

## 3.0L V6 - VINS [B,C,S]

### 1991 Mitsubishi Montero

1991 ENGINES  
Mitsubishi 3.0L V6  
Montero, Pickup, 3000GT

#### \* PLEASE READ THIS FIRST \*

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

#### ENGINE IDENTIFICATION

Engine may be identified by using Vehicle Identification Number (VIN) stamped on a metal pad, located near lower left corner of windshield. The eighth character identifies the engine model.

Engine model number is stamped on front upper edge of cylinder block (below cylinder head) or on vehicle information plate on firewall. Engine serial number is stamped near the engine model number.

#### ENGINE IDENTIFICATION CODES TABLE

Application	Engine Model	Engine Code
3.0L V6 SOHC		
Montero .....	6G72 .....	S
Pickup .....	6G72 .....	S
3.0L V6 DOHC		
3000GT		
Non-Turbo .....	6G72 .....	B
Turbo .....	6G72 .....	C

#### ADJUSTMENTS

##### VALVE CLEARANCE ADJUSTMENT

NOTE: Hydraulic lash adjusters are set into rocker arms (SOHC) or cylinder head (DOHC). No adjustment is required.

#### 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

Perform these steps to release fuel system pressure:

- \* Disconnect fuel pump harness connector at fuel tank.
- \* Start engine. After it stalls, turn ignition switch to OFF position.
- \* Disconnect battery (-) terminal, and reconnect fuel pump harness connector.

- \* Wrap shop towels around fuel return and high pressure hoses to prevent fuel splashing on engine. Disconnect fuel return hose and high pressure fuel hose to drain any residual fuel.

## ENGINE

### Removal (Montero & Pickup)

- 1) Remove hood. Drain cooling system, and remove radiator. Remove skid plate and splash shields. Release fuel system pressure. See FUEL PRESSURE RELEASE under REMOVAL & INSTALLATION. Disconnect negative battery cable.
- 2) Remove air cleaner ducts. Remove accessory drive belts. Remove and support A/C compressor and power steering pump. DO NOT disconnect hoses from compressor or pump. Disconnect oil cooler hoses. Cover fuel hose using shop towel, and disconnect high pressure fuel hose and "O" ring. Remove fuel return hose.
- 3) Label and disconnect all vacuum hoses. Disconnect cooling system hoses. Label and disconnect all electrical connections from engine. Remove heat shield from motor mounts. Remove motor mount bolts. Ensure all hoses and wires are disconnected and set aside.
- 4) Disconnect exhaust pipe from exhaust manifolds. Remove starter. Attach engine hoist to engine. Support transmission. Disconnect engine from transmission. See appropriate article in CLUTCHES or TRANSMISSION SERVICING. Remove engine.

### Installation (Montero & Pickup)

To install, reverse removal procedure. Install new "O" ring on fuel line. Install new exhaust gaskets and nuts. See TORQUE SPECIFICATIONS (MONTERO & PICKUP) table at end of article. Adjust fluid levels.

### Removal (3000GT)

- 1) Release fuel pressure. See FUEL PRESSURE RELEASE under REMOVAL & INSTALLATION. Remove hood. Remove cruise control vacuum pump and linkage. On turbo models, remove necessary turbo air intake hoses and pipes. On all other models, remove air cleaner hoses.
- 2) On all models, drain cooling system. Drain engine oil and transaxle oil. Remove heater hoses and radiator hoses. Remove transaxle assembly. See appropriate article in CLUTCHES or TRANSMISSION SERVICING.
- 3) Remove radiator. Label and disconnect all vacuum hoses. Label and disconnect all electrical connections and harnesses from engine. Remove accessory drive belts.
- 4) Remove and support A/C compressor and power steering pump. DO NOT disconnect hoses from compressor or pump. Cover fuel hose using shop towel, and disconnect high pressure fuel hose and "O" ring. Remove fuel return hose.
- 5) On turbo models, disconnect oil cooler and vacuum hoses. On all models, remove motor mount bolts and brackets. Ensure all hoses and wires are disconnected and set aside. Attach engine hoist to engine. Remove engine.

### Installation

To install, reverse removal procedure. Install new "O" ring on fuel line. Install new exhaust gaskets and nuts. See TORQUE SPECIFICATIONS (3000GT) table at end of article. Adjust fluid levels.

