

MODIFICATION NOTICE:

- TB45E engine models with three way catalyst have been provided for the Middle East and General areas.
- Turbocharger for ZD30DDTi engine has been changed.
For information not included here, refer to information for ZD30DDTi engine in NISSAN model Y61 series SERVICE MANUAL SUPPLEMENT-III 2nd Revision (Publication No. SM9E-Y61CG2).

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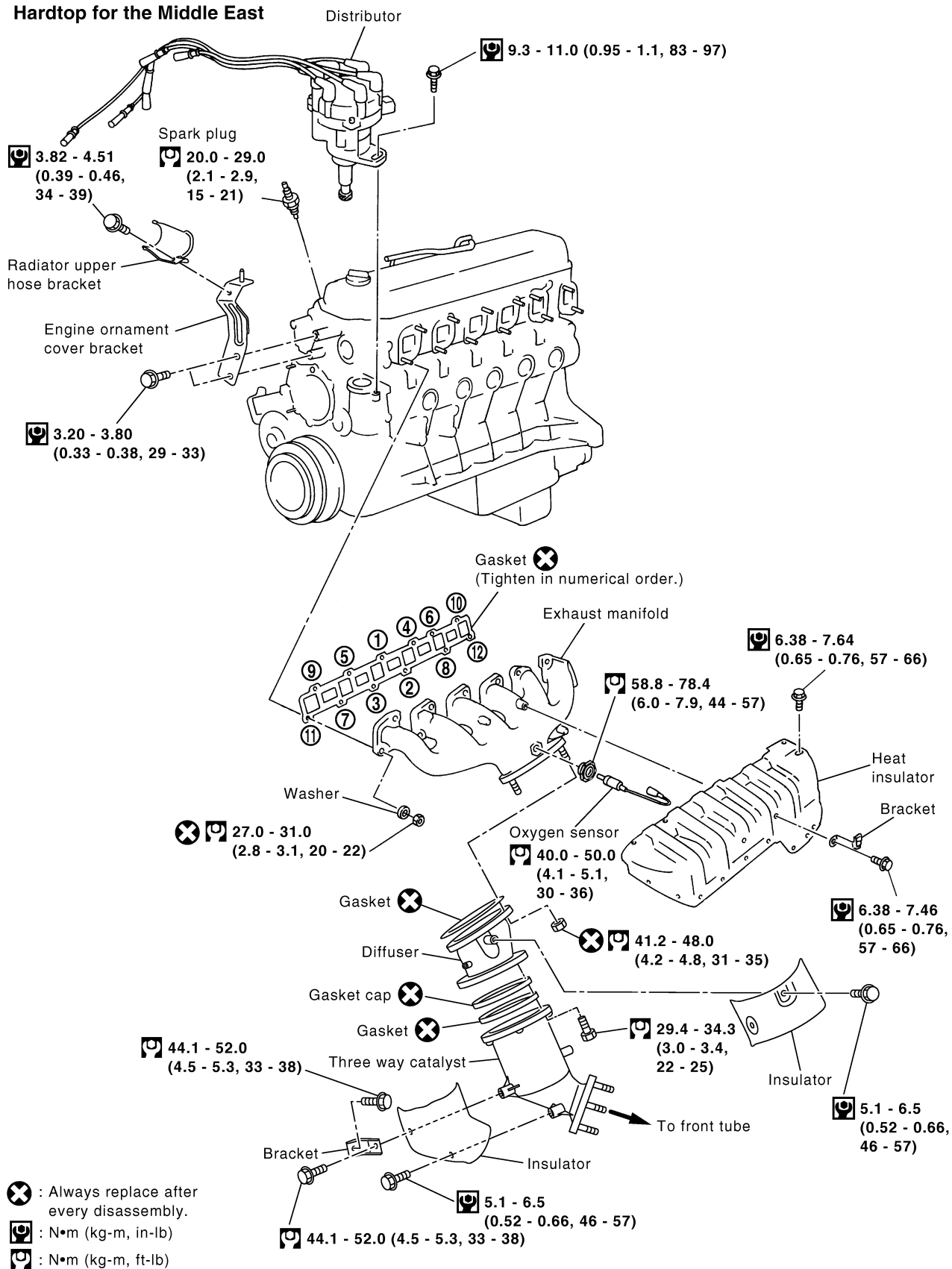
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SEC. 140•210•220•221

Hardtop for the Middle East



Removal and Installation

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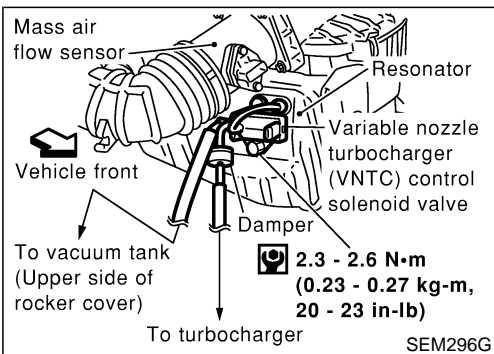
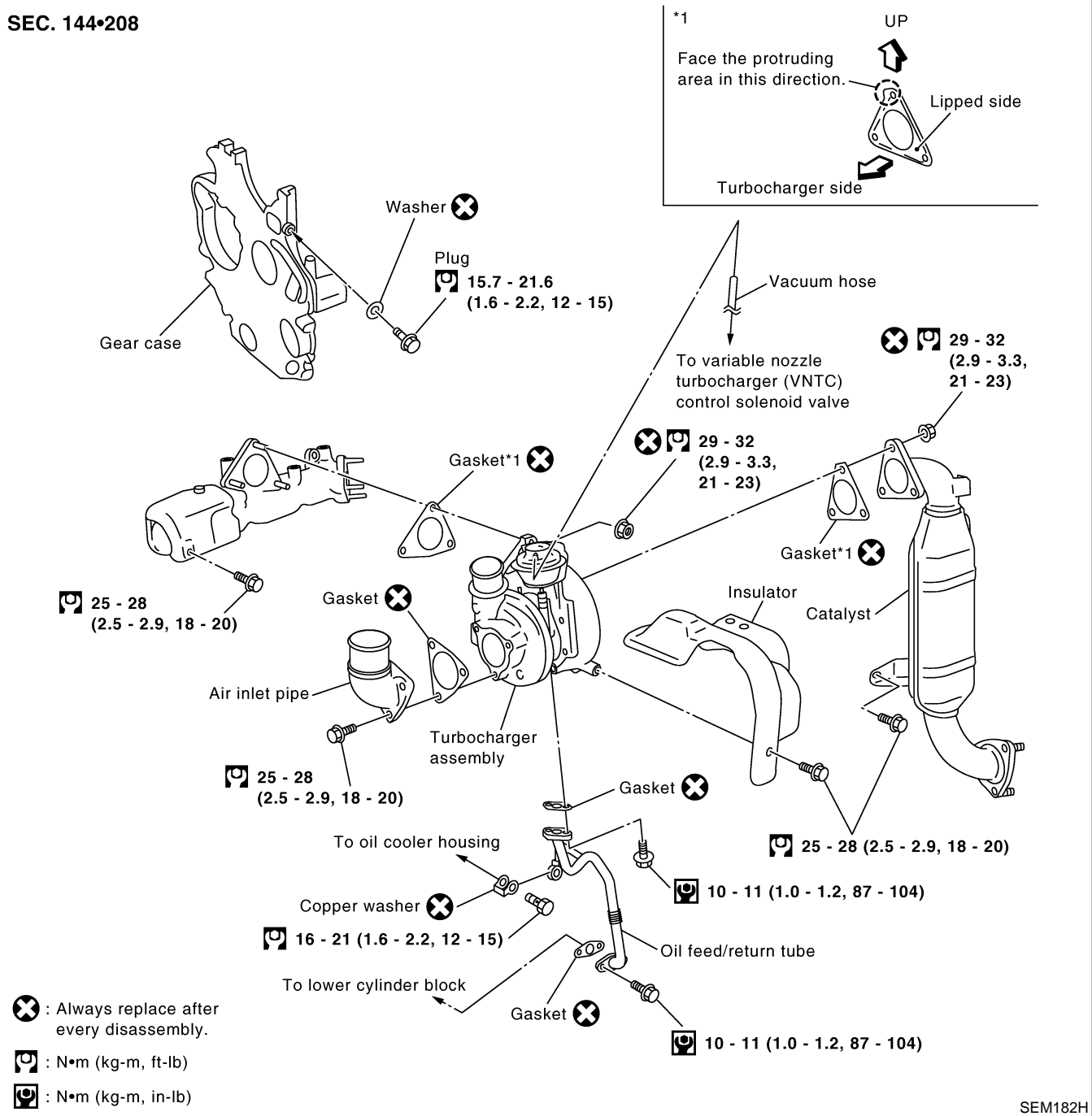
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SEC. 144•208



