CLUTCH

1997-98 CLUTCHES Mazda - RWD

DESCRIPTION

All models use a hydraulically operated clutch. On all models except Miata, the clutch release bearing and clutch release cylinder are combined into a single unit. No routine adjustments are necessary on B2300, B2500, B3000 and B4000 models.

ADJUSTMENTS

CLUTCH PEDAL FREE PLAY

Miata

Measure clutch pedal free play. See **Fig. 1** . See **CLUTCH PEDAL FREE PLAY** table. If free play is not within specification, inspect hydraulic and mechanical system components. If adjustment is required, loosen lock nut and rotate master cylinder push rod to obtain specified free play. Tighten lock nut.

CLUTCH PEDAL FREE PLAY (1)

Application	In. (mm)
Miata	0.2-0.5 (5-13)
(1) See **Fig. 1** .	

CLUTCH PEDAL HEIGHT

Miata

Measure clutch pedal height from bulkhead to front side of pedal pad. See **Fig. 1** . See **CLUTCH PEDAL HEIGHT** table.

CLUTCH PEDAL HEIGHT (1)

Application	In. (mm)
Miata	6.89-7.28 (175-185)
(1) Measure to carpet on bulkhead. See **Fig. 1** .	

CLUTCH DISENGAGEMENT HEIGHT

Miata

Measure clutch disengagement height, where clutch disengages, from pedal pad to bulkhead. See **Fig. 1** . See **CLUTCH DISENGAGEMENT HEIGHT (MINIMUM)** table.

CLUTCH DISENGAGEMENT HEIGHT (MINIMUM) (1)

Application	In. (mm)
Miata	2.68 (68)
(1) Measure to carpet on bulkhead. See **Fig. 1** .	

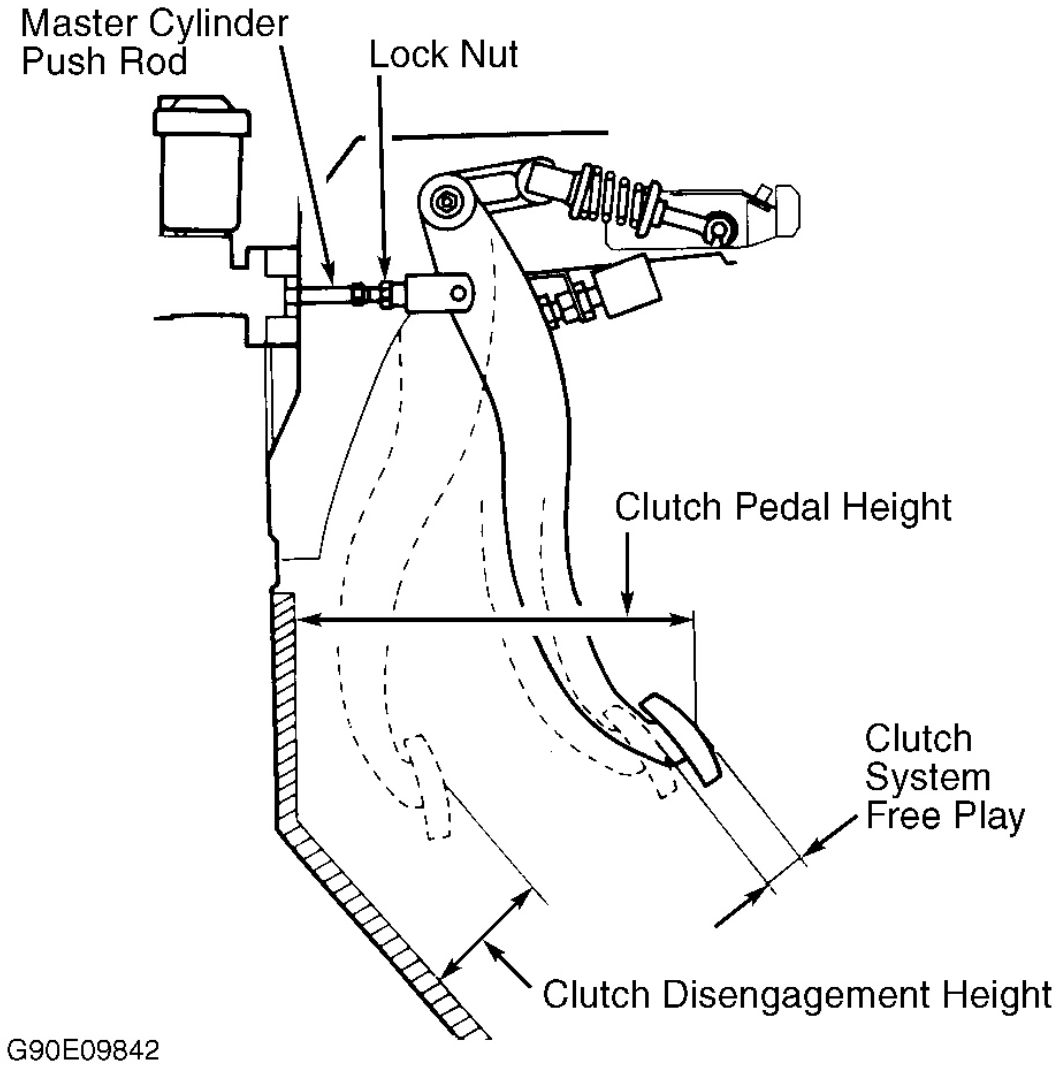


Fig. 1: Adjusting Clutch Pedal (Miata)
Courtesy of MAZDA MOTORS CORP.

