

210 Clutch

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GENERAL

This repair group covers replacement of the clutch mechanical and hydraulic components. Special tools may be required for some of the procedures. Read the procedure through before beginning a job.

NOTE —

See **200 Transmission-General** for transmission application information.

The major components of the clutch system are shown in Fig. 1.

CLUTCH HYDRAULICS

The clutch is hydraulically actuated by the master and slave cylinders. Clutch disc wear is automatically taken up by the pushrod travel of the slave cylinder, 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.

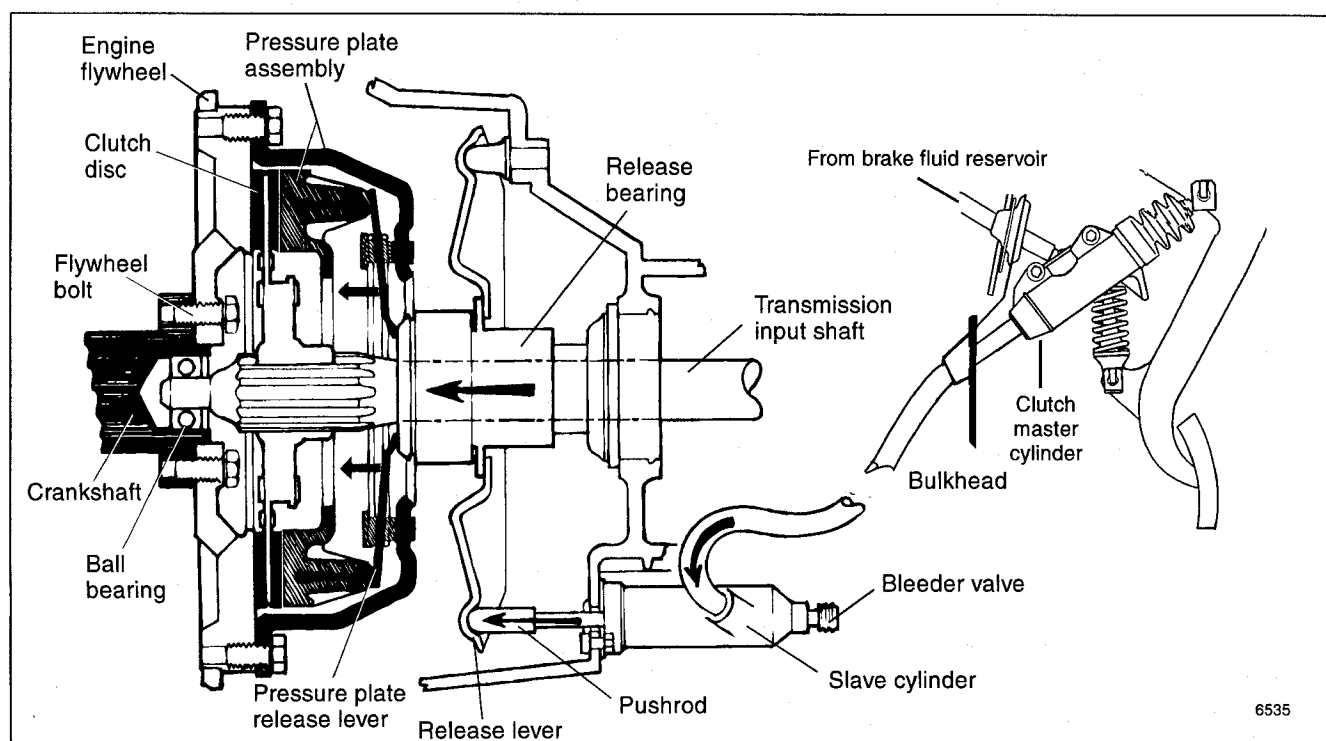


Fig. 1. Clutch assembly and hydraulics.

CLUTCH HYDRAULICS

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.

1. Remove brake fluid reservoir cap. Using a clean syringe, remove brake fluid from reservoir. Refill reservoir with clean fluid.
2. Attach pressure brake bleeder to fluid reservoir.

CAUTION —

Do not exceed 2 bar (29 psi) pressure at the fluid reservoir when bleeding or flushing the hydraulic system.

