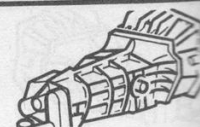




TRANSMISSION (TYPE 395)

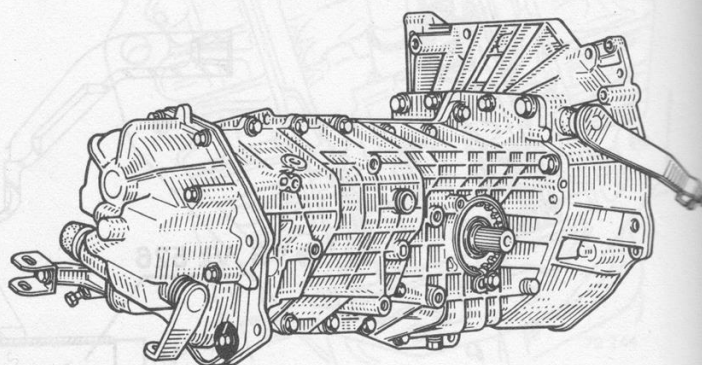
GENERAL DESCRIPTION



395 TRANSMISSION

This transmission is used in vehicles R 1341, R 1351, R 1348, and R 1358.

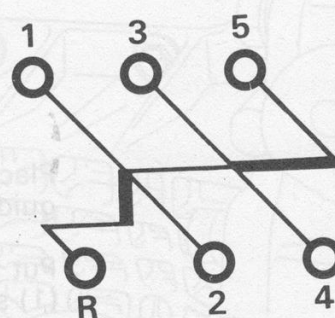
The type, index number, and manufacturing number are given on an identification plate found on the rear transmission cover.



74 008

81221

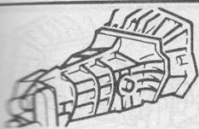
There are five synchronized forward gears:
1st-2nd: Renault Synchro
3rd-4th-5th: Borg-Warner Synchro



74 067

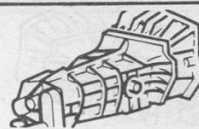
LUBRICATION:

QUALITY	QUANTITY	VISCOSITY
MIL L 2105 B or API GL 5	2 liters (about 2 qts.)	SAE 80 W hot and temperate climates SAE 75 W cold climates

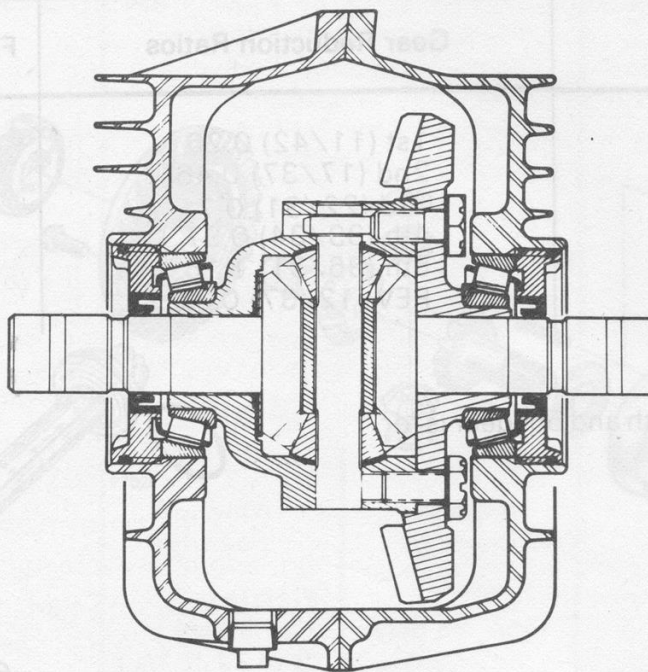


GENERAL DESCRIPTION

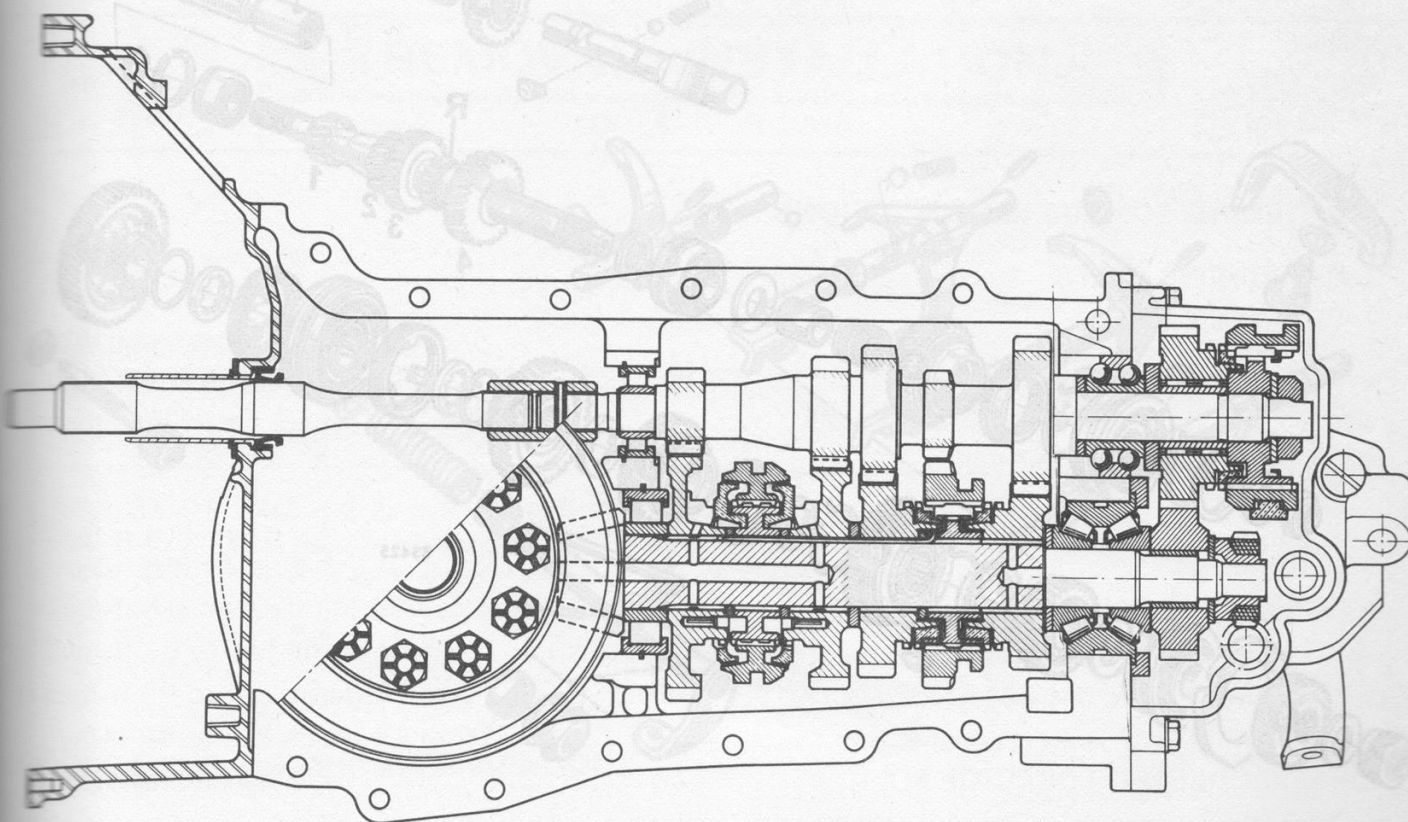
SECTIONAL VIEW



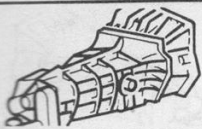
395 TRANSMISSION



81 378 .1

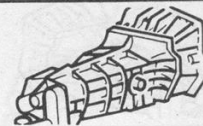


83 938



GENERAL DESCRIPTION

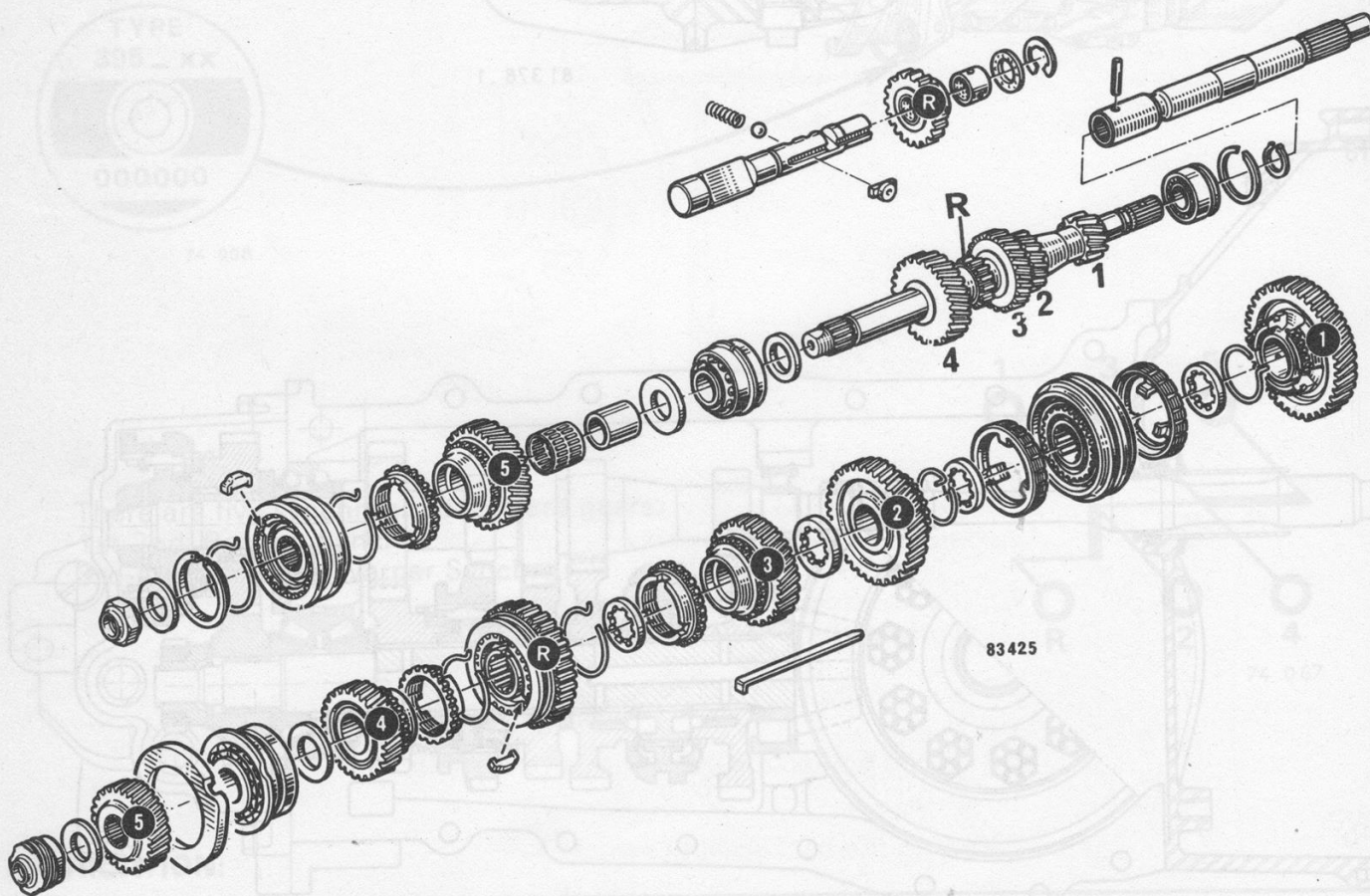
TRANSMISSION GEARS



395 TRANSMISSION

Vehicle Type	Index	Gear Reduction Ratios	Final Drive	Speedometer Drive
R 1341 R 1351 R 1348 R 1358	21	1st (11/42) 0.26 2nd (17/37) 0.46 3rd (22/31) 0.71 4th (33/34) 0.97 5th (36/31) 1.16 REV (12/37) 0.32	9/34	6/20

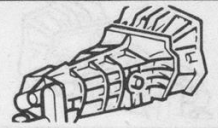
The contact switch on 4th and 5th gear is for emission control.



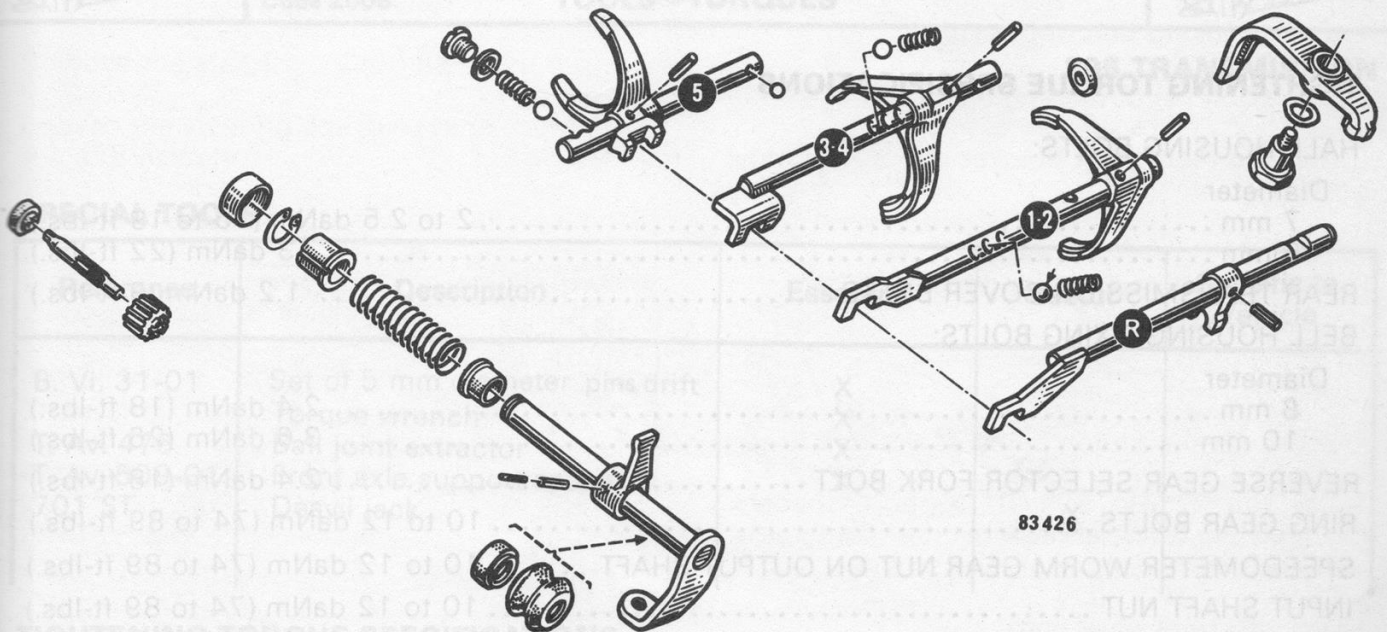
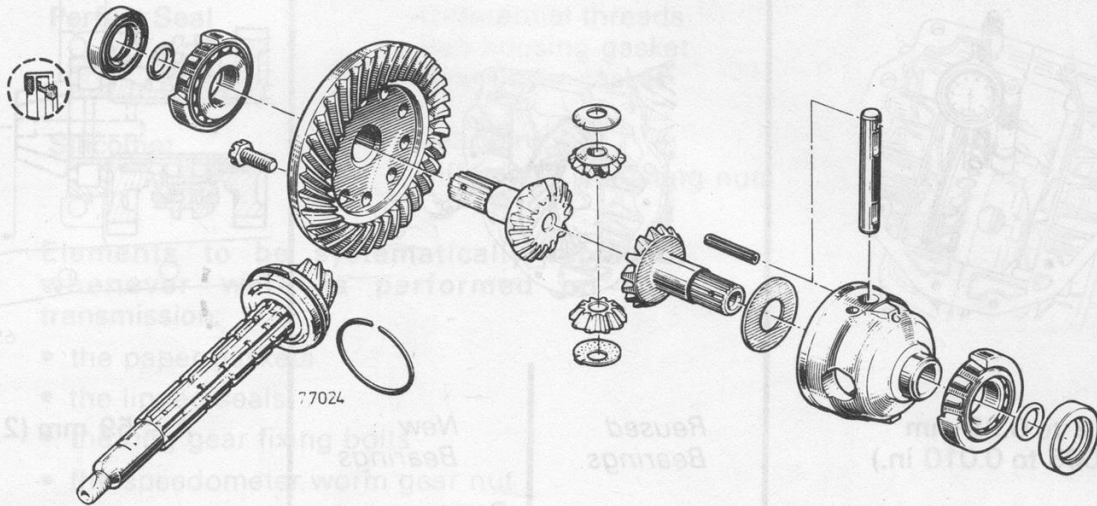




GENERAL DESCRIPTION

DIFFERENTIAL — FORKS



395 TRANSMISSION

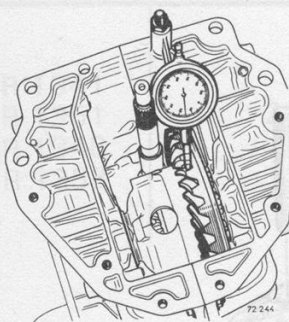


	GENERAL DESCRIPTION	
	ADJUSTMENTS—TORQUES	

395 TRANSMISSION

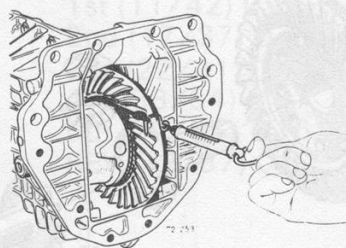
ADJUSTMENTS

Backlash



0.12 to 0.25 mm
(0.005 to 0.010 in.)

Differential bearings



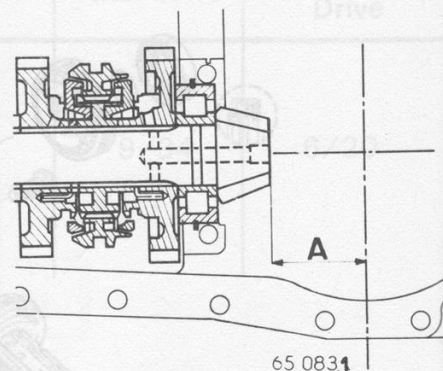
*Reused
Bearings*

Free, no play

*New
Bearings*

Prestress
1 to 3 daN
(8 to 22 ft-lbs.)

Pinion Depth



A = 59 mm (2.323 in.)

TIGHTENING TORQUE SPECIFICATIONS

HALF-HOUSING BOLTS:

Diameter	
7 mm	2 to 2.5 daNm (15 to 19 ft-lbs.)
8 mm	3 daNm (22 ft-lbs.)

REAR TRANSMISSION COVER BOLTS 1.2 daNm (9 ft-lbs.)

BELL HOUSING FIXING BOLTS:

Diameter	
8 mm	2.4 daNm (18 ft-lbs.)
10 mm	3.6 daNm (26 ft-lbs.)

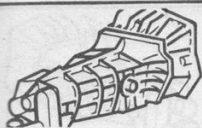
REVERSE GEAR SELECTOR FORK BOLT 2.4 daNm (18 ft-lbs.)

RING GEAR BOLTS 10 to 12 daNm (74 to 89 ft-lbs.)

SPEEDOMETER WORM GEAR NUT ON OUTPUT SHAFT 10 to 12 daNm (74 to 89 ft-lbs.)

INPUT SHAFT NUT 10 to 12 daNm (74 to 89 ft-lbs.)

DIFFERENTIAL NUT LOCKSTOP BOLT 2.4 daNm (18 ft-lbs.)



GENERAL DESCRIPTION

LUBRICANTS



395 TRANSMISSION

LUBRICANTS

Molykote BR 2 Grease Side gear splines and clutch shaft splines

Perfect Seal

Half-housing assembly surfaces
Differential threads
Bell housing gasket
Rear cover gasket

Silicomet

Gear pins
Differential adjusting nuts

Elements to be systematically replaced whenever work is performed on the transmission:

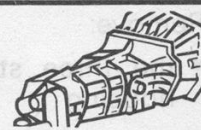
- the paper gaskets
- the lipped seals
- the ring gear fixing bolts
- the speedometer worm gear nut
- the input shaft nut
- the roll pins



REMOVAL—INSTALLATION

Code 2005

TOOLS—TORQUES



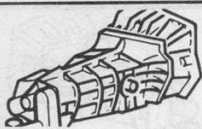
395 TRANSMISSION

SPECIAL TOOLS

Reference	Description	Essential	Useful	Specific to Vehicle
B. Vi. 31-01	Set of 5 mm diameter pins drift	X		
T. Av. 476	Torque wrench	X		
T. Av. 509-01	Ball joint extractor	X		
701 ST	Front axle support spacer	X		
	Desvil jack		X	

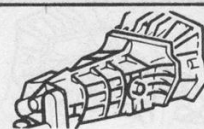
TIGHTENING TORQUE SPECIFICATIONS

Wheel nuts	8 daNm (59 ft-lbs.)
Upper suspension ball joint	5 daNm (37 ft-lbs.)
Steering ball joint	3.8 daNm (28 ft-lbs.)
Brake caliper bracket bolts	10 daNm (74 ft-lbs.)



REMOVAL—INSTALLATION

REMOVAL



395 TRANSMISSION

The transmission may be removed:

- with the engine (from the top of the vehicle) or
- by itself, using the **701 ST** Desvil jack equipped with its pins (from underneath the vehicle).

It is not necessary to drain the gear lube to perform this operation (if the transmission itself is not to be worked on) since the side gears are sealed.

