

CLUTCH

1991 Mazda Miata

1991 Clutch

B2200, B2600i, Miata, MPV, Navajo, RX7

DESCRIPTION

Clutch assembly uses a diaphragm spring type disc. Clutch is hydraulically-operated. MPV 4-cylinder is fitted with a hydraulic pressure damper.

CLUTCH PEDAL FREE PLAY ADJUSTMENTS

Except Navajo

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

CLUTCH PEDAL FREE PLAY TABLE (1)

Application	In. (mm)
B2200, B2600i, Miata & RX7	.20-.51 (5-13)
MPV	.22-.69 (5.5-17.4)

(1) - See Fig. 1.

CLUTCH PEDAL HEIGHT ADJUSTMENTS

Except Navajo

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

CLUTCH PEDAL HEIGHT TABLE (1)

Application	In. (mm)
B2200	7.13-7.52 (181-191)
B2600i	7.52-7.91 (191-201)
Miata	6.89-7.28 (175-185)
MPV	8.19-8.58 (208-218)
RX7	7.20-7.60 (183-193)

(1) - Measure to carpet on firewall. See Fig. 1.

CLUTCH DISENGAGEMENT HEIGHT ADJUSTMENTS

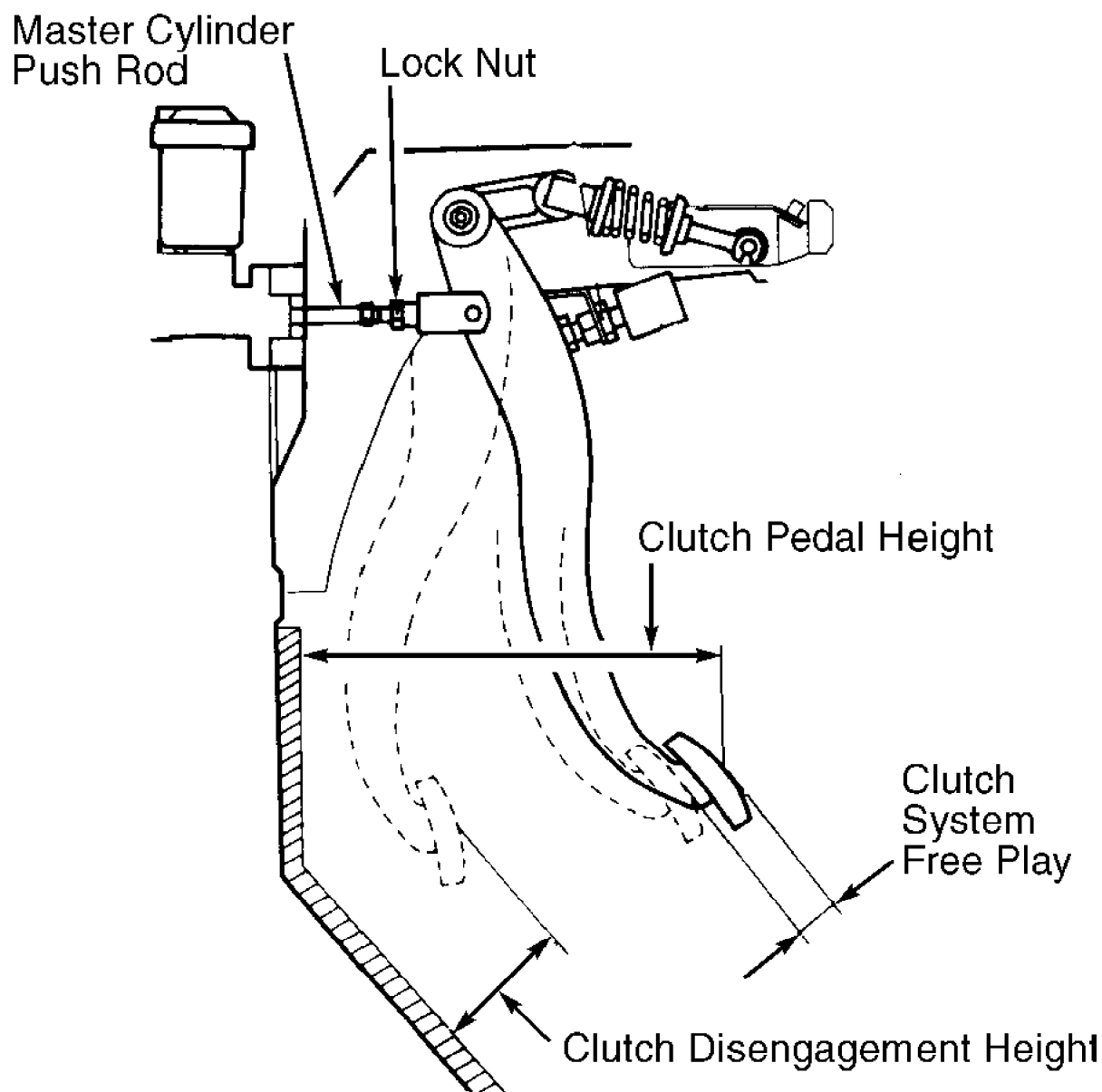
Except Navajo

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

CLUTCH DISENGAGEMENT HEIGHT TABLE (MINIMUM) TABLE (1)

Application	In. (mm)
B2200	2.60 (66)
B2600i	2.80 (71)
Miata	2.68 (68)
MPV	1.38 (35)
RX7	2.13 (54)

(1) - Measure to carpet on firewall. See Fig. 1.



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Fig. 1: Measuring Clutch Pedal Adjustment & Position (except Navajo)
 Courtesy of Mazda Motors Corp.

CLUTCH RELEASE BEARING TRAVEL ADJUSTMENTS

Navajo

1) Remove rubber plug from transmission bellhousing. Position Bearing Travel Measurement Tool (D87T-4201A) against slave cylinder. See Fig. 2. Measure bearing travel.

2) If bearing travel is greater than .30" (7.5 mm), replace pressure plate and/or clutch disc. If bearing travel is .30" (7.5 mm) or less, inspect and repair any leaks in hydraulic system. If no leak is found, bleed system. See HYDRAULIC SYSTEM BLEEDING ADJUSTMENTS.

