

GEARBOX

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PRESENTATION : AL4 AUTOACTIVE AUTOMATIC GEARBOX

1 – GENERAL

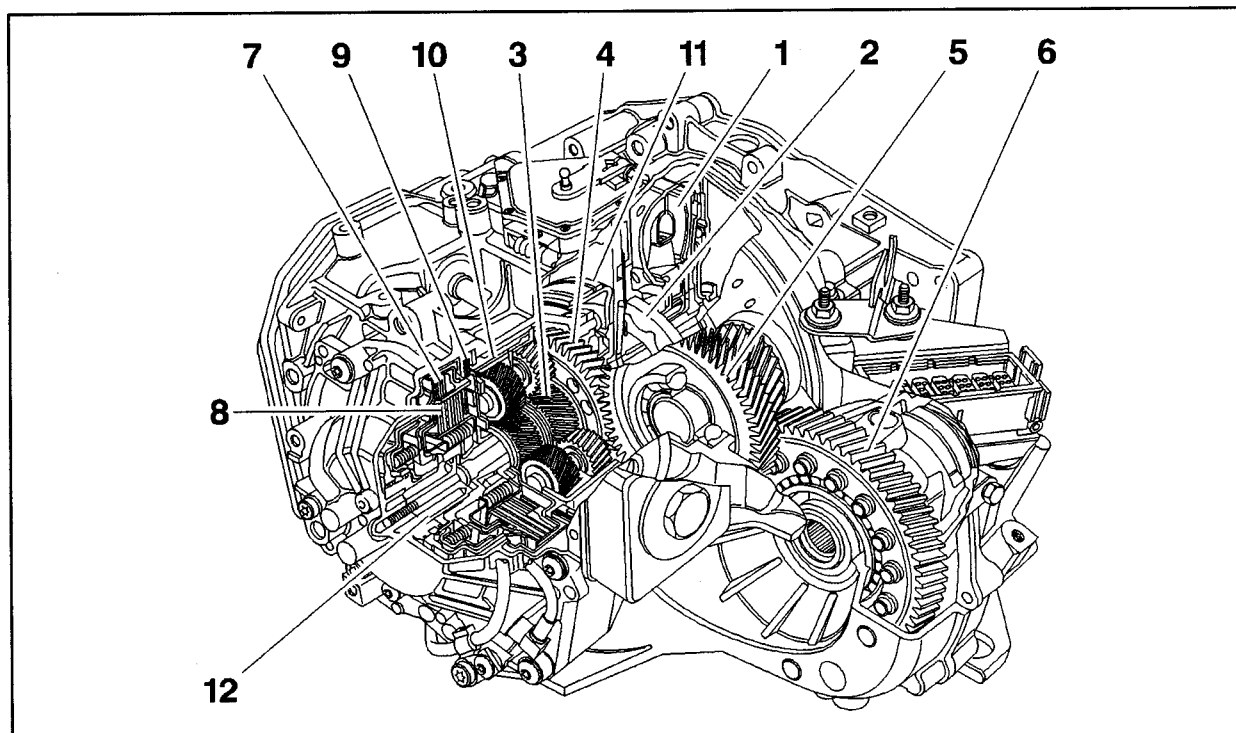


Fig : B2CP39BD

- (1) torque converter.
- (2) oil pump.
- (3) double epicyclic gear train.
- (4) primary shaft.
- (5) output shaft.
- (6) differential.
- (7) clutch E1.
- (8) clutch E2.
- (9) disc brake F1.
- (10) band brake F2.
- (11) band brake F3.
- (12) supply hub.

The AL4 automatic gearbox weighs approximately :

- 70 kg with oil and converter
- 57 kg without oil and without converter

2 – IDENTIFICATION

2.1 – AL4 automatic gearbox

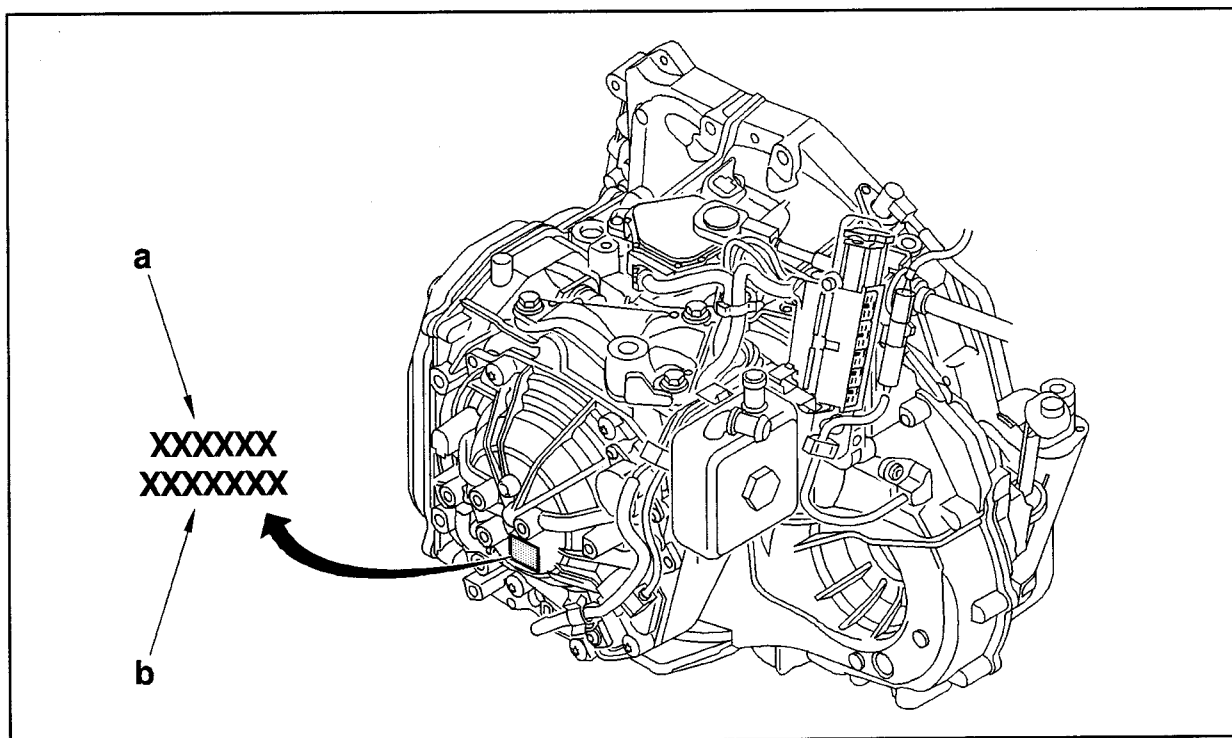


Fig : B2CP39CD

The gearbox can be identified by an engraving on the rear housing.

"a" component number.

"b" serial number.

2.2 – Automatic gearbox ECU

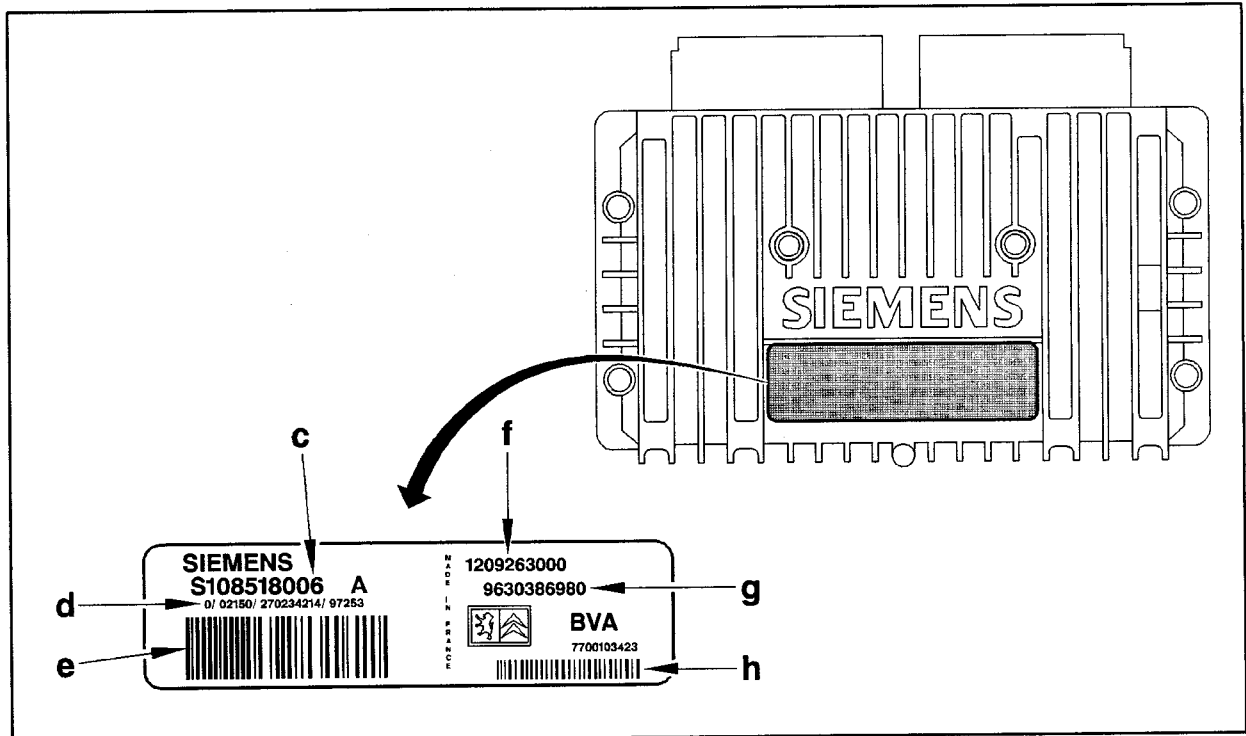


Fig : B2CP39DD

"c" SIEMENS reference.

"d" SIEMENS serial number.

"e" SIEMENS bar code number.

"f" serial number.

"g" hardware version reference.

"h" customer bar code number.

2.3 – Hydraulic valve block

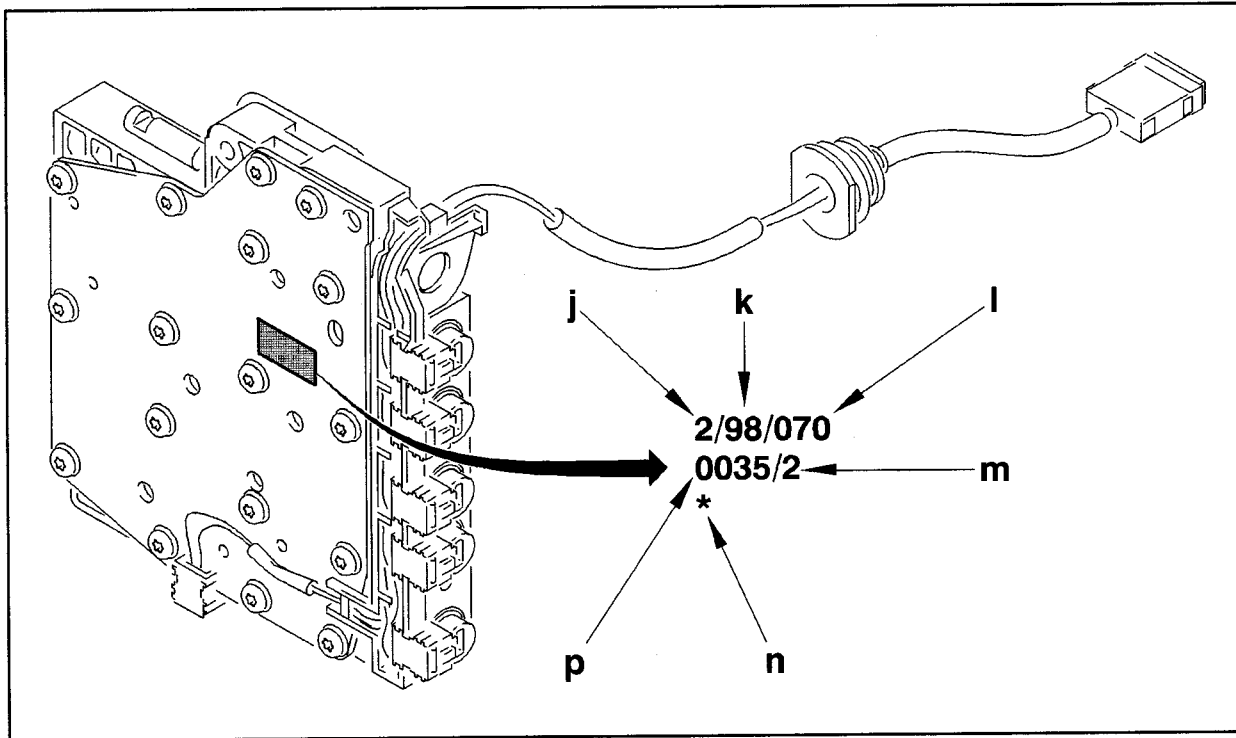


Fig : B2CP39ED

The identification number of the hydraulic valve block is engraved on the left hand side of the main distributor.

"j" bench assembly number (1 bench with 2 assemblies).

"k" year of manufacture.

"l" day of the year of manufacture.

"m" bench number.

"n" repair number (1* = 1 repair).

"p" part number.

3 – SUMMARY OF OPERATED COMPONENTS

The AL4 automatic gearbox changes gears using the following components :

- 2 clutches (E1 and E2)
- 3 brakes (F1 disc brakes F2 and F3 band brakes)
- a double epicyclic gear train

Position of the gear lever	Gear engaged	Driving component	Locked component	Clutches			Brakes		
				"P (*)"	"E1"	"E2"	"F1"	"F2"	"F3"
P	P	"P1"	–		X				
R	R	"P1"	"C2-PS1"		X			X	
N	N	"P1"	–		X				
D	1	"P1"	"P2"		X				X
	2	"C2-PS1"	"P2"	X (*)		X			X
	3	"P1" and "C2-PS1"	–	X (*)	X	X			
	4	"C2-PS1"	"P1"	X (*)		X	X		
3	1	"P1"	"P2"		X				X
	2	"C2-PS1"	"P2"	X (*)		X			X
	3	"P2" and "C1-PS2"	–	X (*)	X	X			
2	1	"P1"	"P2"		X				X
	2	"C2-PS1"	"P2"	X (*)		X			X
2 + press button "1" of the program selector	1	"P1"	"P2"		X				X

Index :

- X : activated component
- (*) : the lock-up clutch may be activated (depending on the driving conditions)
- "C1" – crown wheel with internal teeth 1
- "C2" – crown wheel with internal teeth 2
- "PS1" – planet wheel carrier 1
- "PS2" – planet wheel carrier 2
- "P1" – sunwheel 1
- "P2" – sunwheel 2
- "C2-PS1" – the planet wheel carrier "PS1" is mechanically connected to the crown wheel "C2"
- "C1-PS2" – the planet wheel carrier "PS2" is mechanically connected to the crown wheel "C1"
- "P" – lock-up clutch
- "E1" – clutch E1
- "E2" – clutch E2
- "F1" – brake F1
- "F2" – brake F2
- "F3" – brake F3

DPO - AL4

Position of the gear lever	Gear engaged	Clutches			Brakes			Sequence electrovalves					
		"P (*)"	"E1"	"E2"	"F1"	"F2"	"F3"	"EVS1"	"EVS2"	"EVS3"	"EVS4"	"EVS5"	"EVS6"
P	P		X							X			
R	R		X			X						X	
N	N		X							X			
D	1		X				X			X	X		
	2	X (*)		X			X		X		X		
	3	X (*)	X	X									
	4	X (*)		X	X			X	X				
3	1		X				X			X	X		
	2	X (*)		X			X		X		X		X
	3	X (*)	X	X									
2	1		X				X			X	X		
	2	X (*)		X			X		X		X		
2 + press button "1" of the program selector	1		X				X			X	X		

Index :

- X : activated component
- (*) : the lock-up clutch may be activated (depending on the driving conditions)
- "P" – lock-up clutch
- "E1" – clutch E1
- "E2" – clutch E2
- "F1" – brake F1
- "F2" – brake F2
- "F3" – brake F3
- "EVS" – sequence electrovalve (EVS1 to EVS6)

DPO - AC4

4 – POSITION : NEEDLE THRUST BEARINGS, FRICTION WASHERS, ADJUSTING SHIMS

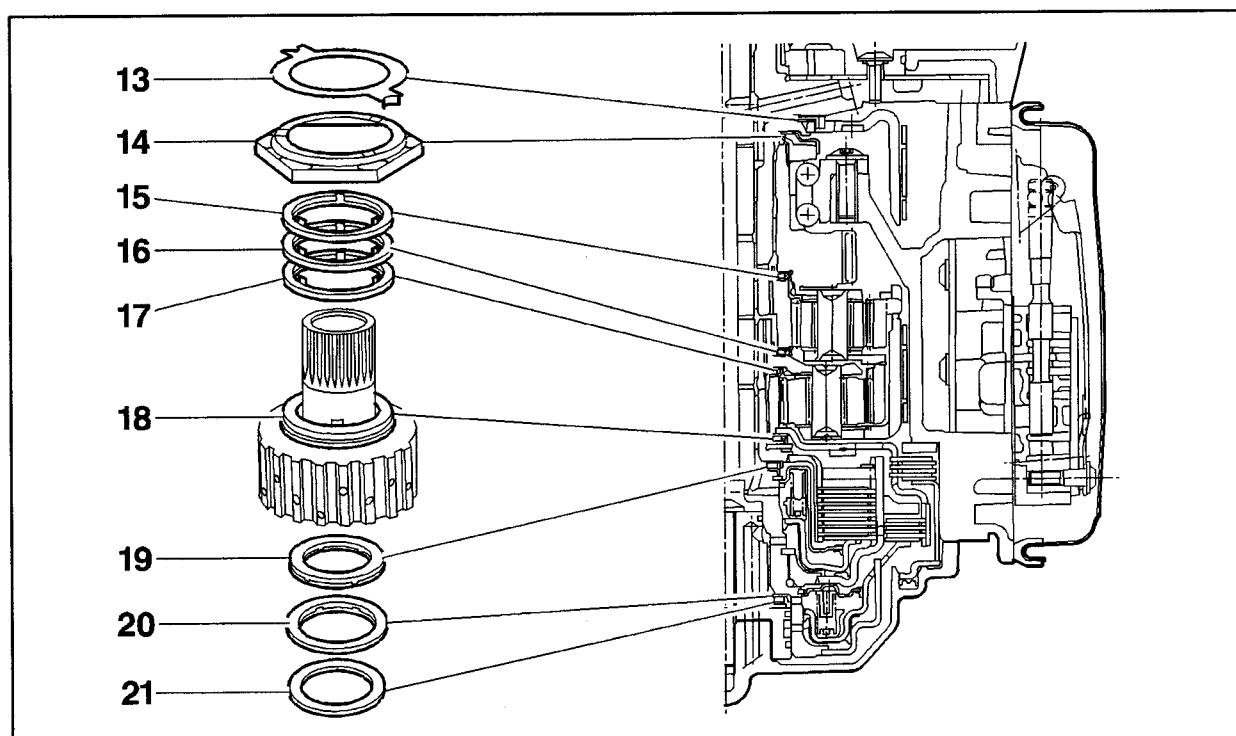


Fig : B2CP39FD

(13) and (14) friction washers.

(15) to (20) needle thrust bearing.

(21) adjusting shim.

NOTE : The black surfaces of the stops always face the converter side.

NOTE : The needle thrust bearing (18) cannot be removed.

5 – DESCRIPTION : CLUTCH ASSEMBLIES E1 AND E2, BRAKE F1

Receiver	Operating clearance in mm	Number of discs
"E1"	A = 1 to 1,4	6
"E2"	B = 2 to 2,4	14
"F1"	—	6

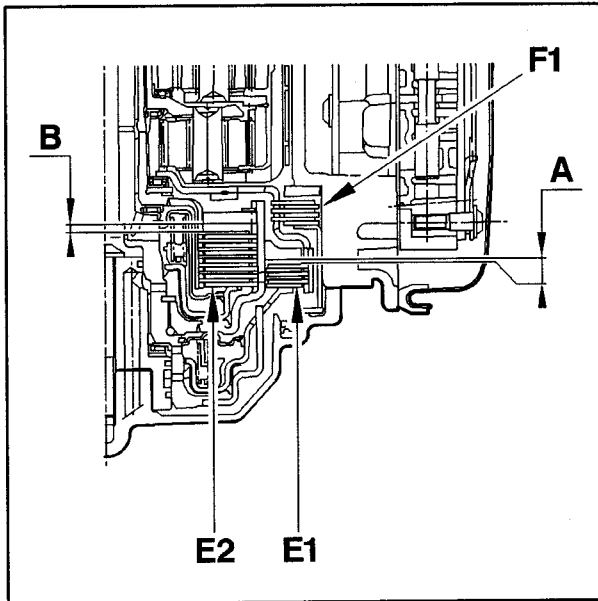


Fig : B2CP39SC

NOTE : The discs are lined on one side and smooth on the other, with alternating internal and external fasteners. Brakes F3 and F2 are band brakes.

6 – PRESENTATION : SPECIAL TOOLS

6.1 – Peripheral repair kit (–).0338

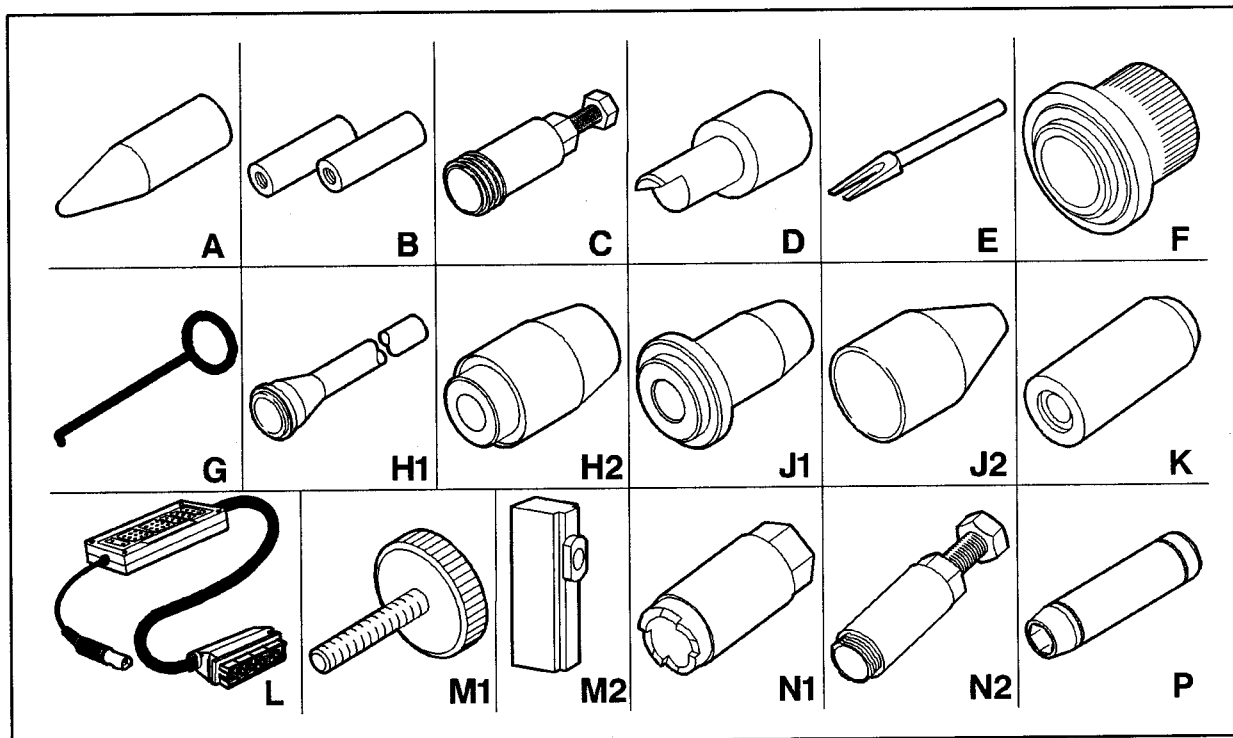


Fig : E5AP13VD

- [A] locating post (–).0338 A.
- [B] handles for removing–refitting the converter (–).0338 B.
- [C] right hand driveshaft seal extractor (–).0338 C.
- [D] converter retaining stop (–).0338 D.
- [E] ball joint extractor (–).0338 E.
- [F] converter seal refitting tool (–).0338 F.
- [G] converter lip seal removal hook (–).0338 G.
- [H1] left hand driveshaft seal fitting drift (–).0338 H1.
- [H2] left hand driveshaft seal fitting guide (–).0338 H2.
- [J1] right hand driveshaft seal fitting drift (–).0338 J1.
- [J2] right hand driveshaft seal fitting guide (–).0338 J2.
- [K] selection shaft seal fitting drift (–).0338 K.
- [L] interface harness for checking the AL4 automatic gearbox (–).0338 L.
- [M1] adjusting screw for the internal selection control (–).0338 M1.
- [M2] adjusting shim for the internal selection control (–).0338 M2.
- [N1] gear selector shaft seal extractor (–).0338 N1.
- [N2] gear selector shaft seal extractor (–).0338 N2.
- [P] socket for removing the gearbox mounting shaft (–).0338 P.

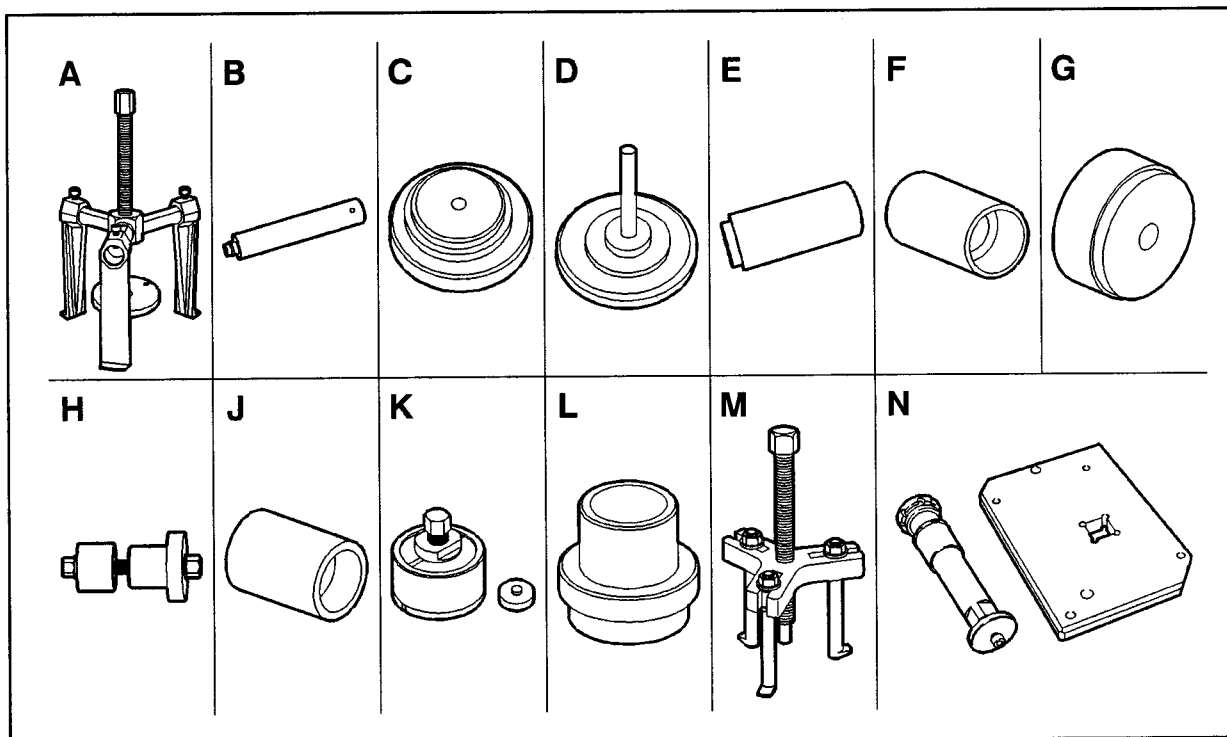


Fig : E5AP18QD

- [A] tool for extracting the large differential bearing (–).0342 A.
- [B] pin of the tool for fitting the cage of the small differential bearing (–).0342 B.
- [C] tool for fitting the left hand driveshaft deflector seal (–).0342 C.
- [D] tool for adjusting the ball blade (–).0342 D.
- [E] tool for supporting the input shaft (–).0342 E
(threaded rod, L = 150 mm, Ø 8 x 1,25, to be made in the workshop).
- [F] tool for fitting the small differential bearing (–).0342 F.
- [G] tool for fitting the cage of the small differential bearing (–).0342 G.
- [H] tool for fitting the large differential bearing (–).0342 H.
- [J] tool for fitting the secondary line bearings (–).0342 J.
- [K] tool for extracting secondary line bearings (–).0342 K.
- [L] end piece for removing the cage of the large differential bearing (–).0342 L.
- [M] tool for extracting the cage of the large differential bearing (–).0342 M.
- [N] tool for removing–refitting the epicyclic gear train nut (–).0342 N.

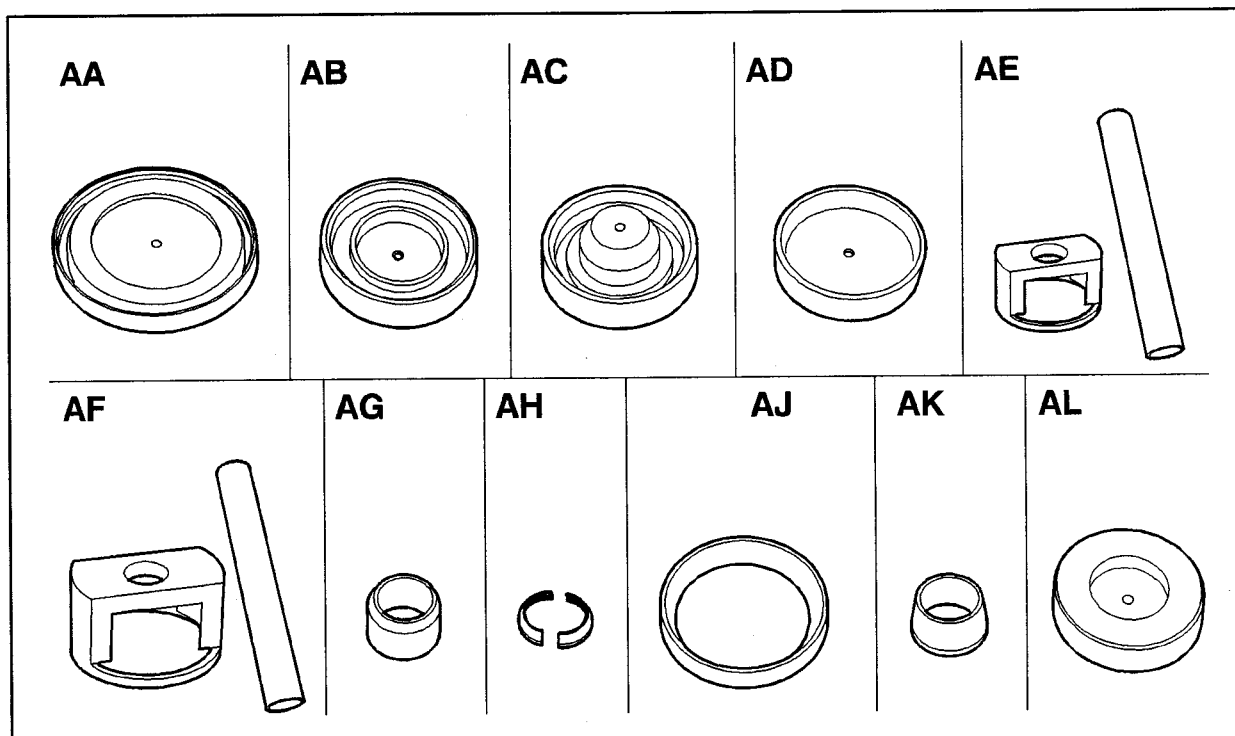


Fig : E5AP18RD

[AA] tool for preforming the piston of brake F1 (-).0342 AA.

[AB] tool for preforming the clutch E1 counter piston (-).0342 AB.

[AC] tool for preforming the piston of clutch E1 (-).0342 AC.

[AD] tool for preforming the piston of clutch E2 (-).0342 AD.

[AE] tool for removing the clutch E2 counter piston (-).0342 AE.

[AF] tool for removing the clutch E1 counter piston (-).0342 AF.

[AG] tool for fitting the clutch piston E2 (-).0342 AG.

[AH] tool for guiding the inner lip of the clutch E2 counter piston (-).0342 AH.

[AJ] tool for guiding the outer lip of the clutch E2 counter piston (-).0342 AJ.

[AK] tool for fitting circlips of clutch E1 and E2 housing assembly (-).0342 AK.

[AL] tool for fitting the cage of the large differential bearing (-).0342 AL.

PRECAUTIONS TO BE TAKEN : AL4 AUTOACTIVE AUTOMATIC GEARBOX

1 – GENERAL

Do not use trichlorethylene and paint thinner so as to avoid splashes or contact with the seals.

Clean the parts using an ultrasonic device in a hot anti-corrosion detergent bath.

Do not clean the following components :

- the friction discs
- non removable parts (wipe with a chamois leather)

When cleaning, and when not completely dismantling the gearbox, blank the driveshaft output orifices.

WARNING : Using cloths may cause fluff to enter the hydraulic circuits.

Wiping parts :

- use special lint free workshop paper or a chamois leather
- carefully blow the components clean with compressed air

Blow thoroughly with compressed air into all hydraulic supply and component lubricating channels.

During reassembly :

- lubricate all rubber seals (mixture of vaseline and gearbox oil)
- oil new friction discs with the recommended oil

When dismantling a gearbox, when the oil is burnt, full of metal particles or bits of lining, the following operations must be performed :

- drain and rinse the converter and heat exchanger carefully. Do not add any other fluid than the oil recommended
- dismantle and clean the hydraulic distributor carefully : all the valves must move freely without tight spots (see section on hydraulic distributor)

2 – TRANSPORTING AND STORING THE GEARBOX

The converter support bracket must be fitted when handling to avoid breaking the input shaft segment (dismantling the converter).

The gearbox should always be stored filled with oil, both before and after repairs (6 litres of the recommended oil).

3 – COMPONENTS TO BE SYSTEMATICALLY CHANGED

The friction washers (hub of drum brake F3).

The filter gauze.

The filter of the hydraulic distributor.

All the adjusting plugs of the hydraulic distributor valves.

