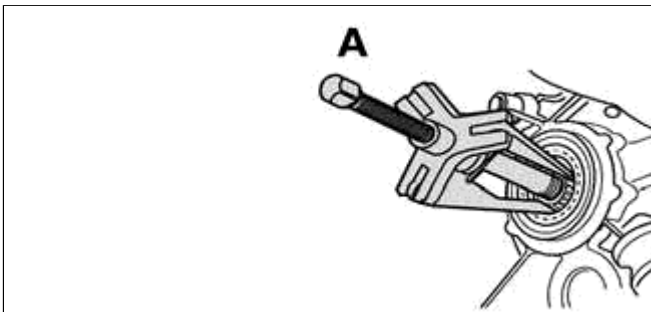


General

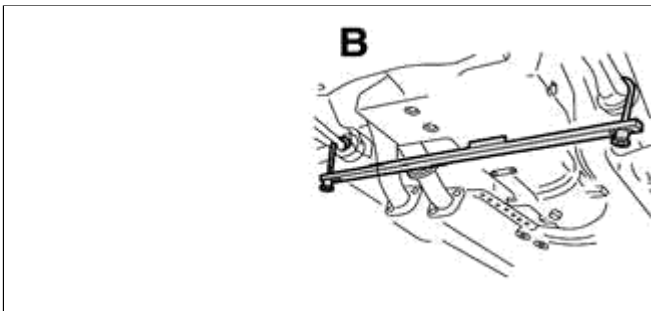
This repair group covers external transmission service, including removal and installation of the transmission unit. Internal transmission repair is not covered. Special press tools and procedures are required to disassemble and service the internal geartrain.

Special tools

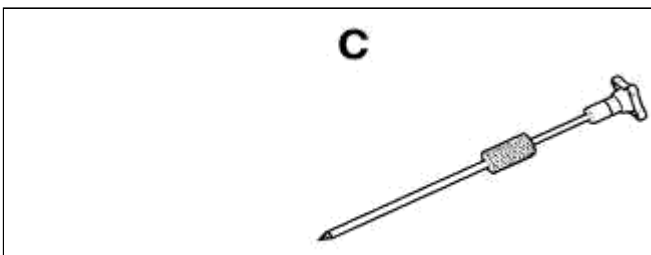
BMW specified tools are required for removal and installation of the manual transmission, as well as the removal and installation of seals at the transmission input, output, and selector shafts. If these tools are unavailable, equivalent tools may be substituted.



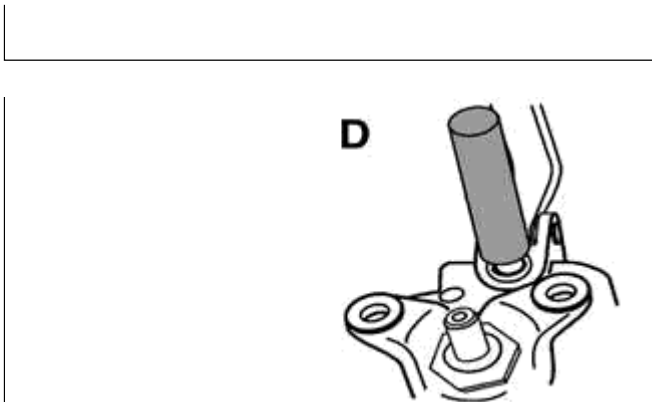
- ◀ Seal puller BMW 00 5 010



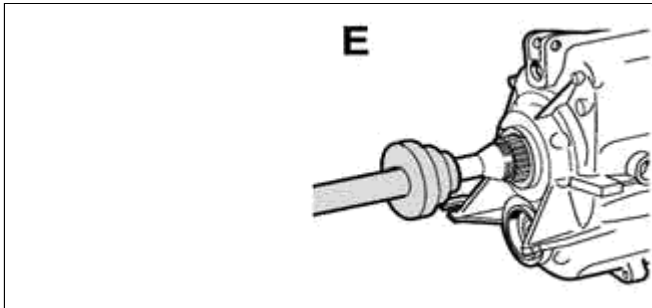
- ◀ Engine support bracket (lower) BMW 11 8 022