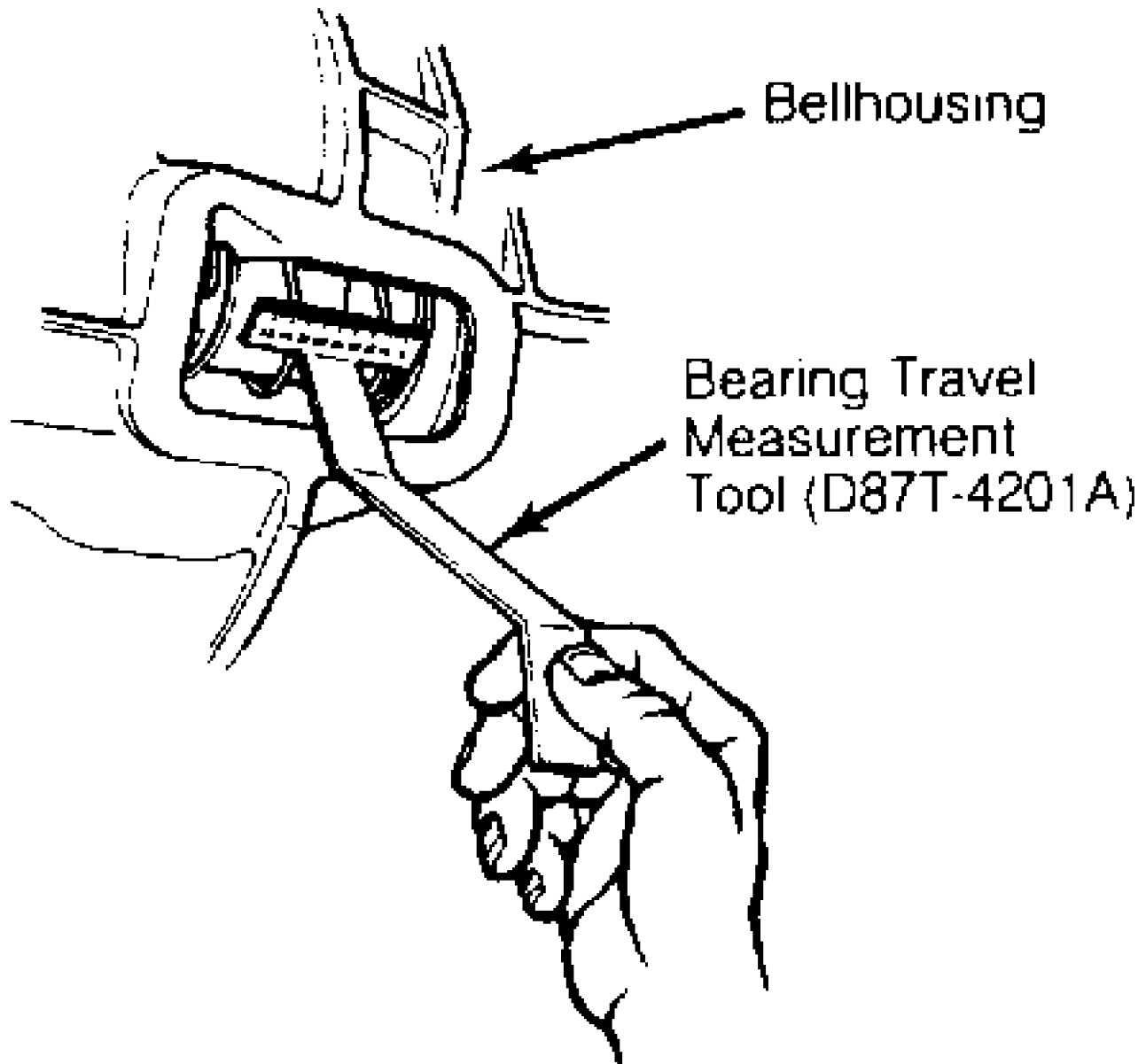


Fig. 2: Measuring Clutch Release Bearing Travel (Navajo)
Courtesy of Ford Motor Co.

HYDRAULIC SYSTEM BLEEDING ADJUSTMENTS

1) Fill reservoir with DOT 3 brake fluid. Place hose on

bleeder screw to prevent brake fluid entering bellhousing. Loosen bleeder screw and maintain fluid level in reservoir.

2) Close bleeder screw when fluid stream is free of air bubbles. Ensure proper fluid level, and install reservoir cap.

CLUTCH/STARTER INTERLOCK SWITCH TESTING

Navajo

Disconnect wiring connector at switch. See Fig. 3. Switch should be open (infinite ohms) when pedal is up. Switch should be closed (zero ohms) when clutch pedal is pressed to floor. If switch does not function as specified, replace switch.

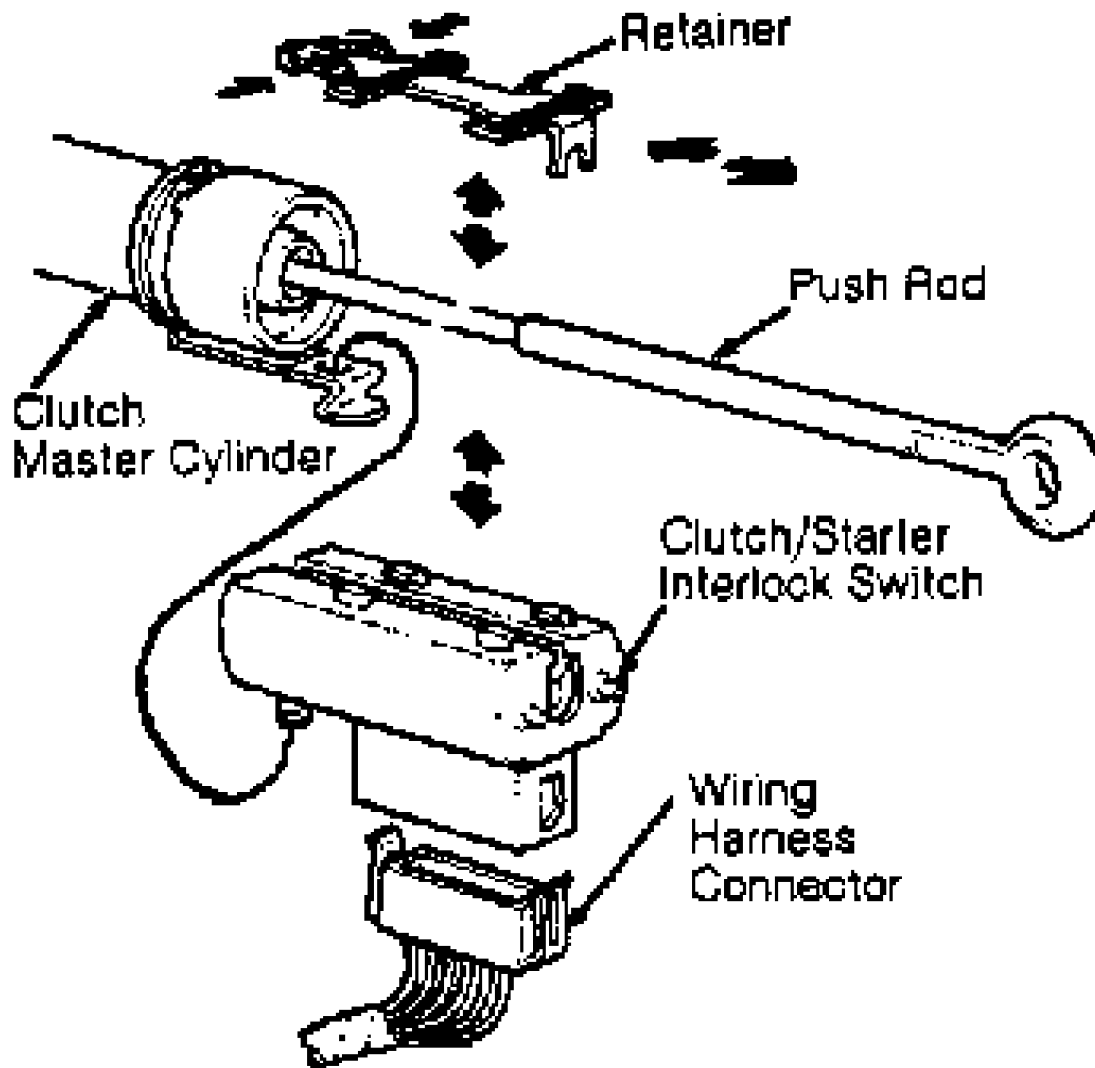


Fig. 3: Testing Clutch/Starter Interlock Switch (Navajo)
Courtesy of Ford Motor Co.

