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[BMW E36 328i Sedan](#) / [Repair Manuals and Technical Data](#) / [23 Manual gearbox](#) / [23 21 Transmission shafts](#) /

23 21 502 Removing and installing complete drive and output shafts (S5D 260Z / 310Z / 320Z)



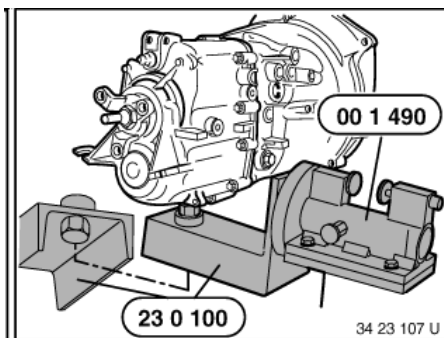
Special tools required:

- [00 1 490](#)
- [23 0 020](#)
- [23 0 100](#)
- [23 0 490](#)
- [23 1 050](#)
- [23 1 160](#)
- [23 2 150](#)
- [23 2 250](#)
- [23 2 260](#)
- [23 2 270](#)
- [23 2 280](#)
- [23 2 290](#)
- [23 2 293](#)
- [23 2 300](#)
- [23 2 320](#)
- [23 2 330](#)
- [23 2 340](#)
- [23 2 350](#)
- [23 2 360](#)
- [23 2 370](#)
- [23 2 380](#)
- [33 1 150](#)
- [33 1 301](#)



Remove transmission.

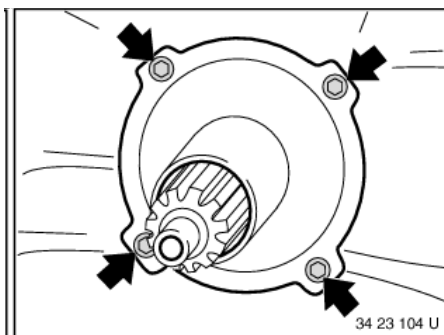
[Remove clutch release unit/lever.](#)



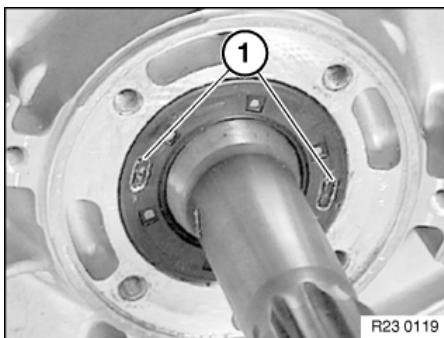
Unscrew drain plug.
Drain off oil.
Screw special tool [23 0 100](#) (transmission bracket) into hole for drain plug and secure.
Mount special tool [23 0 100](#) on assembly stand [00 1 490](#) .



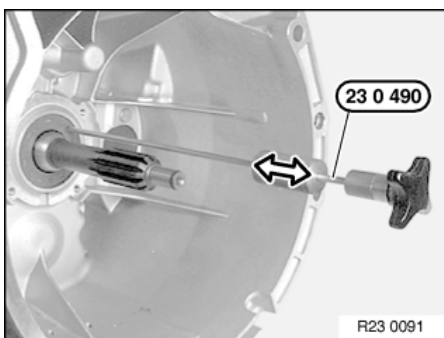
Recycling:
Catch and dispose of escaping transmission fluid.
Observe country-specific waste-disposal regulations.



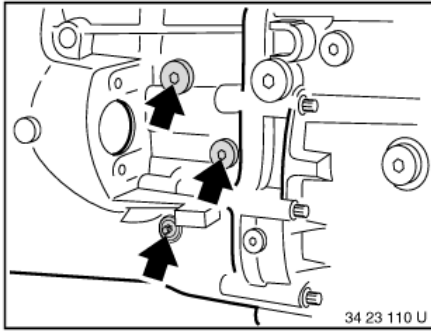
Release screws and pull out guide tube.



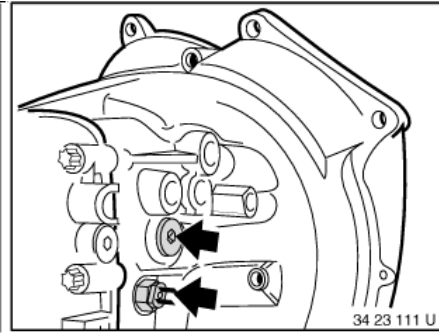
Note:
Two covered removal holes (1) are located on end face of radial seal.



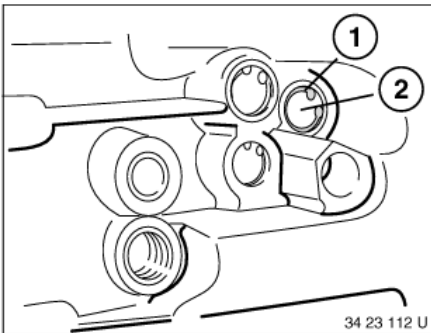
Screw special tool [23 0 490](#) into one of the two removal holes.
Withdraw radial seal from transmission housing with aid of impact weight.



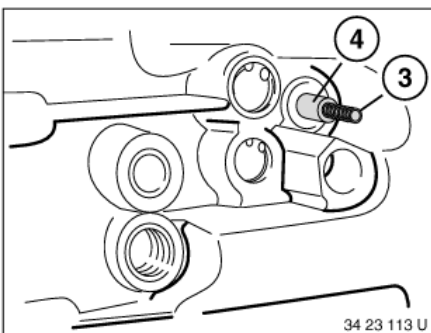
Remove left bearing pin and screw for reverse gear pin in front housing section.



