

240 Automatic Transmission

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GENERAL

This section covers maintenance and replacement of the automatic transmission for E39 models.

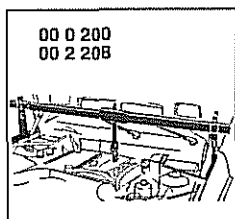
Automatic transmission internal repairs are not covered. Such repairs require special service equipment and knowledge. If it is determined that transmission internal service is required, consult an authorized BMW dealer about a factory reconditioned unit or a transmission rebuild.

CAUTION—

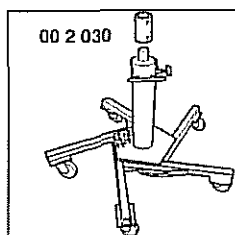
ATF does not circulate unless the engine is running. When towing an automatic transmission vehicle, use a flat bed truck or raise the rear wheels off the ground.

Special tools

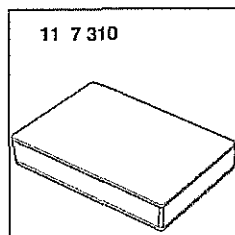
Some special tools are required for the removal and installation of an automatic transmission on the E39 BMW models. While these tools are not absolutely necessary, they are especially helpful when dealing with the removal and replacement of the torque converter.



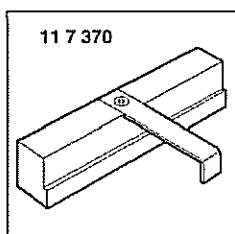
- ◀ Engine support bracket
(Tool No. BMW 00 0 200, 00 0 208)



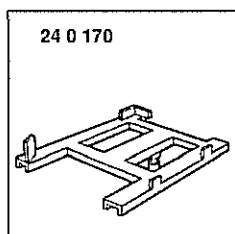
- ◀ Transmission jack
(Tool No. BMW 00 2 030)



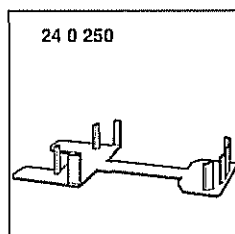
- ◀ Engine support block (V-8 models)
(Tool No. BMW 11 7 310)



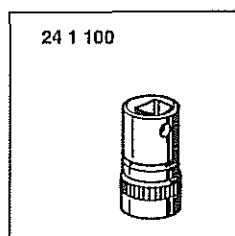
- Engine support block (6-cylinder models)
(Tool No. BMW 11 7 370)



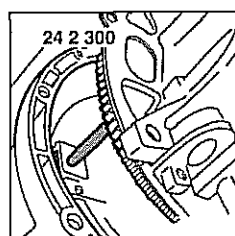
- Transmission support (for use with transmission jack,
A5S 560Z transmission) (Tool No. BMW 24 0 170)



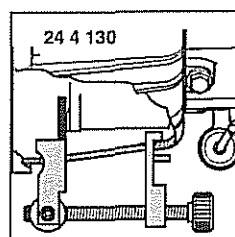
- Transmission support (for use with transmission jack,
A5S 440Z transmission) (Tool No. BMW 24 0 250)



- Torque converter socket
(Tool No. BMW 24 1 100)



- Spline bore alignment tool
(Tool No. BMW 24 2 300)



- Torque converter clamp set
(Tool No. BMW 24 4 130)

Automatic transmission applications

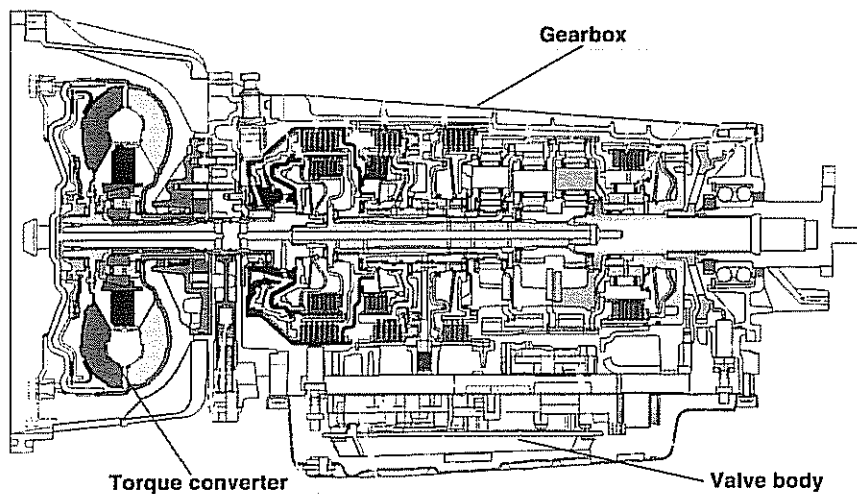
Automatic transmissions are identified by code letters found on a data plate located on the side or rear of the transmission case. See table below for application information.

