

2000-05 CLUTCHES**X3, X5 & 645Ci****APPLICATION**

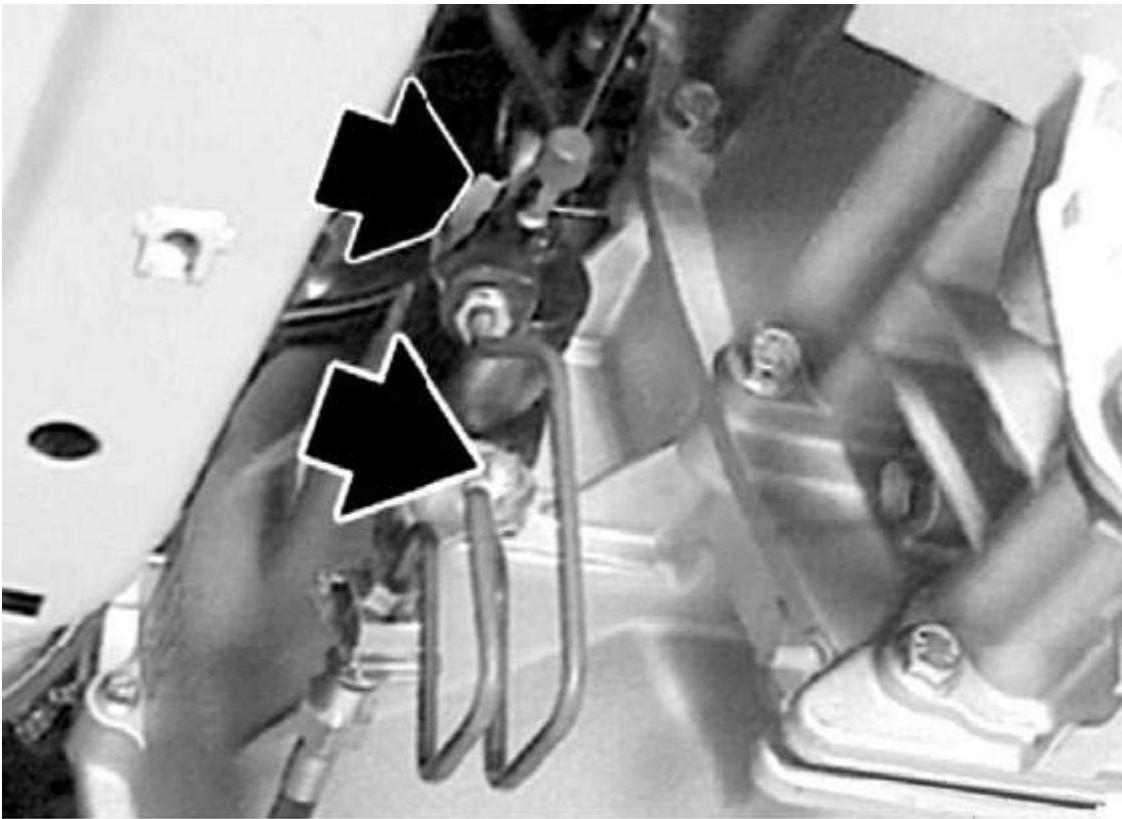
For manual transmission applications, see **SERVICING** article.

BLEEDING

1. Remove transmission underbody protection if necessary. Remove micro filter housing as necessary. See **CABIN AIR FILTERS - X3** , **CABIN AIR FILTER - X5** or **CABIN AIR FILTERS - 645Ci** . Unfasten nuts and remove clutch slave cylinder (pressure line remains connected). See **Fig. 1** . Fit special tool (21 5 030) on clutch slave cylinder (1). Press piston rod (2) with aid of spindle completely into clutch slave cylinder. See **Fig. 2** . Connect bleeder unit to brake fluid expansion tank.

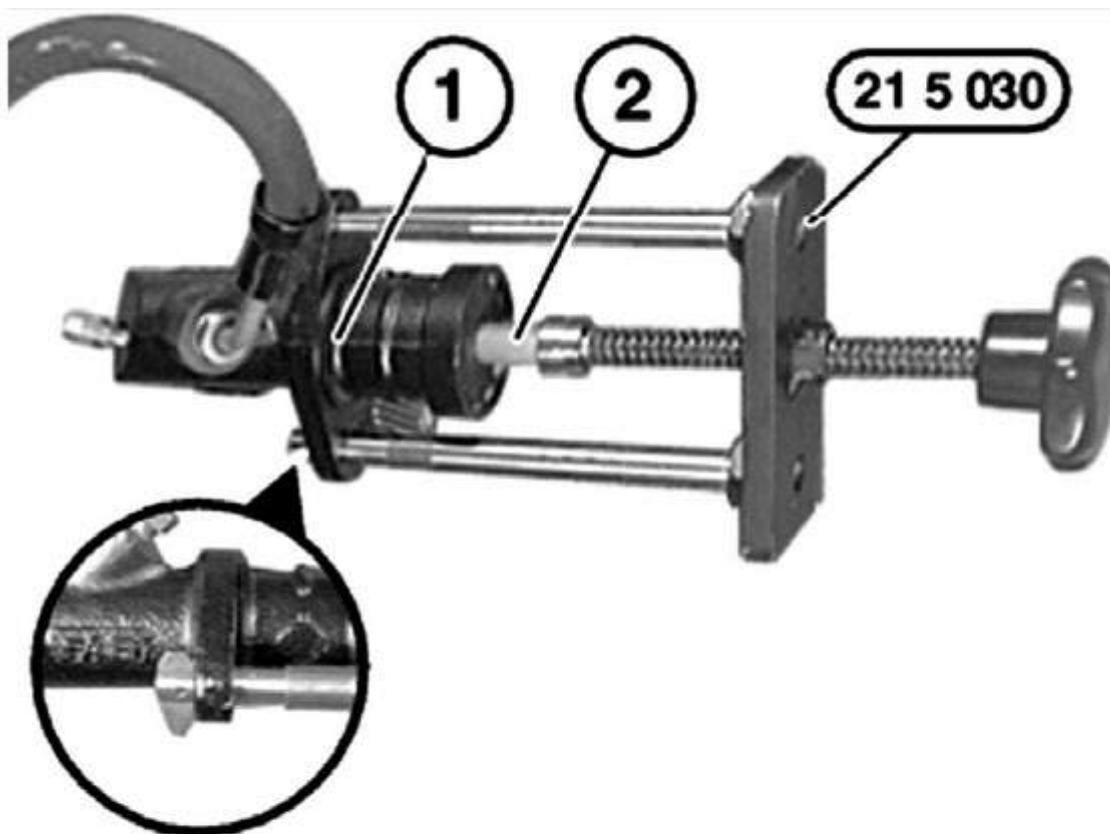
NOTE: **Check relevant operating instructions for each device.**

2. Charging pressure should not exceed 2 bar. Connect bleeder hose to bleeder valve (1). See **Fig. 3** . Hold clutch slave cylinder in illustrated position with special tool (21 5 030). Open bleeder valve (1). If bubble-free brake fluid emerges, retract piston rod (2) of clutch slave cylinder with aid of spindle a little and press in again. If no air bubbles escape, close bleeder valve (1), otherwise repeat procedure.
3. Do not under any circumstances remove special tool (21 5 030) from clutch slave cylinder when brake system is pressurized. Piston with push rod can jump out of clutch slave cylinder. Switch off bleeder unit or remove from brake fluid expansion tank.
4. Slowly retract piston rod (2) of clutch slave cylinder (1) with special tool (21 5 030). See **Fig. 4** . Remove special tool (21 5 030) from clutch slave cylinder (1). Fit clutch slave cylinder to transmission. See **Fig. 5** . During installation, replace self-locking nuts. Correct brake fluid level in expansion tank with DOT 4 brake fluid.



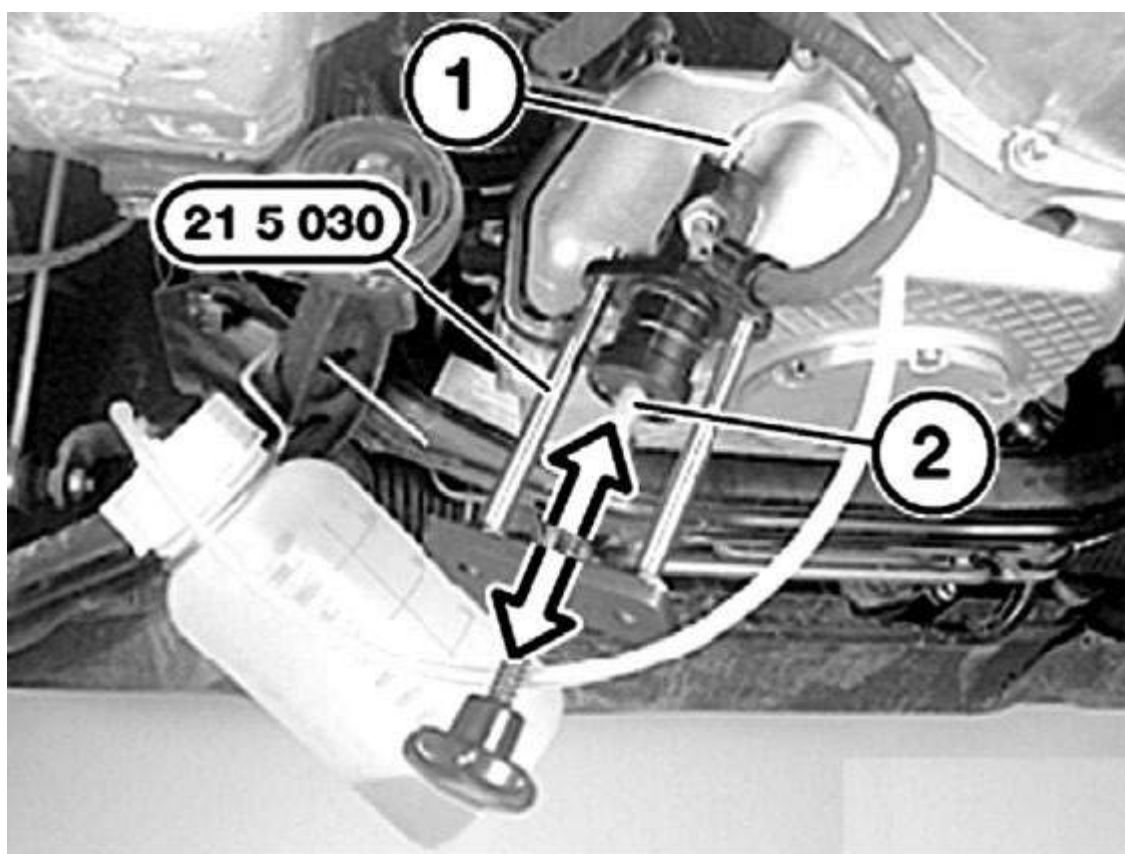
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Fig. 1: Unfastening Nuts & Removing Clutch Slave Cylinder
Courtesy of BMW OF NORTH AMERICA, INC.



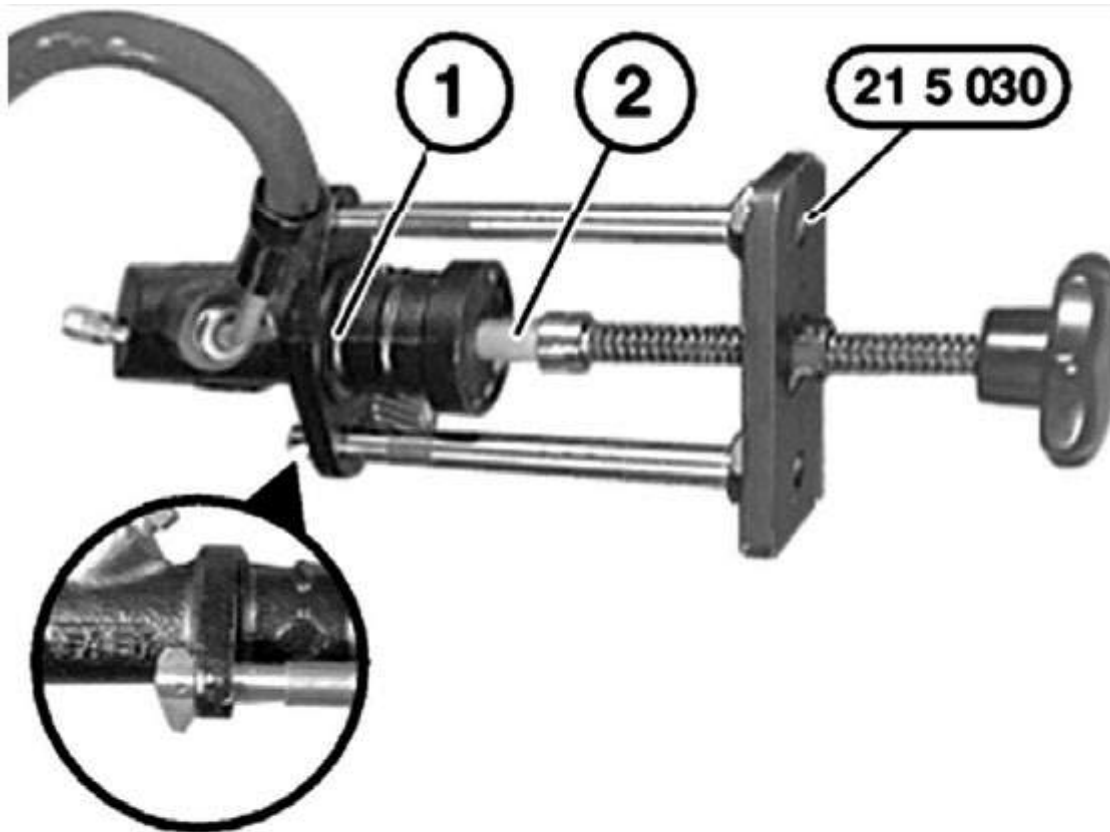
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Fig. 2: Pressing Piston Rod With Aid Of Spindle Completely Into Clutch Slave Cylinder
Courtesy of BMW OF NORTH AMERICA, INC.



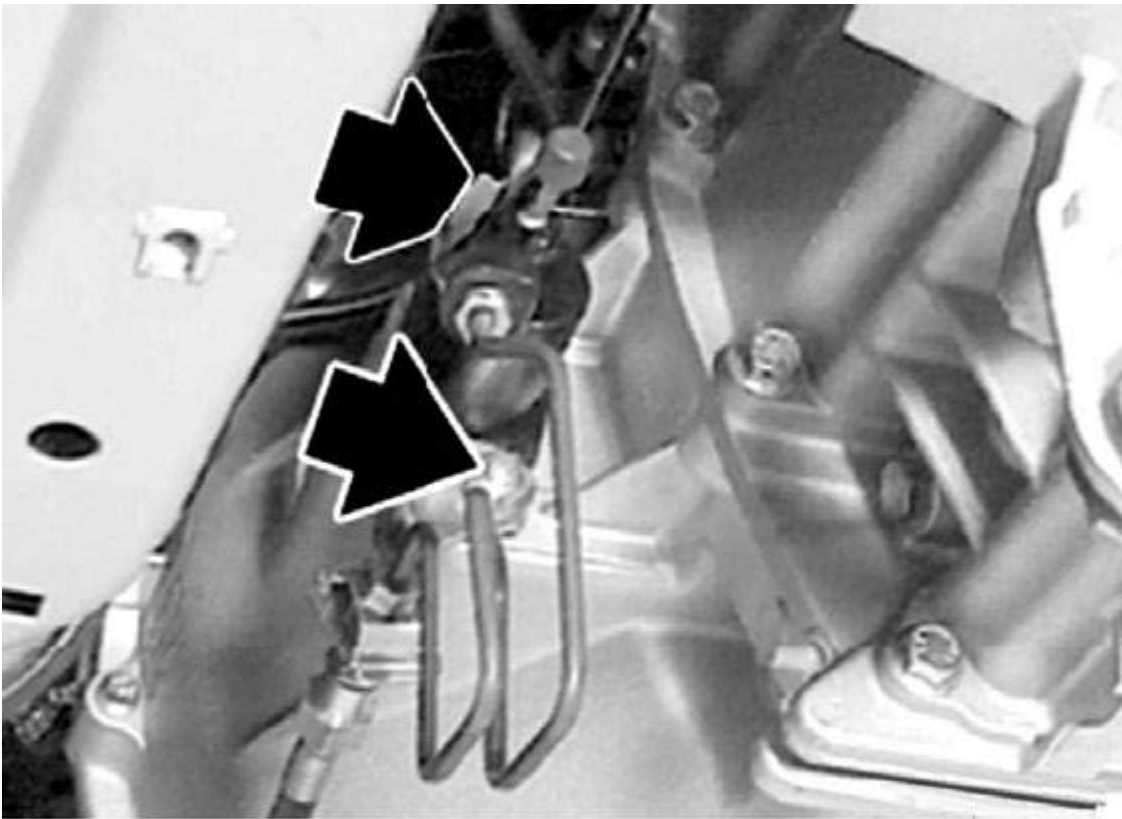
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Fig. 3: Connecting Bleeder Hose To Bleeder Valve
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 4: Slowly Retracting Piston Rod Of Clutch Slave Cylinder
Courtesy of BMW OF NORTH AMERICA, INC.



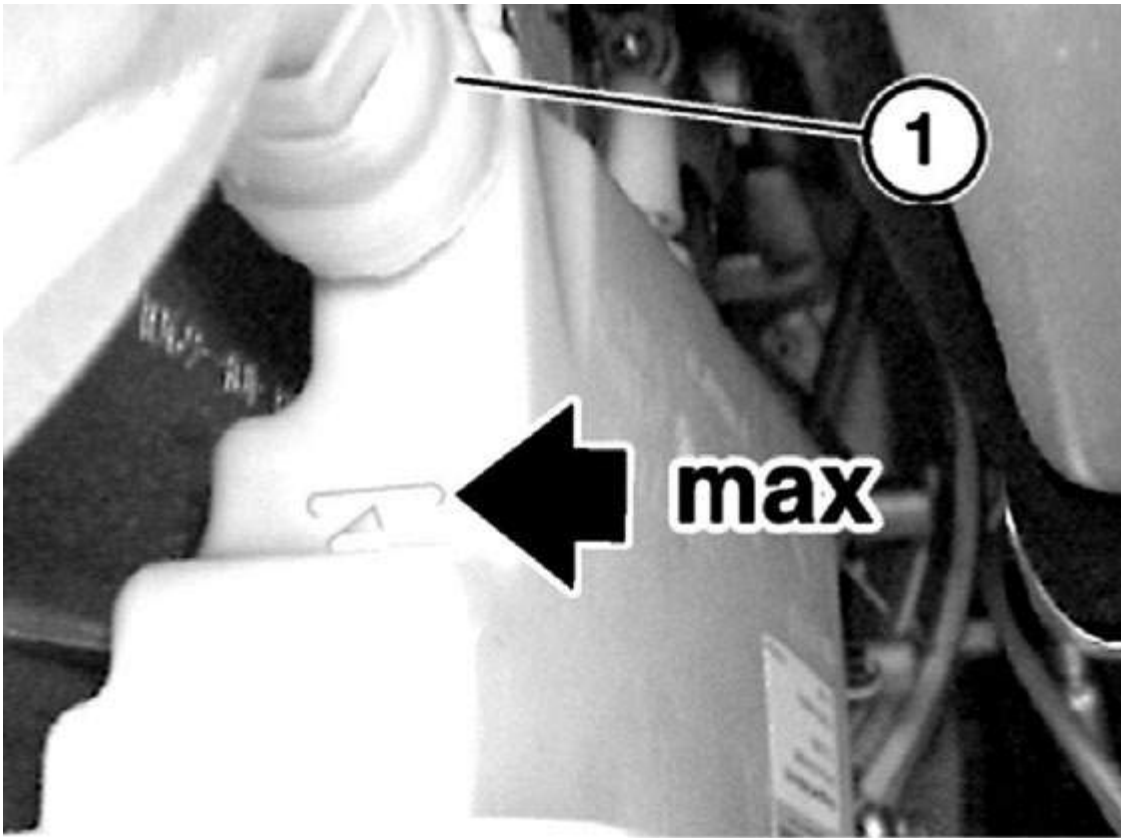
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Fig. 5: Installing Clutch Slave Cylinder To Transmission
Courtesy of BMW OF NORTH AMERICA, INC.

CHECKING/TOPPING OFF FLUID LEVEL IN HYDRAULIC SYSTEM

GS6S37BZ/GS6S53BZ/SMG

1. Method 1: Switch on ignition. Bleed hydraulic system. See **BLEEDING** . Open filler screw (1). Fill expansion tank up to MAX marking with DOT 4 brake fluid. See **Fig. 6** .
2. Method 2: Depressurize hydraulic system in accordance with BMW diagnosis system. Open filler screw (1). Add BMW DOT 4 hydraulic fluid up to lower edge of filler cap. See **Fig. 6** .

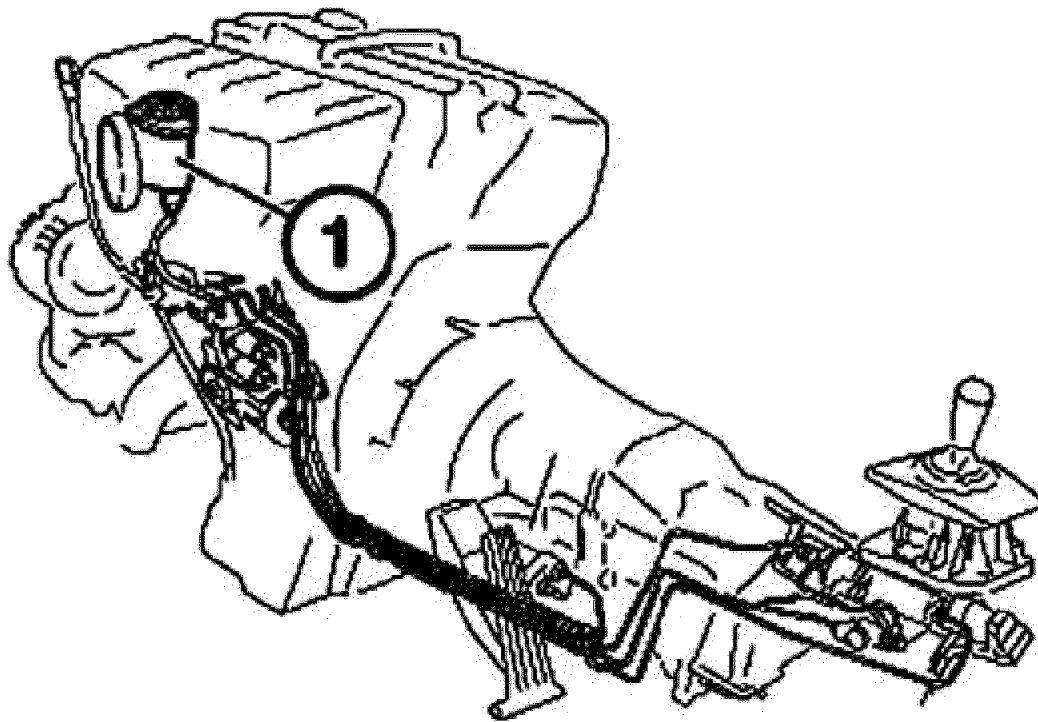


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Fig. 6: Identifying Filler Screw & MAX Mark
Courtesy of BMW OF NORTH AMERICA, INC.

S6S420G/SMG

Turn on ignition. Press brake pedal. Move selector lever from position "0" to "R" or "0" to "E" until hydraulic pump is activated. Wait until hydraulic pump shuts down. Open expansion tank (1). See **Fig. 7** . Fill expansion tank up to MAX marking (2) on dipstick (1). See **Fig. 8** . Check with dipstick on cap by screwing in cap.



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Fig. 7: Identifying Expansion Tank

Courtesy of BMW OF NORTH AMERICA, INC.

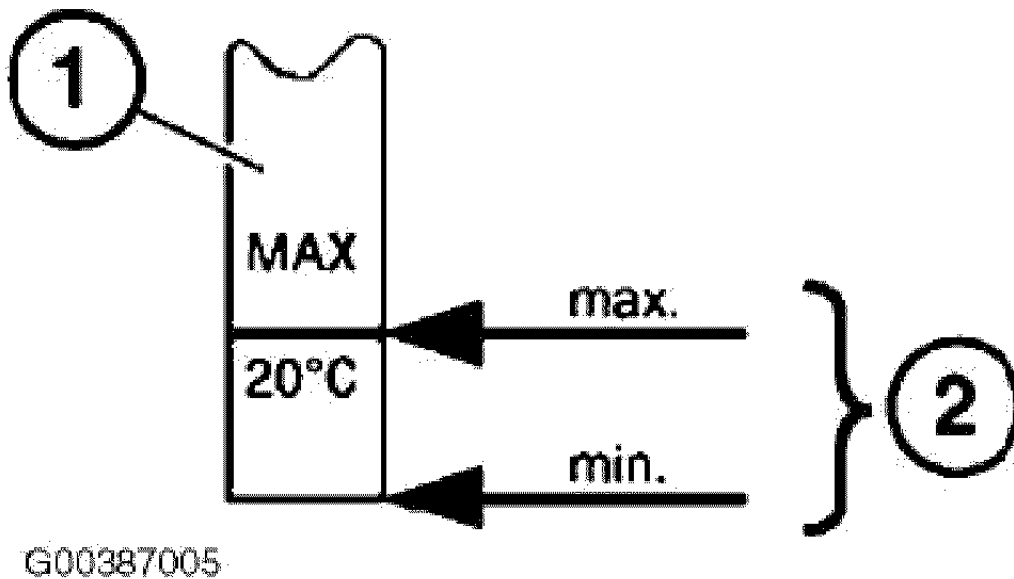


Fig. 8: Identifying Dipstick Markings

Courtesy of BMW OF NORTH AMERICA, INC.

ADJUSTMENTS

CLUTCH PEDAL

Clutch pedal stroke and free play are adjusted automatically.

BREAKING IN SELF-ADJUSTING CLUTCH (SAC)

Break in SAC clutches moderately to ensure correct operation, as fast sports driving maneuvers destroy new clutches. Such maneuvers include:

- Driving maneuvers with high speed differentials.
- Overlapping gearshifts with high speed differentials (slipping clutch).
- Very high starting speeds (such as when driving onto a transporter).

Comply with the following procedure when breaking in the new clutch:

- Break in friction linings with light to medium loads (observe breaking-in program).
- Normal driving with many "moderate" gearshifts.
- Starting speeds on the level up to approximately 2000 RPM.

2003 BMW X5 44i

2000-05 CLUTCHES X3, X5 & 645Ci

- Specific breaking-in program on gentle gradients.
- Starting speeds on a medium gradient up to approximately 2500 RPM (e.g. when driving onto a transporter).

This procedure helps to create a carbon layer between lining and metal friction surface which generates the required coefficient of friction. See **SELF-ADJUSTING CLUTCH BREAKING IN PROGRAM** table. Experience shows that approximately 800-1000 gearshifts are required for an optimally broken-in lining when a car is driven normally.

SELF-ADJUSTING CLUTCH BREAKING IN PROGRAM

Application	Specification
Shift Through Gears Often	Starting Speed Maximum 200 RPM
Upshifts	1-2-3-4-5
Downshifts At 2000 RPM	5-4-3-2-1
Upshifts & Downshifts	At 3000-
3-5 Times Starting On Gentle Gradient (Up To Approximately 12%)	Starting Speed Maximum 2500 RPM

TROUBLESHOOTING

1. If clutch is slipping, check for:
 - Clutch pressure too low.
 - Lining too heavily worn.
 - Lining oiled.
 - Engine:
 - a. Crankshaft Radial Seal At Front & Rear Including End Cover
 - b. Oil Sump
 - c. Cylinder Head Gasket At Cylinder Head
 - d. Oil Filler Cap
 - e. Timing Case Cover
 - f. Flywheel Mounting Bolts
 - Cooling System:
 - a. Hoses & Connections
 - b. Heating Valves
 - c. Sealing Plugs On Engine Block
 - Steering Unit:
 - a. Steering Gear
 - b. Servo Pump
 - c. Hydraulic Lines & Connections
 - Transmission:

- a. Drive Shaft Radial Seal
- b. Sealing Plugs Of Countershaft
- Release Bearing:
 - a. Clutch Was Overheated
 - b. Clutch Is Not An Original Equipment BMW Part

If problem is found, replace clutch and repair leaks as necessary.

2. If clutch sticks/slips, check for:
 - a. Lining not to specification.
 - b. Lining oiled.
 - c. Release unit presses on one side.
 - d. Clutch presses at an angle.
 - e. Crankshaft does not align with transmission input shaft.
 - f. Engine and transmission suspension defective.
 - g. Clutch plate not an original equipment BMW part.

If engine, speed characteristics not okay:

- a. Engine management not okay.
- b. Check engine control unit.

If problem is found, replace clutch, check engine/transmission contact face, adapter sleeves and cover plate for damage, replace engine and transmission suspension, install original equipment BMW part as necessary,

3. If clutch does not separate, check for:
 - a. Lining of clutch plate broken.
 - b. Lining rusted onto flywheel.
 - c. Guide bearing for transmission input shaft in crankshaft defective.
 - d. Leak in clutch hydraulic system.
 - e. Tangential leaf springs of clutch bent down.
 - f. Release unit binds on guide sleeve.

If problem is found, replace clutch plate, evenly sand flywheel with sandpaper and replace clutch plate, replace guide bearing in crankshaft, replace faulty parts and bleed clutch hydraulics, replace clutch, or clean guide sleeve, remove and install release unit.

4. If clutch makes noise, check for:
 - a. Imbalance of clutch and clutch plate too great.
 - b. Torsional-vibration damper defective.
 - c. Release unit defective.
 - d. Guide bearing for transmission input shaft in crankshaft defective.
 - e. Clutch rivet connection loose.

If problem is found, replace clutch plate or dual mass flywheel, release unit, guide bearing in crankshaft or clutch as necessary.

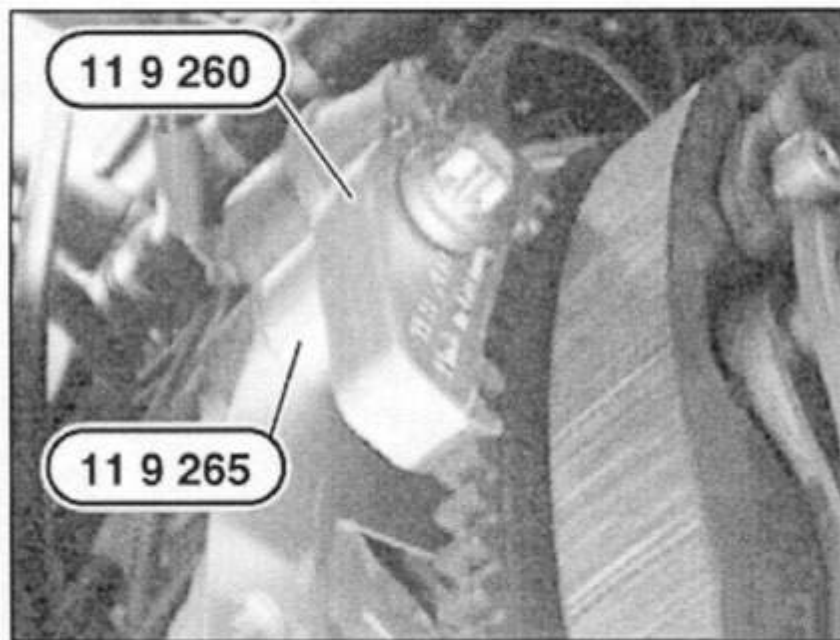
REMOVAL & INSTALLATION

CLUTCH

NOTE: Numbers in text refer to numbers in figures.

Removal & Installation X3 & 6-Series

1. Remove transmission. See appropriate MANUAL TRANSMISSION removal article. On X3 6-cylinder, block flywheel with special tools (11 9 260) and (11 9 265). See **Fig. 9** . On 6-Series V8, block flywheel with special tools (11 9 260, 11 9 263 and 11 9 264). See **Fig. 10** .



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Fig. 9: Blocking Flywheel (X3 6-Cylinder)
Courtesy of BMW OF NORTH AMERICA, INC.

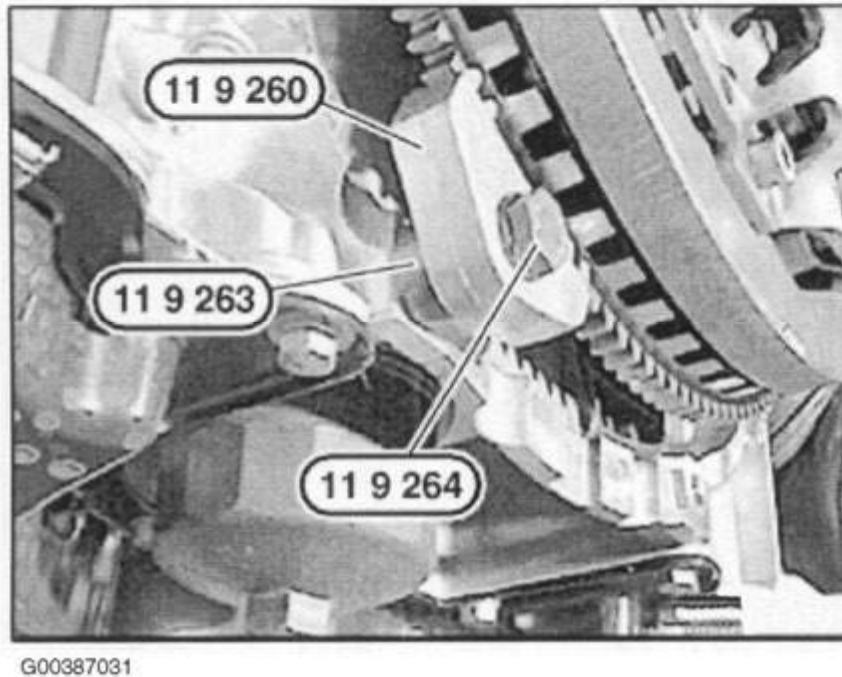
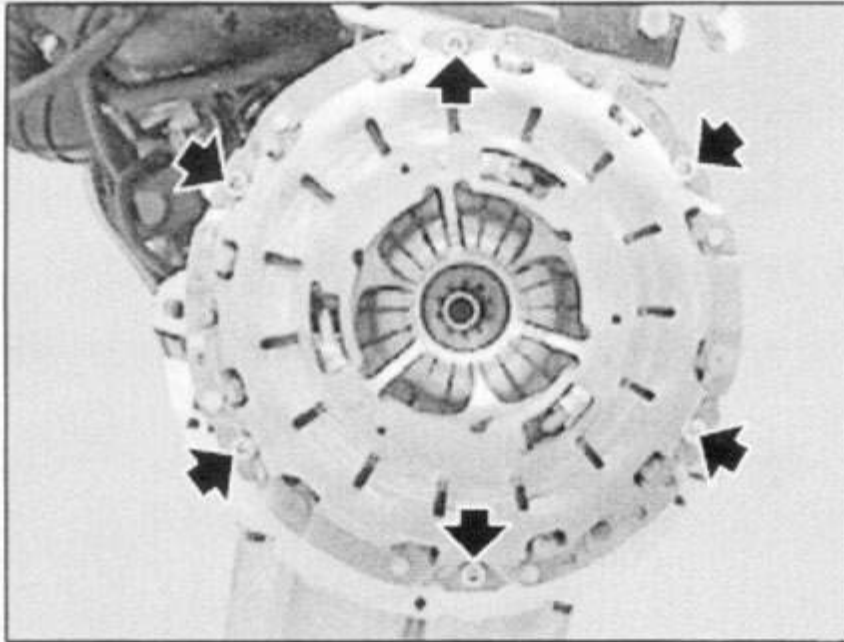


Fig. 10: Blocking Flywheel (6-Series V8)

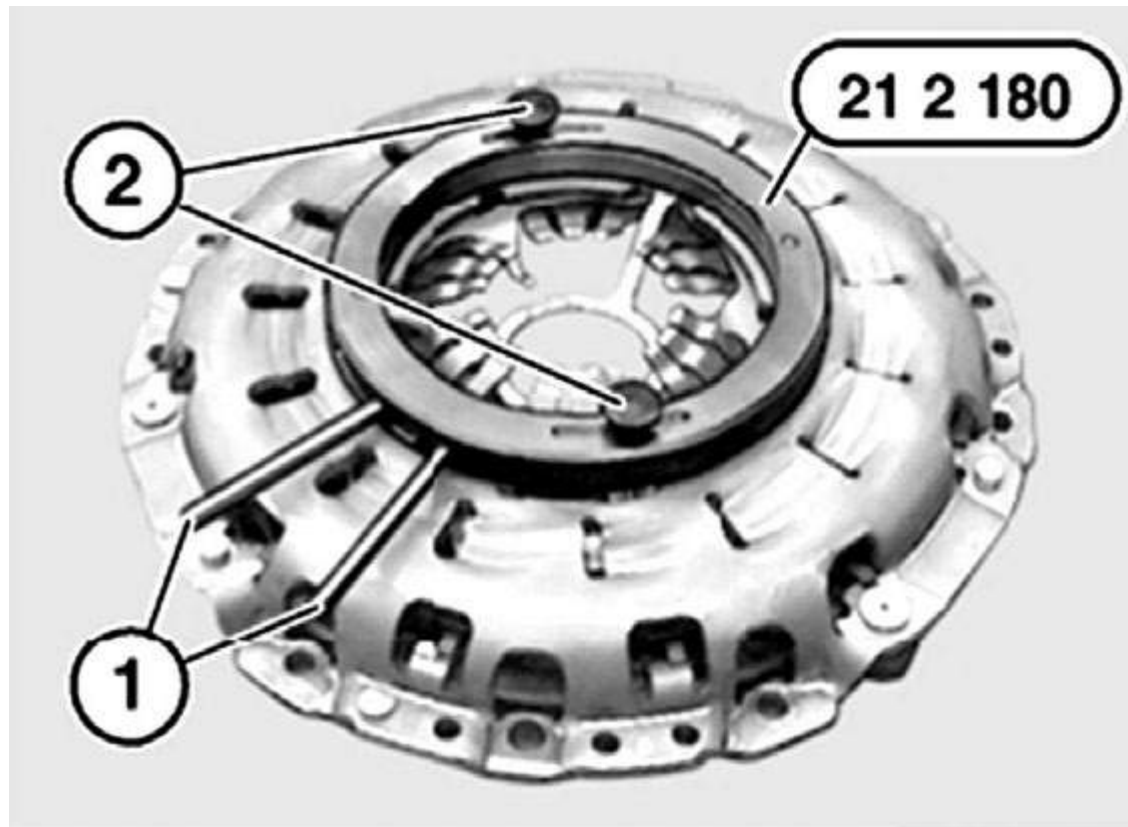
Courtesy of BMW OF NORTH AMERICA, INC.

