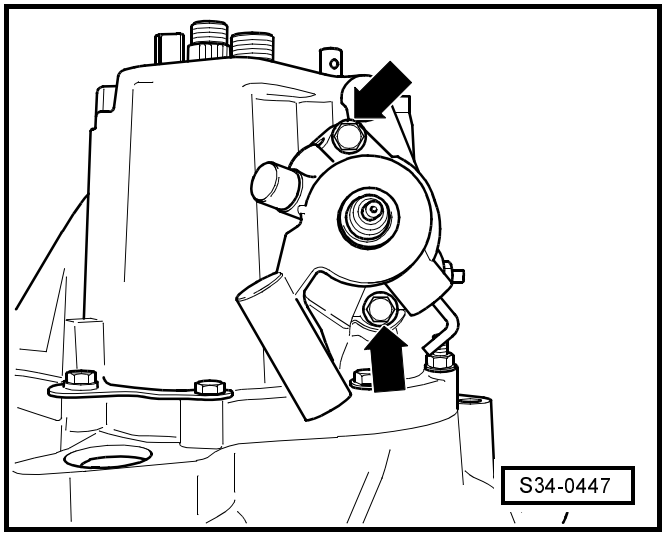
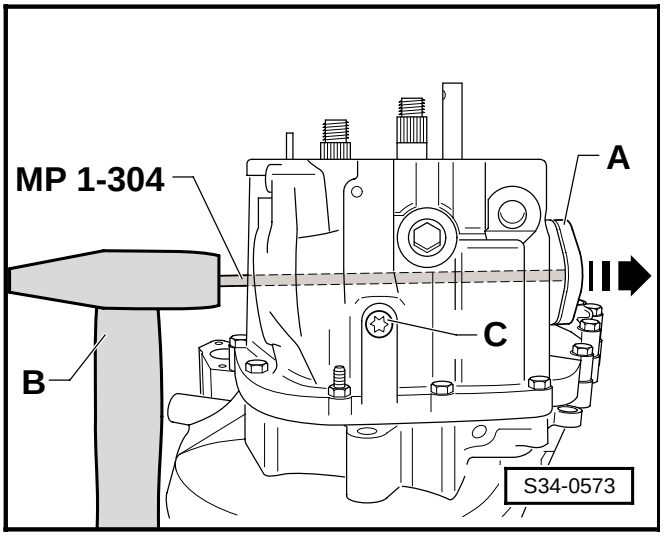
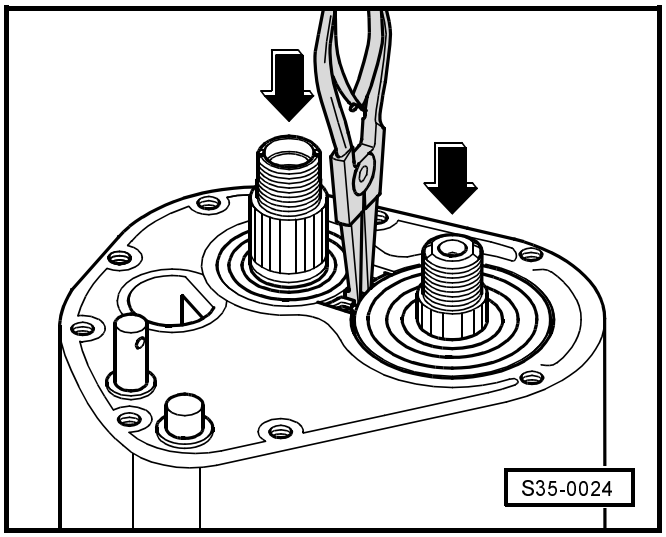
– Remove the gearshift shaft with cover. Put the gearshift shaft into Neutral. Subsequently unscrew screws -arrows- and remove the gearshift shaft from the gearbox housing.



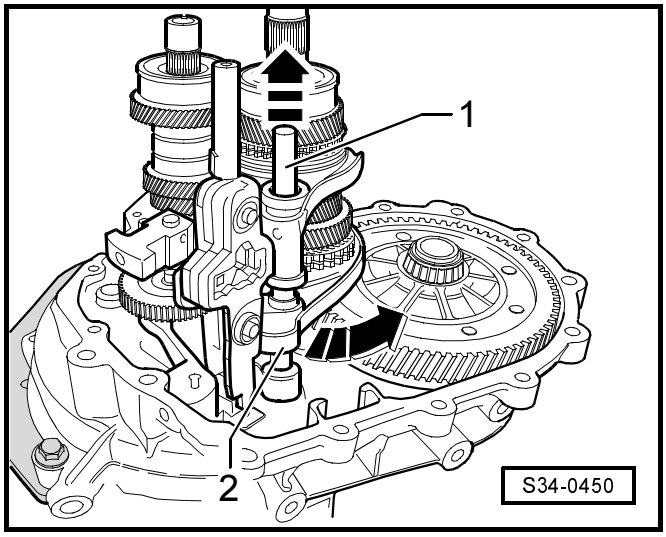
– Carefully drive out the cover -A- with valve guide driver -MP 1-304- and hammer -B-.
– Release screw -C- for reverse shaft support.
– Remove the screws for the gearbox housing on the clutch housing.



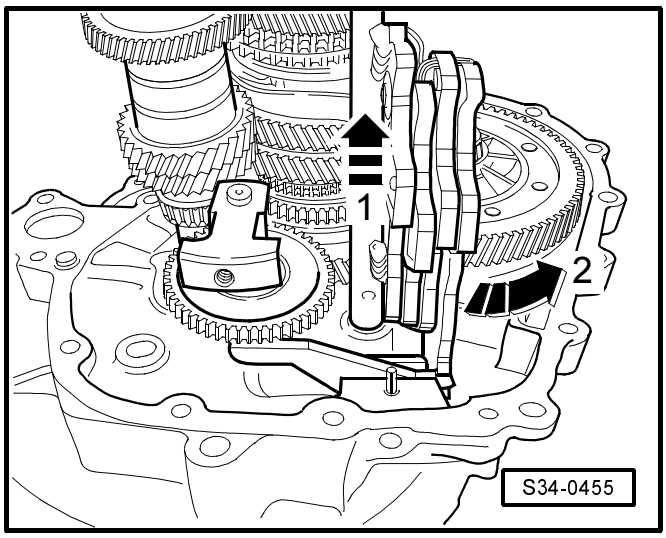
– Open the circlips of the grooved ball bearings for the input and output shafts with pliers.
– Press the input and output shafts down to the stop -arrows-.
– Carefully lever off the gearbox housing from the projecting housing lands and make sure the sealing surfaces are not damaged in the process.



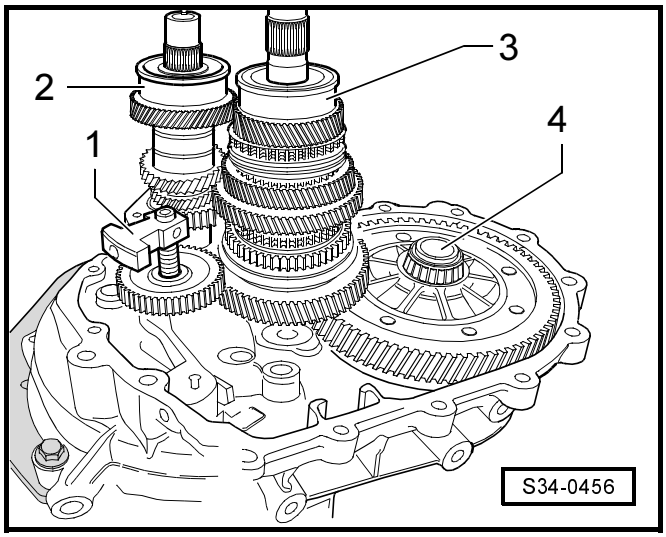
– Remove gear shift rod for gears 1 through 4 -1-.
– Swivel out the shift fork for the 1st and 2nd gear -2- from the gearshift rail and remove from sliding sleeve.



– Pull the shift rod of the 5th gear -arrow 1- out of the clutch housing.
– Draw out the shift rod with gearshift rails and 3rd and 4th gearshift fork from the reverse gear shift fork -arrow 2-.



– Pull out the reverse shaft -1-.
– Remove the input shaft -2- together with the output shaft -3- from the clutch housing.
– Remove the differential gear -4-.



Assembling

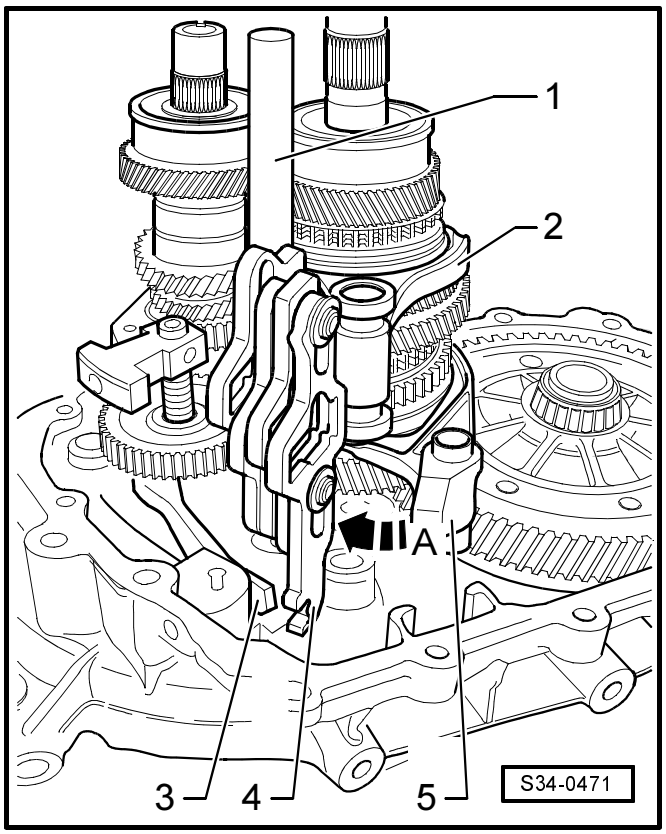
– Insert the differential gear.

– Position the input shaft together with the output shaft in the clutch housing.

– Install the reverse shaft support.

– Install the gearshift mechanism as follows: ►

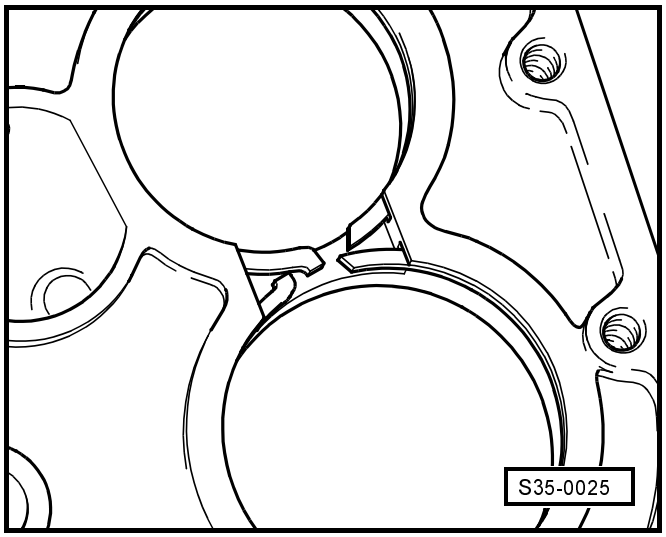
1. Place the 5th gear shift rod -1- together with the gear shift rails in the clutch housing. To do so insert the 3rd/4th gearshift fork -2- in the sliding sleeve and the reverse gear shift fork -3- in the gearshift rail -4-.
2. Install the 1st and 2nd gear shift fork -5- and swivel into the 1st/2nd gear shift rail -arrow A-.
3. Insert gear shift rod for gears 1 through 4.



– The circlips for the grooved ball bearing of the input and output shaft must be inserted in the gearbox housing as shown in the figure. ►

– Apply sealant -THREE BOND 1104- uniformly on the sealing surface.

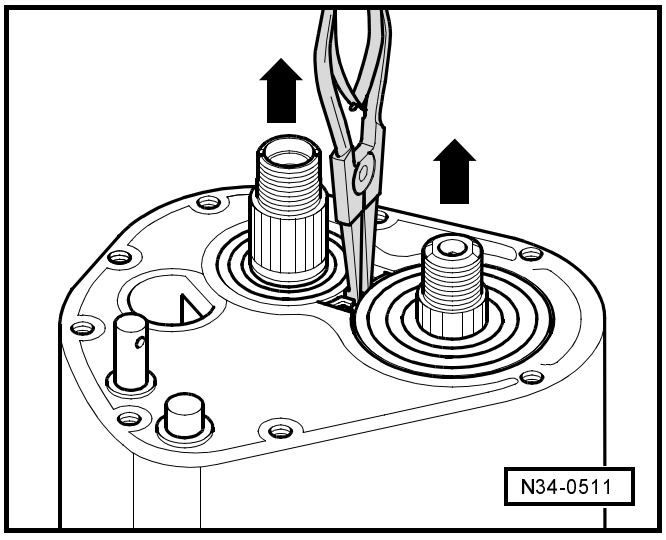
– Position the gearbox housing on the clutch housing.



– Open the circlips with pliers. ►

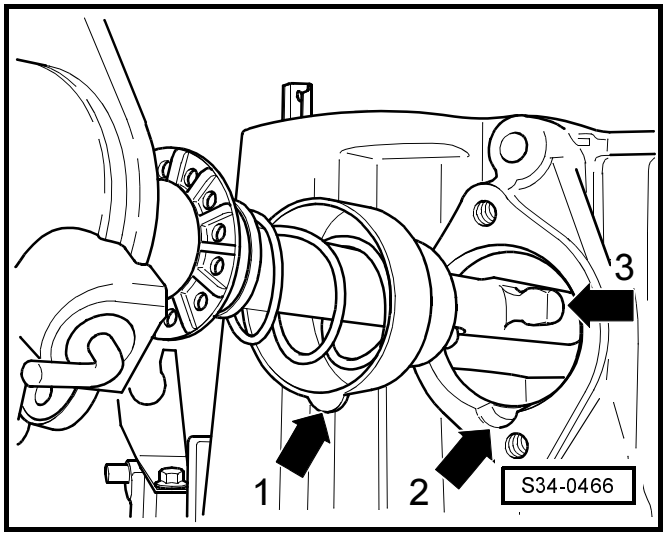
– Pull the input and output shaft upwards -arrows- until the circlips catch in the bearing groove.

– Tighten the screws for securing the gearbox housing to 25 Nm.

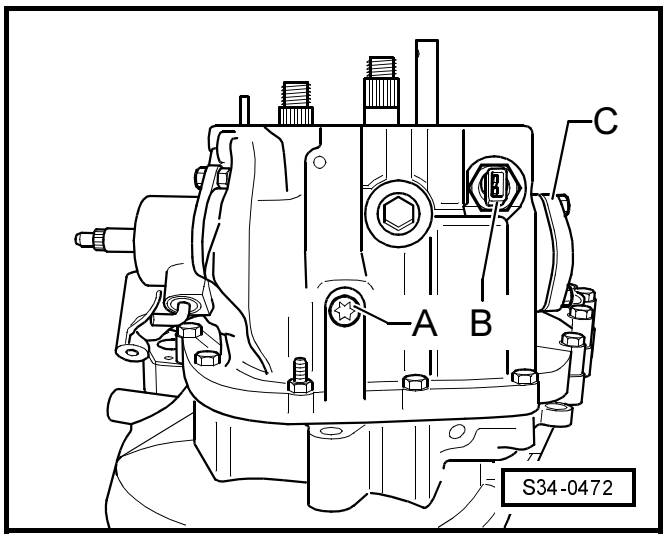


Install the gearshift shaft as follows:

- Put the shift rails in neutral position.
- Before fitting the gearshift shaft coat the seat surfaces with sealant -THREE BOND 1324-.
- Position the peg -arrow 1- in the recess -arrow 2- of the gearbox housing.
- Align the gearshift shaft in such a way that the shift finger -arrow 3- is inserted in the shift rails.

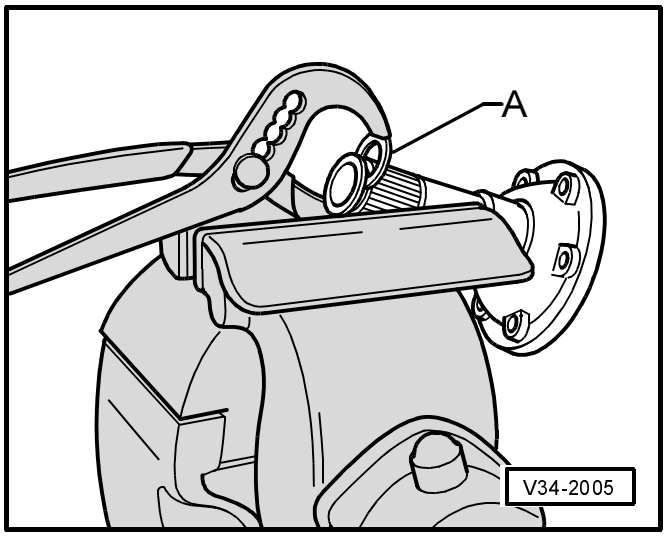


- Tighten the screw -A- for the reverse shaft support to 30 Nm.
- Coat the switch -B- for reversing lights -F4- with sealant -THREE BOND 1324- and tighten to 15 Nm.
- Coat cover -C- with sealant and tighten screws to 25 Nm.



For gearbox up to 06.00

- Secure the flange shaft in a vice fitted with protective jaws. Push out the old circlip from the groove with a new circlip -A-.
- Drive in the flange shaft on the right and left with a plastic hammer.



For gearbox after 06.00

- Secure the left and right flange shaft with conical screw.

For all gearboxes

Fitting position of the 5th gear pinion

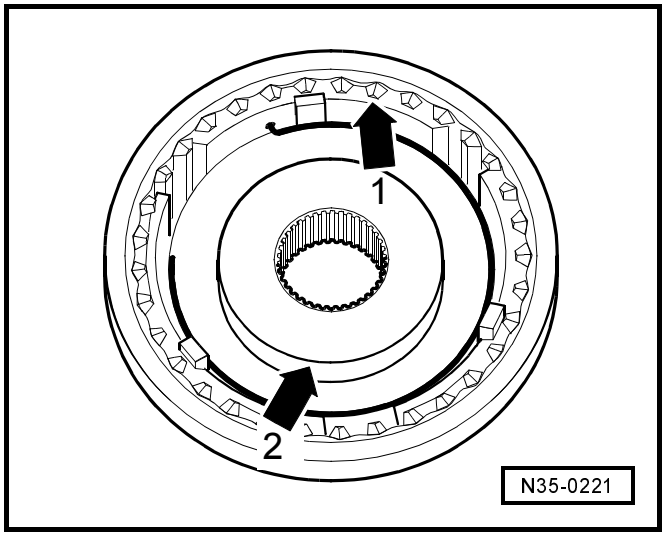
The shoulder on the inside diameter points towards the gearbox housing.

- Insert the 5th gear pinion.
- Insert the sleeve for the 5th gear needle bearing onto the drive shaft, with the oil pockets pointing upwards.
- Install the 5th gear sliding gear together with needle bearing.
- Position the synchronizer ring on the 5th gear output gear.

– Assemble the synchronizer body with the 5th gear sliding sleeve ⇒ Chap. 35-1.

Fitting position of the 5th gear synchronizer body/sliding sleeve

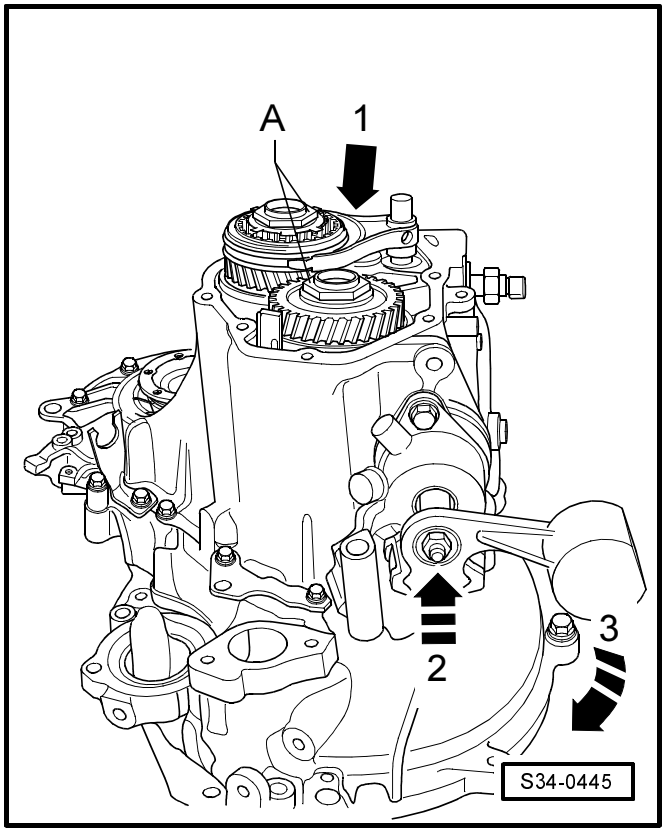
The sharp teeth of the sliding sleeve -arrow 1- and the raised flange of the synchronizer body -arrow 2- point towards the gearbox housing.