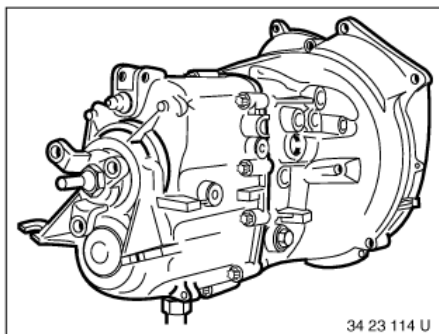
Remove reverse gear switch and right bearing pin in front housing section.



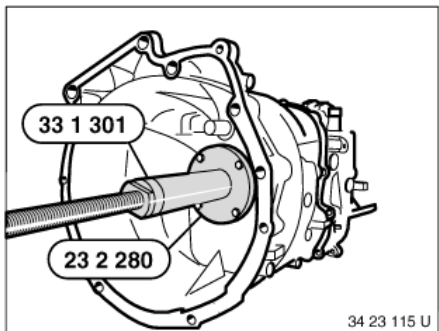
Lever out retaining ring (1).
Remove sealing cover (2).



Remove pressure spring (3) and catch pin (4).



Remove housing screws.



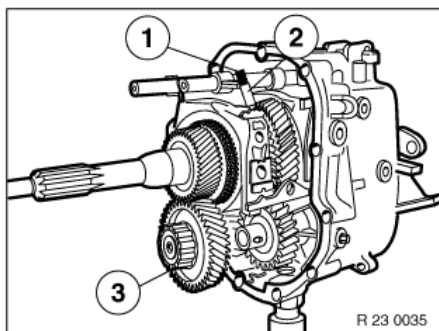
Pull off front housing section with special tools [23 2 280](#) and [33 1 301](#).

Caution!

Bearings or elements of the bearing brackets could be damaged while pulling off the front case section.

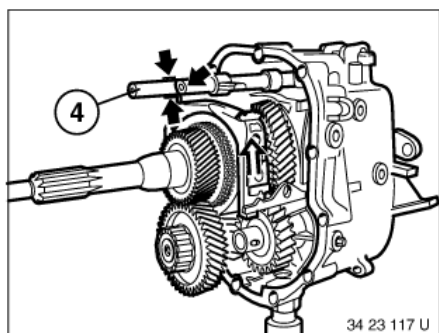
Catch pin for 5th/reverse gear falls out.

Always replace bearings and segments during removal.



Remove pressure spring (1) and thrust pin (2).

Remove roller bearing (3).

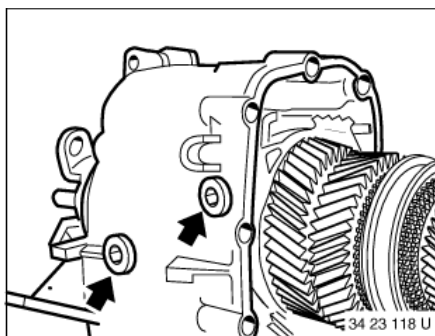


Withdraw shift shaft (4).

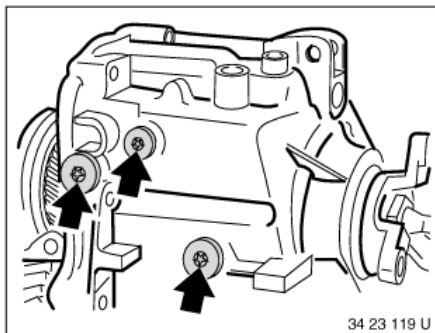
Caution!

Needles on shift shaft.

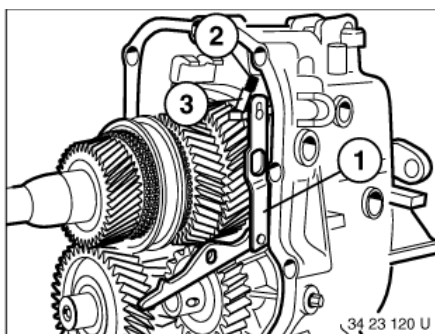
Remove 5th/reverse gear shift arm towards top.



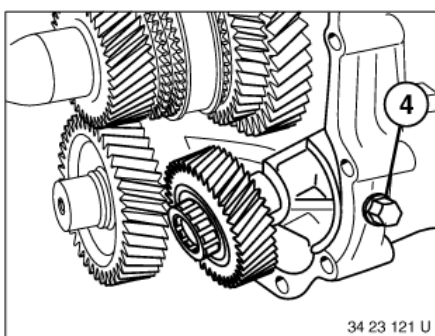
Remove 2 bearing pins on right. **Note:**
Bearing pins must be replaced.



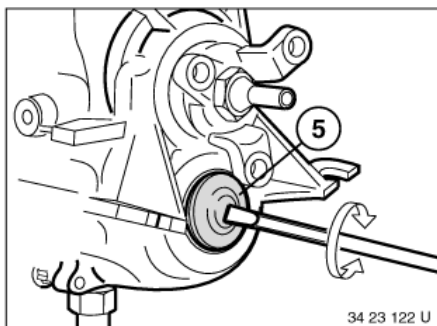
Remove 3 bearing pins on left. **Note:**
Bearing pins must be replaced.



Remove locking lever (1) completely.
Remove pressure spring (2) and thrust pin (3).

