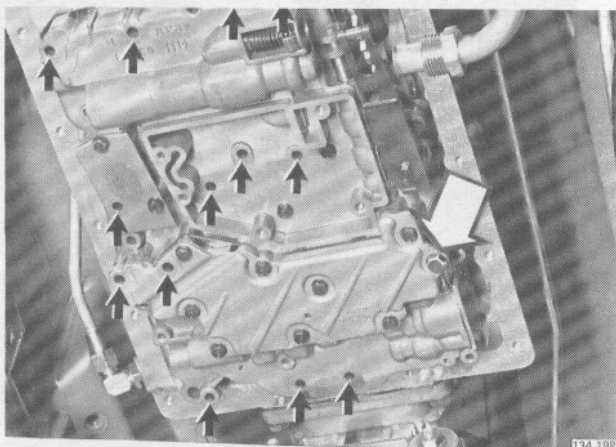
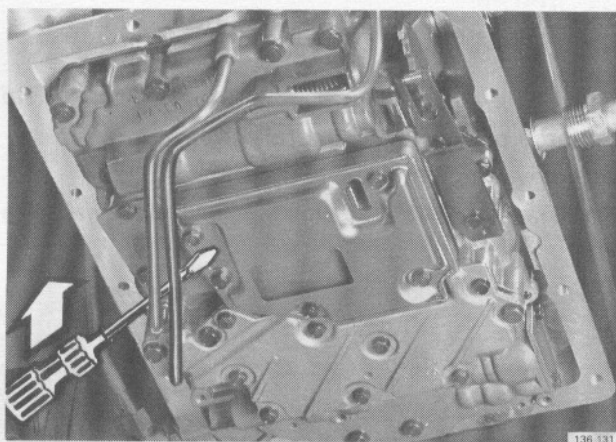
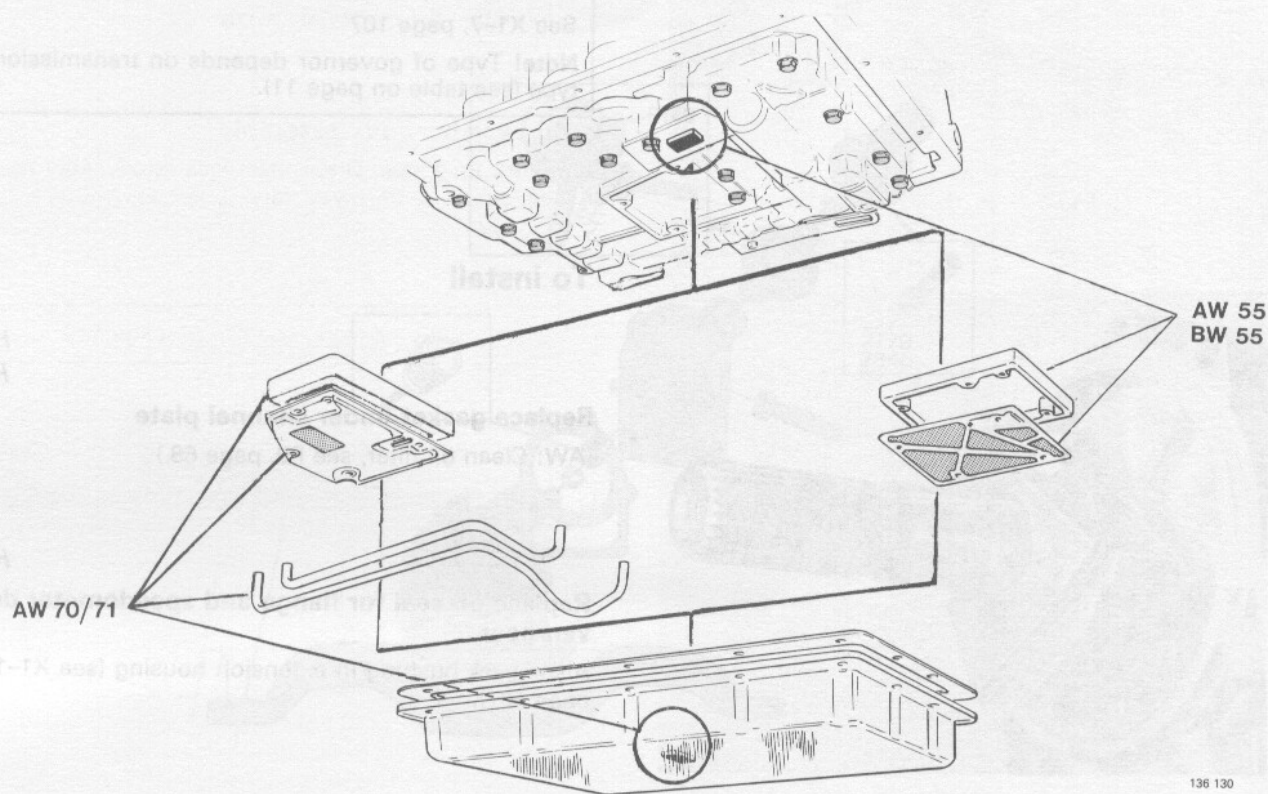


## J. Valve body, removing, installing

Special tool: 5076



### To remove

**J1**  
Disconnect kick-down cable from throttle pulley

B27/28: First remove air filter.

**J2**  
Drain transmission oil and remove filter and gasket

Unscrew filler tube from oil pan. (Drain plug introduced in 1983.)

**WARNING!** The transmission oil may be extremely hot if vehicle has just been driven.

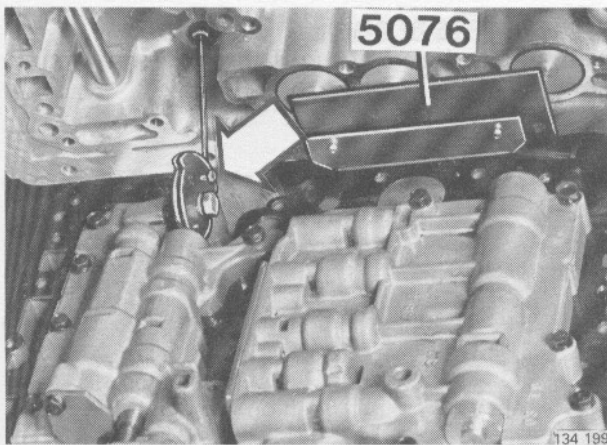
**J3**  
AW70/71: Carefully pry out the two oil tubes with a screwdriver.

**J4**  
Remove oil strainer and magnet  
AW55, BW55: Magnet located in valve body assembly.

AW70//1: Magnet located in oil pan.

### Detach valve body

Do not remove screw behind cam spring at this stage.



J6

#### Install retainer 5076

Slacken cam screw sufficiently to be able to slide in accumulator piston retainer 5076.

J7

#### Remove valve body assembly

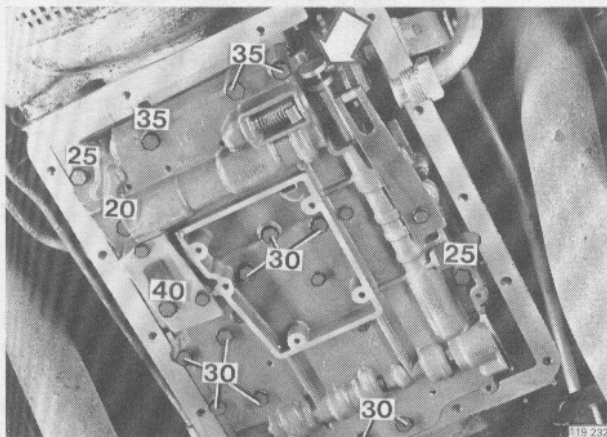
Remove cam screw. Disconnect kick-down cable from throttle cam and lift away valve body assembly.

J8

Valve body repair work, see Z1–38, page 110

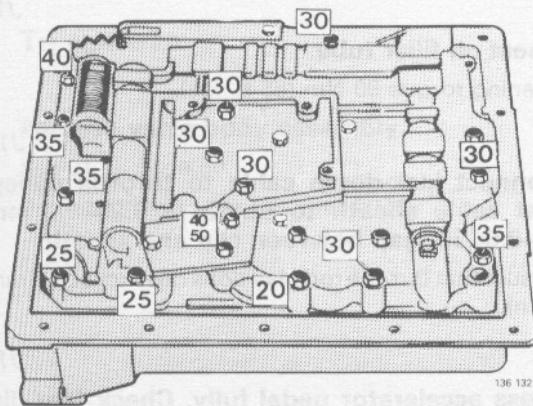
Replacement of accumulator pistons, L1–8, page 56.

Replacement of gear selector mechanism, K1–17, page 53.



BW55, screw lengths in mm

AW55



#### To install

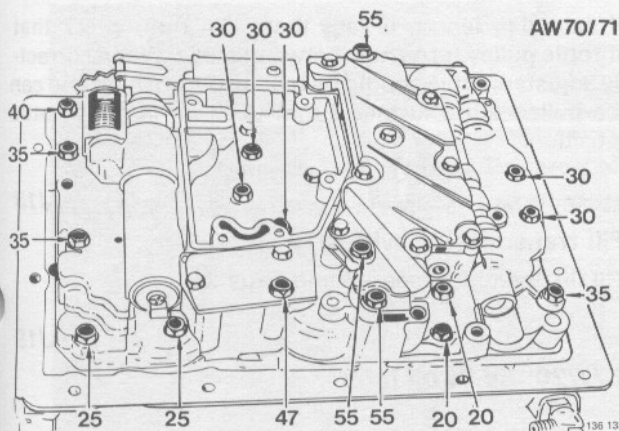
J9

#### Connect kick-down cable to cam. Position valve body and install screws (loosely)

Align gear selector cam pin with valve groove.

**Note!** Screw lengths are different for AW55, BW55, AW70, AW71 transmissions. Location of screws is shown on left.

Screw lengths (mm) AW55

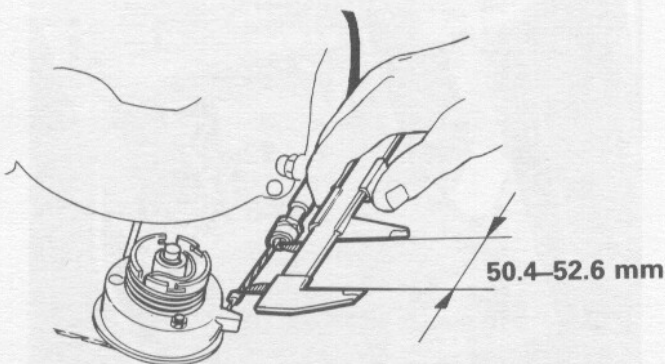
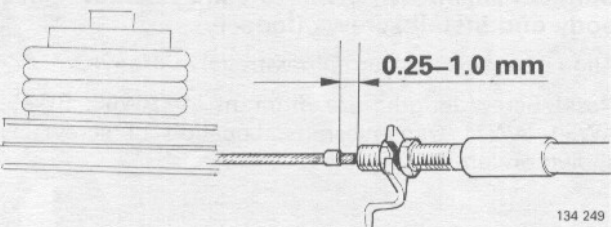
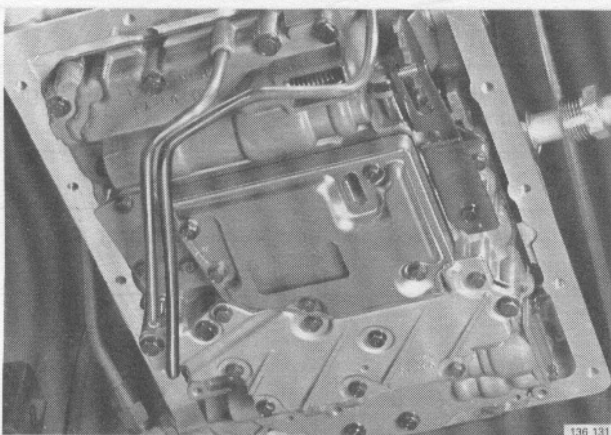
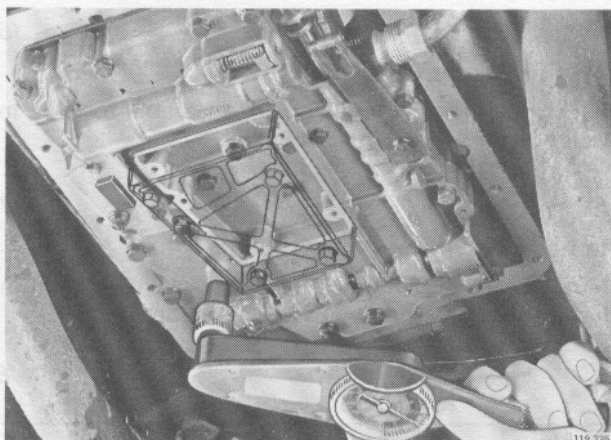


AW70/71

Screw lengths (mm) AW70/71



Valve body, installing



J10

**Remove retainer 5076 and torque screws to 10 Nm (7 ft. lbs)**

J11

**Install gasket, spacer and oil strainer. Torque to 5 Nm (3.6 ft. lbs)**

Spacer not fitted to early type AW55 and BW55 with "shallow" oil pan.

J12

**AW70/71: Install two oil tubes**

Carefully tap tubes into position with a plastic mallet.

J13

**Clean and install magnet**

AW55/BW55: Install magnet in valve body assembly.

AW70/71: Place magnet beneath oil strainer in oil pan.

J14

**Install oil pan with new gasket**

Gasket tightening torques:

AW55, grey ..... 4.5 Nm (3.3 ft. lbs)

BW55, yellow ..... 8 Nm (6 ft. lbs)

blue ..... 10 Nm (7 ft. lbs)

AW70/71 ..... 5 Nm (4 ft. lbs)

Blue type gaskets should be smeared prior to assembly.

J15

**Connect oil filler tube**

Tightening torque 90 Nm (66 ft. lbs).

J16

**Re-connect kick-down cable to throttle pulley. Adjust cable sheath to obtain a 0.25–1.0 mm (0.01–0.04 in) gap between clip and sheath**

Make sure that throttle rod play does not exceed 0.5 mm (0.02 in).

J17

**Depress accelerator pedal fully. Check that distance to clip is 50.4–52.6 mm (1.98–2.07 in)**

If extended length is less than 50.4 mm, check that throttle pulley turns fully between stops. When correctly adjusted, cable should be taut in idle position and can be pulled out a further 2 mm (0.08 in) in full throttle position.

J18

**Fill transmission with ATF**

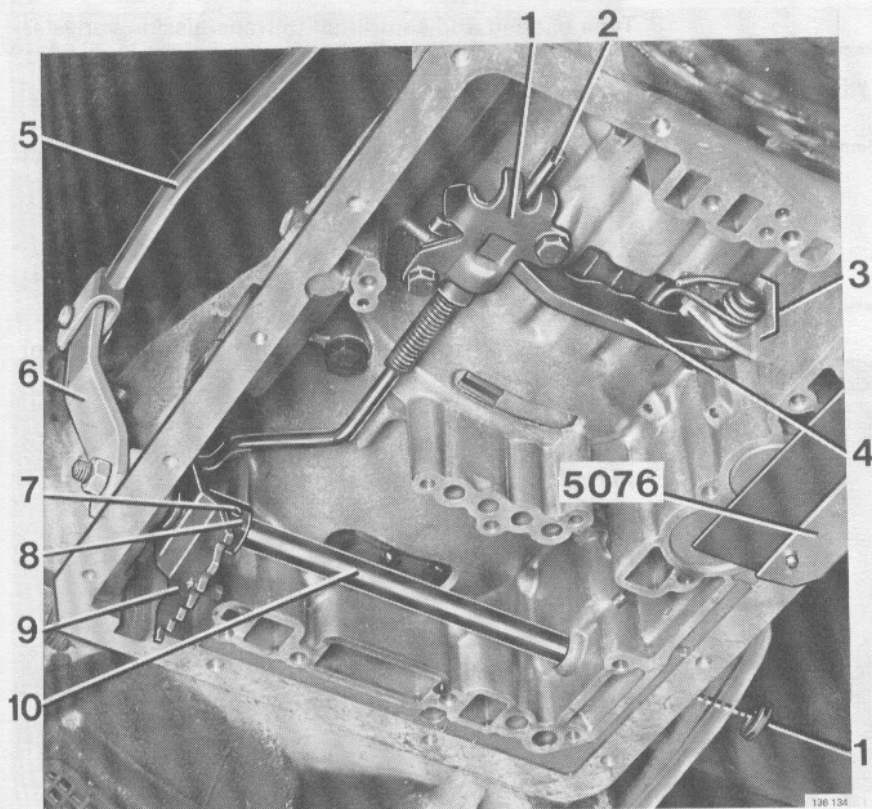
Oil fill quantities, see A6 and page 36.

J19

**B27/28: Re-fit oil filter**

## K. Gear selector mechanism, replacement

Special tools: 5076, 5118



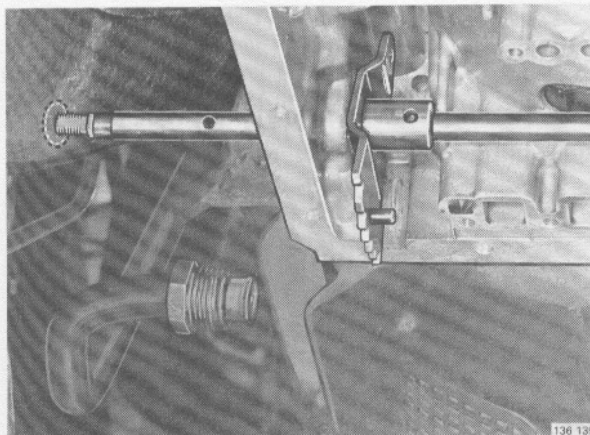
- 1 Lock plate
- 2 Thrust rod
- 3 Spring, lock ring, pivot pin
- 4 Parking pawl (catch)
- 5 Control rod
- 6 Lever
- 7 Pin
- 8 Lock ring (not early type AW55 and BW55)
- 9 Gear selector cam
- 10 Gear selector shaft
- 11 Oil seal

### To remove

#### Remove valve body assembly

See J1-8, page 50.

Do not forget to use retainer **5076**.



K1

### K2 Check for excessive play between gear selector shaft and cam

K2

### K3 Remove selector mechanism in numerical order shown above

K3

Use a 3 or 5 mm punch to tap out cam pin, depending on size of pin.

**Note!** It is necessary to drill a 19 mm (1.37 in) hole in left floor to be able to remove gear selector shaft.

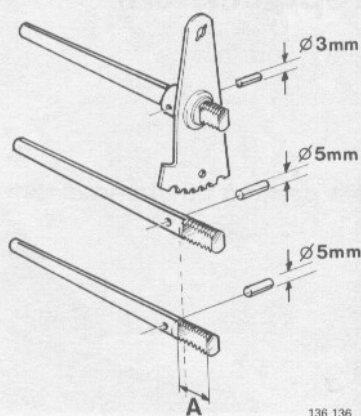
Move carpet to one side to prevent damage and drill hole with a 19 mm hole saw.

K4

### K4 Clean and check all parts

Replace if worn or defective.

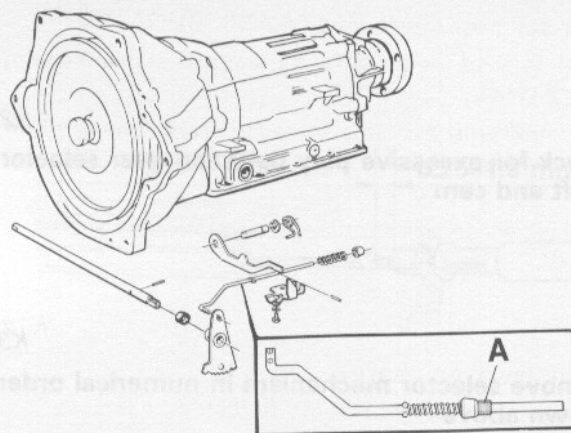




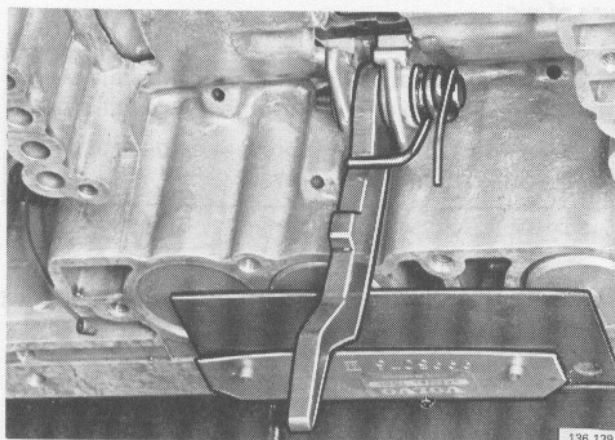
136 136



136 137



136 138



136 139

## To install

K5

### Gear selector shaft and AW55, BW55 cam

Type of shaft and cam fitted to transmission varies as follows:

1. Shaft and cam with 3 mm (2.17 in) pin hole.
2. Shaft and cam with 5 mm (3.62 in) pin hole.
3. Shaft and cam with 5 mm (3.62 in) pin hole. Shaft longer than types 1 and 2 to improve attachment of cam.

When reconditioning gear selector mechanism, always replace shaft and cam with type 3 assembly (P/N 1233 321-7).

Late type AW transmissions have a 4 mm (2.89 in) pin.

K6

### Install shaft and cam

Always use new lock pins.

**Late types:** Place lock ring around pin and secure ring with a punch mark.

K7

### Install rubber plug in hole in floor

Plug P/N 680036-1.

K8

### Parking pawl (catch) AW55, BW55

Type of parking pawl and thrust rod fitted on transmission varies, see below.

Always replace old type assemblies with new ones as follows:

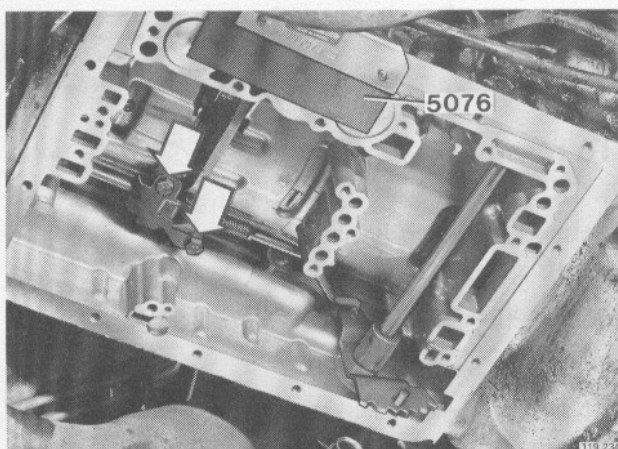
Parking pawl, early type	1233 243-3
late type	1233 294-6
Thrust rod, early type 1	1233 119-6
early type 2	1233 292-6
late type	1233 356-3

Late type thrust rods have a welded collar (A), see fig.

K9

### Install parking pawl, spring and pivot pin

Install spring as illustrated.



**Fit parking pawl rod in cam**

K10



**Install new oil seals for gear selector shaft**

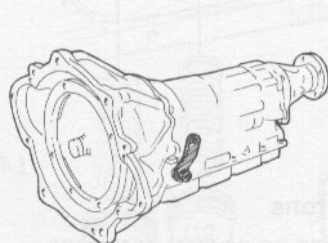
Use drift 5118 and a long screwdriver to ease in seal.

K11

K12

**Install new oil seals for gear selector shaft**

Use drift 5118 and a long screwdriver to ease in seal.



Late type



Early type

**Gear selector shaft lever AW55, BW55**

**Note!** Type of lever fitted to transmission varies with engine type.

1978: new type lever introduced in production to eliminate play. Only fits on the type 3 (extended length) gear selector shaft, see K5.

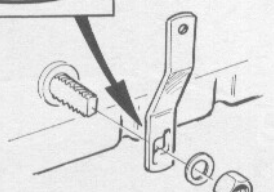
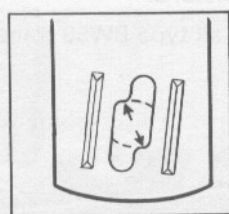
Early type levers fit both early and late type shafts.

K13

**Install lever on shaft**

Tightening torque 14 Nm (10 ft. lbs).

K14



**Connect control rod to lever**

K15

**Install valve body**

See J9-19, page 51.

