

IDENTIFICATION

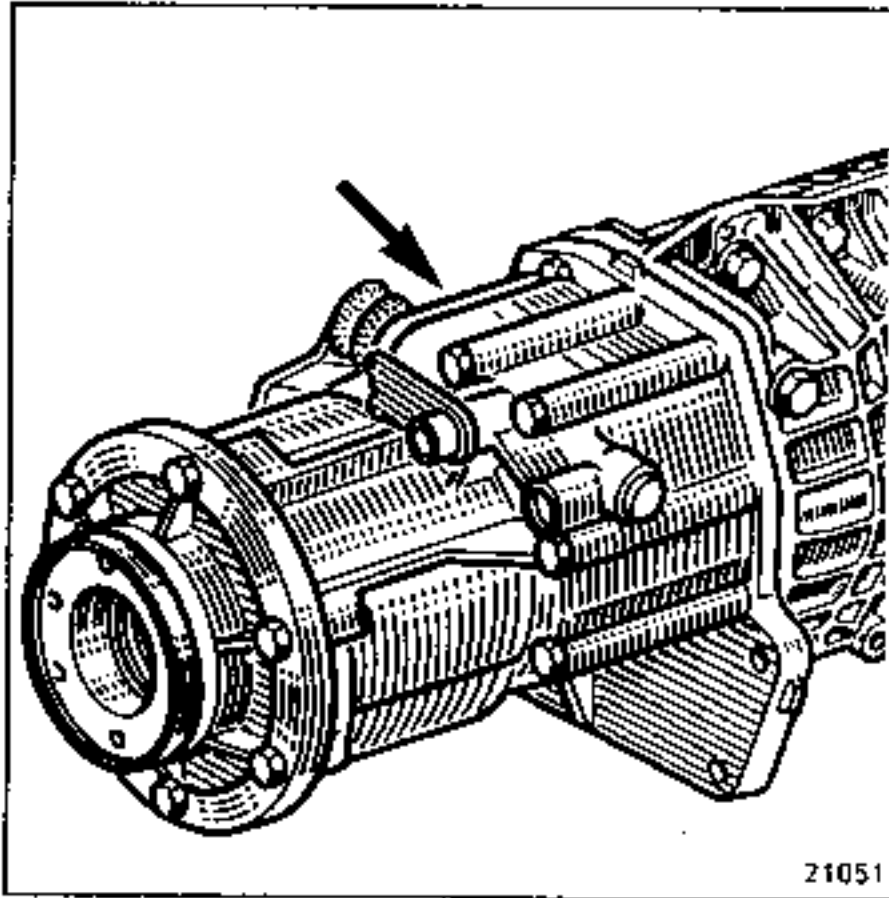
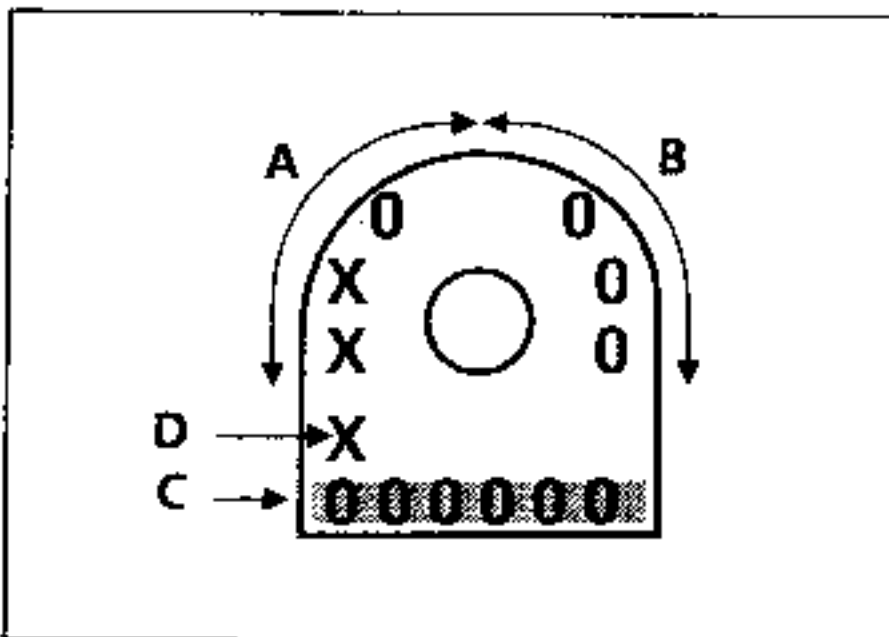


Plate secured to the rear housing showing :

- at A : the gearbox type,
- at B : the gearbox suffix,
- at C : the serial number,
- at D : the factory at which it was manufactured.

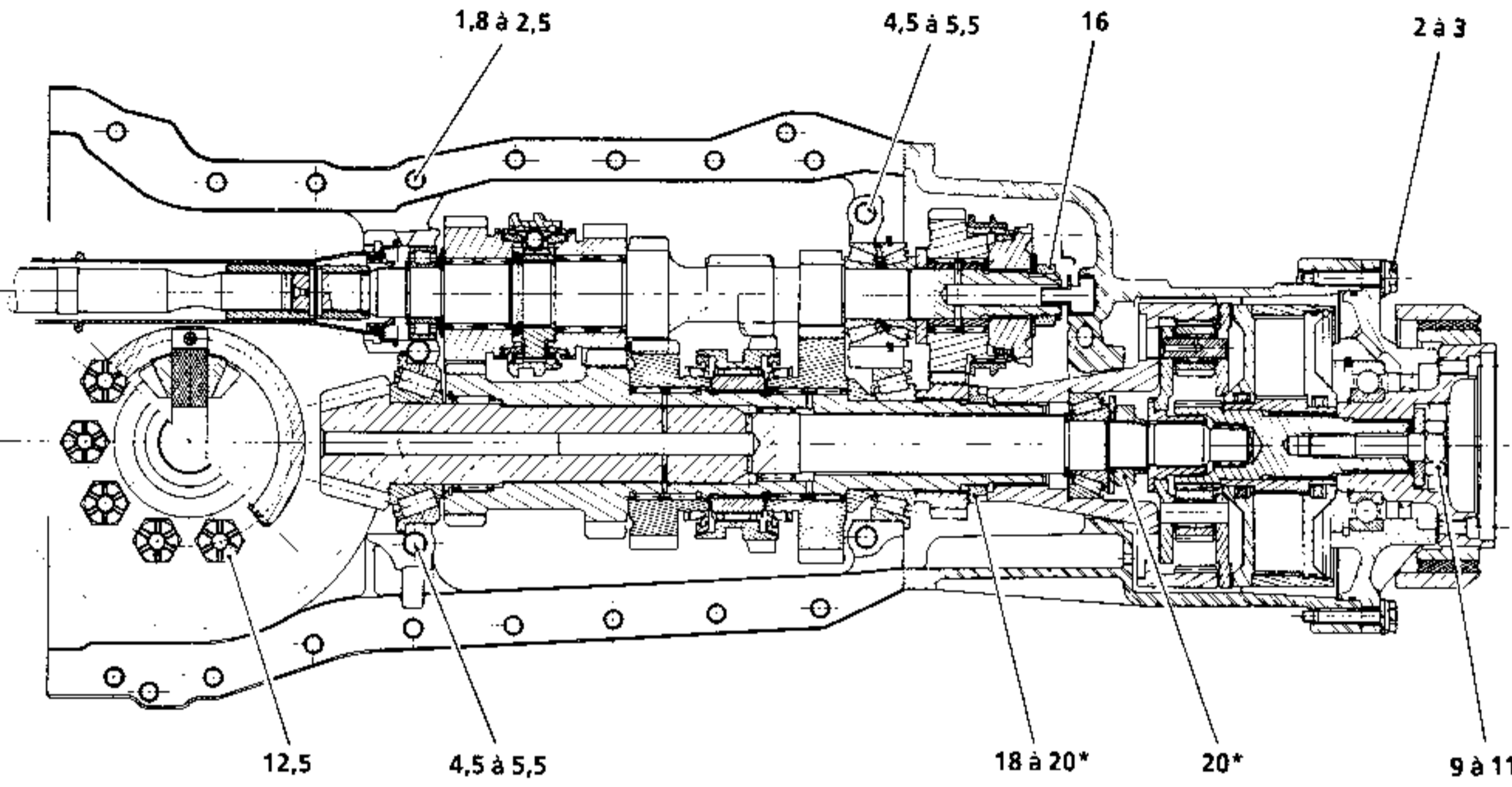


SPECIFICATIONS

- Pressure die-cast light alloy housing consisting of two half-housings joined at a vertical and longitudinal joint face.
- Five synchronised forward speeds :
 - . 1st/2nd : RENAULT synchroniser
 - . 3rd/4th/5th : BORG-WARNER synchroniser
- One reverse.

Alternating synchronisation :

- 1st/2nd speed synchronisation on the secondary shaft.
- 3rd/4th and 5th speed synchronisation on the primary shaft.
- New type synchroniser for 1st and 2nd speeds which is smaller in size and has a shorter travel.
- The intermediate shaft contains the 5th speed assembly, the central differential and the viscous coupling.



* Loctite SCELBLOC

Intermediate housing bolts	:2,5
Reverse gear shaft	:2,25 à 2,75
5th speed locking ball plug	:2 à 3
Drain plug	:2 à 3
Speedometer drive locking plate	:2 à 2,5

Suffix	Vehicle	Crown wheel and pinion	Speedometer drive	1ère	2ème	3ème	4ème	5ème	Reverse
000	L485 L48L	9 x 31							
001	L/B 48Y B48R	9 x 37	23 x 20	11 x 37	17 x 35	21 x 29	27 x 28	39 x 32	$\frac{11}{39}$ 25
002	483	9 x 35							

CAPACITY - LUBRICANTS

Capacity (in litres)	Grade
3,35	TRANSELF TRX 80 W*

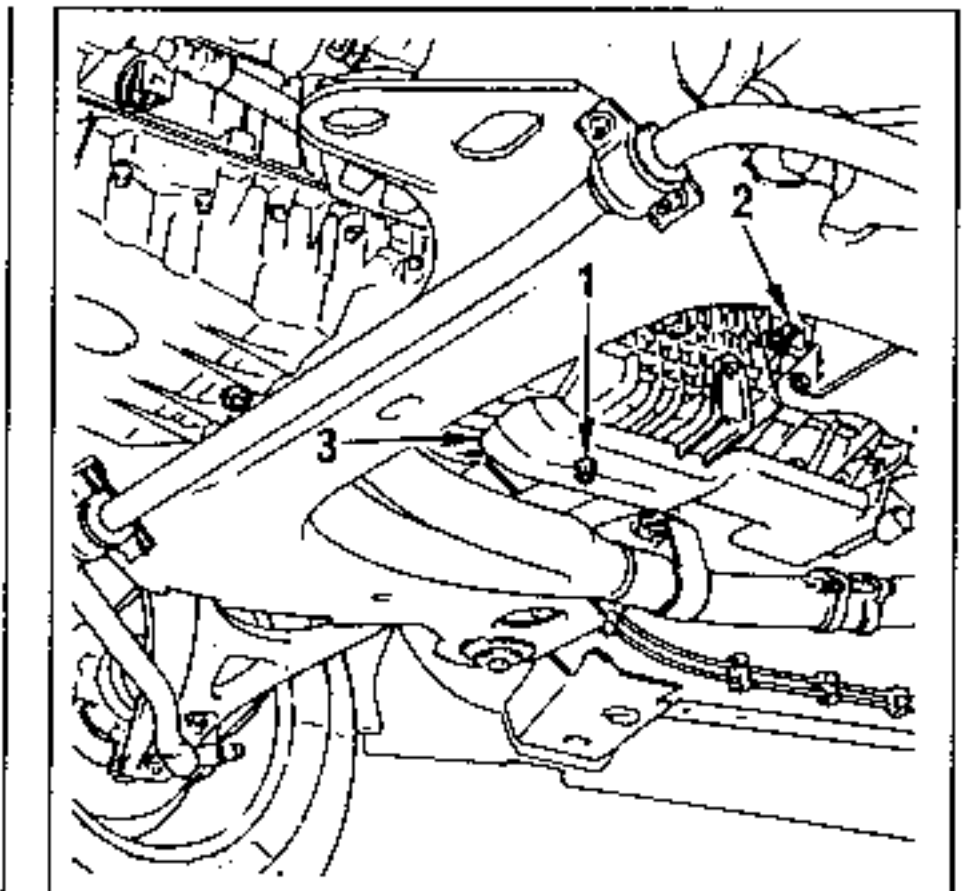
(*) If it is found difficult to obtain supplies locally, this grade of oil can be ordered from the Parts Department under the Part number 77 01 422 306 (in 5 litre cans only).

Draining : Plug (1)

Filling and level : Plug (2)

NOTE: To gain access to the drain plug (1), remove protective plate (3).

Use socket B Vi 1191 fitted to a "Junior" series socket wrench.



SPECIAL PRECAUTIONS

TRANSELF TRX 80 W oil is a high technology product that requires certain precautions in its use to avoid the entry of external agents that could reduce the quality of the oil and cause stiffness in the gear selection.

STORAGE AND USE

Once the can is opened, special care must be taken with it to ensure that it is full sealed and avoid any material or liquid entering it.

In particular :

- 1) The cans must be stored in an area protected from the weather (rain, snow, external splashing), laid horizontally.
- 2) If oil is taken from a can with a syringe, the can must be carefully closed after use.
- 3) Do not store the cans near a wash bay.
- 4) Do not transfer the oil into larger capacity drums before making sure that they are absolutely clean, etc.

WASHING, WITH A PRESSURE JET

- 1) With the gearbox on the vehicle :

Plug the gearbox breather.

- 2) After removal of the gearbox :

It is essential to plug, effectively, all holes leading to the inside of the gearbox, to avoid water entering it.

MATCHED PARTS

- Crown wheel and pinion.
- Synchroniser hubs and sliding gears.
- Bearing track rings and cones.

CROWN WHEEL AND PINION MATCHING

The crown wheel and the pinion are lapped together during manufacture.

They are therefore inseparable.

If one of these parts has to be replaced, so must the other.

SYNCHRONISER HUB/SLIDING GEAR MATCHING

We recommend that, under all circumstances, the positions of the sliding gears should be marked with reference to their hubs.

The synchroniser hubs are retained, lengthwise, by circlips.

The 1st/2nd synchroniser hub is a force fit on the shaft whereas the 3rd/4th hub is free to move on the shaft.

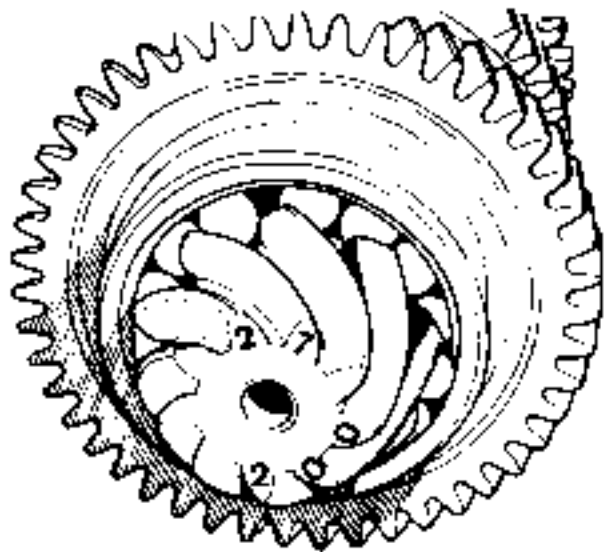
ALTERNATING SYNCHRONISATION

- The 1st/2nd speed synchroniser assembly is on the secondary shaft.
- The 3rd/4th and 5th speed synchroniser assemblies are on the primary shaft.

PRIMARY SHAFT

The lip seal makes direct contact with the primary shaft. If the sealing area is damaged the shaft must therefore be replaced.

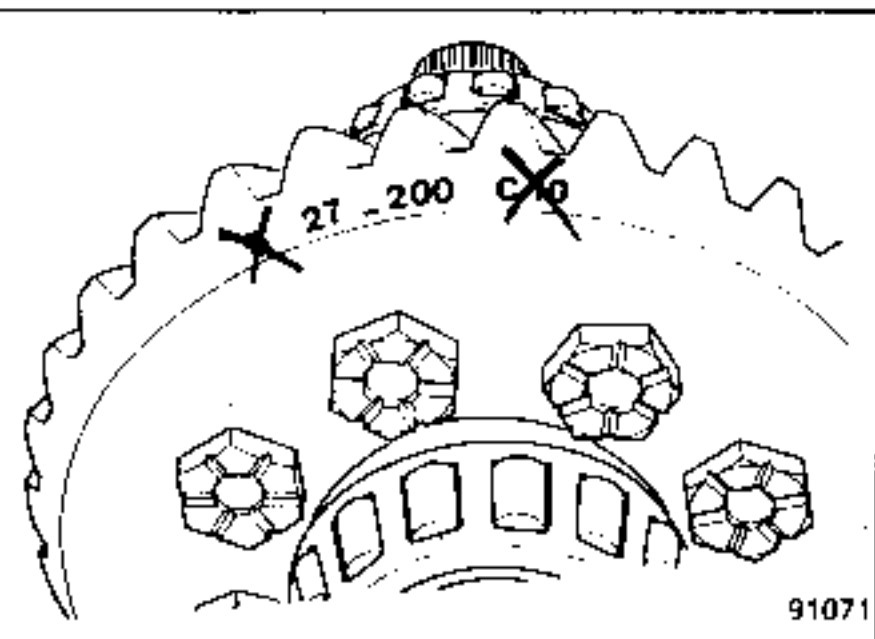
The primary shaft is fitted with a double taper roller bearing at the rear end.



91071

The crown wheel and pinion carry the same inscription.

Example : 27-200 (27th crown wheel and pinion set machined on the 200th day of the year).



91071

The pinion depth cannot be adjusted.

SECONDARY SHAFT

- The secondary shaft is hollow and the final drive pinion runs inside it.
- The taper roller bearings are fitted with pre-loading shims behind them.

IMPORTANT

If one of the component parts of the secondary assembly (as described below) has to be replaced, the three taper roller bearings must also be replaced and their pre-load must be adjusted.

PARTS CONCERNED

- Final drive pinion.
- Secondary shaft.
- Bearing.
- Bearing thrust washer.
- Fixed 5th speed gear.
- Slotted nut.
- Input casing.
- Mechanism housings.

REMARK

If a rectification operation only involves the 1st/2nd speed synchroniser assembly (free running gears, hub - sliding gear, synchroniser rings) it is not necessary to replace the bearings or re-adjust their pre-load.

OUTPUT FLANGE

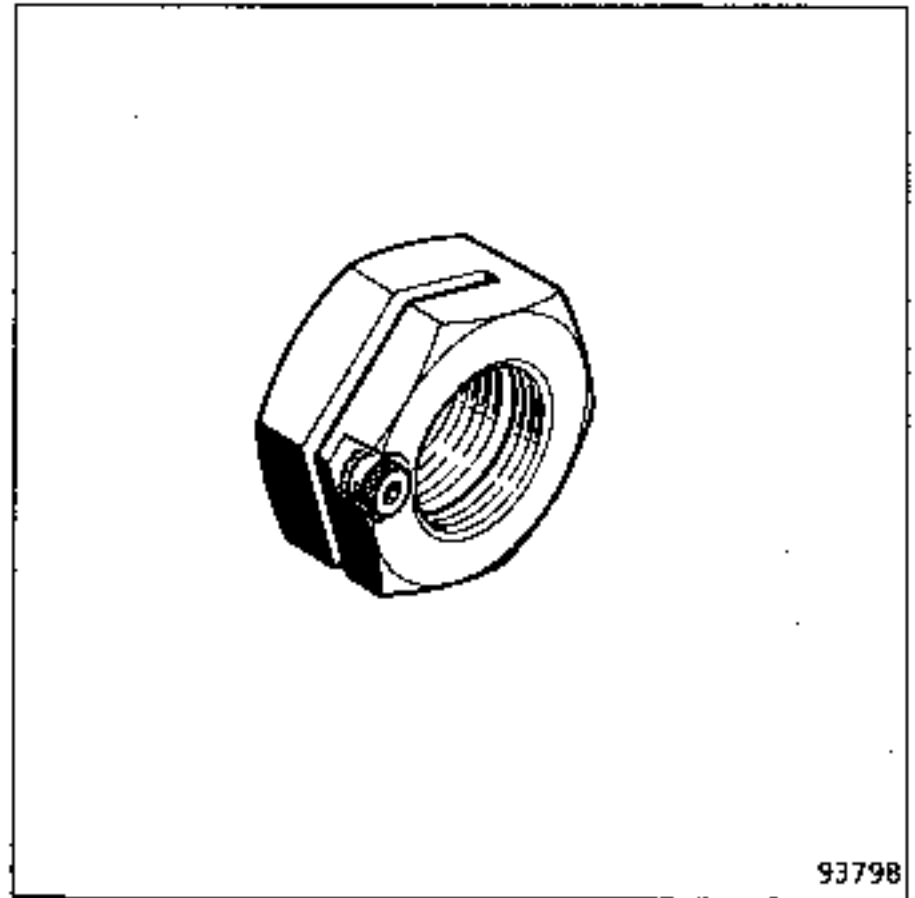
The output flange is fitted with a damper that cannot be removed.

FINAL DRIVE PINION

Under all circumstances, the nut must be bonded with Loctite "Scelbloc".

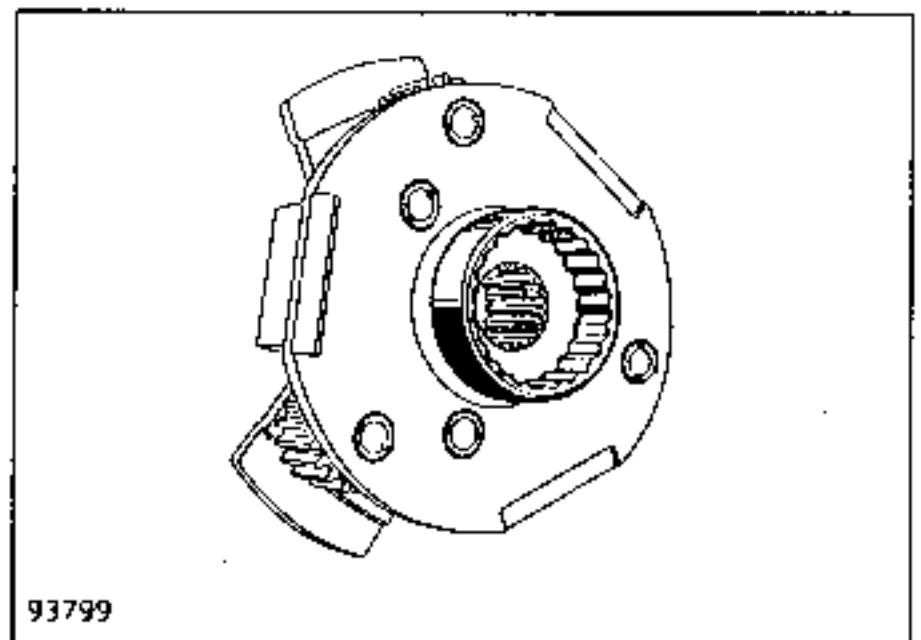
1st arrangement

The nut has a locking screw on it which is to be tightened to a torque of 0.23 daN.m to 0.28. daN.m.



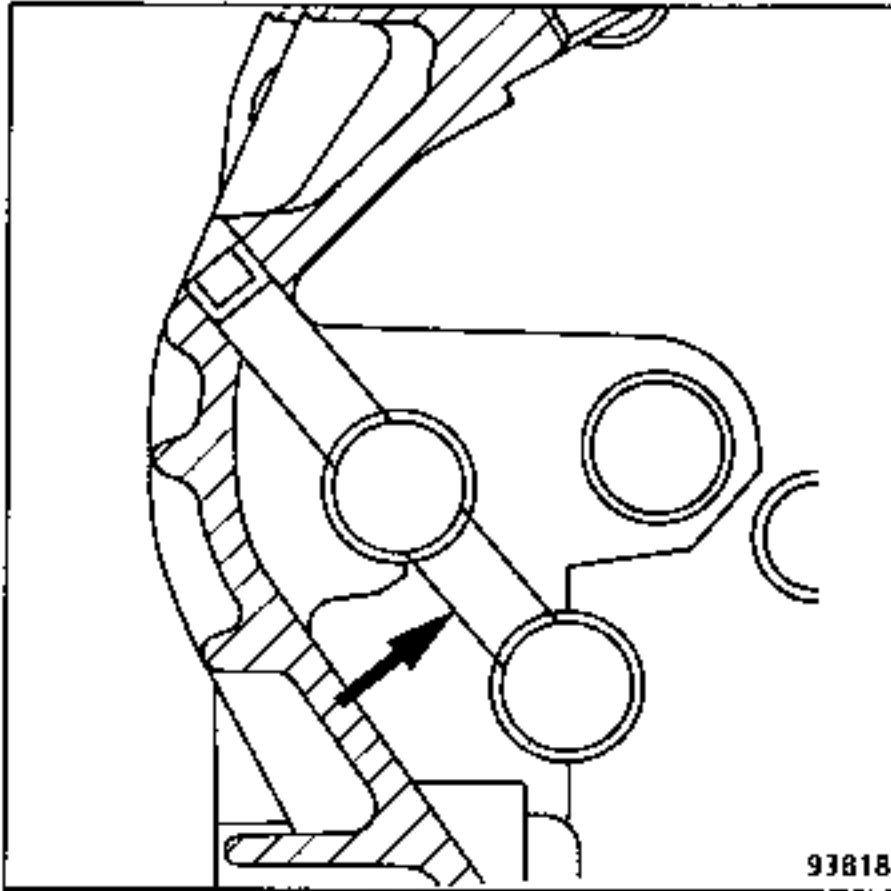
2nd arrangement

The planet wheel carrier has a serrated bush welded to its hub to prevent the nut on the final drive pinion turning.

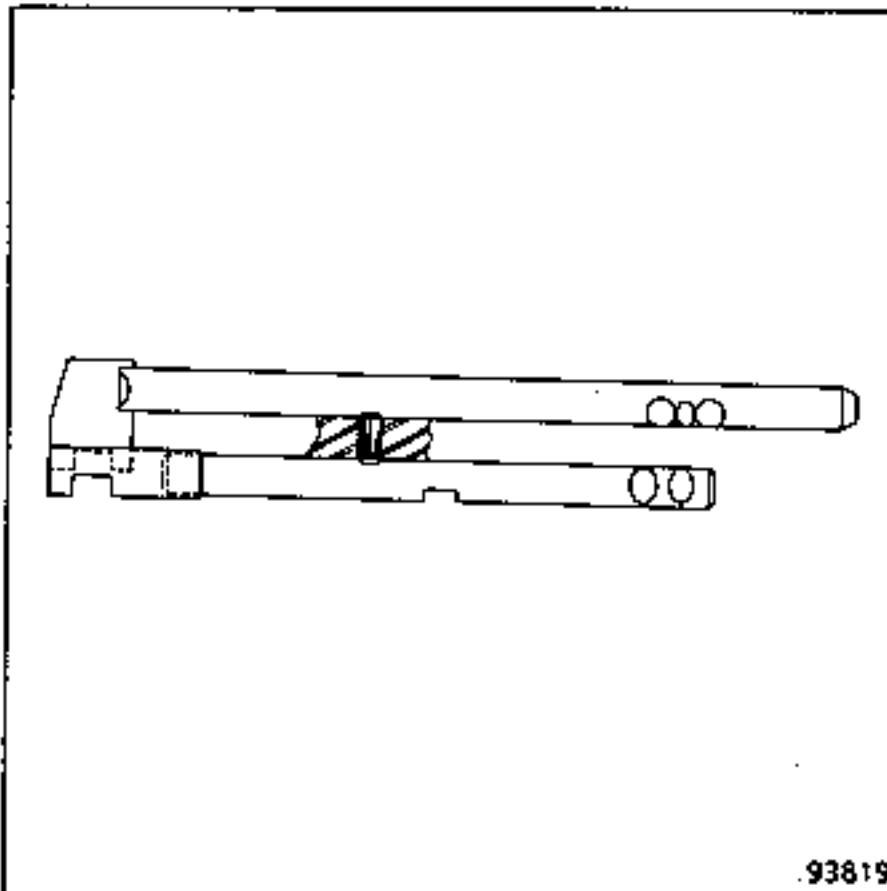


INTERNAL CONTROLS

1st/2nd and reverse shaft interlocking system.



Whenever carrying out any work on this assembly, check the position of the locking plunger in its bore between the two shafts.

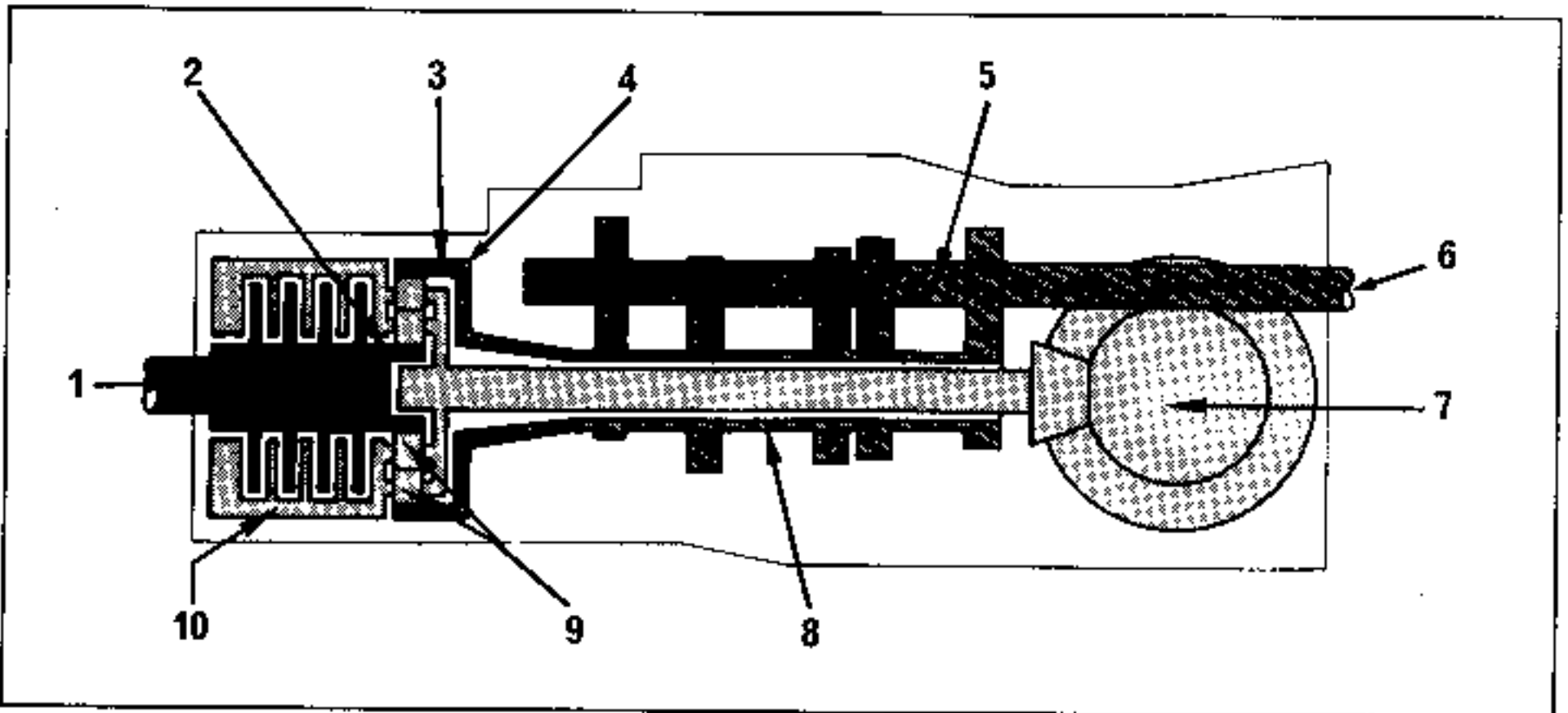


Check the operation as follows :

- Engage reverse.
- Push the 1st/2nd shaft. It should be locked.

THE CENTRAL DIFFERENTIAL

This is in the intermediate housing. It takes the form of an epicyclic train consisting of an outer ring gear (82 teeth), three pairs of planet wheels (17 teeth) and a sun wheel (28 teeth).



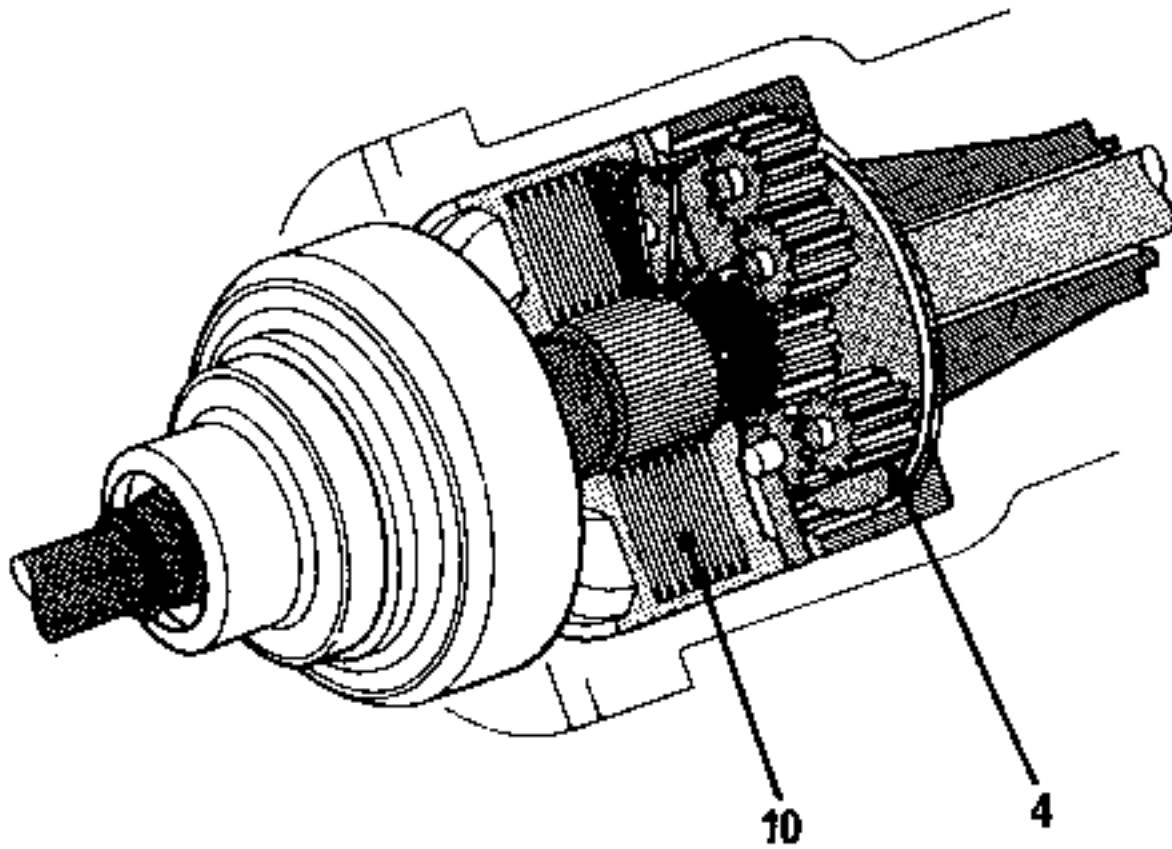
- 1 = Rear final drive unit
- 2 = Sun wheel
- 3 = Ring gear
- 4 = Epicyclic train
- 5 = Primary shaft
- 6 = Engine
- 7 = Front final drive unit
- 8 = Hollow secondary shaft
- 9 = Planet wheels
- 10 = Viscous coupling

The drive is transmitted as follows : the input casing on the epicyclic train is secured to the hollow secondary shaft. It drives, via the planet wheels, a planet wheel carrier which is secured to the final drive pinion (front final drive unit) and, on the other hand, the sun wheel which is secured to the output flange and therefore the rear final drive unit.

The epicyclic train distributes the drive 65% to the front and 35% to the rear. It is backed up by a viscous coupling which transfers the engine torque to the axle on which the adhesion is highest.

THE VISCOUS COUPLING

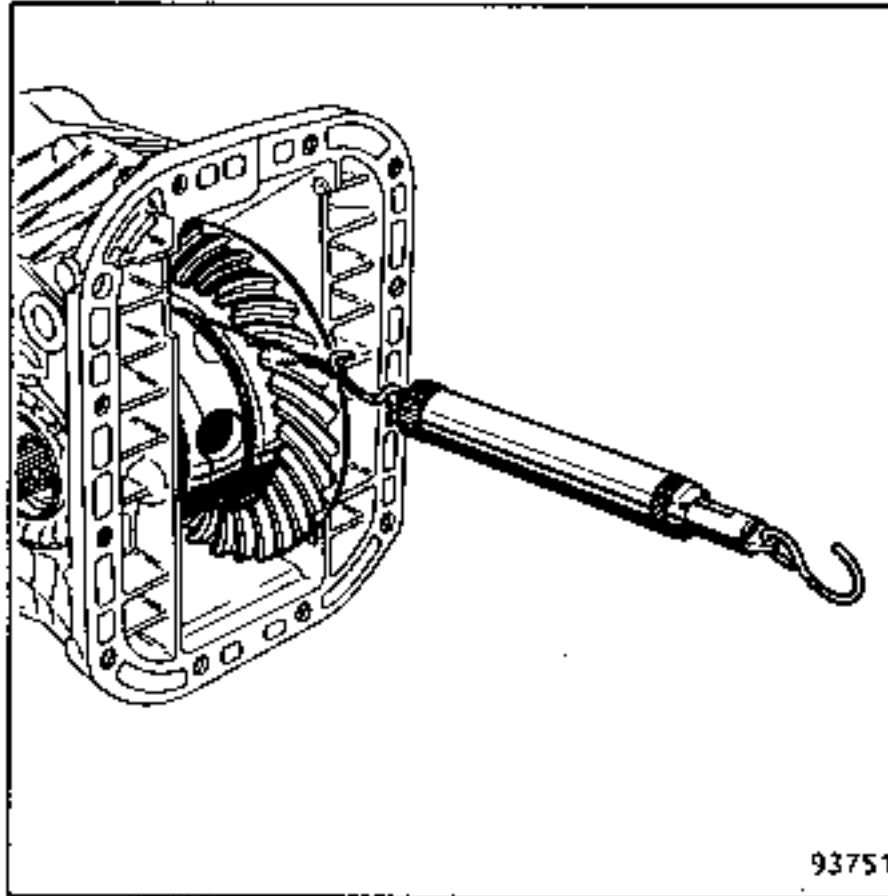
This is mounted in the intermediate housing, just behind the epicyclic train. Its outer housing, connected to the planet wheel carrier by teeth, is therefore also connected to the front final drive unit and its hub, secured to the epicyclic train sun wheel, is connected to the rear final drive unit. As it is between the two drive outputs, it will transfer the engine torque to whichever of the axles has the best adhesion and this distribution can be from 0%-100% to 100%-0%.



- 4 = Epicyclic train
- 10 = Viscous coupling

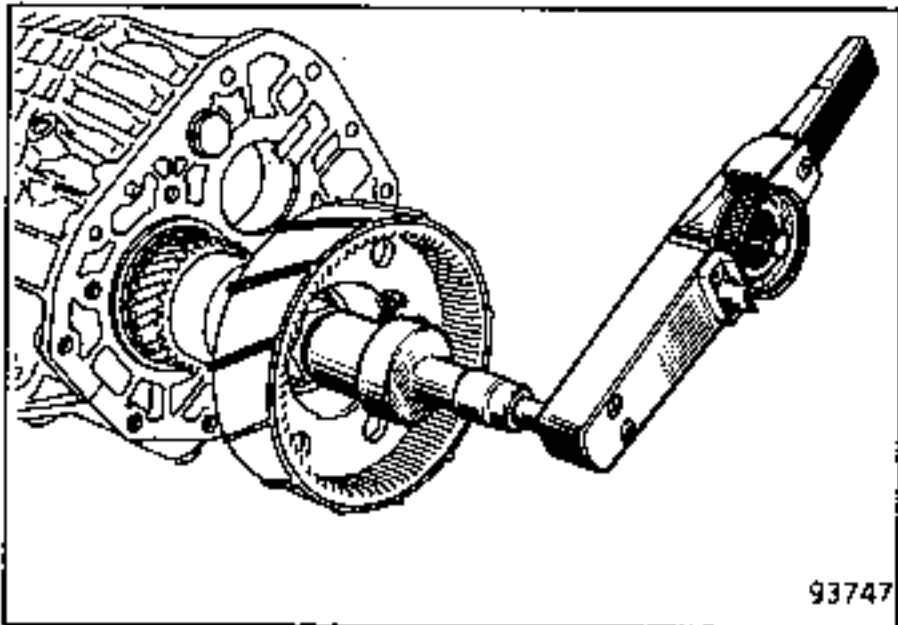
PRE-LOADING THE BEARINGS (WHEN NEW)

1 - Differential



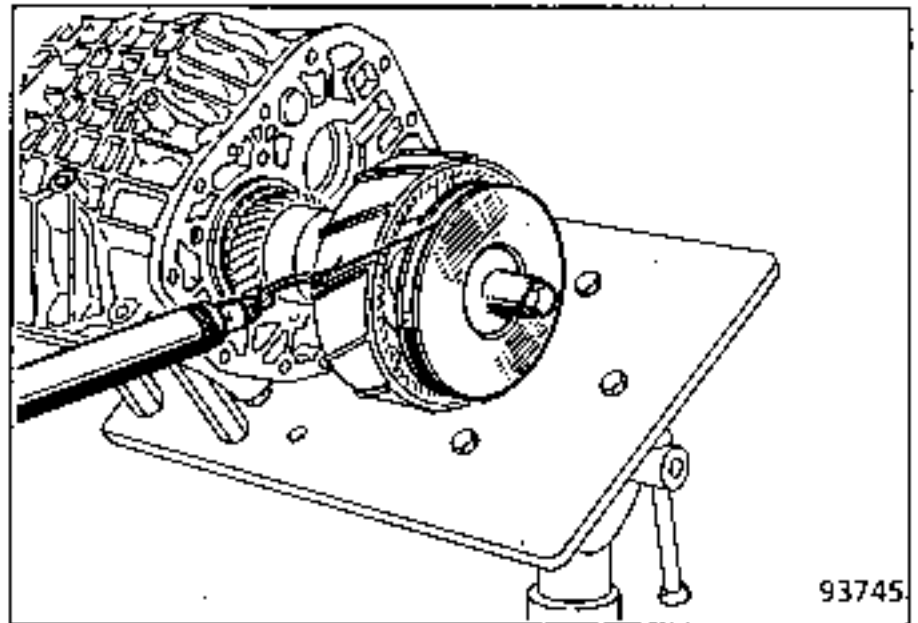
New bearings
5 à 6,5 daN

2 - Secondary shaft



Using a torque wrench

1,2 Nm à 2,2 Nm



Using a spring balance

2,4 daN à 4,4 daN

Description	Pack size	Part No.	To be used on :
Molykote M55 +	1 lit can	77 01 421 079	Clutch shaft splines
Grease n° 20	1 gr sachet	77 01 032 832	Fork pivot) Release bearing guide) Clutch Fork pads
Loctite "518"	24 ml syringe	77 01 421 162	Housing assembly face
CAF 4/60 THIXO	100 gr tube	77 01 404 452	Screwed plugs and switches Locking ball plugs Ends of spring pins on drive shafts
Loctite FRENBLOC (locking and sealing resin)	24 cc bottle	77 01 394 071	Nut on primary shaft
Loctite SCELBLOC (locking and sealing resin)	24 cc bottle	77 01 394 072	Slotted nut Final drive pinion nut
Perfect-Seal "LOWAC" (jointing compound for gaskets)	100 gr tube	77 01 417 404	Paper gaskets on intermediate and clutch housings
Gearbox oil			Immersing all parts

One should wear gloves and goggles when using these products.

PARTS THAT MUST BE REPLACED

Whenever they are removed :

- the 3 taper roller bearings on the secondary shaft,
- the paper gaskets
- the lip seals,
- the differential housing securing bolts,
- the spring pins,
- the bolt on the reverse gear assembly,
- the O ring seals,
- the circlips,
- the primary and secondary shaft nuts,
- the bolts on the output flange.

GRATING WHEN A GEAR IS ENGAGED

(first check the clutch)

Remove the gearbox

Check the synchro assembly for the defective gear :
- synchro cones on the gear and synchro ring,
- synchro hub and springs
- dogs on sliding sleeve and on gear.

KEY :

Check

Operations to carry out

GEAR IMPOSSIBLE TO ENGAGE

(first check the clutch)

Check the area round the shift linkage

O.K.

Faulty

Check condition of shift linkage components

Remove obstacles from shift linkage

O.K.

Faulty

Remove the gearbox

Replace defective parts

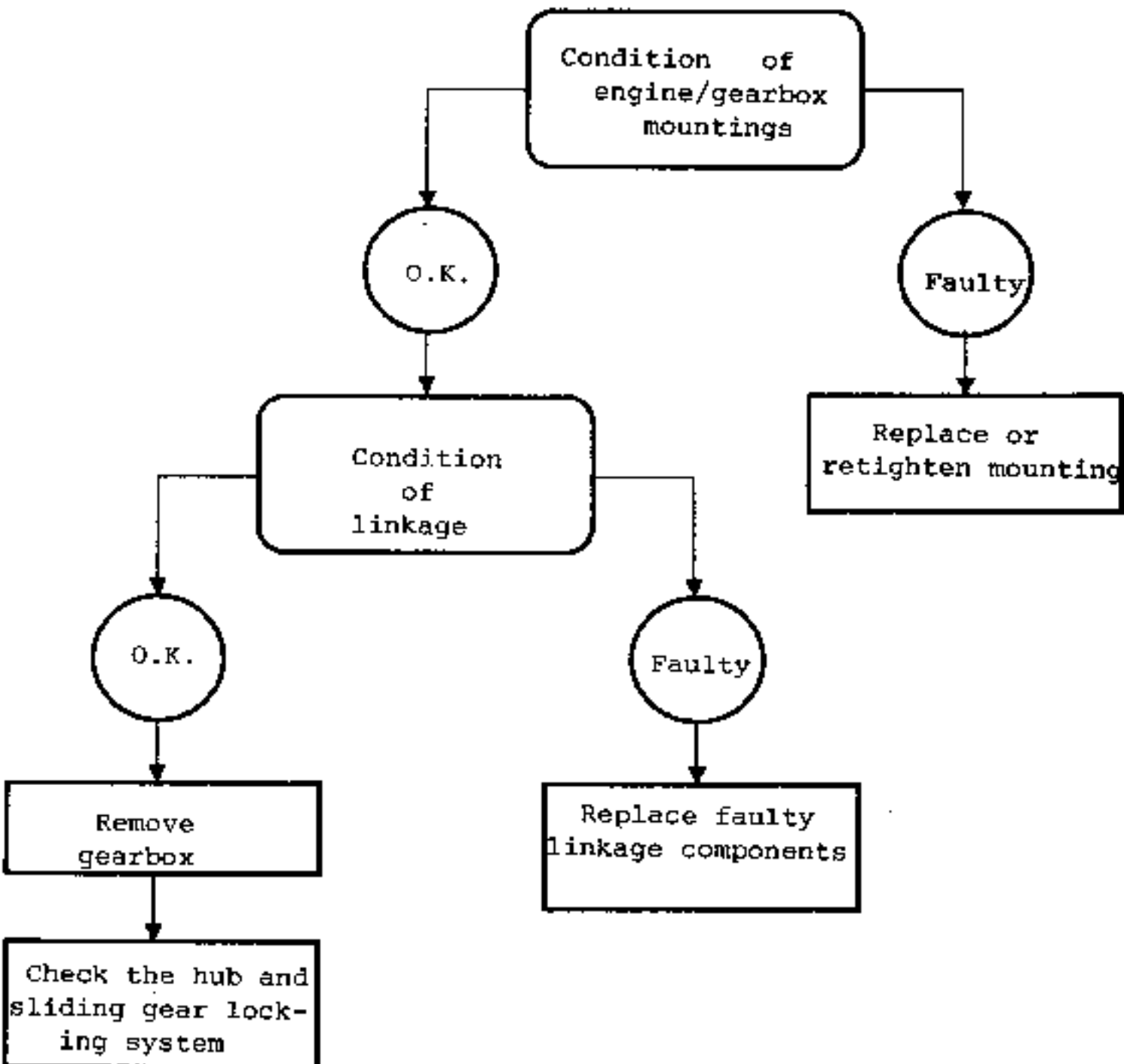
Check the gear-box locking system.