REMOVAL

Disconnect:

- the battery
- the positive cables of the starter
- the power lead to the solenoid.

Remove:

- the three starter fixing bolts on the bell housing
- the rear fixing bolt of the starter.

Loosen bolt (A) of the engine mount.

Swing the rear fixing bracket into a horizontal position.

Pull the starter back the length of its nose.

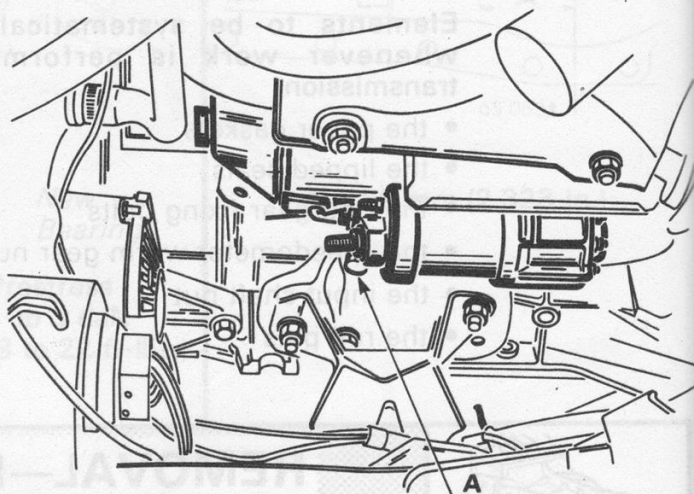
Disconnect the clutch cable at the fork lever.

Place the **T. Av. 509-01** support spacers between the lower shock absorber fixing pins and the lower suspension arm shafts.

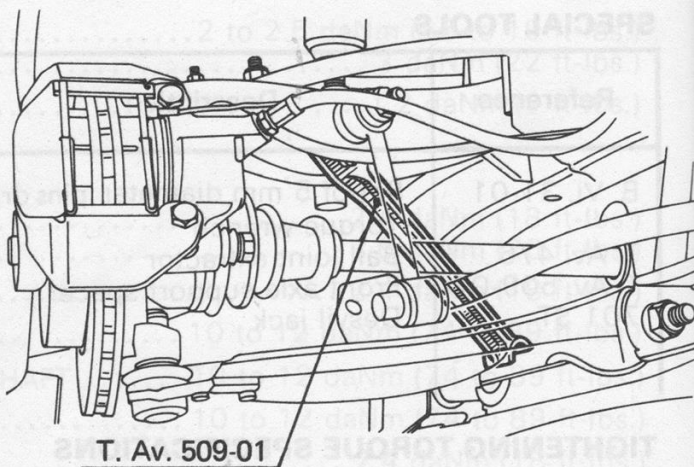
Loosen the front wheel bolts.

Raise the vehicle on a lift or jack. Make sure that the **T. Av. 509-01** spacers remain in place.

Remove the front wheels.

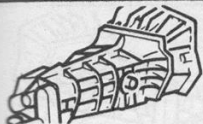


81296



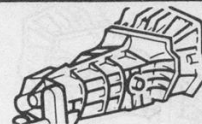
T. Av. 509-01

83199



REMOVAL—INSTALLATION

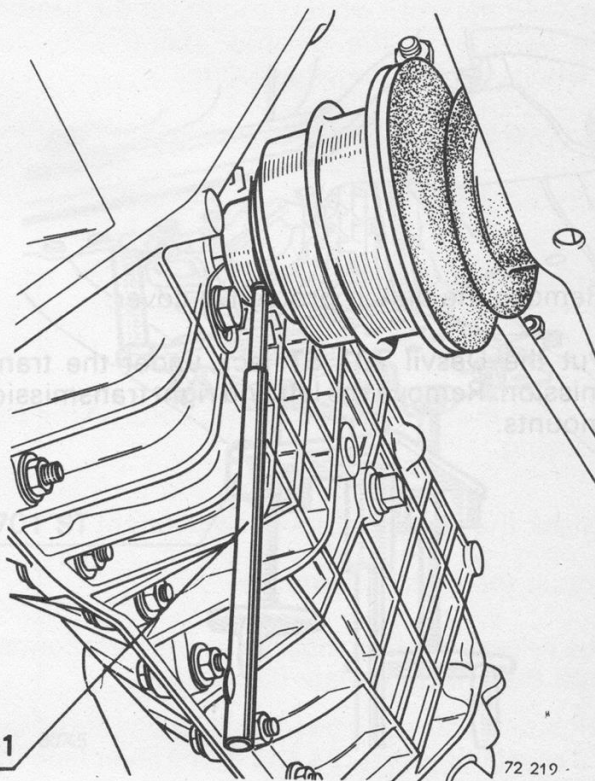
REMOVAL



395 TRANSMISSION

Remove the brake calipers (see the chapter on Brake System).

Punch out the drive shaft roll pins on the side gear shafts using the **B. Vi. 31-01** pin drift.



B. Vi. 31-01

72 219

Remove the steering tie rod ball joint nut.

Loosen the steering ball joint cone using the **T. Av. 476** extractor.

Remove the upper suspension ball joint nut.

Loosen the upper suspension ball joint cone using the **T. Av. 476** extractor.

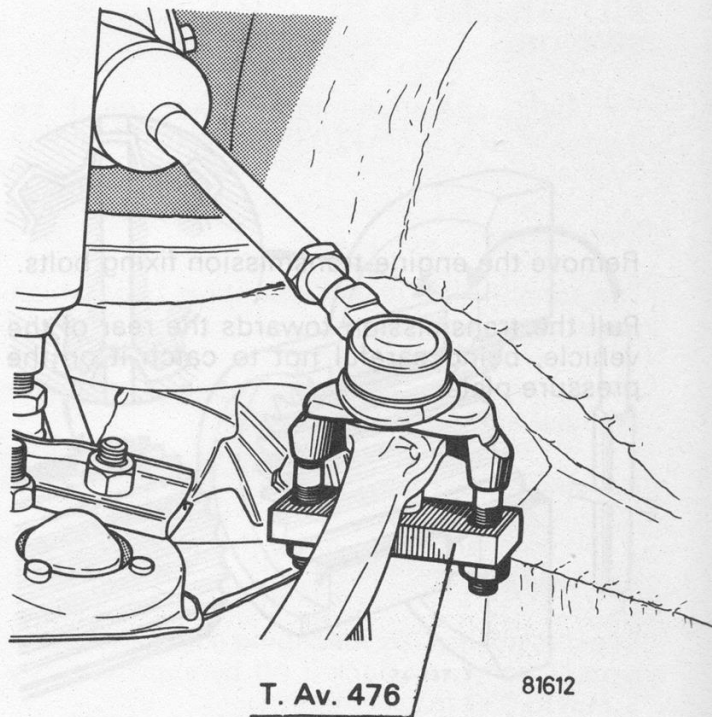
Tilt the stub axle carrier, disengaging the drive shaft from the side gear shaft.

Proceed in the same way for the other side.

Disconnect:

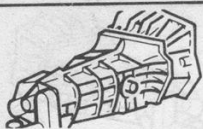
- the speedometer cable
- the input wires to the backup lights and the emission control switches
- the gear shift linkage.

DO NOT REMOVE THE GEAR SHIFT LINKAGE BALL JOINTS FROM THEIR HOUSINGS.



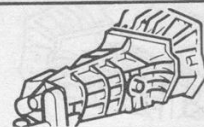
T. Av. 476

81612



REMOVAL—INSTALLATION

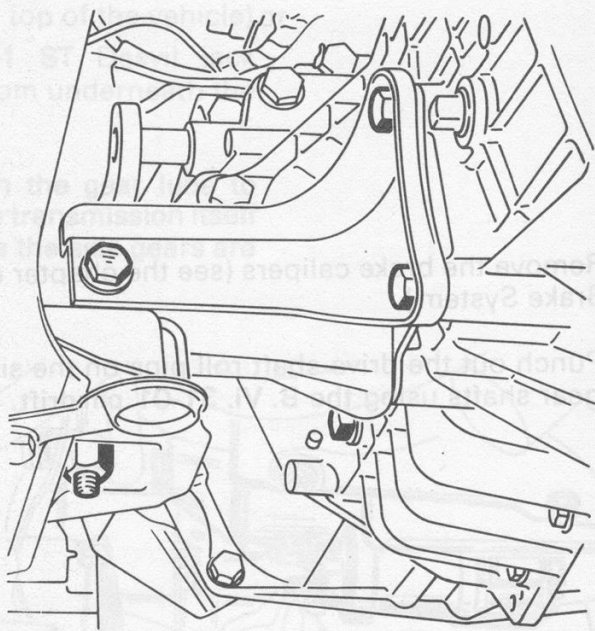
REMOVAL



395 TRANSMISSION

Remove the clutch protective cover.

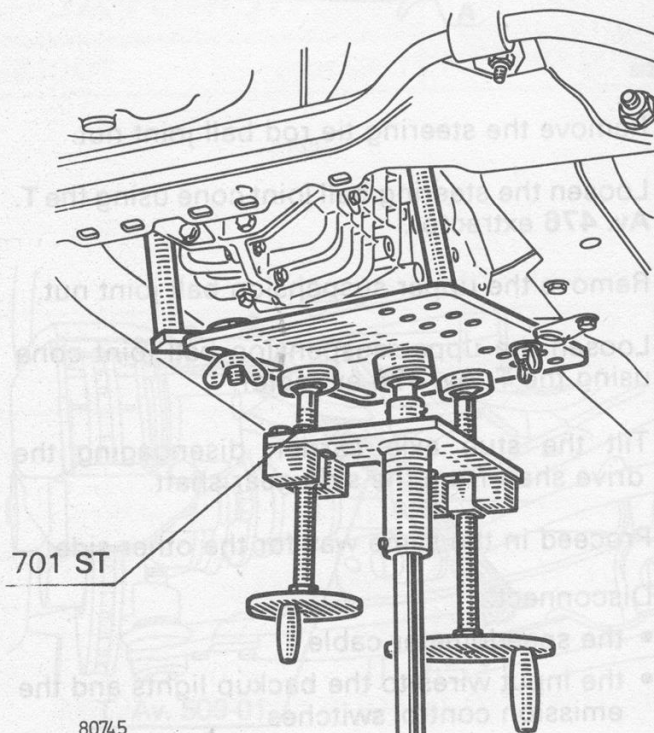
Put the Desvil **701 ST** jack under the transmission. Remove the left and right transmission mounts.



80750

Remove the engine-transmission fixing bolts.

Pull the transmission towards the rear of the vehicle, being careful not to catch it on the pressure plate.



701 ST

80745



REMOVAL - INSTALLATION

INSTALLATION



395 TRANSMISSION

INSTALLATION

Lightly grease the splines of the clutch shaft using **Molykote BR 2** grease.

Engage the transmission, being careful not to catch the clutch mechanism.

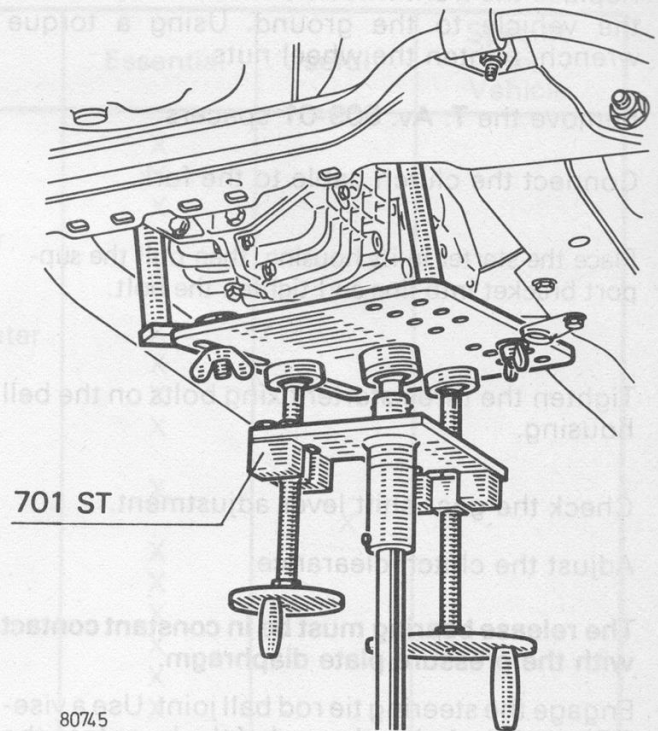
Mount the engine and the transmission and attach the left and right transmission supports.

Remove the Desvil **701 ST** jack.

Install the clutch protective cover, paying attention to the top dead center sensor.

Reconnect:

- the speedometer cable
- the input wires to the backup lights and the emission control switches
- the gear lever linkage.



Lightly grease the splines of the differential side gears with **Molykote BR 2** grease.

Position the drive shaft next to the side gear.

Tilt the stub axle while engaging the drive shaft in the side gear. Use the **B. Vi. 31-01** elbow pin drift to line up the holes.

Insert the drive shaft roll pins.

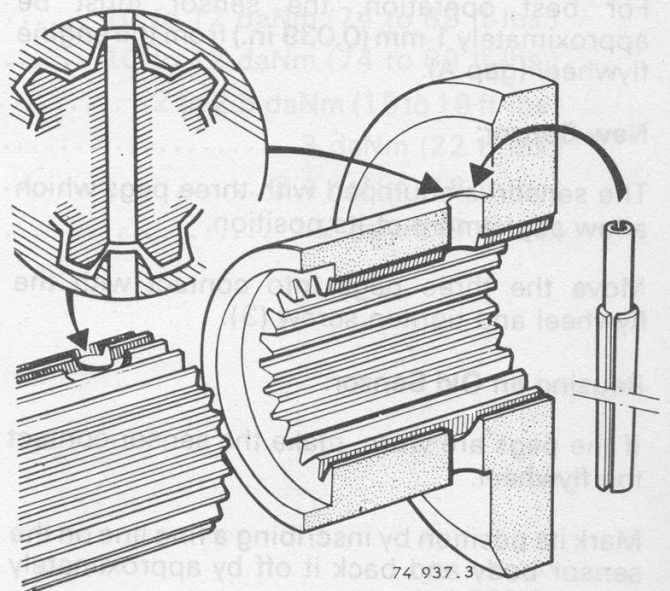
Engage the stub axle carrier in the upper suspension ball joint.

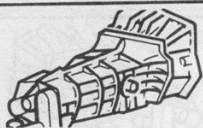
Lock the cone using a vise-grips and tighten the nut to torque.

Engage the steering tie rod ball joint. Use a vise-grips to lock the cone and tighten the nut to torque.

Install the front brake calipers (see the chapter on Brake System).

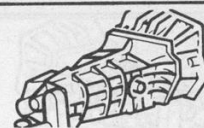
Proceed the same way for the other side.





REMOVAL - INSTALLATION

INSTALLATION



395 TRANSMISSION

Replace the front wheels and lower the front of the vehicle to the ground. Using a torque wrench, tighten the wheel nuts.

Remove the **T. Av. 509-01** spacers.

Connect the clutch cable to the fork.

Place the starter in its housing, then pull the support bracket into line and tighten the bolt.

Tighten the three starter fixing bolts on the bell housing.

Check the gear shift lever adjustment.

Adjust the clutch clearance:

The release bearing must be in constant contact with the pressure plate diaphragm.

Engage the steering tie rod ball joint. Use a vise-**2.5 mm ($\frac{3}{32}$ in.)** at the end of the lever (see the chapter on Clutch).

Connect the battery.

ADJUSTMENT OF TOP DEAD CENTER SENSOR:

For best operation, the sensor must be approximately **1 mm (0.039 in.)** from the engine flywheel (gap A).

New Sensor:

The sensor is equipped with three pegs which allow adjustment of its position.

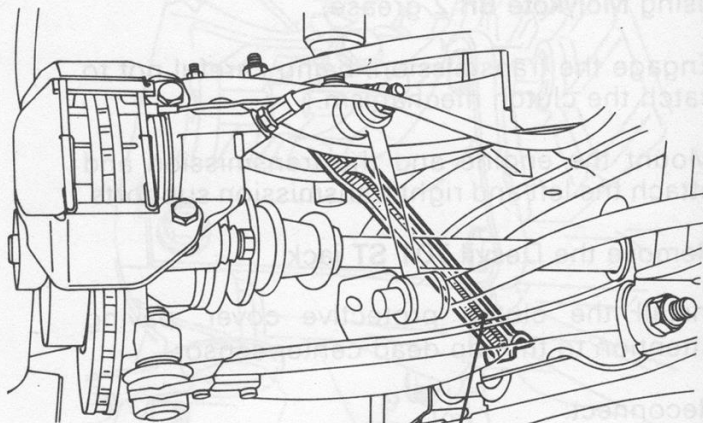
Move the three pegs into contact with the flywheel and tighten screw (3).

Reusing an Old Sensor:

If the pegs are worn, make the sensor contact the flywheel.

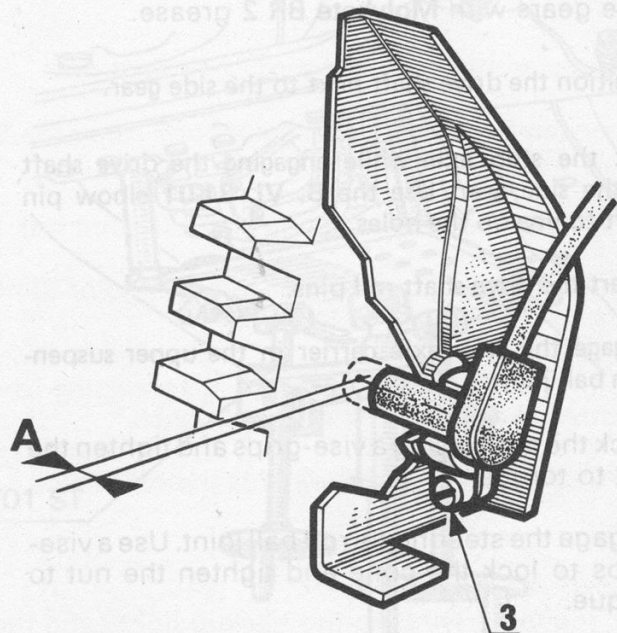
Mark its position by inscribing a fine line on the sensor body and back it off by approximately **1 mm (0.039 in.)**.

Tighten screw (3).

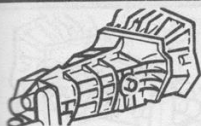


T. Av. 509-01

83199



77 694 -1



COMPLETE OVERHAUL

Code 2010

TOOLS - TORQUES



395 TRANSMISSION

SPECIAL TOOLS

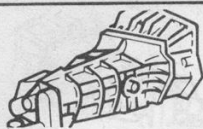
Reference	Description	Essential	Useful	Specific to Vehicle
B. Vi. 22-01	Torque wrench	X		
B. Vi. 28-01	Bearing extractor	X		
B. Vi. 31-01	Set of 5 mm (0.197 in.) diameter pins drift	X		
B. Vi. 39	Pin drift for 4 mm and 10 mm (0.157 in. and 0.394 in.) diameter	X		
B. Vi. 41	Bearing shell	X		
B. Vi. 48	Jaws	X		
B. Vi. NPO	32 wrench for output shaft nut	X		
B. Vi. 239-01	Mandrel			
B. Vi. 239-02	Spacer	X		
B. Vi. 240	Transmission support		X	
B. Vi. 371	Bearing shell	X		
B. Vi. 380-01	Oil drain wrench	X		
B. Vi. 526	Tool for clutch shaft seal	X		
B. Vi. 807	Differential bearing nut wrench	X		
B. Vi. 813	Seal installer	X		
T. Ar. 65	Extractor	X		

TIGHTENING TORQUE SPECIFICATIONS

Speedometer worm gear nut on output shaft	10 to 12 daNm (74 to 89 ft-lbs.)
Ring gear bolts	10 to 12 daNm (74 to 89 ft-lbs.)
7 mm diameter half-housing bolts	2 to 2.5 daNm (15 to 19 ft-lbs.)
8 mm diameter half-housing bolts	3 daNm (22 ft-lbs.)
Reverse gear selector fork bolt	2.4 daNm (18 ft-lbs.)
Rear cover bolts	1.2 daNm (9 ft-lbs.)

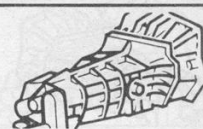
Parts to be replaced:

- paper gaskets
- lipped seals
- differential casing fixing bolts
- speedometer worm gear nut
- speedometer drive gear
- roll pins
- input shaft nut



COMPLETE OVERHAUL

DISASSEMBLY



395 TRANSMISSION

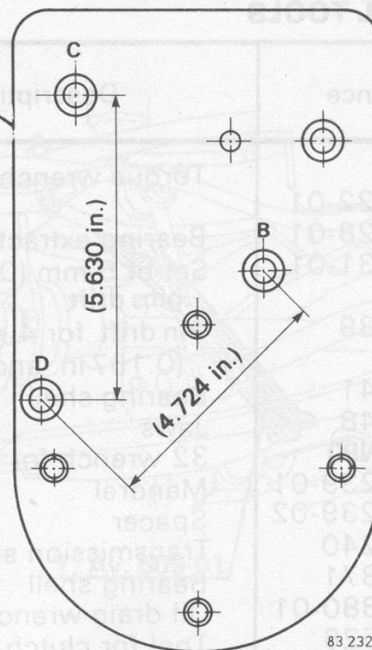
It is necessary to modify the **B. Vi. 240** tool to adapt it to the transmission housing.

Make an **8.5 mm (0.335 in.)** diameter hole (D) at the marks indicated in the drawing.