K16

**Check shift linkage**

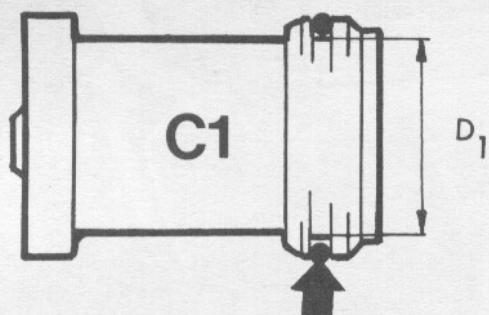
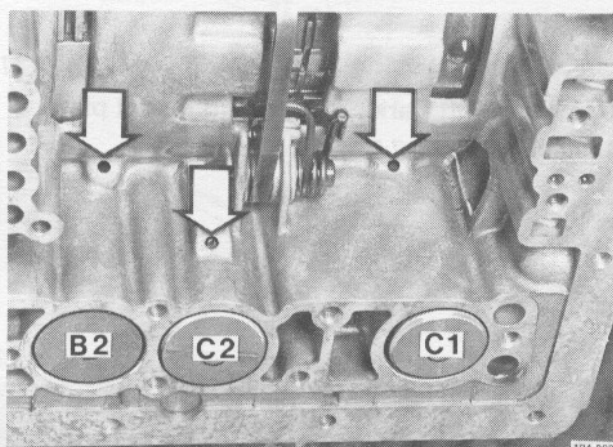
See F1-6, page 44.

K17

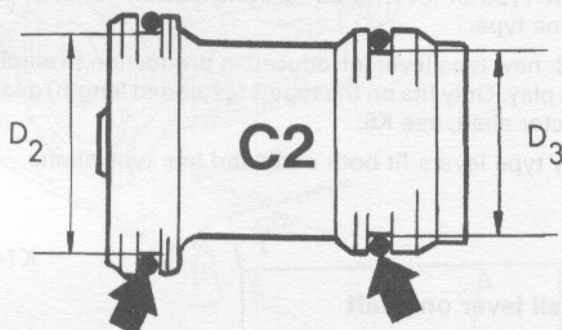


## L. Accumulator pistons, replacement

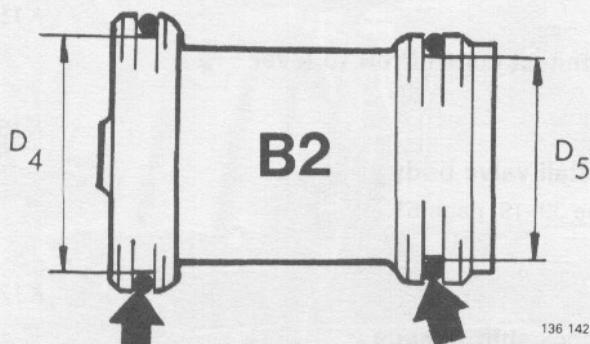
Special tool: 5076



Early type (1233 147)  $D_1 = 23.70$   
Late type (1233 315)  $D_1 = 24.41$



Early type (1233 145)  $D_2 = 26.87$ ,  $D_3 = 22.10$   
Late type (1233 314)  $D_2 = 27.58$ ,  $D_3 = 22.81$



Early type (1233 221)  $D_4 = 28.45$ ,  $D_5 = 25.27$   
Late type (1233 313)  $D_4 = 29.16$ ,  $D_5 = 25.98$

### To remove

L1

#### Remove valve body assembly

See J1–8, page 50.

Do not forget to use retainer 5076.

L2

#### Lift out accumulator pistons

Remove retainer 5076 first.

If pistons are difficult to remove, they can be dislodged by applying compressed air (max 14 psi) to feed hole (arrowed).

#### Note! Location of springs.

BW55: C2 piston does not have spring on some transmissions.

L3

### Clean and check pistons

Replace if worn or damaged.

### To install

L4

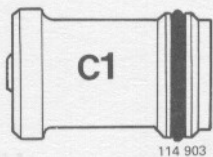
#### BW55 accumulator pistons

Pistons have been modified on several occasions.

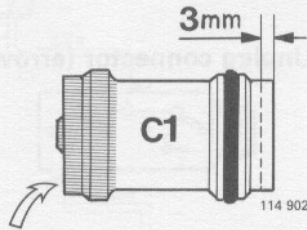
#### Type 1 – to reduce scoring:

- outer bore reduced
- larger grooves for O-rings
- new type O-rings
- increased bevel on pistons.

Pistons can be fitted to all type BW55 transmissions.



Late type (1233 315-9)



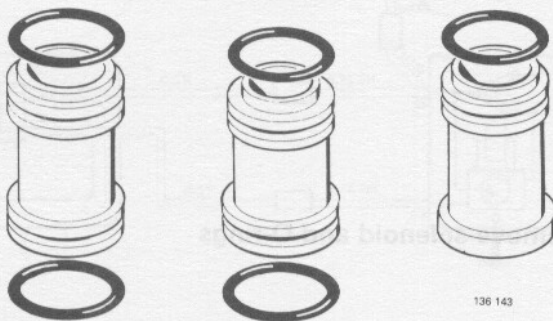
Late type (1233 380-3)

#### Type 2: – to improve oil flow

Accumulator piston C1 modified to improve oil flow to front clutch C1.

Length increased by 3 mm (0.12 in) and piston top modified slightly.

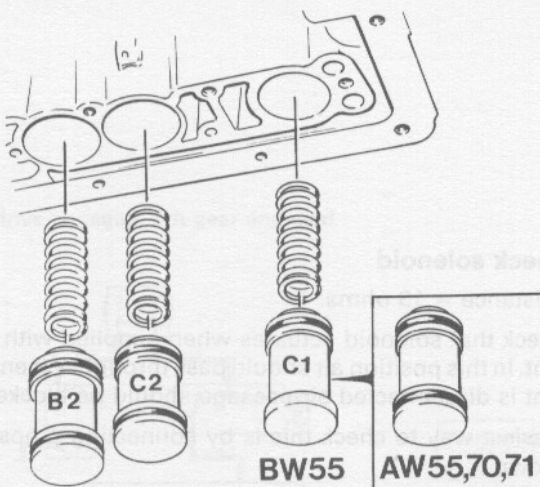
Pistons can be fitted to all type BW55 transmissions.



136 143

#### Install new O-rings on pistons

**Note!** Type of O-ring depends on piston type and transmission type.



136 144

#### Install accumulator pistons and springs

Short spring and smallest piston in center (C2).

The other pistons are different and cannot be installed incorrectly. Install springs as found.

Valve spring charts, see specifications on pages 6, 7 and 10.

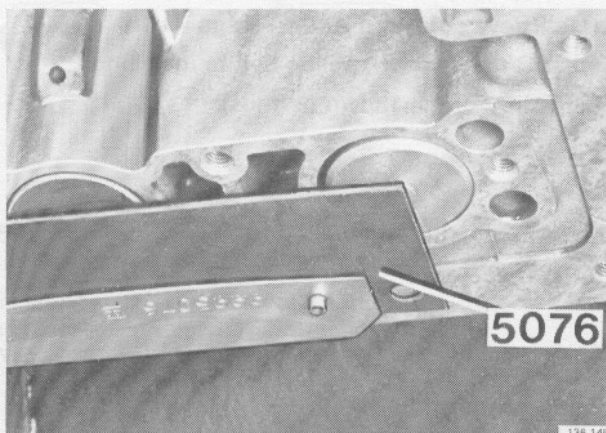
**BW55:** Following transmissions do not have center spring on accumulator piston C2:

Engine type	Transmission code
B 17 A	PP22, 022
B 19 A/B 21 A	014, 003
B 21 A Taxi	009, 013
B 21 E	008, 015
B 21 F	019, 027
B 23 A	031
B 23 E	030
D 20/D 24	020, 026

#### Identification of springs

**BW55:** C1 spring larger than B2 spring.

**AW55, 70, 71:** B2 spring larger than C1 spring.



136 145

#### Install retainer 5076

#### Install valve body assembly

See J9–19, page 51.

L5

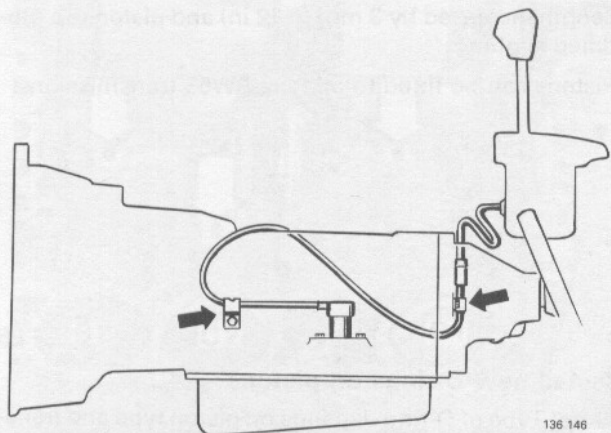
L6

L7

L8



## M. Solenoid valve, replacement (AW70/71 only)



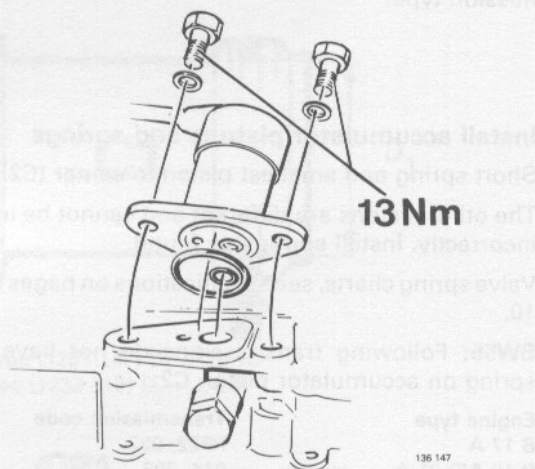
136 146

M1

Unplug connector (arrowed) and unclip wire

M2

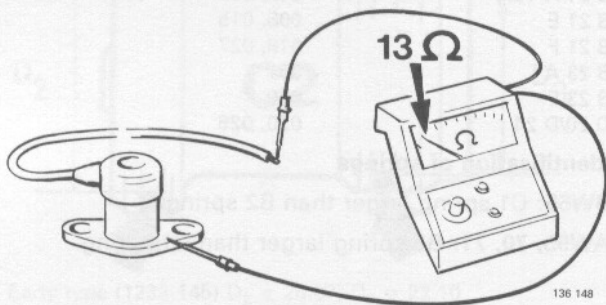
Clean area around solenoid



136 147

M3

Remove solenoid and O-rings



136 148

M4

**Check solenoid**

Resistance = 13 ohms.

Check that solenoid actuates when supplied with current. In this position air should pass through. When current is disconnected air passage should be blocked.

(Easiest way to check this is by connecting a hose as shown.)

M5

**Install new solenoid and O-rings**

Smear O-rings with Vaseline before installing.

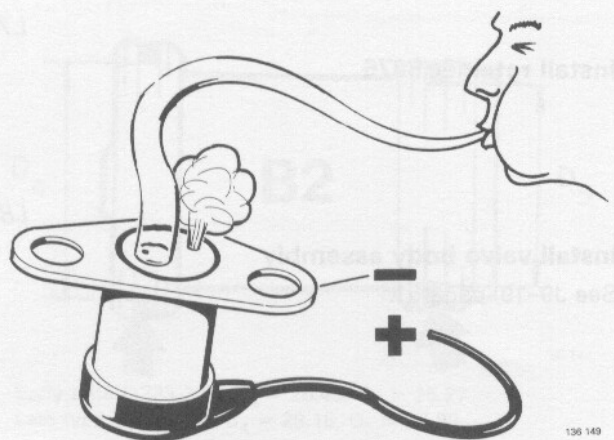
Tightening torque 13 Nm (9 ft-lbs).

M6

Re-connect wire

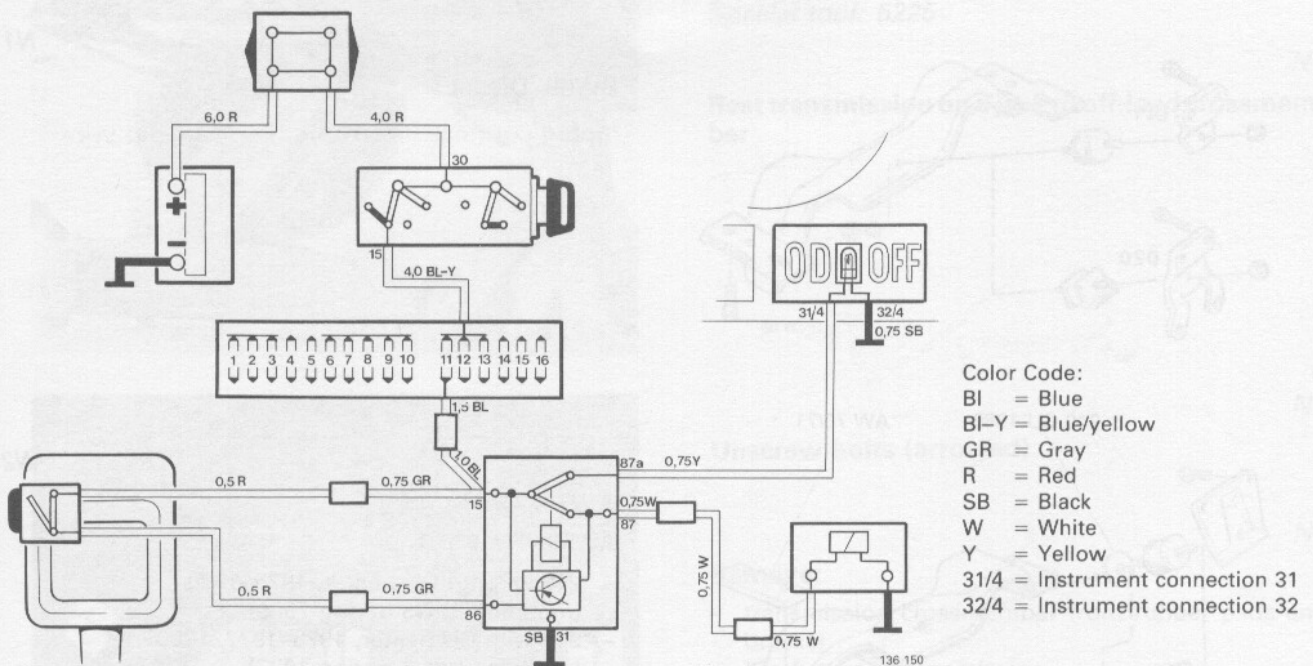
M7

Check function

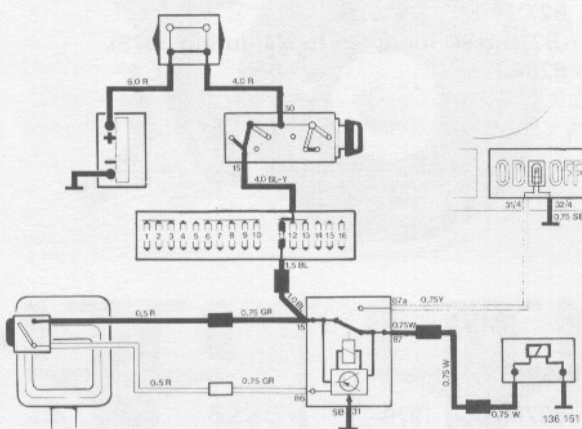


136 149

## Wiring diagram



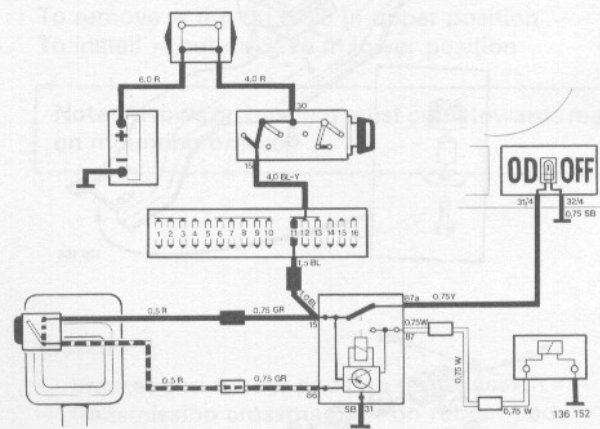
Overdrive engaged. 4th gear engaged



Push button OD OFF actuates solenoid which causes line pressure acting on high coast shift valve to drop.

Solenoid valve not actuated. Line pressure acting on high coast shift valve maintained.

Overdrive disengaged. 3rd gear engaged

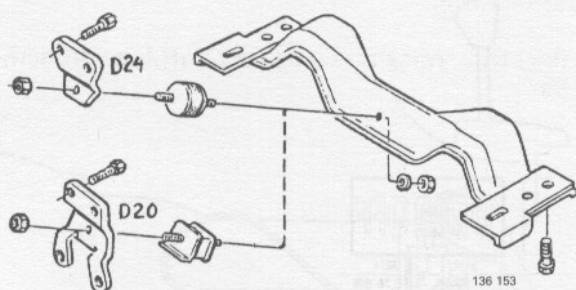


Valve acts directly on shift valve 3-4 and keeps transmission in 3rd gear.

(Line pressure is greater than all other pressures acting in transmission.)

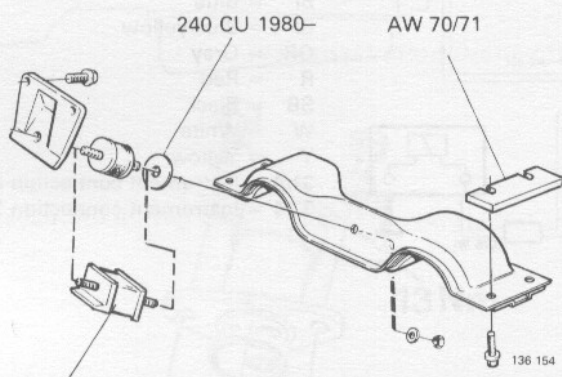


## N. Transmission crossmember



N1

**BW55, Diesel**



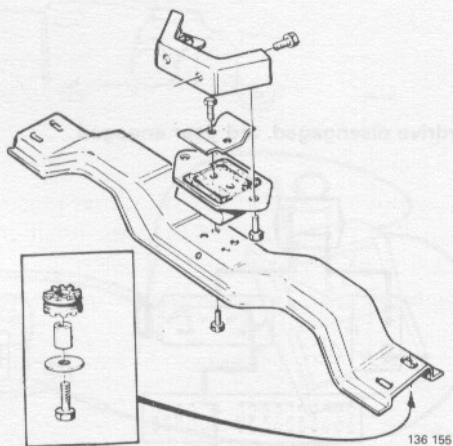
N2

**AW70/71**

**AW55, BW55**

- 240 without CU heater, 1975-1980 (modified to N3 during 1980).
- 240 with CU heater, 1975-1977, 1980- (modified to N3 during 1977).

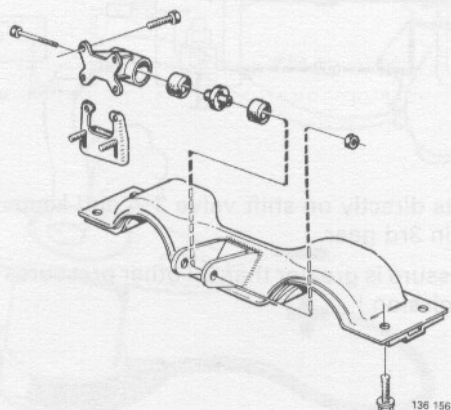
AW 55, BW 55 1975-1978



N3

**AW55, BW55;**

- 240 without CU heater, 1980-.
- 240 with CU heater, 1977-1980 (Modified to N2 during 1980).
- B27 (B27F USA modified to N4 during 1979).
- B28A/E.

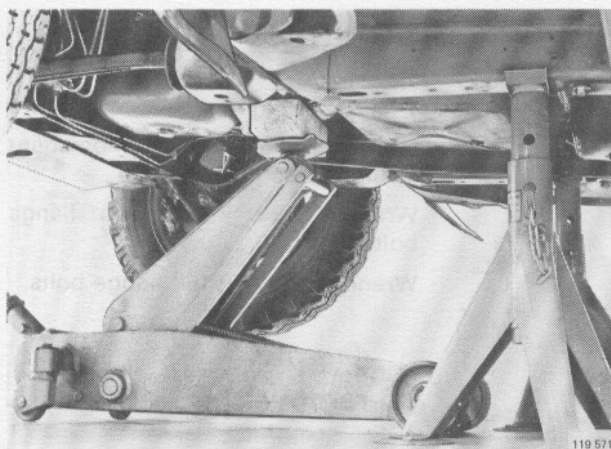


N4

**BW55;**

- B27F USA, 1979-.
- B28F.

Replacement of transmission crossmember

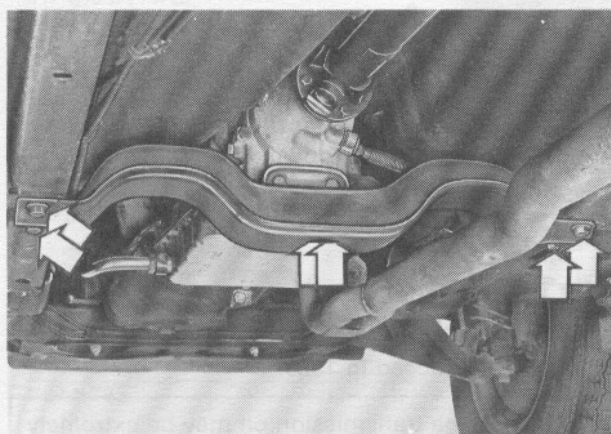


**Replacement of transmission crossmember**

Special tool: 5225

N5

**Rest transmission on a jack to off-load crossmember**



**Unscrew bolts (arrowed)**

N6

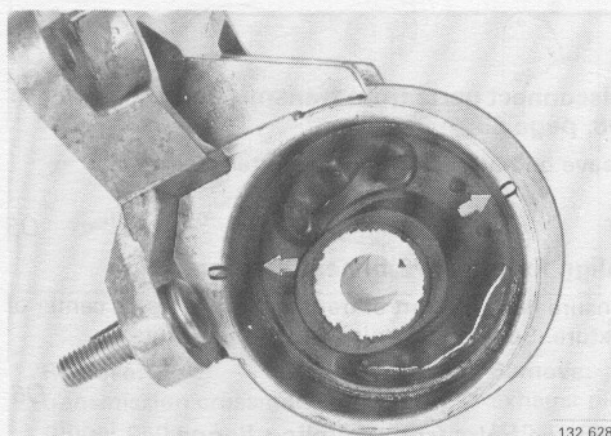
**Remove:**

- transmission crossmember from rubber pads and bracket
- bracket from transmission.

N7

**Replace defective parts**

N8



*B28F, B27F USA (type N4 assembly)*

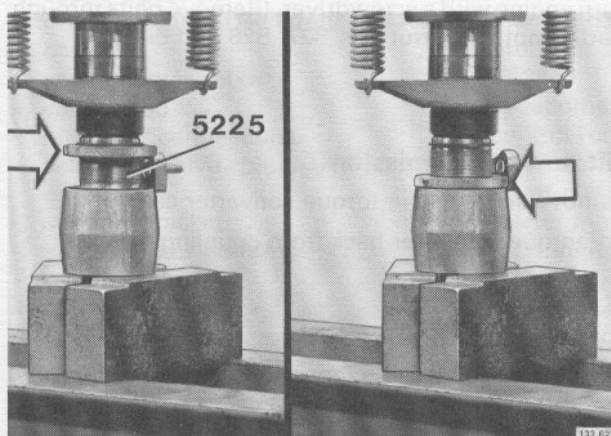
**Replacement of bushing**

Special tool: 5225.

To remove = nut on 5225 in upper position  
To install = nut on 5225 in lower position

N9

**Note!** Arrows on bushing must point towards marks on mounting bracket.



**Install:**

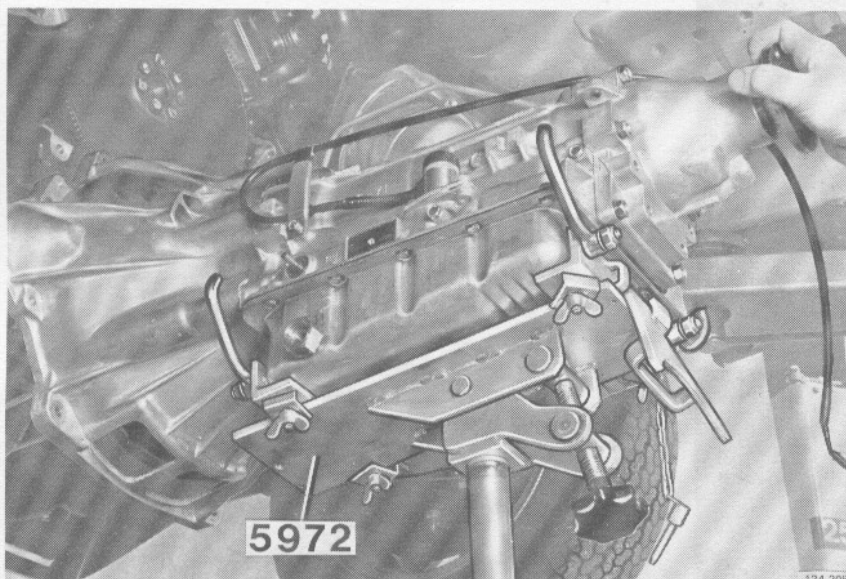
- bracket and rubber pads on transmission
- transmission crossmember on rubber pads
- member to body.