SLIPPING OUT OF GEAR

KEY :

Check

Operations to carry out

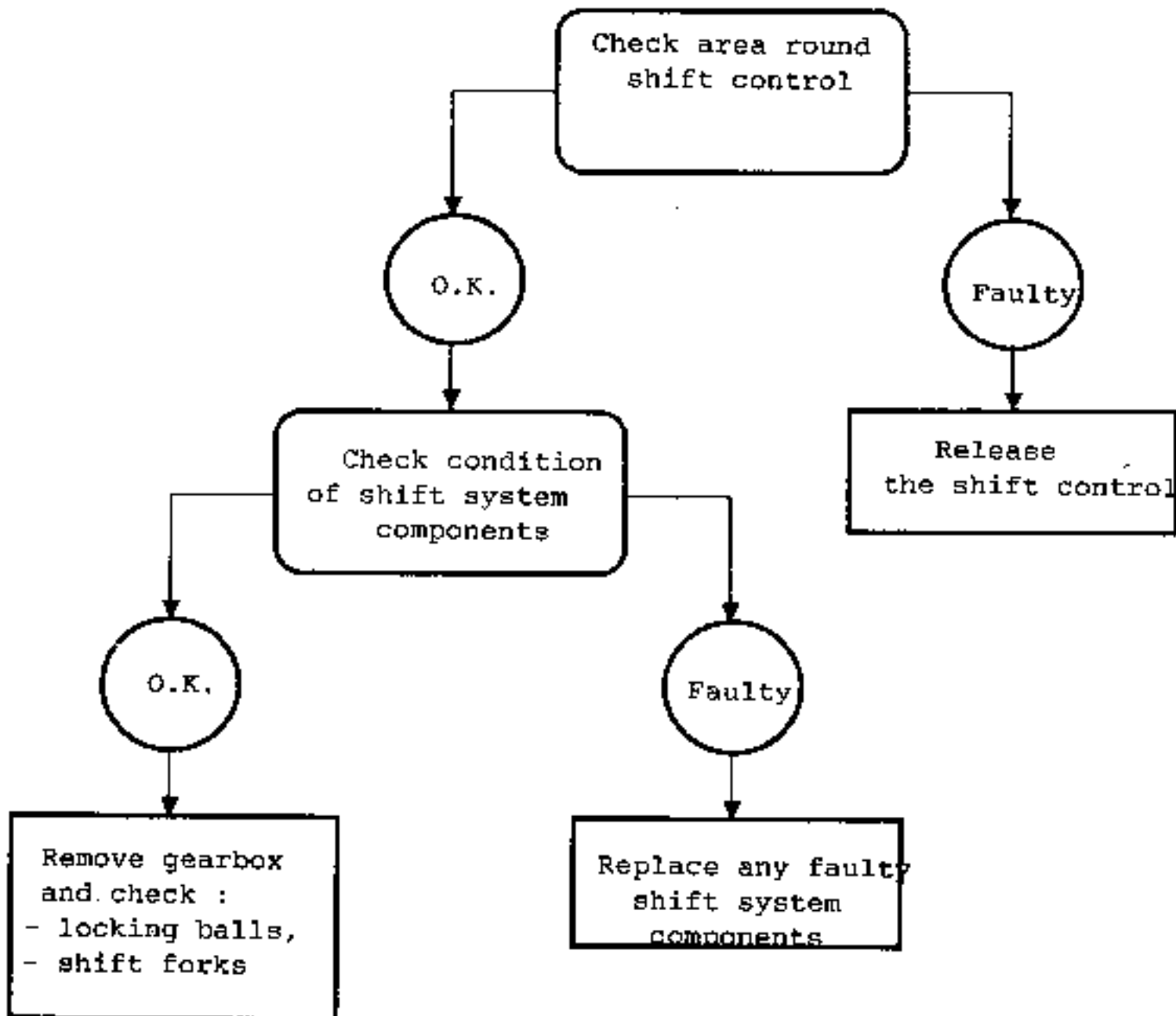



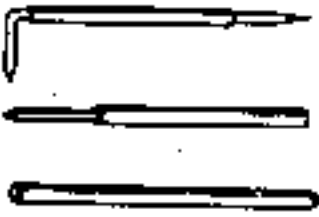
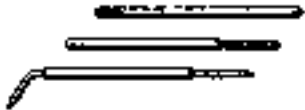
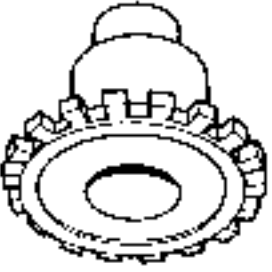



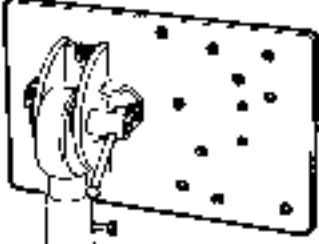
KEY :



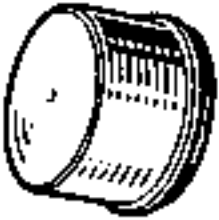
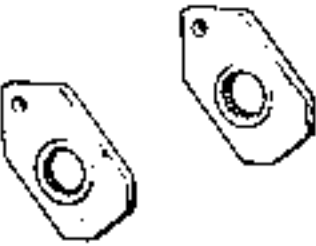


Check

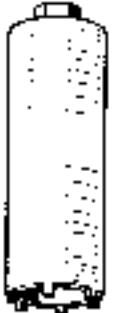

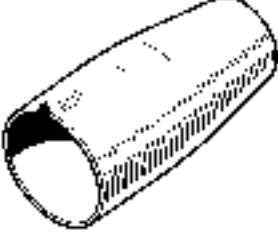


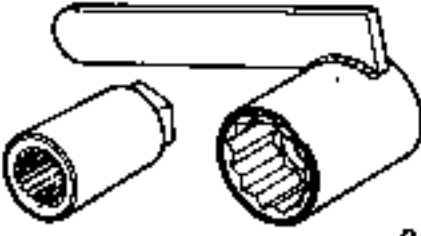

Operations to
carry out

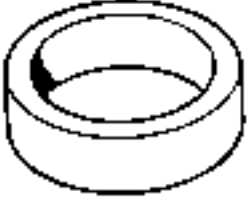

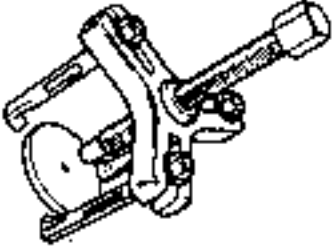

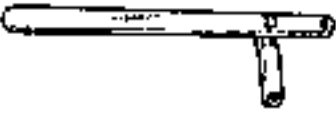
STICKING IN GEAR




Symbol	Methods Reference	Part Number	Description
 <p>71625</p>	B.Vi.28-01	00 01 227 301	Extractor with interchangeable claws
 <p>68997-1</p>	B.Vi.31-01	00 01 259 401	Set of 3 pin punches for fitting 5 mm diameter spring pins
 <p>77743</p>	B.Vi.606	00 00 060 600	Set of pin punches for replacing 6 mm diameter spring pins
 <p>77746</p>	B.Vi.645	00 00 064 500	Castellated spanner for adjusting the differential play
 <p>79405</p>	B.Vi.747	00 00 074 700	Fork for removing and refitting the selector spring
 <p>80545</p>	B.Vi.805	00 00 080 500	Wrench adaptor for the differential nut (used with B.Vi.645)
 <p>86105</p>	B.Vi.955	00 00 095 500	Tool for measuring the pre-load on the final drive pinion bearings
 <p>93405</p>	B.Vi.1016	00 00 101 600	Gearbox mounting plate


Symbol	Methods Reference	Part Number	Description
 <p>91218-10</p>	B.Vi.1078	00 00 107 800	Tool for fitting the sensor ring retaining spring
 <p>91685</p>	B.Vi.1081	00 00 108 100	Tool for fitting the differential seals
 <p>86397</p>	B.Vi.1106	00 00 110 600	Plug for fitting seals
 <p>93590</p>	B.Vi.1180	00 00 118 000	Tool for locking sun wheels
 <p>93587</p>	B.Vi.1181	00 00 118 100	Input casing extractor
 <p>93584</p>	B.Vi.1182	00 00 118 200	Tool for fitting the input casing

Symbol	Methods Reference	Part Number	Description
 <p>93589</p>	B.Vi.1183	00 00 118 300	Castellated spanner for the secondary shaft nut
 <p>93588</p>	B.Vi.1184	00 00 118 400	Tool for fitting the output flange lip seal
 <p>93586</p>	B.Vi.1185	00 00 118 500	End fitting for inserting the output shaft O ring seal
 <p>93746</p>	B.Vi.1186	00 00 118 600	Tool for measuring the pre-load on the secondary shaft bearings (can be used with a torque wrench or with B.Vi.955)
 <p>93000</p>	B.Vi.1187	00 00 118 700	Tool for fitting bearing track ring to the input casing
 <p>94041</p>	B.Vi.1188	00 00 118 800	Tools for locking the final drive pinion
 <p>87324</p>	B.Vi.1191	00 00 119 100	Socket for filler and drain plugs (10 mm square)

Symbol	Methods Reference	Part Number	Description
 <p>93997</p>	B.Vi. 1195	00 00 119 500	Tool for extracting the 1st/2nd hub
 <p>77669</p>	Mot. 587	00 00 058 700	Seal extractor
 <p>92174</p>	T. Ar 1094	00 00 1094 00	Bearing extractor
 <p>69306-1</p>	Rou. 15-01	00 01 331 601	Shaft protector inside diameter 16 mm
 <p>77672</p>	Rou. 604-01	00 00 060 401	Tool for locking hubs

SAFETY 

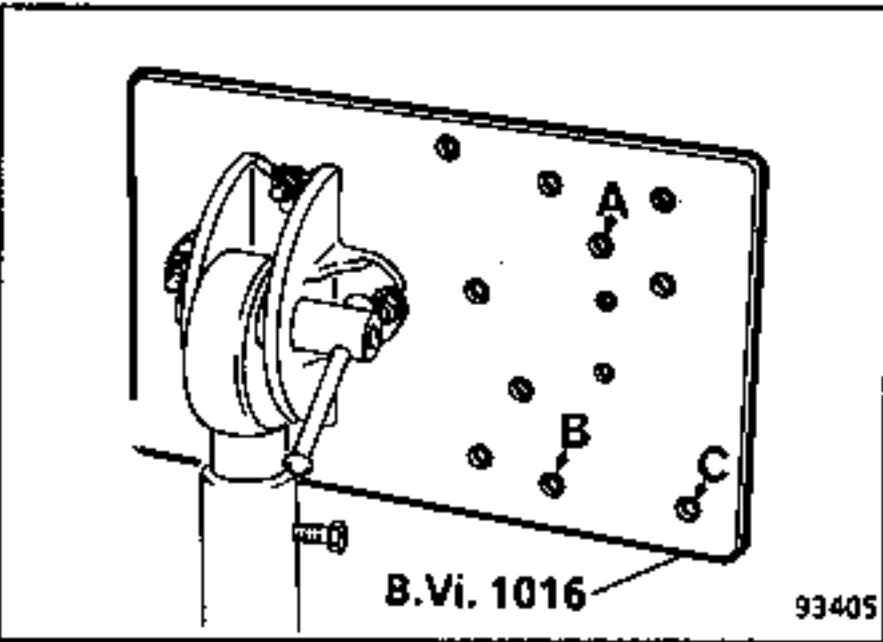
A workshop crane or unit support jack must be used whenever working on heavy components.

The sign  identifies operations that must be carried out as described in the manual.

SEPARATING THE HOUSINGS

The dismantling and handling of these parts must be carried out on a bench with a protective cover (rubber or thick plastic)

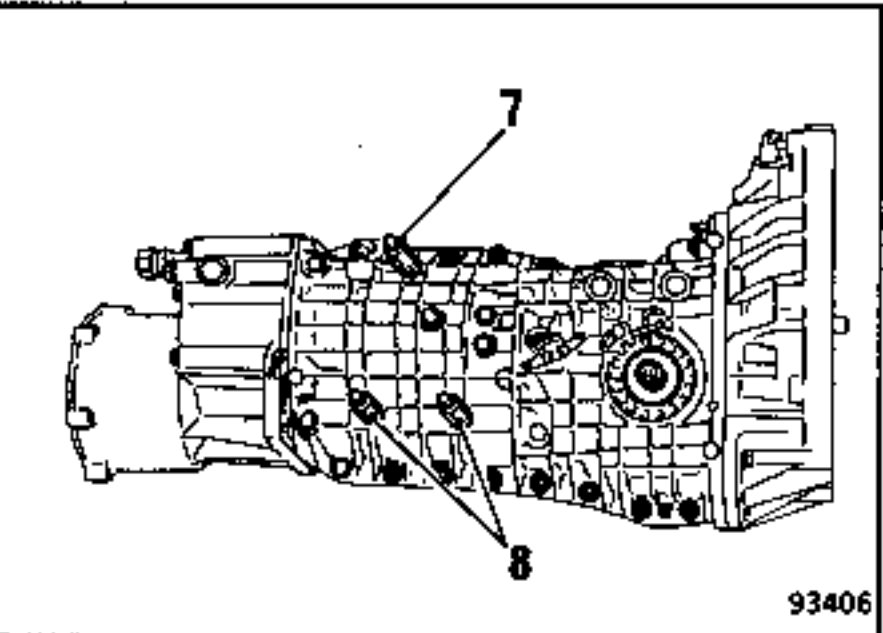
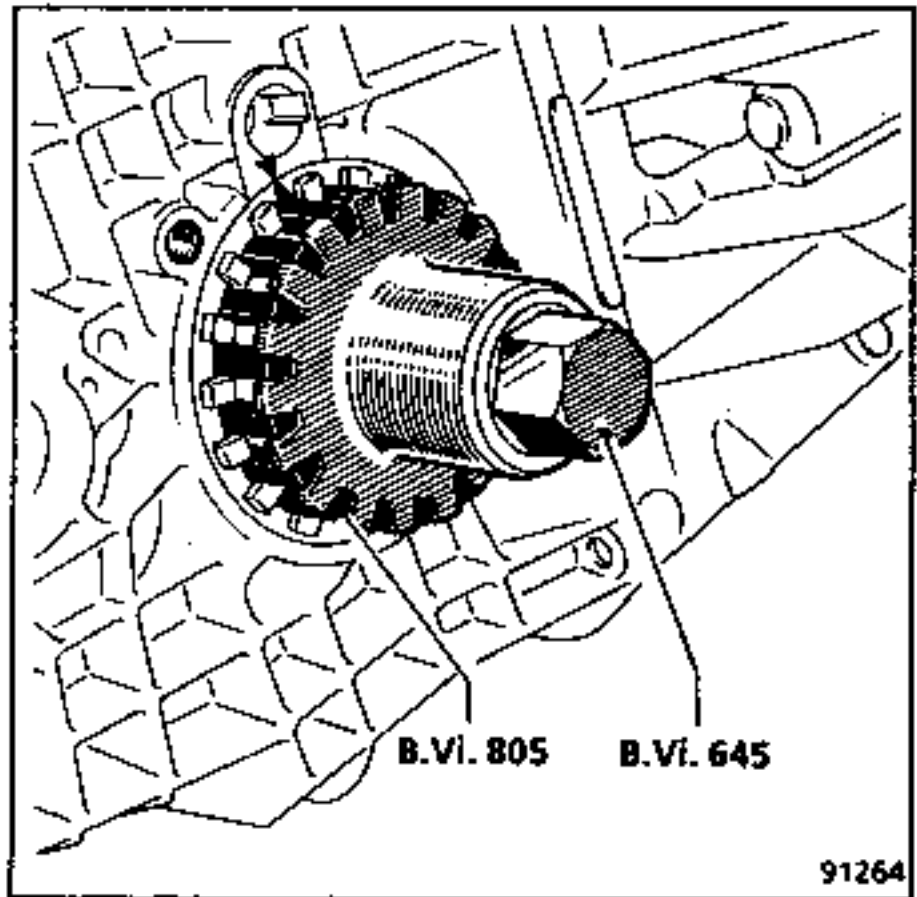
Secure the gearbox to support B.Vi.1016



Holes in plate	Rod reference
A	7
B	8
C	8

Loosen the nut by 1/6 of a turn (3 notches) to release the pre-load from the differential bearings.

Use tools B.Vi.645 and B.Vi.805 to avoid damaging the lip seal.



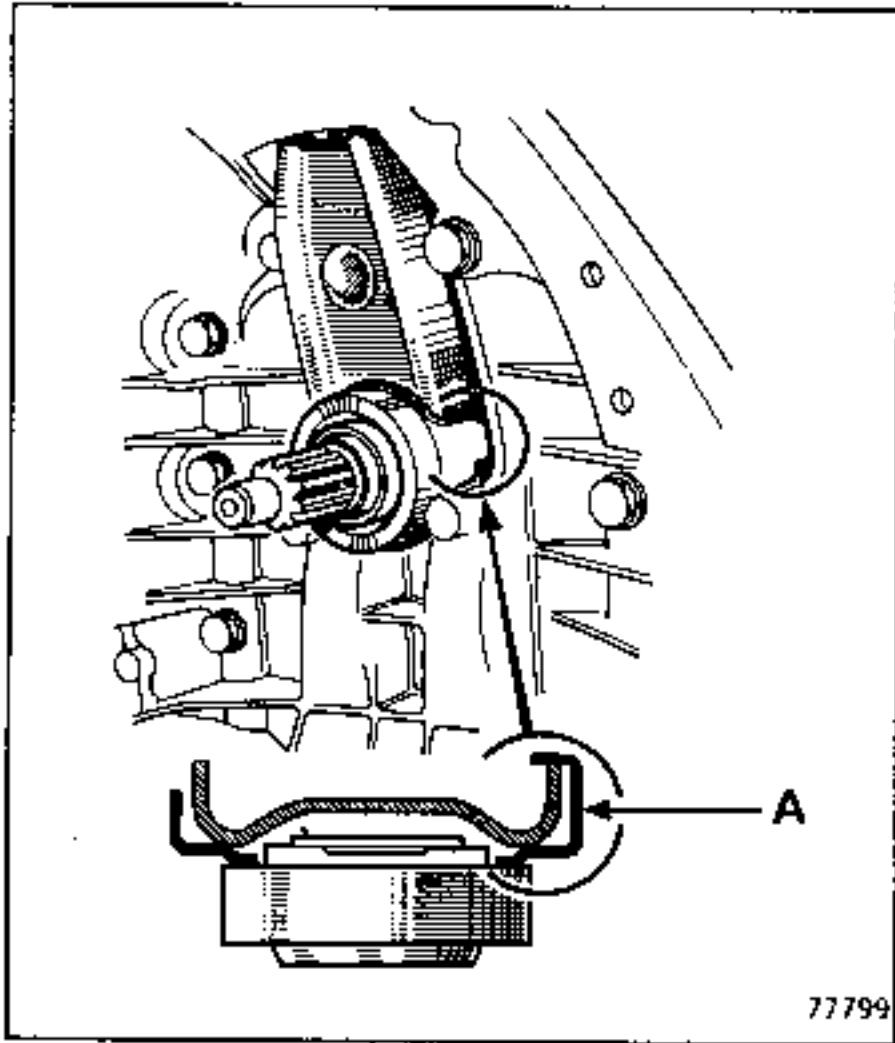
Make a mark on the housing and on the differential nut.

Remove the locking plate.

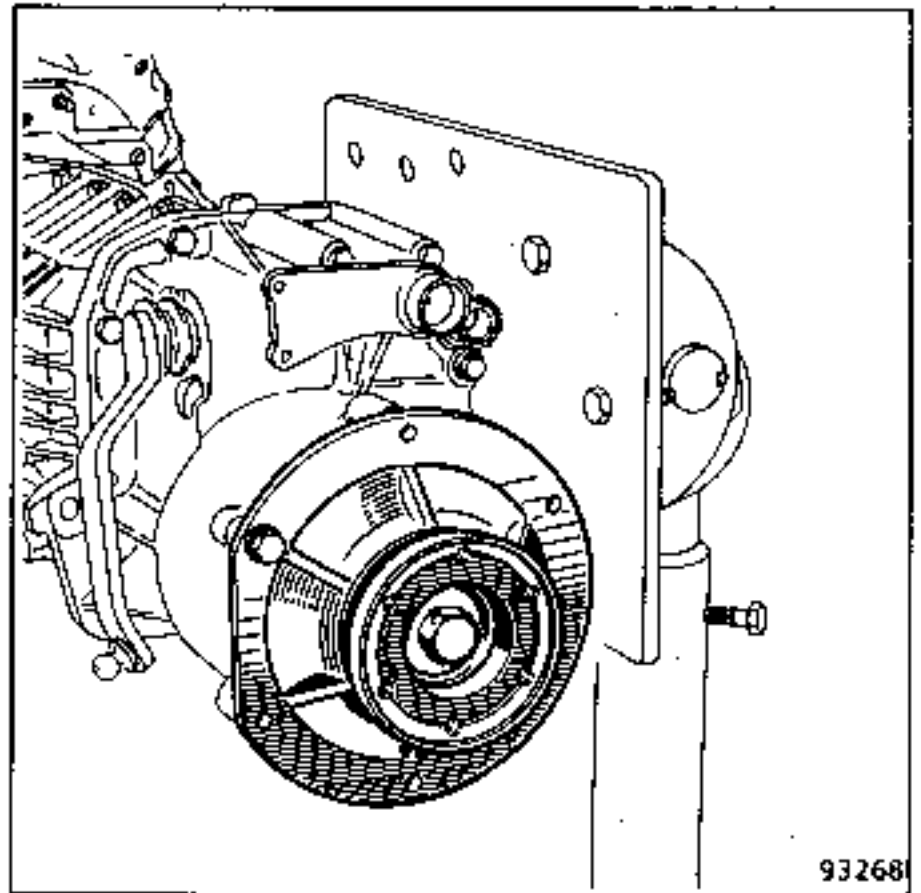
SEPARATING THE HALF HOUSINGS

Remove the clutch release bearing.

Free the fork from its pivot and remove it.

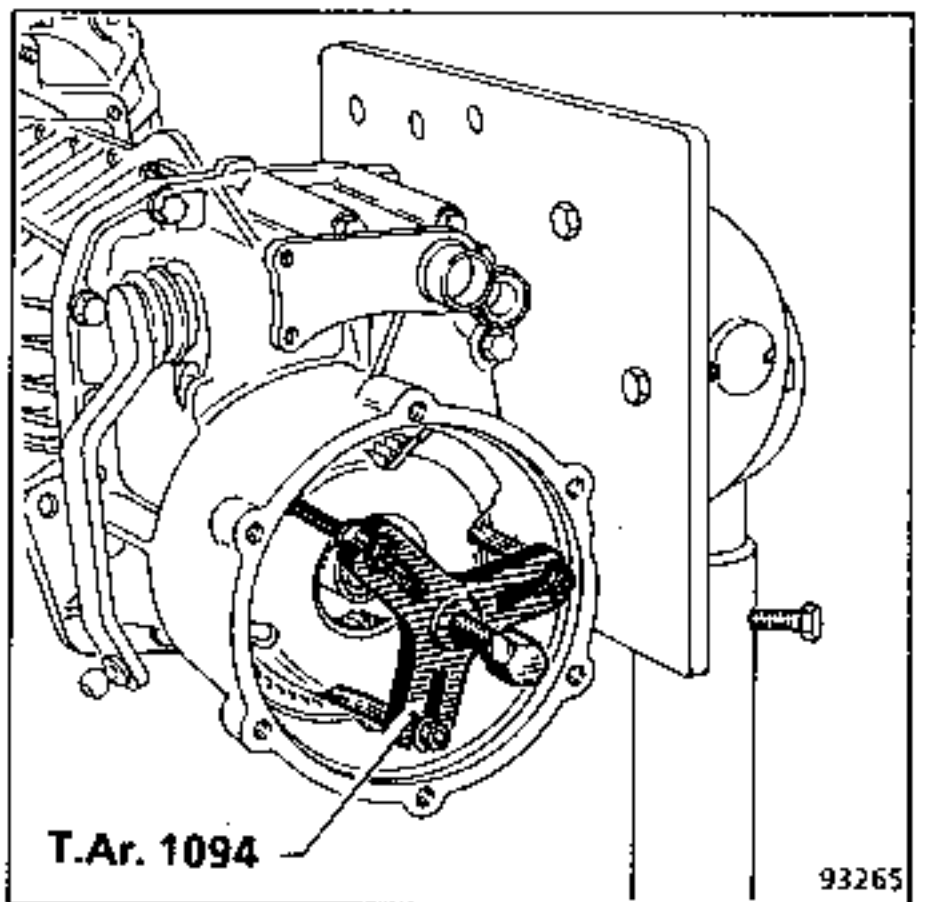


- the bolts that secure the rear cover in place (leave one in position, loosened by just a few turns) and free the cover.



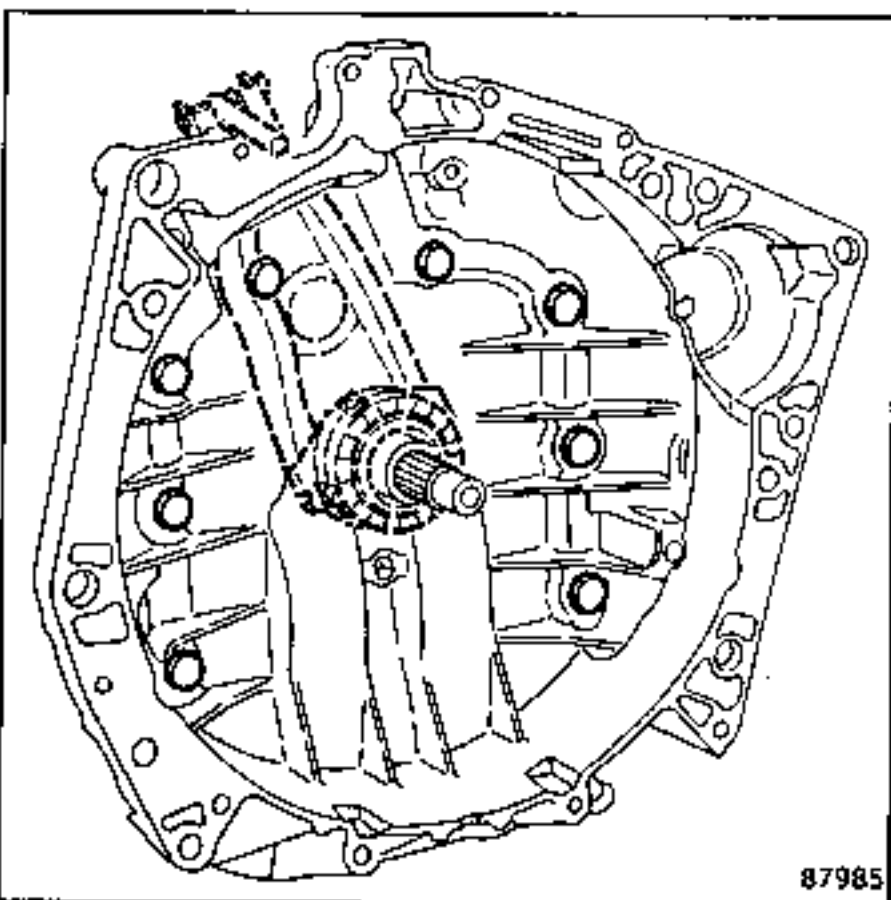
Remove the assembly formed by the cover, flange and viscous coupling.

Extract the planet wheel carrier, if necessary, using tool T.Ar.1094.

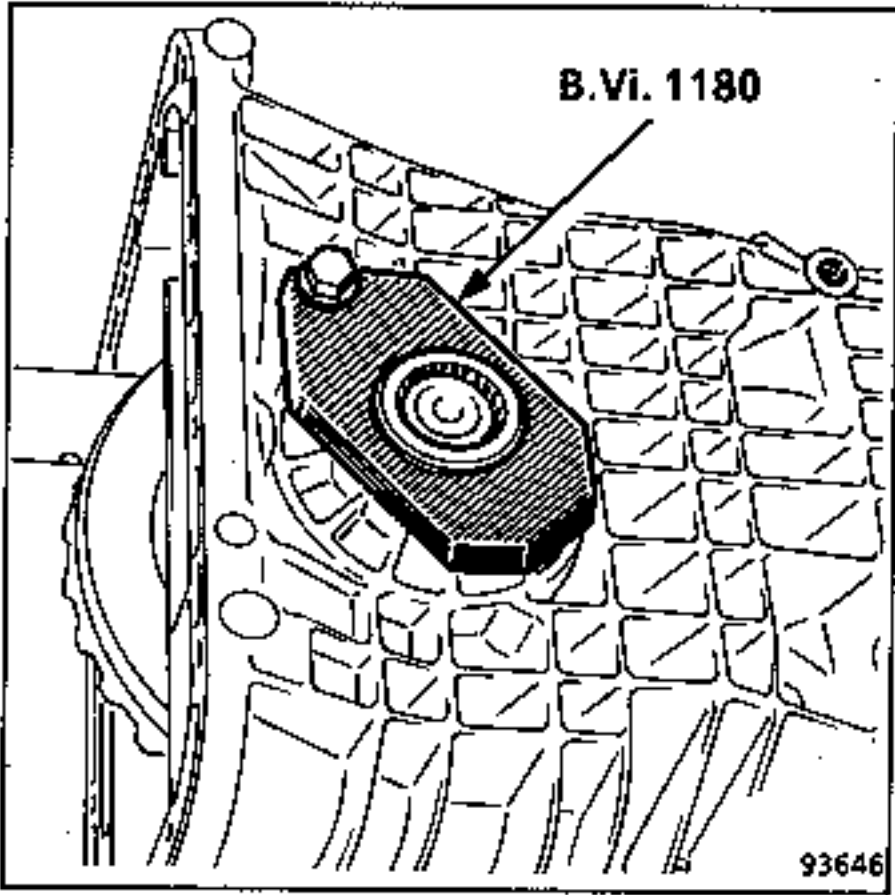


Remove:

- the clutch housing securing bolts,
- the clutch housing.

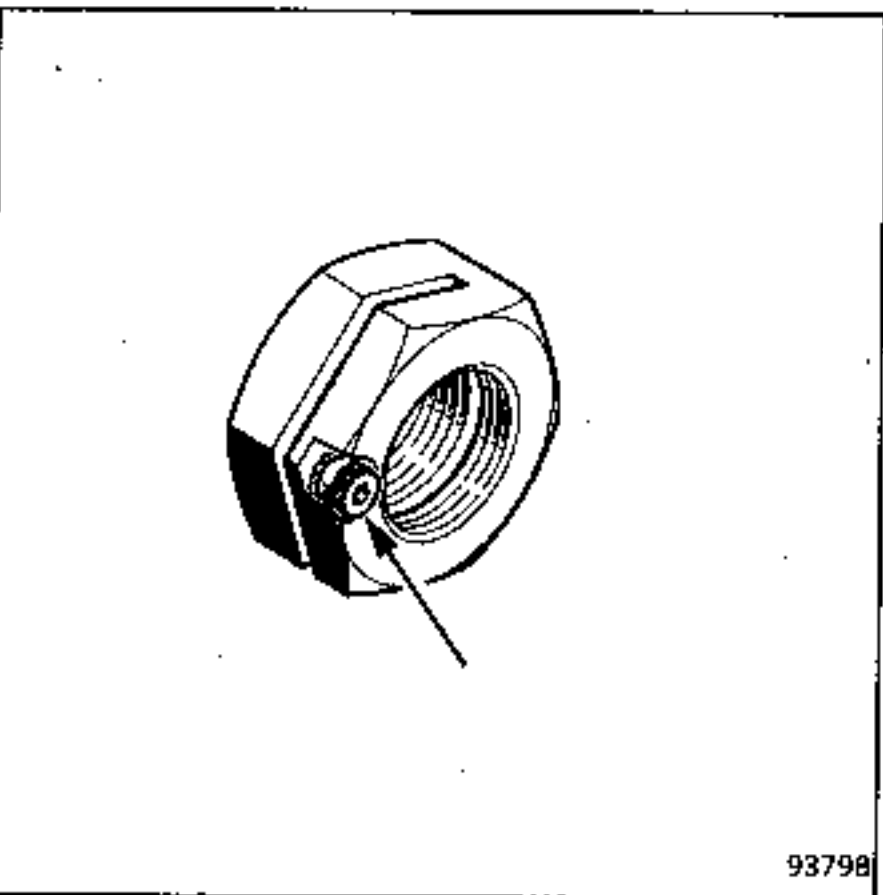


SEPARATING THE HALF HOUSINGS (continued)
Lock the sun wheels using tool B.Vi.1180.

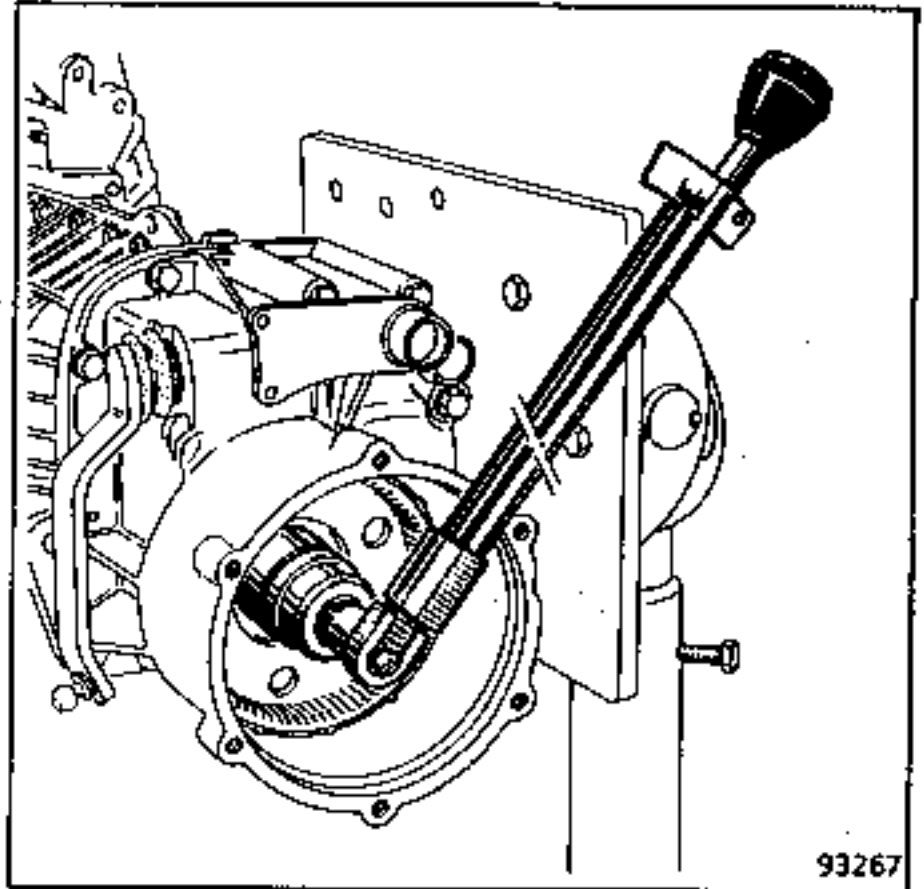


1st arrangement

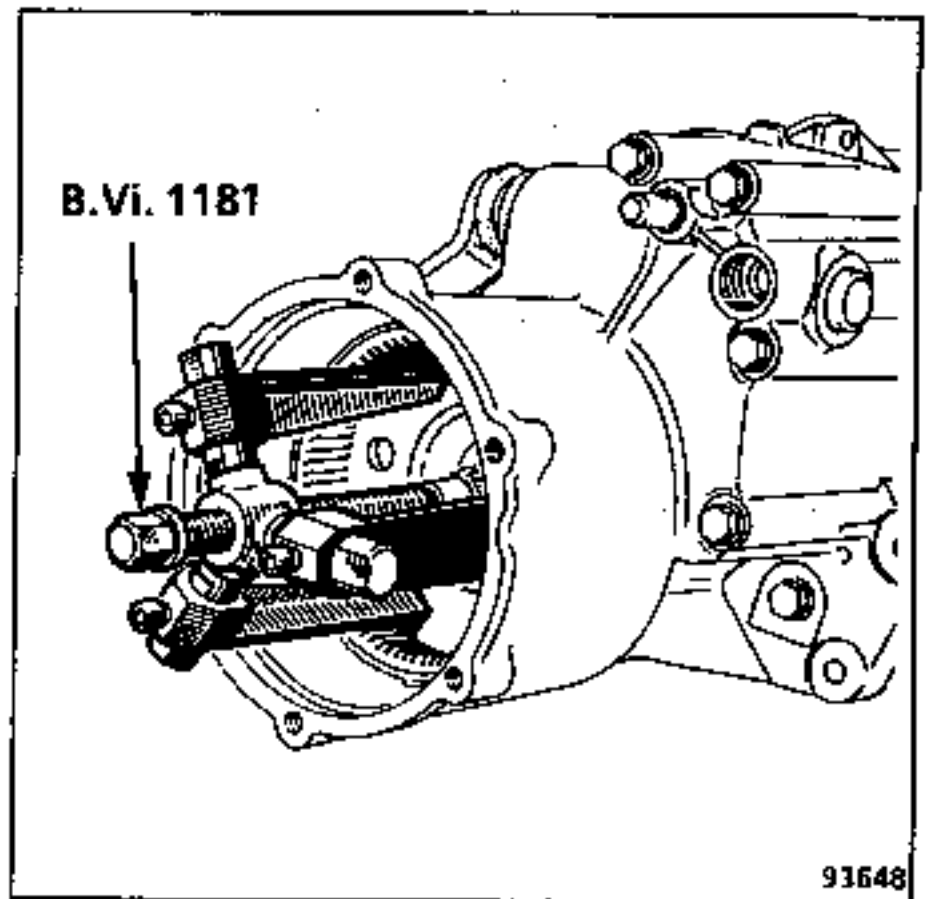
Loosen the locking screw on the final drive pinion nut (3 mm allen key).



Remove the final drive pinion nut with a long series 36 mm socket (e.g. FACOM K36 LA).



Remove the input casing with tool B.Vi.1181 after fitting the shaft protector Rou.15-01.



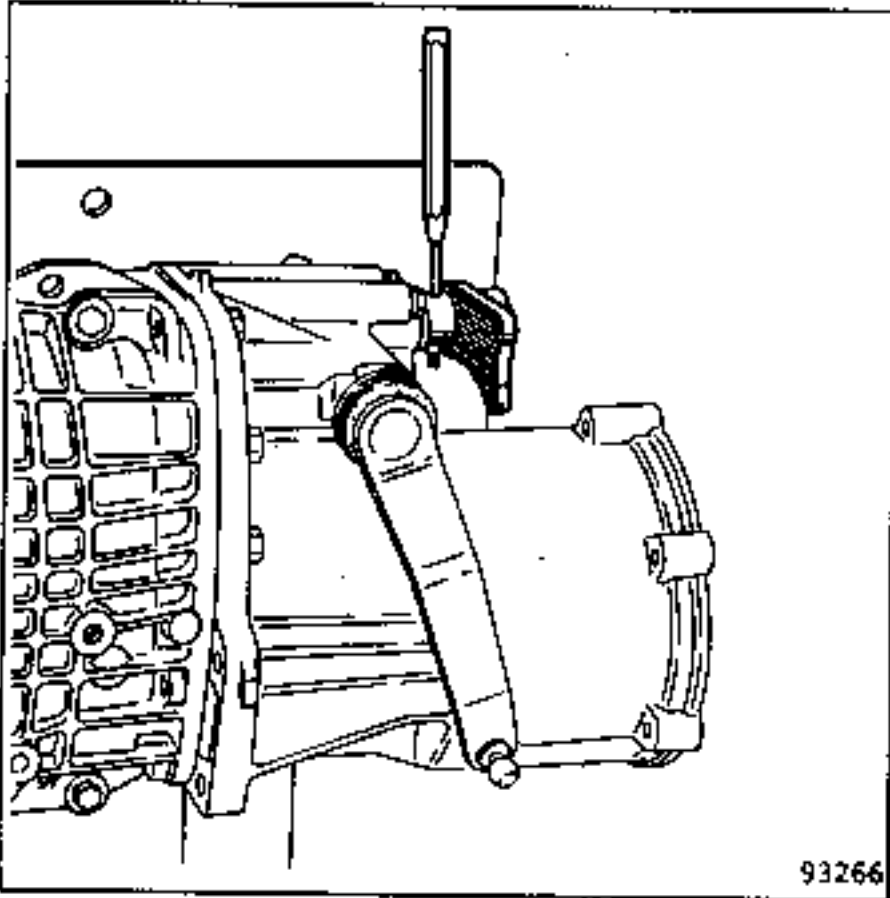
Retrieve the bearing and the spring washer.

SEPARATING THE HALF HOUSINGS (continued)

Free the sleeve - lever cover - selector shaft ball joint.

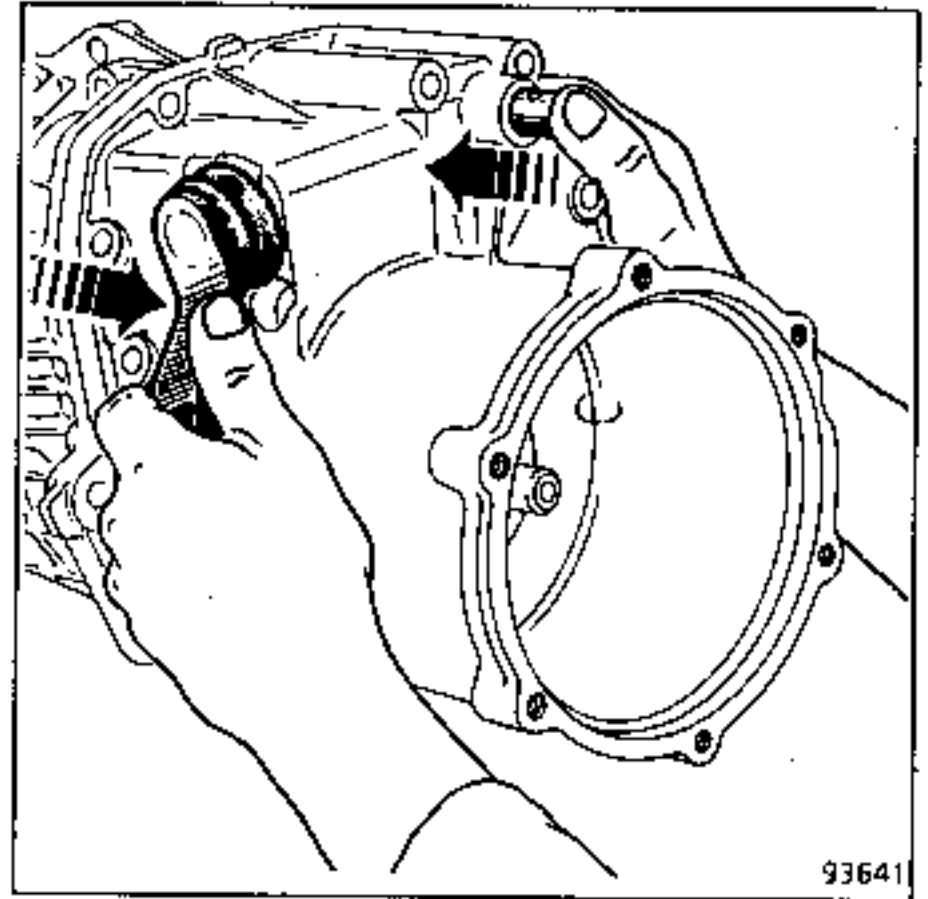
Inner pin : diameter 4 mm

Outer pin : diameter 7 mm



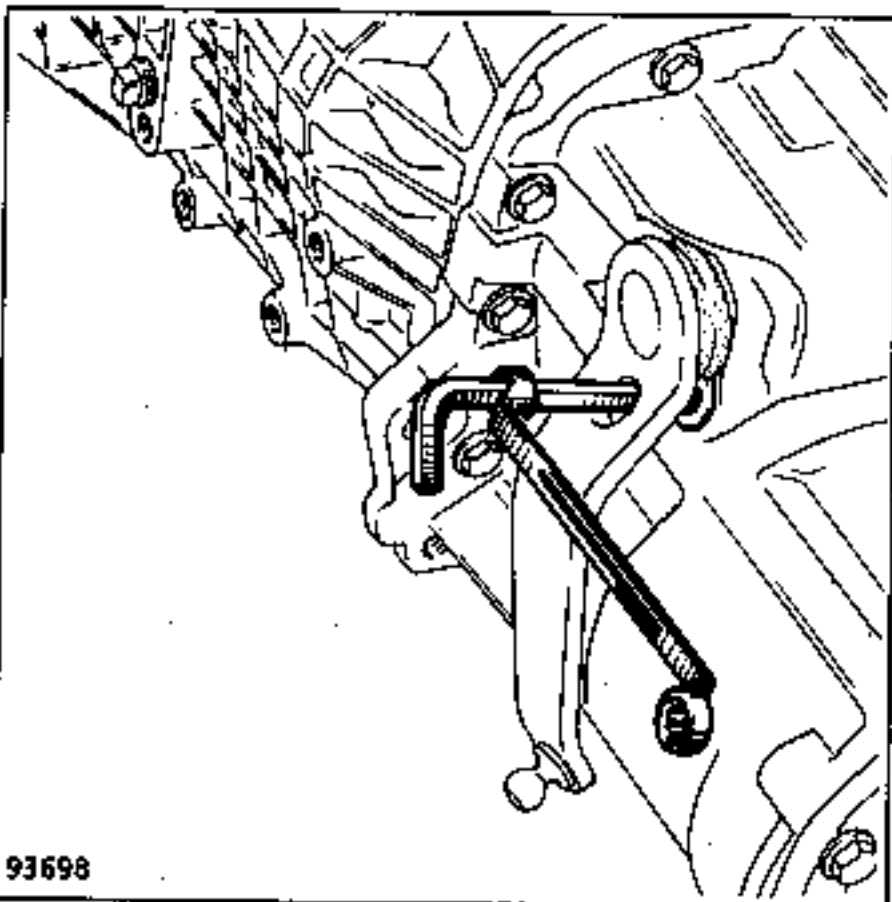
With the gearbox in the neutral position.

Remove the intermediate housing by pushing the selector shaft.



Remove :

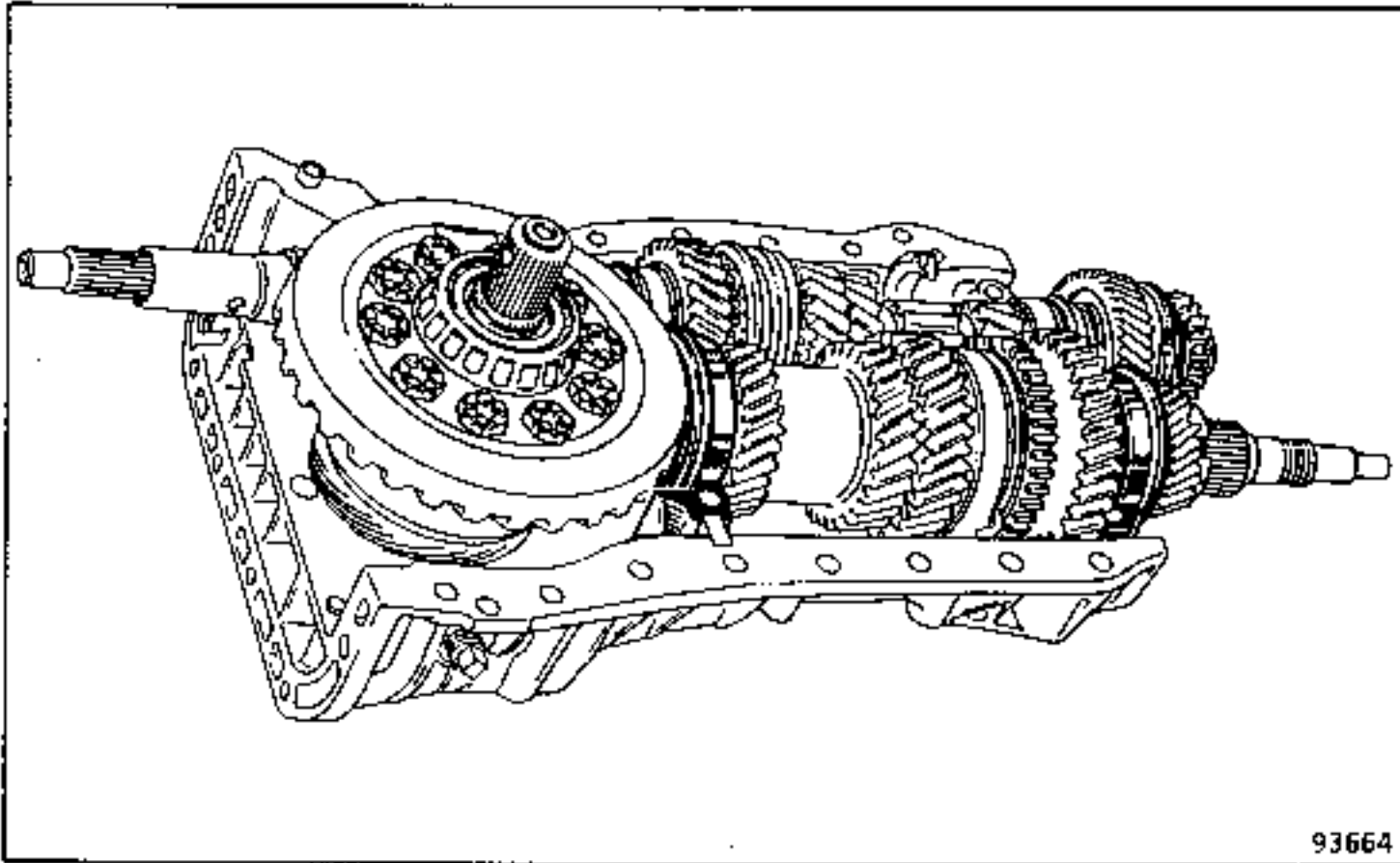
- The 5th speed locking system



- The intermediate housing securing bolts.

