

200 Transmission-General

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GENERAL

This section provides general information for drivetrain components such as clutch, transmission, driveshafts and xDrive transfer case.

See also:

- **119 Lubrication System** for rear main seal replacement
- **210 Clutch** for clutch mechanical and hydraulic repairs and flywheel replacement
- **230 Manual Transmission** for manual transmission fluid service, seal replacement and transmission replacement
- **231 Sequential Manual Gearbox (SMG)** for basic SMG service
- **240 Automatic Transmission** for ATF change and transmission replacement
- **260 Driveshafts** for front and rear driveshaft repairs
- **270 Transfer Case** for xDrive transfer case replacement
- **311 Front Axle Differential** for front differential, front drive axles and front CV joints
- **331 Rear Axle Differential** for rear differential, rear drive axles and rear CV joints

200-2 Transmission-General

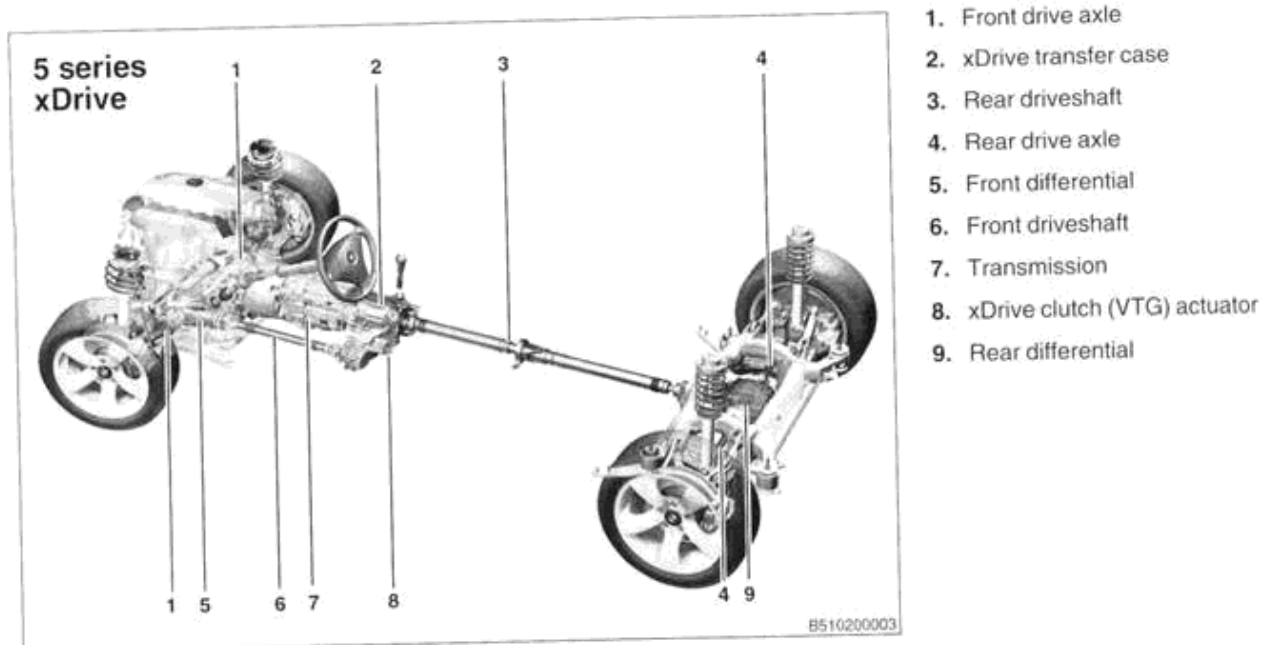
6-speed manual transmission and clutch

DRIVETRAIN

5 Series models are equipped with a longitudinal drivetrain. The transmission is bolted directly to the rear of the engine.

In rear-wheel drive models, a driveshaft connects the output shaft of the transmission to the rear differential.

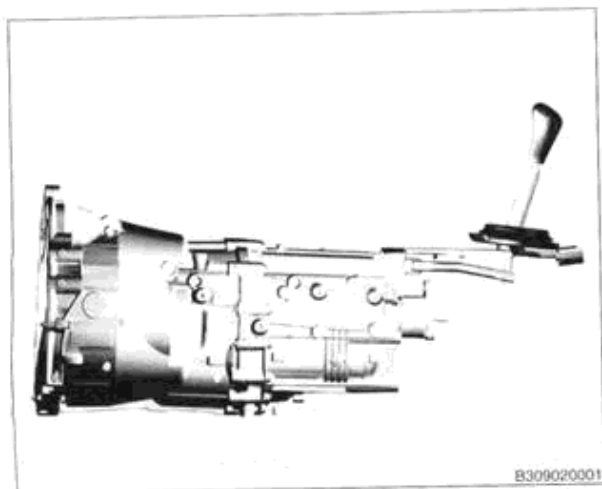
On xDrive models, a transfer case is mounted to the rear of the transmission, with drive shafts leading to front and rear differentials. Individual drive axles with integrated constant velocity joints transfer rotational power from the differentials to the drive wheels.