Replace the O-rings of all the following components :

- pump body
- pump body bolt
- housing of clutches E1 and E2
- bolts of brakes F2 and F3
- electrovalves of the hydraulic valve block
- hydraulic valve block
- plugs of brakes F2 and F3
- oil pressure sensor
- input speed sensor
- output speed sensor
- exchanger flow electrovalve
- electrical harness of the hydraulic valve block
- selector control shaft
- speedometer drive
- right output of the differential

Replace the lip seals of the following components :

- right hand driveshaft output
- left hand driveshaft output
- left hand driveshaft output deflector
- torque converter
- gear control shaft

Replace the flat seals of the following components :

- converter housing
- rear housing
- hydraulic valve block housing
- heat exchanger
- mounting bolt of the heat exchanger
- drain plug
- level plug
- oil filler plug

Replace the sealing rings of the following components :

- rear housing
- pressure accumulator
- input shaft

Replace the circlips of the following components :

- counter piston of clutch E1
- housing of clutches E1 and E2
- counter piston of clutch E2

Replace the pistons and counter piston of the following components :

- clutch E1
- clutch E2
- brake F1
- brake F2
- brake F3

Replace the needle thrust bearings of the following components :

- clutch E1
- clutch E2
- clutch E2 housing hub (joined to the clutch housing)
- epicyclic gear train

FITTING : AUTOMATIC GEARBOX ON REPAIR BENCH

1 – RECOMMENDED TOOLS

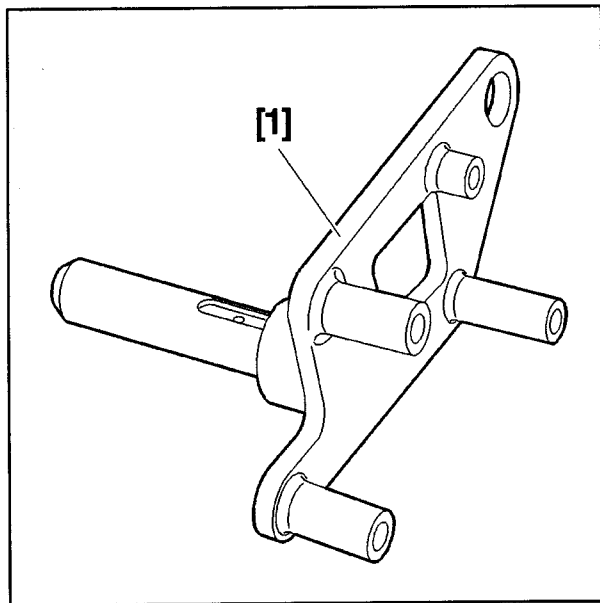


Fig : E5AP17AC

[1] APSJC 24 automatic gearbox lifting tool and support (professional centre equipment).

2 – FITTING THE SUPPORT TO THE GEARBOX

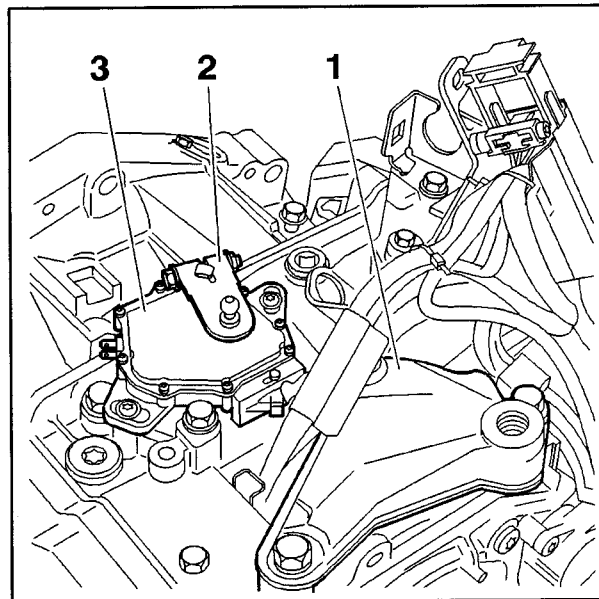


Fig : B2CP397C

Remove :

- the gearbox mounting (1)
- the gear selection lever (2)
- the gearbox multifunction switch (3)

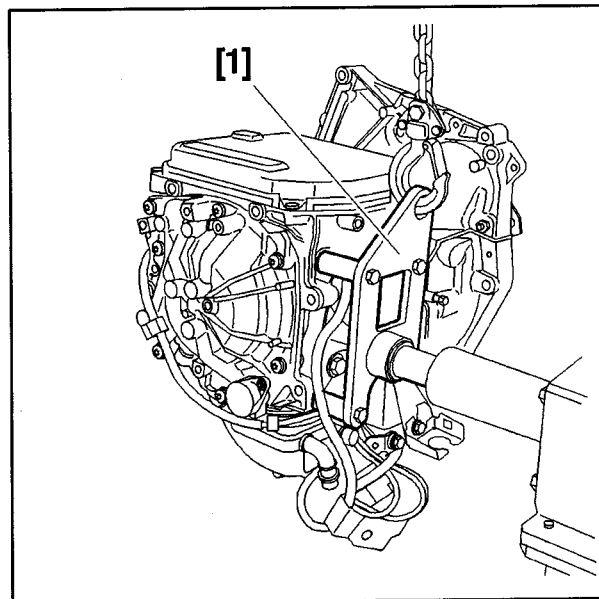


Fig : B2CP398C

Secure tool [1] to the gearbox using the mounting holes on the support (1).

Sling and raise the gearbox.

Put the assembly on the repair stand.

DISMANTLING : CONVERTER HOUSING SIDE

1 – RECOMMENDED TOOLS

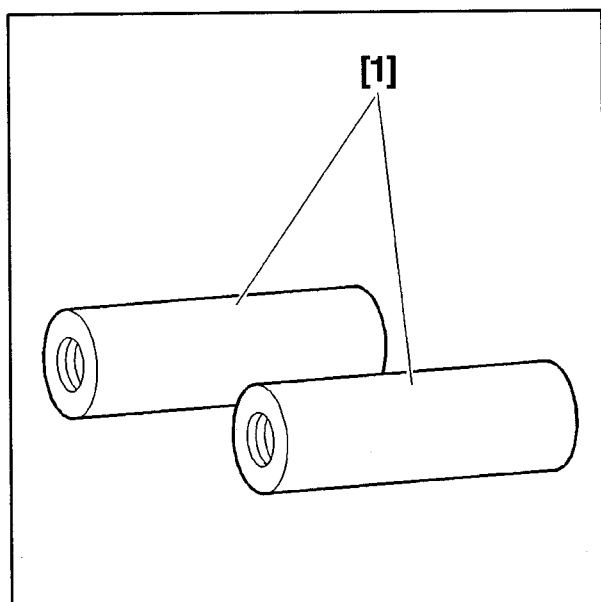


Fig : E5AP131C

[1] handles for removing-refitting the converter (-).0338 B.

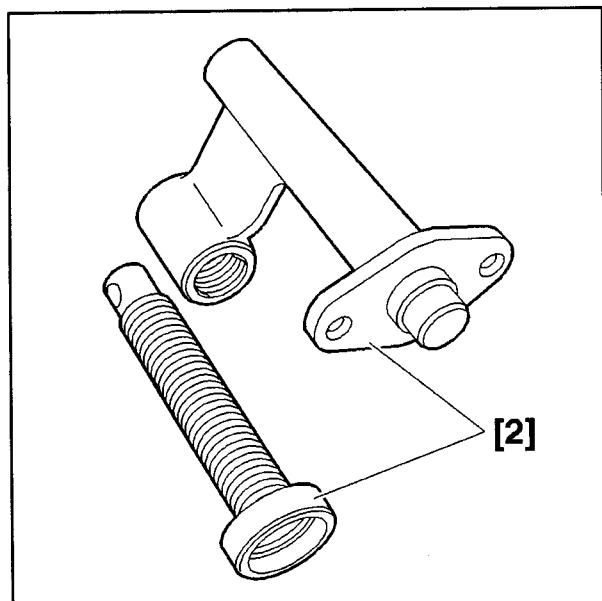


Fig : E5AP15TC

[2] compression tool for removing-refitting circlips of brake F3 . (-).0342 R.

2 – REMOVING

2.1 – Converter housing

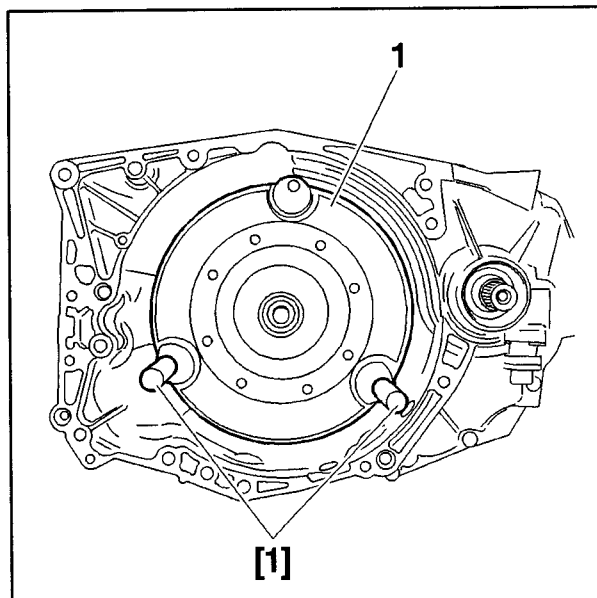


Fig : B2CP32DC

WARNING : The converter contains a significant quantity of oil, blank the input orifice to prevent the ingress of foreign bodies.

Fit the tools [1].

Pull and disengage the converter (1).

NOTE : Due to the shape of the housings, oil will flow out during dismantling operations.

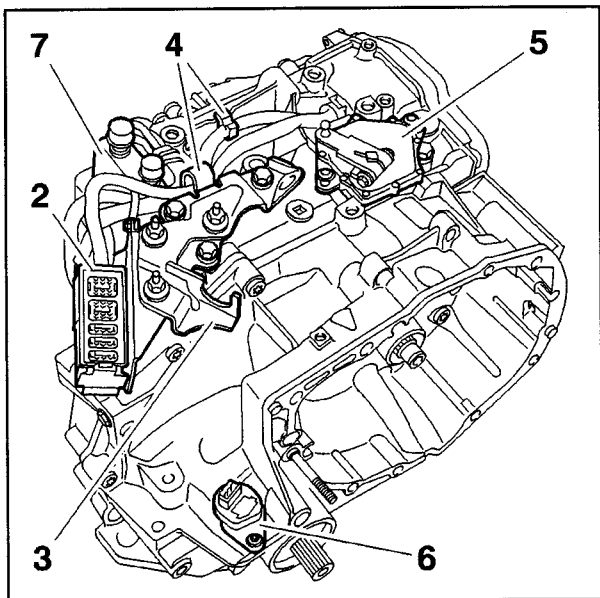


Fig : B2CP35LC

Remove all the connectors from the various sensors.

Remove :

- the modular connector (2)
- the support (3) of the modular connector
- the wiring support (4)
- the gearbox multifunction switch (5)
- the speedometer drive (6) (pinion + guide)
- the heat exchanger (7)

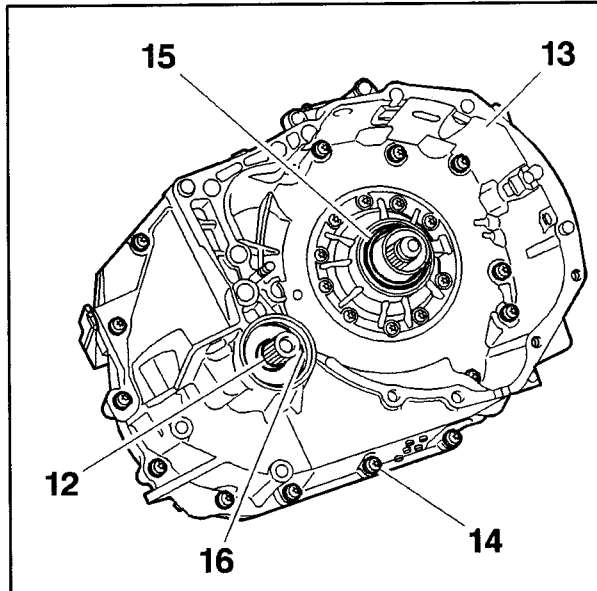


Fig : B2CP35NC

Remove :

- the O-ring (12)
- the screws (14)
- the converter housing (13)
- the seal (15)
- the seal (16)

NOTE : The mounting bolts of the converter housing and the rear housing are the same.

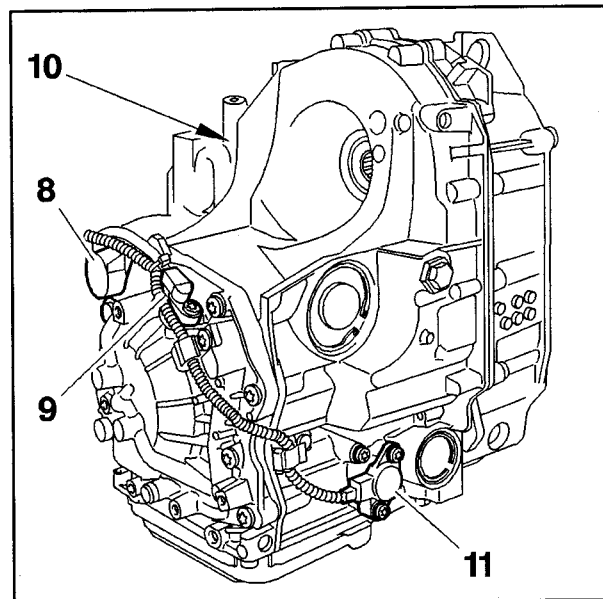


Fig : B2CP35MC

Remove :

- the heat exchanger flow control electrovalve (8)
- the gearbox input speed sensor (9)
- the output speed sensor (10)
- the oil pressure sensor (11)

2.2 – Oil pump

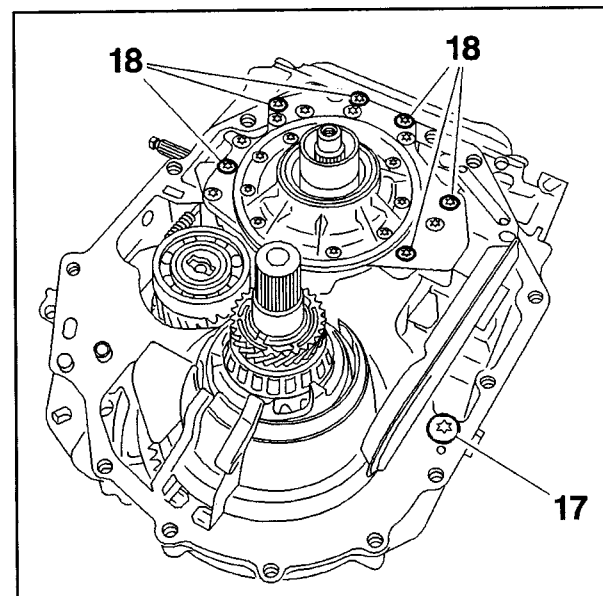


Fig : B2CP35PC

Remove :

- the screw (17)
- the screws (18)
- the oil pump/strainer assembly

NOTE : The screws (18) are of a different colour.

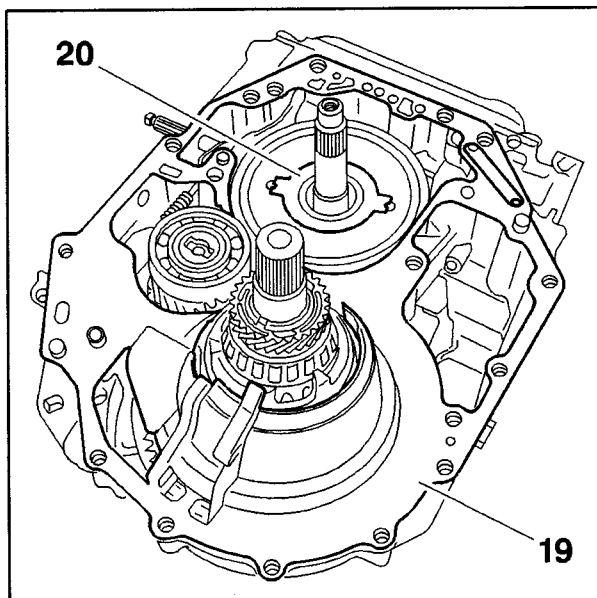


Fig : B2CP35QC

Remove :

- seal (19)
- friction washer (20)

2.3 – Band brake F3

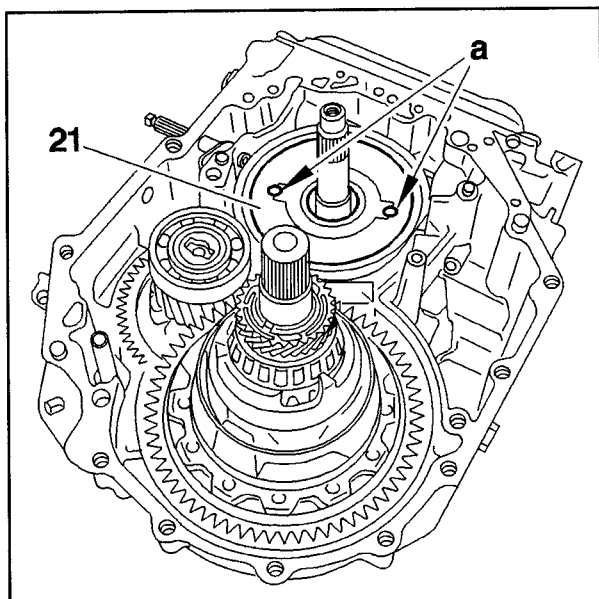


Fig : B2CP35RC

Remove the drum (21) from brake F3 using the 2 hooks fitted at "a".

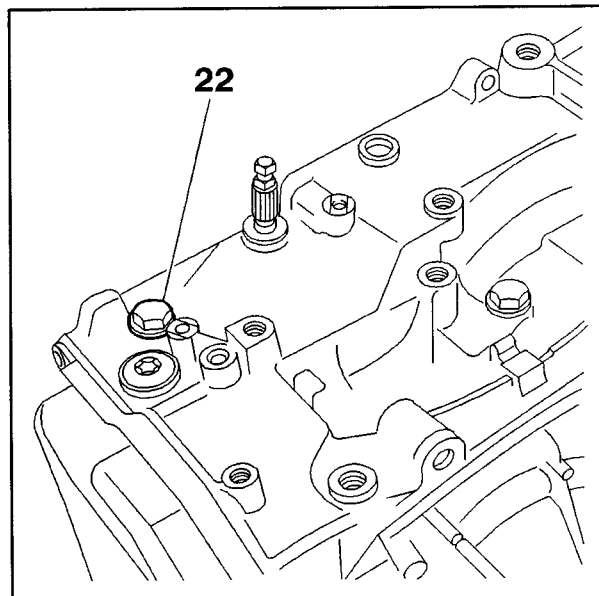


Fig : B2CP35SC

Slacken the counter pressure screw (22) of brake F3.

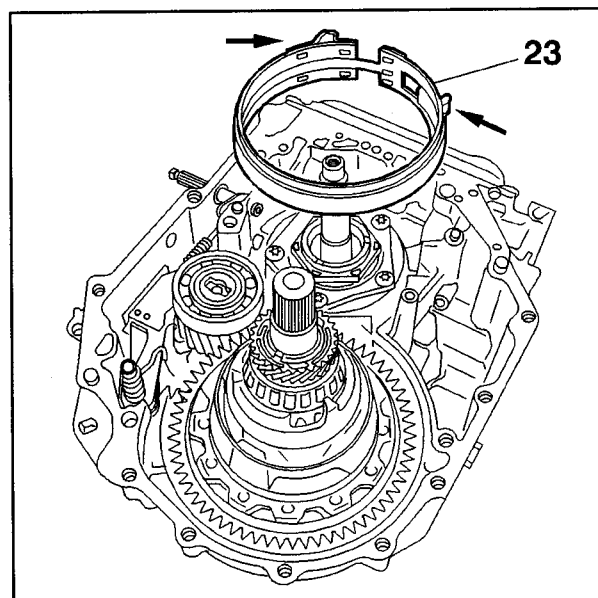


Fig : B2CP35TC

Remove the band (23) from brake F3.

WARNING : Do not invert the bands of brakes F3 and F2.

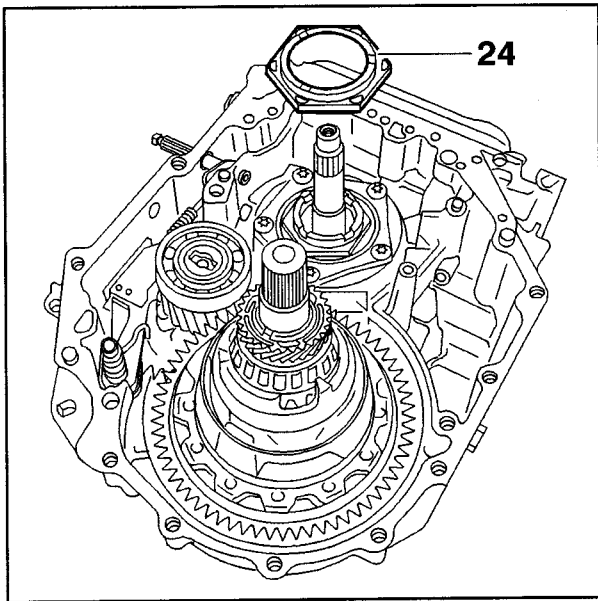


Fig : B2CP35UC

Remove the friction washer (24).

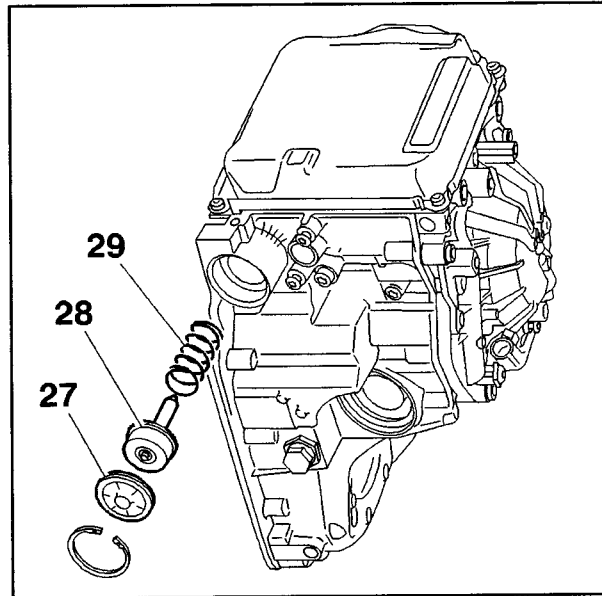


Fig : B2CP35WC

Remove :

- the tool [2]
- the cover (27)
- the piston (28)
- the spring (29)

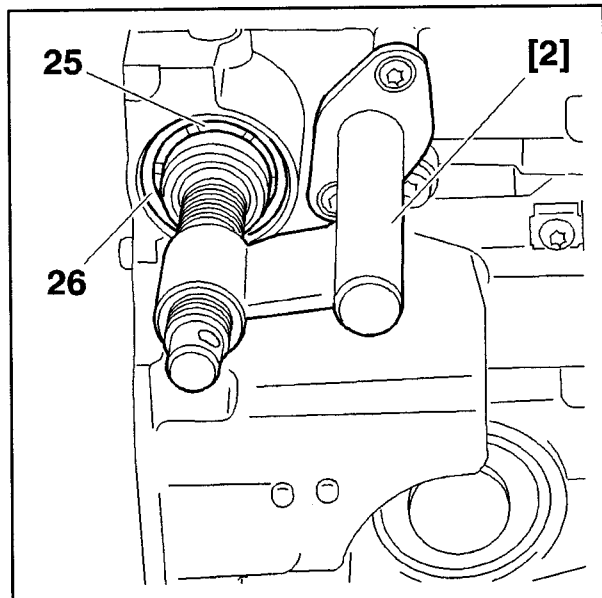


Fig : B2CP35VC

Compress the cover of the control piston (25) of brake F3 ; by means of tool [2].

Remove circlip (26).

Decompress the cover (25).

2.4 – Differential and secondary line

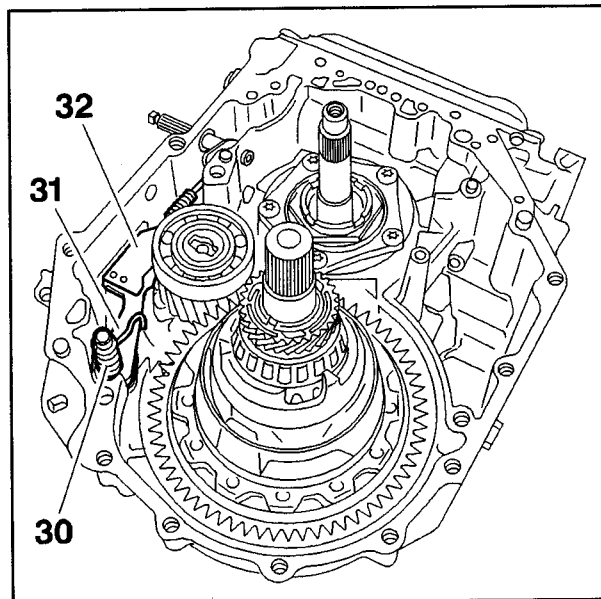


Fig : B2CP35XC

Remove :

- the spring (30)
- the park finger (31) and its lever (32), by pressing on the lever (32) to free the park finger (31)

Pivot the lever by 1/4 turn to remove it from the link.

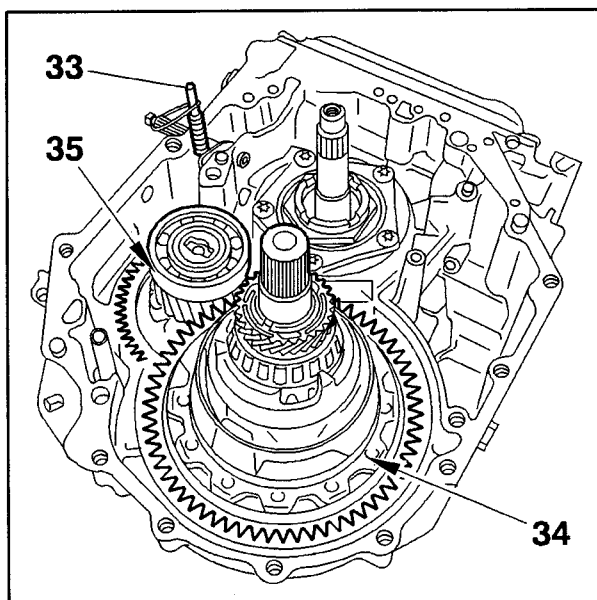


Fig : B2CP35YC

Secure the connection linkage (33) ; using a spring clip.

Remove the secondary line (35) and differential (34) simultaneously.

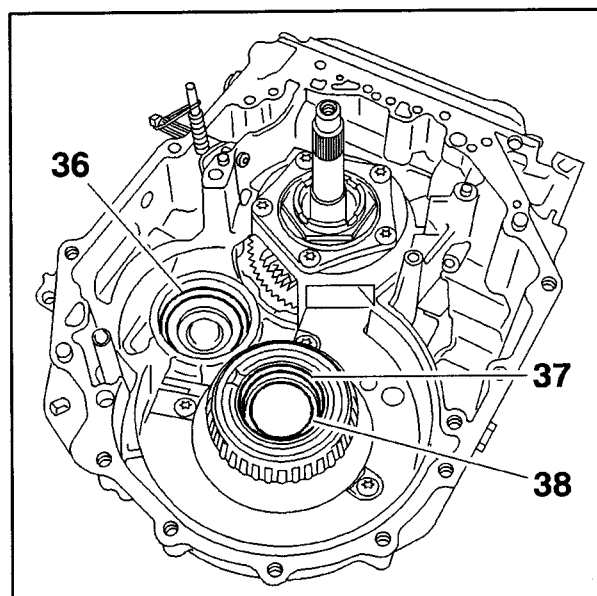


Fig : B2CP35ZC

IMPERATIVE : Take care not to scratch the seal seats during these operations.

Remove :

- the shim (36)
- the seal (38)
- the deflector seal (37)

DISMANTLING – RE-ASSEMBLY : OIL PUMP

Remove the converter housing (see the relevant operation).

Support the oil pump.

1 – DISMANTLING

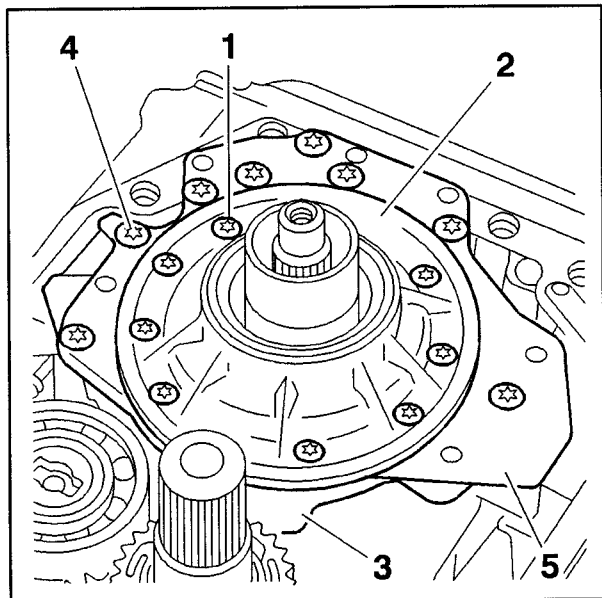


Fig : B2CP368C

Remove :

- screws (1)
- screws (4)
- the entire oil pump of the mechanism housing (3)

WARNING : The locating pins hold the body of the pump (2) firmly upon the feed case (5).

Turn the oil pump over and hit it lightly over a plastic sheet.

Uncouple the oil pump body (2) of the feedcase (5).

2 – RE-ASSEMBLY

IMPERATIVE : Visually check all parts before reassembly.

Fit the feed case (5) on the mechanism housing (3).

NOTE : Refit the screws (4) without tightening.

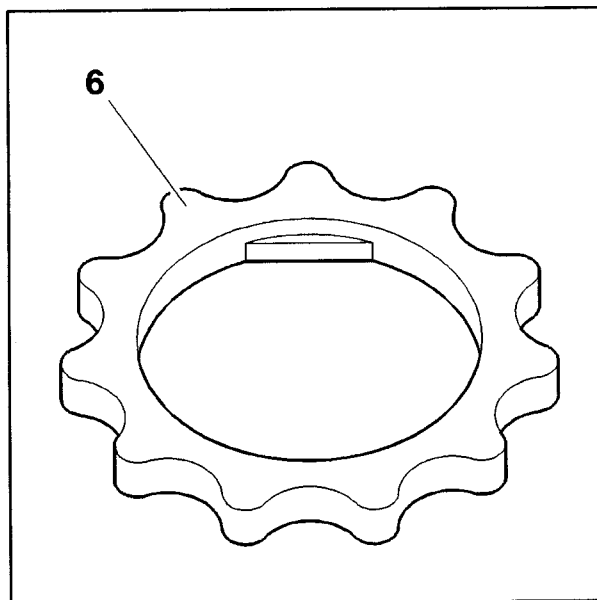


Fig : B2CP369C

Refit the oil pump pinion (6).

NOTE : Place the drive slot on the oil pump body side (2).

Refit the oil pump wheel.

NOTE : Place the chamfer on the oil pump body side (2).

WARNING : The pinion (6) and the body of the oil pump (2) are paired in order to ensure a minimum play.

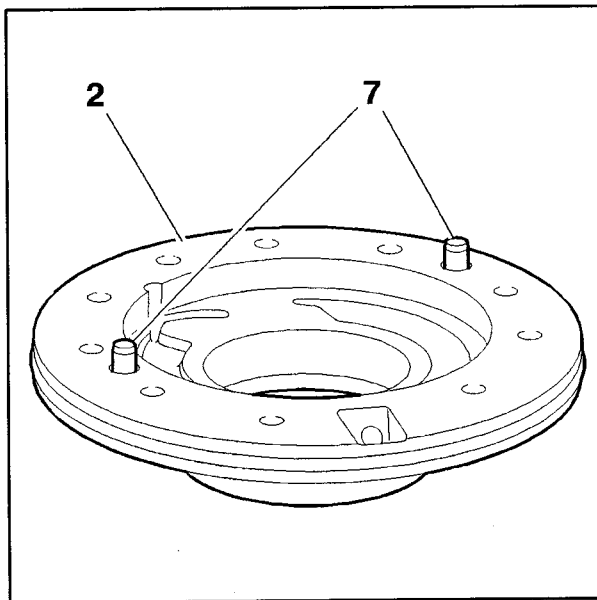


Fig : B2CP36AC

IMPERATIVE : Check for the presence of centring pegs (7).

Fit the oil pump body (2).

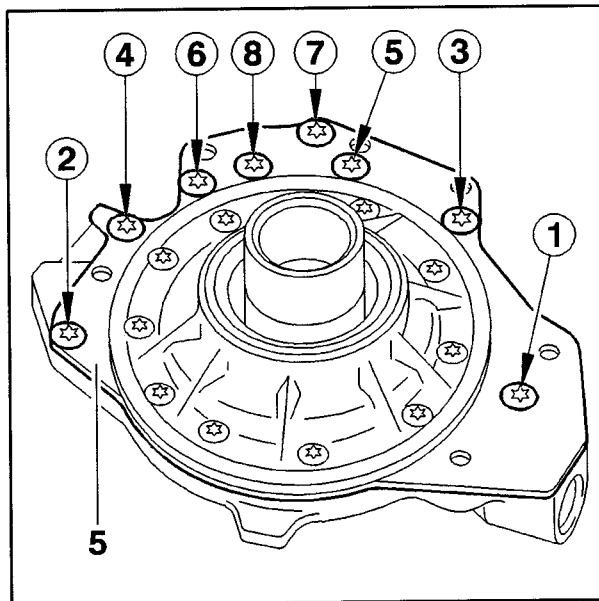


Fig : B2CP36BC

IMPERATIVE : Respect the tightening order : screw by screw and in the order shown from 1 to 8.

Pre-tighten screws (4) to 0,5 m.daN.

Tighten the screw (4) to 0,8 m.daN.

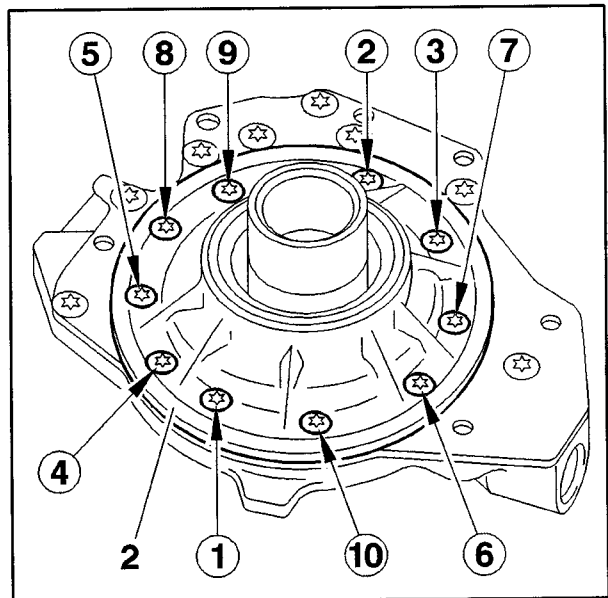


Fig : B2CP36CC

Replace the O-ring of the screws (1).

IMPERATIVE : Respect the tightening order : screw by screw and in the order shown from 1 to 10.

Refit screws (1) :

- pre-tighten to 0,5 mdaN
- tighten to 0,8 m.daN

Check the rotation of the oil pump by placing it on the converter.

Refit a new O-ring on the oil pump body.

REMOVE – REFIT : DIFFERENTIAL AND SECONDARY LINE BEARINGS

1 – RECOMMENDED TOOLS

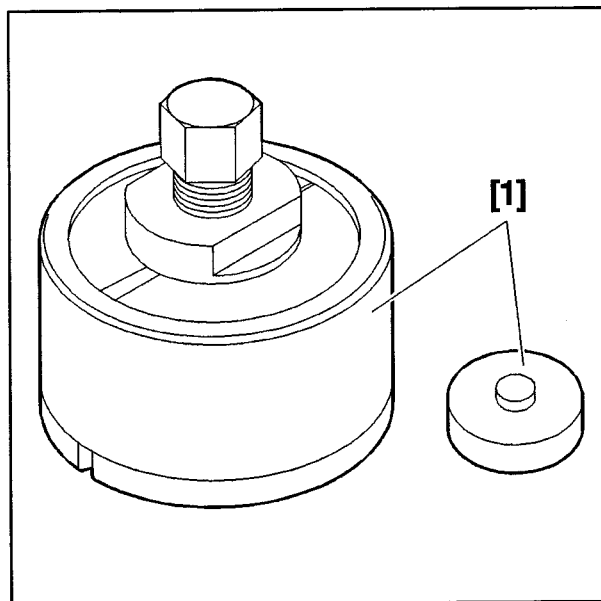


Fig : E5AP18SC

[1] tool for extracting secondary line bearings
(-).0342 K.

