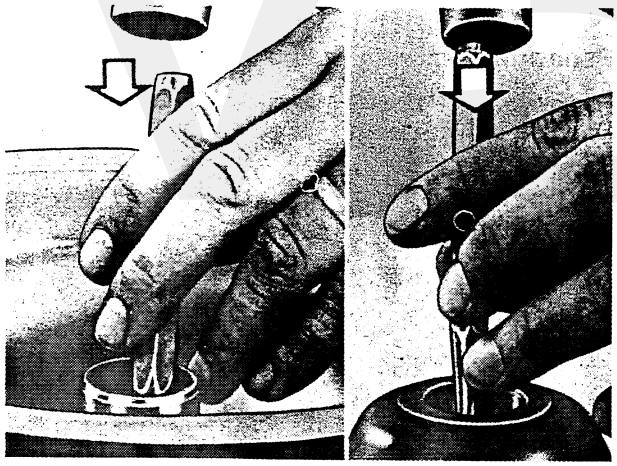
Remove the spacer ring and circlip from the vacuum connecting pipe assembly



F39

Remove the vacuum connecting pipe assembly

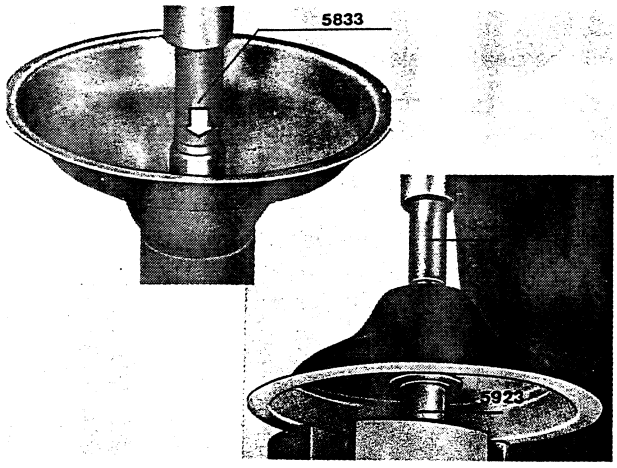
Use special tool **5842.**



F40

Remove the bearings from the side cover

Remove the bearings from both sides with a punch.
Take care not to damage the side cover!



F41

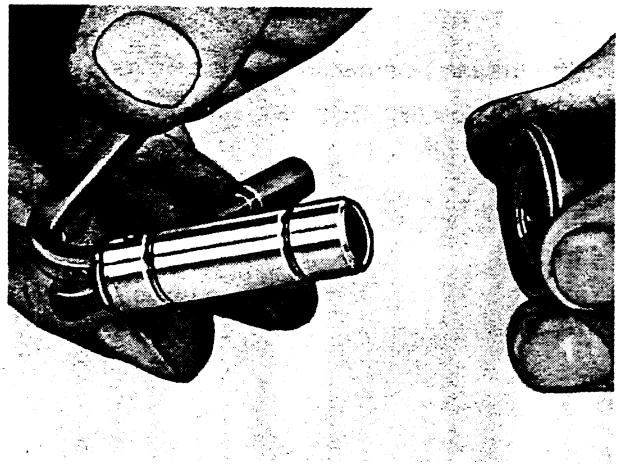
Fit the inner bearing

Use special tool **5833.**
Pack the bearing with grease after assembly.

F42

Fit the outer bearing

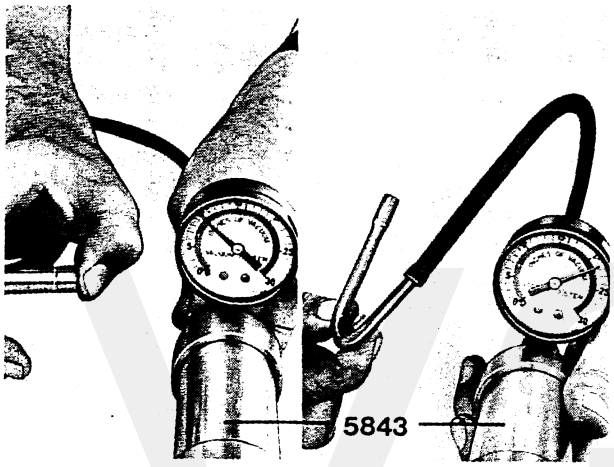
Use special tools **5833** and **5923.**
Pack the bearing with grease after assembly.



F43

Remove the grease retainer from the vacuum connecting pipe assembly

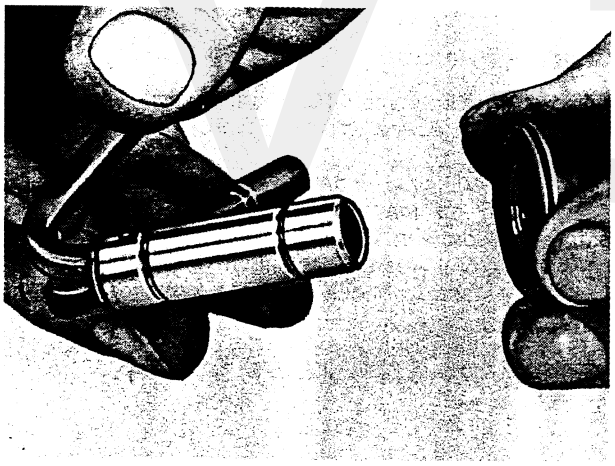
Remove the circlip.
Remove the grease retainer.



F44

Check the vacuum connecting pipe assembly

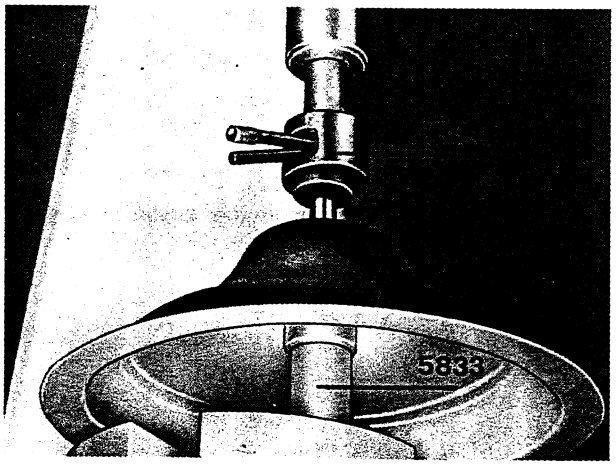
Use special tool **5843** to check that the vacuum connecting pipe assembly is airtight.



F45

Fit the grease retainer

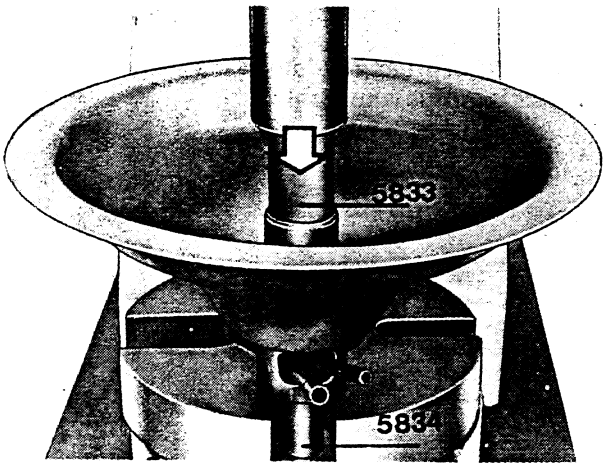
Smear the vacuum connecting pipe assembly with a thin film of grease.
Fit the grease retainer.
Fit the circlip.



F46

Fit the vacuum connecting pipe assembly in the side cover

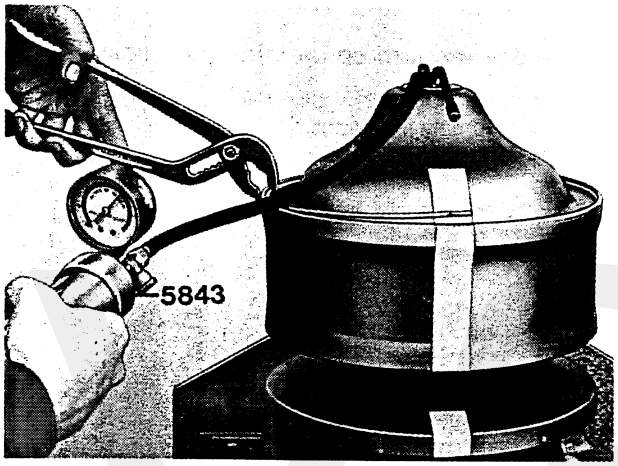
Use special tools **5833** and **5834.**
Fit the circlip and the spacer ring in the vacuum connecting pipe assembly.



F47

Fit the grease retainer in the side cover

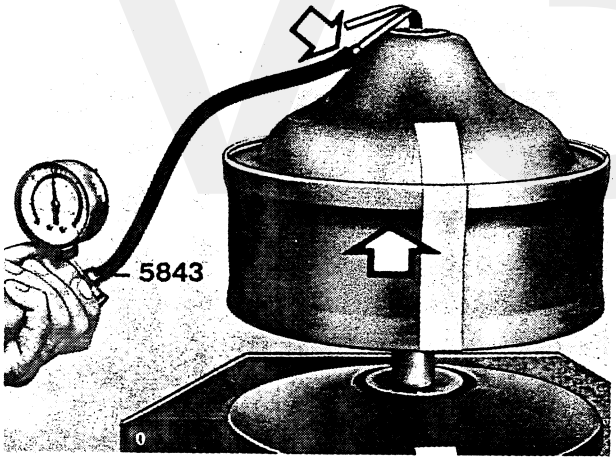
Use special tools **5833** and **5834.**



F48

Fit the side cover

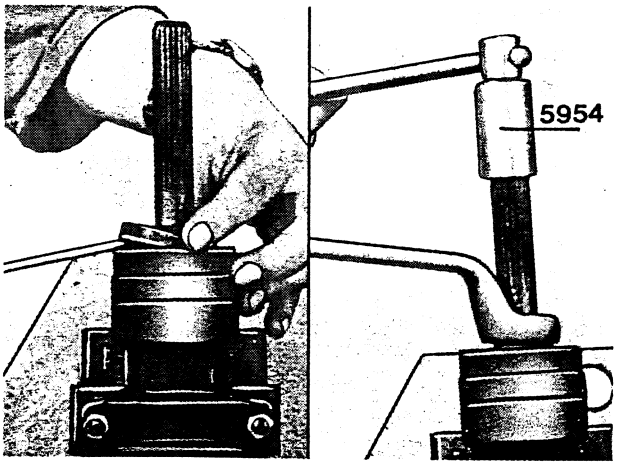
Fit the side cover on the primary CVT unit; fit in accordance with the marks made during disassembly.
Connect the short vacuum pipe to vacuum pump **5843.**
Create vacuum in the space under the side cover.
Centre the side cover.
Fit the lock ring.



F49

Check the vacuum

Connect vacuum pump **5843** to the long vacuum pipe.
When vacuum is applied, the sliding pulley half should move upwards.
Rotate the sliding pulley half and at the same time check the reading on the vacuum gauge. The **maximum** permissible drop in vacuum is 0.3 metres water column/minute (= 1" mercury column/min = 3 kPa/min).
Carry out these checks on both pulleys (left and right).



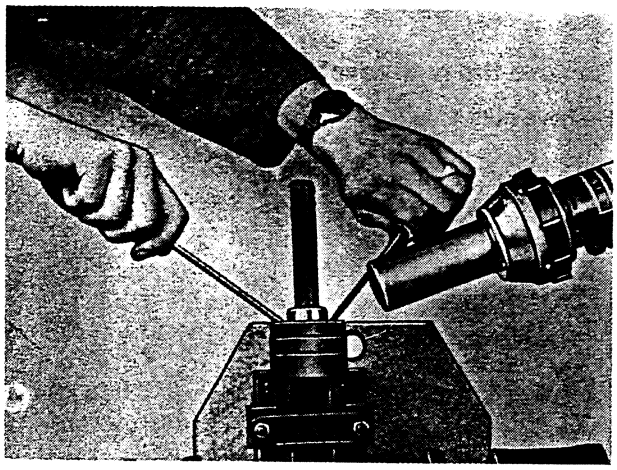
F50

Remove the oil seal from the pinion shaft

F51

Remove the nut from the pinion shaft

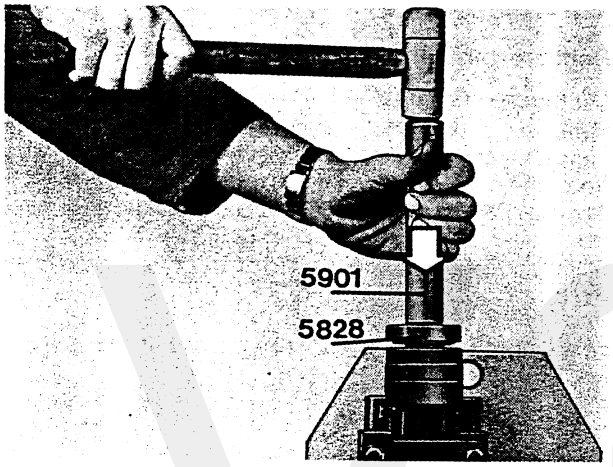
Use special tool **5954** to stop the pinion shaft from turning.
Remove the nut.



