

EXPLANATION OF MANUAL CONTENTS

Maintenance and Servicing Procedures

- (1) A diagram of the component parts is provided near the front of each section in order to give the reader a better understanding of the installed condition of component parts.
- (2) The numbers provided within the diagram indicate the sequence for maintenance and servicing procedures; the symbol **N** indicates a non-reusable part; the tightening torque is provided where applicable.

- **Removal steps:**
The part designation number corresponds to the number in the illustration to indicate removal steps.
- **Disassembly steps:**
The part designation number corresponds to the number in the illustration to indicate disassembly steps.
- **Installation steps:**
Specified in case installation is impossible in reverse order of removal steps. Omitted if installation is possible in reverse order of removal steps.
- **Reassembly steps:**
Specified in case reassembly is impossible in reverse order of disassembly steps. Omitted if reassembly is possible in reverse order of disassembly steps.

Classification of Major Maintenance/Service Points





When there are major points relative to maintenance and servicing procedures (such as essential maintenance and service points, maintenance and service standard values, information regarding the use of special tools, etc.), these are arranged together as major maintenance and service points and explained in detail.

◁A▷: Indicates that there are essential points for removal or disassembly.

◆A◆: Indicates that there are essential points for installation or reassembly.

Symbols for Lubrication, Sealants and Adhesives

Information concerning the locations for lubrication and for application of sealants and adhesives is provided, by using symbols, in the diagram of component parts, or on the page following the component parts page, and explained.

-  . . Grease
(multipurpose grease unless there is a brand or type specified)
-  Sealant or adhesive
-  Brake fluid, automatic transmission fluid or air conditioning compressor oil
-  Engine oil or gear oil

FORM-IN-PLACE GASKET

The engine has several areas where the form-in-place gasket (FIPG) is in use. To ensure that the gasket fully serves its purpose, it is necessary to observe some precautions when applying the gasket. Bead size, continuity and location are of paramount importance. Too thin a bead could cause leaks. Too thick a bead, on the other hand, could be squeezed out of location, causing blocking or narrowing of the fluid feed line. To eliminate the possibility of leaks from a joint, therefore, it is absolutely necessary to apply the gasket evenly without a break, while observing the correct bead size.

The FIPG used in the engine is a room temperature vulcanization (RTV) type and is supplied in a 100-gram tube (Part No. MD970389 or MD997110). Since the RTV hardens as it reacts with the moisture in the atmospheric air, it is normally used in the metallic flange areas. The FIPG, Part No. MD970389, can be used for sealing both engine oil and coolant, while Part No. 997110 can only be used for engine oil sealing.

Disassembly

The parts assembled with the FIPG can be easily disassembled without use of a special method. In some cases, however, the sealant between the joined surfaces may have to be broken by lightly striking with a mallet or similar tool. A flat gasket scraper may be lightly hammered in between the joined surfaces. In this case, however, care must be taken to prevent damage to the joined surfaces.

Surface Preparation

Thoroughly remove all substances deposited on the gasket application surfaces, using a gasket scraper or wire brush. Check to ensure that the surfaces to which the FIPG is to be applied is flat. Make sure that there are no oils, greases and foreign substances deposited on the application surfaces. Do not forget to remove the old sealant remaining in the bolt holes.

Form-In-Place Gasket Application

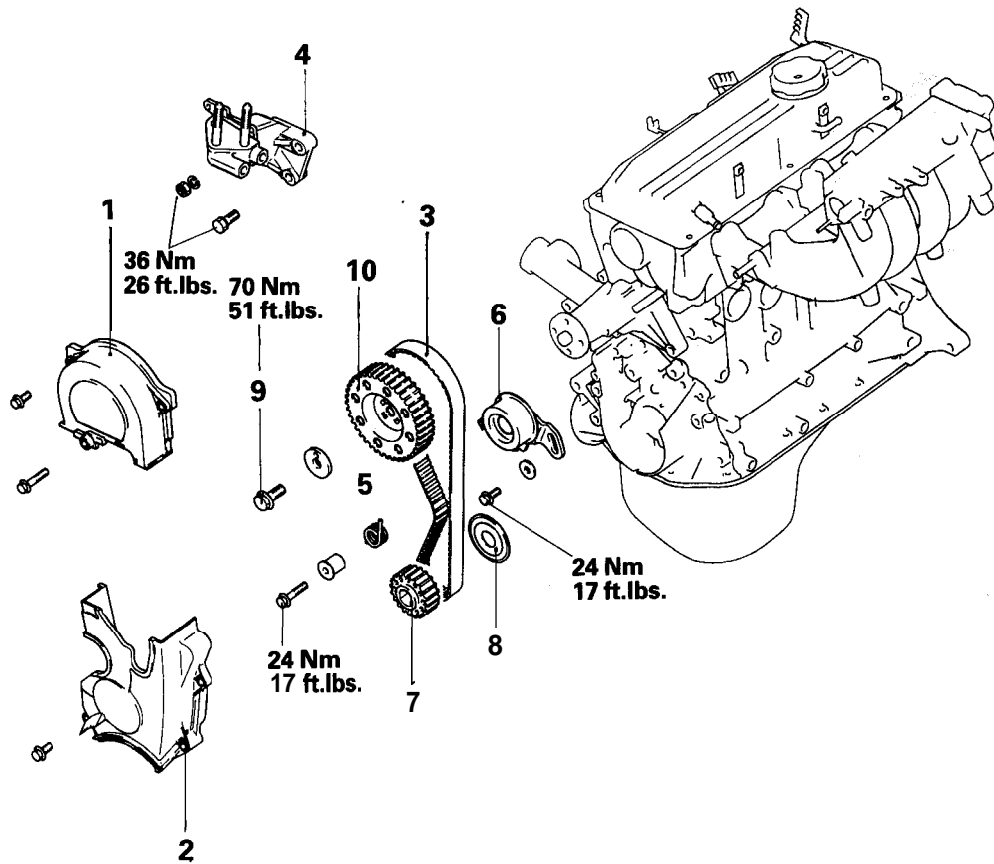
When assembling parts with the FIPG, you must observe some precautions, but the procedure is very simple as in the case of a conventional precut gasket.

Applied FIPG bead should be of the specified size and without breaks. Also be sure to encircle the bolt hole circumference with a completely continuous bead. The FIPG can be wiped away unless it is hardened. While the FIPG is still moist (in less than 15 minutes), mount the parts in position. When the parts are mounted, make sure that the gasket is applied to the required area only.

The FIPG application procedure may vary on different areas. Observe the procedure described in the text when applying the FIPG.