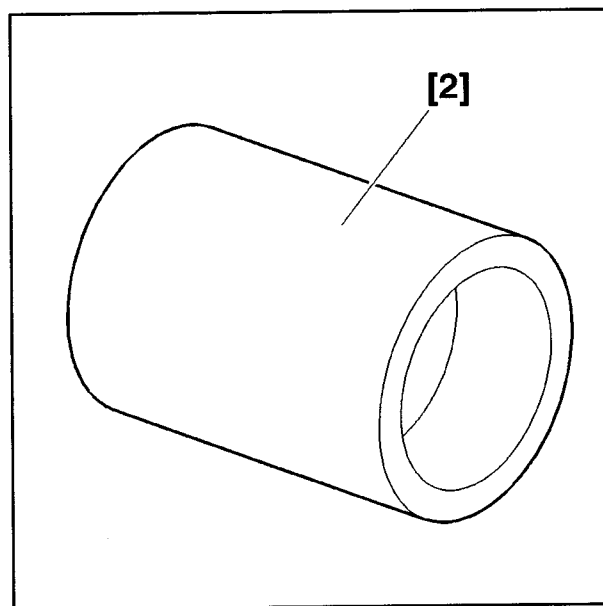


Fig : E5AP18TC

[2] tool for fitting the bearings of the secondary line
(-).0342 J.

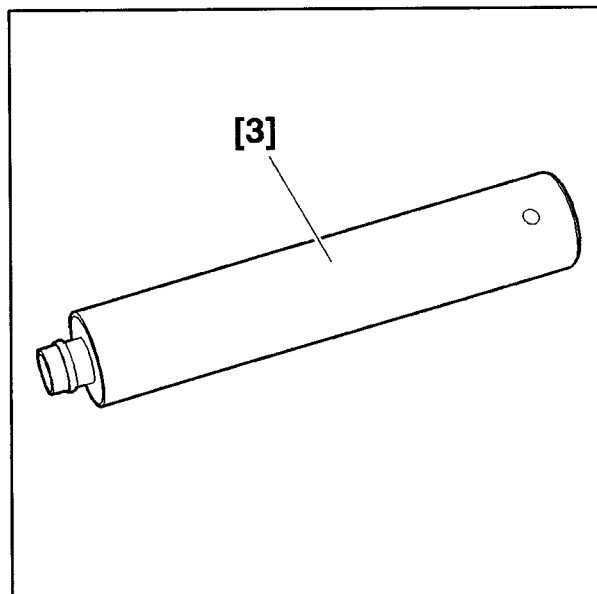


Fig : E5AP18UC

[3] pin of the tool for fitting the cage of the small
differential bearing (-).0342 B.

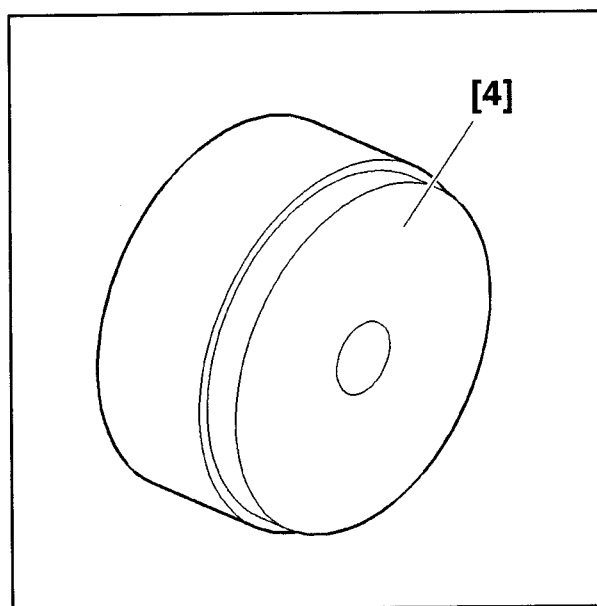


Fig : E5AP18VC

[4] tool for fitting the cage of the small differential
bearing (-).0342 G.

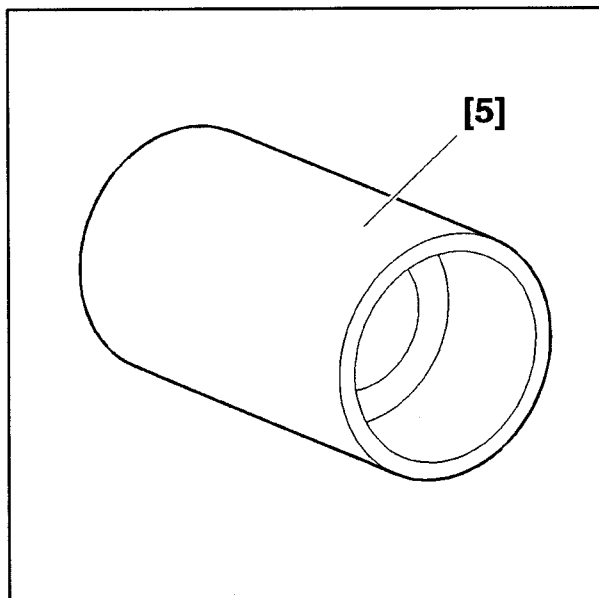


Fig : E5AP18WC

[5] tool for fitting small differential bearing
(-).0342 F.

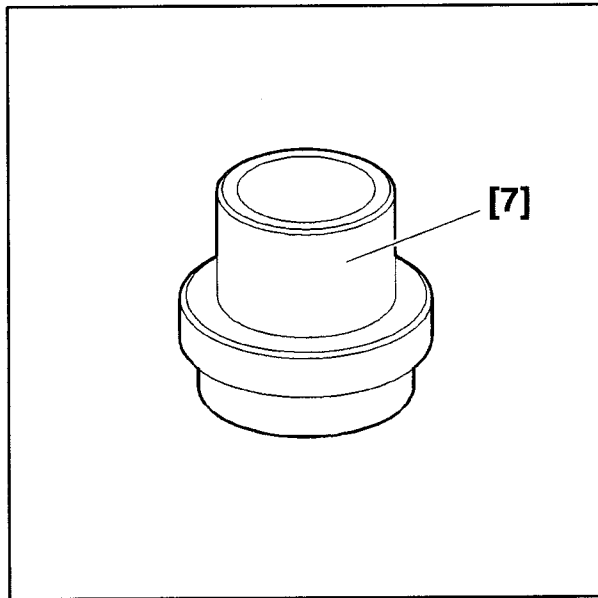


Fig : E5AP18YC

[7] end piece for removing the cage of the large
differential bearing (-).0342 L.

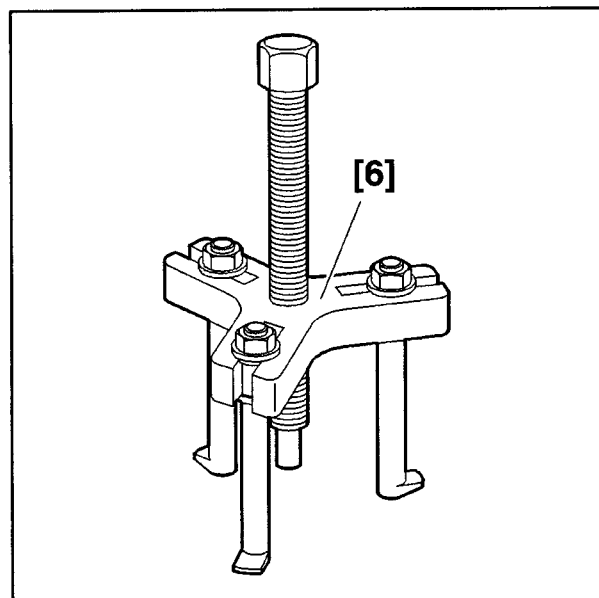


Fig : E5AP18XC

[6] tool for extracting the cage of the large
differential bearing (-).0342 M.

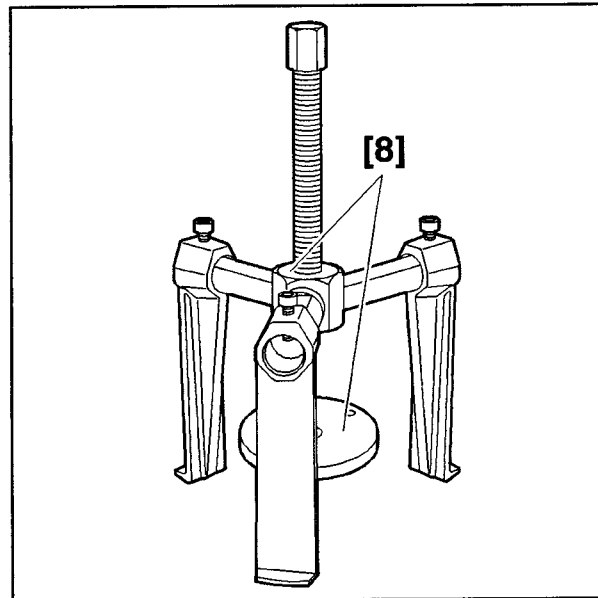


Fig : E5AP18ZC

[8] tool for extracting the large differential bearing
(-).0342 A.

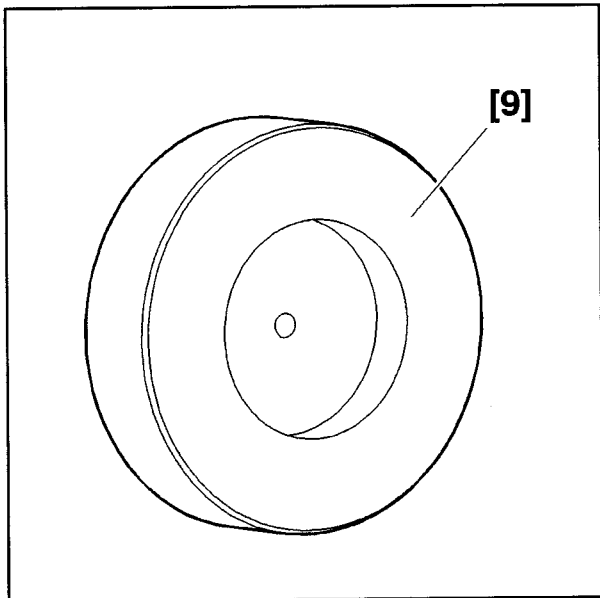


Fig : E5AP190C

[9] tool for fitting the cage of the large differential bearing (-).0342 AL.

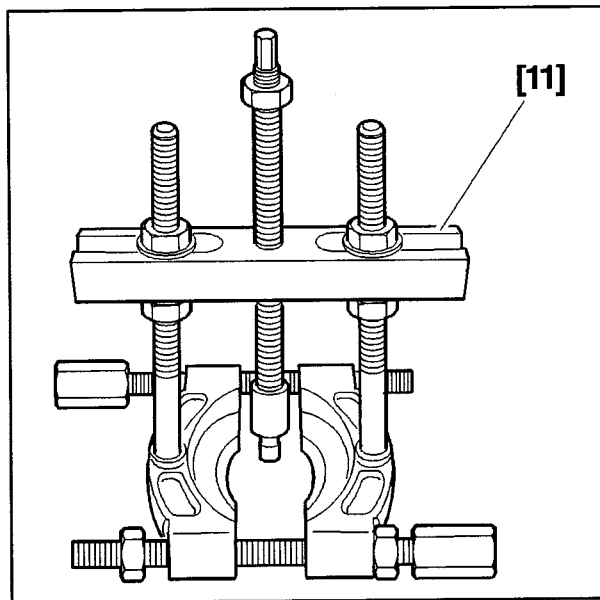


Fig : E5AP192C

[11] tool for extracting the small differential bearing 4108-T.

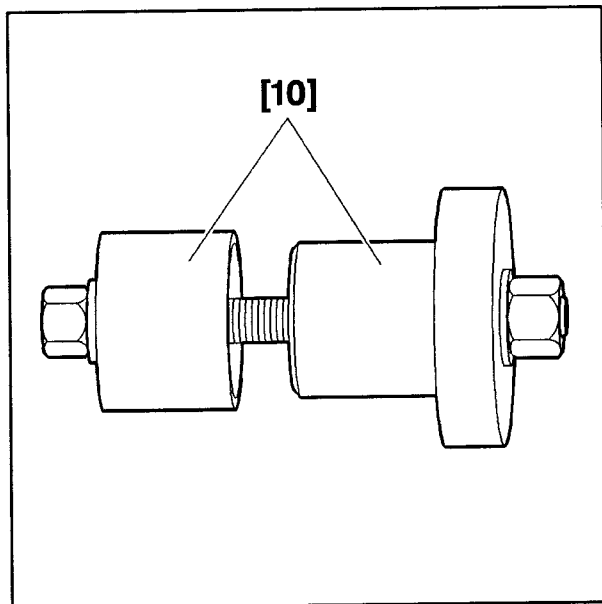


Fig : E5AP191C

[10] tool for fitting the large differential bearing (-).0342 H.

2 – SECONDARY LINE BEARINGS

2.1 – Removing

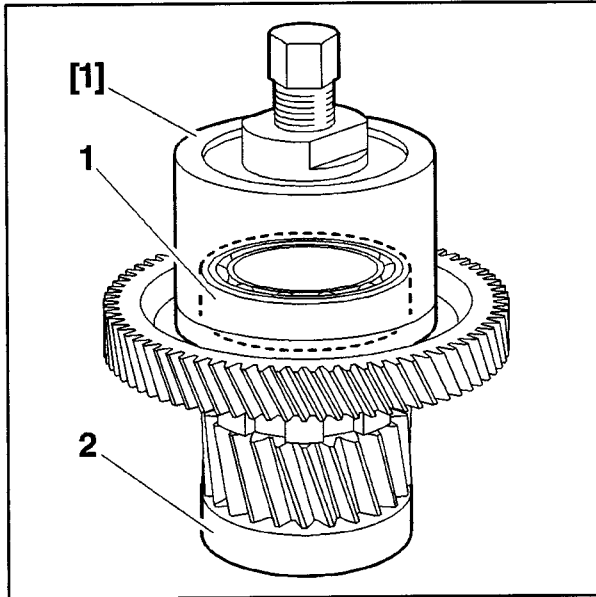


Fig : B2CP39GC

Remove by means of tool [1] :

- bearing (1)
- bearing (2)

2.2 – Refitting

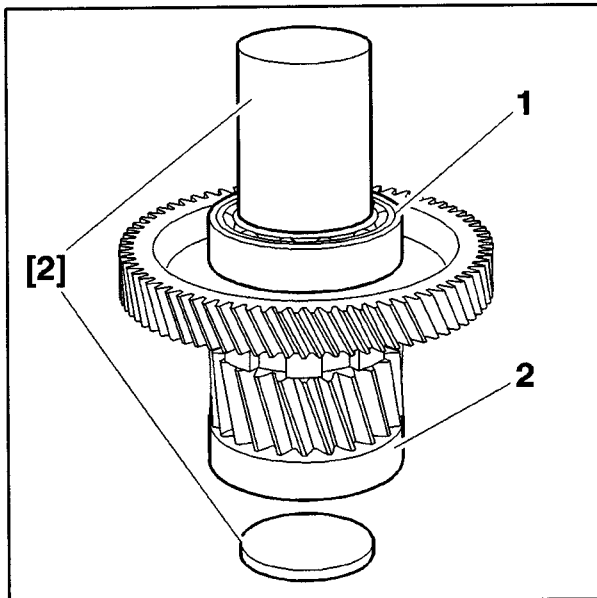


Fig : B2CP39HC

Refit using the tool [2] and a washer under the shaft of the secondary line :

- bearing (1)
- bearing (2)

3 – DIFFERENTIAL BEARINGS

3.1 – Removing

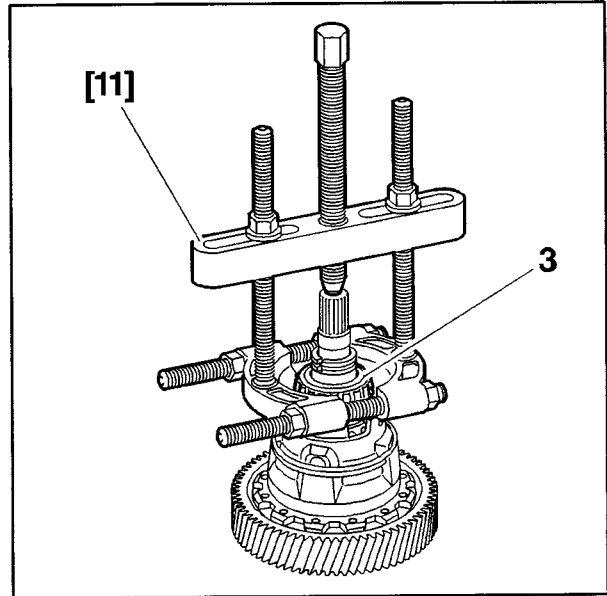


Fig : B2CP39JC

Remove :

- the speedometer crown wheel by separating the three tabs, using a screwdriver, whilst pulling on the crown wheel
- the cage of the small differential bearing (3) ; using a pin drift
- the bearing (3) ; by means of tool [11]

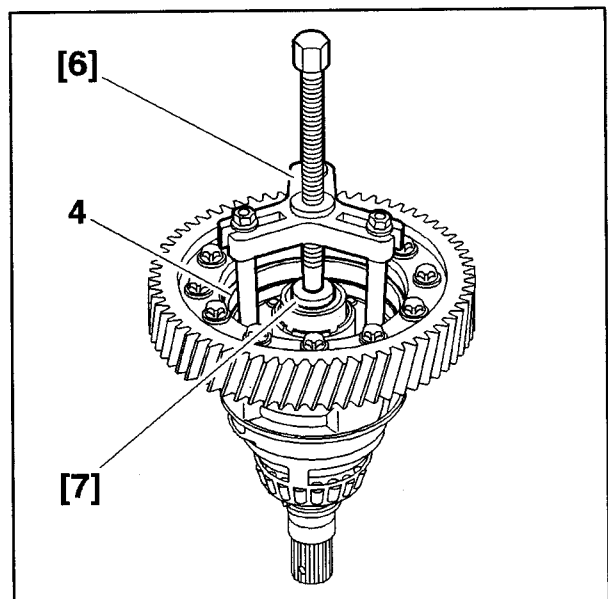


Fig : B2CP39MC

Remove the cage (4) of the large differential bearing ; using the tools [6] and [7].

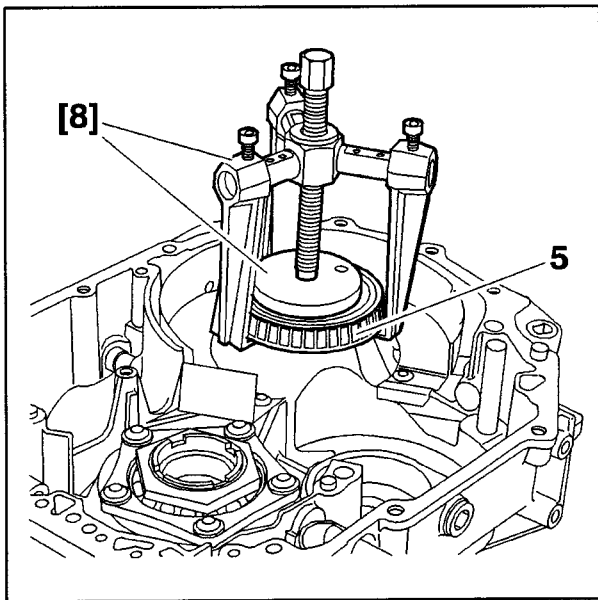


Fig : B2CP39NC

Remove the bearing (5) ; by means of tool [8].

3.2 – Refitting

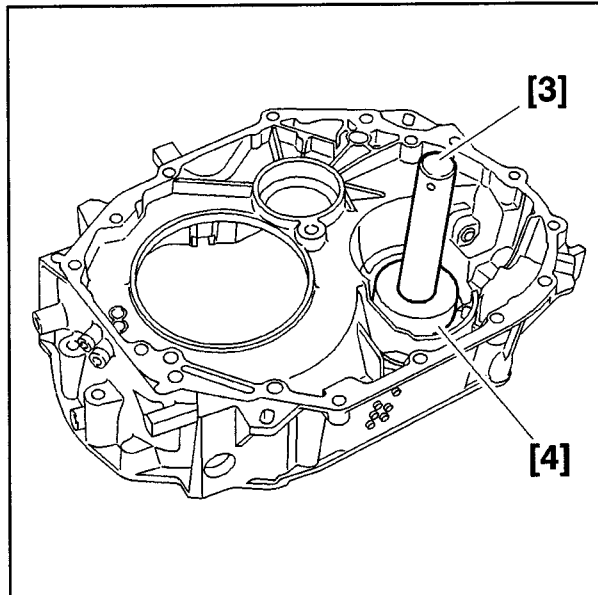


Fig : B2CP39KC

Refit the cage of the small differential bearing (3) ; using the tools [3] and [4].

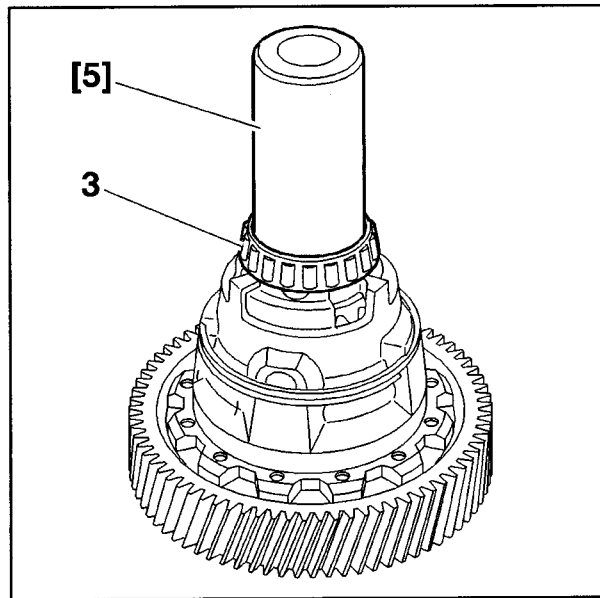


Fig : B2CP39LC

Fit :

- the bearing (3) ; by means of tool [5]
- the speedometer crown wheel

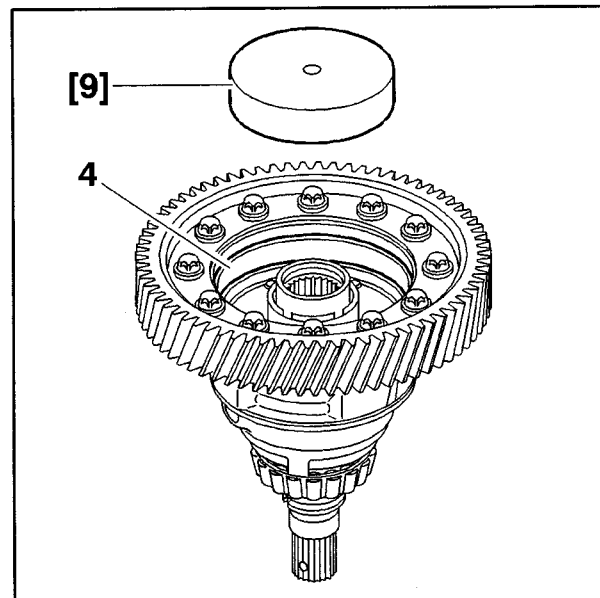


Fig : B2CP39PC

Refit the bearing cage (4) ; by means of tool [9].

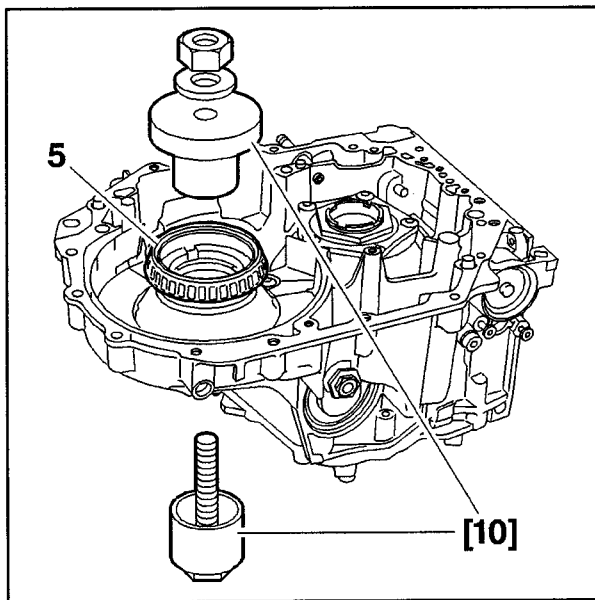


Fig : B2CP39QC

Fit the bearing (5) ; by means of tool [10].

DISMANTLING : REAR HOUSING SIDE

1 – RECOMMENDED TOOLS

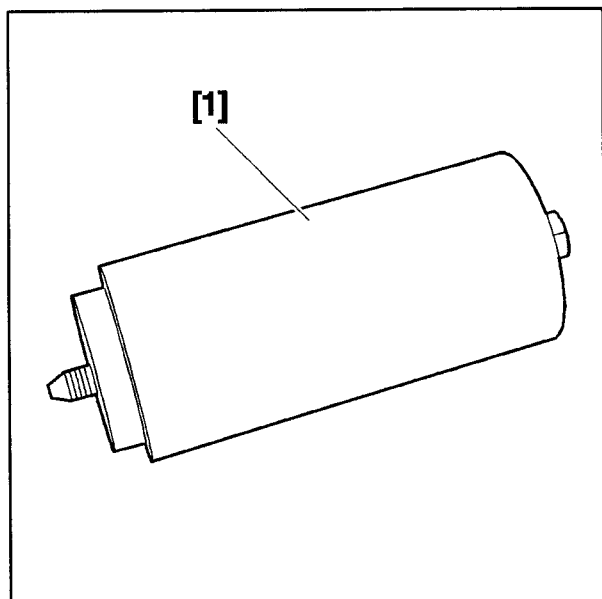


Fig : E5AP15UC

[1] tool for supporting the input shaft (-).0342 E.

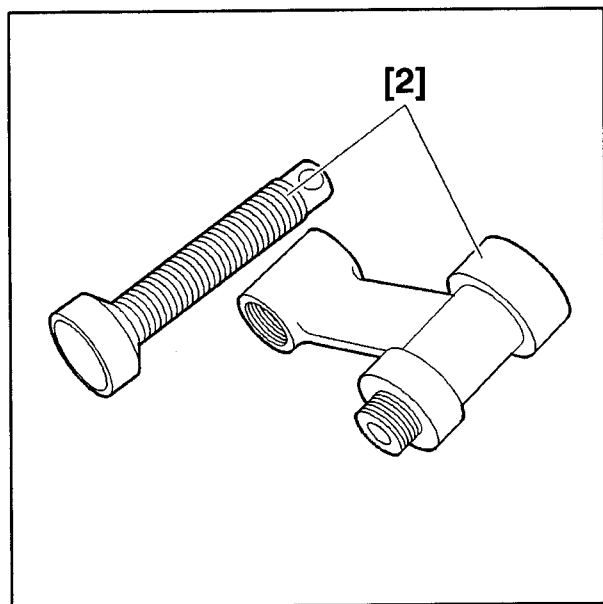


Fig : E5AP15VC

[2] compression tool for removing-refitting circlips of brake F2 . (-).0342 Q.

2 – REMOVING

2.1 – Gearbox rear cover

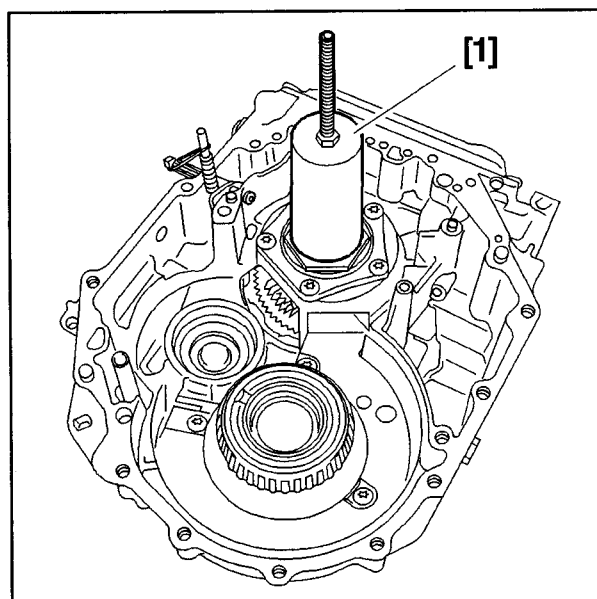


Fig : B2CP36DC

Put tool [1] into place.

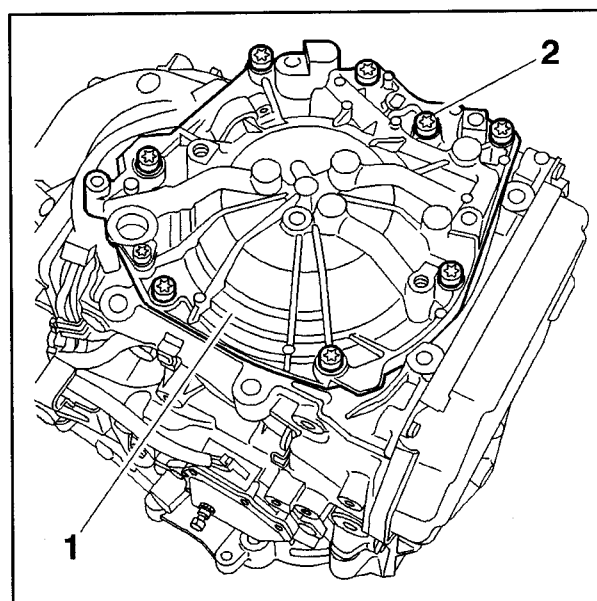


Fig : B2CP36EC

Remove :

- the screws (2)
- the cover (1)

NOTE : The mounting bolts of the converter housing and the rear housing are the same.

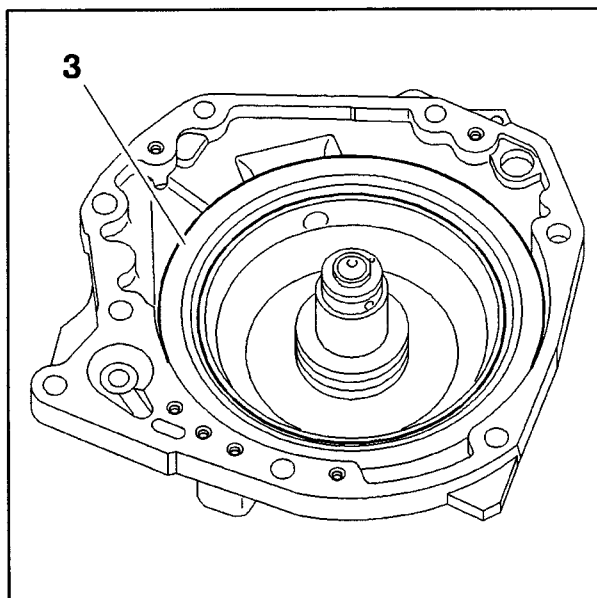


Fig : B2CP36FC

Remove the piston (3) from brake F1 by pivoting it.

2.2 – Pressure accumulator

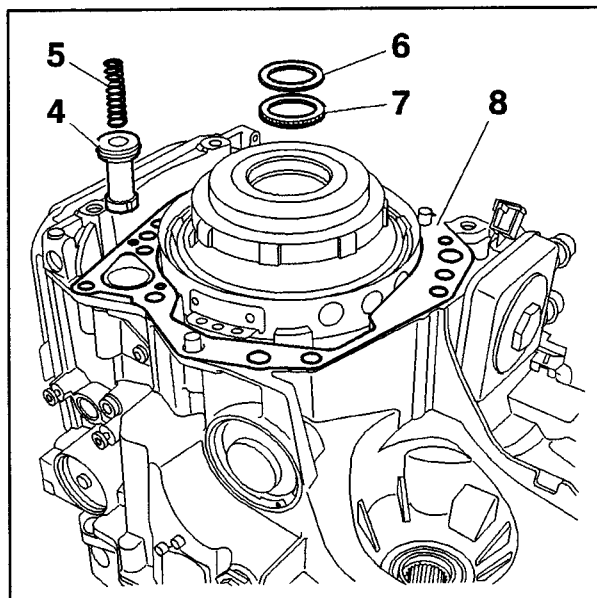


Fig : B2CP36GC

Remove :

- the spring (5)
- the piston (4)
- the shim (6)
- the needle thrust bearing (7)
- the seal (8)

2.3 – Primary line assembly (clutches E1 + E2 and brake F1)

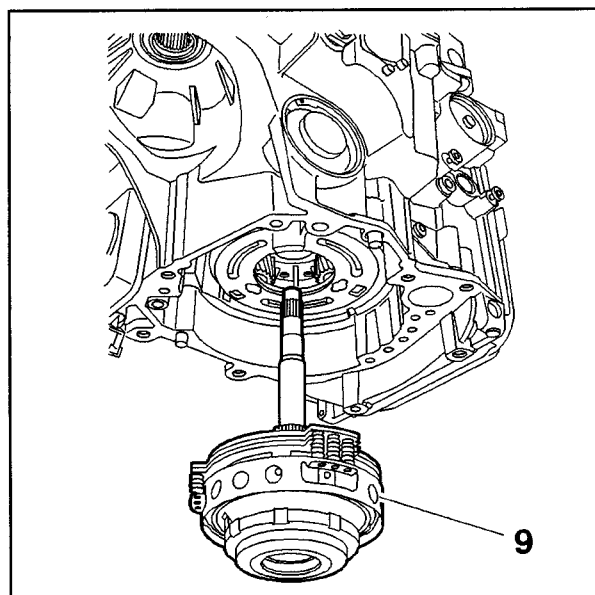


Fig : B2CP36HC

Place the gearbox, with the rear case pointing downwards.

Support the entire primary shaft (9).

Loosen the tool [1].

Remove the entire primary shaft (9).

Remove tool [1].

NOTE : Check that no discs are stuck in the mechanism housing.

2.4 – Band brake F2

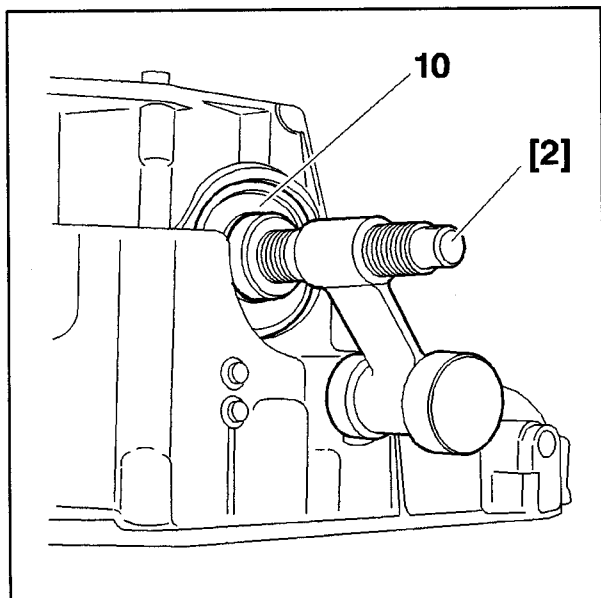


Fig : B2CP36JC

Compress the cover of the control piston (10) of brake F2 ; by means of tool [2].

