
ENGINE

CONTENTS

11109000382

ENGINE <4G6>	11A
ENGINE <4D5>	11B

ENGINE <4G6>

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11109000399

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GENERAL INFORMATION

11100010322

Items			4G63	4G64
Total displacement $m\ell$			1,997	2,351
Bore $\times$ Stroke mm			85.0 $\times$ 88.0	86.5 $\times$ 100.0
Compression ratio			9.5	9.5
Combustion chamber			Pentroof type	Pentroof type
Camshaft arrangement			SOHC	SOHC
Number of valve	Intake		8	8
	Exhaust		8	8
Valve timing	Intake	Opening	BTDC 11°	BTDC 18°
		Closing	ABDC 53°	ABDC 58°
	Exhaust	Opening	BBDC 63°	BBDC 58°
		Closing	ATDC 21°	ATDC 18°
Fuel system			Electronic control multipoint fuel injection	Electronic control multipoint fuel injection
Rocker arm			Roller type	Roller type
Auto-lash adjuster			Equipped	Equipped

SERVICE SPECIFICATIONS

11100030342

Items			Standard value	Limit
Alternator 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	7.0 – 9.0	–
		When a used belt is installed	7.5 – 8.5	–
		When a new belt is installed	5.5 – 7.5	–
Power steering oil 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	5.5 – 7.5	–
		When a used belt is installed	6.0 – 7.0	–
		When a new belt is installed	4.0 – 6.0	–

Items			Standard value	Limit
A/C compressor drive belt tension	Tension N	When checked	355 – 445	–
		When a used belt is installed	355 – 445	–
		When a new belt is installed	530 – 620	–
	Deflection (Reference value) mm	When checked	6.0 – 7.0	–
		When a used belt is installed	6.0 – 7.0	–
		When a new belt is installed	4.5 – 5.5	–
Basic ignition timing			5° BTDC±2°	–
Idle speed r/min			750±100	–
CO contents %			0.5 or less	–
HC contents ppm			100 or less	–
Compression pressure (250–400 r/min) kPa		4G63	1,270	min. 960
		4G64	1,320	min. 1,000
Compression pressure difference of all cylinder kPa			–	max. 100
Intake manifold vacuum kPa			min. 60	–
Cylinder head bolt shank length mm			–	99.4
Auto-tensioner push rod movement mm			Within 1.0	–
Timing belt tension torque Nm (Reference value)			3.5	–
Auto tensioner rod protrusion mm			2.5 – 3.0	–

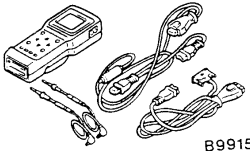
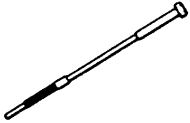
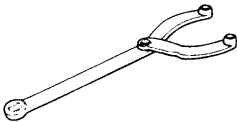
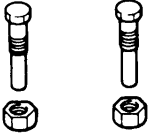
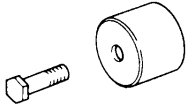
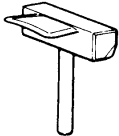
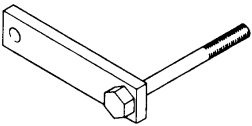
SEALANT

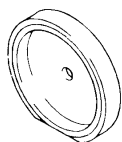
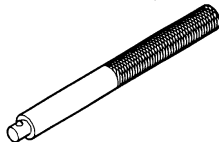
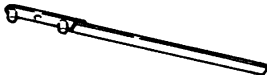
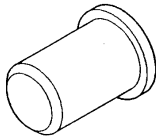
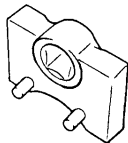
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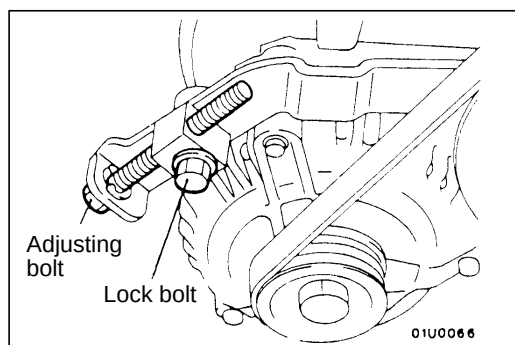
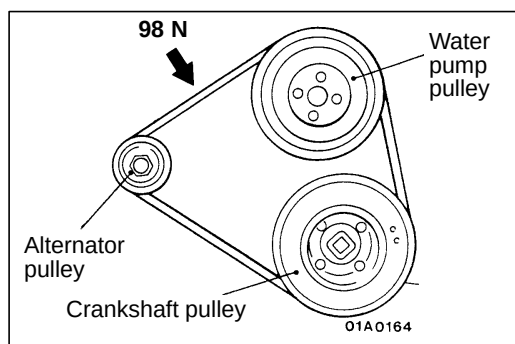
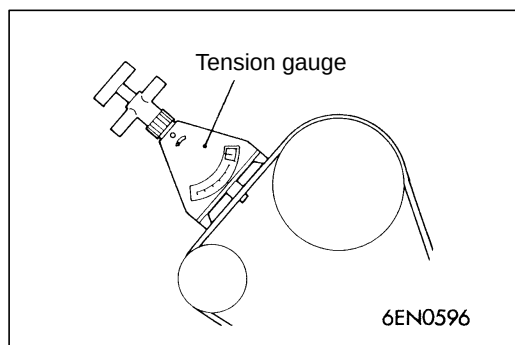
Item	Specified sealant	Remark
Oil pan	MITSUBISHI GENUINE PART MD970389 or equivalent	Semi-drying sealant

SPECIAL TOOLS

11100060310

Tool	Number	Name	Use
 B991502	MB991502	MUT-II sub as- sembly	• Checking the idle speed • Erasing of diagnosis code
	MD998738	Adjusting screw	• Holding the auto tensioner • Timing belt tension adjustment
	MB990767	End yoke holder	Holding the camshaft sprocket
	MD998719 MD998754	or Crankshaft pulley holder pin	
	MD998713	Camshaft oil seal installer	Press-in of the camshaft oil seal
	MD998727	Oil pan remover	Removal of the oil pan
	MD998781	Fly wheel stopper	Securing the flywheel <M/T> or drive plate <A/T>

Tool	Number	Name	Use
	MD998776	Crankshaft rear oil seal installer	Press-fitting the crankshaft rear oil seal
	MB990938	Handle	Press-fitting the crankshaft rear oil seal
	MD998747	Crankshaft pulley holder	Supporting of crankshaft sprocket
	MD998375	Crankshaft front oil seal installer	Press-fitting the crankshaft front oil seal
	MD998767	Tension pulley socket wrench	Timing belt tension adjustment



ON-VEHICLE SERVICE

11100090326

DRIVE BELT TENSION CHECK AND ADJUSTMENT

ALTERNATOR DRIVE BELT TENSION CHECK

Use a belt tension gauge to check that the belt tension is at the standard value at a point half-way between the two pulleys as shown in the illustration. In addition, press this section with a force of 98 N and check that the amount of belt deflection is at the standard value.

Standard value:

Tension N	294–490
Deflection (Reference value) mm	7.0 – 9.0

ALTERNATOR DRIVE BELT TENSION ADJUSTMENT

1. Loosen the nut of the alternator pivot bolt.
2. Loosen the lock bolt.
3. Use the adjusting bolt to adjust the belt tension and belt deflection to the standard values.

Standard value:

Items	When a used belt is installed	When a new belt is installed
Tension N	343–441	490–686
Deflection (Reference value) mm	7.5 – 8.5	5.5 – 7.5

4. Tighten the nut of the alternator pivot bolt.

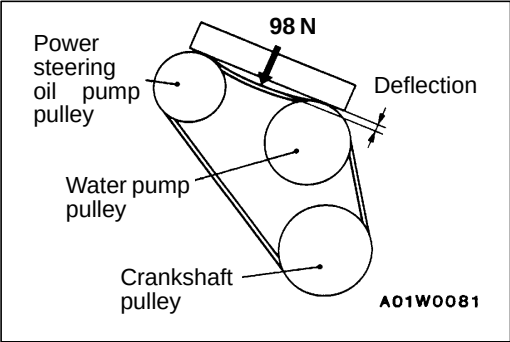
Tightening torque: 22 Nm

5. Tighten the lock bolt.

Tightening torque: 22 Nm

6. Tighten the adjusting bolt.

Tightening torque: 9.8 Nm



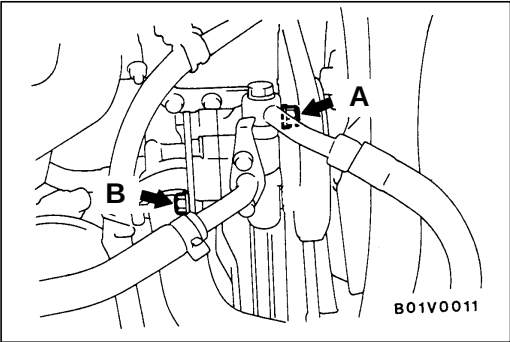
POWER STEERING OIL PUMP DRIVE BELT TENSION CHECK AND ADJUSTMENT

11100110145

1. Use a belt tension gauge to check that the belt tension is at the standard value at a point half-way between the two pulleys (indicated by an arrow in the illustration). In addition, press this section with a force of 98 N and check that the amount of belt deflection is at the standard value.

Standard value:

Items	When checked	When a used belt is intalled	When a new belt is installed
Tension N	294 – 490	343 – 441	490 – 686
Deflection (Reference value) mm	5.5 – 7.5	6.0 – 7.0	4.0 – 6.0

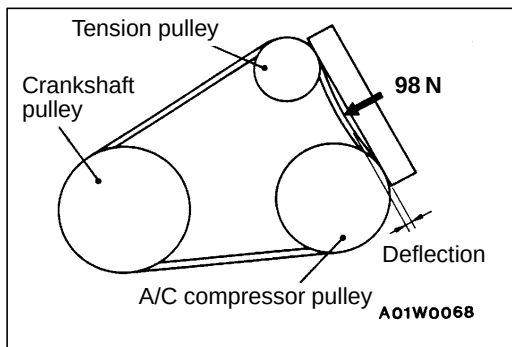


2. If the tension or deflection is outside the standard value, adjust by the following procedure.
 - (1) Loosen power steering oil pump fixing bolts A and B.
 - (2) Move power steering oil pump tension belt moderately and adjust tension.
 - (3) Tighten fixing bolts A and B.
4. Check the belt deflection amount and tension, and readjust if necessary.

Tightening torque: 22 Nm

Caution

Check after turning the crankshaft once or more clockwise (right turn).



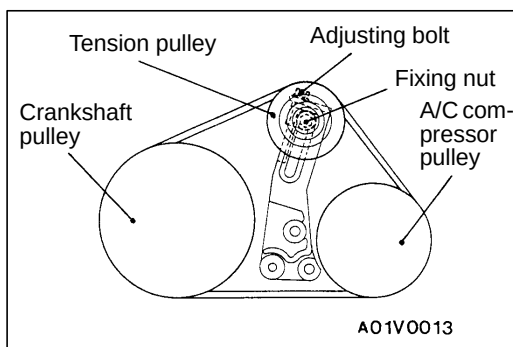
AIR CONDITIONER COMPRESSOR DRIVE BELT TENSION CHECK AND ADJUSTMENT

11100100135

1. Use a belt tension gauge to check that the belt tension is at the standard value at a point half-way between the two pulleys (indicated by an arrow in the illustration). In addition, press this section with a force of 98 N and check that the amount of belt deflection is at the standard value.

Standard value:

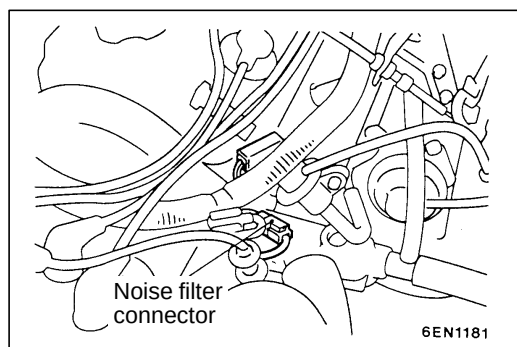
Items	When checked	When a used belt is installed	When a new belt is installed
Tension N	355 – 445	355 – 445	530 – 620
Deflection (Reference value) mm	6.0 – 7.0	6.0 – 7.0	4.5 – 5.5



2. If the tension or deflection is outside the standard value, adjust by the following procedure.
 - (1) Loosen tension pulley fixing nut.
 - (2) Adjust belt tension with adjusting bolt.
 - (3) Tighten fixing nut.
 - (4) Check the belt deflection amount and tension, and readjust if necessary.

Caution

Check after turning the crankshaft once or more clockwise (right turn).



IGNITION TIMING CHECK AND ADJUSTMENT

11100170167

1. Before inspection, set the vehicle to the pre-inspection condition.
2. Insert a paper clip into the noise filter connector (1 pin) as shown in the illustration at left.
3. Connect a primary-voltage-detection type of tachometer to the paper clip.

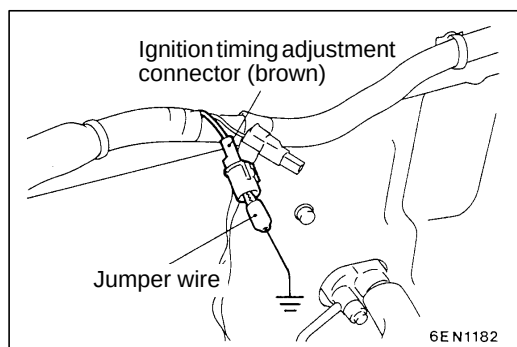
NOTE

Do not use the MUT-II.

If tested with the MUT-II connected to the diagnosis connector, the ignition timing will not be the basic timing but be ordinary timing.

4. Set up a timing light.
5. Start the engine and run at idle.
6. Check that engine idle speed is within the standard value.

Standard value: 750 ± 100 r/min

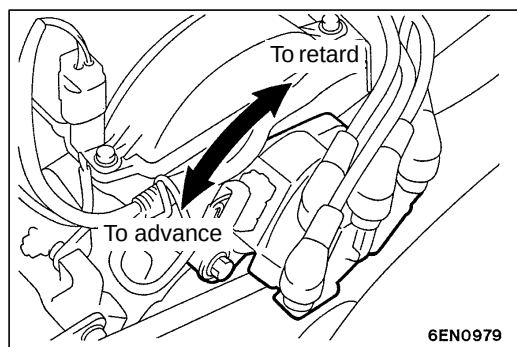


7. Turn the ignition switch to OFF.
8. Remove the waterproof connector from the ignition timing adjustment connector (brown).
9. Connect the jumper wire with the clip to the ignition timing adjustment terminal, and earth this to the body as illustrated.

NOTE

Earthing this terminal sets the engine to the basic ignition timing.

10. Start the engine and run it at idle.



11. Check that basic ignition timing is within the standard value.

Standard value: 5° BTDC ± 2°

12. If not within the standard value, loosen distributor fixing bolts and adjust by rotating distributor body.
13. Tighten mounting bolts after adjusting.

Tightening torque: 12 Nm

14. Stop the engine, remove the jumper wire from the ignition timing adjustment connector (brown), and return the connector to its original condition.
15. Start the engine and check that ignition timing at the standard value.

Standard value: Approx. 10° BTDC

NOTE

1. Ignition timing is variable within about ± 7°, even under normal operating.
2. And it is automatically further advanced by about 5° from 10° BTDC at higher altitudes.

16. Attach a sealing tape to the fixing bolt and nut only for vehicles for Switzerland.

NOTE

Sealing tape is attached to all new vehicles.

IDLE SPEED CHECK

11100190330

1. Before inspection, set the vehicle to the pre-inspection condition.
2. Check the basic ignition timing. Adjust if necessary.
Standard value: 5° BTDC $\pm 2^{\circ}$
3. After turning the ignition switch to OFF, connect the MUT-II to the diagnosis connector.
4. Start the engine and run it at idle.
5. Run the engine at idle for 2 minutes.
6. Check the idle speed.

Curb idle speed: 750 ± 100 r/min

NOTE

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

7. If the idle speed is outside the standard value, inspect the MPI components by referring to GROUP 13A – Troubleshooting.

IDLE MIXTURE CHECK

11100210265

1. Before inspection, set the vehicle to the pre-inspection condition.
2. Check that the basic ignition timing is within the standard value.

Standard value: 5° BTDC $\pm 2^{\circ}$

3. Turn the ignition switch to OFF and connect the MUT-II to the diagnosis connector.
4. Start the engine and run it 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

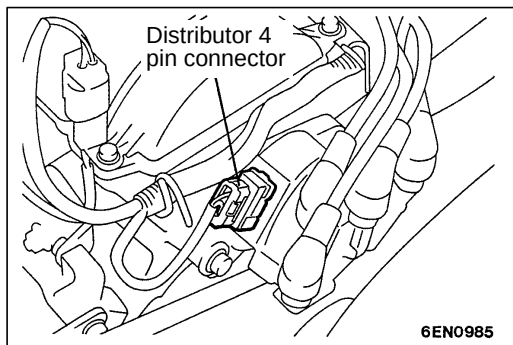
HC contents: 100 ppm or less

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 CHECK**

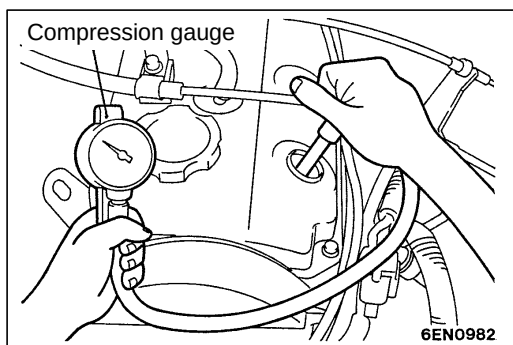
11100260352

1. Before inspection, check that the engine oil, starter and battery are normal. In addition, set the vehicle to the pre-inspection condition.
2. Disconnect the spark plug cables.
3. Remove all of the spark plugs.
4. Disconnect the distributor connector.

NOTE

Doing this will prevent the engine-ECU from carrying out ignition and fuel injection.

5. Cover the spark plug hole with a shop towel etc., and after the engine has been cranked, check that no foreign material is adhering to the shop towel.

**Caution**

1. Keep away from the spark plug hole when cranking.
2. If compression is measured with water, oil, fuel, etc., that has come from cracks inside the cylinder, these materials will become heated and will gush out from the spark plug hole, which is dangerous.
6. Set compression gauge to one of the spark plug holes.
7. Crank the engine with the throttle valve fully open and measure the compression pressure.

Standard value (at engine speed of 250–400 r/min):

4G63: 1,270 kPa

4G64: 1,320 kPa

Limit (at engine speed of 250–400 r/min):

4G63: min. 960 kPa

4G64: min. 1,000 kPa

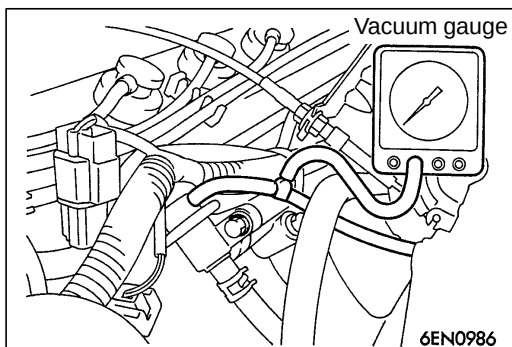
8. Measure the compression pressure for all the cylinders, and check that the pressure differences of the cylinders are below the limit.

Limit: max. 100 kPa

9. 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 (7) and (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.
10. Connect the distributor connector.
11. Install the spark plugs and spark plug cables.
12. Use the MUT-II to erase the diagnosis codes.

NOTE

This will erase the problem code resulting from the distributor connector being disconnected.

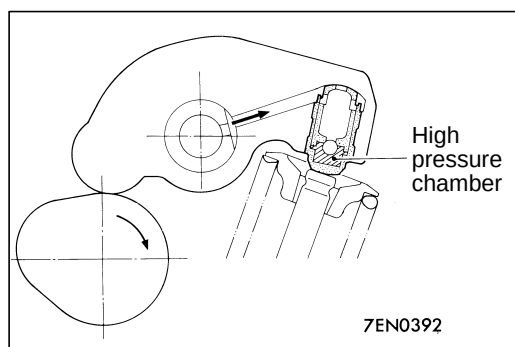
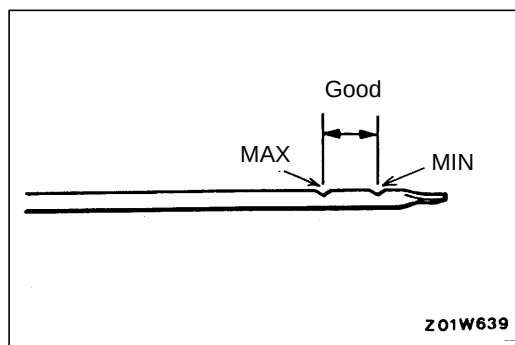


MANIFOLD VACUUM CHECK

11100270270

1. Start the engine and allow it to warm up until the temperature of the engine coolant reaches 80 to 95°C.
2. Connect a tachometer.
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 specification. Then read off the vacuum gauge.

Standard value: min. 60 kPa



LASH ADJUSTER CHECK

11100290214

NOTE

Soon after the engine is started or while it is running, abnormal noise (clattering) which may be attributed to the adjuster sounds but does not stop. In this case, check the following.

1. Check the engine oil, and refill or replace oil if necessary.

NOTE

1. If the oil amount is small, air will be sucked from the oil strainer and mixed in the oil passage.
2. If the oil amount is excessive, the oil will be stirred by the crank and mixed with a large amount of air.
3. Air and oil can not be separated easily in the deteriorated oil, and the amount of air mixed in the oil increases.

If such mixed-in air enters the high pressure chamber in the lash adjuster, the air in the high-pressure chamber will be compressed while the valve is opened, the lash adjuster will be excessively compressed and abnormal noise will be produced when the valve is closed.

This is the same phenomenon which occurs when the valve clearance is improperly adjusted to be excessively large.

However, it will return to be normal if the air entrapped in the adjuster is released in this case.

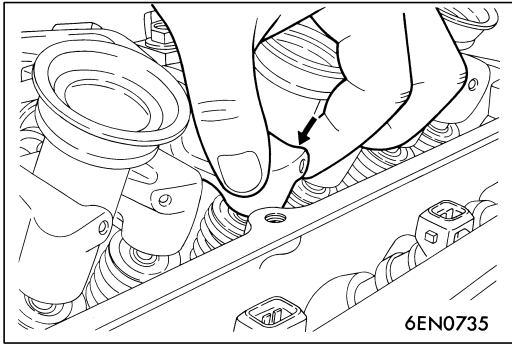
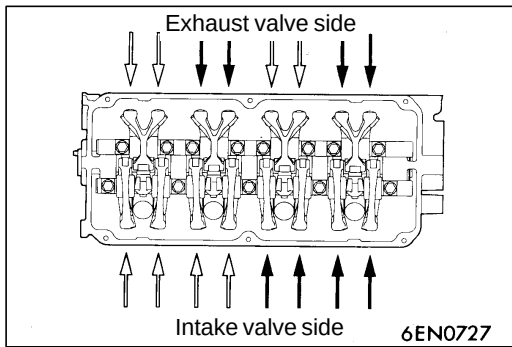
2. Start the engine, and slowly race* it several times (10 times or less).

If the abnormal noise is eliminated by racing the engine, it means that the air is released from the high-pressure chamber of the lash adjuster and the function of the lash adjuster is returned to normal.

* Gradually increase the engine speed from the idle speed to 3,000 r/min (for 30 seconds), and then gradually slow down the engine to the idling speed (for 30 seconds).

NOTE

1. If the vehicle is parked on a slope for a long time, the oil will be sometimes reduced in the lash adjuster, and air will enter the high-pressure chamber when the engine is started.
2. After the vehicle is parked for a long time, the oil will go out of the oil passage. Since it takes a little time to supply oil to the lash adjuster, air sometimes enters the high-pressure chamber.



3. If any abnormal noise is not eliminated by racing, check the lash adjuster.
 - (1) Stop the engine.
 - (2) Set the engine so that cylinder No. 1 is positioned at the top dead centre of the compression.
 - (3) Press the rocker arm at the area indicated by the white arrow mark to check whether the rocker arm is lowered or not.
 - (4) Slowly turn the crankshaft 360 degrees clockwise.
 - (5) In the same procedure as step (3), check the rocker arm at the area indicated by the black arrow mark.

- (6) If the rocker arm is easily lowered when the section directly above the lash adjuster of the rocker arm is pressed, the lash adjuster is defective, so replace it.

Moreover, if it is felt to be so hard that the rocker arm is not lowered when it is pressed, the lash adjuster is normal. Check for other causes of the abnormality. For Y-formed rocker arm at the exhaust valve side, if one lash adjuster is defective and the other is normal, it is impossible to press the rocker arm. In this case, remove the lash adjuster and carry out the leak down test.

NOTE

1. A leak down test can be performed to accurately determine whether the lash adjuster is defective or not.
2. For the procedures for the leak down test and air bleeding of the lash adjuster, refer to the Engine Workshop Manual.

