

ENGINE OVERHAUL <2.0L (4G6)>

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GENERAL INFORMATION

11300010090

GENERAL SPECIFICATIONS

Descriptions		Specifications
Type		"in-line OHV , DOHC
Number of cylinders		4
Combustion chamber		Pentroof type
Total displacement cm³ (cu.in.)		1,997 (121.9)
Cylinder bore mm (in.)		85.0 (3.35)
Piston stroke mm (in.)		88.0 (3.46)
Compression ratio		8.5
Valve, timing	Intake valve	Opens (BTDC) 21°
		Closes (ABDC) 51°
	Exhaust valve	Opens (BBDC) 57°
		Closes (ATDC) 15°
Lubrication system		Pressure feed, full-flow filtration
Oil pump type		Involute gear type
Cooling system		Water-cooled forced circulation
Water pump type		Centrifugal impeller type
EGR type		Single type
Injector type and number		Electromagnetic, 4
Injector identification number		MDL450
Fuel regulated pressure kPa (psi)		300 (42.7)
Throttle bore mm (in.)		54 (2.13)
Throttle position sensor		Variable resistor type
Closed throttle position switch		Contact type

SPECIFICATIONS

SERVICE SPECIFICATIONS

Items		Standard value	Limit
Rocker arms and camshaft			
Camshaft cam height mm (in.)	Intake	34.91 (1.37)	34.41 (1.36)
	Exhaust	34.91 (1.37)	34.41 (1.36)
Camshaft journal O.D. mm (in.)		25.96 (1.02)	—
Cylinder head and valve			
Cylinder head flatness of gasket surface mm (in.)		Less than 0.05 (.0020)	0.2 (.008)
Cylinder head grinding limit of gasket surface mm (in.) *Total resurfacing depth of both cylinder head and cylinder block			● 9.2 (.008)
Cylinder head overall height mm (in.)		131.9-132.1 (5.193-5.201)	—
Cylinder head bolt shank length mm (in.)			Max. 99.4 (3.91)
Valve thickness of valve head (margin) mm (in.)	Intake	1.0 (.039)	6 . 8 (.031)
	Exhaust	1.5 (.059)	0.8 (.031)
Valve overall height mm (in.)	Intake	109.50 (4.3110)	109.00 (4.2913)
	Exhaust	199.70 (4.3189)	1 09.20 (4.2992)
Valve thickness to valve guide clearance mm (in.)	Intake	0.02-0.05 (.0008-.0020)	0.10 (.004)
	Exhaust	0.05-0.09 (.0020-.0035)	0.15 (.006)
Valve face angle mm (in.)		45°-45.5°	—
Valve spring free length mm (in.)		47.0 (1.85)	46.0 (1.83)
Valve spring load/installed height N/mm (lbs./in.)		245/40.0 (54/1.57)	
Valve spring out of squareness		Max. 1.5"	4"
Valve seat valve contact width mm (in.)		0.9-1.3 (.035-.051)	—
Valve guide I.D. mm (in.)		6.6 (.260)	—
Valve guide O.D. mm (in.)		12.1 (.476)	
Valve guide projection from cylinder head upper surface mm (in.)		19.5 (.77)	
Valve stem projection mm (in.)	Intake	49.20 (1.9370)	49.80 (1.9606)
	Exhaust	48.40 (1.9055)	48.90 (1.9252)
Front case, oil pump and oil pan			
Oil pump side clearance	Drive gear	0.08-0.14 (.0031-.0055)	—
	Driven gear	0.06-0.12 (.0024-.0047)	—
Oil cooler by-pass valve dimension (L) [Normal temperature]		34.5 (1.36)	—
Oil cooler by-pass hole closing temperature [97 to 103°C (207 to 217°F) or more]		40 (1.57) or more	
Oil pressure at curb idle speed kPa (psi) [Oil temperature is 75 to 90°C (167 to 194°F)]		80 (11.4) or more	
Piston and connecting rod			
Piston O.D. mm (in.)		84.98 (3.334)	
Piston ring side clearance mm (in.)	No.1	0.04-0.08 (.0016-.0031)	0.1 (.004)
	No.2	0.02-0.06 (.0008-.0024)	0.1 (.004)

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ENGINE OVERHAUL <2.0L (4G6)> – Specifications

Items		Standard value	Limit
Piston ring end gap mm (in.)	No.1	0.25–0.35 (.0098–.0138)	0.8 (.031)
	No.2	0.40–0.55 (.0157–.0217)	0.8 (.031)
	Oil	0.10–0.40 (.0039–.0157)	0.8 (.031)
Piston pin O.D. mm (in.)		21.0 (.83)	
Piston pin press-in load N (lbs.) [Room temperature]		7,500–17,500 (1,653–3,858)	
Crankshaft pin oil clearance mm (in.)		0.02–0.05 (.0008–.0020)	0.1 (.004)
Connecting rod big end side clearance mm (in.)		0.10–0.25 (.0039–.0098)	0.4 (.016)
Crankshaft, flywheel and drive plate			
Bearing cap bolt shank length mm (in.)			Max. 71.1 (2.80)
Crankshaft end play mm (in.)		0.05–0.18 (.0020–.0071)	0.25 (.0098)
Crankshaft journal O.D. mm (in.)		57 (2.24)	
Crankshaft pin O.D. mm (in.)		42 (1.77)	–
Crankshaft journal oil clearance mm (in.)		0.02–0.05 (.0008–.0020)	0.1 (.004)
Piston to cylinder clearance mm (in.)		0.03–0.05 (.0012–.0020)	–
Cylinder block flatness of gasket surface mm (in.)		0.05 (.0020)	0.1 (.004)
Cylinder block grinding limit of gasket surface mm (in.) *Total resurfacing depth of both cylinder head and cylinder block			• 0.2 (.008)
Cylinder block overall height mm (in.)		283.9–284.1 (11.177–11.185)	
Cylinder block I.D. mm (in.)		85.0 (3.35)	

REWORK DIMENSIONS

Items		Standard value
Cylinder head and valve		
Oversize rework dimensions of valve guide hole (both intake and exhaust) mm (in.)	0.05 O.S.	12.05–12.07 (.4744–.4752)
	0.25 O.S.	12.25–12.27 (.4823–.4831)
	0.50 O.S.	12.50–12.52 (.4921–.4929)
Intake oversize rework dimensions of valve seat hole mm (in.)	0.3 O.S.	35.30–35.33 (1.3898–1.3909)
	0.6 O.S.	35.60–35.63 (1.4016–1.4028)
Exhaust oversize rework dimensions of valve seat hole mm (in.)	0.3 O.S.	33.30–33.33 (1.3110–1.3122)
	0.6 O.S.	33.60–33.63 (1.3228–1.3240)
Crankshaft, flywheel and drive plate		
Crankshaft out of roundness and taper of journal and pin mm (in.)		Max. 0.01 (.0004)

NOTE

O.D.: Outer diameter

I.D.: Inner diameter

O.S.: Oversize diameter

TORQUE SPECIFICATIONS

Items	Nm	ft.lbs.
Generator and ignition system		
Water pump pulley bolt	11	8
Generator mounting bolt	23	17
Generator brace bolt	24	17
Generator pivot nut	14	10
Crankshaft pulley bolt	25	18
Spark plug	25	18
Ignition coil bolt	14	10
Center cover bolt	3	2
Ignition power transistor bolt	14	10
Plate	10	7
Camshaft position sensor	9	7
Camshaft position sensor support	14	10
Camshaft position sensing cylinder	22	16
Timing belt		
Crankshaft position sensor bolt	9	7
Tensioner pulley bolt	49	35
Tensioner arm bolt	22	16
Auto tensioner bolt	24	17
Idler pulley bolt	38	27
Oil pump sprocket nut	55	40
Crankshaft bolt	120	87
Tensioner "B" bolt	19	14
Counterbalance shaft sprocket bolt	46	33
Camshaft sprocket bolt	90	65
Engine support bracket bolt	45	33
Fuel and emission parts		
EGR valve bolt	22	16
Throttle body stay bolt	19	14
Throttle body bolt	19	14
Fuel pressure regulator bolt	9	7
Intake manifold		
Intake manifold bolt	20	14
Intake manifold nut	36	26
Intake manifold stay bolt	28	20
Intake manifold plenum bolt and nut	18	13
Intake manifold plenum stay bolt	18	13
Water outlet fitting bolt	19	14
Engine coolant temperature gauge unit	11	8
Engine coolant temperature sensor	30	22

Items		Nm	ft.lbs.
Thermostat case nut		18	13
Manifold differential pressure sensor bolt		9	7
Exhaust manifold and water pump			
Oil dipstick guide bolt		14	10
Heat protector bolt		14	10
Heated oxygen sensor		44	32
Exhaust fitting bolt		60	43
Oil pipe joint		19	14
Oil pipe bolt		9	7
Oil return pipe bolt		9	7
Turbocharger assembly		27-31 + 60°-70° turns	20-22 + 60°-70° turns
Water pipe eye bolt		43	31
Exhaust manifold nut	M8	28	20
	M10	29	21
Water pipe bolt	M6 × 10	5	4
	M6 × 12	10	7
	M8	13	9
Water inlet pipe bolt		13	9
Water pump bolt		14	10
Rocker arms and camshaft			
Bearing cap bolt		20	14
Oil delivery body		11	8
Cylinder head and valves			
Cylinder head bolt		20 + 90° turns + 90° turns	14.5 + 90° turns + 90° turns
Front case, counterbalance shaft and oil pan			
Drain plug		40	29
Oil pan bolt		7	5
Oil screen bolt and nut		19	14
Baffle plate bolt		9	7
Oil cooler bolt		43	31
Oil filter bracket bolt		19	14
Plug		24	17
Left counterbalance shaft flange bolt		37	27
Front case bolt	M8	24	17
	M10	31	22
Oil pressure switch		10	7
Relief plug		45	33
Oil pump cover bolt		17	12
Oil pressure gauge unit		55	40

items	Nm	ft.lbs.
Piston and connecting rod		
Connecting rod cap nut	20 +90° –100° turns	14.5 +90° –100° turns
Crankshaft, flywheel and drive plate		
Flywheel bolt	135	9 8 *
Drive plate bolt	135	98
Oil seal case bolt	11	8
Rear plate bolt	11	8
Bell housing cover bolt	9	7
Bearing cap bolt	25 +90° –100° turns	18 +90° –100° turns
Knock sensor	23	1 6
Bracket		
Left and right engine support bracket bolt	45	3 3
Front roll stopper bracket bolt	65	47
Rear roll stopper bracket bolt	120	87
Front engine support bracket bolt	60	43
Exhaust pipe support bracket bolt	36	26

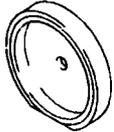
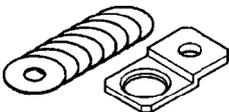
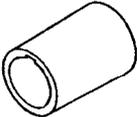
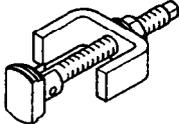
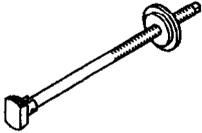
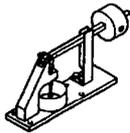
SEALANT

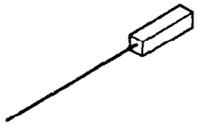
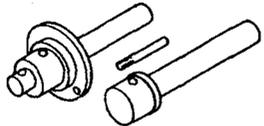
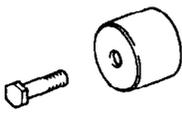
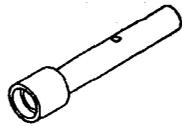
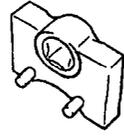
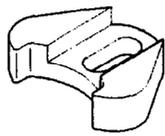
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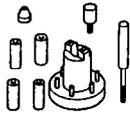
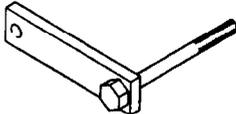
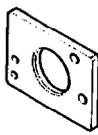
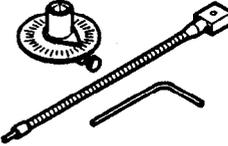
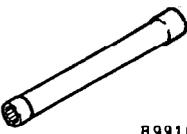
Items	Specified sealant
Camshaft position sensor support	Mitsubishi Genuine Part No. MD970389 or equivalent
Rocker cover	3M ATD Part No. 8660 or equivalent
Semi-circular packing	3M ATD Part No. 8660 or equivalent
Engine support bracket bolt	3M ATD Part No. 8660 or equivalent
Oil pan	Mitsubishi Genuine Part No. MD970389 or equivalent
Water outlet fitting	Mitsubishi Genuine Part No. MD970389 or equivalent
Engine coolant temperature gauge unit	3M ATD Part No. 8660 or equivalent
Engine coolant temperature sensor	3M Nut Locking Part No. 4171 or equivalent
Oil pressure switch	3M ATD Part No. 8660 or equivalent
Oil pressure gauge unit	3M ATD Part No. 8660 or equivalent
Rear oil seal case	Mitsubishi Genuine Part No. MD970389 or equivalent

SPECIAL TOOLS

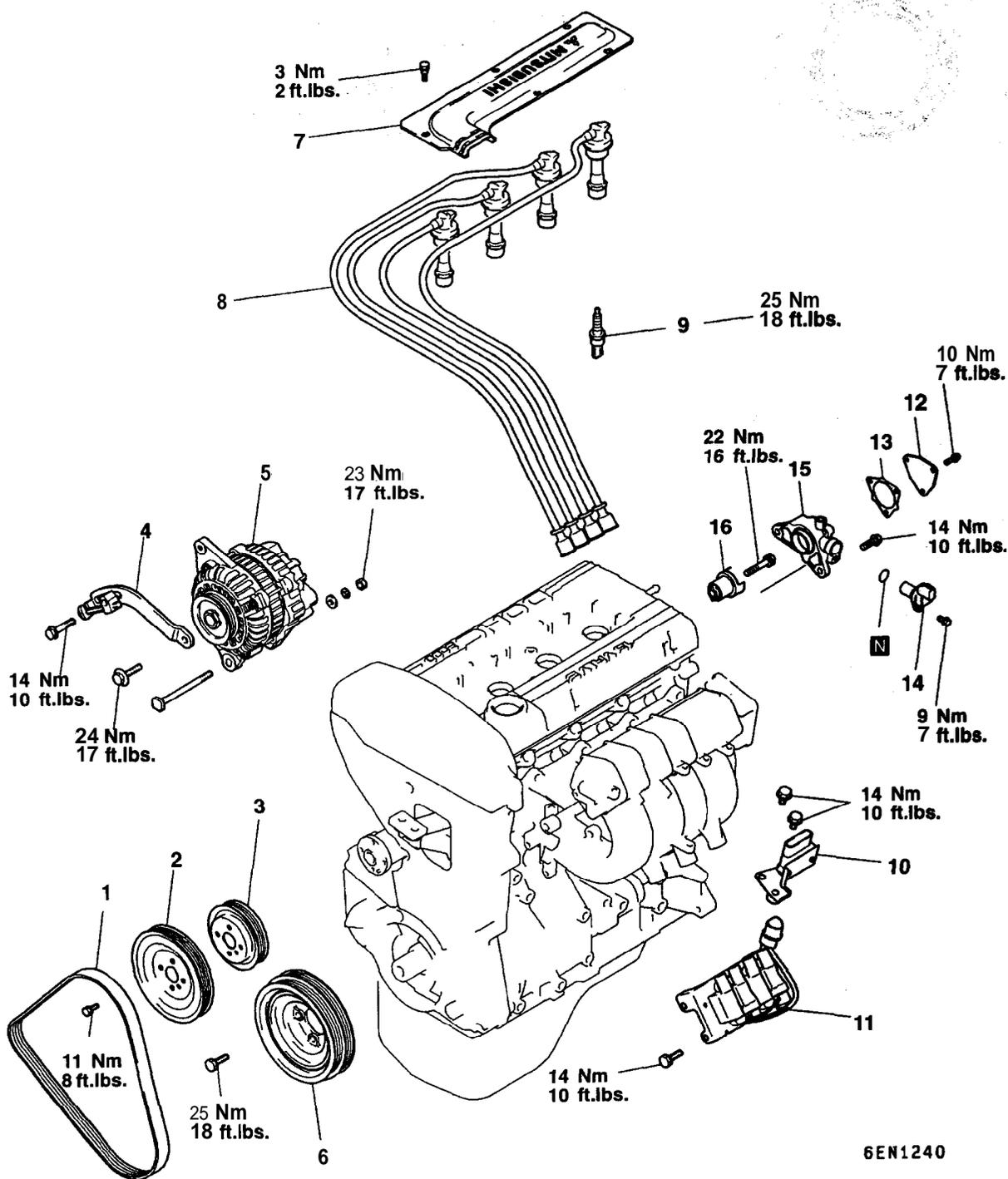
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Tool	Tool number and name	Supersession	Application
	MB990938 Handle	MB990938-01	Installation of crankshaft rear oil seal
	MD998776 Crankshaft rear oil seal installer	MD998376-01	
	MD998162 Plug wrench	MD998162-01	Removal and installation of front case cap plug
	MD998783 Plug wrench retainer	—	
	MD998285 Crankshaft front oil seal guide	MD998285-01	Installation of crankshaft front oil seal
	MD998375 Crankshaft front oil seal installer	MD998375-01	
	MD998371 Silent shaft bearing puller	MD998371-01 Use with MIT304204	Removal of counterbalance shaft rear bearing
	MD998372 Silent shaft bearing puller	MD998372-01 Use with MIT304204	
	MD998440 Leak-down tester	—	Leak-down test of lash adjuster

Tool	Tool number and name	Supersession	Application
	MD998442 Air bleed wire	-	Air bleeding of lash adjuster
	MD998705 Silent shaft bearing installer	MD998373-01 Use with MB990938-01	Installation of counterbalance shaft bearing
	MD998713 Camshaft oil seal installer	MD998713-01	Installation of camshaft oil seal
	MD998727 Oil pan remover	MD998727-01	Removal of oil pan
	MD998737 Valve stem seal installer	MD998737-01	Installation of valve stem seal
	MD998767 Tension pulley wrench	MD998752-01	Installation of auto tensioner
	MD998772 Valve spring compressor	General service tool	Compression of valve spring
	MD998778 Crankshaft sprocket puller	-	Removal of crankshaft sprocket
	MD998785 Sprocket stopper	-	Supporting counterbalance shaft sprocket

Tool	Tool number and name	Supersession	Application
	MD998780 Piston pin setting tool	MIT216941	Removal and installation of piston pin
	MD998781 Flywheel stopper	-	Supporting flywheel and drive plate
	MB991603 Bearing installer stopper	-	Removal and installation of rear bearing
	MB991614 Angle gauge	-	Installation of turbocharger assembly
 <p>8991654</p>	MB991654 Cylinder head bolt wrench (12)	-	Removal and installation of cylinder head bolt

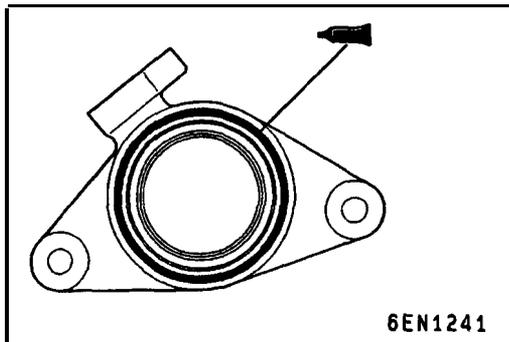
GENERATOR AND IGNITION SYSTEM REMOVAL AND INSTALLATION



Removal steps

1. Drive belt
2. Water pump pulley
3. Power steering pump pulley
4. Generator brace
5. Generator
6. Crankshaft pulley
7. Center cover
8. Spark plug cable

9. Spark plug
10. Ignition power transistor
11. Ignition coil
12. Plate
13. Gasket
- ▶A◀ 14. Camshaft position sensor
15. Camshaft position sensor support
16. Camshaft position sensing cylinder

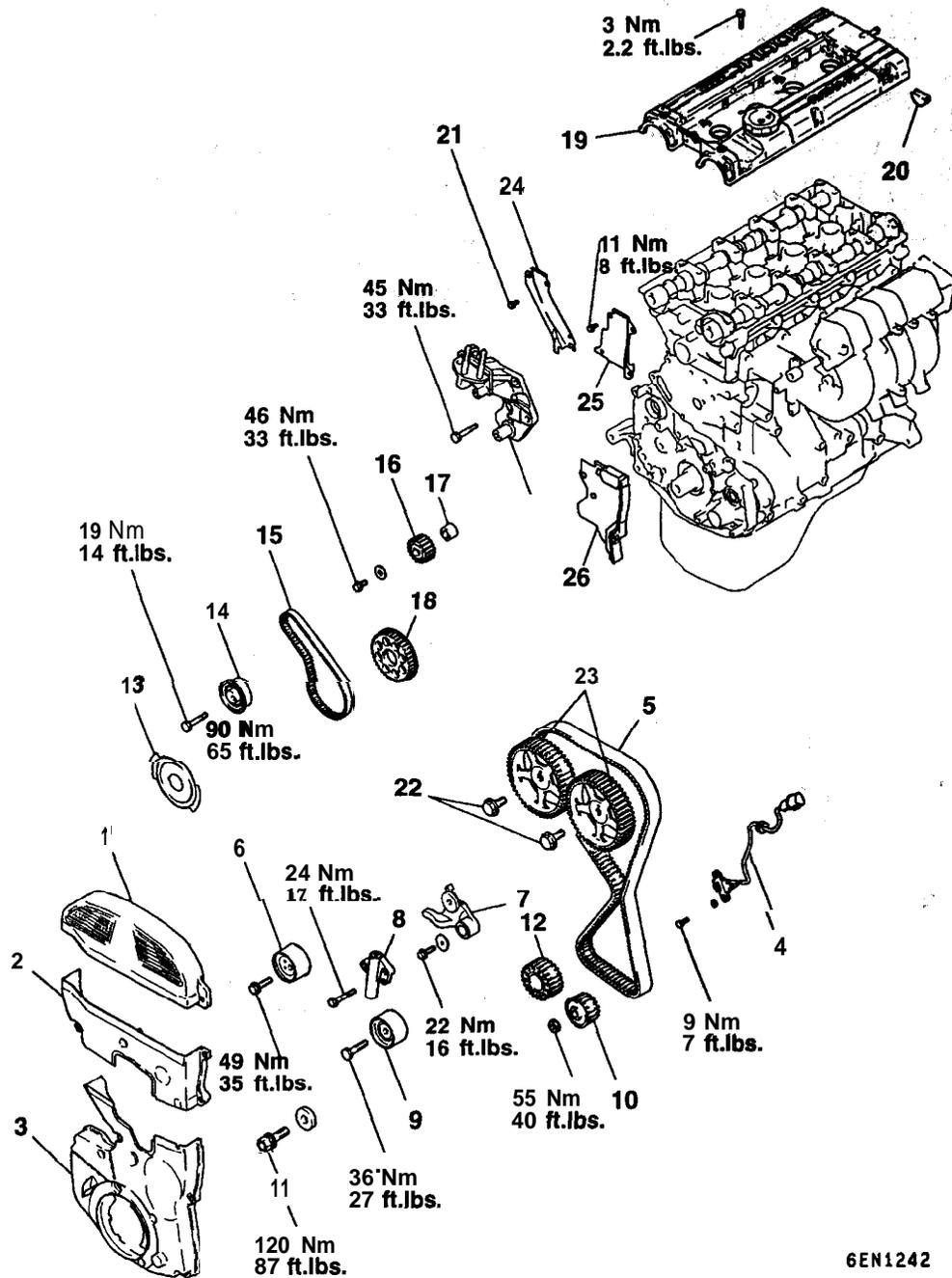


**INSTALLATION SERVICE POINTS,
▶◀CAMSHAFT POSITION SENSOR SUPPORT
I N S T A L L A T I O N**

(1) Apply a 3 mm bead of form-in-place gasket (FIPG) to the area shown.

Specified sealant:
Mitsubishi Genuine Part No. MD970389 or equivalent.