- ◀ Input shaft seal puller (slide hammer) BMW 23 0 490



◀ Selector seal drift BMW 23 0 22



◀ Output seal drift BMW 23 2 300

Manual transmissions used are based on engine application. Consult ⇒ [200 Transmission-General](#) for transmission application information. ⇒ [Table a. Manual transmission gear ratios](#) lists gear ratio specifications.

Note:

Do not rely on forged casting numbers for transmission code identification.

Table a. Manual transmission gear ratios

Transmission	Getrag S5D 250G	ZF S5D 280Z	ZF S5D 320Z
Gear Ratios:			
1st	4.23	4.21	4.21
2nd	2.52	2.49	2.49
3rd	1.66	1.66	1.66
4th	1.22	1.24	1.24
5th	1.00	1.00	1.00
reverse	4.04	3.85	3.85

Transmission Fluid Service

Manual transmissions installed in the 3 Series are normally filled with a "Lifetime" manual transmission fluid (BMW MTF LT-1) and do not require periodic fluid changes. Transmissions filled with MTF LT-1 lifetime oil are identified with a yellow label near the transmission fill plug labeled "Lifetime Oil MTF-LT-1".

Transmission fluid level, checking

Checking the transmission fluid level involves simply removing the side fill plug and inserting a finger into the hole to check the fluid level. If the fluid level is up to the bottom of the fill hole (finger is wetted by transmission fluid), the level is correct.

Transmission fluid, replacing

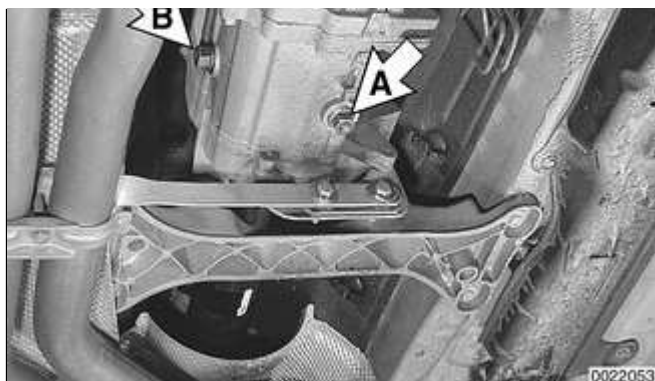
- Drive vehicle for a few miles to warm transmission.
- Raise and safely support vehicle to access drain plug.

CAUTION!

Make sure the car is stable and well supported at all times. Use a professional automotive lift or jack stands designed for the purpose. A floor jack is not adequate support.



Place a drain pan under transmission and remove drain plug (A) at bottom of transmission.



- ◆ Install and torque drain plug.
- ◆ Remove fill plug (**B**) from side of transmission.
- ◆ Slowly fill transmission with fluid until fluid overflows fill hole.
- ◆ Install and torque fluid fill plug.nothing

Fluid capacity	
Getrag transmission	1.0 liter (1.1 US qts)
ZF transmission	1.2 liters (1.3 US qts)

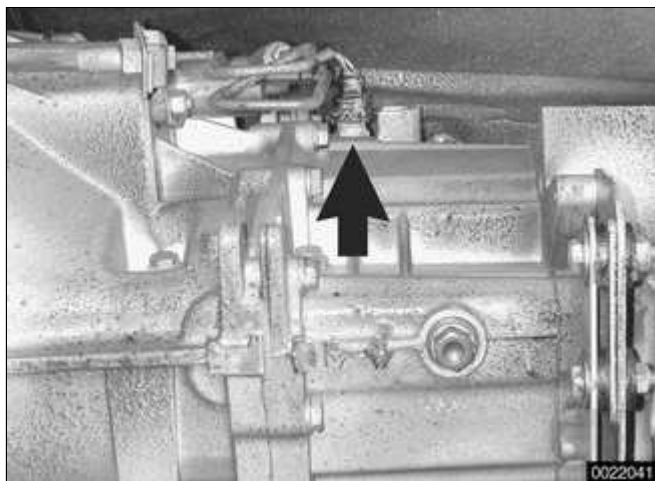
Getrag transmission	1.0 liter (1.1 US qts)
ZF transmission	1.2 liters (1.3 US qts)

