

21 Clutch

Scope of repair work, refer to "Repair Instructions for 7 Series E38"

23 Manual transmission

00 11 229	Oil change in manual transmission	23- 0/1
23 00 025	Transmission – remove and install (engine M70/transmission S6S 560 G)	23- 0/2
025	Transmission – remove and install (engine M60/transmission S6D 420 G)	23- 0/5
035	Exchange transmission – install	23- 0/8
23 11 612	Guide tube for clutch release mechanism – replace - transmission removed -	23-11/1
23 12 056	Radial seal for output flange – replace	23-12/1
087	Dust cover for selector shaft – replace (transmission S6S 560 G)	23-12/3
506	Radial seal for input shaft – replace - transmission removed -	23-12/5
23 21 007	Replacing output flange on transmission	23-21/1

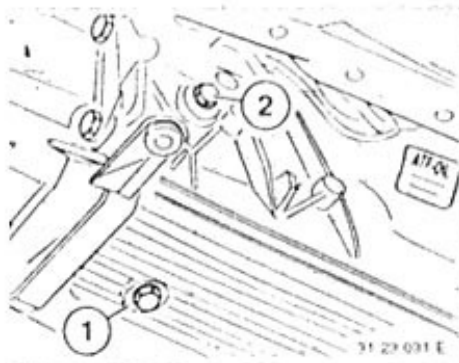
Additional operations – refer to Construction Group Repair Instructions.

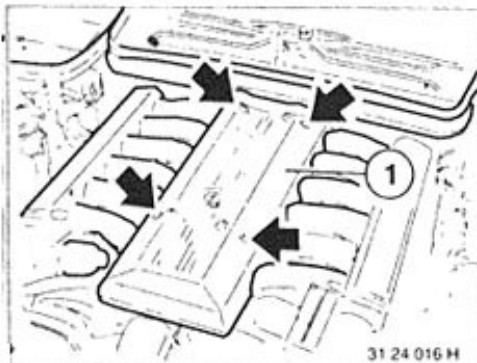
00 11 229 REPLACING OIL IN MANUAL TRANSMISSION

The oil should only be replaced at operating temperature.
Remove drain plug (1) and filler plug (2).
Drain oil.

Note

Dispose old oil.
Clean and screw in drain plug.
Tightening torque*.
Pour in new oil through filler opening.
Refer to label or Operating Fluids for grade of oil.
Oil volume*.
Oil must run out of the filler opening.
Screw in filler plug (2).
Tightening torque*.



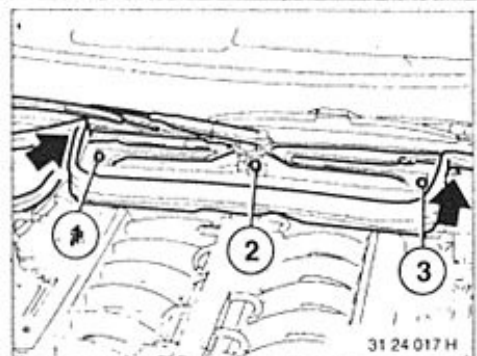


23 00 025 Removing and installing transmission (engine M 70; transmission S 6 S 560 G)

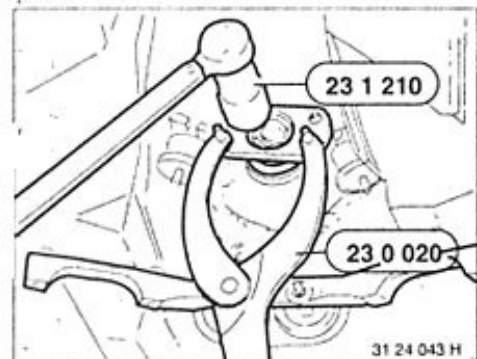
Disconnect ground lead from terminal.

Caution!

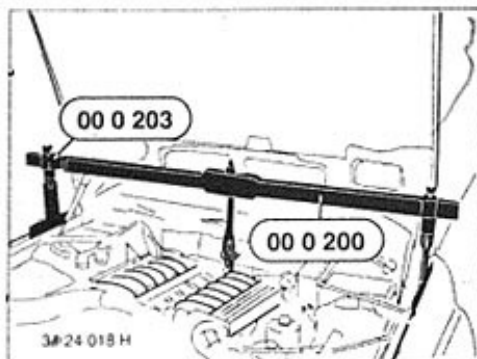
When ground lead is disconnected, fault memories in control units are cancelled. For this reason, first read fault memories with tester and print out any faults in the system. Remove cover (1).



Partially remove rubber seal. Twist mounting (1 ... 3). Remove screws on left and right sides.

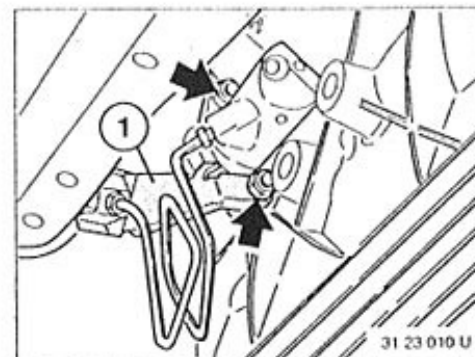


Lift off trim (4) and microfilter (5).



Caution!

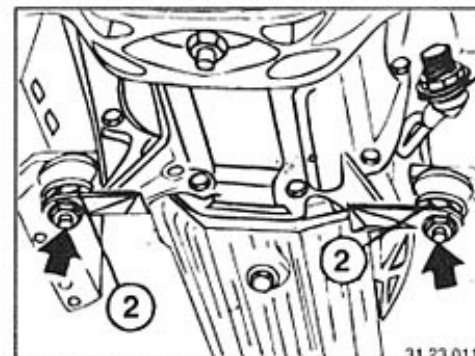
To prevent damage (risk of leaks) to the heating pipe connections on the engine firewall, the engine must be supported on special tool 00 0 200 before the transmission is lowered. Fit special tool 00 0 200 together with extension 00 0 203 and connect to rear lug. Pre-tension chain. Remove complete exhaust system 18 00 020.



Remove clutch slave cylinder from transmission. Pressure line remains connected.

Installation:

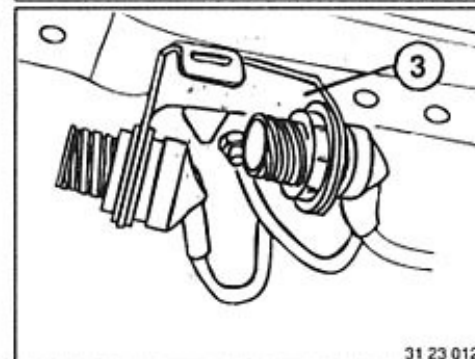
Secure bracket (1) for pressure line at same time.



Remove brackets on left and right for securing exhaust system.

Installation:

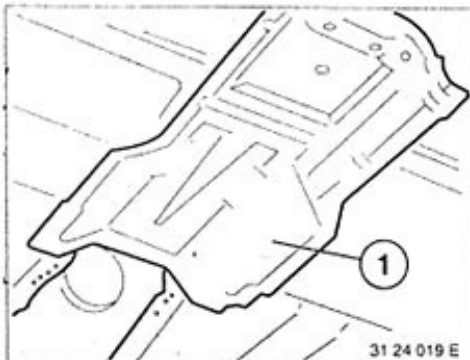
Install rubber mount with lug (2) facing recess.



Unfasten bracket (3) for Lambda oxygen sensor plug.

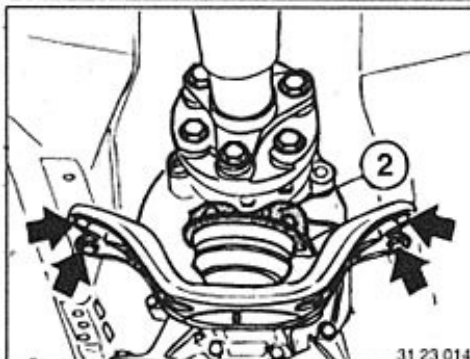


Remove line for Lambda oxygen sensors from brackets.



Remove heat shield (1).

31 24 019 E



Unfasten crossmember from body.
Remove carrier (2) from transmission.