F52

Remove the shaft collar and the O-ring from the pinion shaft

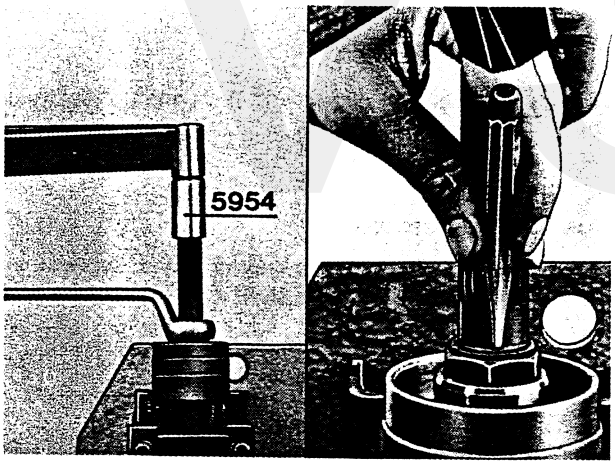
Heat the shaft collar before removal.



F53

Fit the shaft collar and the O-ring on the pinion shaft

Fit a **new** O-ring on the pinion shaft.
Smear the shaft collar with a thin film of grease.
Fit the shaft collar on the pinion shaft; use special tools **5901** and **5828.**



F54

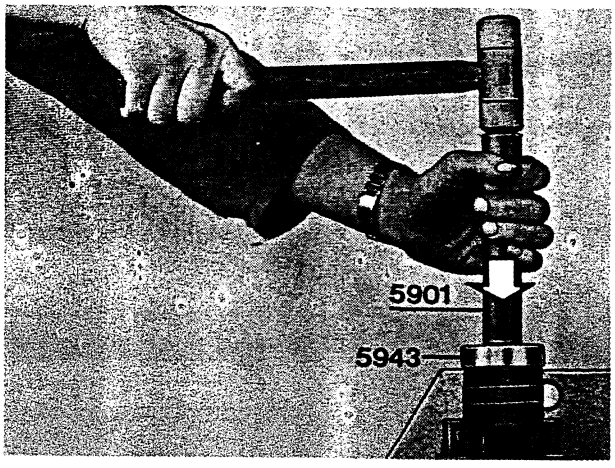
Fit the nut on the pinion shaft

Use special tool **5954.**
Tighten the nut to **50 Nm.**

F55

Stake the nut

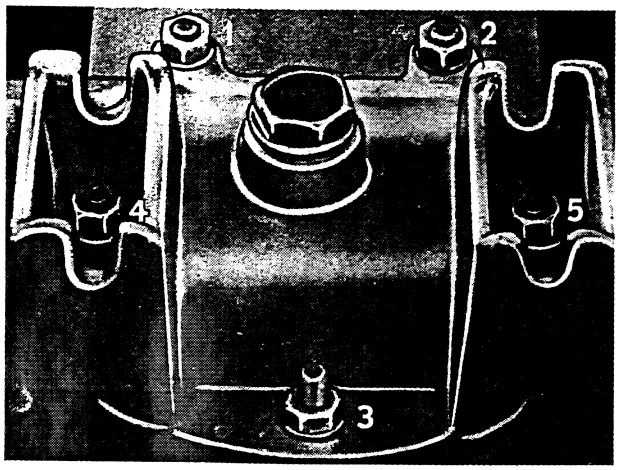
Stake the nut in the extended spline on the pinion shaft.



F56

Fit the oil seal

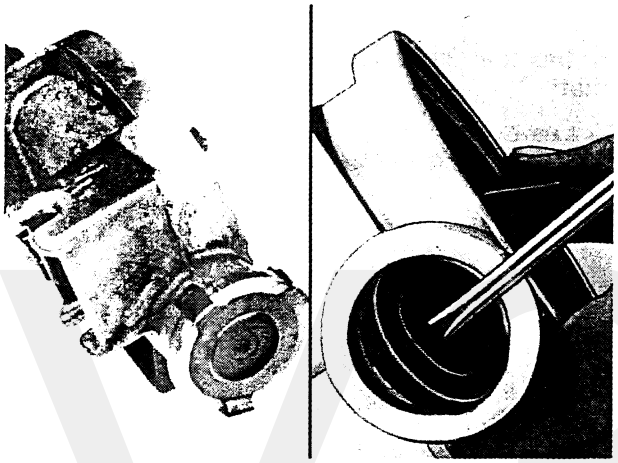
Use special tools **5901** and **5943.**



F57

Remove the rear cover

Remove nuts 1, 2, 3, 4 and 5.

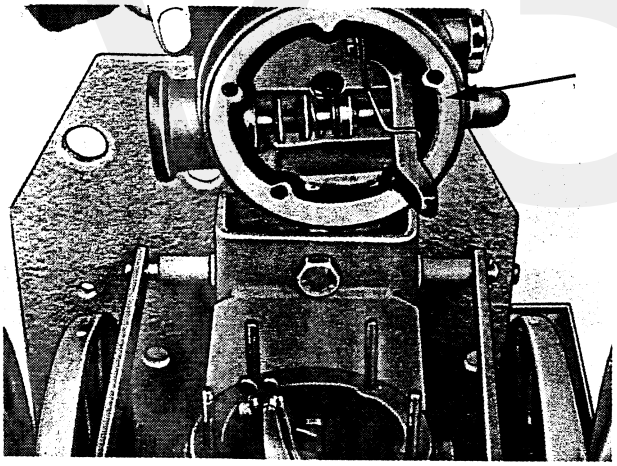


F58

Remove the cover plate

Cut through the locking wire.
Remove the lock ring.
Pierce the cover plate with a screwdriver and prise it out.
Note: the original cover plate has been superseded by a new type. When this new type of cover plate is fitted, the rear cover should also be replaced by a new type. Transfer all parts from the old rear cover to the new cover.

Fit the new cover plate and secure it with the lock ring.



F59

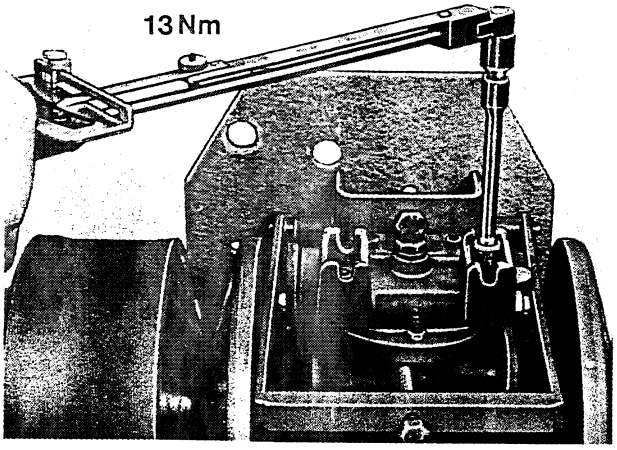
Fit a new gasket

Glue the new gasket carefully in the flange of the rear cover.

F60

Position the rear cover

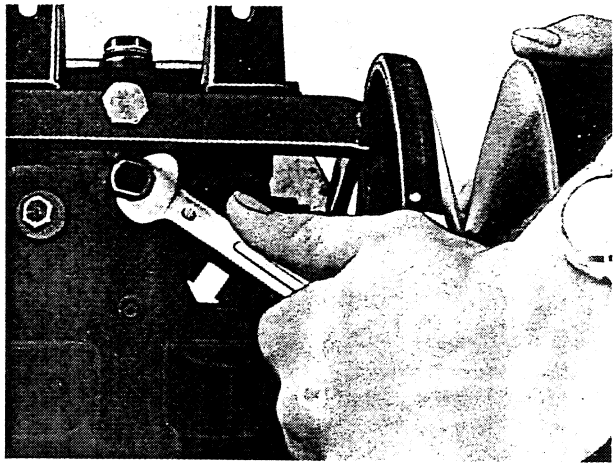
Make sure that the shift forks engage the corresponding grooves in the locking sleeve shaft.



F61

Secure the rear cover

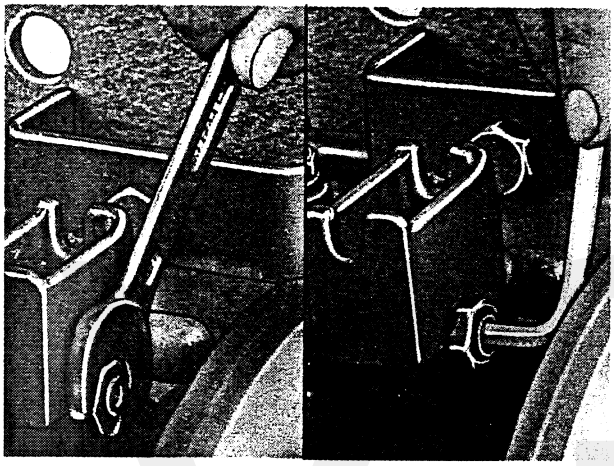
Tighten nuts 1, 2, 3, 4 and 5.
Tighten the nuts to **13 Nm.**



F62

Lock the primary CVT unit

Lock the transmission by moving the selector shaft to the **P** (parked) position.



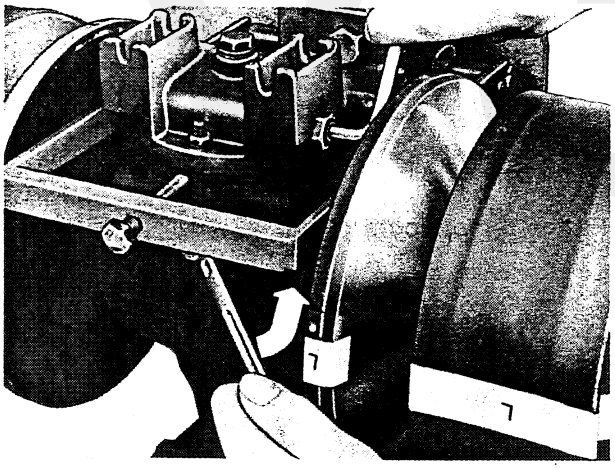
F63

Release the lock nut

F64

Back off the adjustment bolt

Back off the adjustment bolt to its **full extent** by turning it counter-clockwise.
The primary CVT unit will now remain locked in the **P** (parked) position.

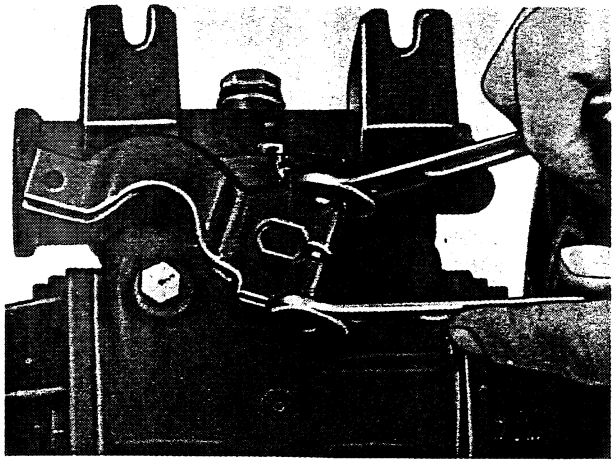


F65

Adjust the locking pawl

Turn the adjustment bolt clockwise until it is possible to move the primary CVT unit out of the **P** (parked) position.
Note: check whether the locking pawl disengages from the other 15 teeth of the forward drive gear. If not, readjust the locking pawl.

Tighten the lock nut on the adjustment bolt.



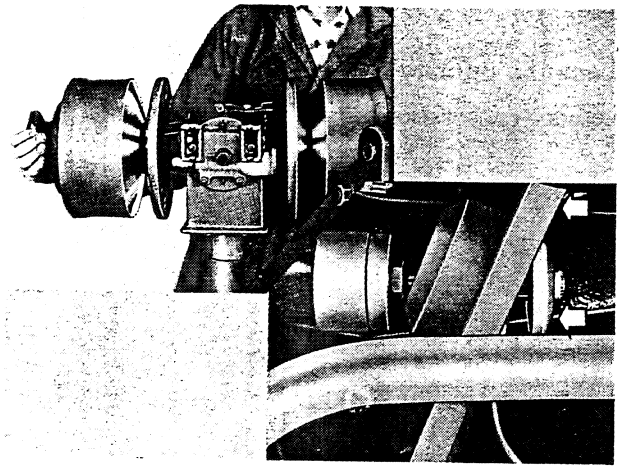
F66

Remove the primary CVT unit from the mounting clamp

Remove clamp **5939** and mounting plate **5800**.