Tightening torque	
Transmission drain or fill plug	50 Nm (37 ft-lb)

Transmission drain or fill plug	50 Nm (37 ft-lb)
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Transmission Service

Back-up light switch, replacing



- Raise and safely support vehicle to access back-up light switch. Unscrew switch from transmission.

Note:

- ◆ *The back-up light switch (arrow) on Getrag transmissions is in the left side of the transmission.*
- ◆ *The back-up light switch on ZF transmission is in the right front of the transmission.*

- Install new switch.

Tightening torque	
Back-up light switch to transmission	20 Nm (15 ft-lb)

Back-up light switch to transmission	20 Nm (15 ft-lb)
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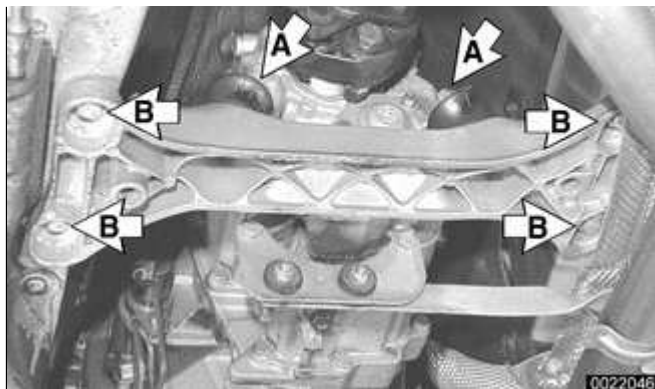
- Check transmission fluid level before lowering vehicle.

Selector shaft seal, replacing (transmission installed)

- Raise and safely support vehicle.
- Support transmission with transmission jack.



- On rear wheel drive cars:



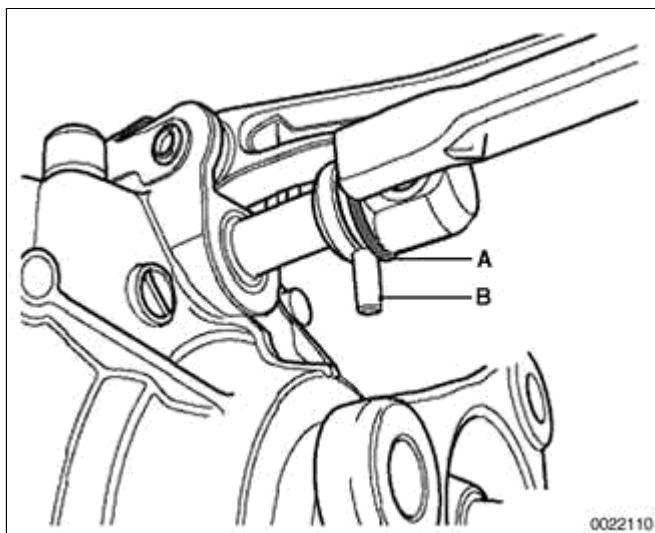
- ◆ Remove driveshaft. See ⇒ [260 Driveshaft](#).
- ◆ Remove transmission mount bolts (A).
- ◆ Remove transmission crossmember bolts (B) and tilt down rear of transmission.



- ✦ On all wheel drive cars:
 - ◆ Remove front and rear driveshafts. See ⇒ [260 Driveshaft](#)
 - ◆ Remove transfer case crossmember bolts (arrows) and remove transfer case. See ⇒ [270 Transfer Case](#).

