

2005 BMW Z4

2003-05 MANUAL TRANSMISSIONS Servicing

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Servicing

APPLICATION

MANUAL TRANSMISSION APPLICATION

Application	Transmission Model
Z4 (E85)	
2003-05 (2.5)	Getrag Type B+
2003-05 (3.0L)	ZF Type H & ZF Type H With SMG
5-Series (E60)	
525i & 530i (8/03 To 2005)	ZF Type H & ZF Type G

LUBRICATION

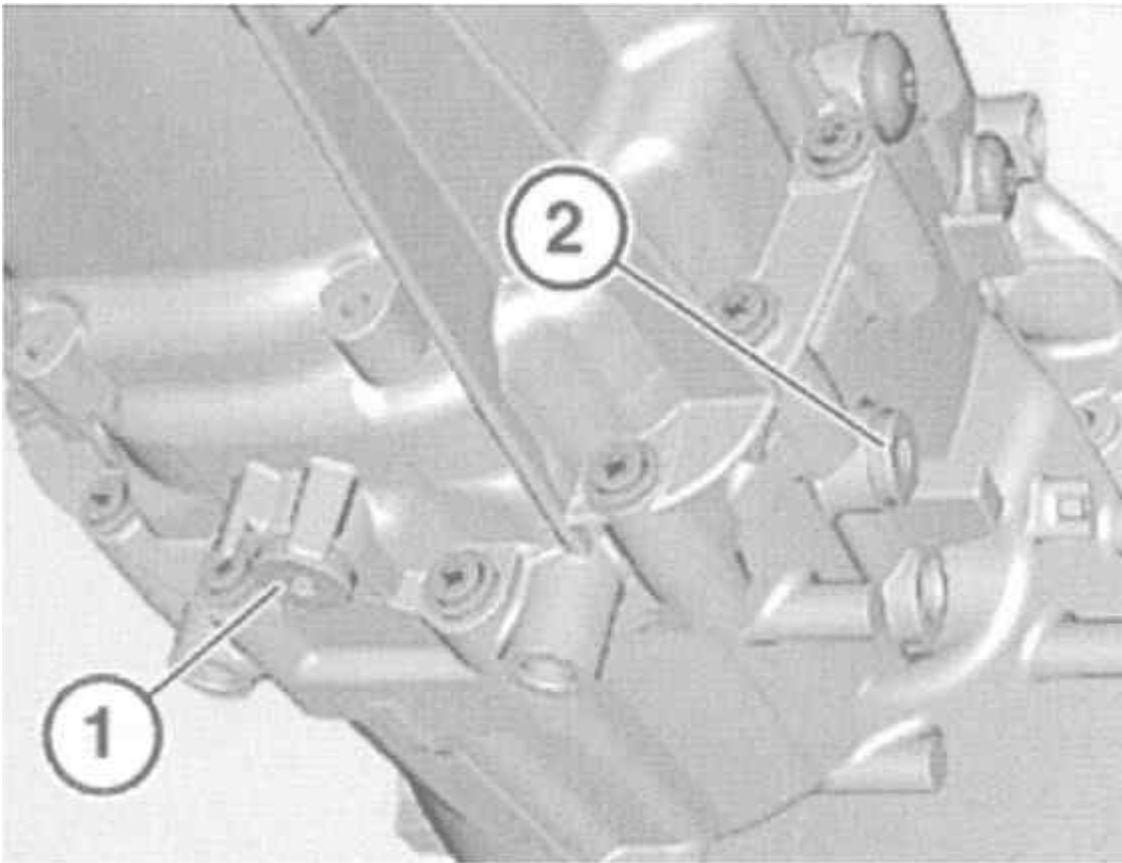
SERVICE INTERVALS

Inspect fluid level when vehicle is serviced. DO NOT drain fluid, transmission has lifetime fluid.

CHECKING FLUID LEVEL

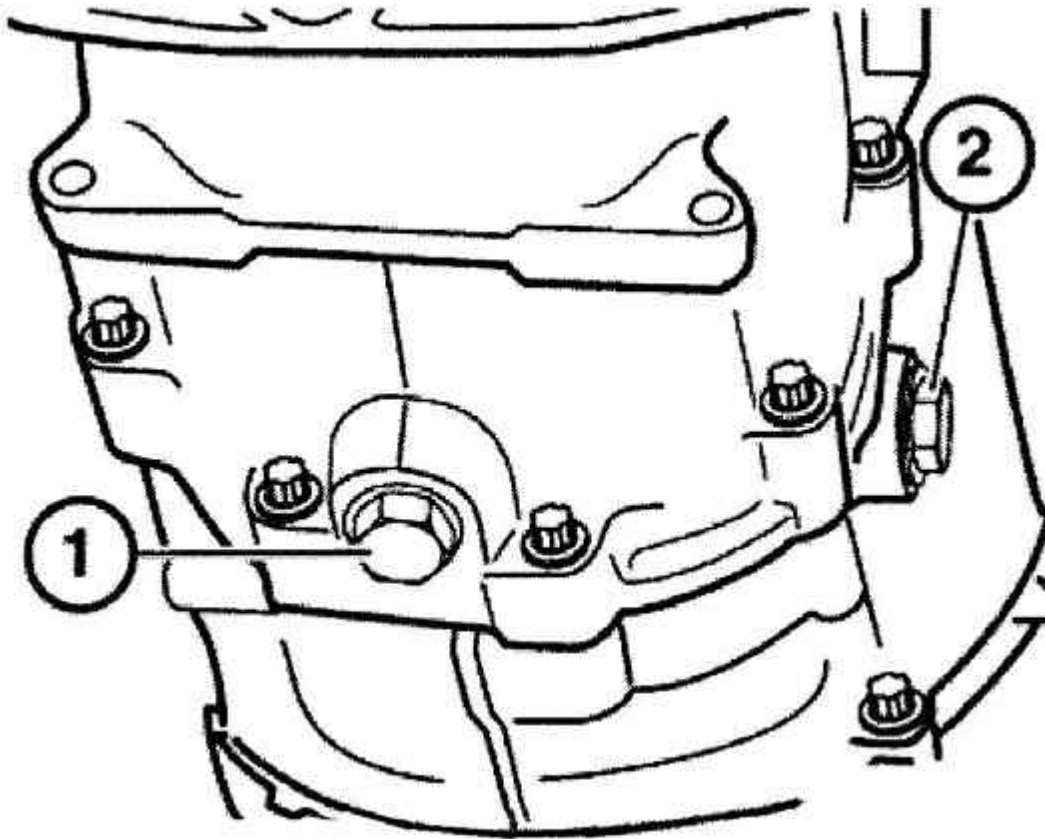
NOTE: **Numbers in text refer to numbers in figures.**

Check lubricant at fill hole (2). For E60 vehicles, see **Fig. 1** . For Z4, see **Fig. 2** . Lubricant should be at bottom of filler plug hole. Tighten Plug to specification. See **TORQUE SPECIFICATIONS** .



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Fig. 1: Locating Transmission Oil Drain & Filler Plug (E60)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 2: Locating Transmission Oil Drain Plug & Filler Plug (Z4)

Courtesy of BMW OF NORTH AMERICA, INC.

DRAINING/TOPPING UP GEAR OIL IN MANUAL TRANSMISSION

NOTE: Numbers in text refer to numbers in figures.

NOTE: Gearbox must be at normal operating temperature. For recommended fluid, see RECOMMENDED FLUID . For fluid capacity, see FLUID CAPACITIES .

Draining gear oil: release oil drain plug (1) and filler plug (2). For E60 vehicles, see Fig. 1 . For Z4, see Fig. 2 . Clean oil drain plug (1), screw in and tighten to specification. See TORQUE SPECIFICATIONS . Fill transmission with gear oil. until overflowing. Screw in filler plug (2). Tighten to specification. See TORQUE SPECIFICATIONS .

RECOMMENDED FLUID

For model years 1998-2003, all manual transmissions are filled with Esso/Exxon MTF-LT-1 lifetime fluid. A Yellow label with the letters MTF-LT-1 is located next to the oil filler plug. Except for models specified under **SERVICE INTERVALS** , no oil change is required for the service life of the transmission.

From model year 2004, some manual transmissions are filled with Castrol MTF-LT-2 lifetime fluid. This fluid has the same properties as the MTF-LT-1 fluid. The MTF-LT-1 fluid may be mixed or substituted for the MTF-LT-2 manual transmission fluid.

FLUID CAPACITIES

Fluid capacity is approximately 1.4 qts. (1.3L). Transmission should be filled to bottom of filler plug hole.

ADJUSTMENTS

GEARSHIFT LINKAGE

No external adjustment is necessary.

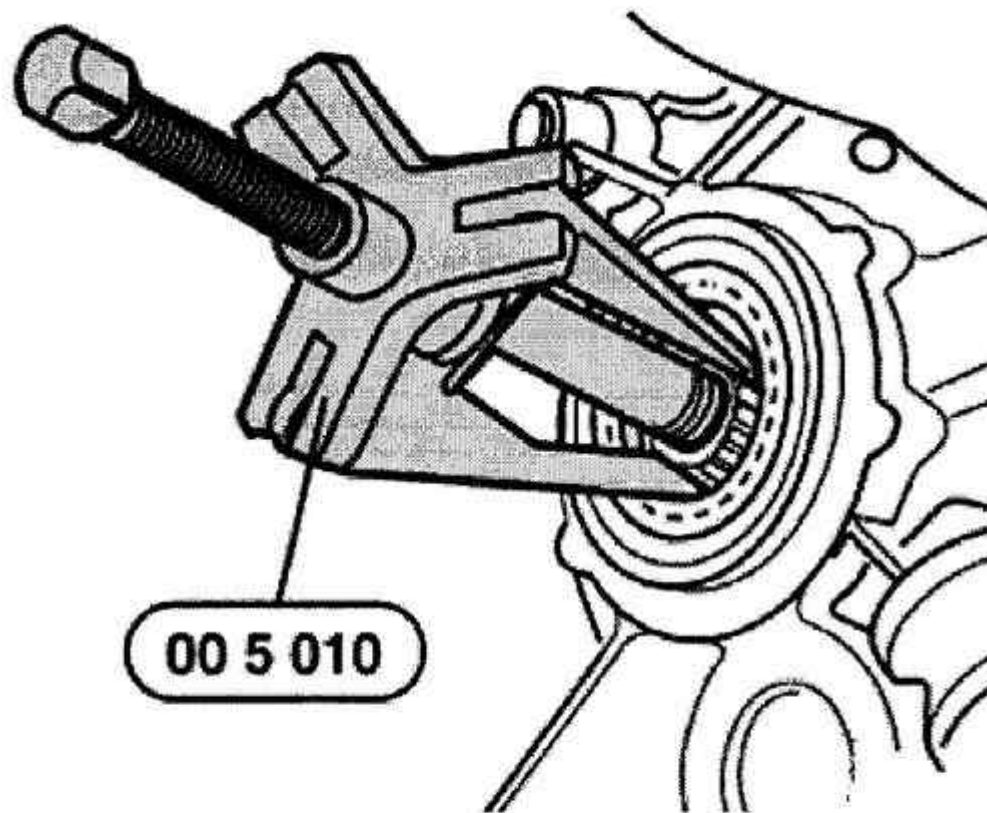
REMOVAL & INSTALLATION

REPLACING RADIAL SEAL FOR OUTPUT FLANGE (S5D 200G / 250G)

CAUTION: After completion of work, check transmission fluid level. See **CHECKING FLUID LEVEL** . Use only approved transmission fluid. See **RECOMMENDED FLUID** . Failure to comply with this instruction will result in serious damage to the transmission.

Remove output flange. See **Replacing Output Flange For Transmission (S5D 200G / 250G)** .

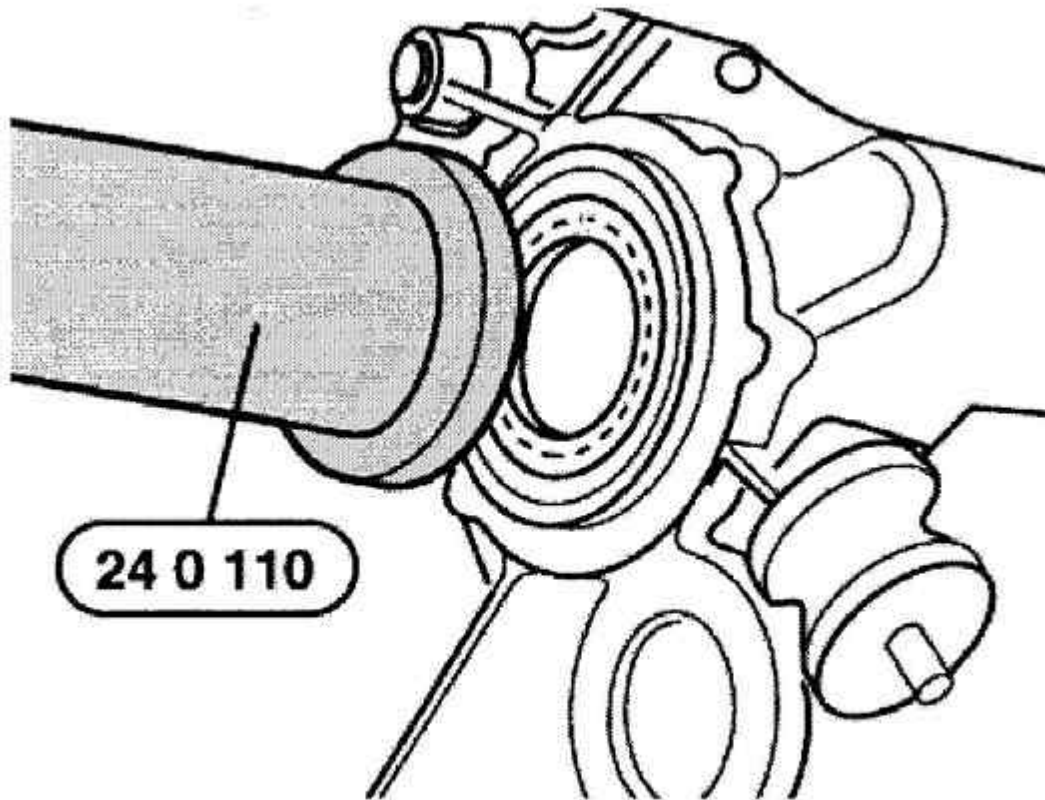
Remove radial seal with Special Tool (00 5 010). See **Fig. 3** .



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Fig. 3: Removing Radial Seal For Output Flange
Courtesy of BMW OF NORTH AMERICA, INC.

