

# ENGINE <6G7>

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## ENGINE <6G7>

### GENERAL

#### OUTLINE OF CHANGES

- A 6G74-SOHC 24-valve engine has been added. To correspond to this, maintenance service procedures are given below.
- The ignition timing adjustment connector for a 6G72-SOHC 24-valve engine has been abolished. To correspond to this, maintenance service procedures are given below.

### SPECIFICATIONS

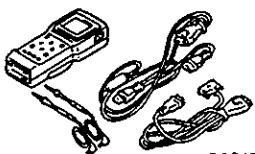
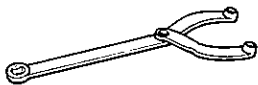
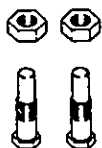

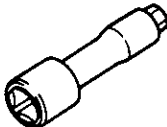


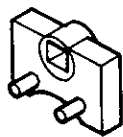
#### GENERAL SPECIFICATIONS <6G74-SOHC 24 Valve Engine>

Items			6G74-SOHC 24 Valve Engine
Total displacement m ℓ			3,497
Bore × Stroke mm			93.0 × 85.8
Compression ratio			9.0
Combustion chamber			Compact type
Camshaft arrangement			SOHC
Number of valve	Intake		12
	Exhaust		12
Valve timing	Intake	Opening	BTDC 13°
		Closing	ABDC 55°
	Exhaust	Opening	BBDC 51°
		Closing	ATDC 17°
Fuel system			Electronically controlled multipoint fuel injection
Rocker arm			Roller type
Lash adjuster			Equipped

## SERVICE SPECIFICATIONS

Items			Standard value	Limit
Alternator drive belt tension	Tension N	When checked	392 – 588	–
		When a used belt is installed	637 – 833	–
		When a new belt is installed	441 – 539	–
	Deflection <Reference value> mm	When checked A	5.0 – 7.0	–
		When checked B	7.5 – 9.5	–
		When a used belt is installed A	5.5 – 6.5	–
		When a used belt is installed B	8.0 – 9.0	–
		When a new belt is installed A	4.0 – 5.0	–
		When a new belt is installed B	5.5 – 7.5	–
Power steering pump drive belt tension	Tension N	When checked	294 – 490	–
		When a used belt is installed	343 – 441	–
		When a new belt is installed	490 – 686	–
	Deflection <Reference value> mm	When checked	13.8 – 17.8	–
		When a used belt is installed	14.8 – 16.8	–
		When a new belt is installed	10.7 – 13.7	–
A/C compressor drive belt tension	Deflection mm	When checked	6.5 – 7.5	–
		When a used belt is installed	6.5 – 7.5	–
		When a new belt is installed	5.0 – 6.0	–
Basic ignition timing			5° BTDC ± 3°	–
Ignition timing			Approx. 15° BTDC	–
Idle speed r/min			700 ± 100	–
CO contents %			0.5 or less	–
HC contents ppm			100 or less	–
Compression pressure (250 – 400 r/min) kPa			1180	Min. 870
Compression pressure difference of all cylinder kPa			–	Max. 98
Intake manifold vacuum kPa			–	Min. 60
Amount of projection of auto tensioner rod mm (Distance between the tensioner arm and auto tensioner body)			3.8 – 5.0	–
Auto tensioner push rod movement mm			1 or less	–

## SPECIAL TOOLS

Tool	Number	Name	Use
 8991502	MB991502	MUT-II sub assembly	Engine idle speed check Erasing diagnosis code
	MB990767	End yoke holder	Supporting the sprocket and shaft pulley during removal and installation Use with MD998715
	MD998715	Pulley holding pins	Supporting the crankshaft pulley when crankshaft bolt and pulley are removed or reinstalled. Use together with MB990767 Camshaft pulley supporting
	MD998769	Crankshaft sprocket spacer	Used if the crankshaft needs to be rotated to attach the timing belt, etc.
	MD998051	Wrench, cylinder head bolt	Loosening and tightening of cylinder head bolt
	MD998713	Camshaft oil seal installer	Camshaft oil seal installation
	MB991559	Camshaft oil seal installer	Press fitting the camshaft oil seal (For left bank)
	MD998767	Tension pulley socket wrench	Adjustment of the timing belt

## SERVICE ADJUSTMENT PROCEDURES

### DRIVE BELTS TENSION INSPECTION AND ADJUSTMENT

The inspection procedures are the same as before.

**Standard value:**

Item		Check value	Adjustment value (used belt)	Adjustment value (new belt)
For alternator	Tension N	392 – 588	637 – 833	441 – 539
	Deflection <Reference value> mm	A: 5.0 – 7.0	A: 5.5 – 6.5	A: 4.0 – 5.0
		B: 7.5 – 9.5	B: 8.0 – 9.0	B: 5.5 – 7.5
For power steering	Tension N	294 - 490	343 – 441	490 – 686
	Deflection <Reference value> mm	13.8 – 17.8	14.8 – 16.8	10.7 – 13.7
For A/C	Deflection mm	6.5 – 7.5	6.5 – 7.5	5.0 – 6.0

**A: Measure between the water pump pulley and the crankshaft pulley.**

**B: Measure between the water pump pulley and the alternator.**

### IGNITION TIMING INSPECTION

- (1) Perform inspection with the vehicles in the following condition.
  - Engine coolant temperature: 80 – 95°C
  - Lights and all accessories: OFF
  - Transmission: Neutral (P range for vehicles with automatic transmission)
- (2) Connect the MUT-II to the diagnosis connector.
- (3) Set up a timing light.
- (4) Start the engine and run at idle.
- (5) Check that engine idle speed is within the standard value.

**Standard value: 700 ± 100 r/min**

- (6) Select No.17 of the MUT-II Actuator test.
- (7) Check that basic ignition timing is within the standard value.

**Standard value: 5° BTDC ± 3°**

- (8) If the basic ignition timing is outside the standard value, inspect the MPI system while referring to GROUP 13A – Troubleshooting.
- (9) Press the MUT-II clear key (Select a forced driving cancel mode) to release the Actuator test.

**Caution**

**If the test is not cancelled, a forced driving will continue for 27 minutes. Driving under this condition may damage the engine.**

- (10) Check that ignition timing is at the standard value.

**Standard value: approx. 15° BTDC**

**NOTE**

- ① Ignition timing is variable within about  $\pm 7^\circ$ , even under normal operating.
- ② And it is automatically further advanced by about  $5^\circ$  from standard value at higher altitudes.

**IDLE SPEED INSPECTION**

- (1) Perform inspection with the vehicles in the following condition.
  - Engine coolant temperature: 80 – 95°C
  - Lights and all accessories: OFF
  - Transmission: Neutral (P range for vehicles with automatic transmission)
- (2) Turn the ignition switch to OFF and connect the MUT-II to the diagnosis connector.
- (3) Check the basic ignition timing. Adjust if necessary.
- (4) Run the engine at idle for 2 minutes.
- (5) Check the idle speed. Select item No.22 and take a reading of the idle speed.

**Curb idle speed: 700  $\pm$  100 r/min**

**NOTE**

The idle speed is controlled automatically by the idle speed control (ISC) system.

- (6) If the idle speed is outside the standard value, check the MPI components by referring to GROUP 13A – Troubleshooting.

**IDLE MIXTURE INSPECTION**

- (1) Perform inspection with the vehicles in the following condition.
  - Engine coolant temperature: 80 – 95°C
  - Lights and all accessories: OFF
  - Transmission: Neutral (P range for vehicles with automatic transmission)
- (2) Turn the ignition switch to OFF and connect the MUT-II to the diagnosis connector.
- (3) Check that the basic ignition timing is within the standard value.

**Standard value: 5° BTDC  $\pm$  3°**

- (4) Run the engine at 2,500 r/min for 2 minutes.
- (5) Set the CO, HC tester.
- (6) Check the CO contents and the HC contents at idle.

**Standard value**

**CO contents: 0.5% or less**

**HC contents: 100 ppm or less**

- (7) If there is a deviation from the standard value, check the following items:
  - Diagnosis output
  - Closed-loop control (When the closed-loop control is normal, the output signal of the oxygen sensor changes between 0 – 400 mV and 600 – 1,000 mV at idle.)
  - Fuel pressure
  - Injector
  - Ignition coil, spark plug cable, spark plug
  - Leak in the EGR system and in the EGR valve
  - Evaporative emission control system
  - Compression pressure

**NOTE**

Replace the three way catalyst when the CO and HC contents are not within the standard value, even though the result of the inspection is normal on all items.

