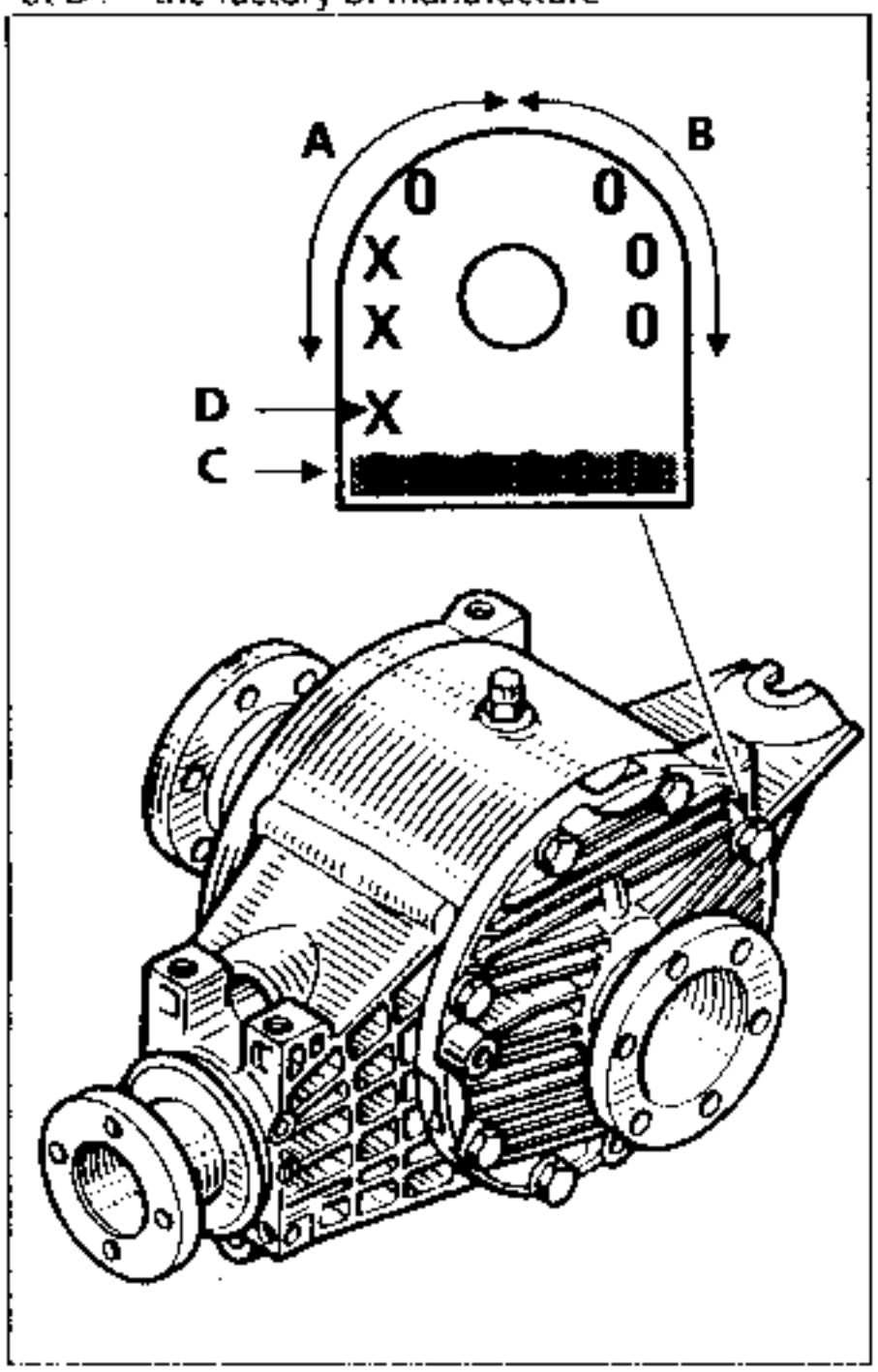
Rear axle differential OT1 is fitted to the following vehicles:
- TRAFIC rear wheel drive and 4x4.

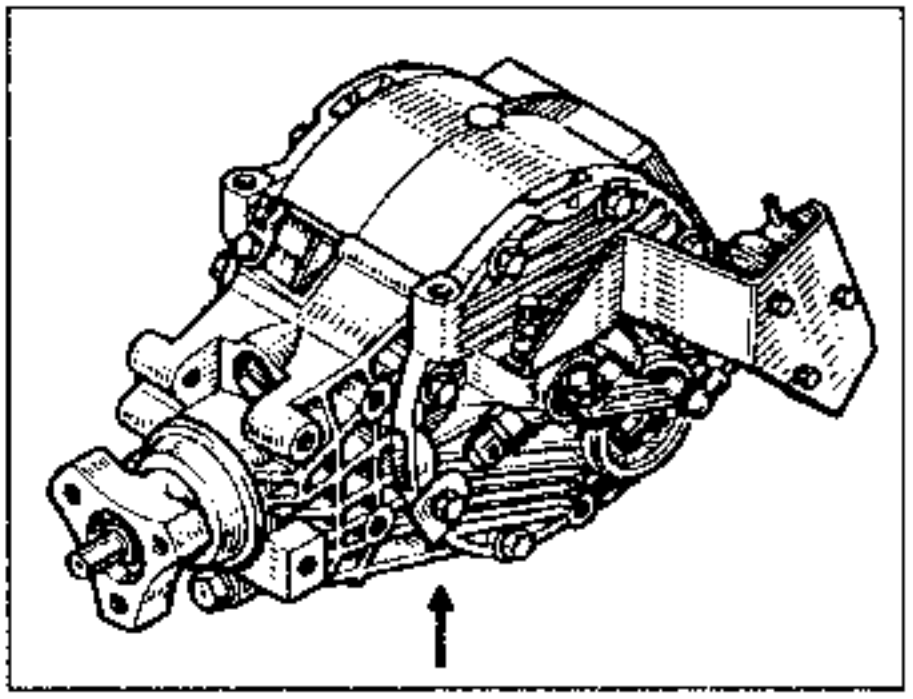
Rear axle differential OT2 is fitted to the following vehicles:
- B, L and K48 4x4
- Espace 4x4
- Safrane 4x4

A plate mounted on the diff case breather (OT1) or on the left-hand flange (OT2) indicates:

at A : axle type
at B : axle suffix
at C : the fabrication number
at D : the factory of manufacture



X 48



SAFRANE

Renault 21 and Safrane 4x4 :

Dog clutch: The differential is locked by a pneumatic control.
Dog clutch with front lobe sliding into the side of sun wheel splines.
Embedding with bevel gear dogs.
Controlled by a fork screwed on to the shaft, actuated by a vacuum capsule.

MAIN CHARACTERISTICS OF DIFFERENTIAL OT2 ON THE SAFRANE

Hanging rear axle with filter block mountings.

Bevel gear drive.

Equipped with an electronic wheel speed sensor.

Differential lock (via electro-pneumatic control).

Drive shaft outputs :
- Transverse: GI 720 (Glaenzer-spicer).
- Longitudinal: LOBRO VL 93 seal.

Mounting:
- 2 points on the side of the cradle or by two symmetrical bracket arms.
- 1 rear mounting point.

Lubrication :
- By oil splashing.

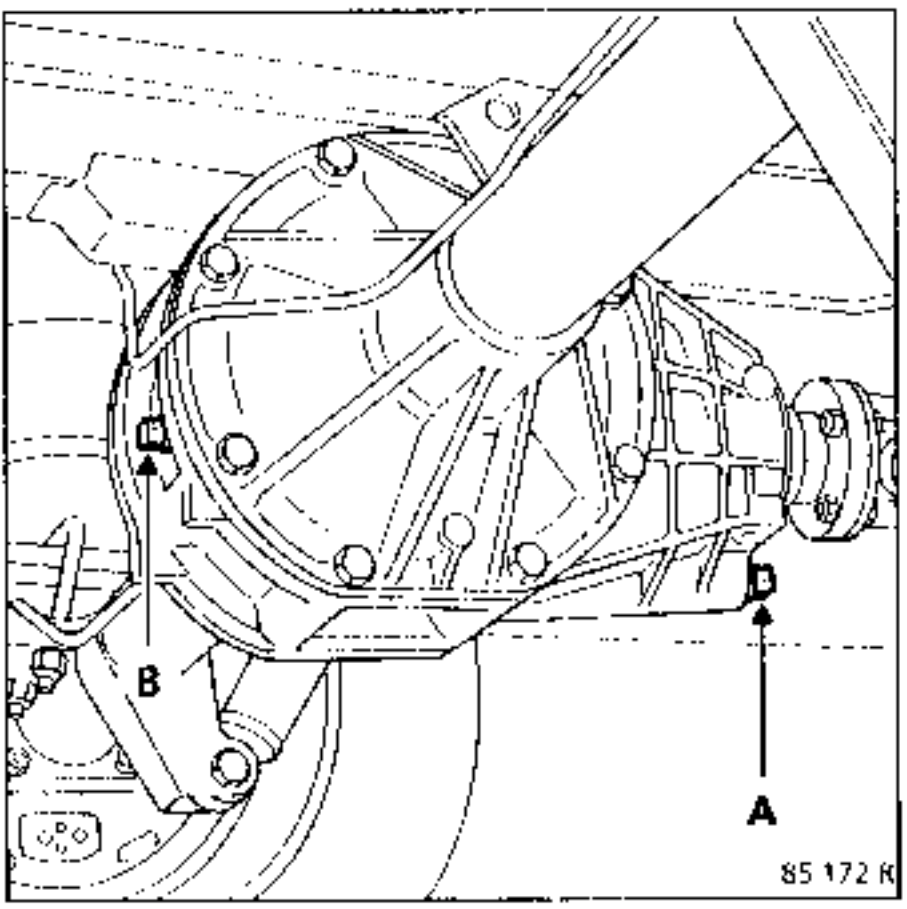
External structure
Aluminium final drive centre casing, cast under pressure.
Aluminium final drive side covers, cast under pressure.

Internal structure
Differential casing with two planet wheels, containing the electronic wheel speed sensor (SAFRANE).
Bevel gear aligned centrally with housing (192 mm diameter).
Differential assembly mounted on tapered bearings with shims for gear backlash.
Final drive pinion fitted on preloaded tapered roller bearings.
Pinion protrusion adjusted by shims under the final drive pinion head.
Hollow sun wheels.

FINAL DRIVE OT 1

Capacity : 1.3 litres

Drain the final drive via plug (A).
Top it up and check the level via plug (B).

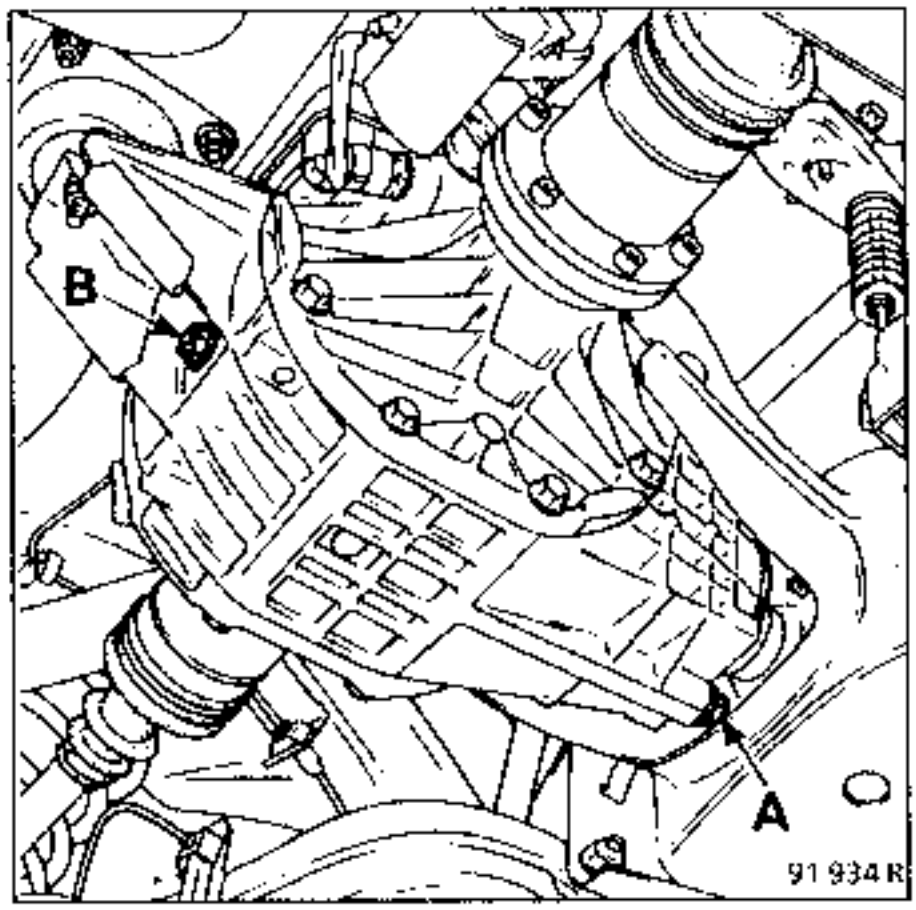


FINAL DRIVE OT2

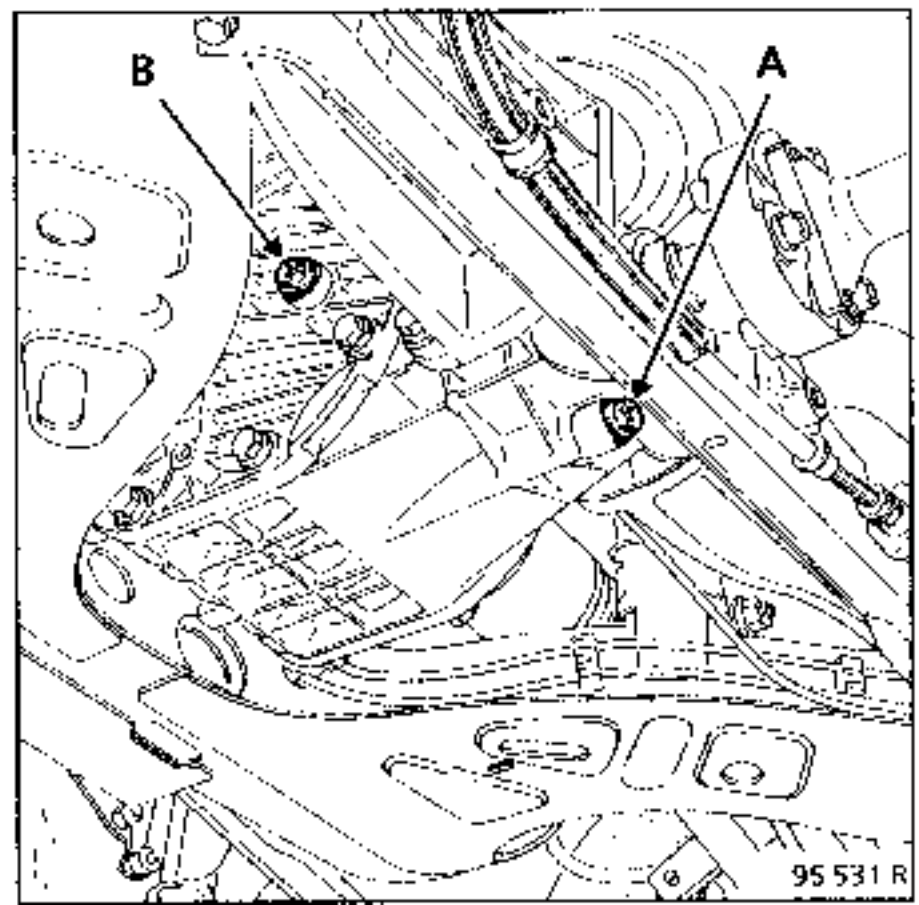
VEHICLE	CAPACITY (in litres)
X 48	1.3
Espace	1.2
Safrane	1.1

The final drive is drained via plug (A).
It is topped up and checked via plug (B).

X 48 - Espace



Safrane



SPECIAL PRECAUTIONS

TRANSELF TRX is a high technology oil product which requires certain precautions to be observed, in order to avoid water entering the oil which, even in small quantities, damages the oil and locks the final drive.
When topping up the level in the gear box, never add any other type of oil to TRX.

STORAGE AND USE

Any can which is opened must be carefully sealed to avoid water or any foreign bodies entering the oil.

In particular:

1) The cans must be stored in a sheltered place (away from rain, snow or where water may be splashed) .

2) If oil is taken with a syringe, the can must be sealed after use.

3) Never leave cans near a washing area.

4) Never siphon oil into larger containers.

PRESSURE WASHING

1) On the vehicle:
   Block the gearbox breather pipe

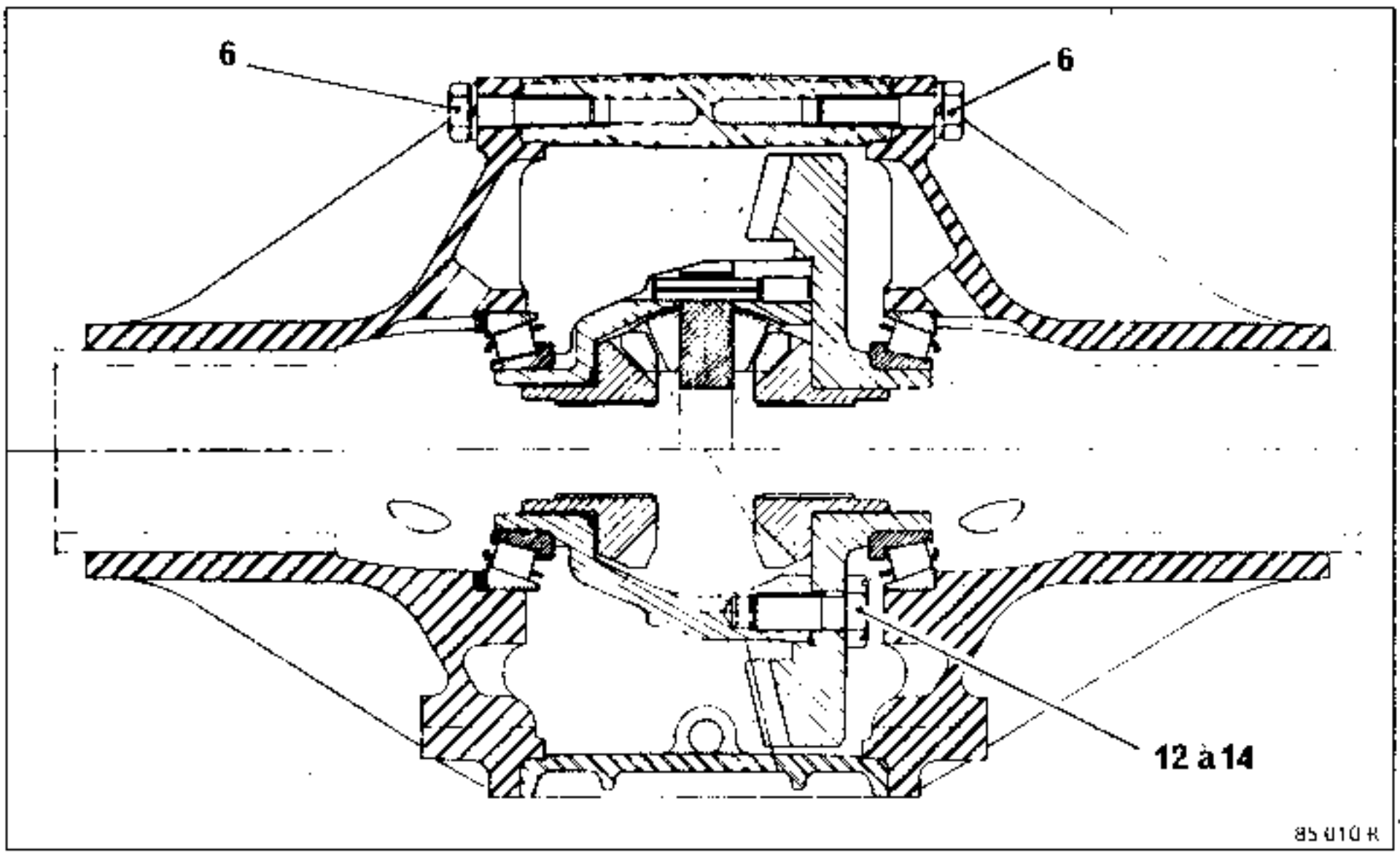
2) Final drive removed
   Block all openings carefully to avoid water entering the final drive.

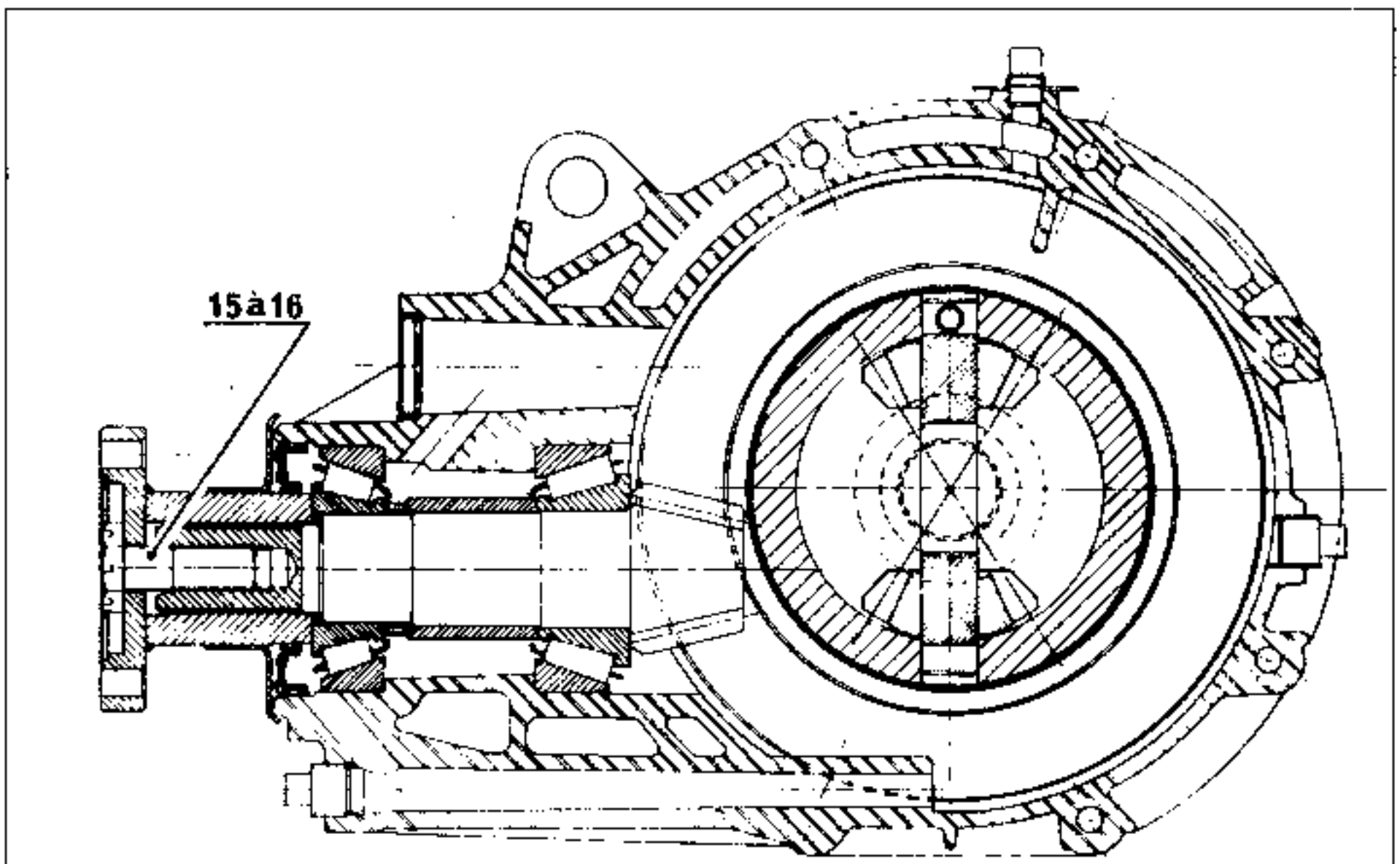
Suffix	Vehicle	Crown wheel and pinion	No. of planet wheels
000 021	Pxx0	7 x 41	2
003 035	Pxx2 Pxx4	8 x 39	4
004 022	Pxx1 Pxx3	8 x 41	2
005 007	Pxx2 Pxx4		4
006 020 023 027 031	Pxx1 Pxx3 Pxx4 Vxx1 Vxx3	7 x 41	4
025 030 037	Pxx2 Vxx3 Vxx2	7 x 38	4
026 034	Pxx1 Pxx3 Pxx8	7 x 43	4
028 032	Pxx1 Vxx1 Pxx3 Vxx3	7 x 41	4
038	Vxx2 Vxx3 VxxA VxxB Vxx4	9 x 53	4
039	Pxx2 Pxx3	7 x 43	4

SUFFIX	VEHICLES 4x4	CROWN WHEEL AND PINION	PINION PROTRUSION
000	K 48 3 K 48 6 K 48 K K 48 V	9 x 31	Not adjustable
010	J 116 J 117	9 x 34	Not adjustable
011	J 116 J 117	9 x 34	Adjustable
022	B 48 R B/L48 Y	9 x 37	Adjustable
023	L 48 5 L 48 L K 48 3 K 48 6 K 48 K	11 x 38	Adjustable
025	K 48 3 K 48 6 K 48 K K 48 V	11 x 38	Adjustable
040	B 54 4	11 x 40	Adjustable

DIFFERENTIAL OT 1 (2 planetary gears)

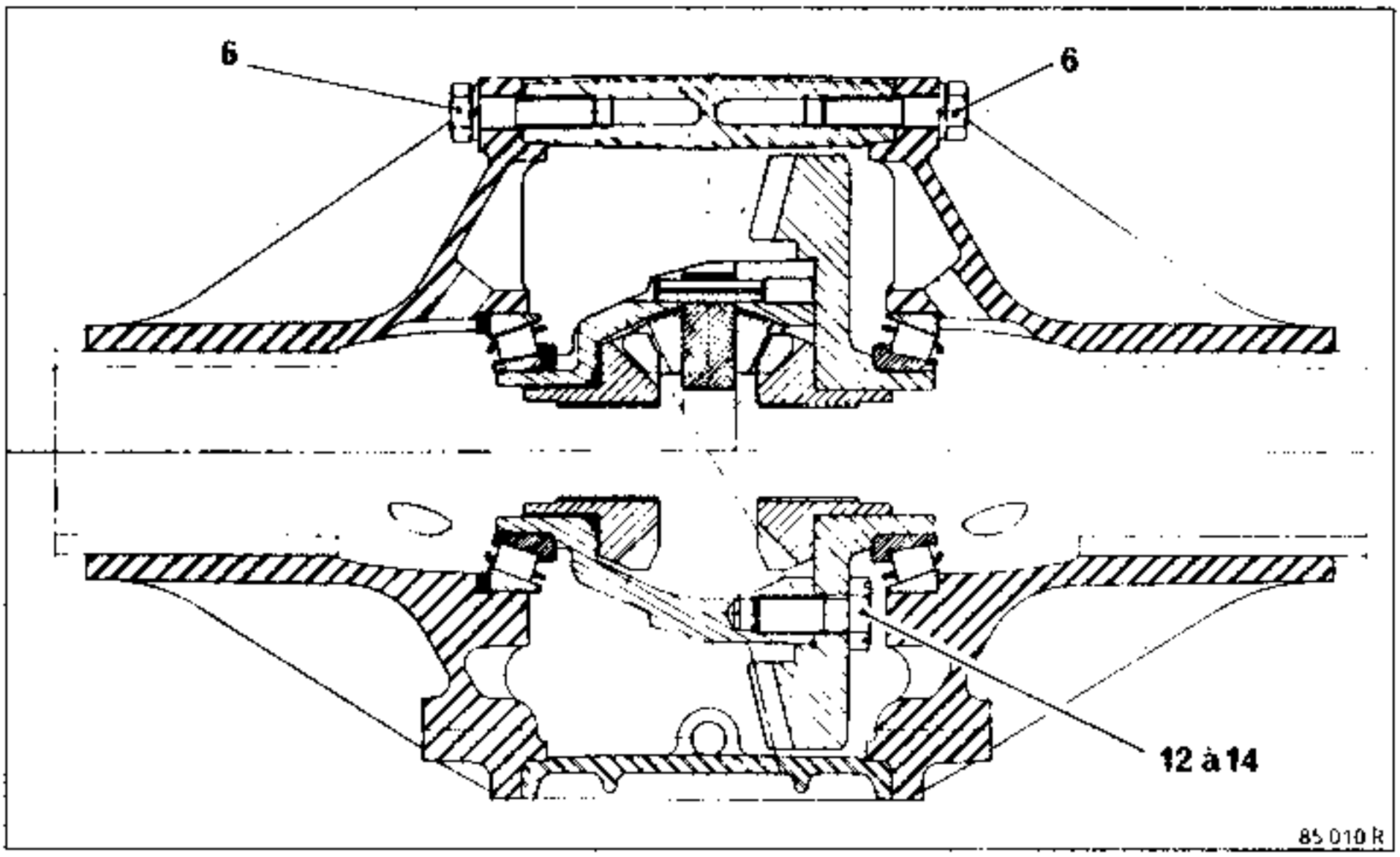
à = to

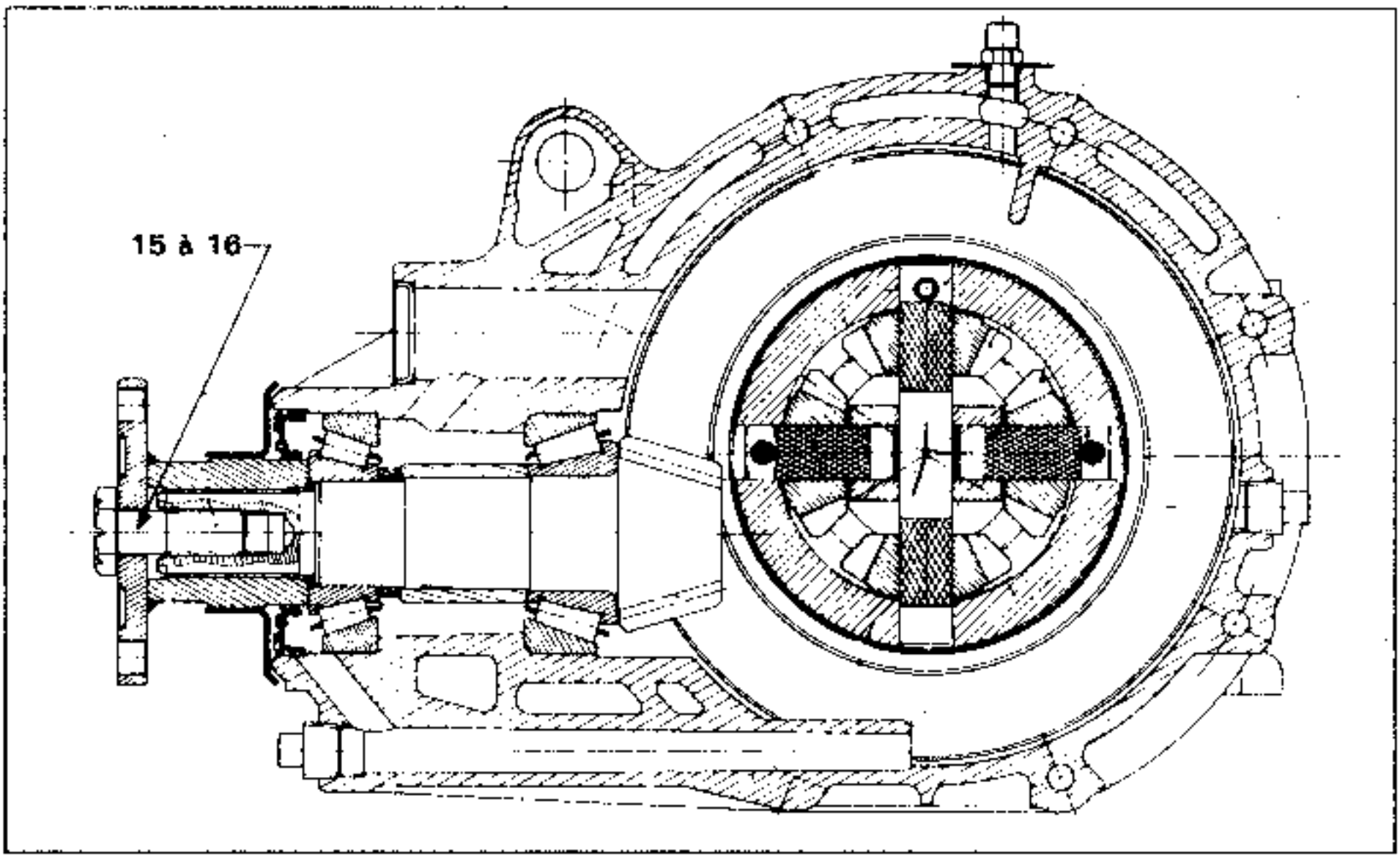




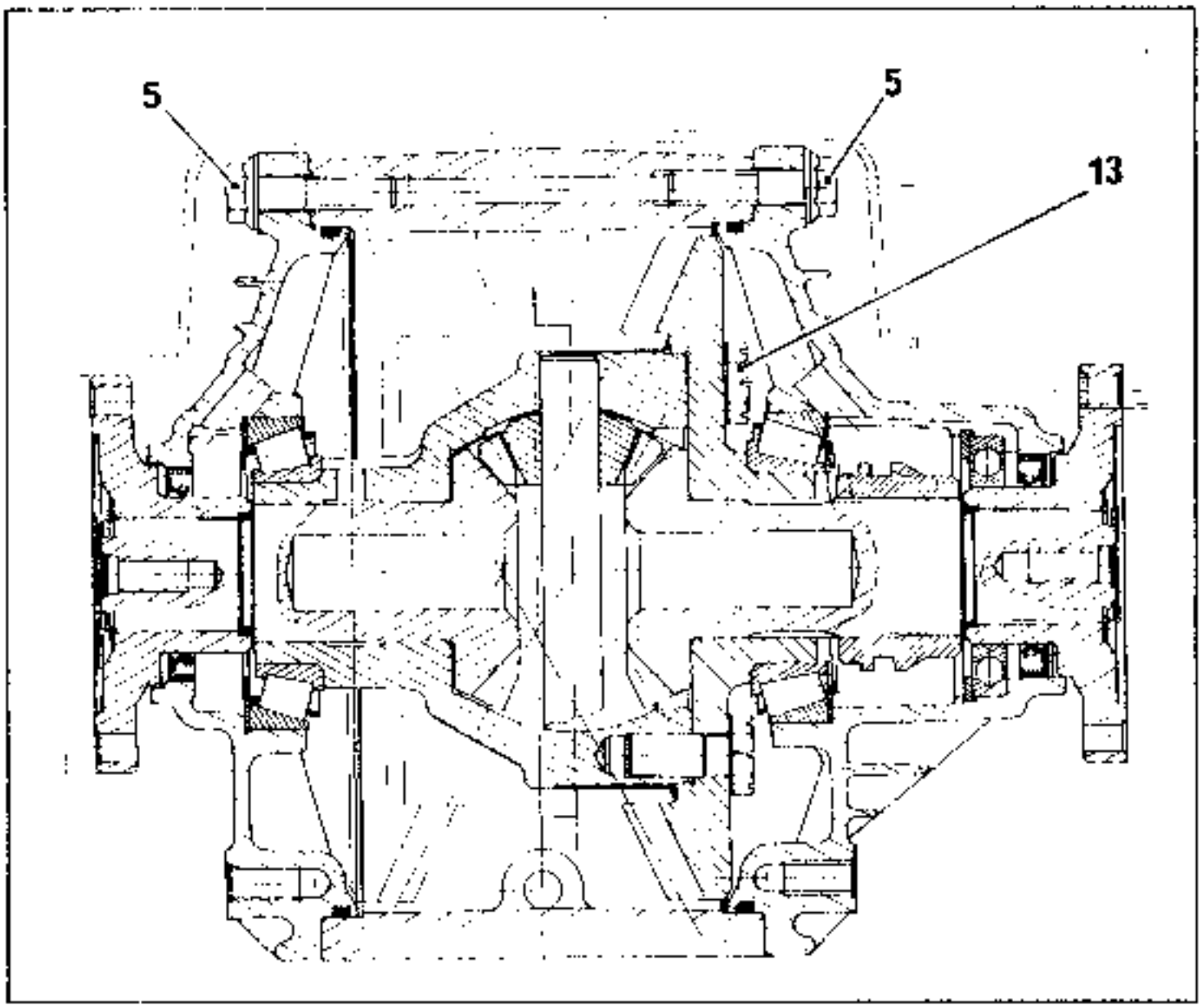
FINAL DRIVE OT 1 (4 planetary wheels)

à = to

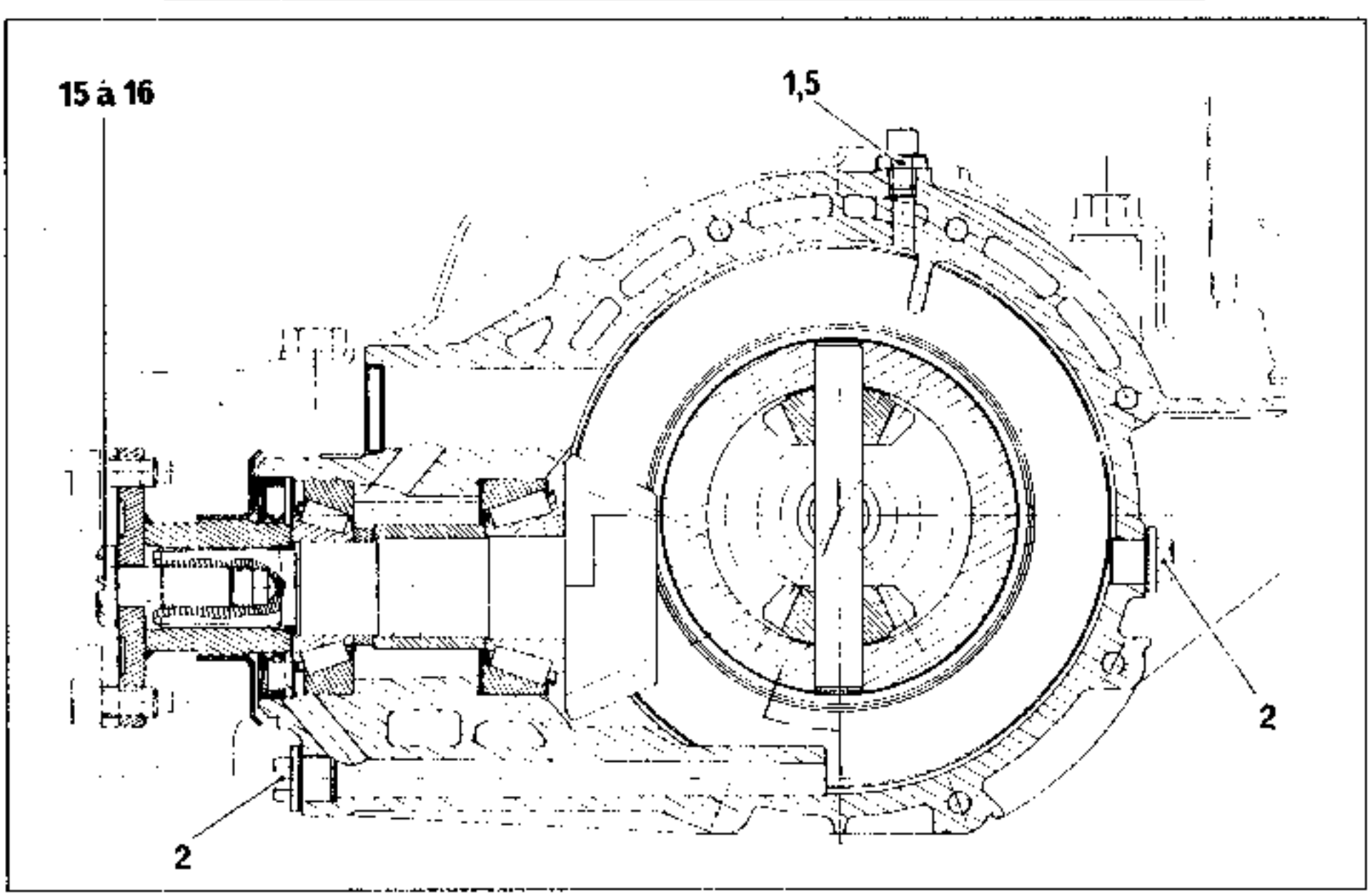




FINAL DRIVE OT 2 (X 48)

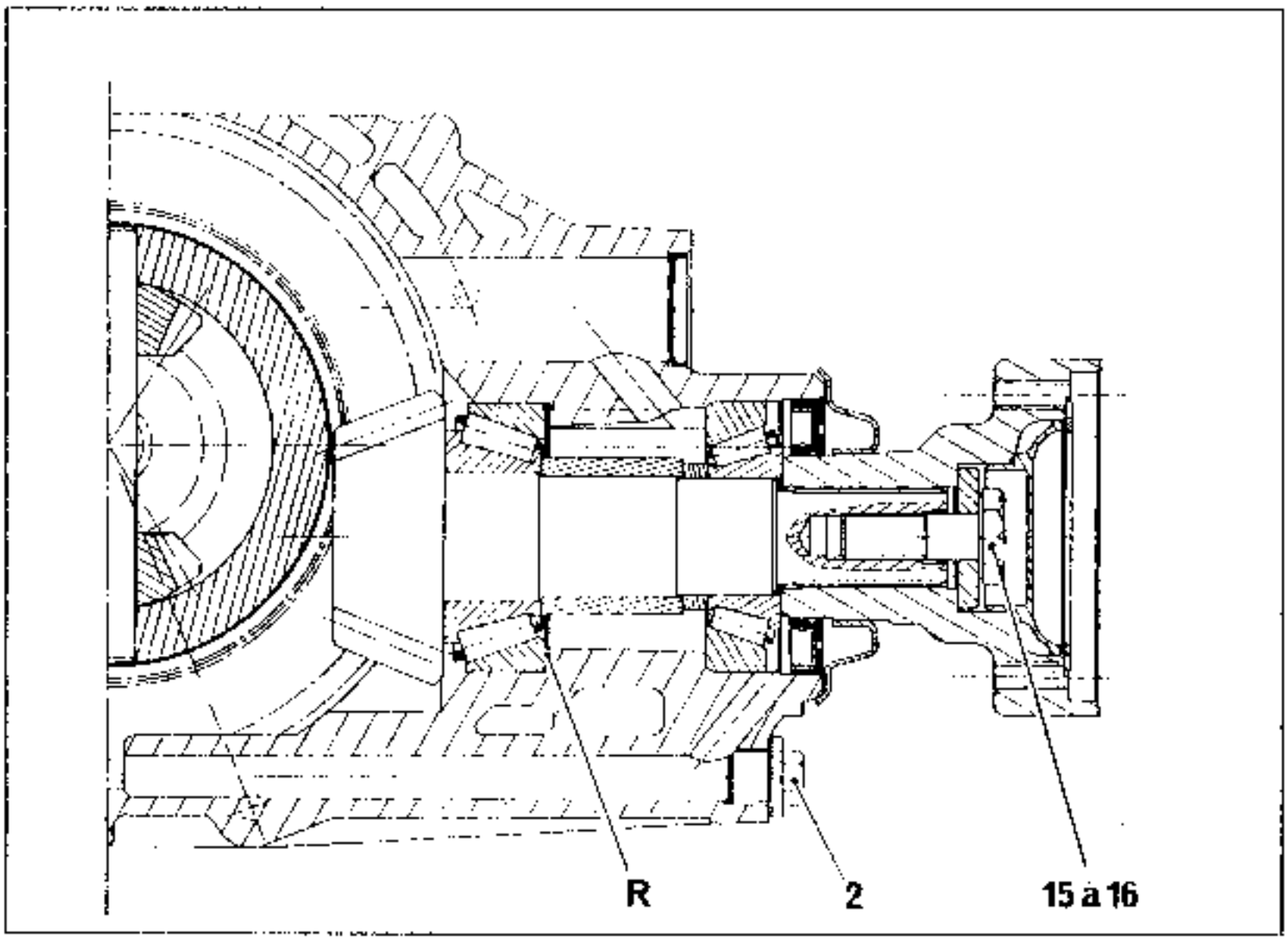


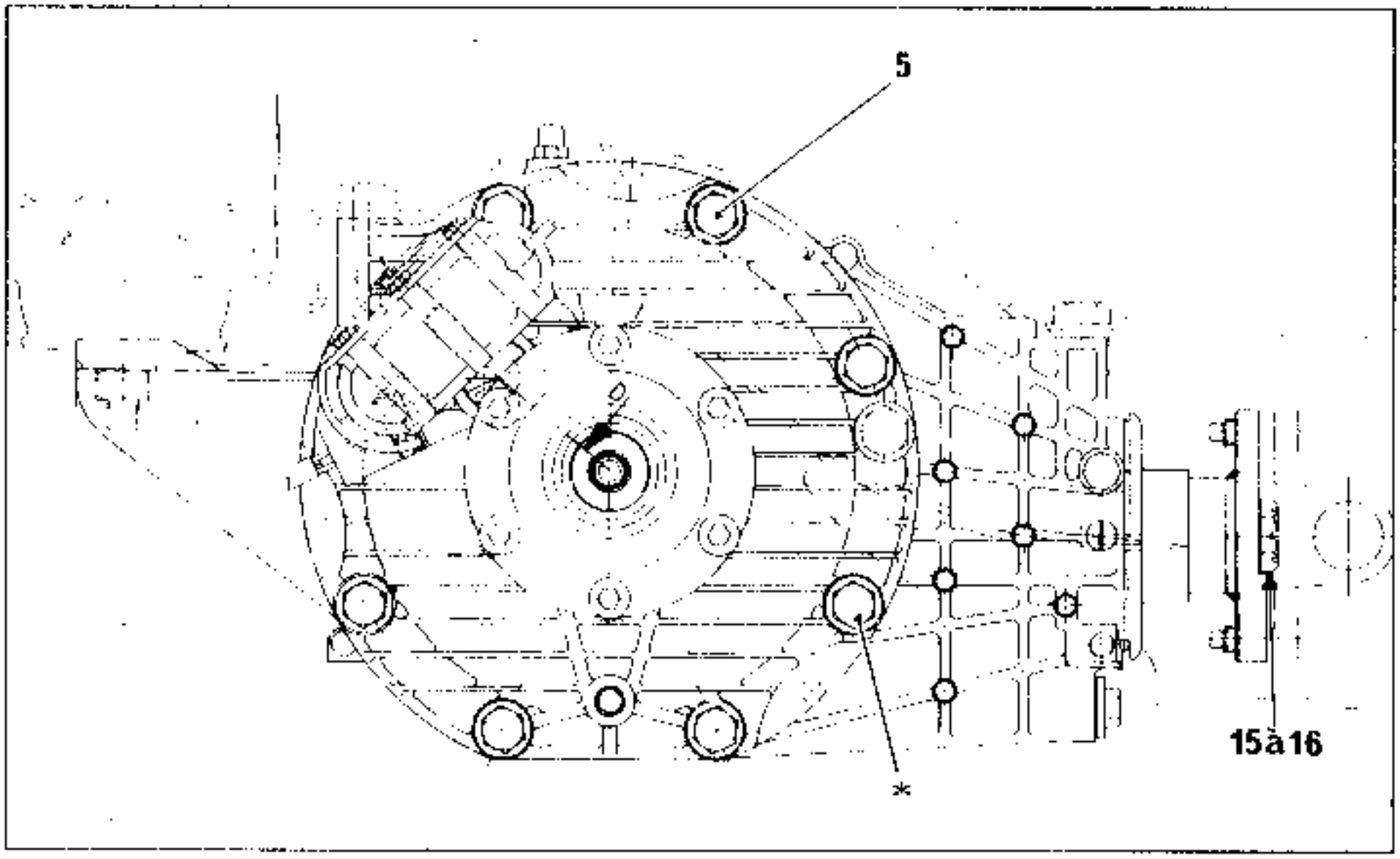
à = to



FINAL DRIVE OT 2 (X 48)

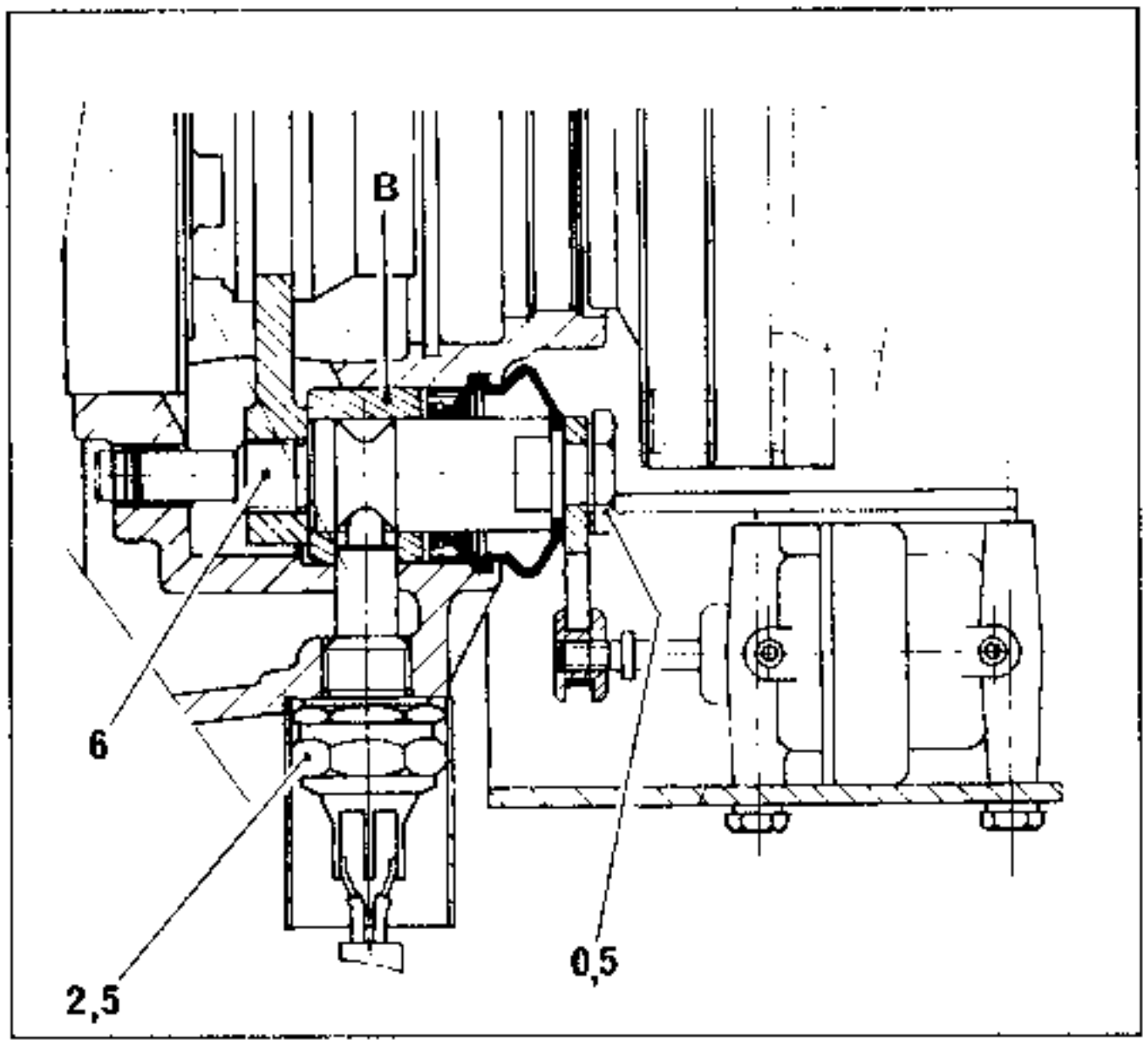
à = to



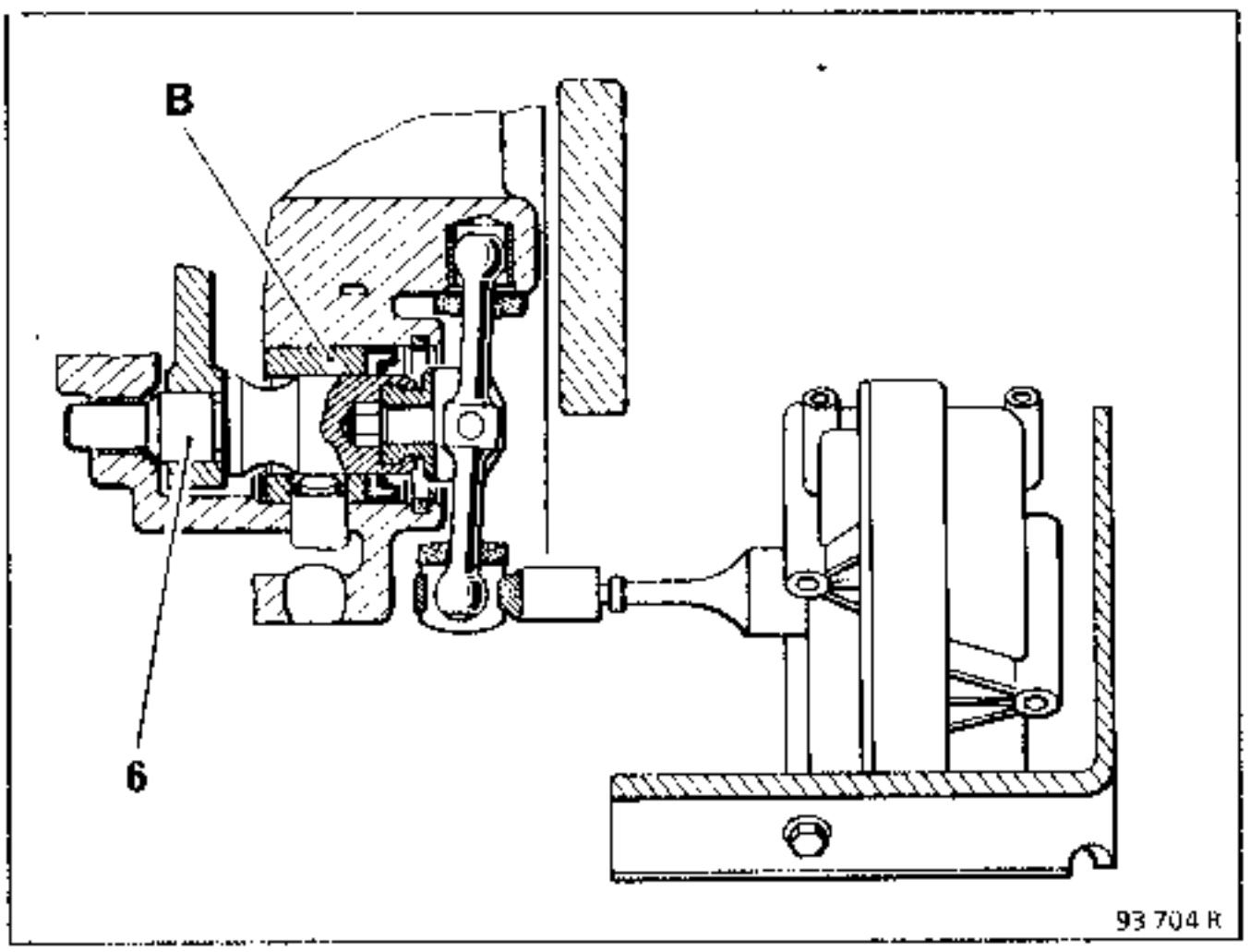


R : Pinion protrusion adjusting shim
* : Bolt protruding into casing **(CAF 4/60 THIXO)**

FINAL DRIVE OT 2 (X 48)
1st type



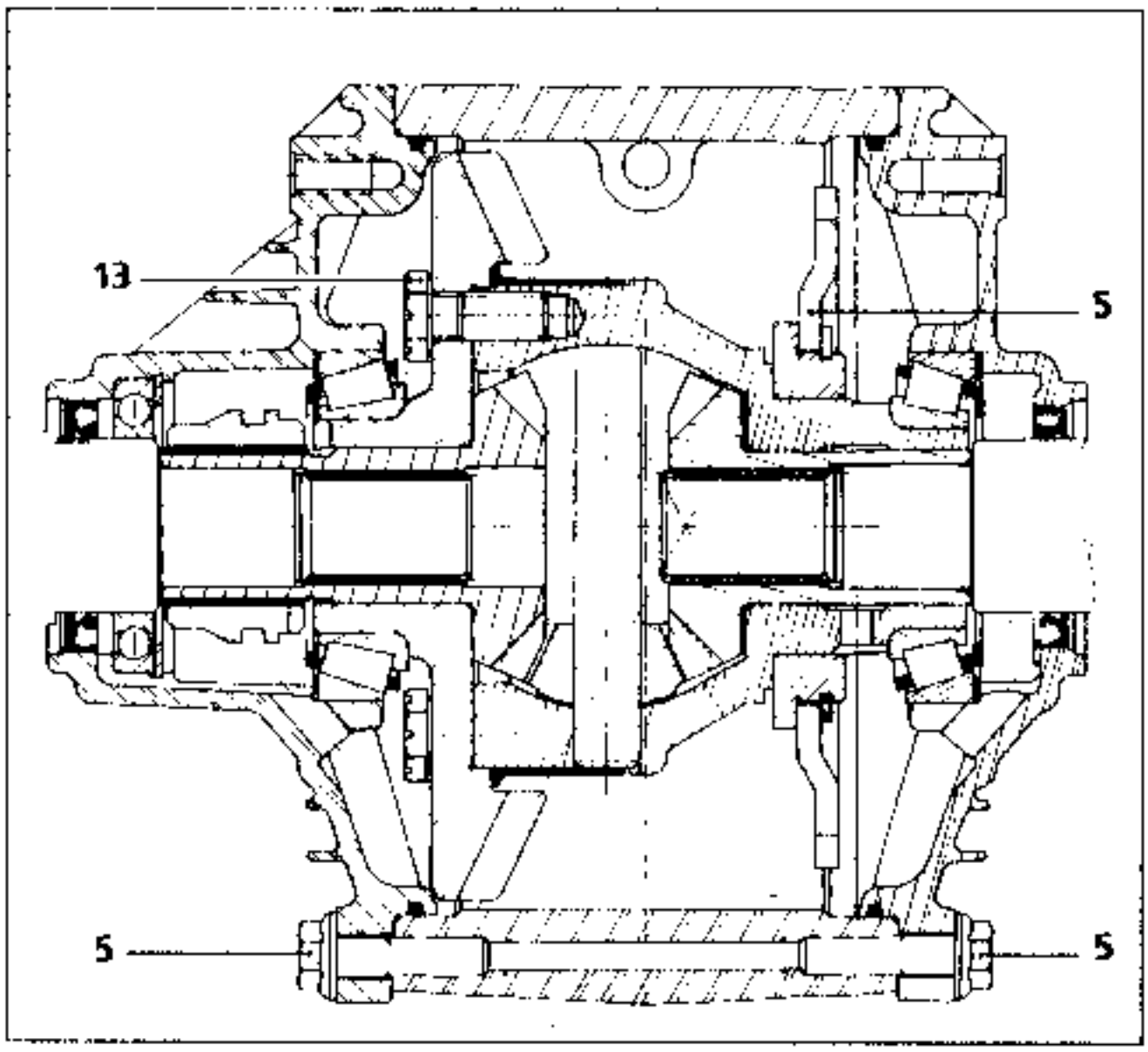
2nd type

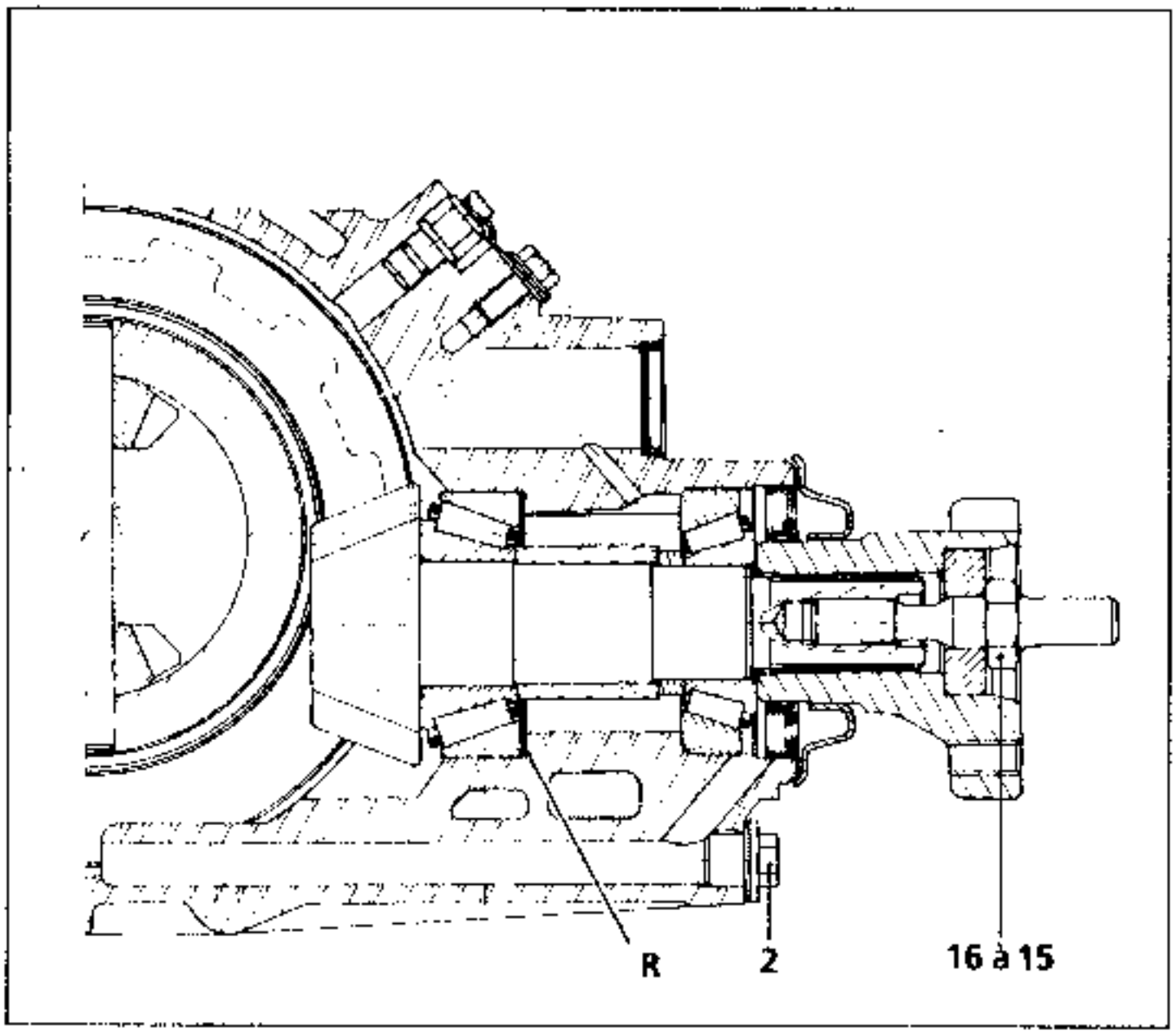


Comment: In all cases, ring (8) must be bonded with **"Loctite SCELBLOC"**

FINAL DRIVE OT 2 (Safrane)