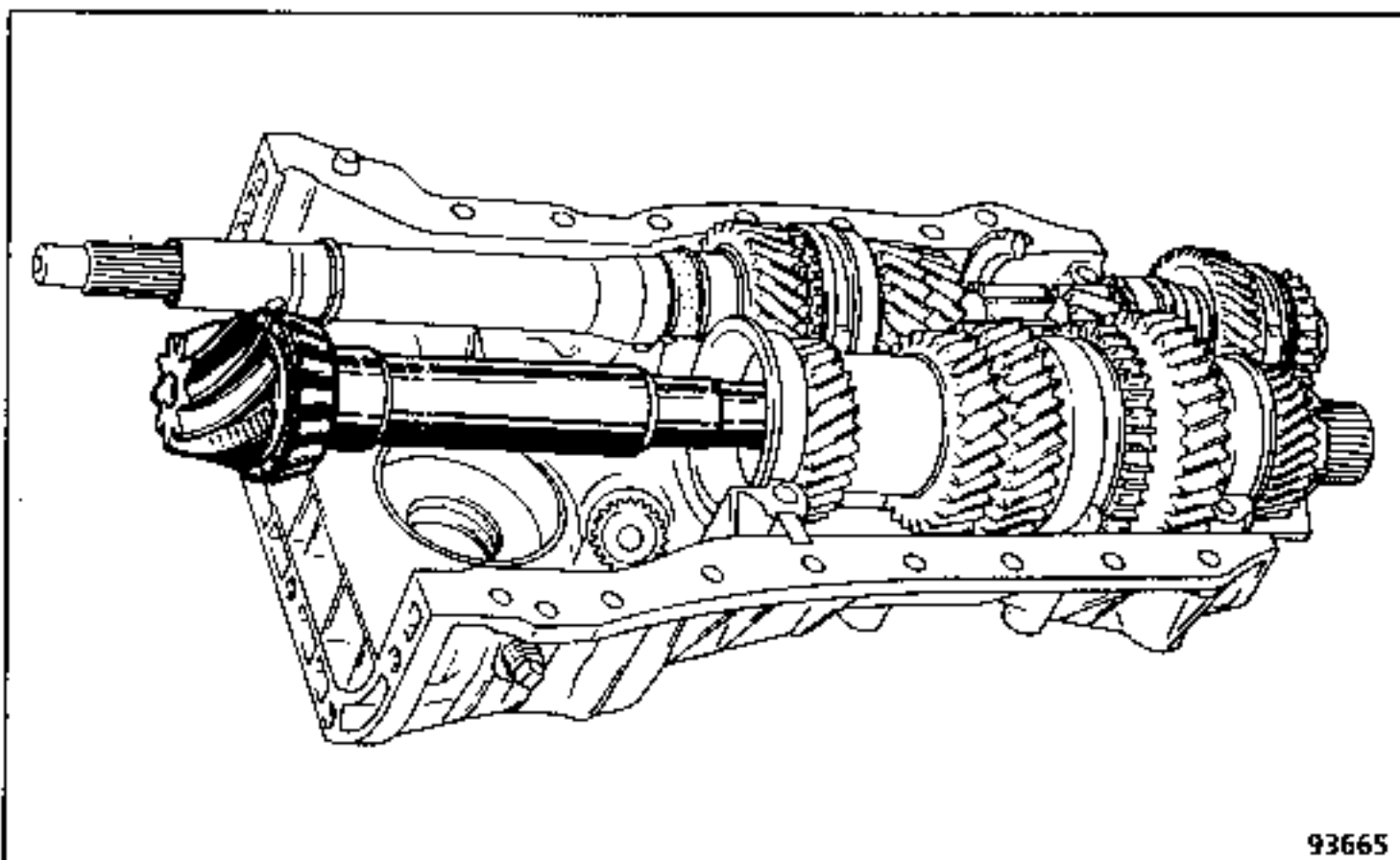
SEPARATING THE HALF HOUSINGS (continued)

Remove the nuts and bolts that secure the half housings together and separate them.



Remove :

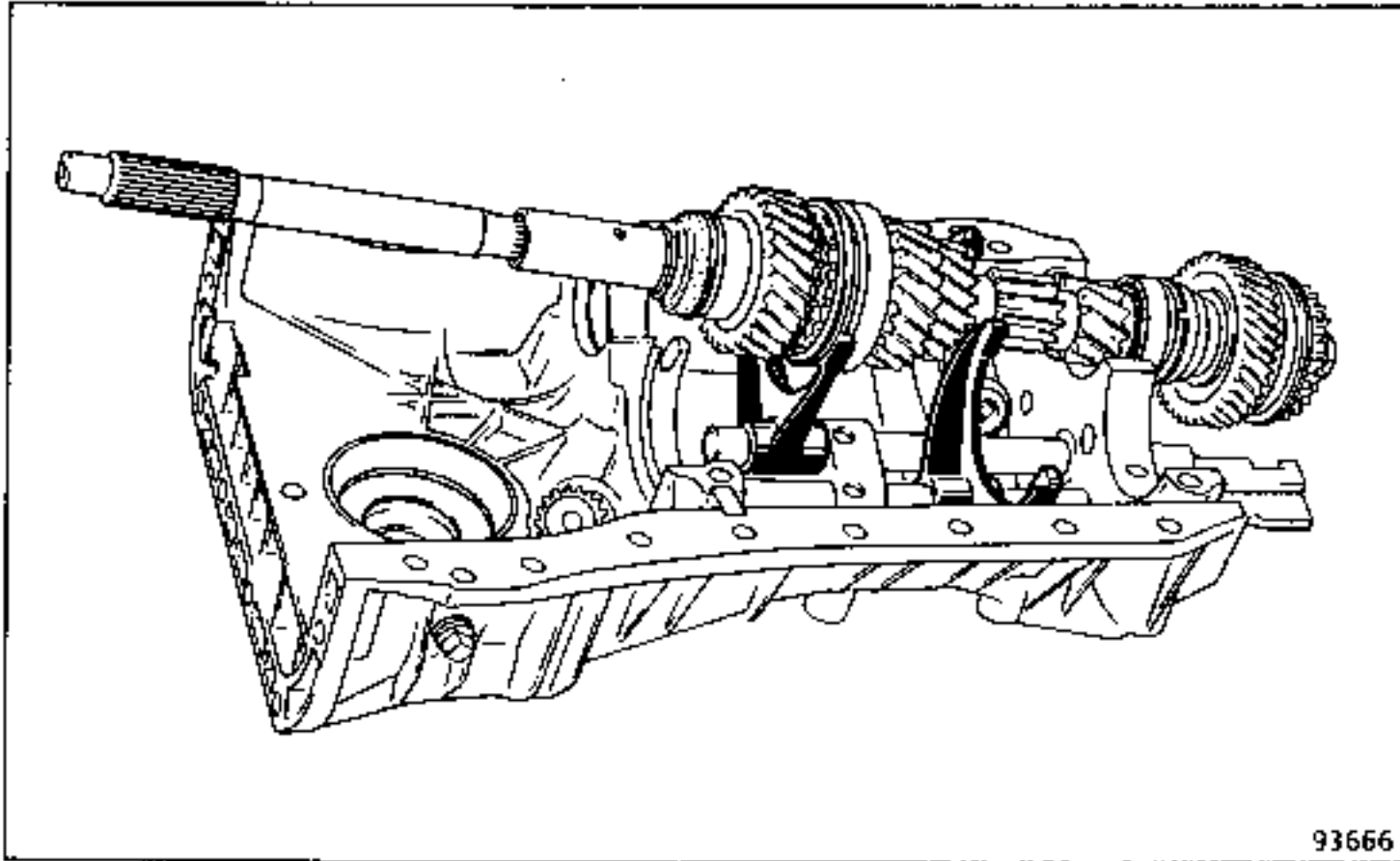
- The differential,
- the final drive pinion.



SEPARATING THE HALF HOUSINGS (continued)

Remove :

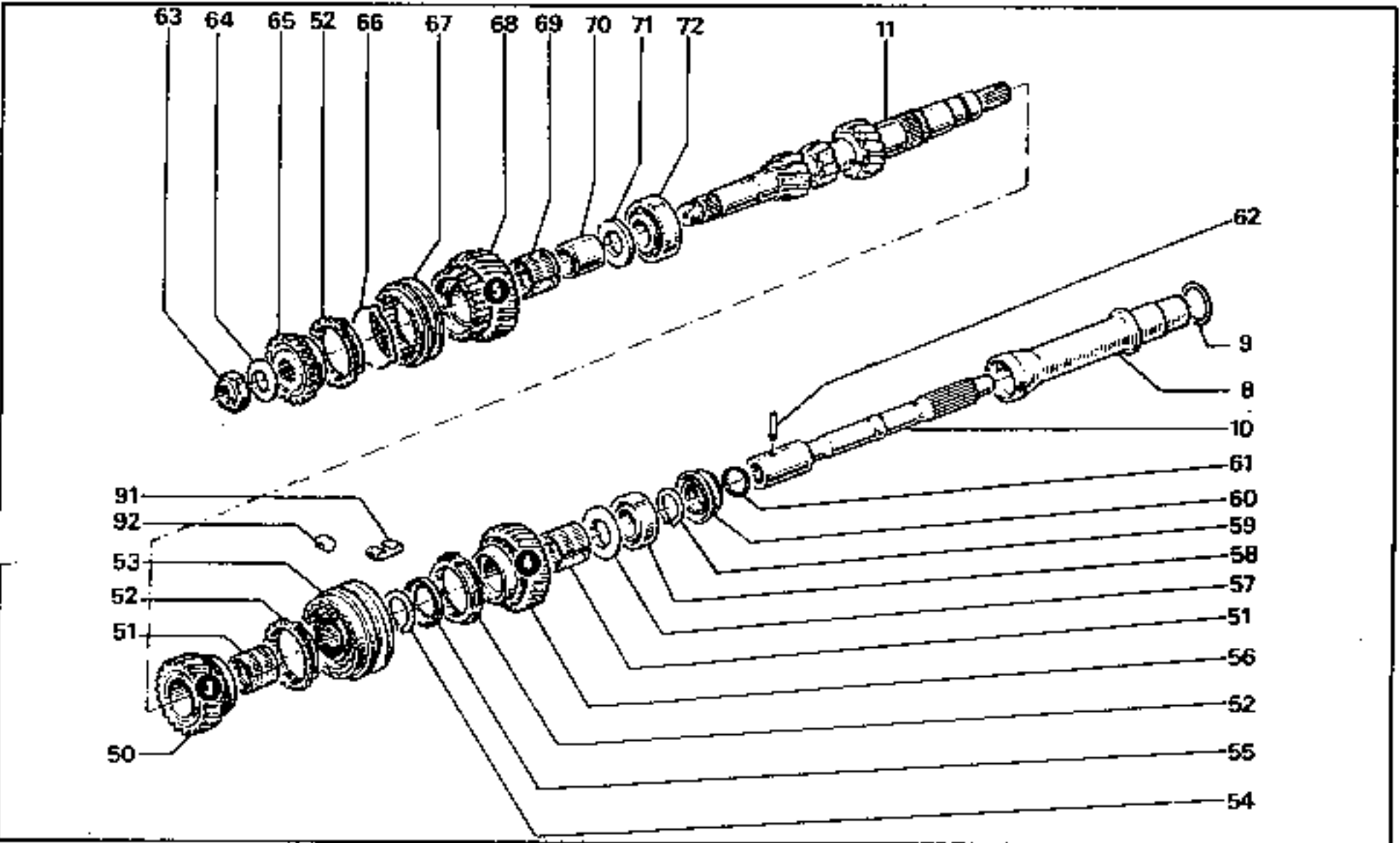
- the secondary shaft,
- the primary shaft.



CLEANING THE HALF HOUSINGS

- Under no circumstances are the joint faces and the bearing locating areas to be cleaned by scraping them with a metal tool. Clean them with a cloth dipped in a cleaning solvent and dry them by blowing them with compressed air. If necessary, remove any burrs with an oil stone.

PRIMARY SHAFT - Dismantling - Re-assembly



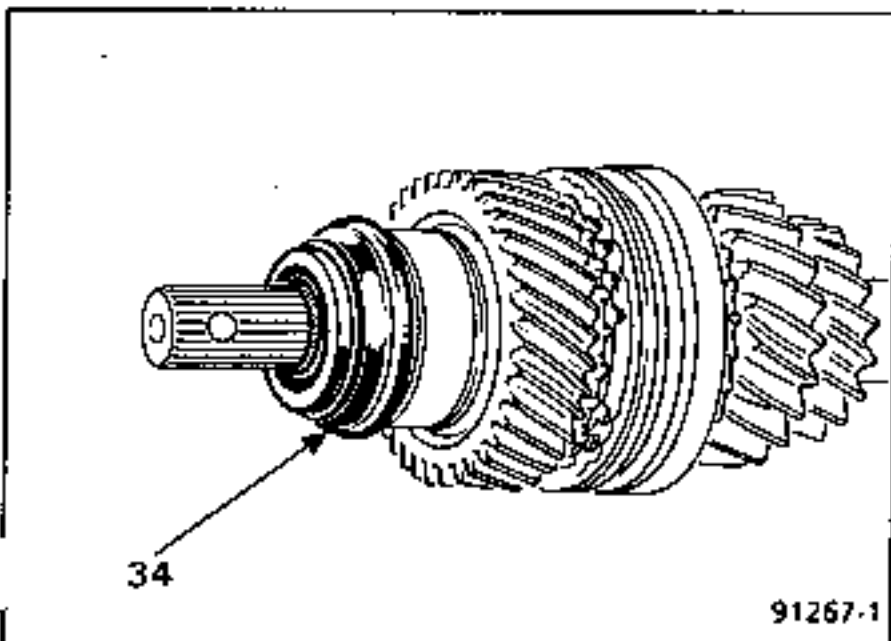
TIGHTENING TORQUES (in daN.m)	
Primary shaft nut	16

Dismantling

Free the release bearing guide tube.

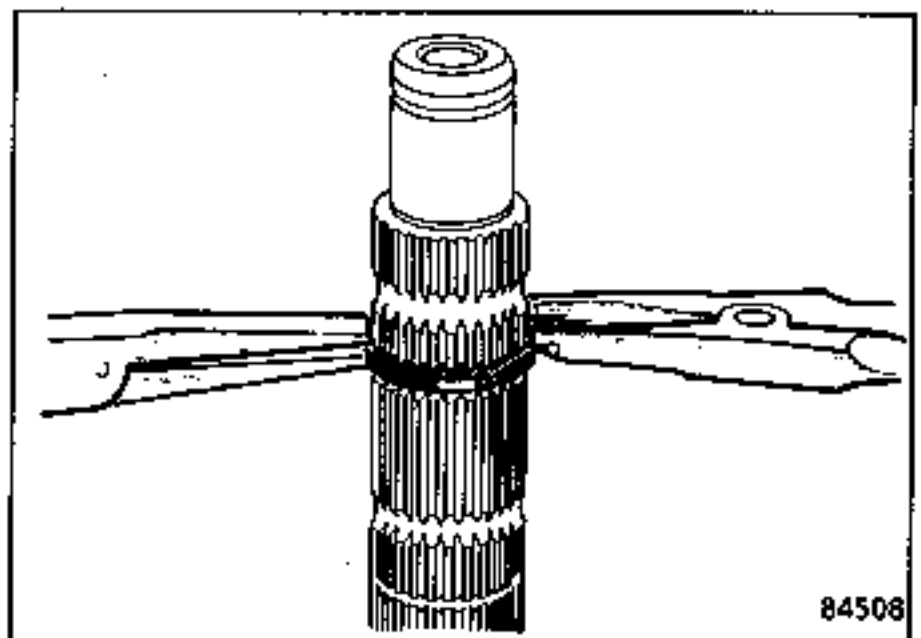
Separate the clutch shaft from the primary assembly by knocking out the spring pin with punch B.Vi.606.

Remove: the O ring and the lip seal (34)



Remove the circlip.

To remove the circlips use, on one side a pair of circlip pliers to spread the ends and on the opposite side flat nosed pliers so that the circlip does not twist.



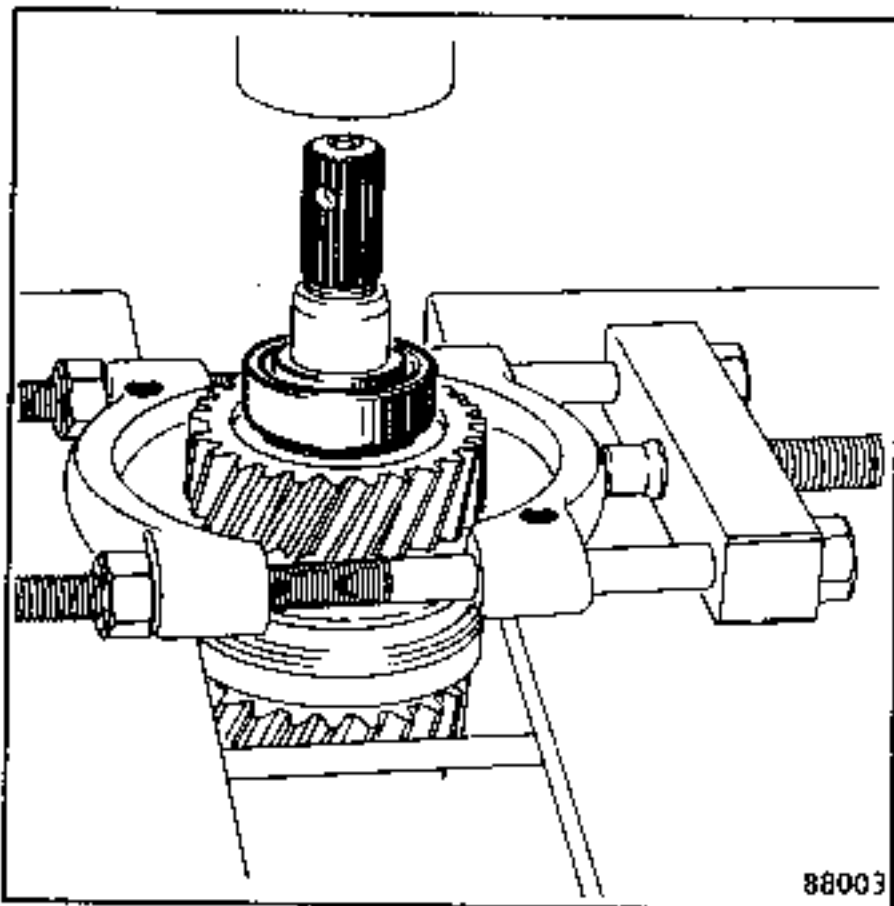
The original circlips are not to be re-fitted. They must be replaced by new ones.

Mark the positions of the hubs with reference to the sliding gears.

PRIMARY SHAFT

Dismantling

Taking the load on the 4th speed gear, extract items 56 to 58 on the press.



Retrieve items 51, 52 and 55.

Mark the position of the hub with reference to the sliding gear.

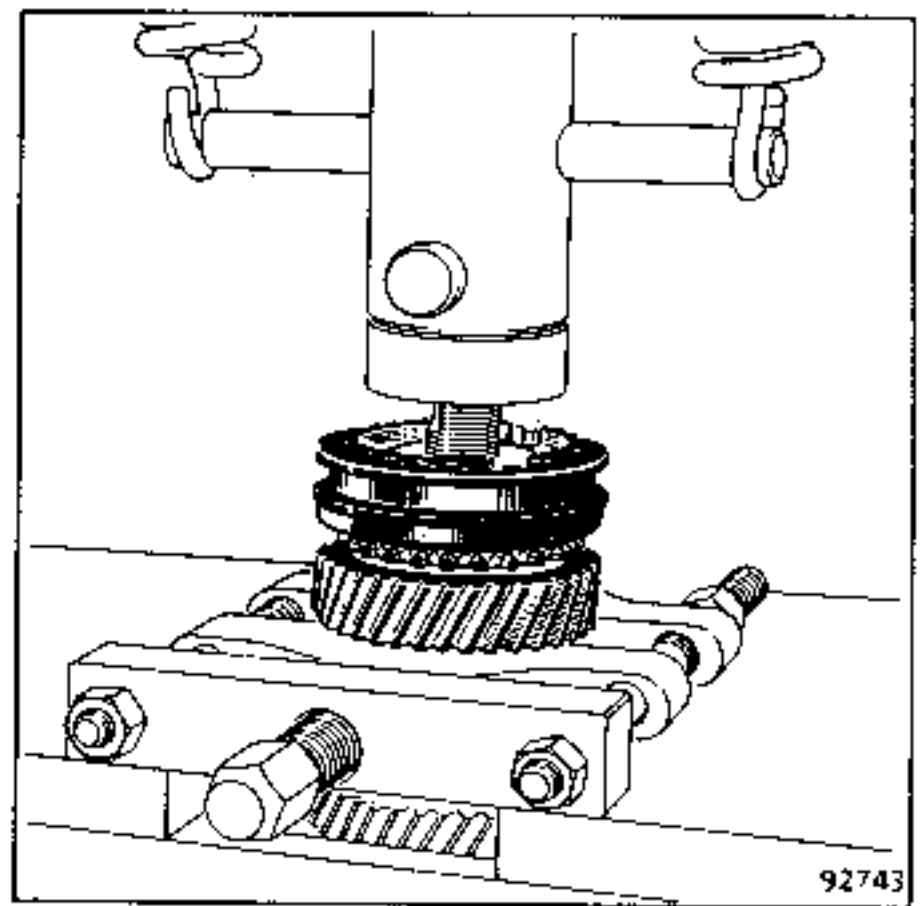
Remove the sliding gear.

Retrieve the rollers and the 3 springs.

Remove the circlip 54.

Remove the 3rd speed synchroniser hub and gear.

- Grip the primary shaft in a vice fitted with soft jaws (across the 2nd speed gear).
- Unlock and remove the nut (30 mm socket).
- Take the load under the 5th speed idle gear to remove the assembly formed by the 5th speed gear, the hub - sliding gear and the dog.



Remove the double taper roller bearing.

Checking the parts.

The bearings must be replaced by new ones if they show any signs of scoring, overheating or excessive wear.

The teeth on the gears and the dogs must show no signs of chipping or excessive wear. Furthermore, check that the surfaces of the shaft and internal faces of the gears show no signs of seizure or excessive wear.

Hubs - sliding gears

Check that the hubs and sliding gears show no signs of chipping and that they slide freely, without excessive play or jamming.

As the lip seal runs directly on the primary shaft, check the condition of the sealing area. If it is scored or is suffering from other forms of finish defects, replace the primary shaft.

PRIMARY SHAFT

Re-assembly

Fit :

- the double taper roller bearing.

Check that the pre-load spacer is in position between the 2 cones.

- The flat washer.
- The spacer.
- The half needle races.
- The 5th speed idle gear and the sliding gear and its spring.

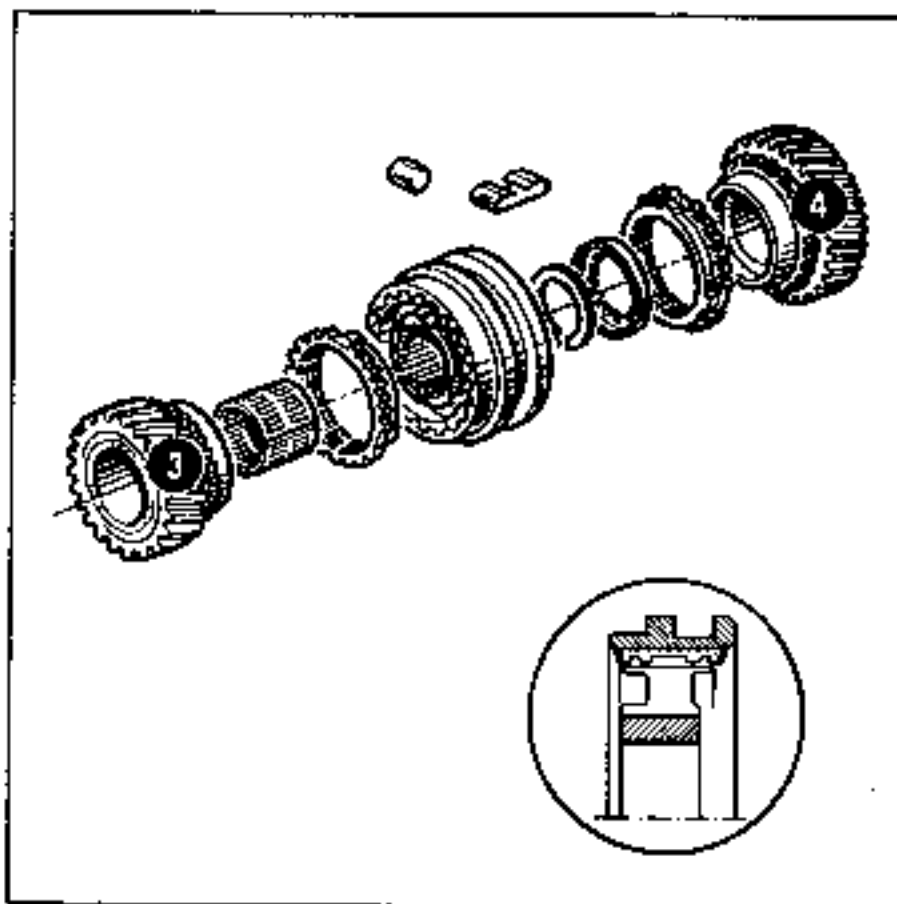
Fit the bosses on the synchroniser ring into the slots in the hub.

Apply 3 drops of Loctit SCELBLOC to the splines.

Fit the 5th speed dog.

Ensure that the following are the correct way round :

- the 3rd/4th speed hub,

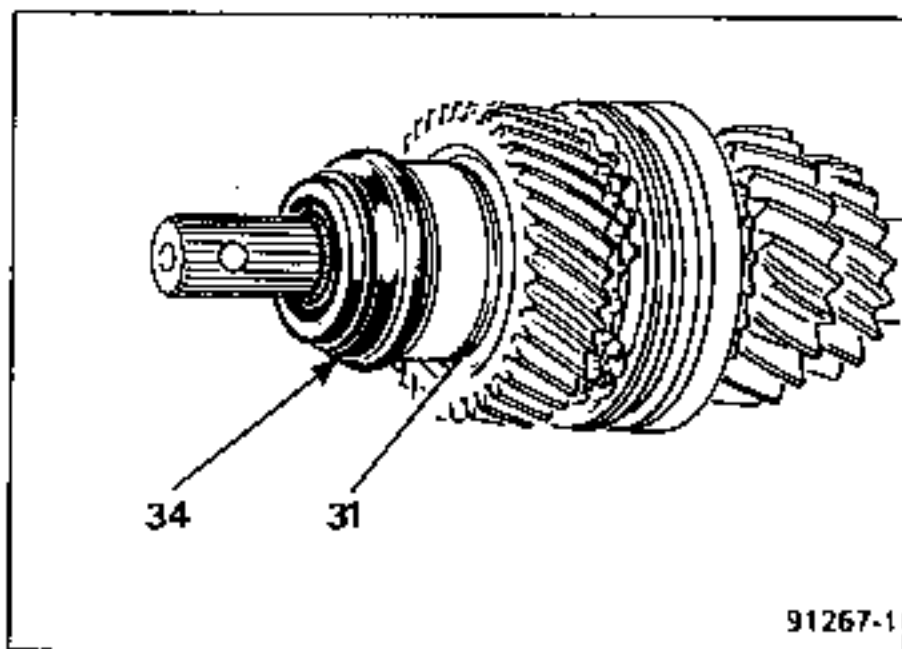


- the sliding gear,
- the springs on the synchroniser roller.

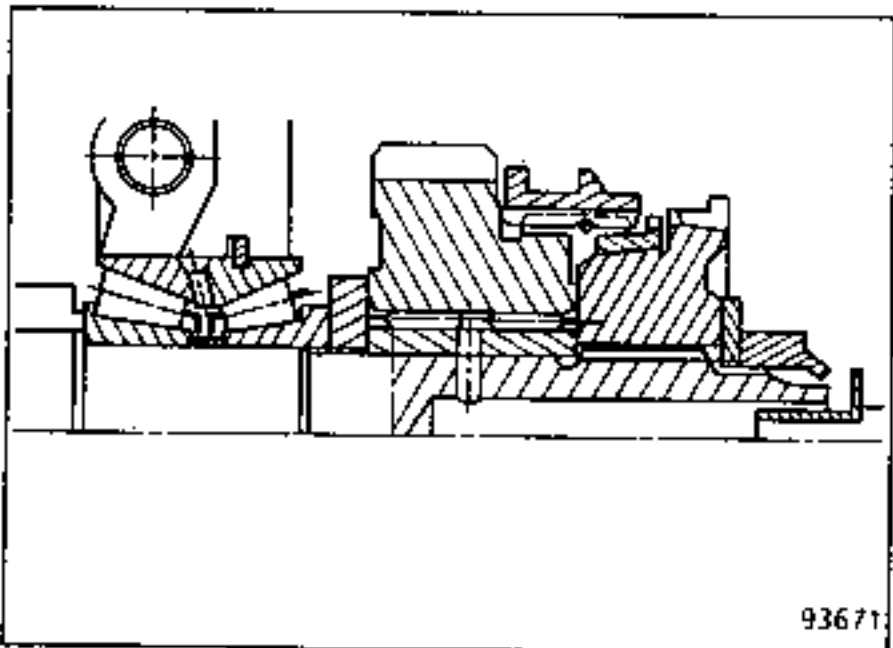
The flat part is to be towards the synchroniser hub.

Take care to align the slots in the hub with the synchroniser ring bosses :

- the thrust washer (31) with its chamfer towards the bearing,
- the lip seal (34).



91267-1



93671

Fit the spring washer.

Apply 3 drops of Loctite FRENBLOC (120° to one another) in the tapping of the new nut, tighten it to torque and lock it.

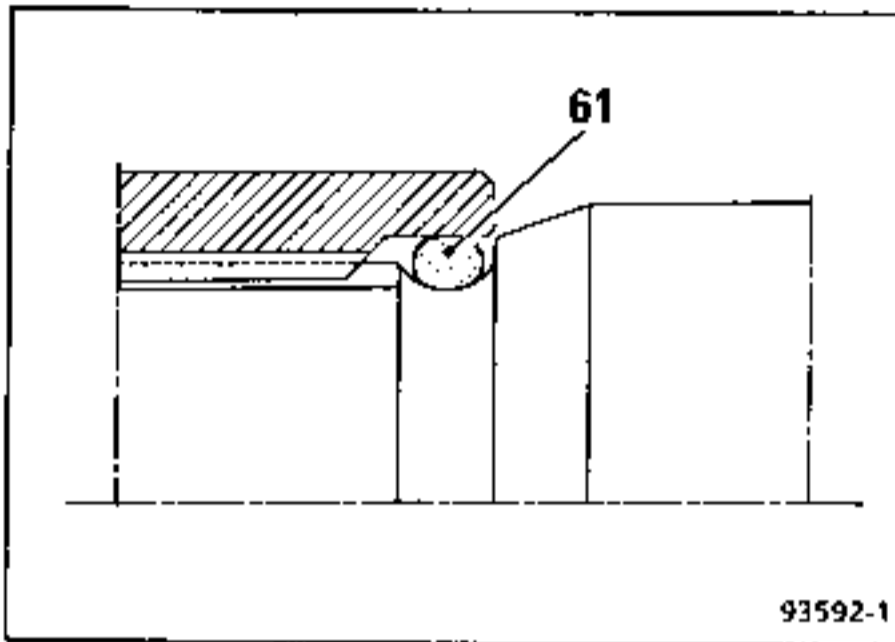
NOTE : When tightening the nut, turn the double taper roller bearing to ensure that it positions itself correctly.

PRIMARY SHAFT

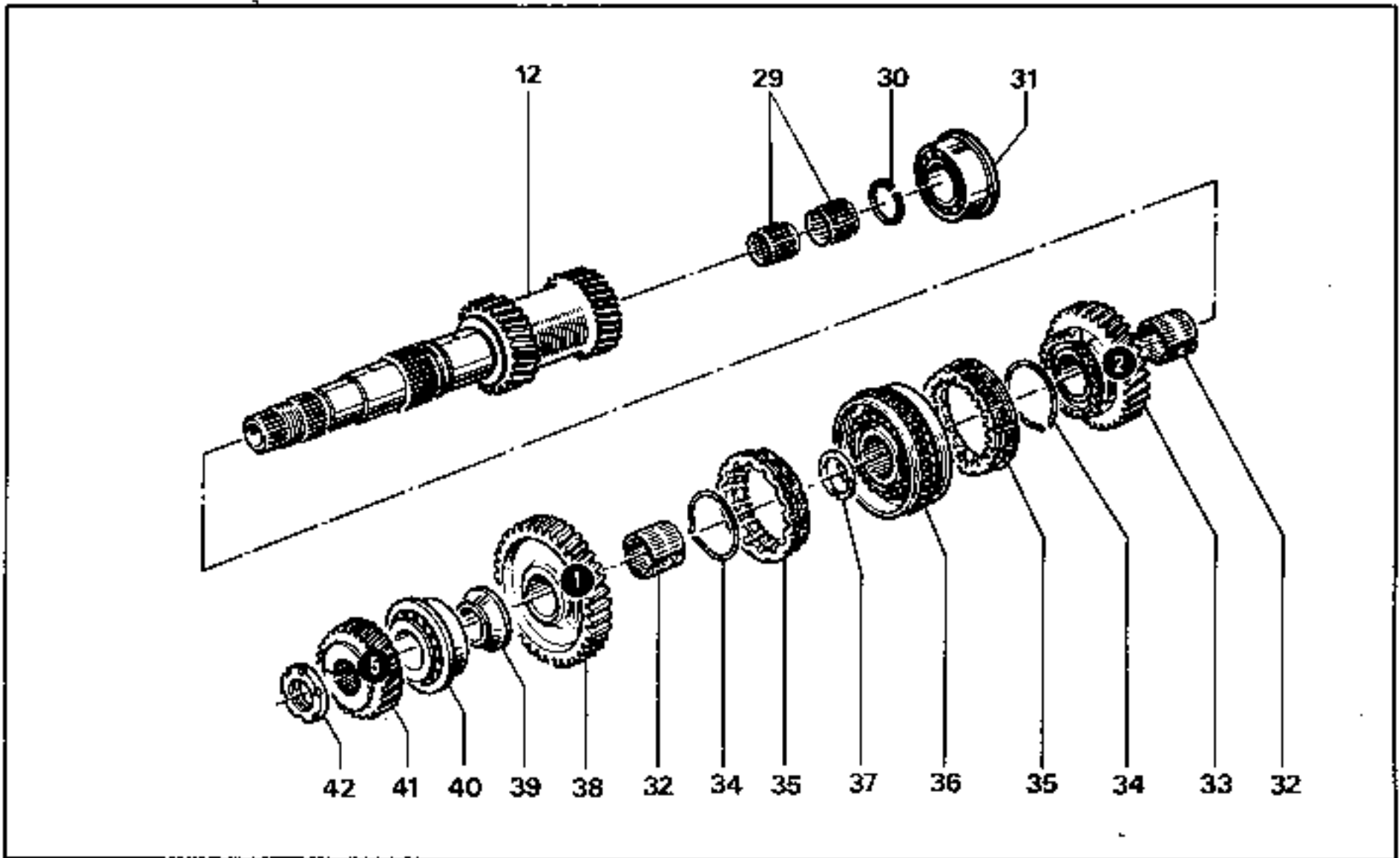
Re-assembly

Fit the circlip.

Fit the O ring (61) and assemble the clutch shaft.

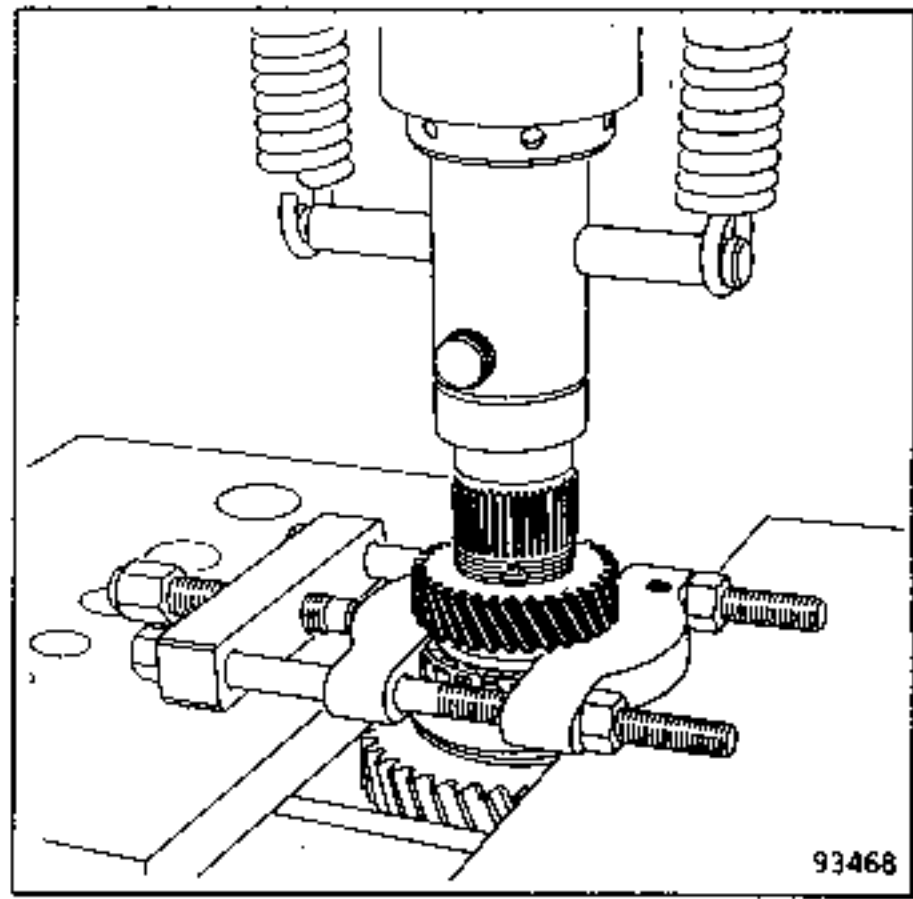


SECONDARY SHAFT



TIGHTENING TORQUES (in daN.m)	
Slotted nut	20

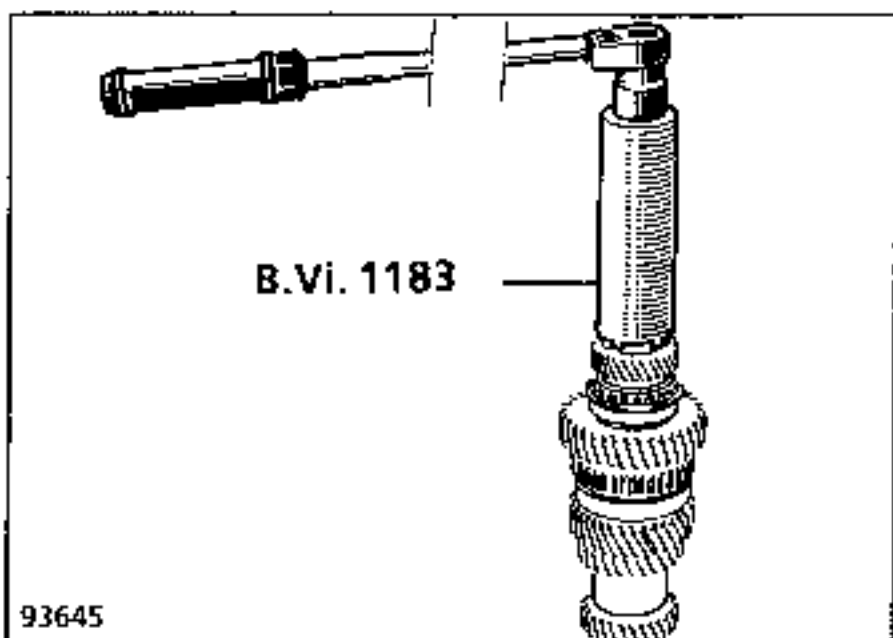
Extract the 5th speed fixed gear on the press



93468

Dismantling

- Grip the shaft in a vice.
- Use a hot air torch to heat up the secondary shaft in line with the slotted nut to break the original bonding.
- Loosen and remove the slotted nut by means of tool B.Vi.1183.



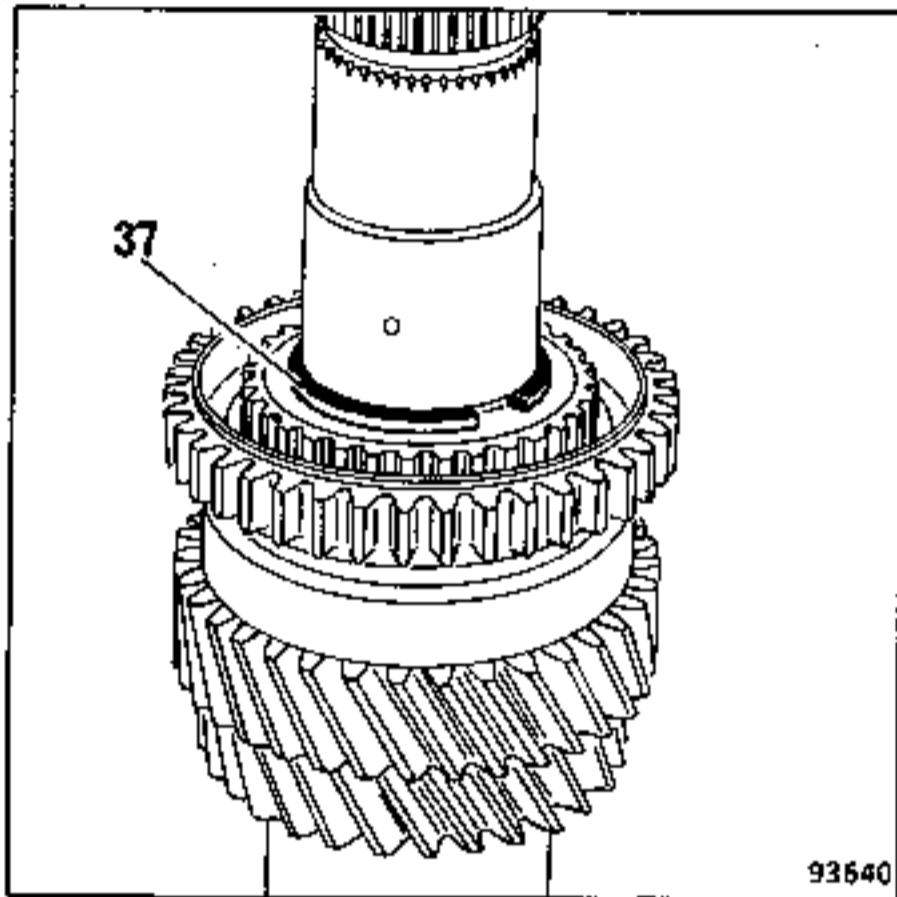
B.Vi. 1183

93645

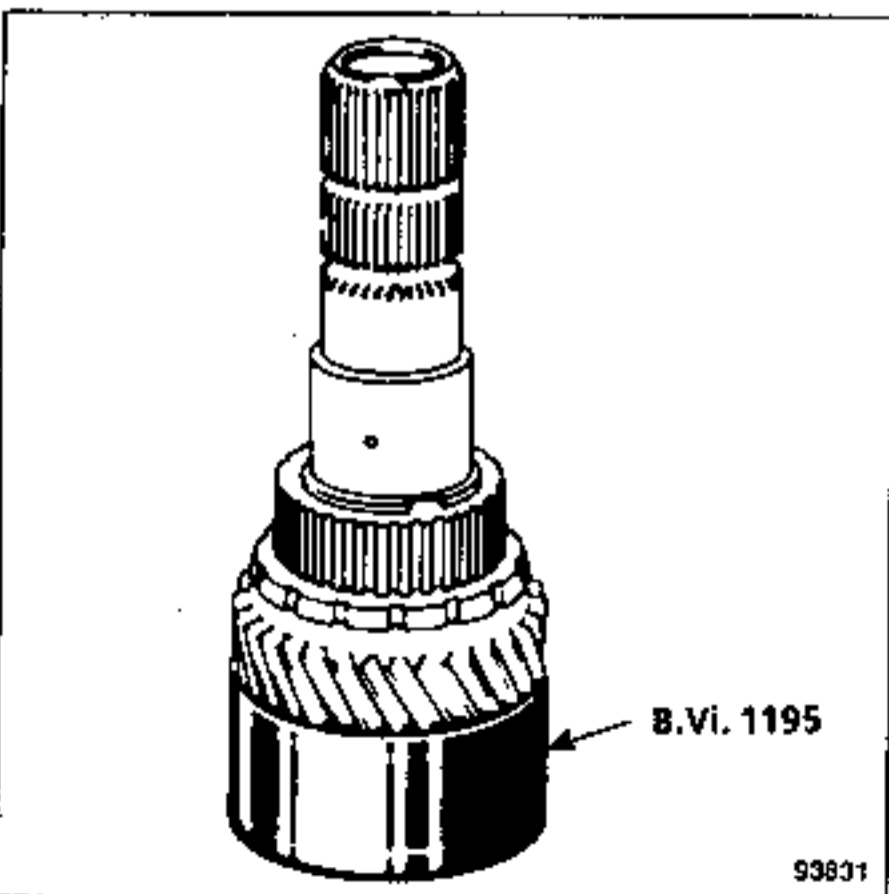
Dismantling

Remove the bearing and the thrust washer.

Remove : the 1st speed idle wheel together with its synchroniser one and circlip (37).



Using tools B.Vi.1059 and 1195, extract the 1st/2nd speed synchroniser hub, taking the load under the 2nd speed gear.



NOTE : Under all circumstances it is advisable to mark the position of the sliding gear with reference to the hub.

Checking the condition of the part

The teeth on the gears and dogs are to show no signs of chipping or excessive wear. Also ensure that the surfaces on the shaft and the internal walls of the gears show no signs of seizure or excessive wear.

Hub - sliding gear

Ensure that the hub and sliding gear are not chipped and that they slide freely, without excessive play or without jamming.

Bearings

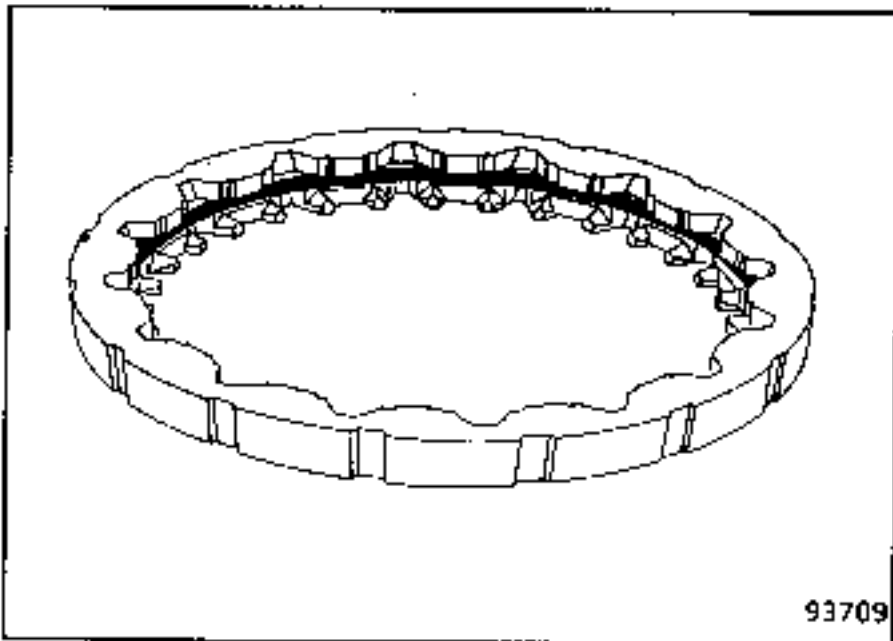
The bearings are to be replaced if they are scored or show signs of overheating or excessive wear.

SECONDARY SHAFT

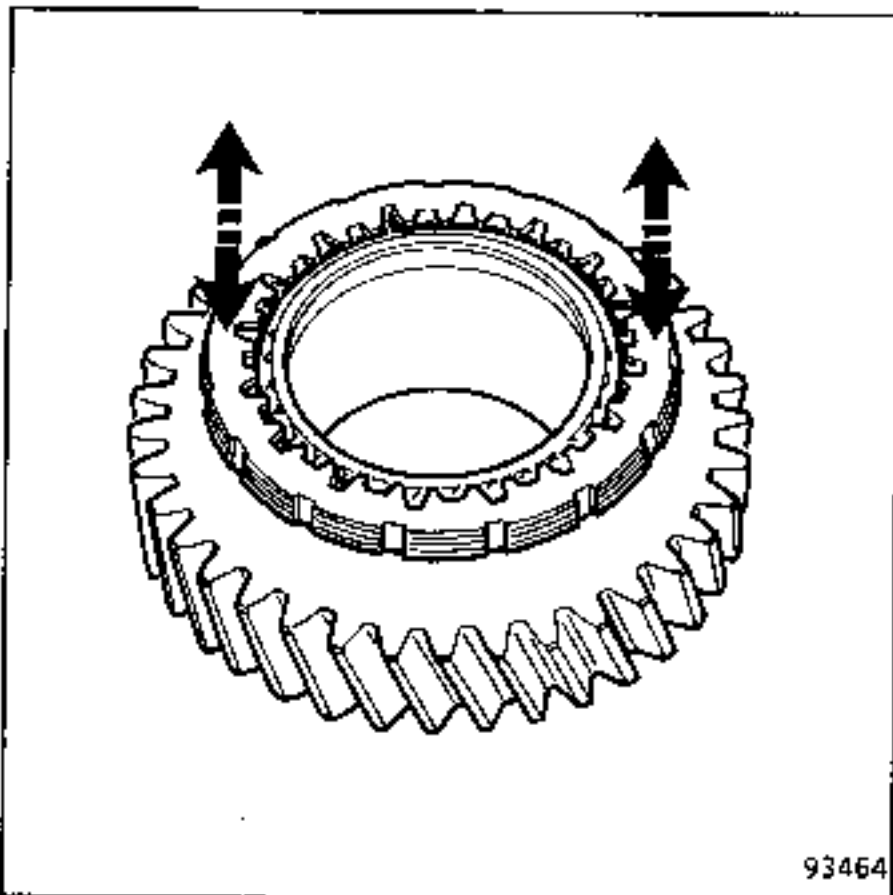
Re-assembly

Oil all the parts before re-assembly :
1st and 2nd speed synchronisers.

