

1991 Mazda MX-5 Miata

MAZDA ENGINES 1.6L 4-Cylinder - VIN (1)

MAZDA ENGINES

1.6L 4-Cylinder - VIN (1)

ENGINE IDENTIFICATION

NOTE: For engine repair procedures not covered in this article, see **ENGINE OVERHAUL PROCEDURES - GENERAL INFORMATION** article in the **GENERAL INFORMATION** section.

Engine may be identified by Vehicle Identification Number (VIN). VIN is stamped on a metal pad located near lower left corner of windshield. The eighth character identifies the engine model. Engine can also be identified by engine number. On Miata, engine number is stamped on flange, at upper right rear of cylinder block deck as viewed from flywheel.

ENGINE IDENTIFICATION CODES

Application	Engine Code	VIN Code
1.6L 4-Cylinder DOHC	B6	1

ADJUSTMENTS

VALVE CLEARANCE ADJUSTMENT

NOTE: Valve clearance is not adjustable. Some valve noise may occur during engine start-up. Noise should disappear after engine reaches normal operating temperature. If noise persists, check oil pressure, oil level and engine condition.

TROUBLE SHOOTING

NOTE: To trouble shoot engine mechanical components, see appropriate table in **TROUBLE SHOOTING** article in **GENERAL INFORMATION**.

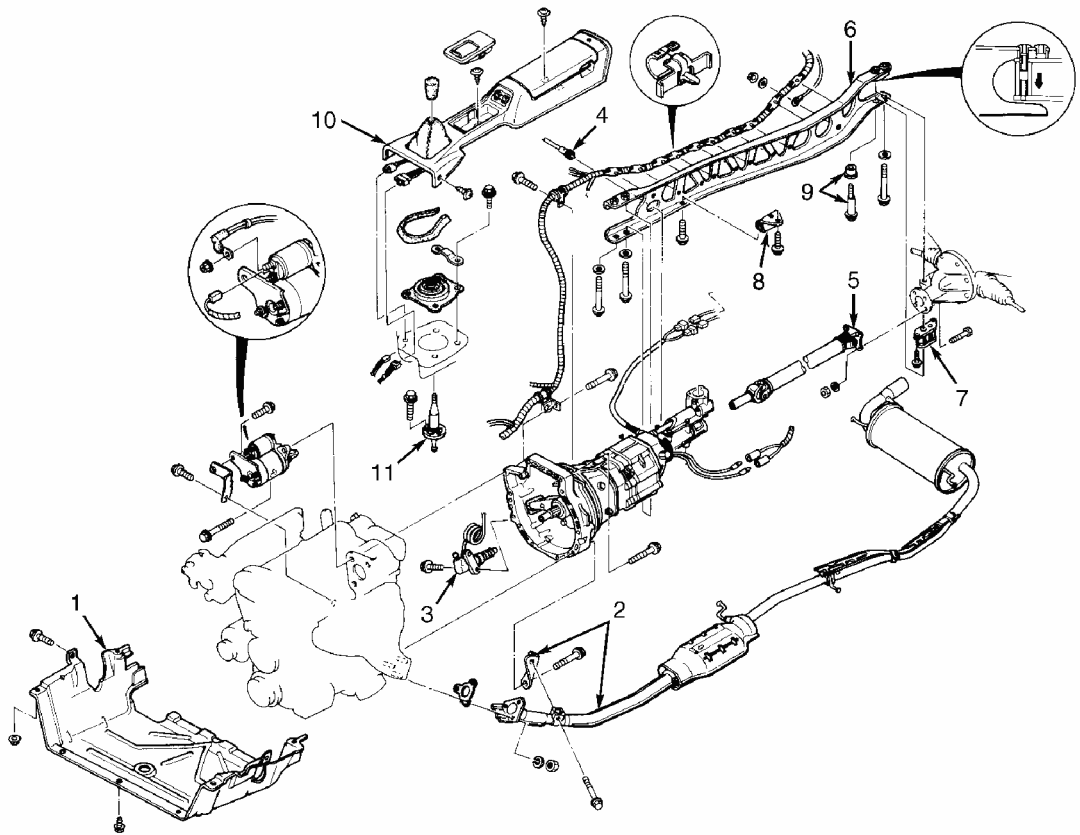
REMOVAL & INSTALLATION

NOTE: For reassembly reference, label all electrical connectors, vacuum hoses and fuel lines before removal. Also place mating marks on engine hood and other major assemblies before removal.

FUEL PRESSURE RELEASE

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

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Fig. 1: Removing & Installing Drive Train Components
Courtesy of MAZDA MOTORS CORP.

3. On all models, note location and remove transmission wiring harness connectors and speedometer cable. Match mark rear drive shaft flanges, and remove drive shaft.
4. Push up on transmission, and remove Power Plant Frame (PPF) angle bracket from lower rear of transmission extension housing. Remove 4 PPF long mounting bolts from transmission and differential, noting location of large shank reamer bolt at differential. Remove PPF/differential mounting spacer bolts, and pry out spacer at differential. See **Fig. 3**. Remove engine mount nuts.
5. Lower vehicle. On M/T models, remove shift knob, center console, boot and transmission shift lever. See **Fig. 1**. On all models, remove air cleaner assembly and throttle body intake duct assembly. See **Fig. 2**. Remove throttle cable.
6. Remove all cooling system hoses and A/T oil cooler lines at radiator (if equipped).