HYDRAULIC SYSTEM BLEEDING

B2300, B2500, B3000 & B4000

1. Using Clutch Disconnect Tool (T88T-70522-A), disconnect hydraulic line at transmission. See **Fig. 2** . Clean reservoir cap area. Fill reservoir with DOT 3 brake fluid. Maintain fluid level in reservoir during bleeding procedure.
2. Using small screwdriver, press and hold internal mechanism of male coupler to open valve. While holding valve open, have an assistant slowly press and hold clutch pedal to floor.
3. Remove screwdriver to allow valve to close. Release clutch pedal. Refill reservoir.
4. Repeat steps 2) and 3). Install reservoir cap. Reconnect hydraulic line. Tug hydraulic line lightly to verify secure connection.
5. As rapidly as possible, operate clutch pedal for full 5-10 strokes. Wait 3 minutes. Repeat this step at least 3 more times.
6. Loosen bleed screw, located next to release cylinder connection. Have an assistant press and hold clutch pedal. Tighten bleed screw. Release pedal. Refill reservoir. Check clutch operation.

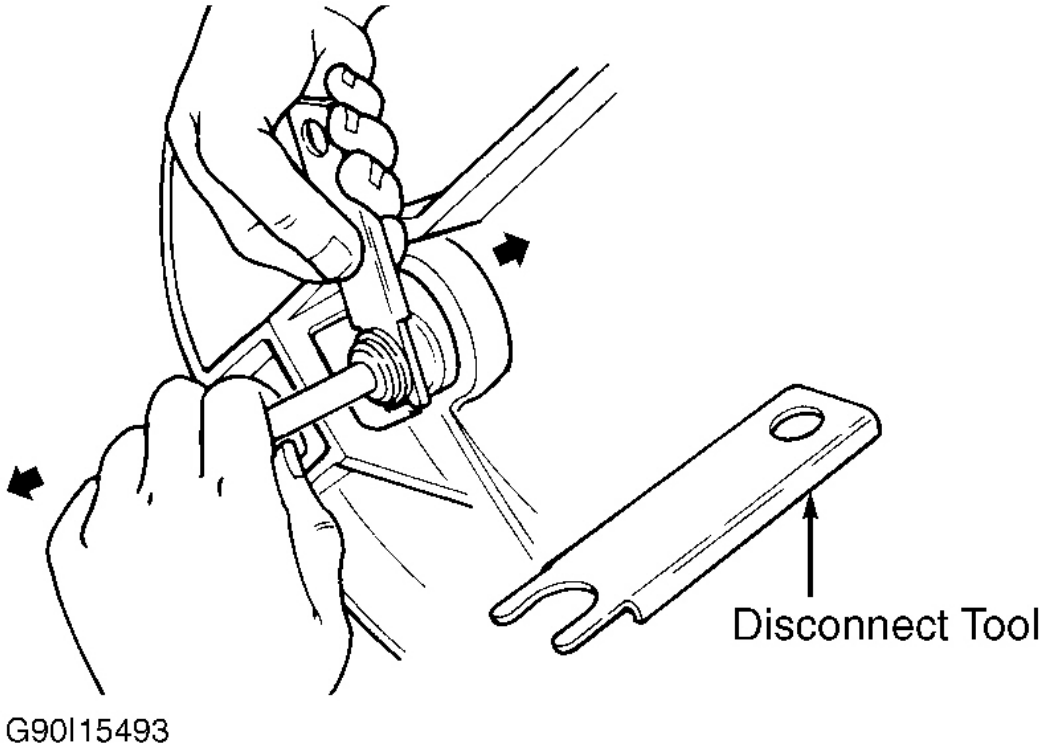


Fig. 2: Removing Hydraulic Line (B2300, B2500, B3000 & B4000)
Courtesy of MAZDA MOTORS CORP.

Miata

1. Remove bleeder screw cap located at clutch release cylinder. Install vinyl hose onto bleeder screw.

Submerge other end of hose in container of brake fluid.

2. Fill reservoir with DOT 3 brake fluid. Have an assistant press and release clutch pedal several times, then hold pedal down. With pedal pressed, loosen bleeder screw to let air and fluid escape.
3. Repeat step 2) until no more air bubbles emerge from hose. Tighten bleeder screw. Fill reservoir. Operate clutch while inspecting for leaks. Check clutch and brake operation.

REMOVAL & INSTALLATION

CLUTCH ASSEMBLY

Removal (B2300, B2500, B3000 & B4000)

1. Disconnect negative battery cable. Shift transmission into Neutral. Remove gearshift lever. Raise and support vehicle. Mark drive shaft flanges for installation reference. Remove drive shaft. Using Clutch Disconnect Tool (T88T-70522-A), disconnect hydraulic line at transmission. See **Fig. 2** . Plug hydraulic line to prevent contamination. Disconnect wiring at transmission.
2. Remove starter. Remove exhaust components as necessary for clearance. On 4WD models, remove skid plate and transfer case. On all models, secure transmission jack under transmission. Remove transmission mount-to-crossmember nuts and bolts.
3. Remove nuts securing crossmember to frame side rails, and remove crossmember. Lower transmission enough to gain access to transmission-to-engine block bolts. Remove transmission-to-engine block bolts. Remove transmission.
4. If clutch parts are going to be reused, mark clutch cover and flywheel for reassembly reference. Loosen pressure plate bolts evenly in crisscross pattern until springs are not under tension. Remove clutch cover and clutch disc.

Inspection (B2300, B2500, B3000 & B4000)

1. Inspect disc for loose rivets, worn or defective springs, excessive wear, or oil contamination. Inspect flywheel and clutch cover for burns, scoring, or grooves.
2. Measure flywheel and clutch cover runout. Resurface or replace flywheel and clutch cover if beyond specification. See **CLUTCH RUNOUT (MAXIMUM)** table.
3. Measure clutch disc runout. Replace disc if it is not to specification. See **CLUTCH RUNOUT (MAXIMUM)** table. Inspect disc hub and input shaft splines for excessive wear. Hub must slide smoothly on input shaft splines.
4. Inspect pilot bearing for wear. Apply inward pressure while rotating pilot bearing. If bearing sticks or has excessive resistance, replace bearing. Check for tight fit in crankshaft. Replace as necessary. Inspect release bearing for smooth operation, wear, damage, or looseness. Replace bearing as necessary.