– Position the 5th gear shift fork together with the synchronizer body and sliding sleeve.

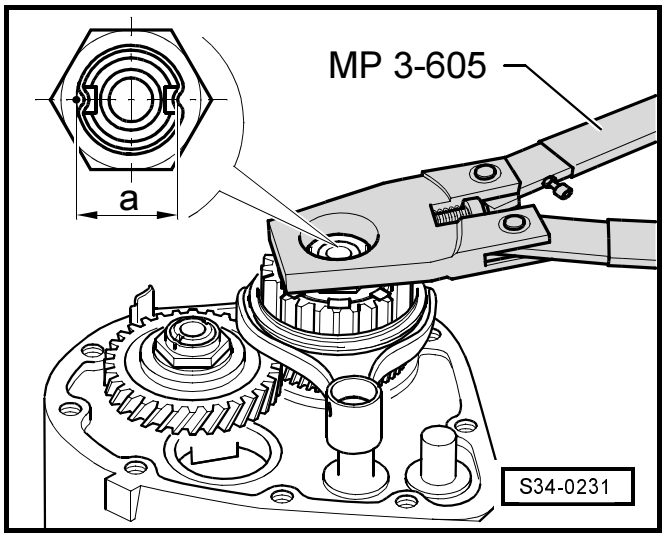
– Place the supporting ring and disc spring on the 5th gear synchronizer body or the disc spring on the 5th gear pinion.

– Before tightening the securing bolts -A- for the synchronizer body and 5th gear pinion engage 2 gears -arrows 1 through 3-.



– Secure the nuts on the input and output shaft.

a = 24.2 ± 0.3 mm



– 5. Slide the 5th gear over the sliding sleeve.

– Secure the 5th gear shift fork with new tensioning sleeve.

– Gradually shift through all gears.

– Apply sealant -THREE BOND 1104- uniformly on the sealing surface.

– Mount cover for gearbox housing

– Installing the clutch release lever, clutch release bearing and guide bushing ⇒ Chapter 30-2.

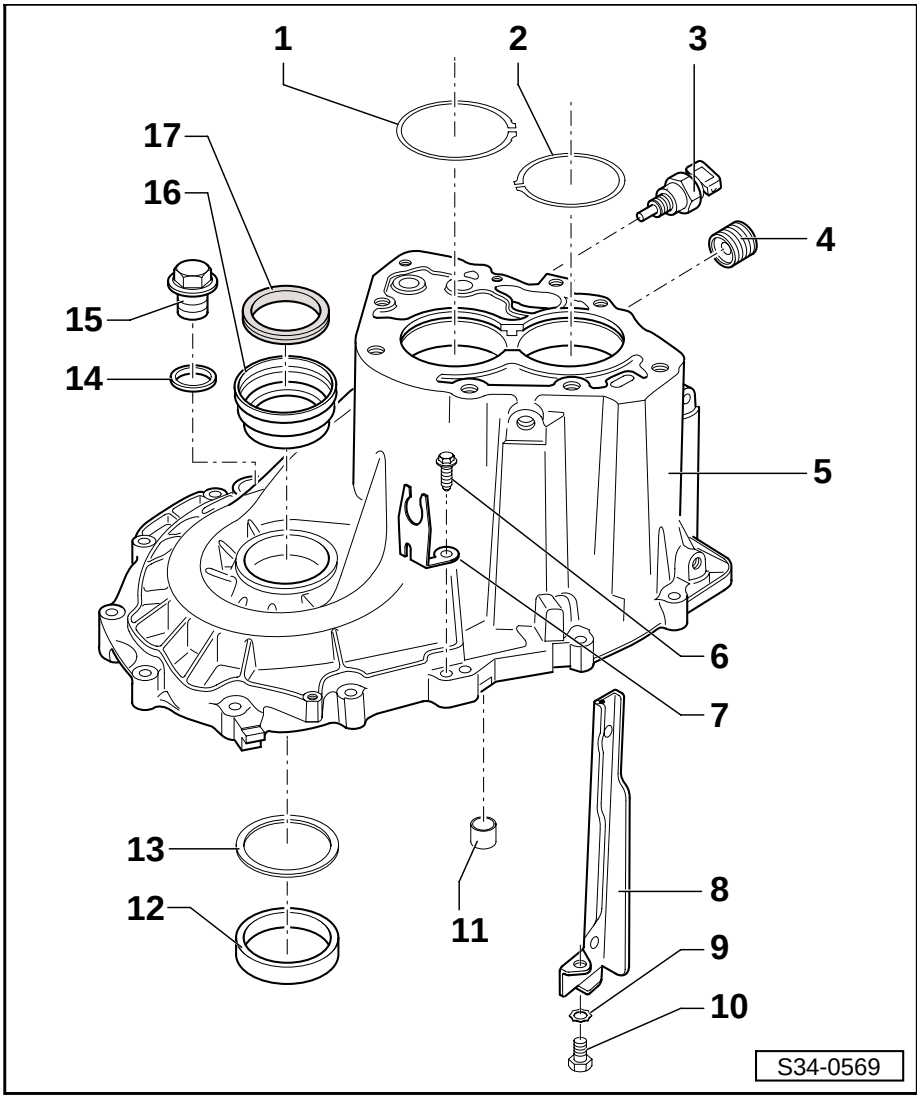
34-10 Repairing the gearbox housing

Special tools, test and measuring equipment and aids required

- Multi-purpose tool -MP 3-419-
- Impact mandrel -MP 3-606-
- Interior extractor 14.5 through 18.5 mm (e.g. -Kukko 21/2-)
- Sealant -THREE BOND 1324-

Note

The oil drainage screw is missing in manual gearboxes from 10/01. Oil drainage ⇒ Chapter 34-8.



1 - Circlip
- ❑ for grooved ball bearing output shaft
- ❑ fitting position ⇒ Fig. 1 in **34-10** page 2

2 - Circlip
- ❑ for grooved ball bearing input shaft
- ❑ fitting position ⇒ Fig. 1 in **34-10** page 2

3 - Switch for reversing lights -F4-, 15 Nm
- ❑ before installing apply sealant -THREE BOND 1324-
- ❑ pay attention to different versions

4 - Oil filler plug, 25 Nm

5 - Gearbox housing

6 - 20 Nm

7 - Bracket

8 - Oil deflector

9 - Lock washer

10 - 10 Nm

11 - Bushing for gear shift rod
- ❑ removing ⇒ Fig. 2 in **34-10** page 2
- ❑ inserting ⇒ Fig. 3 in **34-10** page 3

12 - Outer ring/tapered-roller bearing
- ❑ for the differential gear
- ❑ removing and installing ⇒ Chapter 39-2
- ❑ if replaced: Setting differential gear ⇒ Chap. 39-3

13 - Adjusting washer
- ❑ for the differential gear
- ❑ Determine thickness ⇒ Chap. 39-3

14 - Gasket
- ❑ for gearboxes up to 09/01
- ❑ always replace

15 - Oil drain plug, 25 Nm
- ❑ for gearboxes up to 09/01

16 - Bushing

- ❑ for gearbox after 06.00
- ❑ for left gasket ring ⇒ item 17 in **34-10** page 2
- ❑ removing ⇒ Fig. 4 in **34-10** page 3
- ❑ installing ⇒ Fig. 5 in **34-10** page 3

17 - Gasket

- ❑ for left flange shaft
- ❑ replacing ⇒ Chapter 39-1
- ❑ fill with sealing grease before fitting
- ❑ pay attention to different versions

Fig. 1: Fitting position of the circlips for input and output shaft ►

– Insert the circlips as shown in the housing groove of the geabox.

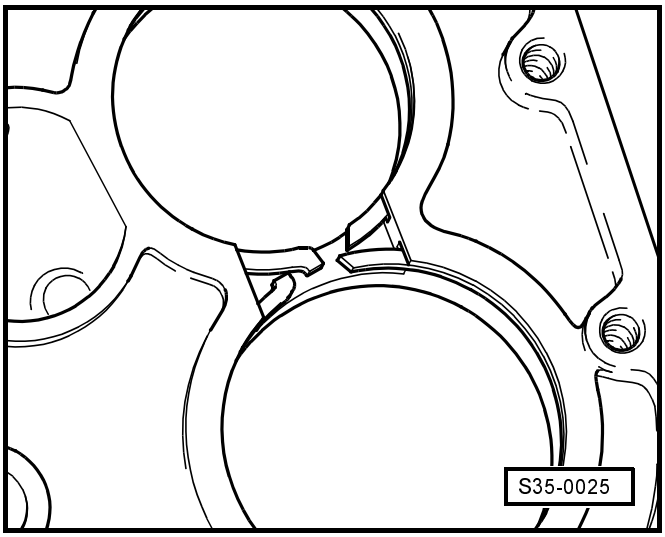


Fig. 2: Remove bushing for gear shift rod ►

A - Interior extractor 14.5 through 18.5 mm (e.g. -Kukko 21/2-)

Note

The bushing can also be removed with ejector -MP 3-609 -.

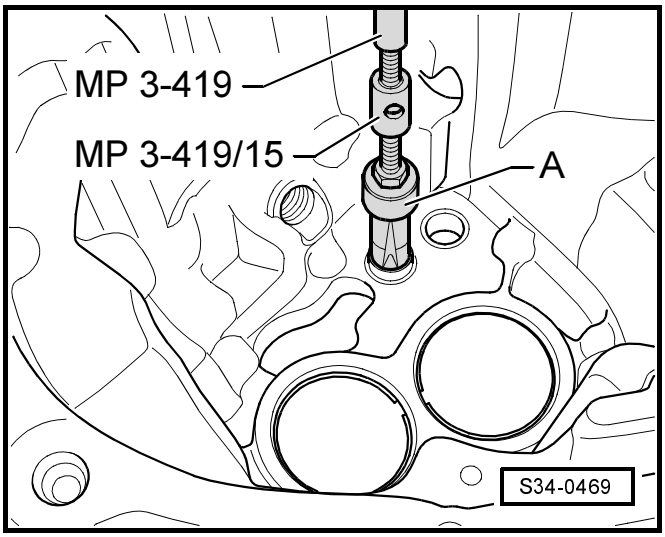


Fig. 3: Drive in the bushing -A- for the shift rod up to the stop. ►

– When installing secure the bushing on both sides against wandering with impact mandrel -MP 3-606-.

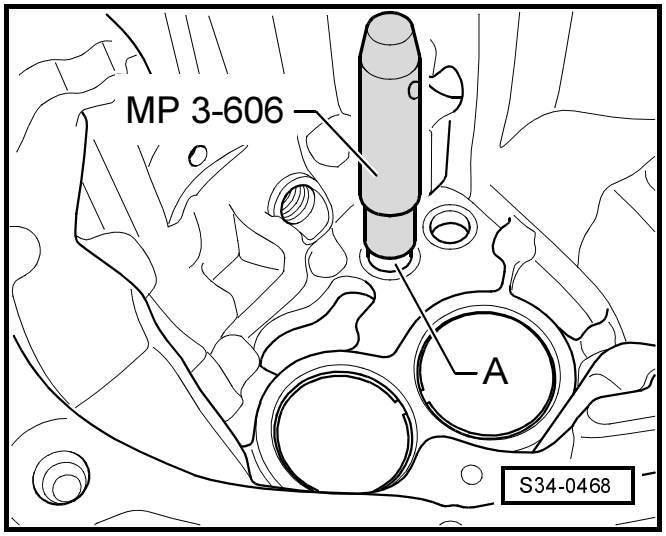


Fig. 4: Levering out the bushing with a screwdriver ►

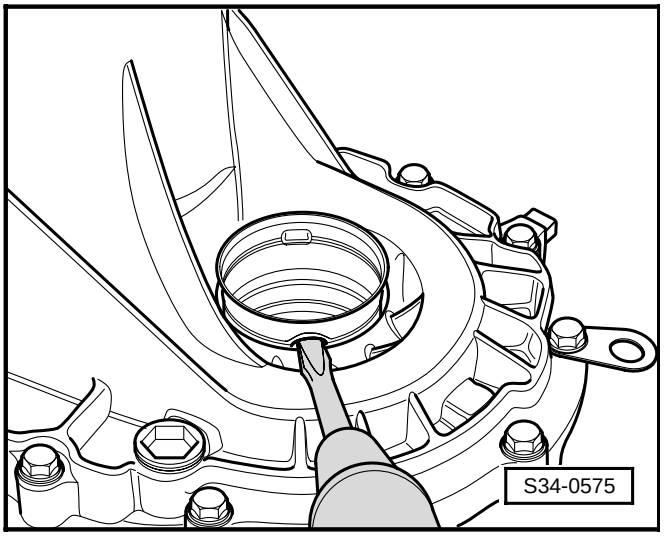
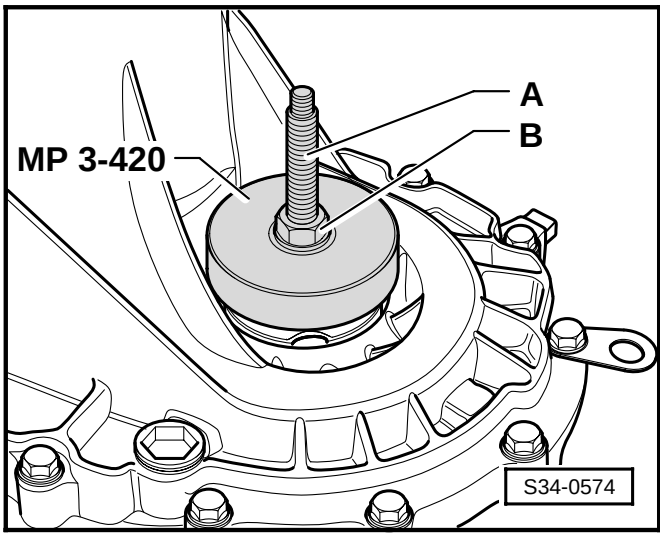


Fig. 5: Fitting the bushing ►

A - Screw threaded rod from assembly device -MP 3-434- into the threaded part of the differential

B - Nut M12 with washer

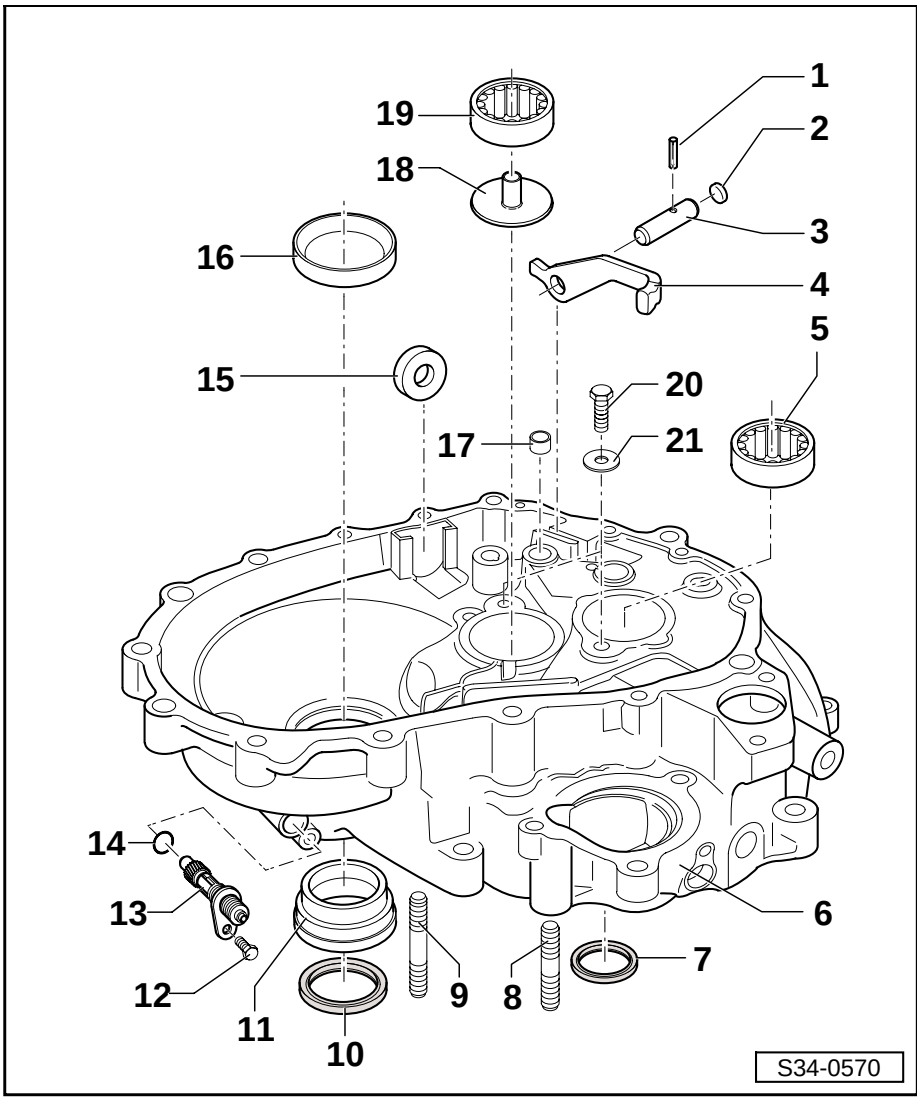
– By turning the nut -B- press in the bushing over the pressure plate washer -MP 3-420- up to the stop.



34-11 Repairing the clutch housing

Special tools, test and measuring equipment and aids required

- Multi-purpose tool -MP 3-419-
- Bushing -MP 3-424-
- Ejector -MP 3-509-
- Impact mandrel -MP 3-606-
- Interior extractor 14.5 through 18.5 mm (e.g. -Kukko 21/2-)
- Sealant -THREE BOND 1305-



1 - Tensioning sleeve
- ❑ 4 x 25 mm
- ❑ pull out with pliers
- ❑ Install with ejector -MP 3-509-

2 - Plug
- ❑ before installing apply sealant -THREE BOND 1305-

3 - Bolt
- ❑ for reverse gear shift fork
- ❑ removing and installing ⇒ Fig. 1 in **34-11** page 2

4 - Gearshift fork reverse gear
- ❑ removing and installing ⇒ Fig. 1 in **34-11** page 2

5 - Cylindrical-roller bearing
- ❑ for drive shaft
- ❑ removing and installing ⇒ Chapter 35-1
- ❑ fitting position ⇒ Fig. 2 in **34-11** page 2

6 - Clutch housing

7 - Gasket ring for drive shaft
- ❑ removing ⇒ Fig. 3 in **34-11** page 3
- ❑ inserting ⇒ Fig. 4 in **34-11** page 3

8 - Pin screw, M10

9 - Pin screw, M10

10 - Gasket
- ❑ for right flange shaft
- ❑ replacing ⇒ Chapter 39-1
- ❑ fill with sealing grease before fitting
- ❑ pay attention to different versions

11 - Bushing
- ❑ for gearbox after 06.00
- ❑ for right gasket ring
- ❑ removing ⇒ Fig. 7 in **34-11** page 4
- ❑ installing ⇒ Fig. 8 in **34-11** page 4

12 - 20 Nm
- ❑ only for vehicles without ABS; from 11/02.

13 - Drive for speedometer
- ❑ only for vehicles without ABS; from 11/02.