TIMING BELT

REMOVAL AND INSTALLATION



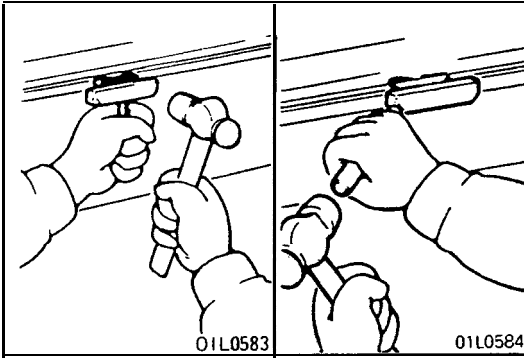
Removal steps

1. Timing belt upper cover
2. Timing belt lower cover
- ↙A↘ ↗C↖ 3. Timing belt
4. Engine support bracket, left
5. Tensioner spring
- ↗B↖ 6. Tensioner
- ↙B↘ 7. Crankshaft sprocket
8. Flange
- ↙C↘ ↗A↖ 9. Camshaft sprocket bolt
10. Camshaft sprocket

REMOVAL SERVICE POINTS

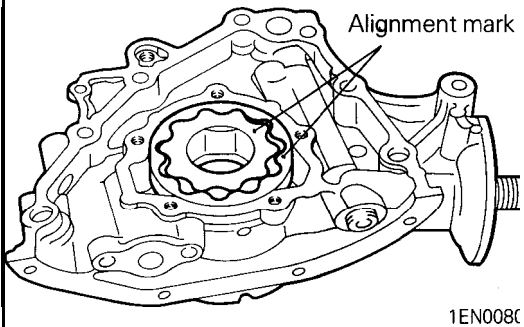
◀A▶ OIL PAN REMOVAL

- (1) Knock the special tool deeply between the oil pan and the cylinder block.
- (2) Hitting the side of the special tool, slide the special tool along the oil pan to remove it.



◀B▶ OUTER ROTOR / INNER ROTOR REMOVAL

- (1) Make alignment marks on the outer and inner rotors for reference in reassembly.

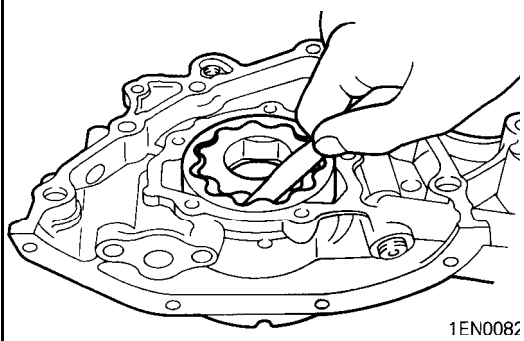


INSPECTION

OIL PUMP

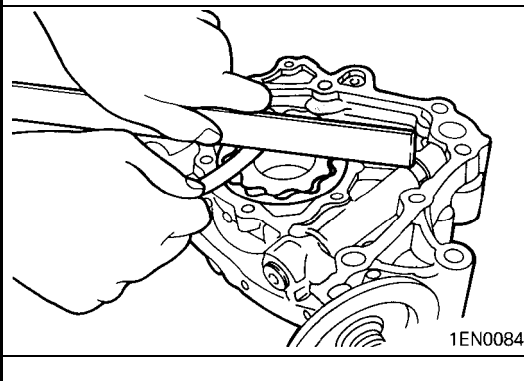
- (1) Check the tip clearance.

Standard value: 0.03 – 0.08 mm (.0012 – .0031 in.)



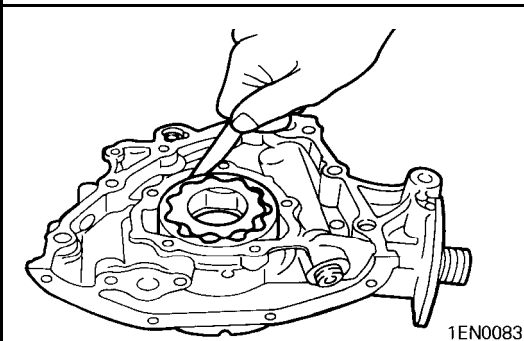
- (2) Check the side clearance.

Standard value: 0.04 – 0.10 mm (.0016 – .0039 in.)



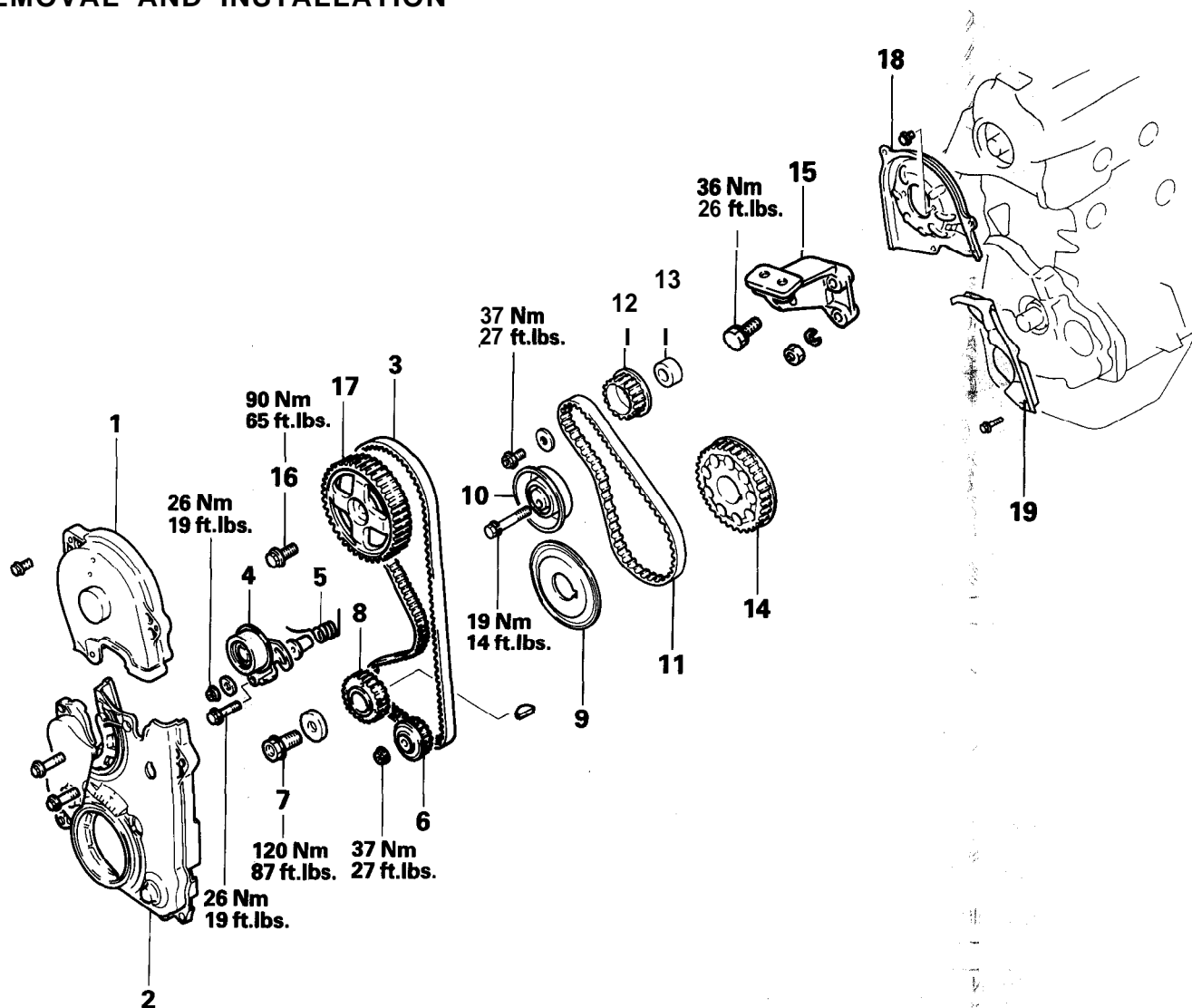
- (3) Check the body clearance.