N10



## O. Transmission, removing, installing

Special tools: 2779, 2846, 5972



Use fixture **5972** when removing/installing transmission.

Wrench **2779** = 11 mm flange bolts.

Wrench **2846** = 9/16" flange bolts.

### To remove

O1

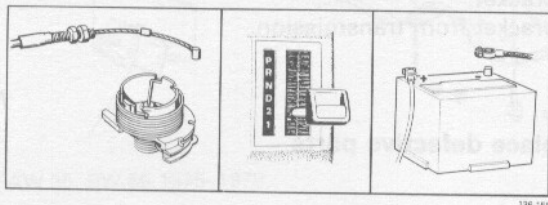
Move selector lever to position 2

O2

### Remove:

- air filter (B27/28 only)
- kick-down cable from throttle pulley
- earth/ground lead from battery.

O3



136 159

### Drain transmission oil

Disconnect oil filler tube from oil pan.

Drain plug introduced in 1983.

**WARNING!** The transmission oil may be extremely hot if vehicle has just been driven.

O4

### Disconnect parts from transmission according to O8, page 63

Leave one bolt in torque converter casing.

O5

### Align fixture 5972 beneath transmission

Ensure heaviest part of transmission rests on center of fixture. Secure transmission with lock nuts.

O6

### Remove bolts from coupling flange

Turn engine with a screwdriver. (Remove bolts through starter motor aperture on B27, B28 and diesel.)

O7

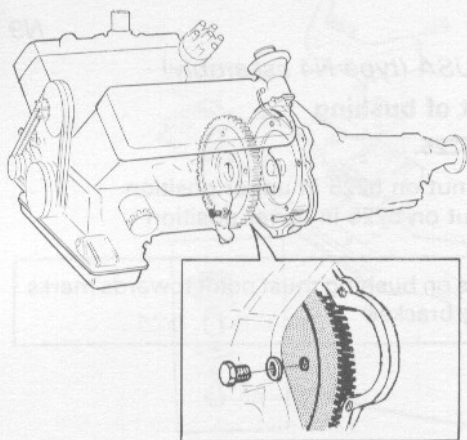
### Lift down transmission

Remove screw left in torque converter casing.

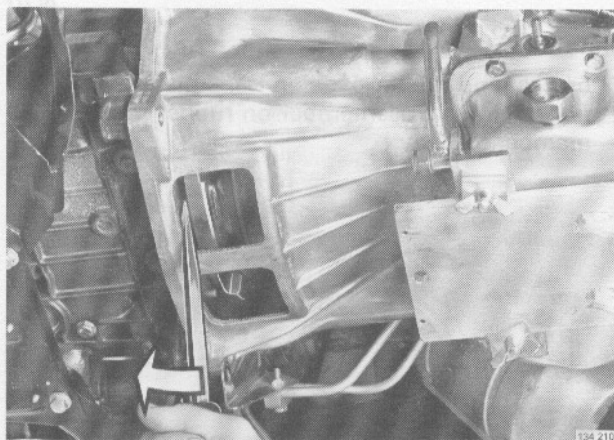
Pry torque converter back from coupling flange.

### Important!

Do not tilt transmission forward otherwise torque converter may slide off shaft.



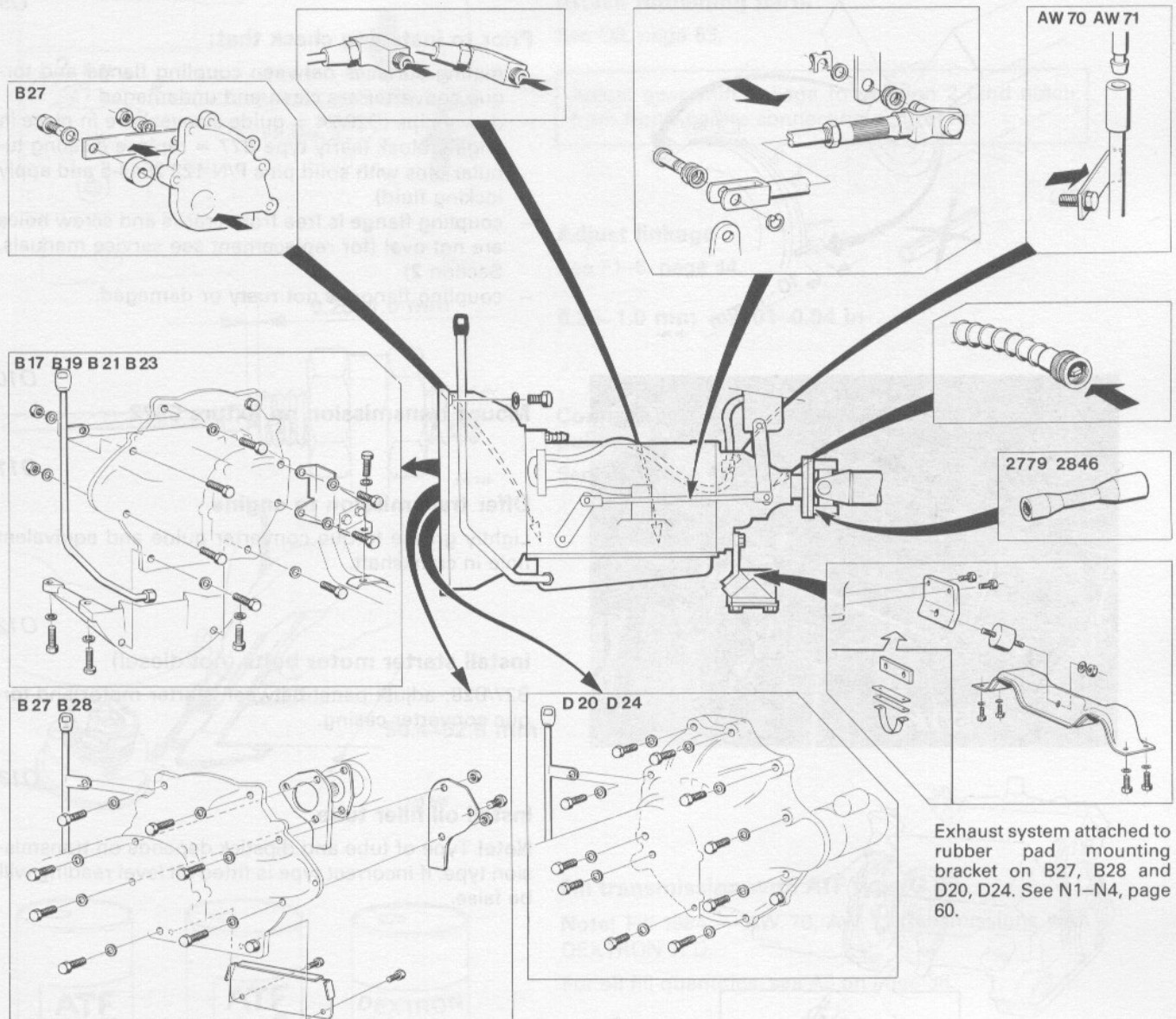
134 209



134 210

## Disconnecting transmission

08



**B17-23**

**Remove:**

- transmission crossmember
- rubber pad
- support bracket
- propeller shaft. Use wrench **2779** or **2846**
- speedometer cable
- control rod
- oil cooler connections
- solenoid valve plug (AW70/71 only)
- support bracket
- starter motor bolts
- oil filler tube
- exhaust pipe bracket
- torque converter casing bolts

**B27, B28**

**Remove:**

- exhaust pipe mount
- transmission crossmember
- rubber pad
- mounting bracket
- propeller shaft. Use wrench **2779** or **2846**
- speedometer cable
- control rod
- oil cooler connections
- cover plates
- starter motor bolts
- start inhibitor switch, early type B27 only
- oil filler tube
- torque converter casing bolts.

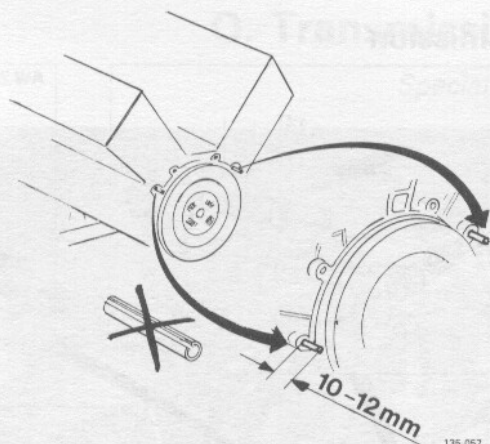
**D20, D24**

**Remove:**

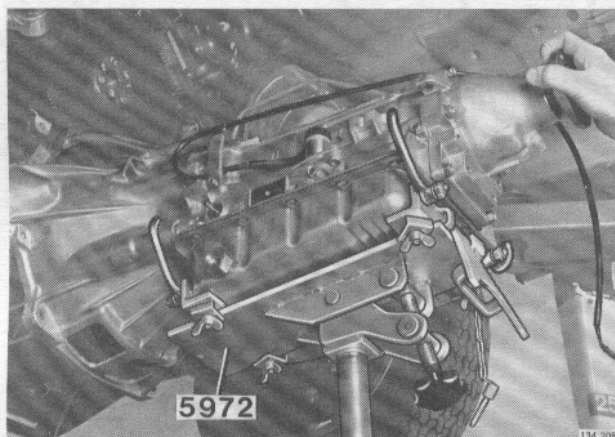
- exhaust pipe mount
- transmission crossmember
- rubber pad
- mounting bracket
- propeller shaft. Use wrench **2779** or **2846**
- speedometer cable
- control rod
- oil cooler connections
- starter motor
- oil filler tube
- torque converter casing bolts.

Leave one bolt in torque converter casing to hold it in position.

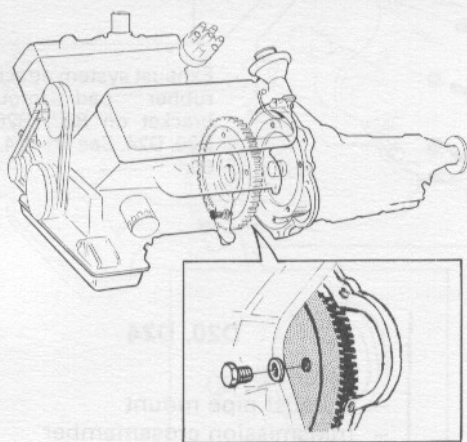




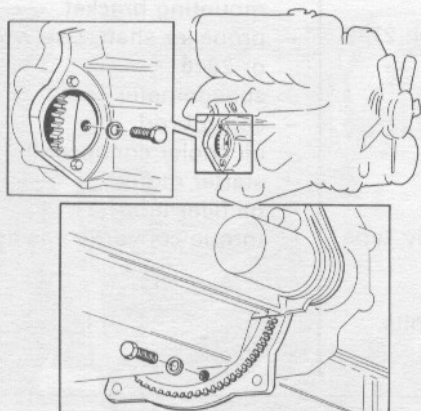
135 057



134 209



134 209



136 160

## To install transmission

09

### Prior to installing check that:

- mating surfaces between coupling flange and torque converter are clean and undamaged
- dowel pins (D20/24 = guide sleeves) are in place in engine block (early type B27 = replace existing tubular pins with solid pins P/N 123 2544-5 and apply locking fluid)
- coupling flange is free from cracks and screw holes are not oval (for replacement see service manuals, Section 2)
- coupling flange is not rusty or damaged.

010

### Mount transmission on fixture 5972

011

### Offer transmission to engine

Lightly grease torque converter guide and equivalent hole in crankshaft.

012

### Install starter motor bolts (not diesel)

B27/B28: adjust panel between starter motor and torque converter casing.

013

### Install oil filler tube

**Note!** Type of tube and dipstick depends on transmission type. If incorrect type is fitted oil level reading will be false.

014

### Install torque converter retaining bolts<sup>1</sup> hand tight

#### Important!

Tighten bolts crosswise to torque:

B17-B23, B27, B28:	<b>45 Nm (33 ft-lbs)</b>
D20, D24:	<b>22 Nm (16 ft-lbs)</b>

<sup>1</sup> Late type length = 14 mm (0.55 in)

Early type length = 16 mm (0.63 in)

Replace 16 mm bolts with 14 mm ones to reduce risk of bolts shearing in torque converter.

O15

### Attach remaining parts

See O8, page 63.

Adjust gear shift linkage to position 2 (2nd notch from front) before connecting control rod.

O16

### Adjust linkage

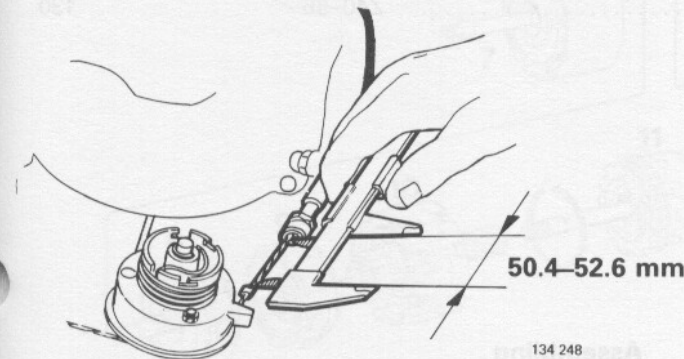
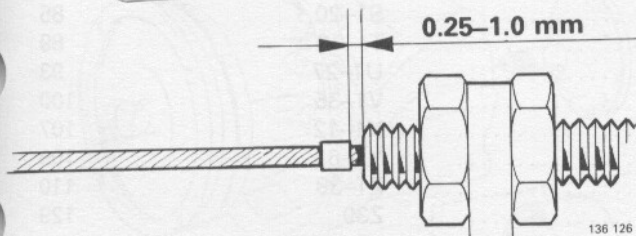
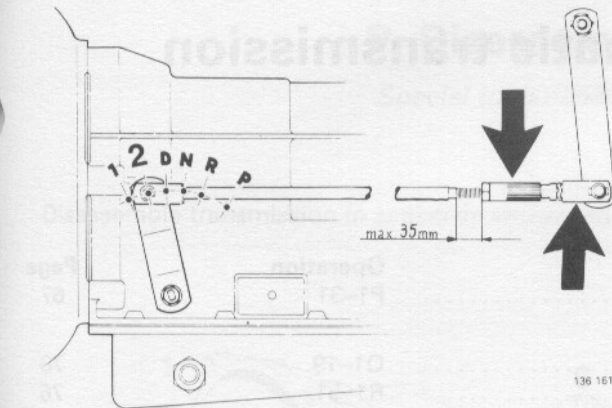
See F1-6, page 44.

0.25–1.0 mm = 0.01–0.04 in

O17

### Connect and adjust kick-down cable to throttle pulley

See G12, page 47.



O18

### Fill transmission with ATF type G (F)

**Note!** Fill 1984 — AW 70, AW 71 transmissions with DEXTRON 11 D.

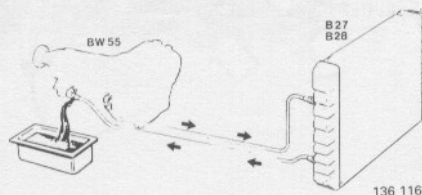
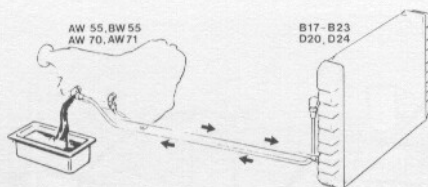
For oil fill quantities, see A6 on page 36.



O19

### Clean oil cooler

See B1-3, page 36.



O20

### Check transmission function



# Reconditioning automatic transmission

	Operation	Page
Disassembly.....	P1-31	67
Reconditioning:		
- oil pump .....	Q1-19	73
- overdrive (AW70/71) .....	R1-51	76
- front clutch .....	S1-20	85
- rear clutch .....	T1-18	89
- center support assembly .....	U1-27	93
- planetary gear assembly .....	V1-35	100
- governor and extension housing .....	X1-12	107
- brake pistons B3 .....	Y1-6	109
- valve body .....	Z1-38	110
Miscellaneous .....	Z39	129
Assembly .....	Z40-86	130

## Reconditioning

### Disassembling

Try to find source of any oil leaks prior to dismantling unit.

Try to establish which parts are defective before disassembling other parts unnecessarily.

Parts which have stuck together should be separated by carefully tapping with a plastic mallet and not by levering apart.

### Cleaning and drying

Carefully clean all oil passages and blow dry with compressed air. Do not use rags which leave behind lint. Wadding must not be used. High standards of cleanliness are essential.

### Assembling

Smear all parts with ATF prior to installing.

Soak new friction discs thoroughly in ATF.

Ensure thrust washers and needle bearings are correctly fitted (smear lightly with Vaseline to hold in position. Too much Vaseline can block valve body passages.)

Always install new gaskets, O-rings and oil seals.

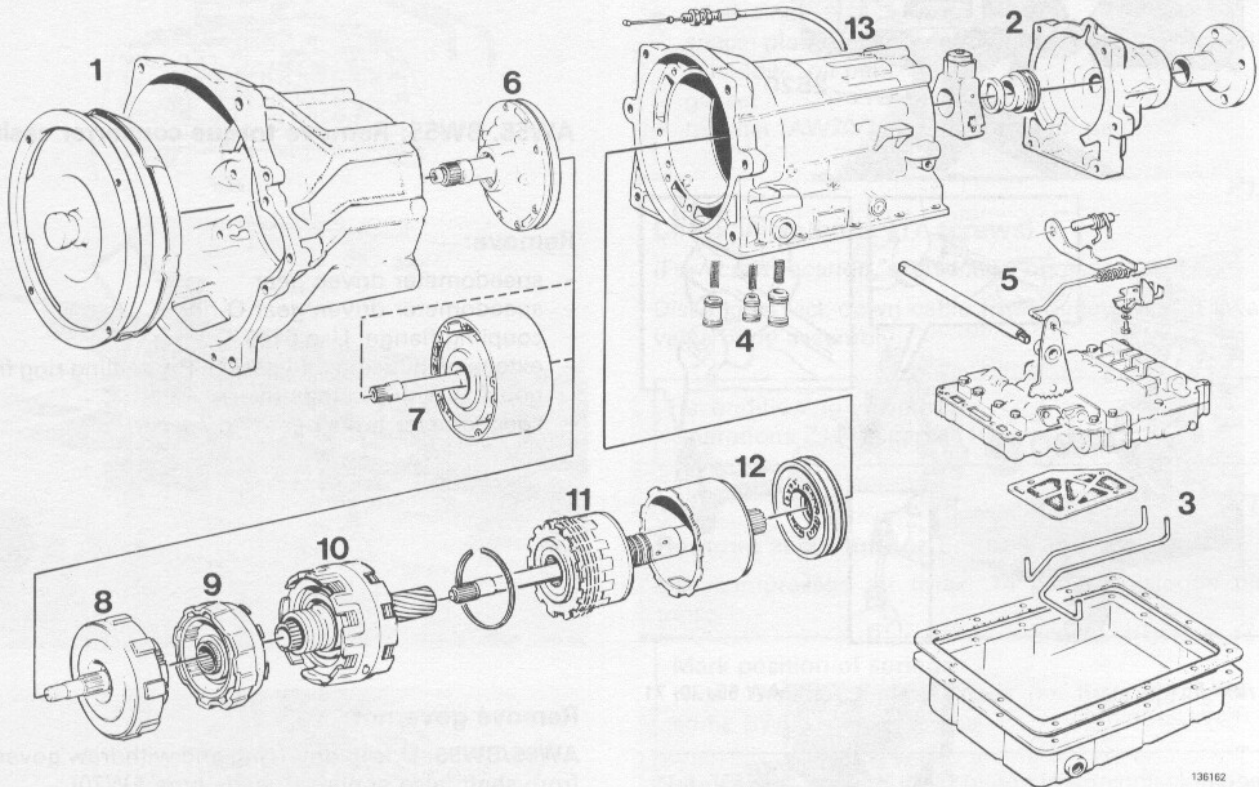
O-rings and pistons should be smeared lightly with Vaseline prior to installing.

Vaseline Volvo P/N 116 1151-4.

## P. Disassembly of transmission

Special tools: 2520, 5070, 5071, 5073, 5149, 5241

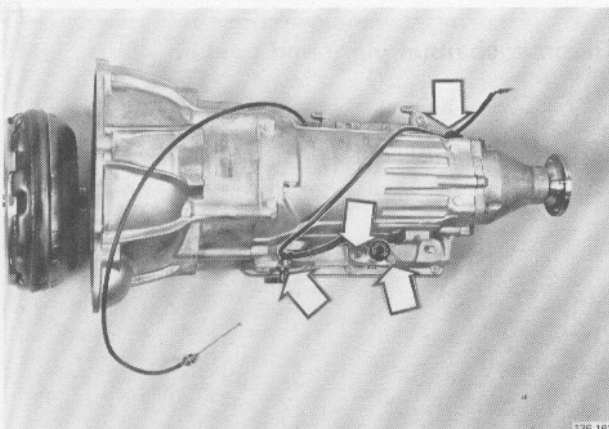
Disassemble transmission in sequence shown below.



- 1 Torque converter and casing (AW55, BW55)
- 2 Extension housing and governor
- 3 Oil pan, oil tubes (AW70/71) and valve body assembly
- 4 Accumulator pistons
- 5 Gear selector linkage
- 6 Oil pump and torque converter casing

- 7 Overdrive unit (AW70/71)
- 8 Front clutch
- 9 Rear clutch
- 10 Center support assembly
- 11 Planetary gear assembly
- 12 Countershaft and piston - B3 brake
- 13 Gear case

136162



136163

P1

### Clean gear case

Locate oil leaks as applicable.

P2

### Detach torque converter

Use both hands to withdraw converter from shaft.

P3

### Remove selector lever

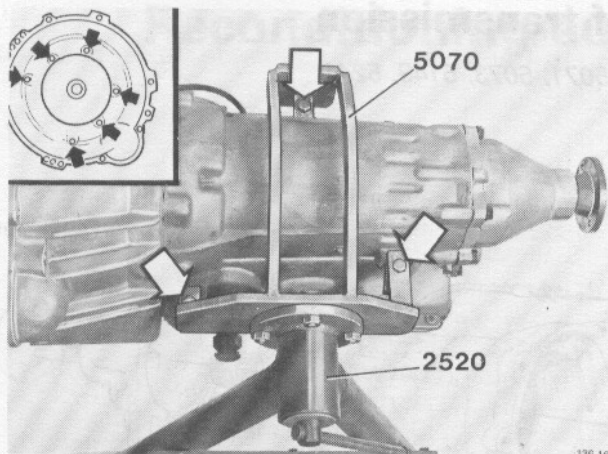
P4

### AW70/71: Remove solenoid

Remove O-rings and wire clamps.



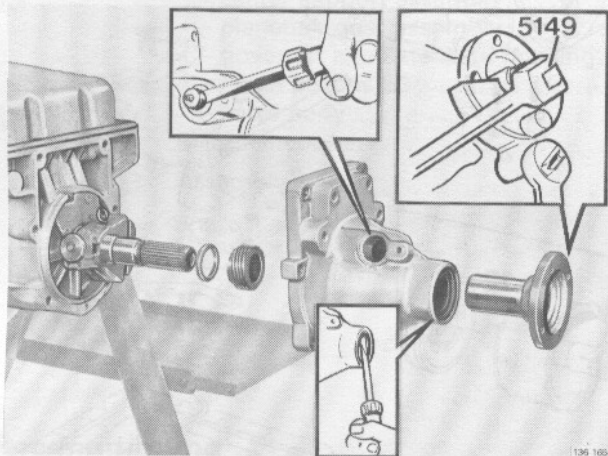
Disassembly



P5

**Mount gear case on fixture 5070. Mount fixture on stand 2520**

Fixture may need modifying to fit different transmission types, see page 21.



P6

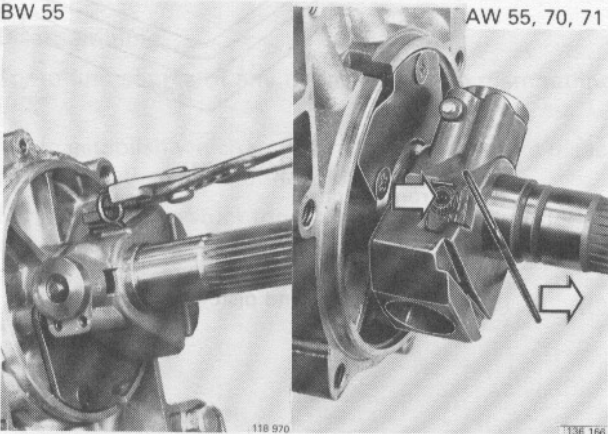
**AW55, BW55: Remove torque converter casing**

P7

**Remove:**

- speedometer driven gear
- speedometer driven gear O-rings
- coupling flange. Use **5149**
- extension housing and gasket. Pry sealing ring from housing with a screwdriver.
- speedometer drive gear and spacer.