**TIMING BELT
REMOVAL AND INSTALLATION**

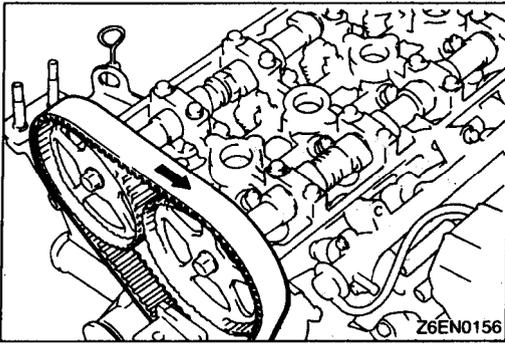


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Removal steps

- | | | | |
|---------|-----------------------------------|---------|---------------------------------------|
| | 1. Timing belt front upper cover | | 14. Tensioner "B" |
| | 2. Timing belt front center cover | | 15. Timing belt "B" |
| | 3. Timing belt front lower cover | | 16. Counterbalance shaft' sprocket |
| | 4. Crankshaft position sensor | | 17. Spacer |
| ◀A▶ ▶L▶ | 5. Timing belt | ▶E▶ | 18. Crankshaft sprocket "B" |
| ▶K▶ | 6. Tensioner pulley | ▶D▶ | 19. Rocker cover |
| | 7. Tensioner arm | ▶C▶ | 20. Semi-circular packing |
| ▶J▶ | 8. Auto tensioner | ▶B▶ | 21. Engine support bracket |
| ▶B▶ | 9. Idler pulley | ▶H▶ ▶A▶ | 22. Camshaft sprocket bolt |
| ▶C▶ ▶I▶ | 10. Oil pump sprocket | | 23. Camshaft sprocket |
| ▶D▶ ▶H▶ | 11. Crankshaft bolt | | 24. Timing belt rear right cover |
| | 12. Crankshaft sprocket | | 25. Timing belt rear left upper cover |
| | 13. Crankshaft sensing blade | | 26. Timing belt rear left lower cover |

TSB Revision



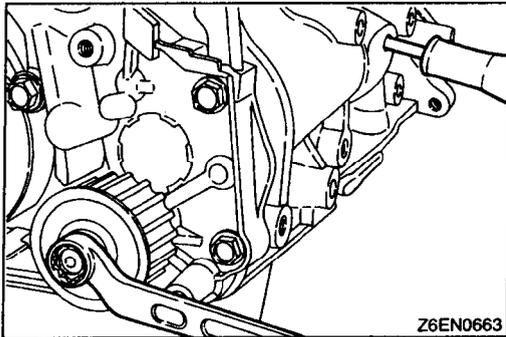
REMOVAL SERVICE POINTS

◀A▶ TIMING BELT REMOVAL

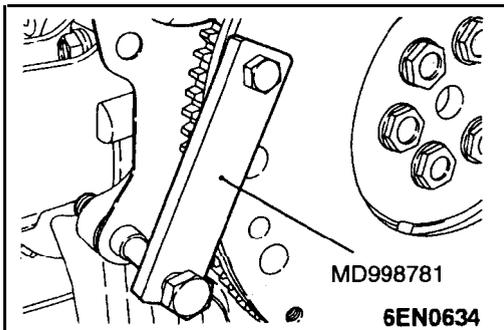
- (1) Mark the belt running direction for reference in **reinstallation**.

NOTE

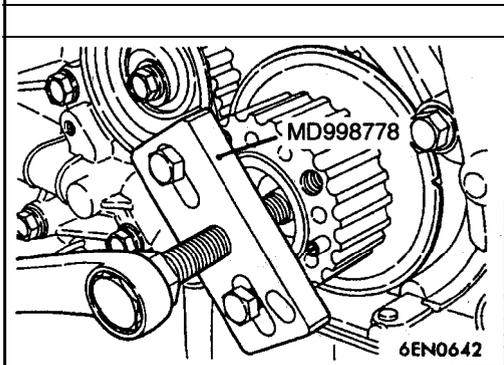
- (1) Water or oil on the belt shorten its life drastically, so the removed timing belt, sprocket, and tensioner must be free from oil and water. These parts should not be washed. Replace parts if seriously contaminated.
- (2) If there is oil or water on each part check front case oil seals, camshaft oil seal and water pump for leaks.



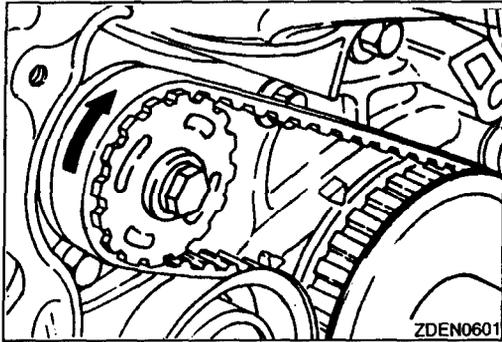
◀B▶ OIL PUMP SPROCKET REMOVAL



◀C▶ CRANKSHAFT BOLT LOOSENING



◀D▶ CRANKSHAFT SPROCKET REMOVAL

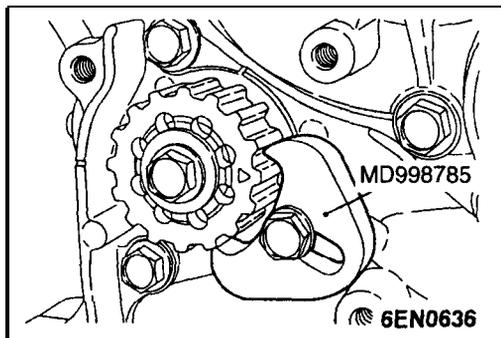


◀E▶ TIMING BELT “B” REMOVAL

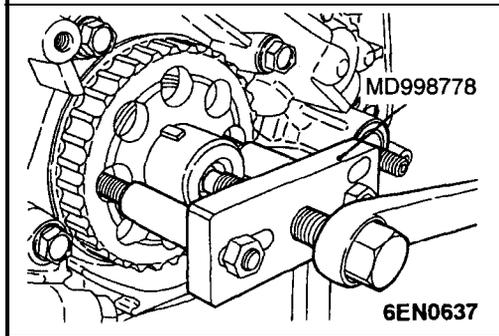
- (1) Make a mark on the back of the timing belt indicating the direction of rotation so it may be reassembled in the same direction if it is to be reused.

NOTE

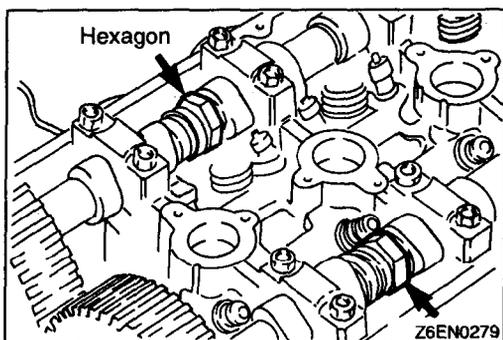
- (1) Water or oil on the belt shortens its life drastically, so the removed timing belt, sprocket, and tensioner must be free from oil and water. These **parts** should not be washed. Replace parts if seriously **contaminated**.
- (2) If there is oil or water on each part, check front case oil seals, camshaft oil seal and water pump for **leaks**.



◀F▶ COUNTERBALANCE SHAFT SPROCKET REMOVAL



◀G▶ CRANKSHAFT SPROCKET “B” REMOVAL



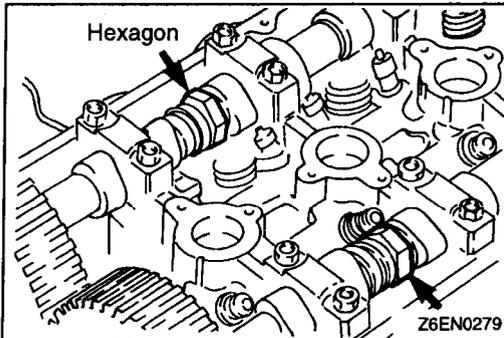
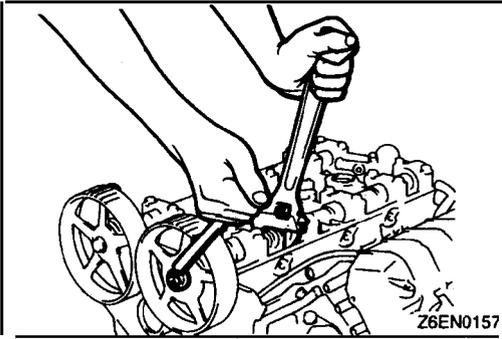
◀H▶ CAMSHAFT’ SPROCKET BOLT LOOSENING

- (1) Using a wrench, hold the camshaft at its hexagon (between the No. 2 and No. 3 journals) and remove the camshaft sprocket bolt.

Caution

Locking the camshaft sprocket with a tool damages the sprocket.

- (2) Remove the camshaft sprockets.



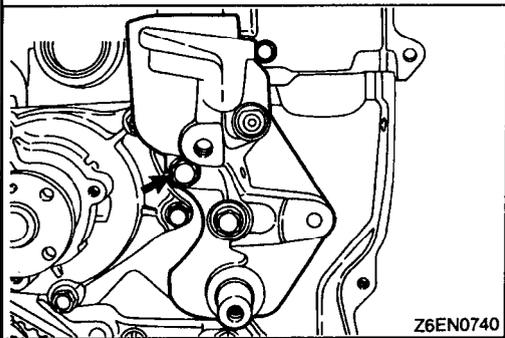
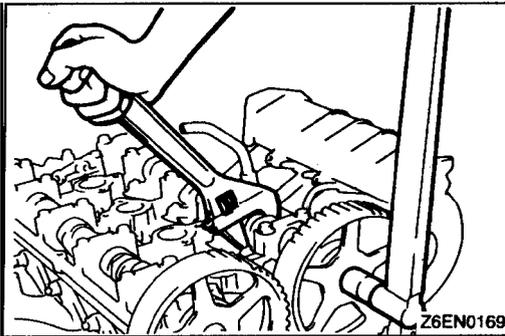
INSTALLATION SERVICE POINTS

▶A◀ CAMSHAFT SPROCKETS TIGHTENING

- (1) Using a wrench, hold the camshaft at its hexagon (between the No. 2 and No. 3 journals) and tighten the bolt to the specification.

Caution

Locking the camshaft sprocket with a tool damages the sprocket.



▶B◀ ENGINE SUPPORT BRACKET INSTALLATION

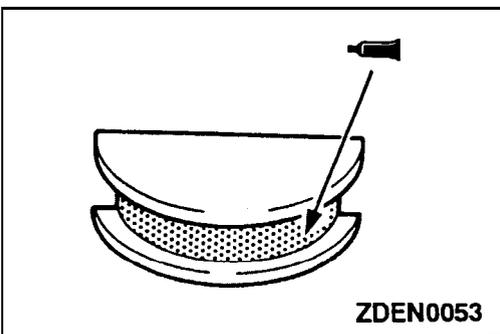
- (1) Coat the bolts illustrated with sealant before tightening.

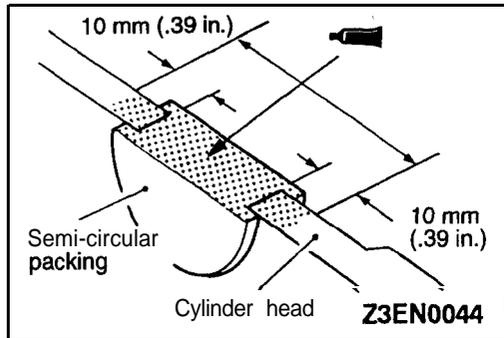
Specified sealant:

3M ATD Part No. 8660 or equivalent

▶C◀ SEALANT APPLICATION ON SEMI-CIRCULAR PACKING

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

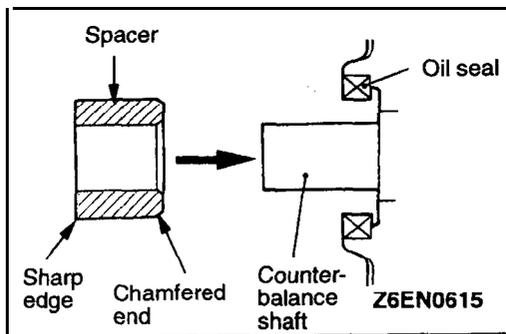
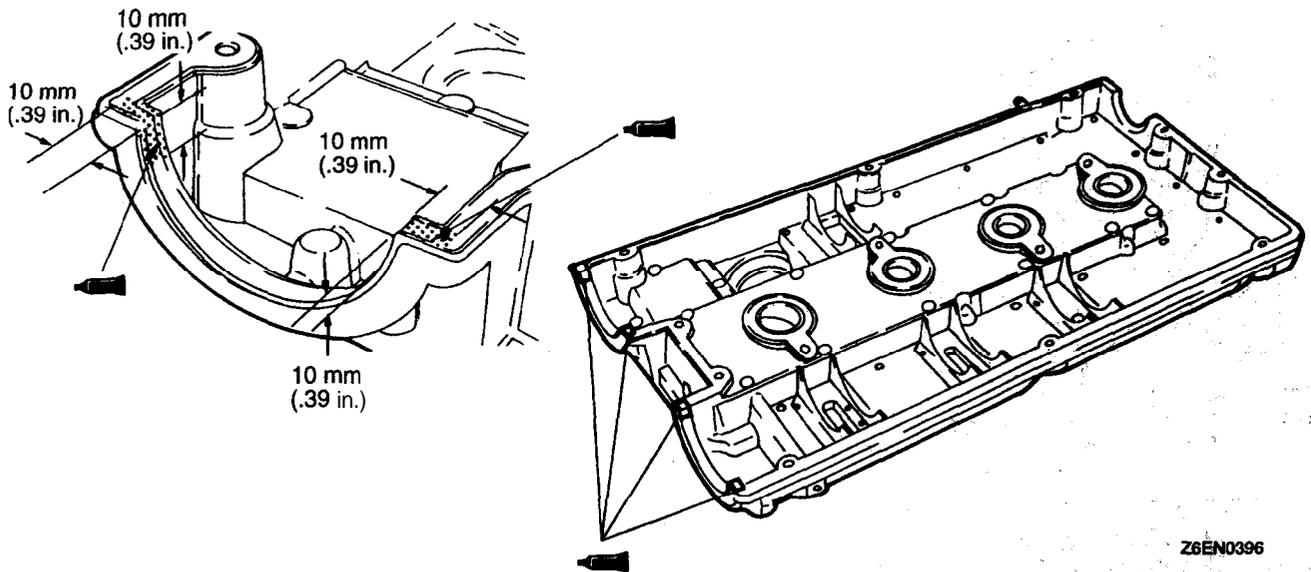




►D◄ SEALANT APPLICATION ON ROCKER COVER

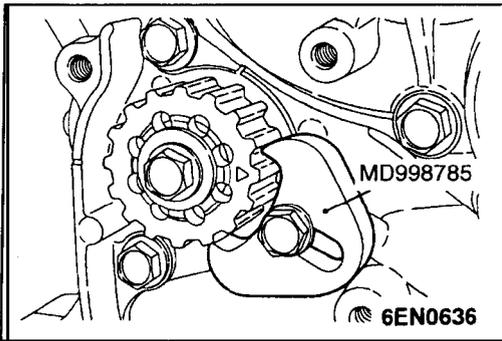
Apply the specified sealant to the areas indicated in the illustration.

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

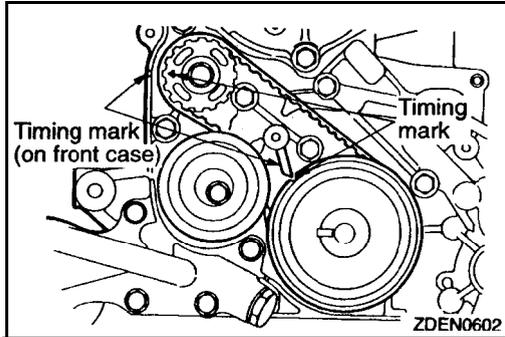


►E◄ SPACER INSTALLATION

- (1) Install the spacer with the chamfered end **facing** toward the oil seal.



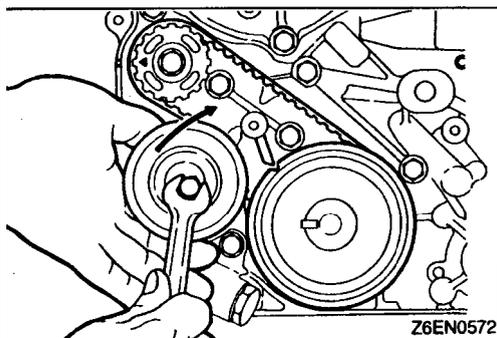
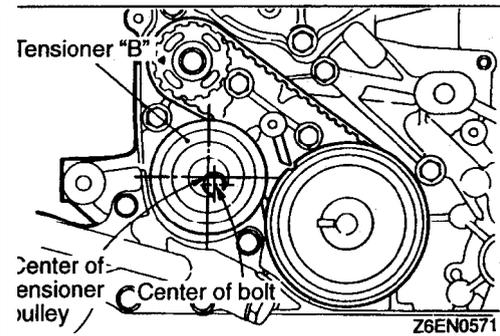
►F◄ COUNTERBALANCE SHAFT SPROCKET INSTALLATION



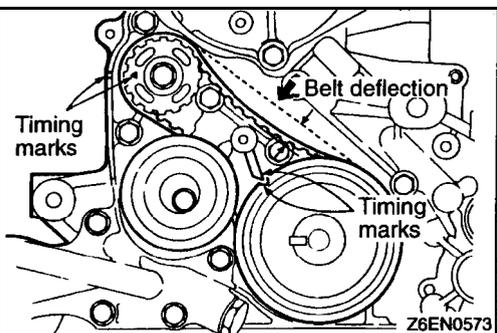
►G◄ TIMING BELT "B" INSTALLATION

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

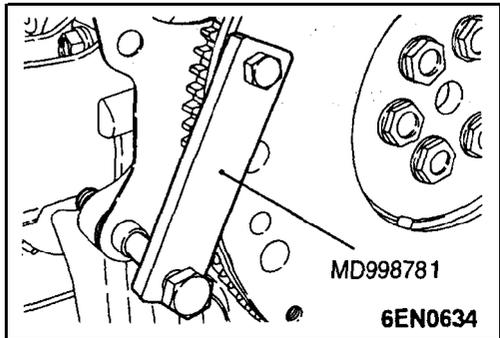
- (3) Make sure that the relationship between, the tensioner pulley center and the bolt center is as shown in the illustration.



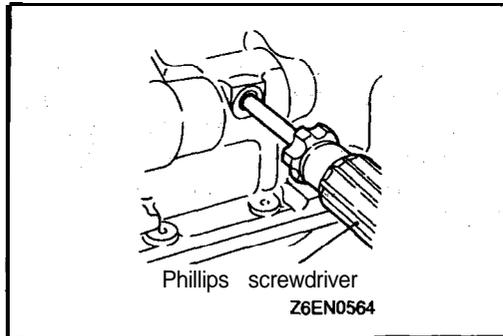
- (4) Move the tensioner "B" in the direction of arrow while lifting with a finger to give a sufficient tension to the tension side of timing belt. In this condition, tighten bolt to secure tensioner "B". When the bolt is tightened, use care to prevent shaft from turning together. If shaft is turned 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 belt must deflect 5-7 mm (.20-.28 in.).

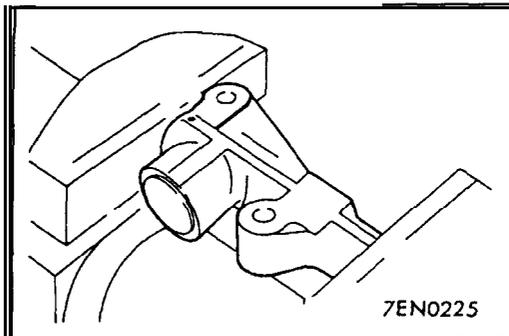


►H◄ CRANKSHAFT BOLT TIGHTENING



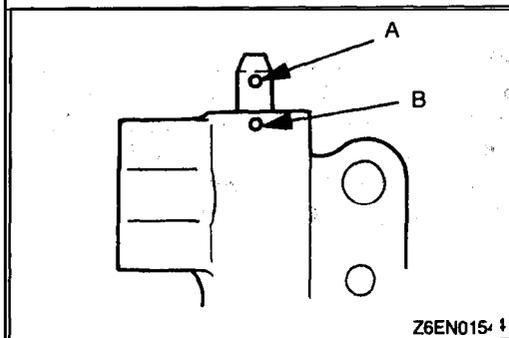
►I◄ OIL PUMP SPROCKET INSTALLATION

- (1) Insert a Phillips screwdriver [shank diameter 8 mm (.31 in.) shaft] through the plug hole on the **left side** of the cylinder block to block the left counterbalance shaft.
- (2) Install the oil pump sprocket.
- (3) Apply a proper amount of engine oil to the bearing **surfaces** of the nuts.
- (4) Tighten the nuts to the specified torque.

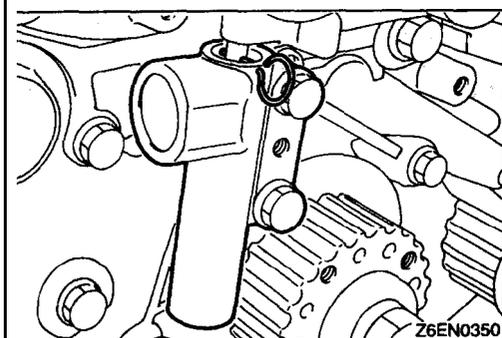


►J◄ AUTO TENSIONER INSTALLATION

- (1) If the auto tensioner rod is in its fully extended position, reset it as follows.
- (2) Clamp the auto-tensioner in the vise **with soft jaws**.



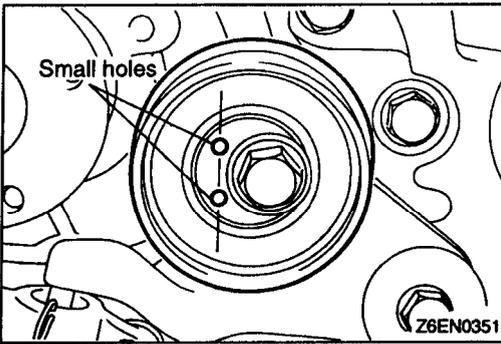
- (3) Push in the rod little by little with the vise **until** the **set** hole A in the rod is aligned with the hole B in the **cylinder**.
- (4) Insert a wire [1.4 mm (.055 in.) in diameter] into the **set** holes.
- (5) Unclamp the auto tensioner from the vise.



- (6) Install the auto tensioner to front case and tighten. **to** the specified torque.

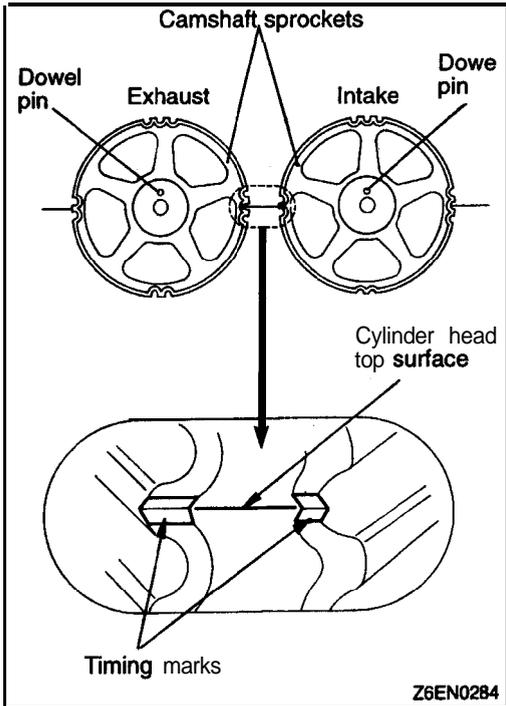
Caution

Leave the wire installed in the auto tensioner.



►K◄ TENSIONER PULLEY INSTALLATION

- (1) Install the tensioner pulley in such direction that its two small holes are arranged vertically.

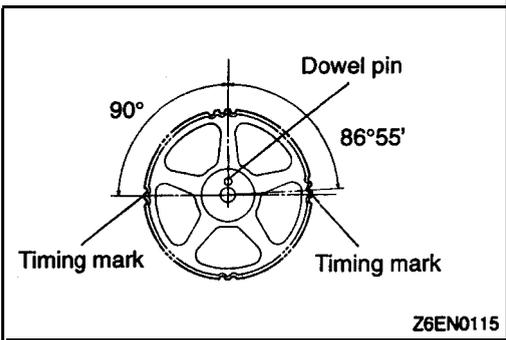


►L◄ TIMING BELT INSTALLATION

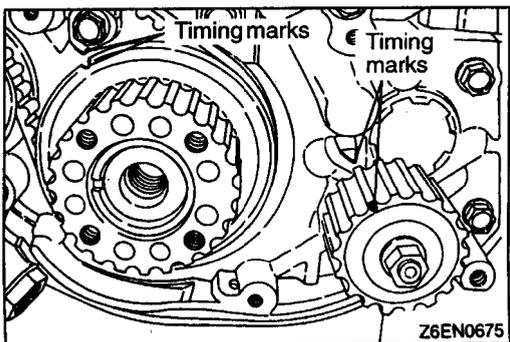
- (1) Turn the two sprockets so that their dowel pins are located on top. Then, align the timing marks facing each other with the top surface of the cylinder head. When you let go of the- exhaust camshaft **sprocket**, it will rotate one tooth counterclockwise. This should be taken into account when installing the timing belt on the sprockets.