MANUAL TRANSMISSION

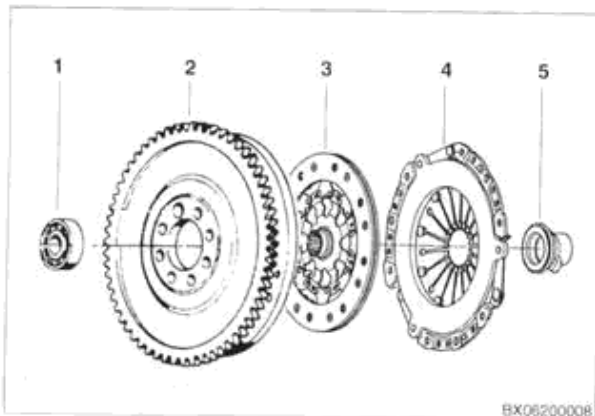
6-speed manual transmission and clutch

◀ A 6-speed manual transmission is available on all models.



Transmission-General 200-3

6-speed manual transmission and clutch



Manual transmission vehicles are equipped with a single-disc clutch and dual-mass flywheel.

1. Pilot bearing
2. Dual-mass flywheel
3. Clutch disc
4. Clutch pressure plate
5. Clutch release bearing

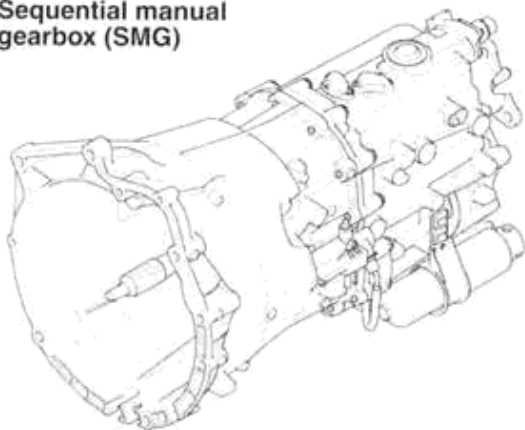
For further information, see **210 Clutch**.

Manual transmission has a metal ID plate mounted on side of transmission. Do not rely on numbers cast on transmission case for identification. For transmission applications, see **Table a**. Transmission gear ratio information is in **230 Manual Transmission**.

Table a. 5 Series manual transmission applications (6-speed)

Model (engine)	Year	BMW designation	Manufacturer designation
525i (M54)	2004 - 2006	GS6-37BZ / DZ	ZF 6HP19 type H
530i (M54, N52)	2004 - 2007	GS6-37BZ / DZ	ZF 6HP19 type H
525i, 528i (N52)	2006 - 2010	GS6-17BG	Getrag type I
525xi, 528xi, 530xi (N52)	2006 - 2010	GS6X37BZ / DZ	ZF 6HP19 type H
535i (N54)	2008 - 2010	GS6-53BZ / DZ	ZF 6HP26 type G
535xi (N54)	2008 - 2010	GS6X53DZ	ZF 6HP26 type G
545i, 550i (N62, N62TU)	2004 - 2010	GS6-53BZ	ZF 6HP26 type G

Sequential manual gearbox (SMG)



SEQUENTIAL MANUAL GEARBOX (SMG)

Available as an option, the 6-speed sequential manual gearbox (SMG) functions like a clutchless manual transmission. Clutch operation is handled via a computer controlled hydraulic unit that engages and disengages the clutch automatically, as well as physically shifting the transmission into gear.

SMG application information is in **Table b**.

Table b. 5 Series SMG applications

Model (engine)	Year	Transmission
525i, 530i (M54)	2004 - 2005	GS6S37BZ
530i (N52)	2006 - 2007	GS6S37BZ
545i (N62)	2004 - 2006	GS6S53BZ

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Paddle shift



Paddle shift

- In addition to the traditional floor-mounted selector lever, SMG models are equipped with paddle shifters above the steering wheel spokes. Pulling or pushing either paddle results in transmission upshift or downshift.

AUTOMATIC TRANSMISSION

6-speed automatic transmission

- The automatic transmission is a 6-speed Steptronic that offers a choice of Normal, Sport, and Manual mode. Sport mode is engaged by moving the shift lever out of Drive and into the Sport / Manual shift gate. In Sport mode, shifts occur at a higher rpm than normal. Additionally, the driver can tip the lever forward (downshifts) or backward (upshifts) to manually select a gear. Automatic transmission applications are in **Table c**.