BW 55



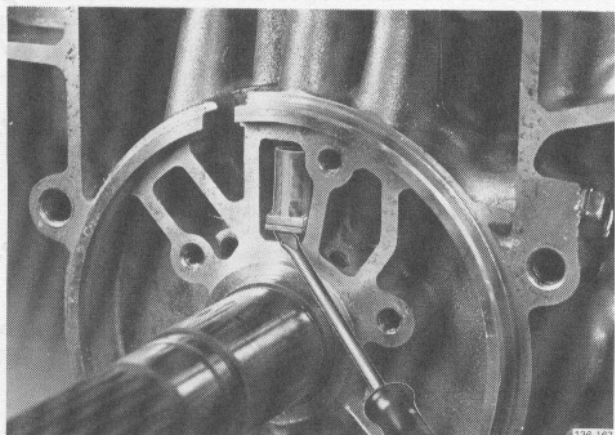
AW 55, 70, 71

P8

**Remove governor**

**AW55/BW55:** Unclip drive ring and withdraw governor from shaft (also applies to early type AW70).

**AW70 late type/71:** Remove bolt and lock plate. Unclip drive ring and withdraw governor from shaft.



P9

**Remove channel plate and gasket**

**AW70/71:** Remove oil filter from oil channel.

P10

**Turn transmission in stand so that oil pan faces up**

P11

**Remove:**

- oil pan and gasket
- **AW70/71**: oil tubes to valve body (carefully ease out with a screwdriver)
- oil strainer
- spacer plate (A). (Not AW55 and late type BW55 with "shallow" oil pan)
- gasket
- magnet (AW70/71 = located in oil pan).

P12

**Check valve body (17 screws)**

(For screw location, see section on assembly.)

Disconnect kick-down cable from pulley and lift away valve body assembly.

Reconditioning valve body  
Operations Z1-49, page 110

P13

**Remove accumulator pistons and springs**

Use compressed air (max. 14 psi) to dislodge pistons.

Mark position of springs.  
Note! Center C2 piston does not have spring on some BW55 transmissions.

**Note!** Type of accumulator piston in transmission does vary, see section on in-car repairs (L4, page 56).

P14

**Remove kick-down cable**

Press off cable sheath with a 10 mm socket.

P15

**Remove:**

- lock plate (3) and thrust rod (4)
- parking pawl (2)

P16

**Remove selector shaft and cam**

Remove lock ring securing cam and tap out pivot pin (3 mm = 0.12 in or 5 mm = 0.20 in) with a punch. (Lock ring not fitted on early type AW55 and BW55.)

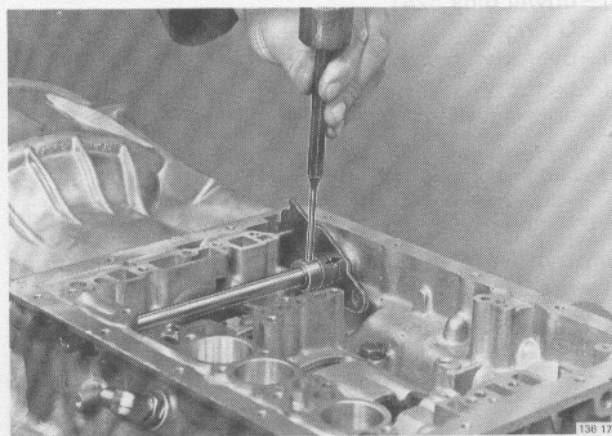
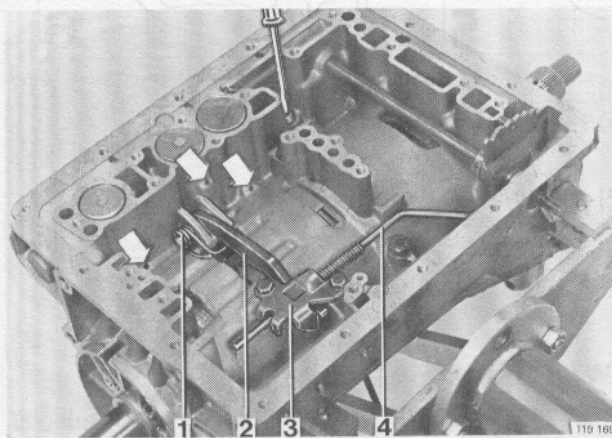
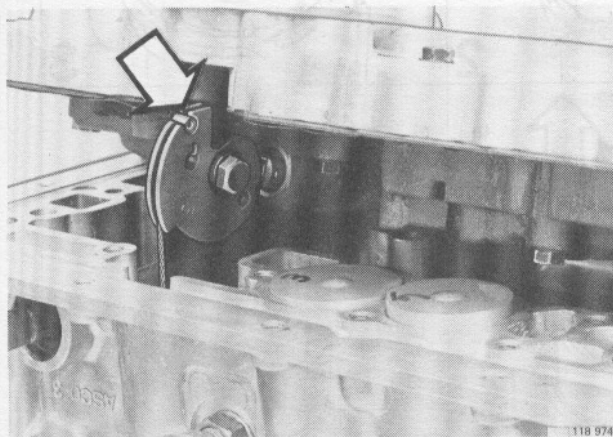
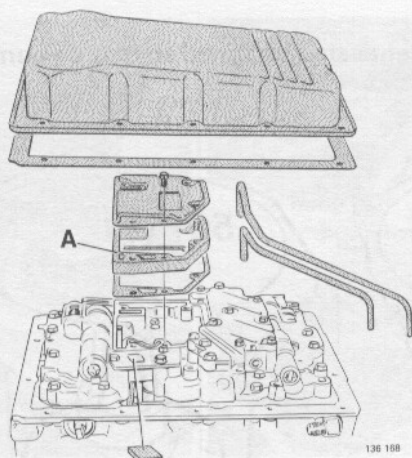
**Note!** For different types of gear selector mechanism, see In-car repairs, K1-17, page 53.

Late type AW transmissions have a 4 mm (0.16 in) pin.

P17

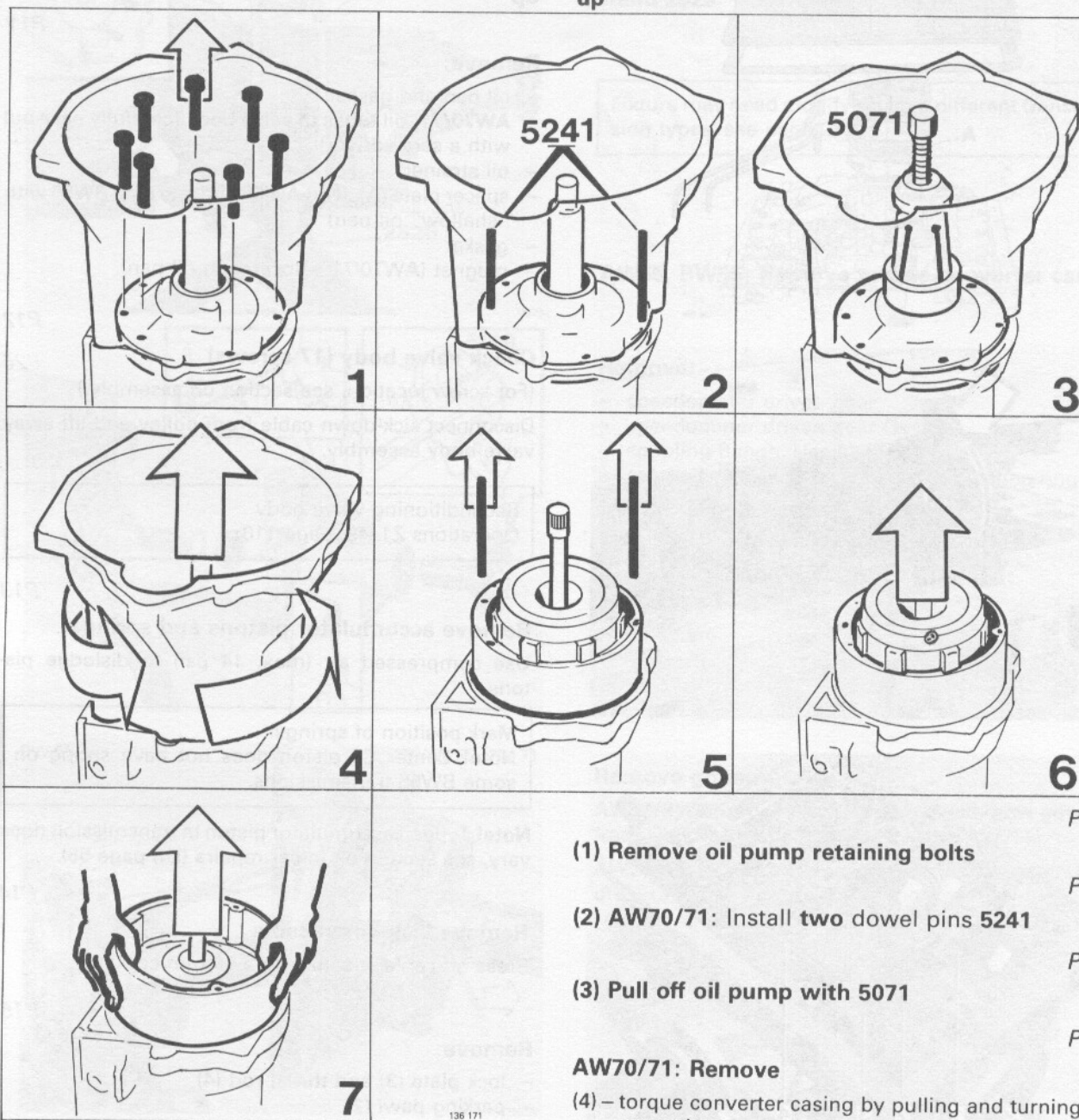
**Remove shaft oil seals**

Ease out seals with a screwdriver.





Turn transmission on stand so that oil pump faces up



P19

(1) Remove oil pump retaining bolts

P20

(2) AW70/71: Install **two** dowel pins 5241

P21

(3) Pull off oil pump with 5071

P22

**AW70/71: Remove**

(4) – torque converter casing by pulling and turning at same time

(5) – dowel pins 5241

(5) – O-ring

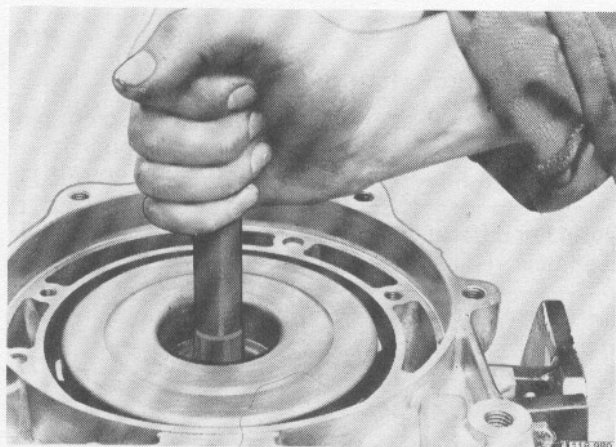
(6) – overdrive clutch

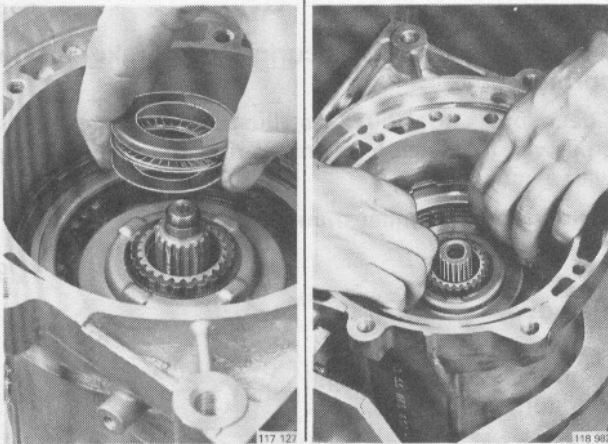
(7) – overdrive housing. Lift housing straight off with both hands.

P23

**Remove front clutch + bearing race and needle bearing**

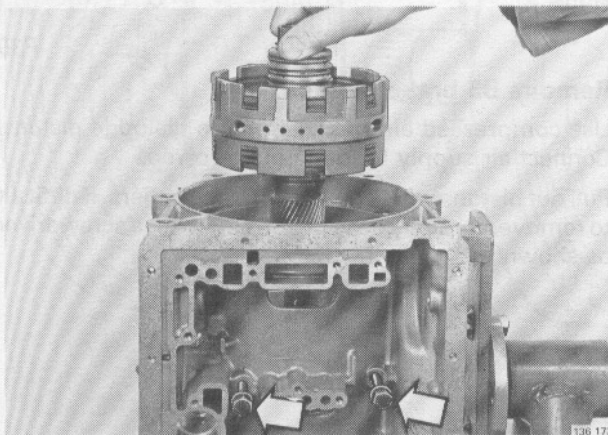
Withdraw clutch body as illustrated.





**Remove rear clutch bearing races and needle bearing**

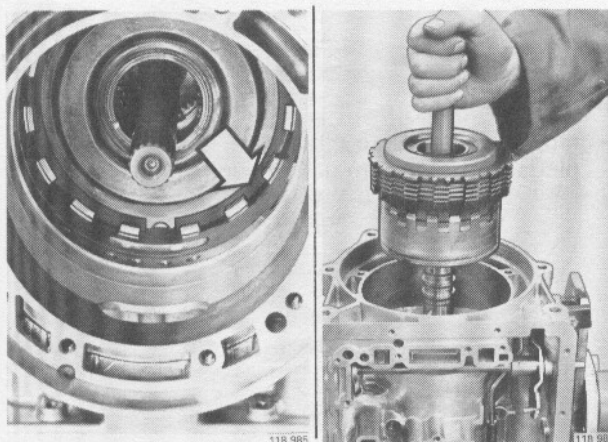
P24



**Remove rear clutch**

Place hand as illustrated and lift out clutch.

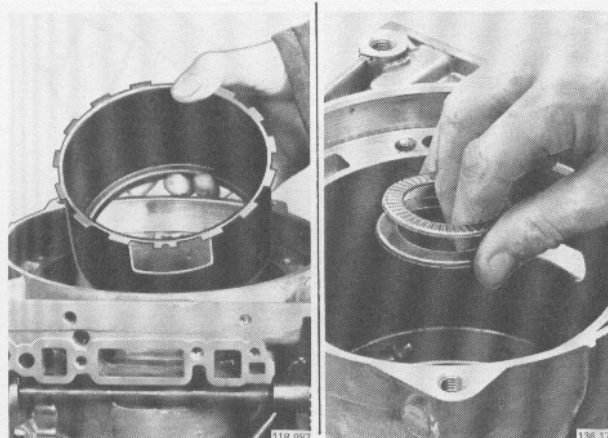
P25



**Lift out center support assembly**

Remove screws and lift out assembly as shown.

P26



**Remove:**

- thrust disc retaining ring with a long screwdriver
- planetary gear unit and clutch pack to B3 brake.

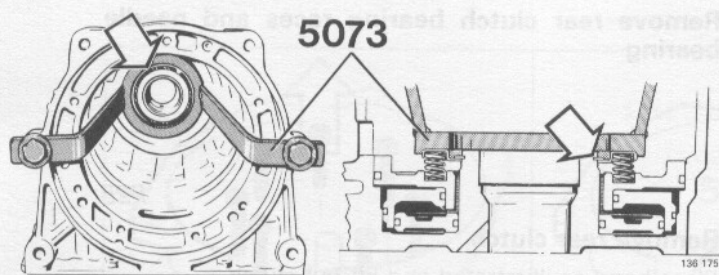
P27

**Remove:**

- countershaft for B3 brake
- needle bearing and bearing race.



Disassembly



P28

**Remove lock ring securing B3 brake return springs**

Attach press tool **5073** as illustrated. Tighten bolts crosswise to release load on lock ring. Remove lock ring with a screwdriver.

Slacken tool in similar manner.

P29

**Remove:**

- press tool **5073**
- thrust plate for springs
- return springs (16)

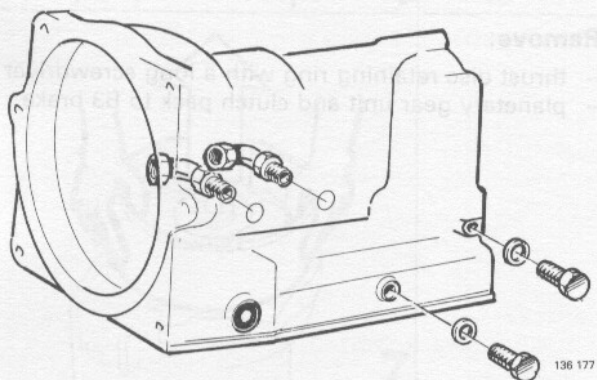
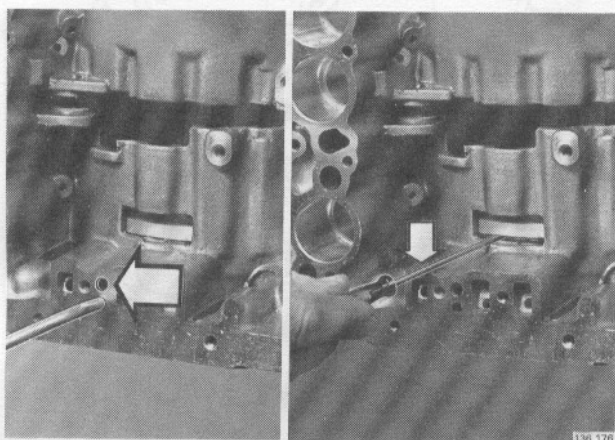
Springs fixed to retainer on most BW55 transmissions.

P30

**Remove B3 brake pistons**

Use compressed air (max. 14 psi) to dislodge pistons. Connect air supply to feed hole arrowed.

Pull out pistons with a pair of flat nosed pliers. If difficult to remove, **carefully** ease pistons out with a screwdriver as shown.



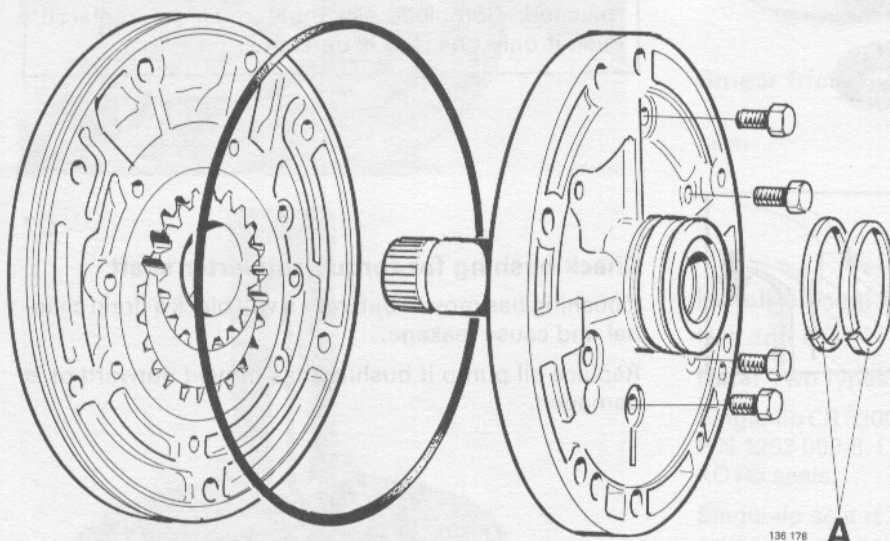
P31

**Remove:**

- nipples for tubes to oil cooler
- plugs from pressure gauge connections.

## Q. Oil pump

Special tools: 5077, 5117



To disassemble

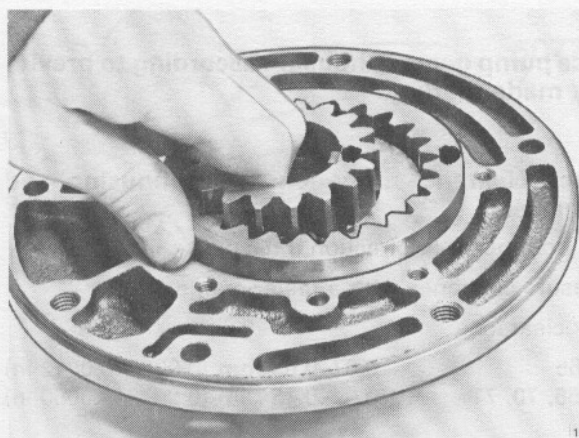
Q1

Remove two oil seals (A)

Unclip rings one at a time with thumbs.

Q2

Separate pump and remove O-ring



119 002

Mark position of gear top on top side

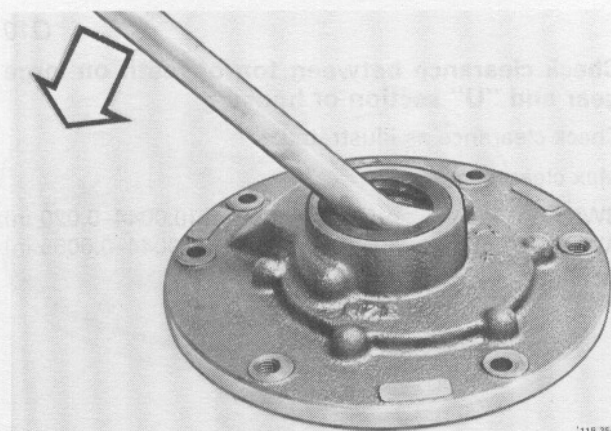
Use a felt-tipped pen.

Do not use a punch!

Q3

Lift off pump gears

Q4



119 354

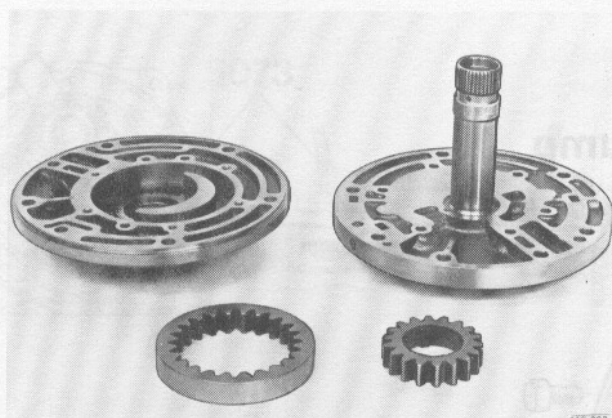
Remove oil seal for converter shaft

Ease off with a screwdriver.

Q5



Oil pump



## Cleaning and checking

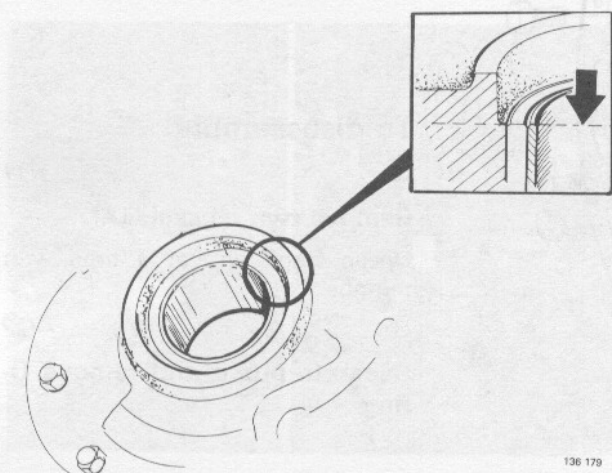
Q6

### Carefully clean all parts without scoring

Dry with compressed air.

Check for cracks, scoring and signs of wear.

**Note!** Pump drive and housing are very accurately matched. Complete assembly must be replaced even if only one part is defective.



Q7

### Check bushing for torque converter shaft

If bushing has moved outward it will block a drain channel and cause leakage.

Replace oil pump if bushing has moved outward or is damaged.

## To assemble

Q8

### Place pump gears in housing according to previously made marks

Q9

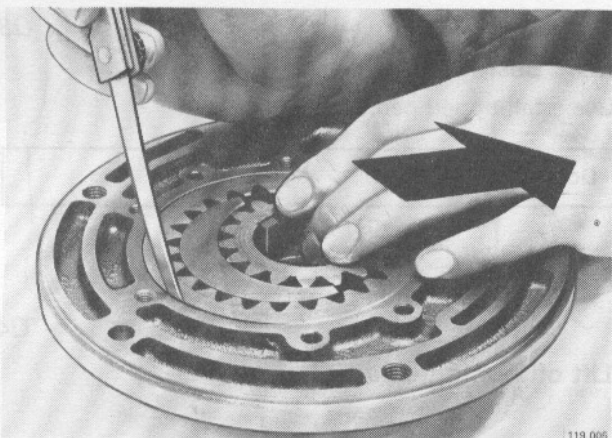
### Check clearance between pump housing and outer gear

Pull both gears in direction indicated.

