ENGINE MECHANICAL

F

SECTION

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MODIFICATION NOTICE:

ZD engine

• ZD30DDTi (with common rail) engine has newly been added.

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Piston, Piston Ring and Piston Pin22	
	BR

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- 1. Gasket

4. Gasket

Solenoid valve bracket 7.

Bracket

8.

ZD

- 2. Intake manifold 3.
- 5. EGR volume control valve
- Throttle chamber Gasket 6.
- Refer to Service Manual NISSAN Y61 FIRST EDITION (publication No. SM7E-1Y61G1), GI-8.

REMOVAL

- 1. Remove the following parts.
- Drain engine coolant. •
- Remove engine cover.
- Remove intercooler.
- Remove air hose (on throttle body side).
- Remove EGR cooler and EGR volume control valve.
- Remove injection tube. •
- Remove or relocate wires/harnesses and tubes/pipes.



2. Remove intake manifold in the reverse order of that shown in the figure.

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- 1. Exhaust manifold cover
- 2. Exhaust manifold

Gasket

3.

- Gasket
 Gasket
- 5. Ga
- 6. EGR tube

- 7. Exhaust outlet cover
- A. To EGR cooler
- B. To turbocharger assembly
- Refer to Service Manual NISSAN Y61 FIRST EDITION (publication No. SM7E-1Y61G1), GI-8.

REMOVAL

- 1. Remove the following parts.
- Remove catalytic converter and turbocharger. Refer to Service Manual NISSAN Y61 SUPPLEMENT-III (publication No. SM9E-Y61CG3), EM-24.
- Remove EGR tube.

Removal and Installation (Cont'd)



2. Loosen nuts holding the exhaust manifold in the reverse order $\ensuremath{\mathbb{Gl}}$ of that shown in the figure.

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INSTALLATION EC

- 1. Tighten exhaust manifold in the numerical order shown in the figure.
- 2. Install in the reverse order of removal.

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- 1. Water pipe
- 2. Gasket
- EGR tube 3.
- 4. Gasket
- EGR cooler 5.
- 6. Water pipe
- Refer to Service Manual NISSAN Y61 FIRST EDITION (publication No. SM7E-1Y61G1), GI-8.

8.

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REMOVAL

EGR volume control valve

Gasket

10. Water hose

11. Gasket

- 1. Remove oil level gauge bracket.
- 2. Remove EGR bracket.
- 3. Drain engine coolant.
- 4. Disconnect EGR cooler from the water pipe.
- 5. Disconnect EGR connecting hoses to EGR volume control valve.

A. To water pipe

B. To exhaust manifold

C. To cylinder block

D. To cylinder block

- 6. Disconnect EGR volume control valve connecting hose to cylinder block.
- 7. Disconnect EGR connecting hose to cylinder block.
- 8. Remove EGR tube.
- 9. Remove EGR cooler.

EM-6

10. Remove EGR volume control valve.

INSTALLATION

- 1. Replace all gaskets by new ones.
- 2. Finger tighten all mountings bolts.
- 3. Tighten mountings bolts in few steps.
- 4. Tighten brackets at the end.
- 5. Tighten mountings bolts to the specified torques.

EGR SYSTEM	\mathbf{D}
Removal and Installation (Cont'd) INSPECTION	GI
 Check engine coolant level. Start engine, and check engine coolant and exhaust gas the leakage. 	for _{MA}
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1. Rocker cover

2.

Glow plug oil seal

Oil filler cap

4. Gasket

ZD

REMOVAL

3.

- 1. Remove the following parts.
- Engine cover •
- Intercooler •
- Air inlet pipe
- Throttle body •
- Injector tube No. 1 No. 4
- Spill tube •
- Injector harness •
- Glow harness
- Remove glow plug oil seal from rocker cover. 2.
- Rotate it counterclockwise to remove while holding cutout on • top of oil seal with pliers.



ROCKER COVER

Removal and Installation (Cont'd)



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REMOVAL [OIL PAN (UPPER) AND OIL STRAINER]

- 1. Remove the following parts.
- Remove the engine assembly and then separate the transmission. Refer to Service Manual NISSAN Y61 SUPPLEMENT-III (publication No. SM9E-Y61CG3), EM-74.

