

General

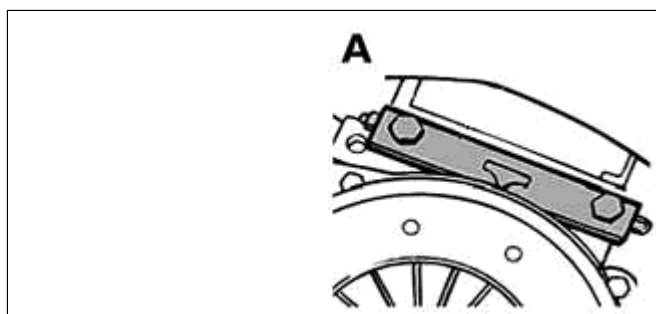
This repair group covers replacement of the clutch mechanical and hydraulic components. Read the procedure through before beginning a job.

Note:

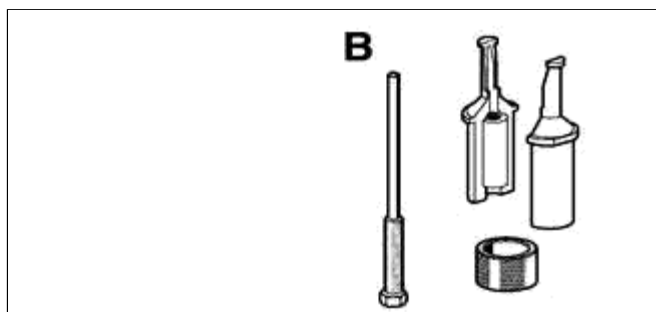
See ⇒ [200 Transmission-General](#) for transmission application information.

Special tools

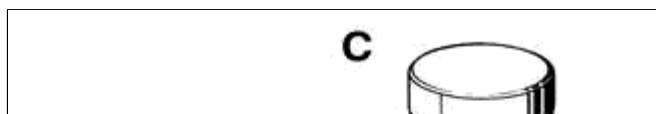
The 3 Series BMW employs a traditional style clutch layout with a self adjusting clutch for manual transmission cars. BMW suggests some specific tools for fitting and removing the self adjusting clutch (SAC) assembly. These tools are required for aligning and assembling the clutch disk, as well as locking the flywheel in place and aligning the SAC assembly to the dual mass flywheel.



- ◀ Flywheel locking tool BMW 11 2 170



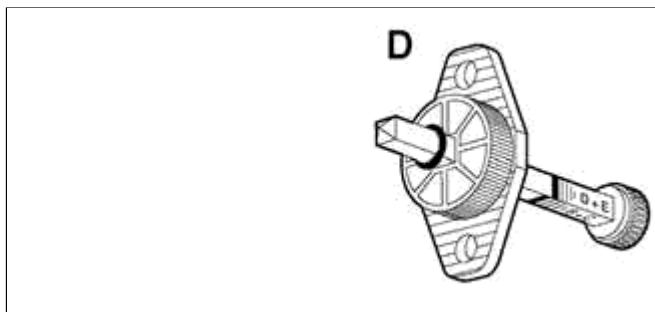
- ◀ Pilot bearing removal tool BMW 11 2 340



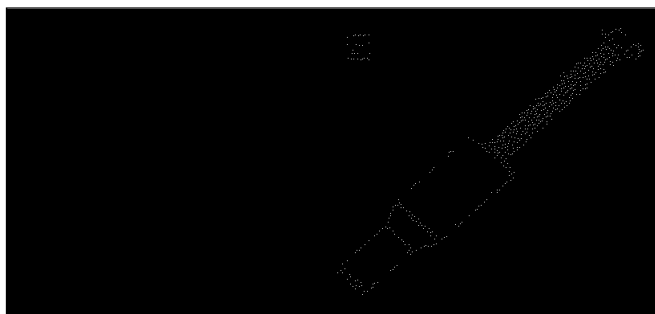
- ◀ Pilot bearing installation tool BMW 11 2 350