CLUTCH ASSEMBLY REMOVAL & INSTALLATION

Removal (B2200, B2600i & MPV)

1) Disconnect negative battery cable. Remove console and gear shift lever. Raise and support vehicle. Mark position of drive shaft flanges, and remove drive shaft(s). Disconnect speedometer cable. On MPV 4WD, disconnect Hi-Lo shift cable.

2) On B2600i models, remove splash shield and transfer case cover. On all models, disconnect wiring harness. Remove return spring. Disconnect parking brake cables. Remove clutch release cylinder and gusset plate.

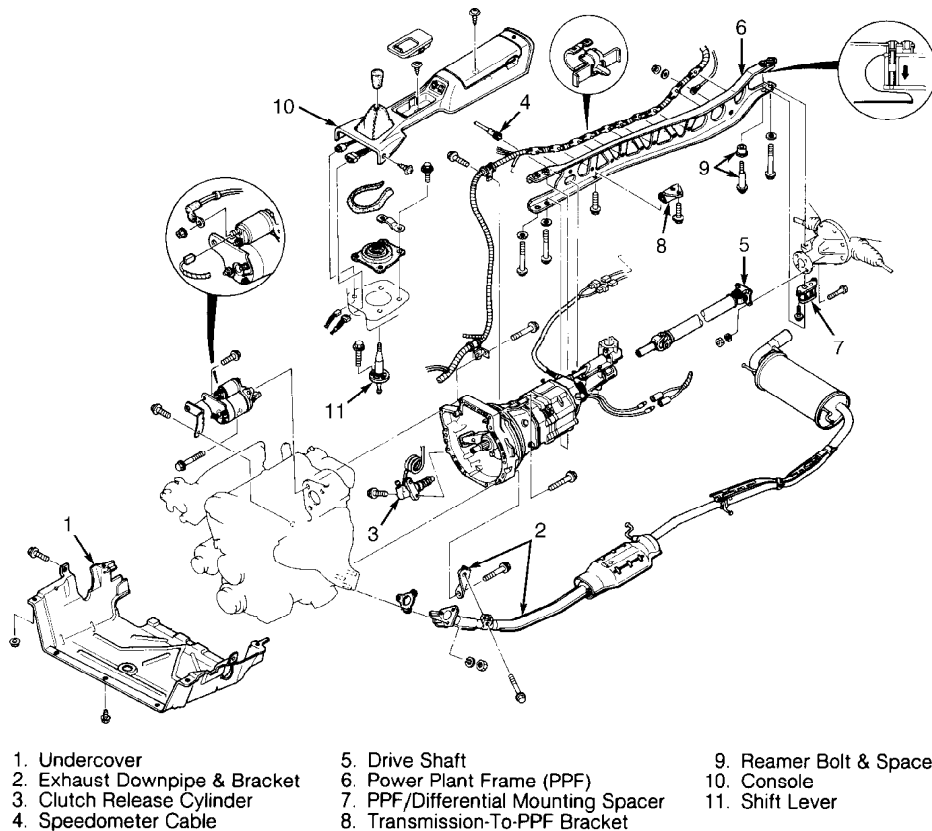
3) Disconnect and move exhaust pipe aside. Support transmission, and remove crossmember. Remove starter. Remove transmission-to-engine bolts. Remove transmission from vehicle. Remove clutch cover mounting bolts. Remove clutch cover and disc.

INSPECTION & INSTALLATION

See INSPECTION (ALL MODELS) and INSTALLATION (EXCEPT MIATA & NAVAJO) .

Removal (Miata)

1) Disconnect negative battery cable. Remove gear shift knob, console and shift lever. See Fig. 4. Raise and support vehicle. Remove engine undercover. Disconnect exhaust pipe from manifold. Mark position of drive shaft flanges, and remove drive shaft.



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Fig. 4: Exploded View of Drive Line (Miata)
Courtesy of Mazda Motors Corp.

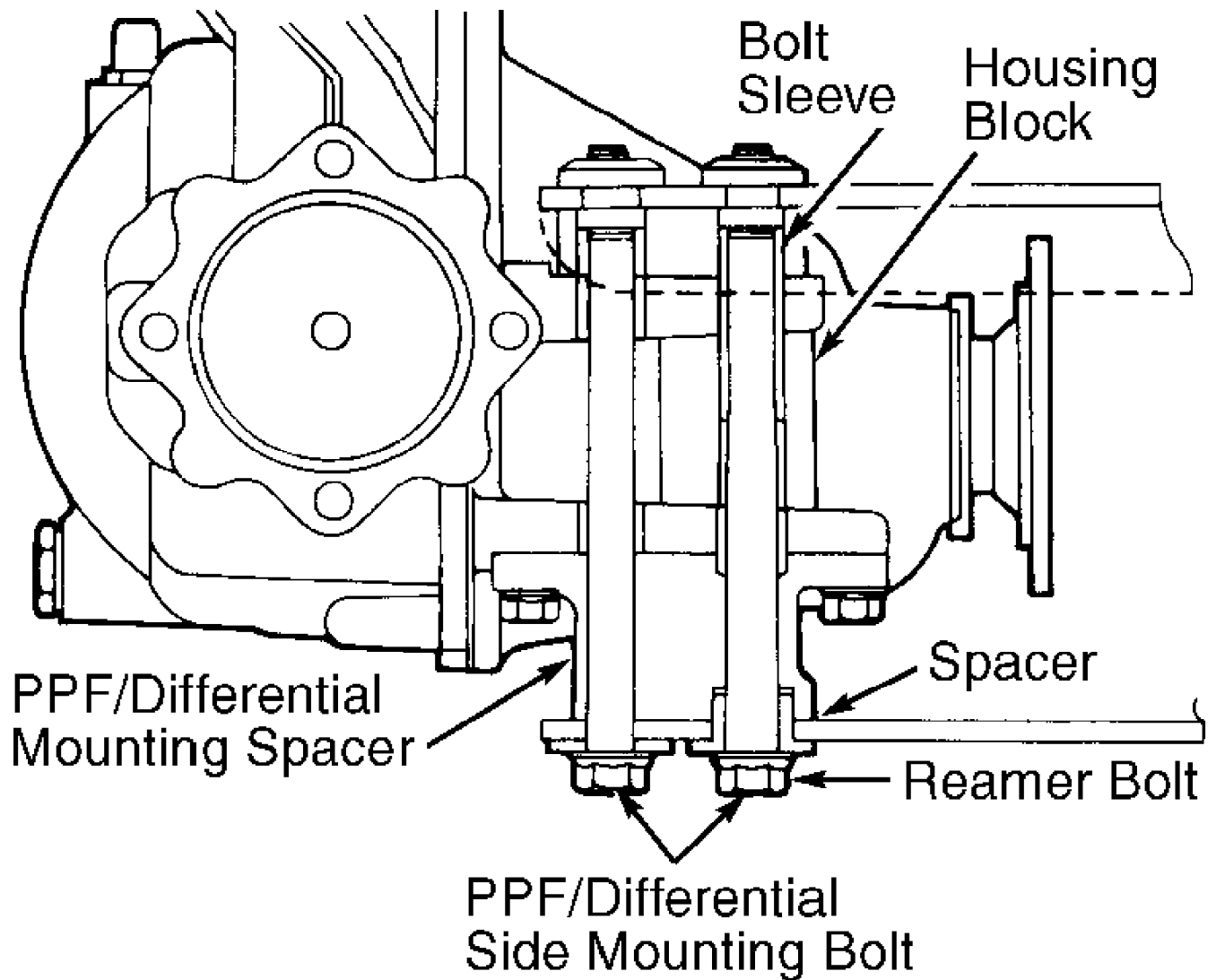
2) Remove clutch release cylinder. Remove starter. Disconnect speedometer cable from transmission. Note locations, and disconnect

