

SECTION

EM

ENGINE MECHANICAL

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< SERVICE INFORMATION >

SERVICE INFORMATION

MODIFICATION NOTICE

Major Modification Item

INFOID:000000003802402

- YD25DDTi (with common rail) engine has newly been added.

OIL PAN

< SERVICE INFORMATION >

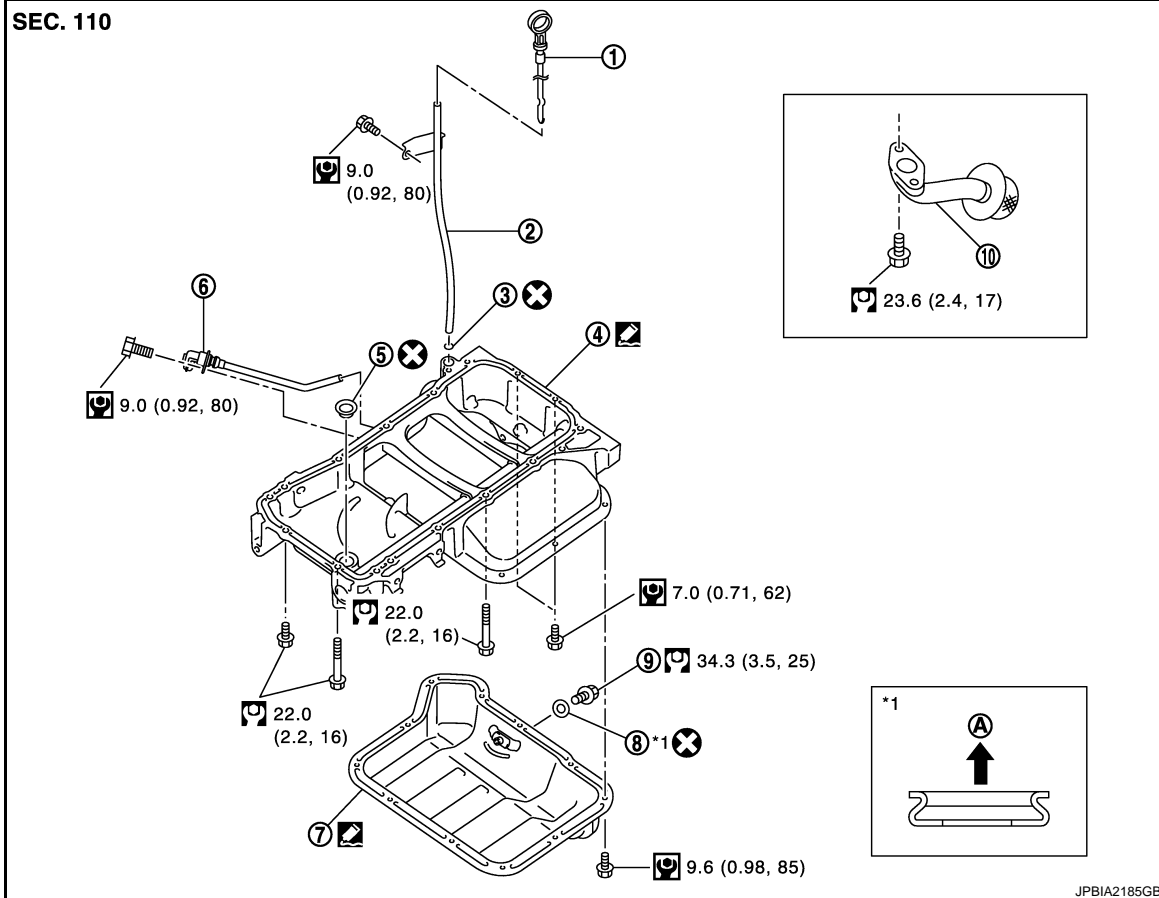
[YD25DDTi]

OIL PAN

Removal and Installation

INFOID:000000003802118

2WD models



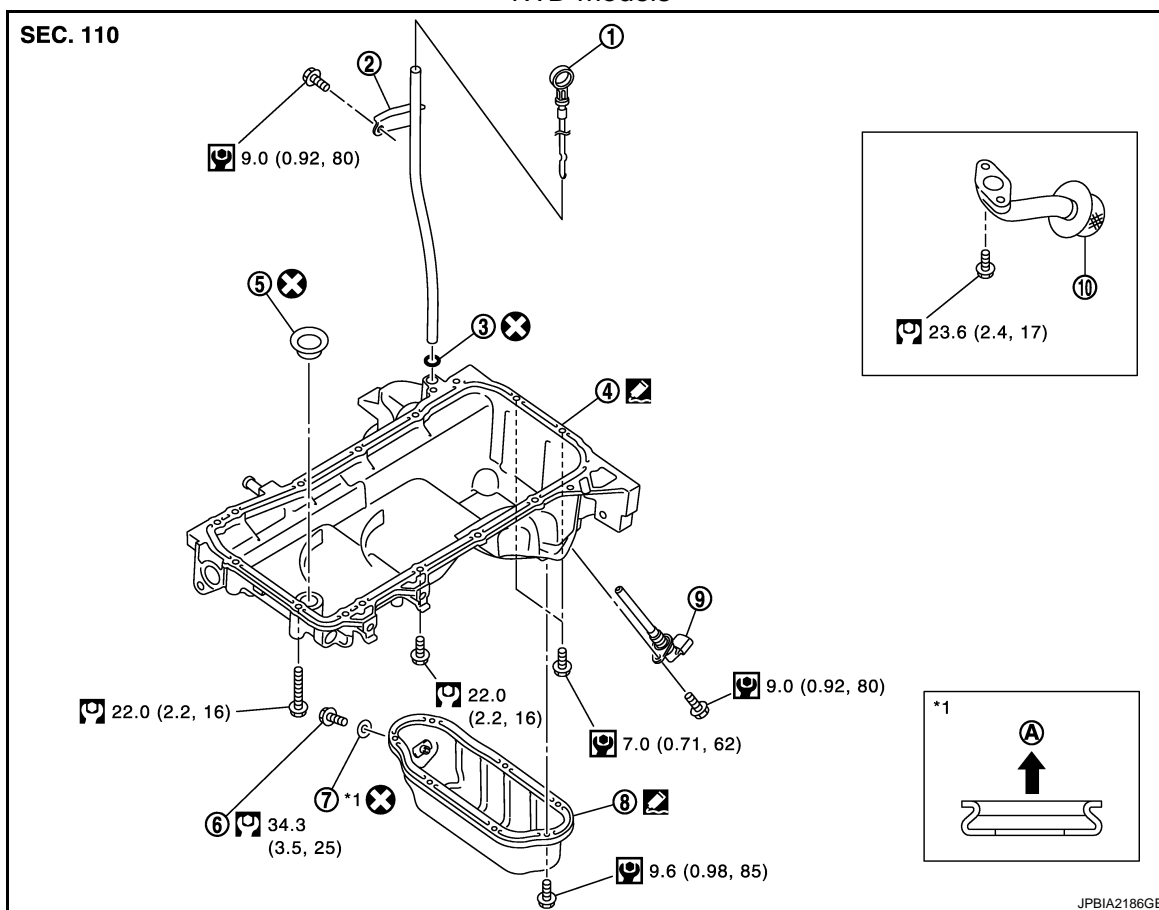
- Refer to Service Manual NISSAN D22 FIRST EDITION (Publication No. SM8E-0D22E0E), GI-7.