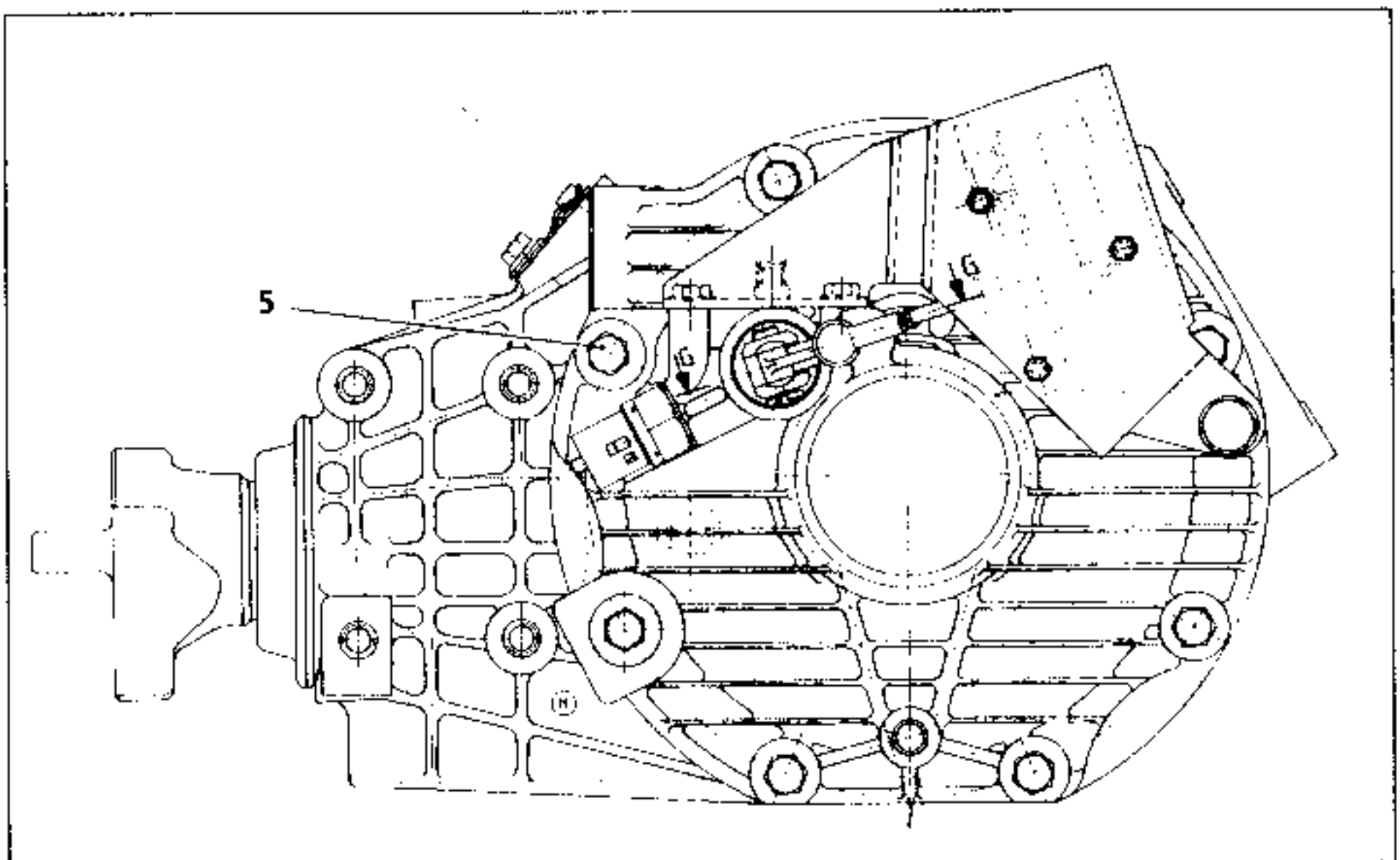
à = to

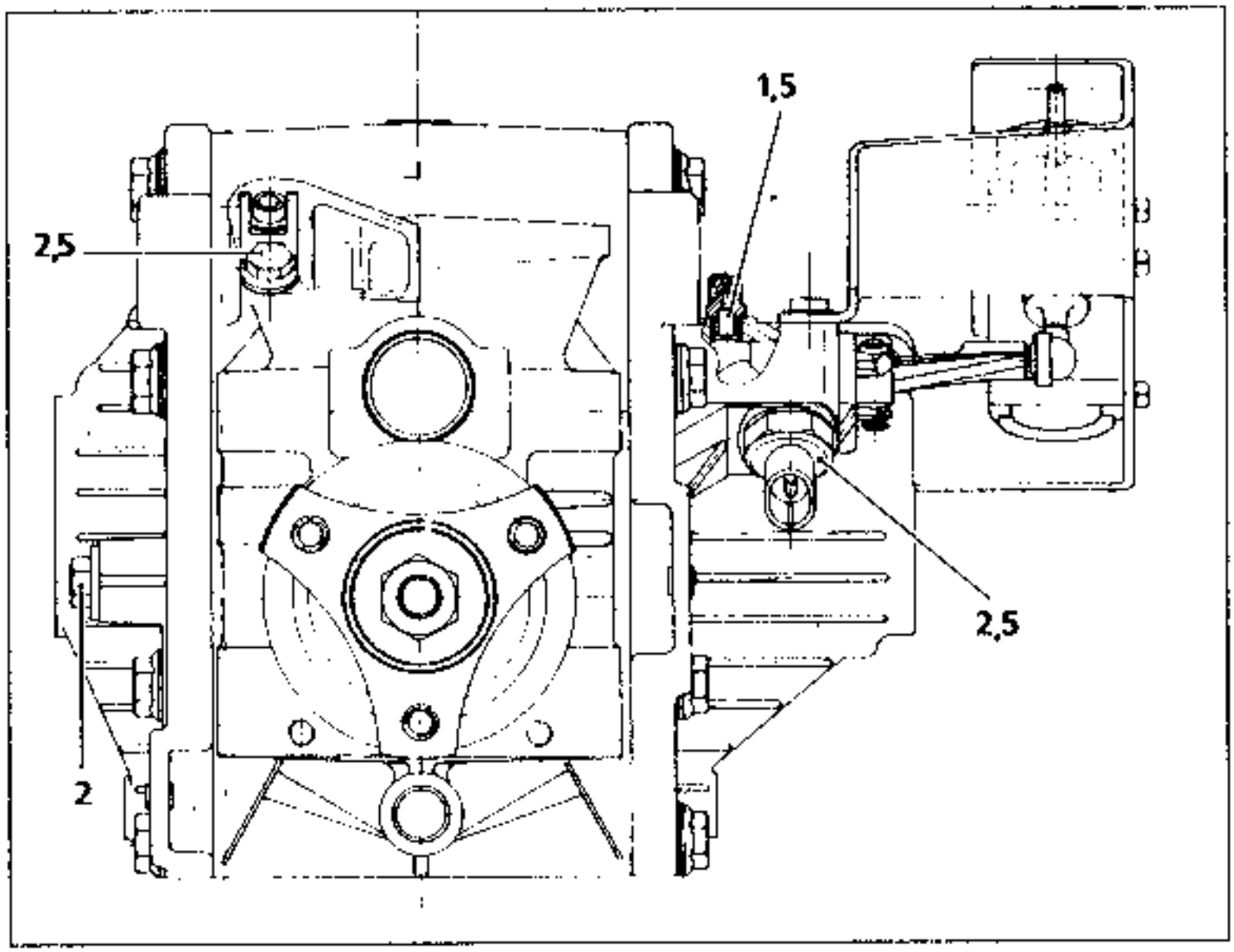




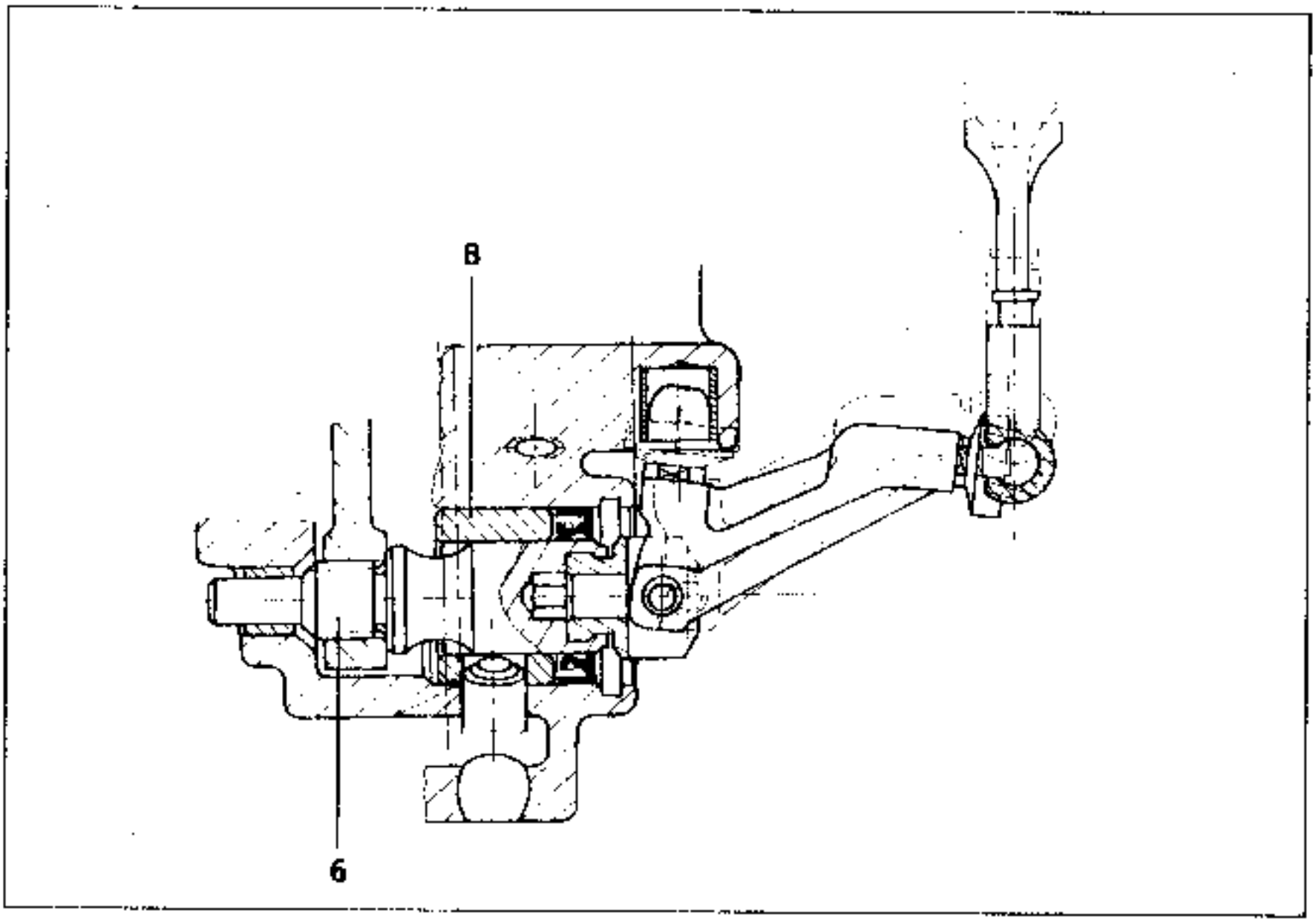
R : Pinion protrusion adjusting shim

FINAL DRIVE OT 2 (Safrane)



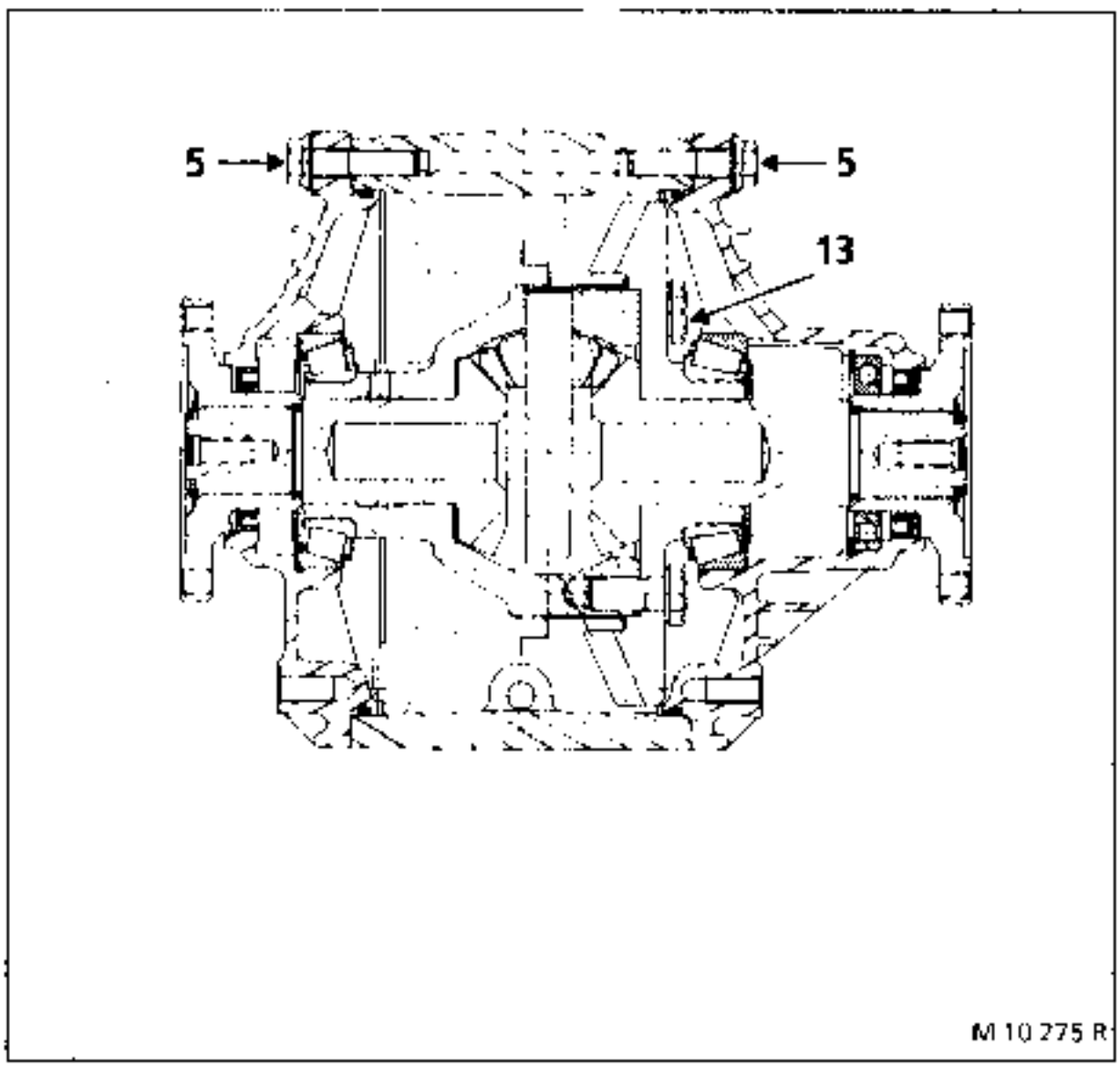


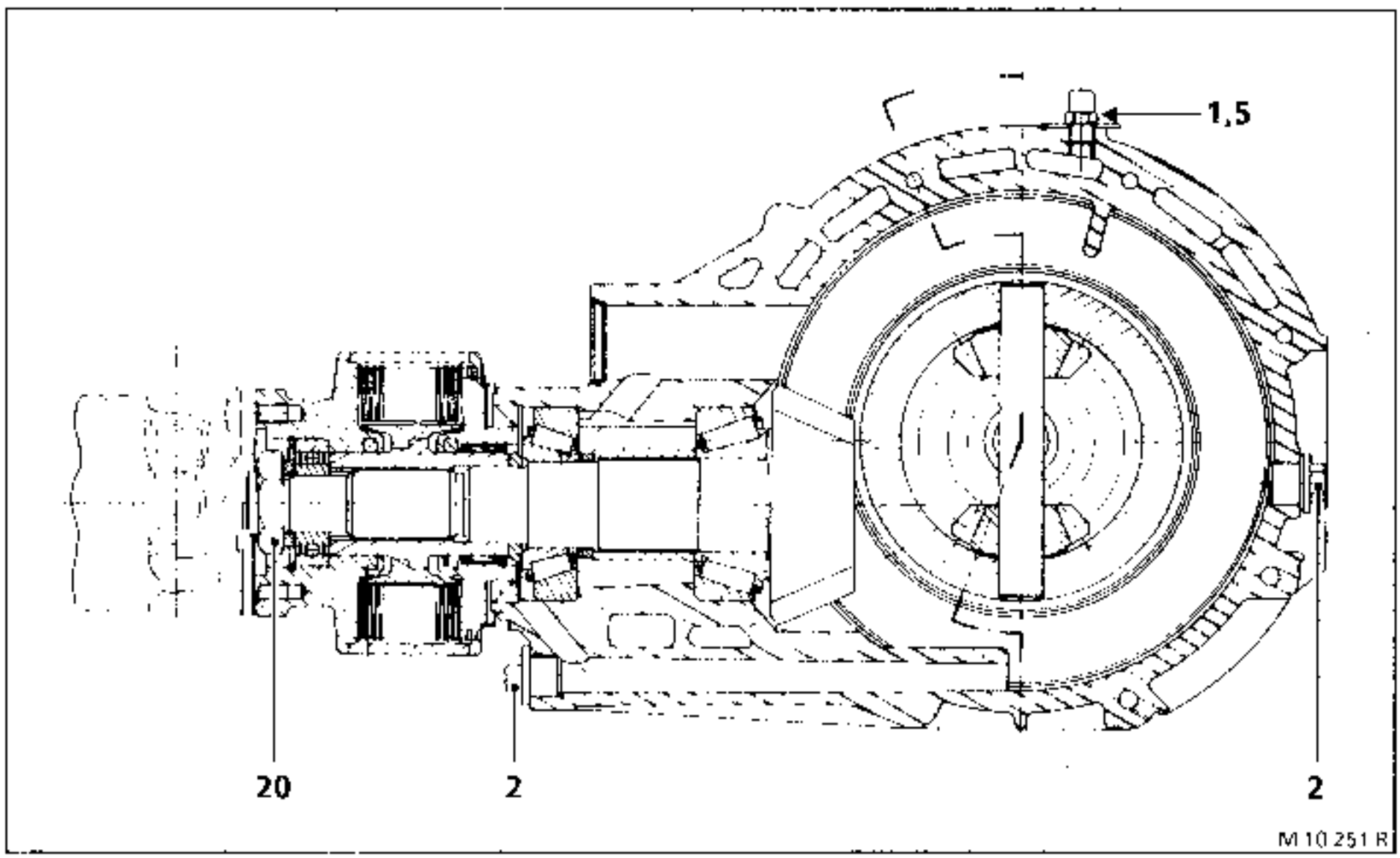
DIFFERENTIAL OT 2 (Safrane)



Comment : In all cases, ring (B) must be bonded using **"Loctite SCELBLOC"**

FINAL DRIVE OT 2 (Espace)



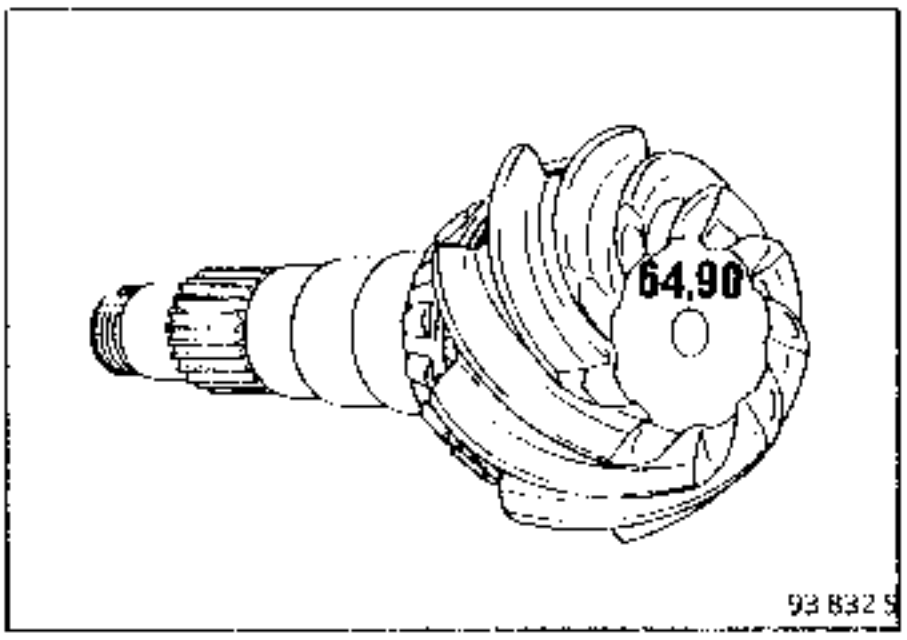


MATCHED PARTS

- Final drive pinion and crown wheel.
- Differential and final drive pinion bearing cone and cup.

MATCHING OF CROWN WHEEL AND PINION SETS

The final drive pinion and crown wheel are matched during manufacture.
They cannot be used separately and are replaced as a pair.
A common reference is marked on the crown wheel and pinion. Depending on the suffix, the front face of the final drive pinion has a second marking which shows the pinion protrusion.
(This value is between **64.70 mm and 65.20 mm.**)



SPECIAL FEATURES OF FINAL DRIVE OT 2

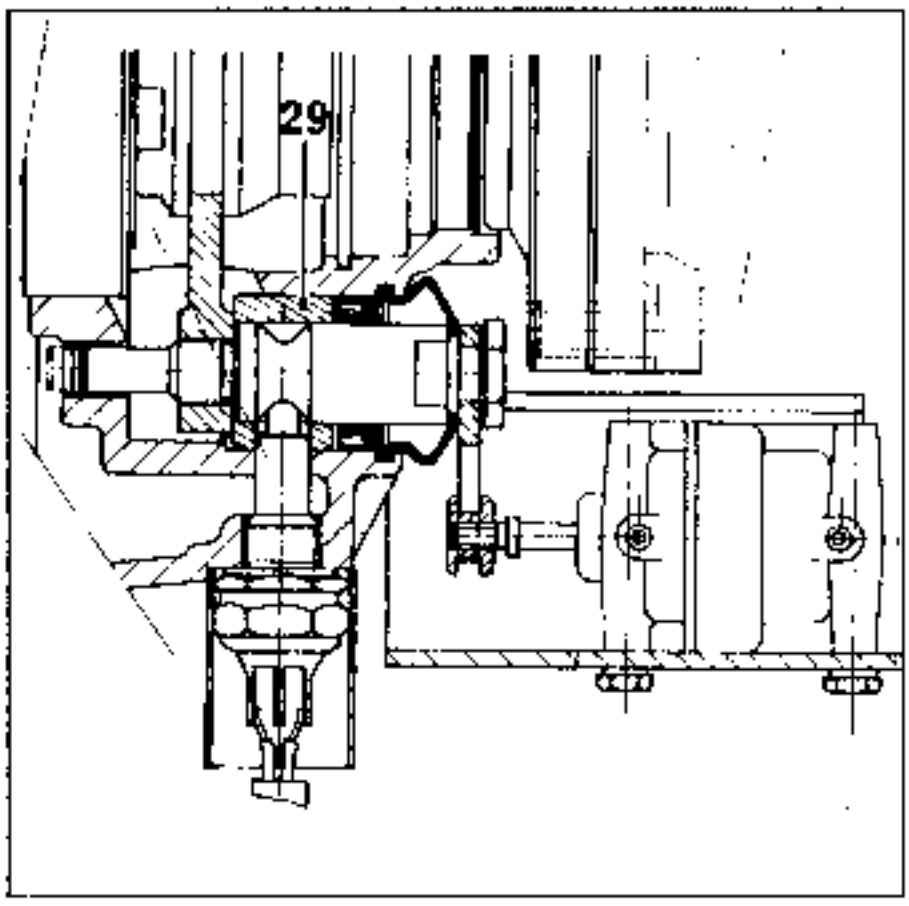
Locking the differential :
A fork moved by a small pneumatically controlled lever locks the right-hand sun wheel and the final drive crown wheel with a splined sleeve (front sliding gear), sliding on the sun wheel which engages with the crown wheel This arrangement allows the vehicle to be driven if road adherence is poor

4x4 Intégral :

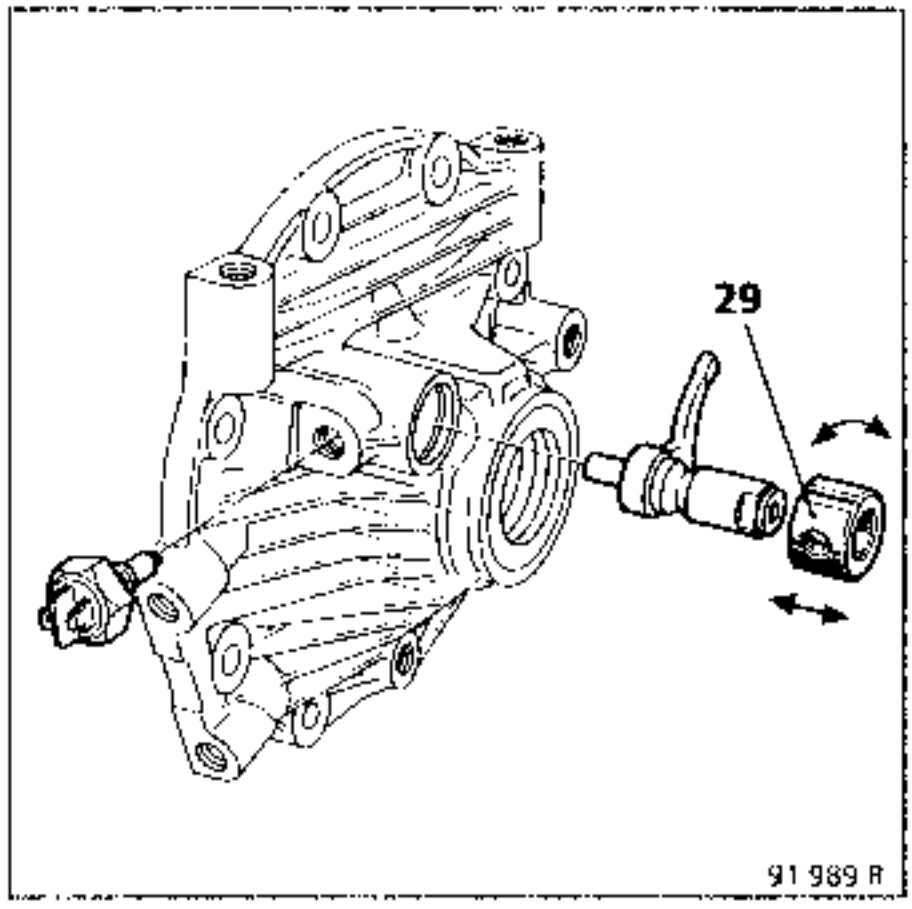
The rear differential lock has two other features:
- The ABS operates in downgraded mode and the warning light on the dashboard illuminates.
- Only used in first and reverse gears: the differential is unlocked automatically in gears other than these (some vehicles)

IMPORTANT : Replacing the differential locking warning light switch.

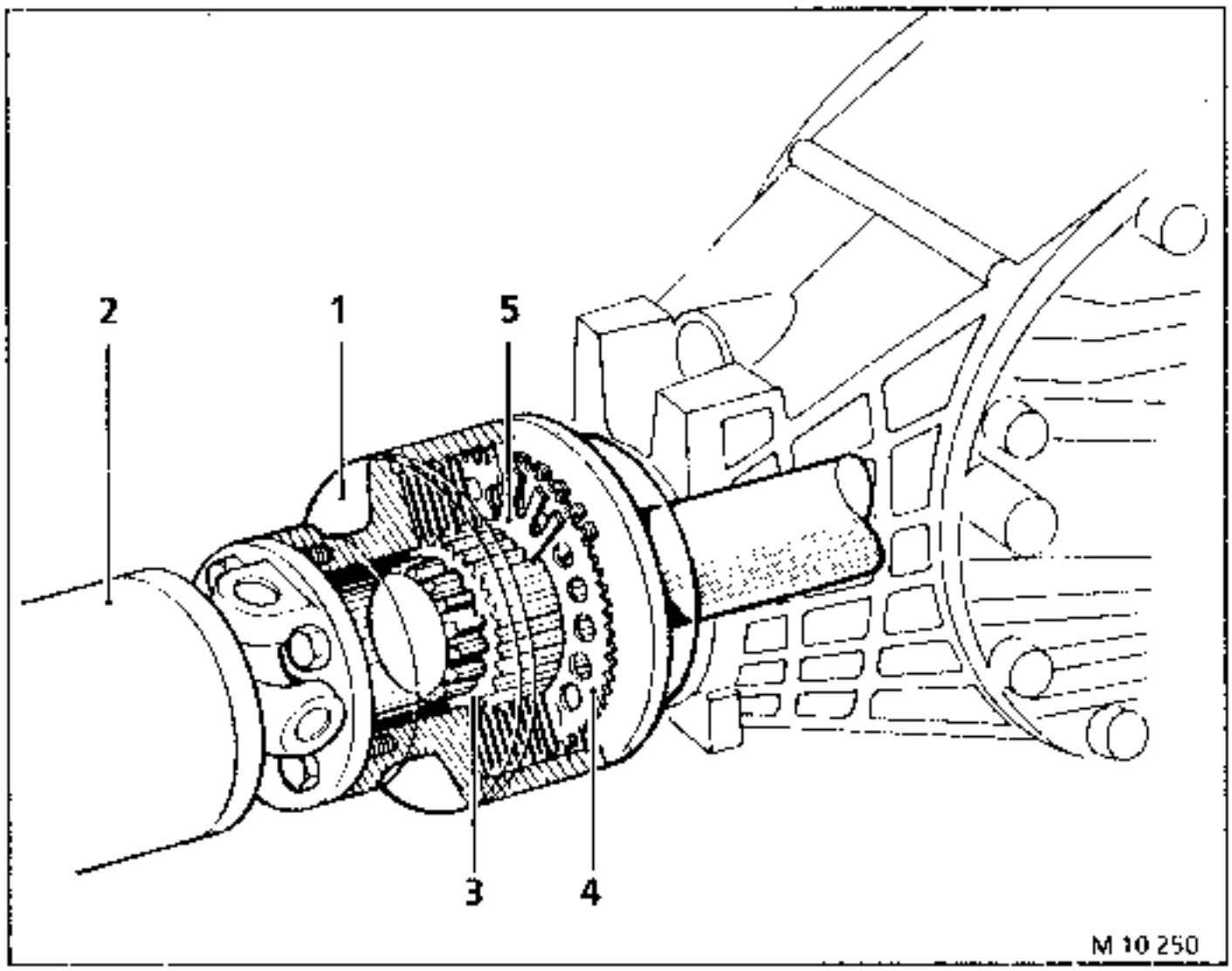
- **The vacuum capsule for the pneumatic control of the differential locking control shaft lever must be removed before the switch.**



- **The shaft must not be moved during the operation since there is a risk of bush (29) moving and covering the aperture for the switch.**



DESCRIPTION

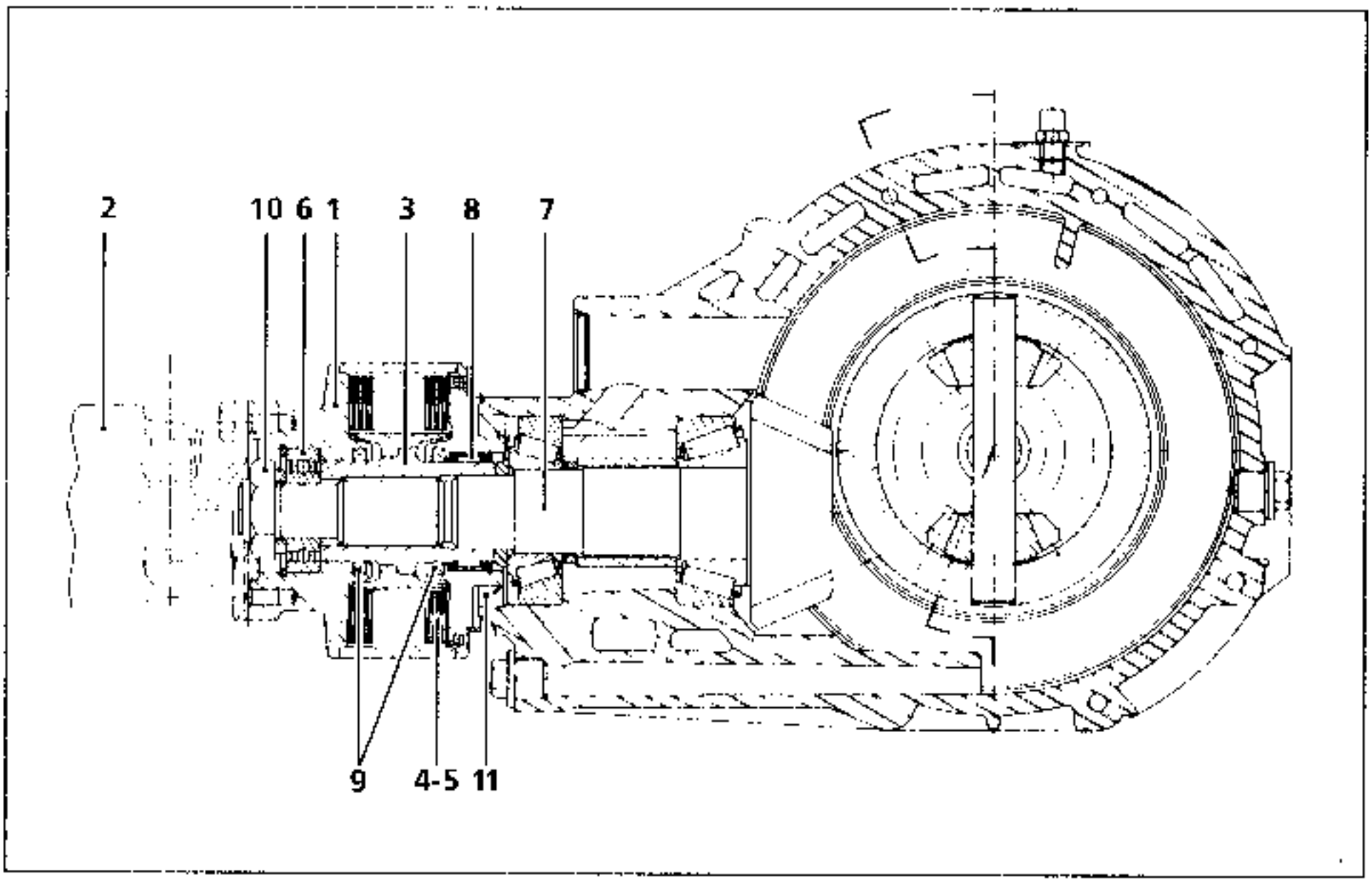


It consists of:

- An **outer race** (1) connected to the **prop** shaft (2).
- An **internal disc carrier** (3) connected to the final drive pinion.
- Two **sets of discs:**
  - one set of discs (4) is connected to the outer race (outer splines),
  - one set of discs (5) is connected to the disc carrier (inner splines).

  The discs of the two sets alternate; they are slotted and drilled to create turbulent currents.
- **Silicone oil** placed in the space defined by the outer cage and the inner disc carrier and surrounding the discs; a bubble of air is left on refilling.

  THE OIL CANNOT BE TOPPED UP SUBSEQUENTLY.



- **Two bearings** :
  - **A sealed ball bearing** (6) located at the front between the outer race (1) and the final drive pinion shaft (7),
  - **A needle bearing** (8) lubricated by the rear axle oil and located at the rear between the outer race (1) and the inner disc carrier (3).

- **Two inner seals** (9) which both withstand high pressure and high temperatures.

COUPLING TO FINAL DRIVE PINION SHAFT

Crimped nut (10) ensures that final drive pinion shaft (7) is tight ; the tightening torque defines the tapered bearing preload.

A seal (11) is fitted to the final drive (seated on outer race).

OPERATING PRINCIPLE

When the difference in rotational speed between the front and rear axles increases, i.e. when the adhesion of one of the wheels decreases (for example, if the drive wheels slip on starting, loss of grip as a result of the state of the road: sand, gravel, ice, snow) the viscous coupling automatically transfers some of the engine torque to the axle with the greatest grip as follows:

The difference in speed between the sets of discs (one integral with the front axle and one integral with the rear axle) causes the silicone oil to heat and thus expand.

The result of this phenomenon is:

1. To increase the transmission of the shearing forces in the fluid, hence the tendency to balance the rotational speed which transfers some of the torque to the axle with the greatest grip.

2. To move the discs closer to each other which accentuates the above phenomenon.

When the rotational speeds of the discs are balanced, the heating and expansion of the silicone oil decreases, which re-establishes the normal state of the viscous coupling if the wheels on each of the axles grip to a uniform extent, i.e. rotate at similar speeds The viscous coupling plays the role of a torque distributor between the two axles

CRITICAL MODE

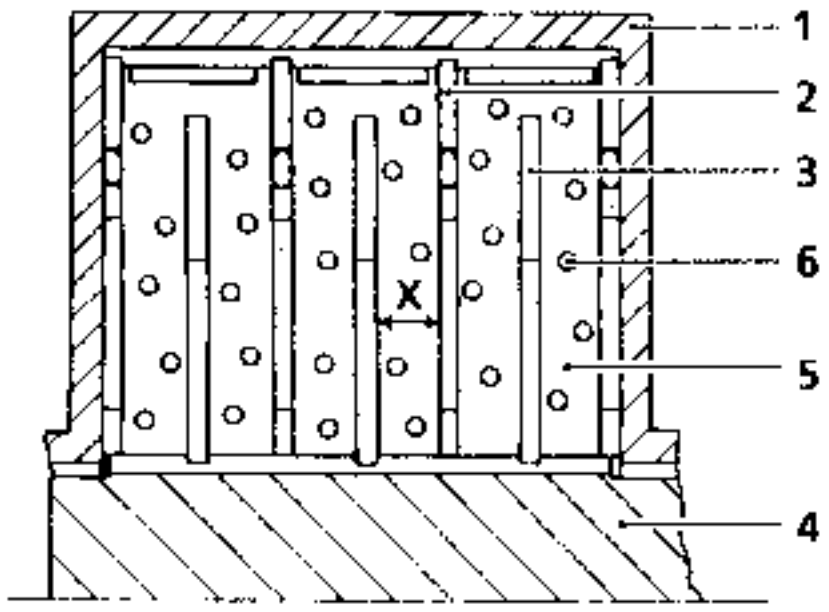
If there is a great difference in speed between the axles (for example, wheel on one axle stuck in mud) and this occurs for a long time (several seconds), the silicone oil expands to a large extent: the amount of air it contains is compressed hence an increase in the internal pressure which may reach 120 bars) which causes the discs to stick to one another in the manner of a clutch: the viscous coupling is blocked.

When the discs are attached, the shearing forces in the oil decrease and its temperature decreases, hence a gradual return to normal if the wheels should once again have uniform grip

This phenomenon has two advantages:

1. It enables maximum torque (up to 90%) to be transferred to the gripping wheels.

2. It temporarily protects the viscous coupling by restricting the increase in oil temperature.



1 Outer race

2 Disc

3 Disc

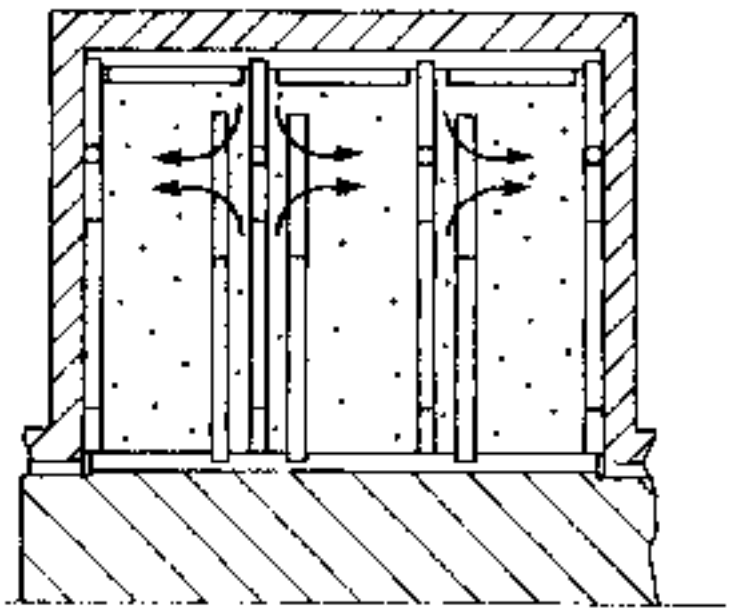
4 Internal disc holder

5 Silicone oil

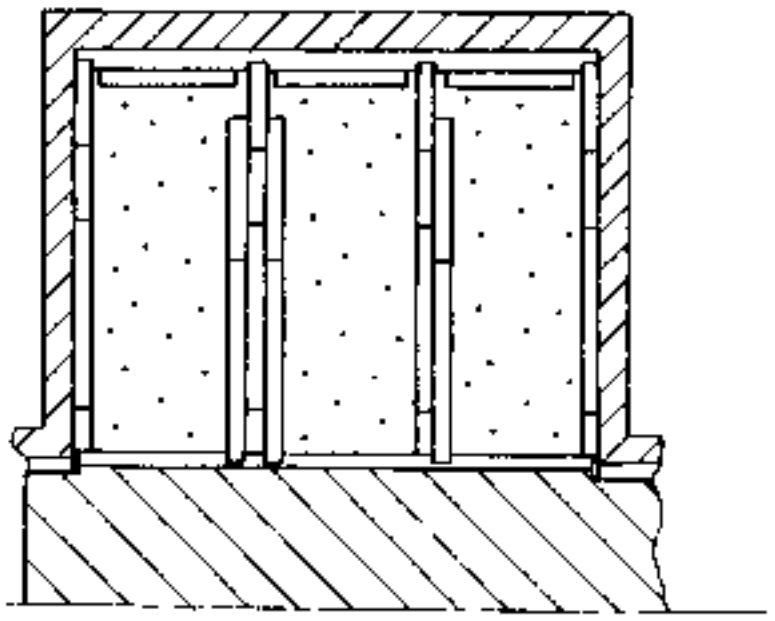
6 Air bubble

X Initial distance between discs

VISCOUS COUPLING IN REST POSITION



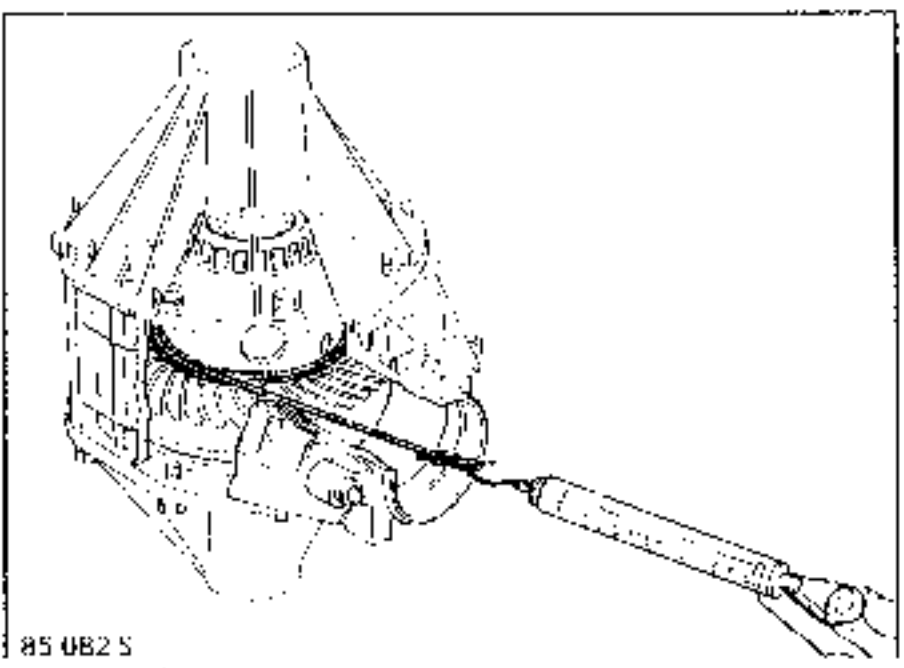
NORMAL OPERATION



CRITICAL MODE : DISC COUPLING

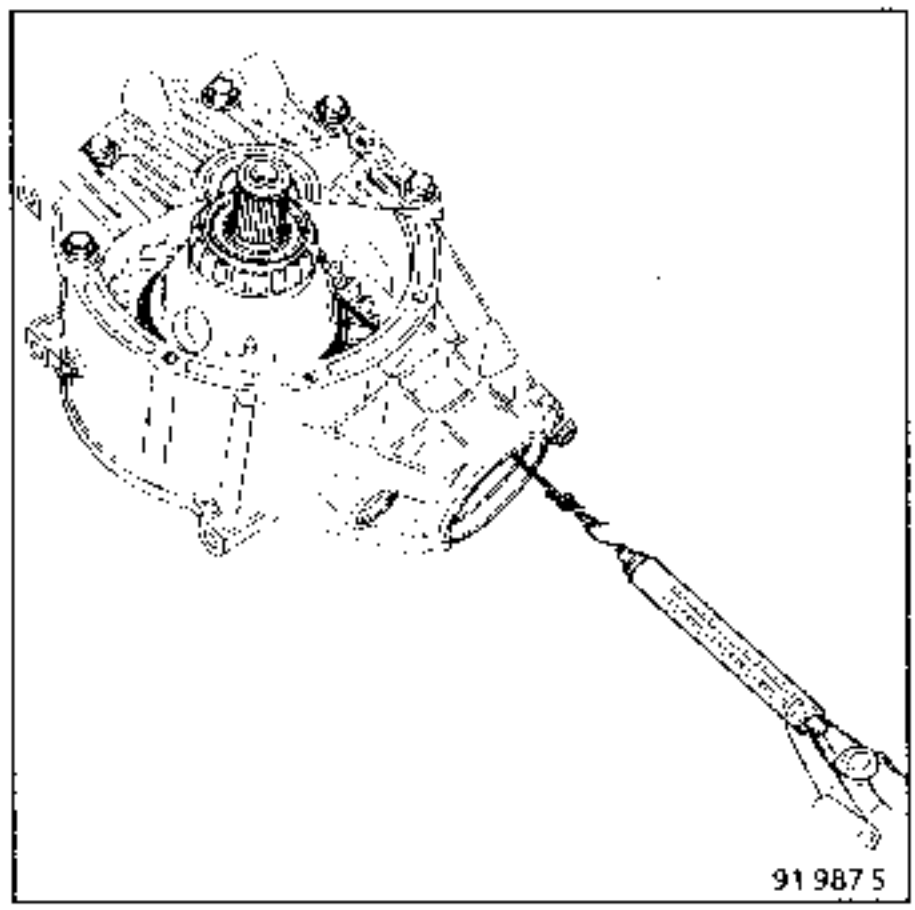
M 10 252

DIFFERENTIAL BEARING PRELOAD (Final drive OT1)



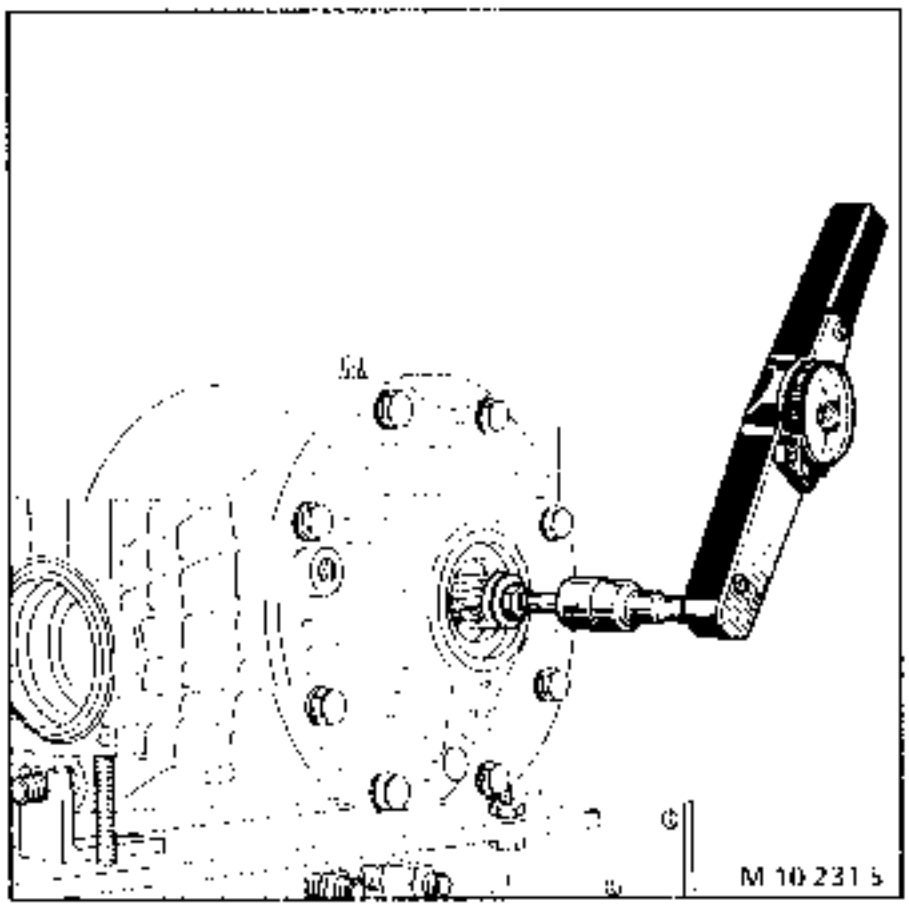
Final drive	New bearings
OT 1	4.5 to 6.5 daN

X 54



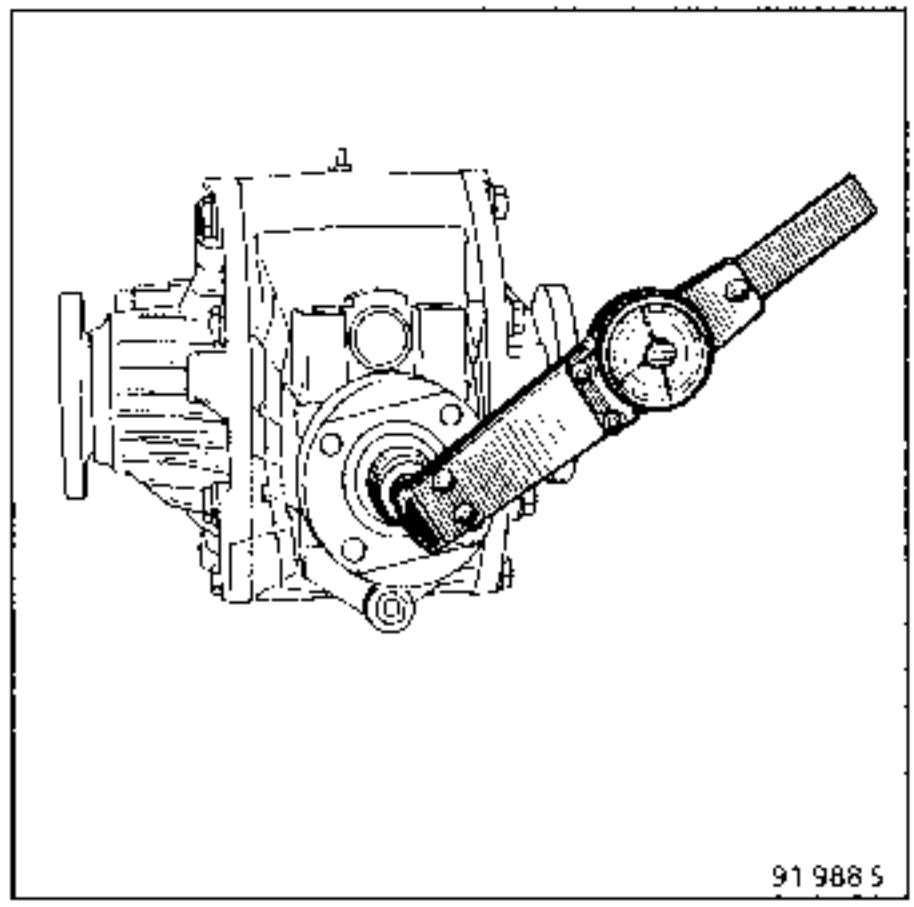
Final drives	New bearings
OT 2 Safrane and X48	4.5 to 6.5 daN

Differential OT2 X48 - Espace



Final drives	New bearings
OT 2	10.5 to 12.5 N.m

FINAL DRIVE PINION BEARING PRELOAD



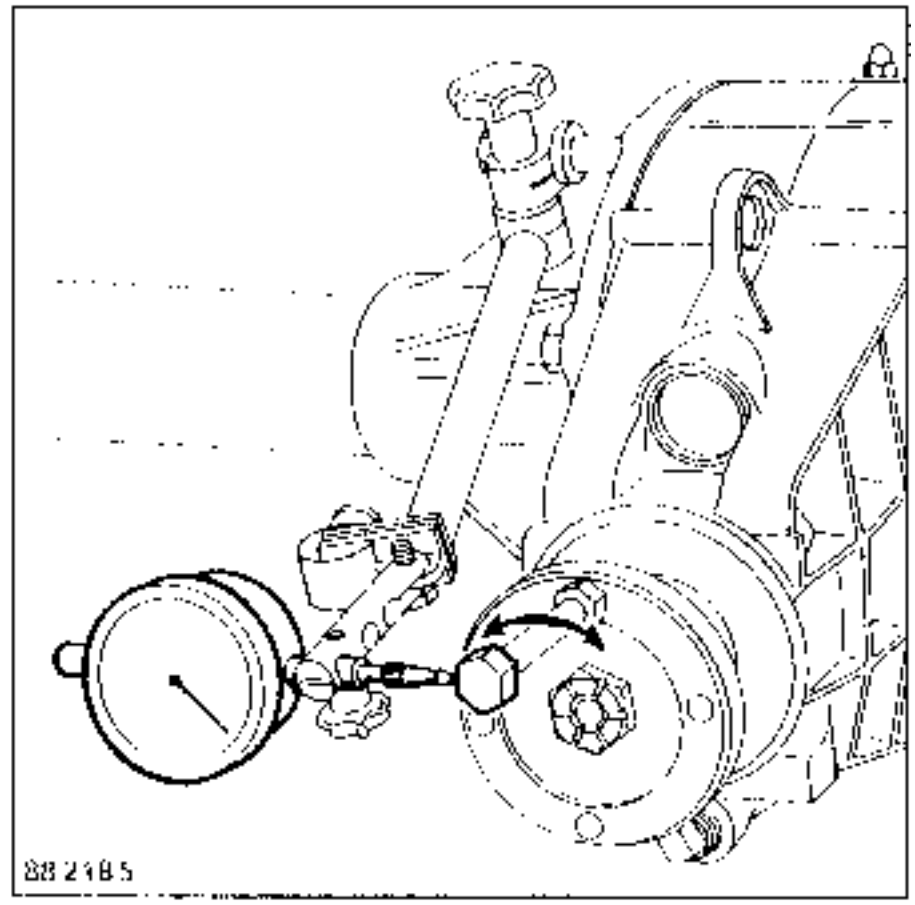
Final drives	New bearings
OT 2	2.5 to 3.5 N.m
OT 1	1.2 to 2.5 N.m

ADJUSTING THE BACKLASH

Final drive OT 1

Backlash 0.12 to 0.20 mm

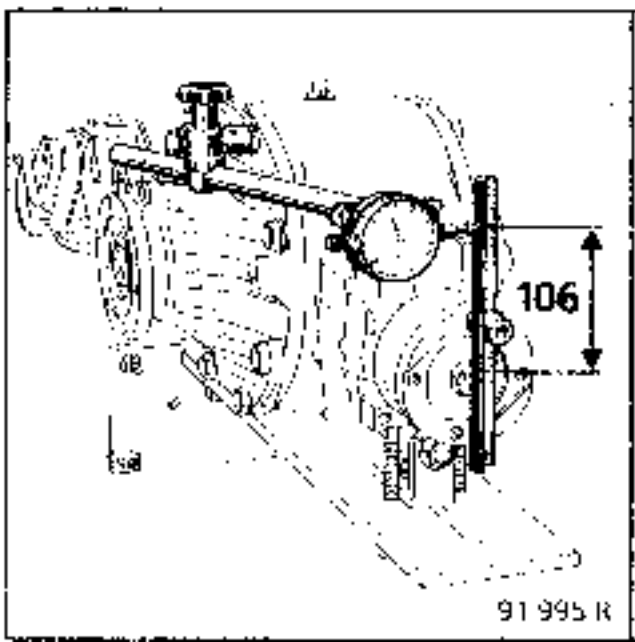
The backlash, measured at the pinion input flange, must be between 0.20 mm and 0.30 mm. This corresponds to a backlash at the crown wheel and pinion teeth of 0.12 to 0.20 mm.



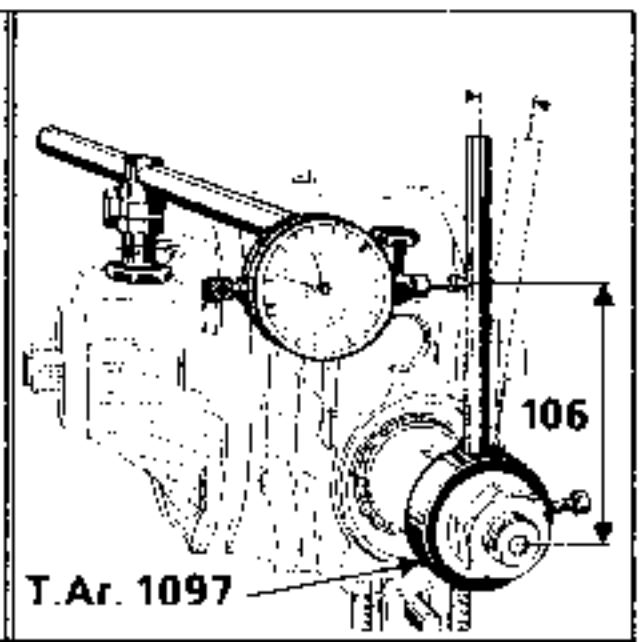
Final drive OT 2

Vehicles	Suffix	Crown wheel and pinion	To obtain a backlash at the crown wheel and pinion teeth of **0.09 mm to 0,15 mm**, the backlash measured at the pinion input flange (at a radius of **106 mm**) must be between :
X48	000 023 - 025	9 x 31 11 x 38	0.46 mm and 0.80 mm
Espace	010 - 011	9 x 34	0.50 mm and 0.88 mm
X48	022	9 x 37	0.55 mm and 0.96 mm
X54	040	11 x 46	0.48 mm and 0.84 mm

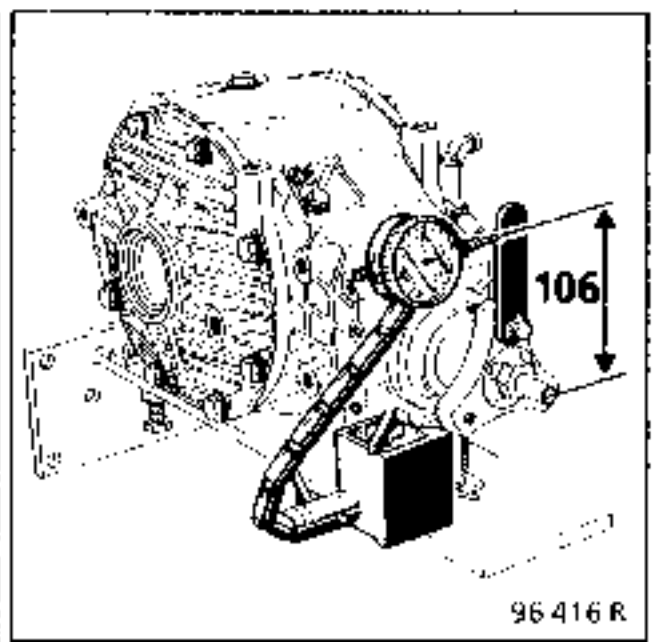
X 48



Espace



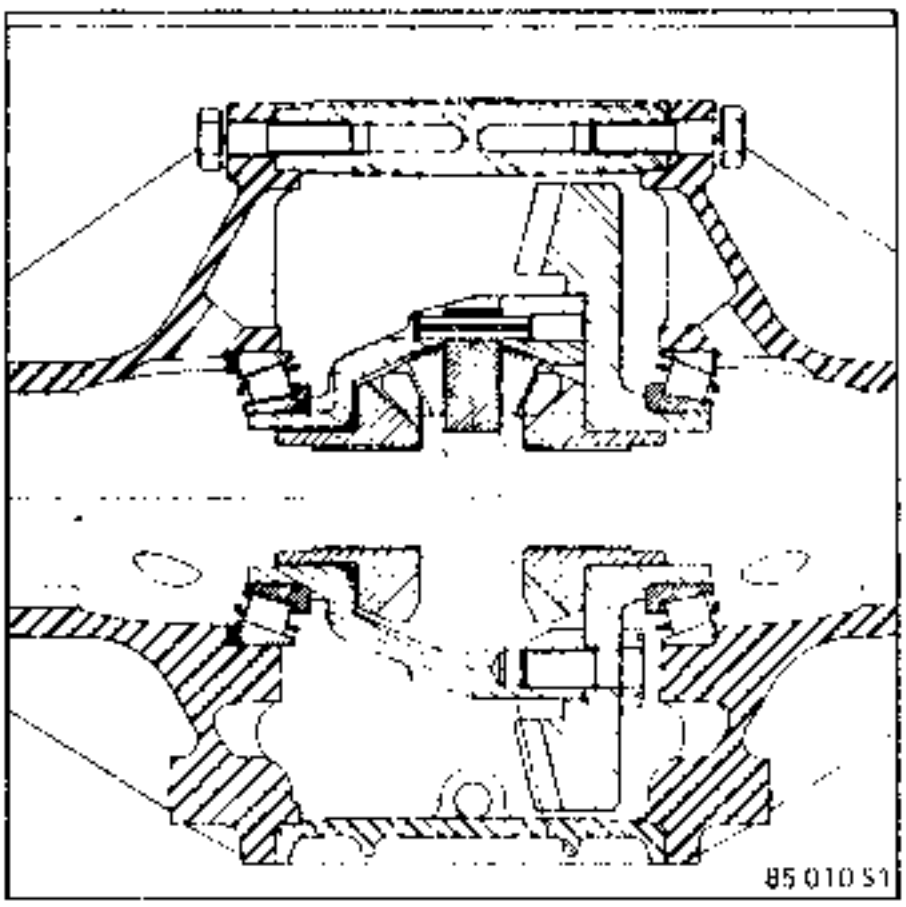
X 54



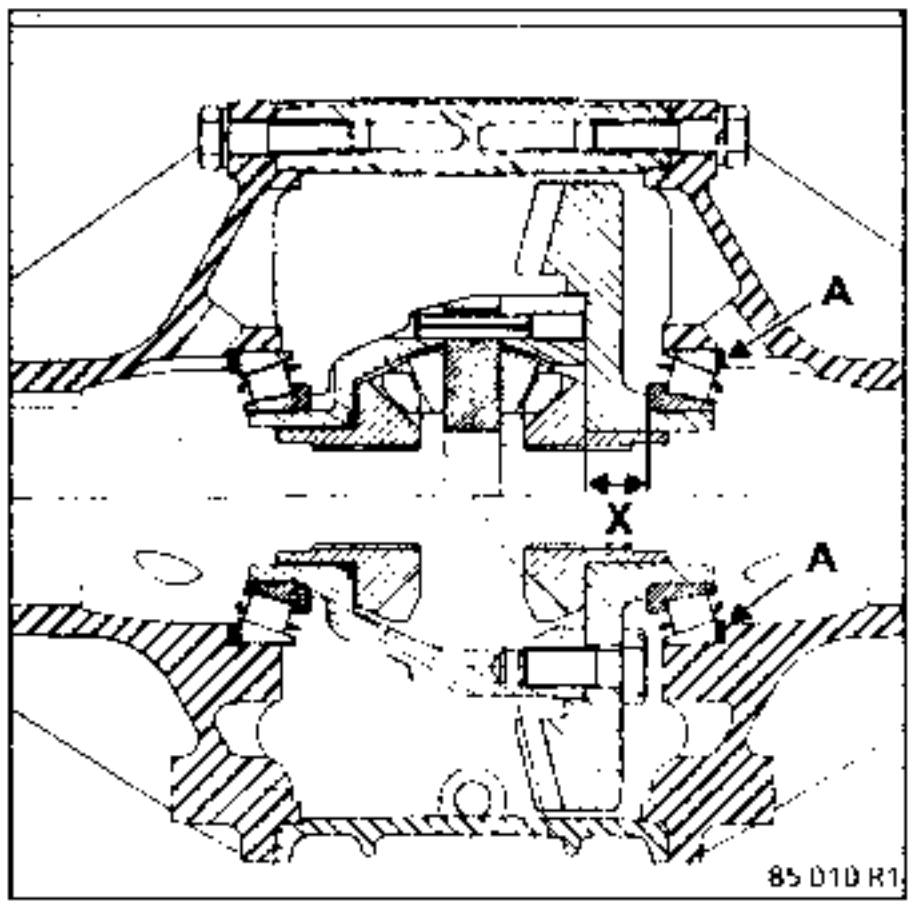
The backlash cannot be adjusted on the crown wheel and pinion sets fitted to OT1 (1st type).