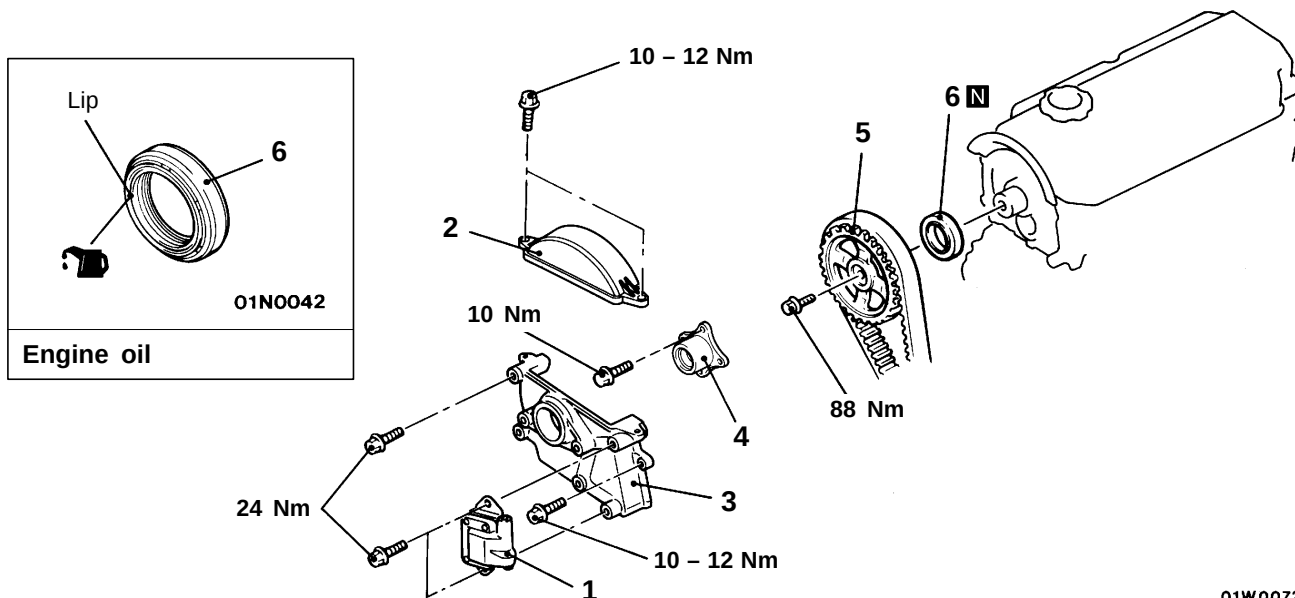
CAMSHAFT OIL SEAL

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REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

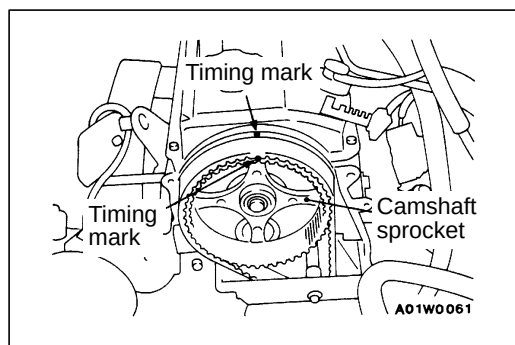
- Distributor Removal and Installation

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Removal steps

1. Ignition coil
2. Timing belt upper cover assembly
3. Distributor bracket

- | | | |
|-----|-----|-----------------------------|
| ◀A▶ | ▶C▶ | 4. Camshaft sprocket spacer |
| ◀B▶ | ▶B▶ | 5. Camshaft sprocket |
| | ▶A▶ | 6. Camshaft oil seal |



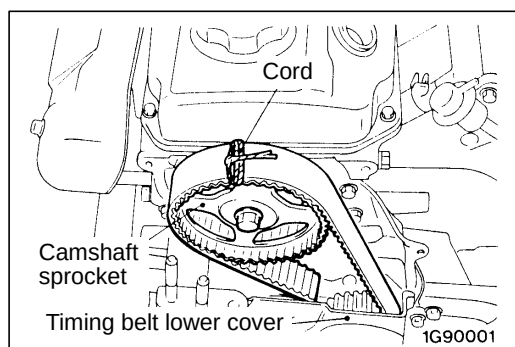
REMOVAL SERVICE POINTS

◀A▶ CAMSHAFT SPROCKET REMOVAL

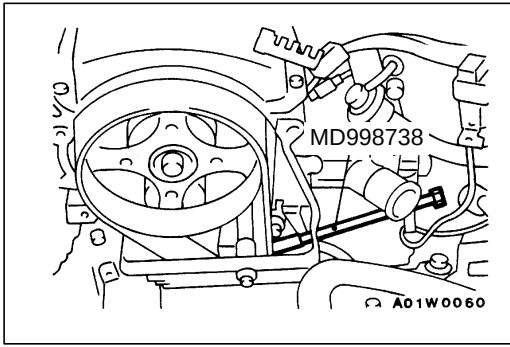
1. Rotate the crankshaft in the forward (right) direction and align the timing mark.

Caution

The crankshaft must always be rotated in the forward direction only.



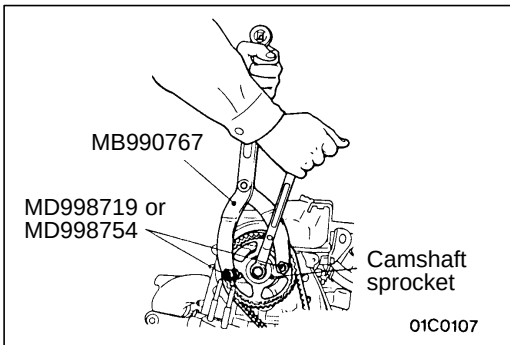
2. Tie the camshaft sprocket and timing belt with a cord so that the position of the camshaft sprocket will not move with respect to the timing belt.



3. Insert the special tool into the rubber plug hole in the timing belt cover assembly rear and turn it gently. Stop turning the special tool when it can no longer be turned gently.

NOTE

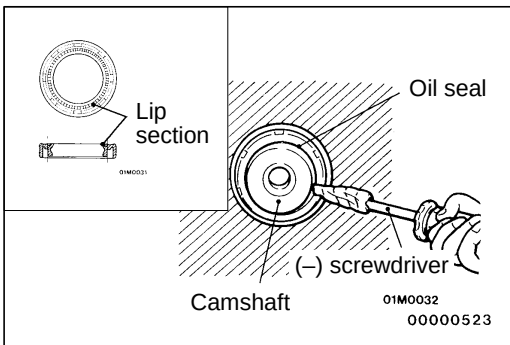
This work will make the end of the special tool touch the tensioner arm. So the auto tensioner will stop and the timing belt tension will not vary.



4. Use the special tool to remove the camshaft sprocket with the timing belt attached.

Caution

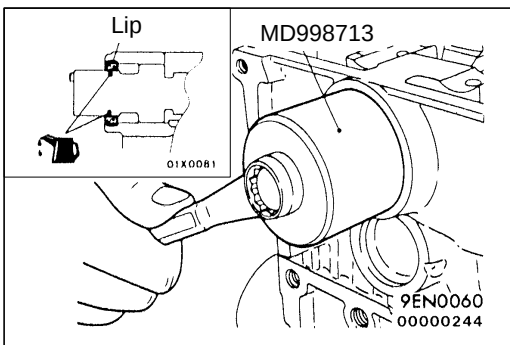
After removing the camshaft sprocket, be sure not to rotate the crankshaft.

**◀B▶ CAMSHAFT OIL SEAL REMOVAL**

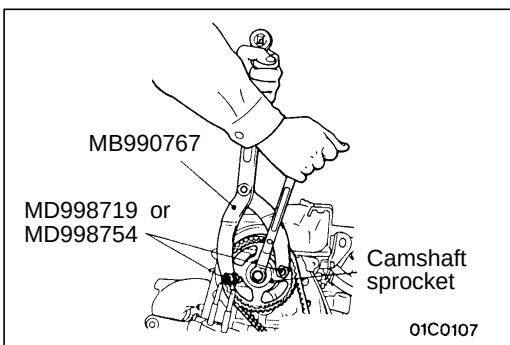
1. Make a notch in the oil seal lip section with a knife, etc.
2. Cover the end of a (-) screwdriver with a rag and insert into the notched section of the oil seal, and lever out the oil seal to remove it.

Caution

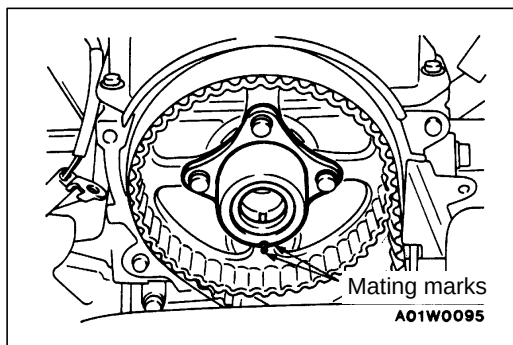
Be careful not to damage the camshaft and the cylinder head.

**INSTALLATION SERVICE POINTS****▶A◀ CAMSHAFT OIL SEAL INSTALLATION**

1. Apply engine oil to the camshaft oil seal lip.
2. Use the special tool to press-fit the camshaft oil seal.

**▶B◀ CAMSHAFT SPROCKET INSTALLATION**

1. Use the special tool to stop the camshaft sprocket from turning, and then install the camshaft sprocket bolt.
2. Remove the special tool from the rubber plug hole.
3. Remove the cord which binds the camshaft sprocket and timing belt.

**►C◄ CAMSHAFT SPROCKET SPACER INSTALLATION**

Align the mating marks on the camshaft sprocket and the camshaft sprocket spacer (groove), and then install them.

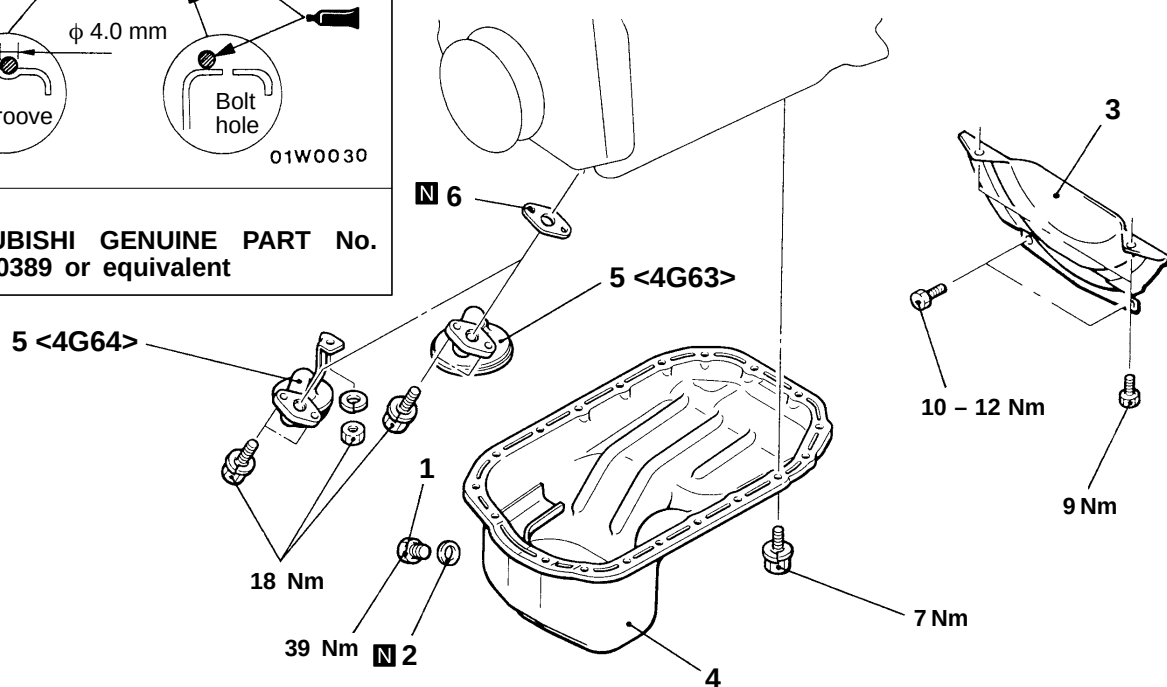
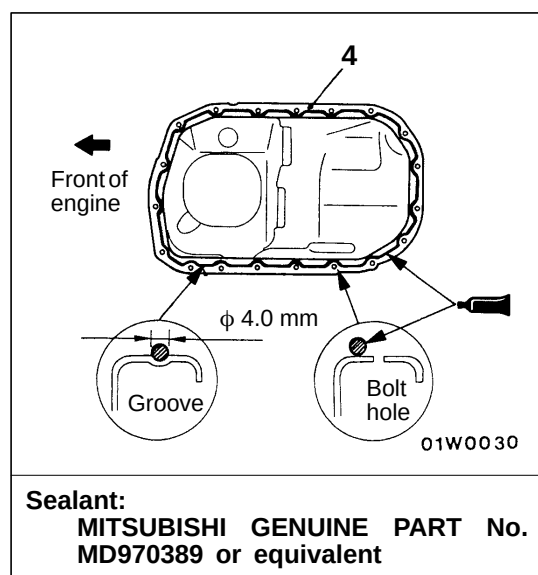
OIL PAN AND OIL SCREEN

11200250185

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

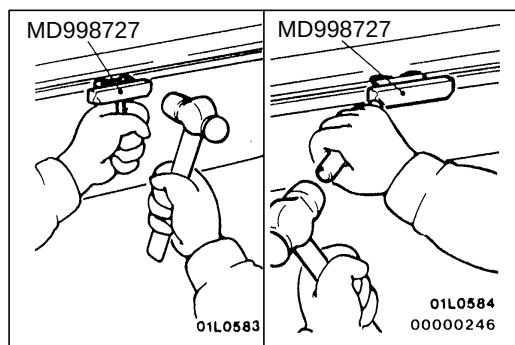
- Under Cover Removal and Installation
- Engine Oil Draining and Refilling
(Refer to GROUP 12 – On-vehicle Service.)

01V0085
00005182**Removal steps**

1. Drain plug
2. Drain plug gasket
3. Bell housing cover



4. Oil pan
5. Oil screen
6. Gasket



REMOVAL SERVICE POINT

◀▶ OIL PAN REMOVAL

After removing the oil pan mounting bolts, remove the oil pan with the special tool and a brass bar.

Caution

Perform this slowly to avoid deformation of the oil pan flange.

INSTALLATION SERVICE POINTS

▶▶ OIL PAN INSTALLATION

1. Remove sealant from oil pan and cylinder block mating surfaces.
2. Degrease the sealant-coated surface and the engine mating surface.
3. Apply the specified sealant around the gasket surface of oil pan.

Specified sealant: MITSUBISHI GENUINE PART No. MD970389 or equivalent

NOTE

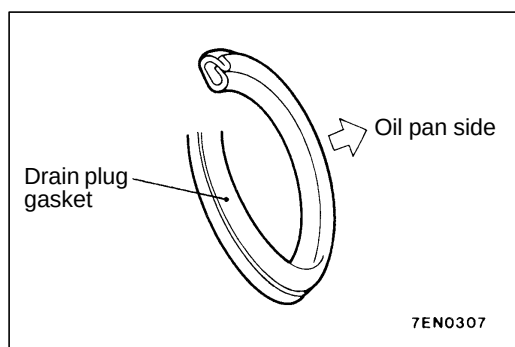
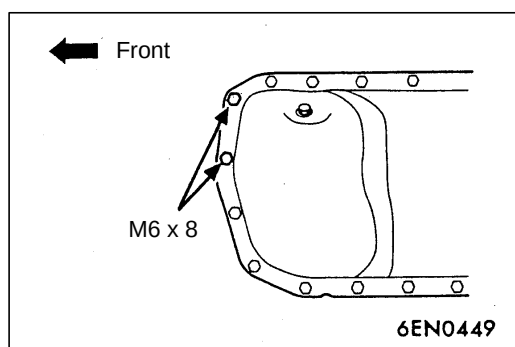
The sealant should be applied in a continuous bead approximately 4 mm in diameter.

4. Assemble oil pan to cylinder block within 15 minutes after applying the sealant.

Caution

After installing the oil pan, wait at least 1 hour before starting the engine.

Be careful when installing, as the bolts indicated in the illustration have different lengths from the other bolts.



▶▶ DRAIN PLUG GASKET INSTALLATION

Install the drain plug gasket in the direction so that it faces as shown in the illustration.

INSPECTION

11200260041

- Check oil pan for cracks.
- Check oil pan sealant-coated surface for damage and deformation.
- Check oil screen for cracked, clogged or damaged wire net and pipe.

CYLINDER HEAD GASKET

11200400351

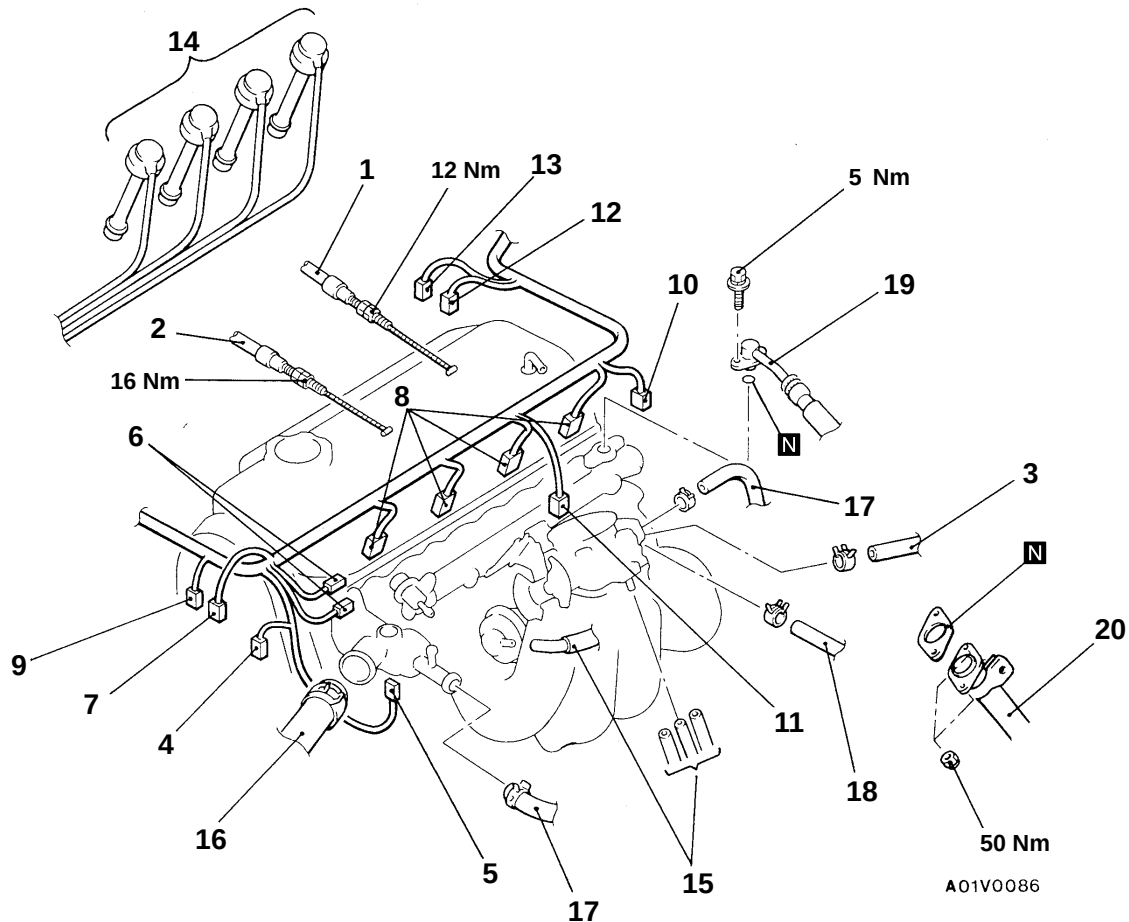
REMOVAL AND INSTALLATION

Pre-removal Operation

- Engine Coolant Draining
(Refer to GROUP 14 – On-vehicle Service.)
- Fuel Line Pressure Releasing
(Refer to GROUP 13A – On-vehicle Service.)
- Battery Removal
- Air Cleaner Assembly Removal
(Refer to GROUP 15.)
- Distributor Removal

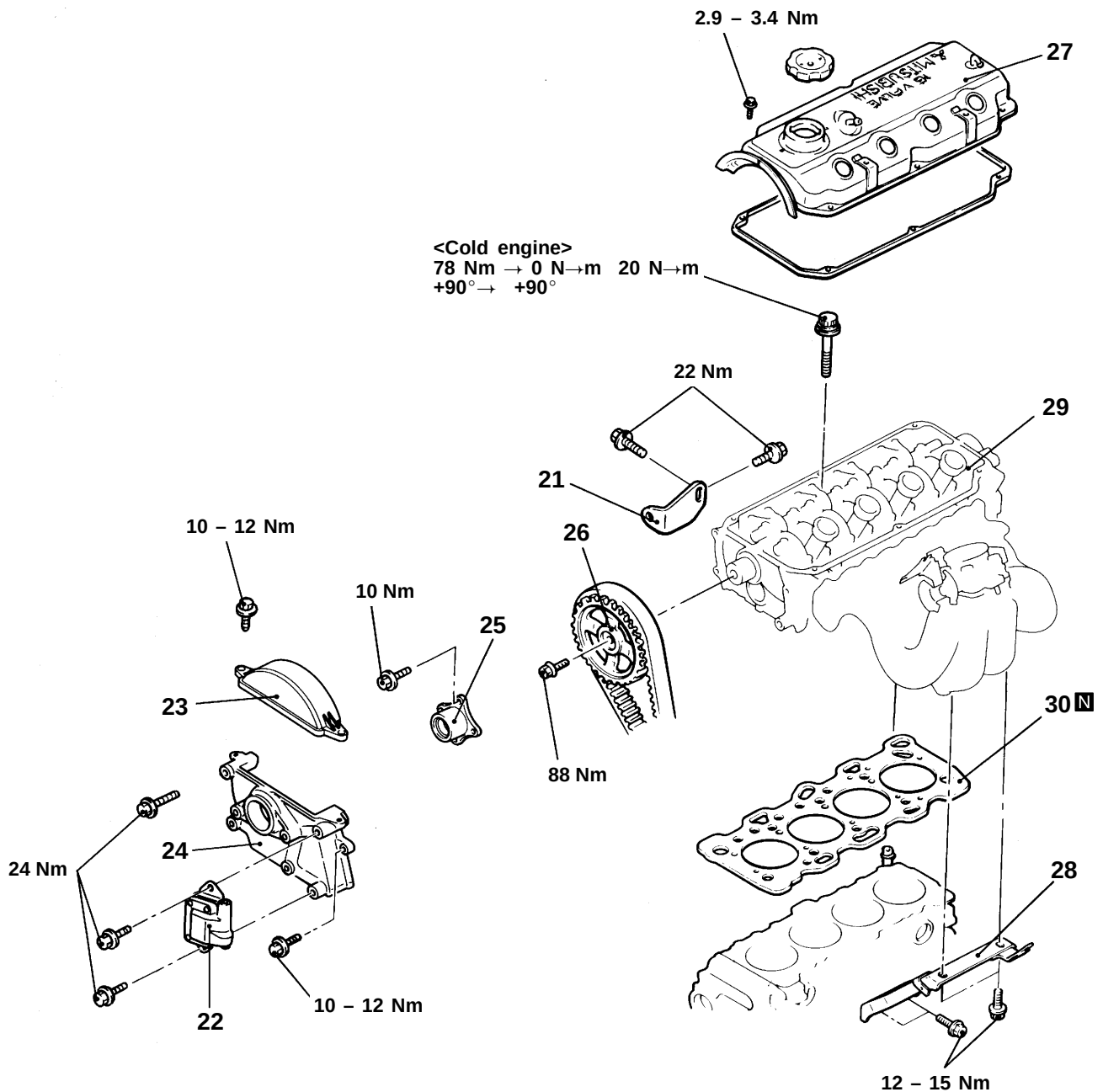
Post-installation Operation

- Distributor installation
- Air Cleaner Assembly installation
(Refer to GROUP 15.)
- Battery Installation
- Engine Coolant Refilling
(Refer to GROUP 14 – On-vehicle Service.)
- Accelerator Cable Adjustment
(Refer to GROUP 17 – On-vehicle Service.)
- Throttle Cable Adjustment
(Refer to GROUP 23 – On-vehicle Service.)