Fit the spring into the groove in the
synchroniser cone.



Fit the cones to the idle gears, ensuring
that the spring is correctly positioned.



Note:
When replacing the 1st or 2nd speed idle
gear, the cone must be bedded-in to
ensure that it returns correctly.
To do this, push the cone - spring
assembly up and down the ramps on the
idle gear.

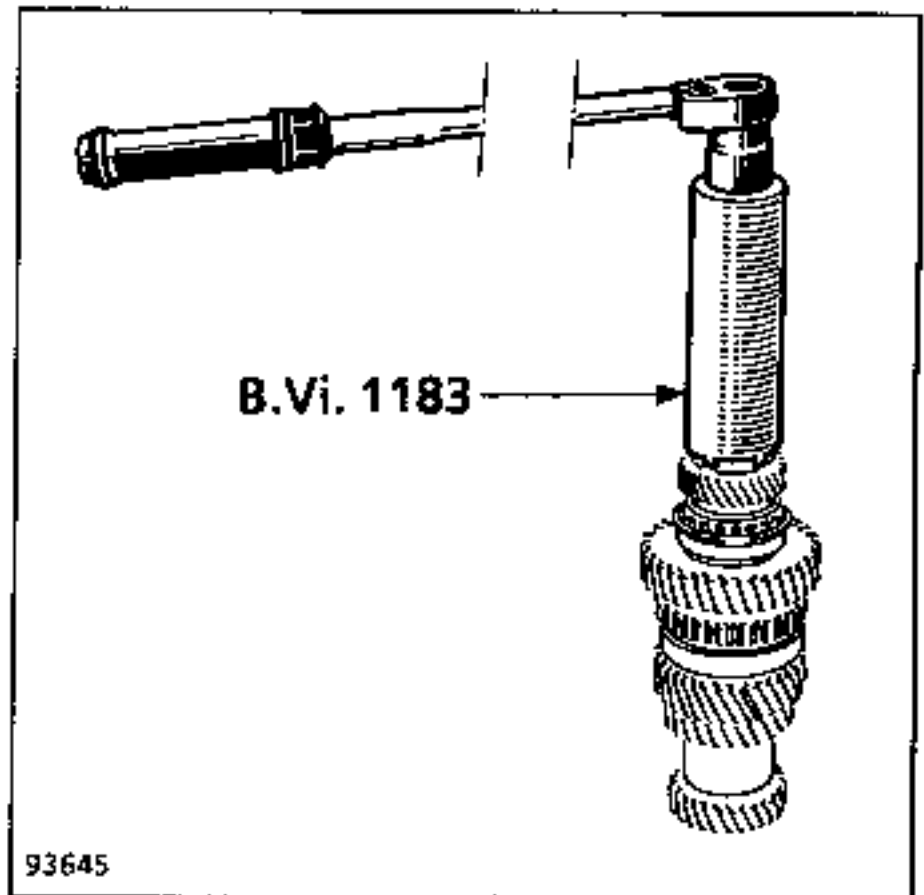
Fit the 1st/2nd synchroniser hub on the
press using a tube with an inside dia-
meter of 57 mm.

The shoulder is to be towards the 2nd
speed gear.

- Fit the circlip (37).
- Ensure that the 1st - 2nd sliding gear,
spacer and bearing are fitted the
correct way round.
- Check that the idle gears turn freely
and that the gears engage correctly.
- Fit the 5th speed fixed gear on the
press.



- As during dismantling, grip the
shaft in a vice fitted with soft
jaws.



Apply 3 drops of Loctite Scelbloc (at
120° to one another) to the tapping of
the nut and tighten it to torque (tool
B.Vi.1183).

Note:

Remove any burrs from the upper face of
the nut. It has a ground finish.

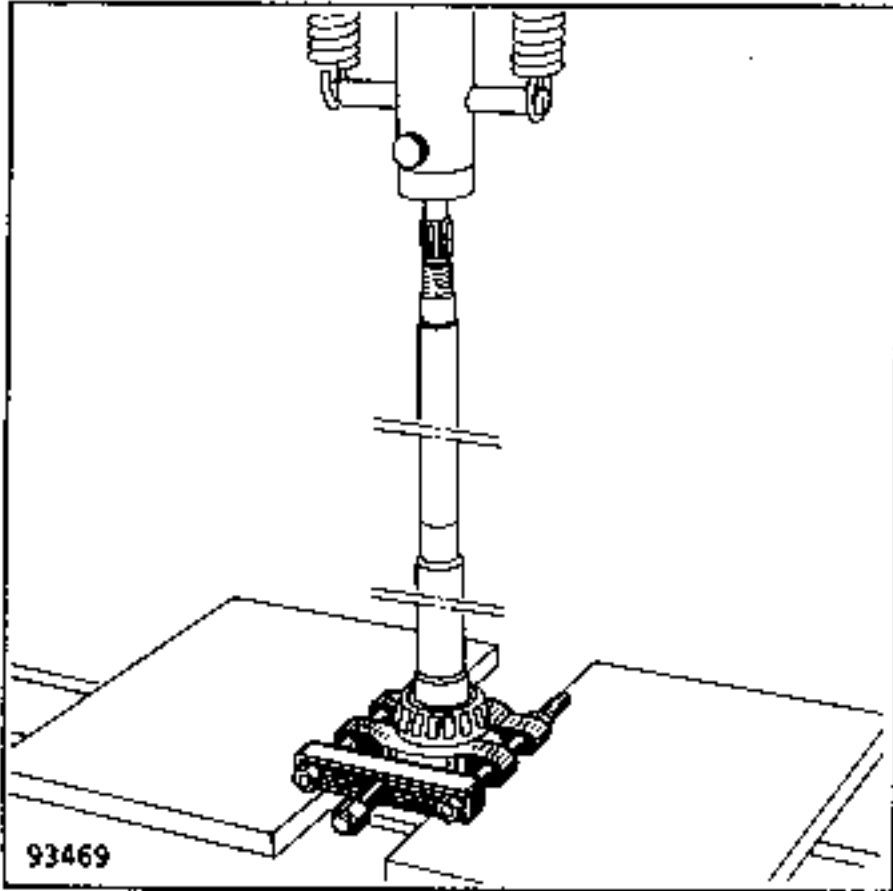
Then adjust the secondary shaft bearing
pre-load.

FINAL DRIVE PINION

Removing the bearing

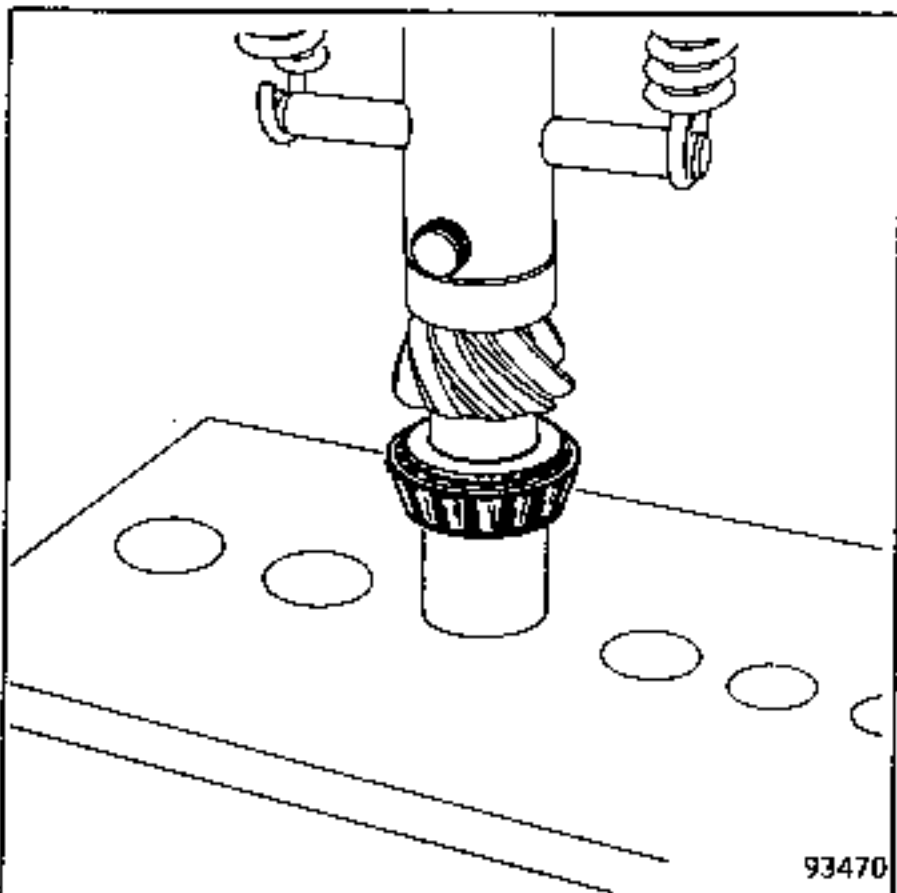
Unstick the bearing from its locating face on the pinion teeth, taking care not to damage the teeth.

Extract the bearing on the press using tool FACOM U53G or a similar type.



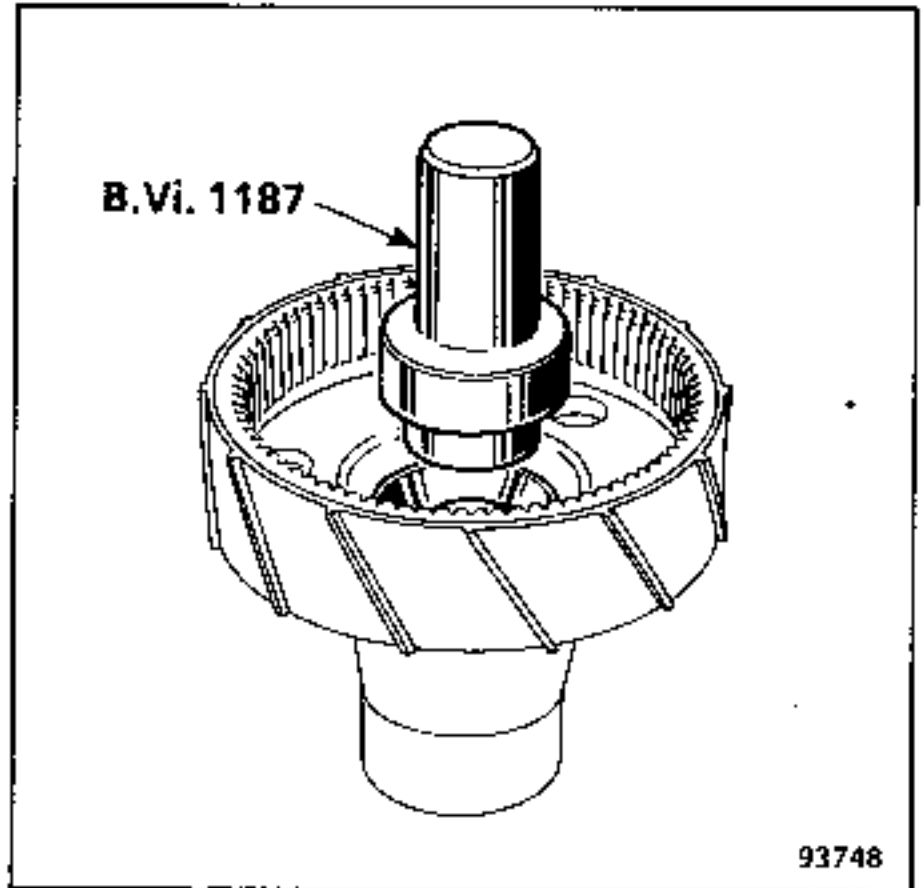
Refitting

This is done on the press taking the load on a tube with an inside diameter of 40 mm.



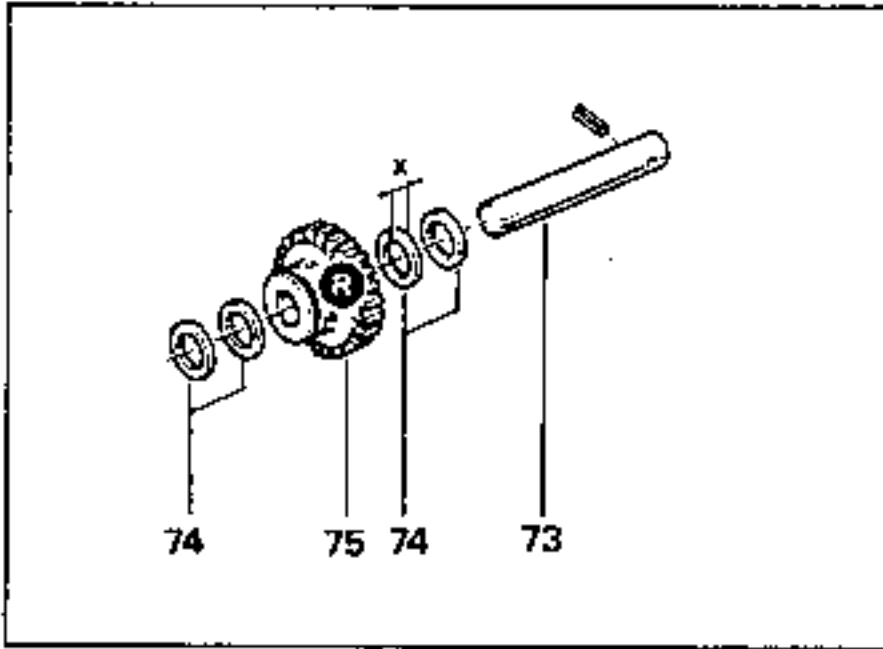
INPUT CASING

Push out the old bearing track ring and push in the new one using tool B.Vi.1187 and a press.



REMARK : If the bearings are replaced by new ones the pre-load of the new bearings must be adjusted.

REVERSE IDLE GEAR AND SHAFT



Dismantling

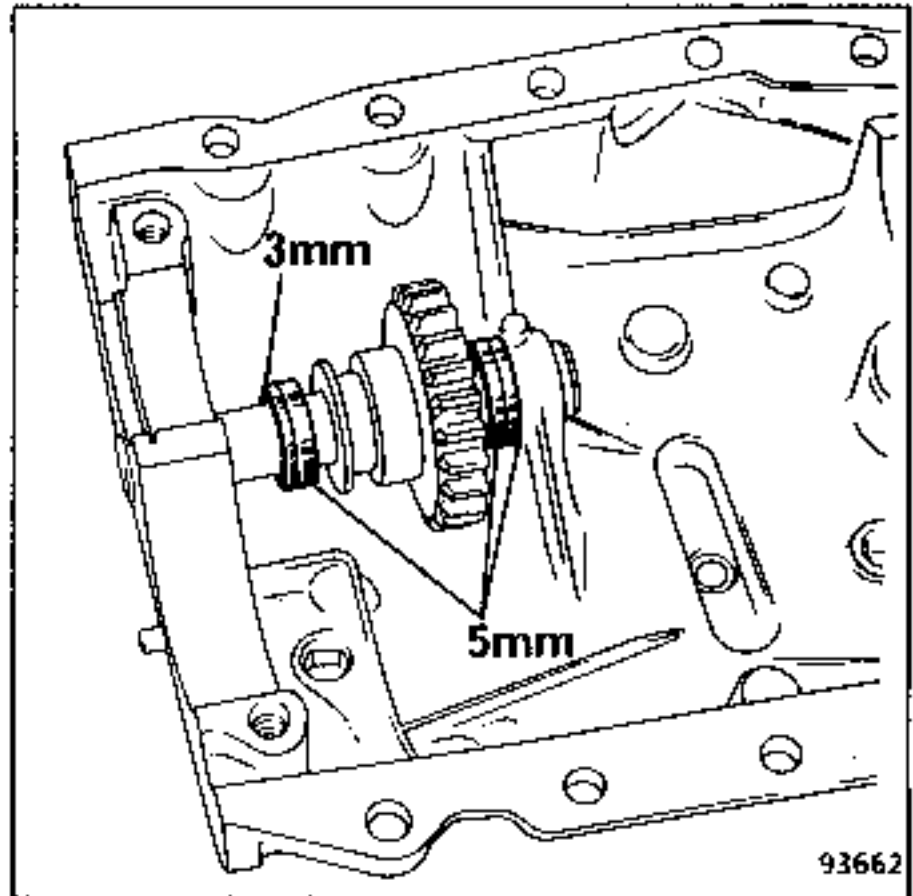
Pull the shaft rearwards and retrieve the gear and its friction washers.

The bushes inside the idle gear cannot be removed.

The pin is removed using tool B.Vi.606.

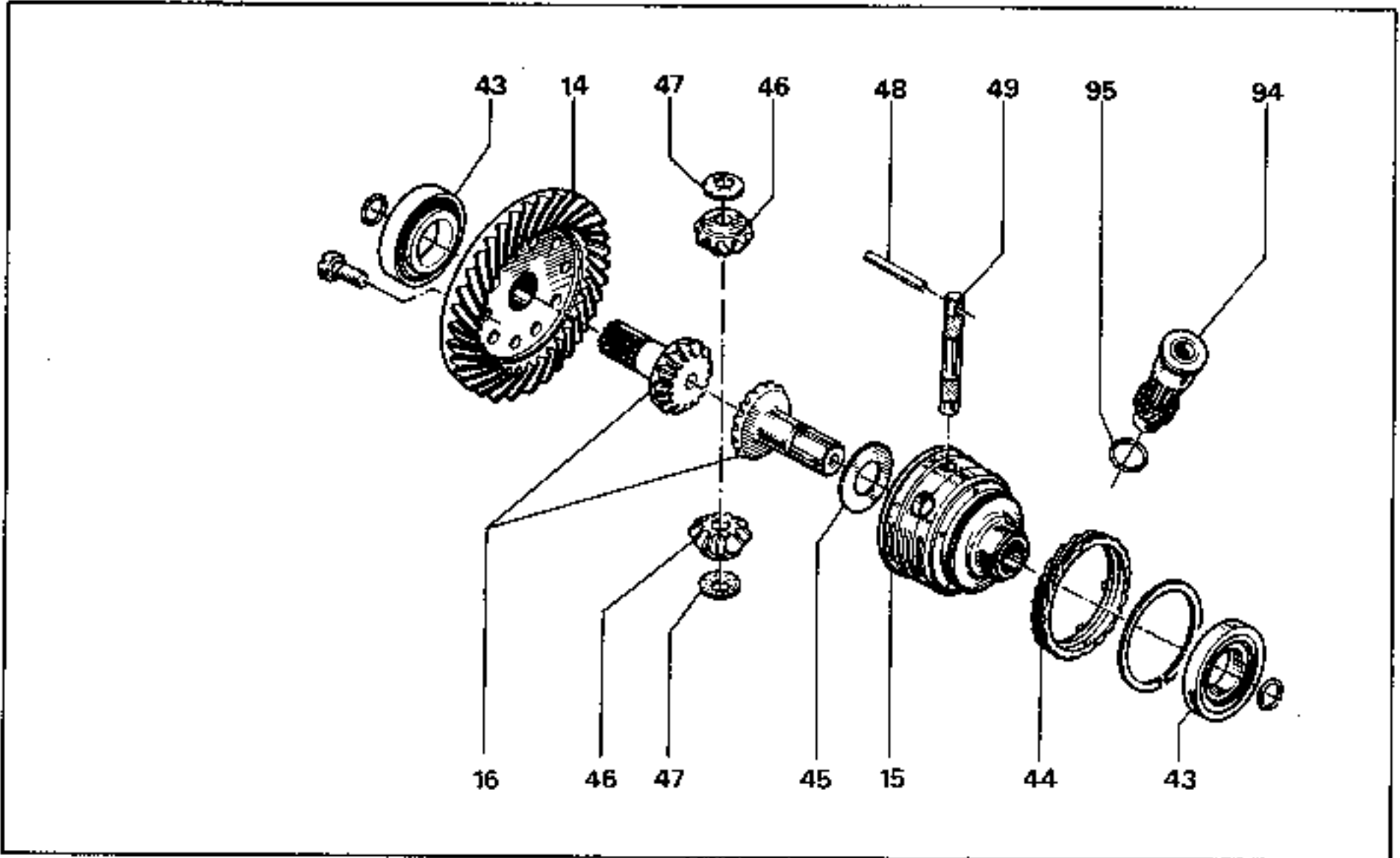
Re-assembly

Ensure that the gear is the correct way round and the friction washers are the correct thickness.



REMARK : After assembling the half housings, it is absolutely essential not to pull out, even partially, the reverse idle gear shaft as one of the friction washers could fall down inside the gearbox.

DIFFERENTIAL - EXPLODED VIEWS



TIGHTENING TORQUES (in daN.m)	
Crown wheel bolts	12.5

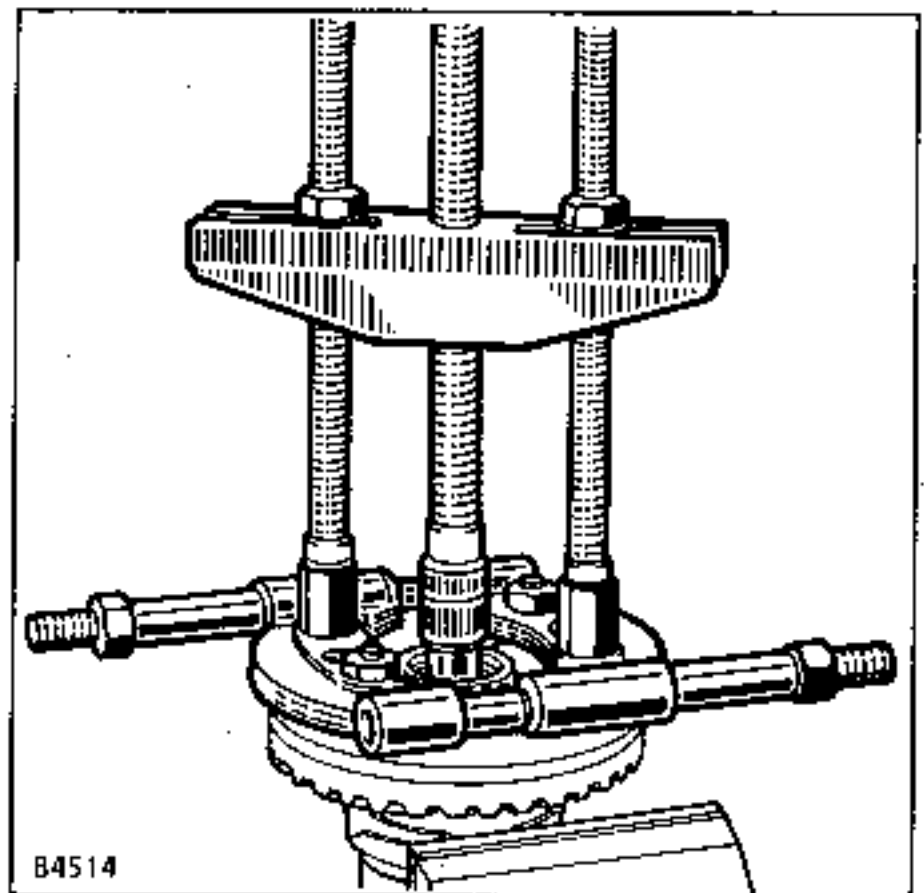
Extract the bearings using tool FACOM U53G + U53 E or a tool of a similar type.

Dismantling

- Remove the crown wheel securing bolts (these bolts cannot be re-used).

Leave two, diametrically opposite one another, in place.

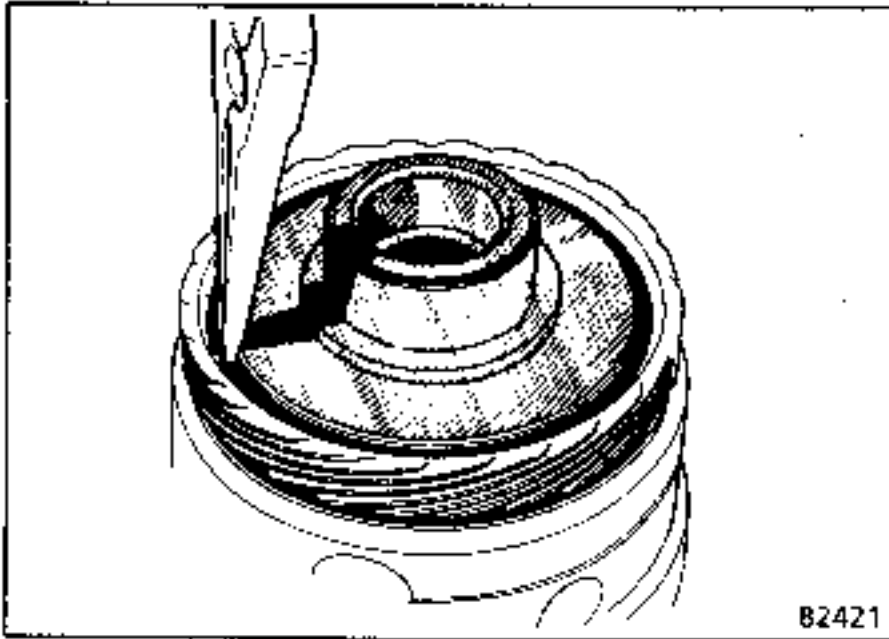
Remove the O rings from the sun wheels.



B4514

Dismantling

Remove the circlip that secures the speedometer drive worm to the housing.



82421

Take out the speedometer drive worm.

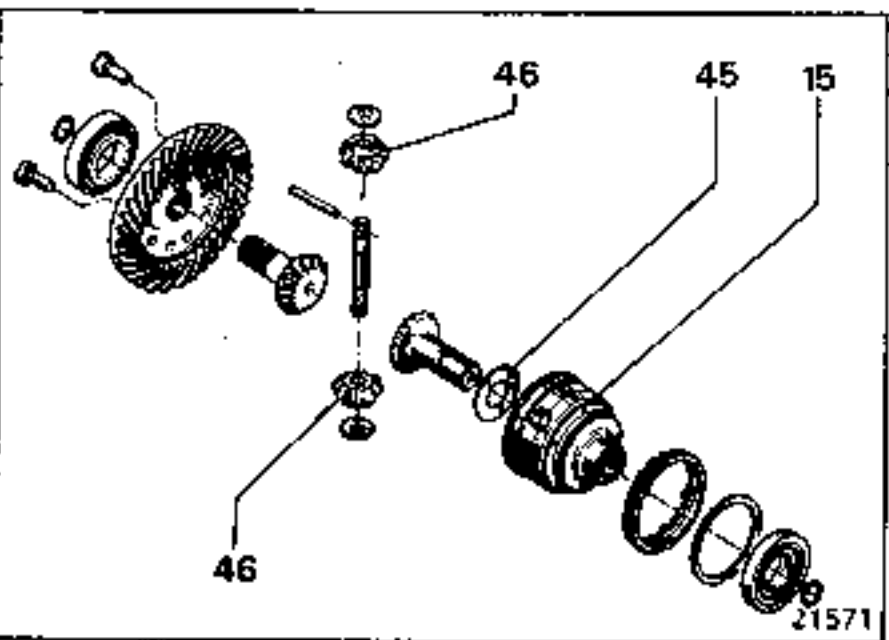
Take out the planet wheel retaining pin with a magnet.

Separate the various parts.

Check the parts.

Check the condition of :

- the gear teeth,
- the bearing areas,
- the washers (planet wheel),
- the splines,
- the housing.



21571

Re-assembly

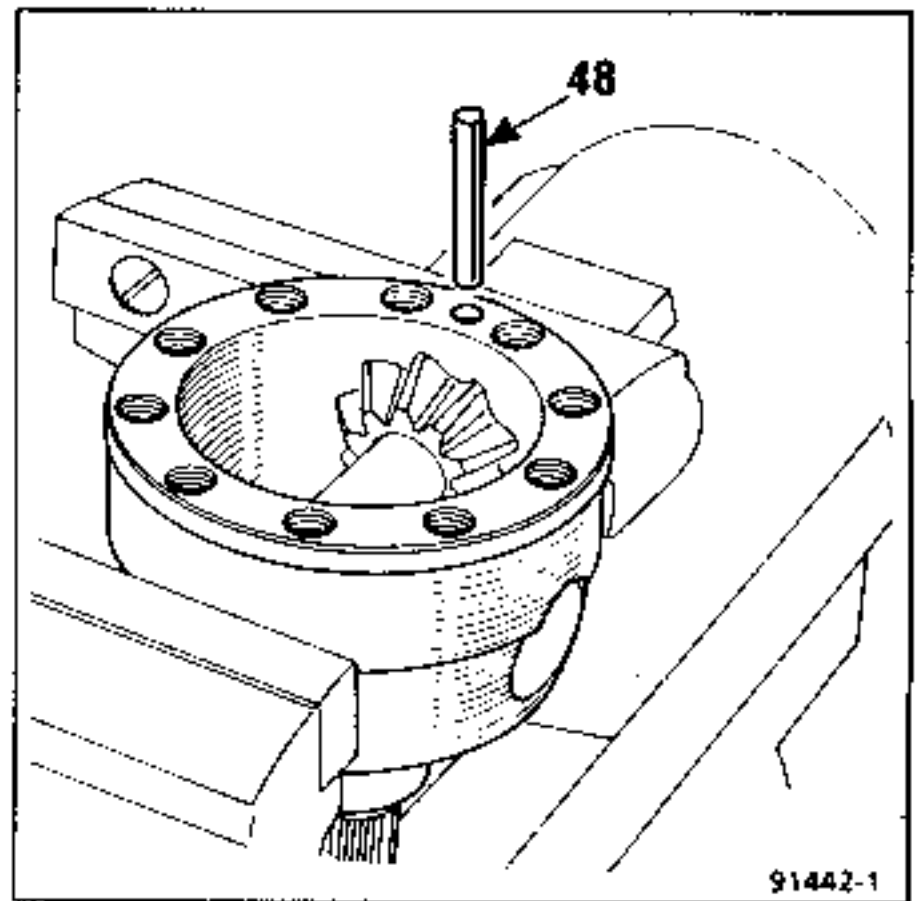
Oil all the cleaned and checked parts as they are fitted.

Place the following in the housing :

- the steel washer (45),
- a sun wheel,
- the planet wheels and their bearings.

Fit the shaft, aligning the securing hole with that in the housing.

Lock the planet wheel shaft with the retaining pin (48).

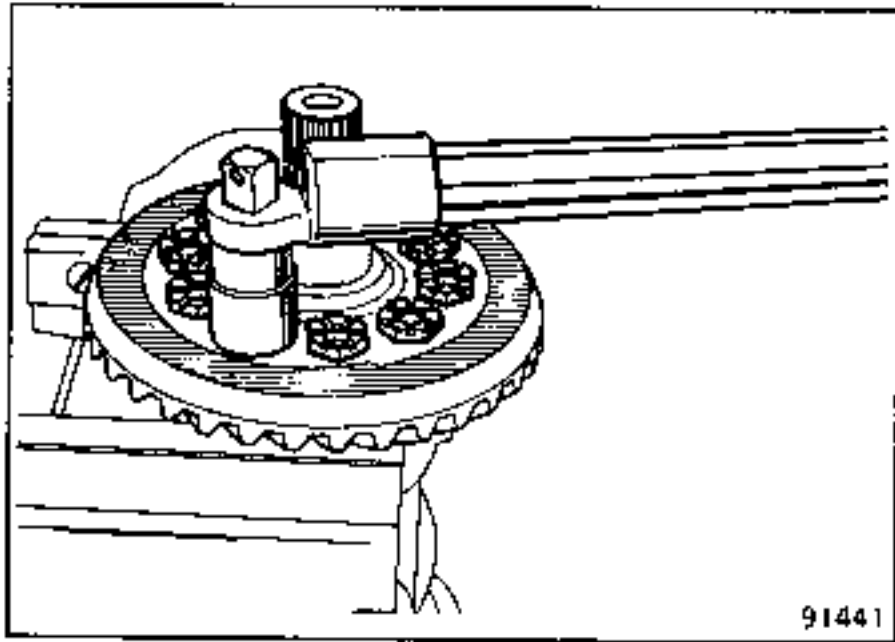


91442-1

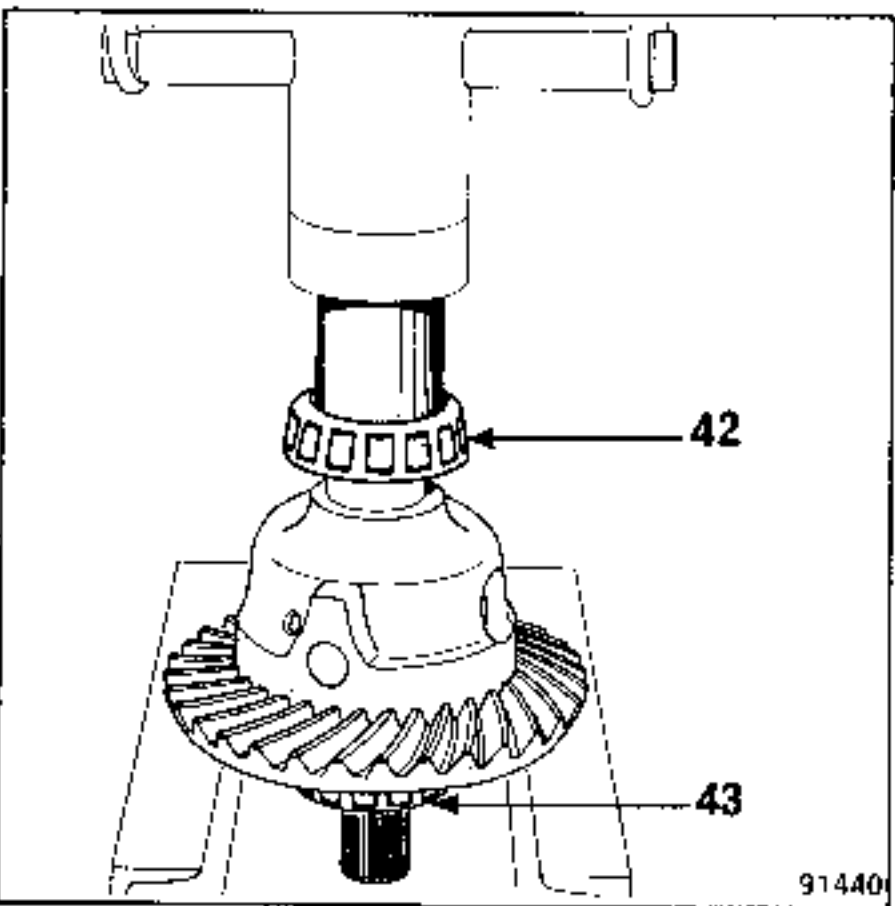
DIFFERENTIAL

Secure the crown wheel to the housing
(use new bolts).

Tighten the bolts to the specified torque

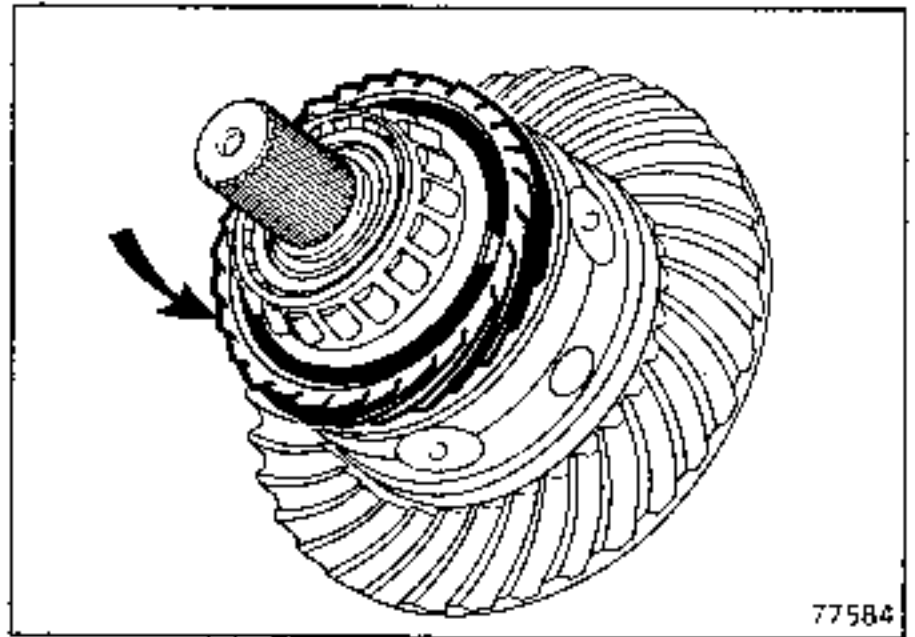


After assembly, the differential may be slightly stiff to rotate.
Refit the two bearings (42) and (43) on the press

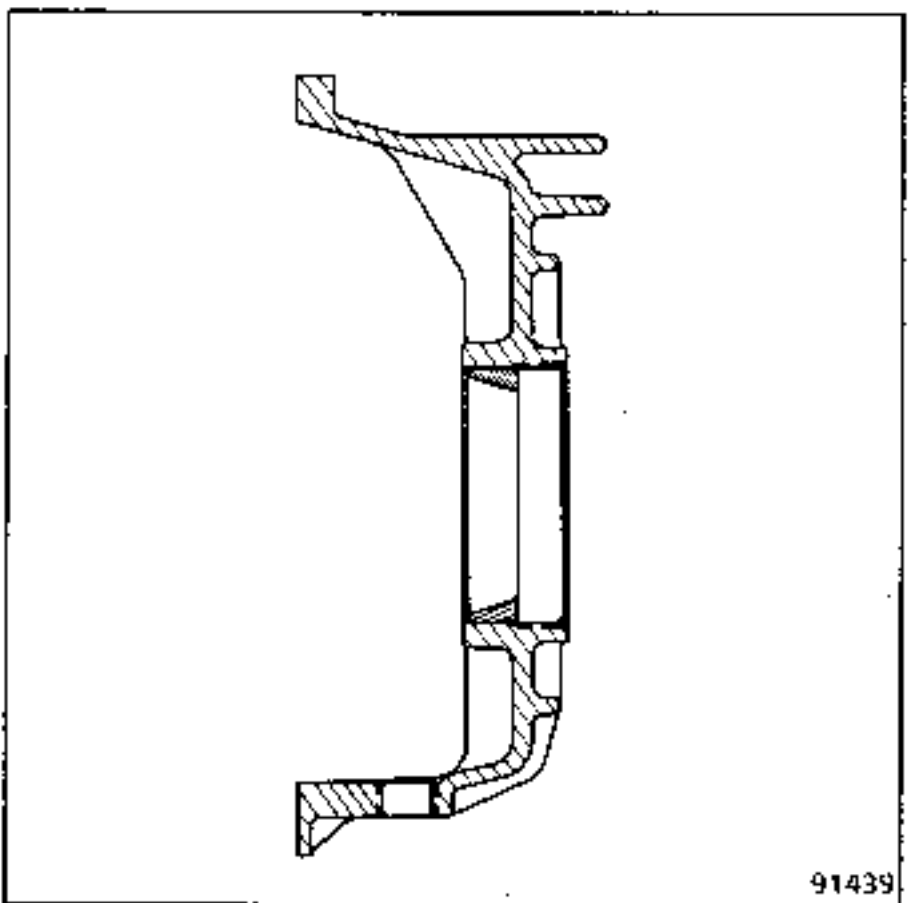


Fit the O rings to the sun wheels.

Fit the speedometer drive worm and its retaining circlip.



Fit the corresponding track ring to the half housing with the adjusting nut in it, slightly set back with reference to the inner face of the housing.



NOTE : The bearing tracks rings and cones must be kept in their matched sets.

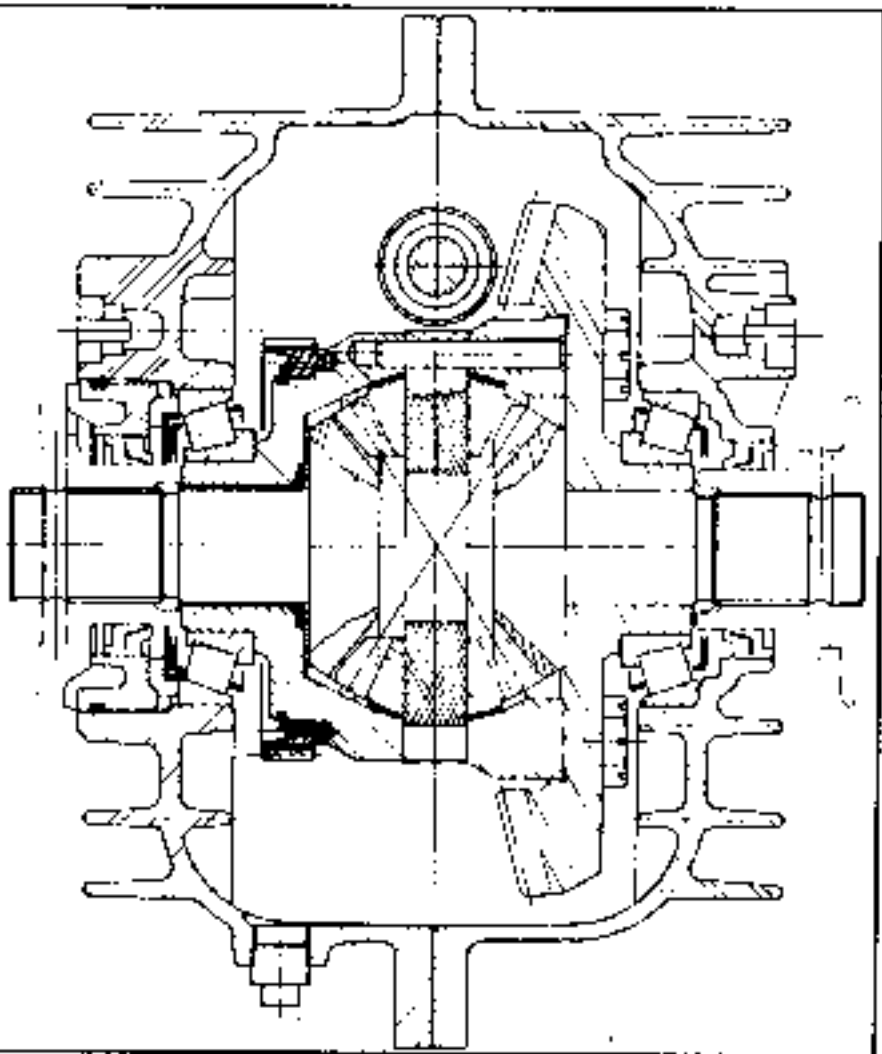
To the housing which has no adjusting nut, fit the correct track ring for the bearing and ensure that it is fully engaged in its location.

ADJUSTING THE DIFFERENTIAL BEARING PRE-LOAD

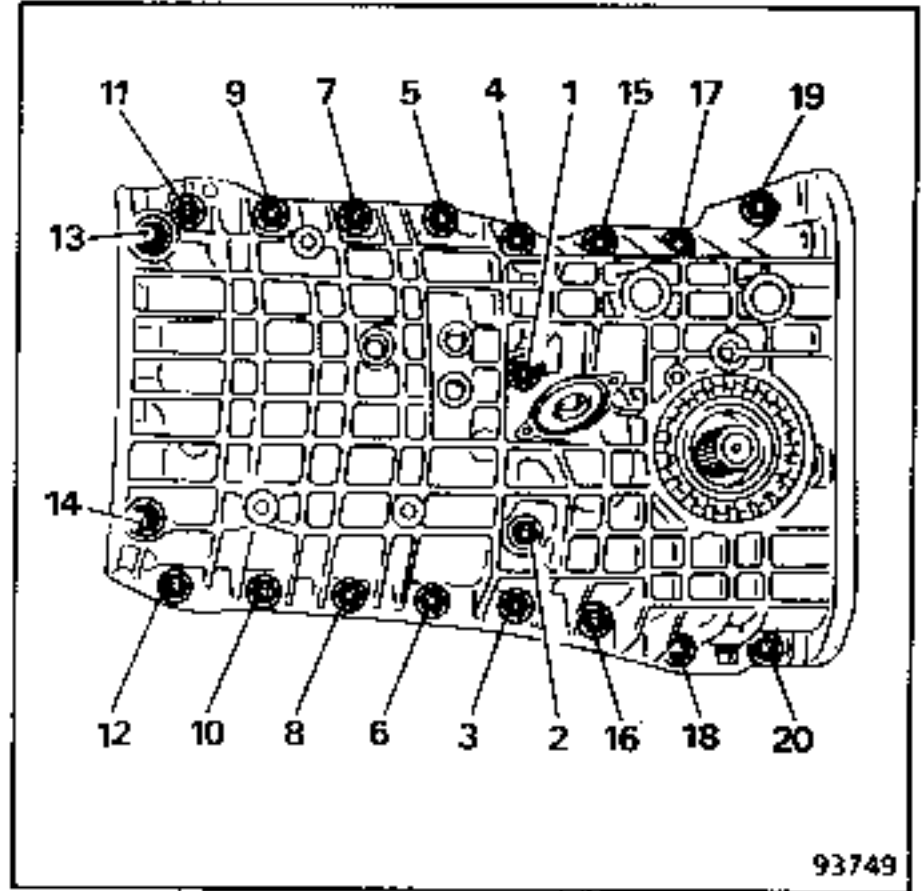
This operation is carried out before the final drive pinion is fitted.

Tightening torques (in daN.m)	
8 mm diameter housing securing bolts	2.5
10 mm diameter housing securing bolts	5

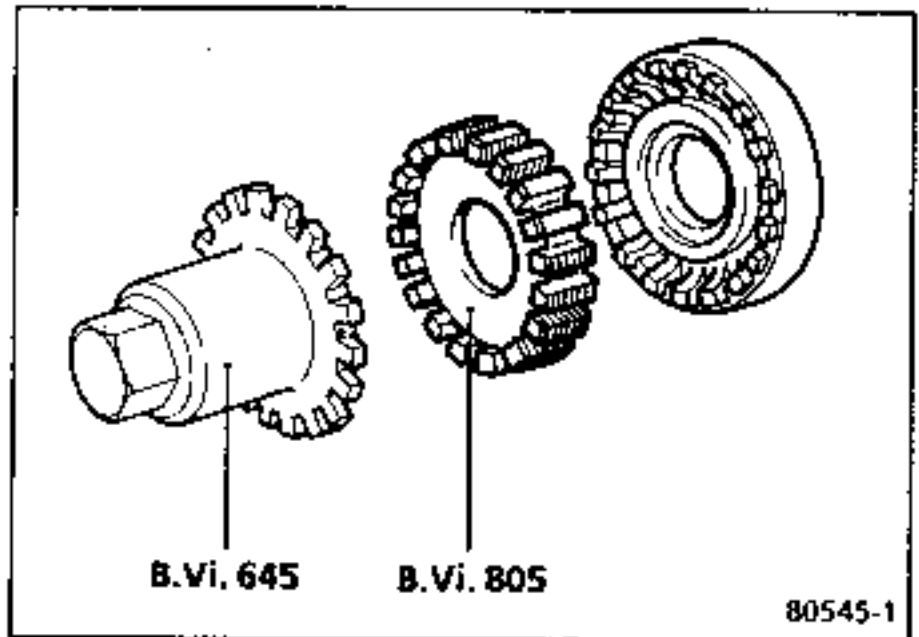
Place the differential in the housing ensuring that the crown wheel is on the correct side (view below as seen from clutch housing end).



Assemble the half housings and tighten their securing bolts to the specified torques.



The bearing pre-load is adjusted by screwing the nut in or out using tool B.Vi.645 and B.Vi.805, to avoid damaging the lip seal.



ADJUSTING THE DIFFERENTIAL BEARING PRE-LOAD

One of two cases may arise :

1. If the original bearings are fitted

The differential should rotate freely without play. If all the parts are refitted fit a new, oiled O ring and screw in the nut by the same number of turns and up to the marks made during dismantling.

2. If new bearings are fitted

Fit a new, oiled O ring to the nut and screw it in until the differential is slightly stiff to turn, then check the pre-load.

Turn the differential a few times to centralise the bearings.

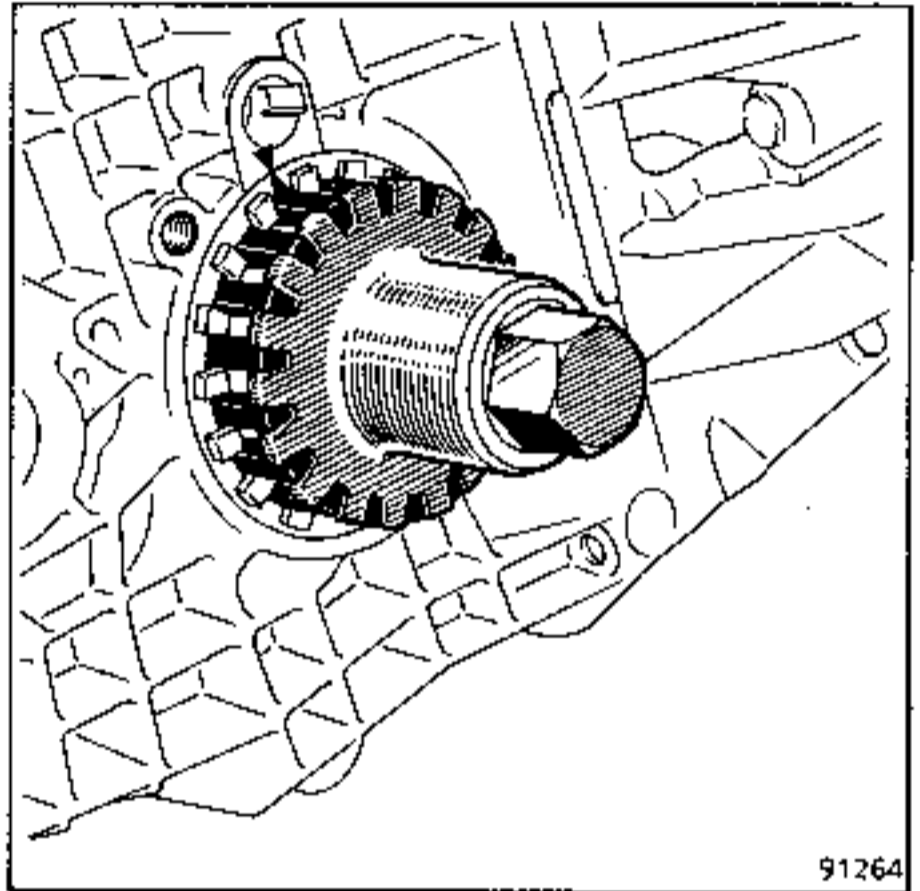
Wrap a string around the differential housing.