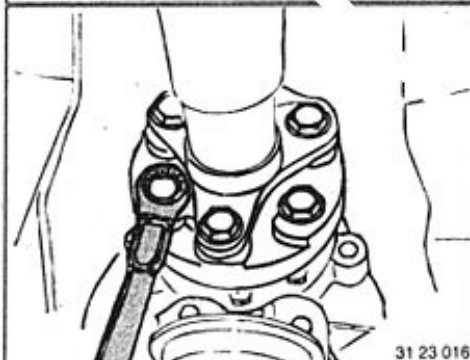
Installation:
Center transmission, see Main Group 26.
Tightening torque 24 71 2AZ*

31 23 014



Remove flexible coupling from transmission.

31 23 015

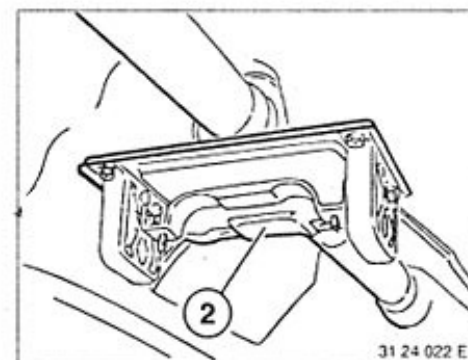


Installation:
Tighten joint disk to correct torque.

Tightening torque 26 11 1AZ*

31 23 016

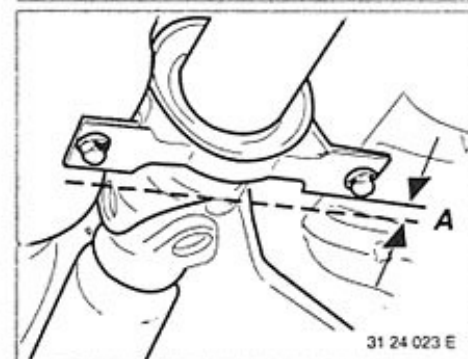
* Refer to Technical Data



Remove exhaust bracket (2).

31 24 022 E

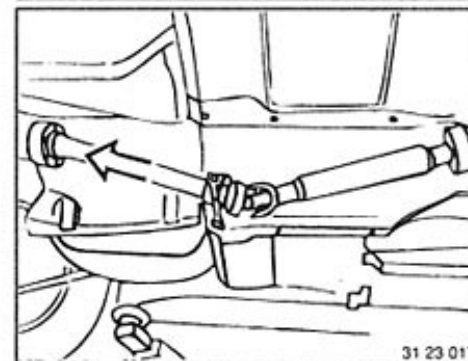
Installation:
Tightening torque*.



Remove center mount.

Installation:
Preload center mount in direction of travel
2 ... 4 mm (A).
Tightening torque 26 11 6AZ*

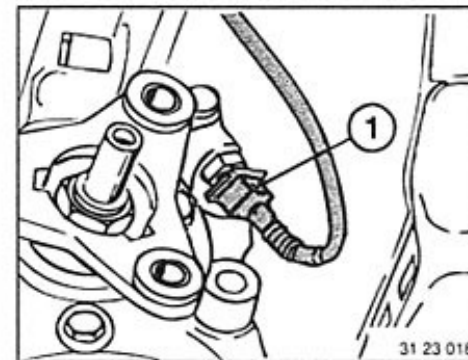
31 24 023 E



Slide propeller shaft in direction of constant
velocity joint.
Tilt propeller shaft on center mount, with-
drawing guide bearing from output spigot on trans-
mission.

Caution!
Tie up propeller shaft.

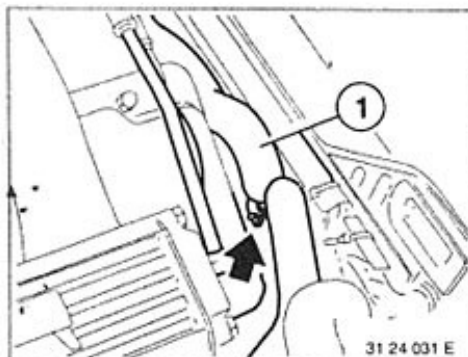
31 23 017



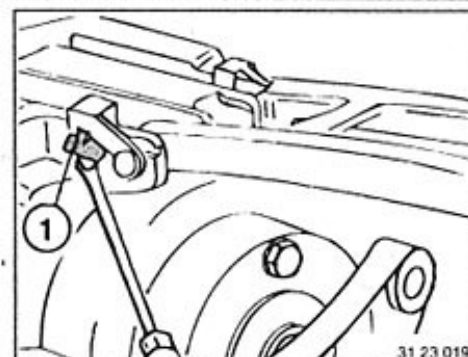
Remove plug (1) for reverse gear.

31 23 018

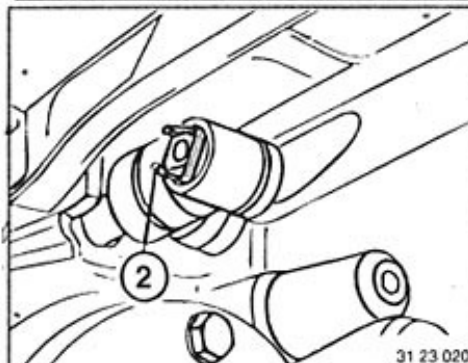
* Refer to Technical Data



Lower vehicle.
Lower engine with spindle on special tool 00 0 200 until there is a gap between engine and rear heating pipe connection (1) of approx. 1 mm (visual check).

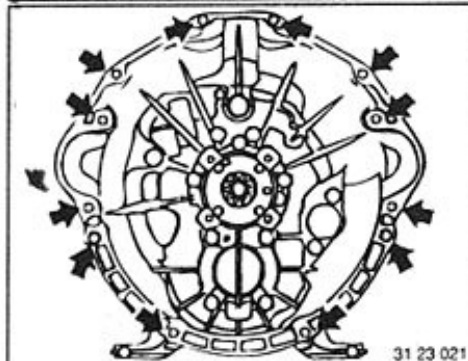


Lever retaining lug (1) out with a screwdriver and twist bolts upwards.
Remove bearing pins on left and right sides.

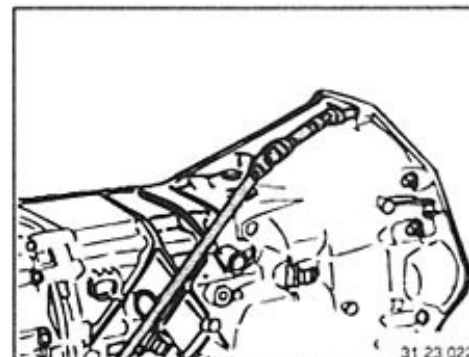


Remove (2) retaining fixture.
Pull out selector rod sideways.

Caution!
Note use of plastic washers.

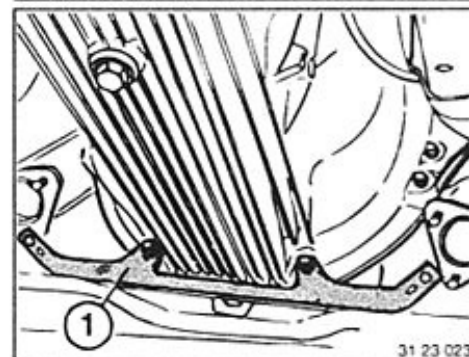


Disconnect transmission from engine flange.

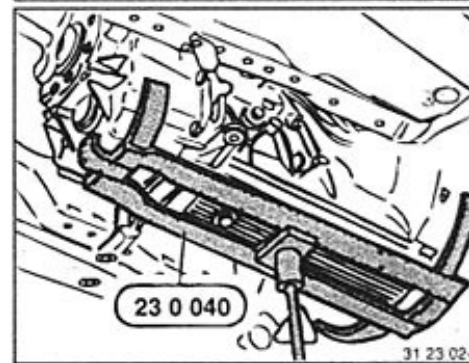


Unfasten Torx screws with Torx insert.
Use approx. 100 cm extension.

Caution!
To avoid increasing the break-loose torque, always fit washers.
Tightening torque 23 00 1A2*

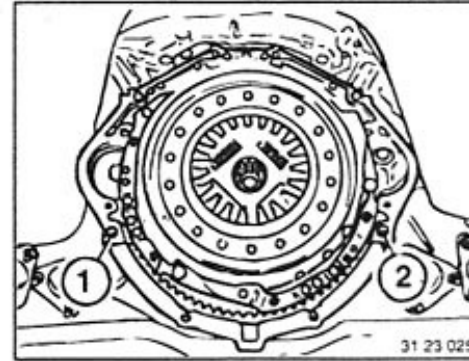


Installation:
Use to secure exhaust bracket (1).



Fit tool 23 0 040 and jack to transmission.
Remove transmission from engine.

Caution!
The lifting fixture may only be moved when fully lowered while transmission is attached.



