

231 Sequential Manual Gearbox (SMG)

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GENERAL

This repair group covers sequential manual gearbox (SMG) description and operation, as well as transmission removal and installation. Transmission repair is not covered.

See also:

- **230 Manual Transmission** for transmission seal replacement
- **ECL Electrical Component Locations** for SMG components

SMG applications and gear ratios

SMG application information is in **Table a**. Gear ratios are in **Table b**.

Table a. SMG applications

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

Table b. SMG gear ratios

Gear	ZF GS6S37BZ	ZF GS6S53BZ
1 st	4.35 : 1	4.06 : 1
2 nd	2.50 : 1	2.40 : 1
3 rd	1.66 : 1	1.58 : 1
4 th	1.23 : 1	1.19 : 1
5 th	1.00 : 1	1.00 : 1
6 th	0.85 : 1	0.87 : 1
Reverse	3.93 : 1	3.77 : 1

231-2 Sequential Manual Gearbox (SMG)

SMG overview

SMG overview

Introduction

The sequential manual transmission (SMG) had its origins in racing cars. Modified for use in street vehicles, it was available as an option in selected 2004 - 2007 5 Series rear-wheel drive models.

In contrast to a conventional manual transmission, SMG clutch control is automated. By driver choice, shifting is either manual or automatic. A computerized electrohydraulic system operates the clutch and can take over gearshifts as well.

For SMG, 6-speed manual transmission housings for GS637BZ and GS653BZ transmissions were modified to accommodate the following components:

- Hydraulic unit with actuators for engaging and disengaging the clutch and for switching gears.
- Additional sensors: Shift travel sensor, selector angle sensor, inductive sensor for transmission input speed.

The construction of the transmission and the clutch remain unchanged. The version used in V8 models (GS6S53BZ) is equipped with a more powerful clutch actuator.

SMG maximum torque capabilities

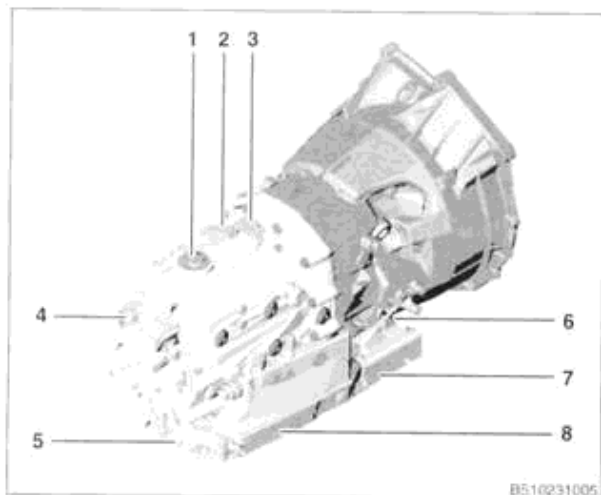
GS6S37BZ	370 Nm (273 lb-ft)
GS6S53BZ	600 Nm (443 lb-ft)

GS6S37BZ external views

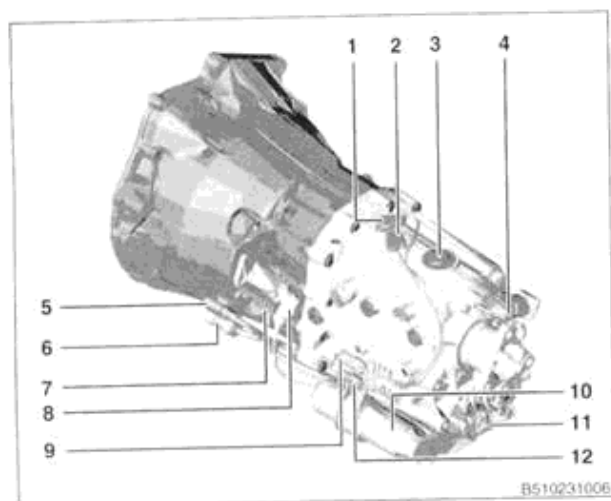


Right side:

1. Assembly port (access to selector shaft, gearshift and selector angle actuator)
2. Shift travel sensor
3. Selector angle sensor
4. Gearshift and selector angle actuator
5. Hydraulic unit
6. Transmission input speed sensor
7. Hydraulic pump
8. Expansion tank



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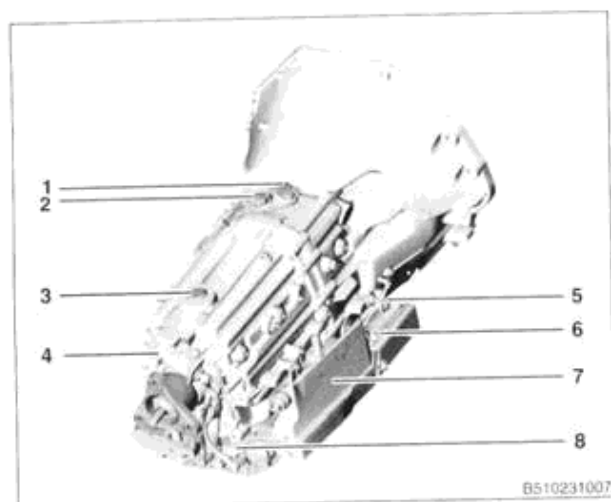
Left side:

1. Selector angle sensor
2. Shift travel sensor
3. Assembly port (access to selector shaft, gearshift and selector angle actuator)
4. Gearshift and selector angle actuator
5. Hydraulic pump power supply connector
6. Hydraulic unit components electrical connector (4 solenoid valves, hydraulic pressure sensor)
7. Clutch travel sensor
8. Clutch actuator
9. Selector angle sensor connector
10. Pressure accumulator
11. Hydraulic unit
12. Shift travel sensor connector

GS6S53BZ external views

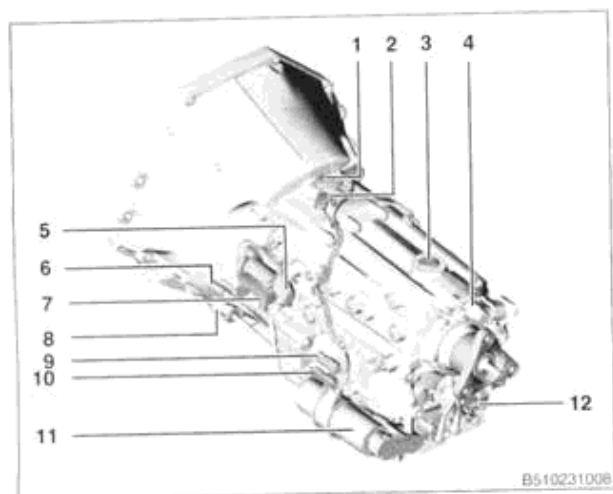
Right side:

1. Selector angle sensor
2. Shift travel sensor
3. Assembly port (access to selector shaft, gearshift and selector angle actuator)
4. Transmission input speed sensor
5. Hydraulic pump
6. Gearshift and selector angle actuator
7. Expansion tank
8. Hydraulic unit