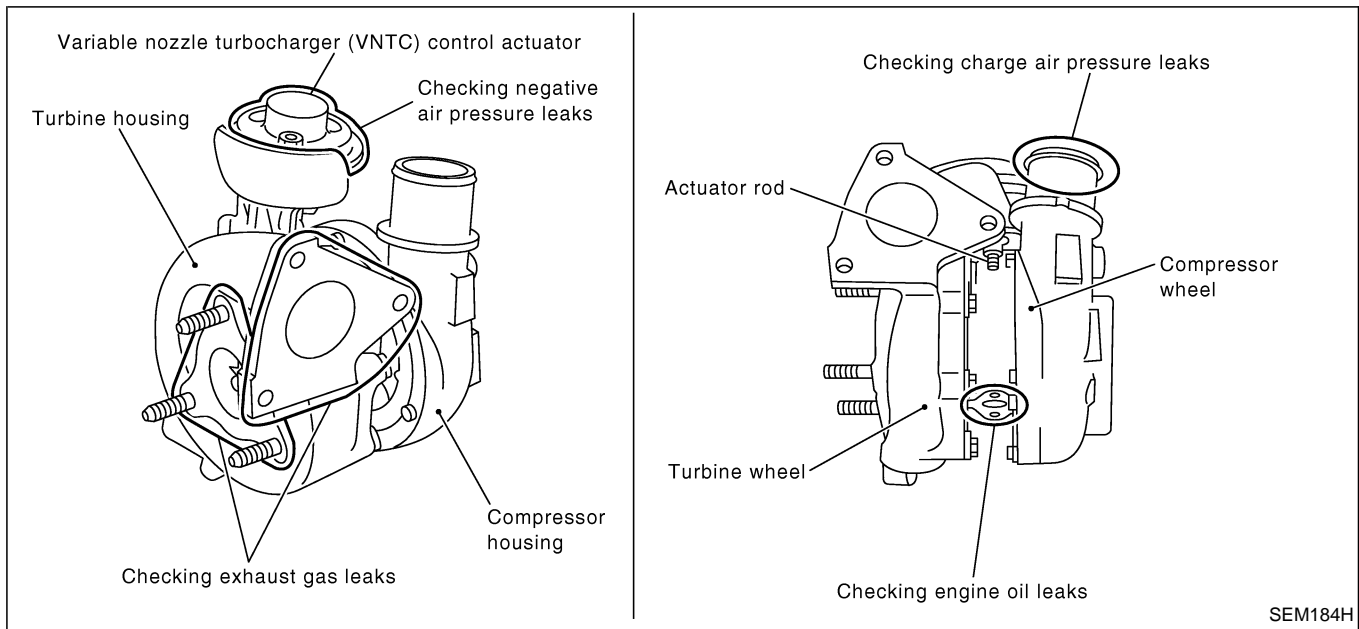
REMOVAL

1. Remove the following parts.

- Undercover
 - Under guard
 - Battery (on left side) (for cold areas)
 - Exhaust front tube
- Refer to FE-7, "EXHAUST SYSTEM" in NISSAN model Y61 series SERVICE MANUAL SUPPLEMENT-III 2nd Revision (Publication No. SM9E-Y61CG2).
- Remove wires, harnesses, tubes and pipes.

Removal and Installation (Cont'd)

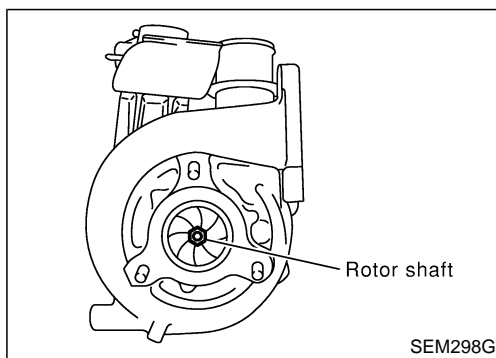
2. Remove catalyst.

CAUTION:**Do not disassemble catalyst.****Inspection****TURBOCHARGER****CAUTION:**

When the compressor wheel, turbine wheel, or rotor shaft is damaged, remove all the fragments and foreign matter left in the following passages in order to prevent a secondary failure:

Suction side: Between turbocharger and intercooler

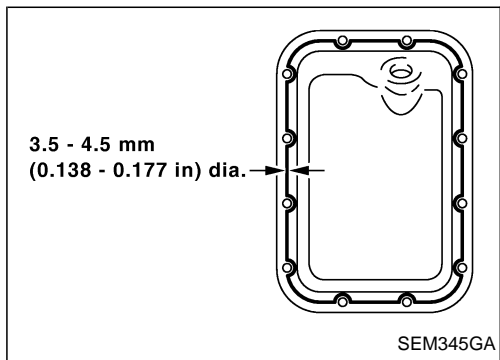
Exhaust side: Between turbocharger and catalytic converter

**Rotor shaft**

- Check that the rotor shaft rotates smoothly without any resistance when it is rotated by your fingertips.
- Check that the rotor shaft is not loose when it is moved vertically or horizontally.

Standard value for rotor shaft oil clearance:

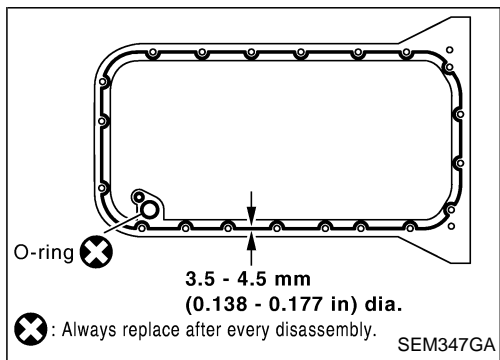
0.056 - 0.127 mm (0.0022 - 0.0050 in)



Removal and Installation

INSTALLATION [OIL PAN (LOWER)]

- Install oil pan (Lower).
 - Apply liquid gasket to inner sealing surface as shown in figure.
 - **Be sure liquid gasket is 3.5 to 4.5 mm (0.138 to 0.177 in).**
 - **Attaching should be done within 5 minutes after coating.**
- Use Genuine Liquid Gasket or equivalent.



INSTALLATION [OIL PAN (UPPER) AND OIL STRAINER]

- Install oil pan (Upper).
 - Apply liquid gasket to inner sealing surface as shown in figure.
 - **Be sure liquid gasket is 3.5 to 4.5 mm (0.138 to 0.177 in).**
 - **Attaching should be done within 5 minutes after coating.**
- Use Genuine Liquid Gasket or equivalent.