2. Release screws and remove clutch from flywheel. See **Fig. 11** . During installation, clean flywheel and check for wear and damage. Replace damaged flywheel. Always replace clutch plates fouled by oil, cleaning agent or other materials. If installing removed clutch with new clutch plate, go to step 5 . If installing a new clutch, go to step 7 . If installing a removed clutch and clutch plate, observe the following procedure when installing the removed clutch and clutch plate. Insert special tool (21 2 180) in clutch. Press special tool 212180 together at handles (1) as far as it will go and tighten down knurled screws (2). See **Fig. 12** .



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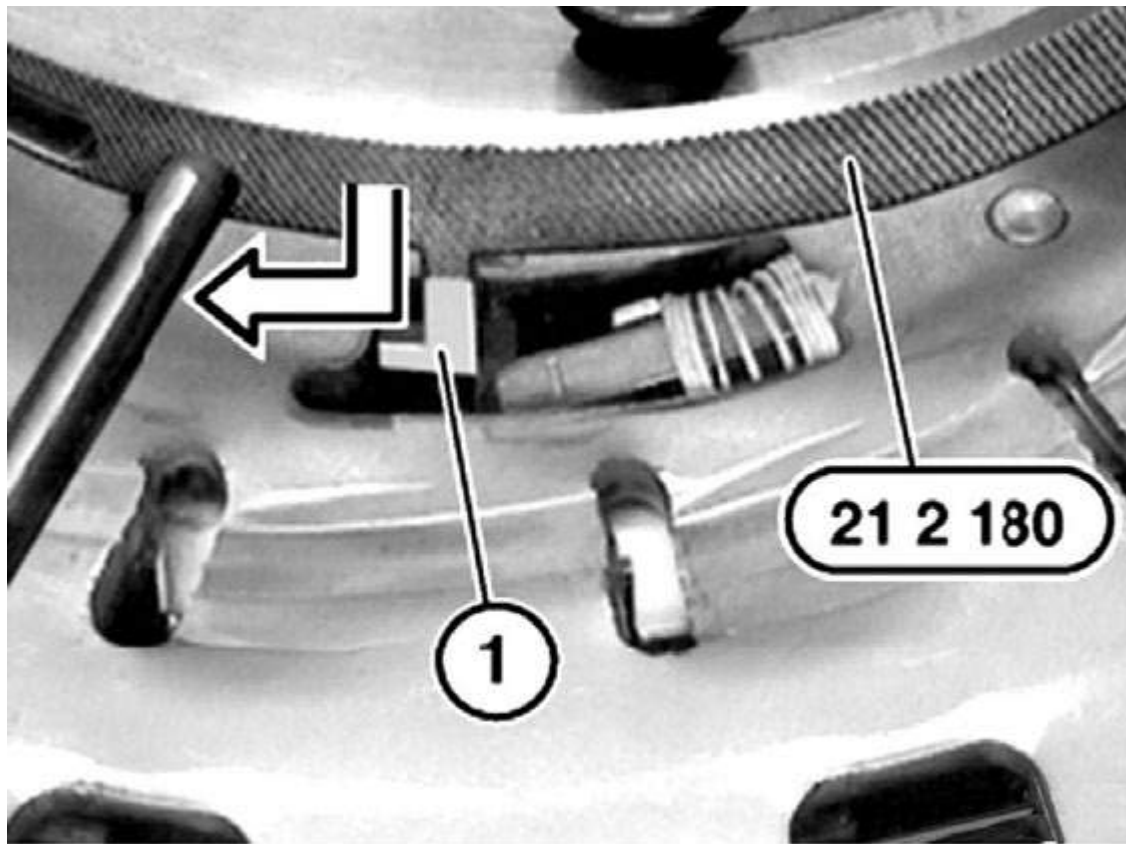
Fig. 11: Removing Clutch From Flywheel
Courtesy of BMW OF NORTH AMERICA, INC.



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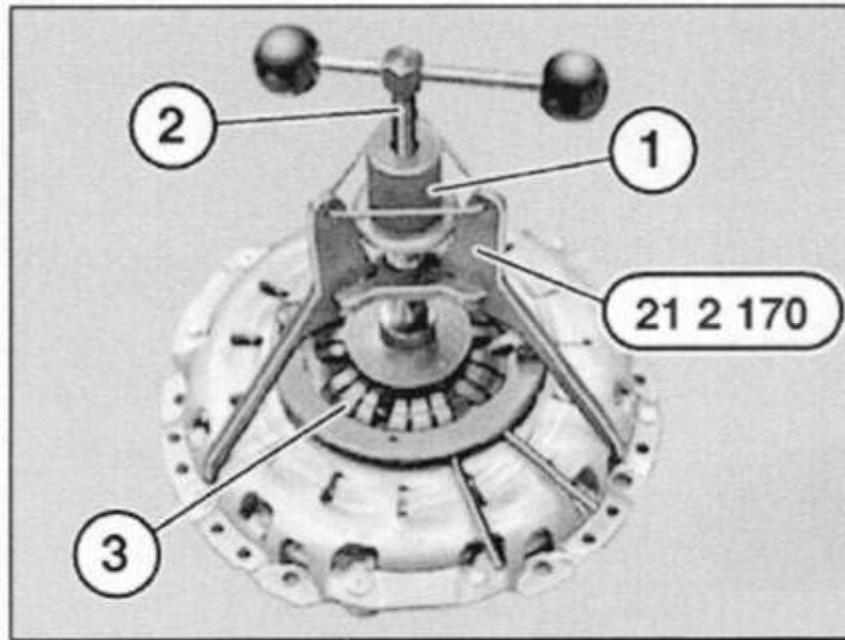
Fig. 12: Pressing Special Tool At Handles & Tightening Knurled Screws
Courtesy of BMW OF NORTH AMERICA, INC.

3. Adjustment ring of clutch is now secured in its original position (wear position). Note that locking hooks (1) of special tool (21 2 180) must engage in openings of pressure spring. See **Fig. 13** . Fit special tool (21 2 170) and tighten down at knurled screw (1). Screw in spindle (2) until diaphragm spring (3) is tensioned on stop. See **Fig. 14** . Insert special tool (21 2 170) only in area of bores for dowel pins. Center clutch plate (1) with special tool in dual-mass flywheel. See **Fig. 15** .



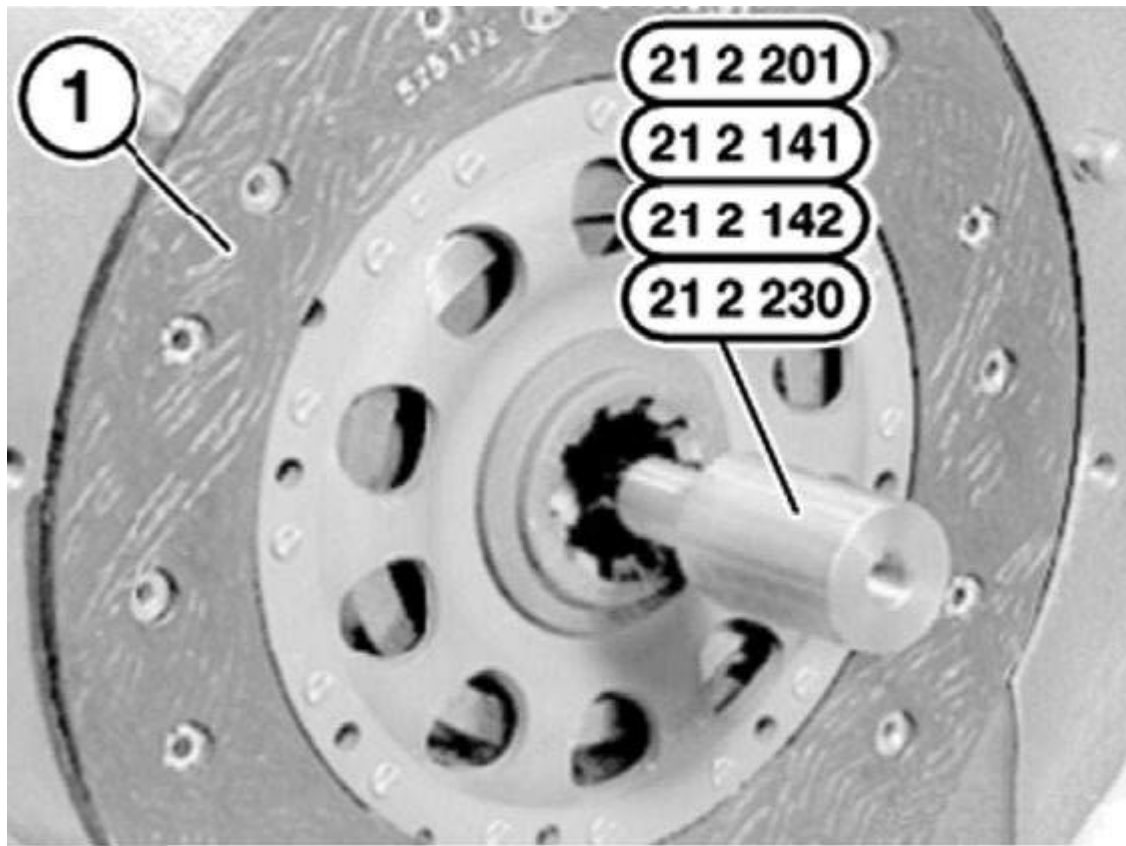
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Fig. 13: Identifying Locking Hooks Of Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.



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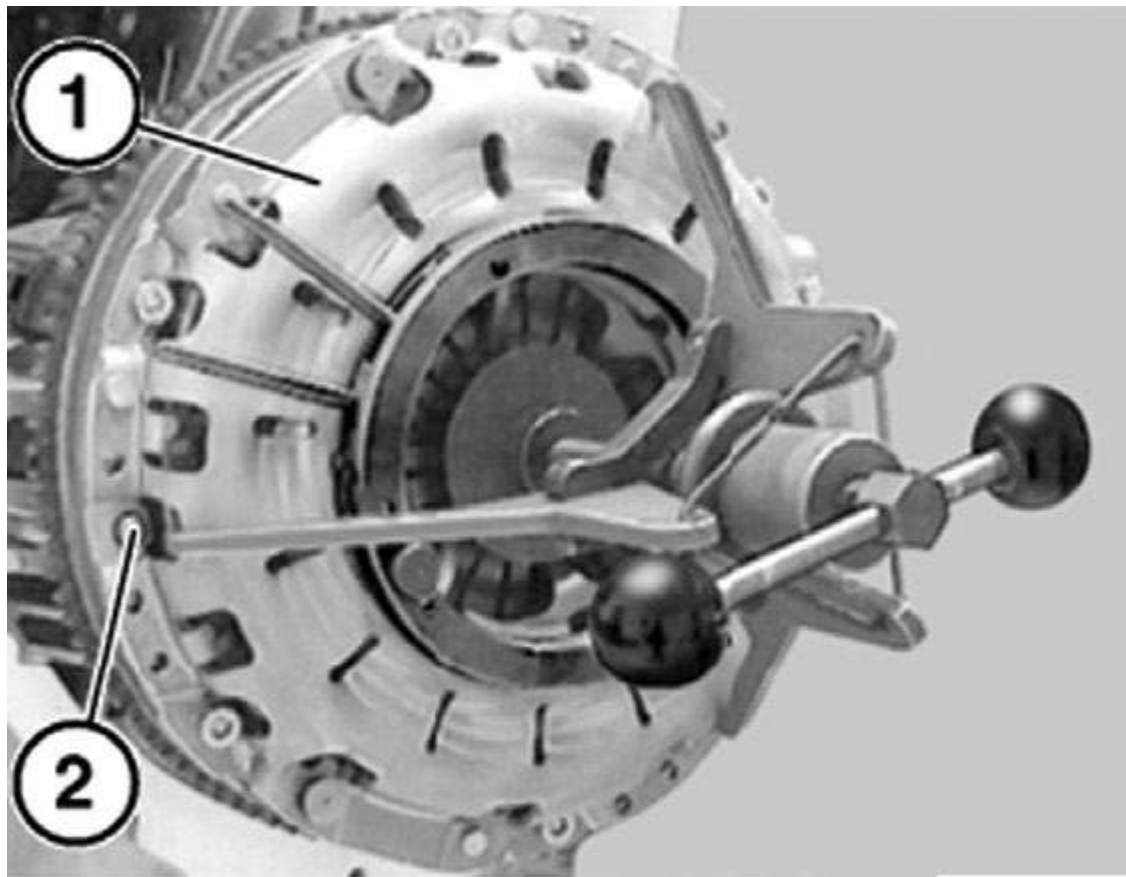
Fig. 14: Screwing In Spindle Until Diaphragm Spring Is Tensioned On Stop
Courtesy of BMW OF NORTH AMERICA, INC.



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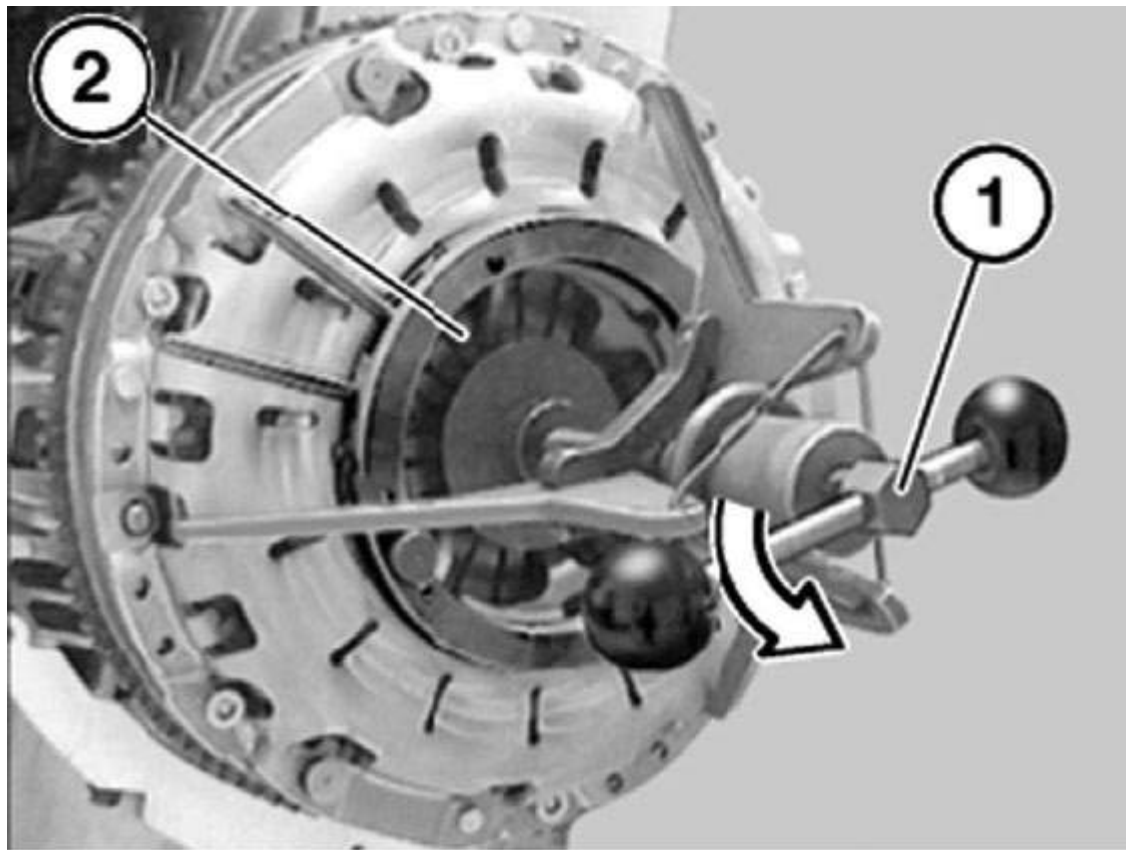
Fig. 15: Centering Clutch Plate With Special Tools
Courtesy of BMW OF NORTH AMERICA, INC.

4. Install clutch plate in correct position. Note designation for "engine side" and "transmission side". Handle clutch plate with care. Do not touch surfaces of friction linings. Fit clutch (1) to flywheel. Clutch (1) must be secured by way of dowel pins (2). See **Fig. 16** . Release spindle (1) until load is fully removed from diaphragm spring. See **Fig. 17** . Remove special tools (21 2 170 and 21 2 180). Withdraw special tool from clutch plate with aid of accompanying screw (1). See **Fig. 18** .



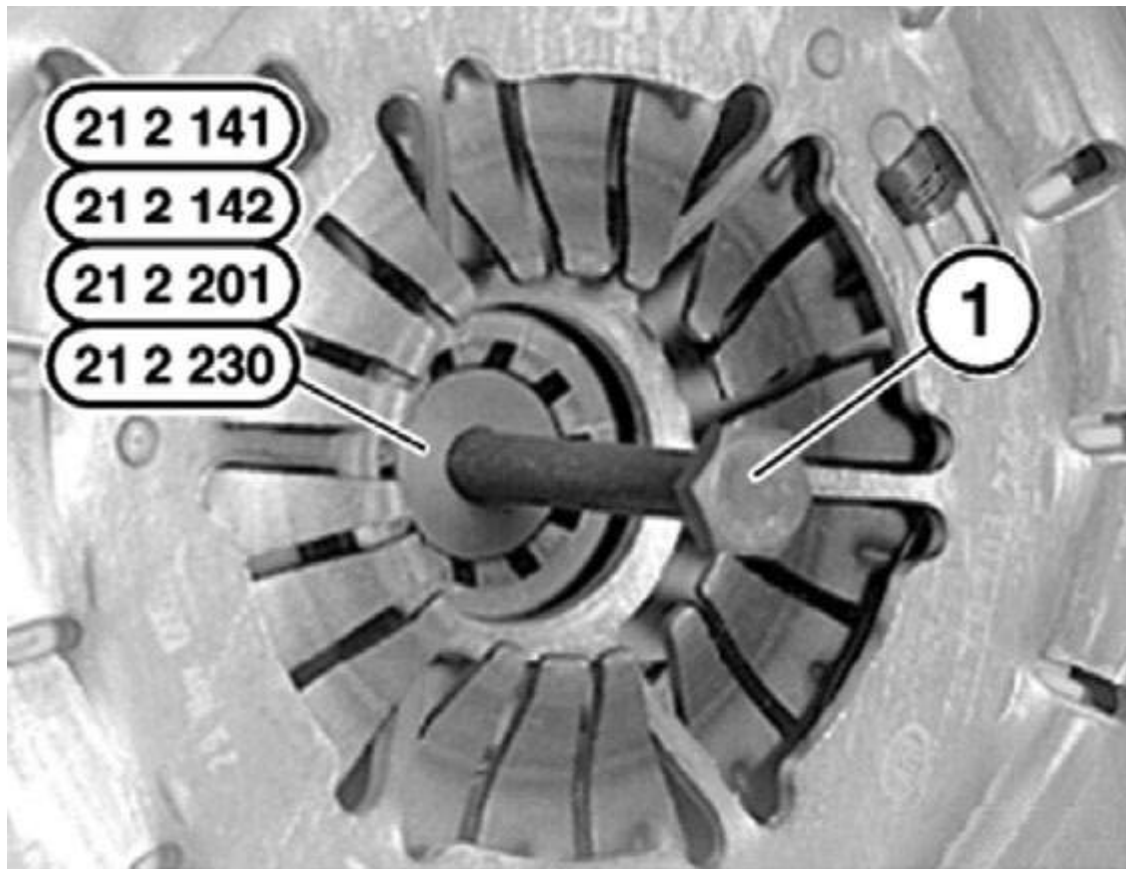
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Fig. 16: Identifying Clutch & Dowel Pins
Courtesy of BMW OF NORTH AMERICA, INC.



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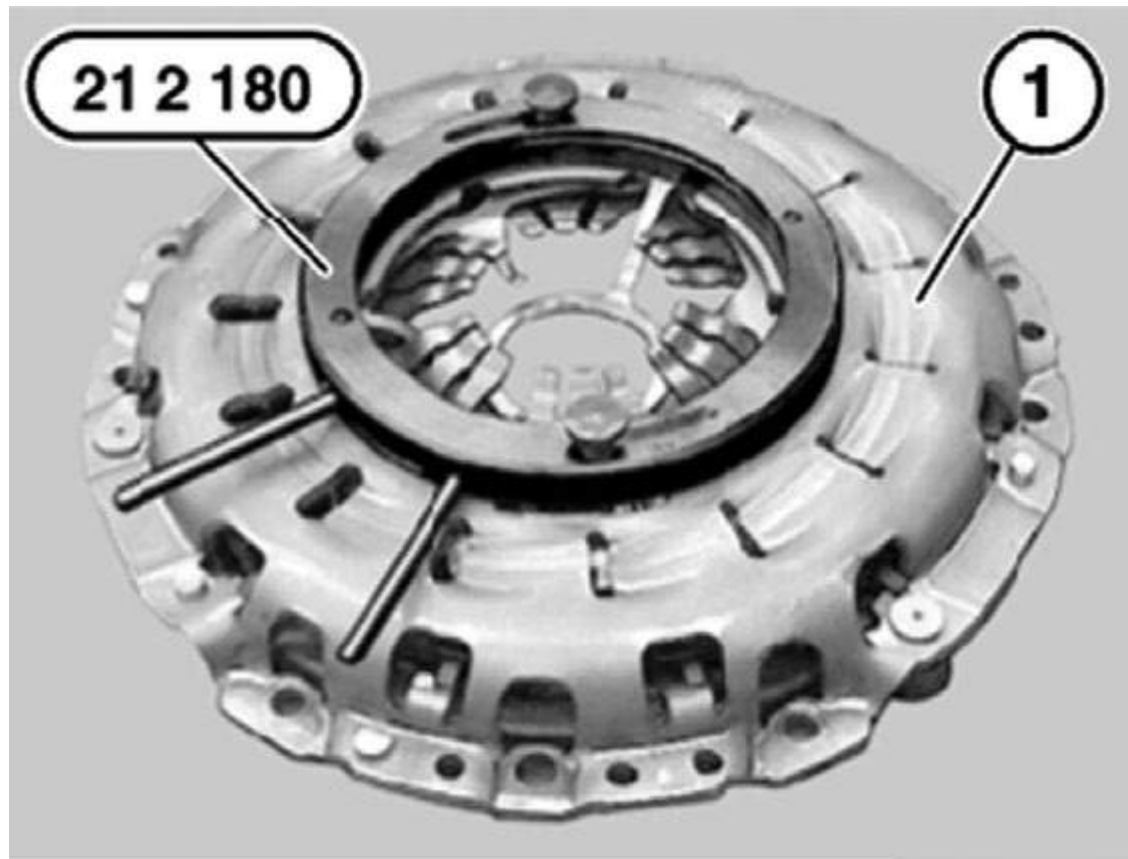
Fig. 17: Releasing Spindle Until Load Is Fully Removed
Courtesy of BMW OF NORTH AMERICA, INC.



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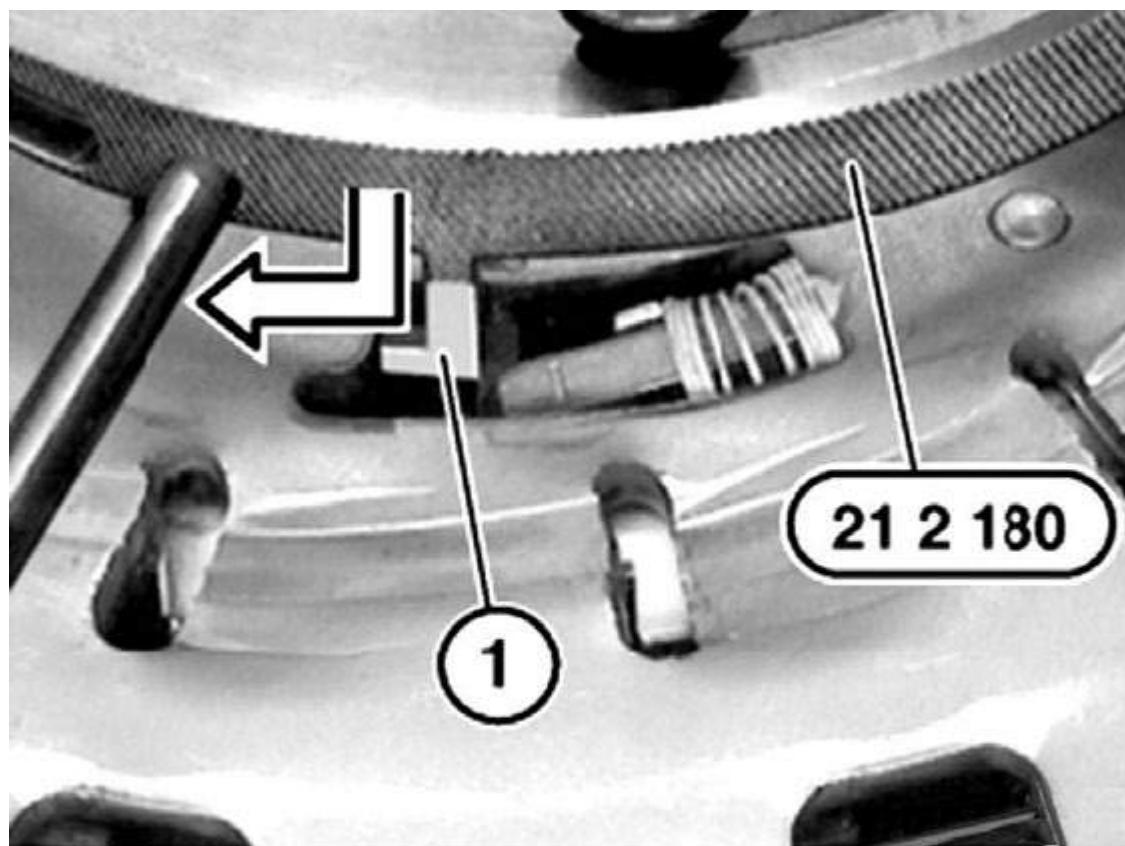
Fig. 18: Removing Special Tool From Clutch Plate Using Screw
Courtesy of BMW OF NORTH AMERICA, INC.

5. When installing removed clutch with new clutch plate, always reset adjustment ring in new position. Set clutch down on a clean surface. Insert special tool (21 2 180) in clutch (1). See **Fig. 19** . Note that locking hooks (1) of special tool (21 2 180) must engage in openings in clutch. See **Fig. 20** . Fit special tool (21 2 170) and tighten down at knurled screw (1). See **Fig. 16** . Insert special tool (21 2 170) only in area of bores for dowel pins. Screw in spindle (1) until adjustment ring of clutch (2) can be turned with special tool (21 2 180) at handles (3). Press special tool together at handles (3) as far as it will go and grip firmly.



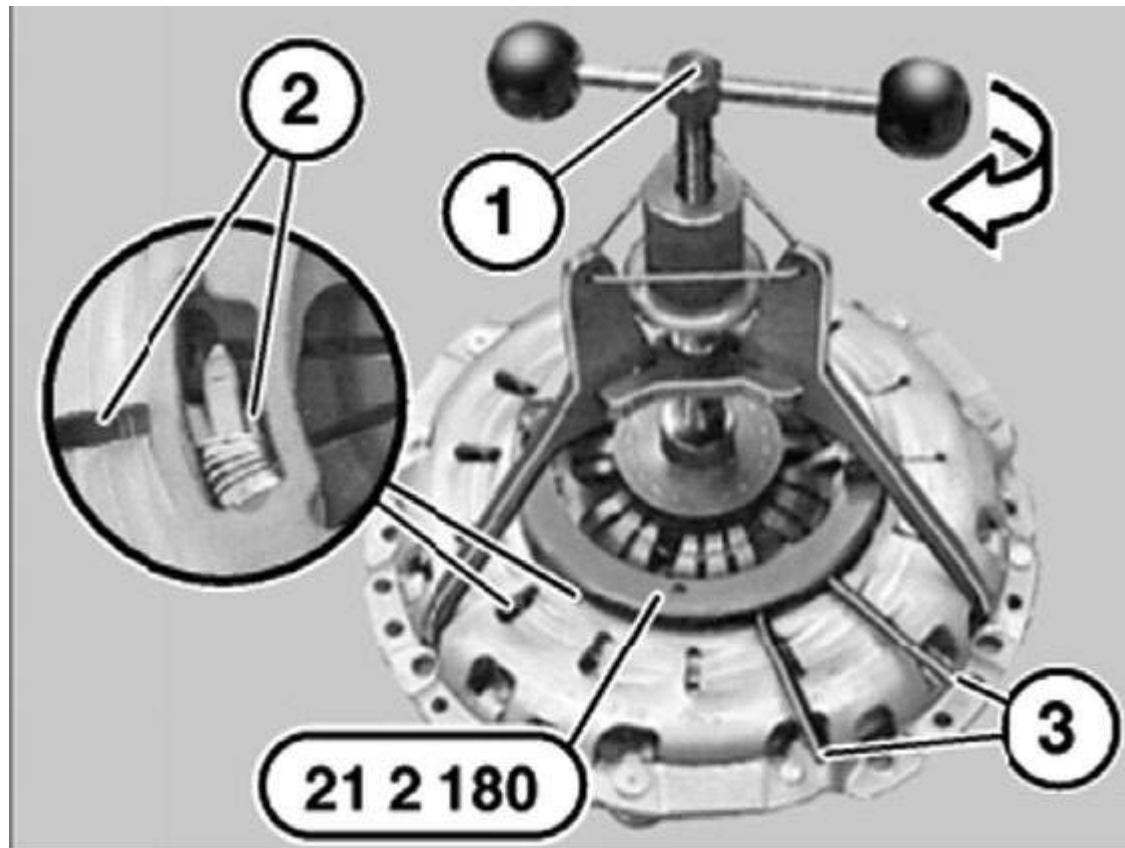
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Fig. 19: Installing Special Tool In Clutch
Courtesy of BMW OF NORTH AMERICA, INC.



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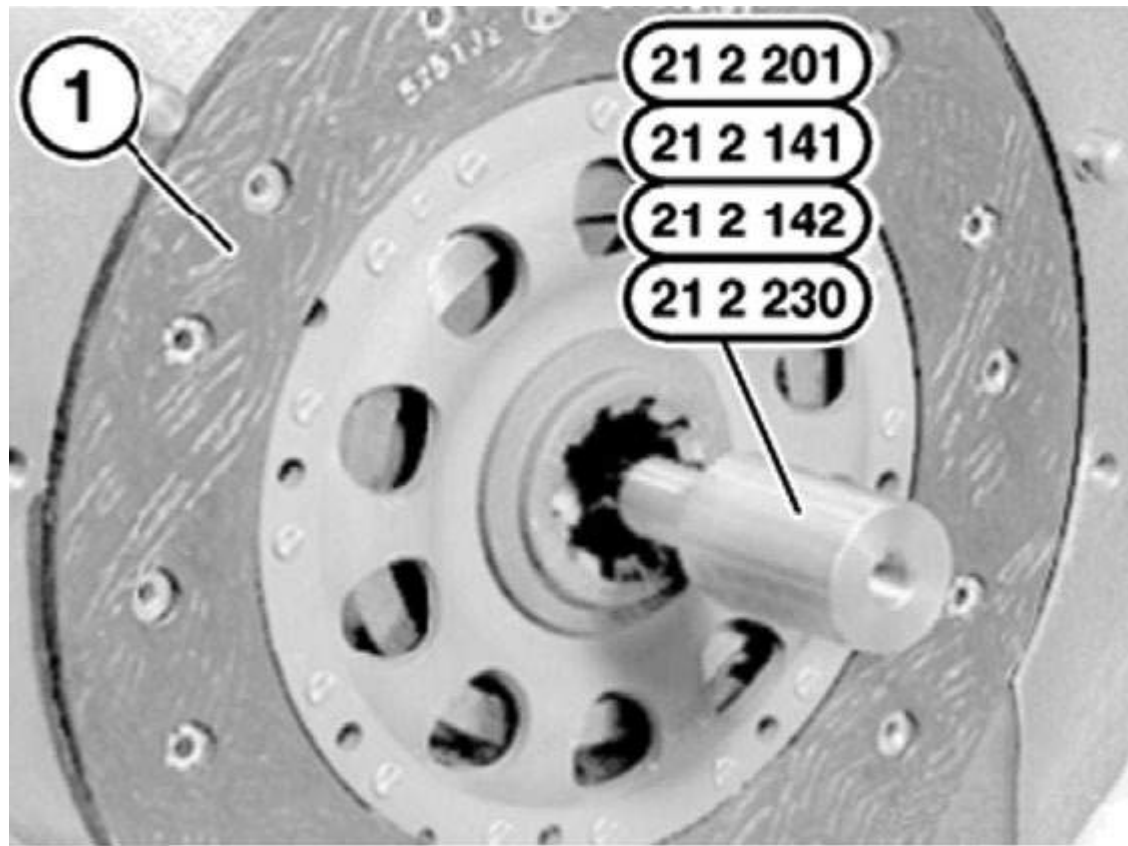
Fig. 20: Ensuring Locking Hooks Engage In Openings In Clutch
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 21: Screwing In Spindle Until Diaphragm Spring Is Tensioned On Stop
 Courtesy of BMW OF NORTH AMERICA, INC.

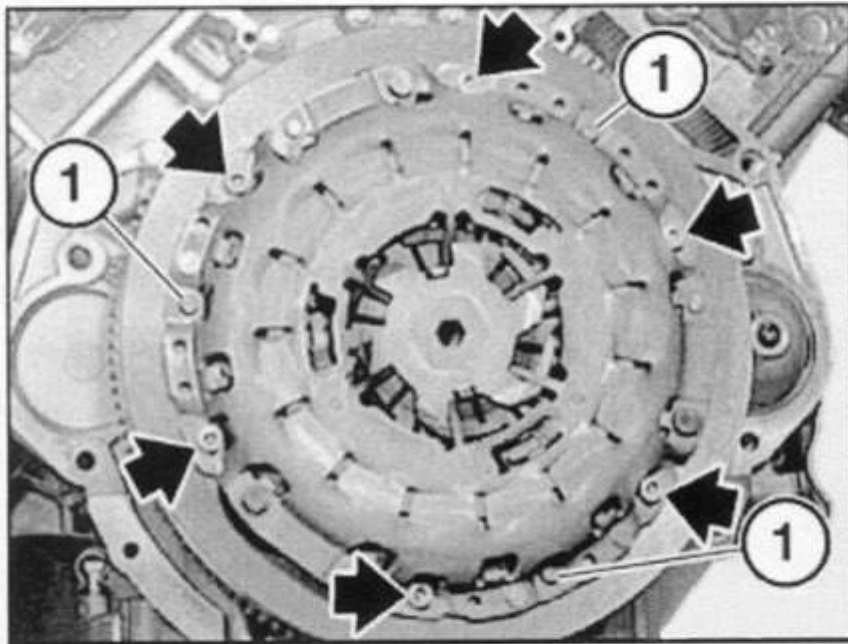
6. At same time, tighten down knurled screws (2). Adjustment ring of clutch is now secured in new position. Screw in spindle (1) until diaphragm spring is tensioned on stop. See **Fig. 21** . Center clutch plate (1) with special tools. See **Fig. 22** . Install clutch plate in correct position. Note designation for "engine side" and "transmission side". Handle clutch plate with care. Do not touch surfaces of friction linings. Fit clutch (1) to flywheel. Clutch (1) must be secured by way of dowel pins (2). See **Fig. 16** . Release spindle (1) until load is fully removed from diaphragm spring (2). Remove special tools (21 2 170 and 21 2 180). See **Fig. 17** . Withdraw special tool from clutch plate with aid of accompanying screw (1). See **Fig. 18** .