**COMPRESSION PRESSURE INSPECTION  
<6G74-SOHC 24 Valve Engine>**

The inspection procedures are the same as 6G72-SOHC 24-valve engine.

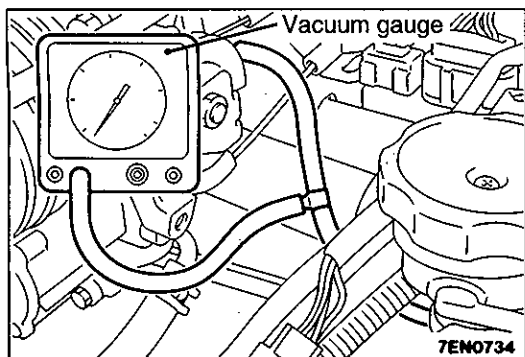
**Standard value**

**Compression pressure: 1,180 kPa**

**Limit**

**Compression pressure: 870 kPa**

**Compression pressure difference between each cylinder: max. 98 kPa**

**MANIFOLD VACUUM INSPECTION**

- (1) Perform inspection with the vehicle in the following condition.
  - Engine coolant temperature: 80 – 95°C
  - Lights and all accessories: OFF
  - Transmission: Neutral (P range for vehicles with an automatic transmission)
- (2) Install a tachometer or connect the MUT-II to the diagnosis connector.
- (3) Attach a three-way union to the vacuum hose between the fuel pressure regulator and the air intake plenum, and connect a vacuum gauge.
- (4) Start the engine and check that idle speed is within the standard value.

**Standard value: 700 ± 100 r/min**

- (5) Check the manifold vacuum.

**Limit: Min. 60 kPa**



**LASH ADJUSTER INSPECTION**

If an abnormal noise (knocking) that seems to be coming from the lash adjuster is heard after starting the engine and does not stop, carry out the following check.

**NOTE**

- ① The abnormal noise which is caused by a problem with the lash adjusters is generated after the engine is started, and will vary according to the engine speed. However, this noise is not related to the actual engine load.

Because of this, if the noise does not occur immediately after the engine is started, if it does not change in accordance with the engine speed, or if it changes in accordance with the engine load, the source of the noise is not the lash adjusters.

- ② If there is a problem with the lash adjusters, the noise will almost never disappear, even if the engine has been run at idle to let it warm up.

The only case where the noise might disappear is if the oil in the engine has not been looked after properly and oil sludge has caused the lash adjusters to stick.

- (1) Start the engine.  
(2) Check that the noise occurs immediately after the engine is started, and that the noise changes in accordance with changes in the engine speed.

If the noise does not occur immediately after the engine is started, or if it does not change in accordance with the engine speed, the problem is not being caused by the lash adjusters, so check for some other cause of the problem. Moreover, if the noise does not change in accordance with the engine speed, the cause of the problem is probably not with the engine. (In these cases the lash adjusters are normal.)

- (3) While the engine is idling, check that the noise level does not change when the engine load is varied (for example by shifting from N → D).

If the noise level changes, the cause of the noise is probably parts striking because of worn crankshaft bearings or connecting rod bearings. (In such cases, the lash adjusters are normal.)

- (4) After the engine has warmed up, run it at idle and check if any noise can be heard.

If the noise has become smaller or has disappeared the cause of the noise was probably that oil sludge had caused the lash adjusters to become stuck. If this happens, carry out the following check. If the noise level does not change, go to step 5.

- ① Let the engine cool down sufficiently.  
② Turn the crankshaft two full revolutions.

- ③ Carry out lash adjuster simple check.
- If any of the rocker arms can be pushed down easily during the lash adjuster simple check, replace the corresponding lash adjusters.
  - If the lash adjuster simple check has been carried out but all lash adjusters are normal (if none of the rocker arms could be pushed down easily), check for some other cause of the problem.

**NOTE**

You can check whether the lash adjusters are normal or not by carrying out a leak-down test. (Refer to the Engine Workshop Manual.)

**Caution**

**Make sure that the air has been fully bled before installation of a new lash adjuster. (Refer to the Engine Workshop Manual.)**

- (5) Bleed the air from the lash adjusters.
- (6) If the noise does not disappear even after the air has been bled from the lash adjusters, carry out the following check.

Carry out lash adjuster simple check.

- If one of the rocker arms can be pushed down easily during the lash adjuster simple check, replace the corresponding lash adjuster.
- If two or more of the rocker arms can be pushed down easily during the lash adjuster simple check, the cause may be that the oil passage to the cylinder head is blocked.

Check for blockages in the oil passage, and clear the blockages if any are found. If there are no blockages, replace the lash adjusters.

- If the lash adjuster simple check has been carried out but all lash adjusters are normal (if none of the rocker arms could be pushed down easily), check for some other cause of the problem.

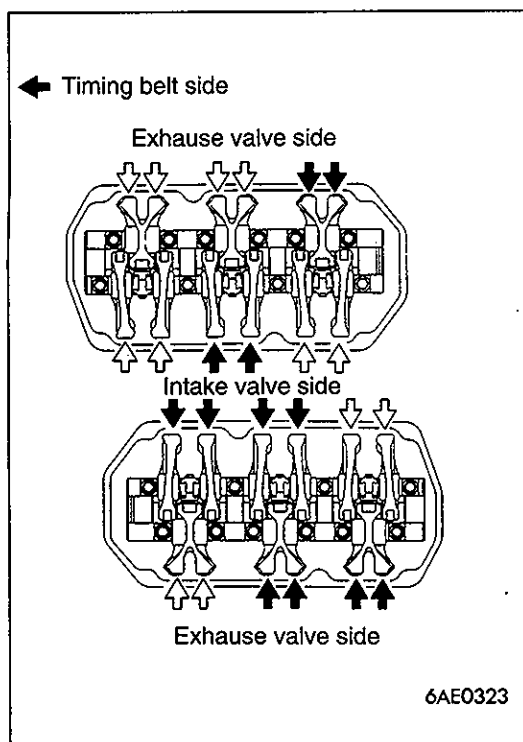
**NOTE**

You can check whether the lash adjusters are normal or not by carrying out a leak-down test. (Refer to the Engine Workshop Manual.)

**Caution**

**Make sure that the air has been fully bled before installation of a new lash adjuster. (Refer to the Engine Workshop Manual.)**

- (7) Start the engine and check that the abnormal noise has disappeared. If necessary, bleed the air from the lash adjusters.

**<LASH ADJUSTER SIMPLE CHECK>**

- (1) Stop the engine.
- (2) Remove the rocker cover.
- (3) Set the No.1 cylinder to the compression top dead centre position.
- (4) Check the rocker arms indicated by white arrows in the illustration by the procedures given below.

**<Checking an intake-side rocker arm>**

Check whether the rocker arm moves downwards when the part of the rocker arm which touches the top of the lash adjuster is pushed.

- If the rocker arm moves down easily when it is pushed, make a note of which is the corresponding lash adjuster.
- If the rocker arm feels extremely stiff when it is pushed and does not move down, the lash adjuster is normal, so check for some other cause of the problem.

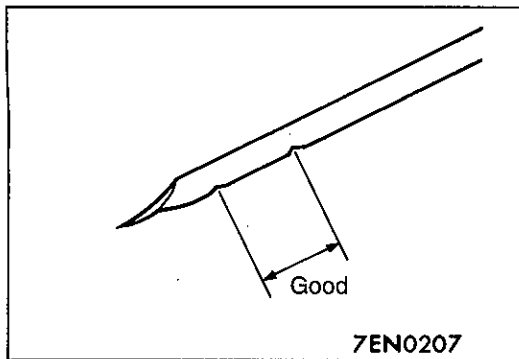
**<Checking an exhaust-side rocker arm>****NOTE**

It will not be possible to depress the Y-shaped rocker arm at the exhaust valve side if one lash adjuster is defective but the other one is normal. In such cases, carry out the following procedure using a thickness gauge.

- ① Check that a thickness gauge with a thickness of 0.1 – 0.2 mm can be inserted easily between the valve and the lash adjuster.
  - ② If the thickness gauge can be inserted easily, make a note of which is the corresponding lash adjuster.
  - ③ If the thickness gauge cannot be inserted easily, the lash adjuster is normal, so check for some other cause of the problem.
- (5) Slowly turn the crankshaft 360° in the clockwise direction.
  - (6) Check the rocker arms indicated by black arrows in the illustration in the same way as explained in step 4.