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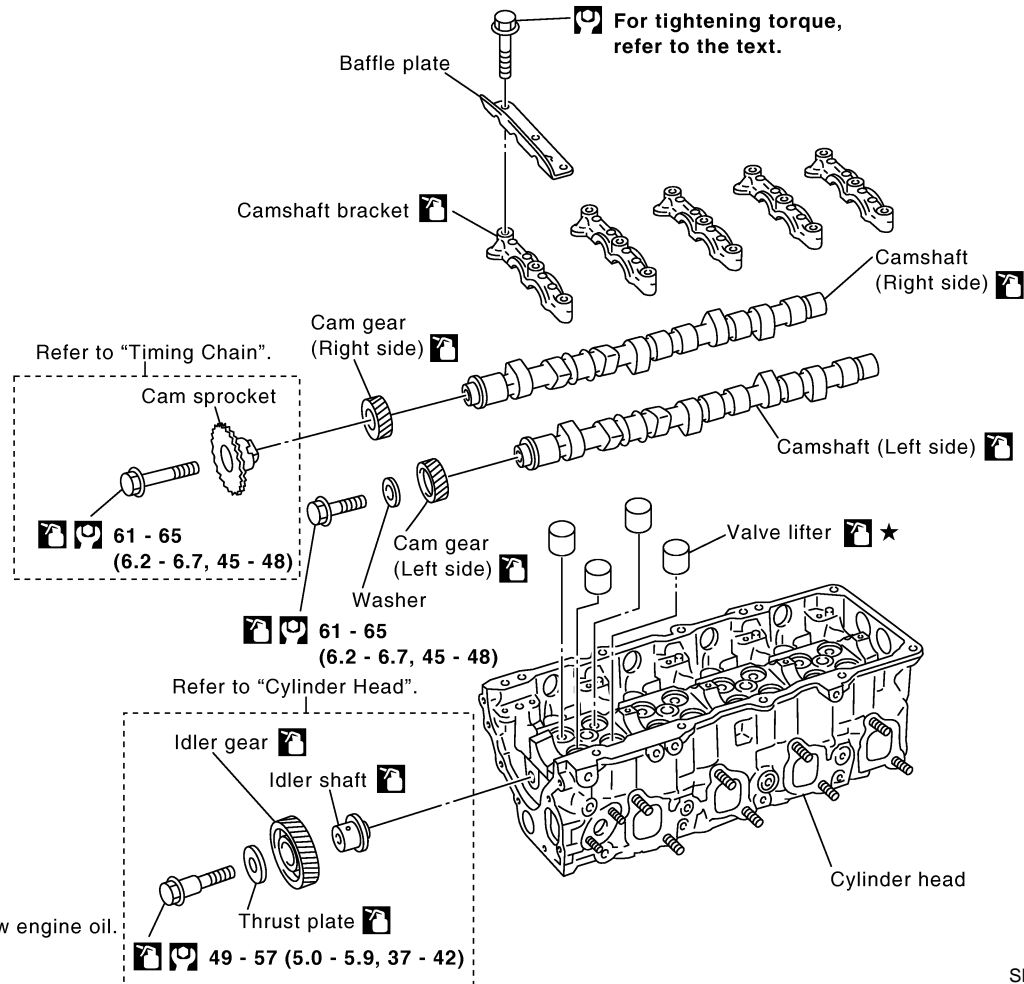
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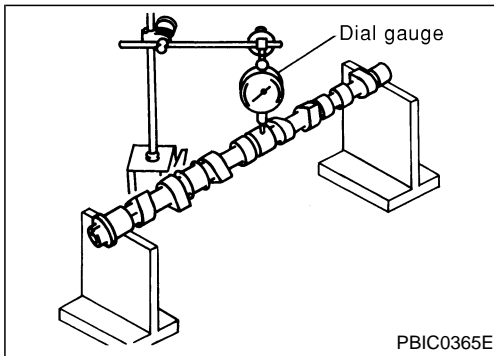
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Removal and Installation

SEC. 130



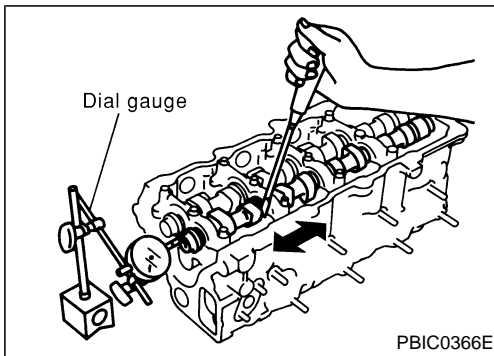
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Inspection

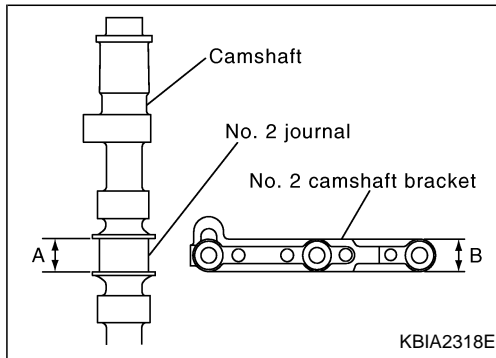
CAMSHAFT RUNOUT

- Prepare V-block on a flat surface and secure camshaft journals No. 1 and No. 5.
- Set the dial gauge vertically on journal No. 3.
- Rotate camshaft in one direction by hand, then read needle movement on dial indicator. (Total indicator reading)
Limit: 0.02 mm (0.0008 in)
- If it exceeds the limit, replace camshaft.



CAMSHAFT END PLAY

- Set the dial gauge to the front end of the camshaft. Measure the end play by moving the camshaft in the direction of the axle.
Standard: 0.065 - 0.169 mm (0.0026 - 0.0067 in)
Limit: 0.2 mm (0.0079 in)

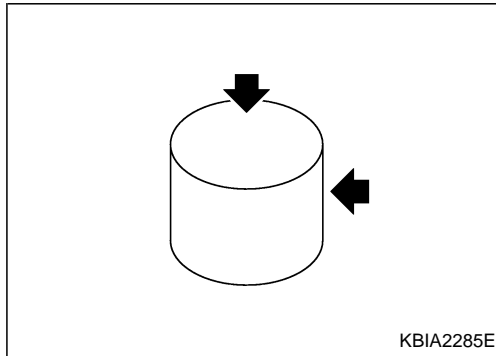


Inspection (Cont'd)

- Replace the following parts if outside the limit.
 - a. Dimension A for camshaft (No. 2 journal)
Standard: 19.455 - 19.507 mm (0.7659 - 0.7680 in)
 - b. Dimension B for No. 2 camshaft bracket
Standard: 19.338 - 19.390 mm (0.7613 - 0.7634 in)
- Replace camshaft and/or cylinder head referring to the standards above.

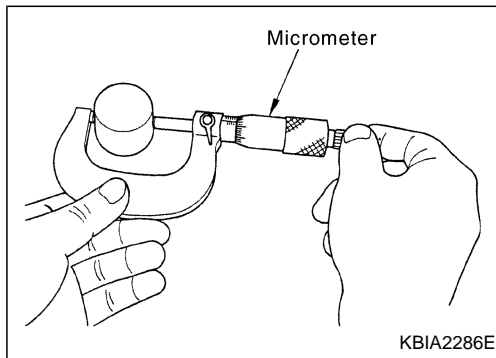
NOTE:

It is impossible to replace only the camshaft bracket as the camshaft bracket is manufactured with the cylinder head.



VISUAL INSPECTION OF VALVE LIFTER

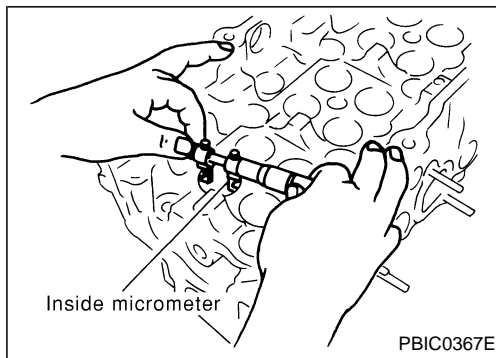
- Check if surface of valve lifter has any wear or cracks.
- Replace valve lifter if necessary.
- Select the thickness of the head so that valve clearance is the standard when replacing. Refer to EM-46, "Inspection" in NISSAN model Y61 series SERVICE MANUAL SUPPLEMENT-III 2nd Revision(Publication No. SM9E-Y61CG2).



VALVE LIFTER OUTER DIAMETER

Measure the outer diameter of the valve lifter with a micrometer.

Standard: 34.455 - 34.465 mm (1.3565 - 1.3569 in) dia.