## UPPER INTAKE MANIFOLD

### Removal (Montero & Pickup)

- 1) Remove air intake hose. See Fig. 1. Remove accelerator cable adjusting bolts. On models equipped with automatic transmission, remove throttle control cable. On all models, remove accelerator

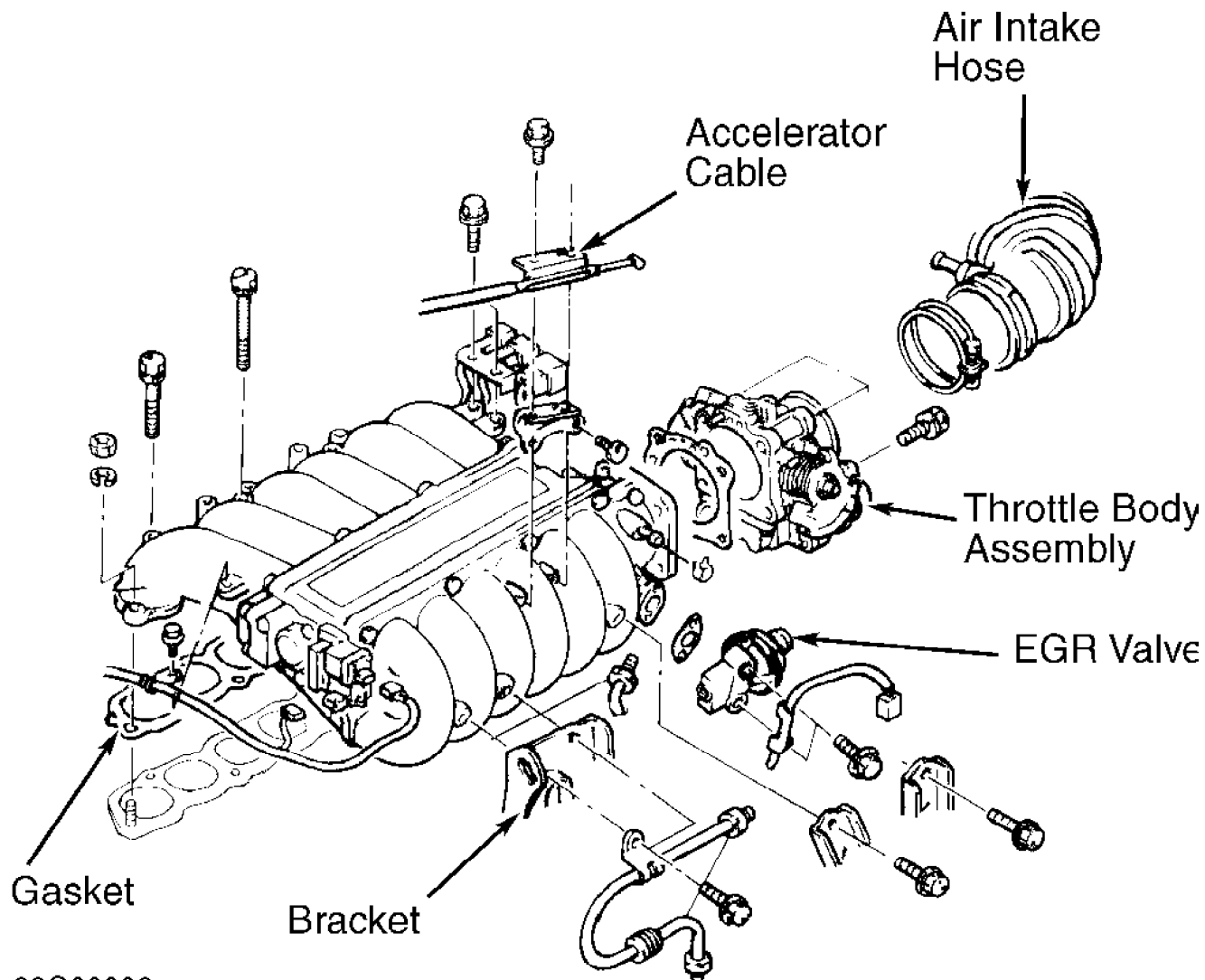
cable. Label and disconnect all vacuum hoses from throttle body and upper intake manifold.

2) Disconnect O2 sensor connector. Remove EGR pipe and gasket. Remove ignition coil. Remove engine oil filler neck bracket. Remove throttle body, leaving coolant hoses connected. Remove throttle body gasket. Remove upper intake manifold plenum mounting bolts and nuts.

3) If necessary, remove EGR valve and pipe. Remove upper intake manifold plenum brackets. Remove upper intake manifold and gasket.