Caution!
Before fitting the transmission, check that guide sleeves (1 and 2) are fitted. If necessary, convert or replace guide sleeves on transmission.
After installation, check oil level and top up if necessary.

* Refer to Technical Data

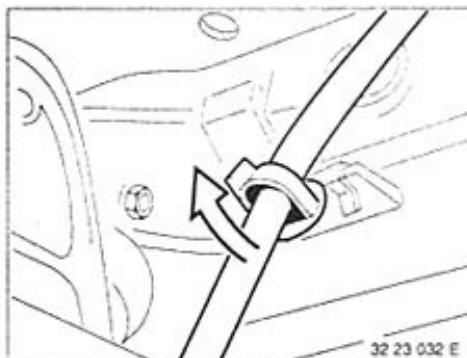
23 00 025 Removing and installing transmission (engine M 60/ transmission S 6 D 420 G)

Disconnect ground lead from battery.

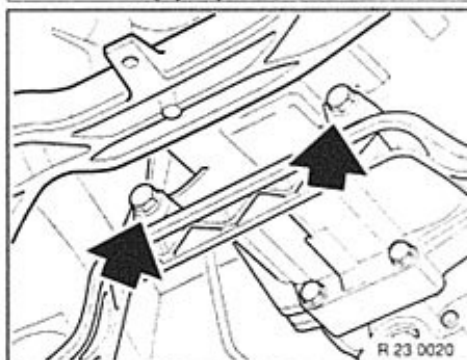
Caution!

When ground lead is disconnected, the fault memories in the control units are cancelled. For this reason, first read out the fault memory using the tester and print out any faults which appear.

Remove complete exhaust system 18 00 020.



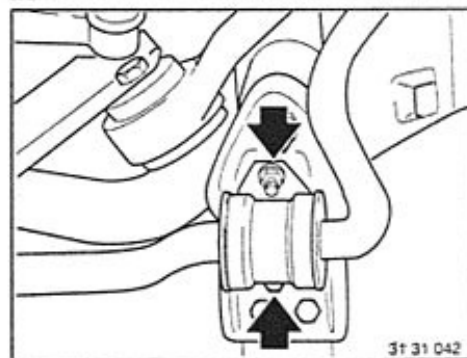
Unclip cable bracket from transmission.



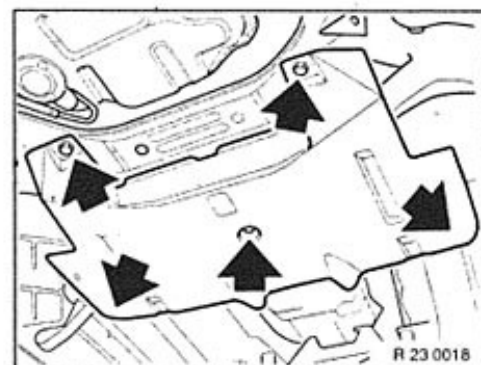
Remove exhaust bracket from transmission.



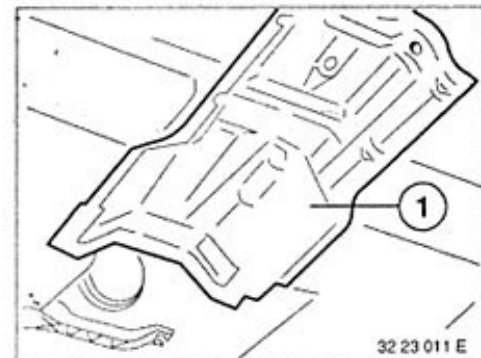
Remove plug for reversing lights.



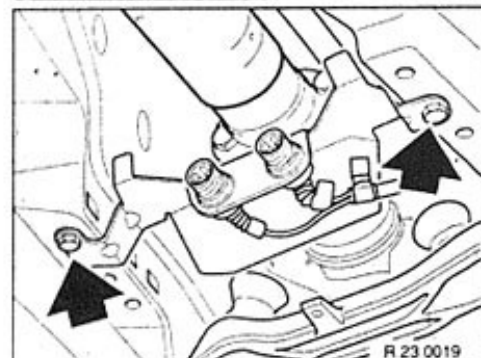
Unscrew stabilizer on left and right sides and leave hanging downwards.



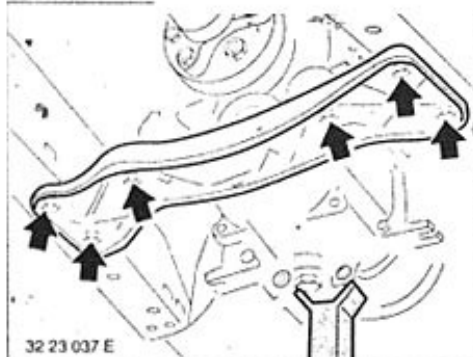
Remove splash guard.



Remove heat shield (1).

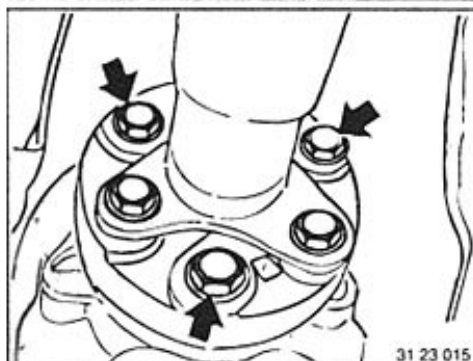


Remove bracket for Lambda oxygen sensor plug.

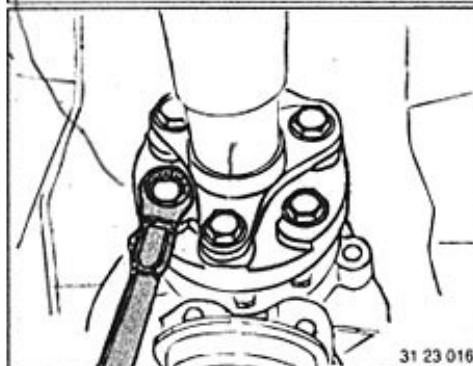


Support transmission.
Unscrew crossmember.

Installation:
Center the transmission (see Gr. 26)
Tightening torque 23 71 2AZ*

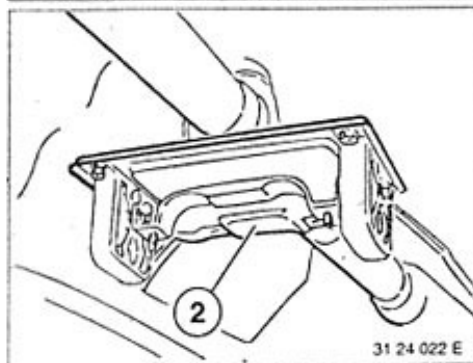


Unscrew joint disk from transmission.



Installation:
Replace stop nuts.
Tightening torque 26 11 1AZ*

Caution!
To prevent torsional stress on joint disk, only tighten nuts on side of flange, provided that the design permits this.



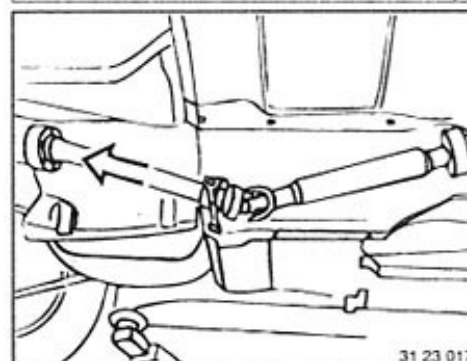
Remove exhaust bracket (2).

* Refer to Technical Data



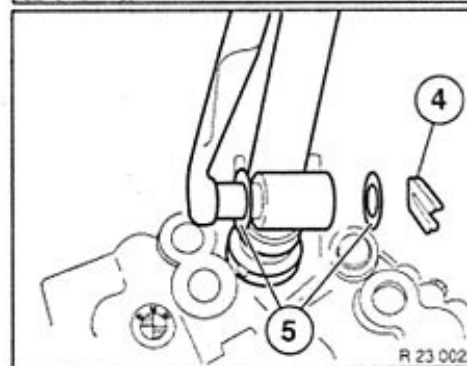
Remove center mount.