3. Connect a length of hose from clutch slave cylinder bleeder valve to a container. See Fig. 2.

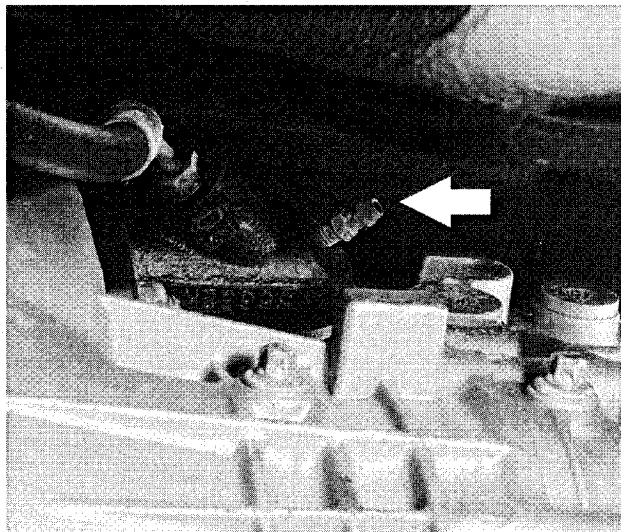


Fig. 2. Clutch slave cylinder bleeder valve on left side of transmission (arrow).

4. Open bleeder valve and allow brake fluid to expel until clean fluid comes out free of air bubbles.
5. Close bleeder valve and disconnect pressure bleeding equipment from fluid reservoir. Hose on bleeder valve remains connected.
6. Slowly operate clutch pedal about 10 times. Fill reservoir with clean fluid as necessary.
7. Unbolt slave cylinder from transmission.
8. Position slave cylinder so that bleeder valve is facing up (highest point).

9. Open bleeder valve and slowly push slave cylinder pushrod all the way in. Close bleeder valve and slowly release pushrod. Repeat procedure until fluid runs out clear and without bubbles.
10. Disconnect bleeder hose. Install slave cylinder to transmission. Add clean brake fluid to reservoir as necessary. Check clutch operation.

Tightening Torques

- Clutch slave cylinder to transmission 22 Nm (17 ft lb)

Clutch master cylinder, replacing

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

1. 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.

2. Remove brake fluid reservoir cap. Using a clean syringe, remove brake fluid from reservoir.

CAUTION —

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.

3. Disconnect fluid supply hose from master cylinder. Place a pan under hose to catch any excess fluid.
4. Working in engine compartment, disconnect fluid line fitting from master cylinder.
5. Working in passenger compartment, remove lower instrument panel trim above pedal cluster.
6. Disconnect clutch pedal from clutch master cylinder push rod by removing clevis pin locking clip and slide out clevis pin.
7. Remove master cylinder mounting bolts. See Fig. 3.
8. Installation is reverse of removal. Fill fluid reservoir with clean fluid. Bleed clutch hydraulics as described earlier. Connect negative cable to battery last.

CLUTCH HYDRAULICS

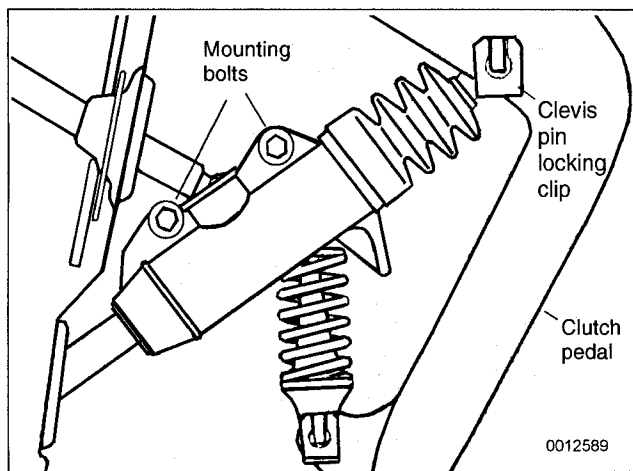


Fig. 3. Clutch master cylinder mounting bolts.

Tightening Torques

- Clutch master cylinder to bulkhead . . . 22 Nm (17 ft-lb)
- Fluid line to master cylinder
or slave cylinder 16 Nm (12 ft-lb)

Clutch slave cylinder, replacing

The clutch slave cylinder is mounted on the left side of the transmission.