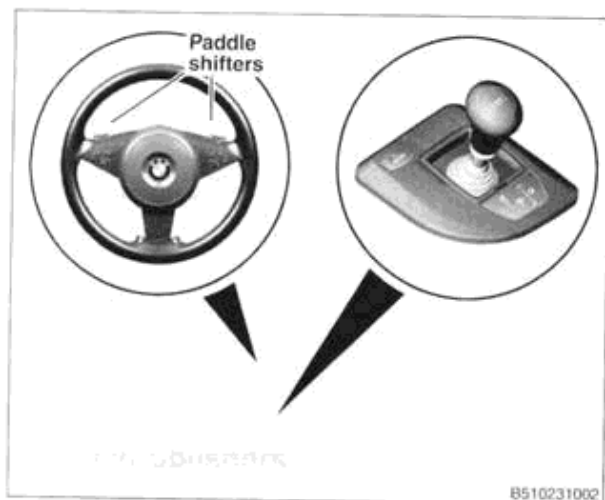
Left side:

1. Selector angle sensor
2. Shift travel sensor
3. Assembly port (access to selector shaft, gearshift and selector angle actuator)
4. Gearshift and selector angle actuator
5. Clutch actuator
6. Hydraulic pump power supply connector
7. Clutch travel sensor
8. Hydraulic unit components electrical connector (4 solenoid valves, hydraulic pressure sensor)
9. Selector angle sensor connector
10. Shift travel sensor connector
11. Pressure accumulator
12. Hydraulic unit



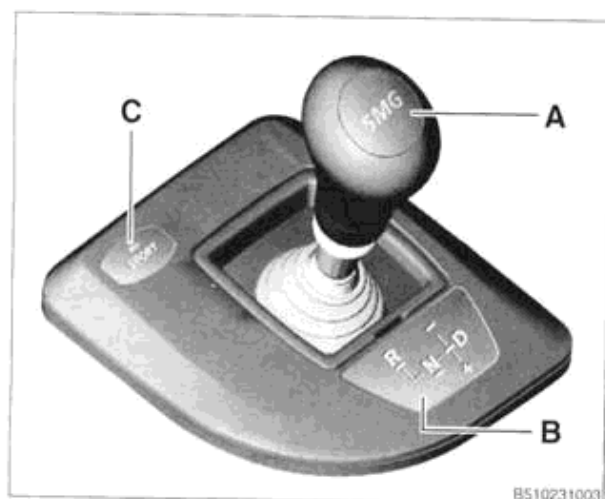
231-4 Sequential Manual Gearbox (SMG)

SMG overview



Selector lever

- SMG can be shifted using either the center-console-mounted selector lever or steering-wheel-mounted shift paddles.



- SMG operation modes are controlled by the selector lever (A). The gear position display (B) indicates the modes that can be selected:

- N = Neutral position.
- R = Reverse gear. With foot on brake pedal, press selector down, left and forward.
- + or - = Manual mode. Flick selector forward or backward to change gears.
- D = Automatic mode.

Pressing the SPORT button (C) in either manual or automatic mode engages dynamic driving control (FDC). This intervention in engine and transmission controls reduces gear shift times. In automatic mode, up-shifts occur at higher engine speeds.

The SPORT button also switches the steering system Servotronic or active steering setting to sports mode.

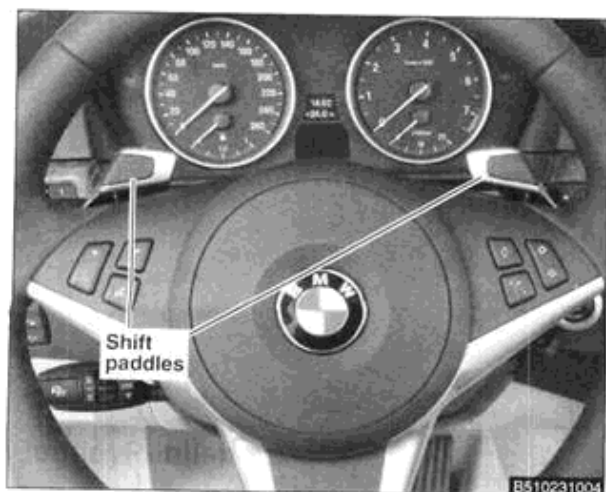
The selector lever assembly is equipped with shiftlock function.

Shift paddles

- The steering wheel with 2 gearshift paddles allows manual gear changes without the driver having to take hands off the steering wheel. Pull one or both of the paddles to shift up a gear. Press one or both of the paddles to shift down a gear.

The two gearshift paddles are identical in construction and are wired in parallel.

Power is supplied to the gearshift paddles from the steering column switch cluster (SZL).



Manual mode

Gears are selected sequentially by briefly pressing the selector lever or shift paddle(s) in + or - direction. Gears can be skipped by rapidly pressing the shifter repeatedly.

Gears are changed when a shift pulse is transmitted electrically to the SMG control module. With the shift-by-wire gearshift method, there is no mechanical linkage between the gear lever or gearshift paddles and the transmission.

There is no clutch pedal. The clutch is operated automatically.

Automatic mode

When the selector lever is in D, shift points are automatically controlled according to characteristic curves and adapted to the driving situation.

SMG control module

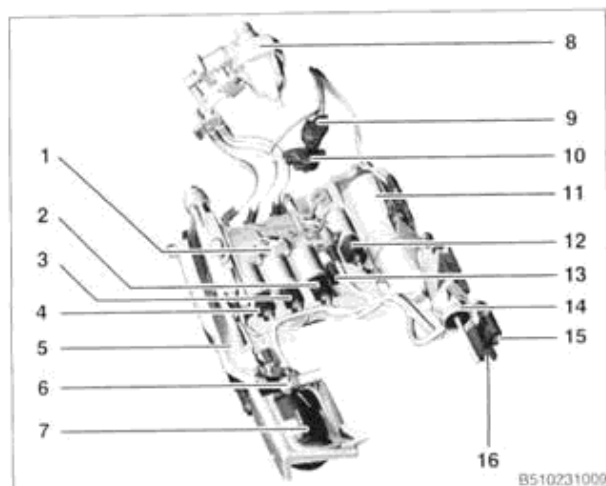
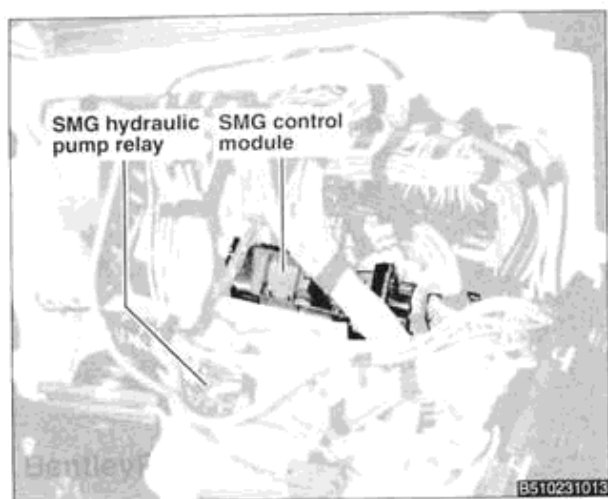
- ◀ The SMG control module, in E-box at right rear of engine compartment, computes solenoid actuation for clutch operation and gear change. The control module also communicates with other control modules (for example, ECM).