Installation:
Preload center mount in direction of travel
2...4 mm.
Tightening torque 26 11 6AZ*



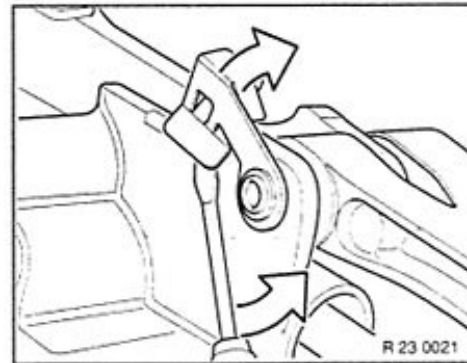
Slide propeller shaft in direction of constant velocity joint.
Tilt propeller shaft on center mount, removing guide bearing from output spigot of transmission while doing so.

Caution!
Tie up propeller shaft.



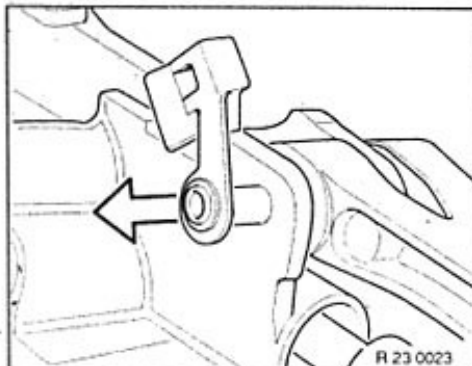
Lower transmission.
Lift out retaining fixture (4) and remove disk (5).
Note O-rings.

Remove selector rod.



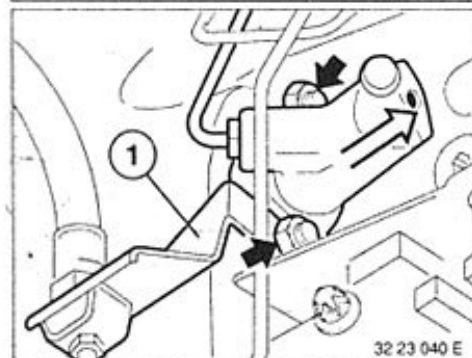
Lift spring off lug of housing with screwdriver and tilt upwards.

* Refer to Technical Data



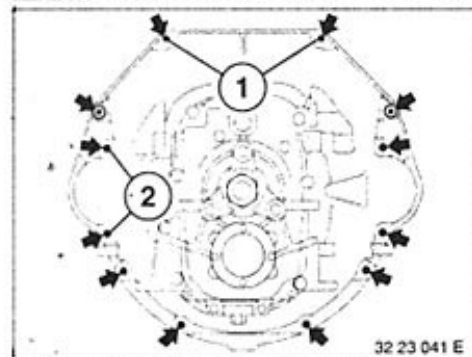
Remove bearing pin.
Remove shift console

Installation:
Apply light coat of Molykote- Longterm 2** grease.



Remove clutch slave cylinder.
Pressure line remains connected.

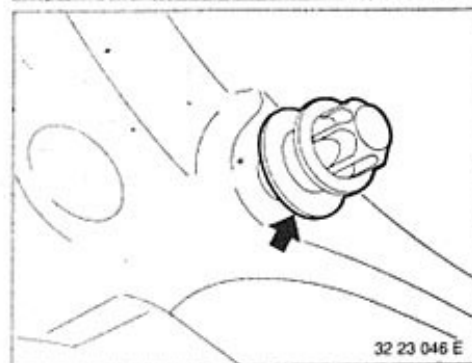
Installation:
Secure bracket (1) for pressure line.



Disconnect transmission from engine flange.
(Torx- screws).

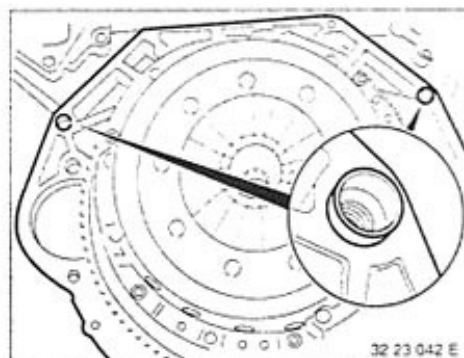
Lift transmission out backwards.

Note:
The screws (1) = Torx E 10
all others are Torx E 12
The screws opposite the starter motor are fitted with nuts on the front side.

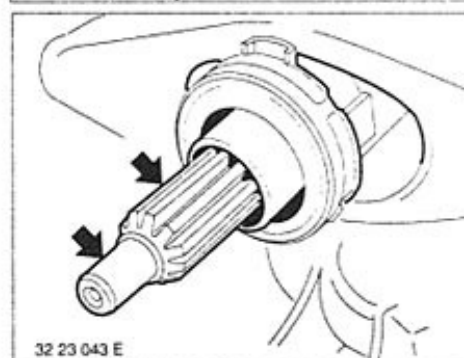


Installation:
Note that washers are fitted to the Torx screws.
Tightening torque 23 00 1AZ*

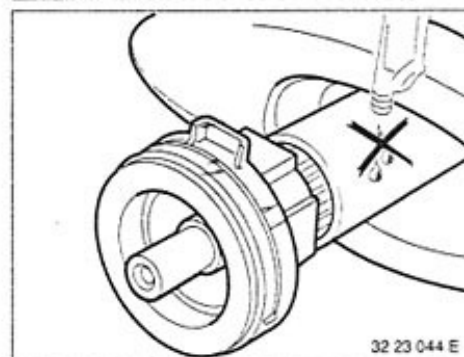
* Refer to Technical Data
** Source of Supply: BMW Parts Service



Note hollow bushes.
If necessary, move or replace hollow bushes on transmission.

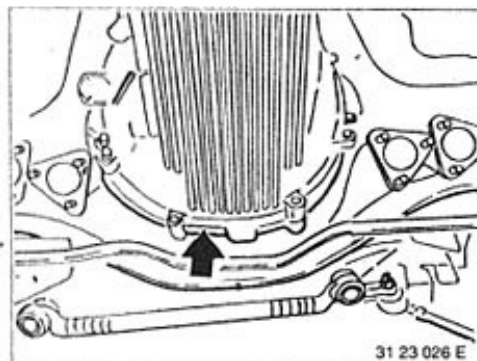


Installation:
Apply light coat of Klüber Mikrglupe GL 261** to wedge tapers and guide spigot.



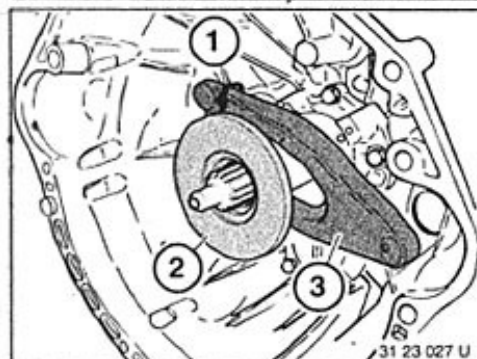
Caution!
From 3. 92, release bearings will be fitted with plastic guides.
No grease should be applied to sliding face of guide sleeve on bearings with plastic guides.
If this advice is ignored, the bearing can stick to the guide sleeve.

** Source of Supply: BMW Parts Service



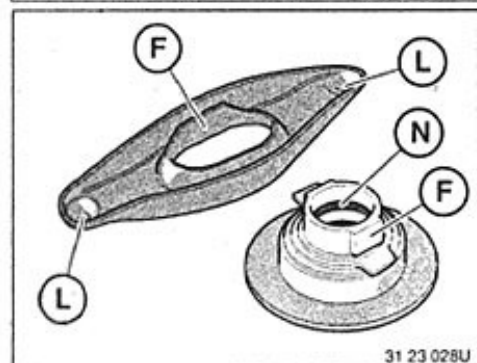
23 00 035 Installing replacement transmission

Remove transmission 23 00 025.
Transmission designation:
BMW Code* on front section of housing.

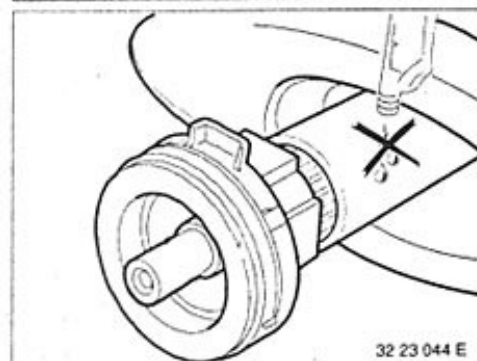


Lift retaining spring (1) off release lever.
Fit release unit (2) and release lever (3).

Note:
Apply light coat of Microlube GL 261** to the taper grooves and guide spigot of the transmission input shaft.