Removal steps

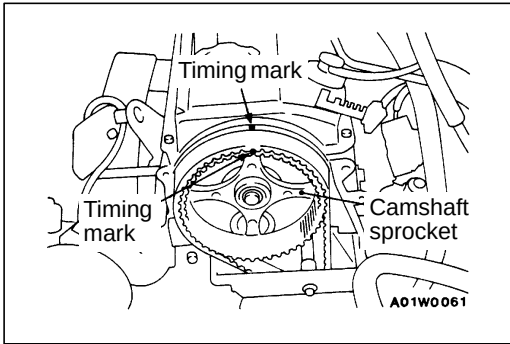
1. Accelerator cable connection
2. Throttle cable connection <A/T>
3. Brake booster vacuum hose connection
4. Ignition coil connector
5. Engine coolant temperature sensor connector
6. Noise filter connector
7. Power transistor connector
8. Injector connectors
9. Capacitor connector
10. Throttle position sensor connector
11. Idle speed control servo connector
12. Engine coolant temperature gauge unit connector
13. Engine coolant temperature switch connector <A/T>
14. Spark plug cable
15. Vacuum hose connection
16. Radiator upper hose connection
17. Water hose connections
18. Fuel return hose connection
19. High-pressure fuel hose connection
20. Front exhaust pipe connection



A01W0100

21. Power steering pump mount bracket
22. Ignition coil
23. Timing belt upper cover assembly
24. Distributor bracket
▶D◀ 25. Camshaft sprocket spacer

- ◀A▶ ▶C◀ 26. Camshaft sprocket
27. Rocker cover
28. Intake manifold stay
◀B▶ ▶B◀ 29. Cylinder head assembly
▶A◀ 30. Cylinder head gasket



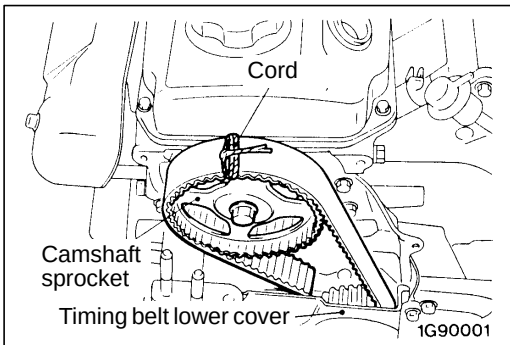
REMOVAL SERVICE POINTS

◀A▶ CAMSHAFT SPROCKET REMOVAL

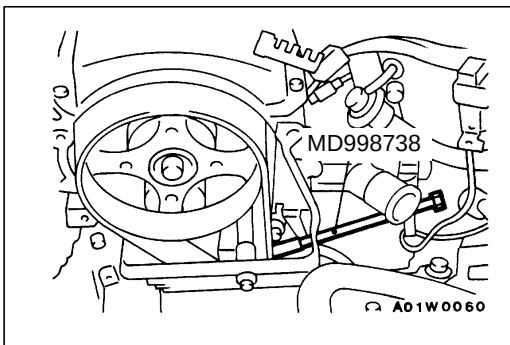
1. Rotate the crankshaft in the forward (right) direction and align the timing mark.

Caution

The crankshaft must always be rotated in the forward direction only.



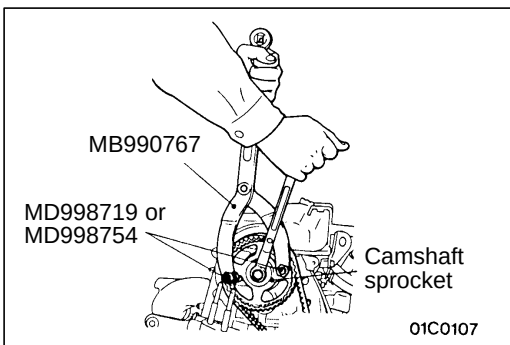
2. Tie the camshaft sprocket and timing belt with a cord so that the position of the camshaft sprocket will not move with respect to the timing belt.



3. Insert the special tool into the rubber plug hole in the timing belt cover assembly rear and turn it gently. Stop turning the special tool when it can no longer be turned gently.

NOTE

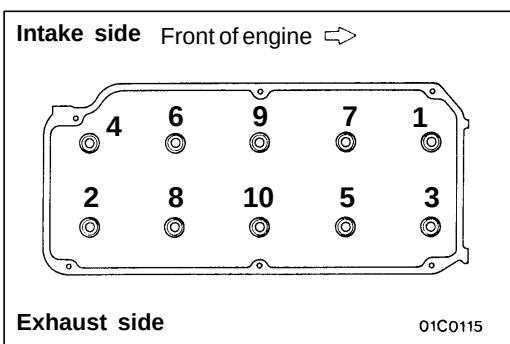
This work will make the end of the special tool touch the tensioner arm. So the auto tensioner will stop and the timing belt tension will not vary.



4. Use the special tool to remove the camshaft sprocket with the timing belt attached.

Caution

After removing the camshaft sprocket, be sure not to rotate the crankshaft.

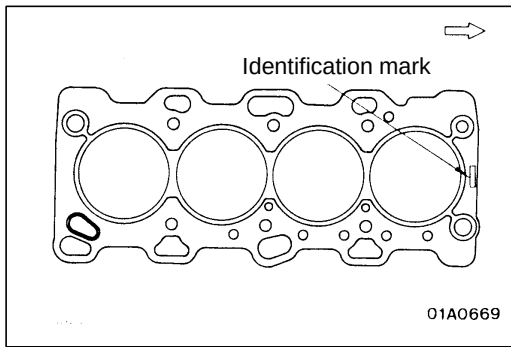


◀B▶ CYLINDER HEAD ASSEMBLY REMOVAL

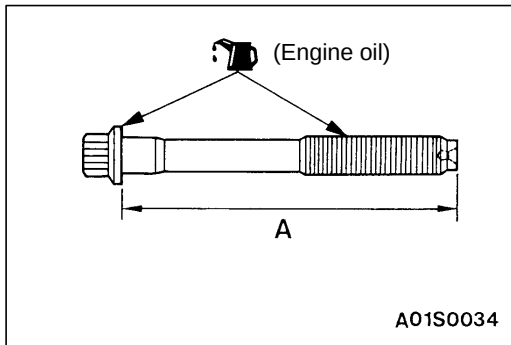
Loosen the bolts in 2 or 3 steps in order of the numbers shown in the illustration, and remove the cylinder head assembly.

Caution

Because the plug guides cannot be replaced by themselves, be careful not to damage or deform the plug guides when removing the cylinder head bolts.

**INSTALLATION SERVICE POINTS****►A◄ CYLINDER HEAD GASKET INSTALLATION**

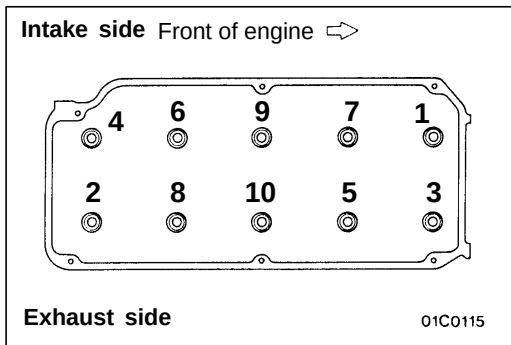
1. Wipe off all oil and grease from the gasket mounting surface.
2. Install the gasket to the cylinder block with the identification mark facing upwards.

**►B◄ CYLINDER HEAD ASSEMBLY INSTALLATION**

1. When installing the cylinder head bolts, the length below the head of the bolts should be within the limit. If it is outside the limit, replace the bolts.

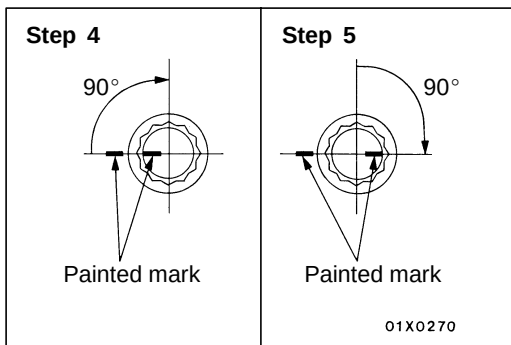
Limit (A): 99.4 mm

2. Apply a small amount of engine oil to the thread section and the washer of the cylinder head bolt.

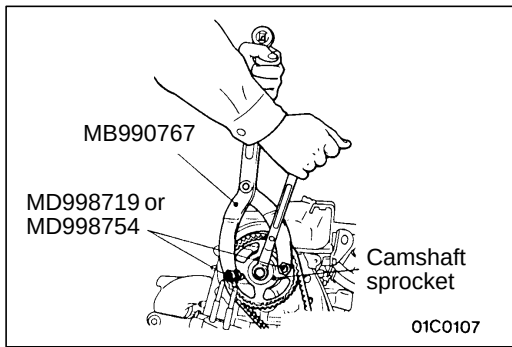


3. Tighten the bolts by the following procedure.

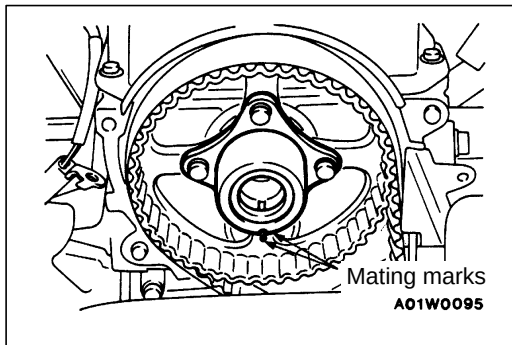
Step	Operation	Remarks
1	Tighten to 78 Nm.	Carry out in the order shown in the illustration.
2	Fully loosen.	Carry out in the reverse order of that shown in the illustration.
3	Tighten to 20 Nm.	Carry out in the order shown in the illustration.
4	Tighten 90° of a turn.	In the order shown in the illustration. Mark the head of the cylinder head bolt and cylinder head by paint.
5	Tighten 90° of a turn.	In the order shown in the illustration. Check that the painted mark of the head bolt is lined up with that of the cylinder head.

**Caution**

1. Always make a tightening angle just 90°. If it is less than 90°, the head bolt will be loosened.
2. If it is more than 90°, remove the head bolt and repeat the procedure from step 1.

**►C◄ CAMSHAFT SPROCKET INSTALLATION**

1. Use the special tool to stop the camshaft sprocket from turning, and then install the camshaft sprocket bolt.
2. Remove the special tool from the rubber plug hole.
3. Remove the cord which binds the camshaft sprocket and timing belt.

**►D◄ CAMSHAFT SPROCKET SPACER INSTALLATION**

Align the mating marks on the camshaft sprocket and the camshaft sprocket spacer (groove), and then install them.

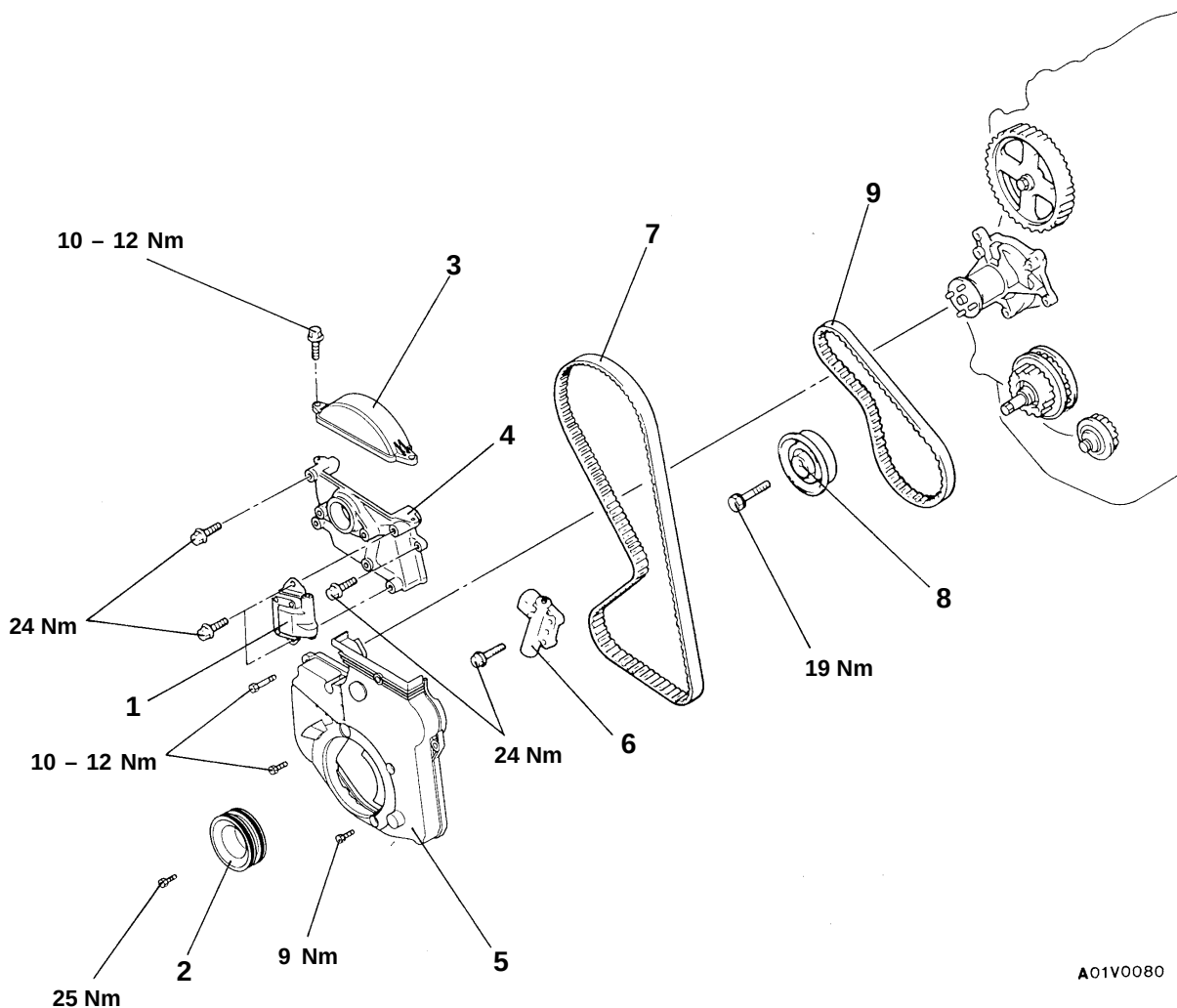
TIMING BELT, TIMING BELT B

11200430336

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

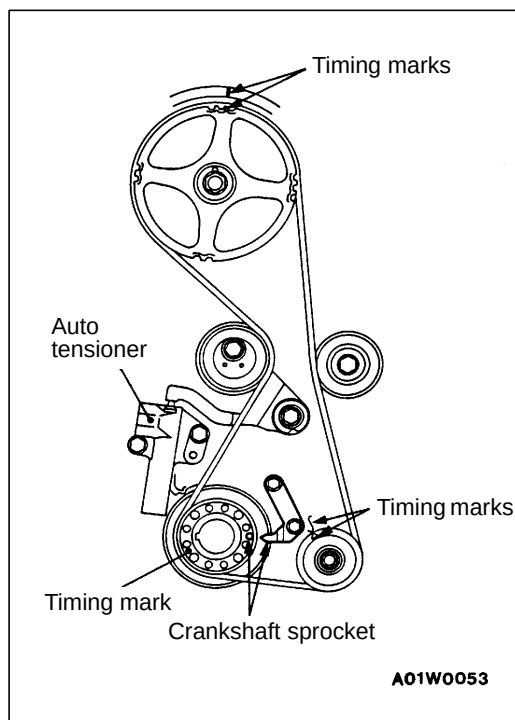
- Engine Coolant Draining and Refilling
(Refer to GROUP 14 – On-vehicle Service.)
- Cooling Fan Removal and Installation
(Refer to GROUP 14.)
- Distributor Removal and Installation

**Removal steps**

1. Ignition coil
 2. Crankshaft pulley
 3. Timing belt upper cover assembly
 4. Distributor bracket
 5. Timing belt lower cover assembly
- Timing belt tension adjustment

- | | | |
|-----|-----|------------------------------------|
| ◀A▶ | ▶D▶ | 6. Auto tensioner |
| ◀B▶ | ▶C▶ | 7. Timing belt |
| | ▶B▶ | • Timing belt B tension adjustment |
| | | 8. Timing belt B tensioner |
| ◀B▶ | ▶A▶ | 9. Timing belt B |

▶E▶

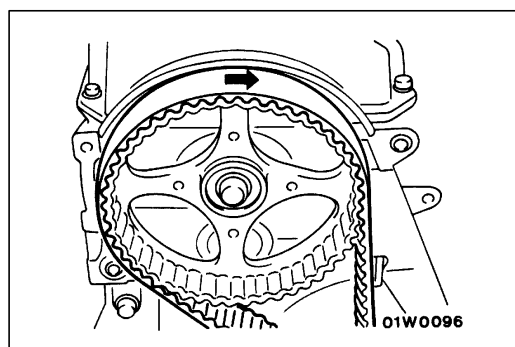
**REMOVAL SERVICE POINTS****◀A▶ AUTO TENSIONER REMOVAL**

1. Turn the crankshaft clockwise (right turn) to align each timing marks and to set the No. 1 cylinder to compression top dead centre.

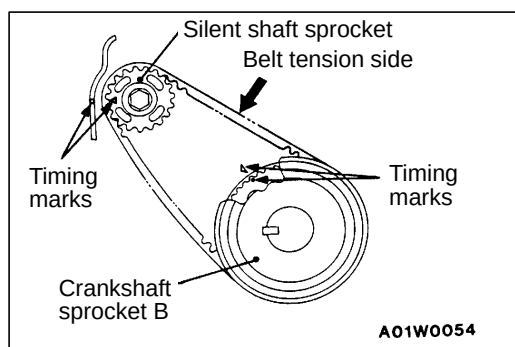
Caution

Never turn the crankshaft anticlockwise.

2. Remove the auto tensioner.

**◀B▶ TIMING BELT/TIMING BELT B REMOVAL****Caution**

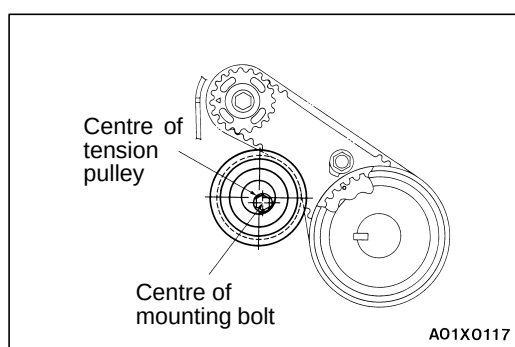
If the belt is to be re-used, chalk the belt with an arrow indicating the clockwise direction of rotation.

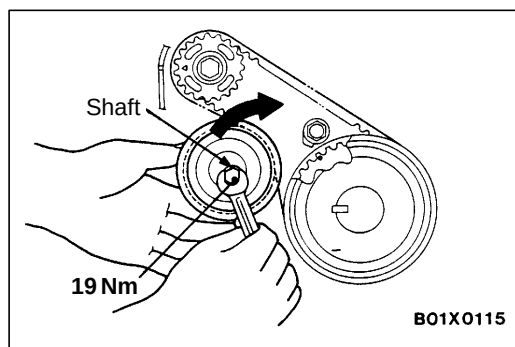
**INSTALLATION SERVICE POINTS****▶A◀ TIMING BELT B INSTALLATION**

1. Ensure that crankshaft sprocket "B" timing marks and the silent shaft sprocket timing marks are aligned.
2. Fit timing belt "B" over crankshaft sprocket B and the silent shaft sprocket. Ensure that there is no slack in the belt.

▶B◀ TIMING BELT B TENSION ADJUSTMENT

1. Temporarily fix the timing belt "B" tensioner such that the centre of the tensioner pulley is to the left and above the centre of the installation bolt, and temporarily attach the tensioner pulley so that the flange is toward the front of the engine.

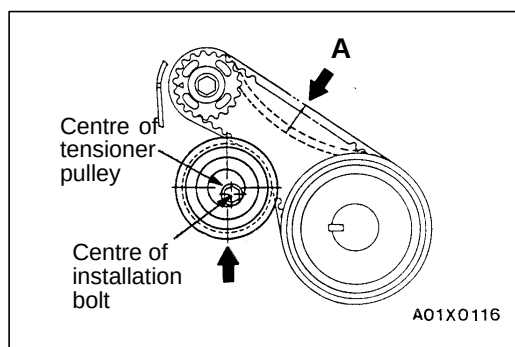




2. Holding the timing belt "B" tensioner up with your finger in the direction of the arrow, apply pressure on the timing belt so that the tension side of the belt is taut. Now tighten the bolt to fix the tensioner.

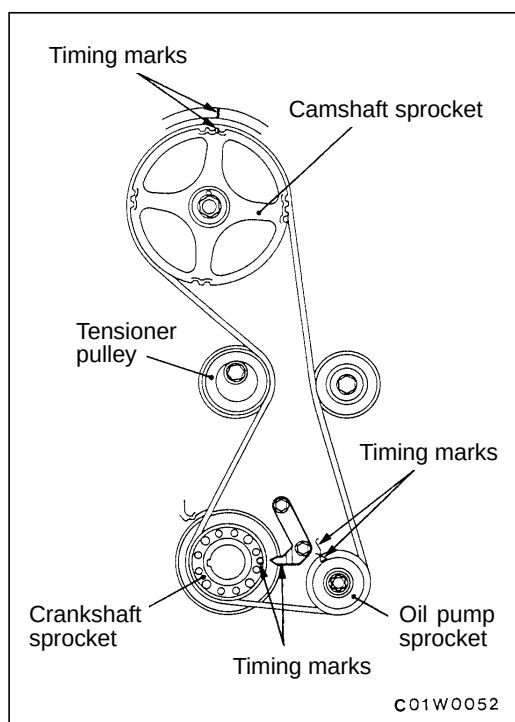
Caution

When tightening the bolt, ensure that the tensioner pulley shaft does not rotate with the bolt. Allowing it to rotate with the bolt can cause excessive tension of the belt.



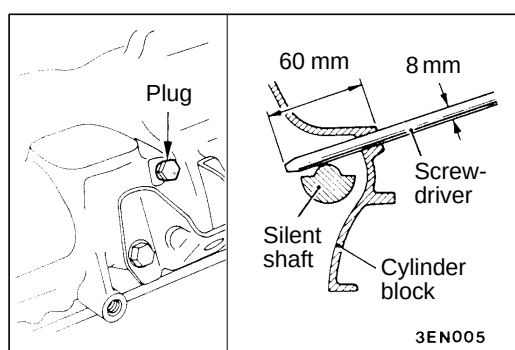
3. To ensure that the tension is correct, depress the belt (point A) with a finger. Adjust the belt tension if it is incorrect.

Standard value: 5 – 7 mm

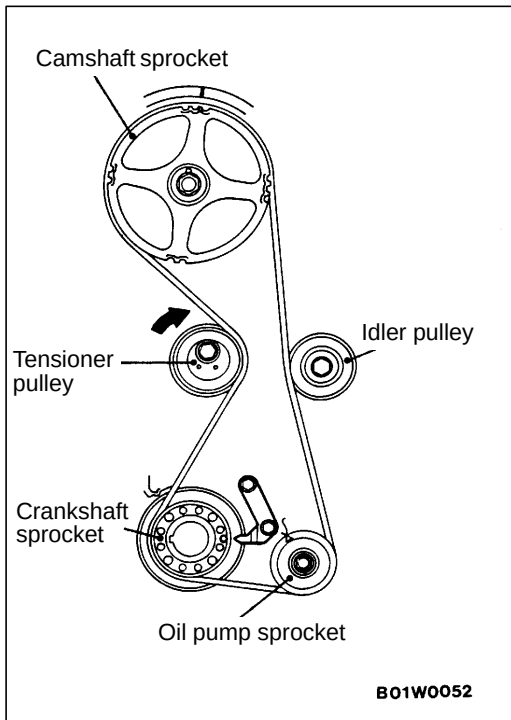


►C◄ TIMING BELT INSTALLATION

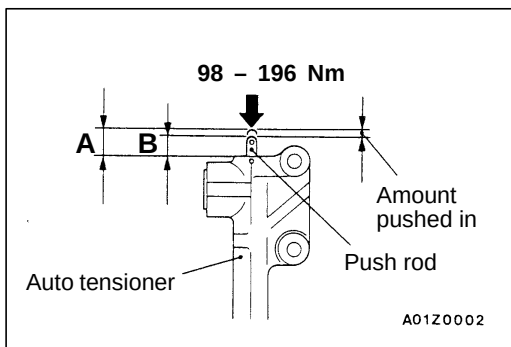
1. Check that the timing marks of the camshaft sprocket, crankshaft sprocket and oil pump sprocket are all aligned.



2. After aligning the timing marks on the oil pump sprocket, remove the cylinder block plug and insert a Phillips screwdriver with a diameter of 8 mm, and check to be sure that the screwdriver goes in 60 mm or more. If the screwdriver will only go in 20 – 25 mm before striking the silent shaft, turn the sprocket once, realign the timing mark and check that the screwdriver goes in 60 mm or more. The screwdriver should not be taken out until the timing belt is installed.



3. Install the timing belt by the following procedure.
 - (1) Place the timing belt onto the tensioner pulley and crankshaft sprocket, and hold it with your left hand so that it doesn't slip.
 - (2) While pulling the timing belt with your right hand, place it onto the oil pump sprocket.
 - (3) Place the timing belt onto the idler pulley and camshaft sprocket.
 - (4) Push the tensioner pulley in the direction shown by the arrow to apply tension to the timing belt, and then tighten the tensioner pulley fixing bolt.



►D◄ AUTO TENSIONER INSTALLATION

1. While holding the auto-tensioner by hand, press the end of the rod against a metal surface (such as the cylinder block) with a force of 98 – 196 Nm and measure how far the rod is pushed in.