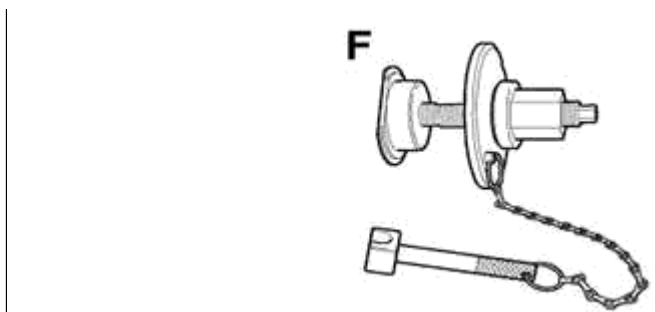
➤ Clutch lining gauge BMW 21 2 080



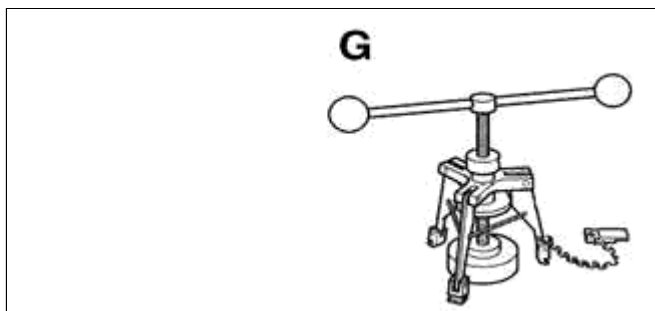
➤ Clutch centering mandrel BMW 21 2 142



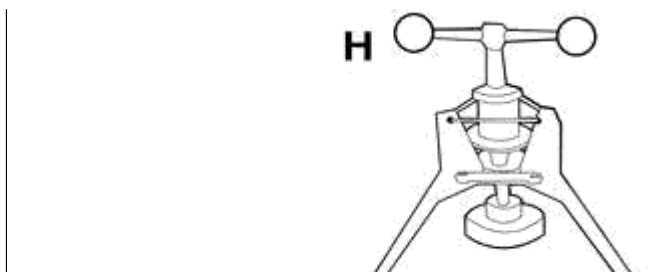
➤ SAC clutch lock tool BMW 21 2 150

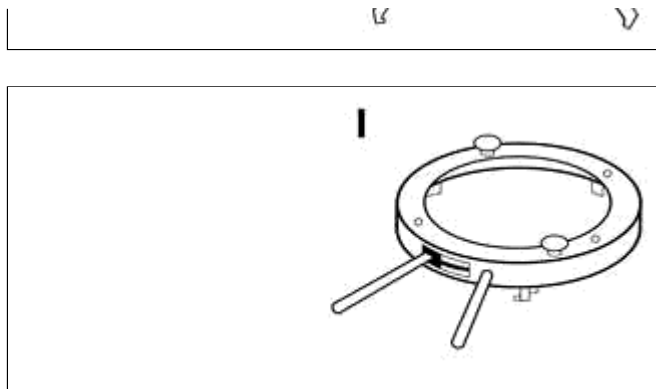


➤ Clutch diaphragm tensioning tool BMW 21 2 160



➤ SAC tensioning tool BMW 21 2 170





➤ SAC locating ring BMW 21 2 180

Clutch Hydraulics

The clutch is hydraulically actuated by the master and slave cylinders. Clutch disc wear is automatically taken up through the self adjusting pressure plate springs, making periodic adjustments unnecessary.

A soft or spongy feel to the clutch pedal, long pedal free-play, or grinding noises from the gears while shifting can all indicate problems with the clutch hydraulics. In these circumstances it is best to start with a clutch fluid flush, followed, if necessary, by replacement of the hydraulic parts.

Note:

The clutch hydraulic system shares the fluid reservoir and fluid with the brake hydraulic system.

Clutch hydraulic system, bleeding and flushing

If the clutch/brake fluid is murky or muddy, or has not been changed within the last two years, the system should be flushed. Flushing the old fluid from the clutch lines is done using a brake system pressure bleeder.

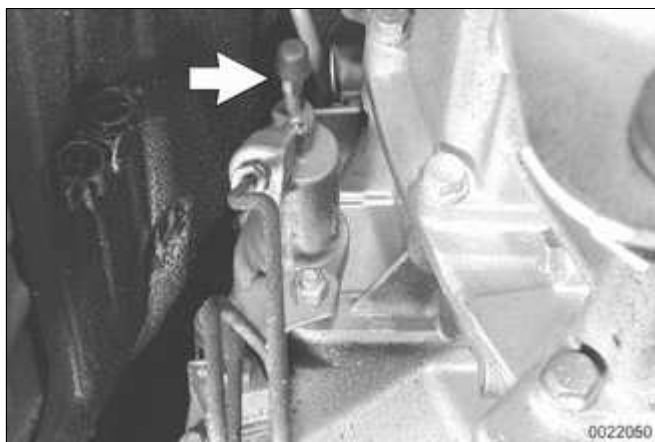
- Raise and safely support vehicle.
- Remove under transmission splash guard if applicable.
- Remove brake fluid reservoir cap. Using a clean syringe, remove brake fluid from reservoir. Refill reservoir with clean DOT 4 brake fluid.