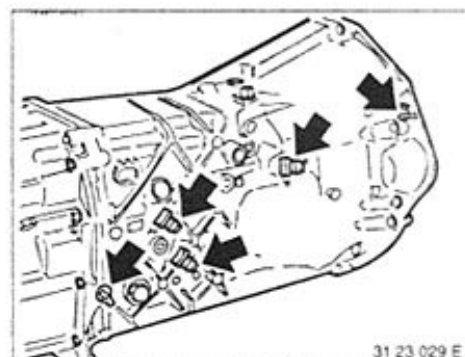


Installation:
Fill lube groove (N) with Molykote Longterm 2.
Apply light coat of Molykote Longterm 2** grease to guides (F) and bearings (L).
If this advice is ignored, the bearing can seize on the guide sleeve.

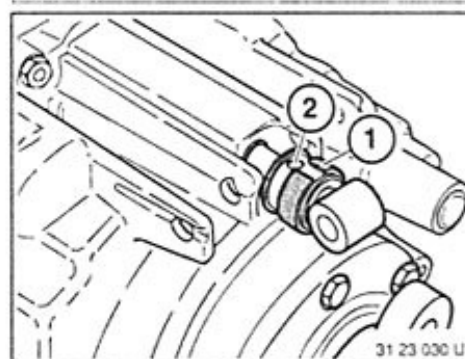


Caution!
From 3. 92, release bearings are being fitted with plastic guides.
No grease should be applied to sliding face of guide sleeve on bearings with plastic guides.
If this advice is ignored, the bearing can seize on the guide sleeve.

* Refer to Parts Catalogue
** Source of Supply: BMW Parts Service



Fit mounts on Lambda oxygen sensor line.

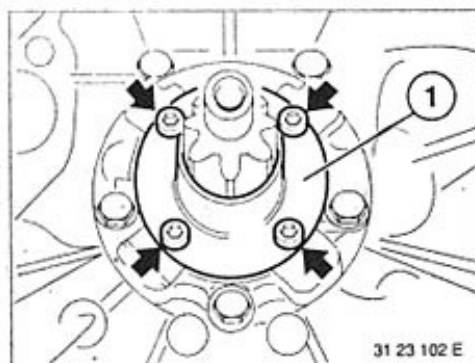


Fit selector rod joint.
Slide back retaining sleeve (1).
Drive out cylinder pin (2).

Caution!
The transmission is supplied with an oil fill.
After installation of the transmission, it is then only necessary to perform an oil level check.

**23 11 612 Replacing guide tube for
clutch release mechanism**
- transmission removed -

Remove and install clutch release unit / lever.
This work is described in section on removing, installing or replacing the clutch release unit / lever.
Refer to 21 51 000.



Unfasten screws.
Lift up guide tube (1).

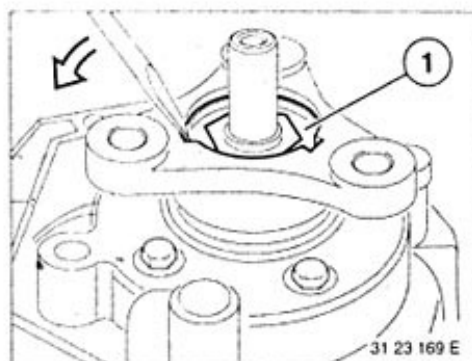
Installation:
Tightening torque 10 Nm *

23 12 056 Replacing radial seal for output flange

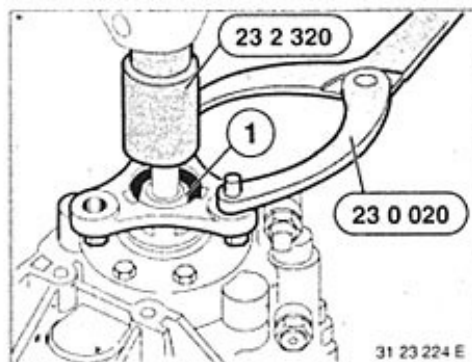
Remove front propeller shaft and center mount.

Tie propeller shaft to one side.

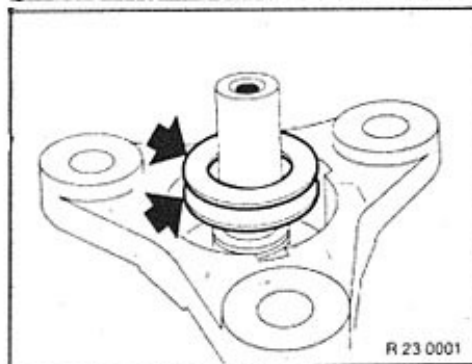
This work is described in section on removing and installing the complete propeller shaft. See 26 11 000.



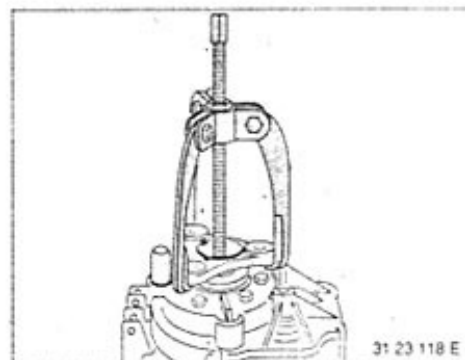
Lift out retaining plate (1).



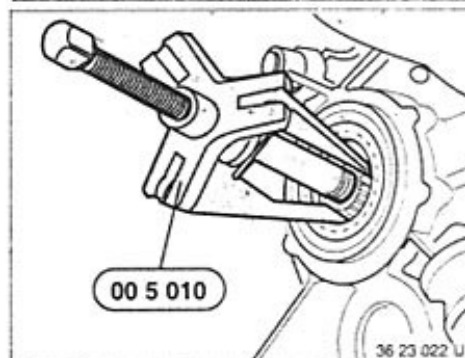
Brace output flange with special tool 23 0 020. Use socket wrench insert 23 2 320 to unfasten collar nut (1).



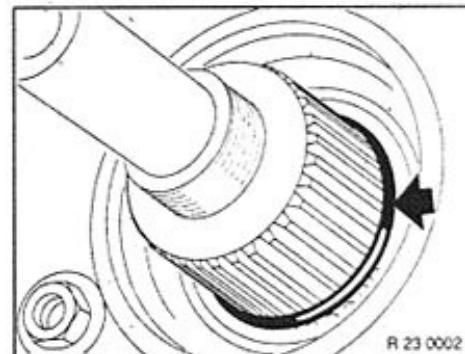
Note:
Two washers are located beneath the collar nut.
Refit spacers of same thickness.



Remove output flange with standard extractor tool.

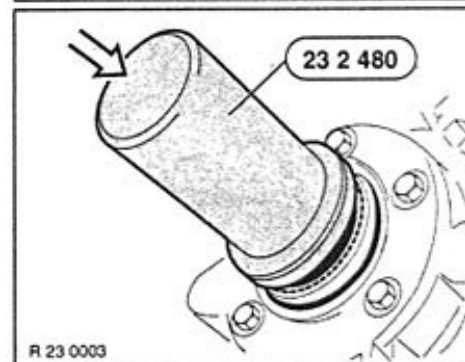


Remove radial seal with special tool 00 5 010.



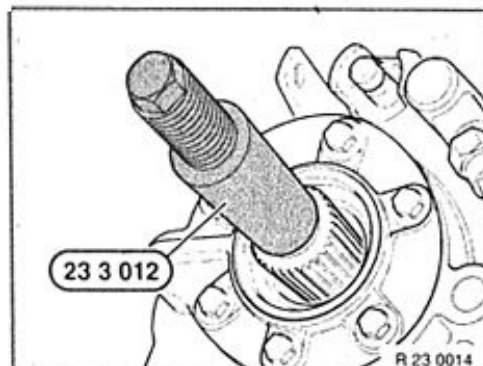
Only on transmission S6S 560 G:

Fit new O-ring to the output shaft

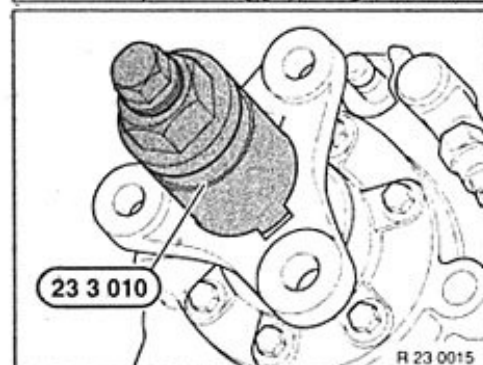


Coat sealing lip of radial seal with oil. Drive radial seal firmly home with special tool 23 2 480.

Caution!
Use plastic hammer to drive home.