On the crown wheel and pinions of the "2nd type", dimension X has been reduced by 1.2 mm and the backlash is adjustable by inserting shims at A.

1st type



1st type



NOTE : The crown wheel and pinion sets supplied as replacement parts are of the 2nd type. Their backlash must therefore be adjusted. To adjust the preload, a shim 1.2 mm thick is fitted at A.

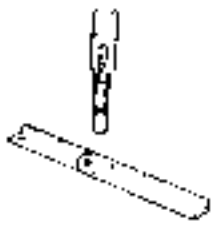
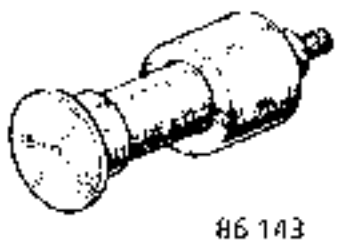
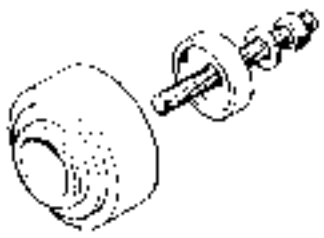
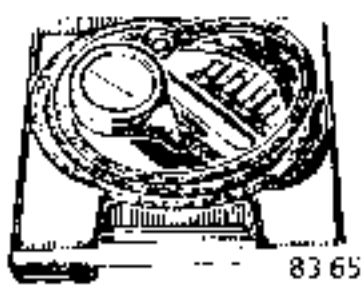
Illustration	Tool No.	Part No.	Description
 87 217	**Elé. 346-03**	00 00 034 603	Drive belt tension gauge rod. For use with **Elé. 346**
 77 070	**Ms. 580**	00 00 058 000	Slide hammer
 69 306-1	**Rou. 15-01**	00 01 331 601	Puller protection cup for **16 mm** inside diameter
 77 672	**Rou. 604-01**	00 00 060 401	Wheel hub locking tool
 71 625	**B.Vi. 28-01**	00 01 227 301	Puller with interchangeable jaws
 77 743	**B.Vi. 606**	00 00 060 600	Roll pin drift set, **6 mm dia. roll pins.**
 86 143	**Tar. 1093**	00 00 109 300	Final drive pinion bearing fitting tool
 92 174	**Tar. 1094**	00 00 109 400	Differential bearing extractor

Illustration	Tool No.	Part No.	Description
 92 424	Tar. **1095**	00 00 109 500	Drive shaft output flange and seal fitting tool
 91 999	Tar. **1096**	00 00 109 600	OT rear axle support bracket on Desvil 126
 92 225	Tar. **1097**	00 00 109 700	Locating pin for checking and adjusting final drive pinion preload/backlash
 92 173	**Tar. 1098**	00 00 109 800	Differential locking tool
 92 276	Tar. **1099**	00 00 109 900	Final drive input flange seal fitting tool
 87 324	**Tar. 1140**	00 00 114 000	36 mm drive socket
 94 442	**Tar. 1194**	00 00 119 400	Rear axle crown wheel and pinion setting
 83 657	**Mot. 867**	00 00 086 700	Diesel fuel pressure test kit

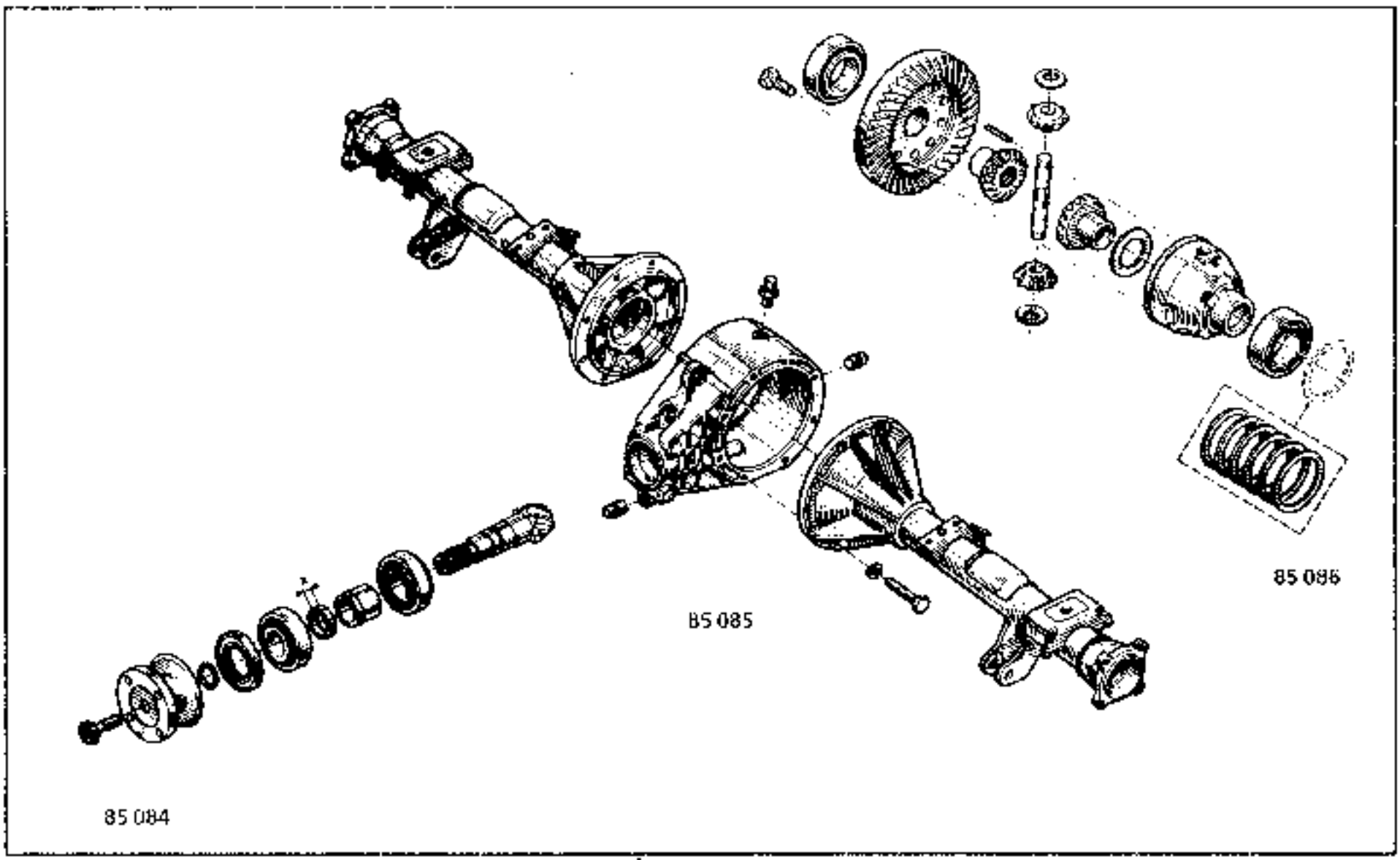
PACK SIZE - PART NUMBERS

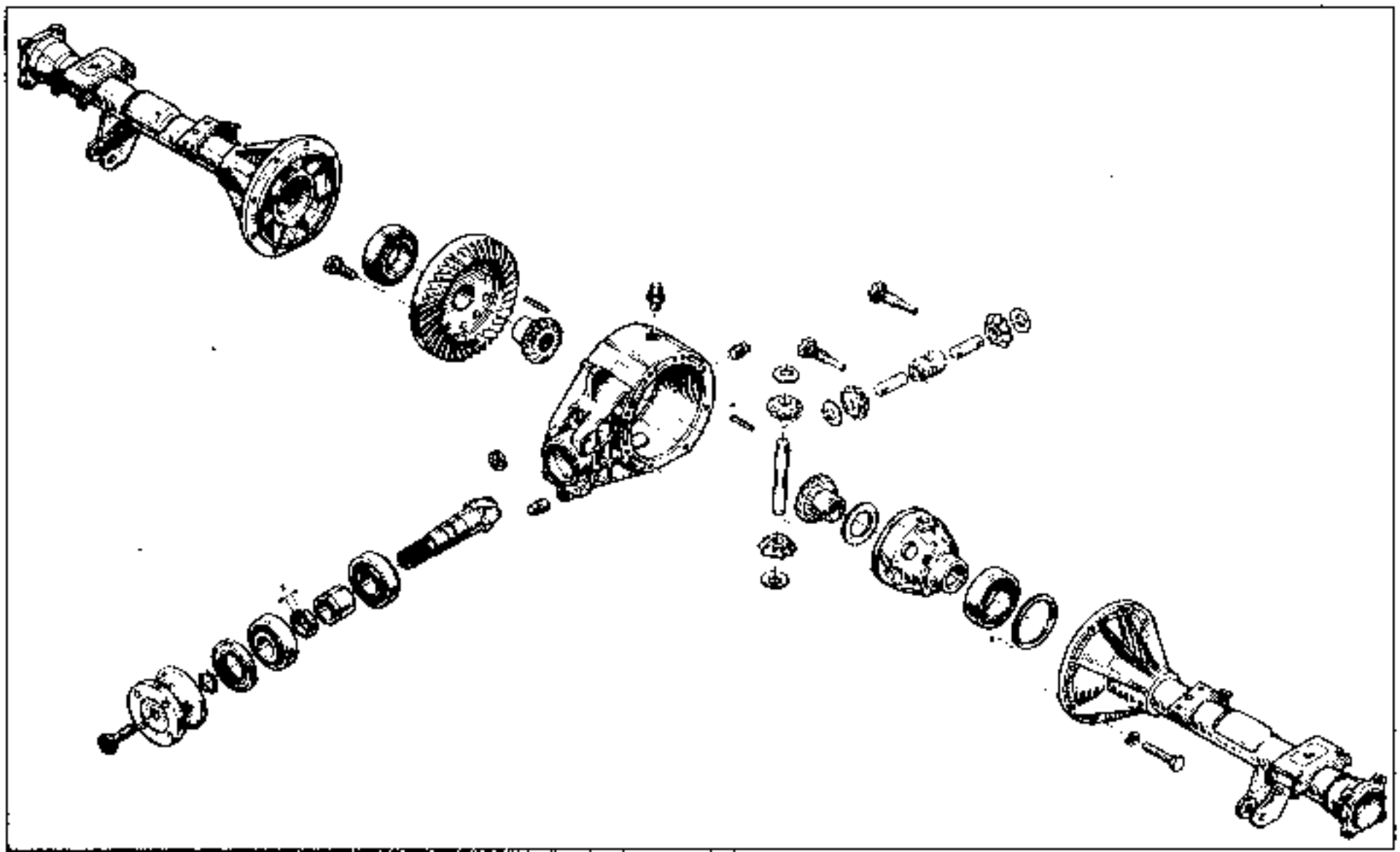
DESCRIPTION	PACK SIZE	PART NO.	TO BE USED FOR
• **MOLYKOTE "BR2"**	1 kg tin	77 01 421 145	Sun wheel splines Flange splines
• **CAF 4/60 THIXO**	100 g tube	77 01 404 452	Switch thread Side cover bolts protruding into casing
• **LOCTITE FRENBLOC** (locking and sealing resin)	24 cc bottle	77 01 394 071	Dog clutch fork/shaft assembly securing bolt Crown wheel bolts Final drive pinion flange bolts Flange bolts (Safrane final drive)
• **LOCTITE SCELBLOC** (sealing resin)	24 cc bottle	77 01 394 072	Dog clutch switch bush.

Parts which always need replacing

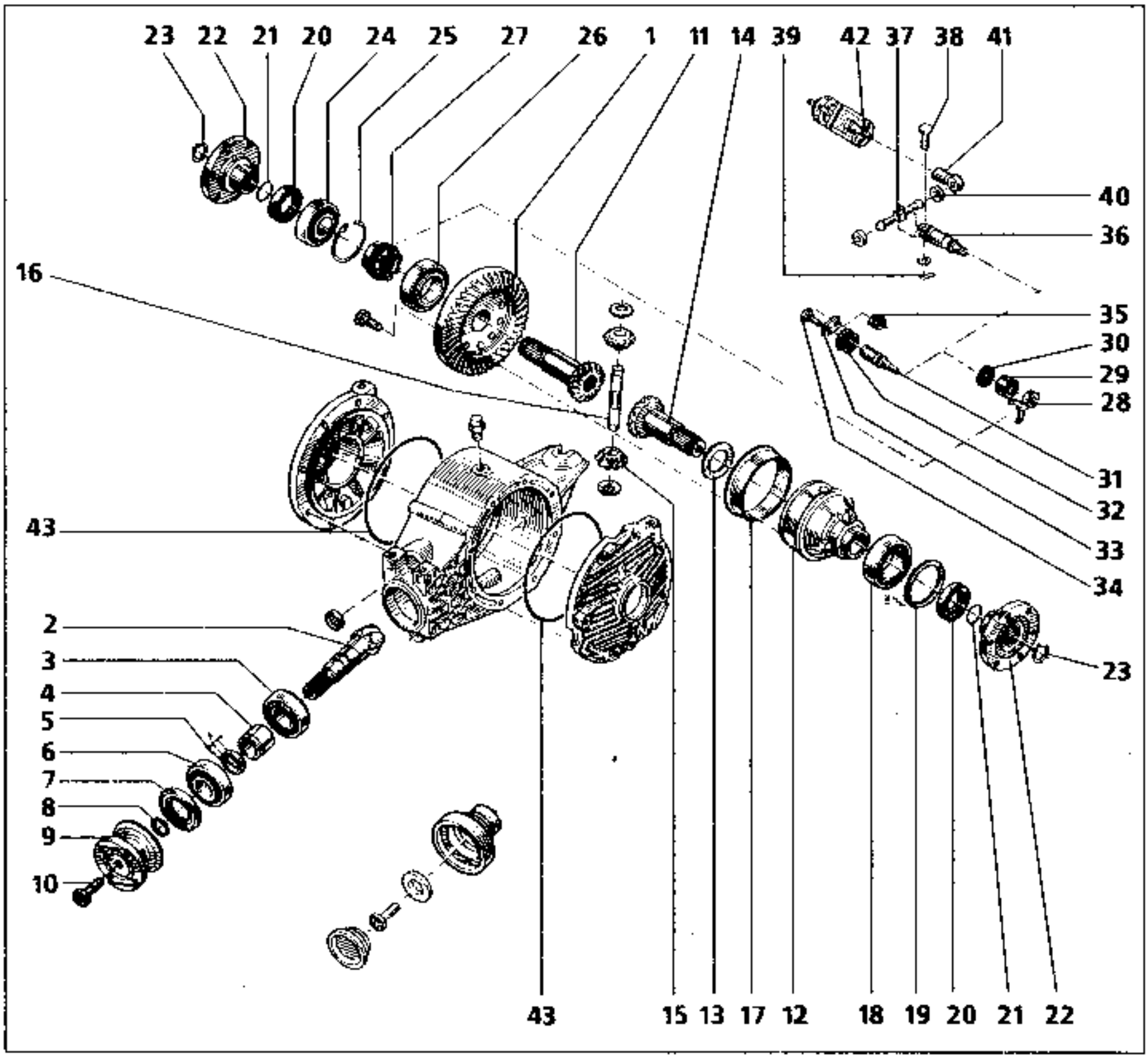
when they are removed:

- crown wheel bolts,
- lip seals,
- O-rings,
- circlips,
- flange mounting bolts,
- viscous coupling mounting nut.


85 086
85 085
85 084



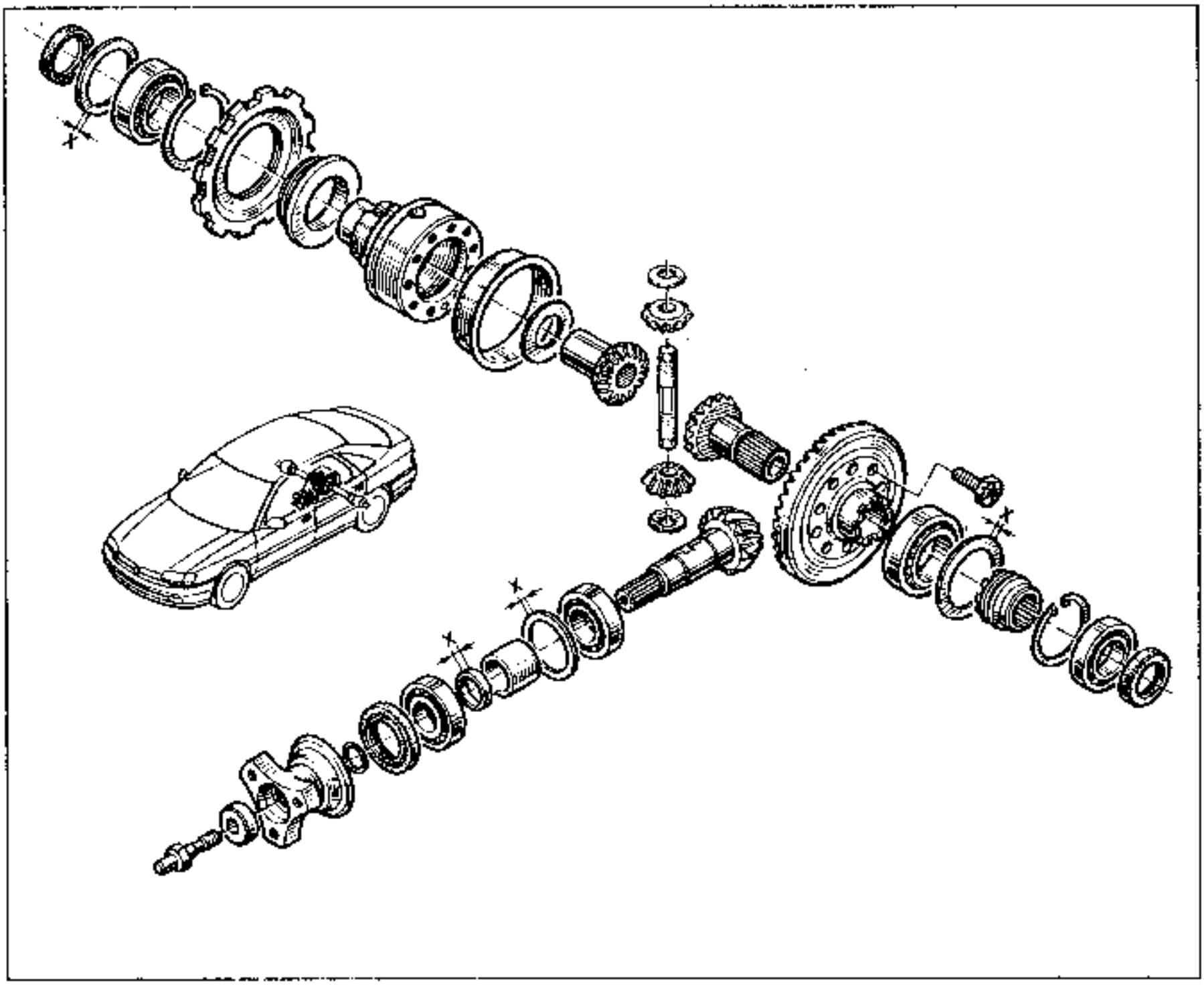
REAR AXLE
Exploded view



1. Crown wheel
2. Final drive pinion
3. Tapered roller bearing
4. Spacer
5. Preload adjusting spacer
6. Tapered roller bearing
7. Lip seal
8. O-ring
9. Input flange
10. Flange bolt
11. Right-hand sun wheel
12. Differential casing
13. Friction ring
14. Left-hand sun wheel
15. Planet wheel
16. Planet wheel shaft
17. Axle sleeve
18. Tapered roller bearing
19. Adjusting shim
20. Lip seal
21. O-ring seal
22. Drive shaft flange
23. Circlip
24. Ball bearing
25. Circlip
26. Tapered roller bearing
27. Sliding gear dog with front lobe
28. Fork
29. Switch bush
30. Lip seal
31. Fork shaft
32. Gaiter
33. Selector lever
34. Stud
35. Clevis
36*. Fork shaft
37*. Selector lever
38*. Stud
39*. Pin
40*. Ball joint protector
41*. Capsule end fitting
42. Vacuum capsule
43. Side cover O-ring

* 2nd type

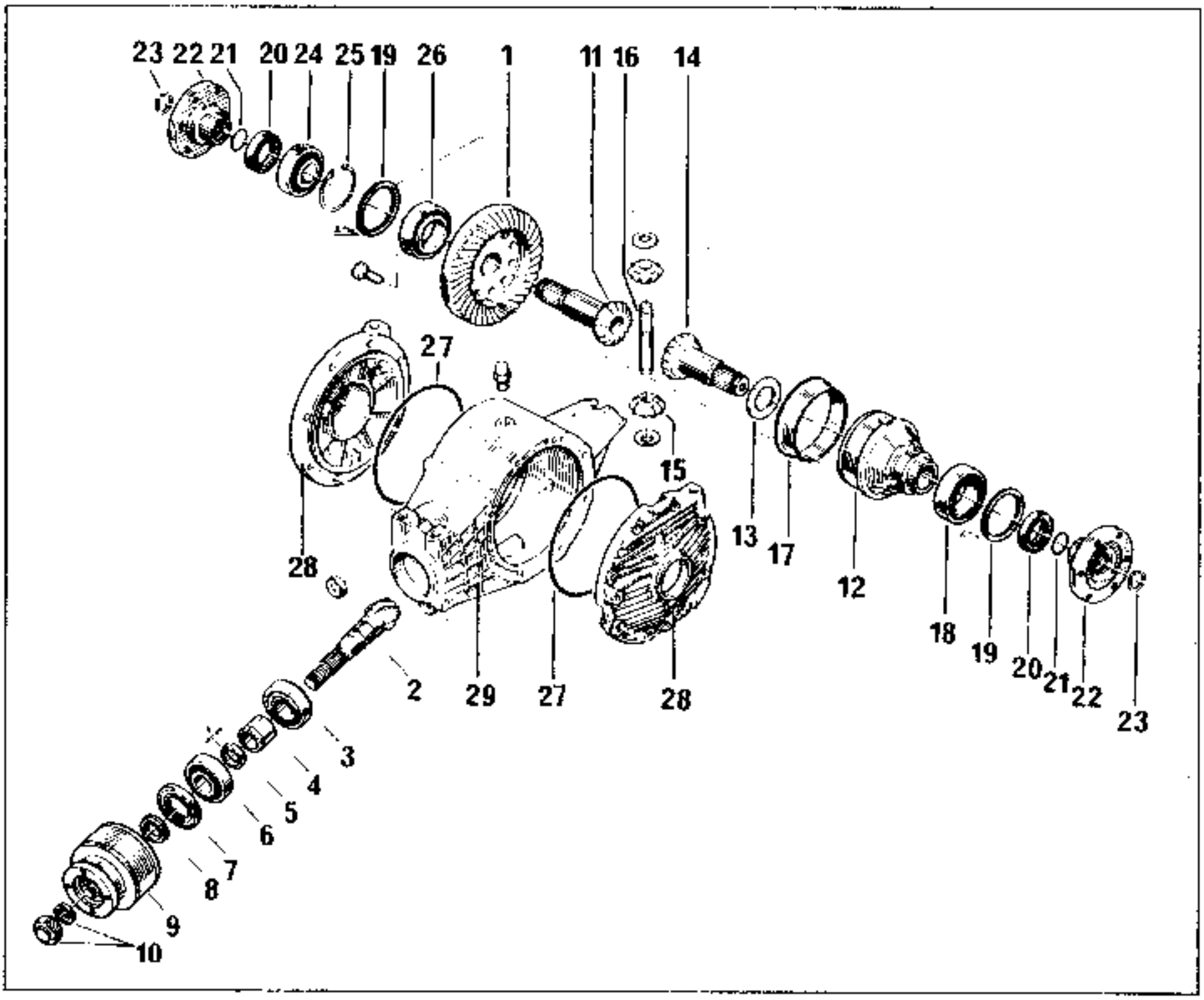
REAR AXLE
Exploded view



Special features:

It is different to the X48 because of the:

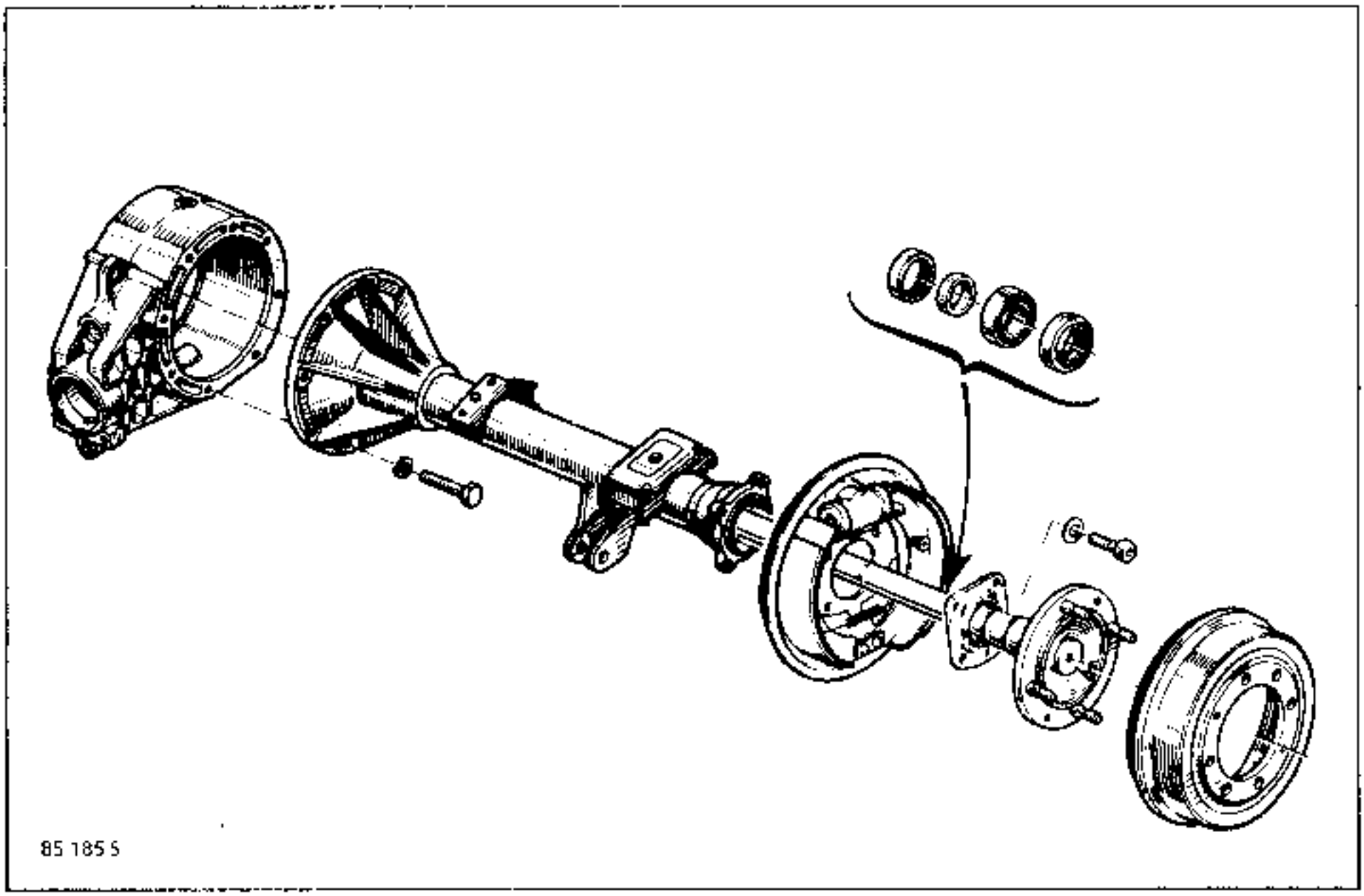
- Absence of flanges for the rear drive shafts (internal splines in the sun wheels).
- Inverse crown wheel.
- Speed information on the differential (sensor) for variable power-assisted steering
- Position of dog clutch system moved, but operating principle similar to that of the X48



1 Crown wheel
2 Final drive pinion
3 Tapered roller bearing
4 Spacer
5 Preload adjusting spacer
6 Tapered roller bearing
7 Lip seal
8 Spacer
9 Viscous coupling
10 Washer - Nut
11 Right-hand sun wheel
12 Differential casing
13 Shim
14 Left-hand sun wheel
15 Planet wheel
16 Planet wheel shaft
17 Axle sleeve
18 Tapered roller bearing
19 Shim
20 Lip seal
21 O ring
22 Drive shaft flange
23 Circlip
24 Ball bearing
25 Circlips
26 Tapered roller bearing
27 Side cover O-ring seal
28 Side cover
29 Final drive casing

TIGHTENING TORQUES (in daN.m)	
Crown wheel bolts	12 to 14
Final drive pinion flange bolts	15 to 16
Final drive pinion nut	20
Final drive side cover mounting bolts	5
Flared tube mounting bolts	6
Drain and refill plugs	2
Brake backing plate bolts	6

DISMANTLING

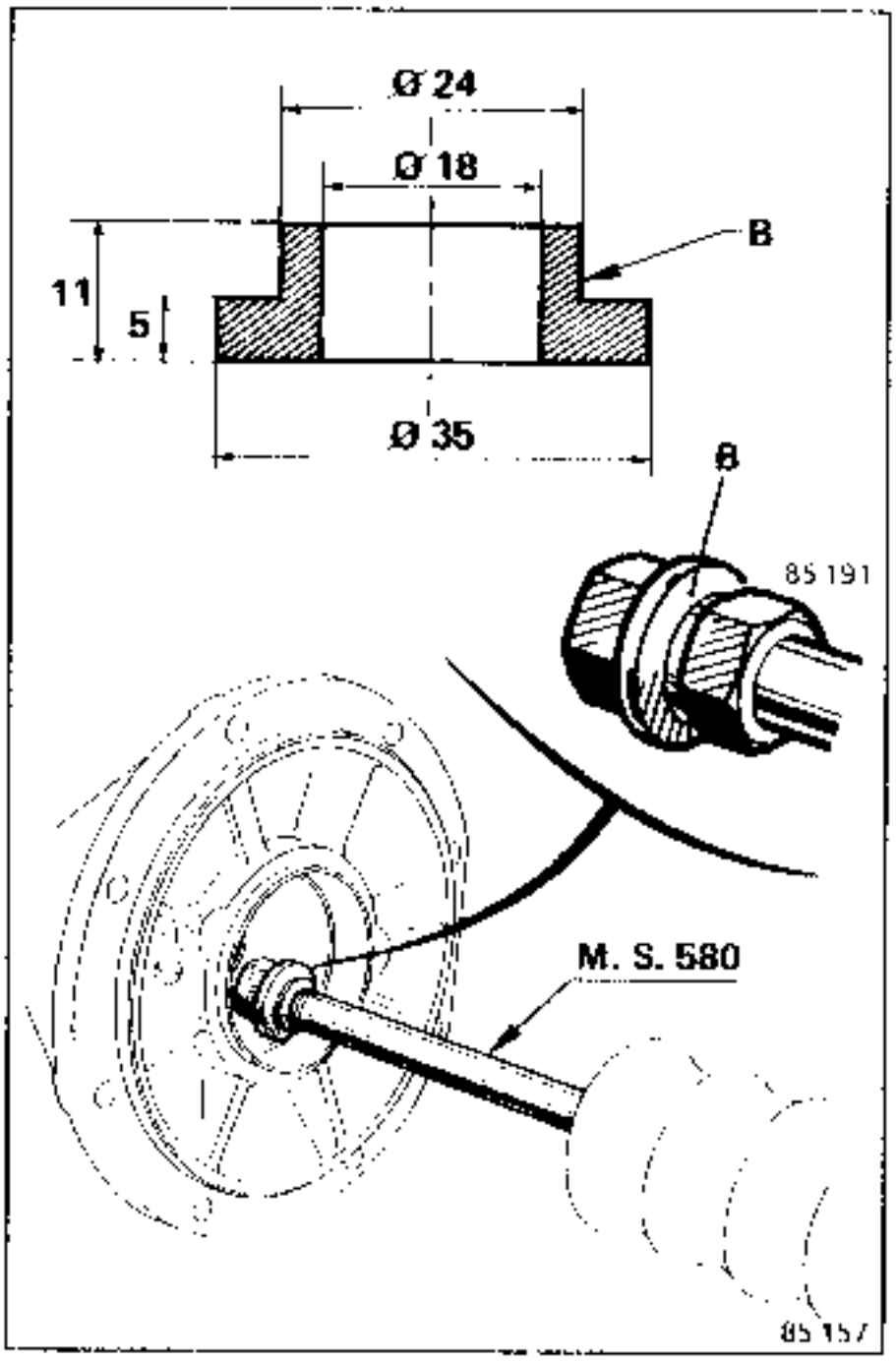


Dismantling - Special points:

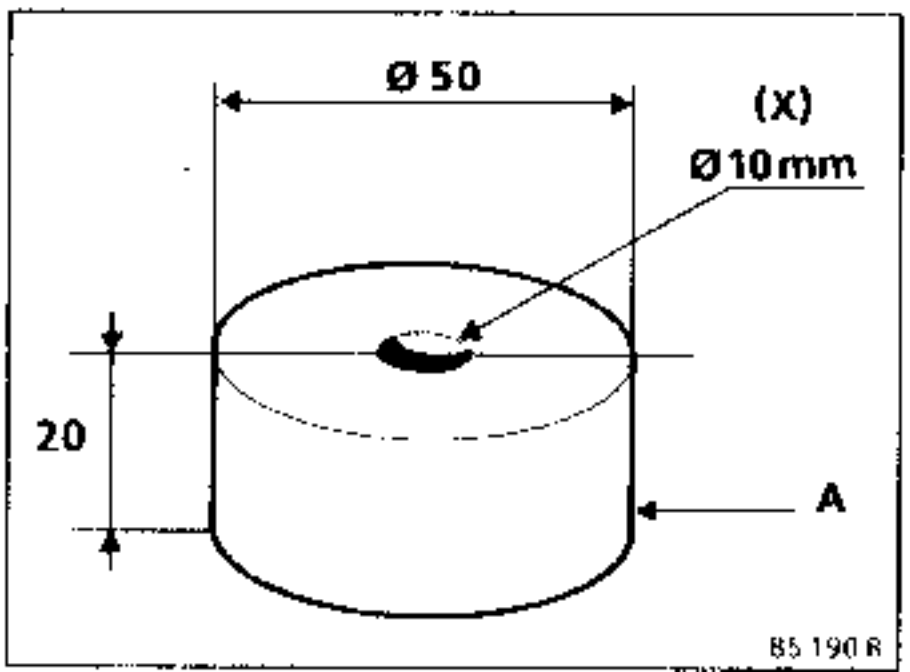
When removing the right-hand flared tube, make sure that the differential does not fall out.

DISMANTLING (continued)

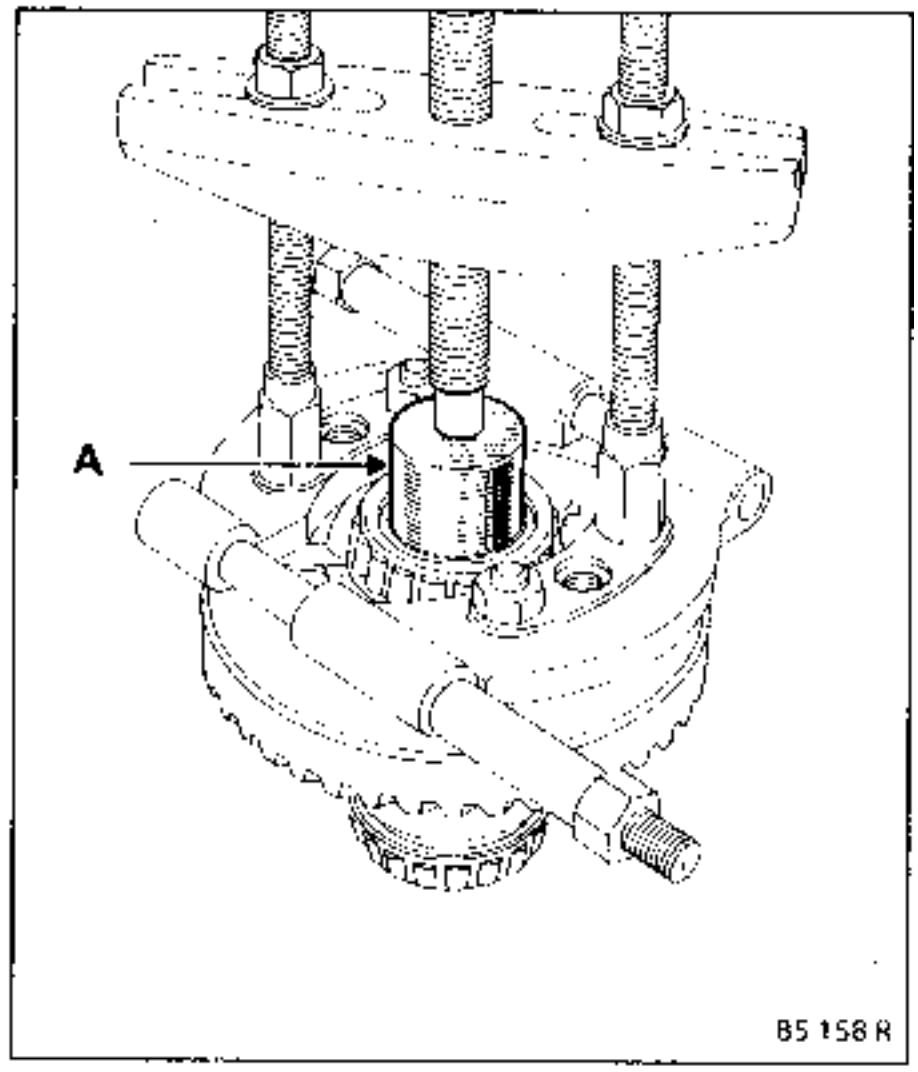
Using tool (B) manufactured locally and slide hammer extractor **M.S 580**, remove the bearing races in the flared tubes (dimensions in mm)



NOTE: Recover the two differential preload shims on the left-hand side.
A locally manufactured tool (A) is required to remove the differential bearings (dimension in mm) ((X) : drill bit recess)



Using a puller of the type **Facom U53T + U53K** and tool (A), remove the bearings.
Remove the bolts securing the crown wheel to the casing.



Use pin drift **B.Vi.606** to remove the planet wheel shaft pin.
Separate the various parts.

Checking the parts :

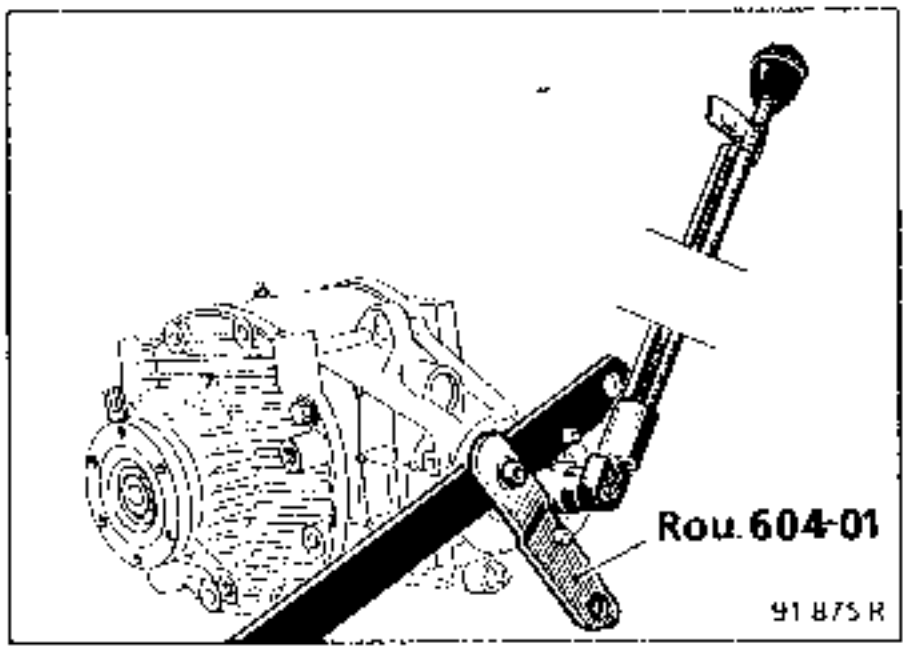
The bearings must be replaced as soon as they show any scratches, spots where overheating has occurred or excessive wear.

The teeth on the sun wheels and planet wheels should not be jagged or excessively worn.

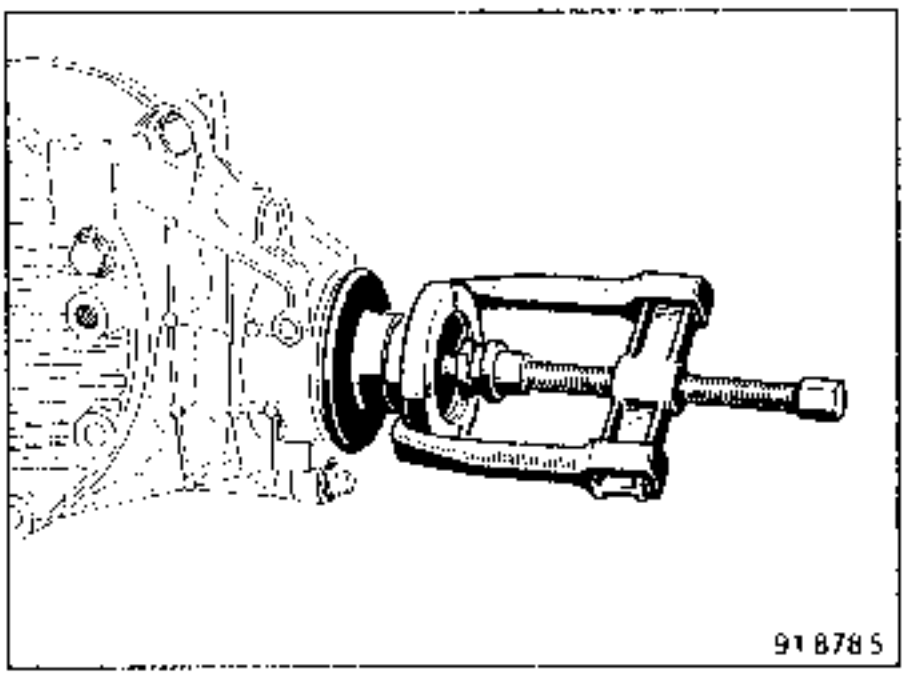
Also make sure that the surfaces in contact with the crown wheel and the casing do not show any traces of seizing or abnormal wear.

DISMANTLING (continued)

Removing the final drive pinion
Remove the flange bolt using tool **Rou. 604.01** to prevent it from turning

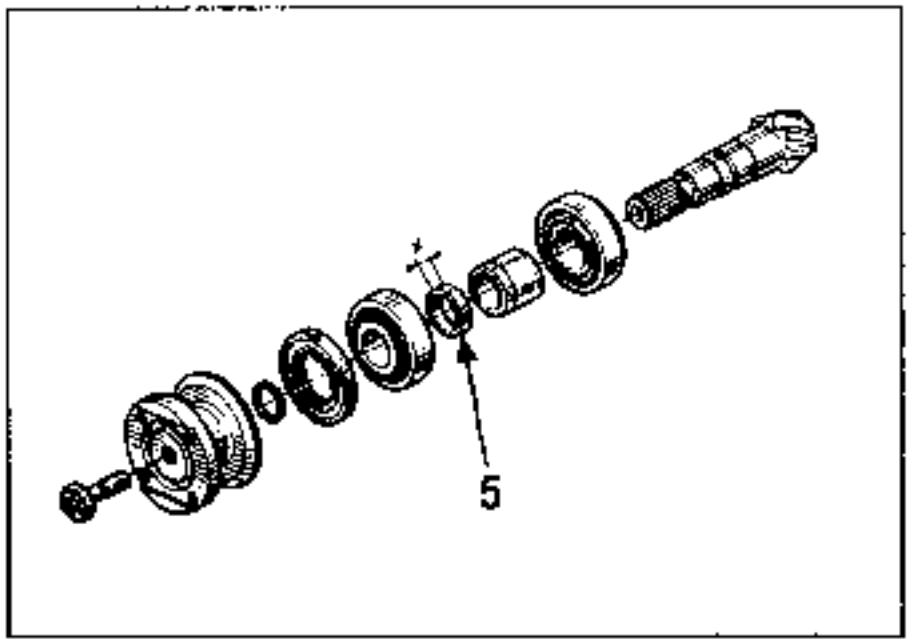


Using a puller of the type **FACOM U32-120** or similar, take out the input flange.



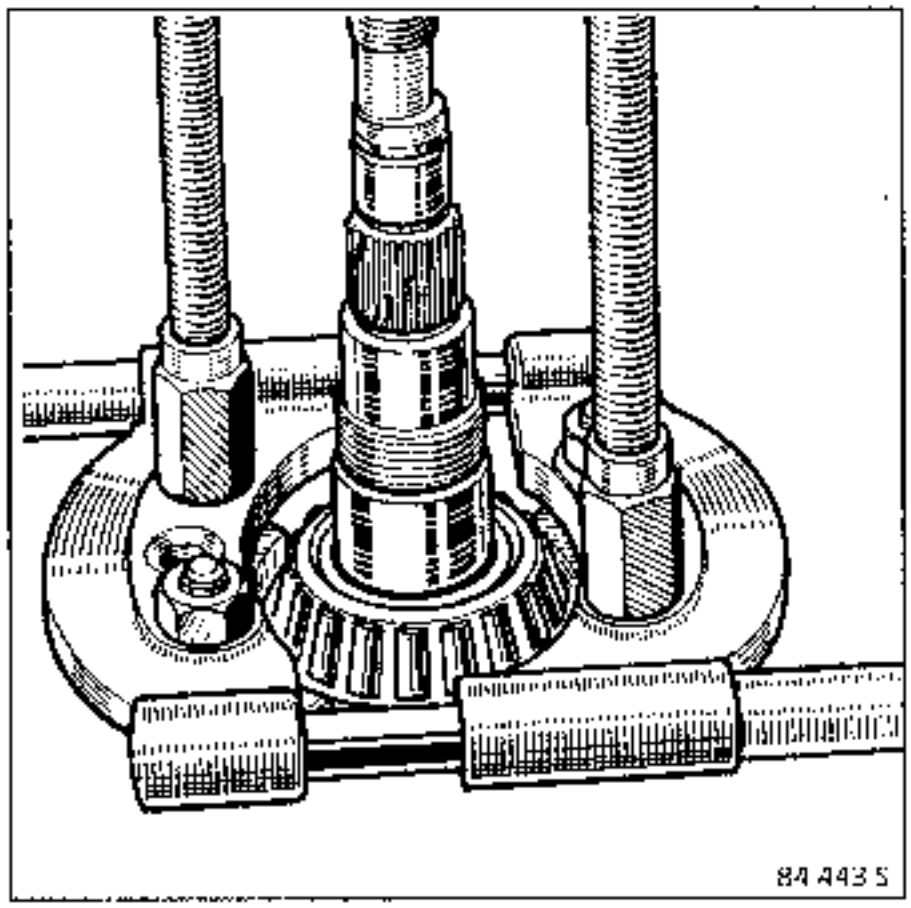
Knock out the final drive pinion using a bronze drift.

Remove the lip seal and bearing .



Recover the preload shim (5) and the spacer.

Using a tool of the type **FACOM U 53 T + U 53 K** or similar, take out the final drive pinion underhead bearing

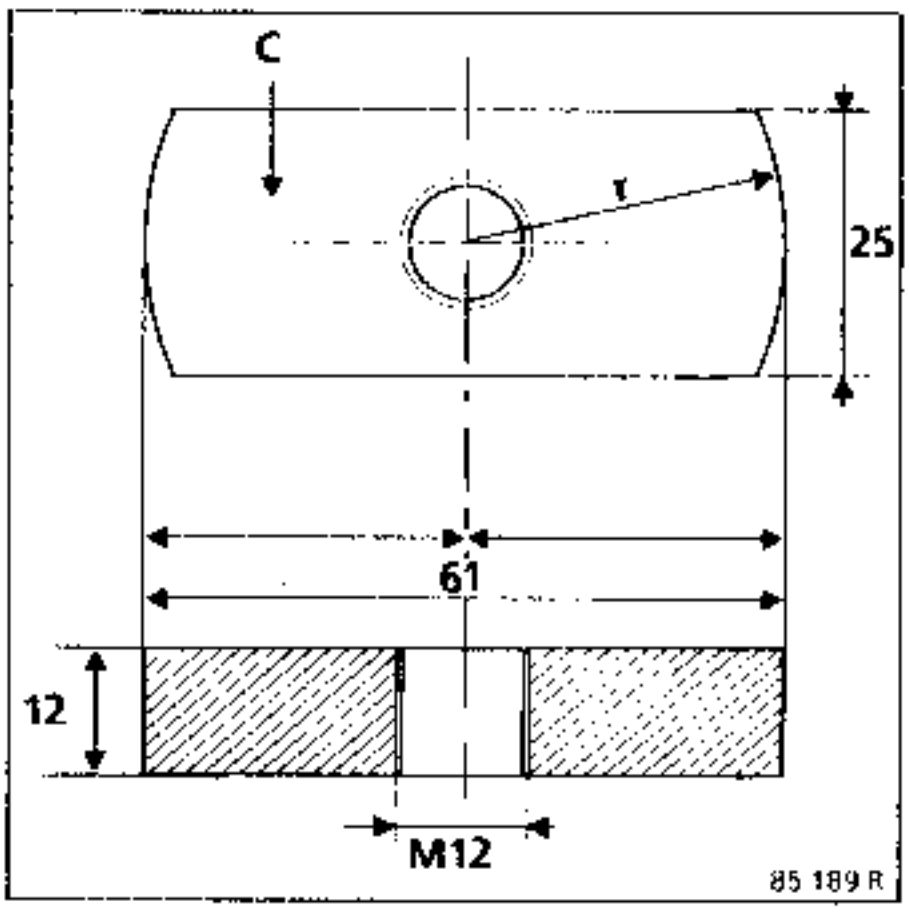


DISMANTLING (continued)

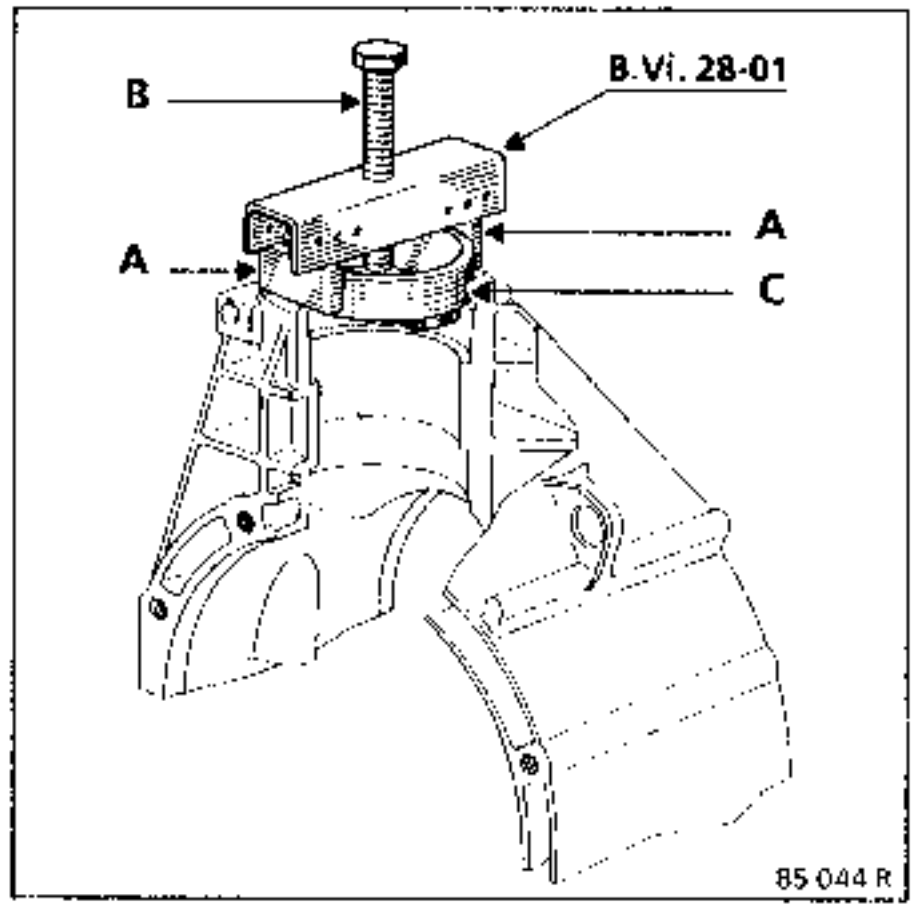
Pulling out bearing races in the final drive casing

Make the following tools locally:
- Two shims (A), 5 mm and 50 mm long.
- A bolt (B) 12 mm in diameter, 150 pitch and 120 mm long.
- A tool (C) with the dimensions shown below.

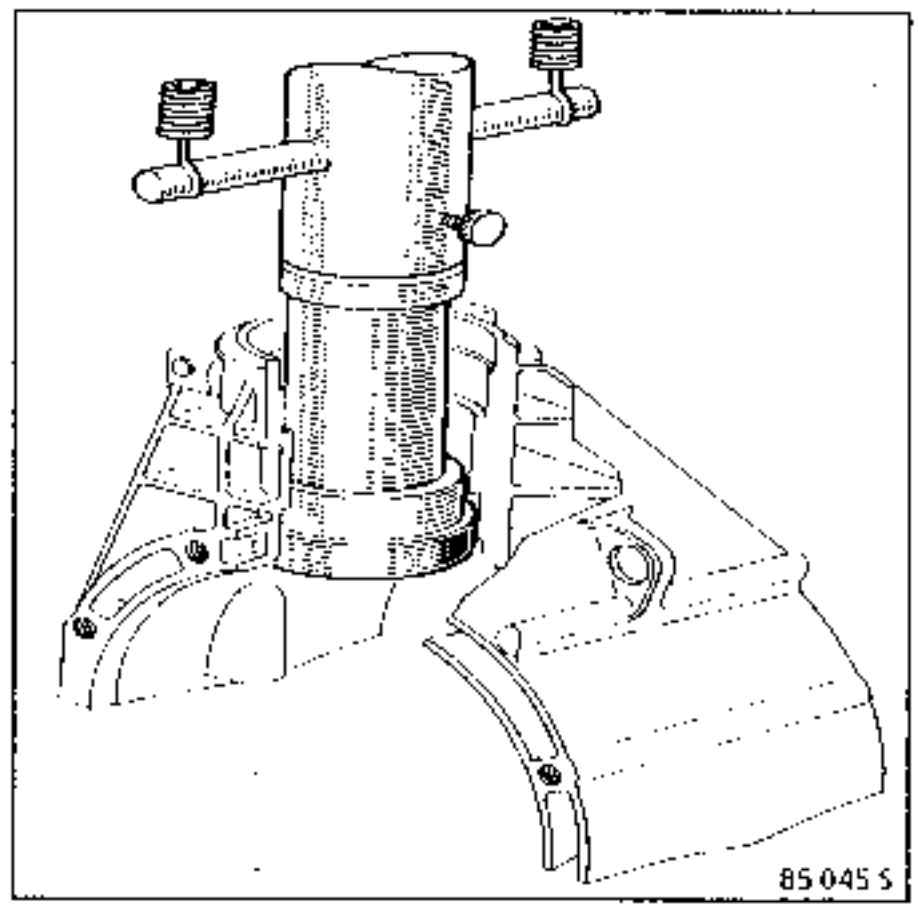
Use the upper part of tool **B. Vi. 28-01**.



Place :
- Tool (C) below the bearing race.
- The two shims (A) to support the casing on each side.
- Bolt (B) across the upper part of tool **B. Vi. 28-01** and screwed into (C).



Under-head bearing
Lock the final drive on a press using a 61 mm dia. tube and remove the bearing cup.



Recover the pinion protrusion shim (depending on type).

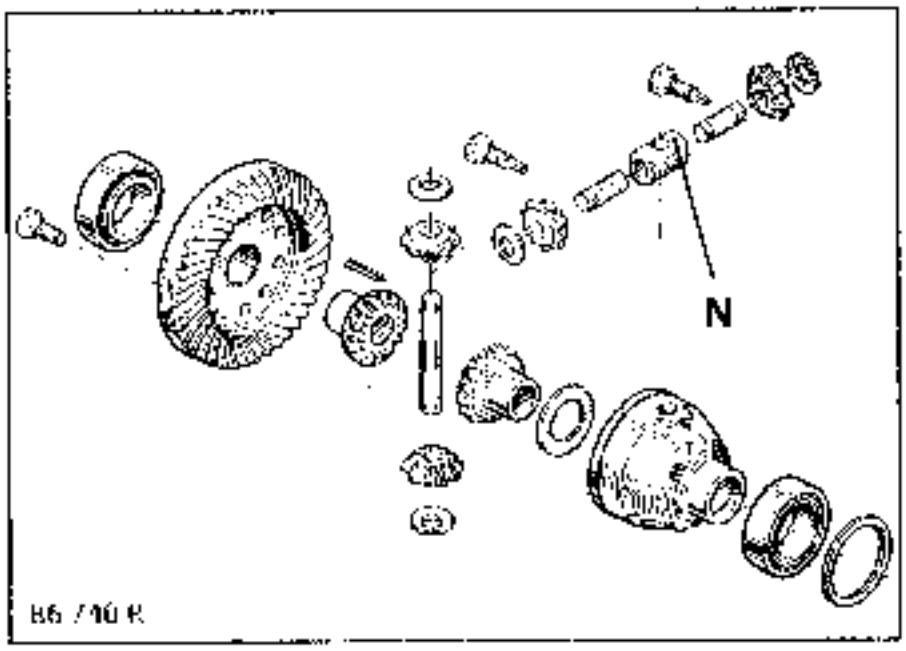
Checking the parts :

The bearings must be replaced as soon as they show any scratches, spots where overheating has occurred or excessive wear.
As the lip seal is in direct contact with the flange, check the condition of the seating. If there are any scratches, replace the flange.

REASSEMBLY - ADJUSTMENT

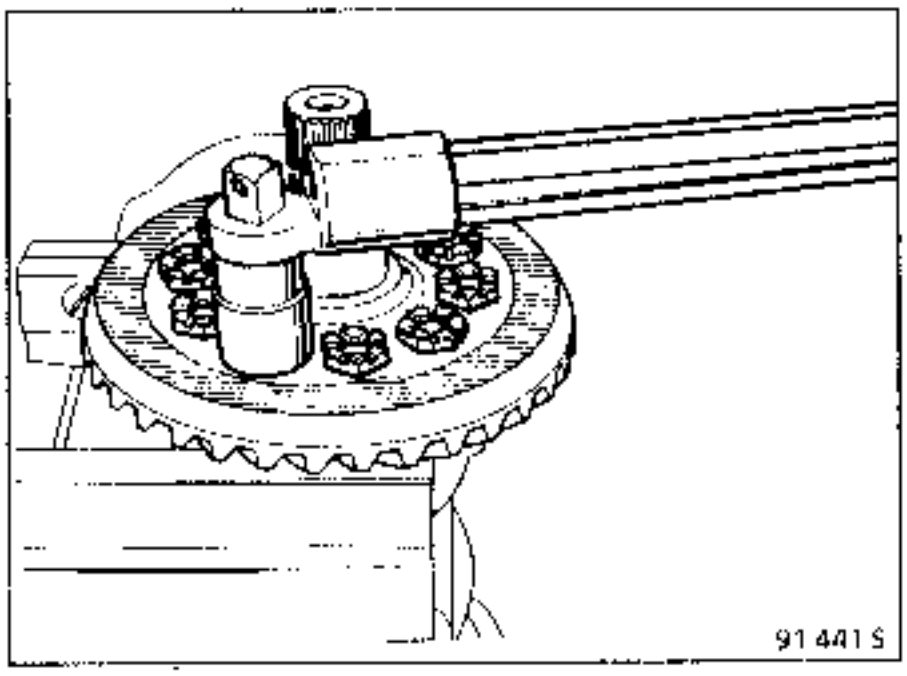
Reassembling the differential

Special points:
Oil all the parts before reassembly.
The bearing on the crown wheel side is wider than that on the differential housing side.



Secure the crown wheel to the housing, using new bolts.
The double nut (N) must be fitted and aligned lengthwise with the planet wheel half-shafts.

Torque the bolts to 12 to 14 daN.m.

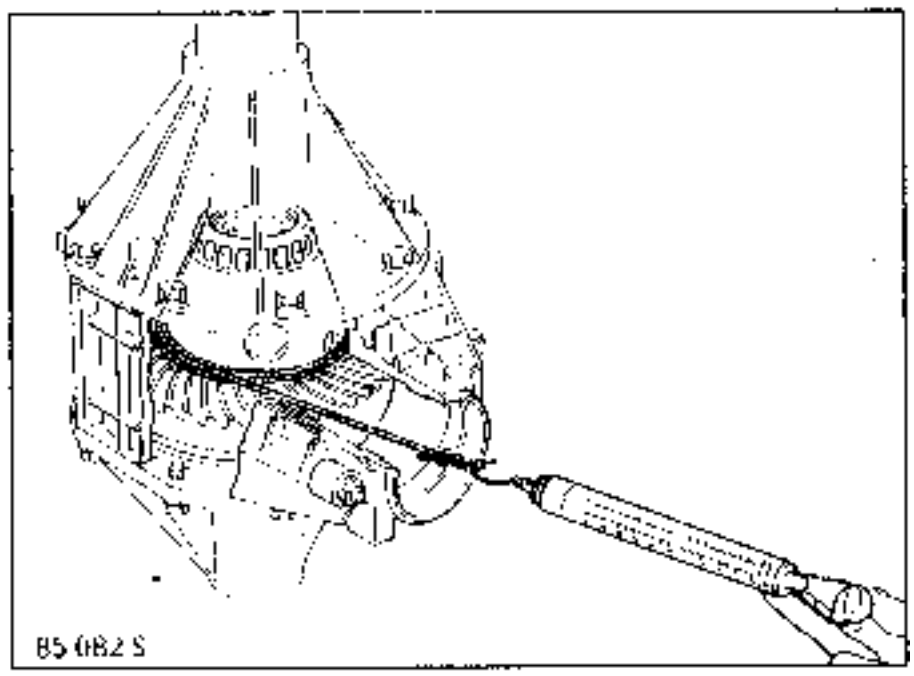


There is nothing special about refitting the bearing outer races. However, ensure that the shims removed during dismantling are refitted in the correct position.