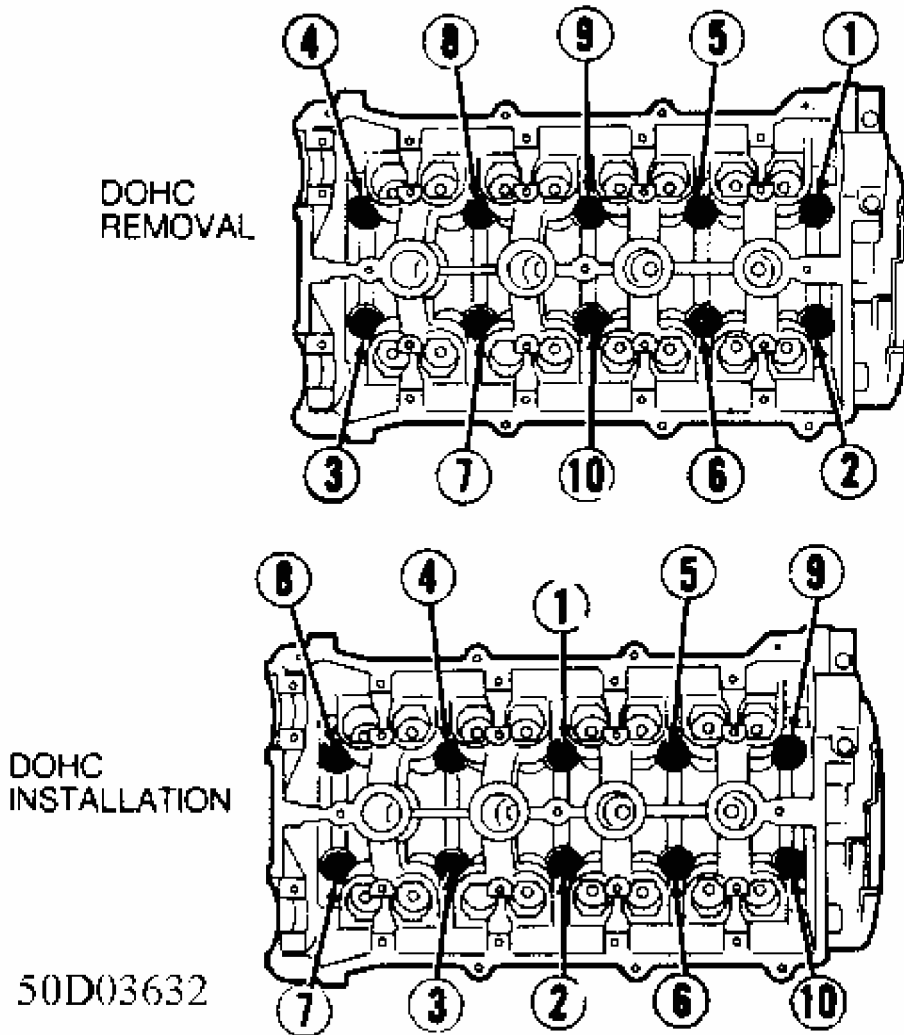


Fig. 4: Cylinder Head Bolt Removal & Installation Sequence
Courtesy of MAZDA MOTORS CORP.

CRANKSHAFT FRONT SEAL

Removal

Disconnect negative battery cable. Remove drive belts and crankshaft pulley. Remove water pump pulley, timing belt covers and timing belt. See TIMING BELT under REMOVAL &