LIFTER GUIDE INNER DIAMETER

Measure the lifter guide inner diameter of the cylinder head with an inside micrometer.

Standard: 34.495 - 34.515 mm (1.3581 - 1.3589 in) dia.

VALVE LIFTER CLEARANCE CALCULATIONS

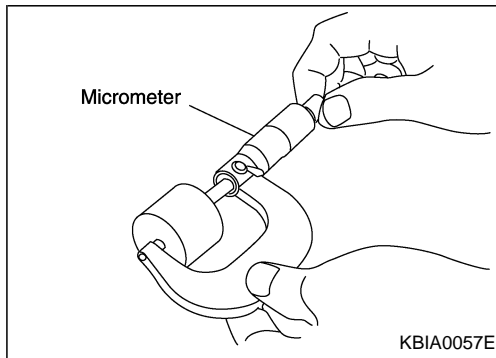
Clearance = Lifter guide inner diameter - Valve lifter outer diameter

Standard: 0.030 - 0.060 mm (0.0012 - 0.0024 in)

If it exceeds the standard value, refer to the outer diameter and bore diameter standard values and replace valve lifter and/or cylinder head.

Adjustments

- Perform adjustment depending on selected head thickness of valve lifter.
- 1. Remove camshaft. Refer to EM-41, "Removal" in NISSAN model Y61 series SERVICE MANUAL SUPPLEMENT-III 2nd Revision (Publication No. SM9E-Y61CG2).
- 2. Remove valve lifters at the locations that are outside the standard.



- 3. Measure the center thickness of the removed valve lifters with a micrometer.

- 4. Use the equation below to calculate valve lifter thickness for replacement.

- Valve lifter thickness calculation:

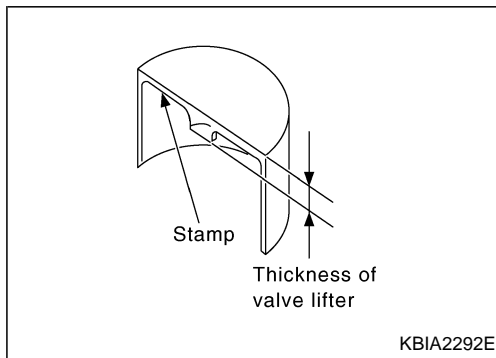
$$\text{Thickness of replacement valve lifter} = t1 + (C1 - C2)$$

$$t1 = \text{Thickness of removed valve lifter}$$

$$C1 = \text{Measured valve clearance}$$

$$C2 = \text{Standard valve clearance:}$$

When engine is cool [Approximately 20°C (68°F)]:
Intake and exhaust 0.35 mm (0.014 in)



- Thickness of a new valve lifter can be identified by stamp marks on the reverse side (inside the cylinder).

Stamp mark 535 indicates 5.35 mm (0.2106 in) in thickness.
 Available thickness of valve lifter: 15 sizes with range 5.35 to 6.05 mm (0.2106 to 0.2382 in) in steps of 0.05 mm (0.0020 in) (when manufactured at factory). Refer to EM-19, "AVAILABLE VALVE LIFTER".

- 5. Install the selected valve lifter.
- 6. Install camshaft. Refer to EM-44, "Installation" in NISSAN model Y61 series SERVICE MANUAL SUPPLEMENT-III 2nd Revision (Publication No. SM9E-Y61CG2), EM-44.
- 7. Manually turn crankshaft pulley a few turns.
- 8. Make sure that valve clearances for cold engine are within specifications by referring to the specified values.

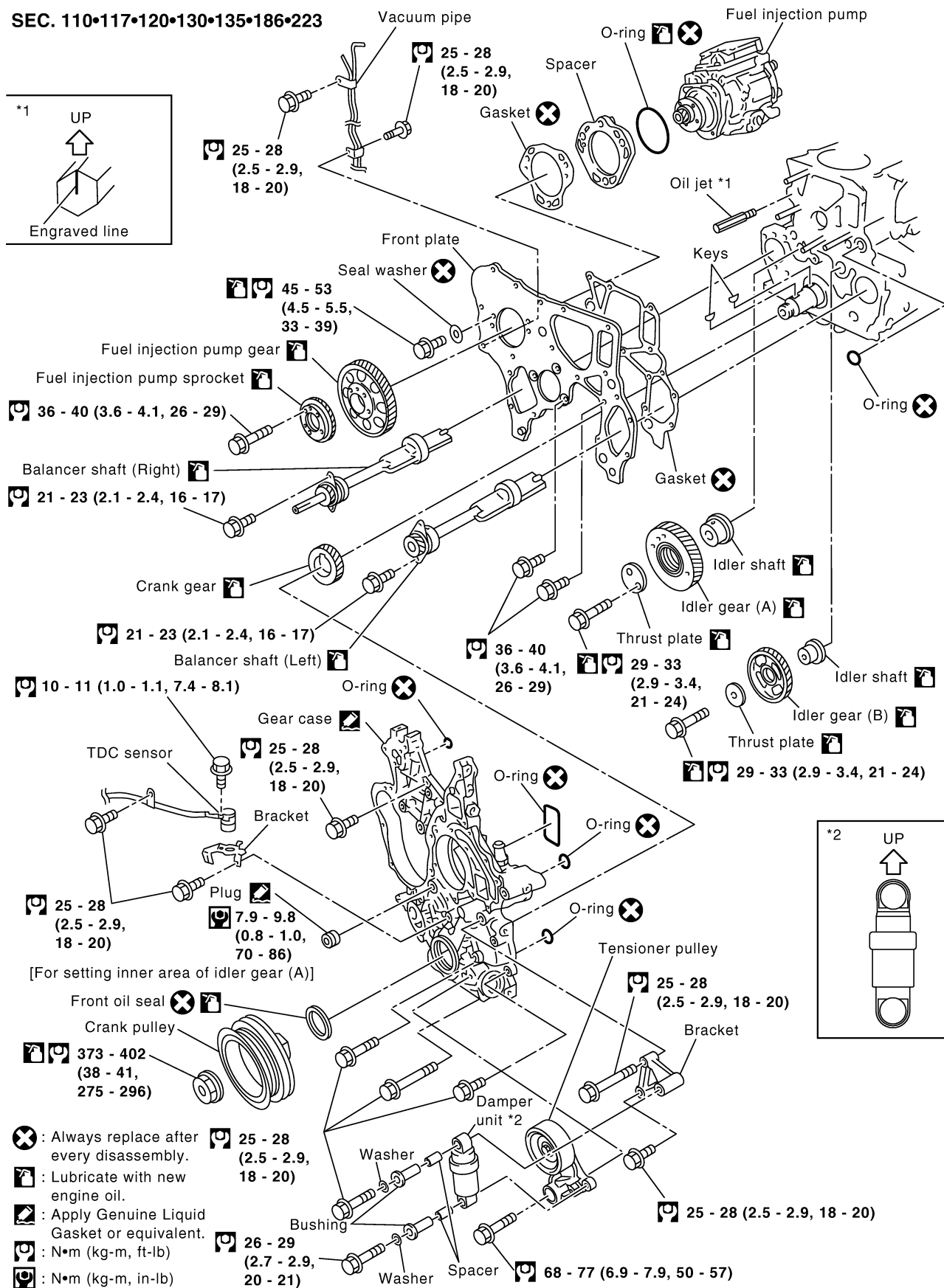
Valve clearance:

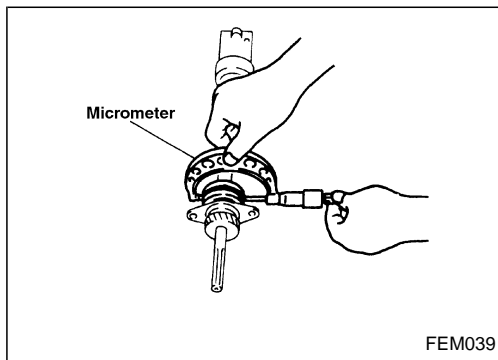
When engine is cool [Approximately 20°C (68°F)]
Intake and exhaust
0.30 - 0.40 mm (0.012 - 0.016 in)

Removal and Installation

2 idler gears are shown in this chapter. Idler gear (A) has scissors gear, and idler gear (B) does not.

