## 2005 ENGINE

## Engine Mechanical - Outlander

# GENERAL DESCRIPTION

The 4G69 (2.4L) engine is an in-line four cylinder engine. The cylinder numbers are assigned as 1 - 2 - 3 - 4 from the front of the engine (timing belt side). This engine is fired in the order of the 1, 3, 4 and 2 cylinders.

| ITEM | | | SPECIFICATION |
|---|---|---|---|
| Type | | | In-line SOHC |
| Number of cylinders | | | 4 |
| Bore mm (in) | | | 87 (3.43) |
| Stroke mm (in) | | | 100.0 (3.94) |
| Total displacement $cm^3$ (cu in) | | | 2,378 (145.1) |
| Compression ratio | | | 9.5 |
| Firing order | | | 1 – 3 – 4 – 2 |
| Counterbalance shaft | | | Equipped |
| Valve timing | Intake valve | Opens (BTDC) | 6° <Low speed cam> |
| | | | 20° <High speed cam> |
| | | Closes (ABDC) | 38° <Low speed cam> |
| | | | 72° <High speed cam> |
| | Exhaust valve | Opens (BBDC) | 60° |
| | | Closes (ATDC) | 16° |
| Lubrication system | | | Pressure feed, full-flow filtration |
| Oil pump type | | | Involute gear type |

G02479793

**Fig. 1: Item And Specification Reference Chart**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

# ENGINE DIAGNOSIS

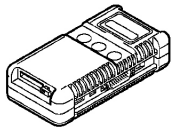
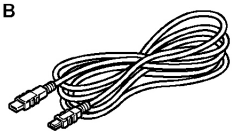
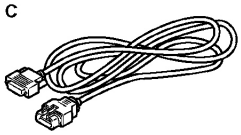
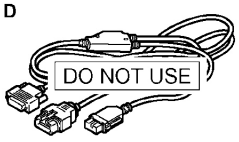
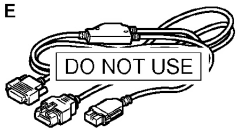
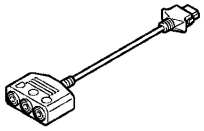
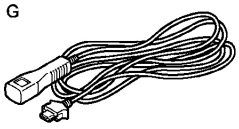
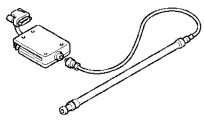
 

| SYMPTOM | PROBABLE CAUSE | REMEDY |
|---|---|---|
| Compression is too low | Blown cylinder head gasket | Replace the gasket |
| | Worn or damaged piston rings | Replace the rings |
| | Worn piston or cylinder | Repair or replace the piston and/or the cylinder block |
| | Worn or damaged valve seat | Repair or replace the valve and/or the seat ring |
| Drop in engine oil pressure | Engine oil level is too low | Check the engine oil level |
| | Malfunction of engine oil pressure switch | Replace the engine oil pressure switch |
| | Clogged oil filter | Install a new filter |
| | Worn oil pump gears or cover | Replace the gears and/or the cover |
| | Thin or diluted engine oil | Change the engine oil to correct viscosity |
| | Stuck (opened) oil relief valve | Repair the relief valve |
| | Excessive bearing clearance | Replace the bearings |
| Engine oil pressure too high | Stuck (closed) oil relief valve | Repair the relief valve |
| Noisy valves | Incorrect valve clearance | Adjust valve clearance |
| | Thin or diluted engine oil (low engine oil pressure) | Change the engine oil |
| | Worn or damaged valve stem or valve guide | Replace the valve and/or the guide |
| Connecting rod noise/main bearing noise | Insufficient oil supply | Check the engine oil level |
| | Low engine oil pressure | Refer to engine oil pressure drop symptoms above |
| | Thin or diluted engine oil | Change the engine oil |
| | Excessive bearing clearance | Replace the bearings |

G02479794

**Fig. 2: Engine Diagnosis Chart**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

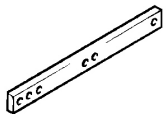
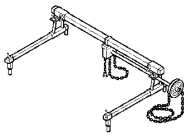
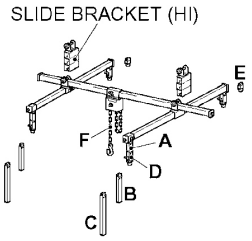
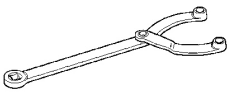
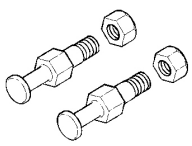
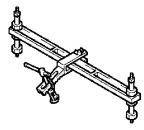
# SPECIAL TOOLS

| TOOL | TOOL NUMBER AND NAME | SUPERSESSION | APPLICATION |
|---|---|---|---|
| A<br>  <br>B<br>  <br>C<br>  <br>D<br>  <br><br>E<br>  <br><br>F<br>  <br>G<br>  | MB991958<br>Scan tool (MUT-III sub assembly)<br>A: MB991824<br>Vehicle communication interface (V.C.I.)<br>B: MB991827<br>MUT-III USB cable<br>C: MB991910<br>MUT-III main harness A (Vehicles with CAN communication system)<br>D: MB991911<br>MUT-III main harness B (Vehicles without CAN communication system)<br>E: MB991914<br>MUT-III main harness C (for Daimler Chrysler models only)<br>F: MB991825<br>MUT-III measurement adapter<br>G: MB991826<br>MUT-III trigger harness | MB991824-KIT<br>*NOTE: G: MB991826 MUT-III trigger harness is not necessary when pushing V.C.I. ENTER key.* | • Drive belt tension check<br>• Ignition timing check<br>• Curb idle speed check<br>• Idle mixture check<br>**⚠ CAUTION**<br>**For vehicles with CAN communication, use MUT-III main harness A to send simulated vehicle speed. If you connect MUT-III main harness B instead, the CAN communication does not function correctly.**<br>*NOTE: This vehicle supports only the CAN communication between the SRS-ECU and the MUT-III.* |
|  | MB991668<br>Belt tension meter set | Tool not available | Drive belt tension check [used together with scan tool (MUT-III sub assembly)] |

G02479795

**Fig. 3: Identifying Special Tools (1 Of 4)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

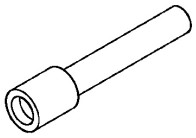
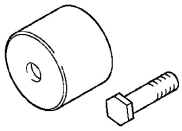
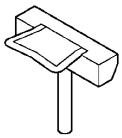
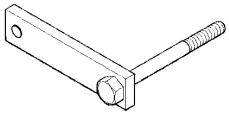
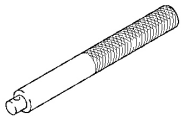
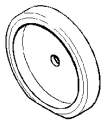
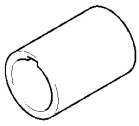
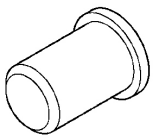
 

| TOOL | TOOL NUMBER AND NAME | SUPERSESSION | APPLICATION |
|---|---|---|---|
|  | MB991454<br>Engine hanger balancer | MZ203827-01 | When the engine hanger is used: Supporting the engine assembly during removal and installation of the transaxle assembly<br>*NOTE: Special tool MB991454 is a part of engine hanger attachment set MB991453.* |
|  | MB991527<br>Hanger | Tool not available | |
|  | MB991895<br>Engine hanger | Tool not available | |
|  | MB991928<br>Engine hanger<br>A: MB991929<br>Joint (50) × 2<br>B: MB991930<br>Joint (90) × 2<br>C: MB991931<br>Joint (140) × 2<br>D: MB991932<br>Foot (standard) × 4<br>E: MB991933<br>Foot (short) × 2<br>F: MB991934<br>Chain and hook assembly | Tool not available | |
|  | MB990767<br>Front hub and flange yoke holder | MB990767-01 | Holding the camshaft sprocket |
|  | MD998719<br>Pin | MIT308239 | |
|  | MD998772<br>Valve spring compressor | General service tool | Compressing valve spring |

G02479796

**Fig. 4: Identifying Special Tools (2 Of 4)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

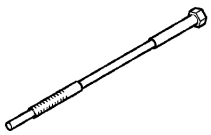
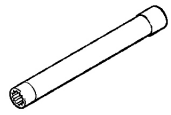
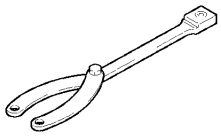
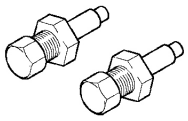
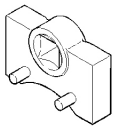
 

| TOOL | TOOL NUMBER AND NAME | SUPERSESSION | APPLICATION |
|---|---|---|---|
|  | MB991999<br>Valve stem seal installer | – | Valve stem seal installation |
|  | MD998713<br>Camshaft oil seal installer | MD998713-01 | Camshaft oil seal installation |
|  | MD998727<br>Oil pan FIPG cutter | MD998727-01 | Oil pan removal <FWD> |
|  | MD998781<br>Flywheel stopper | General service tool | • Supporting the flywheel assembly <M/T><br>• Supporting the A/T drive plate <A/T> |
|  | MB990938<br>Installer bar | MB990938-01 | Crankshaft rear oil seal installation |
|  | MD998776<br>Crankshaft rear oil seal installer | MD998776-01 | |
|  | MD998285<br>Crankshaft front oil seal guide | MD998285-01 | Crankshaft front oil seal installation |
|  | MD998375<br>Crankshaft front oil seal installer | MD998375-01 | |

G02479797

**Fig. 5: Identifying Special Tools (3 Of 4)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

| TOOL | TOOL NUMBER AND NAME | SUPERSESSION | APPLICATION |
|---|---|---|---|
|  | MD998738<br>Adjusting bolt | General service tool | Supporting the timing belt tensioner arm and timing belt tensioner adjuster |
|  | MB991654<br>Cylinder head bolt wrench (12) | General service tool | Removal and installation of cylinder head bolt |
|  | MB991367<br>Special spanner | MB991367-01 | Holding the crankshaft camshaft drive sprocket |
|  | MB991385<br>Pin | MIT217213 | |
|  | MD998767<br>Tensioner wrench | MD998752-01 | Valve timing belt tension adjustment |

G02479798

**Fig. 6: Identifying Special Tools (4 Of 4)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

# ON-VEHICLE SERVICE

## DRIVE BELT TENSION CHECK

**CAUTION: Check the drive belt tension after turning the crankshaft clockwise one turn or more.**

1. Make sure that the indicator mark is within the area marked with A in the illustration.
2. If the mark is out of the area, replace the drive belt. (Refer to **<< A >> DRIVE BELT REMOVAL**).

**NOTE: The drive belt tension adjustment is not necessary as auto-tensioner is adopted.**

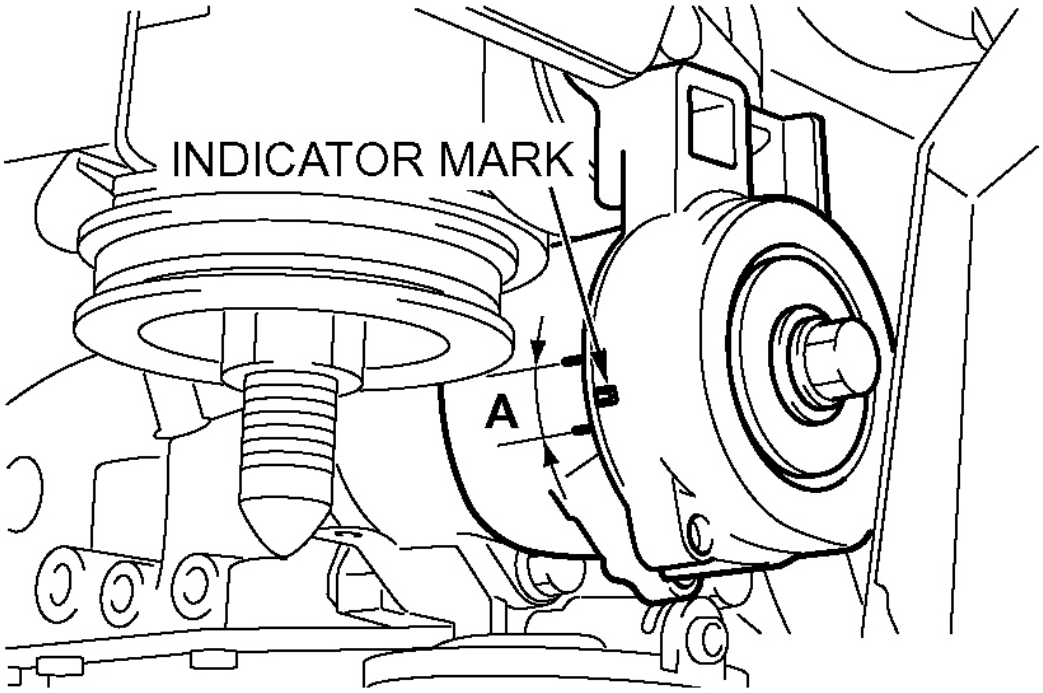



**Fig. 7: Identifying Indicator Mark**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

## AUTO-TENSIONER CHECK

### OPERATION CHECK

1. Turn OFF the engine from the idle state then check to see that the drive belt is not protruding from the pulley width of the auto-tensioner.
2. Remove the drive belt. (Refer to **<< A >> DRIVE BELT REMOVAL**).
3. Securely insert the spindle handle or ratchet handle with a 12.7 mm (1/2-inch) insertion angle into the jig hole of the auto tensioner. Turn the auto-tensioner to the left and right to check and see that there is no threading.
4. If there are any problems in the procedure 1 or 3, replace the auto-tensioner.
5. Install the drive belt. (Refer to **<< A >> DRIVE BELT REMOVAL**).

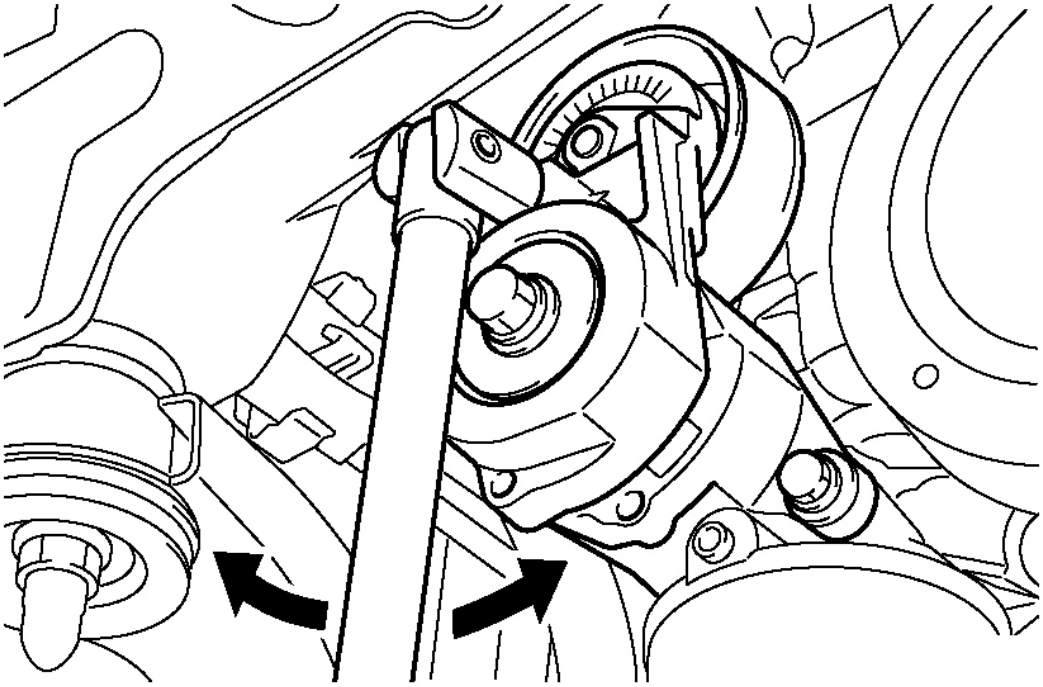



**Fig. 8: Turning Auto-Tensioner To Left And Right**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**FUNCTION CHECK**

You can verify if the auto-tensioner is defective or not by checking the drive belt tension.

**When using scan tool MB991958**

### Required Special Tools:

- MB991668: Belt Tension Meter Set
- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991910: MUT-III Main Harness A

1. Check the drive belt tension. (Refer to **DRIVE BELT TENSION CHECK**).
2. Measure the drive belt tension vibration frequency by the following procedures:

**CAUTION: To prevent damage to scan tool MB991824, always turn the ignition**

**switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991824.**

1. Connect special tool MB991668 to scan tool MB991824.
2. Connect scan tool MB991910 to scan tool MB991824.
3. Connect scan tool MB991910 to the data link connector.
4. Turn the ignition switch to the "ON" position and select "Belt Tension" from the menu scan tool MB991824 screen.

**CAUTION:**

- **The temperature of the surface of the belt should be as close to normal temperature as possible.**
- **Do not allow any contaminants such as water or oil to get onto the microphone.**
- **If strong gusts of wind blow against the microphone or if there are any loud sources of noise nearby, the values measured by the microphone may not correspond to actual values.**
- **If the microphone is touching the belt while the measurement is being made, the values measured by the microphone may not correspond to actual values.**
- **Do not take the measurement while the vehicle's engine is running.**

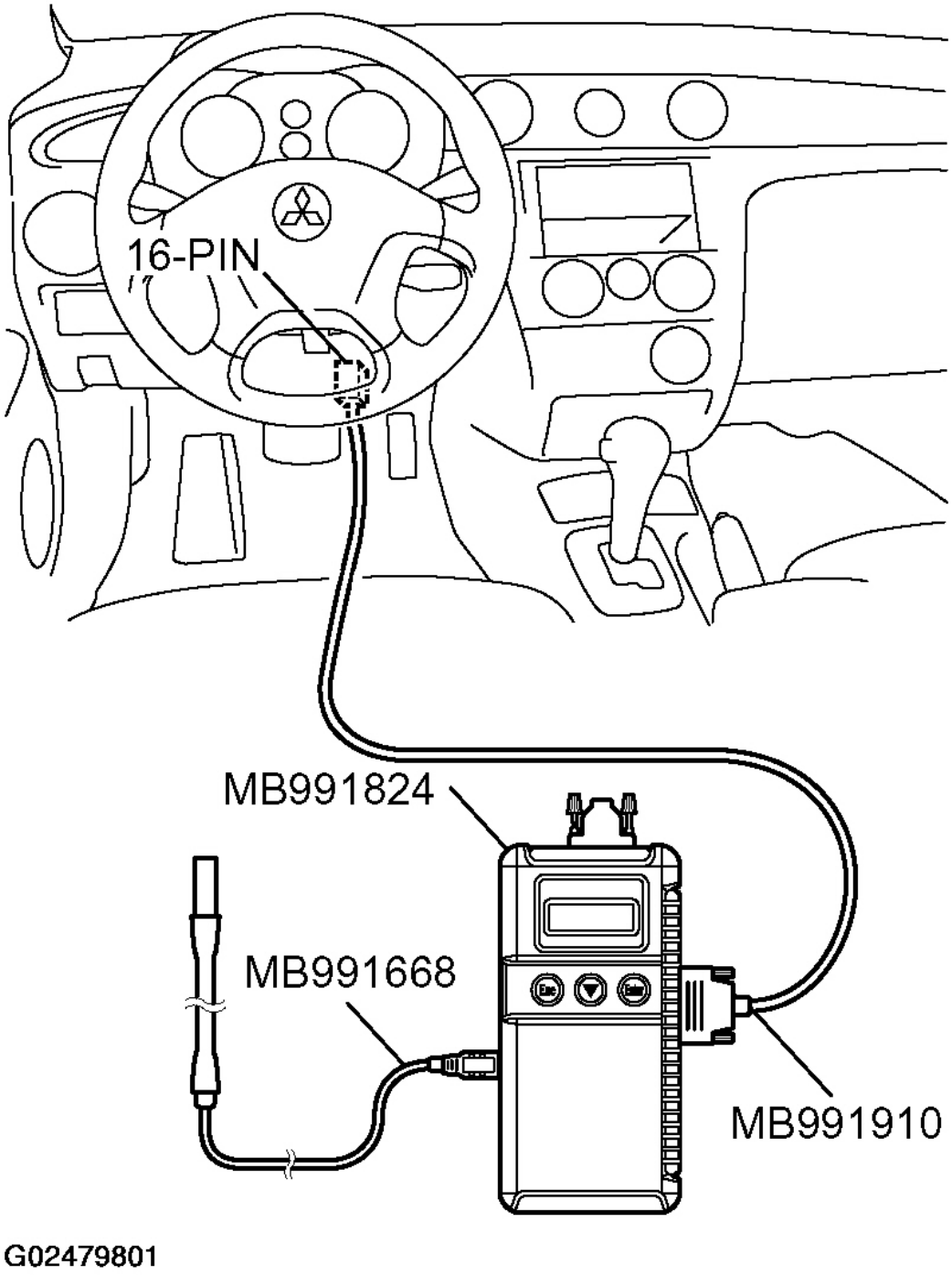



**Fig. 9: Connecting Scan Tool MB991910 To Data Link Connector**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

5. Hold special tool MB991668 to the middle of the drive belt between the pulleys (at the place

indicated by arrow), approximately 10 - 20 mm (0.40 - 0.78 inch) away from the rear surface of the belt so that it is perpendicular to the belt (within an angle of +/- 15 degree).

6. Gently tap the middle of the belt between the pulleys (the place indicated by the arrow) with your finger as shown in the illustration, and measure that the vibration frequency of the belt is within the standard value.

   **Standard value: 120 - 154 Hz**

3. If not within the standard value, replace the auto-tensioner.

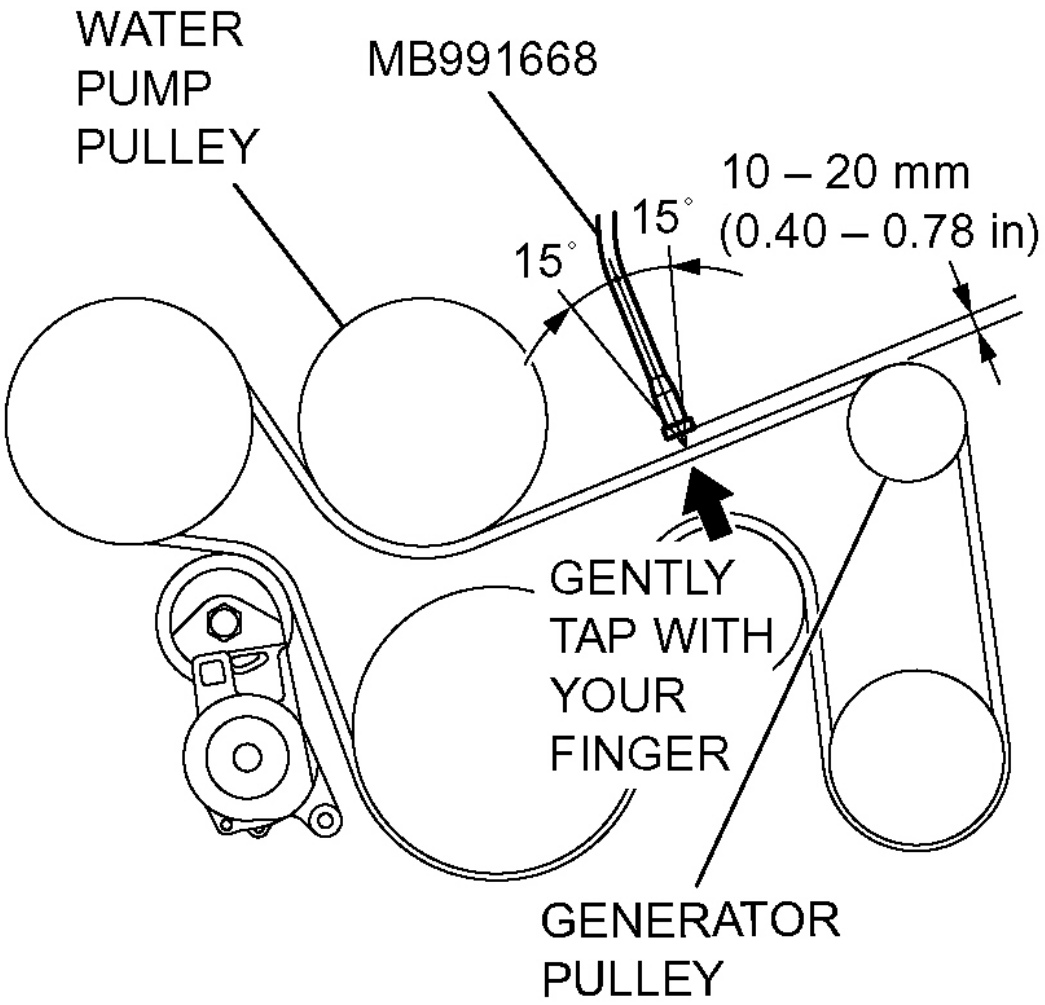



**Fig. 10: Taping Middle Of Belt Between Pulleys With Your Finger**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**When using a tension gauge**

1. Check the drive belt tension. (Refer to **DRIVE BELT TENSION CHECK**).
2. Use a belt tension gauge in the middle of the belt between the pulleys (at the place indicated by the arrow) to measure that the belt tension is within the standard value.

   **Standard value: 340 - 555 N**
3. If not within the standard value, replace the auto-tensioner.

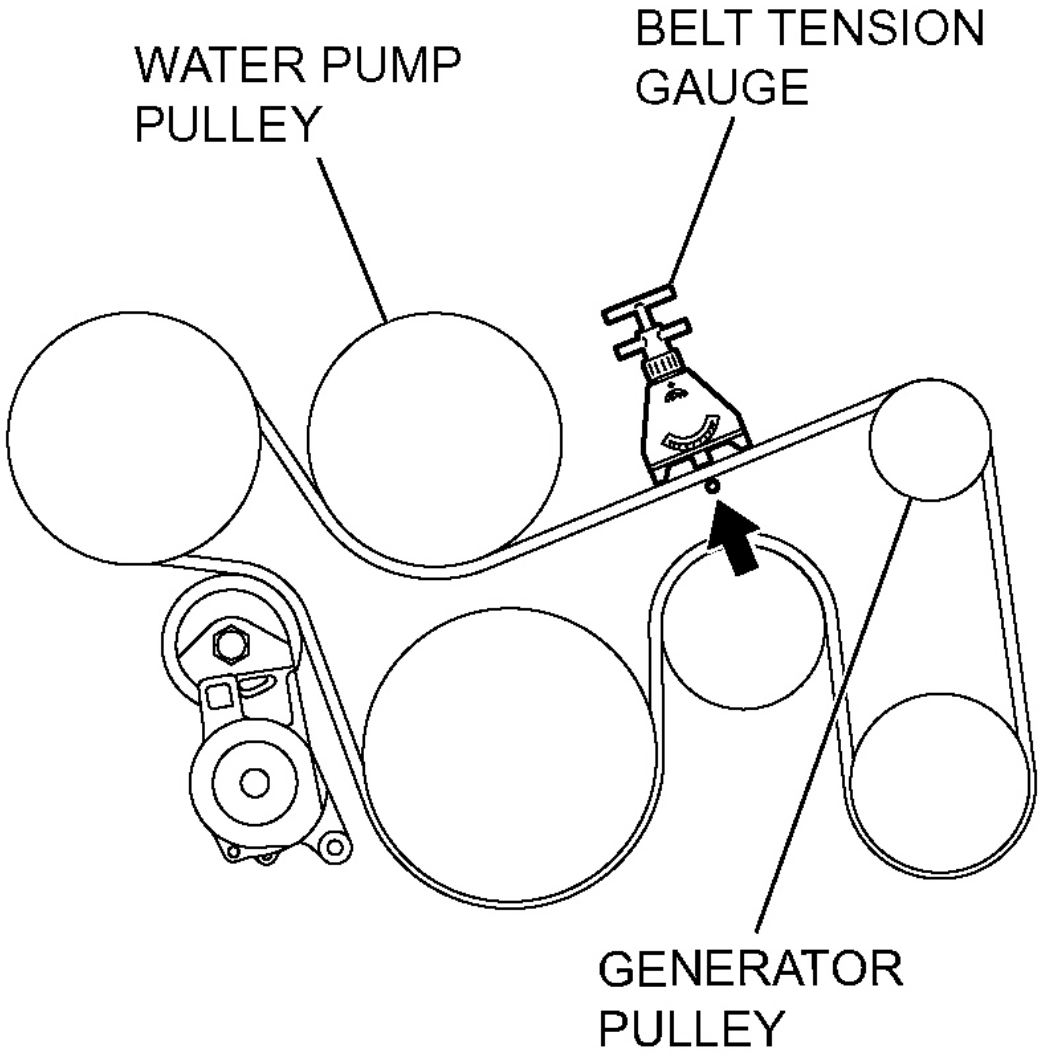



**Fig. 11: Checking Belt Tension Using Belt Tension Gauge**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

## VALVE CLEARANCE CHECK AND ADJUSTMENT

1. Before inspection, check that the engine oil, starter and battery are normal. Also, set the vehicle in the following condition:
   - Engine coolant temperature: 80 - 95°C (176 - 203°F)
   - Lights and all accessories: OFF
   - Transaxle: Neutral (P range on vehicles with A/T)

   **NOTE: Vehicles for Canada, the headlight, taillight, etc. remain lit even when the lighting switch is in "OFF" position but this is no problem for checks and adjustment.**

2. Remove all of the ignition coils.
3. Remove the rocker cover.
4. Turn the crankshaft clockwise until the notch on the pulley is lined up with "T" mark on the timing indicator.
5. Move the rocker arms on the No.1 and No.4 cylinders up and down by hand to determine which cylinder has its piston at the top dead center on the compression stroke.

   If both intake and exhaust valve rocker arms have a valve lash, the piston in the cylinder corresponding to these rocker arms is at the top dead center on the compression stroke.

6. Valve clearance inspection and adjustment can be performed on rocker arms indicated by white arrow mark when the No.1 cylinder piston is at the top dead center on the compression stroke, and on rocker arms indicated by black arrow mark when the No.4 cylinder piston is at the top dead center on the compression stroke.

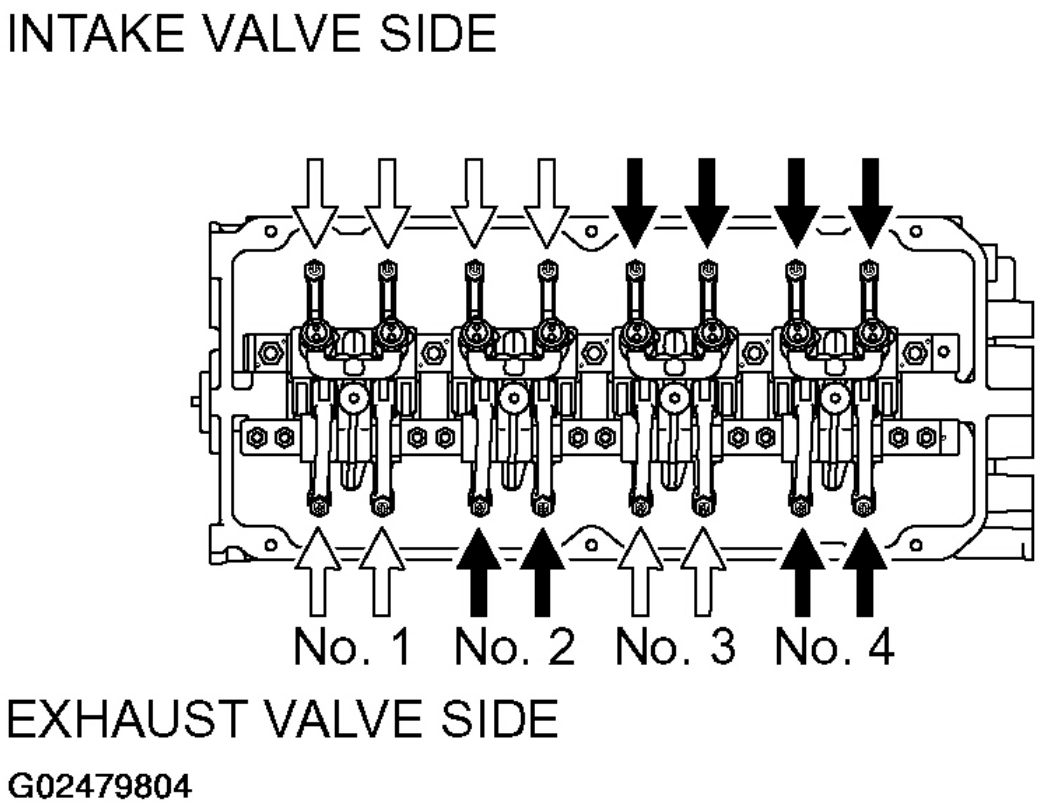



**Fig. 12: Identifying Valves**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

7. Measure the valve clearance.

   If the valve clearance is not as specified, loosen the rocker arm lock nut and adjust the clearance using a thickness gauge while turning the adjusting screw.

   **Standard value (hot engine):**

   **Intake valve: 0.20 mm (0.008 inch)**

   **Exhaust valve: 0.30 mm (0.012 inch)**

   While holding the adjusting screw with a screwdriver to prevent it from turning, tighten the lock nut to the specified torque.

   **Tightening torque: 9 +/- 1 N.m (80 +/- 9 in-lb)**

   Turn the crankshaft through 360 degree angle to line up the notch on the crankshaft pulley with the "T" mark on the timing indicator.

   Repeat steps (7) and (8) on other valves for clearance adjustment.

   Install the rocker cover.

Install the ignition coils.

**ROCKER ARM PISTON OPERATION CHECK**

1. Remove all of the ignition coils.
2. Remove the rocker cover.
3. Remove the engine oil control valve.
4. Remove the engine oil pressure switch.
5. Turn the crankshaft clockwise until the notch on the crankshaft pulley is lined up with "T" mark on the lower cover of timing belt.
6. Move the rocker arms on the No.1 and No.4 cylinders up and down by hand to determine which cylinder has its piston at the top dead center on the compression stroke.

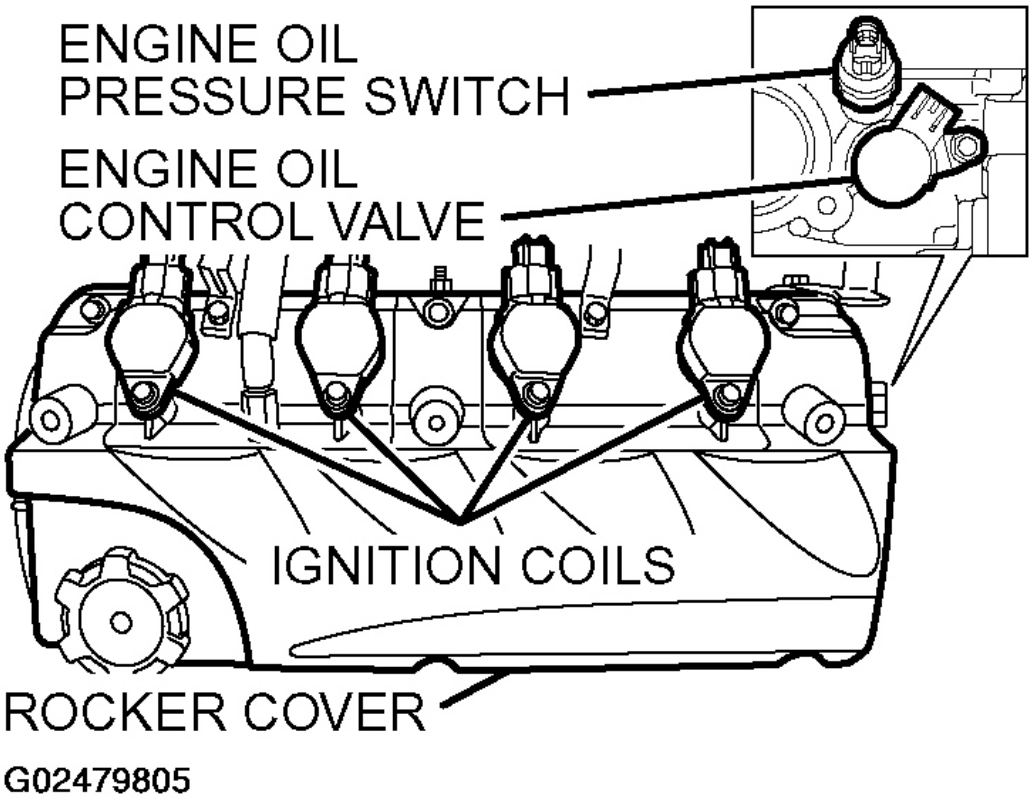



**Fig. 13: Removing Rocker Cover And Engine Oil Pressure Switch**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**NOTE: The rocker arm piston operation check can be performed on rocker arms indicated by white arrow mark when the No. 1 cylinder piston is at the top**

**dead center on the compression stroke, and on rocker arms indicated by black arrow mark when the No.4 cylinder piston is at the top dead center on the compression stroke.**

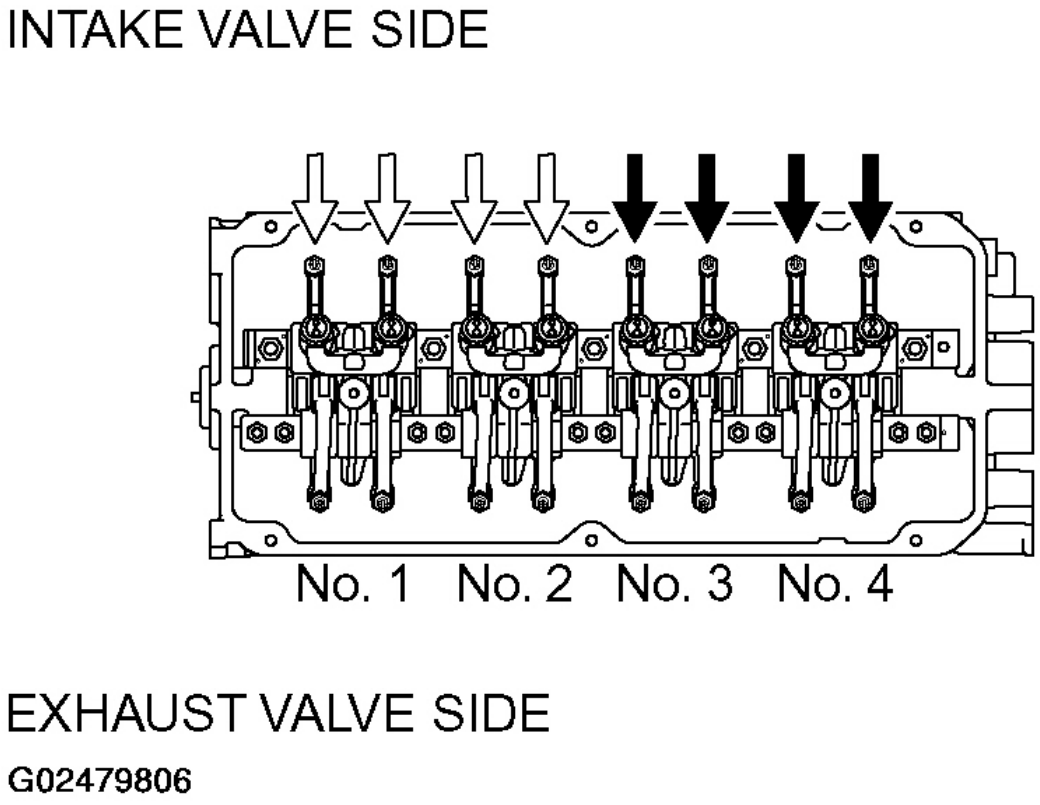



**Fig. 14: Identifying Valves**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

7. While shutting up the oil passage hole at the depth of the engine oil control valve's installation hole by finger not to leak air, blow compression air into the engine oil pressure switch's installation hole by air blowgun. At this time, confirm that the rocker arm piston can operate.

**NOTE: To fully confirm the check, prevent the compression air from leaking as much as possible by installing the O-ring to the end of air blowgun.**

8. Turn the crankshaft clockwise until the notch on the crankshaft pulley is lined up with "T" mark on the lower cover of timing belt.
9. Confirm the rest of the rocker arm pistons under the procedure 7.
10. When the rocker arm piston does not operate, replace the rocker arm assy.

11. Install the engine oil pressure switch and the engine oil control valve. (Refer to **REMOVAL AND INSTALLATION** .)
12. Install the rocker cover.
13. Install all of the ignition coils.

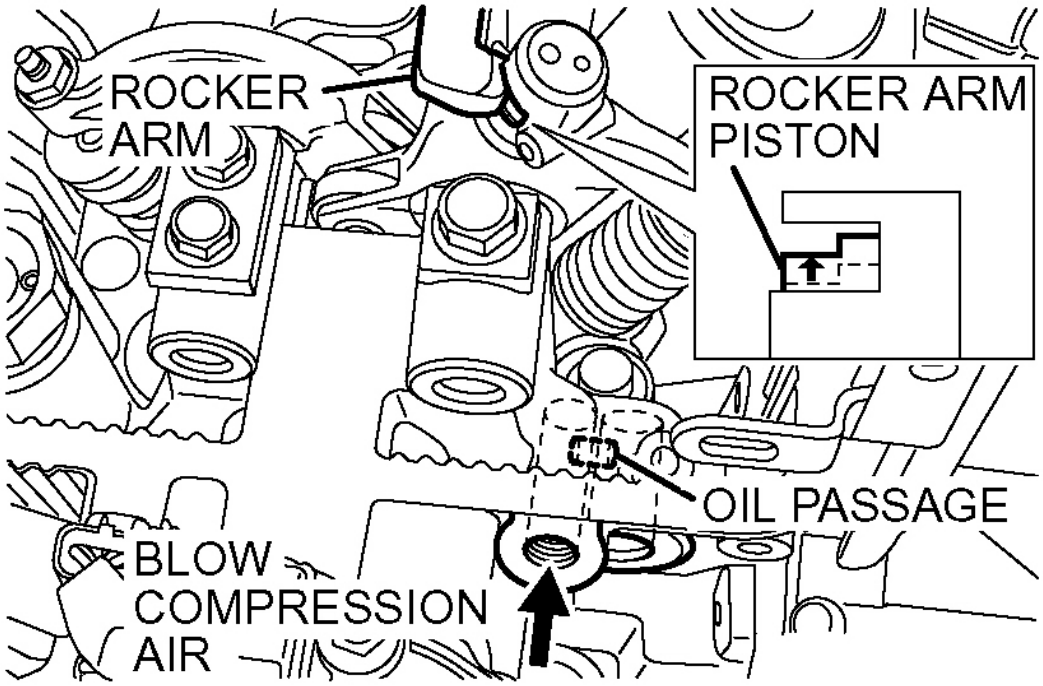



**Fig. 15: Identifying Oil Passage Hole And Rocker Arm**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**IGNITION TIMING CHECK**

**Required Special Tool:**

MB991958: Scan Tool (MUT-III Sub Assembly)

- MB991824: V.C.I.
- MB991827: MUT-III USB Cable
- MB991910: MUT-III Main Harness A

1. Before inspection, set the vehicle in the following condition:
    - Engine coolant temperature: 80 - 95°C (176 - 203°F)

- Lights and all accessories: OFF
- Transaxle: Neutral (P range on vehicles with A/T)

**NOTE: Vehicles for Canada, the headlight, taillight, etc. remain lit even when the lighting switch is in "OFF" position but this is no problem for checks and adjustment.**

**CAUTION: To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.**

1. Connect scan tool MB991958 to the data link connector.
2. Set the timing light to the power supply line (terminal No. 1) of the ignition coil No. 1.

**NOTE: The power supply line is looped and also longer than the other ones.**

3. Start the engine and run it at idle.
4. Check that the idle speed is approximately 680 r/min.
5. Select scan tool MB991958 actuator test "item number 17".
6. Check that basic ignition timing is within the standard value.

   **Standard value: 5° BTDC +/- 3°**
7. If the basic ignition timing is not within the standard value, check the following items:
   - Diagnostic output
   - Timing belt cover and crankshaft position sensor installation conditions
   - Crankshaft sensing blade condition

**CAUTION: If the actuator test is not canceled, the forced drive will continue for 27 minutes. Driving in this state could lead to engine failure.**

8. Press the clear key on scan tool MB991958 (select forced drive stop mode), and cancel the actuator test.
9. Check that the actual ignition timing is at the standard value.

   **Standard value: Approximately 10deg; BTDC**

**NOTE: Ignition timing fluctuates about +/- 7° Before Top Dead Center, even under normal operating condition.**

**NOTE: It is automatically further advanced by about 5° to 10° Before Top Dead Center at higher altitudes.**

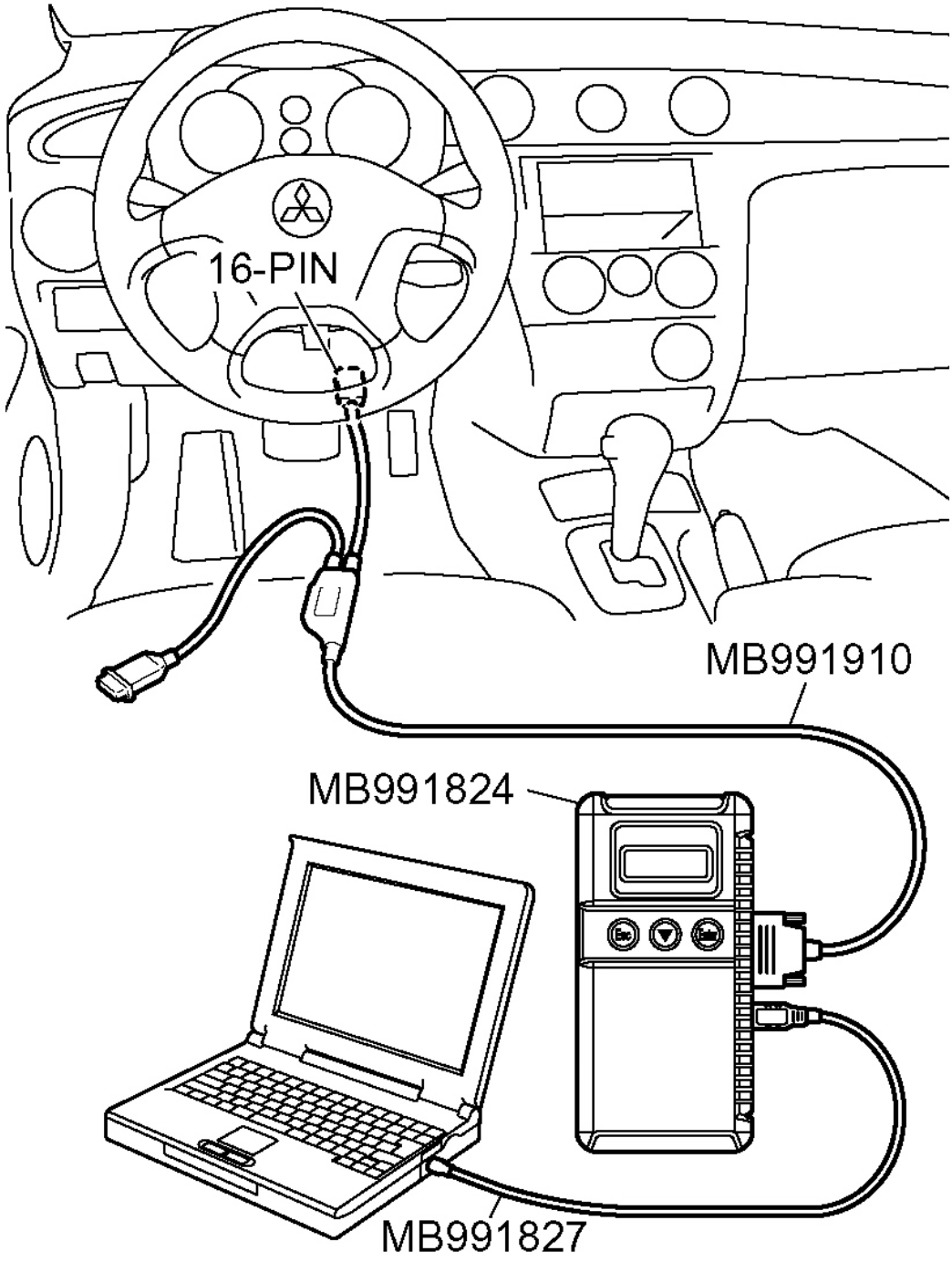



**Fig. 16: Connecting Scan Tool MB991910 To Data Link Connector**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**IDLE MIXTURE CHECK**

**Required Special Tool:**

MB991958: Scan Tool (MUT-III Sub Assembly)

- MB991824: V.C.I.
- MB991827: MUT-III USB Cable
- MB991910: MUT-III Main Harness A

1. Before inspection, set the vehicle in the following condition:
   - Engine coolant temperature: 80 - 95°C (176 - 203°F)
   - Lights and all accessories: OFF
   - Transaxle: Neutral (P range on vehicles with A/T)

**NOTE: Vehicles for Canada, the headlight, taillight, etc. remain lit even when the lighting switch is in "OFF" position but this is no problem for checks and adjustment.**

**CAUTION: To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.**

   - Connect scan tool MB991958 to the data link connector.
   - Check that the basic ignition timing is within the standard value.

     **Standard value: 5° BTDC +/- 3°**
   - Start the engine and increase the engine speed to 2,500 r/min for 2 minutes.
   - Set the CO, HC tester.
   - Check the CO contents and the HC contents at idle.

     **Standard value:**

     **CO contents: 0.5 % or less**

     **HC contents: 100 ppm or less**
   - If the CO and HC contents do not remain inside the standard value, check the following items:

**NOTE: Replace the catalytic converter when the CO and HC contents do not remain inside the standard value, even though the result of the inspection is normal for all items.**

     - Diagnostic output
     - Closed-loop control (When the closed-loop control is carried out normally, the output signal of the heated oxygen sensor changes between 0 - 400 mV and 600 - 1,000 mV at idle.)
     - Fuel pressures

- Injector
- Ignition coil, spark plug
- EGR system
- Evaporative emission system
- Compression pressure

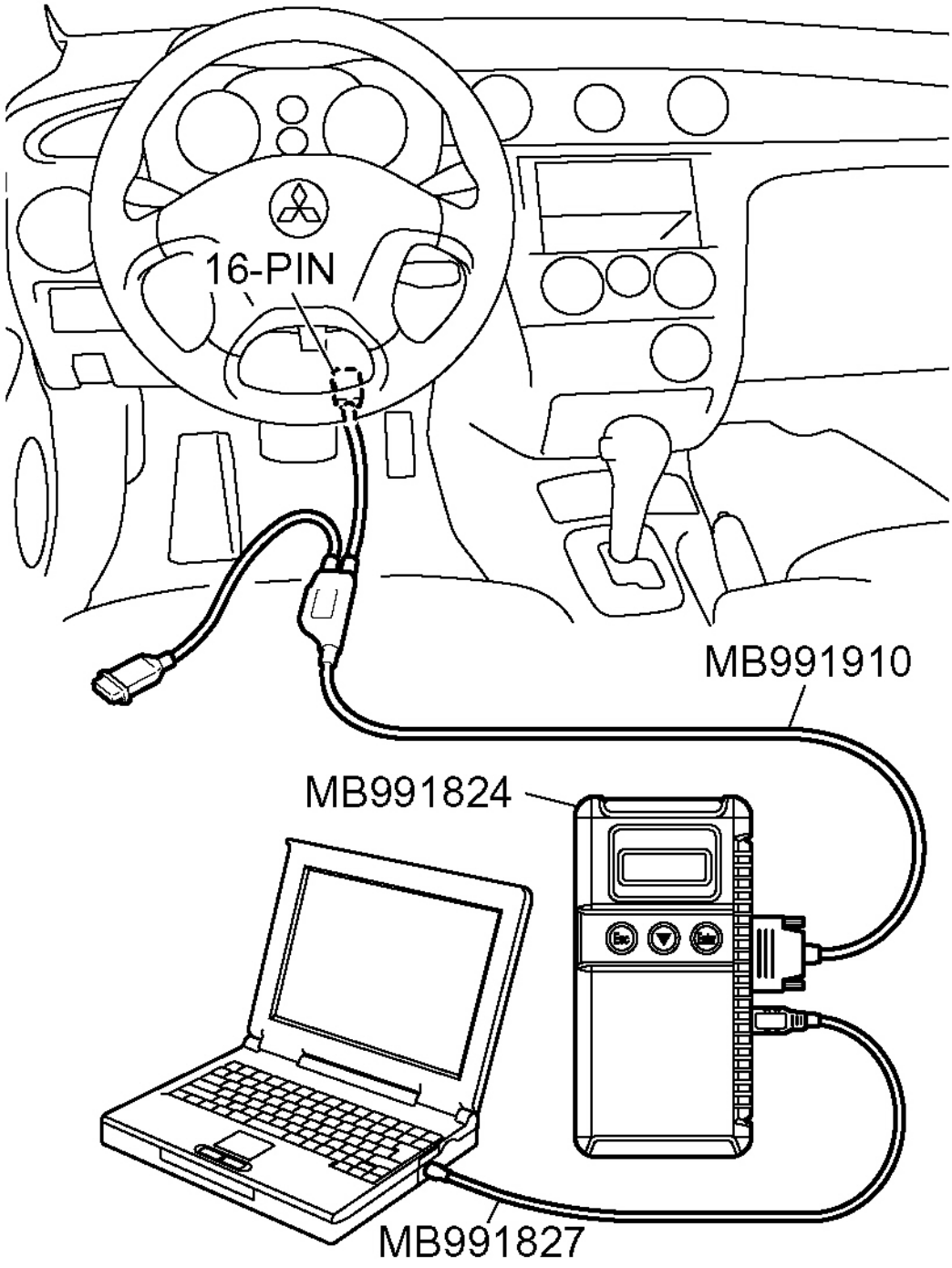



**Fig. 17: Connecting Scan Tool MB991910 To Data Link Connector**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**CURB IDLE SPEED CHECK**

**Required Special Tool:**

MB991958: Scan Tool (MUT-III Sub Assembly)

- MB991824: V.C.I.
- MB991827: MUT-III USB Cable
- MB991910: MUT-III Main Harness A

1. Before inspection, set the vehicle in the following condition.
   - Engine coolant temperature: 80 - 95°C (176 - 203°F)
   - Lights and all accessories: OFF
   - Transaxle: Neutral (P range on vehicles with A/T)

   **NOTE: Vehicles for Canada, the headlight, taillight, etc. remain lit even when the lighting switch is in "OFF" position but this is no problem for checks and adjustment.**

   **CAUTION: To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.**

2. Connect scan tool MB991958 to the data link connector.
3. Check the basic ignition timing.

   **Standard value: 5° BTDC +/- 3°**
4. Start the engine.
5. Run the engine at idle for 2 minutes.
6. Check the idle speed. Select item number 22 and take a reading of the idle speed.