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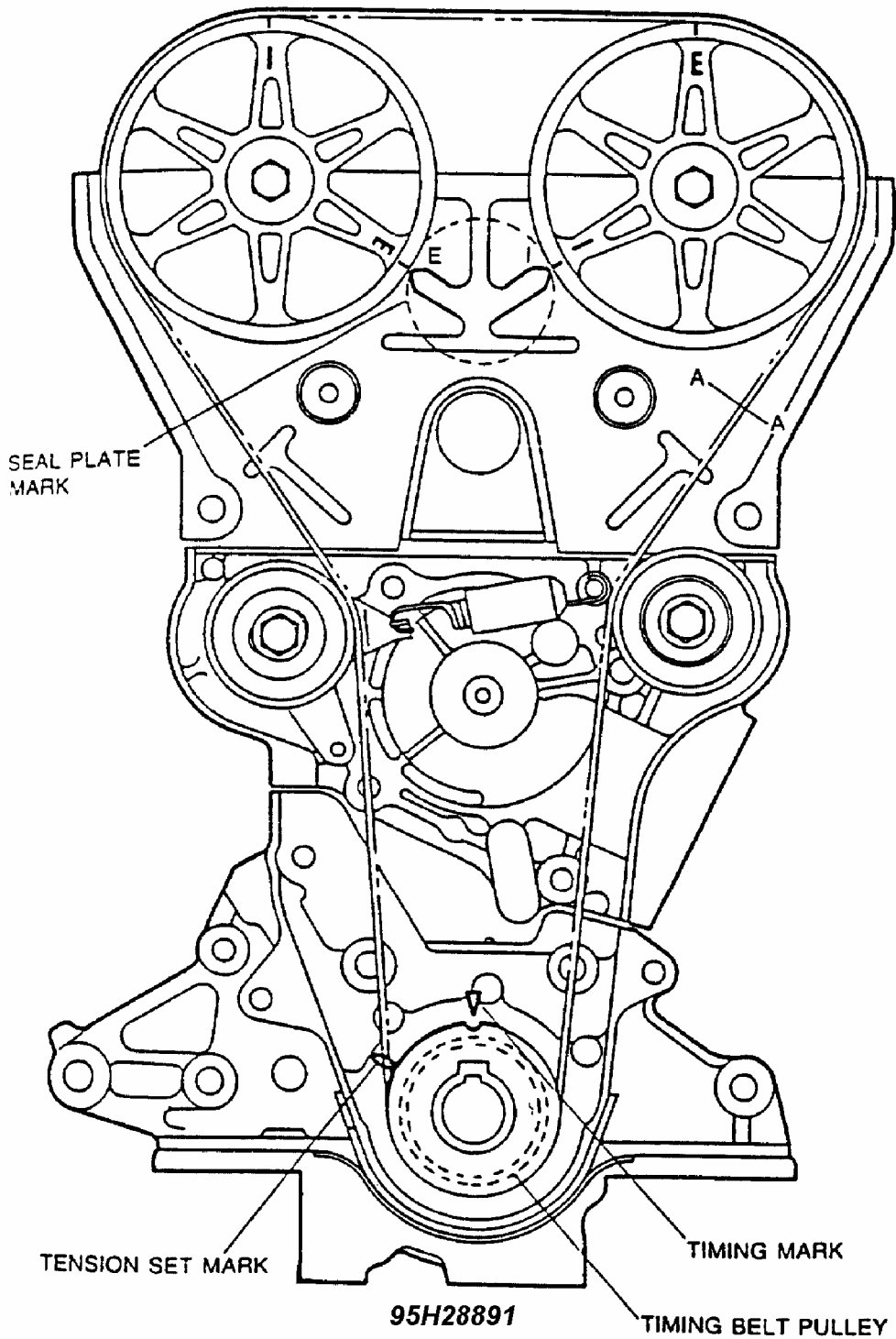
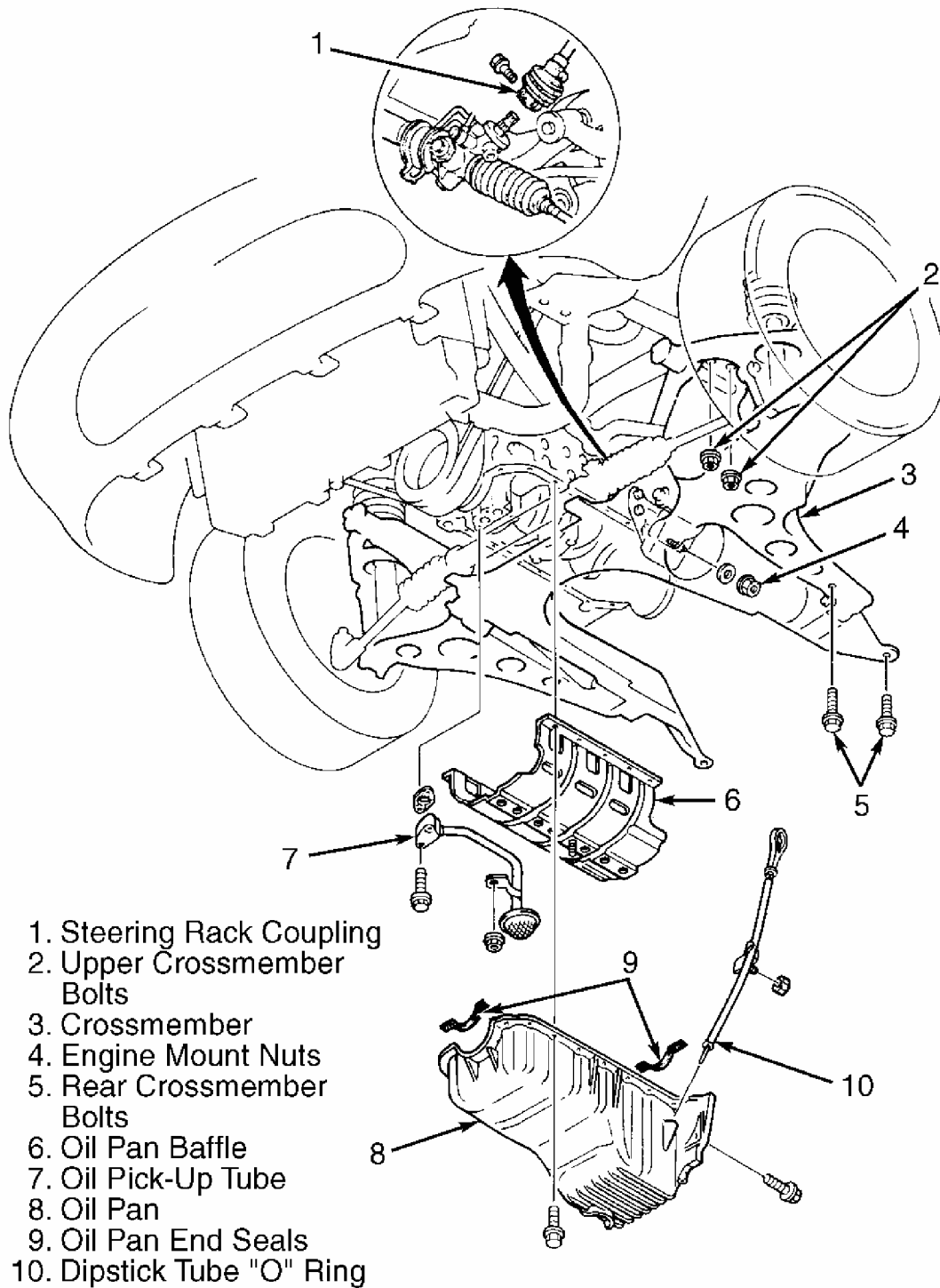


Fig. 6: Aligning Camshaft Timing Marks
Courtesy of MAZDA MOTORS CORP.