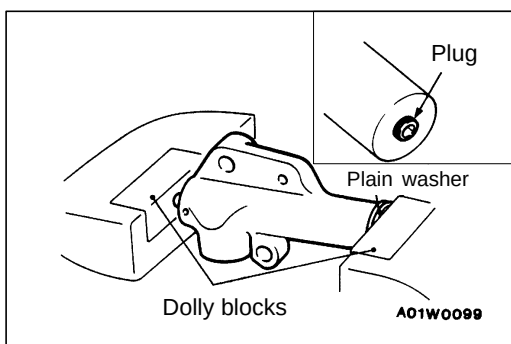
Standard value: Within 1 mm

A: Length when no force is applied

B: Length when force is applied

A – B: Amount pushed in

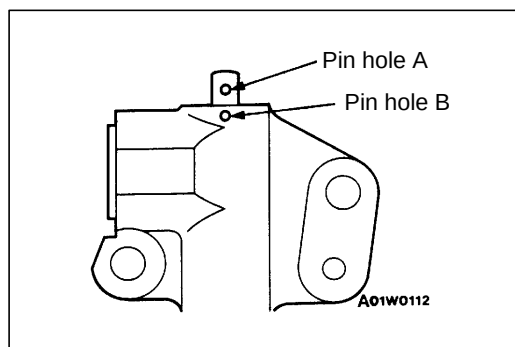
2. If it is not within the standard value, replace the auto tensioner.



3. Place two dolly blocks in a vice as shown in the illustration, and then place the auto tensioner in the vice.

Caution

- (1) Place the auto tensioner perpendicular to the jaws of the vice.
- (2) If there is a plug at the base of the auto tensioner, insert a plain washer onto the end of the auto tensioner to protect the plug.



4. Slowly compress the push rod of the auto tensioner until pin hole A in the push rod is aligned with pin hole B in the cylinder.

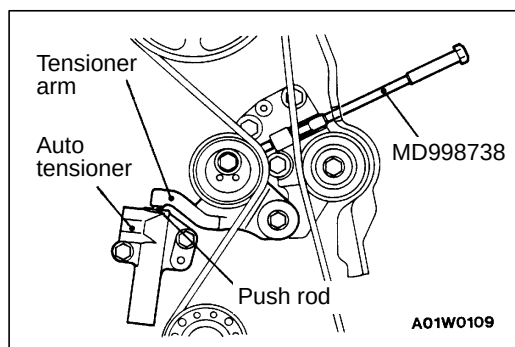
Caution

Never compress the push rod too fast, or the push rod may be damaged.

5. Insert the setting pin into the pin holes once they are aligned.

NOTE

If replacing the auto tensioner, the pin will already be inserted into the pin holes.



6. Install the auto tensioner to the engine.

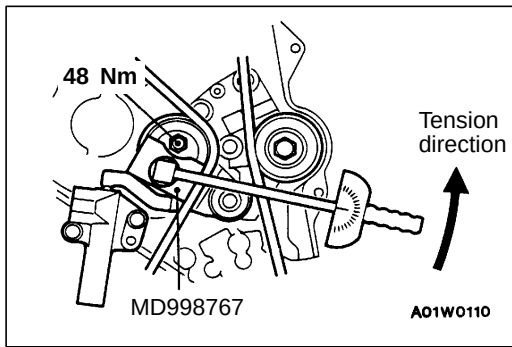
Caution

Do not remove the setting pin from the auto tensioner.

7. Remove the rubber plug from the timing belt cover assembly rear. Then screw in the special tool by hand until the tensioner arm is touching the auto tensioner push rod.

Caution

Do not use a spanner or the similar tool to turn the special tool, otherwise, the auto tensioner setting pin may be broken. Turn the special tool by hand only.



►E◄ TIMING BELT TENSION ADJUSTMENT

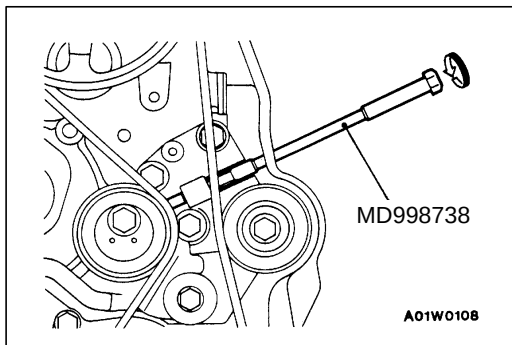
1. Turn the crankshaft 1/4 of a revolution in the anticlockwise direction, then turn it in the clockwise direction until the timing marks are aligned.
2. Loosen the tension pulley fixing bolt, and then use the special tool and a torque wrench to tighten the fixing bolt to the specified torque while applying tension to the timing belt.

Standard value: 3.5 Nm <Timing belt tension torque>

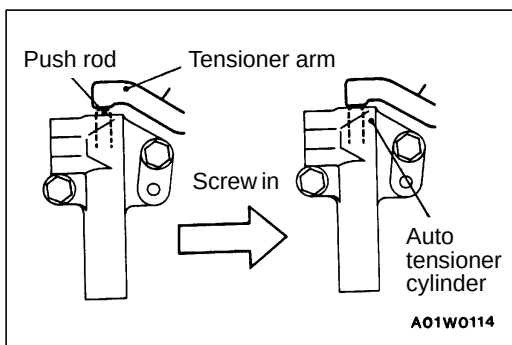
Caution

When tightening the fixing bolt, make sure that the tension pulley does not turn with the bolt.

3. Remove the setting pin that has been inserted into the auto tensioner, and then remove the special tool.
4. Turn the crankshaft two turns clockwise, and wait for approximately 15 minutes.



5. Insert the special tool again and turn it by hand until the end of the special tool touches the tensioner arm.



6. Once the end touches, keep turning the special tool until the auto tensioner push rod retracts and the tensioner arm contacts the auto tensioner cylinder.

Caution

Turn the special tool slowly 1/4 of a turn at a time.

7. Check that the amount by which the special tool has been screwed in is within the standard value range.

Standard value: 2.5 – 3 turns

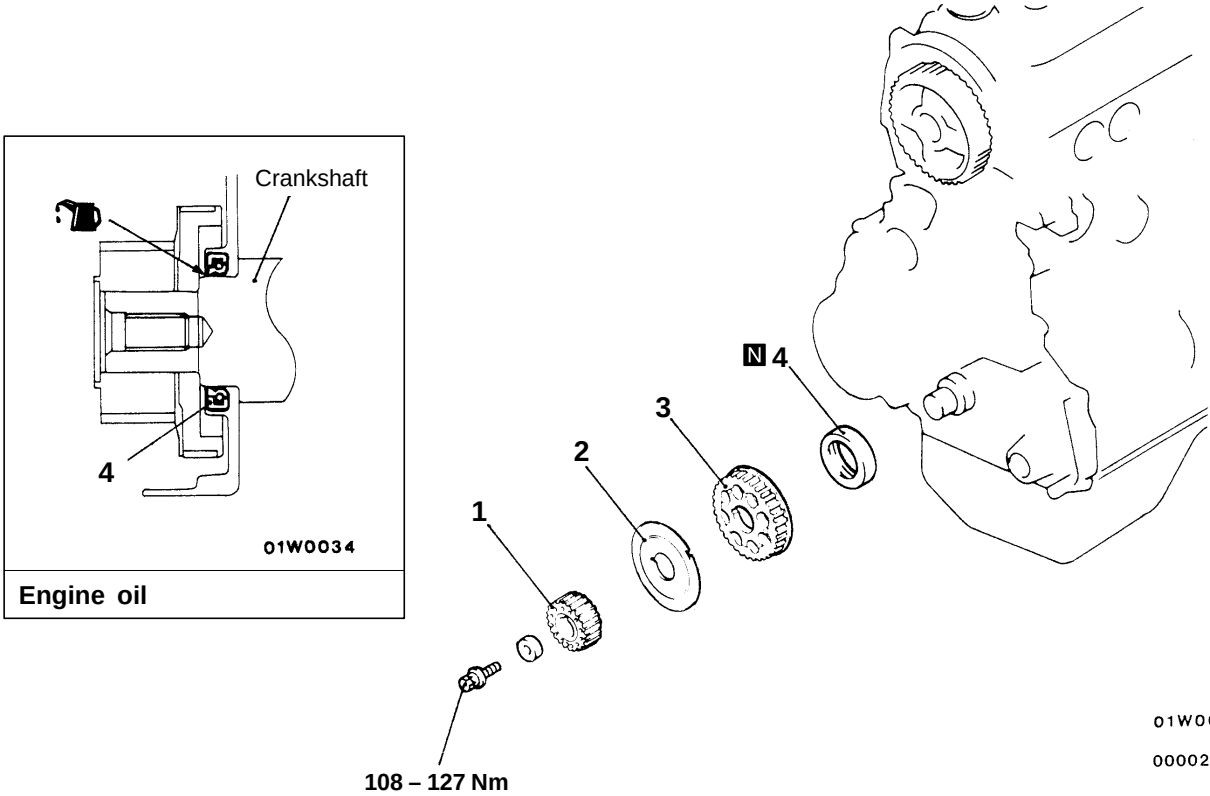
8. Remove the special tool and install the rubber plug.

CRANKSHAFT FRONT OIL SEAL

11200340226

REMOVAL AND INSTALLATION

- Pre-removal and Post-installation Operation
- Timing Belt, Timing Belt B Removal and Installation
(Refer to P.11A-26.)

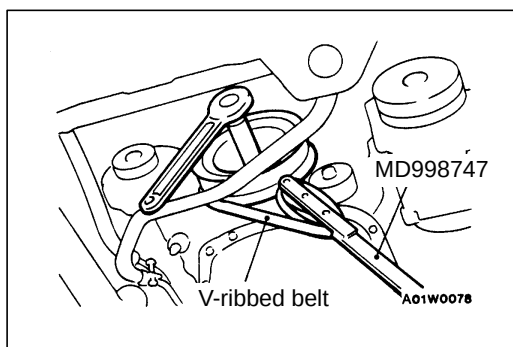


01W0067
00002270

- Removal steps
- ◀A▶▶B▶B▶

1. Crankshaft sprocket
2. Flange
- ▶B▶A▶

3. Crankshaft sprocket B
4. Crankshaft front oil seal

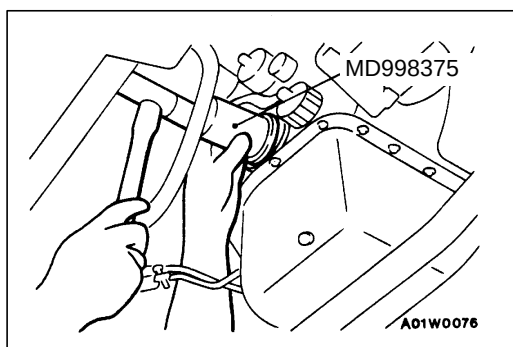
**REMOVAL SERVICE POINT****◀A▶ CRANKSHAFT SPROCKET REMOVAL**

1. Temporarily install the crankshaft pulley, and then use the V-ribbed belt and the special tool to stop the crankshaft pulley from turning.

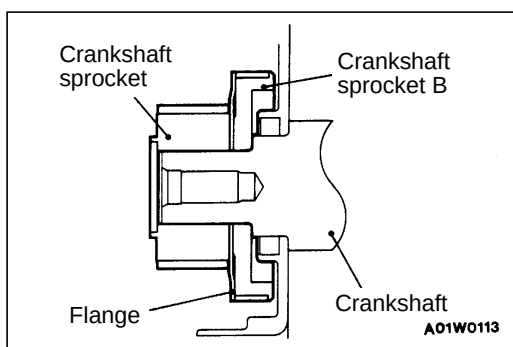
Caution

- (1) Do not use the vehicle's V-ribbed belt, or the belt may be damaged.
- (2) Do not use a damaged V-ribbed belt.

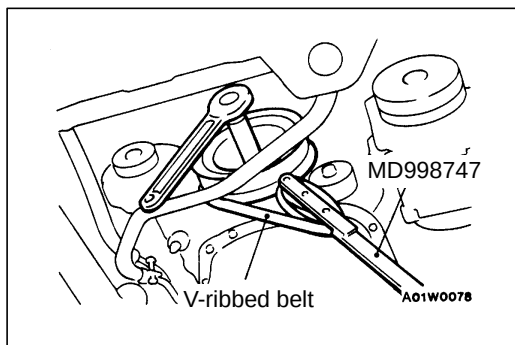
2. Loosen the crankshaft sprocket bolt, and then remove the sprocket.

**INSTALLATION SERVICE POINTS****▶A◀ CRANKSHAFT FRONT OIL SEAL INSTALLATION**

1. Apply engine oil to the entire circumference of the oil seal lip.
2. Press-fit the oil seal until it is flush with the front case.

**▶B◀ CRANKSHAFT SPROCKET B/FLANGE/ CRANKSHAFT SPROCKET INSTALLATION**

1. Install the crankshaft sprocket B, flange and the crankshaft sprocket so that they face as shown in the illustration.



2. Temporarily install the crankshaft pulley, and then use the V-ribbed belt and the special tool to stop the crankshaft pulley from turning.

Caution

- (1) Do not use the vehicle's V-ribbed belt, or the belt may be damaged.
 - (2) Do not use a damaged V-ribbed belt.
3. Tighten the crankshaft sprocket bolt to the specified torque.

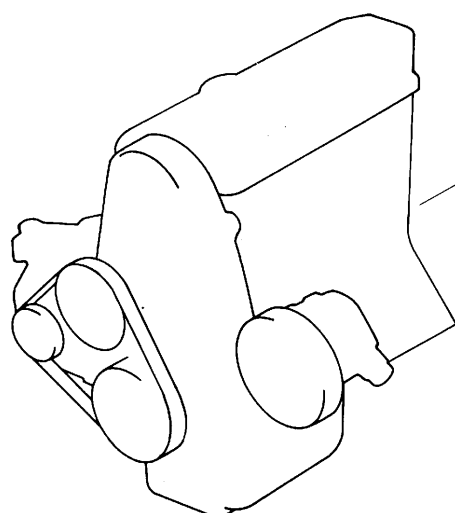
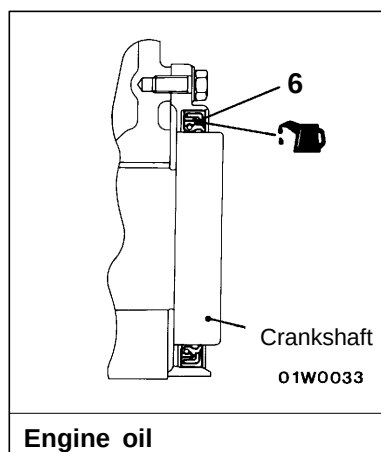
Tightening torque: 108 – 127 Nm

CRANKSHAFT REAR OIL SEAL

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Transmission Assembly Removal and Installation <2WD> (Refer to GROUP 22, 23.)
- Transmission and Transfer Assembly Removal and Installation <4WD> (Refer to GROUP 22.)



<M/T>

127 – 137 Nm

1

2

<A/T>

127 – 137 Nm

3

4

5

4

01W0036

00000854

Removal steps

<M/T>

- Clutch cover and clutch disc

1. Flywheel bolt

2. Flywheel

6. Crankshaft rear oil seal

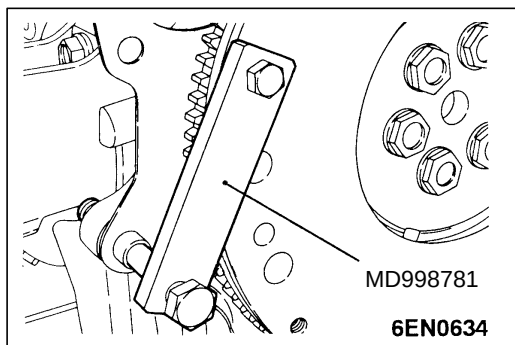
<A/T>

3. Drive plate bolt

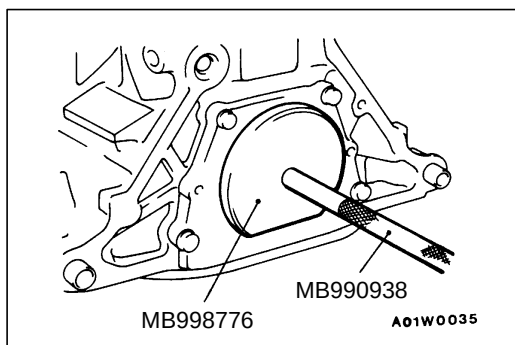
4. Adaptor plate

5. Drive plate

6. Crankshaft rear oil seal

**REMOVAL SERVICE POINT**

◀A▶ FLYWHEEL BOLT <M/T>/DRIVE PLATE BOLT
<A/T> REMOVAL

**INSTALLATION SERVICE POINTS**

▶A◀ CRANKSHAFT REAR OIL SEAL INSTALLATION

1. Apply a small amount of engine oil to the entire circumference of the oil seal lip.
2. Tap in the oil seal as shown in the illustration.

▶B◀ DRIVE PLATE BOLT <A/T>/FLYWHEEL BOLT
<M/T> INSTALLATION

Use the special tool to install the drive bolt and flywheel bolt.

ENGINE ASSEMBLY

11200100350

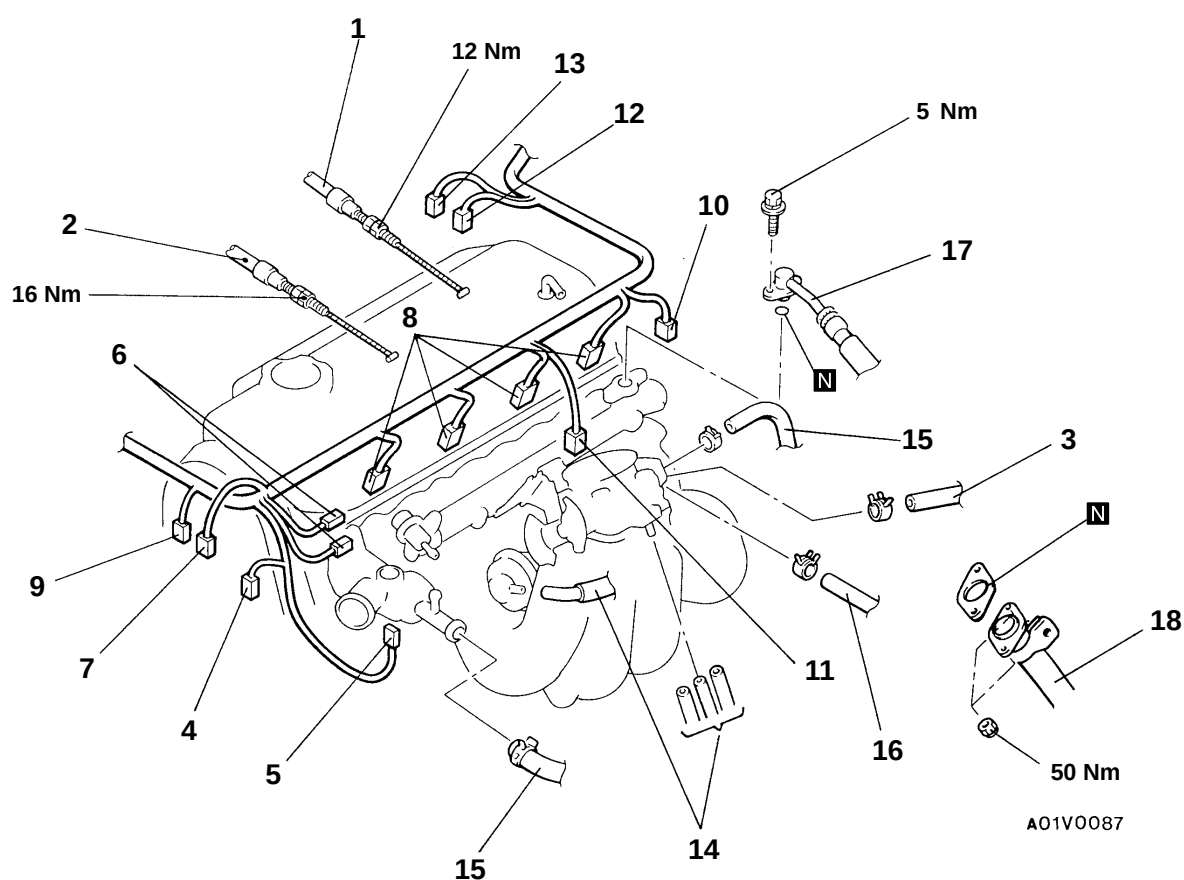
REMOVAL AND INSTALLATION

Pre-removal Operation

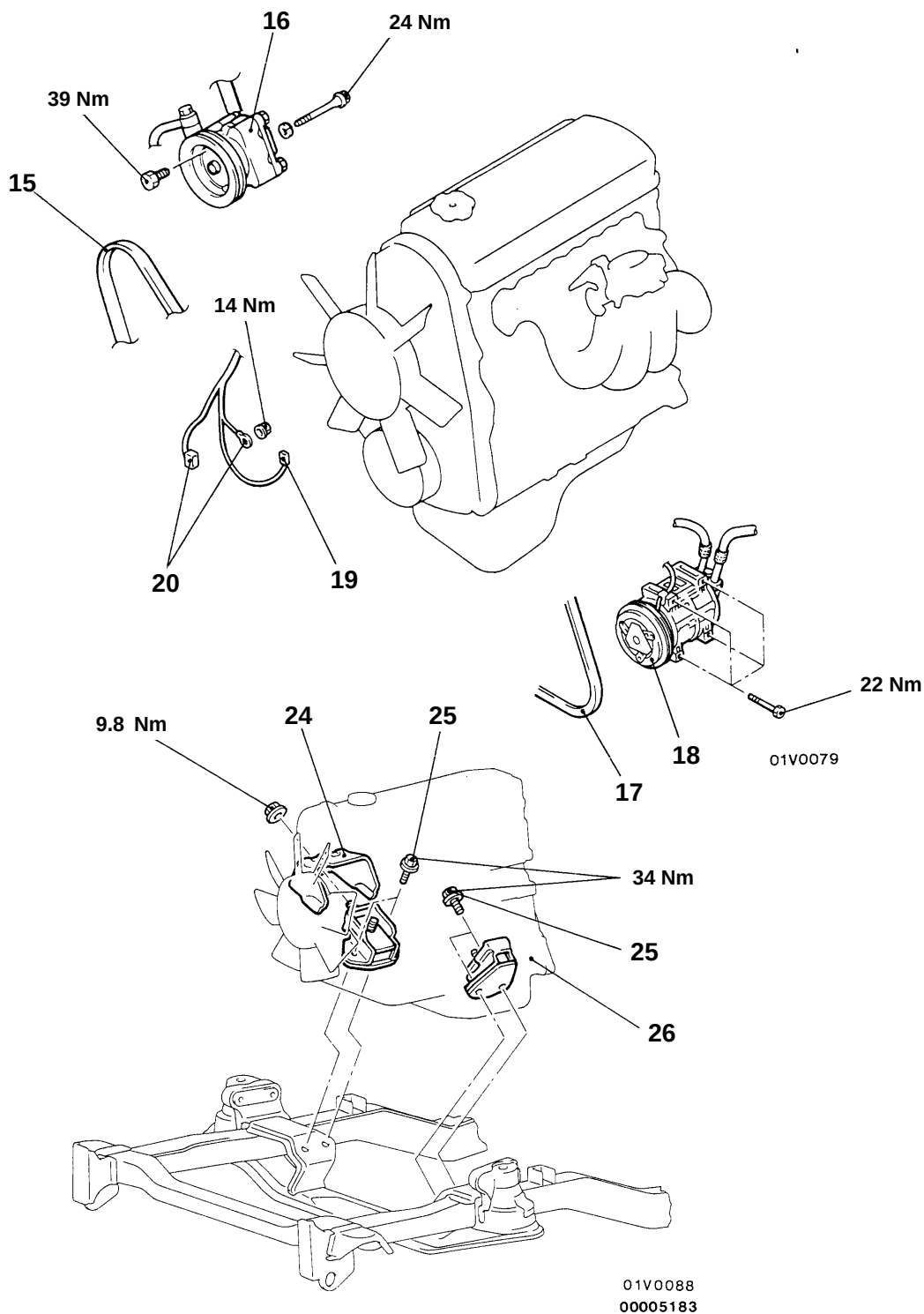
- Hood Removal (Refer to GROUP 42.)
- Fuel Line Pressure Releasing (Refer to GROUP 13A – On-vehicle Service.)
- Air Cleaner and Air Intake Hose Removal (Refer to GROUP 15.)
- Battery Removal
- Radiator Removal (Refer to GROUP 14.)
- Transmission Assembly Removal <2WD> (Refer to GROUP 22, 23.)
- Transmission and Transfer Assembly Removal <4WD> (Refer to GROUP 22.)

Post-installation Operation

- Transmission and Transfer Assembly Installation <4WD> (Refer to GROUP 22.)
- Transmission Assembly Installation <2WD> (Refer to GROUP 22, 23.)
- Radiator Installation (Refer to GROUP 14.)
- Battery Installation
- Air Cleaner and Air Intake Hose installation (Refer to GROUP 15.)
- Hood Installation (Refer to GROUP 42.)
- Drive Belt Tension Adjustment (Refer to P. 11A-7.)
- Accelerator Cable Adjustment (Refer to GROUP 17 – On-vehicle Service.)
- Throttle Cable Adjustment <A/T> (Refer to GROUP 23 – On-vehicle Service.)

**Removal steps**

- | | |
|--|---|
| 1. Accelerator cable connection | 11. Idle speed control servo connector |
| 2. Throttle cable connection <A/T> | 12. Engine coolant temperature gauge unit connector |
| 3. Brake booster vacuum connection | 13. Engine coolant temperature switch connector <A/T> |
| 4. Ignition coil connector | 14. Vacuum hose connection |
| 5. Engine coolant temperature sensor connector | 15. Water hose connections |
| 6. Noise filter connector | 16. Fuel return hose connection |
| 7. Power transistor connector | 17. High-pressure fuel hose connection |
| 8. Injector connectors | 18. Front exhaust pipe connection |
| 9. Capacitor connector | |
| 10. Throttle position sensor connector | |



- ◀A▶

◀A▶
15. Drive belt (for Power steering)

16. Power steering oil pump assembly

17. Drive belt (for A/C)

18. A/C compressor assembly

19. Engine oil pressure switch connector
- ◀B▶ ▶A▶

20. Alternator connector

24. Heat protector

25. Engine support front insulator attaching bolt

26. Engine assembly

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

1. Remove the oil pump and A/C compressor (with the hose attached).
2. 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 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 POINT**▶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.