**<LASH ADJUSTER AIR BLEEDING>****NOTE**

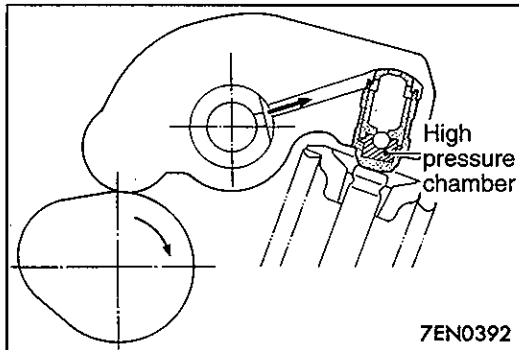
- ① If the vehicle is parked on a slope for a long period of time, the amount of oil inside the lash adjuster will decrease, and air may get into the high pressure chamber when starting the engine.
- ② After parking the vehicle for long periods, the oil drains out of the oil passage, and it takes time for the oil to be supplied to the lash adjuster, so air can get into the high pressure chamber.
- ③ If either of the above situations occur, the abnormal noise can be eliminated by bleeding the air from inside the lash adjusters.



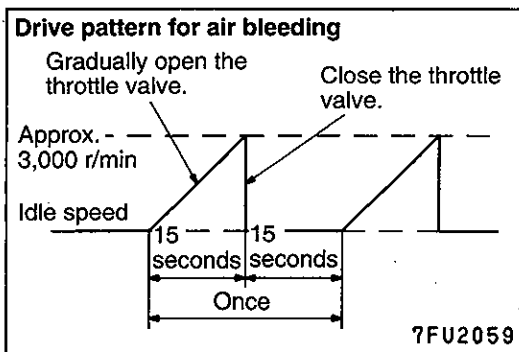
- (1) Check the engine oil and replenish or replace the oil if necessary.

## NOTE

- ① If there is a only small amount of oil, air will be drawn in through the oil screen and will get into the oil passage.
- ② If the amount of oil is greater than normal, then the oil will being mixed by the crankshaft and a large amount of air may get mixed into the oil.
- ③ If the oil is degenerated, air and oil will not separate easily in oil, and the amount of air mixed into the oil will increase.



- ④ If the air which has been mixed in with the oil due to any of the above reasons gets into the high pressure chamber of the lash adjuster, the air inside the high pressure chamber will be compressed when the valve is open and the lash adjuster will over-compress, resulting in abnormal noise when the valve closes. This is the same effect as if the valve clearance is adjusted to be too large by mistake. If the air inside the lash adjusters is then released, the operation of the lash adjusters will return to normal.

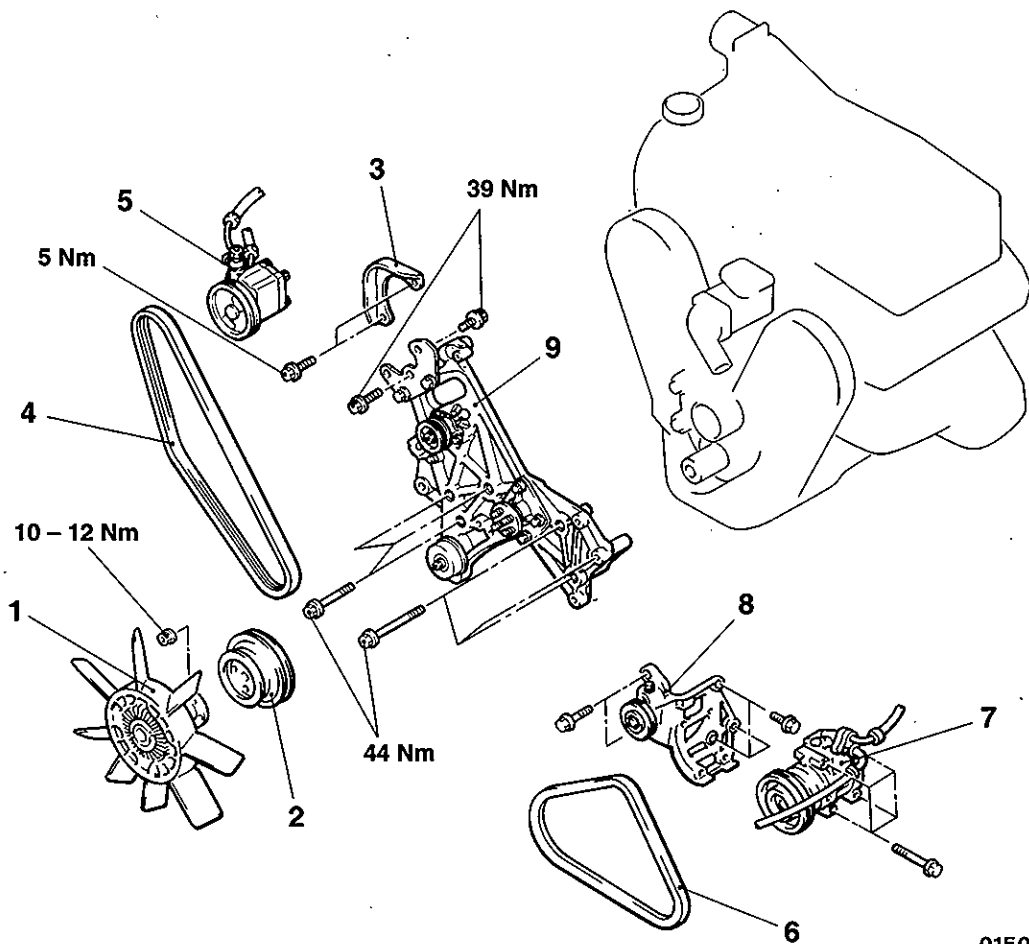


- (2) Run the engine at idle for 1 – 3 minutes to let it warm up.
- (3) With no load on the engine, repeat the drive pattern shown in the illustration at left and check if the abnormal noise disappears. (The noise should normally disappear after 10 – 30 repetitions, but if there is no change in the noise level after 30 repetitions or more, the problem is probably not due to air inside the lash adjusters.)
- (4) After the noise has disappeared, repeat the drive pattern shown in the illustration at left a further 5 times.
- (5) Run the engine at idle for 1 – 3 minutes and check that the noise has disappeared.

## REMOVAL AND INSTALLATION

- Under skid plate, Under cover removal
- Battery, battery tray removal
- Radiator shroud removal
- Engine coolant draining

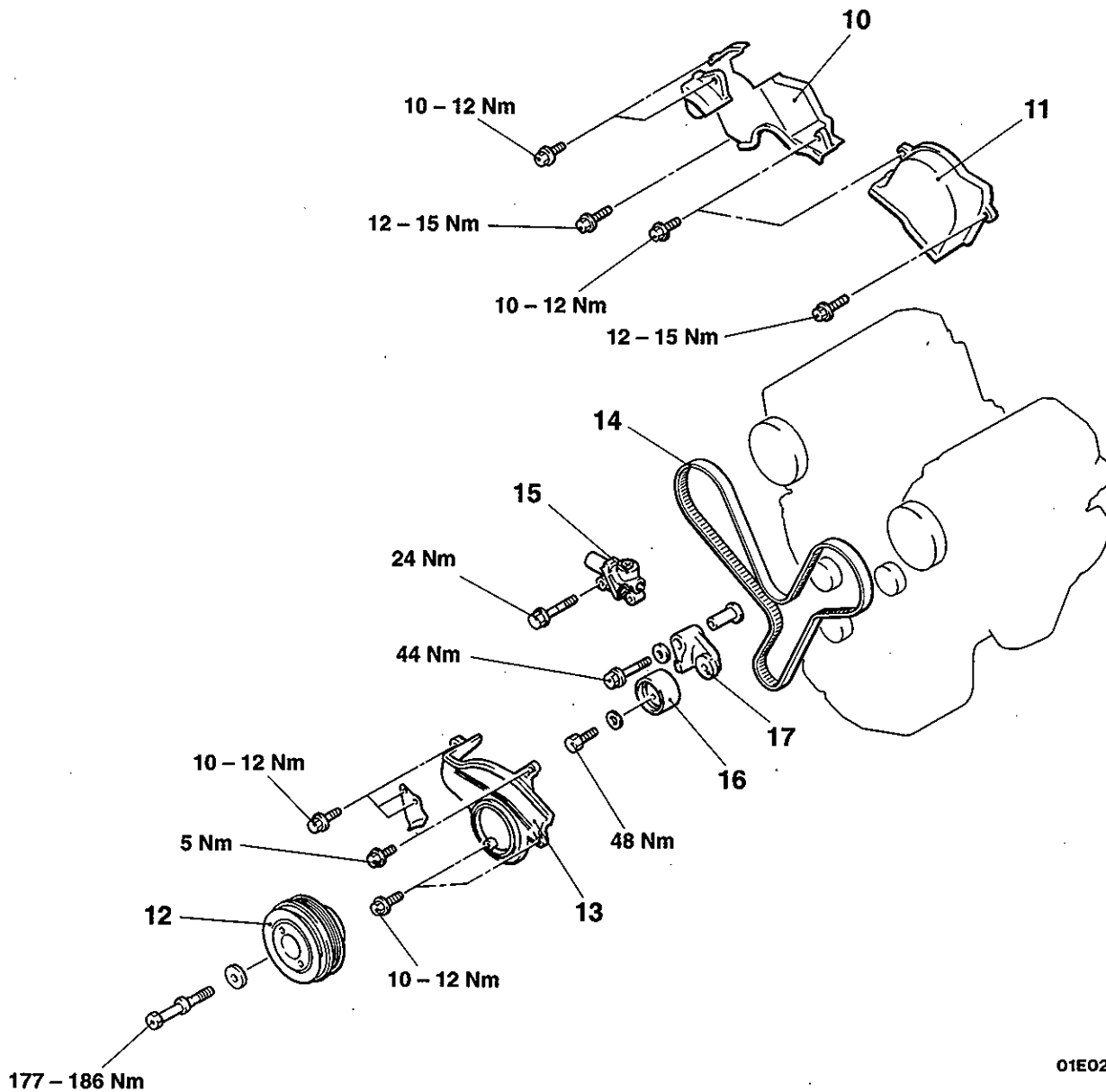
- Battery, battery tray installation
- Under skid plate, under cover installation
- Drive belts tension adjustment
- Radiator shroud installation
- Engine coolant refilling