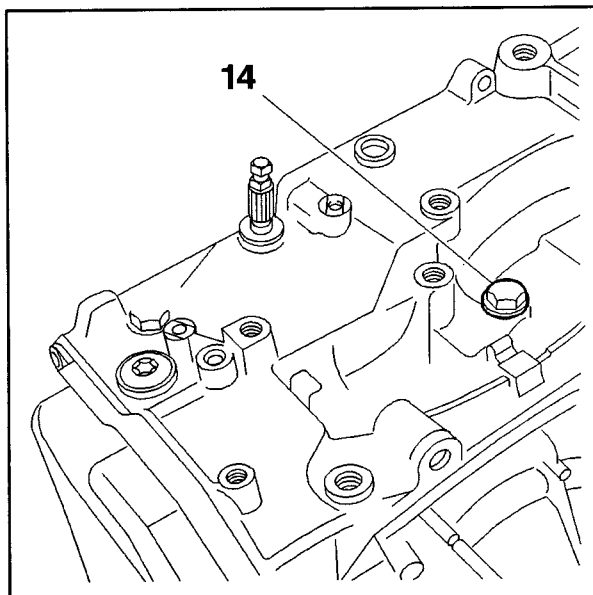


Fig : B2CP36LC

Slacken the counter pressure bolt (14) by a few turns to release the band from brake F2.

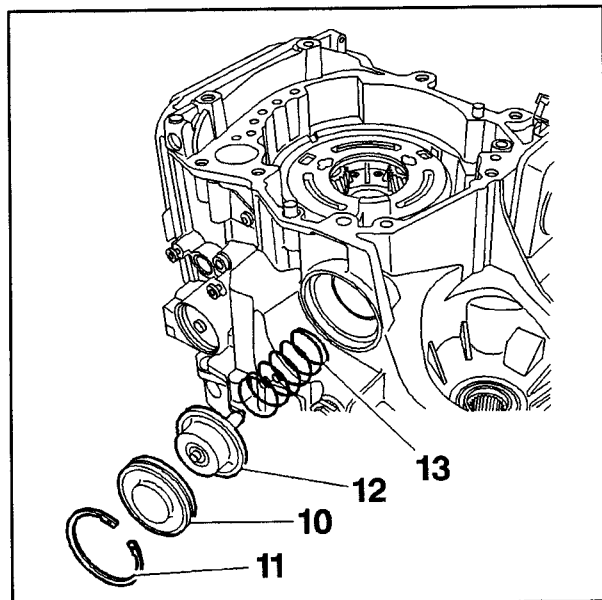


Fig : B2CP36KC

Remove :

- the circlip (11)
- the tool [2]
- the cover (10)
- the piston (12)
- the spring (13)

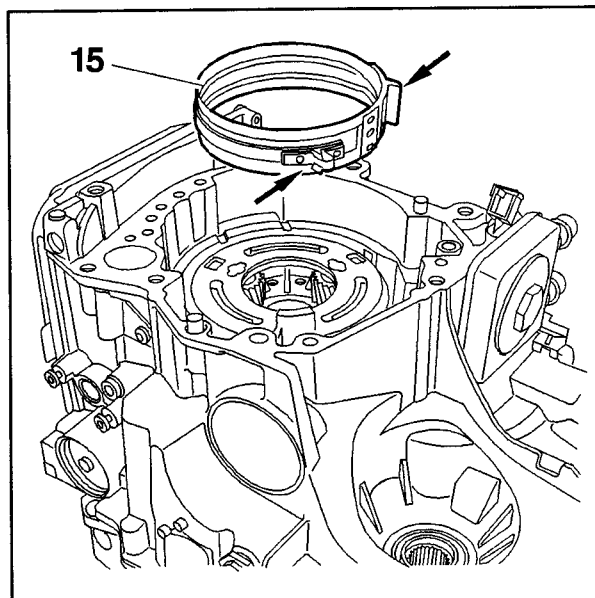


Fig : B2CP36MC

Remove the band (15) from brake F2.

DISMANTLING – RE-ASSEMBLY : CLUTCH ASSEMBLIES E1 AND E2

1 – RECOMMENDED TOOLS

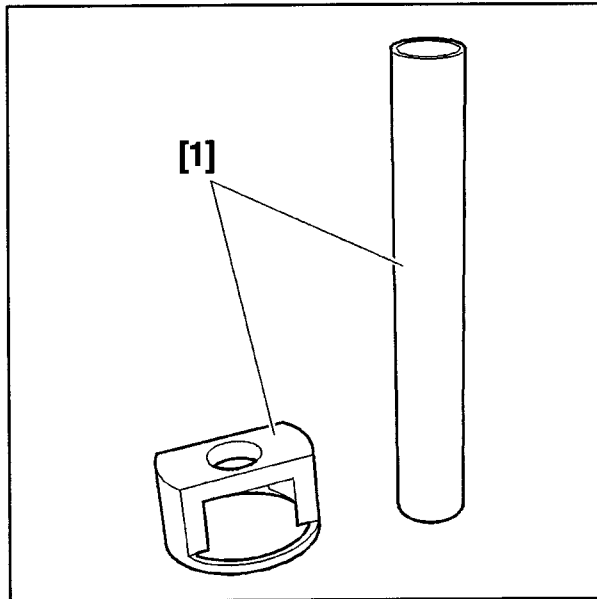


Fig : E5AP15WC

[1] tool for removing the clutch E2. counter piston
(-).0342 AE.

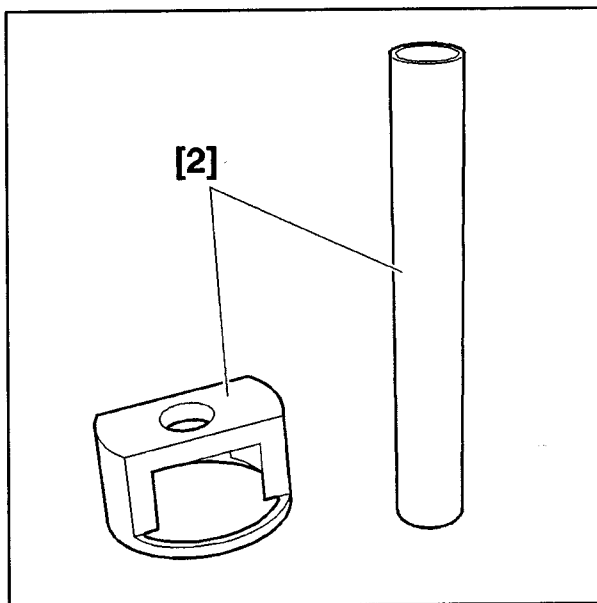


Fig : E5AP15XC

[2] tool for removing the clutch E1. counter piston
(-).0342 AF.

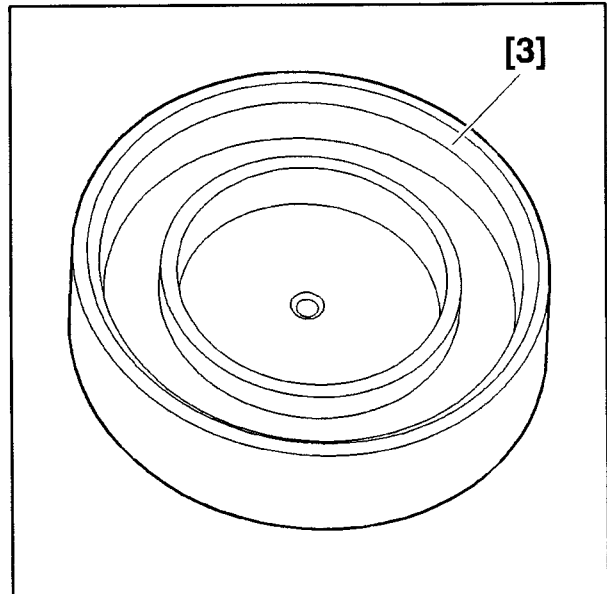


Fig : E5AP15YC

[3] tool for preforming the clutch E1. counter piston
(-).0342 AB.

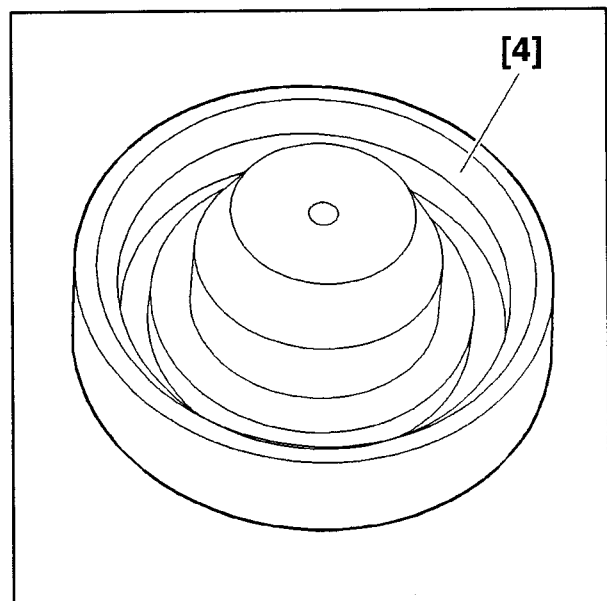


Fig : E5AP15ZC

[4] tool for preforming the piston of clutch E1.
(-).0342 AC.

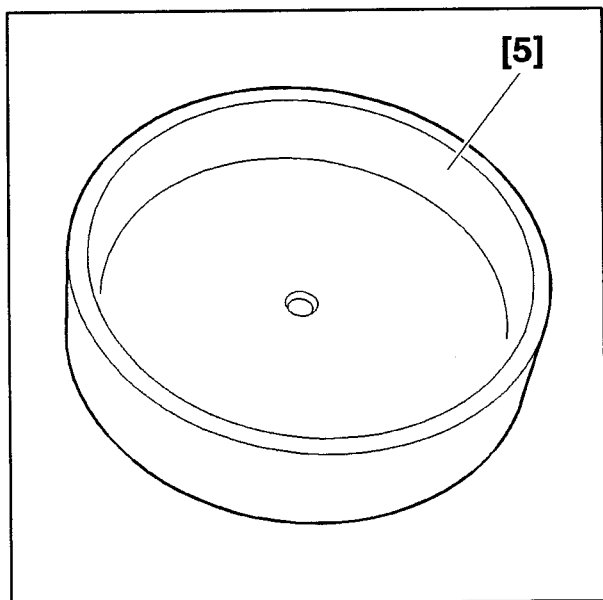


Fig : E5AP160C

[5] tool for preforming the piston of clutch E2. (-).0342 AD.

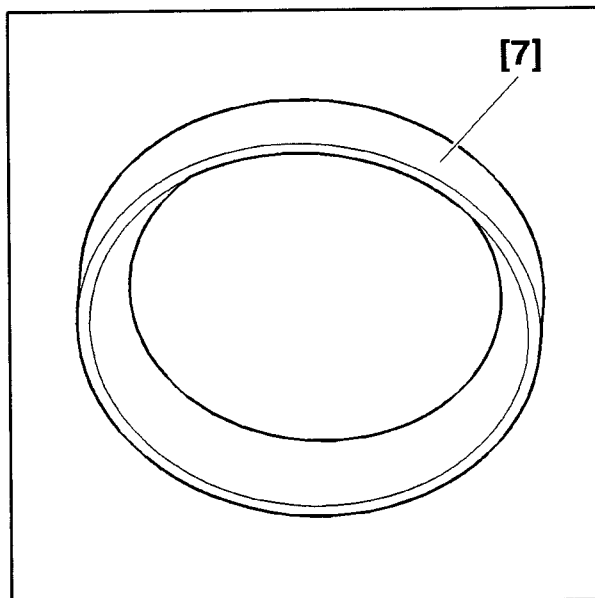


Fig : E5AP162C

[7] tool for guiding the outer lip of the clutch counter piston (-).0342 AJ.

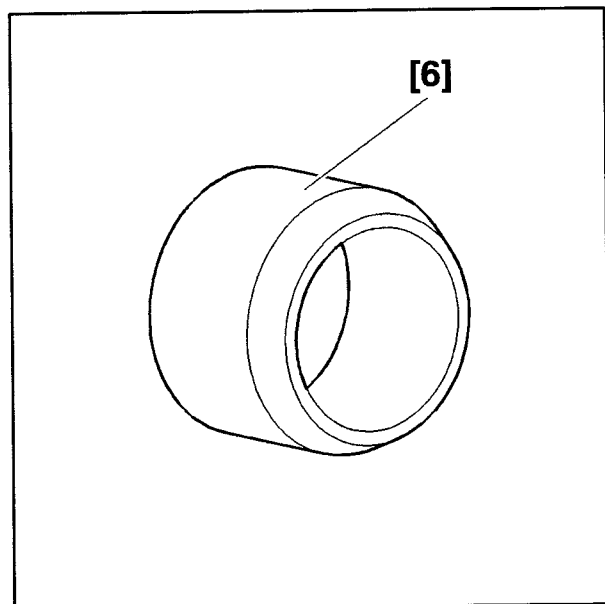


Fig : E5AP161C

[6] tool for fitting the clutch piston E2. (-).0342 AG.

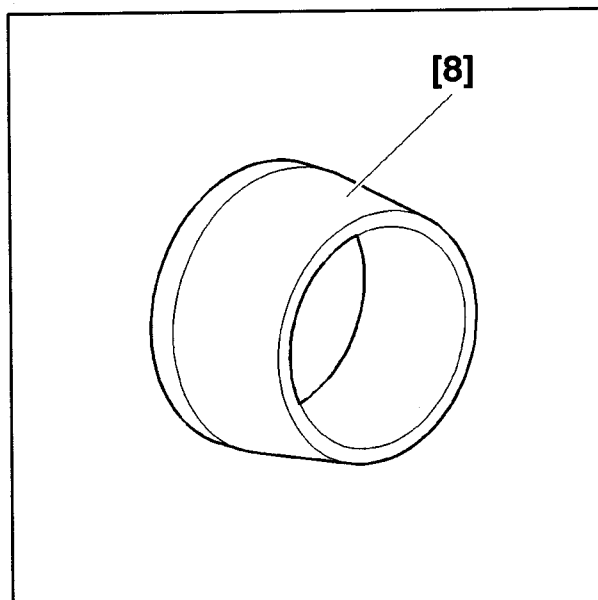


Fig : E5AP163C

[8] tool for fitting circlips of clutch E1 and E2. housing assembly (-).0342 AK.

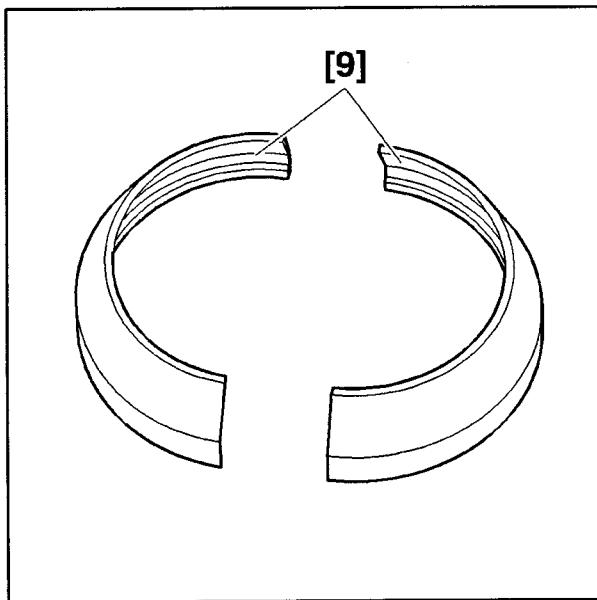


Fig : E5AP164C

[9] tool for guiding the inner lip of the clutch E2.
counter piston (-).0342 AH.

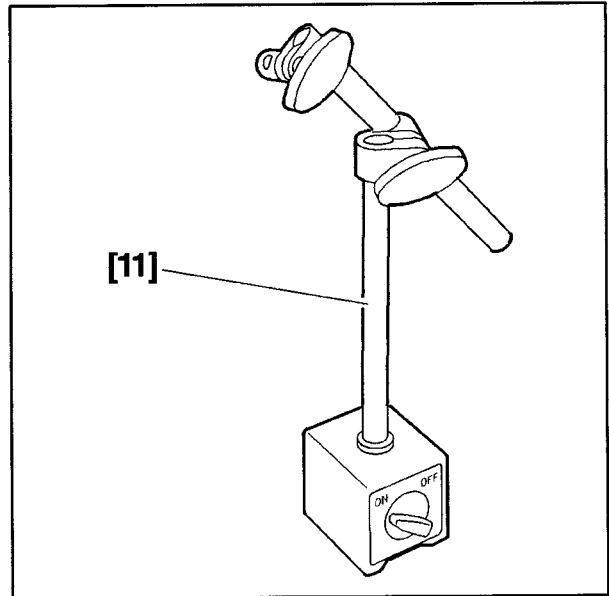


Fig : E5AP166C

[11] dial gauge magnetic support.

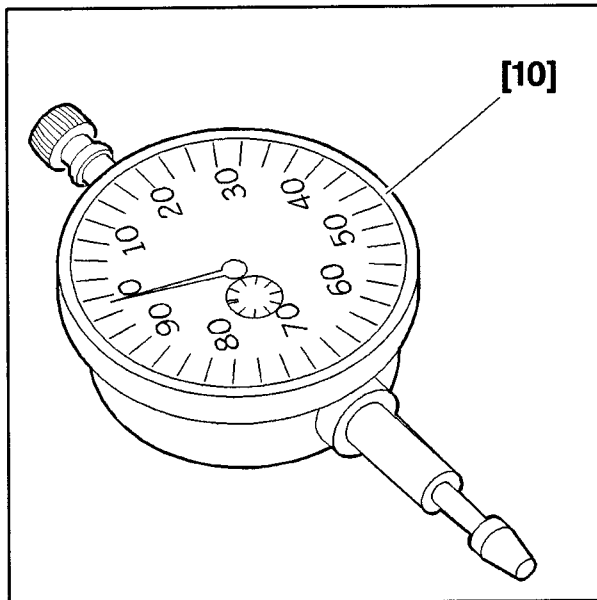


Fig : E5AP165C

[10] dial gauge (-).0337 H.

2 – DISMANTLING

2.1 – Clutch E2

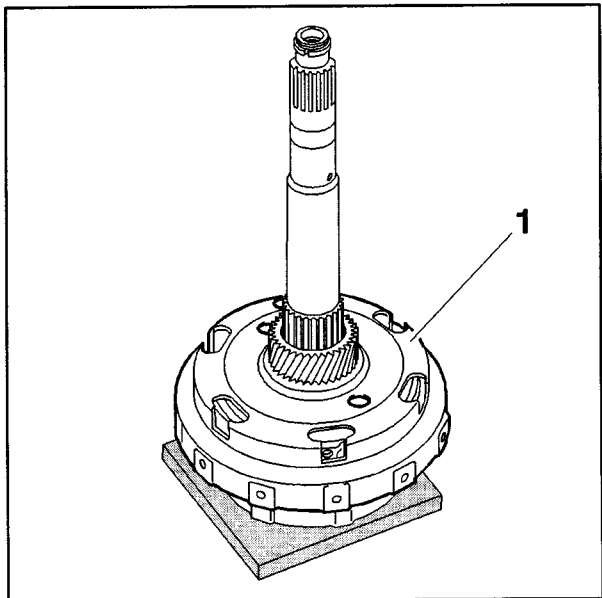


Fig : B2CP36NC

Remove the sunwheel (1).

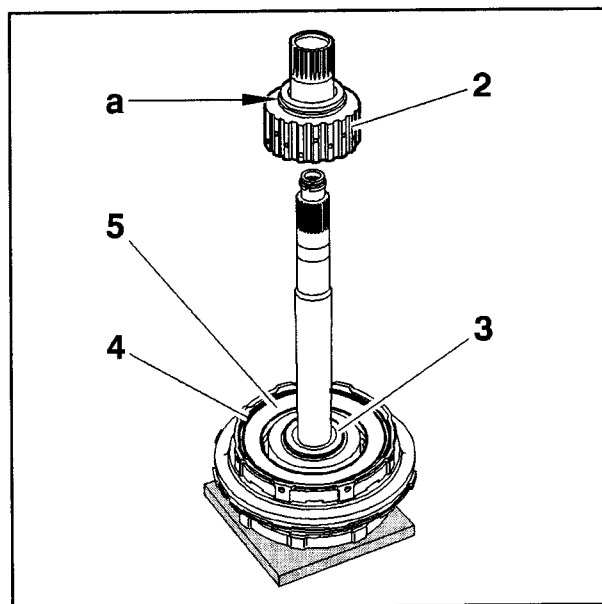


Fig : B2CP36PC

Remove :

- the clutch housing hub (2)
- the thrust bearing (3)
- the circlip (4)
- the contact plate (5)

NOTE : The thrust bearing "a" cannot be removed.

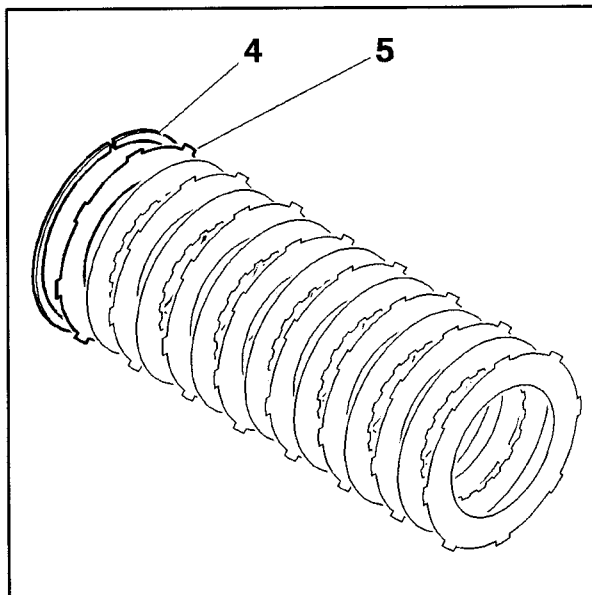


Fig : B2CP36QC

Turn the input shaft over in order to remove the discs from clutch assembly E2.

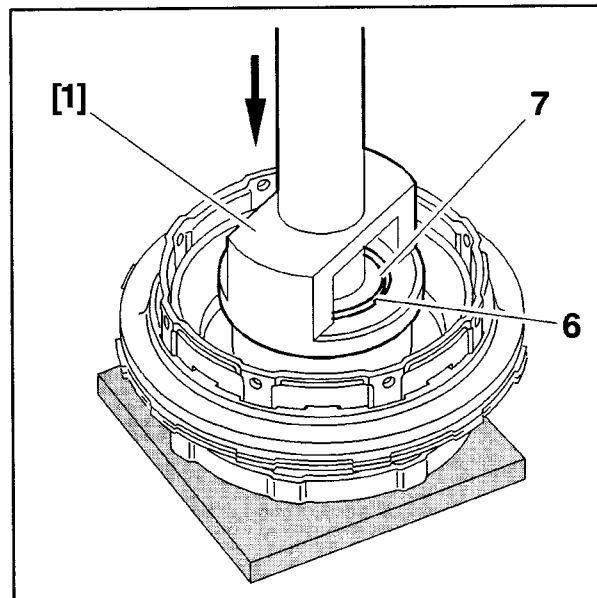


Fig : B2CP36RC

WARNING : The compression stroke of the tool [1] is very short.

Remove the circlips (6) from the counter piston (7) ; using the tool [1], a press and circlip pliers.

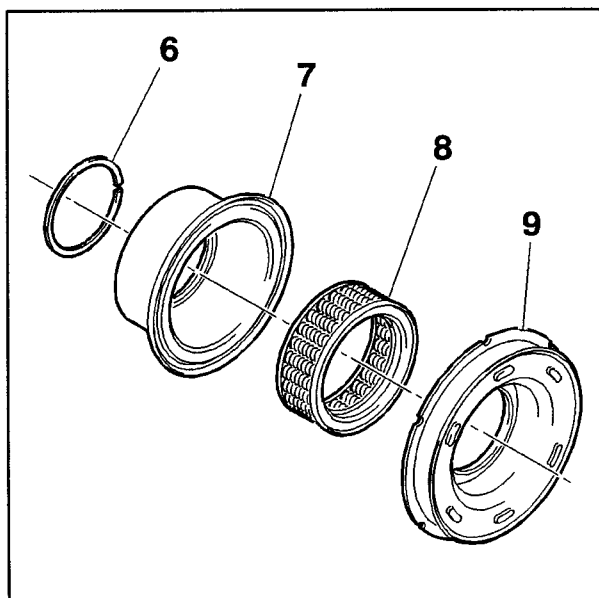


Fig : B2CP36SC

Remove :

- the tool [1]
- the circlip (6)
- the counter piston (7)
- the return spring assembly (8)
- the piston (9) (refer to the Note)

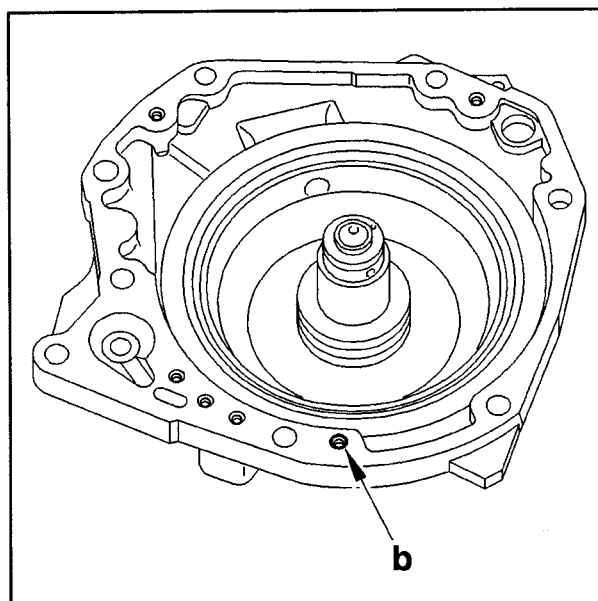


Fig : B2CP36TC

NOTE : The piston (9) is removed by placing the input shaft on the rear cover and blowing compressed air into the orifice "b".

2.2 – Clutch E1

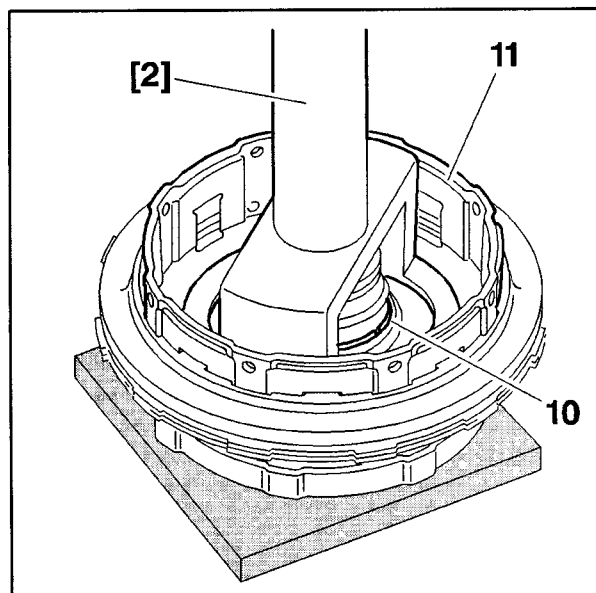


Fig : B2CP36UC

WARNING : The compression stroke of the tool [2] is very short.

Remove circlip (10) ; using the tool [2], a press and circlip pliers.

Remove :

- the tool [2]
- the housing (11) of clutch assemblies E1 and E2

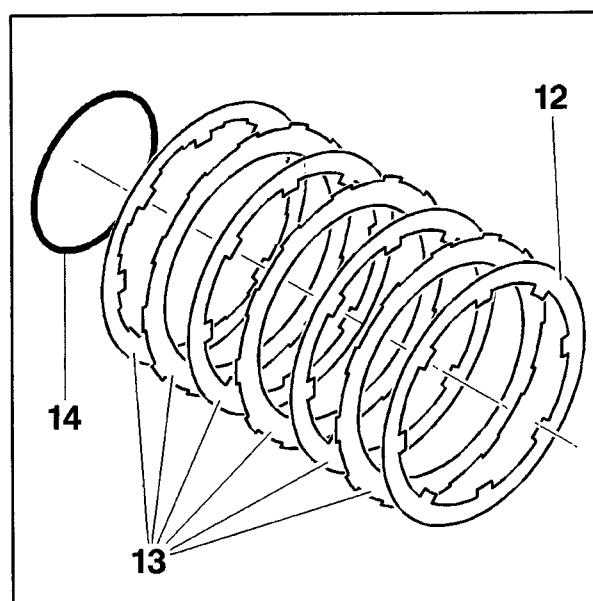


Fig : B2CP36VC

Remove :

- the contact plate (12)
- the discs (13) of clutch assembly E1
- the O-ring (14)

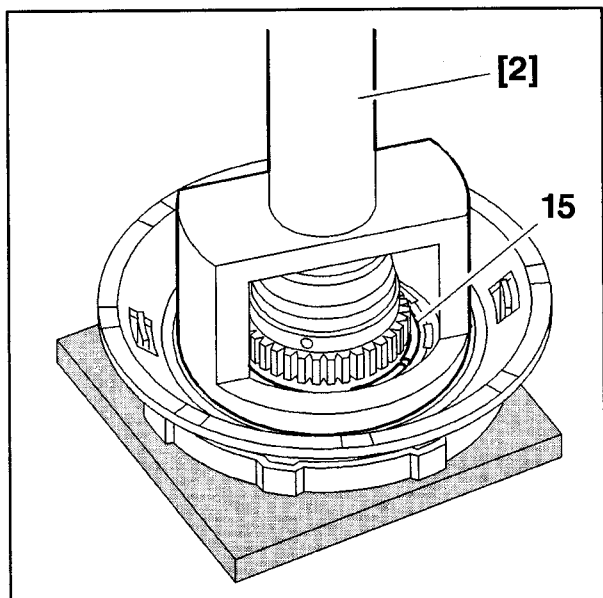


Fig : B2CP36WC

WARNING : The compression stroke of the tool [2] is very short.

Remove circlip (15) ; using the tool [2], a press and circlip pliers.

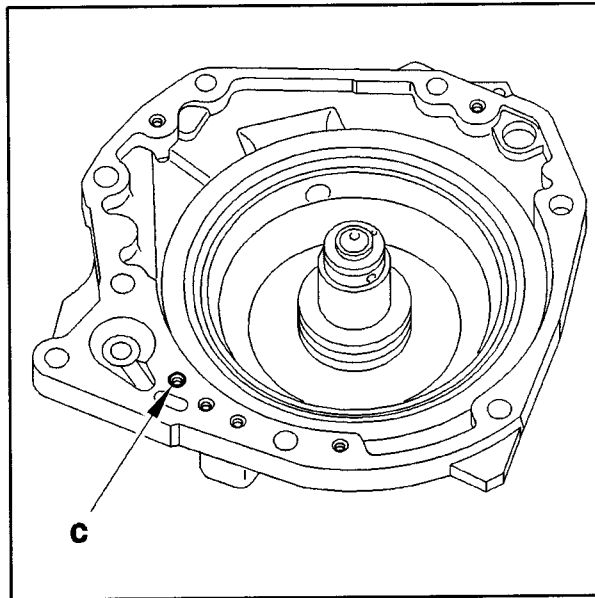


Fig : B2CP36YC

NOTE : The piston (18) is removed by placing the input shaft on the rear cover and blowing compressed air into the orifice "c".

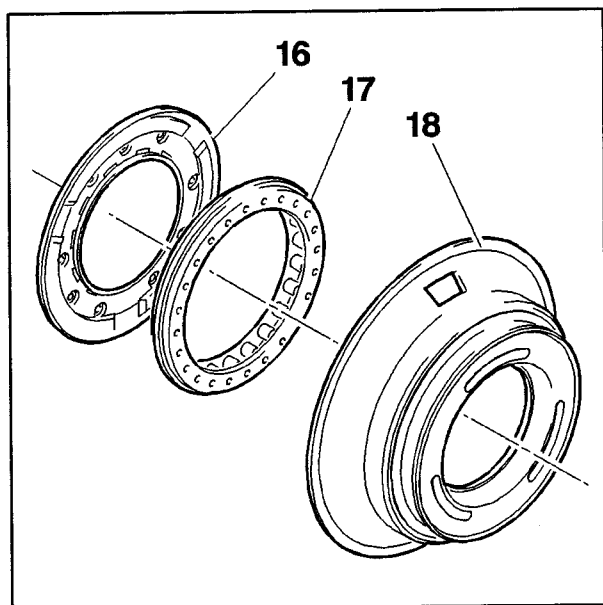


Fig : B2CP36XC

Remove :

- the tool [2]
- the counter piston (16)
- the return spring assembly (17)
- the piston (18) (refer to the Note)

3 – RE-ASSEMBLY

3.1 – Clutch E1

IMPERATIVE : Coat the lips of the piston and counter piston of clutch E1 with a mixture of vaseline and gearbox oil.

IMPERATIVE : Place the piston of clutch E1 in the tool [4] for preforming (for 5 minutes).

IMPERATIVE : Place the counter piston of clutch E1 in the tool [3] for preforming (for 5 minutes).

IMPERATIVE : Quickly refit the piston and counter piston of clutch E1 after removing the preforming tools [4] and [3].

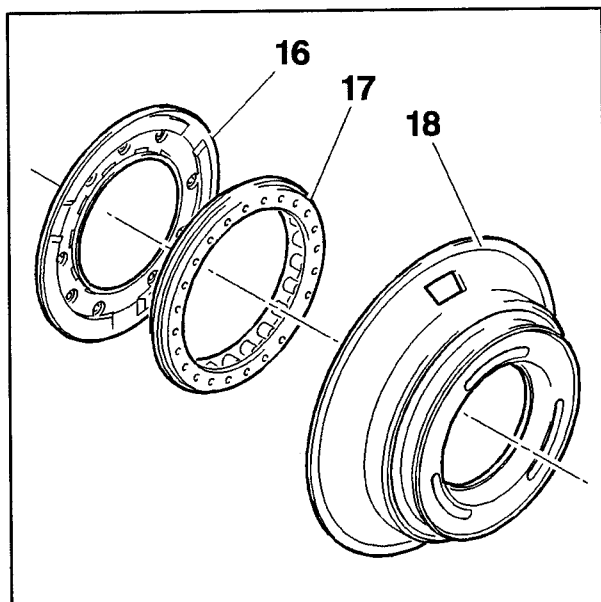


Fig : B2CP36XC

Fit :

- the piston (18) (by rotation)
- the return spring assembly (17)
- the counter piston (16)

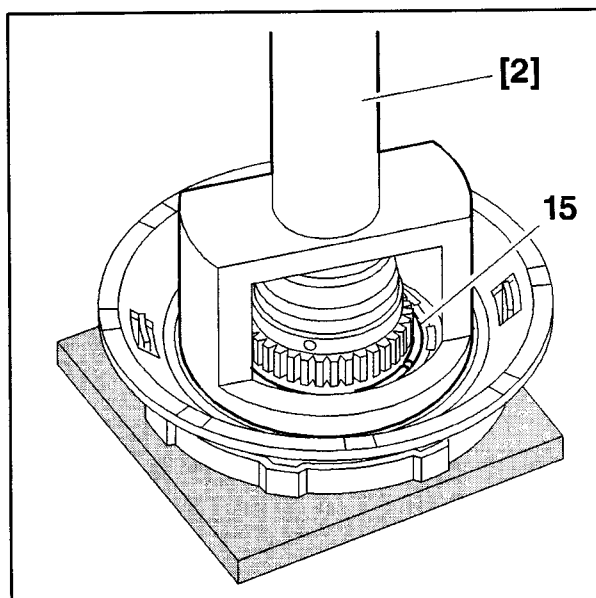


Fig : B2CP36WC

Refit circlip (15) ; using the tool [2], a press and circlip pliers.

Refit the new O-ring seal (14).

WARNING : Do not damage the O-ring (14) on the splines of the input shaft .