The SMG control module can be programmed and coded.

Hydraulic unit

- ◀ The hydraulic unit assembly, bolted to the bottom of the transmission sump, is precharged and tested. Within this assembly are the actuators for transmission operation.

1. Valve block
2. Solenoid MV2: 2nd, 4th, 6th gear shifts
3. Solenoid MV1: 1st, 3rd, 5th gear shifts
4. Solenoid MV0: Clutch actuator
5. Expansion tank
6. Transmission input speed inductive sensor
7. Hydraulic pump
8. Gearshift and selector angle actuator
9. Shift level sensor
10. Selector angle sensor
11. Pressure accumulator
12. Solenoid MV3: Selector angle brake, pressure relief valve
13. Hydraulic pressure sensor
14. Clutch actuator with clutch travel sensor
15. Hydraulic pump power supply
16. Hydraulic unit components electrical connector (4 solenoid valves, hydraulic pressure sensor)



231-6 Sequential Manual Gearbox (SMG)

SMG overview

GS6S37BZ

Gearshift and selector angle actuator

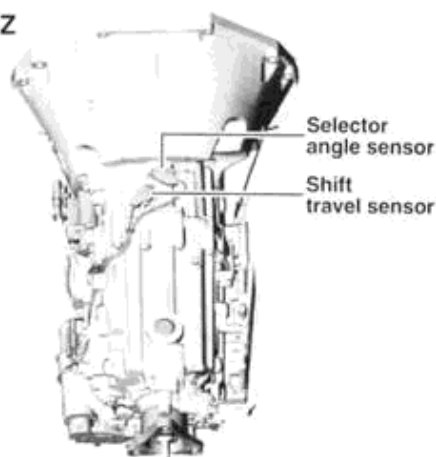


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Gearshift and selector angle actuator

- ◀ The gearshift and selector angle actuator shifts the selector shaft along its longitudinal axis and turns the selector shaft to change shift gate.

GS6S53BZ



B510231011

Shift travel sensor and selector angle sensor

- ◀ The gear engaged is recognized from the shift travel sensor and the selector angle sensor:
- The shift travel sensor detects the forward and backward movements of the selector shaft in the shift gate.
 - The selector angle sensor detects how far the selector shaft turns, and so recognizes a change of shift gate.

GS6S53BZ transmission illustrated. GS6S37BZ transmission is similar.

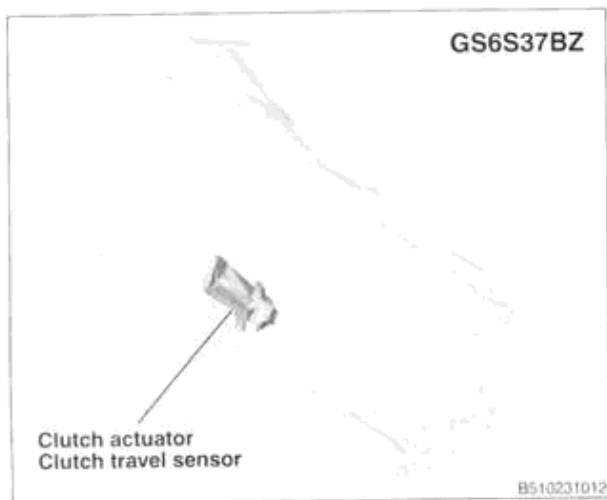
Pressure accumulator

The pressure accumulator, fitted on the lower left of the transmission, ensures that there is always sufficient oil pressure for a gearshift to be executed.

A freely moving piston subdivides the pressure accumulator into 2 chambers. One chamber is permanently charged with nitrogen at approx. 27 bar and -25°C. The other chamber fills with oil from the hydraulic pump. During transmission operation, the oil exerts pressure on one side of the piston, compressing the nitrogen and maintaining oil pressure during shifting.

Hydraulic pressure sensor

The hydraulic pressure sensor is installed directly on the hydraulic unit valve block and reports the current oil pressure to the SMG control module. The hydraulic pump is switched ON and OFF as required.



Clutch actuator with clutch travel sensor

- The clutch actuator executes clutch operations. The clutch travel sensor registers clutch release travel.

Hydraulic pump with electric motor

The hydraulic pump with electric motor generates 55 bars (798 psi) of system pressure for gearshifts. The pump is actuated by the SMG control module.

Transmission input speed sensor

The SMG control module compares transmission speed, measured by the sensor, with engine speed and computes clutch closing speed (i.e., how fast the clutch can establish the optimal power flow between the engine and the transmission).

Expansion tank

- The expansion tank ensures that there is always sufficient hydraulic fluid available in the system. There are MAX and MIN marks on the expansion tank for adjusting oil level.

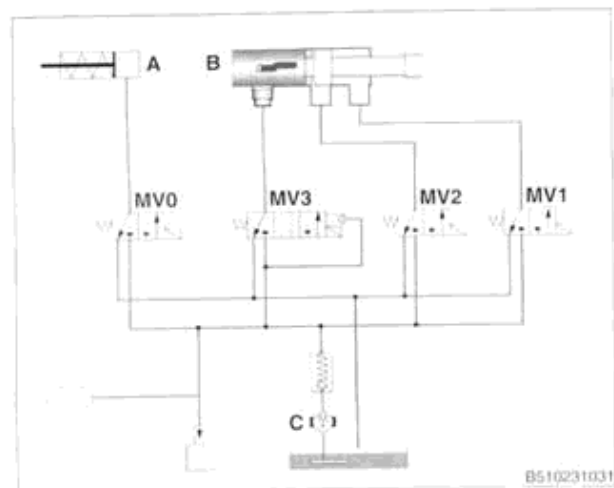
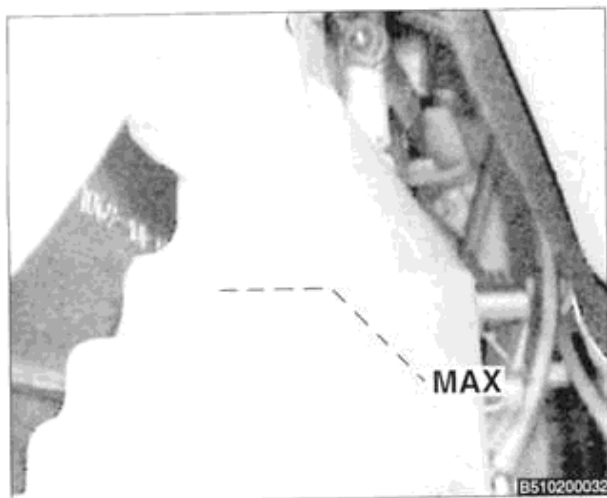
Valve block

The valve block contains the solenoid valves, the hydraulic pressure sensor, the pressure accumulator and a check valve.