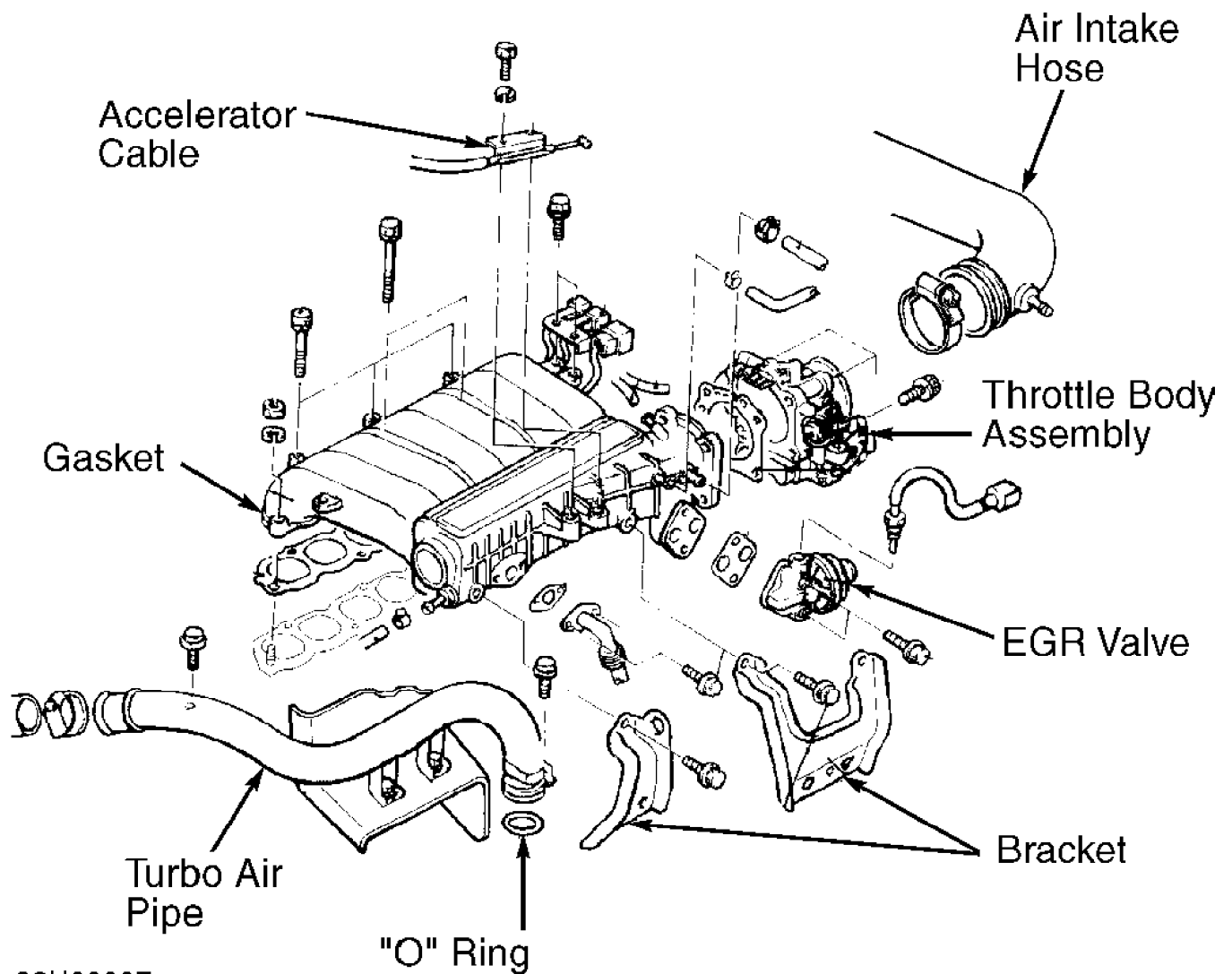
#### Inspection & Installation (Montero & Pickup)

Clean all gasket mating surfaces. Inspect for damage and cracks on all mounting surfaces. To install, reverse removal procedure using new gaskets. Tighten bolts and nuts to specification. See TORQUE SPECIFICATIONS (MONTERO & PICKUP) table at end of article.