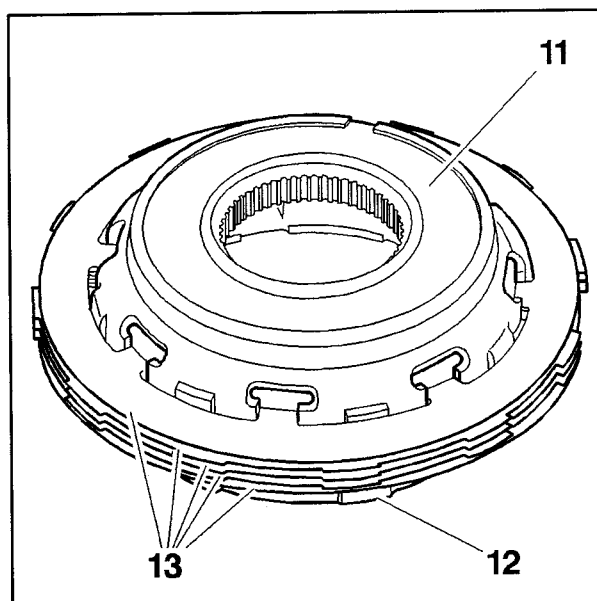


Fig : B2CP36ZC

Put the housing (11) of clutch E1 upside down.

IMPERATIVE : The first disc has external fastenings. Put the lined side of the disc on the contact plate side.

Position :

- the contact plate (12)
- the discs (13) of clutch assembly E1

Fit the assembly onto the input shaft.

3.2 – Clutch E2

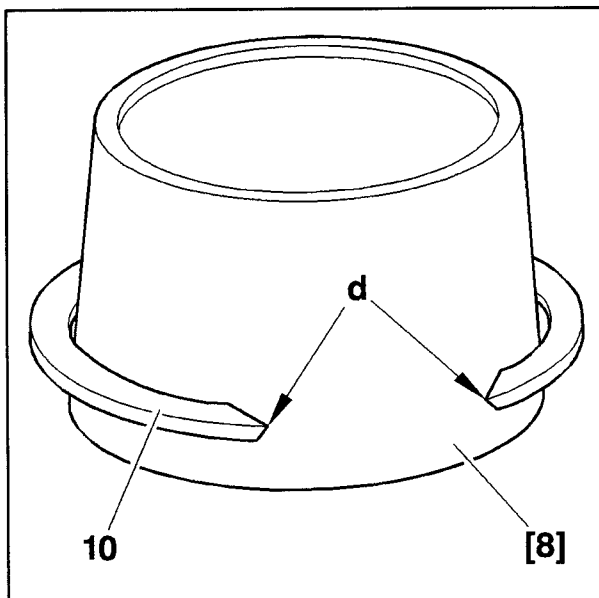


Fig : B2CP370C

Fit the circlips (10) on the tool [8].

IMPERATIVE : Position the circlips at the end of the tapered part. Position the points "d" of the opening upwards.

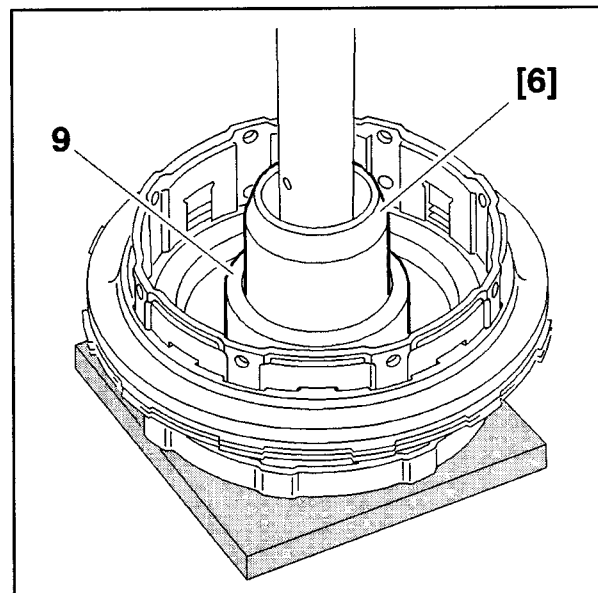


Fig : B2CP372C

Refit the piston (9) ; by means of tool [6].

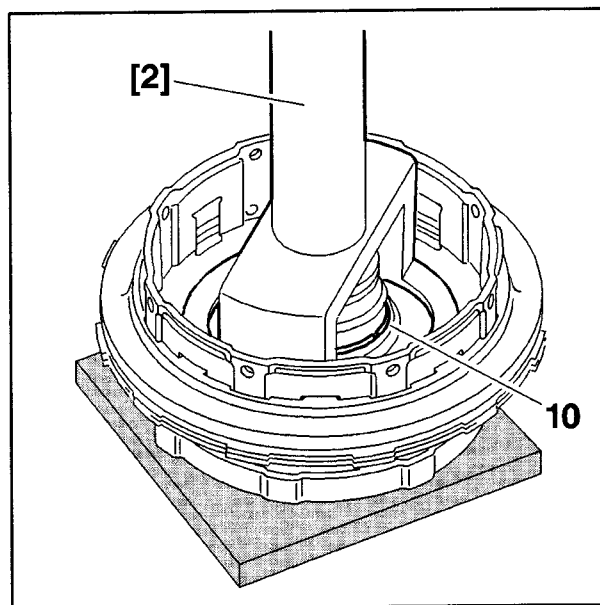


Fig : B2CP371C

Fit the assembly onto the input shaft.

Fit the circlips (10) ; using the tool [2], a press and circlip pliers.

IMPERATIVE : Check that the circlip (10) is in its housing correctly.

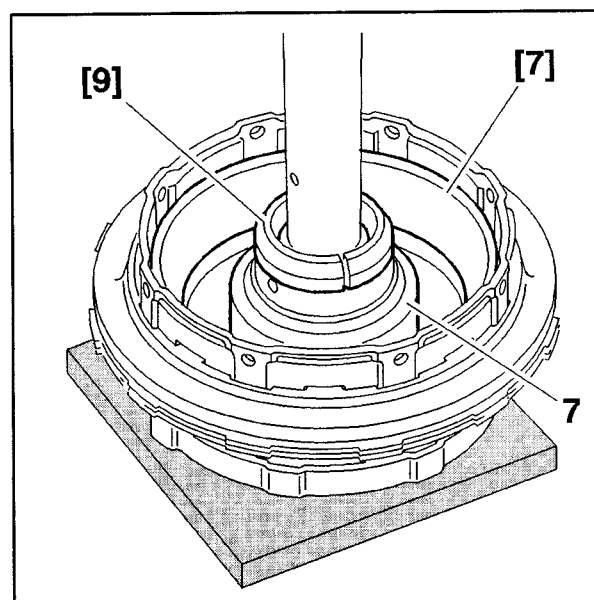


Fig : B2CP373C

Position :

- tool [9]
- tool [7]

Fit :

- the return spring assembly (8) (flat part upwards)
- the counter piston (7)

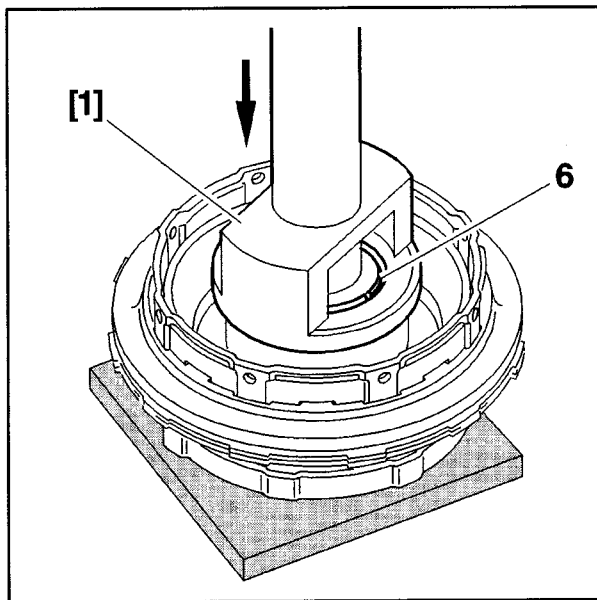


Fig : B2CP374C

Compress the counter piston (7) until the tool [9] has been freed ; by means of tool [1] and a press.

Remove tool [9].

Refit circlip (6) ; using circlip pliers.

Remove :

- tool [1]
- tool [7]

IMPERATIVE : Check that the circlip (6) is in its housing correctly.

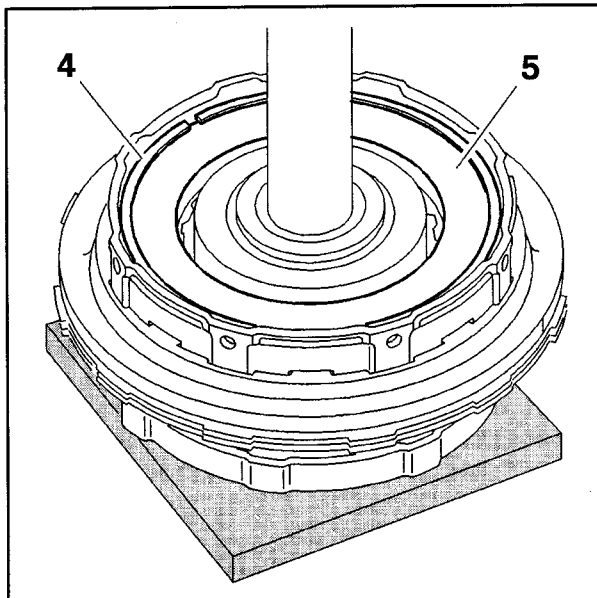


Fig : B2CP375C

Refit the discs of clutch assembly E2.

NOTE : The first disc has external fastenings. Put the smooth side of the disc against the piston (9).

Fit :

- the contact plate (5) (chamfer on circlip side (4))
- the circlip (4)

IMPERATIVE : Position the outer opening of the circlip (4) on the slots of the housings of clutches E1 and E2.

4 – CLEARANCE CHECKS

4.1 – Clutch E1

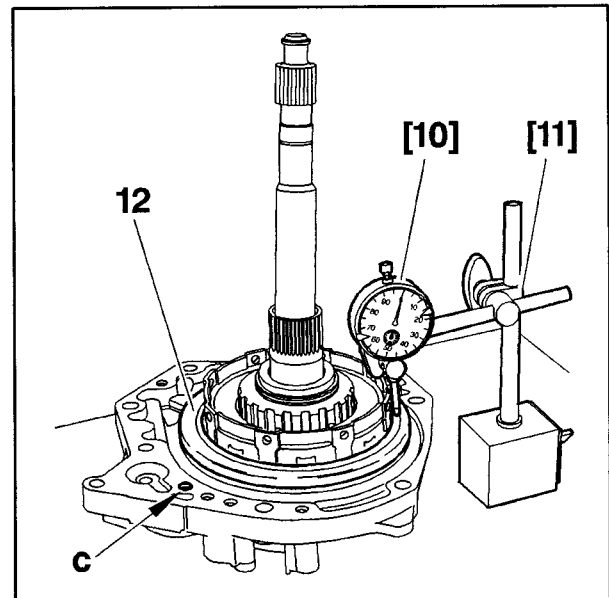


Fig : B2CP376C

Put the input shaft on the rear housing fitted with the piston of brake F1.

WARNING : Allow for an assembly to stabilise the rear casing on the body jig.

Fit :

- the assembly on a jig
- the tools [10] and [11]
- the pointer of the gauge [10] on the contact plate (12)

Set the dial gauge to zero.

Pressurise the piston of clutch E1 (blow compressed air into orifice "c").

Read the travel of the gauge [10].

Remove the compressed air pressure.

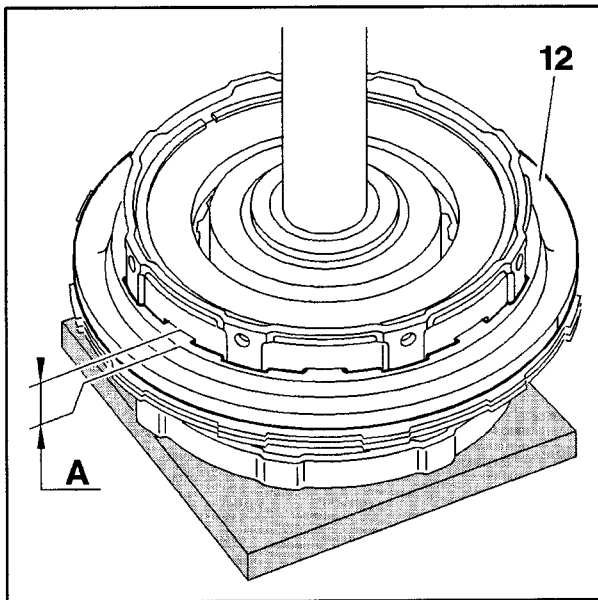


Fig : B2CP377C

IMPERATIVE : The travel of clutch E1 = A should be between 1 and 1,4 mm, otherwise replace the contact plate (12).

Thicknesses of the contact plates available from the Replacement Parts Division :

6,92 mm	7,19 mm	8 mm	9,08 mm
	7,46 mm	8,27 mm	9,35 mm
	7,73 mm	8,54 mm	9,62 mm
		8,81 mm	

4.2 – Clutch E2

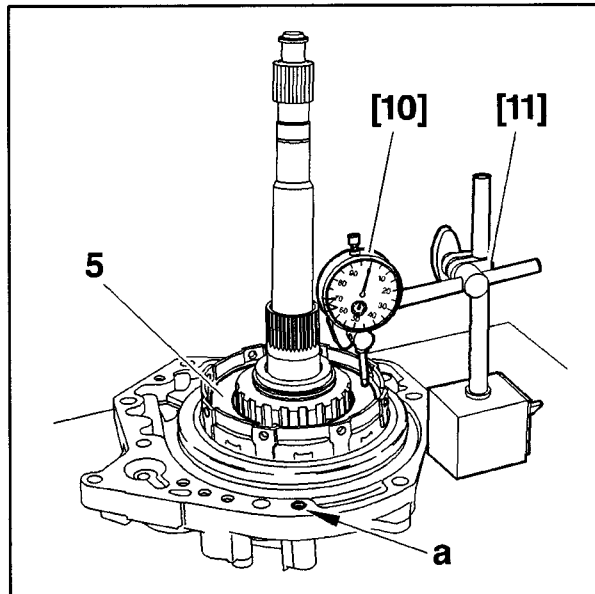


Fig : B2CP378C

Put the input shaft on the rear housing fitted with the piston of brake F1.

WARNING : Allow for an assembly to stabilise the rear casing on the body jig.

Fit :

- the assembly on a jig
- the tools [10] and [11]
- the pointer of the gauge [10] on the contact plate (5)

Set the dial gauge to zero.

Pressurise the piston of clutch E2 ; (blow compressed air into orifice "b").

Read the travel of the gauge [10].

Remove the compressed air pressure.

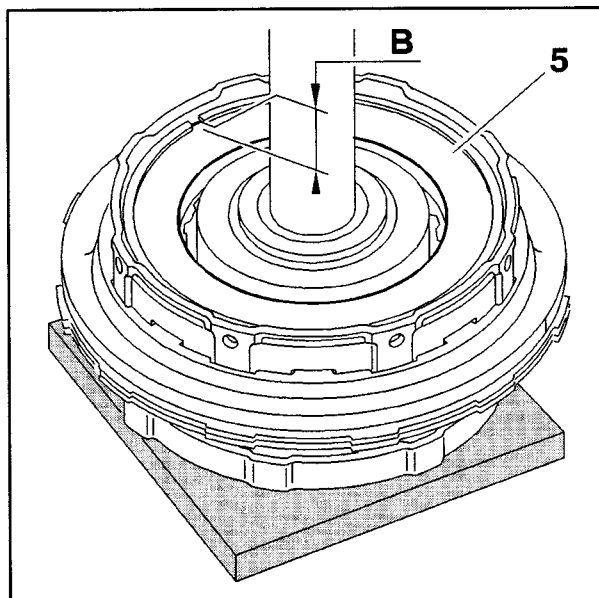


Fig : B2CP379C

IMPERATIVE : The travel of clutch E2 = B should be between 2 and 2,4 mm, otherwise replace the contact plate (5).

Thicknesses of the contact plates available from the Replacement Parts Division :

4 mm	5 mm	6 mm
4,25 mm	5,25 mm	6,25 mm
4,50 mm	5,50 mm	
4,75 mm	5,75 mm	

Fit :

- the thrust bearing (3)
- the clutch housing hub (2)
- the sun wheel (1)

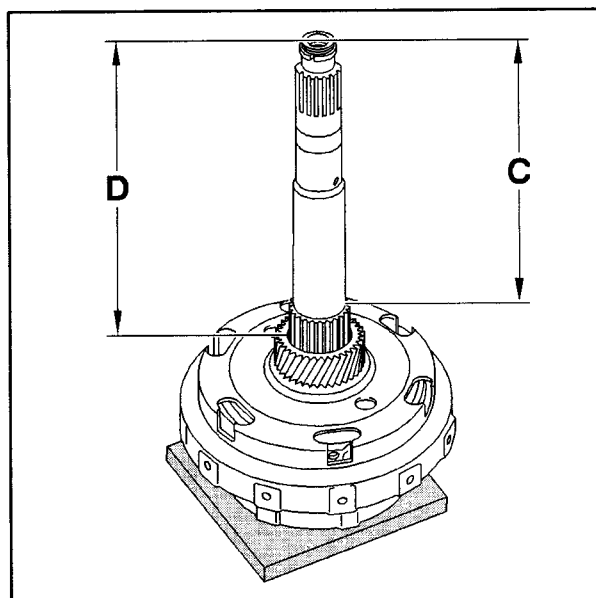


Fig : B2CP37AC

IMPERATIVE : To ensure the assembly is fitted correctly, check the following dimensions :
C = $184 \pm 0,5$ mm ; D = $206 \pm 0,5$ mm.

REMOVE – REFIT : INTERNAL SELECTOR CONTROL

1 – RECOMMENDED TOOLS

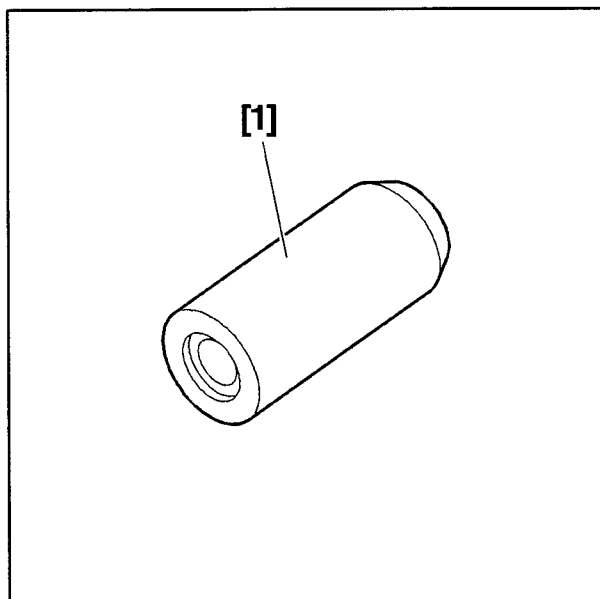


Fig : E5AP172C

[1] selection shaft seal fitting drift (-).0338 K.

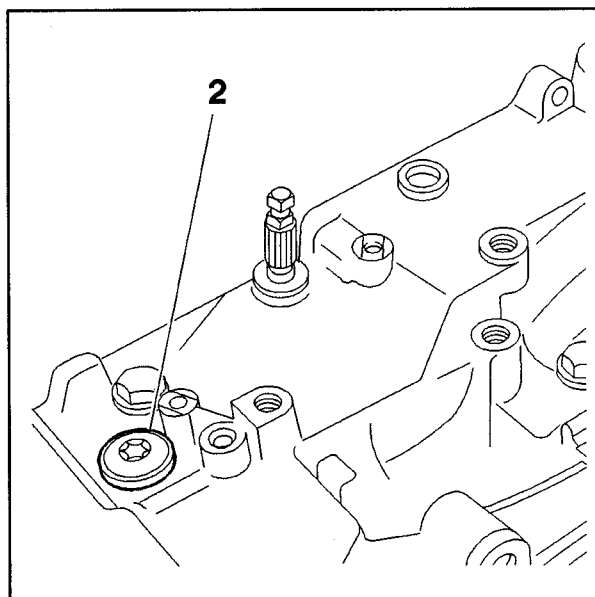


Fig : B2CP381C

Remove :

- the pin (2)
- the ball sector by releasing it from the control linkage
- the control selector and the 2 linkages by releasing them from the internal bearing by pivoting them

2 – REMOVING

NOTE : This operation requires that the converter housing and the hydraulic block be removed.

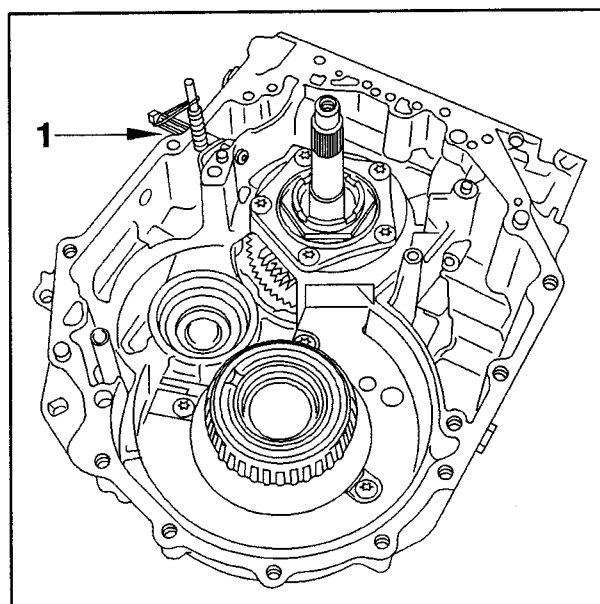


Fig : B2CP380C

Remove the selector shaft seal (1) ; using a pin drift (from inside the mechanism housing).

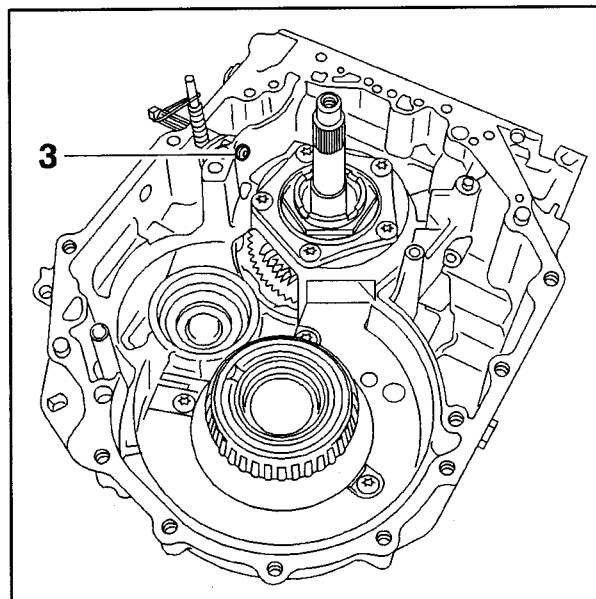


Fig : B2CP382C

Remove the internal bearing (3) of the control pin ; using a pin drift.

3 – REFITTING

Fit :

- the internal bearing (3) of the control pin ; using a pin drift (diameter = 12)
- the control selector and the 2 linkages by pivoting them through the seal housing hole

Secure the ball sector onto the control linkage.

Refit the pin (2) ; tighten to 3,3 m.daN.

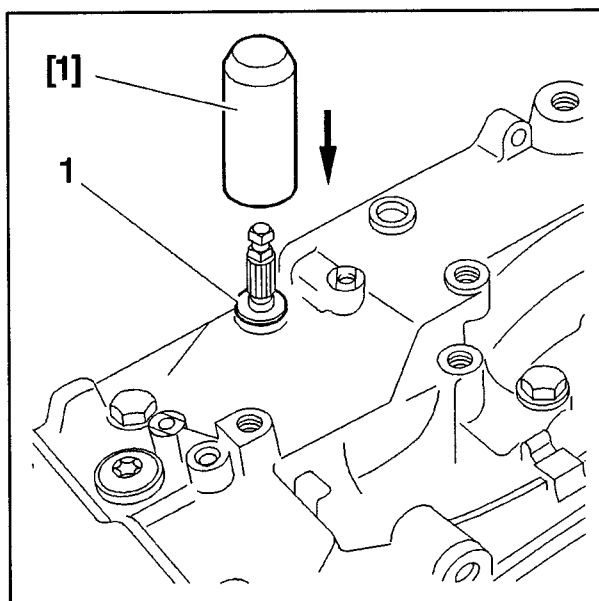


Fig : B2CP383C

Clean the seal seat (1).

Refit the seal (1) (new) ; by means of tool [1].

DISMANTLING – RE-ASSEMBLY : EPICYCLIC GEAR TRAINS

1 – RECOMMENDED TOOLS

2 – DISMANTLING

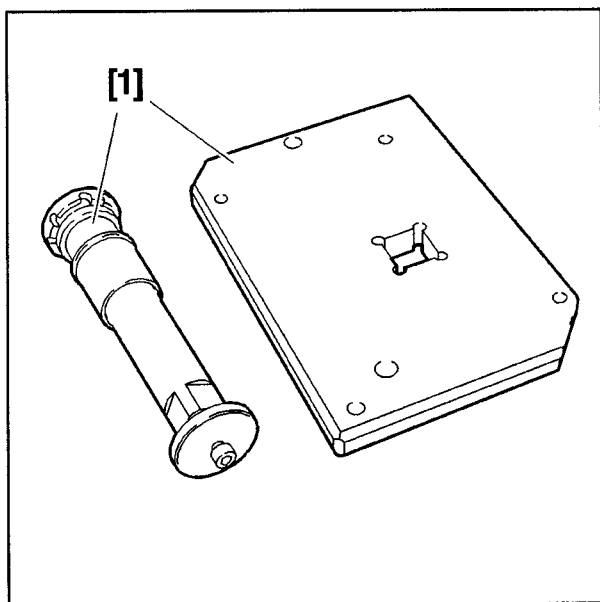


Fig : E5AP16XC

[1] tool for removing–refitting the epicyclic gear train nut (–).0342 N.

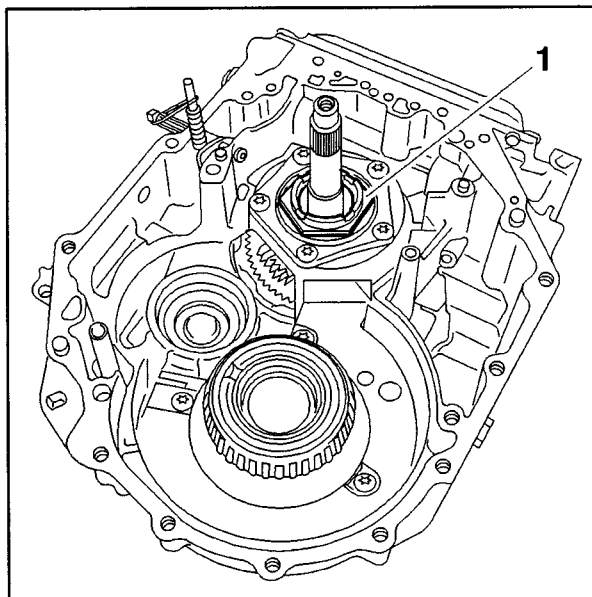


Fig : B2CP37GC

Release nut (1) ; using a pin drift.

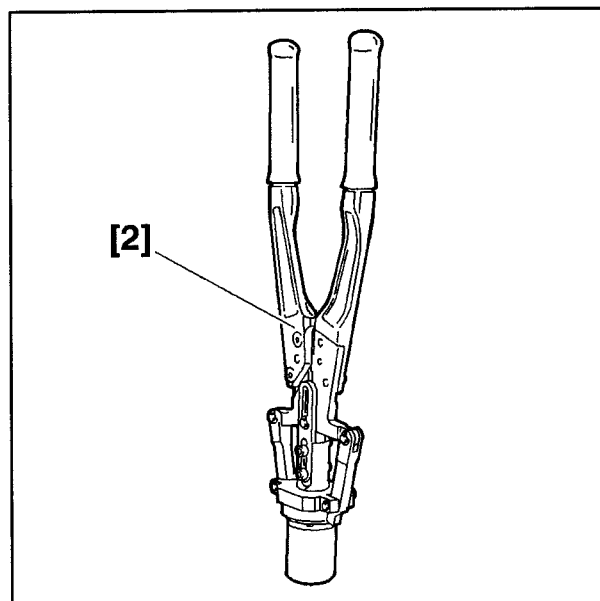


Fig : E5AP16YC

[2] tool for inserting the epicyclic gear train nut (–).0342 P.

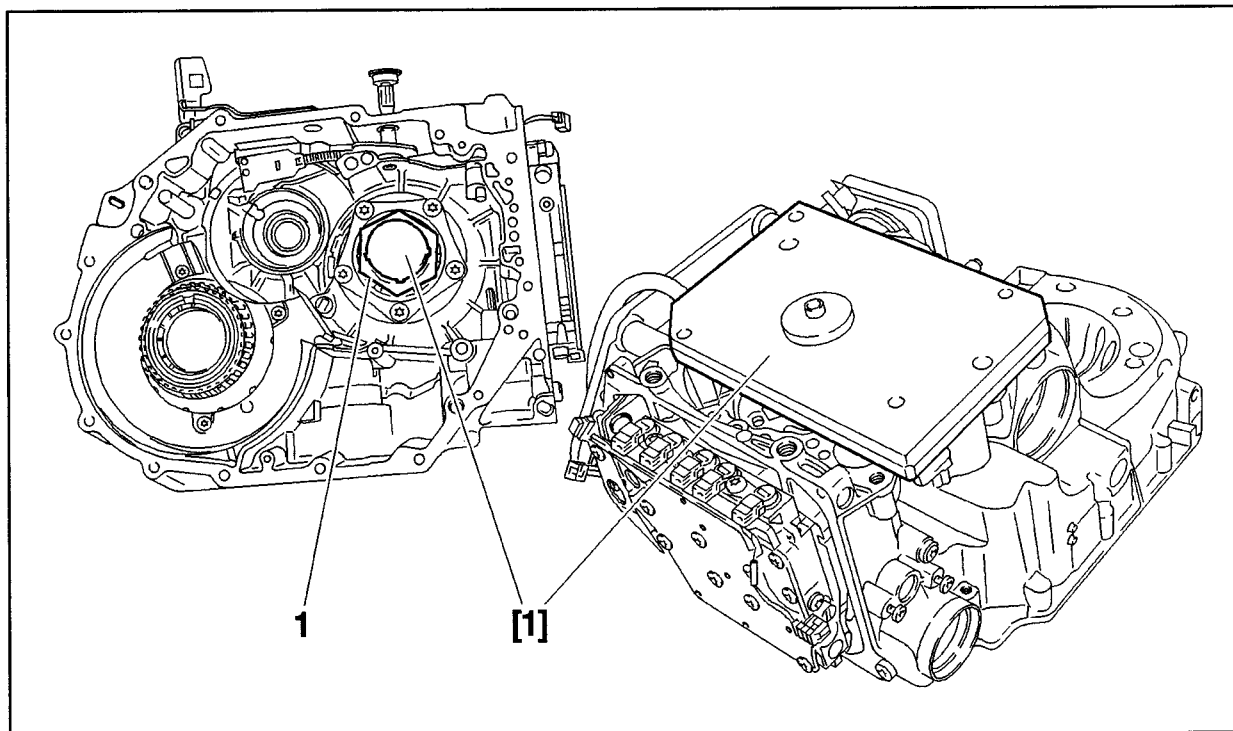


Fig : B2CP37HD

IMPERATIVE : Position the nylon ring of the tool [1].

Put tool [1] into place.

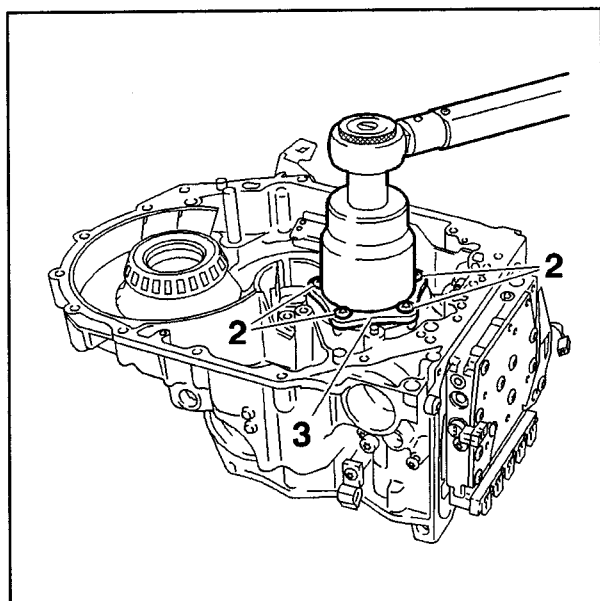


Fig : B2CP37JC

Remove :

- the nut (1)
- the tool [1]
- the epicyclic gear trains
- the screws (2)
- the bearing (3)

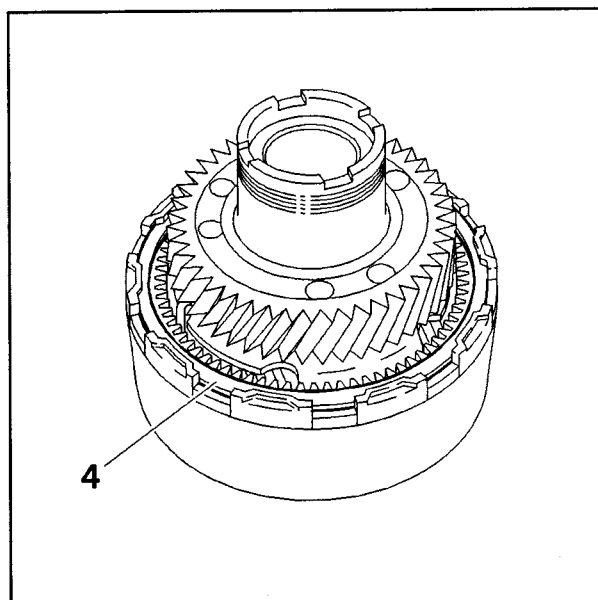


Fig : B2CP37KC

Remove circlip (4).

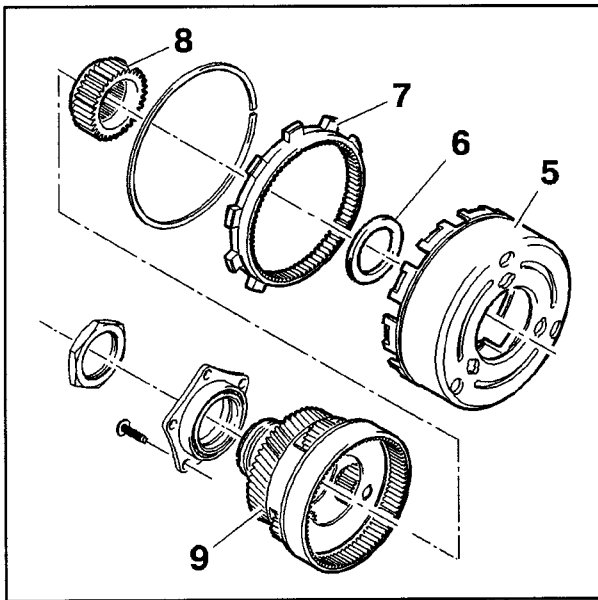


Fig : B2CP37LC

Remove :

- the primary planet wheel carrier (5)
- the needle thrust bearing (6)
- the secondary crown wheel (7)
- the sun wheel (8)
- the secondary planet wheel carrier (9)

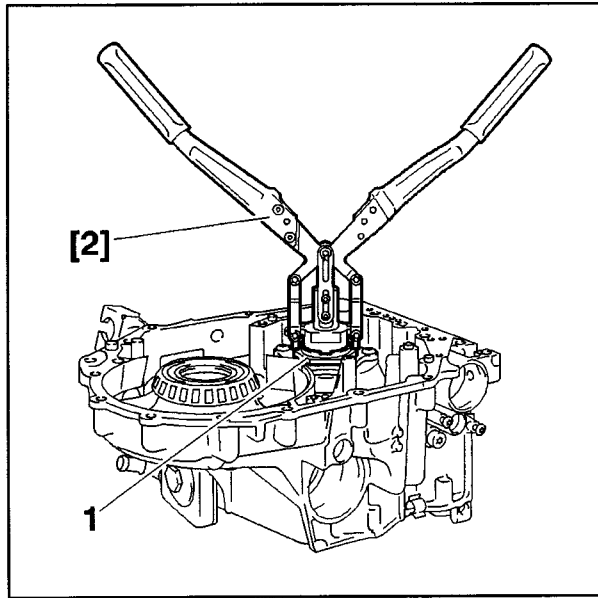


Fig : B2CP37MC

Remove tool [1].