Standard value: 0.10 – 0.18 mm (.0039 – .0071 in.)
Limit: 0.35 (.138 in.)



TIMING BELT

REMOVAL AND INSTALLATION



Removal steps

1. Timing belt front upper cover
2. Timing belt front lower cover
- ◁A▷ ▷H▷ 3. Timing belt
- ▷G▷ 4. Tensioner
- ▷G▷ 5. Tensioner spring
- ◁B▷ ▷F▷ 6. Oil pump sprocket
- ◁C▷ ▷E▷ 7. Crankshaft bolt
- ◁D▷ 8. Crankshaft sprocket
9. Flange
10. Tensioner "B"
- ◁E▷ ▷D▷ 11. Timing belt "B"
- ◁F▷ ▷C▷ 12. Silent shaft sprocket
- ▷B▷ 13. Spacer
- ◁G▷ 14. Crankshaft sprocket "B"
15. Engine support bracket, left
- ◁H▷ ▷A▷ 16. Camshaft sprocket bolt
17. Camshaft sprocket
18. Timing belt under upper cover
19. Timing belt under lower cover

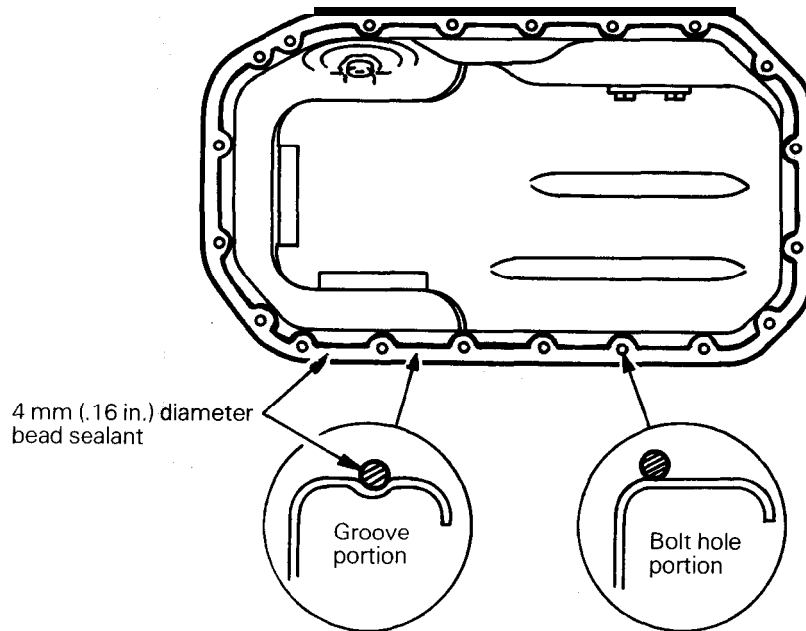
◆J◆ OIL PAN INSTALLATION

- (1) Clean mating surfaces of both oil pan and cylinder block.
- (2) Apply a 4 mm (.16 in.) diameter bead of sealant to the oil pan flange.

Specified sealant:

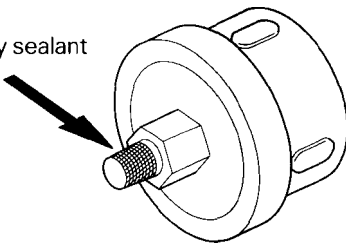
MITSUBISHI GENUINE Part "No. MD970389 or equivalent"

- (3) The oil pan should be installed within 15 minutes after the application of sealant.



3EN0189

Apply sealant



3EN0221

◆K◆ SEALANT APPLICATION TO OIL PRESSURE GAUGE UNIT

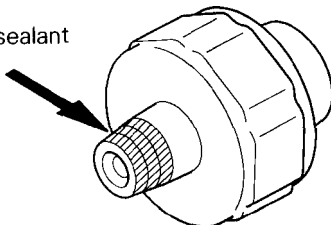
- (1) Coat the threads of the oil pressure gauge unit with sealant and install the unit using the special tool.

Specified sealant: 3M ATD Part No, 8666 or equivalent

Caution

1. Keep the end of threaded portion clear of sealant.
2. Avoid an **overtightening**.

Apply sealant



9EN0094

◆L◆ SEALANT APPLICATION TO OIL PRESSURE SWITCH

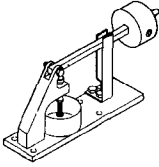

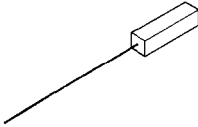
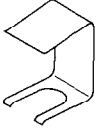
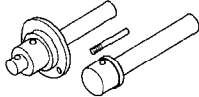

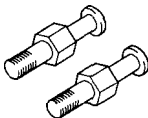
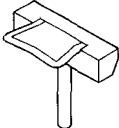
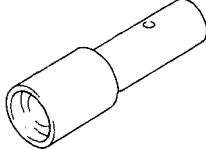
- (1) Coat the threads of the oil pressure switch with sealant and install the switch using the special tool.