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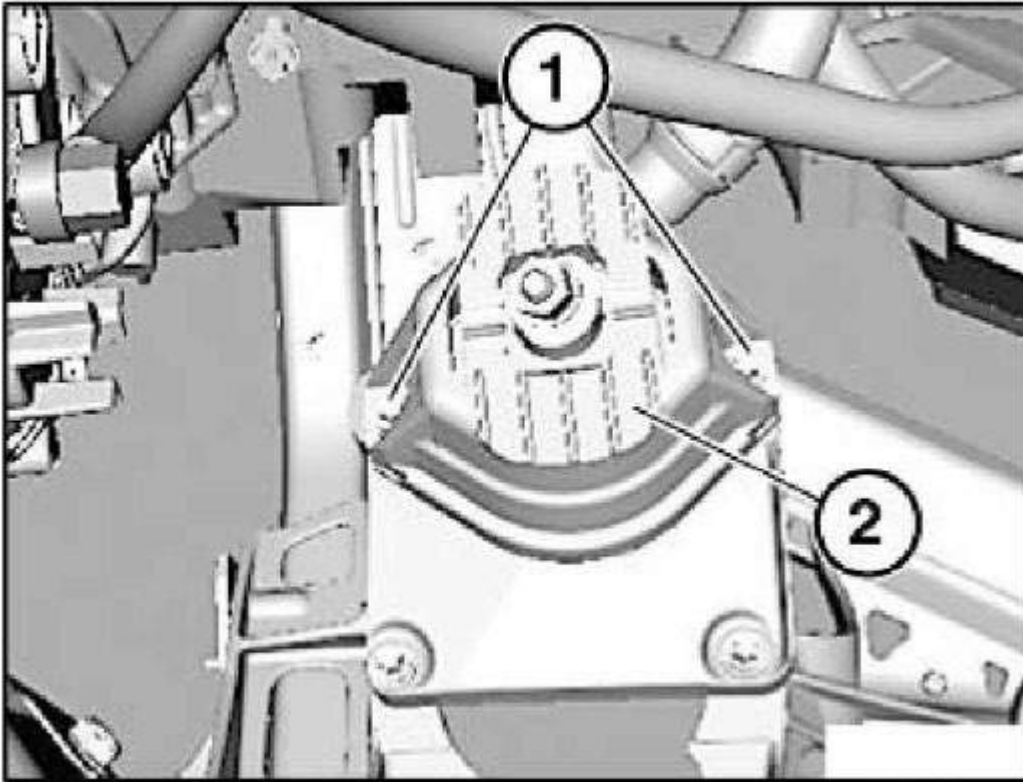
Fig. 22: Centering Clutch Plate With Special Tools
Courtesy of BMW OF NORTH AMERICA, INC.

7. If installing new clutch, locking piece may only be removed if clutch is screwed down. Center clutch plate (1) with special tools. See **Fig. 22** . It is important that clutch plate is installed in correct position. Note designation for "engine side" and "transmission side". Handle clutch plate with care. Do not touch surfaces of friction linings. Fit clutch to flywheel. It is important that clutch is secured by way of dowel pins (1). See **Fig. 23** . Carefully unscrew locking piece (1) clockwise or counterclockwise with a 14-mm WAF hexagon socket wrench (2). See **Fig. 24** . Note that a slight snapping of the plate spring while unscrewing the lock is possible. Withdraw special tool (1) from clutch plate with aid of accompanying screw (2). See **Fig. 18** .



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Fig. 23: Fitting Clutch To Flywheel By Way Of Dowel Pins
Courtesy of BMW OF NORTH AMERICA, INC.

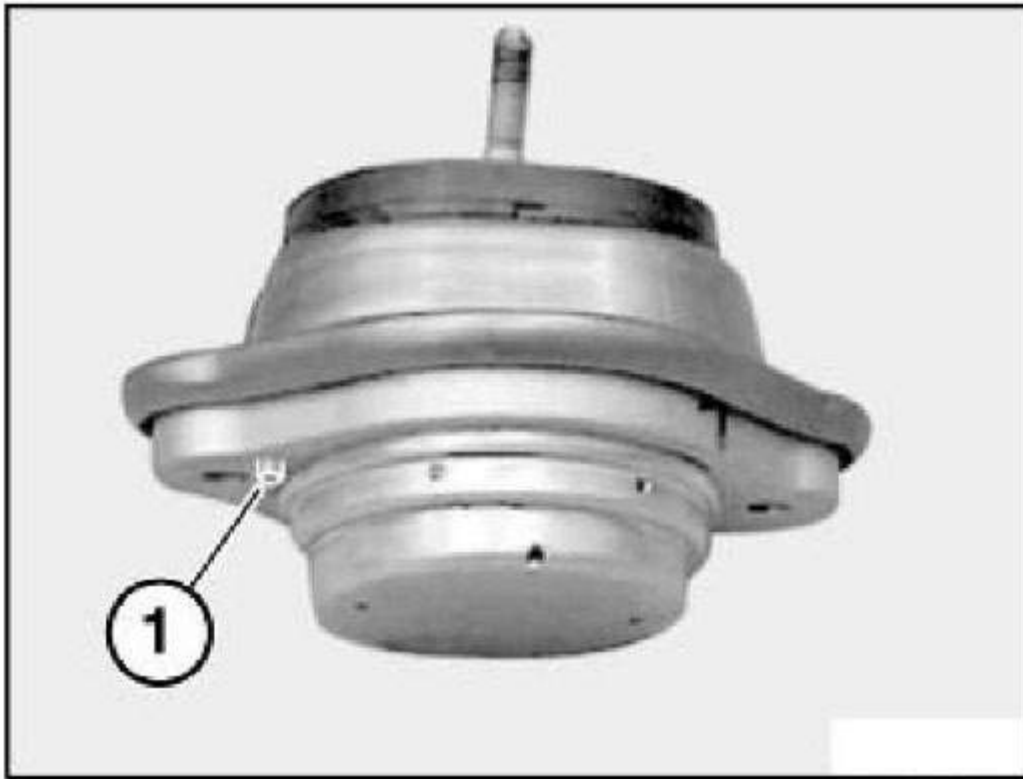


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Fig. 24: Unscrewing Locking Piece
Courtesy of BMW OF NORTH AMERICA, INC.

Removal & Installation (X5)

1. Remove transmission. See appropriate MANUAL TRANSMISSION removal article. To identify clutch, note 3 openings each with a pressure piece (1) of a ring and a pressure spring (2).

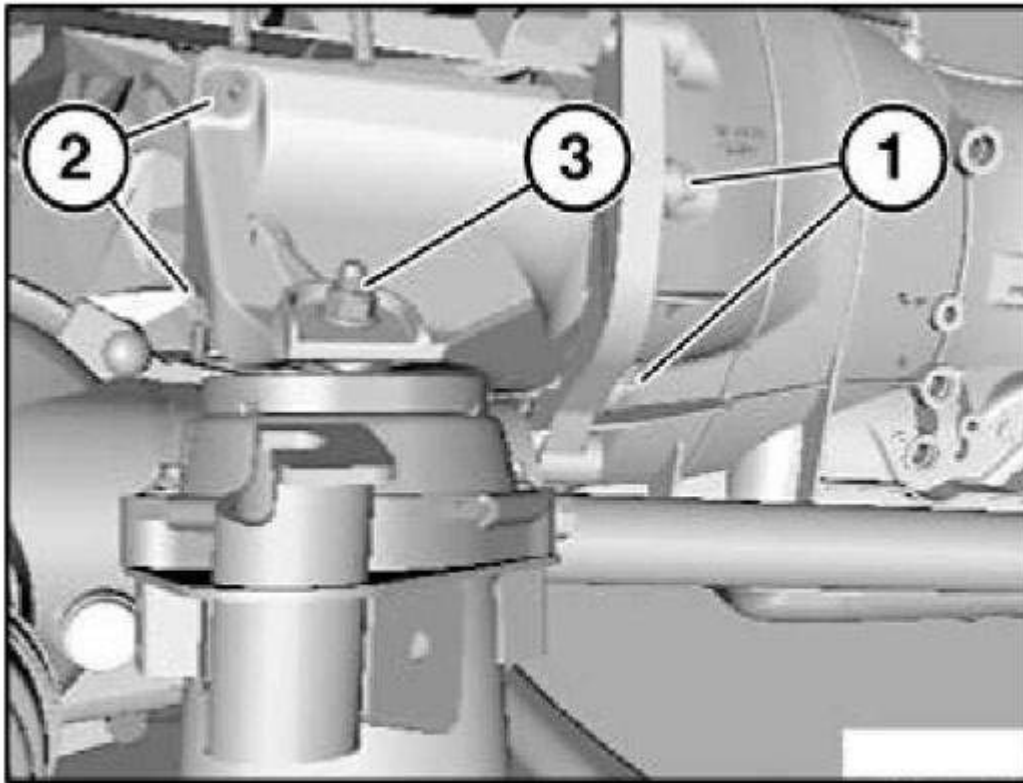


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Fig. 25: Identifying Clutch

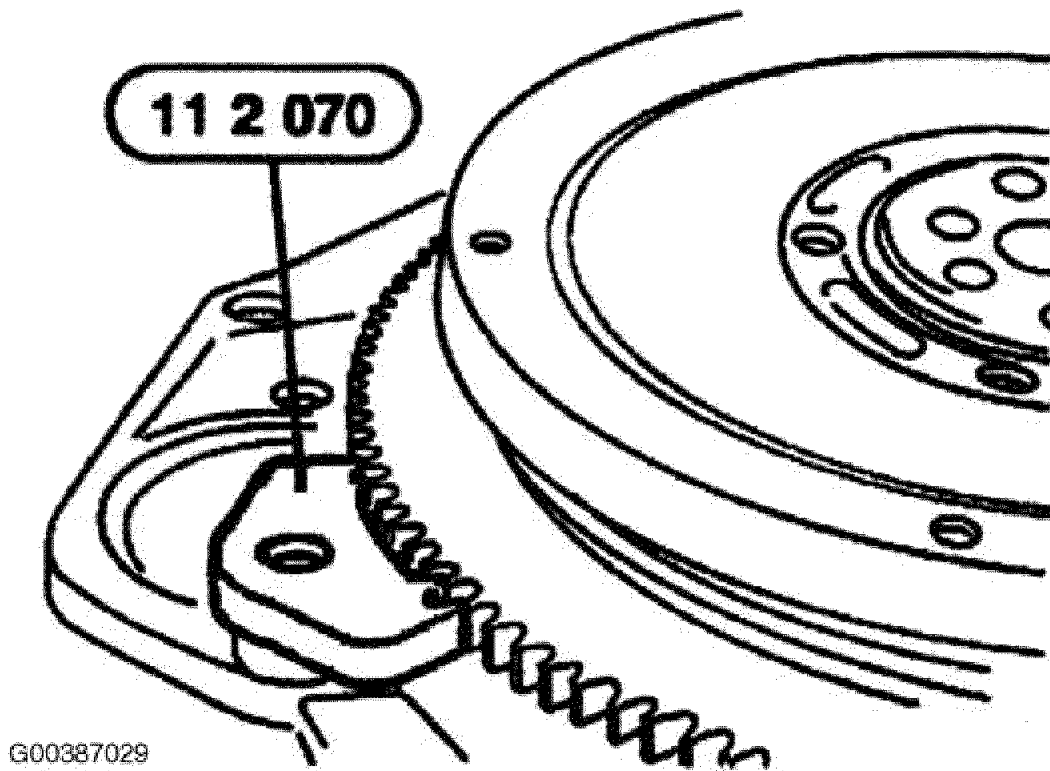
Courtesy of BMW OF NORTH AMERICA, INC.

2. On 6-cylinder engine, block flywheel (1) with special tool 11 2 170. See **Fig. 26** . On 8-cylinder engine, lock flywheel with special tool 11 2 070. See **Fig. 27** . Unfasten bolts and remove SAC from flywheel. See **Fig. 28** . Do not use a special tool to detach SAC clutch from flywheel. Remove clutch plate (1) from flywheel. See **Fig. 29** . Clean flywheel, check for wear and damage. Replace damaged flywheel. Check grooved ball bearing in crankshaft for ease of movement and tightness and if necessary replace grooved ball bearing. Always replace clutch plates fouled by oil or cleaning agent. Check clutch plate for damage and friction rust in hub profile and replace if necessary. Check clutch disk for wear and measure lining protrusion at lining rivets at closing head (A) in each case. Rivet connection: A = closing head, B = swage head. See **Fig. 30** . Replace clutch plate if lining protrusion at closing head (A) is less than 1 mm. Push clutch disk onto the cleaned transmission input shaft and check for easy movability. Do not clean SAC clutch with high pressure cleaner or washing machine as this may impair function of adjustment unit. Clean friction surface only. Check SAC for wear and damage and replace if necessary.



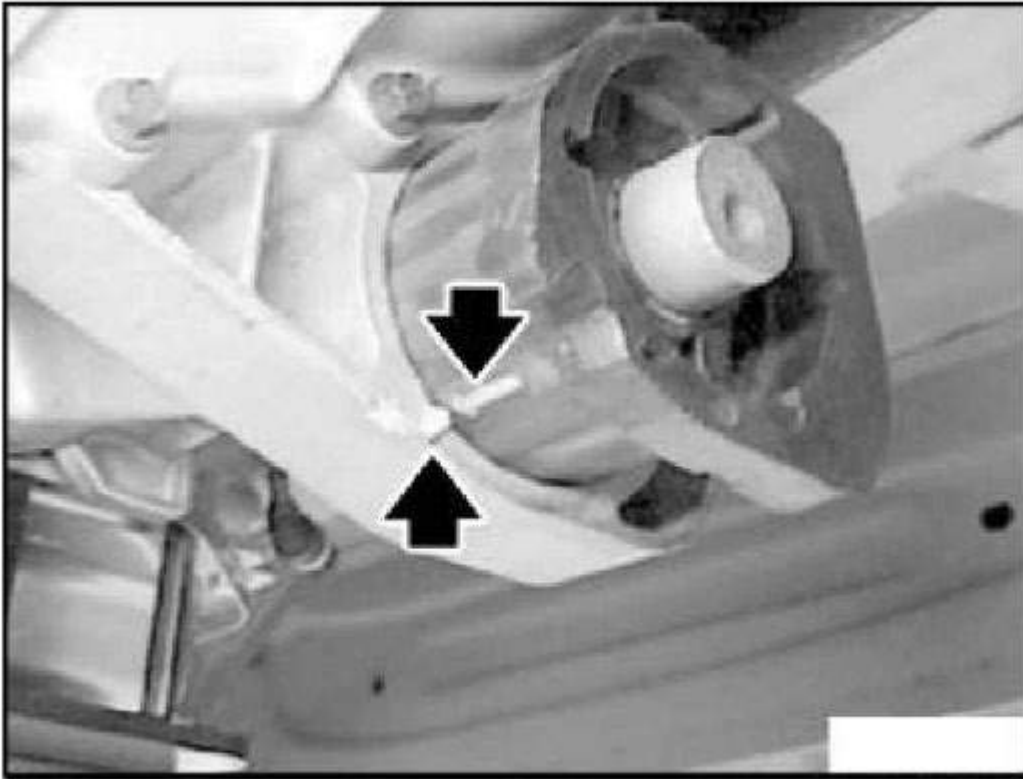
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Fig. 26: Blocking Flywheel (6-Cylinder)
Courtesy of BMW OF NORTH AMERICA, INC.



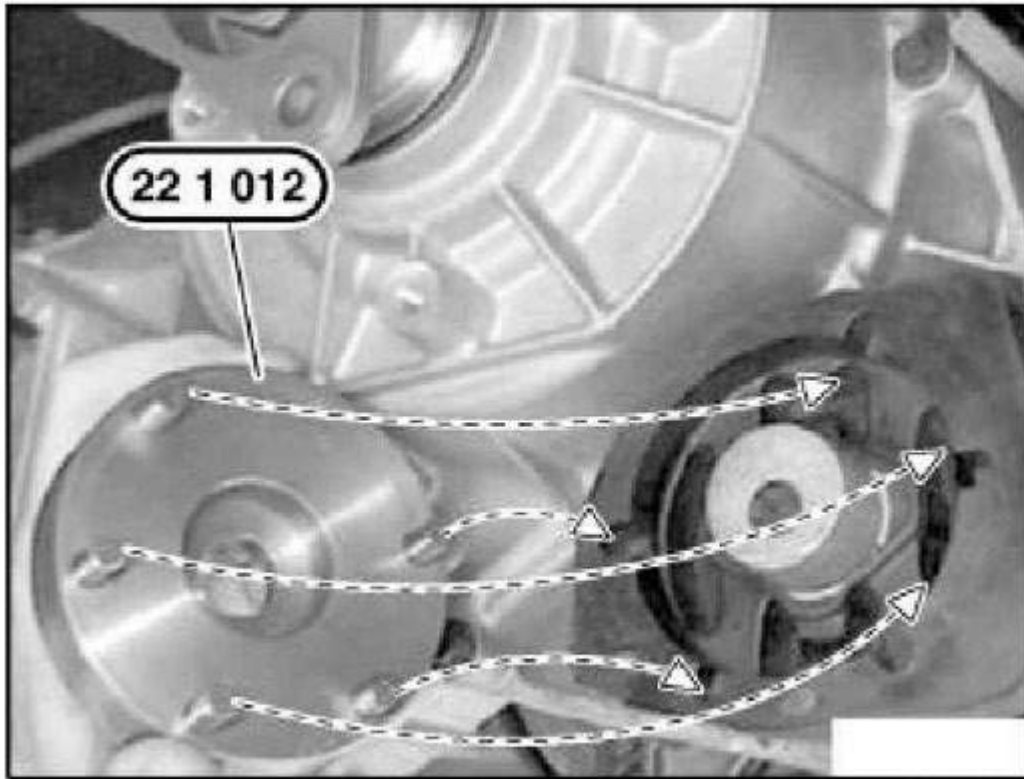
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Fig. 27: Blocking Flywheel (8-Cylinder)
Courtesy of BMW OF NORTH AMERICA, INC.



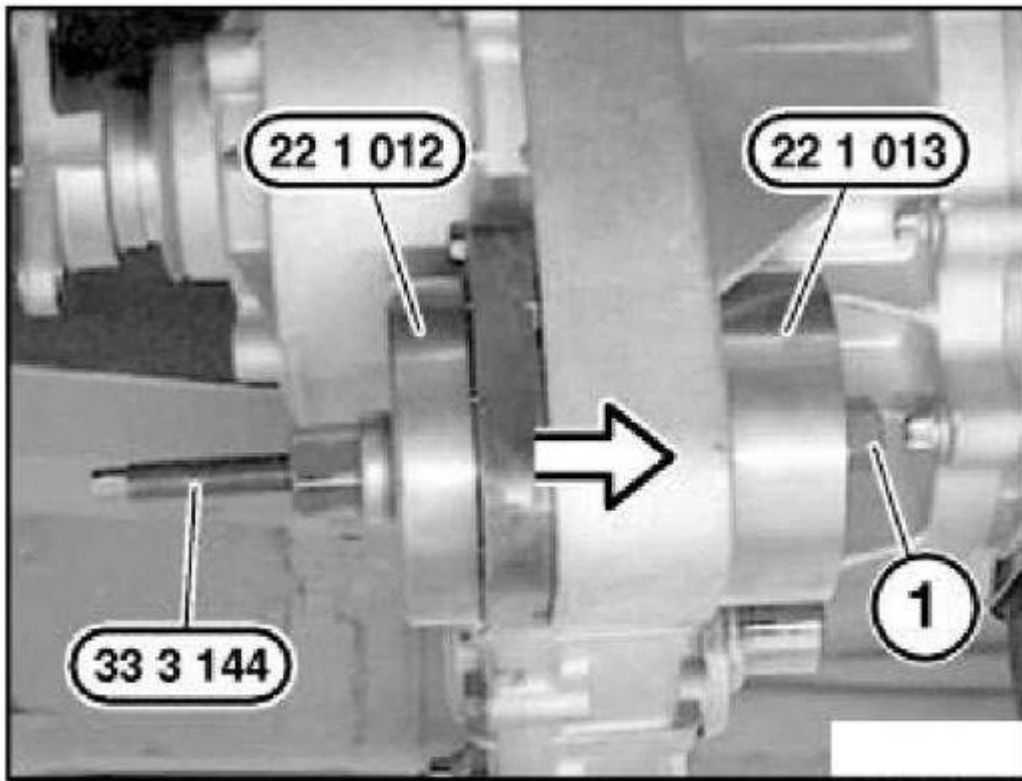
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Fig. 28: Removing SAC From Flywheel
Courtesy of BMW OF NORTH AMERICA, INC.



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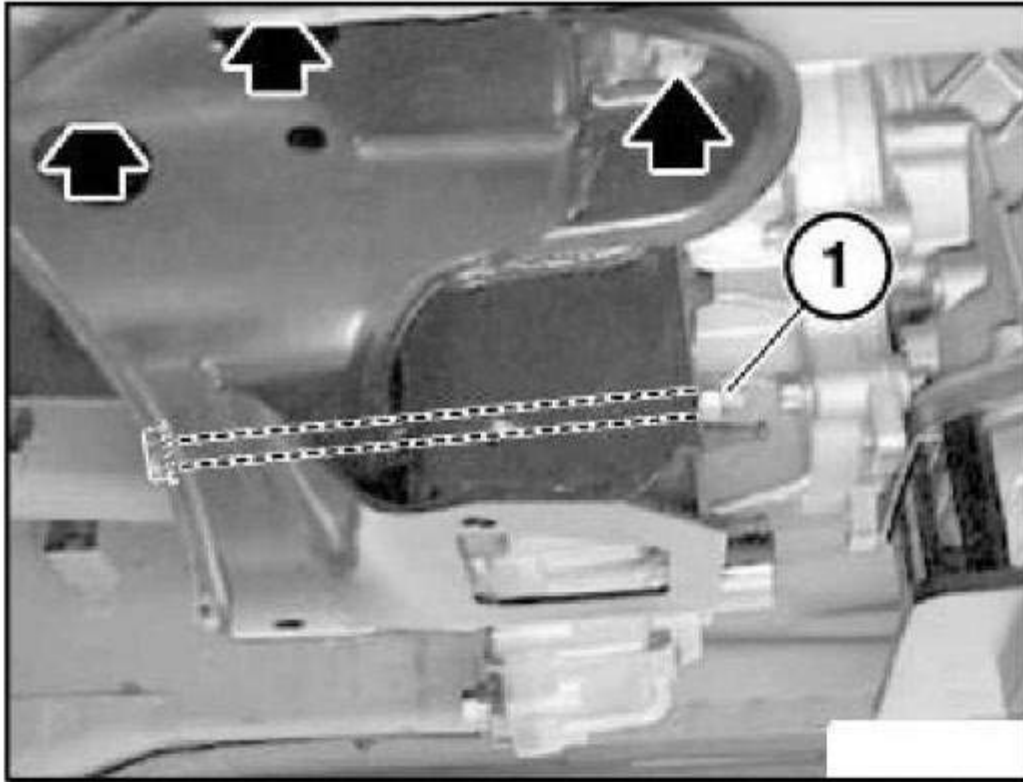
Fig. 29: Removing Clutch Plate From Flywheel
Courtesy of BMW OF NORTH AMERICA, INC.



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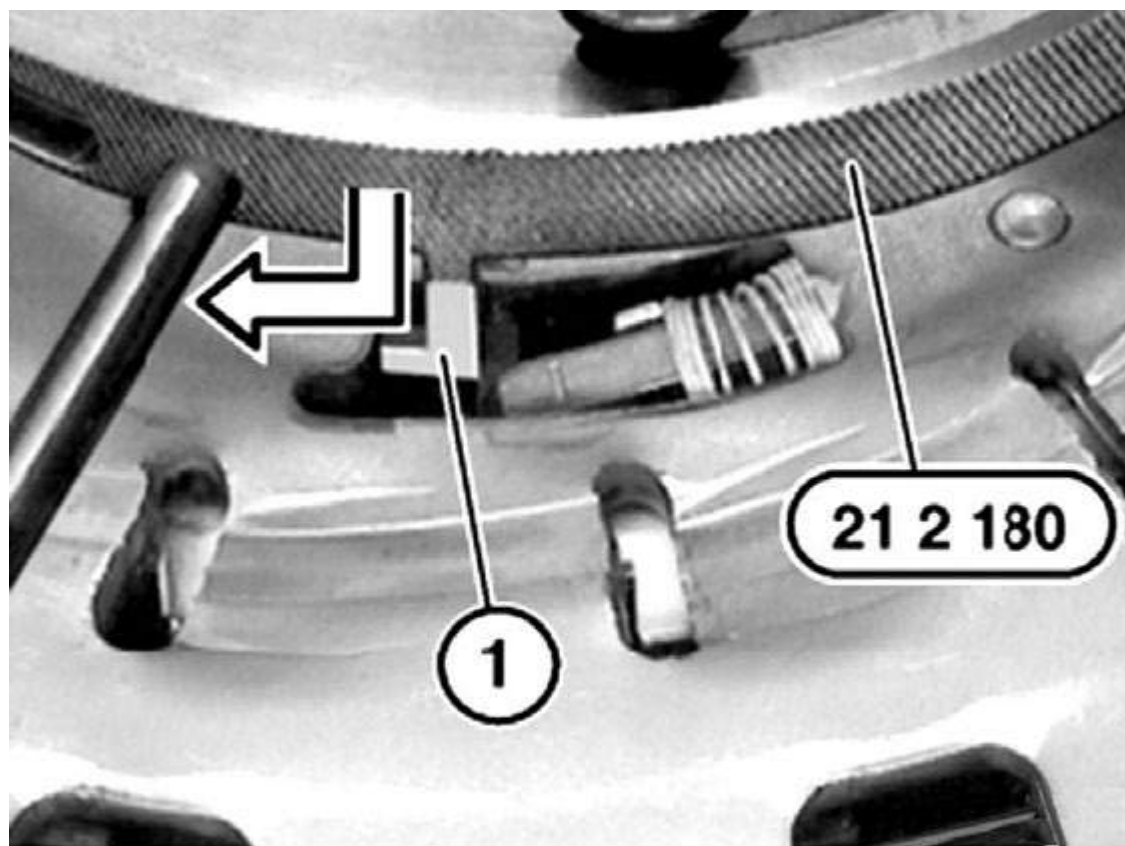
Fig. 30: Identifying Closing Head & Swage Head
 Courtesy of BMW OF NORTH AMERICA, INC.

3. To reinstall removed SAC clutch and clutch plate, set SAC clutch (1) down on a clean surface. See **Fig. 31** . Install special tool 21 2 180 in SAC clutch (1). Locking hooks (1) of special tool 21 2 180 must engage in openings in SAC clutch. See **Fig. 32** . Press special tool (21 2 180) together at handles (1) as far as it will go and grip firmly. At same time tighten down knurled screws (2). See **Fig. 33** . Adjustment ring of SAC clutch is now secured in its original position (wear position). Do not reset adjustment ring to new position. Insert special tool 21 2 170 only in area of bores for dowel pins. See **Fig. 34** . Fit special tool 21 2 170 and tighten down at knurled screw (1). See **Fig. 35** . Screw in spindle (1) until diaphragm spring (2) is pretensioned up to stop. See **Fig. 36** . Handle clutch disk carefully, using care to not touch surfaces of friction pads. Install clutch plate in correct position. Note designation for "engine side" and "transmission side". Center clutch plate (1) with special tool. See **Fig. 37** . On vehicles manufactured from 4/03, note color marking when fitting clutch with balance marking. Position color marking (1) on dual-mass flywheel and color marking (2) on clutch pressure plate as closely as possible to each other. See **Fig. 38** . Maximum possible angle error is 60 degrees. On all vehicles, fit SAC clutch (1) on flywheel. Pay attention to dowel pins (2). See **Fig. 39** . SAC clutch (1) must be secured by way of dowel pins (2).



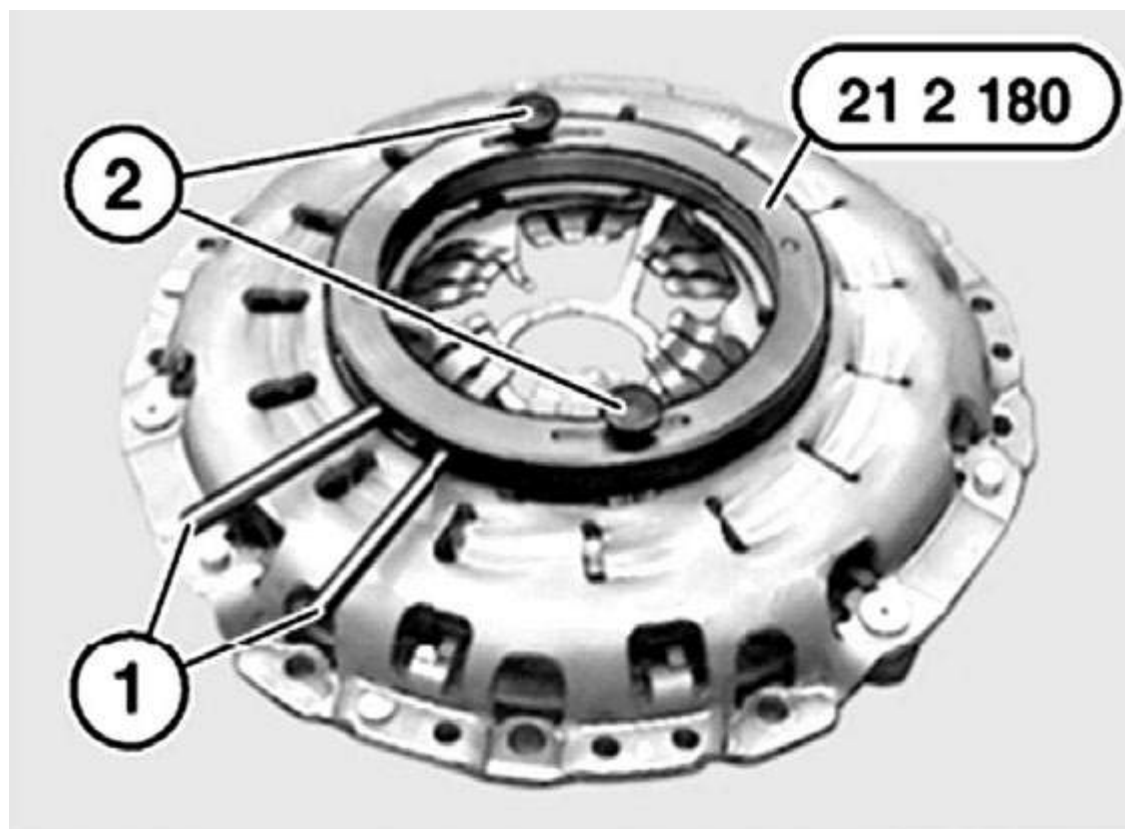
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Fig. 31: Setting SAC Clutch Down On A Clean Surface
Courtesy of BMW OF NORTH AMERICA, INC.



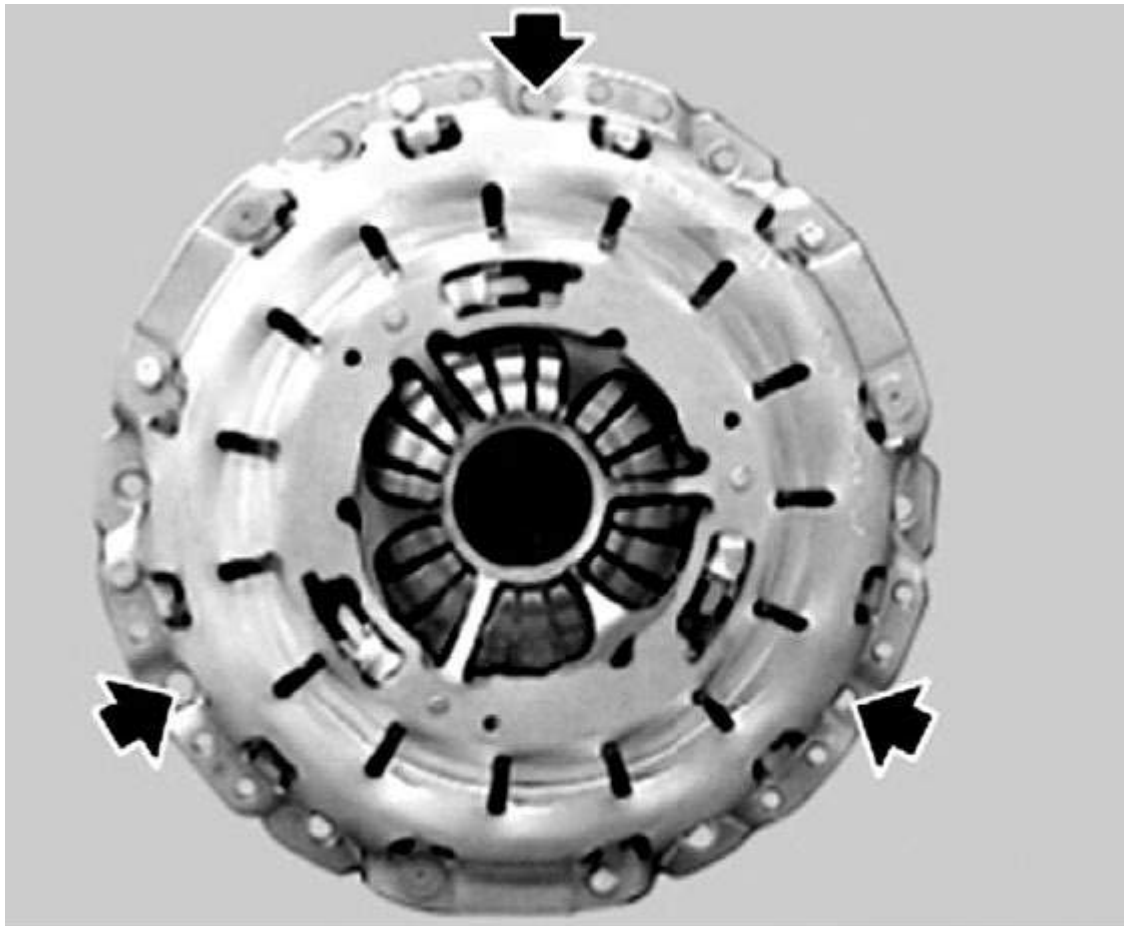
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Fig. 32: Identifying Locking Hooks Of Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.



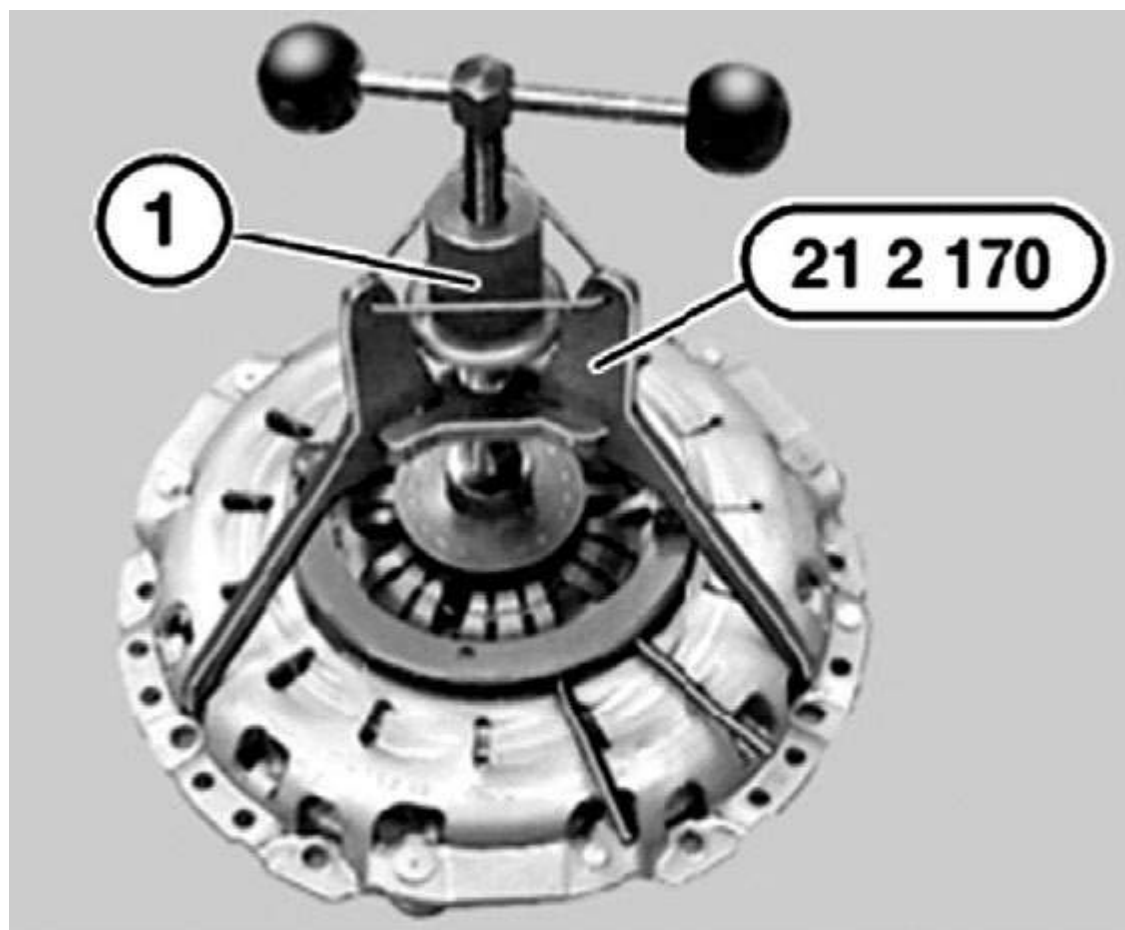
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Fig. 33: Pressing Special Tool At Handles & Tightening Knurled Screws
Courtesy of BMW OF NORTH AMERICA, INC.