Adjusting the differential bearing preload

1st method
The differential bearing preload must be adjusted with the final drive casing stripped and without final drive pinion bearing cups as these obstruct the movement of the string and spring balance.
Fit:
- the right-hand flared tube in a vice with clamping jaws
- the differential
- the drained final drive casing
- the left-hand flared tube fitted with adjusting shims
- Torque the flared tubes to **6 daN.m.**

Measure the preload using a spring balance. The preload should be between **5 and 6.5 daN.**

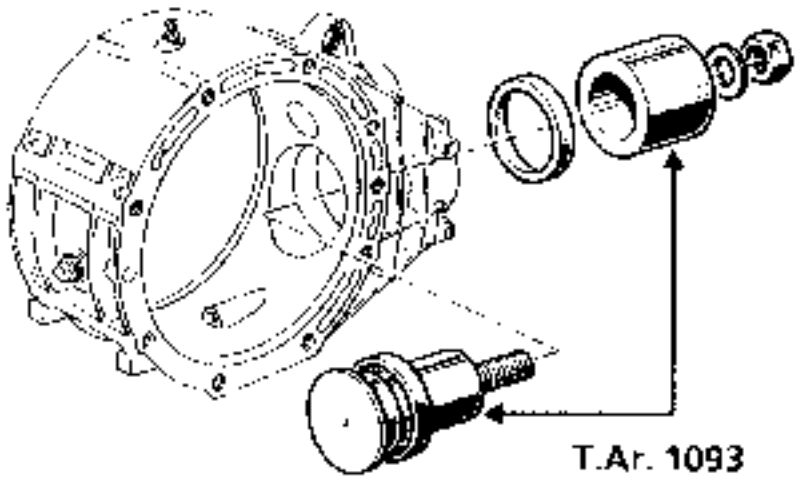


The preload increases with the value of the shim and vice versa.
After the adjustment has been made, remove the flared tubes and the differential.

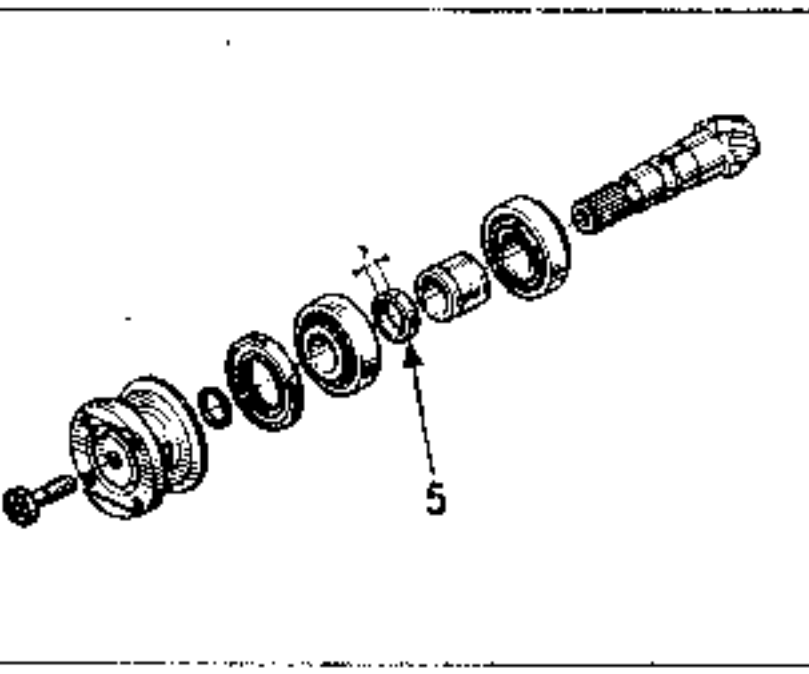
REASSEMBLY - ADJUSTMENT

Refitting the final drive pinion

Fit the under-head bearing using a press and a tube.
Fit the bearing cups using tool **T.Ar. 1093**

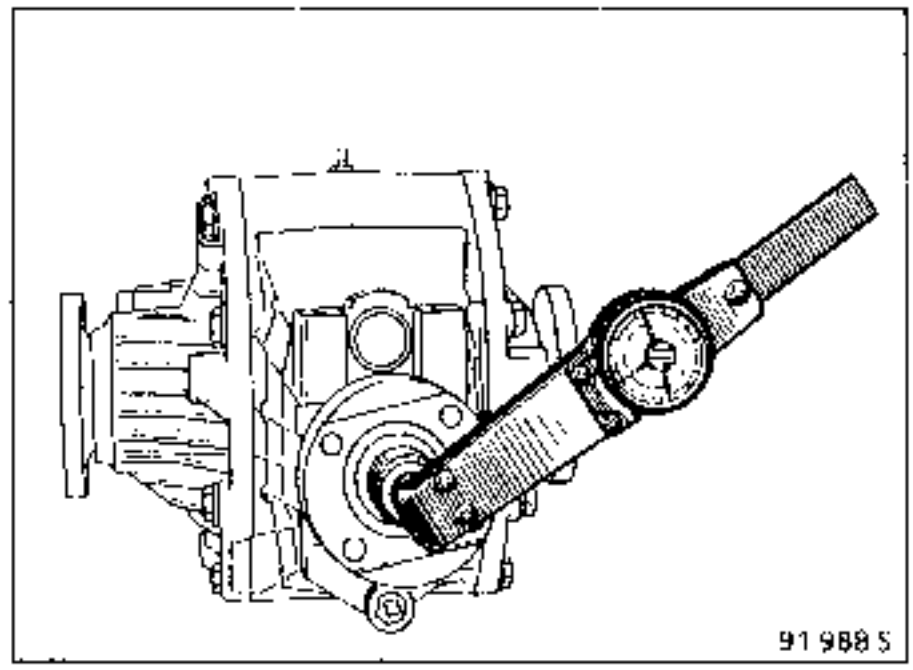


Check the bearing cup mounting and the washer on the casing.
Adjust the final drive pinion bearing preload.
This operation is performed without the differential. Fit the spacer and the preload shim (5) on to the final drive pinion: it must be refitted in the same position.

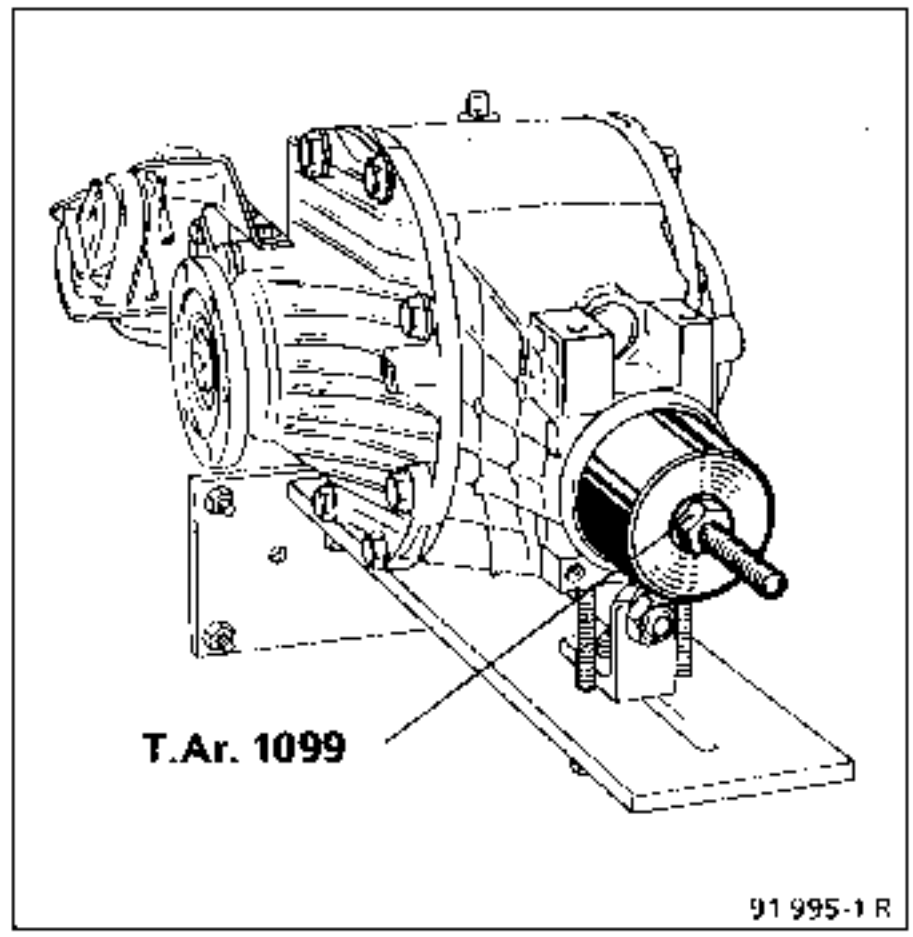


Fit the bearing and flange; torque the bolt to **15 to 16 daN.m.**

Using a precision torque wrench and tool **T.Ar 1140,** measure the rotational torque.

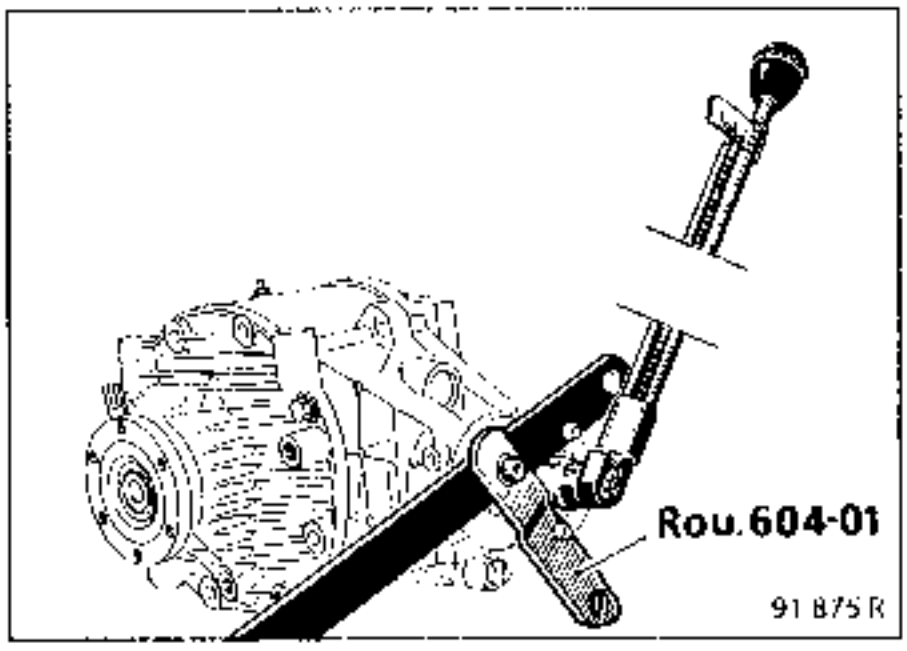


The final drive pinion should rotate when a torque of between 1.2 and 2.5 **N. m** is applied.
This is the torque required to maintain the rotational movement.
If the adjustment is not correct, increase or reduce the thickness of the spacer (5).
After the correct adjustment has been obtained, remove the flange and fit the lip seal (lubricated) using tool **T.Ar 1099**



REASSEMBLY - ADJUSTMENT (continued)

Refit the flange.
Put three drops of **LOCTITE FRENBLOC** on the bolt threads (new) and tighten to the specified torque.



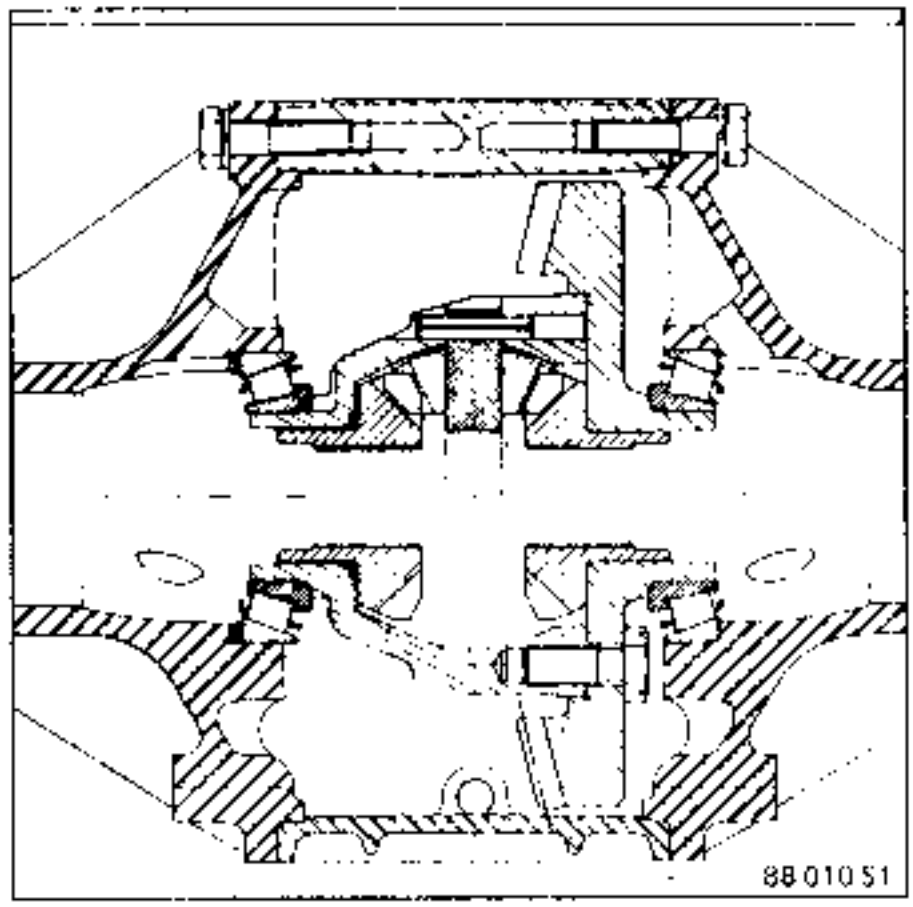
Adjusting backlash :

This operation is to be carried out after adjusting the differential and final drive pinion bearing preloads.

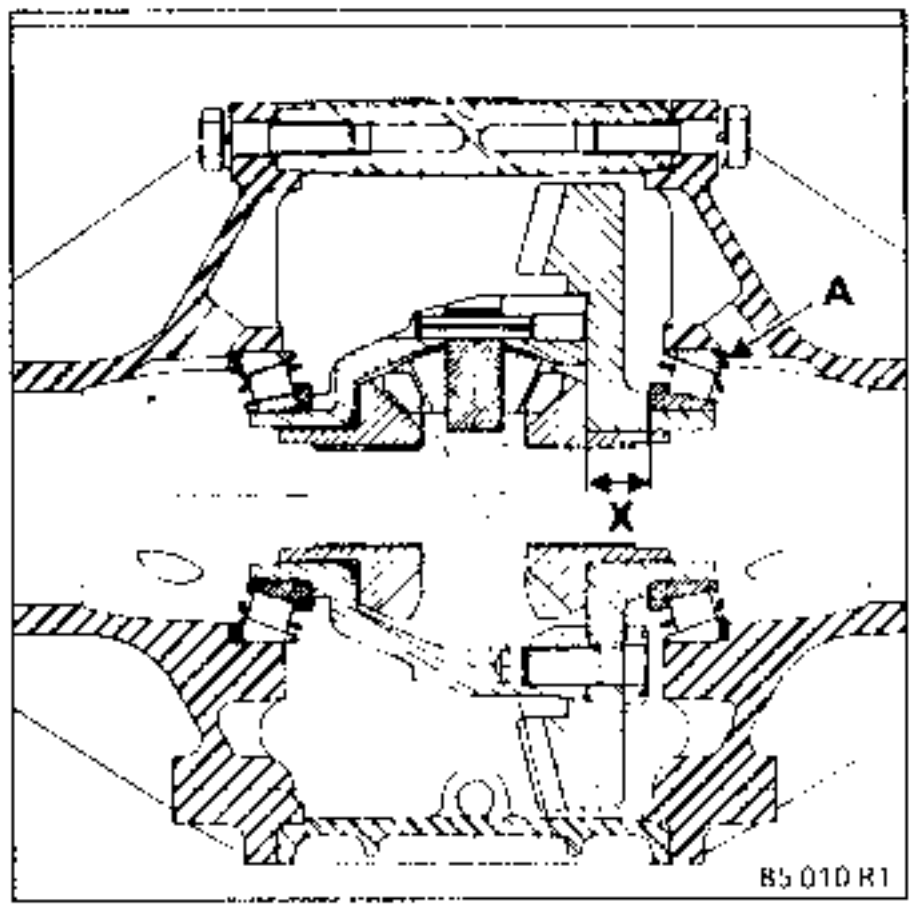
There are two types:
1st type : It is not possible to adjust the backlash.

2nd type : Dimension X has been reduced by 1.2 mm on the crown wheel and the backlash can be adjusted by fitting shims at A.

1st type



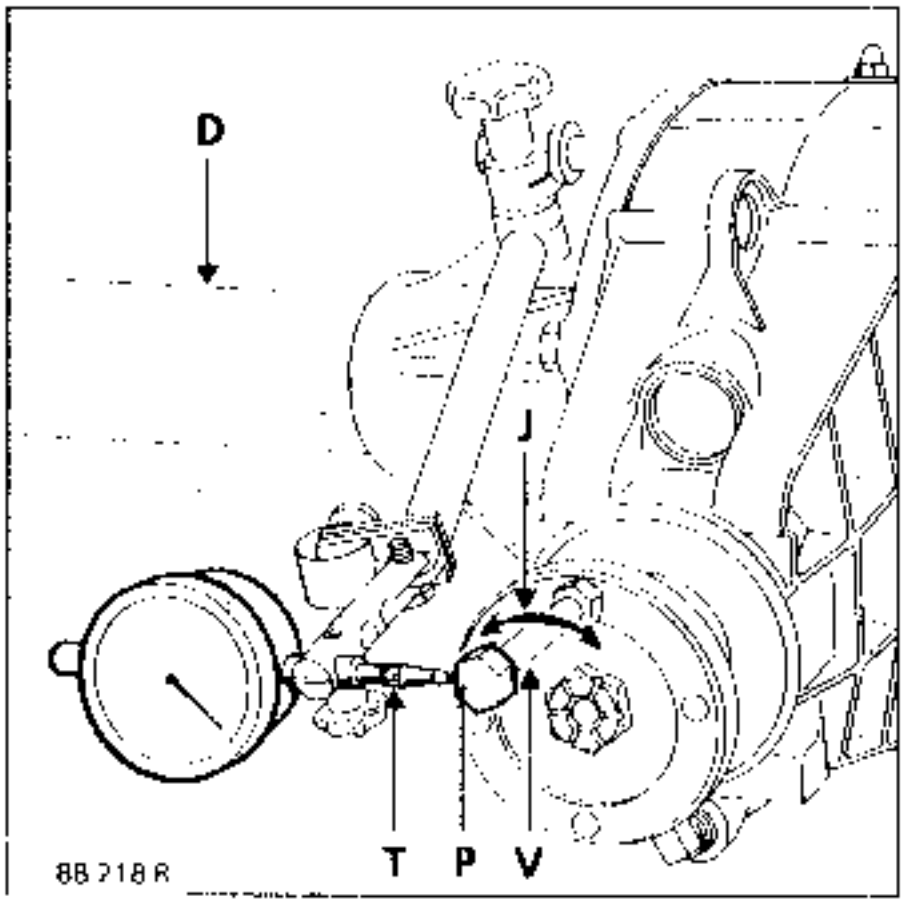
2nd type



NOTE : When a crown wheel and pinion set is required as a service part, the second type is supplied. The backlash therefore has to be adjusted and a shim **1.2 mm** thick has to be placed at A to adjust the bearing preload.

REASSEMBLY - ADJUSTMENT (continued)

Insert a 8 mm dia bolt (V) in one of the flange holes
Fit a dial gauge on a bracket and probe (T) on one of the flats (P) of the bolt.

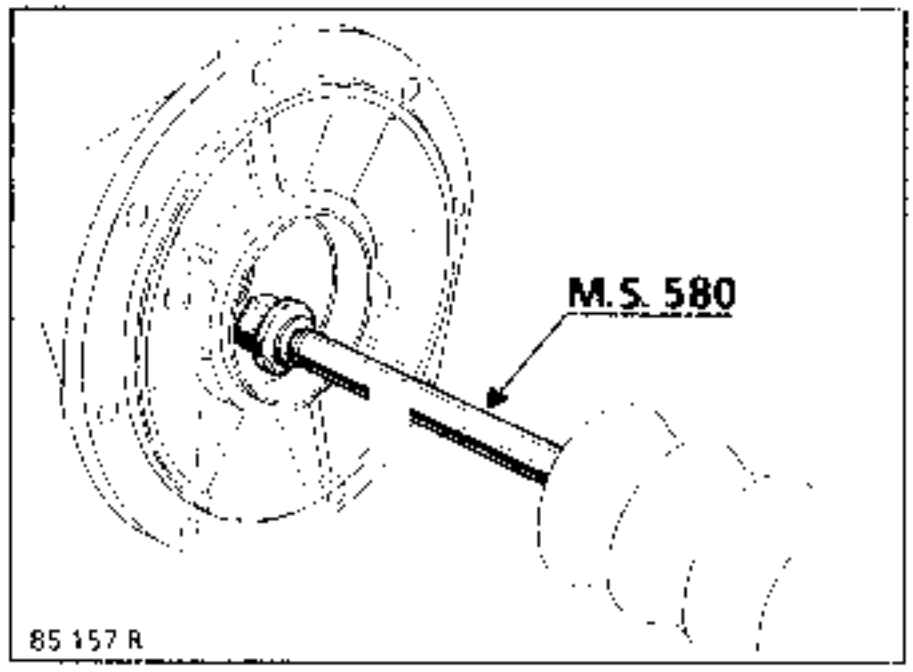


Measure the backlash (J) by turning the flange slightly.
Turn the flange a dozen times and insert the bolt (V) in another hole.
Measure the backlash (J).
Measure the backlash four times (J) and take the average.

0.20 mm < J < 0.30 mm

(Which corresponds to an internal backlash of 0.10 to 0.20 mm.)
If the backlash (J) is not correct, remove the flared tubes (D) on the right-hand and left-hand sides .

Remove the bearing races in the flared tubes.

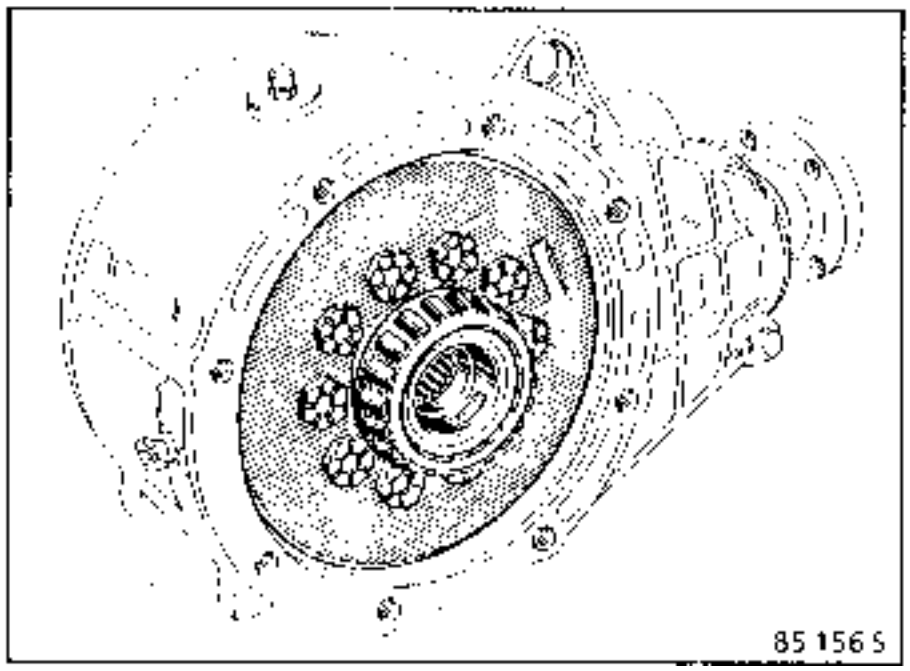


Recover the shims behind the bearing races.
To reduce the backlash (J) by 0.08 mm on the side opposite the crown wheel, reduce the thickness of the shims by 0.1 mm and make this up on the crown wheel side (to maintain the same bearing preload).
To increase the backlash (J) add shims.
Check the backlash after refitting the flared tubes.

NOTE : Coat the surfaces of the seal between the casing and the end of the flared tube with **CAF 4/60 THIXO.**

Torque tighten the flared tube bolts to **6 daN. m**

Install the wheel shafts with the flanges fitted, ensuring that the handbrake cables are routed towards the front of the vehicle.
Torque tighten the flange bolts to **6 daN. m.**



ESPACE

TIGHTENING TORQUES (in daN.m)	
Crown wheel bolts	13
Final drive pinion nut	20
Axle side cover mounting bolts	5
Breather	1.5
Drain and refill plugs	2

X 48

TIGHTENING TORQUES (in daN.m)	
Crown wheel bolts	13
Final drive pinion flange bolts	15 to 16
Axle side cover mounting bolts	5
Fork/dog clutch shaft	6.5
Bolts, 6 mm dia. at end of dog clutch shaft	0.5
Switch	2.5
Breather	1.5
Drain and refill plugs	2
Bolt, 10 mm dia., for capsule bracket on right-hand flange	5

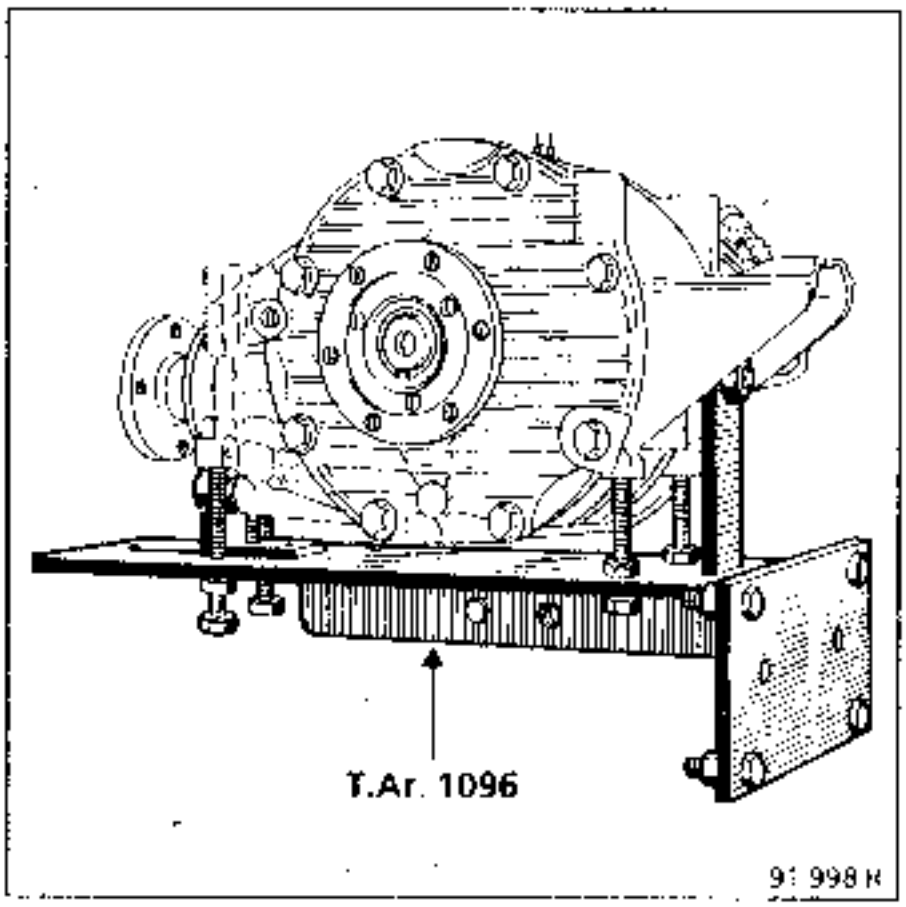
SAFRANE

TIGHTENING TORQUES (in daN.m)	
Crown wheel bolts	13
Final drive pinion flange bolts	15 to 16
Axle side cover mounting bolts	5
Fork/dog clutch shaft	6.5
Bolt, 6 mm dia., at end of dog clutch shaft	0.5
Electronic wheel speed sensor	5
Mounting bolts for wheel speed sensor support on final drive casing	2.5
Switch	2.5
Breather	1.5
Drain and refill plug	2
Bolt, 12 mm dia., for capsule bracket on left-hand flange	9
Bolt, 6 mm dia. for capsule mounting on left-hand flange	0.7

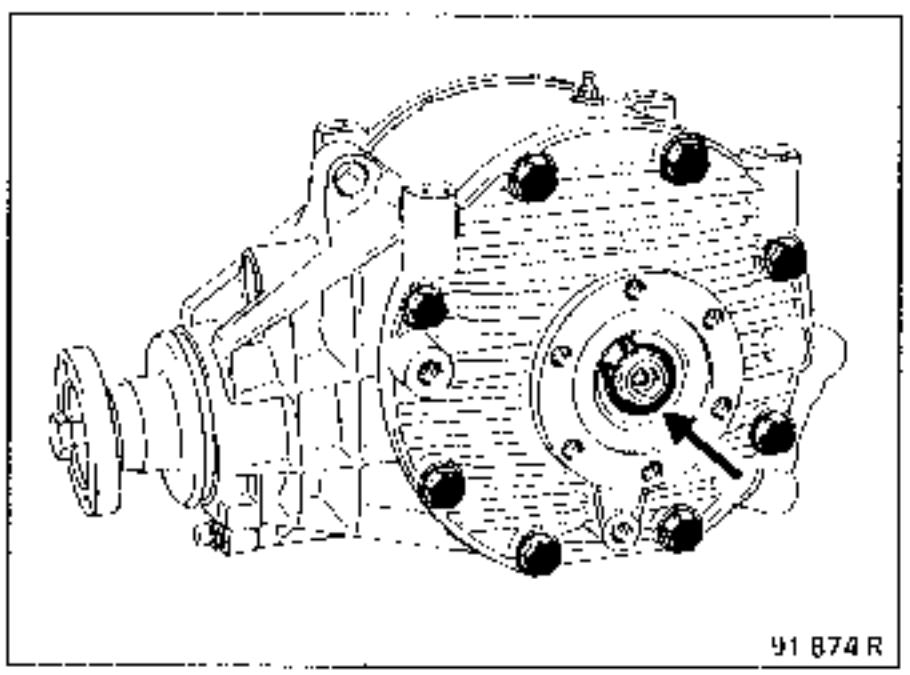
REMOVAL

Drain the final drive

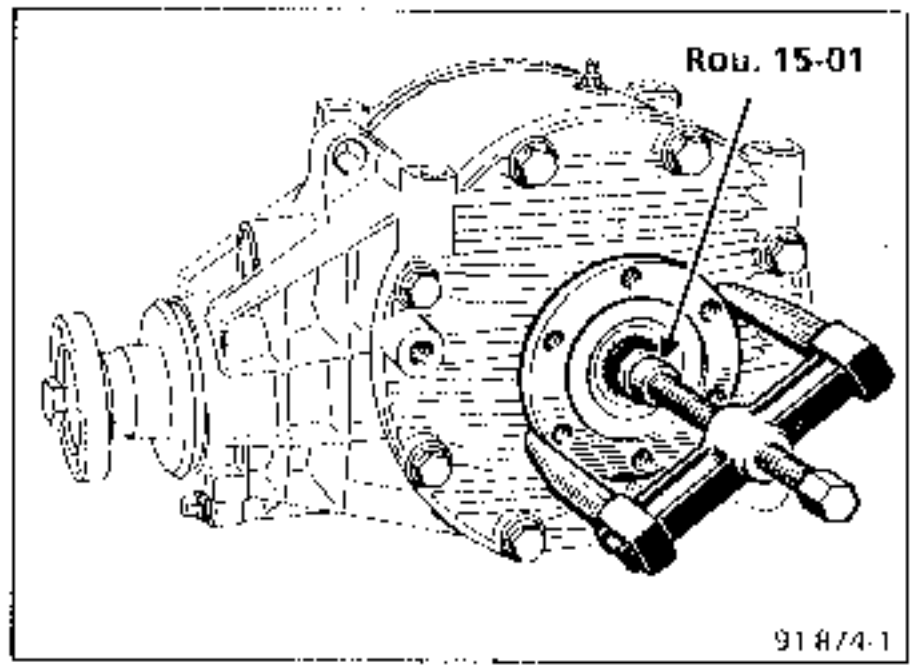
Place the assembly on support **T.Ar. 1096** which can be fitted to the Desvil stand.



Remove:
–the circlips securing the drive shaft flanges;



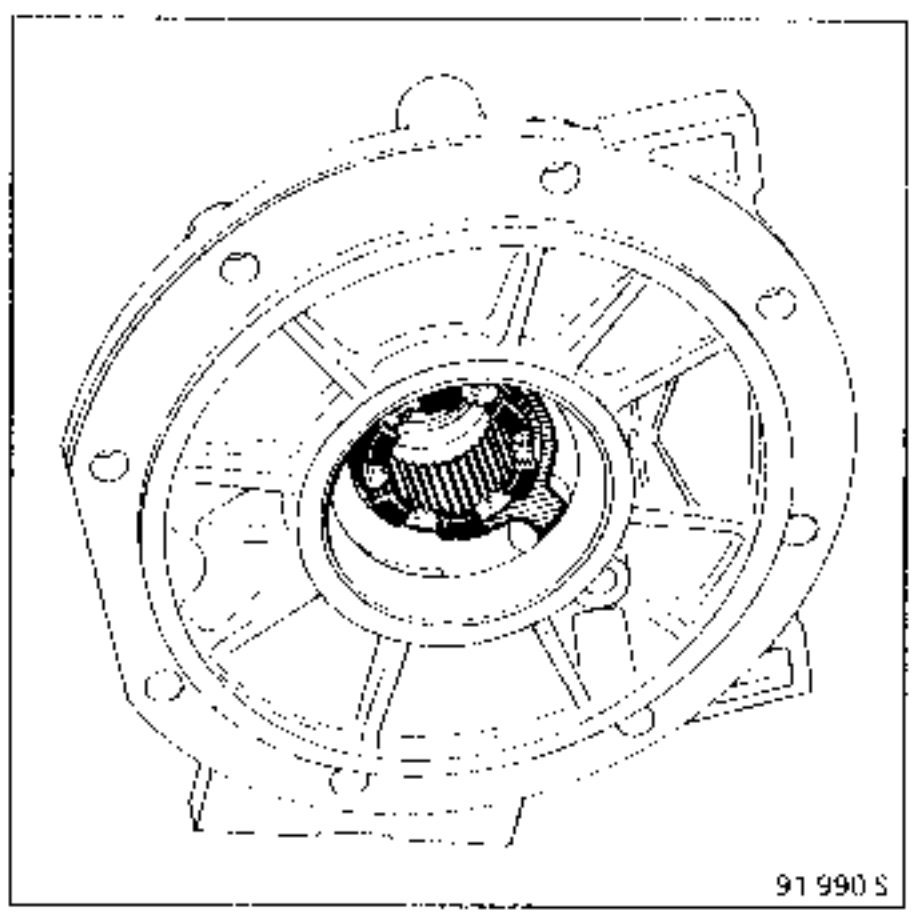
– the drive shaft flanges using a **FACOM U32-120** puller or the like, fitting the shaft protection cup **Rou. 15-01**;



– the right-hand final drive side cover.

For X48

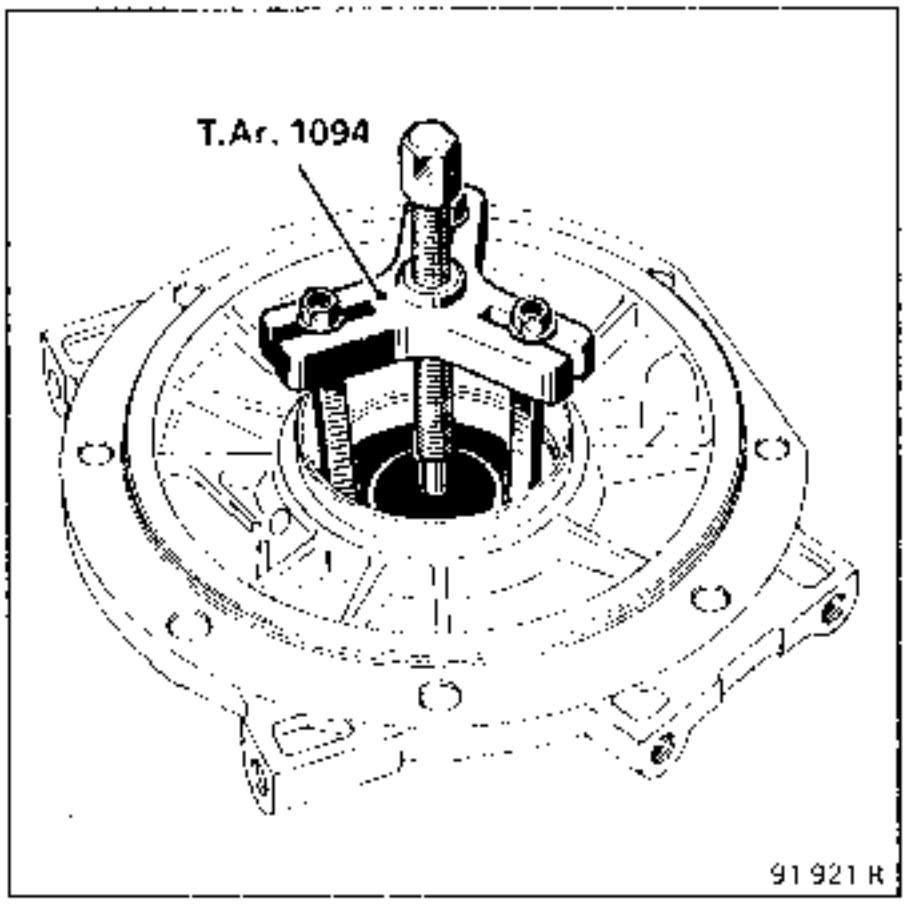
- Remove the right-hand rear axle side cover together with the dog clutch control assembly and remove the front-mounted sliding gear.



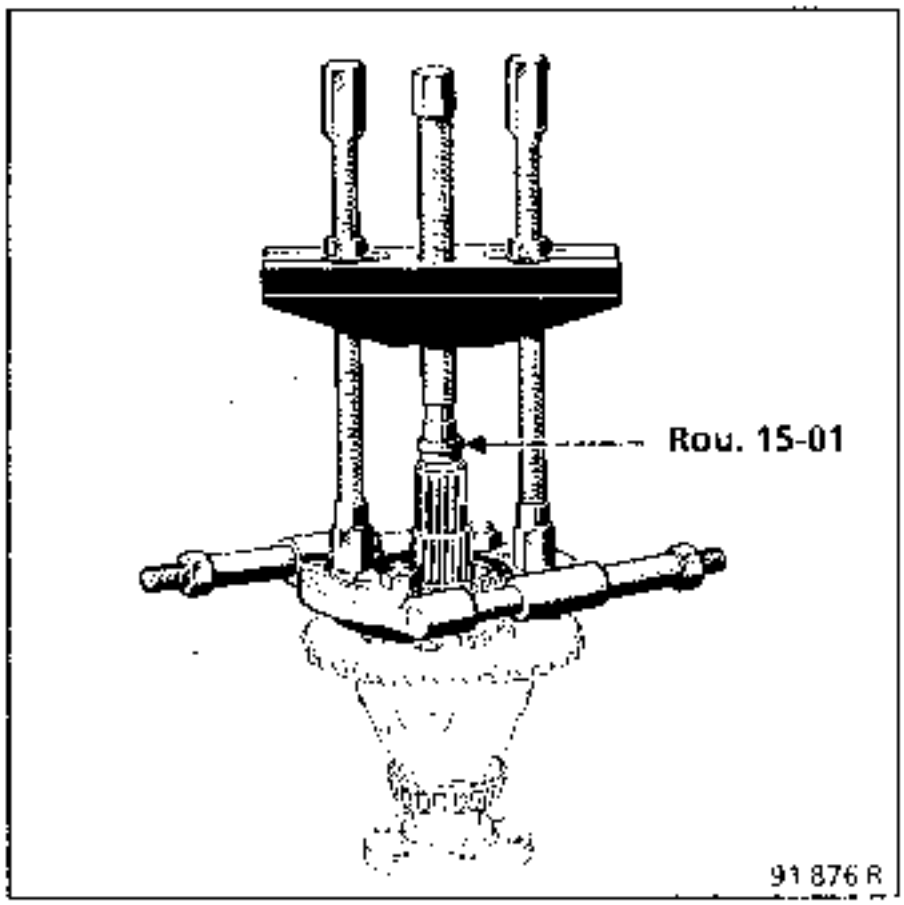
Remove the differential and the left-hand final drive side cover.

REMOVAL (continued)

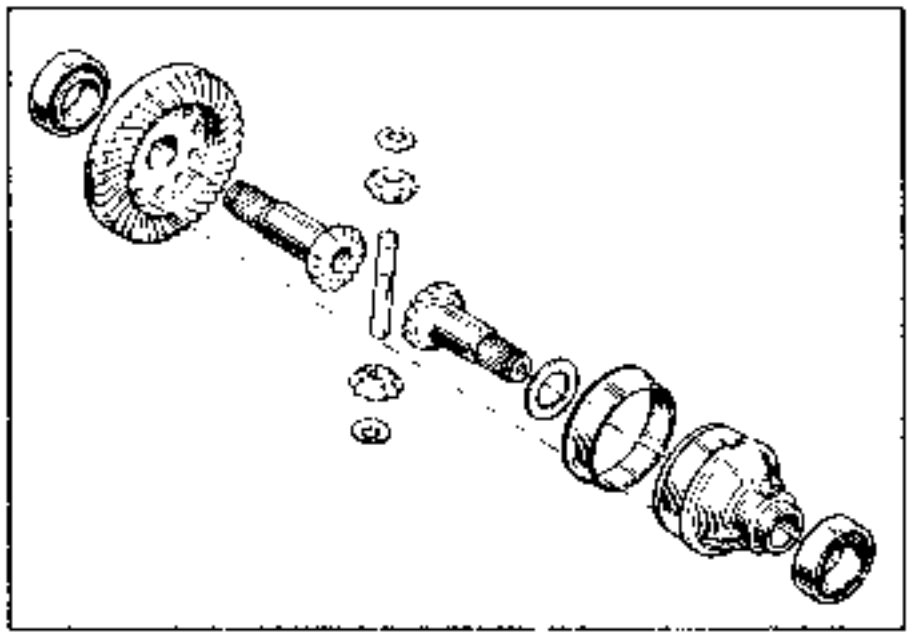
Use tool **T.Ar. 1094** to remove the bearing cups from the final drive side covers.



Recover the shims located behind the bearing cups.
Using a puller of the type **FACOM U53T + U53K** or similar, extract the bearings after fitting shaft protection cup **Rou.15-01.**



Remove:
- the bolts securing the crown wheel to the casing (these bolts cannot be reused).



- the planet wheel shaft retaining band.

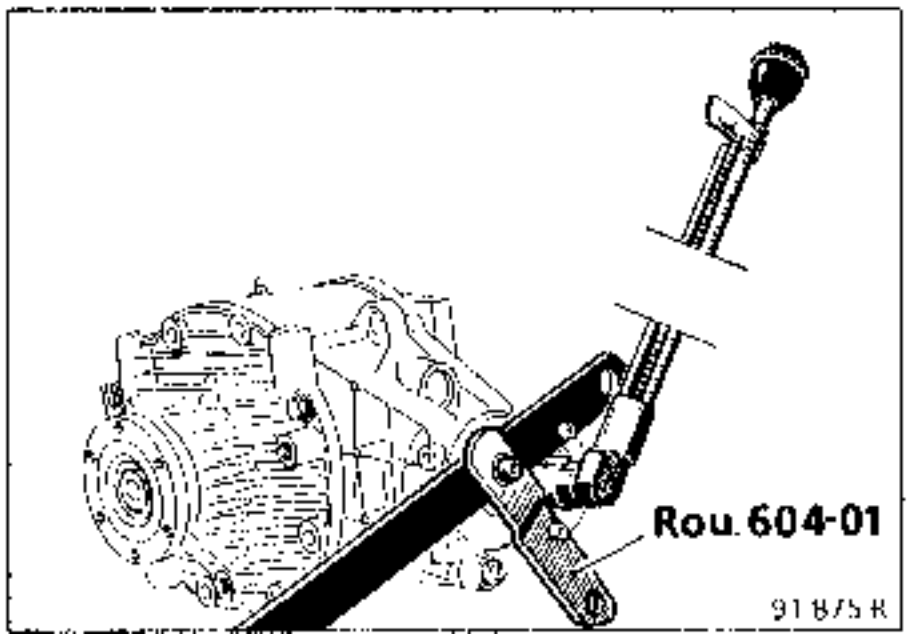
Separate the various parts.

Checking the parts :

The bearings must be replaced as soon as they show any scratches, spots where overheating has occurred or excessive wear.
The teeth on the sun wheels and planet wheels should not be jagged or excessively worn.
Also make sure that the surfaces in contact with the crown wheel and the casing do not show any traces of seizing or abnormal wear.

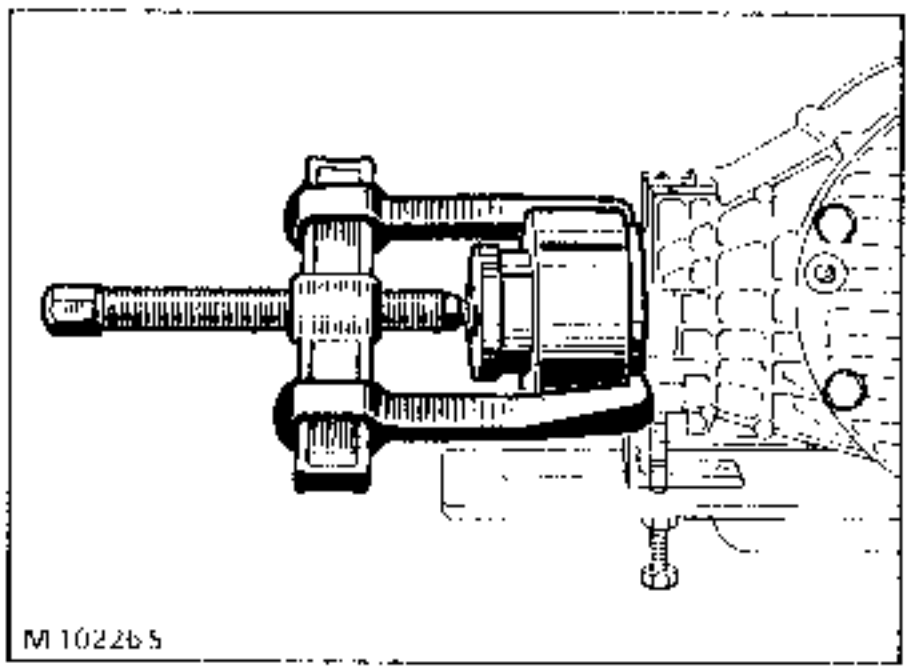
Removing the final drive pinion

Espace
Remove the nut on the final drive pinion, using tool **Rou. 604-01** to make sure the viscous coupling does not turn.



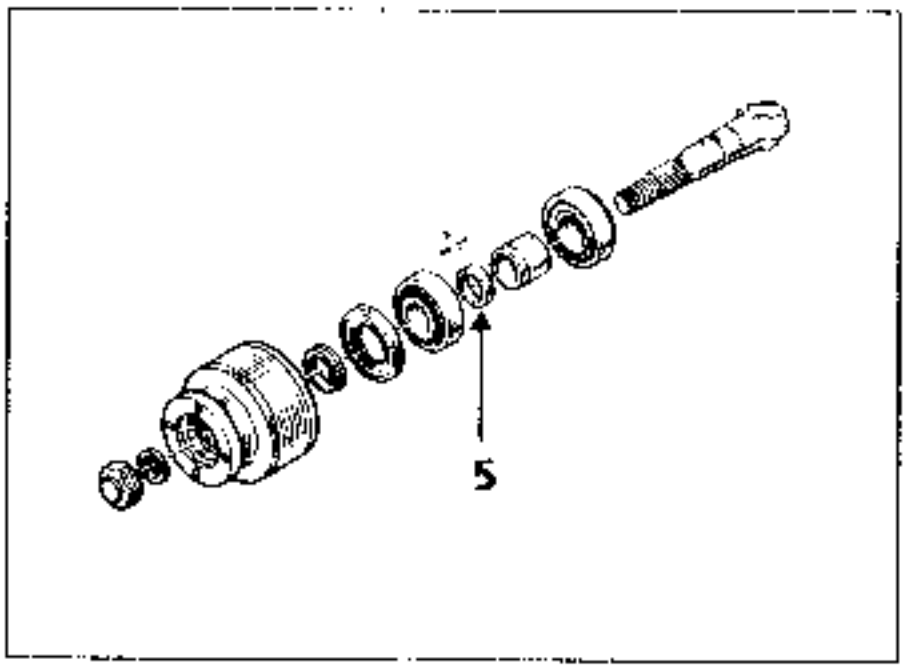
REMOVAL (continued)

Using a puller of the type **FACOM U32-120** or similar, take out the viscous coupling.



Knock out the final drive pinion using a bronze drift.

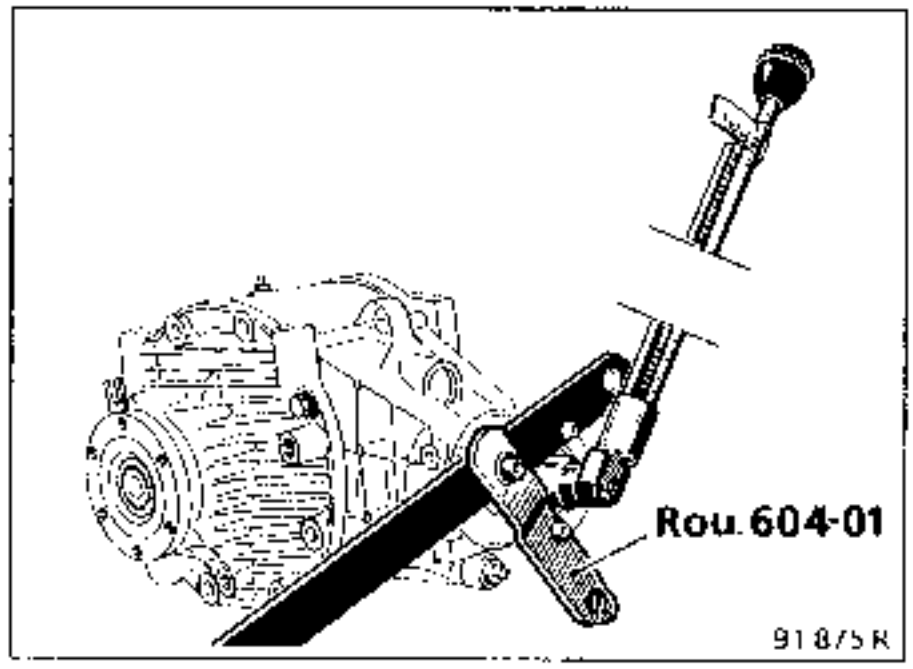
Remove the lip seal and bearing.



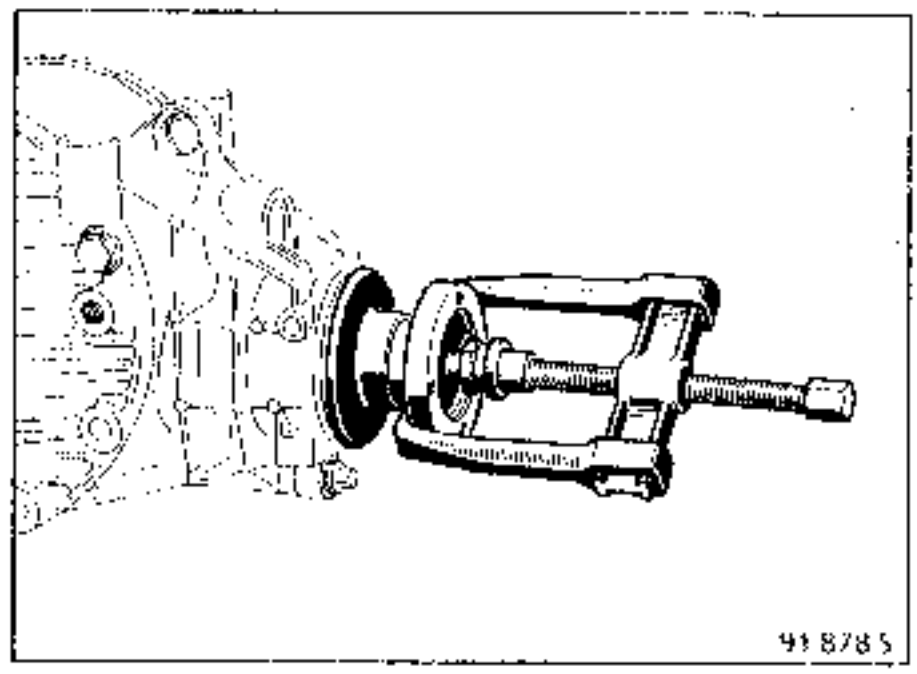
Recover the preload shims (5) and the spacer.

X 48

Remove the flange bolt using tool **Rou. 604-01** to prevent it from turning.

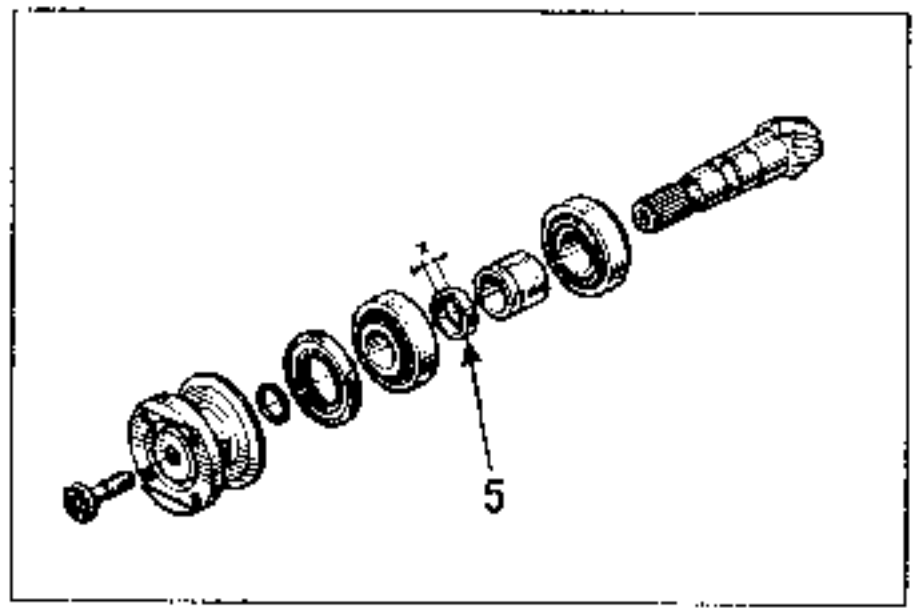


Using a puller of the type **FACOM U 32-120** or similar, take out the input flange.



Knock out the final drive pinion using a bronze drift.

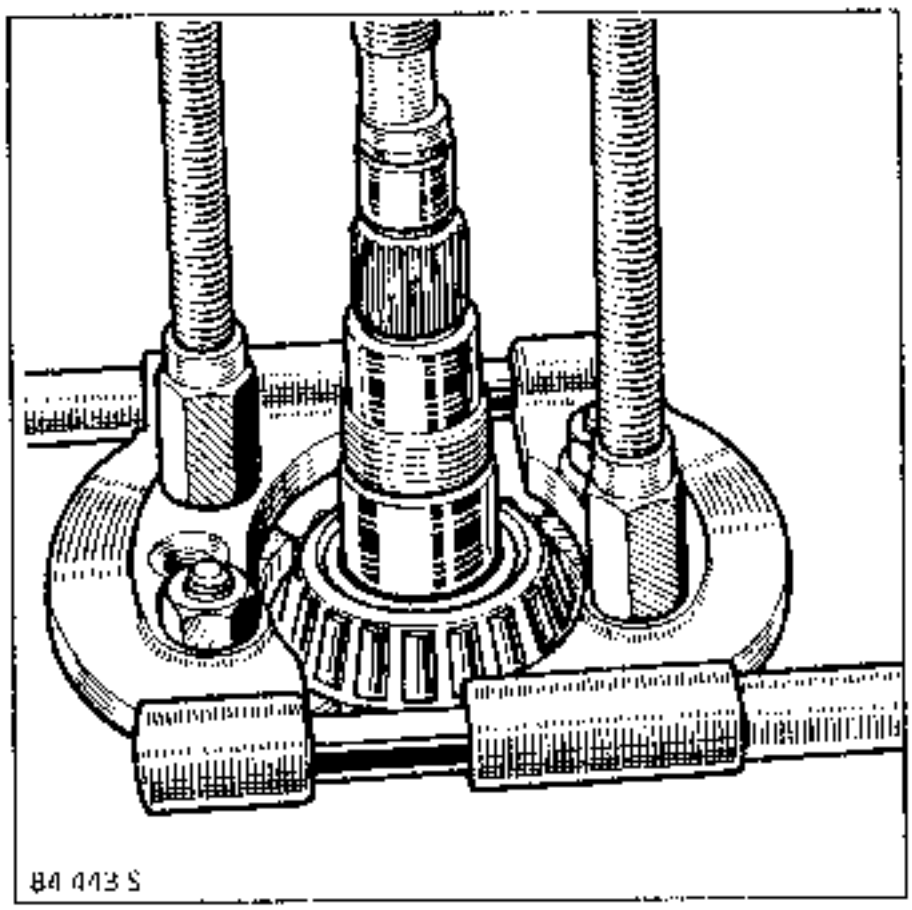
Remove the lip seal and bearing.



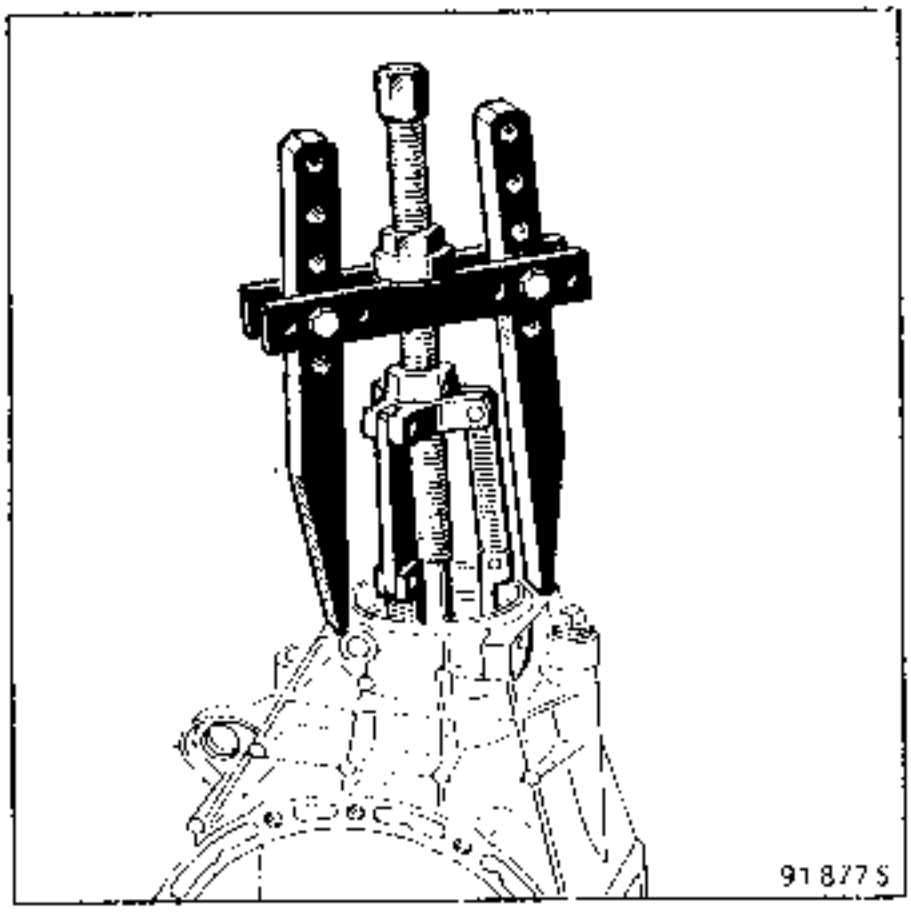
Recover the preload shims (5) and the spacer.

REMOVAL (continued)

Using a tool of the type **FACOM U53T + U53K** or similar, take out the final drive pinion under-head bearing.

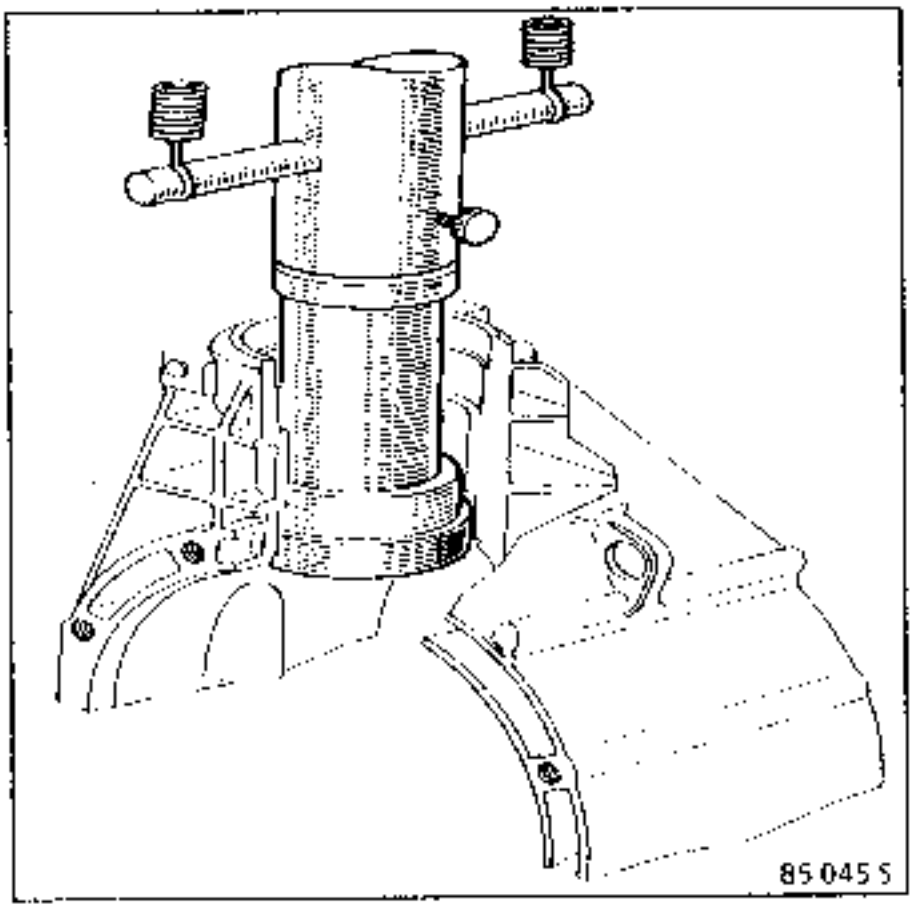


Using a **FACOM U40 - U50** (no. 12 socket) or similar, take out the bearing cup.