Installation: coat sealing lips of new radial seal with transmission oil. Drive in radial seal with Special Tool (24 0 110) and plastic hammer until flush. See **Fig. 4** .



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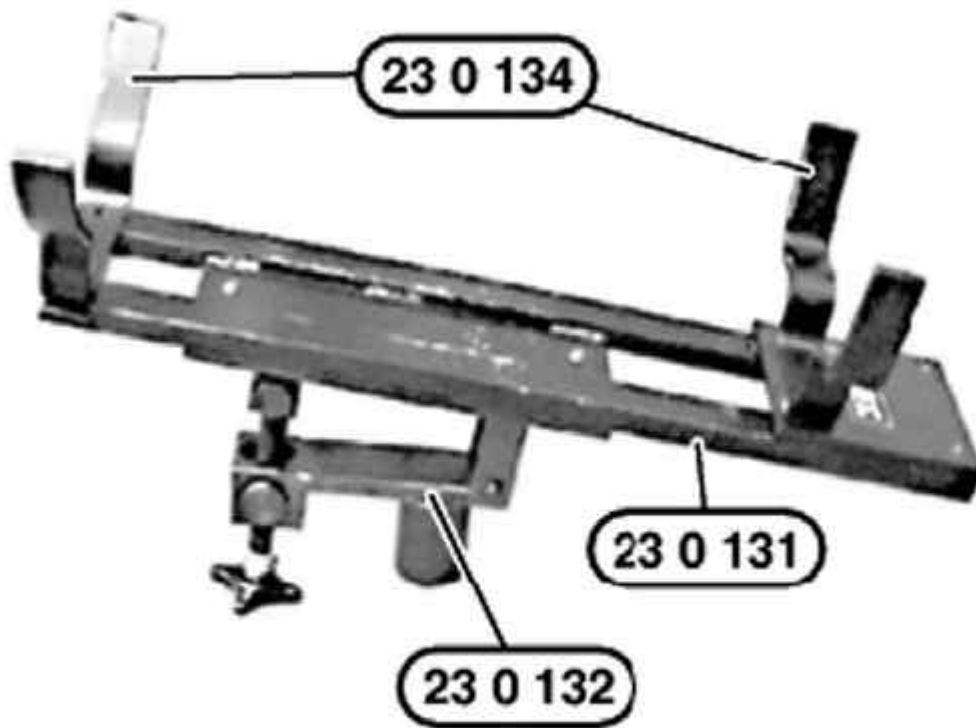
Fig. 4: Installing Radial Seal For Output Flange
Courtesy of BMW OF NORTH AMERICA, INC.

REPLACING RADIAL SHAFT SEAL FOR OUTPUT FLANGE (GS6-37BZ/DZ H-TRANSMISSION)

CAUTION: After completion of work, check transmission fluid level. See **CHECKING FLUID LEVEL** . Use only approved transmission fluid. See **RECOMMENDED FLUID** . Failure to comply with this instruction will result in serious damage to the transmission.

Remove exhaust system. See REMOVING AND INSTALLING COMPLETE EXHAUST SYSTEM (M54) .

Preparing Special Tool (23 0 130): screw both Special Tools (23 0 134) onto Special Tools (23 0 131) and (23 0 132). See **Fig. 5** . Observe markings.

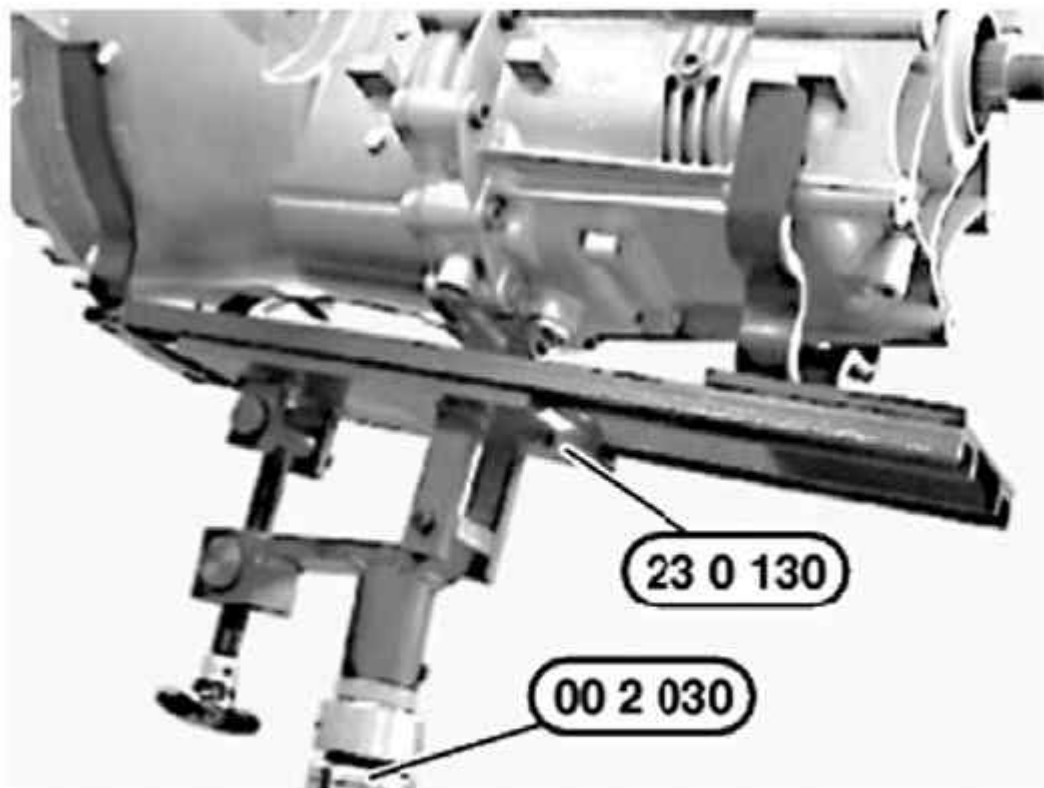


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Fig. 5: Preparing Special Tools

Courtesy of BMW OF NORTH AMERICA, INC.

Support transmission with Special Tools (00 2 030) and (23 0 130). See **Fig. 6** .

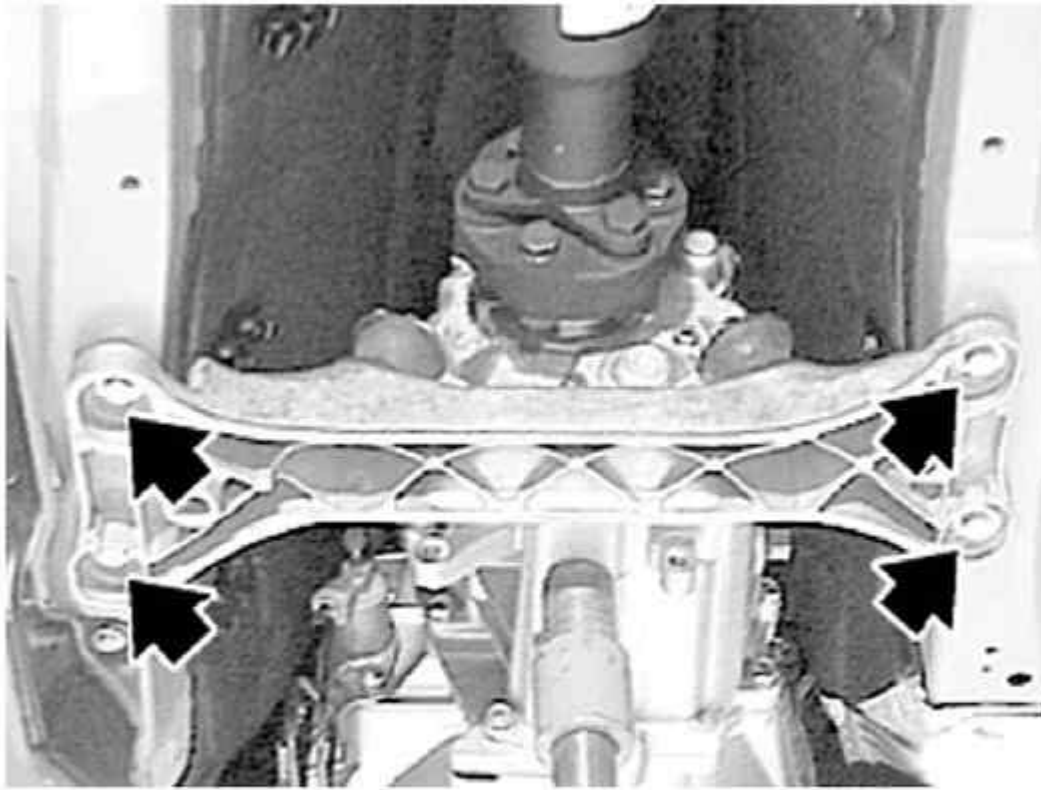


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Fig. 6: Supporting Transmission

Courtesy of BMW OF NORTH AMERICA, INC.

Remove transmission cross-member (E60/E46/E87/E63/E64). See **Fig. 7** .



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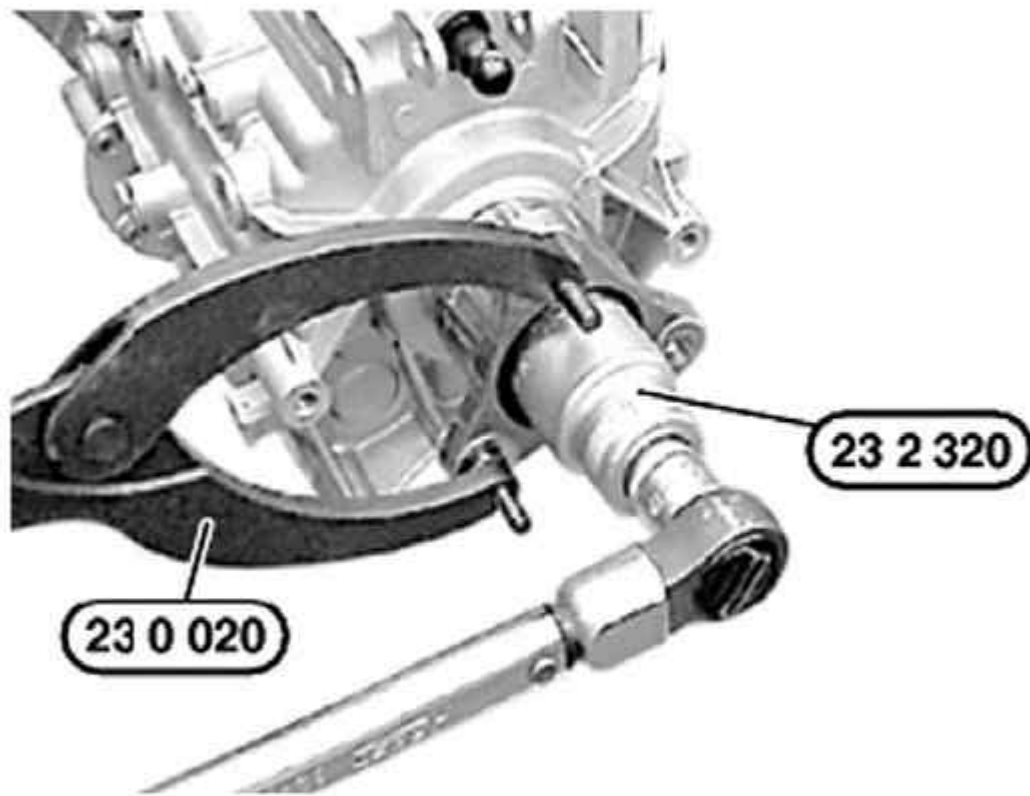
Fig. 7: Removing Cross-Member**Courtesy of BMW OF NORTH AMERICA, INC.**

Remove transmission bearing pedestal (E60/E53/E63/E64).

Unflange propeller shaft from transmission and tie up to one side. See REMOVING AND INSTALLING PROPELLER SHAFT (CARDAN UNIVERSAL JOINT) COMPLETELY .

WARNING: Scalding hazard. Fit flange wearing suitable protective gloves only.

Brace output flange with Special Tool (23 0 020). See **Fig. 8** . Release collar nut with Special Tool (23 2 320). Upon installation, mark flange with thermo pin and heat to min. 100°C. DO NOT drive on flange. Secure collar nut with Loctite 243. Tighten to specification. See **TORQUE SPECIFICATIONS** .

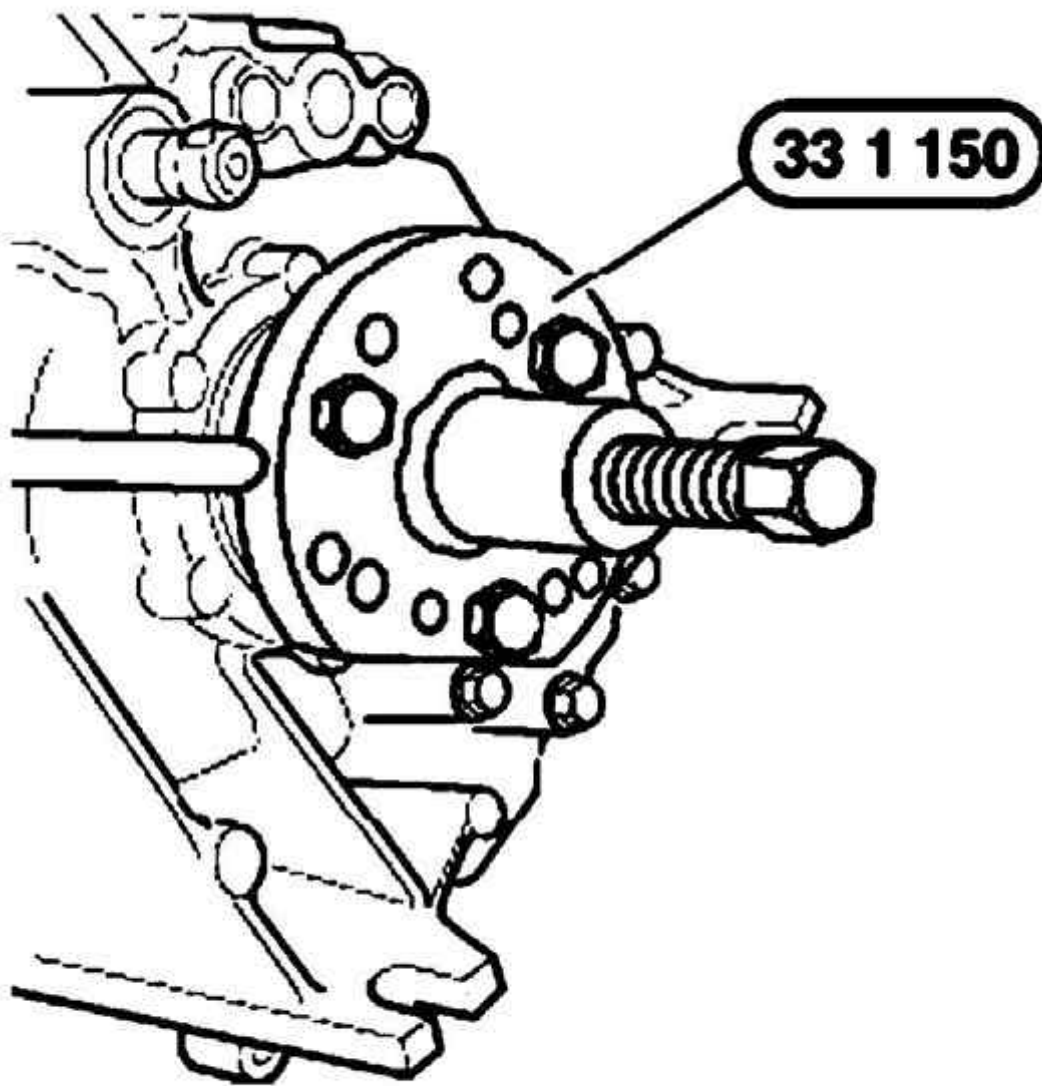


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Fig. 8: Releasing Collar Nut

Courtesy of BMW OF NORTH AMERICA, INC.