- ✦ Attach pressure brake bleeder to fluid reservoir and pump bleeder a few times to pressurize hydraulic fluid system.

CAUTION!

- ✦ *Do not exceed 2 bar (29 psi) pressure at the fluid reservoir when bleeding or flushing the hydraulic system.*
- ✦ *Brake fluid is poisonous, highly corrosive and dangerous to the environment. Wear safety glasses and rubber gloves when working with brake fluid. Do not siphon brake fluid with your mouth. Immediately clean away any fluid spilled on painted surfaces and wash with water, as brake fluid will remove paint.*
- ✦ *Always use new brake fluid from a fresh, unopened container. Brake fluid will absorb moisture from the air. This can lead to corrosion problems in the hydraulic systems, and will also lower the brake fluid's boiling point. Dispose of brake fluid properly.*



- ✦ Connect a length of hose from clutch slave cylinder bleeder valve (**arrow**) to a container.
 - Open bleeder valve and allow brake fluid to expel until clean fluid comes out free of air bubbles.
 - Close bleeder valve and disconnect pressure bleeding equipment from fluid reservoir. Hose on bleeder valve remains connected.

- Slowly operate clutch pedal about 10 times. Fill reservoir with clean fluid as necessary.
- Unbolt slave cylinder from transmission. Fit BMW special tool 21 5 030. Press slave cylinder pushrod completely into slave cylinder.
- Hold slave cylinder so that bleeder valve is at the highest point.
- Open bleeder valve.
- ◆ Once brake fluid appears with out air bubbles, withdraw pushrod completely.
- ◆ Press slave cylinder pushrod all the way in.
- ◆ If brake fluid appears without air bubbles close bleeder valve and slowly release pushrod. Repeat procedure until fluid runs out clear and without bubbles.
- Disconnect bleeder hose. Install slave cylinder to transmission. Add clean brake fluid to reservoir as necessary. Check clutch operation.

Tightening torque	
Clutch slave cylinder to transmission	22 Nm (16 ft-lb)

Clutch master cylinder,

replacing

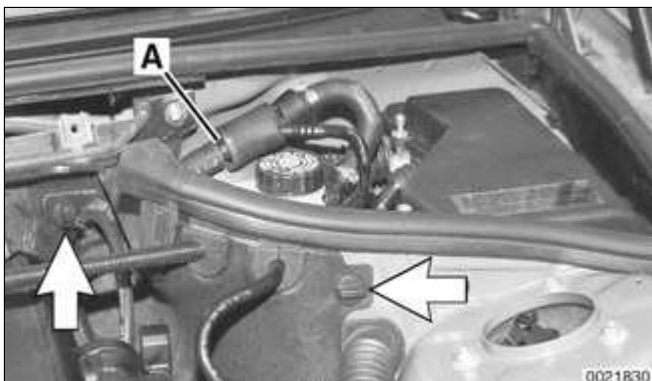
The clutch master cylinder is mounted to the pedal assembly directly above the clutch pedal.

- Disconnect negative (-) cable from battery.

CAUTION!

Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- Raise and safely support vehicle.
- Remove under transmission splash guard if applicable.
- Remove brake fluid reservoir cap. Using a clean syringe, remove brake fluid from reservoir.
- Disconnect fluid supply hose from brake master cylinder. Place a pan under hose to catch any excess fluid.
- Working in engine compartment, disconnect fluid line fitting from master cylinder.



◀ Working at left rear of engine compartment:

- ◆ Peel rubber edge seal off top of panel.
- ◆ Twist plastic panel retainers (**arrows**) 90° and pull out to remove.

- ◆ Disengage panel from hoses and wiring harnesses and remove from engine compartment.
- ◆ Separate brake booster vacuum hose at one way valve (**A**). Plug hose ends.
- Disconnect clutch pedal from clutch master cylinder push rod by removing securing pin.



- ✦ Remove master cylinder mounting bolts (**arrows**).