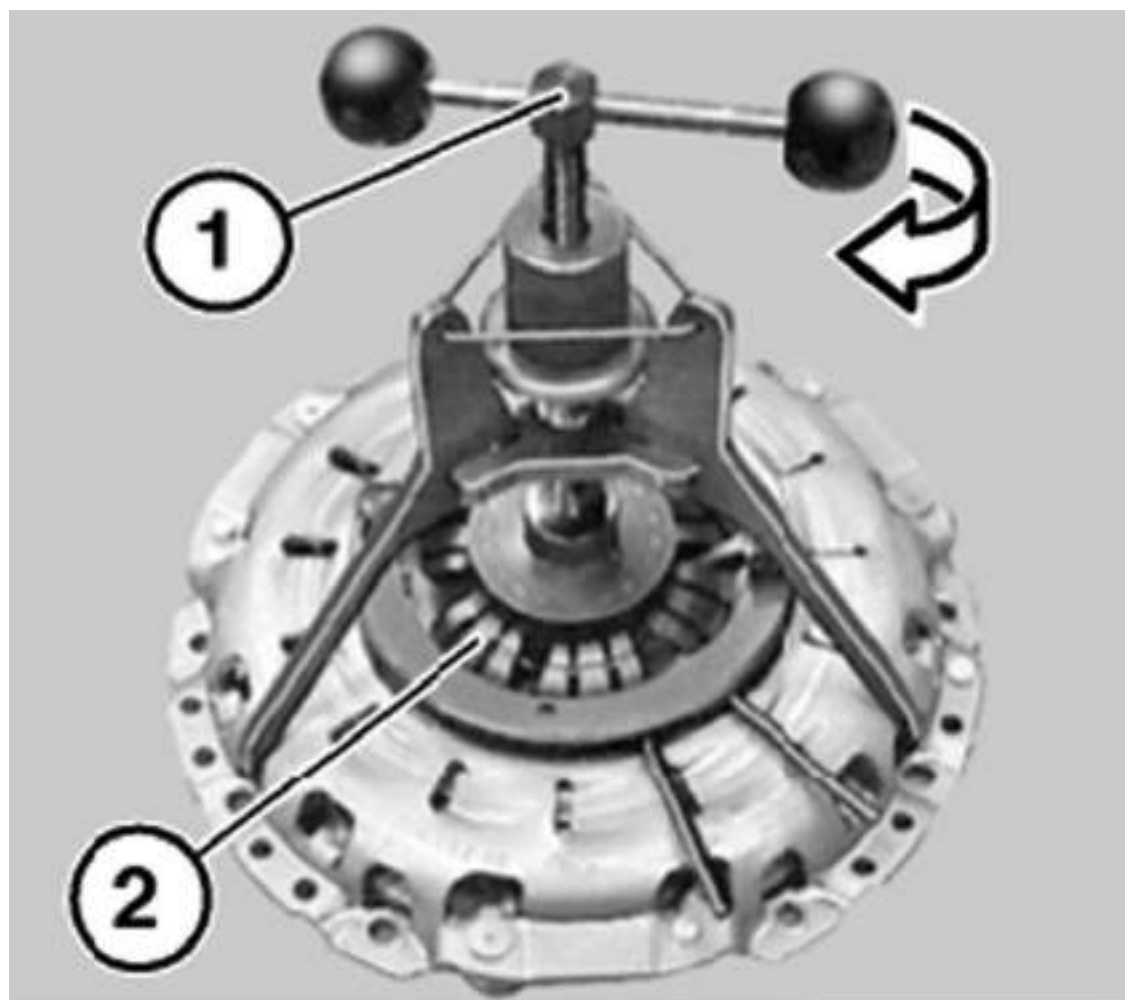
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Fig. 34: Identifying Area Of Bores For Dowel Pins
Courtesy of BMW OF NORTH AMERICA, INC.



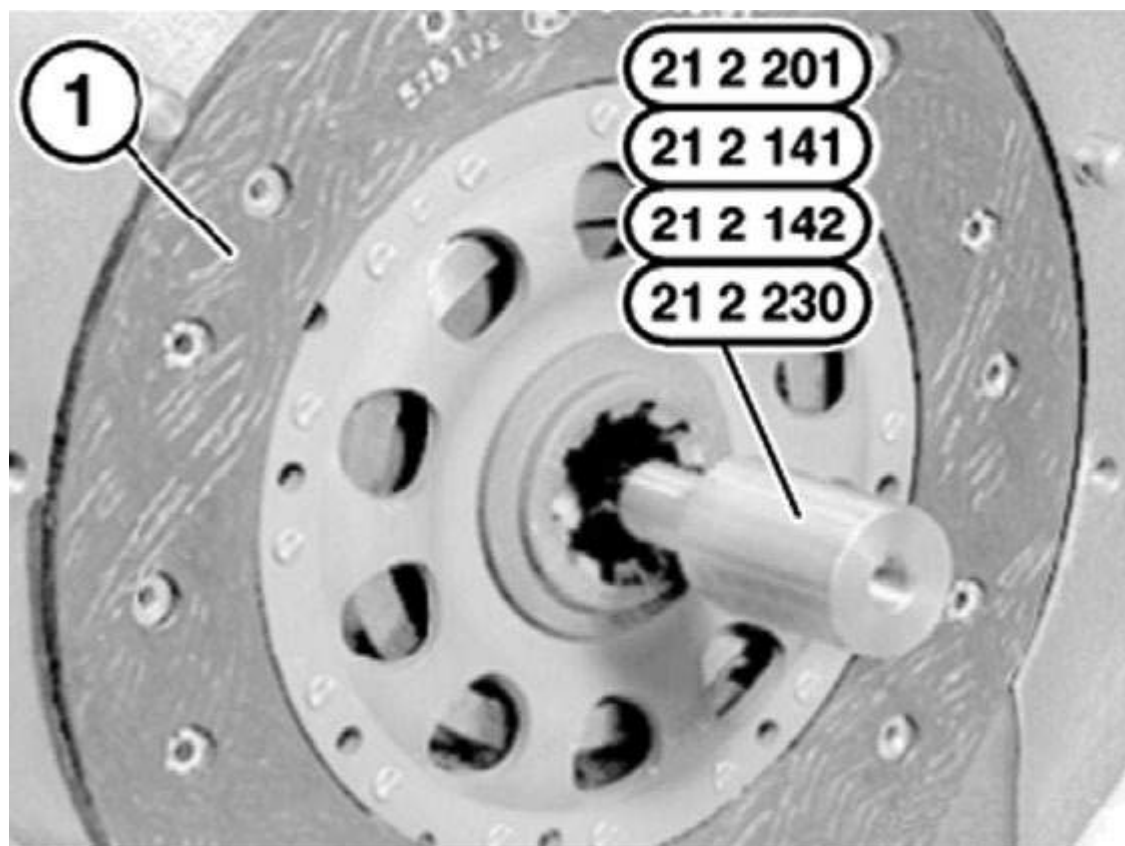
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Fig. 35: Installing Special Tool & Tightening At Knurled Screw
Courtesy of BMW OF NORTH AMERICA, INC.



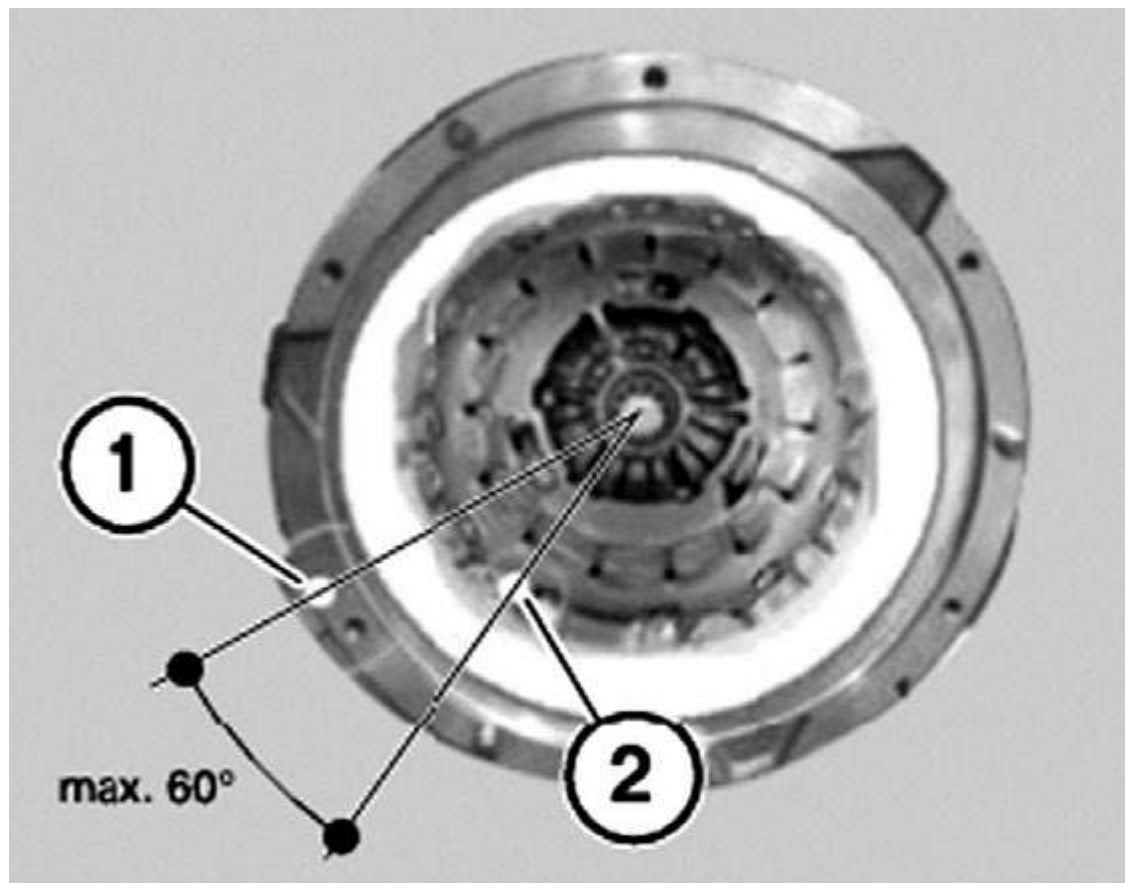
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Fig. 36: Screwing In Spindle Until Diaphragm Spring Is Pretensioned
Courtesy of BMW OF NORTH AMERICA, INC.



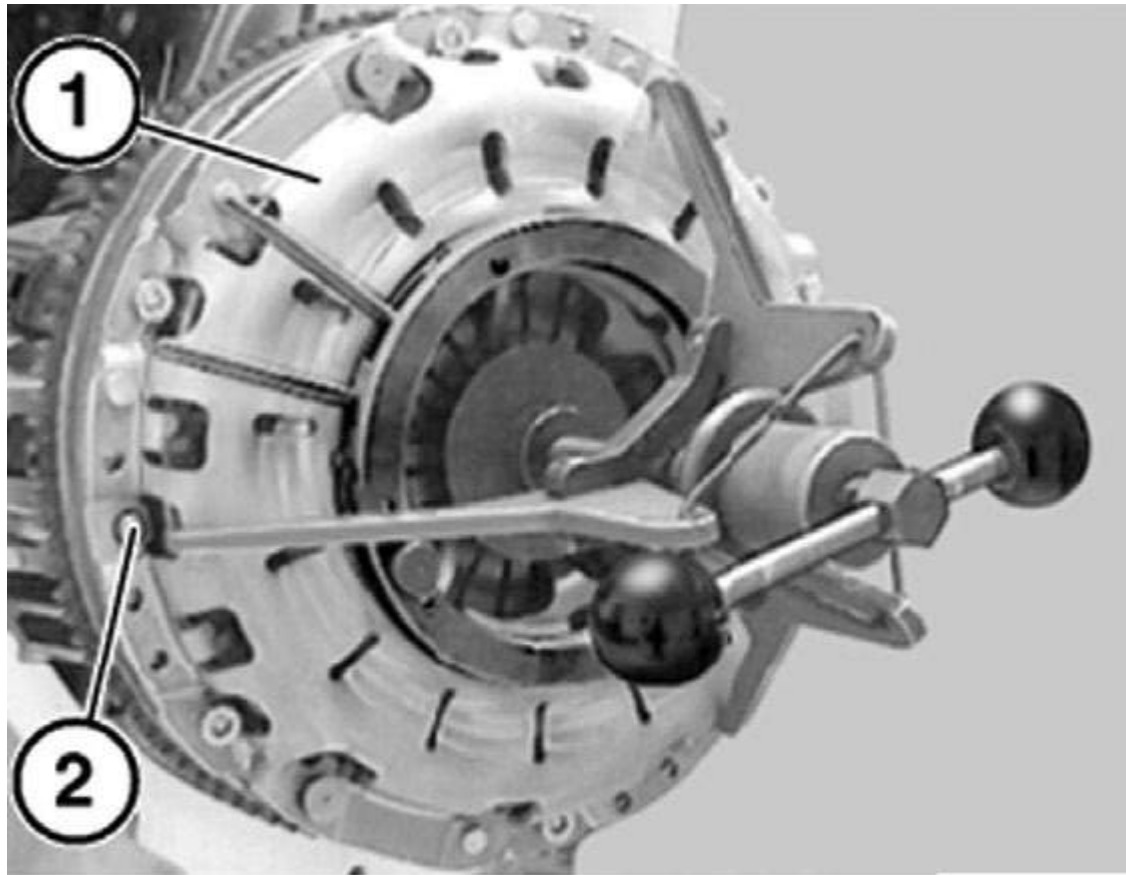
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Fig. 37: Centering Clutch Plate With Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 38: Positioning Color Marking
Courtesy of BMW OF NORTH AMERICA, INC.

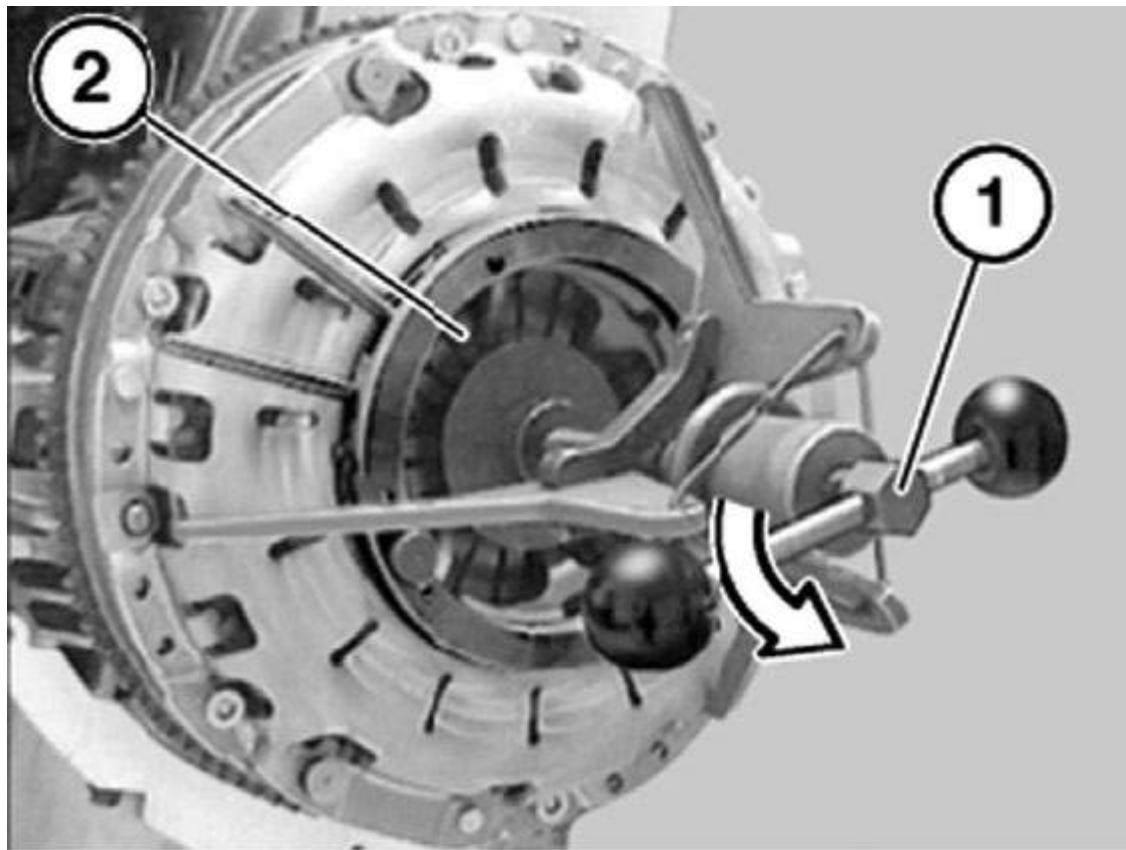


G00386933

Fig. 39: Identifying Clutch & Dowel Pins

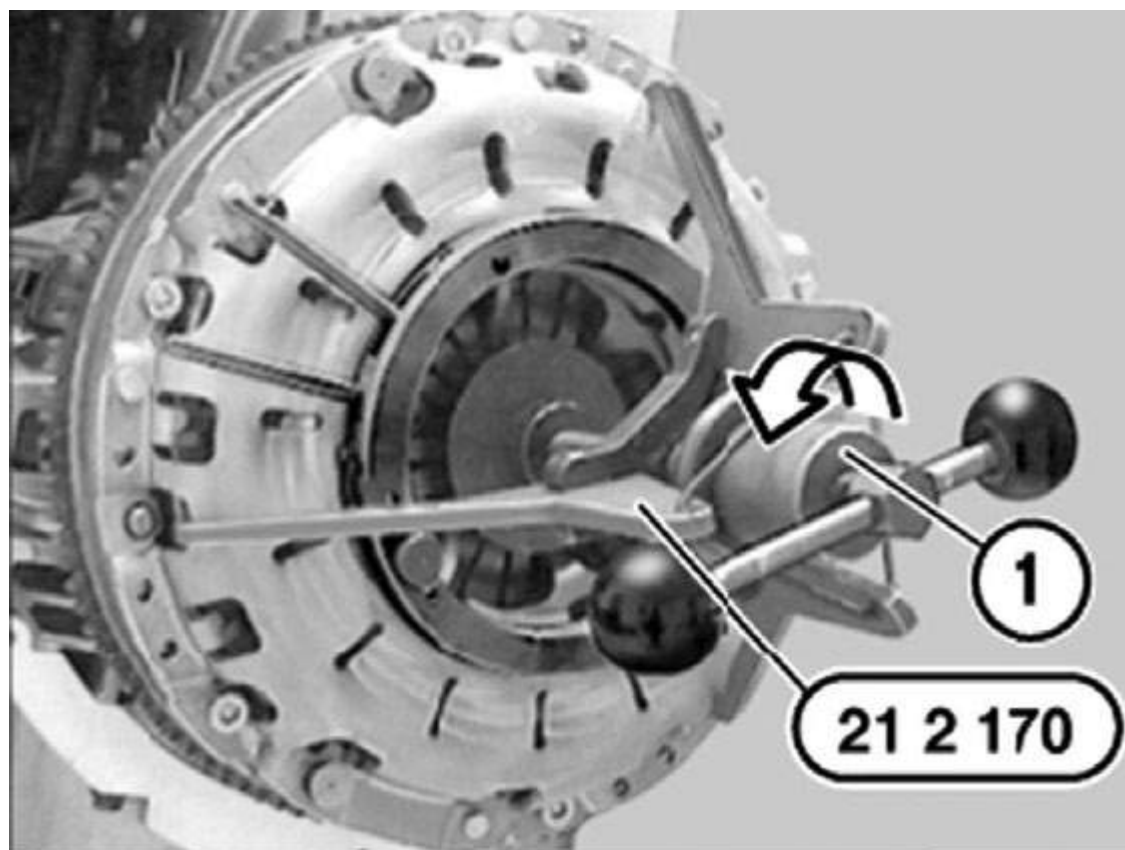
Courtesy of BMW OF NORTH AMERICA, INC.

4. Insert screws and tighten down. Release spindle (1) until tension is completely removed from diaphragm spring (2). See **Fig. 40** . Release knurled screw (1) and remove special tool (21 2 180). See **Fig. 41** . Release knurled screws (2) and remove special tool (21 2 180) from SAC clutch. See **Fig. 42** . Withdraw special tool from clutch plate with aid of accompanying screw (1). See **Fig. 43** .



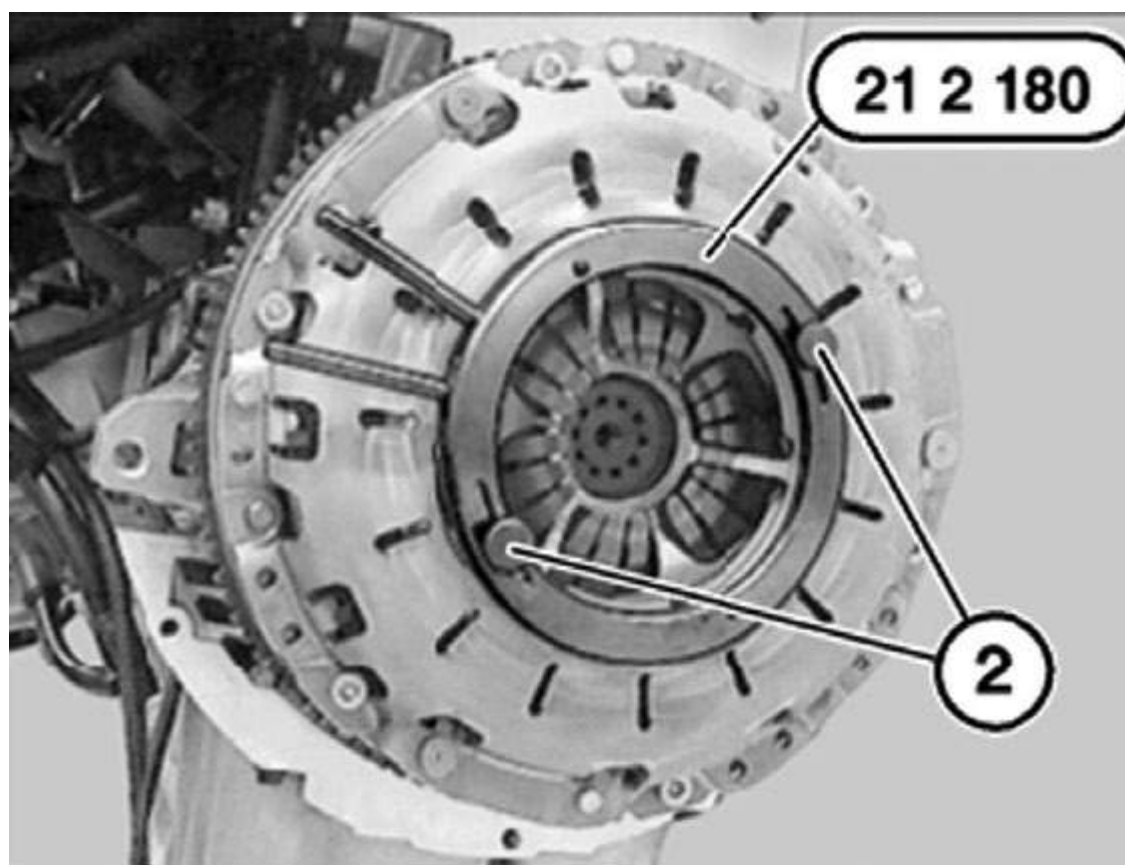
G00386934

Fig. 40: Releasing Spindle Until No Tension Is Present At Diaphragm Spring
Courtesy of BMW OF NORTH AMERICA, INC.



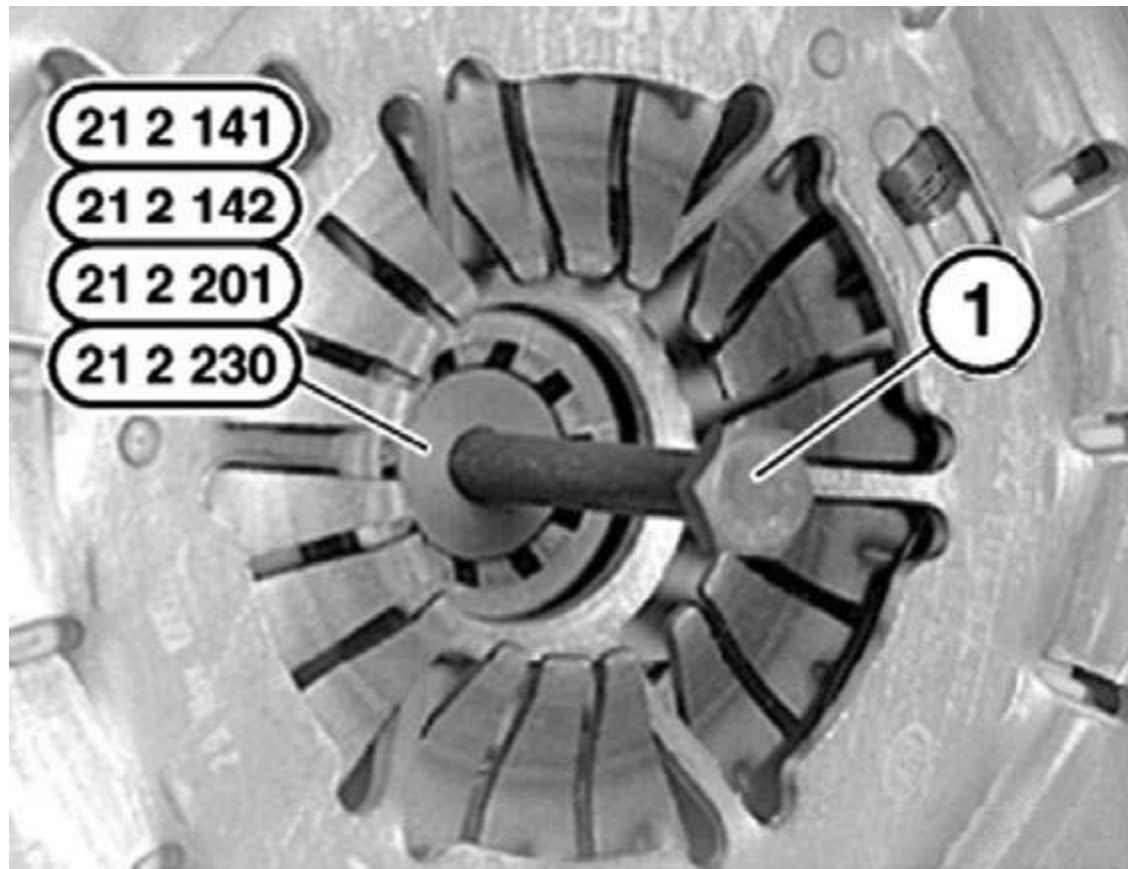
G00386935

Fig. 41: Releasing Knurled Screw & Special Tool From Clutch
Courtesy of BMW OF NORTH AMERICA, INC.



G00386936

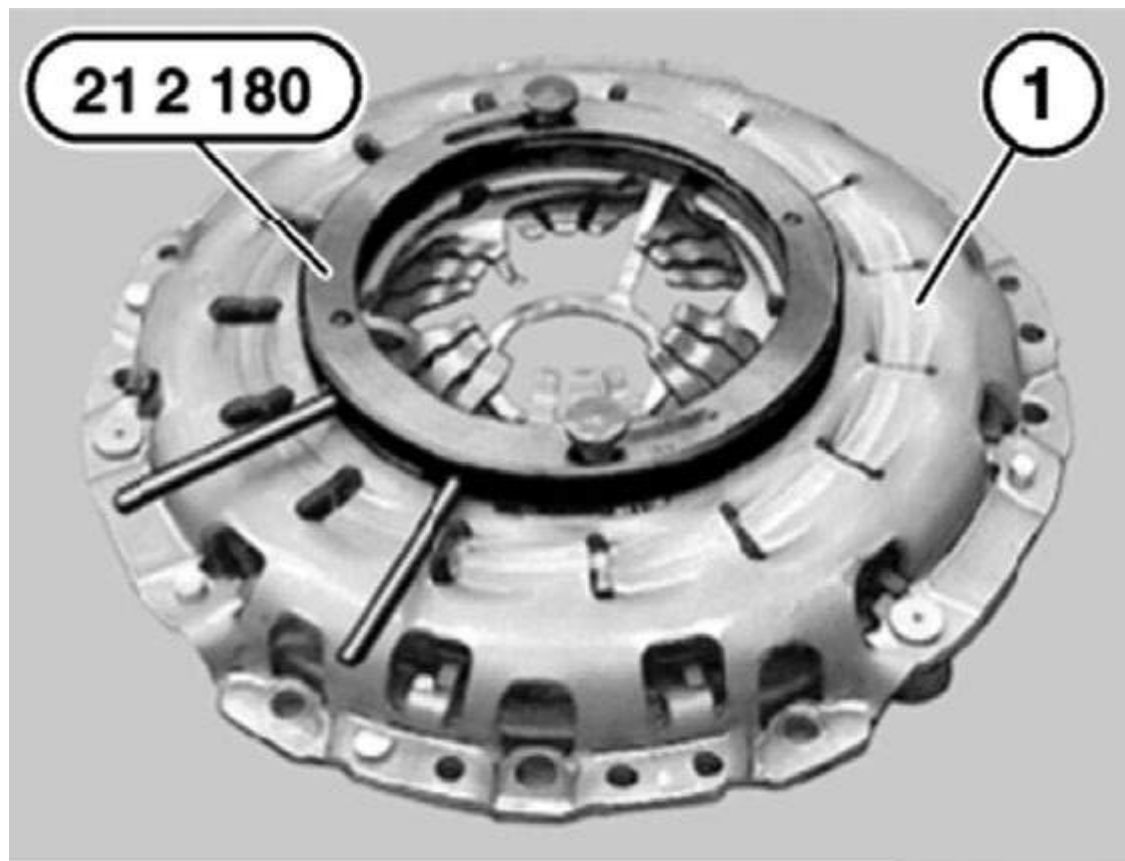
Fig. 42: Releasing Knurled Screws & Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.



G00386937

Fig. 43: Removing Special Tool From Clutch Plate Using
Courtesy of BMW OF NORTH AMERICA, INC.

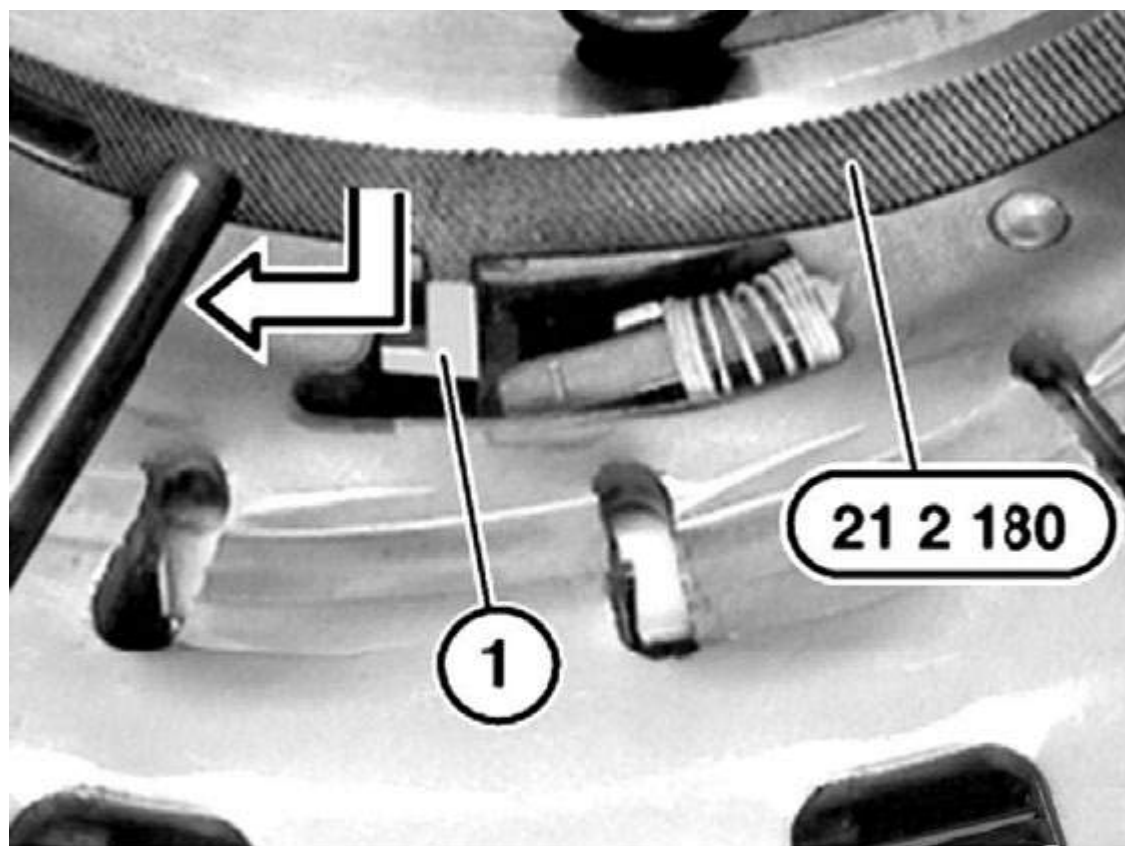
5. Before installing an SAC clutch which has been in service with a new clutch plate, always reset adjustment ring in new position. Set SAC clutch down on a clean surface. Install special tool (21 2 180) in SAC clutch (1). See Fig. 44 .



G00386938

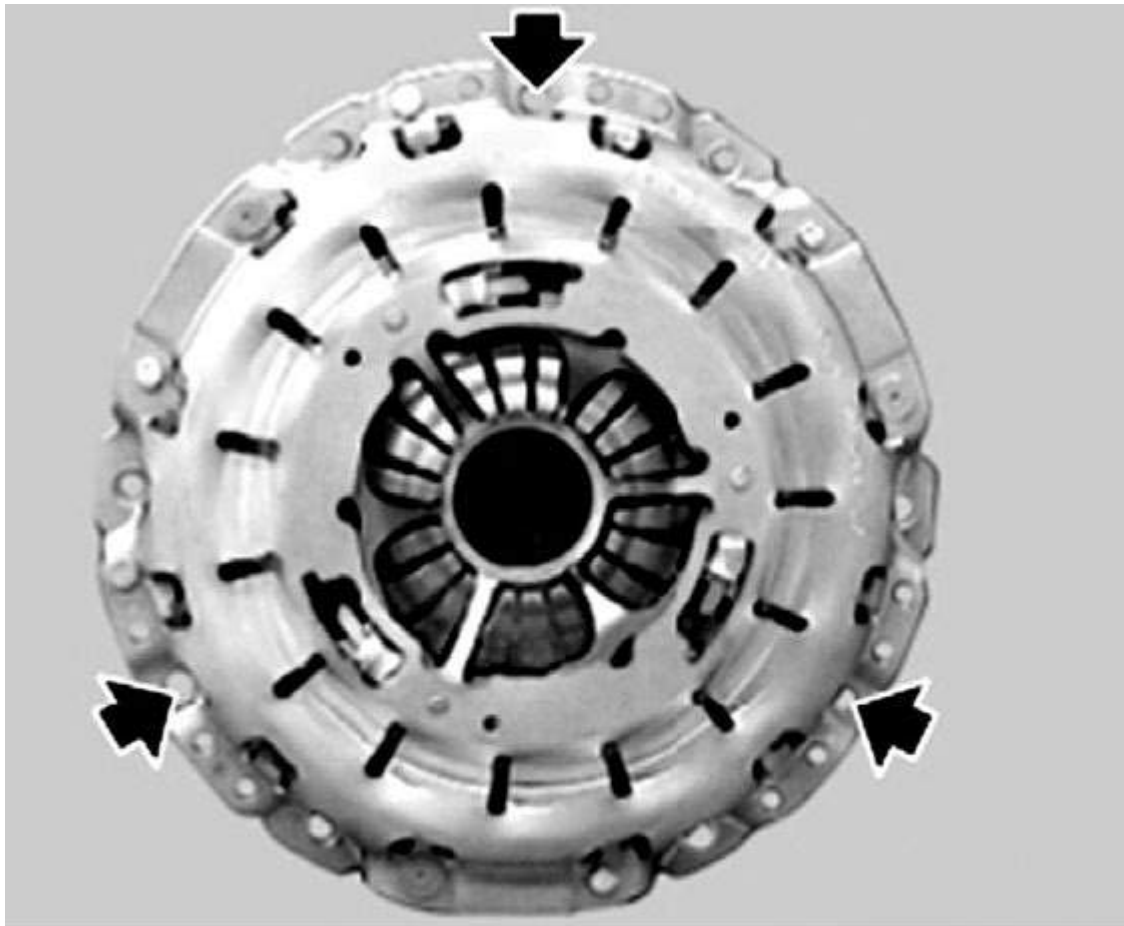
Fig. 44: Installing Special Tool In SAC Clutch
Courtesy of BMW OF NORTH AMERICA, INC.

6. Locking hooks (1) of special tool (21 2 180) must engage in openings in SAC clutch. See **Fig. 45** . Insert special tool (21 2 170) only in area of bores for dowel pins. See **Fig. 46** . Fit special tool (21 2 170) and tighten down at knurled screw (1). See **Fig. 47** . Screw in spindle (1) until adjustment ring of SAC clutch (2) can be turned with special tool (21 2 180) at handles (3). Press special tool (21 2 180) together at handles (3) as far as it will go and grip firmly. See **Fig. 48** . At same time tighten down knurled screws (2). Adjustment ring of SAC clutch is now secured in new position. See **Fig. 49** . Screw in spindle (1) until diaphragm spring (2) is tensioned to stop. See **Fig. 50** . Handle clutch plate with care, do not touch surfaces of friction linings. Install clutch plate in correct position. Pay attention to text "engine end" and "transmission side".