OIL PAN

< SERVICE INFORMATION >

[YD25DDTi]

4WD models



- | | | |
|----------------------|--------------------------|-----------------------|
| 1. Oil level gauge | 2. Oil level gauge guide | 3. O-ring |
| 4. Oil pan (upper) | 5. O-ring | 6. Oil pan drain plug |
| 7. Drain plug washer | 8. Oil pan (lower) | 9. Oil level sensor |
| 10. Oil strainer | | |
| A. Oil pan side | | |

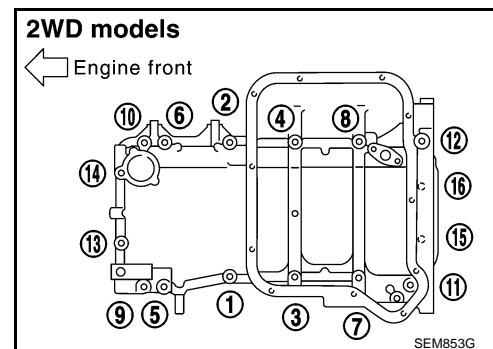
- Refer to Service Manual NISSAN D22 FIRST EDITION (Publication No. SM8E-0D22E0E), GI-7.

INSTALLATION

2WD models

- Install oil pan (upper), and tighten mounting bolts in numerical order as shown in the figure.
- Bolt dimensions vary depending on the installation location. Refer to the following and use appropriate bolts.

- M6 x 30 mm (1.18 in) : Bolt No. 15, 16**
- M6 x 92 mm (3.62 in) : Bolt No. 11, 14**
- M8 x 25 mm (0.98 in) : Bolt No. 1, 5, 9, 13**
- M8 x 60 mm (2.36 in) : Bolt No. 2, 3, 4, 6, 7, 8, 10, 12**



TIMING CHAIN

< SERVICE INFORMATION >

[YD25DDTi]

TIMING CHAIN

Primary Timing Chain

INFOID:000000003810905

- Check gaps on oil pan (upper) mounting surface.
- Using straightedge and feeler gauge, measure gaps between the locations of the following parts:

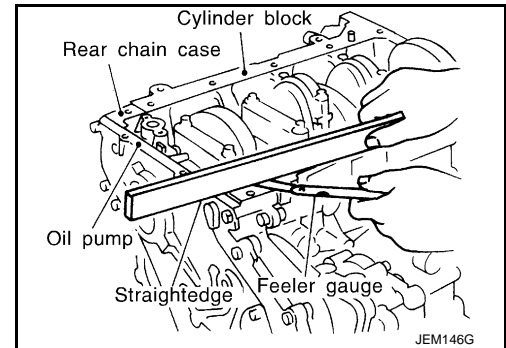
Standard:

Oil pump and rear chain case

–0.09 to 0.09 mm (–0.0035 to 0.0035 in)

Rear chain case and cylinder block

–0.19 to 0.07 mm (–0.0075 to 0.0028 in)



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P

INTAKE MANIFOLD

[YD25DDTi]

< SERVICE INFORMATION >

- Refer to Service Manual NISSAN D22 FIRST EDITION (Publication No. SM8E-0D22E0E), GI-7.

REMOVAL

WARNING:

To avoid the danger of being scalded, never drain engine coolant when engine is hot.

1. Drain engine coolant.
2. Remove charge air cooler.
3. Disconnect air inlet hose from intake manifold.
4. Remove oil level gauge guide.
5. Remove fuel hoses and fuel gallery.
 - To prevent fuel from flowing out, plug the opening of the hose with plug after disconnection.

CAUTION:

Be careful not to spill fuel in the engine component.

- Add marks as necessary for easier installation.

6. Disconnect EGR volume control valve water hoses and wiring harness.
7. Disconnect heater feed hose, water hoses, and remove heater feed pipe.
8. Remove EGR cooler.
9. Remove injection tube center.

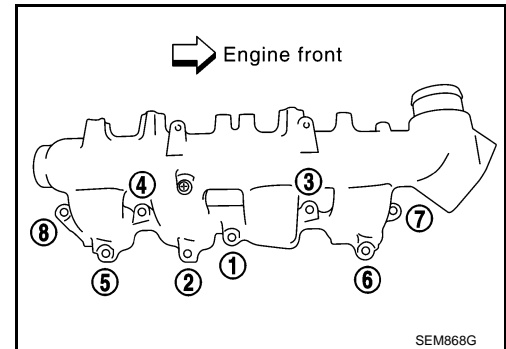
CAUTION:

Be careful not to spill fuel in the engine component.

10. Remove water pipe.
11. Remove EGR volume control valve from intake manifold.
12. Loosen bolts and nuts in the reverse order of that shown in the figure, and remove intake manifold.

CAUTION:


Cover engine openings to avoid entry of foreign materials.

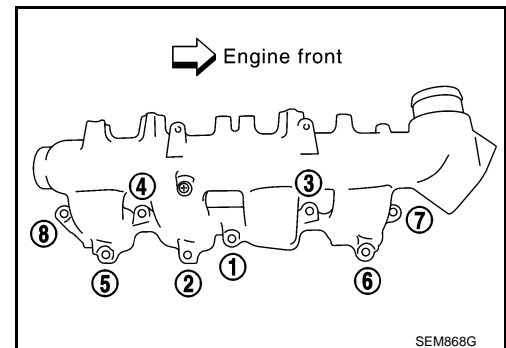


INSTALLATION

Note the following, and install in the reverse order of removal.

1. Install intake manifold.
 - Tighten fixing bolts and nuts in numerical order as shown in the figure.
 - If stud bolts were removed, tighten them to the specified torque.

: **10.8 N·m (1.1 kg-m, 8 ft-lb)**



2. Install EGR cooler and EGR volume control valve.
3. Install water hoses and heater feed hose.
 - Install water hose by referring to paint marks avoiding twisting.
 - When an insert stopper is provided on the pipe side, insert the hose until it reaches the stopper.
4. Before starting engine, bleed air from fuel piping.