F67

Fit the shift lever



F68 - F80

Installing the primary CVT unit

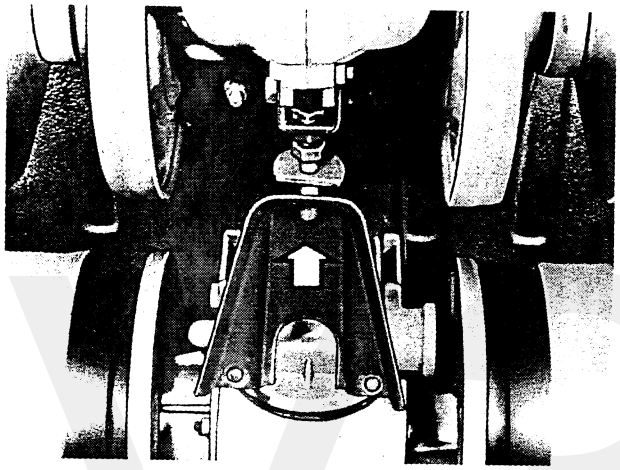
F68

Place the primary CVT unit on a stand

F69

Fit the rubber moulding

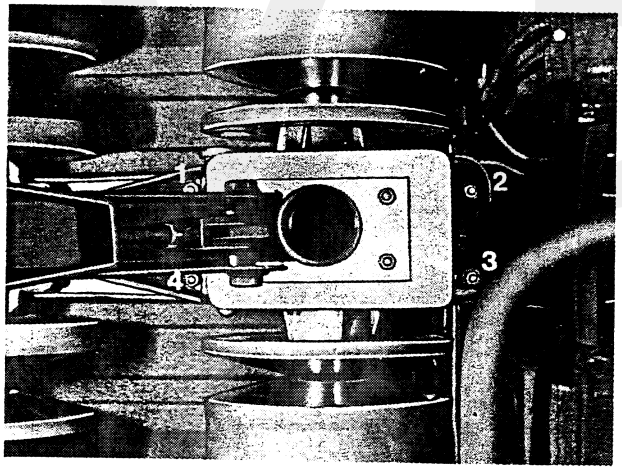
Raise the stand to working height.
Fit the rubber moulding.
Fit the dust cover so that the lug engages the extended spline.
Fit the spring.



F70

Fit the adjusting bracket

Secure the primary CVT unit finger-tight.
Fit the lock nut.



F71

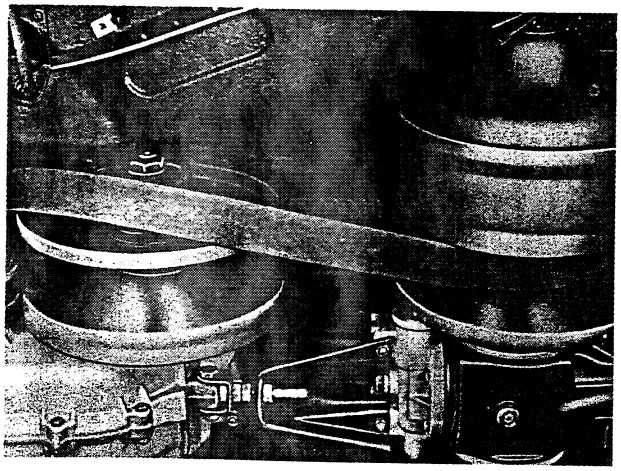
Tighten the nuts

Tighten the nuts to **26 Nm.**
Remove the stand.

F72

Fit the remote control rod

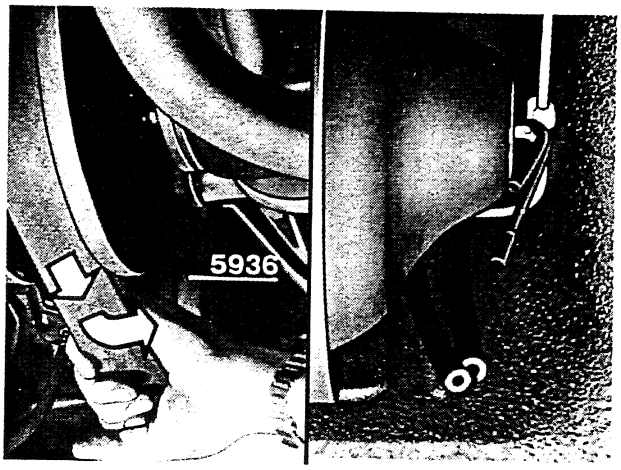
See Operation *E30.*



F73

Fit the drive belts

Note: check the condition of the belts before fitting.
Spread the secondary unit pulley halves; see Operation *F7.*
Clean the bearing surfaces of the pulley halves with acetone.
Fit the belts over the primary CVT unit.
Pull the belts in between the pulley halves.
Fit the belts over the secondary CVT unit.



F74

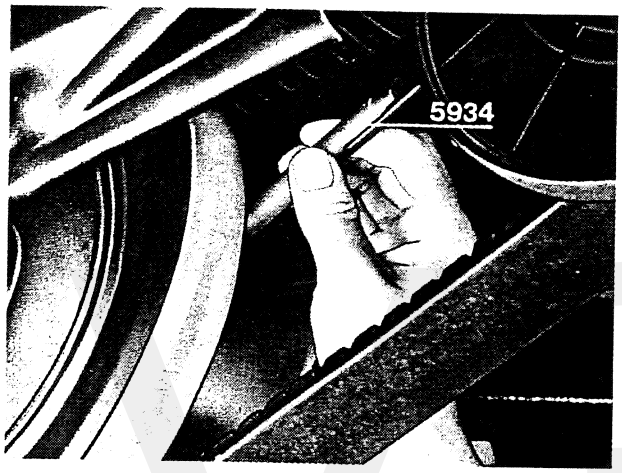
Remove the spacer blocks

Pull the belts against the sliding pulley halves.
Remove spacer blocks **5936.**

F75

Connect up the vacuum hoses

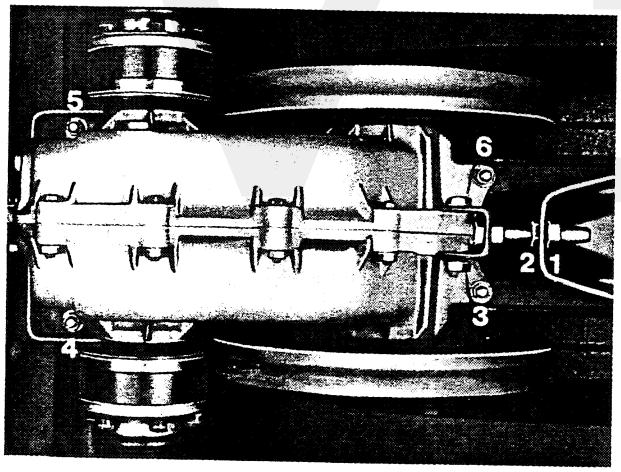
Connect the vacuum hoses to the vacuum connecting pipe assembly.



F76

Adjust the gap between the secondary unit pulley halves

Slide the secondary CVT unit back to its approximate original position.
Tighten the adjusting nut.
Roll the car back and forth until the drive belts are positioned in between the secondary pulleys at the top.
Check the gap between the pulley halves.
This gap should be at least 1.5 mm; if necessary, adjust the gap to 1.5-2 mm.
Note: when new belts have been fitted, the setting must be checked again after 1,000-1,500 km.



F77

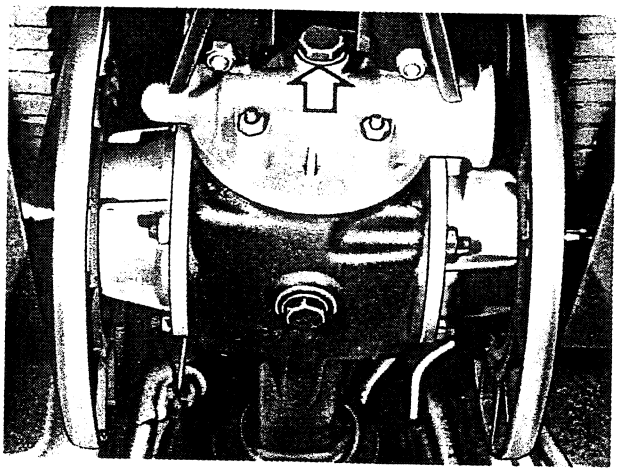
Secure the secondary CVT unit

Tighten nuts 3, 4, 5 and 6 to **26 Nm.**
Tighten the lock nut (1).

F78

Check the oil level of the primary CVT unit

If necessary, top-up with SAE 80 or SAE 80W/90 (API GL-4 or API GL-5).
Nordic countries: ATF, type F.



F79

Fit the propeller shaft

See Operation *E33.*

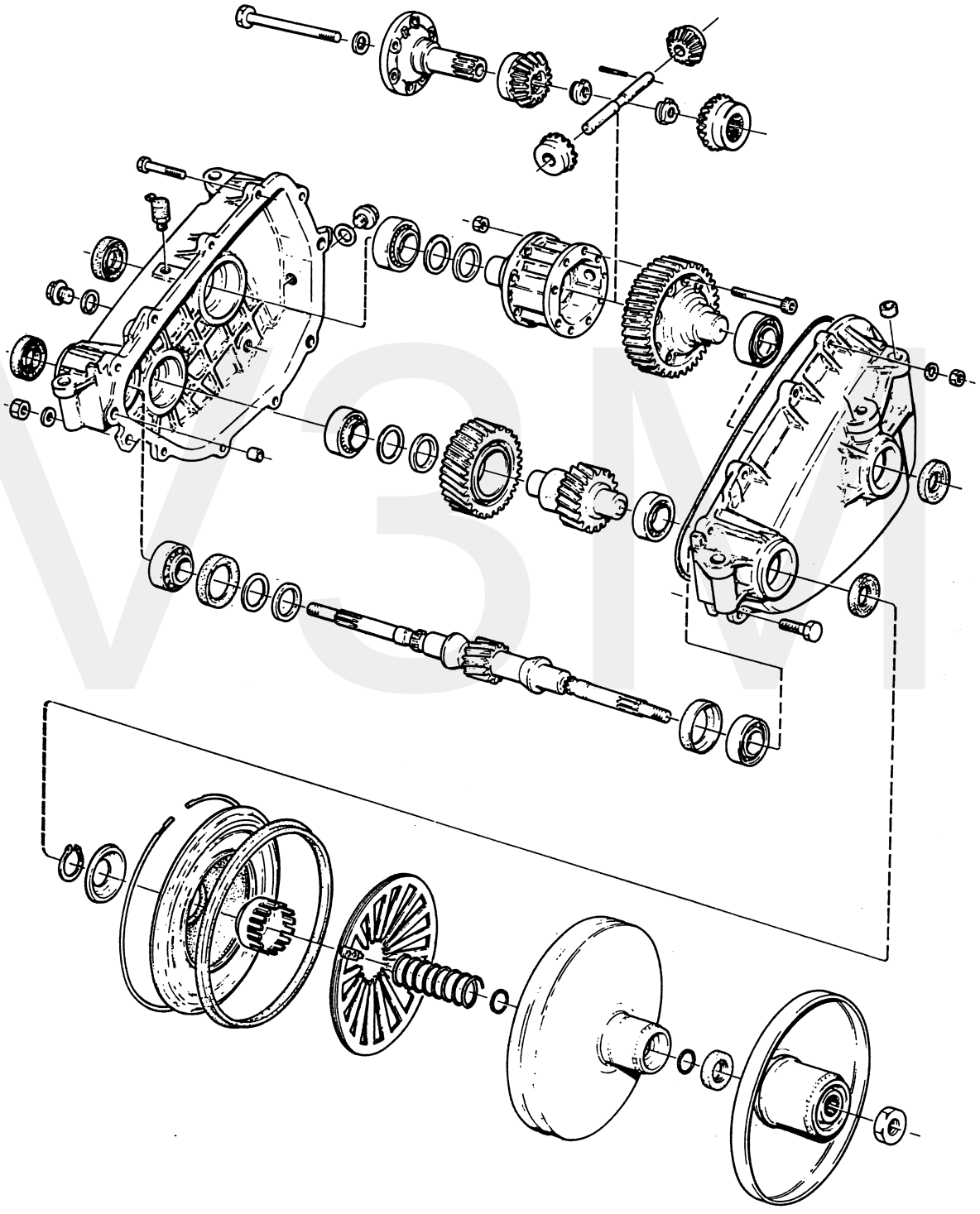
F80

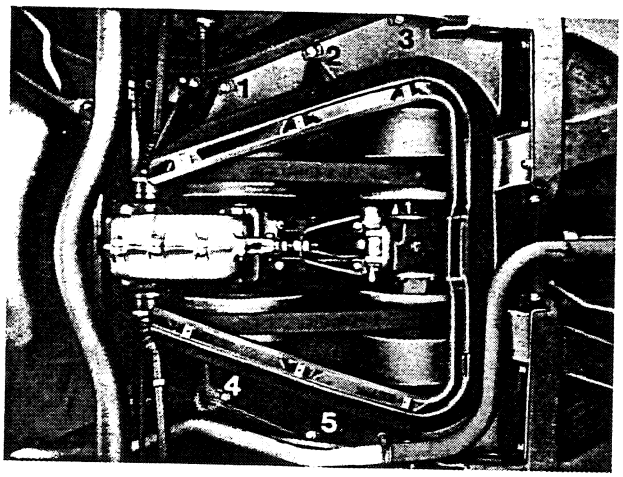
Further assembly operations

Secure the transmission guard plate outer rim; see Operation *F3.*
Secure the exhaust pipe front mounting strap; see Operation *F2.*
Fit the transmission guard plate; see Operation *F1.*