CAUTION!

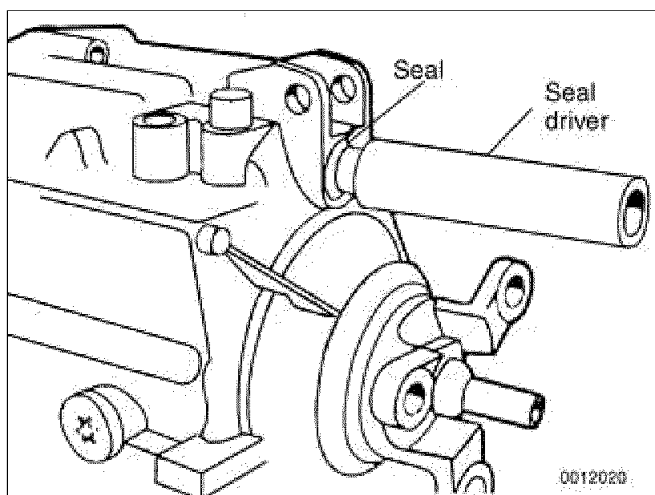
Tilting the engine to lower the transmission can lead to damage to various components due to lack of clearance.



- ✦ Working at rear of selector shaft, pry snap ring (A) out of groove with a small screwdriver. Push snap ring towards gear selector rod joint and drive out pin (B).



- ✦ Carefully pry out selector shaft oil seal with a narrow seal remover or small screwdriver.



✦ Coat new selector shaft seal with transmission fluid. Drive new seal in flush with housing. Use BMW special seal installation tool 23 1 140 or equivalent and a soft-faced (plastic) hammer.

- Installation is reverse of removal, noting the following;
- ◆ Install driveshaft using new lock nuts.
- ◆ Check transmission oil level, topping up as necessary.

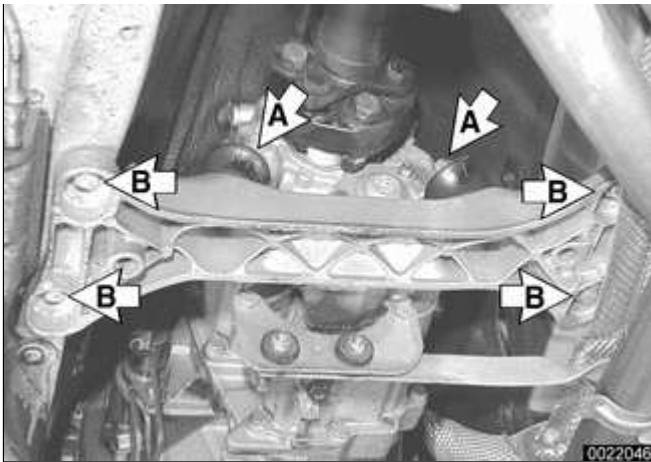
Tightening torques

Center bearing (driveshaft) to body	21 Nm (15 ft-lb)
Clamping sleeve (driveshaft)	10 Nm (89 in-lb)
Driveshaft to final drive flange	
With U-joint (M10 ribbed nut)	80 Nm (59 ft-lb)
With U-joint (M10 compressed nut)	64 Nm (47 ft-lb)
Flex-disc to driveshaft or transmission flange	
M10 (8.8 grade)	48 Nm (35 ft-lb)

Tightening torques	
M10 (10.9 grade)	60 Nm (44 ft-lb)
M12 (10.9 grade)	100 Nm (74 ft-lb)
Transmission / transfer case crossmember to chassis (M8)	21 Nm (15 ft-lb)
Transfer case to transmission (M10)	41 Nm (30 ft-lb)

Output shaft seal, replacing (transmission installed)

- Raise and safely support vehicle.
- Support transmission with transmission jack.



On rear wheel drive cars:

- ◆ Remove driveshaft. See ⇒ [260 Driveshaft](#).
- ◆ Remove transmission mount bolts (A).
- ◆ Remove transmission crossmember bolts (B) and tilt down rear of transmission.