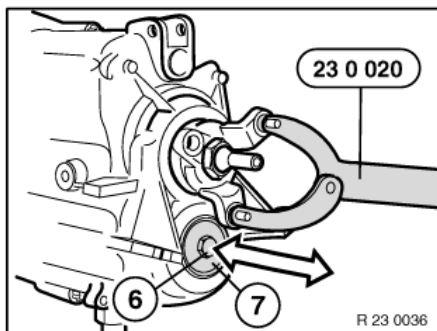


Remove screw (4).
Remove reverse gear wheel with needle bearings, thrust washer, pin and half shell.



Pierce sealing cover (5) on side.
Lever out sealing cover (5) in hole with a screwdriver.

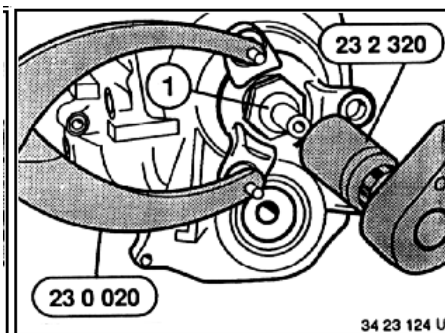
Installation:
Replace sealing cover.



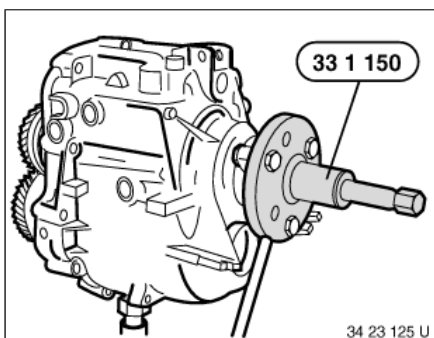
Engage a gear by hand.
Grip output flange with special tool [23 0 020](#) .
Release screw (6).

Caution!
Left-hand threads.

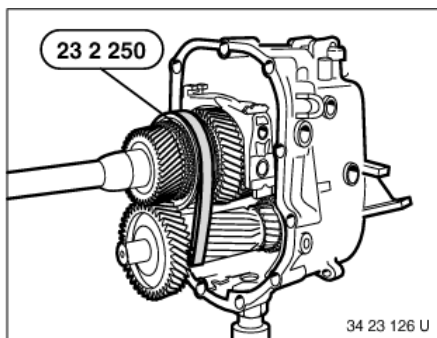
Remove washer (7).
Disengage selected gear again.



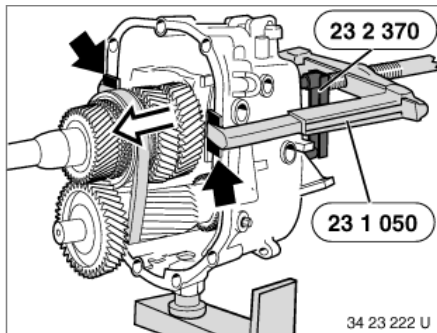
Grip output flange with special tool [23 0 020](#) .
Release collar nut (1) with special tool [23 2 320](#) .



Detach output flange with special tool [33 1 150](#) .



Compress gear train at 5th/reverse gear sliding sleeve with countershaft with special tool 23 2 250.



Attach special tool [23 2 370](#) to output shaft and countershaft.

Attach special tool [23 1 050](#) to housing sealing surface and center of special tool [23 2 370](#).

Caution!

Use a piece of wood, plastic or similar on the sealing surfaces.

Press out gear train and countershaft uniformly.

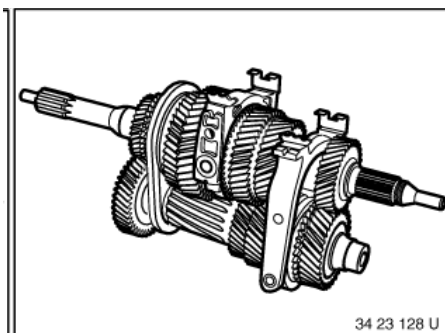
When pressing out, make sure gear train and countershaft do not get jammed.



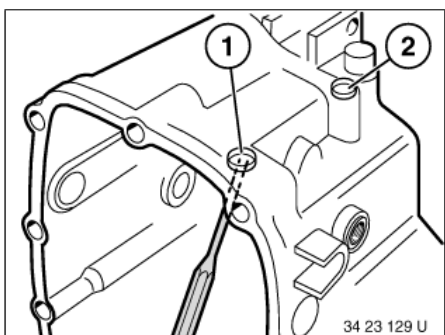
Installation:

The bearings or elements of the bearing brackets could be damaged while pressing out the drive and output shafts.

Always replace bearing and segments during removal.



Remove gear train with 1st/2nd and 3rd/4th gear shift arms and countershaft.



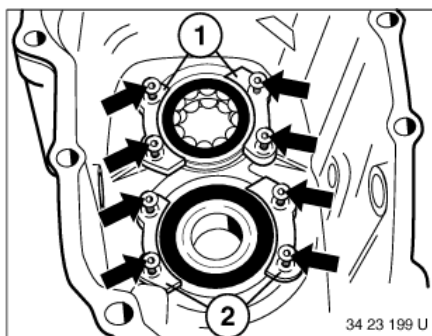
Installation:

Clean housing.

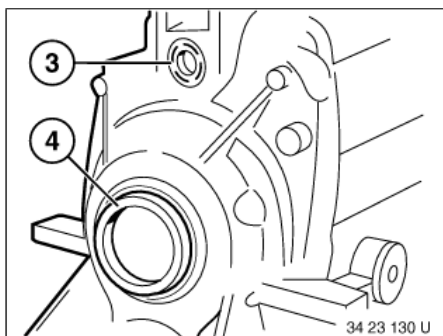
Drive out sealing cap (1 and 2) on rear housing section with a mandrel from inside to outside.