wiring harness from Power Plant Frame (PPF).

3) Remove PPF bracket from rear transmission extension housing. Remove PPF-to-differential side bolts, and pry out spacer. Remove PPF/differential mounting spacer. See Fig. 5.

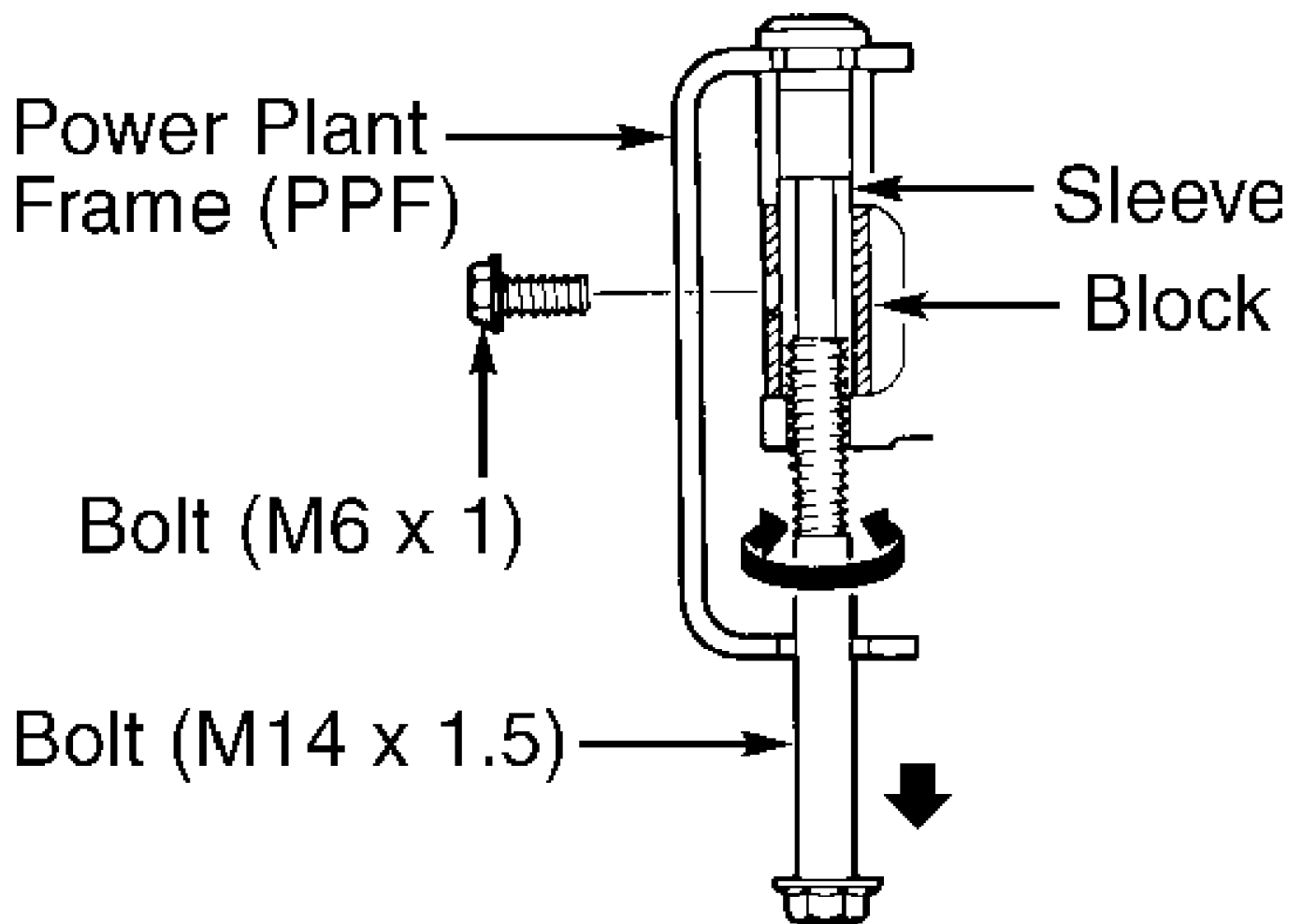
4) Install metric bolt (M14X1.5) into sleeve. See Fig. 6. Twist bolt side-to-side while pulling it downward. Install a metric bolt (M6X1) into hole in housing block to hold sleeve, and remove long bolt (M14X1.5). Remove short bolt (M6X1).

5) Remove PPF-to-transmission side bolts, and remove PPF. Remove clutch housing-to-engine bolts. Remove transmission from vehicle. Remove clutch cover mounting bolts. Remove clutch cover and disc. See Fig. 7.



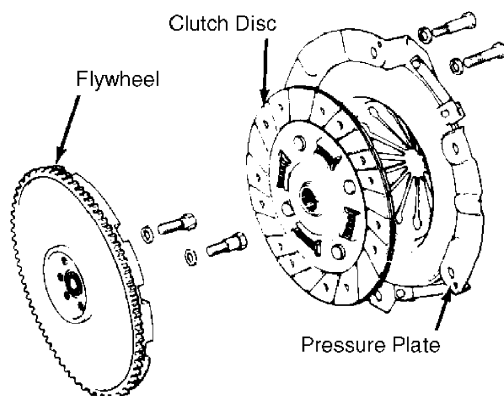
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Fig. 5: Installing & Removing Power Plant Frame (Miata)
Courtesy of Mazda Motors Corp.



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Fig. 6: Removing Reamer Bolt Sleeve (Miata)
Courtesy of Mazda Motors Corp.



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Fig. 7: Exploded View of Clutch Assembly (Typical)
Courtesy of Mazda Motors Corp.

Inspection
See INSPECTION (ALL MODELS).

Installation

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-to-flywheel bolts evenly in a crisscross pattern to specification. See TORQUE SPECIFICATIONS table at end of article.

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 clutch housing-to-engine block bolts to specification. Place jack (from front of engine) under transmission.

3) Raise transmission until it is level with engine. Position Power Plant Frame (PPF) in place. Install PPF/differential mounting spacer, and tighten bolts to 27-38 ft. lbs. (37-52 N.m). Install and tighten PPF-to-transmission side mounting bolts.