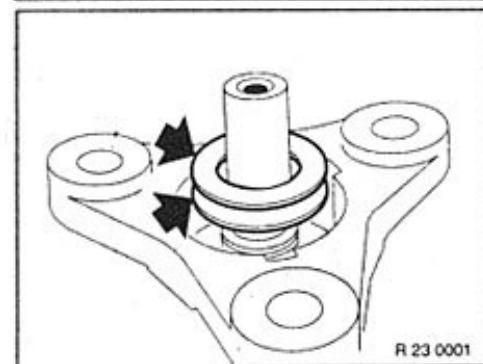


Screw spindle 23 3 012 of special tool 23 3 010 to the output shaft.

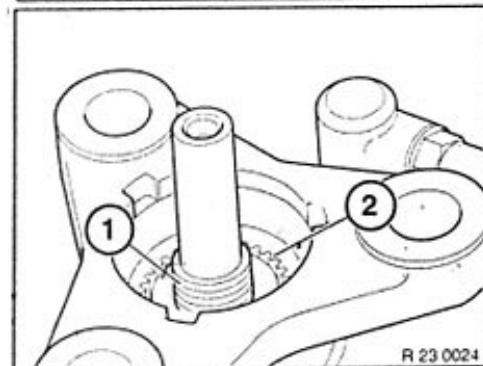


Apply oil to taper shaft.
Fit output flange top spline and attach with special tool 23 3 010.
(Brace output flange with special tool 23 0 020).
Tightening torque 180 ... 200 Nm.

Remove special tool.

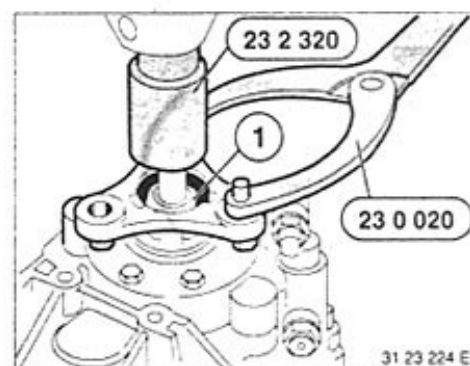


Install shims (1) (2 off).



Coat thread (1) with screw retaining compound Loctite 243.

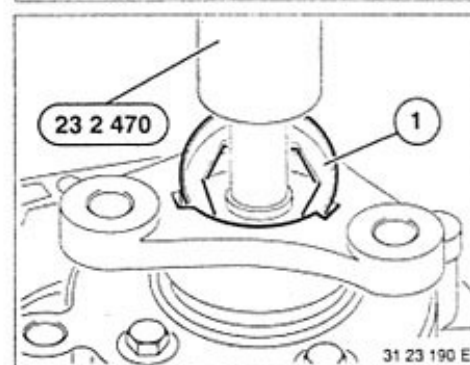
On transmission S6S 420G,
also coat locating face (2) with Loctite 518 for sealing purposes.



Brace output flange with special tool 23 0 020.
Tighten collar nut (1) with socket wrench insert 23 2 320.

Tightening specification:

1. 190 Nm preload
2. loosen
3. 120 Nm tighten



Drive new retaining plate (1) into place with special tool 23 2 470.

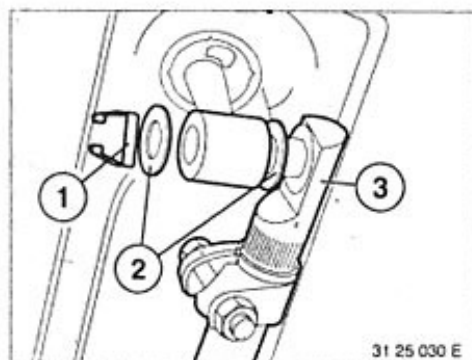
23 12 087 Replacing gaiter on selector shaft (transmission S6S 560 G)

Remove front propeller shaft and center bearing.

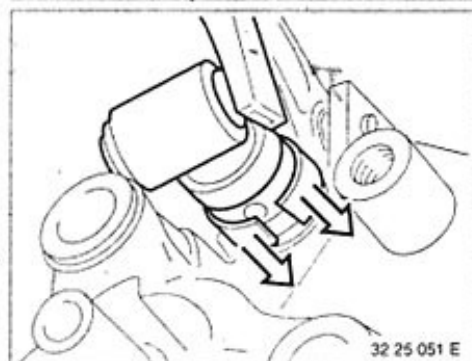
Tie propeller shaft to one side.

This work is described in the section on removing and installing the complete propeller shaft.

See 26 11 000.



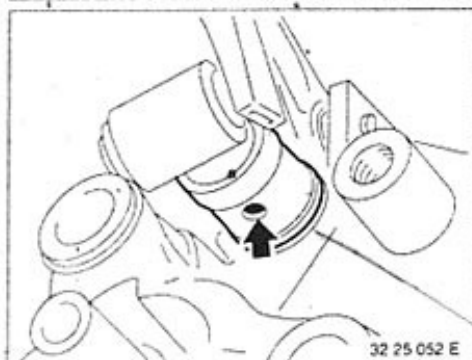
Lift out retaining fixture (1).
Remove disk (2).
Remove selector rod (3).



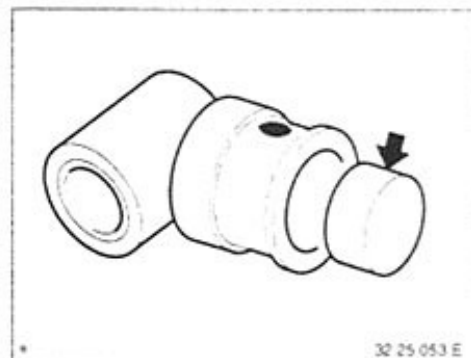
o Removing selector rod joint

Select " R " gear.

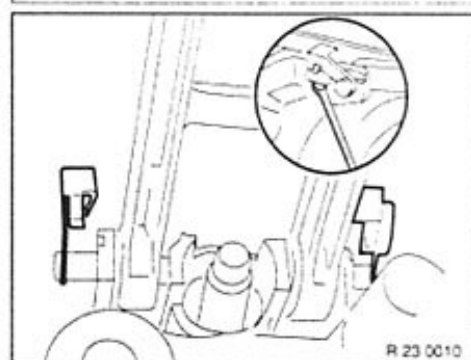
Lift retaining sleeve out of groove and slide forwards.



Drive out pin.
Withdraw selector rod with joint.



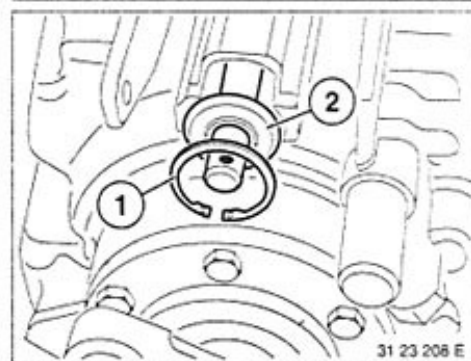
Installation:
Inspect damping disk in the joint,
replacing if necessary.



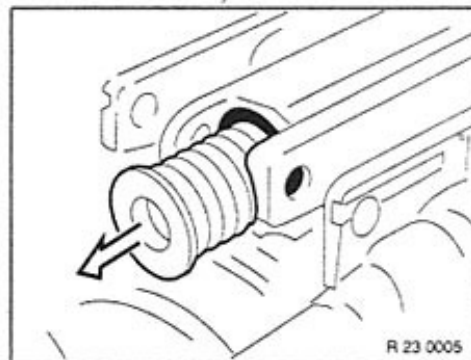
o Replacing gaiter.

Lift retaining flugs on retaining pins in shift console with a screwdriver and bend clips upwards.

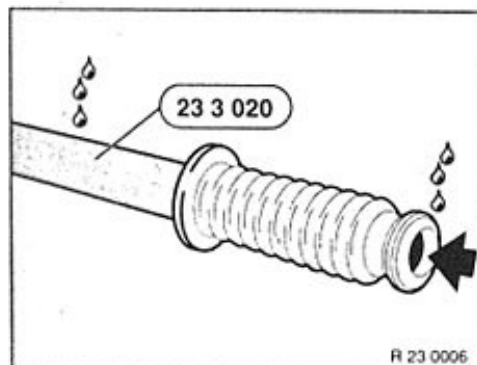
Withdraw bearing pin.