Detach output flange with Special Tool (33 1 150) from output shaft. See **Fig. 9** .



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Fig. 9: Detaching Output Flange
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw on Special Tool (23 3 161). Push special tool over output shaft and screw firmly into sealing ring. See **Fig. 10** .

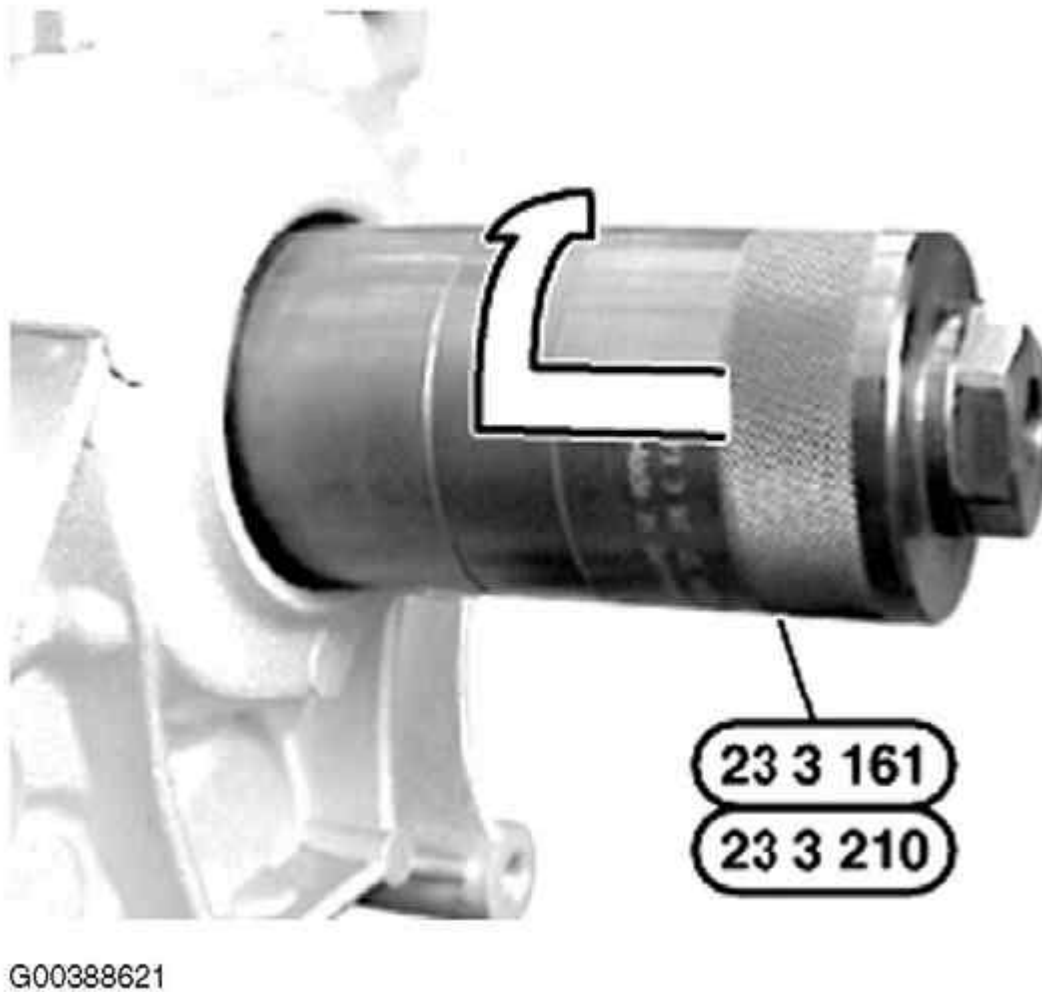
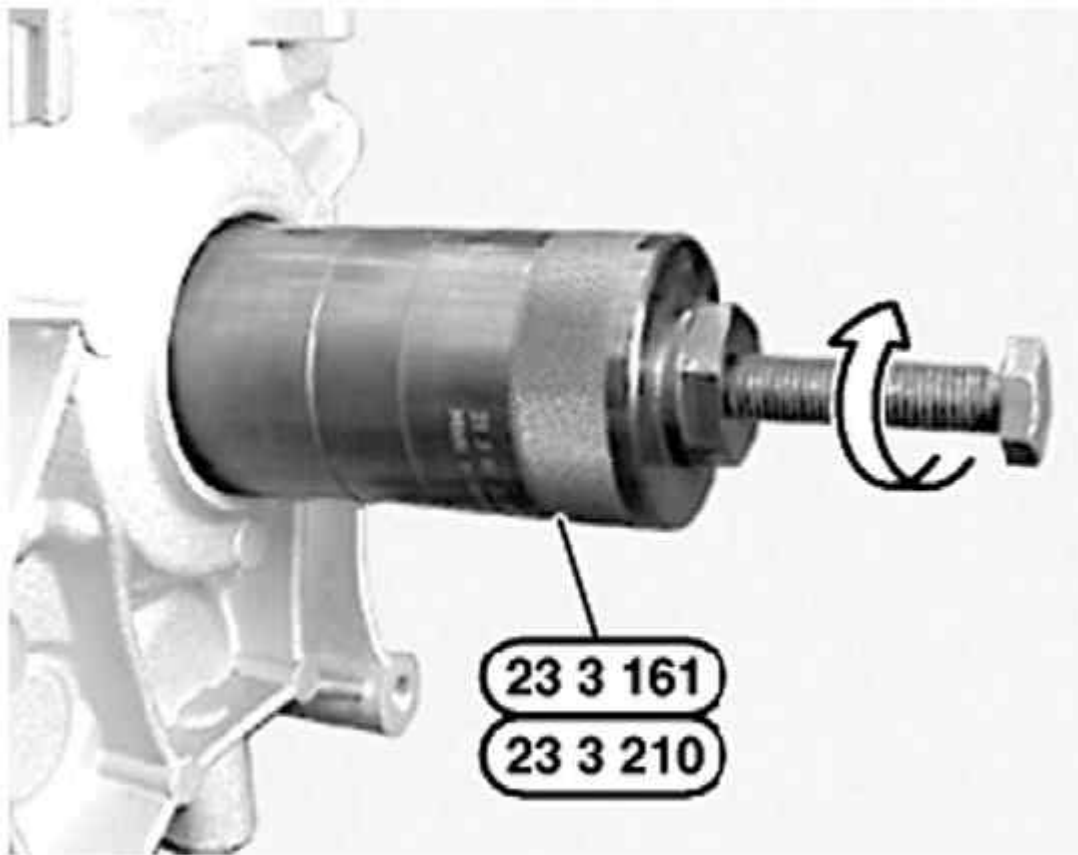


Fig. 10: Screwing Special Tool Into Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

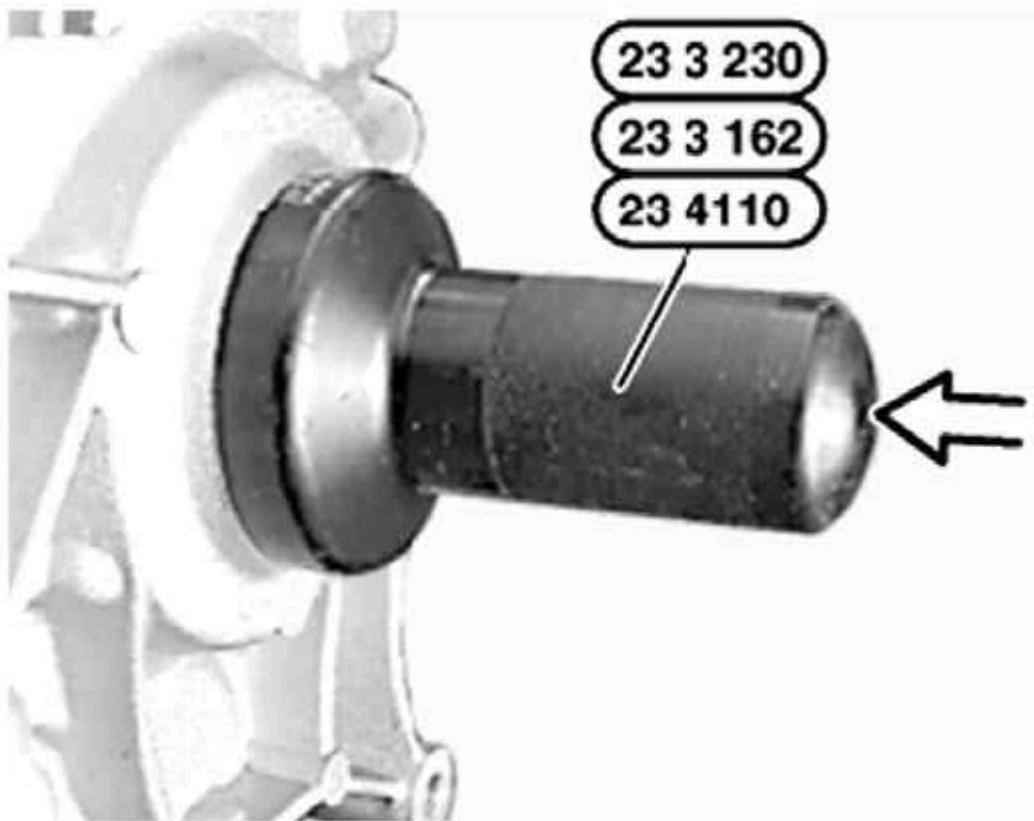
Insert screw into special tool again and continue turning until sealing ring is pulled out of transmission housing. See **Fig. 11** . If necessary, remove Woodruff key of sealing ring.



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Fig. 11: Pulling Sealing Ring Out Of Transmission Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Installation: coat sealing lips of new radial seal with gear oil. Drive in radial seal as far as it will go with Special Tool (23 3 162) and plastic hammer. See **Fig. 12** .



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Fig. 12: Driving In Radial Seal

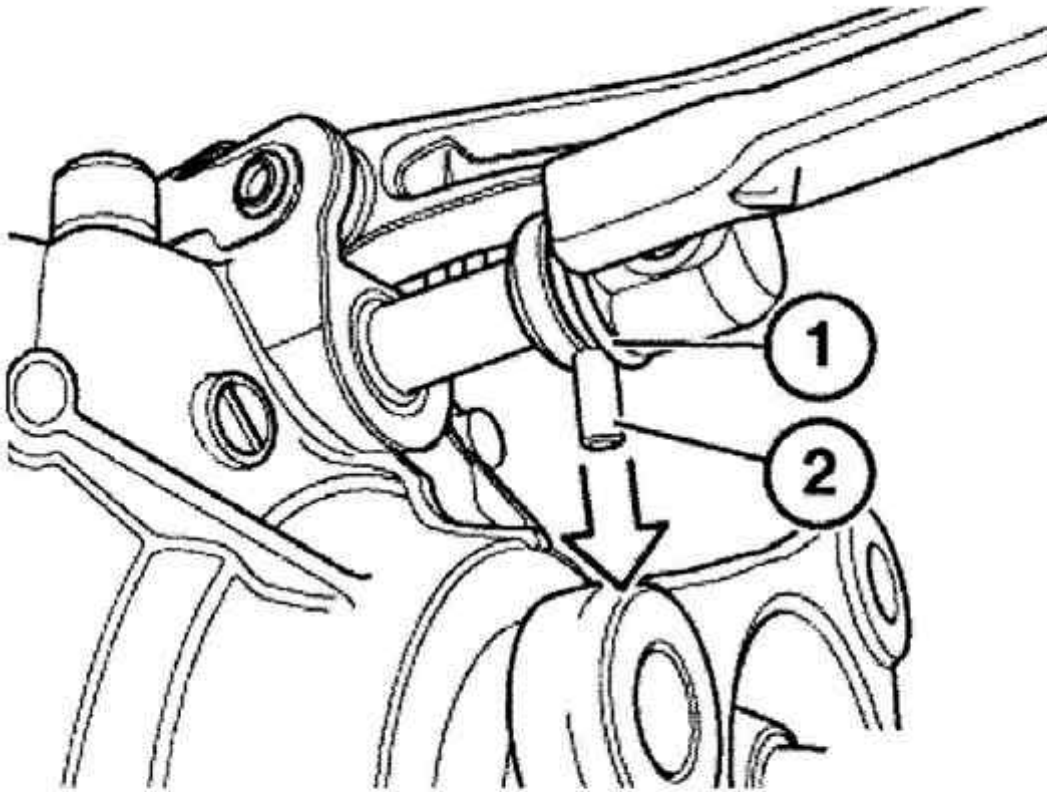
Courtesy of BMW OF NORTH AMERICA, INC.

REPLACING RADIAL SEAL FOR SELECTOR SHAFT (S5D 200G / 250G)**NOTE:** Numbers in text refer to numbers in figures.

CAUTION: After completion of work, check transmission fluid level. See **CHECKING FLUID LEVEL** . Use only approved transmission fluid. See **RECOMMENDED FLUID** . Failure to comply with this instruction will result in serious damage to the transmission.

Shift transmission into 2nd gear. Unflange propeller shaft from transmission and tie back to one side. See **REMOVING AND INSTALLING COMPLETE PROPELLER SHAFT** .