On all wheel drive cars:

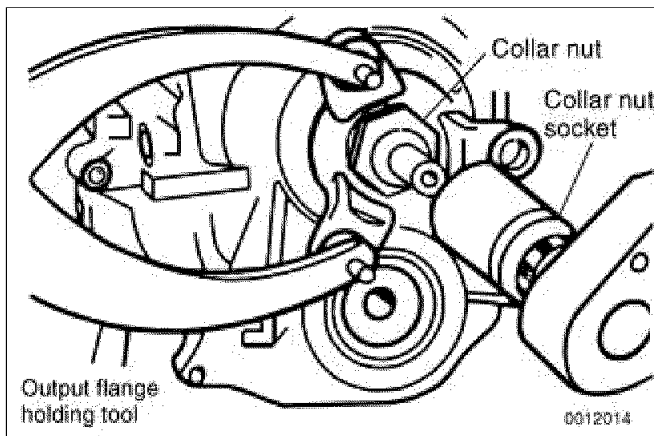
- ◆ Remove front and rear driveshafts. See ⇒ [260 Driveshaft](#)
- ◆ Remove transfer case crossmember bolts (arrows) and remove transfer case. See ⇒ [270 Transfer Case](#).



CAUTION!

Tilting the engine to lower the transmission can lead to damage to various components due to lack of clearance.

- Bend back and remove transmission output collar nut lockplate.

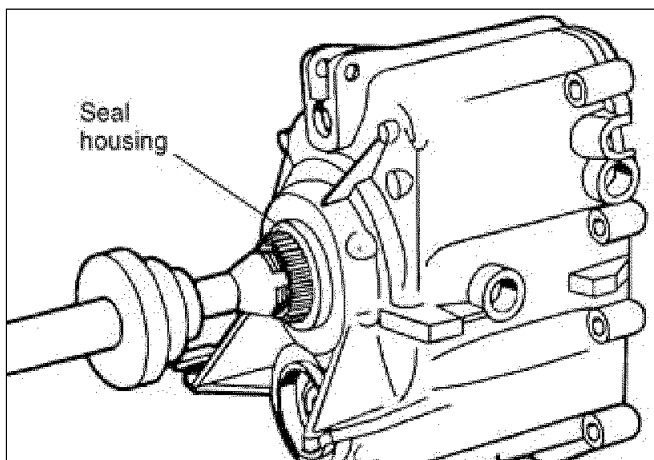


- Remove collar nut with 30 mm thin-walled deep socket. Counterhold output flange to prevent it from turning.

- Remove output flange. If necessary, use a puller.



- Use a seal puller to remove seal from transmission housing



- Coat new seal with transmission fluid and drive into position until it is flush with housing. Use seal driver (BMW special tool 23 2 300) or equivalent.

- Reinstall output flange (and shims, if applicable) to output shaft.

Note:



*On Getrag S5D 250G transmissions
BMW recommends heating the output
flange to about 176F (80C) to aid in
installation. This can be done by
placing the flange in hot water.*

- Coat bearing surface of collar nut with sealer and install nut. Tighten collar nut in two stages. Install new lockplate. Bend tabs into flange grooves.

Note:

BMW recommends the use of a sealer such as Loctite[®] 242 when installing the flange collar nut to prevent oil from leaking past the threads.

- Installation is reverse of removal, noting the following:
- ◆ Install driveshaft using new nuts. See ⇒ [260 Driveshaft](#).
- ◆ Check transmission and transfer case fluid level, if applicable, topping up as necessary.