Automatic transmission applications

Model	Year	Engine	Transmission
528i	to 9/1999	M52	A4S 310R
528i	from 9/1999	M52 TU	A5S 360R
525i	to 3/2001	M54	A5S 390R
525i	from 3/2001	M54	A5S 325Z
530i	to 3/2001	M54	A5S 390R
530i	from 3/2001	M54	A5S 325Z
540i	to 1/1997	M62	A5S 560Z
540i	from 1/1997	M62 TU	A5S 440Z

TROUBLESHOOTING

Automatic transmission basic components



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The automatic transmission fitted to BMW 5 Series models is comprised of 3 main elements:

- Torque converter capable of torque multiplication at an infinitely variable ratio
- Electrohydraulically controlled valve body
- Gearbox containing 5 forward speeds and reverse

Electronics are used to control the operation of these automatic transmissions. Steptronic transmission functions are also programmed into the transmission control module (TCM). The TCM monitors transmission operation for faults and alerts the driver by illuminating the transmission fault indicator on the instrument panel. Diagnostic trouble codes (DTCs) stored in the TCM may be downloaded and interpreted by trained technicians using special BMW diagnostic equipment.

Some minor automatic transmission problems can be corrected by changing the automatic transmission fluid (ATF) and filter. Begin by checking ATF level and condition. Check to see if the fluid is dirty or has a burned odor indicating overheated fluid. The burned odor may be the results of burned discs in the clutch packs. The friction material from the burned disc can clog valve body passages.

NOTE —

The E39 automatic transmission is not equipped with a dipstick. Checking the ATF level must be done while monitoring the ATF temperature with the engine idling. The BMW dealer is equipped with the special equipment to make this check.

AUTOMATIC TRANSMISSION FLUID (ATF) SERVICE

Automatic transmission fluid (ATF)

The E39 automatic transmission is filled with either Dexron III ATF or Texaco 8072B, a life time oil.

CAUTION—

- Use only the transmission fluid that is approved for use by BMW. All other fluids will cause non warrantable transmission damage.
- Mixing different types of transmission fluids will lead to transmission failure.

NOTE—
The type of transmission lubricant used can be found on a sticker on the transmission pan. Dexron III ATF (black sticker) reads "ATF-Oil". Special life time oil (green sticker) reads "Life-Time Oil". If in doubt, consult an authorized BMW dealer for alternate fluid use and current information regarding transmission operating fluids.

ATF level, checking

Check ATF level if there is evidence of a leak, a complaint related to fluid level or after transmission repairs.

The automatic transmission is not equipped with a dipstick. Checking the ATF level requires that the transmission be at operating temperature during the checking procedure.

NOTE—
Vehicle must be level throughout tests.

- Drive vehicle to warm up ATF to operating temperature.
- Connect BMW diagnostic scan tool DISplus, MoDiC, GT1 or equivalent to determine transmission oil temperature.

ATF level checking

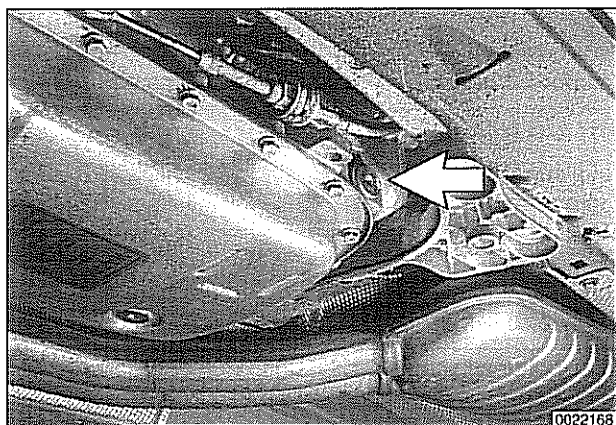
Fluid temperature	30° - 50° C (85° - 120° F)
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- With engine running, switch on air conditioning to increase engine idle speed.
- Apply parking brake.
- While applying foot brake firmly move gear shift selector lever through all gear positions, pausing in each gear briefly.