NOTES

ENGINE <4D5>

CONTENTS

11109000405

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GENERAL INFORMATION

11100010339

Items		4D56
Total displacement mℓ		2,477
Bore x Stroke mm		91.1 x 95.0
Compression ratio		21
Combustion chamber		Vortex chamber type
Camshaft arrangement		SOHC
Number of valve	Intake	4
	Exhaust	4
Valve timing	Intake	Opening BTDC 20°, Closing ABDC 49°
	Exhaust	Opening BBDC 55°, Closing ATDC 22°
Fuel system		Distribution type injection pump
Rocker arm		Roller type
Adjusting screw		Elephant foot type

SERVICE SPECIFICATIONS

11100030359

Items			Standard value	Limit
Alternator drive belt tension (for each belt)	Tension N	When checked	245 – 441	–
		When a used belt is installed	294 – 392	–
		When a new belt is installed	392 – 588	–
	Deflection (Reference value) mm	When checked	12.0 – 17.0	–
		When a used belt is installed	13.0 – 16.0	–
		When a new belt is installed	10.0 – 13.0	–
Power steering oil 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	8.0 – 12.0	–
		When a used belt is installed	9.0 – 11.5	–
		When a new belt is installed	6.0 – 8.0	–
A/C compressor drive belt tension	Tension N	When checked	320 – 400	–
		When a used belt is installed	320 – 400	–
		When a new belt is installed	480 – 560	–
	Deflection (Reference value) mm	When checked	6.0 – 7.0	–
		When a used belt is installed	6.0 – 7.0	–
		When a new belt is installed	4.5 – 5.5	–
Valve clearance (at hot) mm			0.25	–
Injection timing (Value indicated on dial gauge mm)			9° ATDC (1 ± 0.03)	–
Idle speed r/min			750 ± 100	–
Idle up engine speed for ABS r/min			1,900 ± 100	–
Compression pressure kPa			3,040	Min. 2,200
Compression pressure difference of all cylinder (at engine speed of 280 r/min) kPa			–	Max. 300
Timing belt tension mm			4 – 5	–
Timing belt B tension mm			4 – 5	–

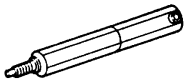
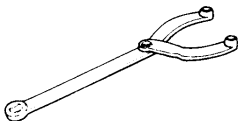
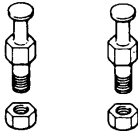
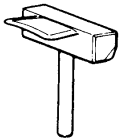
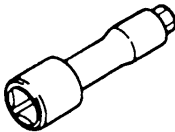
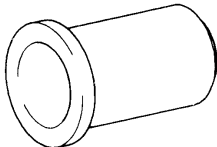
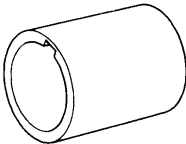
SEALANTS

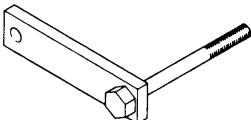
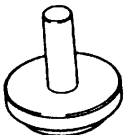
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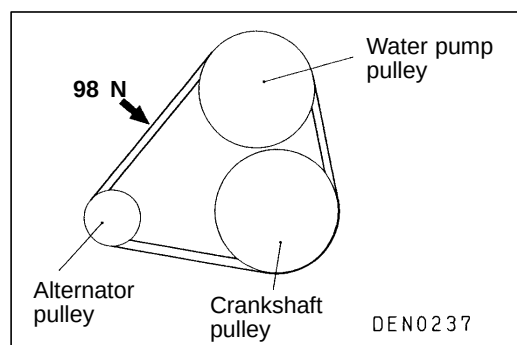
Items	Specified sealant	Remarks
Oil pan	MITSUBISHI GENUINE PART MD970389 or equivalent	Semi-drying sealant
Semi-circular packing and rocker cover seal, and cylinder head seal	3M ATD Part No. 8660 or equivalent	

SPECIAL TOOLS

11100060327

Tool	Number	Name	Use
	MD998384	Prestroke measuring adapter	Adjustment of the injection timing
	MD998721	Crankshaft pulley holder	Holding the crankshaft pulley
	MB990767	End yoke holder	Holding the camshaft sprocket
	MD998719	Crankshaft pulley holder pin	
	MD998381	Camshaft oil seal installer	Installing the camshaft oil seal
	MD998727	Oil pan remover	Removal of oil pan
	MD998051	Cylinder head bolt wrench	Removal and installation of the cylinder head bolt
	MD998382	Crankshaft front oil seal installer	Installing the crankshaft front oil seal
	MD998383	Crankshaft front oil seal guide	

Tool	Number	Name	Use
	MD998781	Flywheel stopper	Securing the flywheel
	MD998376	Crankshaft rear oil seal installer	Press-fitting the crankshaft rear oil seal



ON-VEHICLE SERVICE

11100090333

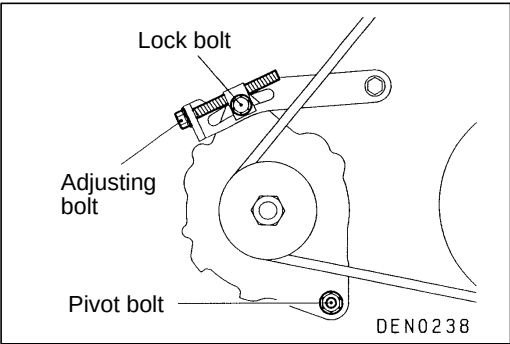
DRIVE BELT TENSION CHECK AND ADJUSTMENT

ALTERNATOR DRIVE BELT TENSION CHECK

Use a belt tension gauge to check that the belt tension is at the standard value at a point half-way between the two pulleys as shown in the illustration. In addition, press this section with a force of 98 N and check that the amount of belt deflection is at the standard value.

Standard value (for each belt):

Tension N	245 – 441
Deflection (Reference value) mm	12.0 – 17.0



ALTERNATOR DRIVE BELT TENSION ADJUSTMENT

1. Loosen the nut of the alternator pivot bolt.
2. Loosen the lock bolt.
3. Use the adjusting bolt to adjust the belt tension and belt deflection to the standard values.

Standard value (for each belt):

Items	When a used belt is installed	When a new belt is installed
Tension N	294 – 392	392 – 588
Deflection (Reference value) mm	13.0 – 16.0	10.0 – 13.0

4. Tighten the nut of the alternator pivot bolt.

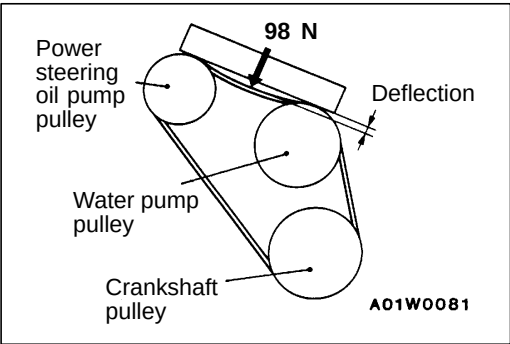
Tightening torque: 44 Nm

5. Tighten the lock bolt.

Tightening torque: 22 Nm

6. Tighten the adjusting bolt.

Tightening torque: 9.8 Nm



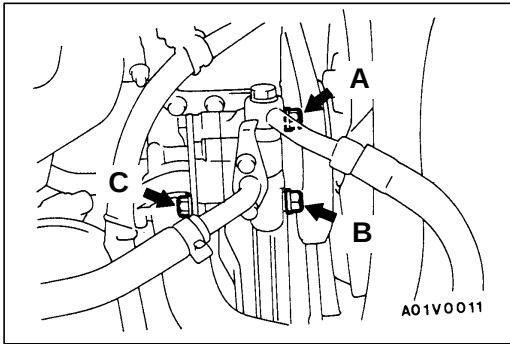
POWER STEERING OIL PUMP DRIVE BELT TENSION CHECK AND ADJUSTMENT

11100110152

1. Use a belt tension gauge to check that the belt tension is at the standard value at a point half-way between the two pulleys (indicated by an arrow in the illustration). In addition, press this section with a force of 98 N and check that the amount of belt deflection is at the standard value.

Standard value:

Items	When checked	When a used belt is intalled	When a new belt is installed
Tension N	294 – 490	343 – 441	490 – 686
Deflection (Reference value) mm	8.0 – 12.0	9.0 – 11.5	6.0 – 8.0



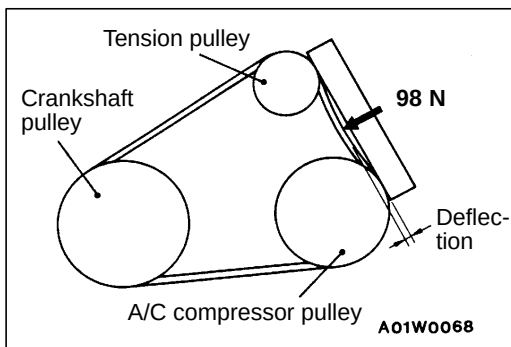
2. If the tension or deflection is outside the standard value, adjust by the following procedure.
 - (1) Loosen power steering oil pump fixing bolts A, B and C.
 - (2) Adjust the amount of belt deflection using adjusting bolt D.
 - (3) Tighten fixing bolts A, B and C.

Tightening torque: 22 Nm

- (4) Check the belt deflection amount and tension, and readjust if necessary.

Caution

Check after turning the crankshaft once or more clockwise (right turn).



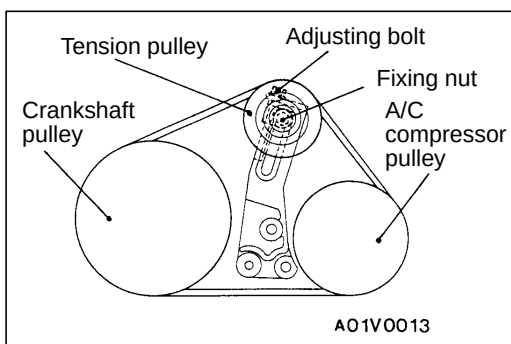
AIR CONDITIONER COMPRESSOR DRIVE BELT TENSION CHECK AND ADJUSTMENT

11100100142

1. Use a belt tension gauge to check that the belt tension is at the standard value at a point half-way between the two pulleys (indicated by an arrow in the illustration). In addition, press this section with a force of 98 N and check that the amount of belt deflection is at the standard value.

Standard value:

Items	When checked	When a used belt is intalled	When a new belt is installed
Tension N	320 – 400	320 – 400	480 – 560
Deflection (Reference value) mm	6.0 – 7.0	6.0 – 7.0	4.5 – 5.5

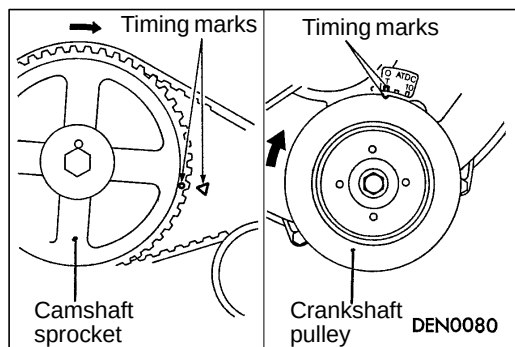


2. If the tension or deflection is outside the standard value, adjust by the following procedure.
 - (1) Loosen tension pulley fixing nut.
 - (2) Adjust belt tension with adjusting bolt.
 - (3) Tighten fixing nut.

- (4) Check the belt deflection amount and tension, and readjust if necessary.

Caution

Check after turning the crankshaft once or more clockwise (right turn).



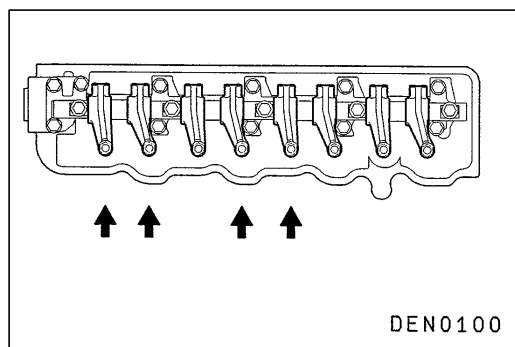
VALVE CLEARANCE CHECK AND ADJUSTMENT

11100150109

1. Start the engine and allow it to warm up until the engine coolant temperature reaches 80 to 90 °C.
2. Remove the timing belt upper cover.
3. Remove the rocker cover.
4. Align the camshaft sprocket timing marks and set the No. 1 cylinder at top dead centre.

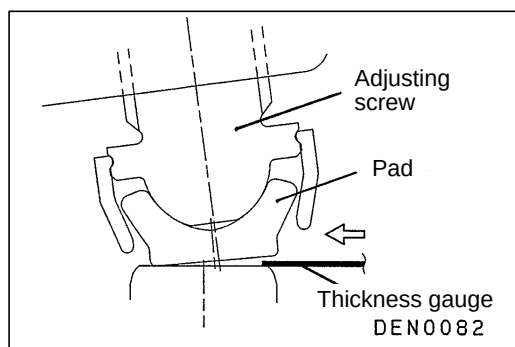
Caution

The crankshaft should always be turned in a clockwise direction.



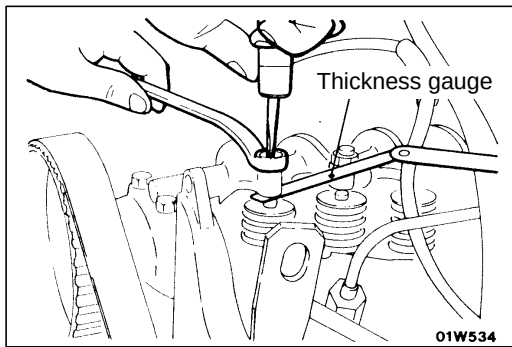
5. Measure the valve clearance at the places indicated by arrows in the illustration.

Standard value: 0.25 mm

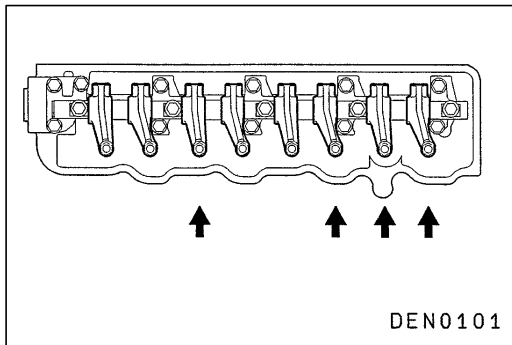


NOTE

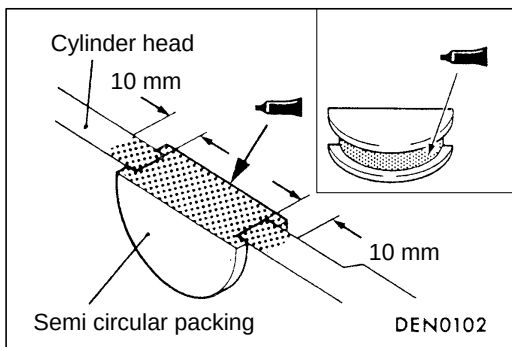
Insert the thickness gauge from the centre of the cylinder head towards the outside so that it doesn't touch the pad.



6. If the clearance is outside the standard value, loosen the lock nut of the rocker arm and adjust by turning the adjusting screw while using a thickness gauge to measure the clearance.
7. Tighten the lock nut while holding the adjusting screw with a screwdriver so that it doesn't turn.
8. Turn the crankshaft 360° clockwise to bring No. 4 cylinder to the top dead centre position.



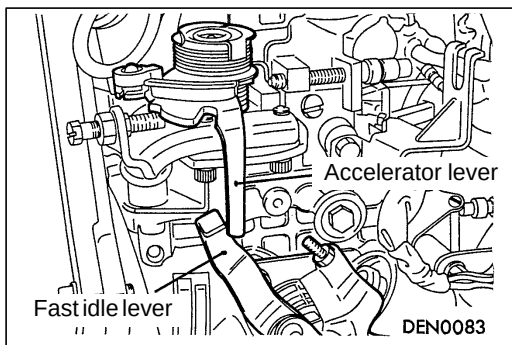
9. Measure the valve clearances at the places indicated by arrows in the illustration. If the clearance is not within the standard value, repeat steps 7 and 8 above.



10. Apply specified sealant to the section of the semi-circular packing shown in the illustration.

Specified sealant: 3M ATD Part No. 8660 or equivalent

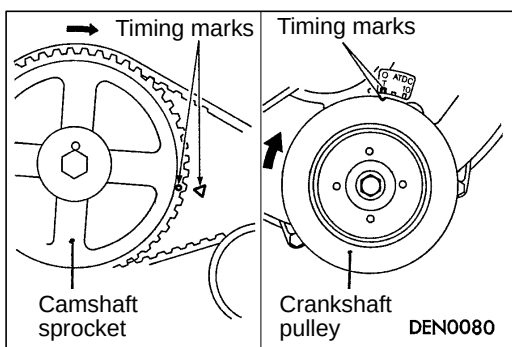
11. Install the rocker cover.
12. Install the timing belt upper cover.



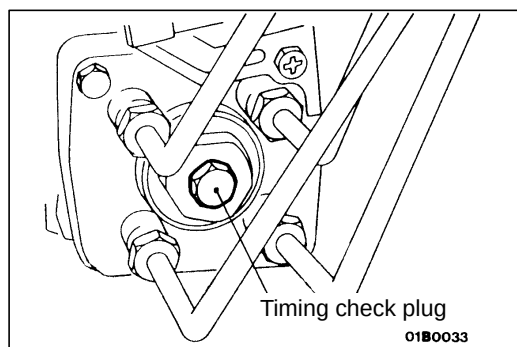
INJECTION TIMING CHECK AND ADJUSTMENT

11100180023

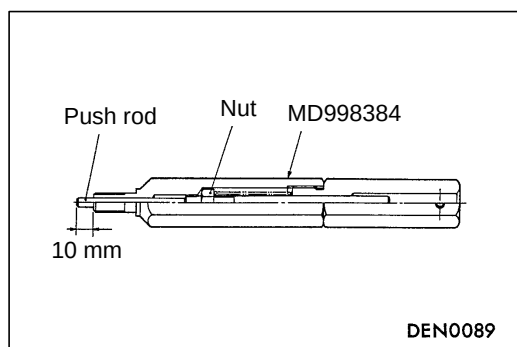
1. Warm up the engine and then check to be sure that the fast idle lever is separated from the throttle lever.
2. Remove all of the glow plugs.
3. Remove the timing belt upper cover.



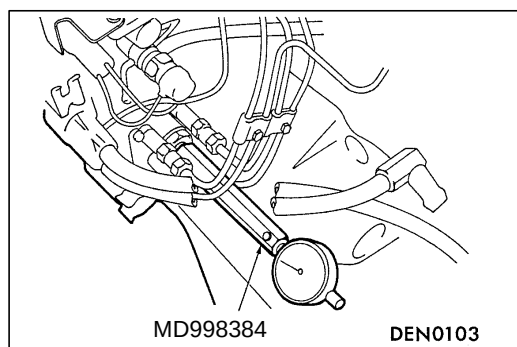
4. Align the timing marks of the camshaft sprocket and set the No. 1 cylinder to the top dead centre position.



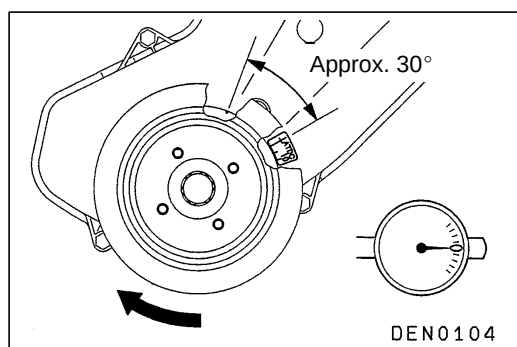
5. Remove the timing check plug at the rear of the injection pump.



6. Before installation of special tool, make sure that push rod is protruding by 10 mm. Protrusion of push rod can be adjusted with an inner nut.
7. Connect the dial gauge to the special tool.



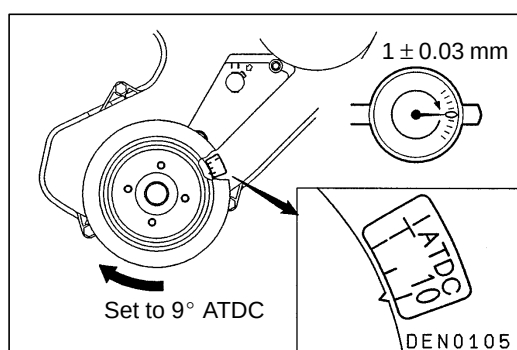
8. Install the special tool to the check plug at the rear of the injection pump.



9. Turn the crankshaft clockwise to move the No. 1 cylinder approximately 30° before compression top dead centre.
10. Set the needle of the dial gauge to 0.
11. Check that the needle doesn't move even if the crankshaft is turned slightly (2 – 3°) in both clockwise and anti-clockwise direction.

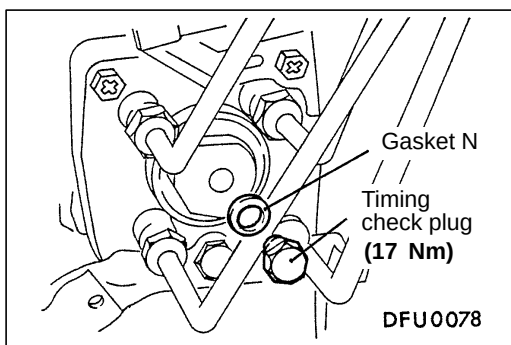
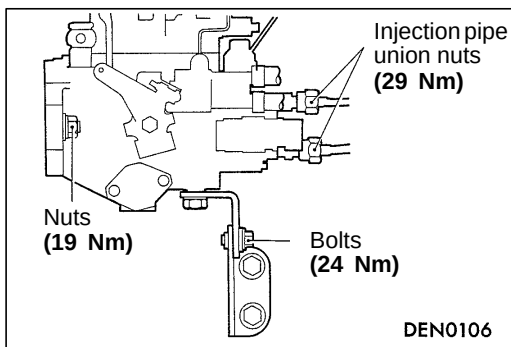
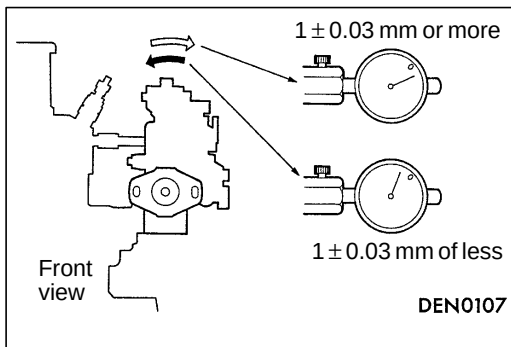
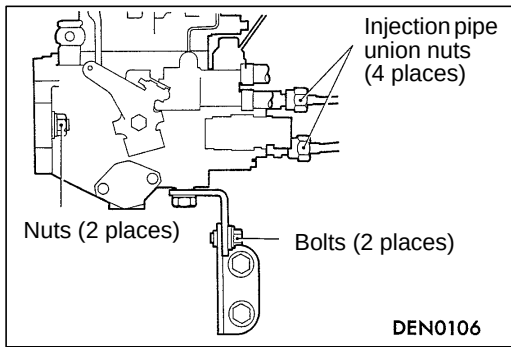
NOTE

If the needle moves, the notch is not positioned properly, so once again move the No. 1 cylinder approximately 30° before compression top dead centre.



12. Turn the crankshaft clockwise to align the No. 1 cylinder to 9° ATDC.
13. Check that the value indicated on the dial gauge is at the standard value.

Standard value: 1 ± 0.03 mm



14. If the needle is outside the standard value, adjust the injection timing by the following procedure.

- (1) Loosen the injection pipe union nuts (4 places) on the injection pump. (Do not remove the union nuts.)

Caution

When loosening the nuts, hold the delivery valve holders with a spanner so that they don't turn at the same time.

- (2) Loosen the upper mounting nuts and the lower mounting bolts of the injection pump. (Do not remove the nut and bolt.)
- (3) Tilt the injection pump to the left and right and adjust the needle on the dial gauge so that the display value is uniform.
- (4) Provisionally tighten the mounting nut and bolt of the injection pump.
- (5) Repeat steps 9 – 13 to check if the adjustment has been made correctly.

- (6) Tighten the mounting nuts and bolts to the specified torque.

- (7) Tighten the injection pump union nuts to the specified torque.

Caution

When tightening the nuts, hold the delivery valve holders with a spanner so that they don't turn at the same time.