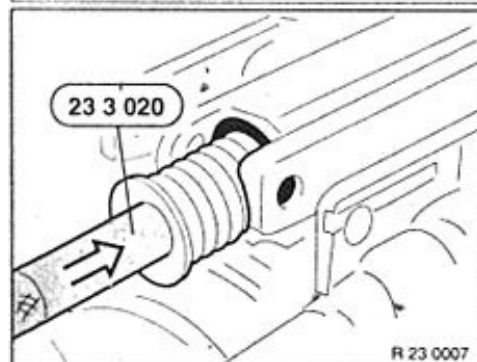
Move selector rod into idle setting.
Lift out retaining ring (1).
Remove disk (2).



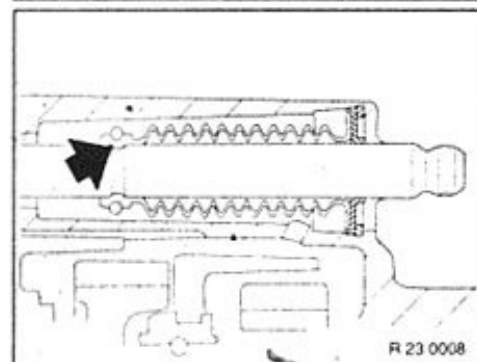
Remove gaiter.



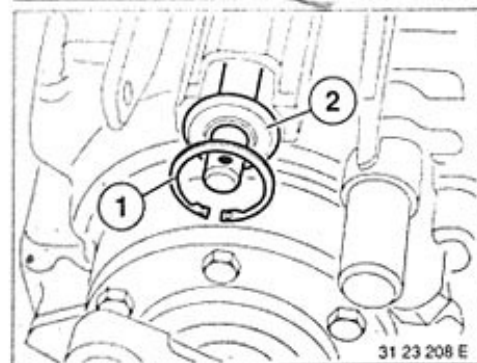
Apply light coat of oil to inside edge of gaiter beside hose spring.
Slide special tool 23 3 020 into gaiter.



Slide gaiter firmly home on selector shaft with special tool 23 3 020.



Grip gaiter.
Slowly unscrew special tool 23 3 010.
Pull gently on gaiter to check that the gaiter on the hose spring has engaged in the groove on the selector shaft.



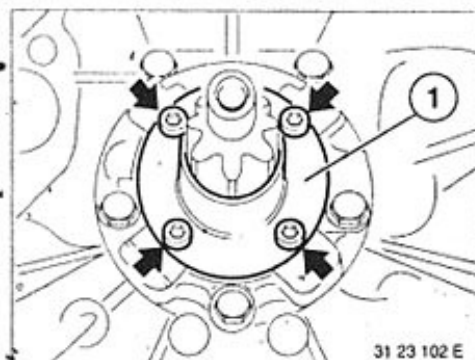
Fit disk (2).
Install retaining ring (1).

23 12 506 Replacing radial seal on input shaft

- transmission removed -

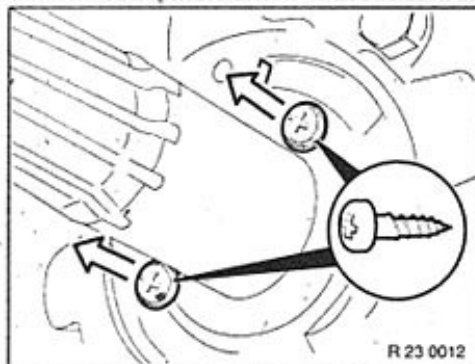
Clutch release mechanism / remove and install lever.

This work is described in the section on removing, installing or replacing the clutch release mechanism / lever.
See 21 51 000.



Remove guide tube (1).

Installation:
Tightening torque 10 Nm *

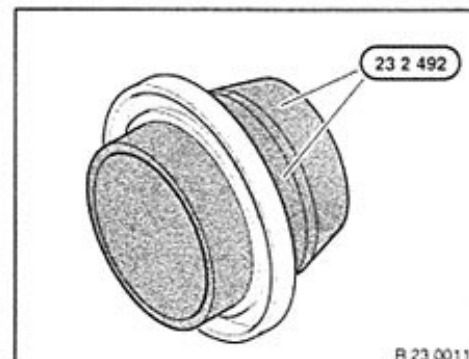


o Removing radial seal.

Locate bores in radial seal with a scribing tool and punch out.

Insert suitable size of self-tapping screw in the holes.
Remove radial seal by pulling self-tapping screws (pliers).

Caution!
Do not damage the surface of the shaft



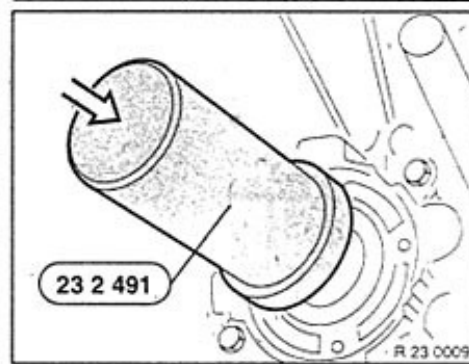
o Installing radial seal

Assemble cap and sleeve of special tool 23 2 492.

Coat radial seal with oil and slide onto sleeve.
Remove cap.



Slide sleeve and radial seal onto input shaft.



Drive radial seal firmly home with special tool 23 2 491.

Remove special tool 23 2 492 (sleeve) from input shaft.

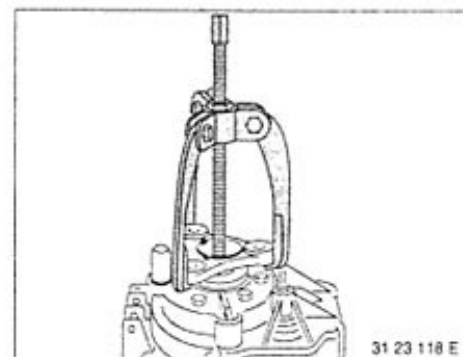
Caution!
Use plastic hammer to drive seal home.

Note:

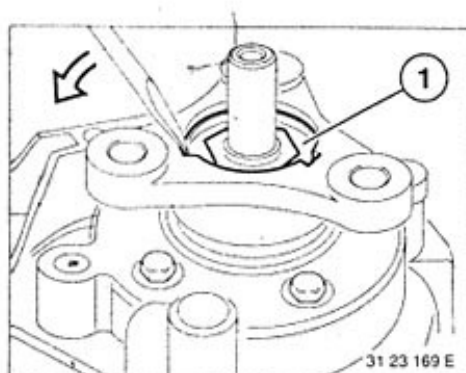
After installation of the transmission it may be necessary to check the oil level.

23 21 007 Replacing output flange on transmission

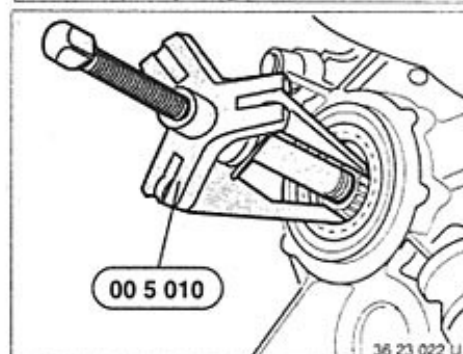
Remove front propeller shaft and center bearing, see 23 00 022.



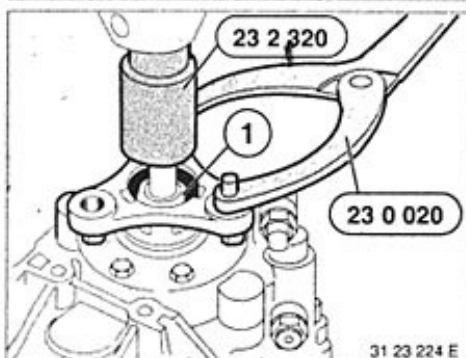
Remove output flange using standard extractor tool.



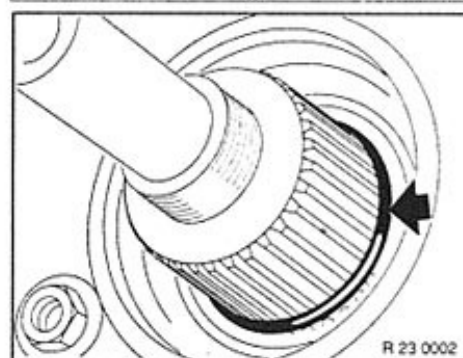
Lift out tab washer (1).



Remove radial seal using special tool 00 5 010.