   **Curb idle speed: 680 +/- 100 r/min**

   **NOTE: The idle speed is controlled automatically by the idle air control system.**

7. If the idle speed is outside the standard value, refer to **SYMPTOM CHART** .

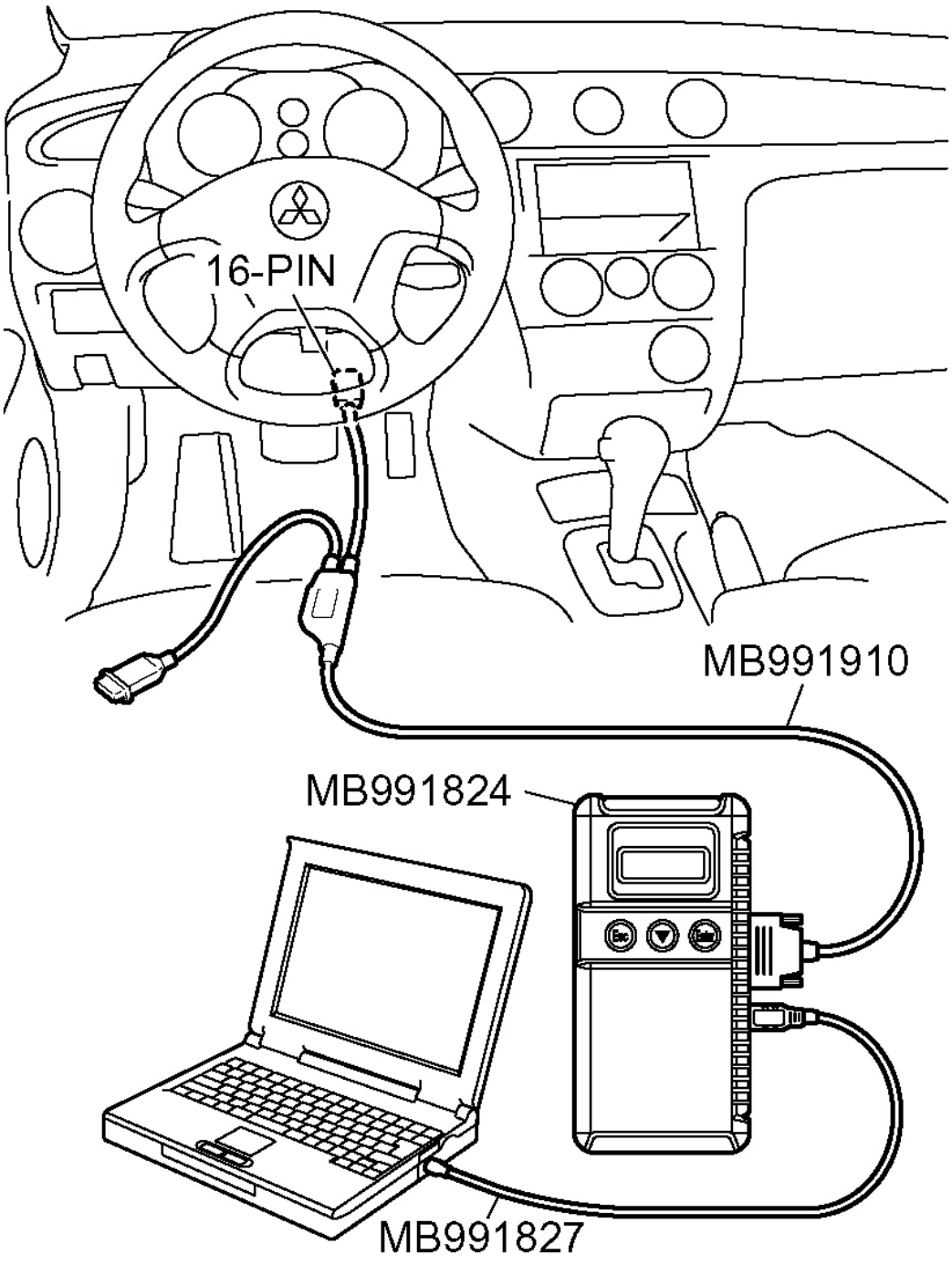



**Fig. 18: Connecting Scan Tool MB991910 To Data Link Connector**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

## COMPRESSION PRESSURE CHECK

**Required Special Tool:**

MB991958: Scan Tool (MUT-III Sub Assembly)

- MB991824: V.C.I.
- MB991827: MUT-III USB Cable
- MB991910: MUT-III Main Harness A

1. Before inspection, check that the engine oil, starter and battery are normal. Also, set the vehicle in the following condition:
   - Engine coolant temperature: 80 - 95°C (176 - 203°F)
   - Lights and all accessories: OFF
   - Transaxle: Neutral (P range on vehicles with A/T)

   **NOTE: Vehicles for Canada, the headlight, taillight, etc. remain lit even when the lighting switch is in "OFF" position but this is no problem for checks and adjustment.**

2. Remove all of the ignition coils and spark plugs.
3. Disconnect the crankshaft position sensor connector.

   **NOTE: Doing this will prevent the engine control module from carrying out ignition and fuel injection.**

   **WARNING: Keep your distance from the spark plug hole when cranking. Oil, fuel, etc., may spray out from the spark plug hole and may cause serious injury.**

4. Cover the spark plug hole with a shop towel etc., during cranking. After the engine has been cranked, check for foreign material adhering to the shop towel.

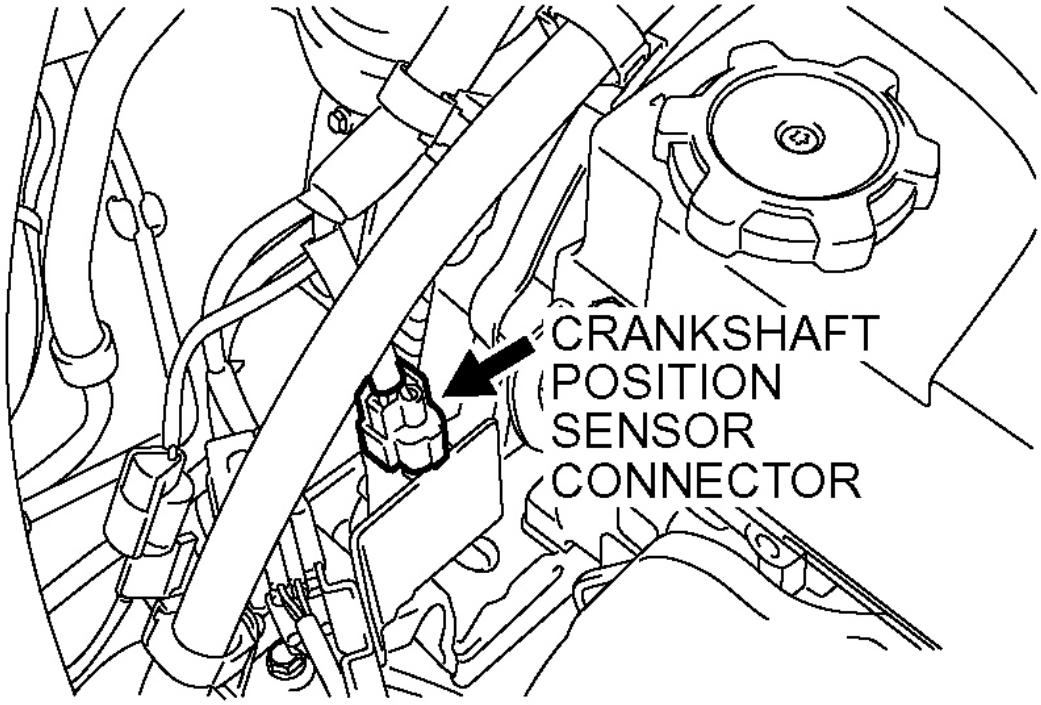



**Fig. 19: Disconnecting Crankshaft Position Sensor Connector**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

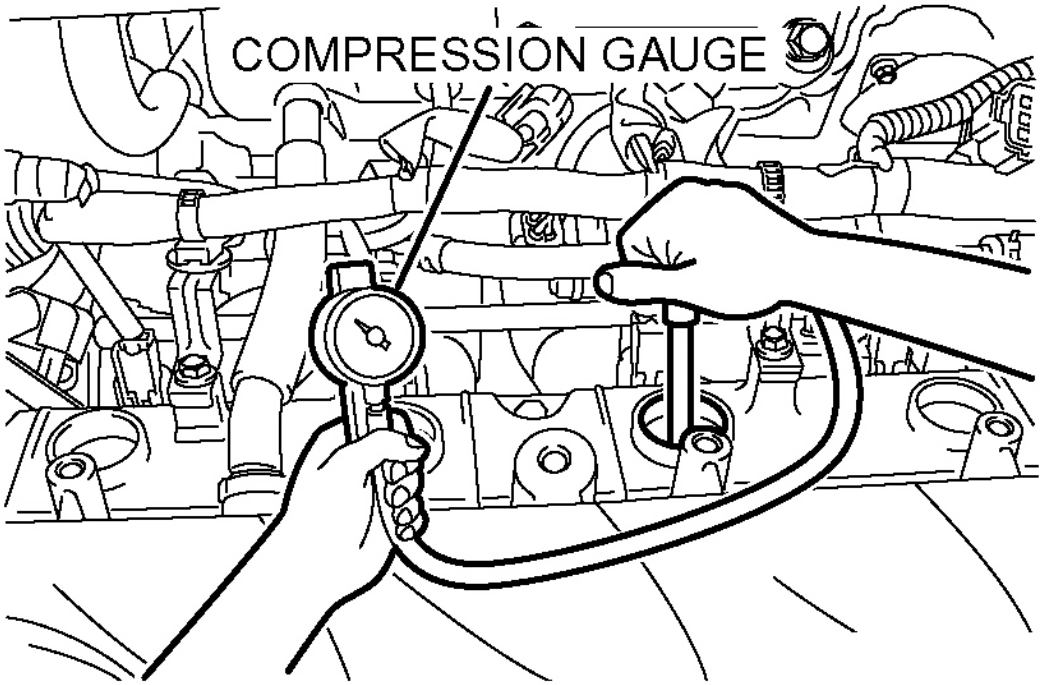
5. Set a compression gauge to one of the spark plug holes.
6. Crank the engine with the throttle valve fully open and measure the compression pressure.

   **Standard value (at engine speed of 200 r/min): 1,560 kPa (461 in.Hg)**

   **Minimum limit (at engine speed of 200 r/min): 1,130 kPa (334 in.Hg)**
7. Measure the compression pressure for all the cylinders, and check that the pressure differences of the cylinders are below the limit.

   **Limit: 98 kPa (29 in.Hg)**




G02479812

**Fig. 20: Setting Compression Gauge To Spark Plug Hole**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

8. If there is a cylinder with compression or a compression difference that is outside the limit, pour a small amount of engine oil through the spark plug hole, and repeat the operations in steps 6 to 8.
    1. If the compression increases after oil is added, the cause of the malfunction is a worn or damaged piston ring and/or cylinder inner surface.
    2. If the compression does not rise after oil is added, the cause is a burnt or defective valve seat, or pressure is leaking from the gasket.
9. Connect the crankshaft position sensor connector.
10. Install the spark plugs and ignition coils.
11. Use the scan tool MB991958 to erase the diagnostic trouble codes.

**NOTE: This will erase the diagnostic trouble code resulting from the crankshaft position sensor connector being disconnected.**

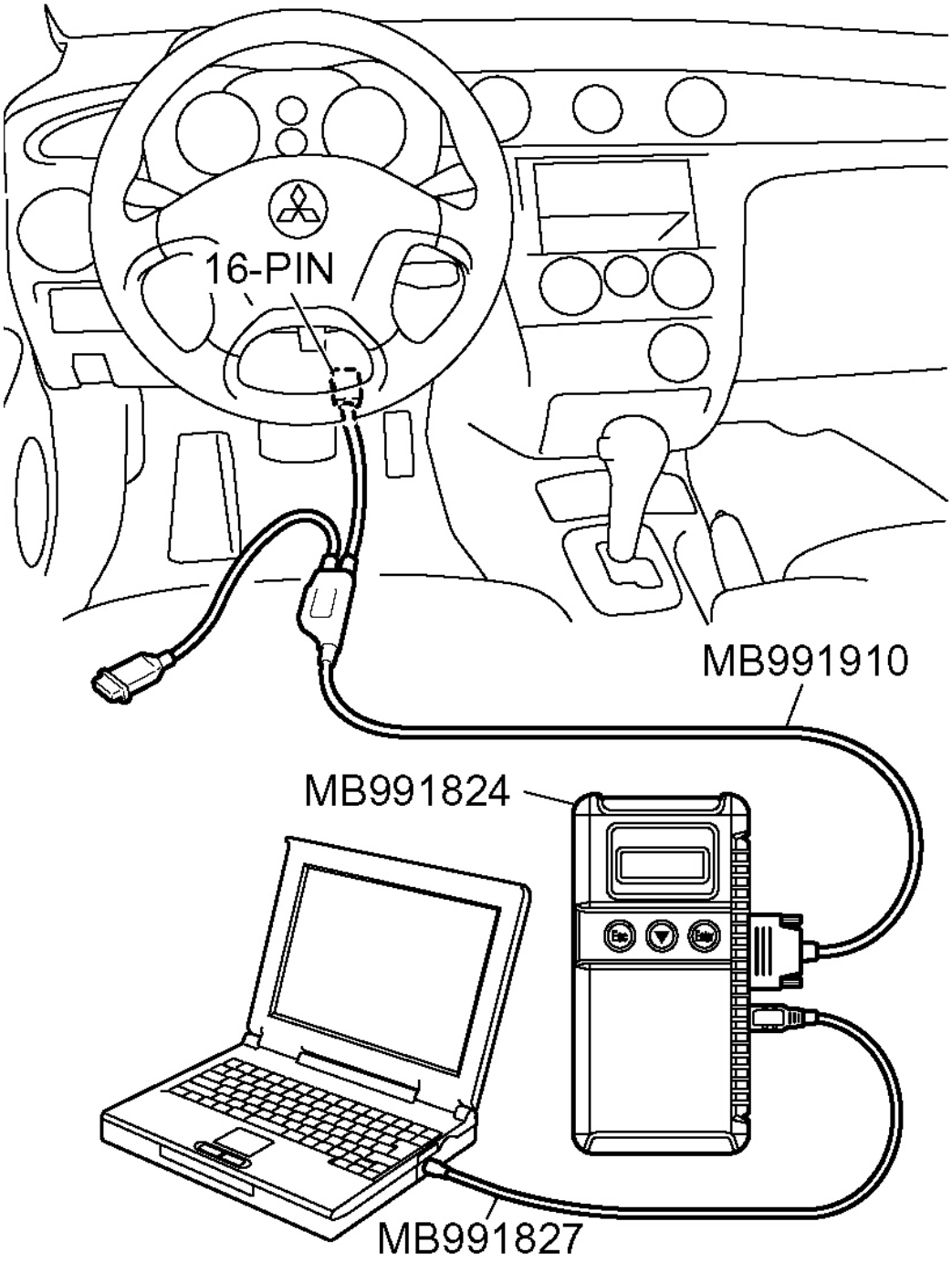



**Fig. 21: Connecting Scan Tool MB991910 To Data Link Connector**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**MANIFOLD VACUUM CHECK**

1. Start the engine and allow it to warm up until the temperature of the engine coolant reaches 80 - 95°C (176 - 203°F).
2. Connect an engine tachometer.
3. Disconnect the ventilation hose from the positive crankcase ventilation (PCV) valve, and connect a vacuum gauge to the ventilation hose.
4. Plug the PCV valve.
5. Start the engine and check that idle speed is within specification. Then check the vacuum gauge reading.

   **Idle speed: 680 +/- 100 r/min**

   **Minimum limit: 60 kPa (18 in Hg)**

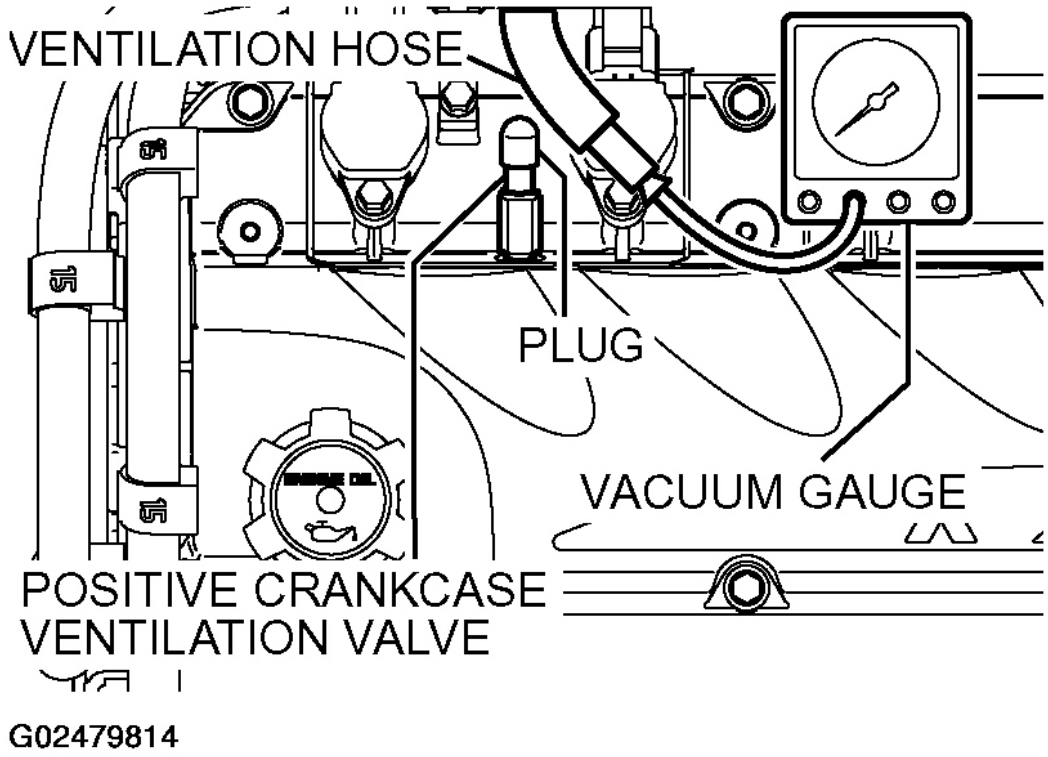



**Fig. 22: Connecting Vacuum Gauge To Ventilation Hose**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

# ENGINE ASSEMBLY

**REMOVAL AND INSTALLATION**

**CAUTION: *: indicates parts which should be temporarily tightened, and then fully tightened with the engine weight applied on the vehicle body.**

| Pre-removal Operation | Post-installation Operation |
|---|---|
| • Under Cover Removal<br>• Fuel Line Pressure Reduction<br>• Engine Oil Draining<br>• Engine Coolant Draining<br>• Transmission Oil Draining <M/T>.<br>• Transmission Fluid Draining <A/T>.<br>• Transfer Oil Draining<br>• Hood Removal<br>• Air Cleaner Removal<br>• Battery and Battery Tray Removal<br>• Accelerator Cable Removal<br>• Radiator Assembly Removal<br>• Front Exhaust Pipe Removal | • Front Exhaust Pipe Installation<br>• Radiator Assembly Installation<br>• Accelerator Cable Installation<br>• Battery and Battery Tray Installation<br>• Air Cleaner Installation<br>• Hood Installation<br>• Transfer Oil Refilling<br>• Transmission Oil Refilling <M/T>.<br>• Transmission Fluid Refilling <A/T>.<br>• Engine Coolant Refilling<br>• Engine Oil Refilling<br>• Accelerator Cable Adjustment<br>• Fuel Leak Check<br>• Drive Belt Tension Check<br>• Under Cover Installation<br>• Front Wheel Alignment Check and Adjustment |

G02479815

**Fig. 23: Engine Assembly Removal And Installation Steps Chart**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

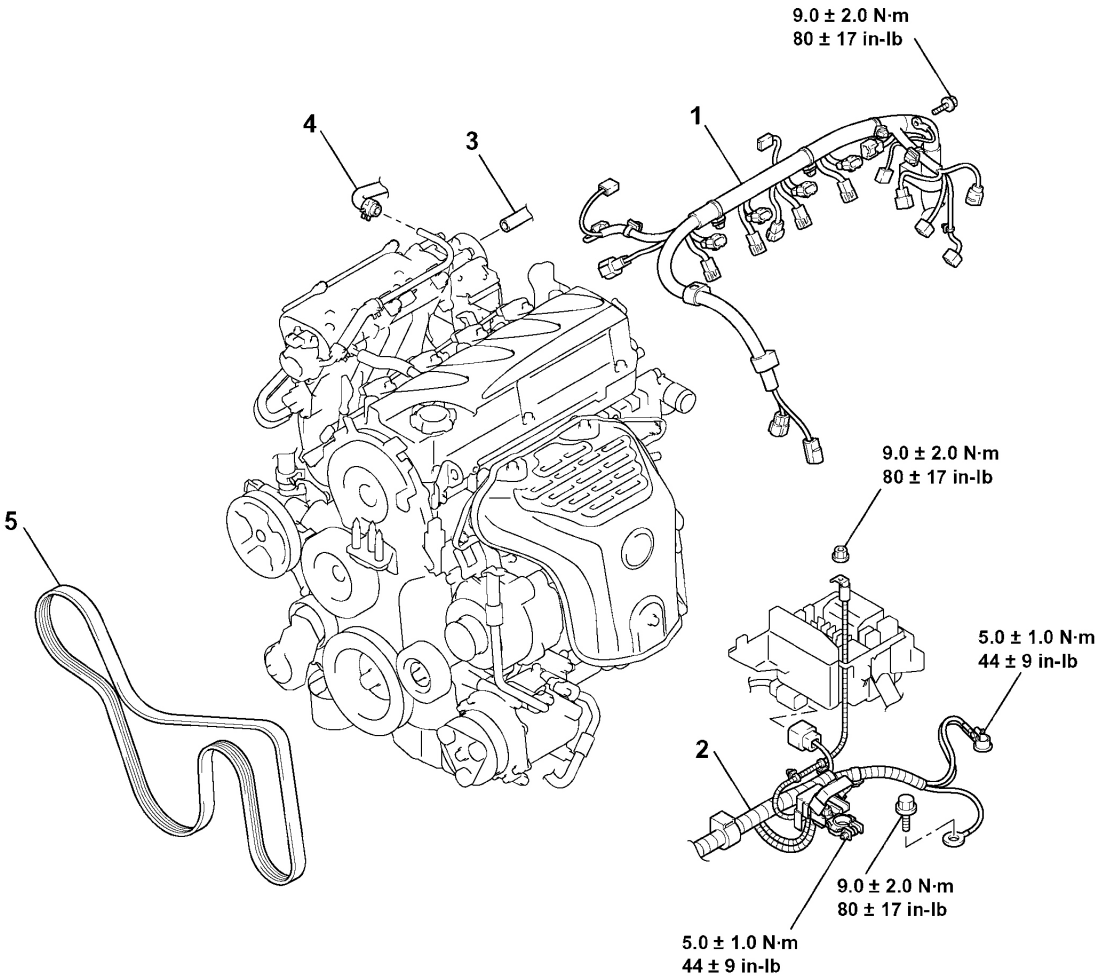
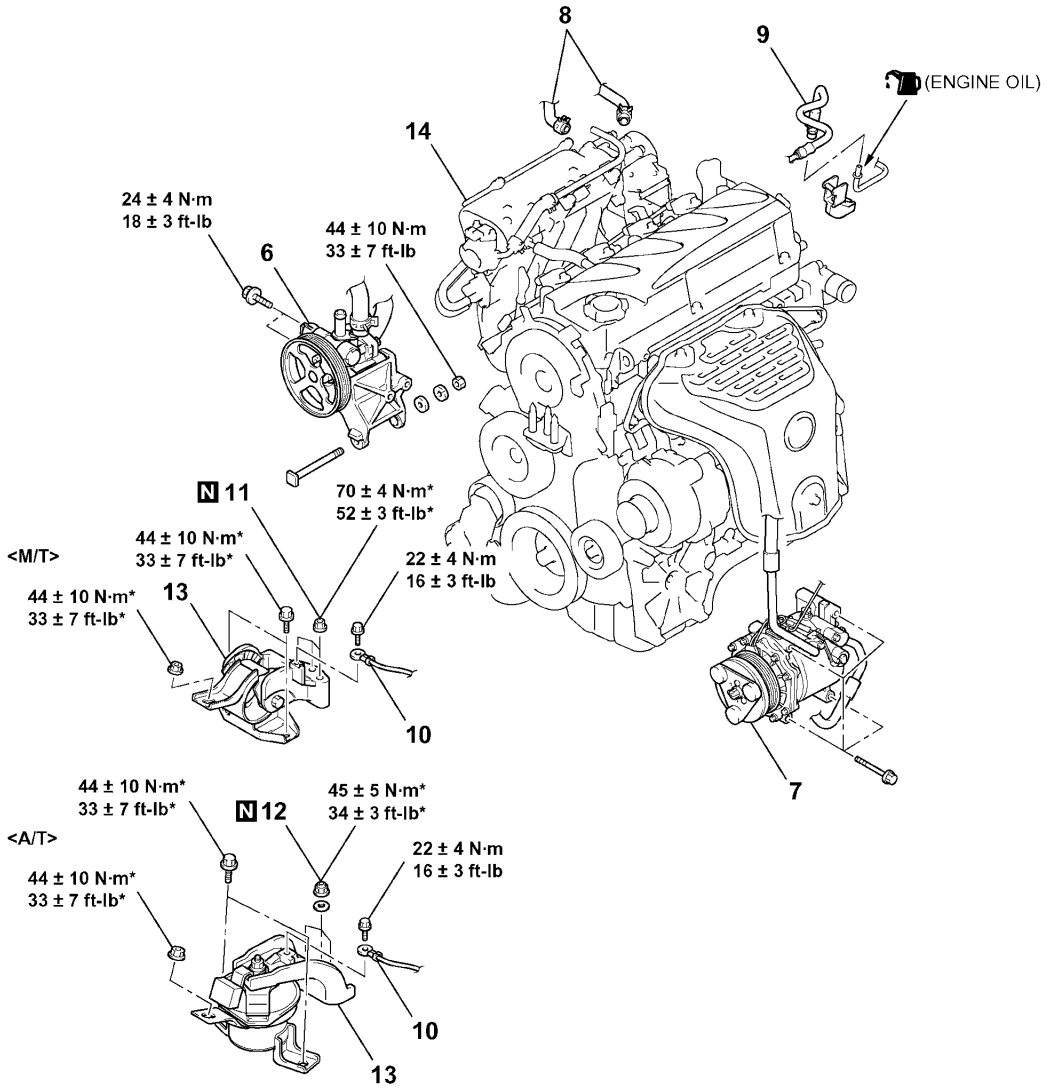



**Fig. 24: Removing Engine Assembly (1 Of 2)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**




**REMOVAL STEPS**

<<B>> 6. POWER STEERING OIL PUMP AND BRACKET ASSEMBLY
<<C>> 7. A/C COMPRESSOR AND CLUTCH ASSEMBLY
8. HEATER WATER HOSES CONNECTION
<<D>> >>E<< 9. FUEL HIGH-PRESSURE HOSE CONNECTION

**REMOVAL STEPS (Continued)**

<<E>> >>D<< • TRANSAXLE ASSEMBLY
10. GROUND CABLE CONNECTION
11. SELF-LOCKING NUTS <M/T>
>>C<< 12. SELF-LOCKING NUTS <A/T>
<<F>> >>B<< 13. ENGINE MOUNTING INSULATOR
<<G>> >>A<< 14. ENGINE ASSEMBLY

G02479817

**Fig. 25: Removing Engine Assembly (2 Of 2)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**Required Special Tools:**

- MB991454: Engine Hanger Balancer
- MB991527: Hanger

- MB991895: Engine Hanger
- MB991928: Engine Hanger

**REMOVAL SERVICE POINTS**

**<< A >> DRIVE BELT REMOVAL**

The following operations will be needed due to the introduction of the serpentine drive system with the drive belt auto-tensioner.

1. Securely insert the spindle handle or ratchet handle with a 12.7 mm (1/2-inch) insertion angle into the jig hole of the auto-tensioner.
2. Rotate the auto-tensioner counterclockwise and align hole A with hole B.

**CAUTION: To reuse the drive belt, draw an arrow indicating the rotating direction (clockwise) on the back of the belt using chalk, etc.**

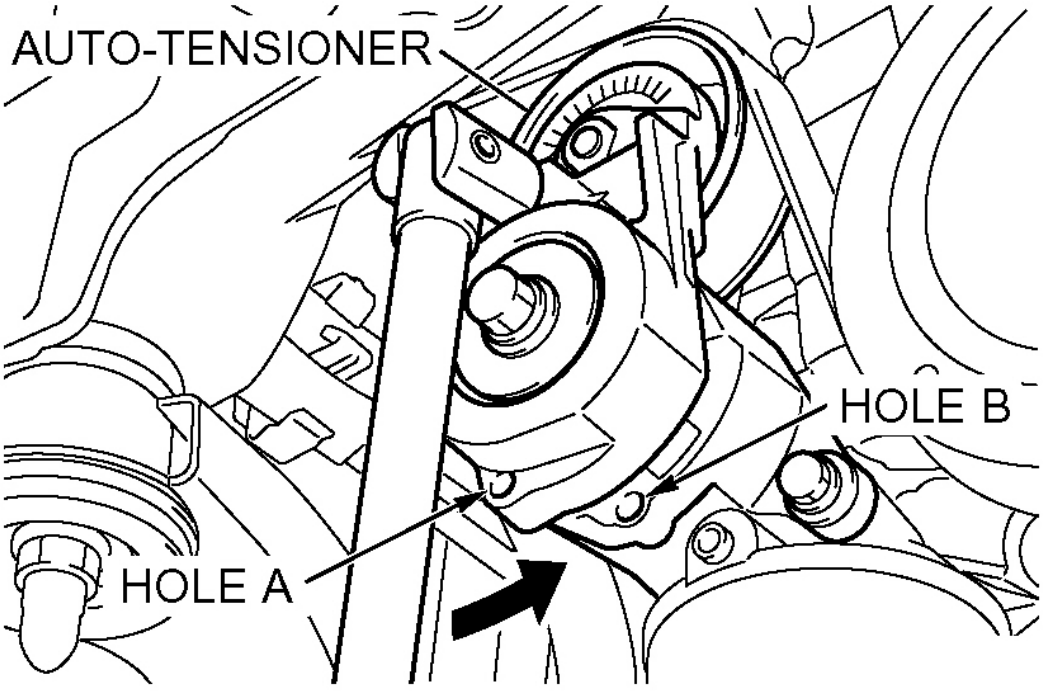



**Fig. 26: Rotating Auto-Tensioner Counterclockwise And Align Hole A With Hole B**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

3. Insert an L-shaped hexagon wrench, etc. into the hole to fix and then remove the drive belt.

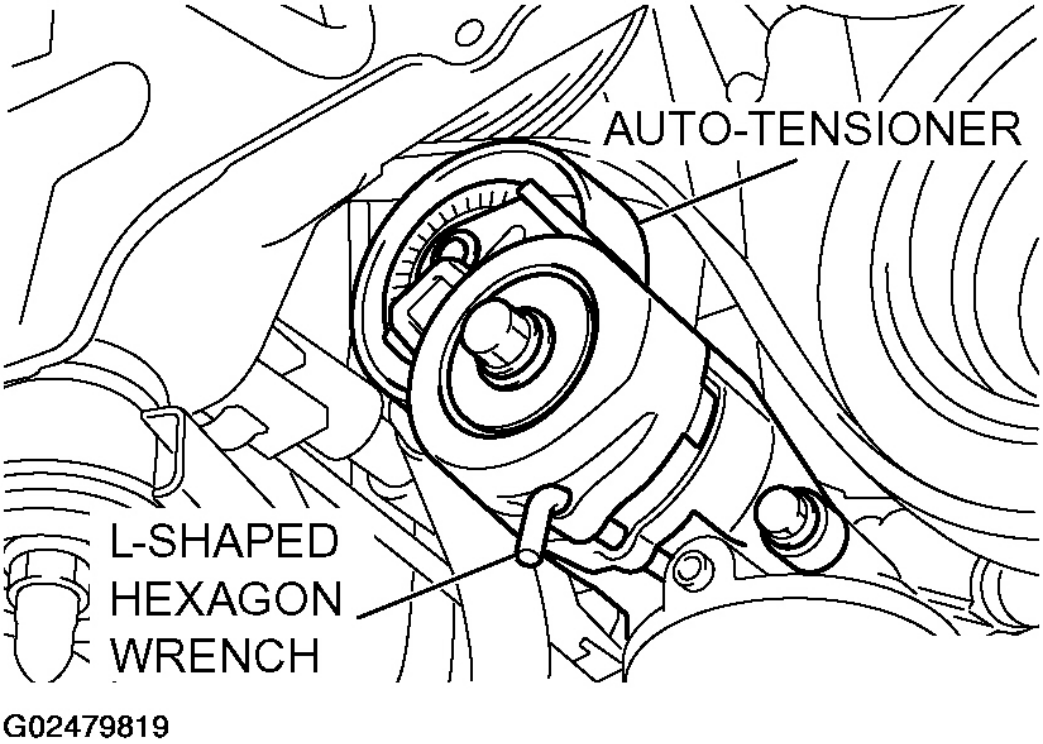



**Fig. 27: Inserting L-Shaped Hexagon Wrench Into Hole**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**<< B >> POWER STEERING OIL PUMP AND BRACKET ASSEMBLY REMOVAL**

1. With the hose installed, remove the power steering oil pump and bracket assembly from the engine assembly.
2. After removing the power steering oil pump and bracket assembly, secure it with a cord in the location where the removal and installation of the engine assembly cannot be hindered.

**<< C >> A/C COMPRESSOR AND CLUTCH ASSEMBLY REMOVAL**

1. With the hose installed, remove the A/C compressor and clutch assembly from the bracket.
2. After removing the A/C compressor and clutch assembly, secure it with a cord in the location where the removal and installation of the engine assembly cannot be hindered.

**<< D >> FUEL HIGH-PRESSURE HOSE REMOVAL**

1. Remove the fuel high-pressure hose stopper.

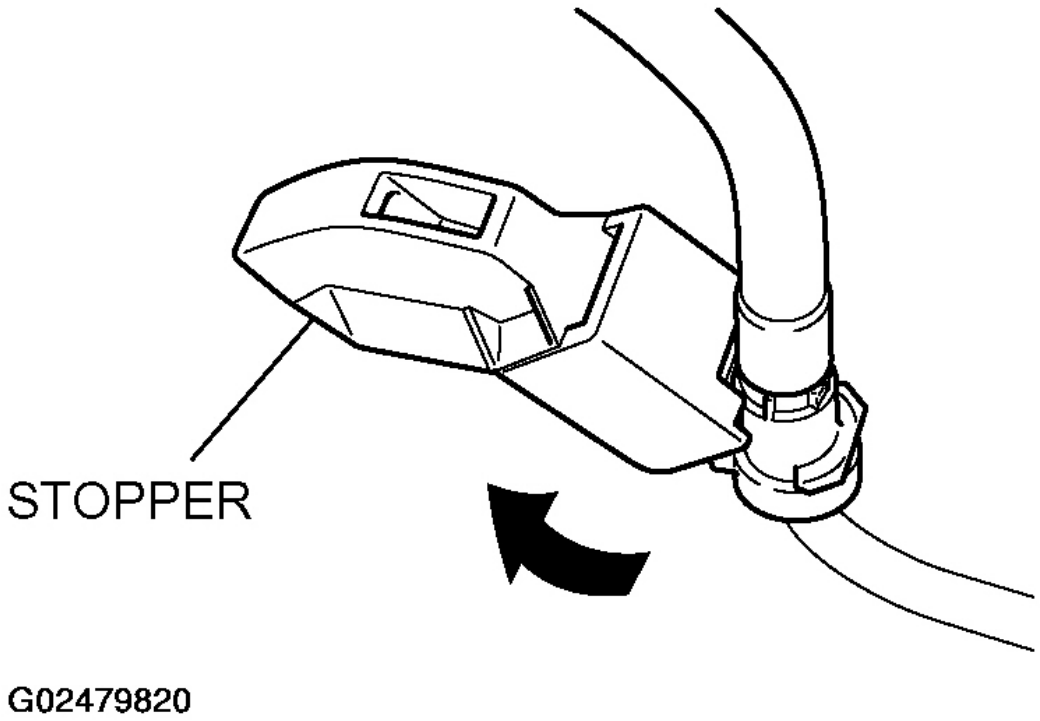



**Fig. 28: Removing Fuel High-Pressure Hose Stopper**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

2. Remove the fuel high-pressure hose in the direction shown in the figure while the retainer is pulled up.

**NOTE: If the retainer is released, install it after removing the fuel high-pressure hose.**

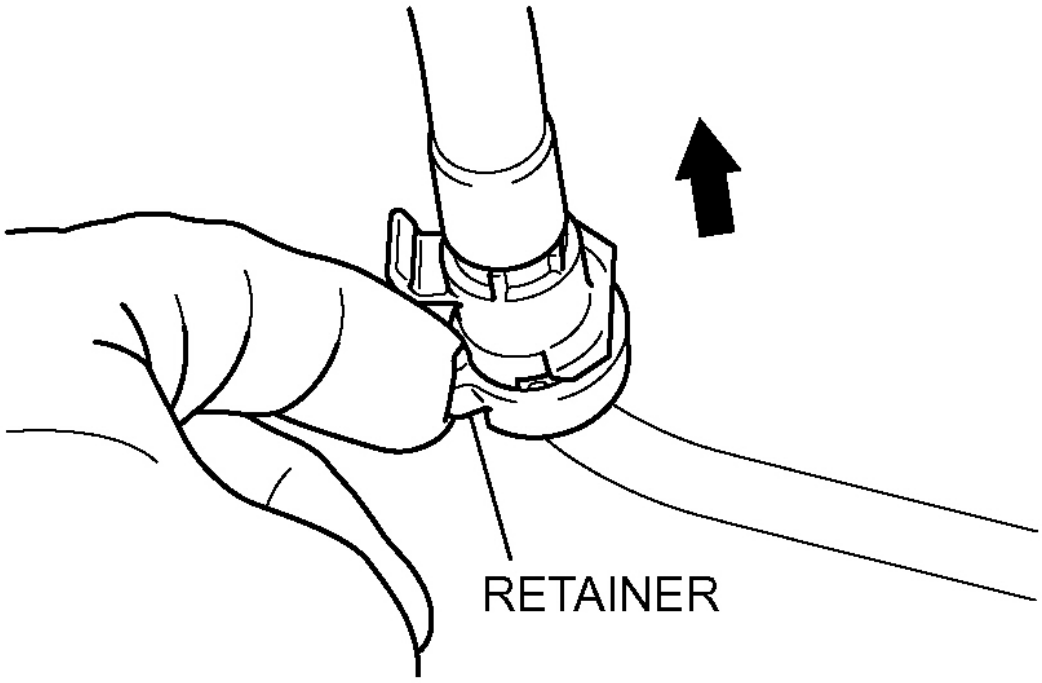
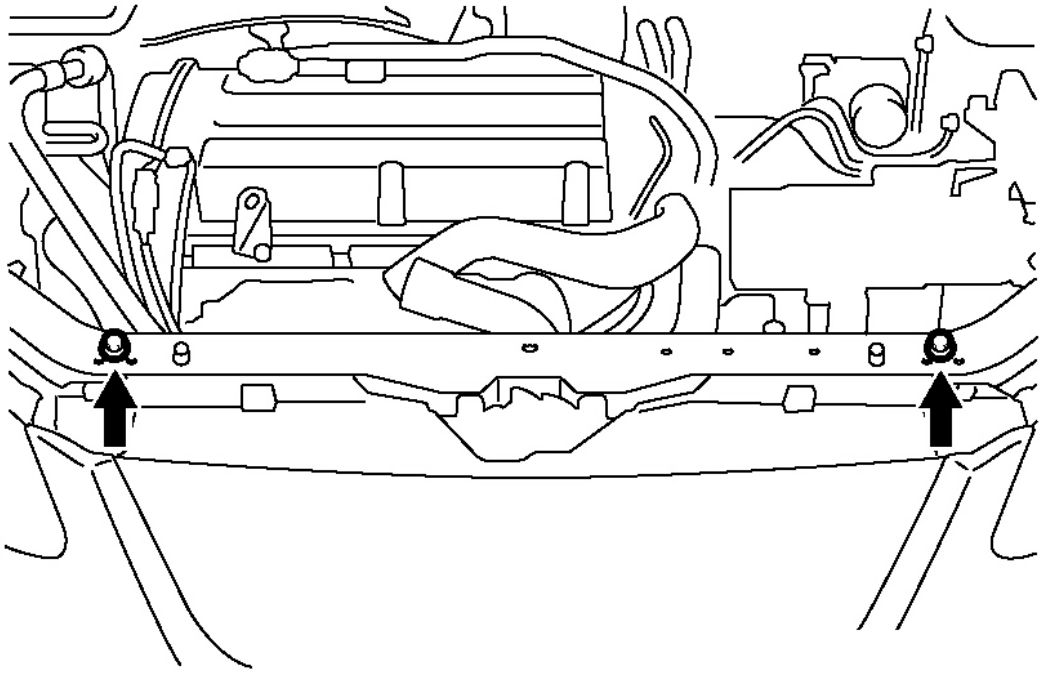



**Fig. 29: Removing Fuel High-Pressure Hose**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**<< E >> TRANSAXLE ASSEMBLY REMOVAL**

1. Pre-tighten the two bolts on the car to assemble the radiator support upper insulator to set special tool MB991928 or MB991895.
2. Remove the transaxle assembly. (M/T: Refer to **TRANSAXLE ASSEMBLY** , A/T. Refer to **TRANSAXLE ASSEMBLY** ).



G02479822

**Fig. 30: Tightening Bolts**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**<< F >> ENGINE MOUNTING INSULATOR REMOVAL**

1. Support the engine with a garage jack.
2. Remove the following special tool.
    1. < Special tool MB991928 is used >

    Remove special tool MB991928.

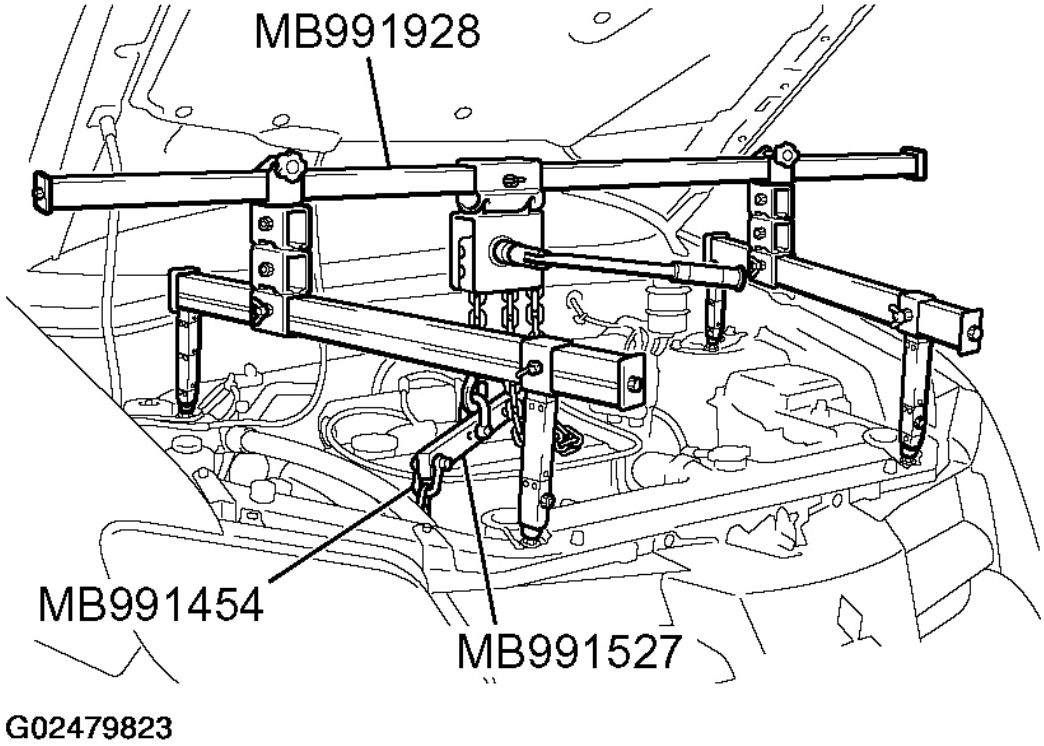



**Fig. 31: Removing Special Tool MB991928**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

2. < Special tool MB991895 is used >

Remove special tool MB991895.

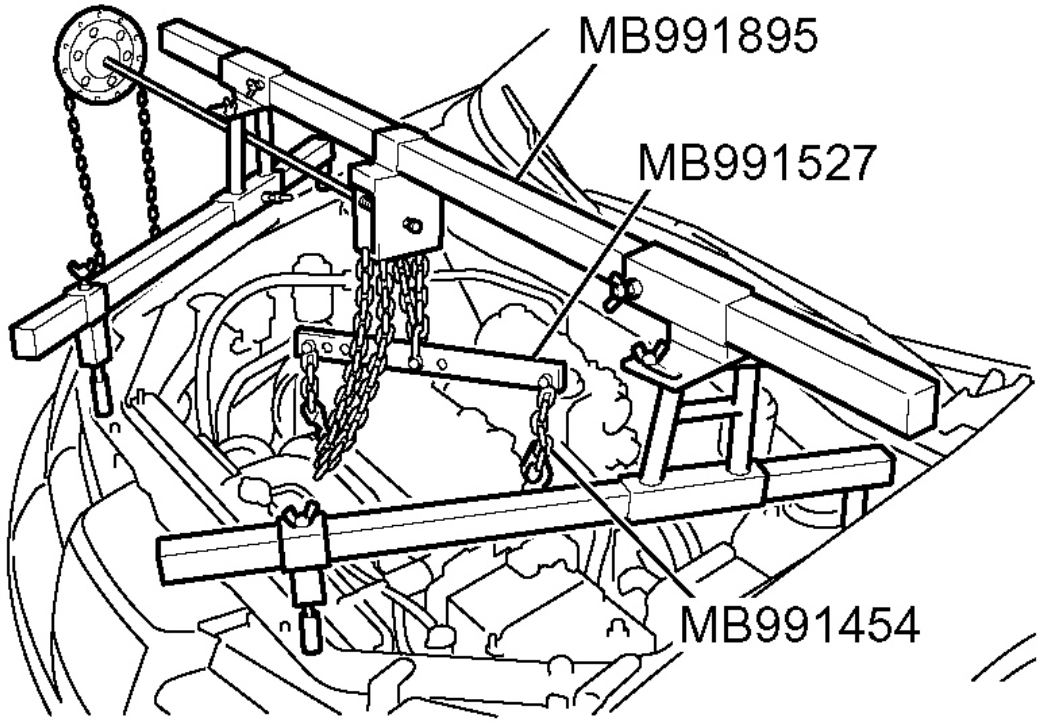



**Fig. 32: Removing Special Tool MB991895**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

3. Hold the engine assembly with a chain block, etc.
4. Place a garage jack against the engine oil pan with a piece of wood in between so that the weight of the engine assembly is no longer being applied to the engine mounting insulator.
5. Loosen the engine mounting insulator mounting nuts and bolts, and remove the engine mounting insulator.

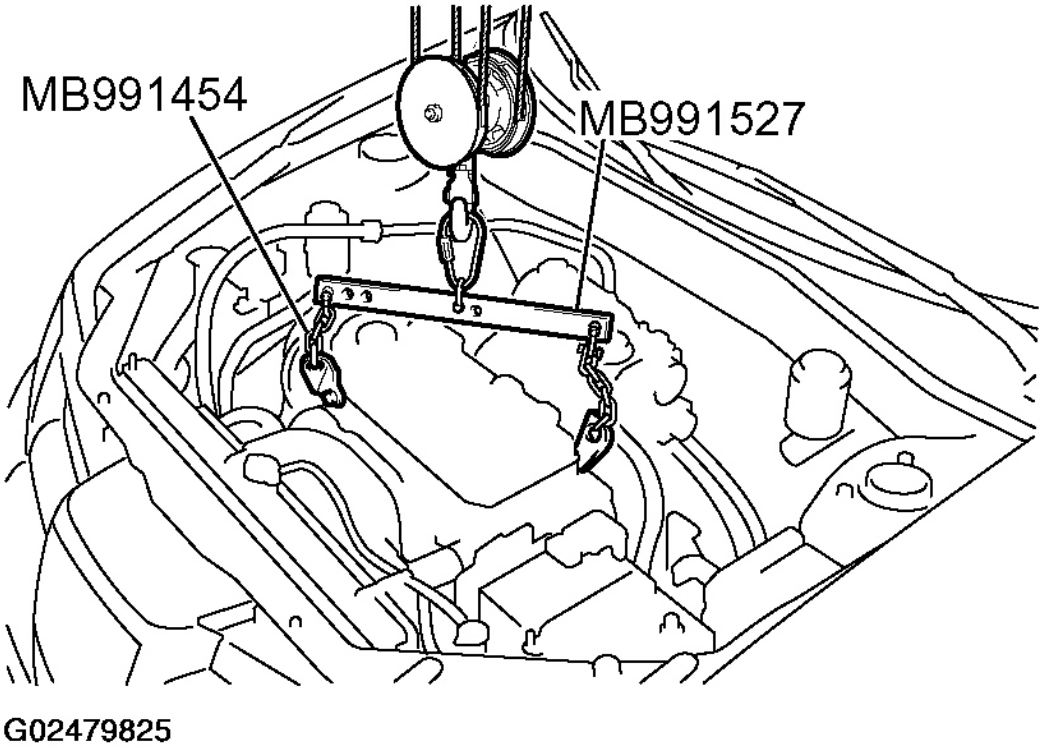



**Fig. 33: Holding Engine Assembly With Chain Block**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**<< G >> ENGINE ASSEMBLY REMOVAL**

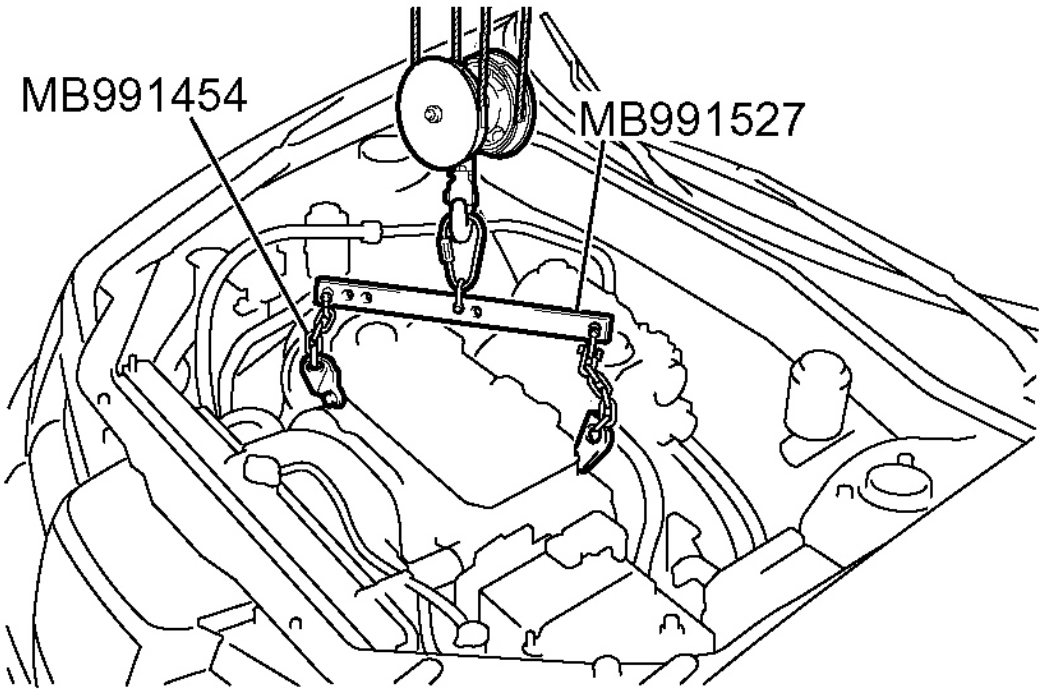
After checking that all cables, hoses and wiring harness connectors and so on are disconnected from the engine, lift the chain block slowly to remove the engine assembly upward from the engine compartment.

**INSTALLATION SERVICE POINTS**

**>> A << ENGINE ASSEMBLY INSTALLATION**

Install the engine assembly, being careful not to pinch the cables, hoses or wiring harness connectors.




G02479826

**Fig. 34: Installing Engine Assembly**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> B << ENGINE MOUNTING INSULATOR INSTALLATION**

1. Place a garage jack against the engine oil pan with a piece of wood in between, and install the engine mounting insulator while adjusting the position of the engine.
2. Support the engine assembly with a garage jack.
3. Remove the chain block.
4. Use the following special tool as during removal to support the engine.
    1. < Special tool MB991928 is used >

       Set special tool MB991928. (M/T: Refer to **TRANSAXLE ASSEMBLY** , A/T: Refer to **TRANSAXLE ASSEMBLY** ).