CLUTCH RUNOUT (MAXIMUM)

Application	In. (mm)
Disc	0.028 (0.7)
Flywheel	0.008 (0.20)

Installation (B2300, B2500, B3000 & B4000)

1. Lightly coat input shaft splines, release bearing, and fork contact areas with molybdenum disulfide grease. Align clutch cover dowel holes with flywheel dowels. Tighten clutch cover bolts evenly in a crisscross pattern to specification. See **TORQUE SPECIFICATIONS** .
2. Raise transmission into position. Install and tighten transmission-to-engine block bolts. See **TORQUE SPECIFICATIONS** . Install crossmember.
3. On 4WD models, install NEW transfer case gasket. Install transfer case. Tighten transfer case bolts to specification is sequence. See **Fig. 3** . See **TORQUE SPECIFICATIONS** .
4. On all models, to complete installation, reverse removal procedure. Bleed hydraulic clutch system. See **HYDRAULIC SYSTEM BLEEDING** under ADJUSTMENTS.

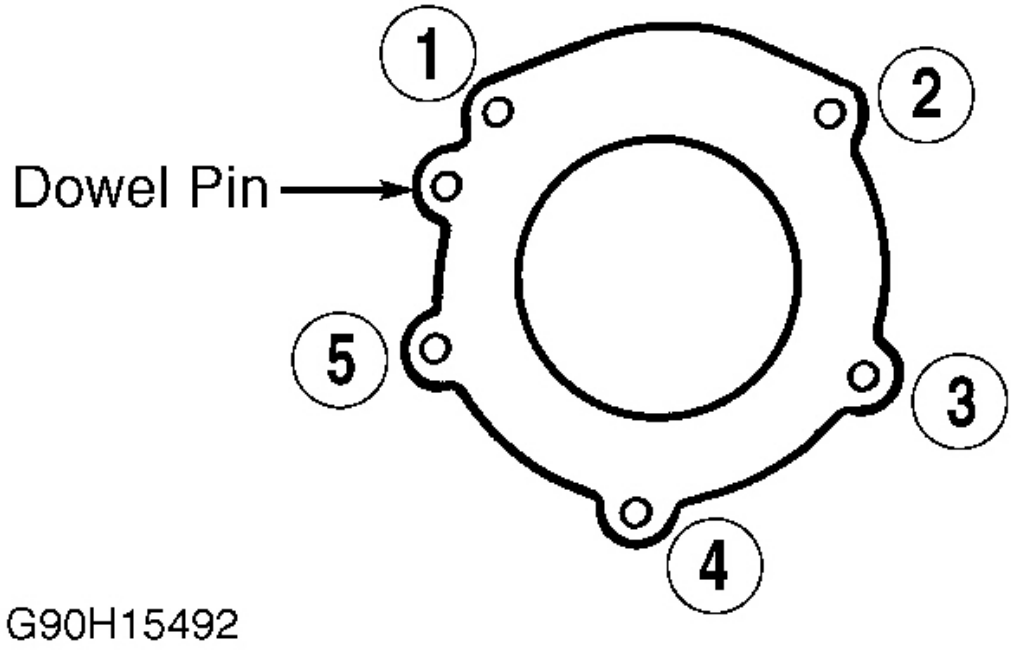
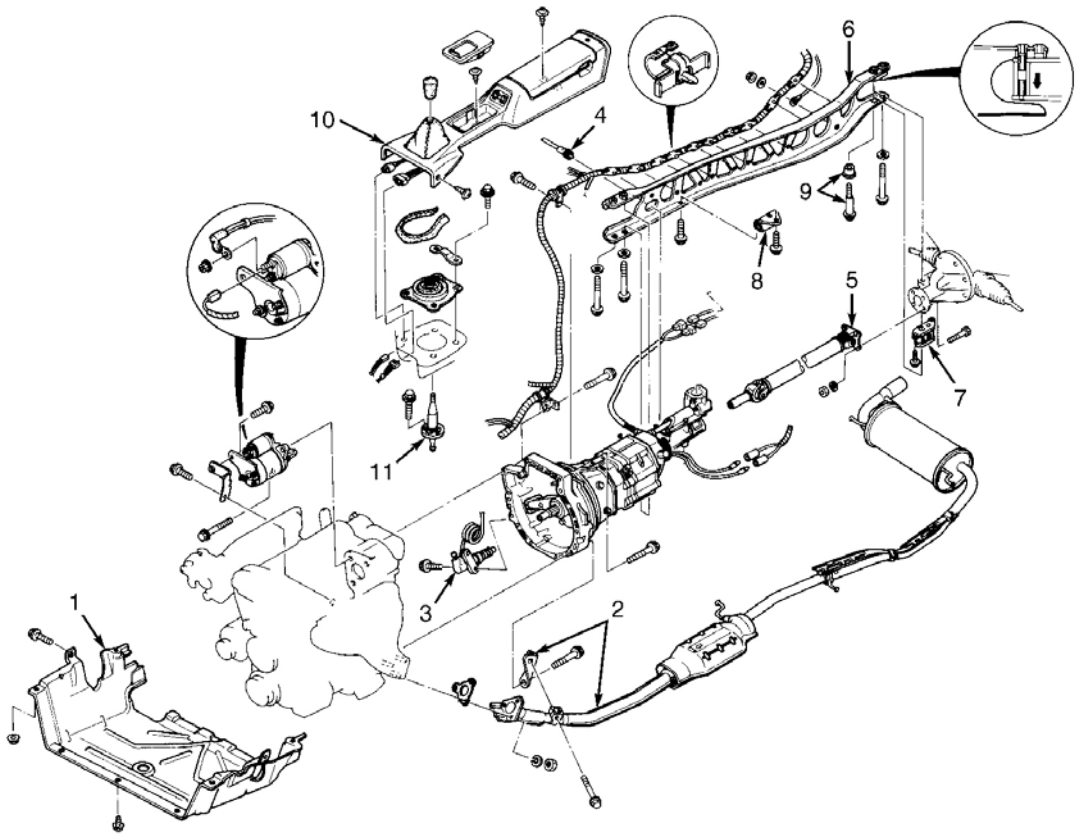


Fig. 3: Tightening Transfer Case Bolts (B2300, B2500, B3000 & B4000)
Courtesy of MAZDA MOTORS CORP.