92G00006

Fig. 1: Exploded View of Upper Intake Manifold & Components (DOHC)  
Courtesy of Mitsubishi Motor Sales of America, Inc



92H00007

Fig. 2: View of Upper Intake Manifold & Components (DOHC Turbo, SOHC)  
 Courtesy of Mitsubishi Motor Sales of America, Inc

Removal (3000GT)

- 1) Remove air intake hose. Remove throttle body and gasket with control cables and coolant and vacuum hoses attached. See Fig. 2.
- 2) Remove EGR and EGR pipe (if equipped). Disconnect power brake hose. Label and disconnect vacuum hoses and electrical connections. Remove upper intake manifold plenum retaining bracket(s), mounting bolts and nuts. Remove upper intake manifold.

Inspection & Installation (3000 GT)

Clean all gasket mating surfaces. Inspect for damage and cracks on all mounting surfaces. To install, reverse removal procedure using new gaskets. Install throttle body gasket with projection on gasket facing upward beyond throttle body mounting surface. Tighten bolts and nuts to specification. See TORQUE SPECIFICATIONS (3000GT) table at end of article.

**LOWER INTAKE MANIFOLD**

CAUTION: Fuel system is under pressure. Fuel pressure must be

released before disconnecting fuel lines.

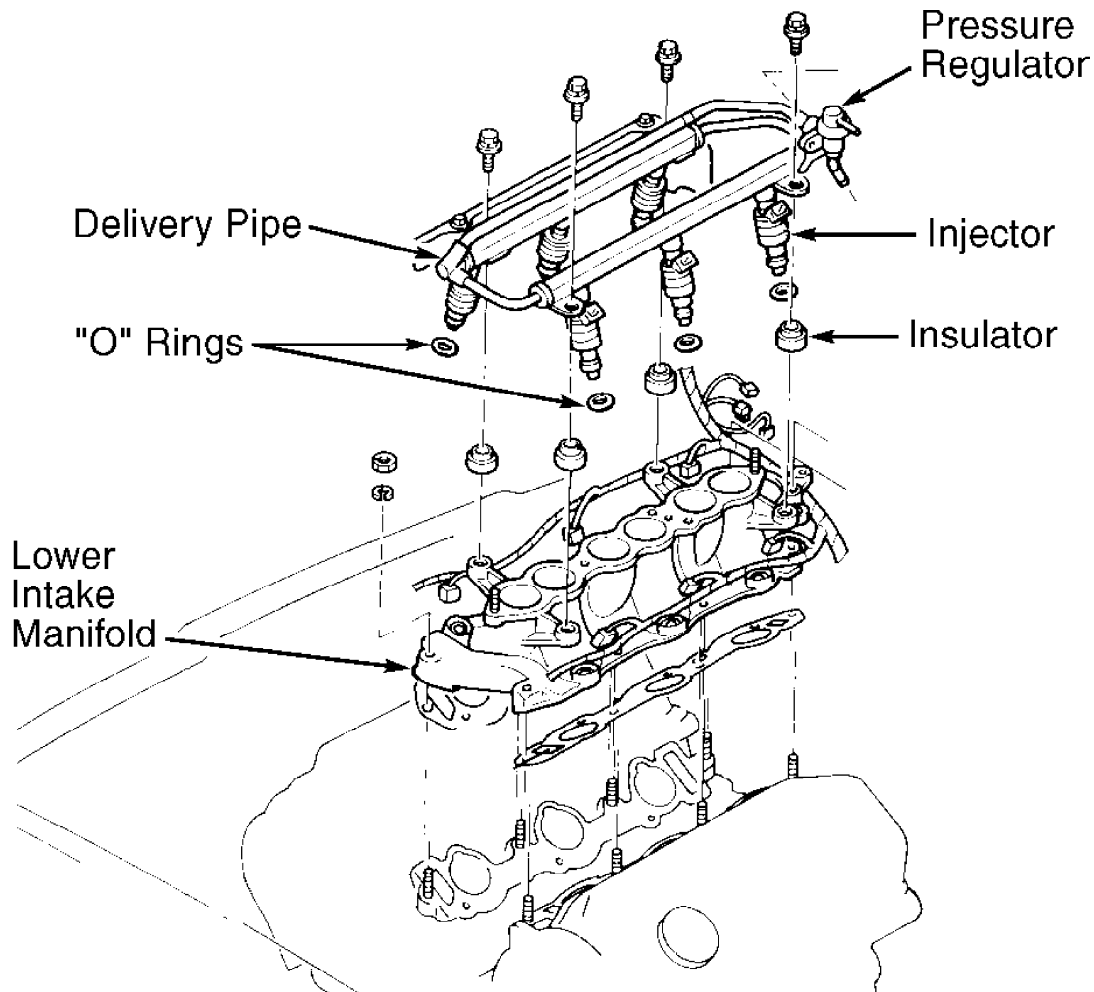
#### Removal

1) Release fuel pressure. See FUEL PRESSURE RELEASE under REMOVAL & INSTALLATION. Remove upper intake manifold. See UPPER INTAKE MANIFOLD under REMOVAL & INSTALLATION.