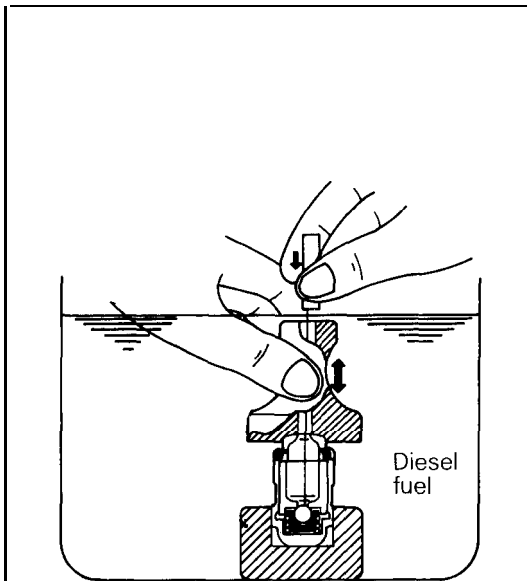
Specified sealant:

3M ATD Part No. 8660 or equivalent

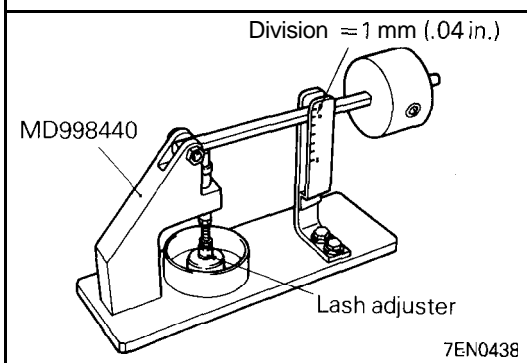
Caution

1. Keep the end of threaded portion clear of sealant.
2. Avoid an **overtightening**.

Tool	Number and tool name	Supersession	Application
	MD998440 Leak-down tester		Leak-down test of lash adjuster
	MD998441 Lash adjuster retainer		Bleeding of air inside the adjuster For SOHC engine only
	MD998442 Air bleed wire		Air bleeding of lash adjuster
	MD998443 Lash adjuster holder (8)	MD998443-01	Supporting of the lash adjuster to prevent it from falling when rocker shaft assembly is removed or installed For SOHC engine only
	MD998705 Silent shaft bearing installer	MD998373-01	Installation of silent shaft bearing
	MD998713 Camshaft oil seal installer	MD998713-01	
	MD998719 Pulley holding pins (2)	MIT308239	Holding camshaft sprocket when loosening or torquing bolt For SOHC engine only
	MD998727 Oil pan remover		Removal of oil pan
	MD998729 Valve stem seal installer	MD998729-01	Installation of valve stem seal For SOHC engine only



6EN057I



7EN0438

- (1) Immerse the lash adjuster in clean diesel fuel.
- (2) While lightly pushing down the inner steel ball using a small wire, move the plunger up and down four or five times to bleed air.
Use of the retainer facilitates the air bleeding of a rocker arm mounted type lash adjuster.
- (3) Remove the small wire and press the plunger. If the plunger is hard to be pushed in, the lash adjuster is normal. If the plunger can be pushed in all the way readily, bleed the lash adjuster again and test again. If the plunger is still loose, replace the lash adjuster.

Caution

Upon completion of air bleeding, hold the lash adjuster upright to prevent inside diesel fuel from spilling.

- (4) After air bleeding, set the lash adjuster on the special tool (Leak down tester MD998440).
- (5) After the plunger has gone down somewhat (.2 – .5 mm), measure time taken for it to go down 1 mm. Replace if the measured time is out of the specification.

Standard value: 4 – 20 seconds / 1 mm (.04 in.)
[Diesel fuel at 15 – 20°C (59 – 68°F)]

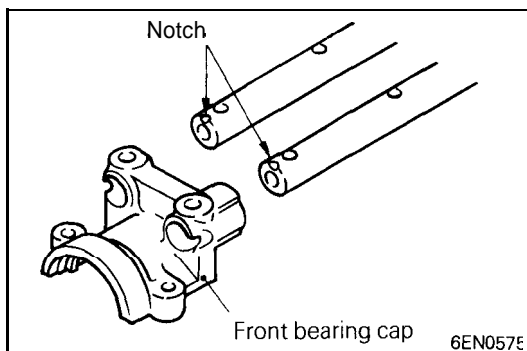
INSTALLATION SERVICE POINTS CAMSHAFT IDENTIFICATION

Identification:

E X P O / GALANT A R
TRUCK D

▶▶▶ ROCKER SHAFT INSTALLATION

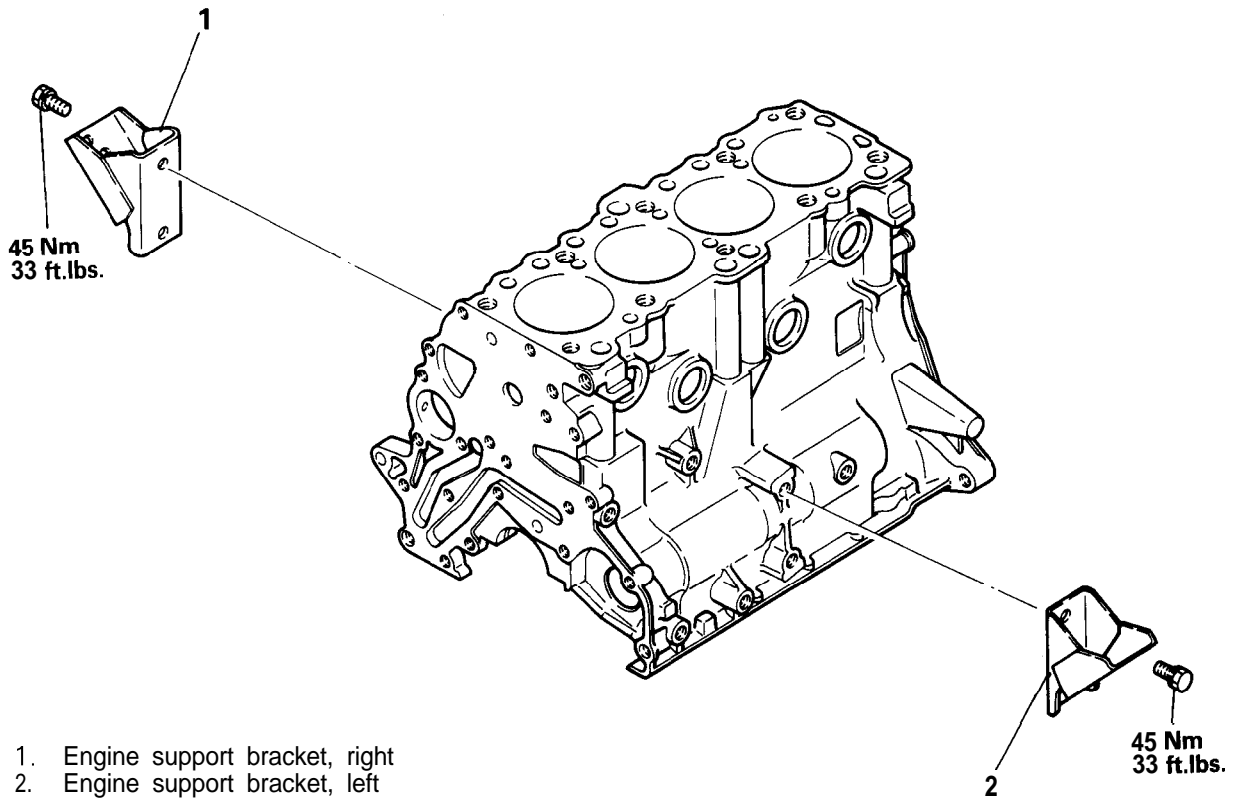
- (1) Insert the rocker arm shaft into the front bearing cap with the notch on the shaft facing up, and insert the installation bolt without tightening it.