G. Secondary CVT unit

Special tools: 2520, 5800, 5830, 5885, 5886, 5887, 5888, 5891, 5923, 5935, 5946





G1 - G8

Removing the secondary CVT unit

G1

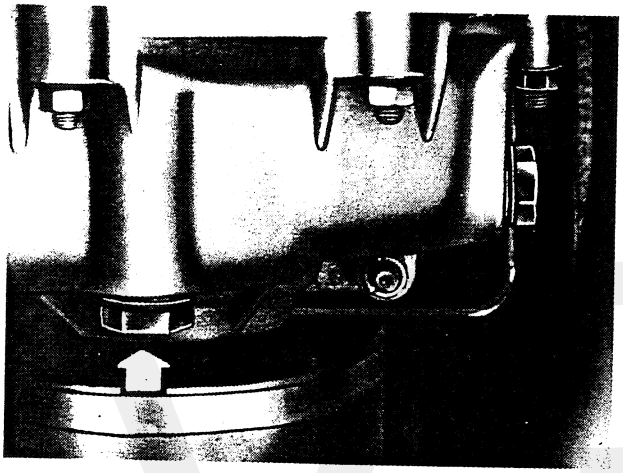
Remove the transmission guard plate

See Operation *F1*.

G2

Release the transmission guard plate outer rim

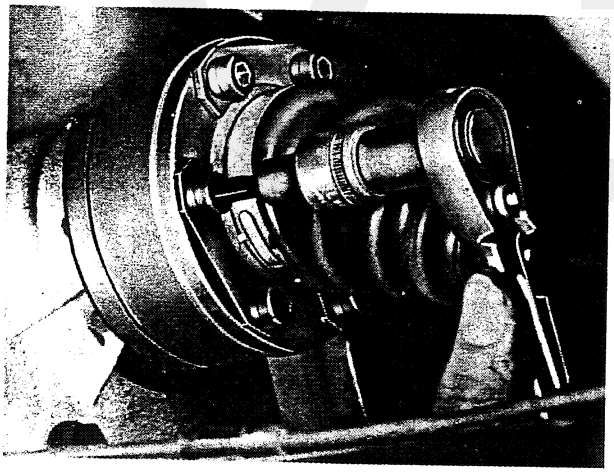
Remove bolts 1, 2, 3, 4 and 5.
Push the outer rim to one side.



G3

Drain the oil

Remove the drain plug.
Drain the oil from the secondary CVT unit.
Fit the drain plug.



G4

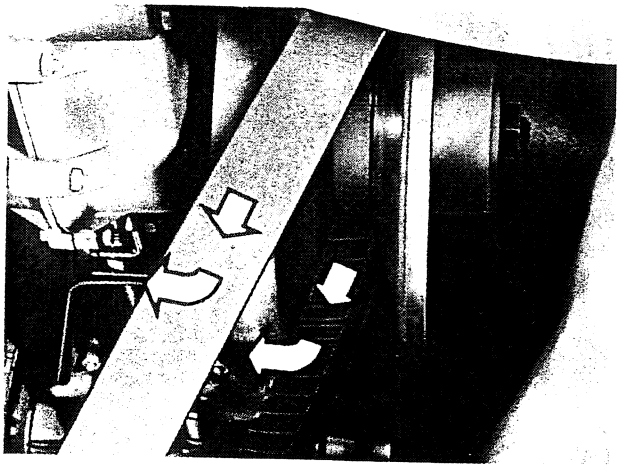
Release the half-shafts

Remove the hexagon socket-head screws.
Suspend the half-shafts from the handbrake cables.

G5

Remove the drive belts

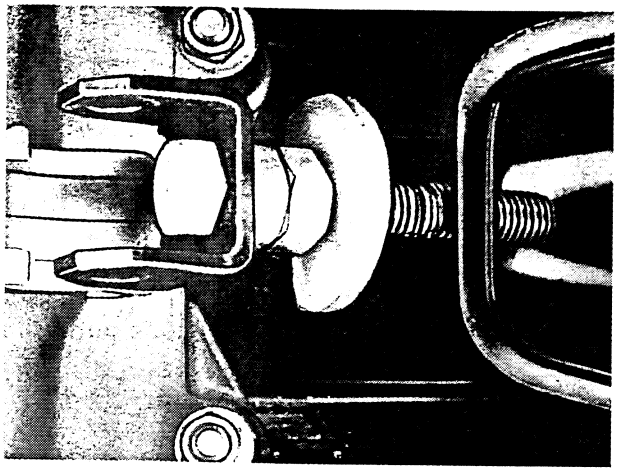
See Operations *F6 - F9*.



G6

Remove the spacer blocks

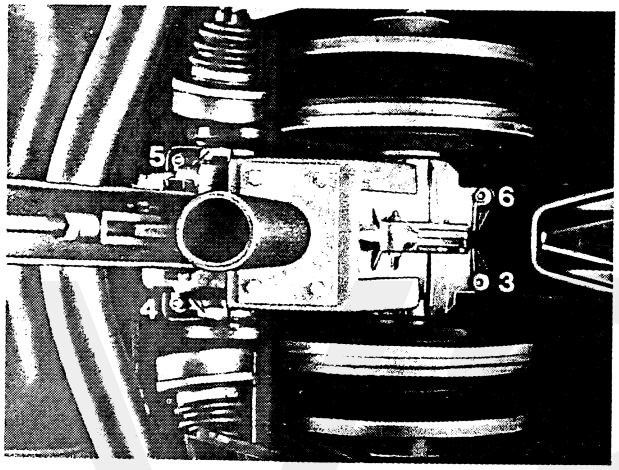
Position the drive belts between the secondary pulley halves.
Pull the belts in between the pulley halves in the direction of the sliding pulley half.



G7

Release the belt tensioner

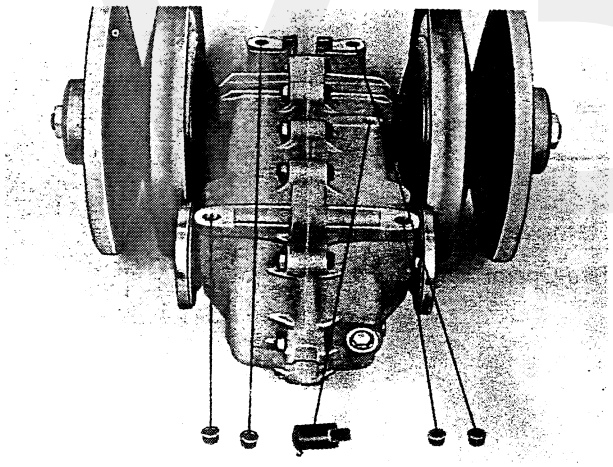
Remove the clamping bolt and mounting bracket from the secondary CVT unit.



G8

Remove the secondary CVT unit

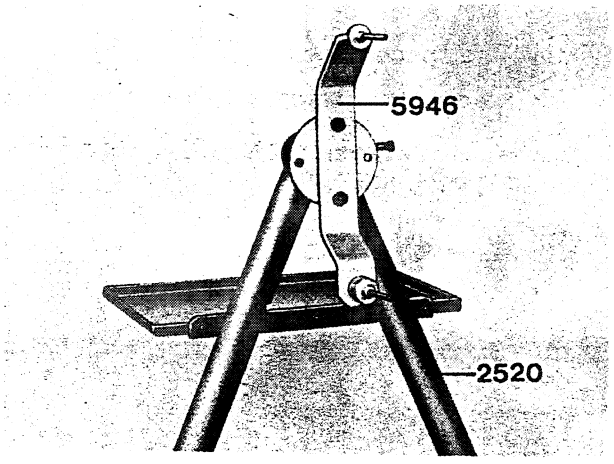
Support the secondary CVT unit.
Remove retaining nuts 3, 4, 5 and 6.
Remove the secondary CVT unit.



G9

Exchange the plug and rubber bushes

(when an exchange unit is being installed)
Remove the plug from the new CVT unit and replace it with the vent nipple from the old unit.
Exchange the rubber bushes in the mounting holes.



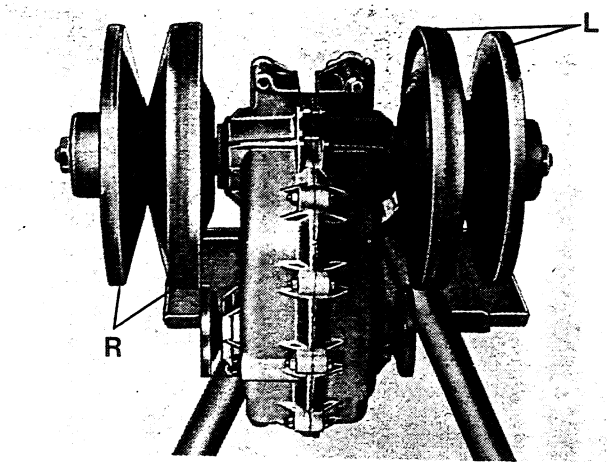
G10 - G34

Reconditioning the secondary CVT unit

G10

Assemble the mounting fixture

Fit mounting plate **5800** and support bracket **5946** on stand **2520.**



G11

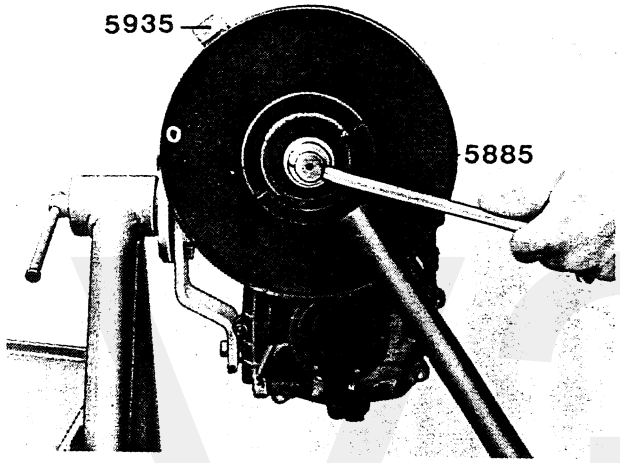
Secure the secondary CVT unit on the mounting fixture

Secure the secondary CVT unit in the vertical position on support bracket **5946**, using the mounting holes in the gear case half **without** the vent nipple.

G12

Mark the pulley halves, diaphragm and gear shaft

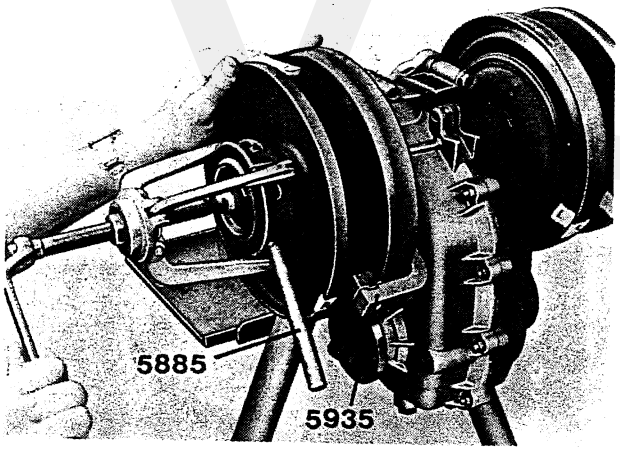
Mark the components with 'L' for left and 'R' for right, as appropriate.