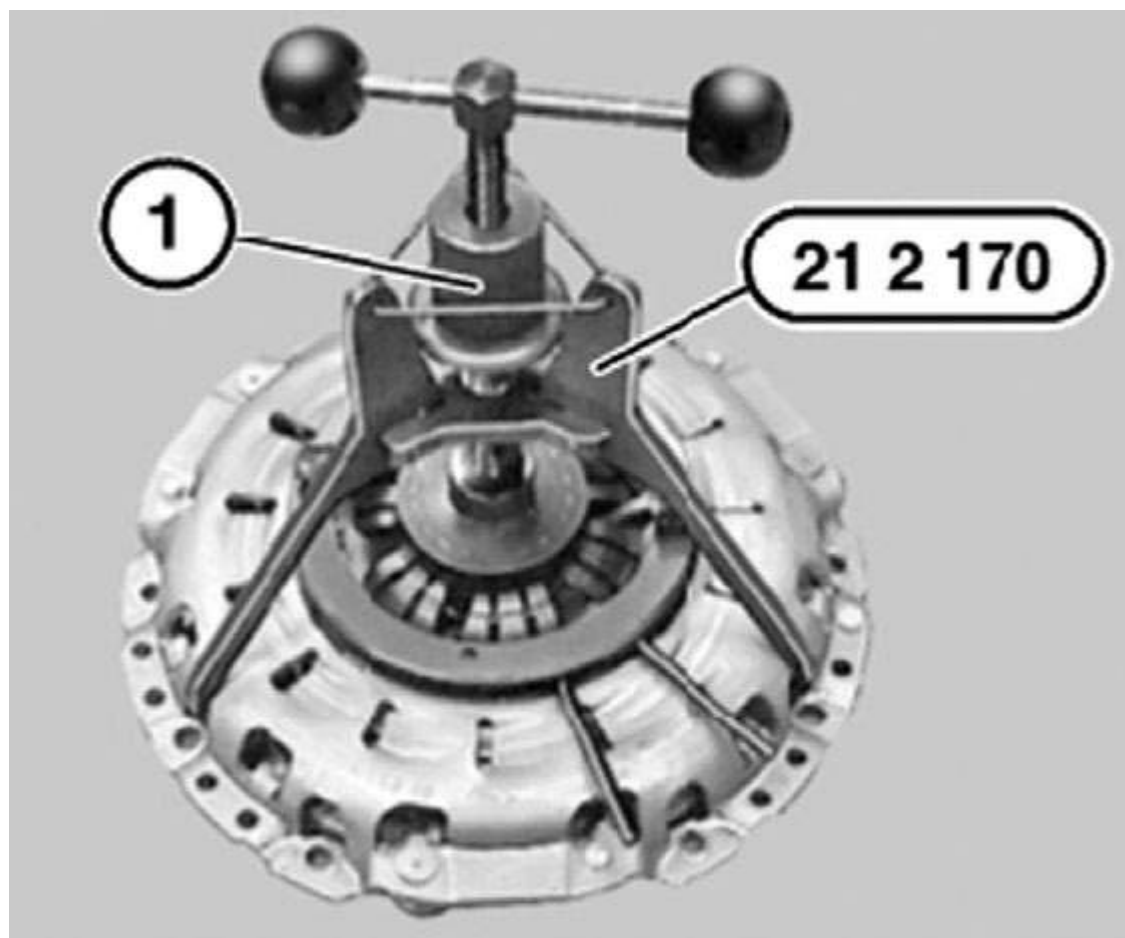
G00386939

Fig. 45: Ensuring Locking Hooks Engage In Openings In SAC Clutch
Courtesy of BMW OF NORTH AMERICA, INC.



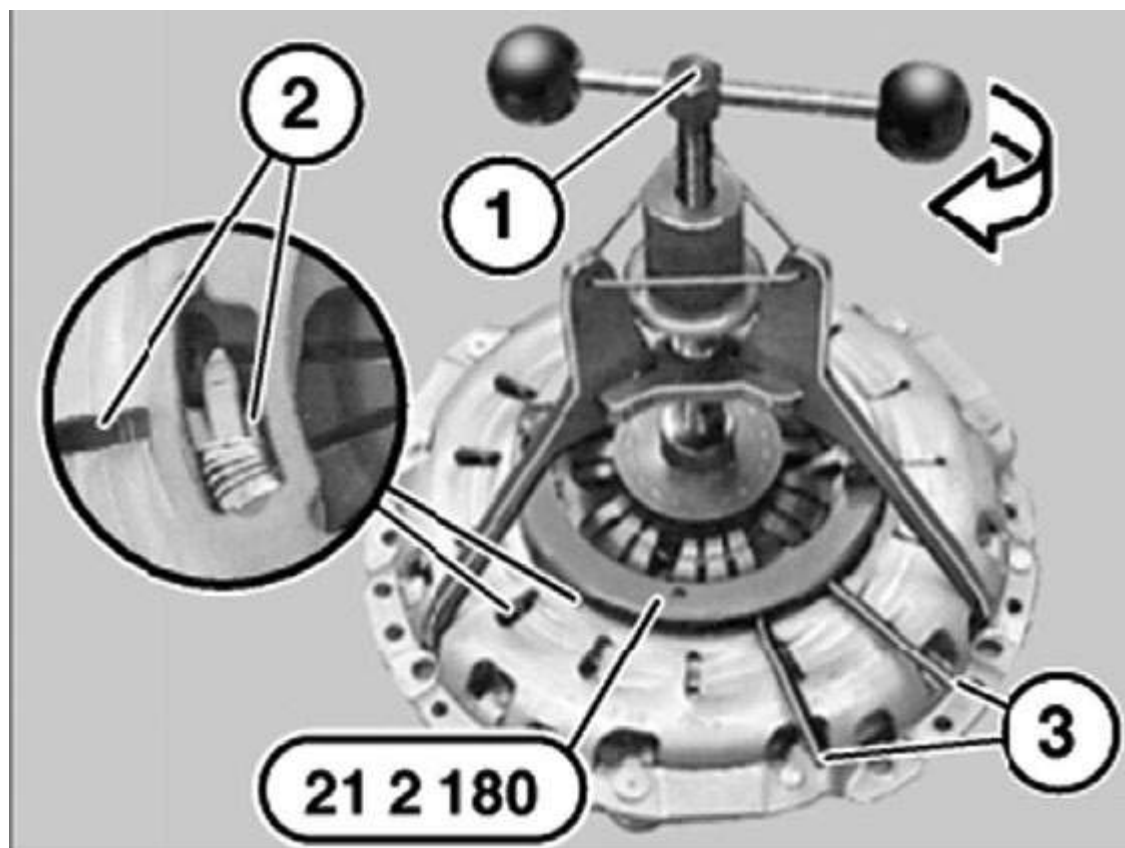
G00386940

Fig. 46: Inserting Special Tool Only In Area Of Bores For Dowel Pins
Courtesy of BMW OF NORTH AMERICA, INC.



G00386941

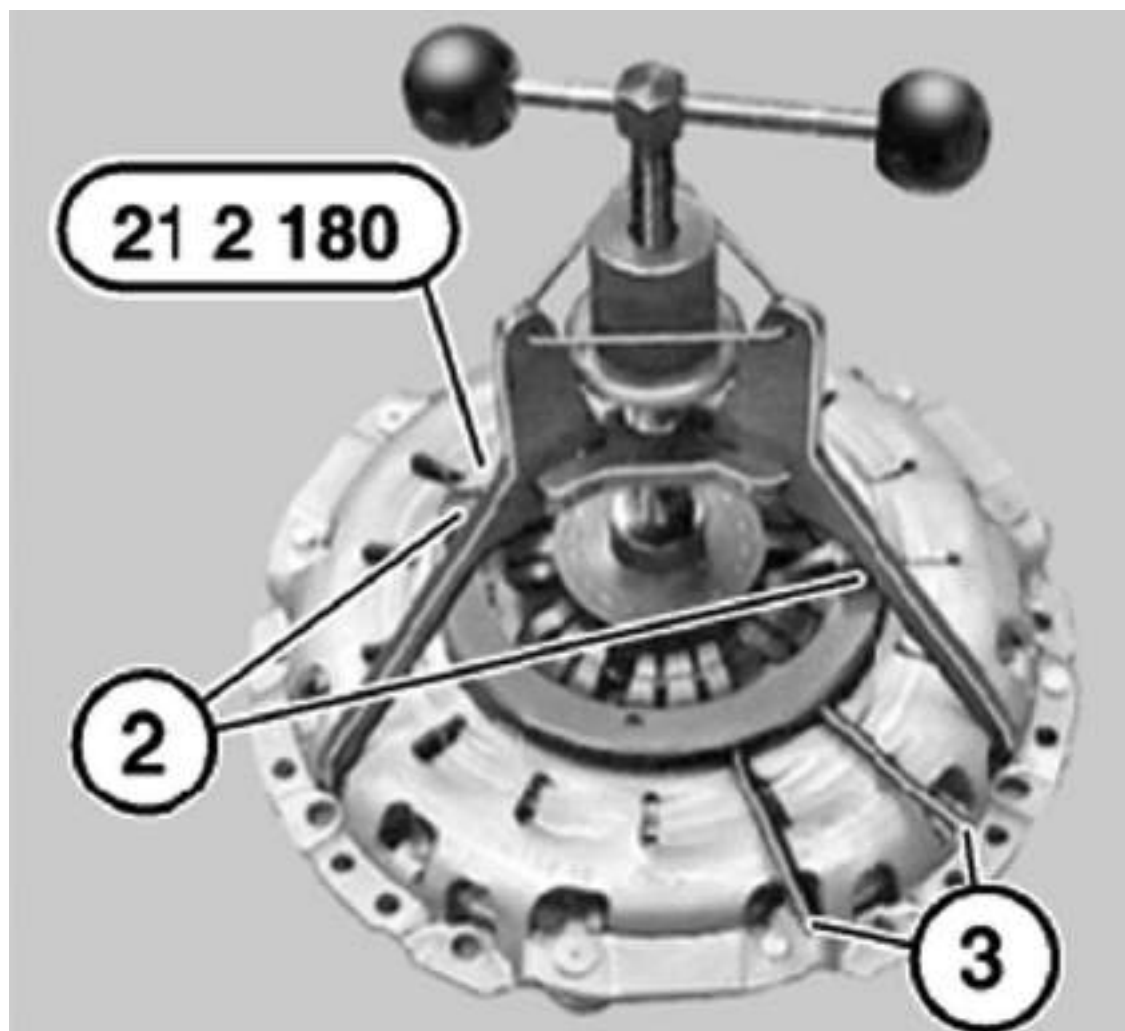
Fig. 47: Installing Special Tool & Tightening Down At Knurled Screw
Courtesy of BMW OF NORTH AMERICA, INC.



G00386942

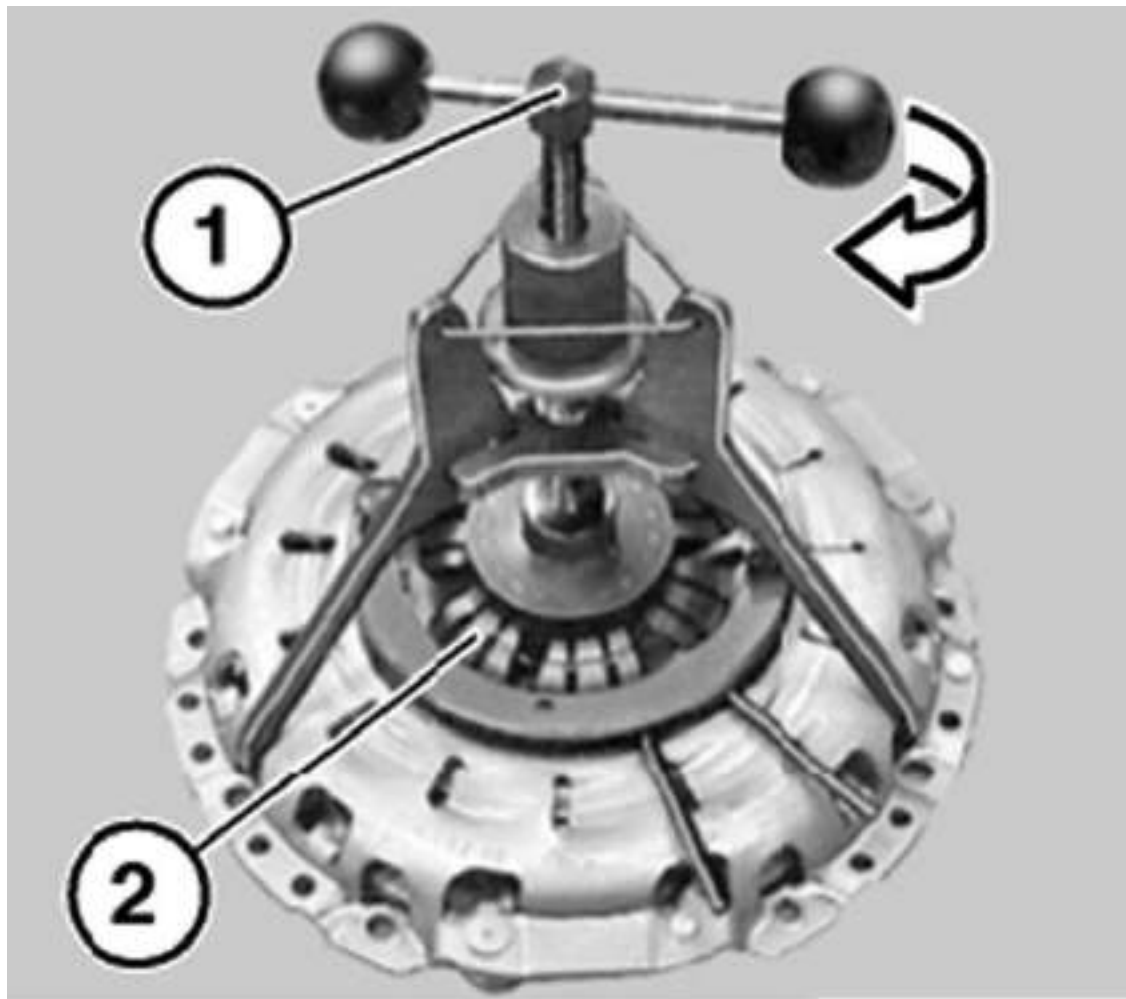
Fig. 48: Screwing In Spindle Until Adjustment Ring Of SAC Clutch Can Be Turned With Special Tool At Handles

Courtesy of BMW OF NORTH AMERICA, INC.



G00386943

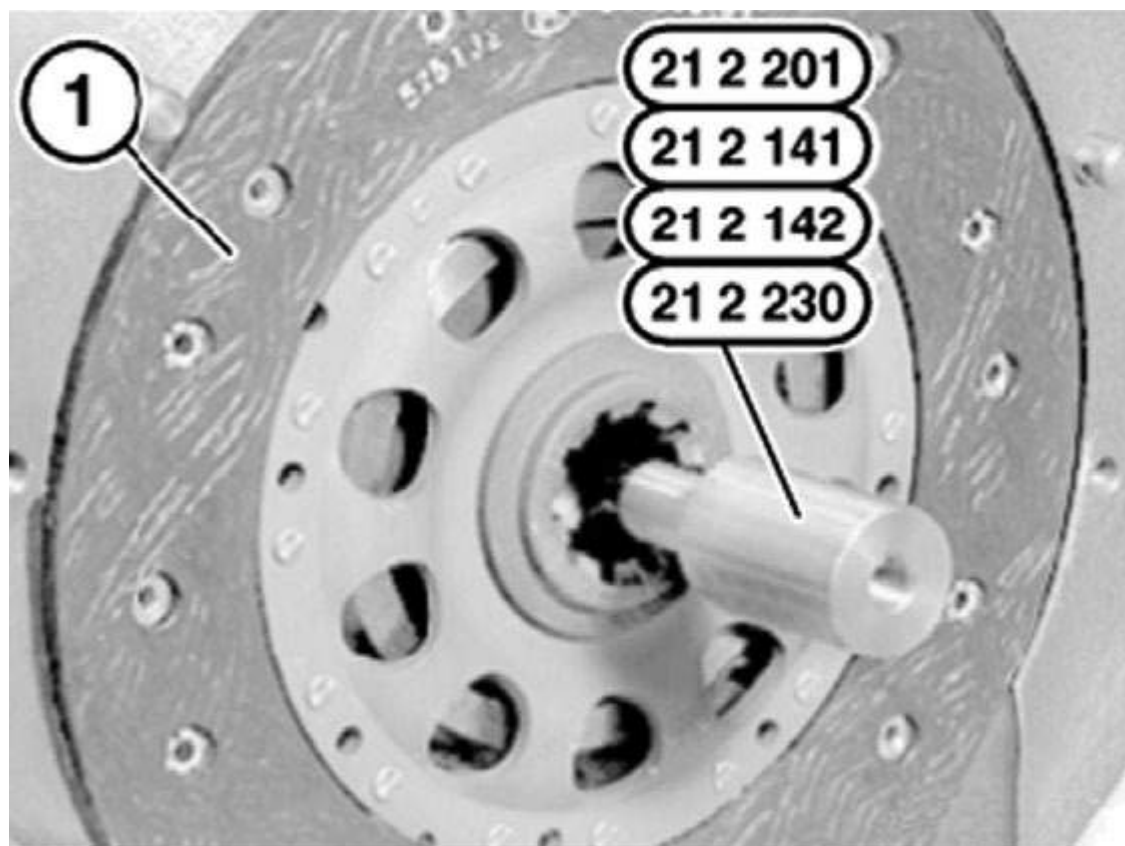
Fig. 49: Securing Adjustment Ring Of SAC Clutch In New Position
Courtesy of BMW OF NORTH AMERICA, INC.



G00386944

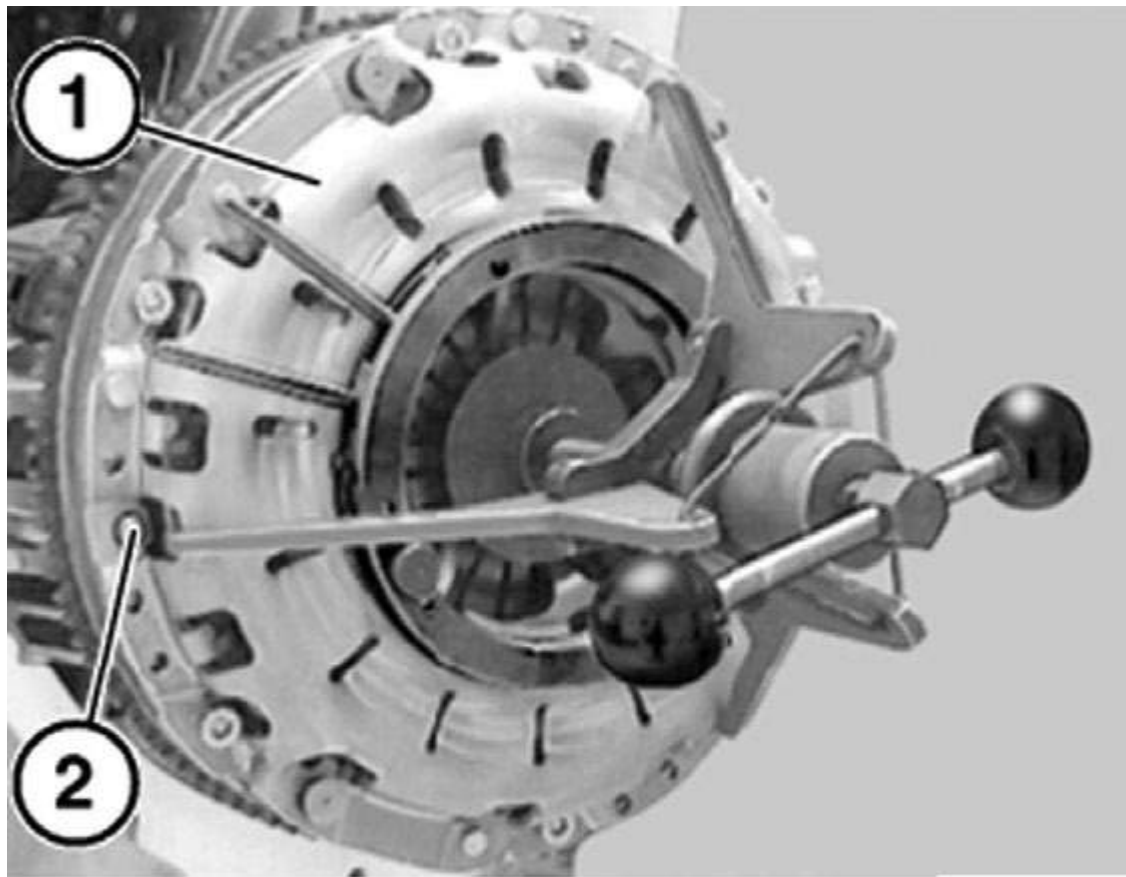
Fig. 50: Screwing In Spindle Until Diaphragm Spring Is Tensioned To Stop
Courtesy of BMW OF NORTH AMERICA, INC.

7. Center clutch plate (1) with special tools. See **Fig. 51** . On vehicles manufactured from 4/03, note color marking when fitting clutch with balance marking. Position color marking (1) on dual-mass flywheel and color marking (2) on clutch pressure plate as closely as possible to each other. See **Fig. 38** . Maximum possible angle error is 60 degrees. Fit SAC clutch (1) on flywheel. Pay attention to dowel pins (2). See **Fig. 52** . SAC clutch (1) must be secured by way of dowel pins (2). Install retaining screws of SAC clutch and tighten down. Release spindle (1) until tension is completely removed from diaphragm spring (2). See **Fig. 53** . Release knurled screw (1) and remove special tool (21 2 170) from SAC clutch. See **Fig. 54** . Release knurled screws (2) and remove special tool (21 2 180) from SAC clutch. See **Fig. 55** . Withdraw special tool from clutch plate with aid of accompanying screw (1). See **Fig. 56** .



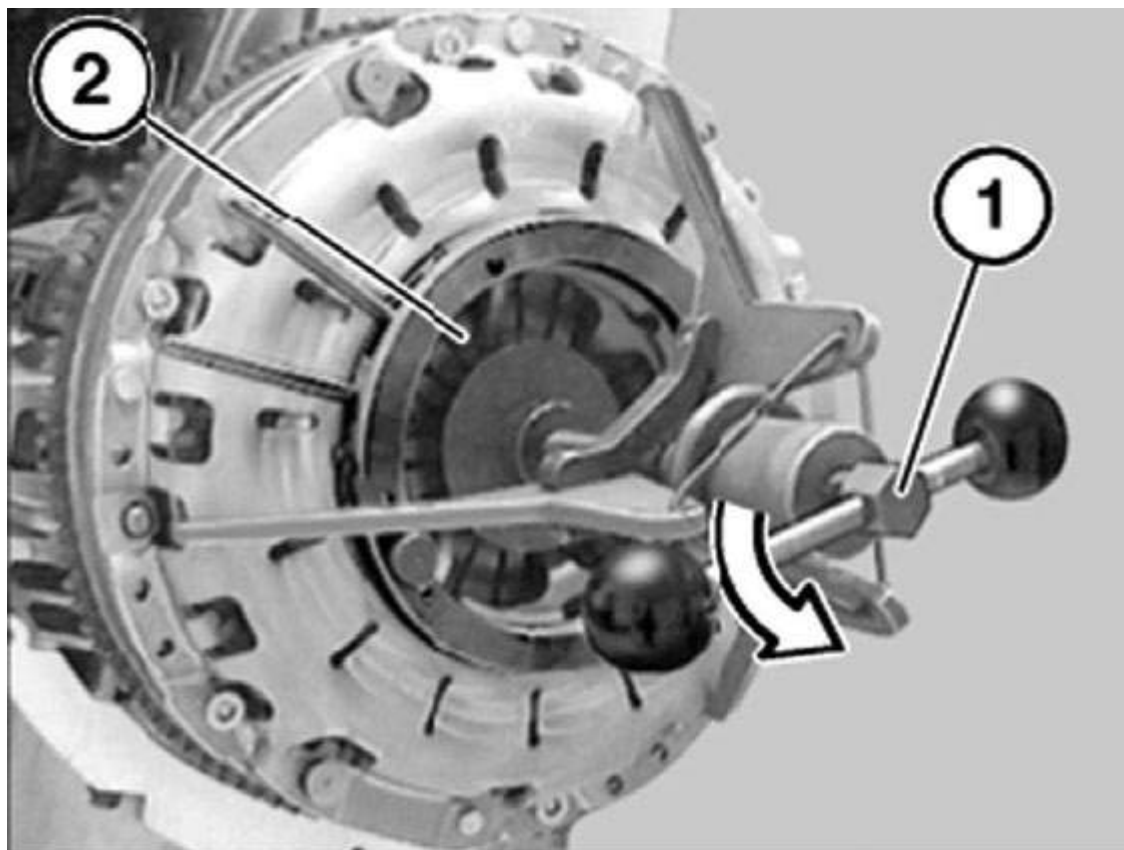
G00386945

Fig. 51: Centering Cutch Plate With Special Tools
Courtesy of BMW OF NORTH AMERICA, INC.



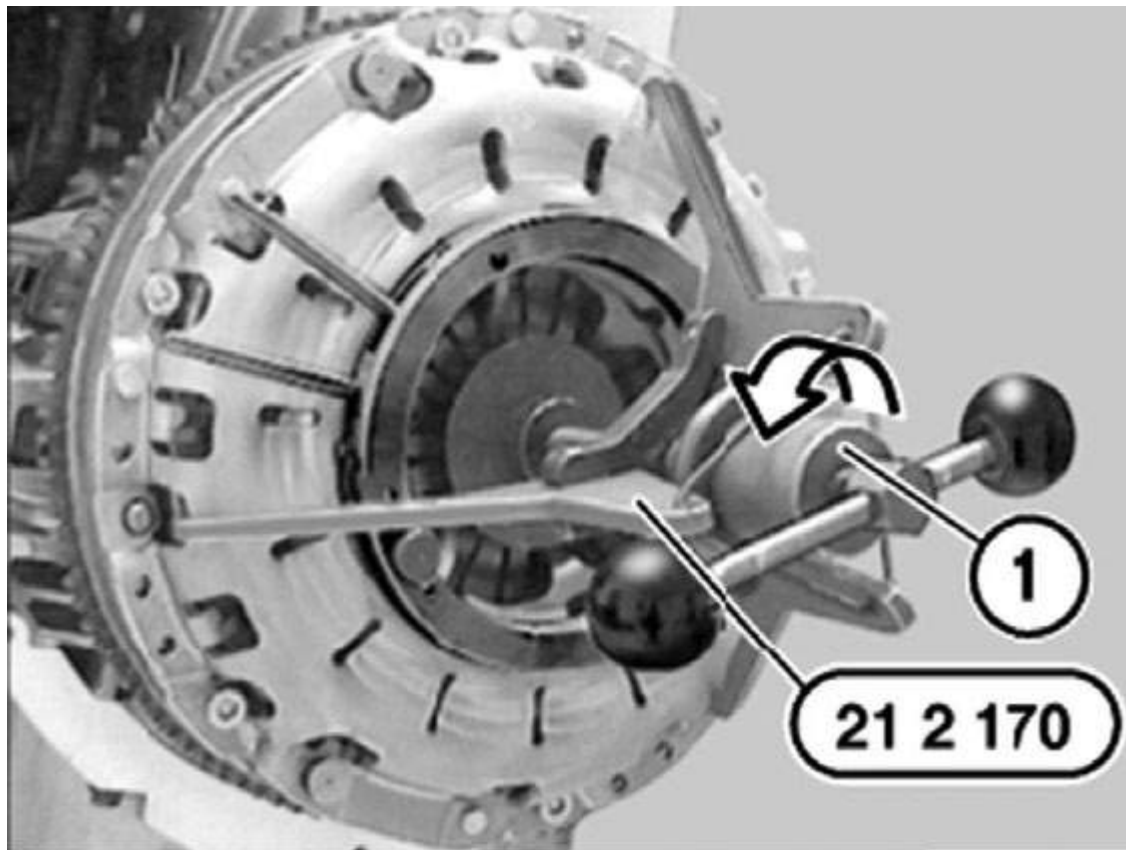
G00386946

Fig. 52: Fitting Clutch On Flywheel & Noting Location Of Dowel Pins
Courtesy of BMW OF NORTH AMERICA, INC.



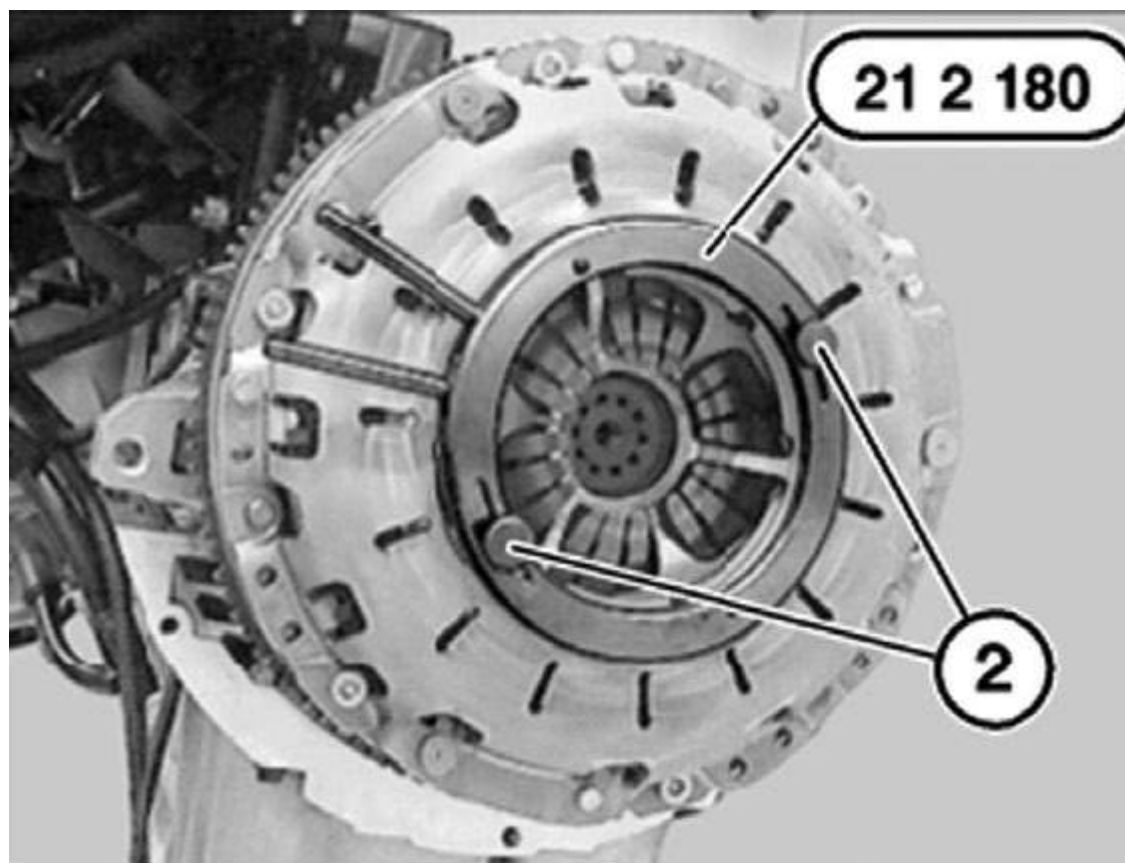
G00386947

Fig. 53: Releasing Spindle Until Tension Is Removed
Courtesy of BMW OF NORTH AMERICA, INC.



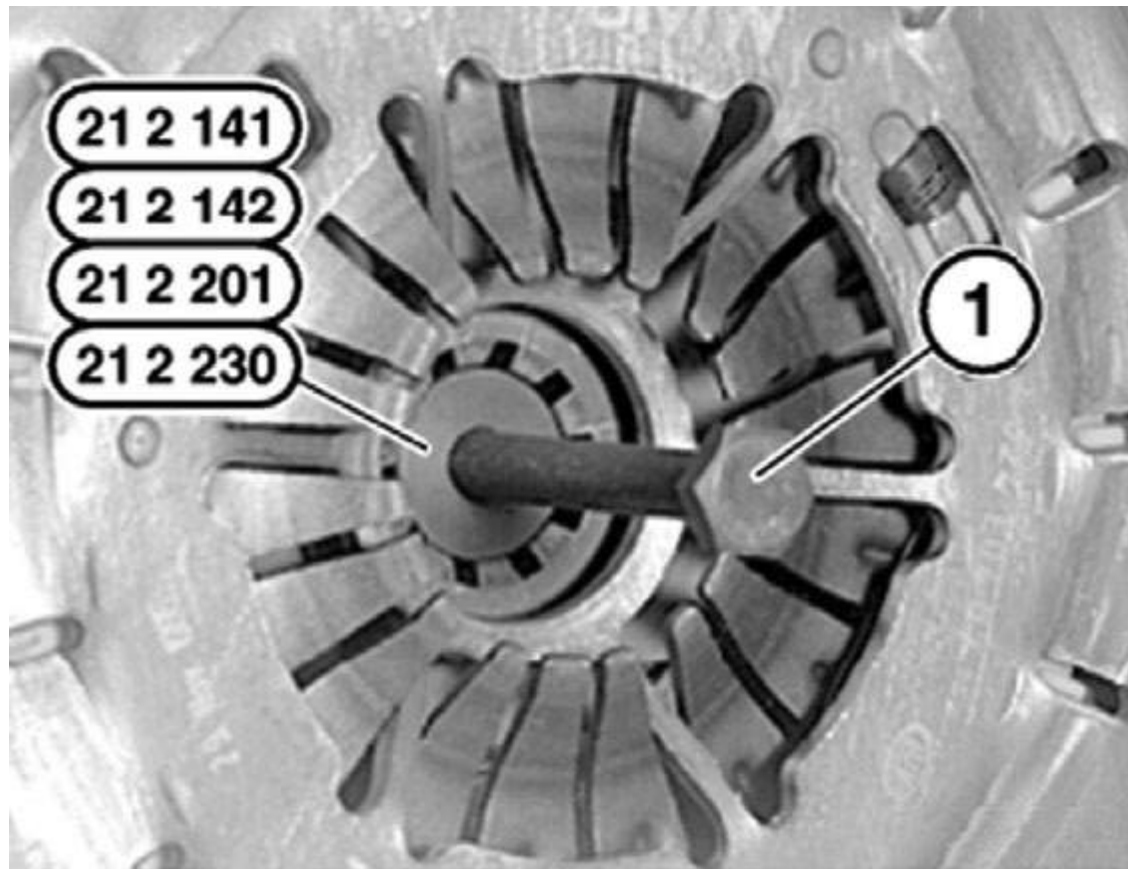
G00386948

Fig. 54: Releasing Knurled Screw
Courtesy of BMW OF NORTH AMERICA, INC.



G00386949

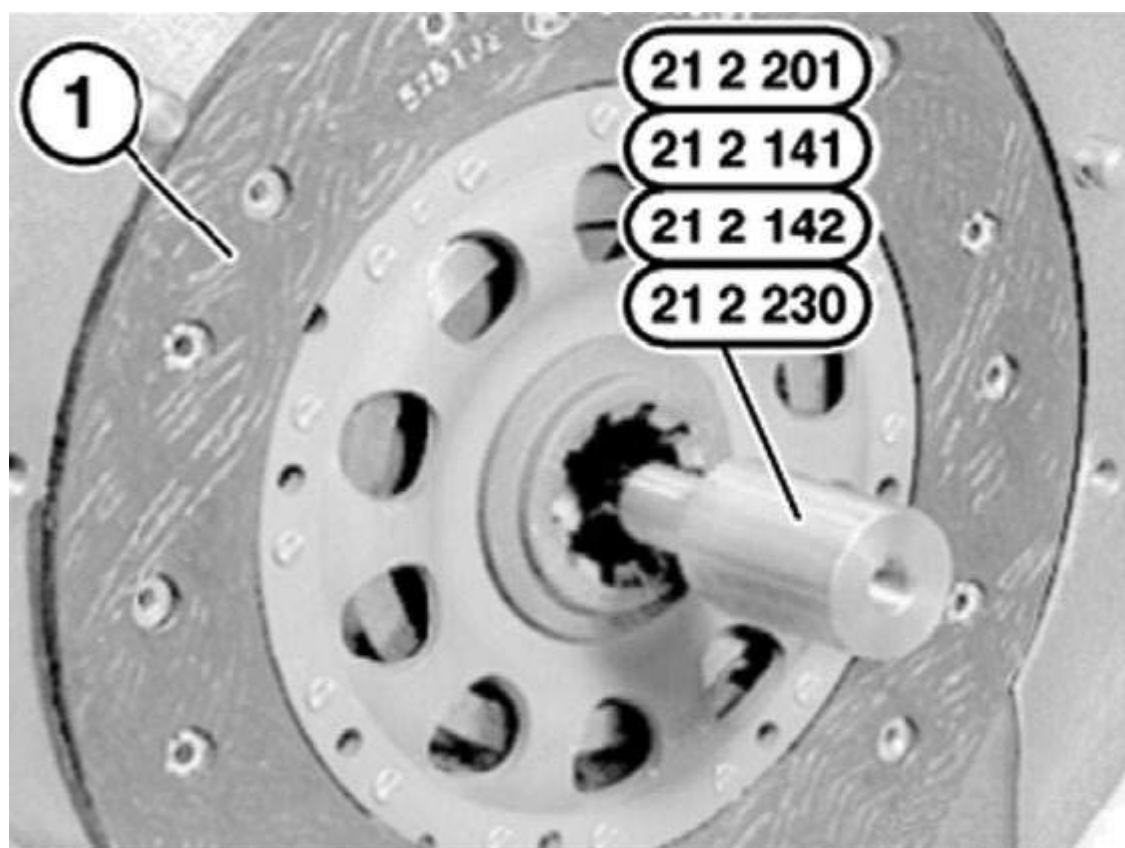
Fig. 55: Releasing Knurled Screws
Courtesy of BMW OF NORTH AMERICA, INC.