2) Drain cooling system. Remove high pressure and return fuel lines. Cover fuel lines using shop towel during removal as some fuel may be retained. Remove vacuum hose from pressure regulator. Disconnect injector harness from injectors.

3) Remove fuel delivery pipe, fuel injectors and pressure regulator. See Fig. 3. DO NOT allow injectors to fall from delivery pipe during removal. Remove vacuum hose and pipe assembly.

4) On Montero & Pickup, disconnect coolant temperature sending unit, coolant temperature switch (A/C equipped), coolant temperature sensor and thermostatic switch (A/T equipped). Disconnect upper radiator and coolant by-pass hoses. Disconnect heater pipe. On all models, remove intake manifold and gasket.



92100008

Fig. 3: Exploded View of Lower Intake Manifold & Components  
Courtesy of Mitsubishi Motor Sales of America, Inc.

#### Inspection & Installation

1) Inspect for damage and cracks on all mounting surfaces. To

install, reverse removal procedure using new gaskets and "O" rings. Coat "O" ring with fuel before installation.

2) Install lower intake manifold gasket with adhesive side toward intake manifold and gasket protrusions facing outboard of engine. Tighten bolts and nuts to specification. See appropriate TORQUE SPECIFICATIONS table at end of article. Check for fuel leaks.

## TURBOCHARGER

### Removal (Front)

1) Drain coolant, and remove radiator. Disconnect exhaust pipe from turbo. Remove all air intake pipes. Note match marks and installation depth on air pipes and hoses for reinstallation. Remove serpentine drive belt. Remove alternator. Remove A/C compressor and bracket, and support aside.

2) Remove O2 sensor. Remove dipstick assembly and turbo heat shield. Disconnect turbo coolant feed and return lines. Disconnect turbo oil feed and return lines. Remove turbocharger assembly.

### Removal (Rear)

1) Drain coolant. Remove battery. Disconnect accelerator cable at bracket and throttle body. Disconnect exhaust pipe from turbo. Remove all air intake pipes and heat shields. Disconnect accelerator cable at pedal.

2) Remove clutch booster vacuum hose. Remove O2 sensor. Remove EGR pipe and turbo heat shield. Disconnect turbo coolant feed and return lines. Disconnect turbo oil feed and return lines. Remove turbocharger assembly.

CAUTION: DO NOT allow foreign material into turbocharger air intakes or coolant and oil passages.

### Inspection (Front & Rear)

1) Inspect turbocharger for oil leakage. Check turbine and compressor wheels for cracks and other damage. Both wheels should turn easily by hand.

2) Apply 6.8 psi (61 kPa) vacuum to wastegate diaphragm. Ensure wastegate operates and diaphragm holds vacuum pressure. Use care when cleaning gasket surfaces so no foreign material enters turbocharger oil, coolant and air passages.

### Installation (Front & Rear)

Refill turbocharger with clean engine oil through oil pipe installation hole. To complete installation, reverse removal procedure. Align match marks, and install air pipes and hoses to proper depth.

## EXHAUST MANIFOLDS

### Removal (Montero & Pickup)

1) Remove splash shields. Remove O2 sensor. Remove exhaust pipe-to-manifold nuts. Lower exhaust pipe, and remove gasket. Remove heat protector. To remove right exhaust manifold, remove air duct, engine lift bracket and alternator bracket.

2) To remove left exhaust manifold, remove EGR pipe and gasket. Remove front intake manifold plenum bracket. Remove exhaust manifolds and gaskets.

### Inspection (Montero & Pickup)

Clean all gasket mating surfaces. Inspect for damage and cracks on all mounting surfaces. Check mounting surfaces of manifold and cylinder head for warpage. Repair or replace components if warpage exceeds .012" (.30 mm).

Installation (Montero & Pickup)

To install, reverse removal procedure using new gaskets. Tighten bolts and nuts to specification. See TORQUE SPECIFICATIONS (MONTERO & PICKUP) table at end of article.

Removal (3000GT)

1) Remove turbocharger(s) (if equipped). See TURBOCHARGER under REMOVAL & INSTALLATION. On front manifold, remove serpentine drive belt and alternator. Remove oil dipstick. On rear manifold, remove EGR pipe (if equipped).