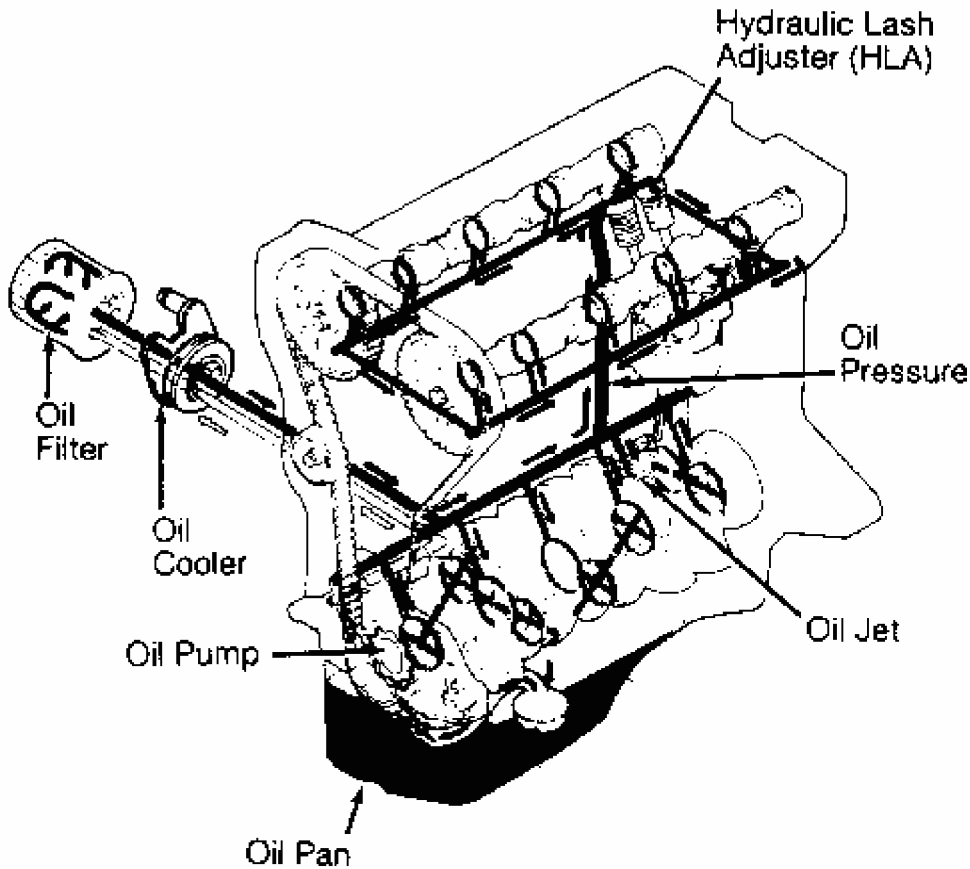
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Fig. 9: Removing Crossmember & Oil Pan



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DOHC

Fig. 14: Cross-Sectional View Of Engine Oil Circuit
Courtesy of MAZDA MOTORS CORP.

Crankcase Capacity

See **ENGINE OIL CRANKCASE CAPACITY** table.

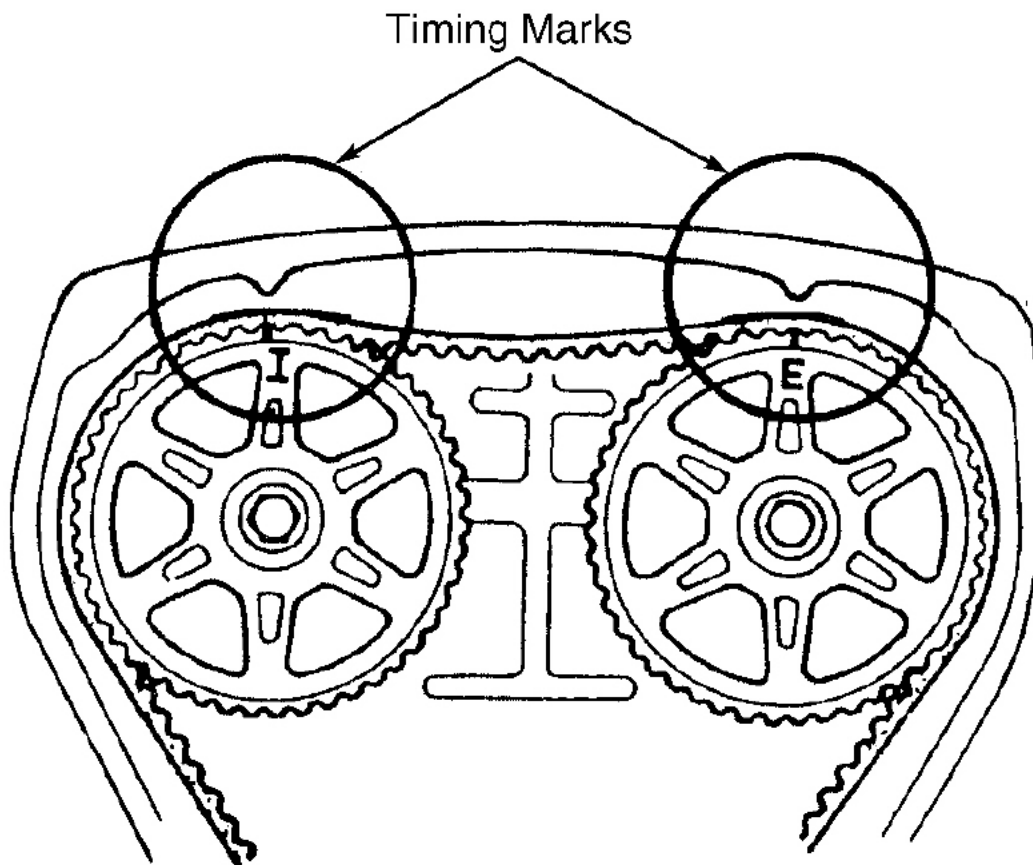
Oil Pressure

With engine at operating temperature, oil pressure should be 28-43 psi (2.0-3.0 kg/cm²) at