14 - O-ring
- ❑ only for vehicles without ABS; from 11/02.
- ❑ always replace

15 - Magnet
- ❑ is held in position by the separator surface of the housing

16 - Outer ring/tapered-roller bearing
- ❑ for differential
- ❑ removing and installing ⇒ Chapter 39-2
- ❑ when inserting: Setting differential gear ⇒ Chapter 39-3

17 - Bushing for gear shift rod
- ❑ removing ⇒ Fig. 5 in **34-11** page 3
- ❑ inserting ⇒ Fig. 6 in **34-11** page 4

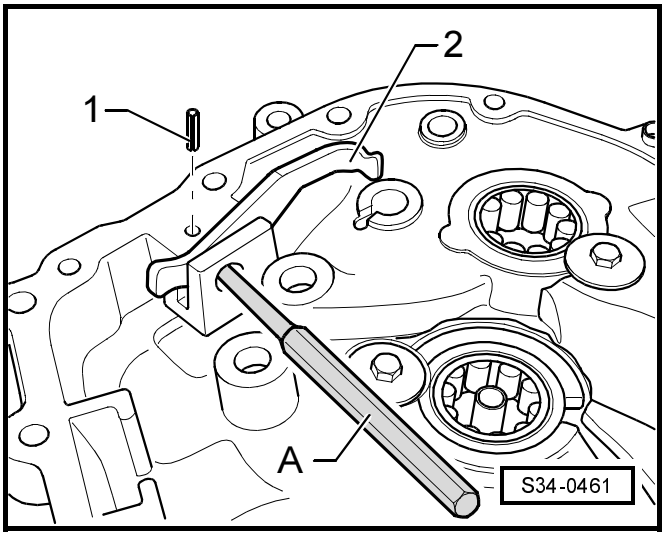
18 - Supports

19 - Cylindrical-roller bearing
- ❑ for output shaft
- ❑ removing and installing ⇒ Chapter 35-2
- ❑ fitting position ⇒ Fig. 2 in **34-11** page 2

20 - 10 Nm

21 - Washer

Fig. 1: Removing and installing reverse gear shift fork -2- ►



Removing

– Pull out tensioning sleeve -1- with pliers.

– Drive out bolt and plug mandrel-A-.

Installing

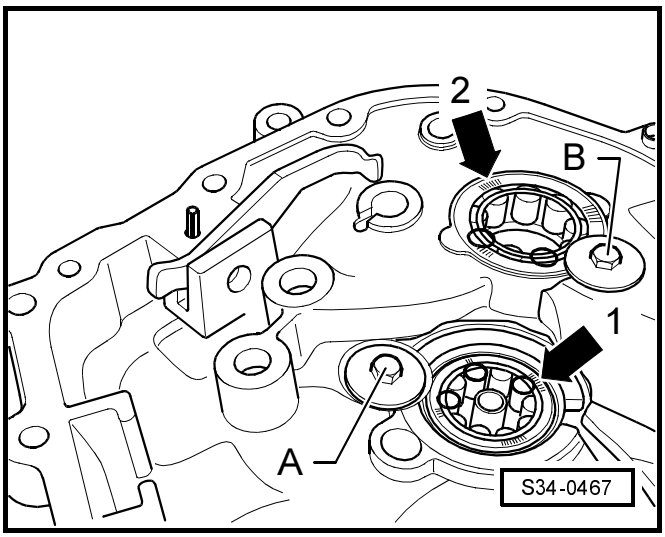
– Insert shift fork -2-.

– Insert the gearshift fork bolt (shortest side of hole for tensioning sleeve point to the plug).

– Drive in tensioning sleeve -1- with ejector -MP 3-509-.

– Cover plug with sealant -THREE BOND 1305- and insert.

Fig. 2: Fitting position of the cylindrical-roller bearing for input and output shaft ►



The marking on the cylindrical-roller bearing for the output shaft -1- and input shaft -2- must be visible after installation (pointing upwards).

After installation secure both bearings with screws -A- and -B-.

Fig. 3: Removing gasket ring for drive shaft

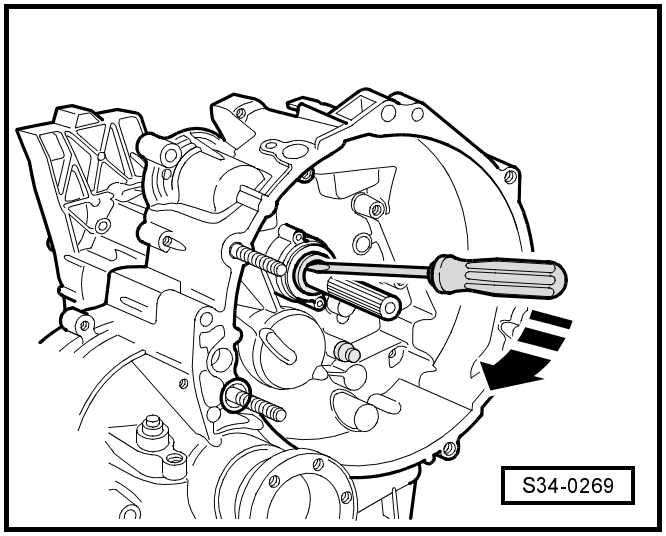


Fig. 4: Drive on the gasket ring for drive shaft, not up to the stop

The correct fitting position of the gasket ring is only obtained after fitting the guide bushing.

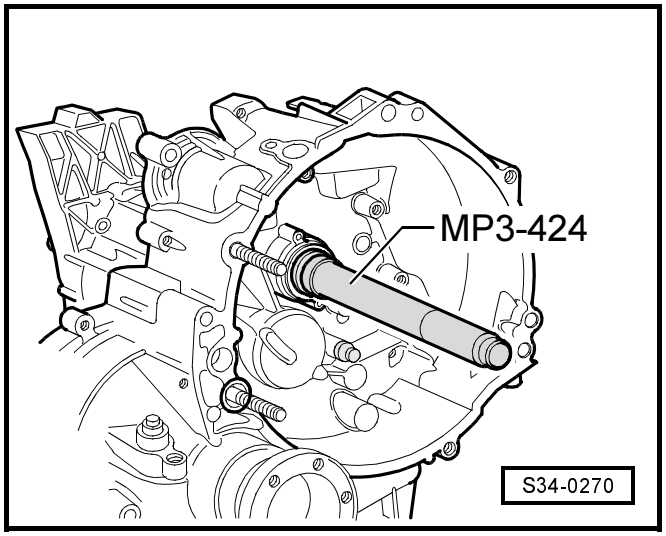


Fig. 5: Remove bushing for gear shift rod

A - Interior extractor 14.5 through 18.5 mm (e.g. -Kukko 21/2-)

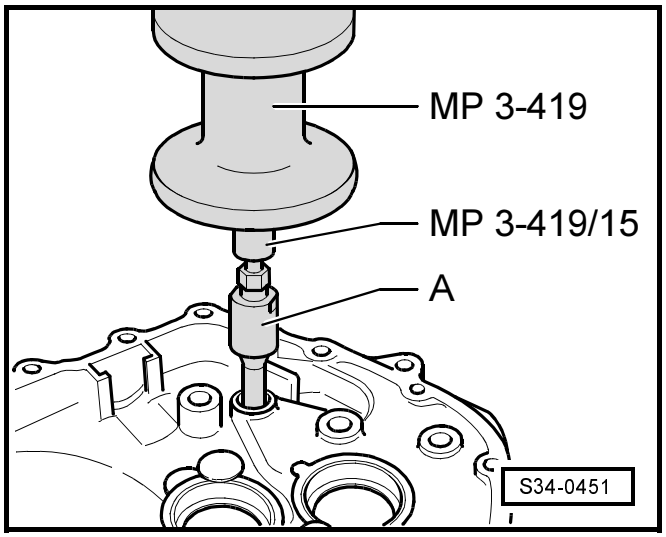


Fig. 6: Drive in the bushing for the shiftrod up to the stop.

When installing secure the bushing on both sides against wandering with impact mandrel -MP 3-606-.

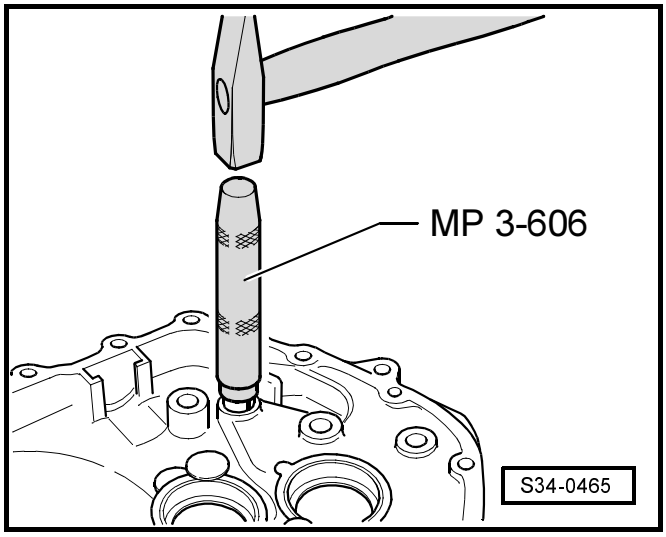


Fig. 7: Levering out the bushing with a screwdriver

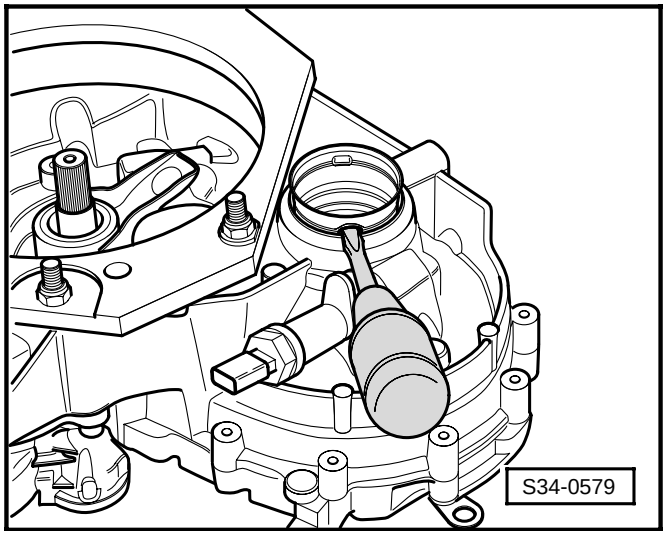
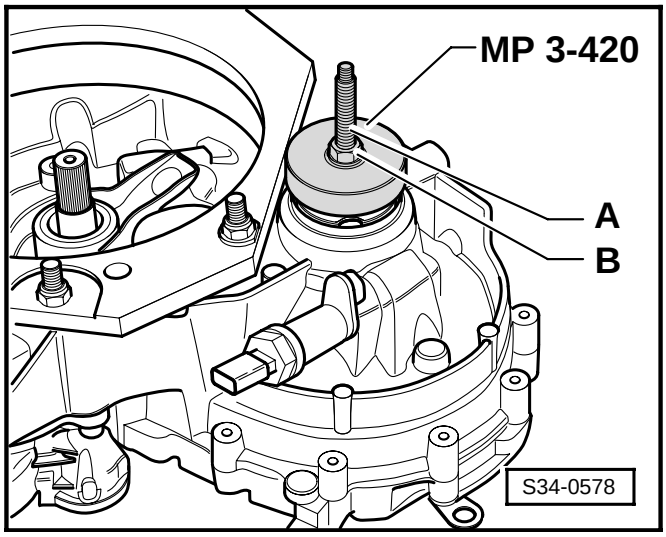


Fig. 8: Fitting the bushing

A - Screw threaded rod from assembly device -MP 3-434- into the threaded part of the differential

B - Nut M12 with washer

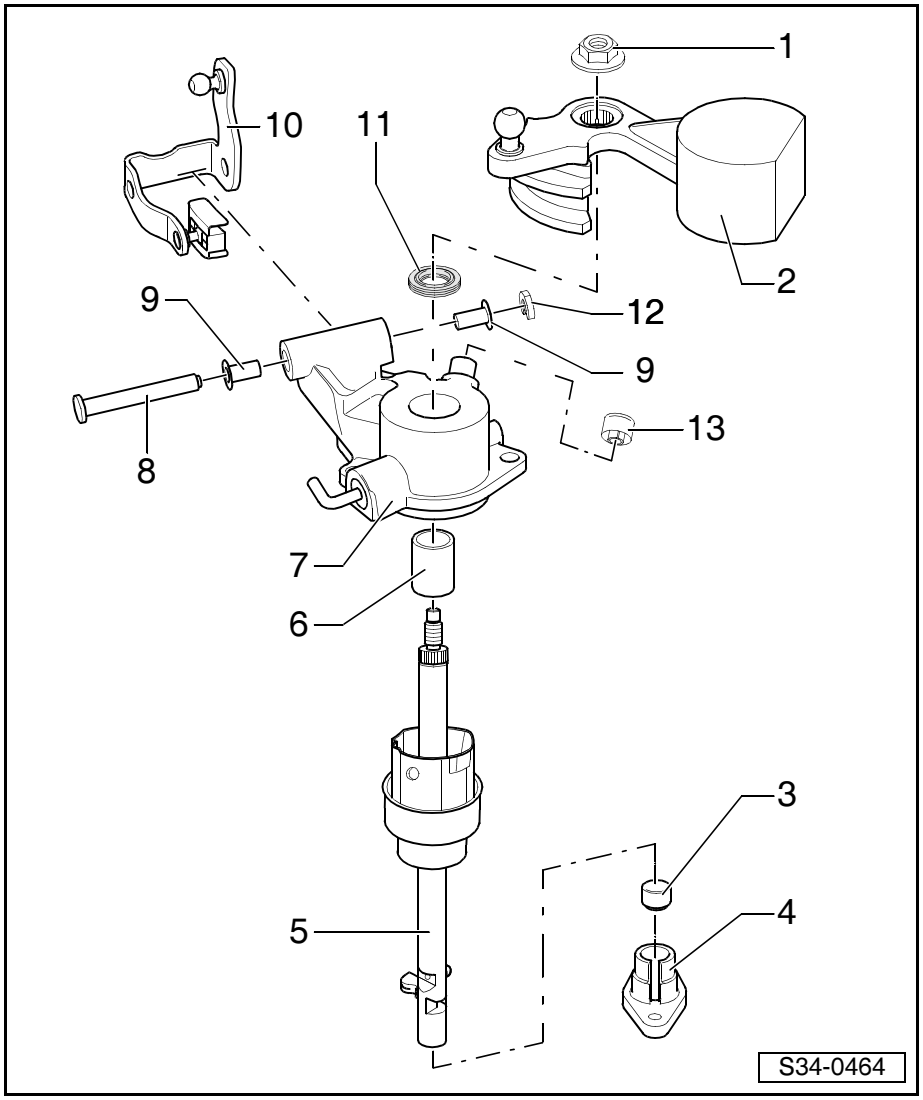
– By turning the nut -B- press in the bushing over the pressure plate washer -MP 3-420- up to the stop.



34-12 Disassembling and assembling the gearshift mechanism on the gearbox side

Special tools, test and measuring equipment and aids required

- Pressure plate -MP 3-407-
- Pipe -MP 3-429-
- Thrust piece -MP 3-448-
- Guide piece -MP 3-454-
- Pressure washer -MP 3-456-
- Pipe -MP 3-4013-
- Mandrel -T30031-
- Interior extractor 18.5...23.5 mm (e.g. -Kukko 21/3-)
- Countersupport (e.g. -Kukko 22/1-)



1 - 25 Nm
- ❑ self-locking
- ❑ always replace

2 - Gearshift lever
- ❑ insert in such a way that the interrupted tooth-pitch is opposite the gearshift shaft
- ❑ may be replaced with the gearshift mechanism mounted
- ❑ Fitting location ⇒ Chap. 34-4

3 - Bushing
- ❑ for gearshift shaft
- ❑ removing ⇒ Fig. 4 in **34-12** page 3
- ❑ inserting ⇒ Fig. 5 in **34-12** page 3

4 - Closing cover

5 - Gearshift shaft

6 - Ball sleeve
- ❑ removing ⇒ Fig. 1 in **34-12** page 2
- ❑ installing ⇒ Fig. 2 in **34-12** page 2

7 - Shift cover
- ❑ with serrated sleeve for gearshift shaft

8 - Bearing bolt

9 - Bushing

10 - Reversing lever
- ❑ Fitting location ⇒ Chap. 34-4

11 - Gasket ring
- ❑ release with a screwdriver
- ❑ inserting ⇒ Fig. 3 in **34-12** page 2

12 - Lock washer

13 - Cap
- ❑ for gearbox bleeder

Fig. 1: Remove the ball sleeve from the cover ►

– Before pulling out the ball sleeve destroy the platic cage and remove the balls.

A - Interior extractor 18.5...23.5 mm (e.g. -Kukko 21/3-)

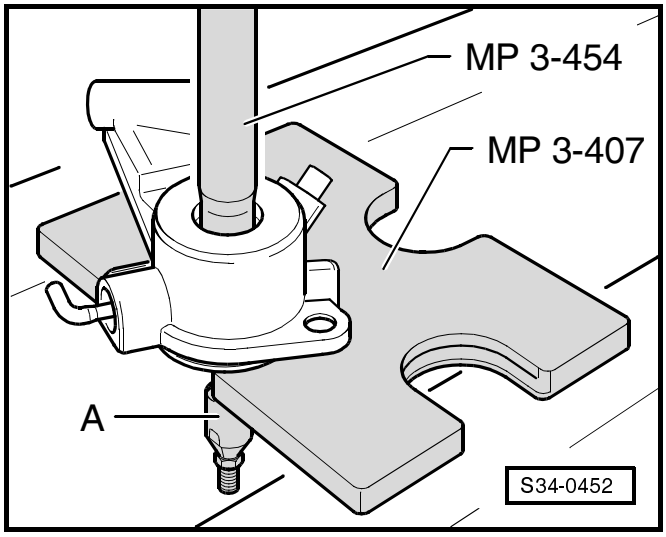


Fig. 2: Press the ball sleeve flush into the gearshift cover ►

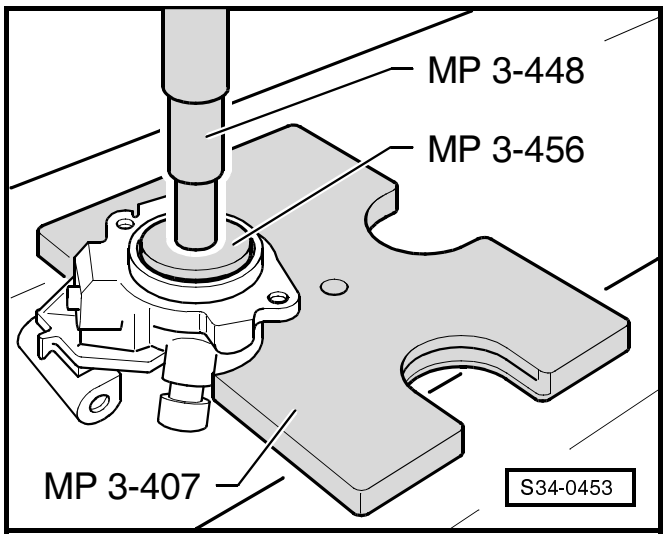


Fig. 3: Insert gasket ring up to the stop ►

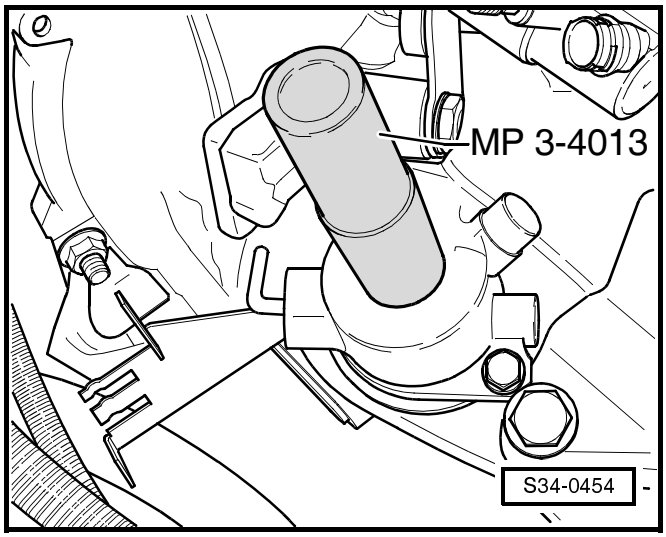


Fig. 4: Pull sleeve -C- from the closing cover

A - Countersupport (e.g. -Kukko 22/1-)
B - Interior extractor 18.5...23.5 mm (e.g. -Kukko 21/3-)

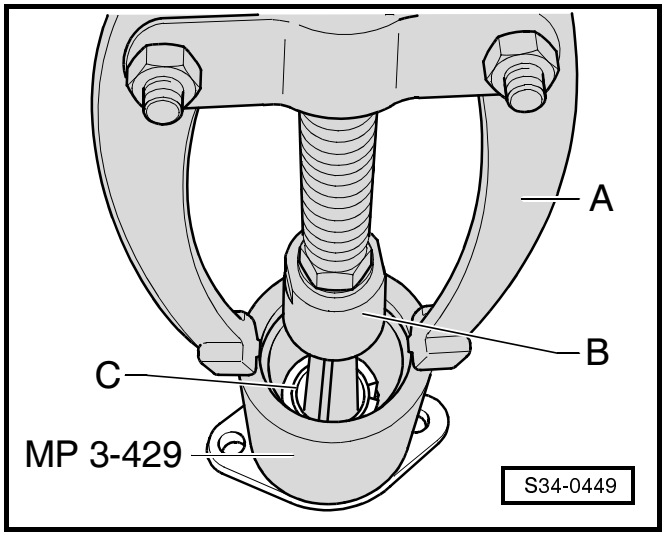
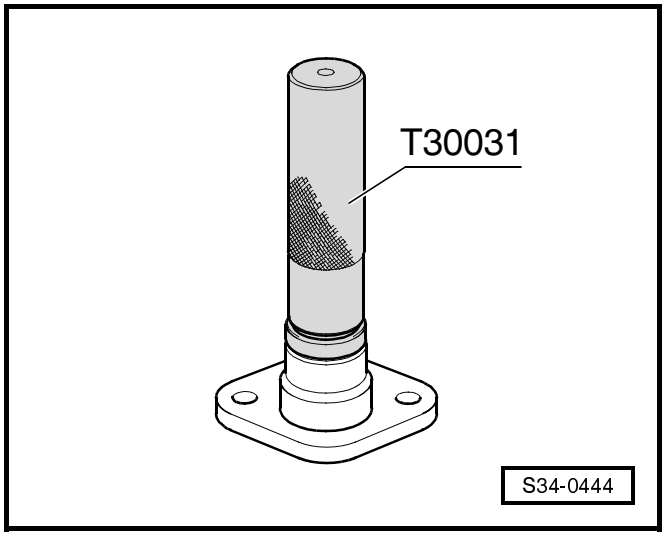


Fig. 5: Drive the sleeve into the closing cover

Secure the bushing on both sides against wandering with impact mandrel -T30031-.