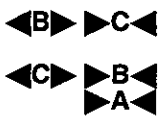
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1. Cooling fan clutch assembly
2. Cooling fan pulley
3. Cover
4. Power steering oil pump drive belt
5. Power steering oil pump assembly
- Alternator

6. A/C compressor drive belt
7. A/C compressor assembly
8. Compressor bracket
9. Accessory mount assembly



- 10. Timing belt upper cover (LH)
- 11. Timing belt upper cover (RH)
- 12. Crankshaft pulley
- 13. Timing belt lower cover
- 14. Timing belt
- 15. Auto tensioner
- 16. Tensioner pulley
- 17. Tensioner arm assembly



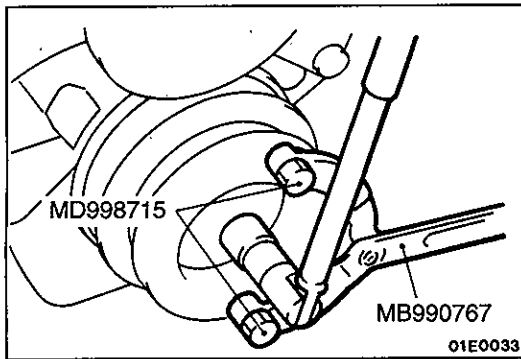
## REMOVAL SERVICE POINTS

### ◀A▶ POWER STEERING OIL PUMP ASSEMBLY / A/C COMPRESSOR ASSEMBLY REMOVAL

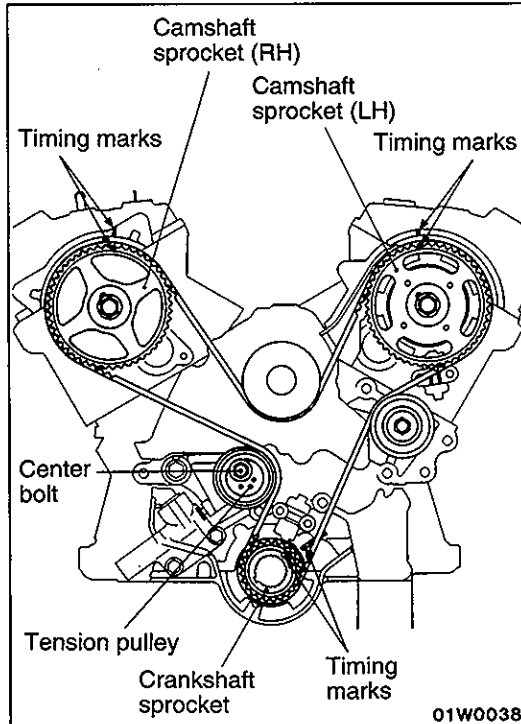
Remove the oil pump and air conditioning compressor (with the hose attached).

#### NOTE

Suspend the removed oil pump (by using wire or similar material) at a place where no damage will be caused during removal/installation of the engine assembly.



## ◀B▶ CRANKSHAFT PULLEY REMOVAL

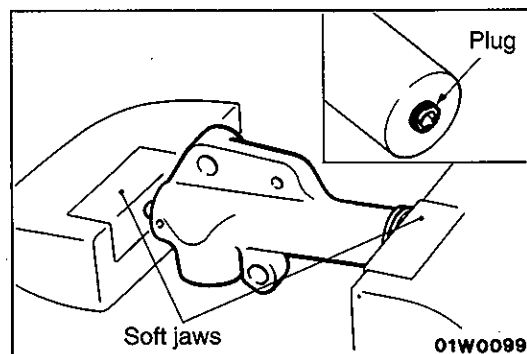


## ◀C▶ TIMING BELT REMOVAL

- (1) Align the timing marks.
- (2) Loosen the center bolt on the tension pulley to remove the timing belt.

### Caution

Make a mark on the back of the timing belt, indicating the direction of rotation, so it may be reassembled in the same direction, if it is to be reused.



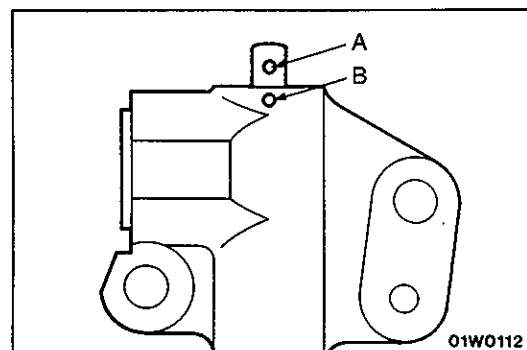
## INSTALLATION SERVICE POINTS

### ▶A◀ AUTO TENSIONER INSTALLATION

- (1) If the auto tensioner rod is in its fully extended position, reset it as follows.
  - 1) Keep the auto tensioner level and, in that position, clamp it in the vise with soft jaws.
  - 2) Push in the rod little by little with the vise until the set hole A in the rod is aligned with that B in the cylinder.

### Caution

1. The auto tensioner must be placed at a right angle to the pressing surface of press or vise.
2. Push in the rod slowly to prevent the push rod from being damaged.



- 3) Insert a wire [1.4 mm in diameter] into the set holes.

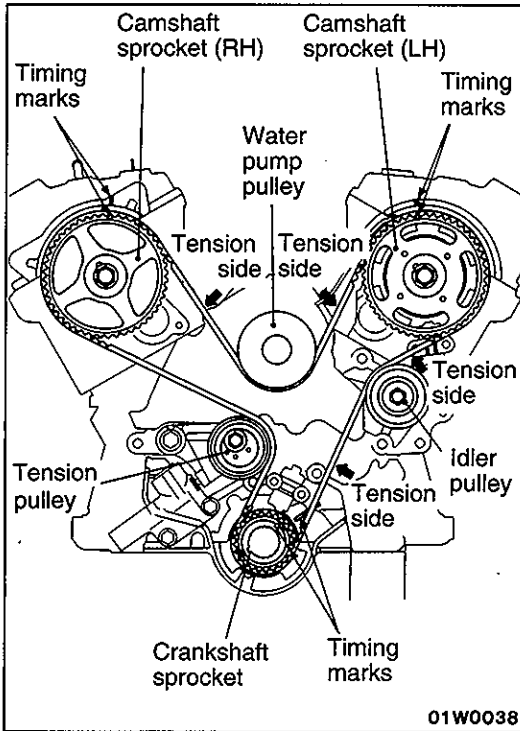
**NOTE**

The wire should be as stiff as possible (such as piano wire, etc.), and should be bent into the shape of an "L".

- 4) Unclamp the auto tensioner from the vise.  
(2) Install the auto tensioner.

**Caution**

Leave the wire installed in the auto tensioner.