15. Remove the special tool.

16. Install a new gasket to the timing check plug.

17. Tighten the timing check plug to the specified torque.

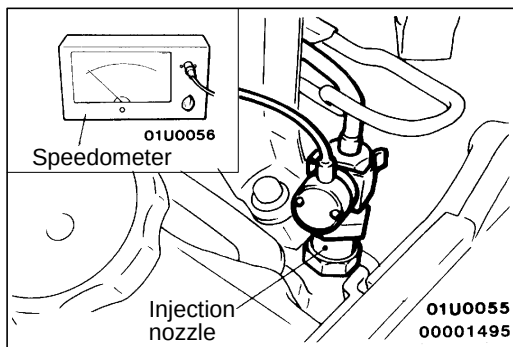
IDLE SPEED CHECK AND ADJUSTMENT

11100190347

NOTE

Check that the injection timing is normal

1. Before inspection, set the vehicle to the pre-inspection condition.



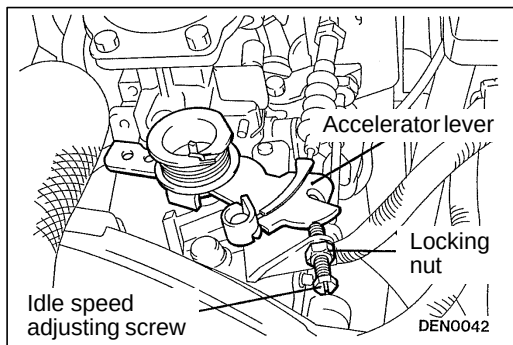
2. Connect the speedometer to the injection nozzle or the injection pipe.

Caution

When the speedometer is connected to the injection pipe, the pipe mounting clamps should all be removed.

3. Start the engine and run it at idle.
4. Check the idle speed.

Standard value: 750 ± 100 r/min



5. If not within the standard value, loosen idle adjusting screw lock nut and adjust the idle speed by rotating adjusting screw. And tighten locking nut.

IDLE-UP MECHANISM CHECK AND ADJUSTMENT-FOR A/C

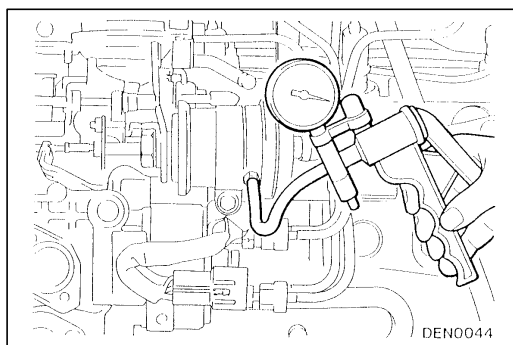
11100230032

Refer to GROUP 55 – On-vehicle Service.

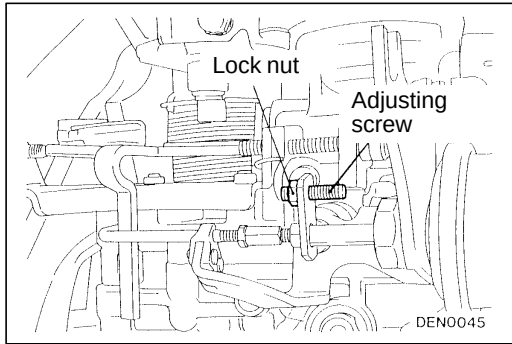
IDLE-UP MECHANISM CHECK AND ADJUSTMENT-FOR ABS

11100230025

1. Before inspection, set the vehicle to the pre-inspection condition.



2. Inspect and adjust the idle speed.
3. Disconnect the vacuum hose (for anti-skid brakes: blue stripe) from the idle-up actuator.
4. Connect a hand vacuum pump to the nipple of the removed vacuum hose.
5. Connect the speedometer.
6. Start the engine and run it at idle.



7. Check the engine speed when a negative pressure of 87 kPa is applied.

Standard value: 1,900 ± 100 r/min

8. If the engine speed is outside the standard value, loosen the lock nut on the actuator rod and adjust by turning the adjusting screw.
9. Tighten the lock nut while making sure that the adjusting screw doesn't turn.

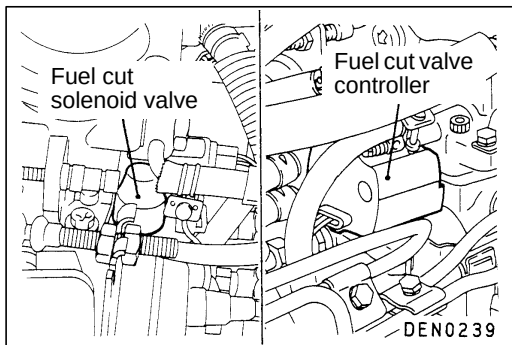
COMPRESSION PRESSURE CHECK

11100260369

1. Before inspection, check that the engine oil, starter and battery are normal. In addition, set the vehicle to the pre-inspection condition.
2. Remove all of the glow plugs.

Caution

Be careful not to subject the glow plugs to any shocks.



3. Disconnect the fuel cut solenoid valve connector or fuel cut valve controller.

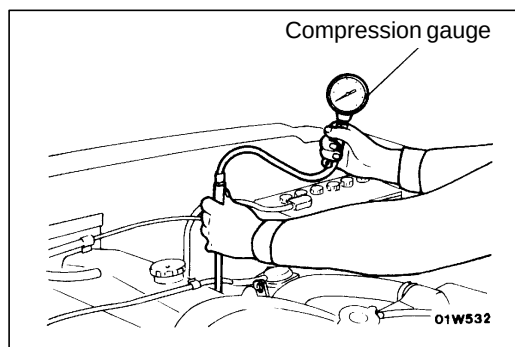
NOTE

Doing this will prevent carrying out fuel injection.

4. Cover the glow plug hole with a shop towel etc., and after the engine has been cranked, check that no foreign material is adhering to the shop towel.

Caution

1. **Keep away from the glow plug hole when cranking**
2. **If compression is measured with water, oil, fuel, etc., that has come from cracks inside the cylinder, these materials will become heated and will gush out from glow plug hole, which is dangerous.**



5. Set compression gauge to one of the glow plug holes.
6. Crank the engine and measure the compression pressure.

Standard value (at engine speed of 280 r/min):
3,040 kPa

Limit (at engine speed of 280 r/min): min. 2,200 kPa

7. Measure the compression pressure for all the cylinders, and check that the pressure differences of the cylinders are below the limit.

Limit: max 300 kPa

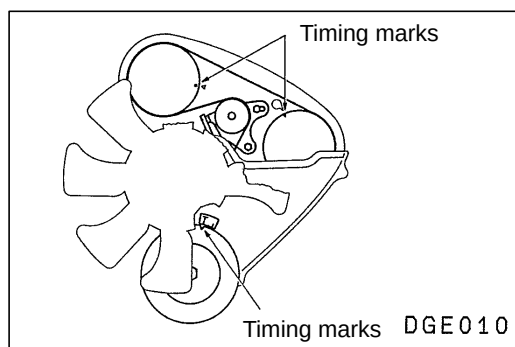
8. If there is a cylinder with compression or a compression difference that is outside the limit, pour a small amount of engine oil through the glow plug hole, and repeat the operations in steps (6) and (7).
 - (1) If the compression increases after oil is added, the cause of the malfunction is a worn 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 fuel cut solenoid valve connector or fuel cut valve controller connector.
10. Install the glow plugs.

Tightening torque: 18 Nm

TIMING BELT TENSION ADJUSTMENT

11100280136

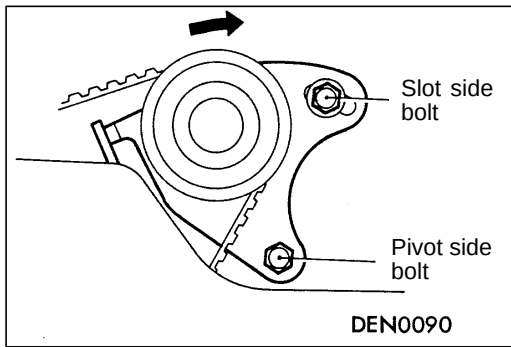
1. Remove timing belt upper cover.
2. Turn the crankshaft in the clockwise direction and check the timing belt around its entire circumference for abnormalities.



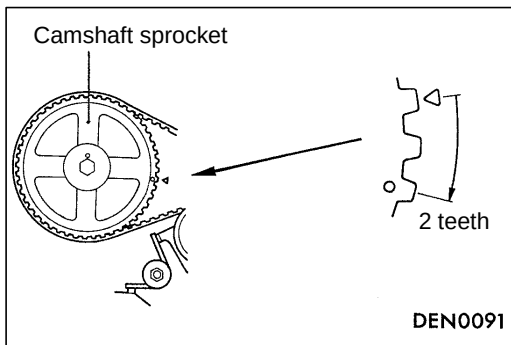
3. Align the timing marks on the sprockets with the timing marks on the front upper case.

Caution

When aligning the timing mark, be sure not to turn the crankshaft in the counterclockwise direction as this can cause improper belt tension.

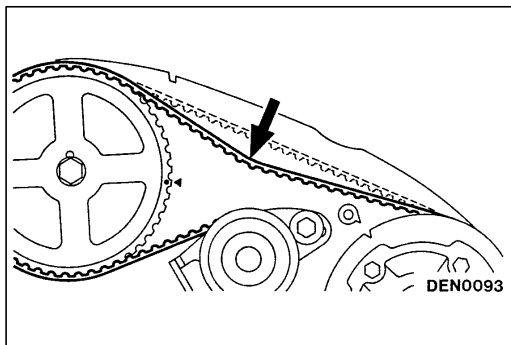


4. Loosen the tensioner pivot side bolt 1 turn and slot side bolt 1 or 2 turns.



5. Turn the crankshaft clockwise and stop at the second lobe of the camshaft sprocket.
6. First tighten tensioner slot side bolt, and then tighten pivot side bolt to the specified torque.

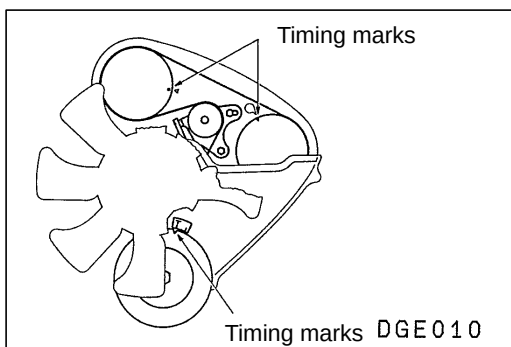
Tightening torque: 25 Nm



7. Turn the crankshaft anti-clockwise to align the timing marks.
8. Push down belt at a point halfway with a forefinger to check that tension of belt is up to standard value.

Standard value: 4 – 5 mm

9. Mount the timing belt upper cover.



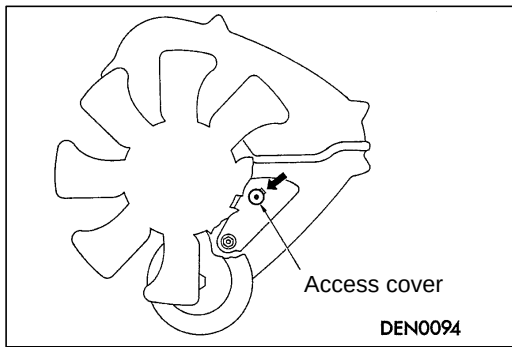
TIMING BELT “B” TENSION ADJUSTMENT

11100280143

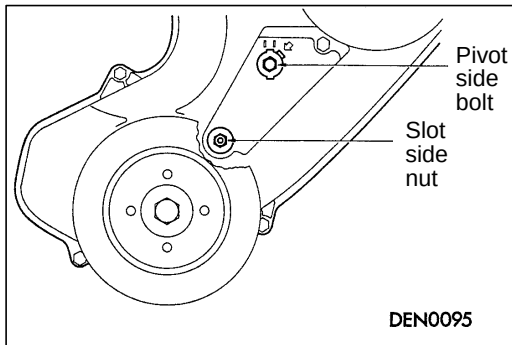
1. Remove timing belt upper cover.
2. Turn the crankshaft in the clockwise direction and check the timing belt around its entire circumference for abnormalities.
3. Align the timing marks on the sprockets with the timing mark on the front upper case.

Caution

When aligning the timing mark, be sure not to turn the crankshaft in the counterclockwise direction as this can cause improper belt tension.



4. Remove the access cover.

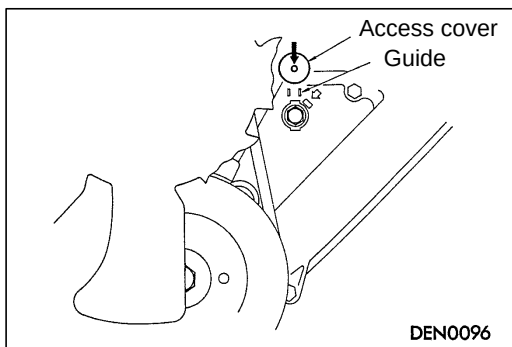


5. Loosen the tensioner pivot side bolt 1 mm and slot side nut 1 or 2 turns.
6. First tighten tensioner slot side nut, and then tighten pivot side bolt to the specified torque.

Tightening torque:

Pivot side bolt 24 Nm

Slot side nut 25 Nm



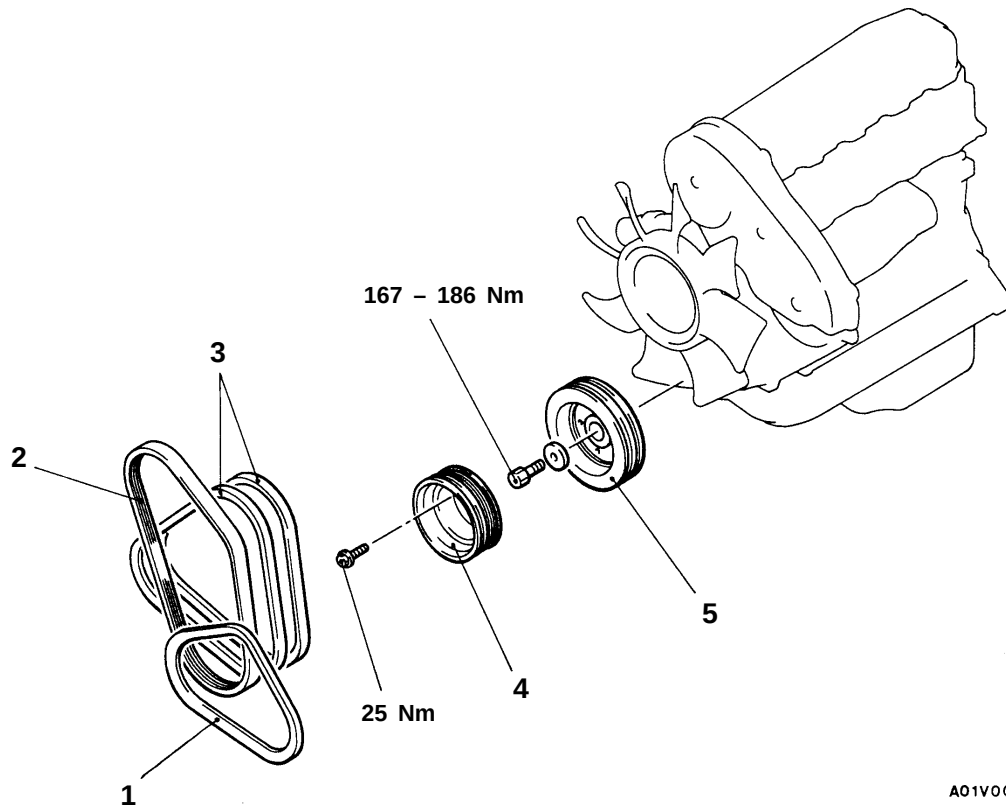
7. Install the access cover while sliding the front lower cover down along the two guides.
8. Install the timing belt upper cover.

CRANKSHAFT PULLEY**REMOVAL AND INSTALLATION****Pre-removal Operation**

- Under Cover Removal

Post-installation Operation

- Drive Belt Tension Adjustment (Refer to P.11B-5.)
- Under Cover Installation

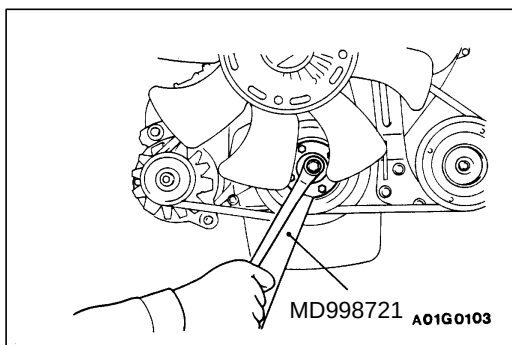


A01V0009

Removal steps

1. Drive belt (for A/C)
2. Drive belt (for power steering)
3. Drive belt (for alternator)
4. Crankshaft pulley (for power steering or A/C)
5. Crankshaft pulley

◀A▶ ▶A◀

**REMOVAL SERVICE POINT**

◀A▶ CRANKSHAFT PULLEY REMOVAL

INSTALLATION SERVICE POINT

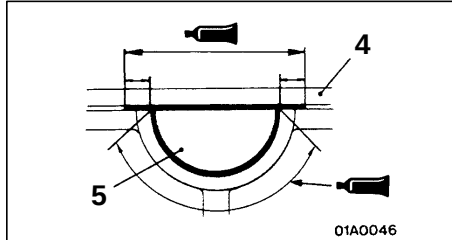
▶A◀ CRANKSHAFT PULLEY INSTALLATION

CAMSHAFT AND CAMSHAFT OIL SEAL

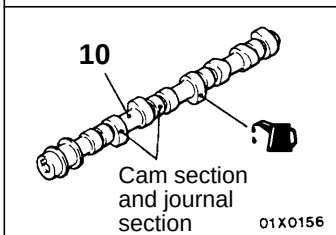
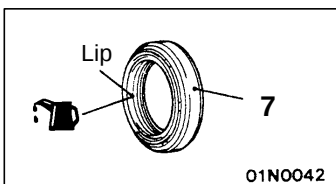
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

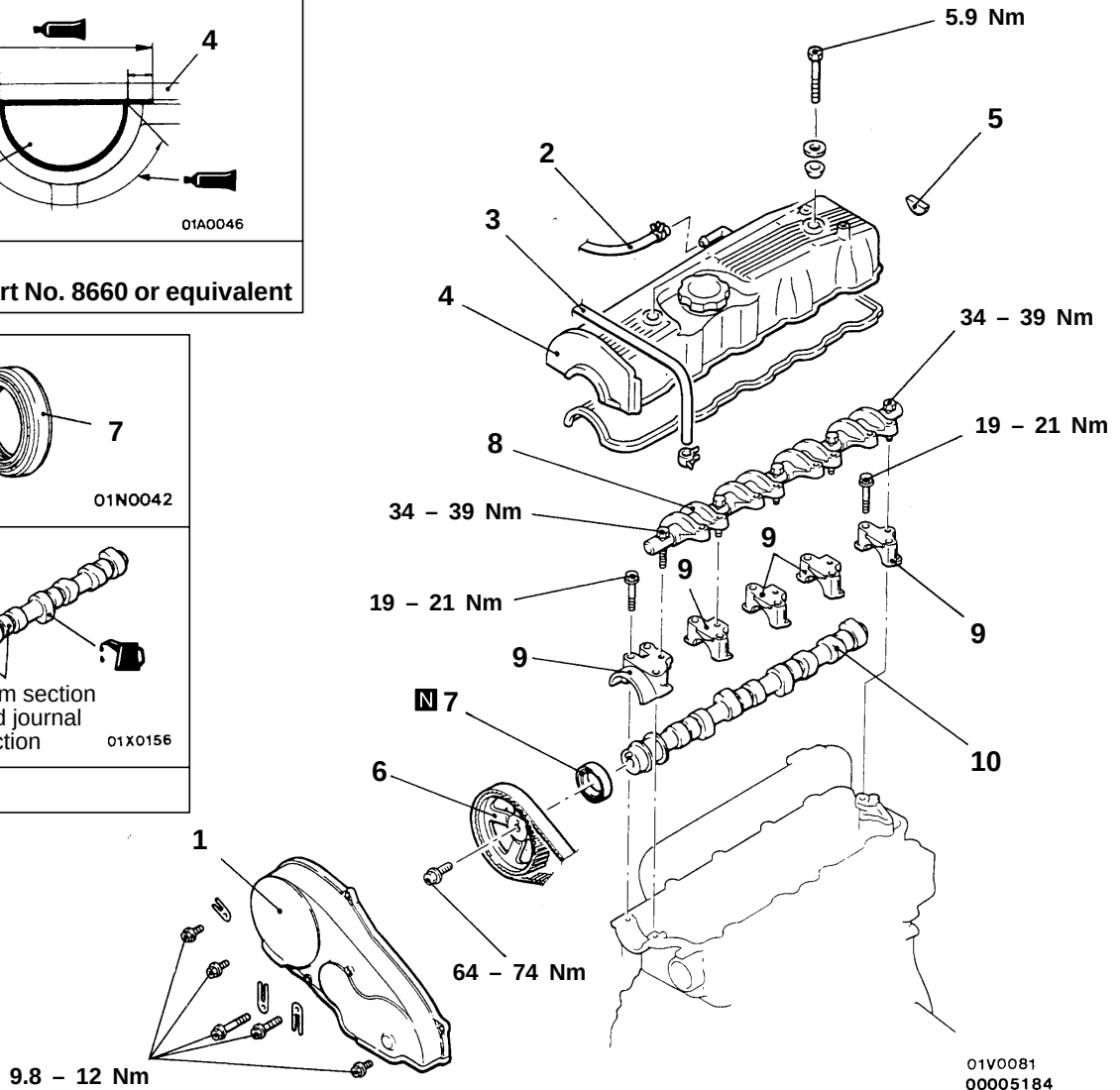
- Intercooler Removal and Installation <4WD> (Refer to GROUP 15.)



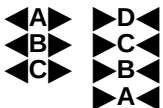
Sealant:
3M ATD Part No. 8660 or equivalent



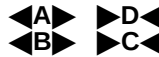
Engine oil

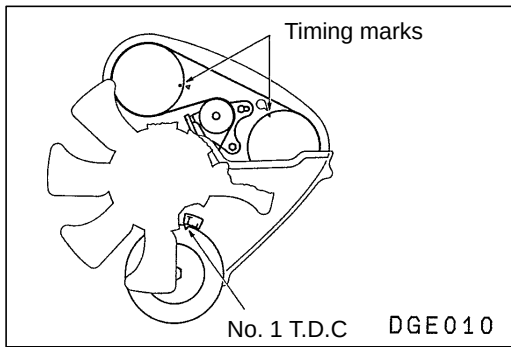
**Camshaft removal steps**

1. Timing belt upper cover assembly
2. Breather hose connection
3. Boost hose connection <4WD>
4. Rocker cover
5. Semi-circular packing
6. Camshaft sprocket
7. Camshaft oil seal
8. Rocker arm and shaft assembly
9. Camshaft bearing cap
10. Camshaft

**Camshaft oil seal removal steps**

1. Timing belt upper cover assembly
6. Camshaft sprocket
7. Camshaft oil seal





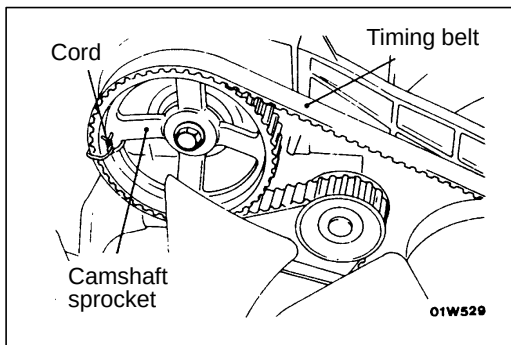
REMOVAL SERVICE POINTS

◀A▶ CAMSHAFT SPROCKET REMOVAL

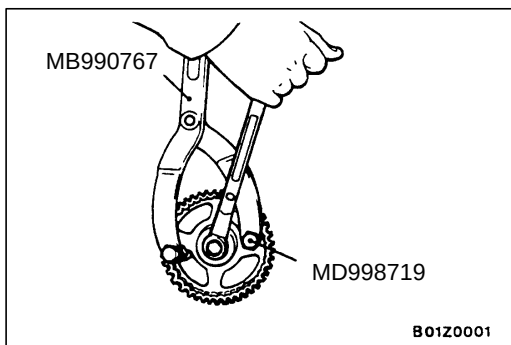
1. Rotate crankshaft clockwise (to the right) and align timing marks.

Caution

Never turn the crankshaft anticlockwise.



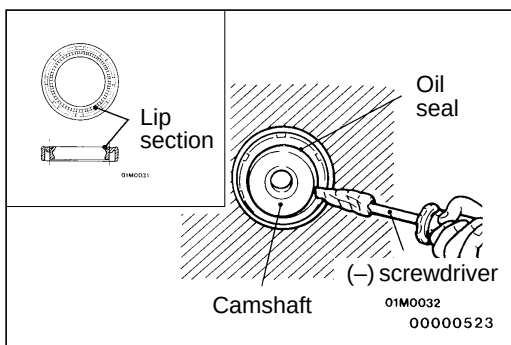
2. Tie the camshaft sprocket and timing belt together with cord so that timing mark is not maladjusted.



3. Use the special tool to stop the camshaft sprocket from turning, and then remove the camshaft sprocket with the timing belt still attached.

Caution

Do not rotate crankshaft after removing camshaft sprocket.



◀B▶ CAMSHAFT OIL SEAL REMOVAL

1. Make a notch in the oil seal lip section with a knife, etc.
2. Cover the end of a (-) screwdriver with a rag and insert into the notched section of the oil seal, and lever out the oil seal to remove it.