Installation:

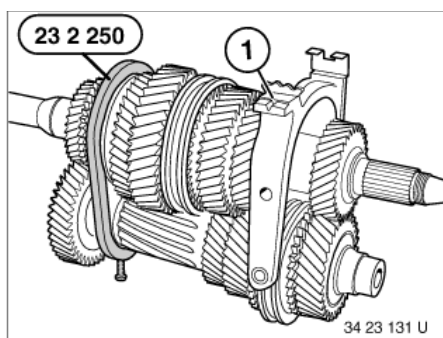
Replace sealing cap.



[Replace bearing \(1\) and \(2\)](#) (output shaft, countershaft and retaining plates).



Lever out radial seal (3 and 4) for output and selector shafts.

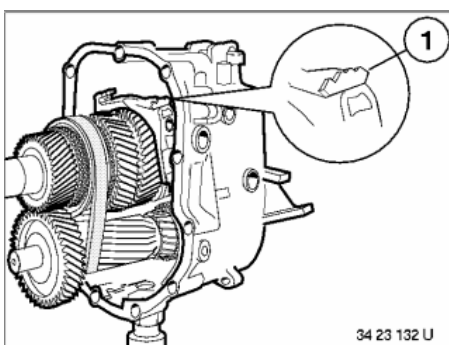


Compress gear train at 5th/reverse gear sliding sleeve with countershaft. Use special tool [23 2 250](#) .

Attach 3rd/4th gear shift arm with sliding blocks to 3rd/4th gear slide sleeve.

Rest shift arm on 3rd gear wheel of output shaft.

Connect shift arm with catch (1) in direction of drive shaft on left.

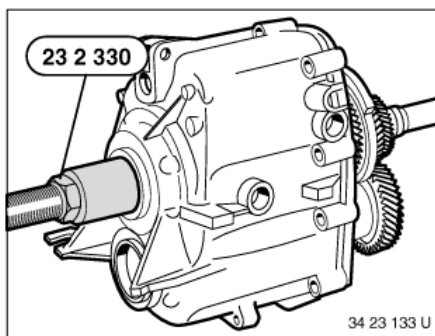


Insert gear train with shift arm in rear housing section.

Attach 1st/2nd gear shift arm with sliding blocks to 1st/2nd gear slide sleeve.

Caution!

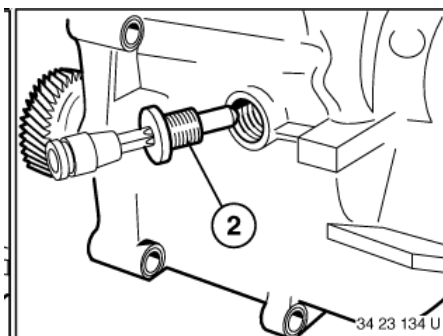
Connect shift arm with catch (1) in direction of drive shaft on left.



Attach special tool [23 2 330](#) to output shaft journal. Draw in output shaft with special tool [23 2 330](#) until firmly seated.

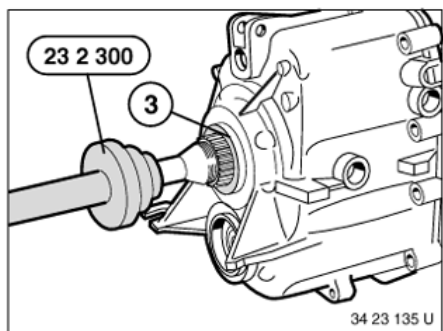
When drawing in, make sure shift arms and countershaft do not get jammed, align if necessary.

Remove special tool [23 2 330](#).



Center 3rd/4th gear shift arm by hand with bore in housing. In this position, screw in bearing pins (2) in succession on left and right and then tighten down.

[Tightening torque, 23 31 1AZ.](#)

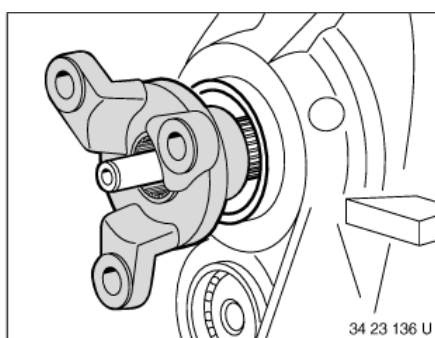


Oil sealing lip of radial seal.

Drive in radial seal (3) for output flange with special tool [23 2 300](#).

Caution!

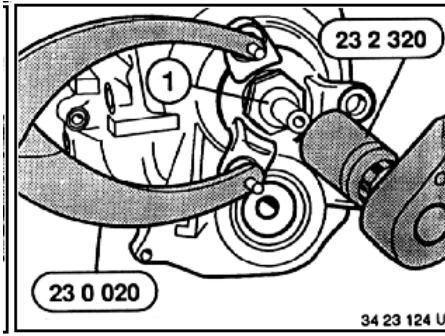
Use a plastic hammer to knock in.



Heat output flange to approx. 80°C (hot-air blower).

Push output flange onto output shaft.

If necessary, drive on to fit tight with special tool [23 1 160](#).

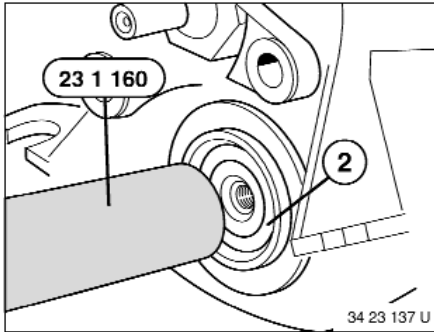


Fit collar nut (1) with flat side pointing to output flange with screw retaining compound, refer to BMW Parts Service.