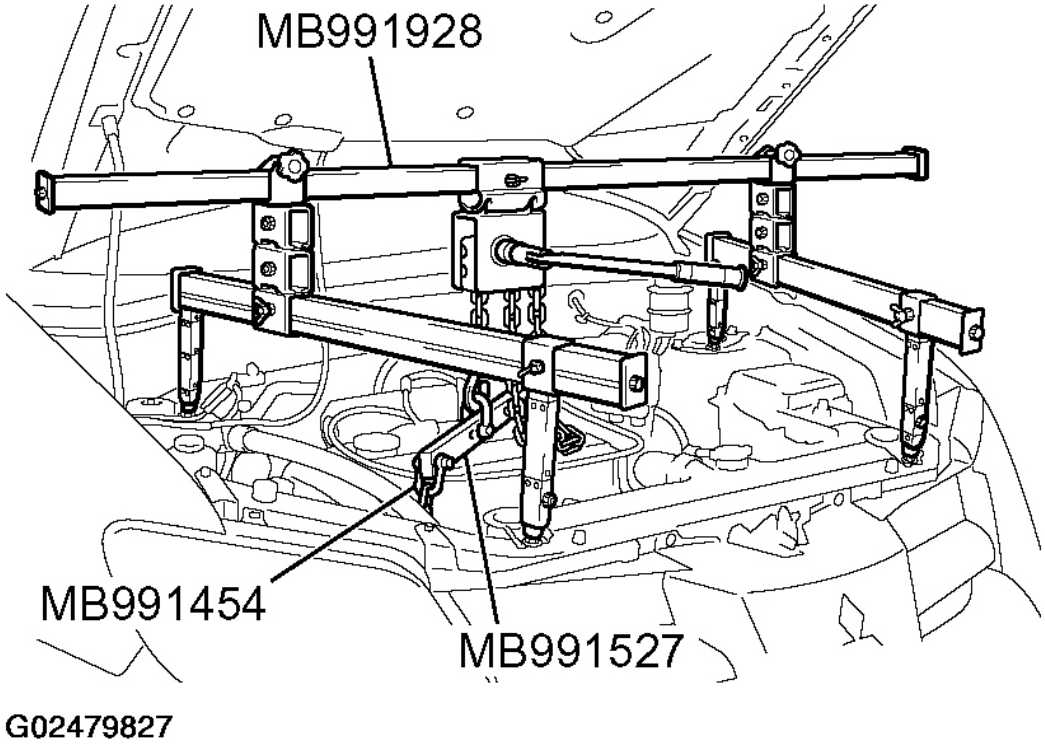



**Fig. 35: Setting Special Tool MB991928**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

2. < Special tool MB991895 is used >

   Set special tool MB991895. (M/T: Refer to **TRANSAXLE ASSEMBLY** , A/T: Refer to **TRANSAXLE ASSEMBLY** ).

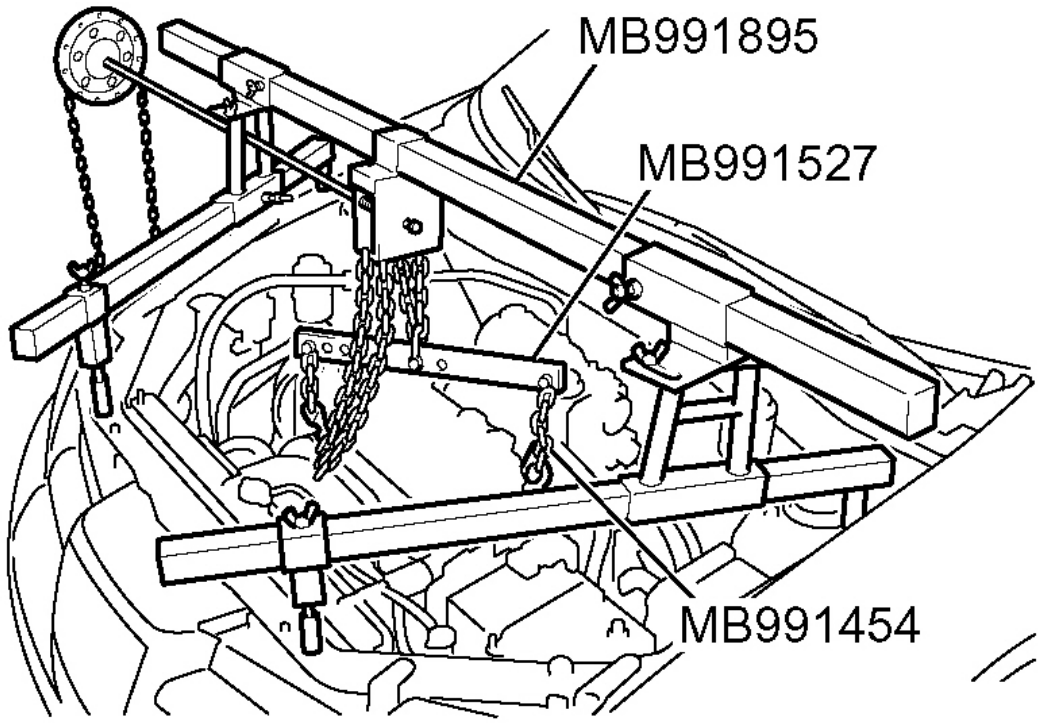



**Fig. 36: Setting Special Tool MB991895**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> C << SELF-LOCKING NUTS < A/T > INSTALLATION**

**CAUTION: Do not tighten the self-locking nuts while the engine is hot.**

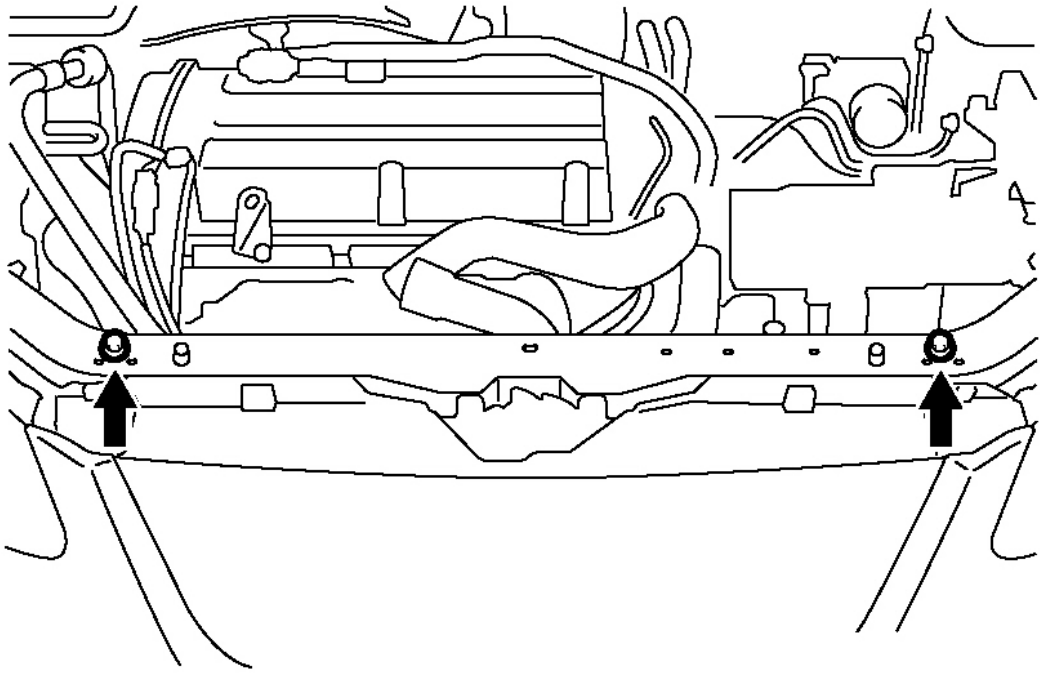
Tighten the self-locking nuts to the specified torque while the engine is cold.

**Tightening torque: 45 +/- 5 N.m (34 +/- 3 ft-lb)**

**>> D << TRANSAXLE ASSEMBLY INSTALLATION**

1. Install the transaxle assembly. (M/T: Refer to **TRANSAXLE ASSEMBLY** , A/T: Refer to **TRANSAXLE ASSEMBLY** ).
2. Remove from the car the two bolts, to assemble the radiator support upper insulator.



G02479829

**Fig. 37: Assembling Radiator Support Upper Insulator**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> E << FUEL HIGH-PRESSURE HOSE INSTALLATION**

**CAUTION: After connecting the fuel high-pressure hose, slightly pull it to ensure that it is installed securely. Also confirm that there is a play approximately 3 mm (0.12 inch). Then install the stopper securely.**

Apply a small amount of engine oil to the fuel line pipe and then install the fuel high-pressure hose.

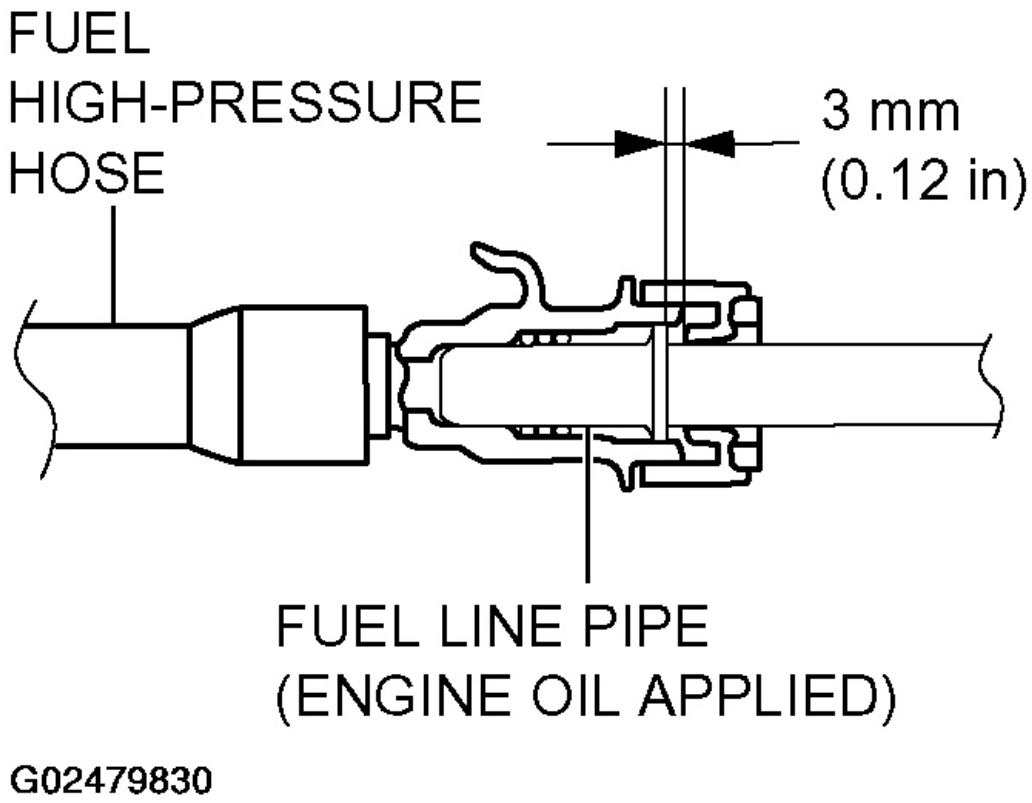



**Fig. 38: Identifying Fuel High-Pressure Hose Play**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

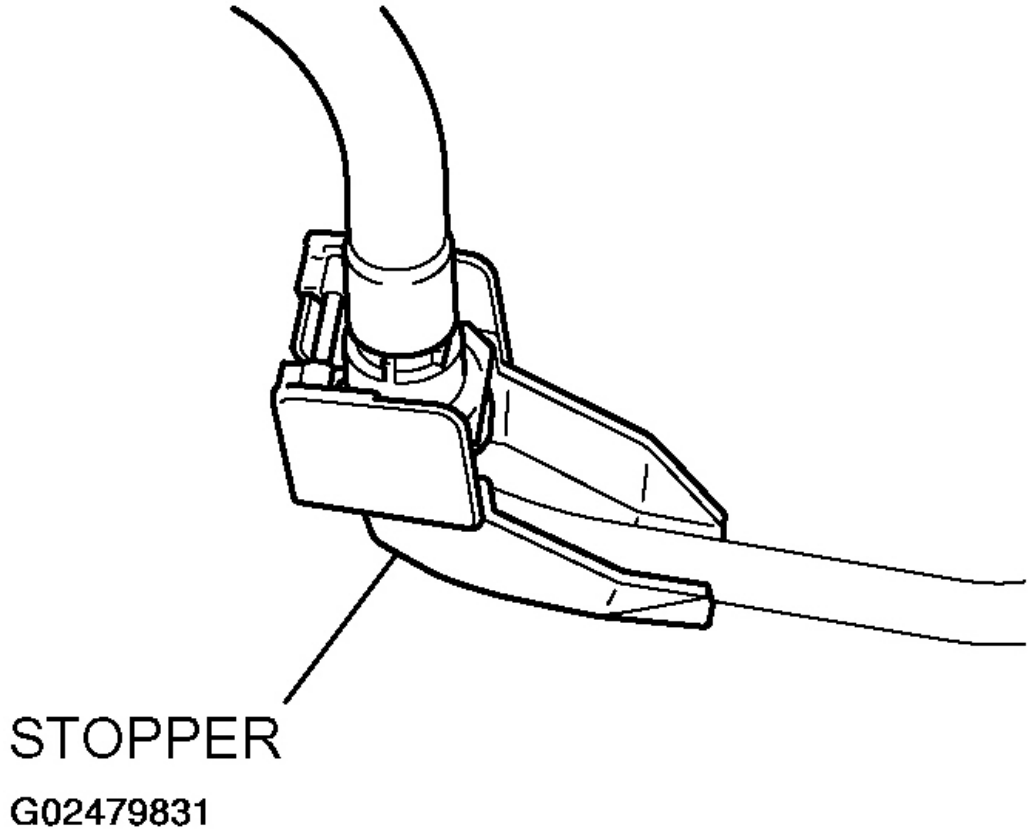


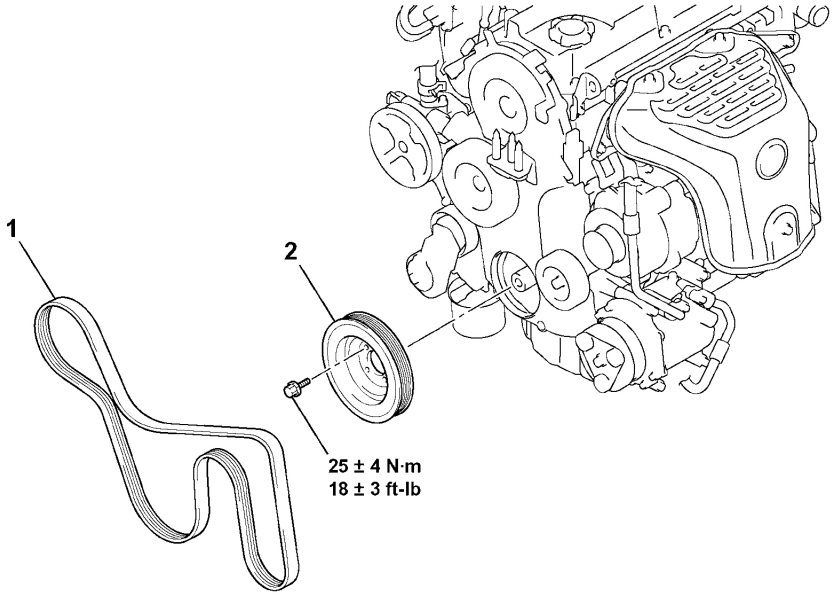

**Fig. 39: Installing Stopper**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

## CRANKSHAFT PULLEY

**REMOVAL AND INSTALLATION**

| Pre-removal Operation | Post-installation Operation |
|---|---|
| • Under Cover Removal | • Drive Belt Tension Check<br>• Under Cover Installation |




**REMOVAL STEPS**

<<A>> 1. DRIVE BELT
2. CRANKSHAFT DAMPER PULLEY

G02479832

**Fig. 40: Removing Crankshaft Pulley**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**REMOVAL SERVICE POINTS**

**<< A >> DRIVE BELT REMOVAL**

The following operations will be needed due to the introduction of the serpentine drive system with the drive belt auto-tensioner.

1. Securely insert the spindle handle or ratchet handle with a 12.7 mm (1/2-inch) insertion angle into the jig hole of the auto-tensioner.
2. Rotate the auto-tensioner counterclockwise and align hole A with hole B.

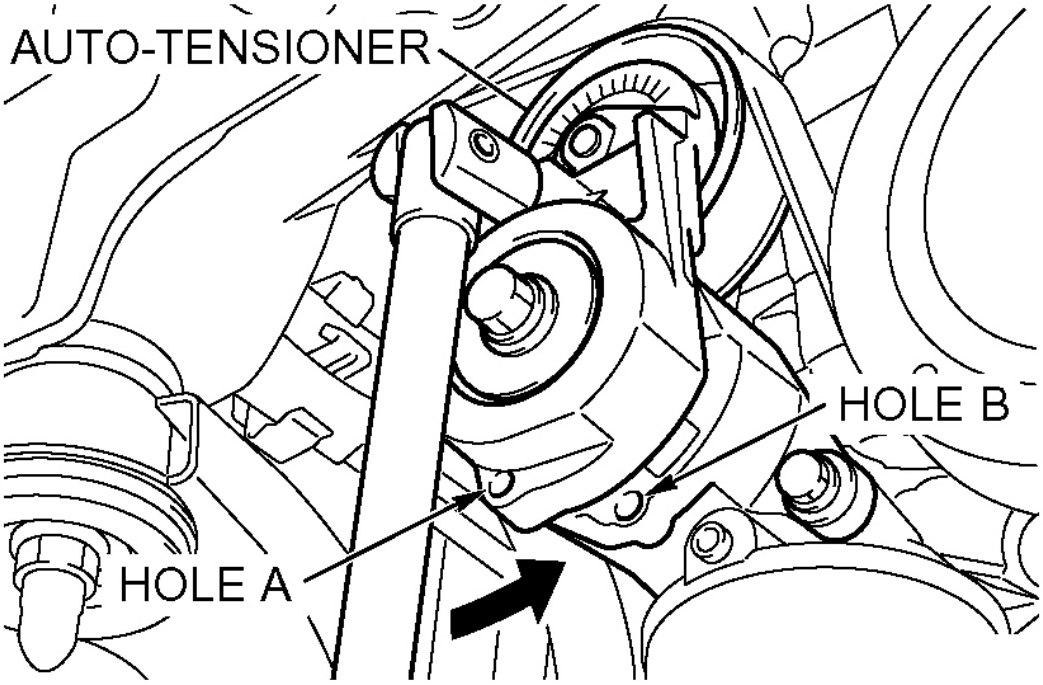



**Fig. 41: Rotating Auto-Tensioner Counterclockwise And Align Hole A With Hole B**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**CAUTION: To reuse the drive belt, draw an arrow indicating the rotating direction (clockwise) on the back of the belt using chalk, etc.**

3. Insert an L-shaped hexagon wrench, etc. into the hole to fix and then remove the drive belt.

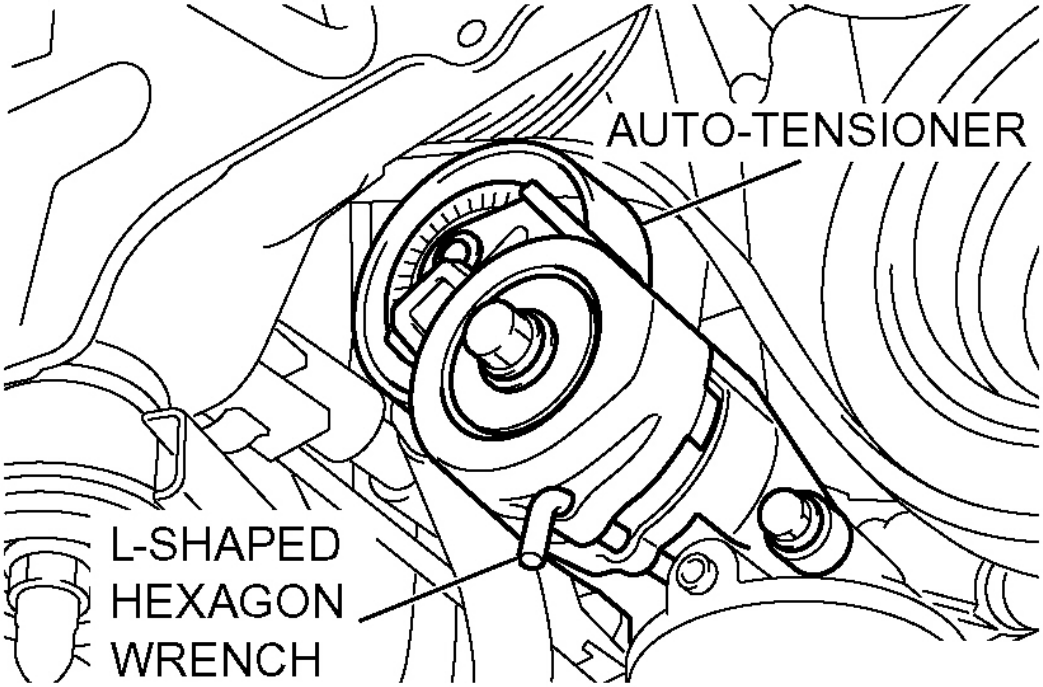



**Fig. 42: Inserting L-Shaped Hexagon Wrench Into Hole**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

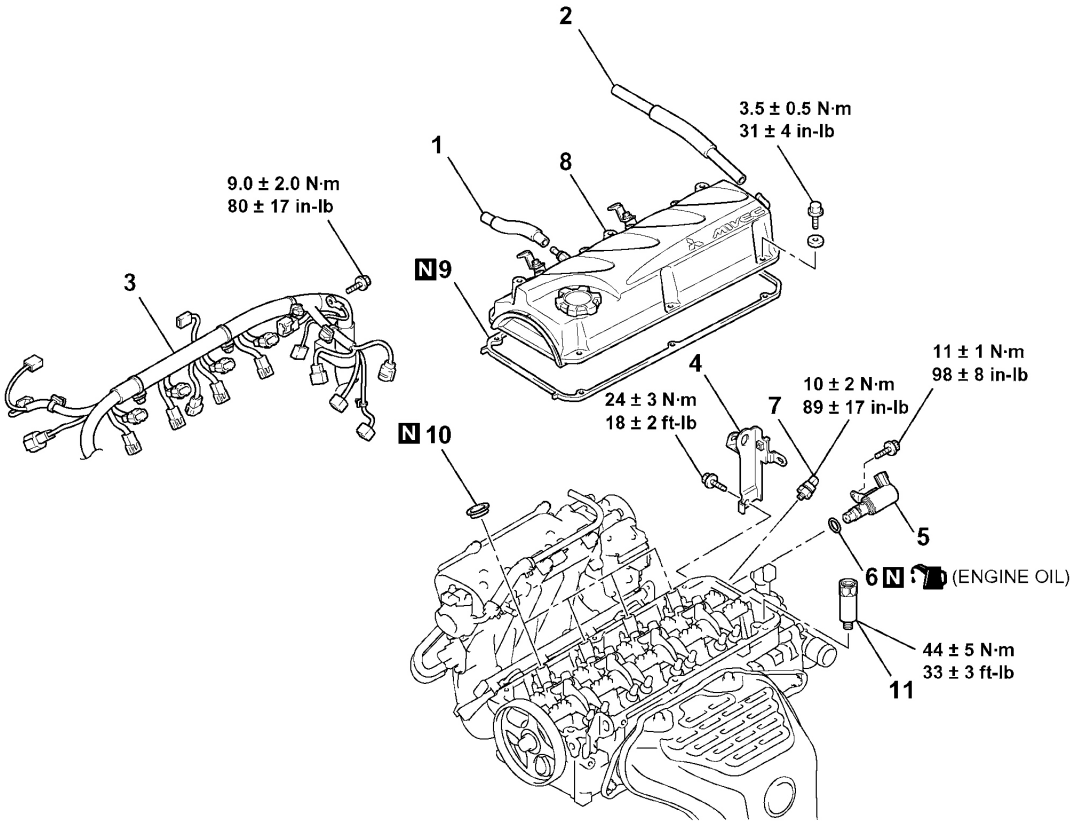
## CAMSHAFT AND VALVE STEM SEAL

### REMOVAL AND INSTALLATION

**CAUTION: * Remove and assemble the marked parts in each cylinder unit.**

| Pre-removal Operation | Post-installation Operation |
|---|---|
| • Air Cleaner Removal<br>• Ignition Coils Removal<br>• Timing Belt Upper Cover Removal | • Timing Belt Upper Cover Installation<br>• Ignition Coils Installation<br>• Air Cleaner Installation<br>• Drive Belt Tension Check<br>• Valve Clearance Check and Adjustment |



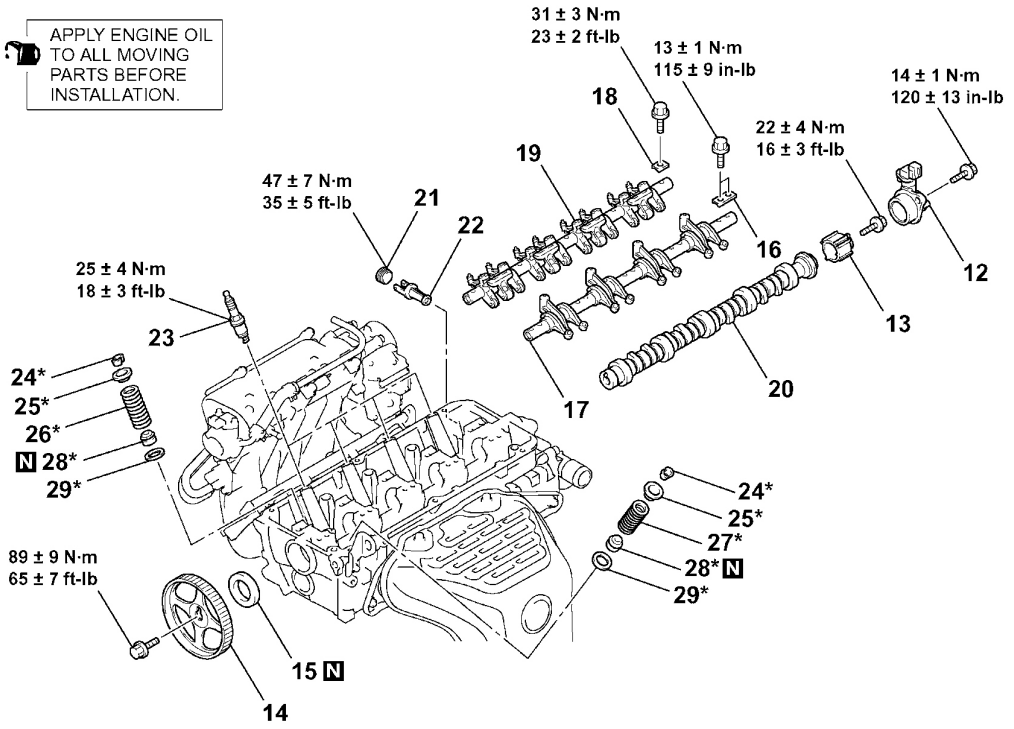

**CAMSHAFT REMOVAL STEPS**
1. ROCKER COVER PCV HOSE CONNECTION
2. ROCKER COVER BREATHER HOSE CONNECTION
3. CONTROL WIRING HARNESS CONNECTION
4. ENGINE HANGER

**CAMSHAFT REMOVAL STEPS**
>>K<< 5. ENGINE OIL CONTROL VALVE
>>K<< 6. O-RING
>>J<< 7. ENGINE OIL PRESSURE SWITCH
8. ROCKER COVER ASSEMBLY
9. ROCKER COVER GASKET
10. SPARK PLUG GUIDE OIL SEALS
11. ACCUMULATOR ASSEMBLY
• VALVE TIMING BELT

G02479835

**Fig. 43: Removing Camshaft And Valve Stem Seal (1 Of 2)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**




**CAMSHAFT REMOVAL STEPS**

- >>I<< 12. CAMSHAFT POSITION SENSOR SUPPORT
- 13. CAMSHAFT POSITION SENSING CYLINDER
- <<A>> >>H<< 14. CAMSHAFT SPROCKET
- >>G<< 15. CAMSHAFT OIL SEAL
- >>F<< 16. EXHAUST ROCKER ARM SHAFT CAPS
- <<B>> >>F<< 17. EXHAUST ROCKER ARM AND SHAFT ASSEMBLY
- >>E<< 18. INLET ROCKER ARM SHAFT CAPS
- <<B>> >>E<< 19. INLET ROCKER ARM AND SHAFT ASSEMBLY
- >>D<< 20. CAMSHAFT
  - WATER INLET FITTING AND THERMOSTAT CASE ASSEMBLY
- 21. CYLINDER HEAD PLUG
- 22. ENGINE OIL CONTROL VALVE FILTER

**CAMSHAFT REMOVAL STEPS**

**VALVE STEM SEAL REMOVAL STEPS**

- 1. ROCKER COVER PCV HOSE CONNECTION
- 2. ROCKER COVER BREATHER HOSE CONNECTION
- 3. CONTROL WIRING HARNESS CONNECTION
- 4. ENGINE HANGER
- 8. ROCKER COVER ASSEMBLY
- 9. ROCKER COVER GASKET
- 10. SPARK PLUG GUIDE OIL SEALS
- >>F<< 16. EXHAUST ROCKER ARM SHAFT CAPS
- <<B>> >>F<< 17. EXHAUST ROCKER ARM AND SHAFT ASSEMBLY
- >>E<< 18. INLET ROCKER ARM SHAFT CAPS

**VALVE STEM SEAL REMOVAL STEPS (Continued)**

- <<B>> >>E<< 19. INLET ROCKER ARM AND SHAFT ASSEMBLY
- 23. SPARK PLUGS
- <<C>> >>C<< 24. VALVE SPRING RETAINER LOCKS
- 25. VALVE SPRING RETAINERS
- >>B<< 26. INLET VALVE SPRINGS
- >>B<< 27. EXHAUST VALVE SPRINGS
- >>A<< 28. VALVE STEM SEALS
- 29. VALVE SPRING SEATS

G02479836

**Fig. 44: Removing Camshaft And Valve Stem Seal (2 Of 2)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**Required Special Tools:**

- MB990767: Front Hub and Flange Yoke Holder
- MD998713: Camshaft Oil Seal Installer
- MD998719: Pin
- MD998772: Valve Spring Compressor
- MB991999: Valve Stem Seal Installer

**REMOVAL SERVICE POINTS**

**<< A >> CAMSHAFT SPROCKET REMOVAL**

1. Hold the camshaft sprocket with special tools MB990767 and MD998719.
2. Loosen the camshaft sprocket mounting bolt and remove the camshaft sprocket.

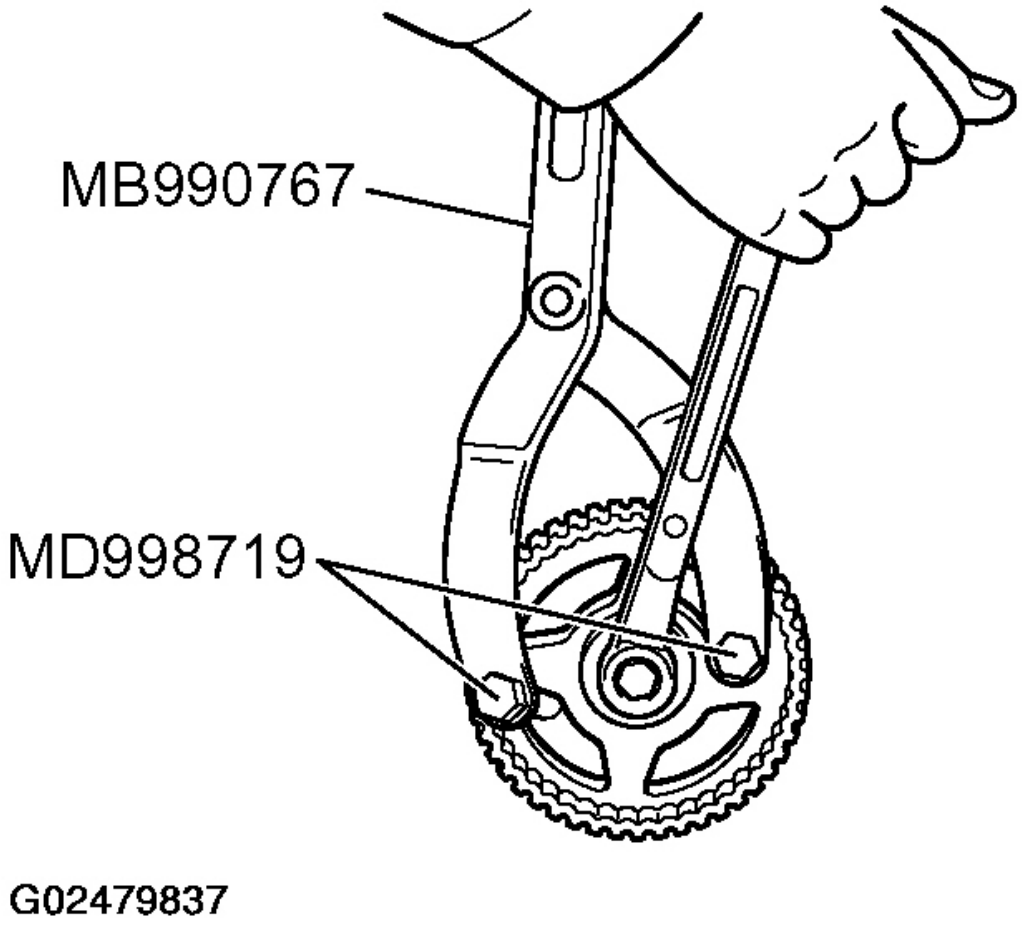



**Fig. 45: Removing Camshaft Sprocket**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**<< B >> EXHAUST ROCKER ARM AND SHAFT ASSEMBLY/INLET ROCKER ARM AND SHAFT ASSEMBLY REMOVAL**

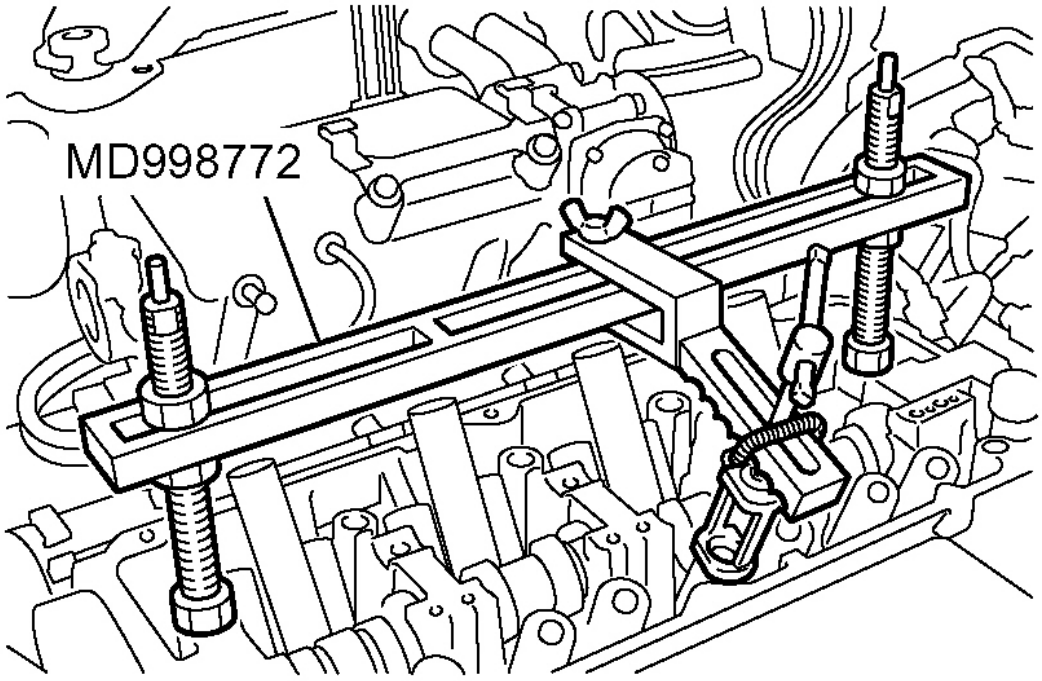
**CAUTION: Never disassemble the exhaust rocker arm and shaft assembly, and inlet rocker arm and shaft assembly.**

**<< C >> VALVE SPRING RETAINER LOCKS REMOVAL**

**CAUTION: When removing valve spring retainer locks, leave the piston of each cylinder in the TDC (Top Dead Center) position. The valve may fall into the cylinder if the piston is not properly in the TDC position.**

Use special tool MD998772 to compress the valve spring and then remove the valve spring retainer locks.




G02479838

**Fig. 46: Removing Valve Spring Retainer Locks**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**INSTALLATION SERVICE POINTS**

**>> A << VALVE STEM SEALS INSTALLATION**

1. Apply a small amount of engine oil to the valve stem seals.

**CAUTION:**
- **Do not re-use the valve stem seal.**
- **The special tool MB991999 must be used to install the valve stem seal. Improper installation could result in oil leaking past the valve guide.**

2. Use special tool MB991999 to fill a new valve stem seal in the valve guide using the valve stem area as a guide.

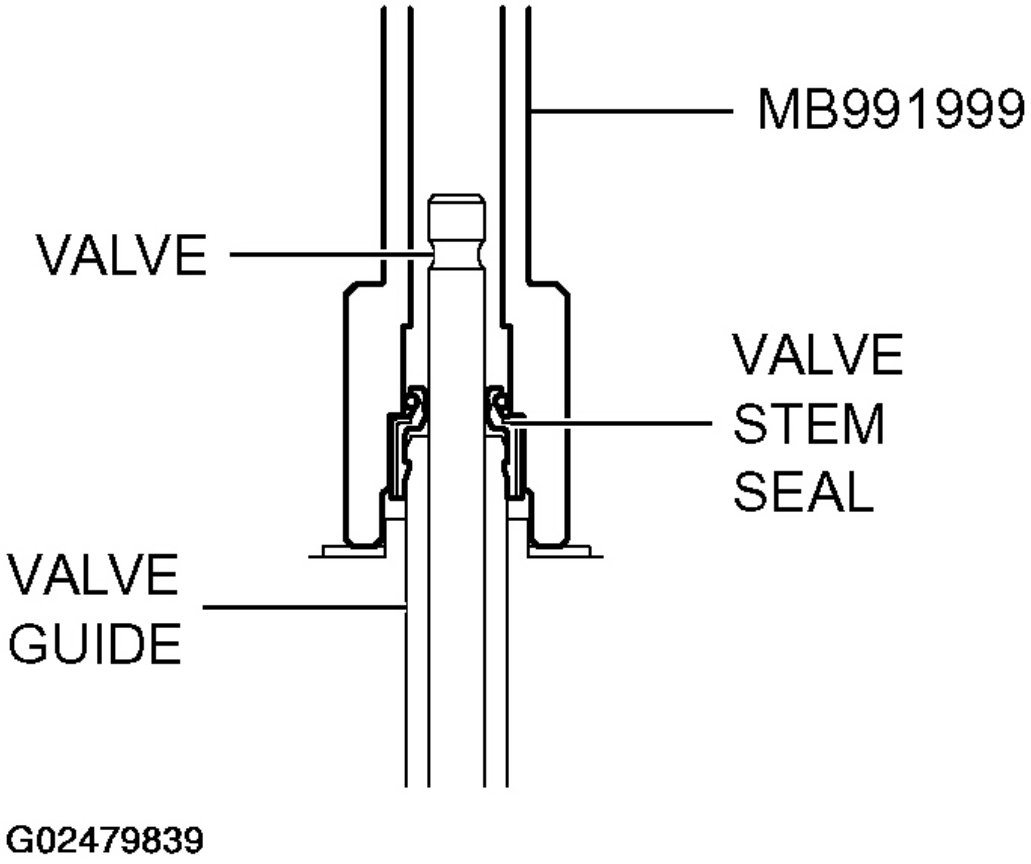



**Fig. 47: Installing Valve Stem Seals**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> B << EXHAUST VALVE SPRINGS/INLET VALVE SPRINGS INSTALLATION**

Install the valve springs with its identification color painted end facing the locker arm.

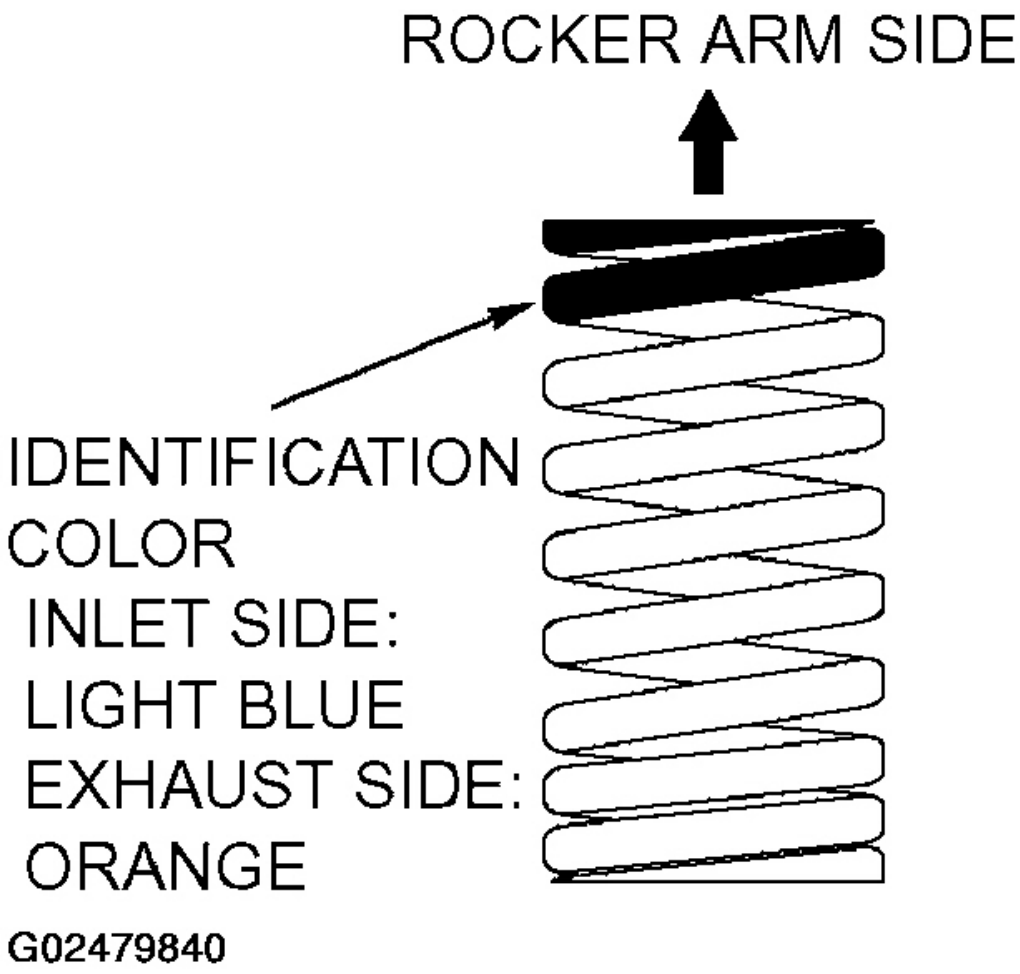
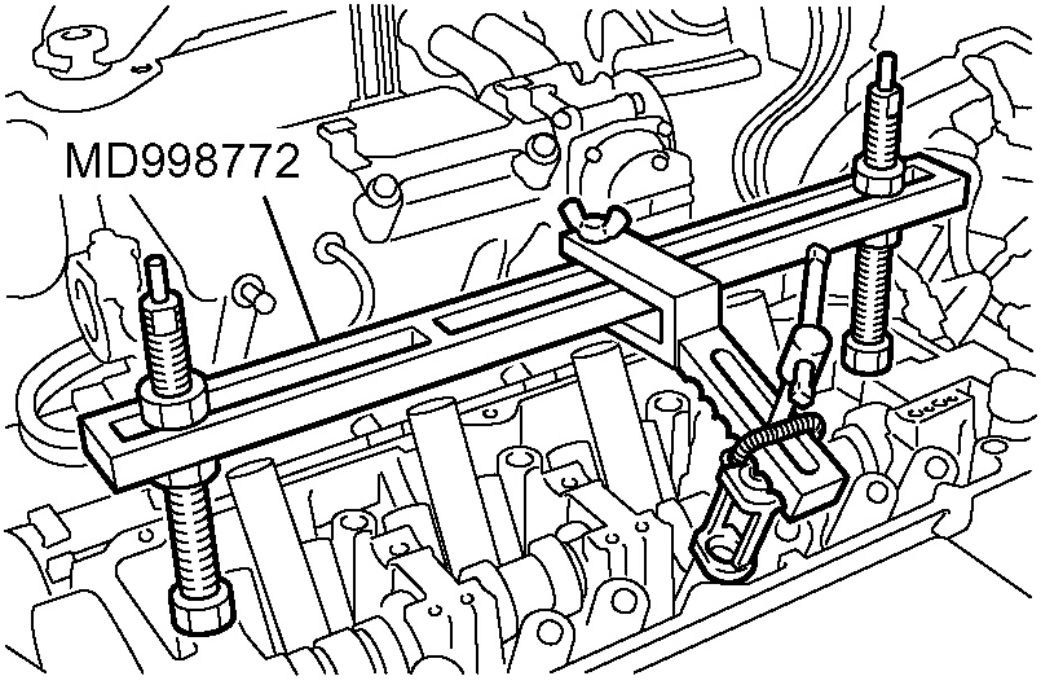



**Fig. 48: Identifying Identification Color On Valve Spring**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> C << VALVE SPRING RETAINER LOCKS INSTALLATION**

Use special tool MD998772 to compress the valve spring and then install the valve spring retainer lock in the same manner as removal.




G02479841

**Fig. 49: Installing Valve Spring Retainer Locks**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> D << CAMSHAFT INSTALLATION**

Set the dowel pin of the camshaft in the position shown in the figure.

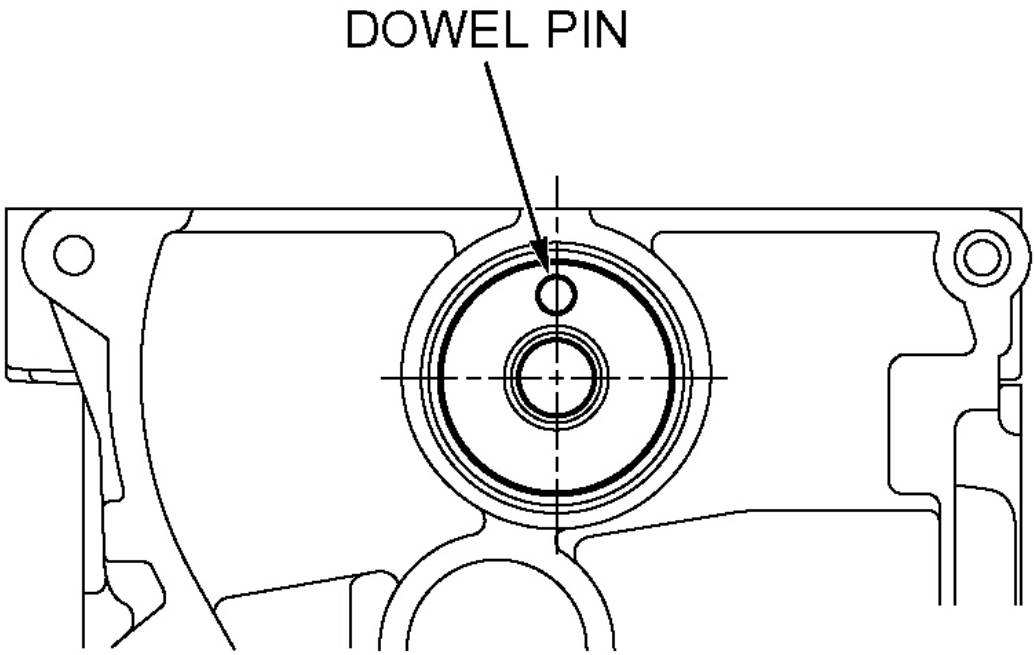



**Fig. 50: Identifying Camshaft Dowel Pin Position**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> E << INLET ROCKER ARM AND SHAFT ASSEMBLY/INLET ROCKER ARM SHAFT CAPS INSTALLATION**

1. Place the inlet rocker shaft so that its 5.5 mm (0.22 inch) hole faces toward the cylinder head.
2. Install the inlet rocker arm shaft caps.
3. Tighten the inlet rocker shaft mounting bolts to the specified torque.

   **Tightening torque: 31 +/- 3 N.m (23 +/- 2 ft-lb)**

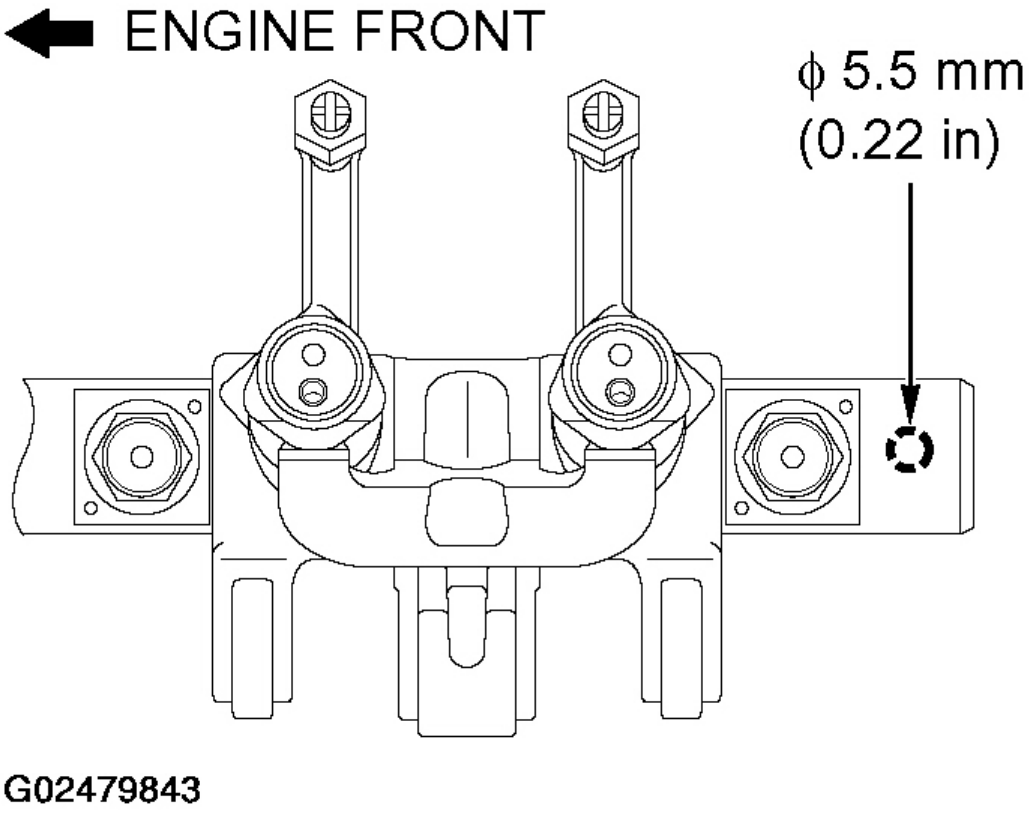



**Fig. 51: Installing Inlet Rocker Arm Shaft Caps**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> F << EXHAUST ROCKER ARM AND SHAFT ASSEMBLY/EXHAUST ROCKER ARM SHAFT CAPS INSTALLATION**

1. Install the exhaust rocker shaft so that its notch is positioned as shown.
2. Install the exhaust rocker arm shaft caps.
3. Tighten the exhaust rocker shaft mounting bolts to the specified torque.

   **Tightening torque: 13 +/- 1 N.m (115 +/- 9 in-lb)**

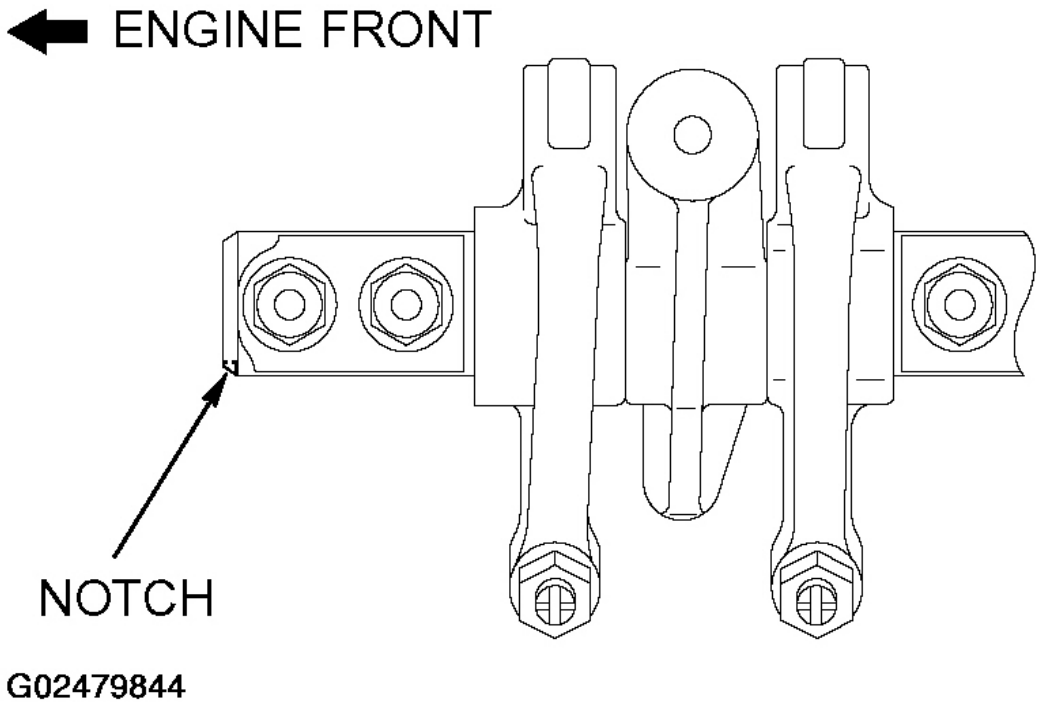



**Fig. 52: Installing Exhaust Rocker Arm Shaft Caps**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> G << CAMSHAFT OIL SEAL INSTALLATION**

1. Apply engine oil to the entire inner diameter of the oil seal lip.
2. Use special tool MD998713 to press-fit the oil seal as shown.