34-13 Disassembling and assembling the gearshift forks

1 - Tensioning sleeve 5 x 22 mm
- ❑ replace
- ❑ removing and installing ⇒ Chap. 34-9

2 - 5th gear shift fork
- ❑ removing and installing ⇒ Chap. 34-9

3 - Gearshift rod with 5th gear shift rail

4 - Washer
- ❑ Thickness 1 mm
- ❑ do not switch with washer ⇒ item 6

5 - Lock washer
- ❑ release with a screwdriver
- ❑ press into the groove of the 1st/2nd gear shift rail

6 - Washer
- ❑ Thickness 2 mm
- ❑ do not switch with washer ⇒ item 4

7 - 3rd/4th gearshift fork with gear shift rail

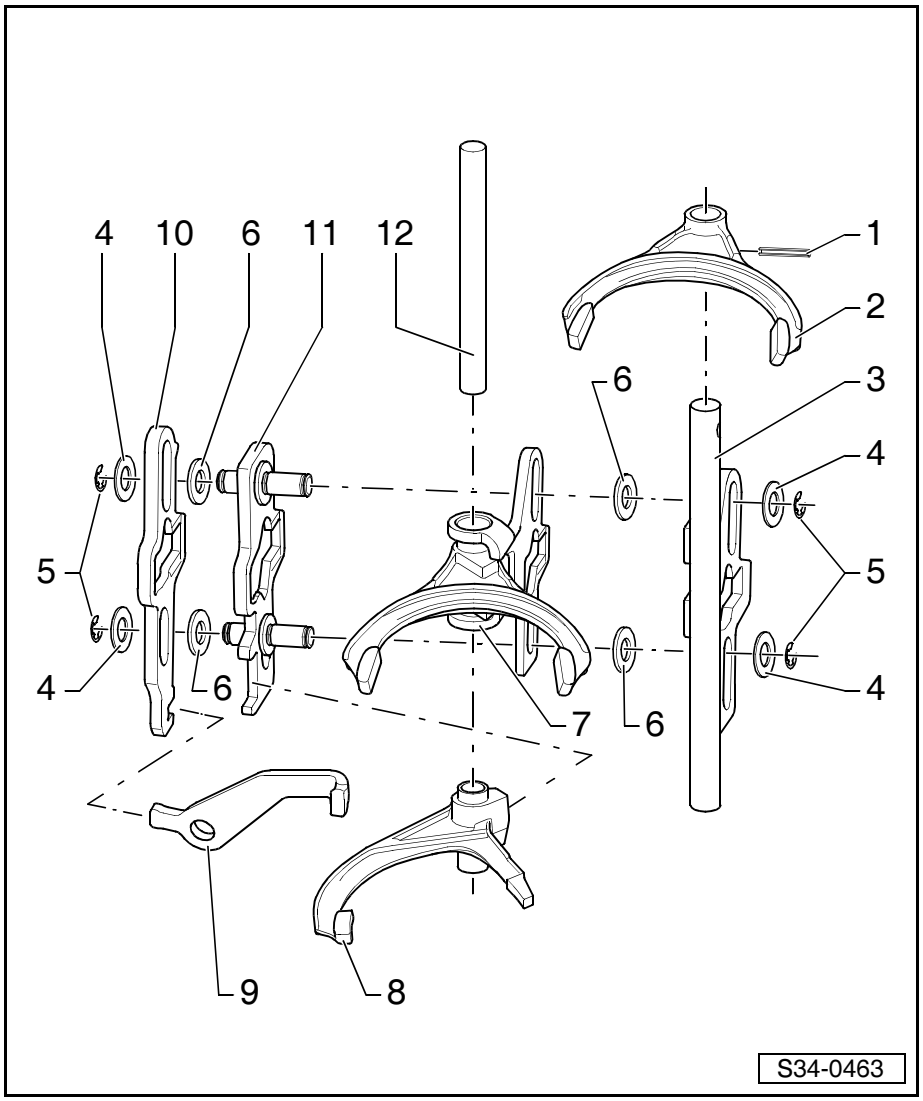
8 - 1st/2nd gear shift fork

9 - Gearshift fork reverse gear

10 - Reverse gear shift rail

11 - 1st/2nd gear shift rail

12 - Gear shift rod for gears 1 through 4



35 – Wheels, shafts

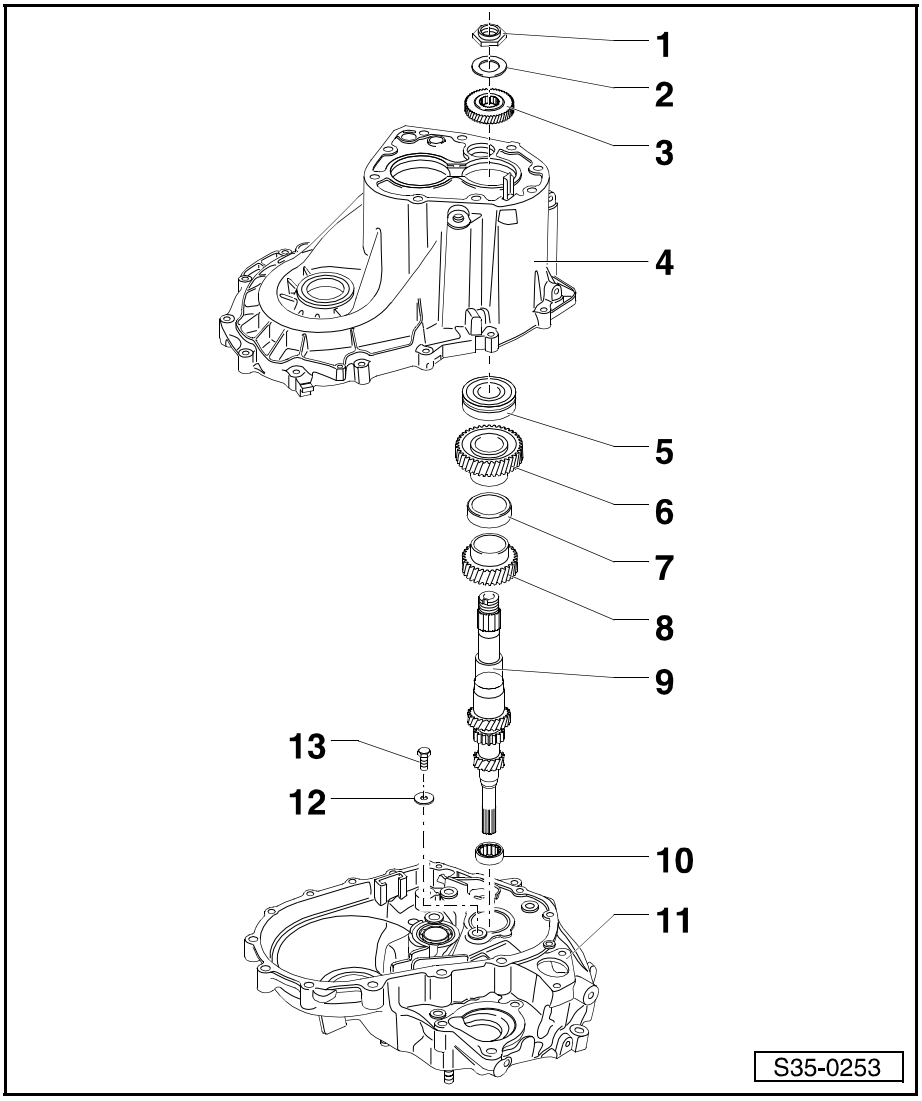
35-1 Disassembling and assembling the drive shaft

Special tools, test and measuring equipment and auxiliary items required

- Pressure plate -MP 3-406-
- Pressure plate -MP 3-407-
- Pressure plate -MP 3-411-
- Thrust piece -MP 3-448-
- Pipe section -MP 3-450-
- Pipe section -MP 3-451-
- Pressure plate -MP 3-4014-
- Separating device -Kukko 17/1-
- Separating device -Kukko 17/2-
- Workshop press, e.g. -V.A.G 1290A-

Note

When installing new pinions observe the technical data ⇒ Chap. 00-1.



1 - Nut, 85 Nm
- ❑ always replace

2 - Disc spring
- ❑ Fitting position: curved side points to gearbox housing cover

3 - 5th gear pinion

4 - Gearbox housing

5 - Grooved ball bearing
- ❑ pressing off ⇒ Fig. 1 in **35-1** page 3
- ❑ pressing on ⇒ Fig. 2 in **35-1** page 3

6 - 4th gear pinion
- ❑ pressing off ⇒ Fig. 3 in **35-1** page 3
- ❑ pressing on ⇒ Fig. 6 in **35-1** page 4
- ❑ Collar points to the 3rd gear

7 - Distance sleeve

8 - 3rd gear pinion
- ❑ pressing off ⇒ Fig. 4 in **35-1** page 4
- ❑ pressing on ⇒ Fig. 5 in **35-1** page 4
- ❑ Collar points to the 4th gear

9 - Drive shaft

10 - Cylindrical-roller bearing
- ❑ pressing out ⇒ Fig. 7 in **35-1** page 5
- ❑ installing ⇒ Fig. 8 in **35-1** page 5
- ❑ Fitting position: The marking on the bearing points upwards

11 - Clutch housing

12 - Washer

13 - 10 Nm

Fig. 1: Press off grooved ball bearing

-A- separating device 12 ... 75 mm, e.g. -Kukko 17/1-

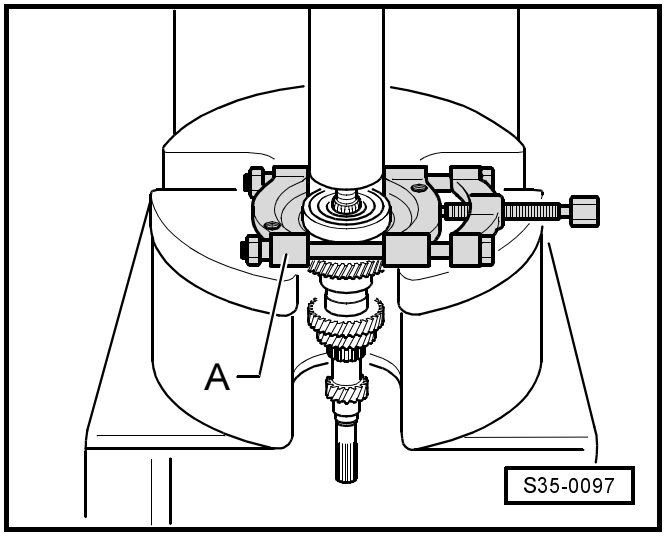


Fig. 2: Press on grooved ball bearing

Fitting position:

Groove of circlip points towards nut thread.

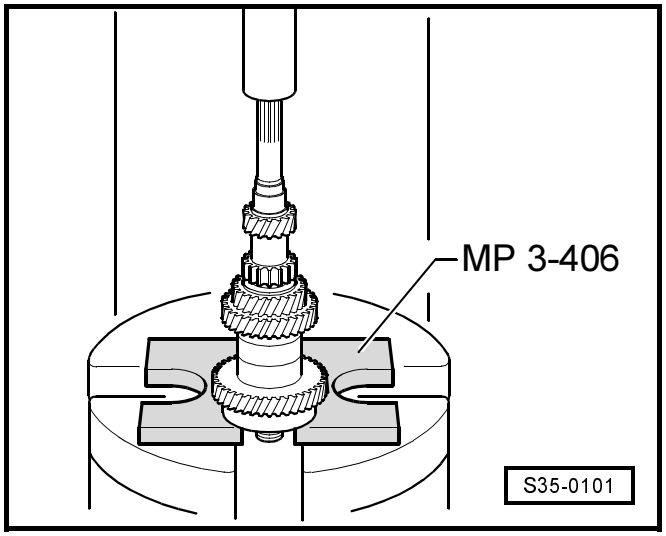


Fig. 3: Pressing out 4th gear pinion

– Press out 4th gear pinion with commercially available workshop press, e.g. -V.A.G 1290A-.

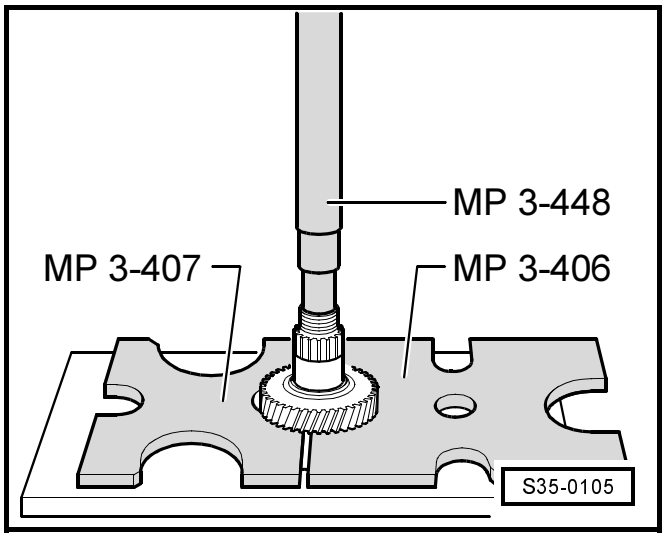
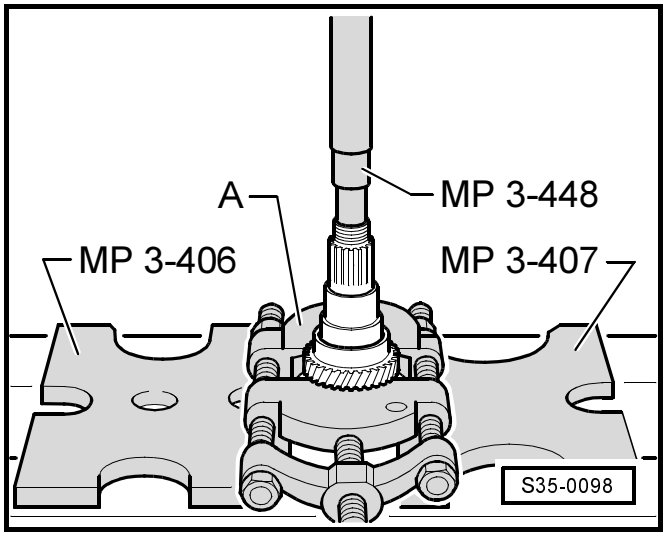


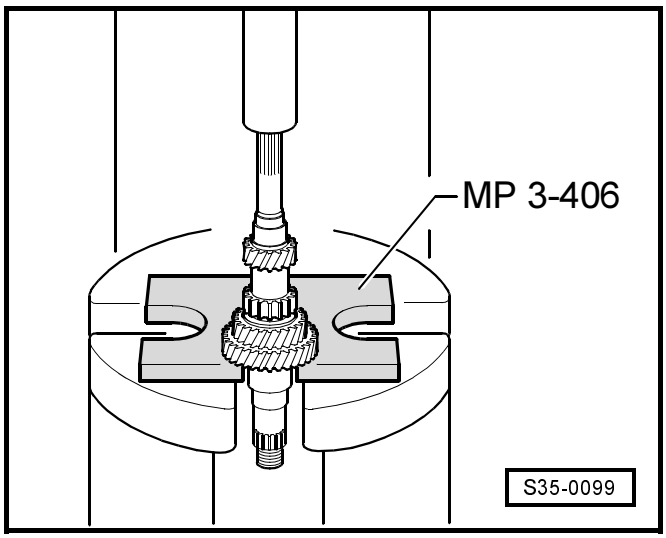
Fig. 4: Pressing out 3rd gearwheel



– Press out 3rd gear pinion with commercially available workshop press, e.g. -V.A.G 1290A-.

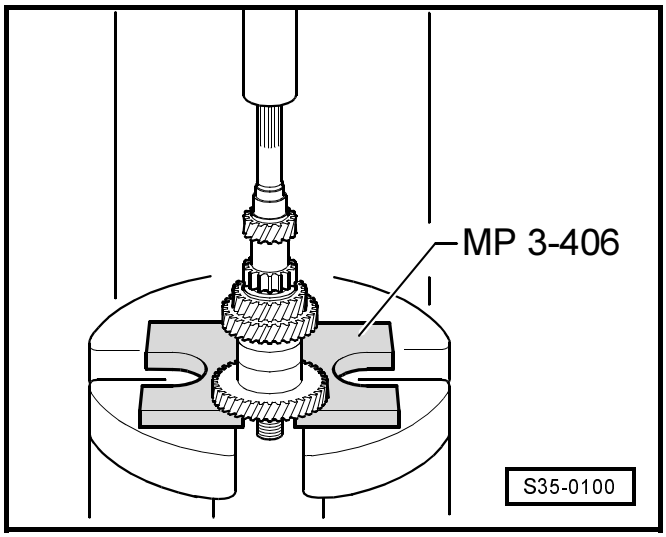
-A- separating device 22 ... 115 mm, e.g. -Kukko 17/2-

Fig. 5: Heat 3rd gear pinion to approx. 100 °C and press on.



Collar points to the 4th gear.

Fig. 6: Heat 4th gear pinion to approx. 100 °C and press on.



– First insert distance sleeve.

Collar points to the 3rd gear.

Fig. 7: Press the cylindrical-roller bearing out of the clutch housing ►

– Support the clutch housing with a pipe section -MP 3-450 - directly below the bearing support.

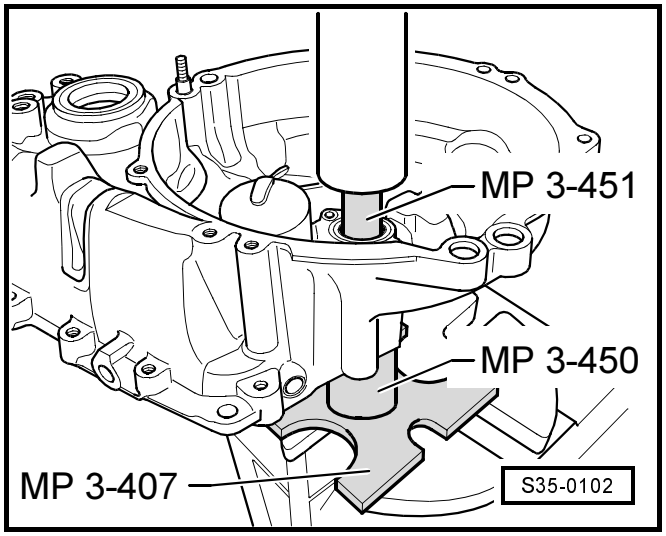
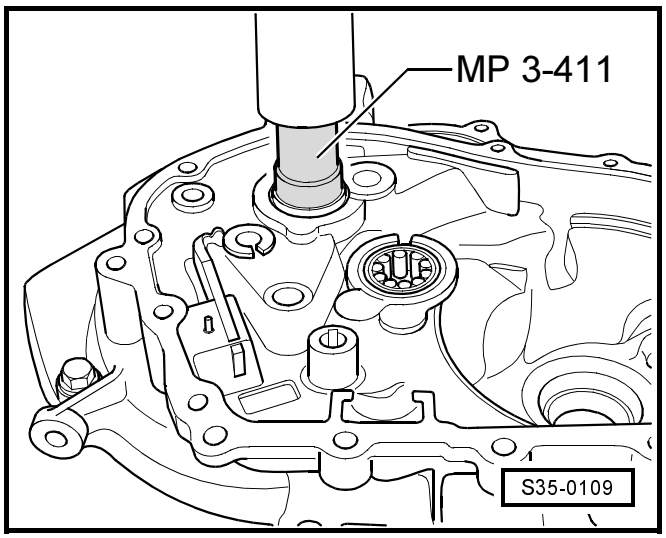


Fig. 8: Press the cylindrical-roller bearing into the clutch housing ►

– Support the clutch housing by positioning the pressure plate -MP 3-4014- (not visible in figure) directly under the bearing support.