ZD

- Remove air conditioner compressor and air conditioner compressor bracket.
- As there is a converter housing side oil pan (upper) installation bolt as well, the transmission will also need to be separated.
- 2. Loosen the installation bolts in the reverse order of that shown in the figure and then remove.
- 3. Using a seal cutter (SST), cut the liquid gasket to separate it.



INSTALLATION [OIL PAN (UPPER) AND OIL STRAINER]

- 1. Install oil pan (upper).
- a. Use a scraper to remove all traces of liquid gasket from mating surfaces.
- Also remove traces of liquid gasket from mating surface of cylinder block, front cover and oil pan (lower).
- Remove old liquid gasket from the bolt hole and thread.
- b. Apply a continuous bead of liquid gasket to mating surface of oil pan (lower).
- Use Genuine Liquid Gasket or equivalent.
- Apply liquid gasket to the groove on the mating surface.
- Allow 7 mm (0.28 in) clearance around bolt holes.
- c. Apply liquid gasket to inner sealing surface as shown in figure.
- Be sure liquid gasket is 4.5 mm (0.177 in).
- Attaching should be done within 5 minutes after coating.



- 2. Tighten the installation bolts in the order shown in the figure. Then tighten in the same order to the torque stated.
- 3. The torque of the installation bolts will differ depending on position.

Measurement below the neck of the installation bolt: 40 mm (1.57 in) (Bolt No. 15, 17 in the figure) 20 mm (Others)

4. Install in the reverse order of removal.





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Installation

- 1. Install the chain cover.
- 1) Before installing chain cover, remove all traces of liquid gasket from mating surface using a scraper.
- 2) Apply a continuous bead of liquid gasket to chain cover.
- Use Genuine Liquid Gasket or equivalent.
- 2. Install chain cover.
- a. Apply liquid gasket to mating surface as shown before installing chain cover.
- Use genuine liquid gasket or equivalent.

b. Install chain cover and O-ring.

- The length of the mounting bolt will vary depending on the part. A: 20 mm (0.79 in)
 - B: 50 mm (1.97 in)
 - C: 60 mm (2.36 in)
- 3. Install by following all removal procedures in reverse.

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Inspection

• When the camshaft or parts in connection with valves are removed or replaced, and a fault has occurred (poor starting, idling, or other faults) due to the misadjustment of the valve clearance, inspect as follows.

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• Inspect and adjust when the engine is cool (at normal temperature).

NOTE:

Components on the figure are as follow:

I: Intake

E: Exhaust



- 1. Remove the following parts.
- Intercooler cover
- Intercooler
- Rocker cover
- 2. Set the No. 1 cylinder at TDC.
- 1) Rotate crankshaft pulley (1) clockwise, and align the TDC mark of crankshaft pulley (2) with the timing indicator (3) of gear case.





- 2) Confirm that the cam nose of the No. 1 cylinder and the knock pin of the cam sprocket is in the position shown in the figure.
- Rotate the crankshaft pulley again if not in the position shown in the figure.

NOTE:

Fuel injector is omitted in the figure Components:

- 1: Knock pin
- 2: Exhaust cam
- 3: Intake cam
- 3. While referring to the figure, measure the valve clearance in the circled area of the table below.

Measuring poi	No. 1	No. 2	No. 3	No. 4	
When the No. 1 cylin-	INT	0	0		
der is in the TDC	EXH	0		0	

• The injection order is 1-3-4-2.

⇐ : Engine front

VALVE CLEARANCE INSPECTIONS AND ADJUSTMENTS



Inspection (Cont'd)

• Measure the valve clearance using a JIS high grade feeler gauge when the engine is cool (at normal temperature). Standard:

Intake and exhaust

0.35±0.05 mm (0.0138±0.0020 in)

4. Set the No. 4 cylinder at TDC by rotating the crankshaft clockwise once.

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- 5. While referring to the figure, measure the valve clearance in the circled area of the table below.