Pull on the string with a spring balance.

The differential should turn at a load of between 5 and 6.5 daN. This figure is the amount of "pull" on the spring balance required to rotate the differential.

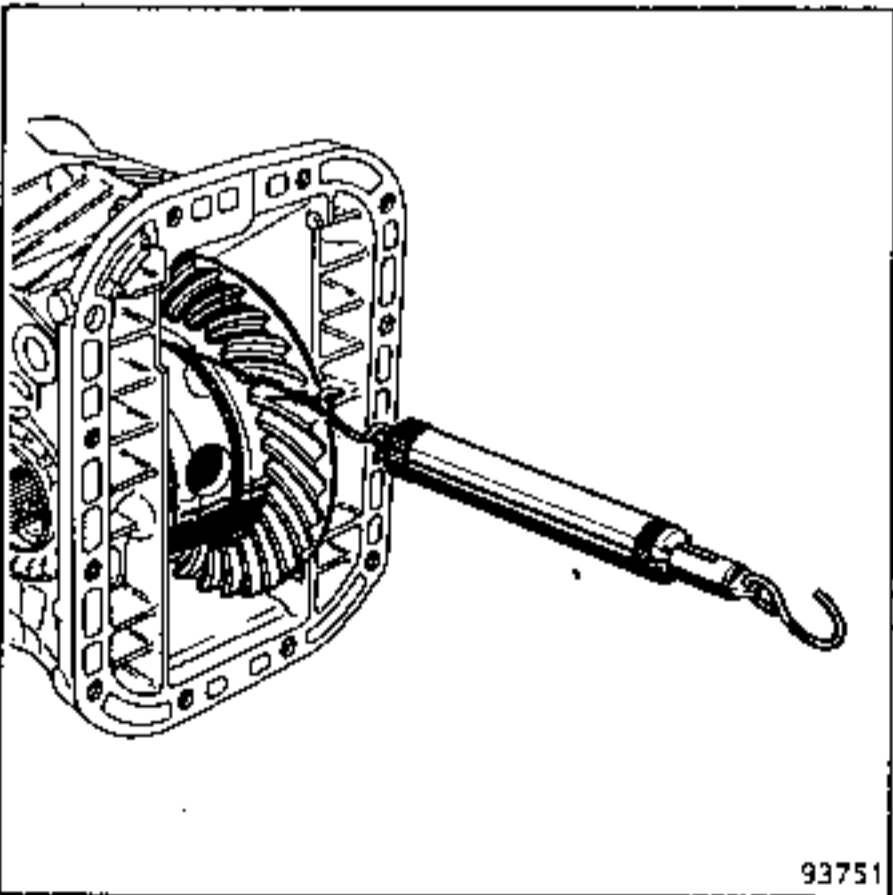
If the adjustment is not correct, screw the nut in or out and re-check the pre-load.

In both cases, after the adjustment has been obtained, make a mark across the nut and the housing.



Loosen the nut by 1/6 of a turn (3 notches) to eliminate the pre-load during the gearbox reassembly phase, before the clutch housing is fitted.

Separate the housings and adjust the pre-load on the secondary shaft bearings.

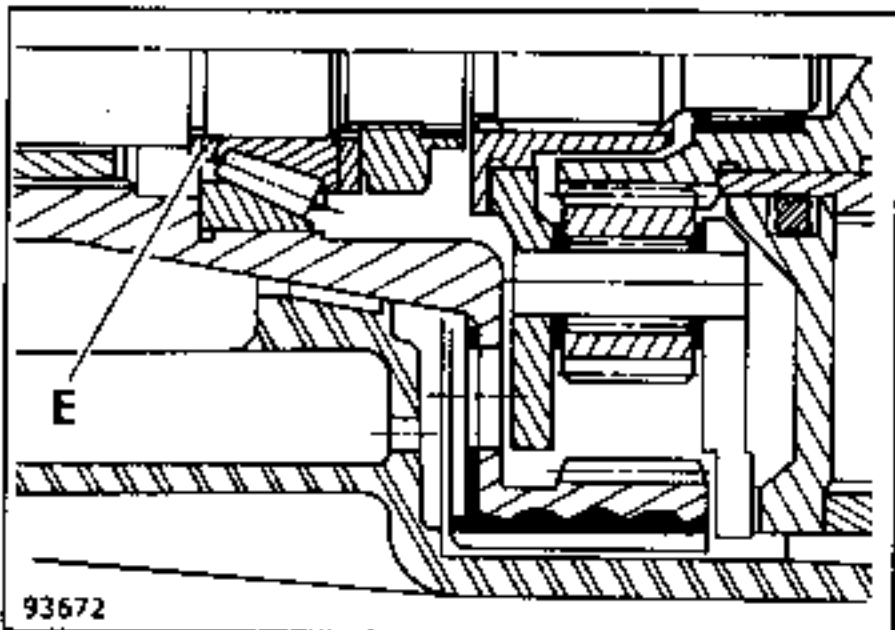


ADJUSTING THE SECONDARY SHAFT BEARING PRE-LOAD

This operation is carried out with the differential and the primary shaft removed.

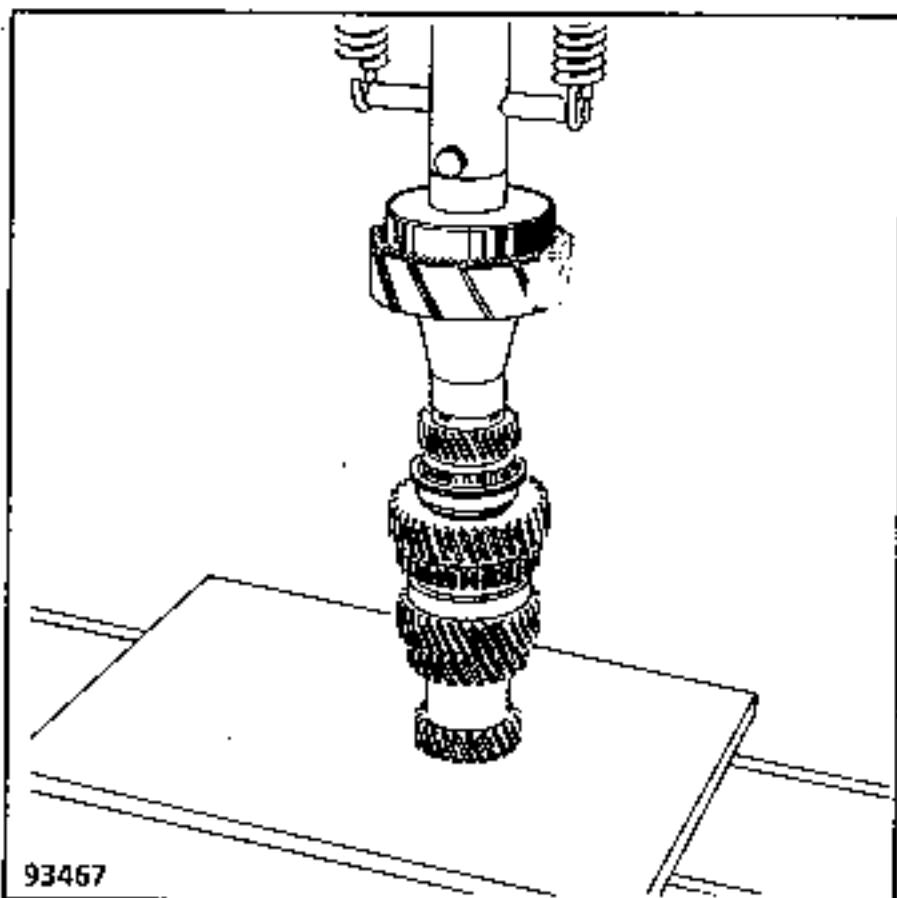
REMARK : It is ESSENTIAL to replace all three bearings on the secondary shaft assembly.

The thickness of the adjusting shim "E" determines the secondary shaft bearing pre-load.

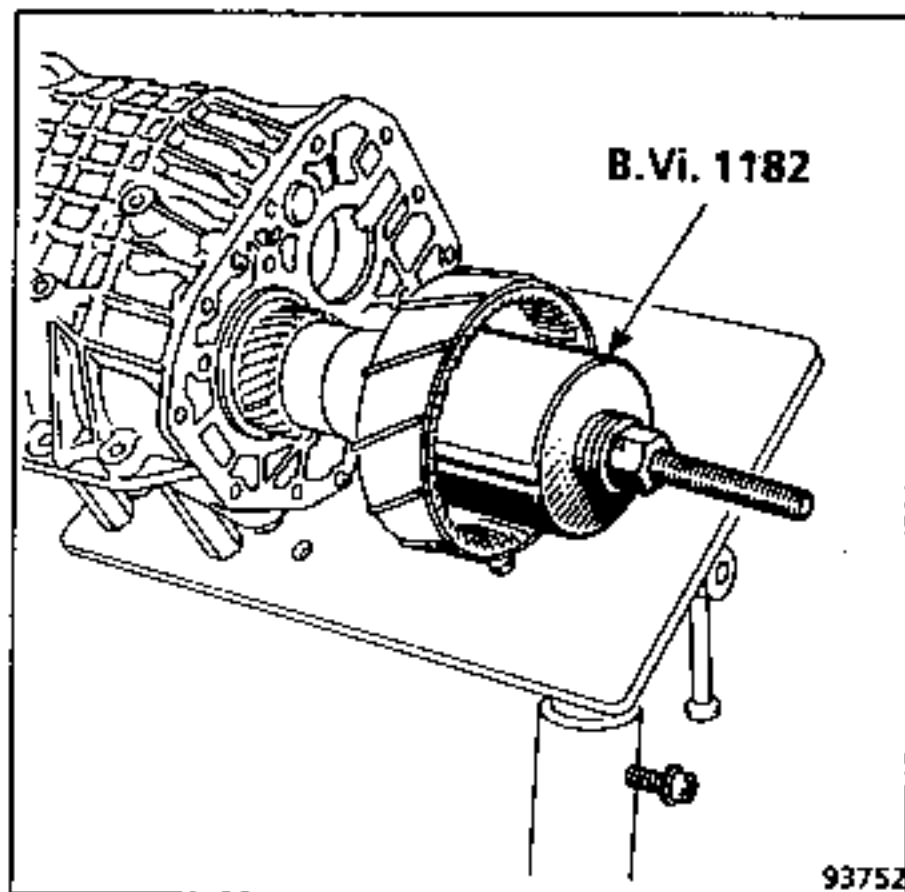


The input casing can be fitted :

a) Either on a press, before fitting the secondary assembly and assembling the housings.



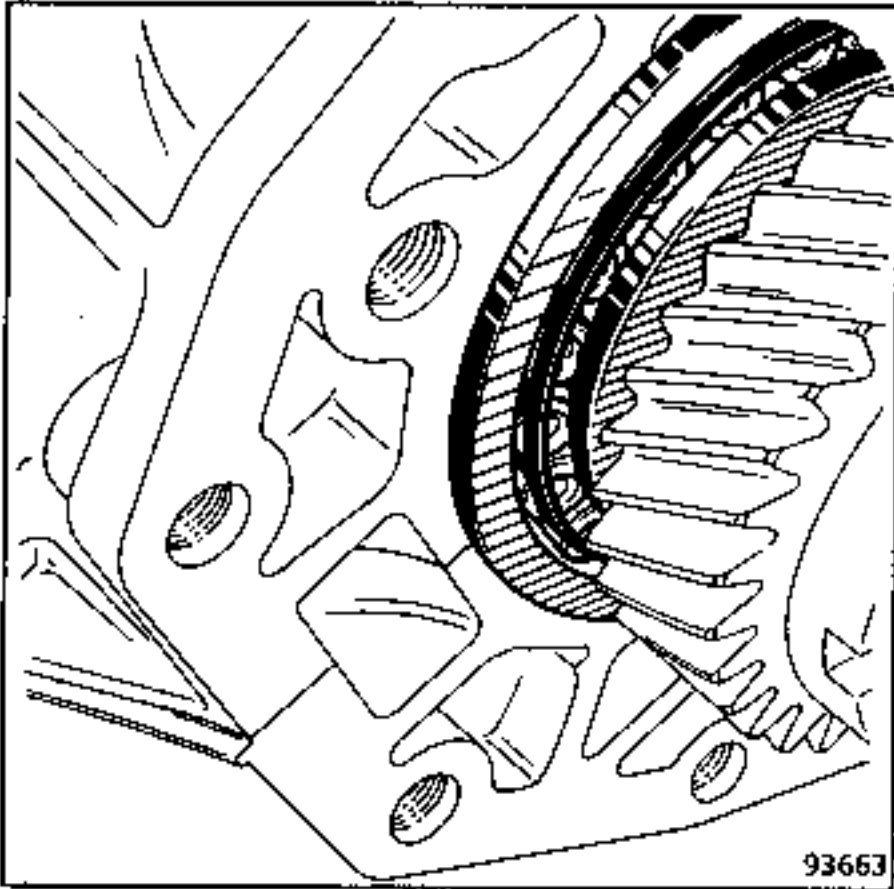
b) Or using tool B.Vi.1182 after fitting the secondary shaft assembly and assembling the housings.



Insert the final drive pinion into the secondary shaft and place the assembly into the right hand housing.

Assemble the housings.

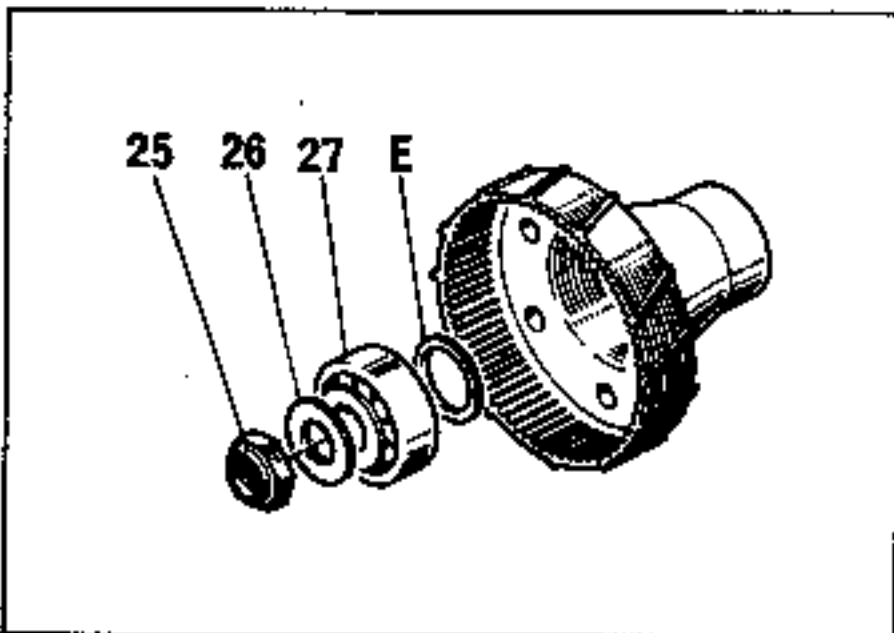
Fit a few of the bolts and run them up without tightening them. Then check the positioning and location of the bearing



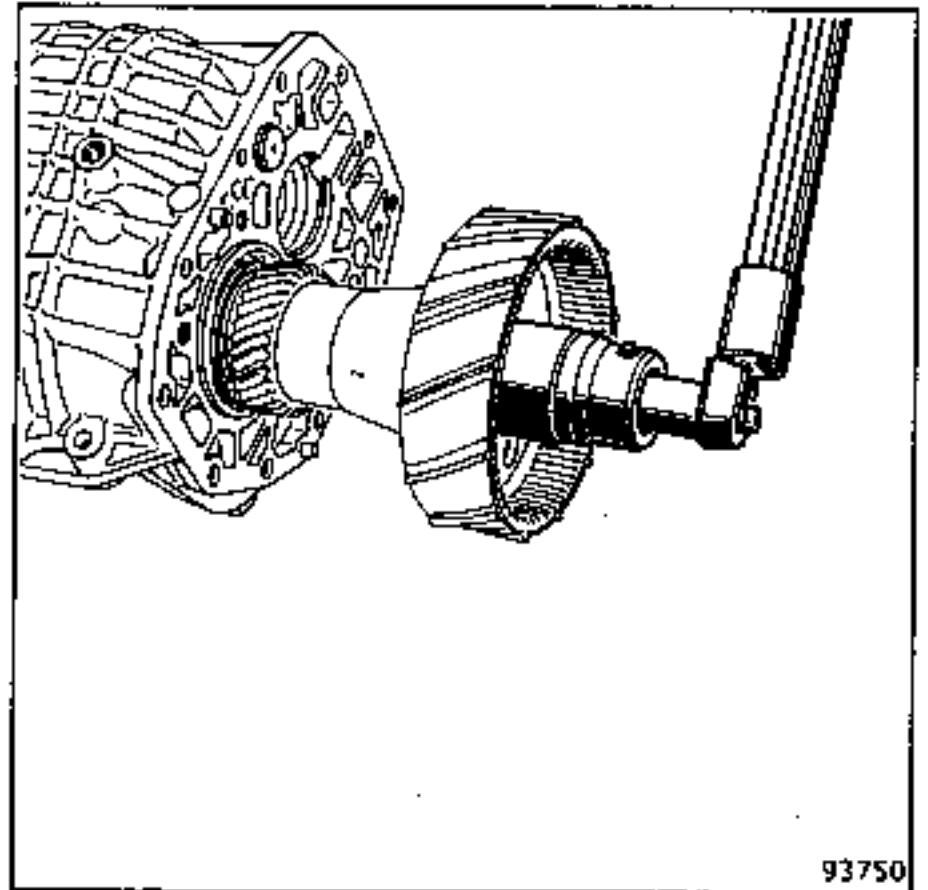
track rings in the housings.

Fit :

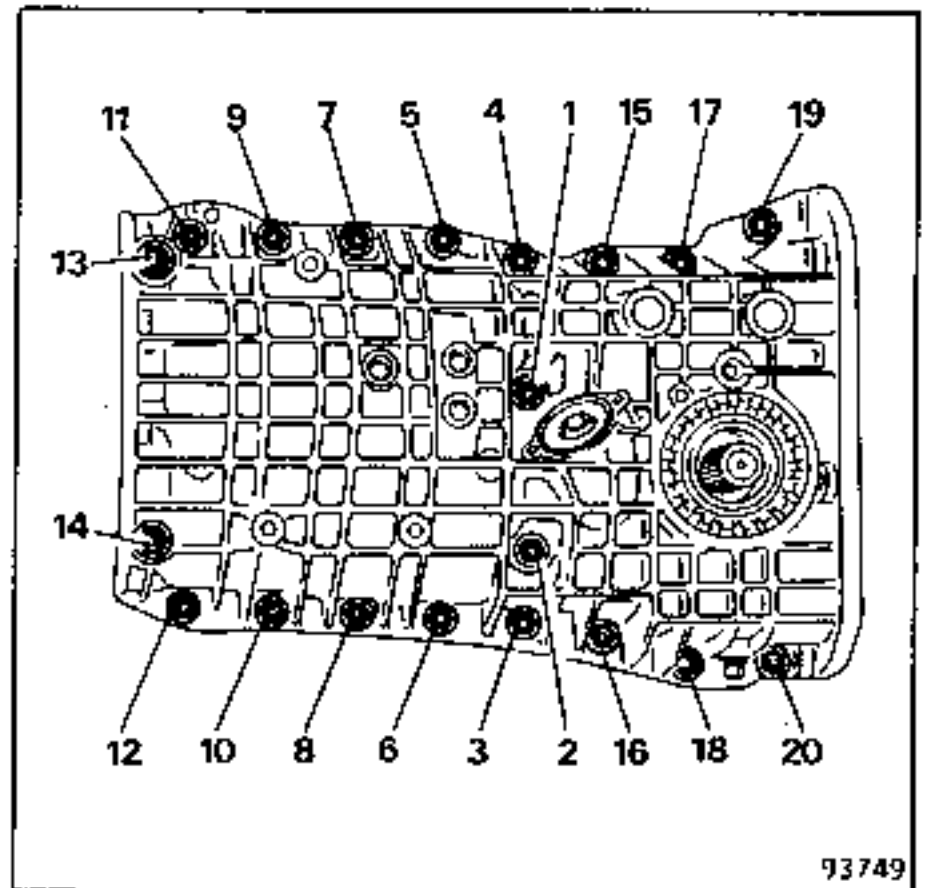
- the pre-load adjusting shim (E) removed during dismantling (with the chamfer towards the inside).
- the bearing (27), the spring washer (26) and the nut (25).



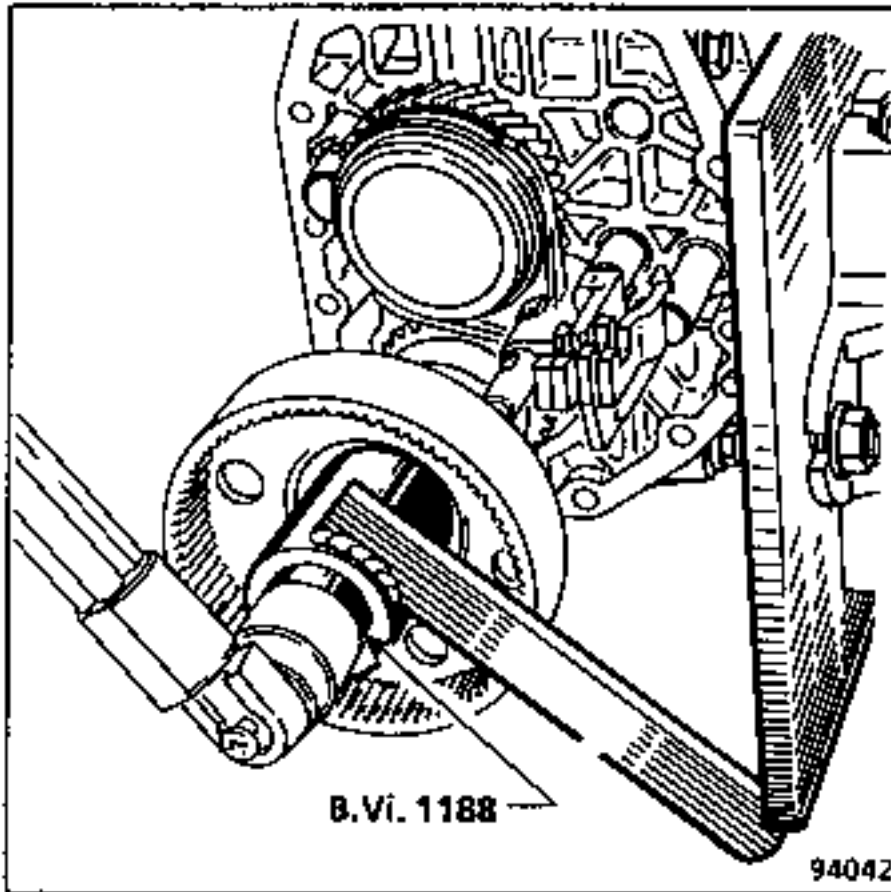
Lightly tighten the nut (long series socket FACOM K36LA) whilst turning the input casing, to ensure that the bearings bed down correctly.



Tighten the housing securing bolts to the specified torques.



Using tool B.Vi.1188, tighten the final drive pinion nut to torque.



Remove tightening tool B.Vi.1188 and turn the final drive pinion to centralise the bearings.

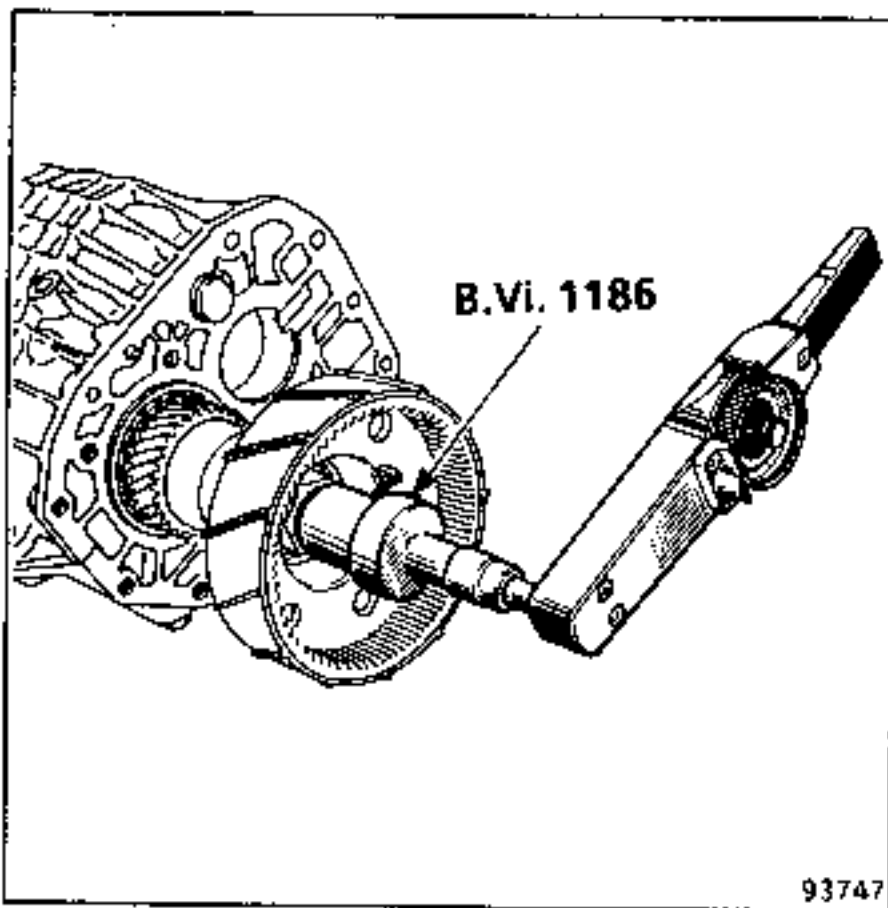
Measure the bearing pre-load.

ADJUSTING THE SECONDARY SHAFT BEARING PRE-LOAD

Turn the final drive pinion through a few turns.

There are two ways of measuring the pre-load :

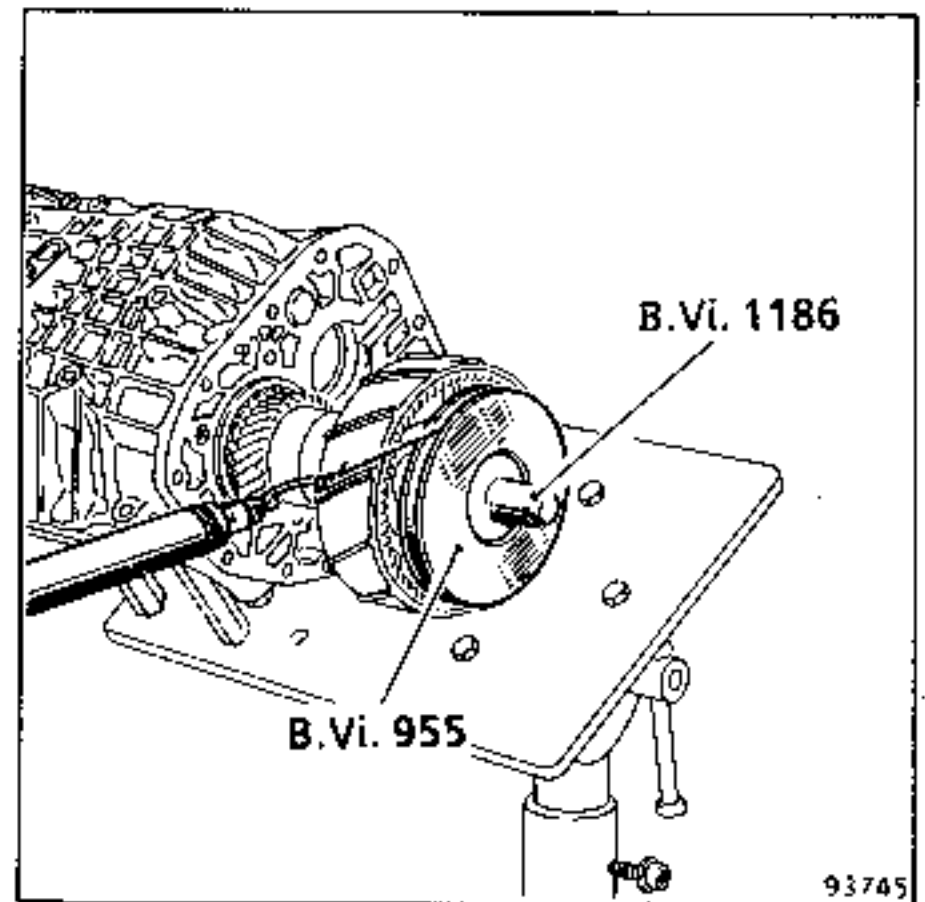
- 1) Using a precision torque wrench (example FACOM R250) and adaptor B.Vi.1186.



The final drive pinion should turn at a torque of between 1.2 Nm and 2.4 Nm.

This is the torque required to keep the pinion turning.

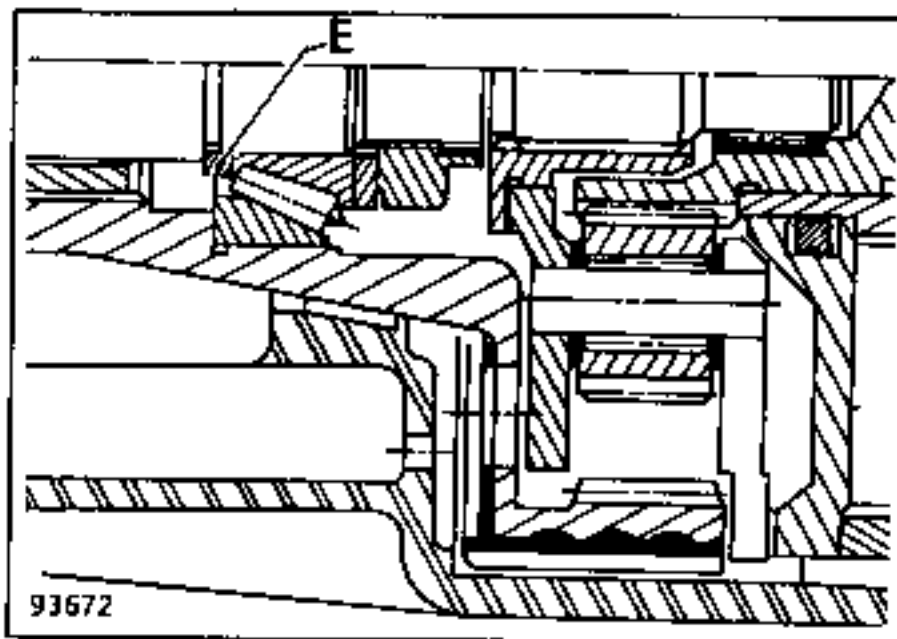
- 2) By means of a spring balance and tools B.Vi.1186 and B.Vi.955.



The final drive pinion should turn under a load of between 2.4 daN and 4.8 daN.

This is the pull on the spring balance necessary to keep the pinion turning.

If the adjustment is not correct, increase or reduce the thickness of the adjusting shim (E).



By increasing the thickness of the shim the pre-load is reduced and vice versa.

A kit of shims* in thicknesses from 4.22mm to 4.50mm, increasing in increments of 2/100mm is available.

The locking tool, the nut and the small bearing will have to be removed and re-fitted each time the pre-load adjusting shim is changed.

When the correct final drive pinion nut adjustment is obtained, separate the housings and take out the secondary shaft assembly.

Then carry out the final assembly of the two half housings.

The input casing is only to be removed after the housing securing bolts are tightened.

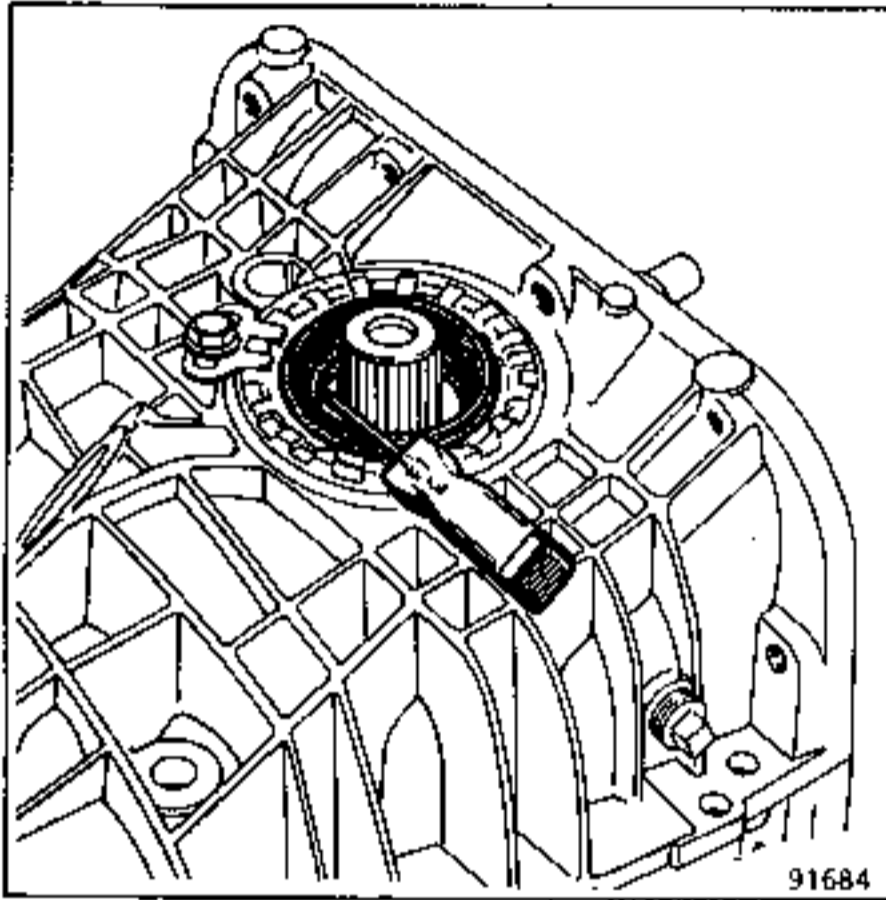
*Shims are also available, separately, to make up any missing from the repair kit.

DIFFERENTIAL SEAL

Replacing

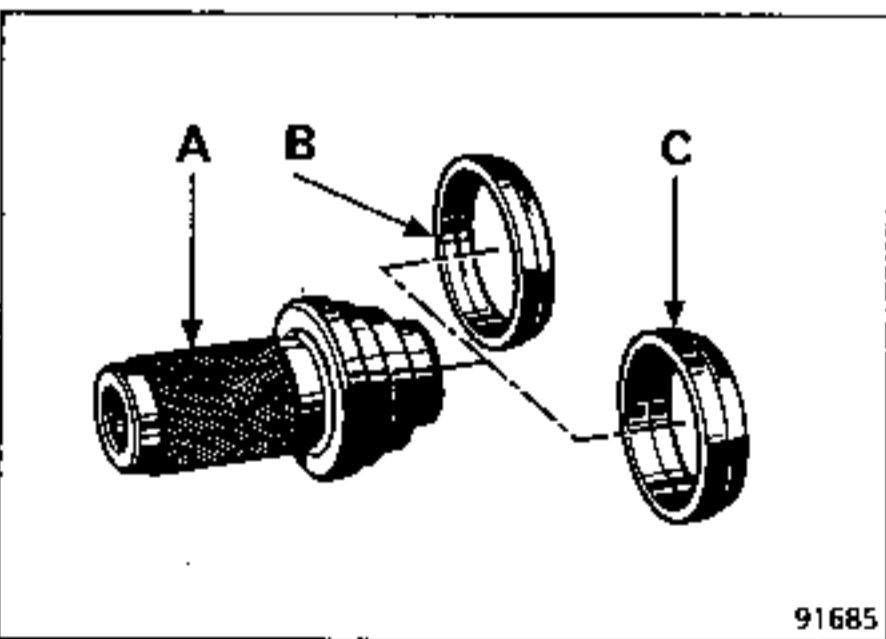
REMOVING

Extract the seal with a screwdriver, taking care not to damage the splines on the sun wheel.



FITTING

Lip seals are fitted using tool B.Vi.1081.



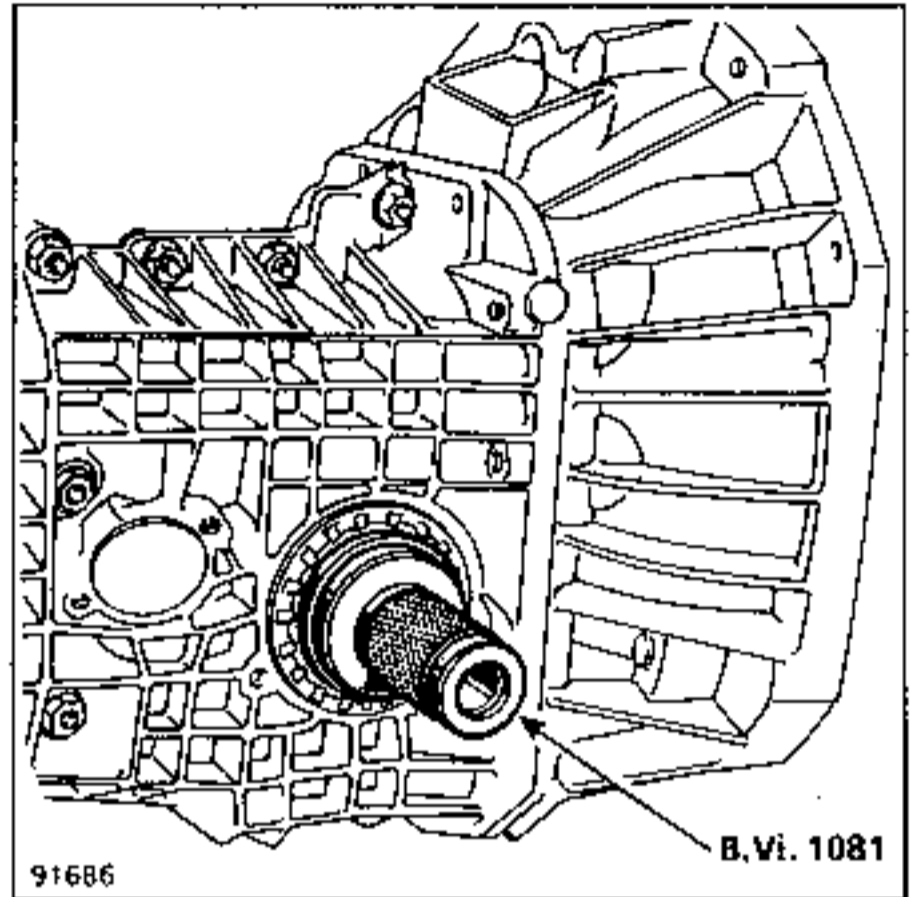
A Lip seal fitting tool

B Ring for positioning the seal on the nut.

C Ring for positioning the seal on the housing.

1 The seal on the adjusting nut

Place the ring (B) (with the chamfer outwards) on the tool (A) and fit the oiled lip seal.

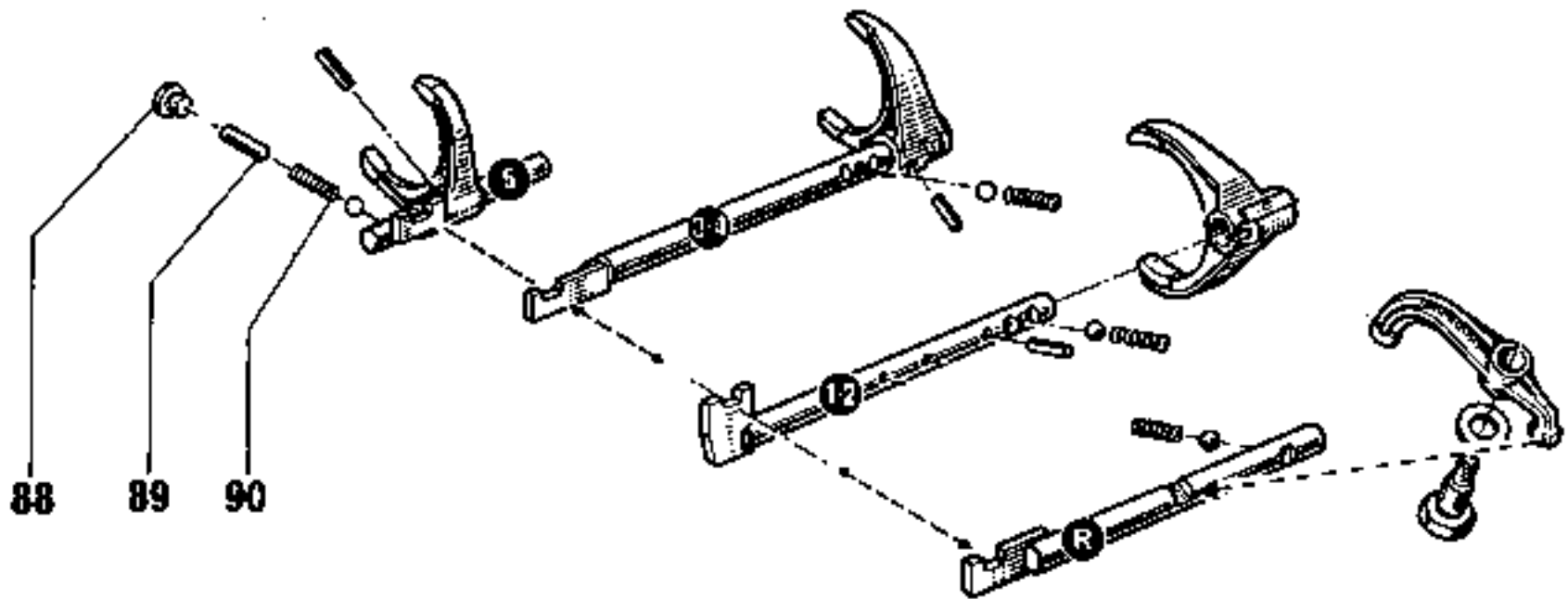


2 Seal on the housing

Do the same, but use ring (C) for positioning the seal.

INTERNAL CONTROLS

Dismantling - Re-assembly



TIGHTENING TORQUES (in daN.m)

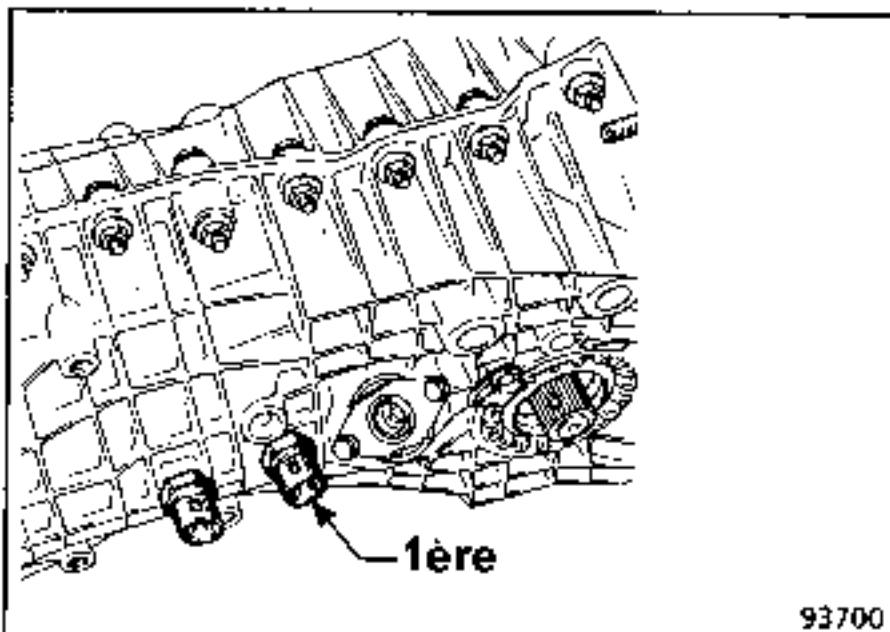
Bolt on reverse engagement lever 2.25 to 2.75

CONSUMABLES

Loctite FRENBLOC :
Reverse engagement lever bolt

Dismantling

Remove the reversing light and 1st speed switches.



Place the shift shafts in the neutral position.

Knock out the spring pins from the 1st/2nd and 3rd/4th shift forks using pin B.Vi.606 and 4 mm diameter pin punch.

Retrieve the locking balls and springs.

Unscrew the reverse selector securing bolt and take out the selector and its shaft.

Checking the parts

There should be no signs of distortion or wear on the locking ball seats on the shafts.

Furthermore, the shafts must slide freely in their bearings without excess play.

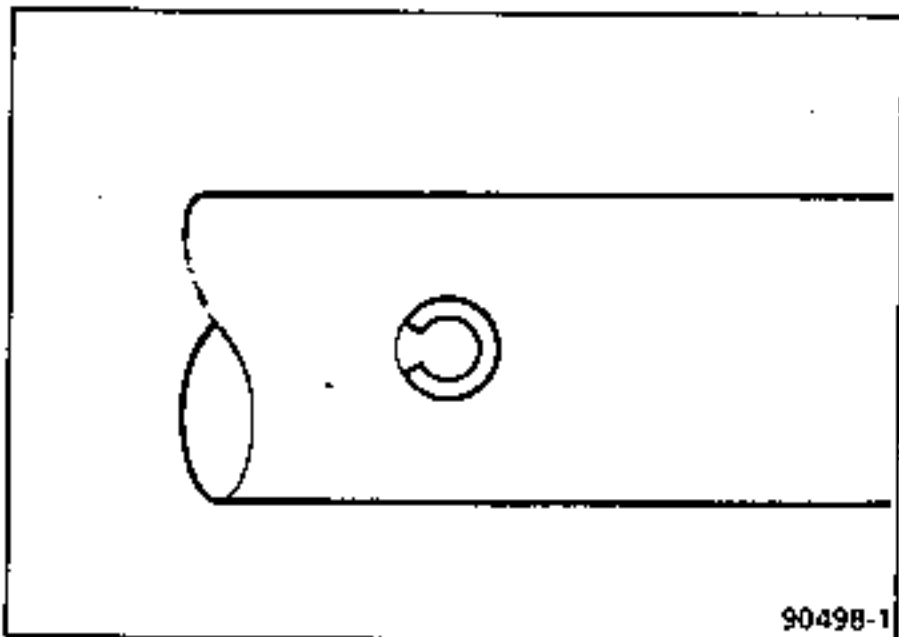
Checking the forks :

The surfaces of the forks that make contact with the sliding gears should be neither distorted nor worn.

INTERNAL CONTROLS

Re-assembly

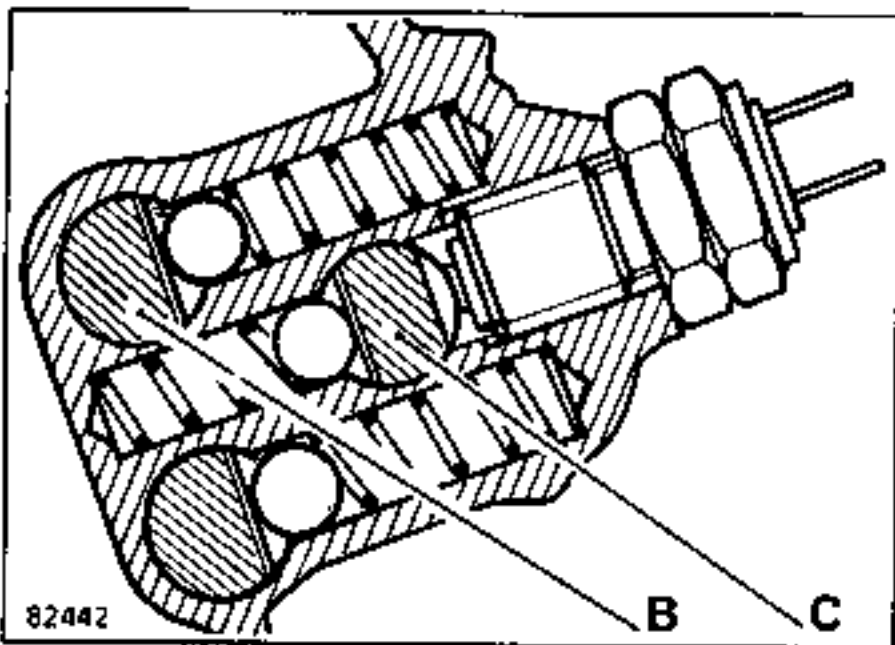
Replace all the spring pins by new ones and ensure that they are correctly fitted. The slits in the pins must be in line with the shaft centre lines.



Locking balls

The 3 balls are identical.

The 3rd/4th (B) and reverse (C) ball springs are identical.



Fit the locking spring and ball and engage the reverse shaft.

Place the reverse engagement lever in position engaging its end in the slot in the shaft.