Lock nut (1) ; by means of tool [2].

IMPERATIVE : Use the correct tightening torque for the nut (1) and ensure it is locked at four points.

3 – REFITTING

IMPERATIVE : Visually check the condition of the parts before reassembling.

Refit all the parts of the epicyclic gear train.

IMPERATIVE : Refit a new needle thrust bearing (6).

Fit :

- the circlip (4)
- the bearing (3) (tighten the screws (2) progressively)

Tighten the bolts (2) to 2,6 m.daN.

Refit the epicyclic gear trains into the mechanism housing.

IMPERATIVE : Use a new nut.

Refit nut (1).

Put tool [1] into place.

Pre-tighten the nut (1) to 45 m.daN.

Loosen the nut (1).

Tighten nut (1) to 40 m.daN.

REFITTING : REAR HOUSING SIDE

1 – RECOMMENDED TOOLS

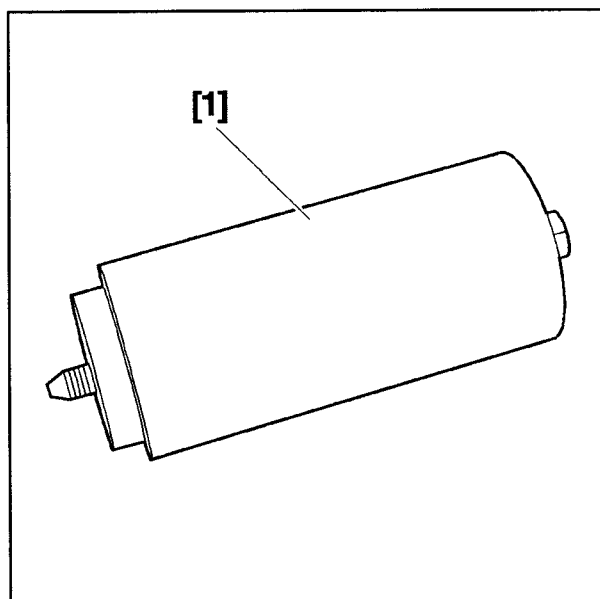


Fig : E5AP15UC

[1] tool for supporting the input shaft (–).0342 E.

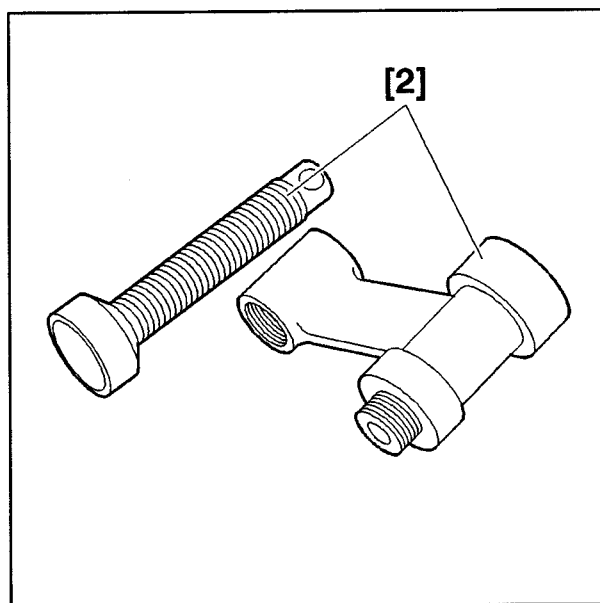


Fig : E5AP15VC

[2] compression tool for removing–refitting circlips of brake F2. (–).0342 Q.

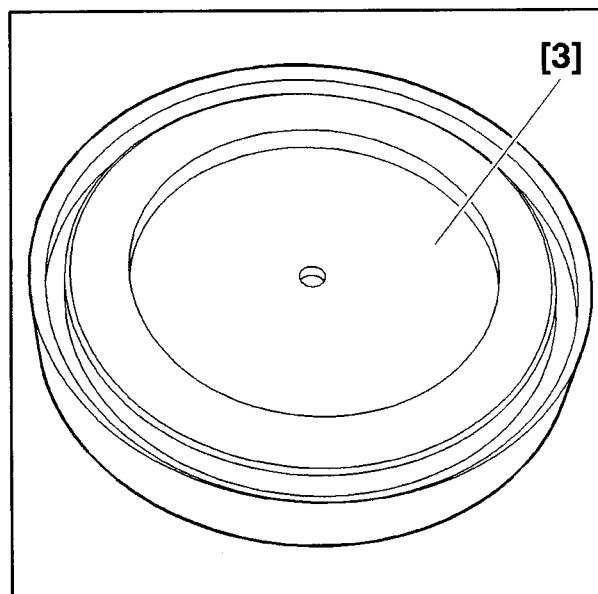


Fig : E5AP16ZC

[3] tool for preforming the piston of brake F1. (–).0342 AA.

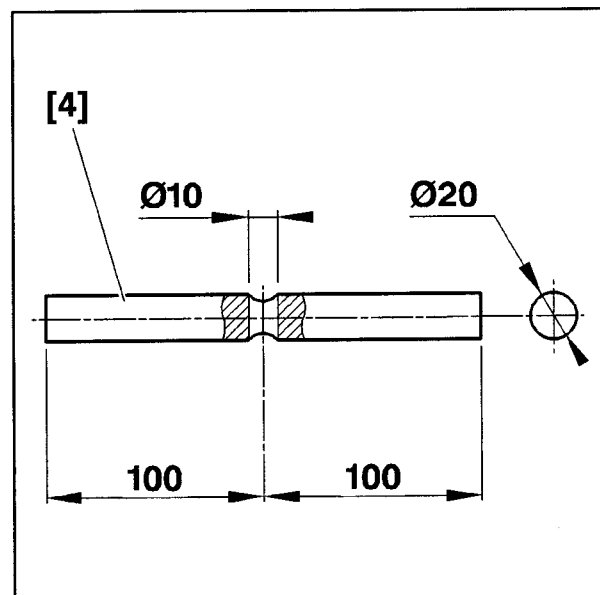


Fig : E5AP170C

[4] tool for pulling the input shaft (steel tool to be made in the workshop).

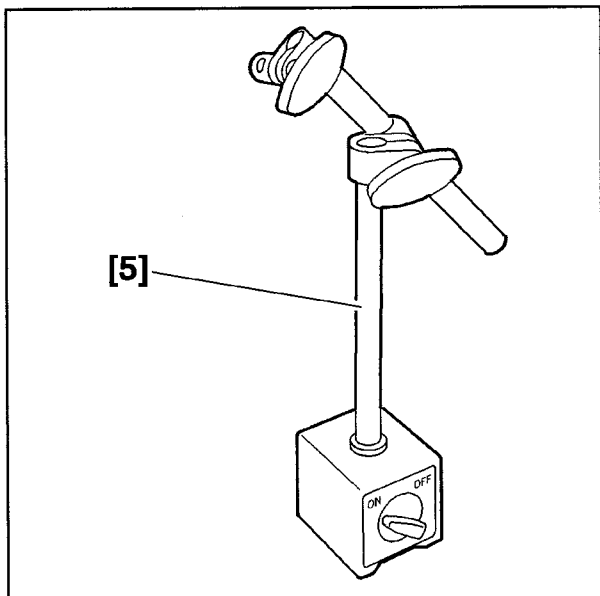


Fig : E5AP171C

[5] dial gauge magnetic support.

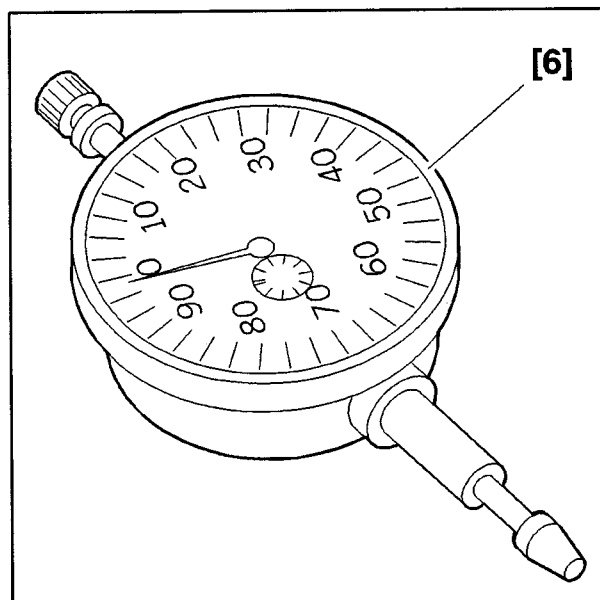


Fig : E5AP11PC

[6] dial gauge (-).0337 H.

2 – REFITTING

2.1 – Brake F1

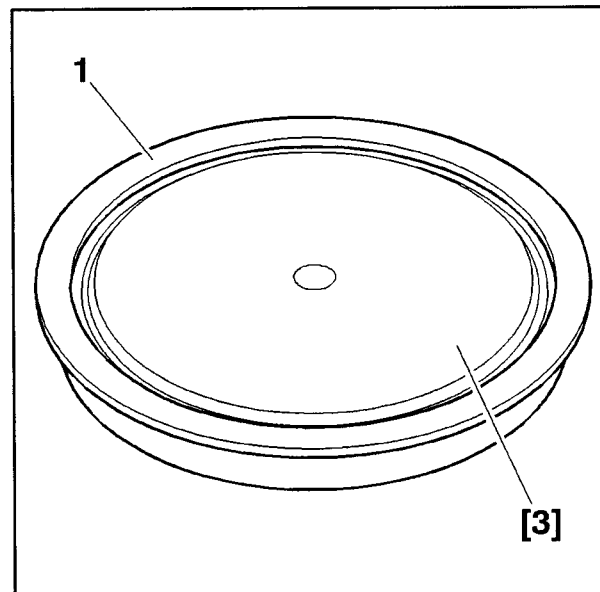


Fig : B2CP37NC

IMPERATIVE : Before reassembling, the piston (1) of brake F1 must be preformed in the tool [3] (for 5 minutes). Coat the lips of the piston with vaseline before placing it in the preforming tool and fit it quickly after removing it from the tool.

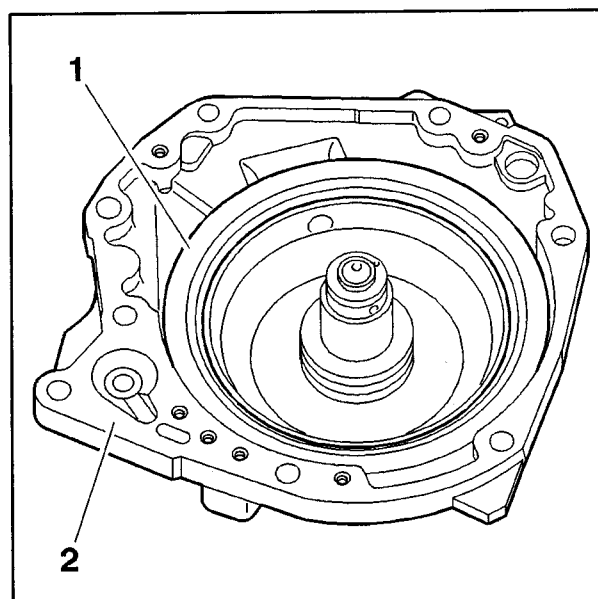


Fig : B2CP37PC

Fit the piston (1) into the rear housing (2).

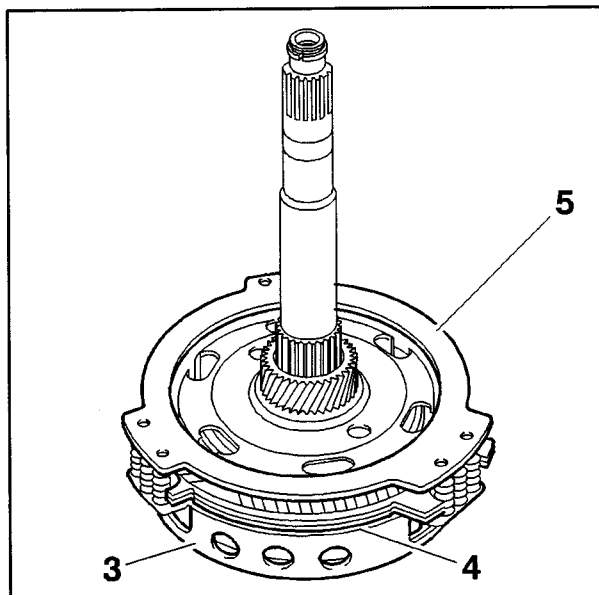


Fig : B2CP37QC

IMPERATIVE : The first disc has external fastenings. Put the smooth side of the disc against the spacer (3).

Fit :

- the return spacer (3)
- the stack of discs (4)
- the contact plate (5)

2.2 – Band brake F2

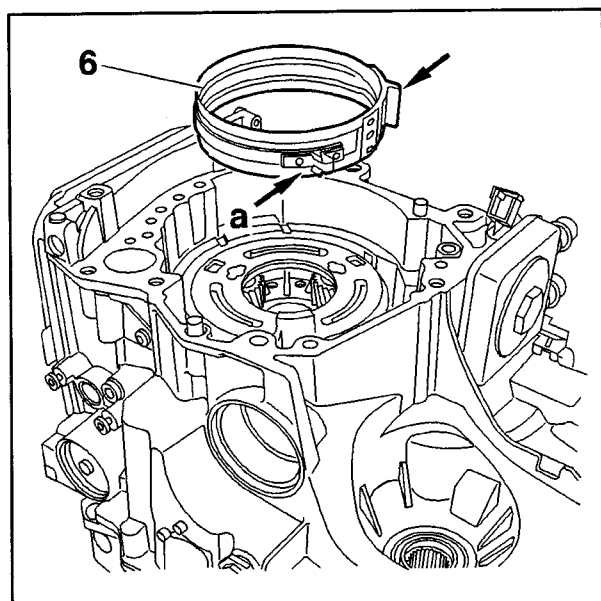


Fig : B2CP37RC

Fit the band (6) of brake F2 (slot "a" on the control piston side).

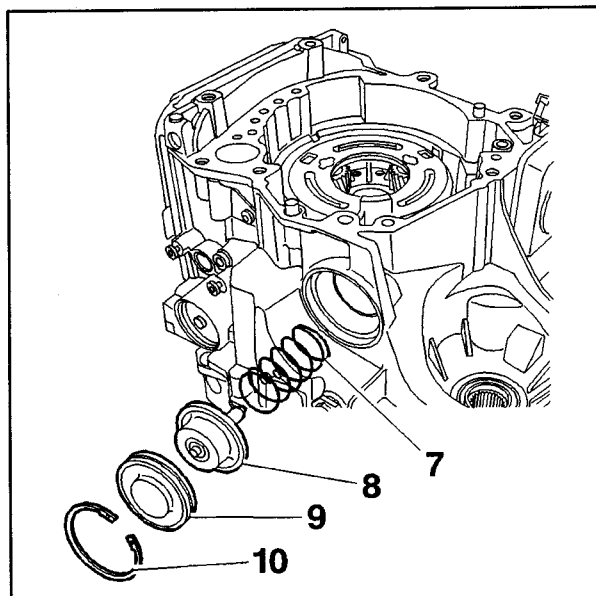


Fig : B2CP37SC

Fit :

- the spring (7)
- the piston (8)
- the cover (9) fitted with a new o-ring

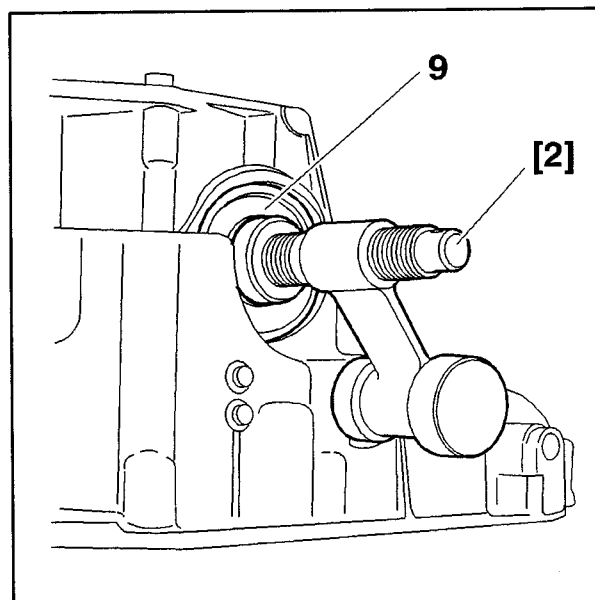


Fig : B2CP37TC

Compress the cover of the control piston (9) of brake F2 ; by means of tool [2].

Refit circlip (10).

Decompress and remove the tool [2].

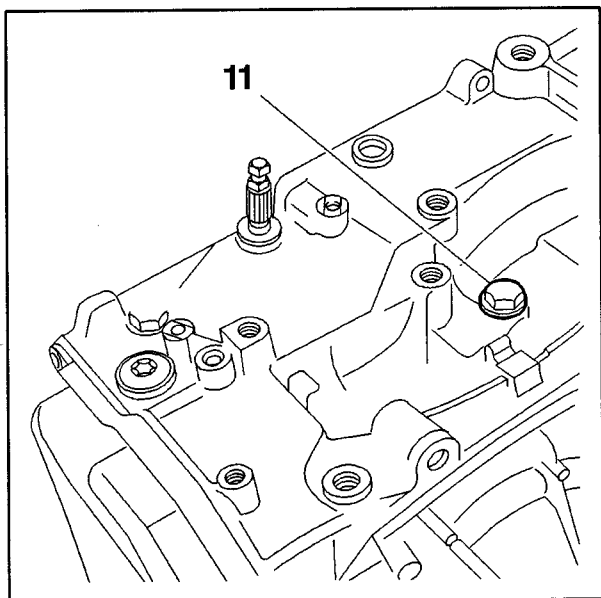


Fig : B2CP37UC

Tighten the screw (11) to 6,7 m.daN.

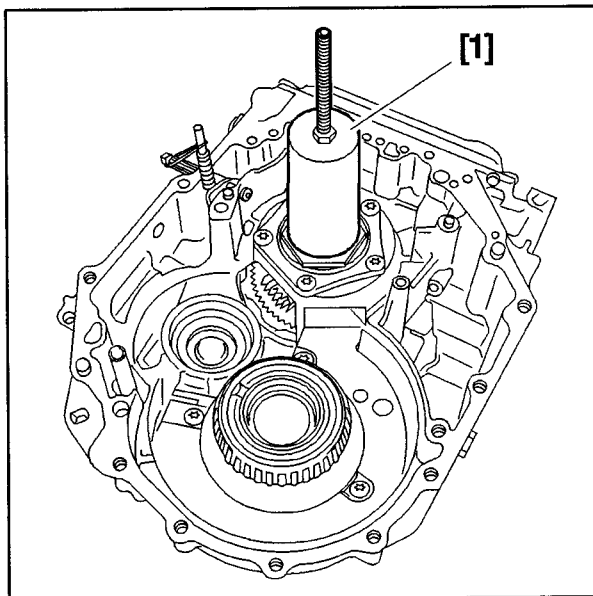


Fig : B2CP36DC

Put tool [1] into place, whilst maintaining the assembly (12).

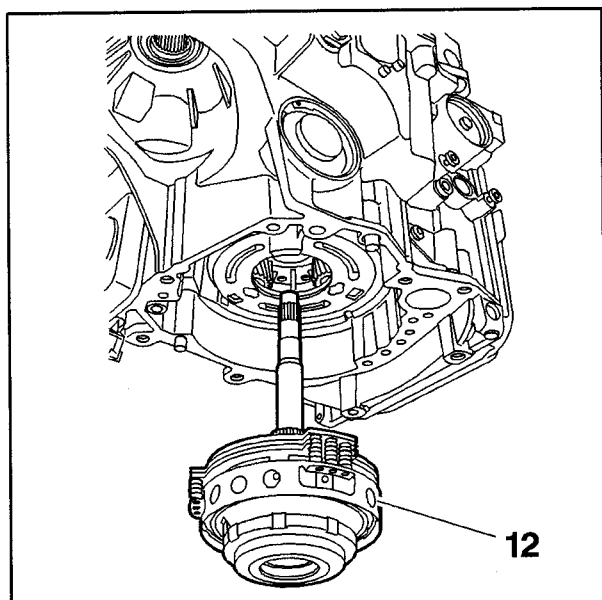


Fig : B2CP37VC

WARNING : Index the brake F1 correctly in the gearcase, as well as the splines of the input shaft in the epicyclic gear train.

Place the gearbox, with the rear case pointing downwards.

Refit the assembly (12) (E1 + E2 + F1).

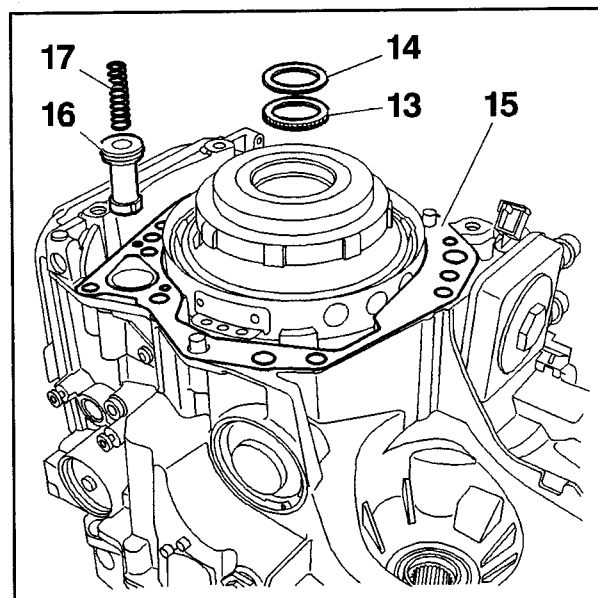


Fig : B2CP37XC

Fit :

- needle thrust bearing (13) (black surface of the input shaft side)
- shim (14)
- piston (16) and its two rings
- spring (17)
- seal (15) (new)

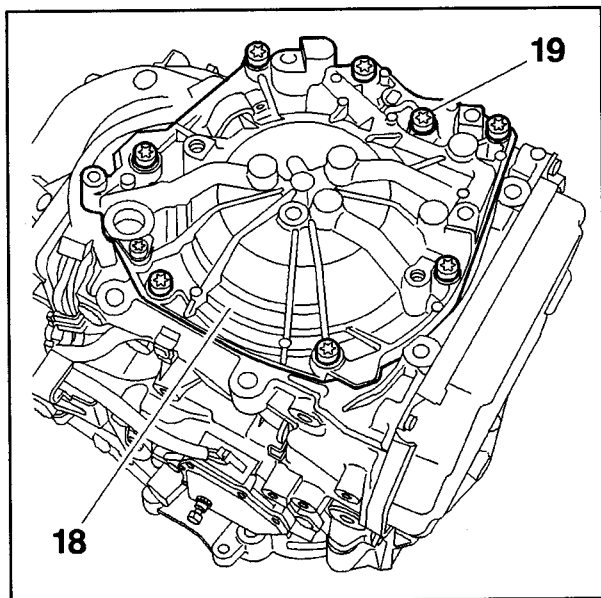


Fig : B2CP37YC

Fit :

- the casing (18)
- the screws (19) ; tighten to 3 m.daN

WARNING : Refit the rear casing carefully so as not to break the rings of the supply hub.

Remove tool [1].

IMPERATIVE : Check that the input shaft rotates freely.

3 – CHECKING THE CLEARANCE OF THE INPUT SHAFT

NOTE : This operation is performed after refitting the converter housing.

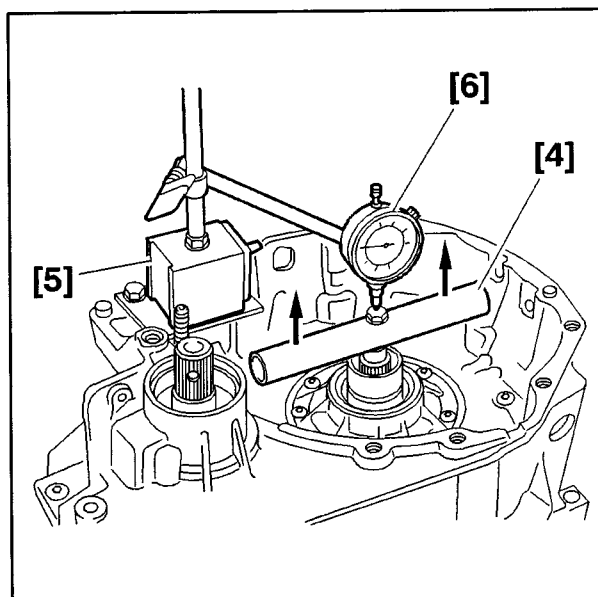


Fig : B2CP37ZC

Fit tools [4], [5] and [6].

NOTE : Place the magnetic support [5] on the gearbox support.

Secure the tool [4] to the input shaft using a bolt.

Calibrate the gauge [6] on the head of the mounting bolt of the tool [4].

Lift the input shaft energetically using the tool [4].

Read the gauge travel.

IMPERATIVE : The clearance should be between 0,20 and 0,45 mm (gauge travel).

IMPERATIVE : If the operating clearance is not correct, ensure that the parts have been correctly reassembled, otherwise change the adjusting shim (14).

Thickness of the available shims (mm) :

0,25	1,25	2,25
0,45	1,45	2,45
0,65	1,65	2,65
0,85	1,85	2,85
1	2	3

REFITTING : CONVERTER HOUSING SIDE

1 – RECOMMENDED TOOLS

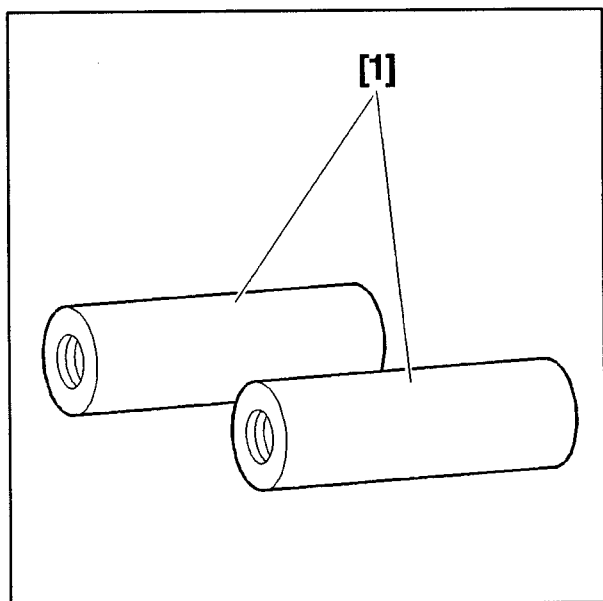


Fig : E5AP131C

[1] handles for removing-refitting the converter
(-).0338 B.

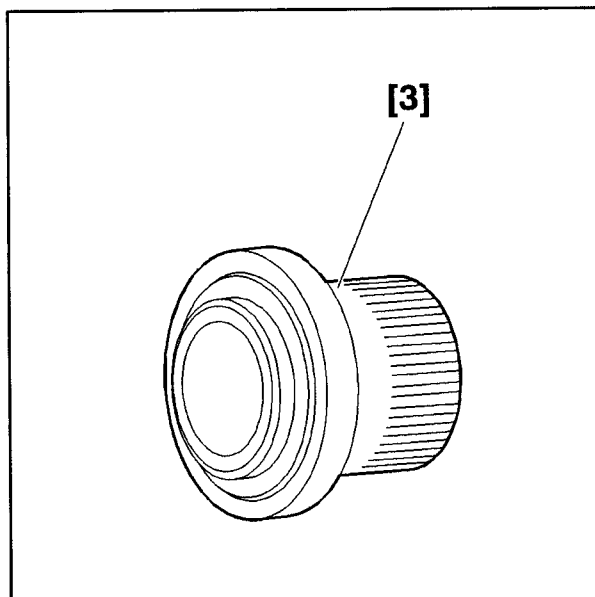


Fig : E5AP132C

[3] converter seal refitting tool (-).0338 F.

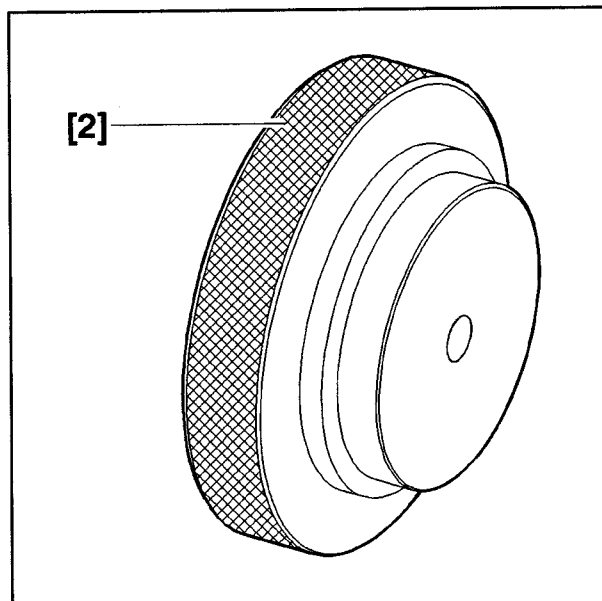


Fig : E5AP173C

[2] tool for fitting the left hand driveshaft deflector
seal (-).0342 C.

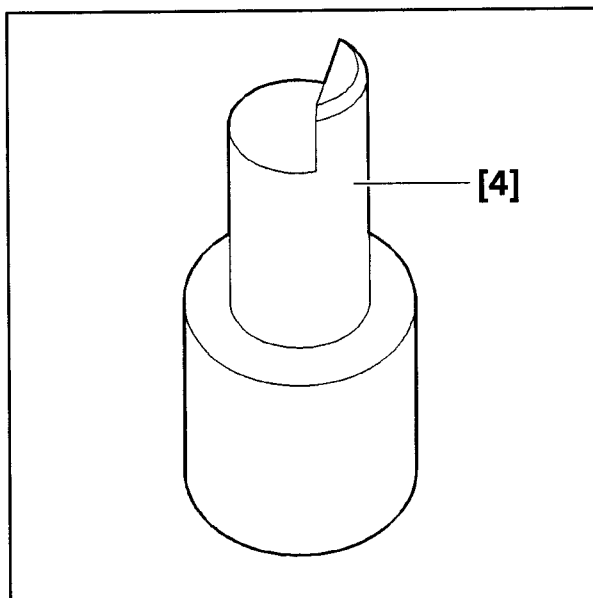


Fig : E5AP05NC

[4] converter retaining stop (-).0338 D.

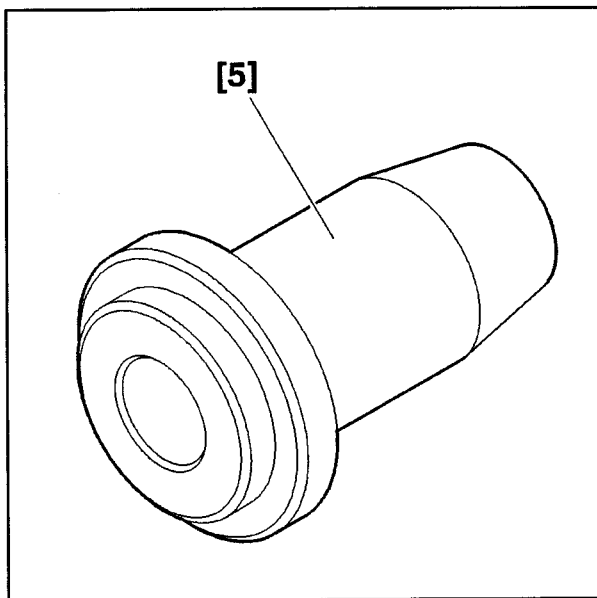


Fig : E5AP174C

[5] right hand driveshaft seal fitting drift (–).0338 J1.

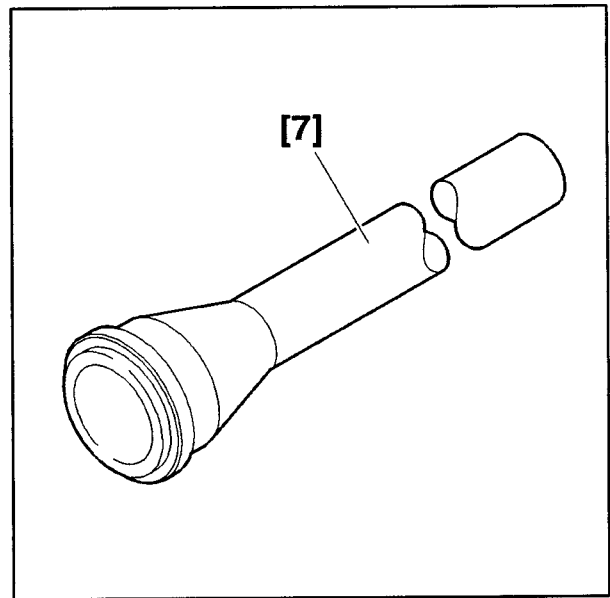


Fig : E5AP176C

[7] left hand driveshaft seal fitting drift (–).0338 H1.

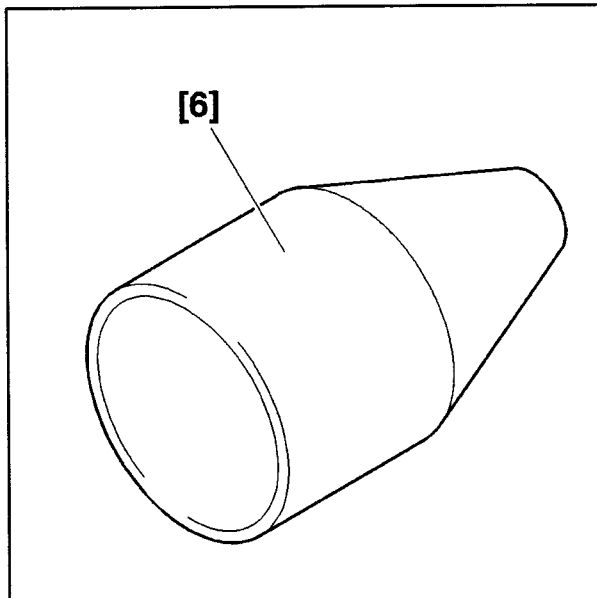


Fig : E5AP175C

[6] right hand driveshaft seal fitting guide (–).0338 J2.