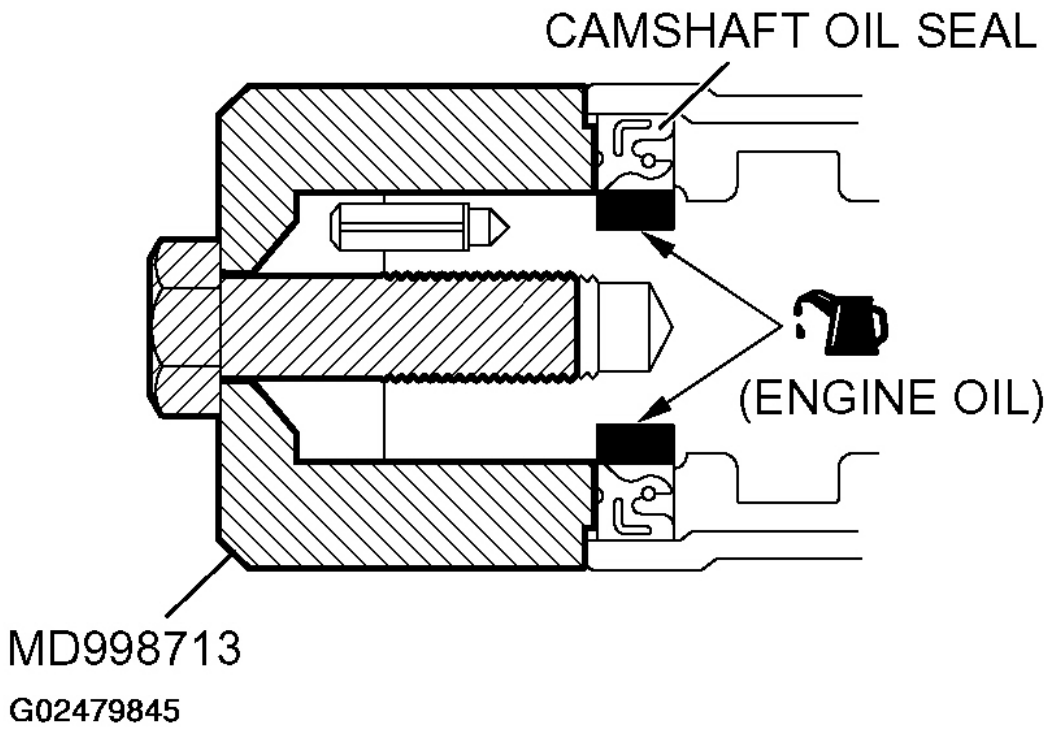



**Fig. 53: Applying Engine Oil To Entire Inner Diameter Of Oil Seal Lip**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> H << CAMSHAFT SPROCKET INSTALLATION**

1. Hold the camshaft sprocket with special tools MB990767 and MD998719 in the same manner as removal.
2. Tighten the camshaft sprocket mounting bolt to the specified torque.

   **Tightening torque: 89 +/- 9 N.m (65 +/- 7 ft-lb)**

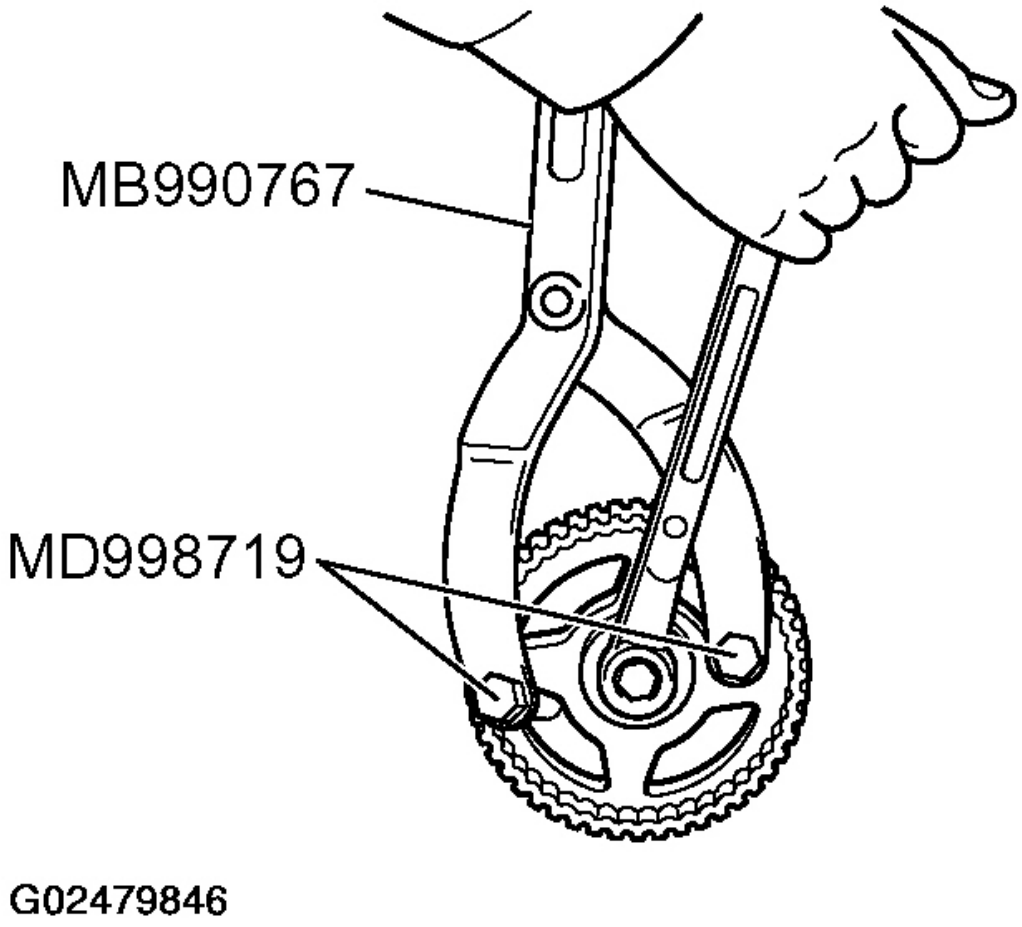



**Fig. 54: Installing Camshaft Sprocket**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> I << CAMSHAFT POSITION SENSOR SUPPORT INSTALLATION**

1. Remove sealant from the camshaft position sensor support and cylinder head surfaces.
2. Apply the sealant to the camshaft position sensor support flange in a continuous bead as shown in the illustration.

   **Specified sealant: 3M™ AAD Part No.8672, 3M™ AAD Part No.8679/8678 or equivalent**

   **NOTE: Install the camshaft position sensor support within 15 minutes after applying the sealant.**

3. Install the camshaft position sensor support to the cylinder head.

**CAUTION: Wait at least one hour. Never start the engine or let engine oil or coolant touch the adhesion surface during that time.**

4. Tighten the camshaft position sensor support mounting bolts to the specified torque.
   **Tightening torque: 14 +/- 1 N.m (120 +/- 13 in-lb)**

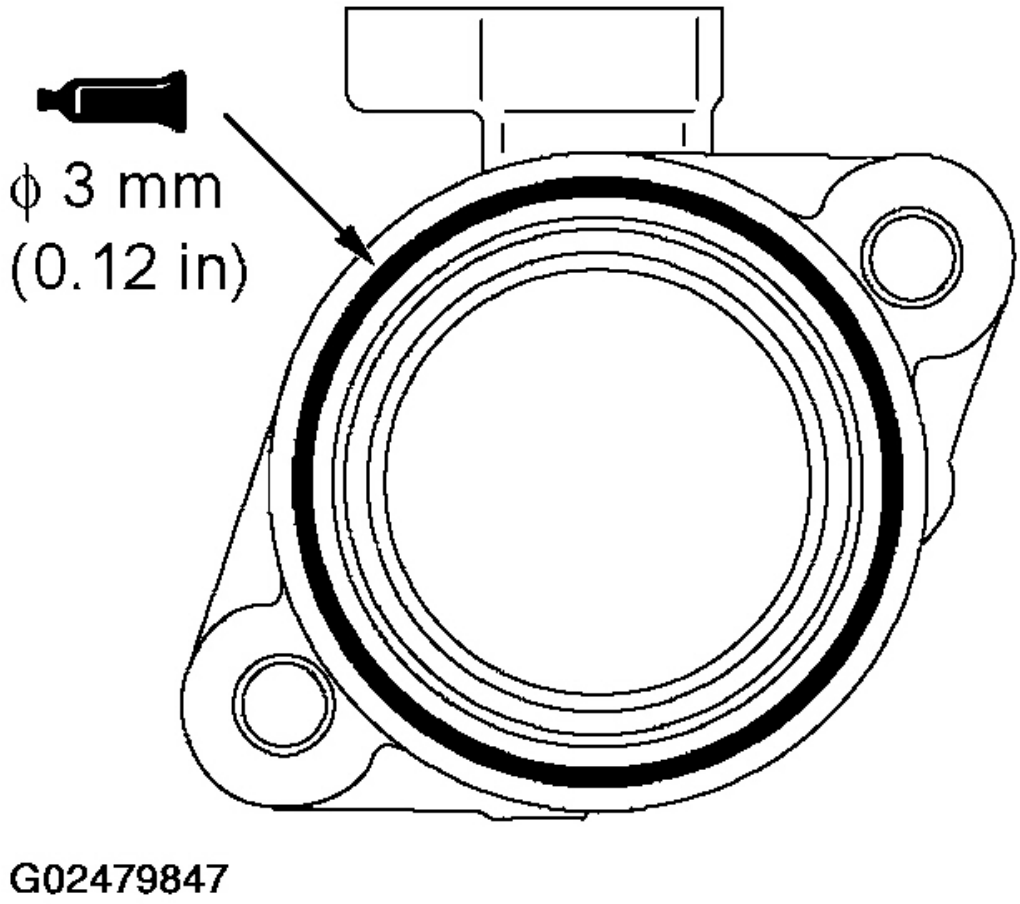



**Fig. 55: Applying Sealant To Camshaft Position Sensor Support Flange In Continuous Bead**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> J << ENGINE OIL PRESSURE SWITCH INSTALLATION**

1. Remove sealant from the engine oil pressure switch and cylinder head surfaces.
2. Apply sealant to the thread of the engine oil pressure switch as shown.
   **Specified sealant: 3M* AAD Part No.8672, 3M* AAD Part No.8679/8678 or equivalent**

**NOTE:** **Install the engine oil pressure switch within 15 minutes after applying the sealant.**

**CAUTION: Wait at least one hour. Never start the engine or let engine oil or coolant touch the adhesion surface during that time.**

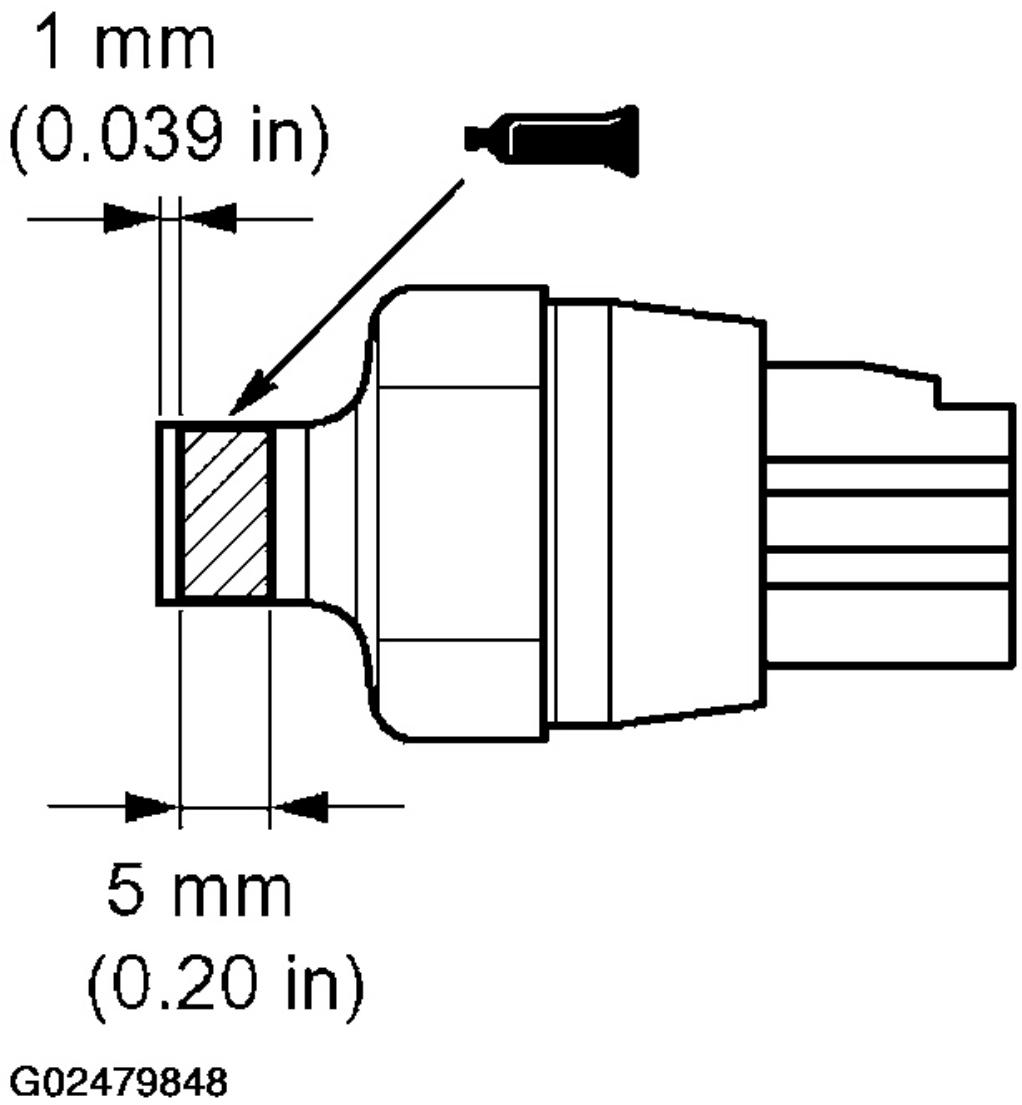



**Fig. 56: Applying Sealant To Thread Of Engine Oil Pressure Switch**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

3. Tighten the engine oil pressure switch to the specified torque as shown.

**Tightening torque: 10 +/- 2 N.m (89 +/- 17 in-lb)**

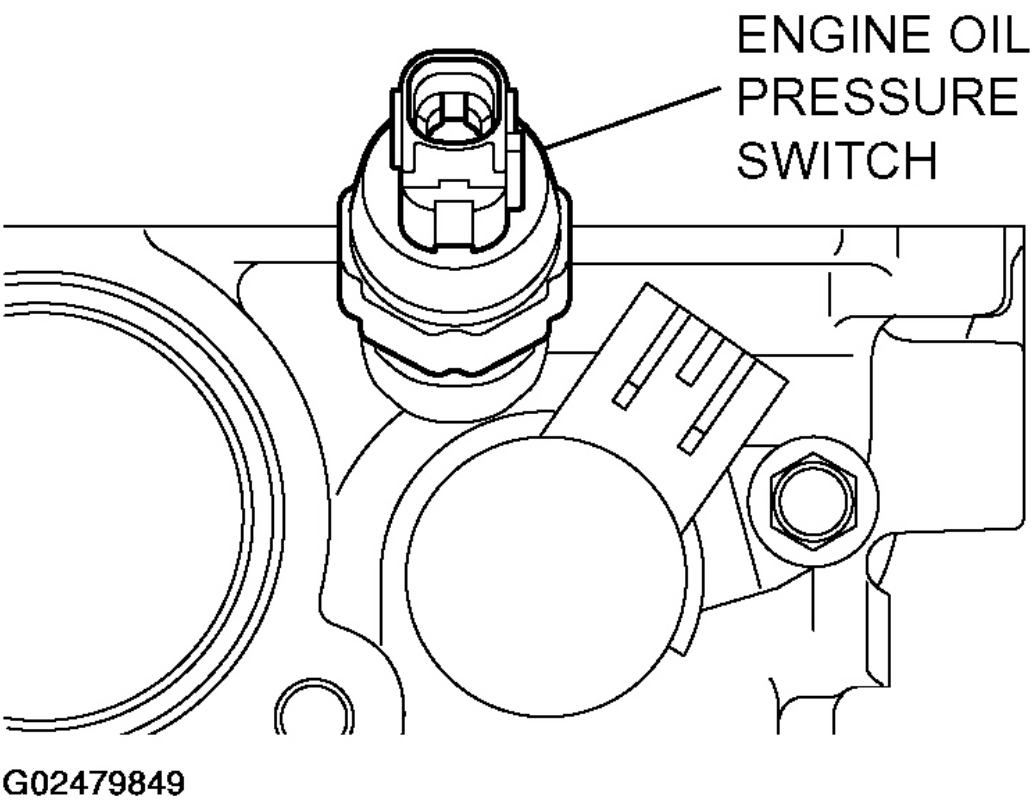



**Fig. 57: Tightening Engine Oil Pressure Switch**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> K << O-RING/ENGINE OIL CONTROL VALVE INSTALLATION**

**CAUTION:**
- **Never re-use the O-ring.**
- **Before installing O-ring, wind the tape with the soft adhesion (sealing tape) around the oil passages cut-out area of engine oil control valve to prevent the damage. If the O-ring is damaged, it can be the cause of oil leak.**

1. Apply a small amount of engine oil to the O-ring and then install it to the oil control valve.
2. Assemble the engine engine oil control valve to the cylinder head.
3. Tighten the engine oil control valve mounting bolt to the specified torque.

**Tightening torque: 11 +/- 1 N.m (98 +/- 8 in-lb)**

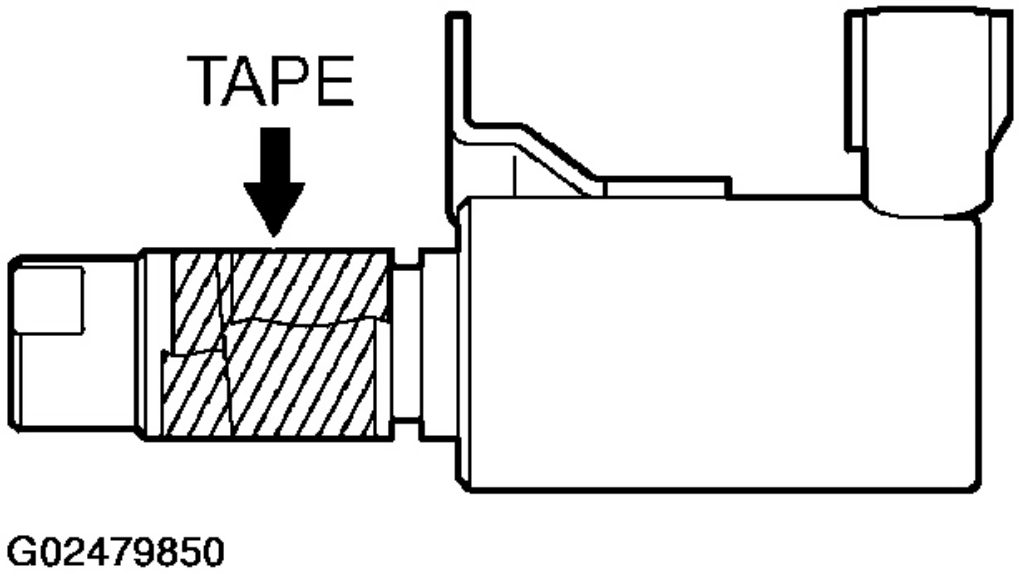


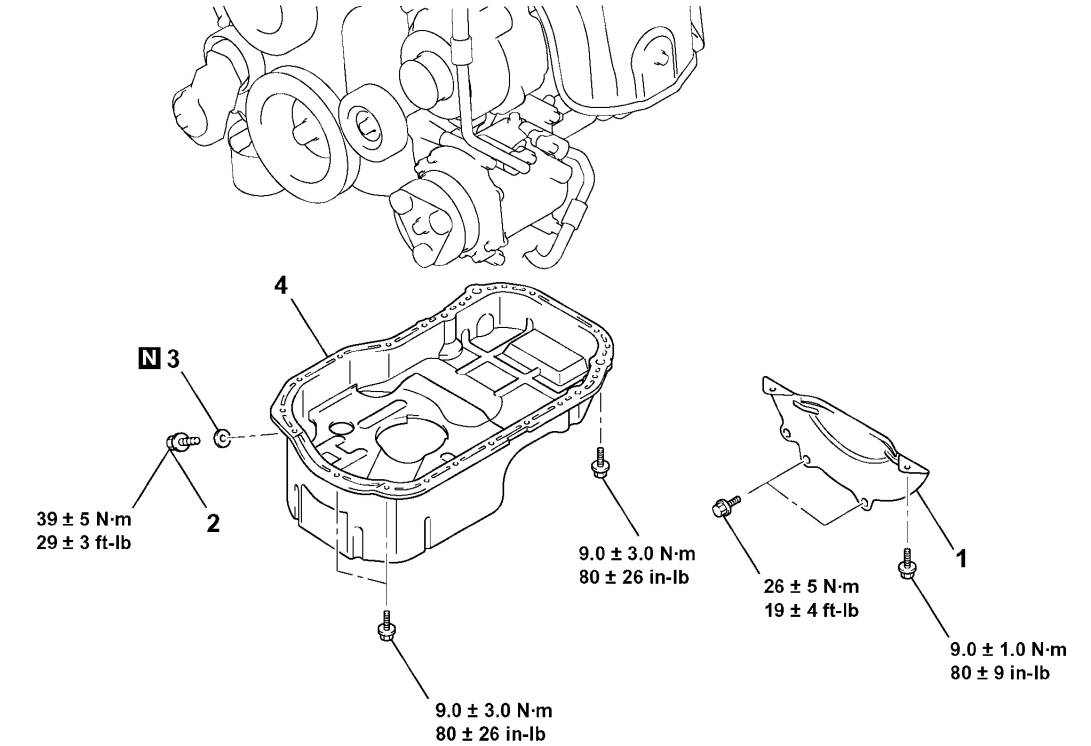

**Fig. 58: Winding Tape With Soft Adhesion Around Oil Passages Cut-Out Area Of Engine Oil Control Valve**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

## OIL PAN

**REMOVAL AND INSTALLATION < FWD >**

| Pre-removal Operation | Post-installation Operation |
|---|---|
| • Under Cover Removal<br>• Engine Oil Draining<br>• Front Exhaust Pipe Removal | • Front Exhaust Pipe Installation<br>• Engine Oil Refilling<br>• Under Cover Installation |




**REMOVAL STEPS**
1. TORQUE CONVERTER HOUSING FRONT LOWER COVER
2. ENGINE OIL PAN DRAIN PLUG

**REMOVAL STEPS (Continued)**
>>B<< 3. ENGINE OIL PAN DRAIN PLUG GASKET
<<A>> >>A<< 4. ENGINE OIL PAN

**Fig. 59: Removing Oil Pan (FWD)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

## Required Special Tool:

- MD998727: Oil Pan FIPG Cutter

**REMOVAL SERVICE POINT**

**<< A >> ENGINE OIL PAN REMOVAL**

1. Remove the engine oil pan mounting bolts.

**CAUTION: Do not use special tool MD998727 in area A of the engine oil pan. Using the special tool in area A may cause deformation of the front case because the front case is made of aluminum.**

2. Tap special tool MD998727 into the range (B) between the cylinder block and the engine oil pan, and then slide the tool sideways.

**NOTE: If any sounding parts interfere with the removal, there is no need to use the special tool.**

3. Remove the engine oil pan.

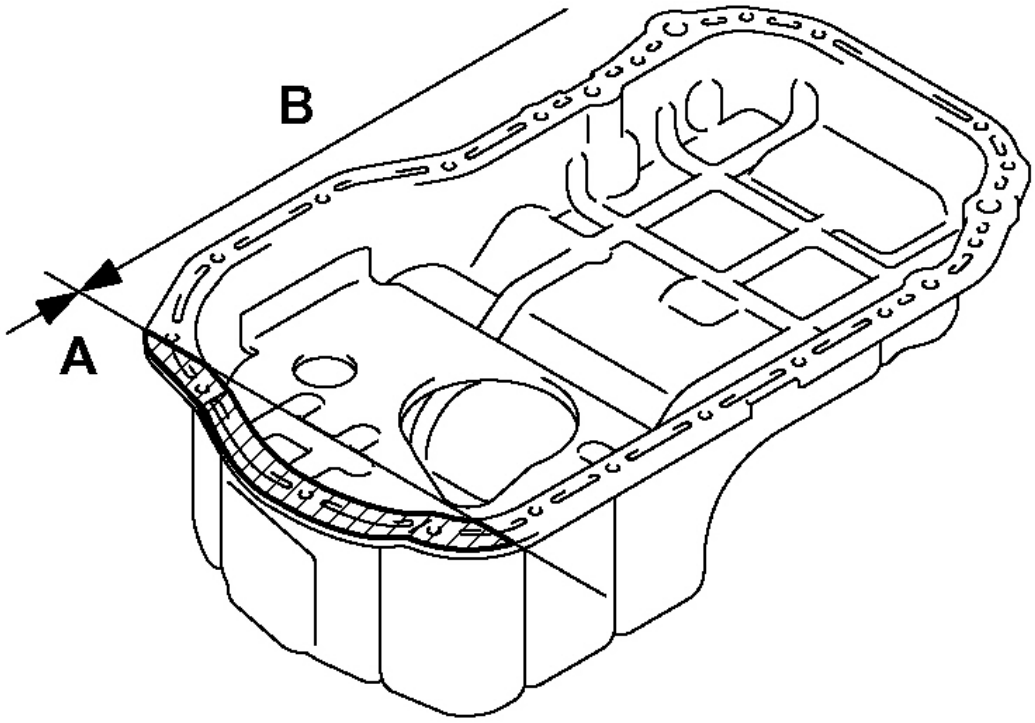
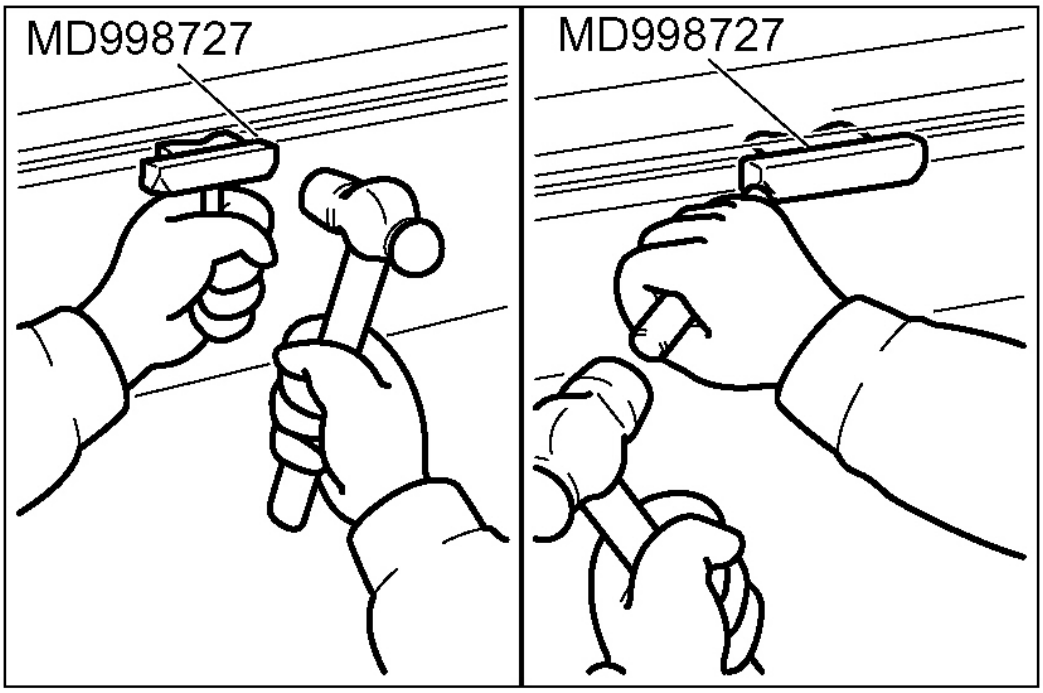



**Fig. 60: Identifying Area For Not Using Special Tool MD998727**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**




G02479853

**Fig. 61: Removing Engine Oil Pan**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**INSTALLATION SERVICE POINTS**

**>> A << ENGINE OIL PAN INSTALLATION**

1. Remove sealant from the engine oil pan, front case and cylinder block surfaces.
2. Apply a bead of the sealant to the cylinder block mating surface of the engine oil pan as shown.
   **Specified sealant: 3M* AAD Part No.8672, 8704, 3M* AAD Part No.8679/8678 or equivalent**

   **NOTE: Install the engine oil pan within 15 minutes after applying sealant.**

3. Assemble the engine oil pan to the cylinder block.

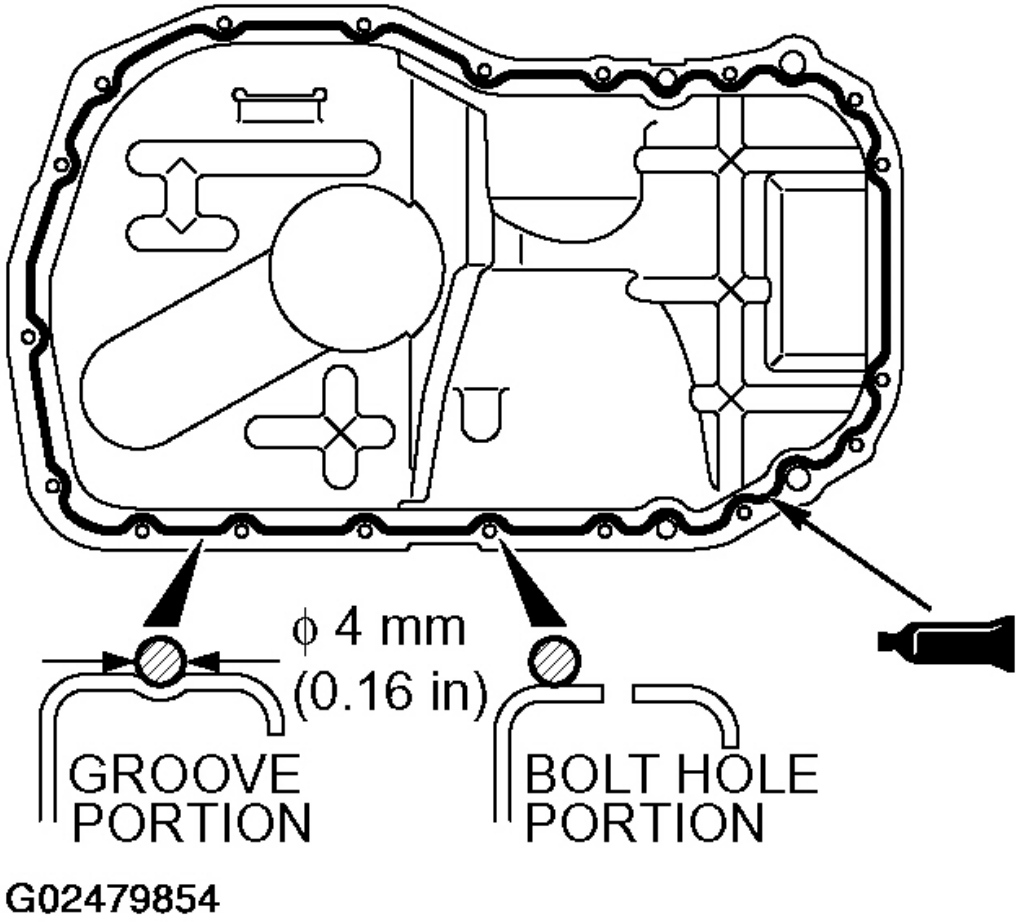



**Fig. 62: Applying Bead Of Sealant To Cylinder Block Mating Surface Of Engine Oil Pan**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**CAUTION: Wait at least one hour. Never start the engine or let engine oil or coolant touch the sealant surface during that time.**

4. Tighten the engine oil pan mounting bolts to the specified torque. Be careful when installing, as the bolts indicated in the illustration have different lengths from the other bolts.

   **Tightening torque: 9.0 +/- 3.0 N.m (80 +/- 26 in-lb)**

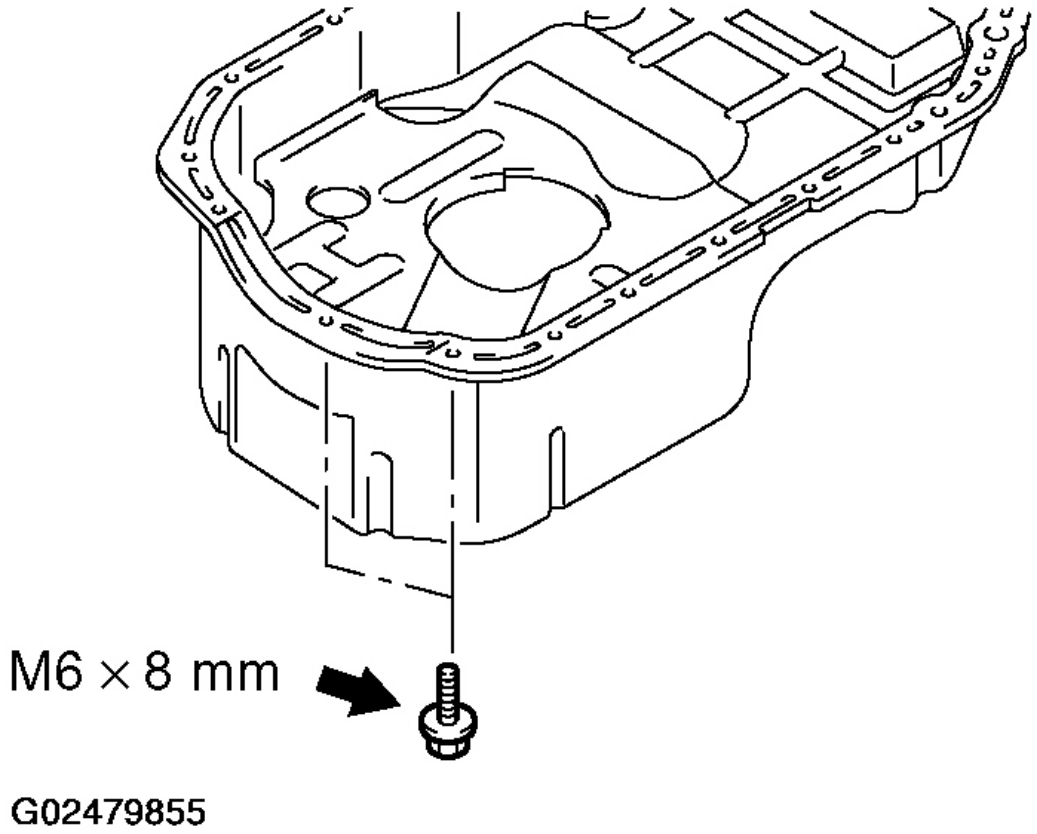



**Fig. 63: Tightening Engine Oil Pan Mounting Bolts**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> B << ENGINE OIL PAN DRAIN PLUG GASKET INSTALLATION**

Replace the gasket with a new gasket. Install the new gasket in the direction shown in the illustration.

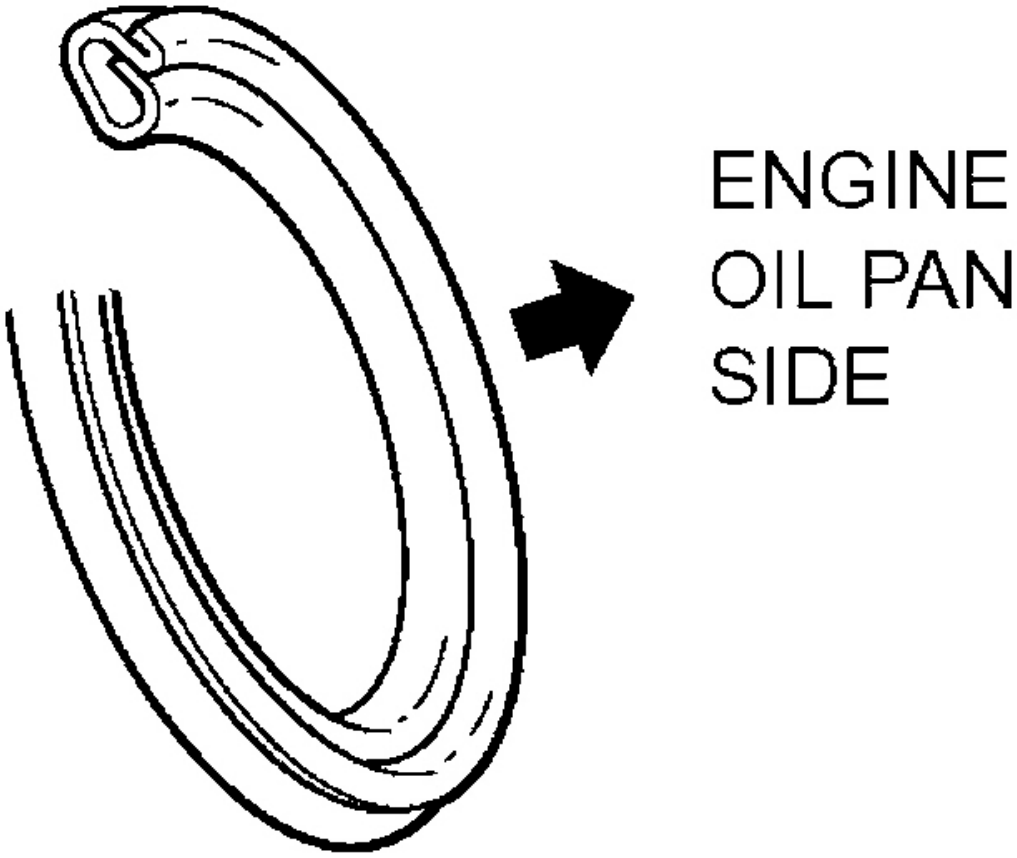
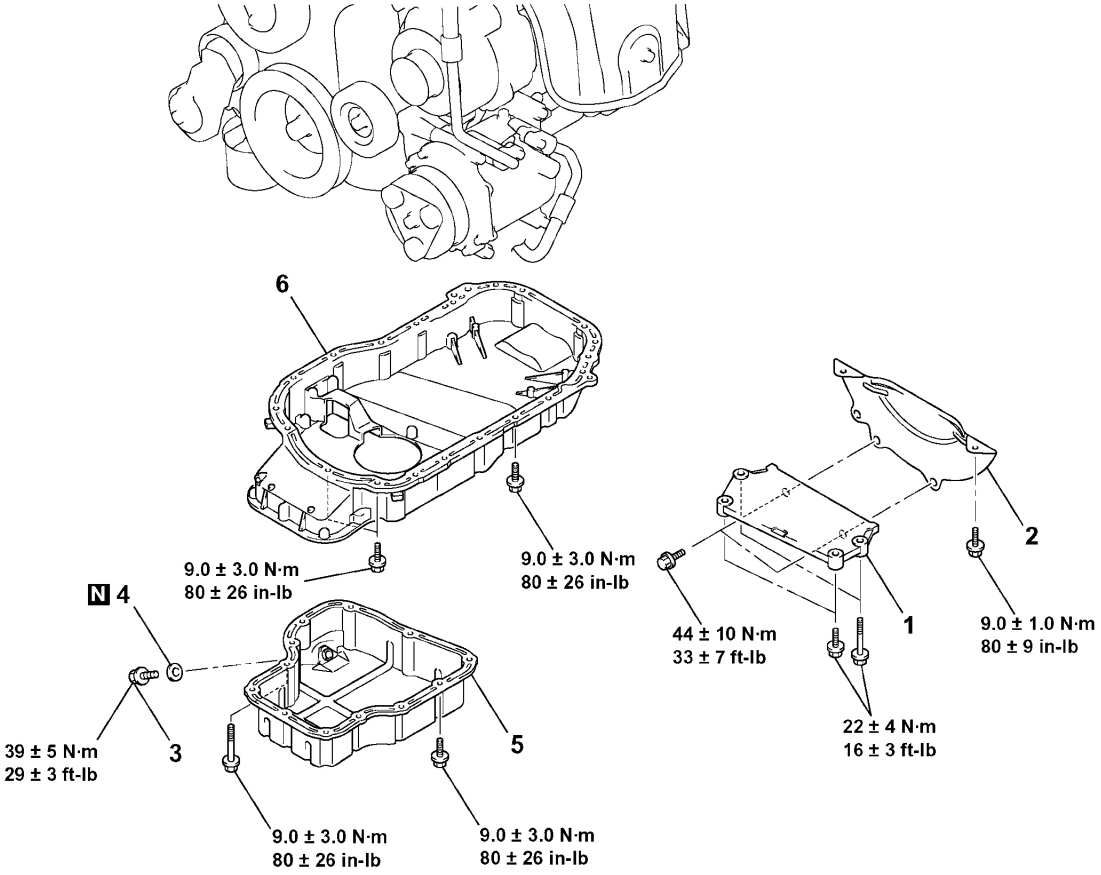



**Fig. 64: Identifying Engine Oil Pan Drain Plug Gasket**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**REMOVAL AND INSTALLATION < AWD >**

| Pre-removal Operation | Post-installation Operation |
|---|---|
| • Under Cover Removal<br>• Engine Oil Draining<br>• Front Exhaust Pipe Removal<br>• Center Member Removal | • Center Member Installation<br>• Front Exhaust Pipe Installation<br>• Engine Oil Refilling<br>• Under Cover Installation |




| | REMOVAL STEPS | | | REMOVAL STEPS (Continued) |
|---|---|---|---|---|
| >>D<< | 1. TRANSAXLE HOUSING FRONT LOWER COVER STAY | | >>C<< | 4. ENGINE OIL PAN DRAIN PLUG GASKET |
| | 2. TORQUE CONVERTER HOUSING FRONT LOWER COVER | <<A>><br><<B>> | >>B<<<br>>>A<< | 5. ENGINE LOWER OIL PAN<br>6. ENGINE UPPER OIL PAN |
| | 3. ENGINE OIL PAN DRAIN PLUG | | | |

G02479857

**Fig. 65: Removing Oil Pan (AWD)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**REMOVAL SERVICE POINTS**

**<< A >> ENGINE LOWER OIL PAN REMOVAL**

1. Remove the engine lower oil pan mounting bolts.

**CAUTION: Do not use oil pan FIPG cutter special tool MD998727. The engine upper oil pan is made of aluminum and this tool will damage it.**

2. Apply a piece of wood to the lower oil pan and strike it with a hammer to remove the engine lower oil pan.

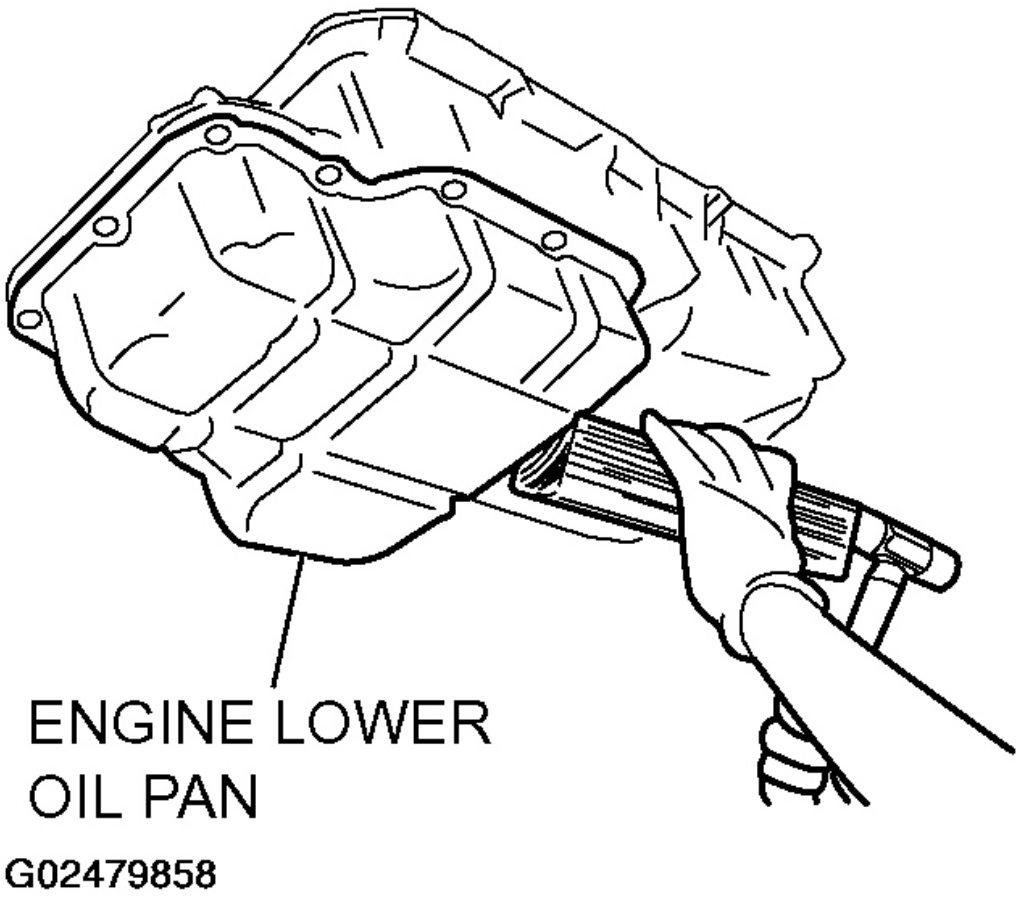



**Fig. 66: Removing Engine Lower Oil Pan**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**<< B >> ENGINE UPPER OIL PAN REMOVAL**

1. Remove the engine upper oil pan mounting bolts.

**CAUTION: Do not use oil pan FIPG cutter special tool MD998727. The engine upper oil pan is made of aluminum and this tool will damage it.**

2. Screw in the bolt into bolt hole A in the location shown. Then lift the upper oil pan and remove it.

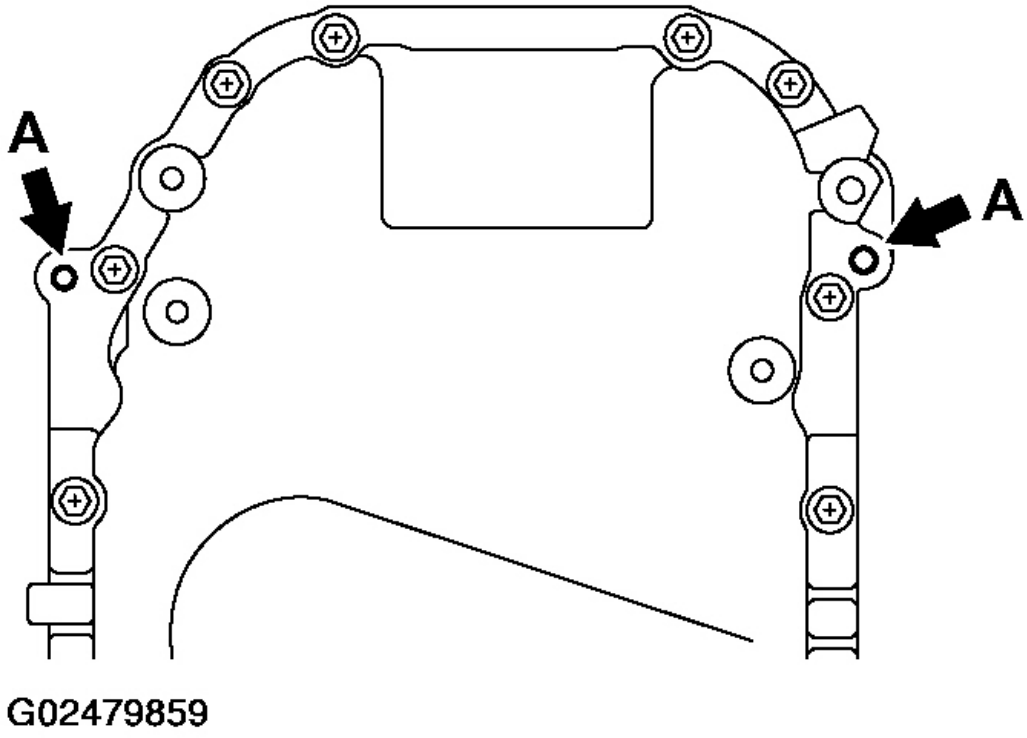



**Fig. 67: Screwing In Bolt Into Bolt Hole A**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**INSTALLATION SERVICE POINTS**

**>> A << ENGINE UPPER OIL PAN INSTALLATION**

1. Remove sealant from the engine upper oil pan, front case and cylinder block surfaces.
2. Apply a bead of the sealant to the mating surface of the engine upper oil pan as shown.

   **Specified sealant: 3M™ AAD Part No.8672, 8704, 3M™ AAD Part No.8679/8678 or equivalent**

   **NOTE: Install the engine upper oil pan within 15 minutes after applying sealant.**

3. Assemble the engine upper oil pan to the cylinder block.

   **CAUTION: Wait at least one hour. Never start the engine or let engine oil or coolant touch the sealant surface during that time.**

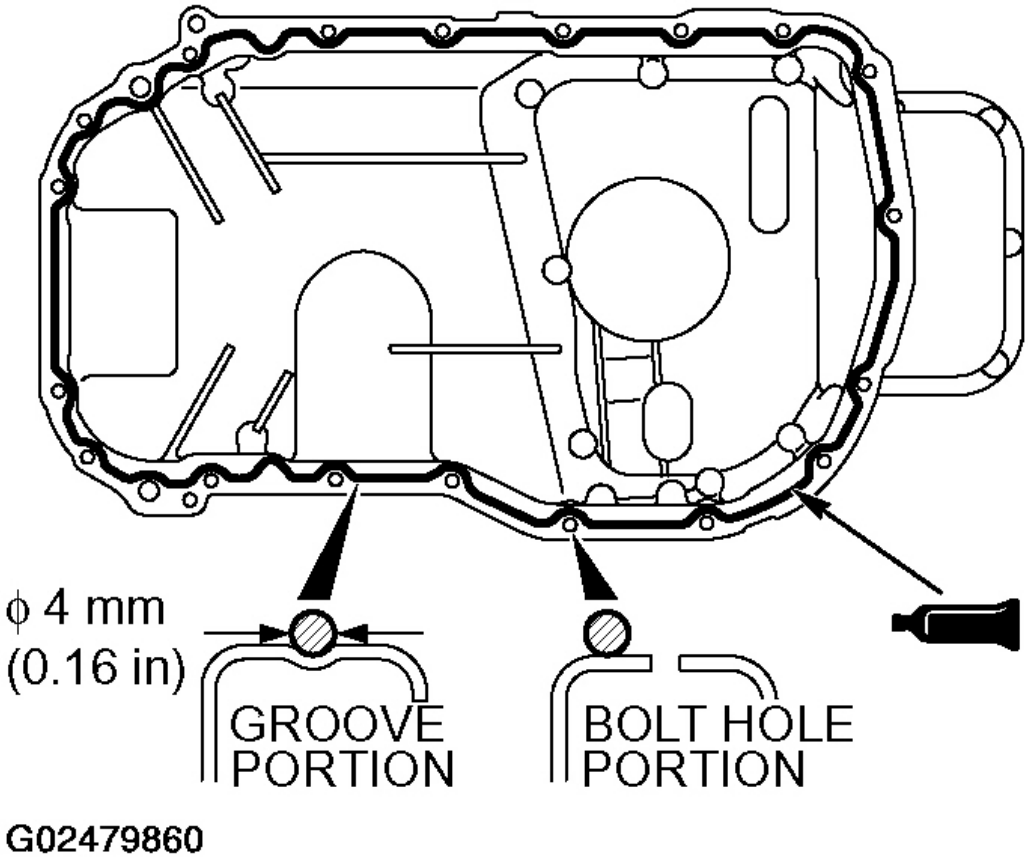



**Fig. 68: Applying Bead Of Sealant To Mating Surface Of Engine Upper Oil Pan**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

4. Insert the bolts to the engine upper oil pan as shown, and tighten them to the specified torque.

| NAME | SYMBOL | QUANTITY | SIZE mm (D × L) |
|---|---|---|---|
| Flange bolt | A | 2 | M6 × 16 |
| | B | 16 | M6 × 18 |

G02479861

**Fig. 69: Flange Bolts Specification Chart**

**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**NOTE: D: Nominal diameter, L: Nominal length**

**Tightening torque: 9.0 +/- 3.0 N.m (80 +/- 26 in-lb)**

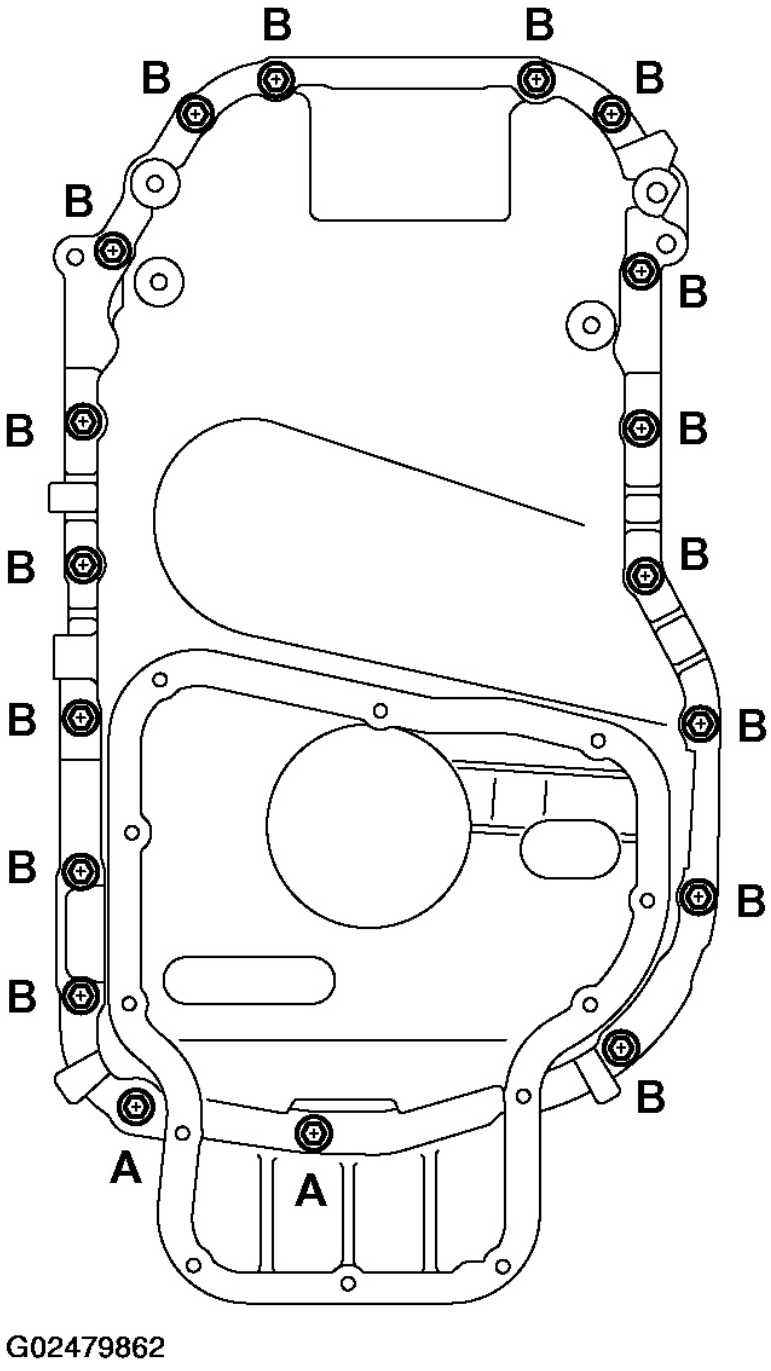



**Fig. 70: Tightening Engine Upper Oil Pan Bolts**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> B << ENGINE LOWER OIL PAN INSTALLATION**

1. Remove sealant from the engine lower oil pan and engine upper oil pan.
2. Apply a bead of the sealant to the mating surface of the engine lower oil pan as shown.