Solenoid valves

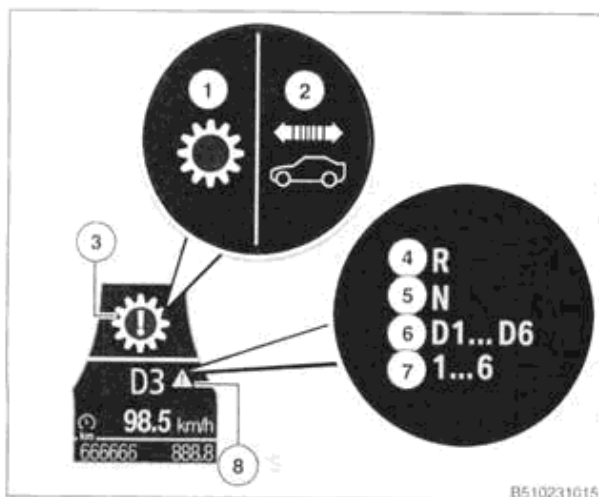
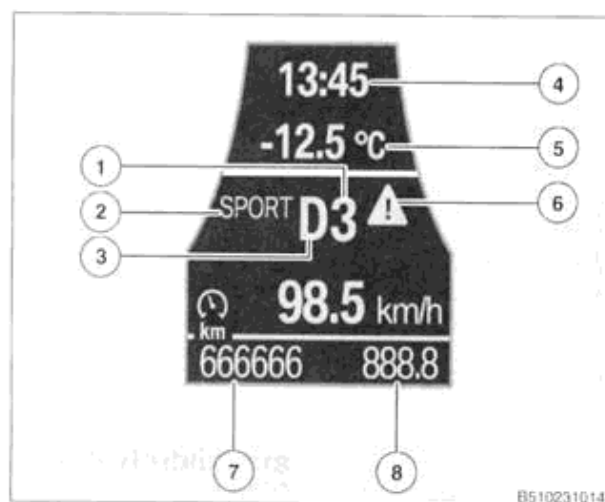
- Four solenoid valves are installed in the valve block:
 - Solenoid MV0 controls clutch actuator (A).
 - Solenoid MV1 (shift travel valve) controls shifting for 1st, 3rd, 5th and reverse gears.
 - Solenoid MV2 controls shifting for 2nd, 4th, and 6th gears.
 - Solenoid MV3:
 - Controls selector angle brake for switching shift gate (B).
 - Serves as pressure relief valve for hydraulic system.

Pressurized fluid to solenoid valves is supplied by a hydraulic pump (C).



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SMG overview



Back-up light function

Back-up lights are switched ON based on messages from the SMG control module to the light module (LM).

- To 09 / 2005: SMG control module -> PT-CAN -> safety and gateway module (SGM) -> K-CAN -> LM
- From 09 / 2005: SMG control module -> PT-CAN -> body-gateway module (KGM) -> K-CAN -> LM

Instrument cluster display

The following information is displayed on the instrument cluster LCD display:

1. Engaged gear
2. SPORT button activated for dynamic drive control (FDC)
3. Engaged drive position
4. Time
5. Ambient temperature
6. Warning triangle indicates Check Control message are present. See **020 Maintenance** for an explanation of Check Control.
7. Total mileage
8. Trip mileage

Details of SMG display in LCD:

1. Clutch overheated
Select N position, then depress brake to start engine
Select gear again (yellow symbol)
2. Transmission in N: Vehicle can roll (yellow symbol)
3. Emergency program (limp-home mode) activated:
Transmission malfunction (yellow or red symbol)
4. Reverse gear
5. Neutral (idle)
6. Automatic mode (D1 - D6)
7. Manual mode: Steptronic (1st - 6th gear)
8. Check Control message(s) present

Fault messages (from SMG control module via PT-CAN, SGM or KGM and K-CAN) illuminate Check Control warning. Check Control messages are displayed in the upper LCD display when the Check Control button on the turn-signal stalk switch is pressed.

Brake light switch

The brake light switch signal is transmitted via PT-CAN by the ECM. For safety reasons, the signal is also transmitted by a direct wire from the brake light switch to the SMG control module. The module uses the signal for the following:

- Shift lever lock (shift-lock) release.
- Brake application detection.
- Shift to N when engine is shut down.

Starter inhibitor

Car access system (CAS) enables the starter when the SMG control module satisfies the following conditions:

- Gear shift lever in position N (neutral). Instrument cluster LCD shows N, indicating that transmission is also in neutral.
- Clutch is disengaged.

SMG functions

SMG functions include the following:

- Engine start
- Gearshift
- Driving in gear lever position D (automatic mode)
- Launch control (acceleration assist system)
- Rock free (e.g., from snow)
- Vehicle standstill
- Gear lever position N and ignition OFF
- Emergency program (limp-home mode)

Engine start. To start the engine, the gear lever and transmission are in N (neutral). When the engine is started, sufficient system pressure immediately builds up to disengage the clutch. For this reason, the SMG control module is activated by a wake-up signal from CAS when the vehicle is unlocked.

The SMG control module measures system pressure via the hydraulic pressure sensor. If system pressure is too low, the hydraulic pump is actuated and builds pressure. When system pressure is reached, the control module switches the hydraulic pump OFF again.

With the prompt signal, the gear lever position indicator in the center console is activated. If terminal 15 (wake-up wire) is not activated approx. 15 minutes after vehicle unlocking, the gear lever position display is switched OFF again.

Gearshift. If a gearshift is initiated in manual or automatic mode, the SMG control module actuates the corresponding solenoid valve in the valve block. The pressurized hydraulic fluid flows into the clutch actuator and opens or closes the clutch.

At the same time, the SMG control module sends information to the ECM that a gearshift is initiated and that engine torque is to be reduced.

In the next step, the gearshift and selector angle actuator is actuated. At the same time, the gearshift and selector angle actuator executes forward, backward and side-to-side movements of the selector shaft.

During the gearshift, engine speed may be raised as required to allow clutch engagement to be completed more quickly and more smoothly.

When the gear is engaged, the clutch automatically engages. The SMG control module receives precise clutch position from the clutch travel sensor.

231-10 Sequential Manual Gearbox (SMG)

SMG overview

After the gear change, the solenoid valves are actuated without the use of current. The course of the entire gearshift depends on accelerator pedal position, road speed, engine speed and other factors (e.g., engine oil temperature).

Just before the vehicle reaches a standstill, SMG shifts into 1st gear and disengages the clutch. The transmission of power between engine and transmission is broken.

Gearshifts that result in an excessively high or low engine speed are suppressed.