- ✦ Remove clip (**arrow**) retaining hydraulic line to master cylinder. Be prepared to catch any excess brake fluid remaining in hydraulic line.

Note:

Wrap clutch master cylinder with shop rags when removing hydraulic fluid lines from master cylinder to prevent brake fluid spill.

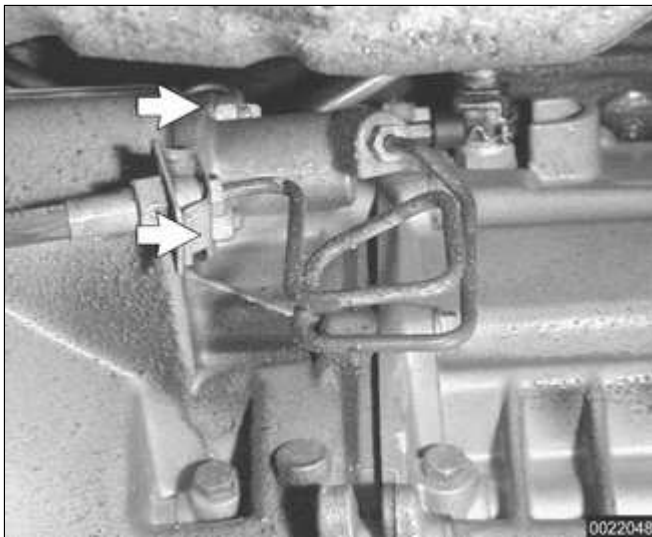
- Pull hydraulic line from master cylinder. Remove master cylinder with supply hose.
- Installation is reverse of removal. Fill fluid reservoir with clean fluid.

Bleed clutch hydraulics as described earlier. Connect negative cable to battery last.

Tightening torques	
Clutch master cylinder to pedal cluster	22 Nm (16 ft-lb)
Fluid line to master cylinder or slave cylinder	20 + 5 Nm (15 + 4 ft-lb)

Clutch slave cylinder, replacing

- Pinch off brake fluid supply hose to clutch master cylinder using BMW special tool 13 3 010 or equivalent fuel line clamp tool.
- Remove transmission splash guard if applicable.
- Disconnect fluid hose from slave cylinder. Place a pan under hose to catch any excess fluid.



✦ Remove mounting nuts (**arrows**) from slave cylinder on left side of transmission.

- Installation is reverse of removal, noting the following:
- ◆ Check for wear on slave cylinder. Any other wear except on tip is caused by misalignment of clutch components.
- ◆ Lightly coat pushrod tip with molybdenum disulfide grease (Molykote® Longterm 2 or

equivalent).

- ◆ During installation be sure pushrod tip engages recess in clutch release lever.
- ◆ Fill fluid reservoir with clean fluid.
- ◆ Bleed clutch hydraulics as described earlier.

Tightening torques	
Clutch slave cylinder to transmission	22 Nm (16 ft-lb)
Fluid line to slave cylinder	20 + 5 Nm (15 + 4 ft-lb)

Clutch Mechanical

The transmission must be removed from the engine to access the clutch mechanical components. It is recommended that the clutch disc, pressure plate and release bearing be replaced during a clutch overhaul. Be sure to check the bottom of the bellhousing for oil. If engine oil is found, check for a faulty rear crankshaft oil seal.

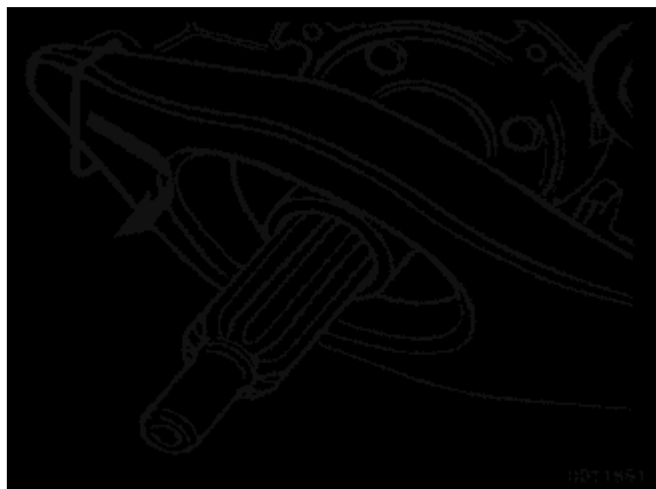
Due to the construction of the self adjusting clutch (SAC) disc special tools must be used when removing the SAC style clutch. The pressure plate of the SAC clutch uses a wedge ring which rotates against the diaphragm springs to accommodate for clutch disc wear. The wedge ring adjusts by means of spring tension, so special tools must be used to apply and relieve spring tension as the clutch pressure plate is removed and installed. For special tools needed for clutch replacement procedures refer to the ⇒ [Special tools](#)