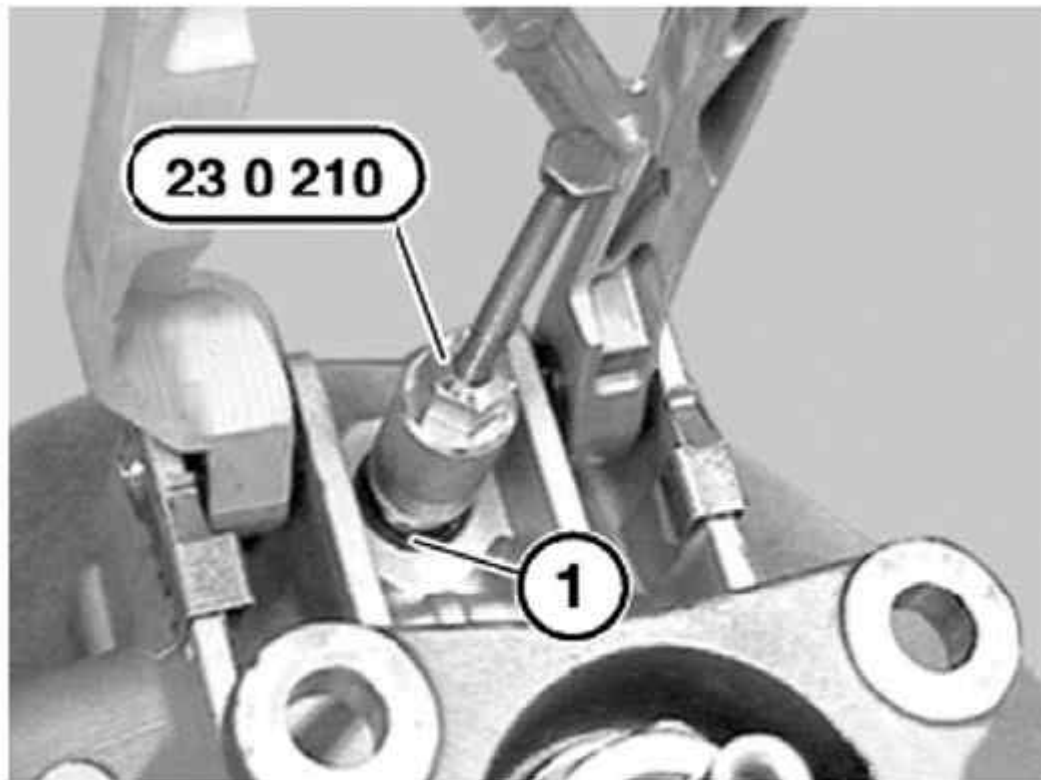
Lever retaining ring (1) out of groove with a small screwdriver. See **Fig. 13** . Push retaining ring (1) towards rear. Drive out straight pin (2).



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Fig. 13: Removing Retaining Ring**Courtesy of BMW OF NORTH AMERICA, INC.**

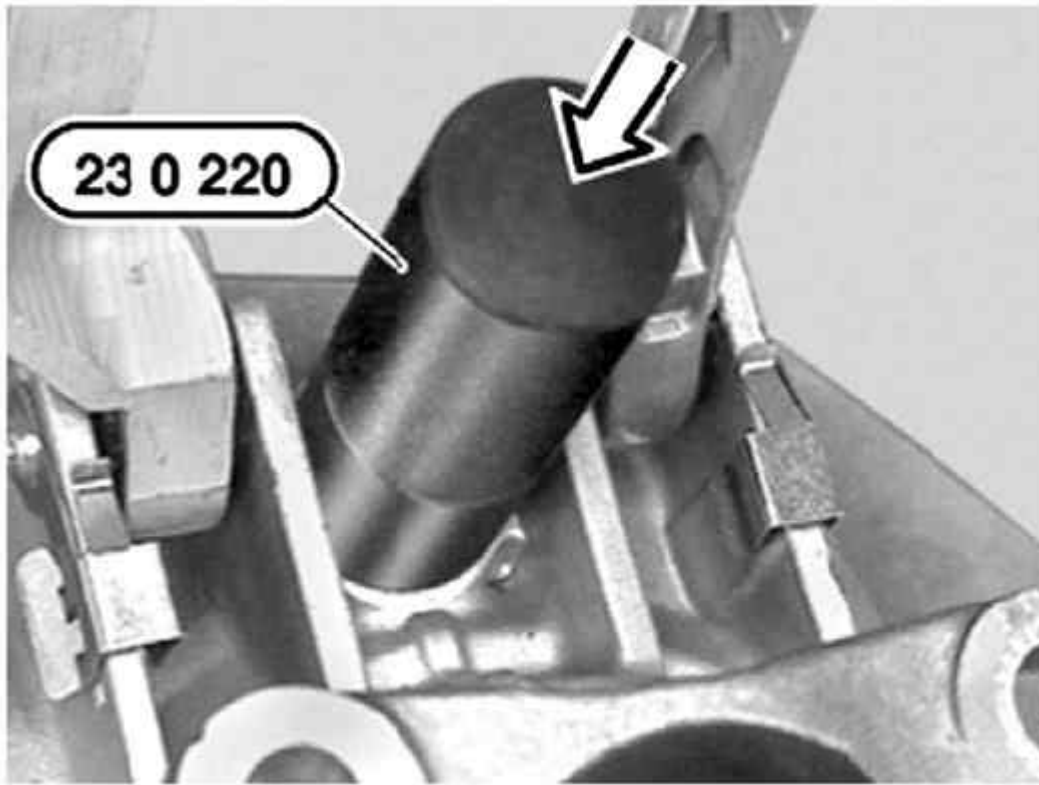
Screw in Special Tool (23 0 210) until it is firmly connected to radial seal (1). See **Fig. 14** . Pull out radial seal with Special Tool (23 0 210).



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Fig. 14: Pulling Out Radial Seal For Selector Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Coat sealing lips of radial seal and selector shaft with gear oil. Drive in radial seal with Special Tool (23 0 220). See **Fig. 15** .



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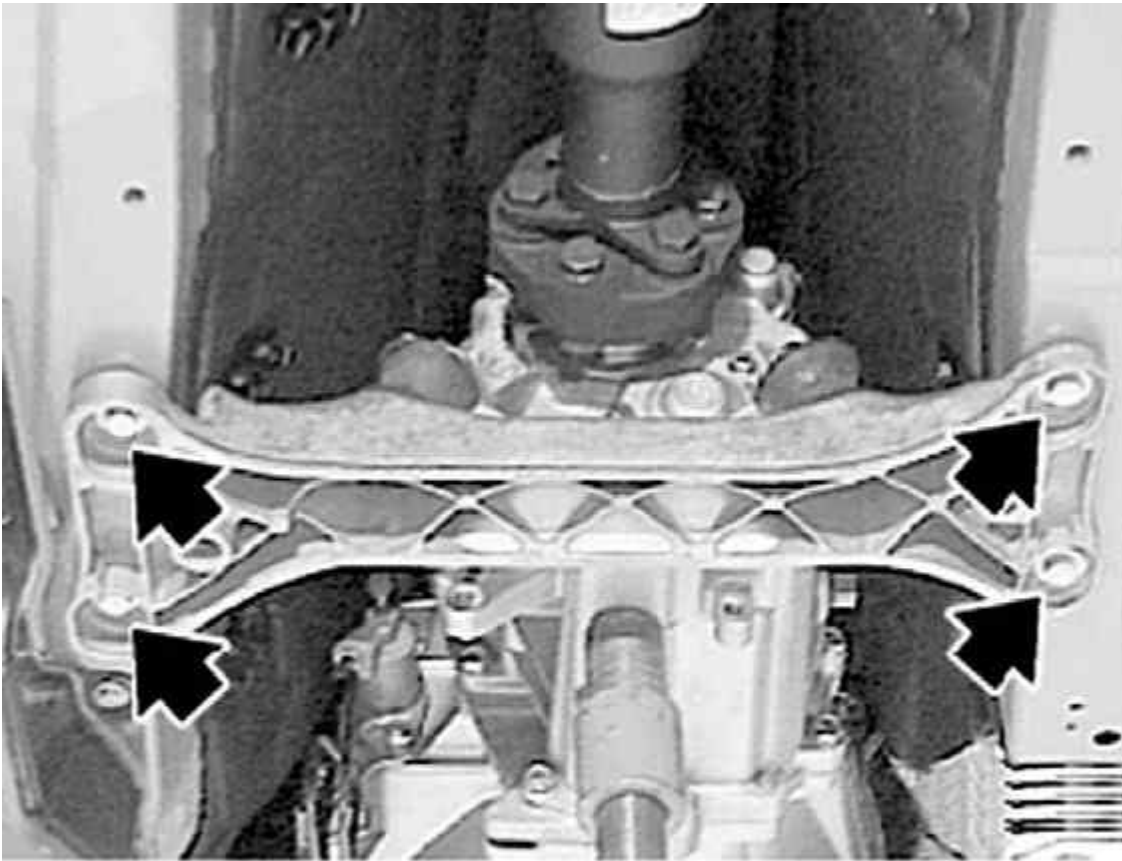
Fig. 15: Driving In Radial Seal For Selector Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

REPLACING OUTPUT FLANGE FOR TRANSMISSION (S5D 200G / 250G)

CAUTION: After completion of work, check transmission fluid level. See CHECKING FLUID LEVEL . Use only approved transmission fluid. See RECOMMENDED FLUID . Failure to comply with this instruction will result in serious damage to the transmission.

Unflange propeller shaft and tie up to one side. See REMOVING AND INSTALLING COMPLETE PROPELLER SHAFT . If necessary, remove heat shields. Support transmission.

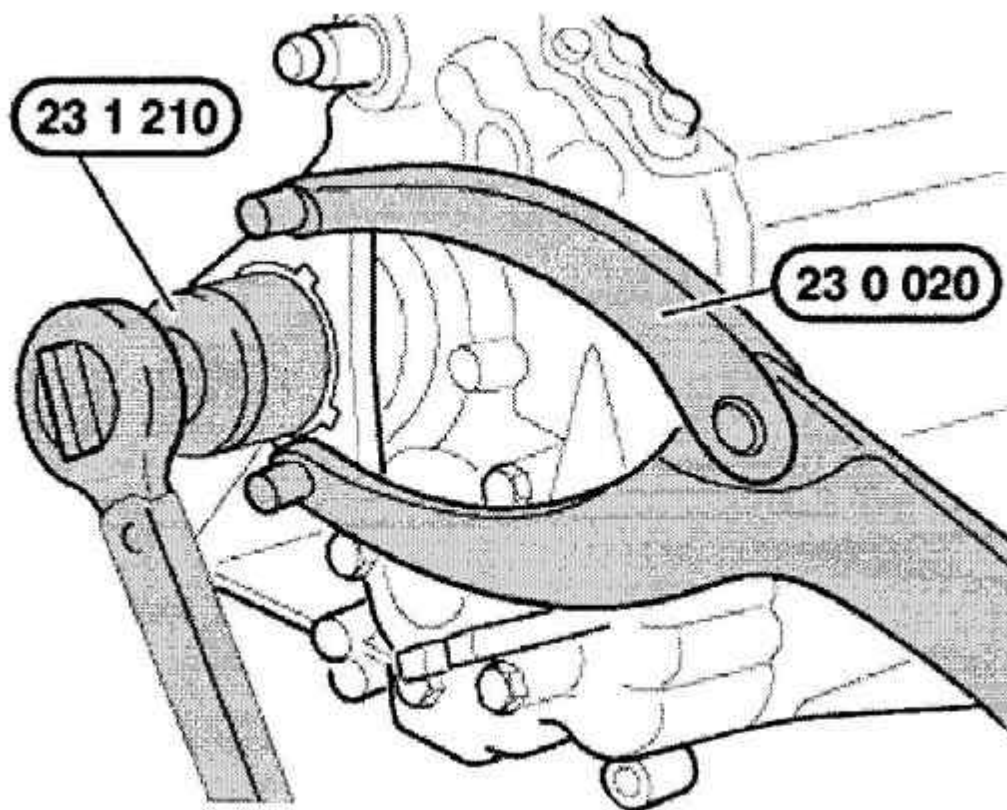
Release screws on cross-member. See **Fig. 16** . Lower transmission. Upon installation, tighten screws to specification. See TORQUE SPECIFICATIONS .



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Fig. 16: Locating Screws On Cross-Member
Courtesy of BMW OF NORTH AMERICA, INC.

Brace output flange with Special Tool (23 0 020). See **Fig. 17** . Unfasten collar nut with Special Tool (23 1 210). Upon installation, insert collar nut with Loctite 243 screw securing adhesive and tighten to specification. See **TORQUE SPECIFICATIONS** .



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Fig. 17: Removing Collar Nut

Courtesy of BMW OF NORTH AMERICA, INC.

Detach output flange with Special Tool (33 1 150) from output shaft. See **Fig. 18**.