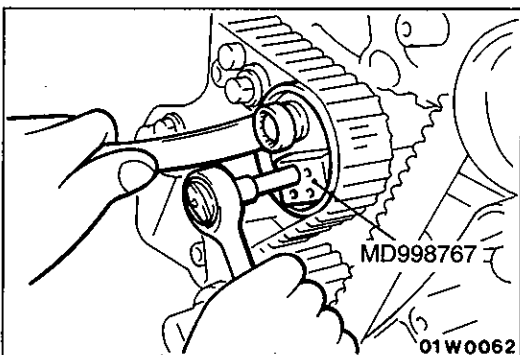
**►B◄ TIMING BELT INSTALLATION**

- (1) Align the timing marks of the camshaft sprockets and crankshaft sprocket.  
(2) Install the timing belt by the following procedure so that there is no deflection in the timing belt between each sprocket and pulley.
1. Crankshaft sprocket
  2. Idler pulley
  3. Camshaft sprocket (left side)
  4. Water pump pulley
  5. Camshaft sprocket (right side)
  6. Tension pulley

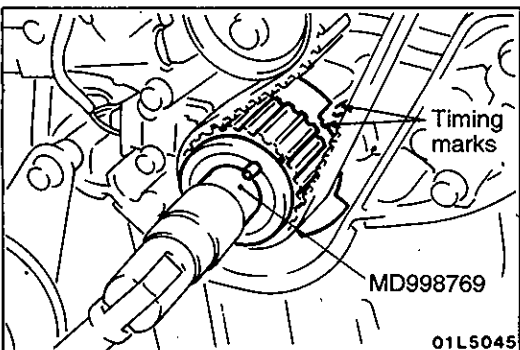
**Caution**

The camshaft sprocket (right side) can turn easily due to the spring force applied, so be careful not to get your fingers caught.

- (3) Turn the camshaft sprocket (right side) counterclockwise until the tension side of the timing belt is firmly stretched, and then check again that all timing marks are aligned.

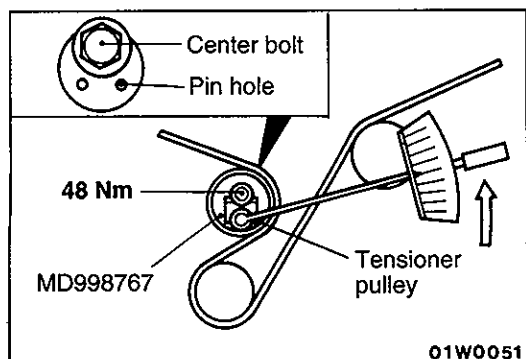


- (4) Use the special tool to push the tension pulley into the timing belt, and then temporarily tighten the center bolt.



- (5) Use the special tool to turn the crankshaft 1/4 of a turn counterclockwise and then turn it again clockwise until the timing marks are aligned.





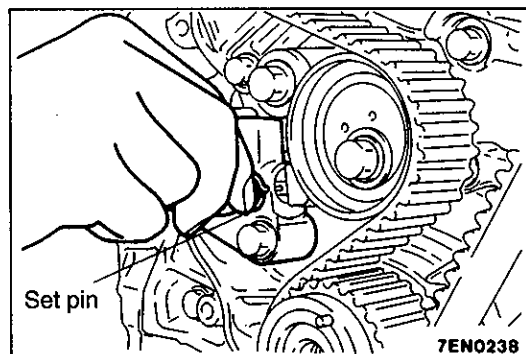
- (6) Loosen the center bolt on the tensioner pulley. Using the special tool and torque wrench, apply tensioning torque to the timing belt and, at the same time, tighten the center bolt to specification.

**Reference value:**

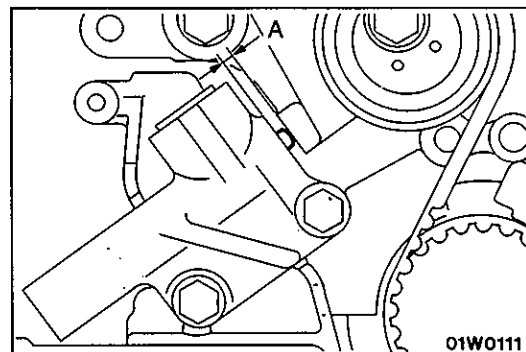
**4.4 Nm (Timing belt tensioning torque)**

**Caution**

**When tightening the center bolt, make sure that the tensioner pulley is not rotated together.**



- (7) Remove the setting pin that has been inserted into the auto tensioner.  
(8) Turn the crankshaft two turns clockwise to align the timing marks.

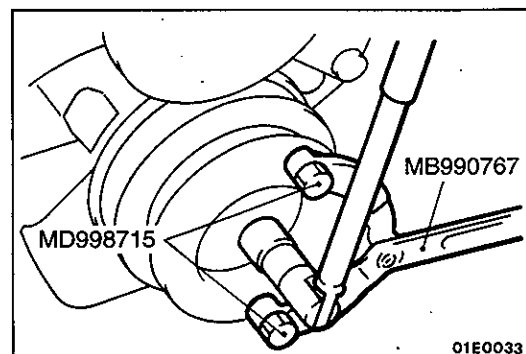


- (9) Leave everything in this condition for five minutes or more, and then check that the protrusion of the auto tensioner push rod is within the range of the standard value.

**Standard value (A): 3.8 to 5.0 mm**

- (10) If the protrusion is out of specification, repeat steps (5) to (9).  
(11) Check again that timing marks on all sprockets are aligned properly.

**►C◄ CRANKSHAFT PULLEY INSTALLATION**



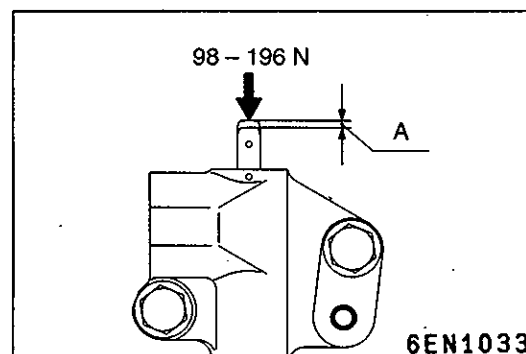
**INSPECTION**

**AUTO TENSIONER**

- (1) Hold the auto tensioner by hand and measure contraction (A) when pressing the tip of the rod on a steel (cylinder block; etc.) with a force of 98 – 196 N.

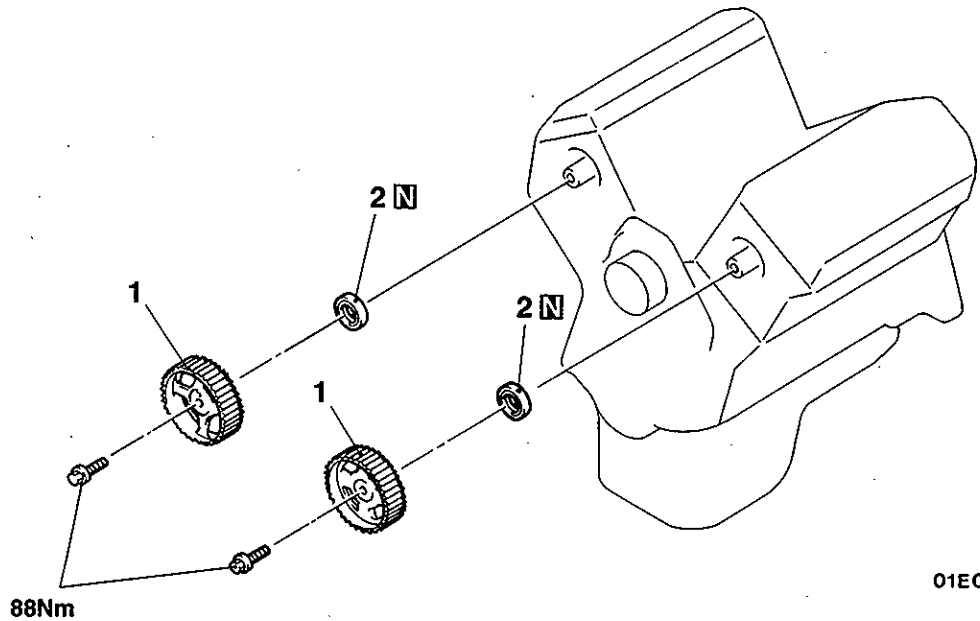
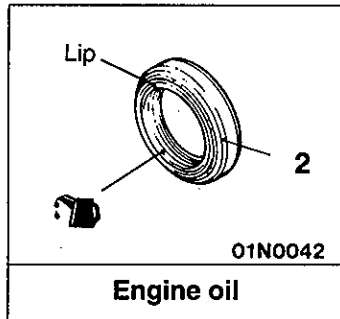
**Standard value (A): 1 mm or less**

- (2) If not within the standard value, replace the auto tensioner.