Under-head bearing

Lock the final drive on a press using a 61 mm dia. tube.
Remove the bearing cup.



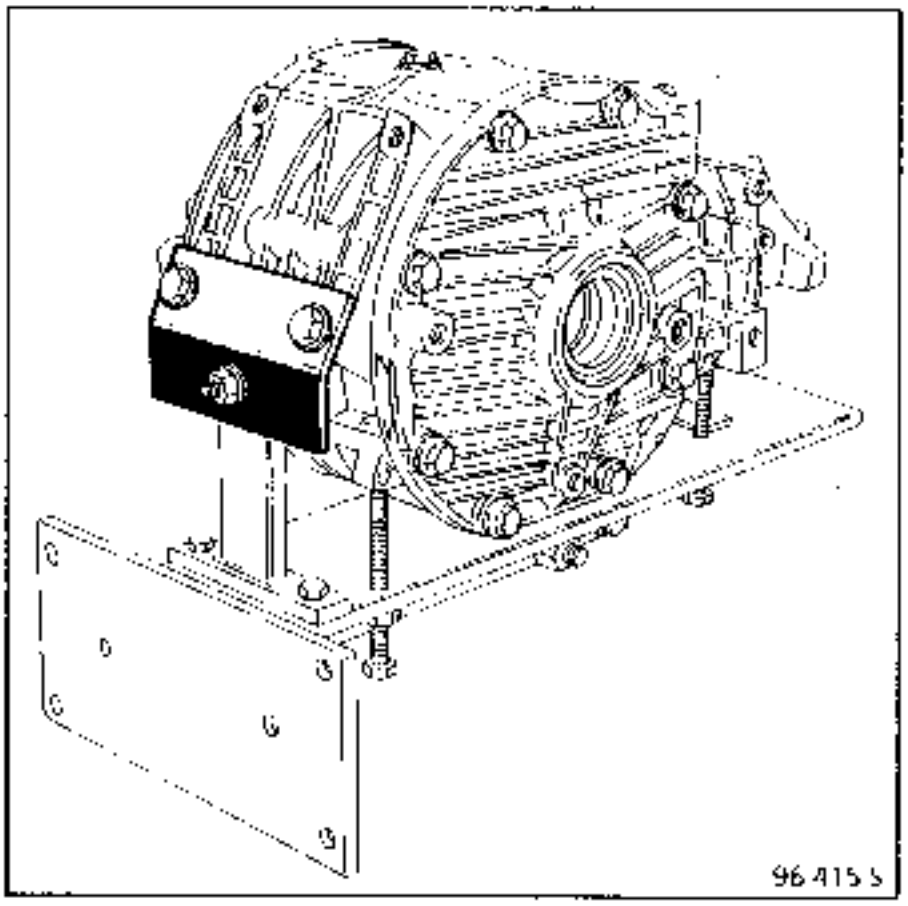
Recover the pinion protrusion shim (depending on type)

Checking the parts

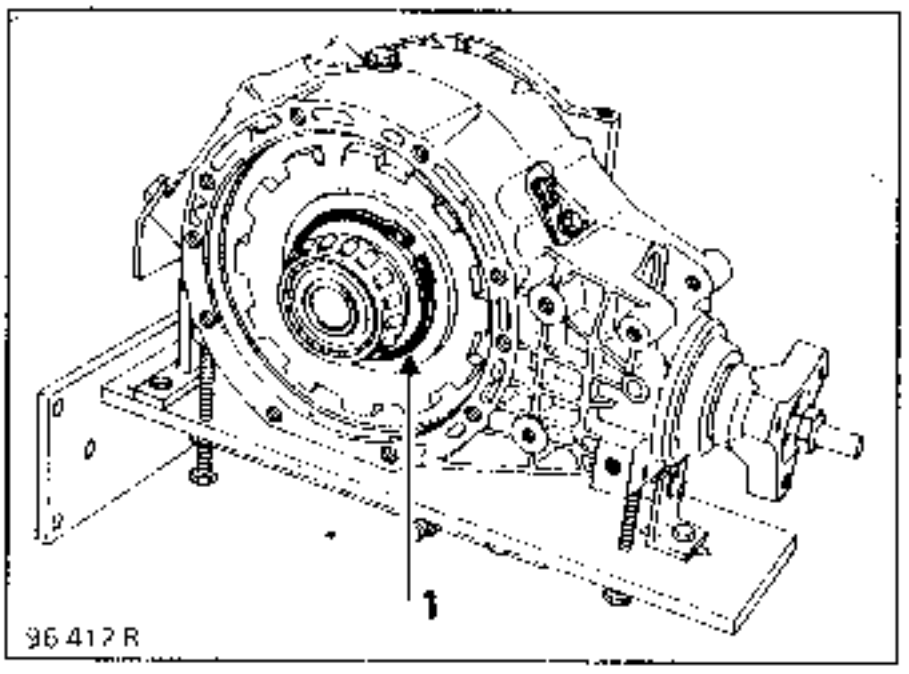
The bearings must be replaced as soon as they show any scratches, spots where overheating has occurred or excessive wear
As the lip seal is in direct contact with the flange, check the condition of the seating. If there are any scratches, replace the flange.

REMOVAL

Drain the final drive.
Place the unit on the support **Tar. 1096** which can be fitted to the Desvil stand and secure it using plate **Tar. 1096-01**.

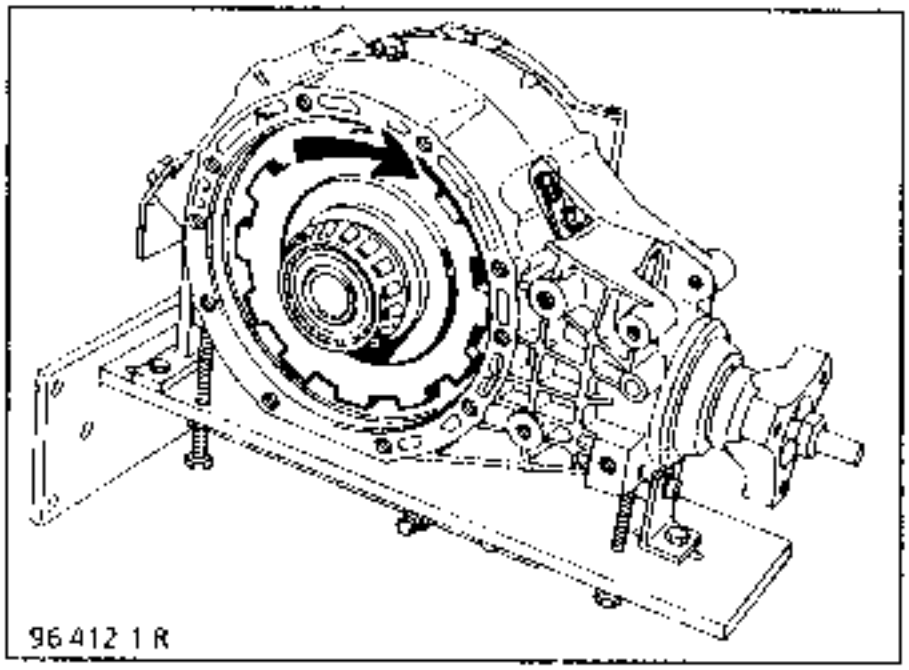


Remove :
- the right-hand final drive side cover;
- the circlip (1).

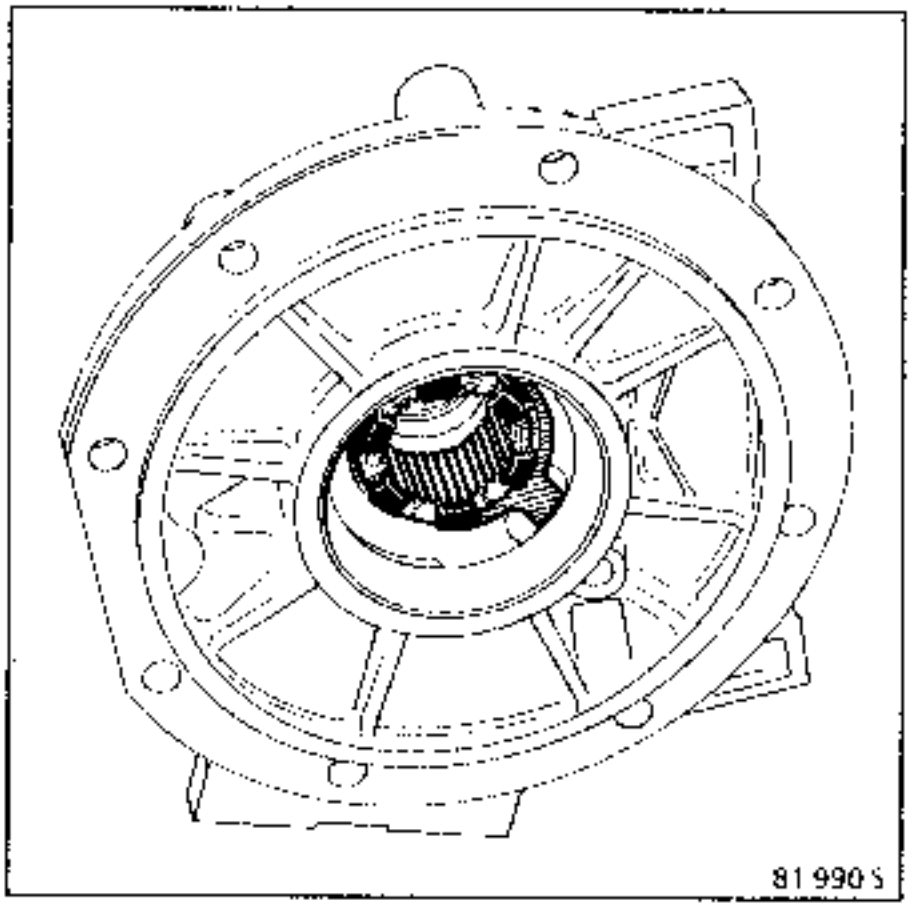


- Unscrew the wheel speed sensor.

ATTENTION : Not left-hand side.



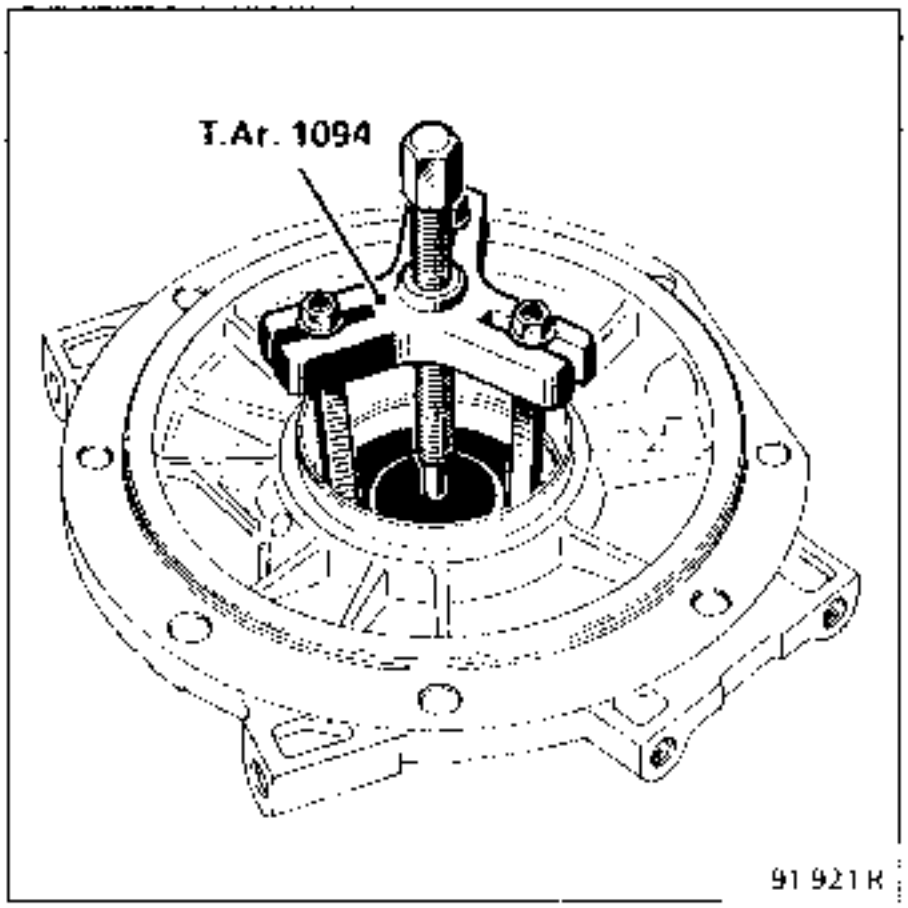
- Remove the left-hand rear axle side cover together with the dog clutch control assembly and remove the front-mounted sliding gear.



Remove the differential.

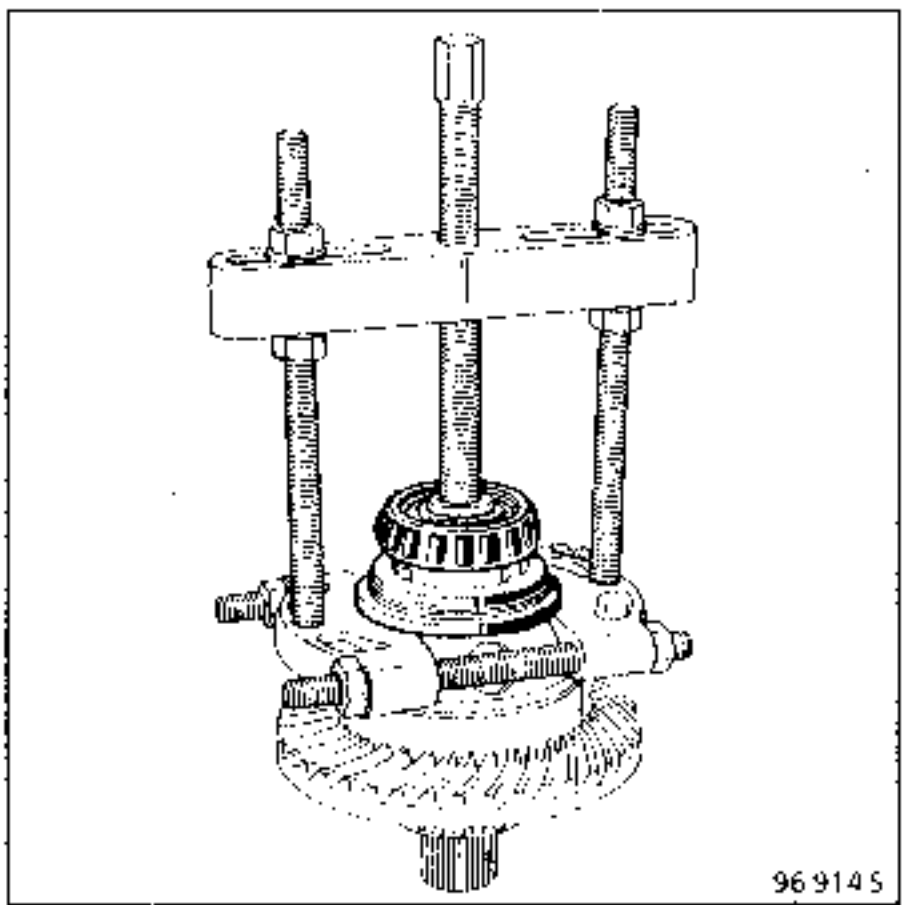
REMOVAL (continued)

Use tool T. Ar. **1094** to remove the bearing cups from the final drive side covers.



Recover the shims located behind the bearing cups.

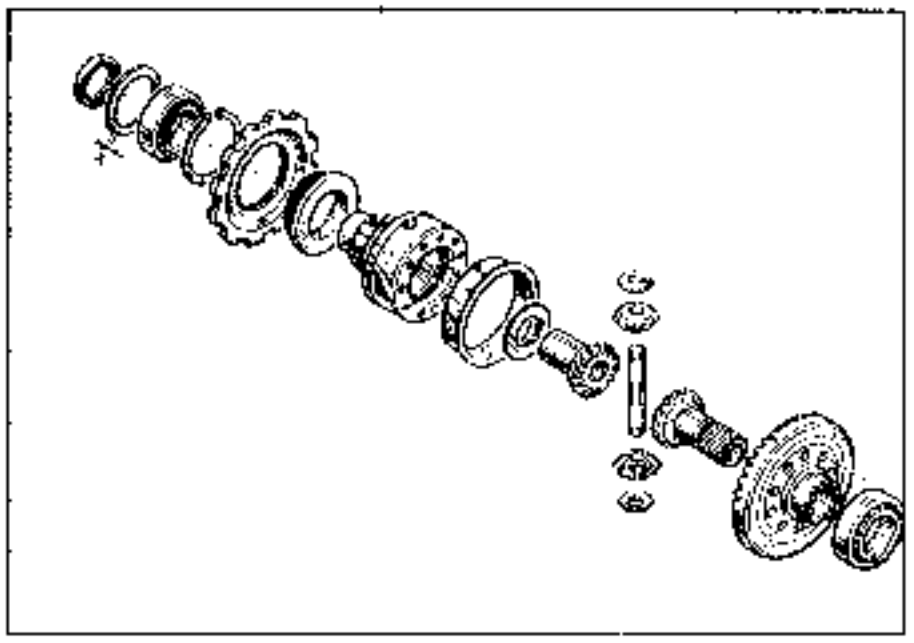
Using a puller of the type **FACOM U53T + U 53 K** or similar, take out the sensor bracket and the bearing on the casing side, fitting a 36 mm dia. pad in between.



Proceed in the same way for the bearing on the crown wheel side

Remove:

- The bolts securing the crown wheel to the casing (these bolts cannot be reused).



- Remove the planet wheel shaft retaining band.

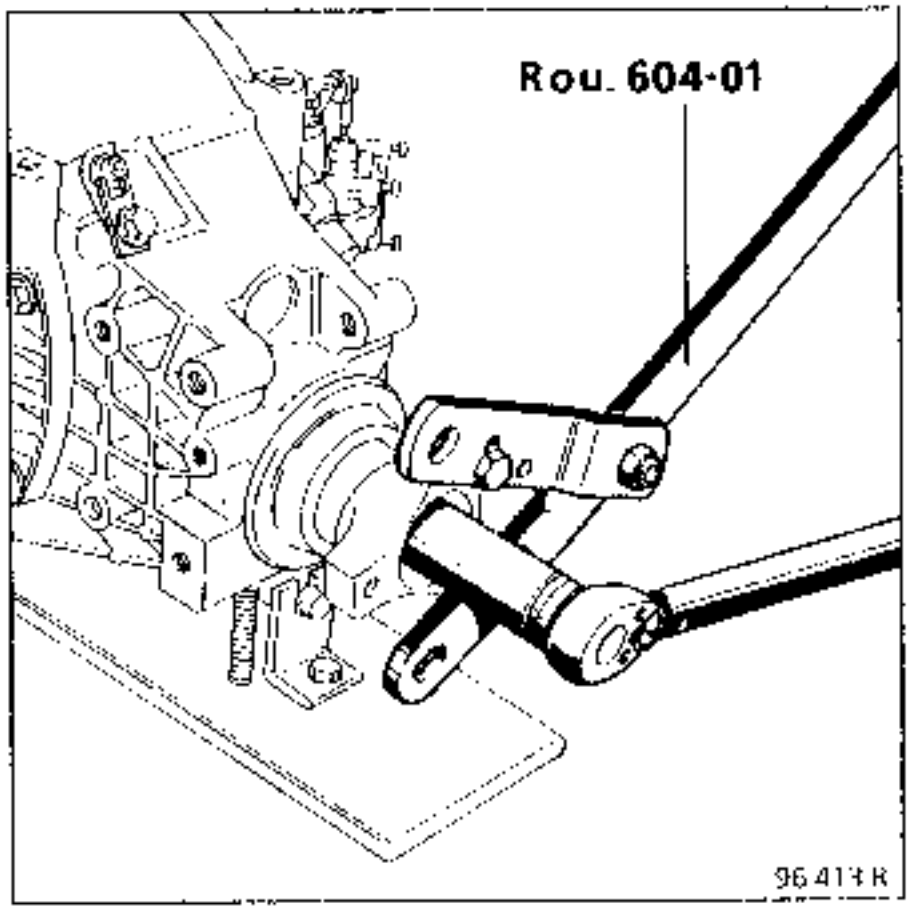
Separate the various parts.

Checking the parts:

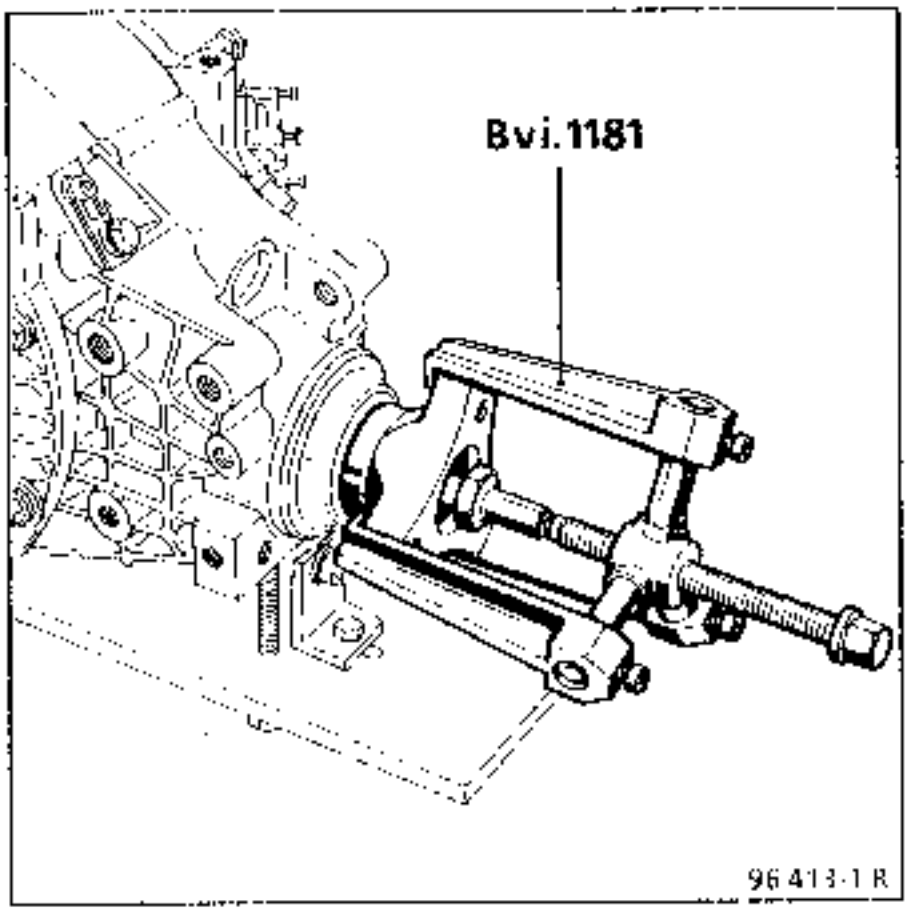
The bearings must be replaced as soon as they show any scratches, spots where overheating has occurred or excessive wear.
The teeth on the sun wheels and planet wheels should not be jagged or excessively worn. Also make sure that the surfaces in contact with the crown wheel and the casing do not show any traces of seizing or abnormal wear.

REMOVAL (continued)

Remove the flange bolt using tool **Rou. 604-01** to prevent it from turning.

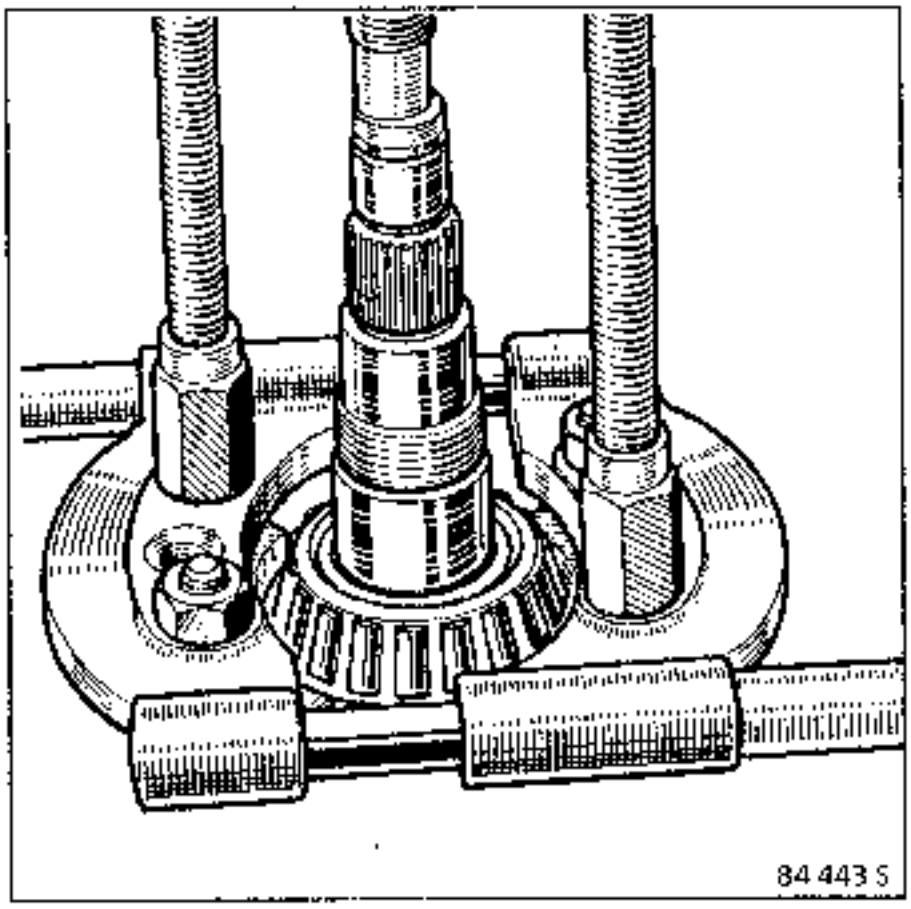


Pull out the input flange using tool **B. Vi. 1181.**



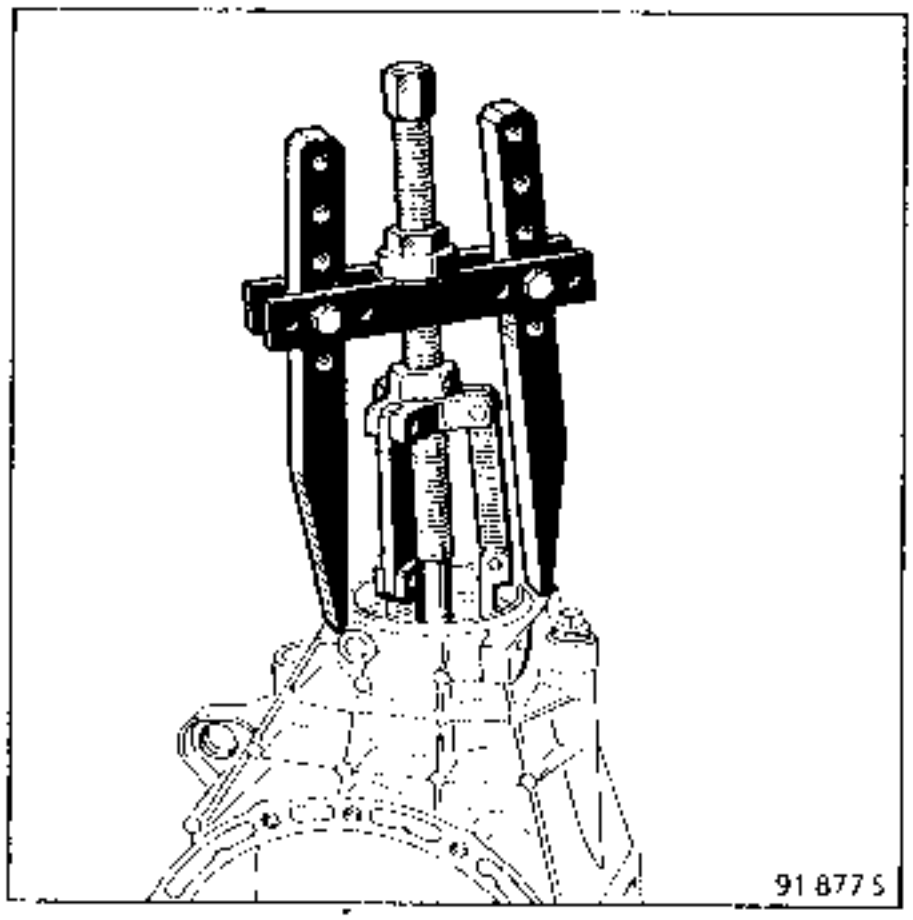
Knock out the final drive pinion using a bronze drift.
Remove the lip seal and bearing.

Recover the preload shims and the spacer.
Using tool **FACOM U53T + U53K** or similar, take out the final drive pinion under-head bearing

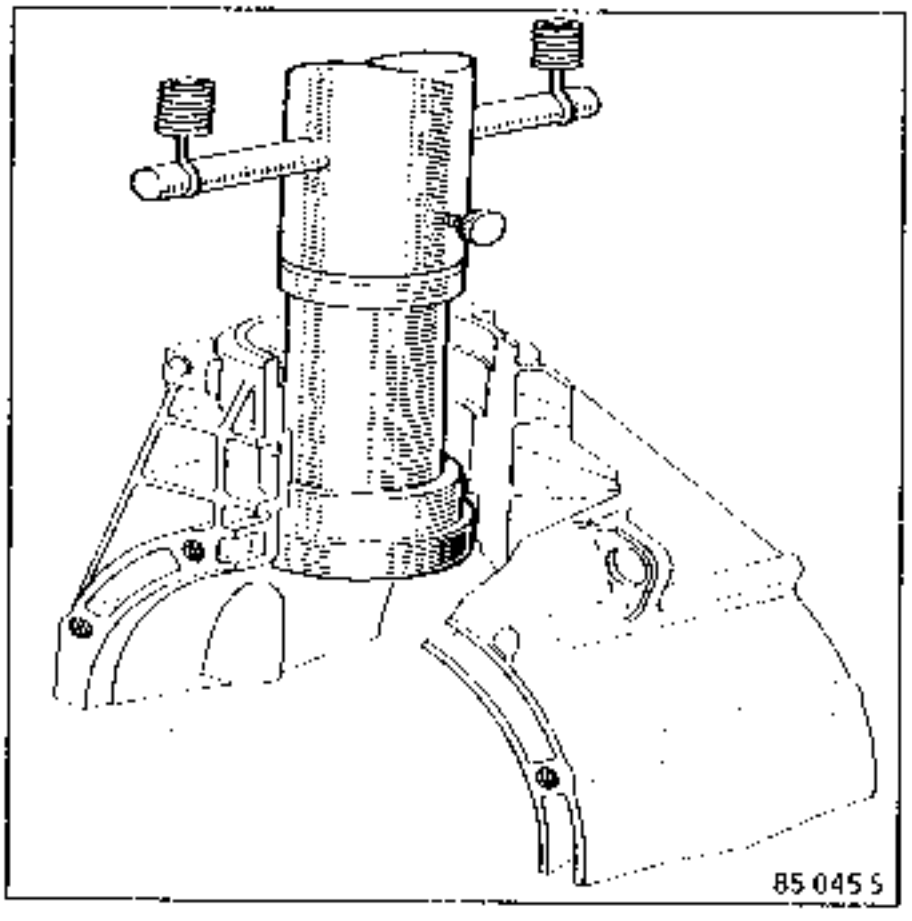


REMOVAL (continued)

Using a **FACOM U40 - 50** (no. 12 socket) or similar, take out the bearing cup.



Under-head bearing:
Lock the final drive on a press using a 61 mm dia. tube and remove the bearing cup.



Recover the pinion protrusion shim.

Checking the parts :

The bearings must be replaced as soon as they show any scratches, spots where overheating has occurred or excessive wear.
As the lip seal is in direct contact with the flange, check the condition of the seating. If there are any scratches, replace the flange.

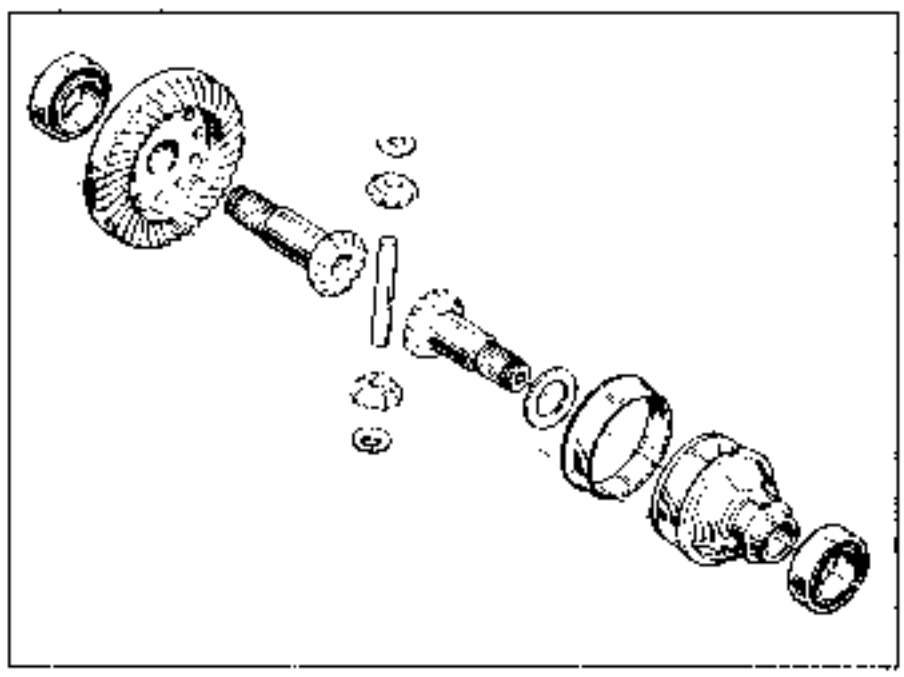
REFITTING - SETTINGS

Refitting the differential

Special points:

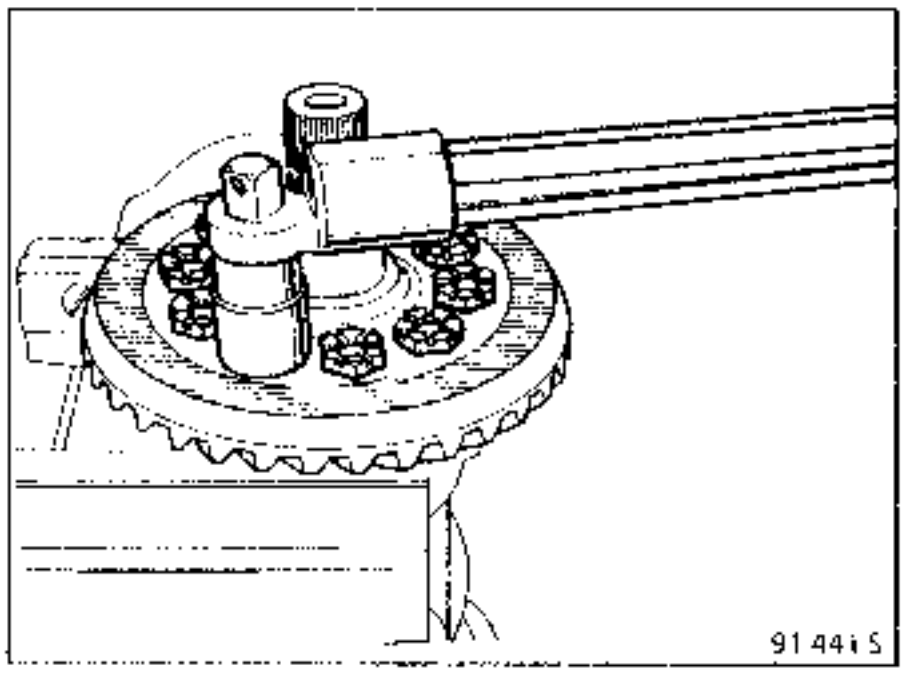
Grease all the parts before reassembly.

The bearing at the crown wheel end is wider than the bearing at the differential end.



Secure the crown wheel to the unit using new bolts.

Torque tighten the bolts



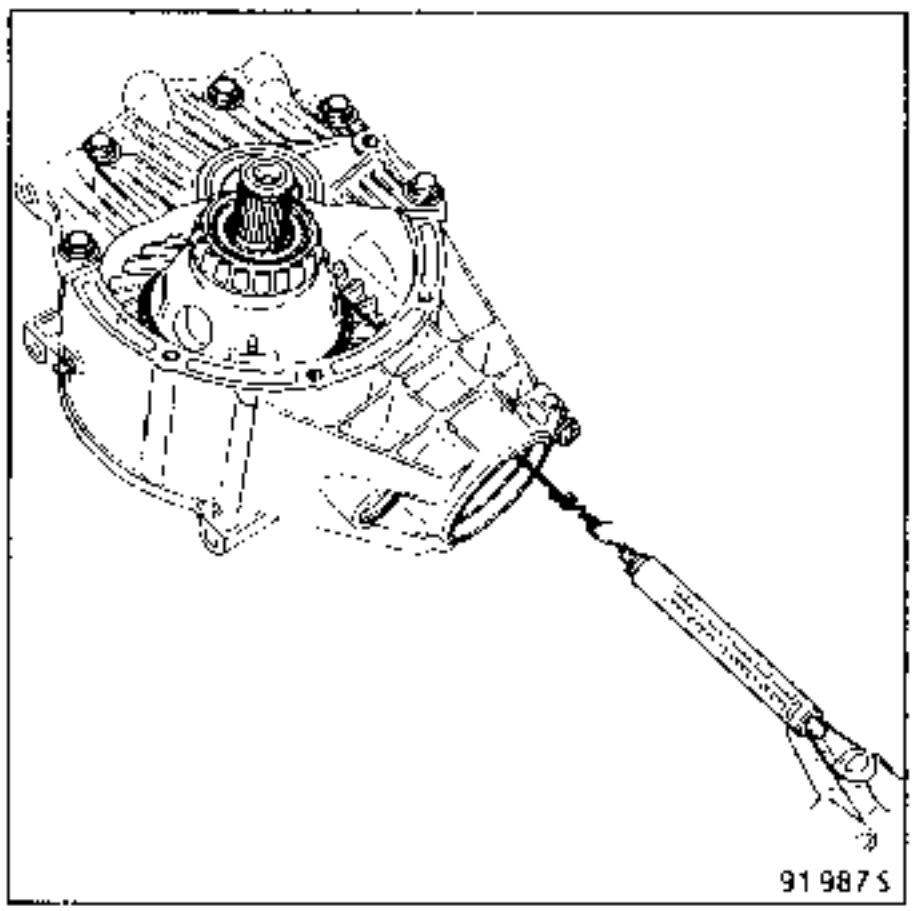
There are no special points concerning the reassembly of the bearing outer races. However, the adjusting shims removed must be refitted in the same position.

NOTE : If the ball bearing is to be refitted to the right-hand flange, the ends of the circlip must be moved opposite the oilway to ensure that the parts are lubricated properly.

ADJUSTING DIFFERENTIAL BEARING PRELOAD

Two possibilities:
1) Using a spring balance

The differential bearing preload must be adjusted with the final drive casing stripped and without the final drive pinion bearing cups fitted since they obstruct the passage of the balance and string.
Fit a side cover to the final drive casing.
Fit the differential and the other side cover (without its dog clutch control).
Measure the preload with a balance.



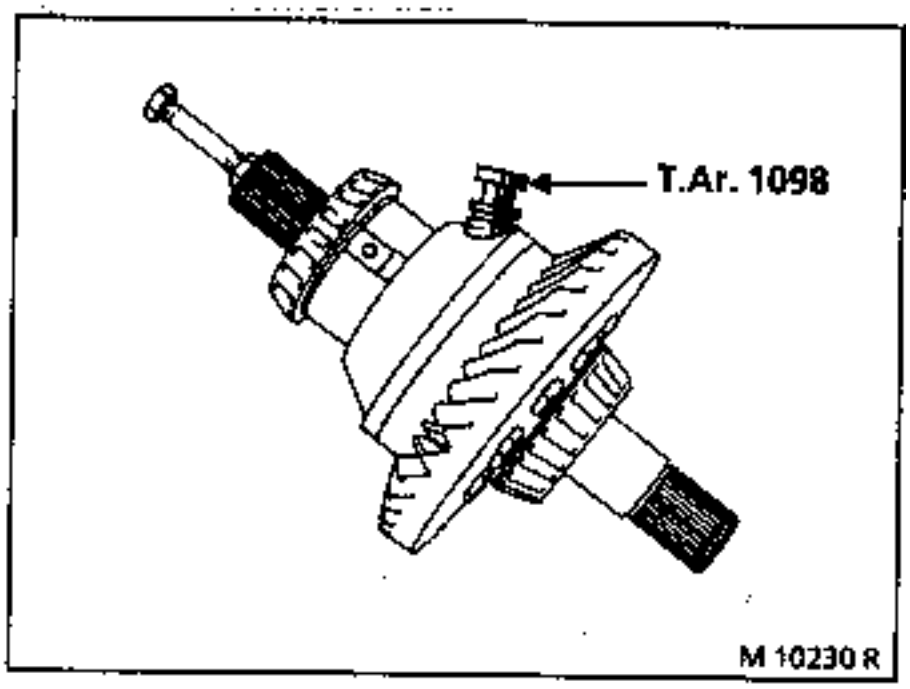
New bearings;
The differential should rotate under a torque of between **4.5 to 6.5 daN.**
This is the torque required to maintain rotational movement of the differential.

When the value of the shim increases, the bearing preload is greater and vice versa.
When the adjustment has been made, remove the side covers and the differential.

2) Using a precision torque wrench (All types except Safrane)

Fit the left-hand side cover to the final drive casing.

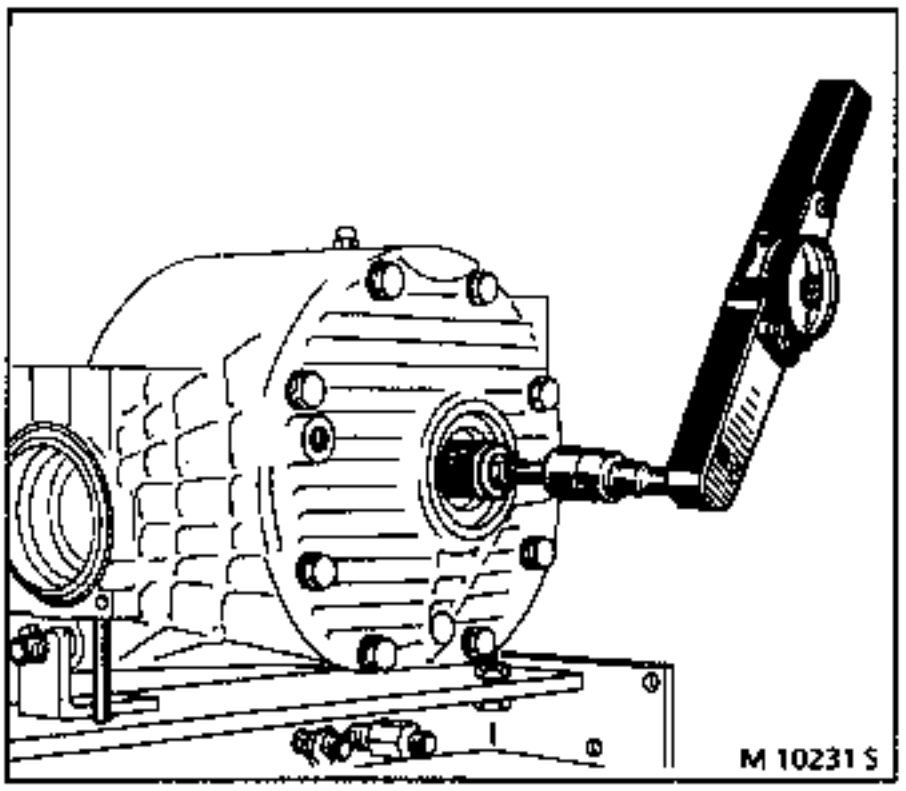
Place the differential locking tool **T.Ar. 1098** in position and fit the differential.



Fit the right-hand side cover.

Tighten the side cover mounting bolts to the specified torque.

Measure the preload using a precision torque wrench (example: **FACOM R250** and adaptors **R232, J232**) and a **M 10 X 50** bolt fitted in the left-hand sun wheel.



New bearings

The differential should rotate under a torque of between **10.5 and 12.5 N.m.** This is the torque required to maintain rotational movement of the differential.

The preload is adjusted by modifying the thickness of the shims placed under the differential bearing races. When the value of the shims **increases**, the preload **increases** and vice versa.
When the adjustment has been made, remove the side covers and the differential.

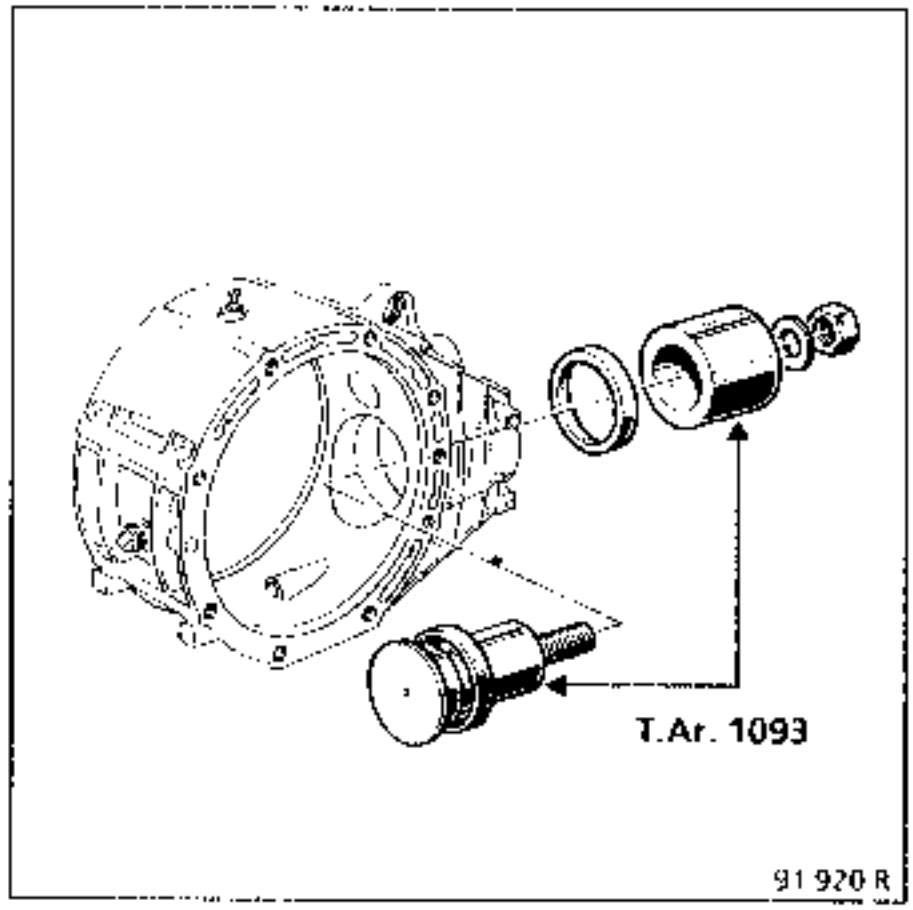
TEMPORARY REASSEMBLY OF THE FINAL DRIVE PINION

- Fit the pinion protrusion adjusting shim in the final drive casing.

  The shim is selected according to the thickness of the old shim and the markings on the old one and the new final drive pinion

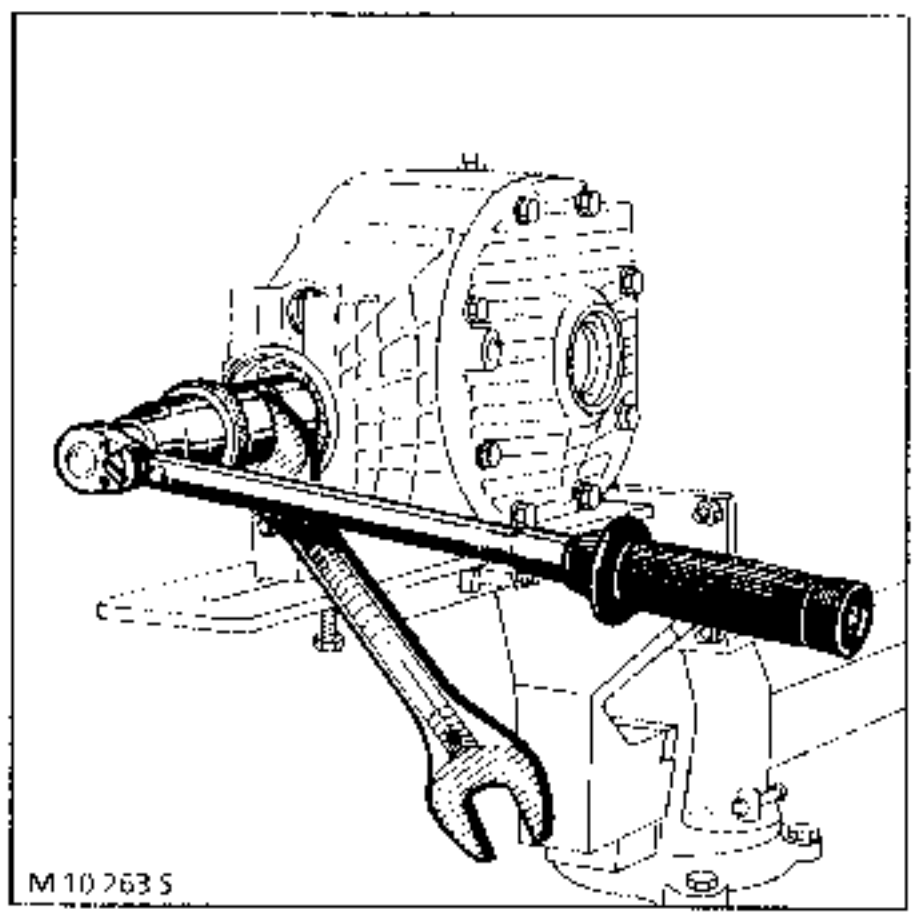
  Engage the bearing cup and use tool **T. ar 1093** to finish the assembly.

Fit the under-head bearing, using a press and a tube with an inside diameter of 36 mm.



Check the cup support and bearing on the casing.
- Fit the final drive pinion and a spacer in place of the flange.

- Gradually tighten while rotating the final drive pinion to ensure that the bearings locate correctly and until they are slightly preloaded.

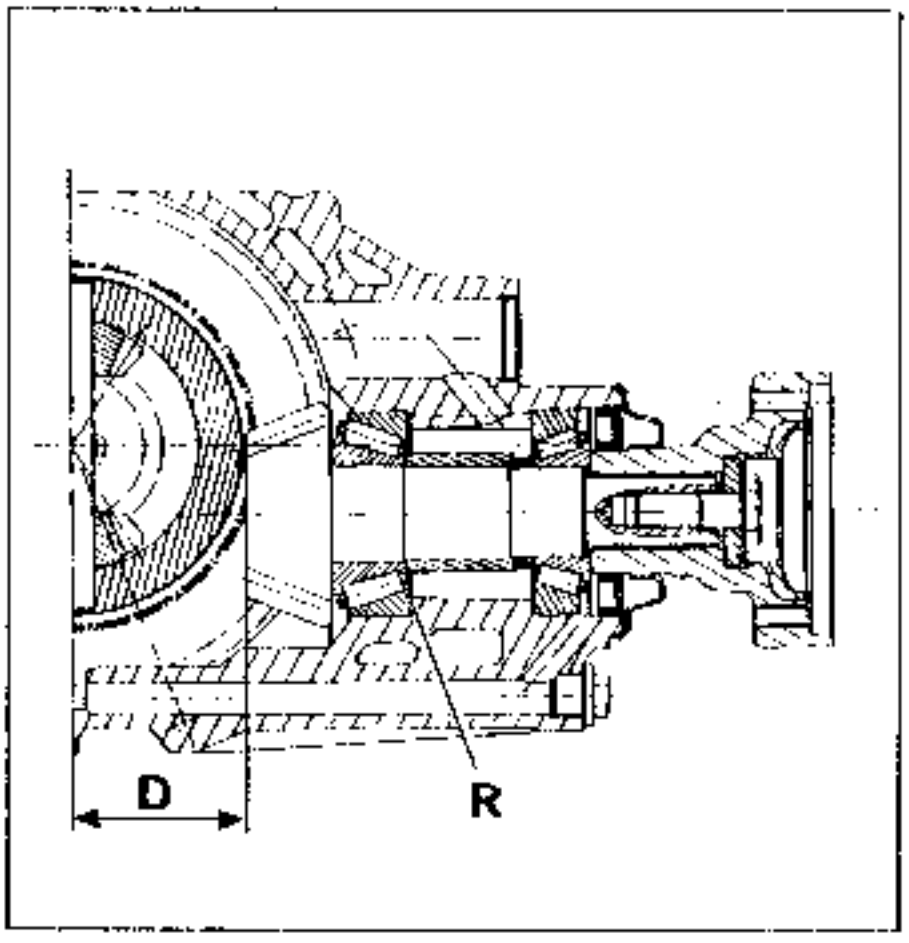


Then adjust the **pinion protrusion**.

PINION PROTRUSION :

The final drive pinion is correctly positioned when its front face is at distance (D) from the crown wheel shaft.

This position is obtained by fitting a washer (R) of a suitable thickness between the bearing and the casing bearing face.



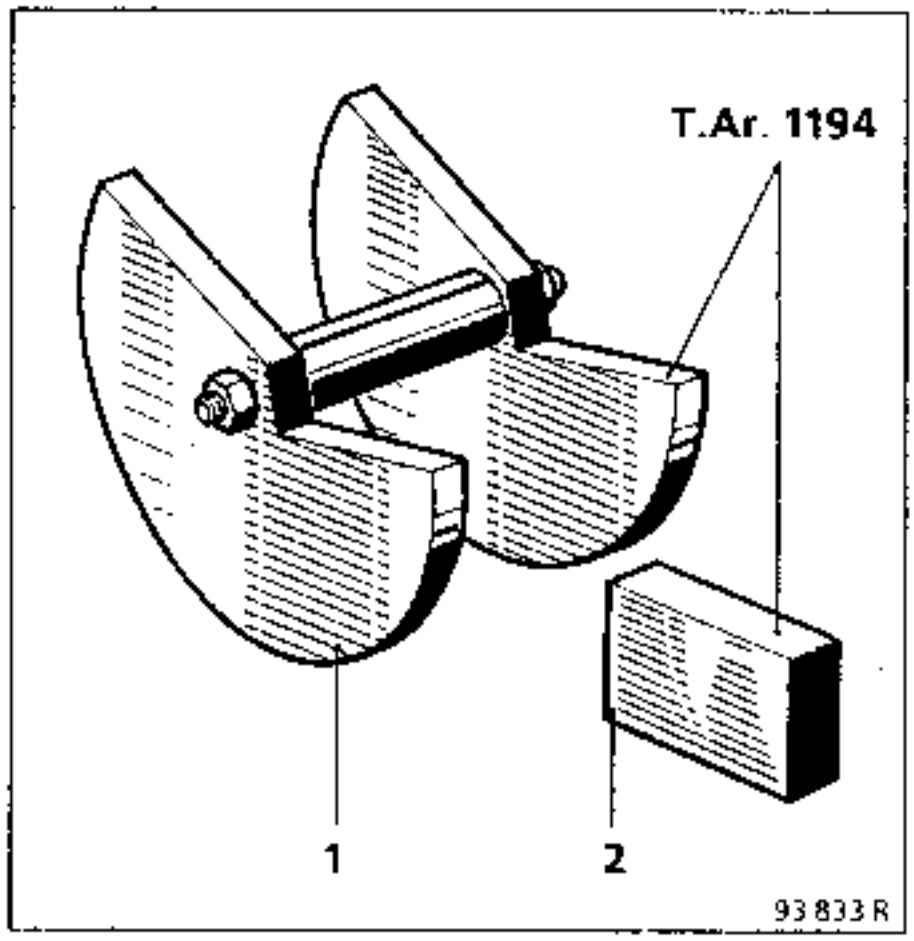
There is a matching number on the crown wheel and final drive pinion.

There is a second number indicating the pinion protrusion distance on the final drive pinion.

Checking the pinion protrusion :

This is checked using tool T.Ar **1194** which comprises:

- the discs and mandrel (1) representing the crown wheel shaft.
- the **44.7 mm** magnetised shim (2) which bears on the front face of the final drive pinion.

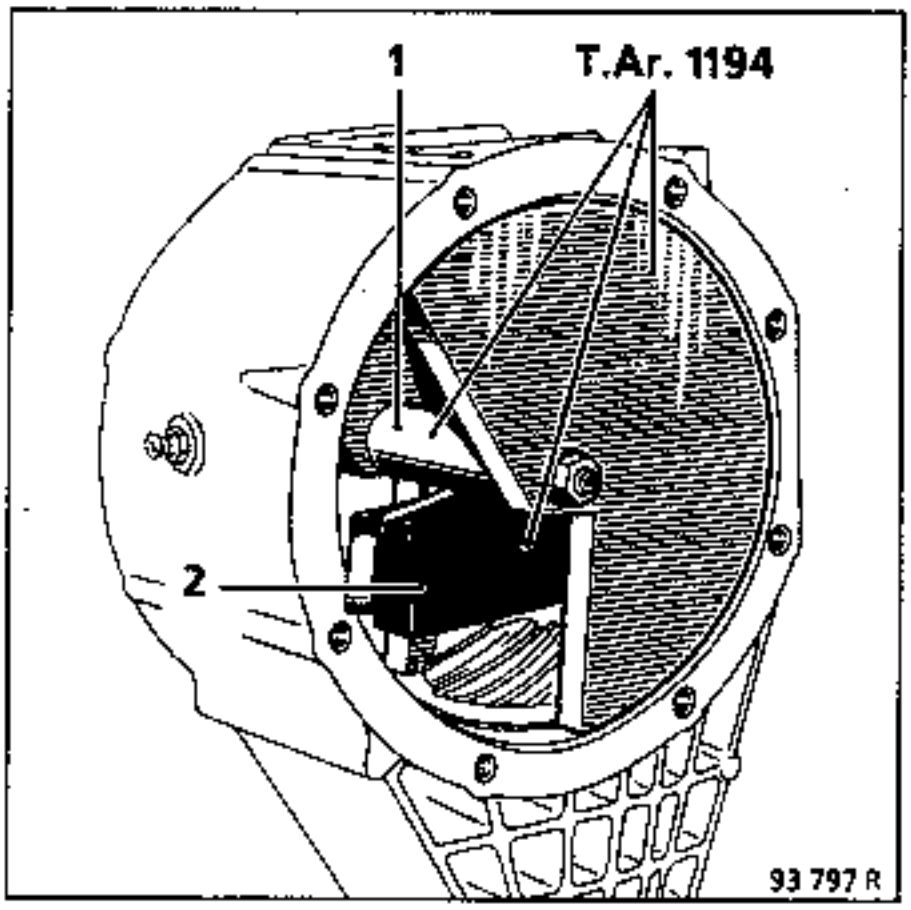


PINION PROTRUSION (continued)

Fit tool **T. Ar 1194** in place with the chamfer and shoulder on the discs facing the inside of the casing.

Ensure that the discs bear correctly on the casing and tighten the nuts.

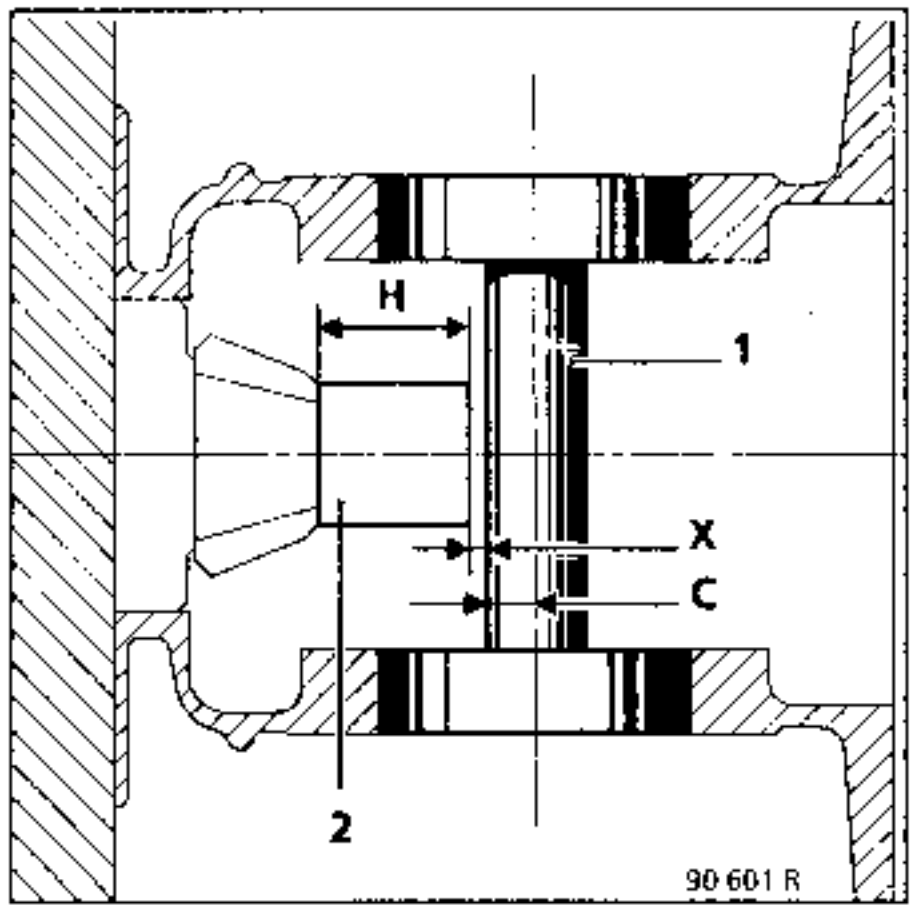
Fit magnetised shim (2) to the front face of the final drive pinion.



Using a set of feeler gauges, measure the space (dimension "X") between shim (2) and the mandrel (1).

The height (H) of the shim (2) plus radius (C) of mandrel (1) represents a dimension of:

44.70 mm + 19.5 mm = 64.20 mm



To this value add measured value (X); Example X = 0.70 mm D = **64.20 mm + 0.70 mm = 64.90 mm**

- Compare this value with the one stamped on the front face of the final drive pinion.

If the value has to be corrected, repeat the operation, changing the thickness of shim (R) located behind the bearing cup under the final drive pinion head.

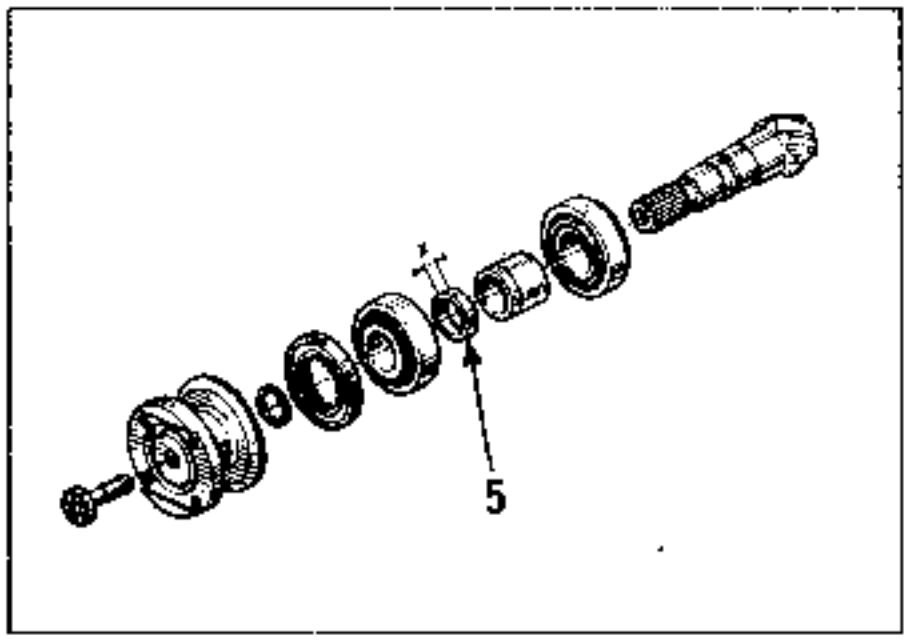
Washers are available in thicknesses from **0.82 mm** to **1 mm** increasing in steps of **0,02 mm.**

Measure the pinion protrusion again after correction.