Measuring poi	nt	No. 1	No. 2	No. 3	No. 4	FE
When the No. 4 cylin-	INT			0	0	
der is in the TDC	EXH		0		0	CL

6. If the valve clearance is outside the specification, adjust as follows.

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			TIMING GEAR			ZD	
			Removal and Instal	lation (Cont'd)		
1.	Fuel supply pump	14.	Balancer shaft bush (front)	26.	O-ring		GI
2.	Gasket	15.	Crank gear	27.	Gear case		
3.	O-ring	16.	Balancer shaft (left)	28.	Dowel pin		
4.	Oil jet	17.	Idler shaft	29.	TDC sensor		MA
5.	Key	18.	Idler gear (A)	30.	Front oil seal		
6.	O-ring	19.	Thrust plate	31.	Crankshaft pulley		
7.	Front plate	20.	Idler shaft	32.	Protector		EM
8.	Gasket	21.	Idler gear (B)	33.	Dowel pin		
9.	Balancer shaft bush (rear)	22.	Thrust plate	34.	O-ring		
10.	Fuel supply pump gear	23.	O-ring	Α.	Engraved line		LC
11.	Washer	24.	Rubber seal	В.	Refer to Fuel supply pump)	
12. 13.	Fuel supply pump sprocket Balancer shaft (right)	25.	Gasket	\diamond	: Upper side		EC
Ref	er to Service Manual NISSAN Y61 FII	RST EDIT	ION (publication No. SM7E-1Y61G	61), GI-8.			

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Installation

- 1. Install cylinder head gasket.
- Cylinder head gasket to be installed is selected by its thickness through the following procedure.

When replacing gasket only

- Install gasket with same thickness as the one removed.
- Gasket thickness is identified by the number of notches located on rear-left side.

Grade	Gasket thickness* mm (in)	No. of notches (B)
1	0.65 (0.0256)	1
2	0.70 (0.0276)	2
3	0.75 (0.0295)	3

*: Thickness of gasket tightened with head bolts



VALVE SPRING FREE LENGTH AND COMPRESSIVE LOAD

Using valve spring tester, check the following.

		Intake	Exhaust
Identification color	Identification color		Orange
Free height mm (in)	55.51 (2.1854)	55.81 (2.1972)
Installation height n	nm (in)	40.8 (1.606)
Height during valve	open mm (in)	32.3 (1.272)	31.95 (1.2579)
Pressure N (kg,	Installation	180 - 206 (18.4 - 21.0, 40.5 - 46.3)	216.2 - 243.8 (22.1 - 24.9, 49 - 55)
10)	Valve open	336 - 372 (34.3 - 37.9, 75.5 - 83.6)	382 - 430.8 (39.0 - 43.9, 86 - 97)
Out-of-square mm (in)		Less than 1.9 (0.075)	Less than 1.95 (0.0768)



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Removal

Removal operation

1. Install the engine slingers (standard service part) to front-left and rear-right.

ZD

[]: 28 N⋅m (2.9 kg-m, 21 ft-lb)

WARNING:

For engines without engine slingers, attach proper slingers and bolts described in the PARTS CATALOG.