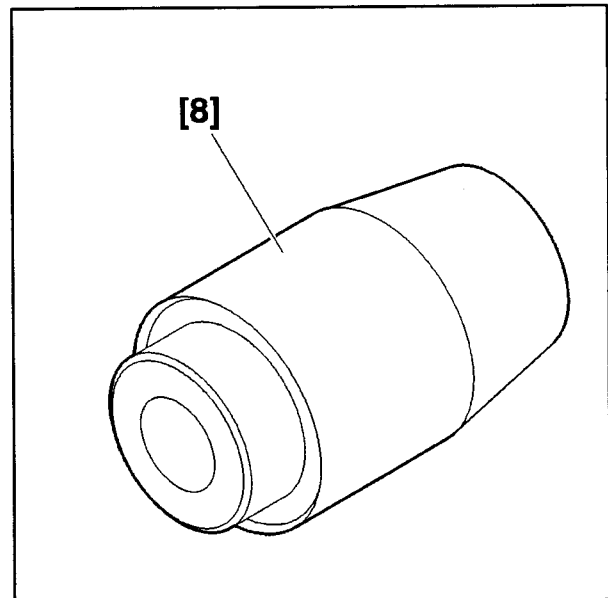


Fig : E5AP177C

[8] left hand driveshaft seal fitting guide (–).0338 H2.

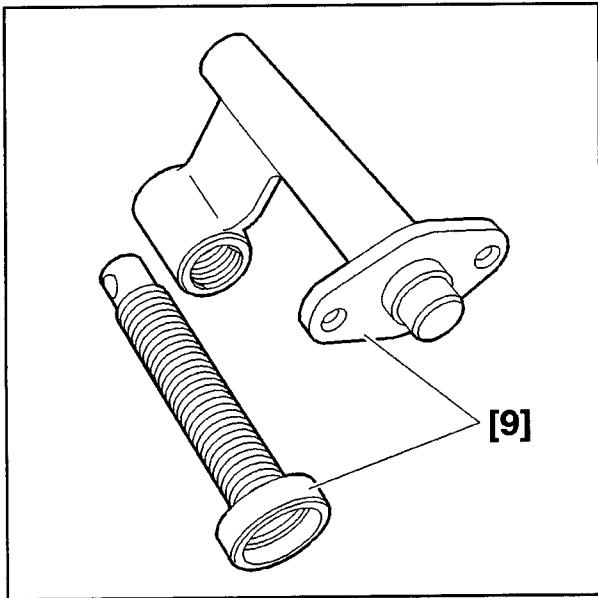


Fig : E5AP178C

[9] compression tool for removing-refitting circlips of brake F3. (-).0342 R.

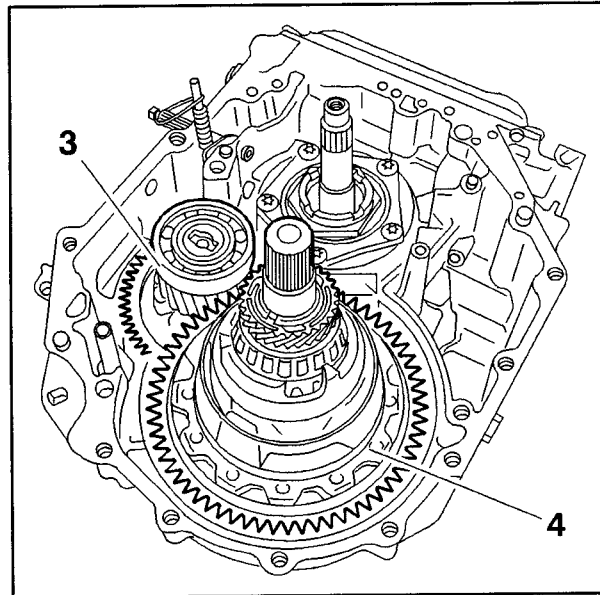


Fig : B2CP385C

Refit the secondary line (3) and the differential (4) simultaneously.

2 – REFITTING

2.1 – Differential and secondary line

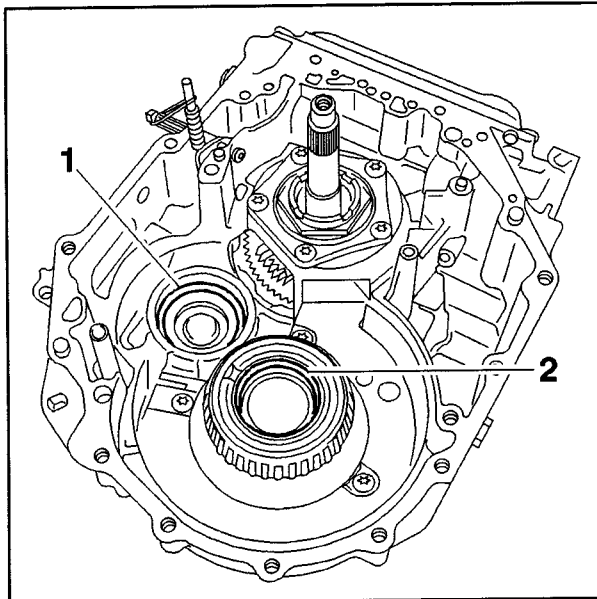


Fig : B2CP384C

Fit :

- the shim (1)
- the deflector seal (2) ; by means of tool [2]

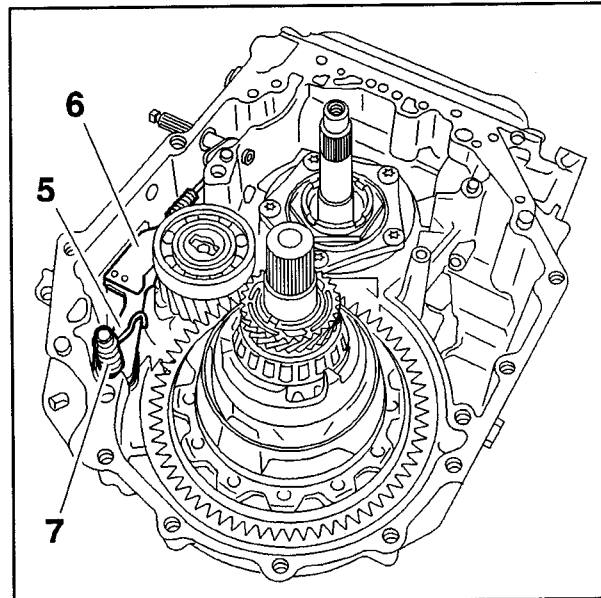


Fig : B2CP386C

Fit :

- the lever (6) by compressing the spring of the link then by pivoting it 1/4 turn
- the park finger (5)
- the spring (7)

2.3 – Band brake F3

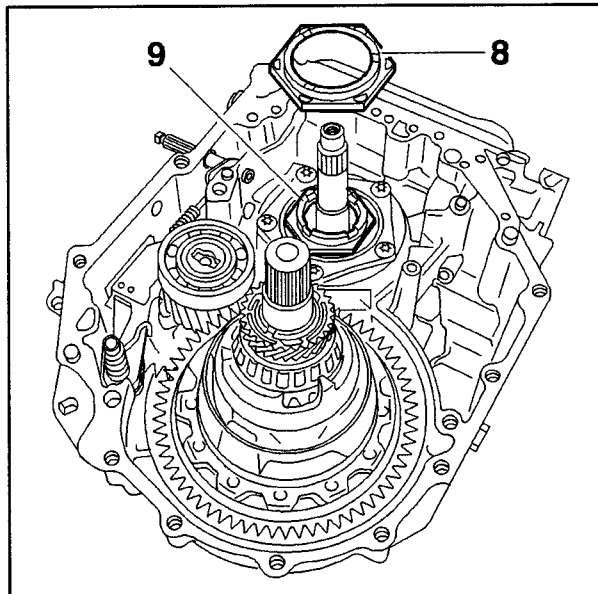


Fig : B2CP387C

Refit the friction washer (8) onto the epicyclic gear train mounting nut (9).

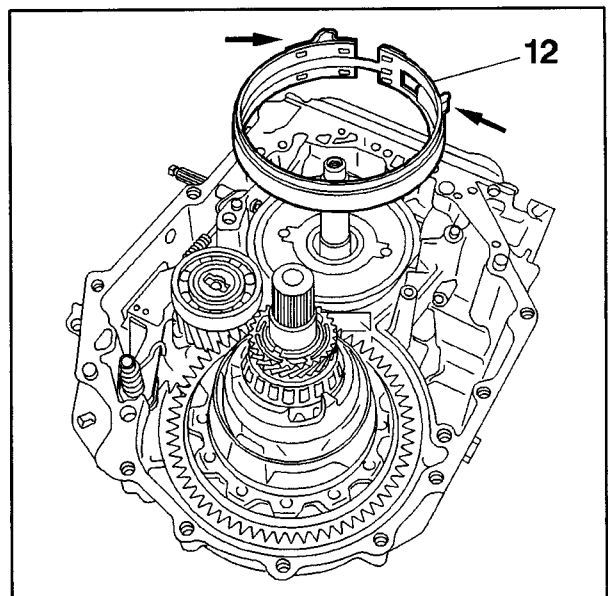


Fig : B2CP389C

Fit the band (12) of brake F3.

WARNING : Do not invert the bands of brakes F3 and F2.

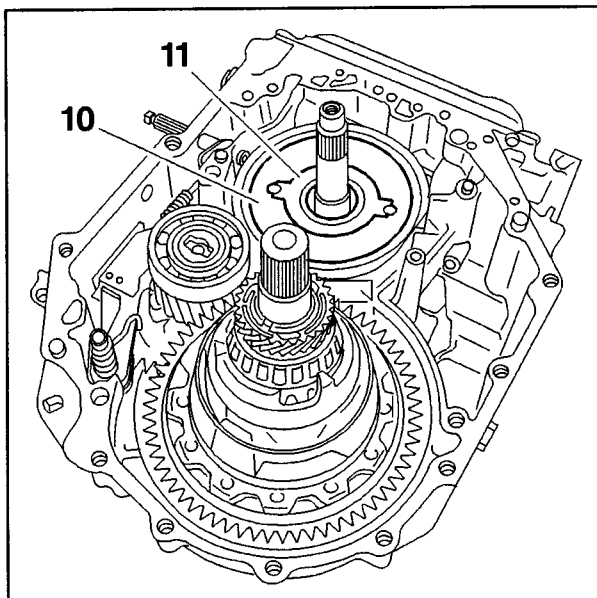


Fig : B2CP388C

Fit :

- the drum (10)
- the friction washer (11)

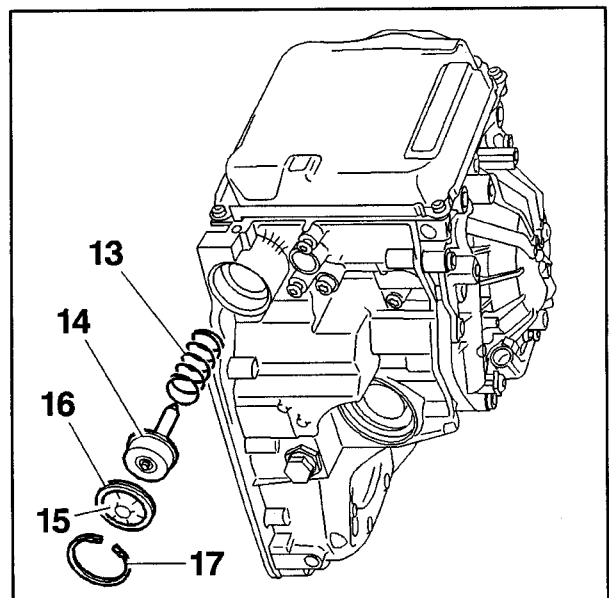


Fig : B2CP38AC

Fit :

- the spring (13)
- the piston (14)
- the cover (15) fitted with a new O-ring (16)

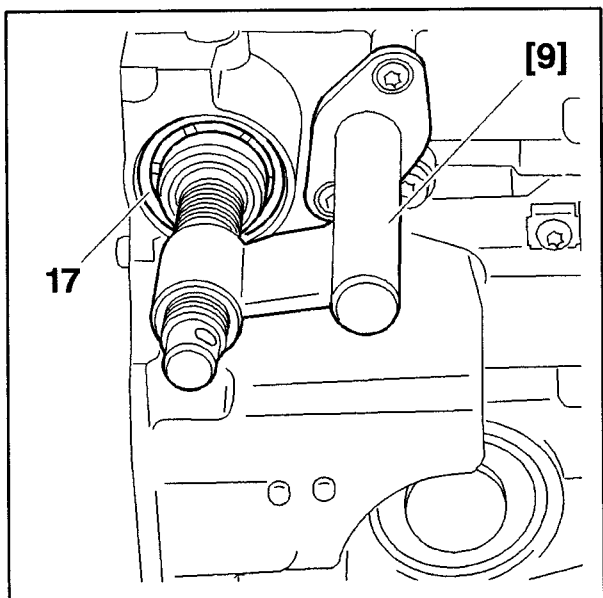


Fig : B2CP38BC

Compress the cover of the control piston (15) of brake F3 ; by means of tool [9].

Refit circlip (17).

Decompress and remove the tool [9].

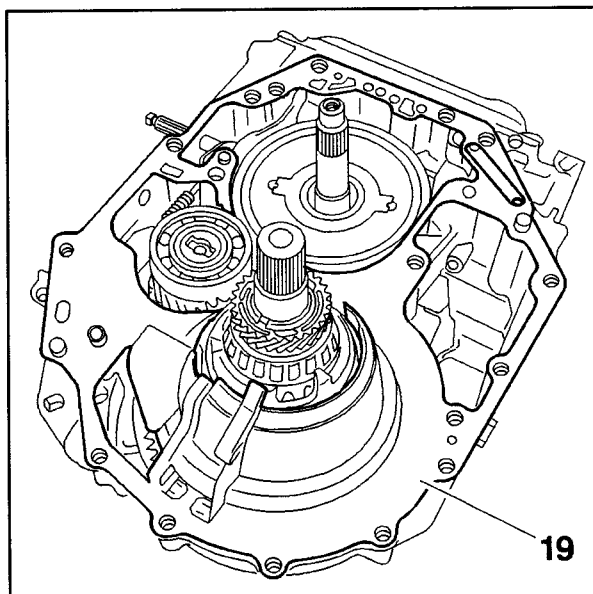


Fig : B2CP38DC

Refit the seal (19) (new).

2.4 – Oil pump

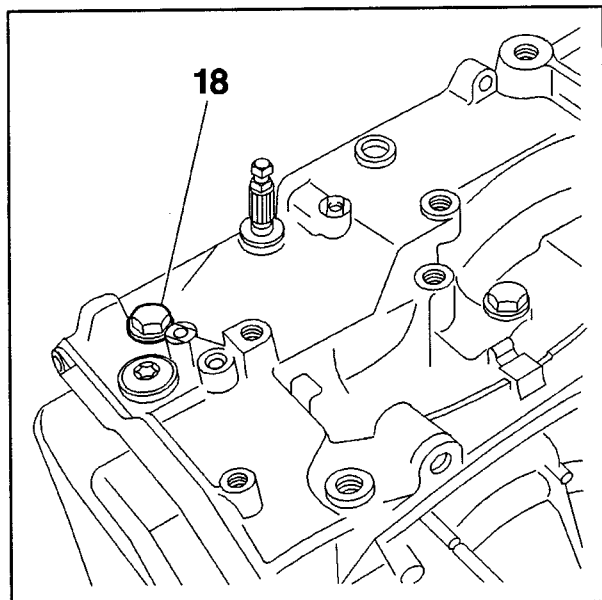


Fig : B2CP38CC

Tighten the screw (18) to 6,7 m.daN.

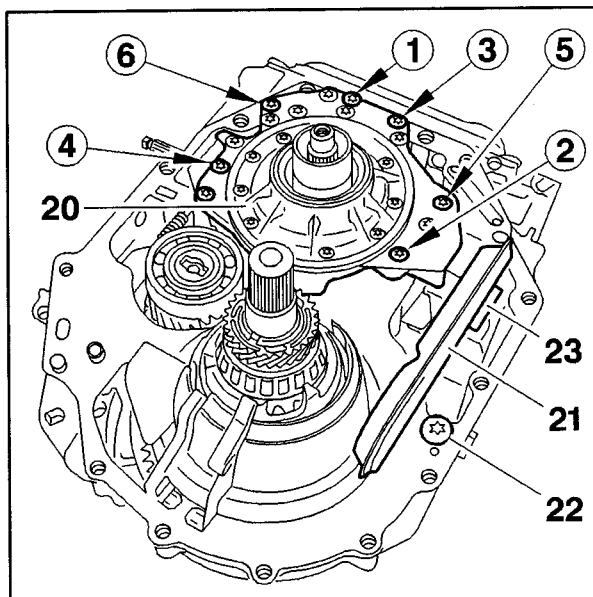


Fig : B2CP38EC

Fit :

- the oil pump (20)/strainer (21) assembly
- the 6 mounting screw of the oil pump (20)

Method of tightening the screws :

- pre-tighten to 0,5 mdaN (in order 1 to 6)
- tighten to 1 m.daN (in order 1 to 6)

Fit :

- the screw (22) ; tighten to 1,2 m.daN
- the magnet (23)

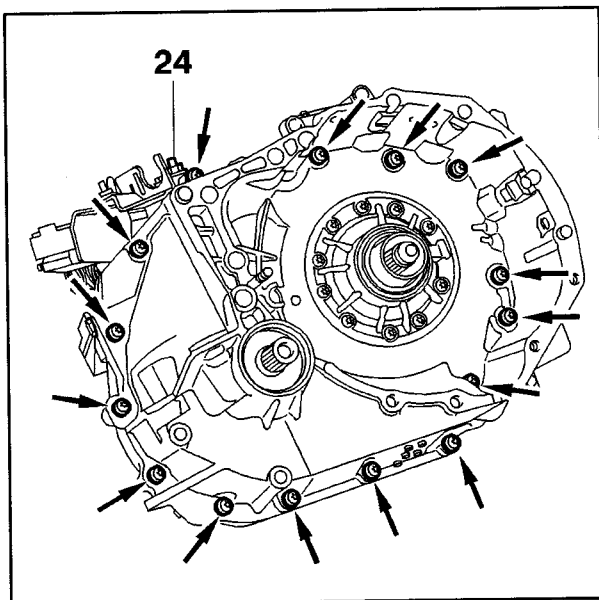


Fig : B2CP38FC

Fit :

- the converter housing ; tighten the 15 screws to 3 m.daN
- a new lip seal on the converter ; by means of tool [3]
- the breather pipe (24)

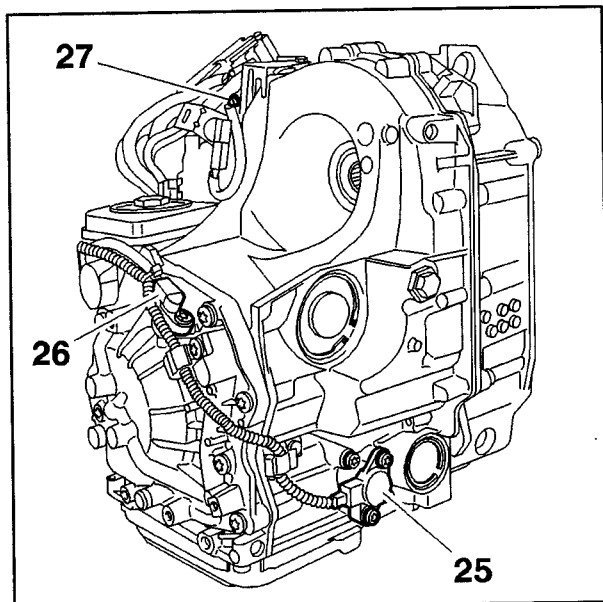


Fig : B2CP38GC

Fit :

- the oil pressure sensor (25) ; tighten the fixing screws to 0,8 mdaN
- the gearbox input speed sensor (26) ; tighten the fixing screw to 1 m.daN
- the output speed sensor (27) ; tighten the fixing screw to 1 m.daN

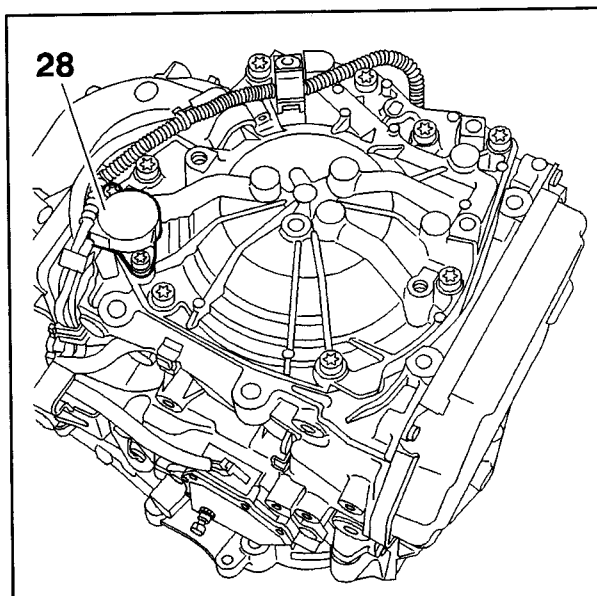


Fig : B2CP38HC

Refit the exchanger flow control electrovalve (28) ; tighten the screws bolts to 1 mdaN.

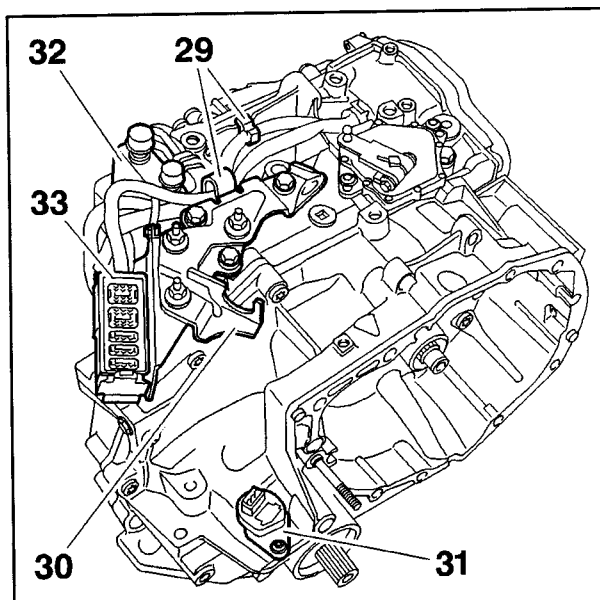


Fig : B2CP38JC

IMPERATIVE : Replace the heat exchanger if the gearbox oil is contaminated.

Fit :

- the wiring support (29)
- the support (30) of the modular connector
- the speedometer drive (31) (pinion + guide) ; tighten the fixing screw to 0,8 m.daN
- the heat exchanger (32) (equipped with new seals) ; tighten the fixing screw to 5 m.daN
- the modular connector (33)

Resecure the modular connector (33) onto the bracket (30).

Fit :

- a new lip seal on the right hand driveshaft output ; using the tools [5] and [6]
- a new lip seal on the left hand driveshaft output ; using the tools [7] and [8]
- a new O-ring on the right hand differential output

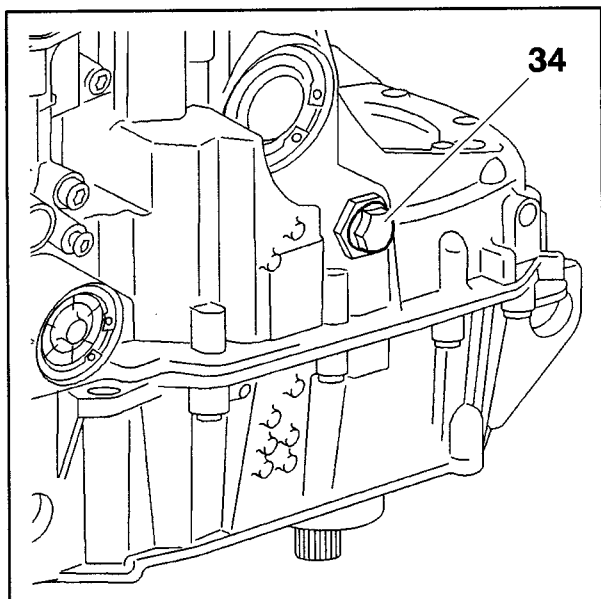


Fig : B2CP38KC

Refit the oil filler plug (34) with new seals ; tighten to 3,3 m.daN.

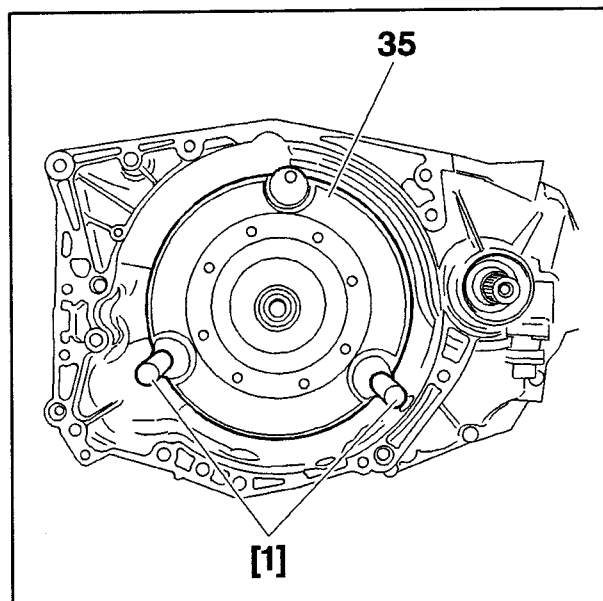


Fig : B2CP38LC

Using tools [1] ; refit the converter (35) by holding it along the axis of the input shaft and rotating it once.

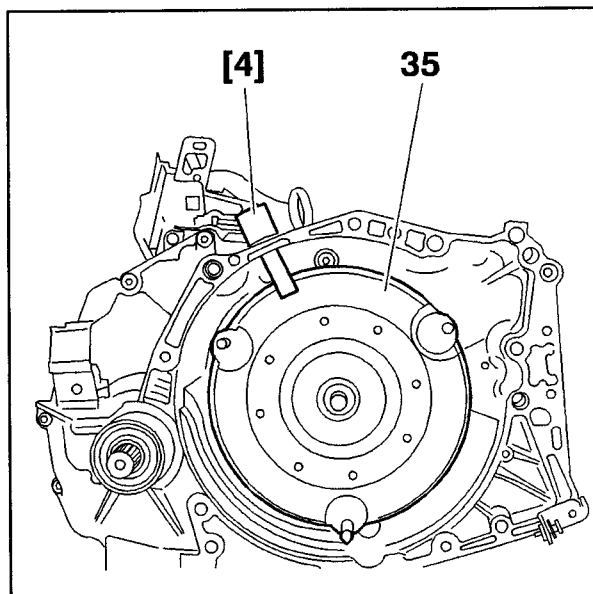


Fig : B2CP38MC

Check that the converter (35) has been correctly fitted ; by means of tool [4] (tool [4] is fitted into the hole for the engine speed sensor).

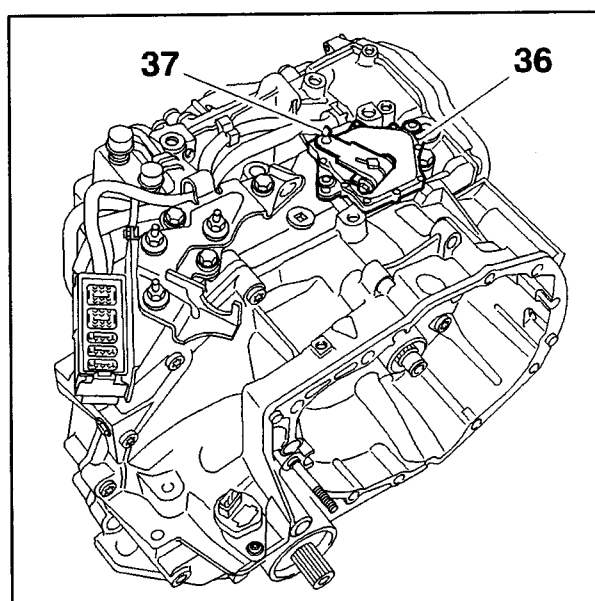


Fig : B2CP38NC

Refit the multifunction switch (36), without tightening the fixing screw.

Position the selector lever (37) in the neutral position.

Measure the resistance at the terminals of the multifunction switch (36).

Turn the multifunction switch (36) in one direction or the other, until a resistance of $\approx 0 \Omega$ is obtained at the switch terminals.

Tighten the screws of the multifunction switch (36) to 1 m.daN.

IMPERATIVE : After tightening the screws, ensure that the multifunction switch (36) is correctly adjusted.

OVERHAUL : HYDRAULIC VALVE BLOCK

1 - PRESENTATION

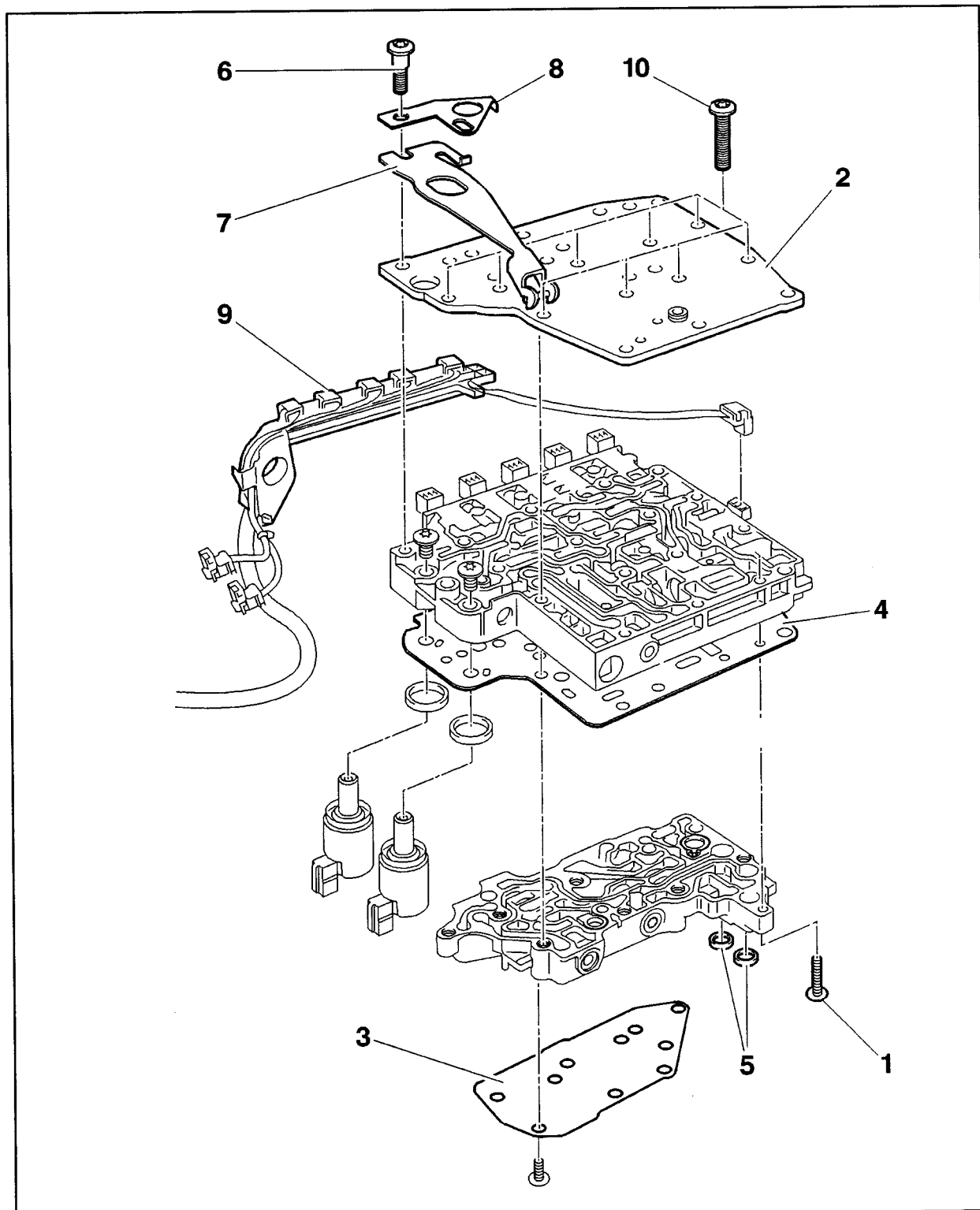


Fig : B2CP38PP

- | | |
|--|-------------------------|
| (1) auxiliary block securing screw. | (6) shouldered screw. |
| (2) main closing plate. | (7) roller blade. |
| (3) auxiliary closing plate. | (8) angle bracket. |
| (4) distribution plate. | (9) electrical harness. |
| (5) seals of the mechanism housing assembly. | (10) fixing screw. |

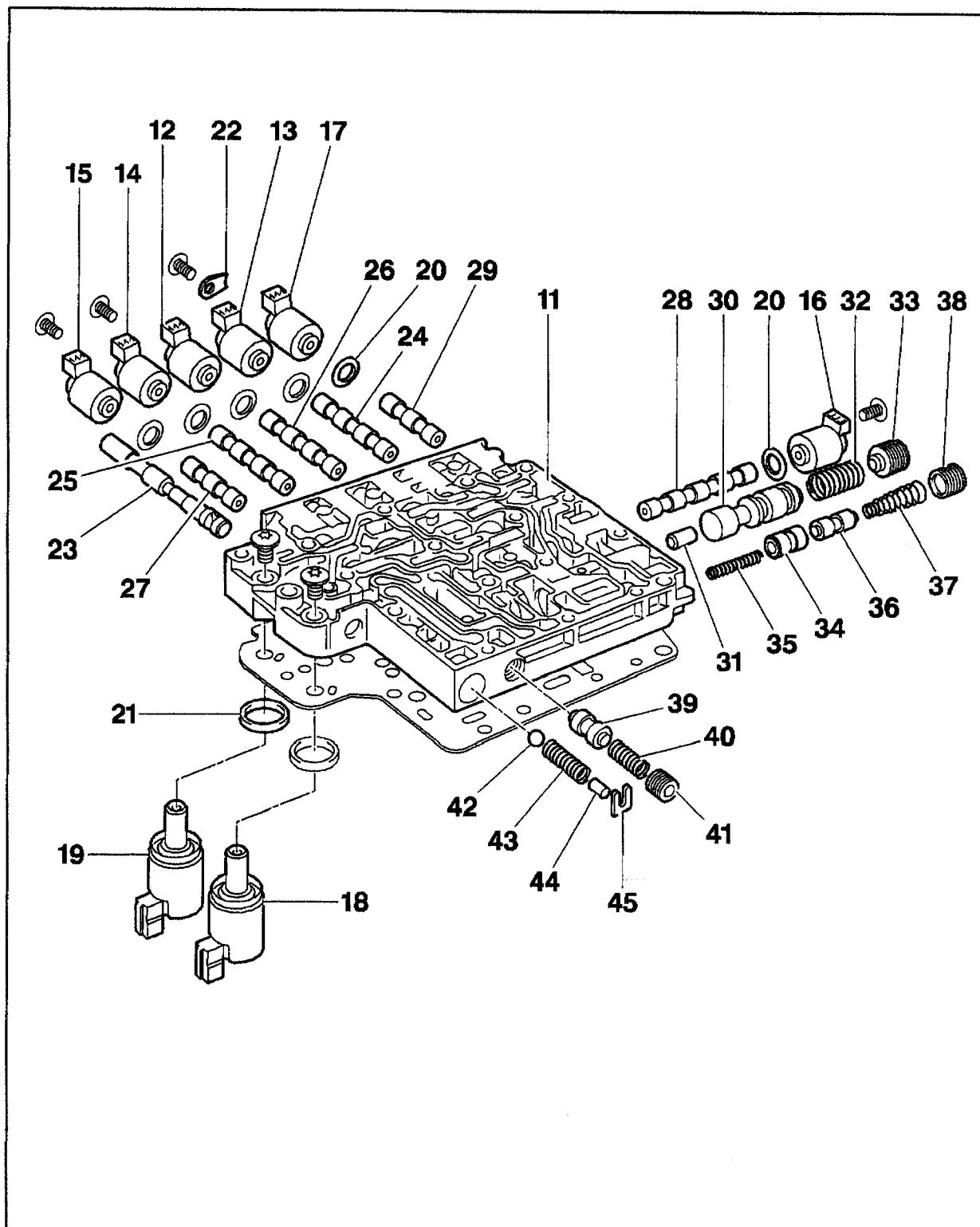


Fig : B2CP38QP

- (11) main hydraulic valve block.
- (12) sequence electrovalve N°1 (EVS1).
- (13) sequence electrovalve N°2 (EVS2).
- (14) sequence electrovalve N°3 (EVS3).
- (15) sequence electrovalve N°4 (EVS4).
- (16) sequence electrovalve N°5 (EVS5).
- (17) sequence electrovalve N°6 (EVS6).
- (18) main pressure modulation electrovalve (EVM).
- (19) converter pressure modulation electrovalve (EVLU).
- (20) O-ring seals (EVS).
- (21) O-ring seals (EVM and EVLU).
- (22) EVS n° 2 and 6 support plate.
- (23) manual valve (VM).
- (24) sequence valve N°2 (VS-E1).
- (25) sequence valve N°3 (VS-E2).
- (26) sequence valve N°1 (VS-F1).
- (27) sequence valve N°4 (VS-F3).
- (28) progression valve N°1 (VP-P).
- (29) progression valve N°2 (VP-Q).
- (30) pressure regulating valve (VRP).
- (31) pushrod of the pressure regulating valve.
- (32) spring of the pressure regulating valve.
- (33) adjusting plug of the pressure regulating valve.
- (34) pressure limiting valve (VL1).
- (35) spring of the pressure limiting valve VL1 (R1).
- (36) pressure limiting valve (VL2).
- (37) spring of the pressure limiting valve VL2 (R2).
- (38) adjusting plug for valve VL1/VL2.
- (39) pressure limiting valve (VL3).
- (40) spring of the pressure limiting valve VL3 (R3).
- (41) adjusting plug for valve VL3.
- (42) ball of the safety valve.
- (43) spring of the safety valve.
- (44) piston of the safety valve.
- (45) clip of the safety valve.