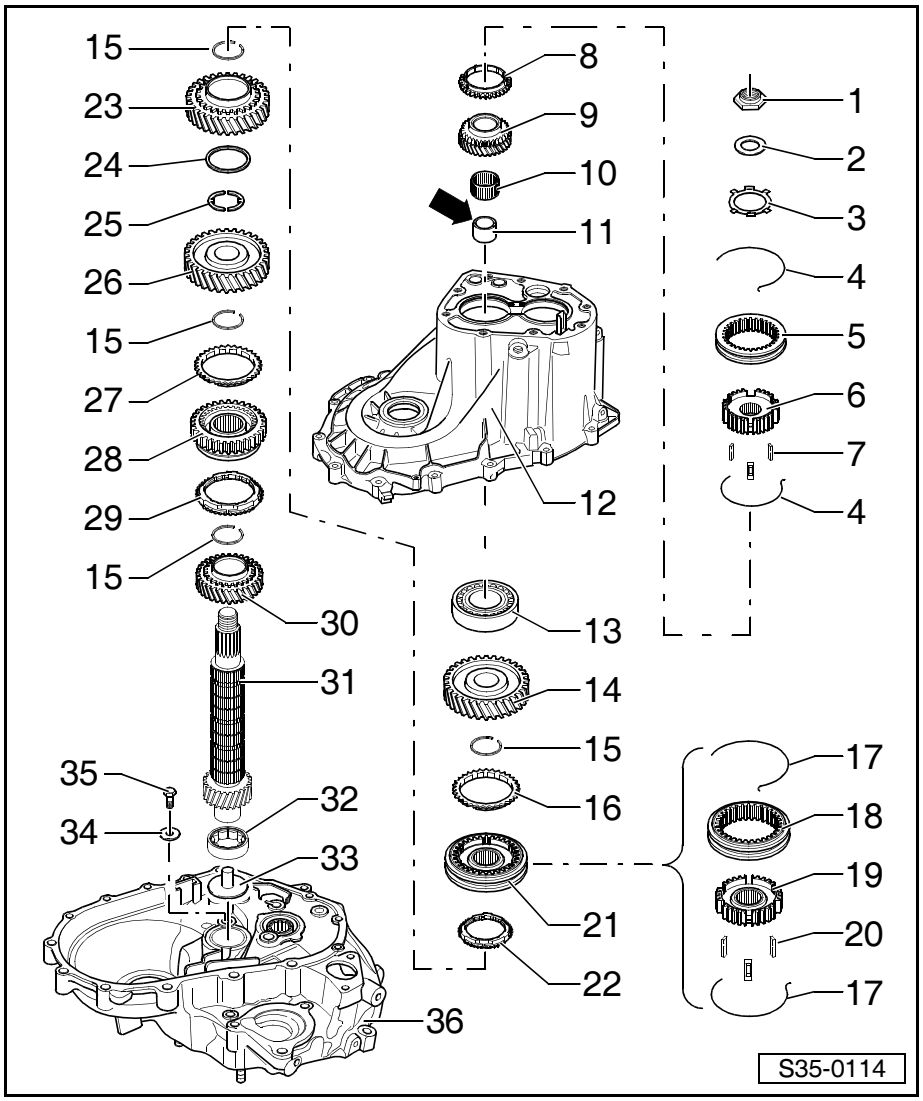
35-2 Disassembling and assembling the output shaft (input shaft)

Special tools, test and measuring equipment and auxiliary items required

- Pressure plate -MP 3-411-
- Inertia extraction attachment (for inertia extractor MP 9-501) -MP 3-507-
- Impact mandrel for roller bearing -MP 3-513-
- Extractor -MP 3-520-
- Inertia extractor -MP 9-501-

Note!

- *When installing new pinions or a new output shaft observe the technical data ⇒ Chap. 00-1.*
- *Insert all bearings, gears and synchronizer rings in the gearbox with gear oil.*
- *Do not interchange the synchronizer rings. If re-used always assign to the original gear.*



1 - Nut, 60 Nm
- ❑ always replace

2 - Disc spring
- ❑ Fitting position: curved side points to gearbox housing cover

3 - Supporting ring

4 - Spring
- ❑ Fitting position ⇒ Fig. 4 in **35-2** page 4

5 - 5th gear sliding sleeve
- ❑ removing and installing ⇒ Fig. 3 in **35-2** page 4 and ⇒ Fig. 3 in **35-2** page 4

6 - 5th gear synchronizer body
- ❑ removing and installing ⇒ Fig. 3 in **35-2** page 4 and ⇒ Fig. 3 in **35-2** page 4

7 - Arresters (3 pieces)
- ❑ Fitting position ⇒ Fig. 4 in **35-2** page 4

8 - 5th gear synchronizer ring
- ❑ check for wear ⇒ Fig. 8 in **35-2** page 5

9 - 5th gear sliding gear

10 - Needle bearing

11 - Bushing for needle bearing
- ❑ Fitting position: The oil pockets -arrow- point towards the 5th gear synchronizer body.

12 - Gearbox housing

13 - Grooved ball bearing
- ❑ removing ⇒ Fig. 1 in **35-2** page 3
- ❑ pressing on ⇒ Fig. 2 in **35-2** page 3

14 - 4th gear sliding gear

15 - Circlip
- ❑ replace

16 - 4th gear synchronizer ring
- ❑ check for wear ⇒ Fig. 8 in **35-2** page 5

17 - Spring

18 - Sliding sleeve 3rd and 4th gear

19 - Synchronizer body 3rd and 4th gear

20 - Arresters for synchronizer body (3 pieces)

21 - Sliding sleeve with 3rd and 4th gear synchronizer body
- ❑ Assembling the sliding sleeve with synchronizer body ⇒ Fig. 3 in **35-2** page 4 and ⇒ Fig. 4 in **35-2** page 4
- ❑ Fitting position of the sliding sleeve with synchronizer body ⇒ Fig. 5 in **35-2** page 4

22 - 3rd gear synchronizer ring
- ❑ check for wear ⇒ Fig. 8 in **35-2** page 5

23 - 3rd gear sliding gear

24 - Washer
- ❑ holds the thrust washers ⇒ item 25 in **35-2** page 2 in the correct position on the output shaft

25 - 2nd and 3rd gear thrust washers

26 - 2nd gear sliding gear

27 - 2nd gear synchronizer ring
- ❑ check for wear ⇒ Fig. 8 in **35-2** page 5

28 - Sliding sleeve with 1st and 2nd gear synchronizer body
- ❑ Assembling the sliding sleeve with synchronizer body ⇒ Fig. 6 in **35-2** page 5 and ⇒ Fig. 7 in **35-2** page 5

29 - 1st gear synchronizer ring
- ❑ check for wear ⇒ Fig. 8 in **35-2** page 5

30 - 1st gear sliding gear

31 - Output shaft
- ❑ is paired with the gear pinion of the final drive, always replace together

32 - Cylindrical-roller bearing
- ❑ removing ⇒ Fig. 9 in **35-2** page 6
- ❑ pressing on ⇒ Fig. 10 in **35-2** page 6
- ❑ Fitting position: the marking on the bearing points upwards

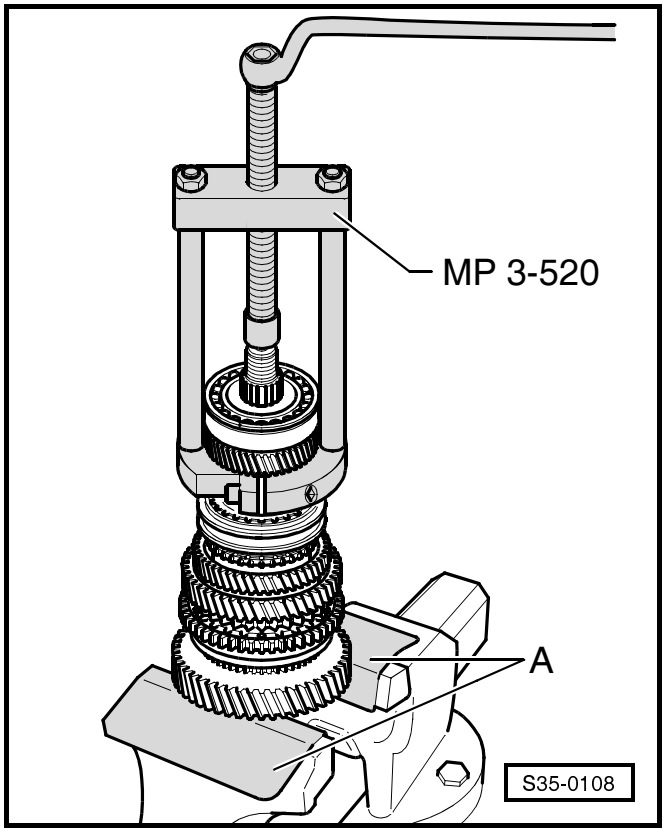
33 - Supports
- ❑ for oil supply

34 - Washer

35 - 10 Nm

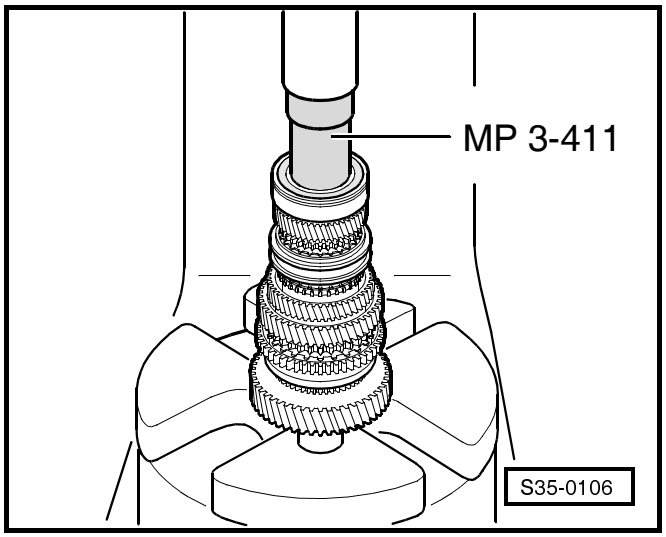
36 - Clutch housing

Fig. 1: Pull off grooved ball bearing with 4th gear sliding gear



– Carefully secure output shaft with protective jaws -A- in the vice.

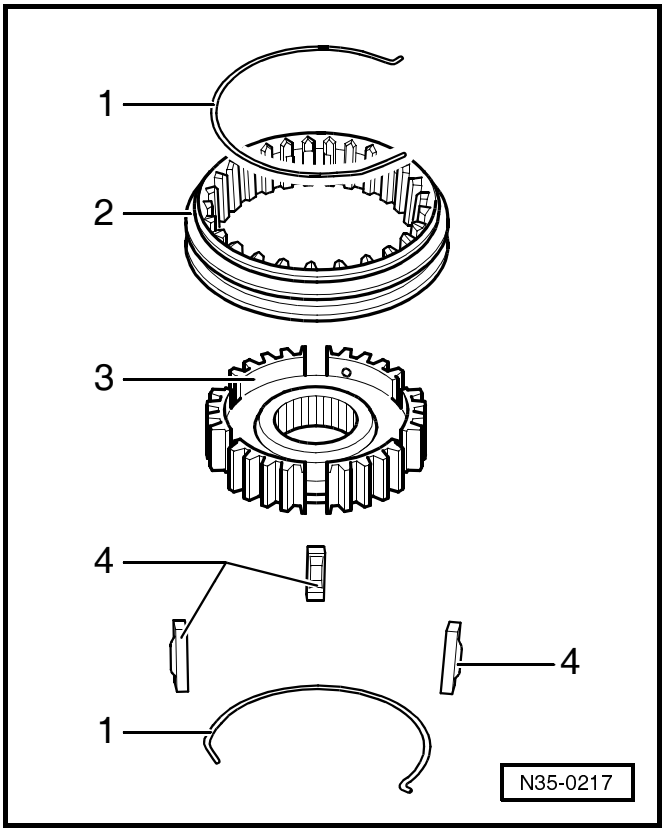
Fig. 2: Press on grooved ball bearing



Fitting position:

Groove of circlip points towards nut thread.

Fig. 3: Disassembling and assembling the sliding sleeve and 3rd, 4th and 5th gear synchronizer body ►

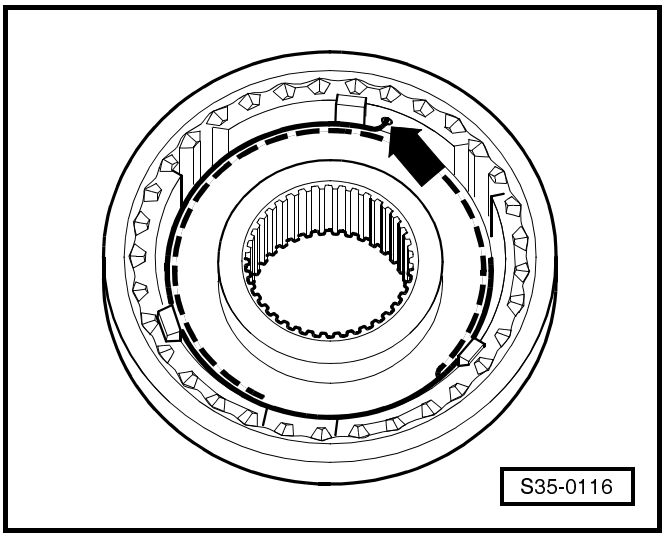


1 - Spring
2 - Sliding sleeve
3 - Synchronizer body
4 - Arresters for synchronizer body

– Slide the sliding sleeve over the synchronizer body.

The recesses for the arresters on the synchronizer body and the sliding sleeve must be positioned above one another.

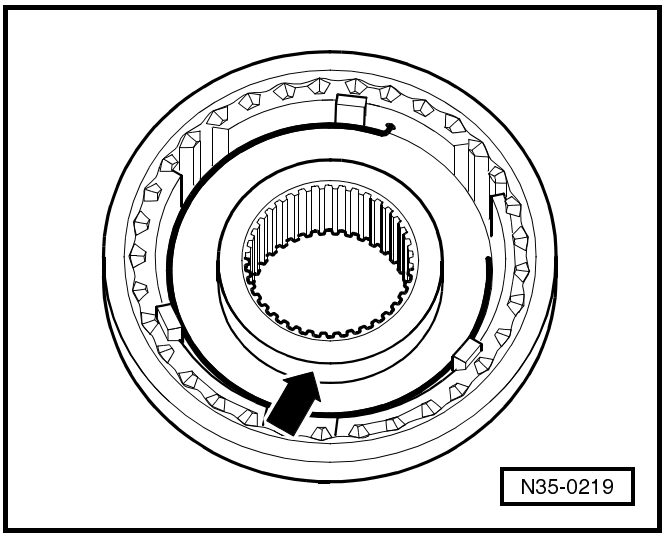
Fig. 4: Assembling the sliding sleeve and 3rd, 4th and 5th gear synchronizer body ►



The sliding sleeve is drawn over the synchronizer body.

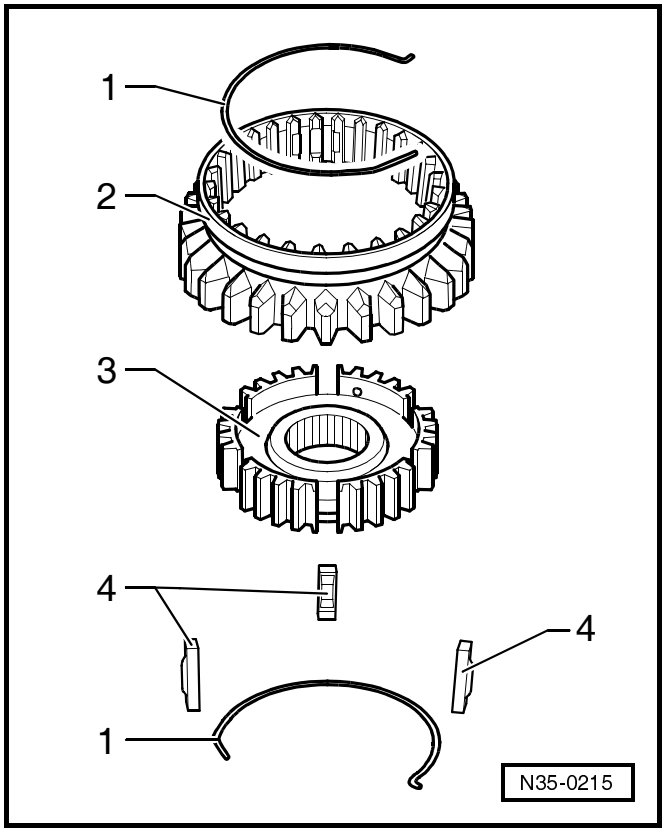
– Insert arresters and install springs with 120° offset. The angled extremity of the spring must catch in the hole of the synchronizer body -arrow-.

Fig. 5: Fitting position of the sliding sleeve/3rd and 4th gear synchronizer body ►



The wider collar of the synchronizer body -arrow- points towards the 4th gear.

Fig. 6: Disassembling and assembling the sliding sleeve and 1st and 2nd gear synchronizer body ►

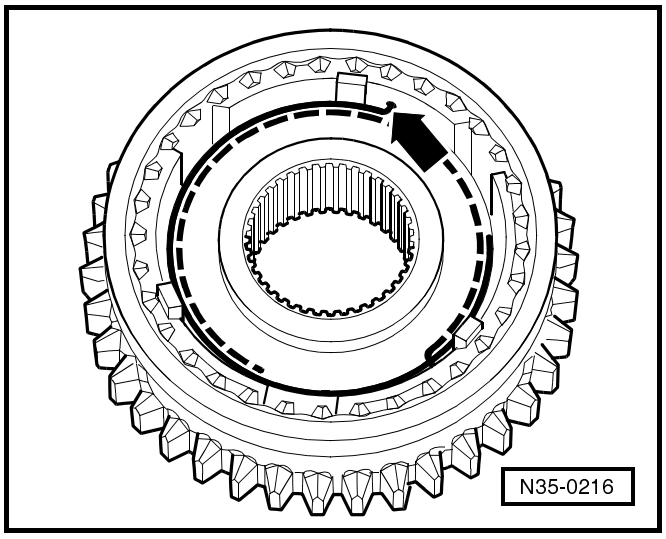


1 - Spring
2 - Sliding sleeve
3 - Synchronizer body
4 - Arrester

– Slide the sliding sleeve over the synchronizer body.

The recesses for the arresters on the synchronizer body and the sliding sleeve must match.

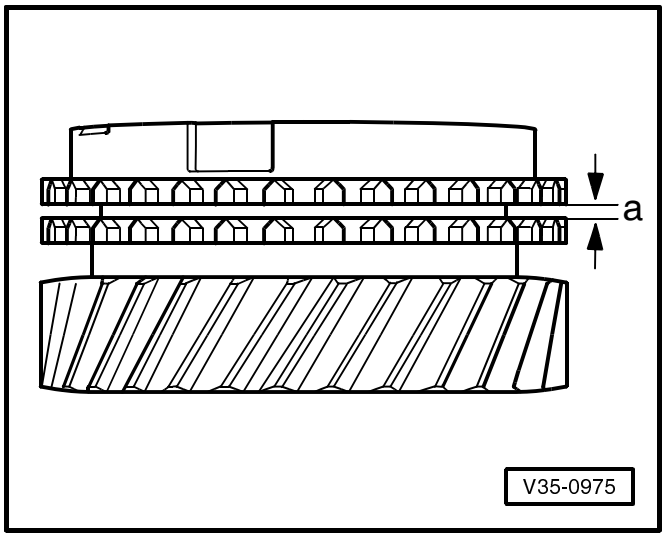
Fig. 7: Assembly of the sliding sleeve/1st and 2nd gear synchronizer body ►



The sliding sleeve is drawn over the synchronizer body.