Weld a spacer with an inner diameter of **8.5 mm (0.335 in.)**, an outer diameter of **16 mm (0.630 in.)** and a length of **37 mm (1.457 in.)** on the plate at D.

Use the mounting points B, C, and D.

B. Vi. 240

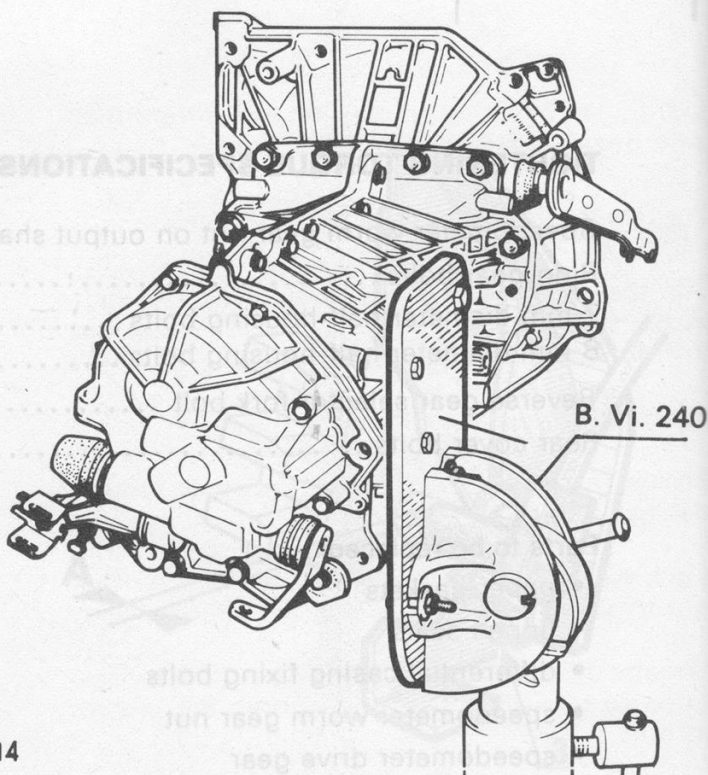


Drain the transmission. Use the **B. Vi. 380-01** wrench.

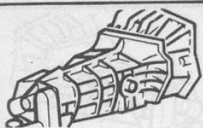
DISASSEMBLY

Remove the backup-lights switch.

Mount the **B. Vi. 240** support to a swivel stand or bench stand, and mount the transmission to the **B. Vi. 240** support.

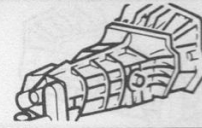


81 214



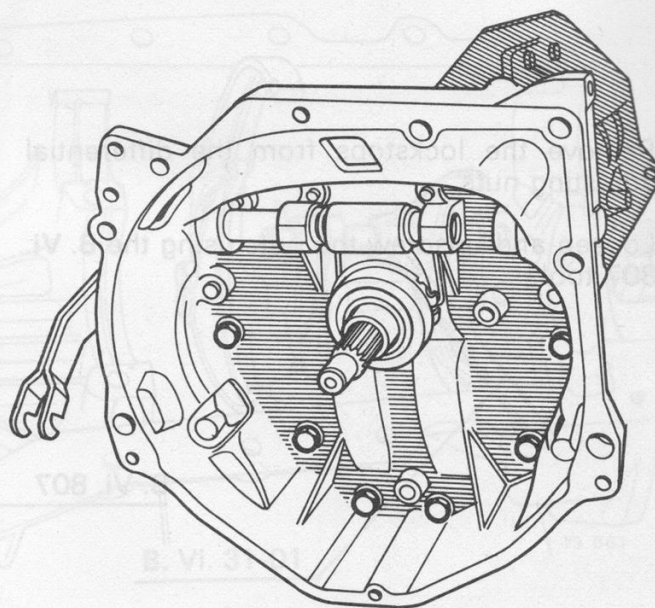
COMPLETE OVERHAUL

DISASSEMBLY



395 TRANSMISSION

Remove the bell housing fixing bolts.



81 219

5th Gear:

Remove the 5th gear lockout screw (A), the locking spring, and ball.

Put the transmission into neutral and remove the fixing bolts of the rear cover. Pull the cover while turning the selection lever.

Engage 5th gear and reverse gear.

Unlock the nut holding the 5th gear synchronizer hub.

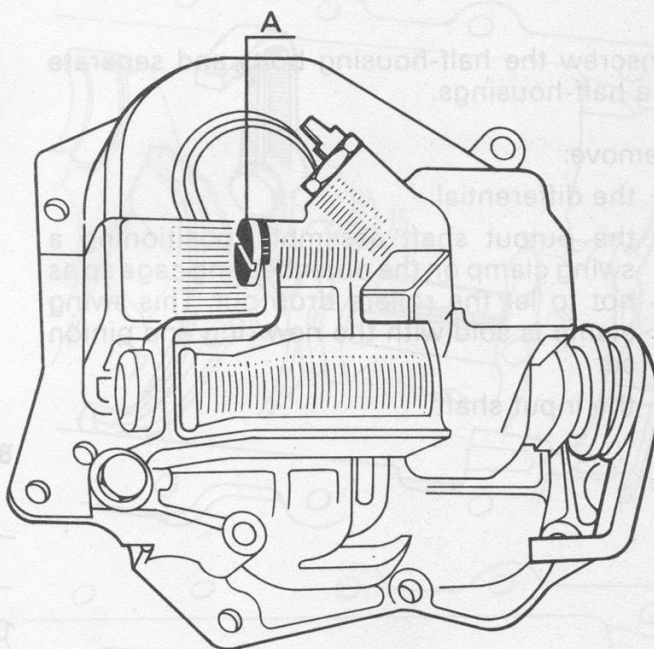
Unlock the speedometer worm gear nut with the **B. Vi. NP0** wrench.

Return the forks to neutral.

Engage 3rd gear.

Drive out the pin of the 5th gear fork with the **B. Vi. 31-01** pin drift.

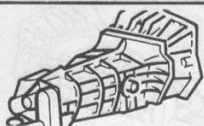
Mark the hub and the 5th gear sliding gear.



83 385

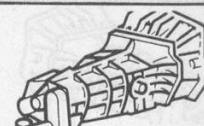
Remove:

- the 5th gear synchronizer and hub assembly and the fork
- the input shaft 5th gear
- the needle bearing with its ring
- the speedometer worm gear nut and the washer
- the output shaft 5th gear
- the bearing thrust washer.



COMPLETE OVERHAUL

DISASSEMBLY

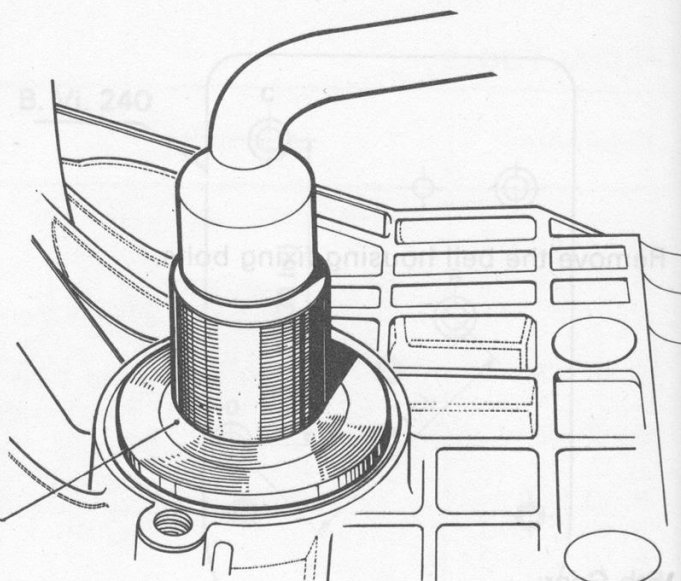


395 TRANSMISSION

Remove the lockstops from the differential adjusting nuts.

Loosen and unscrew the nuts using the **B. Vi. 807** tool.

B. Vi. 807

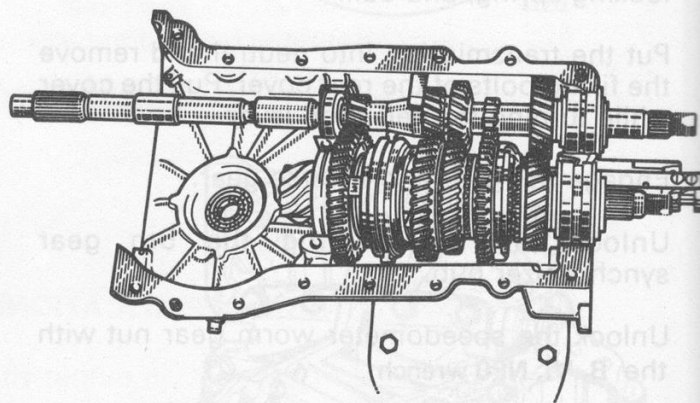


81 216

Unscrew the half-housing bolts and separate the half-housings.

Remove:

- the differential
- the output shaft assembly, positioning a swing clamp on the outer bearing cage so as not to let the rollers drop out. This swing clamp is sold with the new ring and pinion set
- the input shaft.

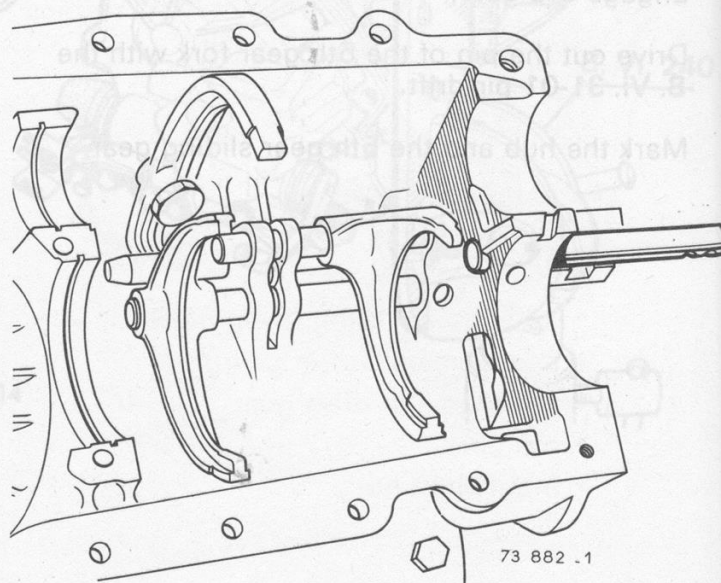


81 215

Shift Forks Mechanism:

Return the 3rd-4th gear shaft to neutral.

Remove the 5th gear shaft.



73 882 -1



COMPLETE OVERHAUL

DISASSEMBLY

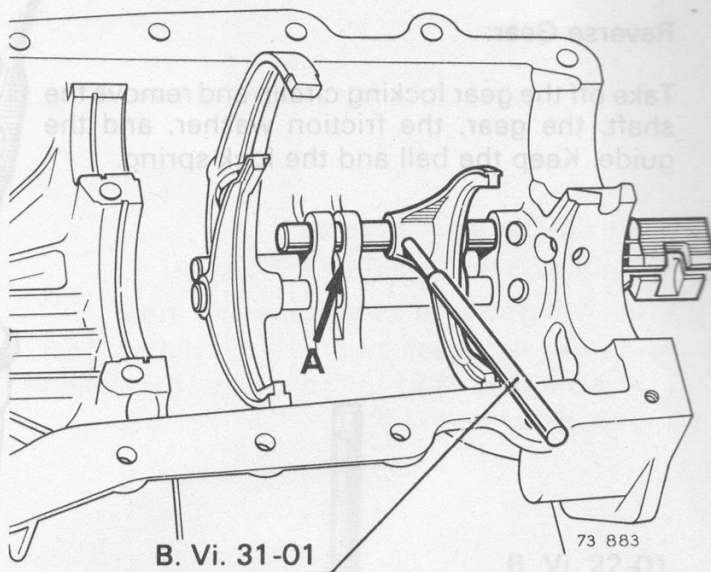


395 TRANSMISSION

Drive out the roll pin of the 3rd-4th gear fork using the **B. Vi. 31-01** pin drift.

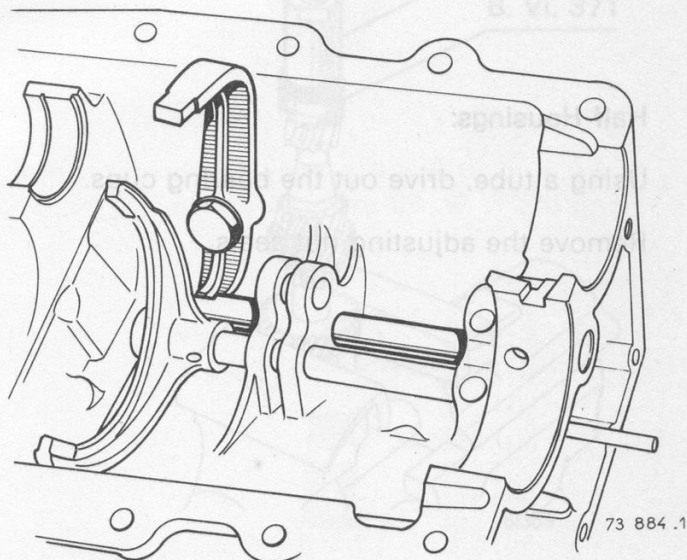
Remove the shaft and the fork. Keep the ball and the lock spring.

Remove the lock disk (A).



Remove:

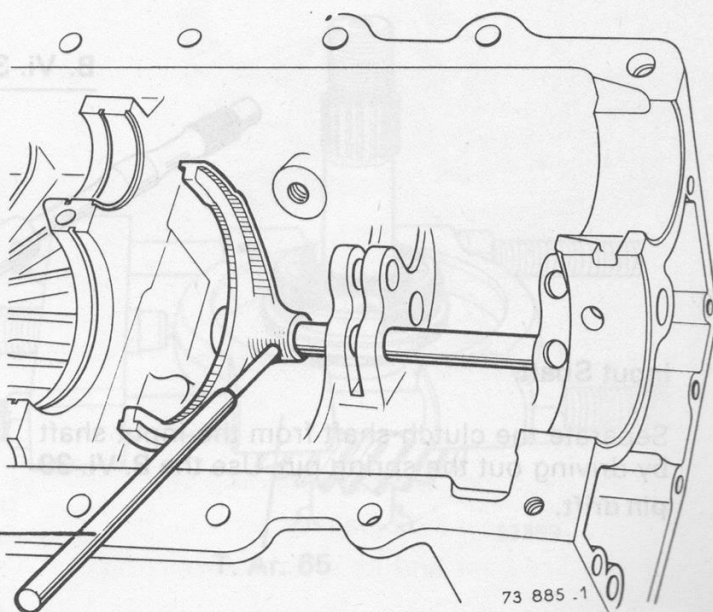
- the reverse gear selector
- the reverse gear shaft.

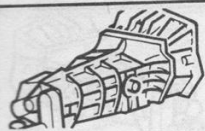


Drive out the roll pin of the 1st-2nd gear fork with the **B. Vi. 31-01** pin drift.

Remove the shaft and the fork. Keep the ball and the lock spring.

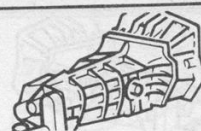
B. Vi. 31-01





COMPLETE OVERHAUL

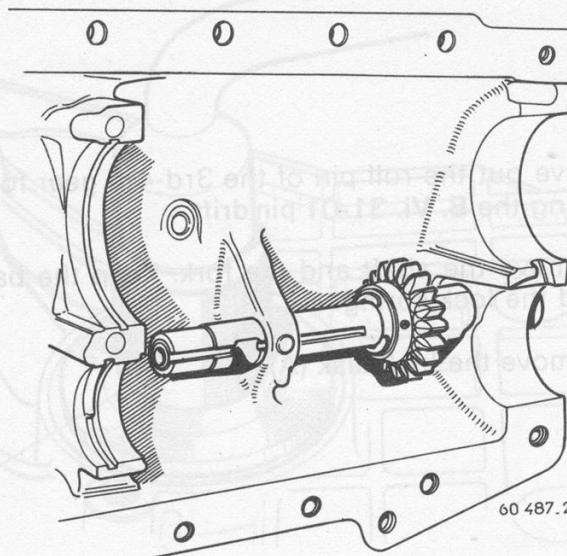
DISASSEMBLY



395 TRANSMISSION

Reverse Gear:

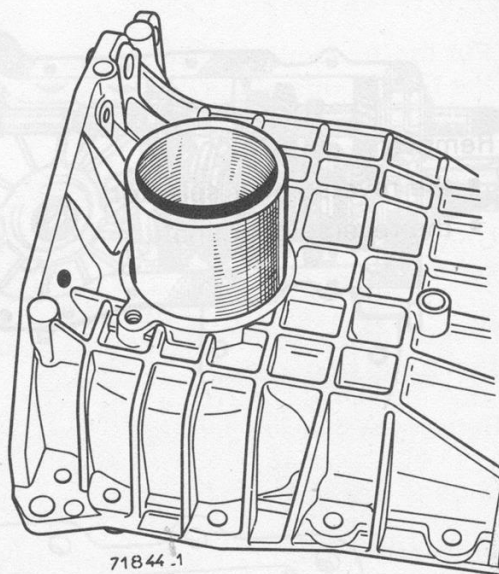
Take off the gear locking circlip and remove the shaft, the gear, the friction washer, and the guide. Keep the ball and the lock spring.



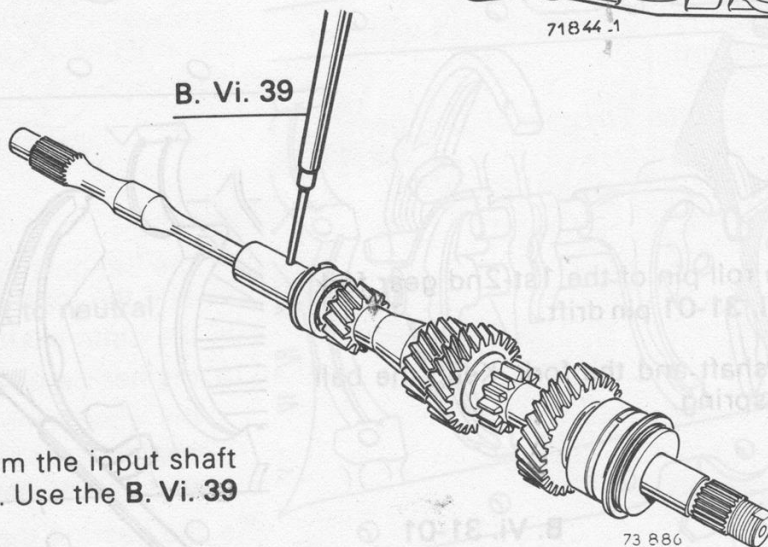
Half-Housings:

Using a tube, drive out the bearing cups.

Remove the adjusting nut seals.



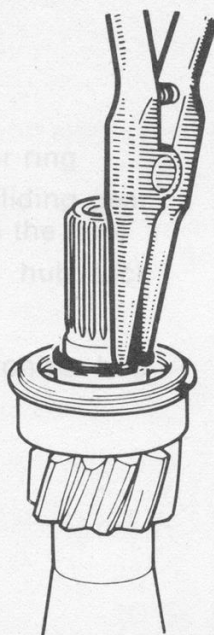
B. Vi. 39



Input Shaft:

Separate the clutch shaft from the input shaft by driving out the spring pin. Use the **B. Vi. 39** pin drift.

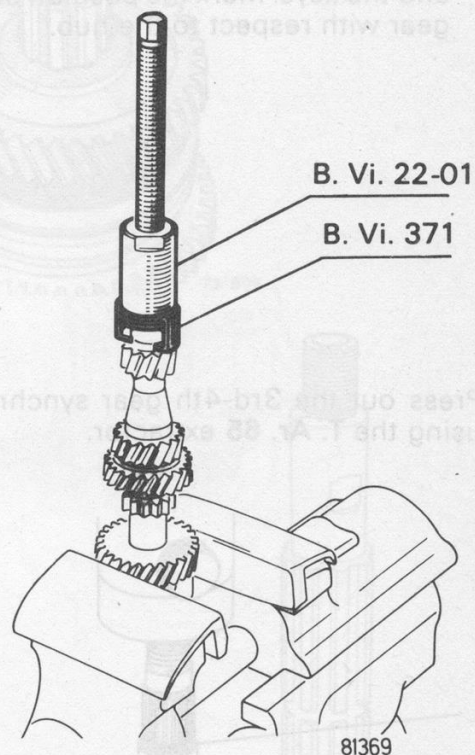
Take off the circlip.



81222

Remove the outer bearing cage with the rollers.

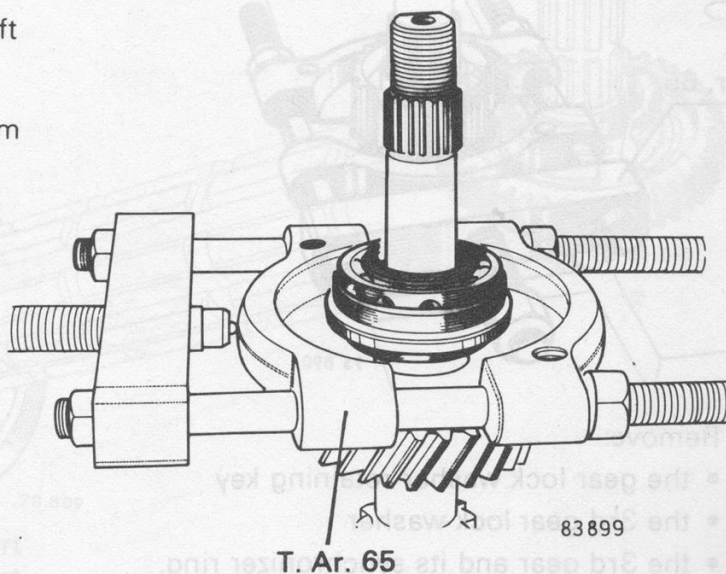
Extract the inner bearing cage using the **B. Vi. 22-01** tool equipped with the **B. Vi. 371** shell.