Removal (Miata)

1. Disconnect negative battery cable. Remove gearshift knob, console, and shift lever. See **Fig. 4** . Raise and support vehicle. Remove engine undercover. Disconnect exhaust pipe from manifold. Mark drive shaft flanges for installation reference. Remove drive shaft.



1. Undercover
2. Exhaust Downpipe & Bracket
3. Clutch Release Cylinder
4. Speedometer Cable
5. Drive Shaft
6. Power Plant Frame (PPF)
7. PPF/Differential Mounting Spacer
8. Transmission-To-PPF Bracket
9. Reamer Bolt & Spacer
10. Console
11. Shift Lever

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Fig. 4: Exploded View Of Drive Line (Miata)
Courtesy of MAZDA MOTORS CORP.

2. Remove clutch release cylinder. Remove starter. Disconnect speedometer cable from transmission. Note locations, and disconnect wiring harness from Power Plant Frame (PPF).
3. Remove PPF bracket from rear transmission extension housing. Remove PPF-to-differential side bolts. Pry out spacer. Remove PPF/differential mounting spacer. See **Fig. 5** .
4. Thread M14 X 1.5 bolt into sleeve. See **Fig. 6** . Twist bolt side to side while pulling it downward. Thread M6 X 1 bolt into hole in housing block to hold sleeve. Remove long bolt. Remove short bolt.

NOTE: Do not remove spacers attached to top of Power Plant Frame (PPF). If they are removed, replace PPF.

5. Remove PPF side bolts. Remove PPF. Remove transmission-to-engine block bolts. Remove transmission. Remove clutch cover bolts evenly in crisscross pattern. Remove clutch cover and disc. See **Fig. 7** .

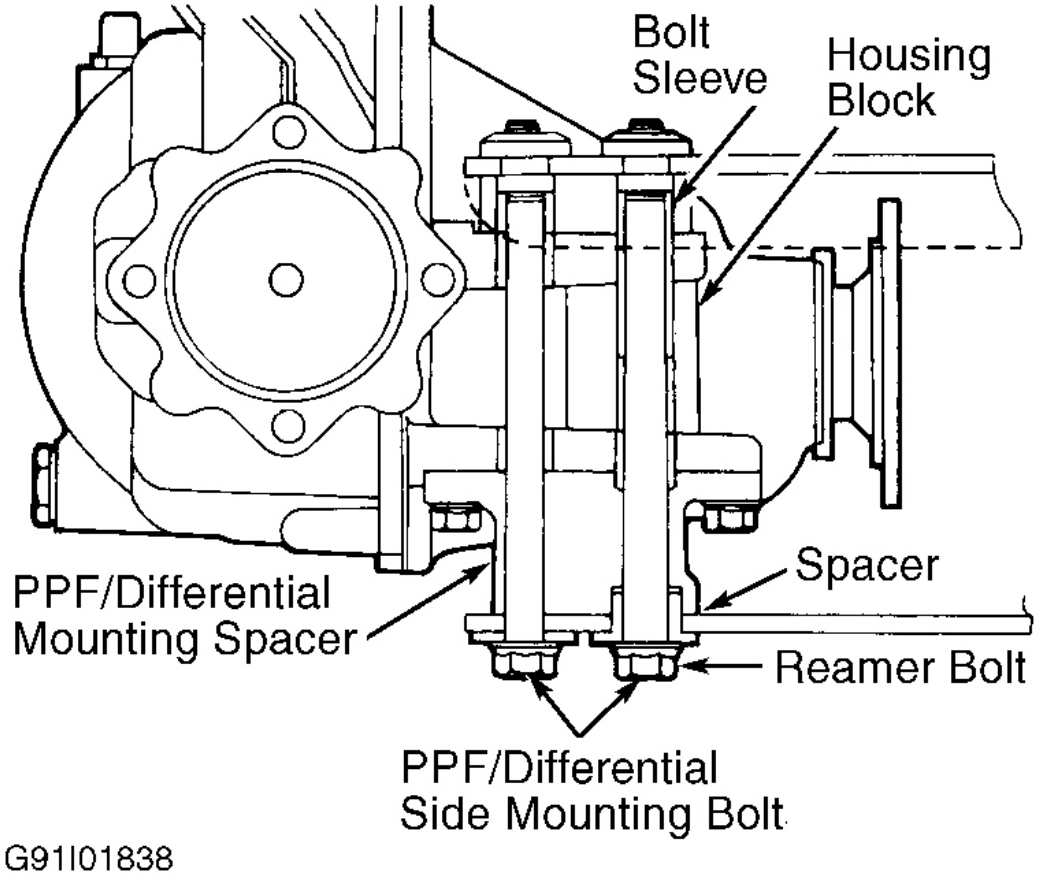


Fig. 5: Installing & Removing Power Plant Frame (Miata)
Courtesy of MAZDA MOTORS CORP.