6EN057E

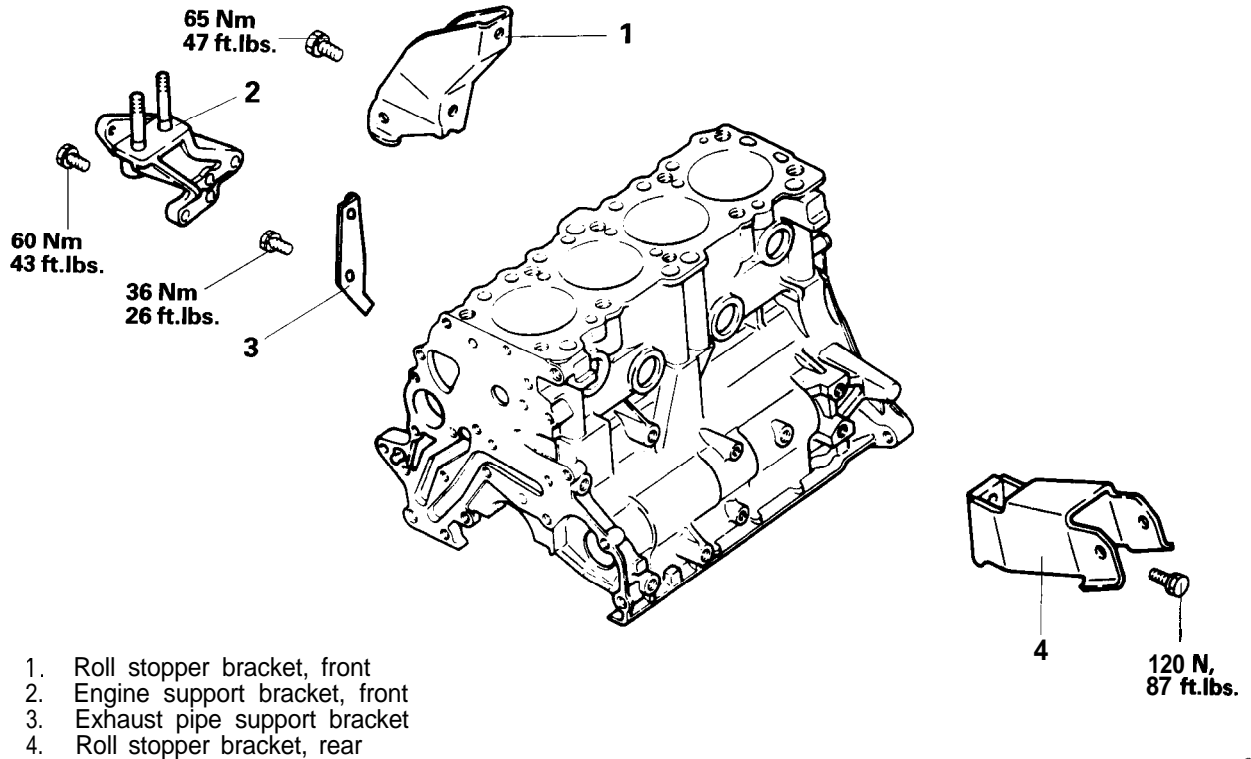
BRACKET

Rear wheel drive and four wheel drive



6EN350

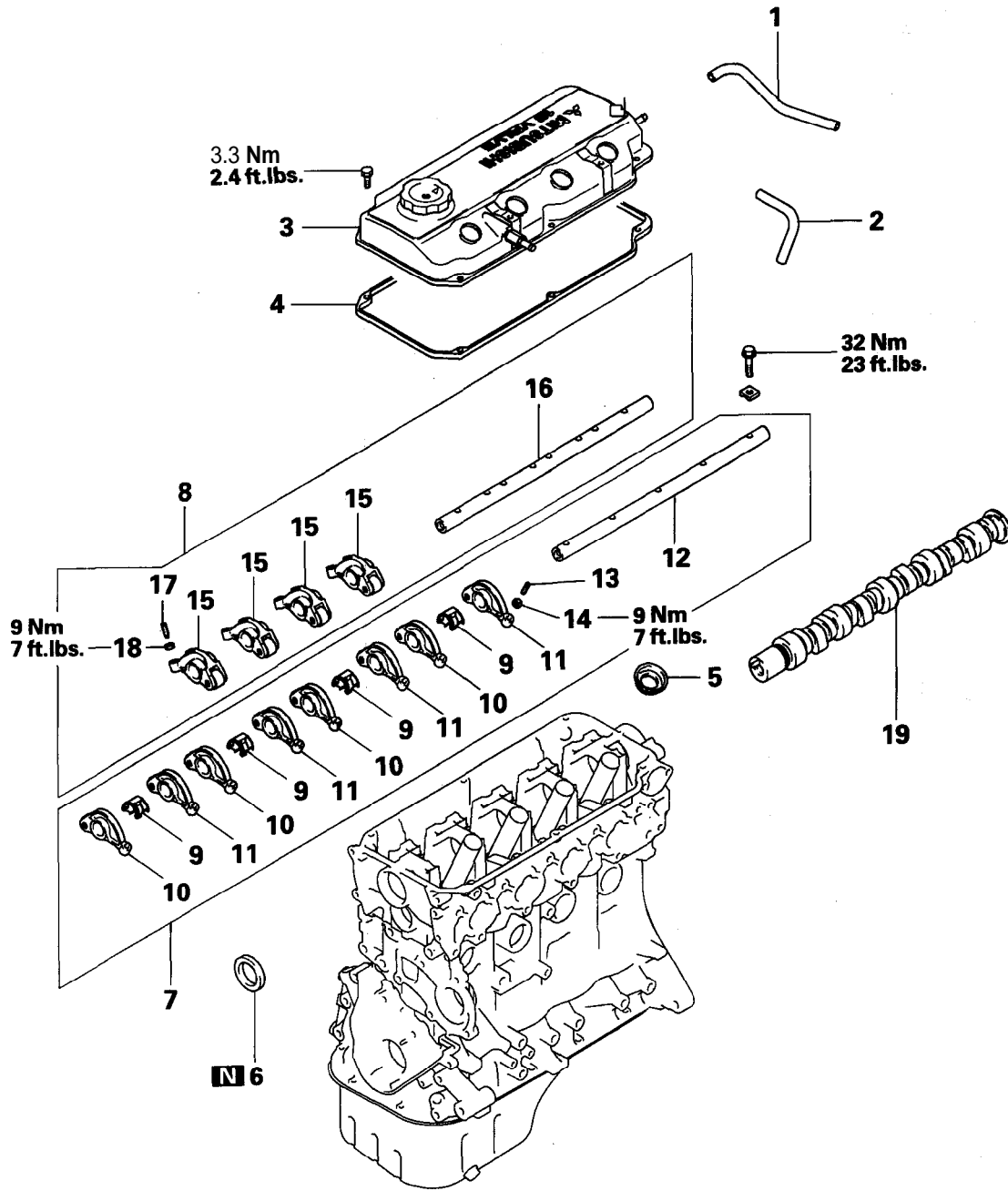
Front wheel drive and all wheel drive



6EN0722

ROCKER ARMS AND CAMSHAFT

REMOVAL AND INSTALLATION

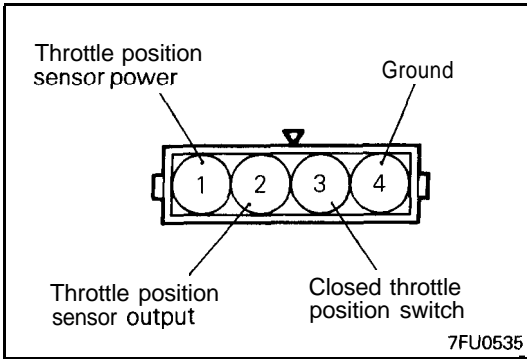


Removal steps

- | | |
|---|-------------------------------------|
| 1. Breather hose | 11. Rocker arm B |
| 2. P.C.V. hose | 12. Rocker arm shaft (Intake side) |
| 3. Rocker cover | 13. Adjusting screw |
| 4. Rocker cover gasket | 14. Nut |
| 5. Oil seal | 15. Rocker arm C |
| ▶▶▶ 6. Oil seal | 16. Rocker arm shaft (Exhaust side) |
| ▶▶▶ 7. Rocker arms and rocker arm shaft | 17. Adjusting screw |
| ▶▶▶ 8. Rocker arms and rocker arm shaft | 18. Nut |
| ▶▶▶ 9. Rocker shaft spring | 19. Camshaft |
| 10. Rocker arm A | |

mm (in.)

	Standard	Limit
Cylinder block Cylinder bore Flatness of gasket surface Grinding limit of top surface * Total resurfacing depth of both cylinder head and cylinder block	91.1 (3.587) 0.05 (.002)	“0.2 (.008)
Oil pump Tip clearance Side clearance Body clearance	0.03 – 0.08 (.0012 – .0031) 0.04 – 0.10 (.0016 – .0039) 0.10 – 0.18 (.0040 – .0070)	0.35 (.0138)
Drive belt – SOHC for DIAMANTE Deflection New belt Used belt Tension gauge N (lbs.) New belt Used belt	4.0 – 5.0 (.157 – .197) 7.0 (.276) 700 – 900 (154 – 198) 500 (110)	
Drive belt – SOHC for MONTERO and TRUCK Deflection New belt Used belt Tension gauge N (lbs.) New belt Used belt	6.5 – 8.0 (.256 – .315) 9.0 (.354) 500 – 700 (110 – 154) 400 (88)	