- Raise and safely support vehicle.

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.



- With engine running and selector lever in PARK, remove filler plug (arrow) (A5S 360R transmission shown, refer to other illustrations for location of filler and drain plugs on other transmissions).

- If a small stream of fluid runs out of the filler hole the level is correct.
- If no fluid leaks out when plug is removed, fluid level is too low. Add ATF fluid until it starts to overflow.
- Install filler plug using a new sealing ring.

WARNING—

Hot ATF can scald. Wear eye protection and protective clothing and gloves during the check. If the transmission was overfilled, hot ATF will spill from the filler hole when the fill plug is removed.

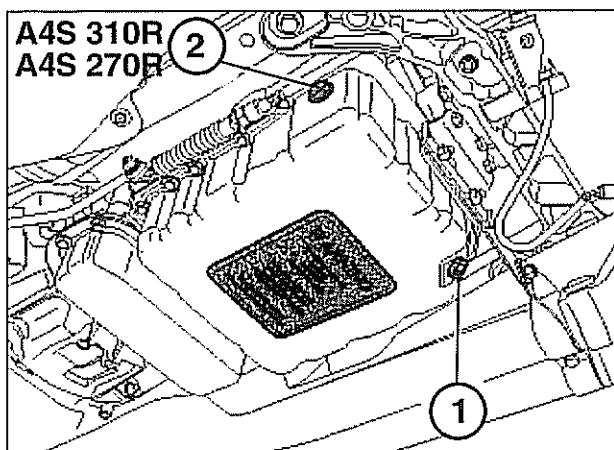
ATF, draining and filling

The procedure given here includes removal and installation of the fluid strainer (filter). Refer to illustrations in **Automatic transmission fluid pan and strainer**.

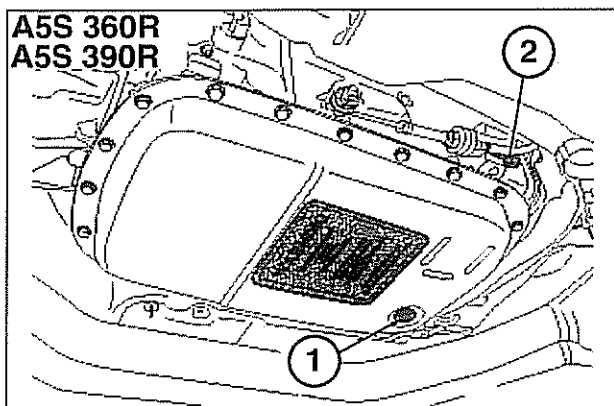
- Remove ATF drain plug (1) and drain fluid into container.

WARNING—

ATF should be warm when draining. Hot ATF can scald. Wear eye protection, protective clothing and gloves.

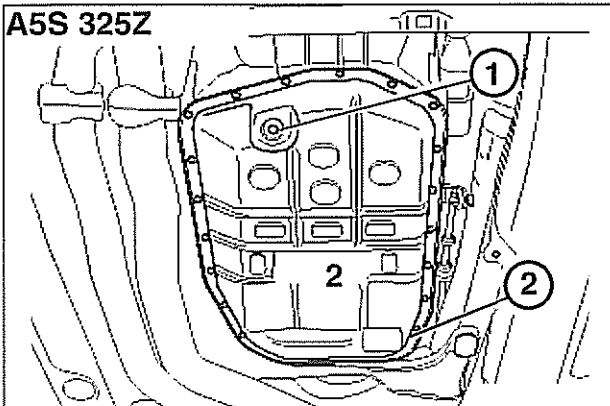


- Remove transmission pan mounting bolts and remove pan.
- Remove pan gasket and clean gasket sealing surface.
- Pull ATF strainer from transmission pump housing. If strainer sealing ring remains in pump housing remove using a seal puller.
- Installation is reverse of removal.
 - Always replace seal for drain plug and all gasket(s) and O-rings.
 - Clean sump and sump magnet(s) using a lint-free cloth.
 - Tighten transmission pan bolts in sequential order.
 - Using filler plug (2), fill transmission with approved ATF.
 - Check fluid level as described earlier.