INJECTION TUBE AND FUEL INJECTOR

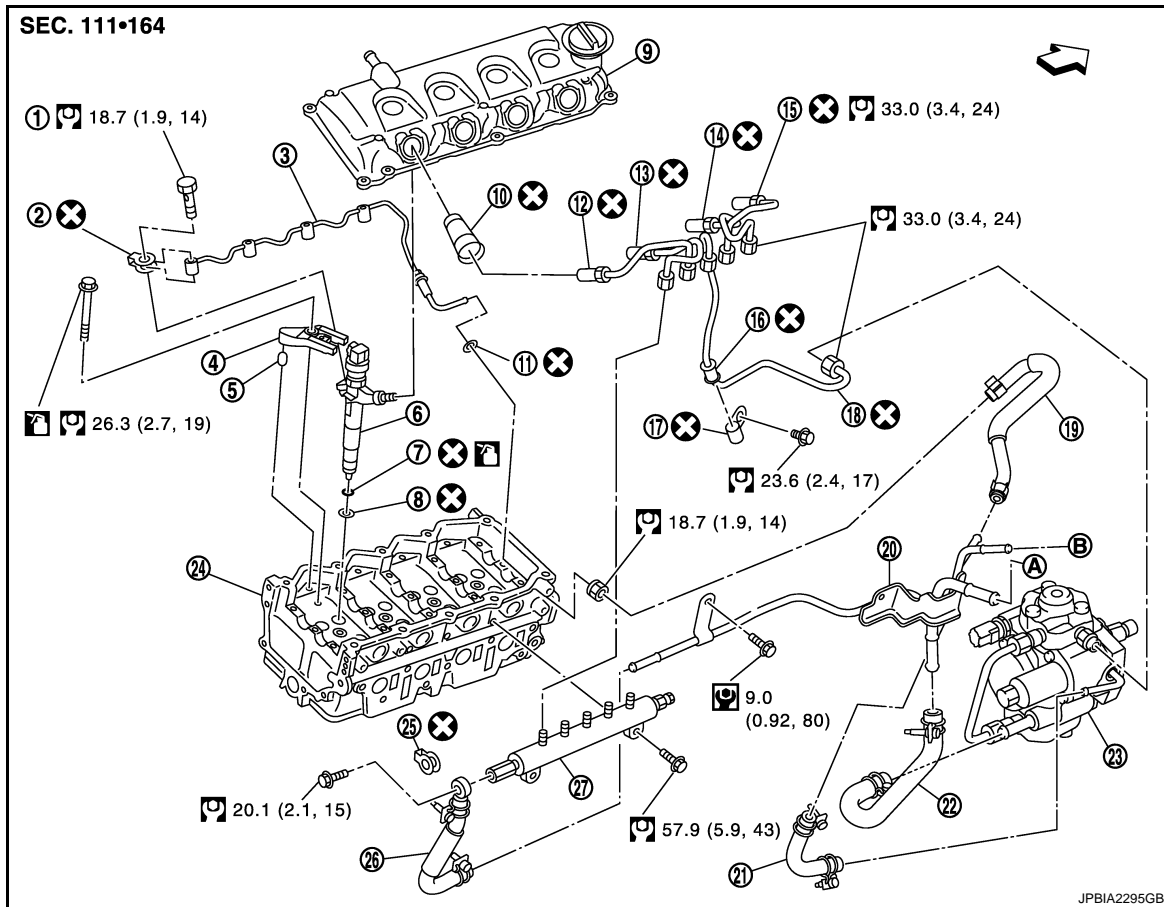
< SERVICE INFORMATION >

[YD25DDTi]

INJECTION TUBE AND FUEL INJECTOR

Removal and Installation

INFOID:000000003802311



- | | | |
|--------------------------|--------------------------|---------------------------|
| 1. Eye-bolt | 2. Cooper washer | 3. Spill tube |
| 4. Nozzle support | 5. Pin | 6. Fuel injector |
| 7. O-ring | 8. Nozzle gasket | 9. Rocker cover |
| 10. Nozzle oil seal | 11. Washer | 12. Injection tube No. 4 |
| 13. Injection tube No. 3 | 14. Injection tube No. 2 | 15. Injection tube No. 1 |
| 16. Insert rubber | 17. Clip | 18. Injection tube center |
| 19. Spill hose | 20. Fuel gallery | 21. Spill hose |
| 22. Fuel hose | 23. Fuel pump | 24. Cylinder head |
| 25. Cooper washer | 26. Fuel hose | 27. Fuel rail |
| A. To fuel filter | B. To under floor piping | |

↩ : Vehicle front

- Refer to Service Manual NISSAN D22 FIRST EDITION (Publication No. SM8E-0D22E0E), GI-7.

REMOVAL

1. Remove charge air cooler.
2. Remove intake manifold.
3. Disconnect harness connector from fuel injector.
4. Remove spill hose.
5. Following steps below, remove injection tubes.

INJECTION TUBE AND FUEL INJECTOR

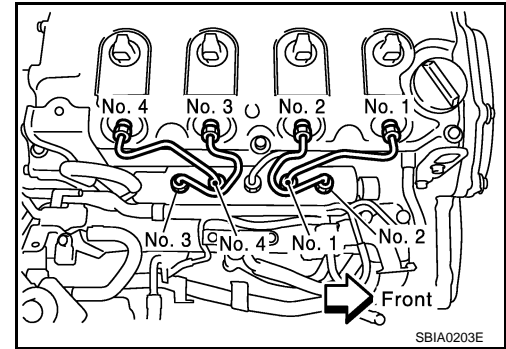
[YD25DDTi]

< SERVICE INFORMATION >

- a. Remove injection tubes in order of 2-1-4-3 individually.

CAUTION:

Be careful not to allow leaked fuel to contaminate engine room. Especially, ensure to keep engine mounting insulator clear of fuel.

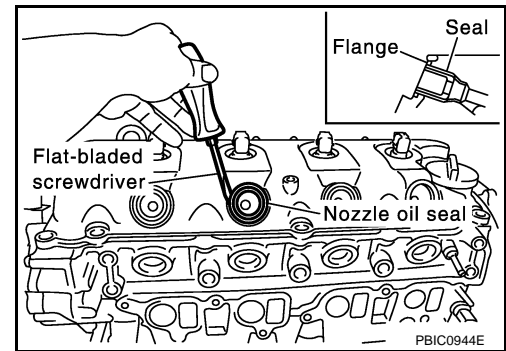


6. Remove nozzle oil seal.

- Using the flat-bladed screwdriver, pry flange to remove oil seal.

NOTE:

Nozzle oil seal seals between fuel injector and rocker cover. If only injection tube shall be removed and installed, nozzle oil seal replacement is not required.



7. Remove rocker cover.

8. Remove spill tube mounting bolts and nut.

- Loosen bolts and nut to the reverse order in the figure and remove them.

B : Spill tube retaining bolt

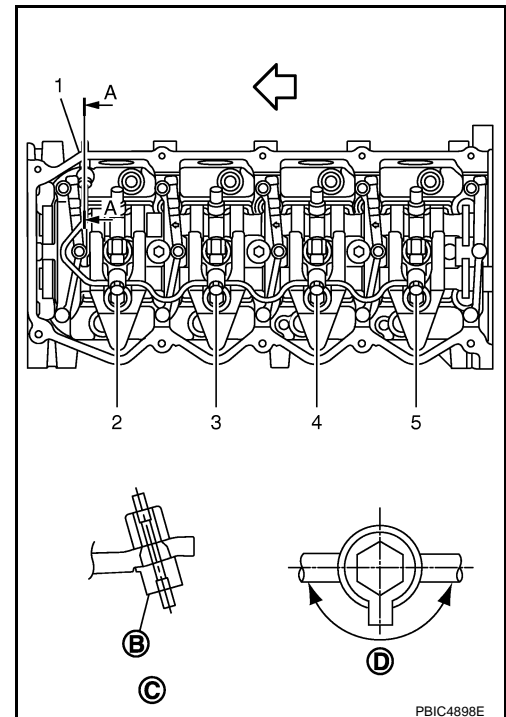
C : SECT A – A

D : OK

⇐ : Engine front

CAUTION:

When loosening nut, fix spill tube retaining bolt with spanner.



INJECTION TUBE AND FUEL INJECTOR

[YD25DDTi]

< SERVICE INFORMATION >

9. Following steps below, remove fuel injector.

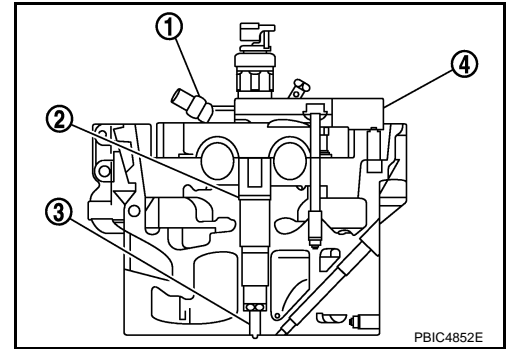
- 1 : Fuel injector
- 2 : O-ring
- 3 : Nozzle gasket
- 4 : Nozzle support

- a. Remove nozzle support.
- b. Remove fuel injector. While rotating it to left and right, raise it to remove.

CAUTION:

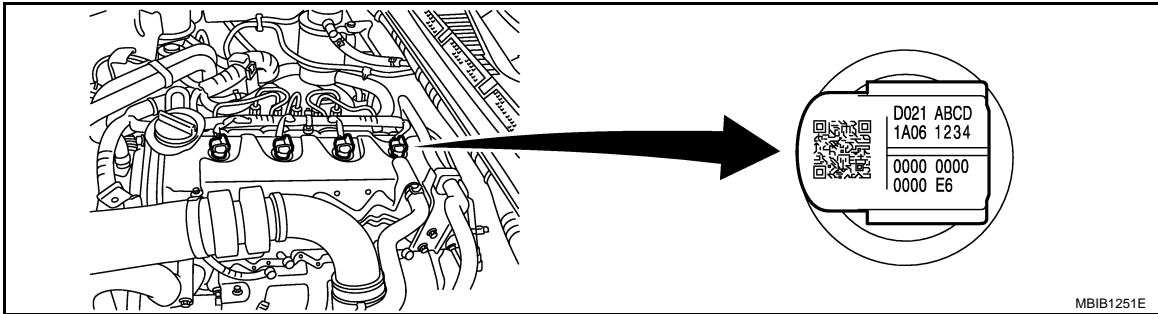
- Handle fuel injector carefully without giving any impact.
- Never disassemble fuel injector.