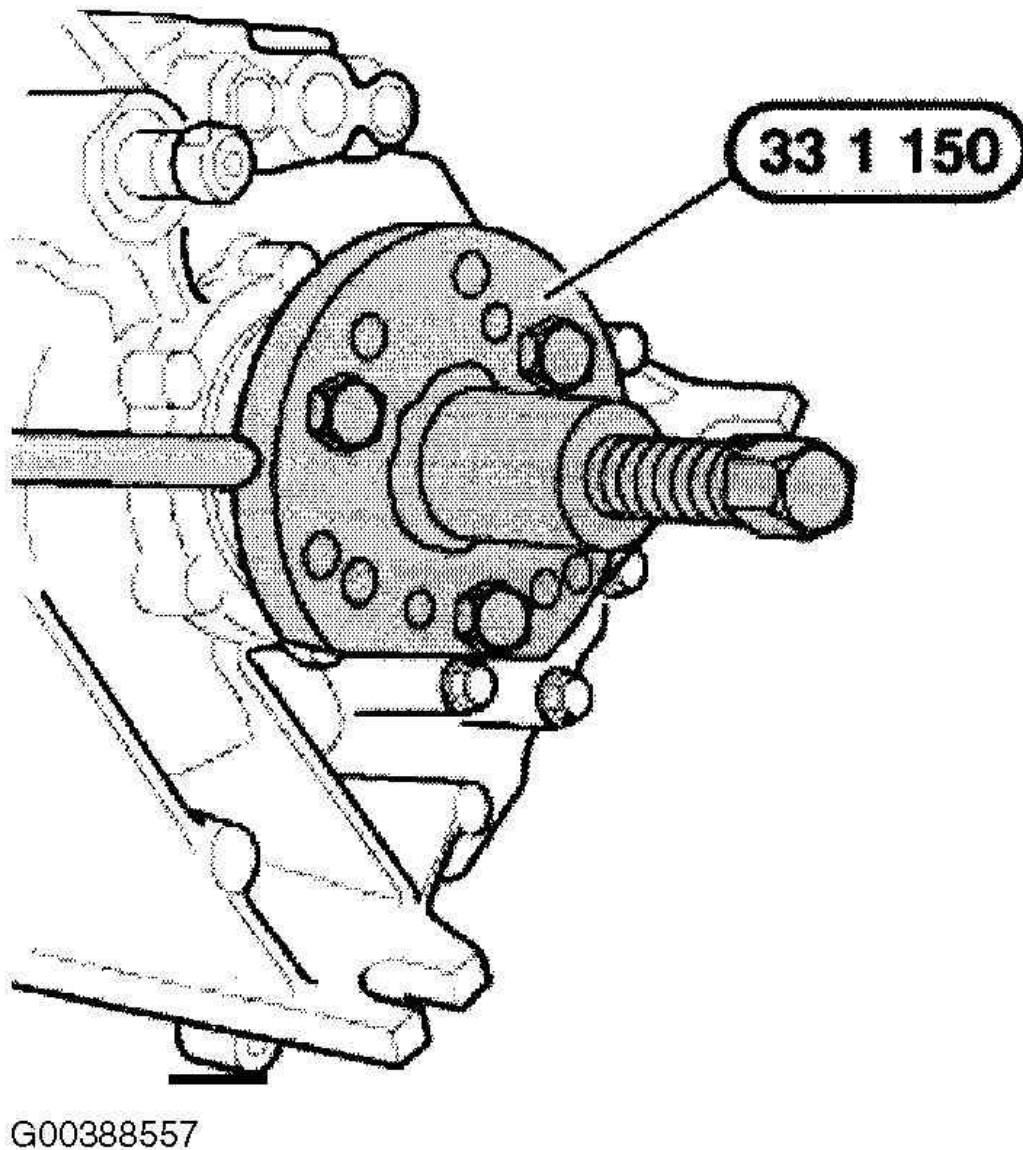


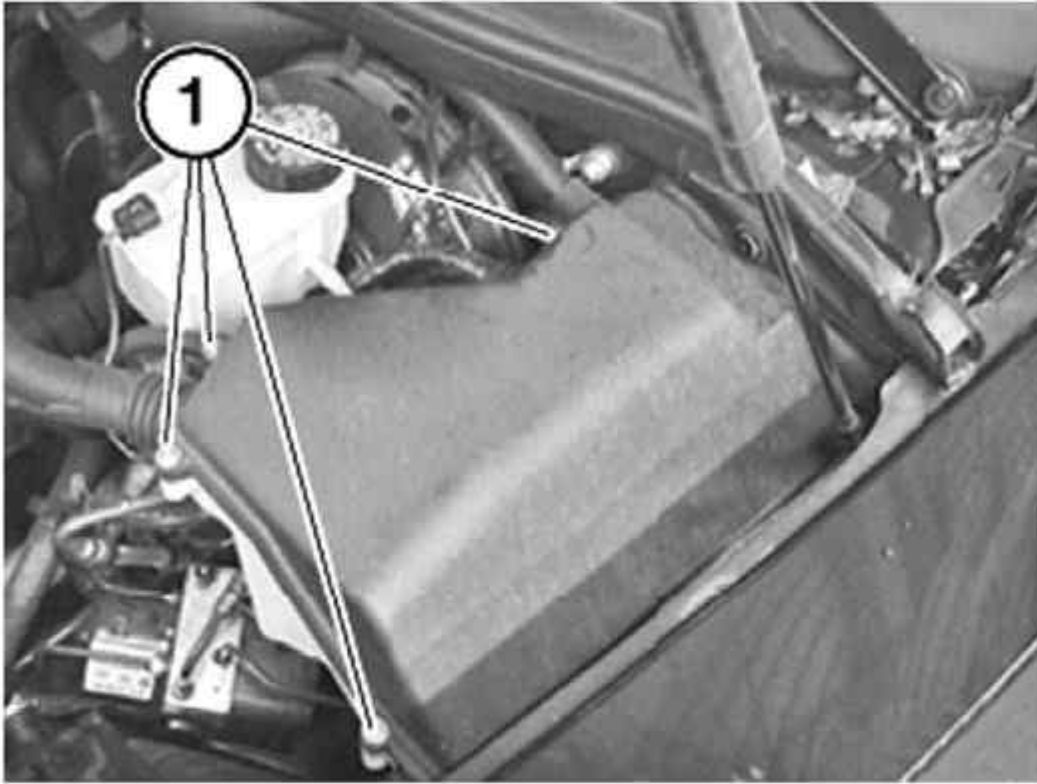
Fig. 18: Removing Output Flange

Courtesy of BMW OF NORTH AMERICA, INC.

REMOVING HYDRAULIC PUMP RELAY (SMG)

NOTE: Numbers in text refer to numbers in figures.

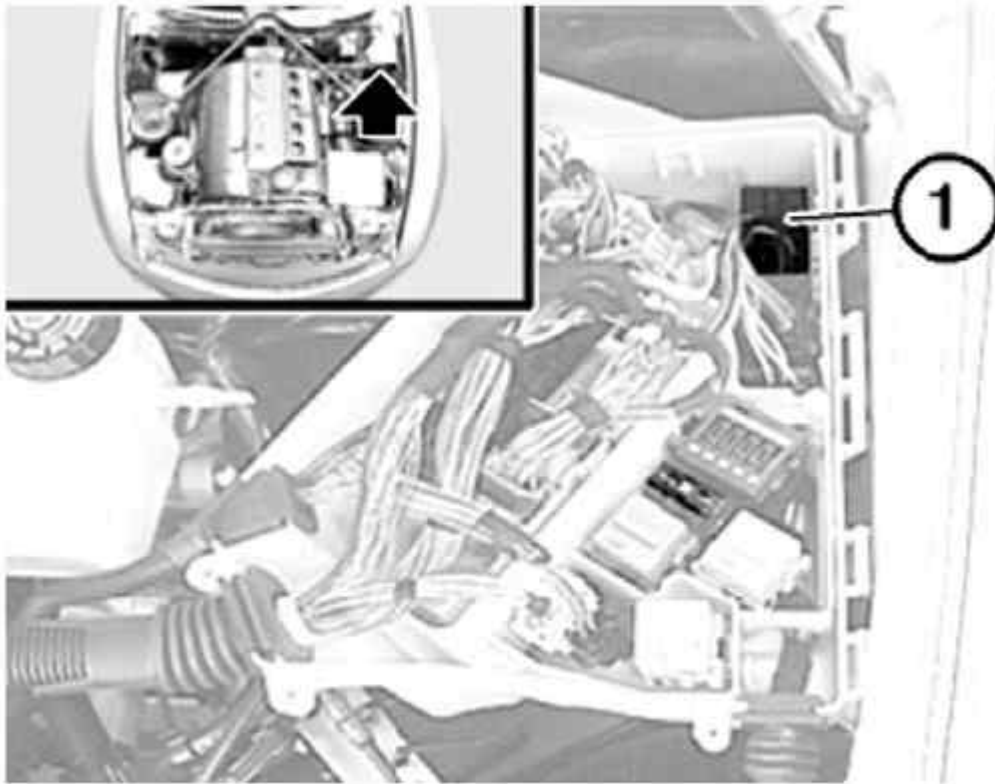
Release screws (1). See **Fig. 19** . Lift off electronics box cover.



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Fig. 19: Removing Electronics Box Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock and detach relay (1). See **Fig. 20** .



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Fig. 20: Locating Hydraulic Pump Relay

Courtesy of BMW OF NORTH AMERICA, INC.

REPLACING EXPANSION TANK GS6S37BZ (SMG)

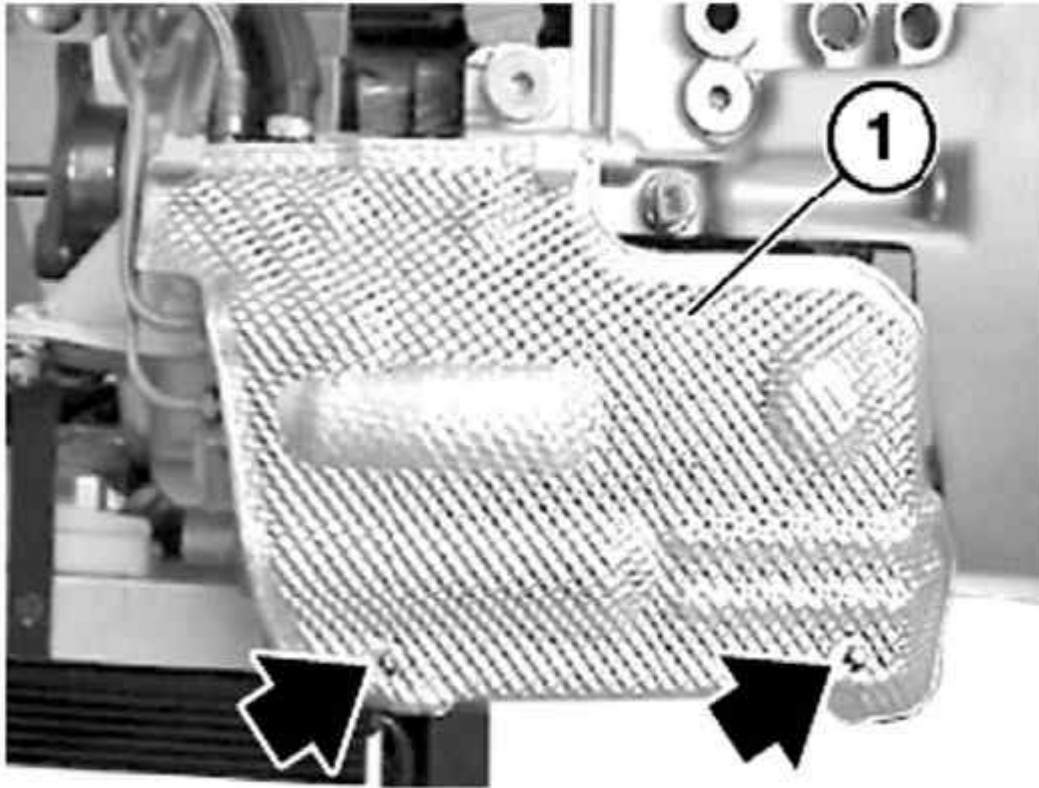
NOTE: Numbers in text refer to numbers in figures.

CAUTION: Before working on hydraulic system: reduce pressure in hydraulic system by means of service function in DIS Tester. Disconnect hydraulic pump relay in electronics box. DO NOT reconnect relay for entire duration of repair work.

NOTE: After completing work: check fluid level in hydraulic system by means of DIS Tester "Service Function". Perform "Teach in transmission" service function by means of DIS Tester.

Remove assembly underside protection (E60 only).

Release nuts and remove heat shield (1). See **Fig. 21** . Upon installation, Tighten to specification. See **TORQUE SPECIFICATIONS** .

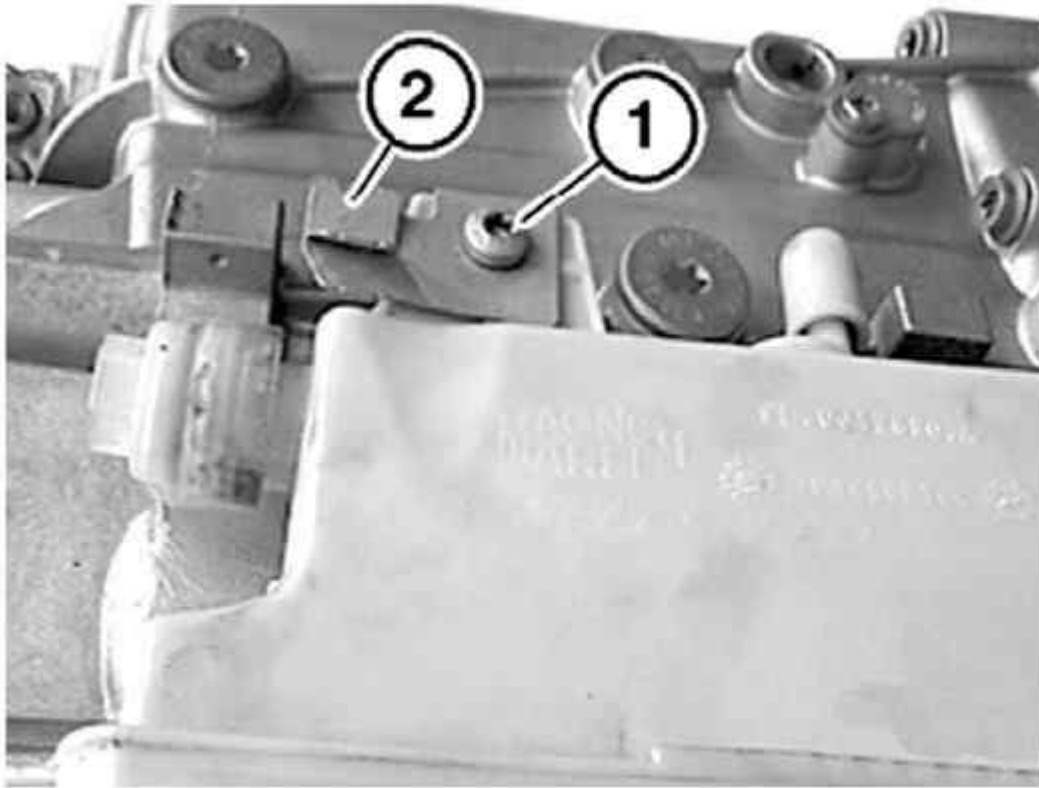


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Fig. 21: Removing Heat Shield

Courtesy of BMW OF NORTH AMERICA, INC.