Gear lever position D (automatic mode):

- Constant-speed travel. Continuous changes of accelerator pedal position (opening and closing the throttle) are registered in the SMG control module. The control module suppresses a pendulum shift between adjacent gears (up and down, e.g., on a highway with constantly changing speed).
- Upshift suppression. Based on accelerator pedal position, the SMG control module recognizes when the throttle is closed rapidly, e.g. before applying the brake. The module suppresses the upshift. This ensures that engine braking stays in effect.
- Driving uphill. The SMG control module recognizes when the vehicle is driving uphill from the data from the wheel speed sensors and accelerator pedal position. The module prevents unnecessary upshifts and irritating pendulum shifts (e.g., at constantly high engine speed and foot taken off the accelerator pedal).
- Driving downhill. The SMG control module recognizes when the vehicle is driving downhill from throttle valve potentiometer (load), wheel speed sensor and brake light switch signals. To maintain and increase engine braking effect, the control module shifts down a gear as road speed increases.
- Braking deceleration and automatic downshift. The SMG control module recognizes braking deceleration from brake light switch, wheel speed sensor and accelerator pedal position sensor signals. The control module shifts down according to road speed to maintain engine braking effect. When this happens, several gears may be skipped. The correct gear is automatically selected when the vehicle accelerates again.
- Manual intervention in automatic operation. When the gearshift lever or the gearshift paddles are operated in automatic mode, the system automatically changes to manual mode. If automatic mode is required, the driver selects it again.

Launch control (acceleration assist system). Launch control enables optimum vehicle acceleration from standstill. Upshifts are automatic even in manual mode when launch control is active. This prevents the engine from reaching critical speeds.

Preconditions for launch control consist of the following:

- High-grip road surface.
- Dynamic stability control (DSC) deactivated (DSC button pressed for longer than 3 seconds).
- SPORT button pressed.
- Accelerator pedal pressed to floor (kick down position)

To deactivate launch control:

- Release accelerator pedal (release from kick down position).
- Manual shift request.
- Switch OFF dynamic driving control (FDC) using SPORT button.
- Activate DSC.

CAUTION—

- *During the running-in phase of a new vehicle, do not accelerate the vehicle using launch control.*
- *Frequent use of launch control leads to increased component wear.*

Rocking free. To rock the vehicle free (e.g., from snow) move gearshift lever rapidly from 1st to R and then back. Complete the gearshift within the space of 0.8 seconds. Otherwise the gear lever lock (shift-lock) becomes activated.

Vehicle standstill. The clutch is disengaged and 1st gear selected when the SMG control module detects that the vehicle is stationary. Vehicle standstill is detected by means of the accelerator pedal position, wheel speeds and engine speed. The clutch is disengaged and 1st gear selected irrespective of the drive program (manual or automatic mode).

An audible warning is triggered immediately if the driver door is opened while the engine is running and the transmission is not in position N or P. At this time, N also flashes nine times in the instrument cluster LCD.

If, despite these warnings, neither the pedals, the gearshift paddles nor the gearshift lever are moved, the selected gear is automatically cancelled after approx. 2 seconds.

Gear lever position neutral and ignition OFF. When the gear lever is in N (neutral) and ignition is switched OFF, N flashes in the instrument cluster LCD. In addition, the audio system controller (M-ASK) emits an acoustic warning.

Emergency program. In the emergency program (limp-home mode), the vehicle remains operational, but with limitations. Only gearshift positions R, N and 1st - 3rd gears are available. Depending on the type of transmission fault, the vehicle may no longer be operational after a vehicle standstill.

Cautions

CAUTION—

- When performing any repair which involves separating the engine and transmission, check that the bell housing dowels are undamaged and properly in place before reassembly. If the alignment of the engine flywheel to the transmission input shaft is incorrect, any of the following complaints may result:
 - Clutch slipping, shudder, or poor disengagement.
 - Noise from transmission input shaft.
 - Transmission popping out of gear.
 - Difficulty changing gears.
 - Internal damage to transmission.
- To avoid electrochemical corrosion to engine components made of aluminum-magnesium alloy, do not use steel fasteners. Use aluminum fasteners only.
- The end faces of aluminum fasteners are usually painted blue. For reliable identification, test fasteners for aluminum composition with magnet.
- Replace aluminum fasteners each time they are loosened.
- Follow torque instructions, including angle of rotation specifications, when installing aluminum fasteners.
- Fill manual transmission only with BMW approved synthetic oil. Filling with incorrect lube could cause the following damage:
 - Premature synchromesh ring wear.
 - Reduced service life of bearings.
 - Tooth profile damage.
 - Faster wear of selector forks.
 - Damage to radial shaft oil seals.
- When removing interior trim clips, avoid damaging trim pieces by using a plastic prying tool or a screwdriver with the tip wrapped with masking tape.

TRANSMISSION FLUID SERVICE

SMG transmissions installed in 5 Series models use lifetime manual transmission fluid and do not require periodic fluid changes.

Table c. SMG fluids

Transmission	Year range	Fluid type
ZF GS637SBZ	2004 - 2005	MTF-LT-2
ZF GS6S53BZ	from 2006	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		
Clutch hydraulic fluid	Pentosin CHF 11S	

Transmission fluid level, checking

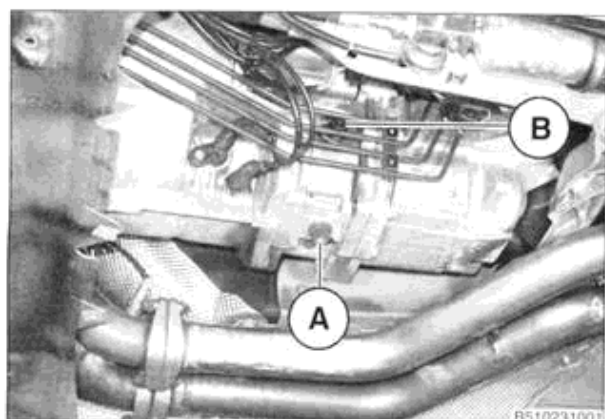
Checking the transmission fluid level involves removing the side fill plug and inserting a gloved finger into the hole to check the fluid level. If the fluid level is up to the bottom of the fill hole (finger is wetted by transmission fluid), the level is correct.

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 underneath transmission and remove drain plug (A) at bottom of transmission.
- Drain fluid.
- Install and torque drain plug.
- Remove fill plug (B) from side of transmission.
- Slowly fill transmission with fluid until fluid overflows fill hole.

Table d. SMG fluid capacities

Transmission	Initial fill, new or rebuilt unit	Fluid change
ZF GS6S37BZ	1.6 liter (1.7 US qt)	1.5 liter (1.6 US qt)
ZF GS6S53DZ	1.6 liter (1.7 US qt)	1.5 liter (1.6 US qt)

- Install and torque fluid fill plug.