– Insert arresters and mount springs with 120° offset. The angled extremity of the spring must catch in the hole of the synchronizer body -arrow-.

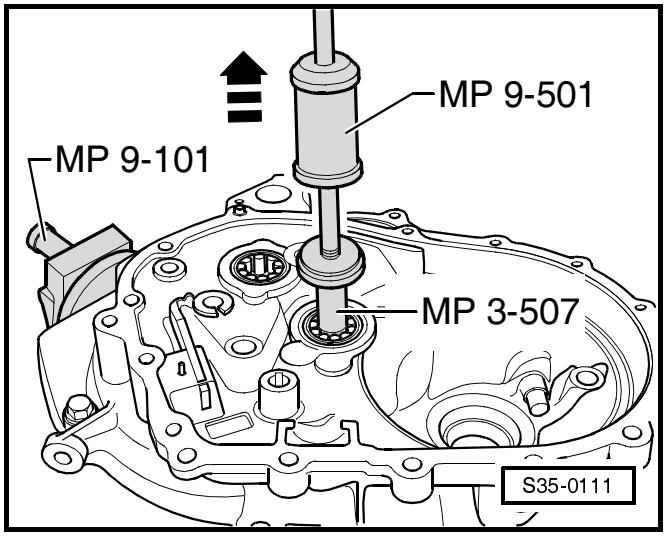
Fig. 8: Check 1st gear through 5th gear synchronizer ring for wear ►



– Press the synchronizer ring on the cone of the sliding gear and measure clearance „a“ with a feeler gauge.

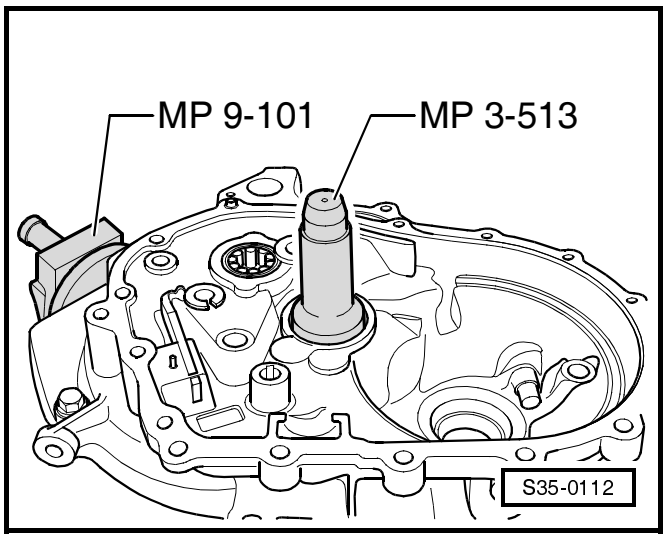
	Fitting dimension	Wear limit
Clearance „a“	1.2 through 1.8 mm	0.5 mm

Fig. 9: Pull out the cylindrical-roller bearing from the clutch housing ►



– Insert inertia extraction attachment -MP 3-507- in the cylindrical-roller bearing and turn.
– Pull out bearing with inertia extractor -MP 9-501-.

Fig. 10: Drive in the cylindrical-roller bearing into the clutch housing ►



35-3 Disassembling and assembling the reverse shaft support

Special tools, test and measuring equipment and aids required

- Ejector -MP 3-508-

1 - Support
- ❑ for reverse shaft support

2 - Tensioning sleeve
- ❑ 4 x 25 mm
- ❑ always replace
- ❑ removing and installing ⇒ Fig. 1 in **35-3** page 1

3 - Clutch housing

4 - Tensioning sleeve
- ❑ 4 x 20 mm
- ❑ Fitting position ⇒ Fig. 2 in **35-3** page 2

5 - Reverse shaft support

6 - Reverse gear
- ❑ removing and installing ⇒ Fig. 1 in **35-3** page 1

7 - Washer

8 - O-ring

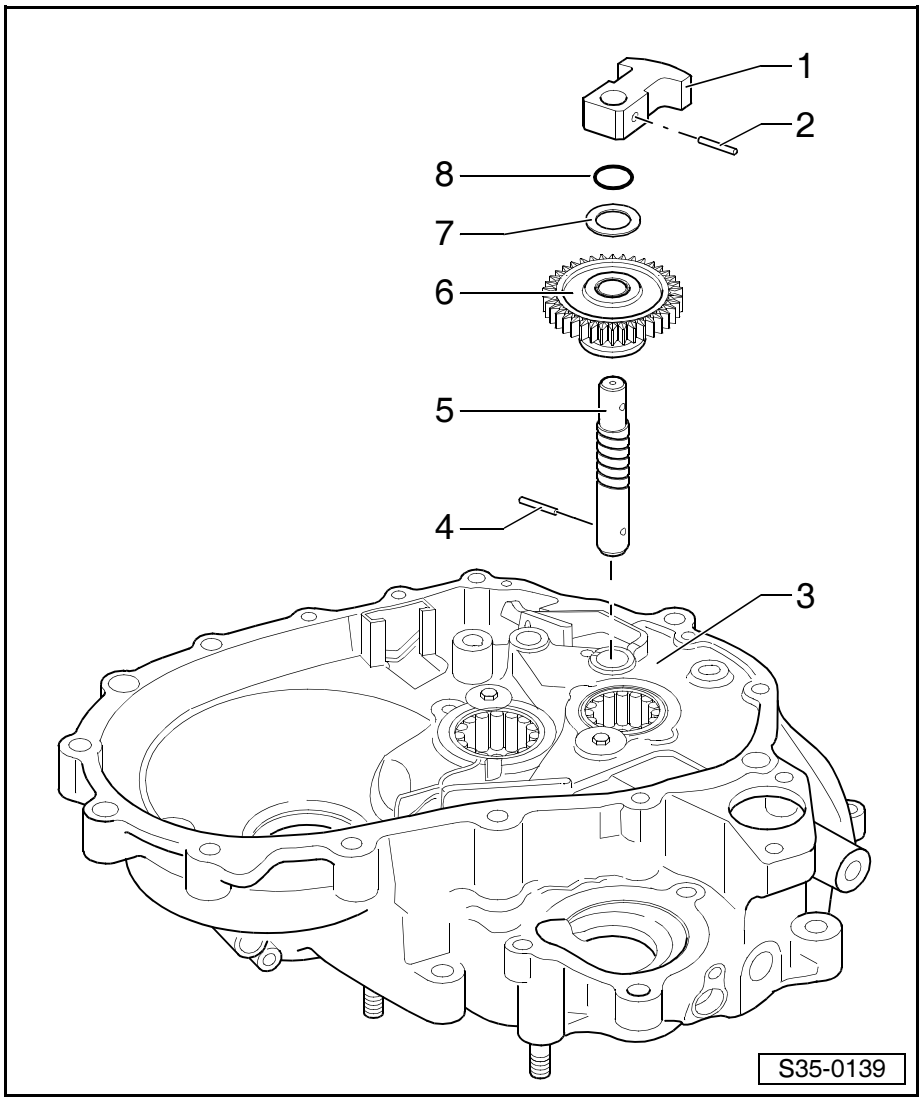
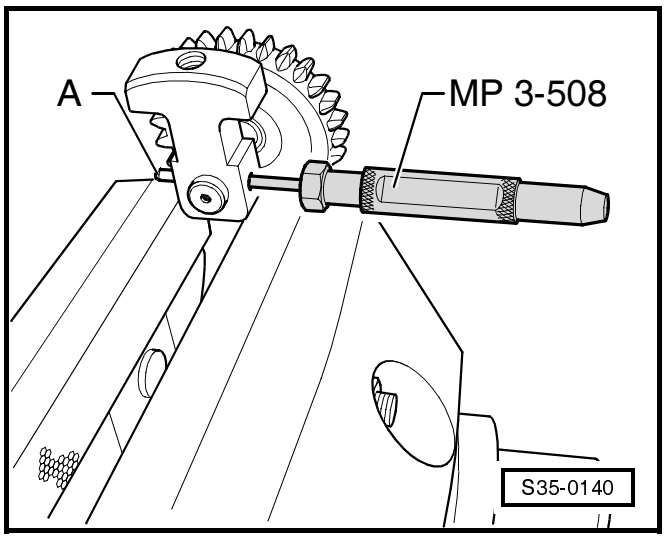


Fig. 1: Removing and installing reverse gear ►



Removing

– Secure the reverse shaft with support in a vice.

– Drive out tensioning sleeve -A- with ejector -MP 3-508-.

– Pull out or extract the reverse shaft from the support.

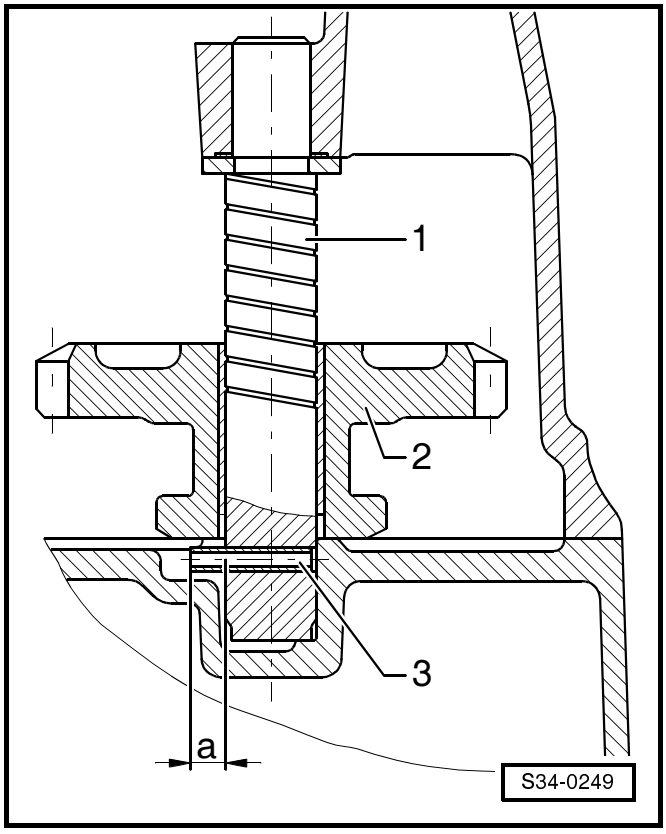
– Remove O-rings, washer and reverse gear.

Installing

The installation occurs in reverse order, while paying attention to the following:

– Drive in the new tensioning sleeve -A- flush.

Fig. 2: Fitting position of the tensioning sleeve in the reverse shaft support.



– With ejector -MP 3-508- drive in tensioning sleeve -3- up to dimension -a- = 6 mm in the reverse shaft support.

2 - Reverse gear

39 – Final drive, Differential

39-1 Replacing the flange shaft gasket rings (gearbox fitted)

Replacing the left flange shaft gasket ring

Special tools, test and measuring equipment and auxiliary items required

- Multi-purpose tool -MP 3-419-
- Gasket ring extractor -MP 3-419/37-
- Adapter -MP 3-419/40-
- Gasket ring retainer -MP 3-610-
- Inertia extractor -MP 9-501-

Removing

– Remove front wheel and raise vehicle.

– If applicable remove the noise insulation below the engine/gearbox

– Remove the wheelhouse liner from the left wheelhouse.

– Turn steering to full left lock.

– Unscrew the drive shaft from the flange shaft.

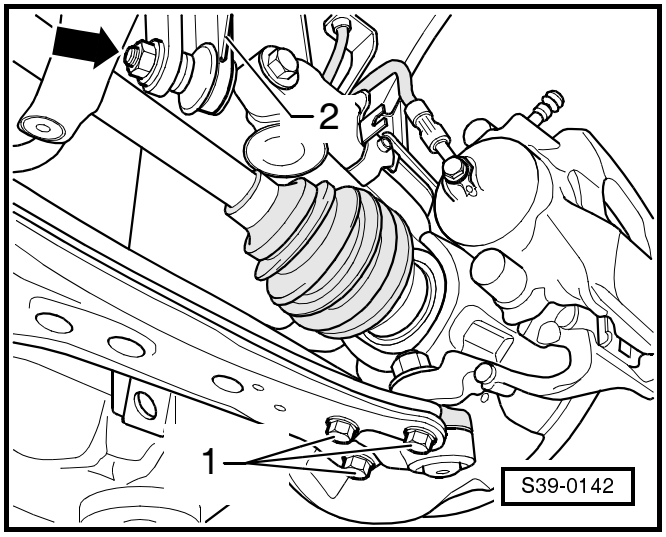
– Mark installation position of bolts -1- for left steering joint, otherwise the steering geometry must be checked.

– Release screws -1-.

– Unbolt coupling rod -2- from the anti-roll bar -arrow-.

– Drive shaft into the wheelhouse and secure to the suspension strut with e.g. wire.

– Position the catch pan under the gearbox.

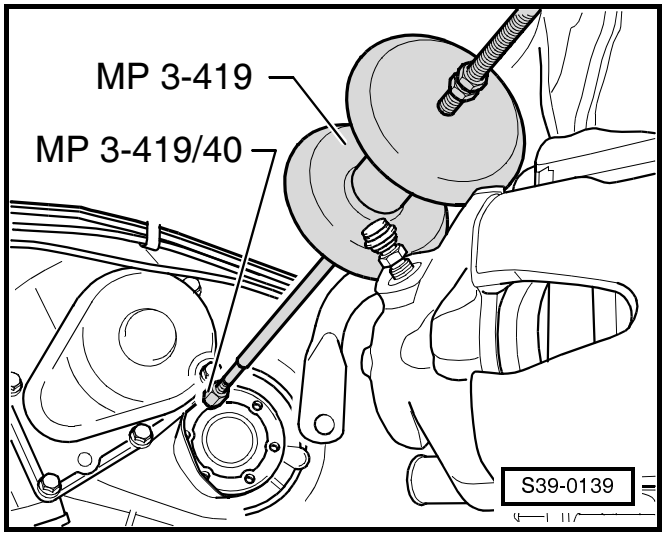


For gearbox after 06.00

– Release fixing screw for flange shaft, to do so secure flange against turning.

For all gearboxes

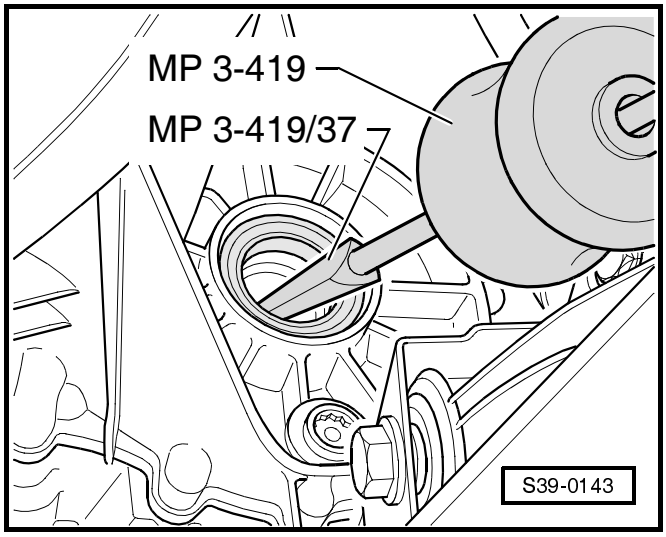
– Remove the left flange shaft, to this end turn the adapter -MP 3-419/40- into the flange shaft and using multi-purpose tool -MP 3-419- pull out the flange shaft from the differential bevel gear large.



Note!

Push the brake hose sideways when removing the flange shaft.

– Remove the gasket ring of the flange shaft.

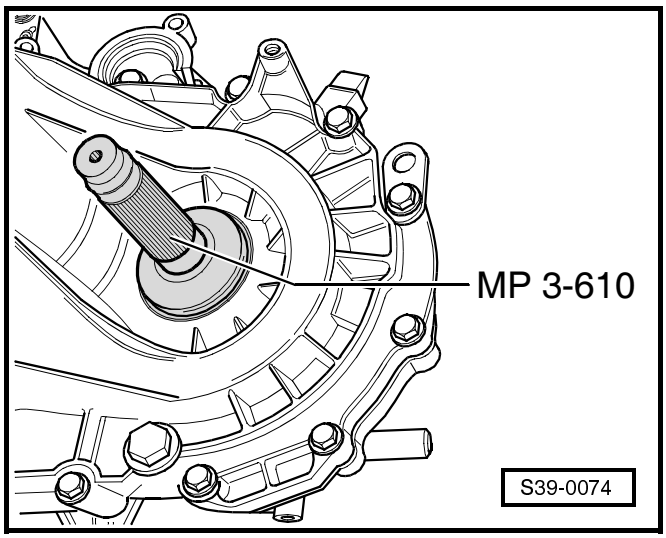


Installing

For gearbox up to 06.00

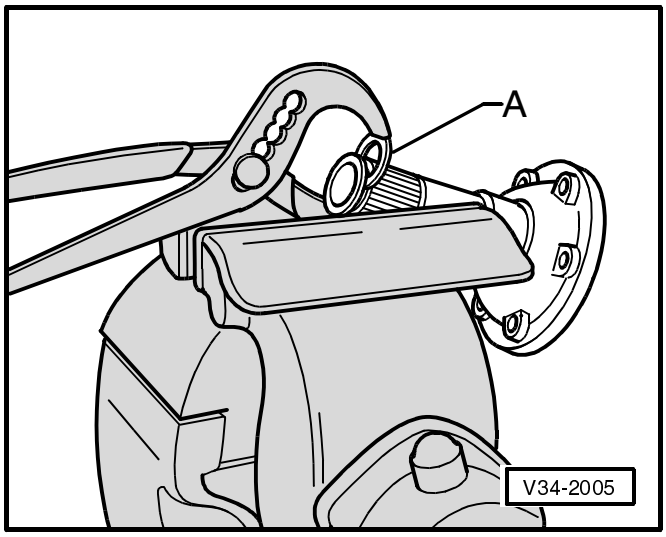
– Drive the new gasket ring in up to the stop, do not twist the gasket ring.

– Fill the space between the sealing lips and dust lips with sealing grease -G 052 128 A1-.



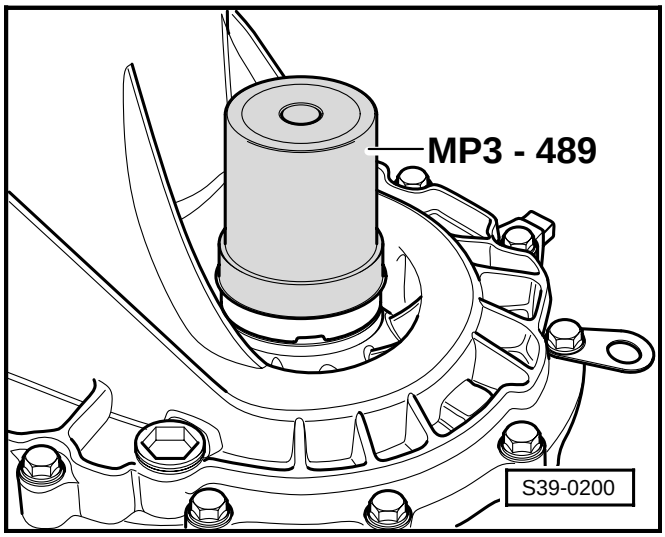
– Secure the flange shaft in a vice fitted with protective jaws. Push out the old circlip from the flange shaft groove with the new circlip -A-.

– Drive in the flange shaft with a plastic hammer.



For gearbox after 06.00

– Drive the new gasket ring in up to the stop, do not twist the gasket ring. ►
– Fill the space between the sealing lips and dust lips with sealing grease -G 052 128 A1-.
– Secure the flange shaft with the conical screw.



For all gearboxes

– Screw the coupling rod holder to the anti-roll bar.
– Screw the left drive shaft to the flange shaft.
– Install the wheelhouse liner in the wheelhouse.
– Check gear oil level, if necessary fill up to lower edge of filler hole ⇒ Chap. 34-8.
– If available install the noise insulation.