**CAMSHAFT OIL SEAL <6G74-SOHC>****REMOVAL AND INSTALLATION****Pre-removal and Post-installation operation**

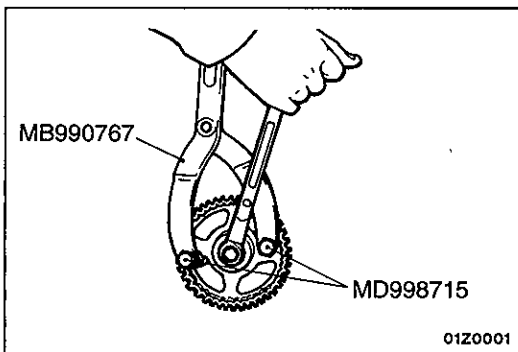
- Timing Belt Removal and Installation  
(Refer to P.11-13.)



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**Removal steps**

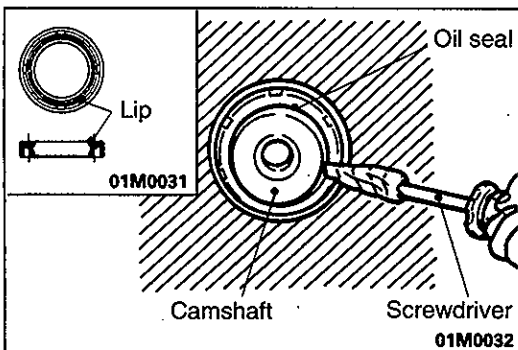
1. Camshaft sprocket
2. Camshaft oil seals

**REMOVAL SERVICE POINTS****◀A▶ CAMSHAFT SPROCKET REMOVAL****◀B▶ CAMSHAFT OIL SEAL REMOVAL**

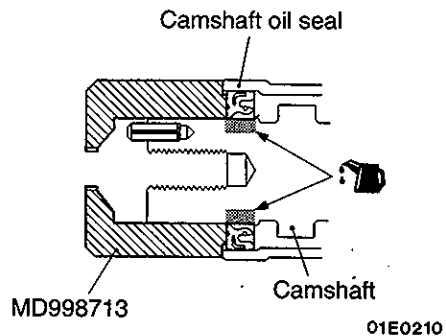
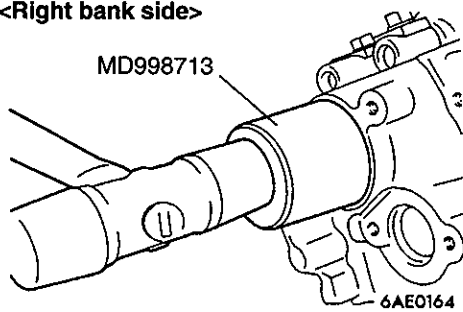
- (1) Cut out a portion in the camshaft oil seal lip.
- (2) Cover the tip of a screwdriver with a cloth and apply it to the cutout in the oil seal to pry off the oil seal.

**Caution**

Use care not to damage the camshaft and cylinder head.



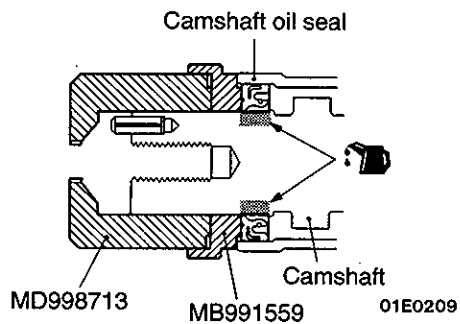
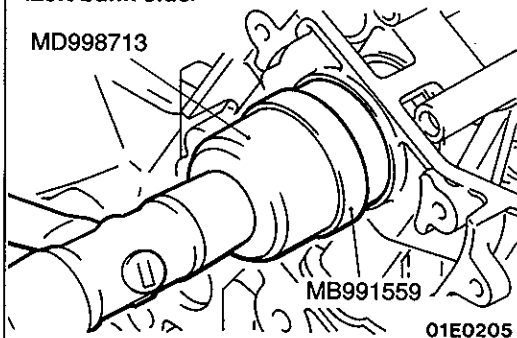
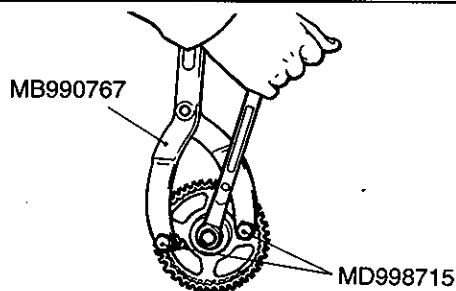
&lt;Right bank side&gt;

**INSTALLATION SERVICE POINTS****►A◄ CAMSHAFT OIL SEAL INSTALLATION**

Coat engine oil on the whole circumference of the oil seal lip section.

Using the special tool, install the camshaft oil seal.

&lt;Left bank side&gt;

**►B◄ CAMSHAFT SPROCKET INSTALLATION**

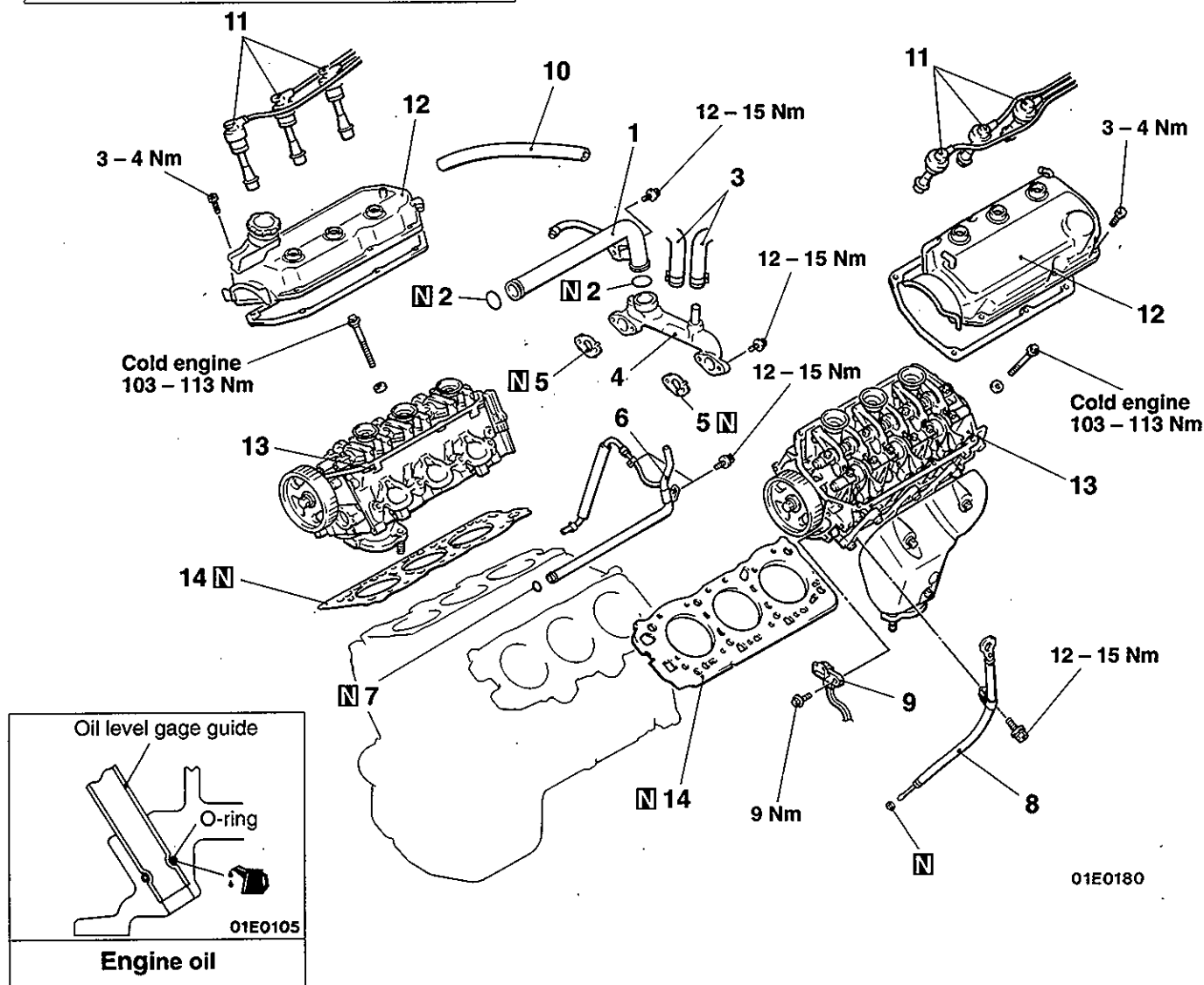
01Z0001

## CYLINDER HEAD GASKET &lt;6G74-SOHC&gt;

## REMOVAL AND INSTALLATION

## Pre-removal and Post-installation Operation

- Engine Coolant Draining and Supplying
- Timing Belt Removal and Installation  
(Refer to P.11-13.)
- Intake Manifold Removal and Installation  
(Refer to GROUP 15 – Intake Manifold.)
- Front Exhaust Pipe Removal and Installation