Grip output flange with special tool [23 0 020](#).

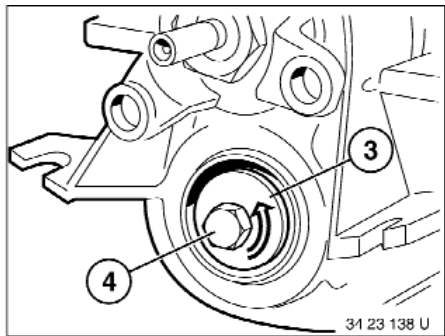
Secure collar nut with drive socket 23 2 320.

[Tightening torque, 23 21 1AZ.](#)



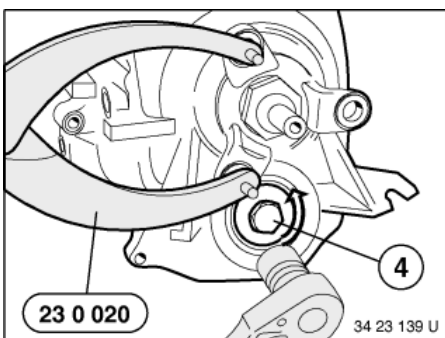
Heat ball bearing inner race (2) for countershaft to approx. 80°C (hot-air blower).

Press on ball bearing inner race (2) with special tool [23 1 160](#) until firmly seated, drive on with gentle taps if necessary.



Install washer (3) and screw (4) with screw retaining compound, refer to BMW Parts Service. **Caution!**

Screw (4) has left-hand thread.



Remove special tool [23 2 250](#) from gear train.

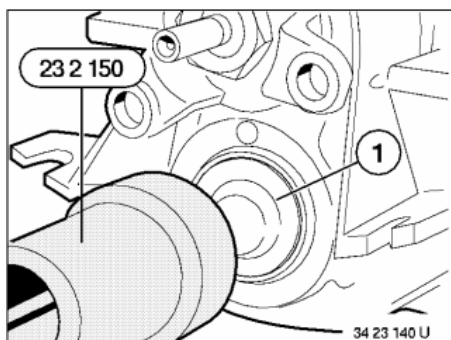
Engage a gear.

Grip output flange with special tool [23 0 020](#).

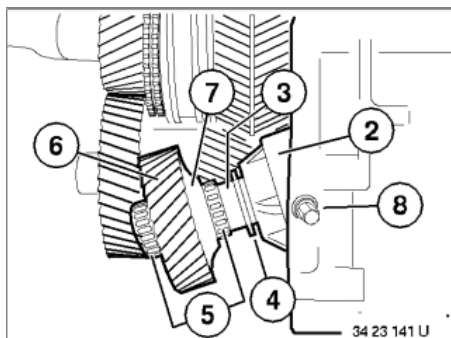
Tighten down screw (4).

[Tightening torque, 23 11 10AZ.](#)

Disengage selected gear again.



Install sealing cap (1) and drive in with special tool [23 2 150](#) until flush.

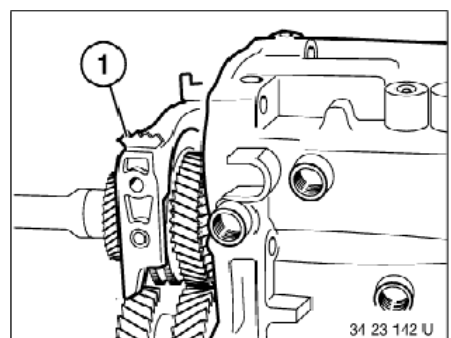


Coat half shell (2) with sealing compound, refer to BMW Parts Service, in area of screw bore and install.

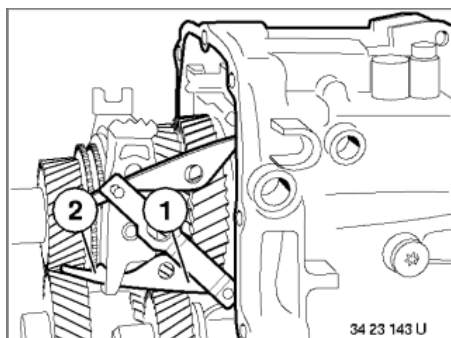
Install pin (3), thrust washer (4), needle bearing (5) and reverse gear wheel (6) with collar (7) pointing to housing.

Coat collar of screw head with sealing compound, refer to BMW Parts Service.

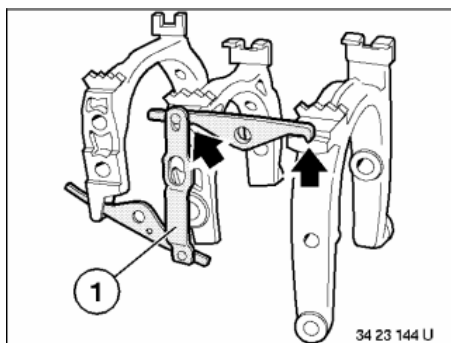
Install screw (8) with screw retaining compound, refer to BMW Parts Service, but do not tighten down.



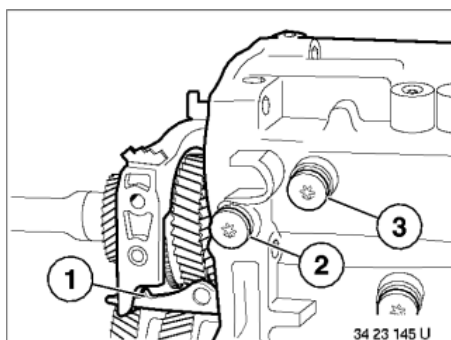
Install 5th/reverse gear shift arm with sliding blocks with catch (1) to left in 5th/reverse gear sliding sleeve.