SEC. 110•117•120•130•135•186•223





Inspection

BALANCER SHAFT OIL CLEARANCE

Outer diameter of balancer shaft journal

Measure the outer diameter of the balancer shaft journal with a micrometer.

Standard:

Front side

50.875 - 50.895 mm (2.0029 - 2.0037 in) dia.

Rear side

50.675 - 50.695 mm (1.9951 - 1.9959 in) dia.

Inner diameter of balancer shaft bearing

Measure the inner diameter of the balancer shaft bearing using a bore gauge.

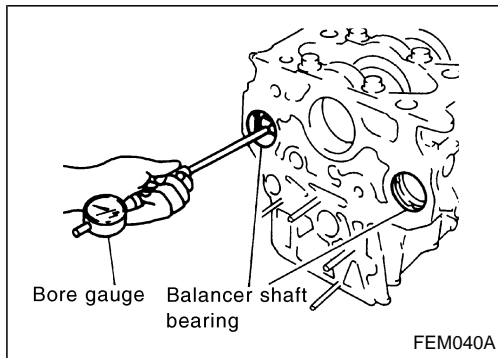
Standard:

Front side

50.955 - 50.980 mm (2.0061 - 2.0071 in) dia.

Rear side

50.755 - 50.780 mm (1.9982 - 1.9992 in) dia.



Oil clearance calculations

Oil clearance = Bearing inner diameter – Journal outer diameter

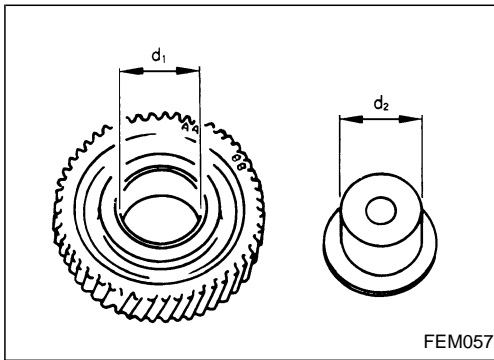
Standard: 0.060 - 0.105 mm (0.0024 - 0.0041 in)

Limit: 0.180 mm (0.0071 in)

Replace the balancer shaft and/or cylinder block if it exceeds the limit.

NOTE:

It is impossible to replace only balancer shaft bearing because balancer shaft bearing is manufactured with cylinder block.



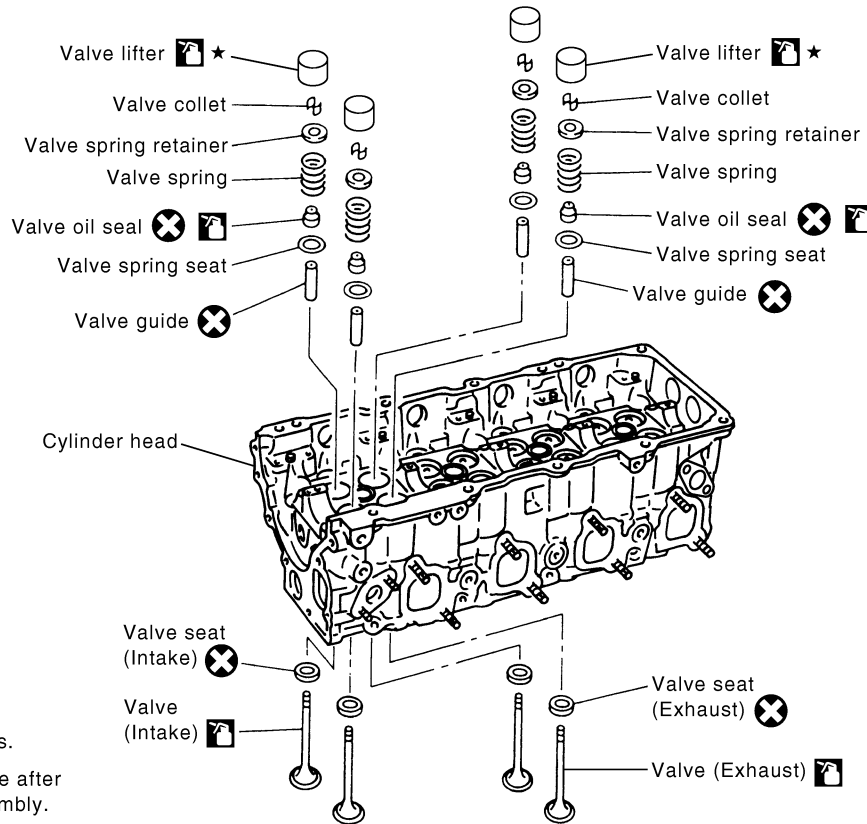
Inspection

IDLER GEAR OIL CLEARANCE

- Measure the inner diameter (d_1) of idler gear shaft hole.
Standard: 26.000 - 26.020 mm (1.0236 - 1.0244 in)
- Measure the outer diameter (d_2) of idler shaft.
Standard: 25.967 - 25.980 mm (1.0223 - 1.0228 in)
- Calculate gear clearance.
 $\text{Clearance} = d_1 - d_2$
Standard: 0.020 - 0.053 mm (0.0008 - 0.0021 in)
- Replace idler gear and/or idler shaft if it is outside of the standard.

Disassembly and Assembly

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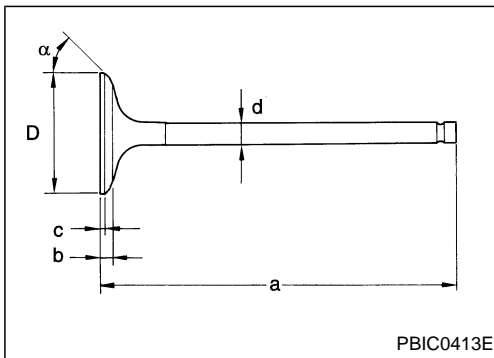


★ : Selective parts.

✕ : Always replace after every disassembly.

🛢️ : Lubricate with new engine oil.

PBIC1749E



Inspection

VALVE DIMENSION

Using micrometer, measure the dimensions of each part.

Standard

Unit: mm (in)

	Intake valve	Exhaust valve
a	113.5 (4.468)	113.5 (4.468)
b	3.8 - 4.2 (0.150 - 0.165)	3.8 - 4.2 (0.150 - 0.165)
c	1.5 (0.059)	1.5 (0.059)
d	6.962 - 6.977 (0.2741 - 0.2747)	6.945 - 6.960 (0.2734 - 0.2740)
D	31.9 - 32.1 (1.256 - 1.264)	29.9 - 30.1 (1.177 - 1.185)
α	45°00' - 45°30'	45°00' - 45°30'

Inspection (Cont'd)

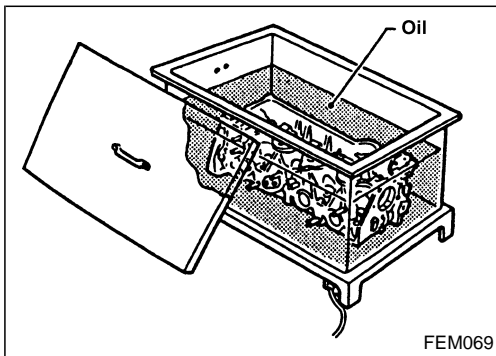
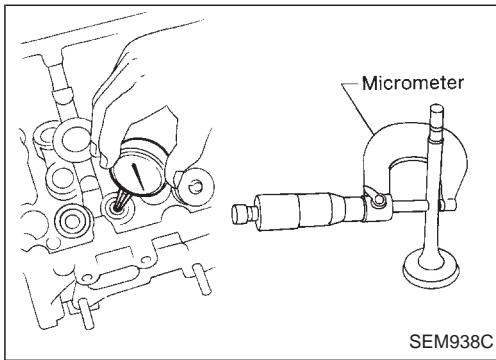
VALVE GUIDE CLEARANCE

- Calculate the clearance by measuring valve stem outer diameter and valve guide inner diameter.