- c. If nozzle gasket remains in cylinder head, hook it with tip of a flat-bladed screwdriver and pull it out.
- d. Remove O-ring from fuel injector.



INSTALLATION

- 1. Record "INJECTOR ADJUSTMENT VALUE" on the top surface when replacing fuel injector.
 - Refer to [EC-22, "Injector Adjustment Value Registration"](#) for use of "INJECTOR ADJUSTMENT VALUE".



Example: Injector Adjustment value = D021ABCD1A061234000000000000E6

- 2. Following steps below, install fuel injector.
 - a. Install O-ring and nozzle gasket to fuel injector, and insert them into cylinder head.
 - b. Tighten injection tubes temporarily in the order of 3-4-1-2.
 - c. Be sure to fit nozzle support and pin without looseness.
 - d. Tighten nozzle support bolts.
 - e. Loosen injection tubes in the order of 2-1-4-3.
- 3. Connect spill tube.

INJECTION TUBE AND FUEL INJECTOR

[YD25DDTi]

< SERVICE INFORMATION >

- Tighten fixing bolts and nut in numerical order shown in the figure.

B : Spill tube retaining bolt

C : SECT A – A

D : OK

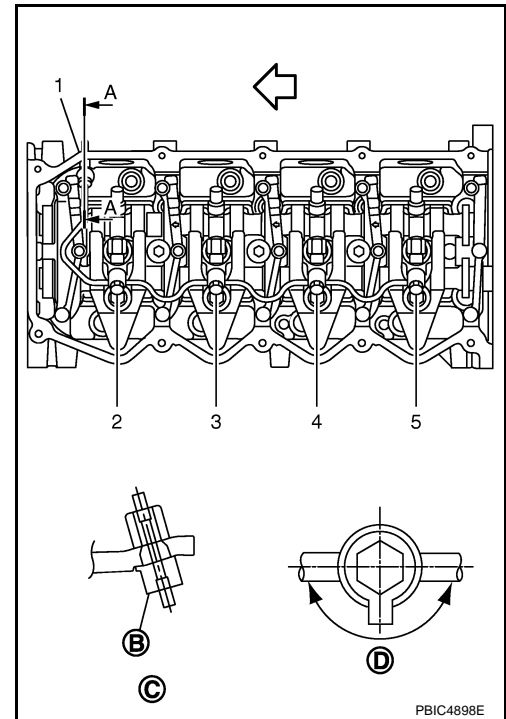
⇐ : Engine front

CAUTION:

When tightening nut, fix spill tube retaining bolt with spanner.

NOTE:

Connection of spill tube gasket may be broken, even if it is tighten to the specified torque. It does not affect performance.



PBIC4898E

4. Perform air tightness test for spill tube.
 - Connect a handy vacuum pump to spill connector. Check that vacuum is retained while applying following vacuum.

Standard:

–53.3 to –66.7 kPa (–533 to –667 mbar, –400 to –500 mmHg, –15.75 to –19.69 inHg)

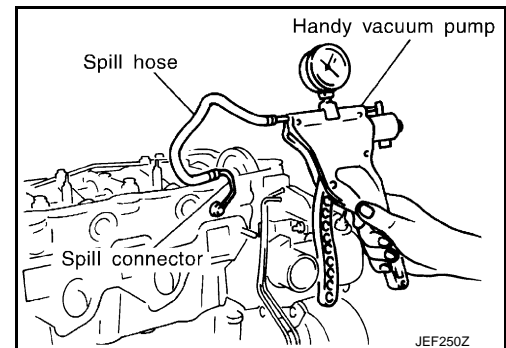
- If outside of standard, reconnect spill tube. (Replace gasket in this case.)

5. Install rocker cover.
6. Install nozzle oil seal.
 - Insert it straight until its flange fully contacts rocker cover.

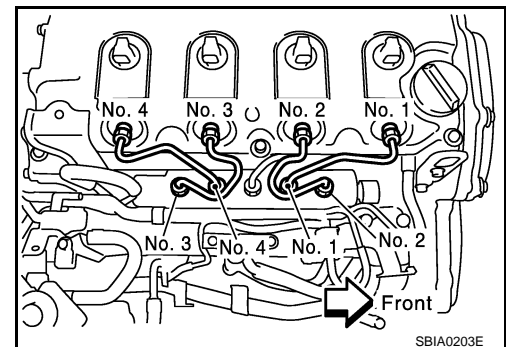
CAUTION:

- **Check gutter spring in nozzle oil seal on fuel injector for missing.**

7. Connect injection tubes individually to each cylinder in order of 3-4-1-2.



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8. Install fuel hoses, spill hose and fuel gallery.
9. Install remaining parts in the reverse order of removal.

INSPECTION AFTER INSTALLATION

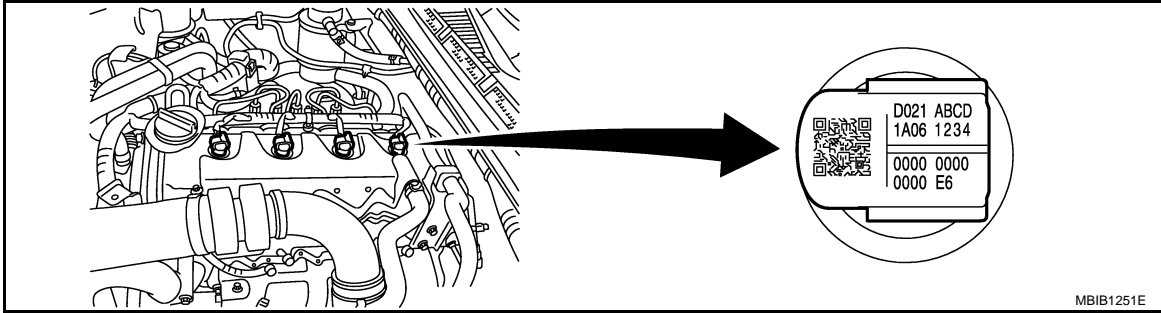
- Input "INJECTOR ADJUSTMENT VALUE" to ECM after installing to the vehicle when replacing fuel injector.

INJECTION TUBE AND FUEL INJECTOR

[YD25DDTi]

< SERVICE INFORMATION >

- Refer to [EC-22, "Injector Adjustment Value Registration"](#) for use of "INJECTOR ADJUSTMENT VALUE".



Example: Injector Adjustment value = D021ABCD1A061234000000000000E6

- Start engine and increase engine speed to check for fuel leak.