NOTE: Note locations and direction of installation of exhaust manifold plain and spring washers for reinstallation reference. DO NOT mix these fasteners.

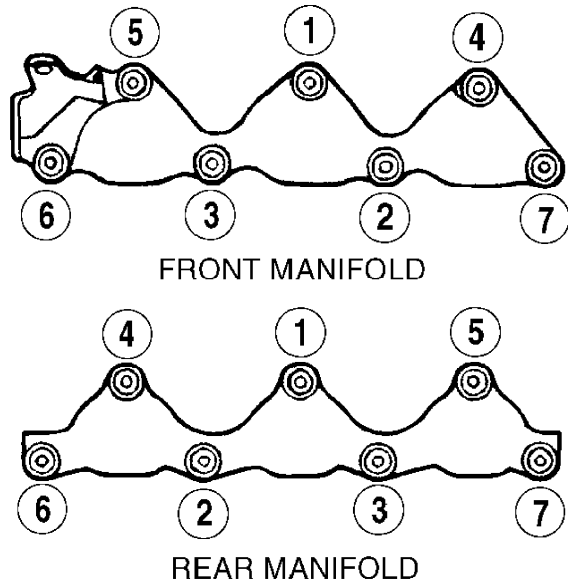
2) On all manifolds, remove exhaust pipe-to-manifold nuts. Lower exhaust pipe, and remove gasket. Remove heat protector. Remove exhaust manifold nuts and washers. Note locations and direction of installation of plain and spring washers for reinstallation reference. DO NOT mix these fasteners. Remove exhaust manifold and gasket.

Inspection (3000GT)

Clean all gasket mating surfaces. Inspect for damage and cracks on all mounting surfaces. Check mounting surfaces of manifold and cylinder head for warpage. Repair or replace components if warpage exceeds .012" (.30 mm).

Installation (3000GT)

To install, reverse removal procedure using new gaskets. Install new "O" ring on dipstick guide. Coat "O" ring with oil before installation. Install manifold nuts and washers in original locations. Tighten nuts to specification in sequence. See Fig. 4. See TORQUE SPECIFICATIONS (3000GT) table at end of article.



92J00009

Fig. 4: Exhaust Manifold Tightening Sequence (3000GT)  
Courtesy of Mitsubishi Motor Sales of America, Inc.

CYLINDER HEADS

Removal (SOHC)

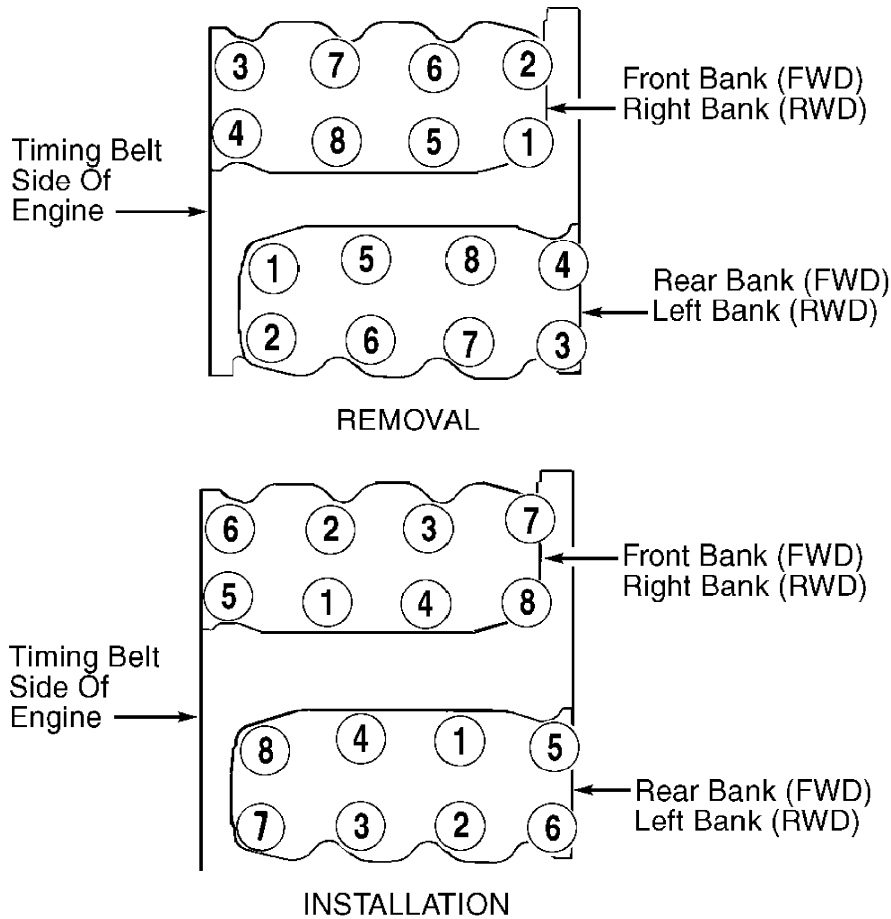
1) Drain cooling system. Remove upper and lower intake manifolds and brackets. See UPPER INTAKE MANIFOLD and LOWER INTAKE MANIFOLD under REMOVAL & INSTALLATION. Remove spark plug wires. Remove splash shields.