Table a. Clutch disc diameter	
Model	Diameter
323i/Ci 325i/Ci/xi	228 mm (8.98 in.)
328i/Ci 330i/Ci/xi	240 mm (9.45 in.)

Clutch, removing

- On all wheel drive vehicles:
Remove transfer case. See ⇒ [270 Transfer Case](#).

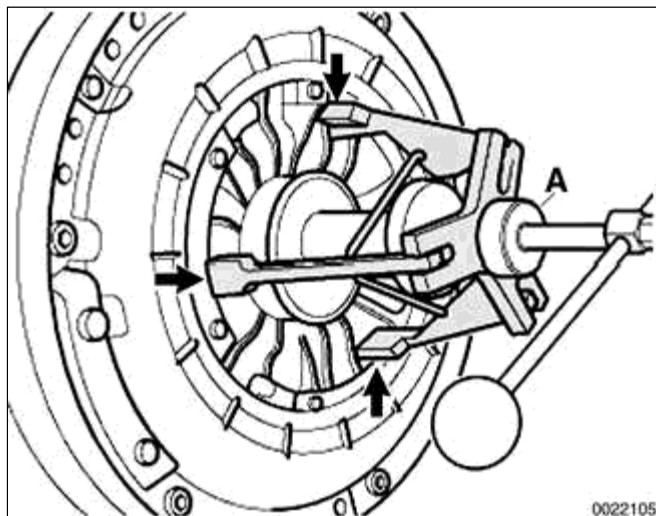
- Remove transmission from engine.
See ⇒ [230 Manual Transmission](#).
- Remove release bearing from transmission input shaft.



- Remove clutch release lever by pulling away from spring clip in direction of **arrow**.



- Lock flywheel in position using BMW special tool 11 2 170 or equivalent.



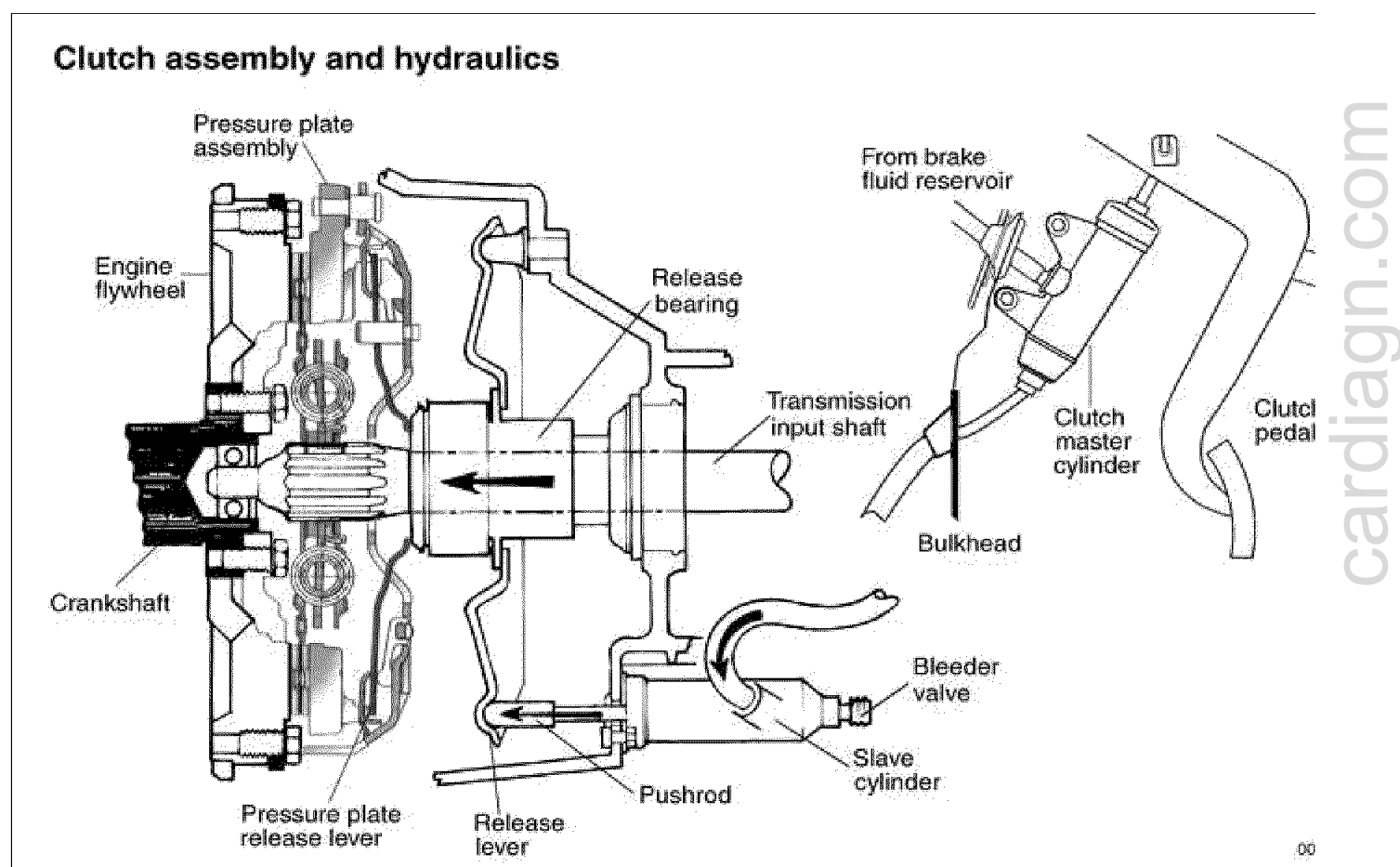
- Install BMW special tool 21 2 160 or 21 2 170 with feet (**arrows**) clamping on to pressure plate at openings for self-adjusting springs. Tighten down head nut (**A**) to lock feet into position.