Unit: mm (in)

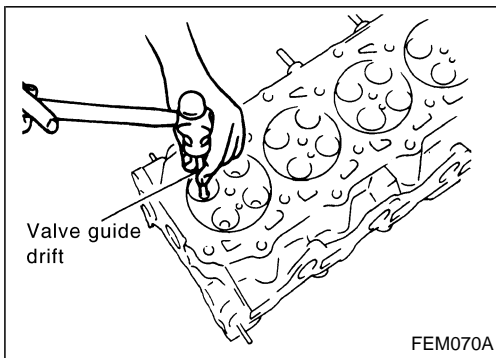
	Standard	Limit
Intake	0.023 - 0.056 (0.0009 - 0.0022)	0.18 (0.0071)
Exhaust	0.040 - 0.073 (0.0016 - 0.0029)	0.10 (0.0039)

- If the measured value exceeds the limit, replace valve guide and/or valve.



VALVE GUIDE REPLACEMENT

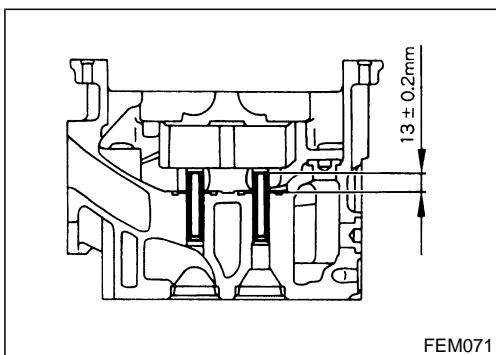
- There is no setup for oversized valve guide.
- Heat cylinder head to 110 to 130°C (230 to 266°F) in oil bath.



- Using valve guide drift (multi-purpose tool: for 7.0 mm dia.), tap valve guides out from the combustion chamber side.

CAUTION:

Cylinder head contains heat. Wear protective equipment to avoid getting burned when working.



- Heat cylinder head to 110 to 130°C (230 to 266°F) in oil bath.
- Using valve guide drift (multi-purpose tool: for 7.0 mm dia.), press fit valve guides from camshaft side, referring to the dimension shown in the figure.

CAUTION:

Cylinder head contains heat. Wear protective equipment to avoid getting burned when working.

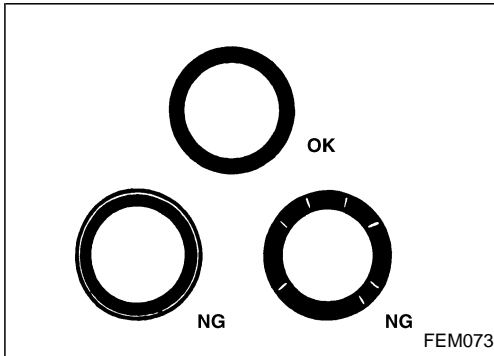
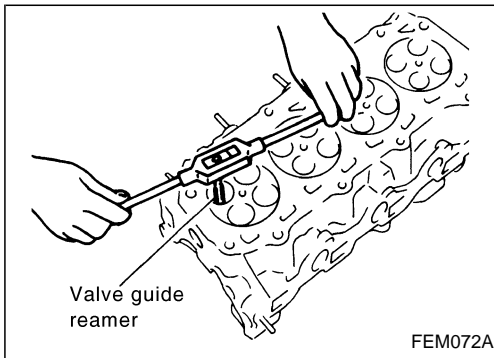
Inspection (Cont'd)

5. Using suitable valve guide reamer, perform reaming to the press-fitted valve guides.

Reaming specifications:

Intake/Exhaust

7.000 - 7.018 mm (0.2756 - 0.2763 in)



VALVE SEAT CONTACT

Check valve for any evidence of pitting at valve contact surface, and reseal or replace if worn out excessively.

- When repairing valve seats, check valve and valve guide for wear beforehand. If worn, replace them. Then check valve seat.

VALVE SEAT REPLACEMENT

1. Cut valve seat to make it thin, and pull it out.

CAUTION:

Cutting valve seat too much may cause damage of cylinder head.

NOTE:

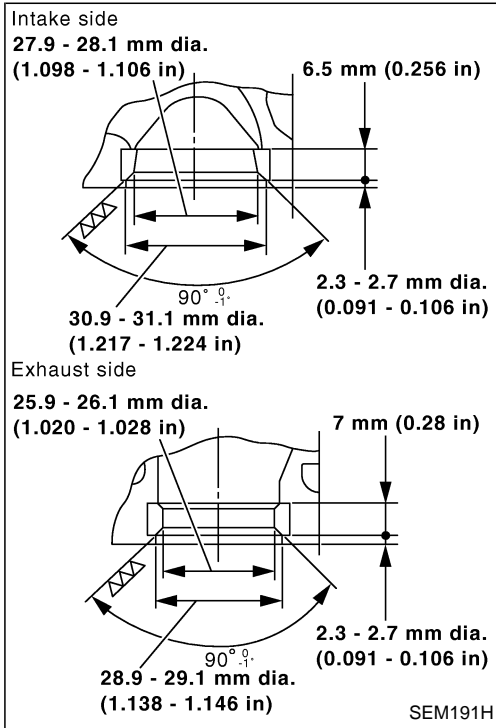
- After removing valve seat, check cylinder head inner area for cracks. If any cracks or deformation, replace cylinder head with new one.
 - Check inner diameter of valve seat mounting area. Refer to EM-21, "Valve Seat".
2. Heat cylinder head to approximately 110 to 130°C (230 to 266°F) in oil bath.
 3. After cooling valve seats sufficiently with dry ice, press fit it to cylinder head.

CAUTION:

- Cylinder head contains heat. Wear protective equipment to avoid getting burned when working.
- Do not touch the cooled valve seats directly by bare hand.

Inspection (Cont'd)

4. Make sure that contacting status is satisfactory.



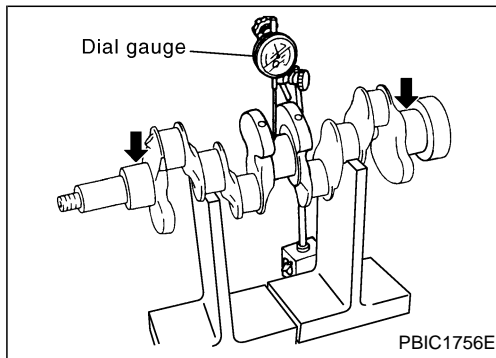
Inspection

SELECTIVE PISTON COMBINATION

Selective combination chart

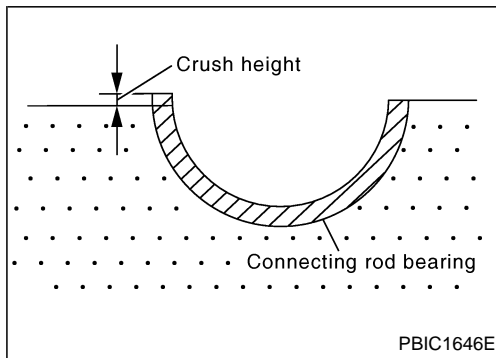
- New pistons are classified into 4 weight classes at factory. The same class pistons are used on a engine.

Weight grade symbol	Weight class g (oz)
E	615 - 620 (21.7 - 21.9)
F	620 - 625 (21.9 - 22.0)
G	625 - 630 (22.0 - 22.2)
H	630 - 635 (22.2 - 22.4)



CRANKSHAFT RUNOUT

- Place V-block onto surface plate to support No. 2 and No. 4 journals.
- Position dial indicator vertically onto No. 1, No. 3 and No. 5 journals.
- Rotate crankshaft to read needle movement on dial indicator. (Total indicator reading)
 - Standard: Less than 0.01 mm (0.0004 in)**
 - Limit: 0.03 mm (0.0012 in)**
- Replace crankshaft if it exceeds the limit.