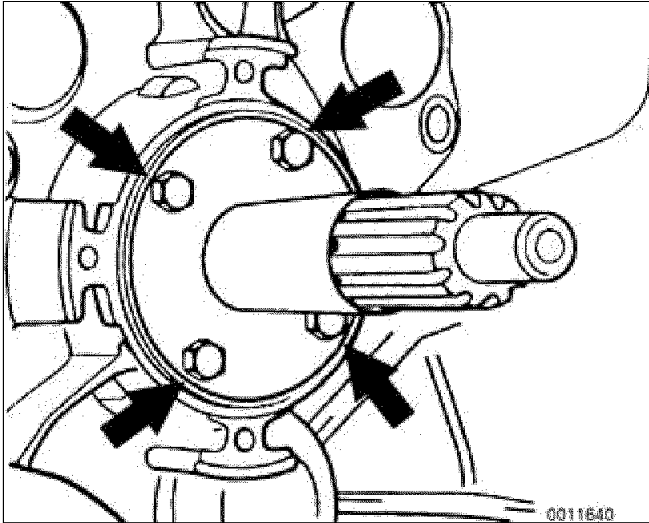
Tightening torque	
Transmission crossmember to chassis	
M8	21 Nm (15 ft-lb)
Transmission output flange to output shaft	
Stage I	190 Nm (140 ft-lb)
Stage II (after loosening)	120 Nm (89 ft-lb)

Input shaft seal, replacing

(transmission removed)

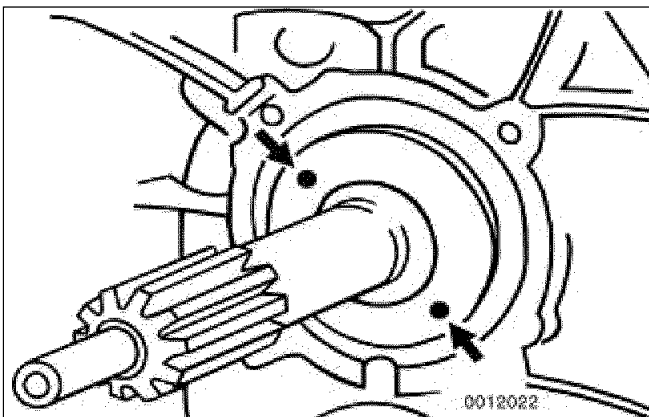
Replacement of the input shaft seal requires the removal of the transmission from the vehicle as described later in this repair group.

- Remove clutch release bearing and release lever from inside bellhousing.



- Remove bolts (**arrows**) for clutch release-bearing guide sleeve, noting bolt lengths (Getrag transmission shown). Remove sleeve and any spacers (shims) under it.

- With transmission on a workbench, remove input shaft seal cover from inside bell-housing.



- Locate two indents (**arrows**) in seal. Thread a slide hammer seal puller at indents, pull seal and remove seal
- Use care not to scratch or damage input shaft. Use a protective sleeve or tape the shaft when removing and installing the seal.
- Lubricate new seal with transmission oil and drive into place using an appropriate drift.
- Thoroughly clean guide sleeve mounting bolts, sealing surfaces, and threads in case. Apply sealer (Loctite[®] 242 or equivalent) to guide sleeve sealing surface and bolts. Reinstall guide sleeve and spacer(s).

Tightening torque	
Guide sleeve to transmission	
M6x12 bolt	10 Nm (89 in-lb)

Transmission Removal and Installation

Removal and installation of the transmission is best accomplished on a lift using a transmission jack. The engine must be supported from above using appropriate support equipment. This allows the engine to pivot on its mounts to access the upper Torx-head bolts at the bellhousing.

WARNING!