CAUTION!

Self adjusting clutch tool feet must engage in the openings for adjusting springs to safely remove the SAC pressure plate.

- Turn tool handle in until clutch diaphragm spring is fully tensioned.
- Remove six bolts from perimeter of pressure plate. Remove self adjusting clutch unit and clutch disk.

Clutch assembly and hydraulics



Clutch, inspecting

- Inspect clutch disc for wear, cracks, loose rivets, contamination or

excessive runout (warping).
Replace if necessary.

Note:

Measure the depth of clutch lining at lining rivets. If shallowest rivet depth is less than 1 mm (0.04 in.), replace clutch disk.

- Inspect flywheel for scoring, hot spots, cracks or loose or worn guide pins. Replace flywheel if any faults are found.

WARNING!

If flywheel is removed from vehicle, use new bolts during installation. The old stretch-type bolts should not be reused.

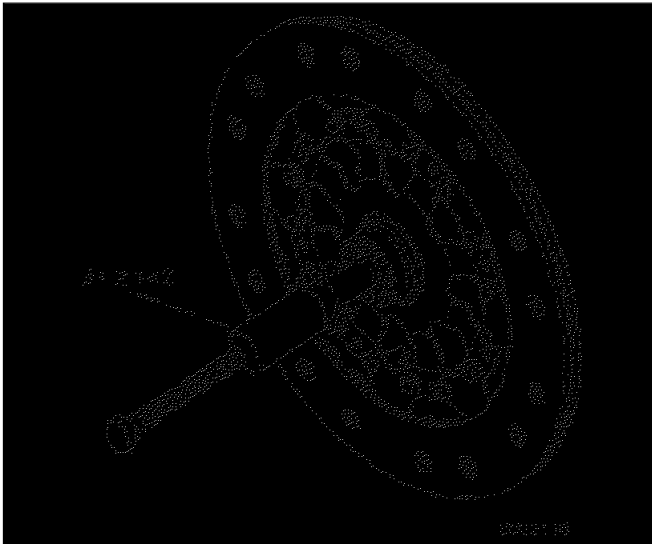
- Inspect transmission pilot bearing in end of crankshaft. The bearing should rotate smoothly without play. If necessary, replace as described later.



- ◀ Inspect and clean release bearing lever. Apply a thin coat of grease to release bearing lever lubrication points (**arrows**). Also, lightly lubricate clutch disc splines and transmission input shaft splines.