CAUTION:

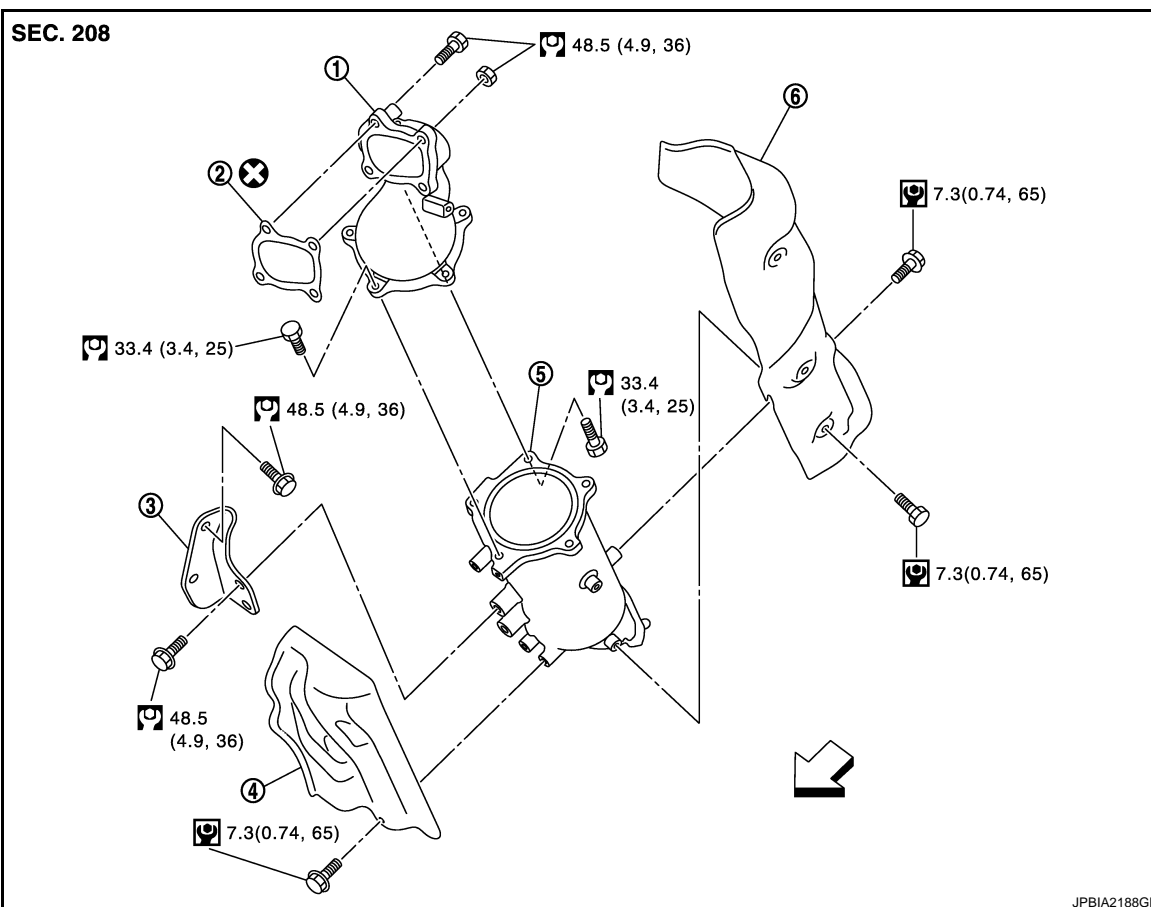
Never touch engine immediately after stopped as engine becomes extremely hot.

CATALYST

Removal and Installation

INFOID:000000003802127

2WD models



1. Exhaust outlet

2. Gasket

3. Gusset

4. Catalyst cover

5. Catalyst

6. Catalyst cover

⇐ : Engine front

- Refer to Service Manual NISSAN D22 FIRST EDITION (Publication No. SM8E-0D22E0E), GI-7.

INSTALLATION

Note the following, and install in the reverse order of removal.

- If stud bolts of turbocharger were removed, tighten them to the specified torque.

: 25.5 N·m (2.6 kg-m, 19 ft-lb)

- If stud bolts of catalyst were removed, tighten them to the specified torque.

: 45.0 N·m (4.6 kg-m, 33 ft-lb)

- Pushing gusset against the cylinder block and the catalyst, temporarily tighten the mounting bolt. And then tighten it to the specified torque.

EXHAUST MANIFOLD AND TURBOCHARGER

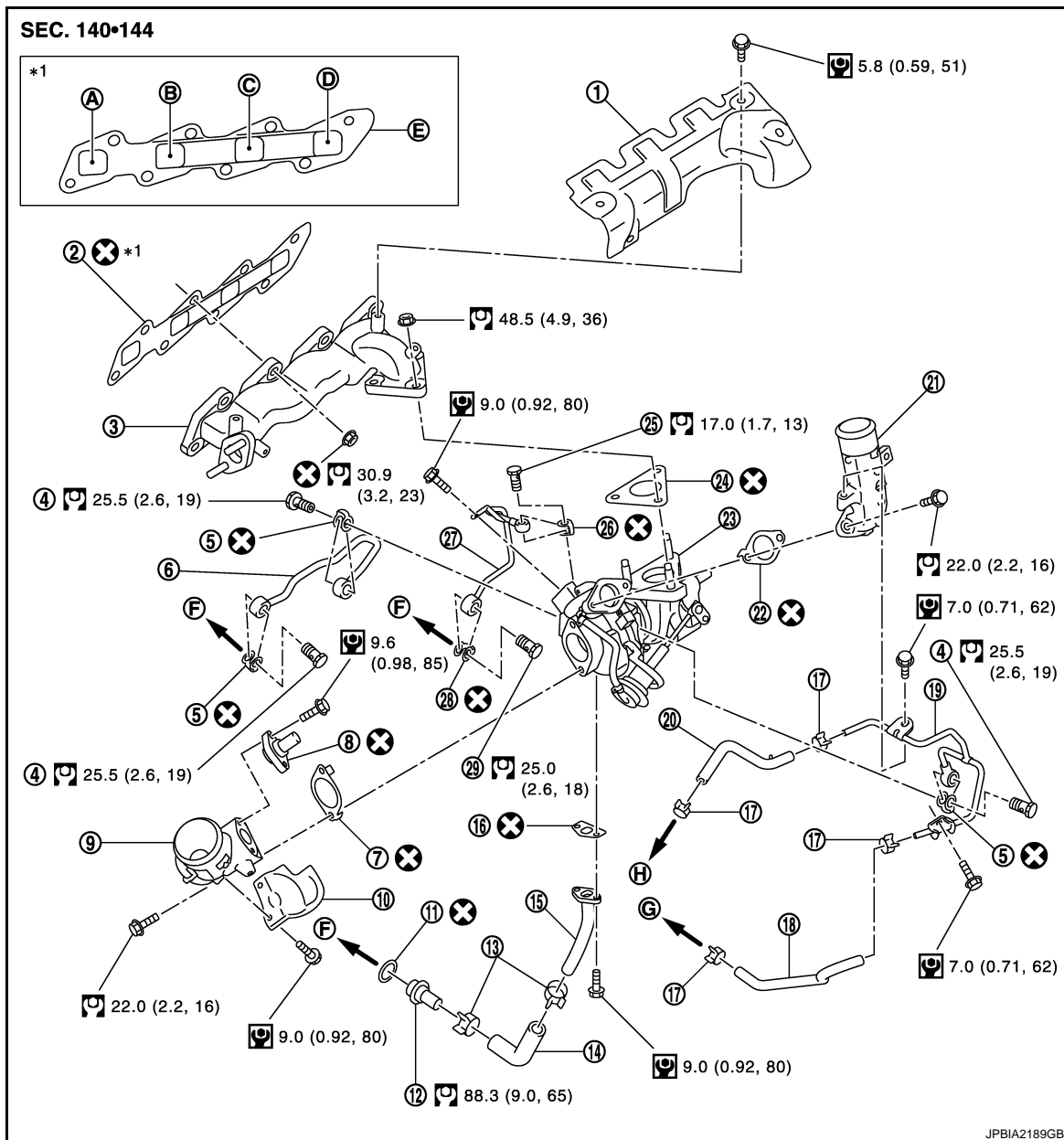
< SERVICE INFORMATION >

[YD25DDTi]

EXHAUST MANIFOLD AND TURBOCHARGER

Removal and Installation

INFOID:000000003802124



- | | | |
|---------------------------|-------------------------------|---------------------|
| 1. Exhaust manifold cover | 2. Gasket | 3. Exhaust manifold |
| 4. Eye-bolt | 5. Copper washer | 6. Water feed pipe |
| 7. Gasket | 8. Ventilation hose connector | 9. Air inlet tube |
| 10. Insulator | 11. Gasket | 12. Connector |
| 13. Clamp | 14. Oil return hose | 15. Oil return tube |
| 16. Gasket | 17. Clamp | 18. Water hose |
| 19. Water return tube | 20. Water hose | 21. Air inlet tube |
| 22. Gasket | 23. Turbocharger | 24. Gasket |
| 25. Eye-bolt | 26. Copper washer | 27. Oil feed pipe |
| 28. Copper washer | 29. Eye-bolt | |
| A. No. 1 | B. No. 2 | C. No. 3 |

EXHAUST MANIFOLD AND TURBOCHARGER

< SERVICE INFORMATION >

[YD25DDTi]

- | | | |
|--------------------------|-------------------------|----------------------|
| D. No. 4 | E. Alignment protrusion | F. To cylinder block |
| G. To heater return pipe | H. To water outlet | |

A

- Refer to Service Manual NISSAN D22 FIRST EDITION (Publication No. SM8E-0D22E0E), GI-7.