7	Inspection	on				
	Piston ou	ter	diameter	op akirt autor dia	motor	
	Use micron Mea	netel asuro 10 r ton ndar	nm (0.39 in) upp	on skirt outer dia	meter. er end of pis-	
		95.9	30 - 95.960 mm	(3.7768 - 3.7779) in) dia.	
1						
	Calculatio	on o	f piston to pis	ton bore cleara	ance	
	 Calcula diamete Clearar 	te u er (di nce =	sing piston skirt rection X, positic - Cylinder inner c	outer diameter a on B). liameter – Piston	nd cylinder inner skirt outer diam-	
	Spe	cific	ations at room	temperature [20	°C (68°F)]:	
			$n = 0.0 \times 0 \times 0 \times 0$	0016 - 0 0031 0		
	If out of	0.0 4 f spe	cification, replac	e piston and pisto	on pin assembly.	
	• If out of	f spe	cification, replac	e piston and pisto	n pin assembly.	
7	If out of When re-u	f spe	g an old cyline	der block	n pin assembly.	
	 If out of When re-u Measur Referring combination inder both the second second	f spe usin re cy ng to ation	g an old cylind linder block bore "Cylinder block chart", select ap rade.	der block inner diameter. bore inner diameter	n pin assembly. eter" in "Selective according to cyl-	
	 If out of When re-u Measur Referring combination of the boost of the b	f spe usin re cy ng to atior ore g	g an old cylind linder block bore "Cylinder block chart", select ap grade.	der block inner diameter. bore inner diametor	n pin assembly. eter" in "Selective according to cyl-	
	 If out of When re-u Measur Referrir combina inder box Selective of 	f spe usin re cy ng to atior ore g	g an old cylind linder block bore "Cylinder block chart", select ap grade. bination chart	der block inner diameter. bore inner diame opropriate piston	n pin assembly. eter" in "Selective according to cyl- Unit: mm (in) grade	
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E	 If out of When re-u Measur Referrir combina inder bo Selective of ○: Prefe △: Allow X: NG c 	f spe f spe e cyng to atior coml erable vable	g an old cylind linder block bore "Cylinder block chart", select ap grade. bination chart	e piston and pisto der block inner diameter. bore inner diameter opropriate piston 1 95.930 - 95.940 (3.7768 - 3.7772)	t) on pin assembly. eter" in "Selective according to cyl- Unit: mm (in) grade 2 95.940 - 95.950 (3.7772 - 3.7776)	
E	 If out of When re-u Measur Referring combination inder box Selective of Selective of Cylinder bore grade 	f spe f spe e cy ng to atior ore c coml erable ombin	g an old cylind linder block bore "Cylinder block chart", select ap grade. bination chart e combination combination 96.000 - 96.010 (3.7795 - 3.7799)	der block inner diameter. bore inner diameter propriate piston 1 95.930 - 95.940 (3.7768 - 3.7772)	1) on pin assembly. eter" in "Selective according to cyl- Unit: mm (in) grade 2 95.940 - 95.950 (3.7772 - 3.7776) X	
	 If out of When re-u Measur Referring combination of the combination of the	f spe f spe usin re cy ng to atior coml erable ombin 1 2	g an old cylind linder block bore "Cylinder block bore "Cylinder block o chart", select ap grade. bination chart e combination combination 96.000 - 96.010 (3.7795 - 3.7799) 96.010 - 96.020 (3.7799 - 3.7803)	der block inner diameter. bore inner diameter propriate piston 1 95.930 - 95.940 (3.7768 - 3.7772)	1) on pin assembly. eter" in "Selective according to cyl- Unit: mm (in) grade 2 95.940 - 95.950 (3.7772 - 3.7776) X	

• Piston grade 3 (95.960/95.950) is applicable at factory only.

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Micrometer

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Valve

VALVE SPRING

		Intake	Exhaust		
Identification color	dentification color		tion color No identific		Orange
Free height mm (in)	ree height mm (in)		55.81 (2.1972)		
Installation height mm (in)	Installation height mm (in)		1.606)		
Height during valve open mm (in)		32.3 (1.272)	31.95 (1.2579)		
Proceuro N (kg. lb)	Installation	180 - 206 (18.4 - 21.0, 40.5 - 46.3)	216.2 - 243.8 (22.1 - 24.9, 49 - 55)		
	Valve open	336 - 372 (34.3 - 37.9, 75.5 - 83.6)	382 - 430.8 (39.0 - 43.9, 86 - 97)		
Out-of-square mm (in)		Less than 1.9 (0.075)	Less than 1.95 (0.0768)		

Piston, Piston Ring and Piston Pin

AVAILABLE PISTON

Unit: mm (in)



SEM369G

	Standard	Grade No. 1	95.930 - 95.940 (3.7768 - 3.7772)
Piston skirt diameter "A"		Grade No. 2	95.940 - 95.950 (3.7772 - 3.7776)
		Grade No. 3	95.950 - 95.960 (3.7776 - 3.7779)
"a" dimension			10 (0.39)