Tightening torques

Components	Torque
Flange shaft to gearbox (conical screw)	25 Nm
Tighten drive shaft to flange shaft M8 crosswise in 2 steps (I and II) a)	I - 10 Nm II - 40 Nm
Steering joint to track control arm a)M8	20 Nm + 90°
Coupling rod holder to track control arm	45 Nm
Wheel bolts to wheel hub	120 Nm

a) Always replace these bolts

Replacing the right flange shaft gasket ring

Special tools, test and measuring equipment and auxiliary items required

- Multi-purpose tool -MP 3-419-
- Gasket ring extractor -MP 3-419/37-
- Adapter -MP 3-419/40-
- Gasket ring retainer -MP 3-610-
- Inertia extractor -MP 9-501-

Removing

– Remove wheel and raise vehicle.
– If applicable remove the noise insulation below the engine and gearbox.
– Remove the wheelhouse liner from the left wheelhouse.
– Turn steering to full right lock.
– Unscrew the drive shaft from the flange shaft.

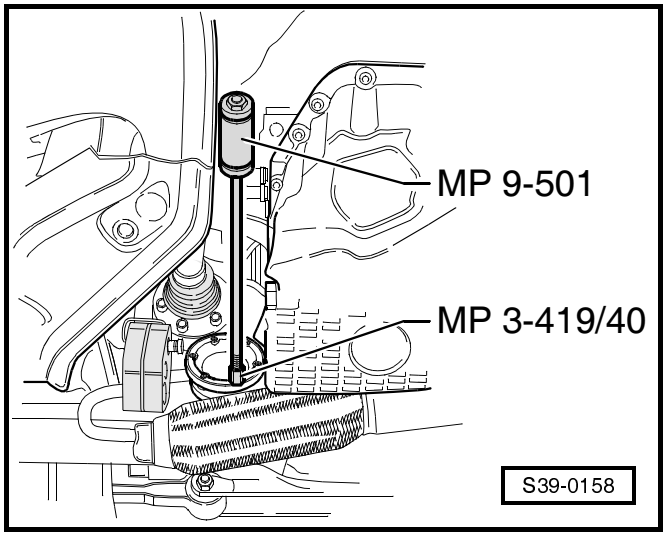
– Tie up the drive shaft as far as possible. Avoid damaging the paintwork on the drive shaft during this operation.
– Position the catch pan under the gearbox.

For gearbox after 06.00

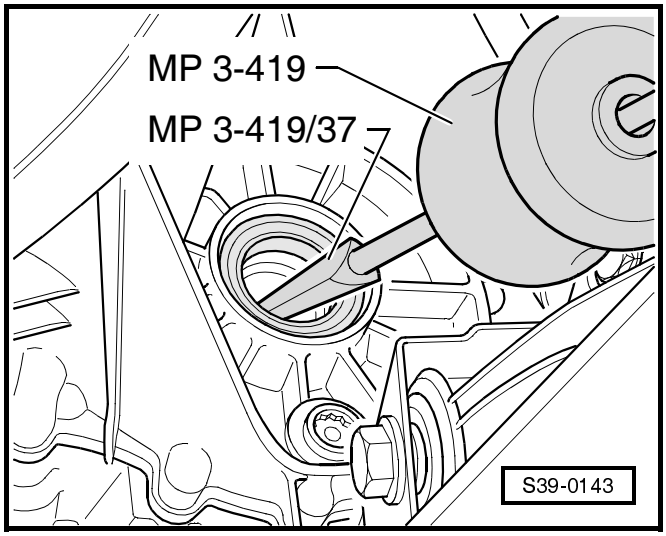
– Release fixing screw for flange shaft, to do so secure flange against turning.

For all gearboxes

– Remove the right flange shaft, to this end turn the adapter -MP 3-419/40- into the flange shaft and using inertia extractor -MP 9-501- pull out the flange shaft from the differential bevel gear.



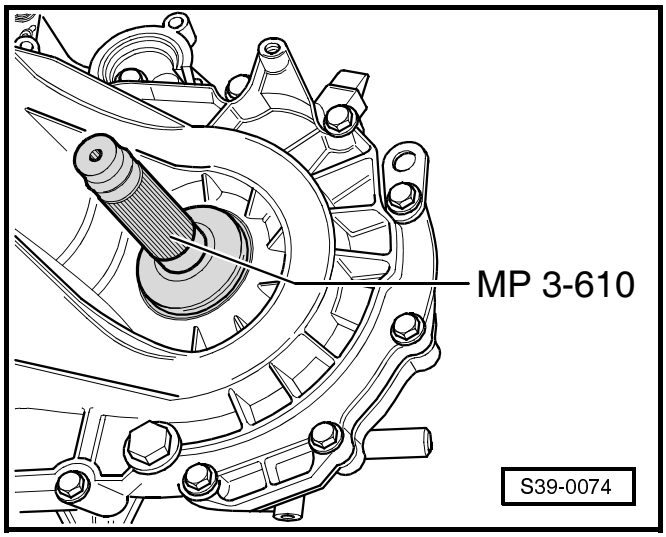
– Remove the gasket ring of the flange shaft.



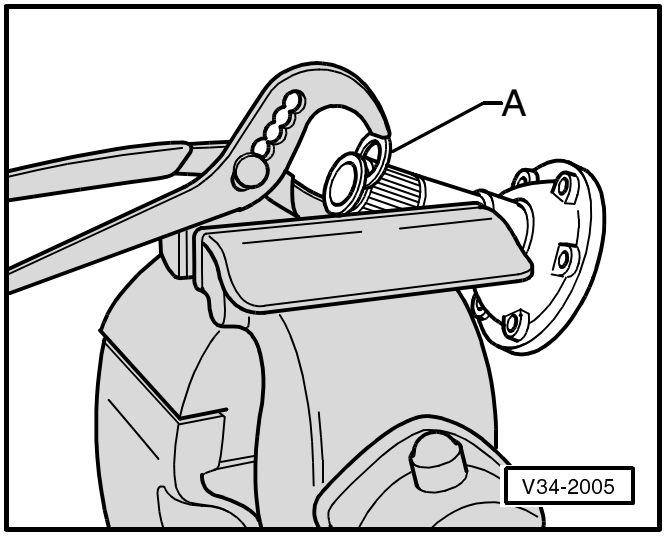
Installing

For gearbox up to 06.00

– Drive the new gasket ring in up to the stop, do not twist the gasket ring.
– Fill the space between the sealing lips and dust lips with sealing grease -G 052 128 A1-.

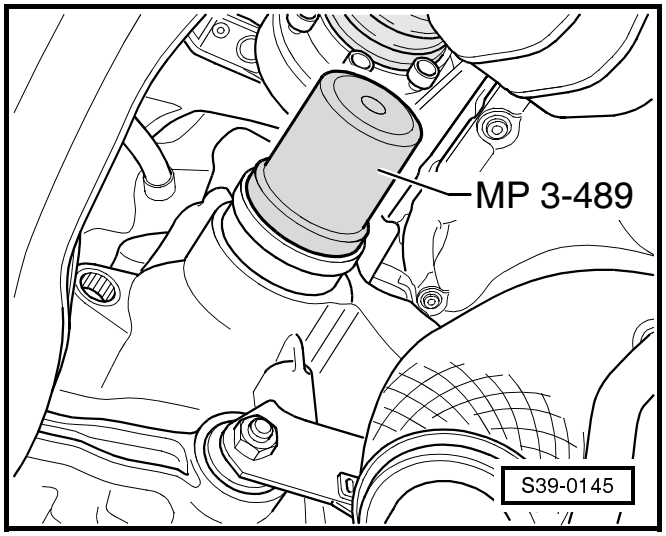


– Secure the flange shaft in a vice fitted with protective jaws. Push out the old circlip from the flange shaft groove with the new circlip -A-.
– Drive in the flange shaft with a plastic hammer.



For gearbox after 06.00

– Drive the new gasket ring in up to the stop, do not twist the gasket ring.
– Fill the space between the sealing lips and dust lips with sealing grease -G 052 128 A1-.
– Secure the flange shaft with the conical screw.



For all gearboxes

– Screw the right drive shaft to the flange shaft.
– Install the wheelhouse liner in the wheelhouse.
– Check gear oil level, if necessary fill up to lower edge of filler hole ⇒ Chap. 34-8.
– If available install the noise insulation.

Tightening torques

Components	Torque
Flange shaft to gearbox (conical screw)	25 Nm
Tighten drive shaft to flange shaft M8 crosswise in 2 steps (I and II) a)	I - 10 Nm II - 40 Nm
Steering joint to track control arm a)M8	20 Nm + 90°
Wheel bolts to wheel hub	120 Nm

a) Always replace these bolts

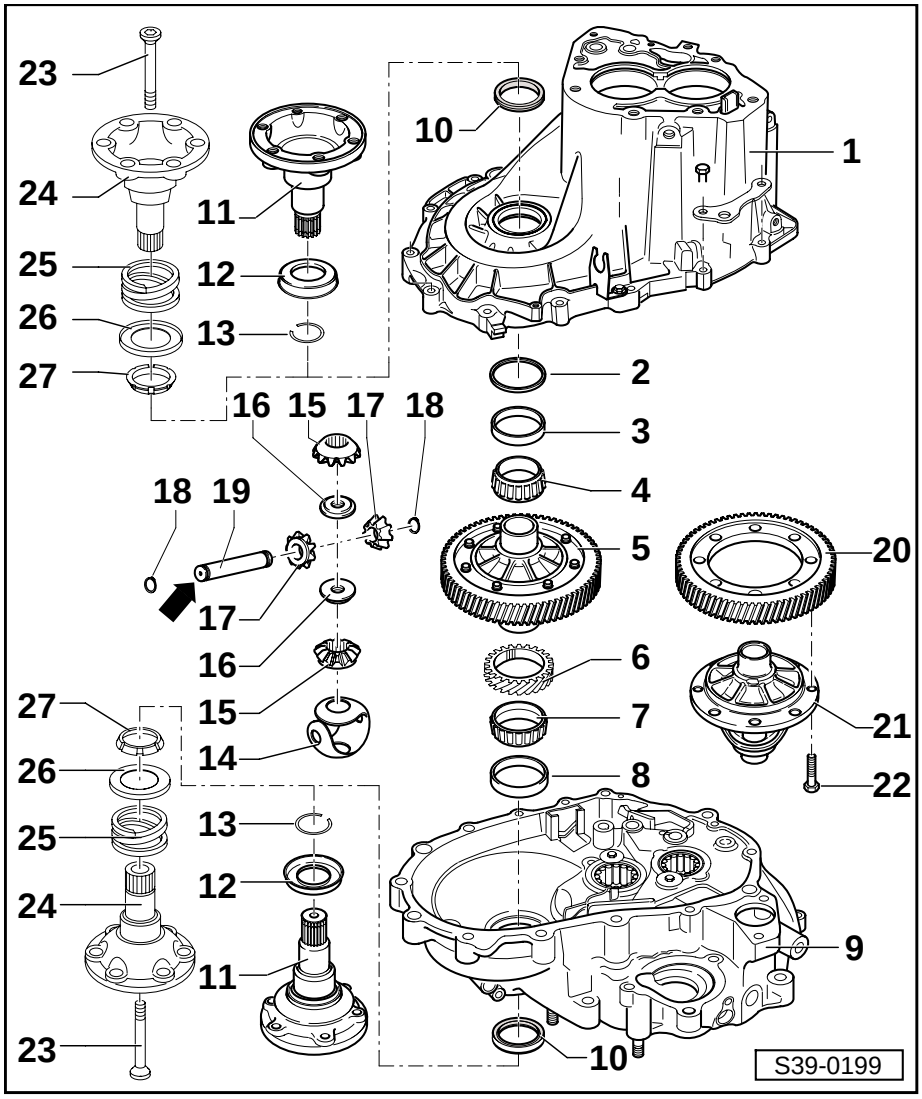
39-2 Disassembling and assembling the differential

Special tools, test and measuring equipment and aids required

- Pressure pad -MP 1-223-
- Pressure plate -MP 3-407-
- Pressure plate -MP 3-431-
- Pipe section -MP 3-450-
- Alignment rails -MP 3-457-
- Pressure plate -MP 3-504-
- Mandrel -MP 3-511-
- Pipe section -MP 3-4013-
- Tapered-roller bearing-extractor -V.A.G 1582-
- Gripper -V.A.G 1582/7-
- Two-arm extractor (e.g. -Kukko 20/10-)
- Interior extractor 46 through 58 mm (e.g. -Kukko 21/7-)
- Countersupport (e.g. -Kukko 22/2-)
- Extraction hook (e.g. -Matra V/170-
- Two-arm extractor (e.g. -THREE BOND 1375 B-)

Note

- *Before installing heat the inner ring of the tapered-roller bearing to 100 °C.*
- *Replace both tapered-roller bearings together.*
- *When replacing the tapered-roller bearing of the differential housing, gearbox housing and clutch housing adjust the differential ⇒ Chap. 39-3.*



1 - Gearbox housing

2 - Adjusting washer
- ❑ for the differential gear
- ❑ Determine thickness ⇒ Chapter 39-3

3 - Outer ring/tapered-roller bearing
- ❑ removing ⇒ Fig. 1 in **39-2** page 3
- ❑ pressing on ⇒ Fig. 2 in **39-2** page 4

4 - Inner ring/tapered-roller bearing
- ❑ remove ⇒ Fig. 3 in **39-2** page 4
- ❑ pressing on ⇒ Fig. 4 in **39-2** page 4

5 - Differential gear housing with pinion

6 - Drive wheel for speedometer
- ❑ only for vehicles without ABS; from 11/02.
- ❑ before pressing on the inner ring place it on the differential gear housing up to the stop

7 - Inner ring/tapered-roller bearing
- ❑ remove ⇒ Fig. 3 in **39-2** page 4
- ❑ pressing on ⇒ Fig. 4 in **39-2** page 4

8 - Outer ring/tapered-roller bearing
- ❑ removing ⇒ Fig. 5 in **39-2** page 5
- ❑ pressing on ⇒ Fig. 6 in **39-2** page 5

9 - Clutch housing

10 - Gasket
- ❑ replacing ⇒ Chapter 39-1

11 - Flange shaft
- ❑ for gearbox up to 06.00
- ❑ removing and installing ⇒ Chapter 39-1

12 - Dust cap
- ❑ for gearbox up to 06.00
- ❑ for flange shaft
- ❑ remove ⇒ Fig. 7 in **39-2** page 5
- ❑ pressing on ⇒ Fig. 8 in **39-2** page 6

13 - Circlip
- ❑ for gearbox up to 06.00
- ❑ always replace

14 - Stop disc compound
- ❑ when installing moisten with gearbox oil

15 - Differential bevel gear large
- ❑ pay attention to different versions
- ❑ Installation for gearbox up to 06/00 ⇒ Fig. 10 in **39-2** page 6
- ❑ Installation for gearbox after 06/00 ⇒ Fig. 12 in **39-2** page 7

16 - Threaded part
- ❑ for gearbox after 06.00
- ❑ installing ⇒ Fig. 12 in **39-2** page 7

17 - Differential bevel gear small
- ❑ Installation for gearbox up to 06/00 ⇒ Fig. 10 in **39-2** page 6
- ❑ Installation for gearbox after 06/00 ⇒ Fig. 12 in **39-2** page 7

18 - Circlip
- ❑ always replace

19 - Differential bevel gear shaft
- ❑ Shaft has a different diameter, front side with centering hole -arrow- means a smaller diameter
- ❑ pressing out ⇒ Fig. 9 in **39-2** page 6
- ❑ pressing on ⇒ Fig. 11 in **39-2** page 7

20 - Pinion for final drive
- ❑ is paired with the output shaft, replace together

21 - Differential housing
- ❑ screw to pinion for final drive

22 - 80 Nm
- ❑ before tightening apply locking agent (e.g. -THREE BOND 1375 B-)

23 - Conical screw, 25 Nm
- ❑ for gearbox after 06.00
- ❑ screw into threaded piece

24 - Flange shaft
- ❑ for gearbox after 06.00

25 - Pressure spring for flange shaft
- ❑ for gearbox after 06.00
- ❑ fitted behind flange shaft

26 - Stop disc
- ❑ for gearbox after 06.00
- ❑ Fitting position: Collar towards pressure spring

27 - Conical ring
- ❑ for gearbox after 06.00
- ❑ Fitting position: Cone towards differential housing

Fig. 1: Remove outer ring/tapered-roller bearing from gearbox housing ►

A - Countersupport (e.g. -Kukko 22/2-

B - Interior extractor 46 through 58 mm (e.g. -Kukko 21/7-)

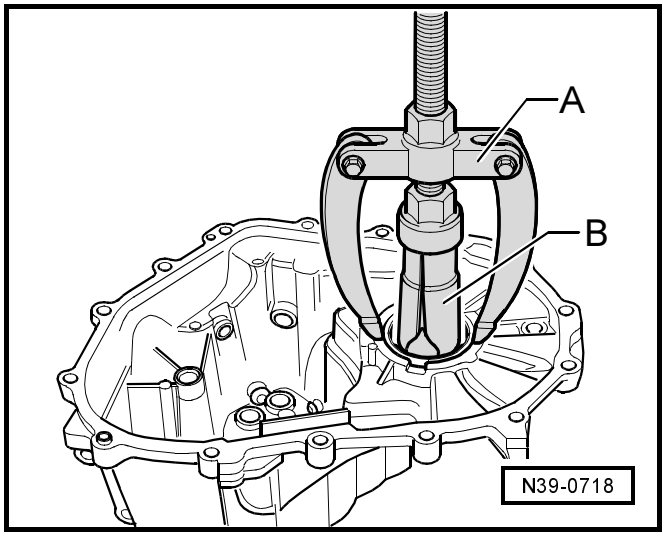
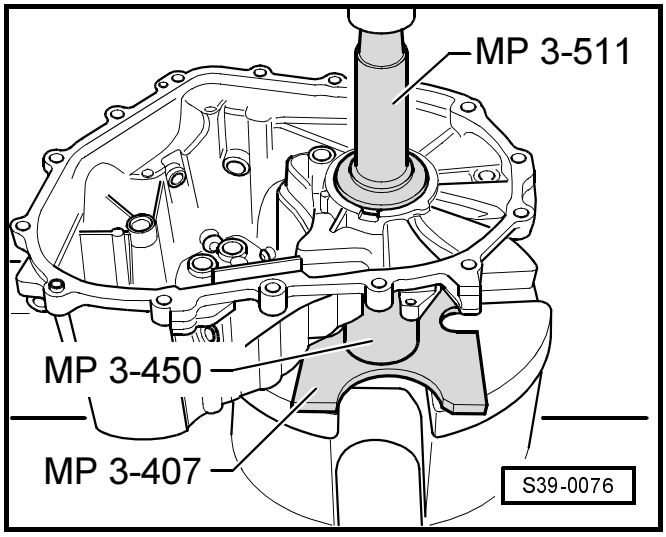
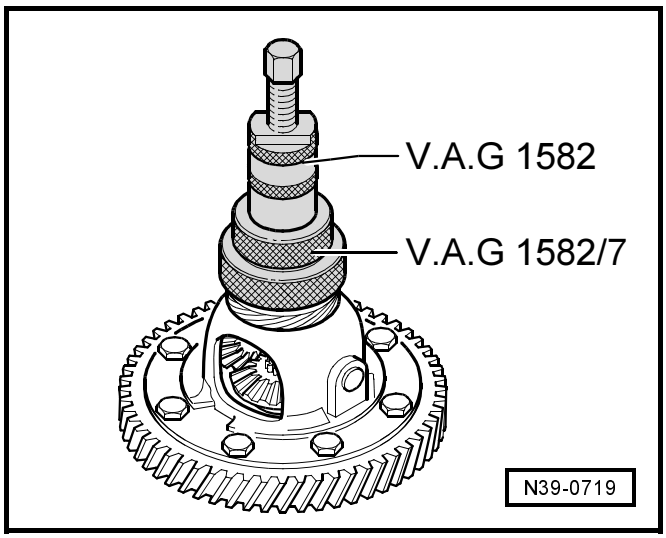


Fig. 2: Press in outer ring/tapered-roller bearing in the gearbox housing ►



– Position adjusting washer under outside ring.
– Support the gearbox housing with a pipe section -MP 3-450 - directly below the bearing support.