G00386950

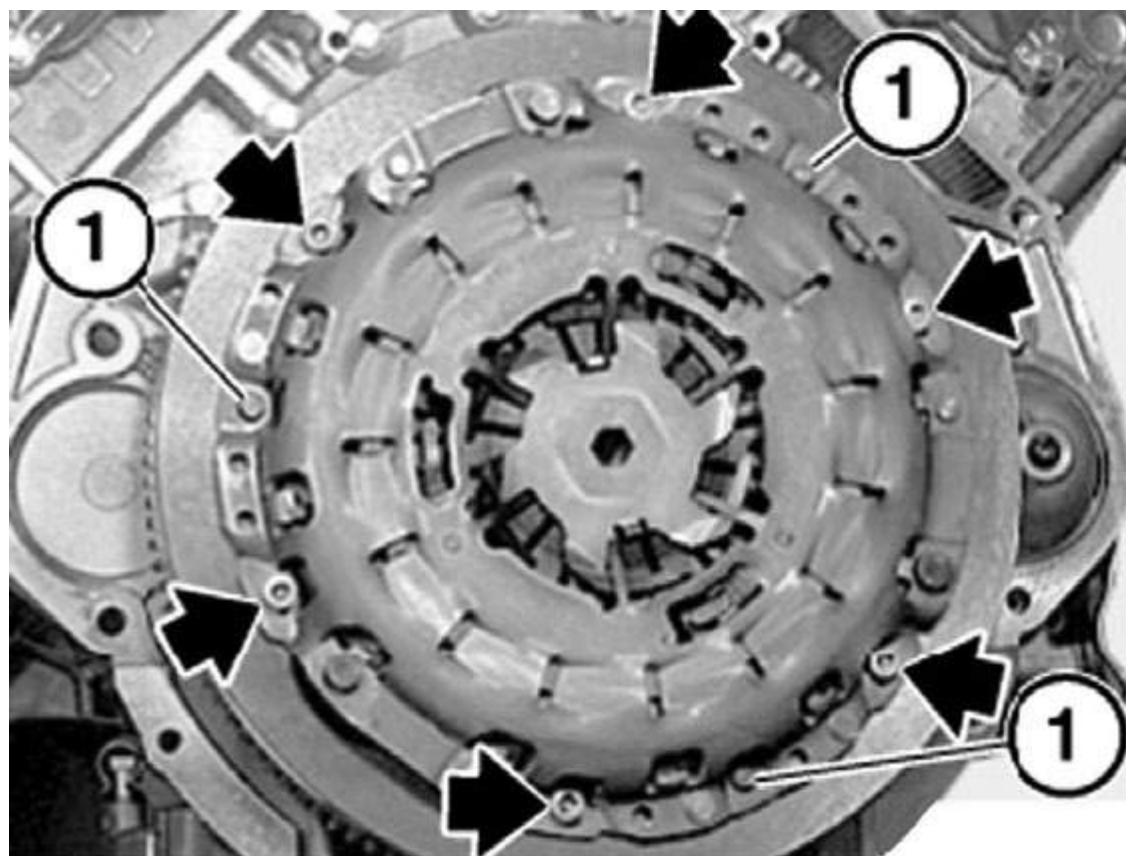
Fig. 56: Withdrawing Special Tool From Clutch Plate
Courtesy of BMW OF NORTH AMERICA, INC.

8. When installing new SAC, handle clutch disk carefully. Do not touch surfaces of friction pads. Install clutch plate (1) in correct position. Note designation for "engine side" and "transmission side". Center clutch plate (1) with special tools. See **Fig. 57** . Push SAC clutch onto dowel pins (1) located in flywheel and screw down. See **Fig. 58** . Locking piece (1) may only be removed with SAC screw-mounted clutch. Carefully unscrew locking piece (1) clockwise or counterclockwise with a hexagon socket wrench (2). See **Fig. 59** . A slight snapping of the plate spring while unscrewing is possible. Withdraw special tool (1) from clutch plate with aid of accompanying screw (2). See **Fig. 60** .



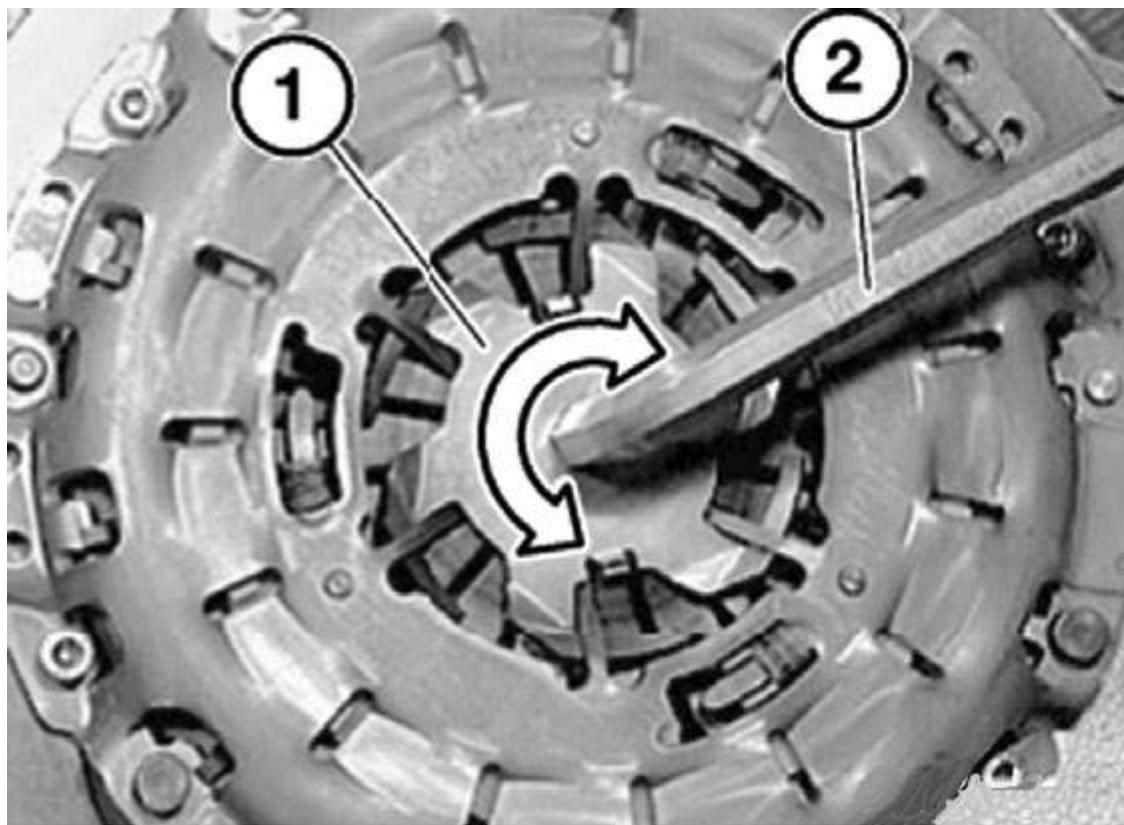
G00386951

Fig. 57: Centering Clutch Plate With Special Tools
Courtesy of BMW OF NORTH AMERICA, INC.



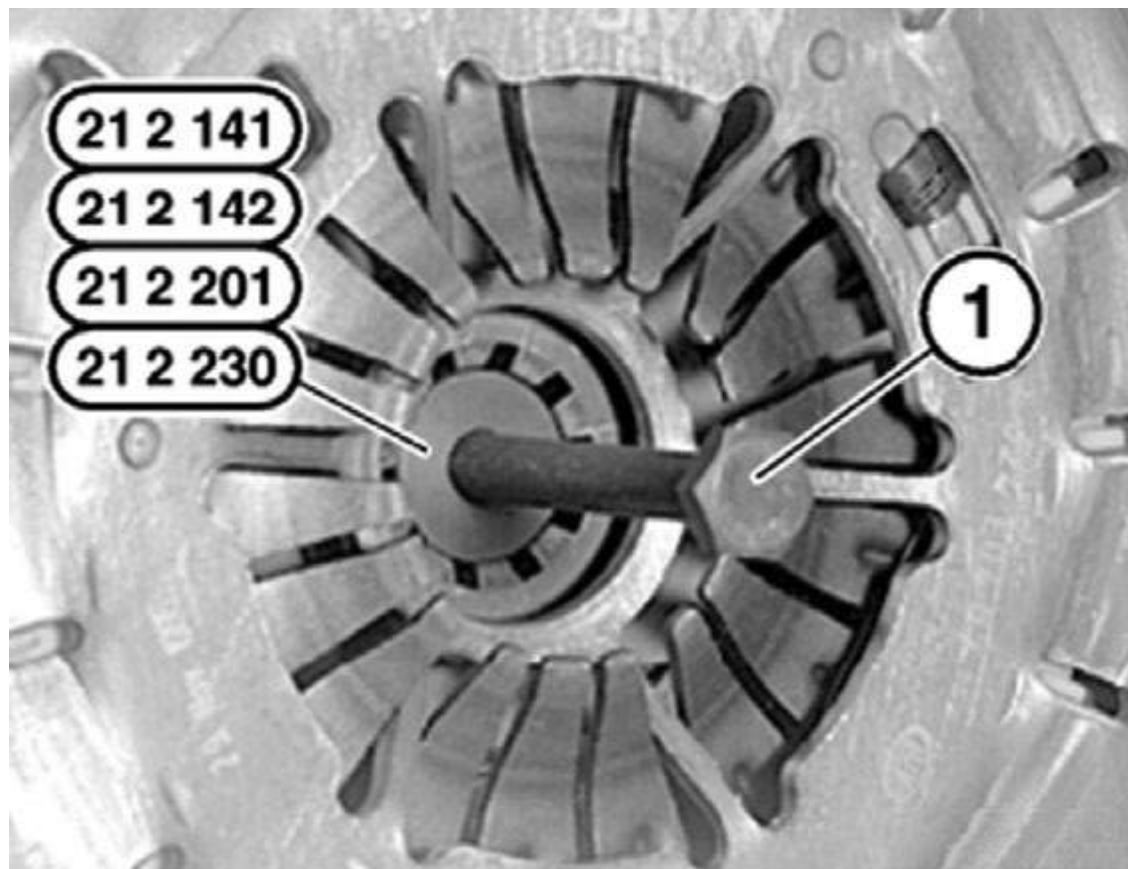
G00386952

Fig. 58: Pushing SAC Clutch Onto Dowel Pins
Courtesy of BMW OF NORTH AMERICA, INC.



G00386953

Fig. 59: Unscrewing Locking Piece
Courtesy of BMW OF NORTH AMERICA, INC.



G00386954

Fig. 60: Removing Special Tool From Clutch Plate
Courtesy of BMW OF NORTH AMERICA, INC.

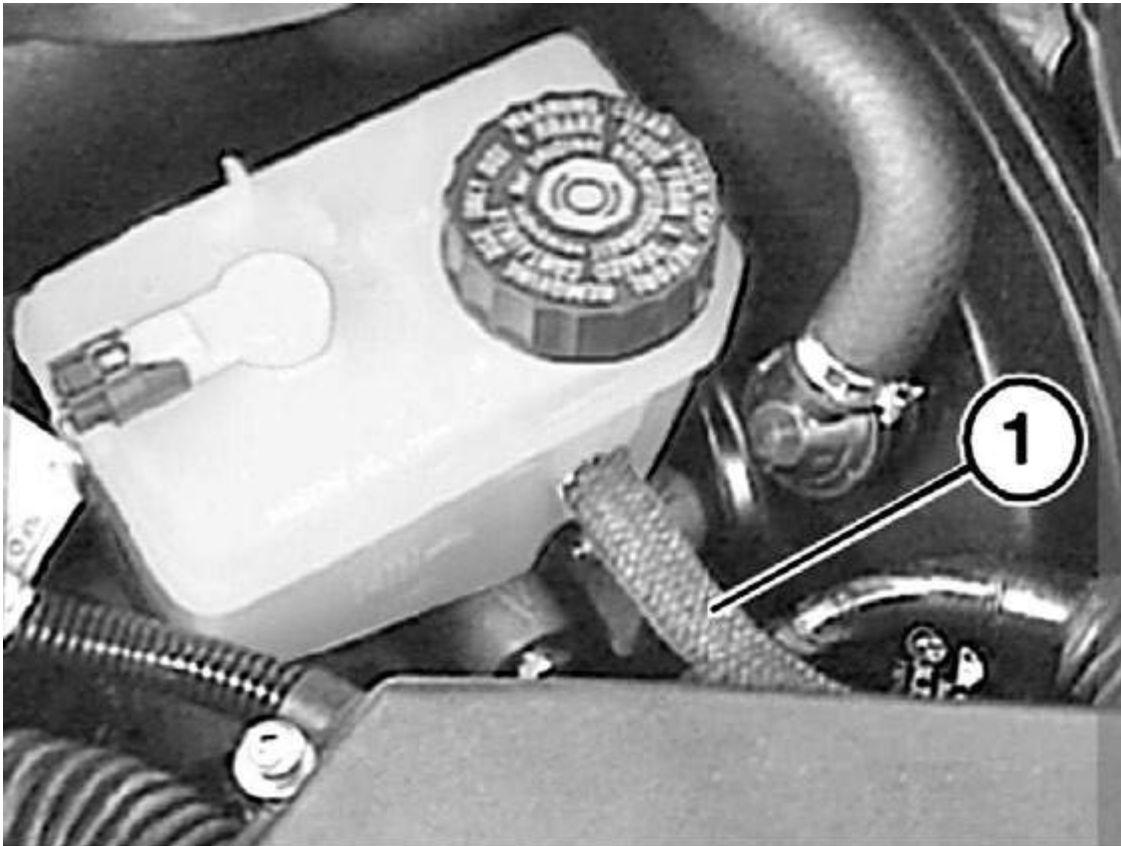
CLUTCH MASTER CYLINDER

NOTE: Numbers in text refer to numbers in figures. After completing work, bleed clutch hydraulic system. See **BLEEDING** .

Removal & Installation (X3)

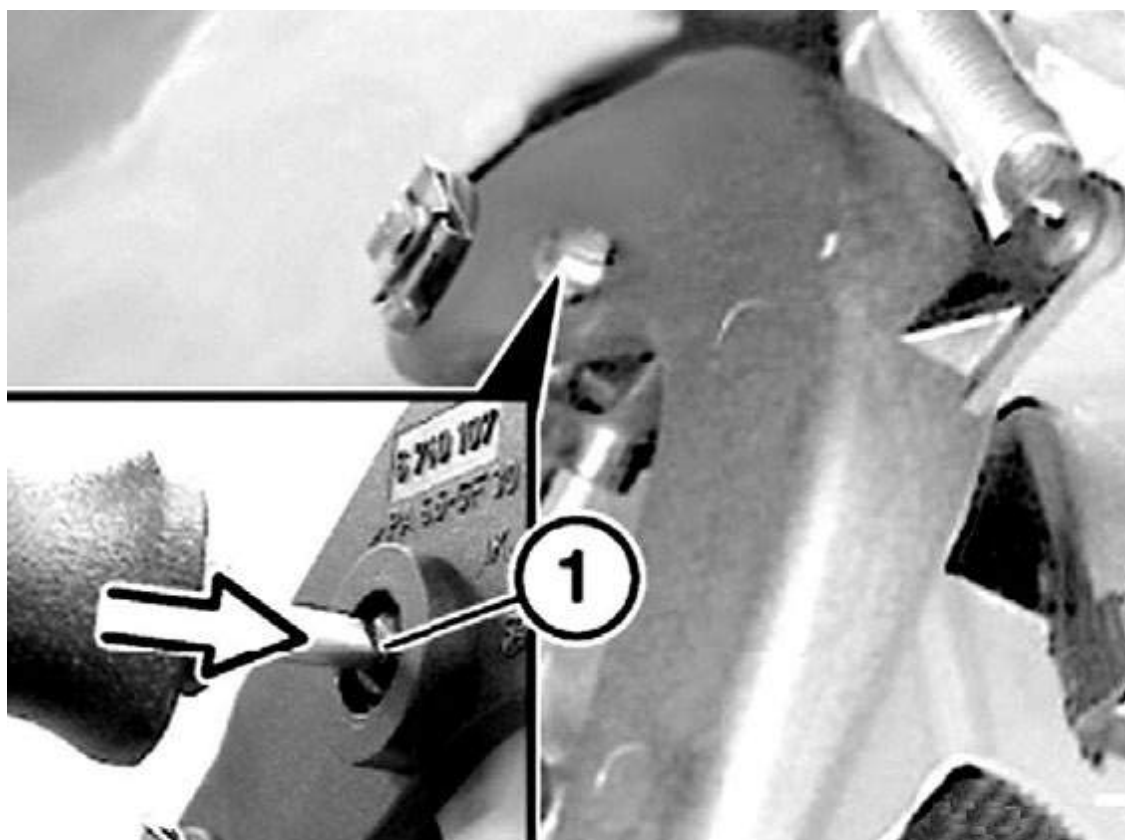
1. Remove trim panel for pedal assembly. See **PEDAL ASSEMBLY TRIM** . Draw off brake fluid up to supply hose of clutch hydraulic system (1). For this purpose, use only a vacuum pipe that is exclusively used for removing brake fluid. Detach supply hose (1) from expansion tank. See **Fig. 61** . Press pin (1) out of clutch pedal with a short screwdriver. See **Fig. 62** .
2. During installation, pin is coded by a straight surface (1). See **Fig. 63** . The coding points upwards. Screw pin with coding upwards. Turn slightly until coding snaps into place. Press in pin until engaged (2). Unfasten bolts. See **Fig. 64** . Detach retainer (1) with a screwdriver (2). See **Fig. 65** . Use care not to foul carpet with brake fluid. Detach hydraulic line from clutch master cylinder. Detach supply hose (1) from clutch master cylinder and remove clutch master cylinder. See **Fig. 66** .

3. Do not pull supply hose completely into interior. Lever out shift element (1) from clutch master cylinder (2) with screwdriver. Release plug connection (3) and disconnect plug (4) from shift element (1). See **Fig. 67** . During installation, shift element is secured against incorrect installation. See **Fig. 68** . Shift element must snap audibly into place. See **Fig. 68** .



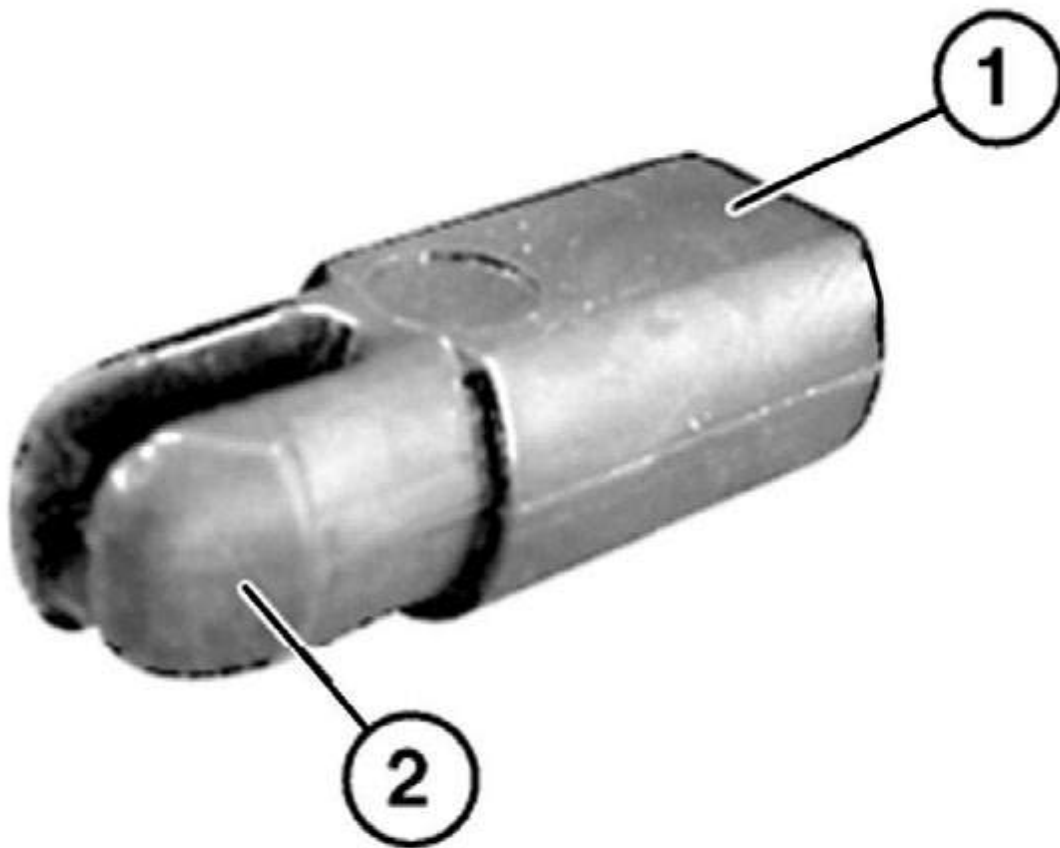
G00386971

Fig. 61: Detaching Supply Hose From Expansion Tank (X3 & 6-Series)
Courtesy of BMW OF NORTH AMERICA, INC.



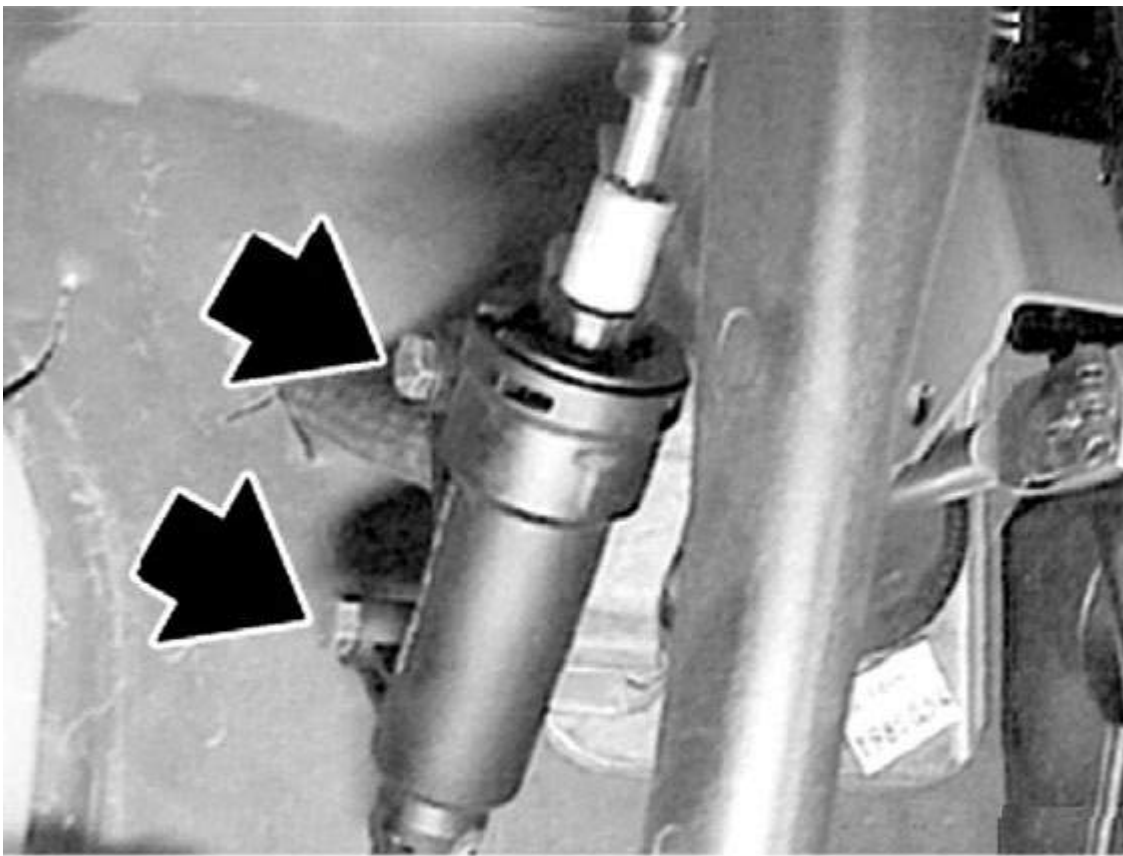
G00386972

Fig. 62: Pressing Pin Out Of Clutch Pedal (X3)
Courtesy of BMW OF NORTH AMERICA, INC.



G00386973

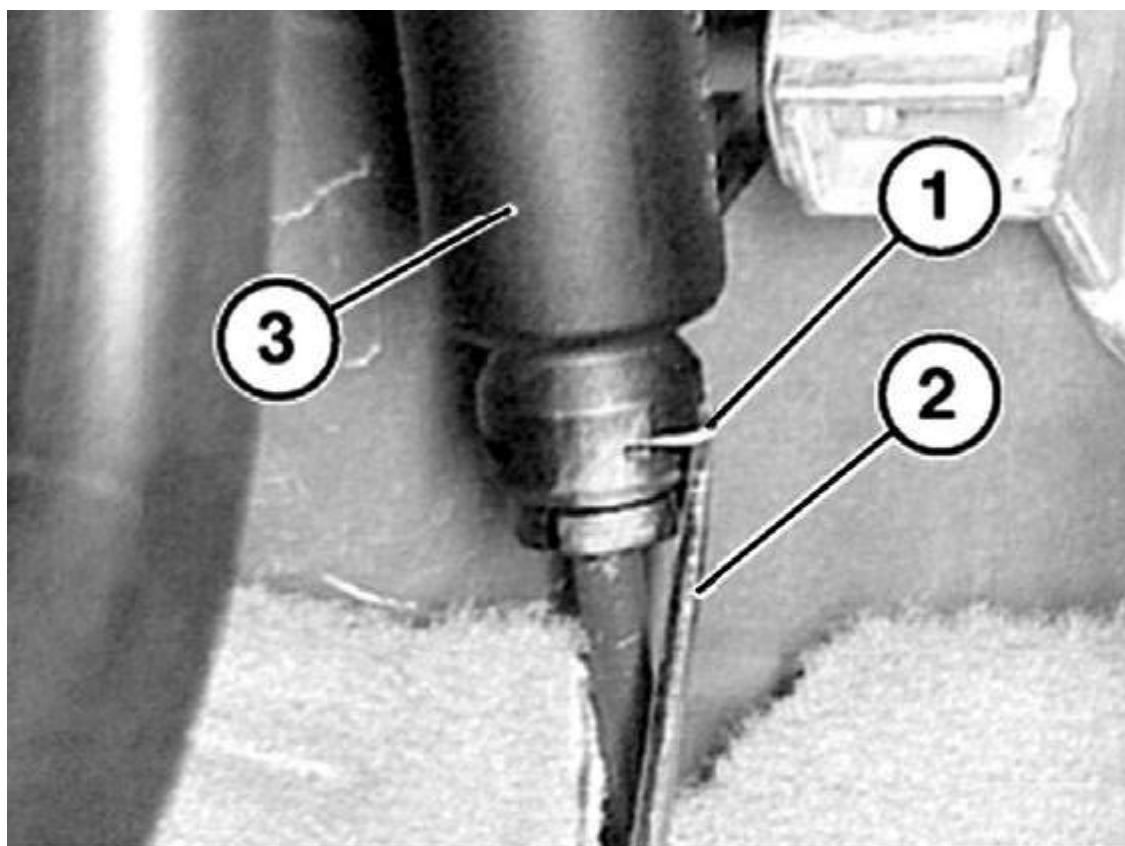
Fig. 63: Identifying Pin Straight Surface & Pressing In Pin Until Engaged (X3)
Courtesy of BMW OF NORTH AMERICA, INC.



G00386974

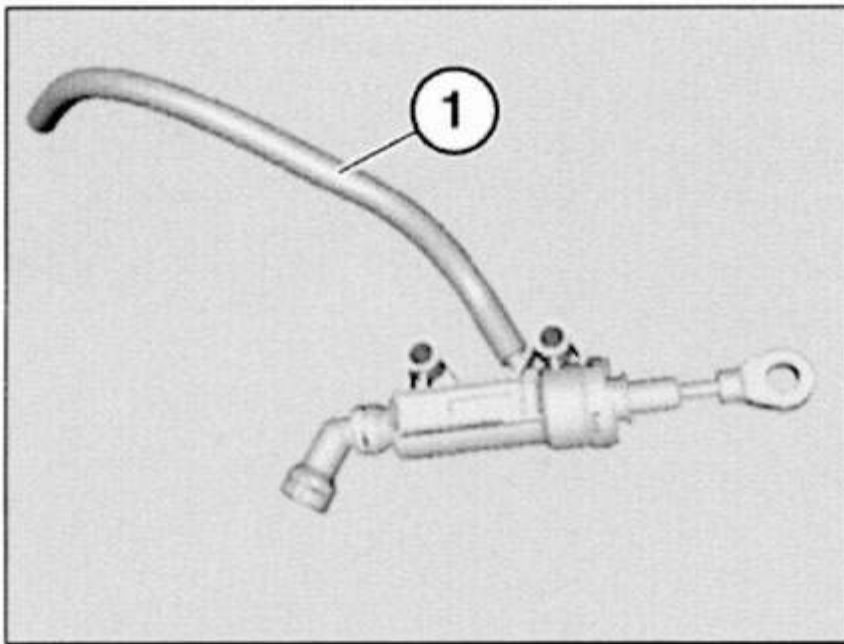
Fig. 64: Unfastening Bolts (X3)

Courtesy of BMW OF NORTH AMERICA, INC.



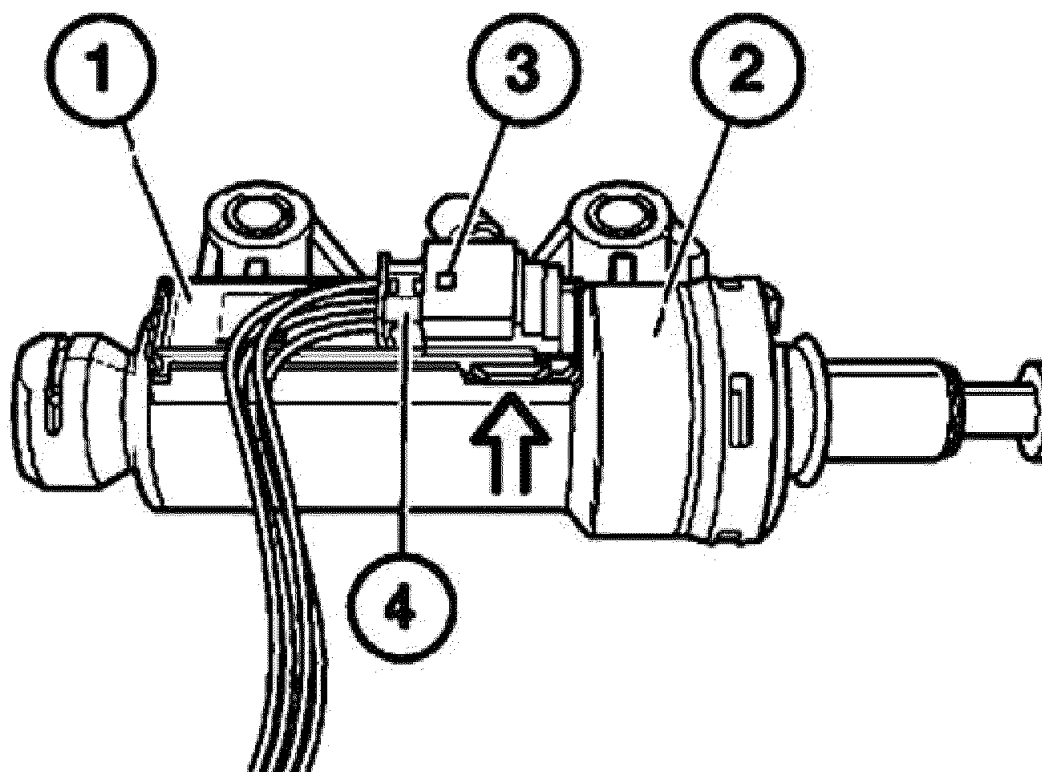
G00386975

Fig. 65: Detaching Clutch Master Cylinder From Hydraulic Line (X3 & 6-Series)
Courtesy of BMW OF NORTH AMERICA, INC.



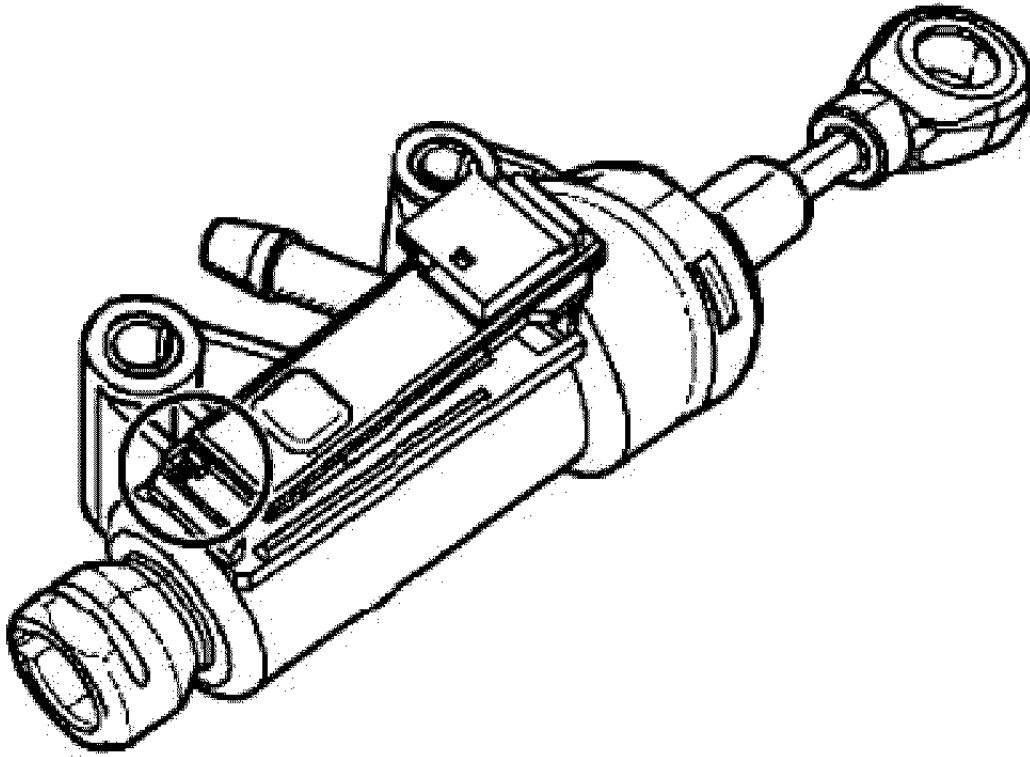
G00387016

Fig. 66: Detaching Supply Hose From Clutch Master Cylinder (X3)
Courtesy of BMW OF NORTH AMERICA, INC.



G00386976

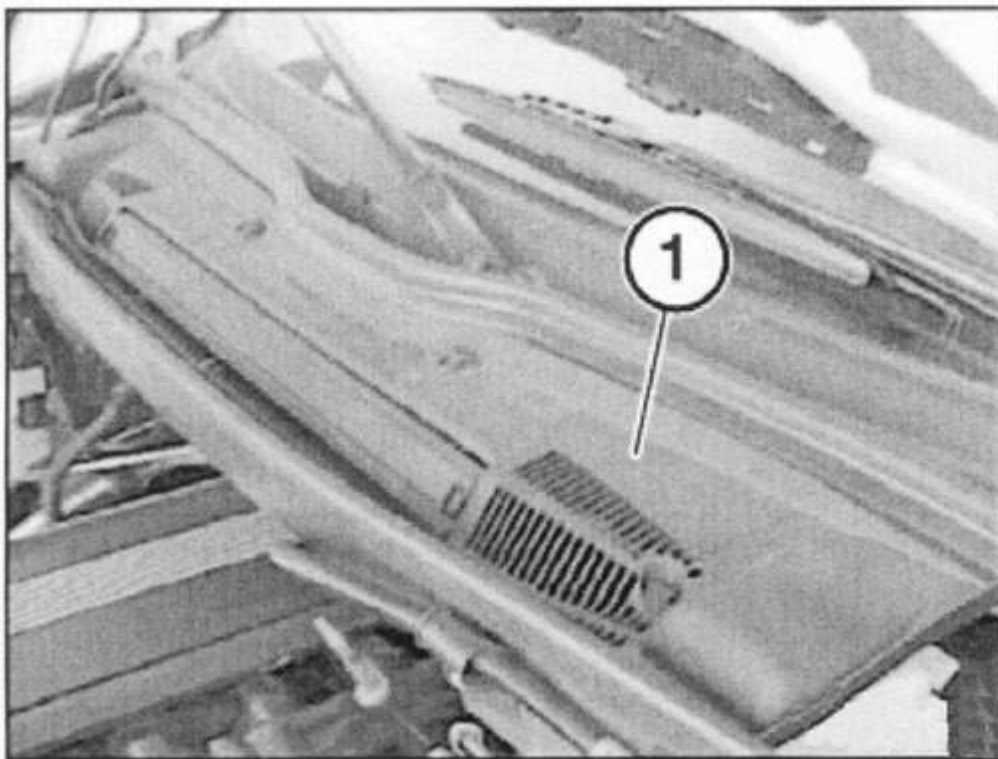
Fig. 67: Levering Out Shift Element (All Models)
Courtesy of BMW OF NORTH AMERICA, INC.



G00386977

Fig. 68: Shift Element Snapping Audibly Into Place (All Models)**Courtesy of BMW OF NORTH AMERICA, INC.****Removal & Installation (X5)**

1. Remove the cover (1). See **Fig. 69** . Draw off brake fluid up to supply hose of clutch hydraulic system. For this purpose, use only a vacuum pipe that is exclusively used for removing brake fluid. Remove the supply hose (1) from the expansion tank. See **Fig. 70** . Remove lower left trim panel from instrument panel. Release screws (1). See **Fig. 71** .
2. Release screw (1) and press clips (2) out of light switch. See **Fig. 72** . Release screw (1) and remove reinforcement plate. See **Fig. 73** . Remove clutch pedal. Pull off retainer (1). Do not soil the footwell carpet with brake fluid.
3. Disconnect clutch master cylinder (2) from hydraulic line and remove with supply hose. See **Fig. 74** . Lever switch module (1) out of clutch master cylinder (2) with a screwdriver. Release plug connection (3) and disconnect plug (4) from switch module (1). See **Fig. 67** . During installation, ensure switch module is protected against incorrect installation. Switch module must audibly snap into place. See **Fig. 68** .