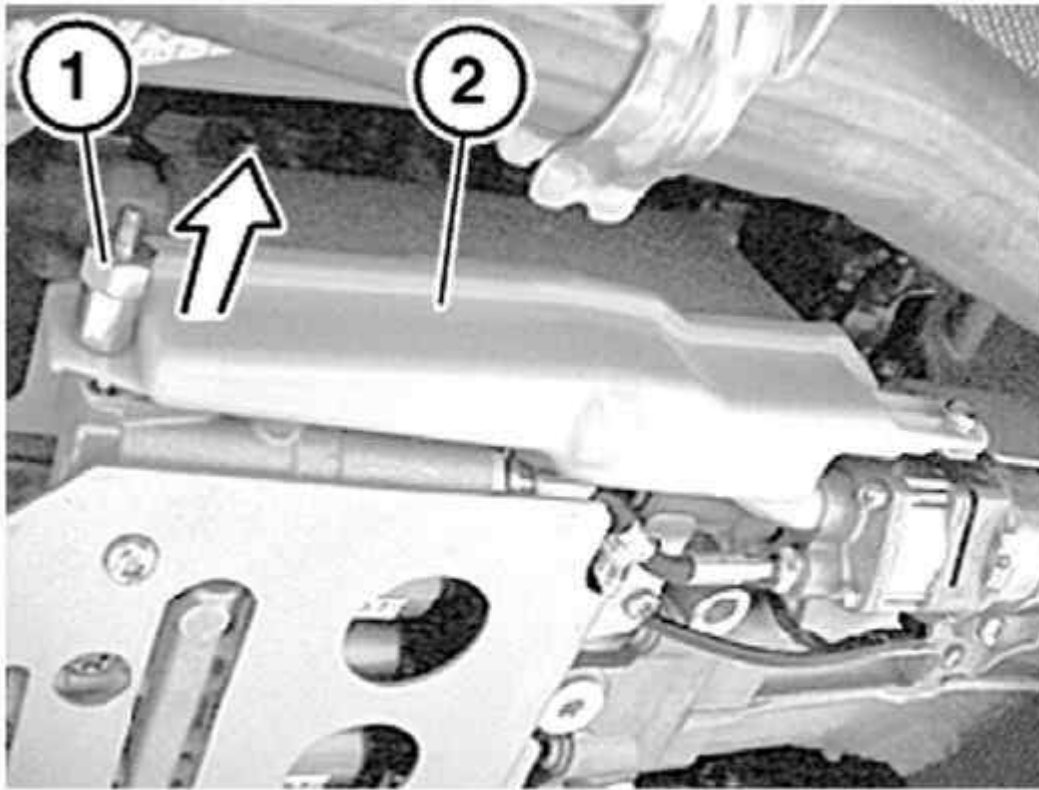
Unscrew bolt (1). See **Fig. 22** . Upon installation, make sure retainer (2) for heat shield is correctly positioned. Tighten to specification. See **TORQUE SPECIFICATIONS** .



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Fig. 22: Locating Bolt**Courtesy of BMW OF NORTH AMERICA, INC.**

Release stud bolt (1) and screw (2). See **Fig. 23** . Remove expansion tank in direction of arrow. Upon installation, replace both sealing rings. Grease sealing rings. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS** .



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Fig. 23: Removing Expansion Tank From Valve Block
Courtesy of BMW OF NORTH AMERICA, INC.

REPLACING PRESSURE SENSOR GS6S37BZ (SMG)

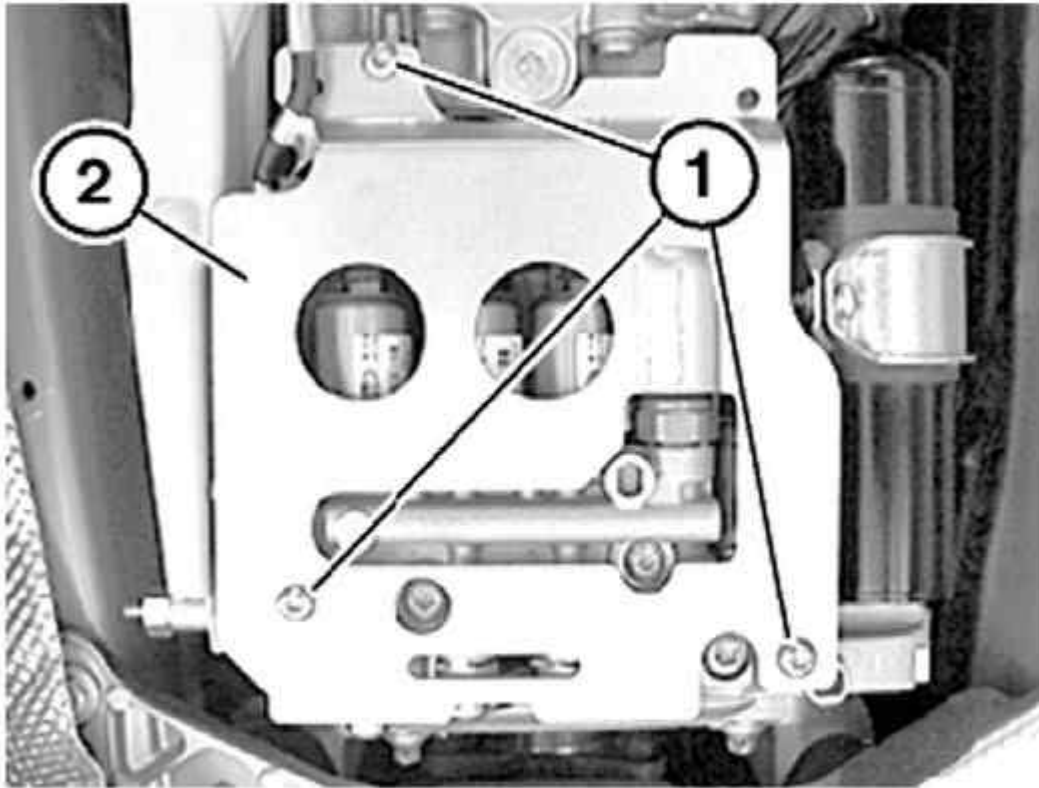
NOTE: Numbers in text refer to numbers in figures.

CAUTION: Before working on hydraulic system: reduce pressure in hydraulic system by means of service function in DIS Tester. Disconnect hydraulic pump relay in electronics box. DO NOT reconnect relay for entire duration of repair work.

NOTE: After completing work: check fluid level in hydraulic system by means of DIS Tester "Service Function". Perform "Teach in transmission" service function by means of DIS Tester.

Remove assembly underside protection (E60 only).

Release screws (1) and remove protective plate. See **Fig. 24** . Upon installation, tighten screws to specification. See **TORQUE SPECIFICATIONS** .

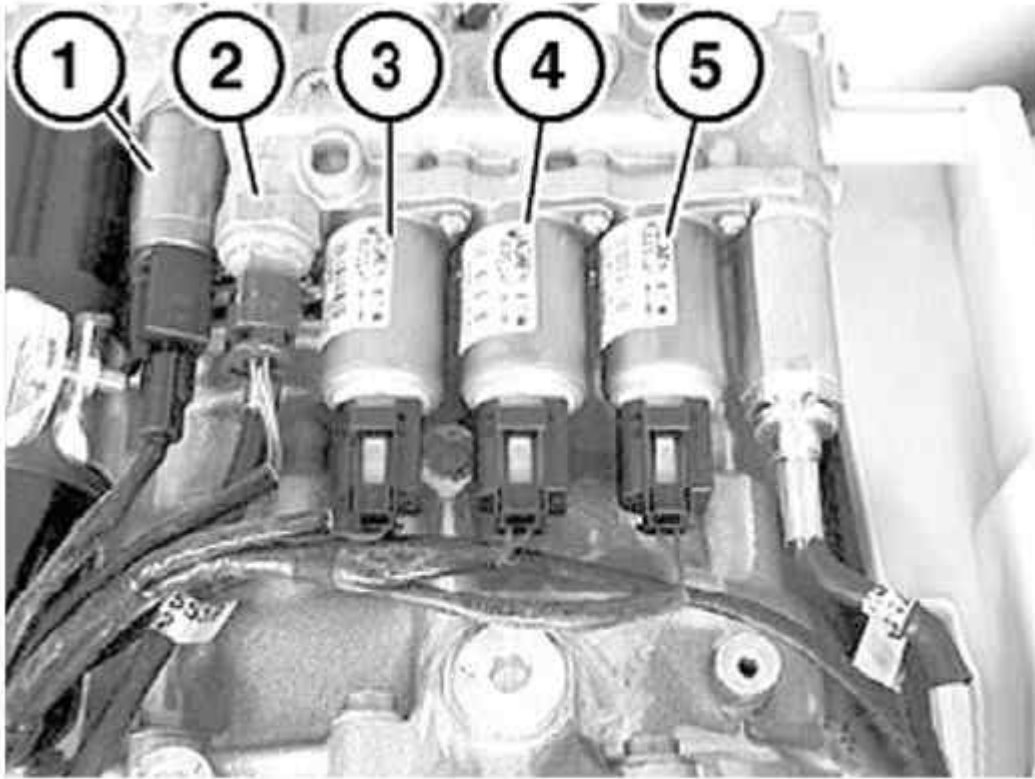


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Fig. 24: Removing Protective Plate

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug and release pressure sensor (2). See **Fig. 25** . Upon installation, replace sealing ring. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS** .



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Fig. 25: Releasing Pressure Sensor

Courtesy of BMW OF NORTH AMERICA, INC.

REPLACING SOLENOID VALVE EV3 FOR SELECTION ANGLE BRAKE GS6S37BZ (SMG)

NOTE: Numbers in text refer to numbers in figures.

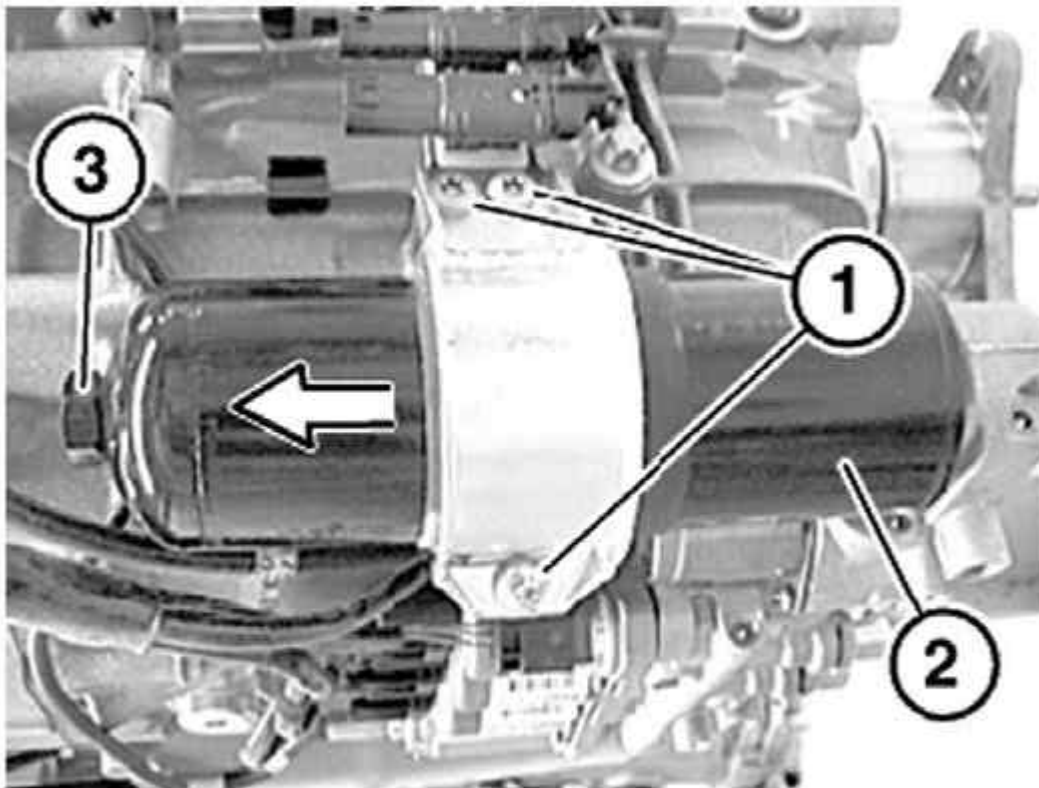
CAUTION: Before working on hydraulic system: reduce pressure in hydraulic system by means of service function in DIS Tester. Disconnect hydraulic pump relay in electronics box. DO NOT reconnect relay for entire duration of repair work.

NOTE: After completing work: check fluid level in hydraulic system by means of DIS Tester "Service Function". Perform "Teach in transmission" service function by means of DIS Tester.

Remove assembly underside protection (E60 only).

Release nuts and remove heat shield (1). See **Fig. 21** . Upon installation, tighten nuts to specification. See **TORQUE SPECIFICATIONS** .

Loosen screws (1). See **Fig. 26** . Release pressure accumulator (2) at hexagon head (3). Upon installation, tighten fasteners to specification. See **TORQUE SPECIFICATIONS** .



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Fig. 26: Releasing Pressure Accumulator At Hexagon Head
Courtesy of BMW OF NORTH AMERICA, INC.

Installation: replace sealing ring (1). See **Fig. 27** . Pay attention to installation position of sealing ring.



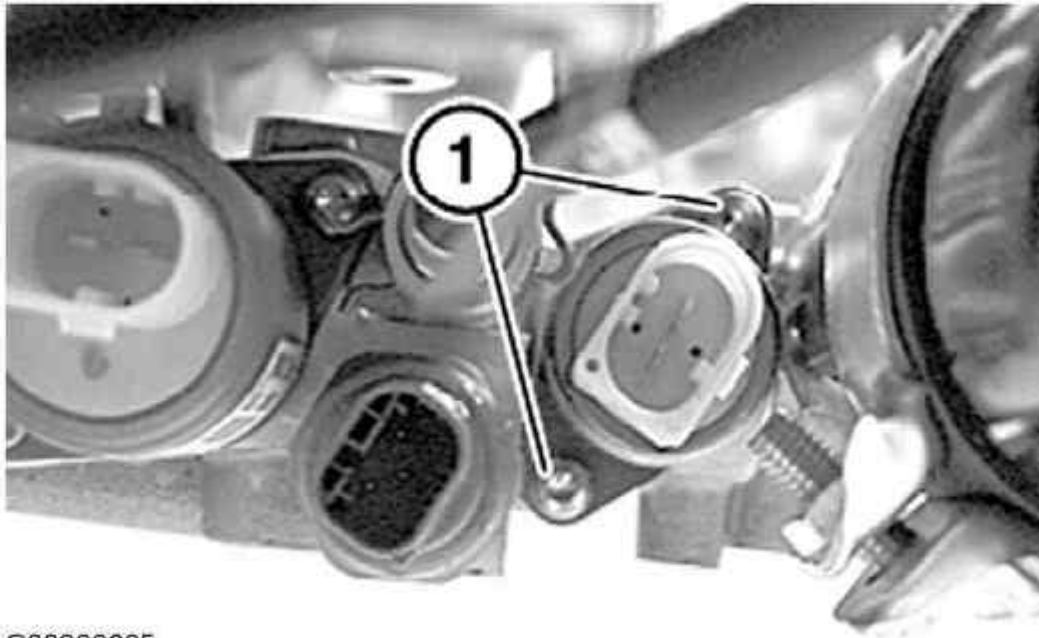
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Fig. 27: Locating Sealing Ring

Courtesy of BMW OF NORTH AMERICA, INC.