81369

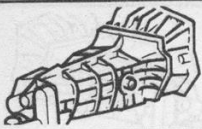
Extract the second bearing from the input shaft with the **T. Ar. 65** tool.

Remove the position adjustment spacer from the input shaft.



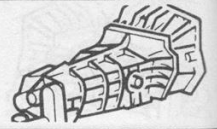
83899

T. Ar. 65



COMPLETE OVERHAUL

DISASSEMBLY



395 TRANSMISSION

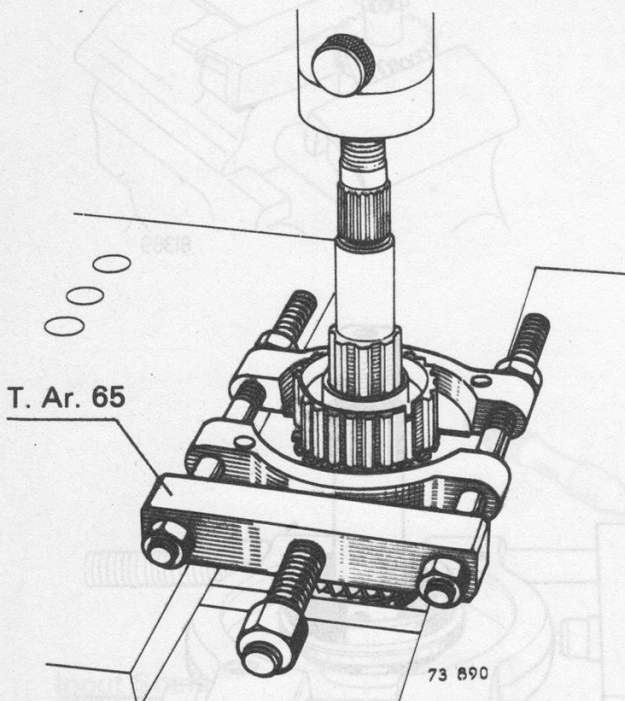
Output Shaft:

Clamp the shaft in a vise by the 1st gear using soft metal jaws.

Remove:

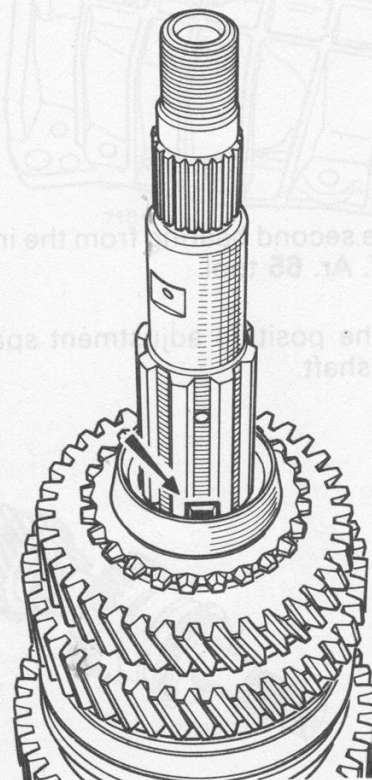
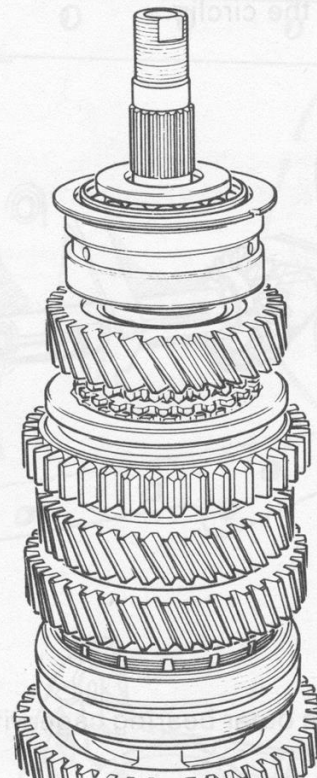
- the double taper bearing
- the pinion depth adjusting washer
- the 4th gear and its synchronizer ring
- the 3rd-4th gear synchronizer sliding gear and the keys. Mark the position of the sliding gear with respect to the hub.

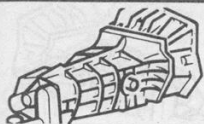
Press out the 3rd-4th gear synchronizer hub using the **T. Ar. 65** extractor.



Remove:

- the gear lock washer retaining key
- the 3rd gear lock washer
- the 3rd gear and its synchronizer ring.





COMPLETE OVERHAUL

DISASSEMBLY



395 TRANSMISSION

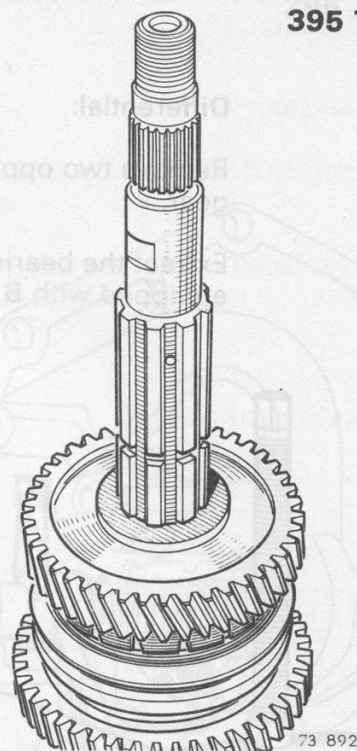
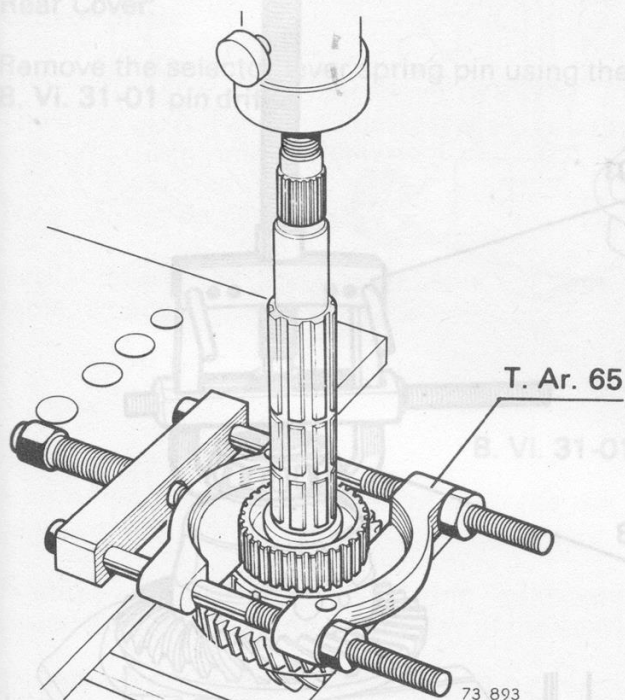
Remove:

- the 2nd gear lock washer
- the 2nd gear and its synchronizer ring
- the 1st-2nd gear synchronizer sliding gear (mark its position with respect to the hub)
- the 1st-2nd gear synchronizer hub lock washer.

Press out the 1st-2nd gear synchronizer hub using the **T. Ar. 65** extractor.

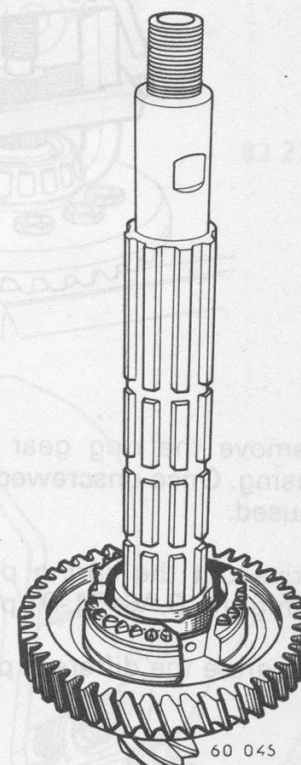
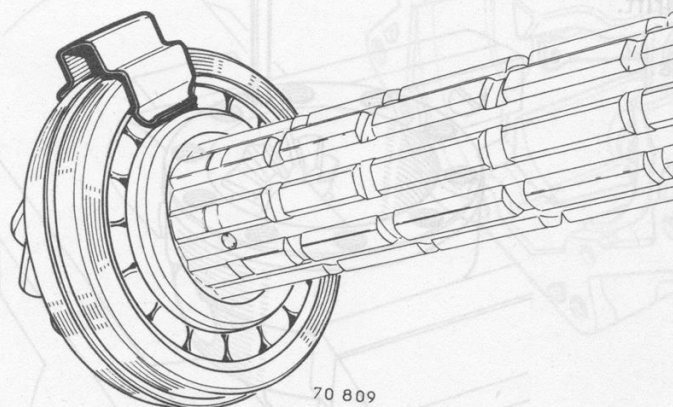
Rear Cover:

Remove the self-aligning pin using the B. VI. 31-01 pin.

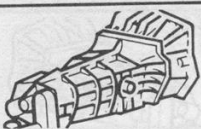


Remove:

- the 1st gear synchronizer ring
- the 1st gear lock washer
- the 1st gear.

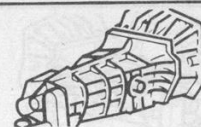


The inner race of this front roller bearing is part of the drive pinion; therefore this bearing cannot be replaced.



COMPLETE OVERHAUL

DISASSEMBLY

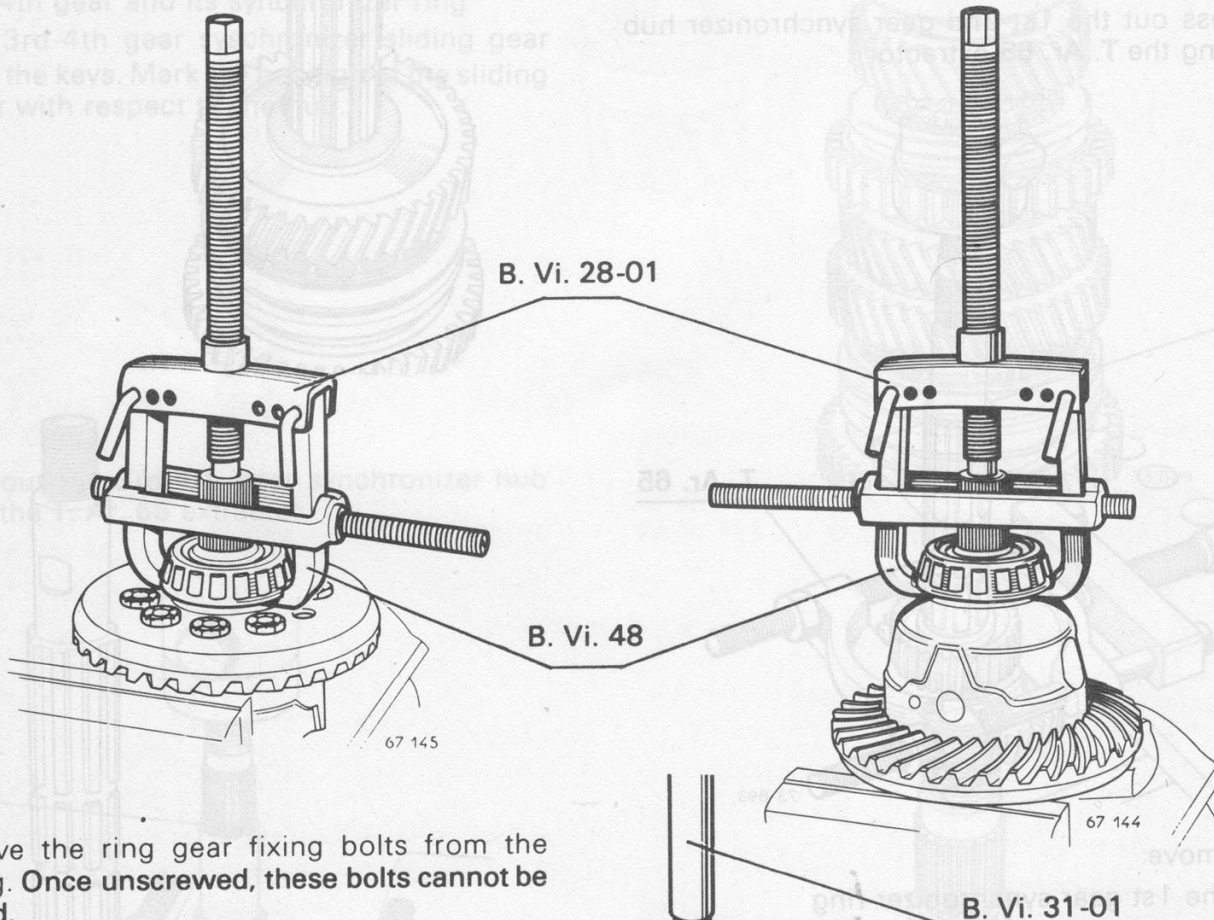


395 TRANSMISSION

Differential:

Remove two opposite fixing bolts from the ring gear.

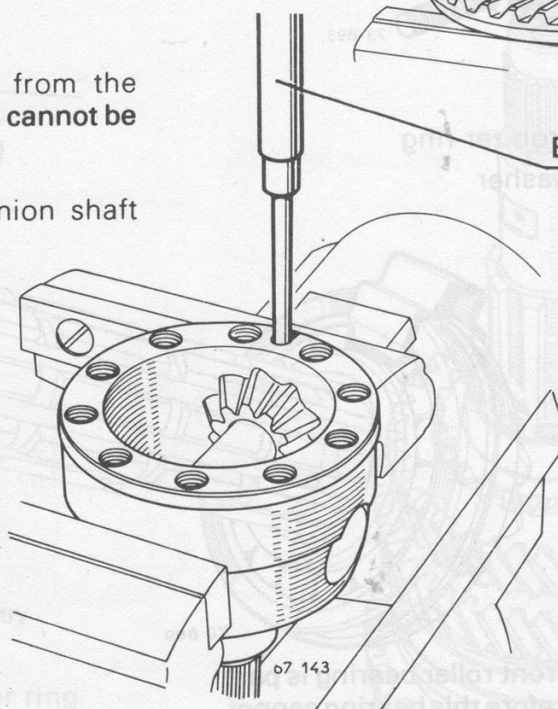
Extract the bearings using the **B. Vi. 28-01** tool equipped with **B. Vi. 48** grips.

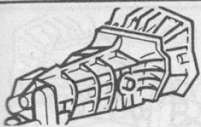


Remove the ring gear fixing bolts from the casing. **Once unscrewed, these bolts cannot be reused.**

Drive out the spring pin in the pinion shaft using the **B. Vi. 31-01** pin drift.

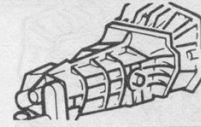
Separate the different parts.





COMPLETE OVERHAUL

DISASSEMBLY



395 TRANSMISSION

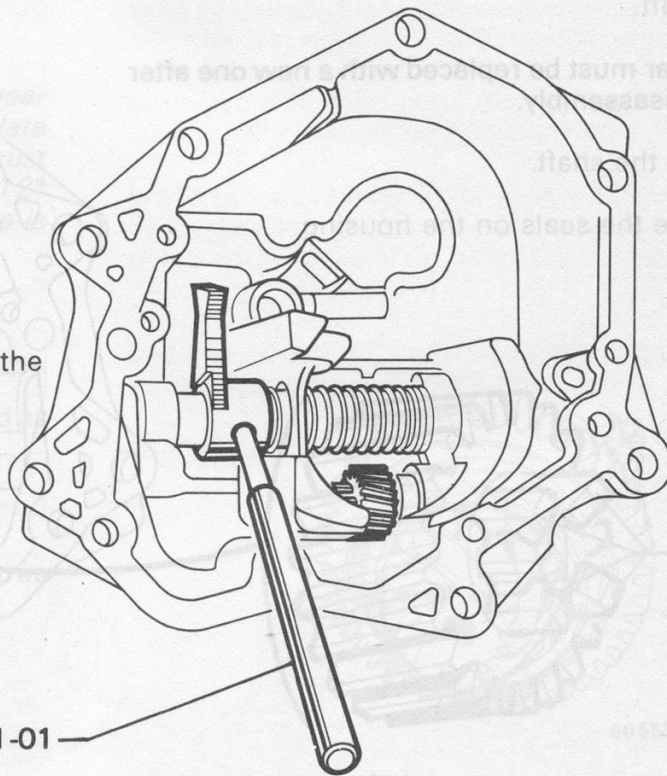
Matched parts:

- drive pinion and ring gear
- synchronizer and shaft's pinion and ring gear
- synchronizer hub and shaft's pinion and ring gear

Any work performed on the 1st-2nd gear synchronizer hub requires that a heat-treated steel pin be used during assembly. This pin must provide a temperature between 100° F (38° C) and 120° C (248° F) Room temperature OK for the 3rd-4th gear hub.

Rear Cover:

Remove the selector lever spring pin using the **B. Vi. 31-01** pin drift.



B. Vi. 31-01

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A common marking is made on both the ring gear and the pinion.

Example: 27-200 (the 27th ring gear and pinion machined on the 200th day of the year)

Using a chisel, remove the cap (A). Use a new cap during reassembly.

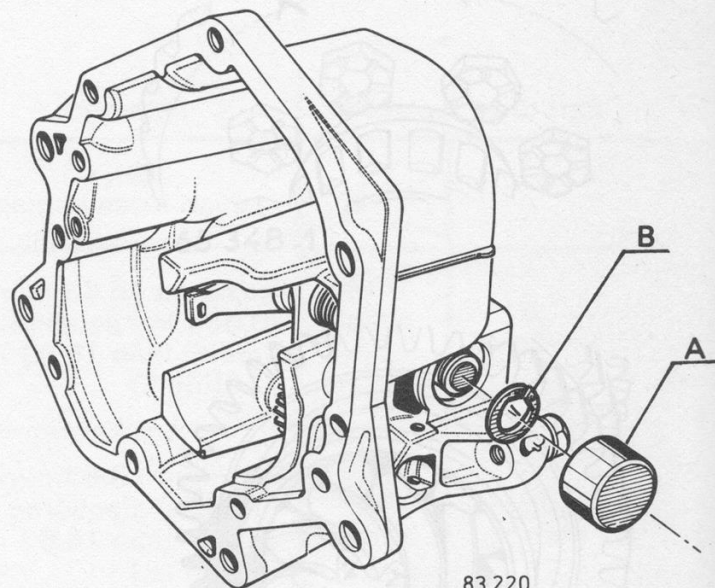
Remove the circlip (B) and slide out the selector lever shaft.

Be sure to keep:

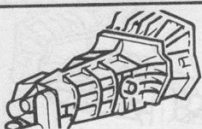
- the spacers
- the spring
- the selector lever.

There is one exception to the above rule.

The drive pinion may have (on its forward surface) an additional marking (X) which is to be used in adjusting the pinion depth. (See the paragraph on adjusting the pinion depth.)

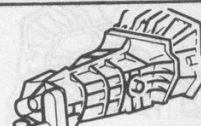


83 220



COMPLETE OVERHAUL

DISASSEMBLY



395 TRANSMISSION

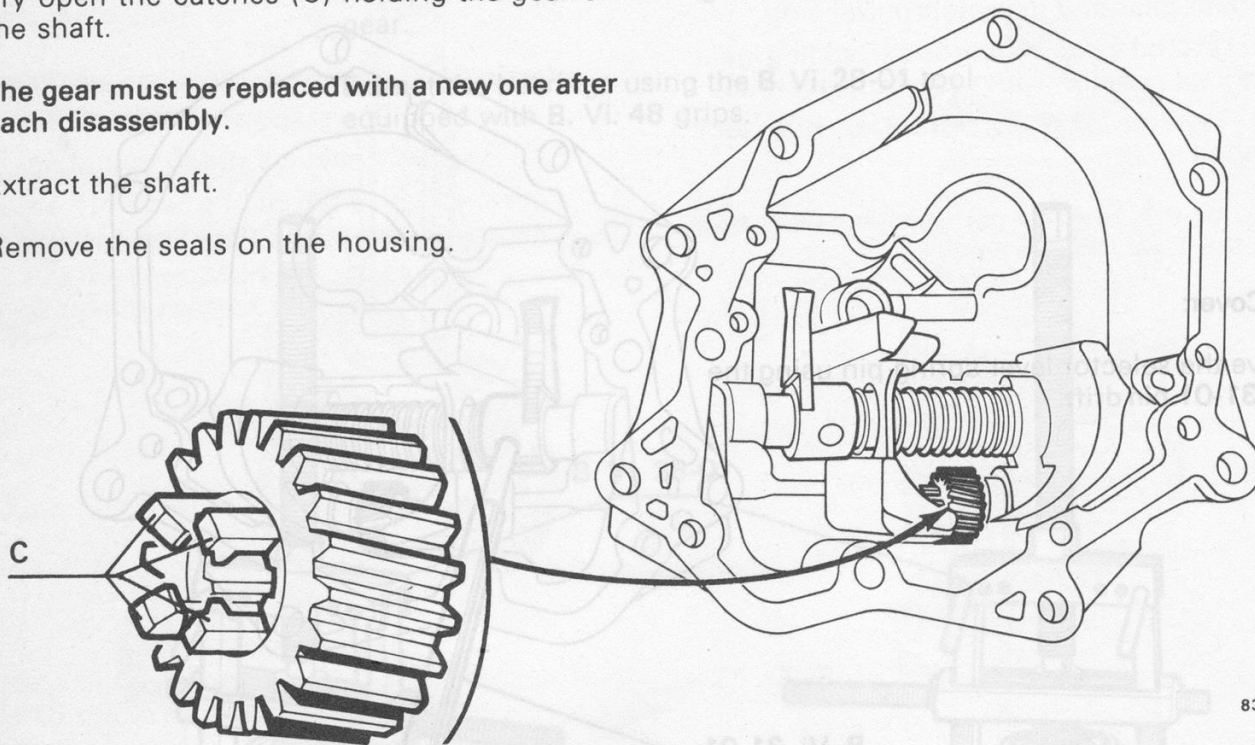
Speedometer Drive Gear:

Pry open the catches (C) holding the gear on the shaft.