G13

Remove the nut from the gear shaft

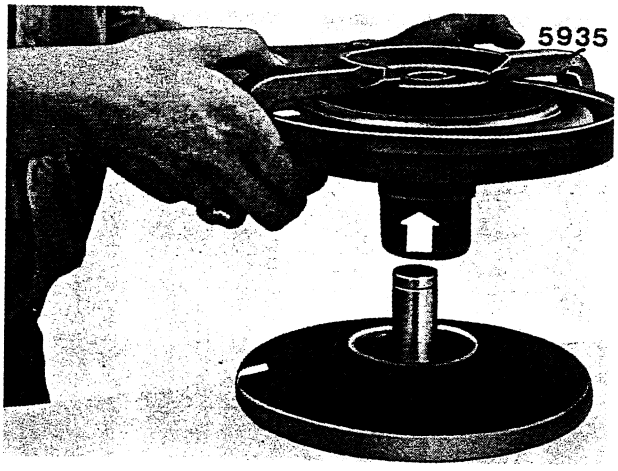
Use special tools **5885** and **5935.**
Use a pipe to extend the length of special tool **5885** so that more force can be applied.



G14

Remove the pulley

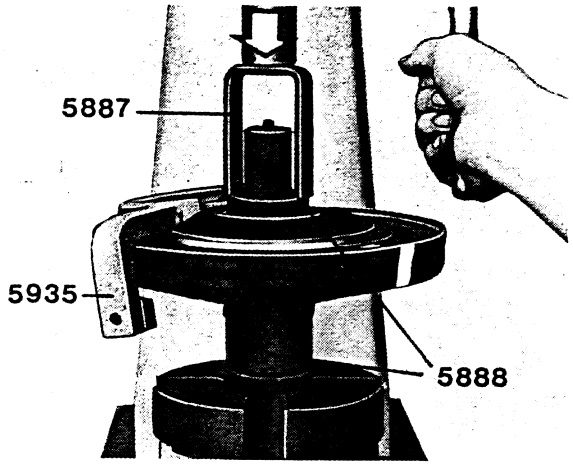
Use a standard gear puller.
Remove the fixed and sliding pulley halves at the same time.



G15

Separate the sliding pulley half from the fixed pulley half

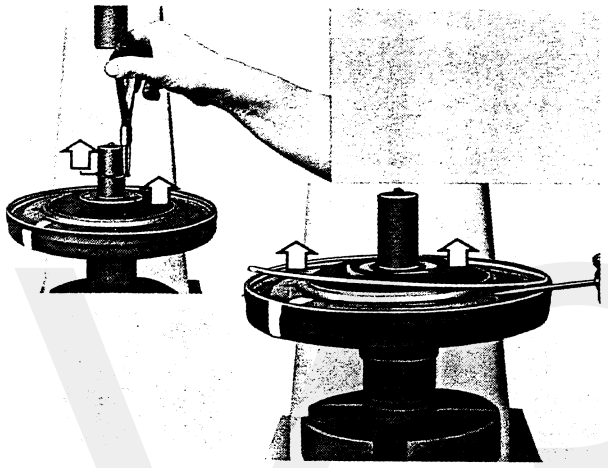
Keep the sliding pulley half upright to avoid possible oil spillage.



G16

Remove special tool 5935

Fit the long part of special tool **5888.**
Compress the diaphragm and spring assembly with special tool **5887.**
Screw in the short part of special tool **5888** as far as the stop.
Remove special tool **5935.**

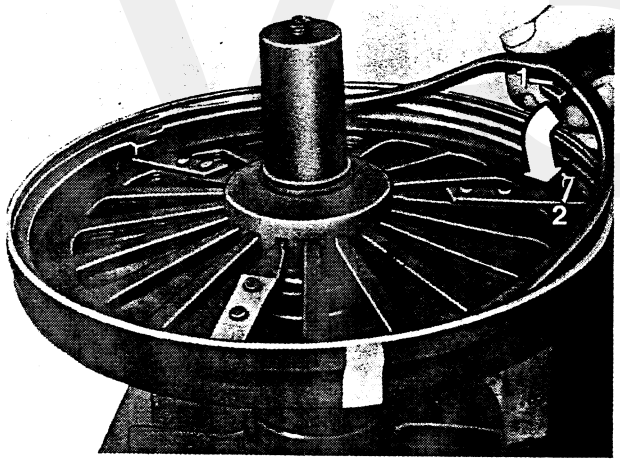


G17

Remove the circlip and the end plate

G18

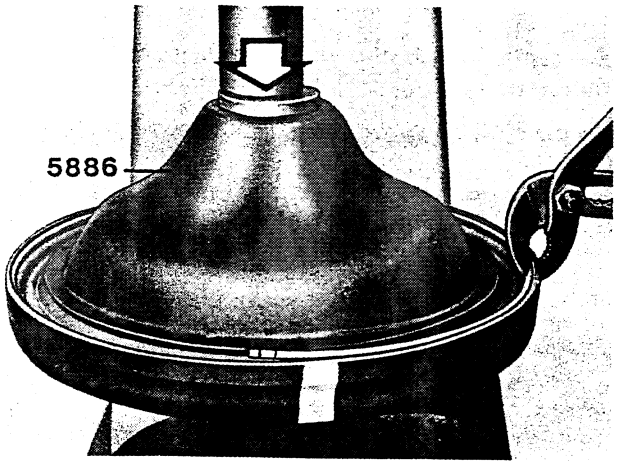
Remove the lock ring and the diaphragm



G19

Fit a new sealing ring

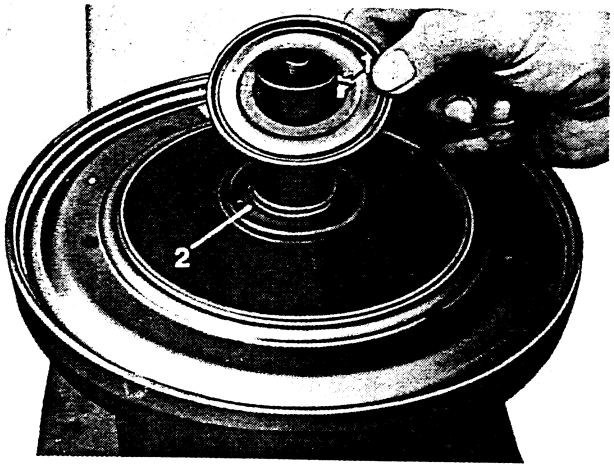
The lugs (1) must engage the recesses (2).
If necessary, top-up with Automatic Transmission Fluid, type A/A; capacity: 75 cc.



G20

Fit the diaphragm

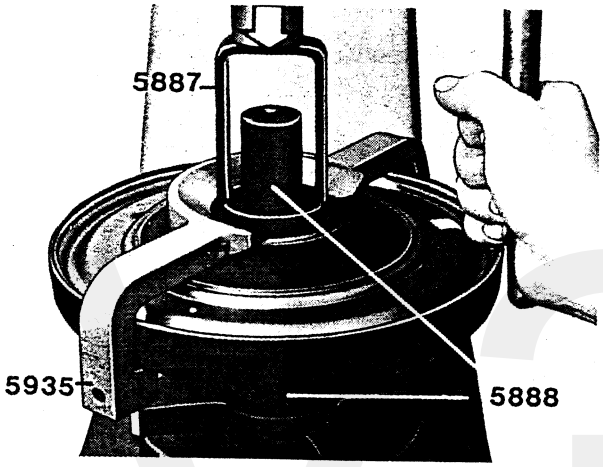
Fit the diaphragm in accordance with the marks made during disassembly.
Compress the diaphragm with special tool **5886** and fit the lock ring.



G21

Fit the end plate

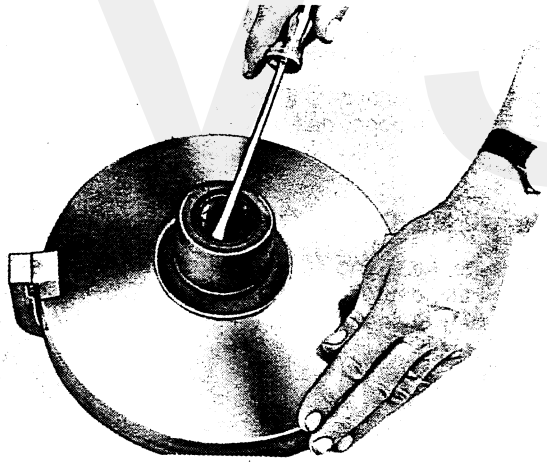
Turn the hole (1) in the end plate 180° relative to hole (2).



G22

Fit the circlip

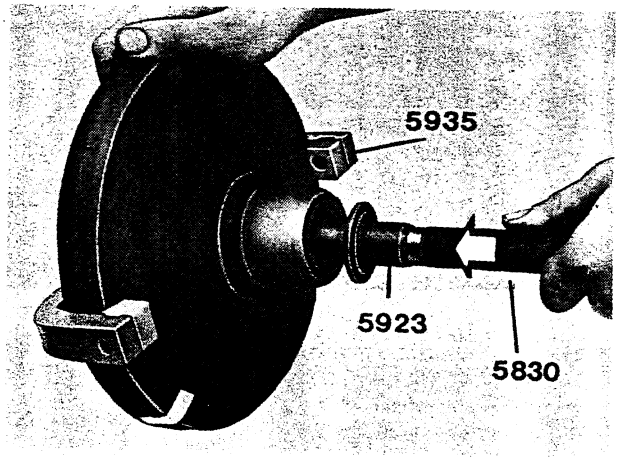
Press the circlip into the groove in the shaft with special tool **5887.**
Fit special tool **5935.**
Remove special tools **5887** and **5888.**



G23

Remove the grease retainer and the O-rings

Remove the grease retainer and the O-rings from the hub of the sliding pulley halves.
Clean the hub and pack it with new grease (Gleitmo 500 or Molykote BR 2S).



G24

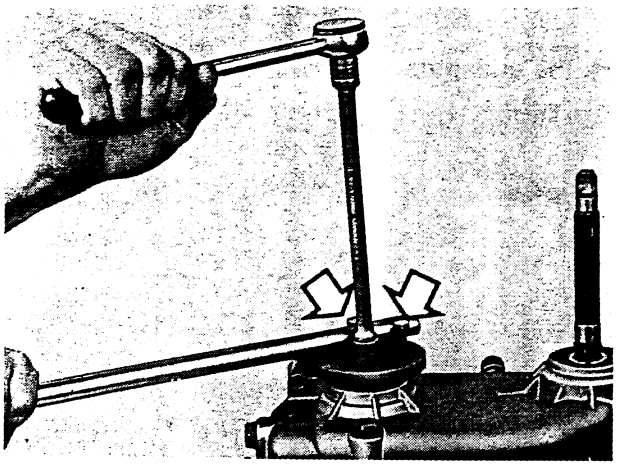
Fit the grease retainer and the O-rings

Fit the O-rings.
Use special tools **5923** and **5830** to fit the grease retainer.

G25

Assemble the fixed and sliding pulley halves

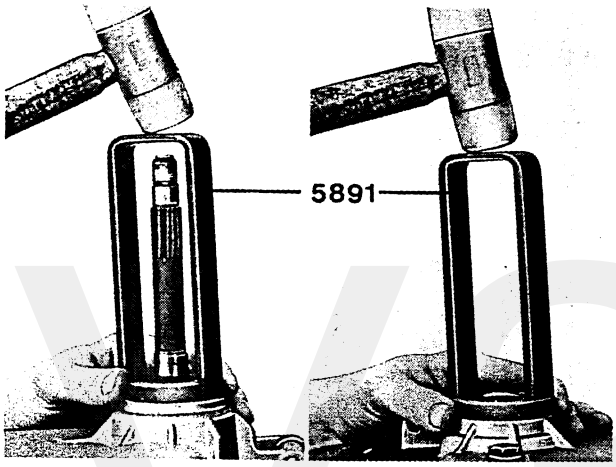
Assemble in accordance with the marks made during disassembly.



G26

Remove the flanged axle shaft

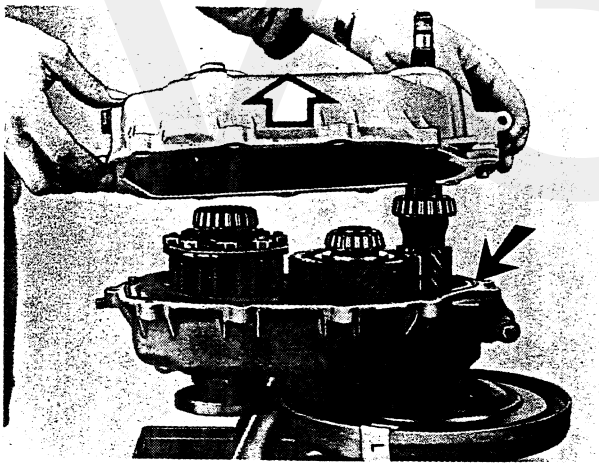
Turn mounting plate **5800** through an angle of 90°.
Fit two bolts in the axle shaft flange.
Remove the centre bolt from the axle shaft.