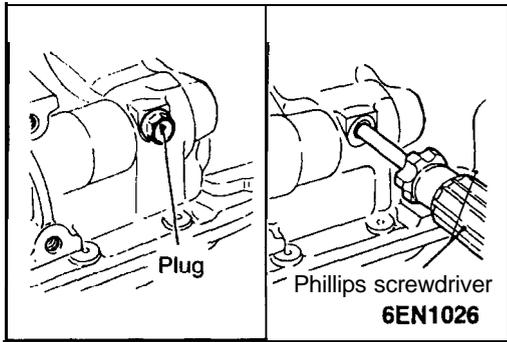
NOTE

The same camshaft sprocket is used, for the intake and exhaust camshafts and is provided with two timing marks. When the sprocket is mounted on the exhaust camshaft, use the timing mark on the right with the dowel 'pin hole on top. For the intake camshaft sprocket, use the one on the left with the dowel pin hole on top.



- (2) Align the crankshaft sprocket timing marks.
- (3) Align the oil pump sprocket timing marks (Engine with counterbalance **shafts**).



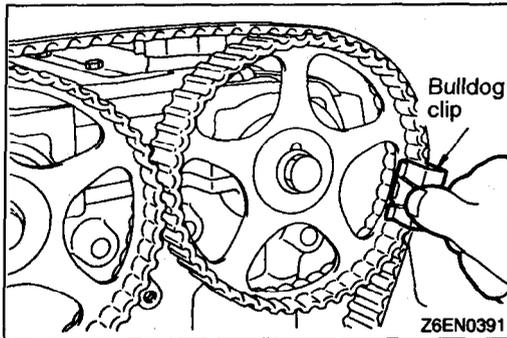


- (4) Insert a Phillips screwdriver [shank diameter 8 mm (.31 in.)] through the hole.

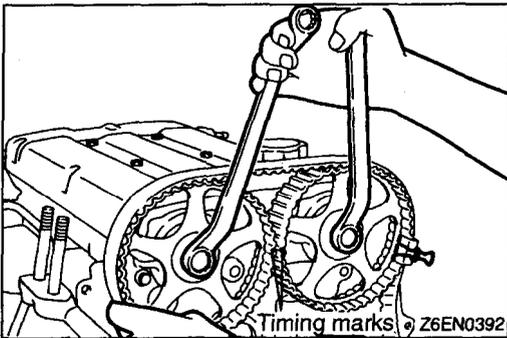
If it can be inserted as deep as 60 mm (2.4 in.) or more; the timing 'marks' are correctly aligned. If the inserted depth is only 20–25 mm (.8–1.0 in.), turn the oil pump sprocket one turn and **realign timing** marks. Then check to ensure that the screwdriver can be inserted 60 mm (2.4 in.) or more. Keep the screwdriver inserted **until** the installation of the timing belt is finished.

NOTE

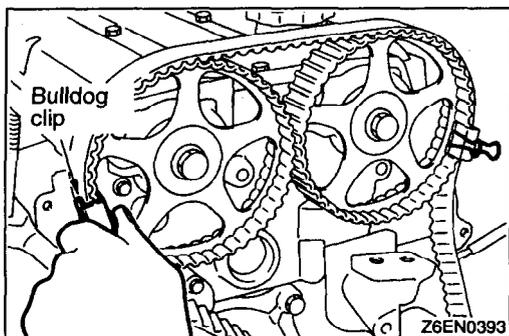
Step (4) is performed to ensure that the oil pump sprocket is correctly positioned with reference to the counterbalance shafts.



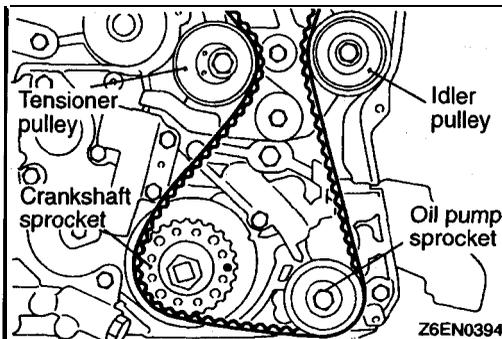
- (5) Thread the timing belt over the intake side camshaft sprocket and fix it at indicated position by a bulldog clip.



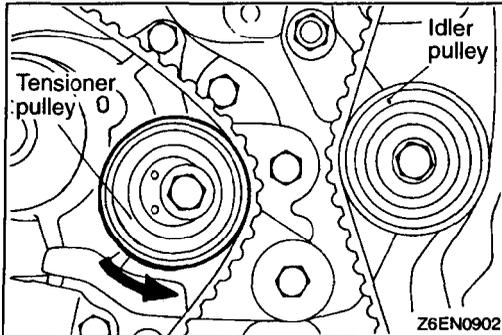
- (6) Thread the timing belt over the exhaust side sprocket, aligning the timing marks with the cylinder head top surface using two wrenches.



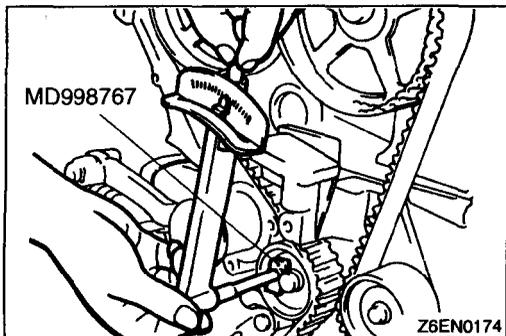
- (7) Fix the belt at indicated, position **by** a bulldog clip.



- (8) Thread the timing belt over the idler pulley, the oil pump sprocket, the crankshaft sprocket and the tensioner pulley in the order shown.
- (9) Remove the two clips.



- (10) Lift up the tensioner pulley in the direction of arrow and tighten the center bolt.
- (11) Check to see that all timing marks are lined up.
- (12) Remove the screwdriver inserted in step (4) and fit the plug. (Engine with counterbalance shafts)
- (13) Give the crankshaft a quarter counterclockwise turn. Then, turn it clockwise until the timing marks are lined up again.

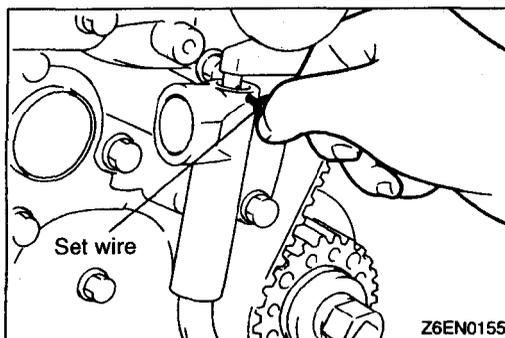


- (14) Install the special tools, Socket Wrench and Torque Wrench, on the tensioner pulley, and loosen the tensioner pulley center bolt.

NOTE

If the special tool is not available, use a commercially available torque wrench that is capable of measuring 0–5 Nm (0–3.6 ft.lbs.).

- (15) Torque to 3.6 Nm (2.60 ft.lbs.) with the torque wrench.
- (16) Holding the tensioner pulley with the special tool and torque wrench, tighten the center bolt to specification.,

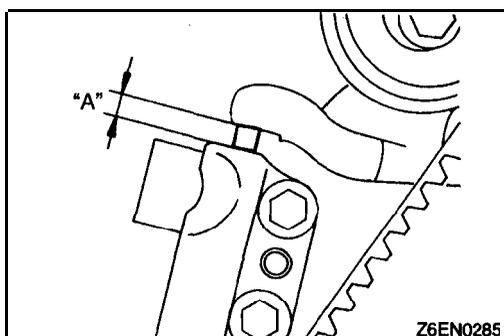


- (17) After giving two clockwise turns to the crankshaft, let it alone for approx. 15 minutes. Then, make sure **that** the auto tensioner setting wire moves freely.

NOTE

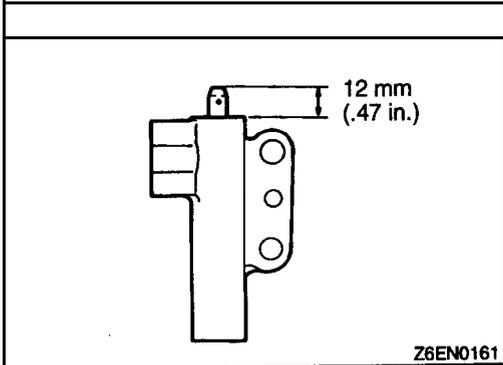
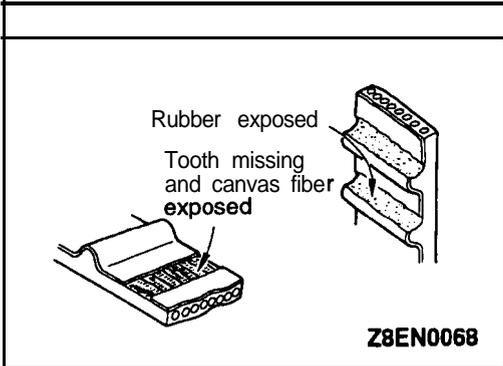
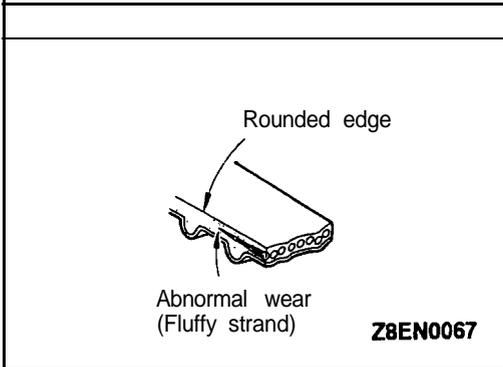
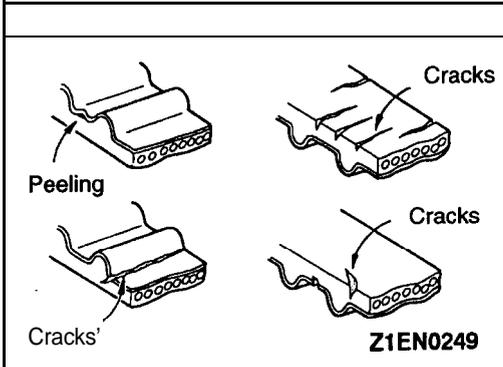
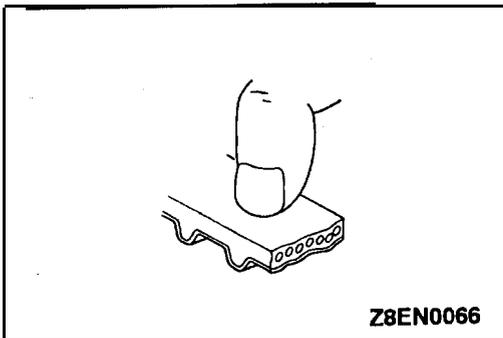
If the wire does not move freely, repeat step (13) above until it moves freely.

- (18) Remove the auto tensioner setting wire.



- (19) Measure the distance "A" (between the tensioner arm and auto tensioner body).

Standard value: 3.8–4.5 mm (.15–.18 in.)



INSPECTION

TIMING BELT

Replace belt if any of the following conditions exist.

- (1) Hardening of back rubber.
Back side is glossy without resilience and leaves no indent when pressed with fingernail.

- (2) Cracks on rubber back.
- (3) Cracks or peeling of canvas.
- (4) Cracks on rib root.
- (5) Cracks on belt sides.

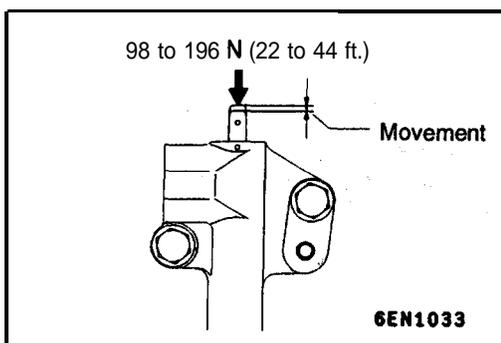
- (6) Abnormal wear of belt sides. The sides are normal if they are sharp as if cut by a knife.

- (7) Abnormal wear on teeth.
- (8) Missing tooth.

AUTO TENSIONER

- (1) Check the auto tensioner for possible leaks and replace as necessary.
- (2) Check the rod end for wear or damage and replace as necessary.
- (3) Measure the rod protrusion. If it is out of specification, replace the auto tensioner.

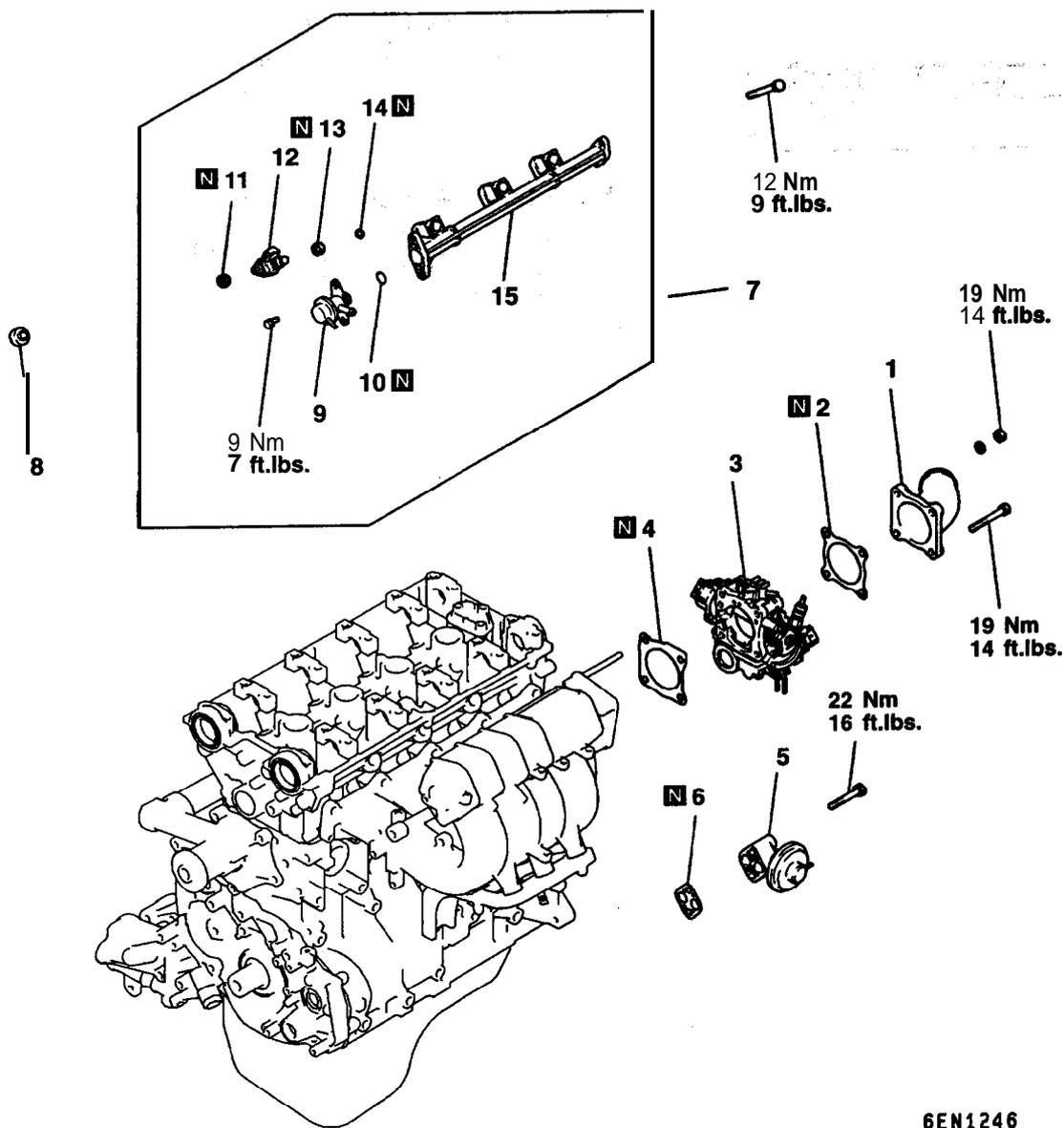
Standard value: 12 mm (.47 in.)



- (4) Press the rod with a force of 98 to 196 N (22 to 44 ft.) and measure its protrusion.
- (5) If the measured value is 1 mm (0.39 in) or more shorter than the value obtained in step (3), replace the auto tensioner.

FUEL AND EMISSION CONTROL PARTS

REMOVAL AND INSTALLATION

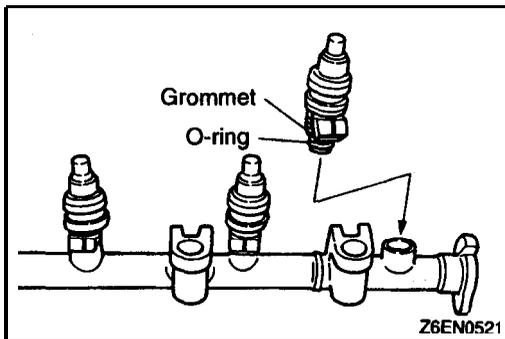


6EN1246

Removal steps

1. Air fitting
2. Air fitting gasket
3. Throttle body
4. Throttle body gasket
5. EGR valve
6. EGR valve gasket
7. Injectors and fuel rail

- 8. Insulator
- 9. Fuel pressure regulator
- ▶B◀ 10. O-ring
- ▶A◀ 11. Insulator
- ▶A◀ 12. Injectors
- ▶A◀ 13. O-ring
- ▶A◀ 14. Grommet
- ▶A◀ 15. Fuel rail



INSTALLATION SERVICE POINTS

▶A◀ INJECTOR INSTALLATION

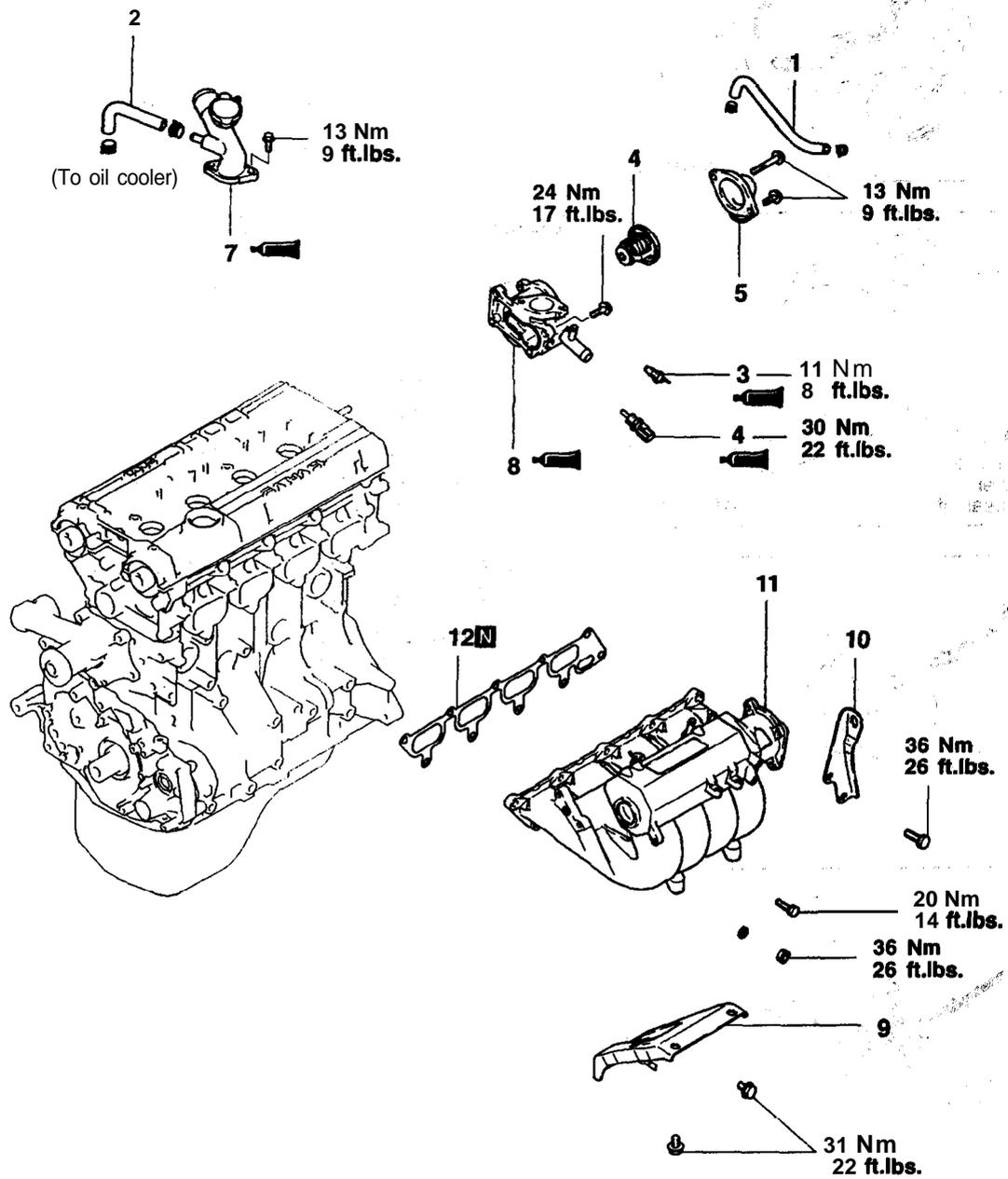
- (1) Before installing an injector the rubber O-ring must be lubricated with a drop of clean engine oil to aid in installation.
- (2) Install injector top end into fuel rail.
Be careful not to damage the O-ring during installation.

▶B◀ FUEL PRESSURE REGULATOR INSTALLATION

- (1) Before installing' **pressure** regulator the O-ring must be lubricated with a drop of **clean** engine O-ring to aid in installation.

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**INTAKE MANIFOLD
REMOVAL AND INSTALLATION**



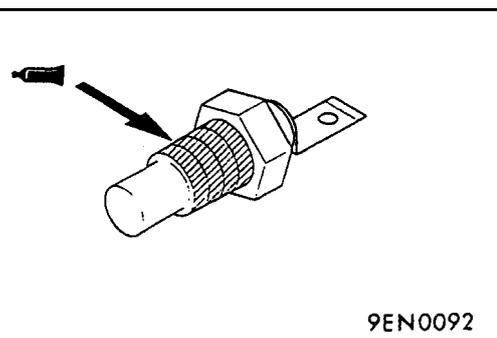
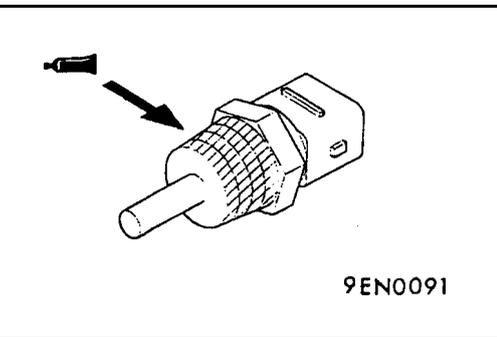
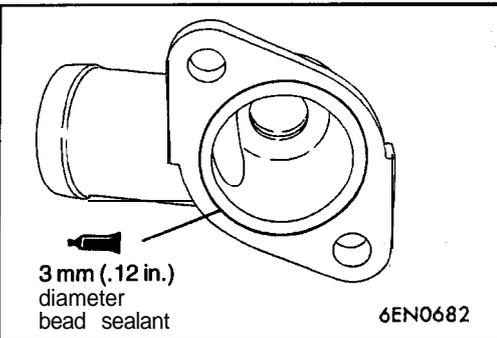
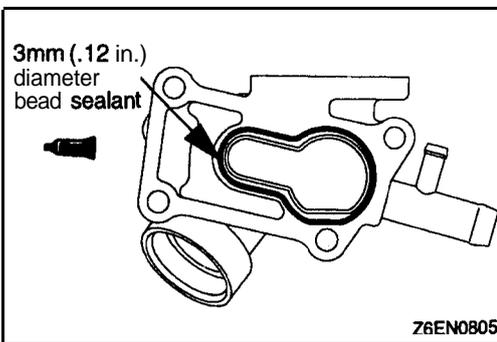
6EN1076

Removal steps

- ▶▶D▶▶ 3. Engine coolant temperature gauge unit
- ▶▶C▶▶ 4. Engine coolant temperature sensor
- 5. Water inlet fitting
- 6. Thermostat case

- ▶▶B▶▶ 7. Water outlet fitting
- ▶▶A▶▶ 8. Thermostat housing
- 9. Intake manifold stay
- 10. Engine hanger
- 11. Intake manifold
- 12. Gasket

TSB Revision



INSTALLATION SERVICE POINTS

▶A◀ SEALANT APPLICATION TO THERMOSTAT HOUSING

Specified sealant:

Mitsubishi Genuine Part No. MD970389 or equivalent

NOTE

- (1) Be sure to install the housing quickly while the sealant is wet (within 15 minutes).
- (2) After installation, keep the sealed area away from the oil and coolant for **approx. 1** hour.