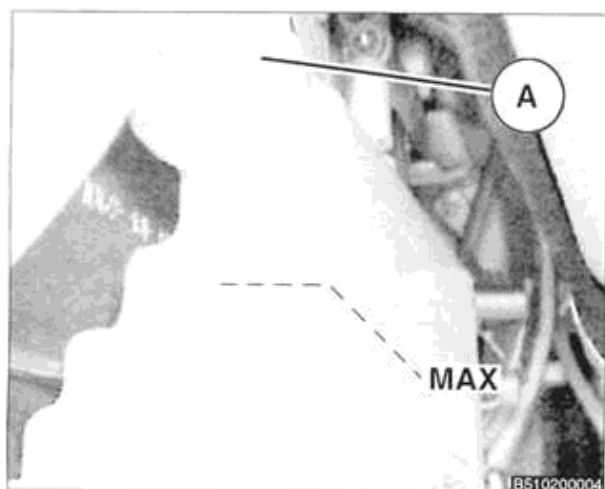
Tightening torque

• Drain or fill plug to transmission housing	35 Nm (26 ft-lb)
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Clutch hydraulic fluid, filling

The clutch in the SMG system is operated via hydraulic fluid.

- Switch ignition ON without starting vehicle.
- Use BMW scan tool to depressurize clutch hydraulic system.
- Working at side of transmission, open hydraulic fluid expansion tank (A) and fill to MAX level with **Pentosin CHF 11S** hydraulic fluid.



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Transmission, removing and installing

TRANSMISSION REMOVAL AND INSTALLATION

Removal and installation of the transmission is best accomplished with the vehicle on a lift and using a transmission jack. Support engine using equipment which allows the engine to pivot on its mounts to access the upper bolts at the transmission bell housing.

WARNING—

- 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 in **001 Warnings and Cautions**.

- Raise and safely support vehicle.

WARNING—

- Make sure the vehicle 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.

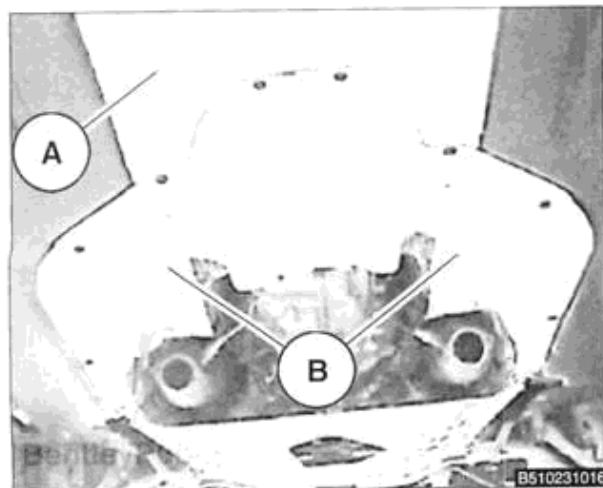
- Remove underbody splash shields.
- Remove front end reinforcement plate.
- Remove complete exhaust system. See **180 Exhaust System**.

WARNING—

- Make sure exhaust system is fully cooled off before removing.

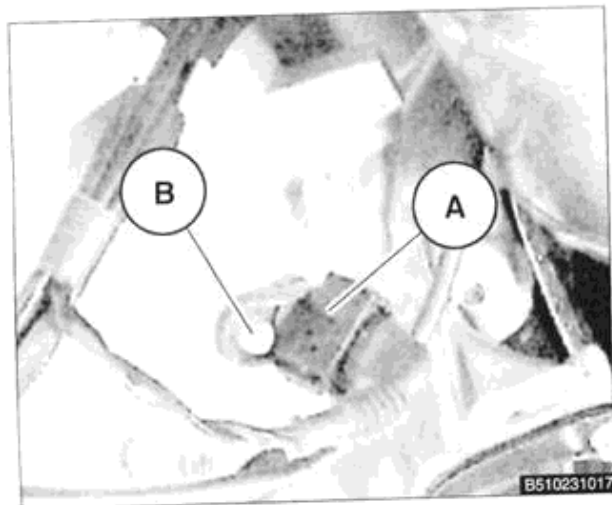
- Remove oxygen sensors and store in safe location.

- ◀ Working underneath vehicle, remove heat shields (A, B)



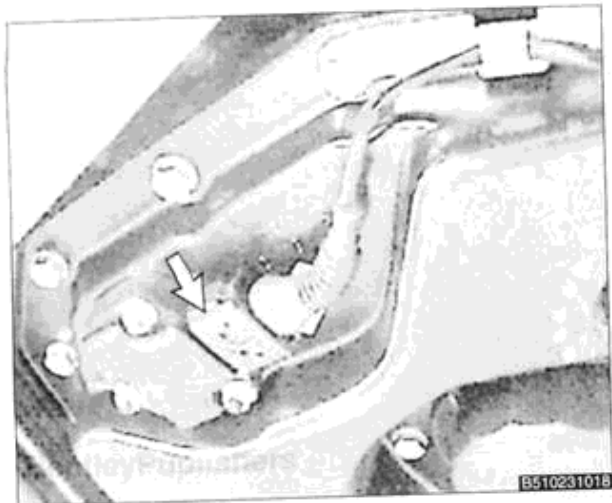
Sequential Manual Gearbox (SMG) 231-15

Transmission, removing and installing

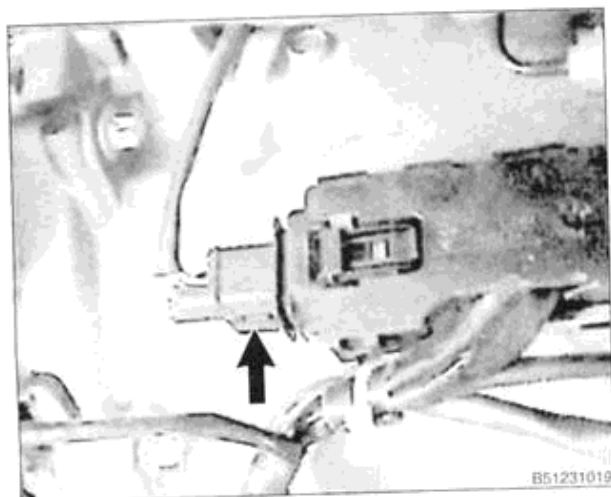


◀ Working at crankshaft sensor:

- Detach electrical connector (A).
- Remove mounting bolt (B) and remove crankshaft sensor.



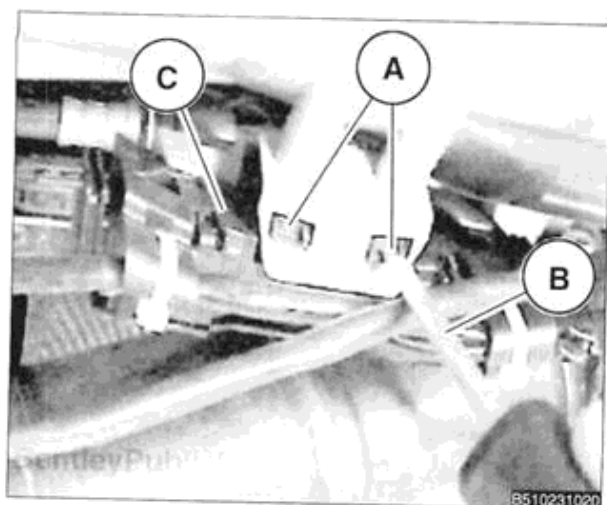
◀ Detach electrical connector (arrow) from oil level sensor. Unclip harness from harness support clips.