INSPECTION AFTER REMOVAL

EM

Wastegate Valve Actuator

- Connect the handy vacuum pump to the turbocharger wastegate valve actuator, and check that the rod strokes smoothly in compliance with the following pressure.
- Pressure to be applied at the turbocharger wastegate valve actuator part to move rod end as follows:

C

Standard (Pressure/rod stroke amount)

: 149.7 to 162.1 kPa (1497 to 1621 mbar, 1122.9 to 1215.9 mmHg, 44.2 to 47.8 inHg)/2.0 mm (0.079 in)

D

: 172.7 to 187.1 kPa (1727 to 1871 mbar, 1295.4 to 1403.4 mmHg, 51.0 to 55.2 inHg)/4.0 mm (0.157 in)

E

INSTALLATION

F

- When a stud bolt is pulled out, replace it with a new one and tighten it to the following torque.

: 25.5 N·m (2.6 kg-m, 19 ft-lb)

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ROCKER COVER

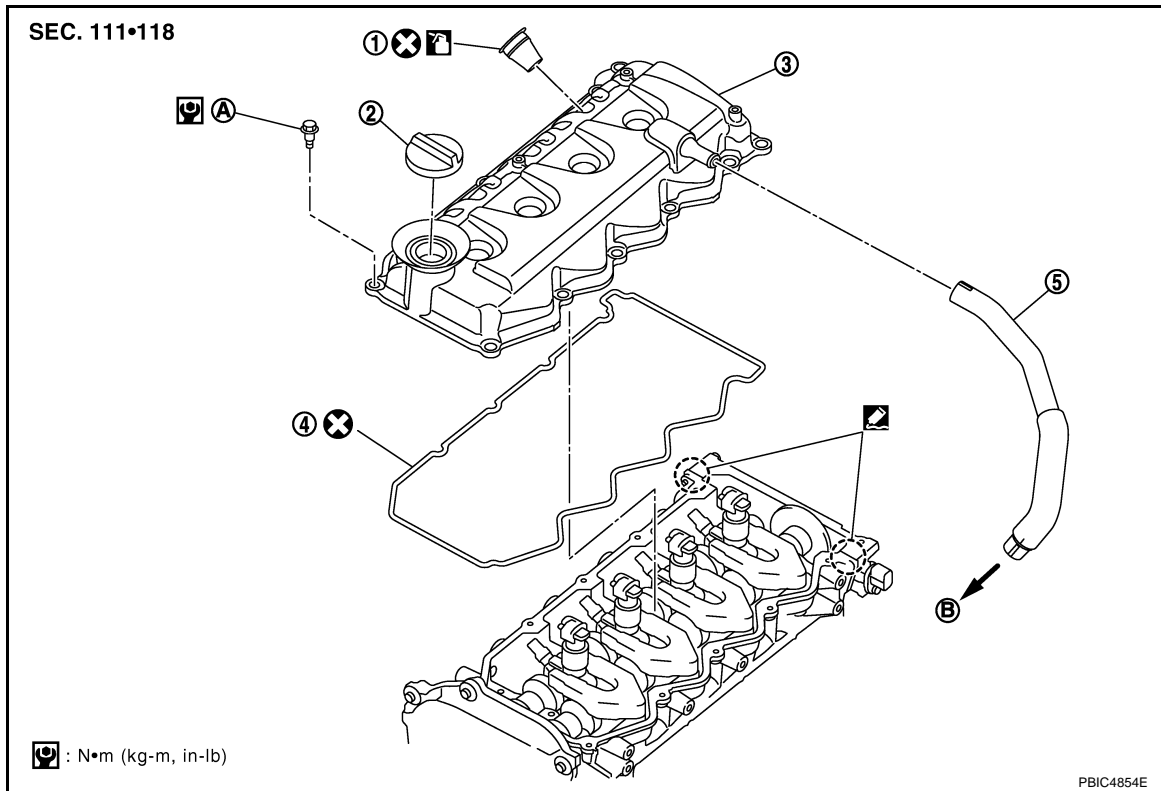
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[YD25DDTi]

ROCKER COVER

Removal and Installation

INFOID:000000003802130



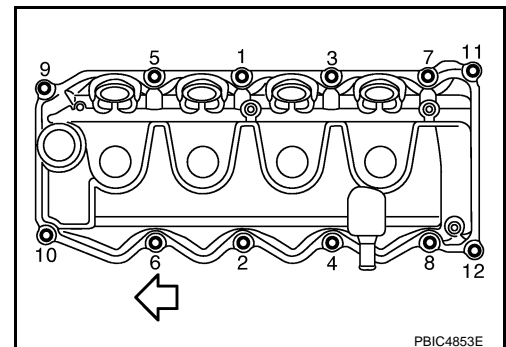
- | | | |
|------------------------|----------------------------------|-----------------|
| 1. Nozzle oil seal | 2. Oil filler cap | 3. Rocker cover |
| 4. Rocker cover gasket | 5. Ventilation hose | |
| A. Refer to text | B. To ventilation hose connector | |

- Refer to Service Manual NISSAN D22 FIRST EDITION (Publication No. SM8E-0D22E0E), GI-7.

REMOVAL

- Remove charge air cooler.
- Remove injection tube and nozzle oil seal. Refer to [EM-8. "Removal and Installation"](#).
- Remove rocker cover.
 - Loosen holding bolts in the reverse order of that shown in the figure and remove.

⇐ : Engine front



INSTALLATION

- Install new gasket to rocker cover.

ROCKER COVER

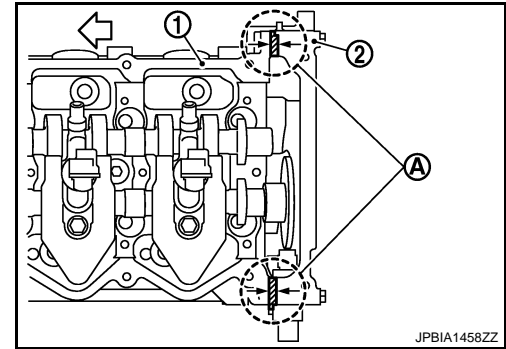
[YD25DDTi]

< SERVICE INFORMATION >

2. Apply liquid gasket with tube presser (commercial service tool) on locations shown in the figure.

- 1 : Cylinder head
- 2 : Cylinder head rear cover
- A : Liquid gasket application area [$\phi 3.0$ mm (0.118 in)]
- ← : Engine front

- Use Genuine Liquid Gasket or equivalent.