▶B◀ SEALANT APPLICATION TO WATER OUTLET FITTING

Specified sealant:

Mitsubishi Genuine Part No. MD970389 or equivalent

NOTE

- (1) Be sure to install the housing quickly while the sealant is wet (within 15 minutes).
- (2) After installation, keep the sealed area away from the oil and coolant for approx. 1 hour.

▶C◀ SEALANT APPLICATION TO ENGINE COOLANT TEMPERATURE SENSOR

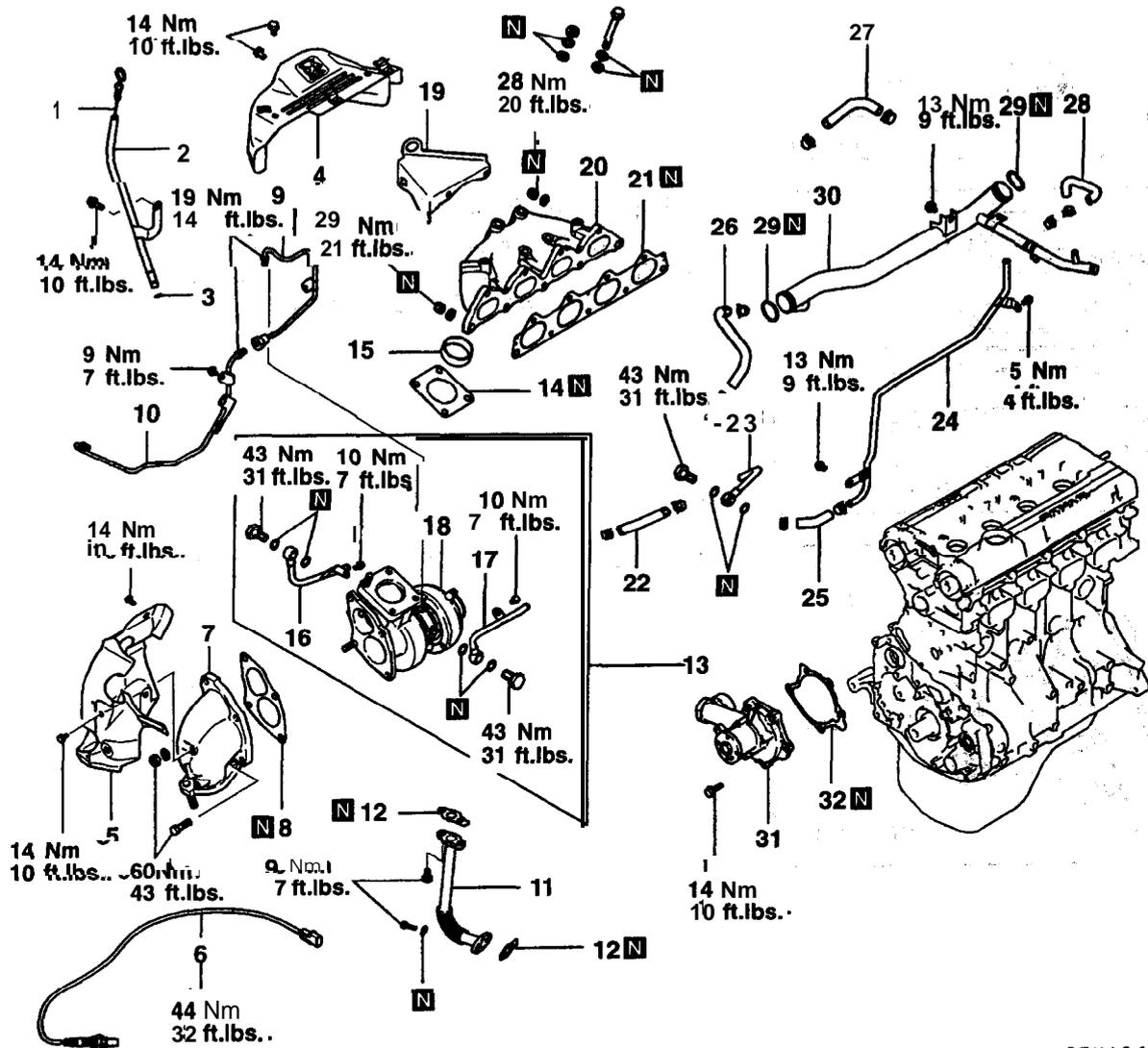
Specified sealant:

3M Nut Locking Part No. 4171 or equivalent

▶D◀ SEALANT APPLICATION TO ENGINE COOLANT TEMPERATURE GAUGE UNIT

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

**EXHAUST MANIFOLD AND WATER PUMP
REMOVAL AND INSTALLATION**

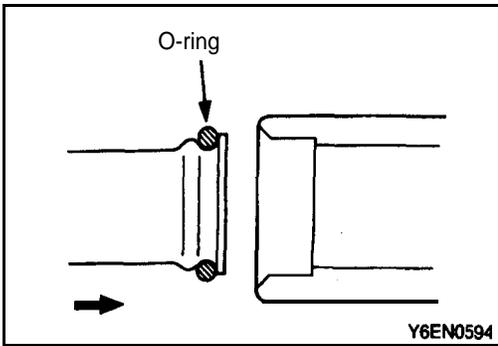


6EN1247

Removal steps

1. Oil dipstick
2. Oil dipstick guide
3. O-ring
4. Heat protector "A"
5. Heat protector "B"
6. Heated oxygen sensor
7. Exhaust fitting
8. Gasket
9. Oil pipe "A"
10. Oil pipe "B"
11. Oil return pipe
12. Gasket
- ▶B◀ 13. Turbocharger assembly
14. Gasket
15. Ring
16. Water pipe "A"

17. Water pipe "B"
18. Turbocharger
19. Engine hanger
20. Exhaust manifold
21. Gasket
22. Water hose
- ▶A◀ 23. Water pipe "C"
24. Water pipe
25. Water hose
26. Water hose
27. Water hose
28. Water hose
29. O-ring
30. Water inlet pipe
31. Water pump
32. Gasket



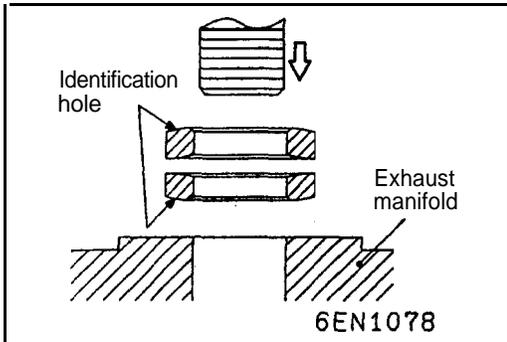
INSTALLATION SERVICE POINT

▶A◀ WATER PIPE/O-RING INSTALLATION

(1) Wet the O-ring (with water) to facilitate assembly.

Caution

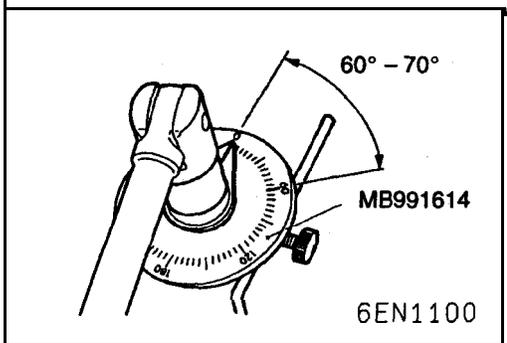
Keep the O-ring free of oil or grease.



▶B◀ TURBOCHARGER ASSEMBLY INSTALLATION

(1) Install the cone disc spring in the shown direction.

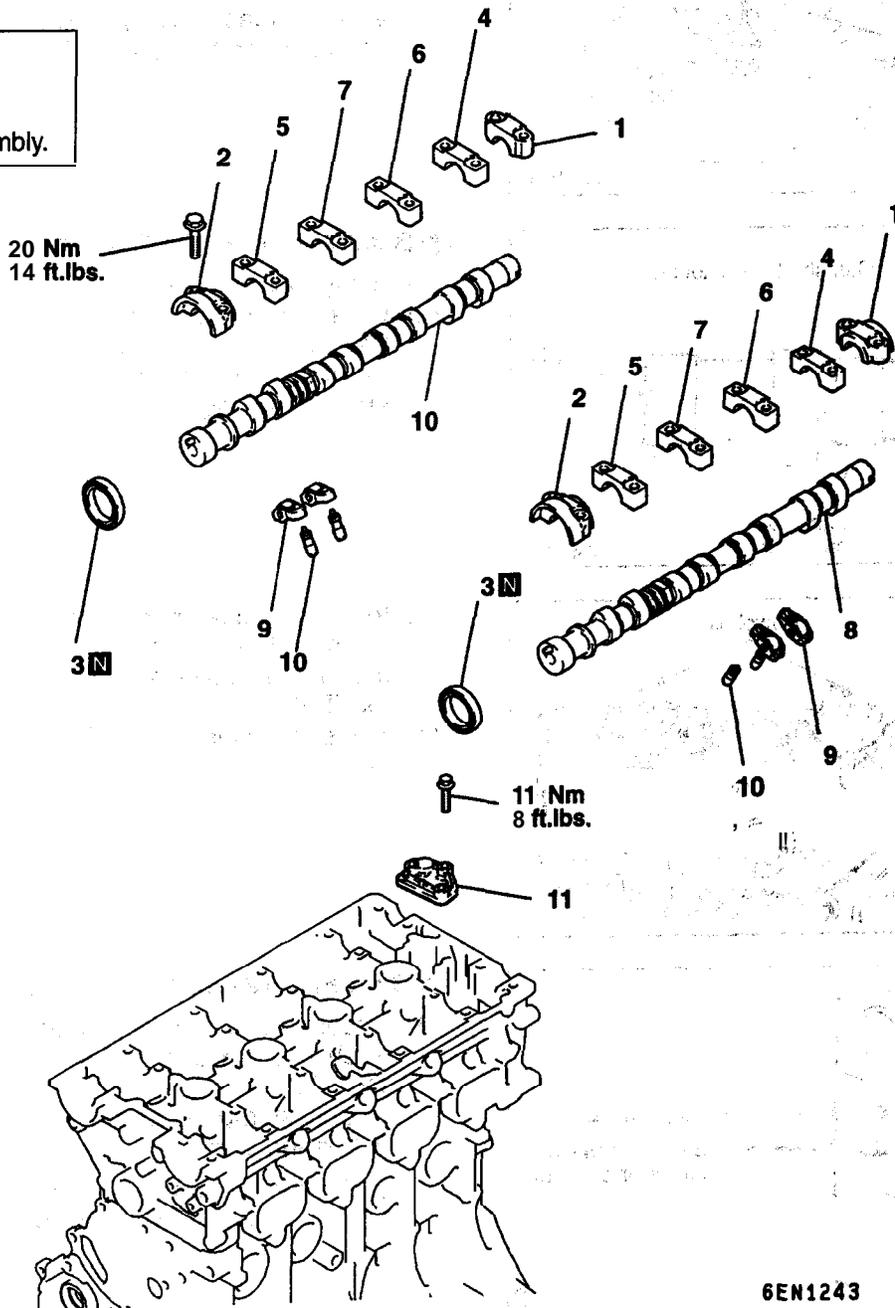
(2) Tighten the turbocharger mounting bolts and nuts to **27 – 31 Nm (20 – 22 ft.lbs.)**.



(3) Use the special tool or similar to tighten **60° – 70°** more.

**ROCKER ARMS AND CAMSHAFT
REMOVAL AND INSTALLATION**

 Lubricate all internal parts with engine oil during reassembly.



6EN1243

Removal steps

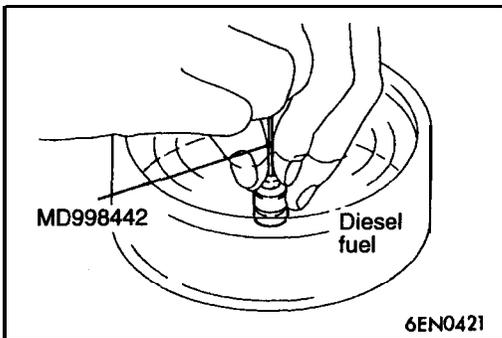


- 1. Bearing cap rear
- 2. Bearing cap front
- 3. Camshaft oil seal
- 4. Bearing cap No. 5
- 5. Bearing cap No. 2
- 6. Bearing cap No. 4



- 7. Bearing cap No. 3
- 8. Camshaft
- 9. Rocker arm
- 10. Lash adjuster
- 11. Oil delivery body

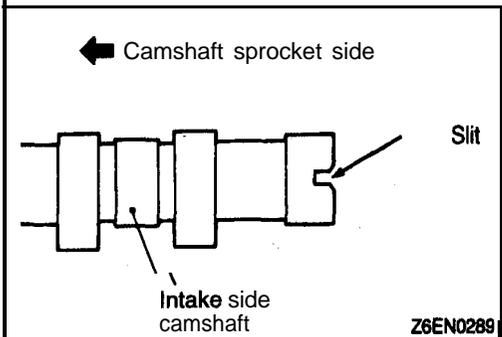
11B-32 ENGINE OVERHAUL <2.0L (4G6)> – Rocker, Arms and Camshaft



INSTALLATION SERVICE POINTS

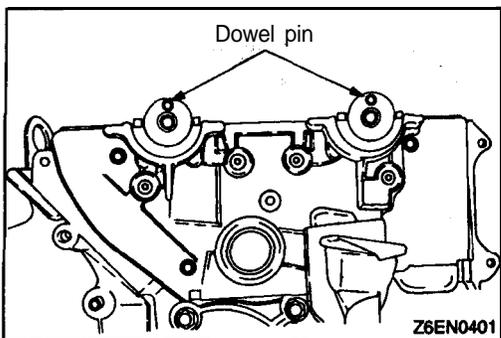
►A◄ LASH ADJUSTER INSTALLATION

- (1) Immerse the lash adjuster in clean diesel fuel.
- (2) Using a special tool, move the plunger up and down 4 or 5 times while pushing down lightly on the check ball in order to bleed out the air.

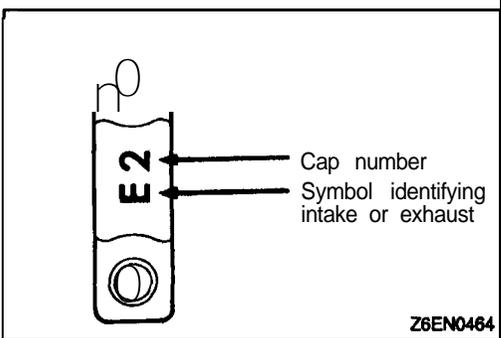


►B◄ CAMSHAFT INSTALLATION

- (1) Apply engine oil to journals and cams of the **camshafts**.
- (2) Install the camshafts on the cylinder head.
Use care not to confuse the intake camshaft with the exhaust one. The intake camshaft has a slit on its rear end for driving the crankshaft position sensor.

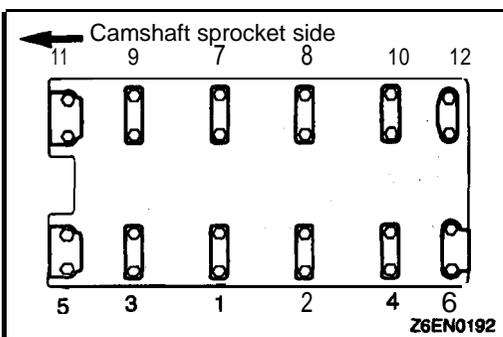


- (3) Install the crankshaft sprocket **B** or spacer and flange to an end of the crankshaft, and turn the **crankshaft** until the timing marks are lined up, setting No. 1 cylinder to the TDC.
- (4) Place the camshafts so that their dowel pins are positioned at top.



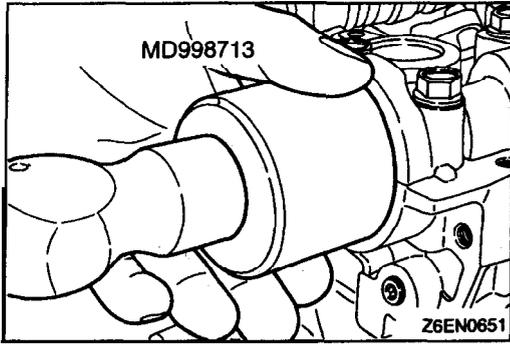
►C◄ BEARING CAPS INSTALLATION

- (1) According to the identification mark stamped on top of each bearing cap, **install** the caps to the cylinder head. Only "L" or "R" is stamped on No. 1 bearing cap. Cap No. is stamped on No. 2 to No. 5 bearing **caps**. No. 6 bearing cap has no stamping.
I: For intake camshaft side
E: For exhaust camshaft side



- (2) Tighten the bearing caps in the order shown two. to three times by torquing progressively.
Tighten to specification in the final sequence.
- (3) Check to ensure that the rocker arm is held in position on the lash adjuster and valve. stem end.

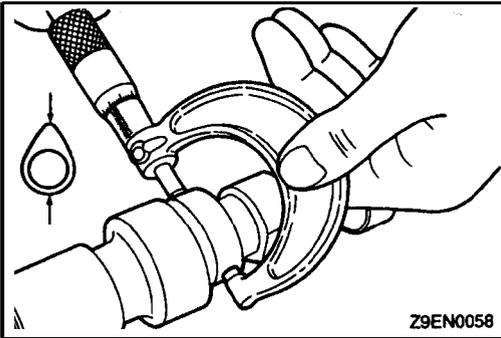
ENGINE OVERHAUL <2.0L (4G6)> – Rocker Arms and Camshaft 11B-33



▶◀ CAMSHAFT OIL SEAL CIRCULAR PACKING INSTALLATION

11 B-34 ENGINE OVERHAUL <2.0L (4G6)> – Rocker Arms and Camshaft

11300550196

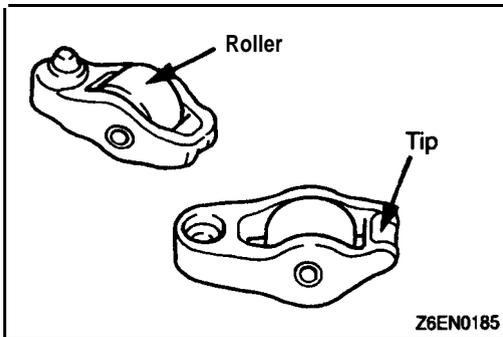


INSPECTION

CAMSHAFT

- (1) Measure the cam height.

Item	Standard value mm (in.)	Limit mm (in.)
Intake	34.91 (1.37)	34.41 (1.36)
Exhaust	34.91 (1.37)	34.41 (1.36)



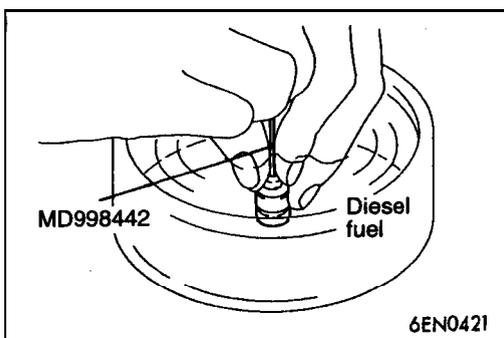
ROCKER ARM

- (1) Check the roller surface. If any dents, damage or seizure is evident, replace the rocker arm.
- (2) Check rotation of the roller. If it does not rotate smoothly or if looseness is evident, replace the rocker arm.
- (3) Check the inside diameter. If damage or seizure is evident, replace the rocker arm.

LASH ADJUSTER LEAK DOWN TEST

Caution

1. The lash adjuster is a precision part. Keep it free from dust and other foreign matter.
2. Do not disassemble lash adjuster.
3. When cleaning lash adjuster, use clean diesel fuel only.

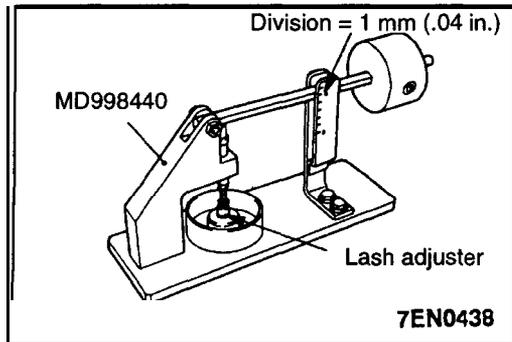


- (1) Immerse the lash adjuster in clean diesel fuel.
- (2) While lightly pushing down inner steel ball using the special tool, move the plunger up and down four or five times to bleed air.
Use of the special tool helps facilitate the air bleeding of the rocker arm mounted type lash adjuster.
- (3) Remove the special tool 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

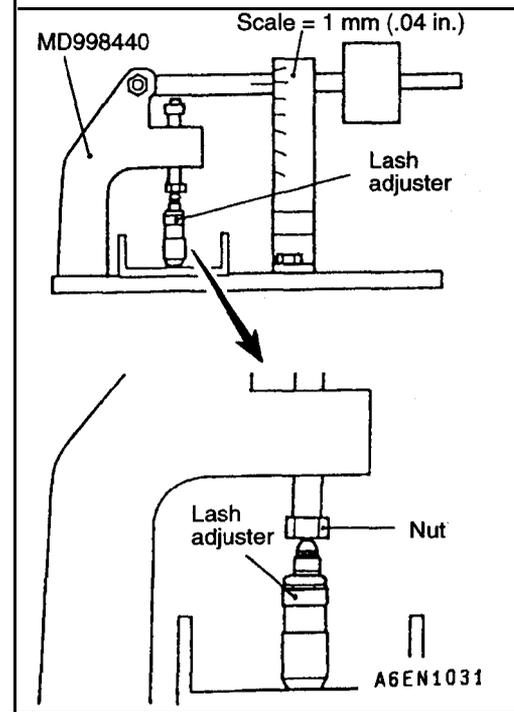
Upon completion of air bleeding, hold lash adjuster upright to prevent inside diesel fuel from spilling.

ENGINE OVERHAUL <2.0L (4G6)> – Rocker Arms and Camshaft 11B-35

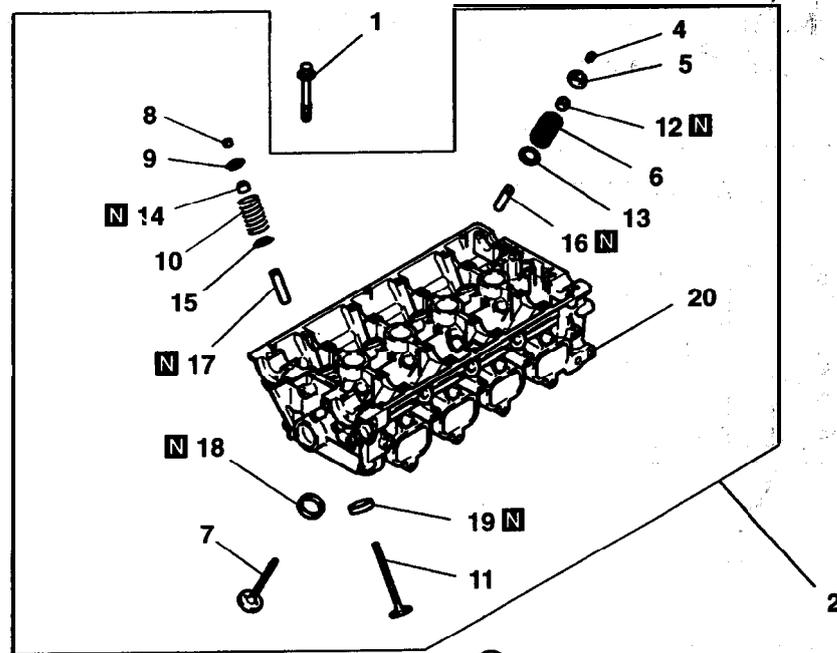


- (4) After air bleeding, place lash adjuster on the **special tool** (Leak down tester).
- (5) After plunger has **gone down somewhat (.2–.5 mm)**, measure time taken for it to go down 1 mm. Replace if measured time is out of specification.