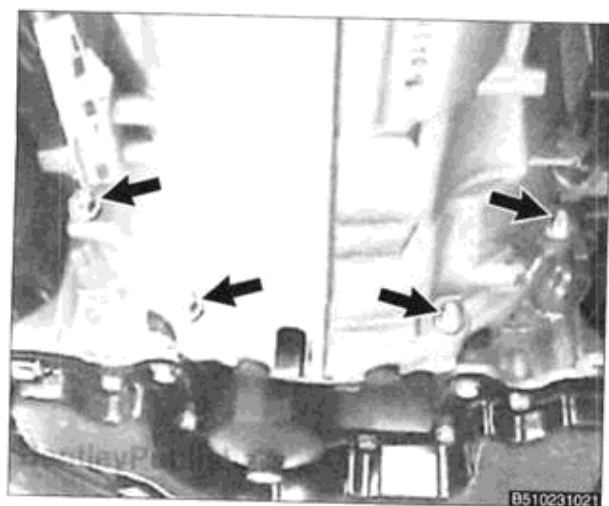
◀ Detach electrical connector (arrow) from hydraulic unit components electrical plug.

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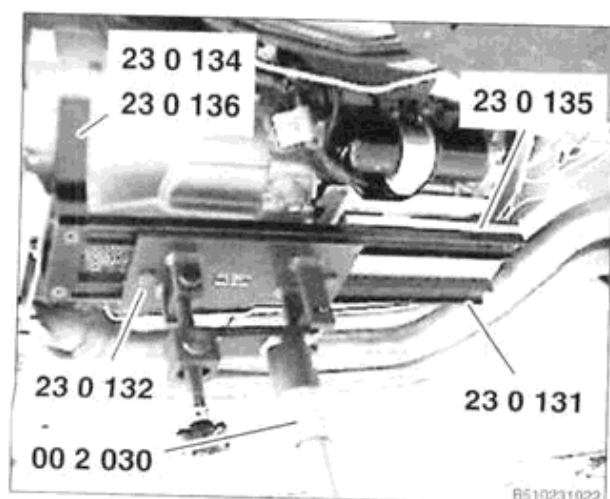
Transmission, removing and installing



Press in retaining lugs (A) with screwdriver (B) and remove cable duct (C). Tie wire loom to one side.



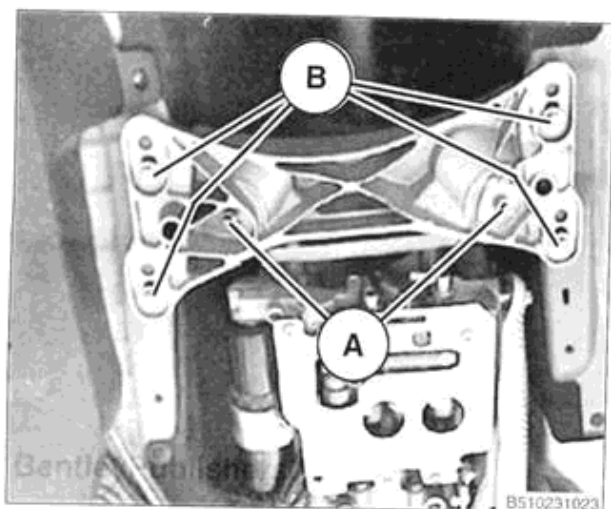
Remove transmission bell housing bolts (arrows).



Support transmission with BMW special tools 00 2 030, 23 0 123, 23 0 131, 23 0 134, and 21 0 135.

Sequential Manual Gearbox (SMG) 231-17

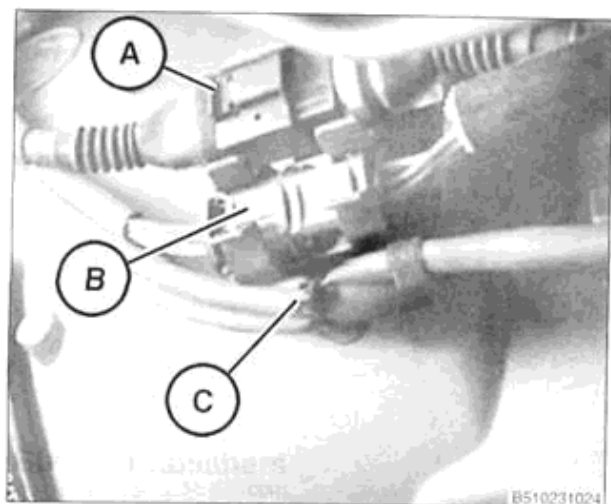
Transmission, removing and installing



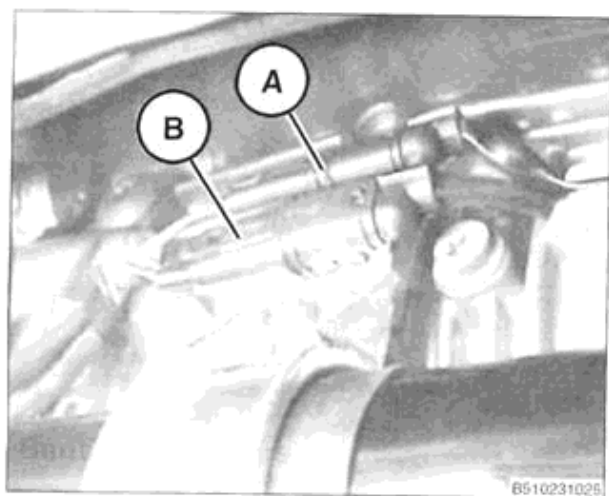
- Remove transmission mounting fasteners (A). Remove transmission rear support fasteners (B). Remove support.
- Remove rear driveshaft from transmission output flange:
 - Remove driveshaft center bearing support fasteners. Support center of driveshaft.
 - Unbolt rear driveshaft flex-disc from transmission flange.
 - Lower center of driveshaft sufficiently to disengage flex-disc from transmission output flange. Tie driveshaft to side.

CAUTION—

- To prevent damage to rear driveshaft CV joint, do not allow driveshaft to hang down unsupported.