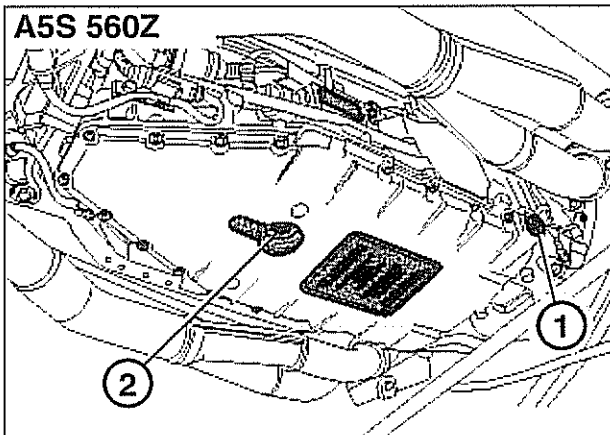


Automatic Transmission

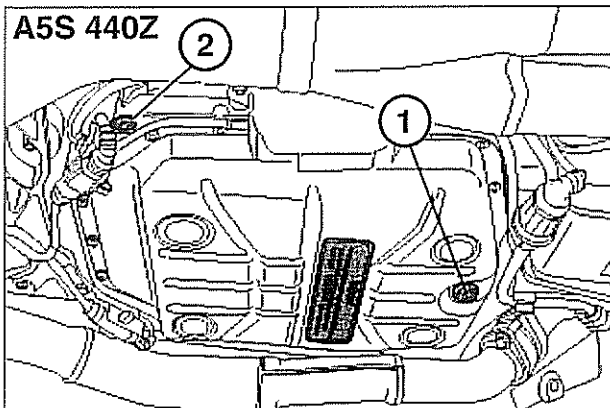
A5S 325Z



A5S 560Z



A5S 440Z

**NOTE —**

Use new ATF pan bolts purchased from BMW. Alternatively, clean old bolts and coat with Loctite® thread locking compound or equivalent.

Automatic transmission fluid capacity**A4S 310R**

with torque converter	7.8 liters (8.3 US qt)
without torque converter	3.3 liters (3.5 US qt)

A5S 360R / A5S 390R

with torque converter	9 liters (9.5 US qt)
without torque converter	4 liters (4.2 US qt)

A5S 325Z (2.5 liter engine)

with torque converter	8.9 liters (9.4 US qt)
without torque converter	6.2 liters (6.5 US qt)

A5S 325Z (3.0 liter engine)

with torque converter	8.7 liters (9.3 US qt)
without torque converter	6.1 liters (6.4 US qt)

A5S 560Z

with torque converter	13.1 liters (13.8 US qt)
without torque converter	5.5 liters (5.8 US qt)

A5S 440Z

with torque converter	9.7 liters (10.2 US qt)
without torque converter	4.0 liters (4.2 US qt)