   **Specified sealant: 3M™ AAD Part No.8672, 8704, 3M™ AAD Part No.8679/8678 or equivalent**

   **NOTE: Install the engine lower oil pan within 15 minutes after applying sealant.**

3. Assemble the engine lower oil pan to the engine upper oil pan.

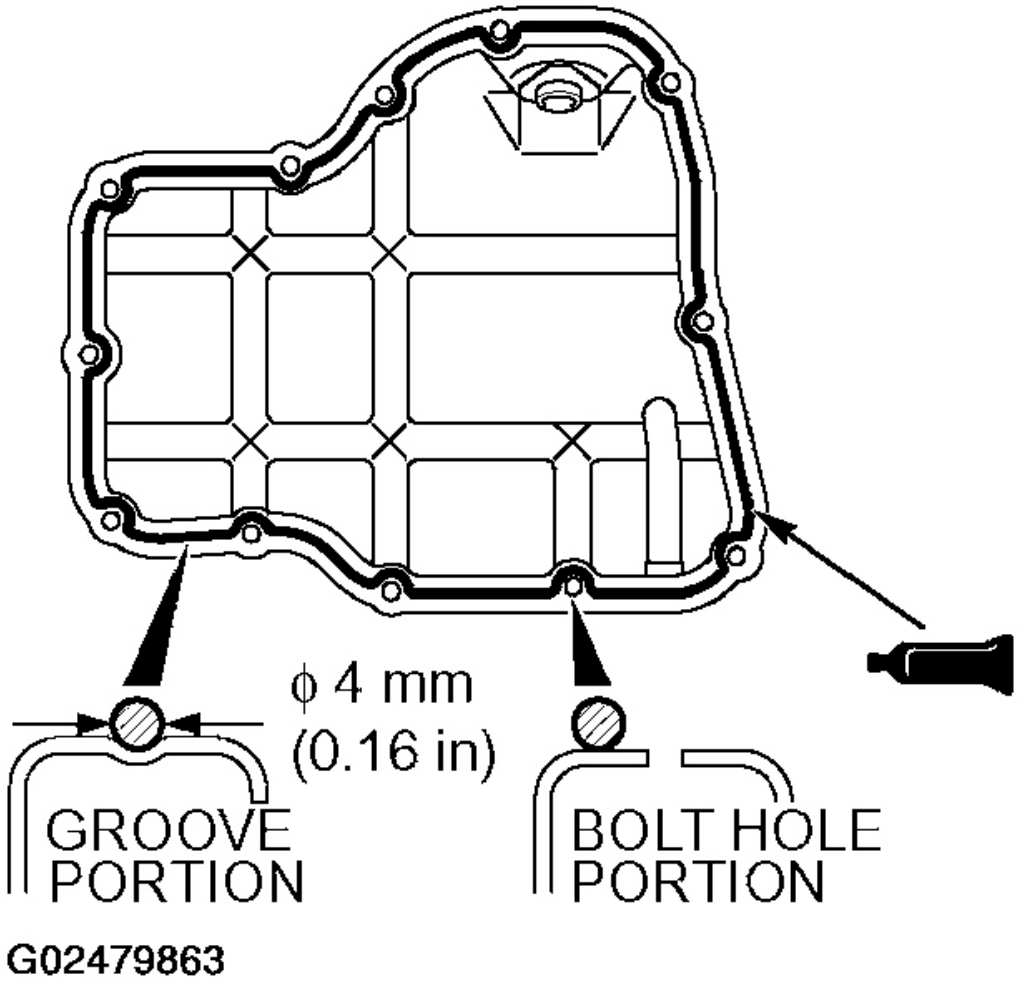



**Fig. 71: Applying Bead Of Sealant To Mating Surface Of Engine Lower Oil Pan**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**CAUTION: Wait at least one hour. Never start the engine or let engine oil or coolant touch the sealant surface during that time.**

4. Insert the bolts to the engine lower oil pan as shown, and tighten them to the specified torque in the order shown.

| NAME | SYMBOL | QUANTITY | SIZE mm (D × L) |
|---|---|---|---|
| Flange bolt | A | 1 | M6 × 75 |
| | B | 11 | M6 × 10 |

G02479864

**Fig. 72: Flange Bolts Specification Chart**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**NOTE: D: Nominal diameter, L: Nominal length**

**Tightening torque: 9.0 +/- 3.0 N.m (80 +/- 26 in-lb)**

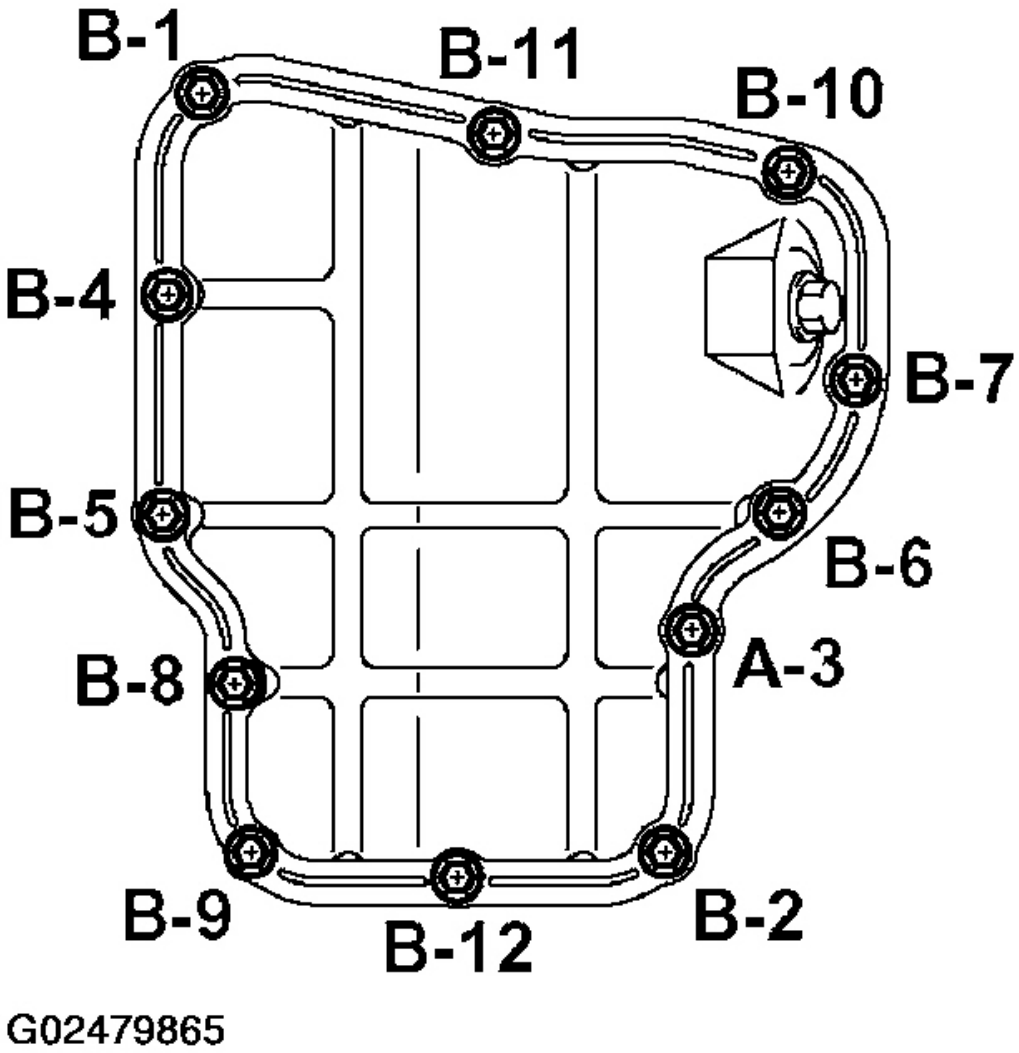



**Fig. 73: Tightening Engine Lower Oil Pan Bolts**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> C << ENGINE OIL PAN DRAIN PLUG GASKET INSTALLATION**

Replace the gasket with a new one. Install the new gasket in the direction shown in the illustration.

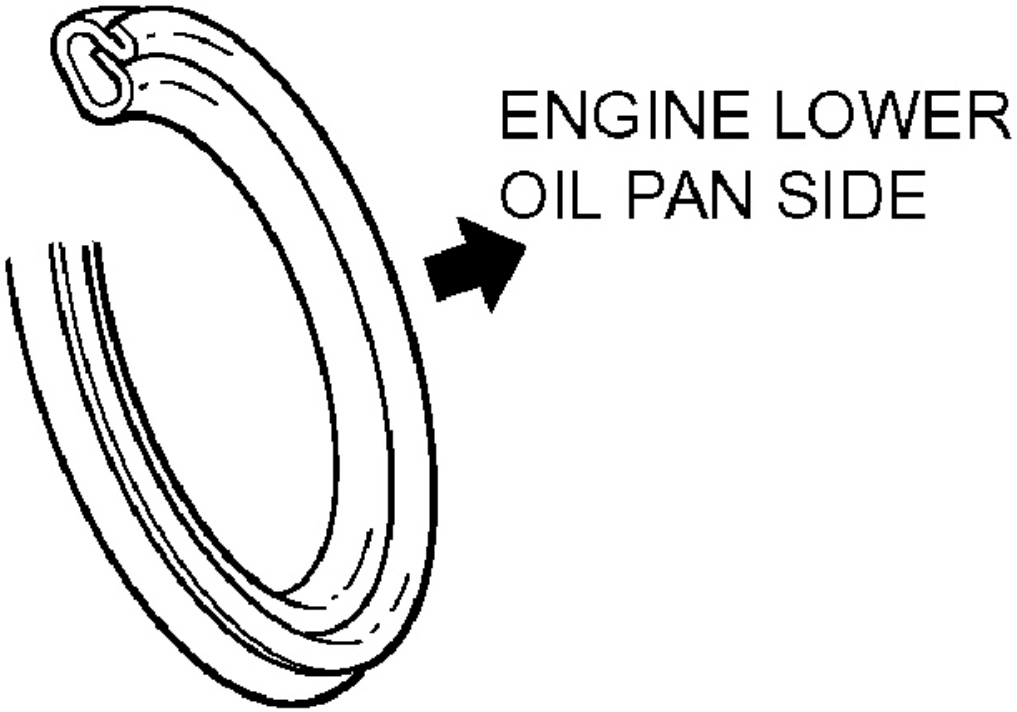



**Fig. 74: Identifying Engine Oil Pan Drain Plug Gasket**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> D << TRANSAXLE HOUSING FRONT LOWER COVER STAY INSTALLATION**

Install the transaxle housing front lower cover stay in the following order.

1. Tighten the engine side four mounting bolts to the specified torque.
   **Tightening torque: 22 +/- 4 N.m (16 +/- 3 ft-lb)**
2. Tighten the transaxle side two mounting bolts to the specified torque.
   **Tightening torque: 44 +/- 10 N.m (33 +/- 7 ft-lb)**

**INSPECTION**

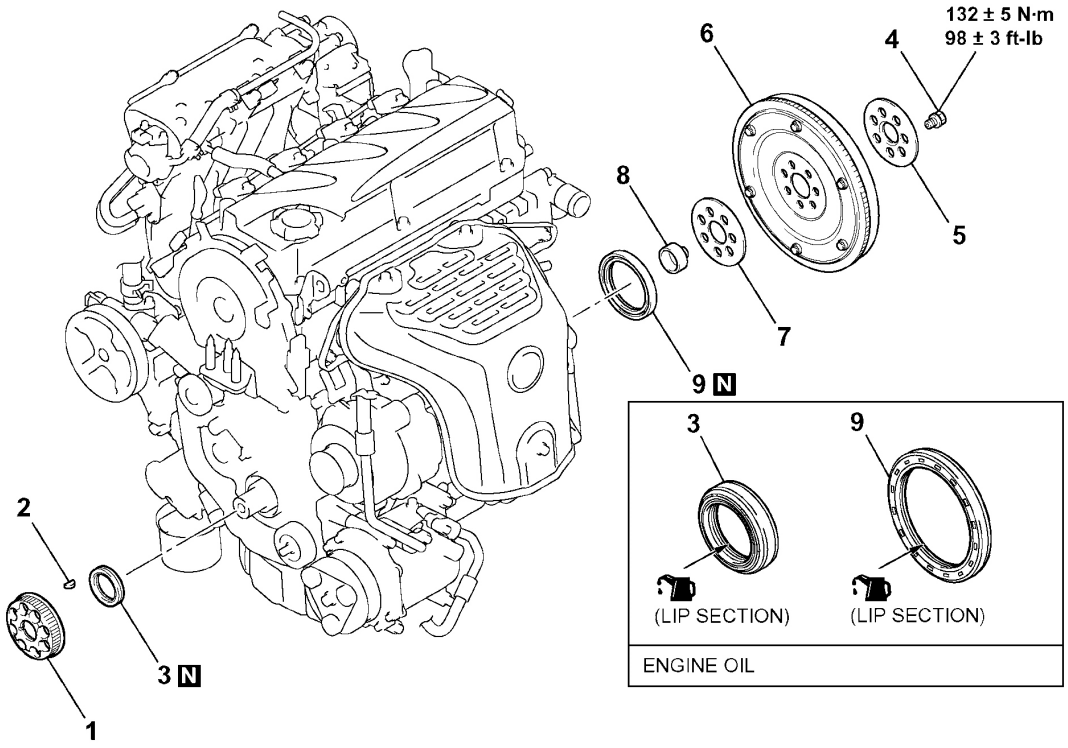
- Check the oil pan for cracks.
- Check the oil pan sealant-coated surface for damage and deformation.

## CRANKSHAFT OIL SEAL

## REMOVAL AND INSTALLATION

**< M/T >**




**CRANKSHAFT FRONT OIL SEAL REMOVAL STEPS**

- VALVE TIMING BELT AND BALANCER TIMING BELT <<A>>
- <<B>> >>B<< 4. FLYWHEEL BOLTS
- >>D<< 1. CRANKSHAFT BALANCER SHAFT DRIVE SPROCKET
- 2. CRANKSHAFT KEY
- >>C<< 3. CRANKSHAFT FRONT OIL SEAL
- 5. FLYWHEEL ADAPTER PLATE
- 6. FLYWHEEL ASSEMBLY
- 7. FLYWHEEL ADAPTER PLATE
- 8. CRANKSHAFT BUSH
- >>A<< 9. CRANKSHAFT REAR OIL SEAL

**CRANKSHAFT REAR OIL SEAL REMOVAL STEPS**

- TRANSAXLE ASSEMBLY

G02479867

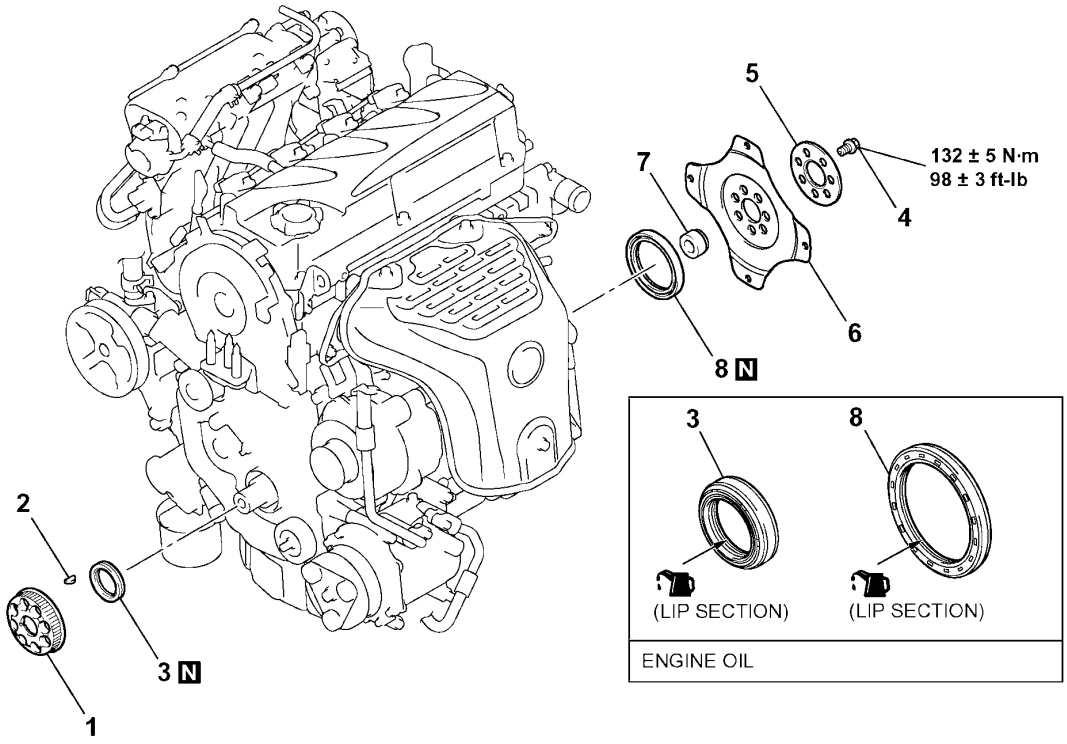
**Fig. 75: Removing Crankshaft Oil Seal (M/T)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**Required Special Tools:**

- MB990938: Installer Bar
- MD998285: Crankshaft Front Oil Seal Guide
- MD998375: Crankshaft Front Oil Seal Installer
- MD998776: Crankshaft Rear Oil Seal Installer
- MD998781: Flywheel Stopper

**< A/T >**




**CRANKSHAFT FRONT OIL SEAL REMOVAL STEPS**

- VALVE TIMING BELT AND BALANCER TIMING BELT

>>D<< 1. CRANKSHAFT BALANCER SHAFT DRIVE SPROCKET
2. CRANKSHAFT KEY
>>C<< 3. CRANKSHAFT FRONT OIL SEAL

**CRANKSHAFT REAR OIL SEAL REMOVAL STEPS**

- TRANSAXLE ASSEMBLY

<<B>> >>B<< 4. A/T DRIVE PLATE BOLTS
5. A/T DRIVE PLATE ADAPTER PLATE
6. A/T DRIVE PLATE
7. CRANKSHAFT BUSH
>>A<< 8. CRANKSHAFT REAR OIL SEAL

G02479868

**Fig. 76: Removing Crankshaft Oil Seal (A/T)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

## Required Special Tools:

- MB990938: Installer Bar
- MD998285: Crankshaft Front Oil Seal Guide
- MD998375: Crankshaft Front Oil Seal Installer
- MD998776: Crankshaft Rear Oil Seal Installer
- MD998781: Flywheel Stopper

**REMOVAL SERVICE POINTS**

**<< A >> TRANSAXLE ASSEMBLY REMOVAL**

**CAUTION: Do not remove the flywheel bolt shown by the arrow. If this bolt is removed, the flywheel assembly will become out of balance and damaged.**

Refer to **TRANSAXLE ASSEMBLY** .

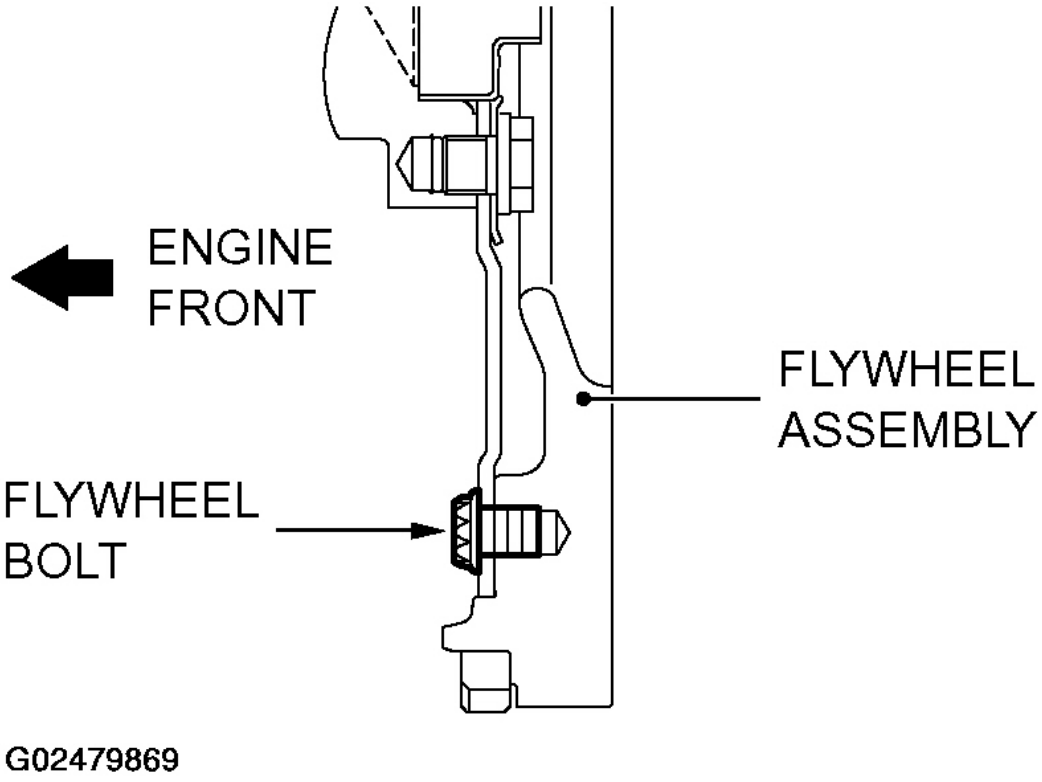



**Fig. 77: Identifying Flywheel Assembly**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**<< B >> FLYWHEEL BOLTS/A/T DRIVE PLATE BOLTS REMOVAL**

1. Use special tool MD998781 to secure the flywheel assembly or A/T drive plate.
2. Remove the flywheel bolts or A/T drive plate bolts.

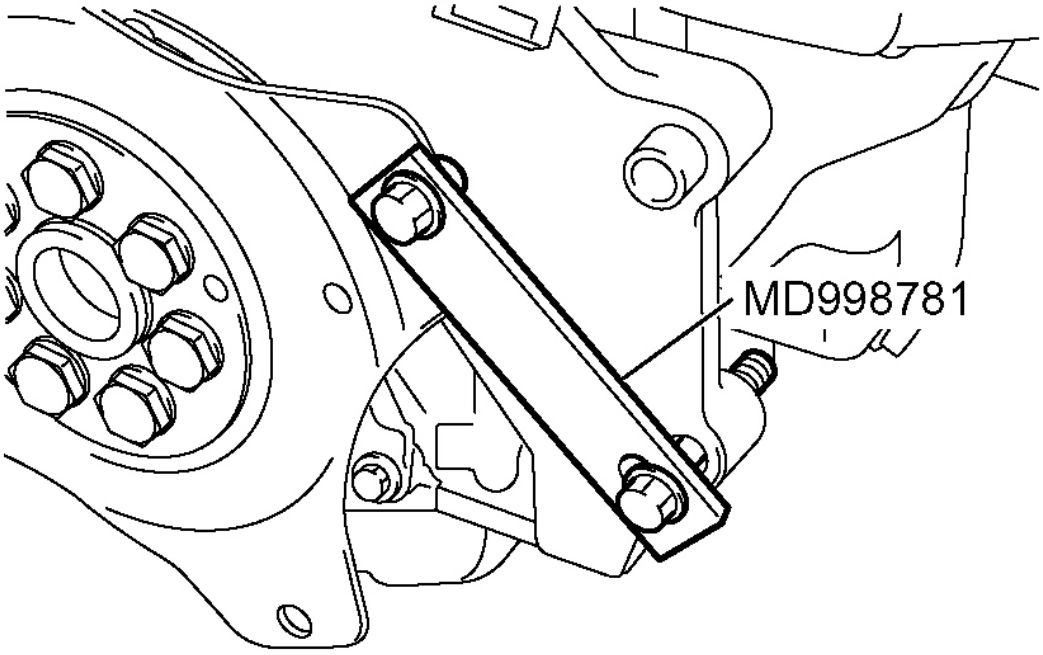



**Fig. 78: Removing Flywheel Bolts**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**INSTALLATION SERVICE POINTS**

**>> A << CRANKSHAFT REAR OIL SEAL INSTALLATION**

1. Apply a small amount of engine oil to the entire inner diameter of the oil seal lip.
2. Use special tools MB990938 and MD998776 to press-fit the oil seal.

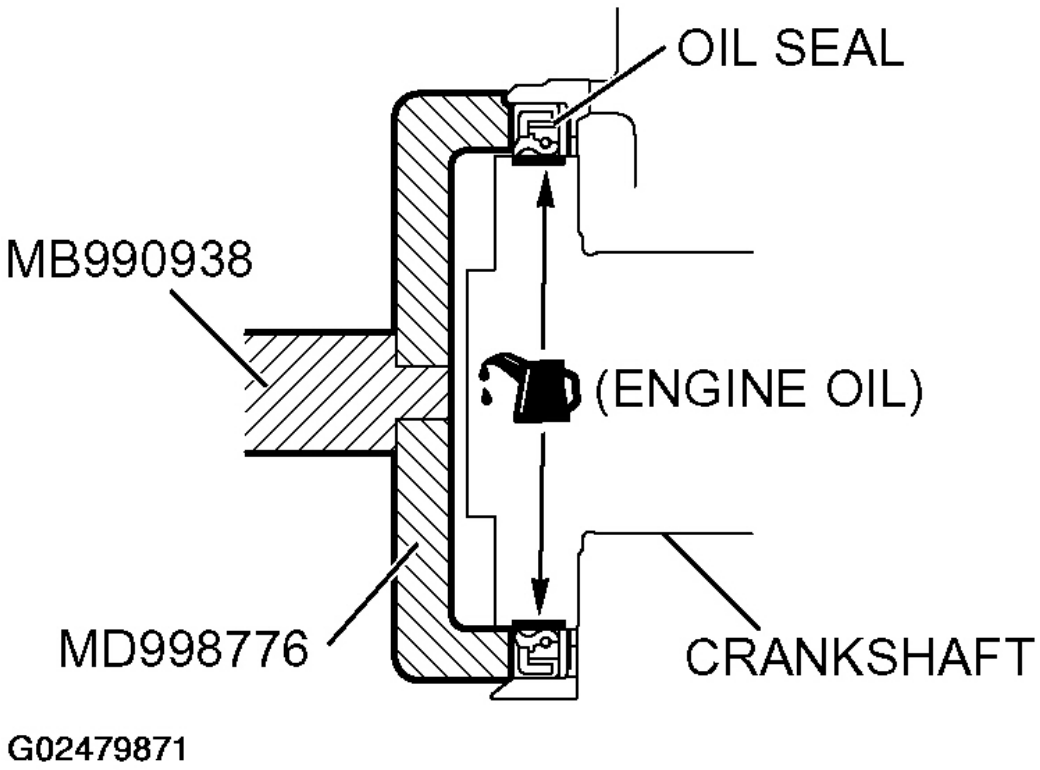



**Fig. 79: Applying Small Amount Of Engine Oil To Entire Inner Diameter Of Oil Seal Lip**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> B << FLYWHEEL BOLTS/A/T DRIVE PLATE BOLTS INSTALLATION**

1. Use special tool MD998781 to secure the flywheel assembly or A/T drive plate in the same manner as removal.
2. Tighten the flywheel bolts or A/T drive plate bolts to the specified torque.

   **Tightening torque: 132 +/- 5 N.m (98 +/- 3 ft-lb)**

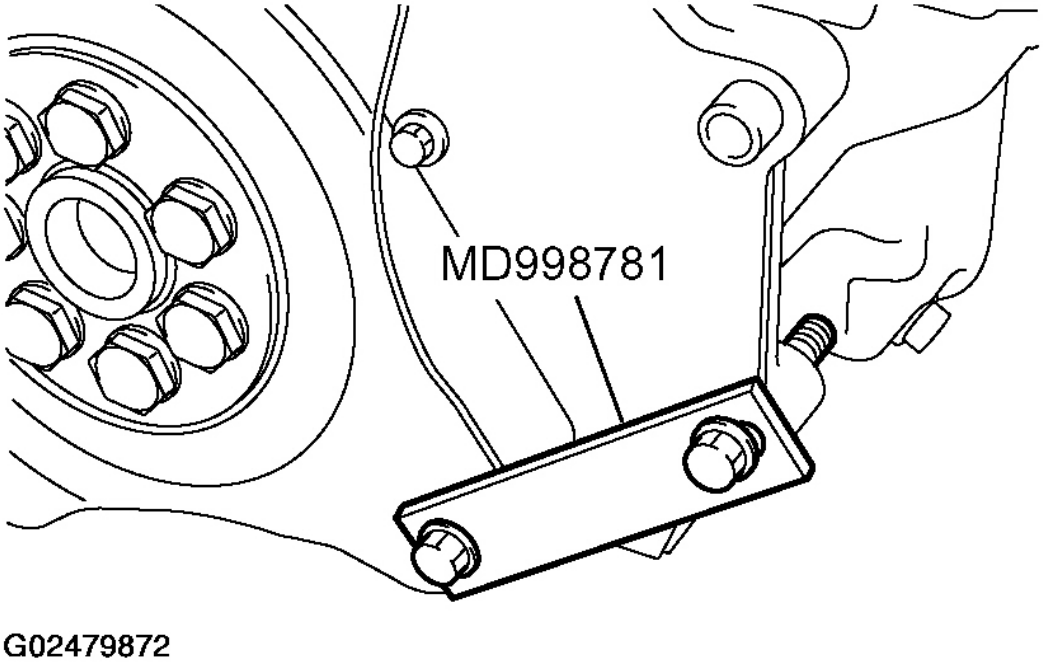



**Fig. 80: Tightening Flywheel Bolts**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> C << CRANKSHAFT FRONT OIL SEAL INSTALLATION**

1. Apply a small amount of engine oil to the outer diameter of special tool MD998285 and install it to the crankshaft.
2. Apply a small amount of engine oil to the entire inner diameter of the oil seal lip.
3. Use special tool MD998375 to press-fit the oil seal.

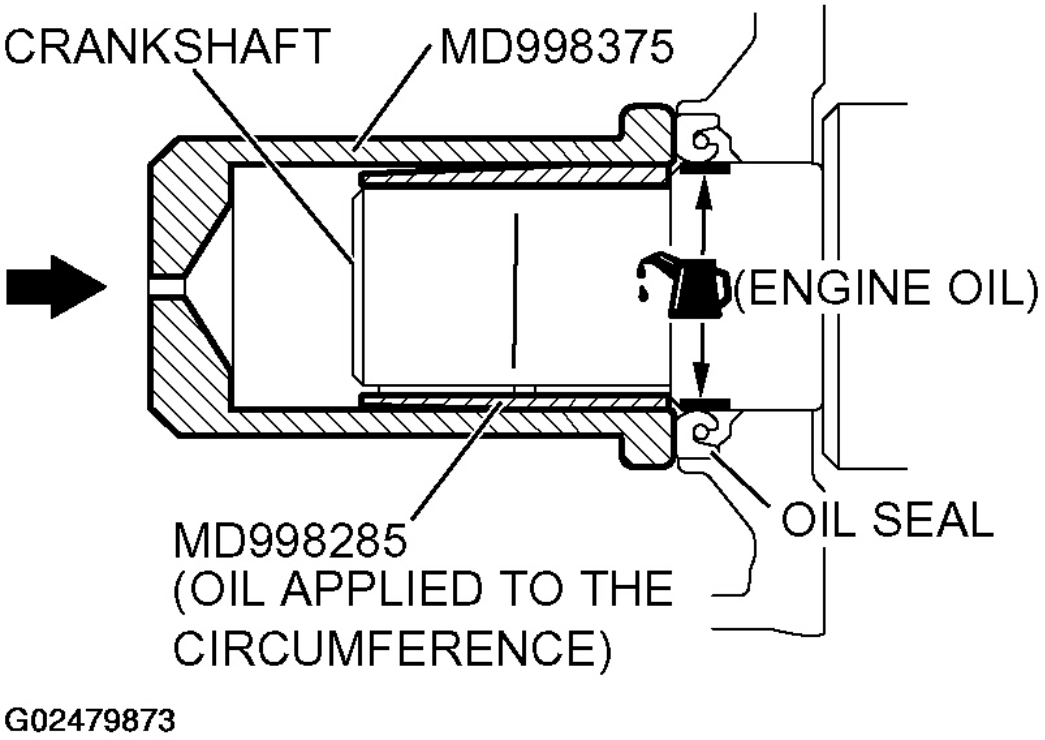



**Fig. 81: Applying Small Amount Of Engine Oil To Outer Diameter Of Special Tool MD998285**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> D << CRANKSHAFT BALANCER SHAFT DRIVE SPROCKET INSTALLATION**

1. Clean or degrease the front case, the crankshaft and the crankshaft balancer shaft drive sprocket as shown.

**NOTE: Also clean the degreased surfaces.**

2. Install the crankshaft balancer shaft drive sprocket in the direction shown in the illustration.

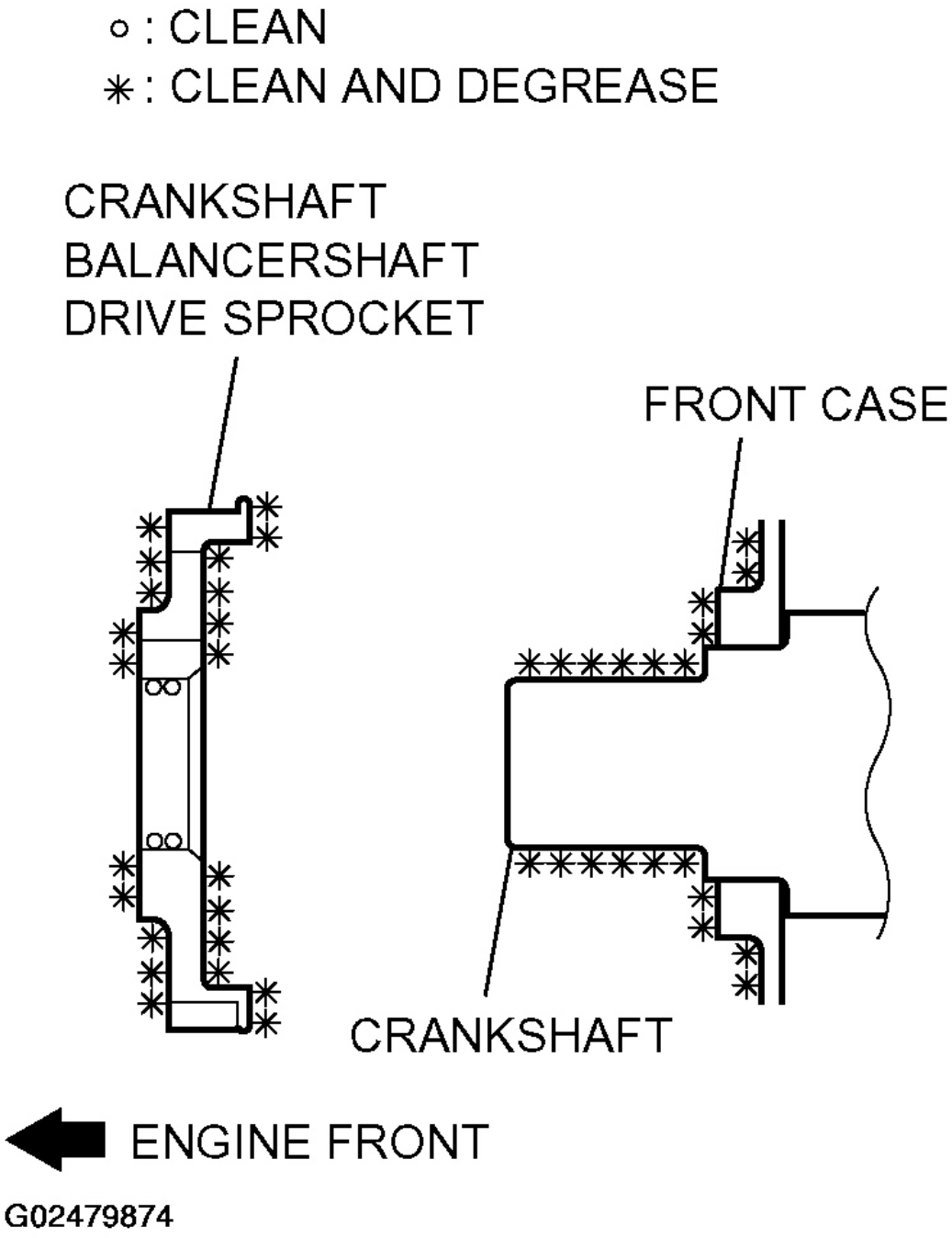


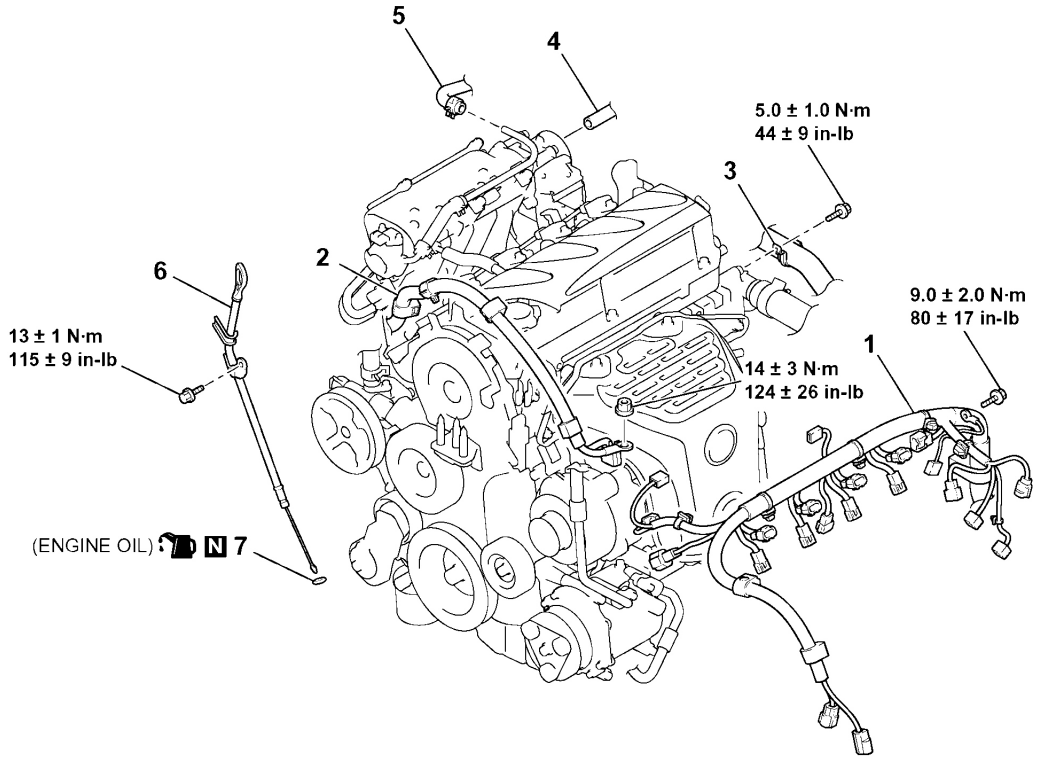

**Fig. 82: Installing Crankshaft Balancer Shaft Drive Sprocket**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

## CYLINDER HEAD GASKET

## REMOVAL AND INSTALLATION

| Pre-removal Operation | Post-installation Operation |
|---|---|
| • Fuel Line Pressure Reduction<br>• Engine Coolant Draining<br>• Air Cleaner Removal<br>• Accelerator Cable Removal | • Accelerator Cable Installation<br>• Air Cleaner Installation<br>• Engine Coolant Refilling<br>• Accelerator Cable Adjustment<br>• Fuel Leak Check |

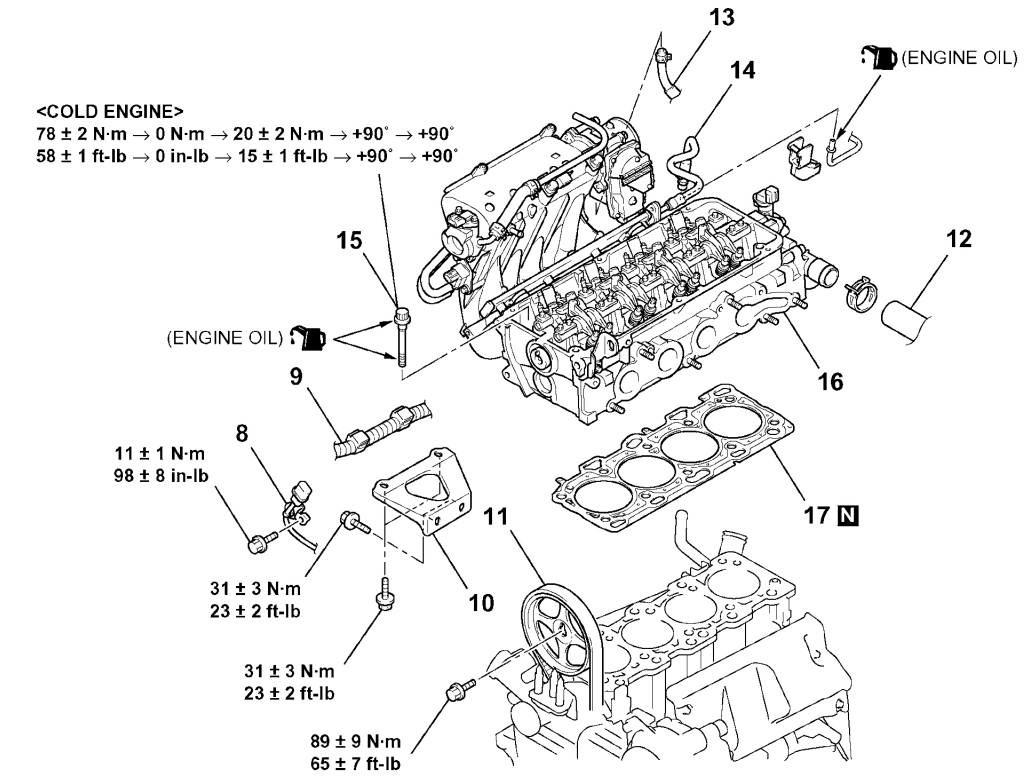



**REMOVAL STEPS**
1. CONTROL WIRING HARNESS CONNECTION
2. BATTERY WIRING HARNESS CONNECTION
3. RADIATOR LOWER HOSE CLAMP

**REMOVAL STEPS (Continued)**
4. EVAPORATIVE EMISSION VACUUM HOSE CONNECTION
5. BRAKE BOOSTER VACUUM HOSE CONNECTION
6. ENGINE OIL DIPSTICK AND DIPSTICK GUIDE
7. O-RING

**Fig. 83: Removing Cylinder Head Gasket (1 Of 2)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**




| | | REMOVAL STEPS | | | REMOVAL STEPS (Continued) |
|---|---|---|---|---|---|
| | | 8. KNOCK SENSOR CONNECTOR CONNECTION | <<B>> | >>D<< | 12. RADIATOR UPPER HOSE CONNECTION |
| | | 9. BATTERY WIRING HARNESS CONNECTION | | | 13. WATER HOSE CONNECTION |
| | | 10. INTAKE MANIFOLD STAY | | | • WATER INLET FITTING AND THERMOSTAT CASE ASSEMBLY |
| | | • EXHAUST MANIFOLD | <<C>> | >>C<< | 14. FUEL HIGH-PRESSURE HOSE CONNECTION |
| | | • TIMING BELT UPPER COVER | | | • ROCKER COVER ASSEMBLY |
| <<A>> | >>E<< | 11. CAMSHAFT SPROCKET | <<D>> | >>B<< | 15. CYLINDER HEAD BOLTS |
| | | | | | 16. CYLINDER HEAD ASSEMBLY |
| | | | | >>A<< | 17. CYLINDER HEAD GASKET |

G02479876

**Fig. 84: Removing Cylinder Head Gasket (2 Of 2)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

## Required Special Tools:

- MB990767: Front Hub and Flange Yoke Holder
- MB991654: Cylinder Head Bolt Wrench (12)
- MD998719: Pin
- MD998738: Adjusting Bolt

### REMOVAL SERVICE POINTS

#### << A >> CAMSHAFT SPROCKET REMOVAL

**CAUTION: Never turn the crankshaft counterclockwise.**

1. Turn the crankshaft clockwise, align the timing marks on the camshaft sprocket to set No.1 cylinder to TDC of its compression stroke.

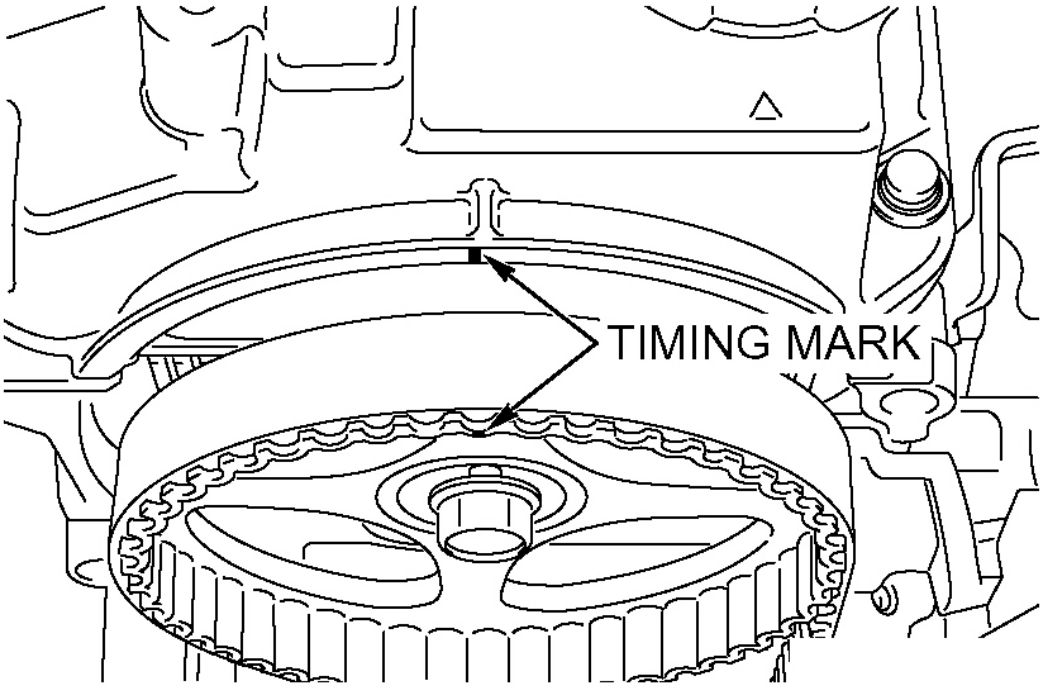



**Fig. 85: Aligning Timing Marks On Camshaft Sprocket To Set No 1 Cylinder To TDC Of Its Compression Stroke**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

2. Remove the timing belt under cover rubber plug and then set special tool MD998738.

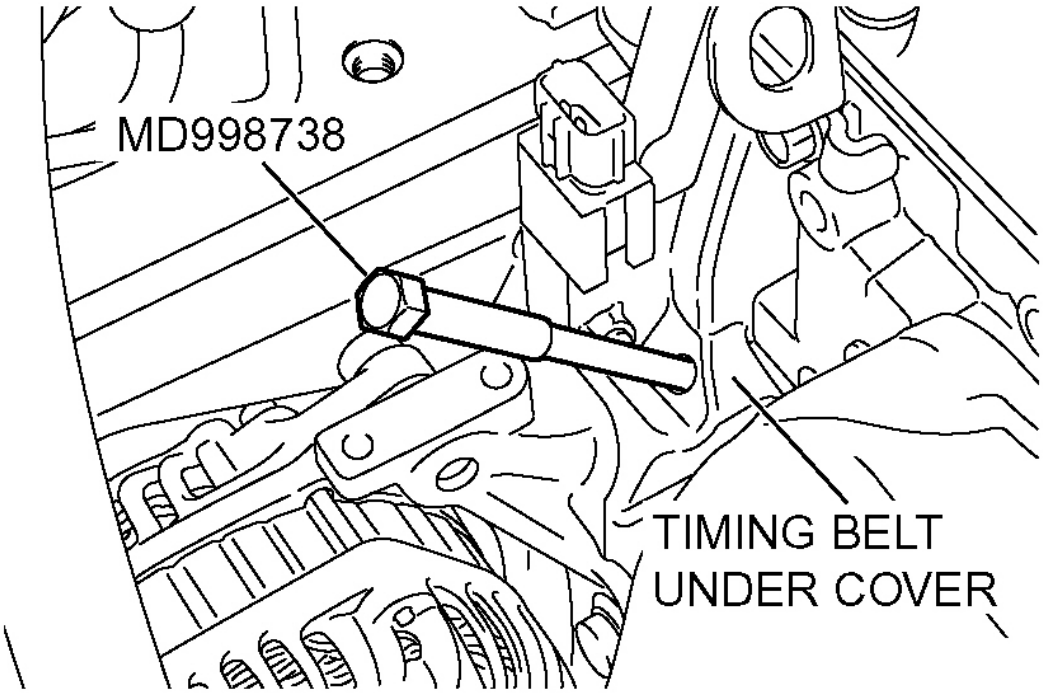



**Fig. 86: Removing Timing Belt Under Cover Rubber Plug**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

3. Screw in special tool MD998738 until it contacts the timing belt tensioner arm.

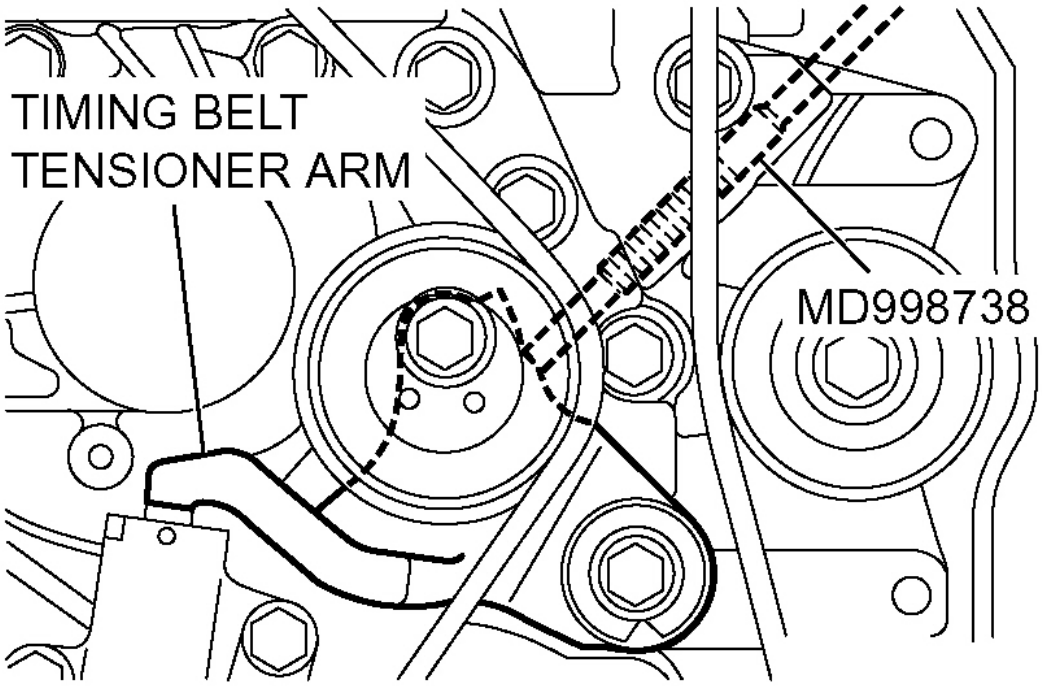



**Fig. 87: Screwing In Special Tool MD998738**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

4. Secure the camshaft sprocket and valve timing belt with wiring bands and so on to prevent slippage between the camshaft sprocket and valve timing belt.