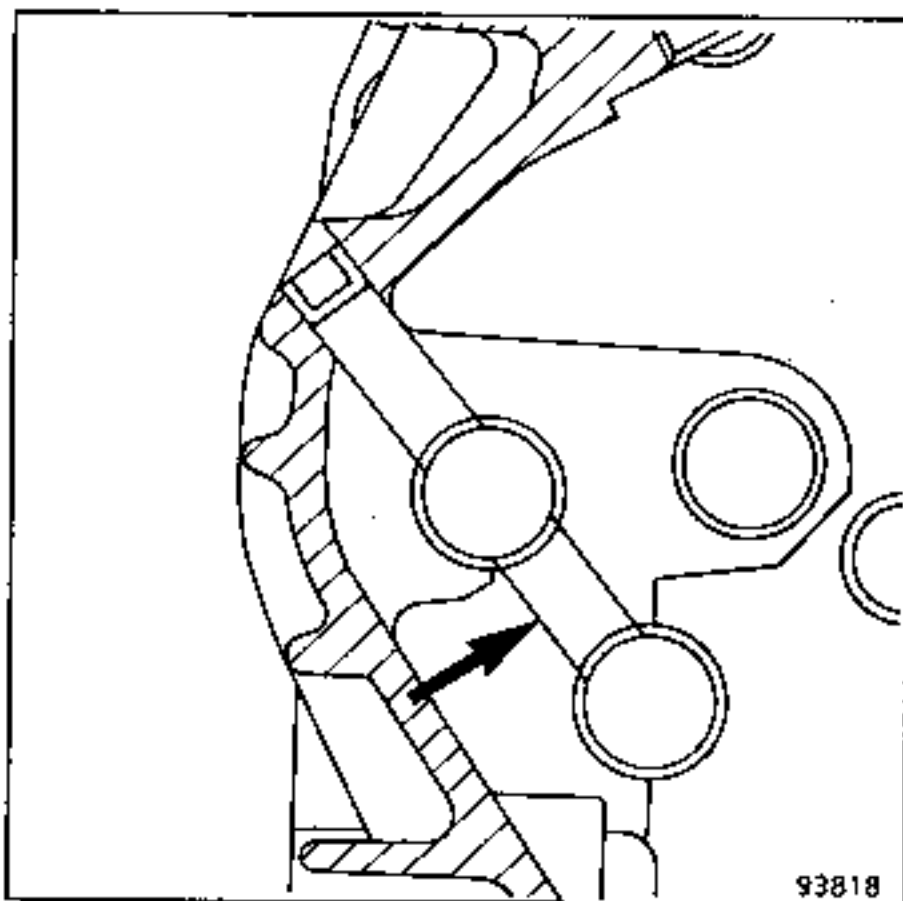
Coat the threads on the reverse engagement lever bolt with Loctite FRENBLOC and tighten it to torque.

Fit the 3rd/4th shaft locking spring and ball.

Engage the shaft, fit the fork and pin it in place.

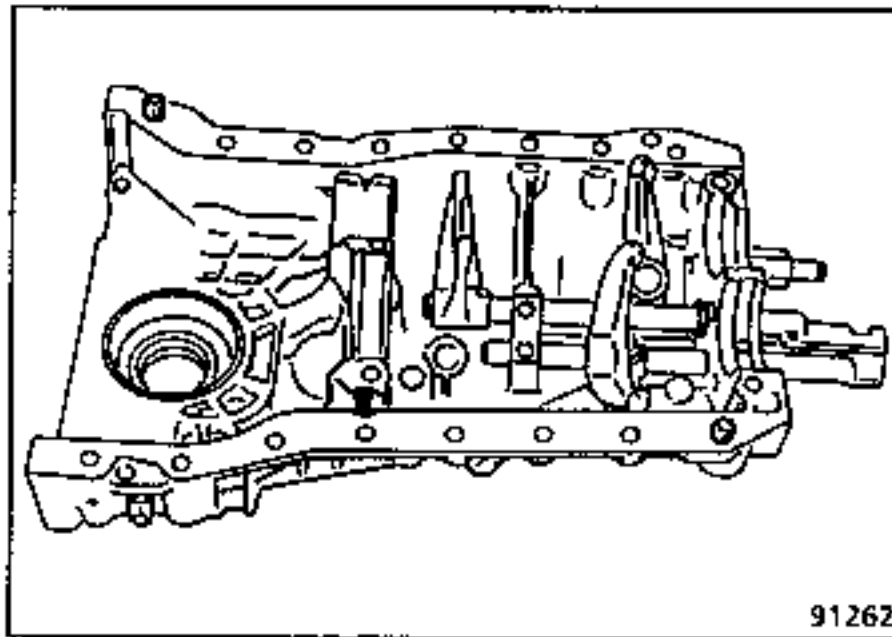
Fit the 1st/2nd shaft locking spring and ball.

Check the position of the locking plunger, in its bore, between the 1st/2nd and reverse shift shafts.



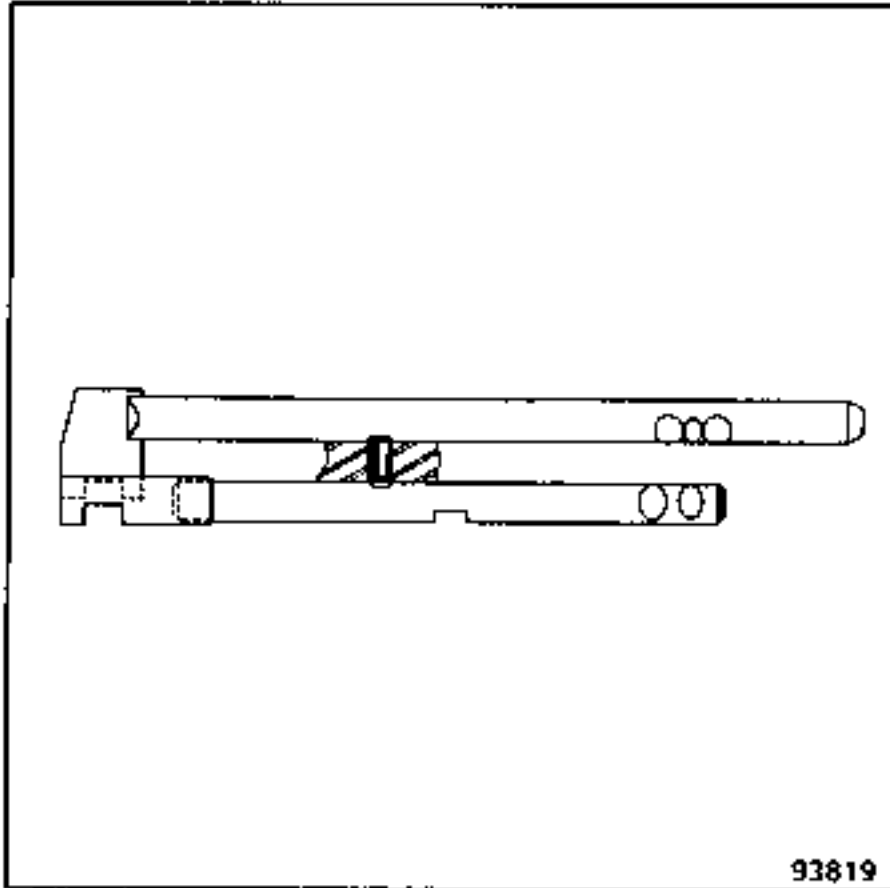
Fit the 1st/2nd shaft locking spring and ball.

Insert the shaft and pin the fork in place.



Check the operation of the shift system :

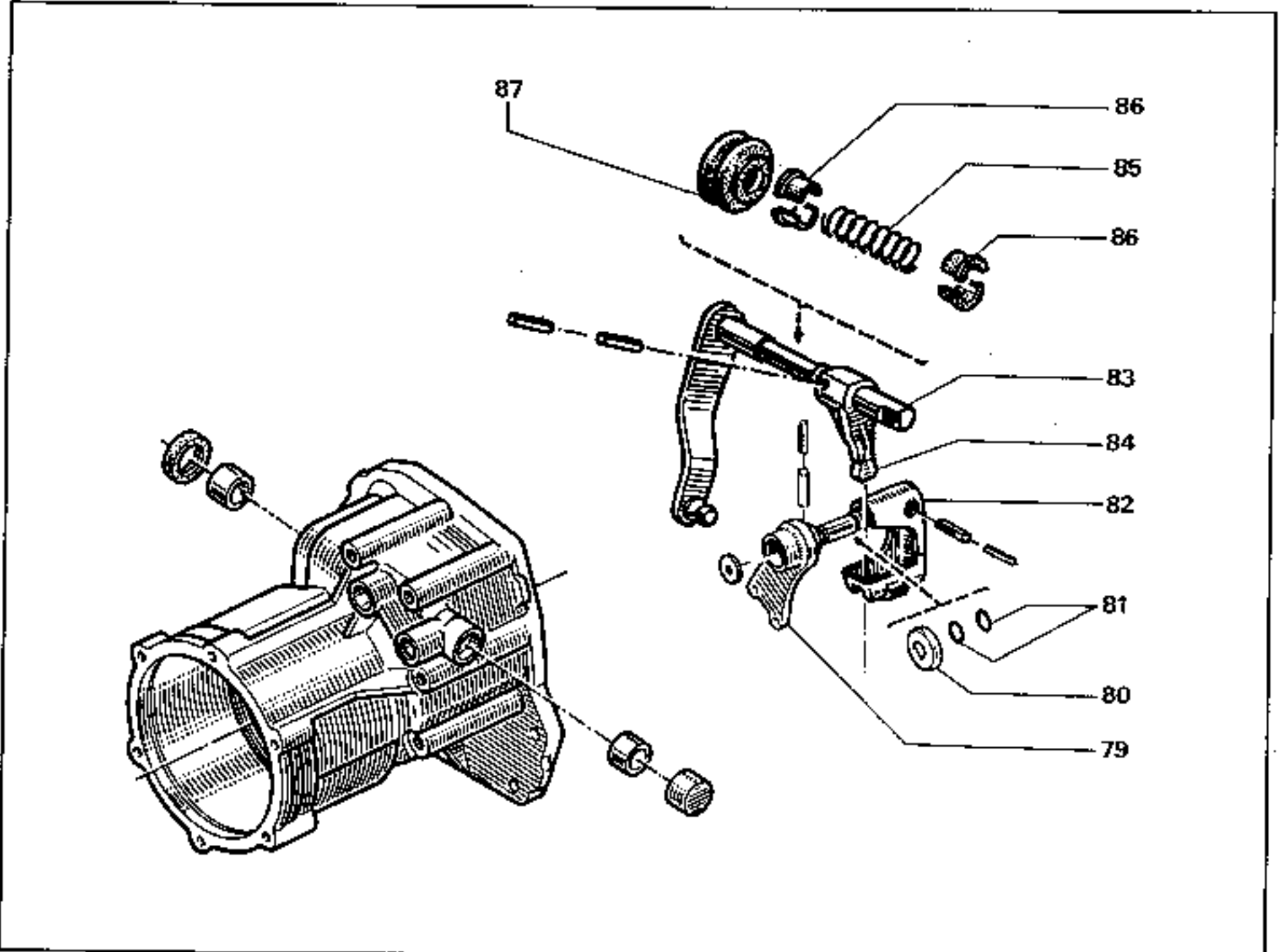
- engage reverse,
- push the 1st/2nd shift shaft. It should be locked.



Refit the primary and secondary shafts ensuring that the forks engage correctly in the grooves in the sliding gears.

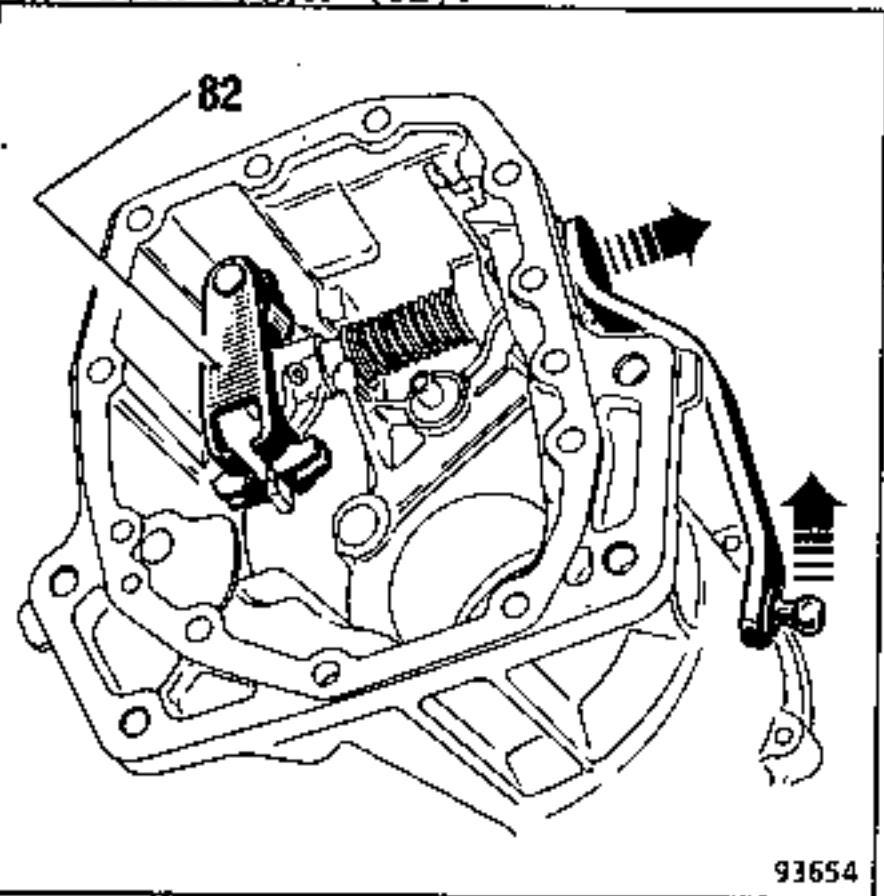
Tighten the reversing lights and 1st speed switches to a torque of 2.5 daN.m. (their threads are to be coated with CAF 4/60 THIXO).

INTERMEDIATE HOUSING



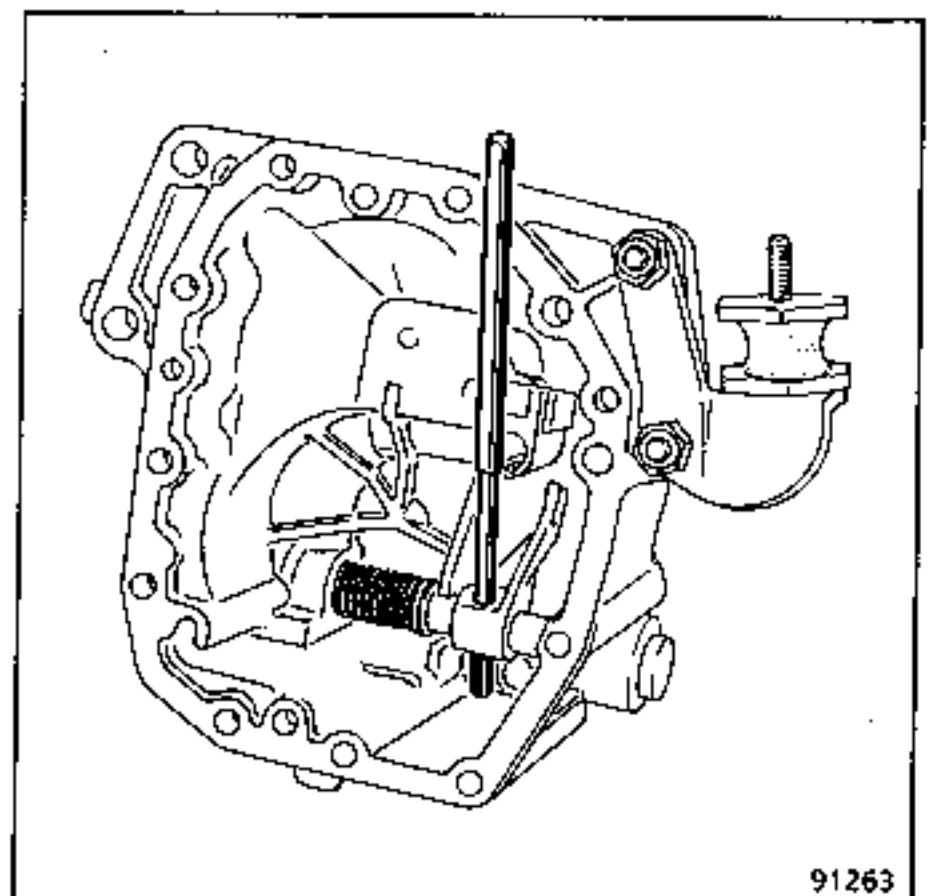
Dismantling

Pull the shift lever and shaft in the direction shown by the arrows and remove the lock rocker (82).



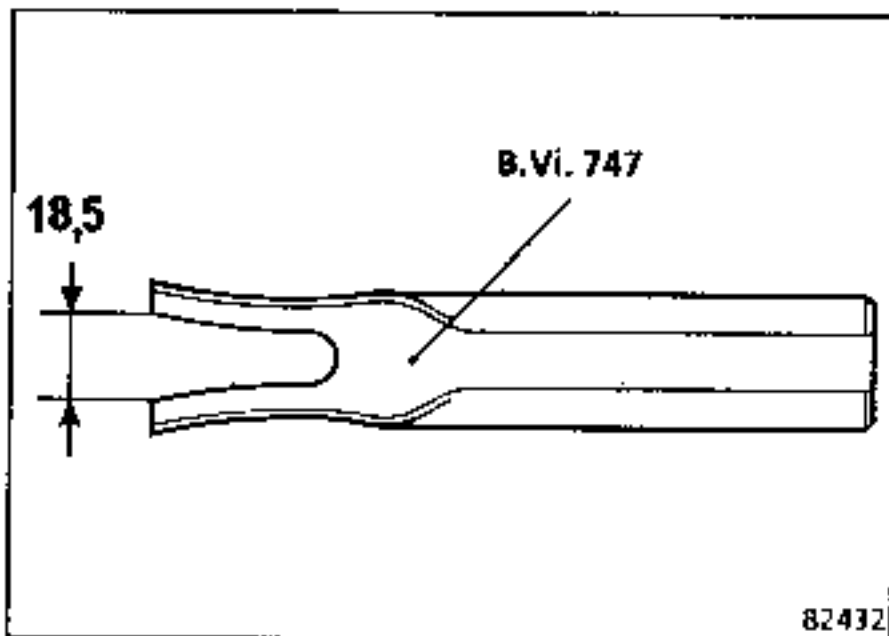
Unpin the selector lever

- outer pin diameter 7 mm
- inner pin diameter 4mm

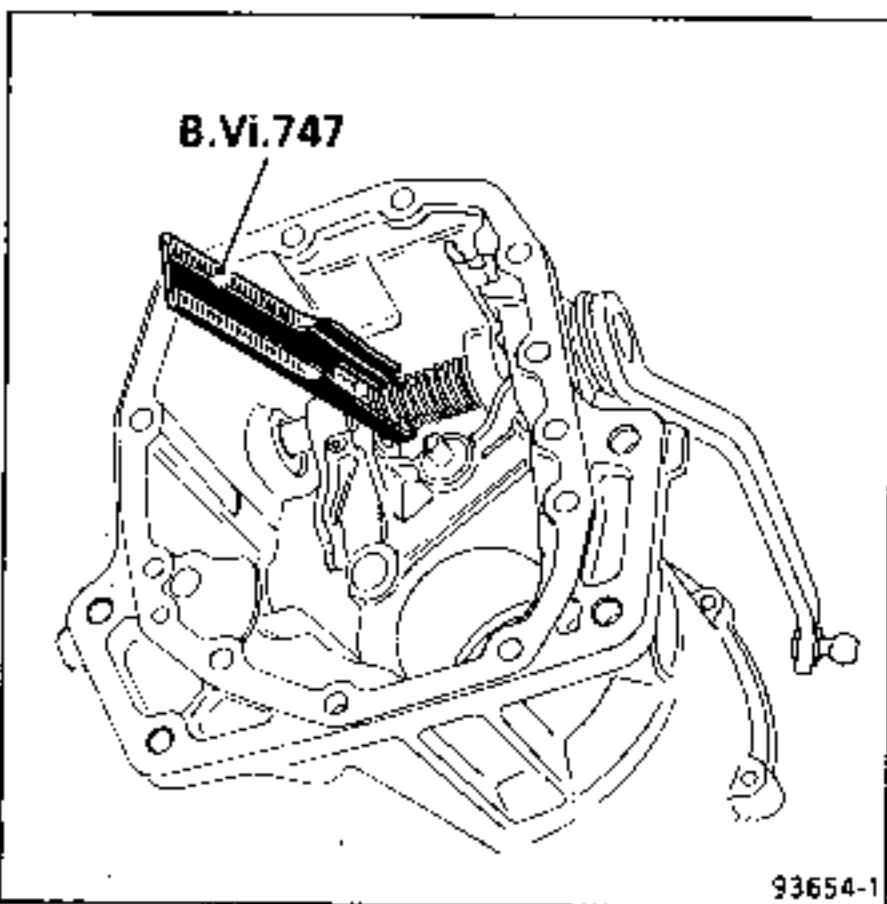


INTERMEDIATE HOUSING

Compress the spring using tool B.Vi.747 which is to be modified as shown in the drawing below.



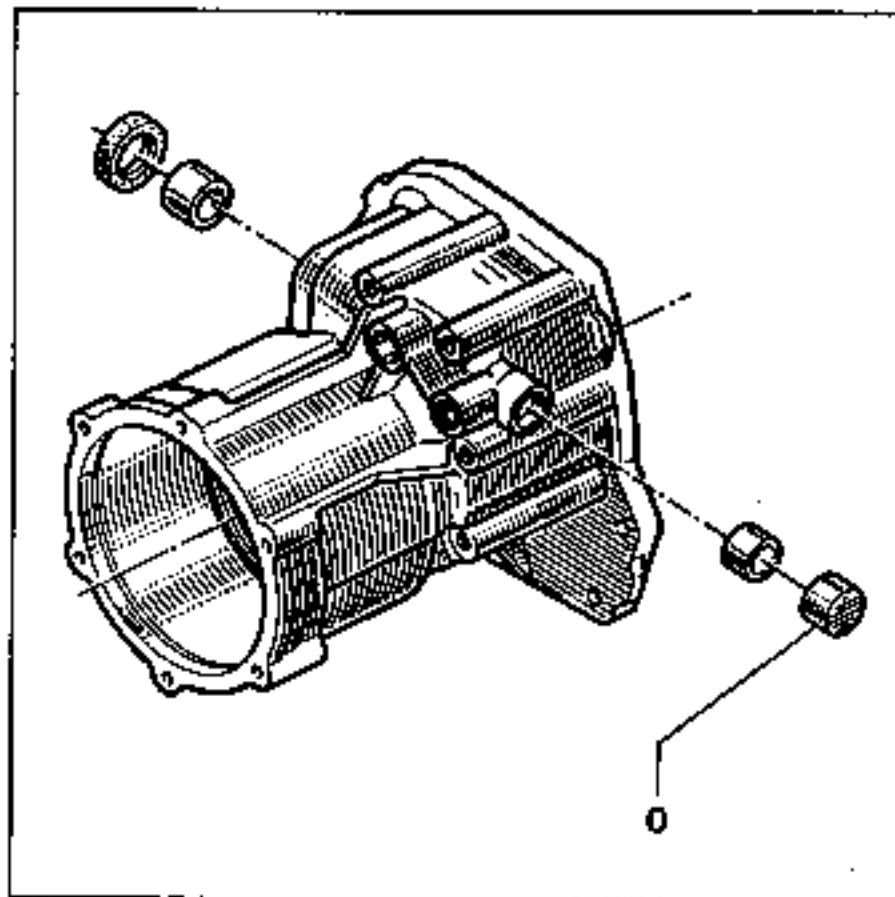
Extract the half shells.



Pull the shaft outwards and retrieve the lever and the spring.

Remove the lip seal with a screwdriver.

Push out the plug (0) with a rod 16 mm in diameter passed down the shift shaft bore.



Knock out the bushes with a tube with an outside diameter of 19 mm.

NOTE : When replacing the shift shaft lip seal we recommend also replacing the shaft bearing bushes.

If they are to be left in place, the bushes should show no signs of scoring or wear.

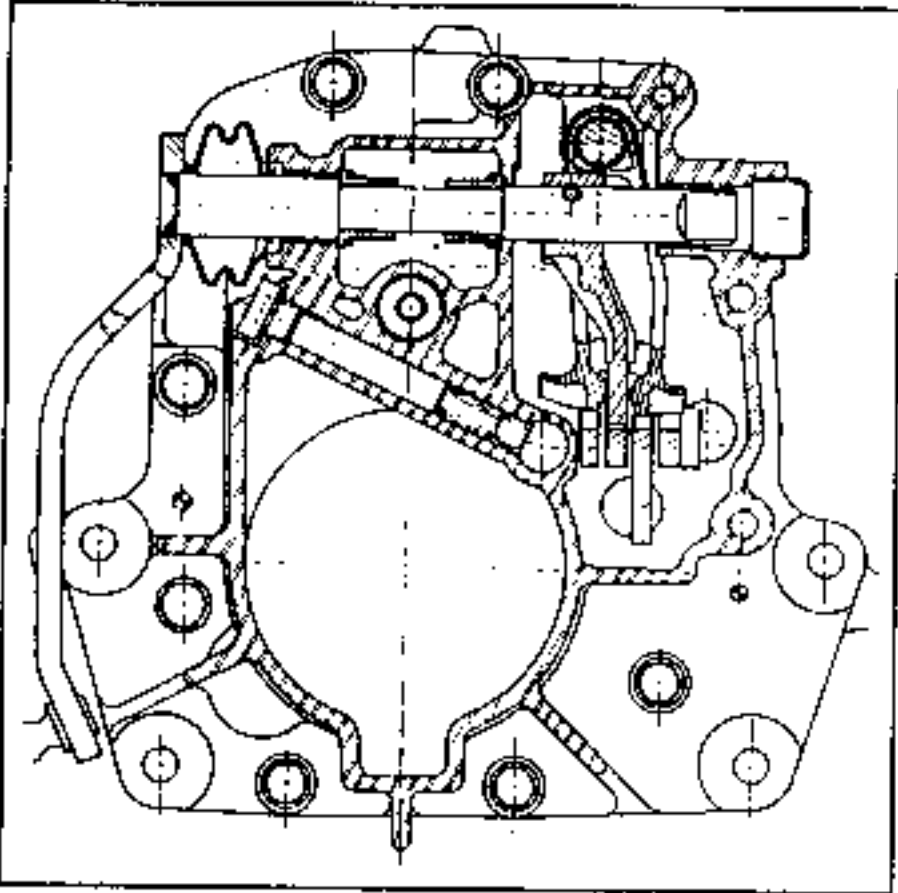
INTERMEDIATE HOUSING

Re-assembly

Push in the two bushes with the tube used for removing the old ones and a plastic mallet.

Ensure that they are correctly positioned.

At the reverse lock end, the slot in the bush should be on the opposite side to the half-moon section.



Refit, in the following order :

- the lip seal, oiled and resting against its shoulder on the housing,
- the plug (0) coated with CAF 4/60 THIXO.

Remove any burrs on the shaft with fine emery cloth, so as not to damage the new lip seal.

Refit the following to the housing :

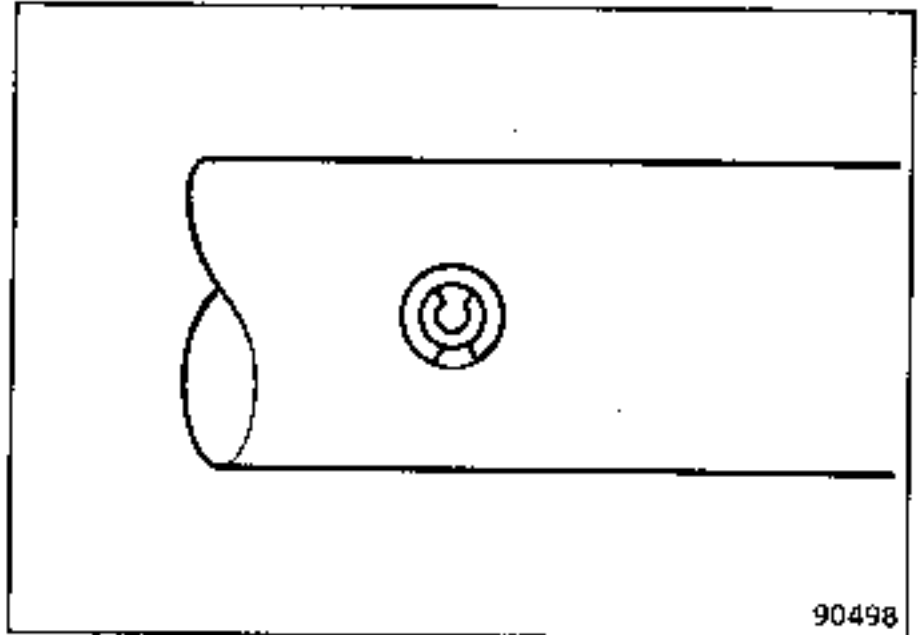
- the spring,
- the selector lever,
- the shaft together with its bellows.

Using tool B.Vi.747, compress the spring and fit the half-shells.

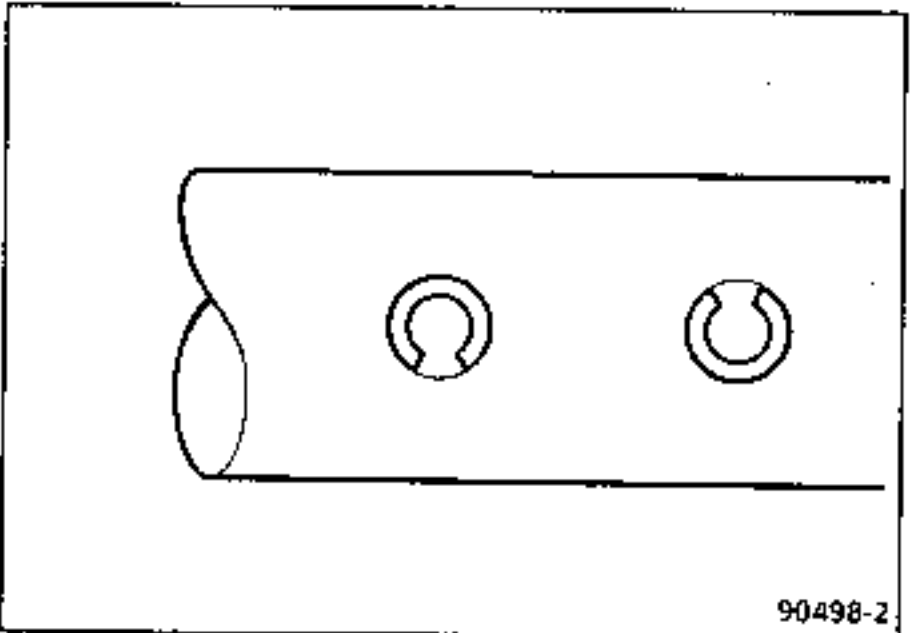
Pin the selector lever (B.Vi.606).

Replace all the spring pins, ensuring that they are fitted in the correct positions.

Their slits are to be perpendicular to the centre line of the shaft and on opposite sides to one another.

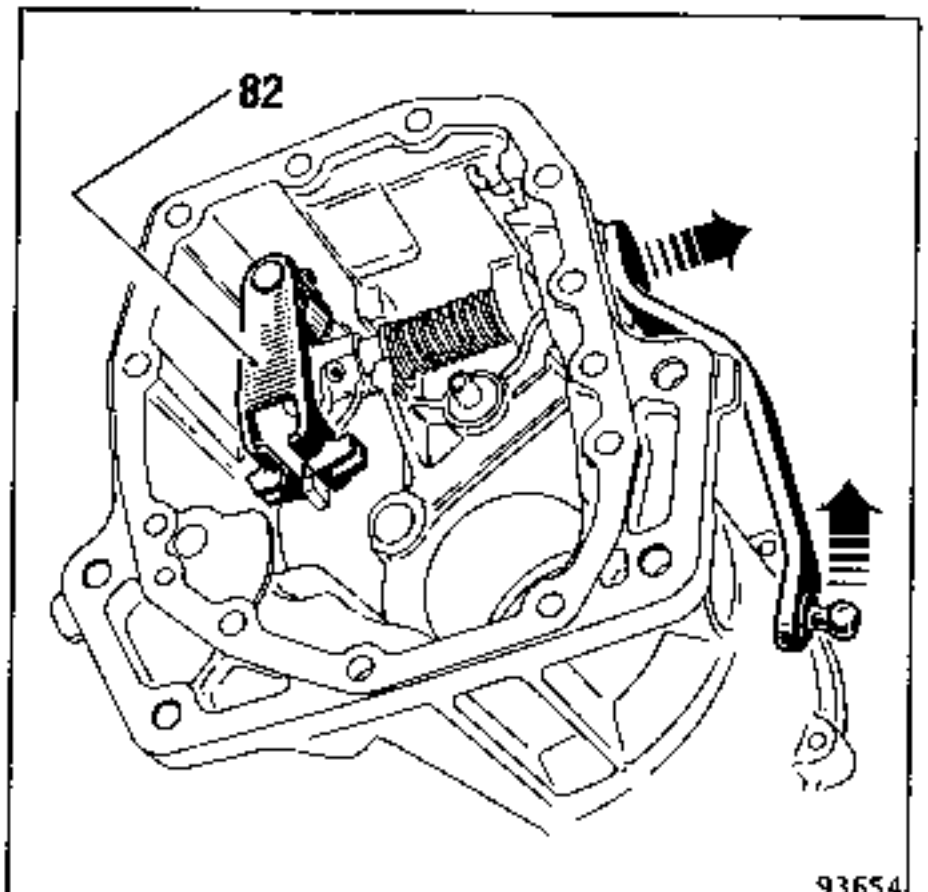


90498



90498-2

Fit the lock rocker (82), after oiling the seals and check that it slides freely on the selector lever.



93654

SPEEDOMETER DRIVE ASSEMBLY

Replacing

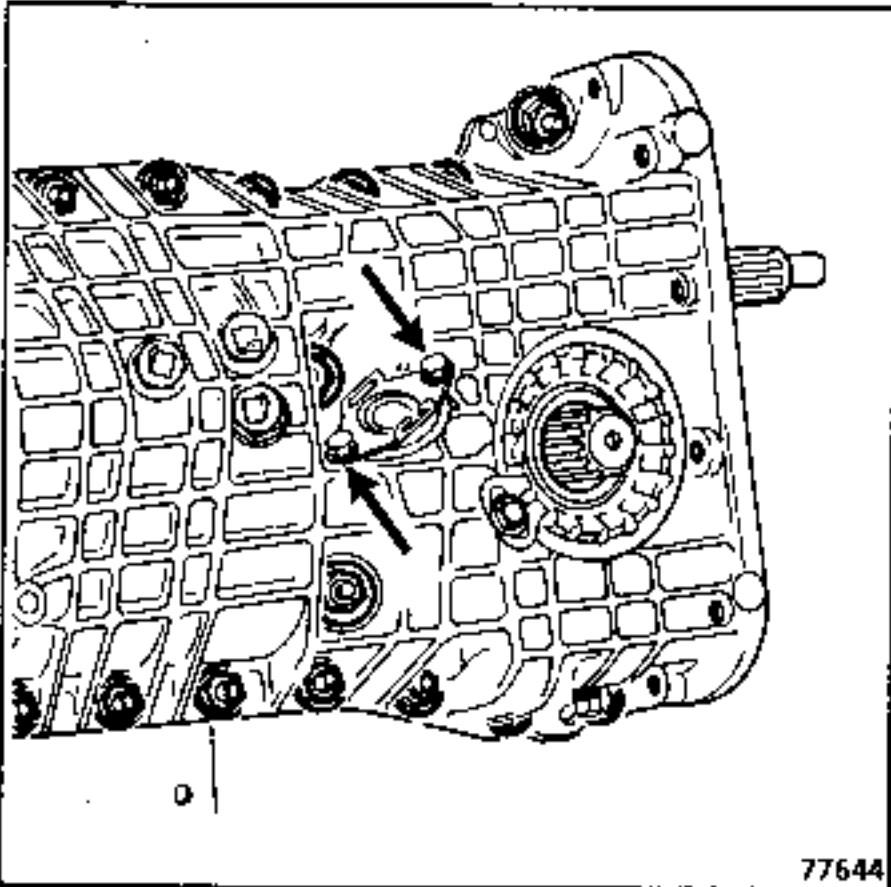
1st CASE

If only the speedometer drive pinion or shaft is damaged.

REMOVING

It is not necessary to dismantle the gearbox.

Remove the 2 bolts that secure the locking plate and take out the speedometer pinion, guide and shaft assembly.



REFITTING

Refit the speedometer guide, shaft and pinion assembly fitted with a new, oiled O ring.

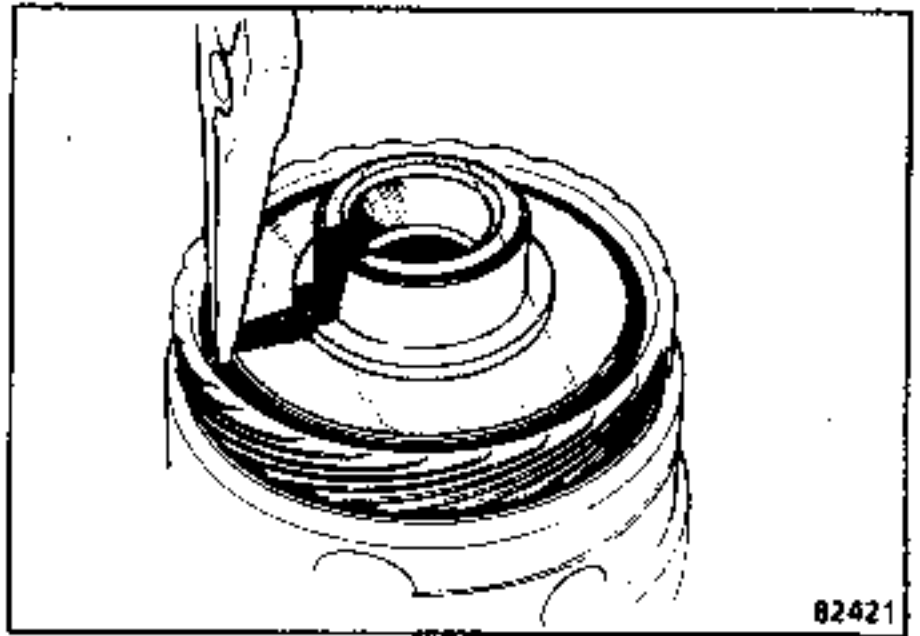
2nd CASE

If both the speedometer drive pinion and worm are damaged.

REMOVING

It will be necessary to remove the gearbox and separate the half-housings.

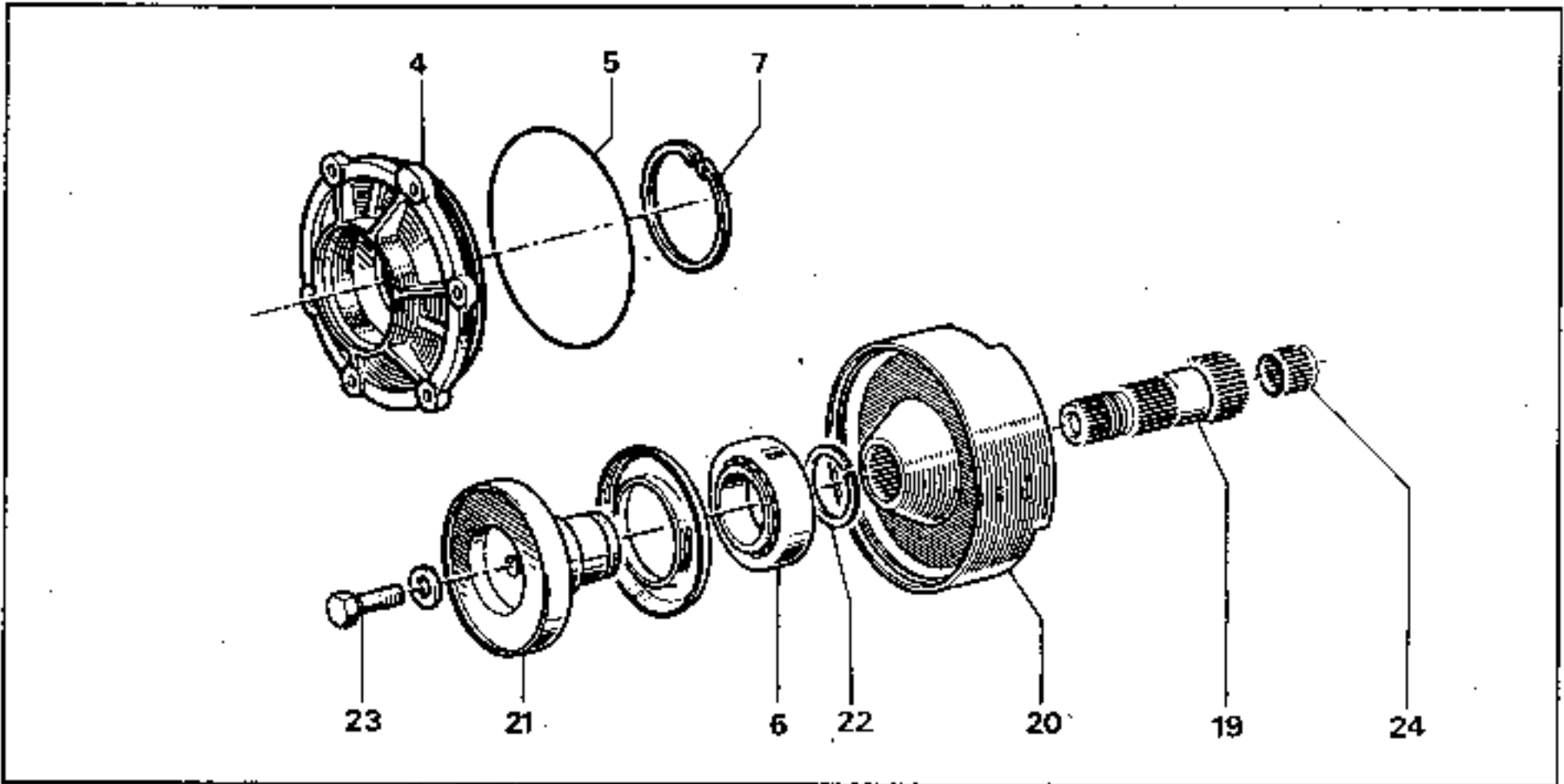
Remove the speedometer drive worm securing circlip from the differential housing and take out the worm.



Refitting is a perfectly straightforward operation.

REAR COVER - OUTPUT FLANGE - VISCOUS COUPLING

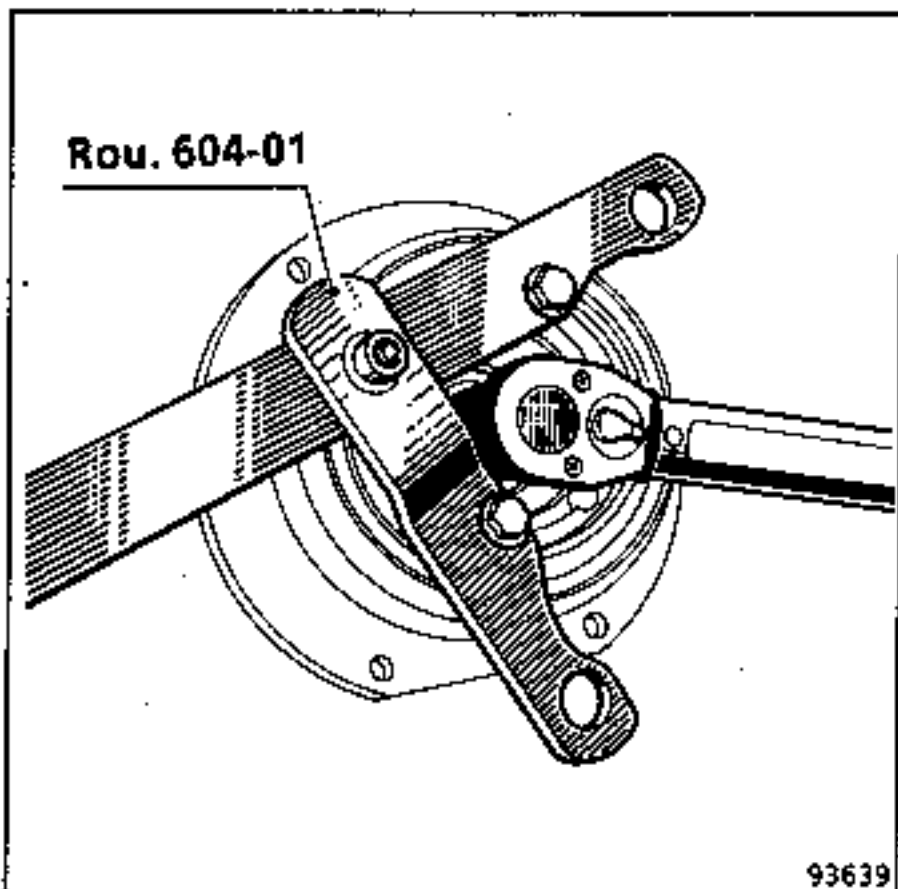
Dismantling - Re-assembly



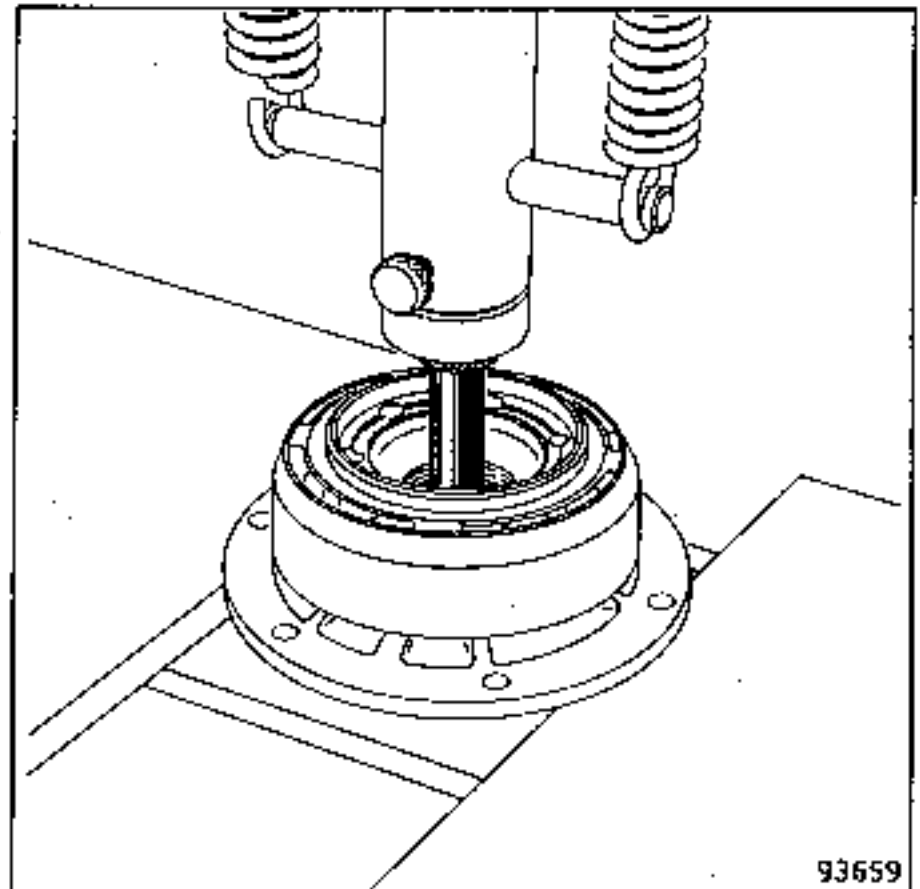
TIGHTENING TORQUES (in daN.m)

Output flange bolt 9 to 11

Place tool Rou. 604-01 on the flange and remove the bolt.



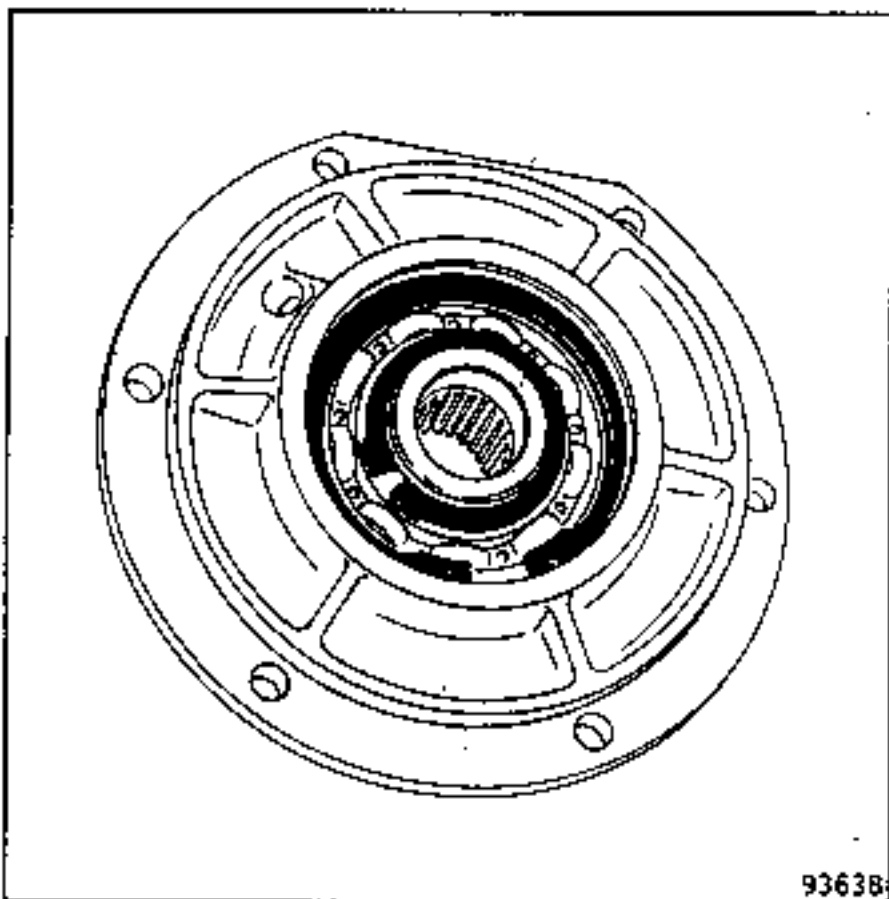
Taking the load on the rear cover, extract the output shaft - viscous coupling assembly.