Detach plug from solenoid valve EV3 (1). See **Fig. 25** .

Release screws (1) and pull solenoid valve out. See **Fig. 28** . Upon installation, replace sealing ring. Tighten screws to specification. See **TORQUE SPECIFICATIONS** .



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Fig. 28: Removing Solenoid Valve

Courtesy of BMW OF NORTH AMERICA, INC.

REPLACING PRESSURE ACCUMULATOR GS6S37BZ (SMG)

For procedure, see **REPLACING SOLENOID VALVE EV3 FOR SELECTION ANGLE BRAKE GS6S37BZ (SMG)** .

REPLACING A SOLENOID VALVE (CLUTCH OR GEARSHIFT) GS6S37BZ SMG

NOTE: Numbers in text refer to numbers in figures.

CAUTION: Before working on hydraulic system: reduce pressure in hydraulic system by means of service function in DIS Tester. Disconnect hydraulic pump relay in electronics box. DO NOT reconnect relay for entire duration of repair work.

NOTE: After completing work: check fluid level in hydraulic system by means of DIS Tester "Service Function". Perform "Teach in transmission" service function by means of DIS Tester.

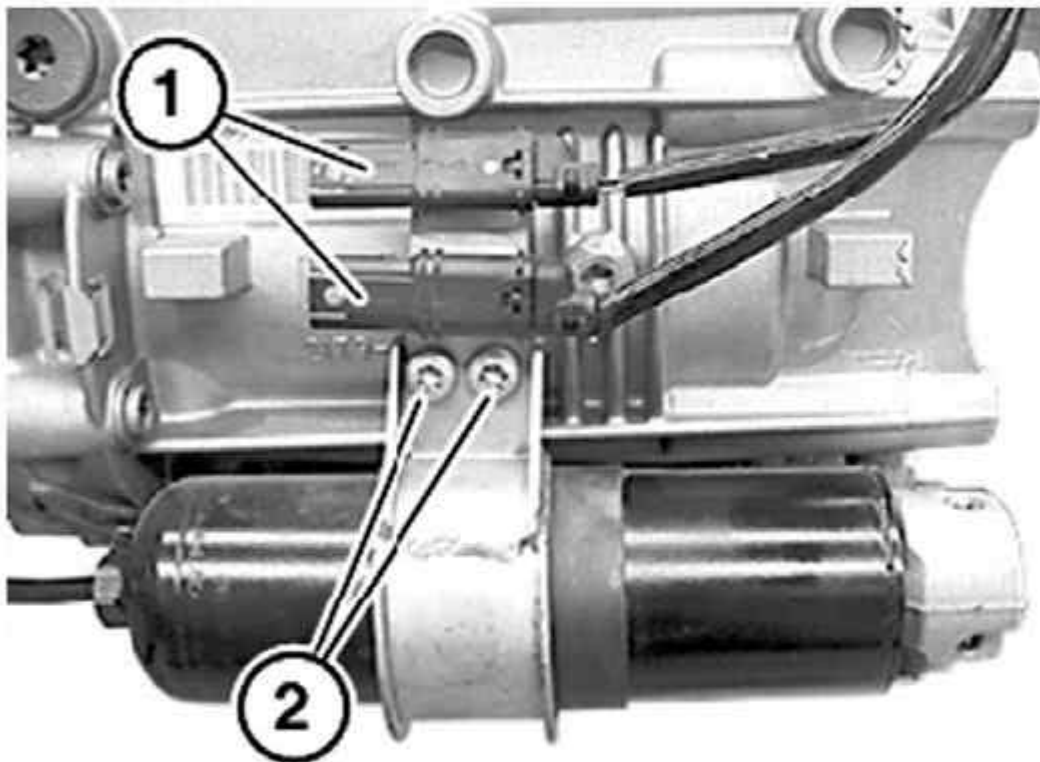
Procedure is identical for all solenoid valves: (1) Solenoid valve EV3, (2) Pressure sensor, (3) Solenoid valve EV2, (4) Solenoid valve EV1 and (5) Solenoid valve EV0. See **Fig. 24** .

Remove assembly underside protection (E60 only).

Release nuts and remove heat shield (1). See **Fig. 21** . Upon installation, tighten nuts to specification. See **TORQUE SPECIFICATIONS** .

Release screws (1) and remove protective plate. See **Fig. 24** . Upon installation, tighten screws to specification. See **TORQUE SPECIFICATIONS** .

Release screws (2). See **Fig. 29** . Upon installation, tighten screws to specification. See **TORQUE SPECIFICATIONS** .



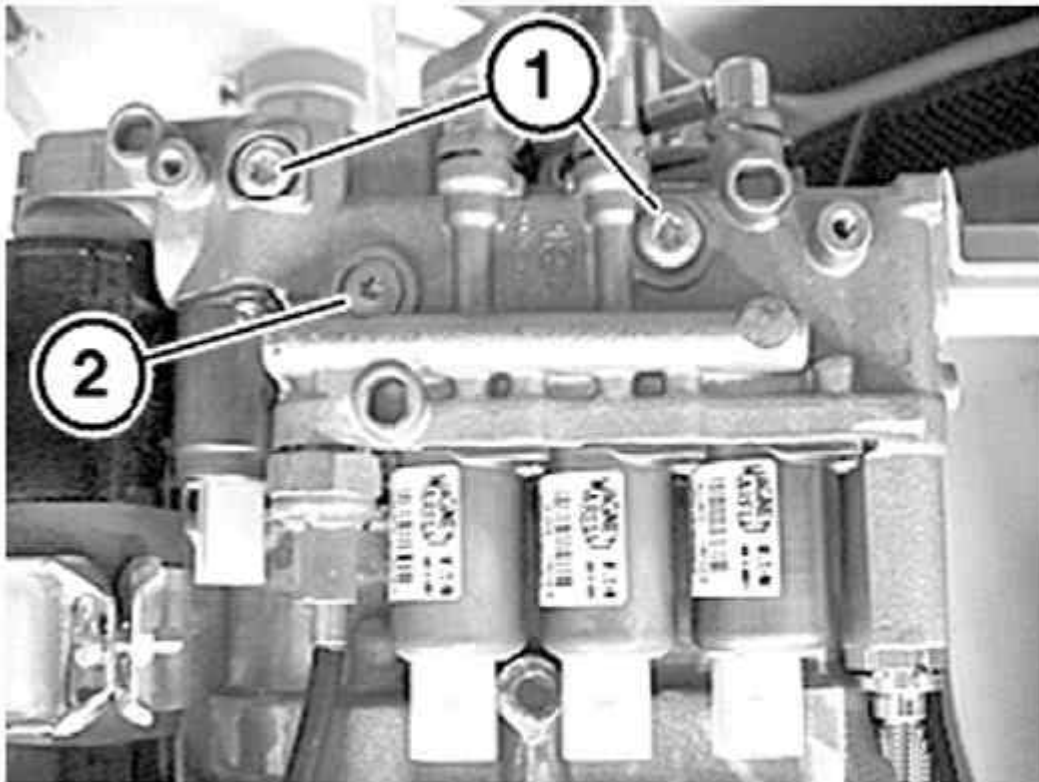
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Fig. 29: Locating Screws

Courtesy of BMW OF NORTH AMERICA, INC.

Remove screws (1) and (2). See **Fig. 30** . Lower valve block until screws of solenoid valve are accessible. Upon

installation, tighten screws to specification. See **TORQUE SPECIFICATIONS** .

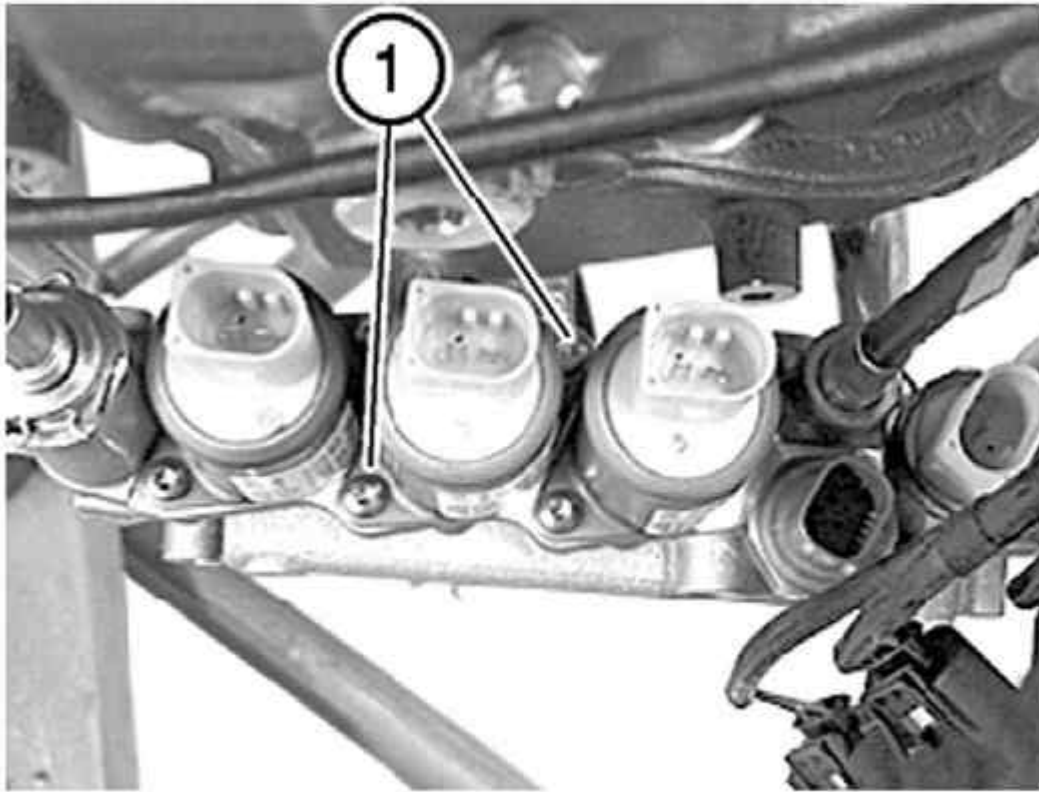


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Fig. 30: Lowering Valve Block

Courtesy of BMW OF NORTH AMERICA, INC.

Detach plug from solenoid valve. Release screws (1) and pull solenoid valve out. See **Fig. 31** . Upon installation: replace sealing ring. Tighten screws to specification. See **TORQUE SPECIFICATIONS** .



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Fig. 31: Removing Solenoid Valve

Courtesy of BMW OF NORTH AMERICA, INC.

REPLACING VALVE BLOCK GS6S37BZ (SMG)

NOTE: Numbers in text refer to numbers in figures.

CAUTION: Before working on hydraulic system: reduce pressure in hydraulic system by means of service function in DIS Tester. Disconnect hydraulic pump relay in electronics box. DO NOT reconnect relay for entire duration of repair work.

NOTE: After completing work: check fluid level in hydraulic system by means of DIS Tester "Service Function". Perform "Teach in transmission" service function by means of DIS Tester.

Procedure is identical for all solenoid valves: (1) Solenoid valve EV3, (2) Pressure sensor, (3) Solenoid valve

EV2, (4) Solenoid valve EV1 and (5) Solenoid valve EV0. See **Fig. 24** .

Remove assembly underside protection (E60 only).

Release nuts and remove heat shield (1). See **Fig. 21** . Upon installation, tighten nuts to specification. See **TORQUE SPECIFICATIONS** .

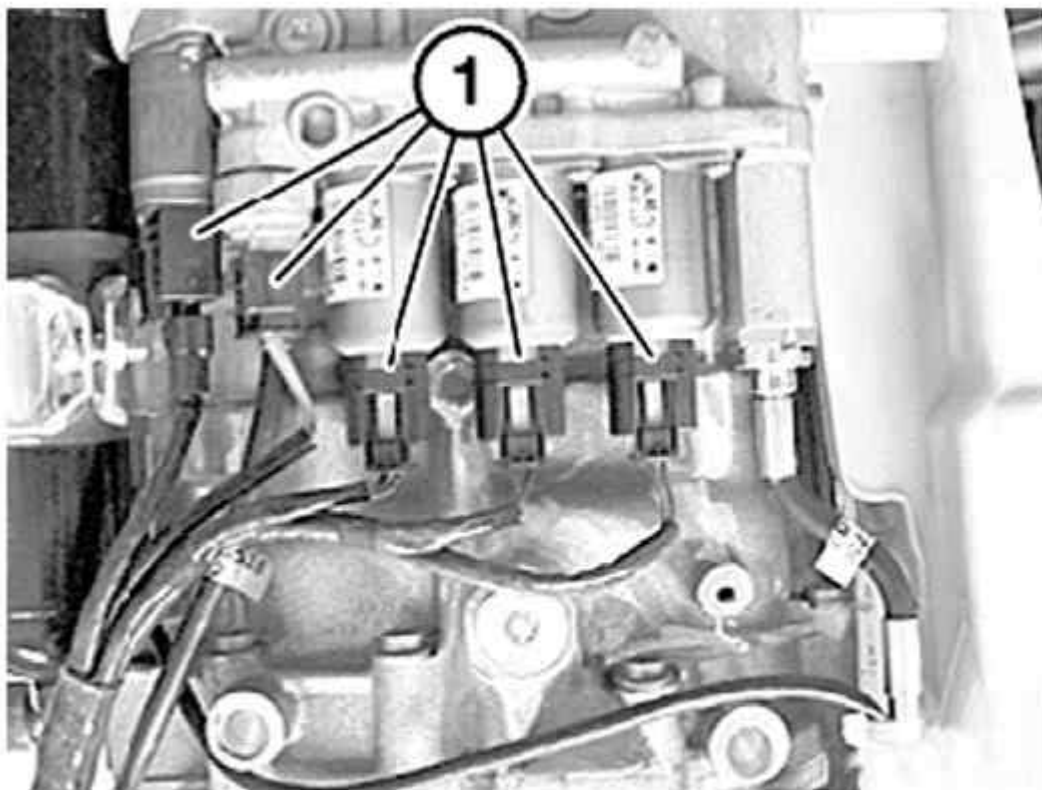
Release screws (1) and remove protective plate. See **Fig. 24** . Upon installation, tighten screws to specification. See **TORQUE SPECIFICATIONS** .

Loosen screws (1). See **Fig. 26** . Release pressure accumulator (2) at hexagon head (3). Upon installation, tighten fasteners to specification. See **TORQUE SPECIFICATIONS** .