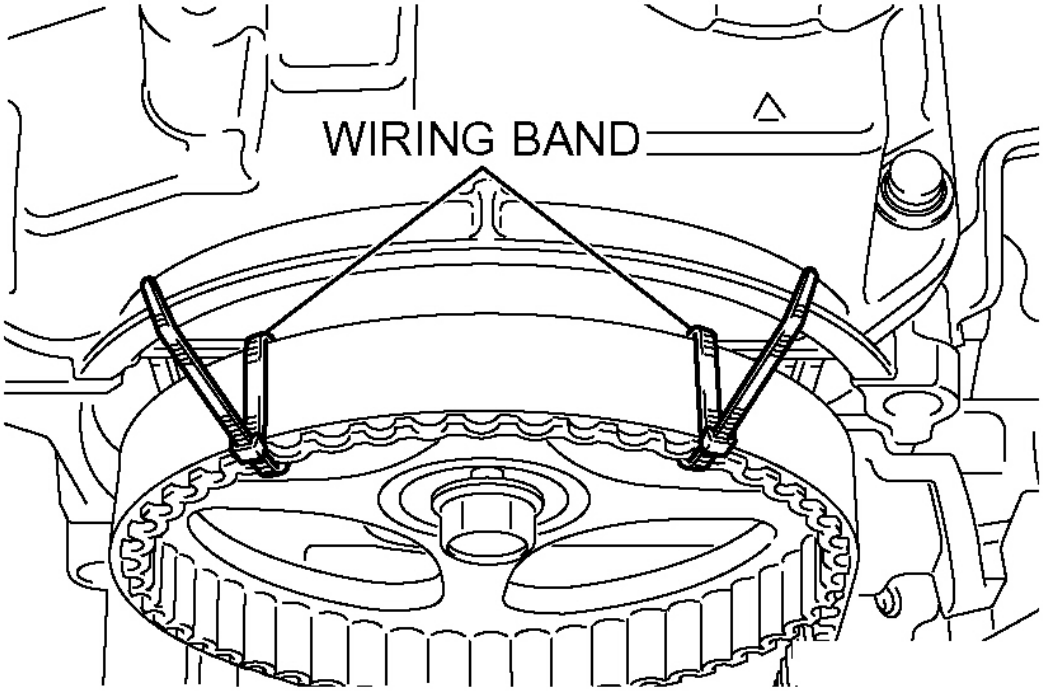



**Fig. 88: Securing Camshaft Sprocket And Valve Timing Belt With Wiring Bands**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

5. Hold the camshaft sprocket with special tools MB990767 and MD998719.

**CAUTION: Do not rotate the crankshaft after camshaft sprocket removal.**

6. Remove the camshaft sprocket with the valve timing belt and place it on the timing belt lower cover.

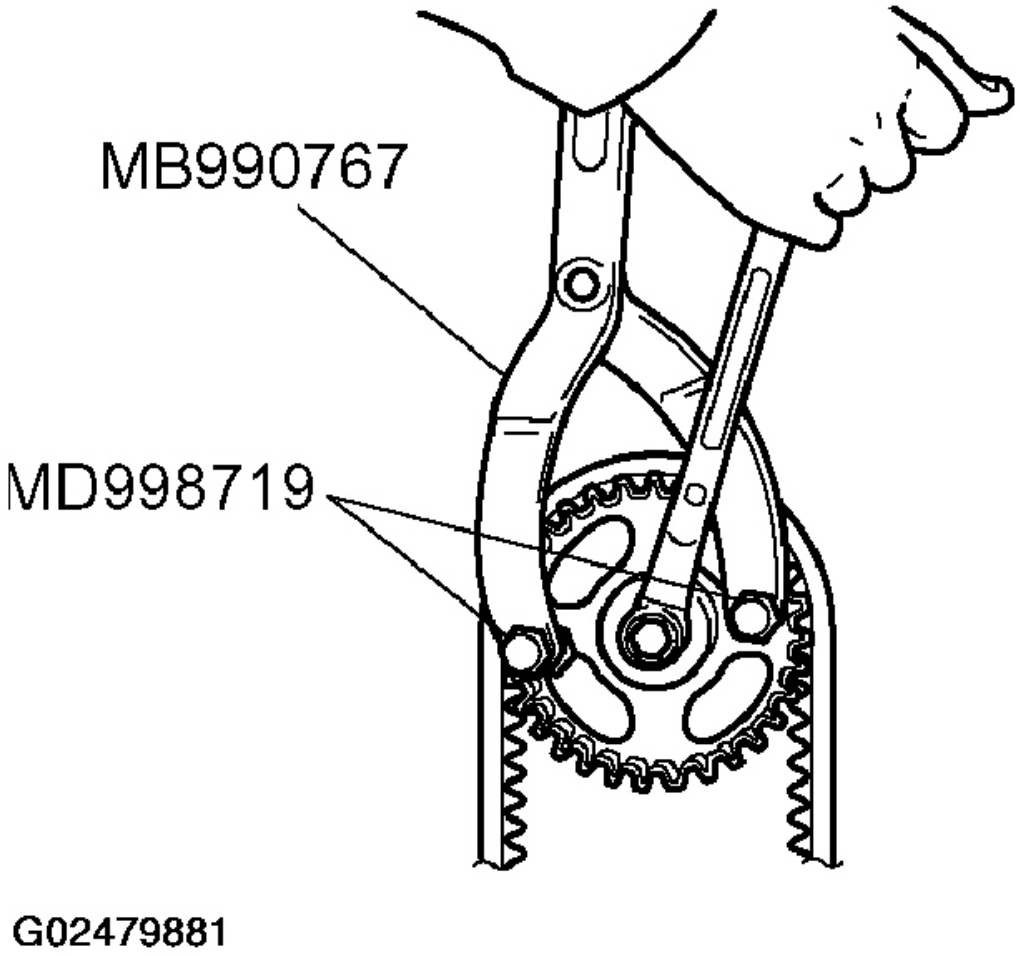



**Fig. 89: Removing Camshaft Sprocket**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**<< B >> RADIATOR UPPER HOSE DISCONNECTION**

Make mating marks on the radiator upper hose and the hose clamp. Disconnect the radiator upper hose.

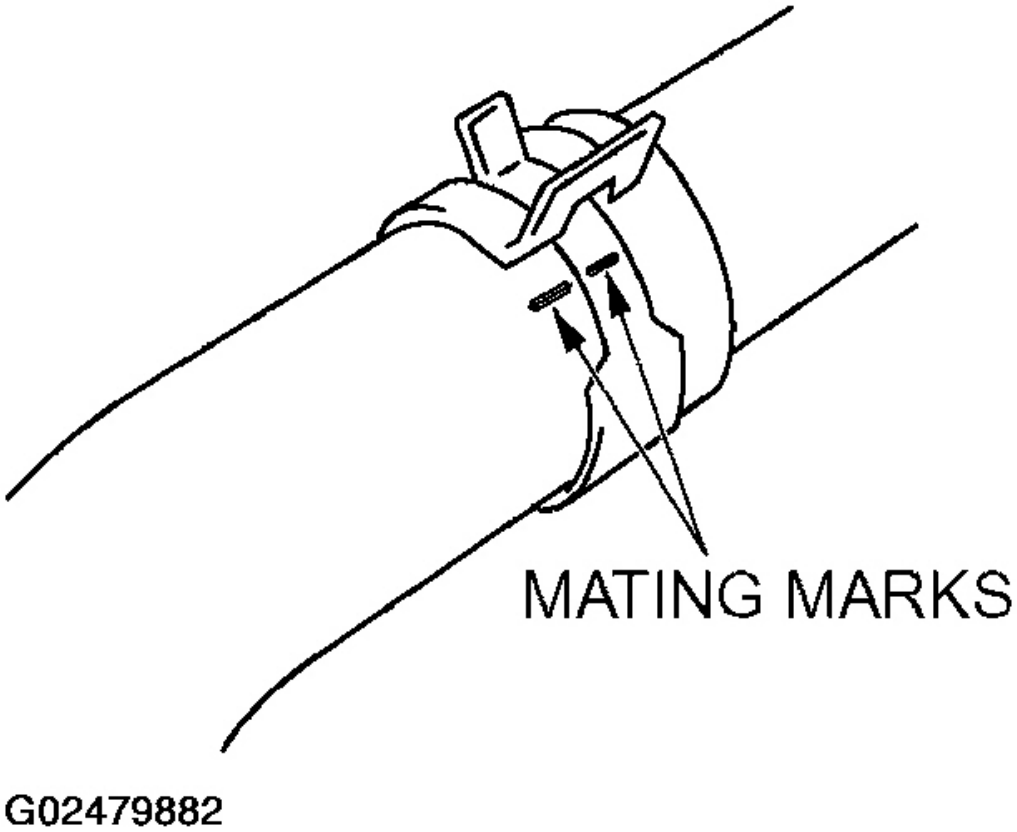



**Fig. 90: Identifying Mating Marks On Radiator Upper Hose And Hose Clamp**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**<< C >> FUEL HIGH-PRESSURE HOSE REMOVAL**

1. Remove the fuel high-pressure hose stopper.

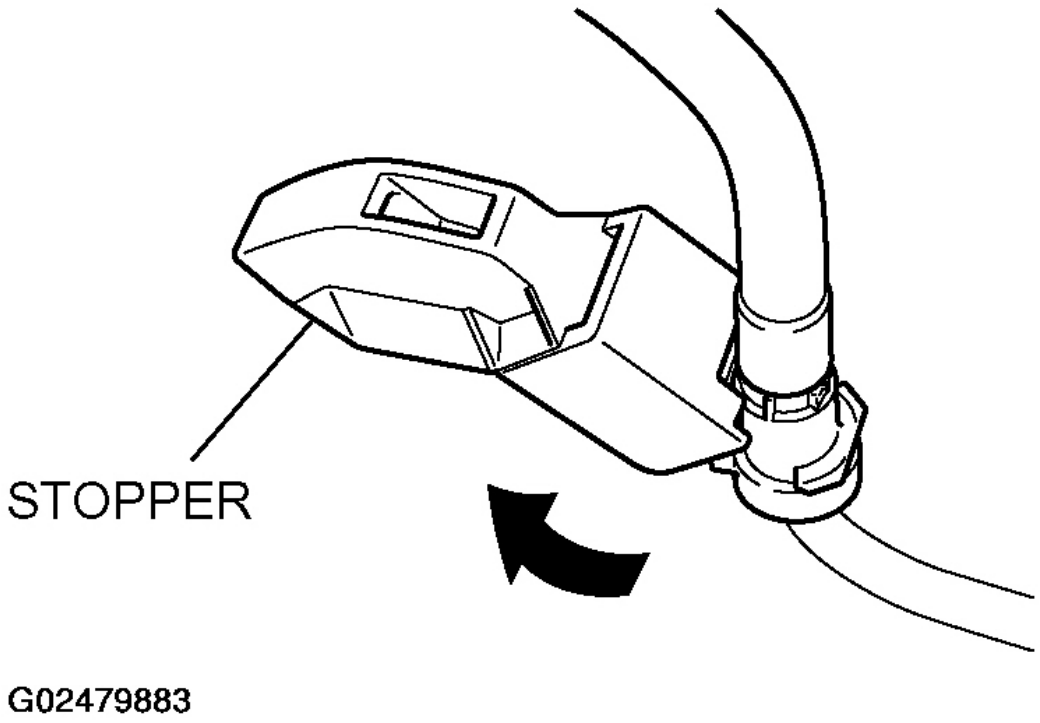



**Fig. 91: Removing Fuel High-Pressure Hose Stopper**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

2. Remove the fuel high-pressure hose in the direction shown in the figure while the retainer is pulled up.

**NOTE: If the retainer is released, install it after removing the fuel high-pressure hose.**

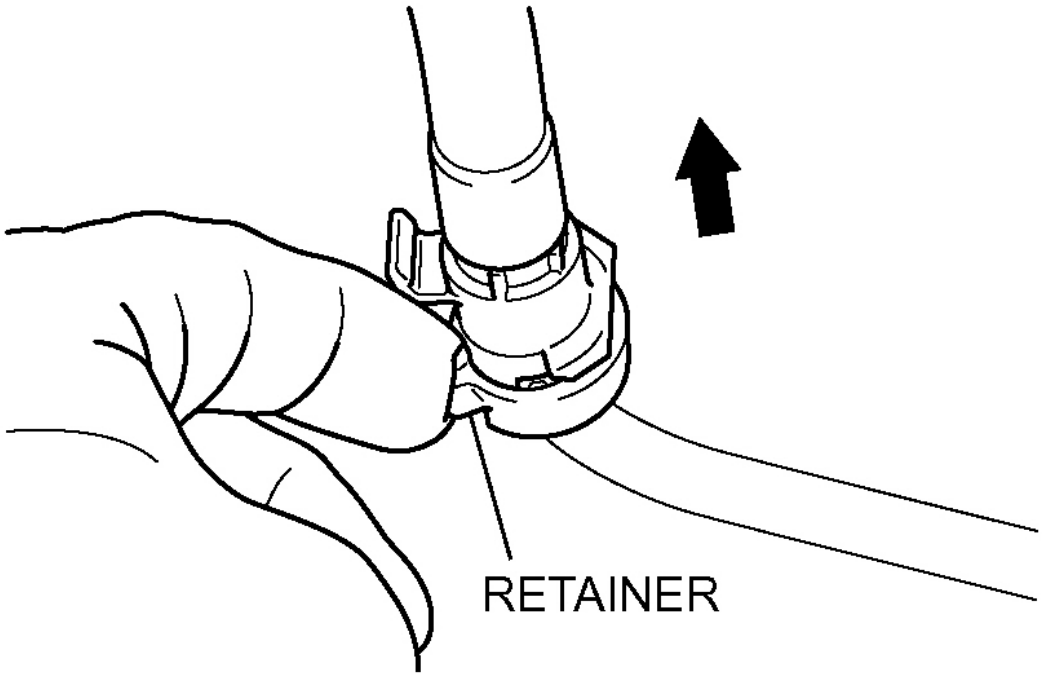



**Fig. 92: Removing Fuel High-Pressure Hose**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**<< D >> CYLINDER HEAD BOLTS REMOVAL**

Use special tool MB991654 to loosen the cylinder head bolts in two or three steps in the order of the numbers shown in the illustration. If the cylinder head bolts cannot be pulled out due to the washer being trapped in the valve spring, raise the bolt slightly, then remove it while holding it by using a magnet.

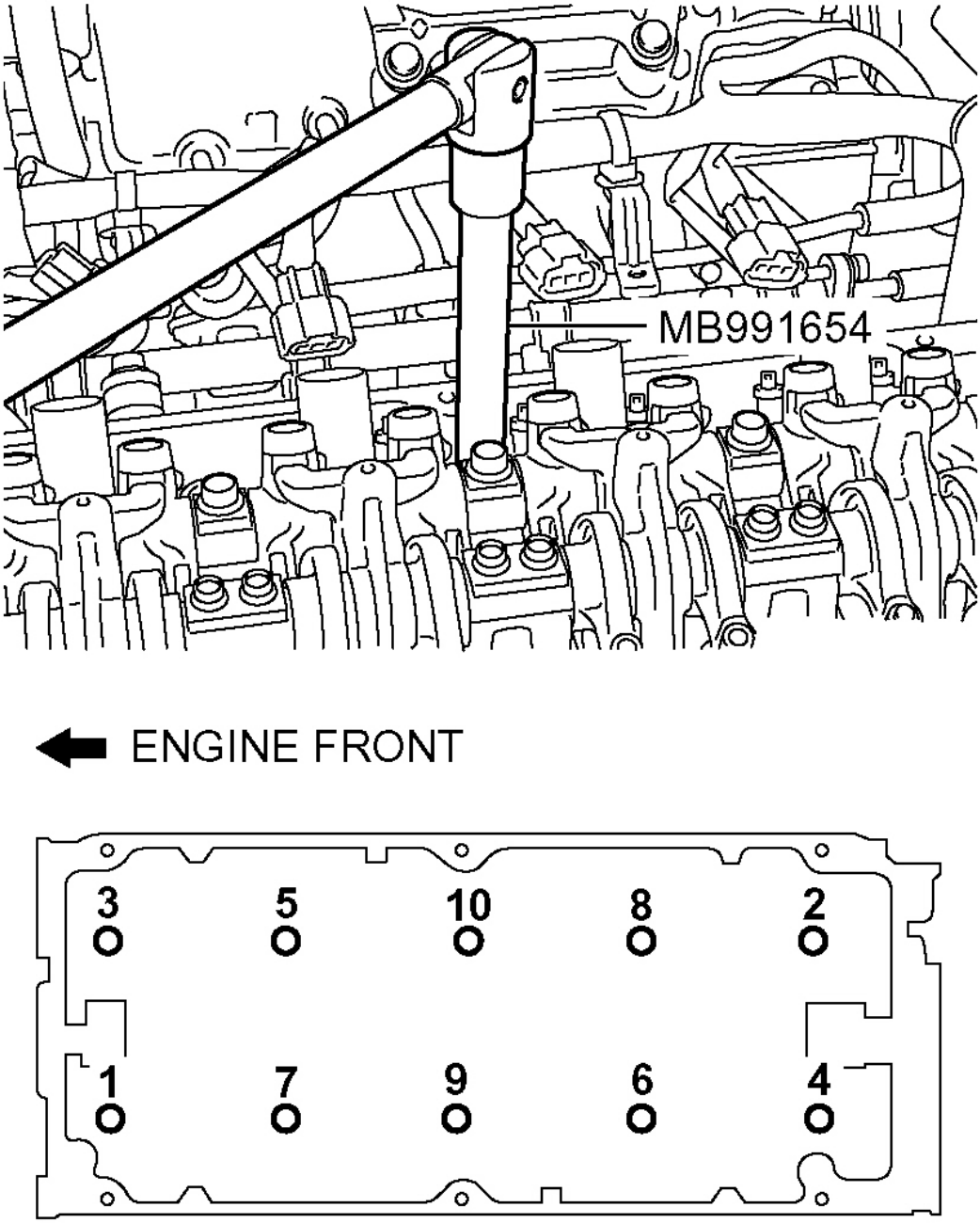



**Fig. 93: Removing Cylinder Head Bolts**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**INSTALLATION SERVICE POINTS**

**>> A << CYLINDER HEAD GASKET INSTALLATION**

**CAUTION: Do not allow any foreign materials get into the coolant passages, oil passages and cylinder.**

1. Degrease the cylinder head gasket mounting surface.
2. Assemble to the cylinder block so the cylinder head gasket identification mark of "381" is at the top surface and on the exhaust side.

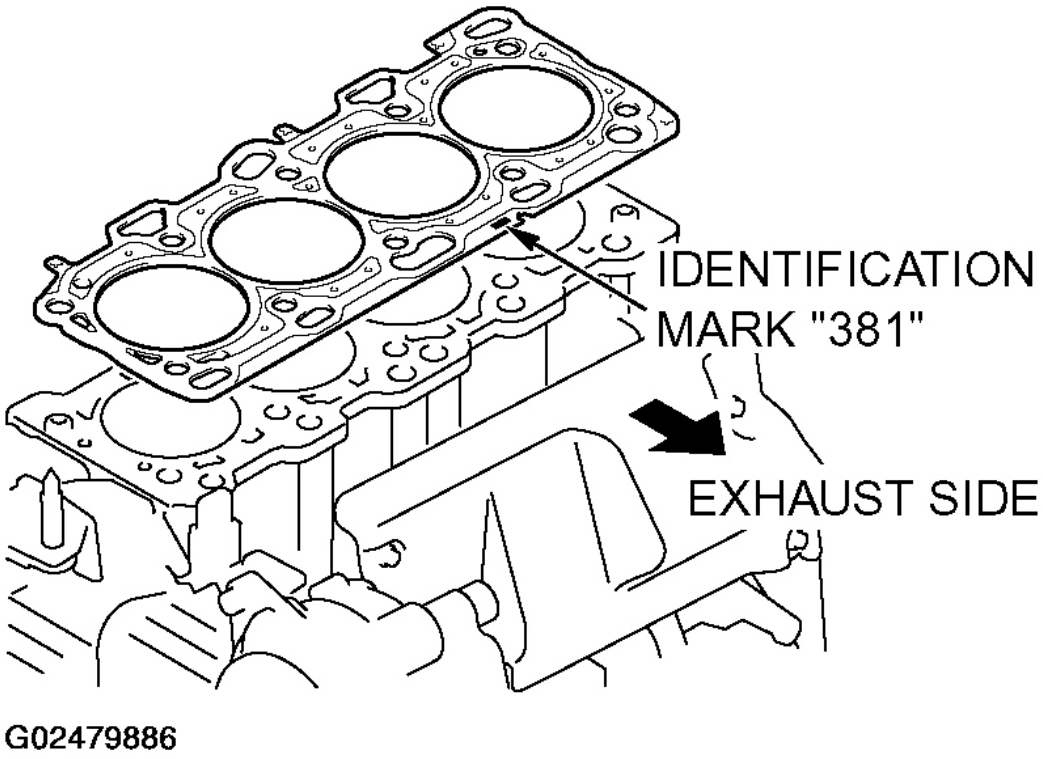



**Fig. 94: Identifying Cylinder Head Gasket Identification Mark**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> B << CYLINDER HEAD BOLTS INSTALLATION**

1. Check that the nominal length of each cylinder head bolt meets the limit. If it exceeds the limit, replace the bolts with a new one.

   **Limit (A): 99.4 mm (3.91 inches)**
2. Apply a small amount of engine oil to the thread of the bolts and to the washers.

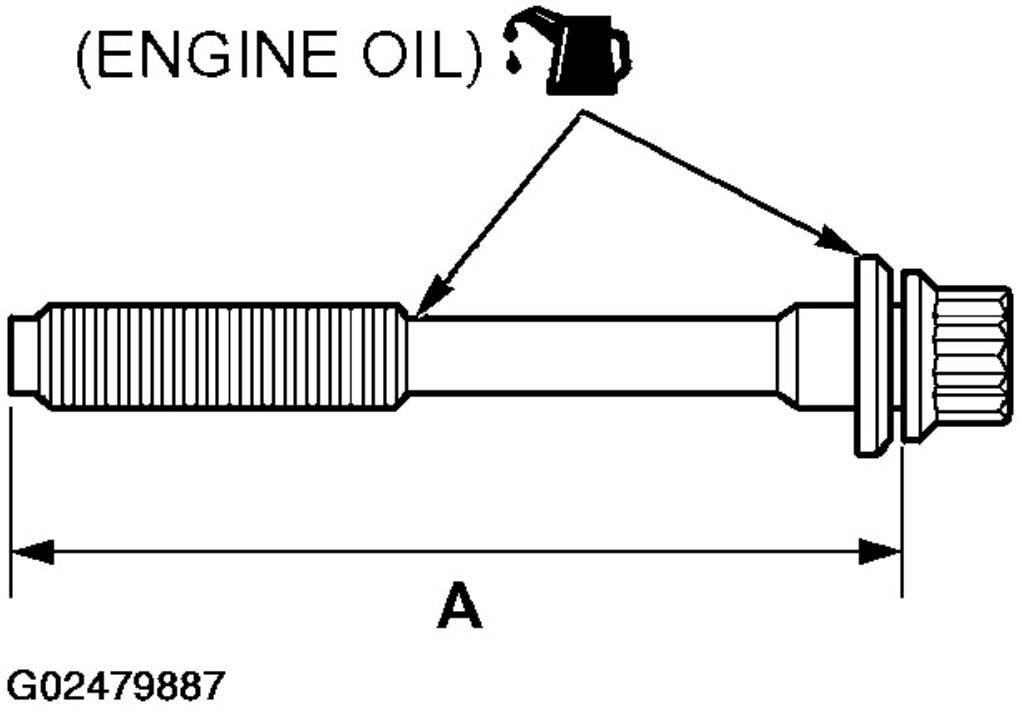



**Fig. 95: Applying Small Amount Of Engine Oil To Thread Of Bolts And To Washers**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

3. Use special tool MB991654 to tighten the cylinder head bolts in the following procedures.
    1. Tighten the bolts to 78 +/- 2 N.m (58 +/- 1 ft-lb) in the order shown.
    2. Loosen the bolts fully in the reverse sequence to that shown.
    3. Tighten the bolts to 20 +/- 2 N.m (15 +/- 1 ft-lb) in the order shown.

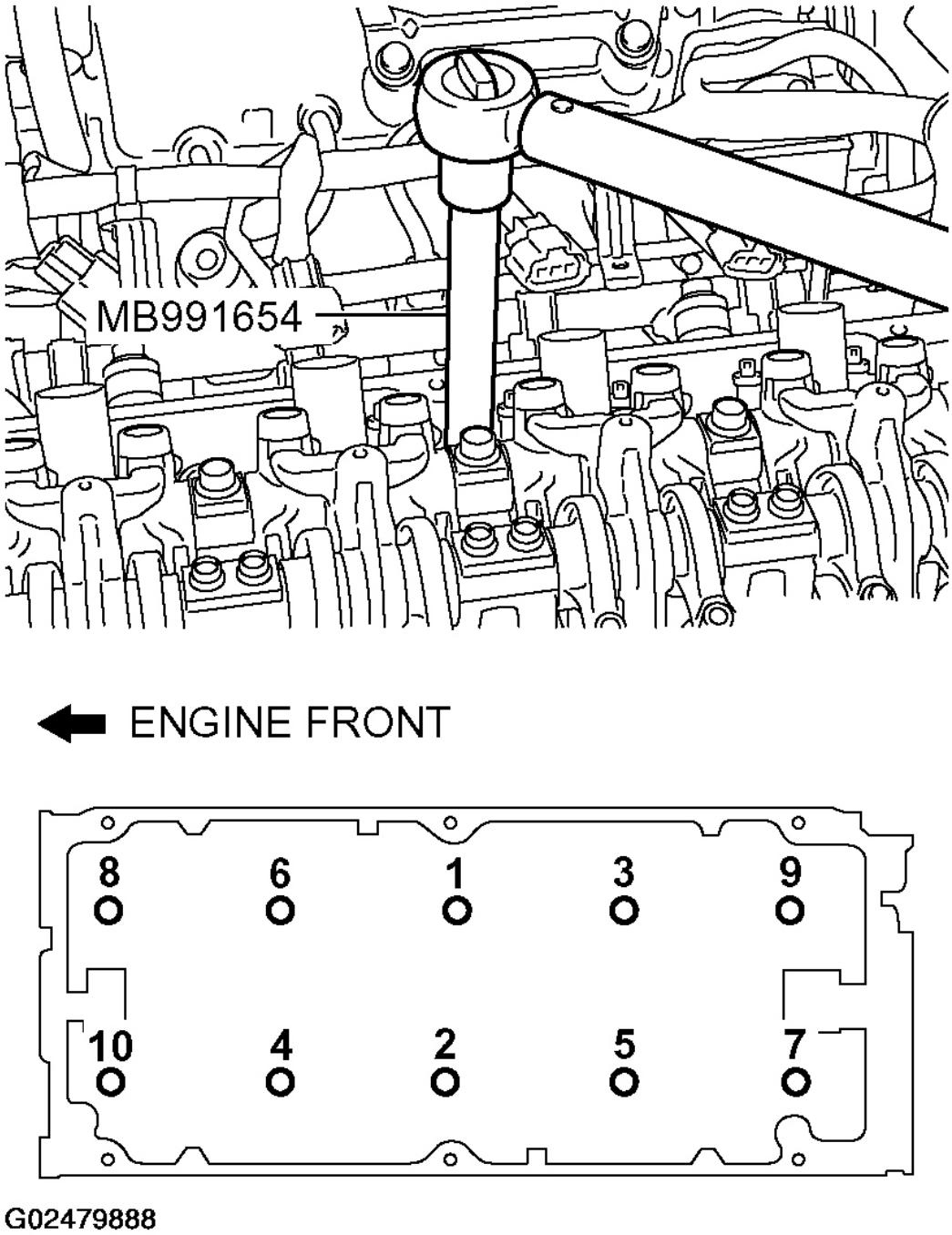


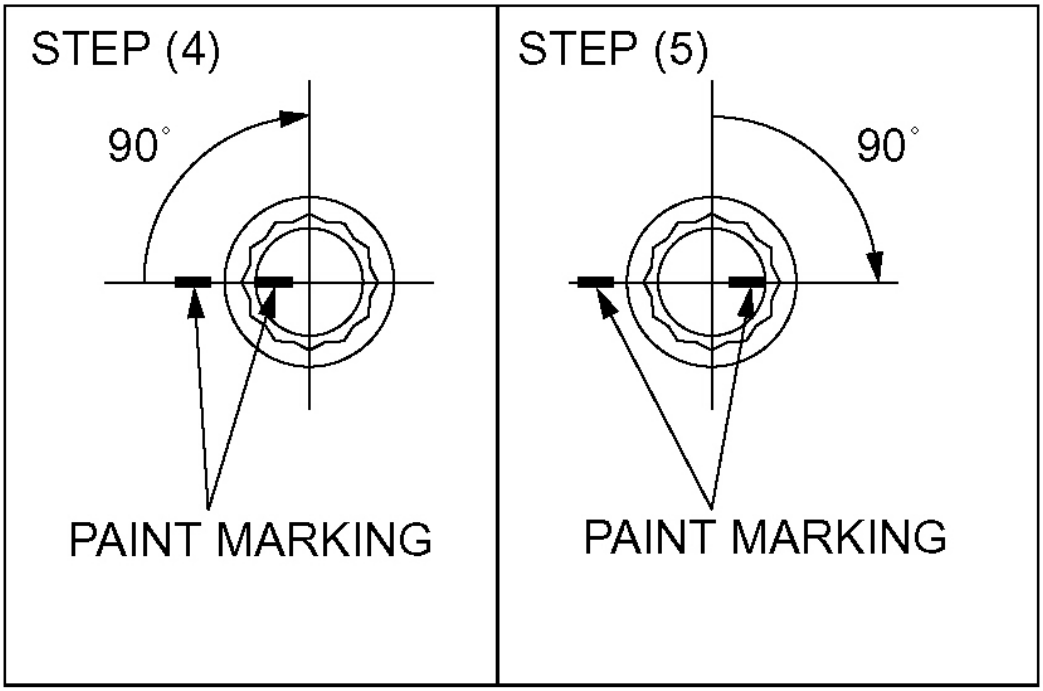

**Fig. 96: Tightening Cylinder Head Bolts**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

4. Apply a paint mark to the heads of the cylinder head bolts and cylinder head, then tighten 90 degree angle as shown.

**CAUTION:**
- **The bolt is not tightening sufficiently if the tightening angle is less than a 90 degree angle.**
- **If the tightening angle exceeds the standard specification, remove the bolt and start over from step 1.**

5. Tighten in a 90 degree angle as shown in the instructions of the figure, then check to see that the paint mark on the head of the cylinder head bolts and the paint mark on the cylinder head is on a linear line.




G02479889

**Fig. 97: Applying Paint Mark To Heads Of Cylinder Head Bolts**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> C << FUEL HIGH-PRESSURE HOSE INSTALLATION**

**CAUTION: After connecting the fuel high-pressure hose, slightly pull it to ensure that it is installed securely. Also confirm that there is a play approximately 3 mm (0.12 inch). Then install the stopper securely.**

Apply a small amount of engine oil to the fuel line pipe and then install the fuel high-pressure hose.

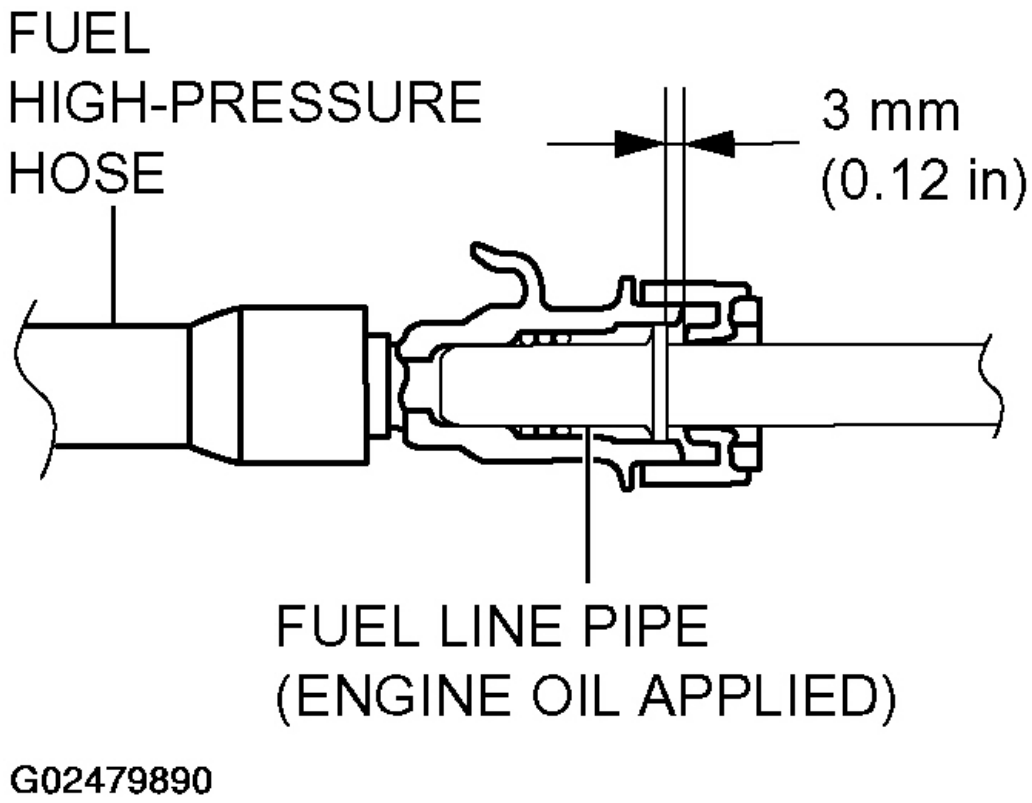



**Fig. 98: Identifying Fuel High-Pressure Hose Play**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

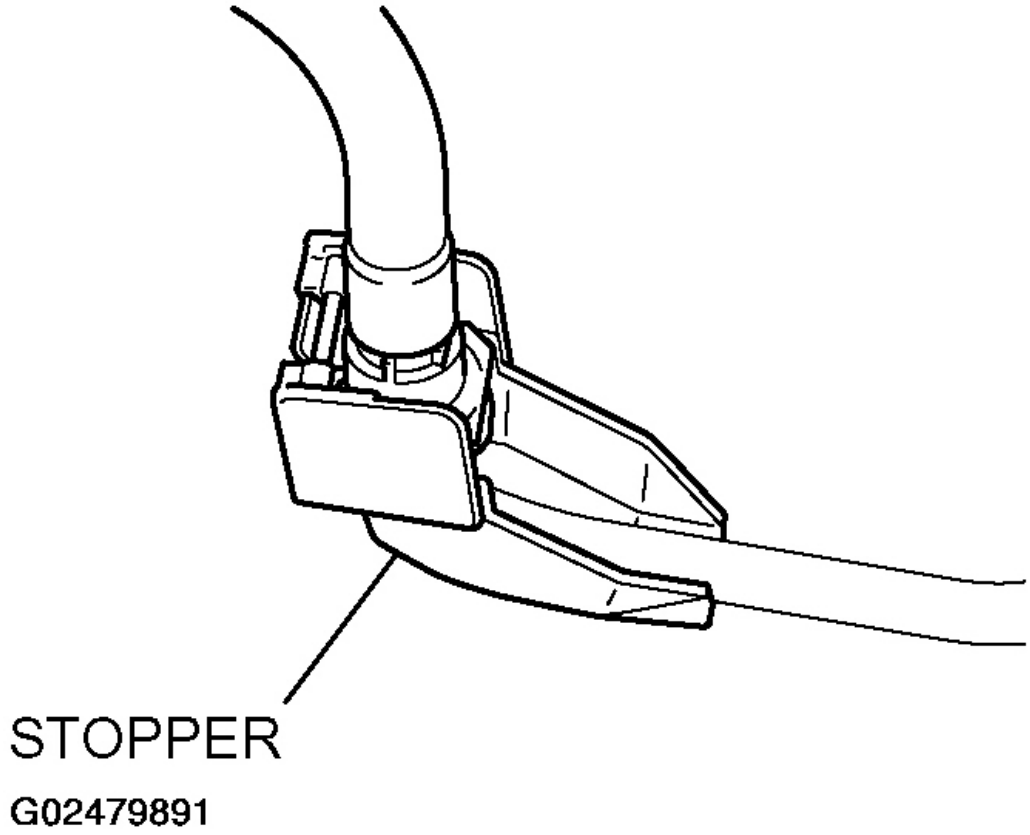



**Fig. 99: Installing Fuel High-Pressure Hose**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> D << RADIATOR UPPER HOSE CONNECTION**

1. Insert radiator upper hose until it contacts the projection on the water outlet fitting.
2. Align the mating marks on the radiator upper hose and hose clamp, and then secure the radiator upper hose.

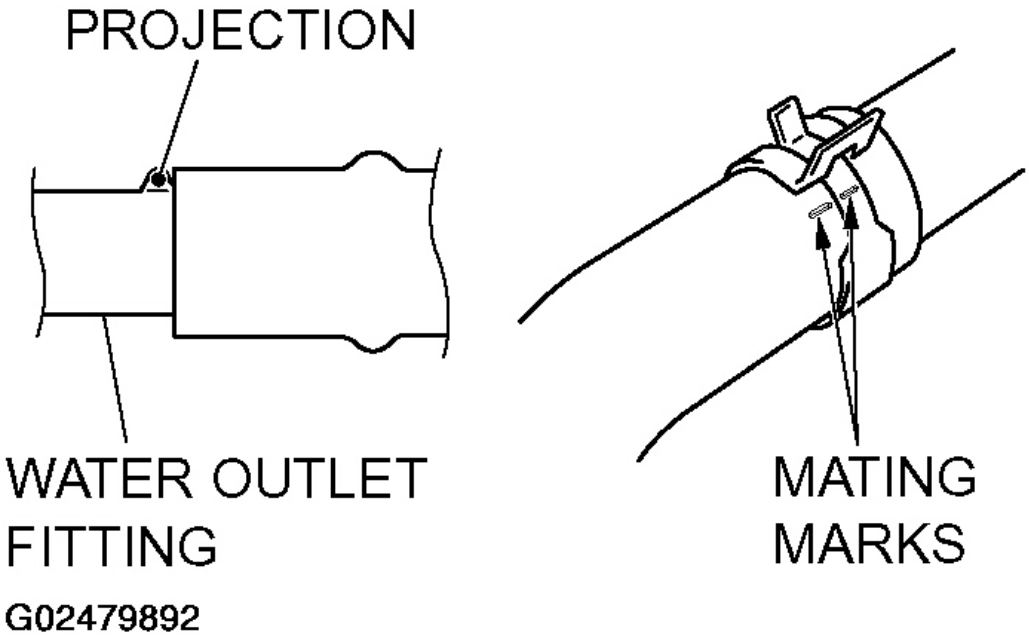



**Fig. 100: Aligning Mating Marks On Radiator Upper Hose And Hose Clamp**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> E << CAMSHAFT SPROCKET INSTALLATION**

1. Hold the camshaft sprocket with special tools MB990767 and MD998719 in the same manner as removal.
2. Tighten the camshaft sprocket mounting bolt to the specified torque.

   **Tightening torque: 89 +/- 9 N.m (65 +/- 7 ft-lb)**

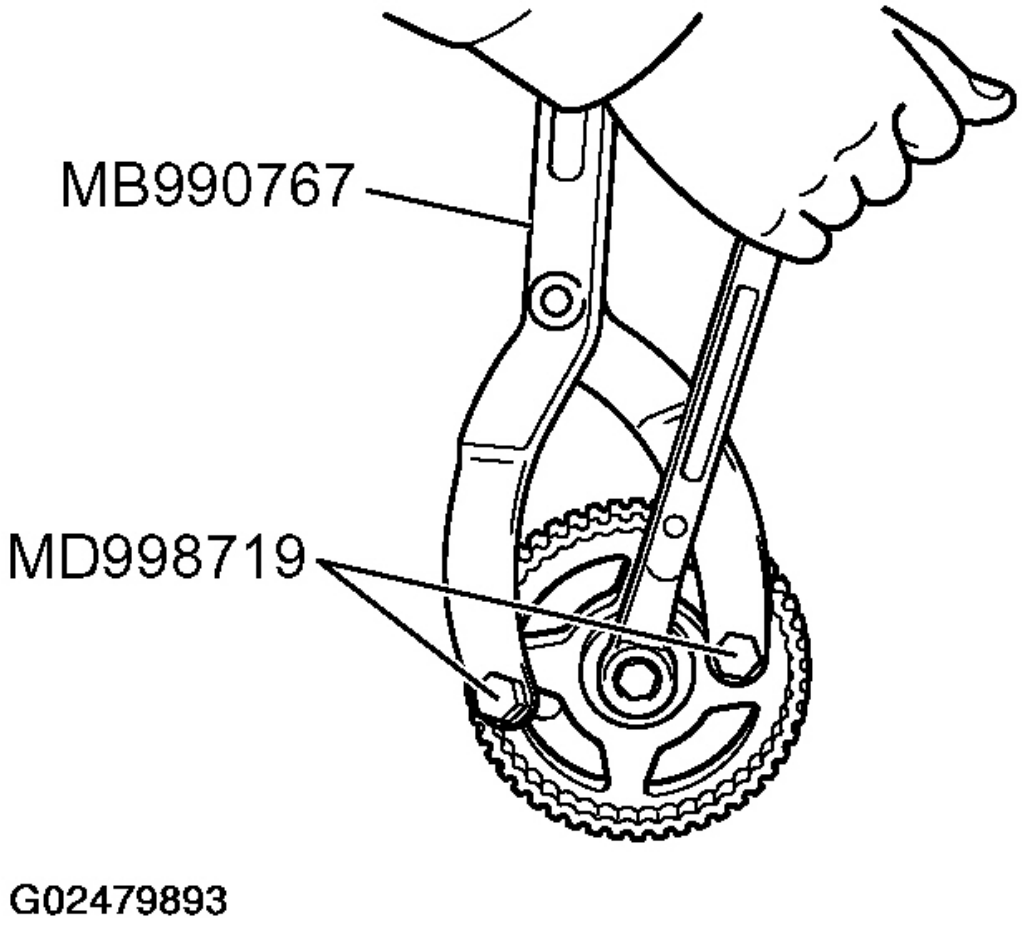


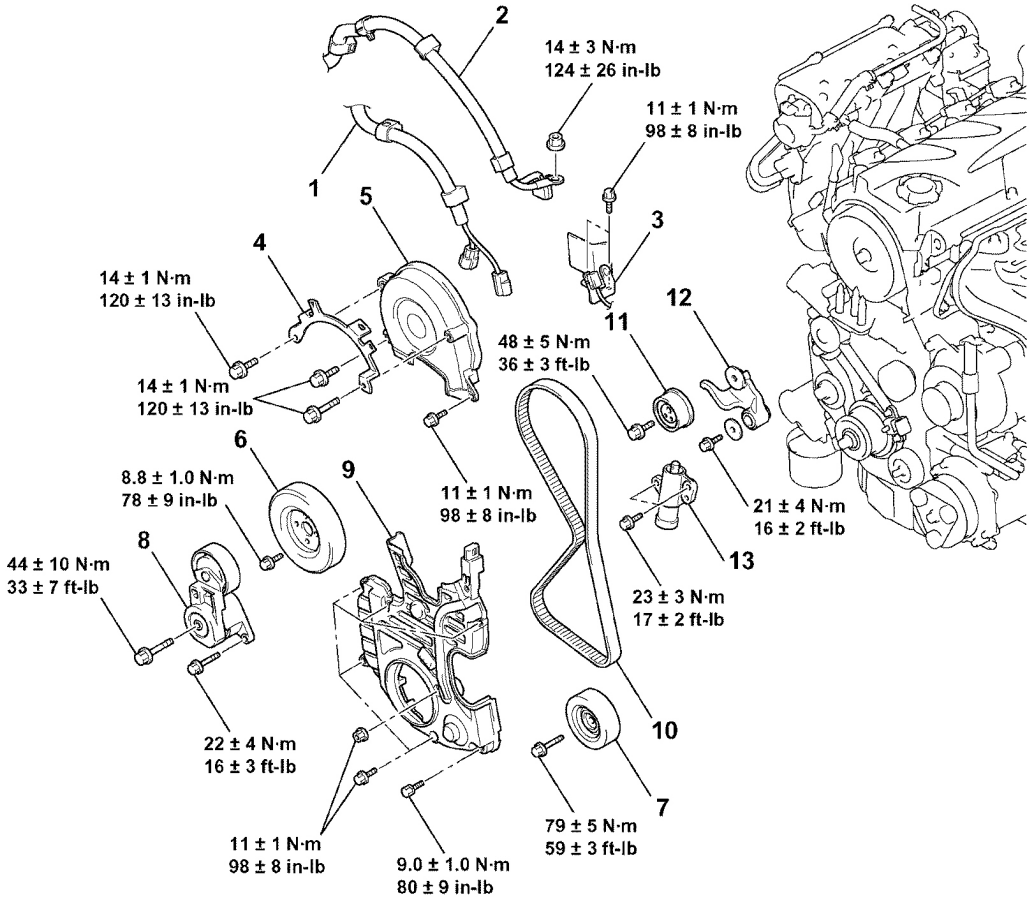

**Fig. 101: Installing Camshaft Sprocket**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

## TIMING BELT

**REMOVAL AND INSTALLATION**

| Pre-removal Operation | Post-installation Operation |
|---|---|
| • Under Cover Removal<br>• Crankshaft Shaft Damper Pulley Removal | • Crankshaft Shaft Damper Pulley Installation<br>• Drive Belt Tension Check<br>• Under Cover Installation |




**REMOVAL STEPS**
1. CONTROL WIRING HARNESS CONNECTION
2. BATTERY WIRING HARNESS CONNECTION
3. CONNECTOR BRACKET
- ENGINE MOUNTING INSULATOR

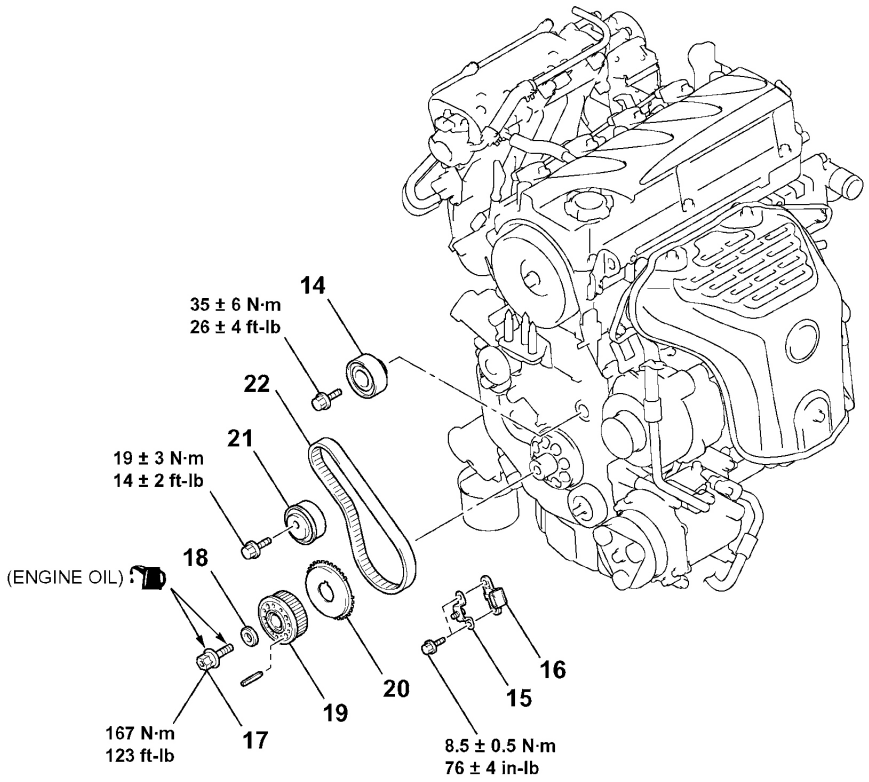
**REMOVAL STEPS (Continued)**
- ENGINE MOUNTING INSULATOR
4. HARNESS BRACKET
5. TIMING BELT UPPER COVER
6. WATER PUMP PULLEY
7. IDLER PULLEY
8. AUTO-TENSIONER
9. TIMING BELT LOWER COVER

**REMOVAL STEPS (Continued)**
>>G<< • VALVE TIMING BELT TENSION ADJUSTMENT (INSTALLATION ONLY)
<<A>> >>F<< 10. VALVE TIMING BELT
>>E<< 11. TIMING BELT TENSIONER PULLEY
12. TIMING BELT TENSIONER ARM
>>D<< 13. TIMING BELT TENSIONER ADJUSTER

G02479894

**Fig. 102: Removing Timing Belt (1 Of 2)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**




| | | | REMOVAL STEPS |
|---|---|---|---|
| | | 14. | TIMING BELT IDLER PULLEY |
| | | 15. | TIMING BELT LOWER COVER BRACKET |
| | | 16. | CRANKSHAFT POSITION SENSOR |
| <<B>> | >>C<< | 17. | CRANKSHAFT PULLEY CENTER BOLT |
| <<B>> | >>C<< | 18. | CRANKSHAFT PULLEY WASHER |
| <<B>> | >>C<< | 19. | CRANKSHAFT CAMSHAFT DRIVE SPROCKET |

| | | | REMOVAL STEPS (Continued) |
|---|---|---|---|
| >>C<< | | 20. | CRANKSHAFT ANGLE SENSING BLADE |
| >>B<< | • | | BALANCER TIMING BELT TENSION ADJUSTMENT (INSTALLATION ONLY) |
| >>A<< | | 21. | BALANCER TIMING BELT TENSIONER |
| <<C>> | >>A<< | 22. | BALANCER TIMING BELT |

G02479895

**Fig. 103: Removing Timing Belt (2 Of 2)**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

## Required Special Tools:

- MB991367: Special Spanner
- MB991385: Pin
- MD998738: Adjusting Bolt
- MD998767: Tensioner Wrench

**REMOVAL SERVICE POINTS**

**<< A >> VALVE TIMING BELT REMOVAL**

**CAUTION: Never turn the crankshaft counterclockwise.**

1. Turn the crankshaft clockwise, align each timing mark to set No.1 cylinder to TDC of its compression stroke.

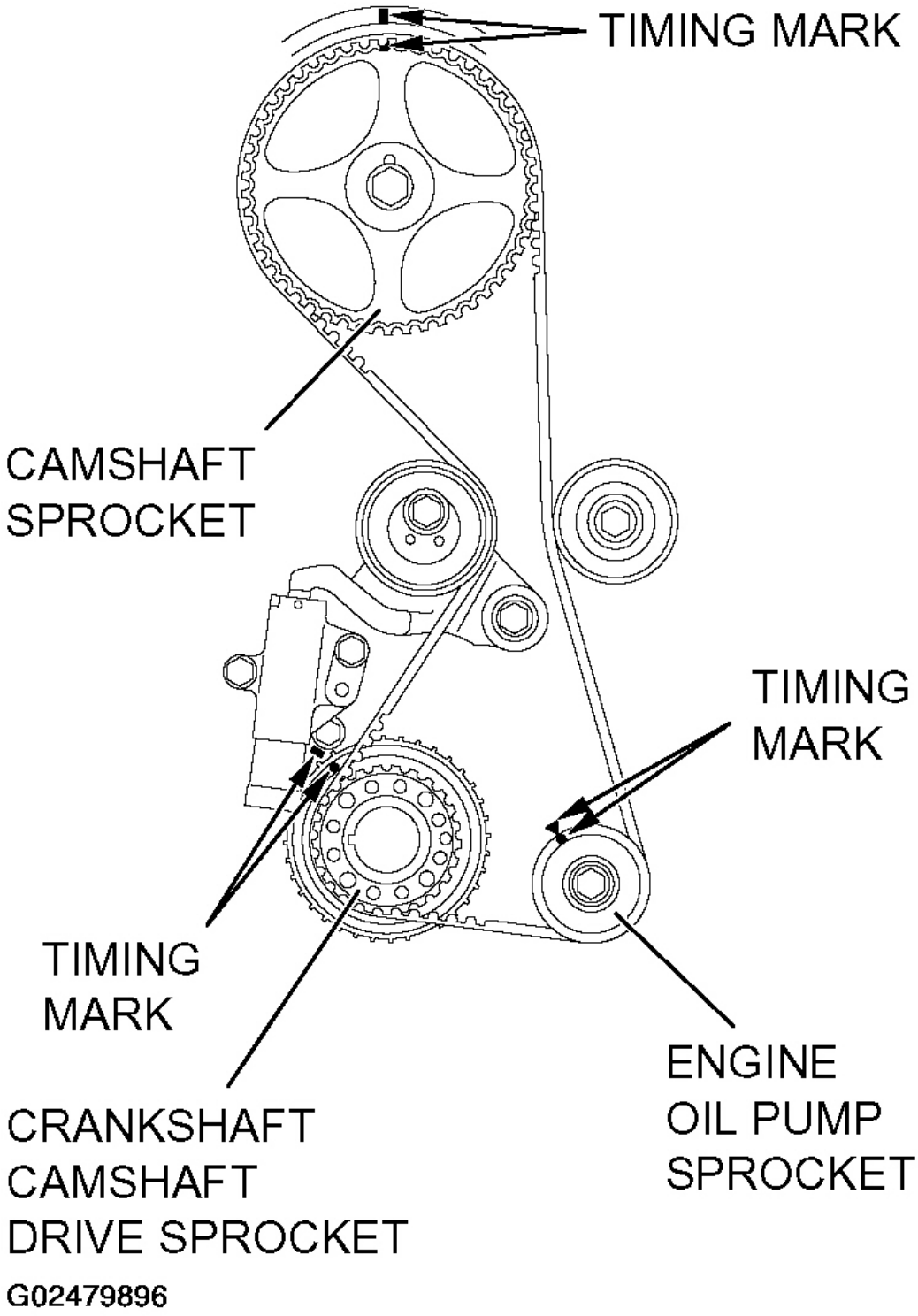



**Fig. 104: Aligning Each Timing Mark To Set No 1 Cylinder To TDC Of Its Compression Stroke**

**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

2. Remove the timing belt under cover rubber plug and then set special tool MD998738.

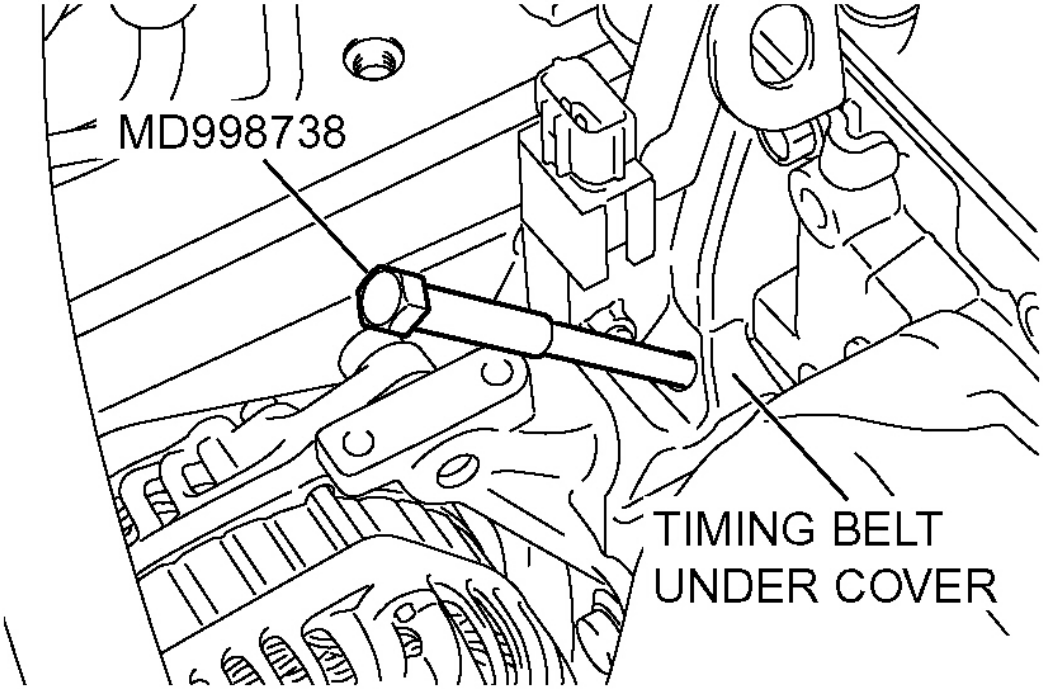



**Fig. 105: Removing Timing Belt Under Cover Rubber Plug**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

3. Screw in special tool MD998738 with hands until it contacts the timing belt tensioner arm.

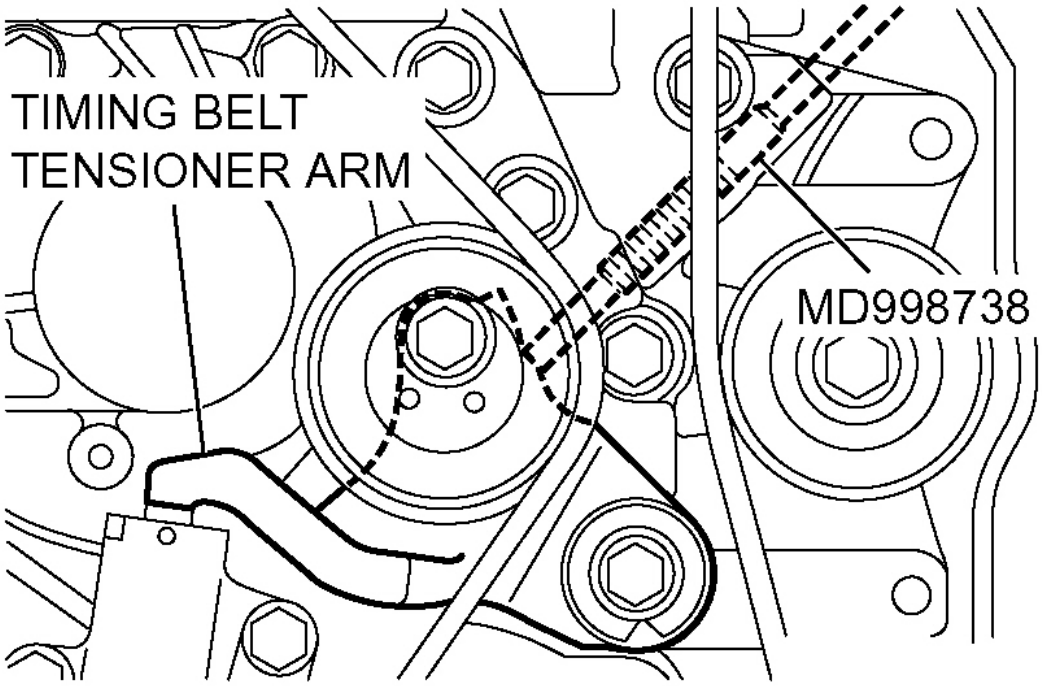



**Fig. 106: Screwing In Special Tool MD998738**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**CAUTION: Special tool MD998738 can be gradually installed at a rate of a 30 degree turn per second. If it is screwed in all at once, the timing belt tensioner adjuster rod will not easily retract and special tool MD998738 may bend.**

4. Gradually screw in special tool MD998738 and then align the timing belt tensioner adjuster rod set hole A with the timing belt tensioner adjuster cylinder set hole B.