Caution

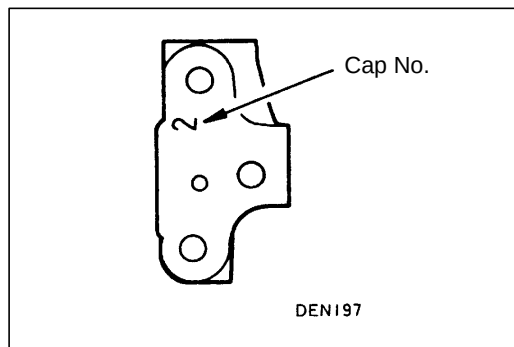
Be careful not to damage the camshaft and the cylinder head.

◀C▶ ROCKER ARM AND SHAFT ASSEMBLY REMOVAL

Loosen the rocker arm and shaft assembly mounting bolt, and then remove the rocker arm and shaft assembly with the bolt still attached.

Caution

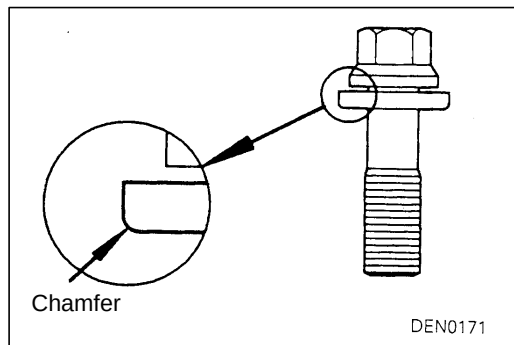
Never disassemble the rocker arm and shaft assembly.



INSTALLATION SERVICE POINTS

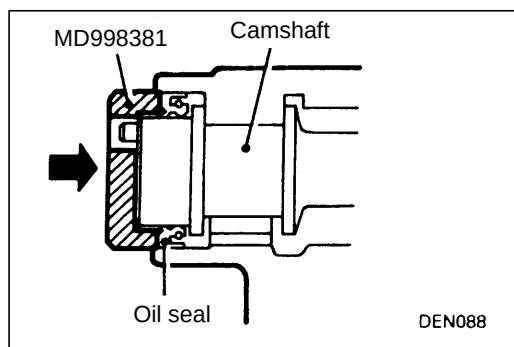
►A◄ CAMSHAFT BEARING CAP INSTALLATION

The cap numbers are embossed on the top surface of the bearing caps, so install in the order of the numbers. However, no numbers are embossed on bearing caps 1 and 5.



►B◄ ROCKER ARM AND SHAFT ASSEMBLY INSTALLATION

1. Install the rocker arm and shaft assembly to the bearing caps.
2. Set the washer so that it faces in the direction shown in the illustration, and then install the bolt.
3. Check the valve clearance and adjust if necessary. (Refer to P.11B-8.)



►C◄ CAMSHAFT OIL SEAL INSTALLATION

1. Apply a small amount of engine oil to the entire circumference of the oil seal lip and camshaft.
2. Use the special tool to tap in the oil seal.

NOTE

The oil seal should be tapped in until the distance from the end of the camshaft to the end of the oil seal is as shown in the illustration.

►D◄ CAMSHAFT SPROCKET INSTALLATION

1. Use the special tool in the same way as during removal to stop the camshaft sprocket from turning, and then tighten the bolt to the specified torque.

Tightening torque: 64 – 67 Nm

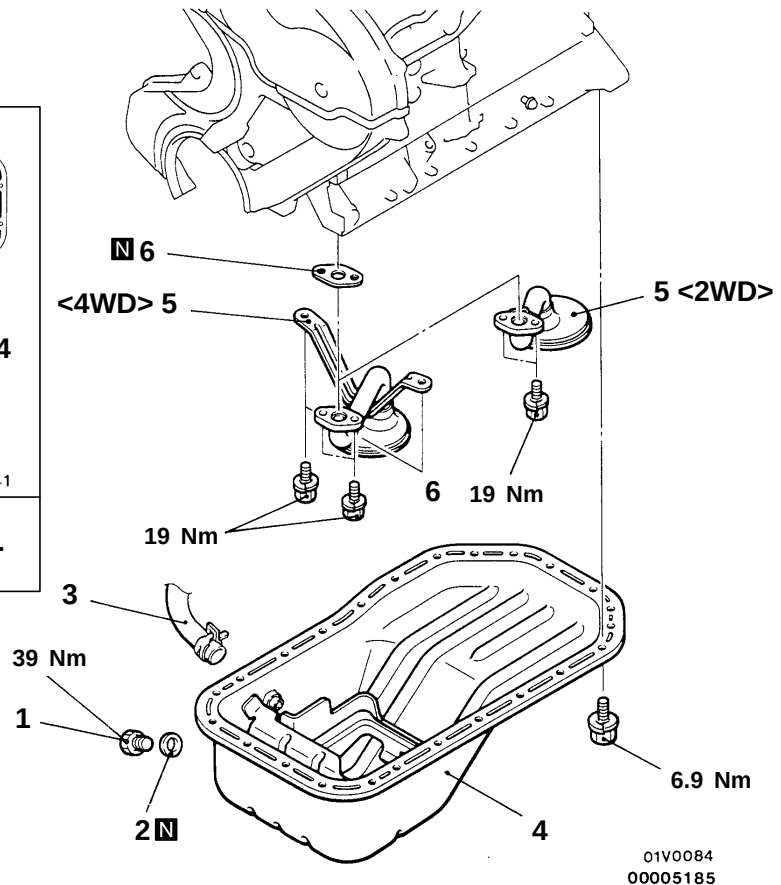
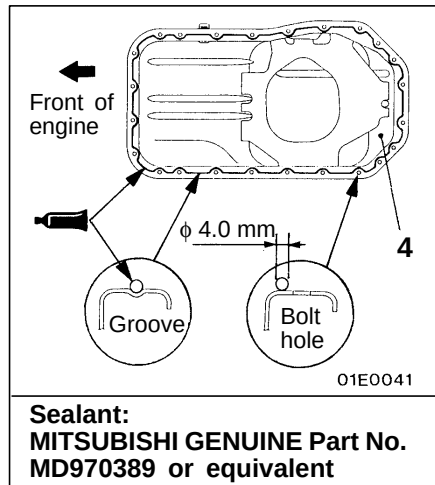
2. Remove the cord which binds the camshaft sprocket and timing belt.

OIL PAN AND OIL SCREEN

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

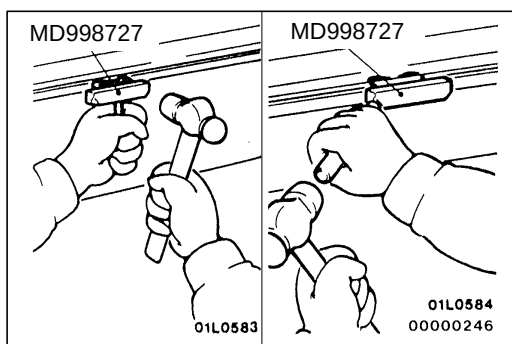
- Under Cover Removal and Installation
- Engine Oil Draining and Supplying
(Refer to GROUP 12 – On-vehicle Service.)

**Removal steps**

1. Drain plug
2. Drain plug gasket
3. Oil return hose connection



4. Oil pan
5. Oil screen
6. Gasket

**REMOVAL SERVICE POINT****◀A▶ OIL PAN REMOVAL**

1. Remove oil pan bolts.
2. Tap the special tool in between the oil pan and cylinder block.
3. Slide the special tool by tapping it at an angle to remove the oil pan.

Caution

The use of a screwdriver or chisel in place of the special tool can damage the gasket seat surface and cause oil leakage.

INSTALLATION SERVICE POINTS**►A◄ OIL PAN INSTALLATION**

1. Remove sealant from oil pan and cylinder block mating surfaces.
2. Degrease the sealant-coated surface and the engine mating surface.
3. Apply the specified sealant around the gasket surface of oil pan.

Specified sealant:

MITSUBISHI GENUINE PART No. MD970389 or equivalent

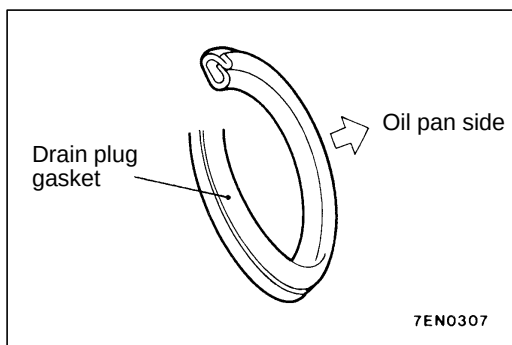
NOTE

The sealant should be applied in a continuous bead approximately 4 mm in diameter.

4. Assemble oil pan to cylinder block within 15 minutes after applying the sealant.

Caution

After installing the oil pan, wait at least 1 hour before starting the engine.

**►B◄ DRAIN PLUG GASKET INSTALLATION**

Install a new gasket in the direction so that it faces as shown in the illustration.

INSPECTION

11200260041

- Check oil pan for cracks.
- Check oil pan sealant-coated surface for damage and deformation.
- Check oil screen for cracked, clogged or damaged wire net and pipe.

CYLINDER HEAD GASKET

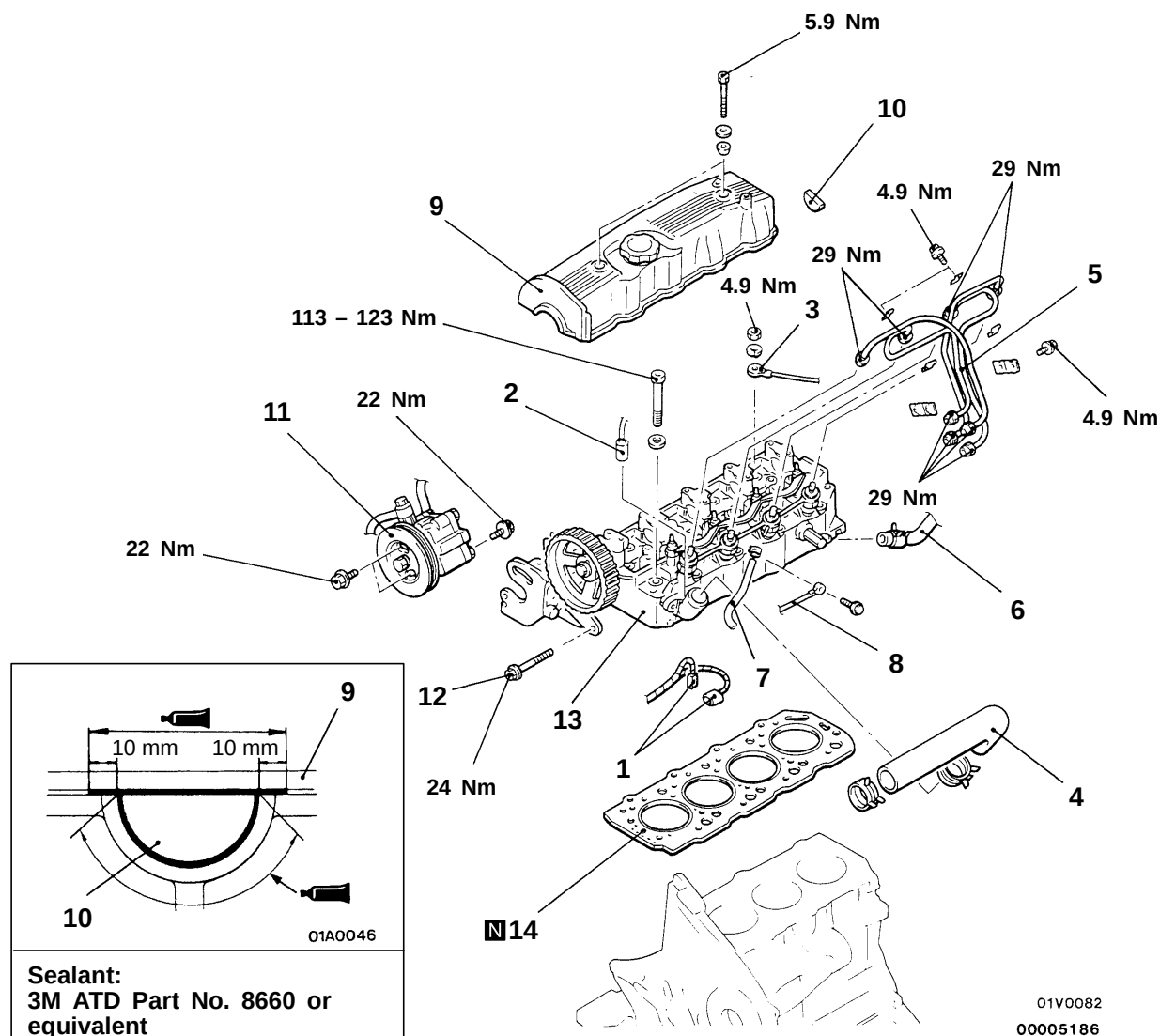
REMOVAL AND INSTALLATION

Pre-removal Operation

- Intake and Exhaust Manifold Removal (Refer to GROUP 15.)
- Timing Belt Removal (Refer to P.11B-26.)
- Engine Coolant Draining (Refer to GROUP 14 – On-vehicle Service.)

Post-installation Operation

- Timing Belt Installation (Refer to P.11B-26.)
- Intake and Exhaust Manifold Installation (Refer to GROUP 15.)
- Fuel Line Air Bleeding (Refer to GROUP 13E – On-vehicle Service.)
- Engine Coolant Filling (Refer to GROUP 14 – On-vehicle Service.)

**Removal steps**

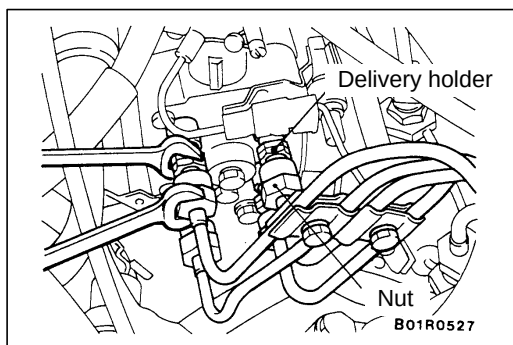
1. Engine coolant temperature switch connector (for A/C)
2. Engine coolant temperature gauge unit and sensor connector
3. Glow plug terminal
4. Radiator upper hose
5. Fuel injection pipe
6. Heater hose or water by-pass hose connection

7. Fuel hose connection
8. Earth cable connection
9. Rocker cover
10. Semi-circular packing
11. Power steering oil pump assembly
12. Power steering oil pump bracket bolt
13. Cylinder head assembly
14. Cylinder head gasket



REMOVAL SERVICE POINTS**◀A▶ RADIATOR UPPER HOSE DISCONNECTION**

After making mating marks on the radiator upper hose and the hose clamp, disconnect the radiator upper hose.

**◀B▶ FUEL INJECTION PIPE REMOVAL**

When loosening nuts at both ends of injection pipe, hold the delivery holder (for pump side) and the injection nozzle assembly (for nozzle side) with wrench and loosen nut.

Caution

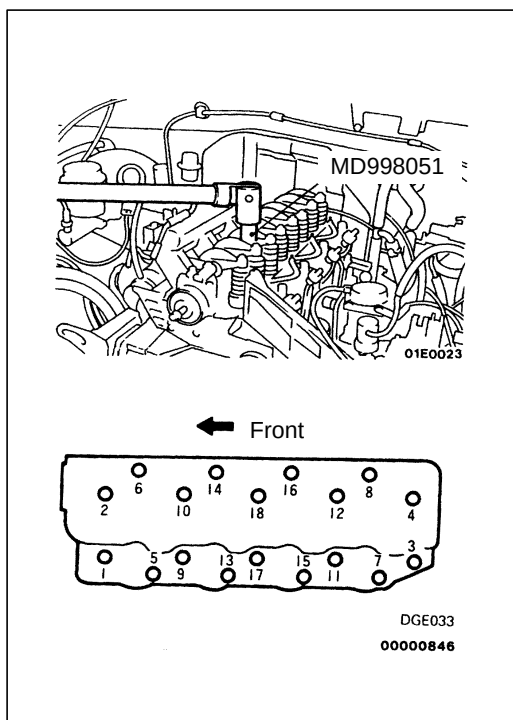
After disconnecting the injection pipe, plug the opening so that no foreign particles get inside the pump or into the injection nozzle.

◀C▶ POWER STEERING OIL PUMP REMOVAL

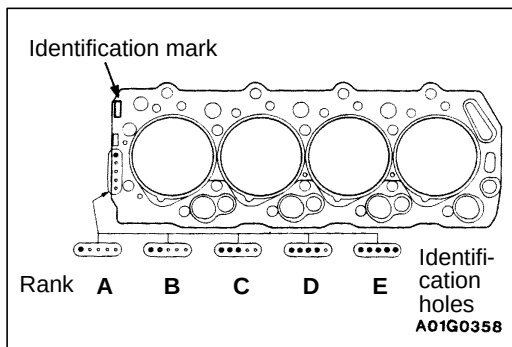
Remove the power steering oil pump from the bracket with the hose attached.

NOTE

Place the removed power steering oil pump in a place where it will not be a hindrance when removing and installing the engine assembly, and tie it with a cord.

**◀D▶ CYLINDER HEAD ASSEMBLY REMOVAL**

Use the special tool to tighten each bolt 2 – 3 times in the order shown in the illustration.



INSTALLATION SERVICE POINTS

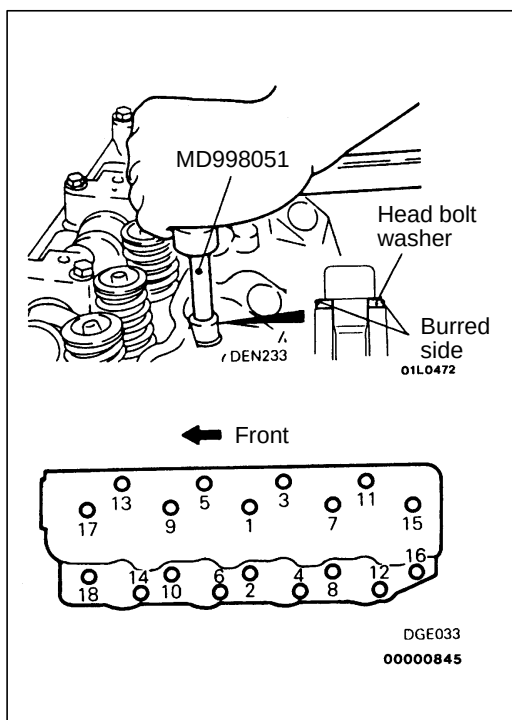
►A◄ CYLINDER HEAD GASKET INSTALLATION

1. Wipe off any oil or grease from the gasket mounting surface.
2. Check the rank from the number of identification holes on the cylinder head gasket that was removed, and select a cylinder head gasket of the same rank.

NOTE

The ranks are listed in the parts catalogue.

3. Place the cylinder head gasket on top of the cylinder block so that the identification mark is facing upwards as in the illustration.



►B◄ CYLINDER HEAD INSTALLATION

Use the special tool to tighten each bolt 2 – 3 times in the order shown in the illustration.

Caution

The head bolt washer should be installed so that the burred side is facing upwards.

►C◄ RADIATOR UPPER HOSE CONNECTION

To reuse the radiator upper hose, align the mating marks that were made during removal, and then install the hose clamp.

►D◄ FUEL INJECTION PIPE INSTALLATION

When tightening the nuts at both ends of the fuel injection pipe, hold the delivery holder (for pump side) and the injection nozzle assembly (for nozzle side) with a wrench, and tighten the nuts to the specified torque.

TIMING BELT AND TIMING BELT B

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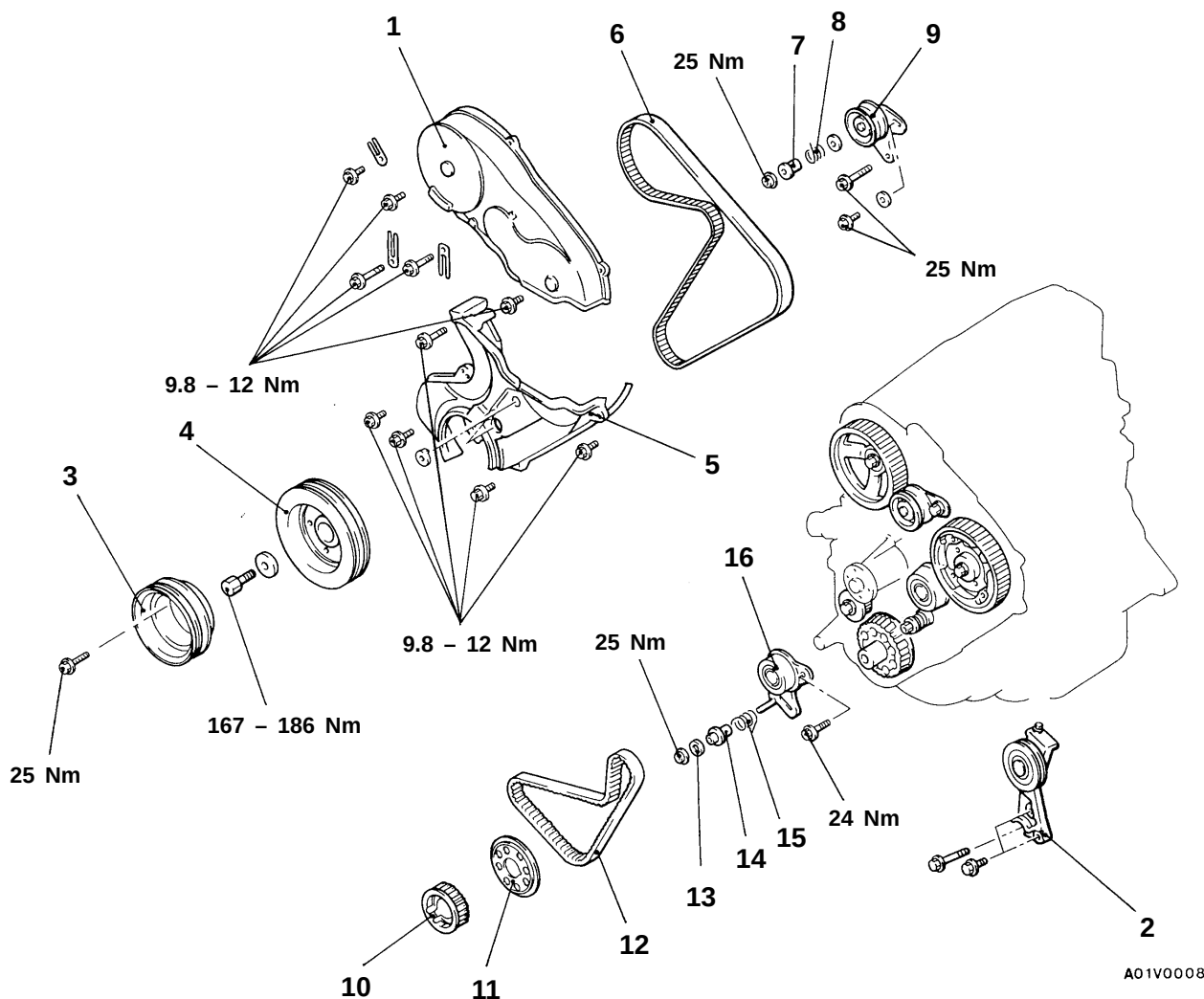
REMOVAL AND INSTALLATION

Pre-removal Operation

- Cooling Fan Removal (Refer to GROUP 14.)

Post-installation Operation

- Cooling Fan Installation (Refer to GROUP 14.)
- Engine Adjustment (Refer to P.11B-5.)

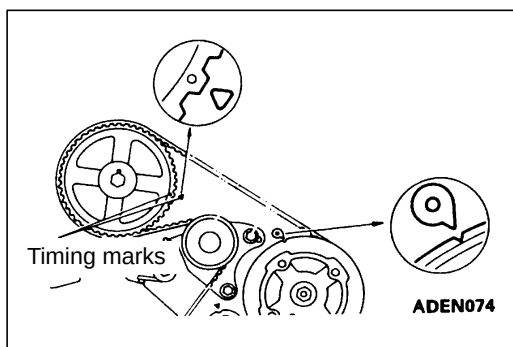
**Removal steps**

1. Timing belt front upper cover
2. Tension pulley bracket (for A/C)
3. Crankshaft pulley (for power steering and A/C)
4. Crankshaft pulley
5. Timing belt front lower cover
6. Timing belt
7. Tensioner spacer
8. Tensioner spring

9. Timing belt tensioner assembly
10. Crankshaft sprocket
11. Flange
12. Timing belt B
13. Gasket
14. Tensioner spacer B
15. Tensioner spring B
16. Timing belt tensioner B

◀A▶ ▶C▶
 ▶B▶ ▶B▶

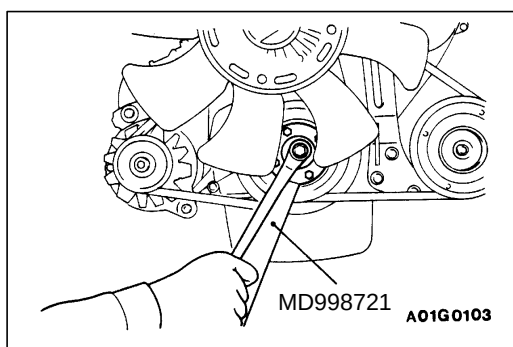
◀C▶ ▶A▶

**REMOVAL SERVICE POINTS****◀A▶ CRANKSHAFT PULLEY REMOVAL**

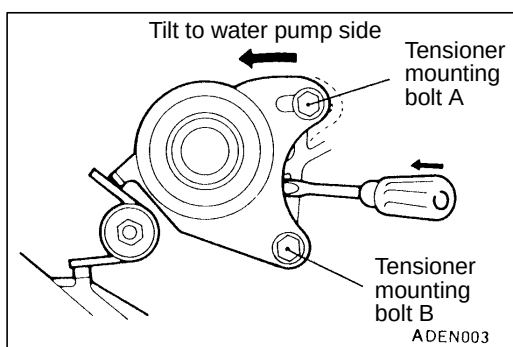
1. Position the No. 1 cylinder at compression TDC and remove the crankshaft pulley.