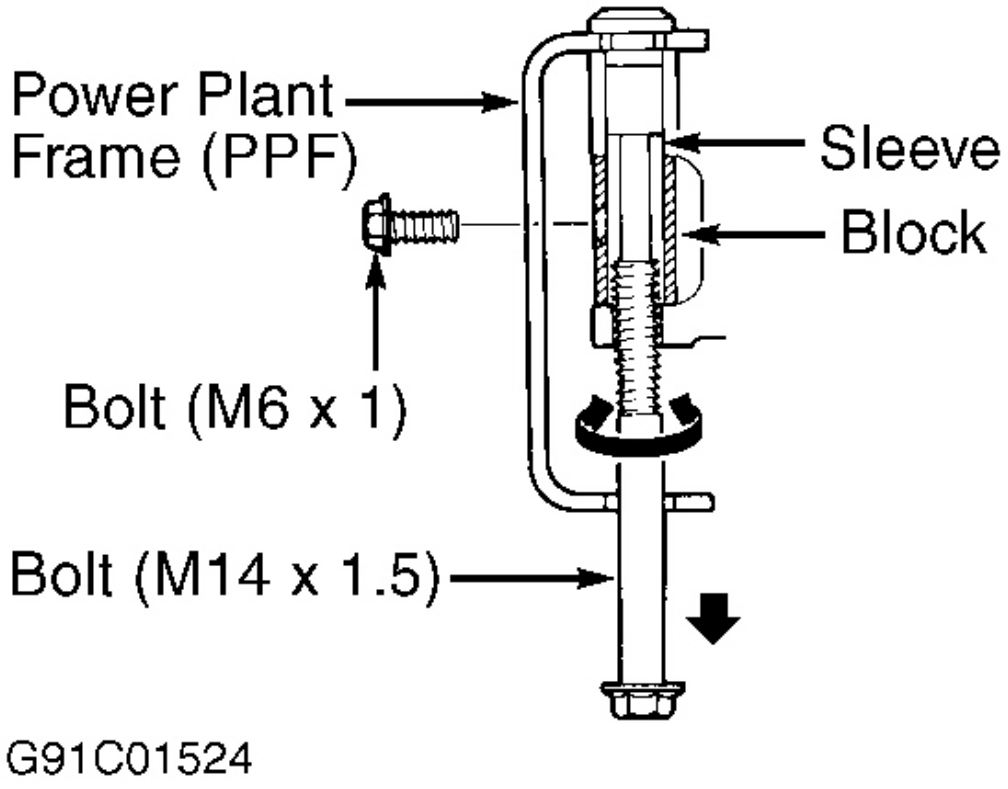


Fig. 6: Removing Reamer Bolt Sleeve (Miata)
Courtesy of MAZDA MOTORS CORP.

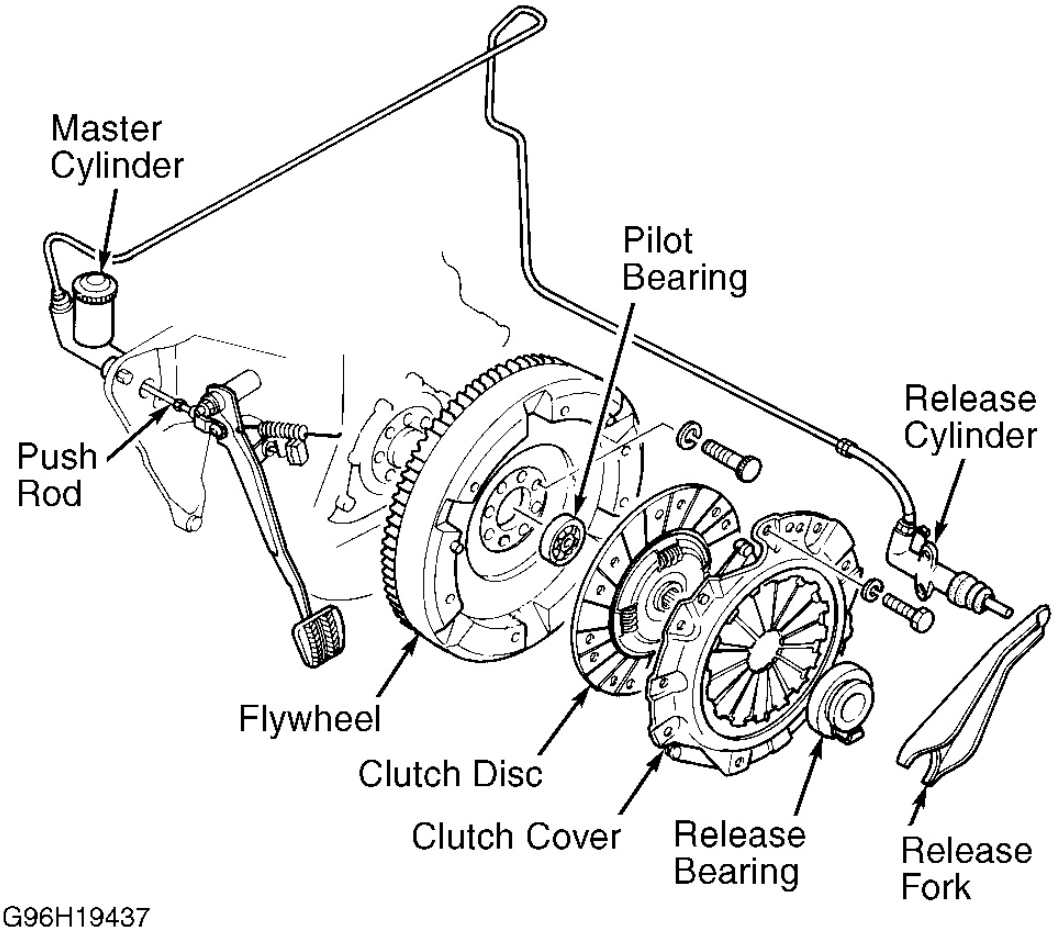


Fig. 7: Exploded View Of Clutch Assembly (Typical)
Courtesy of MAZDA MOTORS CORP.

Inspection (Miata)

1. Inspect disc for loose rivets, worn springs, excessive wear, or oil contamination. Inspect flywheel and clutch cover for burns, scoring, or grooves.
2. Measure flywheel and clutch cover runout. Resurface or replace flywheel and clutch cover if beyond specification. See **CLUTCH RUNOUT (MAXIMUM)** table. If flywheel ring gear is replaced, ensure chamfer on flywheel teeth faces engine.
3. Measure clutch disc runout. Replace disc if it is not to specification. See **CLUTCH RUNOUT (MAXIMUM)** table. Inspect disc hub and input shaft splines for excessive wear. Hub must slide smoothly on input shaft splines.
4. Inspect pilot bearing for wear. Apply inward pressure while rotating pilot bearing. If bearing sticks or has excessive resistance, replace bearing. Check for tight fit in crankshaft. Replace as necessary. Inspect release bearing for smooth operation, wear, damage, or looseness. Replace bearing as necessary.