Tightening torques**ATF drain plug to ATF pan**

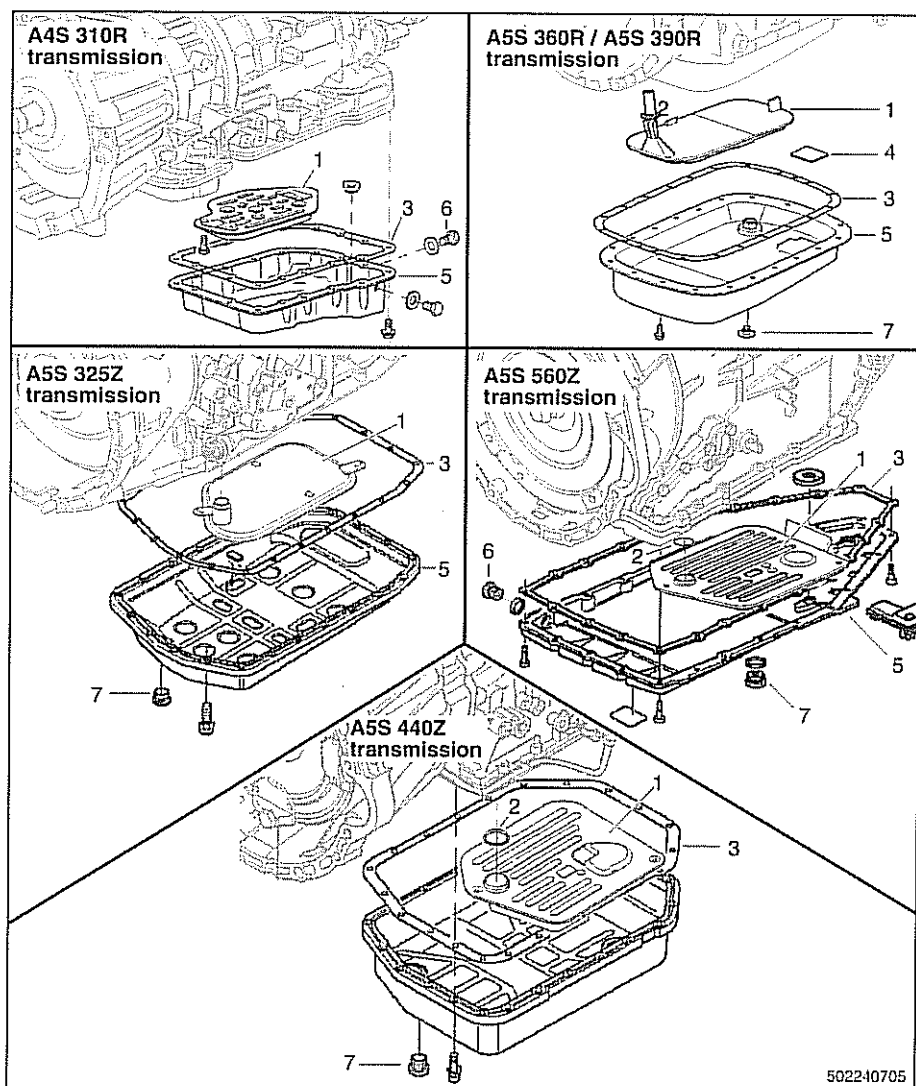
A4S 310R	33 Nm (24 ft-lb)
A5S 360R / A5S 390R (M14)	20 Nm (15 ft-lb)
A5S 325Z	35 Nm (26 ft-lb)
A5S 560Z	50 Nm (37 ft-lb)
A5S 440Z (M16)	30 Nm (23 ft-lb)

ATF fill plug to transmission housing

A4S 310R	25 Nm (18 ft-lb)
A5S 360R / A5S 390R (M14)	20 Nm (15 ft-lb)
A5S 325Z	30 Nm (23 ft-lb)
A5S 560Z	100 Nm (74 ft-lb)
A5S 440Z (M18)	35 Nm (26 ft-lb)

ATF pan to transmission (M6)

A4S 310R	12 Nm (9 ft-lb)
A5S 360R / A5S 390R	10 Nm (7 ft-lb)
A5S 325Z	6 Nm (4 ft-lb)
A5S 560Z	10 Nm (7 ft-lb)
A5S 440Z	10 Nm (7 ft-lb)



Automatic transmission fluid pan and strainer

1. ATF strainer
2. ATF strainer seal
3. Pan gasket
4. Sump magnet
5. ATF pan
6. Filler plug
7. Drain plug

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TRANSMISSION REMOVAL AND INSTALLATION

Removal and installation of the transmission is best accomplished on an automotive lift using a transmission jack. Use caution and safe workshop practices when working beneath car and lowering transmission.

Torx-head bolts are used to mount the transmission to the bellhousing. Be sure to have appropriate tools on hand before starting the job.

WARNING —

Be sure the vehicle is properly supported. The removal of the transmission may upset the balance of the vehicle on a lift.

CAUTION —

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

Transmission, removing and installing

WARNING —

Allow engine and transmission to cool down before starting work on the transmission.

- Disconnect negative (-) cable from battery.