Clutch, installing new pressure plate

New self adjusting clutch (SAC) pressure plates come with a locking plate installed that maintains spring tension on the self adjusting springs. This locking ring must not be removed until the pressure plate is securely installed on the flywheel with the clutch disk in place.



- ◀ Center clutch disk on flywheel using BMW special tool 21 2 142, or an equivalent clutch alignment tool.

Note:

The sides of a replacement clutch disk are labelled engine side and transmission side. Be sure to install clutch disk orientated in the proper direction.

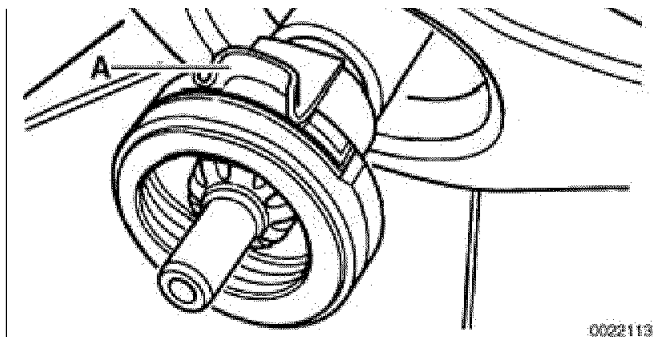
- Install self adjusting clutch pressure plate onto dowel pins at flywheel. Tighten each bolt one turn at a time until pressure plate is fully seated, and then torque to specification

Tightening torque	
Clutch to flywheel	
M8 (8.8 grade)	24 Nm (18 ft-lb)
M8 (10.9 grade)	34 Nm (25 ft-lb)

- Using a 14 mm allen wrench, carefully screw out locking plate in a clockwise direction.
- Remove BMW special tool 21 2 142 with bolt or screw enclosed with replacement clutch disk.



- ◀ Clean and inspect release bearing guide sleeve on transmission. Install release lever and release bearing. Bearing tabs (A) align with contact points (B) on



release lever.

- Install transmission. See ⇒ [230 Manual Transmission](#).

Tightening torques

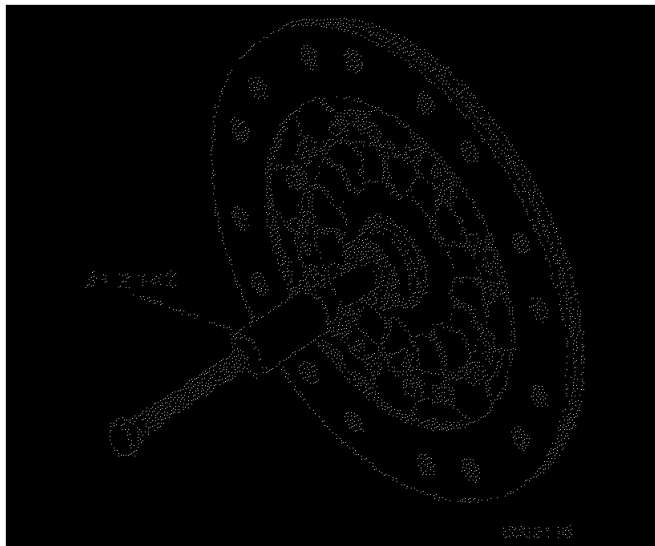
Transmission to engine (Torx bolts)

M8	22 Nm (16 ft-lb)
M10	43 Nm (32 ft-lb)
M12	72 Nm (53 ft-lb)

Clutch, installing used pressure plate

Note:

- ◆ *Before installing a used Self Adjusting Clutch (SAC) pressure plate, be sure to reset self adjusting ring to the new position*
- ◆ *Locating hooks of BMW special tool 21 2 180 must engage in openings of SAC pressure plate*
- Place self adjusting clutch pressure plate on clean work surface. Install special tool 21 2 180 onto pressure plate.
- Squeeze handles of 21 2 180 together. Tighten down knurled knobs of 21 2 180. SAC adjustment ring is now in installation position.
- Install special tool 21 2 170 over 21 2 180 on SAC pressure plate. Screw in handle of 21 2 170 until diaphragm spring of SAC pressure plate is pretensioned.