Drive belt – DOHC Deflection New belt Used belt Tension N (lbs.) New belt Used belt	3.5 – 4.0 (.138 – .157) 4.0 – 5.0 (.157 – .197) 650 – 850 (143 – 187) 450 – 500 (99 – 132)	
Injector Coil resistance Non-turbo Ω Turbo Ω	13 – 16 at 20°C (68°F) 2 – 3 at 20°C (68°F)	
Idle air control motor Coil resistance Ω	28 – 33 at 20°C (68°F)	
Throttle position sensor Resistance $k\Omega$	3.5 – 6.5	
Accelerator pedal position sensor Resistance $k\Omega$	3.5-6.5	
Variable induction control motor Resistance Ω	5 – 35 at 20°C (68°F)	



- (3) Connect a circuit tester between 4 (ground) and 2 (output), or between 2 (output) and 1 (power). Then, make sure that the resistance changes smoothly when the throttle valve is slowly moved to the fully open position.
- (4) Check for continuity across terminals 3 (closed throttle position switch) and 4 (ground) with the throttle valve both fully closed and fully open.

Throttle valve position	Continuity
Fully closed	Conductive
Fully open	Non-conductive

If there is no continuity with the throttle valve fully closed, turn TPS counterclockwise, and then check again.

NOTE

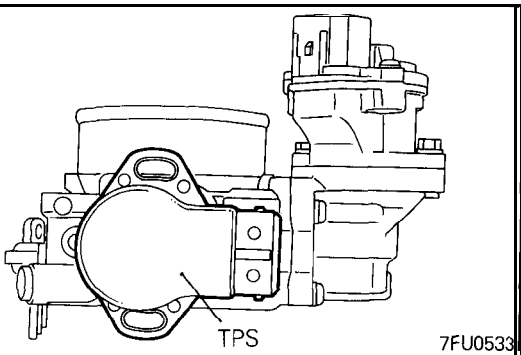
Some throttle position sensors are not provided with the position switch. In that case, the check described in step (4) cannot be accomplished.

- (5) If the above specifications are not met, replace TPS.

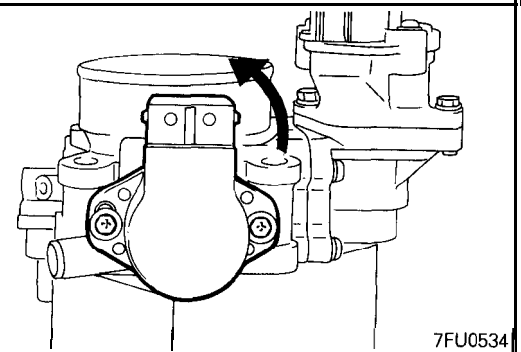
▶B▶ THROTTLE POSITION SENSOR (TPS) INSTALLATION

– SOHC for MONTERO and TRUCK

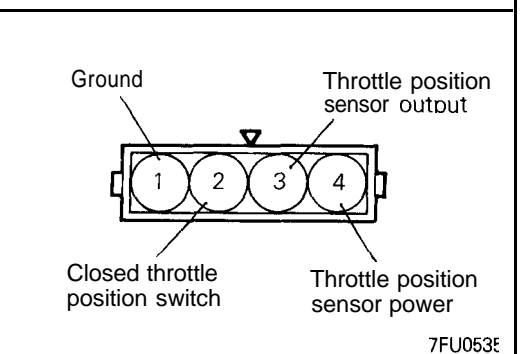
- (1) Install the throttle position sensor to the throttle body as shown in the illustration.