NOTE: On Miata, front PPF-to-differential side mounting bolt is considered reamer bolt and is used to align frame.

4) Ensure sleeve is installed into PPF housing block. Install spacer and bolts. Ensure reamer bolt is installed 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 table. To complete installation, reverse removal procedure.

Removal (Navajo)

1) Disconnect negative battery cable. Shift transmission into Neutral. Remove boot assembly-to-floor bolts. Disconnect vent hose from control lever. Remove shift lever, ball and boot assembly.

2) Raise vehicle. Remove skid plate (if equipped). Remove damper from transfer case (if equipped). Drain fluid from transfer case. Disconnect 4WD indicator switch.

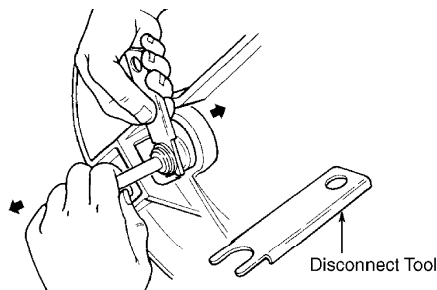
3) Disconnect front and rear drive shafts from transfer case. Disconnect speedometer drive gear. Disconnect back-up light switch. Position jack under engine (protect oil pan using wood).

4) Support transfer case using jack, and remove bolts attaching transfer case to transmission extension housing. Remove transfer case.

5) Using Disconnect Tool (T88T-70522-A), press white retainer bushing. See Fig. 8. Pull hydraulic line to disconnect line from clutch slave cylinder.

6) Position transmission jack under transmission. Tie safety chain around transmission. Remove crossmember. Remove transmission-to-engine bolts. Remove transmission.

7) Mark pressure plate and flywheel for reassembly reference. Loosen pressure plate-to-flywheel bolts evenly until springs are expanded. Remove pressure plate and clutch disc.



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Fig. 8: Removing Hydraulic Line (Navajo)
Courtesy of Ford Motor Co.

Inspection

See INSPECTION (ALL MODELS).

Installation

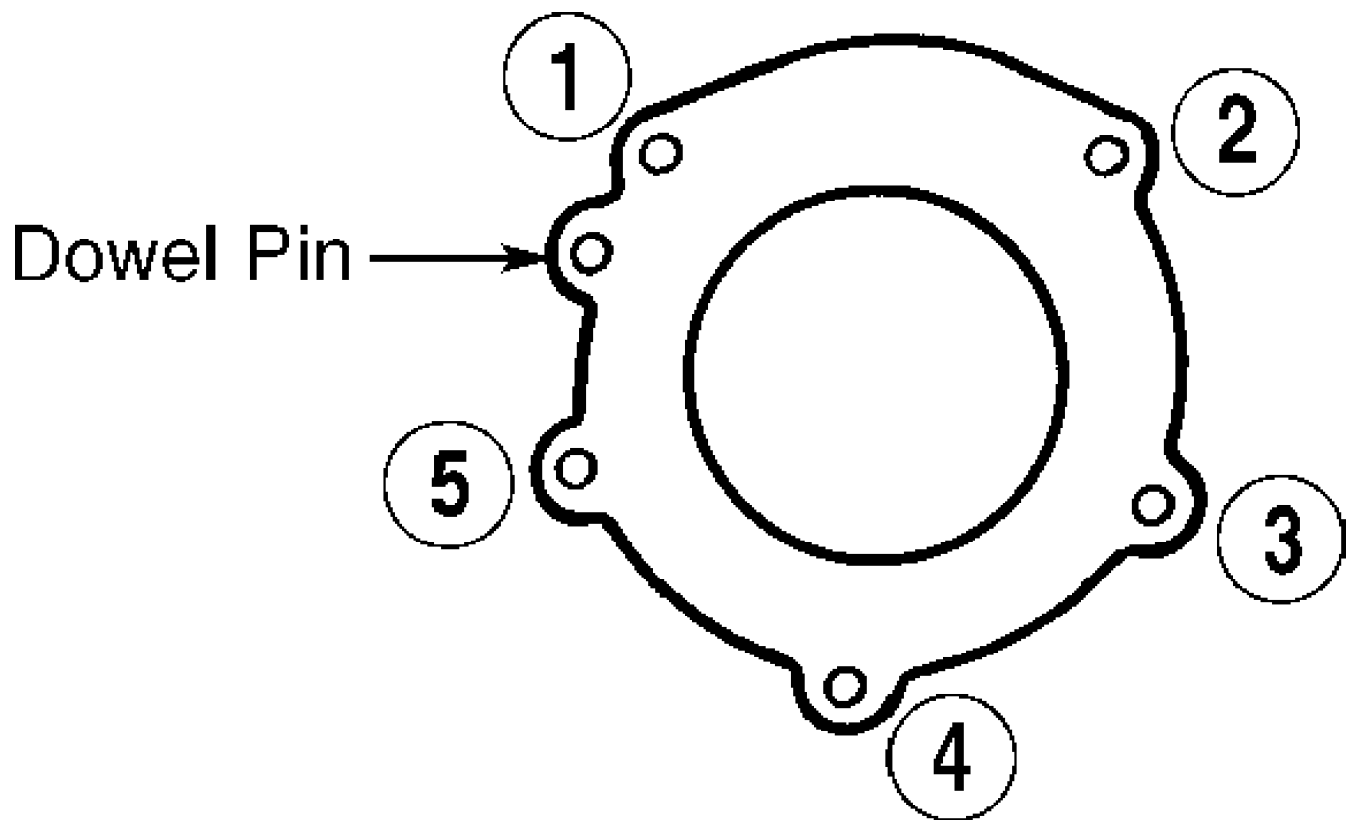
1) Place clutch disc on flywheel. Place pressure plate on flywheel and align reference marks. Tighten bolts evenly in a crisscross sequence.

2) Raise transmission into position. Install transmission-to-engine block bolts. Install crossmember. Install new transfer case-to-extension housing gasket. Install transfer case.

3) Tighten transfer case-to-extension housing bolts in sequence. See Fig. 9. Tighten bolts to specification. See TORQUE SPECIFICATIONS TABLE at end of article. To complete installation, reverse removal procedure.

NOTE: When installing shift lever assembly, always tighten large bolt first.

4) Bleed hydraulic clutch system. See HYDRAULIC SYSTEM BLEEDING ADJUSTMENTS. Fill transfer case with 1.3 qts. (1.2L) of Mercon ATF. Fill transmission with 85W-90 gear oil.



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Fig. 9: Navajo Transfer Case-To-Extension Housing Tightening Sequence
Courtesy of Ford Motor Co.

Removal (RX7)

1) Disconnect negative battery cable. Place shift lever in Neutral. Remove shift knob and console box. Remove shift lever dust boot, lever and related components. Remove air cleaner.

2) Raise and support vehicle. Remove protective cover under engine. Remove clutch slave cylinder with hydraulic line connected. Disconnect front exhaust pipe from manifold.

3) Disconnect speedometer cable and electrical leads from transmission. Mark position of drive shaft flanges, and remove drive shaft. Support engine. Support transmission using jack.