- Dismantle the final drive pinion again.

Adjusting the final drive pinion bearing preload. (except suffix 10 - 11)

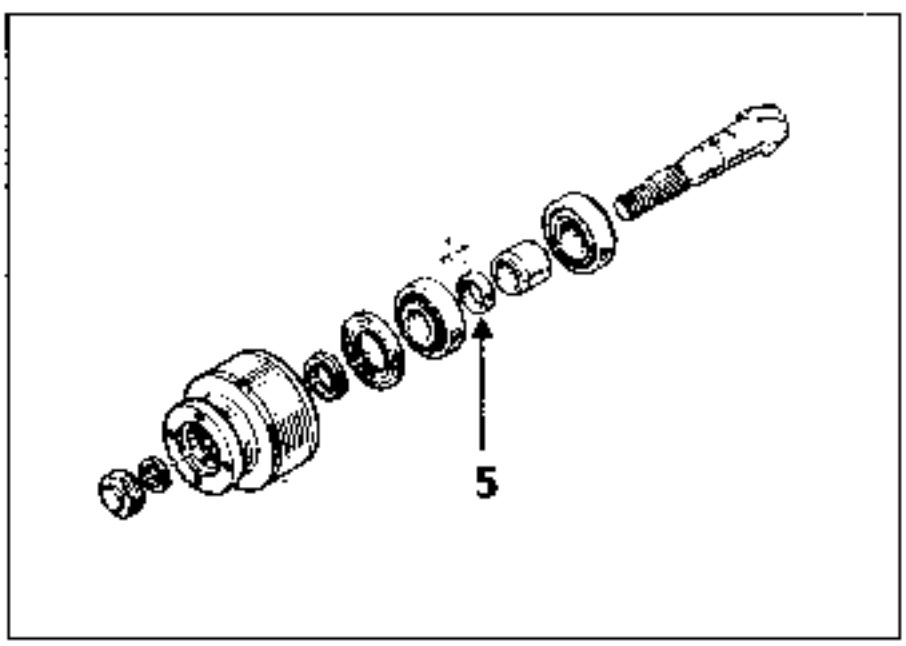
This operation is performed with the differential removed. Fit the spacer and preload adjusting shim (5) recovered on dismantling the final drive pinion.



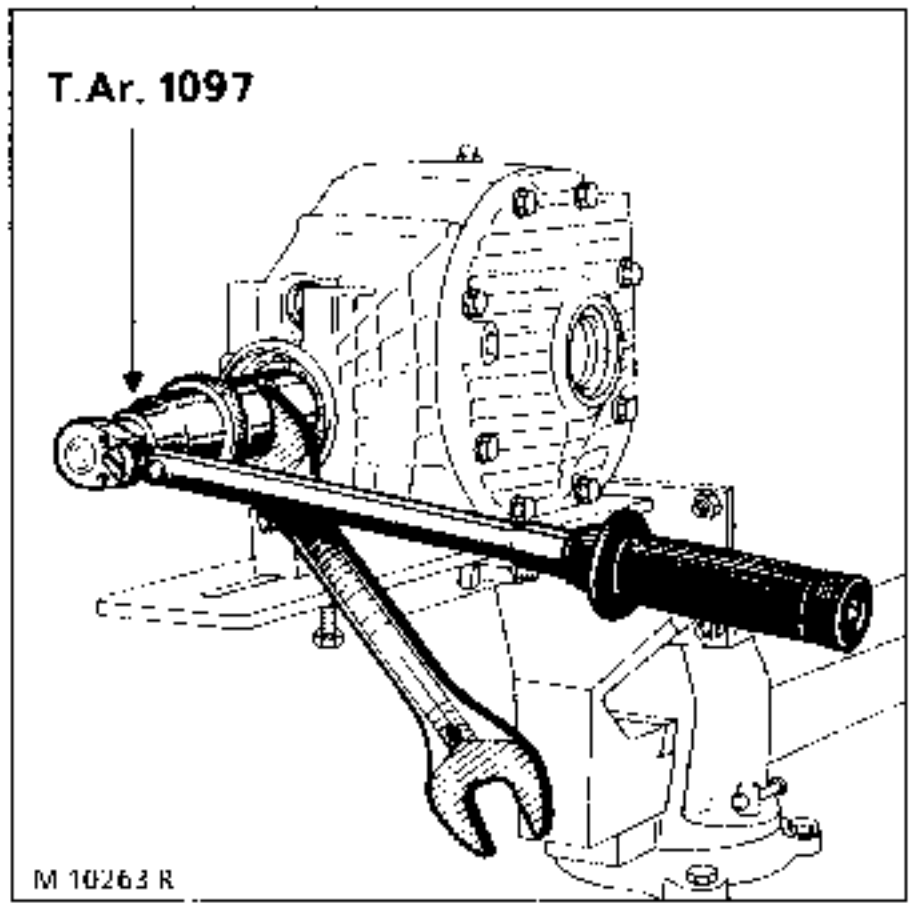
Fit the bearing and flange, and torque tighten the bolt.

Turn the final drive pinion through several revolutions.

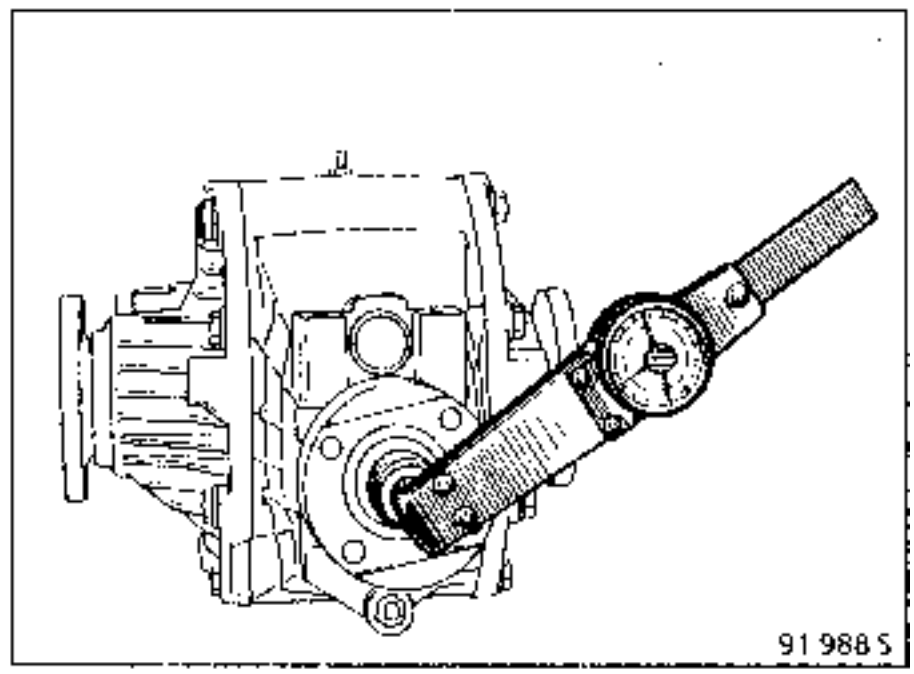
OT2 010 - 11 (ESPACE)



Proceed as described above and then:
Fit the outer bearing using socket tool **Tar. 1097** and torque tighten the nut to **20 daN.m**, holding the tool using a **36 mm** open-ended spanner.



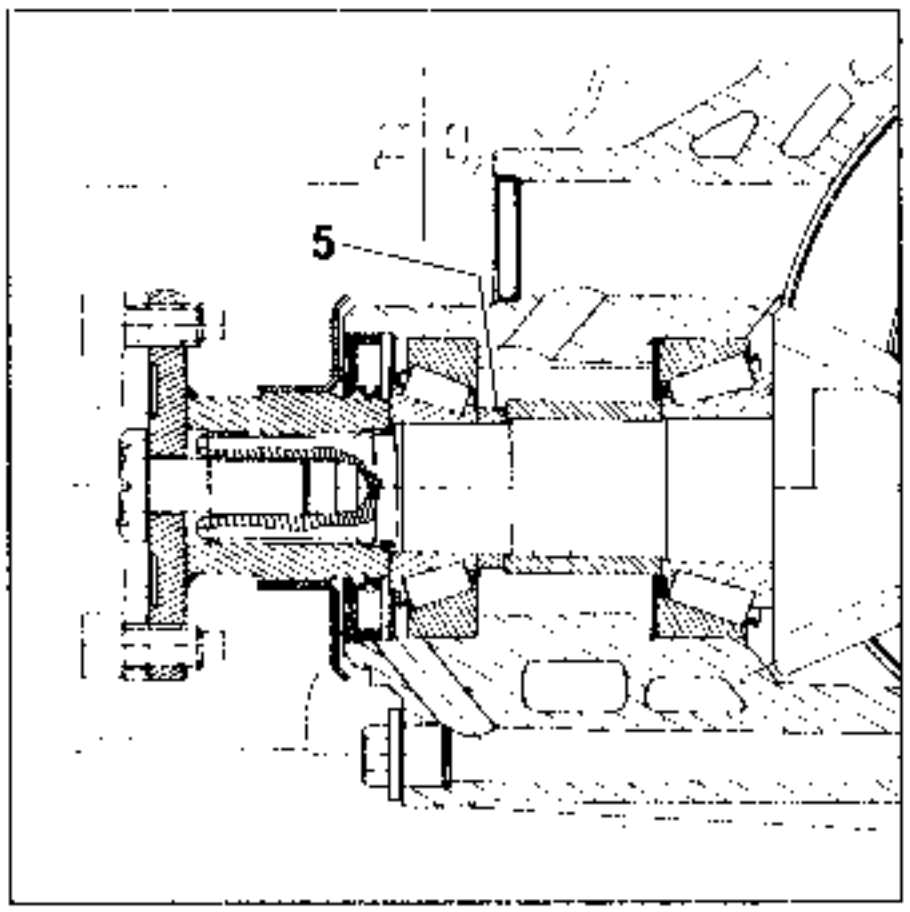
Turn the final drive pinion through several revolutions.
Using a precision torque wrench (e.g. **FACOM R 250**), adaptors **R 232, J 232** and a socket, measure the rotational torque.



The final drive pinion should rotate under a torque of between **2.5 and 3.5 N.m**. This is the torque required to maintain rotational movement.

Adjusting the final drive pinion bearing preload.

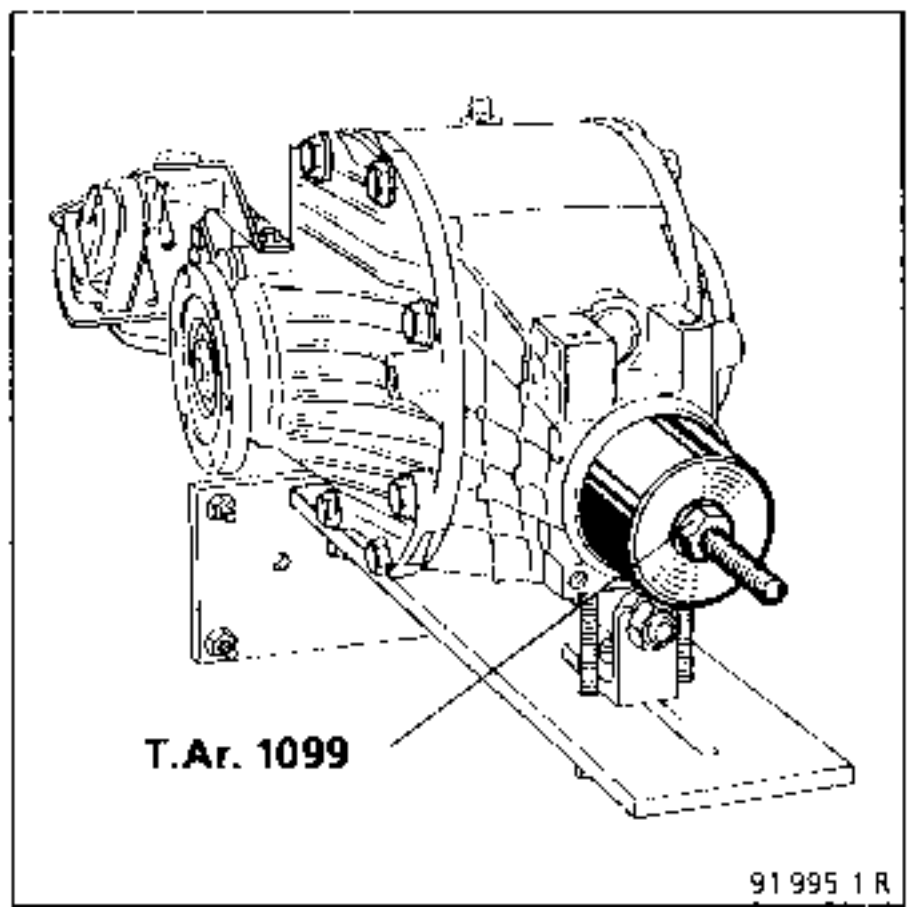
If the adjustment is not correct, increase or decrease the thickness of spacer (5).



The preload decreases as the thickness of the spacer increases and vice versa.

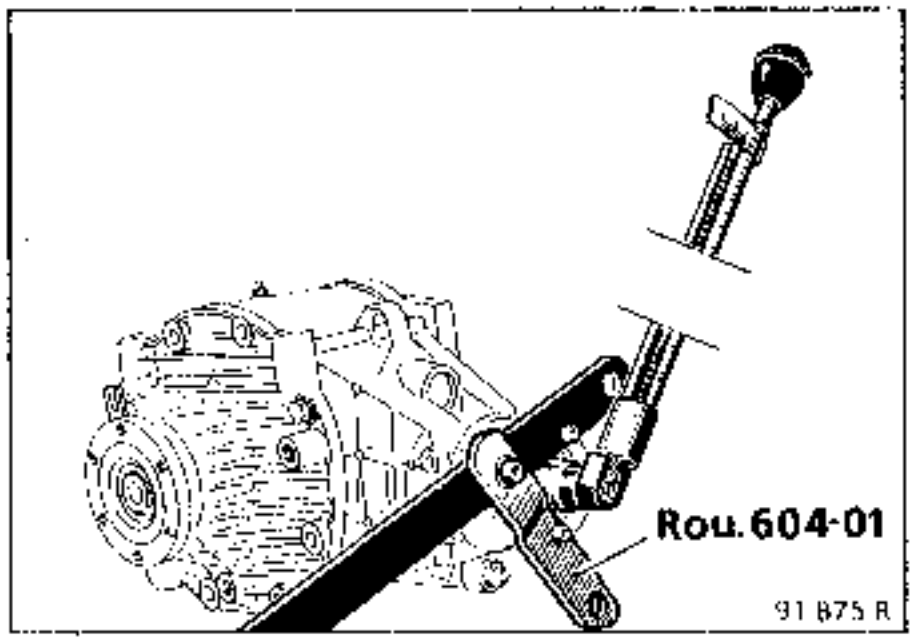
Spacers are available in thicknesses of **6.60 mm** to **7.12 mm** increasing in steps of **0.06 mm**.

When the correct adjustment has been obtained, remove the flange and fit the greased lip seal using tool **T.Ar 1099**.



Refit the flange.

Place three drops of **LOCTITE FRENBLOC** on the threads of the bolt (new) and tighten it to a torque of **15 to 16 daN.m**.



Except final drives : OT2 10 - 11

Adjusting the backlash:

This operation is performed when the differential bearing preload and final drive pinion bearing preload have been adjusted.

Mount:

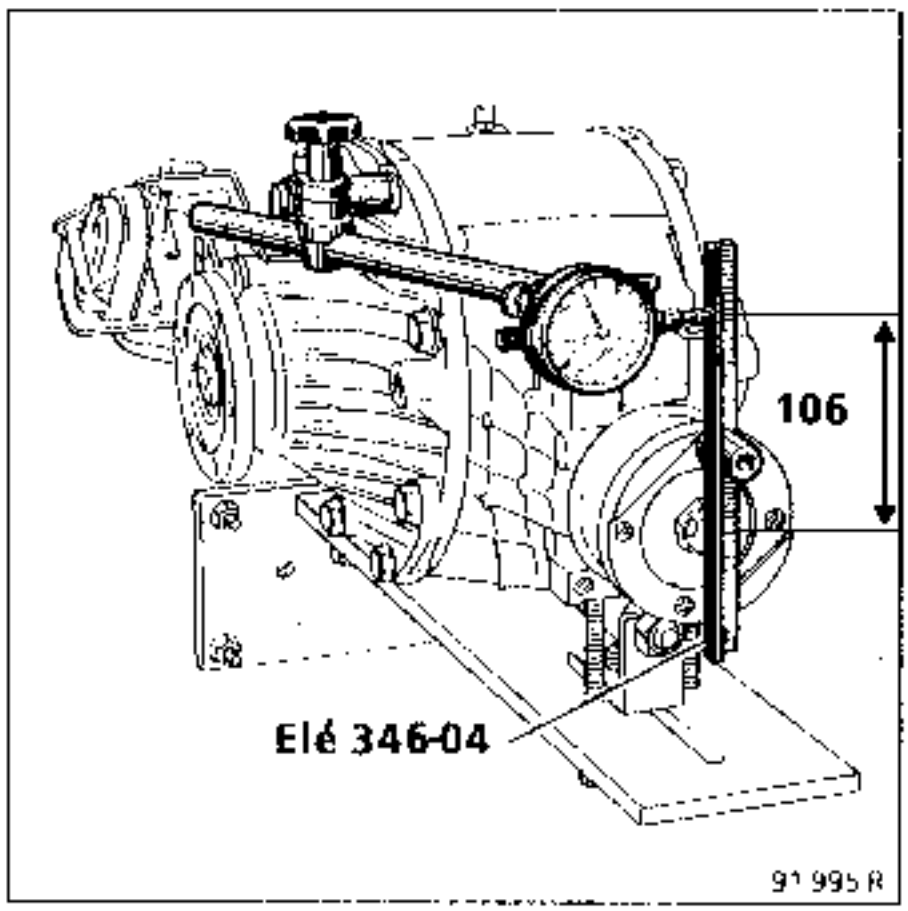
- The bar from tool **Elé. 346.04** on the input flange, fitting a spacer in between.

- A clock gauge and its mounting to one of the final drive side cover mountings.

- To measure the backlash, move the probe on the clock gauge along bar **Elé. 346.04** corresponding to a radius of **106 mm**.

- Measure the backlash by turning the flange slightly.

Adjusting the backlash



Turn the flange, read off the backlash several times and calculate the mean figure

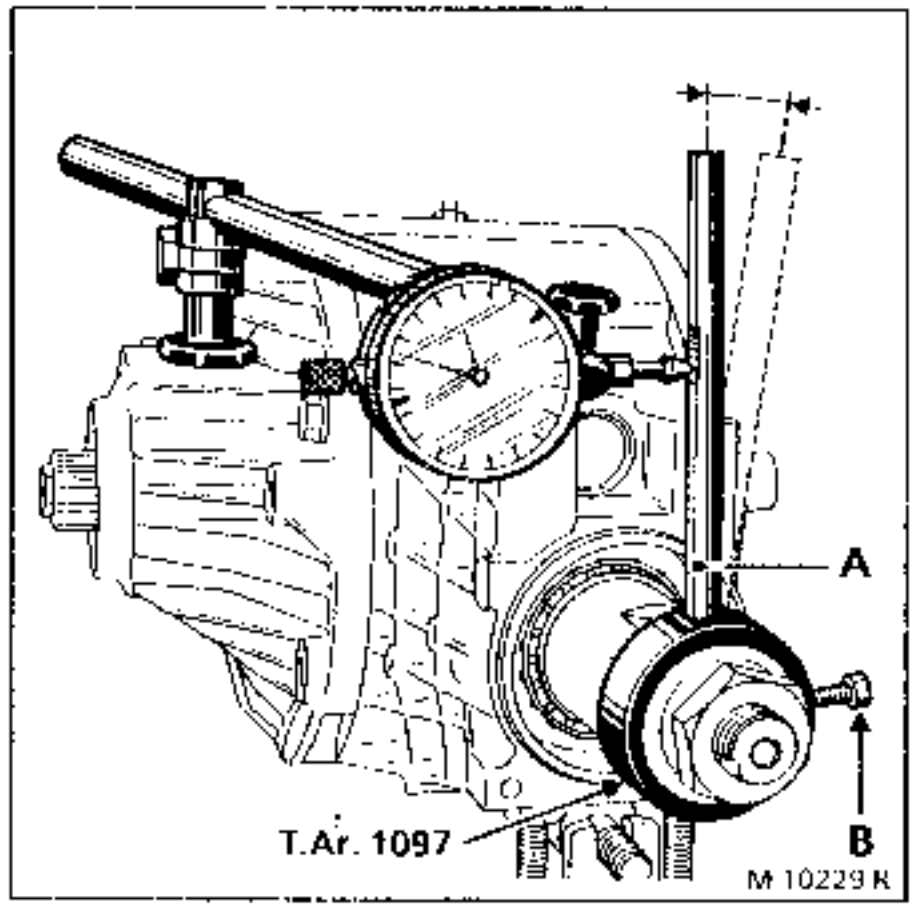
In order to obtain an internal backlash of between **0.09 mm** and **0.15 mm**, the corresponding backlash measured at the input flange (over a radius of **106 mm**) should be between :

Final drive	
9 x 3 11 x 38	0.46mm and 0.80mm
9 x 34	0.50mm and 0.88mm
9 x 37	0.55mm and 0 96mm
11 x 40	0.48mm and 0.84mm

If the backlash is not correct, remove the flanges .

OT2 Espace

Fit in place:
- The differential.
- The right-hand side cover.
- The clock gauge mounting on one of the side cover securing points.



Tool (A) is fitted on socket **T.Ar. 1097**, locked by bolt (B), and the tip of the clock gauge must be placed on the mark (**106 mm** away from the centre of the pinion).

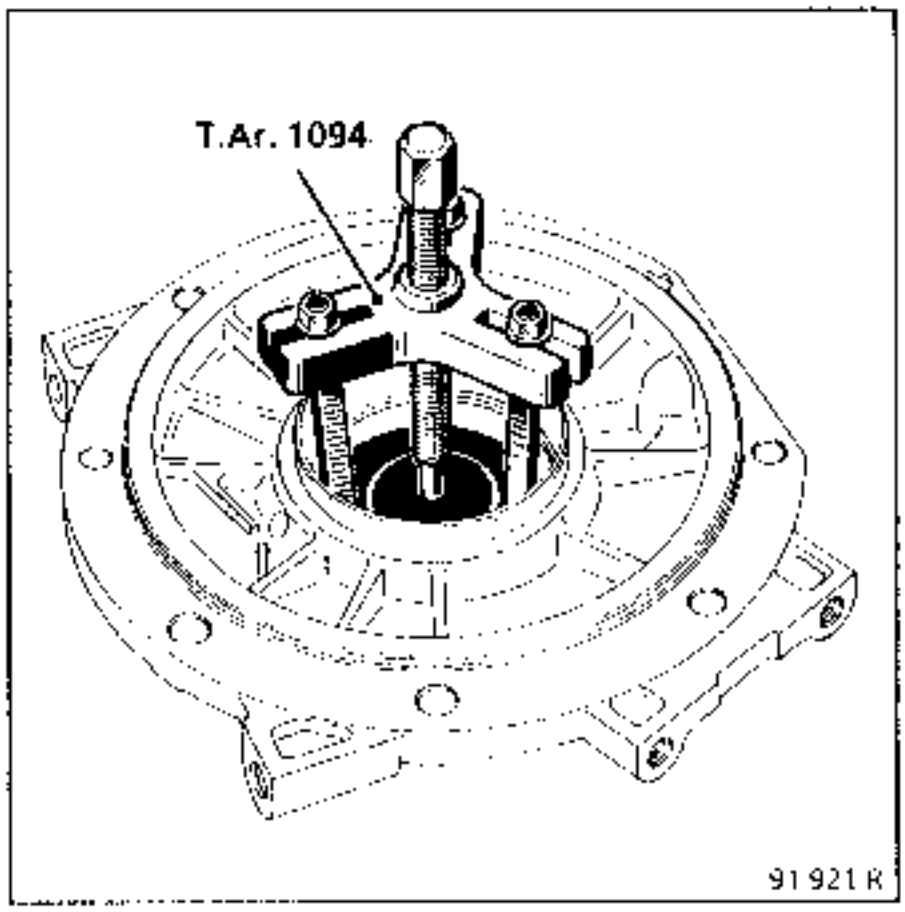
Measure the backlash by turning the nut gently.

Rotate the pinion, read off the backlash several times and calculate the mean figure.

The backlash should be between **0.5** and **0.88 mm**.

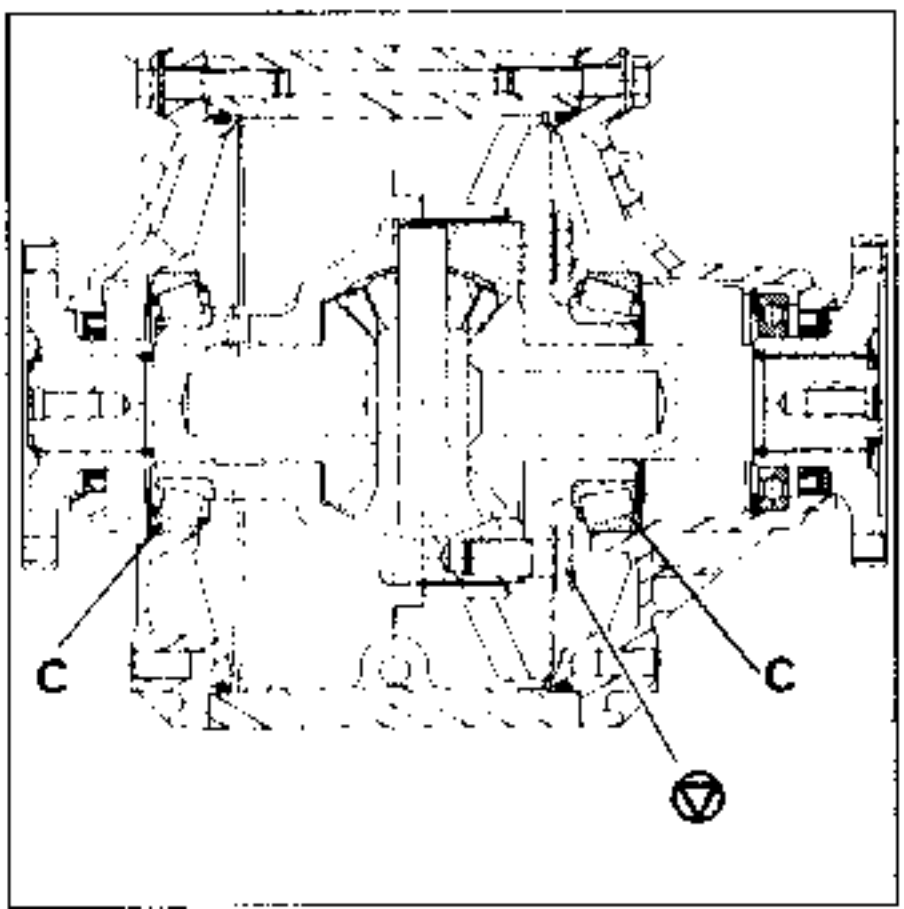
If the backlash is not correct, remove the side covers .

Remove the bearing races from the final drive side covers using tool **T.Ar. 1094.**

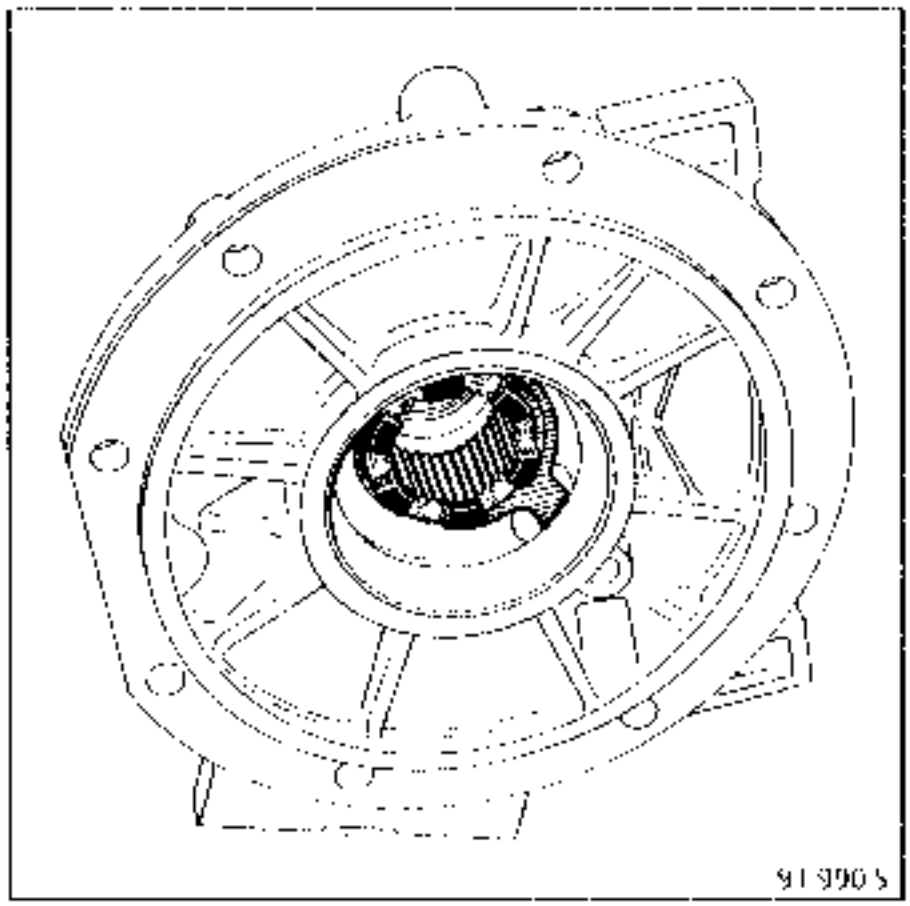


Recover shims (C) found behind the bearing races.
To **decrease** the backlash, on the side opposite the crown wheel reduce the thickness of the shims by the amount which is to be made up on the crown wheel side (in order to keep the same bearing preload).
To **increase** the backlash, proceed in the opposite way. A variation of 0.02 mm shim thickness will vary the backlash by approx. 0.1 mm.

Check the backlash after refitting the side covers.

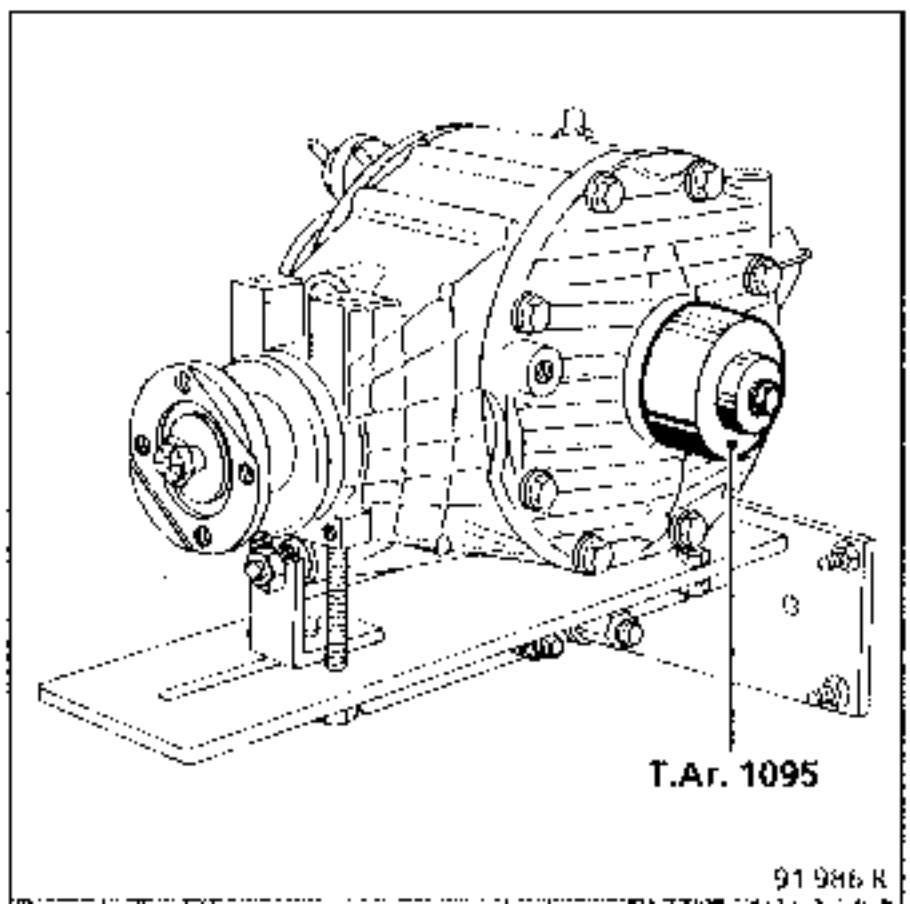


When the correct setting has been obtained, take the right-hand side cover off again.
Fit the sliding gear locating its groove in the fork



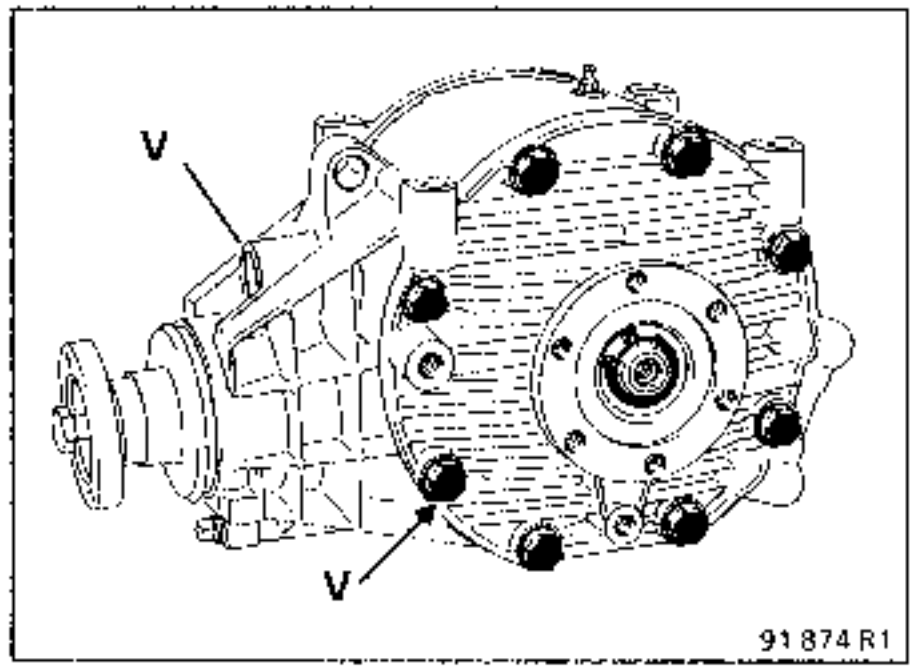
Refit the side cover (with its O-ring seal greased) and hold the sliding gear so that it can be located on the sun wheel splines.

The lip seal is fitted using tool T.ar.**1095**, which determines the position of the seal.



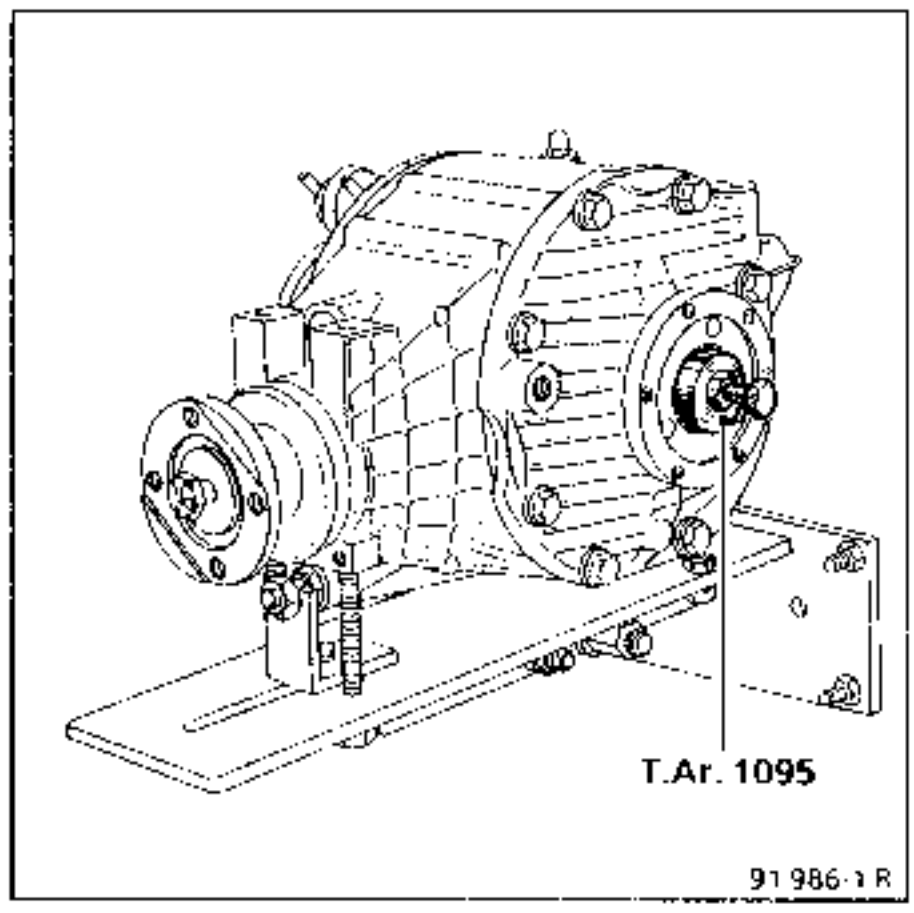
The two bolts (V) on the right-hand and left-hand side covers leading into the final drive casing must be coated with **CAF 4/60 THIX0**.

Torque tighten to bolts to **5 daN.m**.



Make sure that the O-ring seals are fitted to the sun wheel.

Refit the lip seals and the drive shaft flanges using tool **T.Ar.1095**.



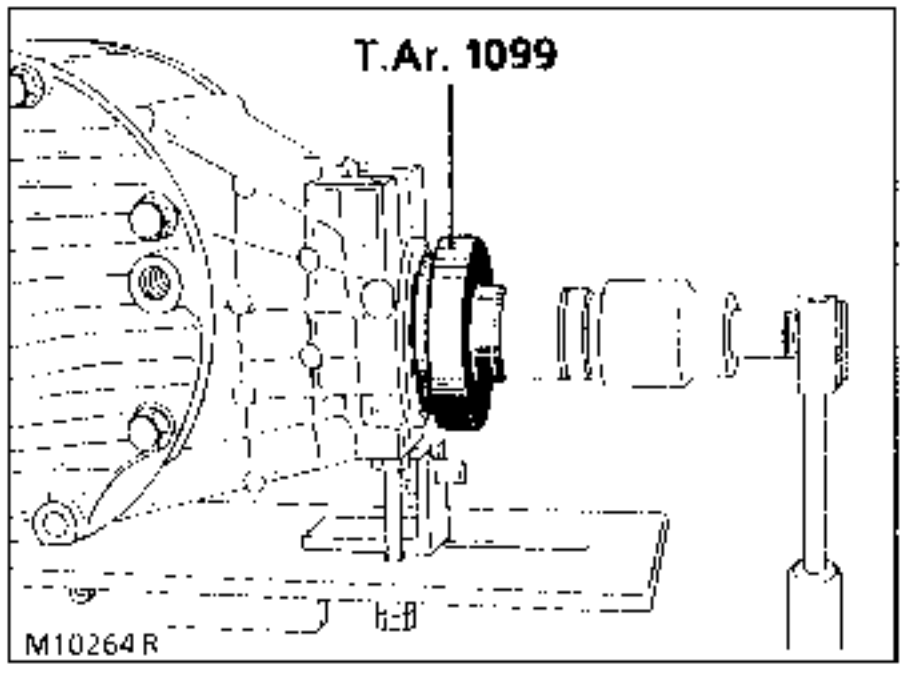
Check that the circlips are located properly in the sun wheel shaft grooves
Fit the plastic seal on the flange.

FITTING THE VISCOUS COUPLING

Position tool **Rou. 604-01** on each drive shaft flange.

Remove socket **T.Ar. 1097**.

Using tool **T.Ar. 1099**, fit seal in position.

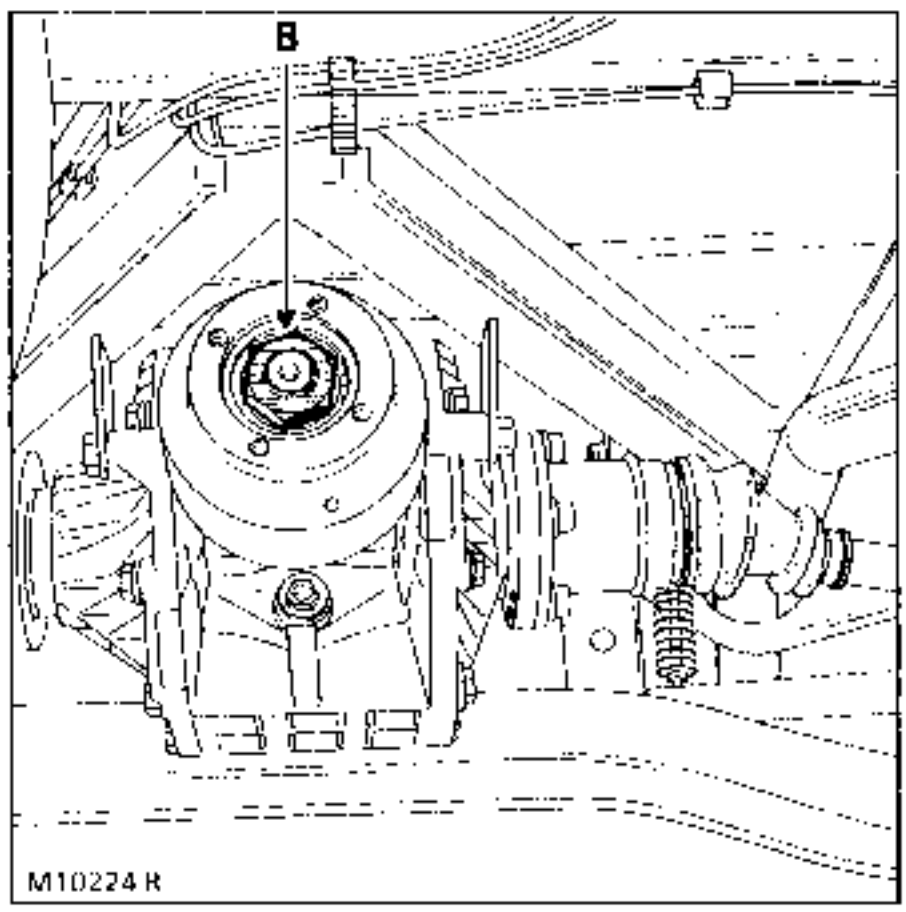


Grease viscous coupling splines.

Fit the viscous coupling on the splines on the final drive shaft.

Fit the washer and the new nut (B)

Tighten the nut to **20 daN.m.**



Lock the nut.

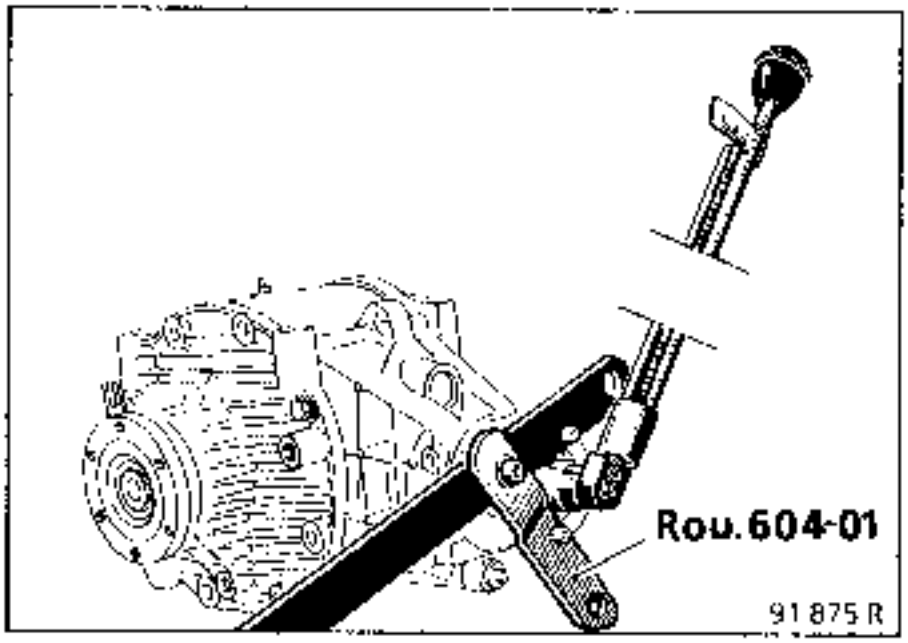
This operation is performed after the final drive assembly has been removed.

ESSENTIAL SPECIAL TOOLING	
T.Ar. 1099	Tool for fitting the final drive input flange seal
Rou. 604-01	Wheel hub locking tool

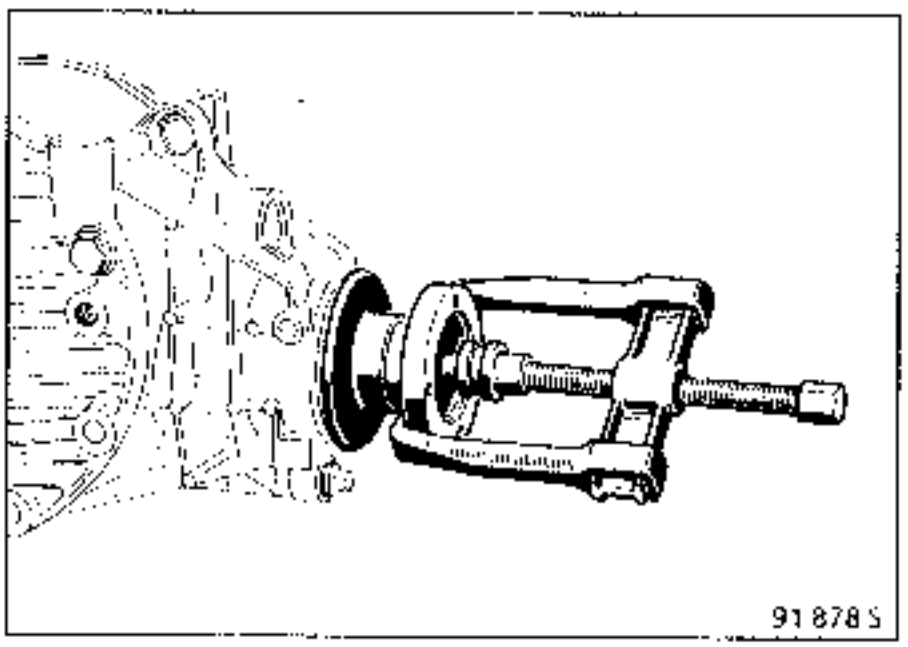
TIGHTENING TORQUE (in daN.m)	
Bolt on final drive input flange	15 to 16

Partially drain the final drive

Remove the input flange bolt using tool **Rou. 604.01** to prevent it from rotating.

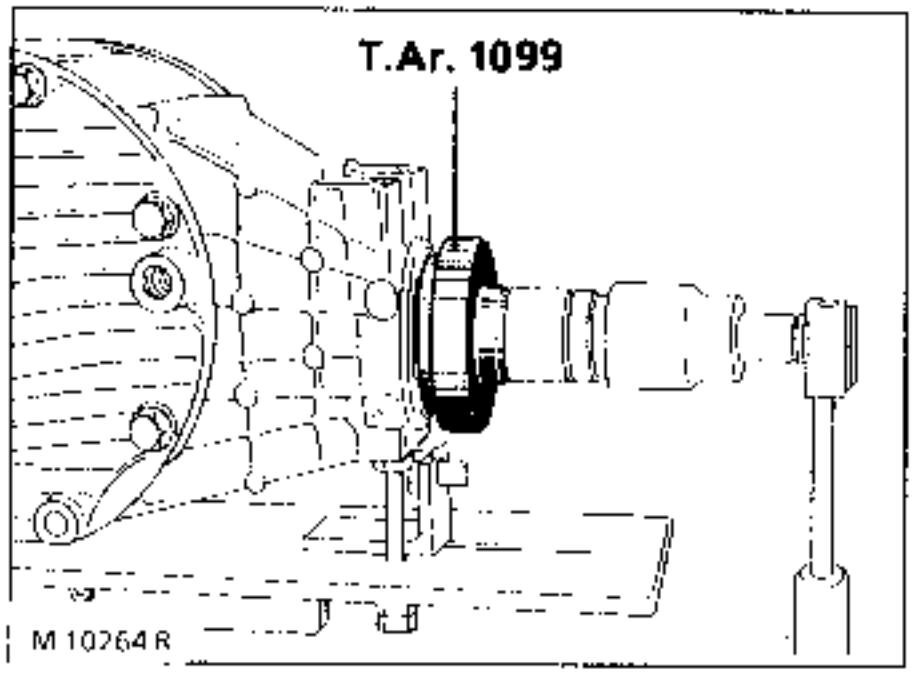


Using a puller of the type **FACOM U32-120** or equivalent, remove the input flange or the viscous coupling and spacer.



Take out the worn seal using a screwdriver.

Ensure that the surface of the seal bearing on the flange is not scratched in any way and does not show any trace of abnormal wear.
Fit the greased lip seal on tool **T.Ar.1099**.
Fit the seal until the tool is right up against the casing.



Refit the flange or viscous coupling, and always fit a new mounting bolt .

Tighten to a torque of **15 to 16 daN.m.**

Top up the final drive with the recommended oil.

This operation can be performed on the vehicle.

ESSENTIAL SPECIAL TOOLING	
B.Vi. 1181	Input flange puller
T.Ar. 1099	Input flange seal fitting tool
T.Ar. 1231	Prop shaft support tool
Rou. 604-01	Wheel hub locking tool

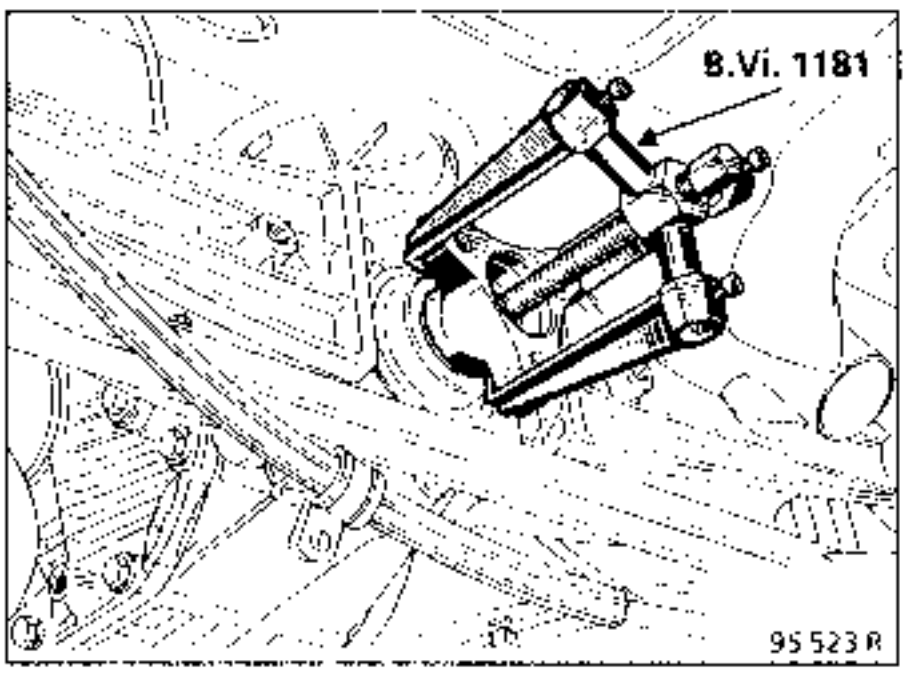
TIGHTENING TORQUES (in daN.m)	
Gearbox output flange bolt	2.5
Final drive input flange bolt	6
Bearing mounting bolt	2
Final drive input flange bolt	15 to 16
Exhaust sleeve mounting bolt	2.5

Put the vehicle on a 2 post lift

Drain the final drive.

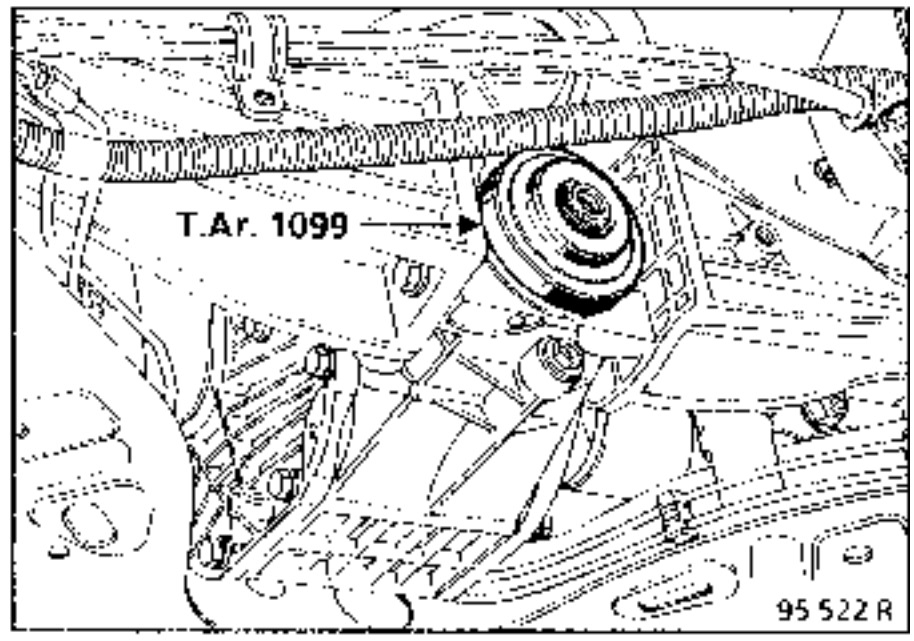
Remove:
- the prop shaft (tool **T. Ar. 1231**),
- the input flange bolt, stopping it turning by using tool **Rou. 604-01.**

Extract:
- the input flange using tool **B.Vi. 1181,**



- the worn seal using a screwdriver.

Ensure that the surface of the seal bearing on the flange is not scratched in any way and does not show any trace of abnormal wear.
Fit the greased lip seal on tool **T.Ar.1099.**
Fit the seal until the tool is right up against the casing



Refit the flange and always fit a new mounting bolt

Top up the final drive with oil.

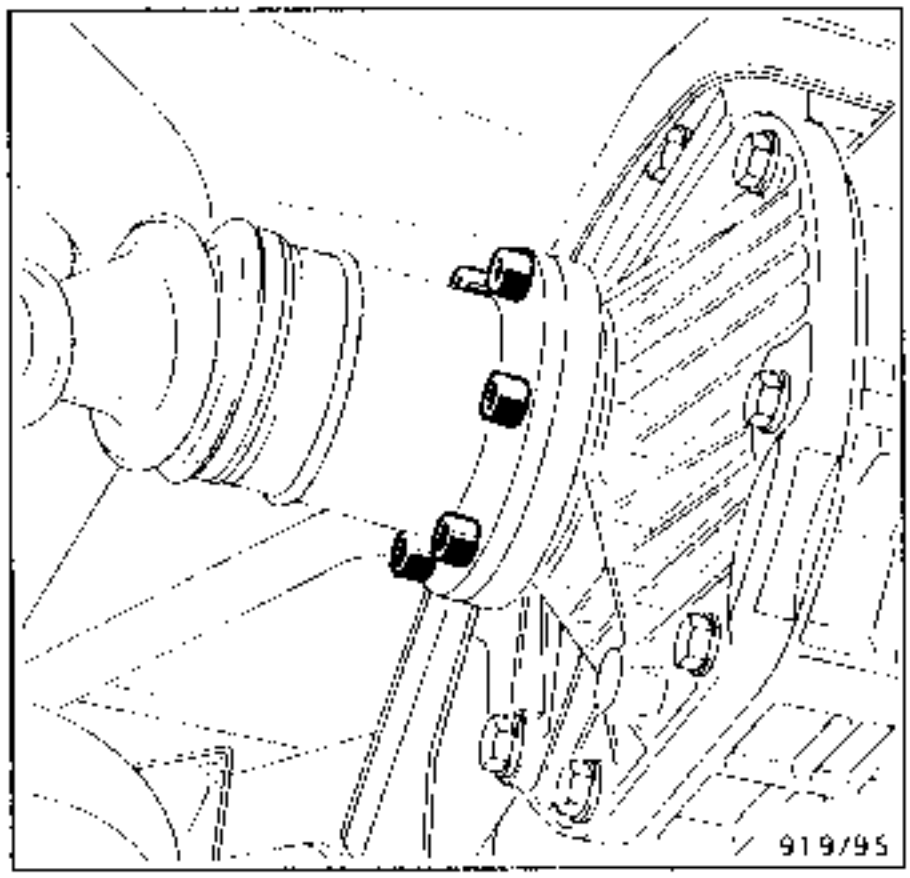
Refit the drive shaft .

REPLACEMENT

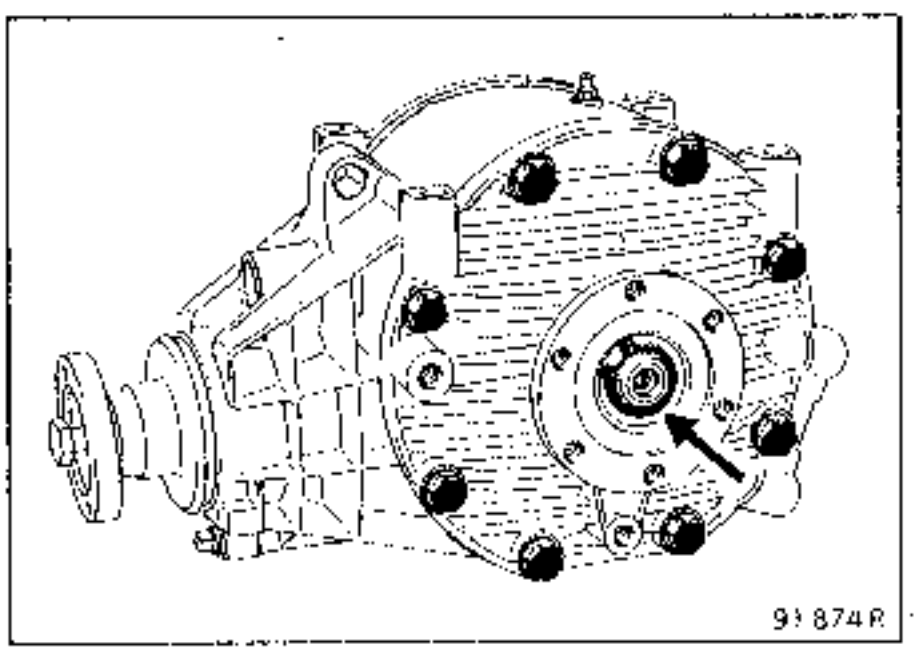
TIGHTENING TORQUE (in daN.m)	
Drive shaft mounting bolts	6

Drain the rear axle.

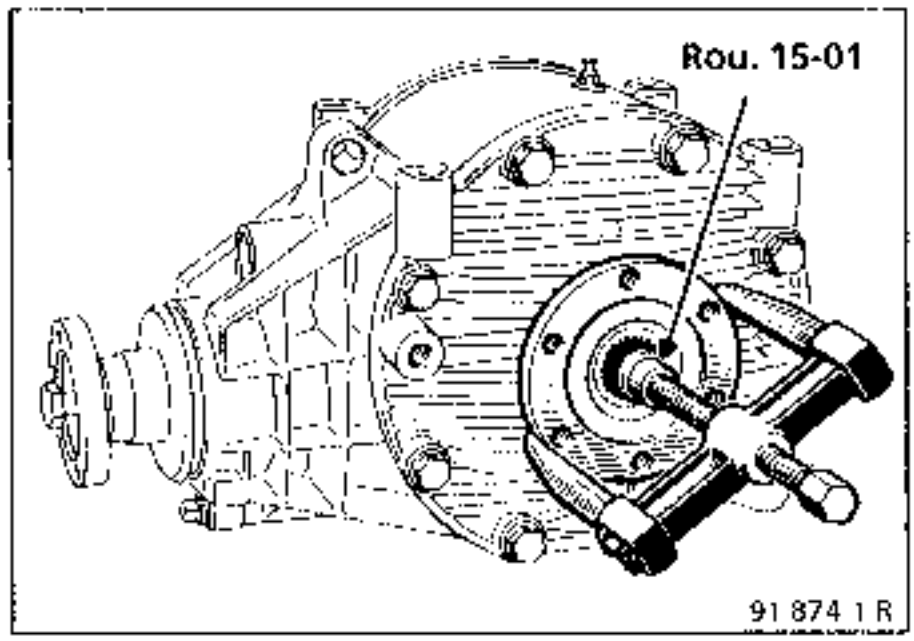
Uncouple the drive shaft on the side in question.



Remove the sun wheel circlip.



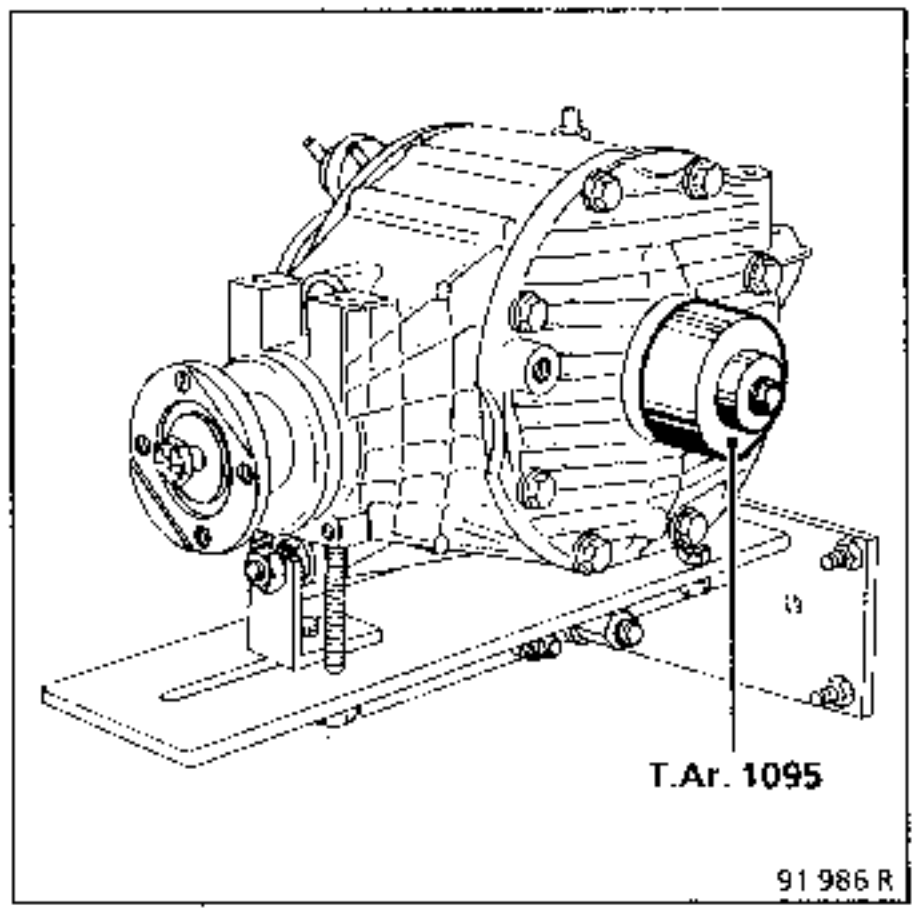
Using a **FACOM U32-120** extractor or equivalent, remove the drive shaft flange, inserting protection cup **Rou.15-01** to protect the shaft.