CONNECTING ROD BEARING CRUSH HEIGHT

- Tighten connecting rod caps to the specified torque with connecting rod bearings installed.
 - Torque: 79 - 83 N·m (8.0 - 8.5 kg-m, 58 - 61 ft-lb)**
- Remove connecting rod caps. The connecting rod bearing end must then be higher than the flat surface.
 - Standard: Crush height must exist.**
- If out of specification, replace connecting rod bearings.

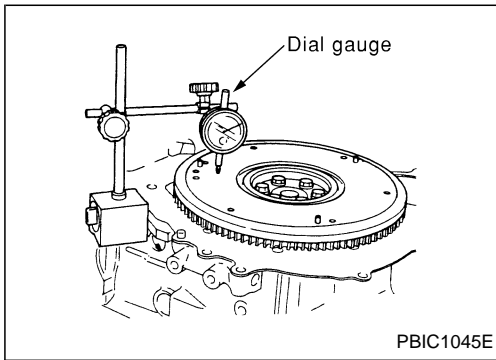
MOVEMENT AMOUNT OF FLYWHEEL (M/T MODELS)

NOTE:

- Inspect for double mass flywheel only.
- Do not disassembly double mass flywheel.

Inspection (Cont'd)

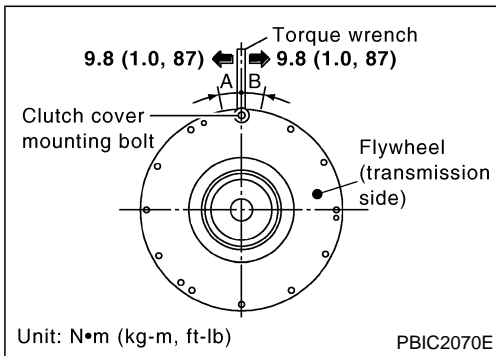
Flywheel Deflection



- Measure deflection of flywheel contact surface to the clutch with a dial gauge.
- Measure deflection at 250 mm (9.84 in) dia.
Standard: 0.3 mm (0.012 in) or less
Limit: 0.7 mm (0.028 in) or less
- When measured value exceeds the limit, replace it with a new one.

Movement Amount in Rotation Direction

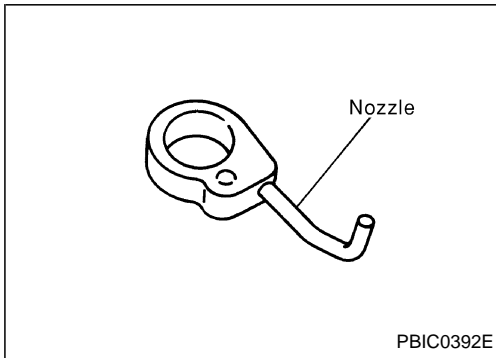
- Check the movement amount in the following procedure.
1. Install a bolt to clutch cover mounting hole, and place a torque wrench on the extended line of the flywheel center line.
 - Tighten bolt at a force of 9.8 N·m (1 kg-m, 87 in-lb) to keep it from loosening.



2. Put a mating mark on circumferences of the two flywheel masses without applying any load (Measurement standard points).
3. Apply a force of 9.8 N·m (1 kg-m, 87 in-lb) in each direction, and mark the movement amount on the mass on the transmission side.
4. Measure dimensions of movement amounts A and B on circumference of the flywheel on the transmission side.
Standard: 5.9 mm (0.232 in) or less
- When measured value is outside the standard, replace flywheel.

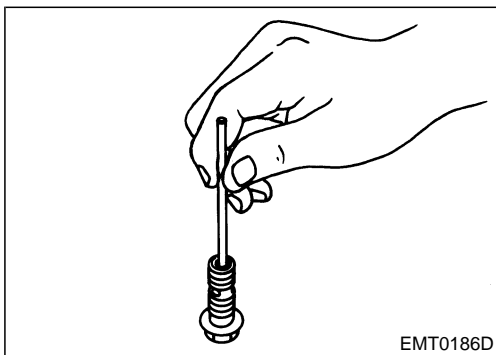
OIL JET

- Check nozzle for deformation and damage.
- Blow compressed air from nozzle, and check for clogs.
Standard: No deformation and no damage
- Replace oil jet if it is out of the standard.



OIL JET RELIEF VALVE

- Using a clean plastic stick, press check valve in oil jet relief valve. Make sure that valve moves smoothly with proper reaction force.
Standard:
Valve moves smoothly with proper reaction force.
- If it is not satisfied, replace oil jet relief valve.



Valve

VALVE CLEARANCE

Unit: mm (in)/°C (°F)

	Cold	Hot (*1)
Intake and Exhaust	0.16 (0.006)/8 - 12 (46 - 54)	0.33 - 0.37 (0.013 - 0.015)
	0.17 (0.007)/13 - 17 (55 - 63)	
	0.19 (0.007)/18 - 22 (64 - 72)	
	0.20 (0.008)/23 - 27 (73 - 81)	
	0.21 (0.008)/28 - 32 (82 - 90)	
	0.23 (0.009)/33 - 37 (91 - 99)	
	0.24 (0.009)/38 - 42 (100 - 108)	
	0.25 (0.010)/43 - 47 (109 - 117)	
	0.26 (0.010)/48 - 52 (118 - 126)	

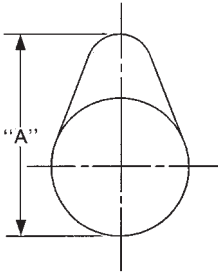
Whenever valve clearances are adjusted to cold specifications:

- Based on the engine coolant temperature (the value indicated by CONSULT-II) during valve clearance adjustment, select the setting value from above table.
- Determine setting value based on radiator coolant temperature if CONSULT-II could not be used.

*1: Reference data at engine coolant temperature 82°C (180°F)

Camshaft and Camshaft Bushing

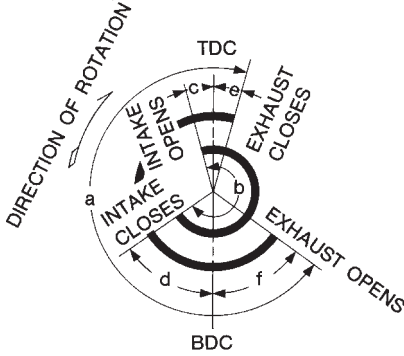
Unit: mm (in)



EM671

	TB45E
Cam height "A"	
Intake	42.314 - 42.564 (1.6659 - 1.6757)
Exhaust	

Valve timing



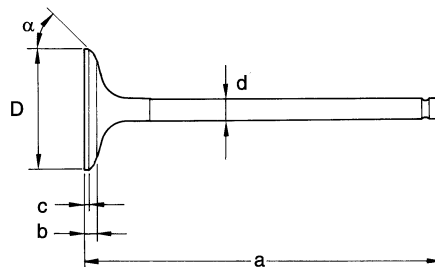
EM120
Unit: degree

	a	b	c	d	e	f
TB45E	236	236	-6	62	5	51

Valve

VALVE

Unit: mm (in)



PBIC0413E

Valve length "a"	Intake	113.5 (4.468)
	Exhaust	
"b"	Intake	3.8 - 4.2 (0.150 - 0.165)
	Exhaust	
Valve margin "c"	Intake	1.5 (0.059)
	Exhaust	
Valve stem diameter "d"	Intake	6.962 - 6.977 (0.2741 - 0.2747)
	Exhaust	6.945 - 6.960 (0.2734 - 0.2740)
Valve head diameter "D"	Intake	31.9 - 32.1 (1.256 - 1.264)
	Exhaust	29.9 - 30.1 (1.177 - 1.185)
Valve seat angle "α"	Intake	45°00' - 45°30'
	Exhaust	

VALVE CLEARANCE

Unit: mm (in)