Measure clearance with a feeler gauge.

Max clearance:

BW55	0.07–0.03 mm (0.0028–0.0012 in)
AW55, 70, 71	0.07–0.15 mm (0.0028–0.0060 in)



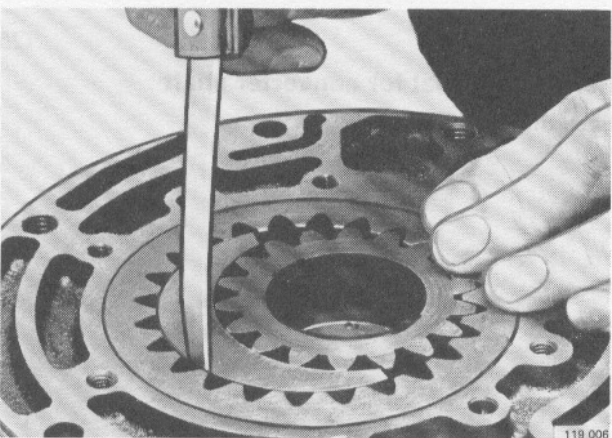
Q10

### Check clearance between top of teeth on large gear and "U" section of housing

Check clearance as illustrated.

Max clearance:

BW55	0.11–0.50 mm (0.0044–0.020 in)
AW55, 70, 71	0.11–0.14 mm (0.0044–0.0055 in)



Oil pump

Q11

**Check axial clearance for both gears**

Place a caliper gauge or straight edge across pump as illustrated and measure axial clearance with a feeler gauge.

Max clearance:

BW55	0.02–0.10 mm (0.0008–0.0040 in)
AW55, 70, 71	0.02–0.05 mm (0.0008–0.0019 in)

Q12

**Smear friction surfaces with ATF**

Q13

**Install oil seal for torque converter shaft**

Use drift 5117.

**Note!** Two types of seals are in use.

Single-lip CR 530039 with green front and twin lip KOYO P/N 1233 009-8. Late type transmissions are fitted with KOYO seals.

Single-lip seal is easily damaged during assembly because top of seal protrudes too far above body.

Therefore to prevent oil leak install twin lip oil seal.

Q14

**Assemble pump loosely**

**Note!** Bolts finger tight at this stage.

Q15

**Install centering tool 5077**

Q16

**Torque bolts to 8 Nm (6 ft lbs)**

Q17

**Remove centering tool**

Q18

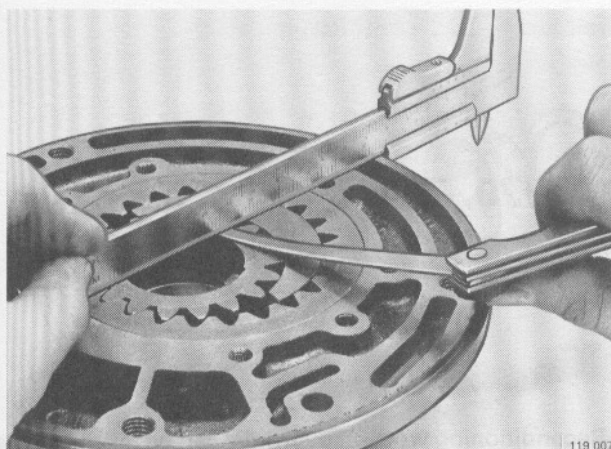
**Install O-ring on pump housing**

Smear O-ring slightly with Vaseline.

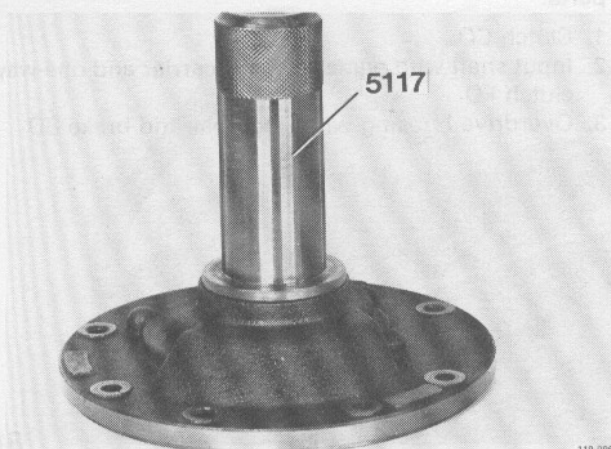
Q19

**Install oil seals on hub**

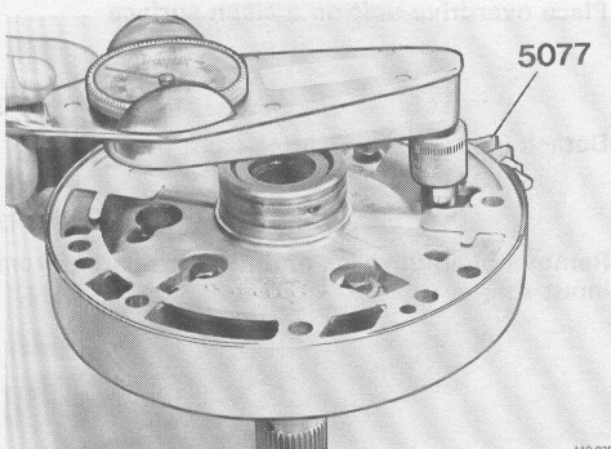
Smear seals with Vaseline.



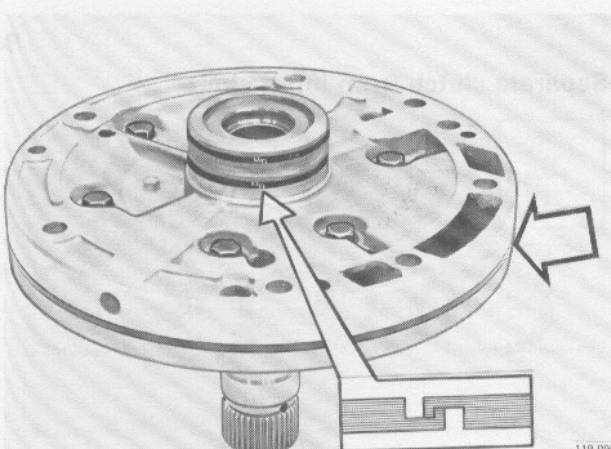
119 007



119 096



119 835



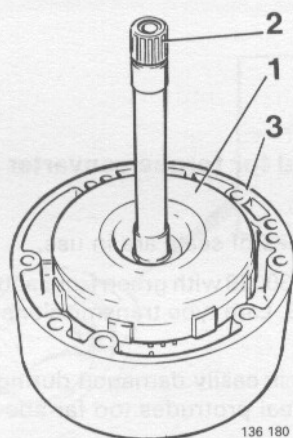
119 090



Overdrive

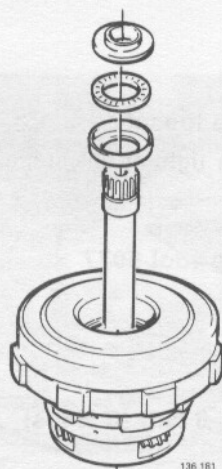
## R. Overdrive, AW70, 71

Special tool: 5072



Reconditioning work on overdrive can be taken in three parts:

1. Clutch CO
2. Input shaft with planetary gear carrier and one-way clutch FO
3. Overdrive housing with ring gear and brake BO



**Place overdrive unit on a clean surface**

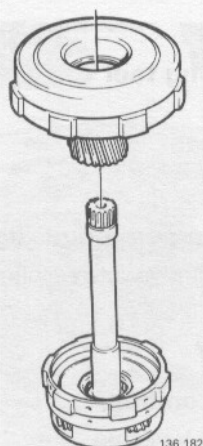
R1

**Detach input shaft + clutch from overdrive**

R2

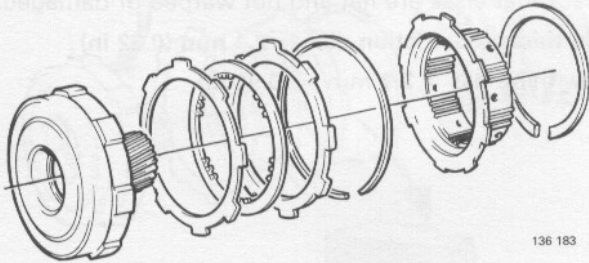
**Remove bearing races and needle bearing from input shaft**

R3



**Separate clutch from input shaft**

R4



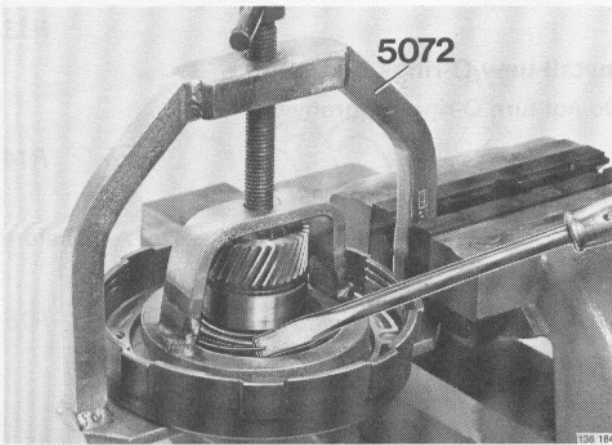
## CO-clutch disassembly

R5

### Remove:

- lock ring
- brake hub to BO brake
- lock ring for clutch pack
- clutches.

R6



### Unclip retaining rings

Remove return springs

Compress springs with press tool 5072.<sup>1</sup>

### Remove:

- lock ring
- 5072
- ring cage
- retaining rings.

Springs fixed to retainer on most BW55 transmission.

<sup>1</sup> Press tool 5072 must be modified to fit AW70/71. See page 21.

R7

### Remove clutch piston from housing

Blow out piston with compressed air at max 14 psi through feed hole indicated. Place finger over opposite hole if piston is difficult to remove. If this doesn't work, press piston back into cylinder and repeat.

R8

### Remove O-rings from piston

## Cleaning and checking

R9

### Wash all parts excluding clutches with solvent

Blow clean and dry with compressed air.

Do not use rags or wadding.

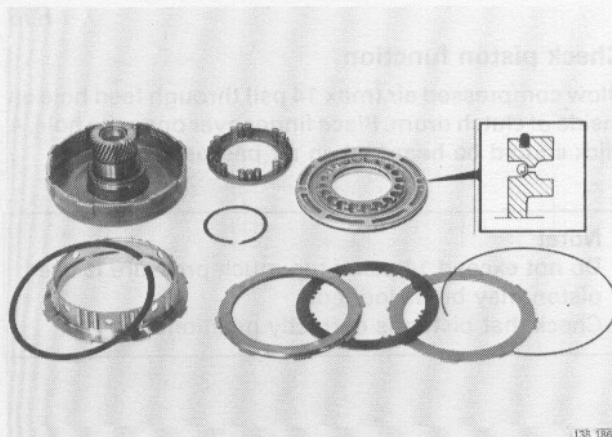
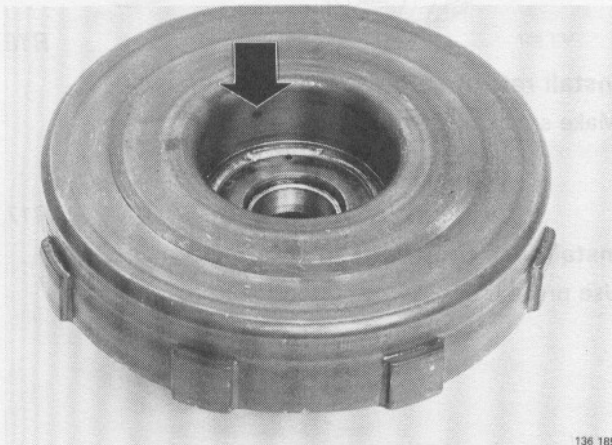
R10

### Check all parts for cracks, signs of wear etc

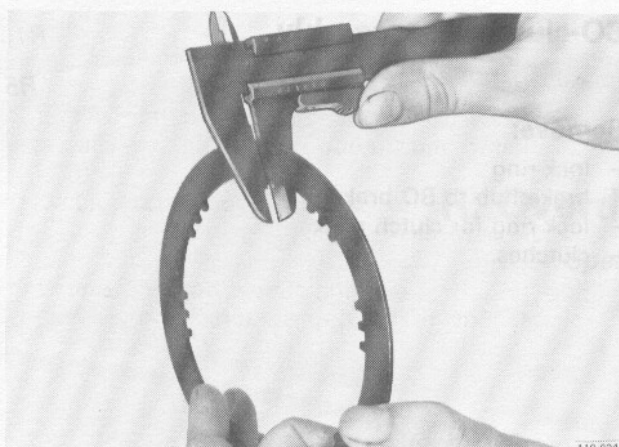
R11

### Check piston

Shake piston and check that ball valve moves freely. Also check sliding surface of piston and O-rings grooves.







119 024

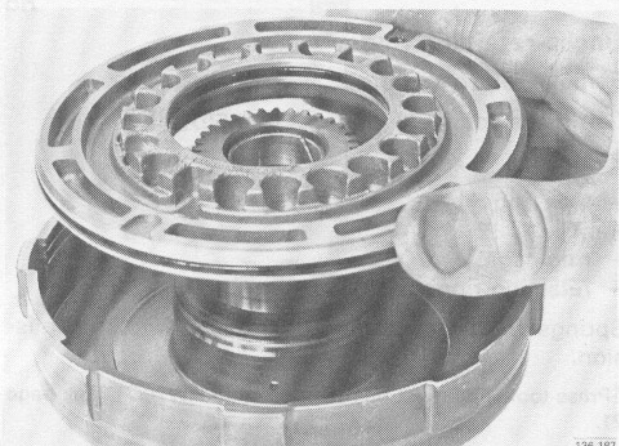
### Check clutch discs

Check that discs are flat and not warped or damaged.

**Min thickness, friction disc = 2.1 mm (0.82 in)**

New thickness = 2.3 mm = (0.91 in)

R12



136 187

### CO Clutch – assembly

#### Install new O-rings on piston

Do not turn O-rings in grooves.

R13

#### Smear all parts with ATF

New clutch rings should be soaked in ATF before assembling.

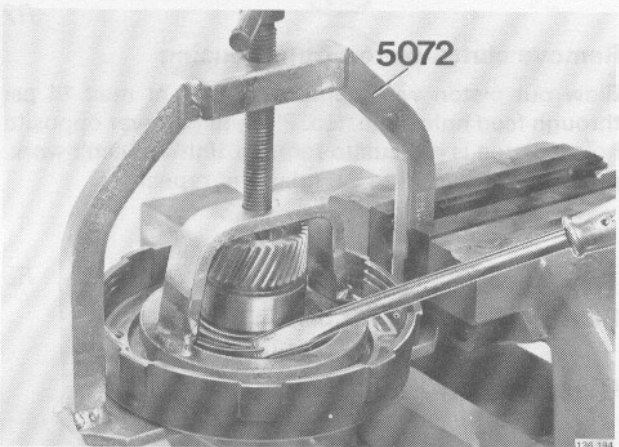
R14

#### Install piston in housing

Smear O-ring with Vaseline.

Push in piston carefully to avoid damage to O-rings.

R15



136 194

#### Install return springs and retainer

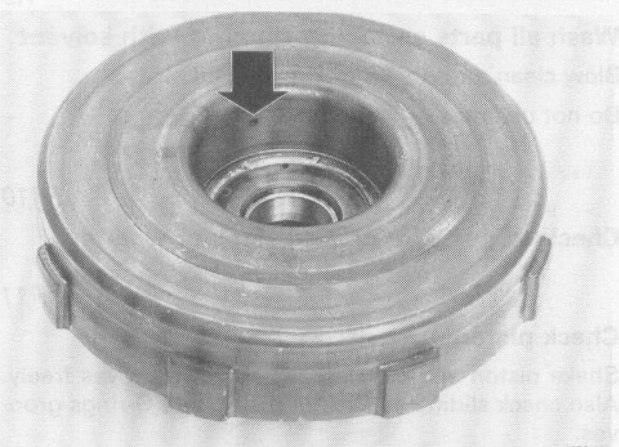
Make sure rings are vertical.

R16

#### Install lock ring

Use press tool 5072 to off load springs.

R17



136 185

#### Check piston function

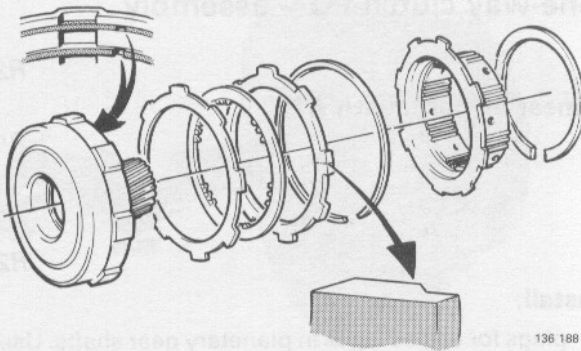
Blow compressed air (max 14 psi) through feed hole on inside of clutch drum. Place finger over opposite hole. A click should be heard when air passes through.

R18

#### Note!

Do not exceed 14 psi. If too much pressure is used, piston may be dislodged.  
Check that piston is correctly positioned.

R19

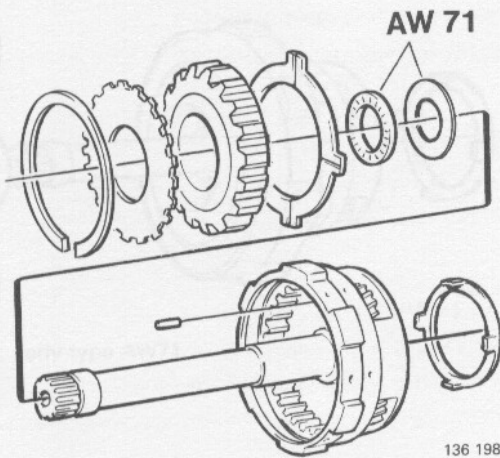


**Install:**

- clutch discs. Thin unlined disc at bottom, next friction lining and outermost the thick bevelled steel disc.
- lock ring for clutch pack. Ring opening should not be in one of recesses, see fig.
- brake hub
- lock ring. Ring opening should not be in one of recesses. Ensure that ring sits directly in groove.

**Input shaft, planetary gear carrier and one-way clutch FO – disassembly**

R20

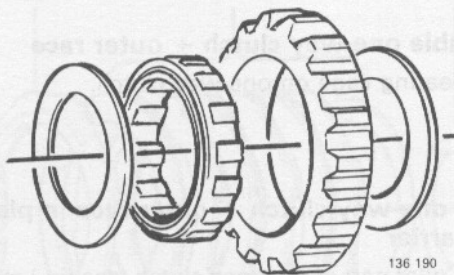


**Remove:**

- lock ring
- pressure plate, one-way clutch FO + outer race
- thrust washer
- AW71: needle bearing and bearing race
- plugs for oil passages in planetary gear shafts. Keep parts in correct order
- thrust washer from planetary gear carrier.

R21

**Remove one-way clutch and bearing cages from outer race**



**Cleaning and checking**

R22

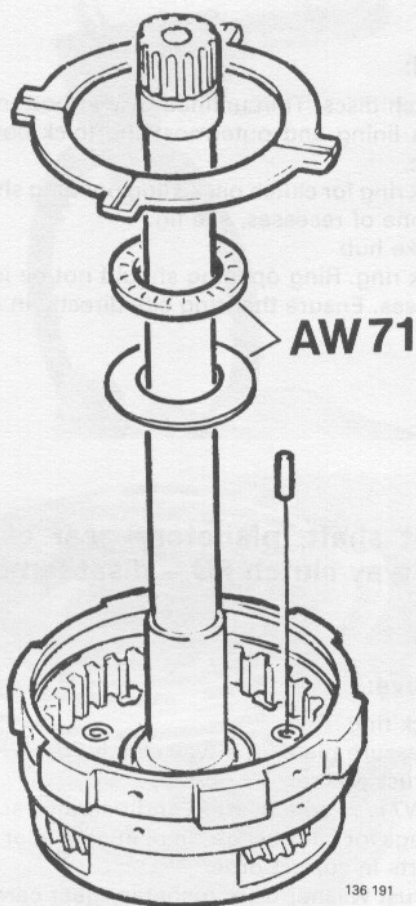
**Wash all parts in solvent**

Dry with compressed air. Do **not** use rags or wadding.

R23

**Check all parts for cracks, signs of wear etc**





## Input shaft, planetary gear carrier and one-way clutch FO – assembly

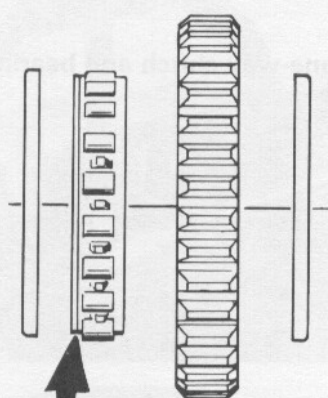
R24

Smear all parts with ATF

R25

### Install:

- plugs for oil passages in planetary gear shafts. Use a magnetic screwdriver
- AW71: bearing race and needle bearing
- thrust washer. Grooves facing up, see fig.



R26

### Assemble one-way clutch + outer race

Place bearing cage on one-way clutch.

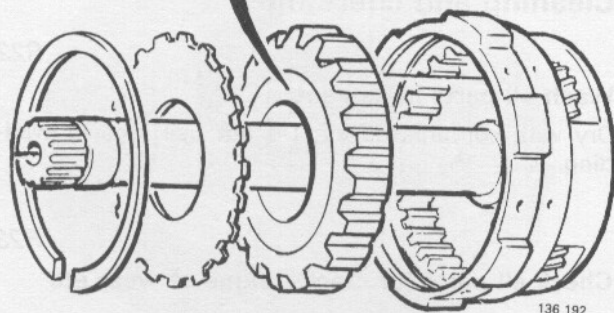
R27

### Install one-way clutch + outer race in planetary gear carrier

**Note!** Collar part of one-way clutch (see fig.) must face outward away from planetary gear carrier.

R28

### Install pressure plate and lock ring



R29

### Assemble CO clutch + input shaft to planetary gear carrier

Make sure that planetary gear carrier fits correctly into clutch pack.

R30

### Check one-way clutch

Hold carrier and turn input shaft. It should be possible to turn shaft clockwise but not anti (counter) clockwise.

R31

### Install thrust washer in rear of planetary gear carrier

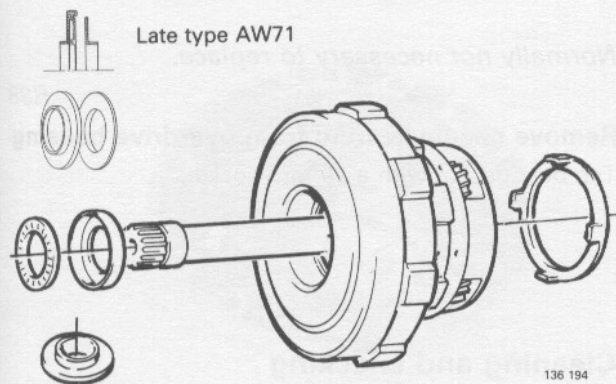
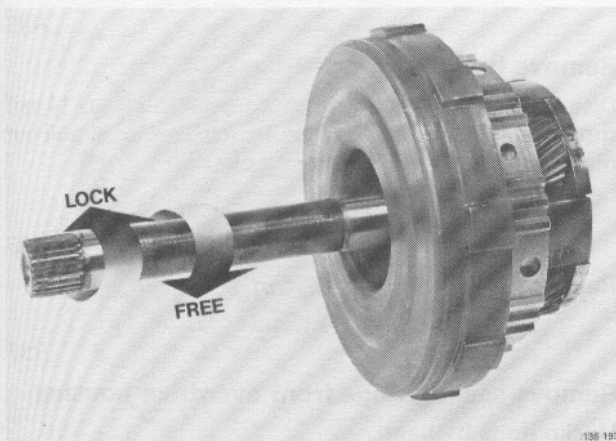
Smear washer with Vaseline to keep it in position.