Installation (Miata)

1. Lightly coat input shaft splines, release bearing, and fork contact areas with molybdenum disulfide grease. Align clutch cover dowel holes with flywheel dowels. Tighten clutch cover bolts evenly in a crisscross pattern to specification. See **TORQUE SPECIFICATIONS** .
2. Place a wooden block on jack, and position jack under front of oil pan. Raise front of engine to ease transmission installation. Install transmission. Tighten transmission-to-engine block bolts to specification. See **TORQUE SPECIFICATIONS** . Place jack (from front of engine) under transmission.
3. Raise transmission until level with engine. Position Power Plant Frame (PPF) in place. Install PPF/differential mounting spacer, and tighten bolts to 27-38 ft. lbs. (37-51 N.m). Install and tighten PPF side mounting bolts.

NOTE: Front PPF-to-differential side mounting bolt is the reamer bolt, used to align frame.

4. Install sleeve into PPF housing block. Install spacer and bolts. Install reamer bolt into front hole, and tighten bolt. See **Fig. 5** .
5. Install transmission-to-PPF bracket. Install remaining PPF bolts, and tighten to specification. See **TORQUE SPECIFICATIONS** . To complete installation, reverse removal procedure.

RELEASE BEARING & FORK

Removal (B2300, B2500, B3000 & B4000)

With transmission removed, twist release bearing and carrier assembly until preload spring pushes bearing assembly from slave cylinder. See **Fig. 8** .

NOTE: Use only lithium base grease on release bearing. DO NOT use petroleum base lubricants.

Installation

Lubricate bearing bore and bearing carrier with NIGI No. 2 (lithium base) grease. Push release bearing assembly onto clutch slave cylinder.

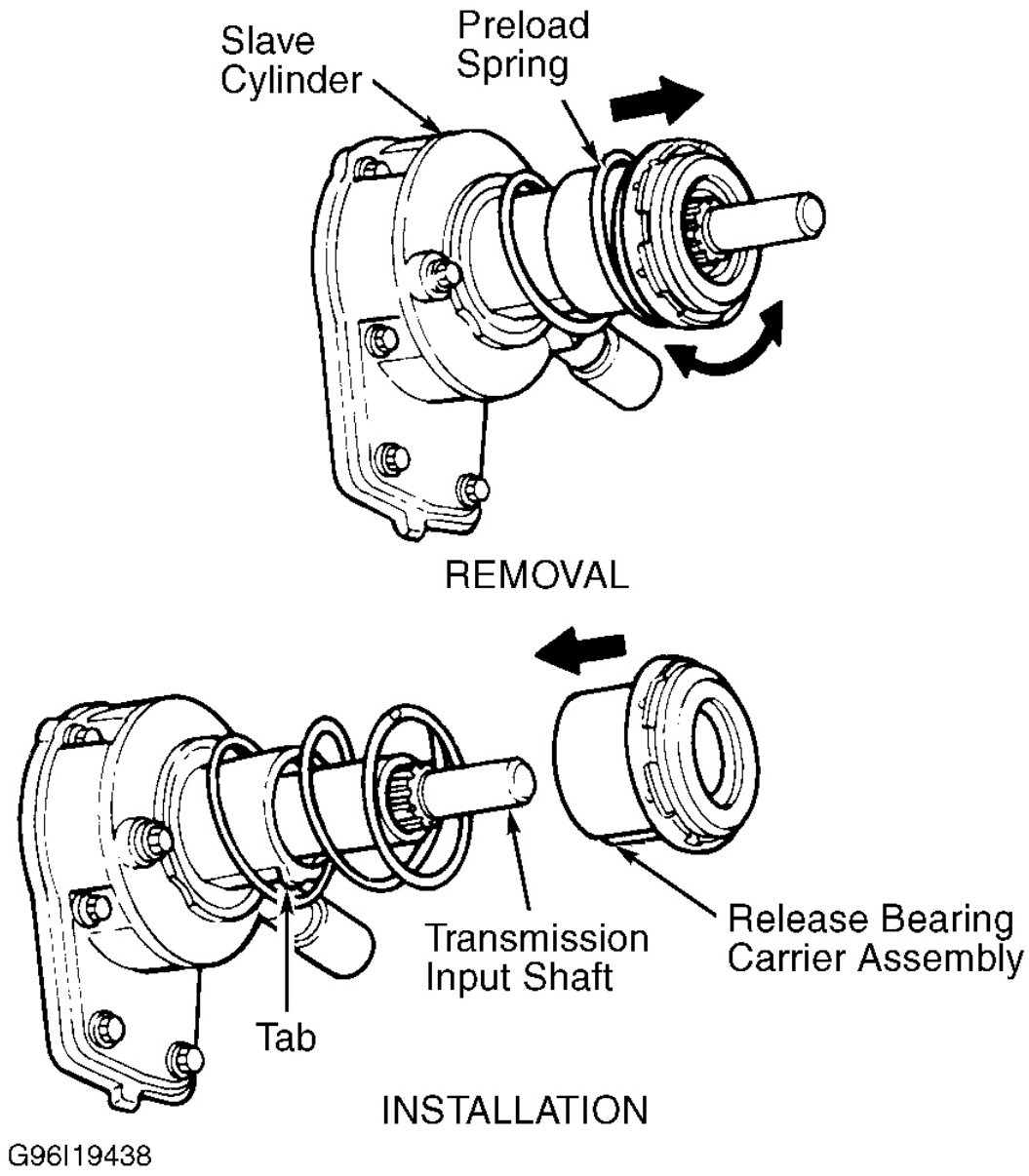


Fig. 8: Servicing Clutch Release Bearing (B2300, B2500, B3000 & B4000)
Courtesy of FORD MOTOR CO.

Removal & Installation (Miata)

1. Remove transmission. See **CLUTCH ASSEMBLY** . Remove release bearing and fork. Turn release bearing in both directions. Replace bearing if rough or noisy.
2. Inspect release fork for wear and damage. Replace if necessary. Apply molybdenum disulfide grease to release bearing contact and sliding surfaces. To complete installation, reverse removal procedure.