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Crossmember-To-Frame Bolt	47-66 (63-89)
Cylinder Head Bolt ⁽²⁾	
Step 1	35-40 (47-54)
Step 2 (Final)	56-60 (76-81)
Distributor Bolt	14-19 (19-26)
Drive Shaft Bolts	20-22 (27-30)
Engine Mount-To-Frame Nut	42-57 (57-77)
Exhaust Header Pipe-To-Exhaust Manifold Nut	23-34 (31-46)
Exhaust Manifold-To-Head Bolt	⁽¹⁾ 28-34 (38-46)
Flywheel Bolt	71-76 (96-103)
Fuel Rail Bolt	14-19 (19-26)
Intake Manifold Support Bracket	14-19 (19-26)
Intake Manifold Bolt/Nut	⁽¹⁾ 14-19 (19-26)
Main Bearing Cap Bolt	
Step 1	⁽¹⁾ 22-27 (30-37)
Step 2 (Final)	⁽¹⁾ 40-43 (54-58)
Main Bearing Support Plate-To-Motor Mount Nut	42-58 (57-79)
Motor Mount-To-Engine Bolt	27-40 (37-54)
Oil Pan Support-To-Transaxle	38-51 (52-69)
Oil Pump-To-Block Bolt	14-19 (19-26)
PPF/Differential SpacerMounting Bolt ⁽²⁾	27-38 (37-52)
PPF-To-Differential Long Mounting Bolt ⁽²⁾	77-91 (104-123)
PPF-To-Transmission Side Mounting Bolt ⁽²⁾	77-91 (104-123)
PPF/Transmission Rear Bracket Mounting Bolt	27-40 (37-54)
Spark Plug	11-17 (15-23)
Timing Belt Tensioner Bolt	27-38 (37-52)
Water Pump Bolt	14-19 (19-26)
	INCH Lbs. (N.m)
Camshaft Cap Bolt (DOHC)	⁽³⁾ 100-125 (11.3-14.1)
Camshaft/Rocker Cover Bolt DOHC (Top)	43-78 (5-9)
Crankshaft Pulley Bolts	109-152 (12-17)
Oil Jet	104-156 (12-18)



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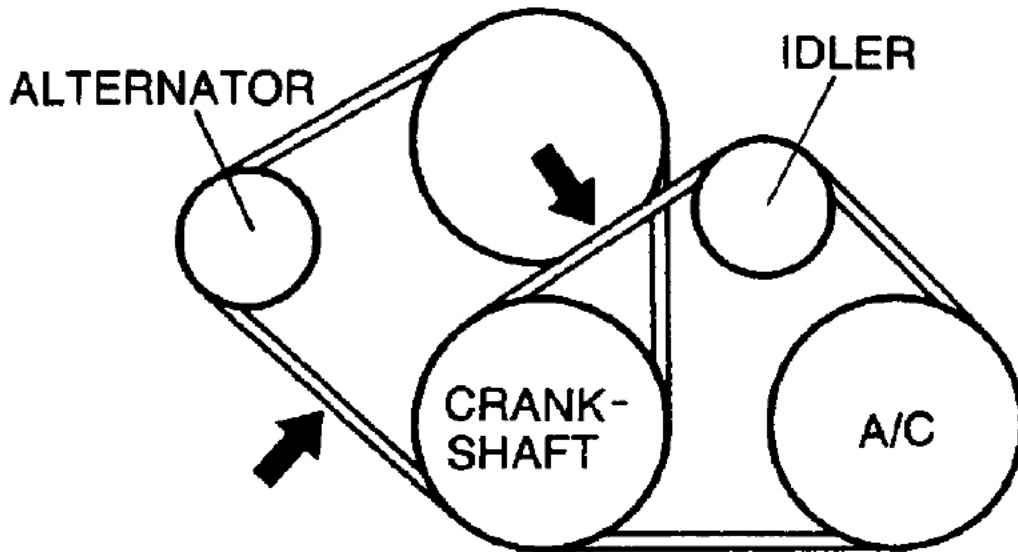
Fig. 5: Aligning Camshaft Timing Marks (DOHC 1.8L Engines)

Courtesy of MAZDA MOTORS CORP.

Removal (MX-5 Miata - DOHC)

1. Disconnect negative battery cable. Drain cooling system. Remove radiator hose and by-pass hoses from thermostat housing. Remove air cleaner intake duct assembly from throttle body to air cleaner filter housing. Remove splash shield.
2. Remove drive belt(s) and water pump pulley. See **Fig. 6**. Align crankshaft pulley timing mark with cylinder No. 1 at TDC of compression stroke. Hold crankshaft pulley stationary. Remove crankshaft pulley bolts. Remove pulley. Remove crankshaft pulley hub bolt and hub.
3. Remove cylinder head cover. Remove upper, center and lower timing belt cover. If timing belt is to be reused, mark timing belt rotation direction. Ensure timing marks on camshaft sprockets are aligned. See **Fig. 7**. Loosen timing belt tensioner lock bolt, and move tensioner away from belt with spring fully expanded. Remove timing belt.

A/C EQUIPPED



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Fig. 7: Identifying Drive Belt Routing & Deflection Check Point (3 Of 3)
 Courtesy of MAZDA MOTORS CORP.

ADJUSTMENT SPECIFICATIONS

NOTE: Check belt deflection when engine is cold, or has bin off for 30 minutes.

DEFLECTION SPECIFICATIONS

Application	(1) Specification - In. (mm)
New Belt (2)	
Alternator	0.31-0.35 (8-9)
A/C Compressor	0.31-0.35 (8-9)
Power Steering Pump	0.31-0.35 (8-9)
Used Belt	
Alternator	0.35-0.39 (9-10)
A/C Compressor	0.35-0.39 (9-10)
Power Steering Pump	0.35-0.39 (9-10)

(1) Deflection with 22 lbs. (10 kg) pressure applied midway on belt run.

Used on for less than 5 minutes.

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AUTO TRANS OVERHAUL - N4A-EL, N4A-HL & NC4A-EL AUTOMATIC TRANSMISSIONS Mazda N4A-EL N4A-EL & NC4A-EL

Miata

1.850 (47.00)

GOVERNOR ASSEMBLY (N4A-HL)

CAUTION: DO NOT mix valves and springs.

Disassembly & Reassembly

Remove attaching bolts, and separate governor from oil distributor. See **Fig. 20** . Transmission model N4A-EL does not use a governor on oil distributor. Remove secondary valve retainer plate. Remove secondary valve and spring. Remove primary valve retainer plate. Remove primary spring and valve. Remove remaining retainer plate. To reassemble, reverse disassembly procedure.