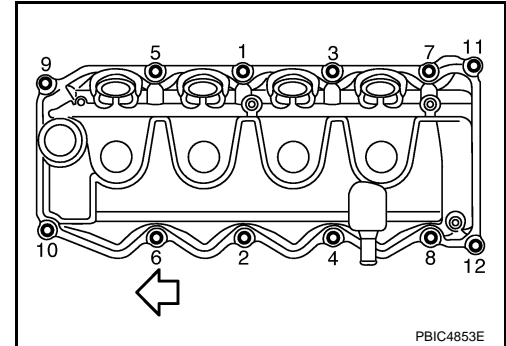


3. Tighten all bolts in numerical order as shown in the figure.

- ← : Engine front

 : 7.8 N·m (0.80 kg-m, 69 in-lb)

- Retighten to the same torque in the same order as above.



4. Install nozzle oil seal.
 - Insert it straight until flange fully contacts rocker cover.
5. Install remaining parts in the reverse order of removal.
6. Before starting engine, bleed air from fuel piping.

ENGINE ASSEMBLY

Removal and Installation

INFOID:000000003802216

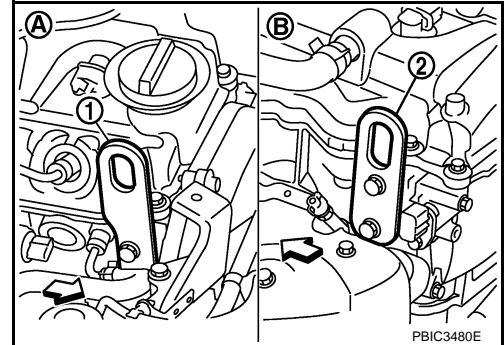
REMOVAL

- Install engine slingers into front right of cylinder head (A) and rear left of cylinder head (B).

1 : Engine slinger (front)

2 : Engine slinger (rear)

⇐ : Engine front

Engine slinger bolts:: **33.4 N·m (3.4 kg-m, 25 ft-lb)**

CYLINDER BLOCK

Disassembly and Assembly

INFOID:000000003802218

ASSEMBLY

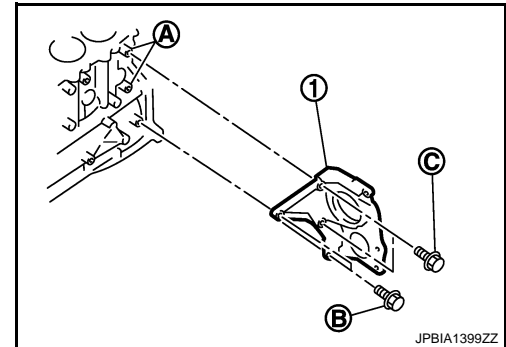
Install fuel pump bracket (1).

: **54.5 N·m (5.6 kg-m, 40 ft-lb)**

Bolt B : 30 mm (1.18 in)

Bolt C : 35 mm (1.38 in)

- Align the bracket with the dowel pins (A) on cylinder block to install.
- The two bolts used for dowel pins have a longer shanks than the other two.



INFOID:000000003802220

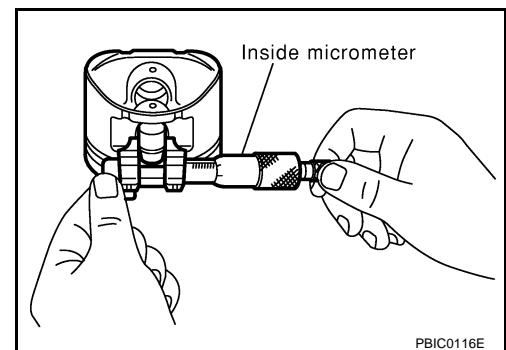
Inspection

PISTON TO PISTON PIN CLEARANCE

Piston Pin Bore Diameter

Using inside micrometer, measure piston pin bore diameter.

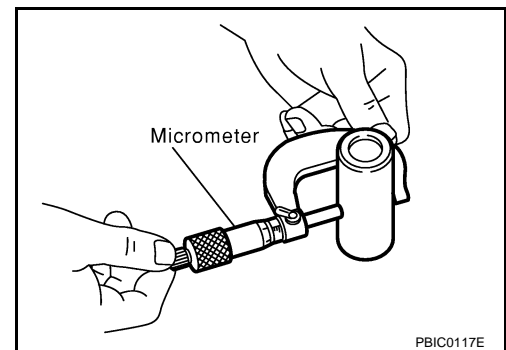
Standard : 28.003 - 28.009 mm (1.1025 - 1.1027 in)



Piston Pin Outer Diameter

Using micrometer, measure piston pin outer diameter.

Standard : 27.995 - 28.000 mm (1.1022 - 1.1024 in)



Calculation of Piston to Piston Pin Clearance

$$(\text{Piston pin clearance}) = (\text{Piston pin bore diameter}) - (\text{Piston pin outer diameter})$$

Standard : 0.003 - 0.014 mm (0.0001 - 0.0006 in)

- If out of the standard, replace piston/piston pin assembly.

NOTE:

Piston is available together with piston pin as assembly.

PISTON RING END GAP

CYLINDER BLOCK

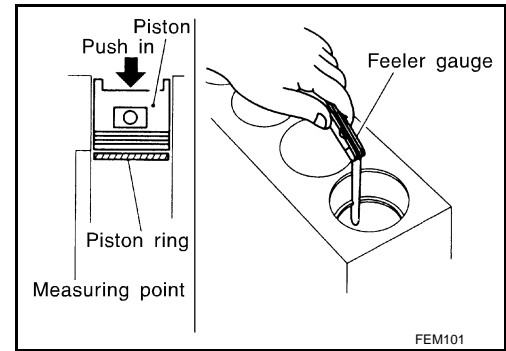
[YD25DDTi]

< SERVICE INFORMATION >

- If out of the limit, replace piston ring. If gap still exceeds the limit even with a new ring, rebore cylinder and use oversized piston and piston ring.

Unit: mm (in)

Items	Standard	Limit
Top ring	0.21 - 0.28 (0.0083 - 0.0110)	1.0 (0.039)
2nd ring	0.32 - 0.47 (0.0126 - 0.0185)	
Oil ring	0.30 - 0.55 (0.0118 - 0.0217)	

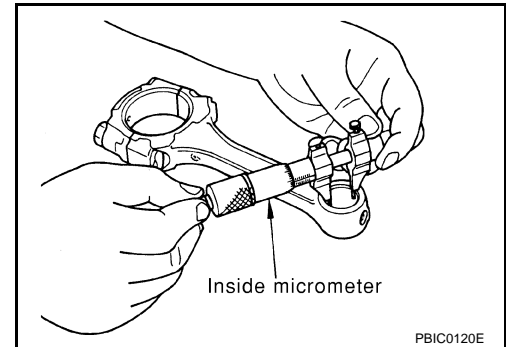


CONNECTING ROD BUSHING OIL CLEARANCE

Connecting Rod Bushing Inner Diameter

Use inside micrometer to measure bushing inner diameter.

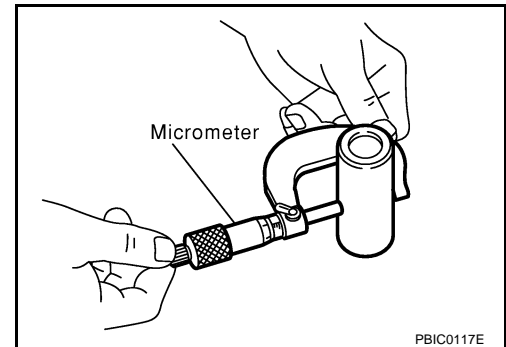
Standard : 28.026 - 28.038 mm (1.1034 - 1.1039 in)



Piston Pin Outer Diameter

Use micrometer to measure piston pin outer diameter.

Standard : 27.995 - 28.000 mm (1.1022 - 1.1024 in)



Calculation of Connecting Rod Bushing Clearance

(Connecting rod bushing clearance) = (Connecting rod bushing inner diameter) – (Piston pin outer diameter)

Standard : 0.026 - 0.043 mm (0.0010 - 0.0017 in)

Limit : 0.057 mm (0.0022 in)

- If it exceeds the limit, replace connecting rod and/or piston and piston pin assembly.