- ♦ *Make sure the car is stable and well supported at all times. Use a professional automotive lift or jack stands designed for the purpose. A floor jack is not adequate support.*
- ♦ *The removal of the transmission may upset the balance of the vehicle on a lift.*

Transmission, removing and installing

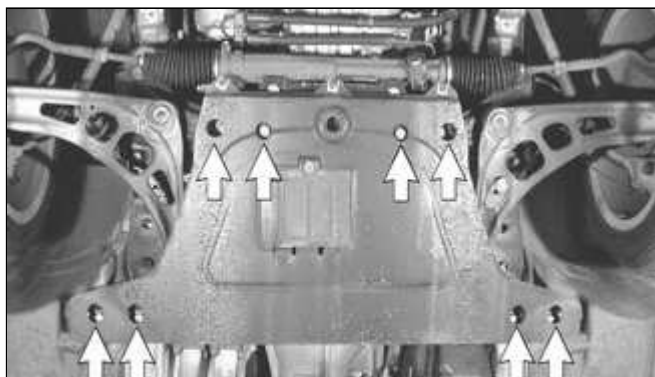
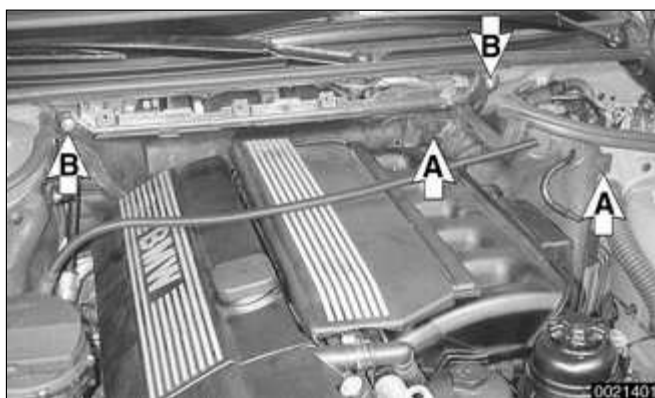
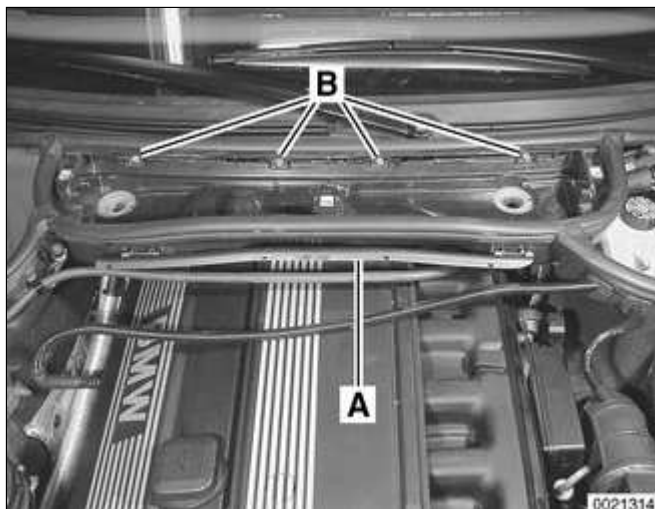
- Disconnect negative (-) cable from battery.

CAUTION!

Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.



- ◀ Remove engine cooling intake hood fasteners (**arrows**) at front of engine compartment.



➤ Remove housing for interior ventilation microfilter.

- ◆ Remove upper cover and microfilter.
- ◆ Open wiring harness loom cover (A) and remove wires.
- ◆ Unfasten screws (B) and remove lower microfilter housing.

➤ Remove heater bulkhead cover.

- ◆ Remove engine compartment side trim panel. Turn locking knobs (A) and slide trim panel from mounting lip.
- ◆ Remove heater bulkhead cover mounting screws (B) and lift cover up and out from firewall.

- Raise and safely support vehicle.

- Remove engine splashguard from underside of vehicle.

➤ Remove front suspension reinforcement bolts (arrows). Remove reinforcement (coupe shown) and front axle subframe.