4) Remove rear support crossmember. Remove transmission-to-engine bolts. Slide transmission back until input shaft is clear of clutch cover. Lower and remove transmission from vehicle.

5) Insert clutch disc guide and diagonally loosen bolts to remove clutch assembly. Mark position of clutch cover to flywheel. Remove clutch cover and disc. See Fig. 7.

Inspection

1) Check disc for loose rivets, worn springs and oil contamination. Minimum lining height above rivet heads is .012" (.30 mm). Inspect flywheel and pressure plate for burns, scoring and grooves.

2) Check flywheel and pressure plate runout. Resurface or replace flywheel and pressure plate if beyond specification. See CLUTCH RUNOUT (MAXIMUM) TABLE. If flywheel ring gear is replaced, ensure chamfer on flywheel teeth faces engine.

3) Check clutch disc runout using dial indicator. Replace disc if it is not to specification. See CLUTCH RUNOUT (MAXIMUM) TABLE. Check disc hub and input shaft splines for excessive wear. Hub must slide smoothly on input shaft splines.

4) Check pilot bearing/bushing for wear. Apply inward pressure and turn pilot bearing/bushing side-to-side. If bearing/bushing sticks or has excessive resistance, replace bearing/bushing.

5) On Navajo, use Impact Slide Hammer Puller (T58L-101-B) to remove pilot bearing. Install pilot bearing with seal toward transmission using Bearing Driver (T71P-7137-H) and Adapter (T74P-7137-A).

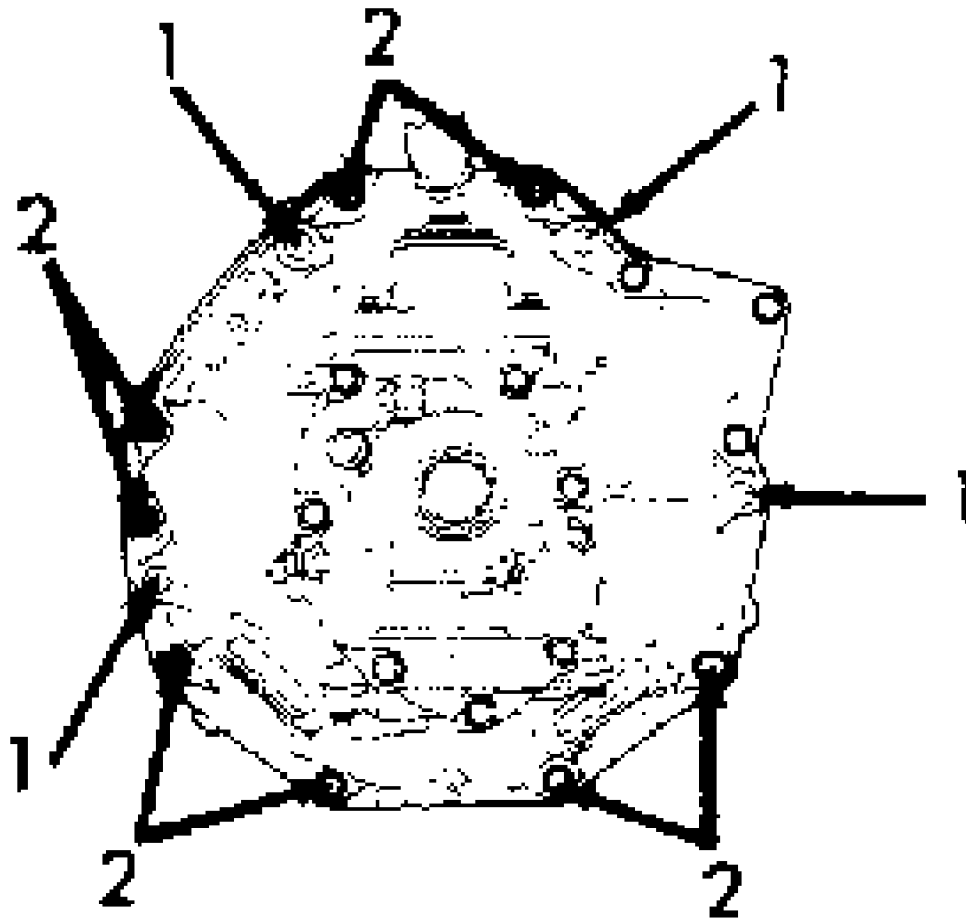
CLUTCH RUNOUT (MAXIMUM) TABLE

Application	In. (mm)
Disc	
B2200, B2600i & MPV	0.040 (1.0)
Miata, Navajo & RX7	0.028 (0.7)
Flywheel	
Except Navajo	0.008 (.20)
Navajo	0.005 (.13)

Installation (Except Miata & Navajo)

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 crisscross pattern.

2) To complete installation, reverse removal procedure. Tighten bolts/nuts to specification. See TORQUE SPECIFICATIONS TABLE at end of article. On MPV 4-cylinder, tighten clutch housing-to-engine to specification. See Fig. 10.



1. Tighten To 51-65 Ft. Lbs. (69-88 N.m)
2. Tighten To 27-38 Ft. Lbs. (37-52 N.m)

Fig. 10: Clutch Housing-To-Engine Torque (MPV 4-Cylinder)
 Courtesy of Mazda Motors Corp.

RELEASE BEARING & FORK REMOVAL & INSTALLATION

Except Navajo

1) Remove transmission. See CLUTCH ASSEMBLY R & I. 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.

Removal (Navajo)

With transmission removed, twist release bearing and carrier assembly until preload spring pushes bearing assembly from slave cylinder. See Fig. 11.

Installation

Lubricate bearing bore and bearing carrier with multipurpose grease. Push release bearing assembly onto clutch slave cylinder.