The gear must be replaced with a new one after each disassembly.

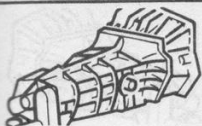
Extract the shaft.

Remove the seals on the housing.



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COMPLETE OVERHAUL

PART MATCHING



395 TRANSMISSION

Matched parts:

- drive pinion and ring gear
- drive pinion shaft and synchronizer hubs
- synchronizer hubs and sliding gears.

Any work performed on the 1st-2nd gear synchronizer hub requires that a heating plate be used during assembly. This plate must provide a temperature between 100° C (212° F) and 120° C (248° F). Room temperature is OK for the 3rd-4th gear hub.

Output Shaft:

Matching the drive pinion and ring gear.

The drive pinion and the ring gear are lapped as one unit during manufacture.

They cannot be separated.

Replacement of one of them requires replacement of the other.

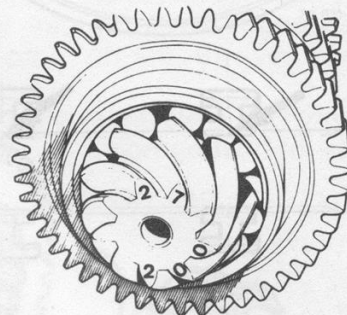
A common marking is made on both the ring gear and the pinion.

Example: 27-200 (the 27th ring gear and pinion machined on the 200th day of the year)

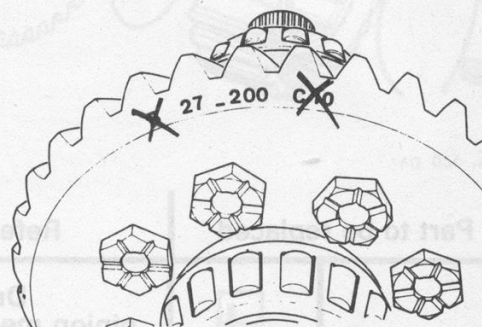
UNDER NO CIRCUMSTANCES SHOULD OTHER MARKINGS ON THE RING GEAR BE USED FOR MATCHING THESE PARTS.

There is one exception to the above rule:

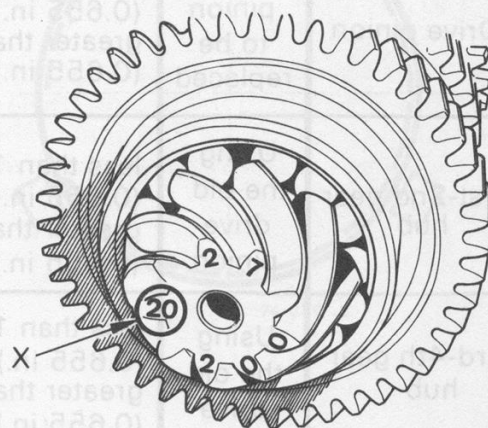
The drive pinion may have (on its forward surface) an additional marking (X) which is to be used in adjusting the pinion depth. (See the paragraph on adjusting the pinion depth.)



60553



65 348 -1

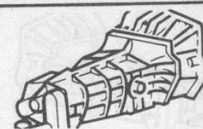


60553 - 1



COMPLETE OVERHAUL

PART MATCHING



395 TRANSMISSION

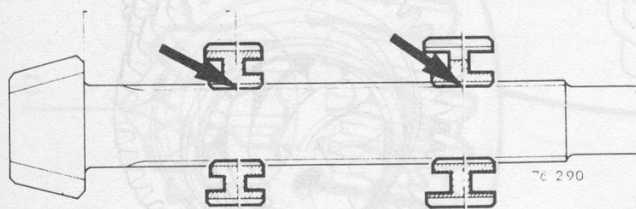
Checking the Parts:

If the drive pinion, the ring gear, or the front roller bearing is worn but the hub-sliding gear assemblies are good and may be reused:

Replace the ring gear and pinion. It is delivered with the bearing mounted on the drive pinion.

It is necessary to determine the spacing of the splines of the new drive pinion to be ordered, so that it can be matched up with the hubs being reused.

To do this, measure the old pinion on two splines at the points shown by the arrows.

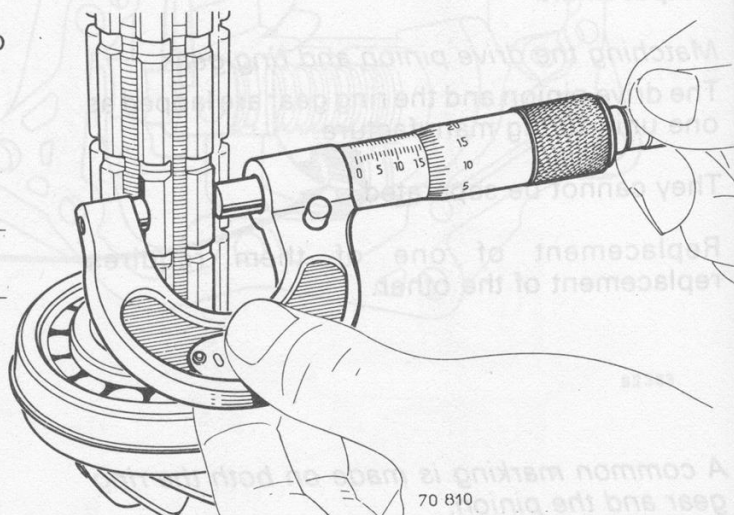


If the hub-sliding gear assemblies are worn, but the drive pinion is good and may be reused:

Replace the hub-sliding gear assemblies.

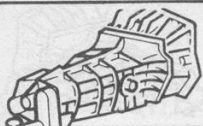
It is necessary to determine the depth of the splines of the new synchronizer hubs to be ordered, so that they can be matched up with the drive pinion that is being reused.

To do this, measure the drive pinion.



Take the measurement at several splines. Get the largest measurement, then see the table. This measurement must be taken where the hub is usually placed.

Part to be replaced		Reference	Parts Dept. Supply (color)		
		Drive pinion measurement	Drive pinion	1st-2nd gear hub	3rd-4th gear hub
Drive pinion	Drive pinion to be replaced	less than 16.63 mm (0.655 in.) equal to or greater than 16.63 mm (0.655 in.)	Red-blue Yellow		
1st-2nd gear hub	Using the old drive pinion	less than 16.63 mm (0.655 in.) equal to or greater than 16.63 mm (0.655 in.)		Red-yellow White	
3rd-4th gear hub	Using the old drive pinion	less than 16.63 mm (0.655 in.) equal to or greater than 16.63 mm (0.655 in.)			Blue-white Red



COMPLETE OVERHAUL

PART MATCHING



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Synchronizer Overhaul:

The hub and the sliding gear are a matched set and are not sold separately.

In the case of a new synchronizer, mark the two parts so that they can be lined up: for the 1st-2nd gear synchronizer, make the mark on the chamfered side of the sliding gear so that it is visible after mounting the hub (see arrows).

Separate the two parts and clean them.

1st-2nd gear synchronizer:

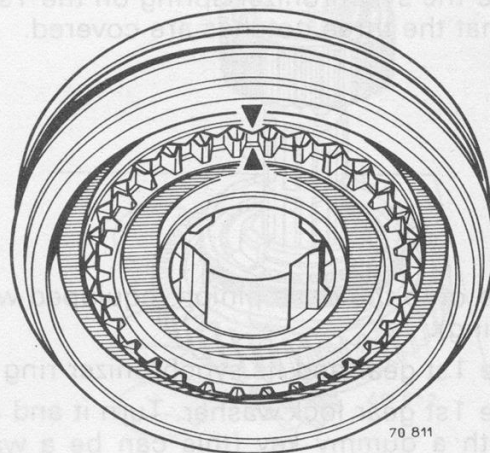
Keep the heating plate at a temperature of 100° C (212° F) to 120° C (248° F).

Place the hub on it and wait 15 minutes to be sure that the temperature is between 100° C (212° F) and 120° C (248° F) throughout the entire part.

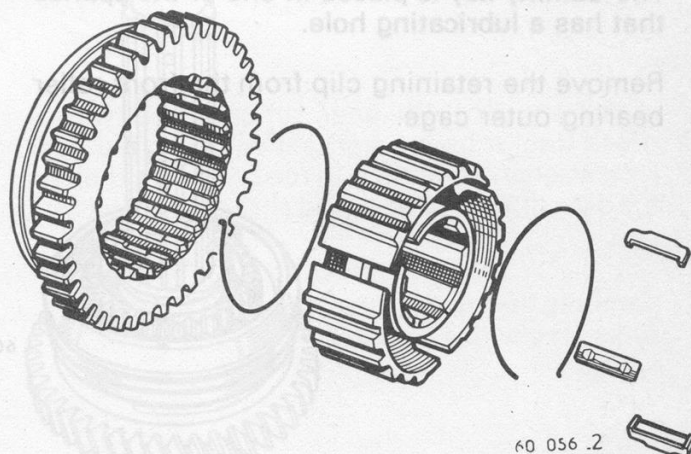
3rd-4th gear synchronizer:

Place onto the hub:

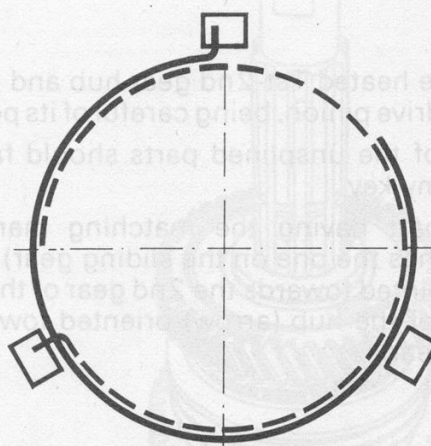
- the three keys
- the two springs
- the sliding gear, paying attention to its position: the sliding gear groove should be on the opposite side of the notch on the hub (marks made during disassembly should line up).



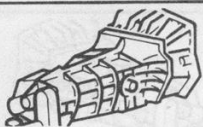
70 811



60 056 .2

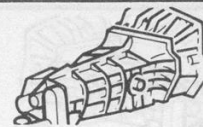


74 079 .2



COMPLETE OVERHAUL

ASSEMBLY OF THE OUTPUT SHAFT



395 TRANSMISSION

Output Shaft:

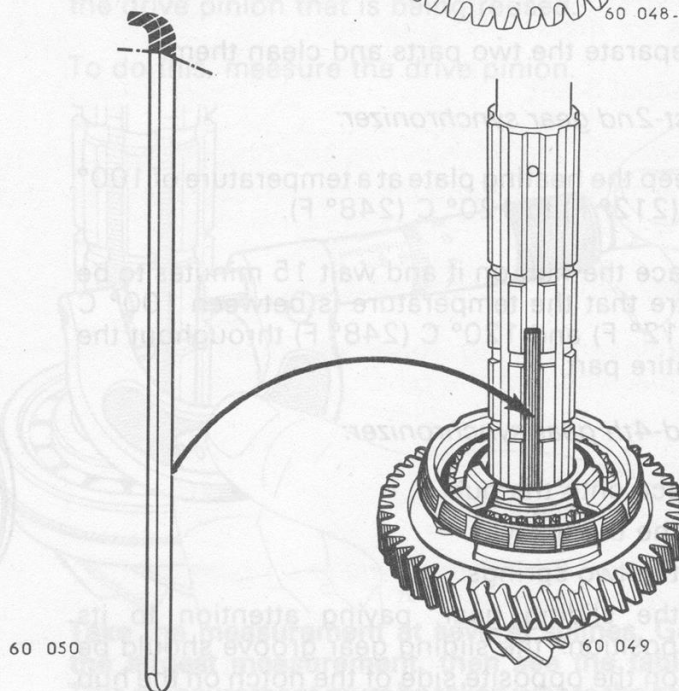
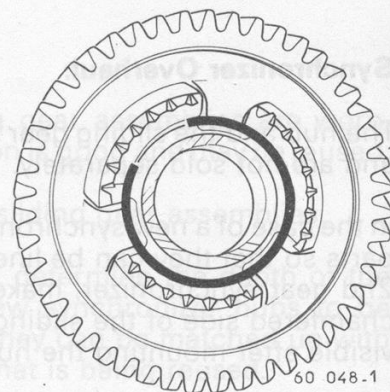
Place the synchronizer spring on the 1st gear so that the three notches are covered.

Place onto the drive pinion (equipped with its bearing):

- the 1st gear and its synchronizer ring
- the 1st gear lock washer. Turn it and lock it with a dummy key (this can be a washer-retaining key with the tip removed).

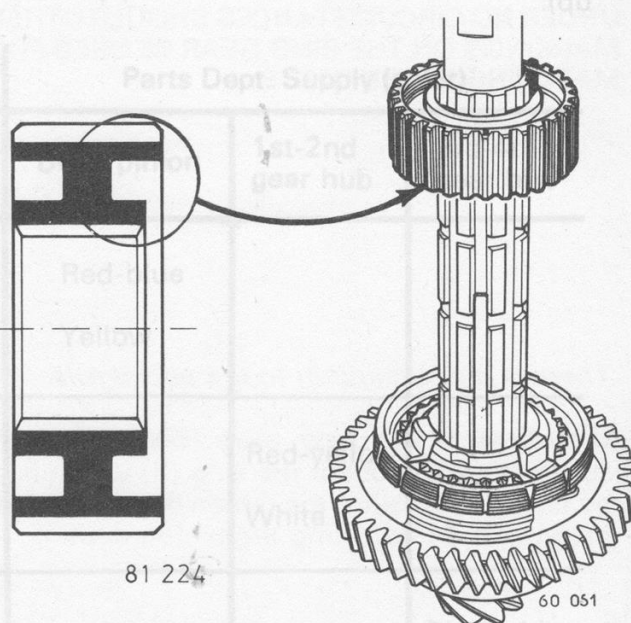
The dummy key is placed in one of the splines that has a lubricating hole.

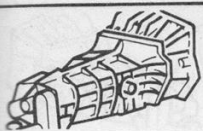
Remove the retaining clip from the front roller bearing outer cage.



Take the heated 1st-2nd gear hub and place it on the drive pinion, being careful of its position:

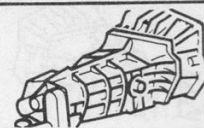
- one of the unsplined parts should face the dummy key
- the part having the matching mark (that matches the one on the sliding gear) should be pointed towards the 2nd gear or the offset side of the hub (arrow) oriented toward the 1st gear.





COMPLETE OVERHAUL

ASSEMBLY OF THE OUTPUT SHAFT



395 TRANSMISSION

Force the hub down with a press until it makes contact with the lock washer. Keep the synchronizer ring well centered with its lugs below the lock washer so as not to damage the spring.

Keep the pressure on the hub long enough for the hub to cool down. The cooling time can be shortened by using compressed air.

Take off the press.

Remove the dummy key.

Install the 1st-2nd gear synchronizer sliding gear:

- the chamfer should be placed toward the 2nd gear
- the matching mark should face the matching mark on the hub.

Install the hub lock washer. Turn it to line up its splines with those of the drive pinion.

Check the play existing between the 1st gear synchronizer sliding gear and the hub.

To do this, the play must be minimum (0.20 mm).

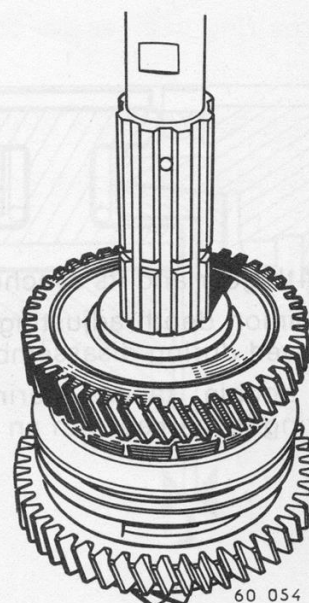
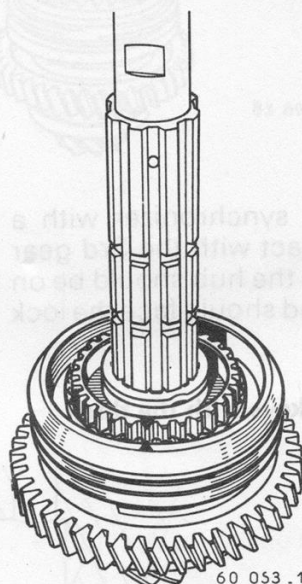
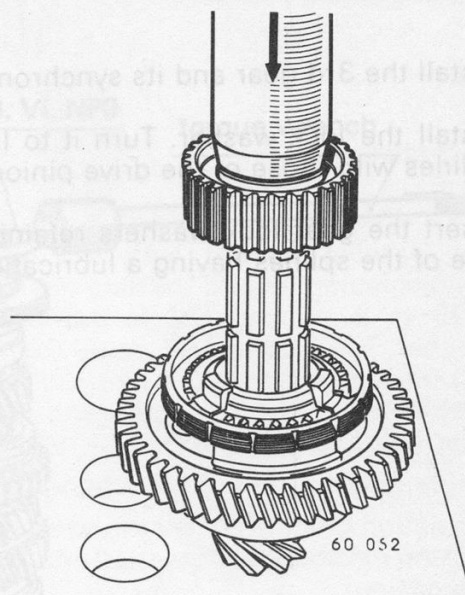
• the synchronizer sliding gear must be firmly against the hub.

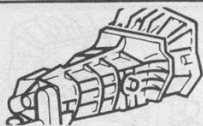
• the gear must be firmly against the hub.

Install the synchronizer spring on the 2nd gear in the same way as for the 1st gear.

Install the 2nd gear and its synchronizer ring.

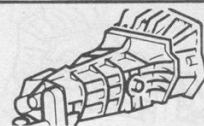
Install the gear lock washer. Turn it to line up its splines with those of the drive pinion.





COMPLETE OVERHAUL

ASSEMBLY OF THE OUTPUT SHAFT



395 TRANSMISSION

Install the 3rd gear and its synchronizer ring.

Install the lock washer. Turn it to line up its splines with those of the drive pinion.

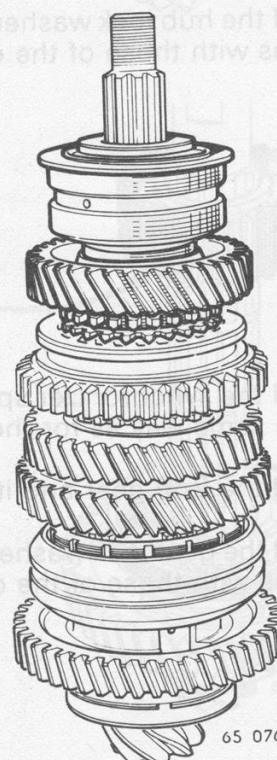
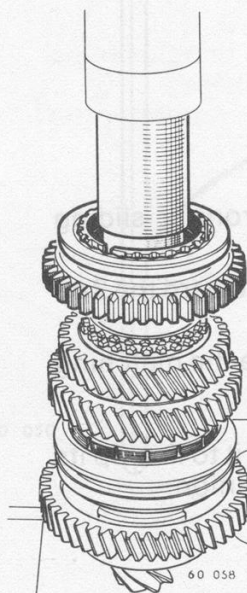
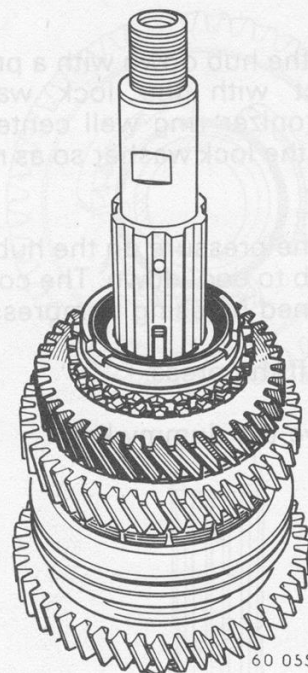
Insert the gear lock washers retaining key in one of the splines having a lubrication hole.

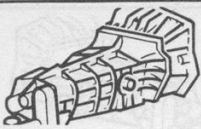
Install the 3rd-4th gear synchronizer with a press until it makes contact with the 3rd gear lock washer. The notch in the hub should be on the side of the 3rd gear and should face the lock key.

Carefully line up the three keys with the three synchronizer ring notches.

Install:

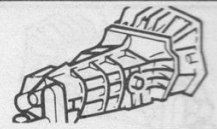
- the 4th gear and its synchronizer ring
- the pinion depth adjusting washer (the one removed during disassembly)
- the double taper bearing (the original bearing is marked with an electric pencil).