- ◀ Center clutch disk with BMW special tool 21 2 142. A comparable clutch alignment tool may be used. Remove threaded handle of clutch alignment tool

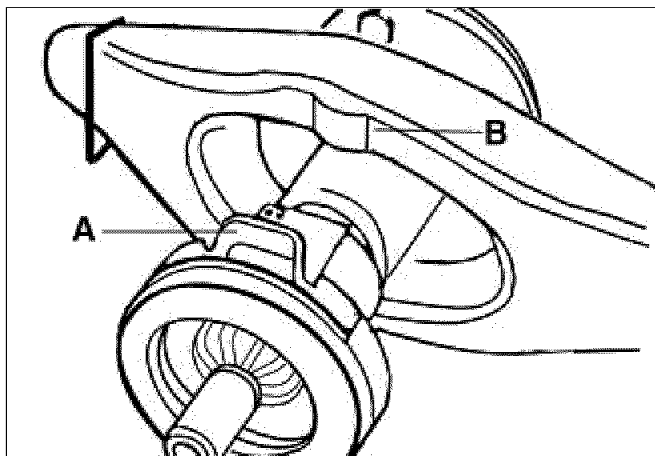
WARNING!

Be sure clutch disc is facing the correct way. The disc should be marked engine side or transmission side.

- Mount self adjusting clutch assembly on flywheel, noting location of alignment pins.
- Tighten each bolt one turn at a time until pressure plate is fully seated, and then torque to specification.

Tightening torque	
Clutch to flywheel	
M8 (8.8 grade)	24 Nm (17-ft-lb)
M8 (10.9 grade)	34 Nm (25 ft-lb)

- Unscrew handle of special tool until load is removed from diaphragm. Remove BMW special tool 21 2 180 from pressure plate.
- Remove clutch alignment tool from disk.



- ◀ Clean and inspect release bearing guide sleeve on transmission. Install release lever and release bearing. Make sure bearing tabs (A) align with contact points (B) on release lever.

- Install transmission. See ⇒ [230 Manual Transmission](#).

Tightening torques



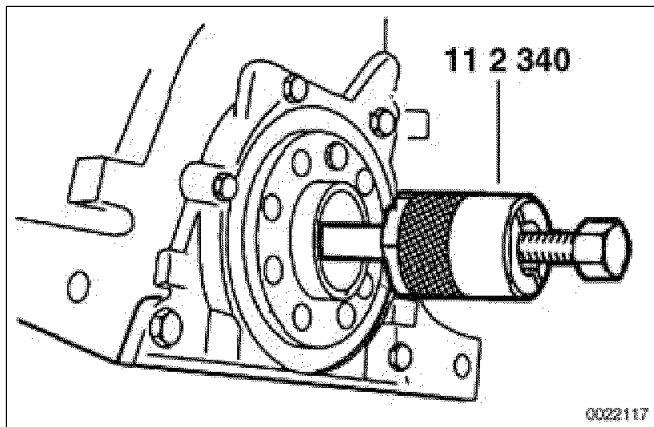
Tightening torques

Transmission to engine (Torx bolts)

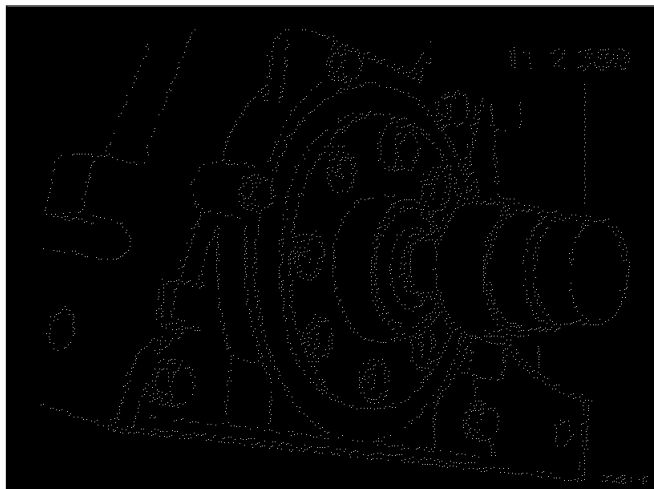
M8	22 Nm (16 ft-lb)
M10	43 Nm (32 ft-lb)
M12	72 Nm (53 ft-lb)

Transmission pilot bearing, replacing

- Remove clutch as described earlier.



- Remove transmission pilot bearing from end of crankshaft using BMW special tool 11 2 340 or equivalent puller.



- Press new bearing into place using BMW special tool 11 2 350 or equivalent driver.