G27

Renew the oil seals

Remove the oil seals from the half-shaft and from the pulley gear shaft.
Fit new seals with special tool **5891.**



G28

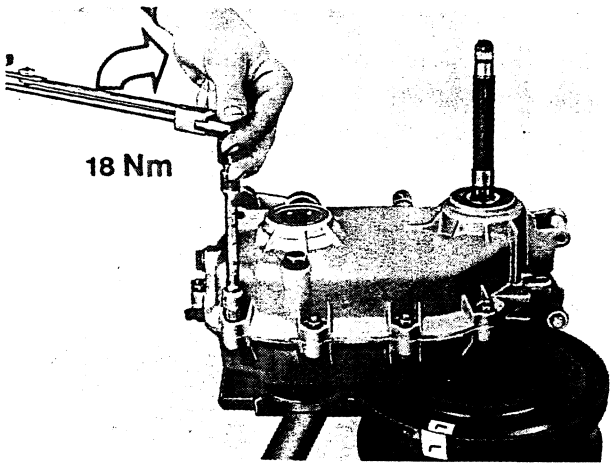
Open the gear case

Remove the attachment bolts.
Remove the upper half of the gear case.

G29

Renew the O-ring

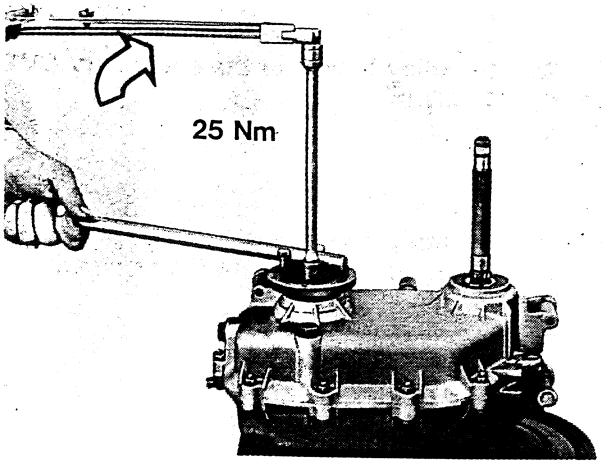
Remove the O-ring.
Clean and degrease the groove.
Fit a **new** O-ring **without** grease (dry).



G30

Assemble the gear case

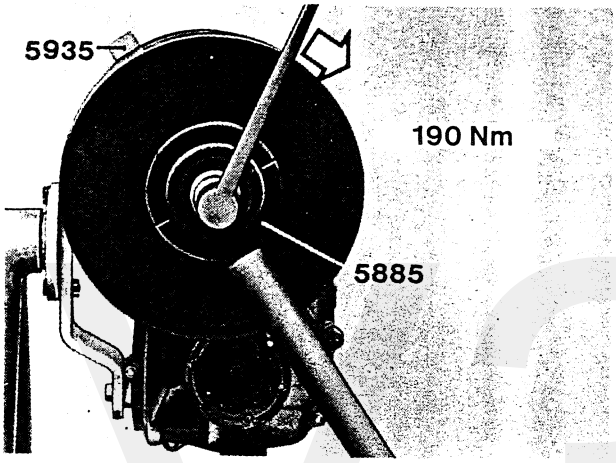
Fit the upper half of the gear case.
Fit and tighten the bolts to **18 Nm.**



G31

Fit the flanged axle shaft

Introduce the axle shaft.
Fit the bolt and tighten to **25 Nm.**
Remove the two bolts from the axle shaft flange.
Turn mounting plate **5800** through an angle of 90°.



G32

Fit the pulley

Fit the pulley on the gear case in accordance with the marks made during disassembly.
Clean the screw thread of the pulley attachment bolt and apply a few drops of Loctite 241 to the screw thread.
Use special tool **5885** to stop the fixed pulley half from turning.
Tighten the pulley attachment bolt; tightening torque: 190 Nm.
Remove special tools **5935** and **5885.**

G33

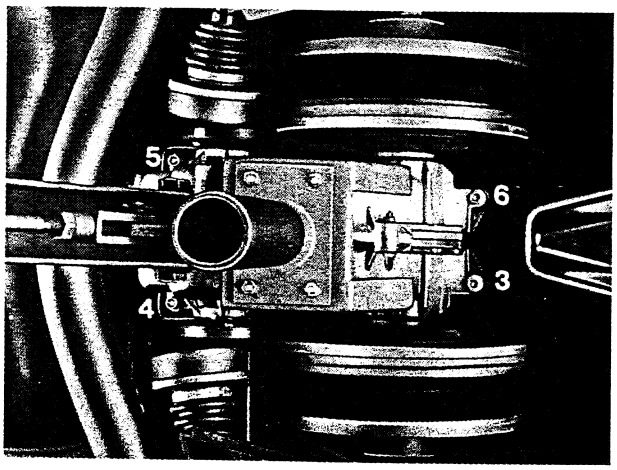
Repeat Operations *G13* - *G25* for the other pulley halves.

Repeat Operations *G26* - *G31* for the other side of the gear case.

G34

Remove the secondary CVT unit from the assembly fixture

Fill the gear case with 1.03 litres of oil: SAE 80 or SAE 80W/90 (API GL-4 or API GL-5).
Nordic countries: ATF, type F.



G35 - G41

Installing the secondary CVT unit

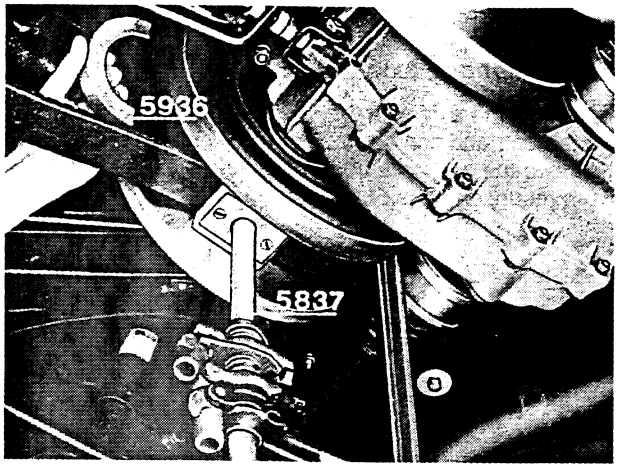
G35

Place the secondary CVT unit on a stand

G36

Fit the attachment bolts

Secure bolts 3, 4, 5 and 6 finger-tight.
Fit the clamping bolt and mounting bracket of the belt tensioner on the secondary CVT unit.



G37

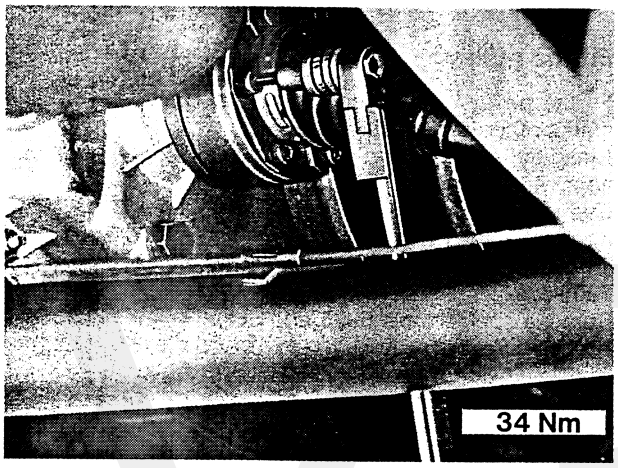
Spread the pulley halves of the secondary CVT unit

See Operation *F7.*

G38

Further assembly operations

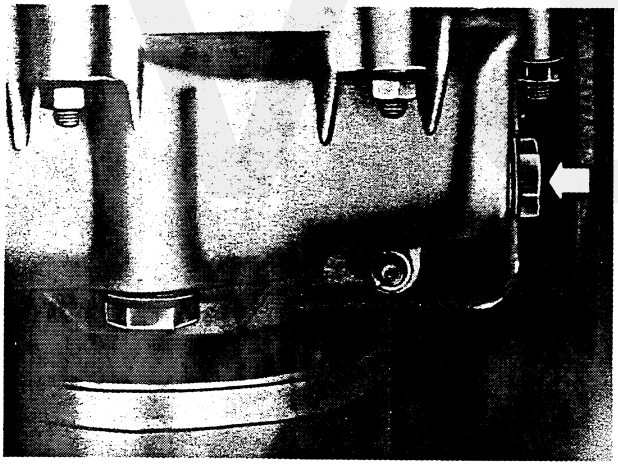
See Operations *F73 - F77.*



G39

Fit the half-shafts

Use new gaskets.
Fit the half-shafts and tighten the hexagon socket-head screws to **34 Nm.**
Remove any excess grease from the flanges.



G40

Check the oil level

If necessary, top-up with SAE 80 or SAE 80W/90 (API GL-4 or API GL-5).
Nordic countries: ATF, type F.

G41

Fit the transmission guard plate

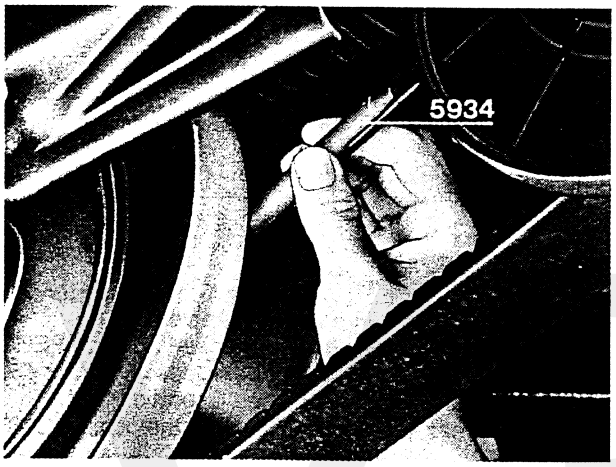
Secure the transmission guard plate outer rim.
Fit the transmission guard plate.

H. Repairs and adjustments under the car

Special tools: 5891, 5934

H1 - H2

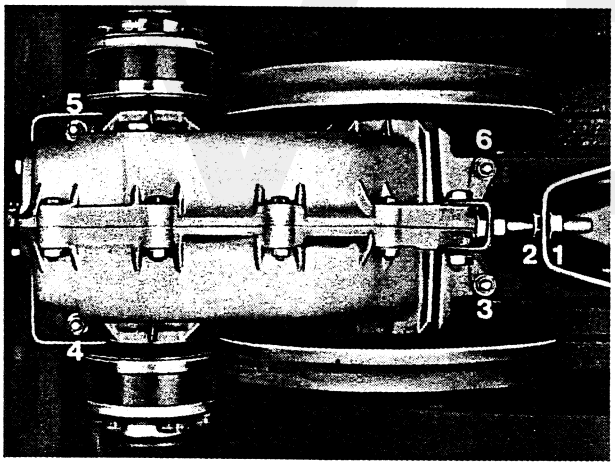
Adjusting the gap between the pulley halves of the secondary CVT unit



H1

Check the gap between the secondary unit pulley halves

Remove the transmission guard plate; see Operation *E27*.
Check the gap between the pulley halves.
This gap should be at least 1.5 mm.
If necessary, adjust the gap to 1.5-2 mm.
Note: when new belts have been fitted, the setting must be checked again after 1,000-1,500 km.



H2

Adjust the gap between the secondary unit pulley halves

Back off the lock nut (1).
Slacken nuts 3, 4, 5 and 6 (do **not** remove).
Pull the belts carefully in between the pulley halves.
Roll the car back and forth until the drive belts are positioned in between the secondary pulleys at the top.
Adjust the gap **(1.5-2 mm)** between the pulley halves with the adjusting nut (2).
Measure the distance between the pulley halves with special tool **5934**.
Tighten nuts 3, 4, 5 and 6; tightening torque: 26 Nm.
Tighten the lock nut (1).
Fit the transmission guard plate.

H3 - H6

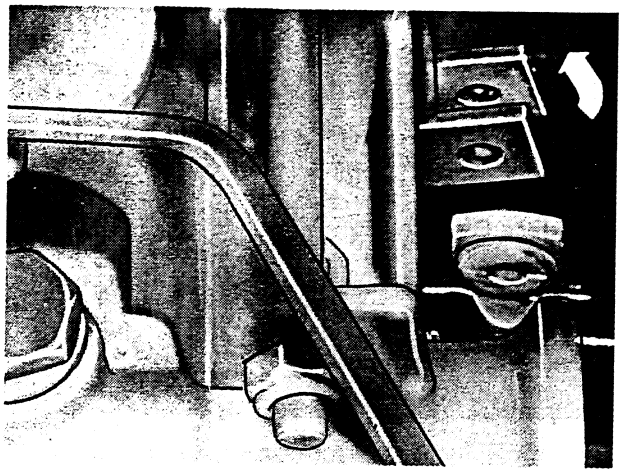
Adjusting the P (parked) position

H3

Preliminary operations

Remove the transmission guard plate; see Operation *E27*.
Disconnect the remote control rod from the primary CVT unit; see Operation *E28*.