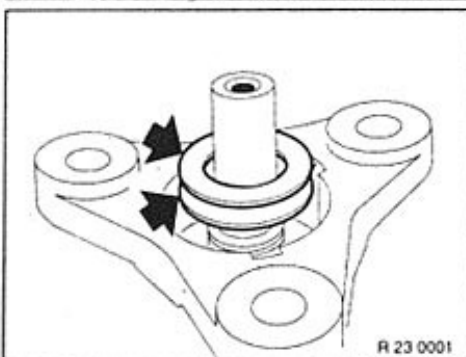


Brace output flange with special tool 23 0 020. Use socket wrench insert 23 2 320 to unfasten collar nut (1).

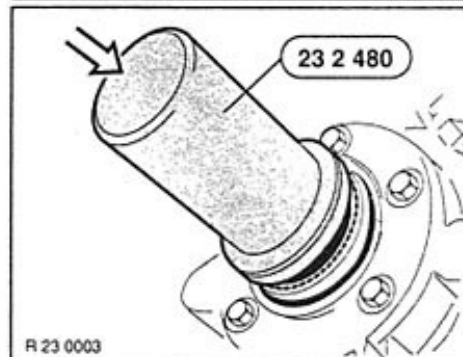


Only on transmission S6S 560G:

Fit new O-ring to the output shaft

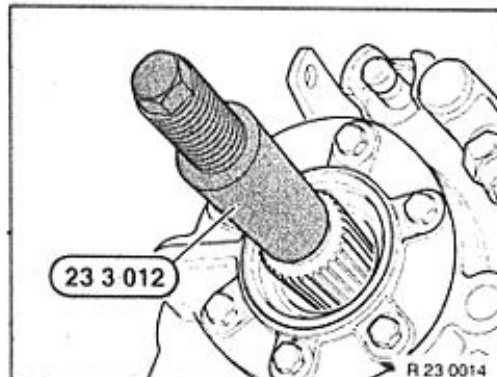


Remove spacers (2 off).

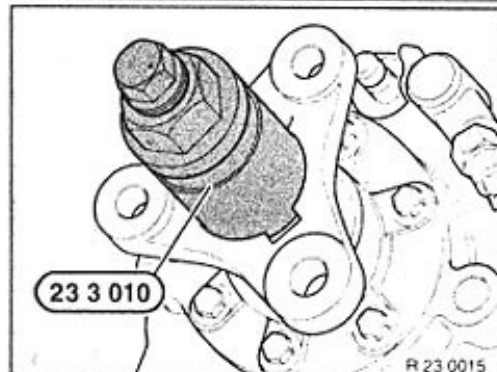


Apply coating of oil to sealing lip of radial seals. Drive radial seal down flush using special tool 23 2 480.

Caution!
Use plastic hammer to drive seal home.

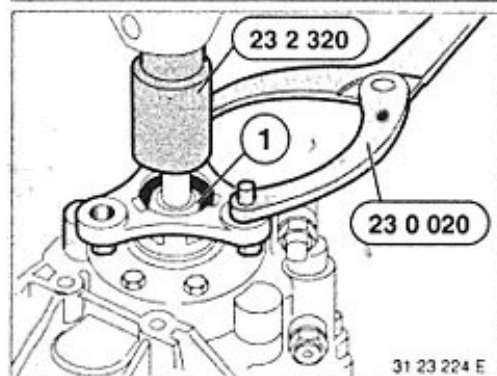


Screw spindle 23 3 012 of special tool 23 3 010 onto the output shaft.



Coat taper shaft with oil.
Place output flange on spline and mount using special tool 23 3 010.
(Brace output flange with special tool 23 0 020).
Tightening torque 180 ... 200 Nm.

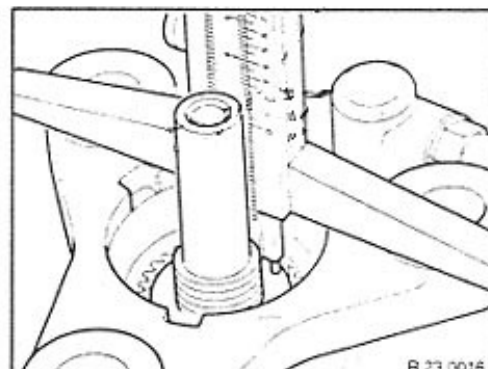
Remove special tool.



Screw on collar nut and press flange down once again.

Tightening torque 180 ... 200 Nm.

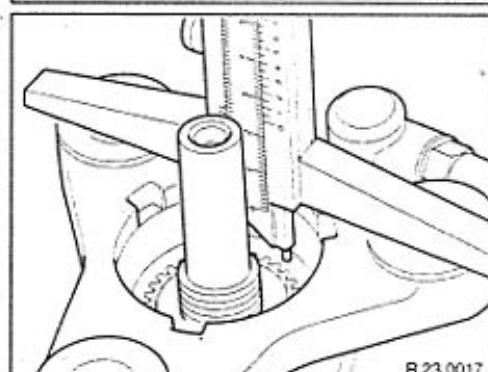
Remove collar nut once again.



o Calculate thickness of shims (2 off).

Determine dimension "A" between face of flange and step on the output shaft.

Example: "A" = 26.6 mm



Determine dimension "B" between face of flange and locating face of collar nut.

Example: "B" = 24.1 mm

Example of calculation:

Transmission S6S 560 G

A = 26.6 mm
minus B = 24.1 mm
Difference = 2.5 mm

Minus clearance 0.05 ... 0.14 mm

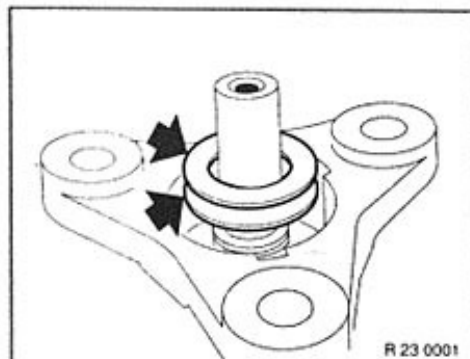
Total thickness of shim: 2.45 ... 2.36 mm

Transmission S6D 420 G

A = 26.2 mm
minus B = 22.7 mm
Difference = 3.5 mm

Minus clearance 0.05 ... 0.22 mm

Total thickness of shim: 3.45 ... 3.28 mm

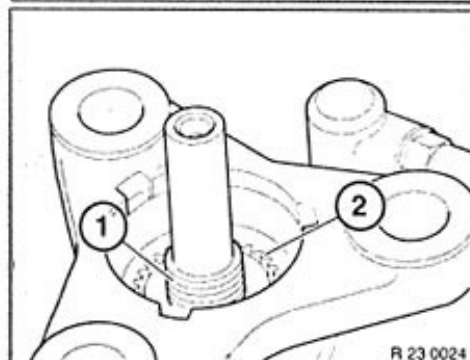


Example:

Transmission S6S 560 G:
Required thickness of shim = 2.4 mm
Thickness of shim 1.1 and 1.3 mm

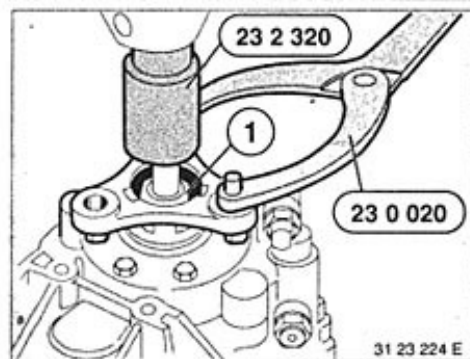
Transmission S6D 420 G:
Required thickness of shim = 3.4 mm
Thickness of shim 2.0 and 1.4 mm

Insert shims.



Coat thread (1) with Loctite 243 screw adhesive.

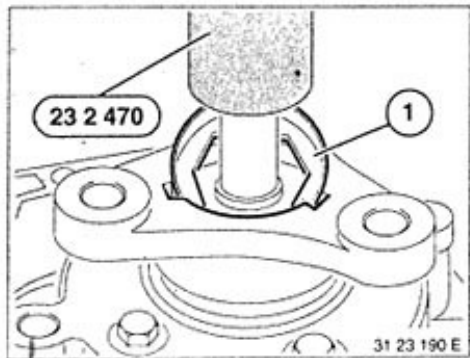
On transmission S6S 420G:
also coat locating face (2) with Loctite 518 for sealing purposes.



Brace output flange with special tool 23 0 020.
Use socket wrench insert 23 2 320 to tighten collar nut (1).

Tightening specification:

1. 190 Nm initial tightening torque
2. loosen
3. 120 Nm tightening torque



Drive in new tab washer (1) with special tool 23 2 470.