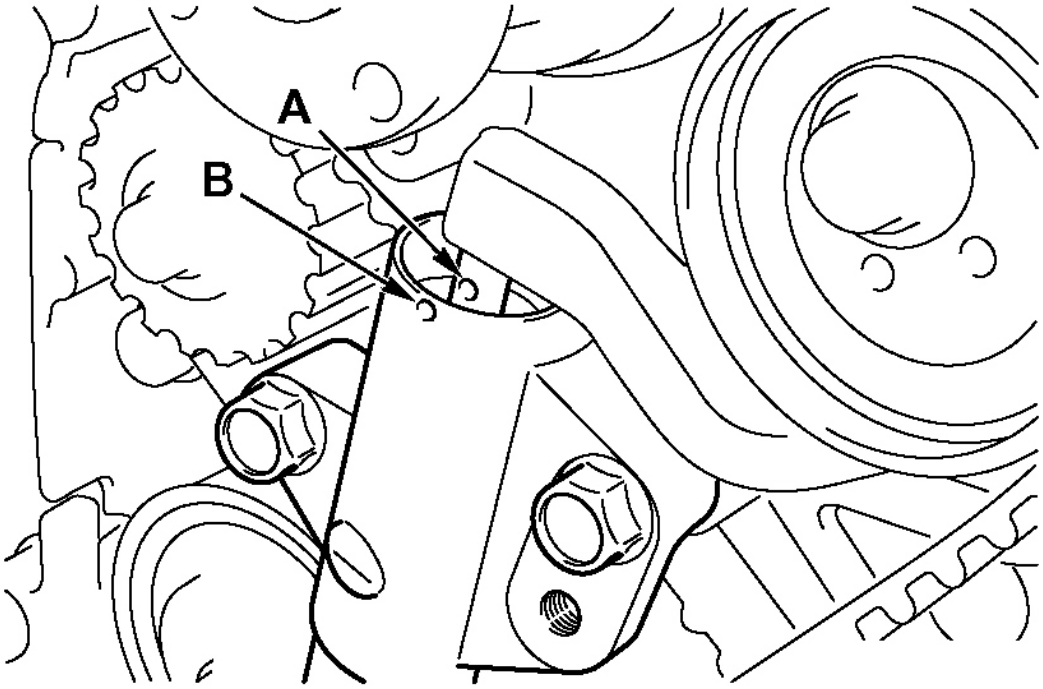



**Fig. 107: Aligning Timing Belt Tensioner Adjuster Rod Set Hole A With Timing Belt Tensioner Adjuster Cylinder Set Hole B**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

5. Insert a wire or pin in the set hole aligned.

**CAUTION: To reuse the valve timing belt, draw an arrow indicating the rotating direction (clockwise) on the back of the belt using chalk, etc.**

6. After removal of special tool MD998738, loosen the timing belt tensioner pulley mounting bolts and remove the valve timing belt.

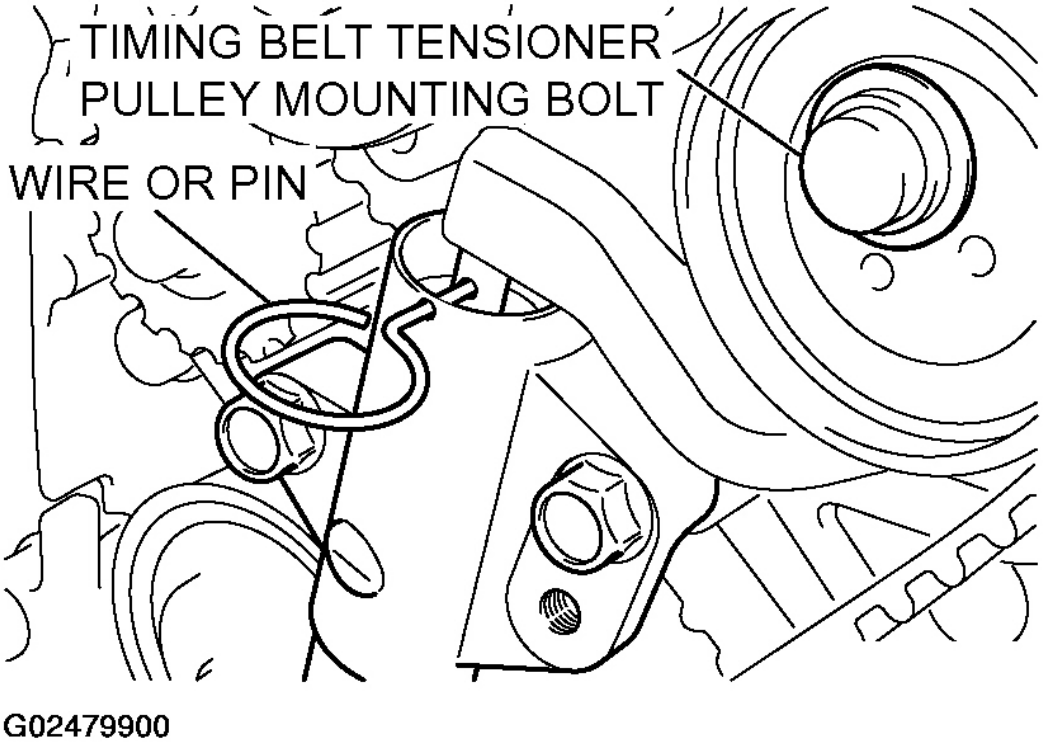



**Fig. 108: Inserting Wire Or Pin In Set Hole**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**<< B >> CRANKSHAFT PULLEY CENTER BOLT/CRANKSHAFT PULLEY WASHER/CRANKSHAFT CAMSHAFT DRIVE SPROCKET REMOVAL**

1. Hold the crankshaft camshaft drive sprocket with special tools MB991367 and MB991385.
2. Loosen the crankshaft pulley center bolt and remove the crankshaft pulley washer and crankshaft camshaft drive sprocket.

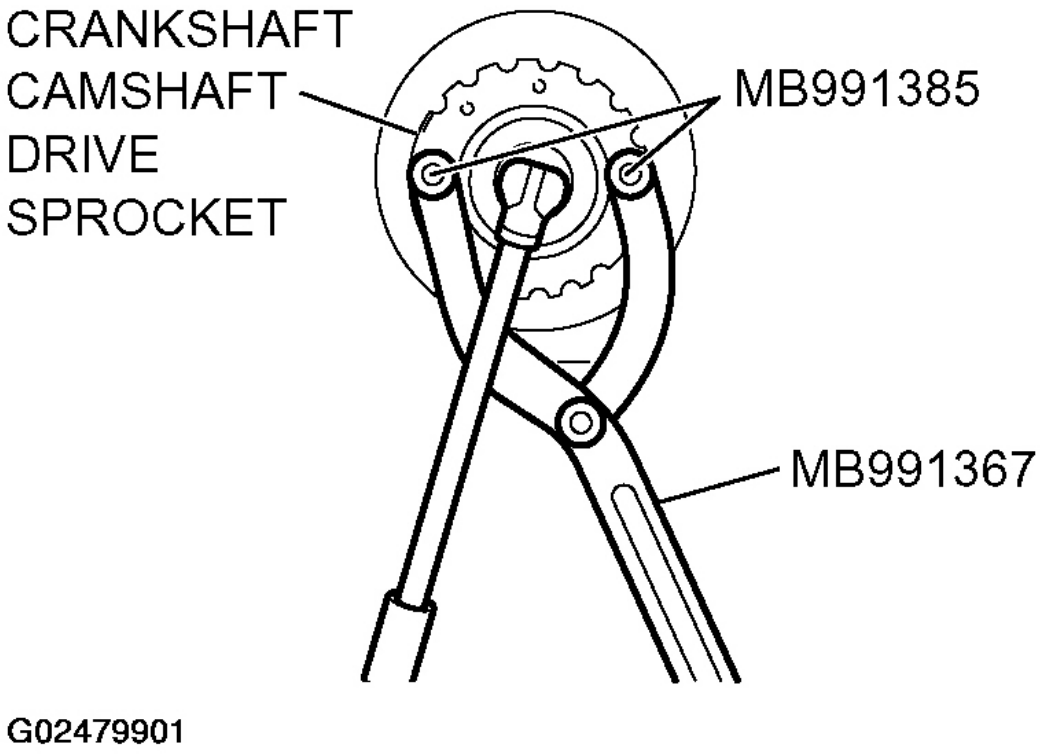



**Fig. 109: Removing Crankshaft Camshaft Drive Sprocket**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**<< C >> BALANCER TIMING BELT REMOVAL**

**CAUTION: To reuse the balancer timing belt, draw an arrow indicating the rotating direction on the back of the belt using chalk, etc.**

**INSTALLATION SERVICE POINTS**

**>> A << BALANCER TIMING BELT/BALANCER TIMING BELT TENSIONER INSTALLATION**

1. Ensure that the crankshaft balancer shaft drive sprocket timing marks and balancer shaft sprocket timing marks are aligned.
2. Install the balancer timing belt on the crankshaft balancer shaft drive sprocket and balancer shaft sprocket. There should be no slack on the tension side.

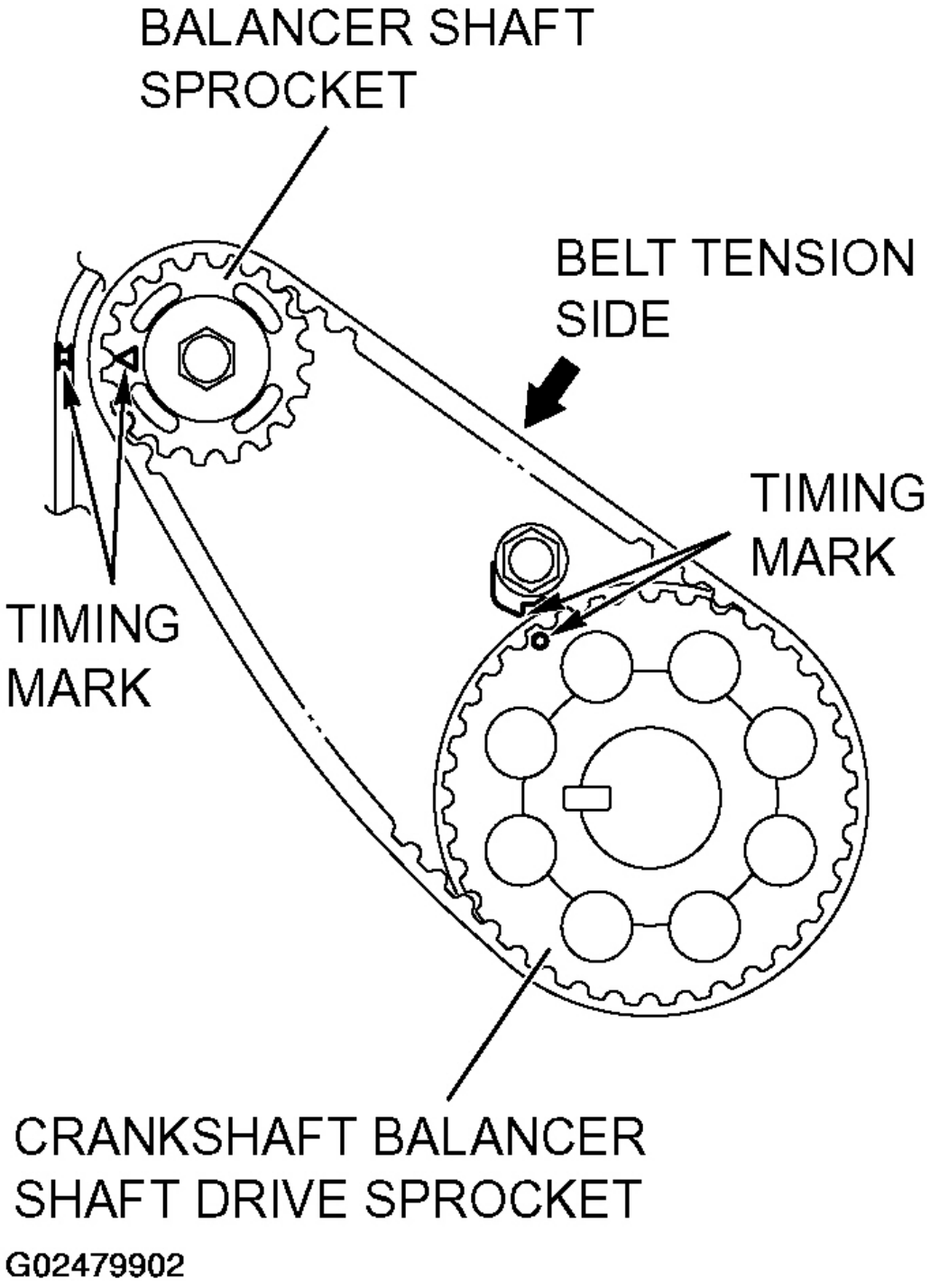



**Fig. 110: Aligning Crankshaft Balancer Shaft Drive Sprocket Timing Marks With Balancer Shaft Sprocket Timing Marks**

**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

3. Assemble and temporarily fix the center of the pulley of the balancer timing belt tensioner so that it is at the top left from the center of the assembling bolt, and the pulley flange is at the front-side of the engine.
4. Adjust the balancer timing belt tension.

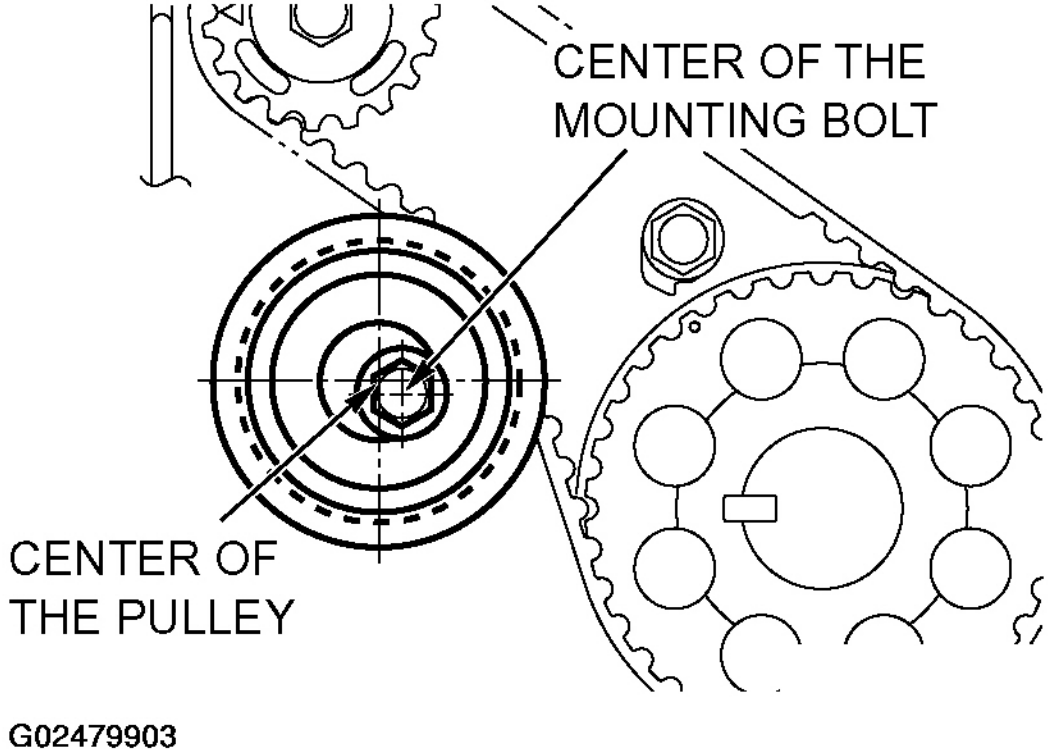



**Fig. 111: Assembling Center Of Pulley Of Balancer Timing Belt Tensioner**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> B << BALANCER TIMING BELT TENSION ADJUSTMENT**

**CAUTION: When tightening the mounting bolts, ensure that the tensioner does not rotate with the bolts. Allowing it to rotate with the bolts can cause excessive tension of the belt.**

1. Lift with your fingers the balancer timing belt tensioner in the direction of the arrow. Apply a tensile torque of [3.0 +/- 0.4 N.m (26 +/- 4 in-lb)] to the balancer timing belt so the belt is tense without any looseness. Tighten the assembling bolt to the specified torque in this state. Then, fix the balancer timing belt tensioner.

   **Tightening torque: 19 +/- 3 N.m (14 +/- 2 ft-lb)**

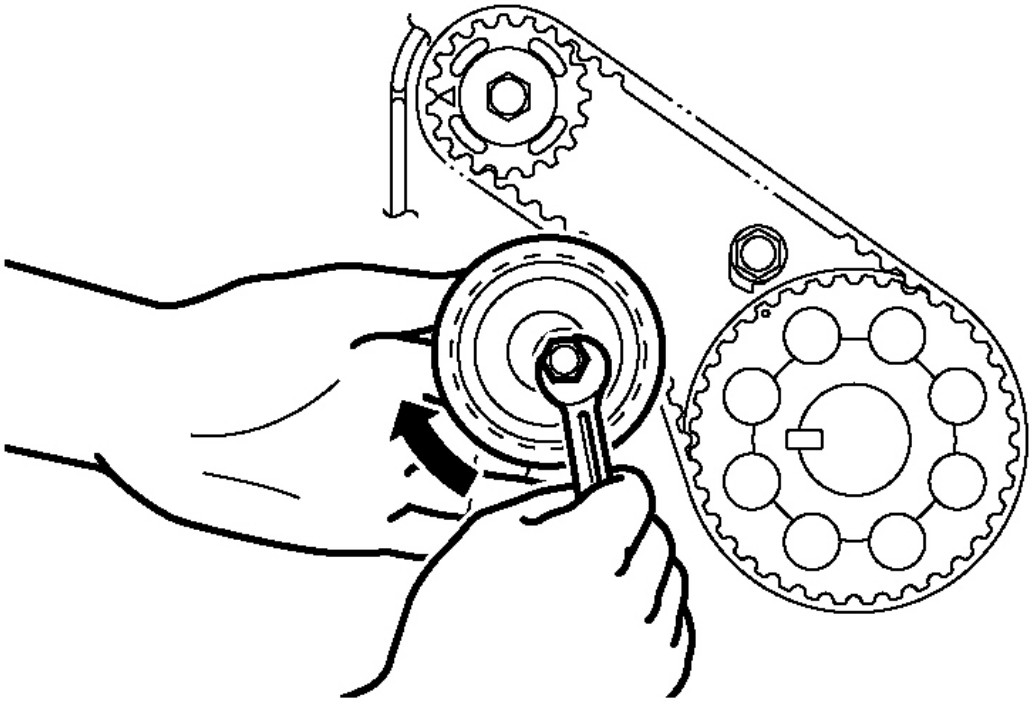



**Fig. 112: Tightening Bolt**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

2. Turn the crankshaft clockwise two turns to set No.1 cylinder to TDC of its compression stroke and check that sprocket timing marks are aligned.

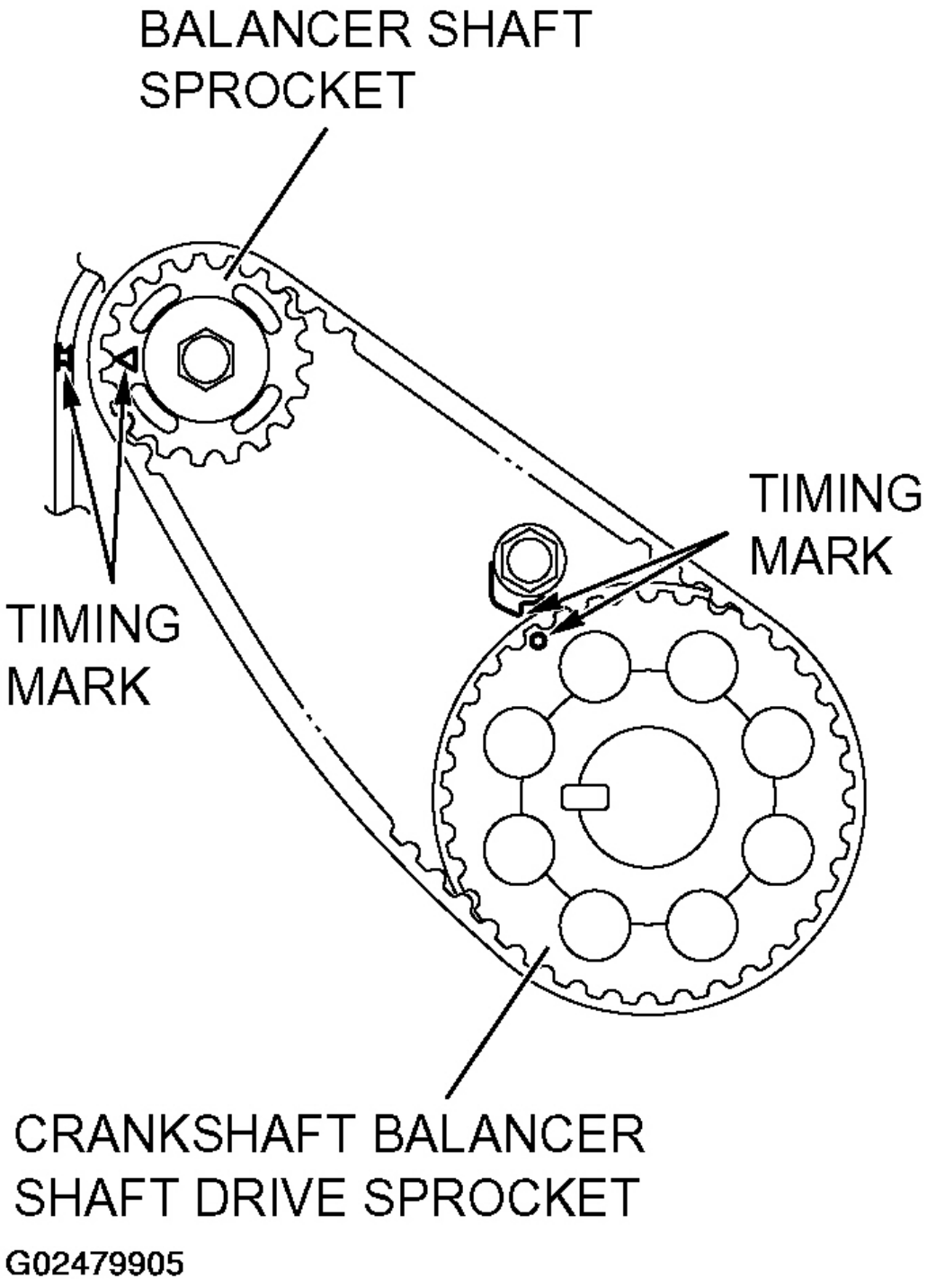



**Fig. 113: Aligning Sprocket Timing Marks**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

3. Apply a pressure of approximately 100 N (22 pounds) at the center (arrow area) between the sprocket as shown in the figure, then inspect whether the belt deflection is within the standard value.

   **Standard value:**

   **< When adjusting > 5 - 7 mm (0.20 - 0.27 inch)**

   **< When replacing > 5 - 7 mm (0.20 - 0.27 inch)**

4. If not within the standard value, adjust the belt tension again.

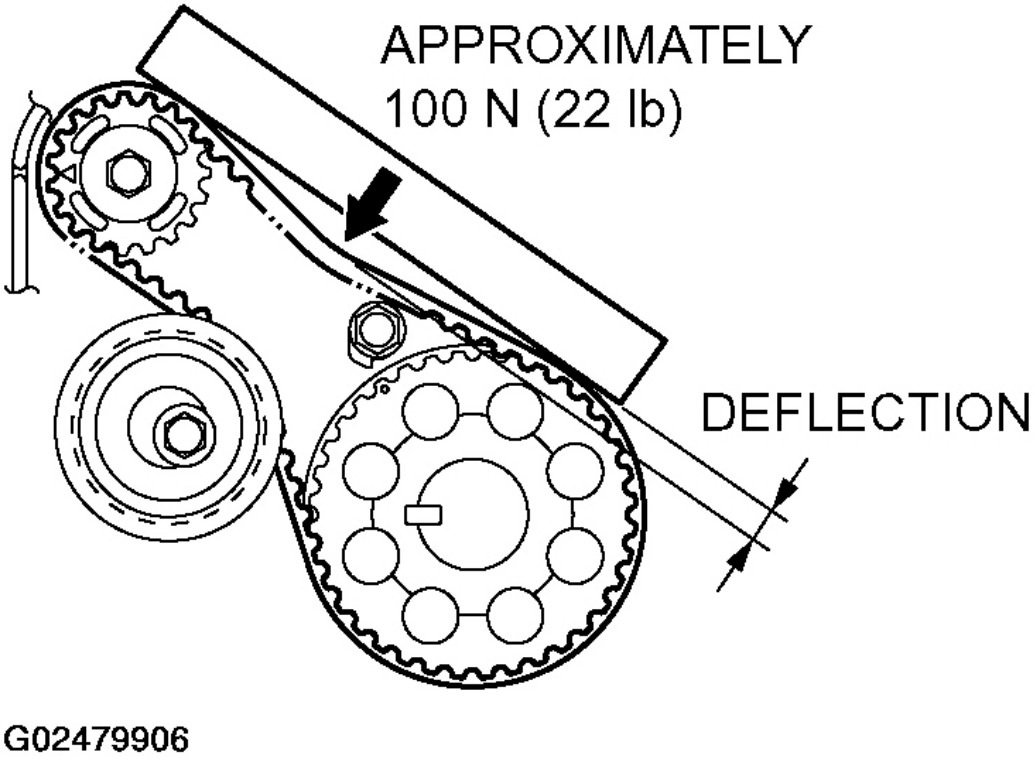



**Fig. 114: Identifying Belt Deflection**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> C << CRANKSHAFT ANGLE SENSING BLADE/CRANKSHAFT CAMSHAFT DRIVE SPROCKET/CRANKSHAFT PULLEY WASHER/CRANKSHAFT PULLEY CENTER BOLT INSTALLATION**

1. Clean or degrease the crankshaft, the crankshaft angle sensing blade, the crankshaft camshaft drive sprocket and crankshaft pulley washer as shown.

   **NOTE: Also clean the degreased surfaces.**

2. Install the crankshaft angle sensing blade and crankshaft camshaft drive sprocket in the direction shown.

3. Place the larger chamfer side of the crank shaft pulley washer in the direction shown in the Figure and then assemble on the crank shaft pulley center bolt.
4. Apply a small of engine oil to the crank shaft pulley center bolt bearing surface and screw.

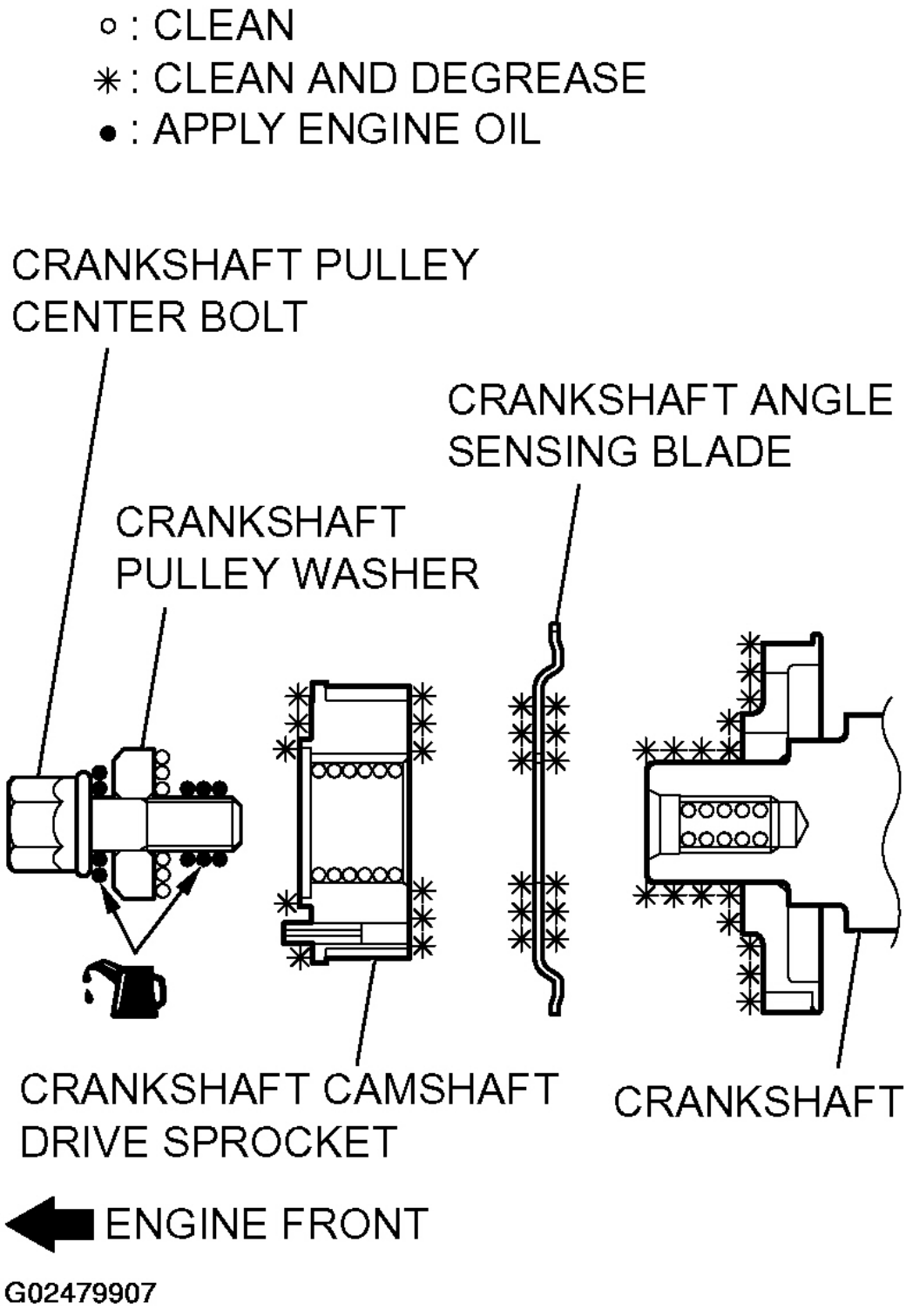



**Fig. 115: Installing Crankshaft Angle Sensing Blade And Crankshaft Camshaft Drive Sprocket**

**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

5. Hold the crankshaft camshaft drive sprocket with special tools MB991367 and MB991385 in the same manner as removal.
6. Tighten the crankshaft pulley center bolts to the specified torque.

   **Tightening torque: 167 N.m (123 ft-lb)**

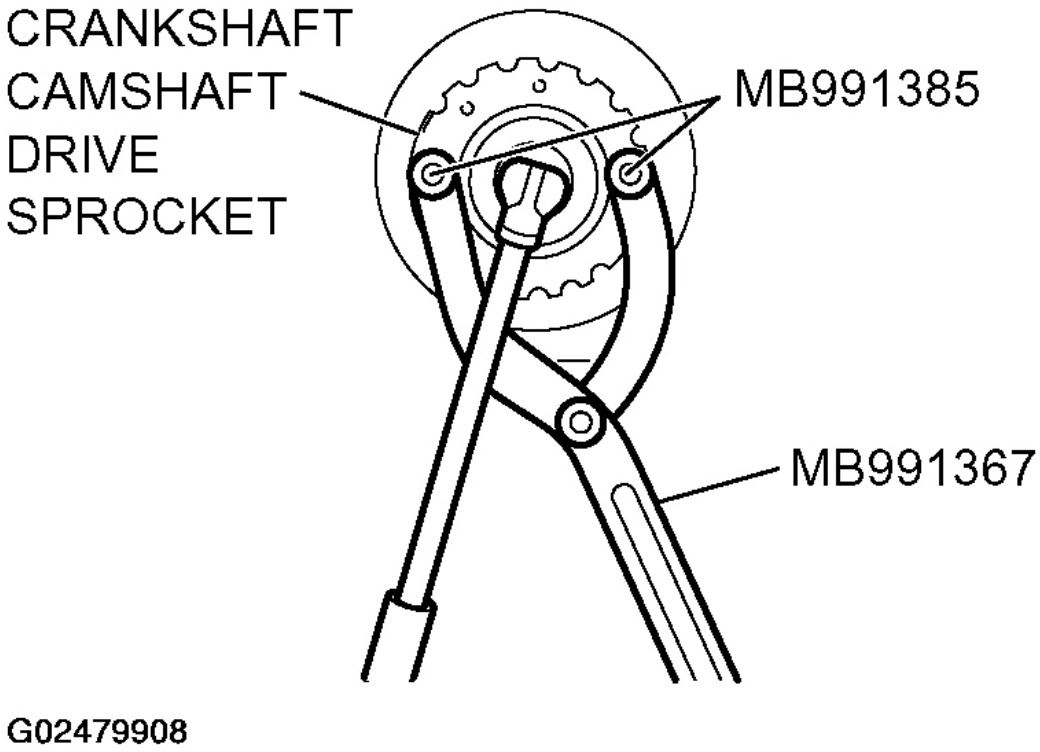



**Fig. 116: Holding Crankshaft Camshaft Drive Sprocket With Special Tools MB991367 And MB991385**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> D << TIMING BELT TENSIONER ADJUSTER INSTALLATION**

1. Set according to the following procedures when the timing belt tensioner adjuster rod is fully extended.

**CAUTION: If the compression is too fast the procedure may damage the rod. Make a point to slowly and thoroughly compress.**

   1. Slowly compress the timing belt tensioner adjuster rod using a press or vice, then align the set hole A of the rod with set hole B of the timing belt tensioner adjuster cylinder.

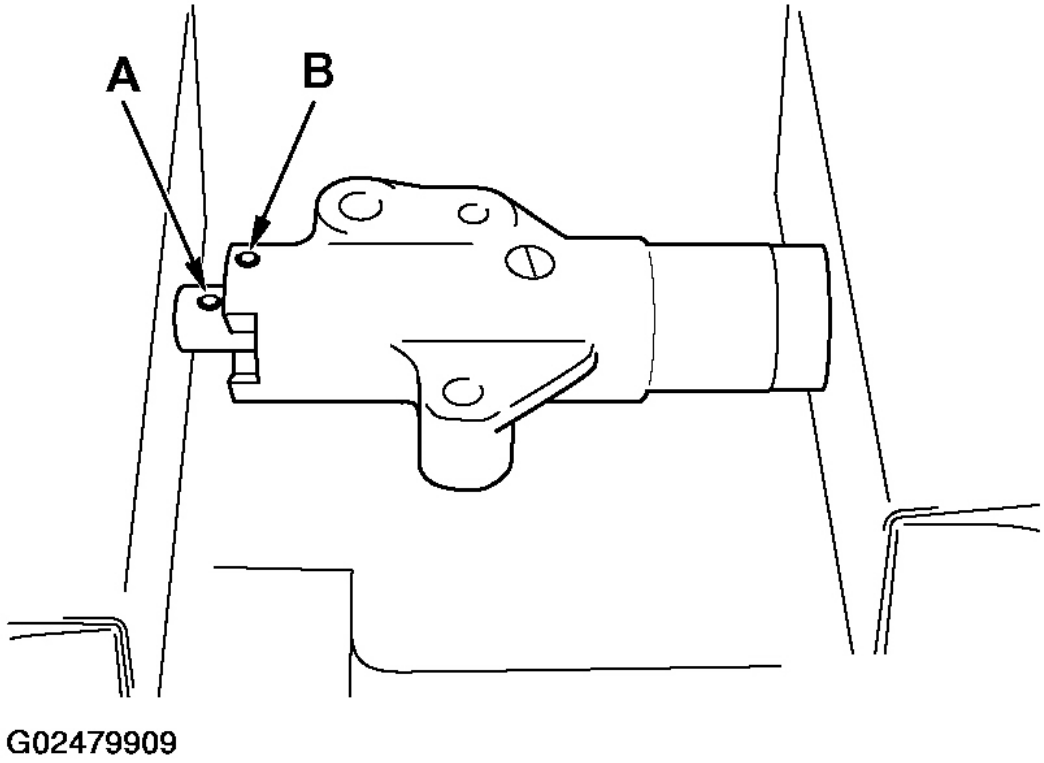



**Fig. 117: Aligning Set Hole A Of Rod With Set Hole B Of Timing Belt Tensioner Adjuster Cylinder**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

2. Insert a wire or pin in the set hole aligned.

**NOTE: When replacing the timing belt tensioner adjuster with new parts, the timing belt tensioner adjuster is set with a pin.**

2. Install the timing belt tensioner adjuster to the engine and then tighten the mounting bolt to the specified torque. Do not remove the wire or pin until the tension of the valve timing belt is adjusted.

**Tightening torque: 23 +/- 3 N.m (17 +/- 2 ft-lb)**

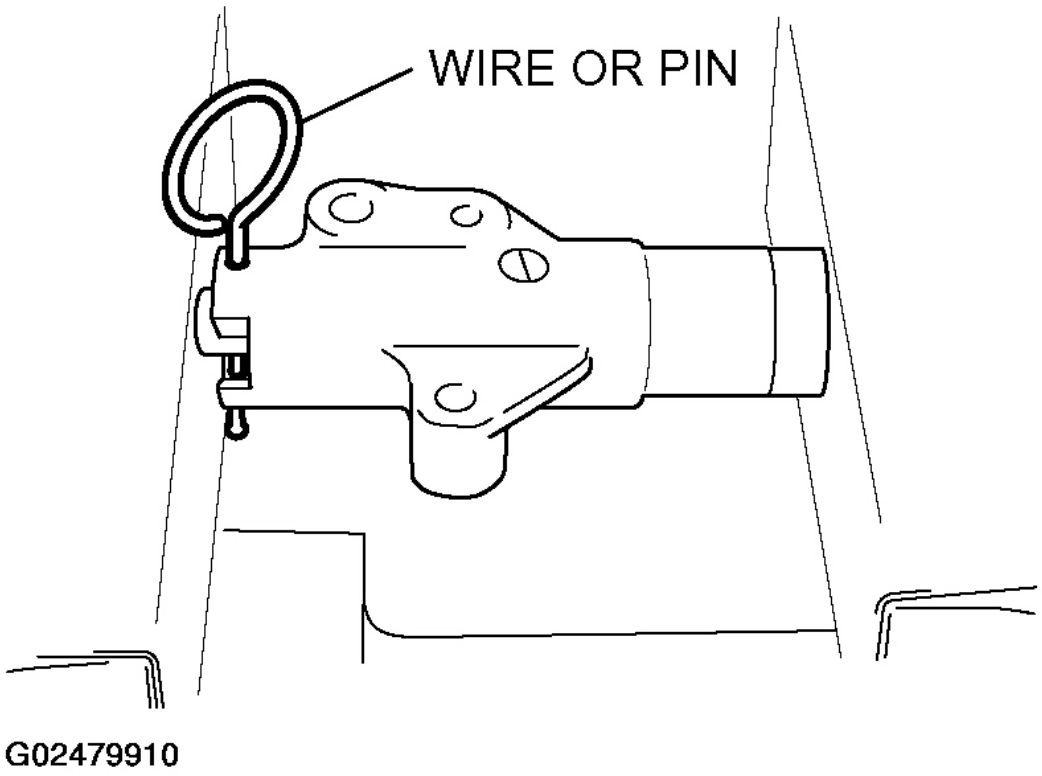
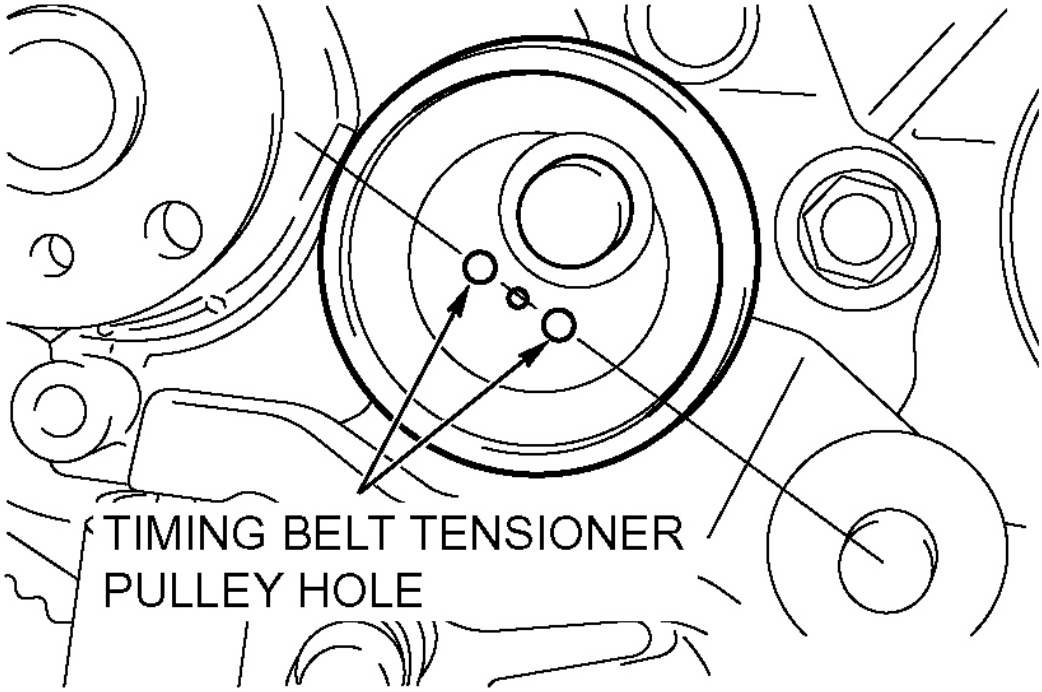



**Fig. 118: Inserting Wire Or Pin In Set Hole**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> E << TIMING BELT TENSIONER PULLEY INSTALLATION**

Temporarily tighten the timing belt tensioner pulley as shown.




G02479911

**Fig. 119: Tightening Timing Belt Tensioner Pulley**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> F << VALVE TIMING BELT INSTALLATION**

1. Align the timing marks on the camshaft sprocket, crankshaft camshaft drive sprocket and engine oil pump sprocket.

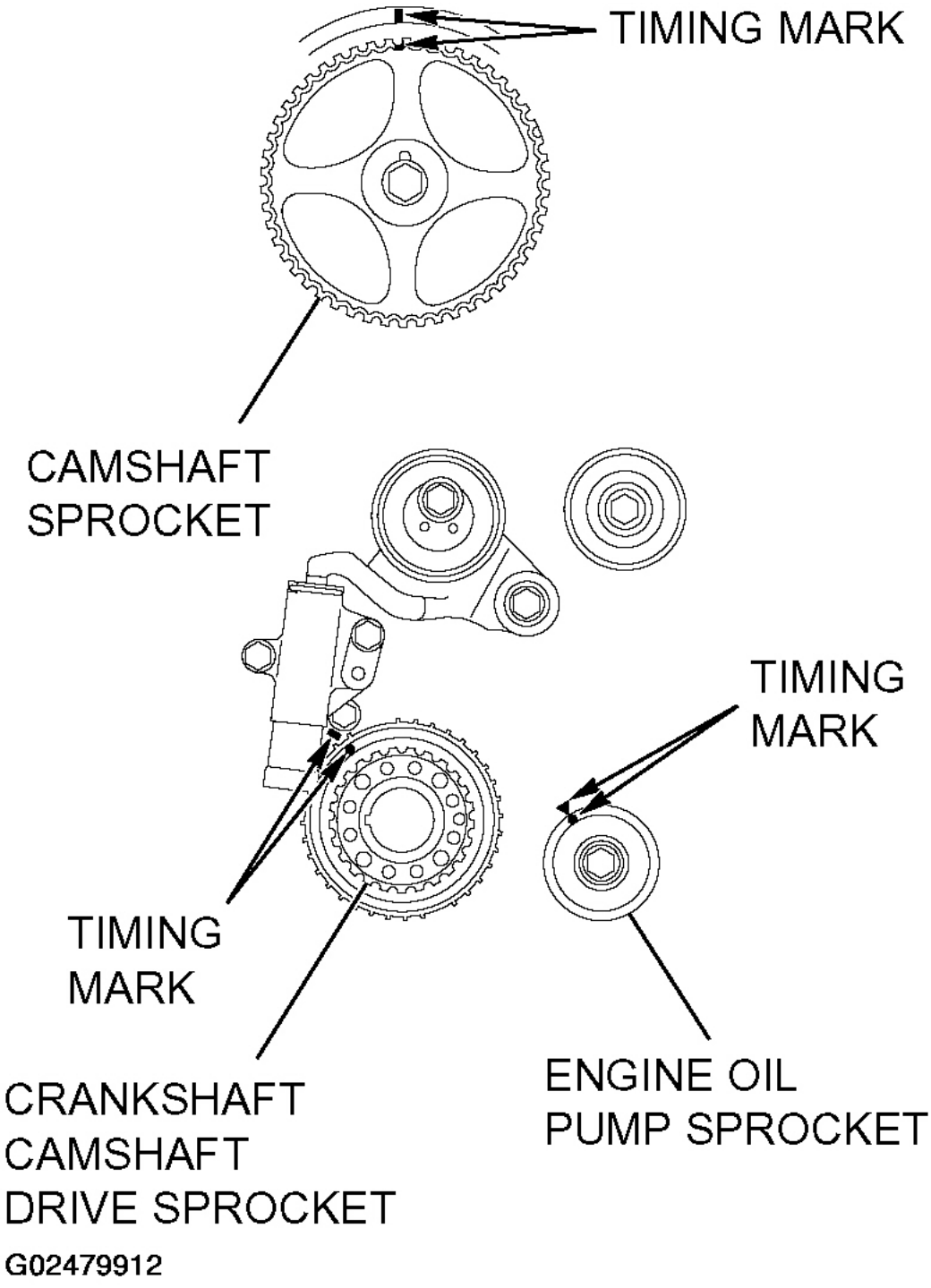
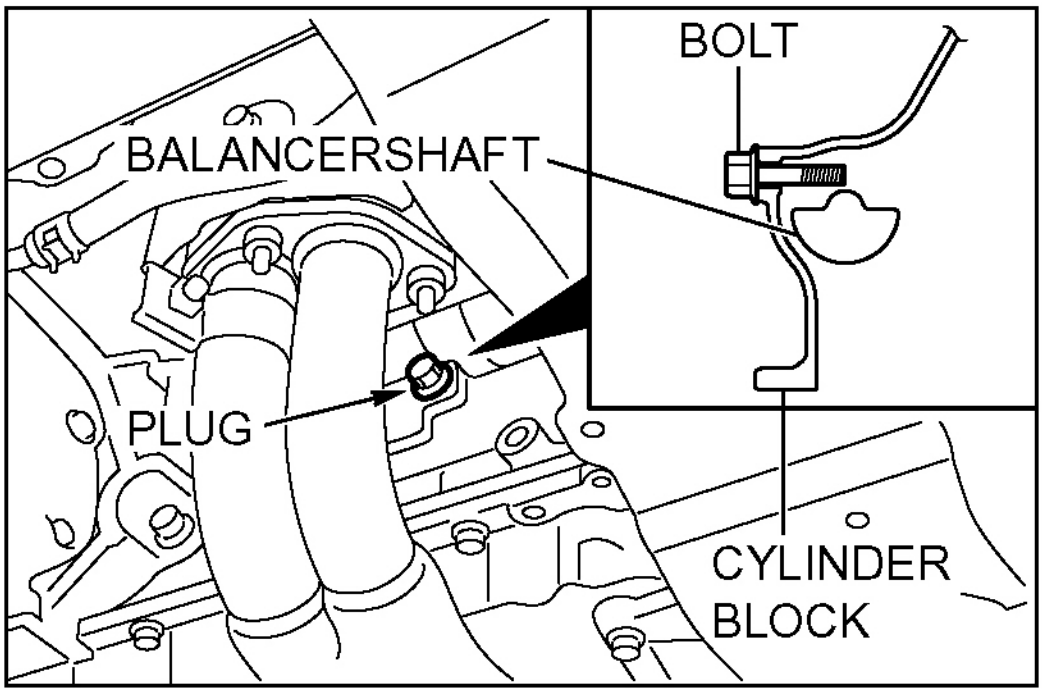



**Fig. 120: Aligning Timing Marks On Camshaft Sprocket, Crankshaft Camshaft Drive Sprocket And Engine Oil Pump Sprocket**

**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

2. Adjust the timing mark of the engine oil pump sprocket. Unplug the cylinder block plug. Insert a bolt (M6, section width 10 mm, nominal length 45 mm) from the plug hole. If the bolt comes in contact with the balancer shaft, turn the engine oil sprocket one rotation. Re-adjust the timing mark and then check to see that the bolt fits. Do not remove the bolt until the valve timing belt is assembled.