COMPLETE OVERHAUL

ASSEMBLY OF THE OUTPUT SHAFT



395 TRANSMISSION

Install:

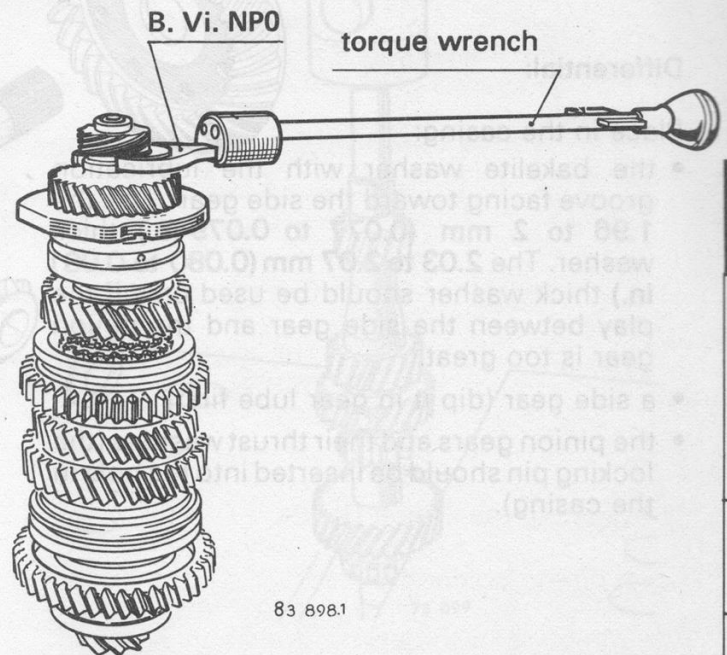
- the spacer plate (it is necessary for adjustment of the pinion depth)
- the 5th gear
- the spring washer
- the speedometer worm gear.

Clamp the shaft in a vise, holding it around the 1st gear. The vise must be equipped with jaws.

Engage 1st gear.

Tighten the speedometer worm gear. Use a torque wrench equipped with the **B. Vi. NPO** wrench.

Do not lock it because the pinion depth adjustment has not yet been done.



83 898.1

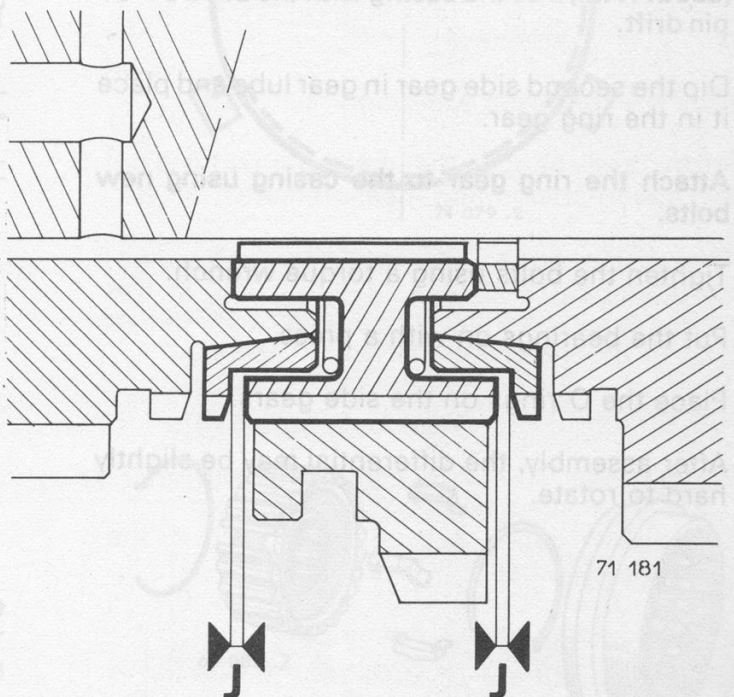
Check the play (J) existing between the 3rd gear synchronizer ring and the rim of the hub:

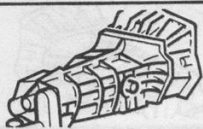
J = 0.20 mm (0.008 in.) minimum

To do this:

- the synchronizer ring must be firmly against the gear cone
- the gear must be resting against the hub.

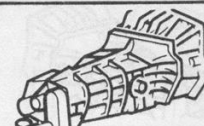
Follow the same procedure for the 4th gear synchronizer ring.





COMPLETE OVERHAUL

ASSEMBLY OF THE DIFFERENTIAL

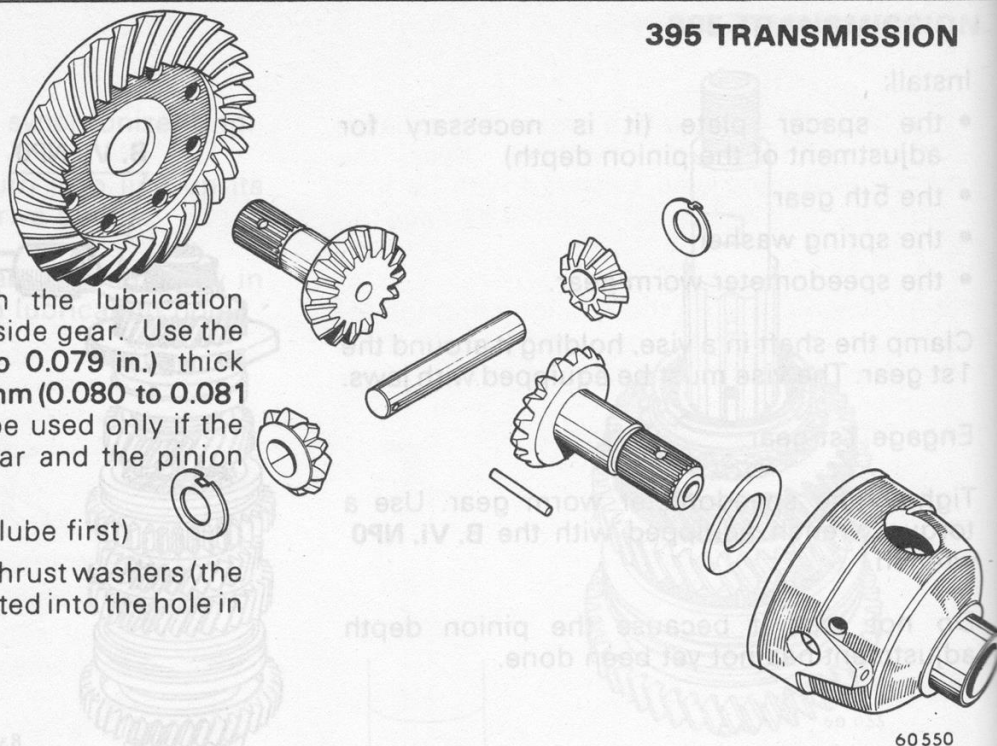


395 TRANSMISSION

Differential:

Place in the casing:

- the bakelite washer with the lubrication groove facing toward the side gear. Use the 1.96 to 2 mm (0.077 to 0.079 in.) thick washer. The 2.03 to 2.07 mm (0.080 to 0.081 in.) thick washer should be used only if the play between the side gear and the pinion gear is too great.
- a side gear (dip it in gear lube first)
- the pinion gears and their thrust washers (the locking pin should be inserted into the hole in the casing).



Engage the pinion gear shaft (line up the hole in the shaft with the hole in the casing).

Put in the spring pin. Tap it down about 5 mm (about 1/4 in.) into the casing with the B. Vi. 31-01 pin drift.

Dip the second side gear in gear lube and place it in the ring gear.

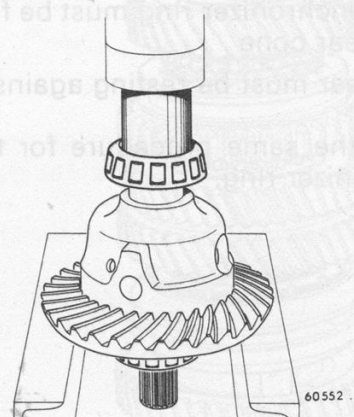
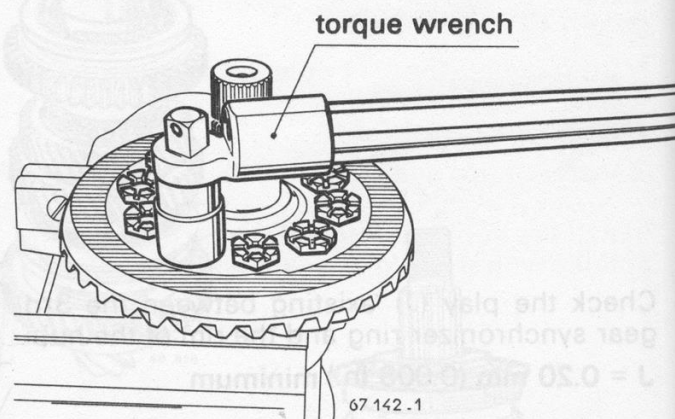
Attach the ring gear to the casing using new bolts.

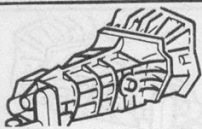
Tighten the bolts using a torque wrench.

Put the bearings on with a press.

Place the O rings on the side gears.

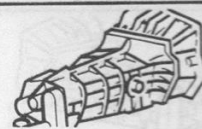
After assembly, the differential may be slightly hard to rotate.





COMPLETE OVERHAUL

ASSEMBLY OF THE INPUT SHAFT



395 TRANSMISSION

Input Shaft:

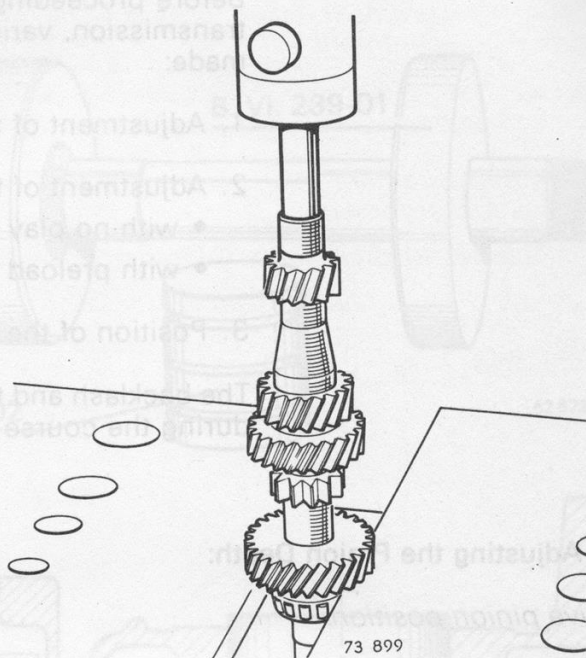
Install:

- the input shaft positioning washer
- the double ball bearing.
- Using a press, install the inner roller bearing cage.

Arrange the rollers in the outer bearing cage and fit the input shaft into this assembly.

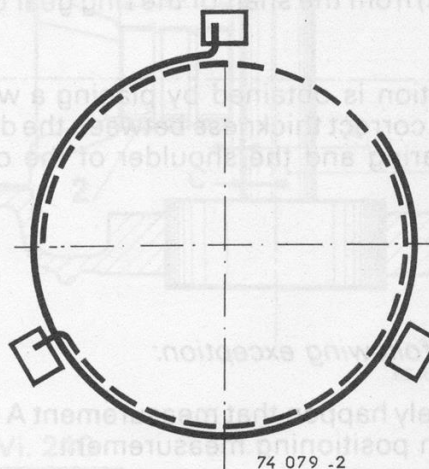
Install the circlip.

Attach the clutch shaft to the input shaft using the spring pin.



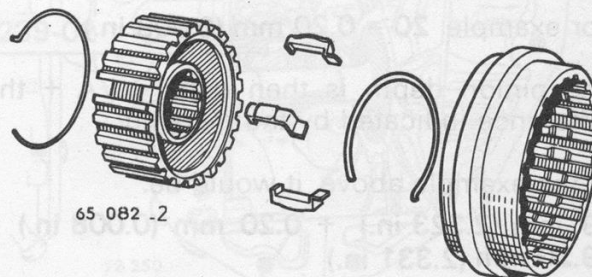
5th Gear Synchronizer:

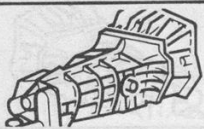
The hub and the sliding gear must be matched up.



Place on the hub:

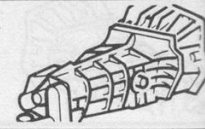
- the three keys
- the two springs
- the sliding gear. Be sure to place it in the correct position: the mark on the sliding gear must line up with the mark on the hub (marks made at time of disassembly).





COMPLETE OVERHAUL

ADJUSTING THE PINION DEPTH



395 TRANSMISSION

Before proceeding with the reassembly of the transmission, various adjustments need to be made:

1. Adjustment of the pinion depth
2. Adjustment of the differential bearings
 - with no play for reused bearings
 - with preload for new bearings
3. Position of the input shaft

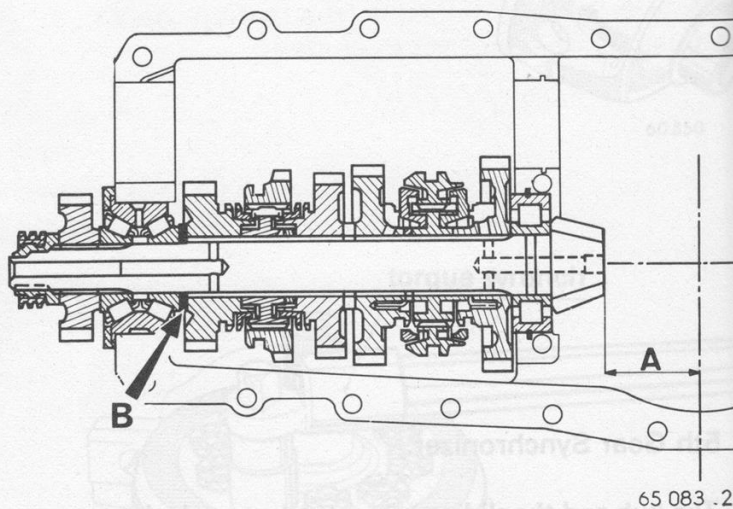
The backlash and the side play will be adjusted during the course of assembly.

1) Adjusting the Pinion Depth:

Drive pinion position:

The pinion is in the correct position when its front surface is at a distance of $A = 59 \text{ mm}$ (2.323 in.) from the shaft of the ring gear center axis.

This position is obtained by placing a washer (B) of the correct thickness between the double taper bearing and the shoulder of the output shaft.



Note the following exception:

It may rarely happen that measurement A is not the pinion positioning measurement.

The difference (X) between the real measurement and measurement A is in this case marked on the front surface of the pinion next to the match-up marking.

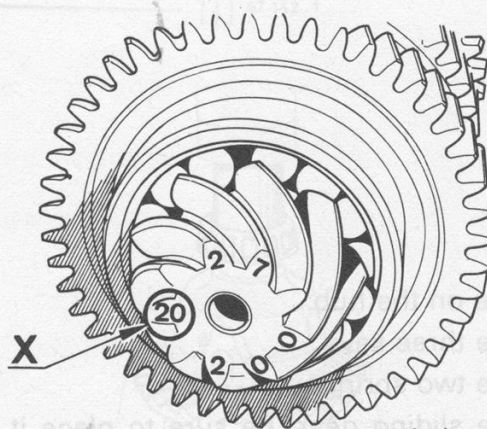
It is given in hundredths of a millimeter.

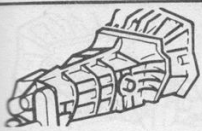
For example: $20 = 0.20 \text{ mm}$ (0.008 in.)

The pinion depth is then equal to $A +$ the difference indicated by the marking.

In the example above, it would be:

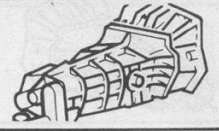
59 mm (2.323 in.) + 0.20 mm (0.008 in.) = 59.20 mm (2.331 in.)





COMPLETE OVERHAUL

ADJUSTING THE PINION DEPTH

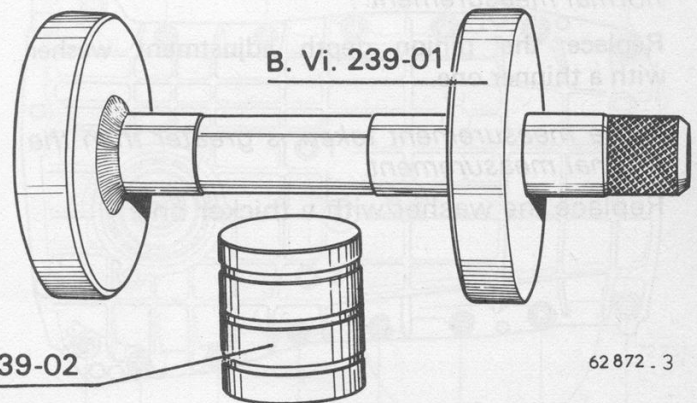


395 TRANSMISSION

Checking the Pinion Depth:

Checking is done using:

- the **B. Vi. 239-01** mandrel acting as the ring gear center axis
- the **B. Vi. 239-02** spacer **48.50 mm (1.909 in.)** high, making contact with the front surface of the drive pinion.



The height (H) of the spacer (2) **48.50 mm (1.909 in.)** plus the radius (C) of the mandrel shaft (1) **10 mm (0.394 in.)** give a measurement of:

$$48.50 \text{ mm (1.909 in.)} + 10 \text{ mm (0.394 in.)} = 58.50 \text{ mm (2.303 in.)}$$

The measurement (X), to be measured with a feeler gauge between the spacer and the mandrel shaft, must be:

$$X = 59 \text{ mm (2.323 in.)} - 58.50 \text{ mm (2.303 in.)} = 0.50 \text{ mm (0.020 in.)}$$

Bolt the right side half-housing directly to the **B. Vi. 240** support.

Put the output shaft into place.

Put the left half-housing into place and hold it there with a few bolts. (Do not tighten the bolts.)

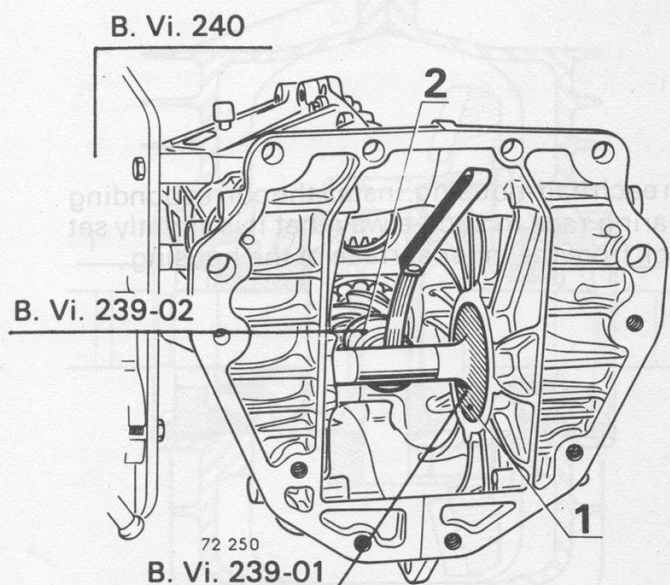
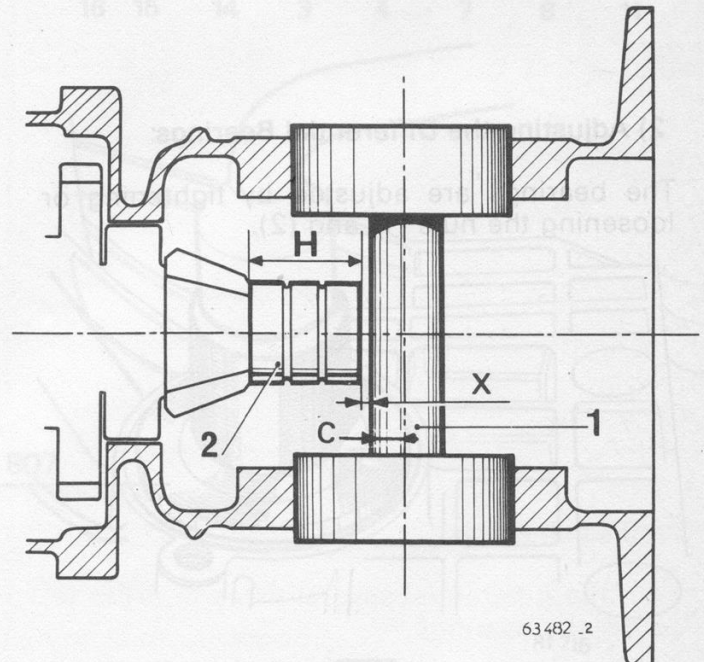
Install the rear cover.

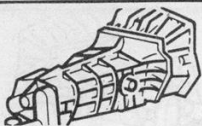
Tighten the fixing bolts of the half-housings and of the rear cover.

Put the mandrel (1) into place.

Place the spacer (2) on the front surface of the drive pinion.

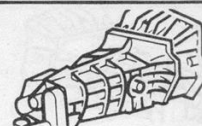
With a set of feeler gauges measure the distance (X) between the spacer and the mandrel shaft.





COMPLETE OVERHAUL

ADJUSTING PINION DEPTH AND DIFFERENTIAL BEARINGS



395 TRANSMISSION

If the measurement taken is less than the normal measurement:

Replace the pinion depth adjustment washer with a thinner one.

If the measurement taken is greater than the normal measurement:

Replace the washer with a **thicker** one.