H4



Lock the primary CVT unit

Lock the transmission by turning the fork on the selector shaft so that the transmission engages the **P** (parked) position.

H5

Adjust the locking pawl

See operations *F63 - F65.*

H6

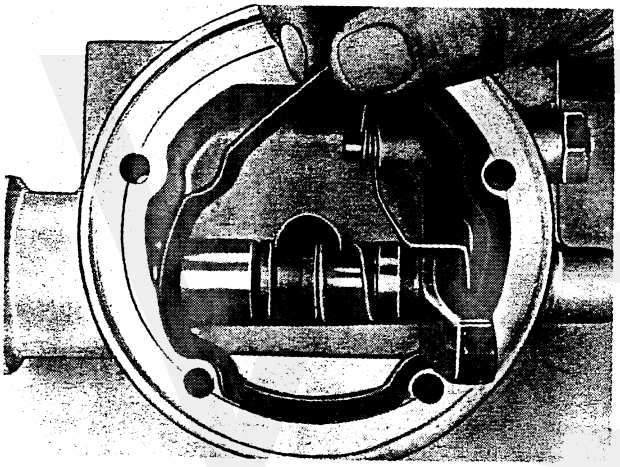
Remaining operations

Fit the remote control rod and the transmission guard plate; see Operation *E30.*
Check the selector lever for correct operation.

H7 - H9

Renewing the rear cover gasket on the primary CVT unit

H7



Preliminary operations

Put the selector lever in position **D** (drive).
Remove the transmission guard plate; see Operation *E27.*
Drain the oil from the primary CVT unit; see Operation *F5.*
Remove the adjusting bracket; see Operation *F12.*
Remove the rear attachment bolts from the primary CVT unit.

H8

Renew the gasket

Remove the rear cover; see Operation *F57.*
Fit a new gasket and replace the rear cover; see Operations *F59 - F61.*

H9

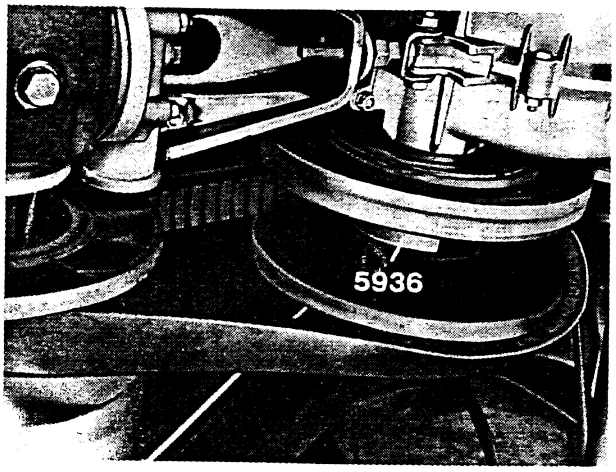
Remaining operations

Fit the rear attachment bolts of the primary CVT unit.
Secure the adjusting bracket finger-tight.
Tighten the attachment bolts of the primary CVT unit; tighten to **26 Nm.**
Tighten the nut on the adjustment bolt.
Fit the lock nut on the adjustment bolt.
If necessary, adjust the gap between the secondary unit pulley halves; see Operation *F76.*
Fill the primary CVT unit with oil; see Operation *F78.*
Fit the transmission guard plate.

H10 - H11

Renew the drive belts

H10



Preliminary operations

Remove the transmission guard plate; see Operation *E27.*
Release the transmission guard plate outer rim; see Operation *F3.*
Spread the secondary unit pulley halves; see Operation *F7.*
Slacken the drive belts; see Operation *F8.*
Release the vacuum hoses from the vacuum connecting pipe assembly.
Remove the drive belts; see Operation *F9.*

H11

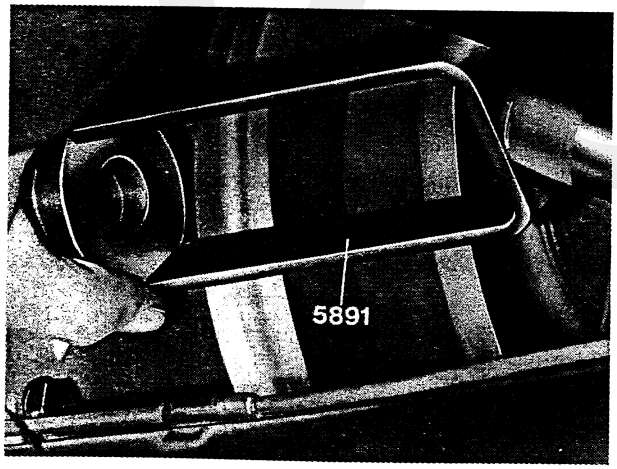
Fit the drive belts

See Operations *F73 - F77.*
Secure the transmission guard plate outer rim.
Fit the transmission guard plate.

H12 - H14

Renewing the oil seal behind the axle shaft flange of the secondary CVT unit

H12



Preliminary operations

Remove the transmission guard plate; see Operation *E27.*
Release the transmission guard plate outer rim; see Operation *F3.*
Drain the oil from the secondary CVT unit; see Operation *G3.*
Release the half-shaft; see Operation *G4.*

H13

Renew the oil seal

Remove the flanged axle shaft; see Operation *G26.*
Check the bearing surface of the seal on the axle shaft for evidence of wear.
Fit a new axle shaft oil seal; use special tool **5891.**

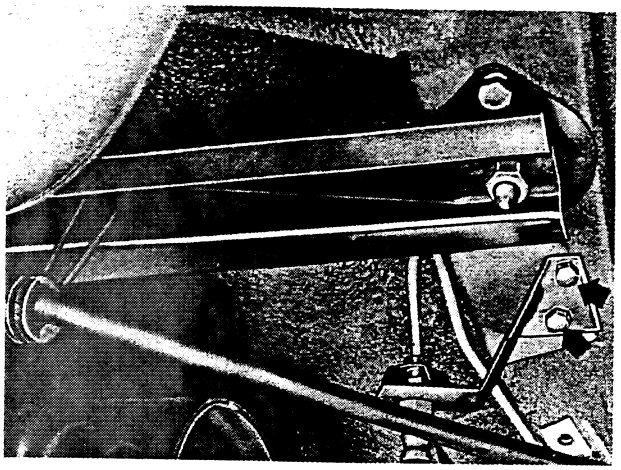
H14

Remaining operations

Fit the flanged axle shaft; see Operation *G31.*
Fit the half-shaft; see Operation *G39.*
Fill the secondary CVT unit with oil; see Operation *G40.*
Secure the transmission guard plate outer rim.
Fit the transmission guard plate.

H15 - H17

Renewing the oil seal behind the sliding pulley half of the secondary CVT unit



H15

Preliminary operations

Remove the transmission guard plate; see Operation *E27.*
Unhook the exhaust pipe front mounting strap; see Operation *F2.*
Release the transmission guard plate outer rim; see Operation *F3.*
Release the brake pipe bracket; see the adjacent illustration.
Remove the drive belts; see Operations *F6 - F9.*
Recondition the sliding pulley halves; see Operations *G6* and *G12 - G25.*

H16

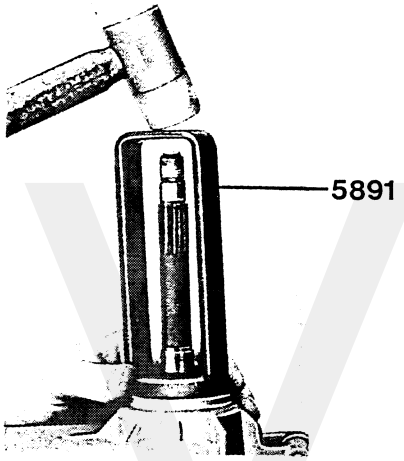
Renew the oil seal on the pulley gear shaft

Fit a new oil seal (only on the pulley gear shaft); use special tool **5891** to fit the oil seal.
Fit the pulley; see Operation *G32.*

H17

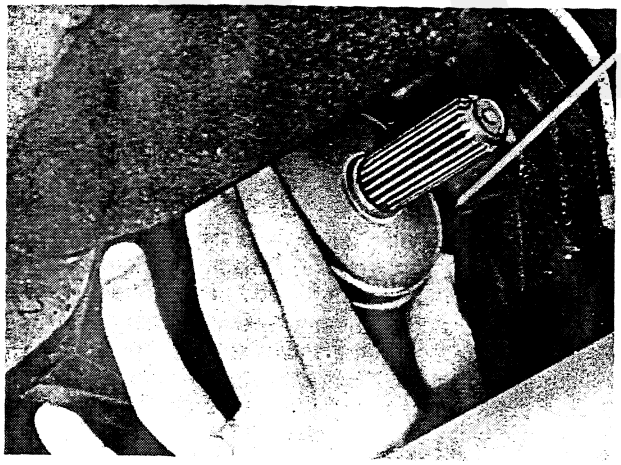
Remaining operations

Fit the drive belts; see Operations *F73 - F77.*
Secure the brake pipe bracket.
For the remaining assembly operations see *F3 - F1.*



H18 - H21

Renewing the pinion shaft oil seal, shaft collar and O-ring



H18

Preliminary operations

Remove the transmission guard plate; see Operation *E27.*
Remove the heat shield; see Operation *E1.*
Remove the propeller shaft; see Operation *C5.*
Drain the oil from the primary CVT unit.

H19

Remove the dust cover

Push back the rubber moulding.
Remove the spring.
Remove the dust cover.

H20

Renew the oil seal

See Operations *F50 - F56.*

H21

Remaining operations

Return the rubber moulding to its original position; see Operation *F69.*
Fit the propeller shaft; see Operation *E33.*
Fit the heat shield.
Fill the primary CVT unit with oil; see Operation *F78.*
Fit the transmission guard plate.

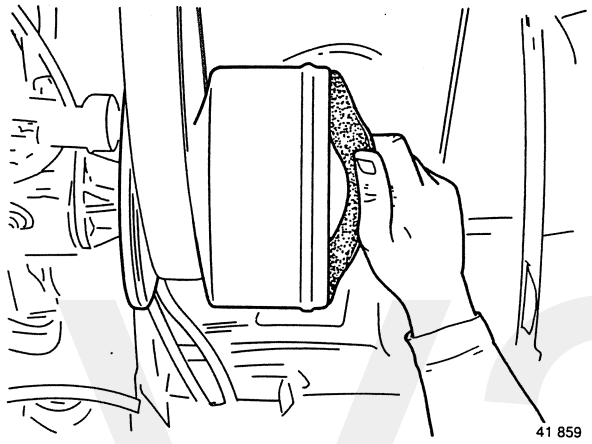
H22 - H26

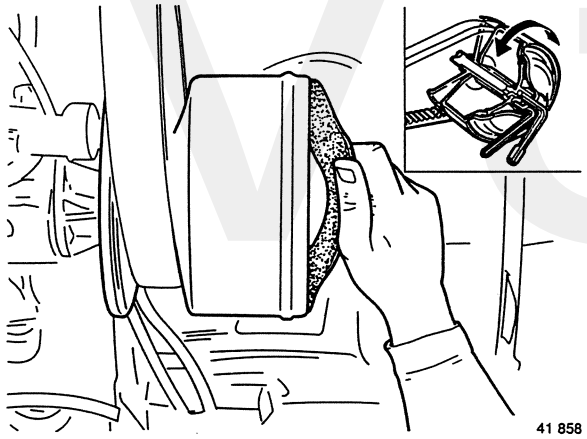
Renewing the vacuum connecting pipe assembly and sealing sleeve oil seal ring and/or diaphragm

Preliminary operations

H22

Remove the transmission guard plate; see Operation *E27*.
Unhook the exhaust pipe front mounting strap; see Operation *F2*.
Release the transmission guard plate outer rim; see Operation *F3*.
Release the vacuum hoses from the vacuum connecting pipe assembly and use special tool **5843** to determine which side is leaking.
Spread the secondary unit pulley halves; see Operation *F7*.
Position the drive belts at the top of the primary unit pulleys so that the pulley halves are as close to each other as possible.
Mark the pulley halves and the side covers ('L' and 'R').
Remove the side cover; see Operation *F19*.





H23

Drain the oil from the pulley

Partly release the diaphragm of the sliding pulley half and pull the pulley outwards.
Remove the support ring over the diaphragm.
Collect the escaping oil.