- (2) Turn the throttle position sensor 90° counterclockwise to set it, and tighten the screws.

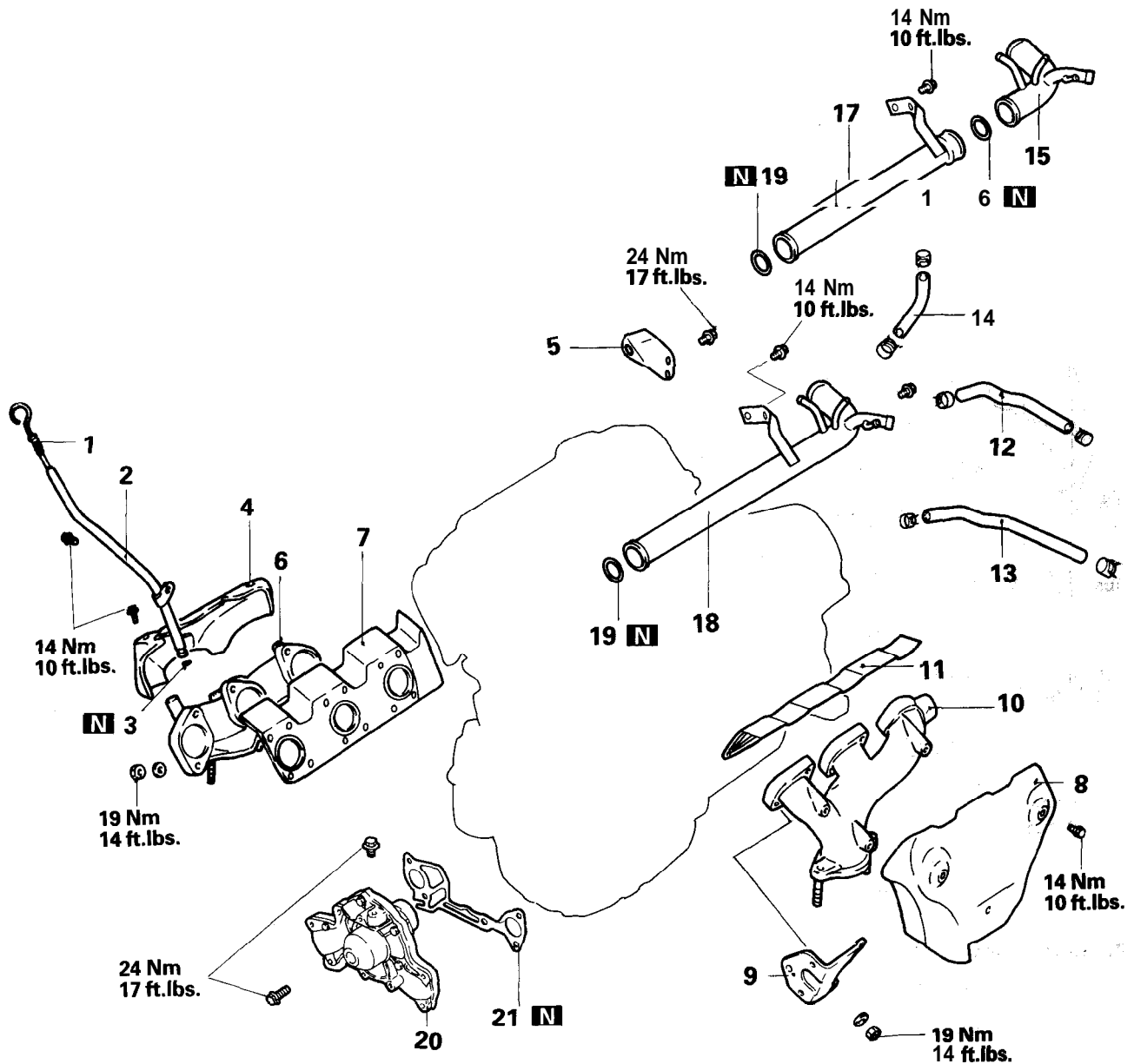


- (3) Connect a circuit tester between ① (ground) and ③ (output), or between ③ (output) and ④ (power). Then, make sure that the resistance changes smoothly when the throttle valve is slowly moved to the fully open position.
- (4) Check for continuity across terminals ② (closed throttle position switch) and ① (ground) with the throttle valve both fully closed and fully open.