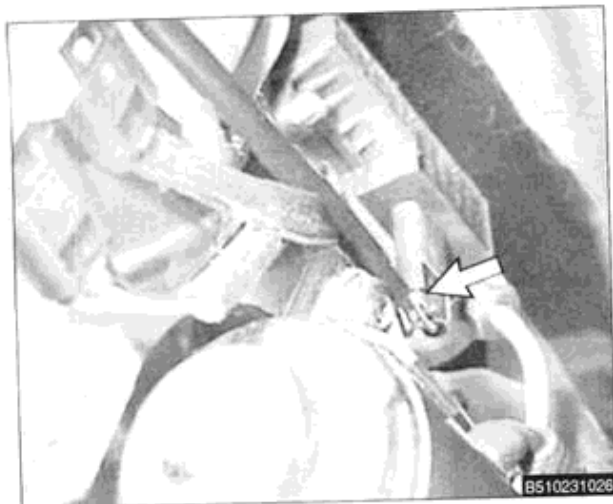
- Disconnect electrical harness connectors (A) and (B). Cut wire tie (C).



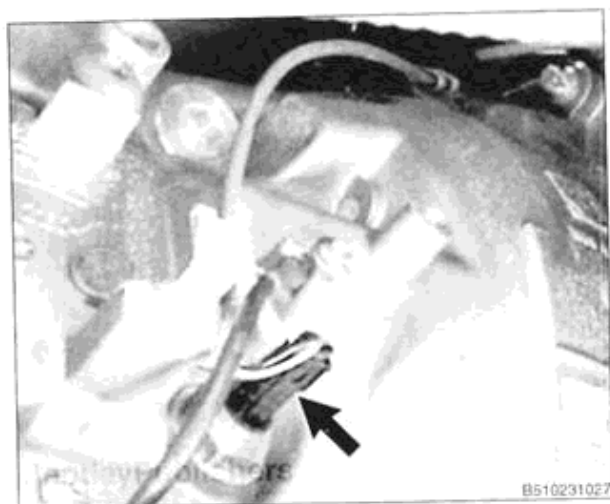
- Disconnect electrical harness connectors (A, B), uncoupling harness from bracket.

231-18 Sequential Manual Gearbox (SMG)

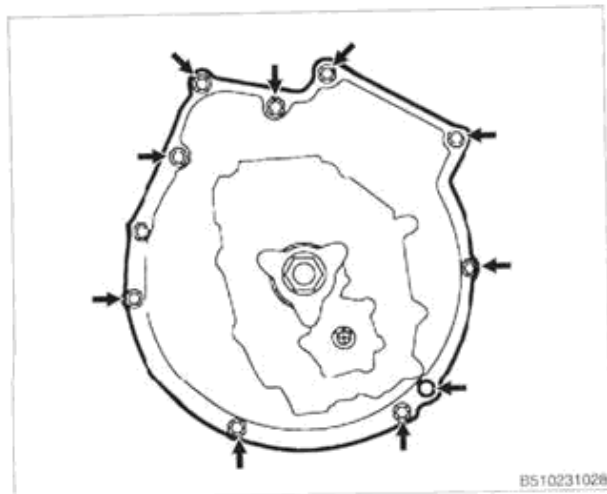
Transmission, removing and installing



- ◀ Disconnect electrical harness connector (**arrow**) from clutch travel sensor.



- ◀ Disconnect electrical harness connector (**arrow**) from sensor.



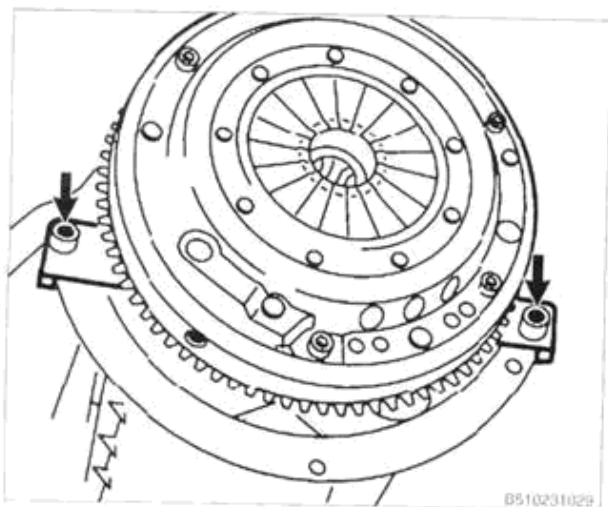
- ◀ Remove bell housing to engine block mounting bolts (**arrows**) and slide transmission off engine.

CAUTION—

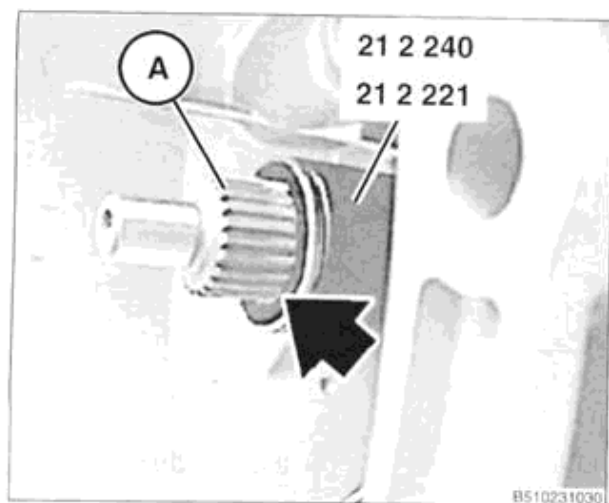
- Do not allow transmission to hang on input shaft while removing and installing as the clutch disc can be damaged.
- Tilting the engine to lower the transmission can lead to damage to various components in the engine compartment due to lack of clearance.

Sequential Manual Gearbox (SMG) 231-19

Transmission, removing and installing



- ⚠ Before installing transmission, make sure bell housing centering dowels (**arrows**) are intact and lined up correctly. Replace if damaged.



- ⚠ Remove and clean release bearing and release lever.
- Push grease scraper, BMW special tool 21 2 221, on input shaft (**A**) as far as it will go.
 - Grease splines of input shaft, using Unirex S2 grease.
 - Slide grease scraper off input shaft.

231-20 Sequential Manual Gearbox (SMG)

Transmission, removing and installing

- 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.
 - Install driveshaft and preload center bearing bracket. Use new nuts when mounting driveshaft to transmission flex disc and final drive. See **260 Driveshafts**.
 - Refill transmission with appropriate lubricant before starting or towing car. See **Transmission Fluid Service** in this repair group.
 - Check and clear fault codes from ECM and SMG control module memory.

Tightening torques

Front end reinforcement to front end (use new fasteners): • Stage 1 • Stage 2	56 Nm (41 ft-lb) additional 90°
Slave cylinder to transmission	22 Nm (16 ft-lb)
Transmission rear support to body (M8)	19 Nm (14 ft-lb)
Transmission mount to rear support (M8)	19 Nm (14 ft-lb)
Transmission to engine (use new aluminum fasteners): • M10 x 30 mm - Stage 1 - Stage 2 • M10 x 85 mm - Stage 1 - Stage 2 • M12 - Stage 1 - Stage 2	20 Nm additional 90° - 110° 20 Nm additional 180° - 200° 25 Nm additional 130° + 20°
Vibration damper to transmission rear support (M10)	38 Nm (28 ft-lb)