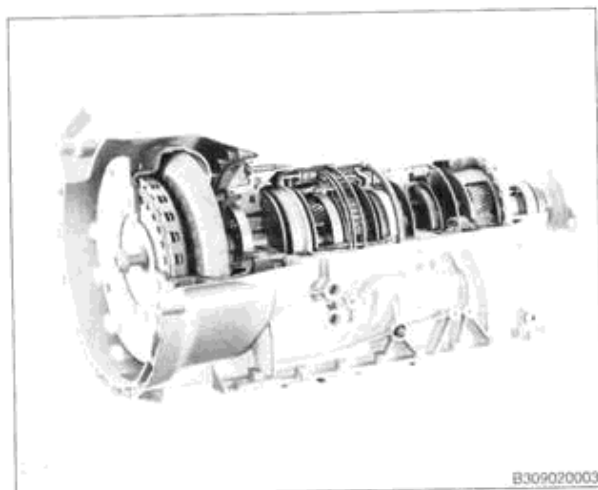
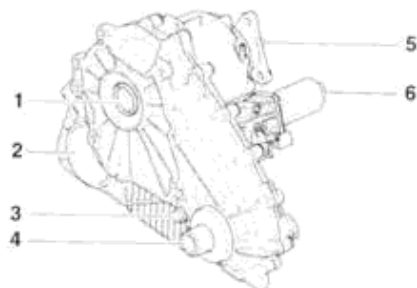


Table c. 5 Series automatic transmission applications

Model (engine)	Year	Transmission
525i, 525xi, 530i, 530xi, (M54, N52)	2004 - 2007	GA6HP19Z
545i, 550i (N62, N62TU)	2004 - 2007	GA6HP26Z
528i, 528xi, 535i, 535xi, (N52, N54)	2008 - 2000	GA6HP19ZTU
550i (N62TU)	2008 - 2009	GA6HP26ZTU

xDrive
transfer case

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xDRIVE**Transfer case**

BMW's advanced all-wheel drive system is known as xDrive. It includes a transfer case with electronically controlled clutch that regulates the front to rear torque split for best traction.

➤ The xDrive transfer case, bolted to the rear of the transmission, directs power from the transmission to both the front and rear differentials via driveshafts. The transfer case is permanently engaged to drive all four wheels all of the time.

1. Transfer case input shaft
2. Transmission and transfer case mount
3. Fill plug
4. Front driveshaft output
5. Rear driveshaft output
6. xDrive clutch actuator

xDrive clutch

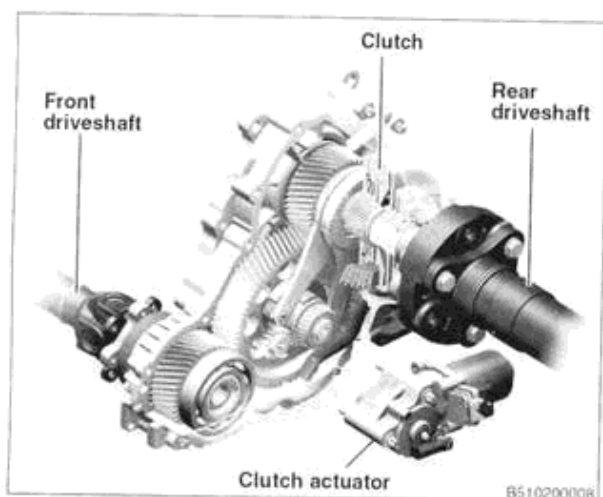
➤ In the xDrive system, an electronically controlled clutch in the transfer case allows for infinitely variable distribution of front to rear torque for best traction.

xDrive functions are integrated with ABS / DSC. Under normal driving conditions, 60% of engine power goes to the rear axle, 40% to the front. If a wheel begins to slip or if the DCS steering angle sensor and acceleration sensors signal excessive yaw (rotational acceleration) in the vehicle, xDrive reacts by transferring power to the wheel or wheels with best traction, usually before a wheel is able to spin. This significantly reduces the risk of under- or oversteer, improving agility and safety on the road.

Torque and engine power are redistributed by xDrive within a few milliseconds. As a result, the driver normally does not notice a change in power distribution.

In addition to controlling power distribution, xDrive and DSC may intervene via braking. If a wheel starts to spin without transmitting power, the brakes are applied at that wheel. In this case, the differential automatically supplies more power to the opposite wheel.

For additional information on xDrive and DSC functions, see **270 Transfer Case** and **340 Brakes**.



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200-6 Transmission-General

Clutch fluids

DRIVETRAIN LUBRICANTS

Clutch fluids

Manual transmission clutch fluid

Manual transmission hydraulic clutch is operated using brake fluid. Brake fluid level checking and topping off is covered in **020 Maintenance**. Hydraulic clutch bleeding is covered in **210 Clutch**.