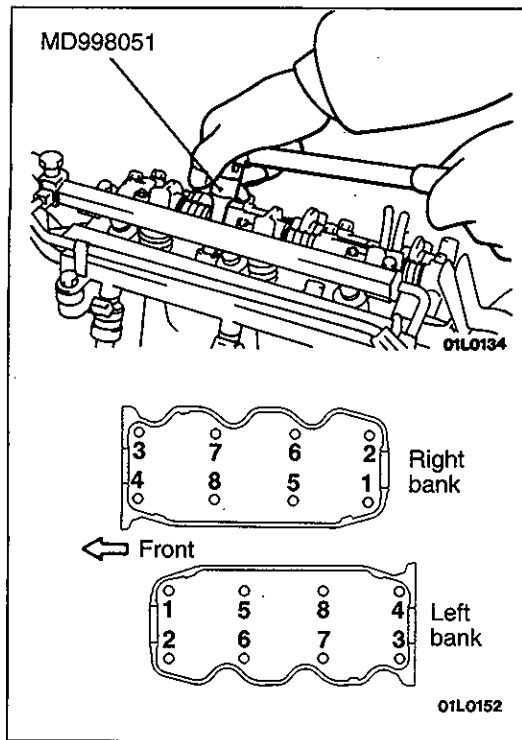
## Removal steps

- C➤ 1. Water outlet pipe  
 ➤D➤ 2. O-ring  
 ➤D➤ 3. Heater hose  
 ➤D➤ 4. Water passage  
 ➤C➤ 5. Gasket  
 ➤C➤ 6. Water pipe and hose assembly  
 ➤C➤ 7. O-ring  
 ➤C➤ 8. Oil level gage guide  
 <Only left bank is removed>

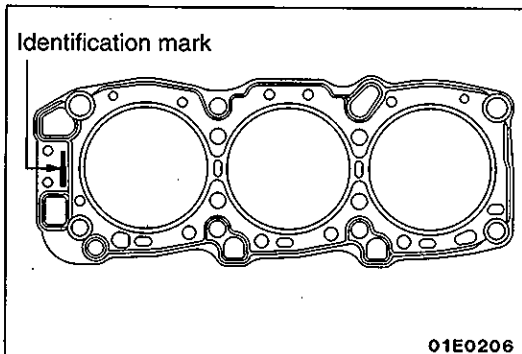
9. Camshaft position sensor  
 <Only left bank is removed>  
 10. Ventilation hose  
 11. Spark plug cable  
 12. Rocker cover  
 13. Cylinder head assembly  
 14. Cylinder head gasket



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**REMOVAL SERVICE POINT****◀A▶ CYLINDER HEAD ASSEMBLY REMOVAL**

Using the special tool, after loosening the bolts (in 2 or 3 cycles), remove the cylinder head assembly.

**INSTALLATION SERVICE POINTS****▶A◀ CYLINDER HEAD GASKET INSTALLATION**

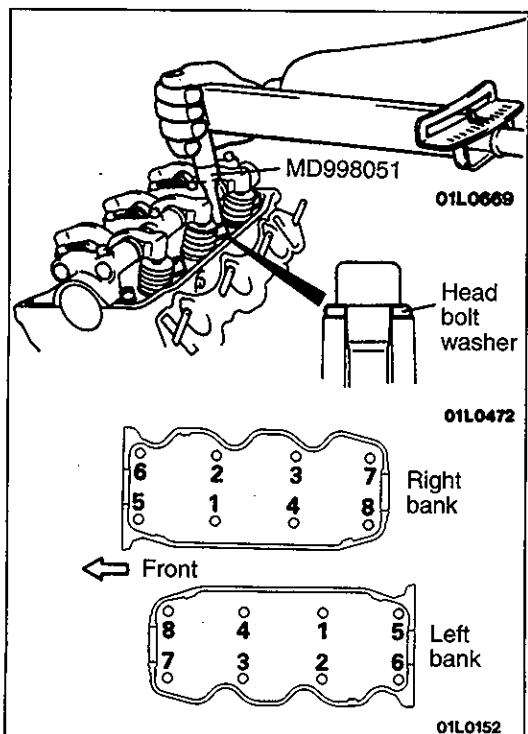
- (1) Degrease the mounting surface of the cylinder head gasket.
- (2) Lay the cylinder head gasket on cylinder block with the identification mark at front top.

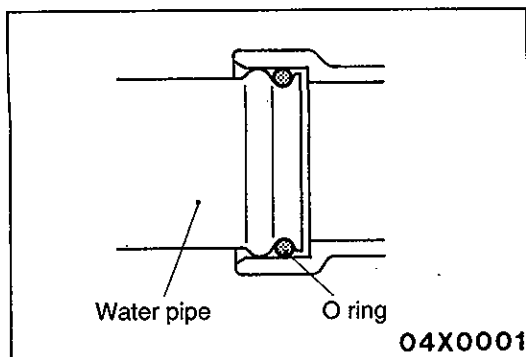
**▶B◀ CYLINDER HEAD ASSEMBLY INSTALLATION**

Using the special tool, tighten the bolts in the order shown in two or three steps.

**Caution**

Attach the head bolt washer in the direction shown in the figure.

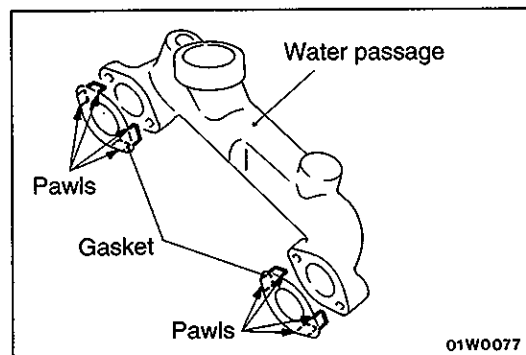


**►C◄ O-RING INSTALLATION**

Rinse the mounting location of the O-ring and water pipe with water, and install the O-ring.

**Caution**

**Do not apply oil and grease to water pipe O-ring.**

**►D◄ GASKET/WATER PASSAGE INSTALLATION**

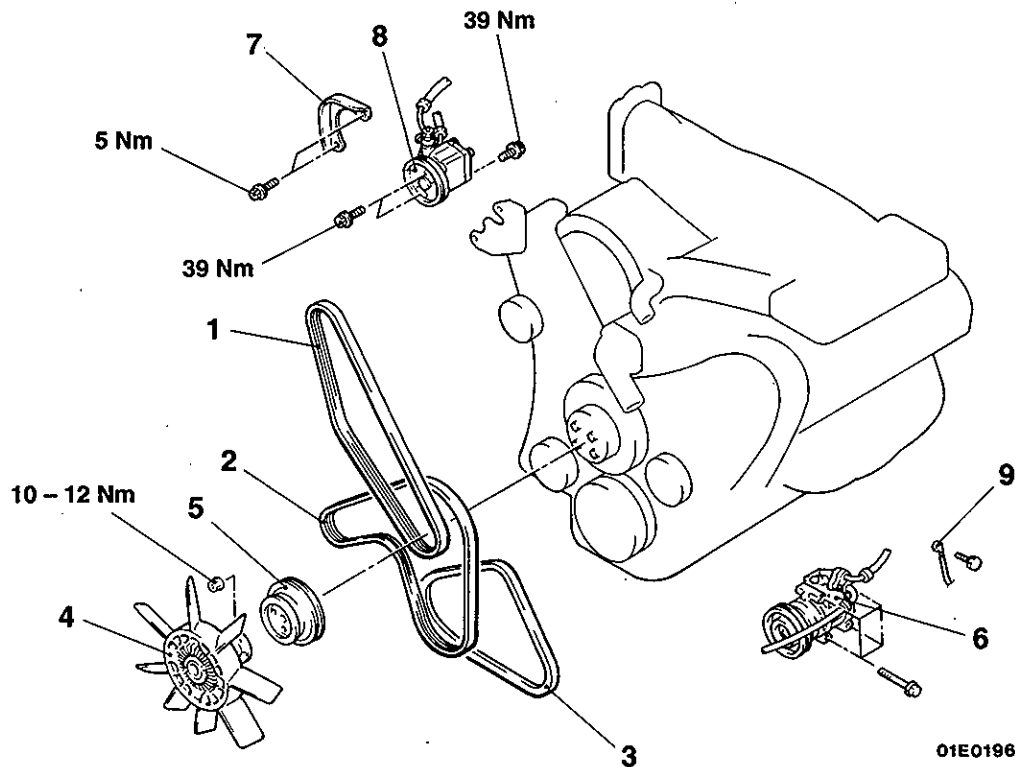
Bend the tabs onto the water passage assembly, and then install the water passage assembly to the cylinder head so that the gasket doesn't slip.