2) Disconnect O2 sensor. Disconnect exhaust pipe from exhaust manifold, and support to crossmember using wire. Remove heat shields and exhaust manifolds. See EXHAUST MANIFOLDS under REMOVAL & INSTALLATION.

3) Remove distributor (left or rear head). Remove timing belt outer covers, camshaft sprockets, timing belt and timing belt inner covers. See TIMING BELT under REMOVAL & INSTALLATION. Remove accessory bracket bolts from front of cylinder head. Remove rocker cover and gasket.

4) Using Socket (MD998051), loosen cylinder head bolts in 2-3 steps using proper sequence. See Fig. 5. Remove cylinder head and camshaft assemblies. Note direction of washer installation on head bolts.

NOTE: Cylinder head bolts must be loosened in 2-3 steps using proper sequence to prevent cylinder head warpage and cracking.



92B00010  
Fig. 5: Cylinder Head Bolt Removal & Tightening Sequence  
Courtesy of Mitsubishi Motor Sales of America, Inc.

Inspection (SOHC)

Check cylinder head height and warpage at gasket and manifold



surfaces. Resurface head if warpage exceeds specification. See CYLINDER HEAD (SOHC) table under ENGINE SPECIFICATIONS at end of article. Replace cylinder head if it is not within specification after resurfacing.

#### Installation (SOHC)

1) Ensure mating surfaces are clean and dry. Note identification mark located on front of head gasket. Identification marks are: "R" for SOHC, "2DN" for DOHC non-turbocharged and "2DT" for DOHC turbocharged engine. Install head gasket with identification mark toward timing belt side of engine and facing upward. Ensure all holes are aligned.

NOTE: Install head gasket with identification mark toward timing belt side of engine and facing upward. Ensure all holes align. Install washers on head bolts with chamfered side toward bolt head.

2) Install cylinder head and bolts. Ensure washers are installed on head bolts with chamfered side toward bolt head. Using proper sequence, tighten bolts to specification in 2-3 steps. See Fig. 5. See appropriate TORQUE SPECIFICATIONS table at end of article.

3) Apply sealant to rocker cover sealing surfaces before installation. See Fig. 6. Ensure rocker cover gasket projections are aligned with notches in rocker cover. Coat all "O" rings with oil, and install a new "O" ring on distributor adapter and oil dipstick tube.

4) Coat camshaft area with oil prior to installing distributor adapter. To complete installation, reverse removal procedure. Tighten bolts and nuts to specification. See appropriate TORQUE SPECIFICATIONS table. After engine reaches normal operating temperature, allow engine to cool, and retighten cylinder head bolts.