R32

### Install bearing race and needle bearing on input shaft

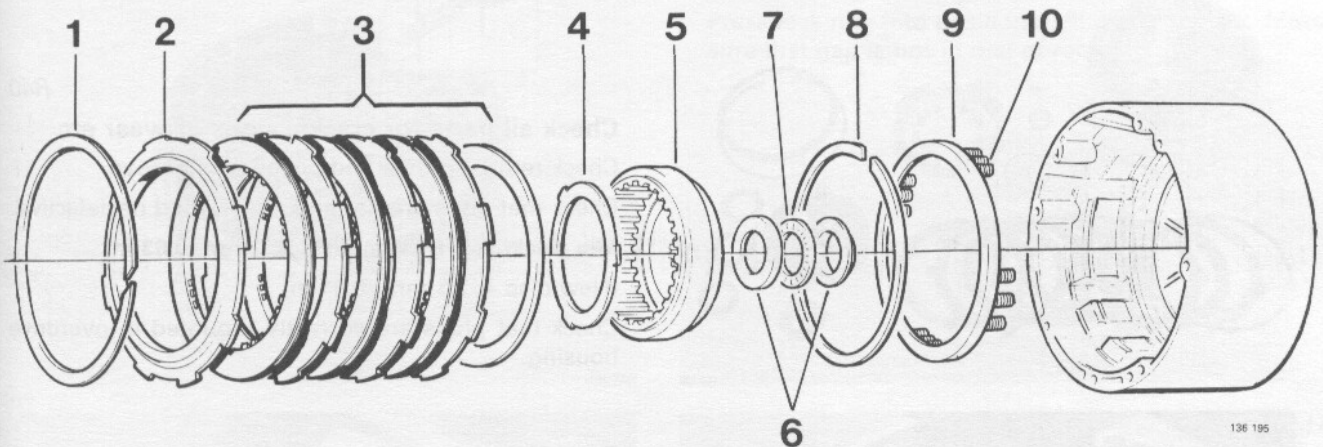
Plugs on washer must face out, away from carrier. (Other (front) bearing washer with collar is installed at rear of oil pump in connection with reassembling transmission, see Z56 page 135.)

**Note!** Two types of bearing washer are in use for AW70/71.



AW70, early type AW71

## Overdrive – disassembly



R33

### Remove:

- lock ring (1) for brake pack (use a screwdriver)
- thrust plate (2) for brake pack
- brake pack (3) and thrust ring
- bearing race (4) from ring gear
- ring gear (5)
- bearing races (6) and needle bearing (7).

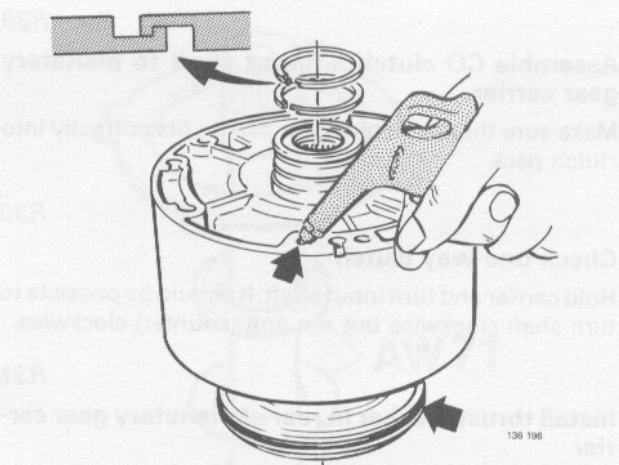
R34

### Remove:

- lock ring (8) for brake piston
- spring retainer (9)
- return springs (10).



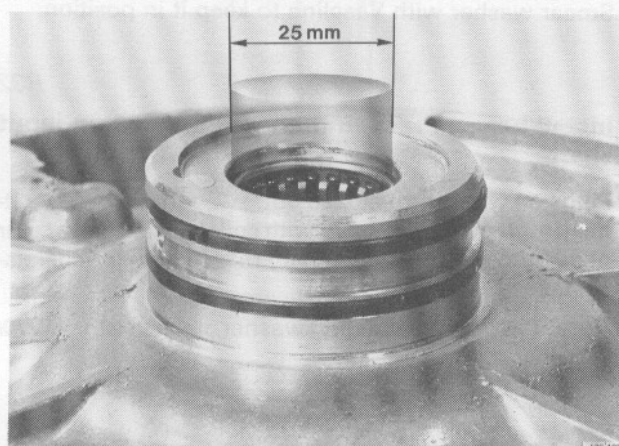
Overdrive



**Remove brake piston**

Dislodge piston by blowing compressed air (max 14 psi) through feed hole, see fig. If difficult to remove, pull out piston with a pair of flat nosed pliers.

R35



**Remove O-rings from piston**

R36

**Remove sealing rings from overdrive housing**

R37

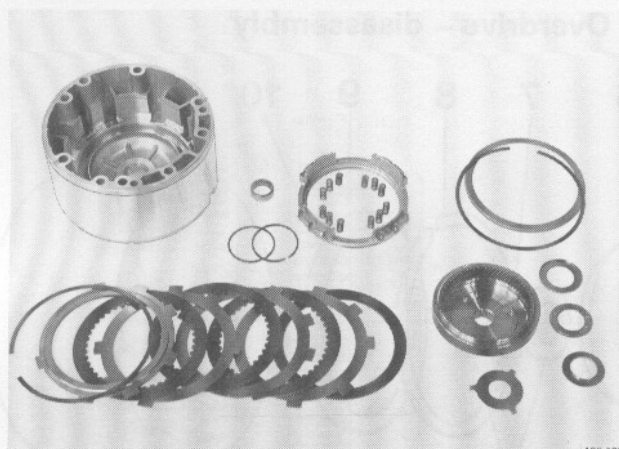
Unclip rings by hand.

*Normally not necessary to replace.*

**Remove needle bearing from overdrive housing**

R38

Tap bearing out with a 25 mm socket.



**Cleaning and checking**

R39

**Wash all parts excluding brake pack in solvent**

Blow clean and dry with compressed air.

Do **not** use rags or wadding.

R40

**Check all parts for cracks, signs of wear etc**

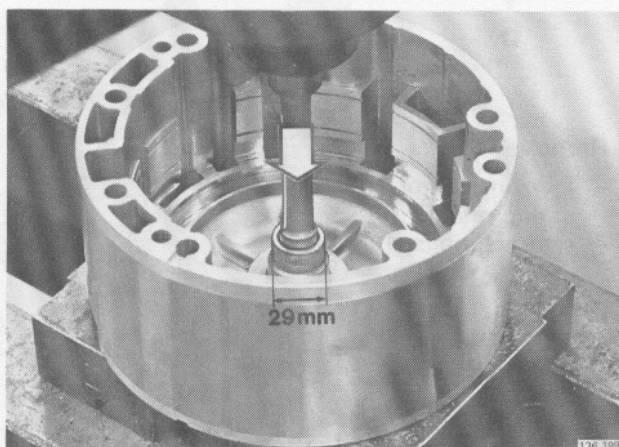
Check return springs and piston ring groove.

Check that discs are flat and not warped or defective.

**Min thickness, friction disc: 2.1 mm (0.83 in)**

(New disc = 2.3 mm (0.91 in))

Check that plugs are correctly mounted in overdrive housing.



**Overdrive housing – assembly**

R41

**Install new sealing rings in overdrive housing**

Rings should slide smoothly in groove.

R42

**Install needle bearing in overdrive housing, as applicable**

Mount housing in a vice protected by soft jaws.

Tap bearing into position with a 29 mm socket (external diam.).

R43

**Install new O-rings on piston**

Do **not** turn O-rings in groove.

R44

**Smear all parts with ATF**

New discs should be soaked in ATF prior to installing.

R45

**Install piston in overdrive housing**

Smear O-rings with ATF and push in piston carefully to avoid damage to O-rings.

R46

**Install:**

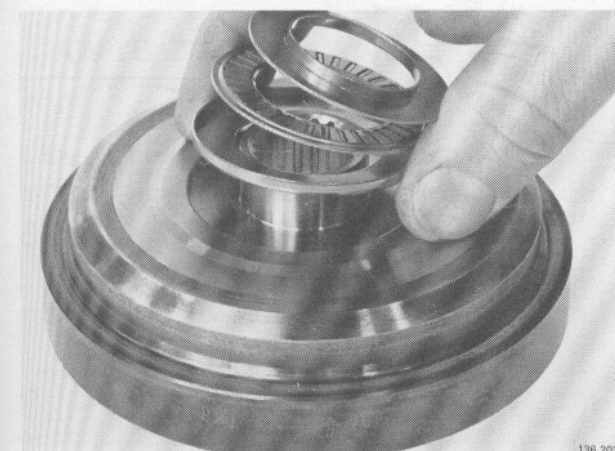
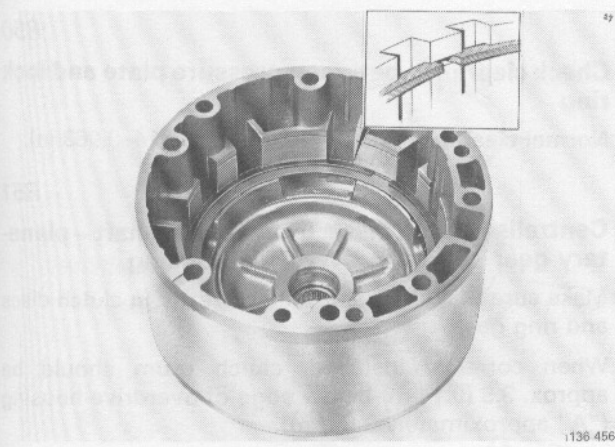
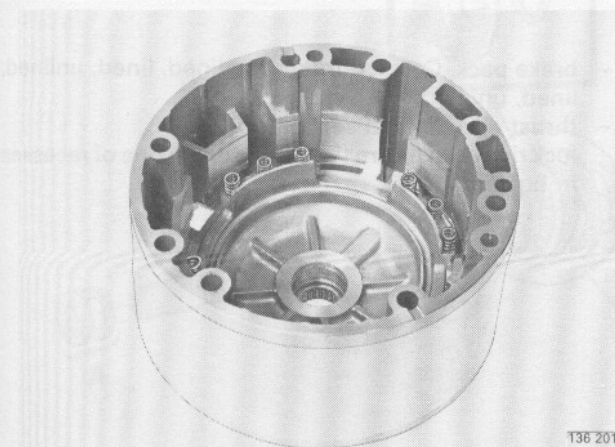
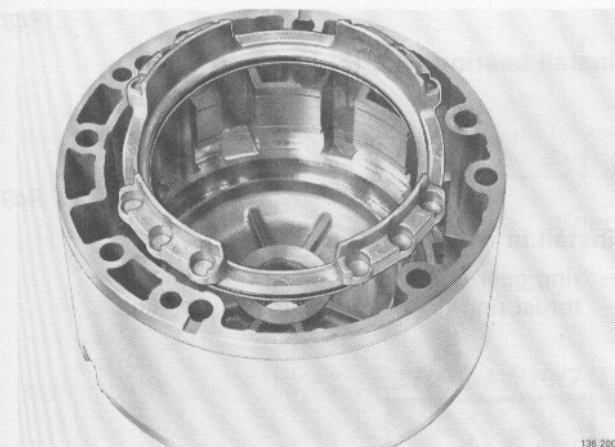
- return springs
- retainer
- lock ring

Press lock ring into position with a screwdriver. Make sure that gap is **not** in one of recesses in body.

R47

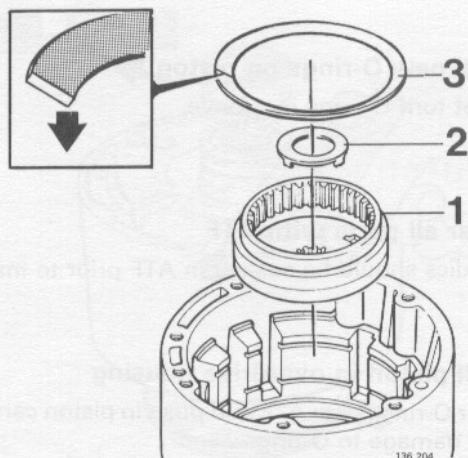
**Install bearing races and needle bearing on ring gear**

Races must be installed as illustrated. Smear parts with Vaseline.





Overdrive



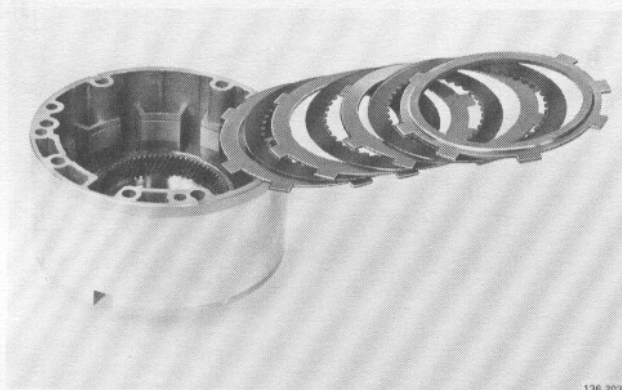
R48

**Install bearing race (2) in ring gear**

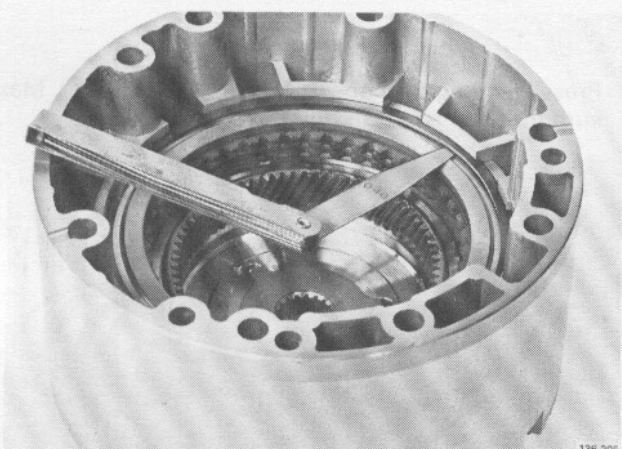
R49

**Install in overdrive housing:**

- ring gear (1)
- thrust ring (3), bevel facing out, see fig.



- brake pack. Correct order = unlined, lined, unlined, lined, unlined, lined
- thrust disc. Raised section up (out)
- lock ring. Make sure that gap is not in one of recesses in housing.



R50

**Check clearance between pressure plate and lock ring**

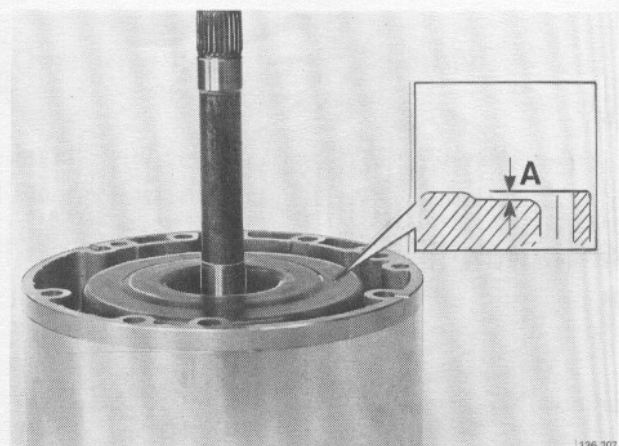
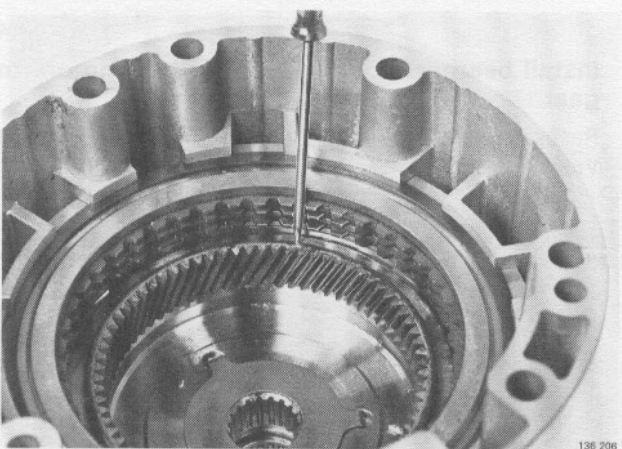
Normal clearance = 0.35–1.60 mm (0.014–0.063 in).

R51

**Centralise clutch discs. Install input shaft – planetary gear carrier in overdrive housing**

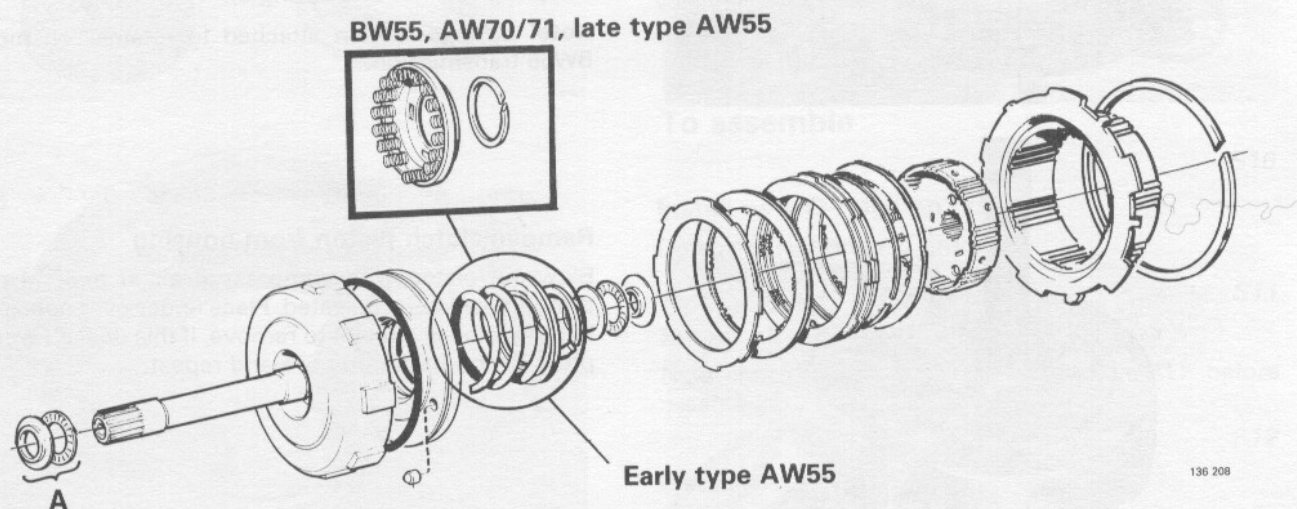
Make sure that input shaft fits correctly in clutch discs and ring gear.

When correctly installed, clutch drum should be approx. 3.5 (0.14 in) below edge of overdrive housing ("A" approximately 3.5 mm).



## S. C1 front clutch

Special tool: 5072



### To disassemble

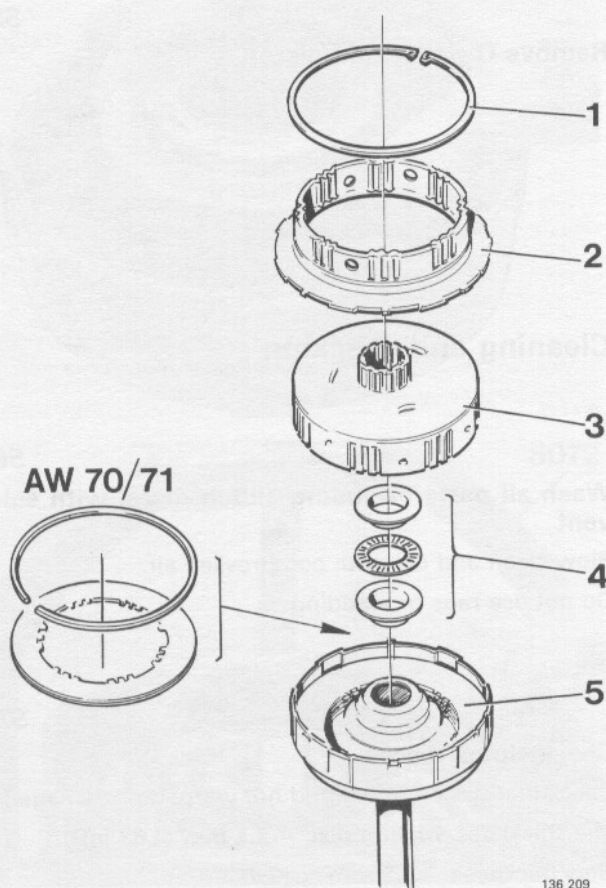
S1

Remove bearing race and needle bearing (A) from input shaft

S2

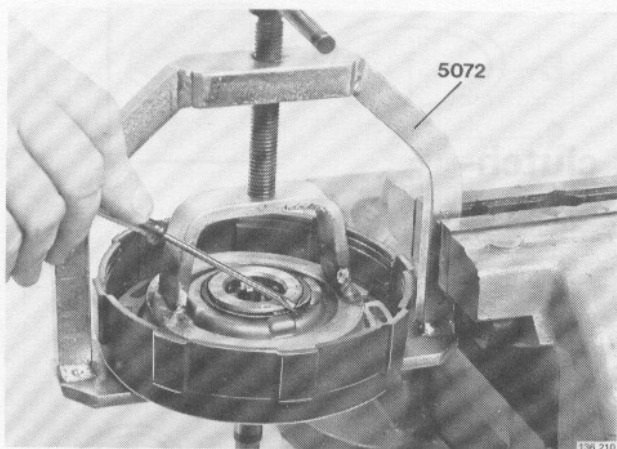
#### Remove:

- lock ring (1) (use a screwdriver)
- rear clutch input hub (2)
- front clutch hub (3)
- bearing races and needle bearing (4)
- friction discs (AW70/71)
- lock ring (AW70/71)
- clutch discs (5).





Front clutch



### Remove return spring(s)

BW55, AW70/71, late type AW55 have 18 small return springs. Early type AW55: has one large return spring.

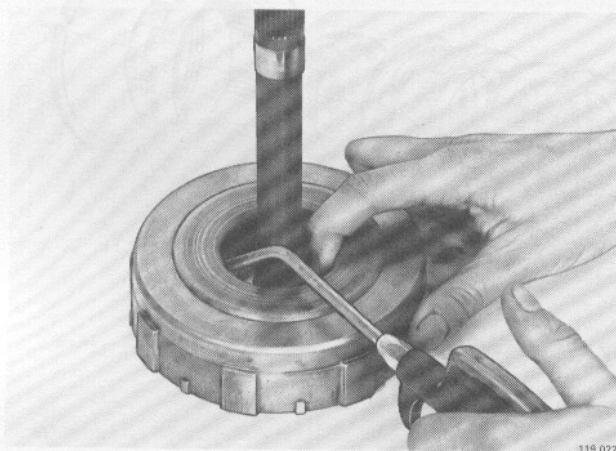
Compress spring(s) with tool **5072**.

#### Remove:

- lock ring
- press tool
- spring retainer and spring(s).

**Note!** Springs remain attached to retainer on most BW55 transmission.

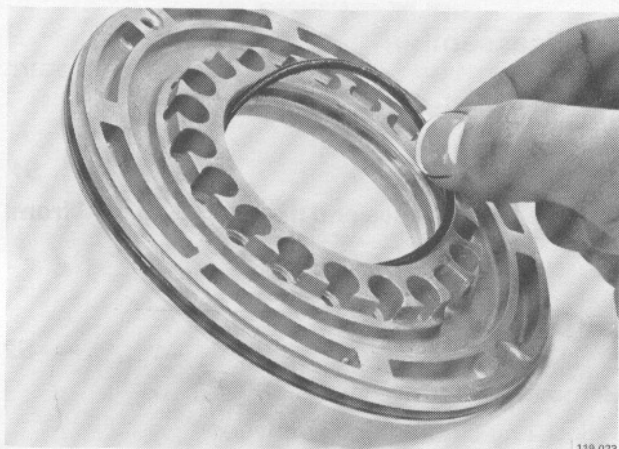
S3



### Remove clutch piston from housing

Blow out piston with compressed air at max 14 psi through feed hole indicated. Place finger over opposite hole if piston is difficult to remove. If this doesn't work, press piston back into bore and repeat.

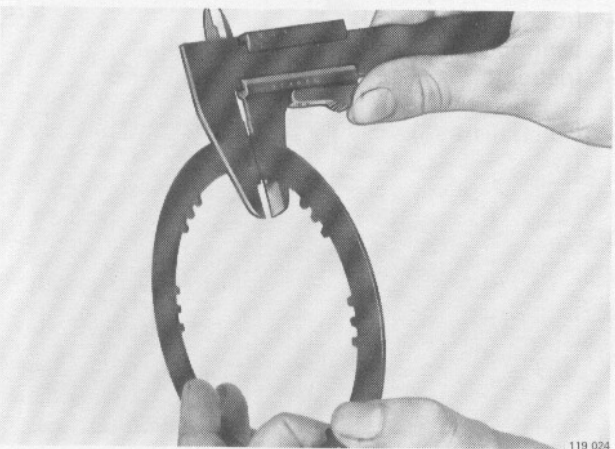
S4



### Remove O-rings from piston

S5

### Cleaning and checking



#### Wash all parts excluding clutch discs, with solvent

Blow clean and dry with compressed air.