H24

Remove the diaphragm

Rotate the primary unit until the hole in the centrifugal weight carrier is pointing upwards.
Put the transmission in position **P** (the transmission is now locked).
Insert a Ø 3.5 mm pin in the hole in the centrifugal weight carrier.
Release the nut in the sealing sleeve; when the nut is slackened, the holes in the carrier and the shaft are brought into line with each other.
While slackening the nut, feel whether the pin engages the hole in the shaft.
Remove the nut. The carrier is now locked to the shaft by means of the pin.
Take the sealing sleeve off the shaft.
Remove the diaphragm and the support ring.

H25

Clean and inspect

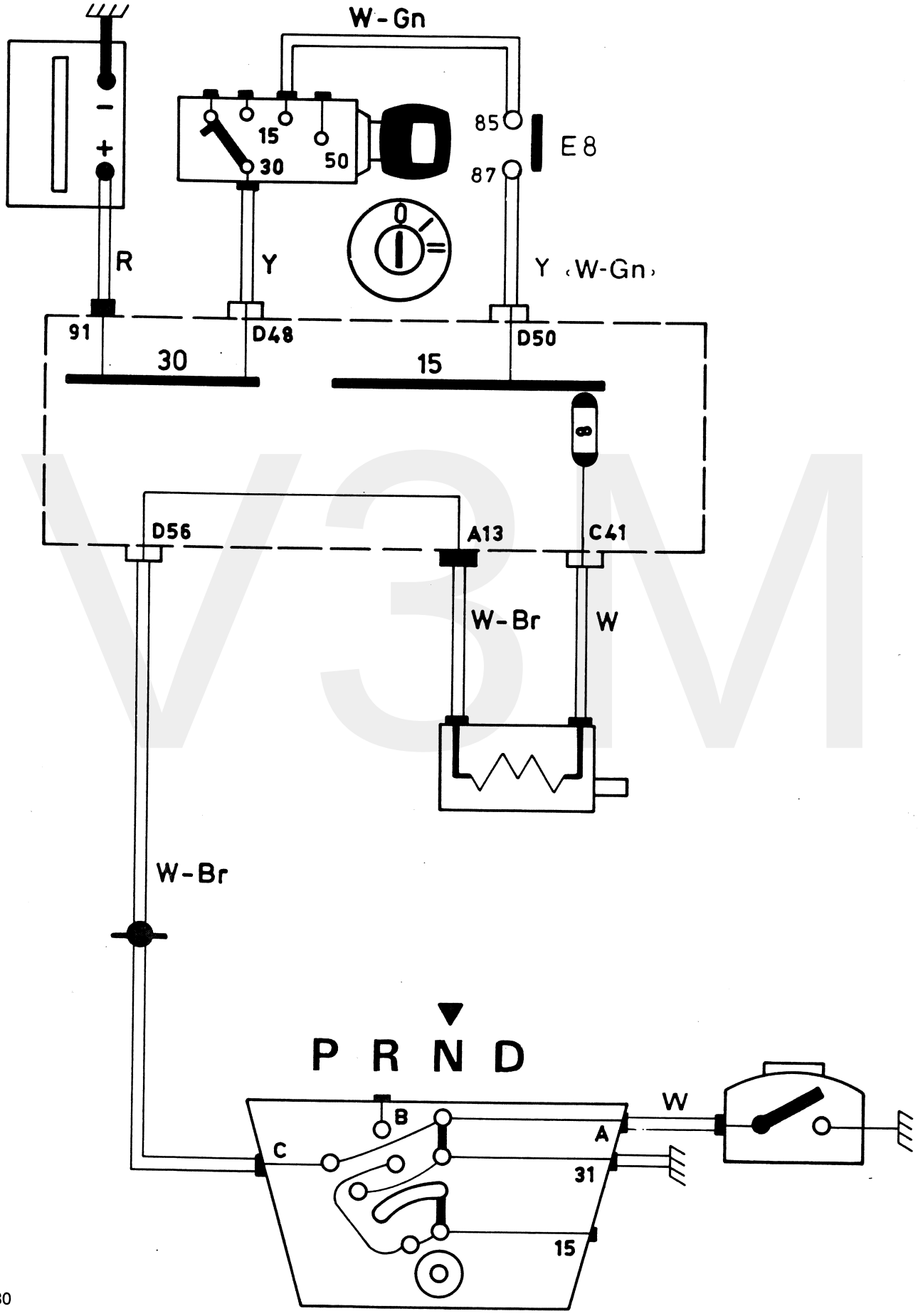
Inspect the seal ring in the sealing sleeve and renew if necessary; see Operation *F35*.
Clean the inside of the sliding pulley half.
Inspect the rubber part of the sealing sleeve for hair cracks.

H26

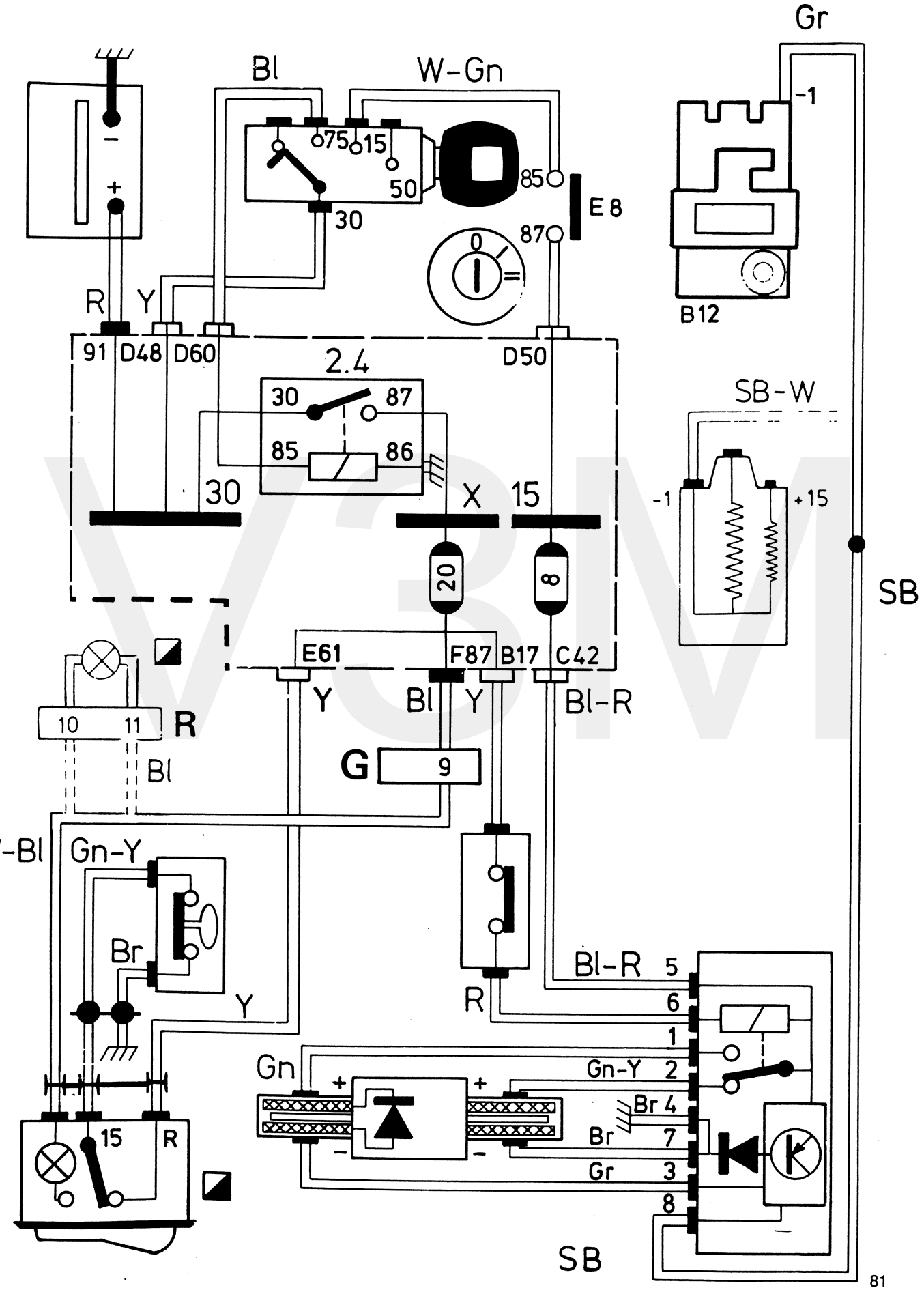
Fitting

Fit the sealing sleeve; withdraw the locking pin from the shaft and the carrier while tightening the central nut.
Pull the diaphragm away from the pulley at the top to create a small opening.
Fill the pulley with 100 cc of oil, type A/A.
Recondition the cover; see Operations *F37 - F49*.
Remove the spacer blocks; see Operation *F74*.
Connect the vacuum hoses to the vacuum connecting pipe assembly.
For the remaining assembly operations see *F3 - F4*.

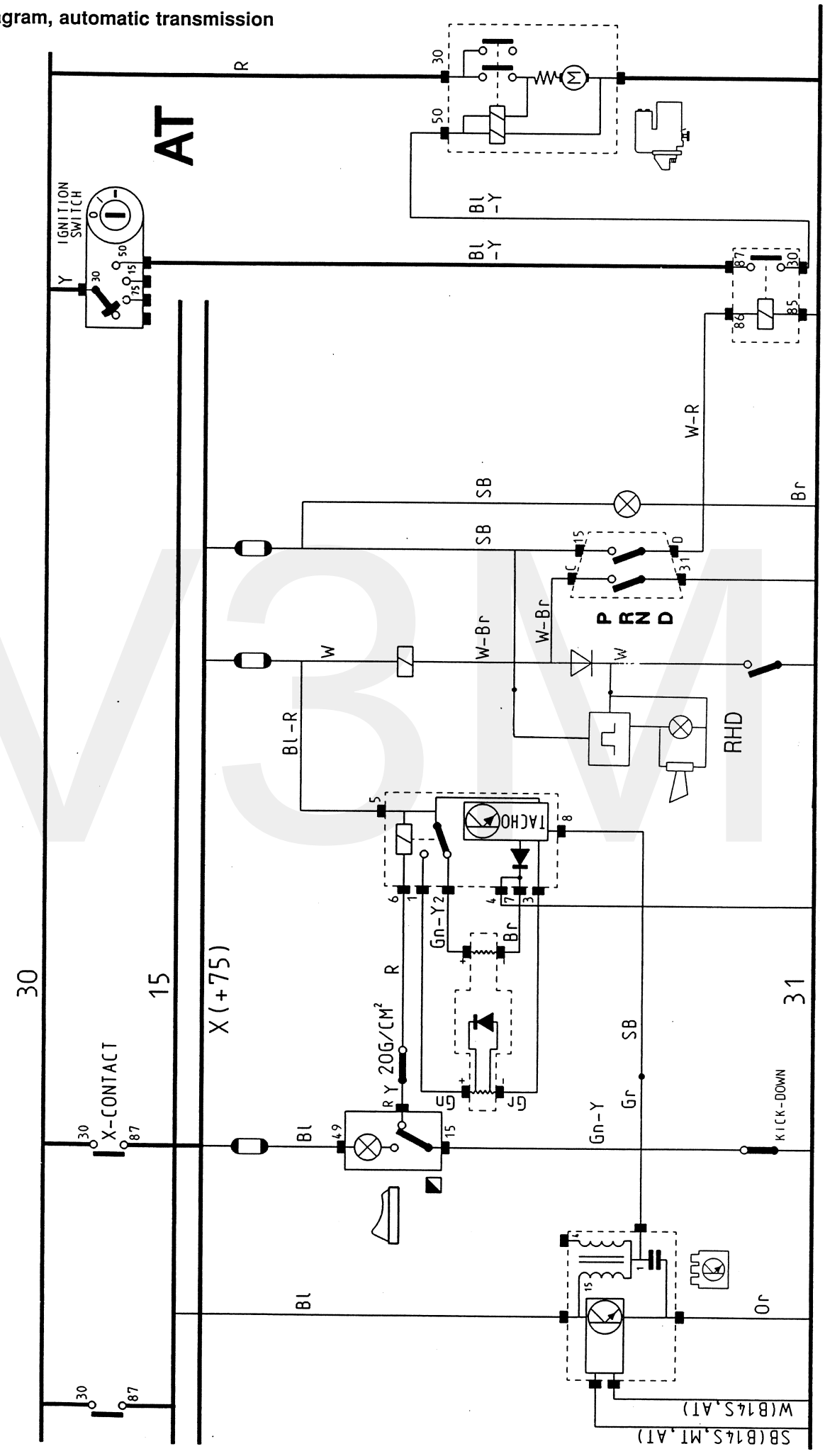
Vacuum valve, clutch release gear



Selector lever, shift functions



Circuit diagram, automatic transmission



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