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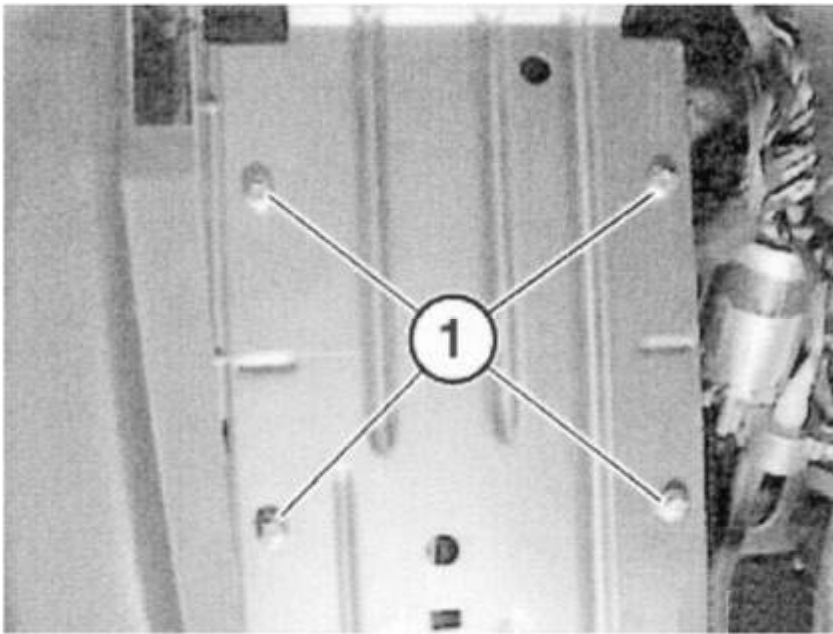
Fig. 69: Removing Cover

Courtesy of BMW OF NORTH AMERICA, INC.



G00387018

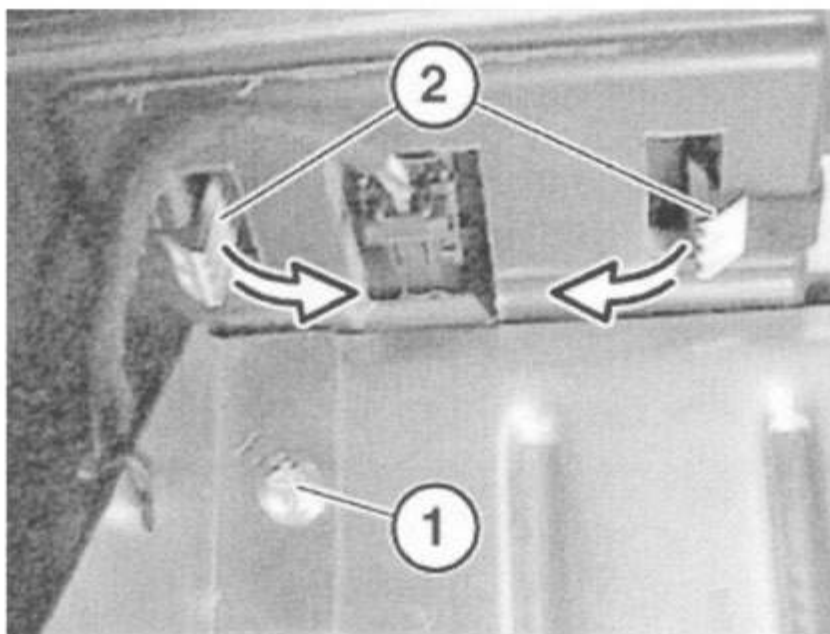
Fig. 70: Removing Supply Hose From Expansion Tank
Courtesy of BMW OF NORTH AMERICA, INC.



G00387019

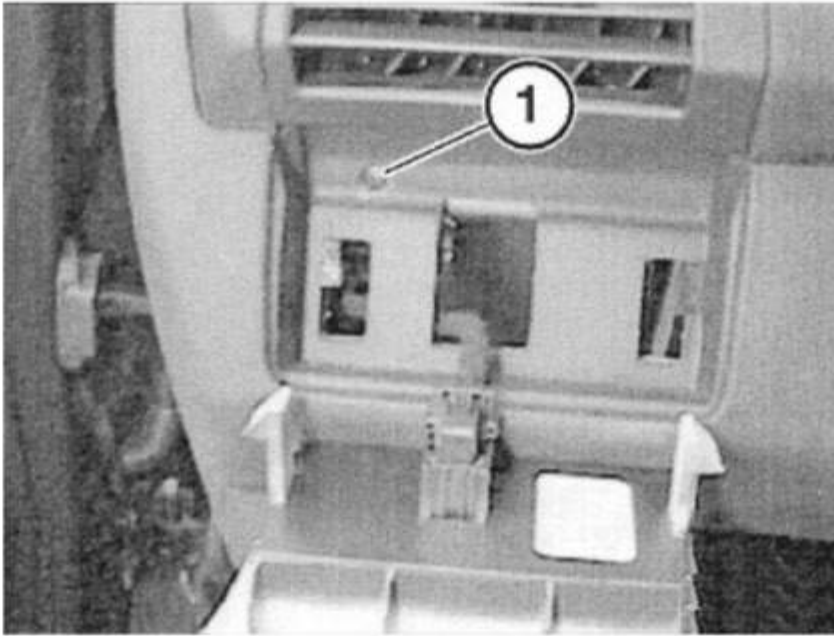
Fig. 71: Releasing Screws

Courtesy of BMW OF NORTH AMERICA, INC.



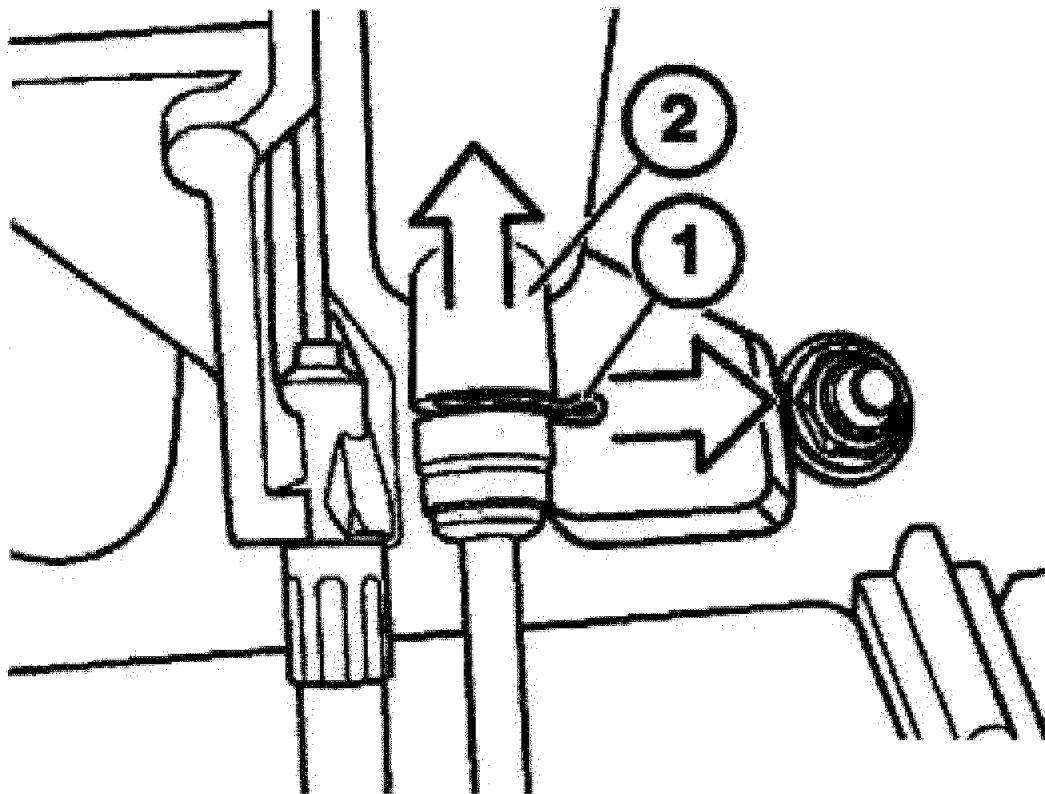
G00387020

Fig. 72: Releasing Screw & Pressing Clips Out Of Light Switch
Courtesy of BMW OF NORTH AMERICA, INC.



G00387021

Fig. 73: Releasing Screw & Removing Reinforcement Plate
Courtesy of BMW OF NORTH AMERICA, INC.

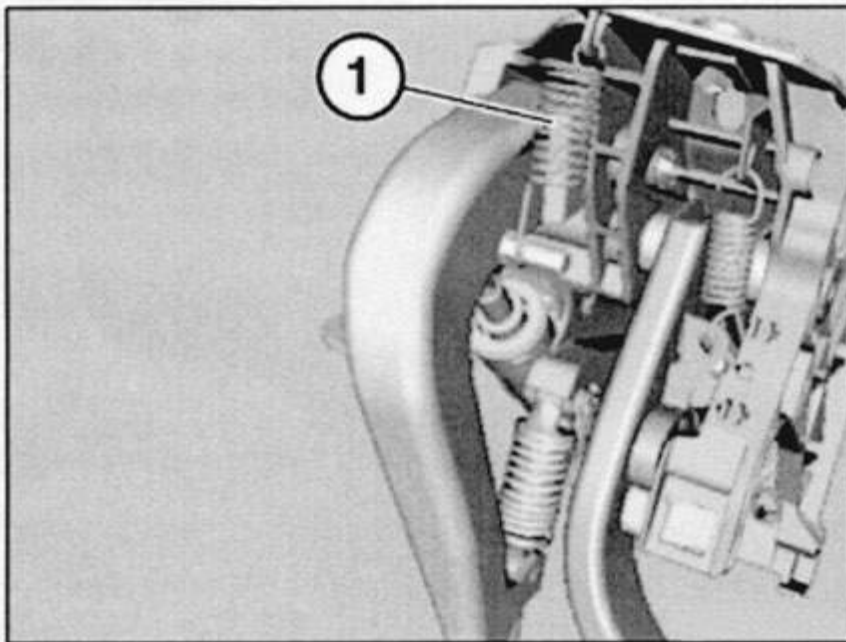


G00387022

Fig. 74: Disconnecting Clutch Master Cylinder From Hydraulic Line
 Courtesy of BMW OF NORTH AMERICA, INC.

Removal & Installation (6-Series)

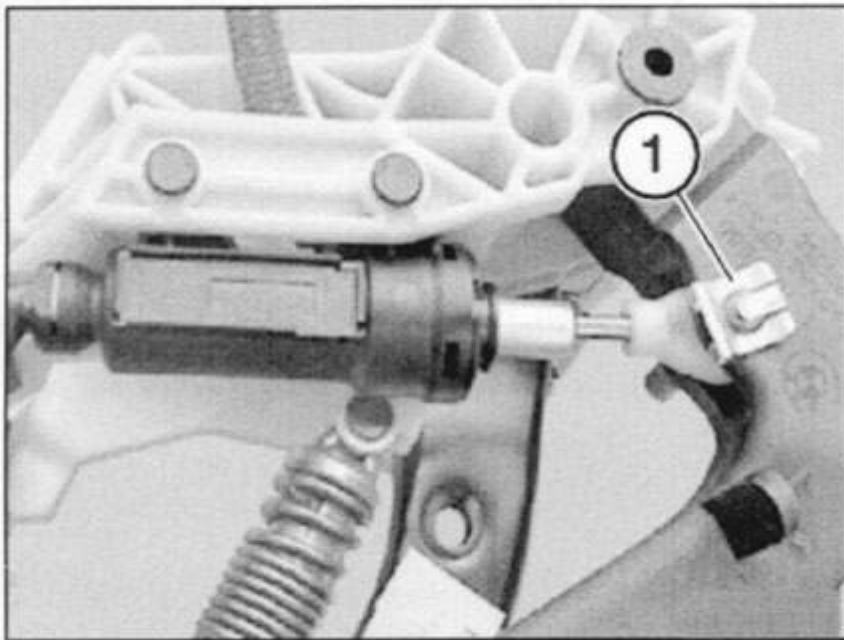
1. Remove trim panel for pedal assembly. See **PEDAL ASSEMBLY TRIM** . Remove microfilter housing on left. See **CABIN AIR FILTERS** . Remove light module. See **LIGHT MODULE** . Draw off brake fluid up to supply hose of clutch hydraulic system (1). For this purpose, use only a vacuum pipe that is exclusively used for removing brake fluid. Detach supply hose (1) from expansion tank. See **Fig. 61** . Disconnect spring (1). Illustration shows component removed. See **Fig. 75** .
2. Remove retainer (1) using screwdriver and press out pin. See **Fig. 76** . Detach retainer (1) with a screwdriver (2). See **Fig. 65** . Do not foul carpet with brake fluid. Detach hydraulic line from clutch master cylinder. Remove lock (1) from pin with aid of screwdriver (2). Lever out pin (3) with aid of screwdriver. Remove clutch master cylinder. During installation, replace pin. Press in pin until lock (1) can be seen to snap into place. See **Fig. 77** . Detach supply hose (1) from clutch master cylinder. Do not pull supply hose completely into interior. Lever out shift element (1) from clutch master cylinder (2) with screwdriver. Release plug connection (3) and disconnect plug (4) from shift element (1). See **Fig. 67** . During installation, shift element is secured against incorrect installation. Shift element must snap audibly into place. See **Fig. 68** .



G00387023

Fig. 75: Disconnecting Spring

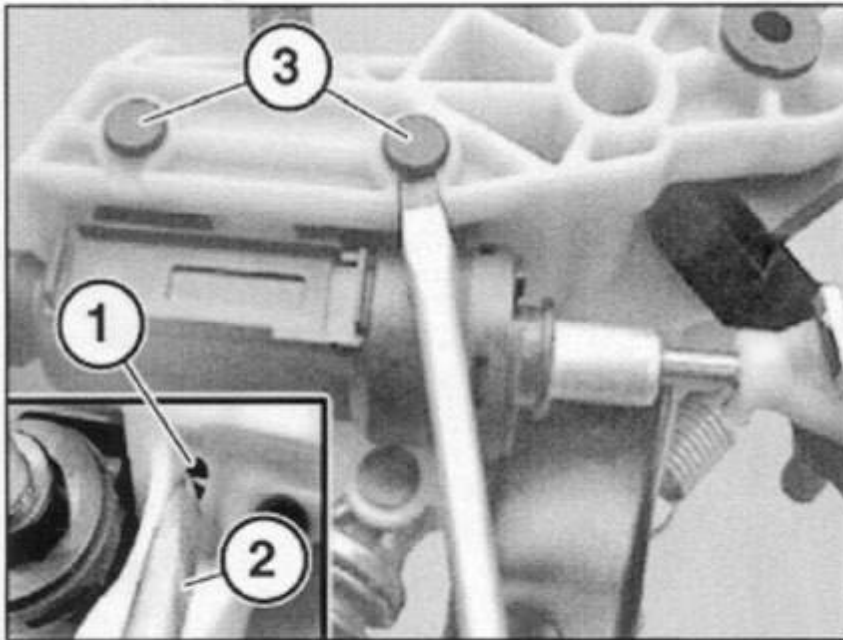
Courtesy of BMW OF NORTH AMERICA, INC.



G00387024

Fig. 76: Removing Retainer

Courtesy of BMW OF NORTH AMERICA, INC.



G00387025

Fig. 77: Identifying Lock & Pin

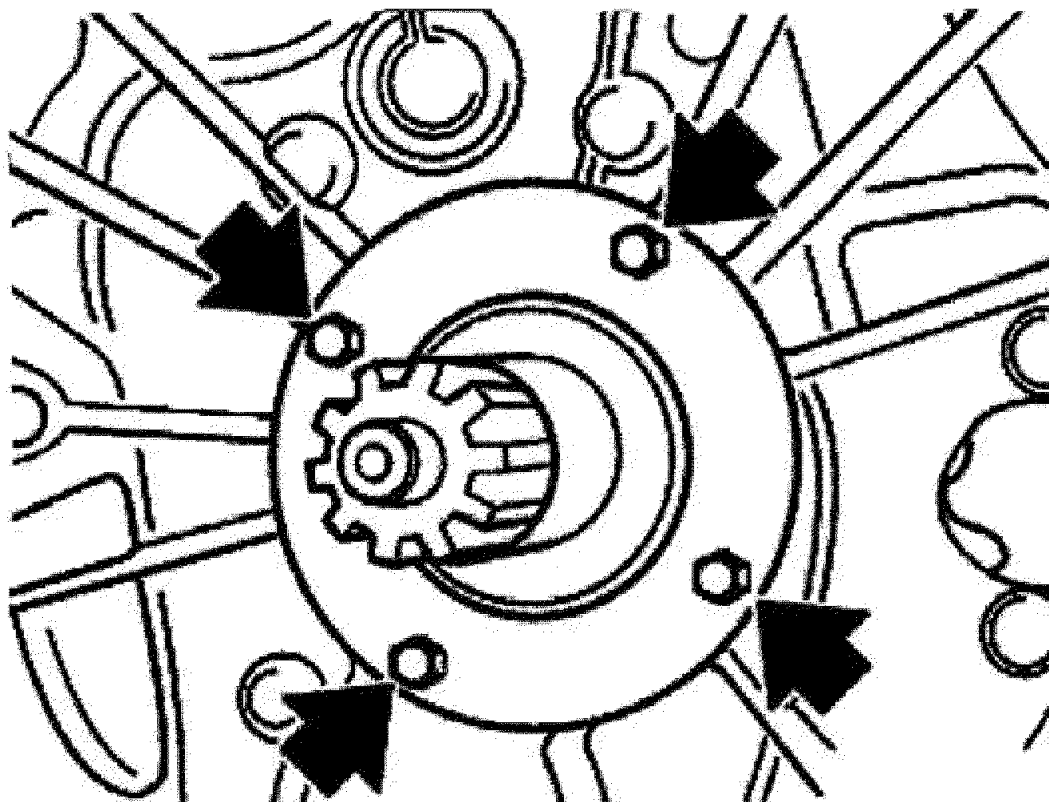
Courtesy of BMW OF NORTH AMERICA, INC.

CLUTCH RELEASE UNIT GUIDE TUBE

NOTE: Numbers in text refer to numbers in figures.

Removal & Installation (X3 & X5 6-Cylinder)

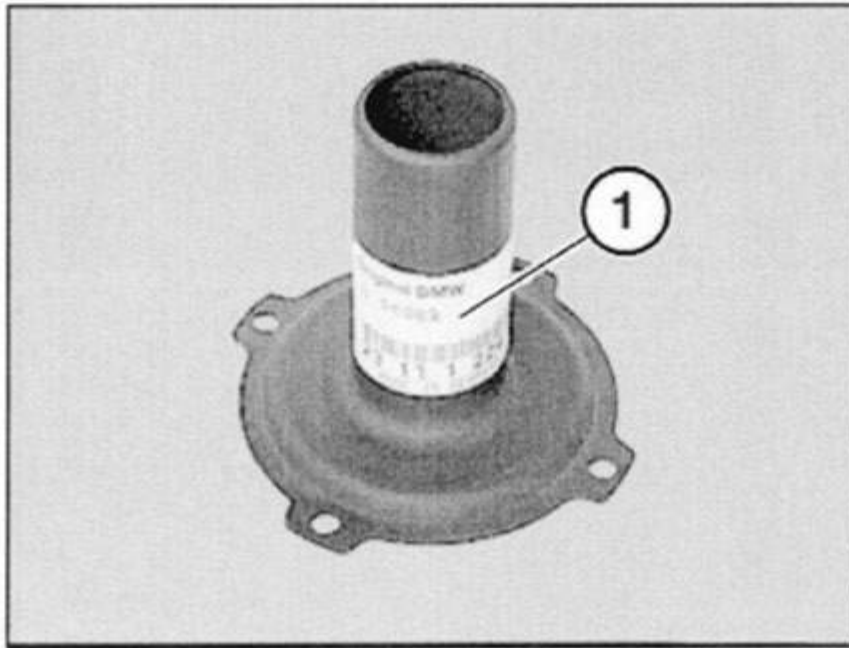
Remove clutch release bearing and release lever from tube. See **CLUTCH RELEASE BEARING/LEVER** . Unfasten bolts. See **Fig. 78** . Remove guide tube (1). When installing, clean thread. Install screws with Loctite 243. Remove sticker (1) and adhesive with a suitable solvent. See **Fig. 79** .



G00390757

Fig. 78: Identifying Guide Tube Bolts

Courtesy of BMW OF NORTH AMERICA, INC.



G00390758

Fig. 79: Identifying Sticker

Courtesy of BMW OF NORTH AMERICA, INC.

LIGHT MODULE

NOTE: Numbers in text refer to numbers in figures.

Removal & Installation (6-Series)

Remove **PEDAL ASSEMBLY TRIM** . Unfasten plug connection (4) and disconnect. Unlock catch (1) and feed out/remove light module (2) in direction of arrow. During installation, make sure light module (2) is correctly seated in mounting (3) and catch (1). See **Fig. 80** . Reprogram light module with BMW DIS.

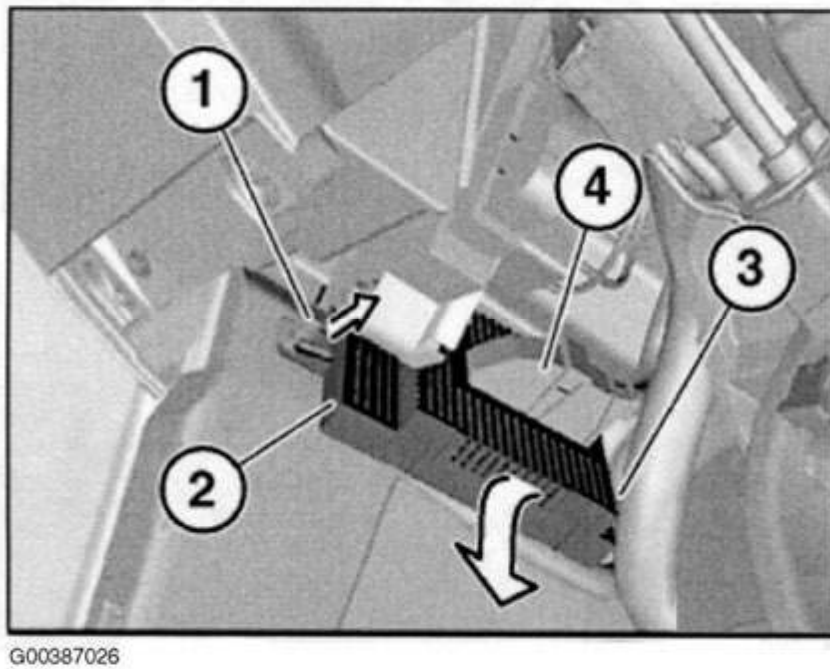


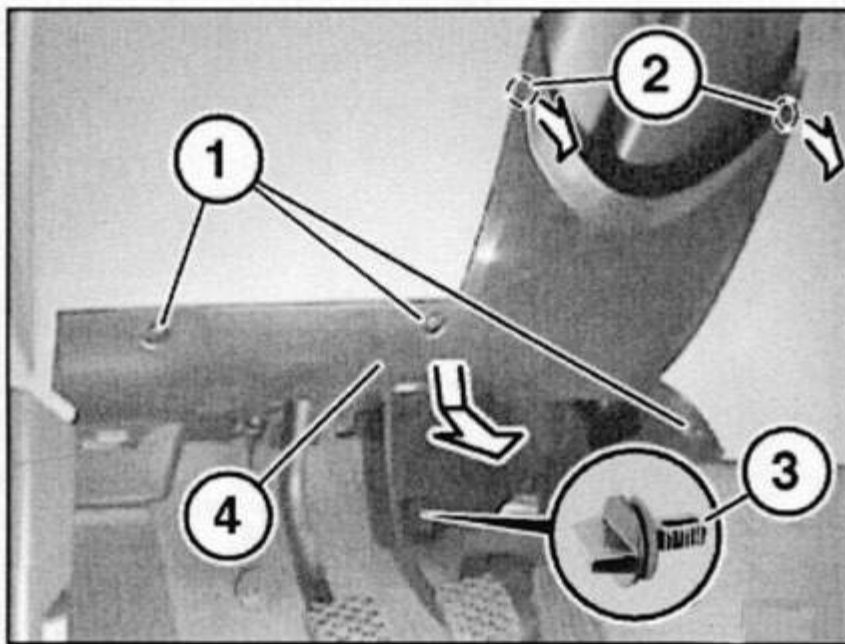
Fig. 80: Removing & Installing Light Module
Courtesy of BMW OF NORTH AMERICA, INC.

PEDAL ASSEMBLY TRIM

NOTE: Numbers in text refer to numbers in figures.

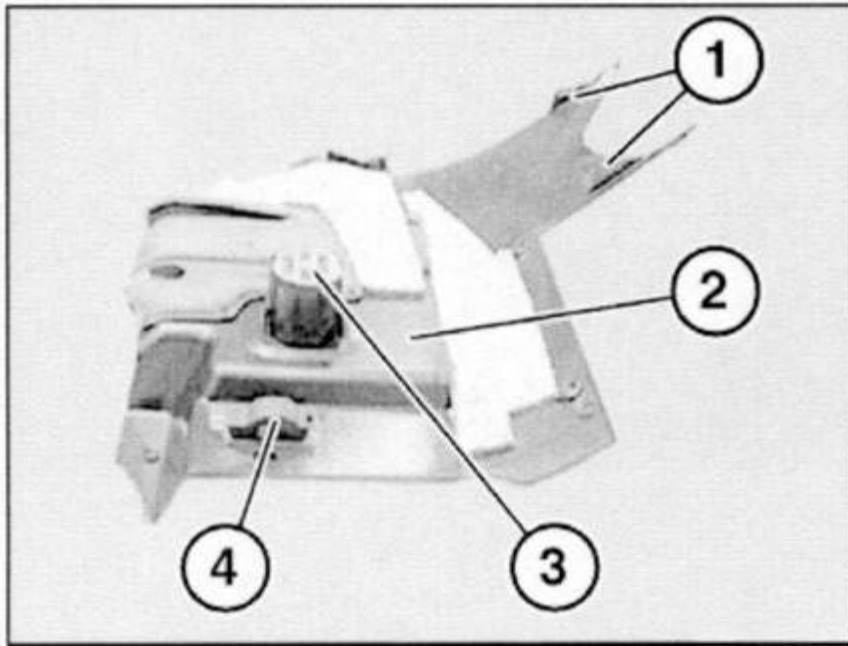
Removal & Installation (X3)

Release screws (1). Unclip trim for pedal assembly (4) at retaining points (2). Remove rotary clip (3) and pull back trim for pedal assembly (4) in direction of arrow. Disconnect associated plug connections and remove trim for pedal assembly (3). See **Fig. 81** . When installing, note that locator tabs (1) of trim for pedal assembly (2) must not be damaged. Note location of gong (3) and footwell light (4). See **Fig. 82** .



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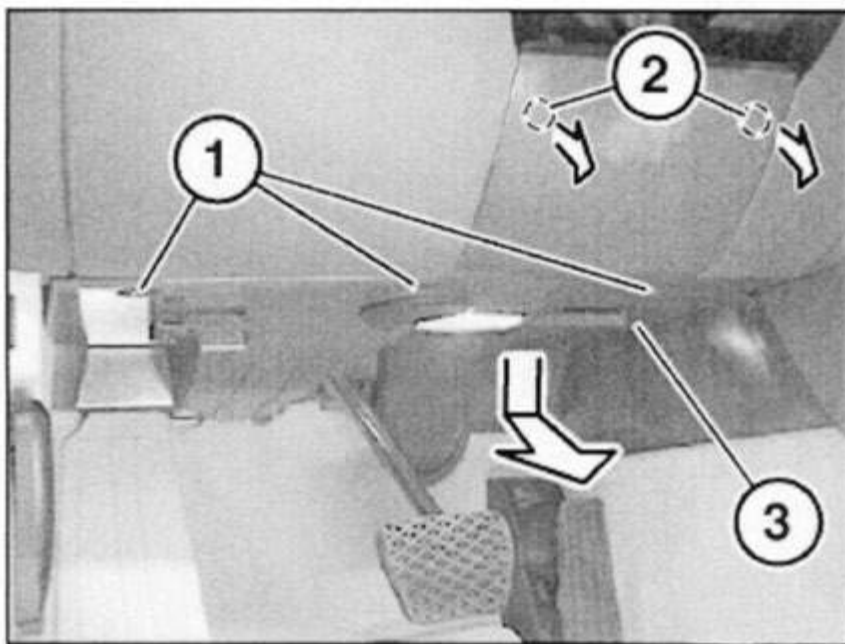
Fig. 81: Removing Pedal Assembly Trim (X3)
Courtesy of BMW OF NORTH AMERICA, INC.



G00390763

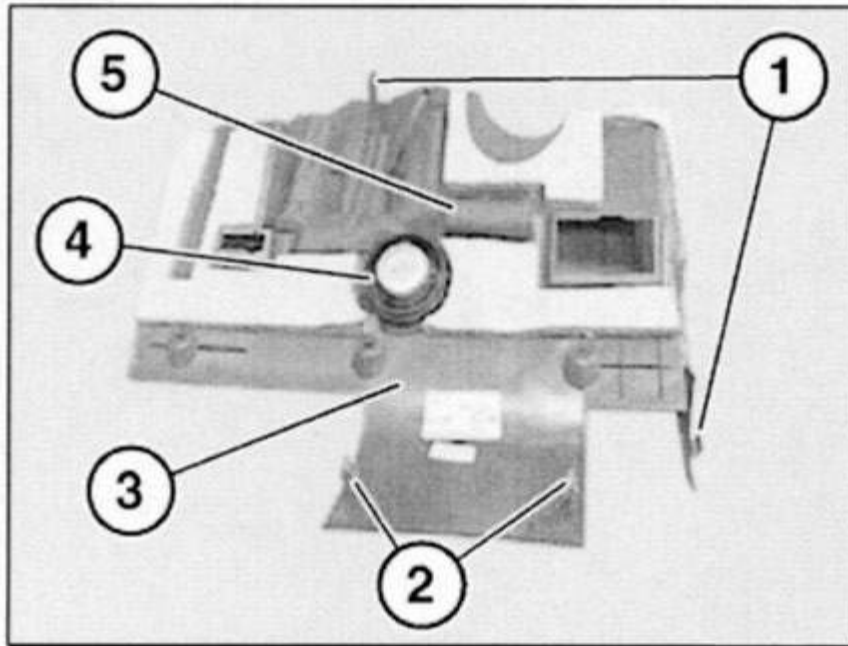
Fig. 82: Installing Pedal Trim (X3)**Courtesy of BMW OF NORTH AMERICA, INC.****Removal & Installation (6-Series)**

Release screws (1). Unclip trim for pedal assembly (3) at retaining points (2). Pull back panel for pedals (3) in direction of arrow. Disconnect associated plug connections and remove trim for pedal assembly (3). During installation, guides (1) and clips (2) of trim for pedal assembly (3) must not be damaged. See **Fig. 83** . Note location of speaker for hands-free system (4) and footwell light (5). See **Fig. 84** .



G00387027

Fig. 83: Removing Pedal Assembly Trim (6-Series)
Courtesy of BMW OF NORTH AMERICA, INC.



G00387028

Fig. 84: Installing Pedal Trim (6-Series)
Courtesy of BMW OF NORTH AMERICA, INC.

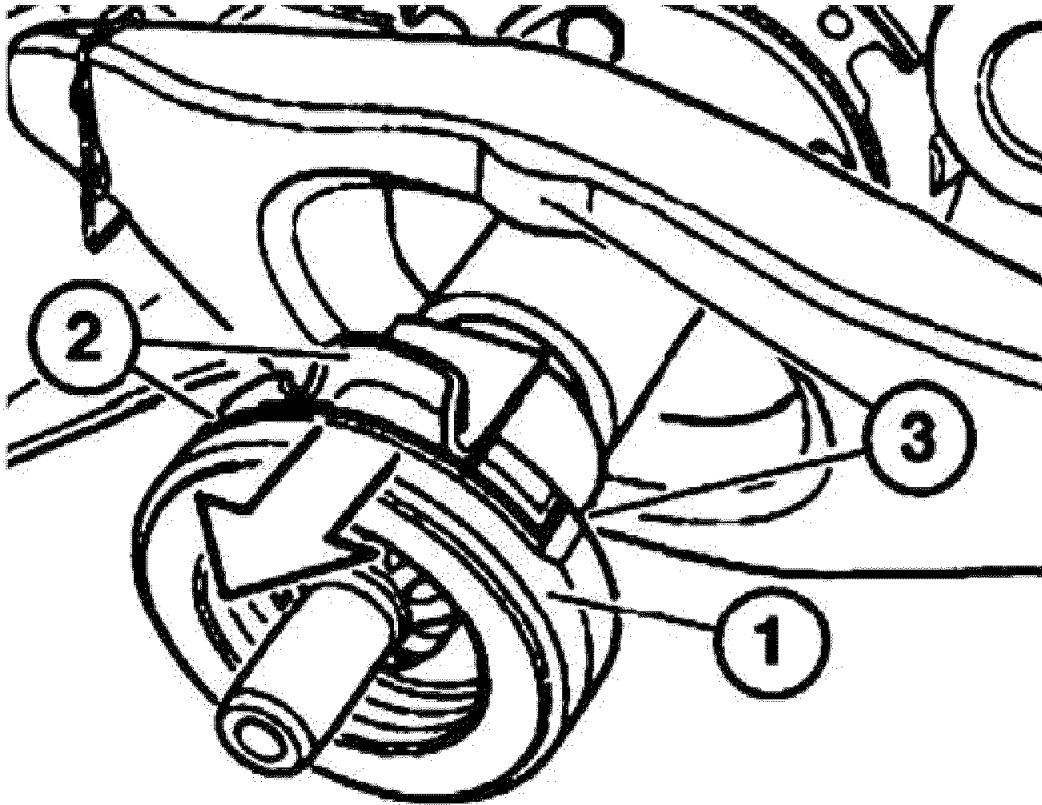
CLUTCH RELEASE BEARING/LEVER

NOTE: Numbers in text refer to numbers in figures.

Removal & Installation

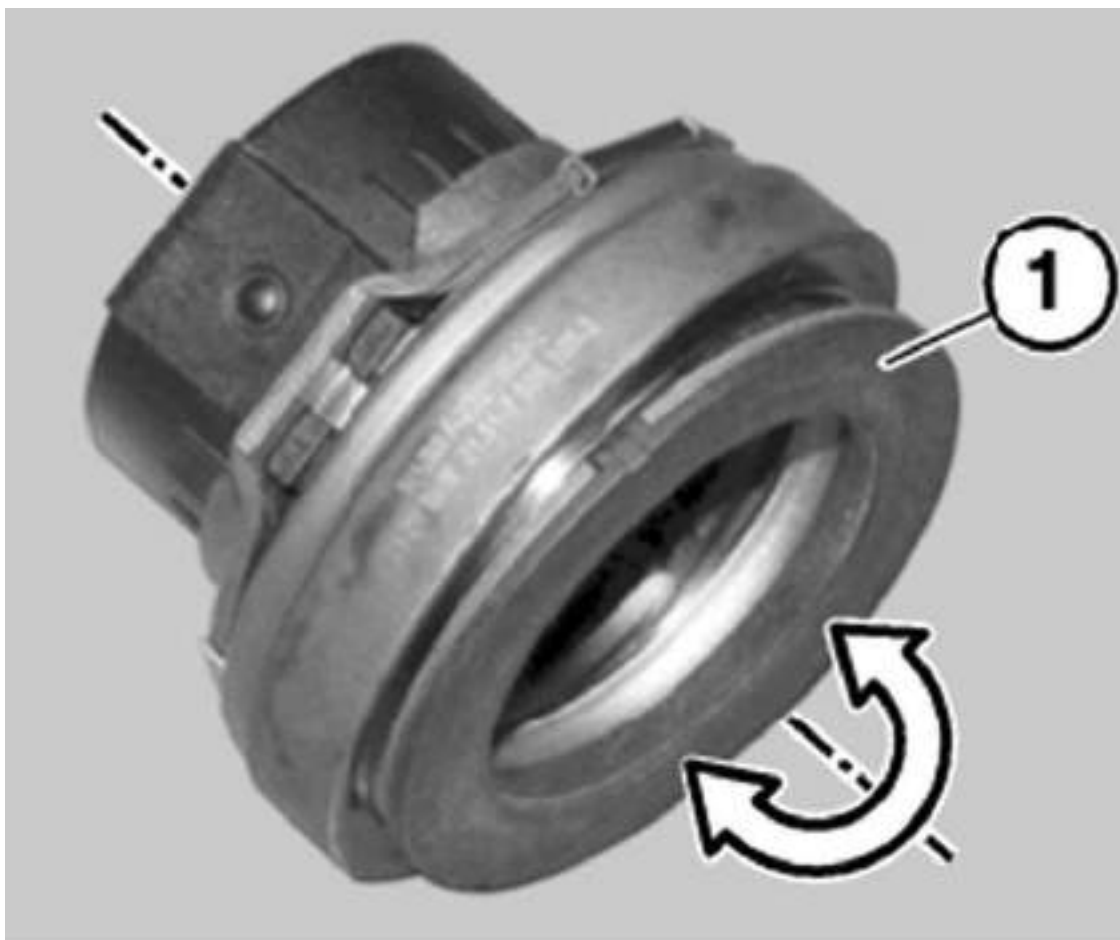
1. Remove transmission. See appropriate REMOVAL & INSTALLATION article. Remove release bearing (1).
2. During installation, clean all sliding surfaces on clutch release bearing, check for damage and replace if necessary. Do not grease clutch release lever. Sliding surfaces (2) of clutch release bearing must rest on sliding surfaces (3) of release lever. Lightly grease sliding surfaces (2) of release bearing. See **Fig. 85** . If a new clutch release bearing is installed, go to next step.
3. New clutch release bearing: clutch release bearing with moving thrust plate (1) and swivel motion of thrust plate (1) possible. See **Fig. 86** . During installation, lightly grease sliding surfaces of release bearing. A previously used clutch release bearing: clutch release bearing with rigidly positioned thrust plate (1) and swivel motion of thrust plate (1) is not possible. See **Fig. 87** . Withdraw release lever (4) from spring wire clip (5) and remove. See **Fig. 88** . Clean release lever. Do not grease release lever. Lightly grease release lever at sliding surfaces (1 and 2) only. See **Fig. 89** .