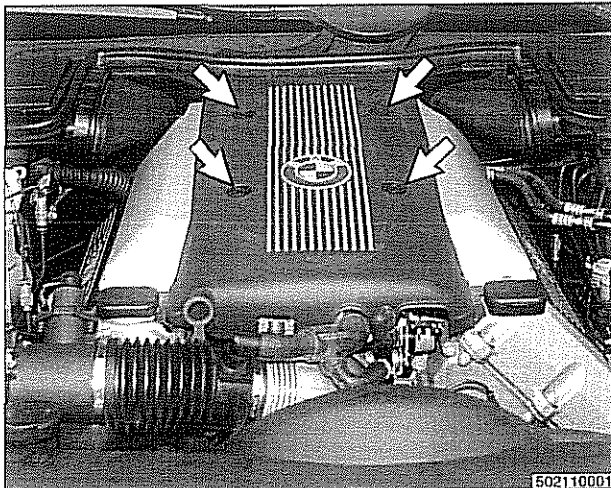
CAUTION —

*Prior to disconnecting the battery, read the battery disconnection cautions given in **001 General Cautions and Warnings**.*

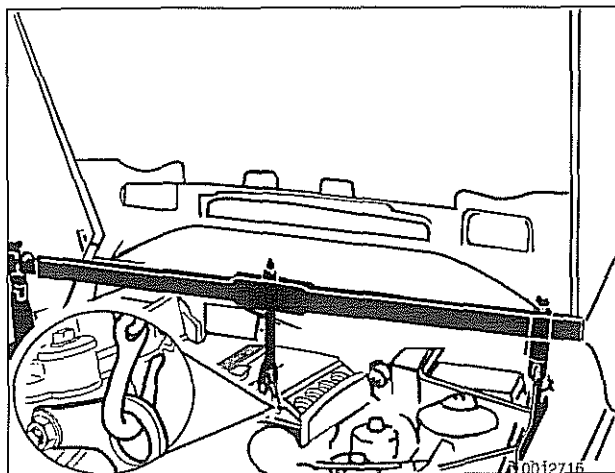


V-8 engine: Remove plastic engine cover.

- Early models: pry out protective caps (**arrows**), then remove nuts securing cover. Lift off cover.
- Later models: depress four studs to release, then lift off cover.



Automatic Transmission



- ◀ Install engine support across engine bay. Raise and safely support vehicle.

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.

CAUTION—

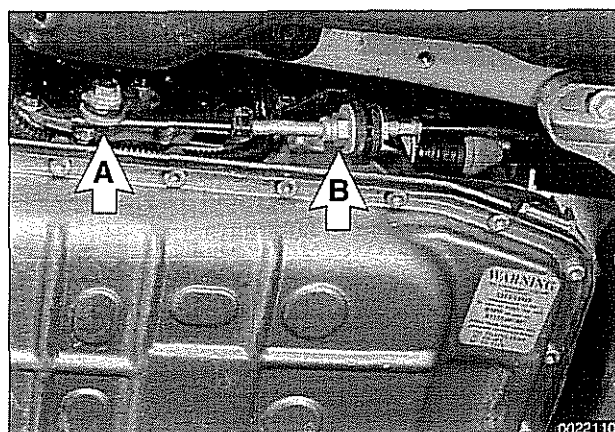
Removal of transmission will cause engine to tip unless engine support is used.

- Remove splash shields from underside of vehicle.
- 6-cylinder models: Detach front stabilizer bar from stabilizer bar links. Swivel stabilizer bar upward.
- Drain ATF from transmission as described earlier.
- Remove exhaust system and exhaust heat shield. See **180 Exhaust System**.
- Disconnect driveshaft from transmission and hang to one side. See **260 Driveshaft**.

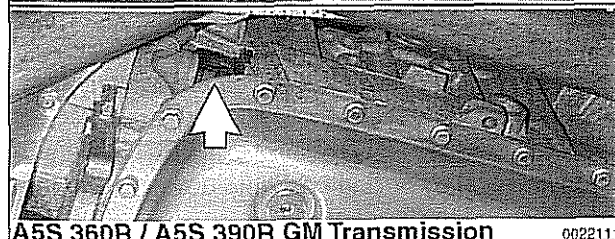
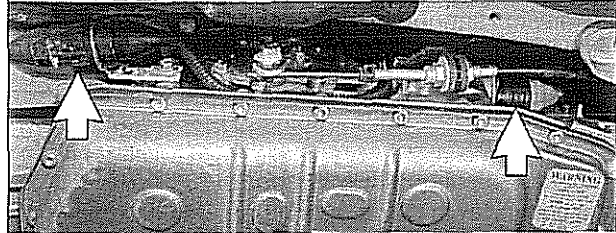
- ◀ With selector lever in park:

- Hold linkage clamping bolt (A) stationary when loosening selector lever cable clamping nut (B).
- Loosen cable clamping nut and remove cable from bracket (A5S 325Z transmission shown).