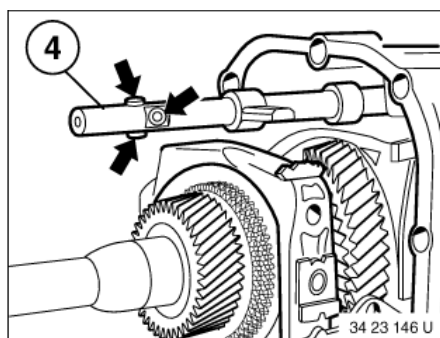
Insert locking lever (1) with long tongue (2) into slot of 5th/reverse gear shift arm.



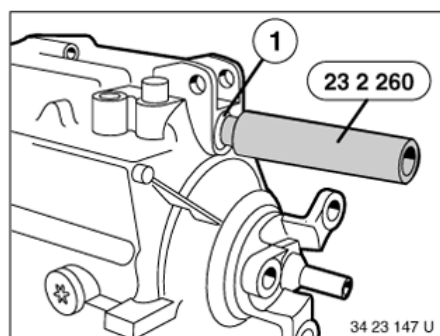
Swivel locking lever (1) inwards and in so doing engage in recesses of 1st/2nd and 3rd/4th gear shift arms.



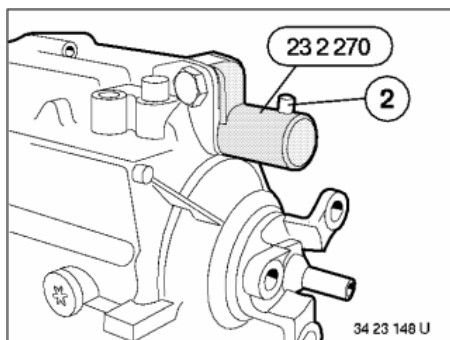
Center locking lever (1) by hand with bores.
Install bearing pins (2) and (3) on left and right and tighten down.
[Tightening torque. 23 31 1AZ.](#)
Carry out movement check on locking lever.



Insert selector shaft (4) in horizontal position.
Apply grease to 4 rollers.

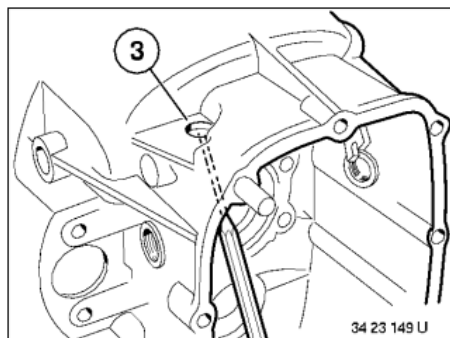


Drive in radial seal (1) for selector shaft with special tool [23 2 260](#) .



Secure selector shaft with special tool [23 2 270](#) in neutral position.

Use a 8 mm bolt and cylindrical pin (2) from the shift joint or a suitable mandrel for holding the shift shaft.

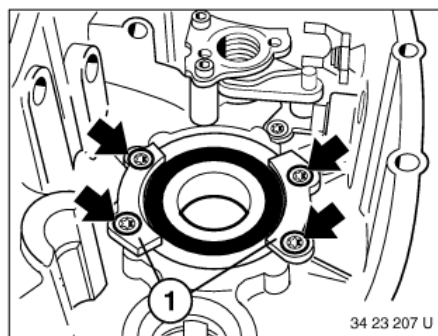


Clean front housing section.

Drive out sealing cap (3) for locking pin with a mandrel from inside to outside.

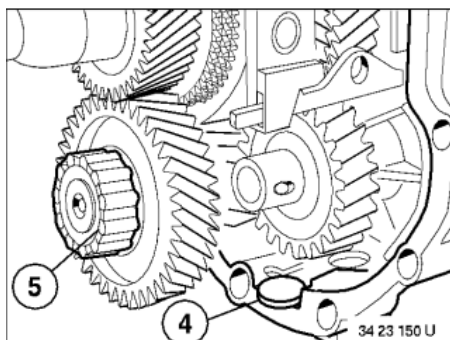
Installation:

Replace sealing cap.



[Replace bearing of drive shaft and retaining segments \(1\).](#)

Remove retaining plates (1).



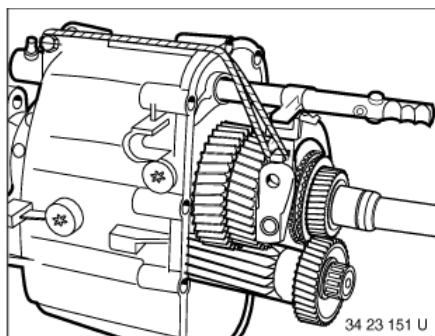
Insert magnets (4) in rear housing section.

Attach roller bearing (5) with small diameter facing outwards.

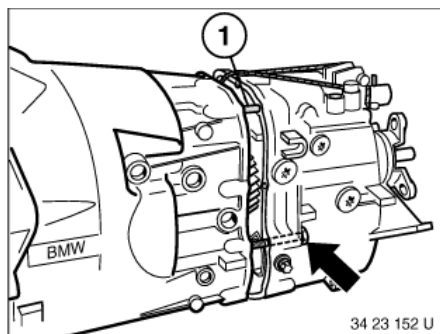
Note:

Coat needles with grease and press them in to avoid canting of the needles when mounting the front case section.