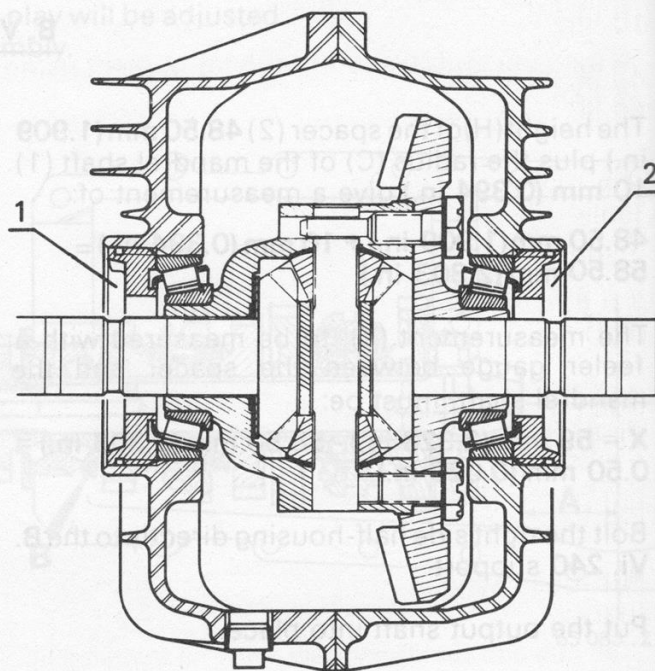
Washers exist in thicknesses of **3.50 to 4.10 mm (0.138 to 0.161 in.)** in increments of **5/100ths of a millimeter (.002 in.)**.

Once the final adjustment has been made, remove:

- the checking device
- the left half-housing and rear cover
- the output shaft.

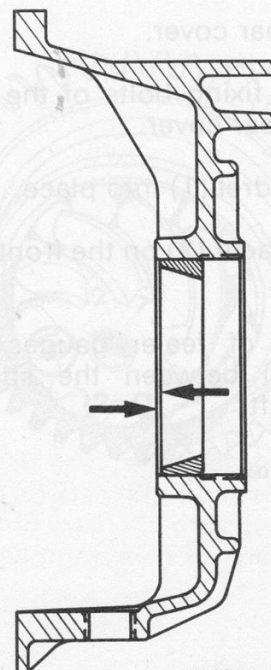
2) Adjusting the Differential Bearings:

The bearings are adjusted by tightening or loosening the nuts (1) and (2).

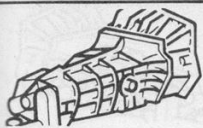


81378

On each half-housing, install the corresponding bearing race in such a way that it is slightly set back from the inner surface of the housing.

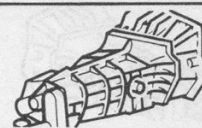


65221



COMPLETE OVERHAUL

ADJUSTING THE DIFFERENTIAL BEARINGS



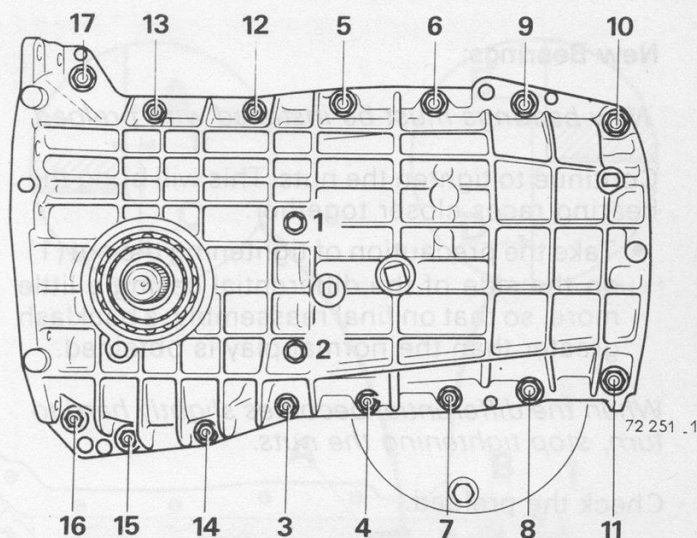
395 TRANSMISSION

Place the differential, equipped with its bearings, in the right half-housing.

Put the left half-housing in place and install all the bolts.

Tighten the bolts with the torque wrench, following the correct tightening sequence.

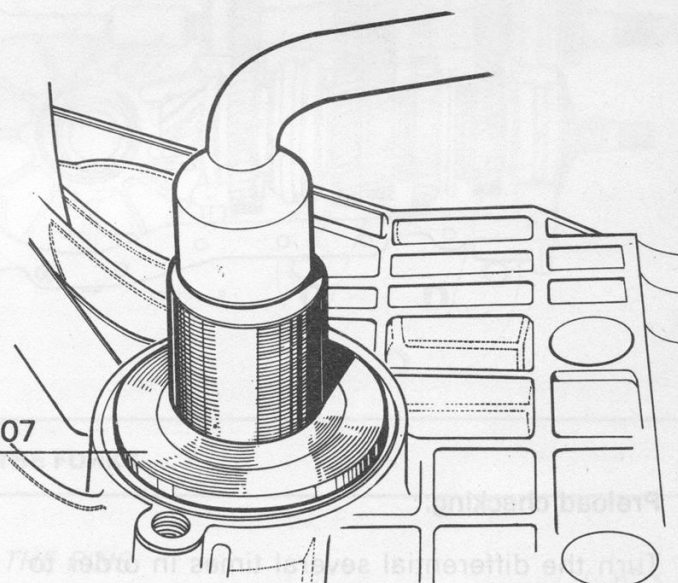
DO NOT AT THIS POINT INSTALL THE NEW SEALS ON THE DIFFERENTIAL ADJUSTING NUTS, since the lip of the seals may be damaged by the side gears when the transmission is reopened for adjustment.



On each half-housing tighten the adjusting nut until it makes contact with the bearing race. Use the **B. Vi. 807** tool.

Two situations may now exist, depending on whether new or used bearings are installed:

B. Vi. 807



Reused Bearings:

The differential must turn with no play.

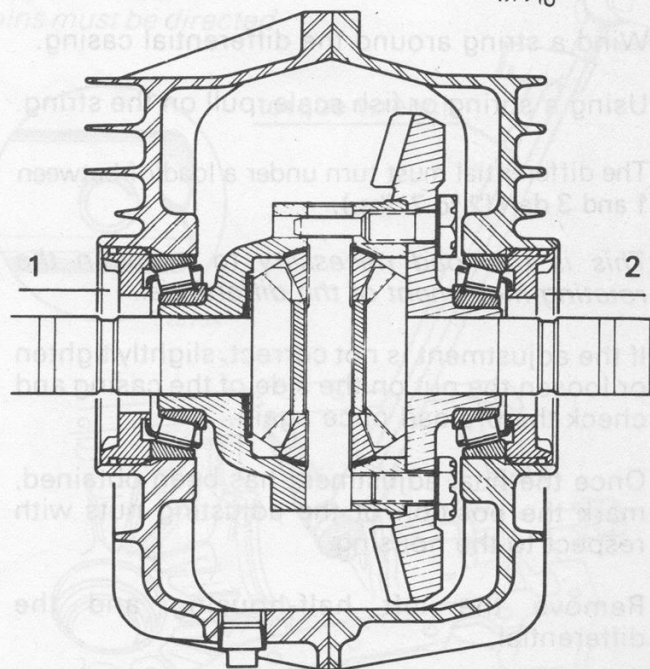
Continue to tighten the nuts. This will push the bearing races closer together.

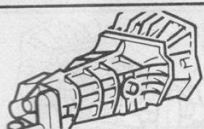
- Take the precaution of tightening the nut (1) on the side of the differential casing a little more, so that, on final reassembly, a backlash greater than normal play is obtained.

When the differential can be turned with no play, stop tightening the nuts.

Final adjustment has now been made.

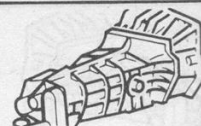
Mark the position of the nuts with respect to the housing.





COMPLETE OVERHAUL

ADJUSTING THE DIFFERENTIAL BEARINGS



395 TRANSMISSION

New Bearings:

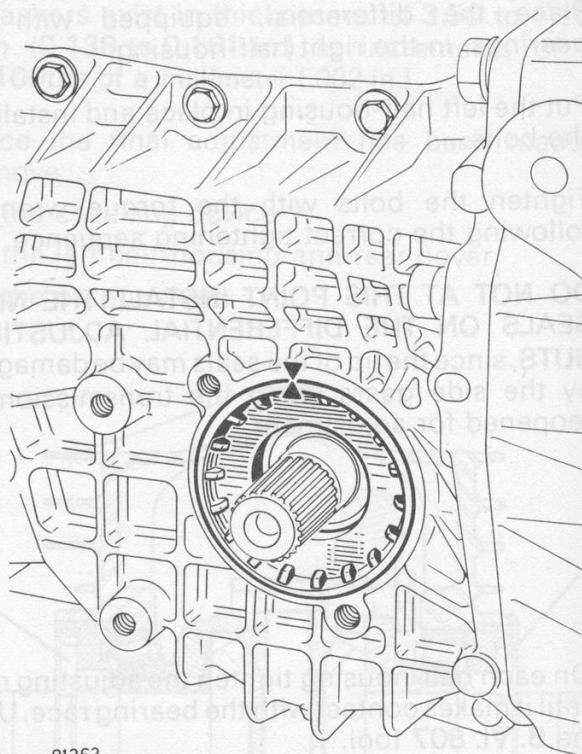
New bearings must be installed with preload.

Continue to tighten the nuts. This will bring the bearing races closer together:

- Take the precaution of tightening the nut (1) on the side of the differential casing a little more, so that on final reassembly, a backlash greater than the normal play is obtained.

When the differential becomes slightly hard to turn, stop tightening the nuts.

Check the preload.



81363

Preload checking:

Turn the differential several times in order to center the bearings.

Wind a string around the differential casing.

Using a spring or fish scale, pull on the string.

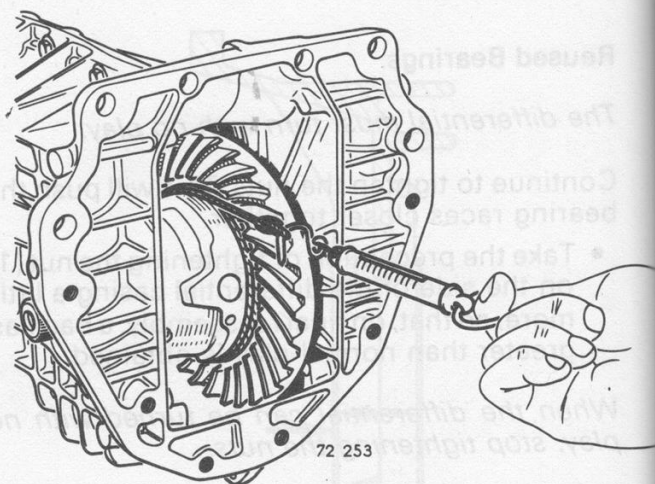
The differential must turn under a load of between 1 and 3 daN (2 to 7 lbs.).

This is the load necessary to maintain the rotating movement of the differential.

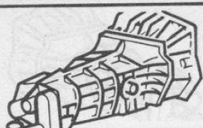
If the adjustment is not correct, slightly tighten or loosen the nut on the side of the casing and check the preload once again.

Once the final adjustment has been obtained, mark the position of the adjusting nuts with respect to the housing.

Remove the left half-housing and the differential.

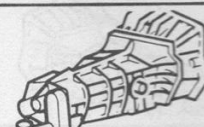


72 253



COMPLETE OVERHAUL

POSITIONING THE INPUT SHAFT



395 TRANSMISSION

3) Positioning the Input Shaft:

Place in the right half-housing:

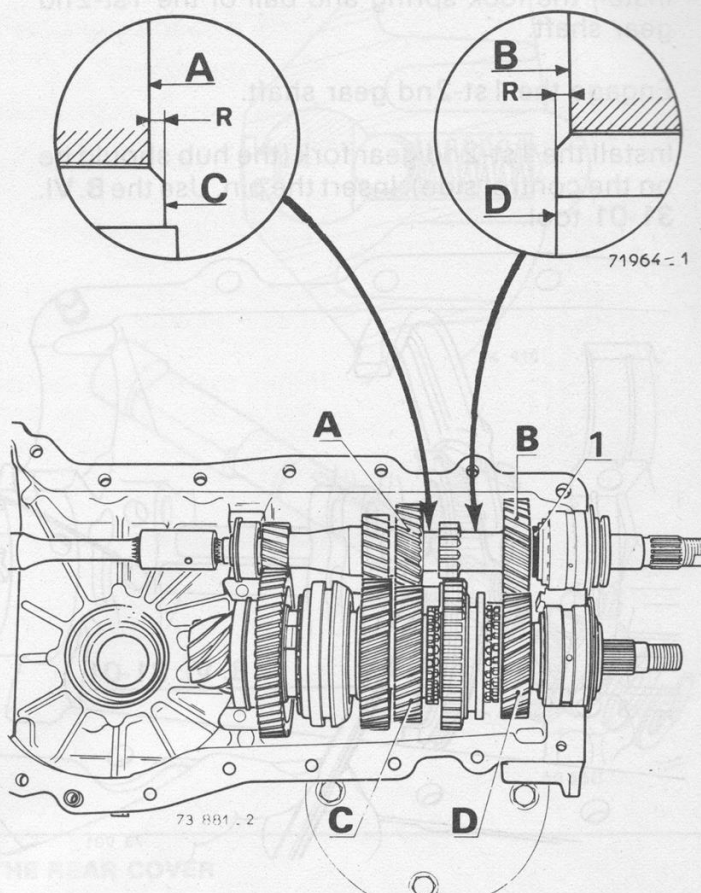
- the output shaft assembly (remove the speedometer worm gear, the spring washer, the 5th speed gear, and the spacer plate).

Position the input shaft next to the output shaft (the set-back (R) should be the same for the two sets of gears).

This position is achieved by the washer (1): washers of different thicknesses are available.

When the adjustment is finished, remove:

- the input shaft
- the output shaft.

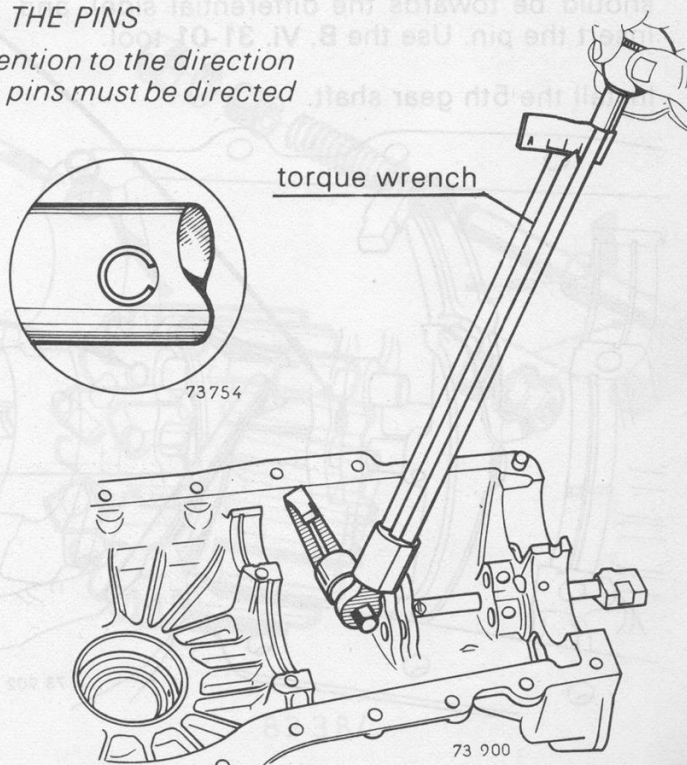


ASSEMBLY OF THE FORKS

Gear Control:

POSITIONING THE PINS

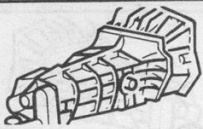
During assembly, pay attention to the direction of the pins: the slot of the pins must be directed toward the rear cover.



Engage the reverse gear shaft.

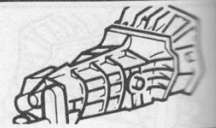
Install the reverse gear selector, engaging its end in the notch of the reverse gear shaft.

Tighten the reverse gear shaft using a torque wrench.



COMPLETE OVERHAUL

ASSEMBLY OF THE FORK

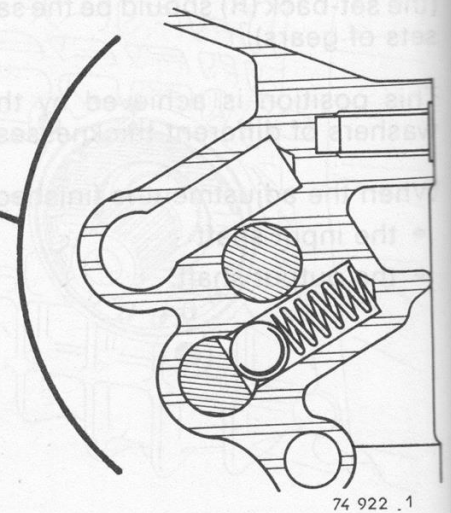
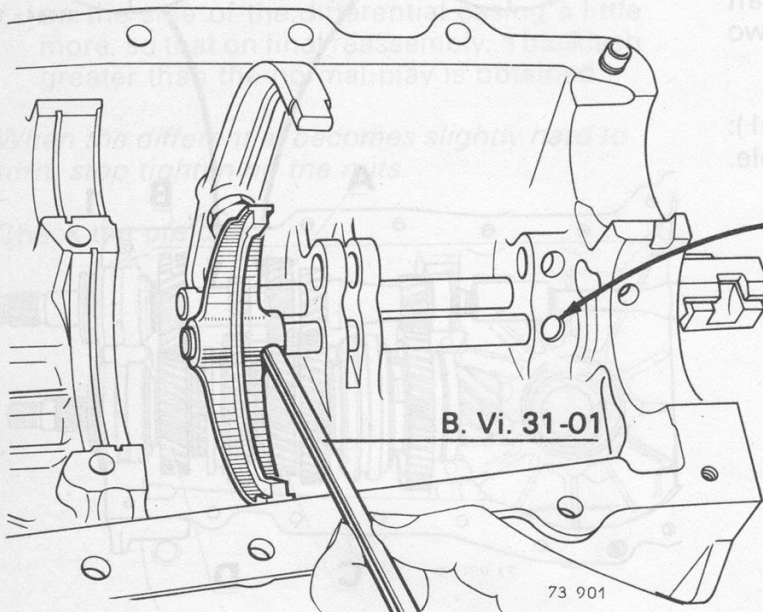


395 TRANSMISSION

Install the lock spring and ball of the 1st-2nd gear shaft.

Engage the 1st-2nd gear shaft.

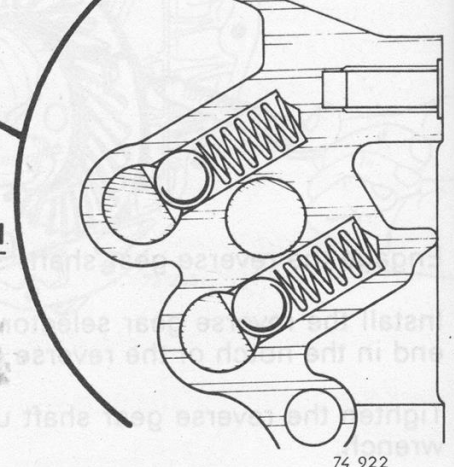
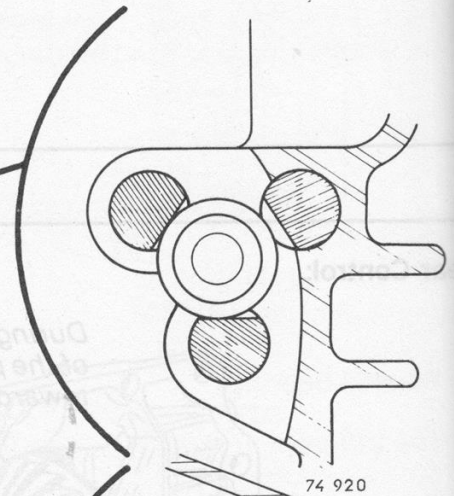
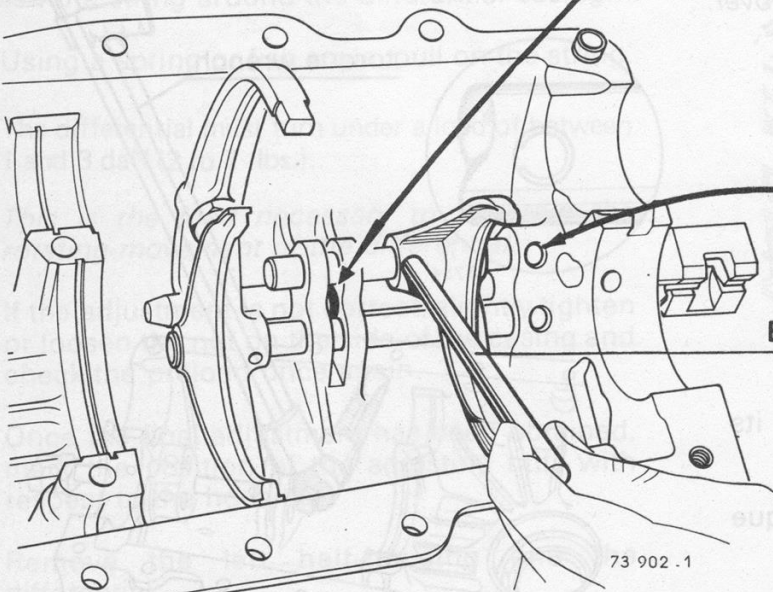
Install the 1st-2nd gear fork (the hub should be on the control side). Insert the pin. Use the **B. Vi. 31-01** tool.