G02479913

**Fig. 121: Inserting Bolt Into Plug Hole**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

3. Incorporate the valve timing belt in the following manner so that the tensile force of the belt is not lax.
    1. Place the valve timing belt on the timing belt tensioner pulley and crankshaft camshaft driver sprocket and then support it with your left hand so it does not slide.
    2. Place the valve timing belt on the engine oil pump sprocket while pulling it with the right hand.
    3. Place the valve timing belt on the timing belt idler pulley.

**CAUTION: Incorporate the valve timing belt. Then apply reverse rotation (counterclockwise rotation) pressure to the cam shaft sprocket. Re-check to see that each timing mark is aligned while the tension side of the belt is right.**

4. Place the valve timing belt on the camshaft sprocket.

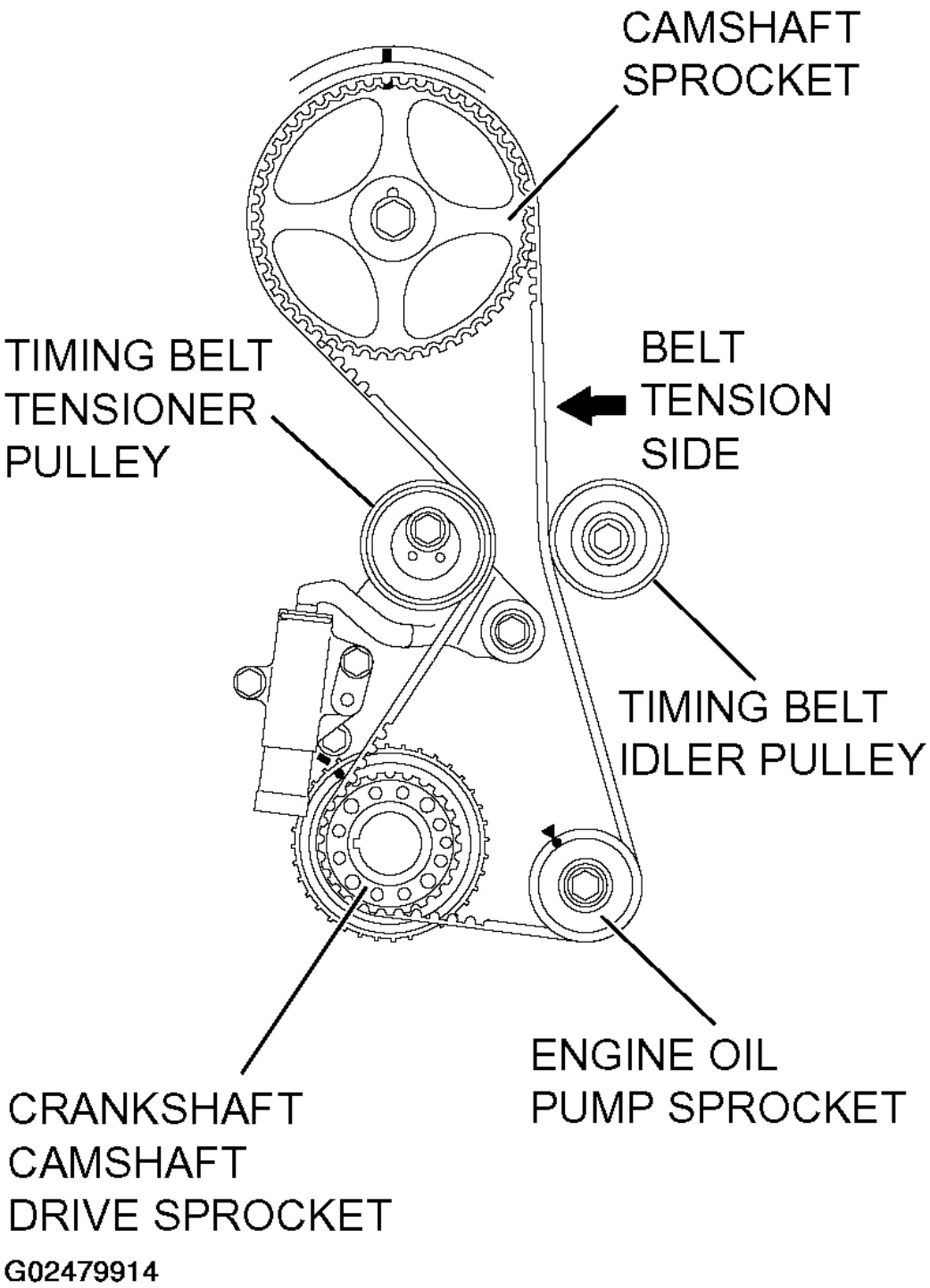


**Fig. 122: Placing Valve Timing Belt On Camshaft Sprocket**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

4. Turn the timing belt tensioner pulley in the direction shown in the figure using special tool MD998767 to apply tension to the valve timing belt. Then temporarily tighten and fix the timing belt tensioner pulley mounting bolt.

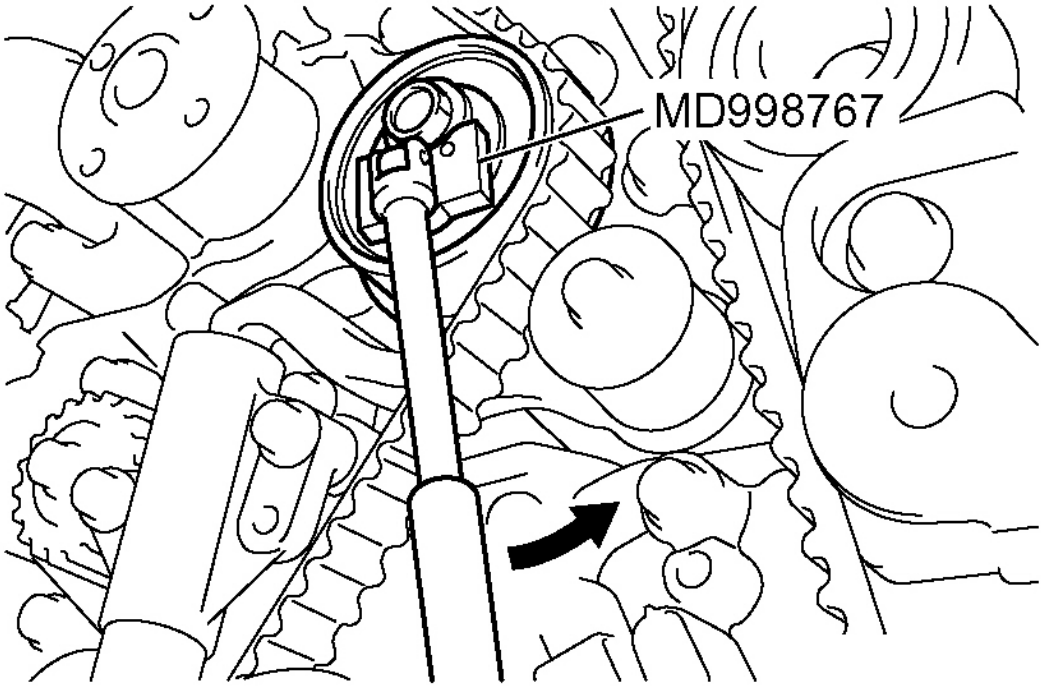



**Fig. 123: Turning Timing Belt Tensioner Pulley**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

5. Check that the timing marks are aligned.

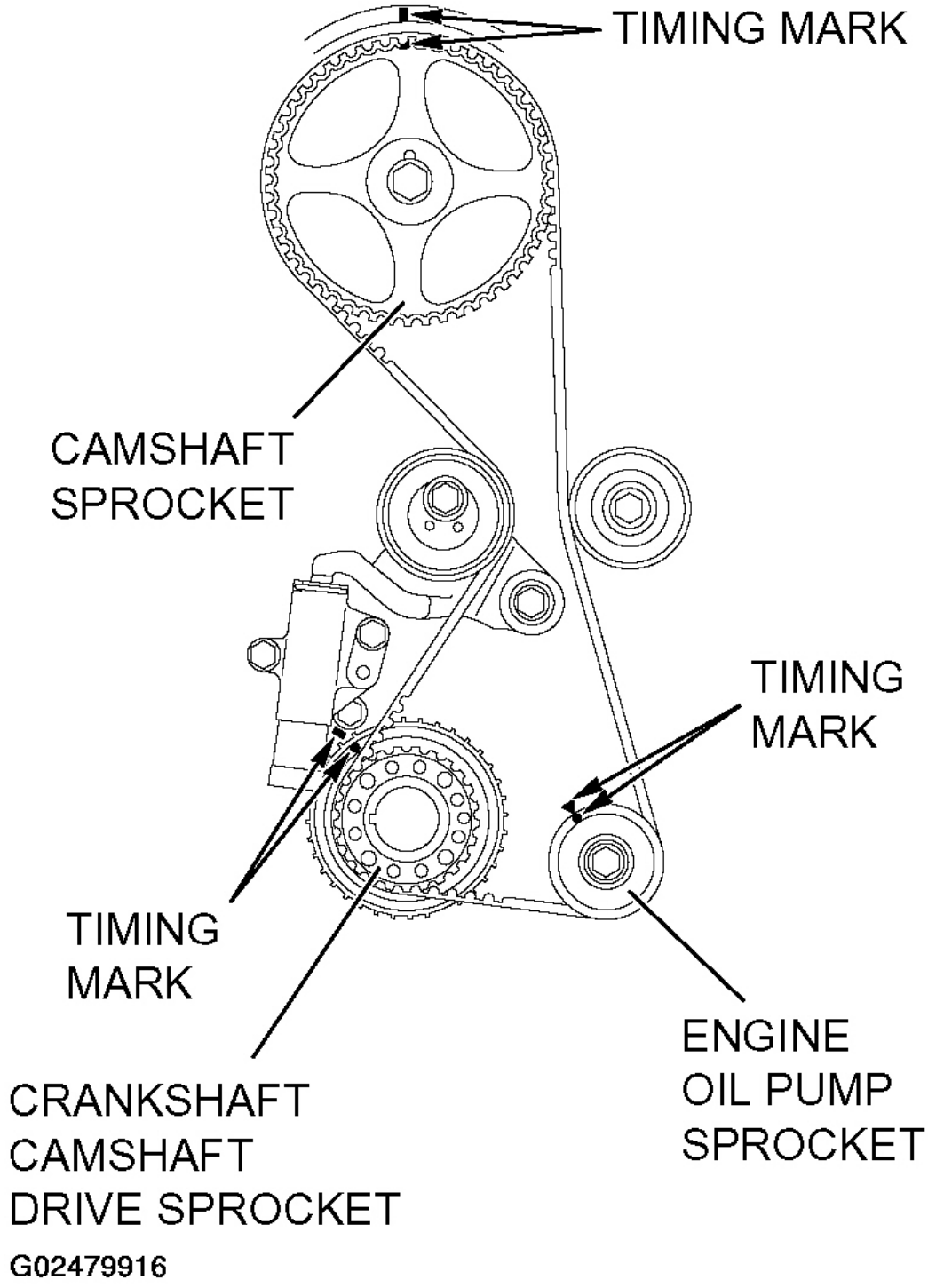
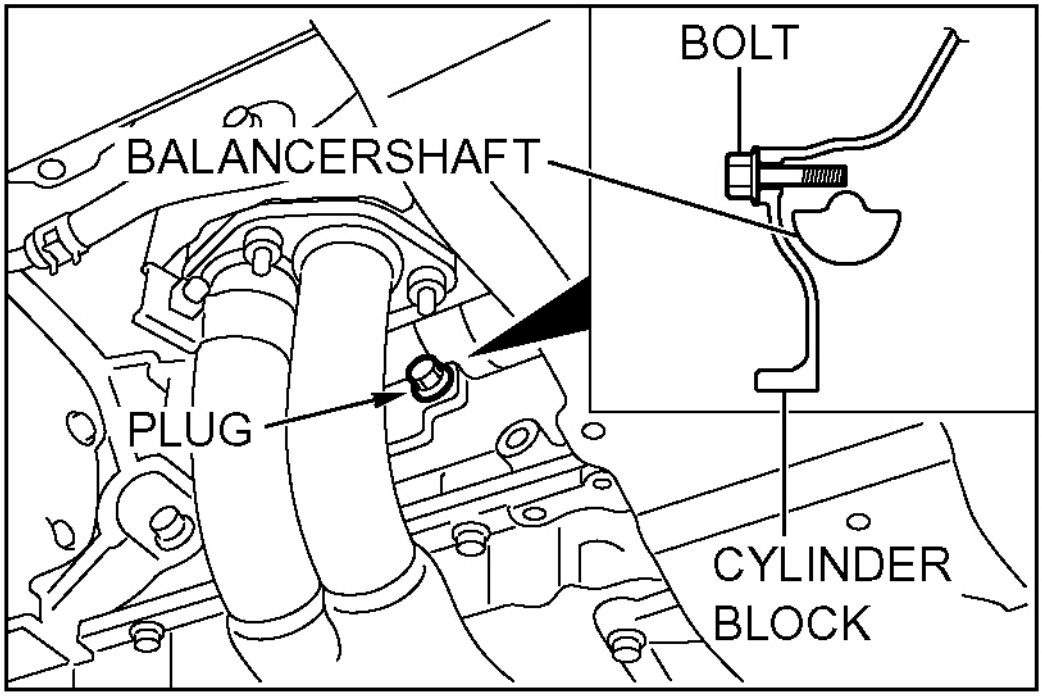



**Fig. 124: Aligning Timing Marks**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

6. Remove the bolt inserted in Step 2 above, then assemble the cylinder block plug.
7. Tighten the cylinder block plug to the specified torque.

   **Tightening torque: 30 +/- 3 N.m (23 +/- 2 ft-lb)**
8. Adjust the valve timing belt tension.




G02479917

**Fig. 125: Installing Cylinder Block Plug**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**>> G << VALVE TIMING BELT TENSION ADJUSTMENT**

1. Set special tool MD998738 used when removing the valve timing belt.

   **CAUTION: Always screw in special tool MD998738 in with your hands, since use of a spanner or other tools may damage the wire or pin inserted in the timing belt tensioner adjuster.**

2. Gradually screw in special tool MD998738 to a position in which the wire or pin inserted in the timing belt tensioner adjuster lightly moves.
3. Turn the crankshaft 1/4 of a revolution in the counterclockwise direction.
4. Turn the crankshaft in the clockwise direction, align each timing mark to set No.1 cylinder to TDC of its

compression stroke.

5. Loosen the timing belt tensioner pulley mounting bolt.

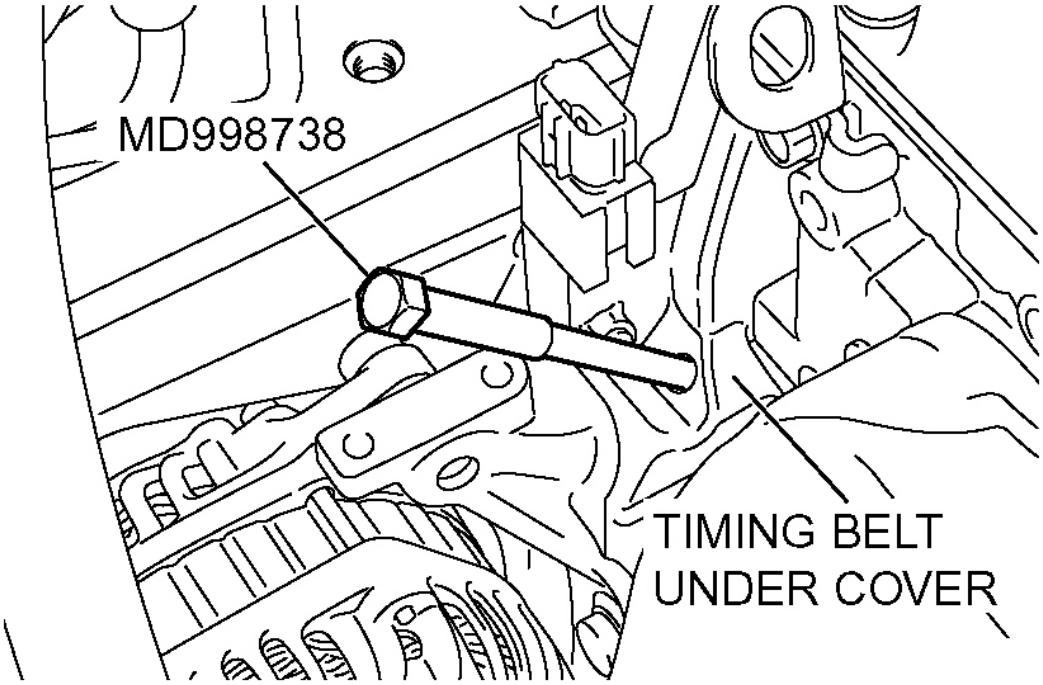



**Fig. 126: Setting Special Tool MD998738**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

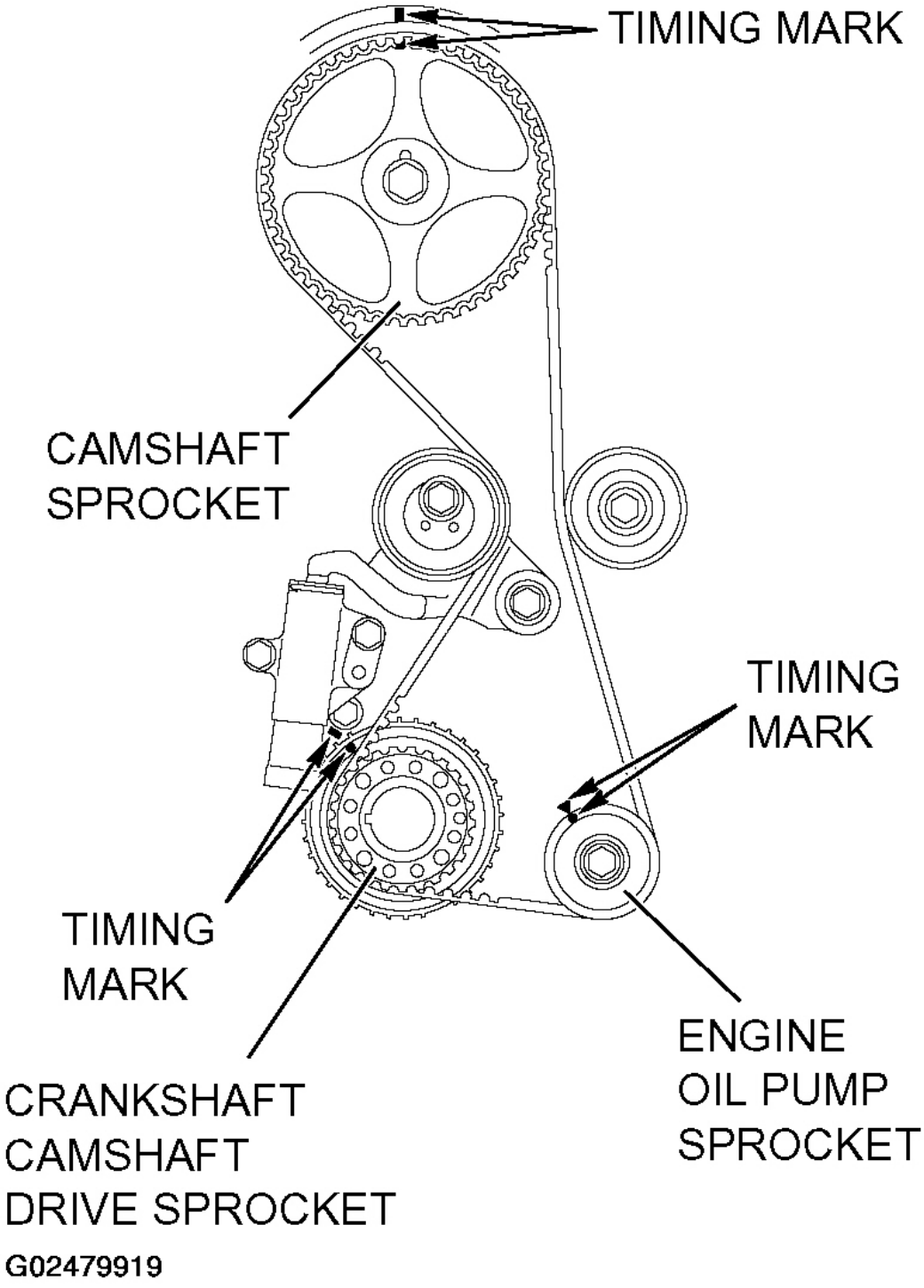



**Fig. 127: Aligning Each Timing Mark To Set No 1 Cylinder To TDC Of Its Compression Stroke**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**CAUTION: When tightening the mounting bolt, ensure that the timing belt tensioner pulley does not rotate with the bolt. Allowing it to rotate with the bolt can cause deficient tension of the belt.**

6. With special tool MD998767 and torque wrench, apply tension torque [3.5 N.m (31 in-lb)] to the valve timing belt, and tighten the timing belt tensioner pulley mounting bolt to the specified torque.

   **Tightening torque: 48 +/- 5 N.m (36 +/- 3 ft-lb)**

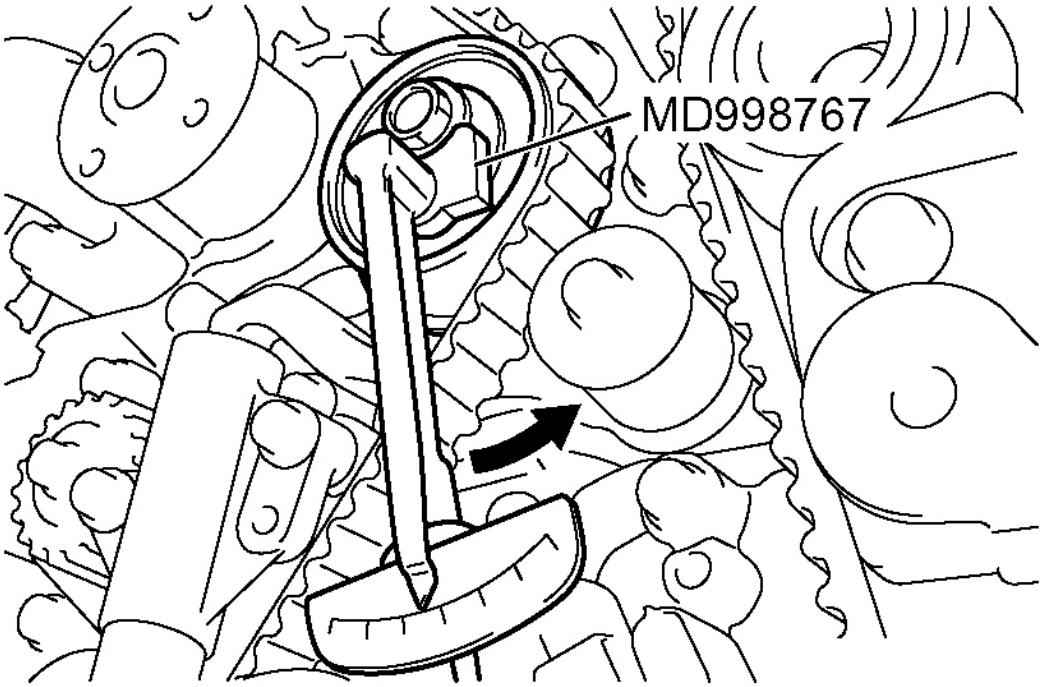



**Fig. 128: Tightening Timing Belt Tensioner Pulley Mounting Bolt**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

7. Remove wire or pin inserted to timing belt tensioner adjuster.

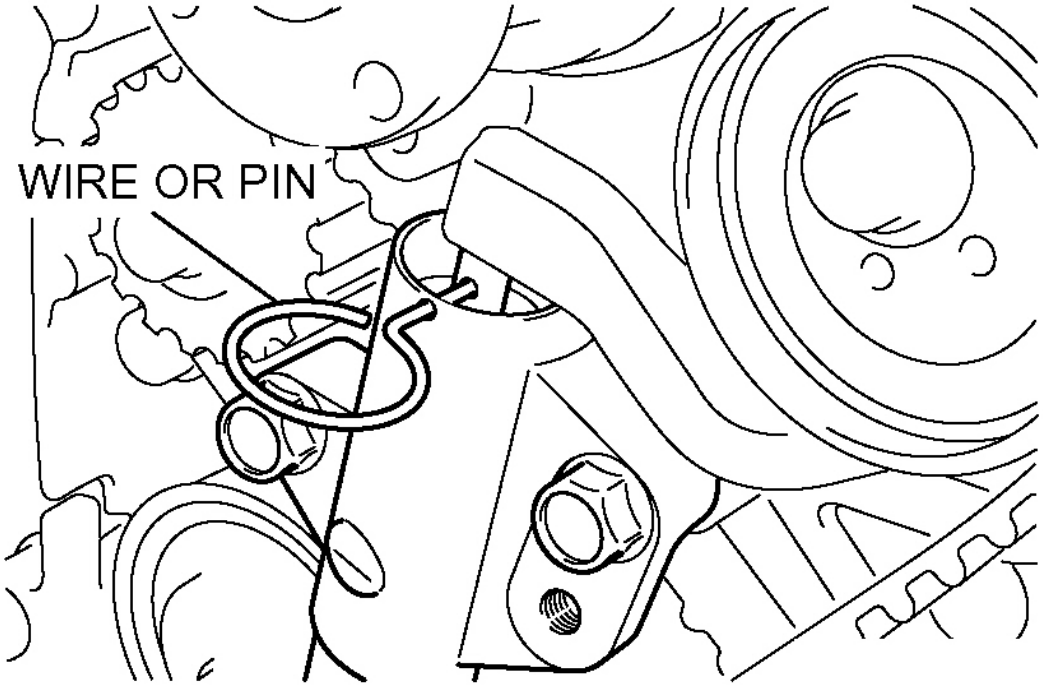



**Fig. 129: Removing Wire Or Pin**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

8. Remove special tool MD998738, and install the rubber plug to the timing belt under cover.
9. Rotate crankshaft clockwise two turns, and leave it for about 15 minutes.

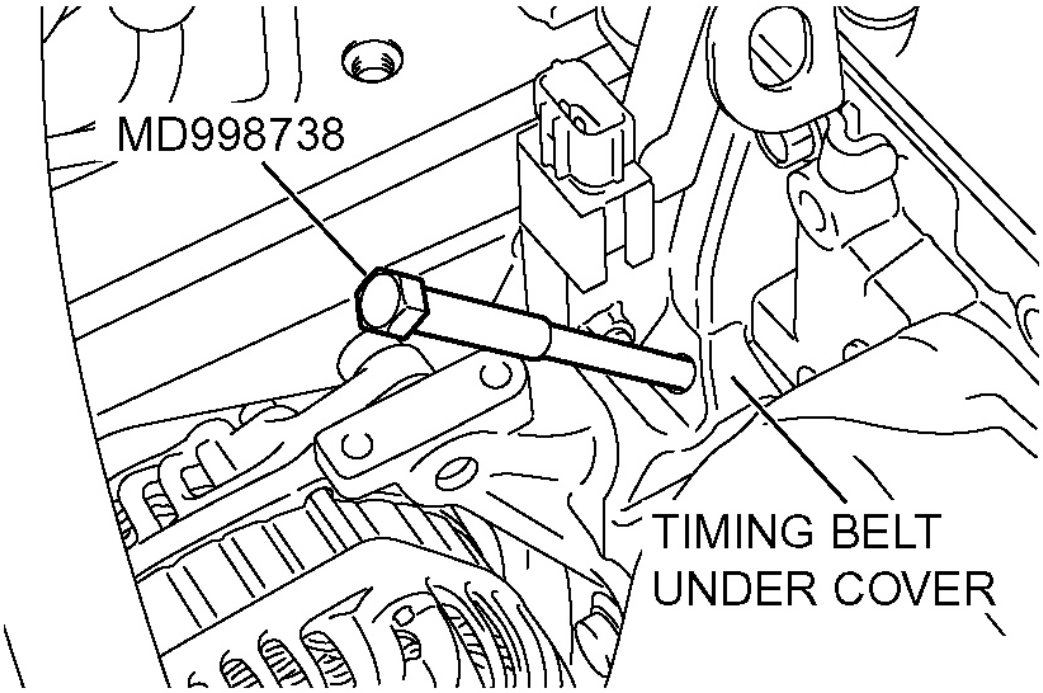



**Fig. 130: Removing Special Tool MD998738**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

10. Insert wire or pin removed in Step 7 again, and ensure that it can be pulled out with a light load. When wire or pin can be lightly removed, appropriate tension is applied on timing belt. In this case, remove wire or pin.

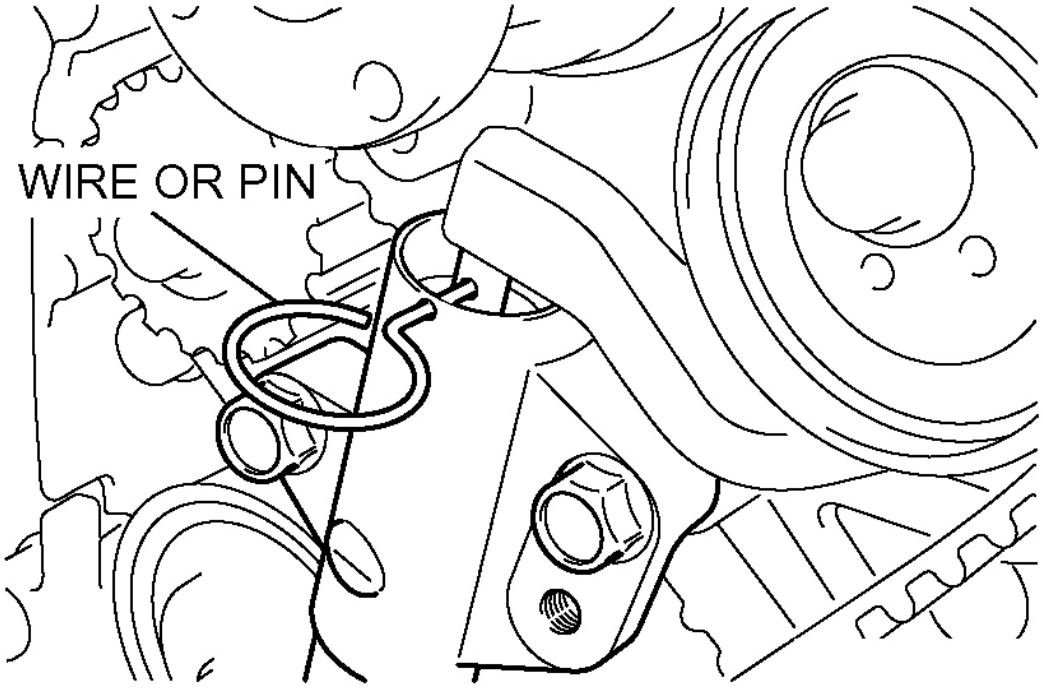



**Fig. 131: Inserting Wire Or Pin**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

Also the projection of timing belt tensioner adjuster rod (A) is within the standard value, appropriate tension is applied.

**Standard value (A): 3.8 - 4.5 mm (0.15 - 0.17 inch)**

11. If wire or pin cannot be easily pulled out, repeat Step 1 through Step 9 to reach proper valve timing belt tension.

**CAUTION: Always check the tightening torque of the crank shaft pulley center bolt when turning the crank shaft pulley center bolt counterclockwise. Re-tighten if it is loose.**

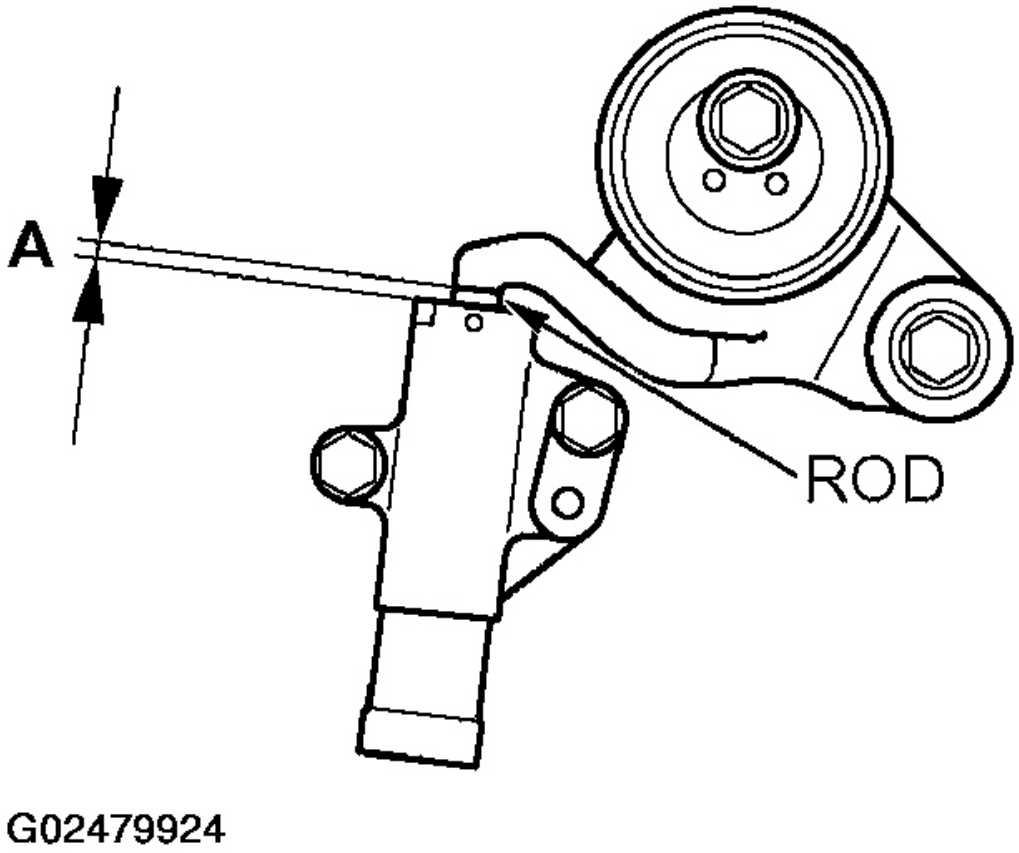



**Fig. 132: Identifying Timing Belt Tensioner Adjuster Rod Projection**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

12. Check again that the timing marks on sprockets are aligned.

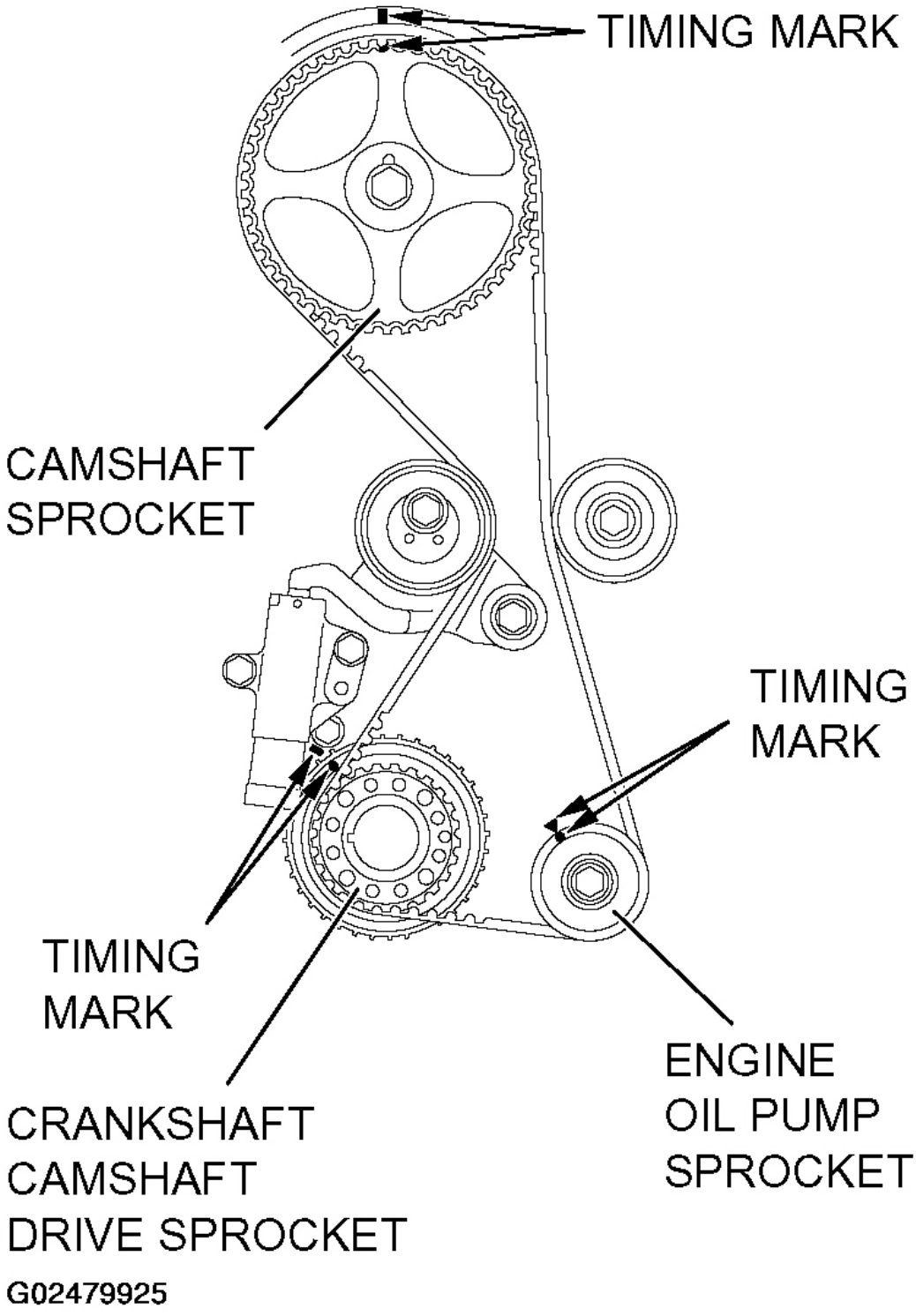



**Fig. 133: Aligning Timing Marks On Sprockets**

**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

## INSPECTION

### TIMING BELT TENSIONER ADJUSTER CHECK

1. Check for oil leak from seal, and replace it if leak is detected.
2. Check for wear or damage at the top of the rod. Replace it, if required.
3. Hold the timing belt tensioner adjuster by hand, and press top end of the rod onto the metal (e.g. cylinder block) under a pressure of 98 - 196 N (22 - 44 pounds) to measure the movement of the rod.

   **Standard value: Within 1 mm (0.039 inch)**

   **A: Length when it is free (not pressed)**

   **B: Length when it is pressed**

   **A - B: Movement**

   If the measured value is out of the standard value, replace the timing belt tensioner adjuster.

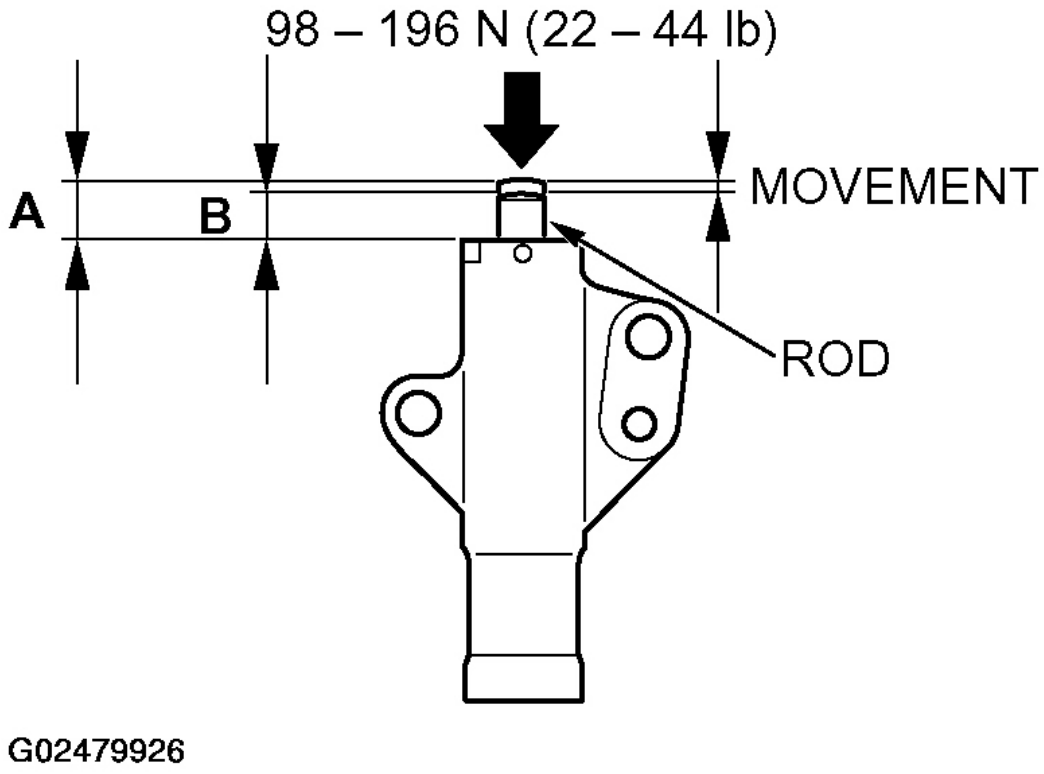



**Fig. 134: Checking Timing Belt Tensioner Adjuster**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

**BALANCER TIMING BELT TENSION CHECK**

Check the balancer timing belt tension in the following procedures.

1. Apply a pressure of approximately 100 N (22 pounds) at the center (arrow area) between the sprocket as shown in the figure, then inspect whether the flexure is within the standard value.

   **Standard value: 5 - 10 mm (0.20 - 0.39 inch)**
2. If not within the standard value, adjust the belt tension. (Refer to **TIMING BELT**).

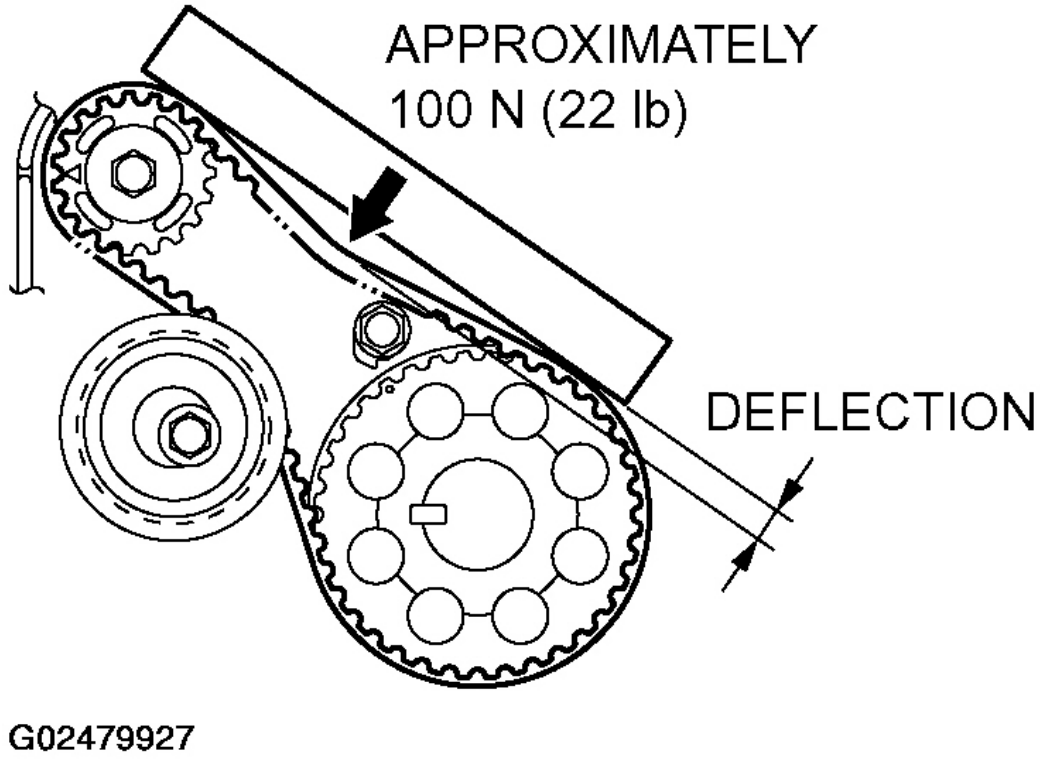



**Fig. 135: Checking Balancer Timing Belt Tension**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

## SPECIFICATIONS

**FASTENER TIGHTENING SPECIFICATIONS**

**FASTENER TIGHTENING SPECIFICATIONS**

| ITEM | SPECIFICATION |
|---|---|
| **Camshaft and valve stem seal** | |
| | |

| | | |
|---|---|---|
| Accumulator assembly | | 44 ± 5 N.m (33 ± 3 ft-lb) |
| Camshaft position sensing cylinder bolt | | 22 ± 4 N.m (16 ± 3 ft-lb) |
| Camshaft position sensor support bolt | | 14 ± 1 N.m (120 ± 13 in-lb) |
| Camshaft sprocket bolt | | 89 ± 9 N.m (65 ± 7 ft-lb) |
| Control wiring harness bolt | | 9.0 ± 2.0 N.m (80 ± 17 in-lb) |
| Cylinder head plug | | 47 ± 7 N.m (35 ± 5 ft-lb) |
| Engine hanger bolt | | 24 ± 3 N.m (18 ± 2 ft-lb) |
| Engine oil control valve bolt | | 11 ± 1 N.m (98 ± 8 in-lb) |
| Engine oil pressure switch | | 10 ± 2 N.m (89 ± 17 in-lb) |
| Exhaust rocker arm shaft bolt | | 13 ± 1 N.m (115 ± 9 in-lb) |
| Inlet rocker arm shaft bolt | | 31 ± 3 N.m (23 ± 2 ft-lb) |
| Rocker cover assembly bolt | | 3.5 ± 0.5 N.m (31 ± 4 in-lb) |
| Spark plug | | 25 ± 4 N.m (18 ± 3 ft-lb) |
| **Crankshaft oil seal** | | |
| A/T drive plate bolt | | 132 ± 5 N.m (98 ± 3 ft-lb) |
| **Crankshaft pulley** | | |
| Crankshaft damper pulley bolt | | 25 ± 4 N.m (18 ± 3 ft-lb) |
| **Cylinder head gasket** | | |
| Battery wiring harness nut | | 14 ± 3 N.m (124 ± 26 in-lb) |
| Camshaft sprocket bolt | | 89 ± 9 N.m (65 ± 7 ft-lb) |
| Control wiring harness bolt | | 9.0 ± 2.0 N.m (80 ± 17 in-lb) |
| Cylinder head bolt <Cold engine> | | 78 ± 2 N.m --> 0 N.m --> 20 ± 2 N.m --> +90° --> +90° (58 ± 1 ft-lb --> 0 in-lb --> 15 ± 1 ft-lb --> +90° --> +90°) |
| Engine oil dipstick guide bolt | | 13 ± 1 N.m (115 ± 9 in-lb) |
| Inlet manifold stay bolt | | 31 ± 3 N.m (23 ± 2 ft-lb) |
| Knock sensor connector bracket bolt | | 11 ± 1 N.m (98 ± 8 in-lb) |
| Radiator lower hose clamp bolt | | 5.0 ± 1.0 N.m (44 ± 9 in-lb) |
| **Engine assembly** | | |
| Battery terminal nut | | 5.0 ± 1.0 N.m (44 ± 9 in-lb) |
| Battery wiring harness bolt and nut | | 9.0 ± 2.0 N.m (80 ± 17 in-lb) |
| Control wiring harness bolt | | 9.0 ± 2.0 N.m (80 ± 17 in-lb) |
| Engine mounting insulator bolt | | 44 ± 10 N.m (33 ± 7 ft-lb) |
| Engine mounting insulator nut (flange nut, self locking) <A/T> | M10 | 45 ± 5 N.m (34 ± 3 ft-lb) |
| Engine mounting insulator nut (flange nut, self locking) <M/T> | M10 | 70 ± 4 N.m (52 ± 3 ft-lb) |
| Engine mounting insulator nut (nut, washer assembled) | M10 | 44 ± 10 N.m (33 ± 7 ft-lb) |
| Ground cable bolt | | 22 ± 4 N.m (16 ± 3 ft-lb) |
| Power steering oil pump bracket bolt | | 24 ± 4 N.m (18 ± 3 ft-lb) |

| | | |
|---|---|---|
| Power steering oil pump bracket nut | | 44 ± 10 N.m (33 ± 7 ft-lb) |
| **Oil pan <AWD>** | | |
| Engine lower oil pan bolt | | 9.0 ± 3.0 N.m (80 ± 26 in-lb) |
| Engine oil pan drain plug | | 39 ± 5 N.m (29 ± 3 ft-lb) |
| Engine upper oil pan bolt | | 9.0 ± 3.0 N.m (80 ± 26 in-lb) |
| Torque converter housing front lower cover bolt (bolt, washer assembled) | M6 | 9.0 ± 1.0 N.m (80 ± 9 in-lb) |
| Transaxle housing front lower cover stay bolt (bolt, washer assembled) | M8 | 22 ± 4 N.m (16 ± 3 ft-lb) |
| | M10 | 44 ± 10 N.m (33 ± 7 ft-lb) |
| **Oil pan <FWD>** | | |
| Engine oil pan bolt | | 9.0 ± 3.0 N.m (80 ± 26 in-lb) |
| Engine oil pan drain plug | | 39 ± 5 N.m (29 ± 3 ft-lb) |
| Torque converter housing front lower cover bolt (bolt, flange) | M10 | 26 ± 5 N.m (19 ± 4 ft-lb) |
| Torque converter housing front lower cover bolt (bolt, washer assembled) | M6 | 9.0 ± 1.0 N.m (80 ± 9 in-lb) |
| **Timing belt** | | |
| Auto-tensioner bolt (bolt, washer assembled) | M8 | 22 ± 4 N.m (16 ± 3 ft-lb) |
| | M10 | 44 ± 10 N.m (33 ± 7 ft-lb) |
| Balancer timing belt tensioner bolt | | 19 ± 3 N.m (14 ± 2 ft-lb) |
| Battery wiring harness nut | | 14 ± 3 N.m (124 ± 26 in-lb) |
| Connector bracket bolt | | 11 ± 1 N.m (98 ± 8 in-lb) |
| Crankshaft pulley center bolt | | 167 N.m (123 ft-lb) |
| Cylinder block plug | | 30 ± 3 N.m (23 ± 2 ft-lb) |
| Idler pulley bolt | | 79 ± 5 N.m (59 ± 3 ft-lb) |
| Timing belt idler pulley bolt | | 35 ± 6 N.m (26 ± 4 ft-lb) |
| Timing belt lower cover bolt (bolt, flange) | M6 | 11 ± 1 N.m (98 ± 8 in-lb) |
| Timing belt lower cover bolt (bolt, washer assembled) | M6 | 9.0 ± 1.0 N.m (80 ± 9 in-lb) |
| Timing belt lower cover bracket bolt | | 8.5 ± 0.5 N.m (76 ± 4 in-lb) |
| Timing belt lower cover nut | | 11 ± 1 N.m (98 ± 8 in-lb) |
| Timing belt tensioner adjuster bolt | | 23 ± 3 N.m (17 ± 2 ft-lb) |
| Timing belt tensioner arm bolt | | 21 ± 4 N.m (16 ± 2 ft-lb) |
| Timing belt tensioner pulley bolt | | 48 ± 5 N.m (36 ± 3 ft-lb) |
| Timing belt upper cover bolt (bolt, flange) | M6 | 11 ± 1 N.m (98 ± 8 in-lb) |
| | M8 | 14 ± 1 N.m (120 ± 13 in-lb) |
| Water pump pulley bolt | | 8.8 ± 1.0 N.m (78 ± 9 in-lb) |

## SERVICE SPECIFICATIONS

| ITEM | | STANDARD VALUE | LIMIT |
|---|---|---|---|
| Drive belt tension | Vibration frequency Hz (Reference) | 120 – 154 | – |
| | Tension N (Reference) | 340 – 555 | – |
| Valve clearance (at hot) mm | Intake valve | 0.20 | – |
| | Exhaust valve | 0.30 | – |
| Actual ignition timing at idle | | Approximately 10° BTDC | – |
| Basic ignition timing at idle | | 5°BTDC ± 3° | – |
| CO content % | | 0.5 or less | – |
| HC contents ppm | | 100 or less | – |
| Curb idle speed r/min | | 700 ± 100 | – |
| Compression pressure (200 r/min) kPa (psi) | | 1,560 (226) | Minimum 1,130 (164) |
| Intake manifold vacuum at curb idle kPa (in Hg) | | – | Minimum 60 (18) |
| Cylinder head bolt nominal length mm (in) | | – | 99.4 (3.91) |
| Balancer timing belt tension (When adjusted) | Deflection mm (in) | 5 – 7 (0.20 – 0.27) | – |
| Balancer timing belt tension (When replaced) | Deflection mm (in) | 5 – 7 (0.20 – 0.27) | – |
| Balancer timing belt tension (When checked) | Deflection mm (in) | 5 – 10 (0.20 – 0.39) | – |
| Timing belt tensioner adjuster rod protrusion amount mm (in) | | 3.8 – 4.5 (0.15 – 0.17) | – |
| Timing belt tensioner adjuster rod movement mm (in) | | Within 1 (0.039) | – |

G02479930

**Fig. 136: Service Specifications Chart**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**

## SEALANTS

| ITEM | SPECIFIED SEALANT |
|---|---|
| Camshaft position sensor support | 3M™ AAD Part No.8672, 3M™ AAD Part No.8679/8678 or equivalent |
| Engine oil pressure switch | |
| Engine oil pan <FWD> | 3M™ AAD Part No.8672, 8704, 3M™ AAD Part No.8679/8678 or equivalent |
| Engine upper oil <AWD> | |
| Engine lower oil pan <AWD> | |

G02479931

**Fig. 137: Sealants Specifications Chart**
**Courtesy of MITSUBISHI MOTOR SALES OF AMERICA.**