Do not use rags or wadding.

S6

#### Check clutch discs

Check that discs are flat and not warped or damaged

**Min thickness, friction disc = 2.1 mm (0.83 in)**

**New thickness = 2.3 mm = (0.91 in)**

S7

Front clutch

S8

**Check hub, clutch drum, input shaft and return springs**

Carefully inspect all parts for cracks and signs of wear etc.

S9

**Check piston**

Shake piston and check that ball valve moves freely. Also check sliding surface of piston and O-rings grooves.

**To assemble**

S10

**Install new O-rings on piston**

Do **not** turn O-rings in grooves.

S11

**Smear all parts with ATF**

New clutch rings should be soaked in ATF before assembling.

S12

**Install piston in housing**

Smear O-ring with Vaseline.

Push in piston carefully to avoid damage to O-rings.

S13

**BW55, late type AW55, AW70/71: Install return spring (18x) and spring retainer**

Make sure that springs are properly seated in retainer.

S14

**Early type AW55:**

Install return spring and spring retainer.

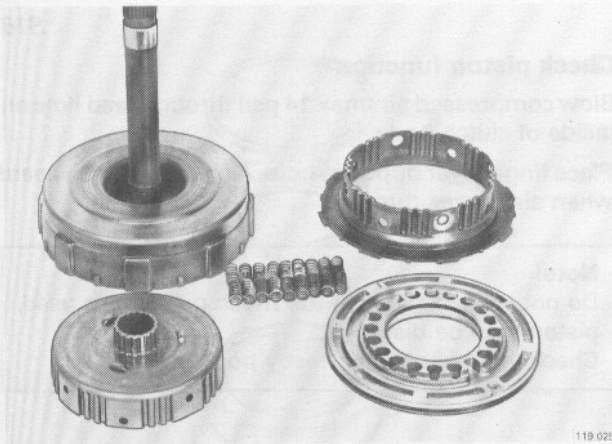
S15

**Install lock ring**

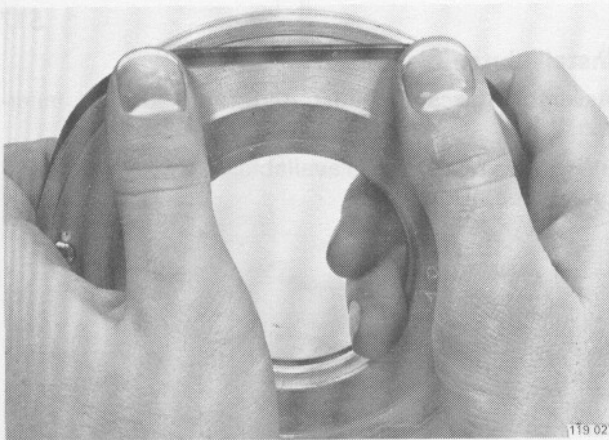
Compress return spring(s) with 5072.

Install lock ring, making sure that it fits correctly in groove.

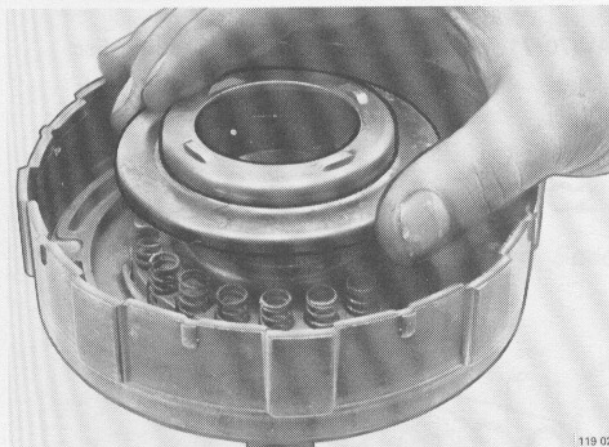
Remove tool 5072.



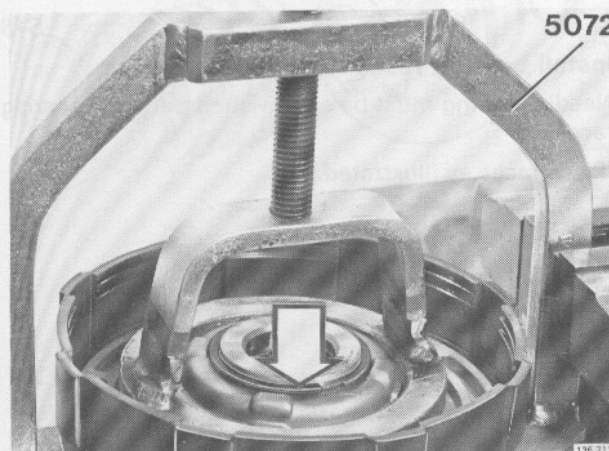
119 025



119 027



119 020

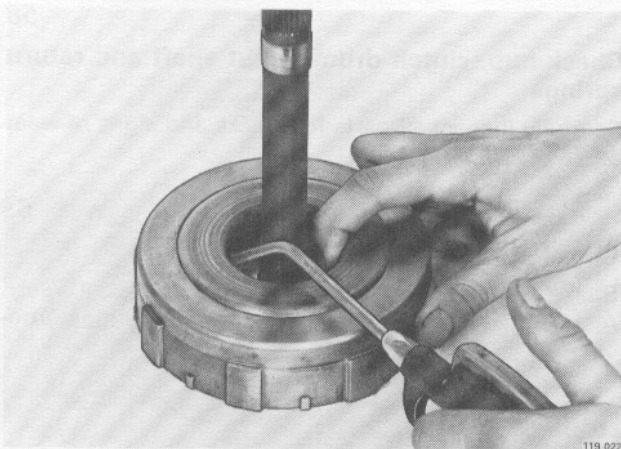


5072

136 211



Front clutch



S16

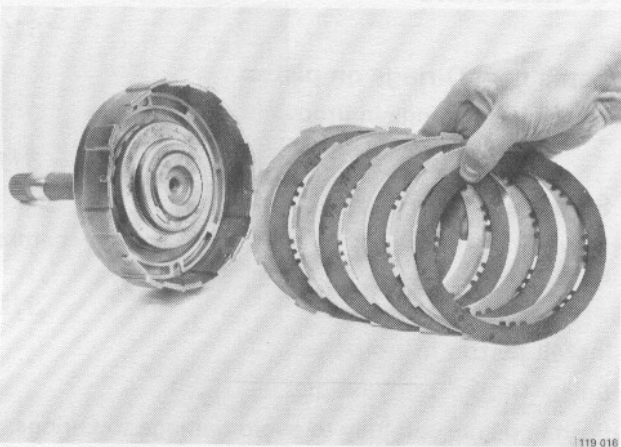
**Check piston function**

Blow compressed air (max 14 psi) through feed hole on inside of clutch body.

Place finger over opposite hole. A click should be heard when air passes through.

**Note!**

Do not exceed 14 psi. If too much pressure is used, piston may be dislodged.  
Check that piston is correctly positioned.



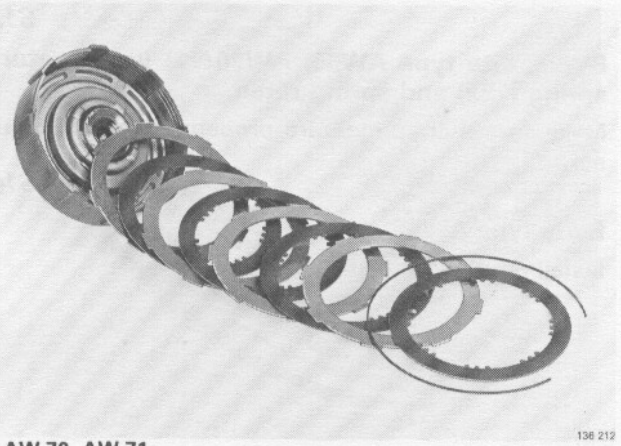
S17

**Install clutch discs**

Assemble discs as illustrated (unlined disc innermost).

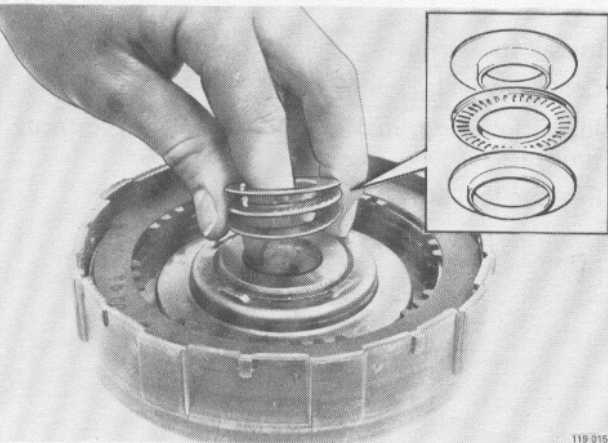
**BW55:** two clutch packs available, one with 6 discs and one with 8 discs.

AW 55, BW 55



**AW70/71:** install lock ring and last friction disc.

AW 70, AW 71



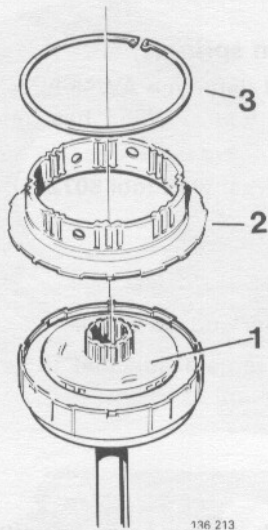
S18

**Install bearing races and needle bearing**

Needle bearing must be sandwiched between bearing races.

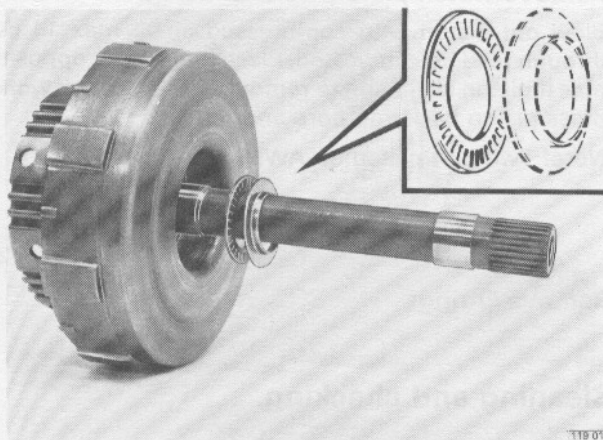
(Place races as illustrated.)

S19



**Install:**

- front clutch hub (1), making sure that discs seat correctly
- rear clutch hub (2)
- lock ring (3) for rear clutch hub. Make sure that ring fits correctly in groove.



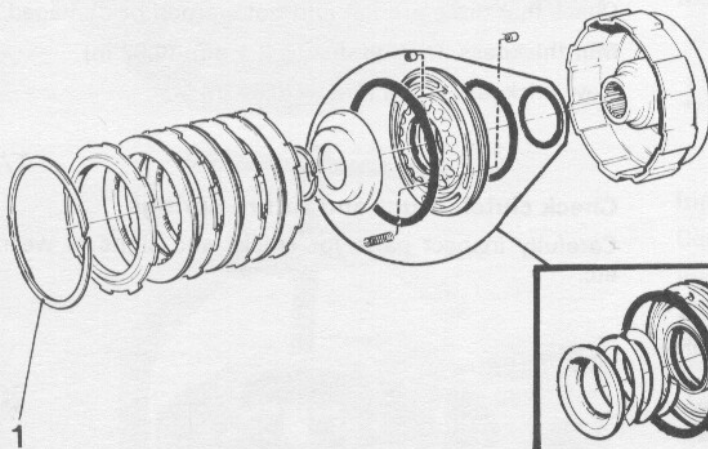
S20

**Install needle bearing on shaft**

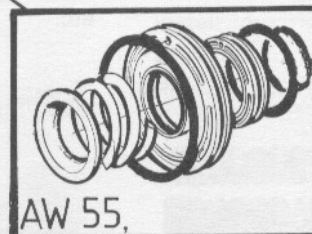
See Z53, page 134 and Z56, page 135.

**T. C2 rear clutch**

Special tool:5072



AW70: two part piston, similar to AW55



Early type

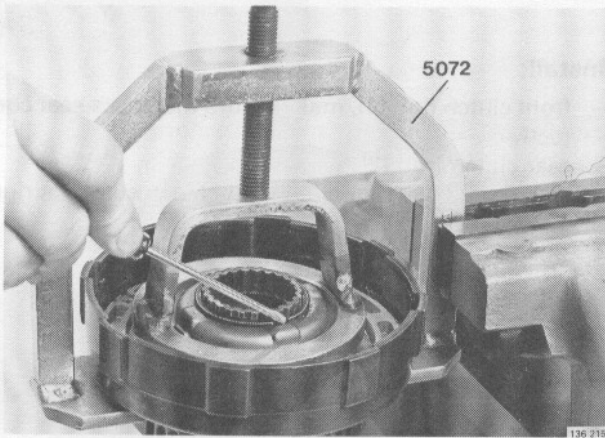
**To disassemble**

- Remove clutch pack**  
Unclip lock ring (1)

T1



Rear clutch



T2

**Remove return spring(s)**

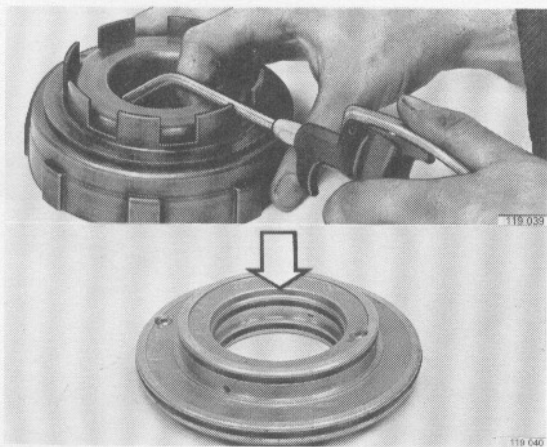
BW55, AW70/71, late type AW55 have 18 small return springs. Early type AW55: has one large return spring.

Compress spring(s) with tool **5072**.

**Remove:**

- lock ring
- press tool
- spring retainer and spring(s).

**Note!** Springs remain attached to retainer on most BW55 transmission.

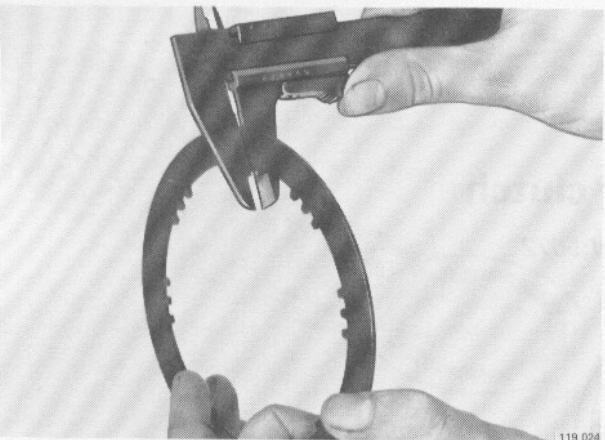


T3

**Remove clutch piston from housing**

Blow out piston with compressed air at max 14 psi through feed hole indicated. Place finger over opposite hole if piston is difficult to remove. If this doesn't work, press piston back into bore and repeat.

**Note!** Two part piston on AW55 and 70.



T4

**Remove O-rings**

**Cleaning and checking**

T5

**Wash all parts excluding clutches with solvent**

Blow clean and dry with compressed air. Do not use rags or wadding.

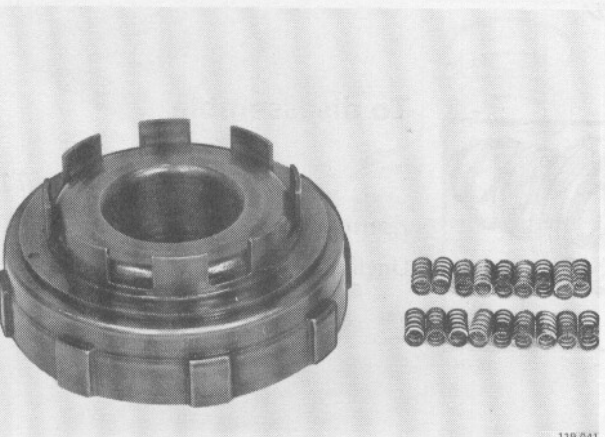
T6

**Check clutch discs**

Check that discs are flat and not warped or damaged.

**Min thickness, friction disc = 2.1 mm (0.82 in)**

**New thickness = 2.3 mm = (0.91 in)**

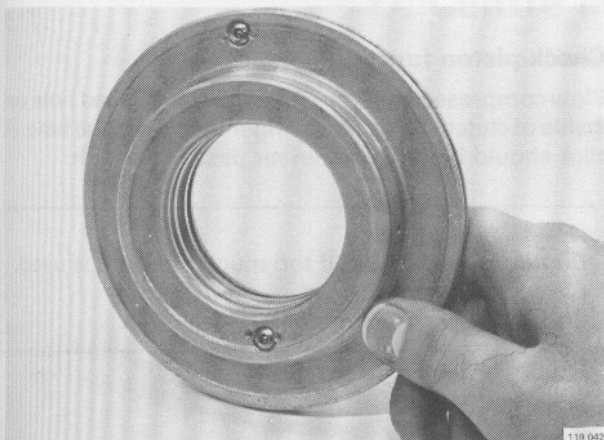


T7

**Check clutch drum and return springs**

Carefully inspect parts for cracks and signs of wear etc.

T8



### Check piston

Shake piston and check that ball valve moves freely. Also check sliding surface of piston and O-rings grooves.

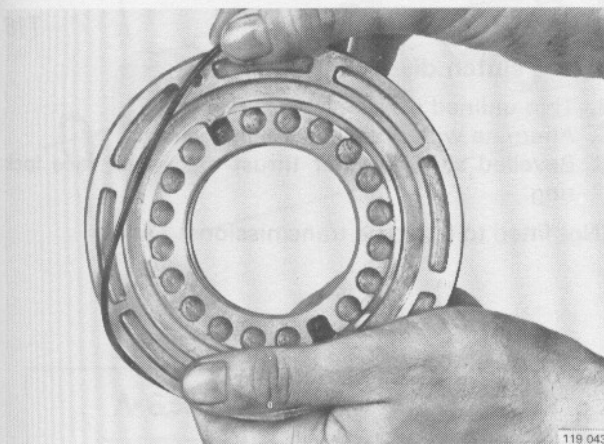
### To assemble

T9

### Install new O-rings on piston

Do **not** turn O-rings in grooves.

T10



### Smear all parts with ATF

New clutch rings should be soaked in ATF before assembling.

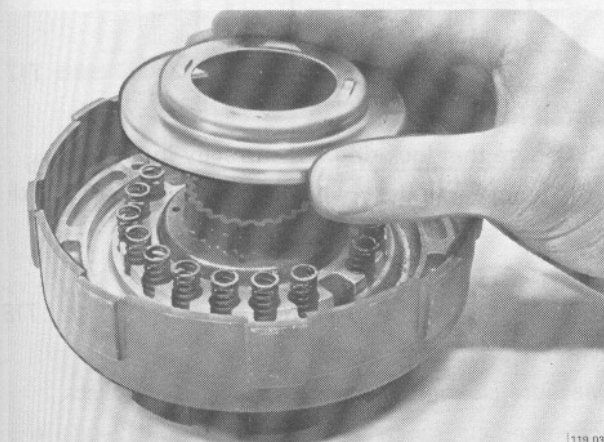
T11

### Press piston(s) into clutch drum, taking care not to damage O-rings

Lightly smear O-rings with Vaseline.

AW55/70: install inner piston first then outer on top of it.

T12



### BW55, late type AW55, AW70/71: Install return spring (18x) and spring retainer

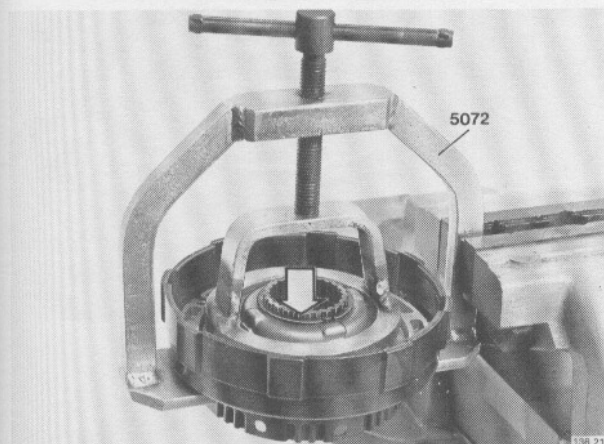
Make sure that springs are properly seated in retainer.

T13

### Early type AW55:

Install return spring and spring retainer.

T14



### Install lock ring

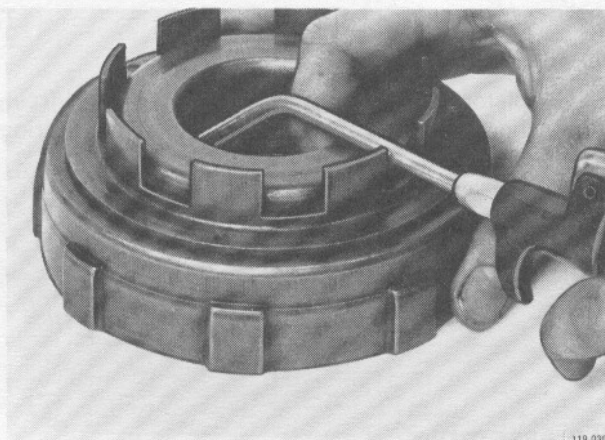
Compress return spring(s) with 5072.

Install lock ring, making sure that it fits correctly in groove.

Remove tool **5072**.



Rear clutch



119 039

T15

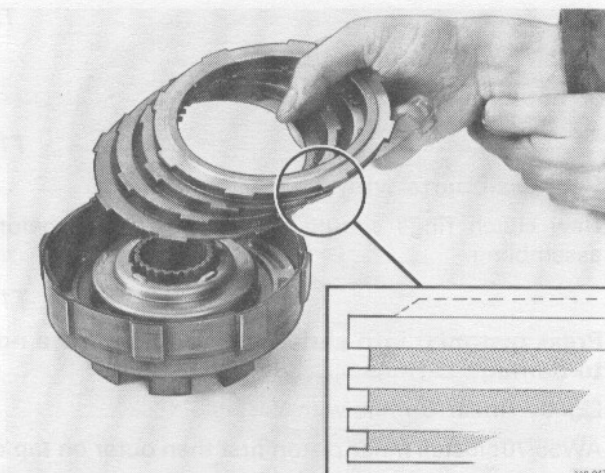
**Check piston function**

Blow compressed air (max 14 psi) through feed hole on inside of clutch drum. Place finger over opposite hole. A click should be heard when air passes through.

**Note!**

Do not exceed 14 psi. If too much pressure is used, piston may be dislodged.

Check that piston is correctly positioned.



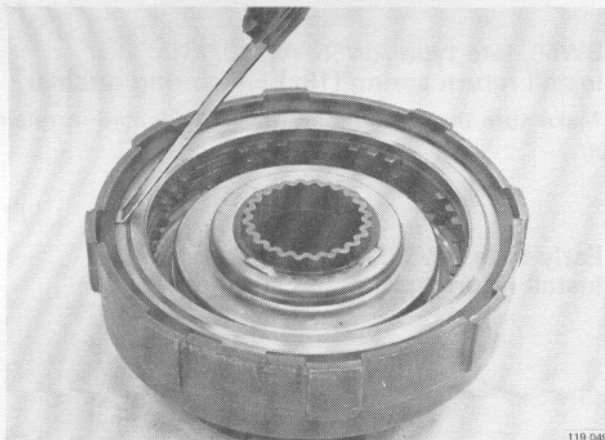
119 047

T16

**Install clutch discs**

1. Thin unlined disc first
2. Alternate with lined and unlined discs
3. Bevelled side of outer thrust disc must face lock ring.

(Not fitted to late type transmissions)



119 048

T17

**Install lock ring**

Make sure that lock ring fits correctly in groove.

Note! Ring gap must not be in one of recesses in clutch drum.