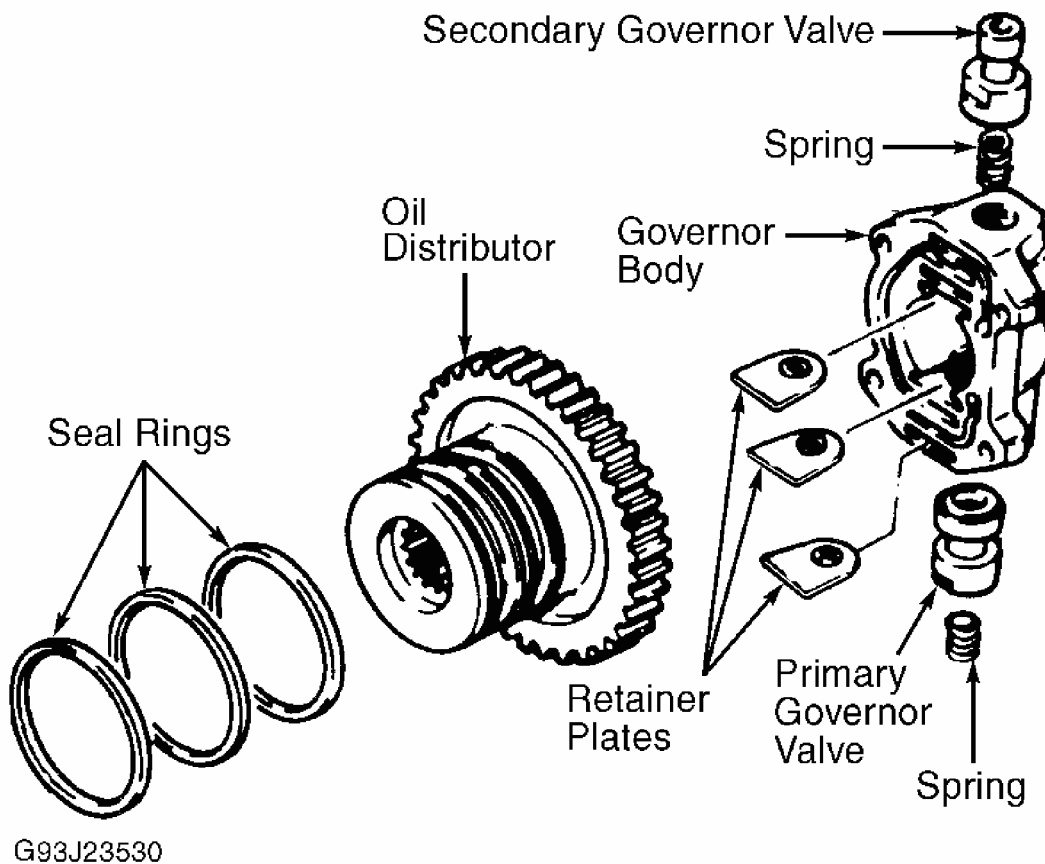
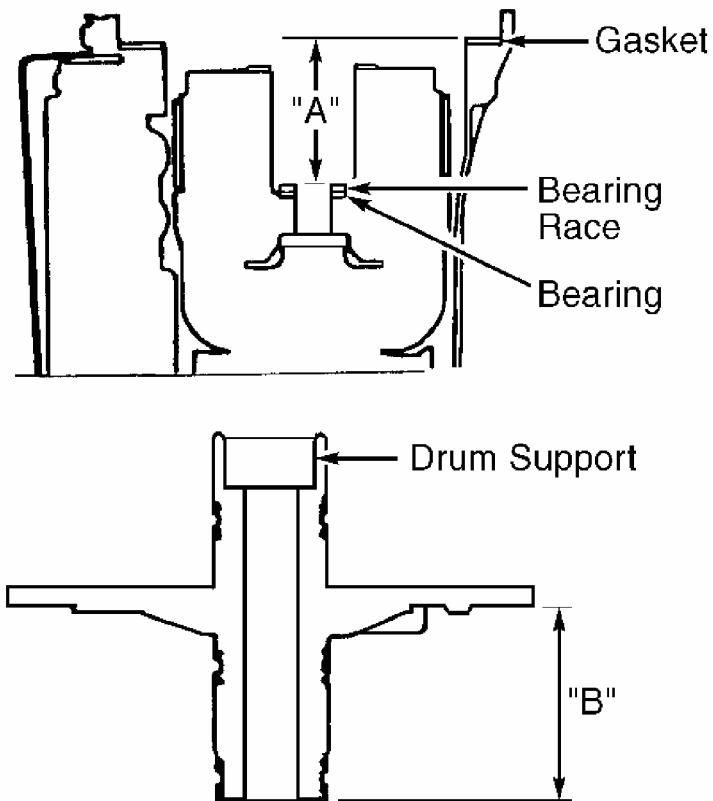


Fig. 20: Exploded View Of Governor Assembly (NA4-HL)

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AUTO TRANS OVERHAUL - N4A-EL, N4A-HL & NC4A-EL AUTOMATIC TRANSMISSIONS Mazda N4A-EL N4A-EL & NC4A-EL