Installation: replace sealing ring (1). See **Fig. 27** . Pay attention to installation position of sealing ring.

Release stud bolt (1). See **Fig. 23** . Lift out expansion tank in direction of arrow from valve block. Upon installation, tighten bolt to specification. See **TORQUE SPECIFICATIONS** .

Pull off plug (1). See **Fig. 32** .



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Fig. 32: Pulling Off Plug

Courtesy of BMW OF NORTH AMERICA, INC.

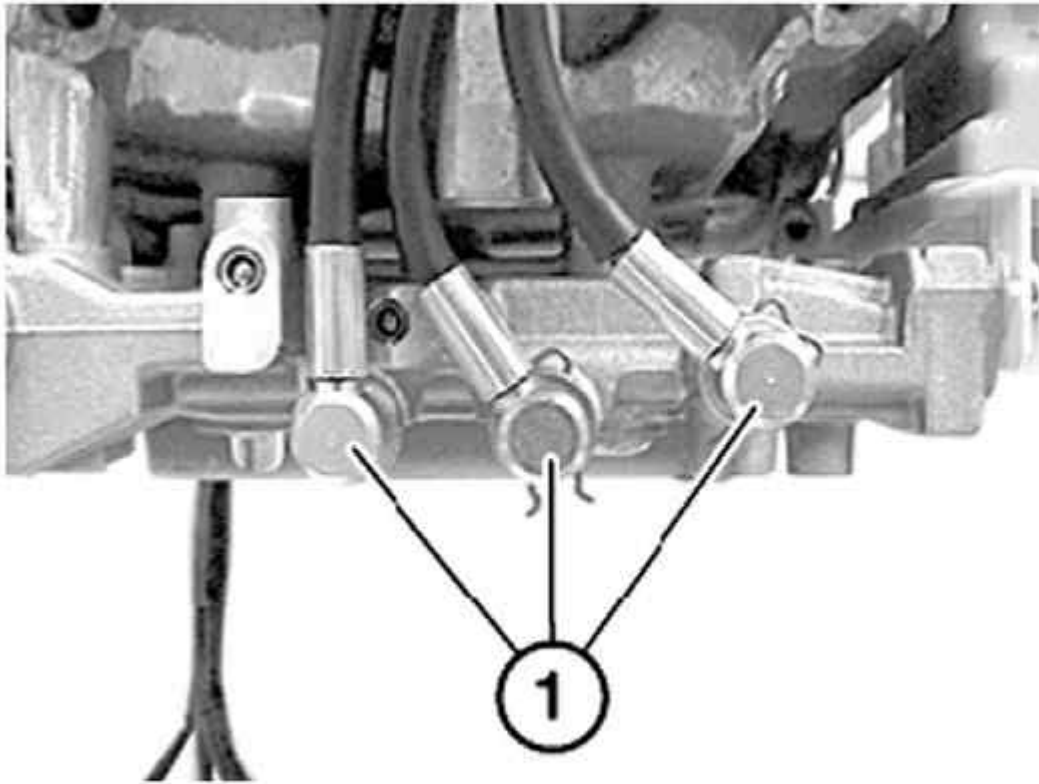
Unlock and disconnect lines (1) and (2). See **Fig. 33** and **Fig. 34** . Upon installation, replace sealing rings.



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Fig. 33: Disconnecting Lines

Courtesy of BMW OF NORTH AMERICA, INC.



G00388612

Fig. 34: Locating Lines

Courtesy of BMW OF NORTH AMERICA, INC.

Remove screws (1) and (2). See **Fig. 30** . Remove valve block. Upon installation, tighten screws to specification. See **TORQUE SPECIFICATIONS** .

REPLACING HYDRAULIC PUMP GS6S37BZ (SMG)

CAUTION: Before working on hydraulic system: reduce pressure in hydraulic system by means of service function in DIS Tester. Disconnect hydraulic pump relay in electronics box. DO NOT reconnect relay for entire duration of repair work.

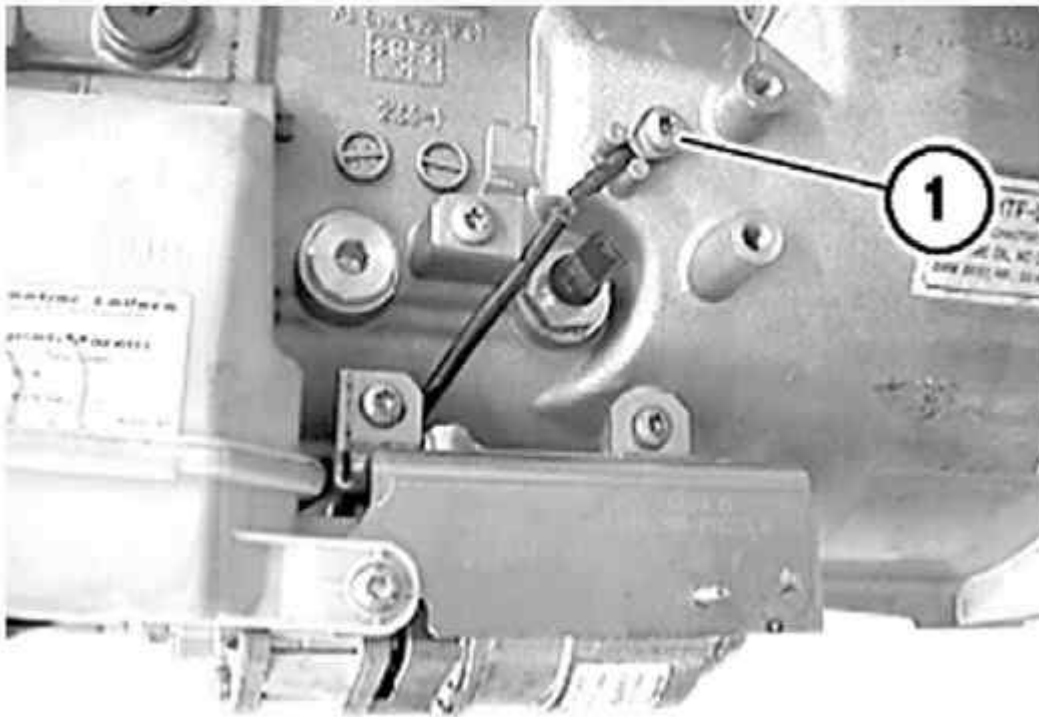
NOTE: Numbers in text refer to numbers in figures.

NOTE: After completing work: check fluid level in hydraulic system by means of DIS Tester "Service Function". Perform "Teach in transmission" service function by

means of DIS Tester.

Remove assembly underside protection (E60 only).

Release screw (1) and remove grounding strap. See **Fig. 35** .

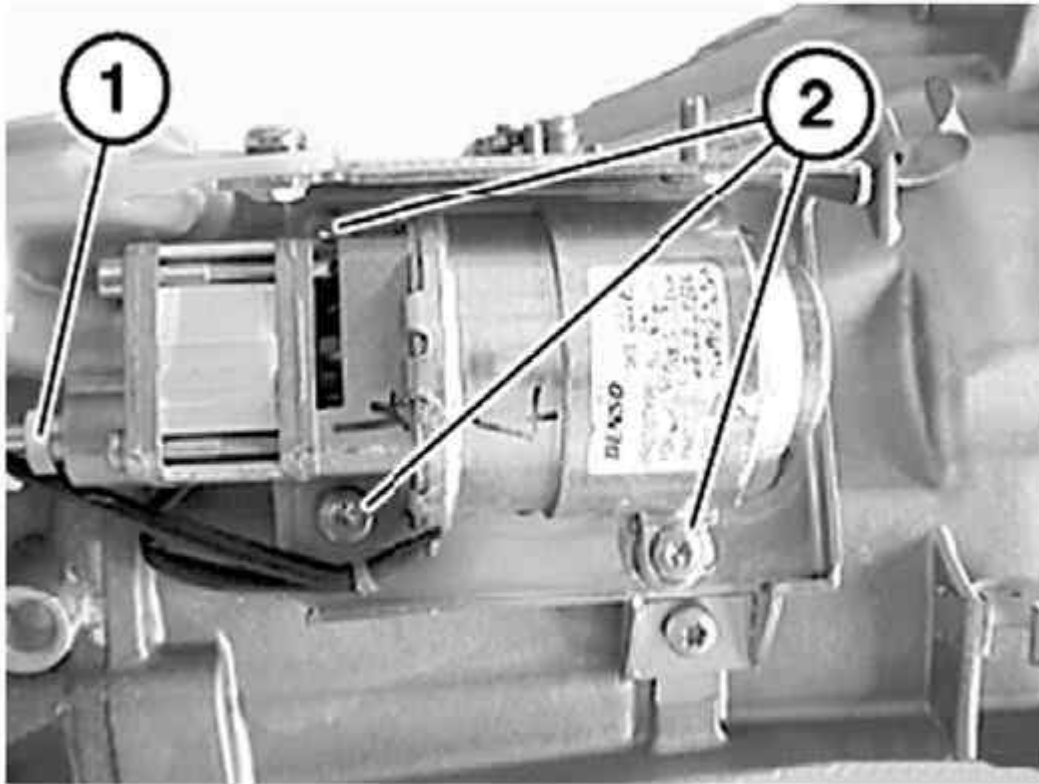


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Fig. 35: Removing Grounding Strap
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts and remove heat shield (1). See **Fig. 21** . Upon installation, tighten nuts to specification. See **TORQUE SPECIFICATIONS** .

Release line (1) and screws (2). See **Fig. 36** . Unlock connector and remove. Remove hydraulic pump. Upon installation, tighten fasteners to specification. See **TORQUE SPECIFICATIONS** .



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Fig. 36: Removing Hydraulic Pump

Courtesy of BMW OF NORTH AMERICA, INC.

REPLACING CLUTCH ACTUATOR GS6S37BZ (SMG)

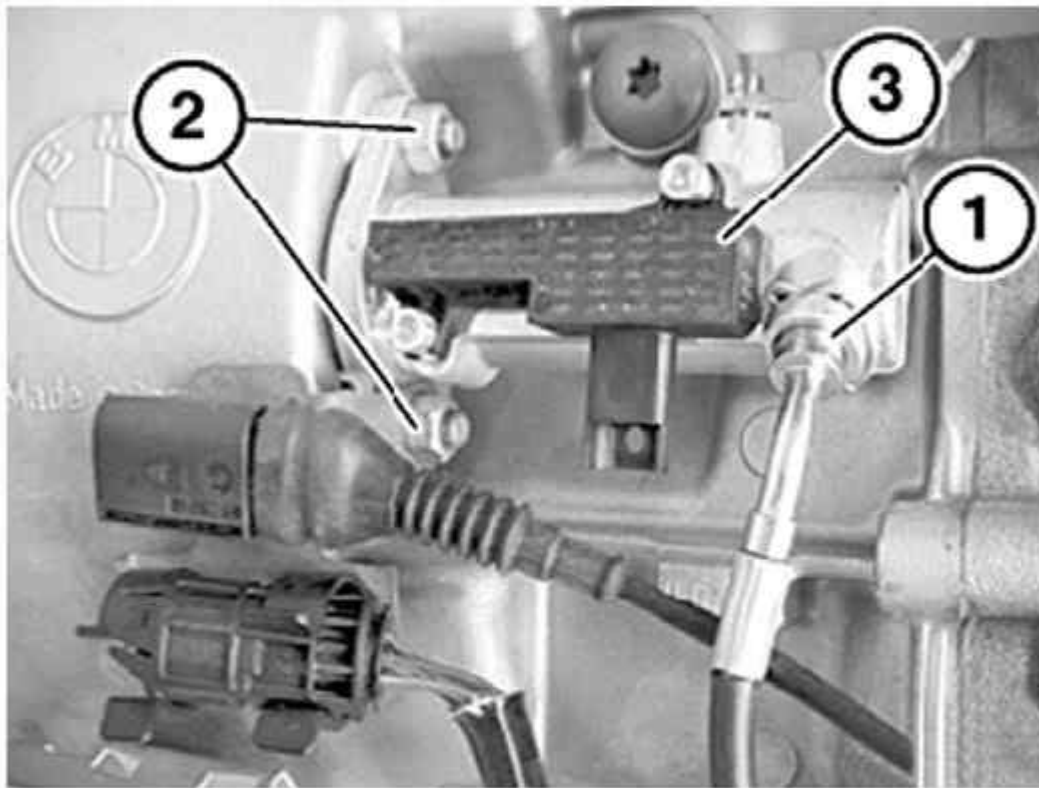
CAUTION: Before working on hydraulic system: reduce pressure in hydraulic system by means of service function in DIS Tester. Disconnect hydraulic pump relay in electronics box. DO NOT reconnect relay for entire duration of repair work.

NOTE: After completing work: check fluid level in hydraulic system by means of DIS Tester "Service Function". Perform "Teach in transmission" service function by means of DIS Tester.

NOTE: Numbers in text refer to numbers in figures.

Remove assembly underside protection (E60 only).

Unlock connector and remove. Unlock and disconnect line (1). See **Fig. 37** . Release nuts (2) and remove clutch actuator (3). Upon installation, replace sealing ring. Tighten nuts to specification. See **TORQUE SPECIFICATIONS** .



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Fig. 37: Removing Clutch Actuator
Courtesy of BMW OF NORTH AMERICA, INC.

TORQUE SPECIFICATIONS

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Application	Ft. Lbs. (N.m)
Clutch Slave Cylinder-To-Clutch Housing/Transmission Case	16 (22)
Drain & Fill Plug	
S5SG	37 (50)
GS6-53BZ/DZ GS6-37BZ/DZ M18x1.5 Hexagon Socket Thread	26 (35)
GS6-53BZ/DZ GS6-37BZ/DZ M12x1.5 Thread	18 (25)

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Output Flange ⁽¹⁾

Step 1	125 (170)
Step 2	Release
Step 3	88 (120)
Pressure Sensor-To-Valve Block	11 (15)
Pressure Accumulator-To-Valve Block	22 (30)
Protective Plate/Valve Block-To-Transmission Housing	15 (20)
Retaining Screw For Hydraulic Line	13 (18)
Transmission Cross Member-To-Body	
M8 Thread	15 (21)
M10 Thread	31 (42)
Transmission Mounts (Rubber)-To-Body	31 (42)
INCH Lbs. (N.m)	
Heat Shield-To-Expansion Tank/Pump Bracket	53 (6)
Protective Plate/Expansion Tank/Shift Actuator/Bracket Pressure Accumulator/Hydraulic Pump/Valve Block-To-Transmission Housing	88 (10)
Valves-To-Valve Block	31 (3.5)

(1) Collar nut installed with bolt cement.