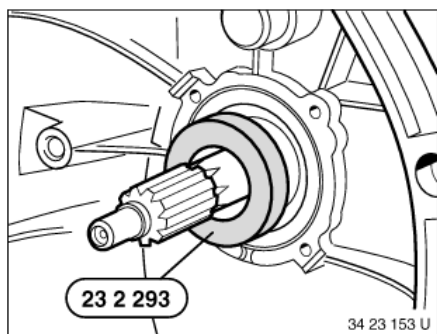
Clean housing sealing surfaces and coat with sealing compound, refer to BMW Parts Service.



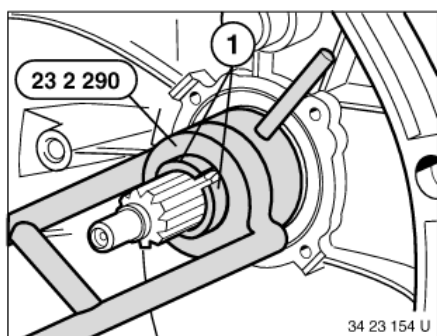
Hold the 5th/reverse gear shift arm in horizontal position with a piece of string to make installation easier.



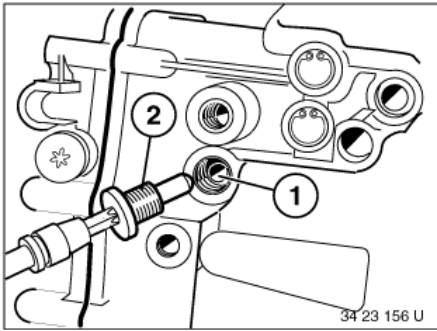
Attach front housing section up to centering pin (1).
Insert 2 auxiliary screws M8 x 75 mm for centering housing opposing on left and right in rear housing section.



Install special tool [23 2 293](#) in front housing section.



Attach special tool [23 2 290](#) to drive shaft.
Attach support shells (1) to drive shaft with conical side facing inwards.
Unscrewing the spindle presses the front case section on to the input shaft.



Press on front housing section only to such an extent that auxiliary cord can be removed again after installation of right bearing pin.

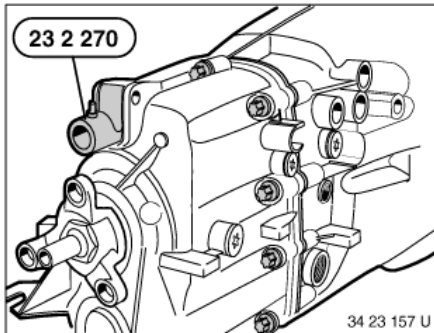
Center 5th/reverse gear shift arm (1) with bore and install right bearing pin (2). Do not tighten down.

Note:

Replace bearing pin (2). Clean thread in housing.

Remove auxiliary cord.

Press on front housing section as far as it will go.



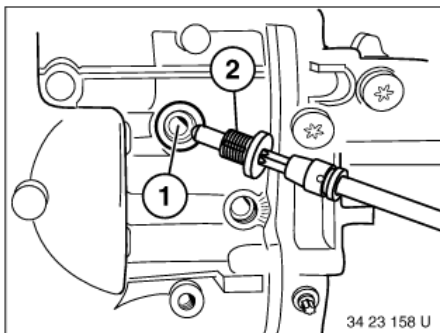
Remove special tool [23 2 290](#) completely.

Remove auxiliary screws from housing.

Clean front housing section to rear section.

[Tightening torque, 23 11 1AZ.](#)

Remove special tool [23 2 270](#) from selector shaft.



Center 5th/reverse gear shift arm (1) with bore and screw in left bearing pin (2) by hand.

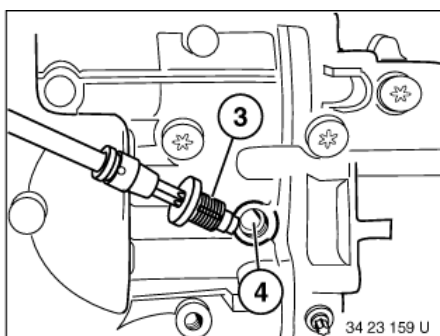
Screw in left bearing pin (2) by hand.

Tighten down bearing pins (2) on left and right.

[Tightening torque, 23 31 1AZ.](#)

Note:

Replace bearing pin (2). Clean thread in housing.

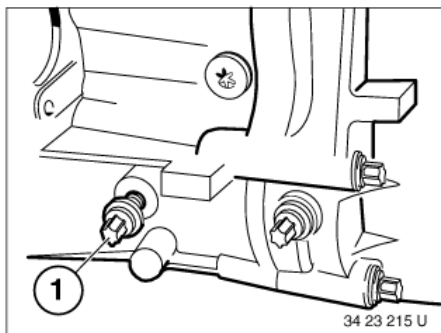


Install bearing pin (3) for locking lever.

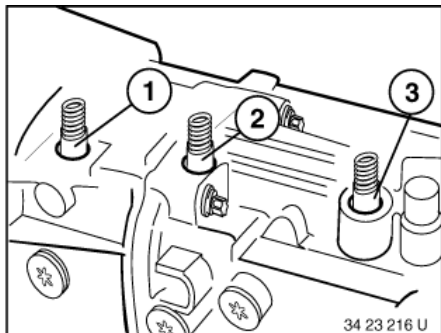
This requires turning the transmission until bore (4) in the locking lever is aligned with the bore in the case.

In this position, turn the bearing pins (3) by hand and secure.