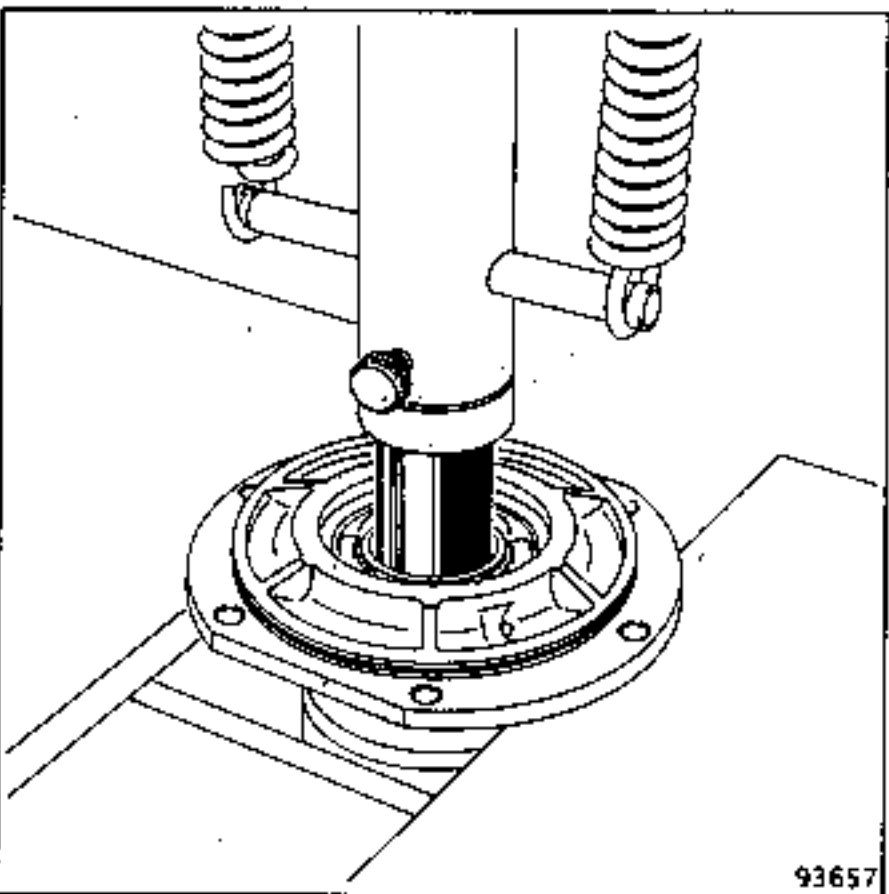
NOTE: the bolt (23) must be replaced by a new one each time it is removed.

Dismantling

Remove the flange and bearing securing circlip.



Take the load on the cover to extract the flange.



REMARK : Each time the flange is removed, the bearing must be replaced by a new one.

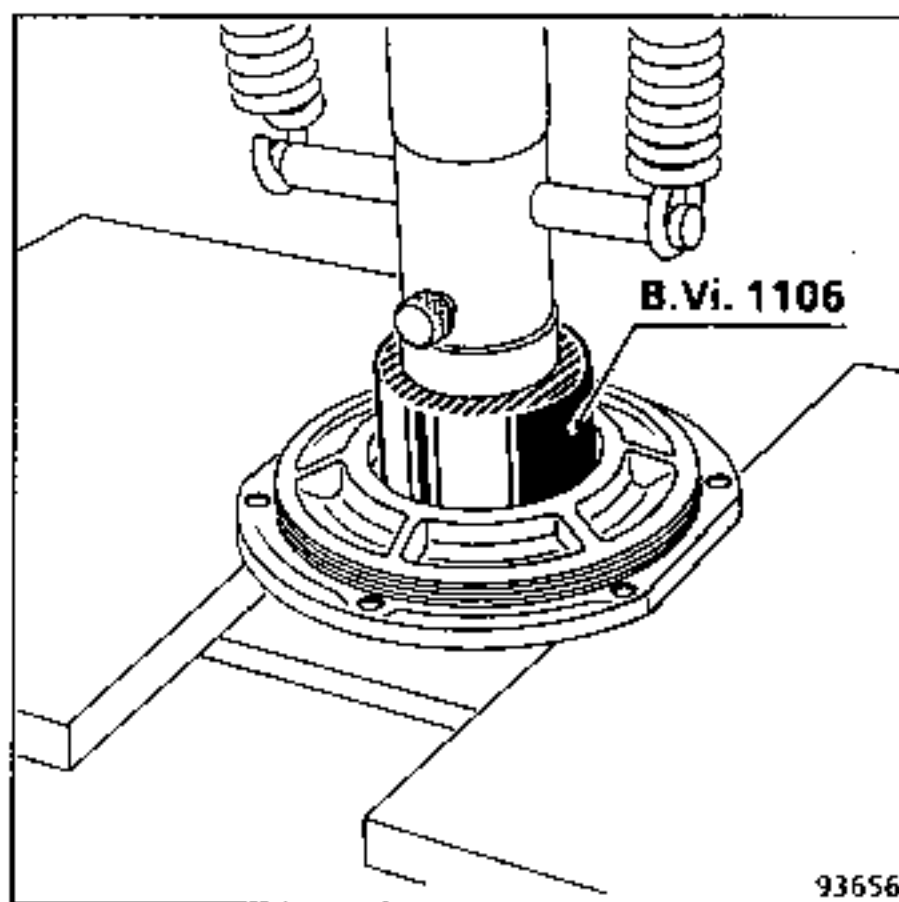
Remove the lip seal and push out the bearing using tool B.Vi1078 and a press.

Re-assembly

Special points :

- Ensure that there are no scores or signs of abnormal wear on the flange sealing area.
- The Parts Department provides a replacement flange with the vibration damper already fitted.

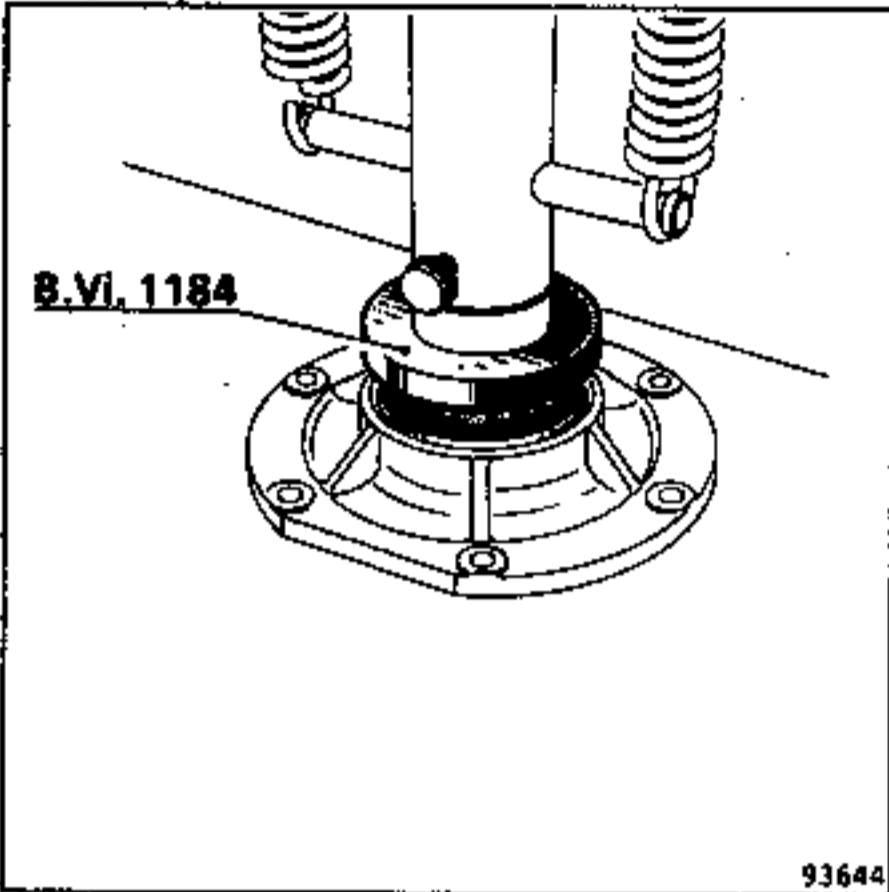
Fit the bearing, taking the load on the outer track ring by means of tool B.Vi.1106.



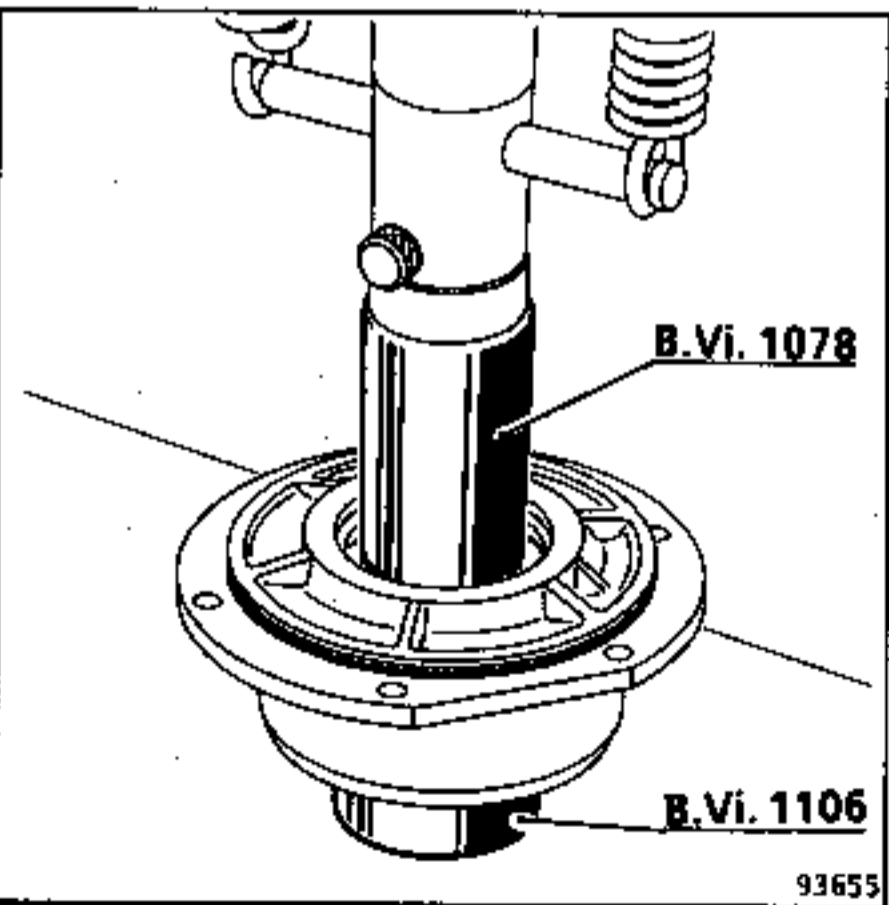
Fit the bearing retaining circlip.

Re-assembly

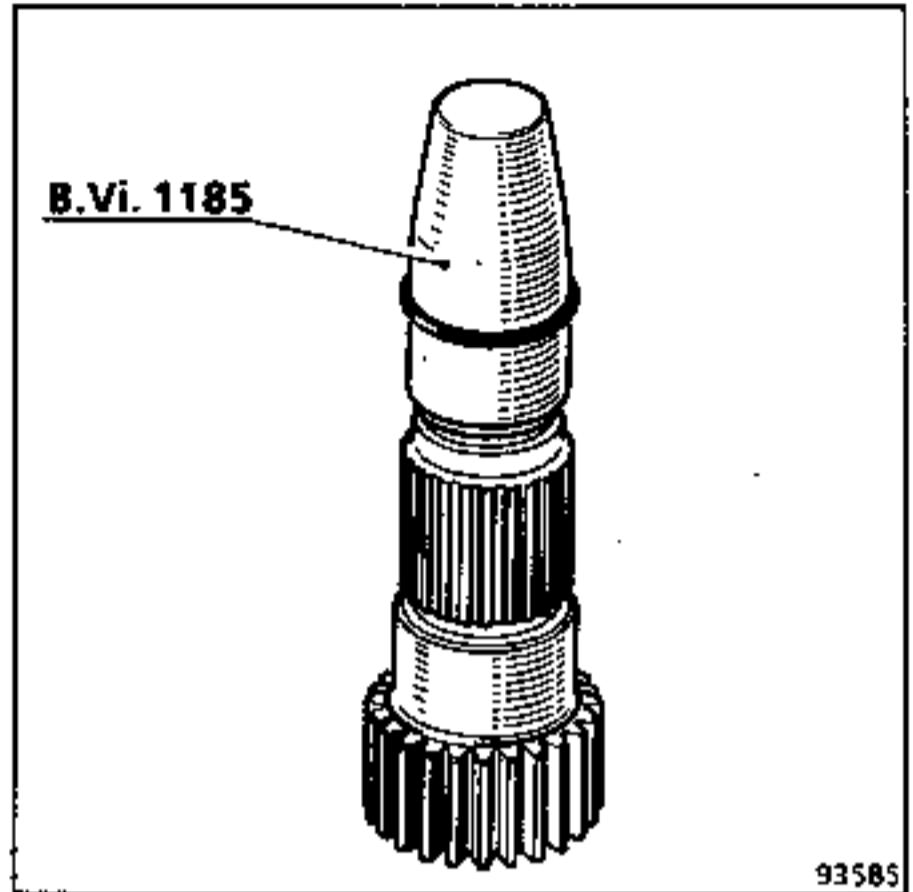
Fit the lip seal (oiled) to tool B.Vi.1184 and fit it, on the press, with the bearing resting against tool B.Vi.1078.



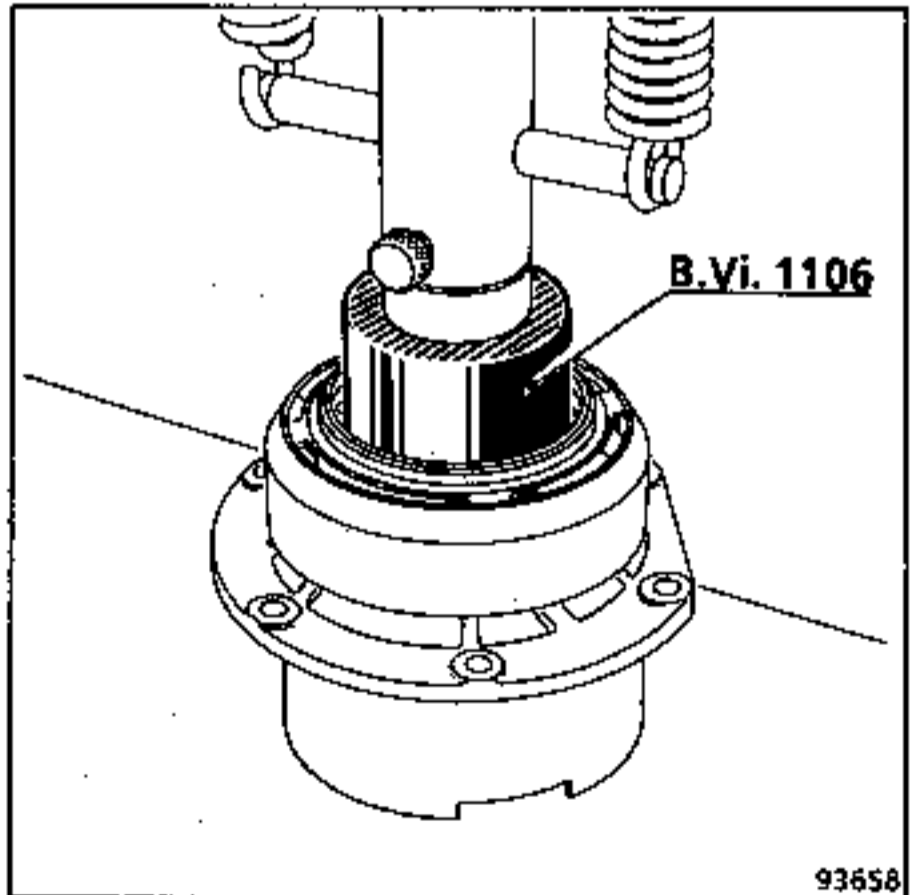
Fit the flange, on the press, using tools B.Vi.1106 and 1078 to take the load on the bearing inner track ring.



Replace the O ring seal on the output shaft using end protector B.Vi.1185.



Place, in position, the assembly formed by the output shaft and viscous coupling and connect up the output shaft - rear cover assembly on the press using tool B.Vi.1106.

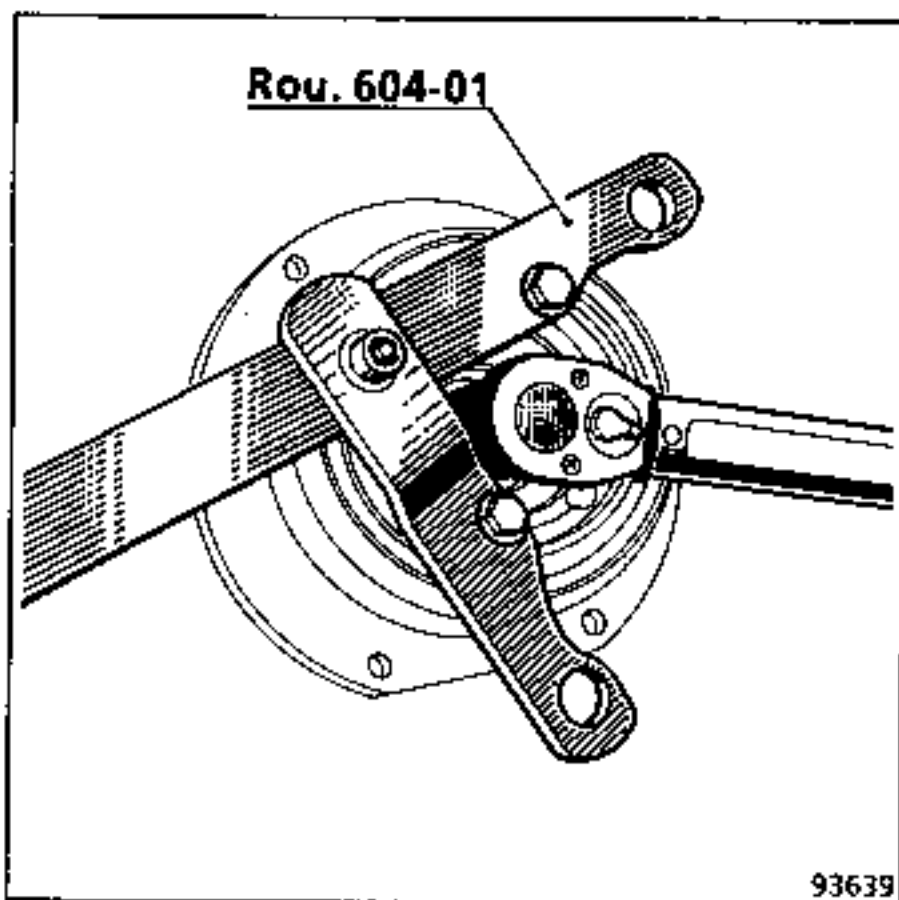


REAR COVER - OUTPUT FLANGE - VISCOUS COUPLING

Re-assembly

Refit :

- the thrust washer,
- the securing bolt (new and oiled). It must be tightened to a torque of between 9 and 11 daN.m.



Fit the plastic plug.

ASSEMBLING THE HOUSINGS

This operation is carried out after determining the thickness of the secondary shaft bearing pre-load shim and adjusting the differential bearing pre-load.

TIGHTENING TORQUES (in daN.m)	
Nut on secondary shaft	20
Housing bolts diameter 8	2.5
Housing bolts diameter 10	5
Intermediate housing bolts	2.5
Screwed plugs	2.5
Switch	2.5
5th speed locking ball plug	2 to 3
Level and drain plugs	2.5
Clutch housing bolts	5
Rear cover bolts	2.5
Differential nut lock bolt	2.4
Output flange bolt	9 to 11
Speedometer drive locking plate bolt	2

CONSUMABLES
Loctite "518" :
- Housing assembly faces
CAF 4/60 THIXO:
- Screwed plugs
- Threads on switches
Grease no. 20 ref. 77 01 032 832 :
- Release bearing guide
- Clutch fork pivot
- Sun wheel splines
- Clutch fork pads
Gearbox oil :
- Lip seals
"LOWAC" Perfect Seal jointing compound
- Paper gasket on rear housing and clutch housing
- Loctite Frenbloc :
- Primary shaft nut
- Loctite SCELLOC :
- Final drive pinion nut

REMARK :

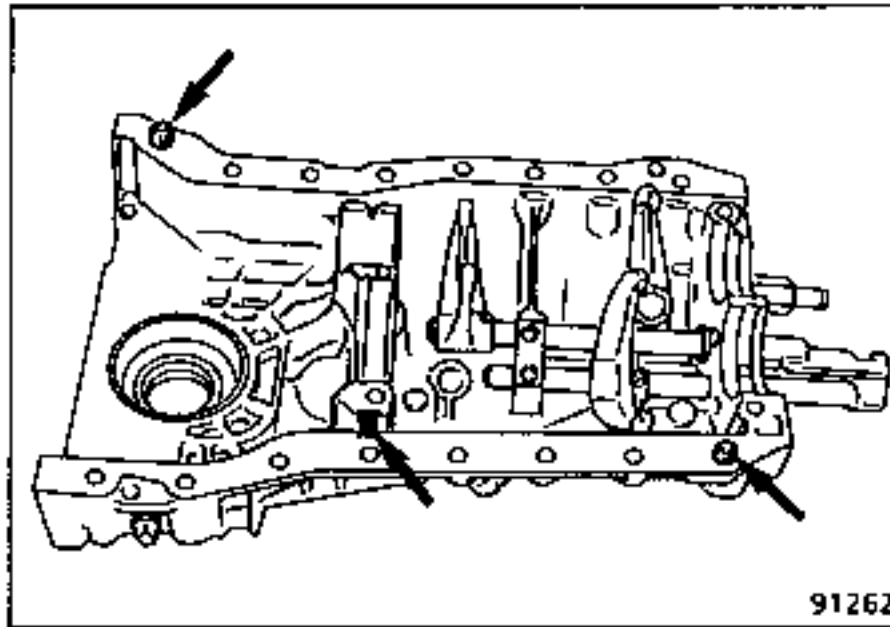
The housing assembly faces must be flat but slight damage can be stoned down.

ASSEMBLING THE HOUSINGS

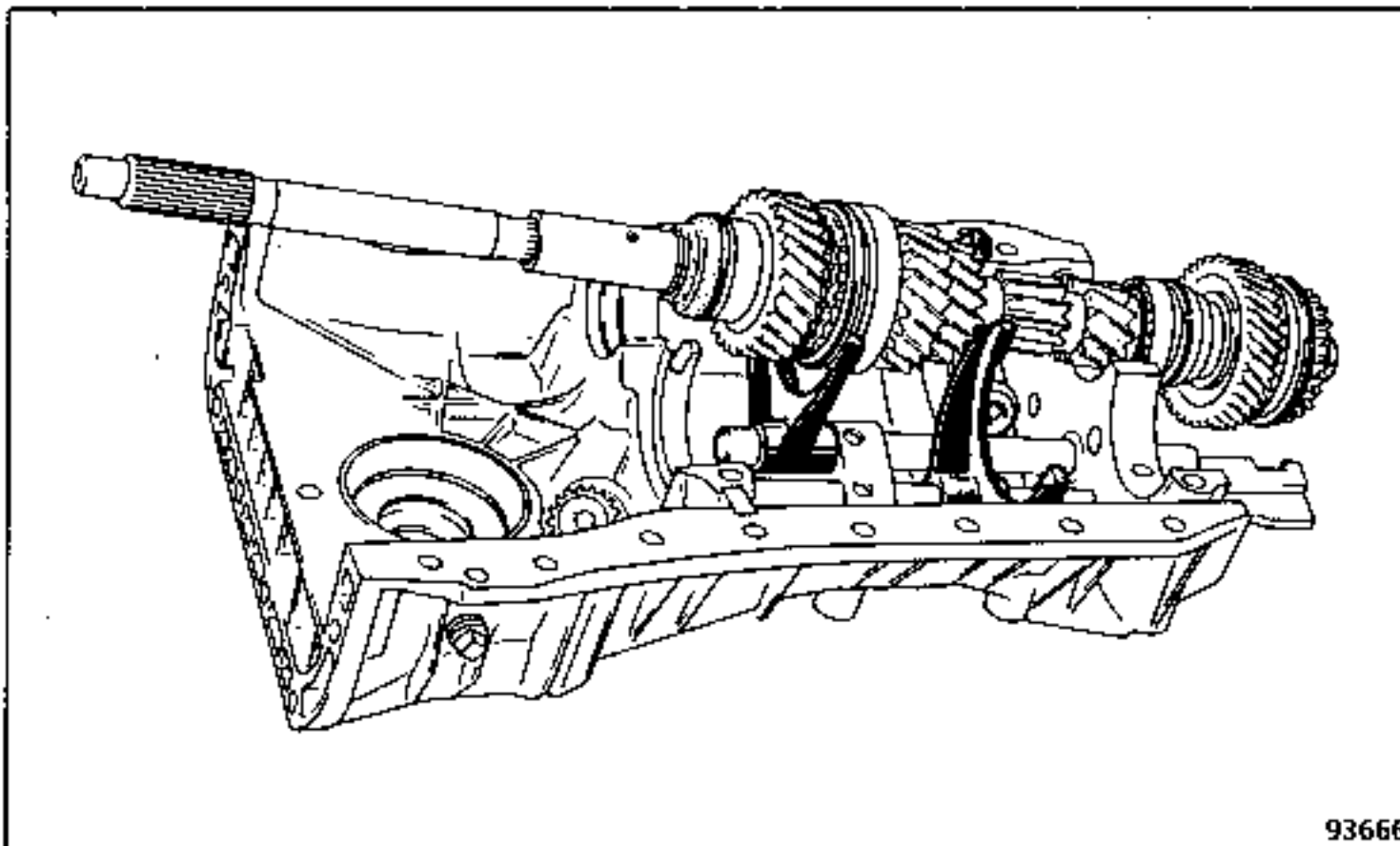
1. On the right hand housing

Ensure that the following are correctly positioned:

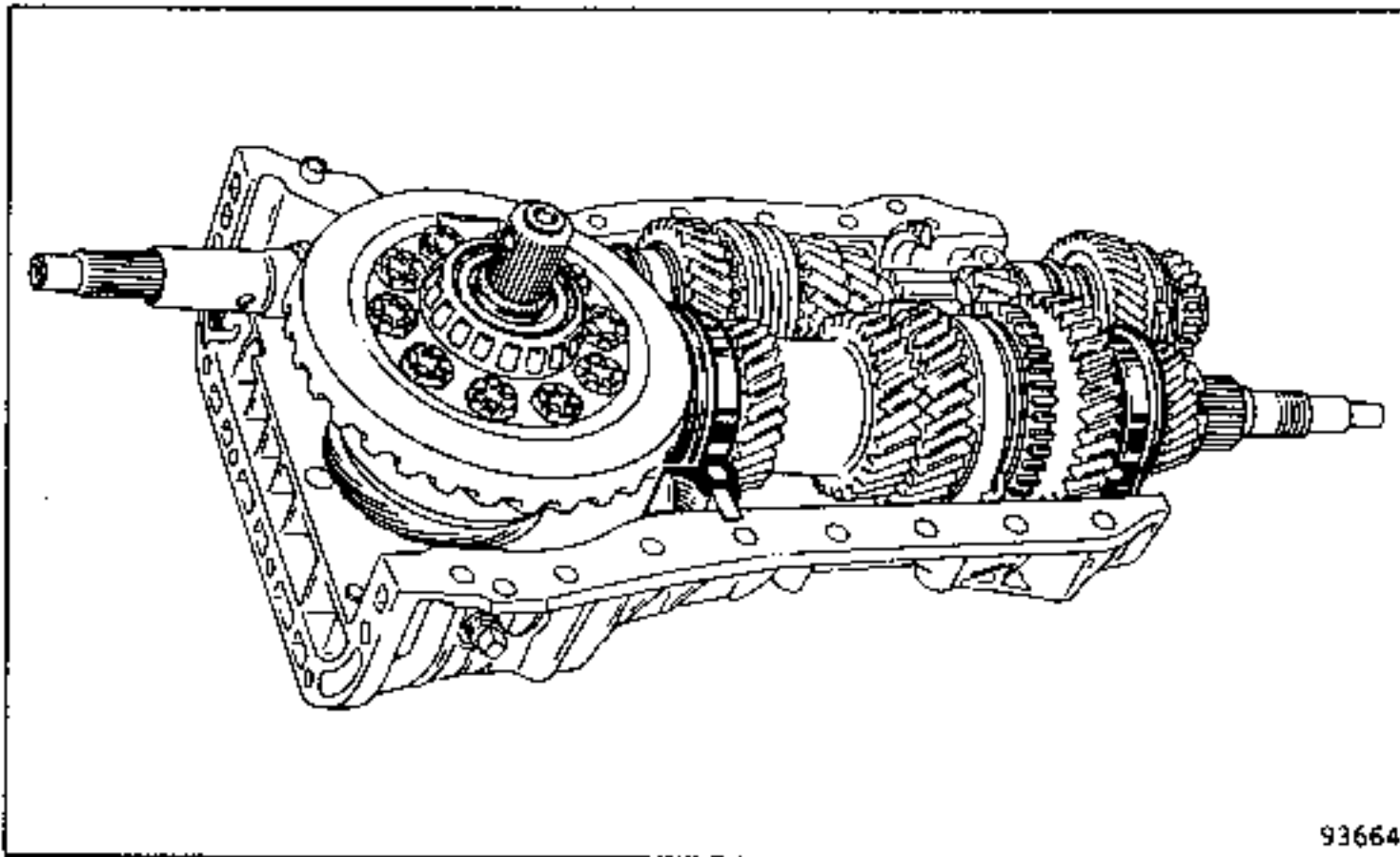
- the 2 locating dowels,
- the magnet in its location,
- the 1st/2nd, 3rd/4th and 5th speed shift shafts in the neutral position.



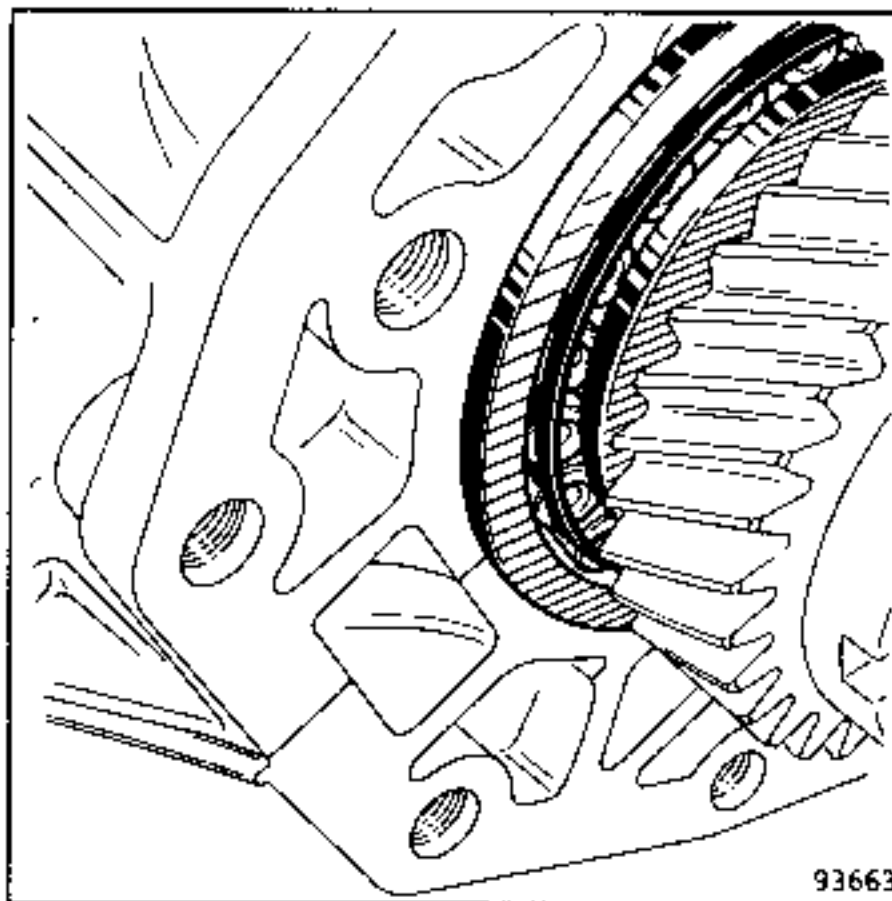
Fit the primary shaft, placing the forks in the grooves on the corresponding sliding gears.



Place the secondary shaft, final drive pinion and finally the differential in position.



Ensure that the bearing track rings are correctly positioned.



Coat the joint faces on the housings with "LOCTITE 518".

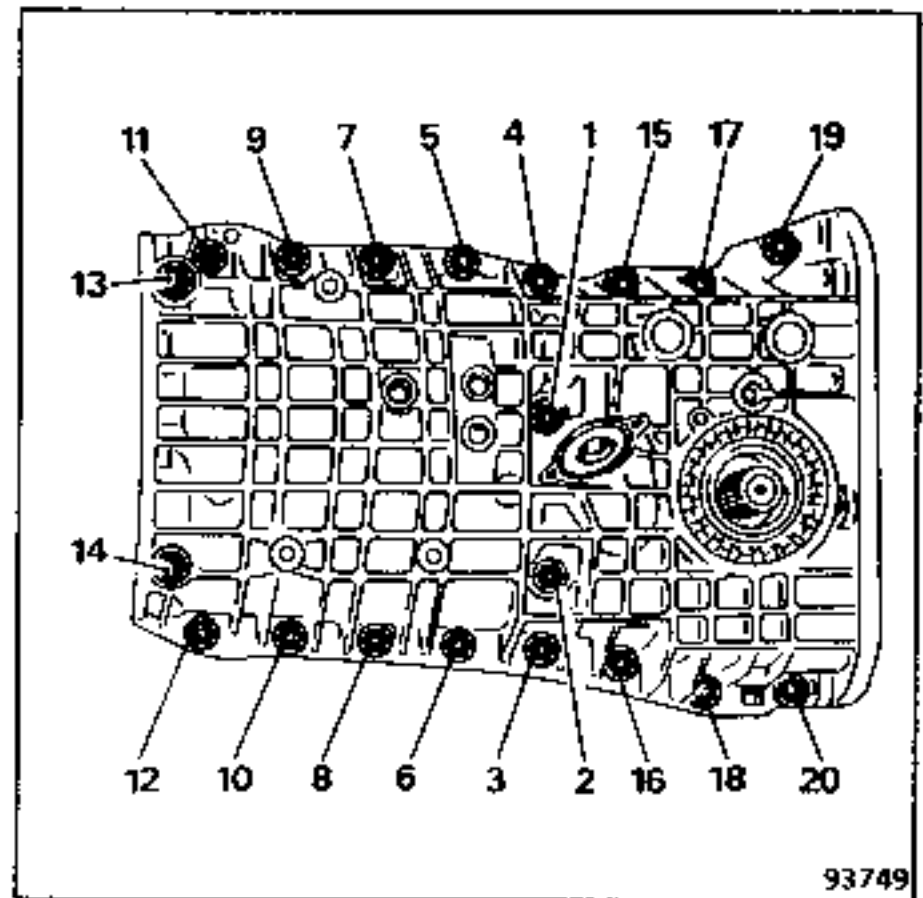
On the left hand housing, place the reverse idle gear against the front bearing (differential end).

Assemble the housings taking care to place the end of the reverse selector in the groove in the idle gear.

Fit and run up the housing securing bolts.

Lock the sun wheels using tools B.Vi.1180.

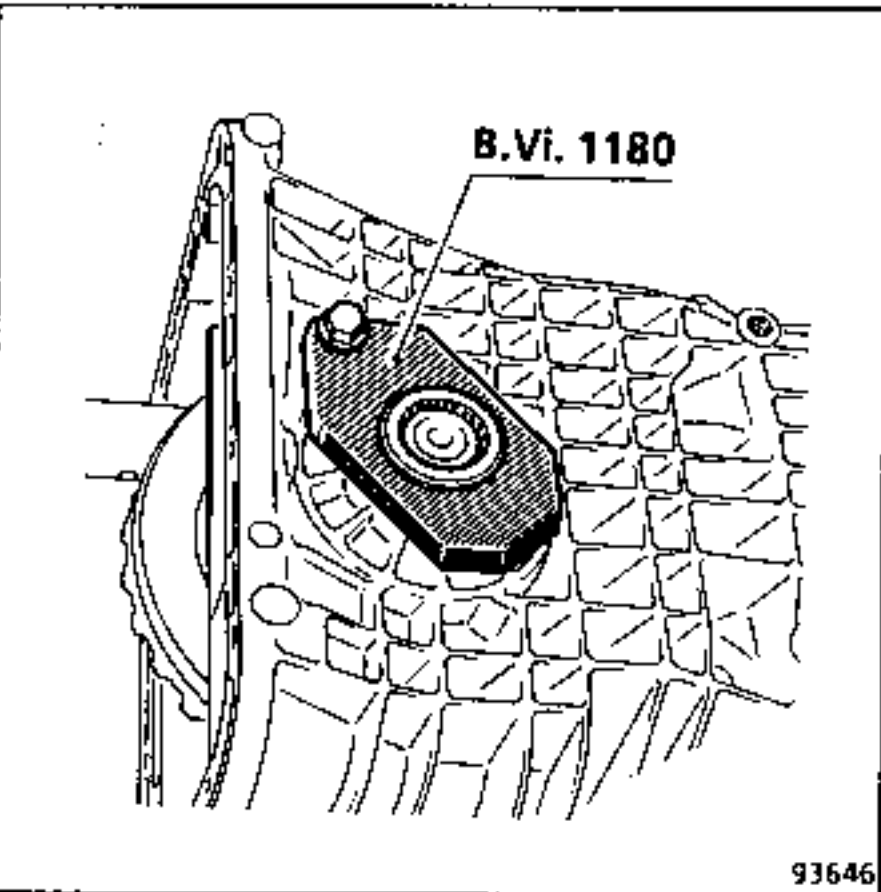
Tighten the housing bolts in the order shown, to the specified tightening torques.



93749

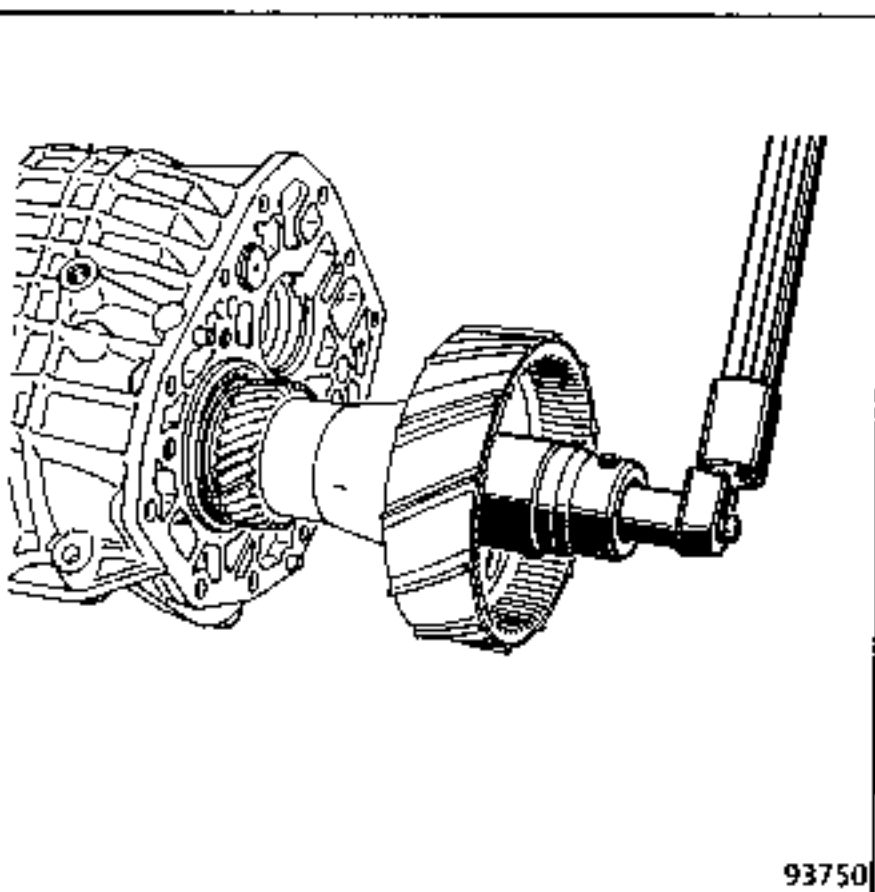
IMPORTANT : The bolts are to be tightened to torque within the 5 minutes following the assembly of the housings, because of the hardening of the Loctite 518.

After assembling the half-housings, it is essential not to pull out the reverse idle gear shaft, even partially, as one of the friction washers could fall down inside the gearbox.



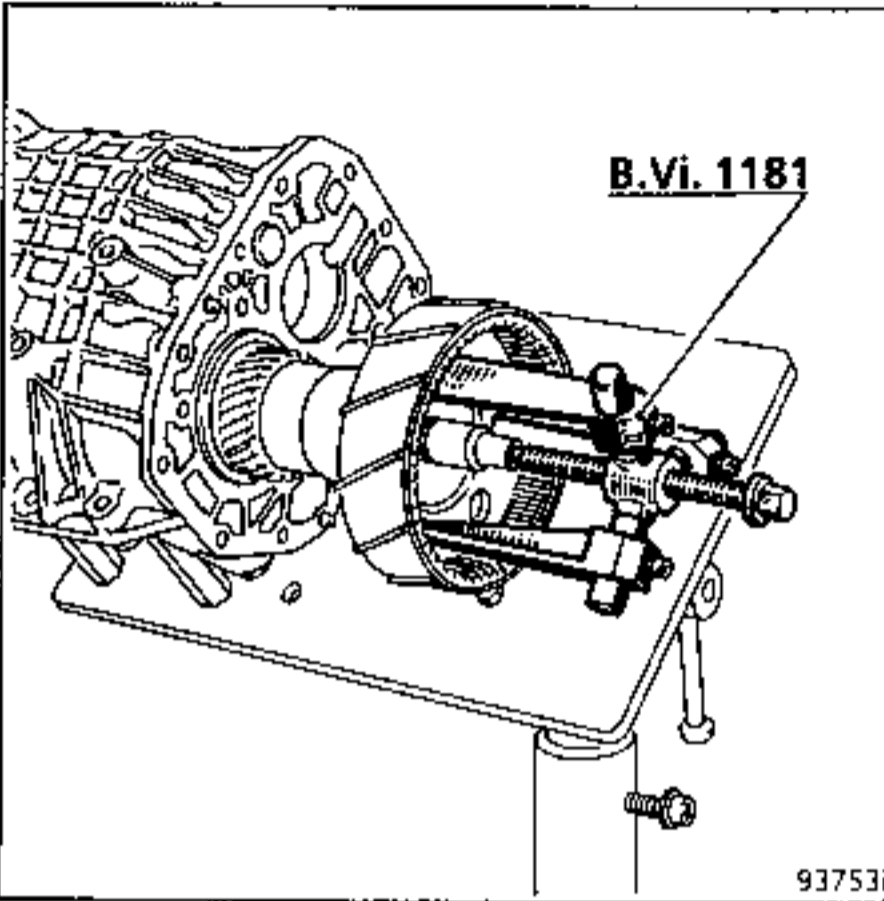
93646

Pre-tighten the final drive pinion nut (whilst turning the drive casing) to a torque of 2 to 3 daN.m.



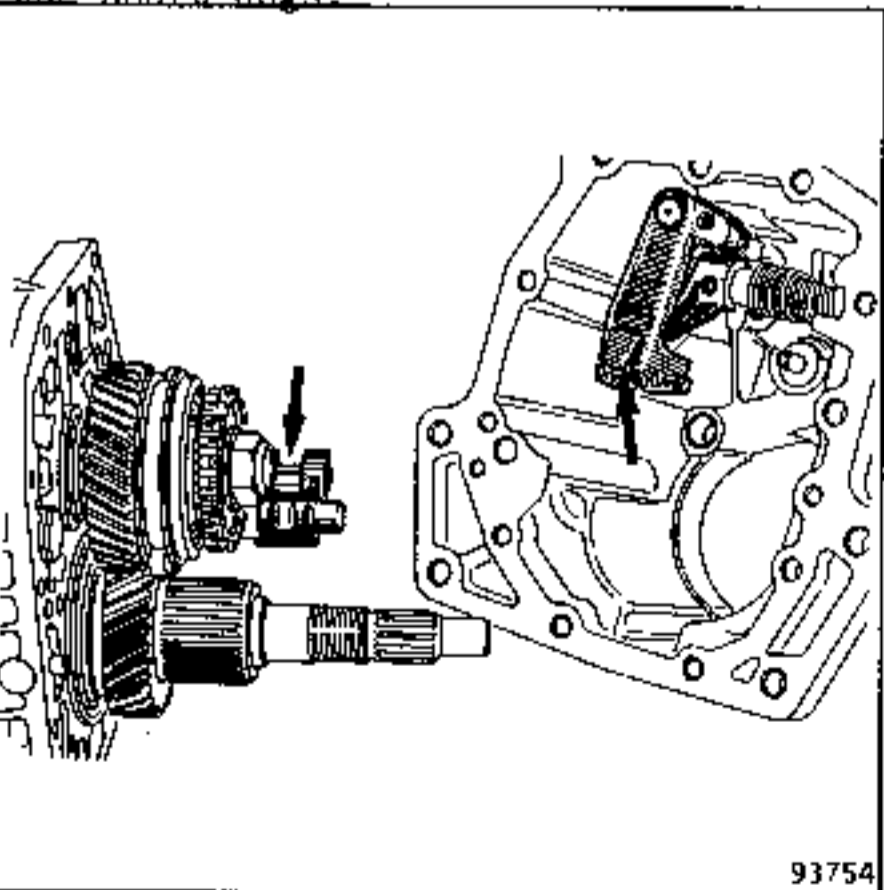
93750

Remove the final drive pinion nut and extract the drive casing using tool B.Vi.1181.



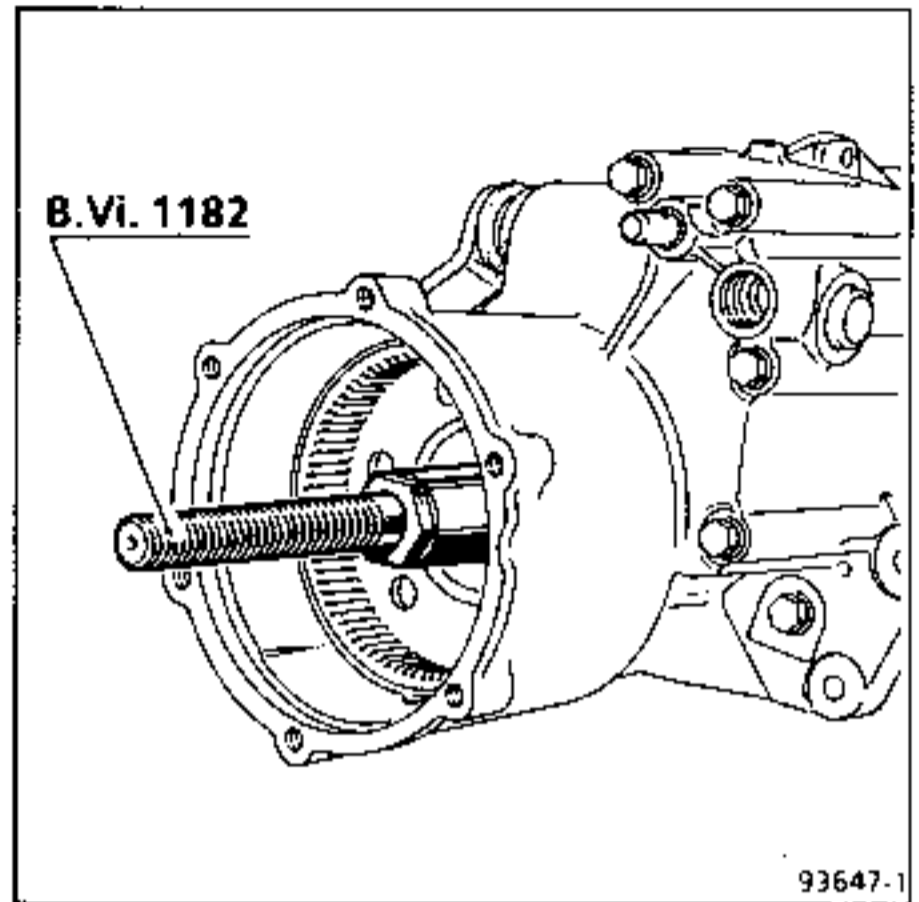
Coat the intermediate housing paper gasket with "Perfect Seal" and place it in position.

With the gearbox in neutral, fit the housing, taking care to place the selector lever and the locking rocker in the shaft dogs.