T18

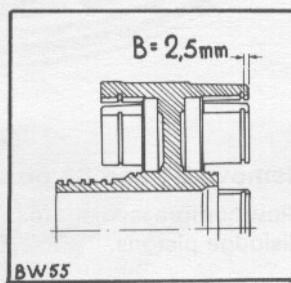
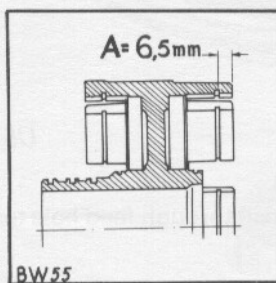
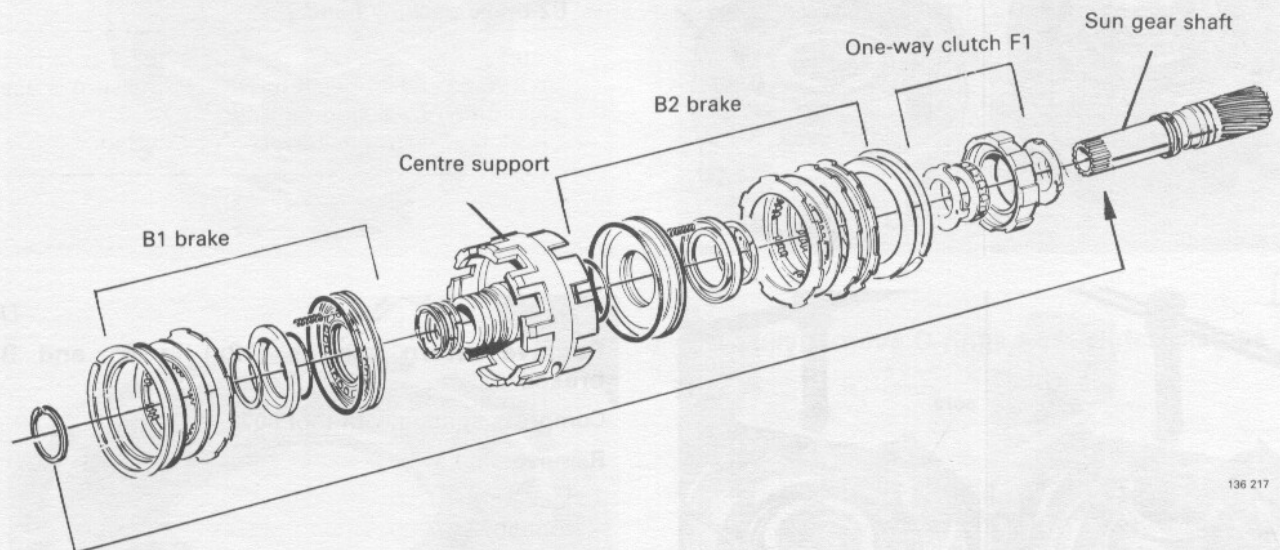
**Measure clutch clearance**

Measure clearance between lock ring and discs.

Permitted clearance = 0.3–1.2 mm = 0.012–0.48 in

## U. Centre support assembly

Special tool: 5072



Two types of centre support assemblies are in use on BW55 transmissions.

One type has two discs in B2 brake, the other three.

Identification

Distance between lock ring groove for B2 brake pack and rear of centre support varies as follows:

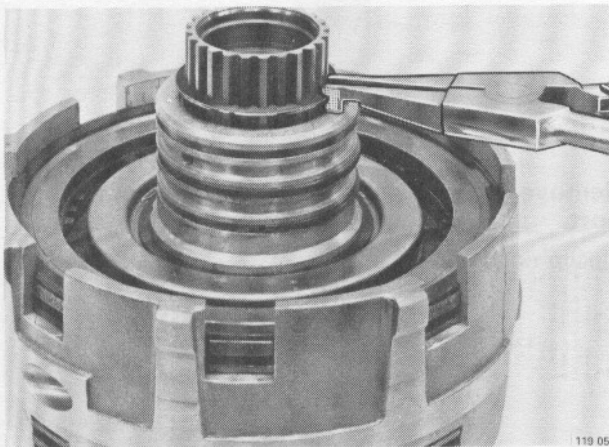
A = 6.5 mm = 0.26 in (two discs);

B = 2.5 mm = 0.10 in (three discs).

### To disassemble

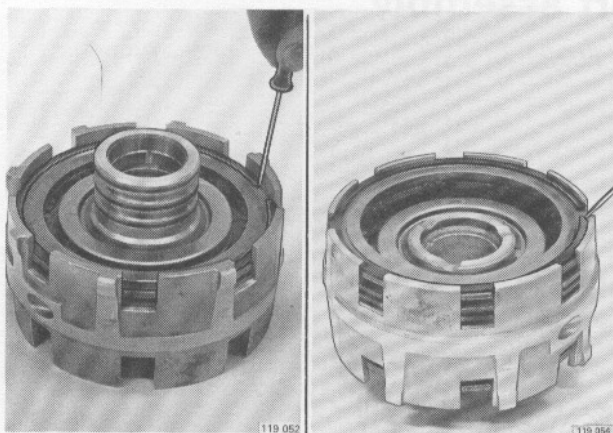
U1  
Unclip lock ring from sun gear shaft

U2  
Lift off centre support assembly from shaft





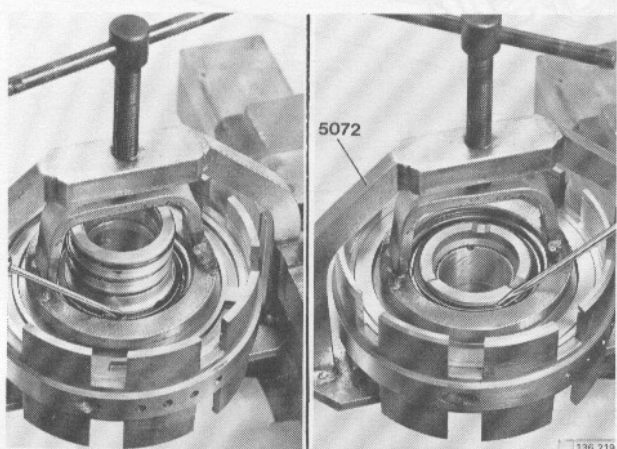
Centre support assembly



U3

**Remove:**

- lock ring securing B1 brake pack
- B1 brake pack by hand
- lock ring securing B2 brake pack
- B2 brake pack by hand.



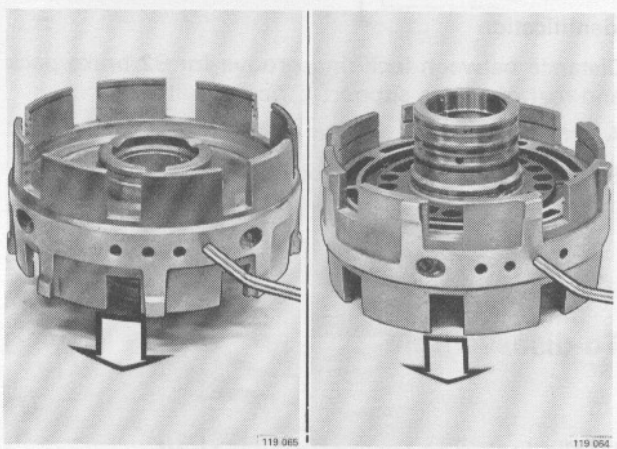
U4

**Remove return springs (12x) in B1 and B2 brakes**

Compress springs with tool 5072.

**Remove:**

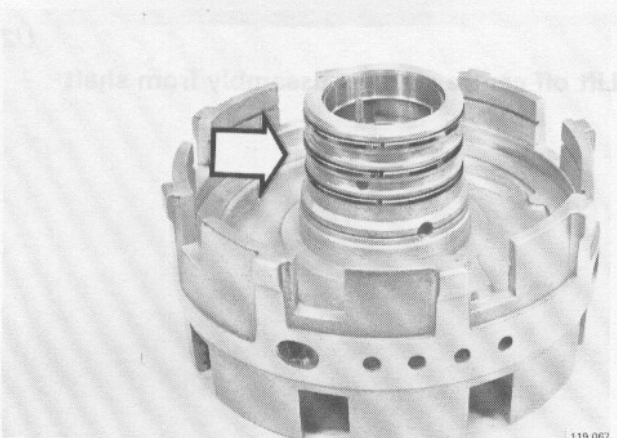
- lock ring
- tool 5072
- spring retainer and return spring.



U5

**Remove B1 and B2 pistons**

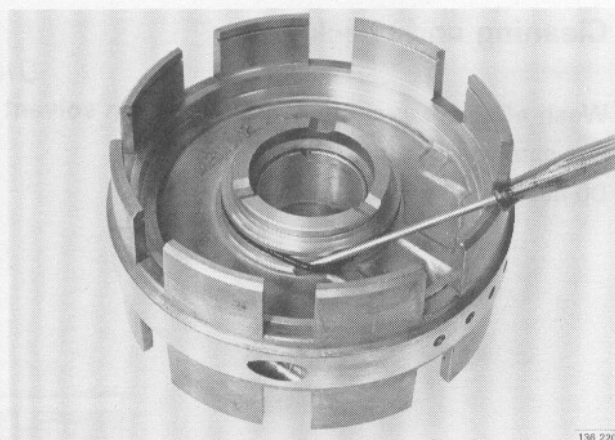
Blow compressed air (max 14 psi) through feed hole to dislodge pistons.



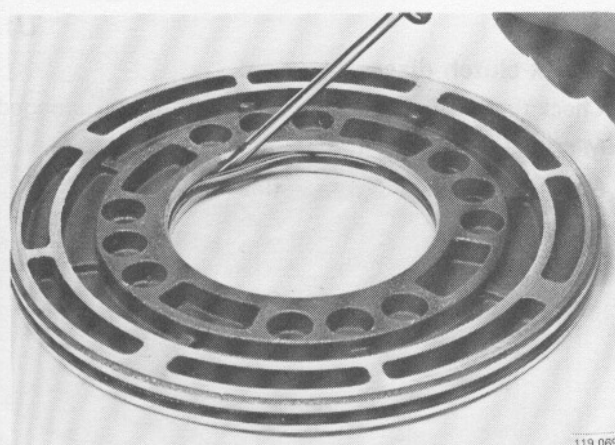
U6

**Remove oil sealing rings (3x) from centre support**

Unclip rings and lift off hub.

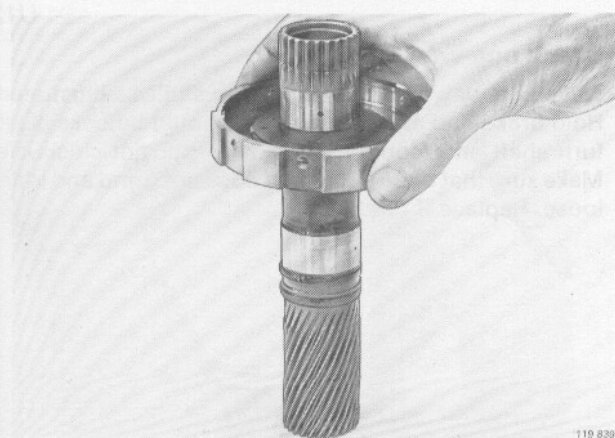


**AW70/71:** Remove O-ring from centre support.



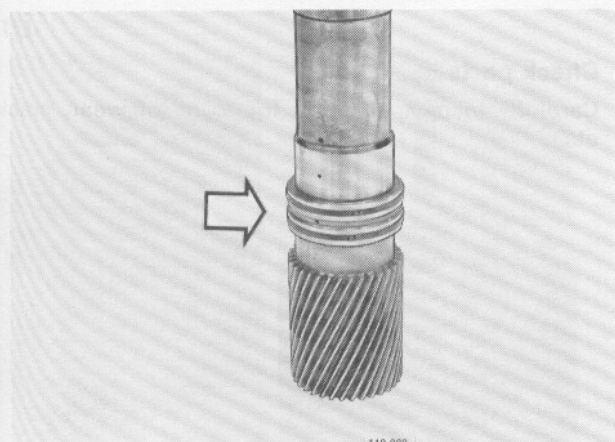
U7

**Carefully remove O-rings from clutch pistons**



U8

**Lift off brake hub (F1) from sun gear shaft**



U9

**Remove oil sealing rings (2x) from shaft**  
Unclip rings and lift off hub.



## Cleaning and checking

U10

### Wash all parts excluding brake discs in solvent

Use compressed air to clean/dry channels.

Do **not** use rags or wadding.

U11

### Check clutch discs

Check that discs are flat and not warped or damaged.

**Min thickness, friction disc = 2.1 mm (0.83 in)**

**New thickness = 2.3 mm = (0.91 in)**

U12

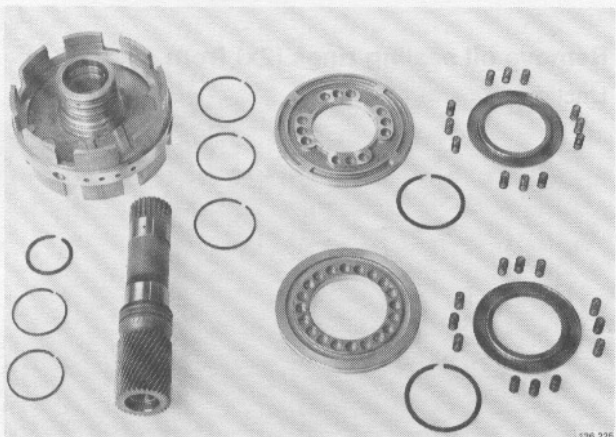
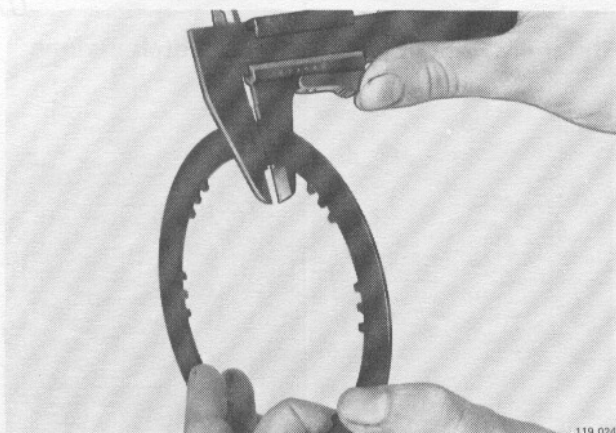
### Check one-way clutch F1

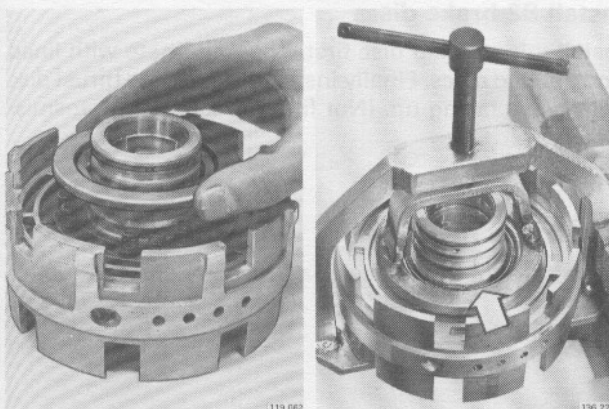
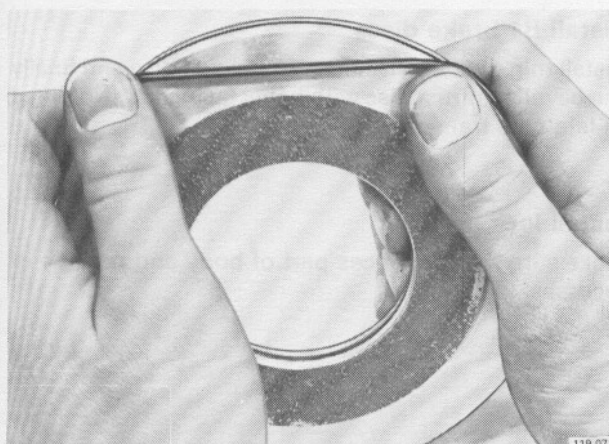
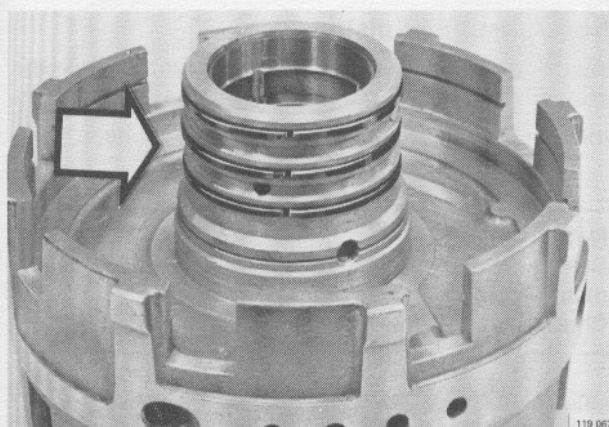
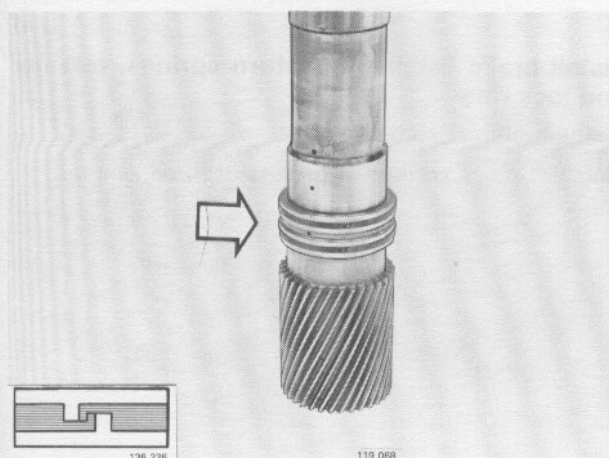
Place one-way clutch on sun gear shaft as illustrated. Hold brake hub and turn shaft. It should be possible to turn shaft anti (counter) clockwise but not clockwise. Make sure that one-way clutch does not grind and is not loose. Replace if defective.

U13

### Check parts

Carefully inspect all parts for signs of wear, cracks etc.





## To assemble

U14

### Install new oil sealing rings:

- 2x on sun gear shaft

- 3x on centre support hub.

U15

### Install new O-rings on brake pistons

Do **not** turn O-rings in groove.

U16

### Smear all moving parts in ATF

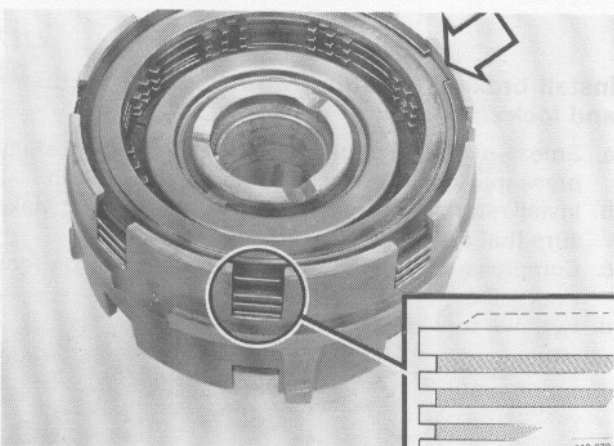
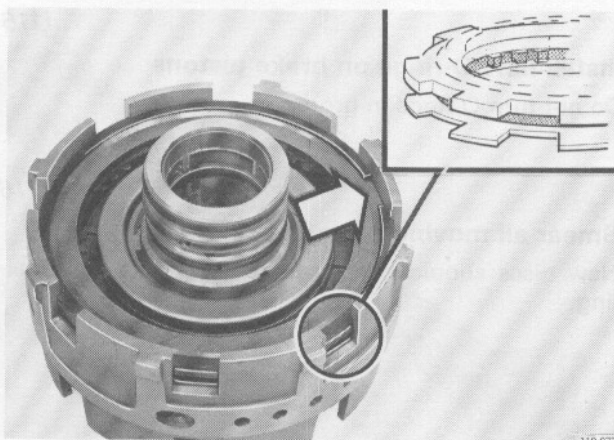
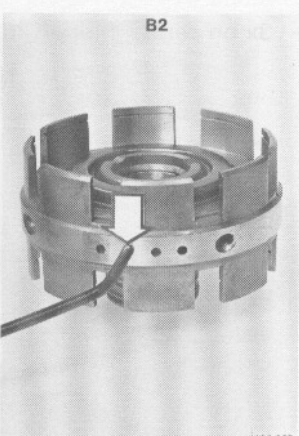
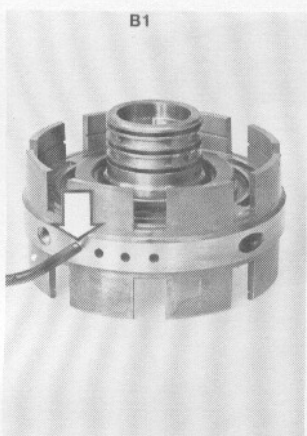
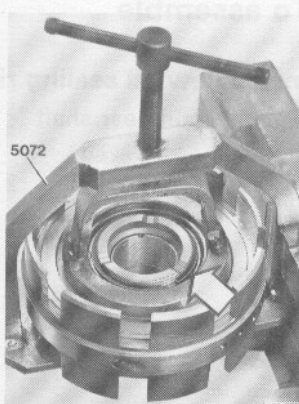
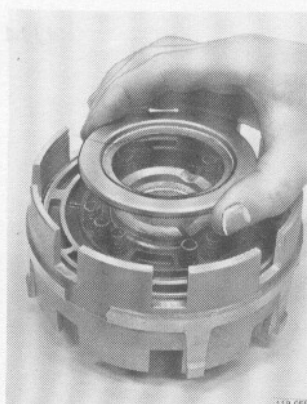
New discs should be soaked in ATF prior to installing.

U17

### Install brake B1 piston, return springs, retainer and lock ring

- Smear piston O-rings with Vaseline and carefully press into position avoiding damage to O-ring
- Install return springs (12x) and spring retainer. Make sure that springs seat correctly in retainer.
- Compress springs with tool **5072** and clip on lock ring.
- Remove tool 5072.





U18

### Install brake B2 piston, return springs, retainer and lock ring

(Same method as above)

AW70/71 place springs in groups of three, see fig.

U19

### Check function of pistons

Blow compressed air (max 14 psi) through oil passage (arrowed).

When air supply is cut off a click should be heard.

#### Note!

Do not exceed 14 psi. If too much pressure is used, piston may be dislodged.  
Check that piston is correctly positioned.

U20

### Install B1 brake discs

Install thin unlined disc first. Then lined disc and finally the bevelled thrust disc with bevel facing up. (Not fitted to late type transmissions)

U21

### Install lock ring

Make sure that gap faces part of body and not one of recesses.

U22

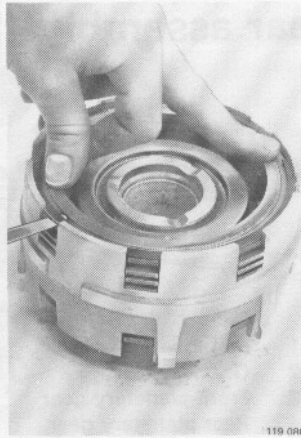
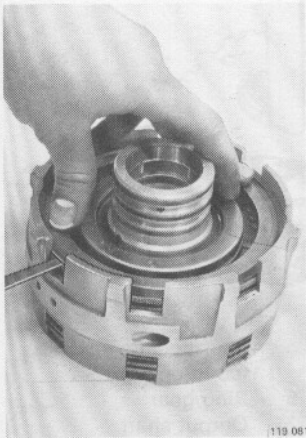
### Install B2 brake discs

Install thin unlined disc first. Then alternate with lined and unlined discs. Finally install the bevelled thrust disc with bevel facing up. (Not fitted to late type transmissions).

U23

### Install lock ring

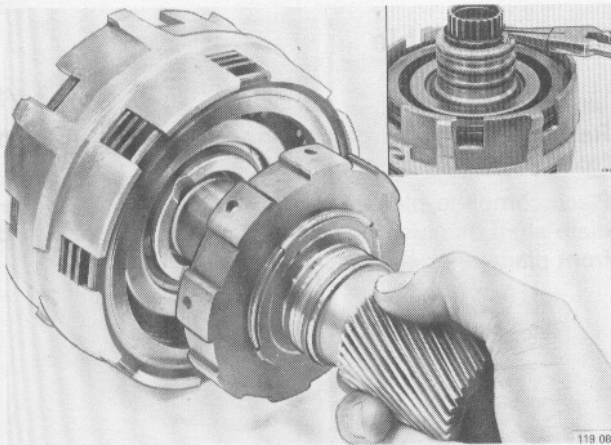
Make sure that gap faces part of body and not one of recesses.



U24

**Measure clearance between lock ring and top disc on B1 and B2 brakes**

0.3–1.2 mm = 0.012–0.048 in



U25

**Install one-way clutch + brake hub on sun gear shaft, see fig.**

U26

**Install hub and shaft in centre support assembly**

Align all discs. Make sure that hub matches discs.

U27

**Install lock ring on sun gear shaft.**