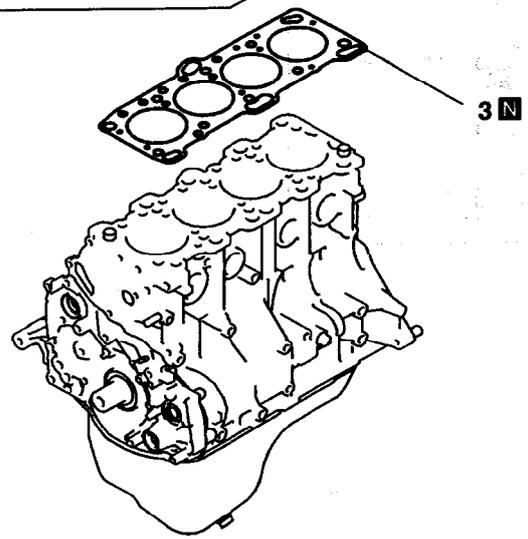
Standard value: 4–20 seconds / 1 mm (.04 in.)
[Diesel fuel at 15–20°C (59–68°F)]



**CYLINDER HEAD AND VALVES
REMOVAL AND INSTALLATION**



 Lubricate all internal parts with engine oil during reassembly.



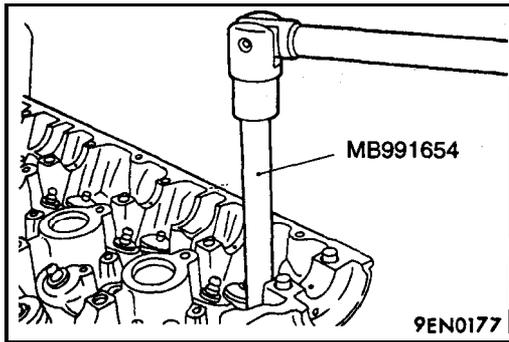
6EN0948

Removal steps

- ◀A▶ ▶E▶ 1. Cylinder head bolt
- ◀B▶ ▶C▶ 2. Cylinder head assembly
- ◀B▶ ▶D▶ 3. Gasket
- ▶B▶ ▶C▶ 4. Retainer lock
- ▶B▶ ▶C▶ 5. Valve spring retainer
- ▶B▶ ▶C▶ 6. Valve spring
- ▶B▶ ▶C▶ 7. Intake valve
- ▶B▶ ▶C▶ 8. Retainer lock
- ▶B▶ ▶C▶ 9. Valve spring retainer
- ▶B▶ ▶C▶ 10. Valve spring

- ◀C▶ ▶A▶ 11. Exhaust valve
- ◀C▶ ▶A▶ 12. Valve stem seal
- ◀C▶ ▶A▶ 13. Valve spring seat
- ◀C▶ ▶A▶ 14. Valve stem seal
- ◀C▶ ▶A▶ 15. Valve spring seat
- ◀C▶ ▶A▶ 16. Intake valve guide
- ◀C▶ ▶A▶ 17. Exhaust valve guide
- ◀C▶ ▶A▶ 18. Intake valve seat
- ◀C▶ ▶A▶ 19. Exhaust valve seat
- ◀C▶ ▶A▶ 20. Cylinder head

TSB Revision



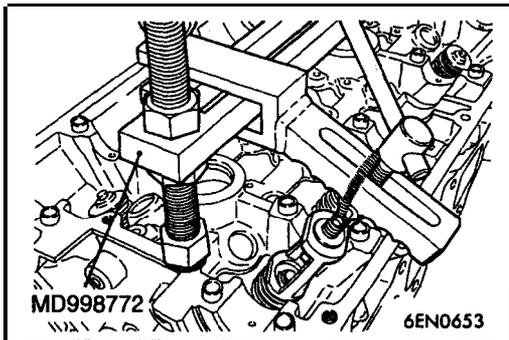
REMOVAL SERVICE POINTS

PRECAUTION FOR REMOVED PARTS

- (1) Keep removed parts in order according to the cylinder, number and intake/exhaust.

◀A▶ CYLINDER HEAD BOLTS REMOVAL

- (1) Using the special tool, **loosen** the cylinder **head** bolts. Loosen evenly, little by little.



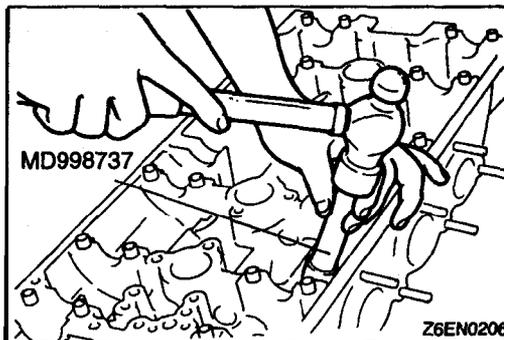
◀B▶ RETAINER LOCK REMOVAL

- (1) Store removed valves, springs and other parts, tagged to indicate their cylinder No. and location for reassembly.



◀C▶ VALVE STEM SEAL REMOVAL

- (1) Do not reuse valve stem seal.



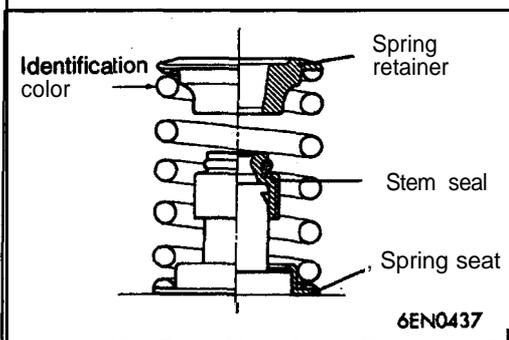
INSTALLATION SERVICE POINTS

▶A▶ VALVE STEM SEAL INSTALLATION

- (1) Install the valve spring seat.
- (2) The special tool must be used to install the **valve** stem seal. Improper installation **could** result in oil leaking past the valve guide.

Caution

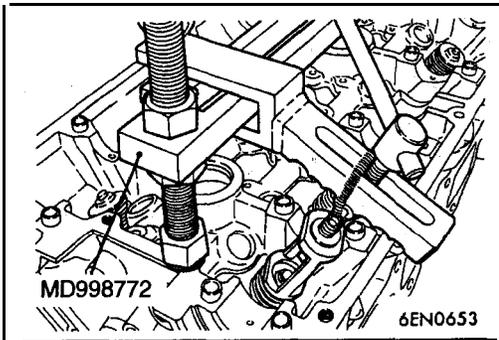
Do not reuse the valve stem seal.



▶B▶ VALVE SPRINGS INSTALLATION

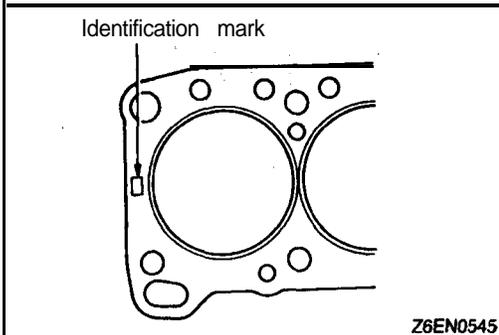
- (1) Direct the valve spring end with identification color end toward the spring retainer.

11 B-38 ENGINE OVERHAUL <2.0L (4G6)> – Cylinder Head and Valves



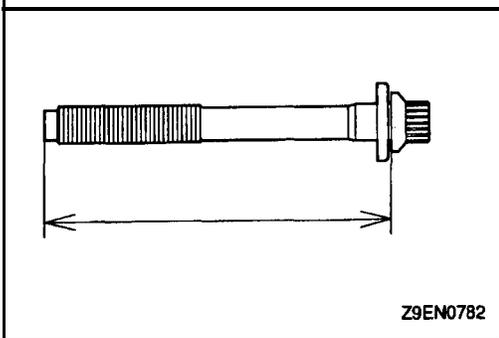
▶C◀ RETAINER LOCK INSTALLATION . .

- (1) The valve spring, if excessively, compressed, causes the bottom end of retainer to be in contact with, and damage, the stem seal.



▶D◀ CYLINDER HEAD GASKET IDENTIFICATION

Identification mark: 4G63K



▶E◀ CYLINDER HEAD BOLT INSTALLATION

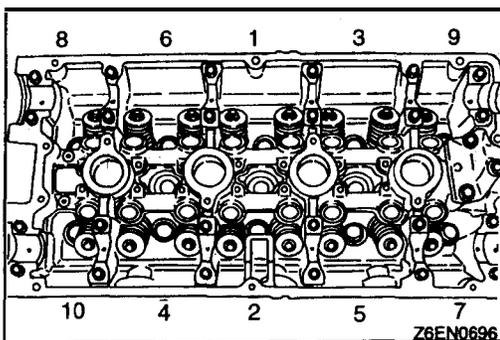
- (1) When installing the cylinder head bolts, check that the shank length of each bolt meets the limit. If the limit is exceeded, replace the bolt.

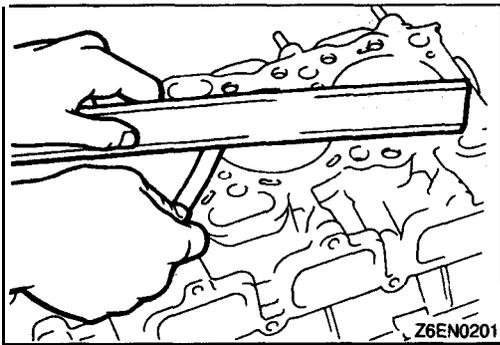
Limit: Max. 99.4 mm (3.91 in.)

- (2) Apply engine oil to the threaded portions of bolts and to the washers.
- (3) According to the tightening sequence, tighten the bolts to the specified torque 78 Nm (58 ft.lbs.) using special tool (MB991654).
- (4) Loosen bolts completely.
- (5) Retighten the loosened bolts to 20 Nm (14.5 ft.lbs.) in the specified tightening sequence.
- (6) Make a paint mark across each bolt head and cylinder head.
- (7) Give a 90° turn to the bolts in the specified tightening sequence.
- (8) Give another 90° turn to the bolts and make sure that the paint mark on the head of each bolt and that on the cylinder head are on the same straight line.

Caution

1. If the bolt is turned less than 90°, proper fastening performance may not be expected. When tightening the bolt, therefore, be careful to give a sufficient turn to it.
2. If the bolt is overtightened, loosen the bolt completely and then retighten it by repeating the tightening procedure from step (1).





INSPECTION
CYLINDER HEAD

11300700225

- (1) Check the cylinder head gasket surface for flatness by using a straightedge and feeler gauge.

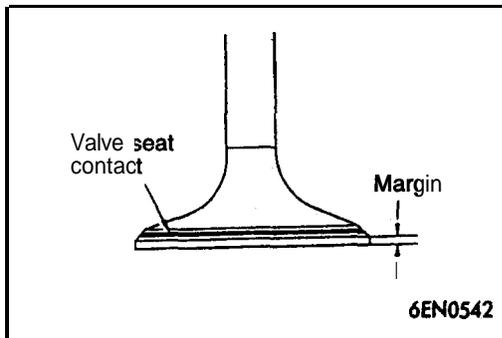
Standard value: 0.05 mm (.0020 in.)
Limit: 0.2 mm (.008 in.)

- (2) If the service limit is exceeded, correct to meet specification.

Grinding limit: *0.2 mm (.008 in.)

* Includes combined with cylinder block grinding.

Cylinder head height (Specification when new):
131.9-132.1 mm (5.193-5.201 in.)



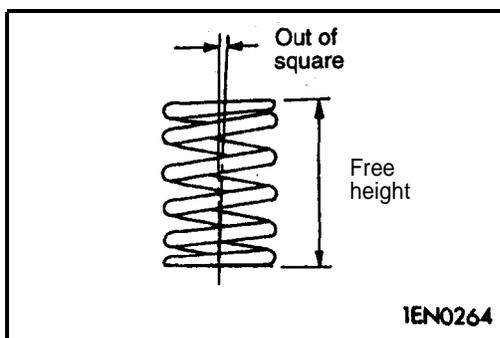
VALVE

- (1) Check the valve face for correct contact. If incorrect, reface using valve refacer. Valve seat contact should be maintained uniform at the center of valve face.
- (2) If the margin exceeds the service limit, replace the valve.

Item	Standard value mm (in.)	Limit mm (in.)	Identification mark
Intake	1.0 (.039)	0.5 (.020)	6T
Exhaust	1.5 (.059)	1.0 (.039)	6T

- (3) Measure the valve's total length. If the measurement is less than specified, replace the valve.

Item	Standard value mm (in.)	Limit mm (in.)
Intake	109.50 (4.3110)	109.00 (4.2913)
Exhaust	109.70 (4.3189)	109.20 (4.2992)



VALVE SPRING

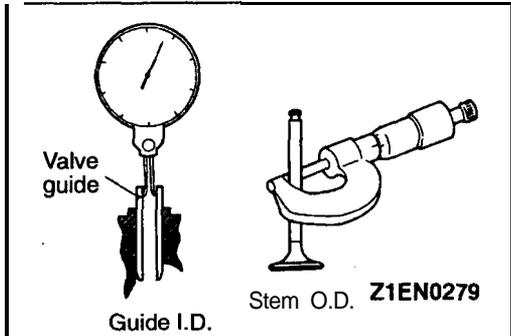
- (1) Measure the free height of spring and, if it is smaller than the limit, replace.

Standard value: 47.0 mm (1.850 in.)
Limit: 46.0 mm (1.811 in.)

11 B-40 ENGINE OVERHAUL <2.0L (4G6)> – Cylinder Head and Valves

- Measure the squareness of the spring and, **if the limit** is exceeded, replace.

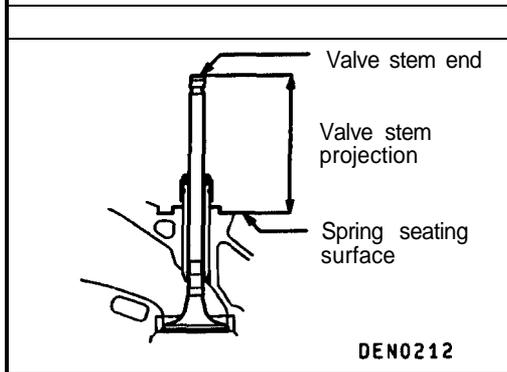
Standard value: 1.5° or less
Limit: Max. 4°



VALVE GUIDE

- Measure the clearance between the valve guide and valve stem. If the limit is exceeded, replace the valve guide or valve, or both.

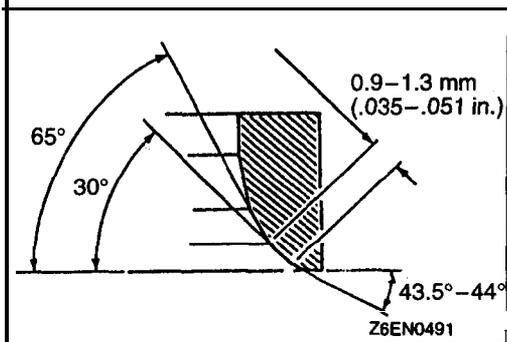
Item	Standard value mm (in.)	Limit mm (in.)
Intake	0.02–0.05 (.0008–.0020)	0.10 (.004)
Exhaust	0.05–0.09 (.0020–.0035)	0.15 (.006)



VALVE SEAT

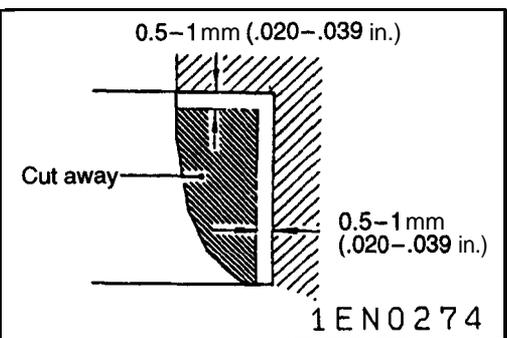
- Assemble the valve, then measure the valve stem projection between the end of the valve stem and the spring seating surface. If the measurement **exceeds** the specified limit, replace the valve seat.

Item	Standard value mm (in.)	Limit mm (in.)
Intake	49.20 (1.9370)	49.80 (1.9606)
Exhaust	48.40 (1.9055)	48.90 (1.9252)



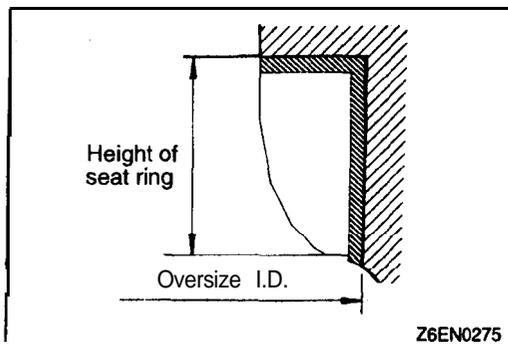
VALVE SEAT RECONDITIONING PROCEDURE

- Before correcting the valve seat, check for clearance between the valve guide and valve and, if necessary, replace the valve guide.
- Using the seat grinder, correct to obtain the specified seat width and angle.
- After correcting the valve seat, lap the valve and valve seat using lapping compound. Then, check the valve stem projection (refer to VALVE SEAT in INSPECTION).



VALVE SEAT REPLACEMENT PROCEDURE

- Cut the valve seat to be replaced **from the inside** to thin the wall thickness. Then, remove the **valve seat**.



- (2) Rebore the valve seat hole in the cylinder head to a selected oversize valve seat diameter.

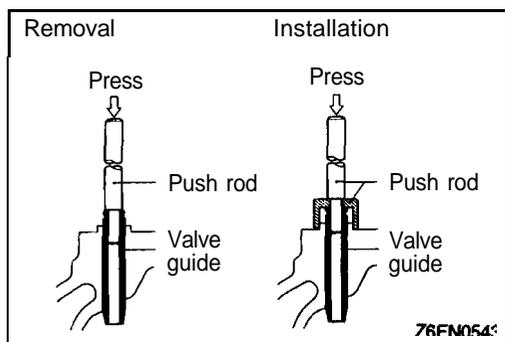
Intake seat ring hole diameters

0.3 O.S. 35.30 – 35.33 mm (1.3989 – 1.3909 in.)
 0.6 OS. 35.60 – 35.63 mm (1.4018 – 1.4028 in.)

Exhaust seat ring hole diameters

0.3 O.S. 33.30 – 33.33 mm (1.3110 – 1.3122 in.)
 0.6 O.S. 33.60 – 36.63 mm (1.3228 – 1.3240 in.)

- (3) Before fitting the valve seat, either heat the cylinder head up to approximately **250°C (482°F)** or cool the valve seat in liquid nitrogen, to prevent the cylinder head bore from galling.
- (4) Using a valve seat cutter, correct the valve seat to the specified width and angle.
 See "VALVE SEAT RECONDITIONING PROCEDURE".



VALVE GUIDE REPLACEMENT PROCEDURE

- (1) Using the push rod and a press, remove the valve guide toward cylinder head gasket surface.
- (2) Rebore valve guide hole to the new oversize valve guide outside diameter.

Valve guide hole diameters

0.05 O.S. 12.05 – 12.07 mm (.4744 – .4752 in.)
 0.25 O.S. 12.25 – 12.27 mm (.4823 – .4831 in.)
 0.50 O.S. 12.50 – 12.52 mm (.4921 – .4929 in.)

NOTE

Do not install a valve guide of the same size again.

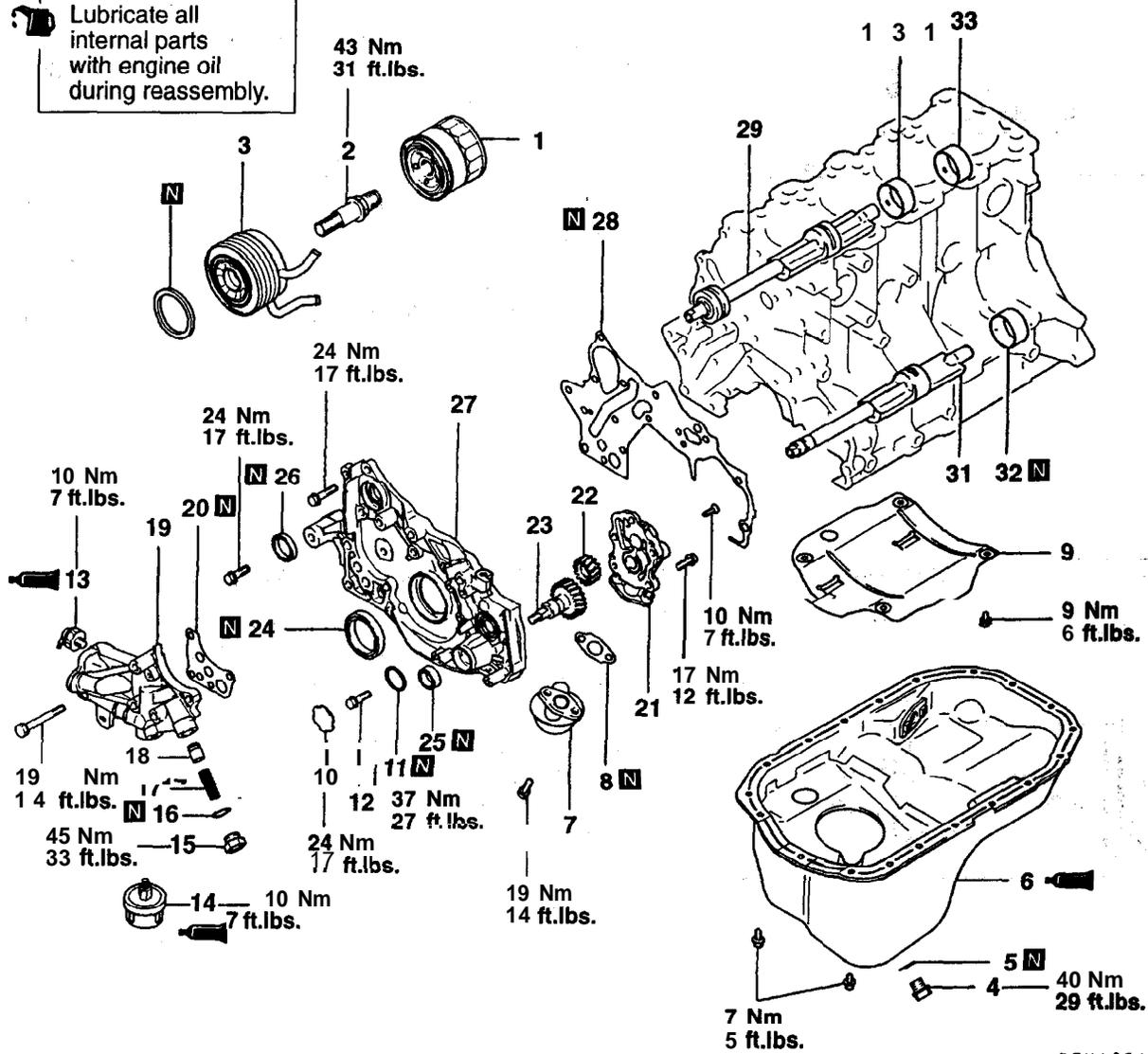
- (3) Using the special tool, press-fit the valve guide, working from the cylinder head top surface.
- (4) After installing valve guides, insert new valves in them to check for sliding condition.
- (5) When valve guides have been replaced, check for valve contact and correct valve seats as necessary.

FRONT CASE, COUNTERBALANCE SHAFT AND OIL PAN

11300720092

REMOVAL AND INSTALLATION

Lubricate all internal parts with engine oil during reassembly.