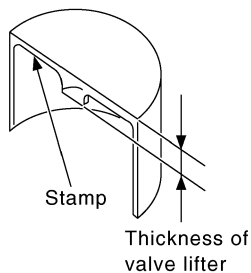
	Cold*
Intake and exhaust	0.30 - 0.40 (0.012 - 0.016)

*: Approximately 20°C (68°F)

Valve (Cont'd)

AVAILABLE VALVE LIFTER

Identification mark	Thickness
535	5.35 (0.2106)
540	5.40 (0.2126)
545	5.45 (0.2146)
550	5.50 (0.2165)
555	5.55 (0.2185)
560	5.60 (0.2205)
565	5.65 (0.2224)
570	5.70 (0.2244)
575	5.75 (0.2264)
580	5.80 (0.2283)
585	5.85 (0.2303)
590	5.90 (0.2323)
595	5.95 (0.2343)
600	6.00 (0.2362)
605	6.05 (0.2382)



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VALVE LIFTER

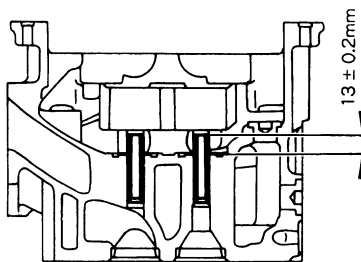
Unit: mm (in)

Valve lifter outer diameter	34.455 - 34.465 (1.3565 - 1.3569)
Lifter guide inner diameter	34.495 - 34.515 (1.3581 - 1.3589)
Clearance between lifter and lifter guide	0.030 - 0.060 (0.0012 - 0.0024)

Valve (Cont'd)

VALVE GUIDE

Unit: mm (in)

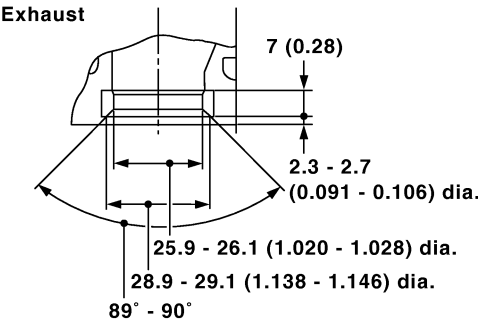
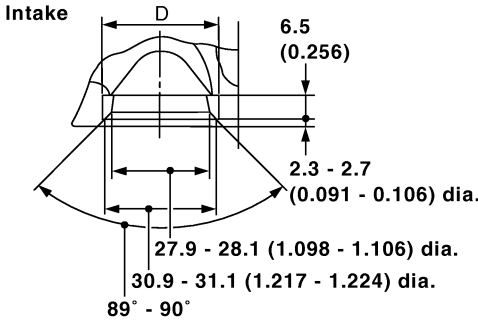


FEM071

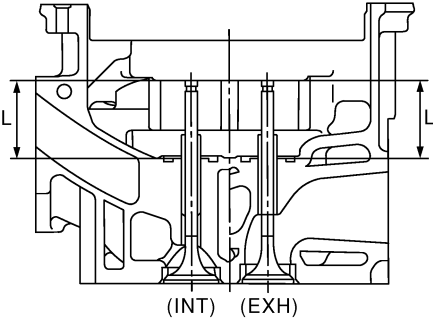
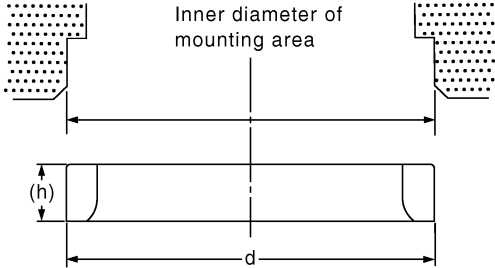
		Standard	Limit
Valve guide	Outer diameter	11.023 - 11.034 (0.4340 - 0.4344)	—
	Inner diameter (Finished size)	7.000 - 7.018 (0.2756 - 0.2763)	—
Cylinder head valve guide hole diameter		10.996 - 10.975 (0.4329 - 0.4321)	—
Interference fit of valve guide		0.027 - 0.059 (0.0011 - 0.0023)	—
Stem to guide clearance	Intake	0.023 - 0.056 (0.0009 - 0.0022)	0.18 (0.0071)
	Exhaust	0.040 - 0.073 (0.0016 - 0.0029)	0.10 (0.0039)
Projection length		12.8 - 13.2 (0.5309 - 0.5197)	—

Valve Seat

Unit: mm (in)



Unit: mm (in)



PBIC1726E

SEM373G

PBIC0421E

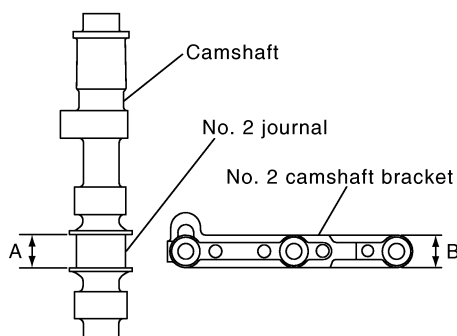
		Standard
Cylinder head seat recess diameter (D)	Intake	33.000 - 33.015 (1.2992 - 1.2998)
	Exhaust	31.495 - 31.510 (1.2400 - 1.2405)
Valve seat interference fit	Intake	0.050 - 0.078 (0.0020 - 0.0031)
	Exhaust	0.040 - 0.066 (0.0016 - 0.0026)

Valve Seat (Cont'd)

Valve seat outer diameter (d)	Intake	33.065 - 33.078 (1.3018 - 1.3023)
	Exhaust	31.550 - 31.561 (1.2421 - 1.2426)
Height (h)	Intake	6.75 - 6.85 (0.2657 - 0.2697)
	Exhaust	7.35 - 7.45 (0.2894 - 0.2933)
Depth (L)	Intake	43.65 - 44.35 (1.7185 - 1.7461)
	Exhaust	43.65 - 44.35 (1.7185 - 1.7461)

Camshaft and Camshaft Bearing

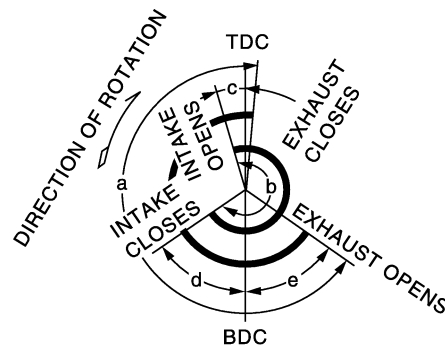
	Standard	Limit
Camshaft runout [TIR*]	—	0.02 (0.0008)
Camshaft end play	0.065 - 0.169 (0.0026 - 0.0067)	0.2 (0.008)



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Camshaft (No. 2 journal) "A" dimension	19.455 - 19.507 (0.7659 - 0.7680)
No. 2 camshaft bracket "B" dimension	19.338 - 19.390 (0.7613 - 0.7634)

Valve timing



PBIC0517E

Unit: degree

a	b	c	d	e
232	220	6	34	50

*: Total indicator reading

Crankshaft

Unit: mm (in)

Runout [TIR*]	Standard	Less than 0.01 (0.0004)
	Limit	0.03 (0.0012)

*: Total indicator reading

Available Connecting Rod Bearing

BALANCER SHAFT BEARING

Unit: mm (in)

Balancer shaft journal outer diameter	Front	50.875 - 50.895 (2.0029 - 2.0037)
	Rear	50.675 - 50.695 (1.9951 - 1.9959)
Balancer shaft bearing inner diameter	Front	50.955 - 50.980 (2.0061 - 2.0071)
	Rear	50.755 - 50.780 (1.9982 - 1.9992)
Balancer shaft journal oil clearance	Standard	0.060 - 0.105 (0.0024 - 0.0041)
	Limit	0.180 (0.0071)

Miscellaneous Components

Unit: mm (in)

Flywheel deflection [TIR]*	Standard	0.3 (0.012) or less
	Limit	0.7 (0.028)
Flywheel movement in rotation direction		5.9 (0.232) or less

*: Total indicator reading