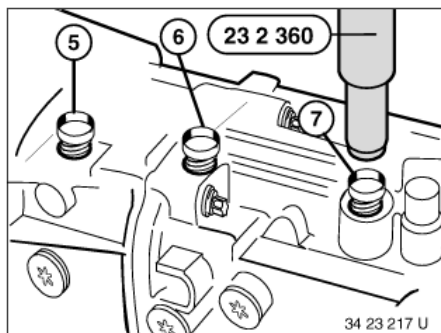
[Tightening torque, 23 31 1AZ.](#)



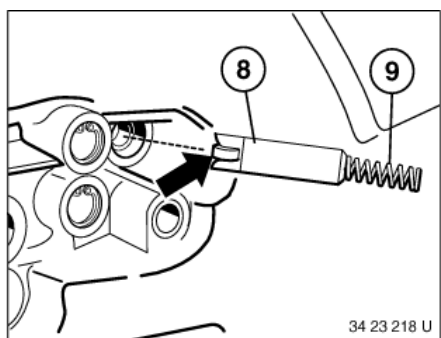
Coat collar of screw head with sealing compound, refer to BMW Parts Service.
Install screw (1) for reverse gear pin with screw retaining compound, refer to BMW Parts Service.
Tighten both screws.
[Tightening torque, 23 11 6AZ.](#)



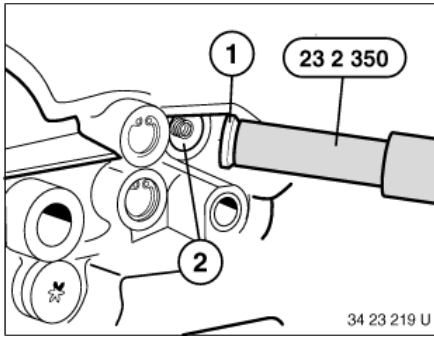
Install catch pins (1 ... 3) with pressure springs in shift arms.



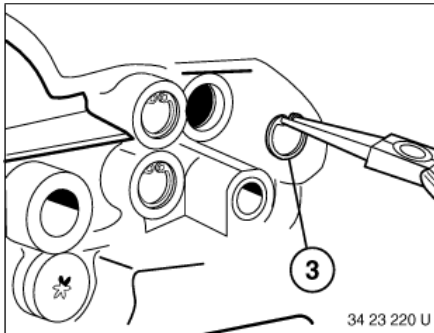
Drive in sealing caps (5 ... 7) with special tool [23 2 360](#).



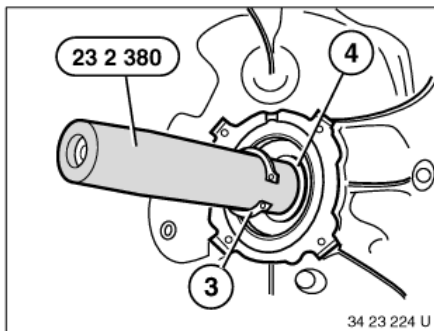
Replace catch pin (8) and pressure spring (9). **Caution!**
Note installation position of catch pin (8) (roller horizontal).



Install sealing cap (1) with special tool [23 2 350](#) in bore (2).
Push sealing cap (1) inwards as far as possible.



Install retaining ring (3) and press in with special tool [23 2 350](#) up to groove.
Check for correct seating of retaining ring (visual inspection).
Install reverse gear switch.



Install spacer (4).

Caution!

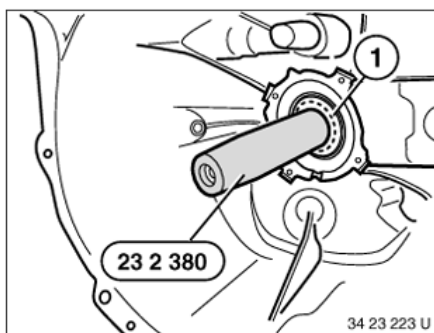
To prevent damage to drive shaft, attach special tool [23 2 380](#) to drive shaft while installing retaining ring (3).

Slide retaining ring (3) over special tool [23 2 380](#) and install in groove.

Retaining ring must be seated without play in groove.

Replace retaining ring with a matching retaining ring. Retaining rings are available in various thicknesses.

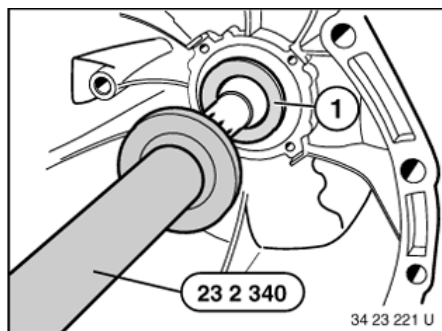
Sizes: 2.2 ... 2.6 mm



Coat sealing lip of radial seal with ATF.

Attach special tool [23 2 380](#) to drive shaft.

Push on radial seal (1) up to housing.

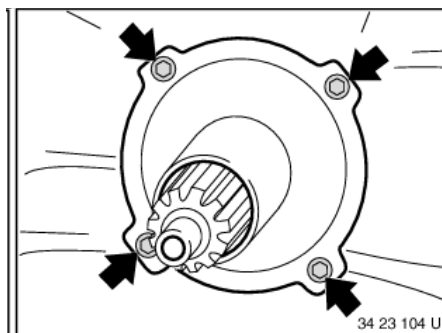


Remove special tool [23 2 380](#) .

Drive in radial seal (1) with special tool [23 2 340](#) until flush.

Caution!

Use plastic hammer to drive in.



Install guide tube.

[Tightening torque. 23 11 2AZ.](#)

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