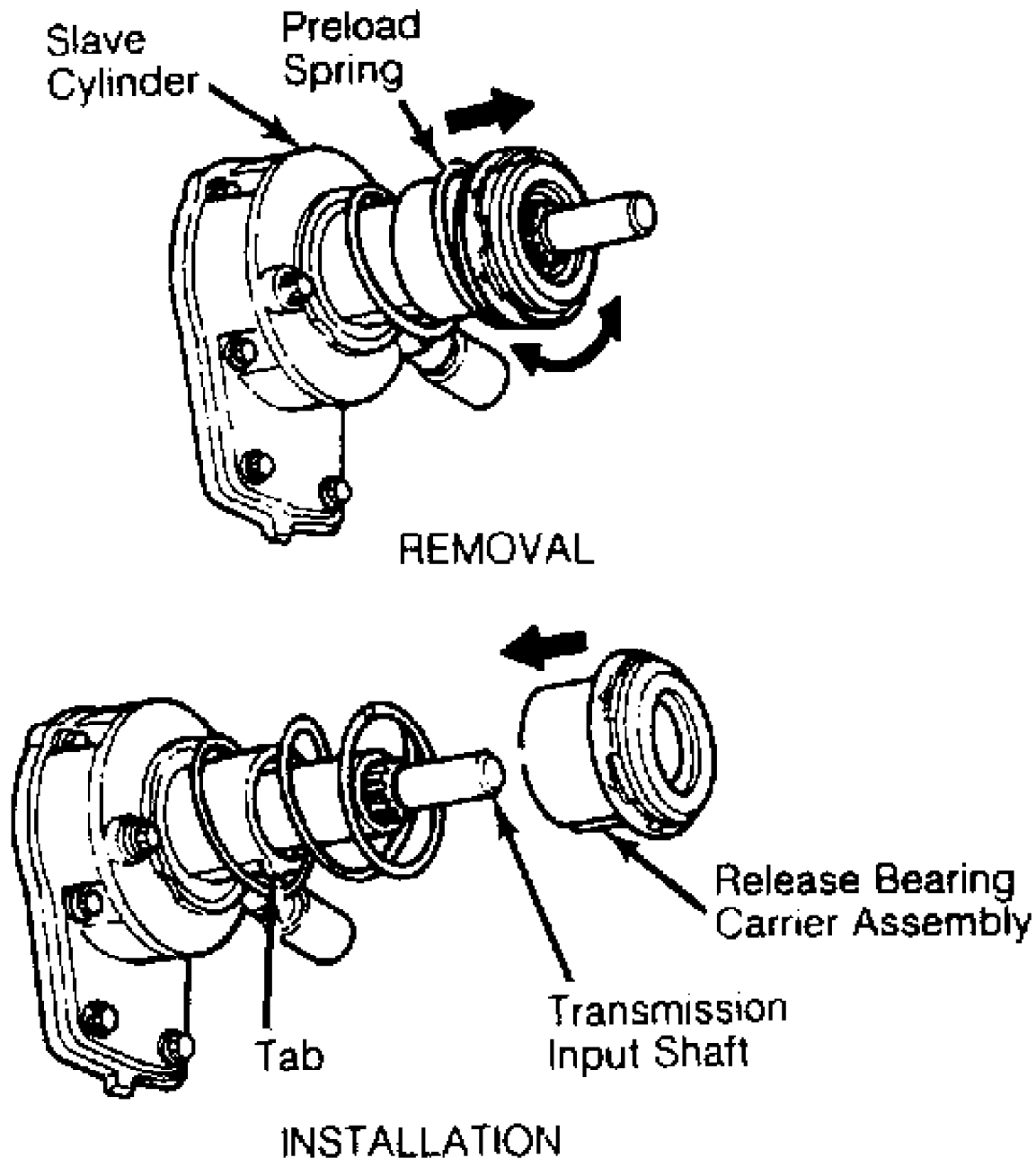


Fig. 11: Servicing Clutch Release Bearing (Navajo)
Courtesy of Ford Motor Co.

CLUTCH MASTER CYLINDER REMOVAL & INSTALLATION

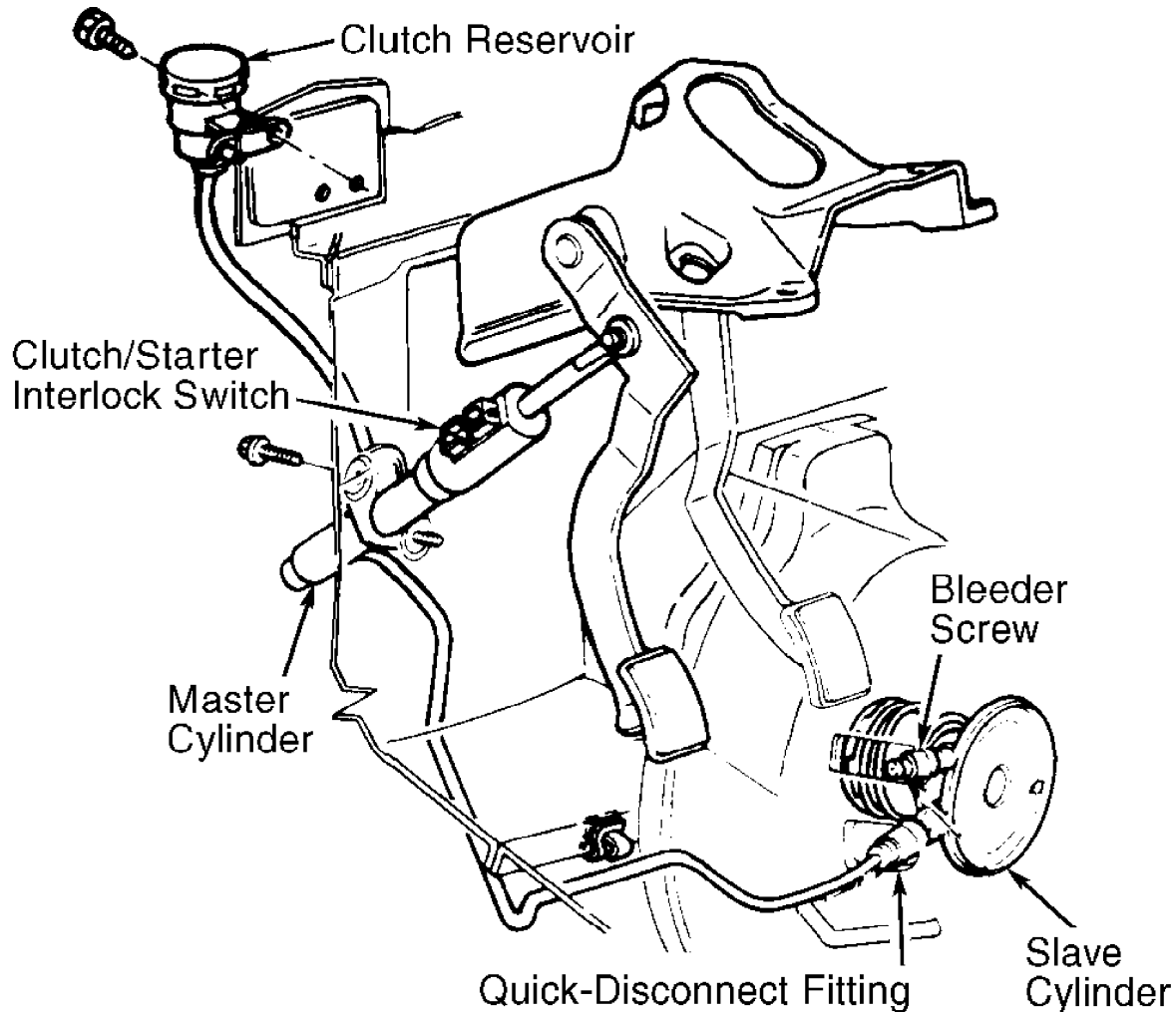
Except Navajo

Disconnect hydraulic line and master cylinder mounting nuts. Unhook clutch pedal from push rod. Remove master cylinder. To install, reverse removal procedure and bleed hydraulic lines.

Removal (Navajo)

1) Disconnect master cylinder push rod from clutch pedal. Disconnect clutch/starter interlock switch connector. See Fig. 12.
2) Using Disconnect Tool (T88T-70522-A), press white retainer bushing. See Fig. 8. Pull hydraulic line to disconnect line from clutch slave cylinder. Remove master cylinder, reservoir and hydraulic line. Plug lines.

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.



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Fig. 12: Removing Clutch/Starter Interlock Switch (Navajo)
Courtesy of Ford Motor Co.