Remove the seal using a screwdriver.

REFITTING

The greased lip seal is refitted using tool **T.Ar. 1095** which locates the seal.



REPLACEMENT (continued)

Check that the O ring seal is fitted on the sun wheel.

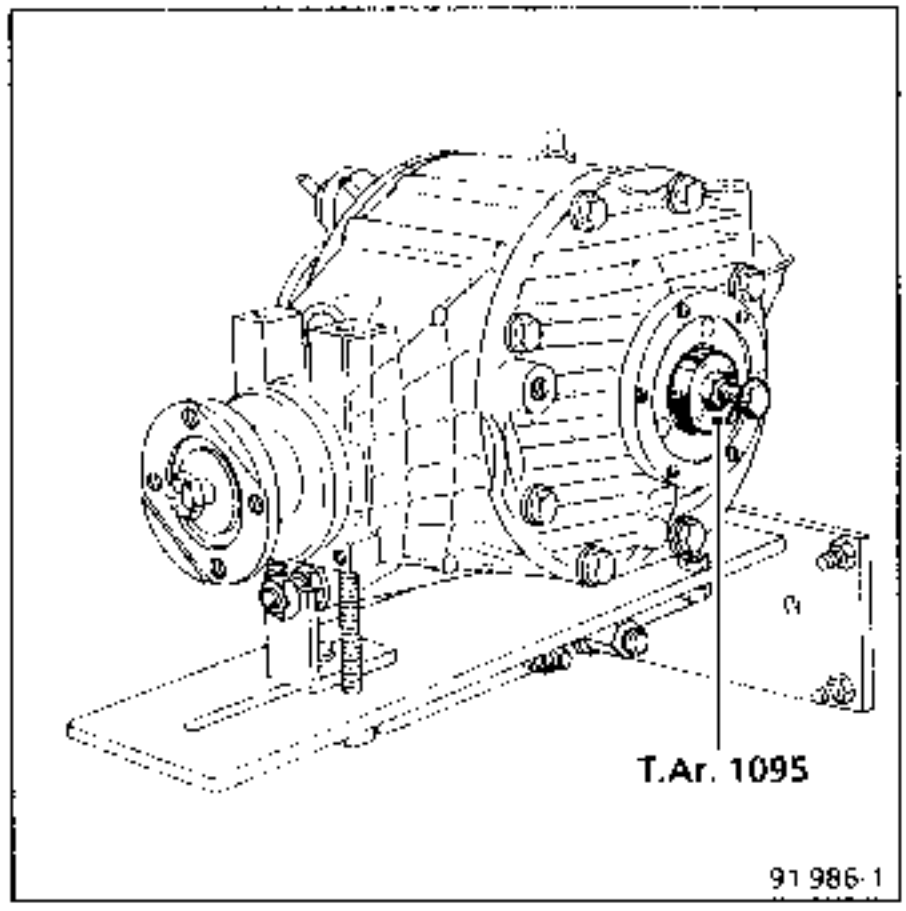
NOTE : The outside diameter of the right-hand and left-hand lip seals is different:

- Right-hand side: **64 mm dia.**
- Left-hand side: **62 mm dia.**

- Ensure that the surface of the seal bearing on the flange is not scratched in any way and does not show any trace of abnormal wear

Refit:

- The drive shaft flange using tool **T.Ar.1095.**



- The circlip.

- The **drive shaft.**

Tighten the bolts to a torque of **6 daN.m**

Fill the final drive with the recommended oil.

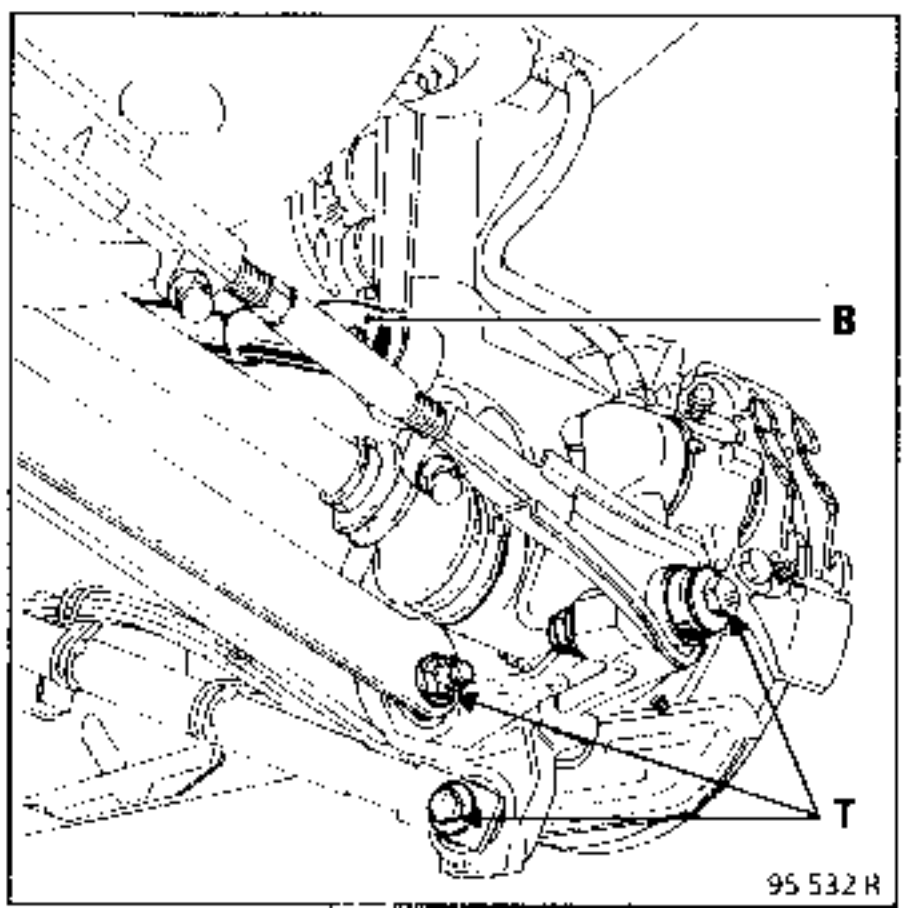
ESSENTIAL SPECIAL TOOLING	
T.Ar. 1238	Drive shaft seal fitting tool
Rou. 604-01	Brake disc locking tool
T.Av. 1050	Drive shaft puller

TIGHTENING TORQUES (n daN.m)		▽
Wheel bolts	4 bolts	9
	5 bolts	10
Brake calliper bolts		10
Anti-roll bar mounting bolts		6
Wheel alignment adjustment bar bolt		11
Rear axle tie rod mounting bolt		13
Drive shaft mounting nut		21
Rear axle transverse bar bolts		11

Put the vehicle on a two-post lift.

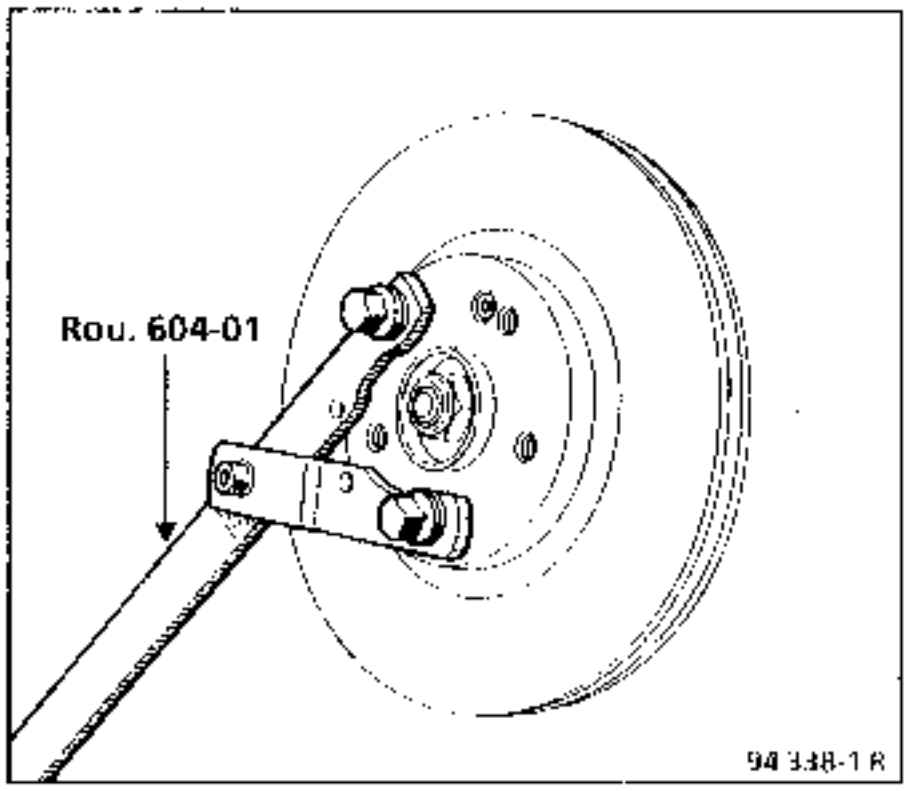
Drain the final drive.

Remove (depending on the side in question) :
- the wheel,
- the brake calliper,
- the anti-roll bar bolt (B),
- three rear axle tie rods (T)

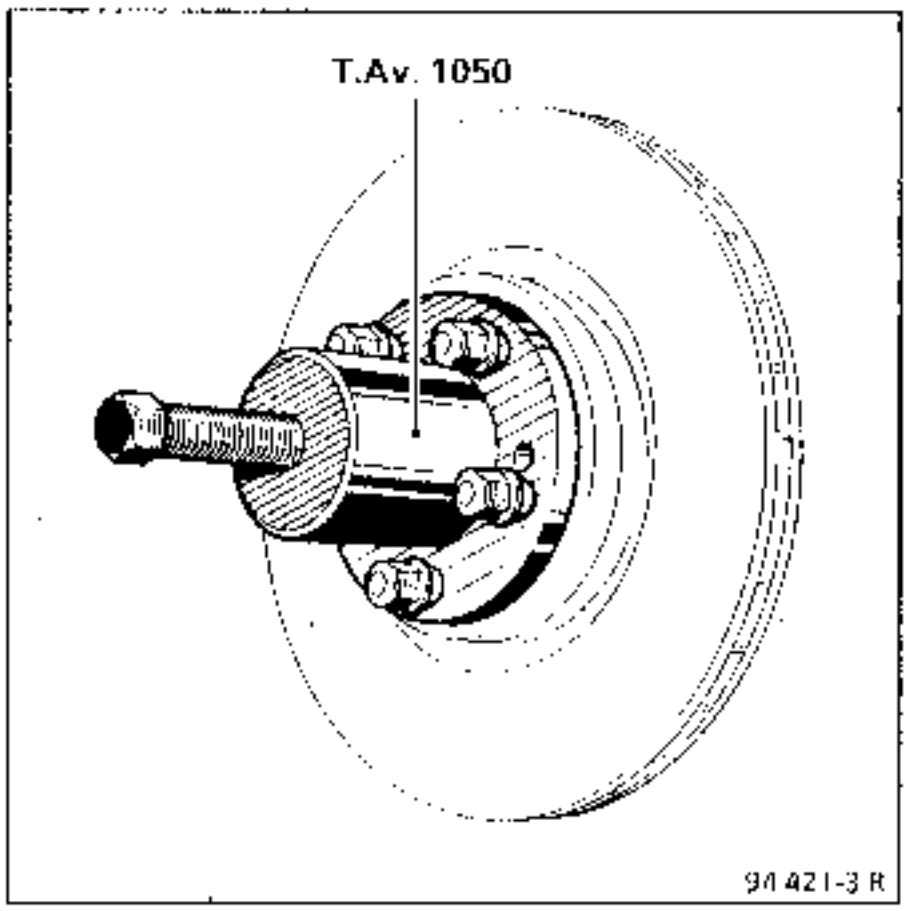


Left-hand side :

Remove the drive shaft nut using tool **Rou. 604-01**.



Pull out the drive shaft using tool **T.Av. 1050.**



Take out the drive shaft.

Right-hand side:

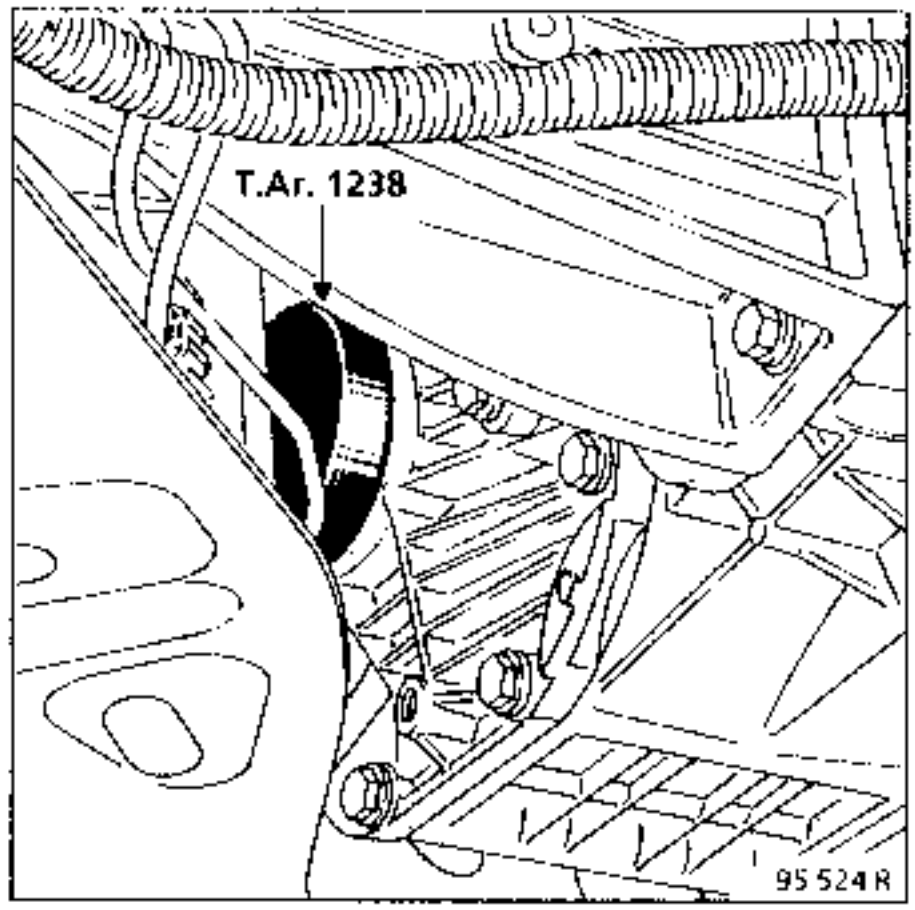
Separate the stub axle carrier/shock absorber arm assembly to remove the drive shaft from the differential output.

Place the drive shaft above the final drive.

Remove (depending on the side in question) the seal using a screwdriver.

REFITTING

Fit the greased lip seal using tool **T.Ar. 1238** which locates the seal.



NOTE : The outside diameter of the right-hand and left-hand lip seals is different:
- Right-hand side : **62 mm dia.**
- Left-hand side : **64 mm dia.**

Before refitting the drive shaft, ensure that the seat of the lip seal is not scratched in any way and does not show any trace of abnormal wear.

Refitting is the reverse of removal.

Tighten the bolts to the recommended torque.

Top up the final drive oil level.

REMOVING - REFITTING

ESSENTIAL SPECIAL TOOLING	
T.Ar. 1140	36 mm socket

Special points:

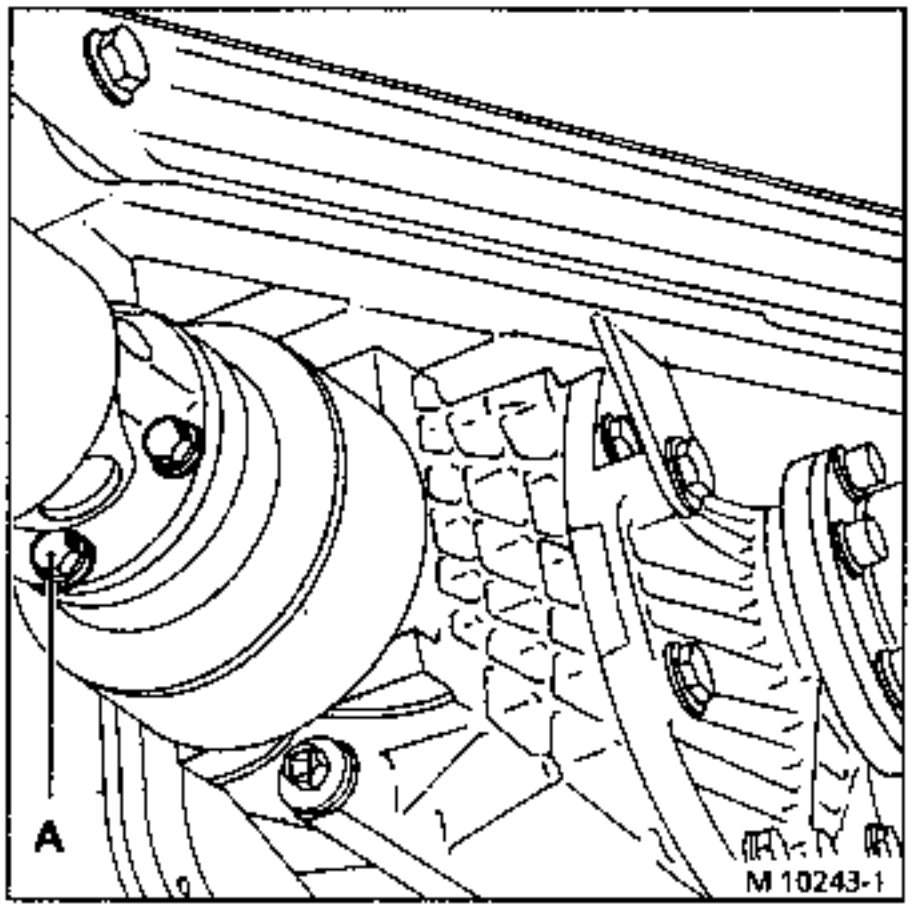
The viscous coupling cannot be repaired. Only the front ball bearing can be replaced.

REMOVAL

Drain the rear axle.

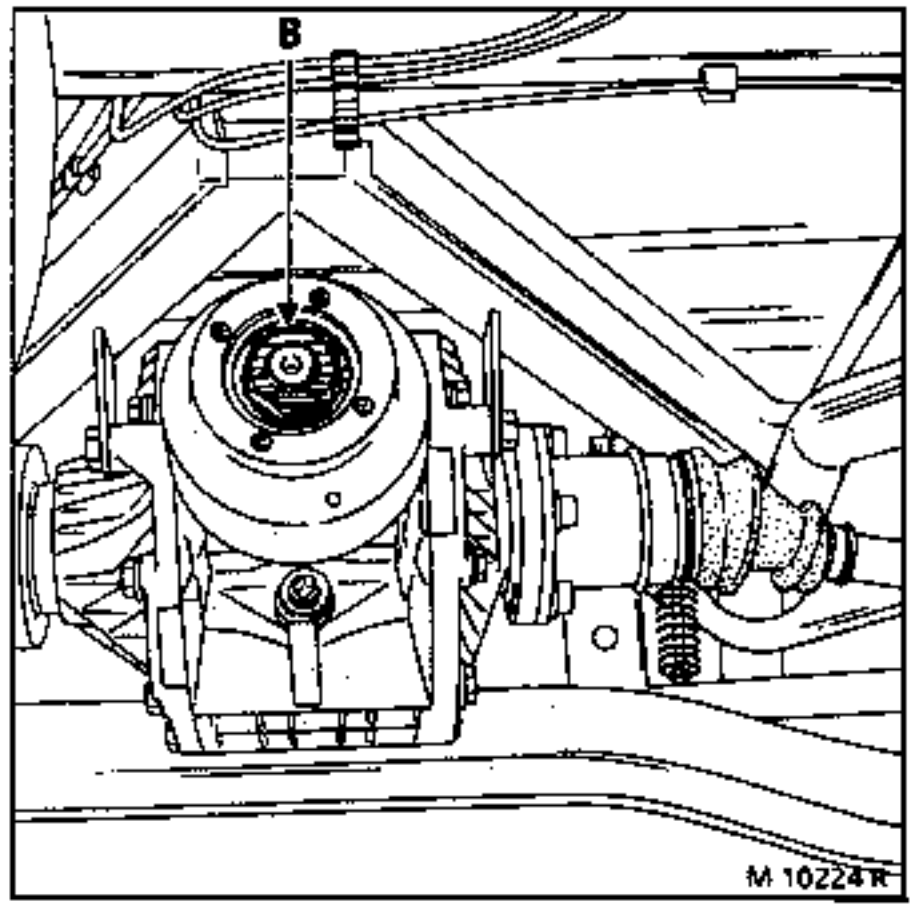
Remove:

- The 4 mounting bolts (A) from the prop shaft and take it out towards the rear.

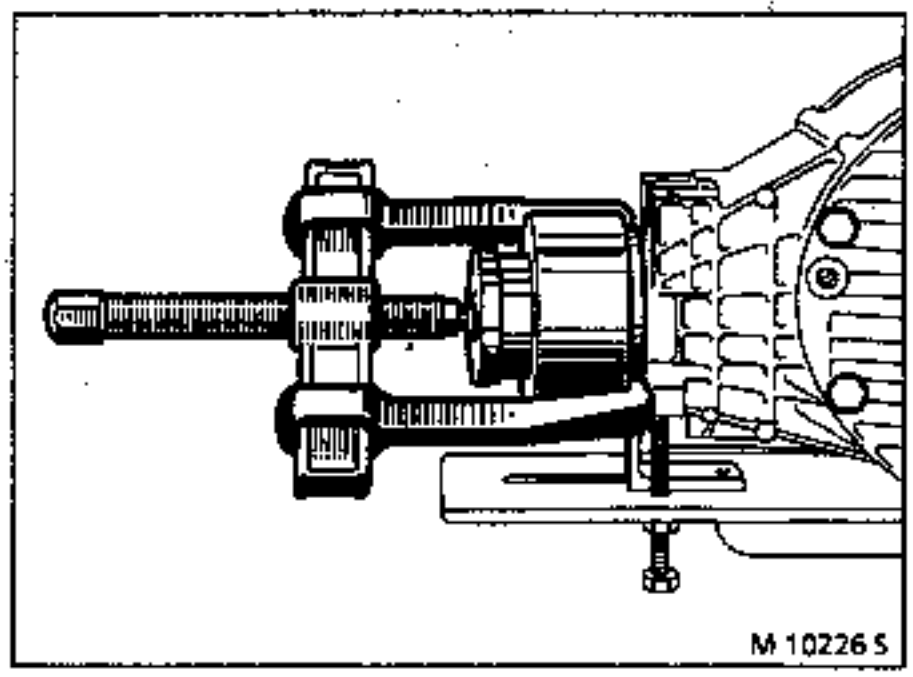


- The anti-dust seal (B).

- The viscous coupling mounting nut using tool **T.Ar. 1140.**



Remove the viscous coupling with the extractor.



REFITTING

Proceed in the reverse order to removal.

Grease the seal and torque tighten the nut to **20 daN.m.**

Coat the bolts securing the shaft to the viscous coupling using **Loctite FRENBLOC** and torque tighten.

Top up the rear axle with the recommended oil.

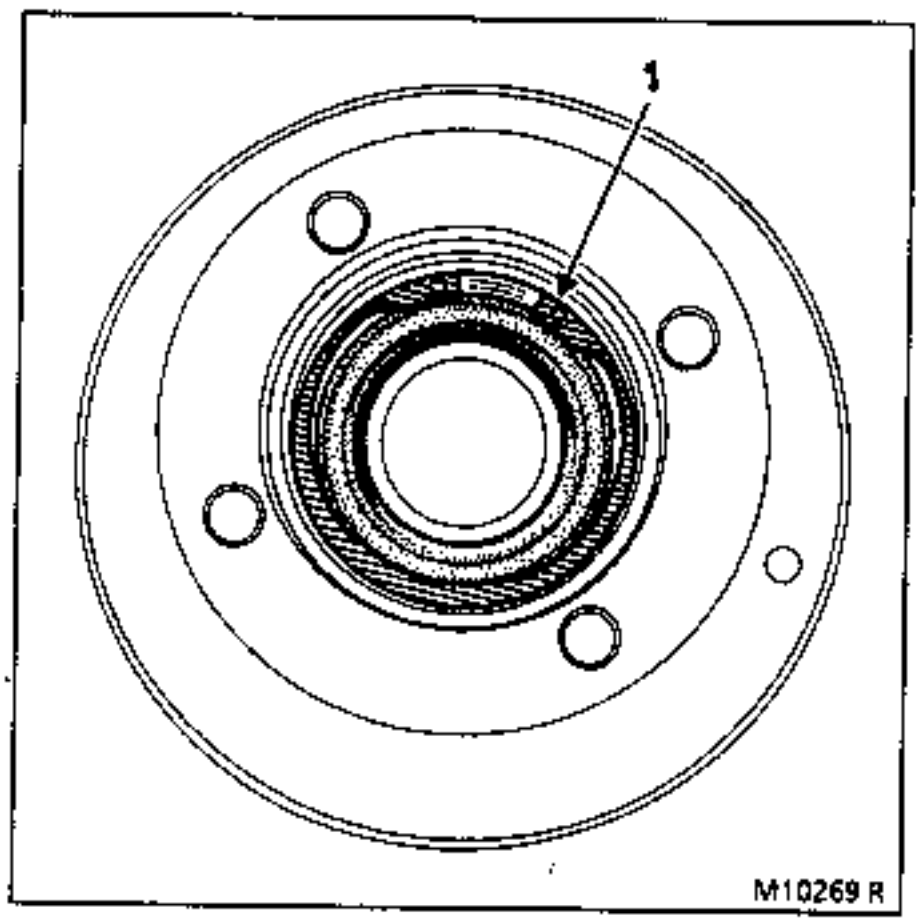
REPLACING THE BALL BEARING

ESSENTIAL SPECIAL TOOLING
Impact extractor

Remove the viscous coupling.

Remove the circlip (1).

Take out the bearing using an impact extractor.



Fit the bearing on the press by pressing on the outer diameter using a socket.

Refit the circlip and viscous coupling.

DISMANTLING - REASSEMBLY

This operation is performed after the right-hand final drive side cover has been removed.

TIGHTENING TORQUES (in daN.m)	
Fork/dog clutch shaft	6.4
Dog clutch shaft 6 mm dia. end bolts	0.5
Switch	2.5
Vacuum capsule securing bolts	0.2 to 0.5

DISMANTLING

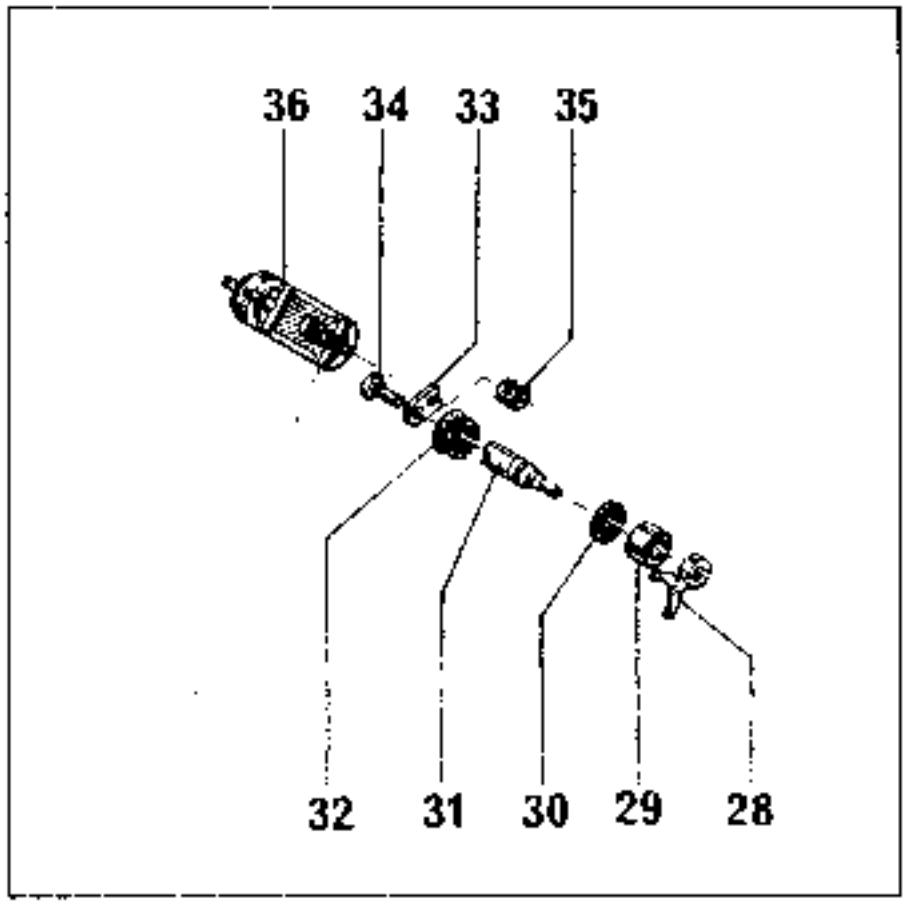
Remove:

- the switch,
- bolt **(34)**,
- lever **(33)**.

Remove gaiter **(32)**.

Unscrew control shaft **(31)** to uncouple it from fork **(28)**.

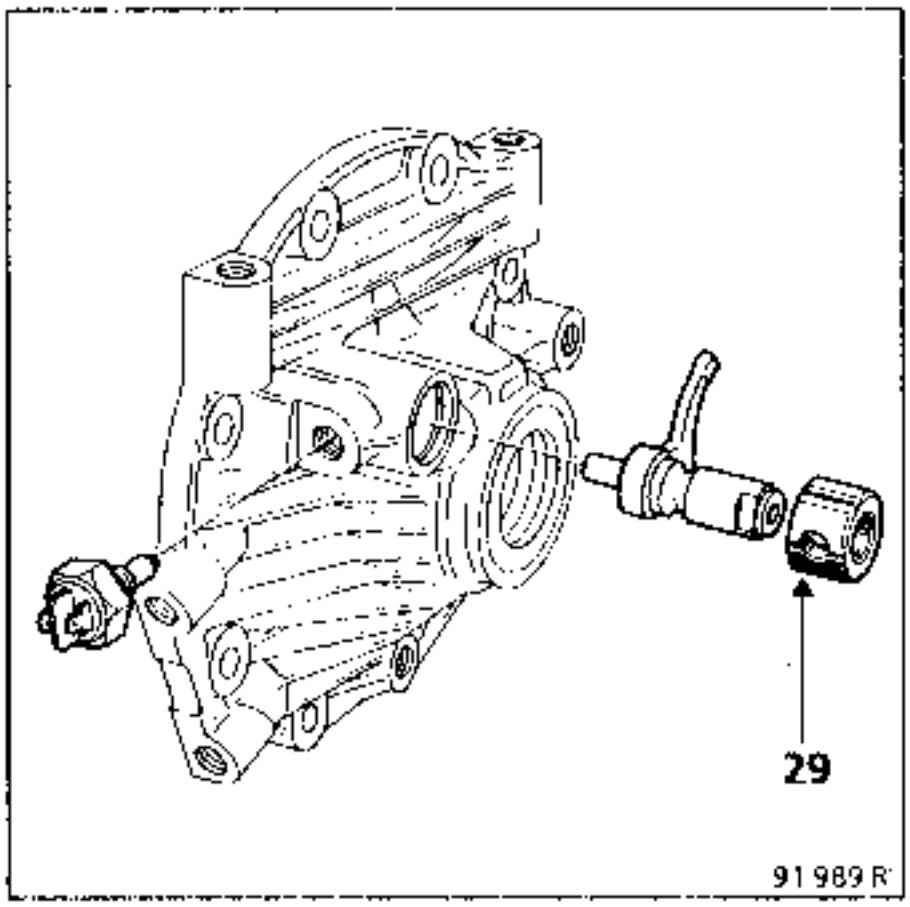
Remove the fork and shaft



Place a **24 mm** dia. disc on switch bush **(29)** and take out the lip seal **(30)** and the bush using a pin drift

REFITTING

Use **"LOCTITE SCELBLOC"** to stick the bush **(29)** into the casing and turn it so that the aperture for the switch is in line with the aperture in the casing.



Screw in the switch by a few threads (having coated the threads with **CAF 4/60 THIXO**) so that the bush is locked.

Refit the following parts in order:

- Lip seal **(30)** (greased).

- The fork and shaft (having coated the threads with **LOCTITE FRENBLOC**).

- Wipe all traces of Loctite off the shaft.

Replace the gaiter and fit lever **(33)** and its bolt **(34)**.

Tighten the bolts to the specified torques.

Check that control shaft **(31)** slides properly and that lever **(33)** rotates.

DISMANTLING - REASSEMBLY

This operation is performed after the right-hand final drive side cover has been removed.

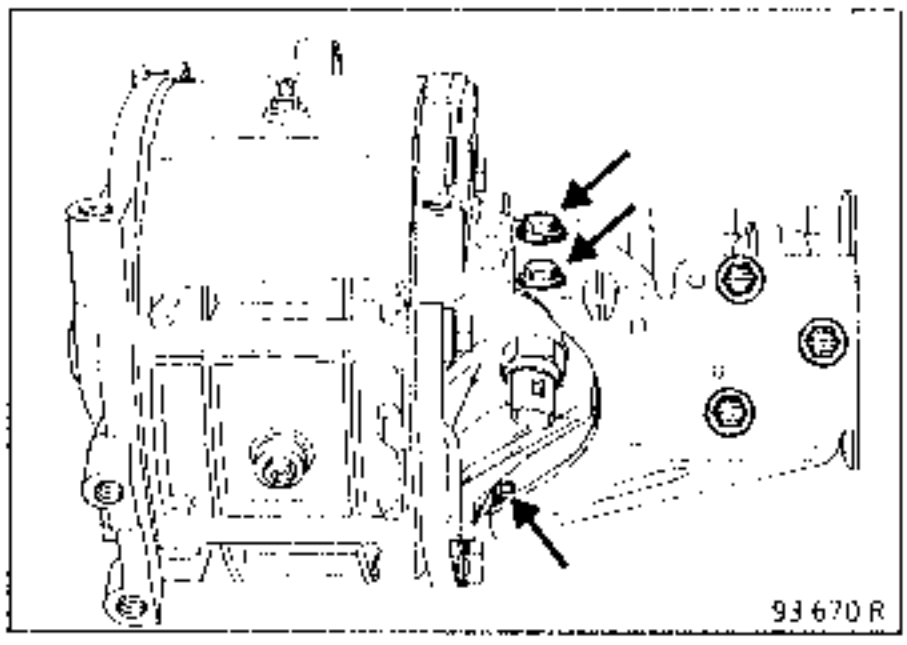
TIGHTENING TORQUES (in daN.m)	
Fork/dog clutch shaft	6
Switch	2.5
Vacuum capsule securing bolts	0.2 to 0.5

DISMANTLING:

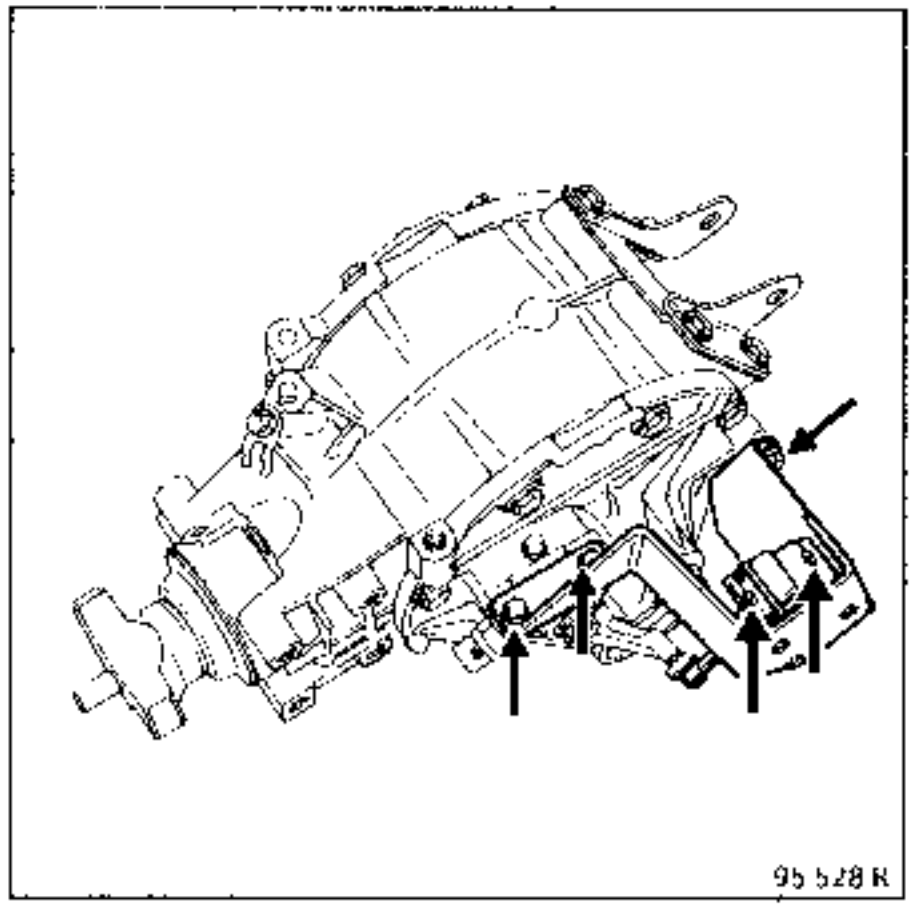
Remove:

- the capsule mounting

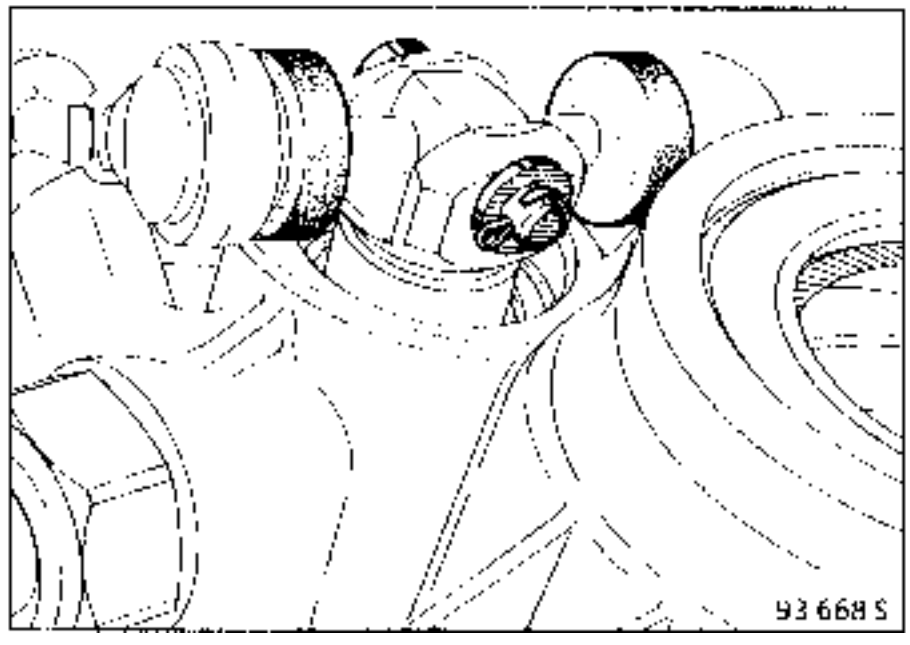
X 48



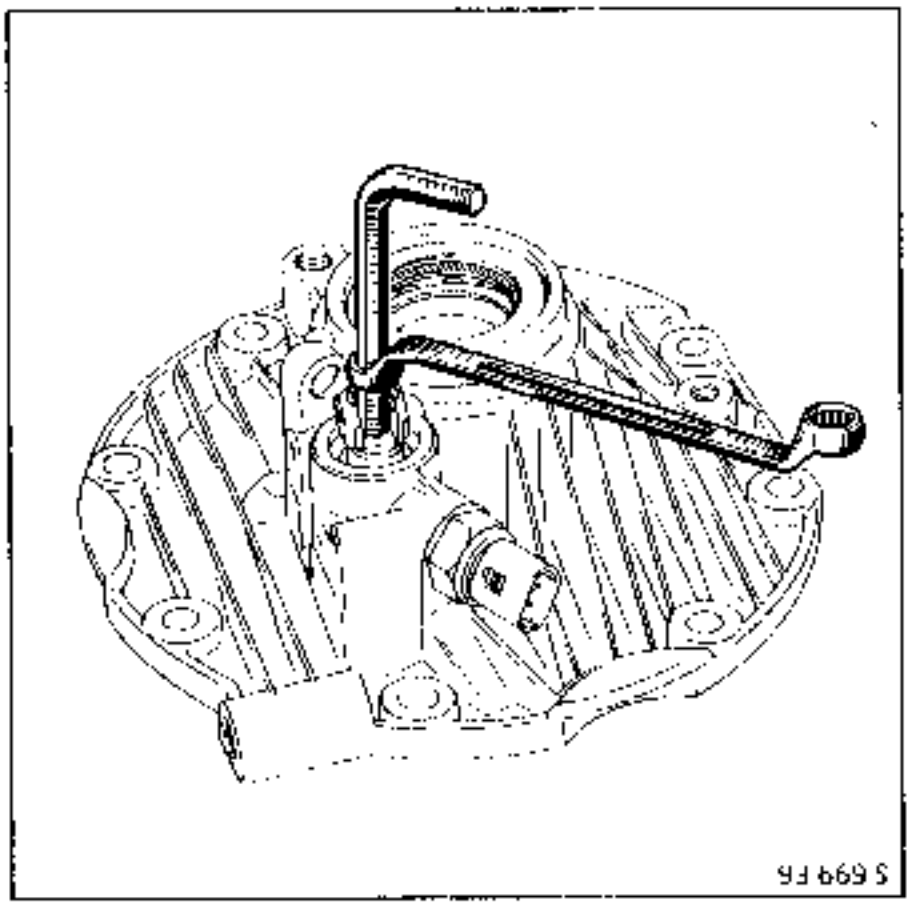
SAFRANE



- the pin
- the control lever shaft



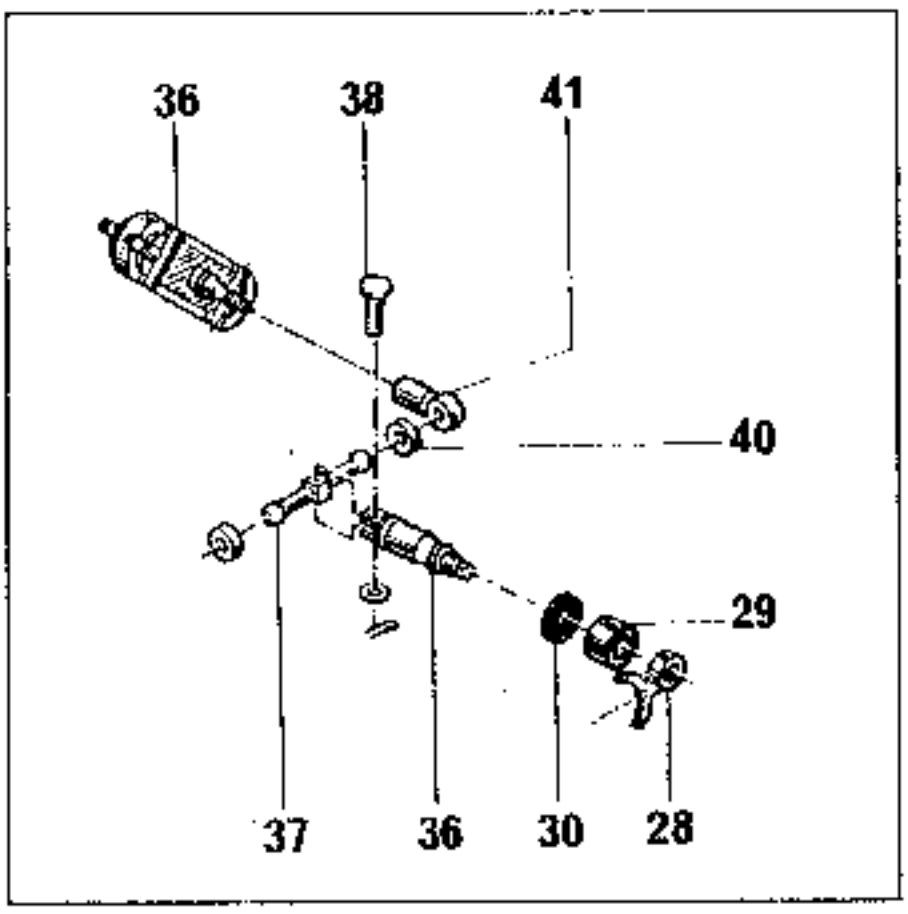
Separate the fork from the control shaft by unscrewing it (hexagonal 8 mm socket).



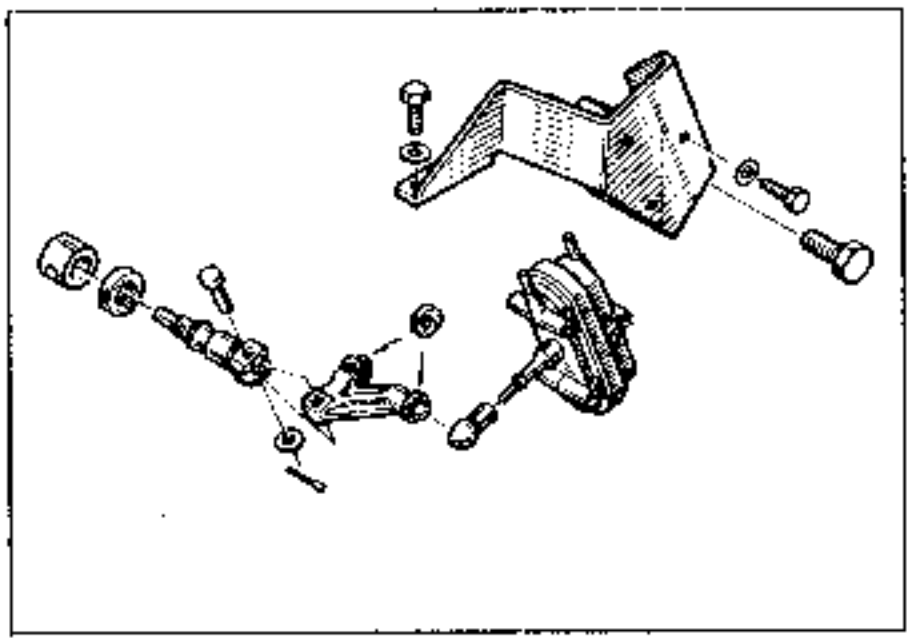
Remove the switch.

DISMANTLING :

Remove the shaft and fork.

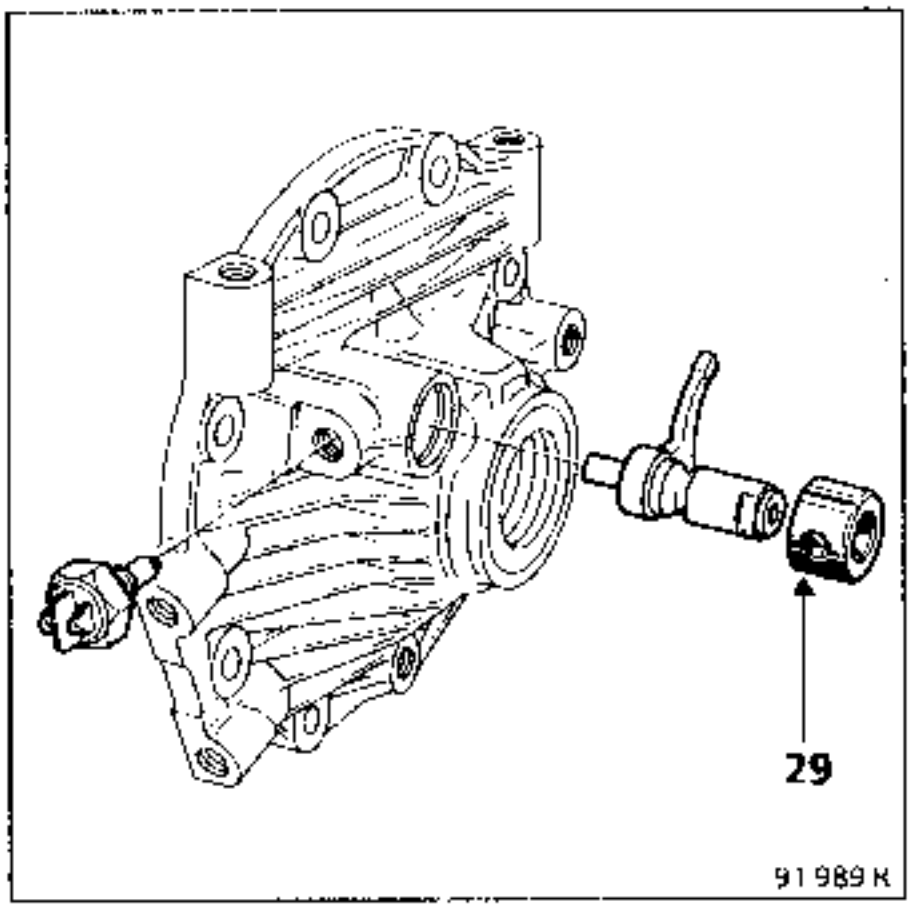


Place a **24 mm** dia. disc on the switch bush **(29)** and take out the lip seal **(30)** and bush using a pin drift.



REASSEMBLY :

Use **"LOCTITE SCELBLOC"** to stick the bush **(29)** into the casing and turn it so that the aperture for the switch is in line with the aperture in the casing.



Screw in the switch by a few threads (having coated the threads with **CAF 4/60 THIXO**) so that the bush is locked.

Refit the following parts in order:
- Lip seal **(30)** (greased).
- The fork and shaft (having coated the threads with **LOCTITE FRENBLOC**).
- Wipe all traces of Loctite off the shaft.
- Coat the control lever ball joint with **MOLYKOTE BR 2** grease.
- Fit the shaft and pin.

Tighten the bolts to the specified torques.

Check operation.

K48 4x4 vehicles are equipped with a pneumatic control for the dog clutch engagement of the prop shaft and locking the rear differential.
The control lever (pneumatic valve) located on the centre console enables the three following positions to be selected:

- at A : position 4x2, normal operation with front wheel drive, for using the vehicle on ground with good grip.

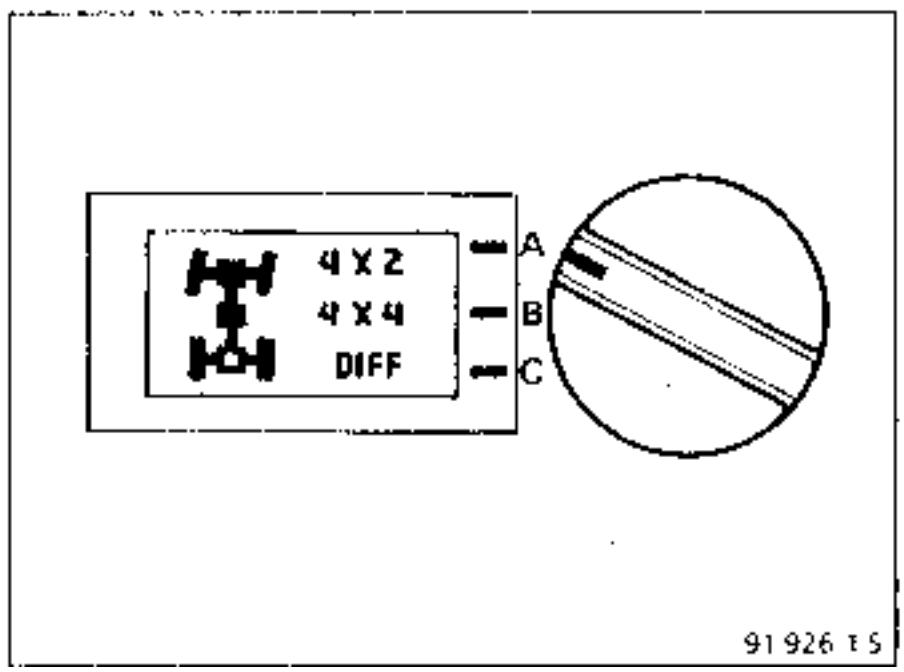
- at B : 4x4 , four-wheel drive by engagement of the prop shaft, 4x4 warning light on the centre console will illuminate.

- at C : DiFF, four-wheel drive with, in addition, engagement of the rear differential locking system. 4x4 and DiFF warning light on the console will illuminate as will the word DiFF on the instrument panel

This final setting enables difficult driving situations to be overcome when one of the two rear wheels can no longer transmit any torque owing to the slip effect. It is essential to disengage the rear differential as soon as the vehicle is free.

Parking manoeuvres :

On ground with good grip, the vehicle must be parked using 4x2
In the 4x4 setting, the scuffing of the tyres owing to the manoeuvres performed causes the steering to be less exact and harmful stresses to be exerted on the drive shafts which make it difficult, or even impossible, to disengage the prop shaft.



EXPLODED VIEW

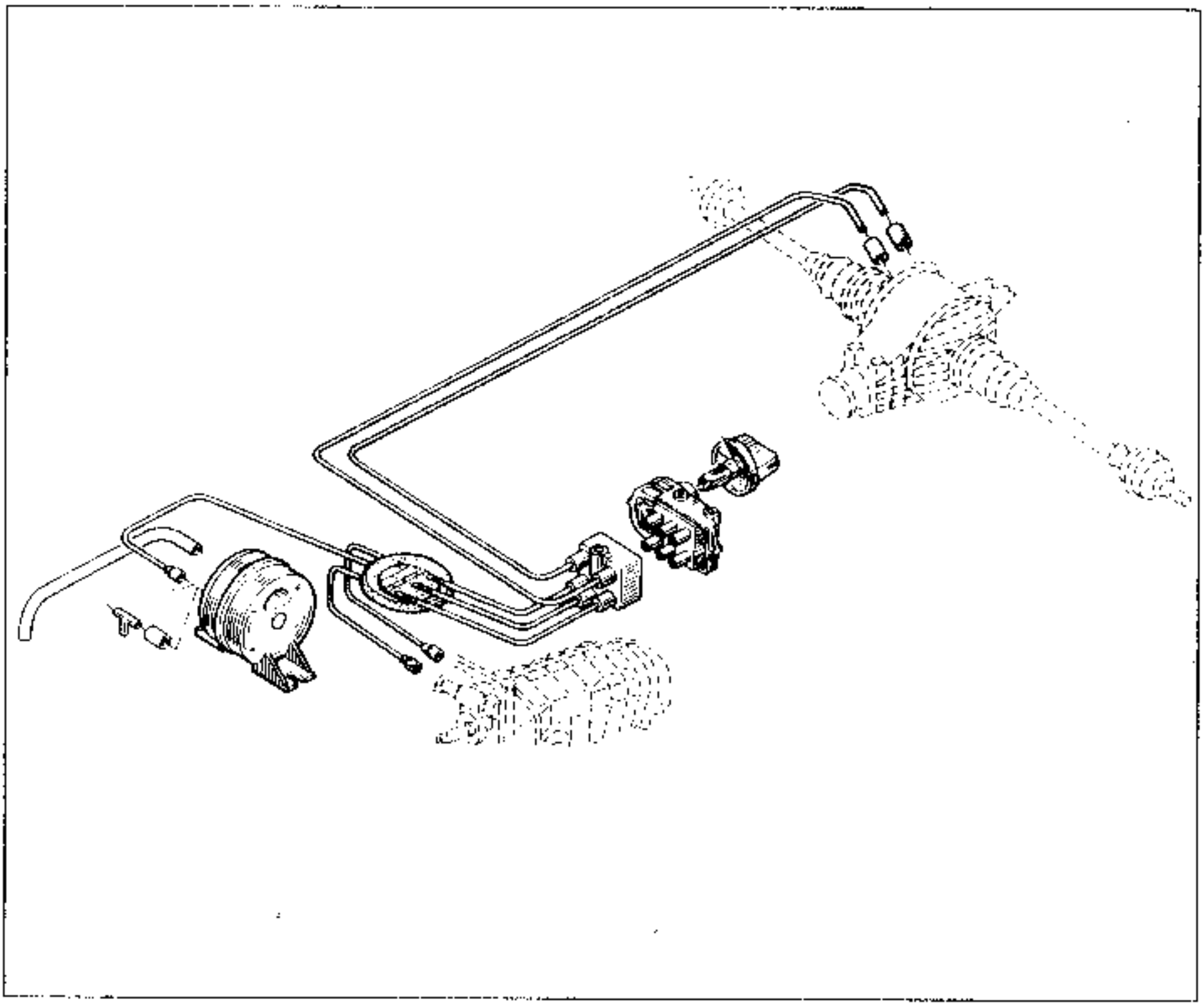
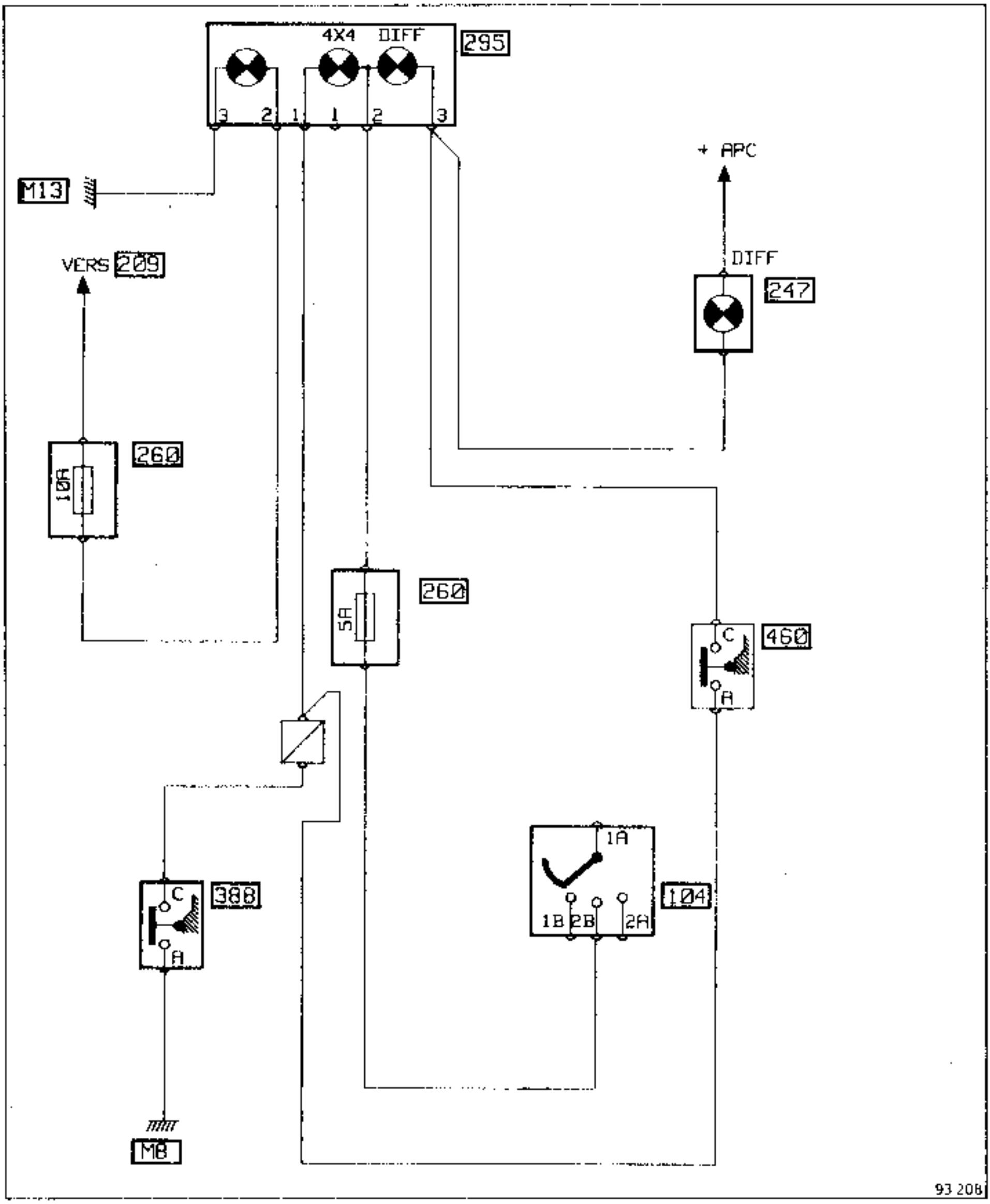


Diagram showing operation - Warning light indicating that 4x4 is in operation

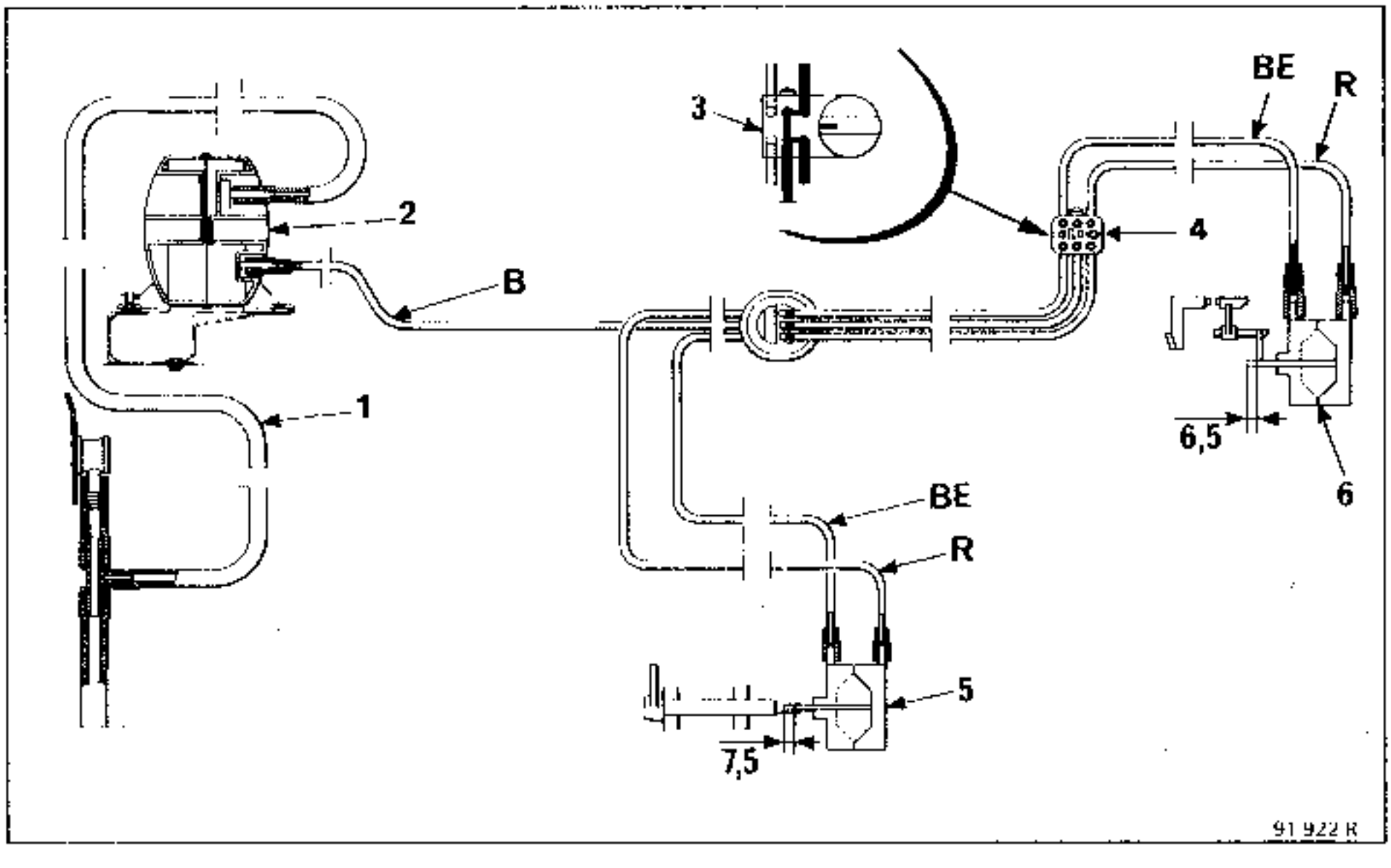


KEY :

104 : Ignition switch
209 : Lighting switch stalk
247 : Instrument panel
260 : Fuse
295 : Tell-tale lights
388 : 4x4 warning light switch
460 : Rear axle switch
M8 : Injection earth
M13 : Console earth
APC : After ignition

PNEUMATIC CONTROL

Filling the power-assisted system



Colour of the hoses:

B : White
BE : Blue
R : Red

1) Vacuum feed hose from the manifold on petrol engines and from the vacuum pump on diesel engines.