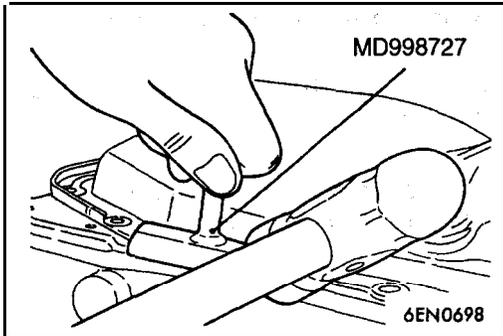


6EN1081

Removal steps

- ▶P◀ 1. Oil filter
- ▶O◀ 2. Oil cooler bolt
- ▶N◀ 3. Oil cooler
- ▶M◀ 4. Drain plug
- ▶A▶▶N◀ 5. Drain plug gasket
- ▶B▶▶M◀ 6. Oil pan
- ▶L◀ 7. Oil screen
- ▶K◀ 8. Oil screen gasket
- ▶J◀ 9. Baffle plate
- ▶I◀ 10. Plug
- ▶H◀ 11. O-ring
- ▶G◀ 12. Flange bolt
- ▶F◀ 13. Oil pressure switch
- ▶E▶▶J◀ 14. Oil pressure gauge unit
- ▶D▶▶I◀ 15. Relief plug
- ▶C▶▶H◀ 16. Gasket
- ▶B▶▶G◀ 17. Relief spring
- ▶A▶▶F◀ 18. Relief plunger
- ▶H▶▶D◀ 19. Oil filter bracket
- ▶H▶▶C◀ 20. Oil filter bracket gasket
- ▶G▶▶B◀ 21. Oil pump cover
- ▶F▶▶A◀ 22. Oil pump driven gear
- ▶E▶▶Z◀ 23. Oil pump drive gear
- ▶D▶▶Y◀ 24. Crankshaft front oil seal
- ▶C▶▶X◀ 25. Oil pump oil seal
- ▶B▶▶W◀ 26. Counterbalance shaft oil seal
- ▶A▶▶V◀ 27. Front case
- ▶Z▶▶U◀ 28. Front case gasket
- ▶Y▶▶T◀ 29. Counterbalance shaft, left
- ▶X▶▶S◀ 30. Counterbalance shaft, right
- ▶W▶▶R◀ 31. Counterbalance shaft, front bearing
- ▶V▶▶Q◀ 32. Counterbalance shaft, rear bearing, left
- ▶U▶▶P◀ 33. Counterbalance shaft, rear bearing, right

TSB Revision



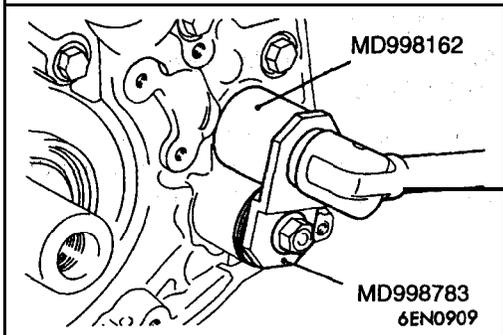
REMOVAL SERVICE POINTS

◀A▶ OIL PAN REMOVAL

- (1) Remove all oil pan bolts.
- (2) Drive in the special tool between the **cylinder block** and oil pan.

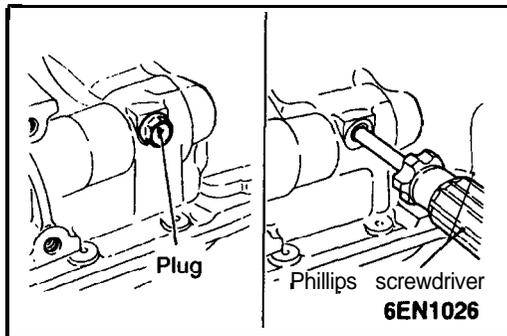
NOTE

Never use a screwdriver or chisel, instead of **the service** tool, as a deformed oil pan flange **will** result in oil leakage.



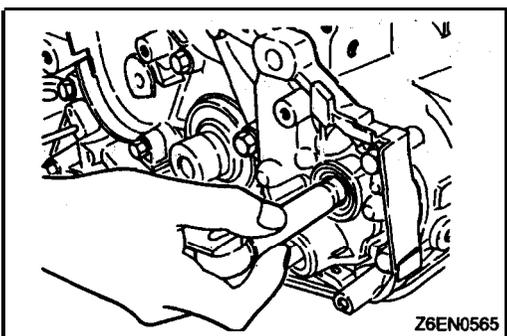
◀B▶ PLUG REMOVAL

- (1) If the plug is too tight, hit the plug head with a hammer two to three times, and the plug will be easily loosened.

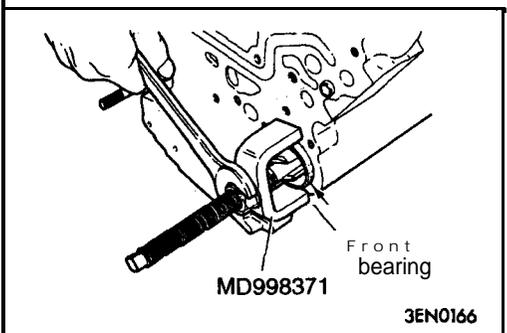


◀C▶ FLANGE BOLT REMOVAL

- (1) Remove the plug on the side of cylinder block.
- (2) Insert a Phillips screwdriver [shank diameter 8 mm (.32 in.)] into the plug hole to lock the counterbalance shaft.



- (3) Loosen the flange bolt.

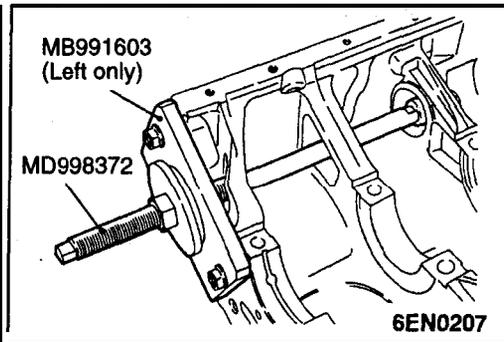


◀D▶ COUNTERBALANCE SHAFT FRONT BEARING REMOVAL

Using the special tool, remove the counterbalance shaft front bearing from the cylinder block.

NOTE

Be sure to remove the front bearing **first**. If it has not been removed, the Rear Bearing Puller cannot be used.

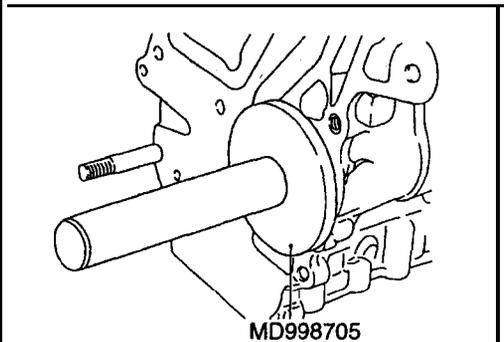


◀E▶ COUNTERBALANCE SHAFT REAR BEARING REMOVAL

Using the special tool, remove the counterbalance shaft rear bearing from the cylinder block.

NOTE

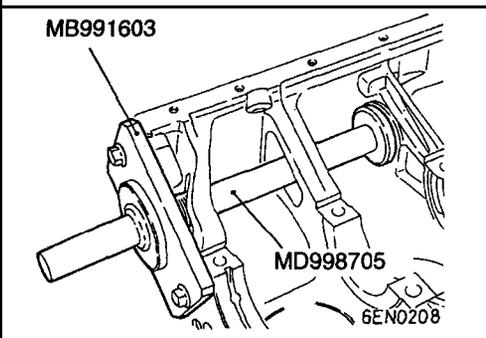
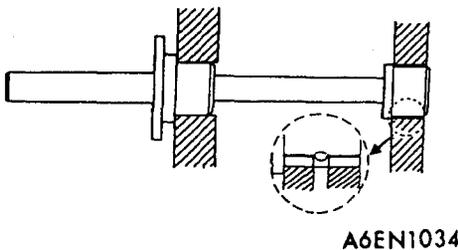
When removing the left counterbalance shaft, install the special tool (MB991603) to the front of the cylinder block.



INSTALLATION SERVICE POINTS

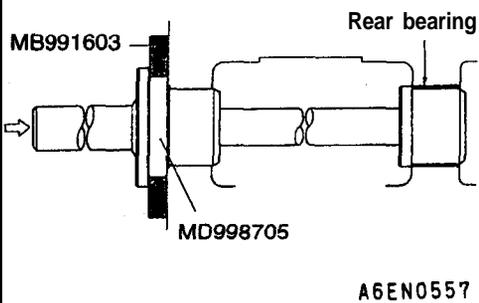
▶A◀ RIGHT COUNTERBALANCE SHAFT REAR BEARING INSTALLATION

- (1) Apply engine oil to the outer surface of bearing.
- (2) Using special tools, install right rear bearing. **Make sure** that oil hole of bearing is aligned **with** oil hole of **cylinder** block.



▶B◀ LEFT COUNTERBALANCE SHAFT REAR BEARING INSTALLATION

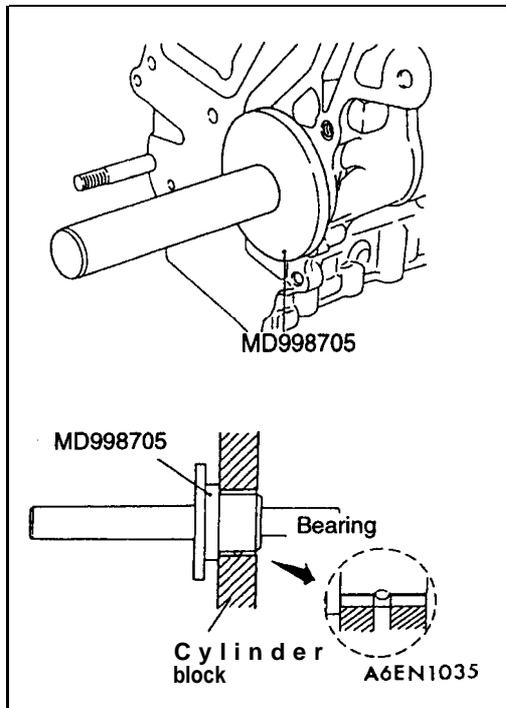
- (1) Install the special tool (GUIDE PLATE) to the **cylinder** block.
- (2) Apply engine oil to the rear bearing outer **inside diameter** and bearing hole in cylinder block.



- (3) Using the special tool, install the rear **bearing**.

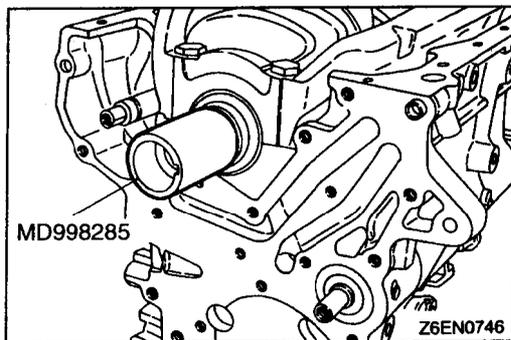
NOTE

The left rear bearing has no oil holes.



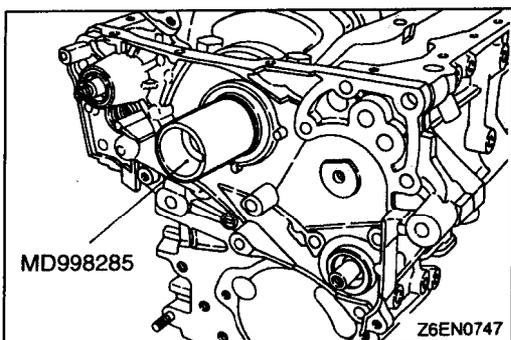
▶◀ COUNTERBALANCE SHAFT FRONT BEARING INSTALLATION

- (1) Using special tools, install front bearing.

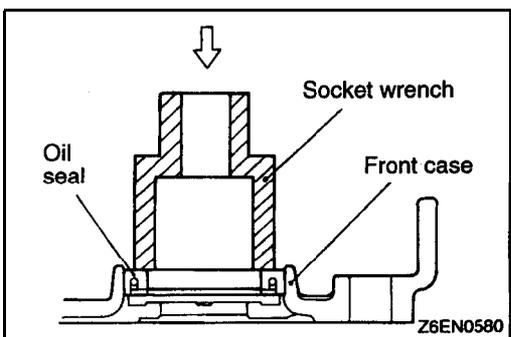


▶◀ FRONT CASE INSTALLATION

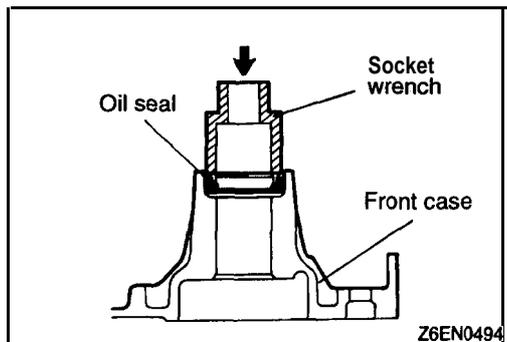
- (1) Place the special tool on the front end of crankshaft and apply a thin coat of engine oil to the outer **inside diameter** of the special tool to install the front **case**.



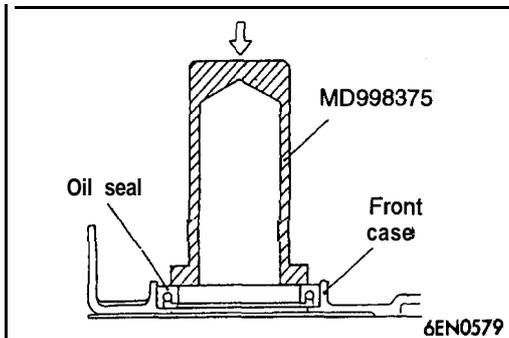
- (2) Install the front case assembly through a new front case gasket and temporarily tighten the flange bolts (other than those for tightening the filter bracket).



▶◀ COUNTERBALANCE SHAFT OIL SEAL INSTALLATION

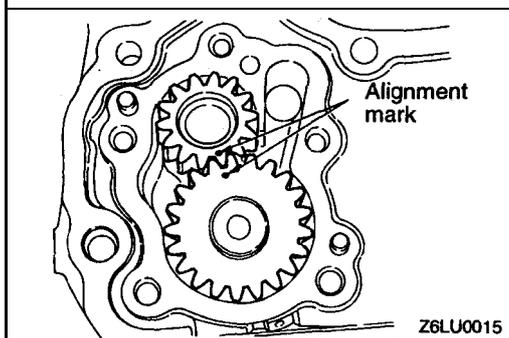


►F◄ OIL PUMP OIL SEAL INSTALLATION



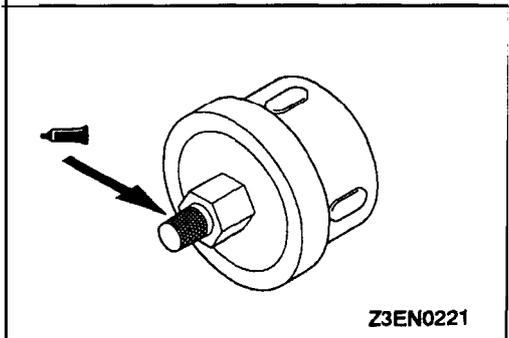
►G◄ CRANKSHAFT FRONT OIL SEAL INSTALLATION

- (1) Using the special tool, install the crankshaft front oil seal into the front case.



►H◄ OIL PUMP DRIVEN GEAR / OIL PUMP DRIVE GEAR INSTALLATION

- (1) Apply engine oil to the gears' and line up the alignment marks.



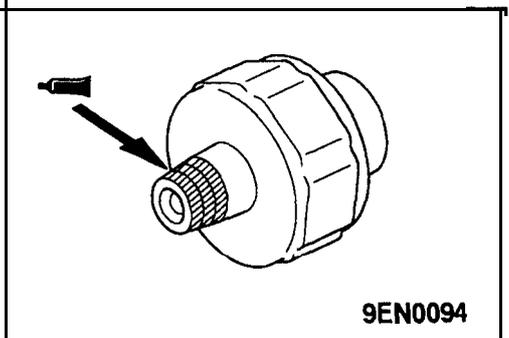
►I◄ SEALANT APPLICATION TO OIL PRESSURE GAUGE UNIT

- (1) Coat the threads of 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.



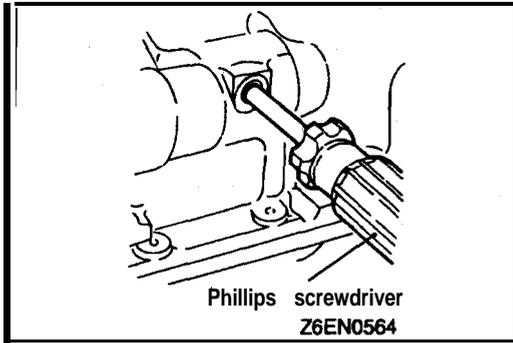
►J◄ SEALANT APPLICATION TO OIL PRESSURE SWITCH

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

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

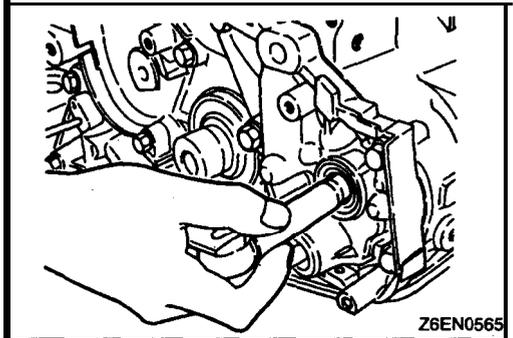
Caution

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

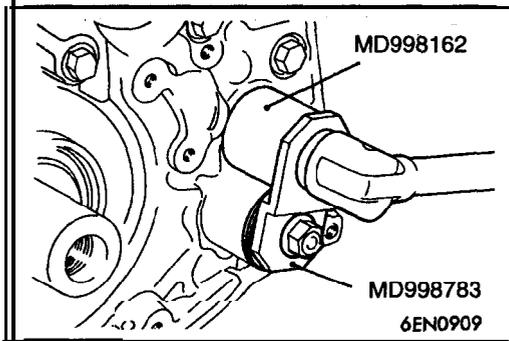


►K◄ FLANGE BOLT INSTALLATION

- (1) Insert a Phillips screwdriver into a hole in the left side of the cylinder block to lock the counterbalance shaft.

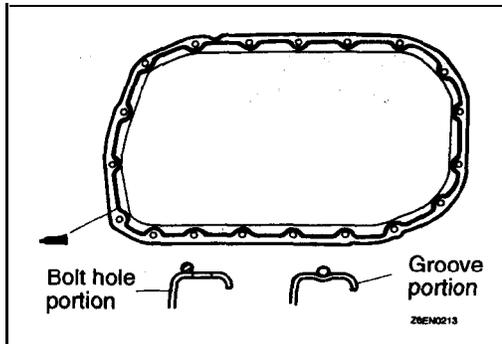


- (2) Secure the oil pump driven gear onto the left counterbalance shaft by tightening the flange bolt to specified torque.



►L◄ PLUG INSTALLATION

- (1) Install a new O-ring to the groove of front case.
- (2) Using the special tool, install the plug and tighten to specified torque.



►M◄ OIL PAN INSTALLATION

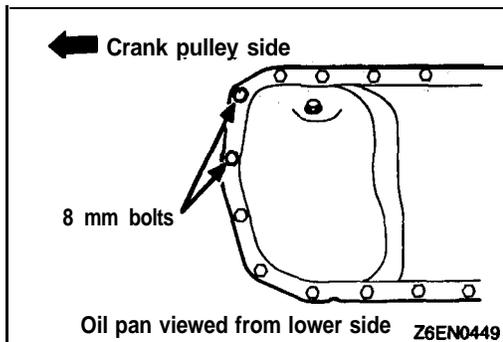
- (1) Clean both mating surfaces of **oil pan** and cylinder block.
- (2) Apply a 4 mm (.16 in.) wide bead of **sealant** to the entire circumference of the oil pan flange.

Specified sealant:

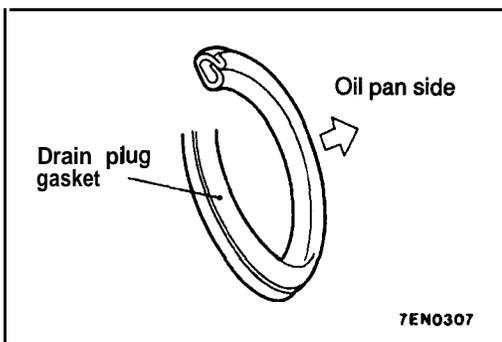
MITSUBISHI GENUINE PART No. MD970389 or equivalent

NOTE

- (1) Be sure to install the oil pan quickly **while** the sealant is wet (within 15 minutes);
- (2) After installation, keep the sealed area **away** from the oil and coolant for approx. **1** hour.

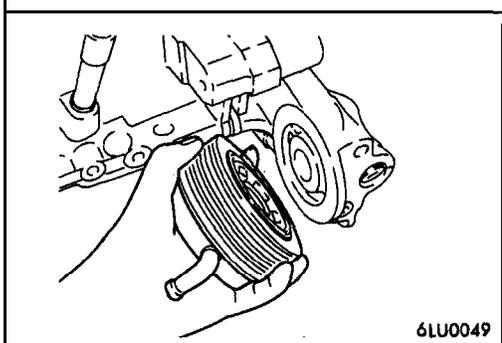


- (3) Note the difference in bolt lengths at the location **shown**.



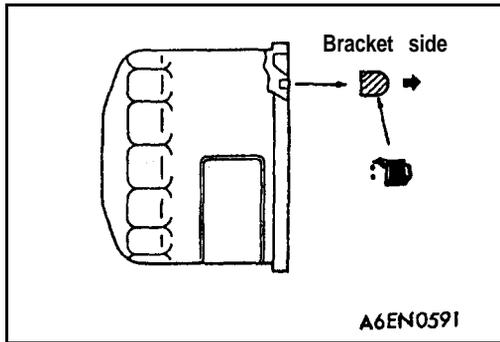
►N◄ DRAIN PLUG GASKET INSTALLATION

Install the drain plug gasket in the direction shown in the illustration.



►O◄ OIL COOLER INSTALLATION

First insert the oil cooler projecting stopper in the oil filter bracket groove and then tighten the oil cooler **bolts**.



▶P◀ OIL FILTER INSTALLATION

- (1) Clean the installation surface of the filter bracket.
- (2) Apply engine oil to the O-ring of the oil filter.
- (3) Screw the oil filter in until the O-ring contacts the bracket.
Then tighten **3/4** turn [tightening torque: **17 Nm (12 ft.lbs.)**].

NOTE

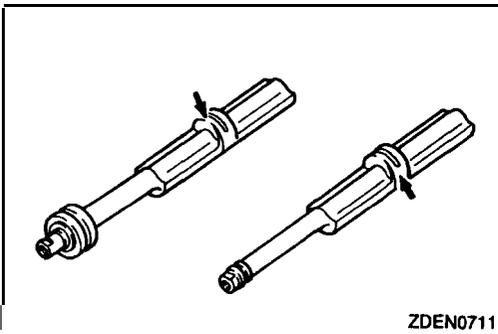
For **MD135737**, tighten one **turn** [Tightening torque: 14 Nm (10 **ft.lbs.**)] after the O-ring contacts the bracket.

INSPECTION**FRONT CASE**

- (1) Check oil holes for clogging and **clean** if necessary.
- (2) Check left counterbalance shaft front bearing **section** for wear, damage and seizure. If there is anything wrong with the section, replace the front **case**.
- (3) Check the front case for cracks and other damage. **Re-**place cracked or damaged front case.

OIL SEAL

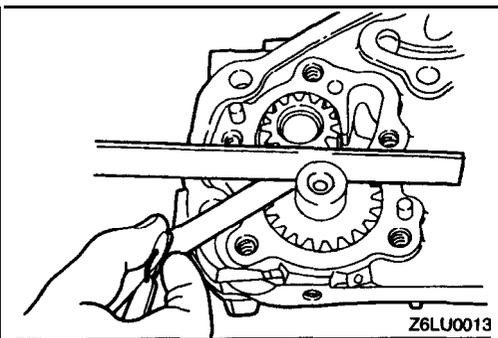
- (1) Check the oil seal lip for wear and damage. Replace oil seal if necessary.
- (2) Check the oil seal lip for deterioration. Replace oil seal if necessary.



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COUNTERBALANCE SHAFT

- (1) Check oil holes for clogging.
- (2) Check journal for seizure, damage and contact with bearing. If there is anything wrong with the journal, replace counterbalance shaft, bearing or front case assembly.



Z6LU0013

OIL PUMP

- (1) Assemble the oil pump gear to the front case and rotate it to ensure smooth rotation with no looseness.
- (2) Ensure that there is no ridge wear on the contact surface between the front case and the gear surface of the oil pump cover.
- (3) Check the side clearance.