Fig. 3: Removing inner ring/tapered-roller bearing ►

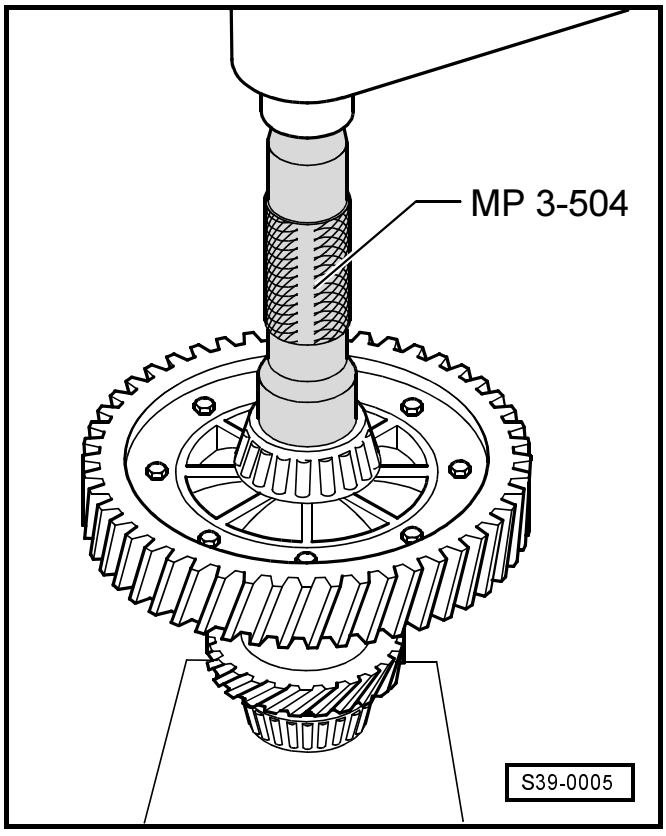


– Before inserting the extractor position pressure plate -MP 3-431- on the differential housing.

Note

Both inner rings/tapered-roller bearings of the differential housing are removed in the same way.

Fig. 4: Pressing on inner ring/tapered-roller bearing ►



Note

The inner ring/tapered-roller bearing for the gearbox housing and clutch housing are pressed on with the same pressure tools.

Fig. 5: Remove outer ring/tapered-roller bearing from clutch housing

A - Countersupport (e.g. -Kukko 22/2-)

B - Interior extractor 46 through 58 mm (e.g. -Kukko 21/7-)

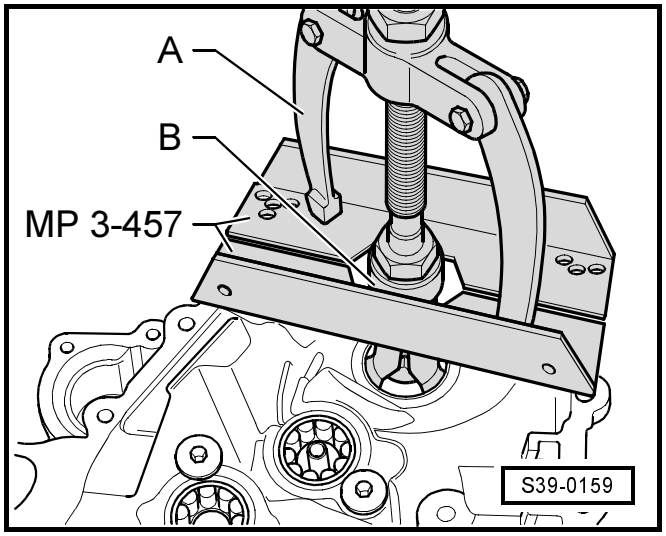


Fig. 6: Press outer ring/tapered-roller bearing into the clutch housing

Note

No adjusting washer is fitted at the side of the clutch housing.

– Support the gearbox housing with a pipe section -MP 3-450 - directly below the bearing support.

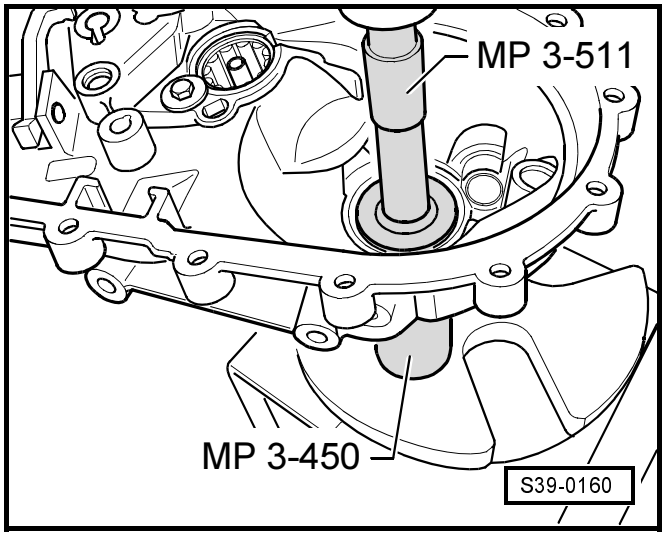


Fig. 7: Remove the dust cap of the flange shaft

A - With Two-arm extractor (e. g. -Kukko 20/10-) with hook (e.g. -Matra V/170-)

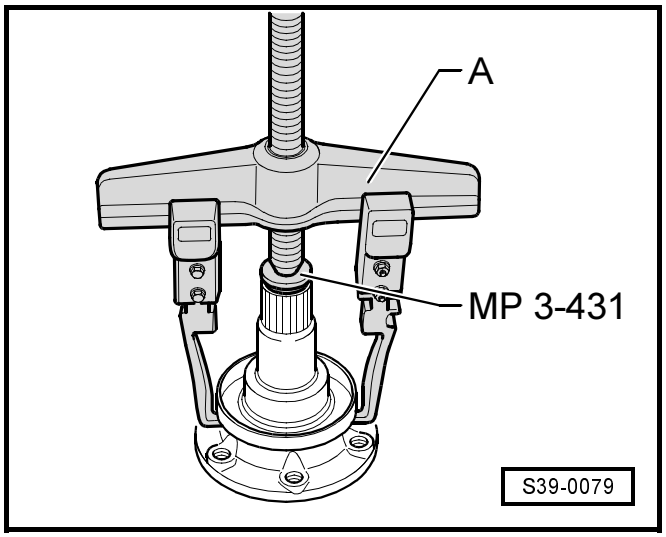


Fig. 8: Press on the dust cap of the flange shaft ►

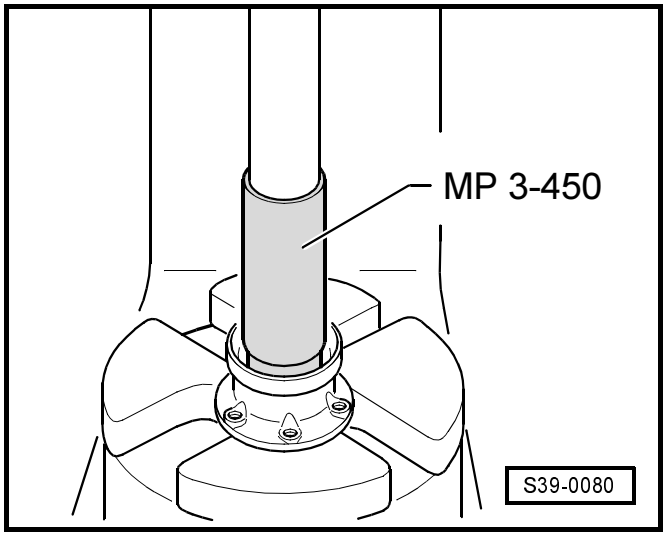


Fig. 9: Press out the differential bevel gear shaft ►

– Remove the circlips of the differential gear shaft.
– Position the counterholder -MP 1-223- on the front side of the shaft with centering hole -arrow- and press on shaft.

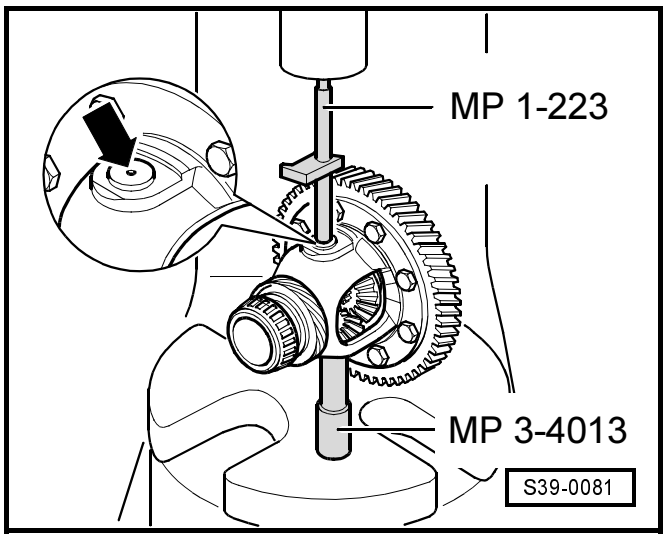


Fig. 10: Install differential bevel gears for gearbox up to 06.00 ►

– Oil thrust washer compound with gearbox oil.
– Position the circlip on the side of the differential bevel gear shaft with a large diameter.
– Slide the differential bevel gear shaft with the smaller diameter (side with centering hole) into the differential gearbox housing.
– Slide the differential bevel gears onto the differential bevel gear shaft ⇒ Fig. 11 in **39-2** page 7.
– Press the differential bevel gear shaft up to its end position and secure with a second circlip.
– Insert the large differential bevel gears into position with a 180° offset and rotate into end position -arrow-.

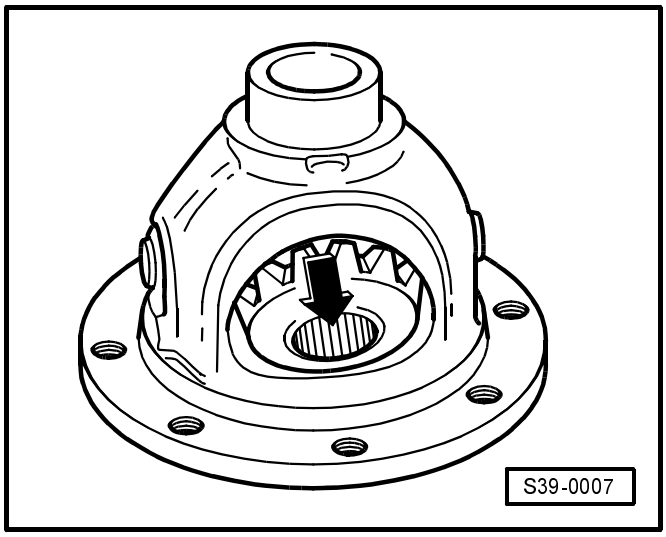


Fig. 11: Press on the differential bevel gear shaft ►

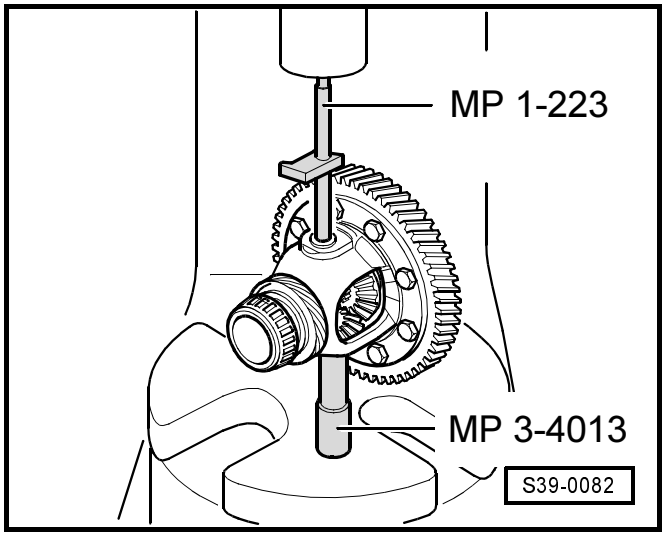
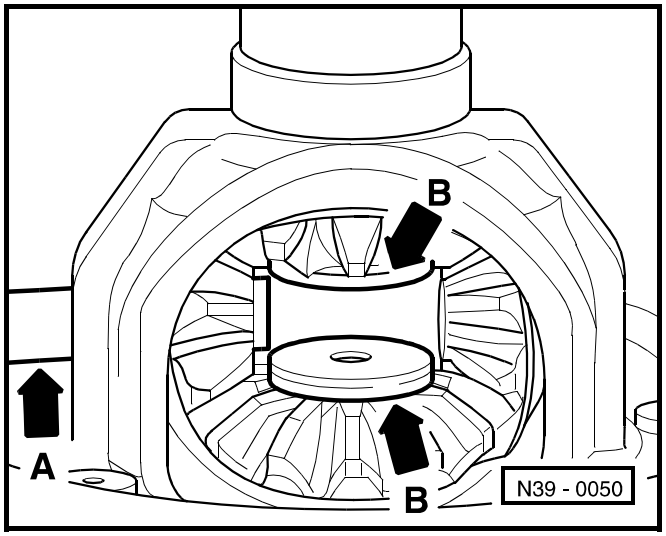


Fig. 12: Installing large and small differential bevel gears for gearbox after 06.00 ►



– Insert the thrust washer compound moistened with oil.
– Insert both large differential bevel gears and secure (e.g. with flange shaft).
– Insert both small differential bevel gears with a 180° offset.
– Circlip on the side of the differential bevel gear shaft with a large diameter.
– Slide differential bevel gear shaft -arrow A- with smaller diameter (centering hole side) up to the first small differential bevel gear.
– Insert the threaded parts -arrow B- in the large differential bevel gears.

Fitting position: Heel towards large differential bevel gears

– Press the differential bevel gear shaft up to its end position and secure with a second circlip.

39-3 Adjusting the differential gear

Special tools, test and measuring equipment and auxiliary items required

- Gauge block plate -MP 3-405/17-
- Pressure plate -MP 3-407-
- Universal dial indicating gauge -MP 3-447-
- Pipe section -MP 3-450-
- Mandrel -MP 3-511-
- Interior extractor 46 through 58 mm (e.g. -Kukko 21/7-)
- Countersupport (e.g. -Kukko 22/2-)
- Dial gauge

The differential gear must be re-set when

- Gearbox housing
- Clutch housing
- Differential housing

or

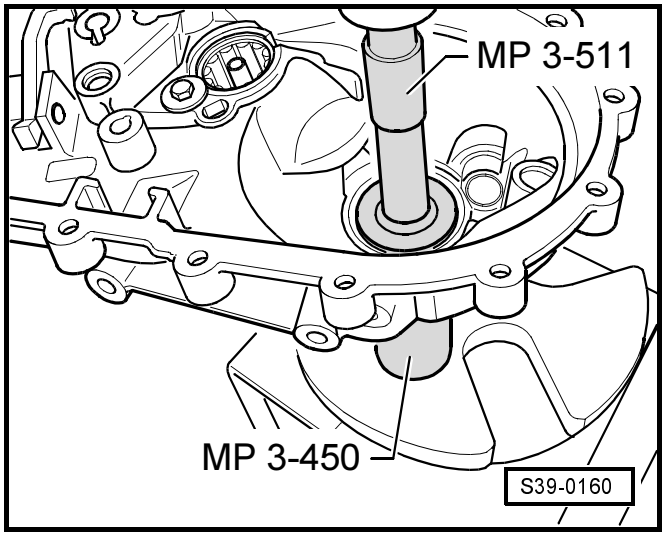
- if the tapered-roller bearing of the differential gear have been replaced.

Note

- *New tapered-roller bearings for the differential gear are low friction. Therefore the friction torque cannot be considered as a control parameter. Correct setting of the bearing preload is only possible by determining the thickness of the adjusting washer.*
- *The inner and outer ring of the tapered-roller bearing are paired - do not interchange.*
- *For gearboxes after 06.00 do not insert gasket ring bushings when measuring.*

– Support the clutch housing with a pipe section -MP 3-450 - directly below the bearing hole. ►

– Press the outer ring/tapered-roller bearing in the clutch housing with impact mandrel -MP 3-511-.



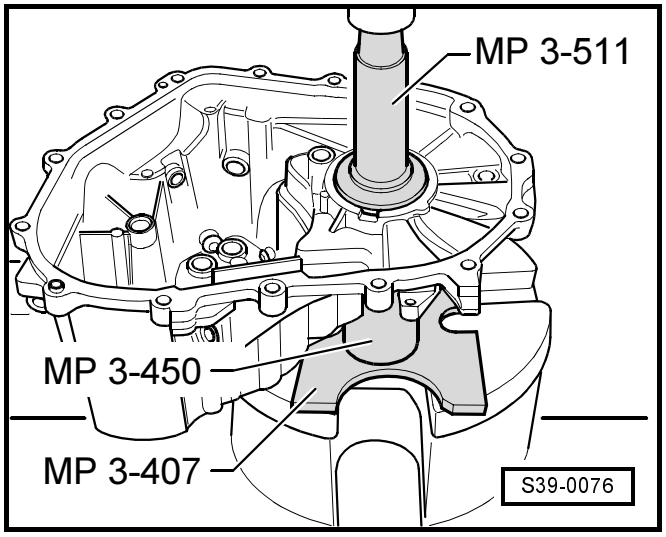
Note

No adjusting washer is fitted at the side of the clutch housing.

– Press outer ring/tapered-roller bearing without adjusting washer into the gearbox housing. ►

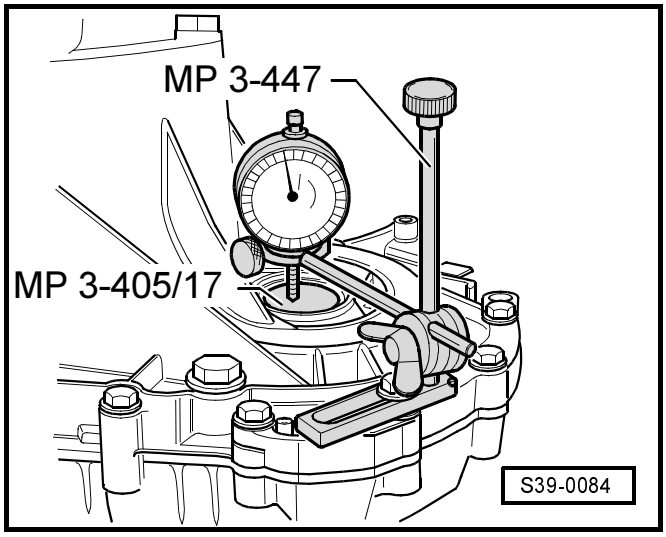
– Insert the differential gear in the clutch housing.

– Position the clutch housing and tighten 5 screws to torque 25 Nm.



– Set the dial gauge to 0 with 1 mm preload on „0“.
– Move the differential gear up and down, read off and write down the clearance on the dial gauge.

(Example: 2.30 mm)



Note

Do not turn when measuring the differential as otherwise the bearing will settle and the measuring result will be inaccurate.

Determine the adjusting screw

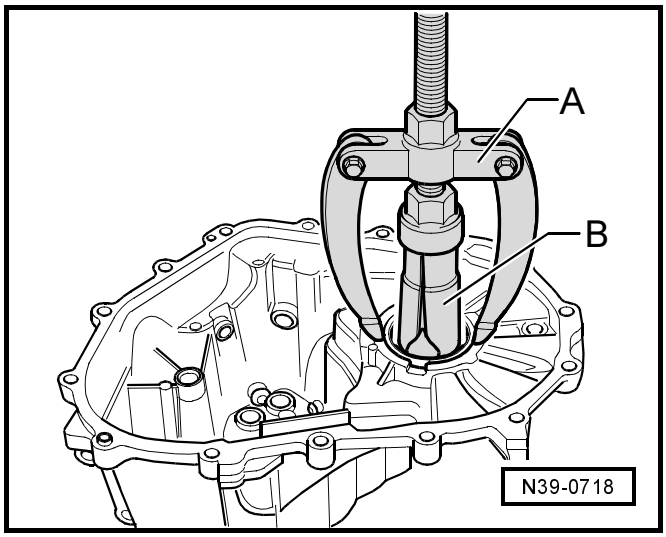
The prescribed bearing preload is reached by adding to the established measured value a constant compression value (0.20 mm).

Example:

measured value	2.30 mm
+ pressure (const. value)	0.20 mm
Thickness of the adjusting washer =	2.50 mm

– Remove the gearbox housing and pull out the outer ring for tapered-roller bearing from the gearbox housing.

A - Countersupport (e.g. -Kukko 22/2-)
B - Interior extractor 46 through 58 mm (e.g. -Kukko 21/7-)



– Insert an adjusting washer of the correct thickness.
– Press outer ring in again and screw down the gearbox housing.

The following adjusting washers are available:

Thickness (mm)	Spare part No.
2,0	002 409 383 A
2,1	002 409 383 B
2,2	002 409 383 C
2,3	002 409 383 D
2,4	002 409 383 E
2,5	002 409 383 F
2,6	002 409 383 G
2,7	002 409 383

Different tolerances allow to measure the required thickness for each washer very precisely.