Installation

1) Insert master cylinder push rod through opening in

2) Insert hydraulic line and fitting in clutch slave cylinder. Install fluid reservoir. Install push rod on clutch pedal. Bleed hydraulic system.

Except Navajo

Raise and support vehicle. Disconnect and plug fluid hose. Remove release cylinder-to-clutch housing nuts. Remove release cylinder. To install, reverse removal procedure. Bleed hydraulic system.

To remove clutch release cylinder, remove transmission. See CLUTCH ASSEMBLY REMOVAL & INSTALLATION.

MPV 4-Cylinder

1) Damper assembly is an in-line unit, mounted between clutch master cylinder and clutch release cylinder. Remove 2 damper cover bolts securing it to mounting bracket.

2) Disconnect fluid lines from damper, and remove 2 mounting bolts. To install, reverse removal procedure. Damper is fitted with a bleeder screw and should be bled after release cylinder. See Fig. 15.

NOTE: No overhaul procedures are available for Navajo.

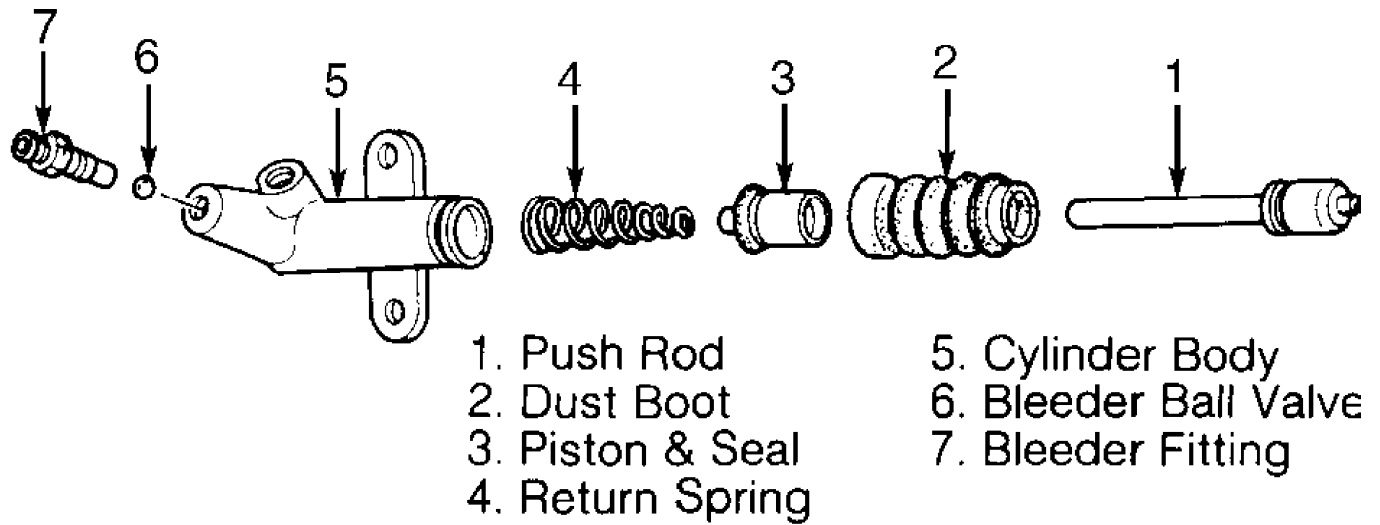
NOTE: For exploded view of clutch master cylinder, see Fig. 13.



Fig. 13: Exploded View of Clutch Master Cylinder (except Navajo)
Courtesy of Mazda Motors Corp.

CLUTCH RELEASE CYLINDER OVERHAUL

NOTE: For exploded view of clutch release cylinder, see Fig. 14.



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Fig. 14: Exploded View of Clutch Release Cylinder (Except Navajo)
Courtesy of Mazda Motors Corp.

CLUTCH DAMPER OVERHAUL

Disassembly (MPV 4-Cylinder)

Hold cover in place and remove remaining damper cover mounting bolts. See Fig. 15. If necessary, cover unit using a rag and use compressed air to force damper piston and seal from cylinder bore.

Reassembly

Check all parts for wear and damage, and replace as required. Coat piston and seal with clean hydraulic fluid before assembly. To complete reassembly, reverse disassembly procedure. Bleed system.

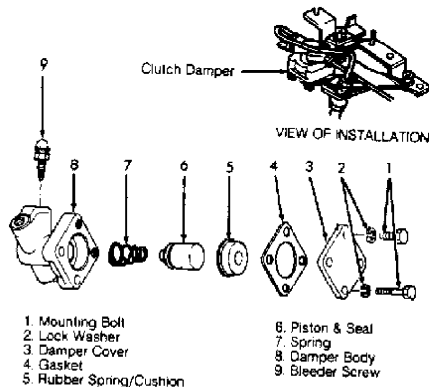


Fig. 15: Exploded View of Damper Unit (MPV 4-Cylinder)
Courtesy of Mazda Motors Corp.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
B2200 & B2600i	
Clutch Cover-To-Flywheel Bolts	13-20 (18-27)
Clutch Housing-To-Engine Block Bolts	51-65 (69-88)
Flywheel-To-Crankshaft Bolts	
B2200	71-76 (96-103)
B2600i	67-72 (91-98)
Starter Mounting Bolts	27-38 (37-52)
Transmission Crossmember Bolts	23-34 (31-46)
Miata	
Clutch Cover-To-Flywheel Bolts	13-20 (18-27)
Clutch Housing-To-Engine Block Bolts	47-66 (64-90)
Drive Shaft Bolts	20-22 (27-30)
Flywheel-To-Crankshaft Bolts	71-76 (96-103)
PPF-To-Differential Mounting	
Spacer Bolt (Short)	27-38 (37-52)
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)
Transmission-To-PPF Bracket Bolts ...	27-40 (37-54)
Starter Mounting Bolts	27-38 (37-52)
MPV	
Clutch Cover-To-Flywheel Bolts	13-20 (18-27)
Clutch Housing-To-Engine Block Bolts	
4-Cylinder	(1)
V6	27-38 (37-52)
Flywheel-To-Crankshaft Bolts	
4-Cylinder	67-72 (91-98)
V6	76-81 (103-110)
Transmission Crossmember Bolts	32-45 (43-61)
Navajo	
Crossmember-To-Frame Nuts	110-140 (149-190)
Drive Shaft U-Bolt	10-15 (14-21)
Pressure Plate Bolts (3)	15-24 (21-33)
Starter Bolt	15-20 (21-27)
Transfer Case-To-Extension	
Housing (2)	25-35 (34-47)
Transmission Mount-To-Crossmember	
Nut	60-80 (81-109)
Transmission-To-Engine Bolt	28-38 (38-52)
RX7	
Clutch Cover-To-Flywheel Bolts	13-20 (18-27)
Clutch Housing-To-Engine Bolts	27-38 (37-52)
Drive Shaft Bolt	36-43 (49-58)
Flywheel-To-Crankshaft Nut	289-362 (392-491)
Starter Mounting Bolts	23-34 (31-46)

(1) - See Fig. 10.

(2) - Tighten in sequence. See Fig. 9.

(3) - Tighten in a crisscross pattern.