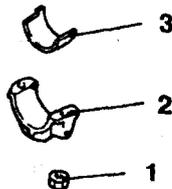
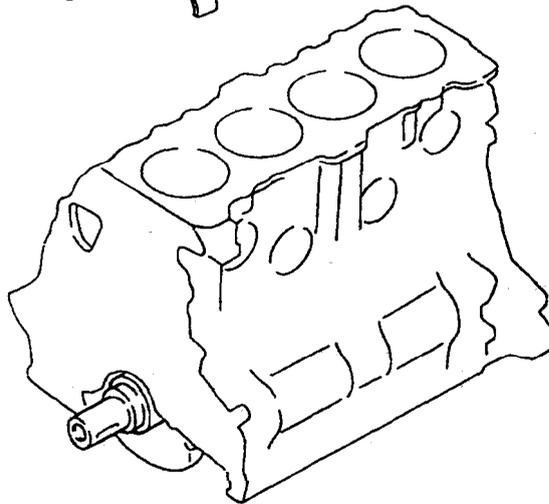
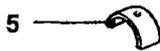
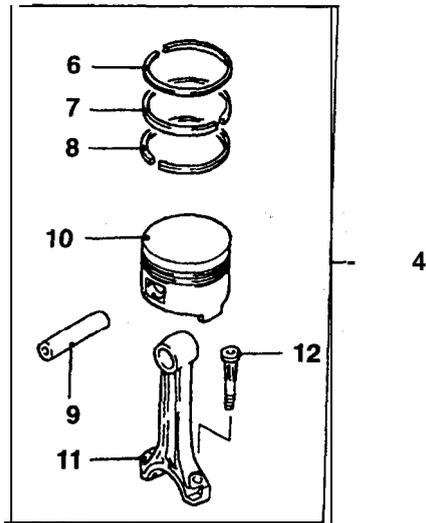
Standard value:Drive gear **0.08–0.14 mm (.0031–.0055 in.)**Driven gear **0.06–0.12 mm (.0024–.0047 in.)**

PISTON AND CONNECTING ROD

11300840194

REMOVAL AND INSTALLATION

 Lubricate all internal parts with engine oil during reassembly.



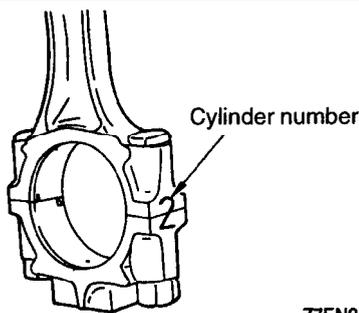
6EN0526

Removal steps

- | | |
|---|---|
| <p>◀A▶ ▶G▶ 1. Nut</p> <p>▶F▶ 2. Connecting rod cap</p> <p>▶E▶ 3. Connecting rod bearing</p> <p>▶D▶ 4. Piston and connecting rod assembly</p> <p>▶E▶ 5. Connecting rod bearing</p> <p>▶C▶ 6. Piston ring No. 1</p> | <p>▶C▶ 7. Piston ring No. 2</p> <p>▶B▶ 8. Oil ring</p> <p>▶B▶ ▶A▶ 9. Piston pin</p> <p>▶A▶ 10. Piston</p> <p>11. Connecting rod</p> <p>12. Bolt</p> |
|---|---|

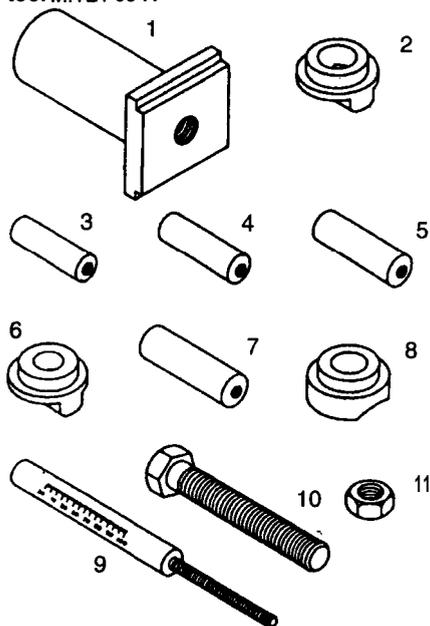
TSB Revision

11 B-52 ENGINE OVERHAUL <2.0L (4G6)> – Piston and Connecting Rod

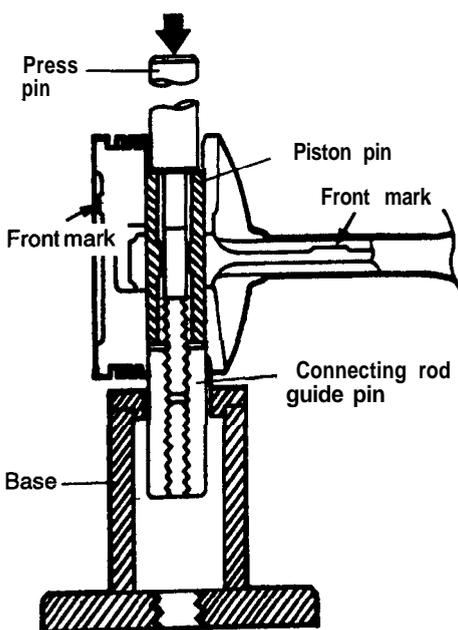


Z7EN0448

Piston pin setting tool MIT21 6941



Z7EN0425



Z7EN0979

REMOVAL SERVICE POINTS

◀A▶ CONNECTING ROD CAP REMOVAL

- (1) Mark the cylinder number on the side of the connecting rod big end for correct reassembly.
- (2) Keep the removed connecting rods, caps, and bearings in order according to the cylinder number.

◀B▶ PISTON PIN REMOVAL

Item No.	Part No.	Description
1	MIT310134	Base
2	MIT31 0136	Piston Support
3	MIT31 0137	Connecting Rod Guide Pin
4	MIT31 0138	Connecting Rod Guide Pin
5	MIT310139	Connecting Rod Guide Pin
6	MIT31 0140	Piston Support
7	MIT310141	Connecting Rod Guide Pin
8	MIT31 0142	Piston Support
9	MIT48143	Press Pin
10	216943	Stop Screw
11	10396	Nut

- (1) Remove the stop screw from the base.
- (2) Select the correct piston support for your application (See above). Fit the piston support onto the base. Place the base on press support blocks.
- (3) Insert the press pin through the piston pin hole. Select the correct connecting rod guide pin (See above). Thread the guide pin onto the threaded portion of the press pin.
- (4) Position the piston assembly on the piston support in the press. With the press pin up as shown in Figure 4, insert the guide pin through the hole in the piston and through the hole in the piston support.
- (5) Press the piston pin out of the assembly.
 - IMPORTANT: To avoid piston damage,**
 - The piston support must seat squarely against the piston.
 - Verify that the piston pin will slide through the hole in the piston support.
- (6) Remove the piston pin from the press pin.

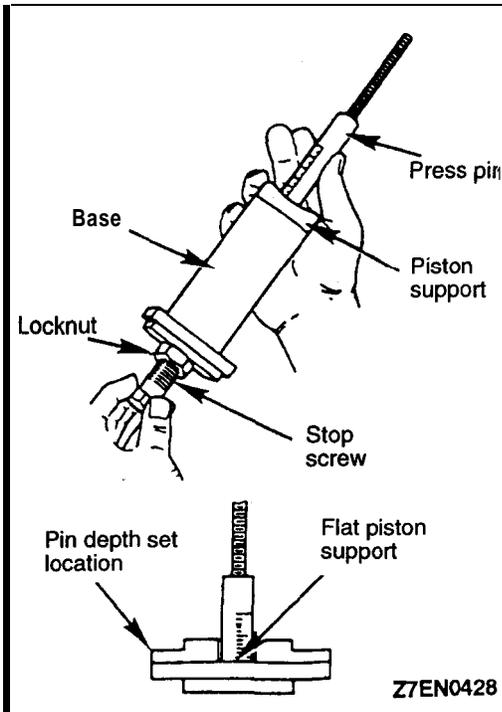
INSTALLATION SERVICE POINTS

▶A◀ PISTON PIN INSTALLATION

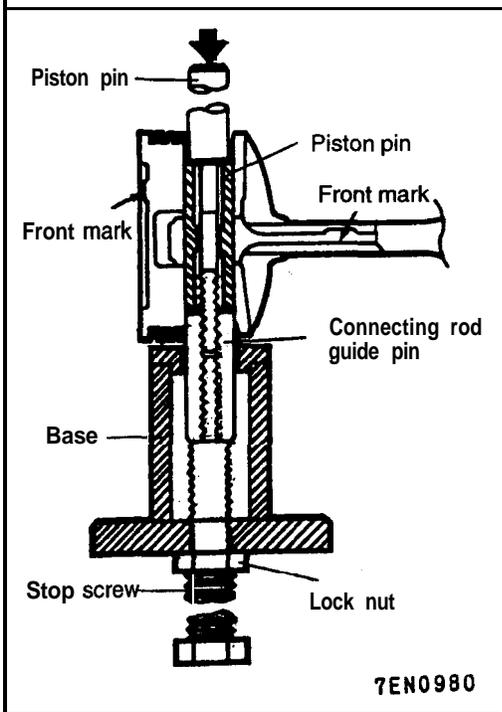
- (1) Thread the stop screw and lock nut **assembly** into the base. Fit the correct piston support on top of the base, **Insert** the press pin, threaded end up, into **the** hole in the piston support until the **press** pin touches the stop screw.
- (2) Using the markings on the **press** pin, **adjust the** stop screw to the depth as shown below.

Depth:

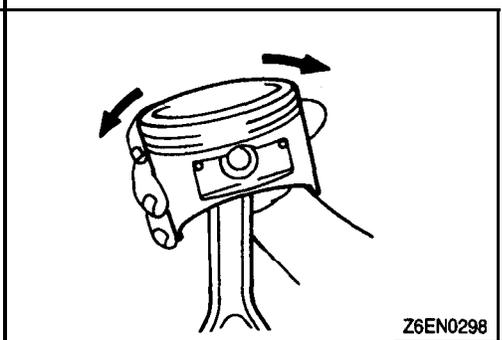
Refer to the operating instructions on the special tool.



Z7EN0428



7EN0980



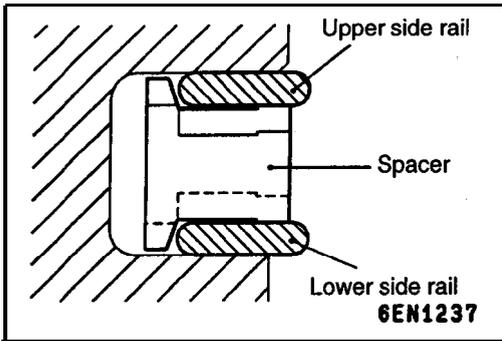
Z6EN0298

- (3) Place the base on press support blocks.
- (4) Slide the piston pin over the threaded end of the press pin, and thread the correct guide pin **up against** it.
- (5) Coat the piston pin with oil, and **with the** connecting rod held in position, slide the guide **pin** through the piston' and connecting rod.
- (6) Press the piston pin through' **the connecting rod** until the guide pin contacts the stop screw.
- (7) Remove the piston **assembly** from the base. Remove the guide pin and press pin from the assembly.

IMPORTANT: Due to production tolerance variations, it is necessary to visually check the piston pin depth after installation to verify that the piston pin is centered. Adjust if necessary.

- (8) Check that the piston moves smoothly.

11 B-54 ENGINE OVERHAUL <2.0L (4G6)> – Piston and Connecting Rod



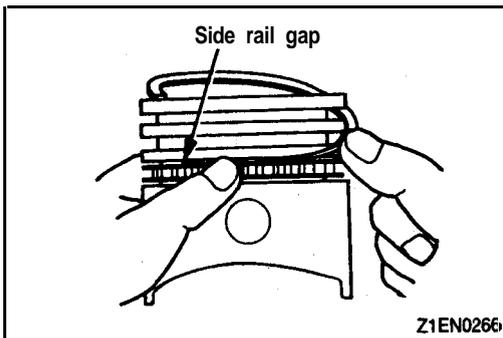
►B◄ OIL RING INSTALLATION

- (1) Fit the oil ring spacer into the piston ring groove.

NOTE

- (1) The side rails and spacer may be installed in either direction.
- (2) New spacer and side rails are colored for **identification** of their sizes.

Size	Identification color
Standard	None
0.50 mm oversize	Blue
1.00 mm oversize	Yellow

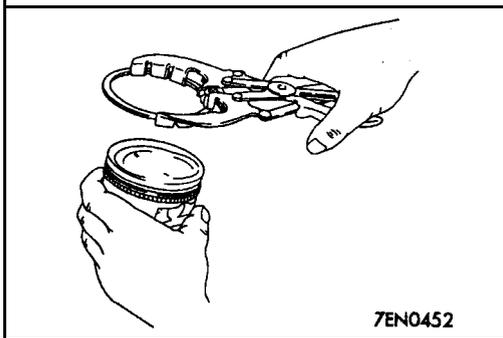


- (2) Install the upper side rail.
To install the side rail, first fit one **end** of the rail into: the piston groove, then press the remaining-portion **into** position by finger. See illustration.

Caution

Do not use piston ring expander when installing side rail.

- (3) Install the lower side rail in the **same procedure** as described in step (2).
- (4) Make sure that the side rails **move smoothly** in either direction.



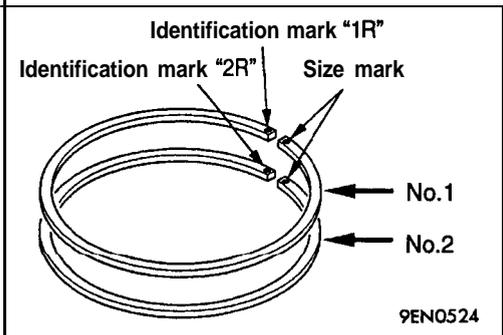
►C◄ PISTON RING NO. 2 / PISTON RING NO. 1 INSTALLATION

- (1) Using piston ring expander, fit No. 2 and then No. 1 piston, ring into position.

NOTE

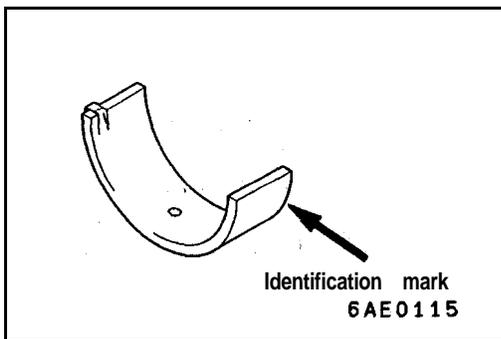
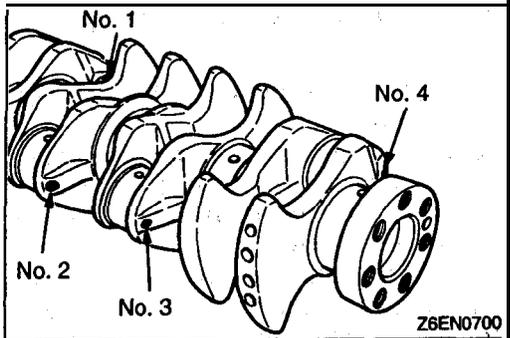
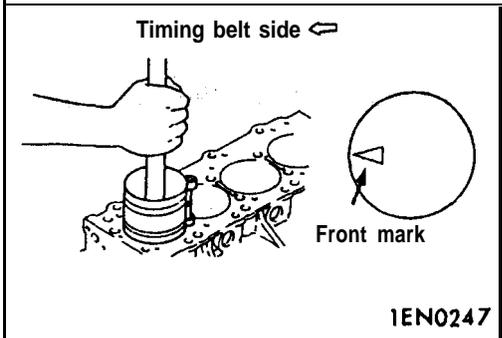
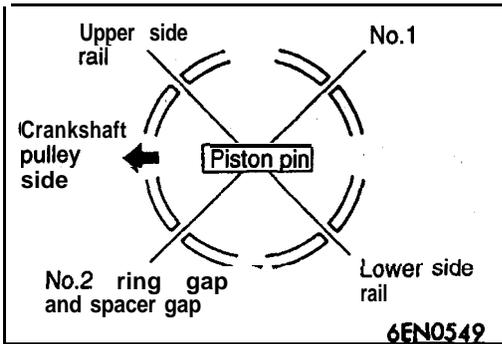
- (1) The ring end has an **identification mark**.

Item	Identification mark
No. 1 ring	1R
No. 2 ring	2R



- (2) install piston rings with identification mark facing up, to the piston crown side.
- (3) Size marks on piston rings are as follows..

Size	Identification mark
Standard	N o n e
0.50 mm oversize	50
1.00 mm oversize	100



►D◄ PISTON AND CONNECTING ROD INSTALLATION

- (1) Liberally coat engine oil on the circumference of the piston, piston ring, and oil ring.
- (2) Arrange the piston ring and oil ring gaps (side rail and spacer) as shown in the figure.
- (3) Rotate crankshaft so that crank pin is on center of cylinder bore.

Identification mark: 63DTF

- (4) Rotate crankshaft so that the crank pin is on the center of the cylinder bore.
- (5) Use suitable thread protectors on the connecting rod bolts before inserting piston and connecting rod assembly into the cylinder block.
Care must be taken not to nick the crank pin.
- (6) Using a suitable piston ring compressor tool, install the piston and connecting rod assembly into the cylinder block.

►E◄ CONNECTING ROD BEARINGS INSTALLATION

When the bearing needs replacing, select and install a proper bearing by the following procedure.

- (1) Measure the crankshaft pin diameter and confirm its classification from the following table. In the case of a crankshaft supplied as a service part, identification colors of its pins are painted at the positions shown in the illustration.
- (2) The connecting rod bearing identification mark is stamped at the position shown in the illustration.

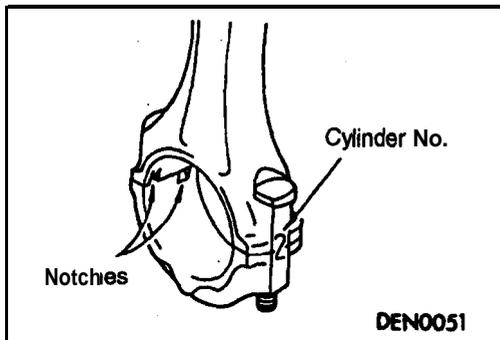
Crankshaft pin				Connecting rod bearing	
Classification	Identification mark	Identification color	O.D. mm (in.)	Identification mark	Thickness mm (in.)
	Production part	Service part			
1	None	Yellow	44.995-45.000 (1.7715-1.7717)	1	1.478-1.491 (0.0582-0.0587)
2	None	None	44.985-44.995 (1.7711-1.7715)	2	1.491-1.495 (0.0587-0.0589)
3	None	White	44.980-44.985 (1.7709-1.7711)	3	1.495-1.499 (0.0589-0.0590)

Connecting rod I.D.: 48.000-48.015 mm (1.8900-1.8904 in.)

- (3) Loosely tighten each nut to the bolt.

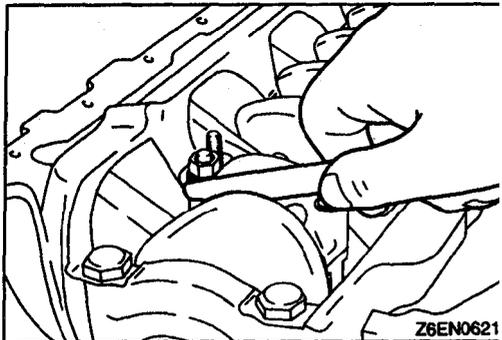
[Example]-

- (1) If the measured value of a crankshaft pin outer diameter is between 44.995 and 45.000 mm (1.7715 and 1.7717 in.), the pin is classified as "1" in the table. In case the crankshaft is also replaced by a spare part, check the identification colors of the pins painted on the new crankshaft. If the color is yellow, for example, the pin is classified as "1". In the above cases, select the connecting rod bearing having identification mark "1".



►F◄ CONNECTING ROD CAP INSTALLATION

- (1) Verifying the mark made during disassembly, install the bearing cap to the connecting rod. If the connecting rod is new with no index mark, make **sure** that the bearing locking notches come on the same side as shown.



- (2) Make sure that the connecting rod big end side clearance meets the specification.

Standard value: 0.10–0.25 mm (.0039–.0098 in.)

Limit: 0.4 mm (.016 in.)

►G◄CONNECTING ROD CAP NUT INSTALLATION

NOTE

The connecting rod nut should be installed **with** the cylinder head or the spark plug removed.

- (1) Since the connecting rod bolts and nuts **are torqued using** the plastic area tightening method, the **bolts** should be examined **BEFORE** reuse. If the bolt threads are “necked down”, the bolt should be replaced. Necking can be checked **by** running a nut with fingers to the full length of the bolt threads. **If** the nut does not run down **smoothly**, the bolt should be replaced.

- (2) Before installation of each nut, apply engine oil to the threaded portion and bearing surface of the nut.
- (3) Loosely tighten each nut to the bolt.
- (4) Then tighten the nuts alternately to a torque of **20 Nm (14.5 ft.lbs.)** to install the cap properly.
- (5) Make a paint mark on the head of each nut.
- (6) Make a paint mark on the bolt end at the position **90°** to **100°** from the paint mark made on the nut in the direction of tightening the nut.
- (7) Give a **90°** to **100° turn** to the nut and make sure that the paint mark on the nut and that on the bolt are in alignment.

Caution

- (1) If the nut is turned less than **90°**, proper **fastening performance** may not be expected. **When** tightening the nut, therefore, be careful to **give** a sufficient turn to it.
- (2) If the nut is **overtightened** (exceeding **100°**), loosen the nut completely and then retighten it by repeating the tightening procedure from step (1).

INSPECTION

PISTON

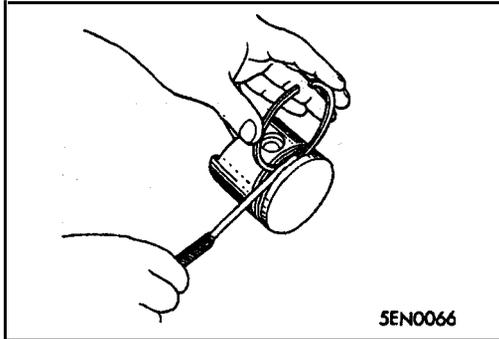
- (1) Replace the piston if scratches or seizure is evident on its surfaces (especially the thrust surface). Replace the piston if it is cracked.

PISTON PIN

- (1) Insert the piston pin into the piston pin hole with a thumb. You should feel a slight resistance. Replace the piston pin if it can be easily inserted or there is an excessive play.
- (2) The piston and piston pin must be replaced as an assembly.

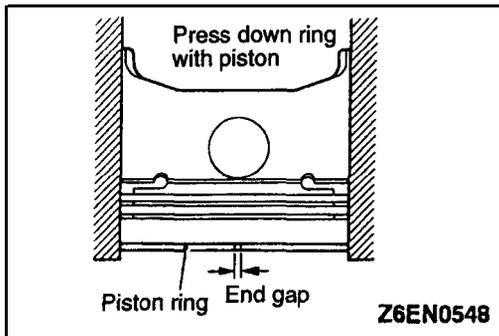
PISTON RING

- (1) Check the piston ring for damage, excessive wear, and breakage and replace if defects are evident: If the piston has been replaced with a new one, the piston rings must also be replaced with new ones.
- (2) Check for the clearance between the piston ring and ring groove. If the limit is exceeded, replace the ring or piston, or both.



Item	-Standard value mm (in.)
No. 1 ring	0.04–0.08 (.0016–.0031)
No.2 ring	0.02–0.06 (.0008–.0024)

Limit: 0.1 mm (.004 in.)



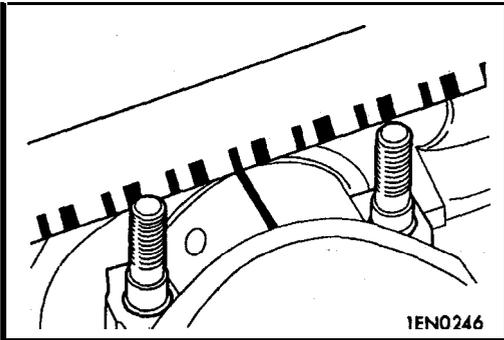
- (3) Install the piston ring into the cylinder bore. Force it down with a piston, its crown being in contact with the ring, to correctly position it at right angles to the cylinder wall. Then, measure the end gap with a feeler gauge. If the ring gap is excessive, replace the piston ring.

Item	Standard value mm (in.)
No. 1 ring	0.25–0.35 (.0098–.0138)
No.2 ring	0.40–0.55 (.0157–.0217)
No.3 ring	0.10–0.40 (.0039–.0157)

Limit:

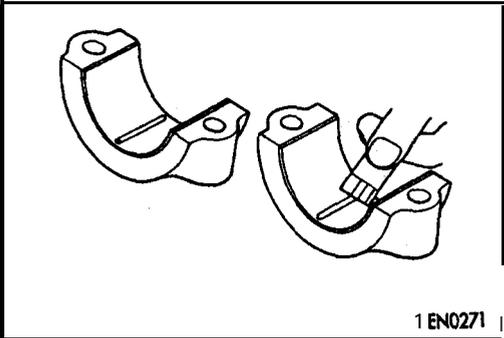
No. 1, No. 2 ring 0.8 mm (.031 in.)
Oil ring 1.0 mm (.039 in.)