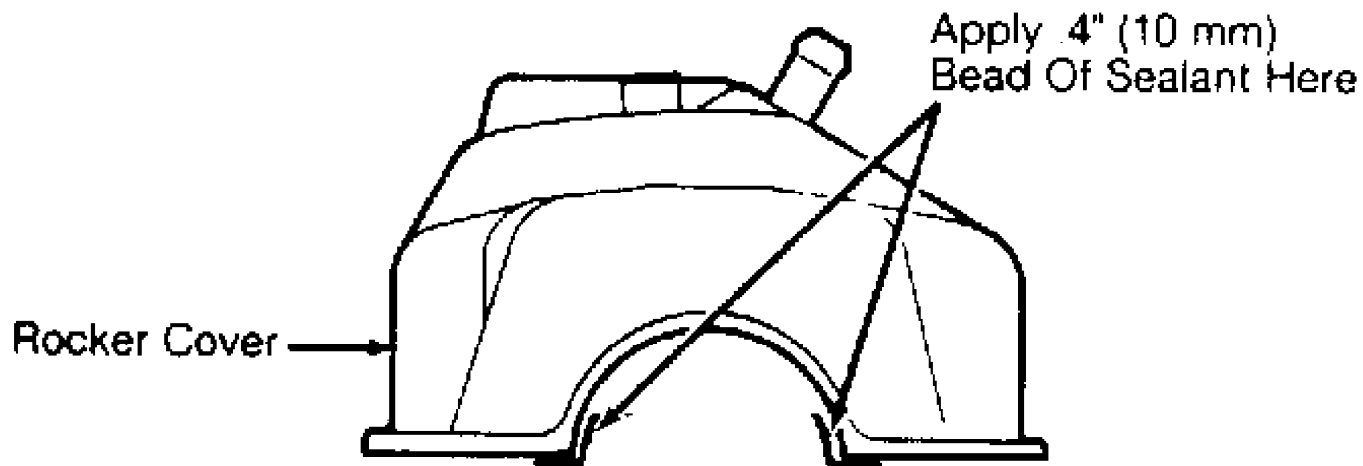


Fig. 6: Applying Sealant to Rocker Cover (SOHC)  
Courtesy of Mitsubishi Motor Sales of America, Inc.

#### Removal (DOHC)

1) Drain cooling system. Remove upper and lower intake manifolds and brackets. See UPPER INTAKE MANIFOLD and LOWER INTAKE MANIFOLD under REMOVAL & INSTALLATION.

2) Remove turbocharger(s) (if equipped). See TURBOCHARGER under REMOVAL & INSTALLATION. Remove heat shields from exhaust manifolds. Remove exhaust manifolds. See EXHAUST MANIFOLDS under REMOVAL & INSTALLATION.

3) Remove spark plug wires and ignition coils. Remove rocker cover and gasket. Remove timing belt and timing belt inner covers. See

TIMING BELT under REMOVAL & INSTALLATION. Remove intake camshaft sprockets.

4) Remove coolant manifold and coolant inlet pipe. Using Socket (MD998051), remove cylinder head bolts. Remove cylinder head and camshaft assemblies. Note direction of washer installation on head bolts.

#### Inspection (DOHC)

Check cylinder head height. Check warpage at gasket and manifold surfaces. Resurface head if warpage exceeds specification. See CYLINDER HEAD (DOHC) table under ENGINE SPECIFICATIONS at end of article. After resurfacing, recheck cylinder head height. Replace cylinder head if it is not within specification.

#### Installation (DOHC)

1) Ensure mating surfaces are clean and dry. Note identification mark located on front of head gasket. Identification marks are: "R" for SOHC, "2DN" for DOHC non-turbocharged and "2DT" for DOHC turbocharged engine. Install head gasket with identification mark toward timing belt side of engine and facing upward. Ensure all holes are aligned.

NOTE: Install head gasket with identification mark toward timing belt side of engine and facing upward. Ensure all holes align. Install washers on head bolts with chamfered side toward bolt head.

2) Install cylinder head and bolts. Ensure washers are installed on head bolts with chamfered side toward bolt head. Using proper sequence, tighten bolts to specification in 2-3 steps. See Fig. 5. See TORQUE SPECIFICATIONS (3000GT) table at end of article. On turbocharger equipped engines, back off head bolts once, and repeat tightening procedure.

3) To reinstall camshaft sprocket, hold hexagonal area of camshaft using wrench while tightening sprocket bolt. Tighten rocker cover bolts in a crisscross pattern. Start at 4 corners of rocker cover and move toward center.

NOTE: Rocker cover bolts are color coded. Front cylinder bank bolts are black; rear cylinder bank bolts are green.

4) To complete installation, reverse removal procedure. Tighten bolts and nuts to specification. See TORQUE SPECIFICATIONS (3000GT) table.

## FRONT CRANKSHAFT OIL SEAL

#### Removal & Installation

Remove timing belt and crankshaft sprocket. See TIMING BELT under REMOVAL & INSTALLATION. Pry oil seal from oil pump. To install, coat seal lip with grease. Using Seal Installer (MD998717), install seal in oil pump. Install remaining components. See appropriate TORQUE SPECIFICATIONS table at end of article.

## TIMING BELT

#### Removal (Montero & Pickup)

1) Drain cooling system. Disconnect upper radiator hose. Remove upper radiator shroud. Remove cooling fan and fan clutch assembly. Remove cooling fan pulley. Remove all drive belts. Remove power steering pump with pressure and return hoses connected, and set aside.

2) Remove power steering pump brackets. Remove A/C tensioner