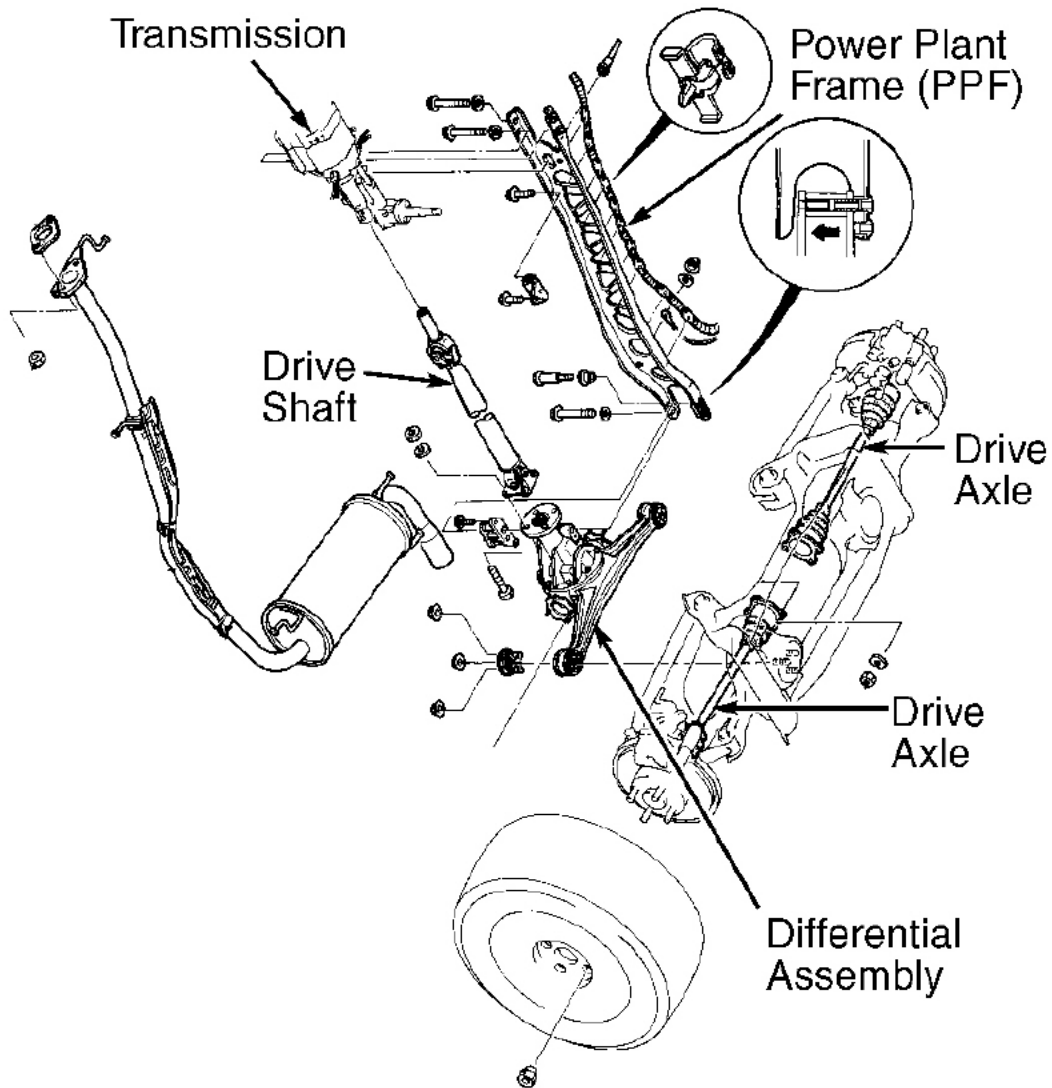
Formula: "A" - "B" - .0039" (.1 mm) = Rear Clutch Total End Play

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Fig. 41: Measuring Rear Clutch (Distance "A" & "B")
Courtesy of MAZDA MOTORS CORP.

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1990-91 DRIVE AXLES Differentials & Drive Axles - 929, B2200, B2600i, MX-5 Miata, MPV, Protege & RX-7



91J01527

Fig. 5: Exploded View of Differential Components (Miata)
Courtesy of MAZDA MOTORS CORP.

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STARTER - DIRECT DRIVE 1990-92 ELECTRICAL Mazda Starters - Direct Drive

NOTE: Solenoid tests must be performed with starter assembled and field lead ("M" terminal wire) disconnected at the solenoid.

CAUTION: Do not engage starter solenoid for more than 10 seconds during testing or damage to coil winding may result.

SOLENOID PULL-IN TEST

Connect positive battery lead to solenoid "S" terminal and negative battery lead to solenoid case. Starter pinion drive gear should extend quickly and maintain this position. If starter pinion drive gear does not extend, replace solenoid. See [Fig. 2](#).

SOLENOID RETURN TEST

Connect positive battery lead to solenoid "M" terminal and ground negative battery lead to starter body. Using screwdriver, pry overrunning clutch pinion drive outward. Release screwdriver and ensure overrunning clutch pinion drive returns to original position. See [Fig. 2](#).

SOLENOID

1. Disconnect all wires to solenoid. Using ohmmeter, ensure continuity between "S" and "M" terminals, and between "S" terminal and solenoid body. See [Fig. 1](#). If continuity does not exist between these terminals, solenoid must be replaced.
2. Next ensure continuity does not exist between "M" and "B" terminals. If continuity exists between these terminals, solenoid is shorted and must be replaced.

PINION GAP ADJUSTMENT

1. Ensure field wire is disconnected from solenoid "M" terminal. Connect positive battery lead to "S" terminal and negative battery lead to starter case. Starter pinion drive gear will extend outward and stop.
2. Quickly measure pinion gap clearance between end of pinion drive and circlip retainer. See [Fig. 3](#). DO NOT operate starter solenoid for more than 10 seconds. Pinion gap clearance should be .02-.08" (0.5-2.0 mm).
3. If pinion gap clearance is not within specification, adjust by increasing or decreasing thickness of solenoid shims located between solenoid and drive housing.