NOTE

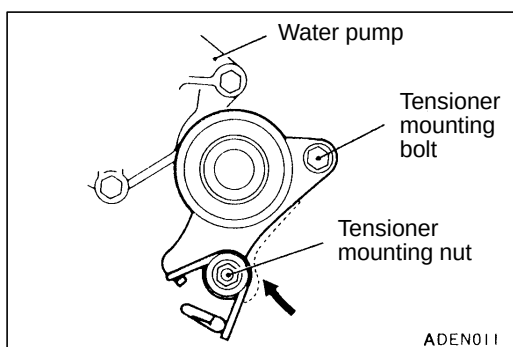
The No. 1 cylinder is at compression TDC when the marks are aligned as shown in the figure.



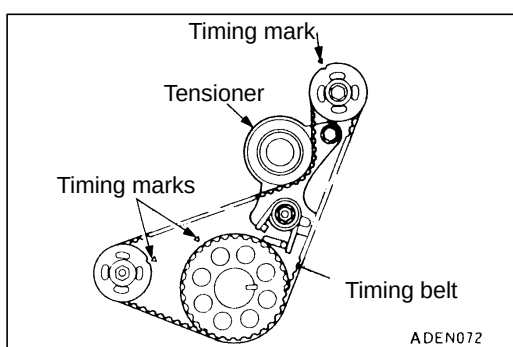
2. Use the special tool to keep crankshaft from turning and remove the bolts.

**◀B▶ TIMING BELT REMOVAL**

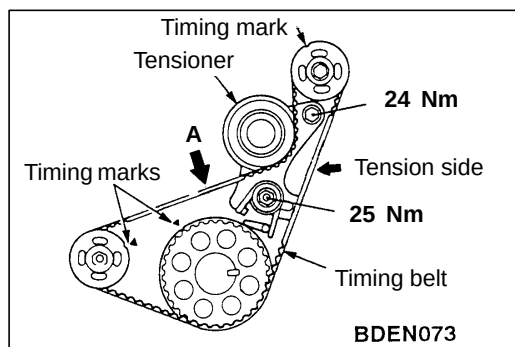
1. When reinstalling timing belt, mark an arrow at the belt to show rotation direction.
2. Loosen the tensioner mounting bolt A and B.
3. Push timing belt tensioner to water pump side and tighten the tensioner mounting bolt A and B. Secure so that tensioner will not move back.

**◀C▶ TIMING BELT B REMOVAL**

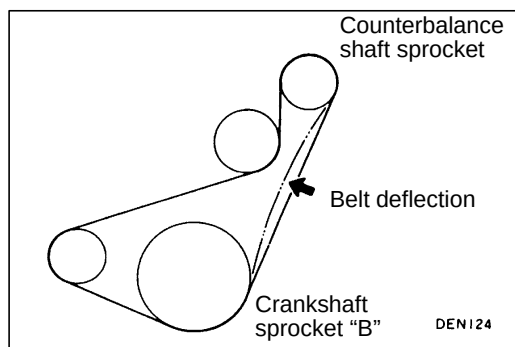
1. When reinstalling timing belt "B", mark an arrow at the belt to show rotation direction.
2. Loosen the tensioner mounting bolt and nut.
3. Push timing belt tensioner to water pump side and tighten the tensioner mounting bolt and nut. Secure so that tensioner will not move back.

**INSTALLATION SERVICE POINTS****▶A▶ TIMING BELT B INSTALLATION**

1. Align the timing marks of the 3 sprockets.
2. When reusing timing belt "B", make sure the arrow mark is pointing in the same direction as when the belt was removed.

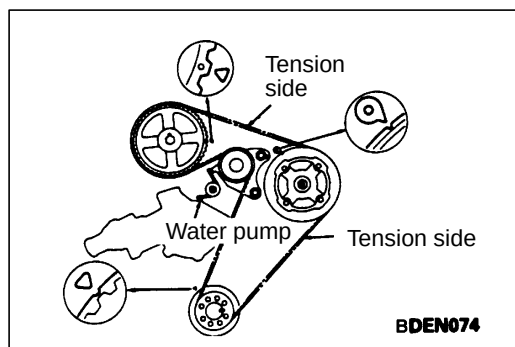


3. Install timing belt B and make sure there is no deflection on the tension side.
4. Press the deflection side of timing belt B (indicated by arrow (A)) with the hand and fully stretch the tensioner side.
5. Make sure that the timing marks are aligned.
6. Loosen the tensioner mounting bolt and nut so that only the pressure of the spring is applied to timing belt B.
7. Tighten the tensioner mounting bolt and nut, tightening the nut first. If the bolt is tightened first, the tensioner will move and tension the belt.



8. Press in the direction of the arrow in the figure with the index finger to check the amount of deflection.

Standard value: 4 – 5 mm

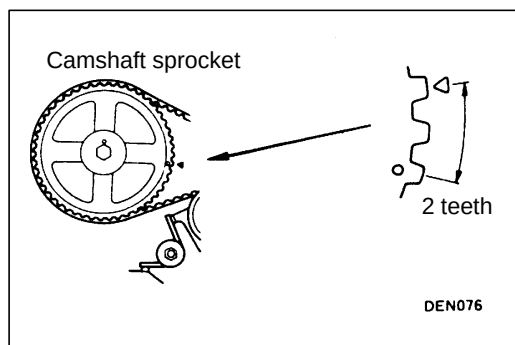


►B◄ TIMING BELT INSTALLATION

1. Align the timing marks of the 3 sprockets.
2. When reusing timing belt, make sure the arrow mark is pointing in the same direction as when the belt was removed.
3. Install the timing belt to the crankshaft sprocket, to injection pump sprocket, to tensioner and to camshaft sprocket in that order. Being careful not to allow deflection on the tension side of the timing belt.

Caution

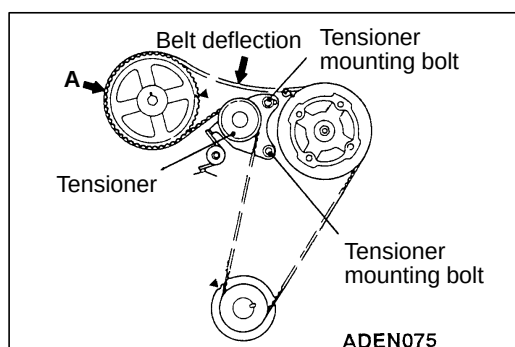
1. Engage the belt on the various sprockets while maintaining tension on the belt of tension side.
2. Align the injection pump sprocket with the timing mark, hold the sprocket so that it does not turn and engage the belt.



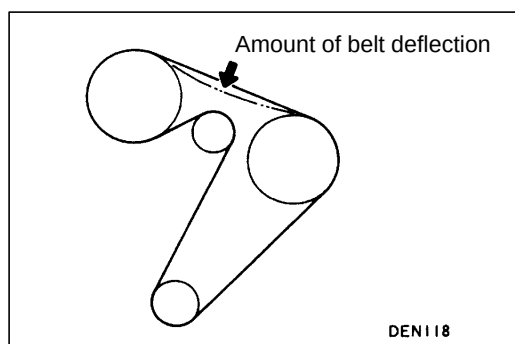
4. Loosen the tensioner mounting bolts and apply tension with the spring.
5. Turn the crankshaft clockwise and stop at the second lobe of the camshaft sprocket.

Caution

1. When turning the crankshaft in item (5), strictly observe the specified amount of rotation (2 teeth on the camshaft sprocket) in order to apply a constant force to the tension side of the belt.
2. Do not turn the crankshaft counterclockwise.
3. Do not touch the belt during adjustment.



6. Make sure that the part indicated by arrow A does not float upward.
7. Tighten the tensioner mounting bolts, starting with the bolt in the elongated hole. If the lower bolt is tightened first, belt tension will become too tight.



8. Turn the crankshaft anticlockwise and align the timing mark. Next, make sure that the timing marks of all sprockets are aligned.
9. Press on the centre of the bolt with an index finger to check the amount of deflection.

Standard value: 4 – 5 mm

►C◄ CRANKSHAFT PULLEY INSTALLATION

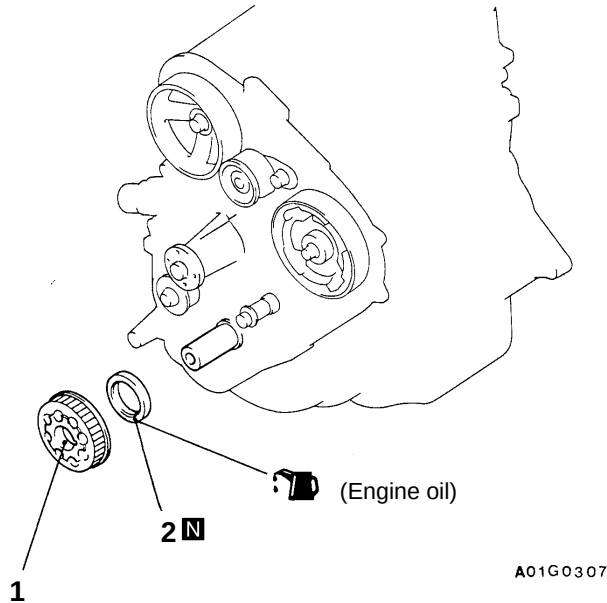
Using the special tool to install the crankshaft pulley as same as removal procedure.

CRANKSHAFT FRONT OIL SEAL

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

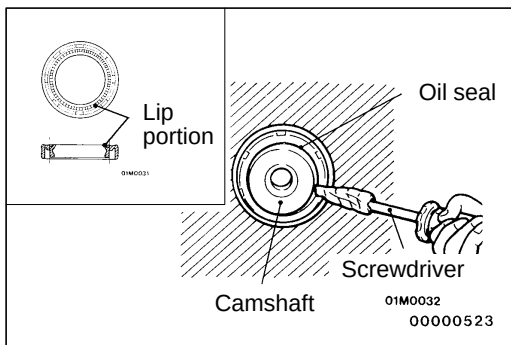
- Timing Belt and Timing Belt "B" Removal and Installation (Refer to P.11B-26.)



Removal steps



1. Crankshaft sprocket B
2. Oil seal



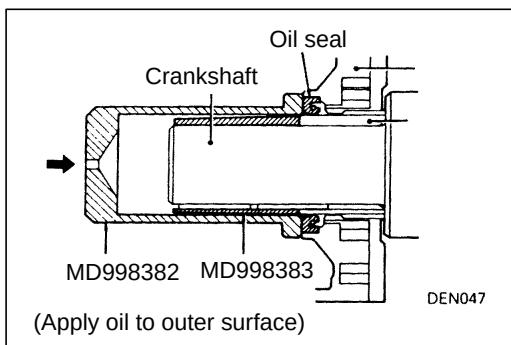
REMOVAL SERVICE POINT

◀A▶ OIL SEAL REMOVAL

1. Cut out a portion in the crankshaft 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

Be careful not to damage the crankshaft and front case.



INSTALLATION SERVICE POINT

▶A◀ OIL SEAL INSTALLATION

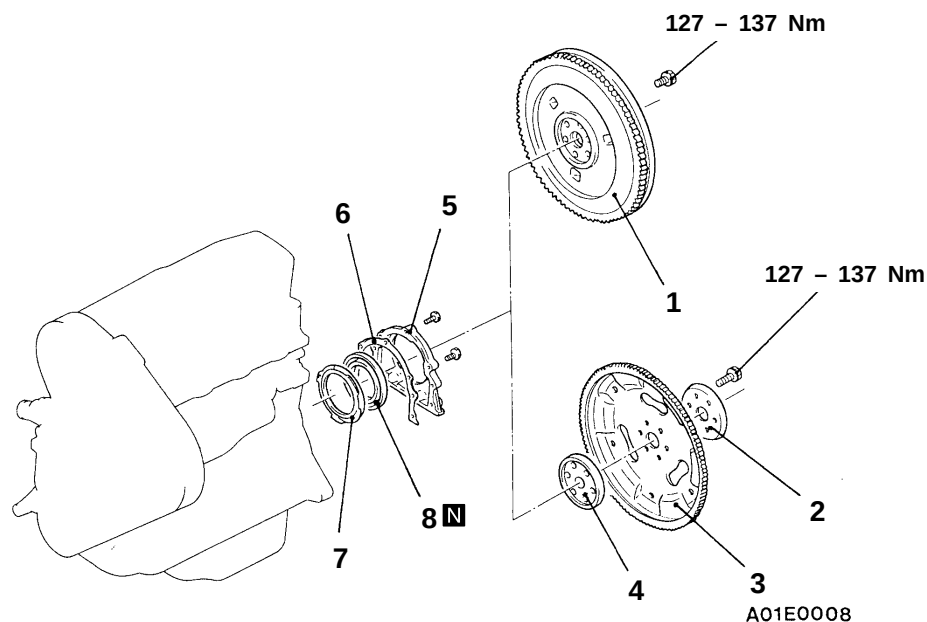
Apply engine oil to the outside of the special tool (MD998383) and to the oil seal lip, and use the special tool to press-fit the oil seal.

CRANKSHAFT REAR OIL SEAL

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

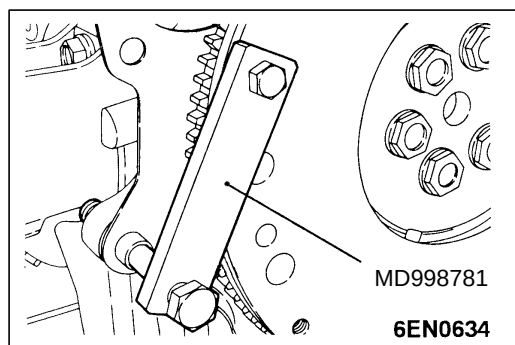
- Oil Pan Removal and Installation (Refer to P.11-21.)
- Transmission Assembly Removal and Installation (Refer to GROUP 22, 23.)

**Removal steps**

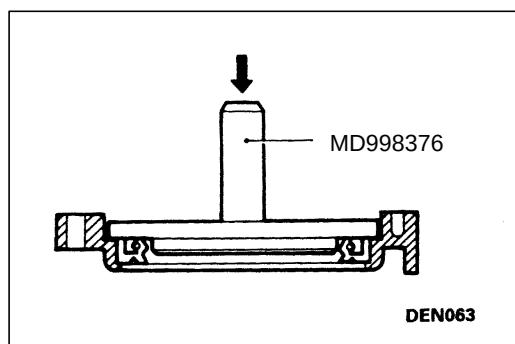
1. Flywheel assembly <M/T>
2. Adaptor plate <A/T>
3. Drive plate <A/T>
4. Crankshaft adaptor <A/T>

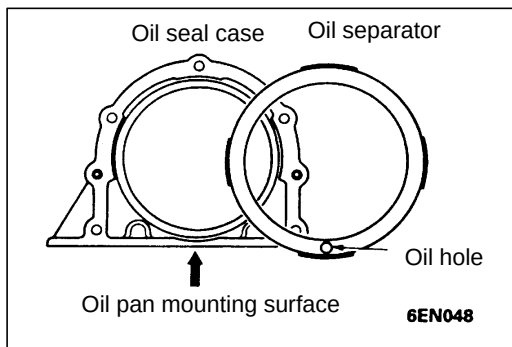


5. Oil seal case
6. Gasket
7. Oil separator
8. Oil seal

**REMOVAL SERVICE POINT****◀A▶ FLYWHEEL <M/T>/ADAPTOR PLATE <A/T> REMOVAL**

Use the special tool to secure the flywheel or adaptor plate and remove the bolt.

**INSTALLATION SERVICE POINTS****▶A◀ OIL SEAL INSTALLATION**

**►B◄ OIL SEPARATOR INSTALLATION**

Install the oil separator in such a way that its oil hole come at the case bottom (indicated by an arrow in the illustration).

►C◄ FLYWHEEL <M/T>/ADAPTOR PLATE <A/T> INSTALLATION

Use the special tool in the same way as during removal to stop the flywheel or adaptor plate assembly from turning, and then tighten the bolt to the specified torque.

Tightening torque: 127 – 137 Nm

ENGINE ASSEMBLY

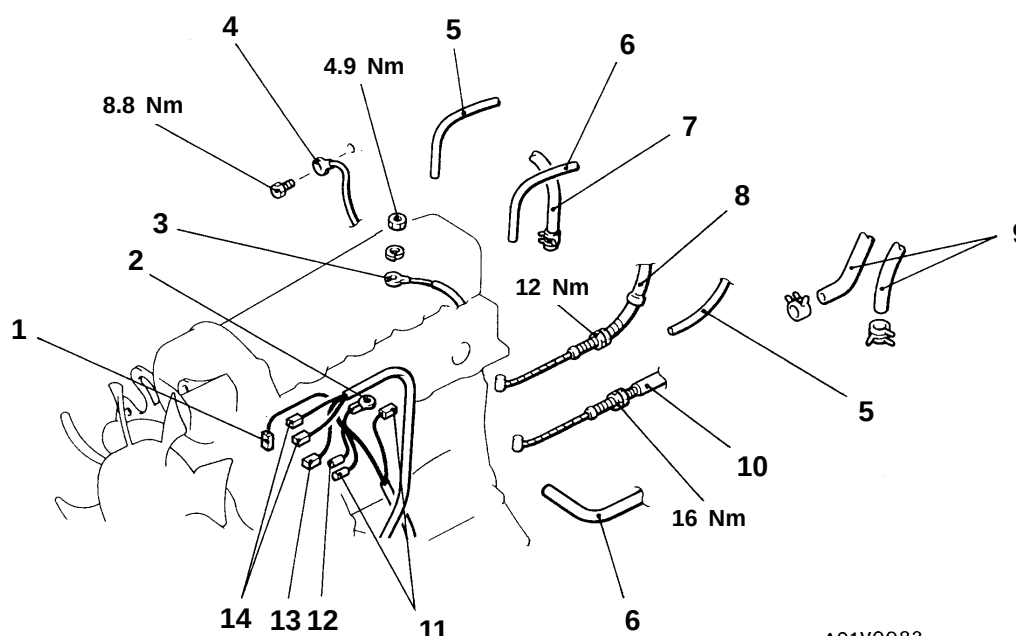
REMOVAL AND INSTALLATION

Pre-removal Operation

- Hood Removal (Refer to GROUP 42.)
- Intercooler Removal <4WD> (Refer to GROUP 15.)
- Air Cleaner and Air Intake Hose Removal (Refer to GROUP 15.)
- Brake Master Cylinder Heat Protector Removal <4WD>
- Battery Removal
- Radiator Removal (Refer to GROUP 14.)
- Transmission Assembly Removal <2WD> (Refer to GROUP 22.)
- Transmission and Transfer Assembly Removal <4WD> (Refer to GROUP 22, 23.)

Post-installation Operation

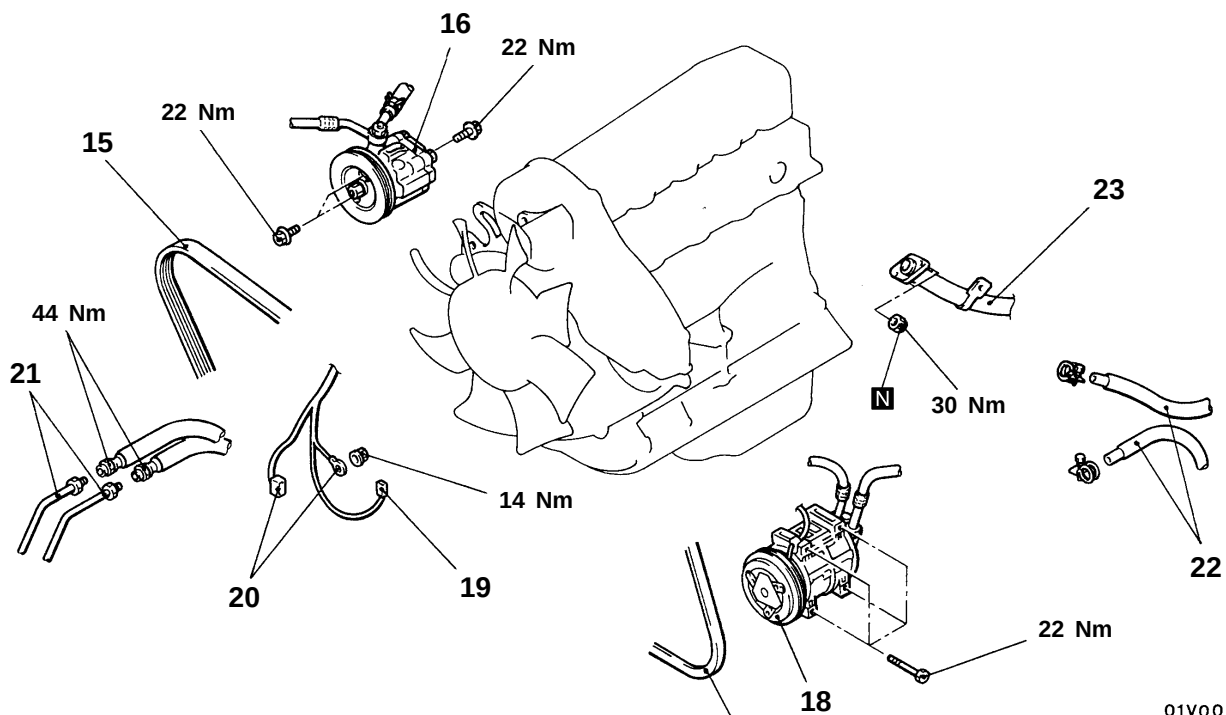
- Transmission and Transfer Assembly Installation <4WD> (Refer to GROUP 22, 23.)
- Transmission Assembly Installation <2WD> (Refer to GROUP 22.)
- Radiator Installation (Refer to GROUP 14.)
- Battery installation
- Brake Master Cylinder Heat Protector Installation <4WD>
- Air Cleaner and Air Intake Hose Installation (Refer to GROUP 15.)
- Intercooler Installation <4WD> (Refer to GROUP 15.)
- Hood Installation (Refer to GROUP 42.)
- Drive Belt Tension Adjustment (Refer to P.11B-5.)
- Accelerator Cable Adjustment (Refer to GROUP 17 – On-vehicle Service.)
- Throttle Cable Adjustment <A/T> (Refer to GROUP 23 – On-vehicle Service.)



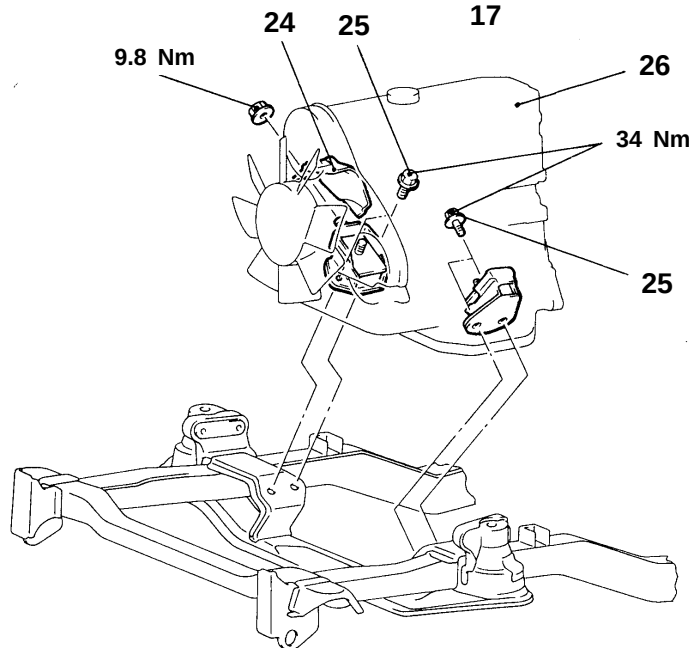
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Removal steps

1. Engine coolant temperature sensor and gauge unit connector
2. Earth cable connector
3. Glow plug terminal
4. Earth cable connector
5. Vacuum hose connection (for A/C)
6. Vacuum hose connection (for ABS)
7. Brake booster vacuum hose connection
8. Accelerator cable connection
9. Heater hose connections
10. Throttle cable connection <A/T>
11. Fuel cut solenoid valve or fuel cut valve controller connector
12. Revolution pick-up sensor connector
13. Lever (throttle) position switch connector
14. Engine coolant temperature switch connector (for A/C)



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- 15. Drive belt (for Power steering)
- 16. Power steering oil pump assembly
- 17. Drive belt (for A/C)
- 18. A/C compressor assembly
- 19. Engine oil pressure switch connector
- 20. Alternator connector



- 21. Engine oil cooler hose connection
- 22. Fuel hose connections
- 23. Front exhaust pipe connection
- 24. Heat protector
- 25. Engine support front insulator attaching bolt
- 26. Engine assembly

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

1. Remove the oil pump and A/C compressor (with the hose attached).
2. 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 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 POINT**▶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.

NOTES