EXHAUST MANIFOLD

REMOVAL AND INSTALLATION – SOHC for DIAMANTE

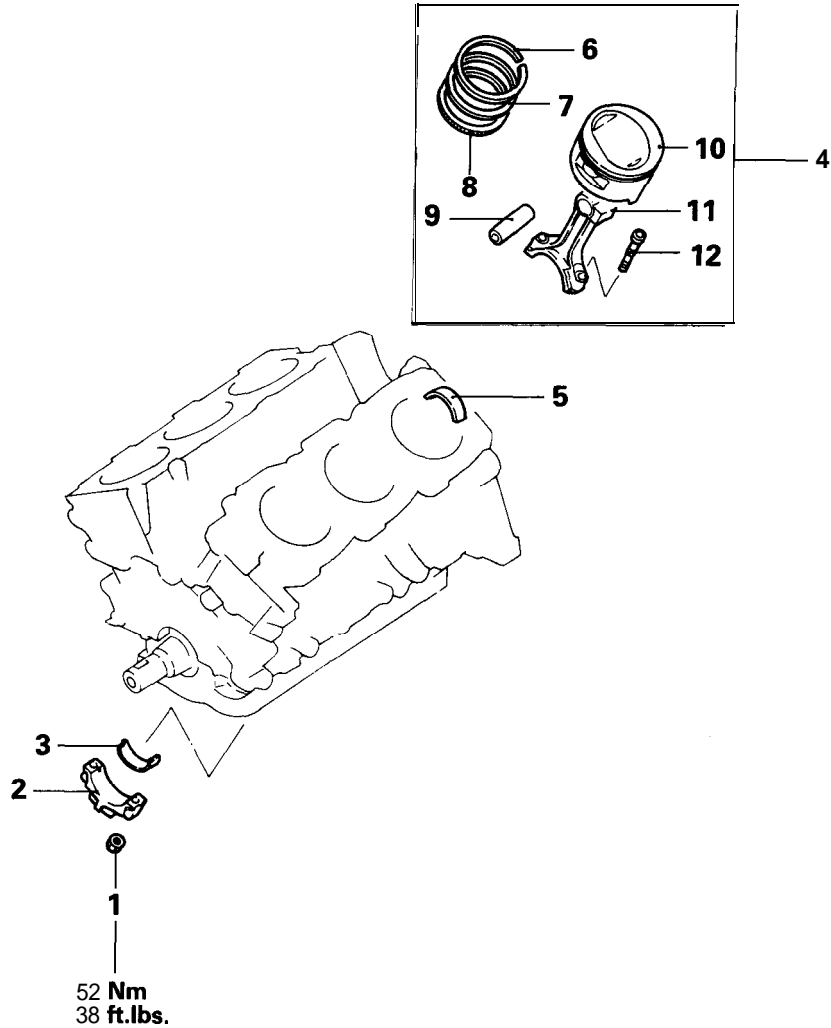


Removal steps

- | | | |
|---------------------------------|----------------------------|-----------|
| 1. Oil level gauge | ◆A◆ 15. Water inlet pipe B | } For M/T |
| 2. Oil level gauge guide | ◆A◆ 16. O-ring | |
| 3. O-ring | ◆A◆ 17. Water inlet pipe A | |
| 4. Heat protector | ◆A◆ 18. Water inlet pipe | } For A/T |
| 5. Engine hanger, right | ◆A◆ 19. O-ring | |
| 6. Exhaust manifold, right | 20. Water pump | |
| ◆B◆ 7. Exhaust manifold gasket | 21. Water pump gasket | |
| 8. Heat protector, right | | |
| 9. Bracket | | |
| 10. Exhaust manifold, left | | |
| ◆B◆ 11. Exhaust manifold gasket | | |
| 12. Water hose | | |
| 13. Water hose | | |
| 14. Water by-pass hose | | |

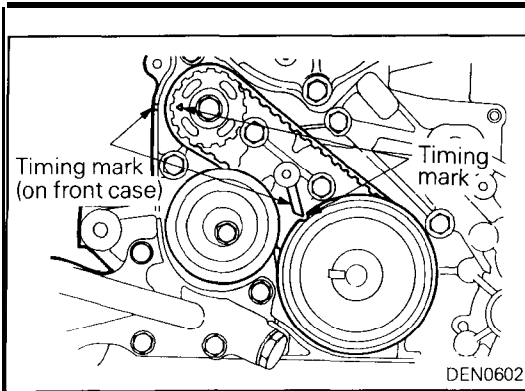
PISTON AND CONNECTING ROD

REMOVAL AND INSTALLATION



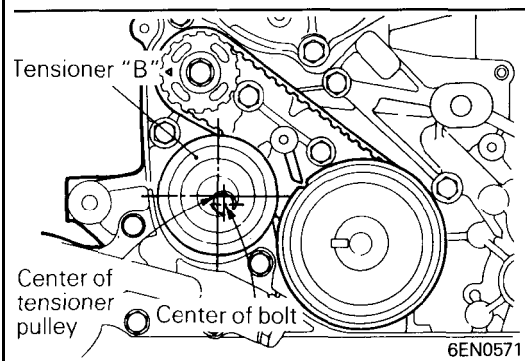
Removal steps

1. Nut
- ↔A↔ ↔E↔ 2. Connecting rod cap
3. Connecting rod bearing (lower)
- ↔D↔ 4. Piston, connecting rod assembly
5. Connecting rod bearing (upper)
- ↔C↔ 6. Piston rina_No.?
- ↔C↔ 7. Piston ring No.2
- ↔B↔ 8. Oil ring
- ↔B↔ ↔A↔ 9. Piston pin
10. Piston
11. Connecting rod
12. Bolt

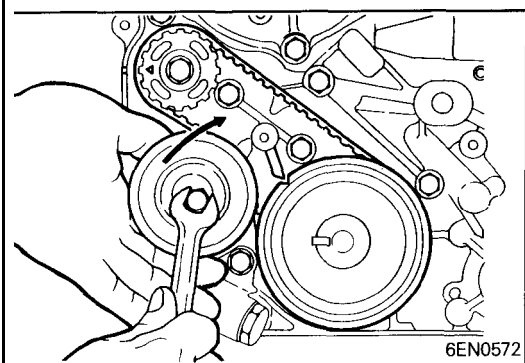


◆◆ TIMING, BELT "B" INSTALLATION

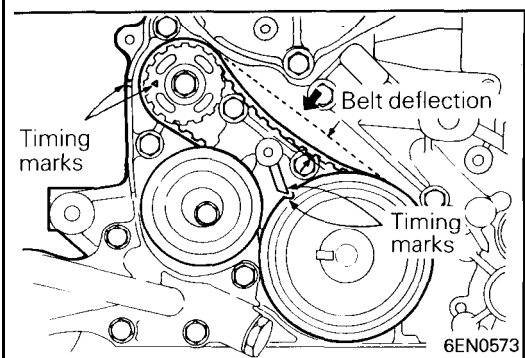
- (1) Align timing marks on the crankshaft sprocket "B" and silent shaft sprocket with the marks on the front case respectively.
- (2) Install the timing belt "B" on the crankshaft sprocket "B" and silent shaft sprocket. There should be no slack on the tension side.



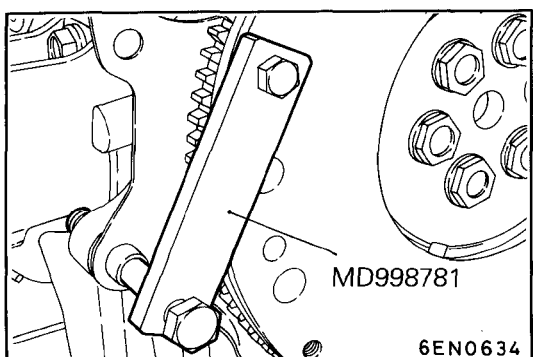
- (3) Make sure that the relationship between the tensioner pulley center and the bolt center is as shown in the illustration.



- (4) Move the tensioner "B" in the direction of arrow while lifting with a finger to give a sufficient tension to the tension side of timing belt. In this condition, tighten bolt to secure tensioner "B". When the bolt is tightened, use care to prevent shaft from turning together. If shaft is turned together, belt will be overtensioned.



- (5) Check to ensure that timing marks on sprockets and front case are in alignment.
- (6) Press with index finger the center of span on tension side of timing belt "B". The bolt must deflect 5 – 7 mm (.20 – .28 in.).



◆◆ CRANKSHAFT BOLT TIGHTENING