11B-58 ENGINE OVERHAUL <2.0L (4G6)> – Piston and Connecting Rod



CRANKSHAFT PIN OIL CLEARANCE (PLASTIGAGE METHOD)

- (1) Remove oil from crankshaft pin and connecting rod bearing.
- (2) Cut the Plastigage to the same length as the width of bearing and place it on crankshaft pin in parallel with its axis.



- (3) Install the connecting rod cap **carefully and** tighten the nuts to specified torque.
- (4) Carefully remove the connecting rod cap.
- (5) Measure the width of the Plastigage at its widest part by using a scale printed on the Plastigage package.

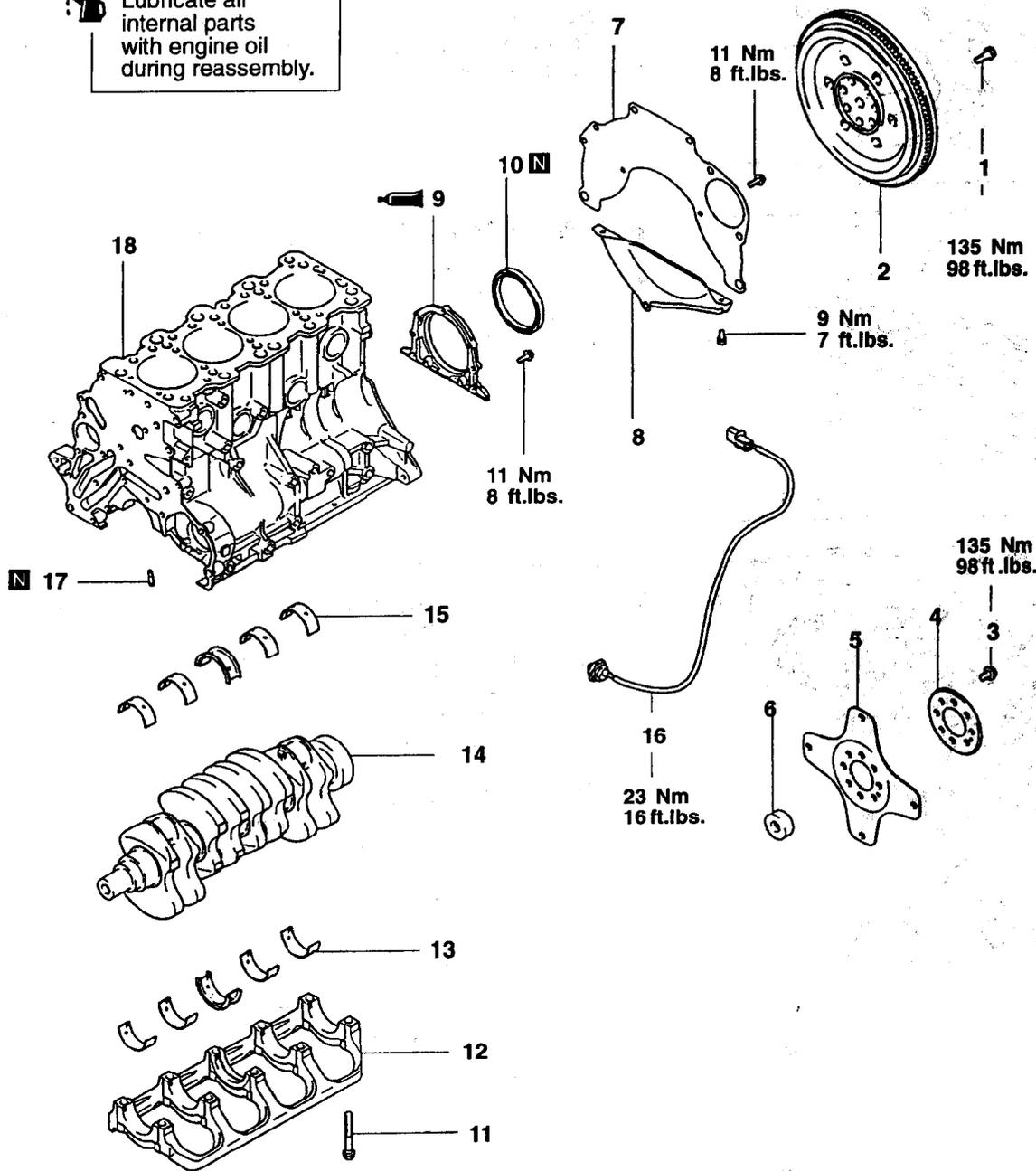
Standard value: 0.02–0.05 mm (.0008–.0020 in.)

Limit: 0.1 mm (.004 in.)

CRANKSHAFT, FLYWHEEL AND DRIVE PLATE

REMOVAL AND INSTALLATION

 Lubricate all internal parts with engine oil during reassembly.

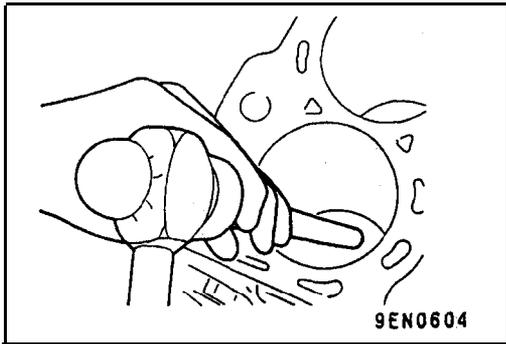


6EN1087

Removal steps

- | | |
|-----------------------------|--|
| 1. Flywheel bolt <M/T> | D 10. Oil seal |
| 2. Flywheel <M/T> | C 11. Bearing cap bolt |
| 3. Drive plate bolt | C 12. Bearing cap |
| 4. Adapter plate | B 13. Crankshaft bearing' (lower) |
| 5. Drive plate | B 14. Crankshaft |
| 6. Crankshaft bushing <A/T> | B 15. Crankshaft bearing (upper) |
| 7. Rear plate | A 16. Knock sensor |
| 8. Bell housing cover | A 17. Oil jet |
| E 9. Oil seal case | A 18. Cylinder block |

TSB Revision



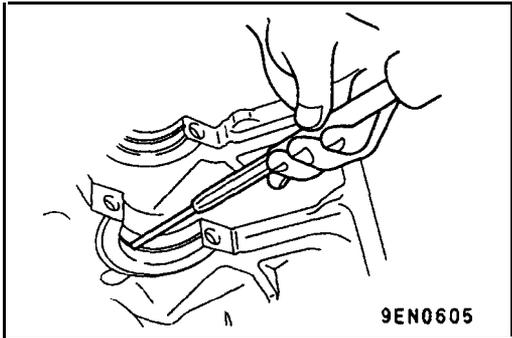
REMOVAL SERVICE POINT

◀A▶ OIL JET REMOVAL

Use an appropriate metal bar to press the oil jet out.

Caution

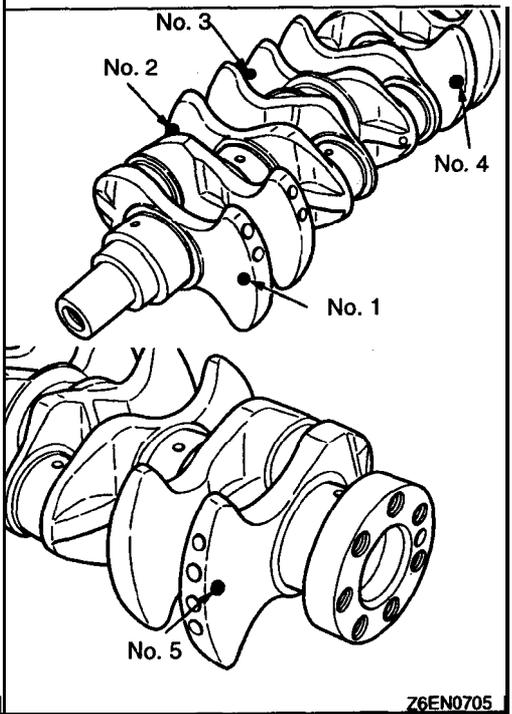
- (1) Be careful not to damage the cylinder wall.
- (2) Never reuse the removed oil jet.



INSTALLATION SERVICE POINTS

▶A▶ OIL JET INSTALLATION

Use a pin punch of 4 – 5 mm (.15 – .20 in.) diameter to press the oil jet in from the crank journal until the oil jet bottoms on.

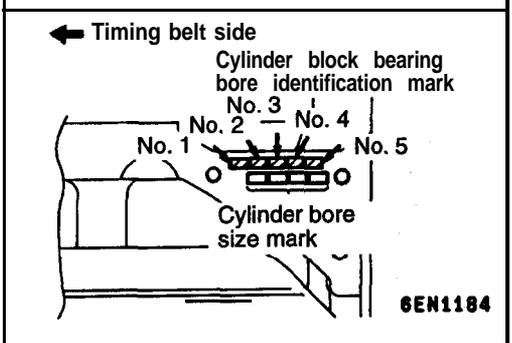


▶B▶ CRANKSHAFT BEARING INSTALLATION

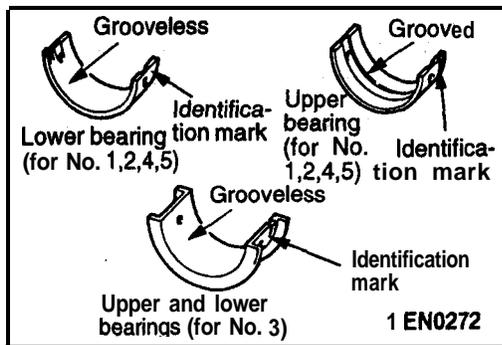
When the bearing needs replacing, select and install a proper bearing by the following procedure.

- (1) Measure the crankshaft journal diameter and confirm its classification from the following table. In the case of a crankshaft supplied as a service part, identification colors of its journals are painted at the positions shown in the illustration.
- (2) The cylinder block bearing bore diameter identification marks are stamped at the position shown in the illustration from the front of engine, beginning at No. 1.

Crankshaft journal				Cylinder block bearing bore diameter	Crankshaft bearing
Classification	Identification mark (for production part)	Identification color (for service part)	Outer diameter mm (in.)	Identification mark	Identification mark (for service part)
1	None	Yellow	56.994–57.000 (2.2439–2.2441)	0	1
				1	2
				2	3
2	None	None	56.988–56.994 (2.2436–2.2439)	0	2
				1	3
				2	4
3	None	White	56.982–56.988 (2.2438–2.2436)	0	3
				1	4
				2	5

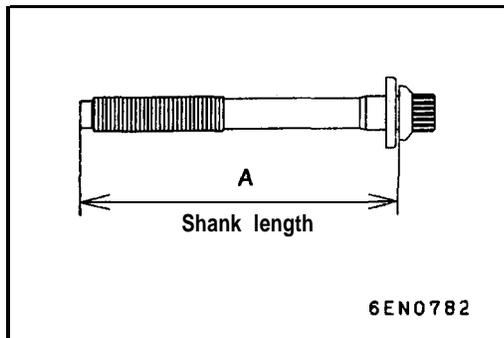


- (3) Select a proper bearing from the above, table on the basis of the identification data confirmed under items (1) and (2).

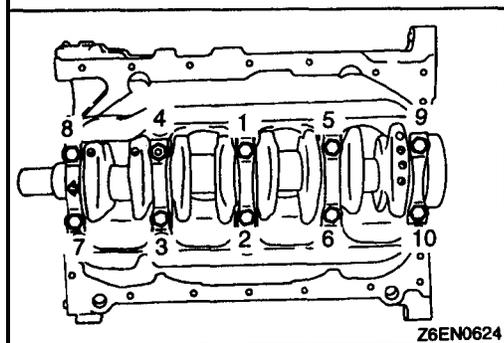


[Example]

- (1) If the measured value of a crankshaft **journal outer diameter** is between 56.994 – 57.000 mm (2.2439 – 2.2441 in.), the journal is **classified as “1”** in the **table**. In case the **crankshaft** is also replaced by a spare part, check the identification colors of the journals painted on the **new** crankshaft. If the color is yellow, for example, **the** journal is classified as **“1”**.
- (2) **Next**, check the cylinder block bearing hole **identification mark** stamped on the cylinder block. If it is “O”, read the “Bearing identification **mark**” column to find the identification mark of the bearing to be used. In this case, it is “1”.
- (4) **Install** the bearings **having an oil groove** to the cylinder block.
- (5) **Install** the bearings having no oil **groove** to the bearing caps.



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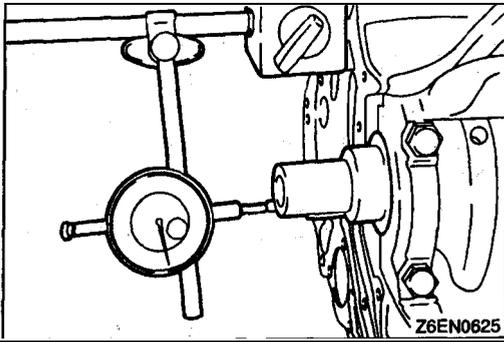
Z6EN0624

▶◀ BEARING CAP / BEARING CAP BOLT INSTALLATION

- (1) Install the bearing caps so that their arrows **are** directed to the timing belt side.
 - (2) Before installing the bearing cap bolts, check that the shank length of each bolt meets the limit. **If the limit is exceeded**, replace the bolt.
- Limit (A): Max. 71.1 mm (2.79 in.)**
- (3) Apply engine oil to the threaded portion and bearing surface of the bolt.
 - (4) Tighten the bolts to 25 Nm (16 ft.lbs.) in the specified tightening sequence.
 - (5) Make a paint mark on the head of each bolt.
 - (6) Make a paint mark on the bearing cap at the position **90° to 100°** from the paint mark made on the bolt in the direction of tightening the bolt.
 - (7) According to the specified tightening sequence, give a **90° to 100°** turn to each bolt and make sure that the paint mark on the bolt and that on the cap are in alignment.

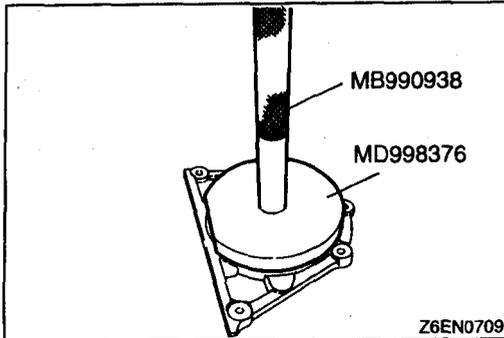
Caution

- (1) If the bolt is turned less than **90°**, proper **fastening performance** may not be expected. **When tightening the bolt**, therefore, be careful to **give a sufficient turn** to it.
- (2) If the bolt is **overtightened (exceeding 100°)**, **loosen the bolt completely** and then **retighten it** by repeating the tightening procedure from step (1).

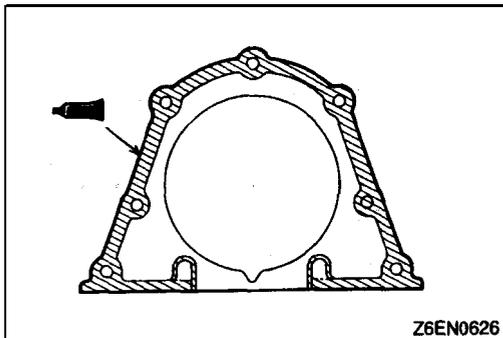


- (8) After installing the bearing caps, make sure that the crankshaft turns smoothly and the end play is correct. If the end play exceeds the limit, replace crankshaft bearings.

Standard value: 0.05–0.18 mm (.0020–.0071 in.)
Limit: 0.25 mm (.0098 in.)



►D◄ OIL SEAL INSTALLATION



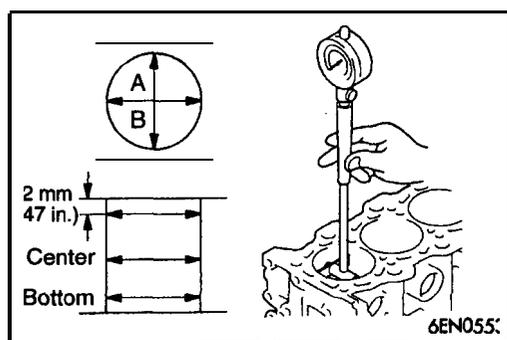
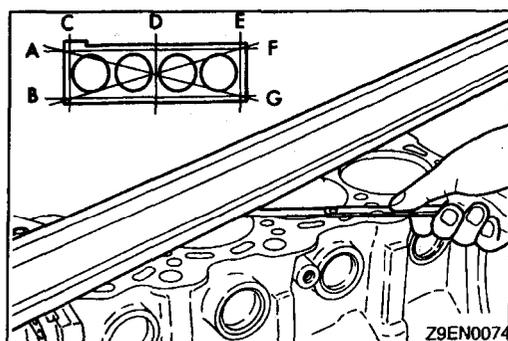
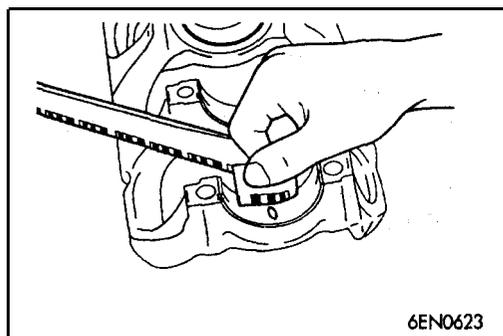
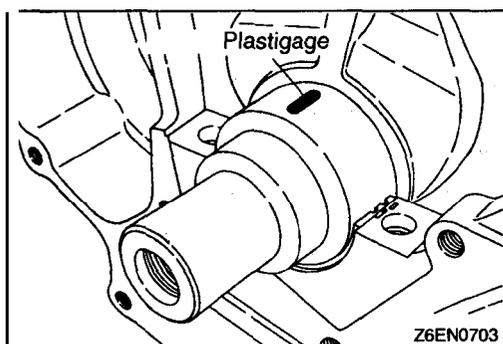
►E◄ SEALANT APPLICATION TO OIL SEAL CASE

Specified sealant:

Mitsubishi Genuine Part No. MD970389 or equivalent

NOTE

- (1) Be sure to install the case quickly while the sealant is wet (within, 15 minutes).
- (2) After installation, keep the sealed area away from the oil and coolant for approx. 1 hour.



INSPECTION

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CRANKSHAFT OIL CLEARANCE (PLASTIGAGE METHOD)

- (1) Remove oil from the crankshaft journal and crankshaft bearing.
- (2) Install the crankshaft.
- (3) Cut the Plastigage to the same length as the width of bearing and place it on journal in parallel with its axis.
- (4) Install the crankshaft bearing cap carefully and tighten the bolts to specified torque.
- (5) Carefully remove the crankshaft bearing cap.
- (6) Measure the width of the Plastigage at its widest part by using a scale printed on the Plastigage package.

Standard value: 0.02–0.04 mm (.0008–.0016 in.)
Limit: 0.1 mm (.004 in.)

CYLINDER BLOCK

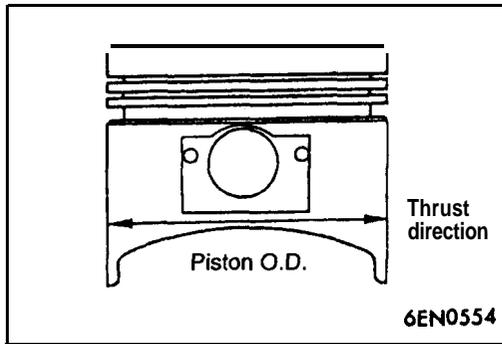
- (1) Visually check for scratches, rust, and corrosion. Use also a flaw detecting agent for the check. If defects are evident, correct, or replace.
- (2) Using a straightedge and feeler gauge, check the block top surface for warpage. Make sure that the surface is free from gasket chips and other foreign matter.
- (3) If the distortion is excessive, correct within the allowable limit or replace.

Grinding limit: 0.2 mm (.008 in.)
Includes/combined with cylinder head grinding
Cylinder block height (when new):
283.9-284.1 mm (11.177-11.185 in.)

- (4) Check cylinder walls for scratches and seizure. If defects are evident, correct (bored to oversize) or replace.
- (5) Using cylinder gauge, measure the cylinder bore and cylindricity. If worn badly, correct cylinder to an oversize and replace piston and piston rings. Measure at the points shown in illustration.

Standard value:

Cylinder I.D.
85.00–85.03 mm (3.3465–3.3476 in.)
Cylindricity 0.01 mm (.0004 in.)



BORING CYLINDER

- (1) Oversize pistons to be used should be determined on the basis of the largest bore cylinder.

Piston size identification

Size	Identification mark
0.50 O.S.	0.50
1.00 O.S.	1.00

NOTE

Size mark is stamped on piston top,

- (2) Measure outside diameter of piston to be used. Measure it in thrust direction as shown.
 (3) Based on measured piston O.D. calculate boring finish dimension.

Boring finish dimension = Piston O.D. + (clearance between piston O.D. and cylinder) - 0.02 mm (.0008 in.) (honing margin)

- (4) Bore all cylinders to calculated boring finish dimension.

Caution

To prevent distortion that may result from temperature rise during honing, bore cylinders, working from No. 2 to No. 4 to No. 1 to No. 3.

- (5)hone to final finish dimension (piston O.D. + clearance between piston O.D. and cylinder).
 (6) Check clearance between piston and cylinder.

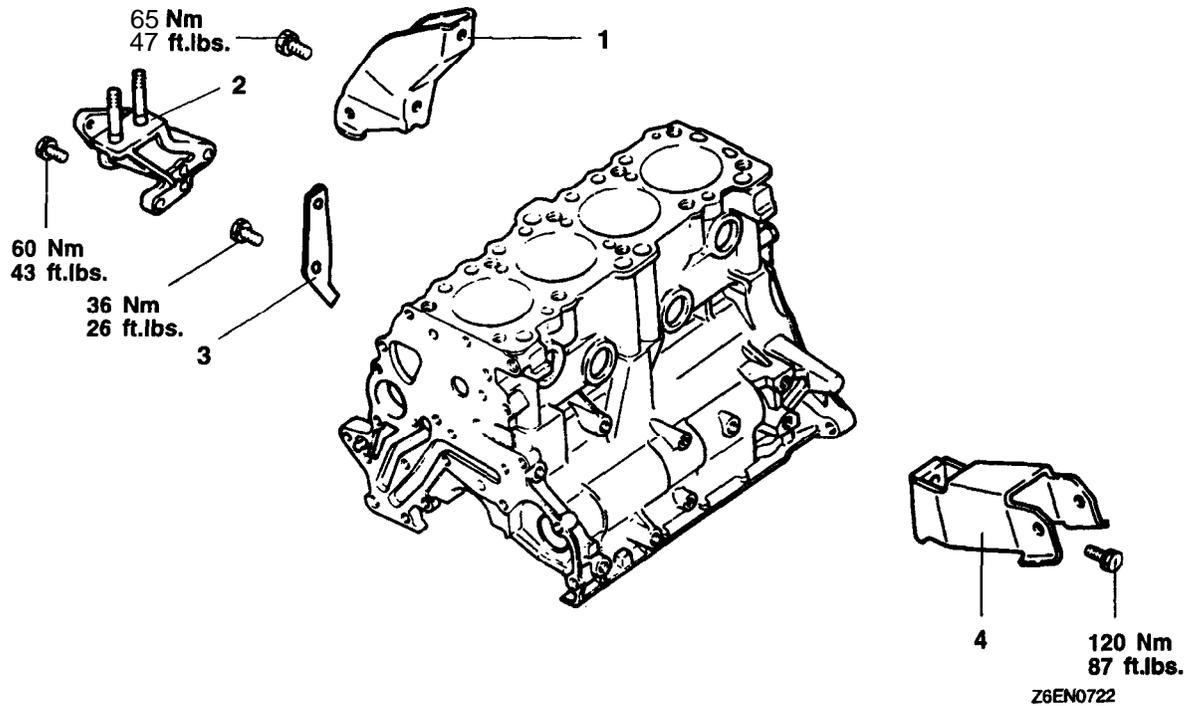
**Clearance between piston and cylinder:
 0.03–0.05 mm (.0012–.0020 in.)**

NOTE

When boring cylinders, finish all of four cylinders to same oversize. Do not bore only one cylinder to an oversize.

BRACKET

REMOVAL AND INSTALLATION



Removal steps

1. Roll stopper bracket, front
2. Engine support bracket, front
3. Exhaust pipe support bracket
4. Roll stopper bracket, rear

NOTES

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