4. During installation, check spring wire clip (5) and ball pin (6) for damage and replace if necessary. See **Fig. 90** . Lightly grease ball pin (6). Note that spring wire clip and ball pin must always be replaced on the S6S420G transmission. Clean guide sleeve (7). See **Fig. 91** . Do not grease guide sleeve. If guide sleeve is greased, the release lever can stick on the guide sleeve.



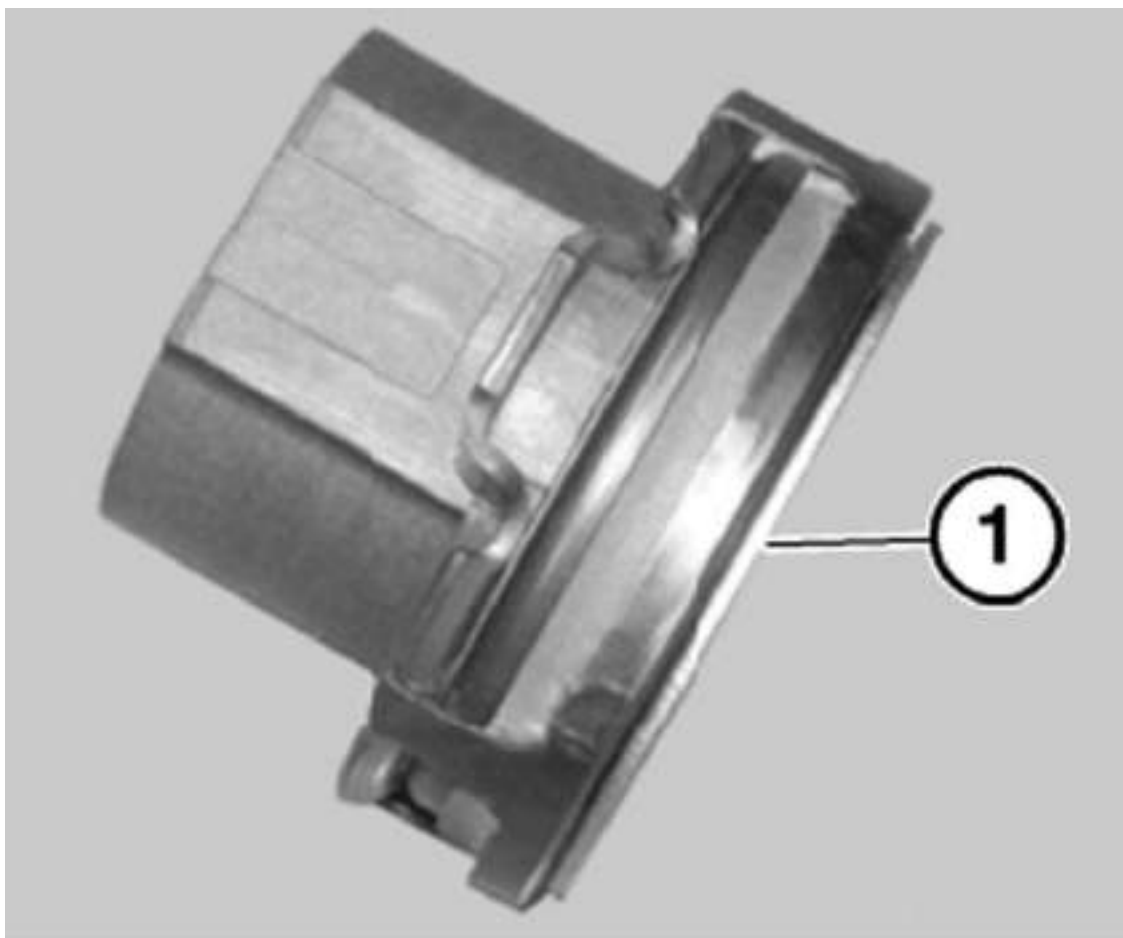
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Fig. 85: Release Bearing, Sliding Surfaces Of Release Bearing & Release Lever
Courtesy of BMW OF NORTH AMERICA, INC.



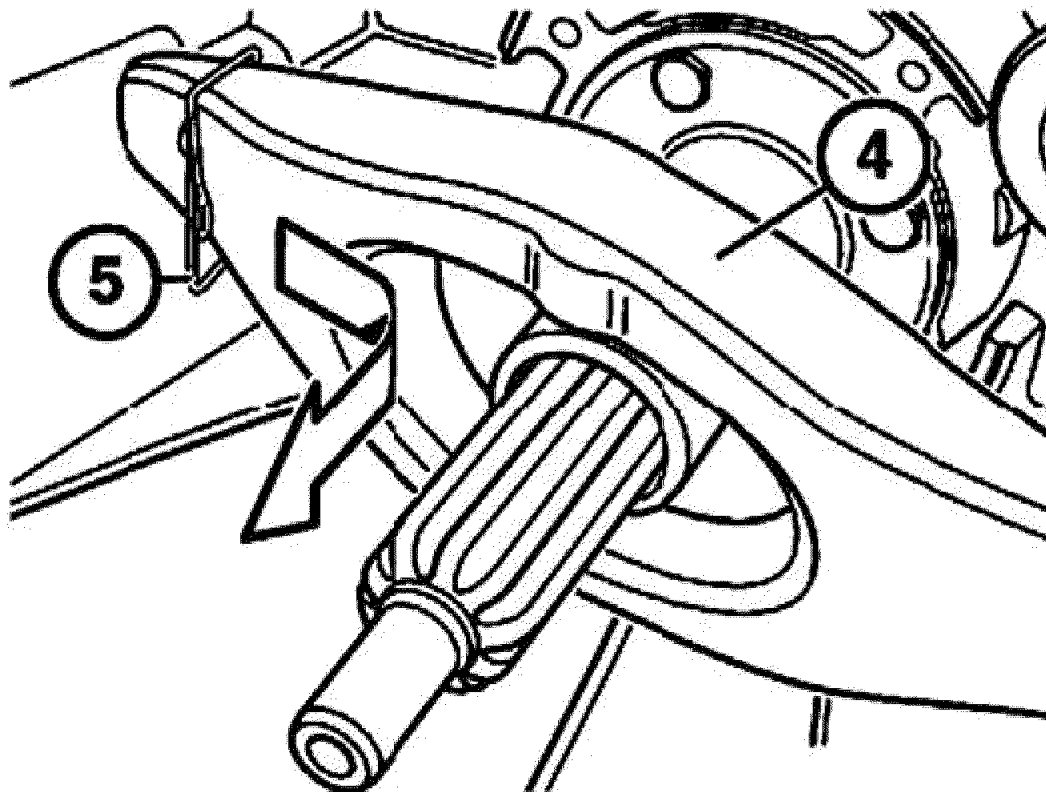
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Fig. 86: Clutch Release Bearing With Moving/Swivel Motion
Courtesy of BMW OF NORTH AMERICA, INC.



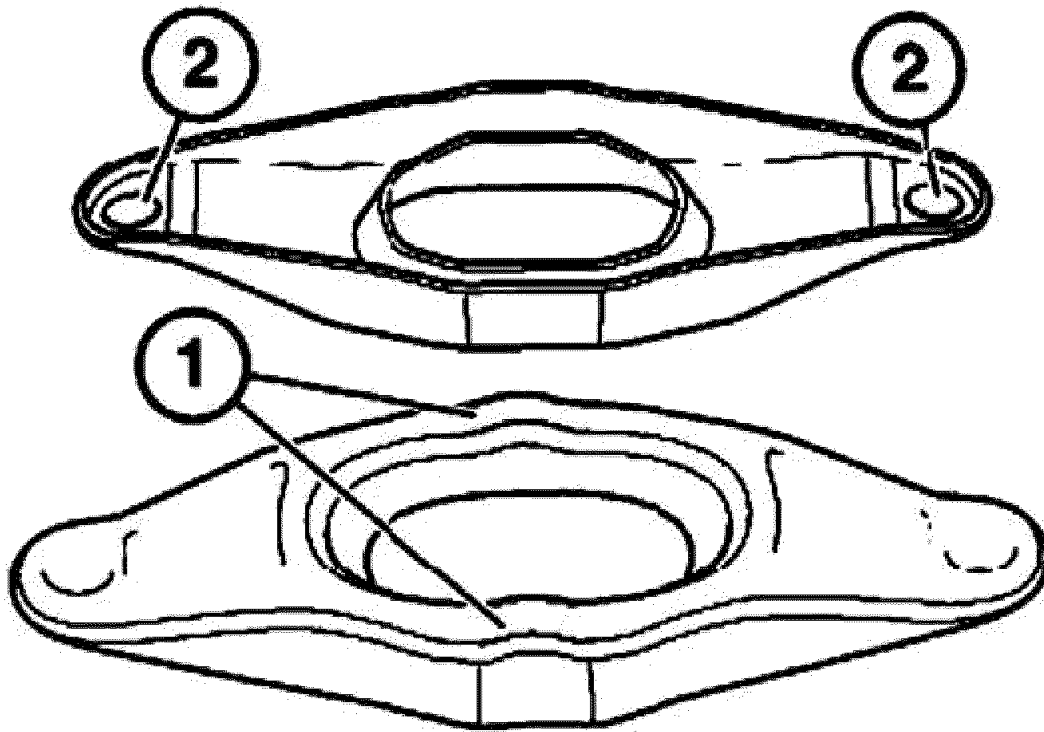
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Fig. 87: Clutch Release Bearing With Rigid Thrust Plate & No Swivel Motion
Courtesy of BMW OF NORTH AMERICA, INC.



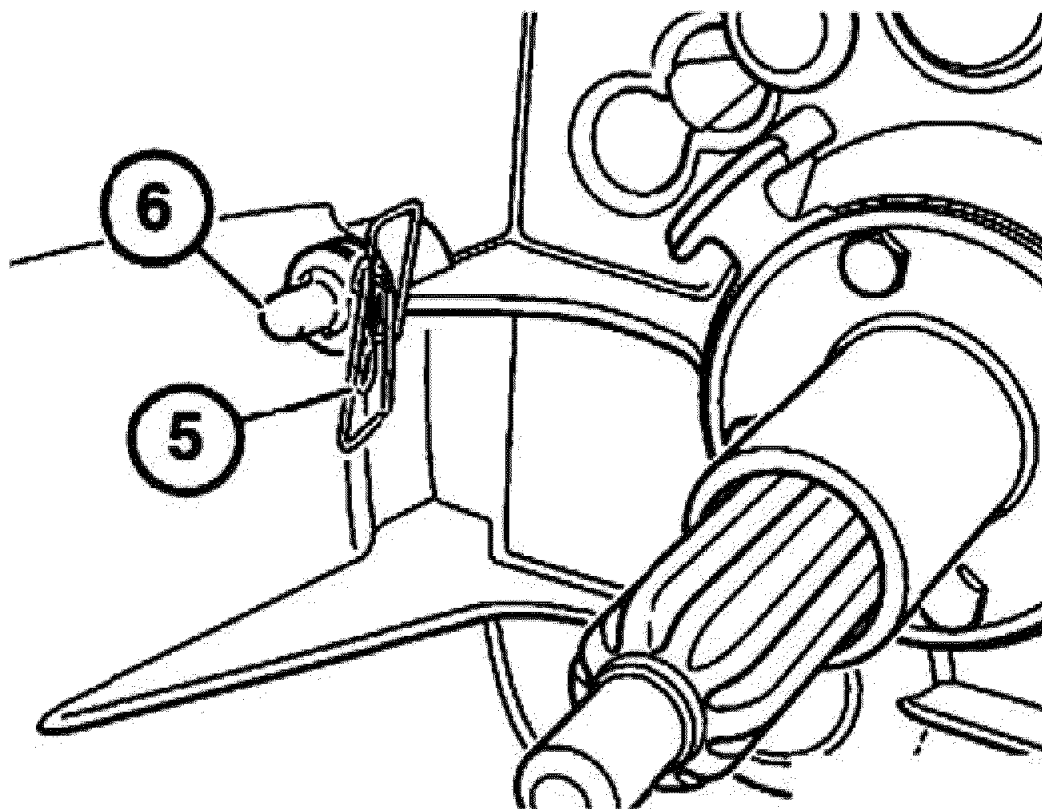
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Fig. 88: Withdrawing Release Lever From Spring Wire Clip
Courtesy of BMW OF NORTH AMERICA, INC.



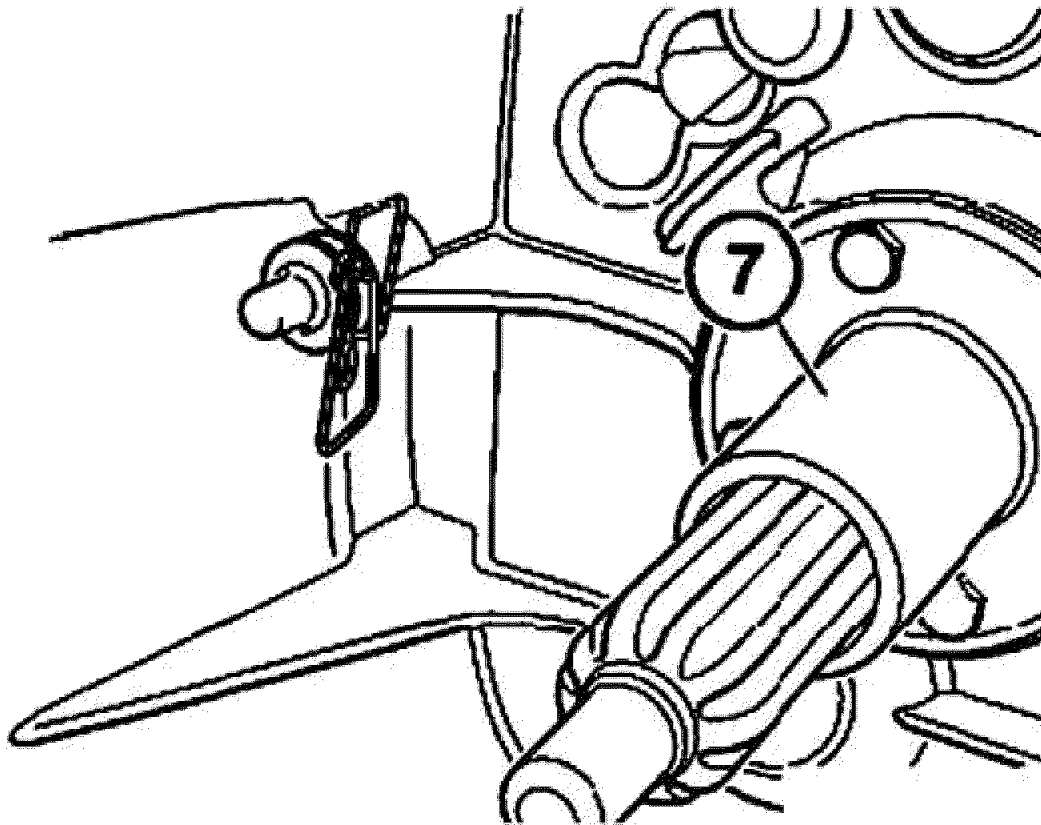
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Fig. 89: Lightly Greasing Release Lever At Sliding Surfaces
Courtesy of BMW OF NORTH AMERICA, INC.



G00386969

Fig. 90: Checking Spring Wire Clip & Ball Pin For Damage
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 91: Cleaning Guide Sleeve

Courtesy of BMW OF NORTH AMERICA, INC.

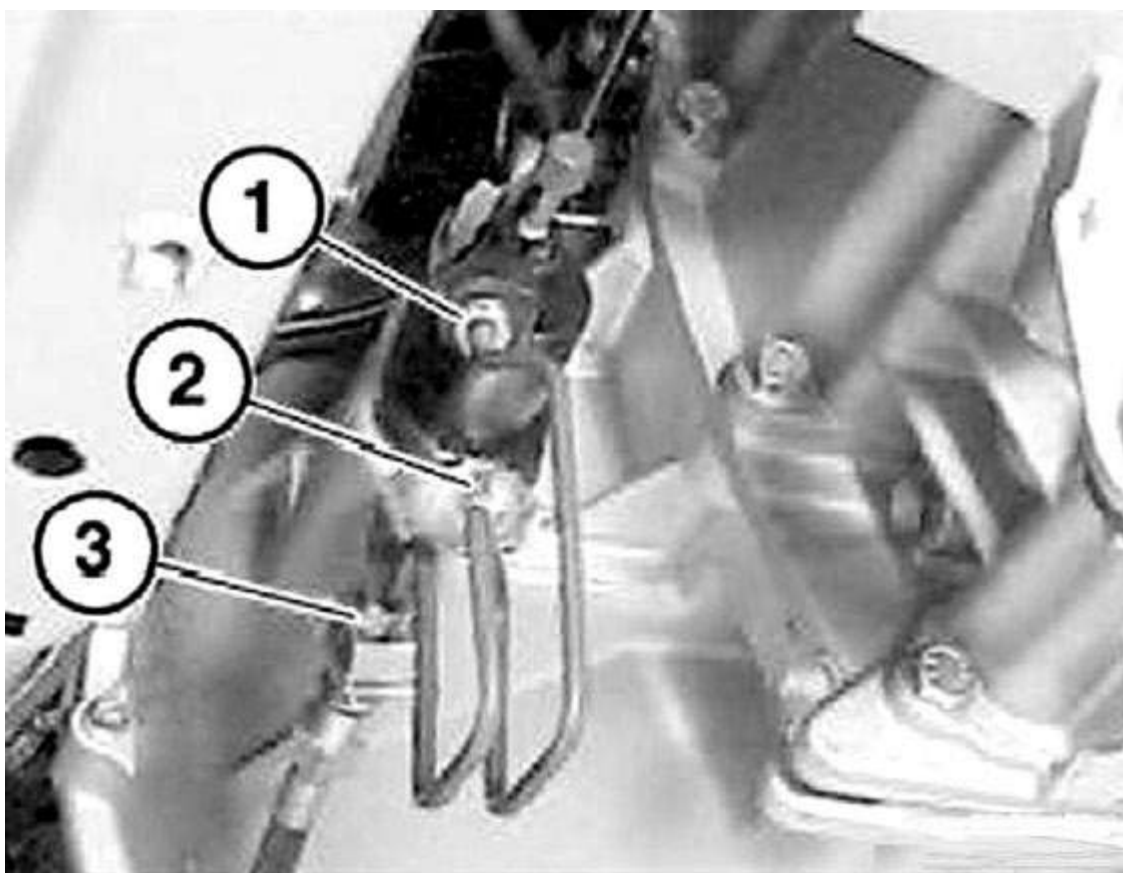
CLUTCH SLAVE CYLINDER**NOTE:** Numbers in text refer to numbers in figures.**Removal & Installation**

1. Seal supply hose to clutch master cylinder with special tool (13 3 010). See **Fig. 92** . Remove transmission underbody protection if necessary. Release union screw (1) on hydraulic line. Release nut (2) and remove hydraulic line (3) with bracket. See **Fig. 93** .
2. Release nut and remove clutch slave cylinder. See **Fig. 94** . During installation, clean thrust member (1) and contact face on release lever (2). Lightly grease thrust member (1) on contact face (3). See **Fig. 95** .
3. Bleed hydraulic system. See **BLEEDING** .



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Fig. 92: Sealing Supply Hose To Clutch Master Cylinder
Courtesy of BMW OF NORTH AMERICA, INC.



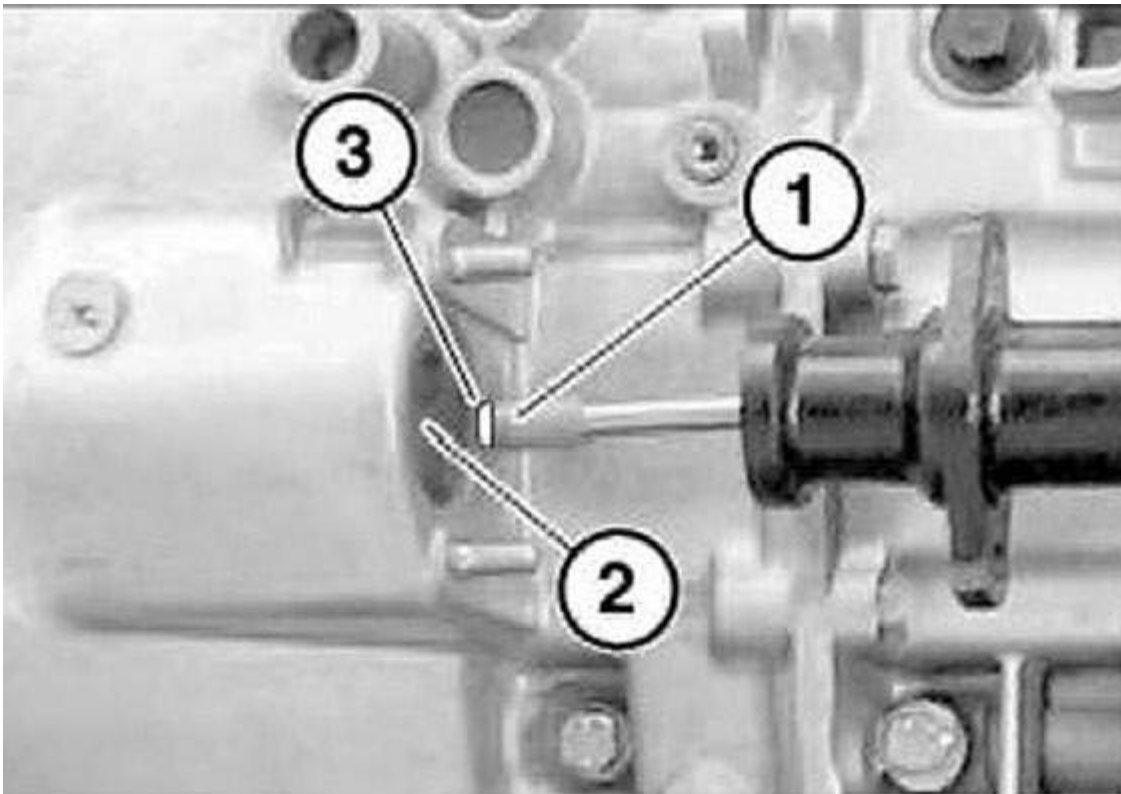
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Fig. 93: Removing Union Screw, Nut & Hydraulic Line
Courtesy of BMW OF NORTH AMERICA, INC.



G00386918

Fig. 94: Releasing Nut & Removing Clutch Slave Cylinder
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 95: Identifying Thrust Member, Release Lever & Contact Face
Courtesy of BMW OF NORTH AMERICA, INC.

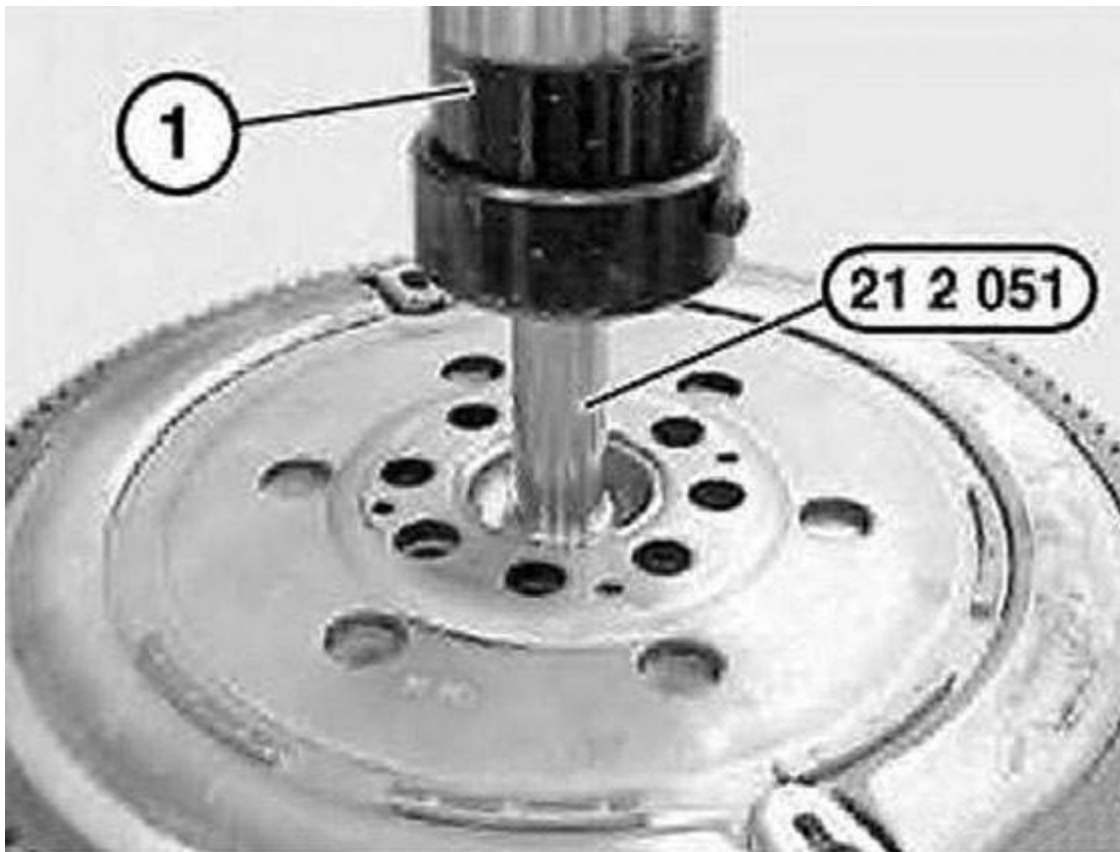
ROLLER BEARING FOR DUAL MASS FLYWHEEL

NOTE: Numbers in text refer to numbers in figures.

Removal & Installation

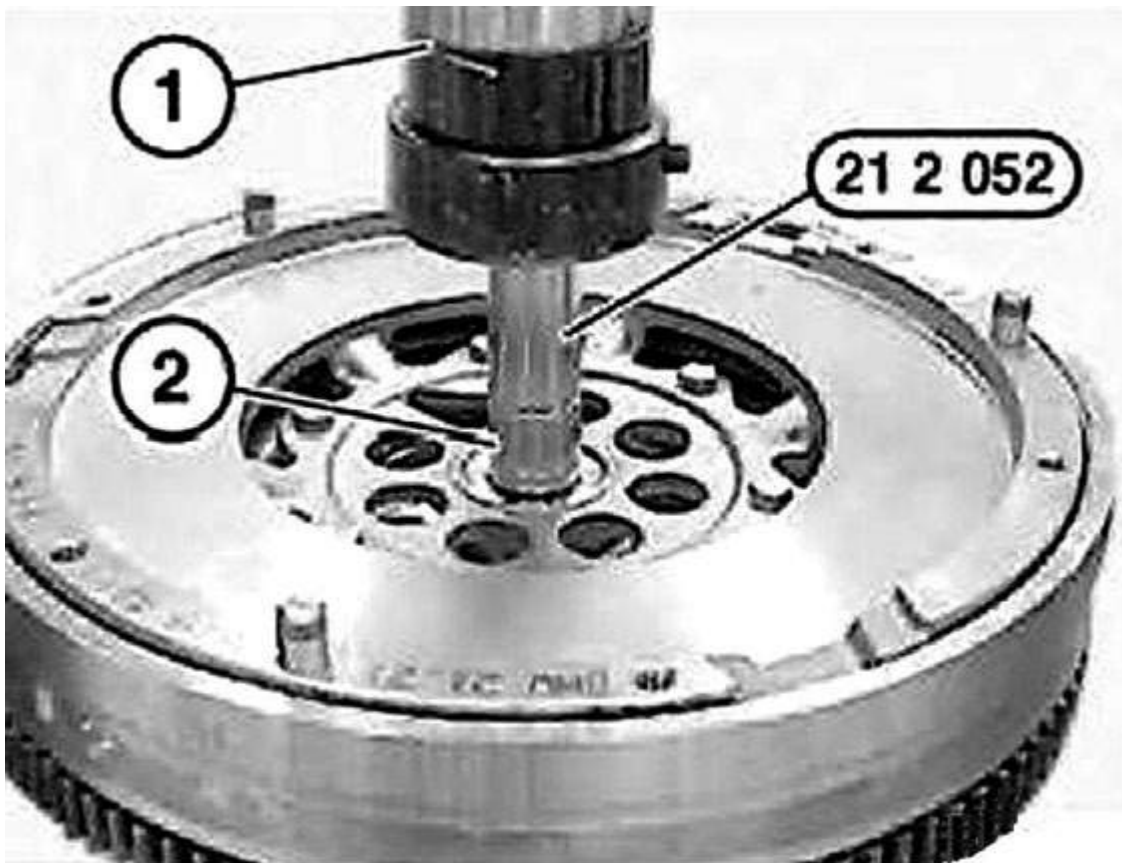
Remove flywheel. See ENGINE MECHANICAL article. Using hydraulic press (1) and special tool 212051, press out dual-mass flywheel downwards on engine side. See **Fig. 96** . Use care as there is a risk of damage: roller bearing must not be driven out. Push roller bearing (2) onto special tool 212052. Using hydraulic press (1), press roller bearing into dual-mass flywheel as far as it will go on clutch side. See **Fig. 97** . Observe press-in instruction.

- a. Roller bearing must not be driven in.
- b. Roller bearing mounting force/travel monitored:
 - Minimum 2000N 1 mm before end of pressing in.
 - Maximum 15000N during entire press-in procedure.



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Fig. 96: Pressing Out Dual-Mass Flywheel
Courtesy of BMW OF NORTH AMERICA, INC.



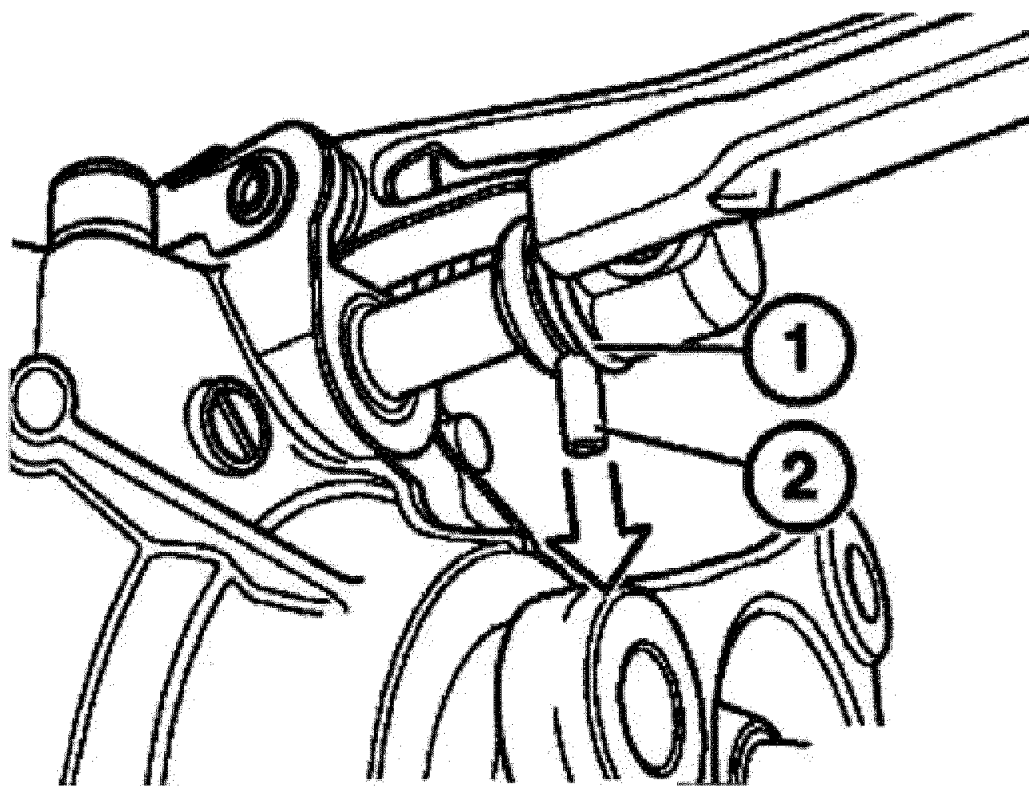
G00387015

Fig. 97: Pressing In Dual-Mass Flywheel

Courtesy of BMW OF NORTH AMERICA, INC.

SELECTOR SHAFT RADIAL SEAL (GS637BZ)**NOTE:** Numbers in text refer to numbers in figures.**Removal & Installation**

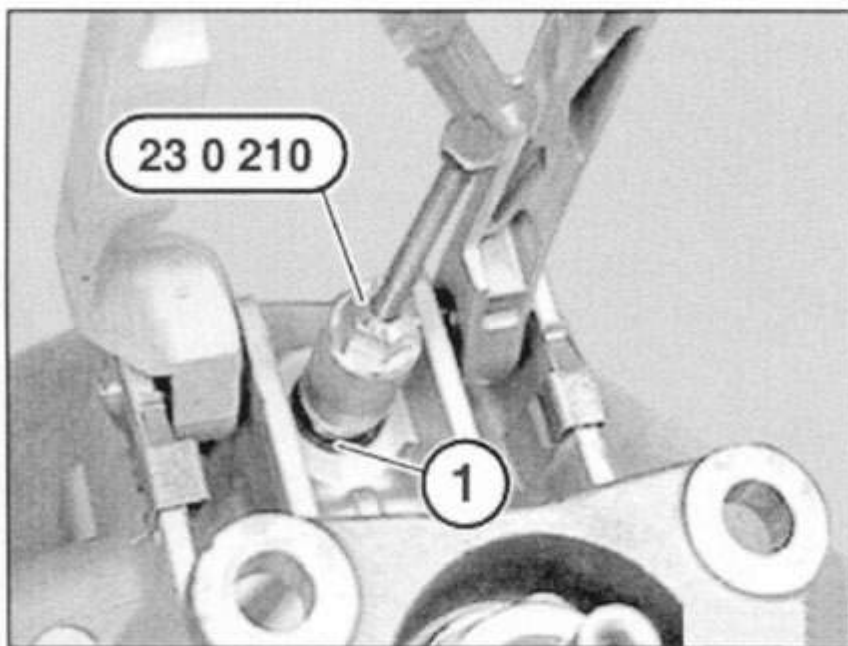
Remove transfer case. See TRANSFER CASE article. Shift transmission into 2nd gear. Drive out cylinder pin (2). See **Fig. 98** . Screw in special tool (23 0 210) until it is firmly connected with radial seal (1). See **Fig. 99** . Pullout radial seal with special tool (23 0 210). Coat sealing lips of radial seal and selector shaft with gear oil. Drive in radial seal with special tool (23 0 220). See **Fig. 100** .



G00390759

Fig. 98: Driving Out Cylinder Pin

Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 99: Screwing In Tool Until It Is Firmly Connected With Radial Seal
Courtesy of BMW OF NORTH AMERICA, INC.

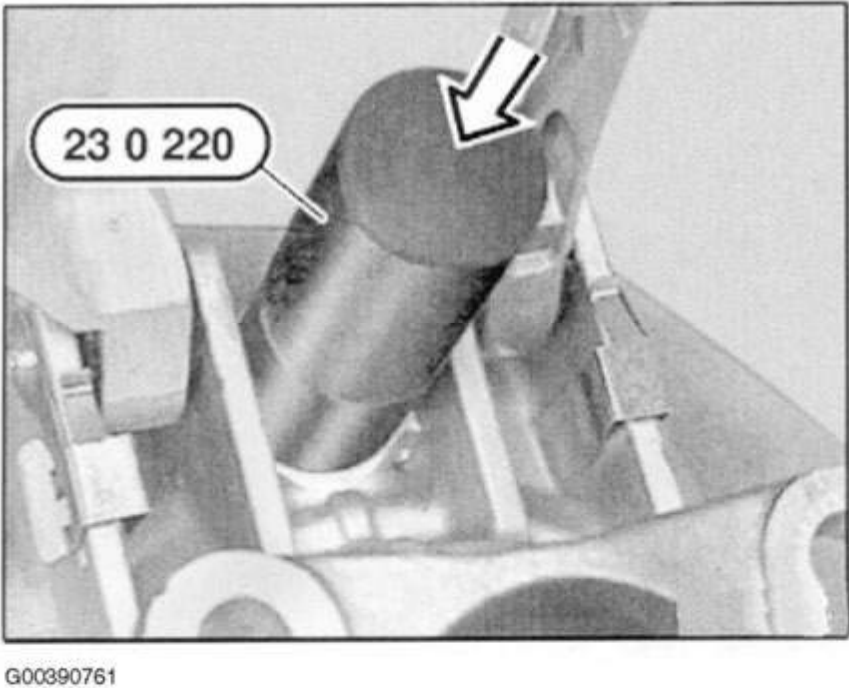


Fig. 100: Driving In Radial Seal
 Courtesy of BMW OF NORTH AMERICA, INC.

OVERHAUL

NOTE: Overhaul information is not provided.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Clutch Housing To Crankcase	
M8	20 (27)
M10	38 (51)
M12	63 (86)
Clutch To Flywheel (X3 & X5)	
M8/8.8	18 (25)
M8/10.9	25 (34)
Clutch To Flywheel (645Ci)	

2003 BMW X5 44i
2000-05 CLUTCHES X3, X5 & 645Ci

M8/8.8	11 (15) ⁽¹⁾
Clutch Master Cylinder To Bearing Block	16 (22)
Clutch Master Cylinder Fitting Screw	16 (22)
Clutch Master Cylinder To Pedal Assembly	88 (10)
Clutch Slave Cylinder To Clutch Housing/Transmission Case	16 (22)
Hydraulic Pipes Coupling Bolts	10 (14)
Hydraulic Unit Pressure Accumulator	30 (40)
(1) Tighten an additional 19-31 degrees.	