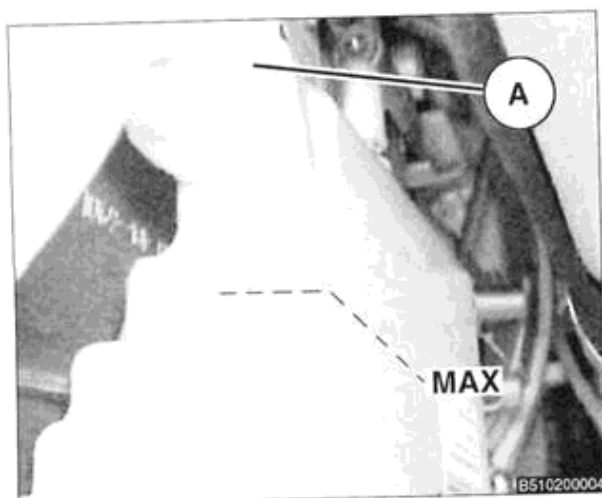
SMG clutch fluid

Clutch fluid reservoir (A) is at side of transmission. Clutch fluid checking and topping off is covered in **231 Sequential Manual Gearbox (SMG)**.

SMG clutch fluid requirement is in **Table d**.

Table d. SMG clutch fluid

Hydraulic fluid	Pentosin CHF 11S
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Transmission fluids

Manual, SMG and automatic transmissions are filled with lifetime lubrication. No oil change is required for the entire service life of the transmission. If repairs have to be made to the transmission or transmission oil cooler, use only the recommended lifetime fluid to refill. See **Table e** or **Table f**.

Table e. Manual and SMG transmission fluids

Transmission	Year range	Fluid type
ZF GS6-37BZ ZF GS6S37BZ (SMG) ZF GS6X37BZ (xDrive) ZF GS6-53BZ ZF GS6S53BZ (SMG) ZF GS6X53BZ (xDrive)	2004 - 2005 from 2006	MTF-LT-2 MTF-LT-3
MTF-LT-2 (Lifetime fluid) BMW part no. 83 22 0 309 031		
MTF-LT-3 (Lifetime fluid) BMW part no. 83 22 0 409 878		

Table f. Automatic transmission fluid

Type	BMW part no.	Manufacturer part no.
GA6HP19Z GA6HP19ZTU GA6HP26Z GA6HP26ZTU	83 22 0 142 516	Shell M-1375.4



▲ A label on manual transmission specifies original lubricant used at the factory.

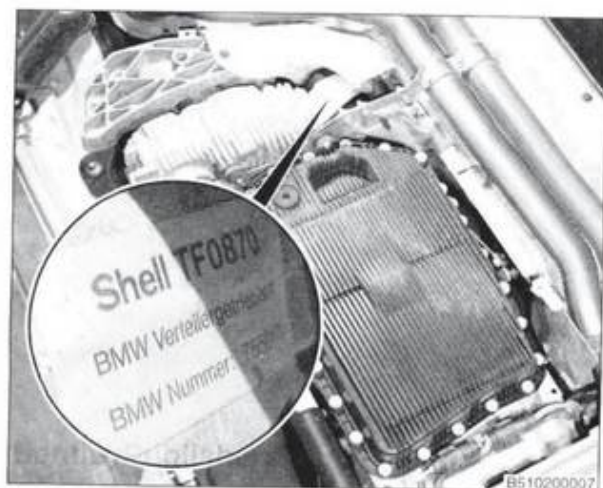
For manual transmission fluid service, see **230 Manual Transmission**.

For SMG fluid service, see **231 Sequential Manual Gearbox (SMG)**.



⚠ ATF is specified on colored label on automatic transmission sump.

For automatic transmission fluid service, including checking fluid level and ATF filter replacement, see **240 Automatic Transmission**.



Transfer case fluid

Transfer case fluid specification for xDrive models is in **Table g**.

Table g. Transfer case fluid specification

Type	BMW part no.	Manufacturer part no.
xDrive (all)	83 22 0 397 244	Shell TF0870

For transfer case fluid service, see **270 Transfer Case**.

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Differential oil

Differential oil

Differentials are filled with lifetime lubrication. No oil change is required for the entire service life of the differential. If repairs have to be made to the differential, use only the recommended lifetime oil to refill. See **Table h**.

Table h. Differential oil (lifetime)

BMW specification	SAF-XO Synthetic
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Front differential in xDrive models is bolted to left side of engine oil pan.

For front differential oil service, see **311 Front Axle Differential**.

➤ Rear differential is supported at rear suspension subframe using three rubber bushings (**arrows**).

For rear differential oil service, see **331 Rear Axle Differential**.