**ENGINE ASSEMBLY <6G74-SOHC>****REMOVAL AND INSTALLATION****Pre-removal Operation**

- Hood Removal
- Battery and Battery Tray Removal
- Auto-cruise Control Intermediate Link Removal
- Radiator Removal
- Under Skid Plate, Under Cover Removal
- Front Exhaust Pipe
- Transmission and Transfer Assembly Removal

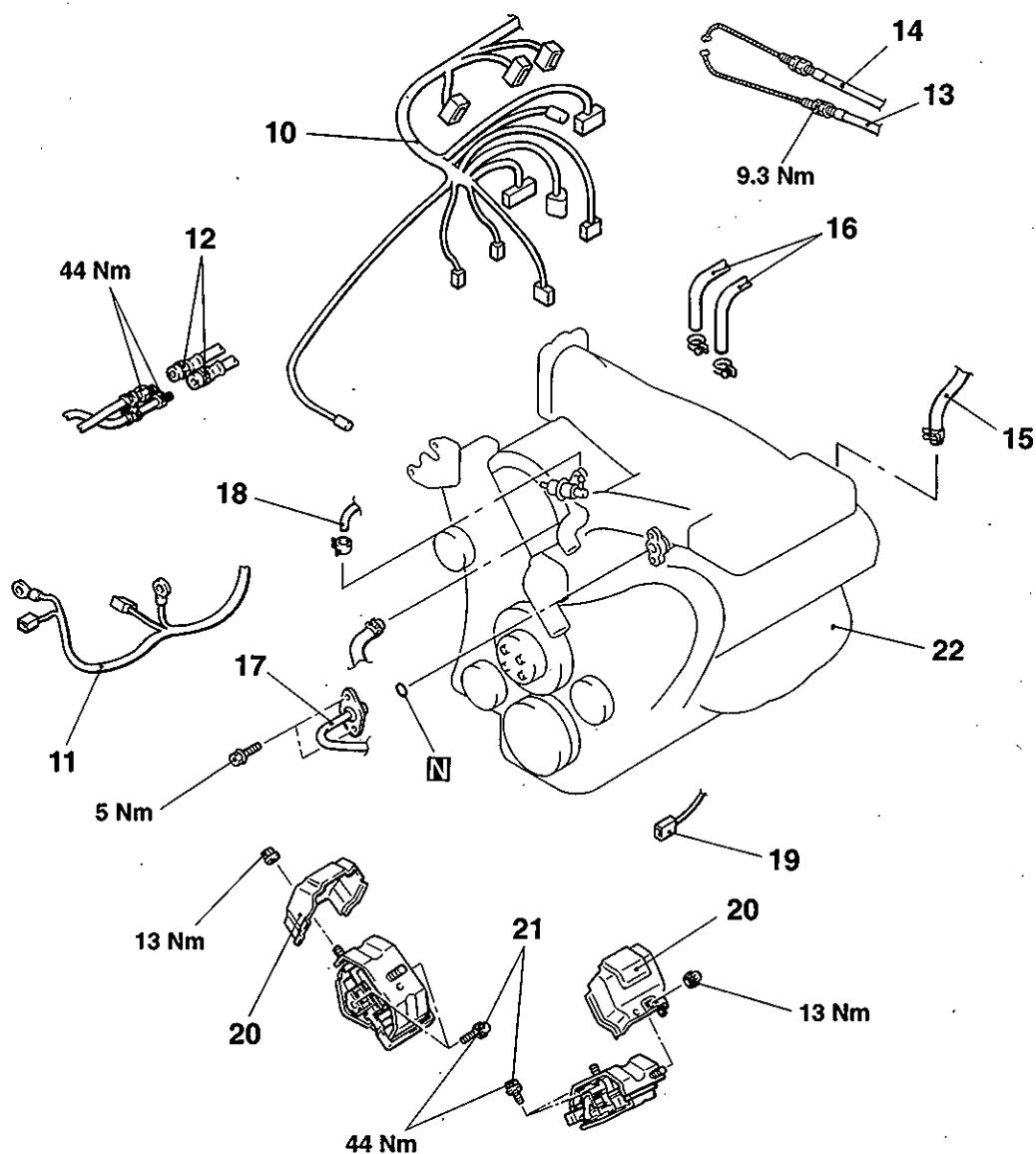
**Post-installation Operation**

- Transmission and Transfer Assembly Installation
- Front Exhaust Pipe Installation
- Under Skid Plate, Under Cover Installation
- Radiator Installation
- Battery and Battery Tray Installation
- Auto-cruise Control Intermediate Link Installation and Adjustment
- Hood Installation
- Engine Adjustment
- Accelerator Cable Adjustment
- Throttle Cable Adjustment
- Engine Oil Supplying and Checking

**Removal steps**

1. Power steering oil pump drive belt
2. Alternator drive belt
3. A/C compressor drive belt
4. Cooling fan and clutch assembly
5. Cooling fan pulley
6. A/C compressor

7. Cover
8. Power steering oil pump
9. Earth cable connection



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10. Engine control harness connection  
 11. Alternator and starter harness connection  
 12. Engine oil cooler hose connection  
 13. Accelerator cable connection  
 14. Throttle cable connection  
 15. Brake booster vacuum hose connection

16. Heater hose connection  
 17. Fuel hose connection  
 18. Fuel return hose connection  
 19. Oil pressure switch harness connection  
 20. Heat protectors  
 21. Engine mounting bolt  
 22. Engine assembly

◀B▶▶B◀

◀C▶▶A◀

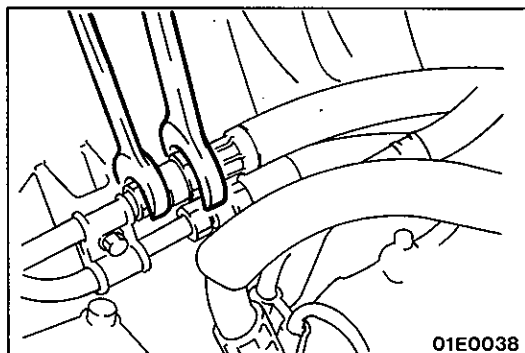


**REMOVAL SERVICE POINTS****◀A▶ POWER STEERING OIL PUMP ASSEMBLY / A/C COMPRESSOR ASSEMBLY REMOVAL**

Remove the oil pump and air conditioning compressor (with the hose attached).

**NOTE**

Suspend the removed oil pump (by using wire or similar material) at a place where no damage will be caused during removal/installation of the engine assembly.

**◀B▶ ENGINE OIL COOLER HOSE DISCONNECTION**

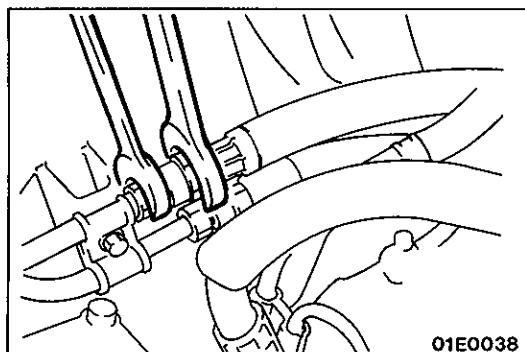
Use a spanner or similar tool to disconnect the oil cooler hose.

**◀C▶ ENGINE ASSEMBLY REMOVAL**

- (1) Check that all cables, hoses, harness connectors, etc. are disconnected from the engine.
- (2) 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. When doing so, check carefully that all pipes and hoses are connected, and that none are twisted, damaged, etc.

**▶B◀ ENGINE OIL COOLER HOSE CONNECTION**

Use a spanner or similar tool to connect the oil cooler hose.

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## NOTES