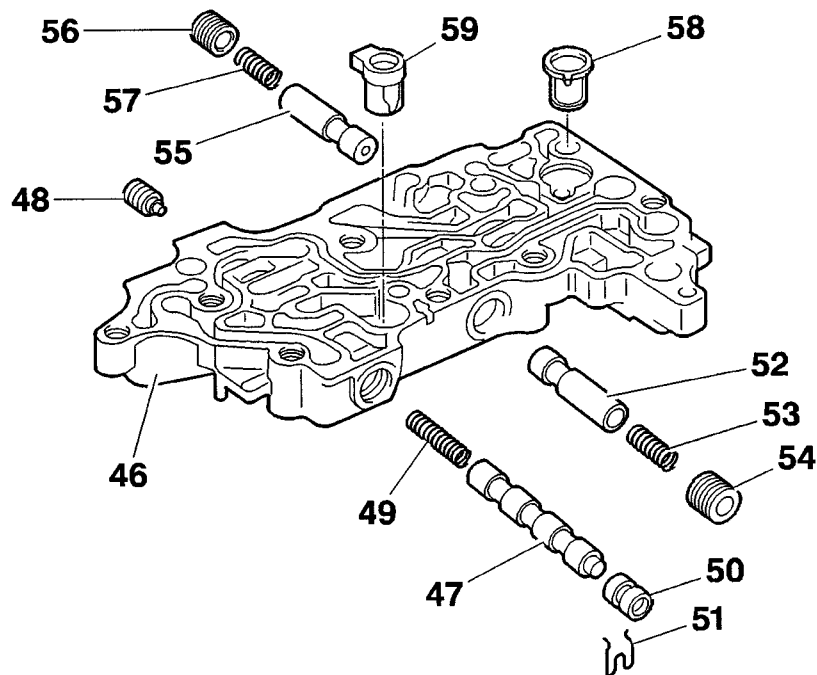


Fig : B2CP38RD

- (46) auxiliary hydraulic valve block.
- (47) converter lock-up control valve (VCPC).
- (48) adjuster cap of the converter lock-up control valve .
- (49) spring of the converter lock-up control valve .
- (50) closure cap of the converter lock-up control valve.
- (51) blank retaining clip.
- (52) converter lock-up regulating valve.
- (53) spring of the converter lock-up regulating valve.
- (54) adjusting plug of the converter lock-up regulating valve.
- (55) valve for declutch regulation when stationary (not available at present).
- (56) adjusting plug of the valve for declutch regulation when stationary.
- (57) spring of the valve for declutch regulation when stationary.
- (58) control circuit filter.
- (59) converter anti-drain valve.

Identical parts :

- valves (24), (25) and (26)
- valves (27) and (29)
- valves (36) and (39)
- plugs (54) and (56)

NOTE : The blank (50) and the valves (24) to (29) and (36) to (39) can be fitted in any direction.

Different parts :

- springs (40) and (43)
- valves (52) and (55)

WARNING : The plug (41) is different to plugs (54) and (56).

2 – CROSS SECTIONS

2.1 – Main hydraulic valve block

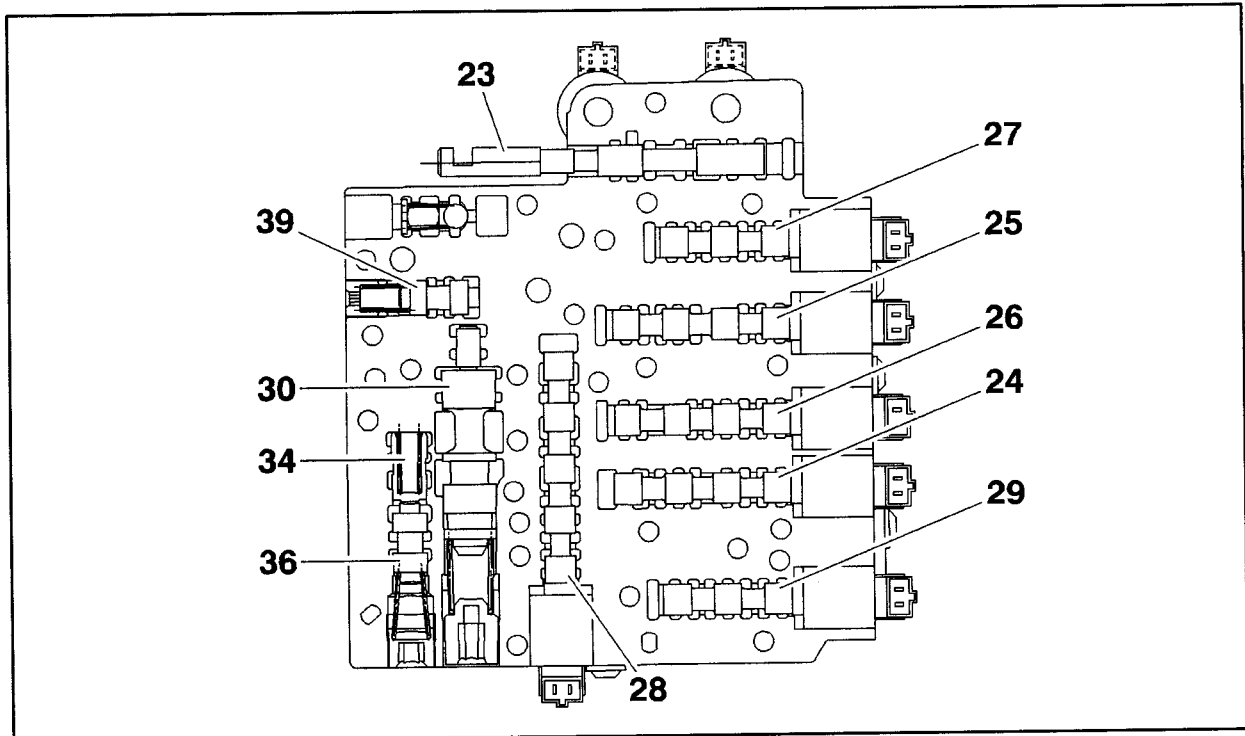


Fig : B2CP38SD

- (23) manual valve.
- (24) sequence valve N°2 (VS-E1).
- (25) sequence valve N°3 (VS-E2).
- (26) sequence valve N°1 (VS-F1).
- (27) sequence valve N°4 (VS-F3).
- (28) progression valve N°1 (VP-P).
- (29) progression valve N°2 (VP-Q).
- (30) pressure regulating valve.
- (34) pressure limiting valve (VL1).
- (36) pressure limiting valve (VL2).
- (39) pressure limiting valve (VL3).

2.2 – Auxiliary hydraulic valve block

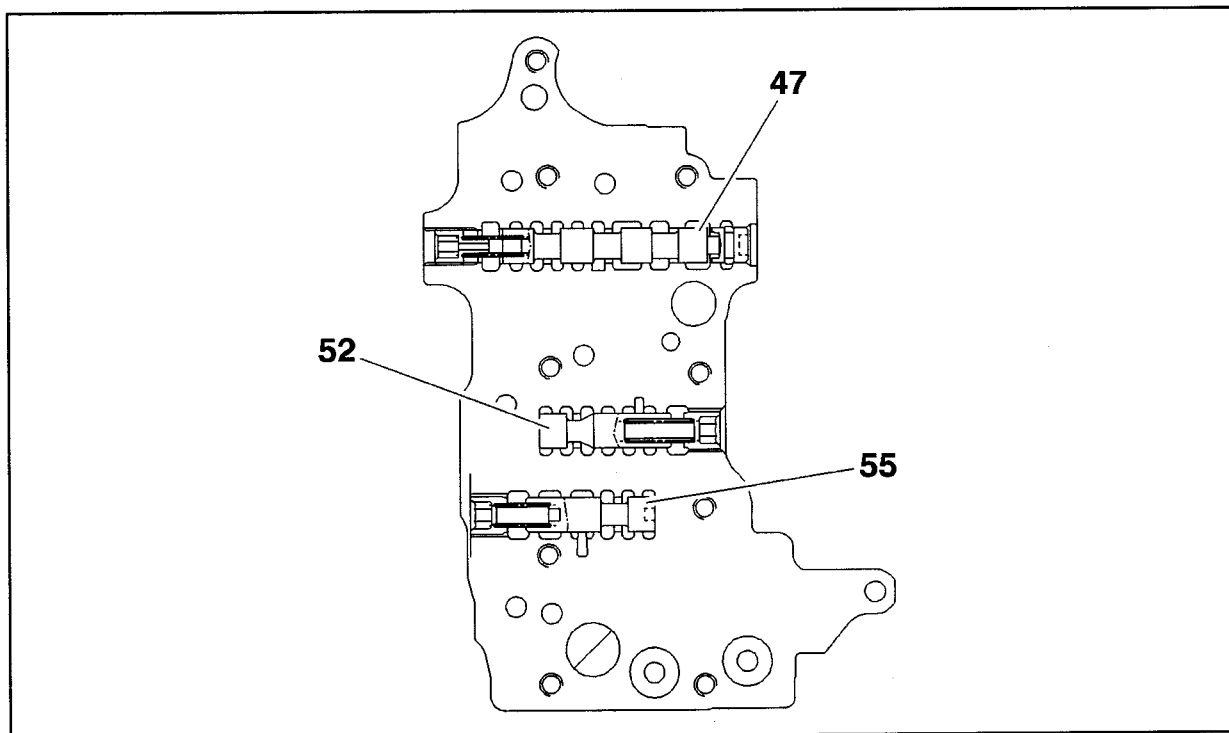


Fig : B2CP38TD

(47) converter lock-up control valve (VCPC).

(52) converter lock-up regulating valve.

(55) valve for declutch regulation when stationary (not available at present).

3 – SPRING IDENTIFICATION

Reference	Application	Length (free spring)	Outside diameter
(32)	Spring of the pressure regulating valve	28,1 mm	13,9 mm
(35)	Spring of the pressure limiting valve VL1 (R1)	33,7 mm	6,1 mm
(37)	Spring of the pressure limiting valve VL2 (R2)	36,8 mm	11,9 to 6,1 mm (tapered)
(40)	Spring of the pressure limiting valve VL3 (R3)	23,6 mm	8,5 mm
(43)	Spring of the safety valve	28,7 mm	7,7 mm
(49)	Spring of the converter lock-up valve	18,3 mm	5,5 mm
(53)	Spring of the converter lock-up regulating valve	26,8 mm	6,2 mm
(57)	Spring of the valve for declutch regulation when stationary	15,1 mm	6 mm

4 – REMOVING THE HYDRAULIC VALVE BLOCK

IMPERATIVE : Refer to the operating procedure on the following pages before dismantling.

4.1 – Recommended tools

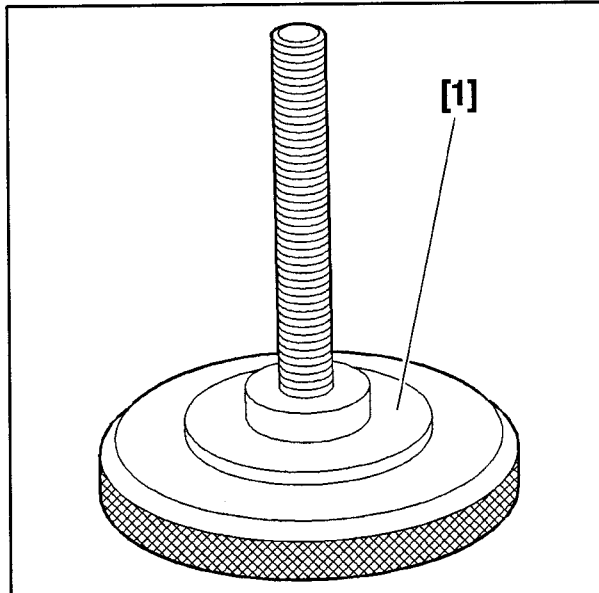


Fig : E5AP179C

[1] tool for adjusting the ball blade (–).0342 D.

4.2 – Removing

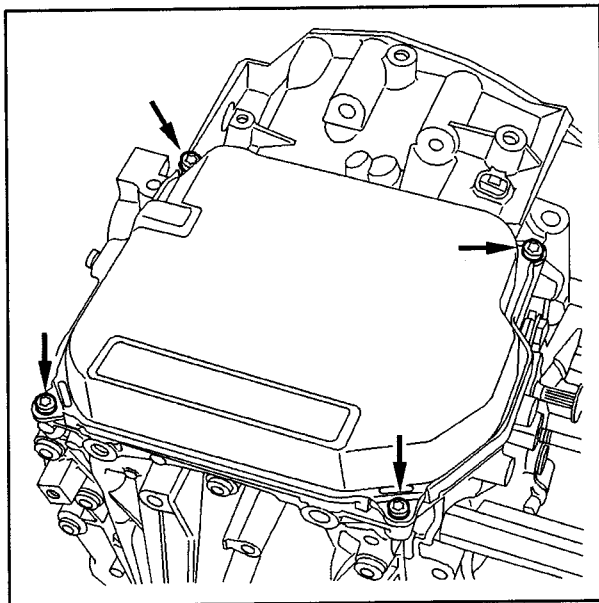


Fig : B2CP38UC

Remove the 4 mounting bolts from the hydraulic valve block housing.

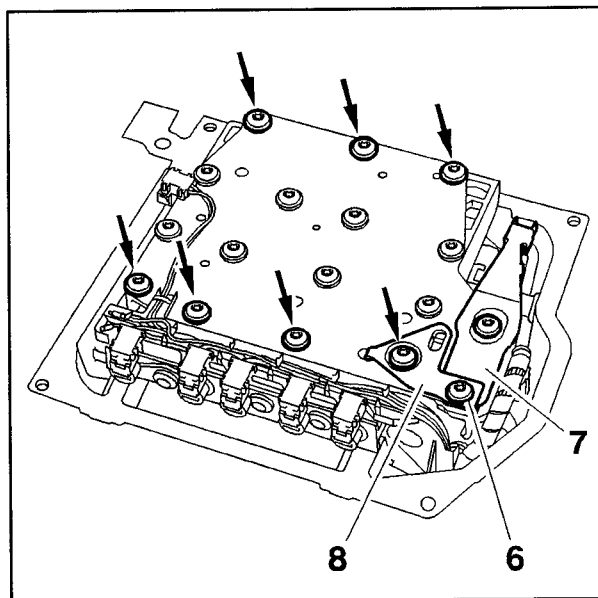


Fig : B2CP38VC

Remove :

- the screw (6)
- the bracket (8)
- the roller blade (7)
- the 7 mounting screws from the hydraulic valve block on the mechanism housing

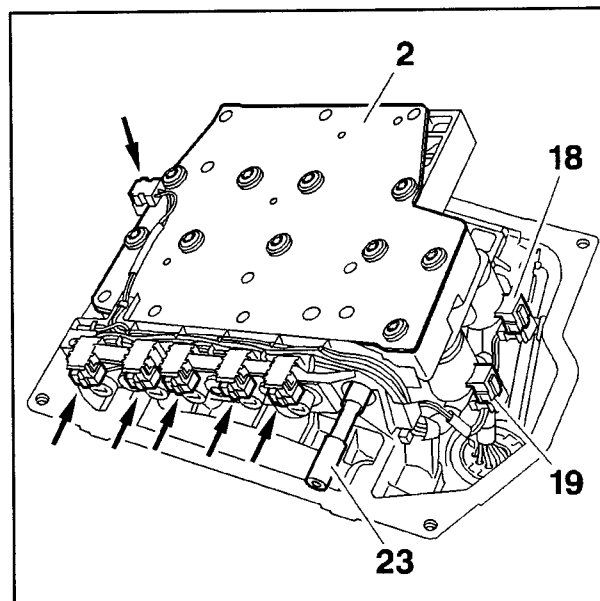


Fig : B2CP38WC

Tip the hydraulic valve block.

Remove the manual valve (23).

Disconnect the 8 electrovalves.

WARNING : Mark the connectors of the modulating electrovalves (18) and (19).

Remove the hydraulic valve block.

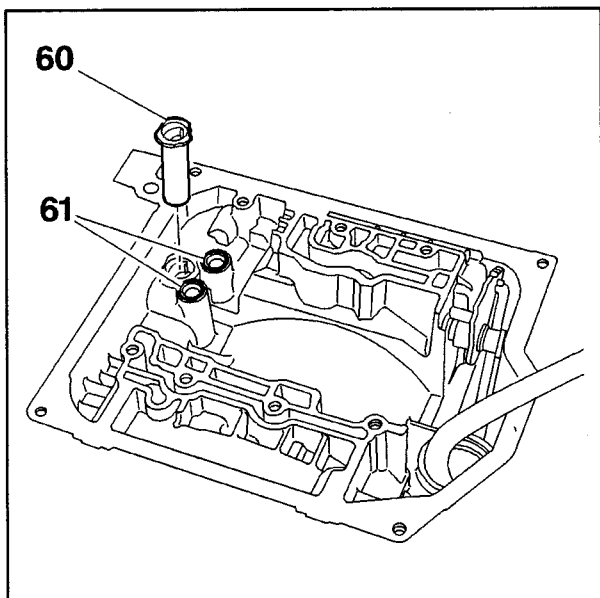


Fig : B2CP38XC

Remove :

- the thermostatic valve (60)
- the O-ring seals (61)

5 – DISMANTLING THE HYDRAULIC VALVE BLOCK

NOTE : The references are those used in the section presenting the hydraulic valve block.

Remove the 9 screws (10).

Remove the main closing plate (2) from the hydraulic valve block.

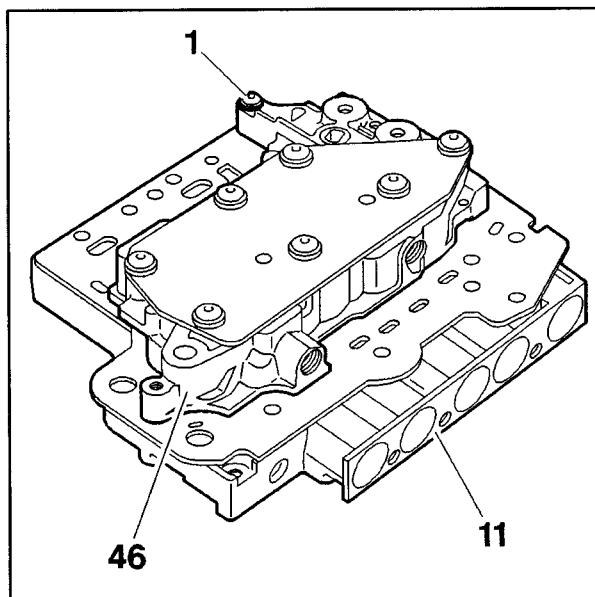


Fig : B2CP38YC

Remove the screw (1).

Separate the auxiliary distributor (46) from the main distributor (11).

Remove :

- the main pressure modulating electrovalve (18)
- the converter pressure variable electrovalve (19)
- the sequence electrovalves (12) to (17)
- the hydraulic progression valves (28) and (29)
- the sequence valves (24) to (27)

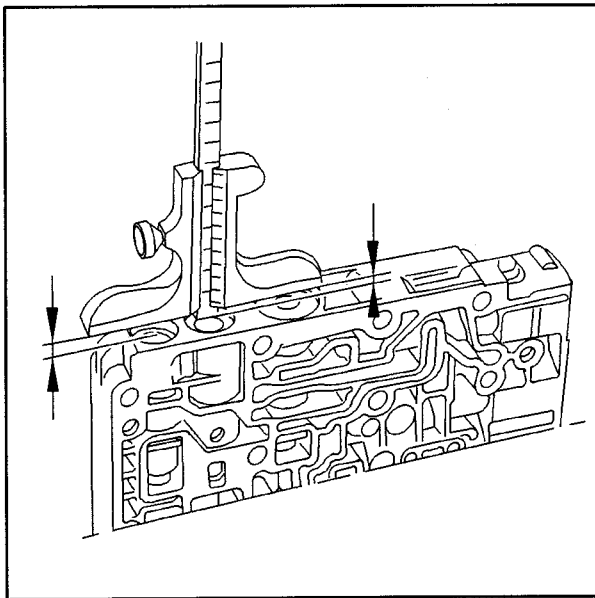


Fig : B2CP38ZC

Mark the position of the plugs :

- make a mark on the body of the hydraulic valve block opposite the existing mark on the plug
- measure how much each plug protrudes or is recessed ; using a depth gauge
- unscrew the plugs counting the number of turns used

Define the position of the following components :

- plug (33)
- plug (38)
- plug (41)

Remove :

- spring (32)
- valve (30)
- plunger 31
- spring (37)
- valve (36)
- valve (34)
- spring (35)
- spring (40)
- valve (39)
- clip (45)
- piston (44)
- spring (43)
- ball bearing (42)

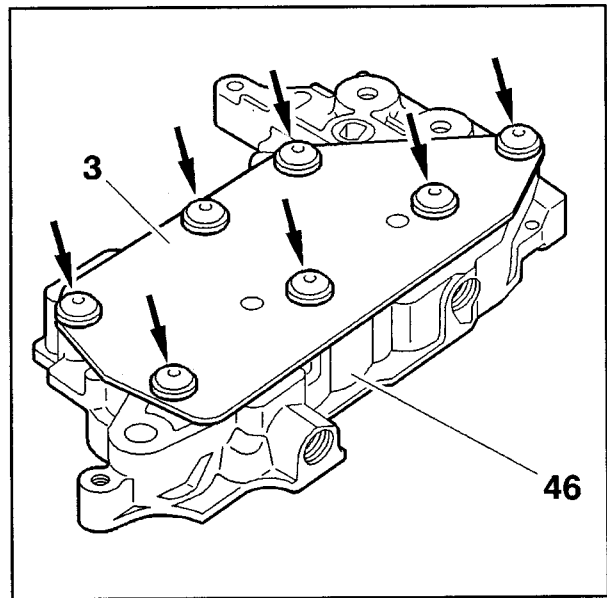


Fig : B2CP390C

Remove :

- the cover plate (3)
- the anti-drain plug (59)
- the filter (58)
- the clip (51)
- the blank (50)
- the valve (47)
- the spring (49)

WARNING : Do not remove the plug (48).

Define the position of the following components :

- plug (54)
- plug (56)

Remove :

- spring (53)
- valve (52)
- spring (57)
- valve (55)

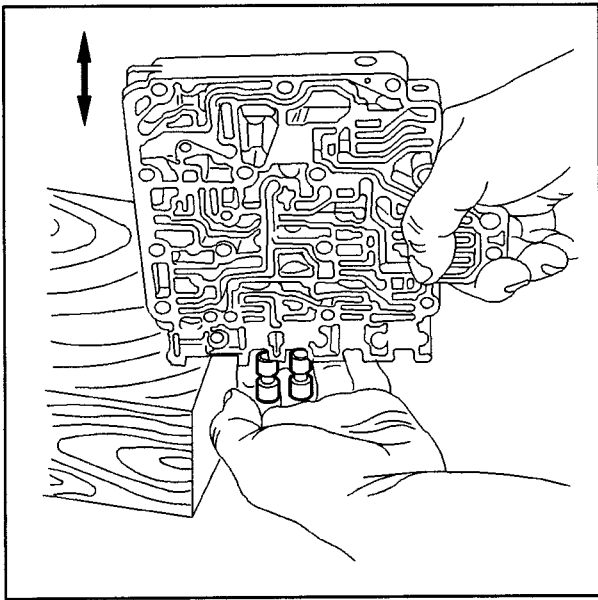


Fig : B2CP391C

IMPERATIVE : Never use metal objects to remove a jammed valve. Gently tap the body of the distributor on a wooden block.

6 – REASSEMBLING THE HYDRAULIC VALVE BLOCK

IMPERATIVE : Clean all the parts using the recommended product.

IMPERATIVE : Carefully blow the components clean with compressed air.

IMPERATIVE : Check that each valve moves freely in its housing.

IMPERATIVE : Systematically change the plugs (33), (38), (41), (54) and (56).

NOTE : To locate the springs, refer to the spring identification chart (chapter 3).

WARNING : The valves (23), (30), (34), (47), (52) and (55) must be fitted in the correct direction (see section on "cross sections" for reassembly).

WARNING : The valves (52) and (55) are the same – do not invert when reassembling.

IMPERATIVE : Adjust the plugs (33), (38), (41), (54) and (56) complying with the reference marks made when dismantling.

NOTE : The measured dimensions are not adjustment figures, they are only used to give an approximate position (to within one turn, pitch of 1 mm). Only aligning the reference marks ensures the plugs are correctly refitted.

Fit :

- the anti-drain plug (59)
- the filter (58) (new)

Assemble the main distributor (11) with the distribution plate (4) and the auxiliary distributor (46) ; using the screw (1) (without tightening).

Refit electrovalves (18) and (19) with new seals (21). Do not tighten the screws and direct the connections towards the outside.

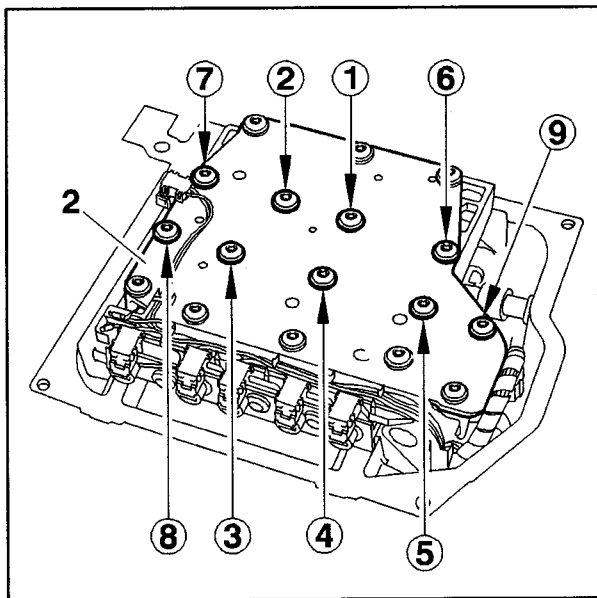


Fig : B2CP392C

Refit the closing plate (2).

Tighten :

- the screws (10) to 0,75 m.daN (in the order shown)
- the screw (1) to 0,75 m.daN
- the screws of electrovalves (18) and (19) to 0,9 m.daN

Refit electrovalves (12) and (17) with new seals (20).

Direct the connectors towards the closing plate (2) and tighten the screws to 0,9 m.daN.

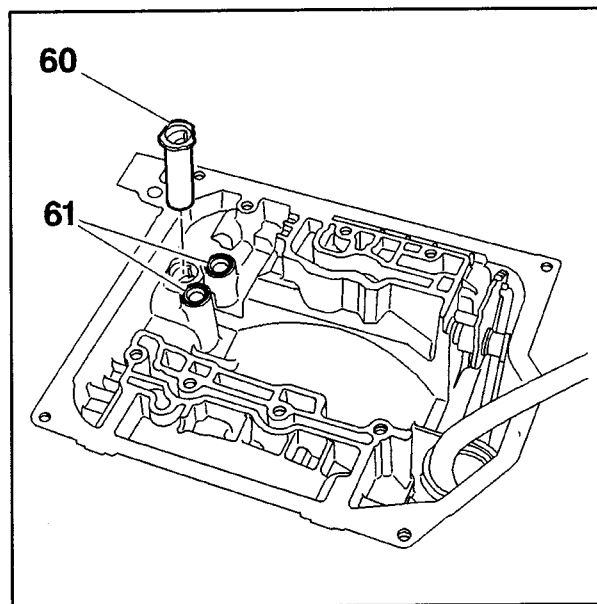


Fig : B2CP38XC

Fit :

- the thermostatic valve (60)
- the seals (61) (new)

7 – REFITTING THE HYDRAULIC VALVE BLOCK

Reconnect, without inverting, the connectors of electrovalves (18) and (19).

Refit the hydraulic valve block.

WARNING : Align the manual valve (23) with the axis of the toothed sector.

WARNING : Do not pinch the electrovalve harness under the hydraulic valve block.

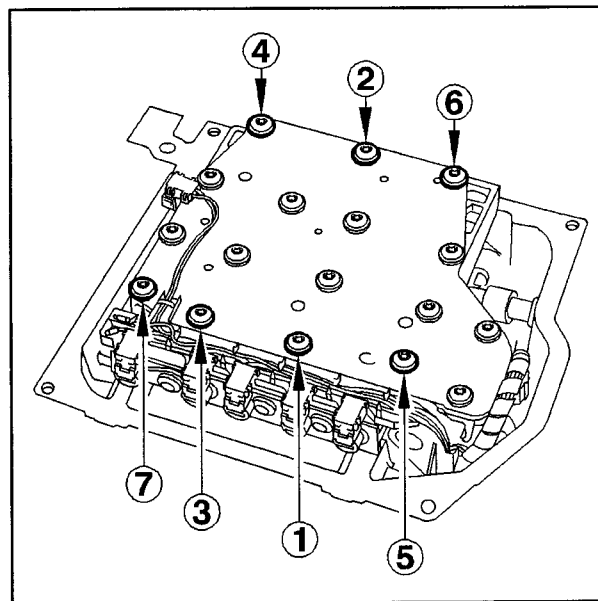


Fig : B2CP393C

Centre the hydraulic valve block using the screws (4) and (5).

Refit the hydraulic valve block mounting screws.

Method of tightening the screws (in the order shown) :

- pre-tighten to 0,9 mdaN
- loosen the 7 screws
- tighten to 0,75 m.daN

8 – ADJUSTING THE INTERNAL SELECTOR CONTROL (ROLLER BLADE)

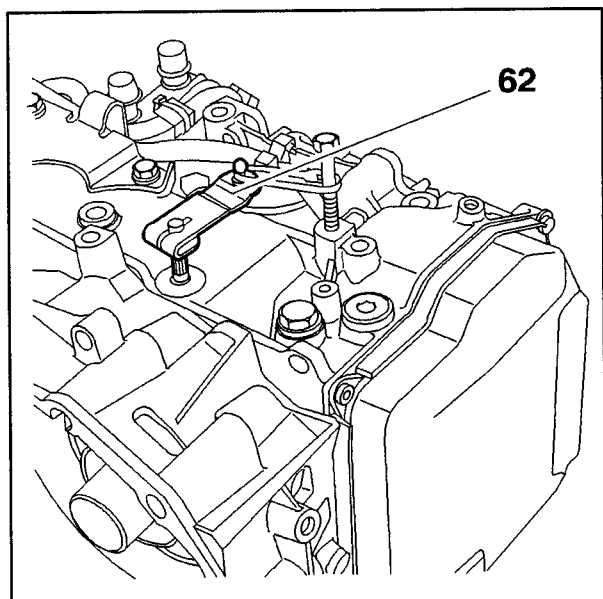


Fig : B2CP394C

Hold the selector lever (62) in position 2. Slacken screw (6).

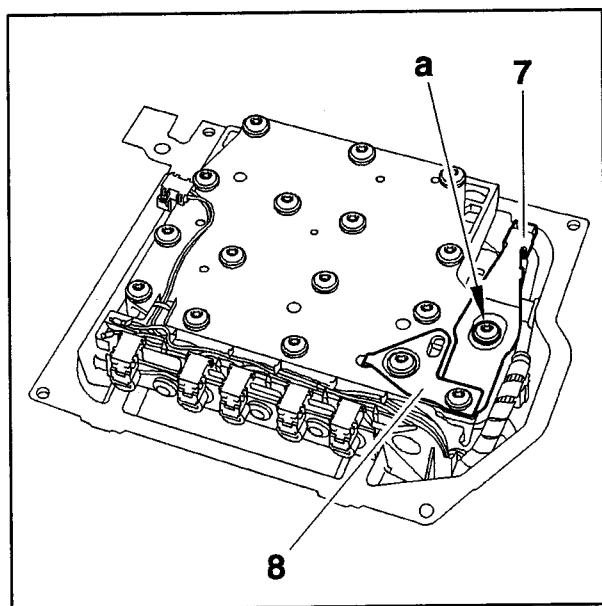


Fig : B2CP395C

Remove the screw at "a".

Fit the roller blade (7) and its bracket (8) by placing the ball roller in the hollow part of the toothed quadrant (corresponding to position 2).

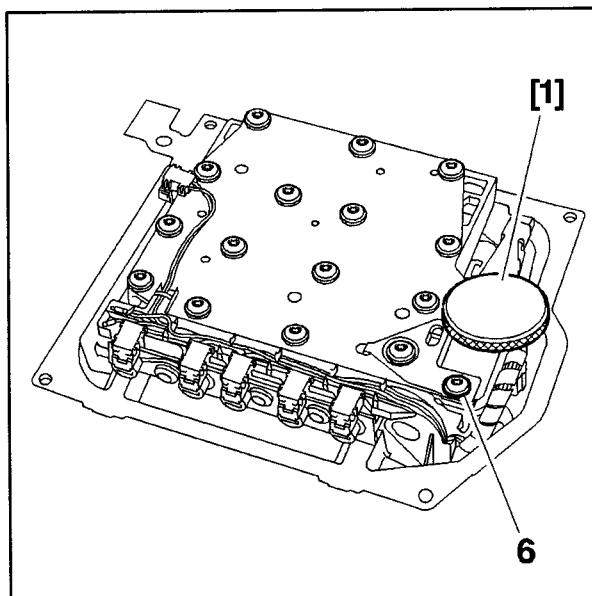


Fig : B2CP396C

Fit tool [1] with its block, and tighten to maximum.

Ensure blade (7) and lever (62) are positively held in position 2.

Tighten the screw (6) to 0,9 m.daN.

Remove tool [1].

Refit the screws at "a". Tighten to 0,75 m.daN.

IMPORTANT : Ensure that the internal selector control operates without any play (if not, repeat above steps).

Refit the housing of the hydraulic valve block along with a new seal.

Tighten the 4 screws to 0,9 m.daN.

7 – REFITTING THE HYDRAULIC VALVE BLOCK

Reconnect, without inverting, the connectors of electrovalves (18) and (19).

Refit the hydraulic valve block.