2) Vacuum reservoir.

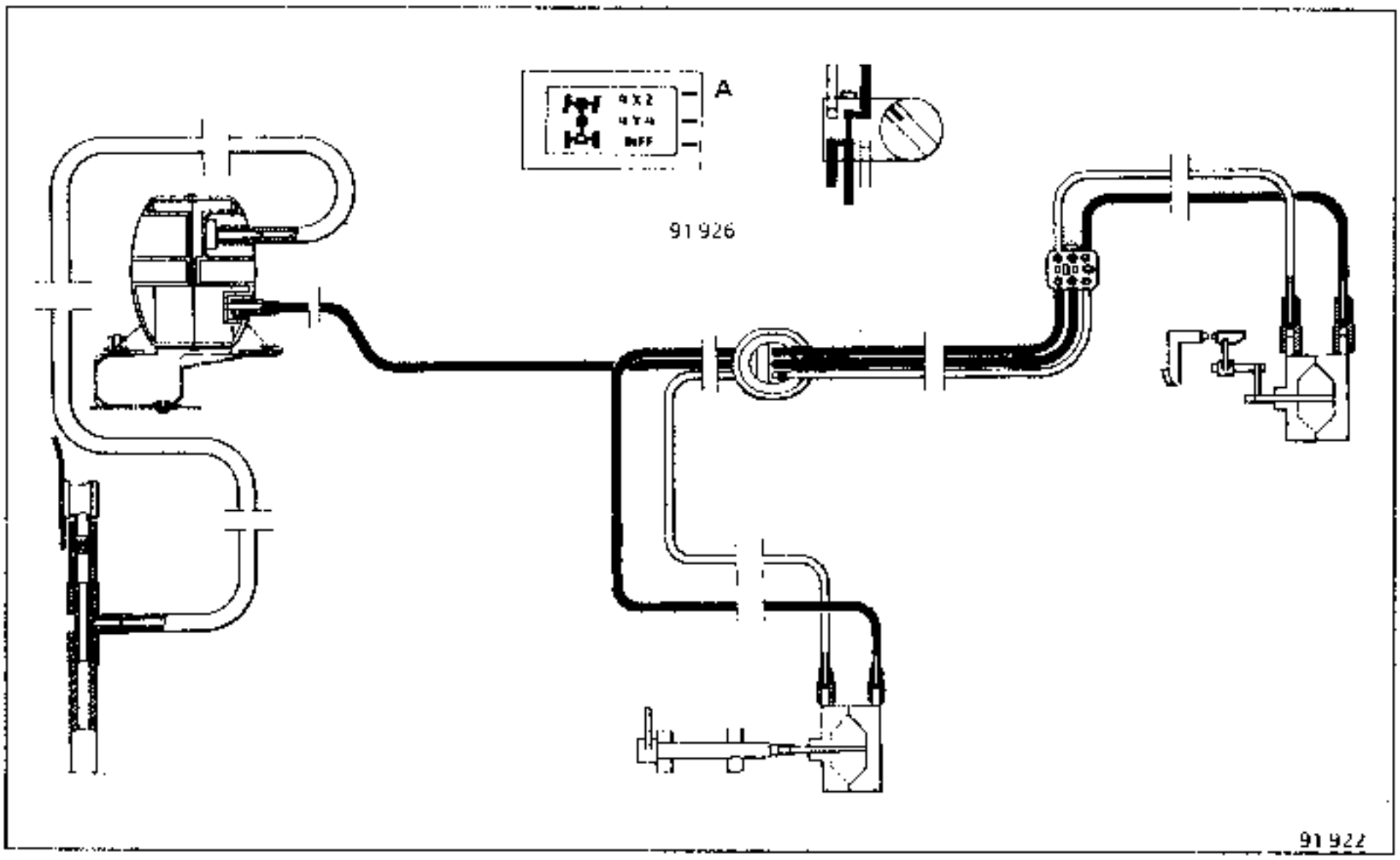
3) Pneumatic control valve.

4) Connector on pneumatic valve.

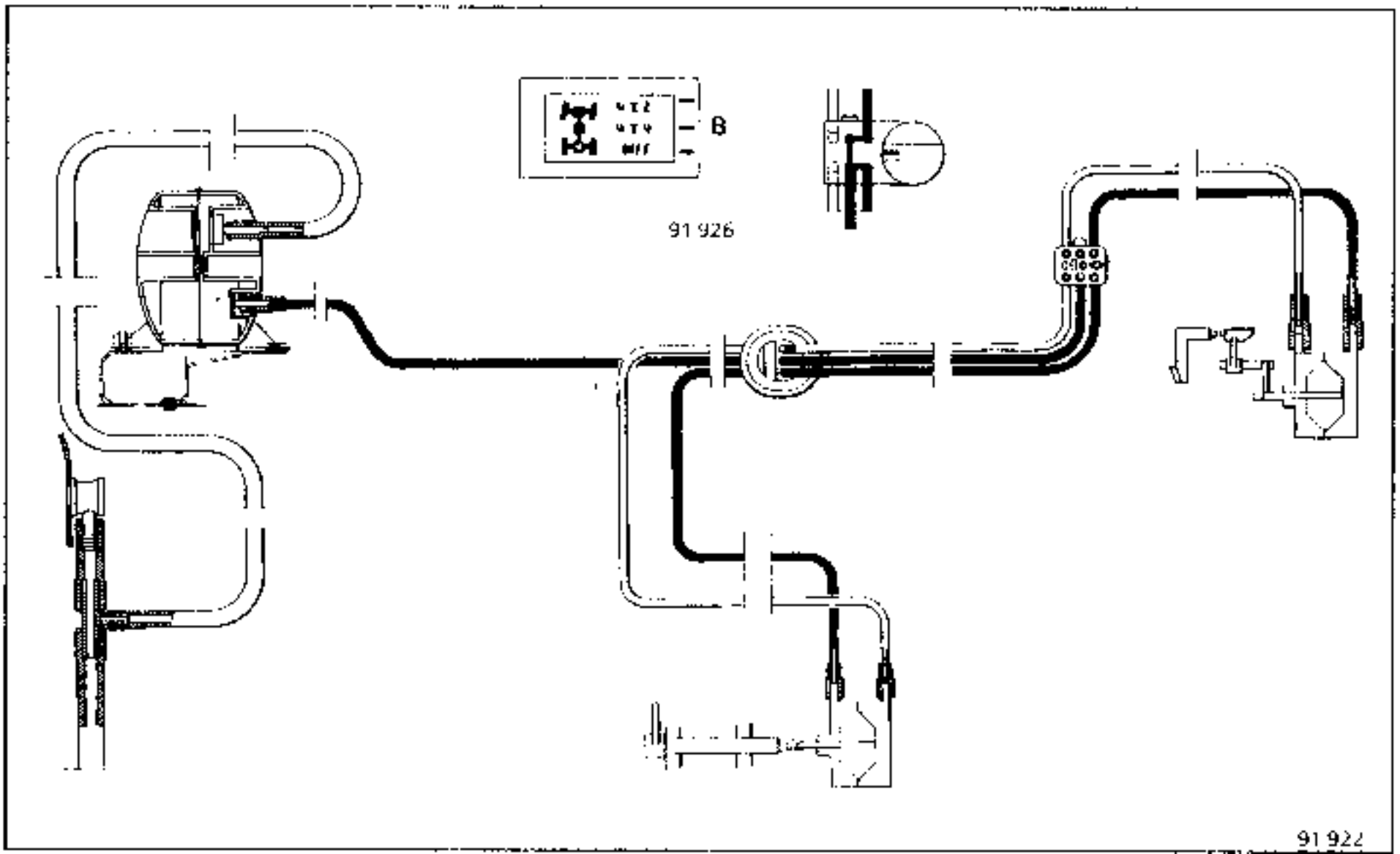
5) Vacuum capsule for prop shaft dog clutch engagement on **NG7 gearbox**.

6) Vacuum capsule for rear differential locking system on **OT2** rear axle.

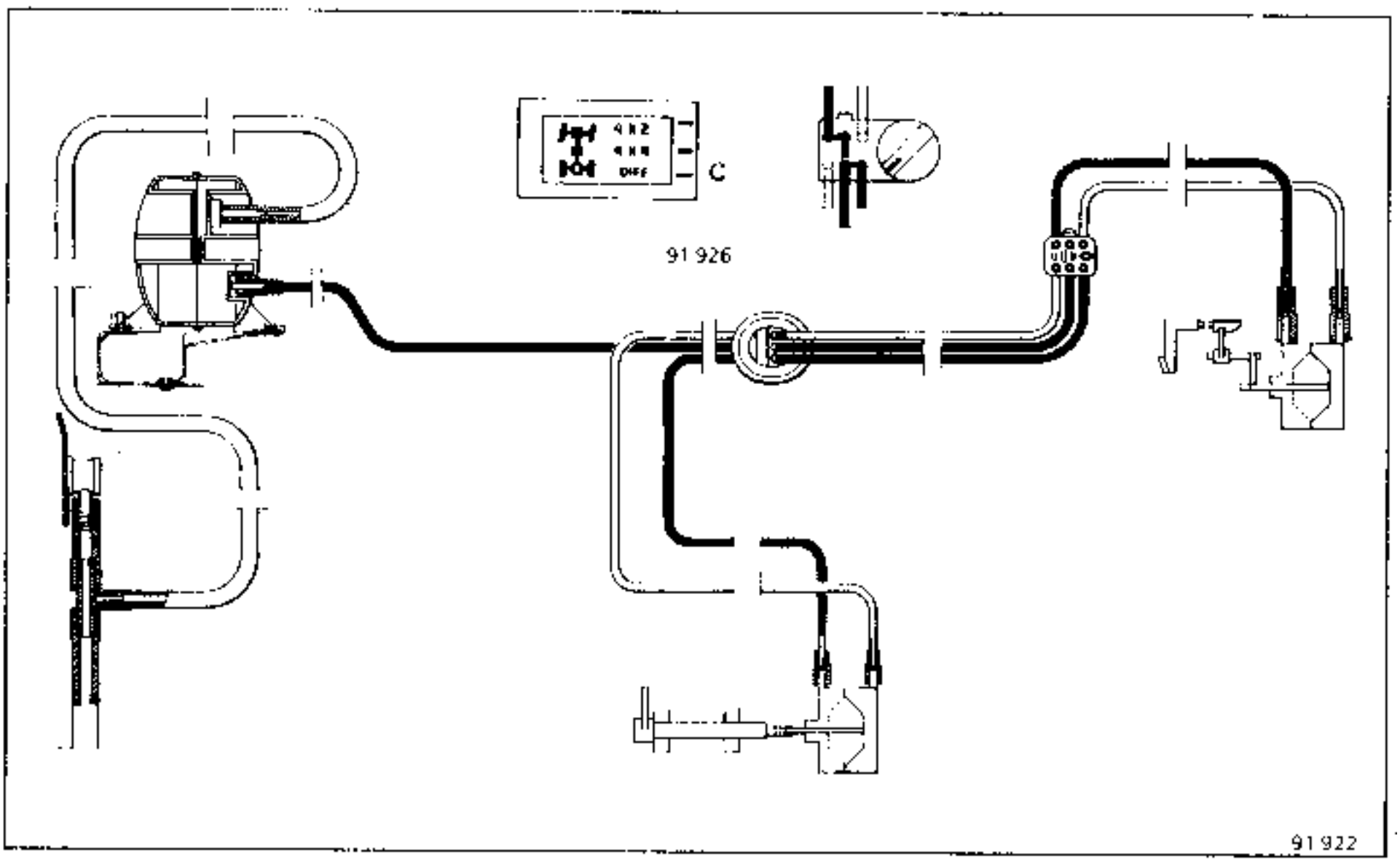
A : 4x2 position



B : 4x4 position



C : 4x4 position with differential locked



NOTE:

The engagement of the differential locking system is not possible when the assembly is in the tooth on tooth position and the control is in position (C) ; the warning light will not illuminate either. The dog clutch engages when the wheels turn at different speeds.

CHECKS

If there are any operating incidents, check:

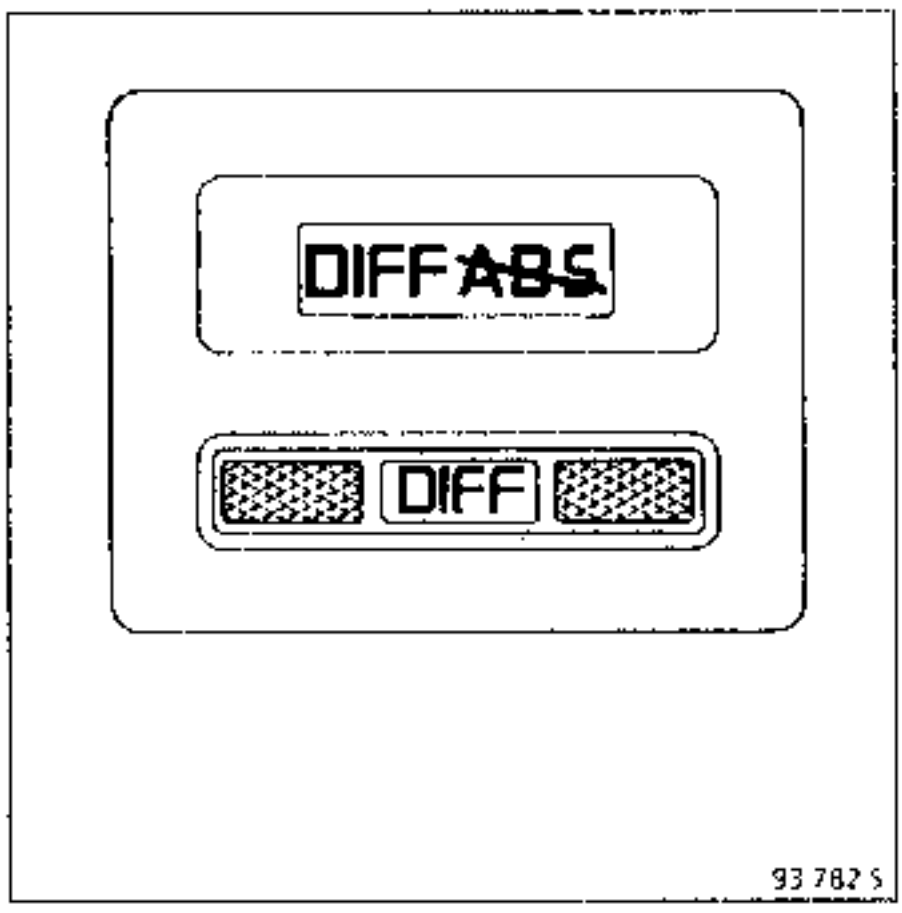
- The condition of the hoses and that they are correctly connected.
- With the engine idling, check the vacuum alternately in the three positions of the control lever.
- Disconnect a hose from the capsule and connect vacuum gauge **Mot. 867** in its place; the vacuum value obtained should be greater than **300 mbar.**
- Check the operation of the vacuum capsules and that they are sealed.

REAR DIFFERENTIAL LOCKING ELECTRO-PNEUMATIC CONTROL

The rear differential locking system has two special features:

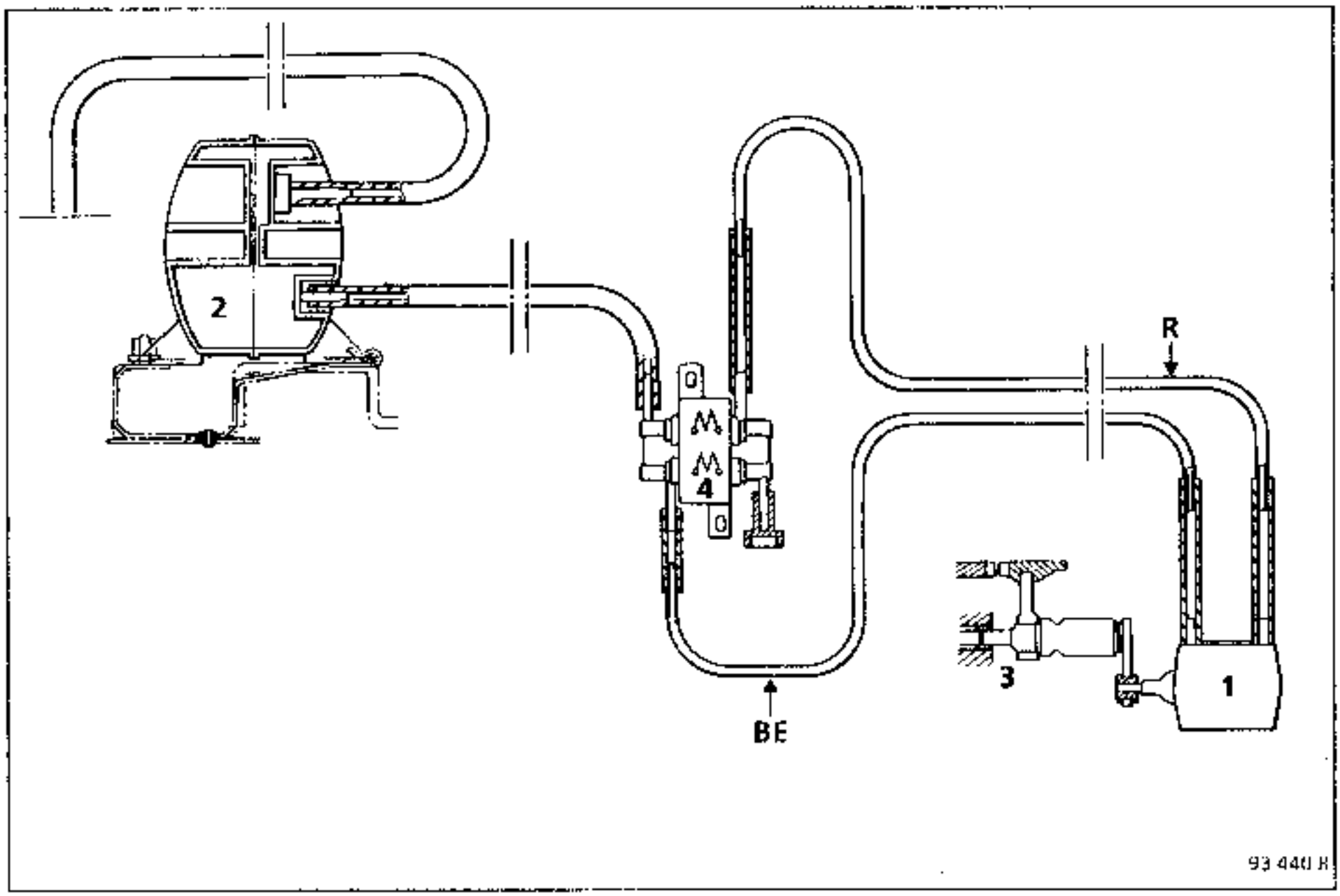
- The cancellation of the ABS operating system.
- Use in first and reverse gears only, unlocking being automatic in any other gears.

The system is controlled by a pushbutton on the dashboard, below a display which is electrically connected to it.



- When the pushbutton is depressed, there is no display and the rear differential is free.
- When the pushbutton is out, there are two possible cases:
  - The display indicates "DIFF ABS":
    The rear differential is locked and the ABS cancelled (first or reverse gear being engaged);
  - The display is flashing:
    Locking has been requested but is not effective.

Electro-pneumatic control : Assembly

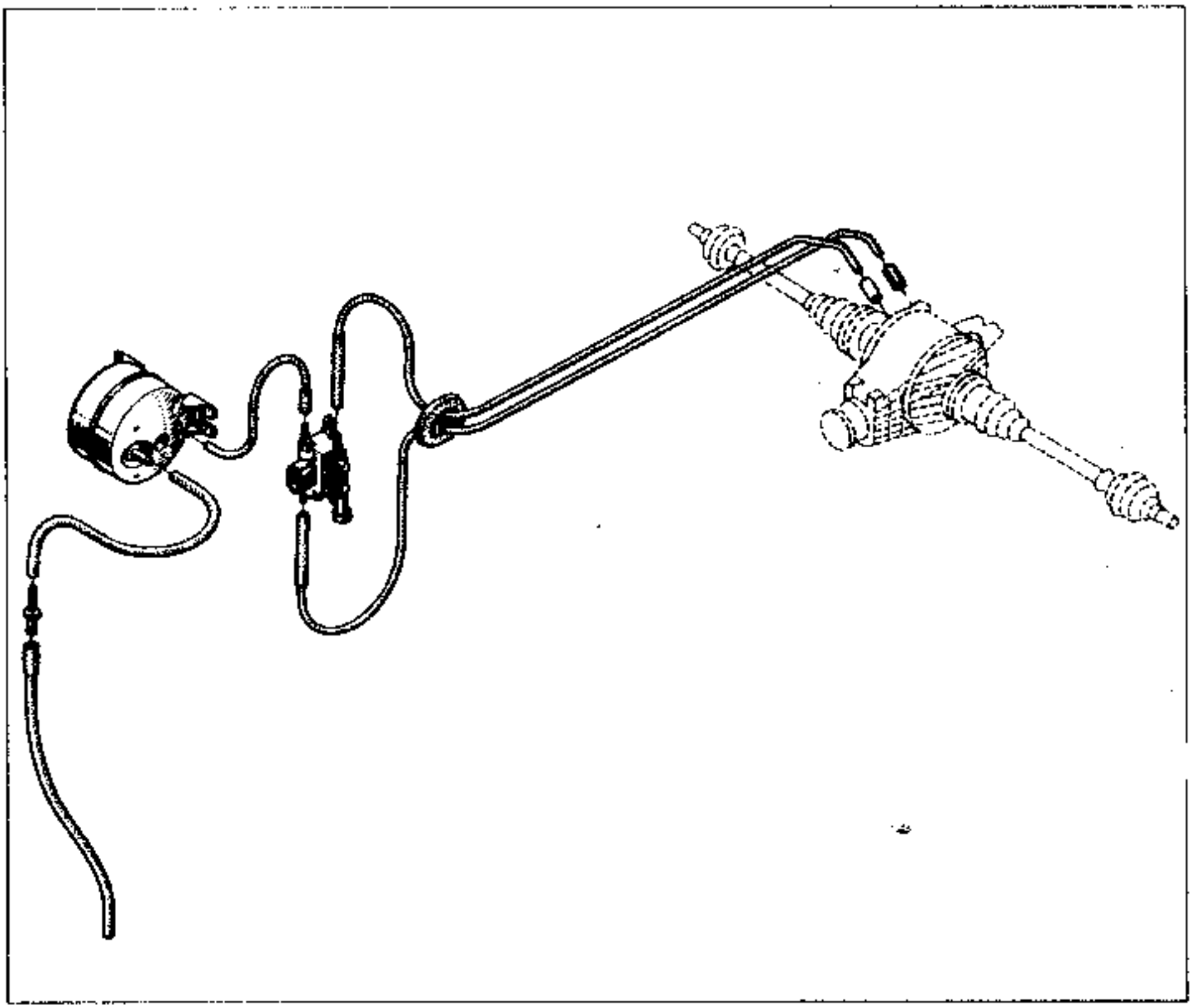


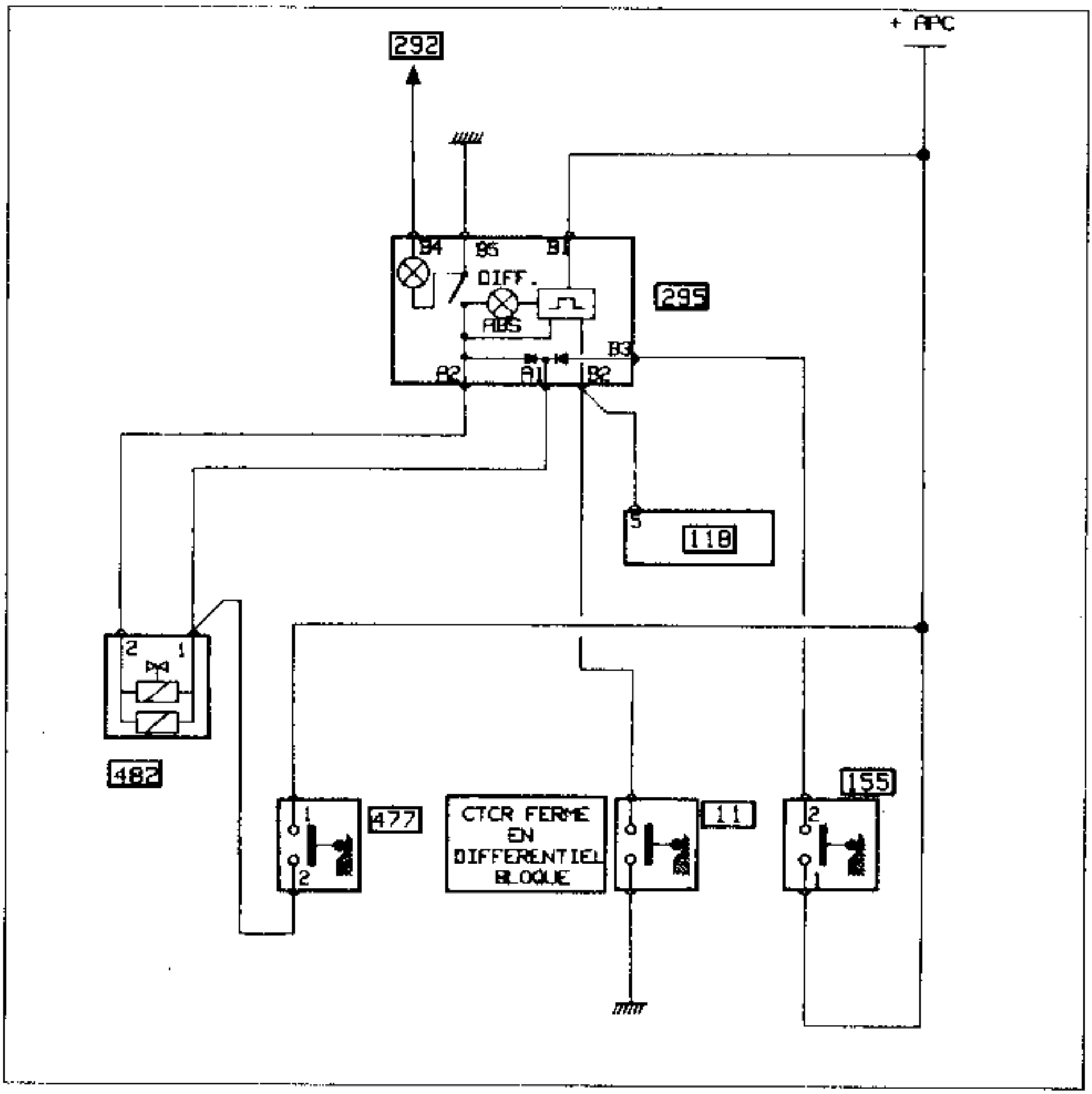
The electro-pneumatic control essentially consists of :

- A vacuum capsule (1) subject to the engine vacuum by means of a vacuum reservoir (2) so as to move dog clutch fork (3) on OT2 rear axle.
- A solenoid valve (4) supplied with positive current by the pushbutton on the dashboard.
- Two switches connected to first and reverse gears earthing the solenoid valve; at the same time, an electrical signal is sent to the ABS computer

Hose colours:
BE : Blue
R : Red

Electro-pneumatic control : Assembly



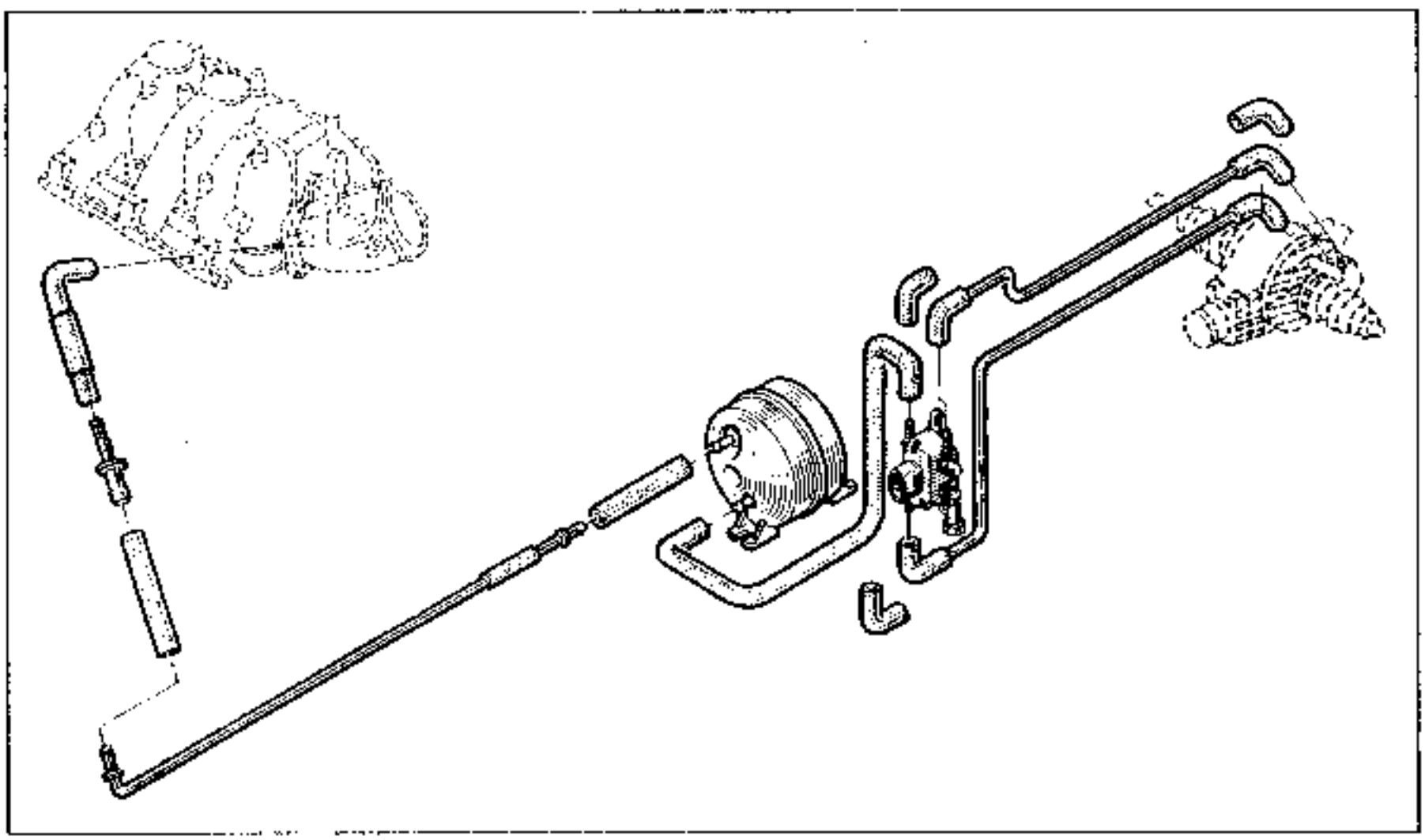


CTCR FERME EN DIFFERENTIEL BLOQUE = DOG CLUTCH SWITCH CLOSED WITH DIFFERENTIAL LOCKED

KEY:

11	:	Dog clutch switch
118	:	ABS computer
155	:	Reversing light switch
292	:	Lighting rheostat relay
295	:	4x4 control unit
477	:	First gear switch
482	:	Dog clutch control solenoid valve
APC	:	After ignition

EXPLODED VIEW



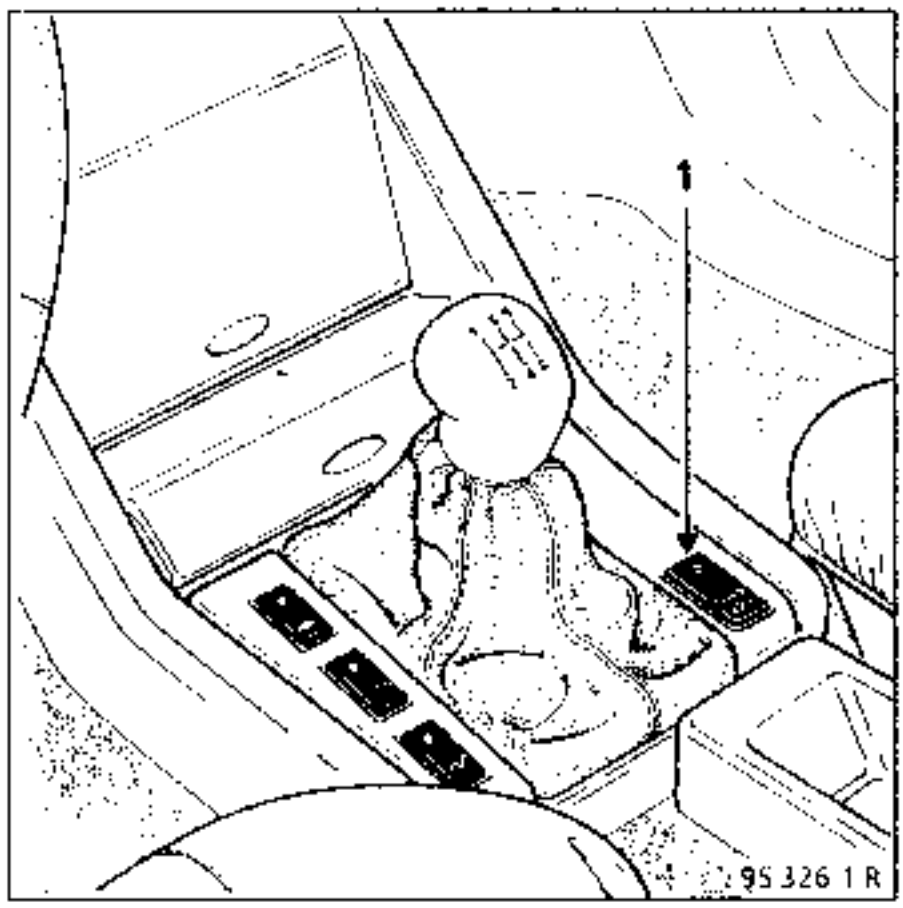
Safrane vehicles have integral 4x4.

REAR DIFFERENTIAL LOCKING ELECTRO-PNEUMATIC CONTROL

The rear differential locking system has two special features:

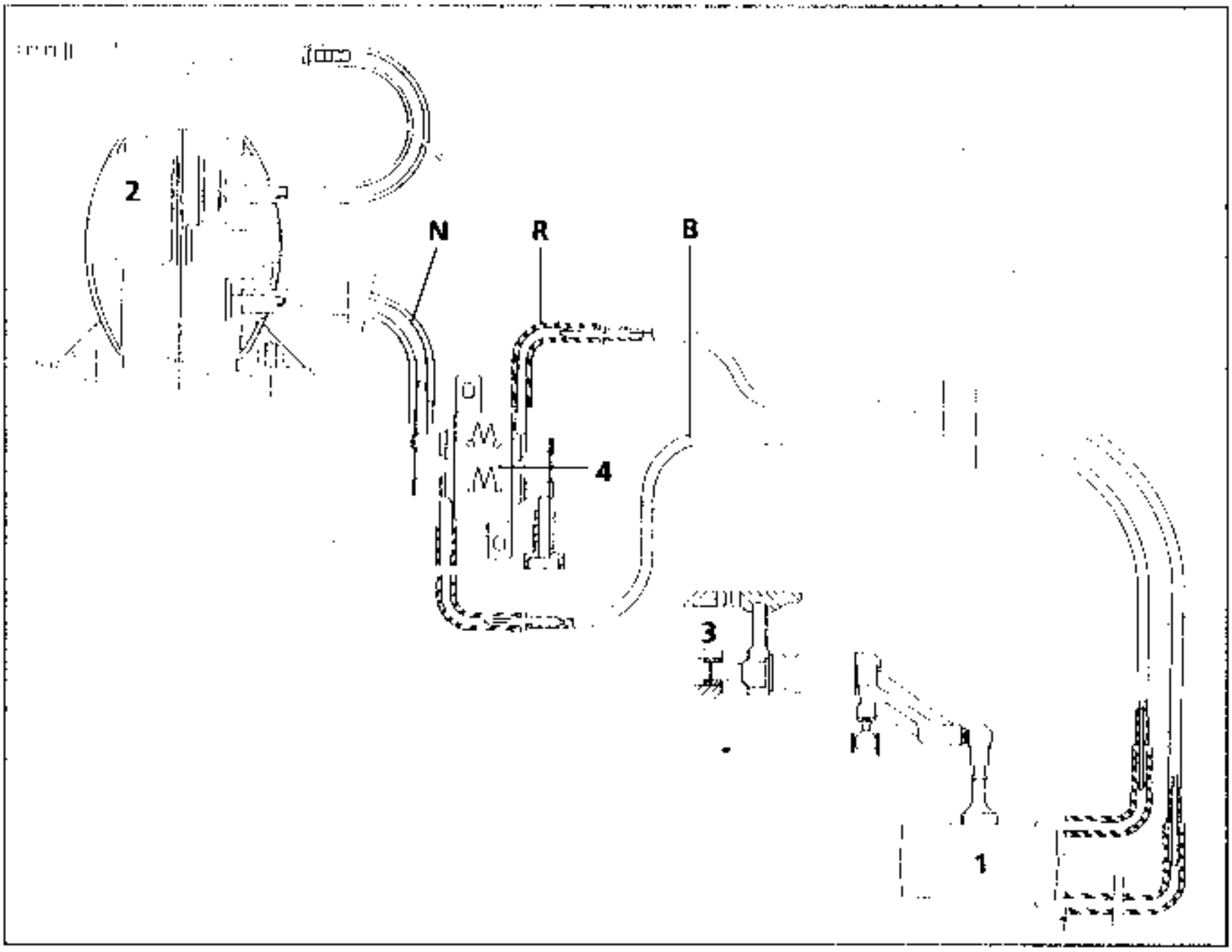
- The cancellation of the ABS operating system.
- Use in first and reverse gears only, unlocking being automatic in any other gears.

The system is controlled by a pushbutton (1) situated on the gear lever console.



- When the pushbutton is out, there is no warning light and the rear differential is free.
- When the pushbutton is depressed, there are two possible cases:
  - The warning light is illuminated and the display (ABS) is also illuminated. The rear differential is locked and the ABS cancelled (first or reverse gear being engaged);
  - The warning light is flashing:
    Locking has been requested but is not effective.
    Gear other than first or reverse gear engaged.

ELECTRO-PNEUMATIC CONTROL : Assembly

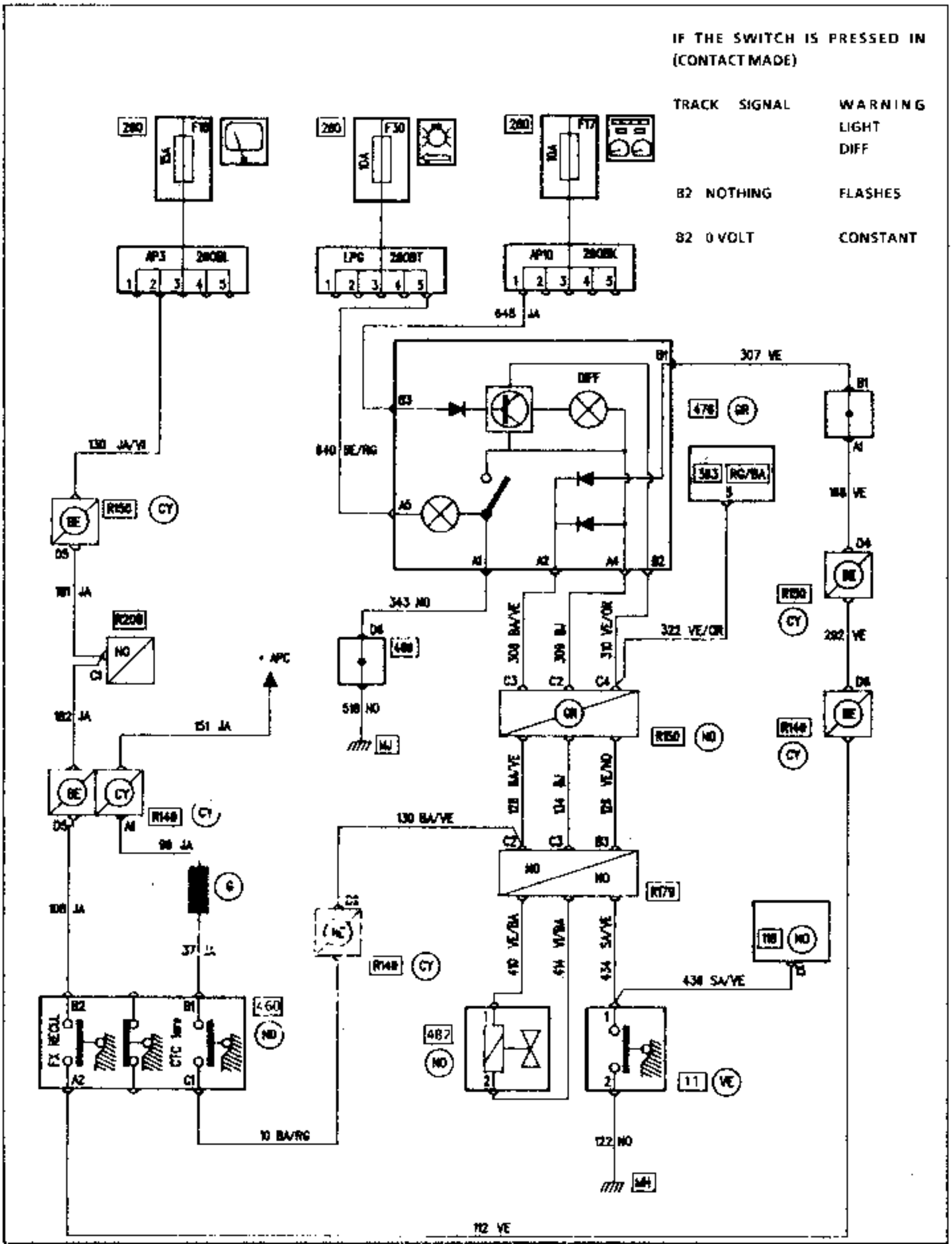


The electro-pneumatic control essentially consists of:

- a vacuum capsule (1) subject to the engine vacuum by means of a vacuum reservoir (2) so as to move the dog clutch fork (3) .
- A solenoid valve (4) supplied with positive current by the pushbutton on the gear lever console.
- The engagement switch earths the solenoid valve; at the same time, an electrical signal is sent to the ABS computer.

Hose colours:
BE : Blue
R : Red
N : Black

Circuit diagram



LIST OF COMPONENTS

11	Dog clutch switch
118	ABS computer
260	Fuse box
363	Voice synthesizer unit
460	Rear axle switch
466	Shunt unit
476	Integral transmission unit
482	Dog clutch solenoid valve

LIST OF JUNCTIONS

R 149	Engine/Front left-hand wing
R150	Passenger compartment/Front left-hand wing
R179	ABS/Front left-hand wing
R208	Front left-hand wing/Electric windscreen

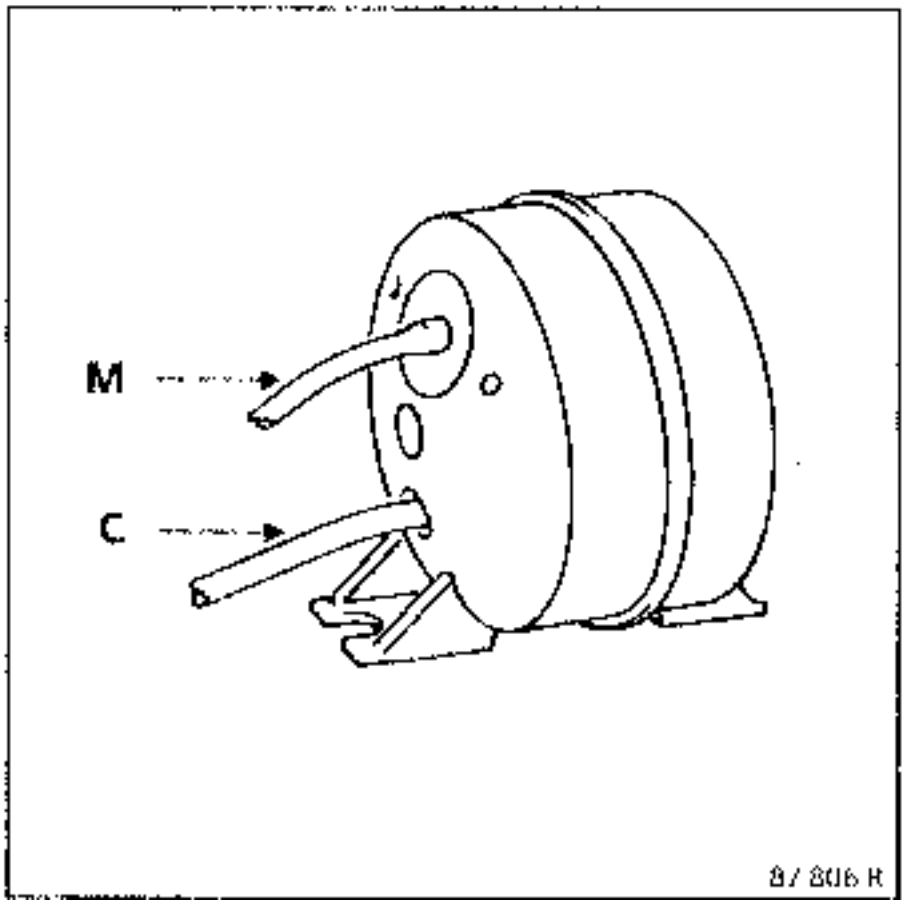
LIST OF EARTHS

M H	Engine electric earth
M J	Front left-hand pillar electric earth

Vacuum reservoir:

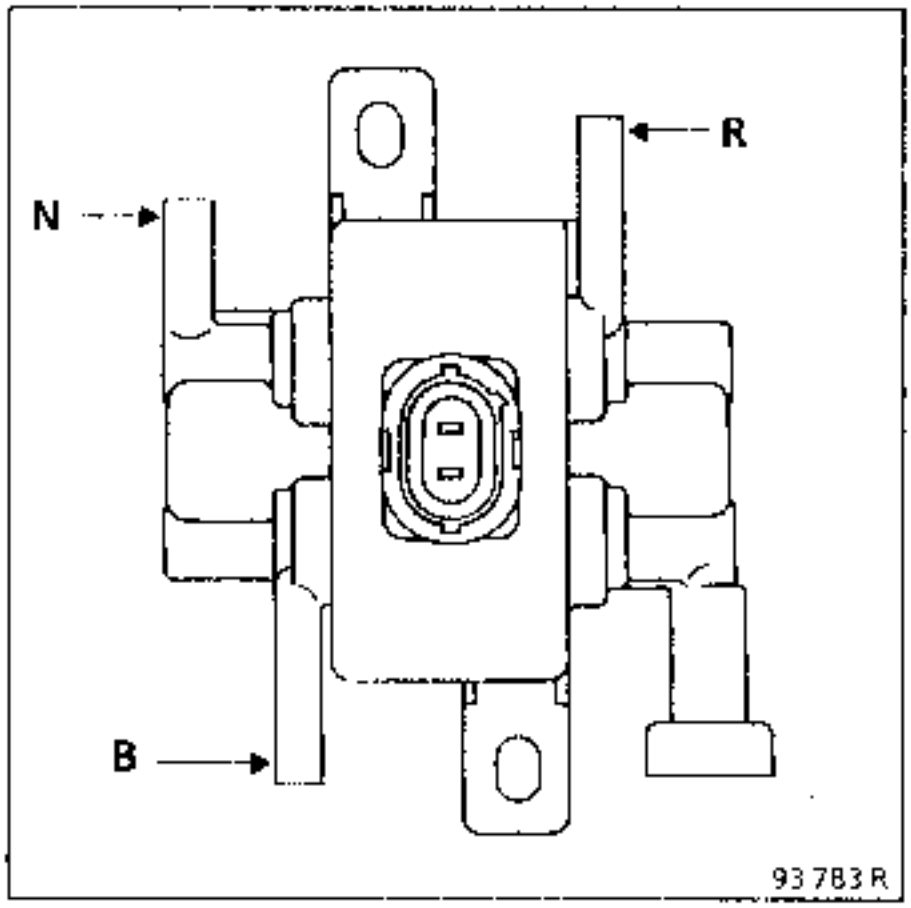
X48 : It is secured to the closing fixture above the scuttle on the right-hand side

X54 : It is secured to the cable channel under the vehicle on the left-hand side, approximately in the middle of the rear door
Connected at (M) to the inlet manifold connection pipe and at (C) to the solenoid valve.



SOLENOID VALVE

It is situated next to the vacuum reservoir.
Ensure that the pipes are correctly connected.



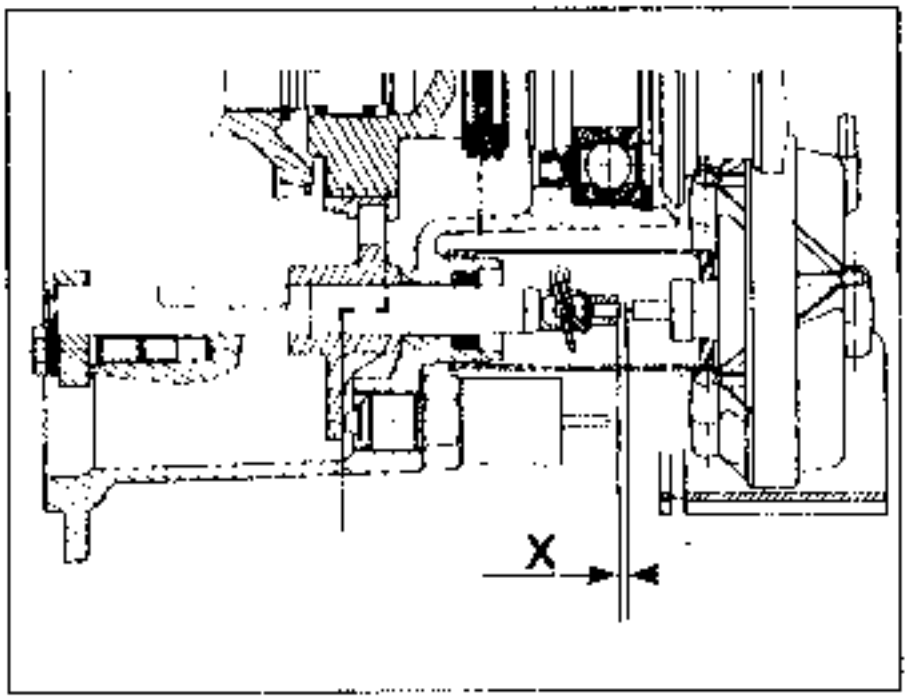
B : blue N : black R : red

SPECIAL FEATURES

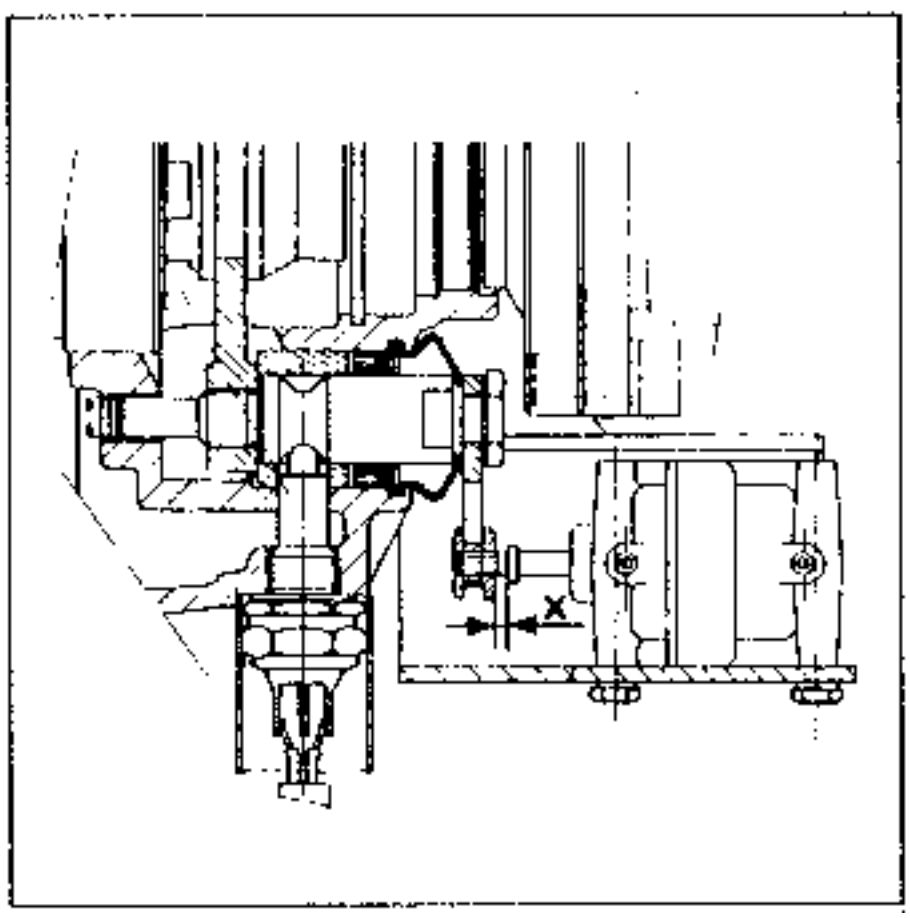
Installation of the vacuum capsule arm:

When the vacuum capsule is replaced, ensure that the arm is fitted on the control rod at the correct position:
X = 2 to 3 mm

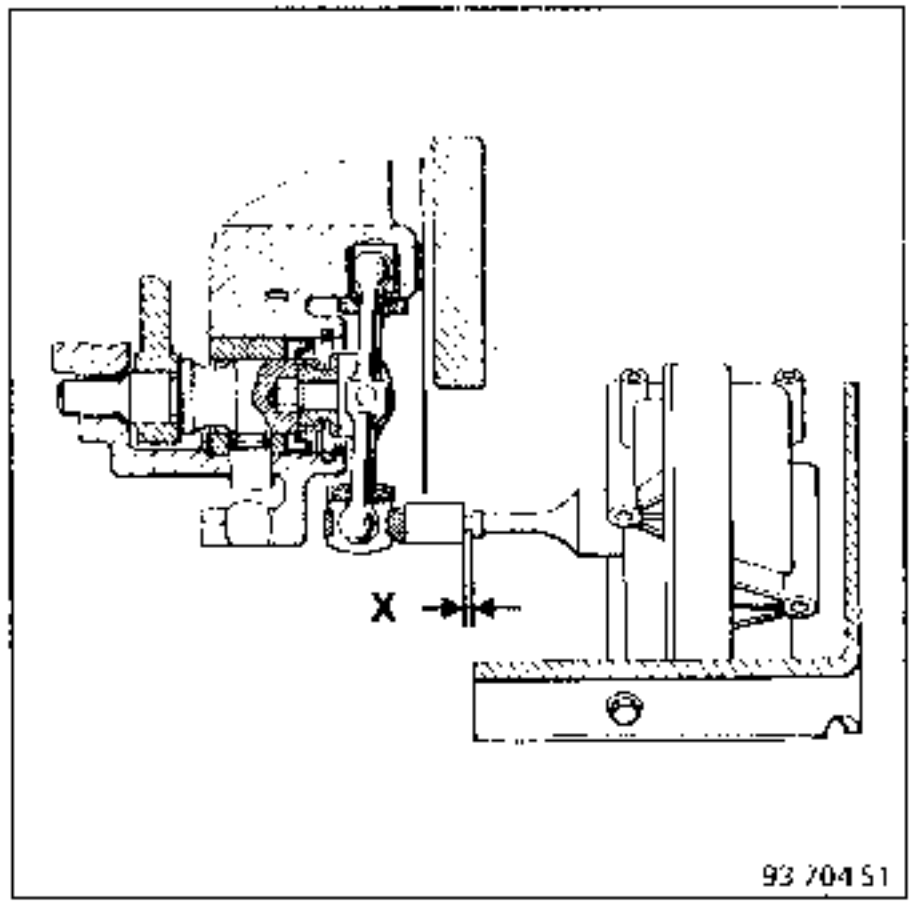
On manual gearbox NG7



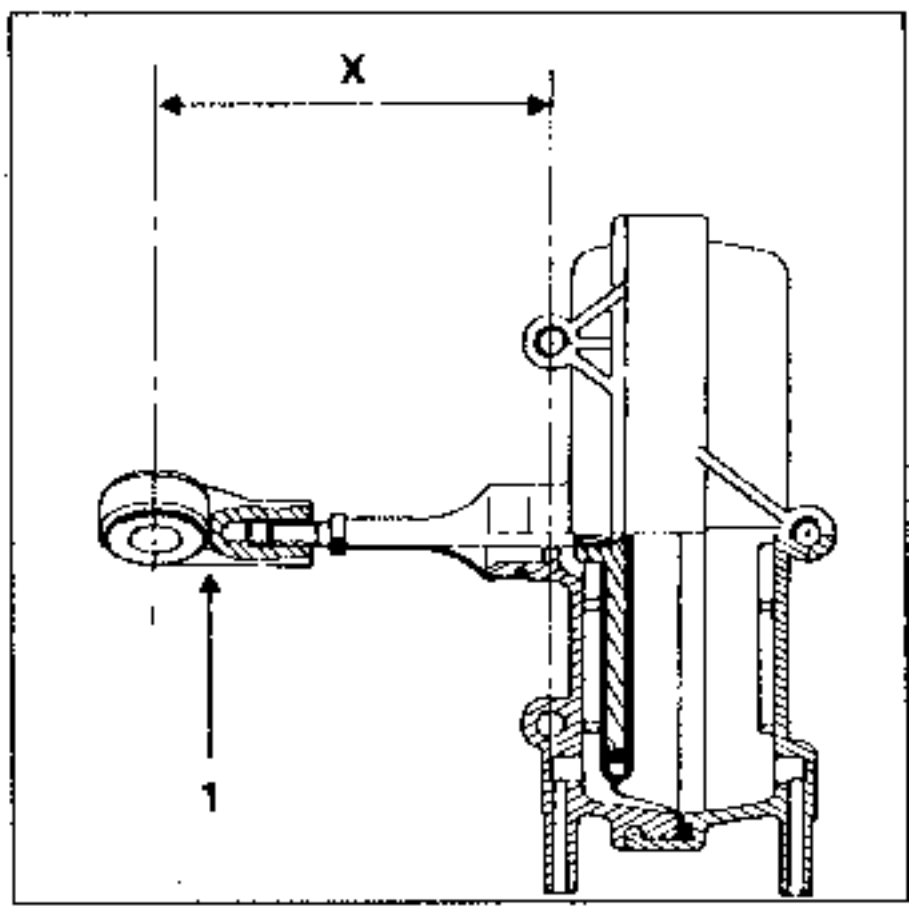
On final drive O12 - X48 1st type



X48 2nd type.

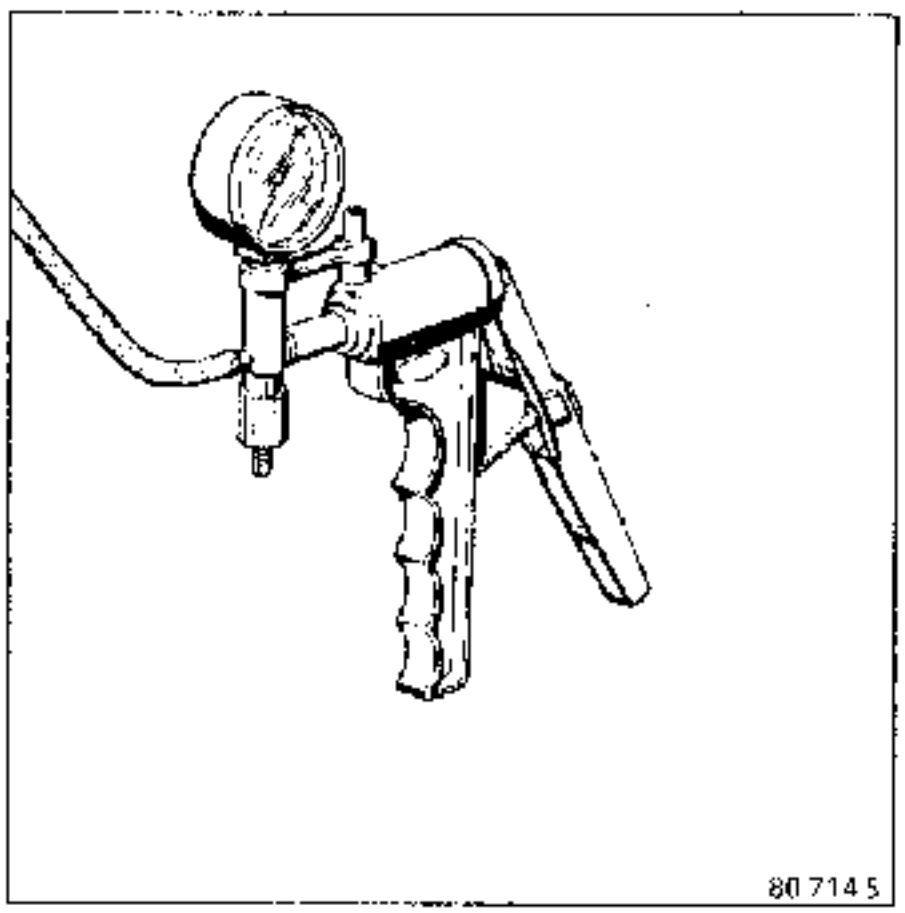


X54
X = 61 mm



CHECKING THE VACUUM CAPSULE

Connect a manual vacuum pump to the two capsule inlet points in turn



Depression to apply	After moving the control rod: the needle	
	IS STABLE	**DROPS**
0.3 to 0.8 bar	**CORRECT**	**INCORRECT**