1. Remove brake fluid reservoir cap. Using a clean syringe, remove brake fluid from reservoir.
2. Disconnect fluid hose from slave cylinder. Place a pan under hose to catch any excess fluid.
3. Unbolt slave cylinder from transmission. See Fig. 4.
4. Installation is reverse of removal, noting the following:
 - Check for wear on pushrod. 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.

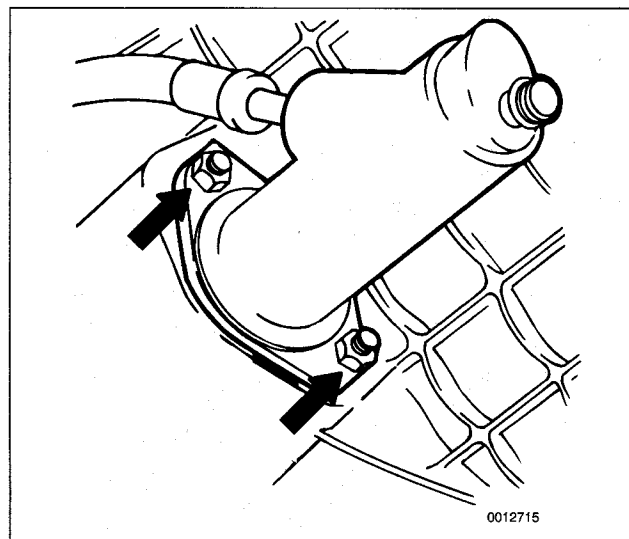


Fig. 4. Clutch slave cylinder mounting bolts (arrows).

Tightening Torques

- Clutch slave cylinder
to transmission 22 Nm (17 ft lb)
- Fluid line to slave cylinder 17 Nm (10-12 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.

Table a. Clutch Disc Diameter

Model	Diameter
318i/is/iC	215 mm (8.46 in)
325i/is/iC 323is/iC	228 mm (8.98 in)
328i/is/iC M3	240 mm (9.45 in)

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Clutch, removing

1. Remove transmission from engine. See **230 Manual Transmission**.
2. Remove release bearing from transmission input shaft.
3. Remove clutch release lever by sliding it out from under spring clip. See Fig. 5.

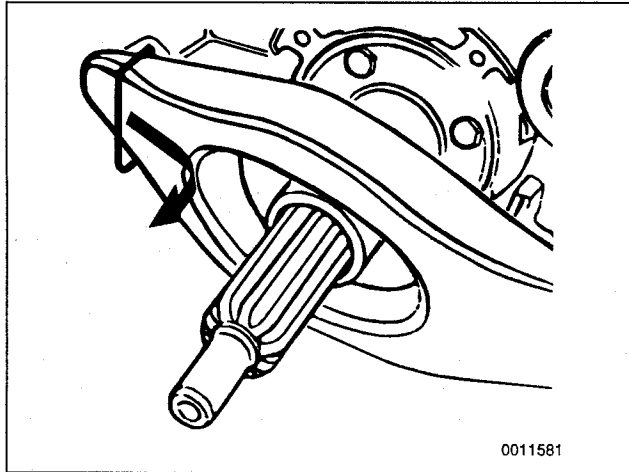


Fig. 5. Remove clutch release lever by pulling away from spring clip in direction of arrow.

4. Lock flywheel in position using a suitable locking tool (BMW Special tool no. 11 2 170, or equivalent). See Fig. 6.

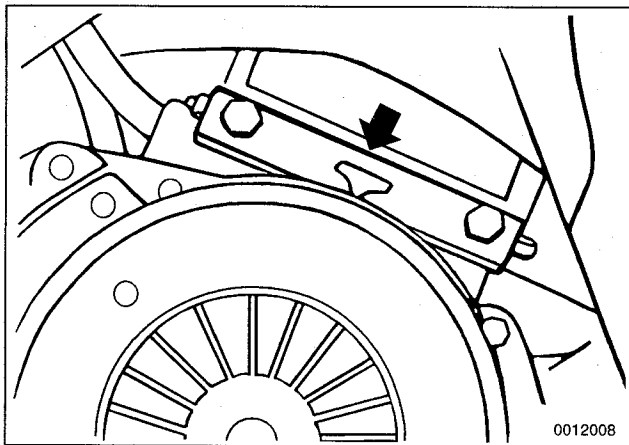


Fig. 6. Flywheel locking tool (arrow) installed to rear of cylinder block.