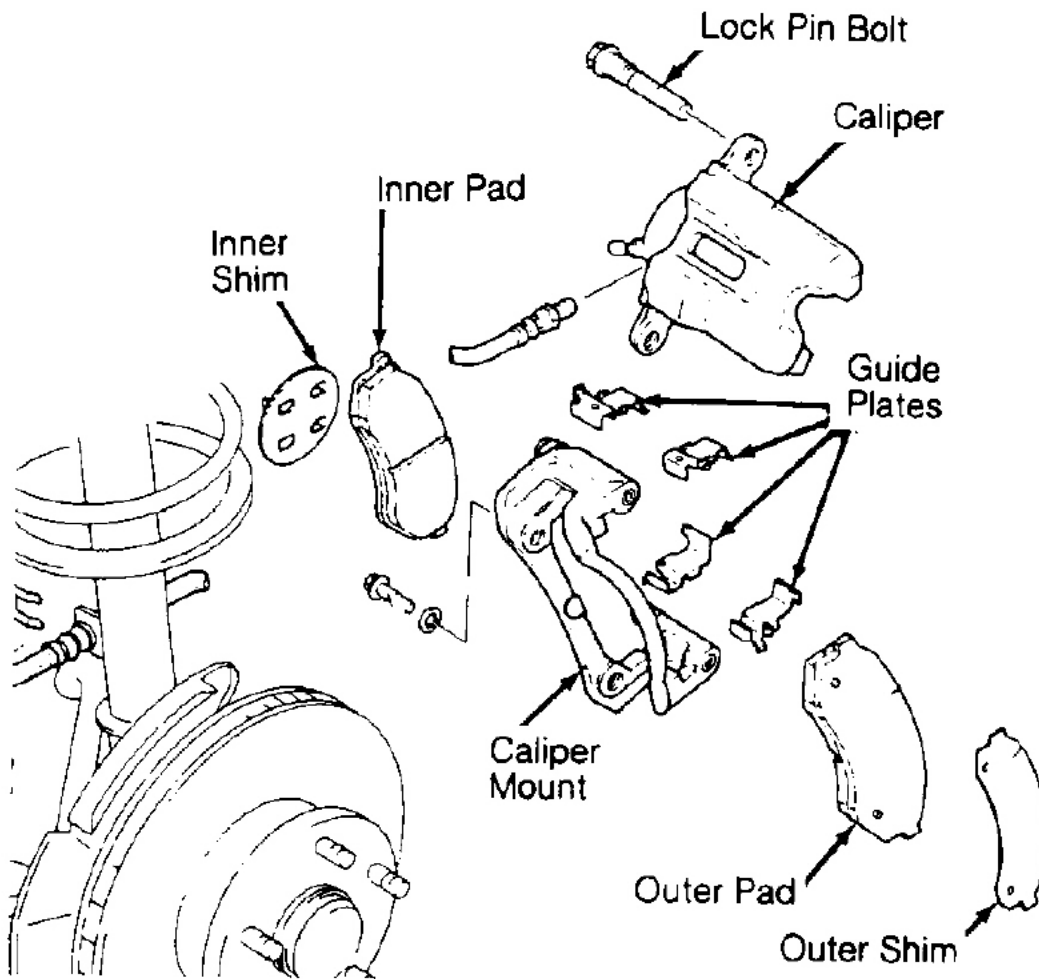


Fig. 12: View of Front Disc Brake Assembly 929

FRONT DISC BRAKE CALIPER

NOTE: For removal and installation of front disc brake caliper for Navajo, see FRONT DISC BRAKE PADS under REMOVAL & INSTALLATION.

Removal & Installation

Raise and support front of vehicle. Remove wheel and disconnect brake hose. Plug all openings. Remove brake disc pads. Remove remaining bolt(s). Remove caliper body from vehicle. To install, reverse removal procedure. Bleed hydraulic system.

FRONT BRAKE ROTOR

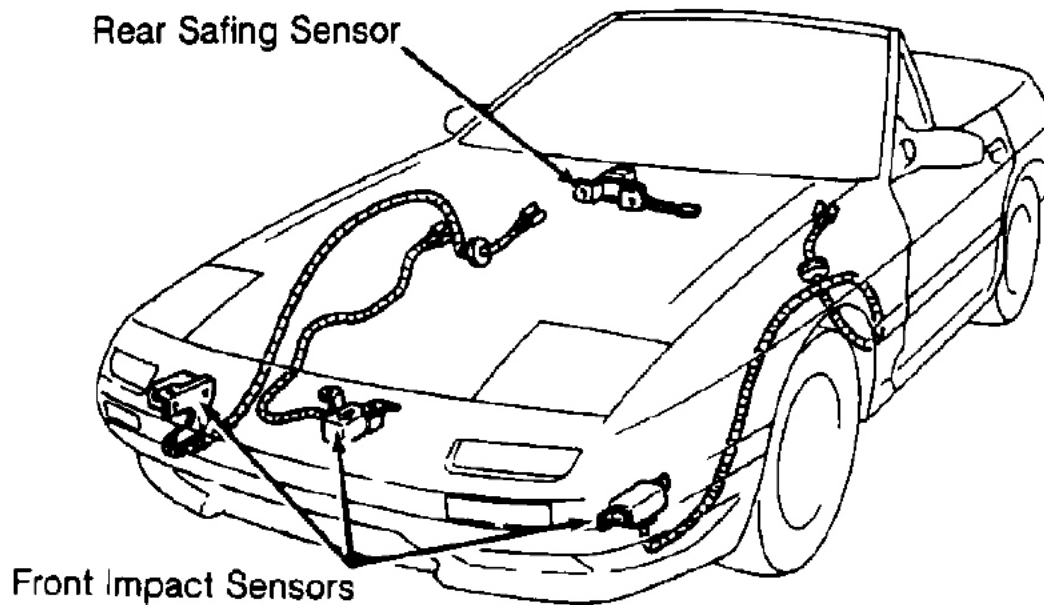


Fig. 3: Locating Crash Sensors (RX7 Convertible)
 Courtesy of MAZDA MOTORS CORP.

Installation

To install, reverse removal procedure. Position sensor with arrow toward front of vehicle. Tighten mounting bolts to specification. See TORQUE SPECIFICATIONS table. Reactivate air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Check AIR BAG indicator light to ensure system is functioning properly. See SYSTEM OPERATION CHECK.

Removal (Rear Safing Sensor)

Before proceeding, follow air bag service precautions. See SERVICE PRECAUTIONS. Disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Rear safing sensor is located under center of instrument panel. Remove instrument panel. Locate and disconnect safing sensor connectors. See **Fig. 2** or **Fig. 3**. Remove sensor and cover.

CAUTION: A double-lock mechanism is used on clockspring connectors. DO NOT use excessive force when disconnecting connectors, as damage to connector may occur.

Installation

To install, reverse removal procedure. Position sensor with arrow toward front of vehicle. Tighten mounting nuts to specification. See TORQUE SPECIFICATIONS table. Reactivate air bag system. See DISABLING &