- Where applicable, disconnect vehicle speed sensor harness connector.



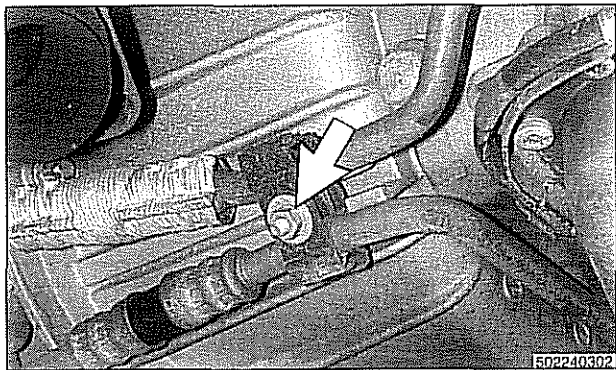
A5S 325Z ZF Transmission



A5S 360R / A5S 390R GM Transmission

- ◀ Disconnect main electrical harness connector(s) from transmission by turning bayonet lock ring(s) (arrows) counter-clockwise.
- A4S 310R transmission: Harness connector at right rear of transmission.
 - A5S 360R / A5S 390R transmission: Harness connector (arrow) at right rear of transmission.
 - A5S 325Z transmission: Two connectors (arrows) on left side of transmission.
 - A5S 560Z transmission: Harness connector at right rear of transmission.
 - A5S 440Z transmission: Harness connector at top left rear of transmission.
- Remove wiring harness from transmission housing.

Automatic Transmission

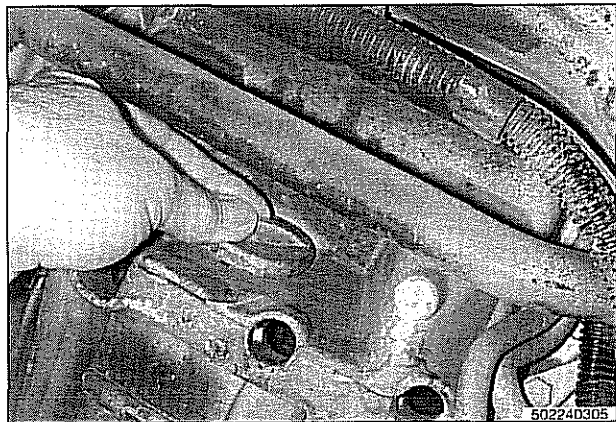


- Remove transmission cooler line clamp mounting nut (**arrow**) from transmission bell housing. Disconnect cooler lines from transmission.

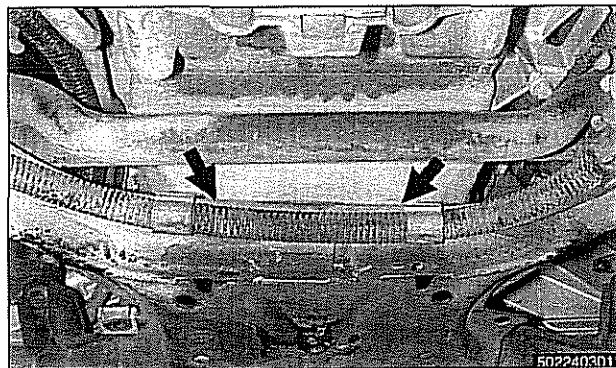
- Disconnect both transmission cooler fluid lines from transmission.

CAUTION—

Place a pan under transmission fluid lines to catch dripping fluid.