Piston Outer Diameter

Use micrometer to measure piston outer diameter.

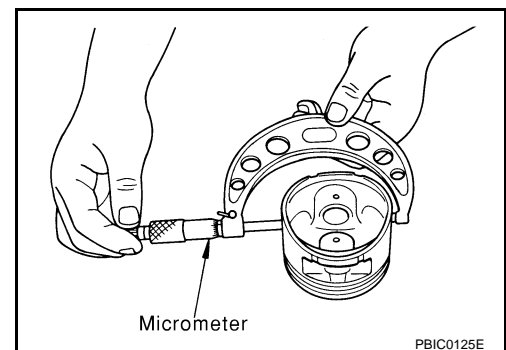
Piston outer diameter

Measurement position : 11.0 mm (0.433 in)
Distance from the bottom

Standard : 88.928 - 88.962 mm
(3.5011 - 3.5024 in)

0.25 (0.0098) O/S : 89.188 - 89.202 mm
(3.5113 - 3.5119 in)

0.50 (0.0197) O/S : 89.438 - 89.452 mm
(3.5212 - 3.5217 in)



CYLINDER BLOCK

[YD25DDTi]

< SERVICE INFORMATION >

Calculation of Piston to Cylinder Bore Clearance

- Calculate using piston outer diameter and cylinder bore inner diameter (direction X, position B).
(Clearance) = (Cylinder bore inner diameter) – (Piston outer diameter)

Specifications at room temperature [20°C (68°F)]:

Standard : 0.058 - 0.082 mm (0.0023 - 0.0032 in)

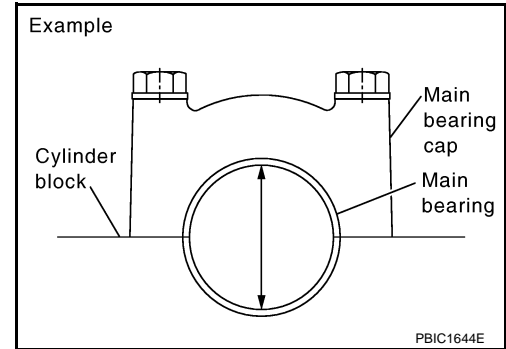
- If it exceeds the limit, replace piston and piston pin assembly.

MAIN BEARING OIL CLEARANCE

- Install main bearings to cylinder block and bearing cap, and tighten the bolts to the specified torque. Then, measure the inner diameter of main bearings.
(Bearing clearance) = (Bearing inner diameter) – (Crankshaft journal outer diameter)

Standard : 0.047 - 0.077 mm (0.0019 - 0.0030 in)

- If out of the standard, check main bearing housing inner diameter and crankshaft journal outer diameter, and select appropriate main bearing to adjust clearance to specifications.

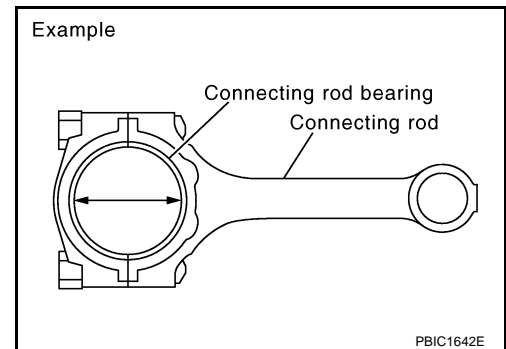


CONNECTING ROD BEARING OIL CLEARANCE

- Install connecting rod bearings to connecting rod and cap, and tighten connecting nuts to the specified torque. Use inside micrometer to measure connecting rod bearing inner diameter.
(Bearing clearance) = (Connecting rod bearing inner diameter) – (Crankshaft pin outer diameter)

Standard : 0.039 - 0.070 mm (0.0015 - 0.0028 in)

- If clearance exceeds the standard, select proper connecting rod bearing according to connecting rod big end diameter and crankshaft pin outer diameter to obtain specified bearing oil clearance.



SERVICE DATA AND SPECIFICATIONS (SDS)

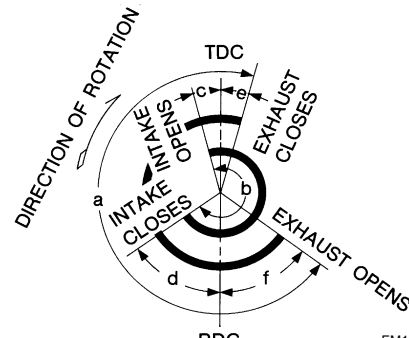
< SERVICE INFORMATION >

[YD25DDTi]

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:000000003802411

Compression ratio			16.5		
Valve timing			<div><p>EM120</p></div>		
Unit: degree					
a	b	c	d	e	f
224	212	2	30	-2	46

Piston, Piston Ring and Pin

INFOID:000000003802412

PISTON PIN

Unit: mm (in)

Piston pin outer diameter	27.995 - 28.000 (1.1022 - 1.1024)	
Piston to piston pin clearance	0.003 - 0.014 (0.0001 - 0.0006)	
Connecting rod bushing clearance	Standard	0.026 - 0.043 (0.0010 - 0.0017)
	Limit	0.057 (0.0022)

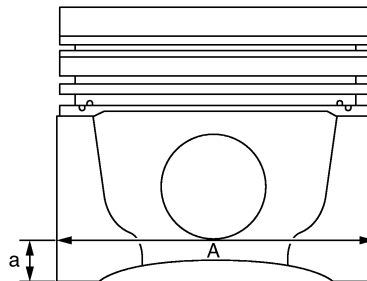
PISTON RING

Unit: mm (in)

Items		Standard	Limit
End gap	Top	0.21 - 0.28 (0.0083 - 0.0110)	1.0 (0.039)
	2nd	0.32 - 0.47 (0.0126 - 0.0185)	
	Oil ring	0.30 - 0.55 (0.0118 - 0.0217)	

AVAILABLE PISTON

Unit: mm (in)



MBIA0026E

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE INFORMATION >

[YD25DDTi]

Piston outer diameter “A”	Standard	Grade No. 1	88.928 - 88.942 (3.5011 - 3.5016)
		Grade No. 2	88.938 - 88.952 (3.5015 - 3.5020)
		Grade No. 3	88.948 - 88.962 (3.5019 - 3.5024)
		Oversize (Service) [0.25 (0.0098)]	89.188 - 89.202 (3.5113 - 3.5119)
		Oversize (Service) [0.50 (0.0197)]	89.438 - 89.452 (3.5212 - 3.5217)
“a” dimension		11.0 (0.433)	
Piston pin bore diameter		28.003 - 28.009 (1.1025 - 1.1027)	
Piston to cylinder bore clearance		0.058 - 0.082 (0.0023 - 0.0032)	

Connecting Rod

INFOID:000000003825985

Unit: mm (in)

Piston pin bushing inner diameter*	28.026 - 28.038 (1.1034 - 1.1039)
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*: After installing in connecting rod

Miscellaneous Components

INFOID:000000003825986

BEARING CLEARANCE

Unit: mm (in)

Main bearing clearance	Standard	0.047 - 0.077 (0.0019 - 0.0030)
Connecting rod bearing clearance	Standard	0.039 - 0.070 (0.0015 - 0.0028)

IMPORTANT SAFETY NOTICE

The proper performance of service is essential for both the safety of the technician and the efficient functioning of the vehicle.

The service methods in this Service Manual are described in such a manner that the service may be performed safely and accurately.

Service varies with the procedures used, the skills of the technician and the tools and parts available. Accordingly, anyone using service procedures, tools or parts which are not specifically recommended by NISSAN must first be completely satisfied that neither personal safety nor the vehicle's safety will be jeopardized by the service method selected.