5. Install a clutch centering tool through clutch assembly to prevent clutch disc from falling out when removing pressure plate. See Fig. 7.

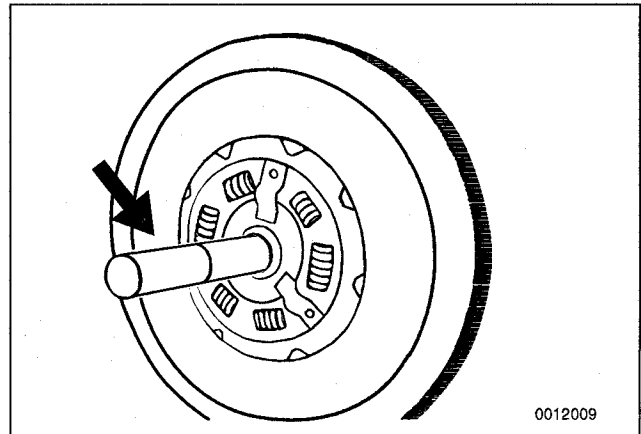


Fig. 7. Clutch centering tool (arrow) shown installed through clutch disc and flywheel.

6. Remove six bolts from perimeter of pressure plate. Remove pressure plate and clutch disc. See Fig. 8.

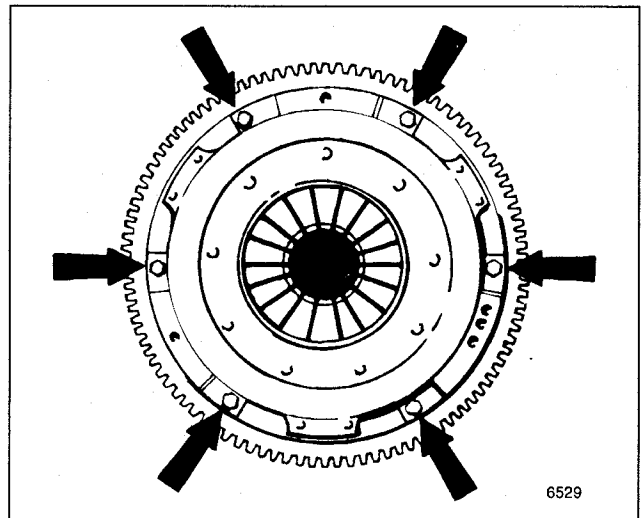


Fig. 8. Clutch pressure plate mounting bolts (arrows).

Clutch, inspecting and installing

1. Inspect clutch disc for wear, cracks, loose rivets, contamination or excessive runout (warping). Replace if necessary.
2. 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.

3. Inspect transmission pilot bearing in end of crankshaft. The bearing should rotate smoothly without play. If necessary, replace as described later.
4. Inspect and clean release bearing lever. Apply a thin coat of grease to release bearing lever contact points. See Fig. 9. Also, lightly lubricate clutch disc splines and transmission input shaft splines.
5. Install pressure plate and clutch disc. Do not fully tighten bolts.
6. Center clutch disc on flywheel using centering tool (BMW special tool no. 21 2 130 or equivalent). Refer to Fig. 7.

NOTE —

*Be sure clutch disc is facing the correct way. The new disc should be marked **engine side** or **transmission side**. See Fig. 10.*

7. Tighten each bolt one turn at a time until pressure plate is fully seated, and then torque to specification.
8. Remove clutch disc centering tool. Remove flywheel locking tool.