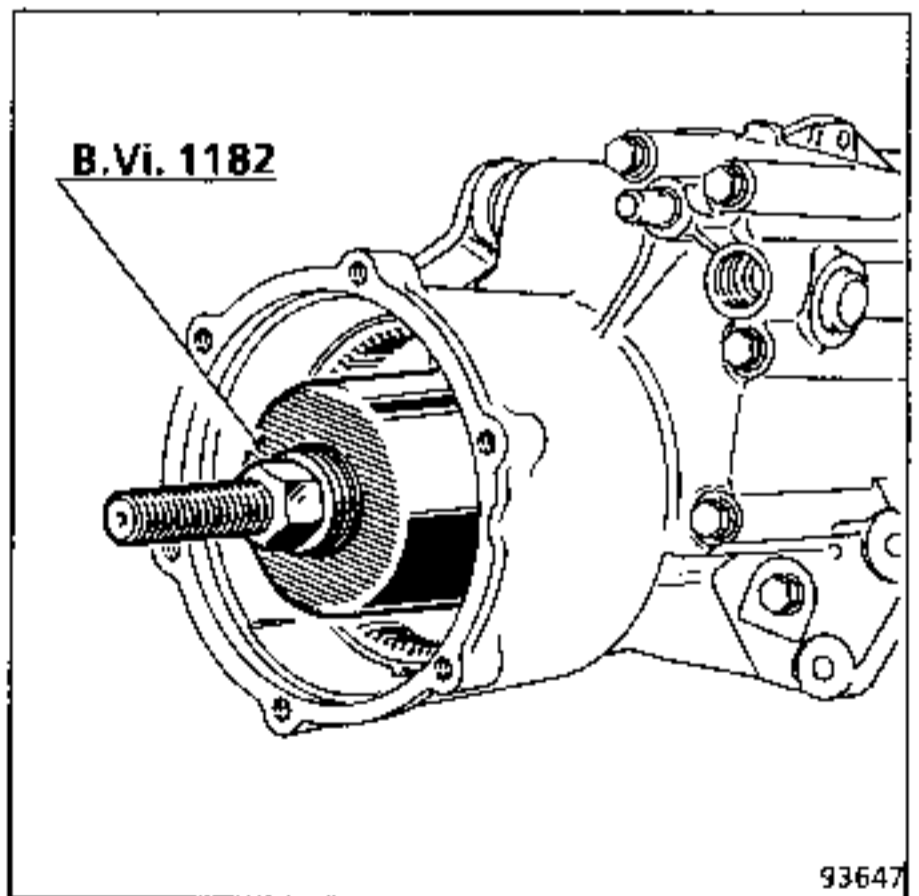


Fit and tighten the bolts to the specified torque.

Fit the input casing to the secondary shaft and screw tool (A) B.Vi.1182 onto the final drive pinion.

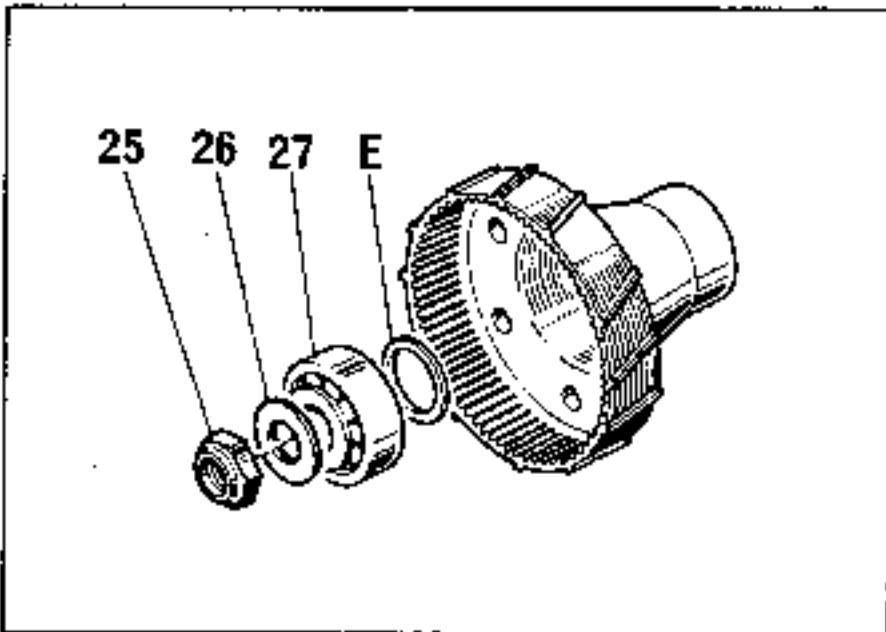


Push in the input casing using tool (B) B.Vi.1182.

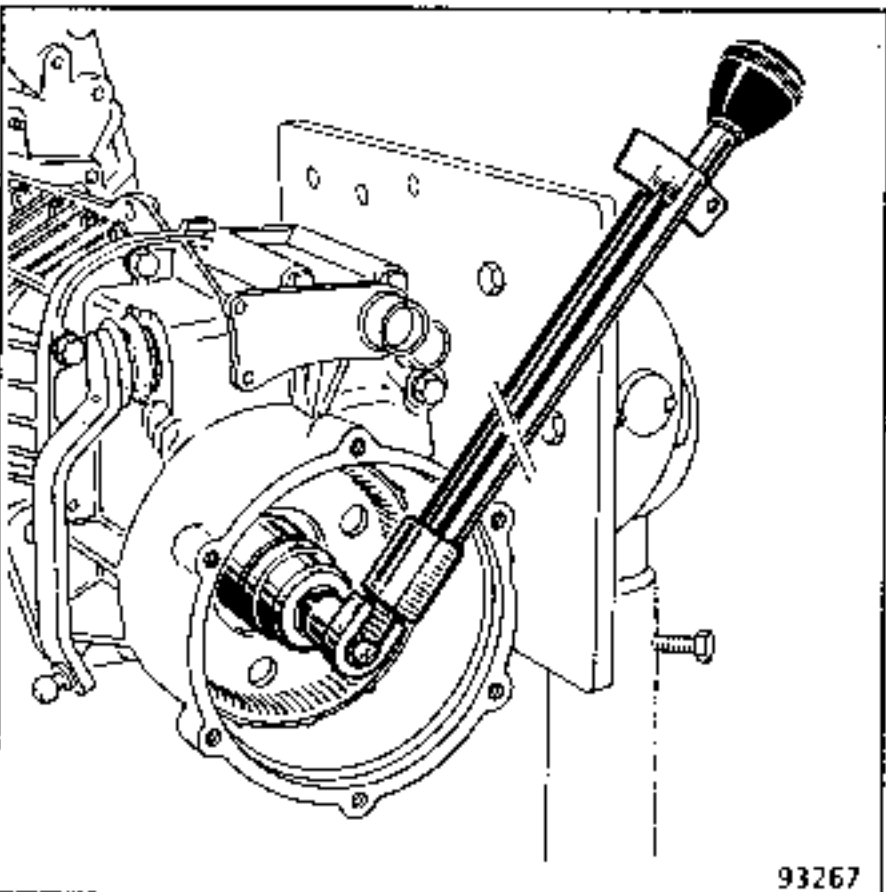


Remove the tool and fit :

- the pre-load adjusting shim,
- the bearing,
- the spring washer,
- the nut with its thread coated with Loctite Scelbloc.



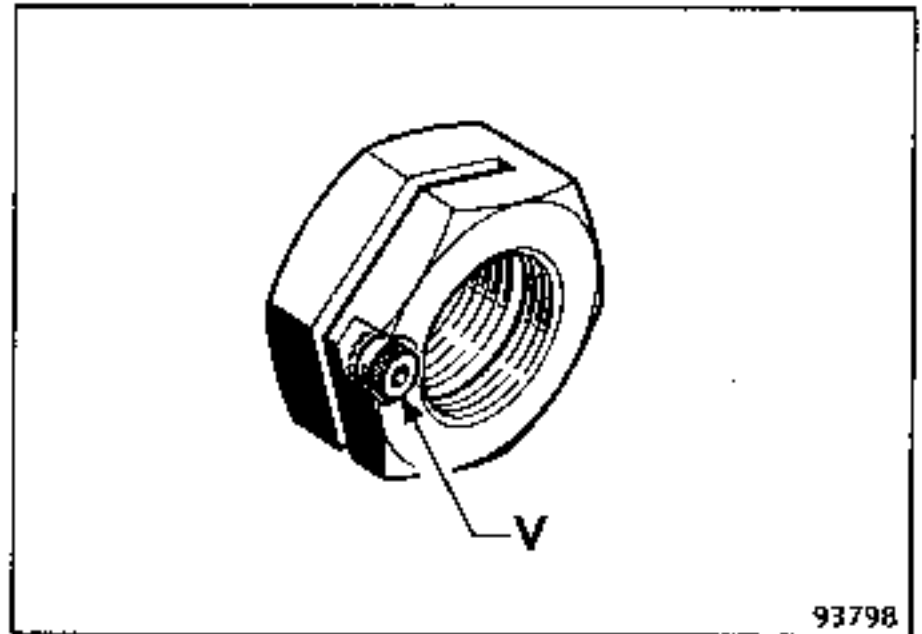
Whilst turning the casing, tighten the nut to the specified torque.



93267

1st arrangement

Lock the nut by tightening screw (V) to a torque of 0.23 daN.m to 0.28 daN.m. 3 mm allen key.

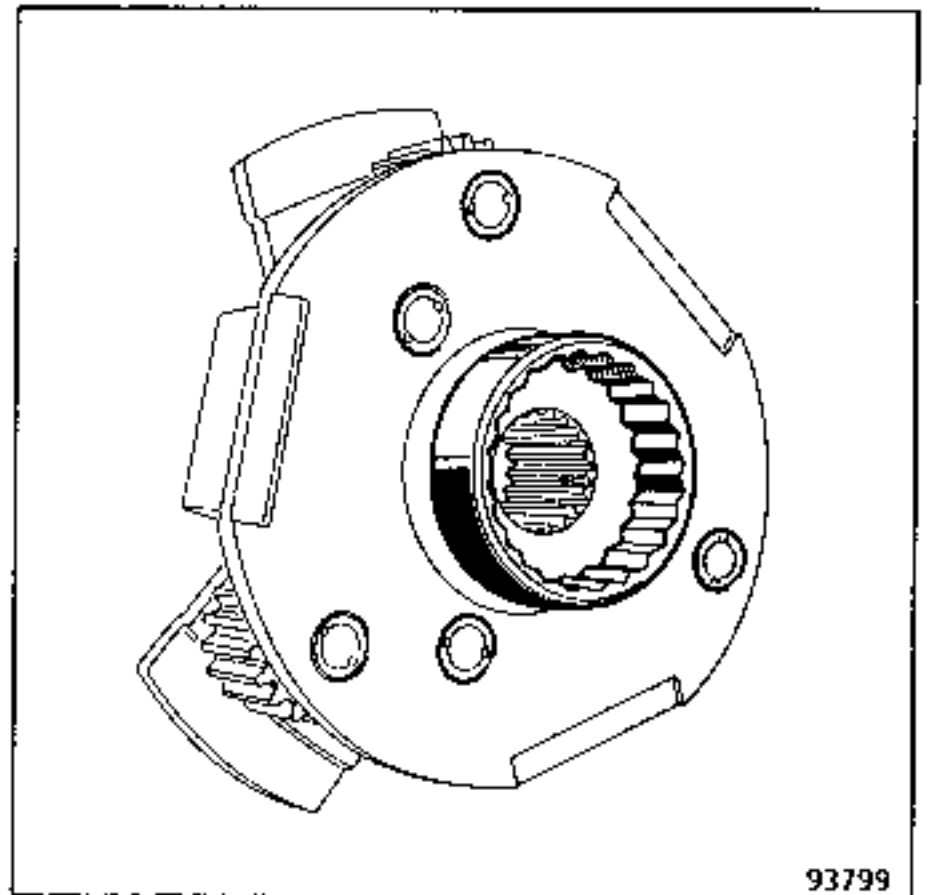


93798

Remove tools B.Vi.1180 from the sun wheels and check that the assembly rotates freely.

2nd arrangement

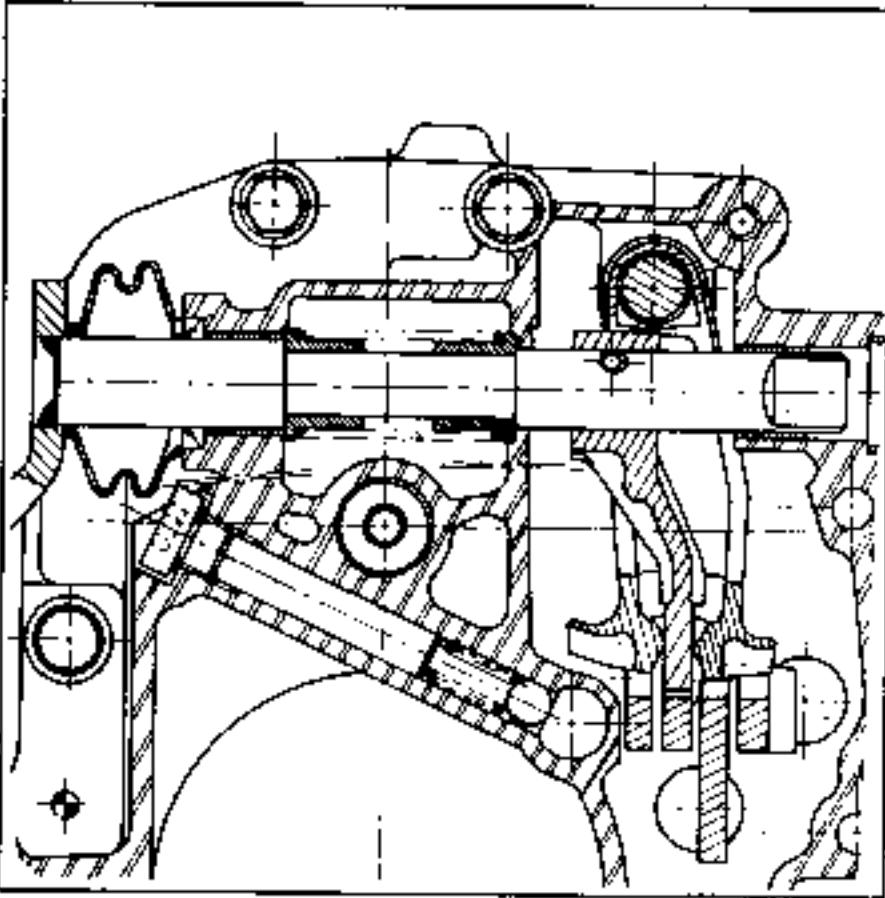
The planet wheel carrier has a serrated bush welded to the hub which locks the nut on the final drive pinion.



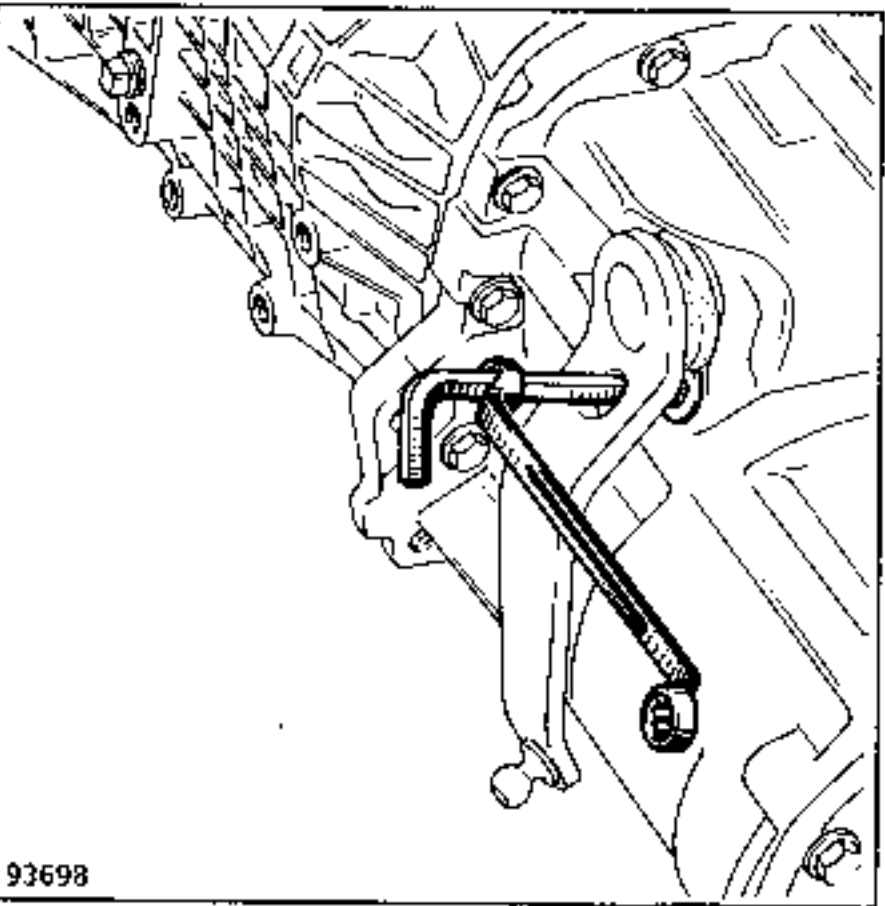
93799

NOTE : Fit the planet wheel carrier and find the position in which it will fit over the splines on the final drive pinion and the ring on the nut.

Refit the 5th speed locking assembly:
ball, spring, spacer.

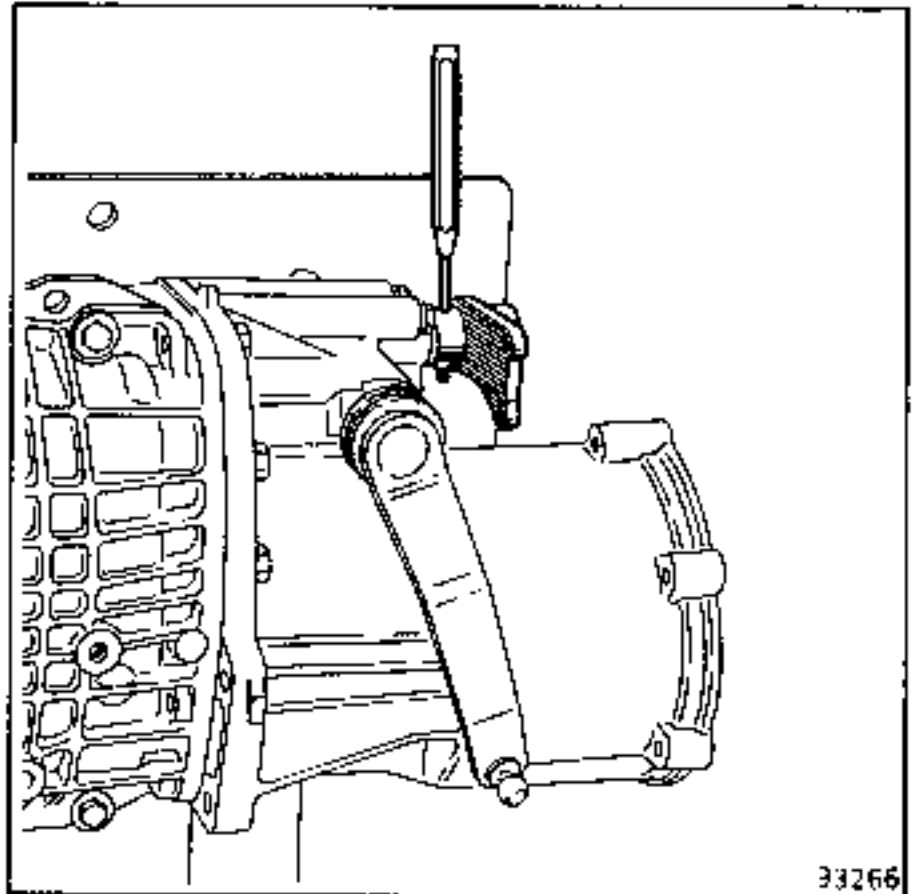


and the plug coated with CAF 4/60 THIXO.



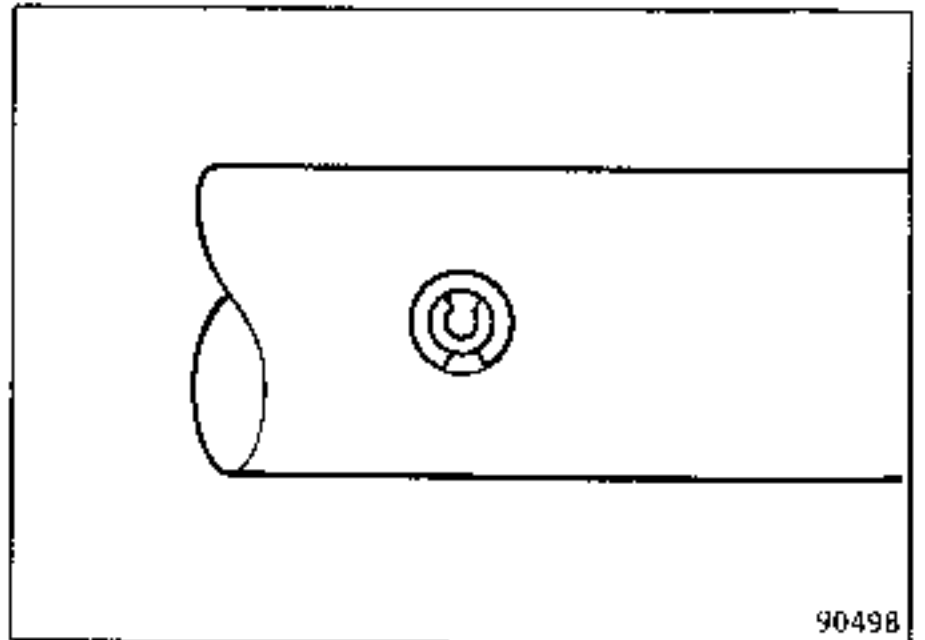
93698

Fit the dust seal to the selector shaft
and pin the ball joint casing lever in
place.



33266

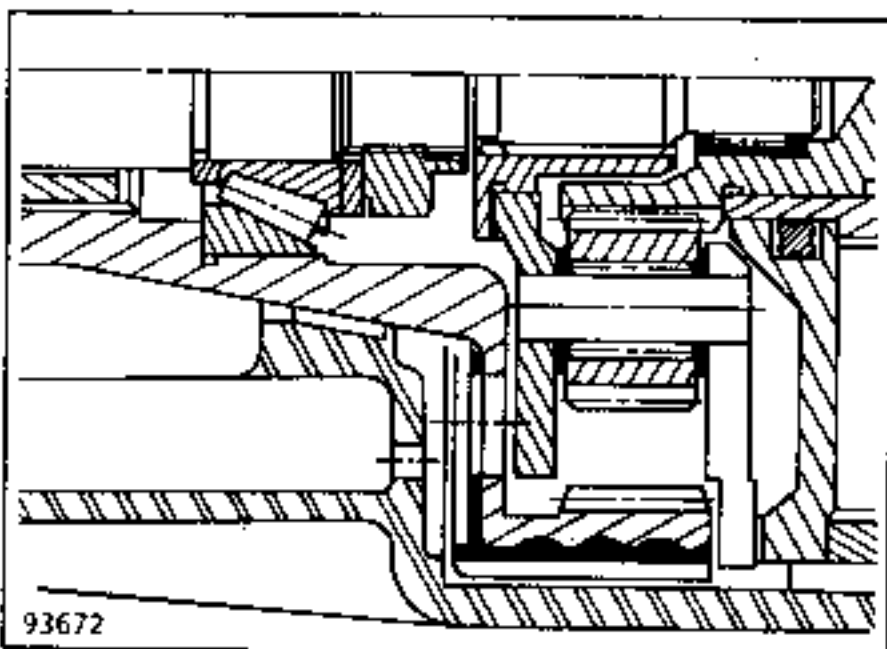
Ensure that the pins are fitted the
correct way round. The slits must be
perpendicular to the shaft centre line
and on opposite sides.



90498

Check that all the gears engage
correctly.

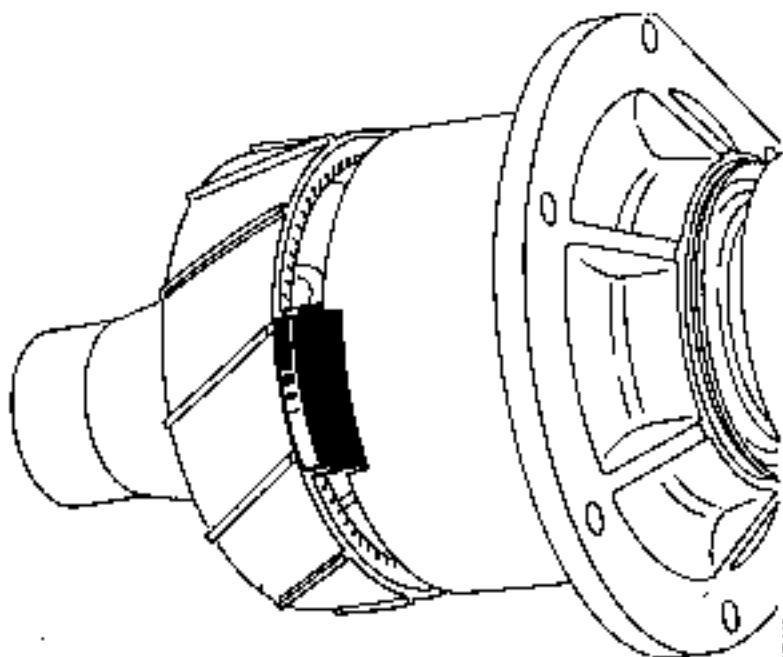
Fit the planet wheel carrier.



Fit the O ring seal (oiled) to the rear cover.

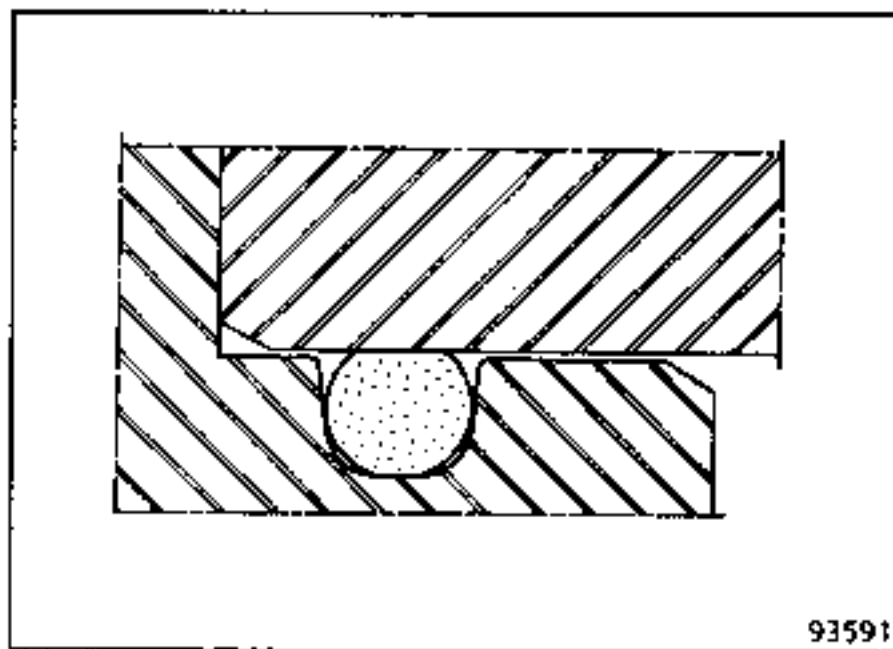
Fit the viscous coupling - cover - flange assembly in place checking that the following are correctly positioned :

- a) The planet wheel carrier in the slots on the viscous coupling.

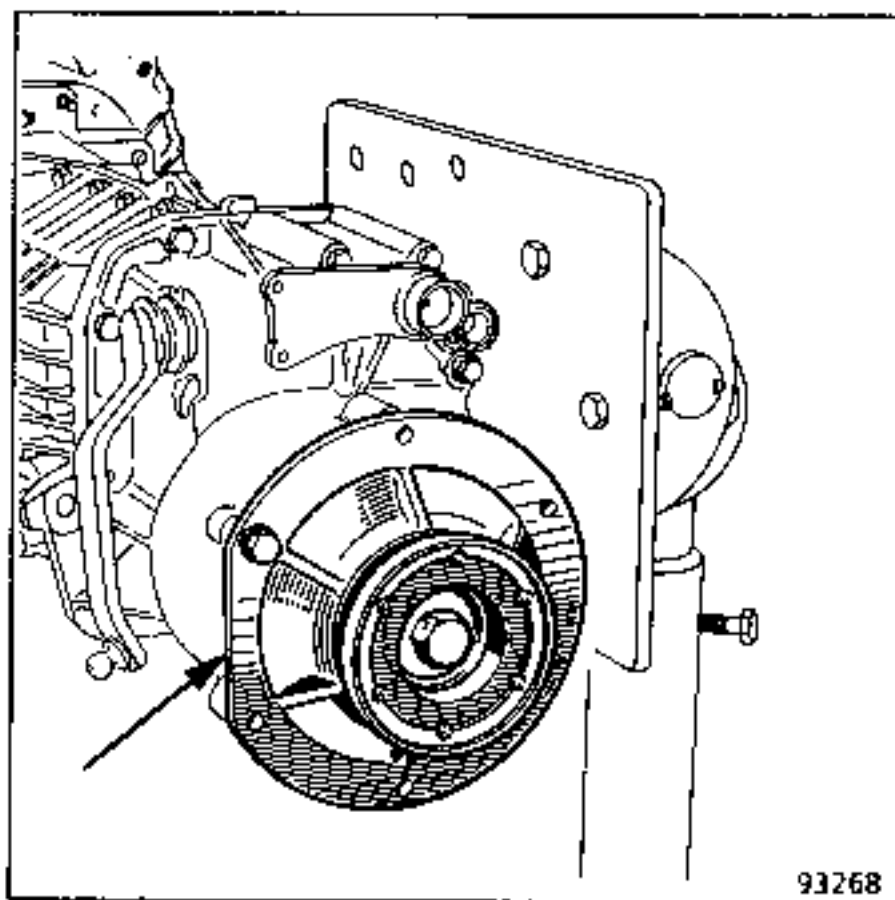


(Align them by turning the flange, without forcing it).

b) The O ring seal.



c) The cover, with reference to the intermediate housing.



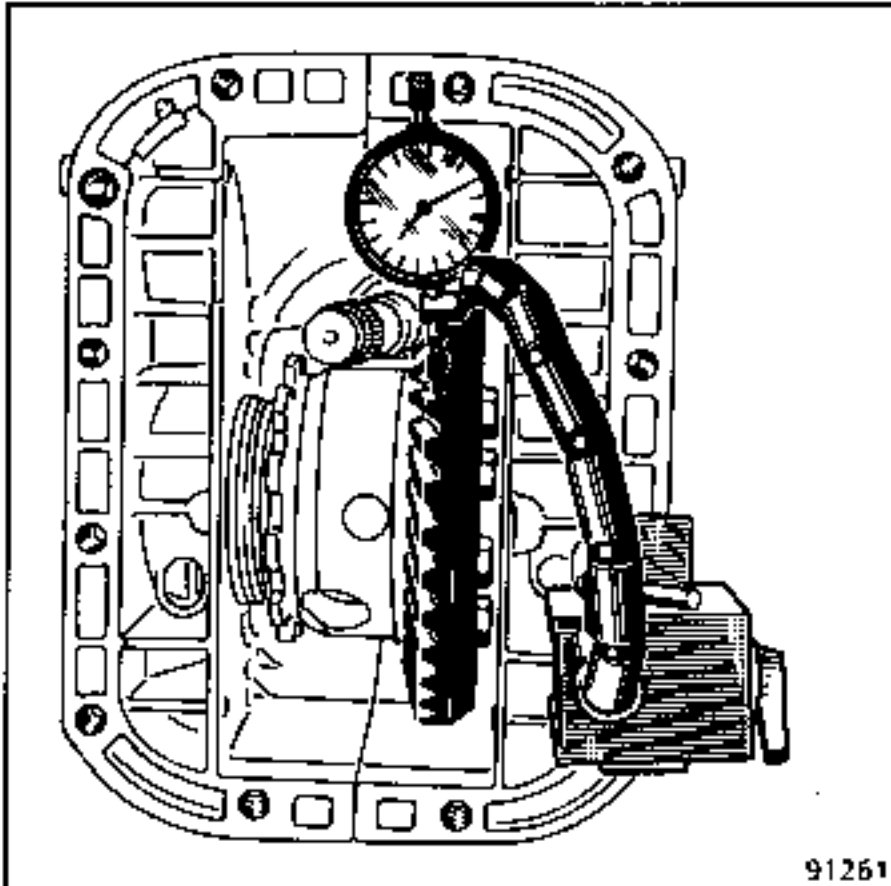
NOTE : One of the securing bolts is offset to ensure that the oil duct which lubricates the flange bearing and lip seal is correctly positioned.

Screw up evenly then tighten the rear cover securing bolts to torque.

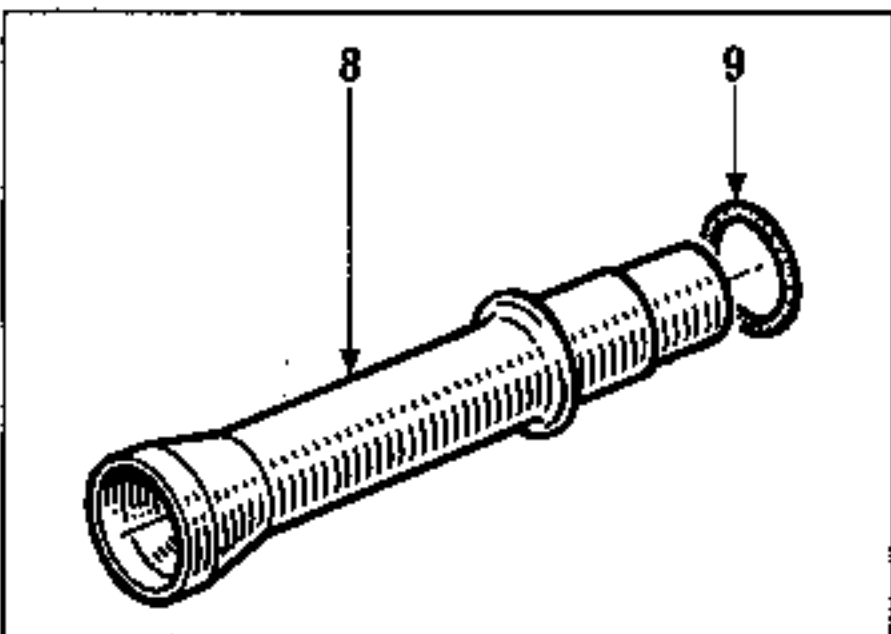
CHECKING THE BACKLASH
(at 3 points 120° to one another)

It should be between 0.12 mm and 0.28 mm.

The backlash is not adjustable, however one must check it.

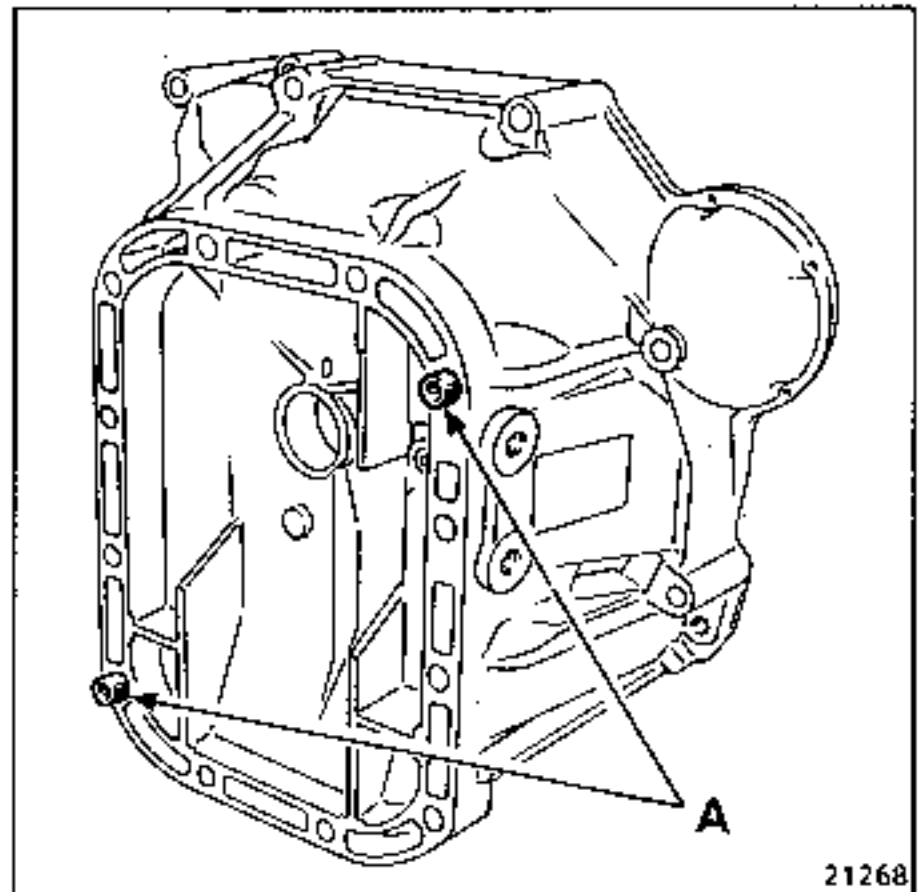


Fit the O ring (9) to the bearing guide tube (8) with the tube oil drain hole at the bottom.



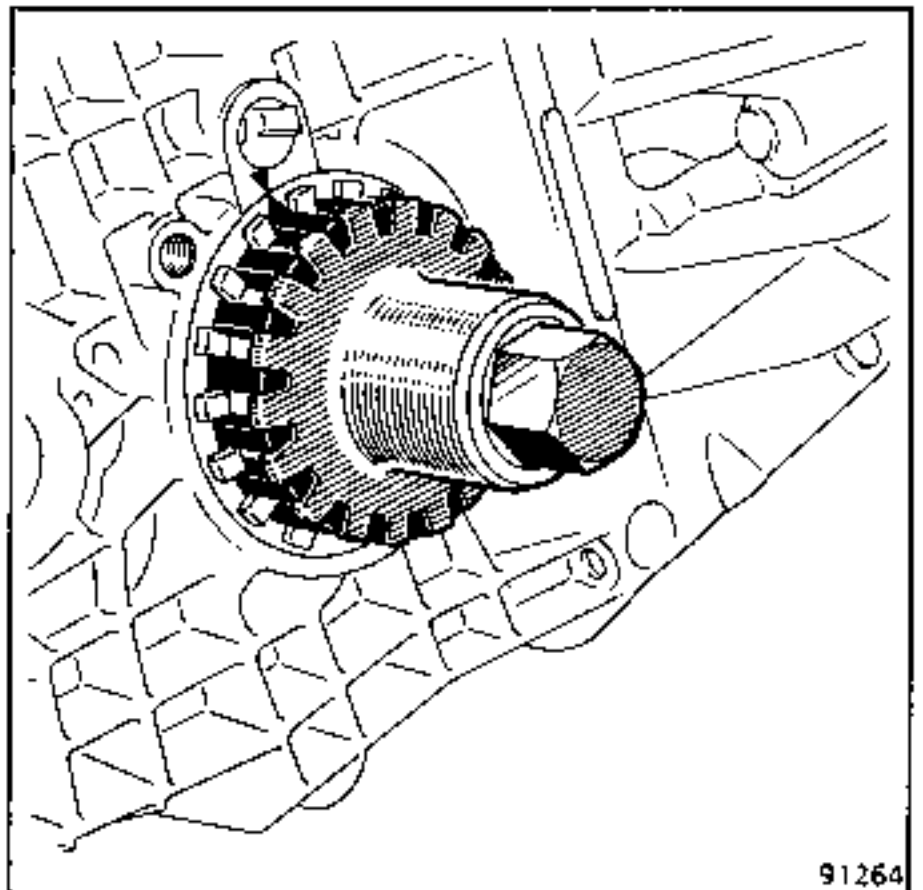
Ensure that the vent hole is unblocked.

Check that the locating dowels (A) are in position on the clutch housing.



Coat the paper gasket with Perfect Seal. Fit the housing and tighten the bolts to torque.

Using tools B.Vi.645 and B.Vi.805, re-tighten the differential nut up to the



position mark on the housing.

Lock the nut with the locking plate.

NOTE : It is not abnormal for the nut tightening torque to reach 15 daN.m (if new bearings have been fitted) before the position marks align.

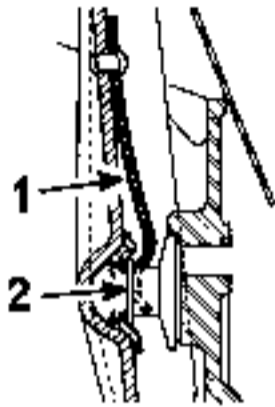
Coat the guide tube and the fork, pads and pivots with grease no. 20.

Fit the clutch fork, taking care to place the spring (1) behind the cup (2).

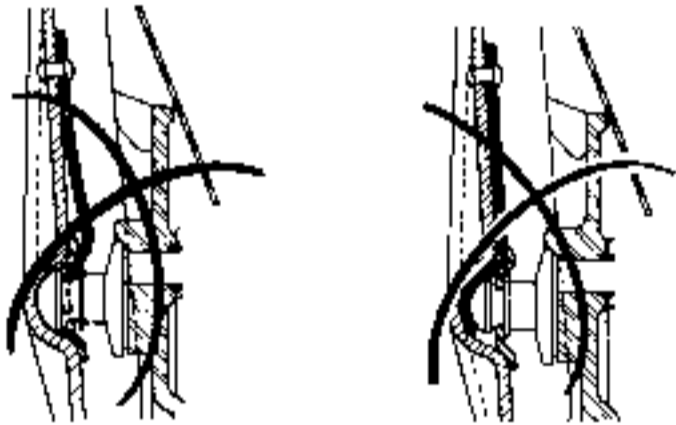
Remove the gearbox from its support (B.VI.1016).

Before refitting the gearbox to the vehicle, check that locating dowels (A) and (B) are in position on the clutch housing.

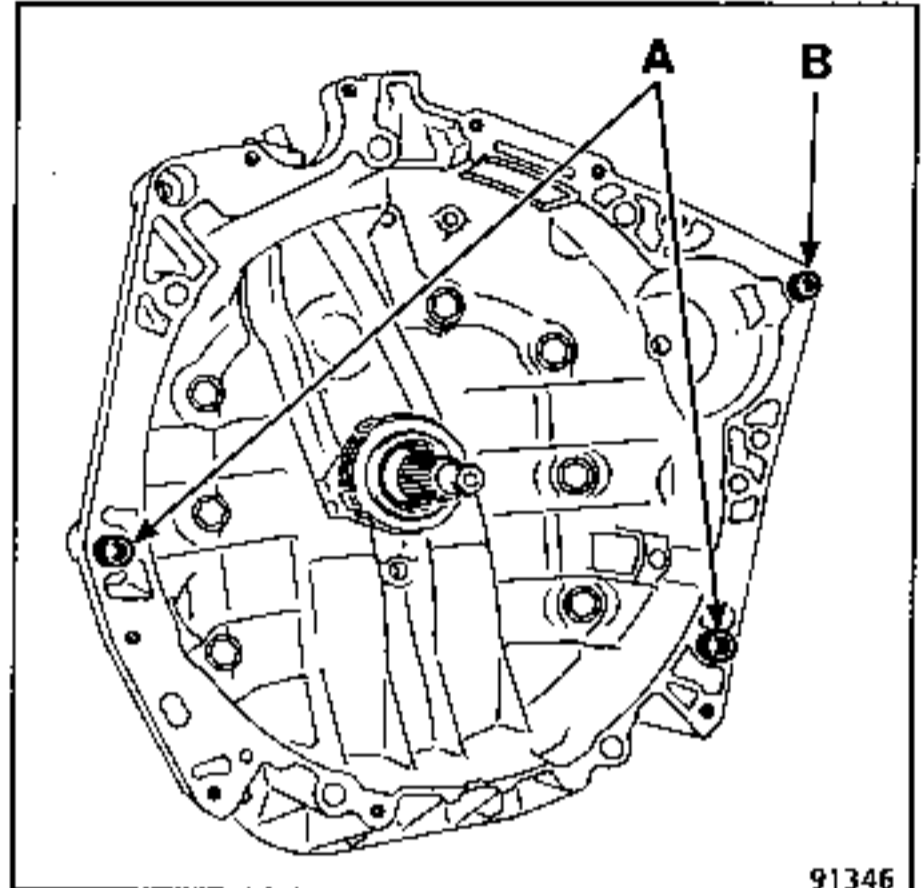
CORRECT



INCORRECT

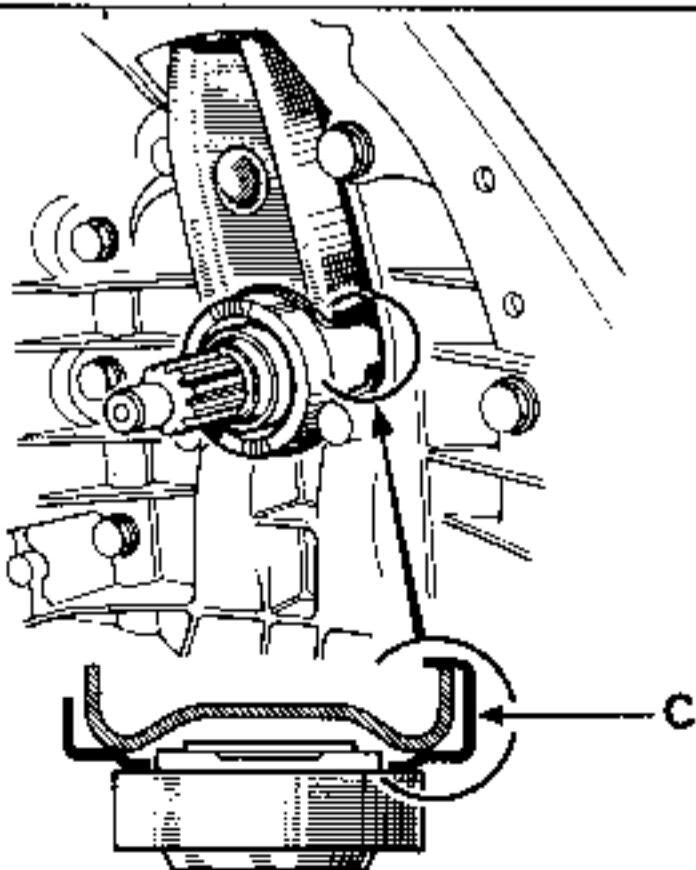


85862



91346

Tilt the fork and fit the lug (C) on the release bearing behind the fork.



77799

- | | |
|------------------------------------|---|
| 1 - Clutch housing | 57 - Thrust washer |
| 2 - Mechanism housings | 58 - Roller bearing |
| 3 - Intermediate housing | 59 - Circlip |
| 4 - Rear cover | 60 - Lip seal |
| 5 - O ring | 61 - O ring |
| 6 - Ball race | 62 - Spring pin |
| 7 - Circlip | 63 - Nut |
| 8 - Release bearing guide tube | 64 - Spring washer |
| 9 - O ring | 65 - 5th speed dog |
| 10 - Clutch shaft | 66 - Synchroniser spring |
| 11 - Primary shaft | 67 - Sliding gear |
| 12 - Secondary shaft | 68 - 5th speed idle gear - hub |
| 13 - Final drive bearing | 69 - Needle race |
| 14 - Crown wheel | 70 - Bush |
| 15 - Differential housing | 71 - Thrust washer |
| 16 - Sun wheels | 72 - Double taper roller bearing |
| 17 - Input casing | 73 - Reverse shaft |
| 18 - Planet wheel carrier | 74 - Washers |
| 19 - Rear output shaft (sun wheel) | 75 - Reverse idle gear |
| 20 - Viscous coupling | 76 - Reverse selector |
| 21 - Output flange | 77 - Corrugated washer |
| 22 - Circlip | 78 - Selector bolt |
| 23 - Securing bolt | 79 - Ball joint casing support lever sleeve |
| 24 - Needle race | 80 - Dust seal |
| 25 - Nut | 81 - O rings. |
| 26 - Spring pin | 82 - Locking rocker |
| 27 - Taper roller bearing | 83 - Shift lever - shaft |
| 28 - Pre-loading shim | 84 - Selector lever |
| 29 - Needle race | 85 - Spring |
| 30 - Circlip | 86 - Half-shells |
| 31 - Taper roller bearing | 87 - Bellows |
| 32 - Needle race | 88 - 5th speed locking plug |
| 33 - 2nd speed idle gear | 89 - 5th speed locking plunger |
| 34 - Synchroniser spring | 90 - Locking spring |
| 35 - Synchroniser ring | 91 - Synchroniser spring |
| 36 - 1st/2nd hub - sliding gear | 92 - Synchroniser roller |
| 37 - Circlip | 93 - Breather |
| 38 - 1st speed idle gear | 94 - Speedometer drive pinion - shaft gui |
| 39 - Spacer | 95 - O ring |
| 40 - Taper roller bearing | |
| 41 - 5th speed fixed gear | |
| 42 - Slotted nut | |
| 43 - Taper roller bearing | |
| 44 - Speedometer drive worm | |
| 45 - Friction washer | |
| 46 - Planet wheel | |
| 47 - Cup | |
| 48 - Retaining pin | |
| 49 - Planet wheel shaft | |
| 50 - 3rd speed idle gear | |
| 51 - Needle race | |
| 52 - Synchroniser ring | |
| 53 - 3rd/4th hub - sliding gear | |
| 54 - Circlip | |
| 55 - Splined washer | |
| 56 - 4th speed idle gear | |