CLUTCH MASTER CYLINDER

Removal (B2300, B2500, B3000 & B4000)

1. Disengage master cylinder push rod from clutch pedal. Disconnect clutch/starter interlock switch connector. See **Fig. 9** .
2. Using Clutch Disconnect Tool (T88T-70522-A), disconnect hydraulic line. See **Fig. 2** . Pull hydraulic line to disconnect line from clutch slave cylinder. Remove master cylinder, reservoir, and hydraulic line. Plug lines.

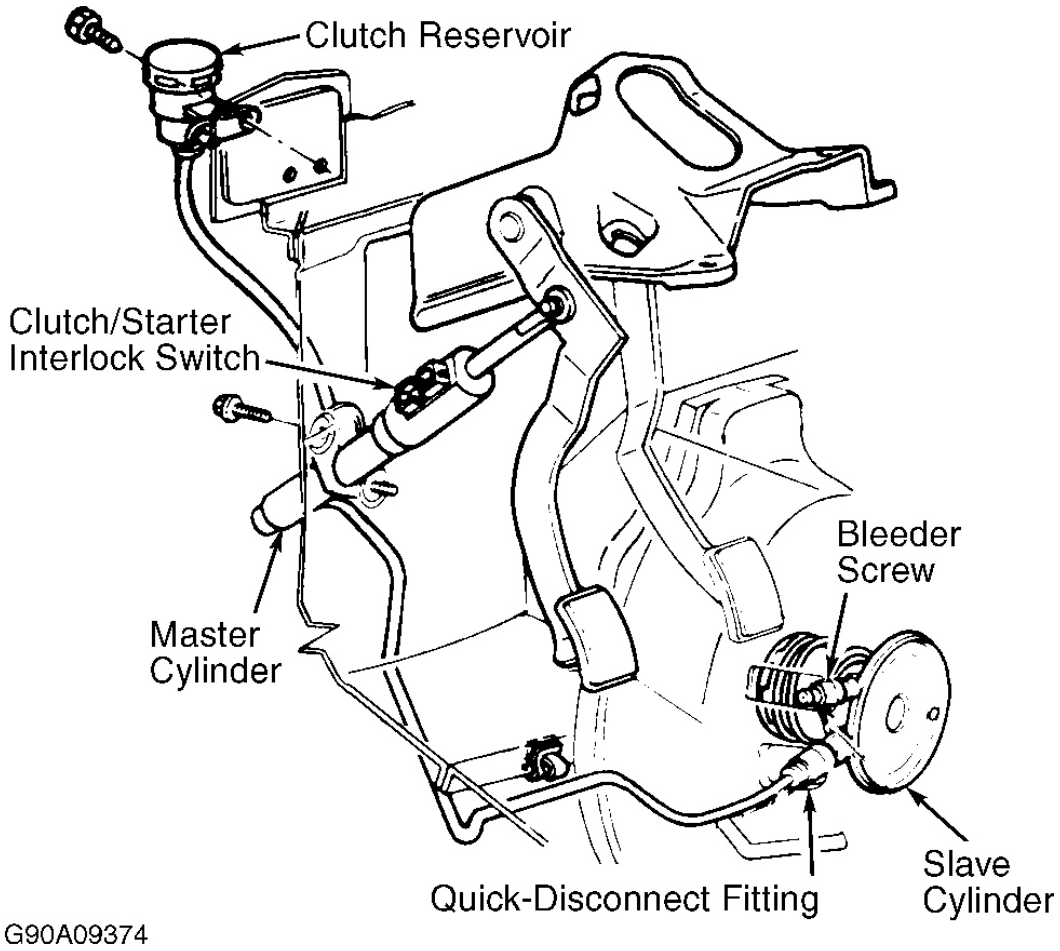


Fig. 9: Removing Clutch/Starter Interlock Switch (B2300, B2500, B3000 & B4000)
Courtesy of FORD MOTOR CO.

CAUTION: Disconnect master cylinder push rod if slave cylinder is to be disconnected from release lever or bearing. Permanent damage to master cylinder will occur if master cylinder is activated with slave cylinder

disconnected.

Installation

Insert master cylinder push rod through opening in bulkhead. Install master cylinder. Connect hydraulic lines. Install fluid reservoir. Install push rod on clutch pedal. Bleed hydraulic system. See **HYDRAULIC SYSTEM BLEEDING** .

Removal & Installation (Miata)

Disconnect hydraulic line and master cylinder mounting nuts. Disengage push rod from clutch pedal. Remove master cylinder. To install, reverse removal procedure and bleed hydraulic system. See **HYDRAULIC SYSTEM BLEEDING** .

CLUTCH RELEASE CYLINDER

Removal & Installation (B2300, B2500, B3000 & B4000)

Release cylinder is removed with clutch. See CLUTCH ASSEMBLY.

Removal & Installation (Miata)