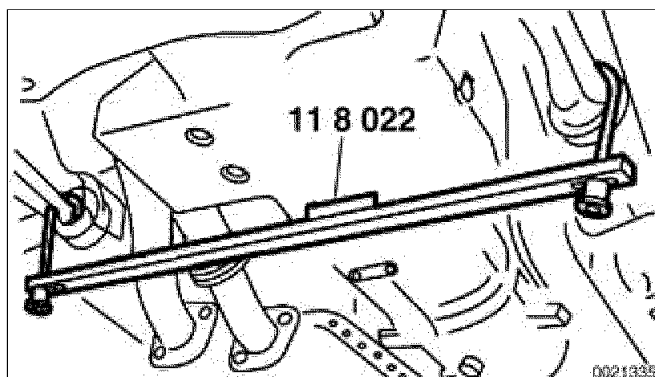
Note:

- ◆ *Tubular style front end reinforcements are used in rear*



wheel drive 3 Series sedans and wagons built up to 11/00 and coupes built up to 10/99.

- ◆ Pan style front end reinforcements are used on rear wheel drive sedans and wagons built after 12/00, coupes built after 11/99 and all convertibles.
- ◆ All wheel drive models require no reinforcement due to the construction of the front subframe.



- ✦ Attach BMW special tool 11 8 022 to left and right lower control arms. Tighten knurled screws until tool makes contact with engine oil pan.
 - Support transmission with transmission jack. Remove reinforcing cross brace from below engine/transmission.
 - Disconnect harness connector from back-up light switch on transmission.
 - Remove exhaust system and heat shield. See ⇒ [180 Exhaust System](#)
 - Remove driveshaft. See ⇒ [260 Driveshaft](#).
 - On all wheel drive vehicles: Remove transfer case. See ⇒ [270 Transfer Case](#).
- ✦ Disconnect shift rod from selector shaft coupling.
 - Disconnect shift console from top





of transmission. See ⇒ [250 Gearshift Linkage](#).

- Unbolt clutch slave cylinder from side of transmission. Do not disconnect fluid hose. Suspend slave cylinder from chassis using stiff wire.

CAUTION!

Do not operate clutch pedal with slave cylinder removed from transmission.

- Loosen knurled screws of BMW special tool 11 8 022 until transmission/engine assembly is just above, but not in contact with fire wall and heater connections.

CAUTION!

Tilting the engine to lower the transmission can lead to damage to various components due to lack of clearance at rear of engine -Remove brake fluid reservoir if necessary.



- Remove transmission mounting Torx-head bolts (**arrows**). Note length and location of bolts.

- Remove transmission by pulling backward until the transmission input shaft clears the clutch disc splines, then pull downwards. Lower jack and remove transmission.



- Installation is reverse of removal, keeping in mind the following:



- ◆ When installing a new transmission, be sure to transfer parts from old transmission if applicable.
- ◆ Thoroughly clean input shaft and clutch disc splines. Lightly lubricate transmission input shaft before installing.
- ◆ Be sure bellhousing dowels (**arrows**) are correctly located.
- ◆ Center rear of transmission in driveshaft tunnel before tightening transmission support bracket.
- ◆ Always replace front end reinforcement mounting fasteners on vehicles equipped with the plate style reinforcement.

Note:

Torx-head mounting bolts should always be used with washers to prevent difficult removal in the future.

- Install driveshaft and preload center bearing bracket. Use new nuts when mounting driveshaft to transmission/flex disc and final drive. See ⇒ [260 Driveshaft](#).
- Refill transmission with appropriate lubricant before starting or towing the car. See ⇒ [Transmission Fluid Service](#) earlier in this repair group.

Tightening torques
Front end reinforcement to chassis and subframe (M10)

Tightening torques	
(tubular style)	42 Nm (31 ft-lb)
(pan style)	59 Nm (44 ft-lb) + 90°
Rubber mount to transmission or bracket nut (M8)	21 Nm (15 ft-lb)
Slave cylinder to transmission	22 Nm (16 ft-lb)
Transmission crossmember to chassis	
M8	21 Nm (15 ft-lb)
Transmission to engine (Torx-head)	
M8	22 Nm (16 ft-lb)
M10	43 Nm (32 ft-lb)
M12	72 Nm (53 ft-lb)
Transmission drain/fill plug	50 Nm (37 ft-lb)