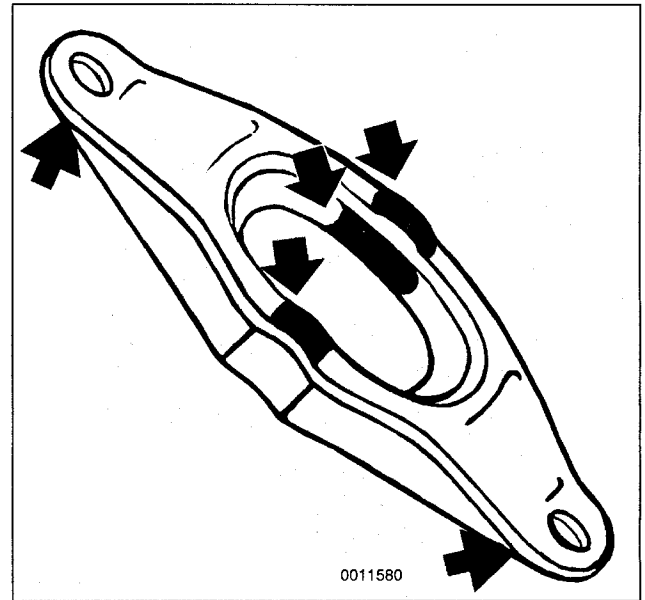


Fig. 9. Clutch release lever lubrication points (arrows).

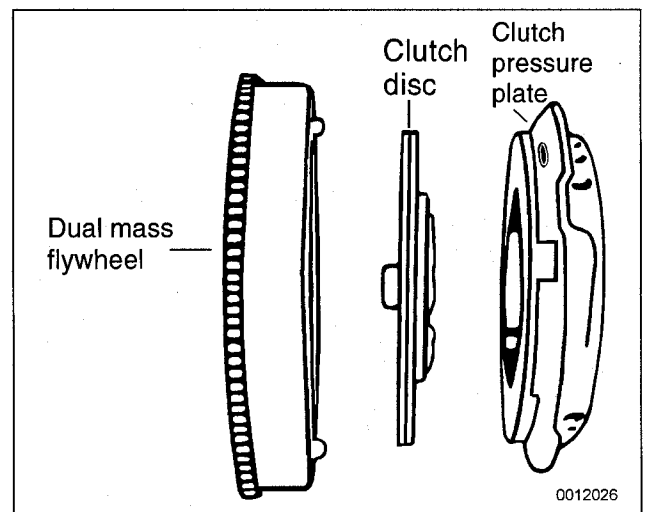


Fig. 10. Clutch assembly. Note clutch disc hub position during installation.

210-6 CLUTCH

9. Clean and inspect release bearing guide sleeve on transmission. Install release lever and release bearing. See Fig. 11.

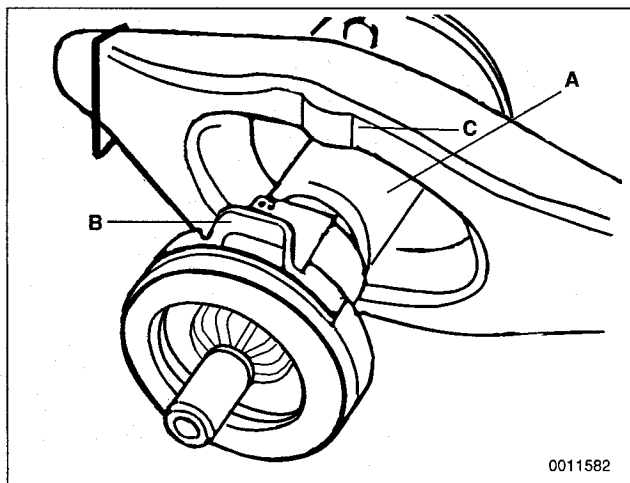


Fig. 11. Clutch release bearing correctly installed on guide sleeve (A). Bearing tabs (B) align with contact points (C) on release lever.

10. Install transmission. See **230 Manual Transmission**.

Tightening Torques

- Flywheel to crankshaft (use new bolts)
 - M42/M44 engines 120 Nm (89 ft-lb)
 - All others 105 Nm (77 ft-lb)
- Pressure plate to flywheel
 - M8 8.8 grade 24 Nm (18 ft-lb)
 - M8 10.9 grade 34 Nm (25 ft-lb)

Transmission pilot bearing, replacing

1. Remove clutch as described earlier.
2. Remove transmission pilot bearing from end of crankshaft using BMW special tool no. 11 2 340, or equivalent.
3. Press new bearing into place using BMW Special Tool no. 11 2 350, or equivalent.