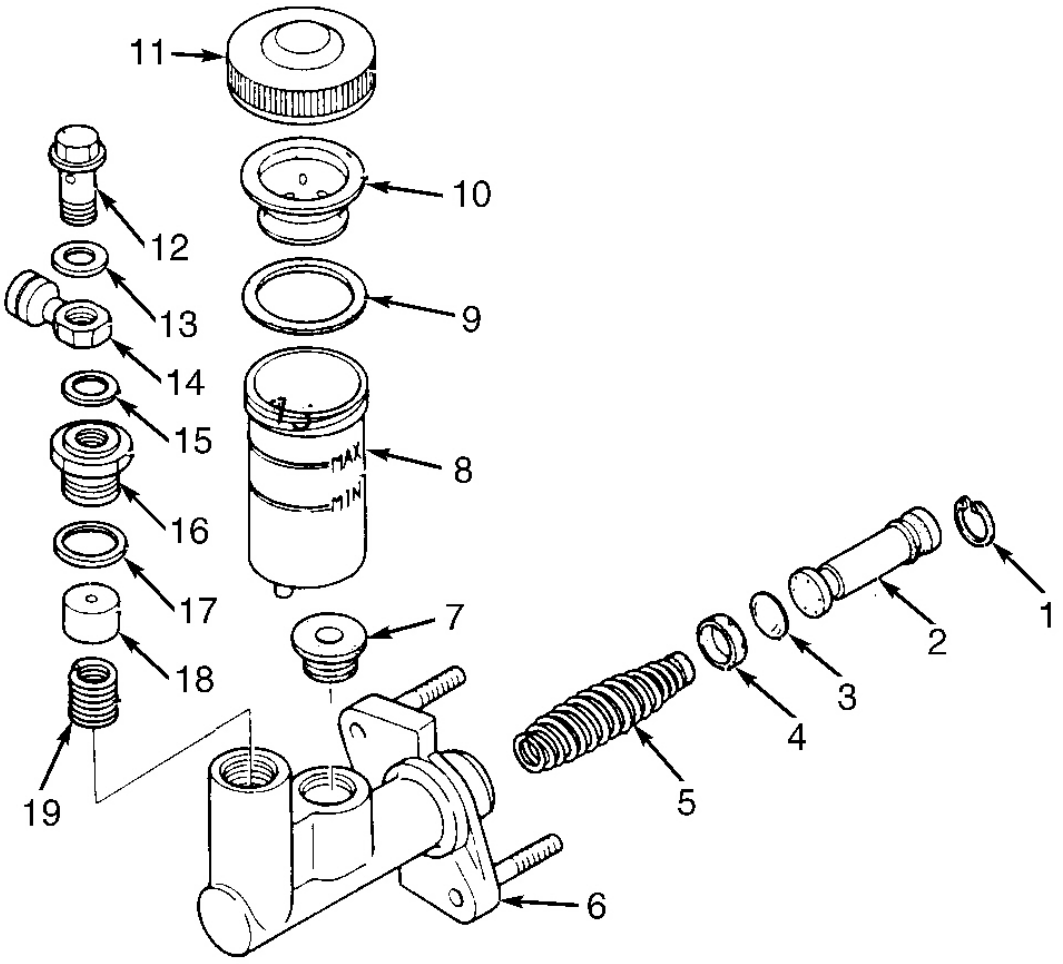
Raise and support vehicle. Disconnect and plug hydraulic line. Remove clutch release cylinder. To install, reverse removal procedure. Bleed hydraulic system. See **HYDRAULIC SYSTEM BLEEDING** .

OVERHAUL

NOTE: Overhaul procedures for B2300, B2500, B3000 and B4000 are not available.

CLUTCH MASTER CYLINDER

NOTE: Use exploded view of clutch master cylinder for overhaul procedure. See Fig. 10 .



1. Snap Ring
2. Piston
3. Spacer
4. Cup
5. Return Spring
6. Cylinder Body
7. Bushing
8. Reservoir
9. Gasket
10. Strainer
11. Cap
12. Bolt
13. Washer
14. Banjo Fitting
15. Washer
16. Outlet Fitting
17. Gasket/Washer
18. One-Way Valve Piston
19. Spring

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Fig. 10: Exploded View Of Clutch Master Cylinder (Miata)
Courtesy of MAZDA MOTORS CORP.

CLUTCH RELEASE CYLINDER

NOTE: Use exploded view of clutch release cylinder for overhaul procedure. See Fig. 11 .

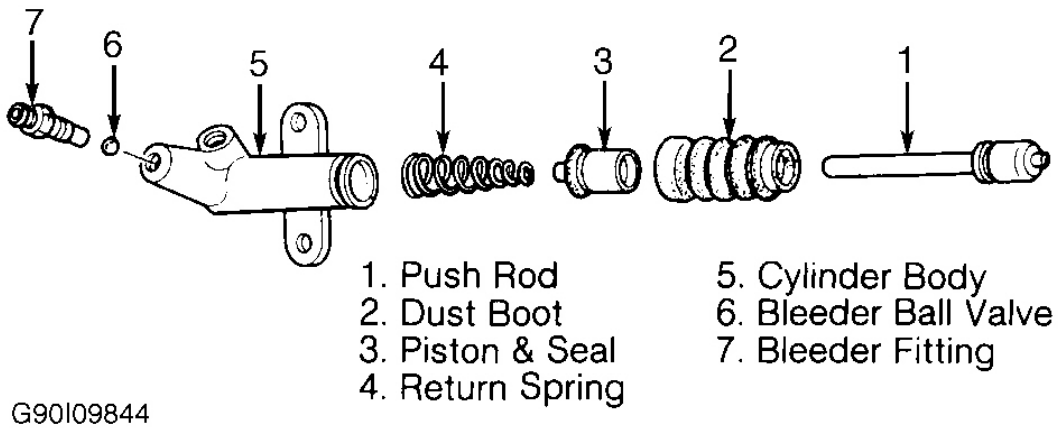

Fig. 11: Exploded View Of Clutch Release Cylinder (Miata)
Courtesy of MAZDA MOTORS CORP.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
B2300, B2500, B3000 & B4000	
Clutch Cover Bolts (1)	17-24 (23-32)
Crossmember Nuts	39-53 (53-72)
Drive Shaft Bolts	65-87 (88-119)
Flywheel-To-Crankshaft Nuts	54-67 (73-91)
Gearshift Lever Bolt	20-30 (27-40)
Starter Mounting Bolts	17-20 (23-27)
Transfer Case Bolts (4WD) (2)	35-46 (47-62)
Transmission-To-Engine Block Bolts	37-50 (50-68)
Miata	
Clutch Cover Bolts (1)	13-19 (18-26)
Drive Shaft Nuts	37-43 (50-58)
Flywheel-To-Crankshaft Bolts	71-76 (96-103)
PPF-To-Differential Mounting Spacer Bolt (Short)	27-38 (37-51)
PPF-To-Differential Side Mounting Bolts (Long)	77-91 (104-123)
PPF-To-PPF Bracket Bolt	27-40 (37-54)

PPF-To-Transmission Side Mounting Bolts (Long)	77-91 (104-123)
Starter Mounting Bolts	28-38 (38-51)
Transmission-To-Engine Block Bolts	48-65 (64-89)
Transmission-To-PPF Bracket Bolts	27-40 (37-54)

(1) Tighten in a crisscross pattern.

(2) Tighten in sequence. See **Fig. 3** .