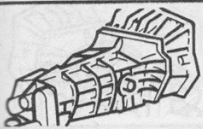


Place the interlocking disk between the shafts, the lock spring, and ball of the 3rd-4th gear shaft.

Engage the shaft, put on the fork (the hub should be towards the differential side), and insert the pin. Use the **B. Vi. 31-01** tool.

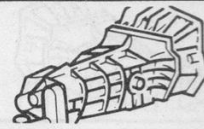
Install the 5th gear shaft.





COMPLETE OVERHAUL

ASSEMBLY OF THE REVERSE GEAR

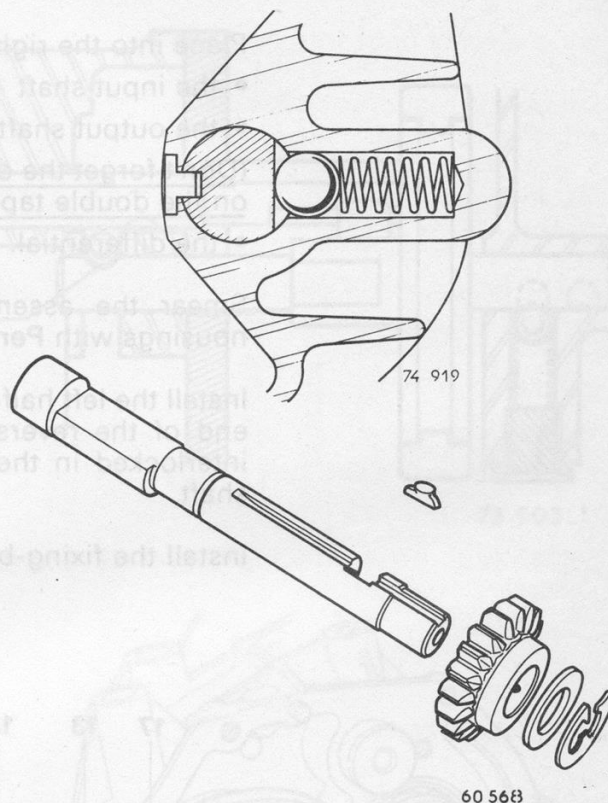


395 TRANSMISSION

Reverse Gear:

In the left half-housing:

- Install the lock spring and ball.
- Engage the shaft and install the gear (the hub should face the differential), then install the thrust washer (the bronze surface should face the gear).
- Place the guide through the inside of the bore and engage the shaft completely.
- Install the gear circlips.



ASSEMBLY OF THE REAR COVER

Put the seals back onto the cover.

Engage the selector lever shaft by putting on:

- the selector lever
- the spacers (the plastic spacer is placed on the side towards the selector lever)
- the spring.

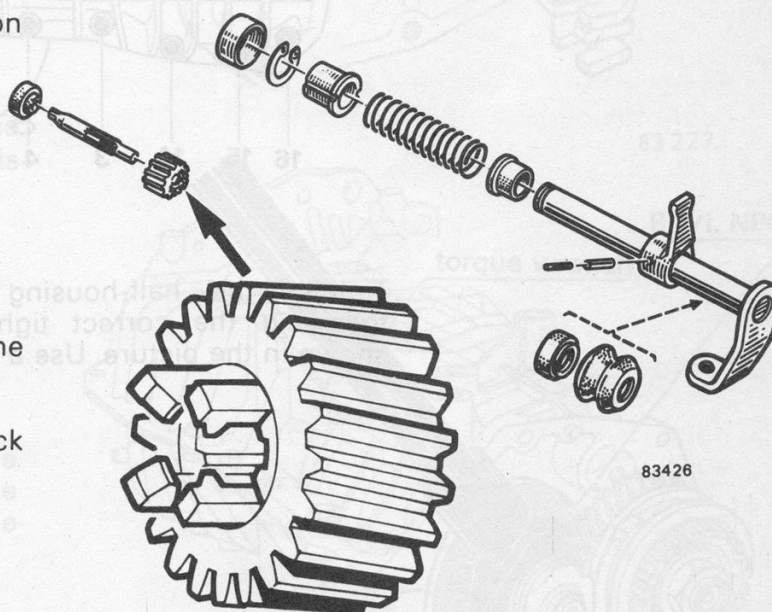
Place the circlip on the rod.

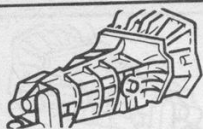
Put on the cap.

Put on a new roll pin.

Put the new speedometer drive gear into the housing.

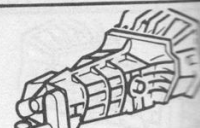
Push the shaft in until the gear catches the lock on the groove of the shaft.





COMPLETE OVERHAUL

ASSEMBLY OF THE HALF-HOUSING



395 TRANSMISSION

Place into the right half-housing:

- the input shaft
- the output shaft assembly

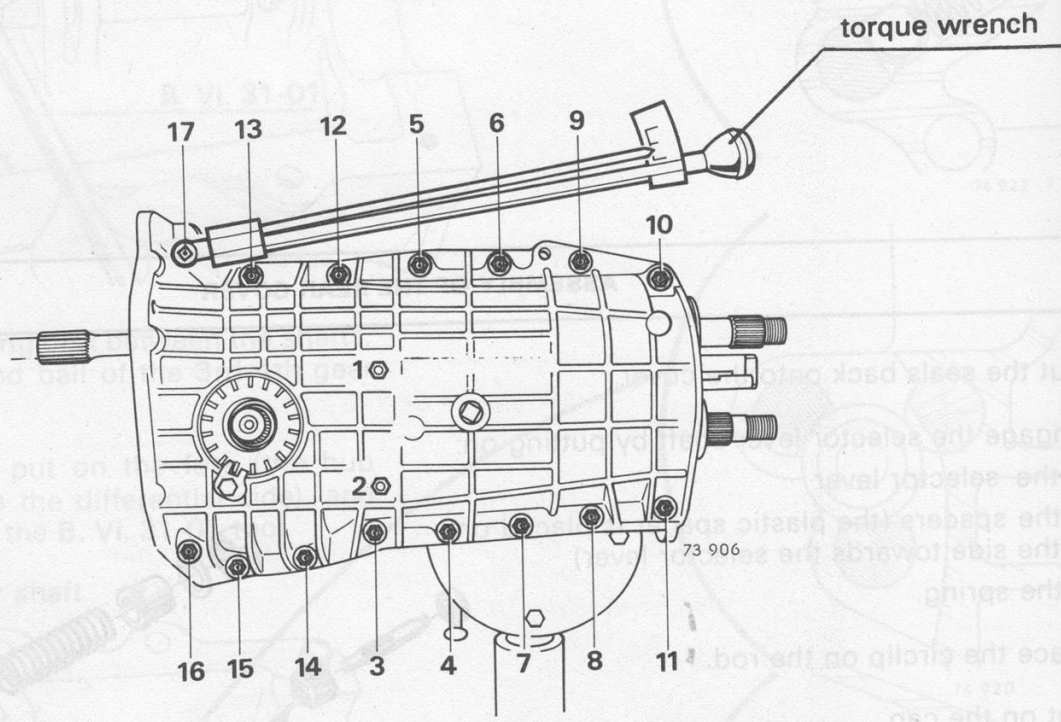
(Don't forget the outer race locking stop dowel on the double taper bearing.)

- the differential.

Smear the assembly surfaces of the half-housings with **Perfect-Seal**.

Install the left half-housing: make sure that the end of the reverse gear selector is securely interlocked in the notch of the reverse gear shaft.

Install the fixing-bolts in the half-housings.

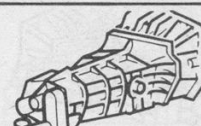


Tighten the half-housing assembly bolts following the correct tightening sequence shown in the picture. Use a torque wrench.



COMPLETE OVERHAUL

ASSEMBLY OF THE 5TH GEAR



395 TRANSMISSION

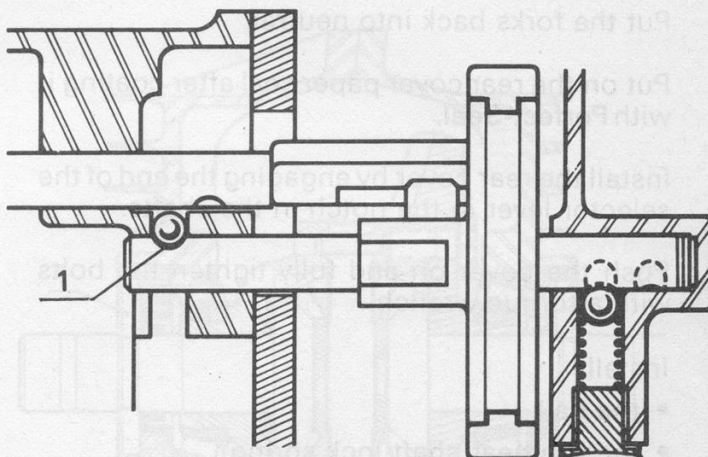
5th Gear Fork Shaft:

Make sure that the fork shaft is in neutral.

Insert the 5th gear lock ball.

Engage the 5th gear fork shaft in neutral.

Engage 3rd gear in order to avoid dislodging the 5th gear shaft when reassembling the gears.



73 903.1

Output Shaft:

Put on the thrust washer of the double taper bearing (place the washer's shoulder on the side of the bearing and its notch around the 5th gear shaft).

Install:

- the gear
- the washer
- the speedometer worm gear nut.

Install:

- the needle bearing with its ring
- the gear and the synchronizer ring.

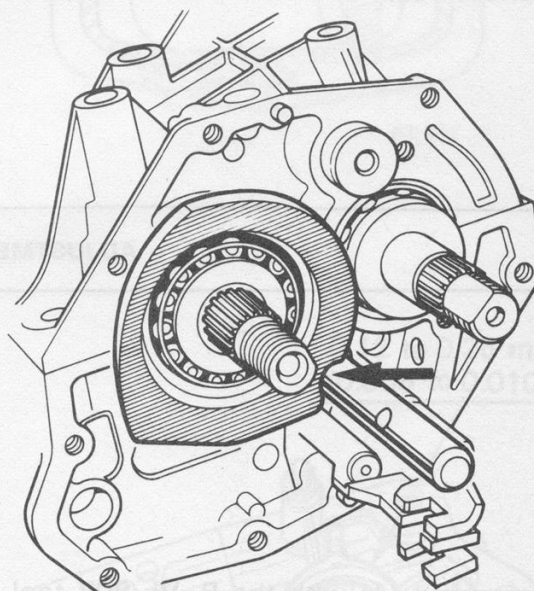
Take the sliding gear-hub with the fork (the cone of the sliding gear should face towards the 5th gear).

Install:

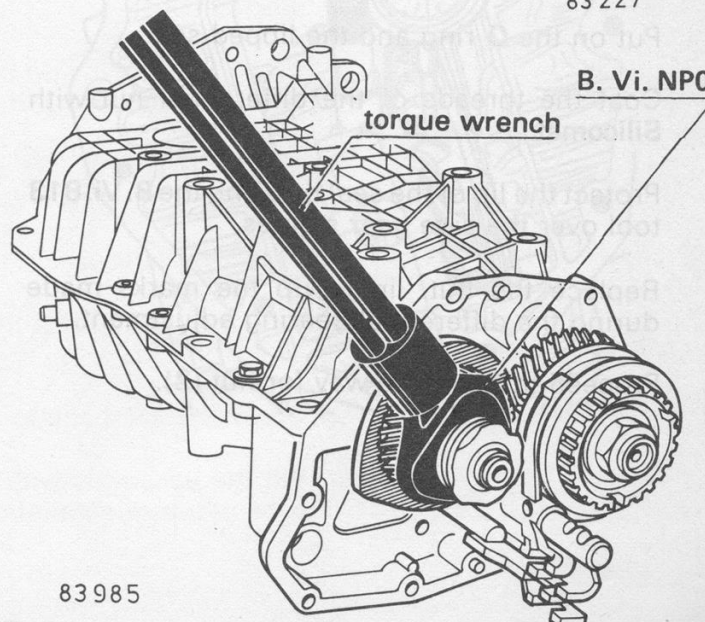
- the pin using the **B. Vi. 31-01** tool
- the washer and the input shaft nut.

Engage 5th gear and reverse gear.

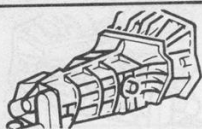
Tighten the nut of the input shaft and of the output shaft with a torque wrench. Tighten the speedometer worm gear nut by attaching the **B. Vi. NP0** wrench to a torque wrench.



83 227

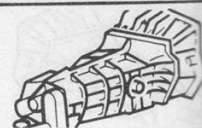


83 985



COMPLETE OVERHAUL

ASSEMBLY OF THE 5th GEAR



395 TRANSMISSION

Put the forks back into neutral.

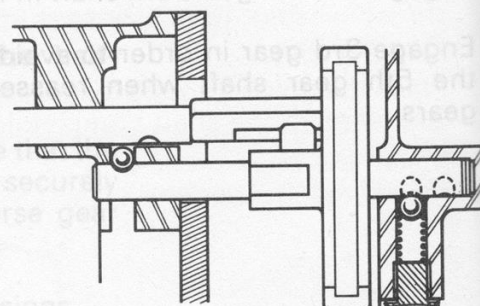
Put on the rear cover paper seal after coating it with **Perfect-Seal**.

Install the rear cover by engaging the end of the selector lever in the notch in the shafts.

Push the cover on and fully tighten the bolts with a torque wrench.

Install:

- the ball
- the 5th gear shaft lock spring
- the washer
- the cap: after coating the threads with **Perfect Seal**.



73 903

ADJUSTMENT OF THE BACKLASH

Remove nut (1) with the **B. Vi. 807** tool and count the number of turns needed to do this.

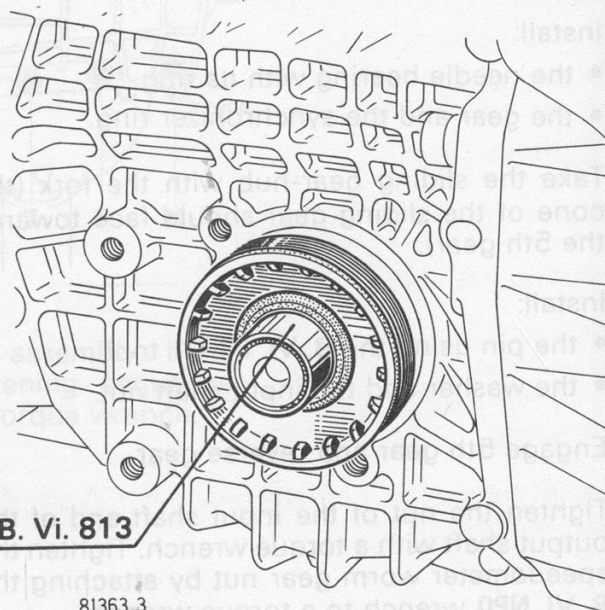
Put on the O ring and the lipped seal.

Coat the threads of the differential nut with **Silicomet**.

Protect the lip of the seal by using the **B. Vi. 813** tool over the side gear splines.

Replace the nut, lining up the marks made during the differential bearing adjustment.

Proceed in the same way for nut (2).



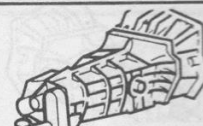
B. Vi. 813

81363.3



COMPLETE OVERHAUL

ADJUSTMENT OF THE BACKLASH

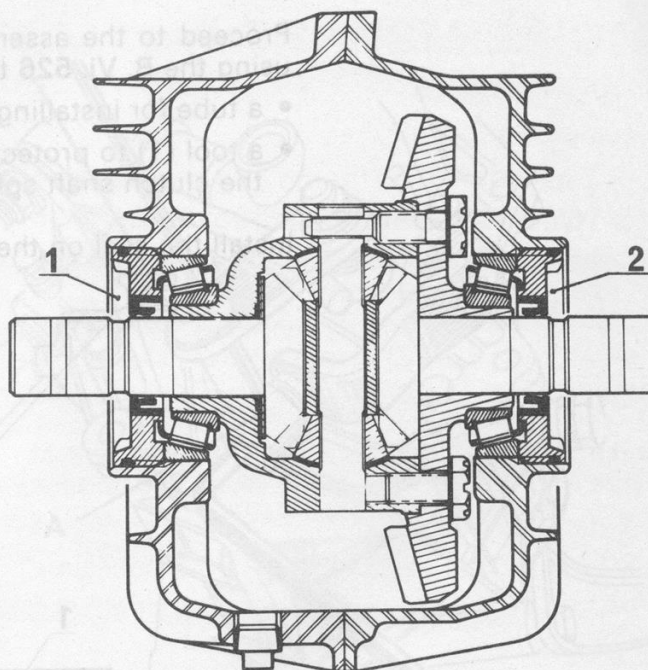


395 TRANSMISSION

Backlash is obtained by partially unscrewing nut (1) on the casing side, and then by screwing in nut (2) on the ring gear side by the same amount.

Estimate, by hand, the amount of backlash.

If it is too great, unscrew nut (1) on the casing side and screw in nut (2) on the ring gear side so as to reduce the backlash before it is checked with a dial indicator.



81 378 .1

Attach a dial indicator gauge to the housing. Keep the tip of the gauge perpendicular to the side of a tooth in the ring gear and as close as possible to the outside edge.

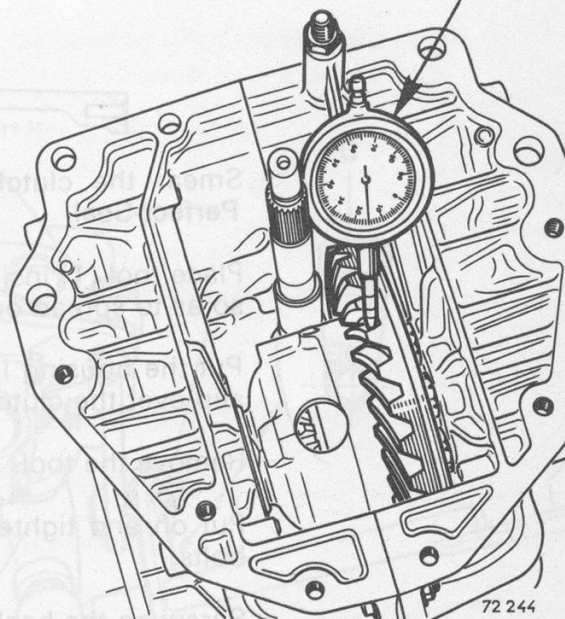
Check the backlash: it must be between **0.12 and 0.25 mm (0.005 and 0.010 in.)**.

If it is too great, unscrew nut (1) on the casing side and screw in nut (2) on the ring gear side by the same amount.

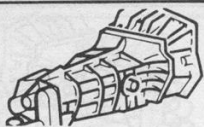
If it is too little, unscrew nut (2) on the ring gear side and screw in nut (1) on the casing side by the same amount.

Once the correct backlash is obtained, lock the differential nuts in place using the stop washers.

**0.12 to 0.25 mm
(0.005 to 0.010 in.)**

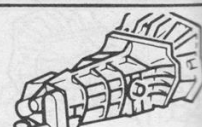


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COMPLETE OVERHAUL

ASSEMBLY OF THE BELL HOUSING

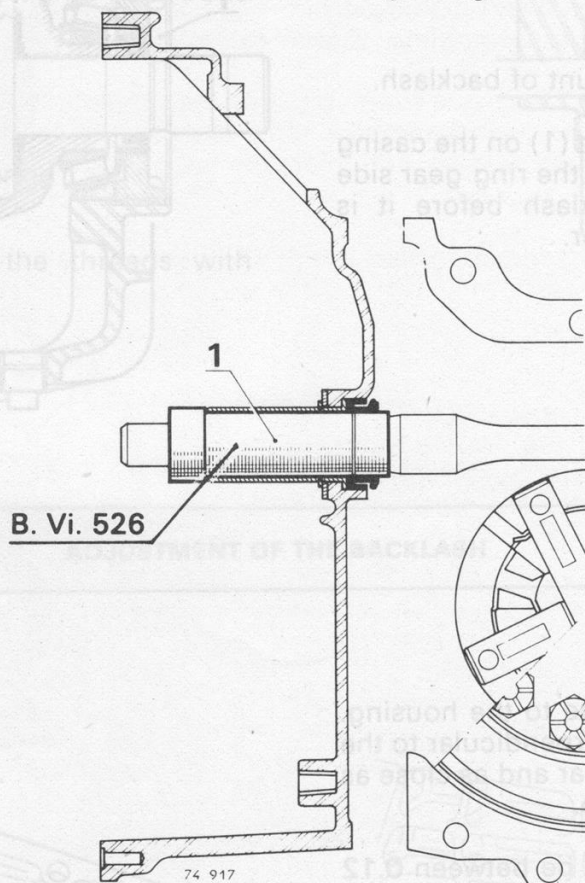


395 TRANSMISSION

Proceed to the assembly of the bell housing, using the **B. Vi. 526** tool. This tool consists of:

- a tube for installing the seal on the housing
- a tool (1) to protect the lip of the seal when the clutch shaft splines pass through.

Install the seal on the housing using the tube.



Smear the clutch housing paper seal with **Perfect-Seal**.

Place tool (1) inside the release bearing guide so as to spread out the lips of the seal.

Put the housing into place by making tool (1) slip over the clutch shaft.

Remove the tool.

Put on and tighten the clutch housing fixing bolts.

Screw on the backup-lights switch.

Fill the assembly with the recommended gear lube when reinstallation has been completed.