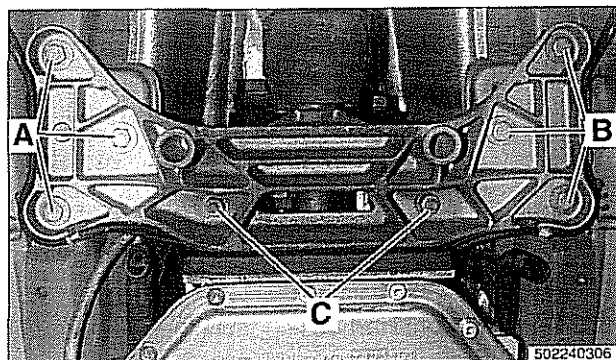


- Remove access plug in cover plate below engine oil pan (V-8 models) or left side of bellhousing (6-cylinder models). Remove torque converter bolts. Turn crankshaft to access bolts.



- V-8 models: Place BMW special tool 23 3 030 between engine oil pan and front subframe (**arrows**).

- 6-cylinder models: Place BMW special tool 11 7 370 between engine oil pan and front subframe.
- Support transmission with transmission jack.



- Remove transmission crossmember bolts **A**, **B** and **C** and remove transmission support crossmember (V-8 model shown, 6-cylinder models are similar).

- Remove bellhousing-to-engine mounting bolts.
- Use appropriate selection of BMW special tools 24 4 130 to hold torque converter in place during transmission removal.

CAUTION—

Do not allow the torque converter to fall off the transmission input shaft.

- Remove transmission by pulling back and down. Lower jack to allow transmission to clear vehicle.

- Blow out oil cooler lines with low-pressure compressed air and flush cooler with clean ATF twice before reattaching lines to transmission.

CAUTION—

- Wear safety glasses when working with compressed air.
- Do not reuse ATF used for flushing.

- Remainder of installation is reverse of removal, noting the following:
 - Reinstall driveshaft using new nuts.
 - Install new sealing washers on transmission cooling line banjo bolts.
 - Install new O-rings on transmission cooler lines, where applicable.
 - Inspect engine drive plate (flywheel) for cracks or elongated holes. Replace if necessary.
 - Be sure bellhousing alignment dowel sleeves are located correctly. Replace damaged sleeves.
 - Check to be sure torque converter is seated correctly in transmission during final installation.
 - Use BMW special tool 24 2 300 to align three mounting tabs on torque converter with indentations on drive plate (flywheel).
 - Fill transmission with clean ATF until oil level is even with fill hole. Then check fluid level as described earlier.
 - Adjust gearshift mechanism. See **250 Gearshift Linkage**.

NOTE—

In order to avoid difficulties in transmission removal at a future time, use washers with Torx-head mounting bolts.

Tightening torques

ATF drain plug to ATF pan

A4S 310R	25 Nm (18 ft-lb)
A5S 360R / A5S 390R (M14)	18 Nm (14 ft-lb)
A5S 325Z	35 Nm (26 ft-lb)
A5S 560Z	50 Nm (37 ft-lb)
A5S 440Z (M16)	30 Nm (23 ft-lb)

ATF fill plug to transmission housing

A4S 310R	33 Nm (24 ft-lb)
A5S 360R / A5S 390R (M14)	18 Nm (14 ft-lb)
A5S 325Z	30 Nm (23 ft-lb)
A5S 560Z	100 Nm (74 ft-lb)
A5S 440Z (M18)	35 Nm (26 ft-lb)

Flex-disc to transmission output flange

M10 (8.8 grade)	48 Nm (35 ft-lb)
M10 (10.9 grade)	60 Nm (44 ft-lb)
M12 (8.8 grade)	81 Nm (60 ft-lb)
M12 (10.9 grade)	100 Nm (74 ft-lb)
M14	140 Nm (103 ft-lb)

Torque converter to drive plate
(flywheel) (M10)

45 Nm (33 ft-lb)

Transmission crossmember to chassis or transmission

M8	21 Nm (15 ft-lb)
M10	42 Nm (32 ft-lb)

Transmission cooler lines to transmission

Banjo bolt	
(M18, A5S 440Z transmission)	25 Nm (18 ft-lb)
Banjo bolt (M16)	37 Nm (27 ft-lb)
Banjo bolt cap screw	
(M18, A5S 440Z transmission)	20 Nm (15 ft-lb)
Compression fitting	
(M14 or M16)	37 Nm (27 ft-lb)
Oil cooler bracket to transmission	
(M8)	21 Nm (15 ft-lb)

Transmission to engine

M8	21 Nm (15 ft-lb)
M10	42 Nm (31 ft-lb)
M12	72 Nm (53 ft-lb)

