ENGINE MECHANICAL

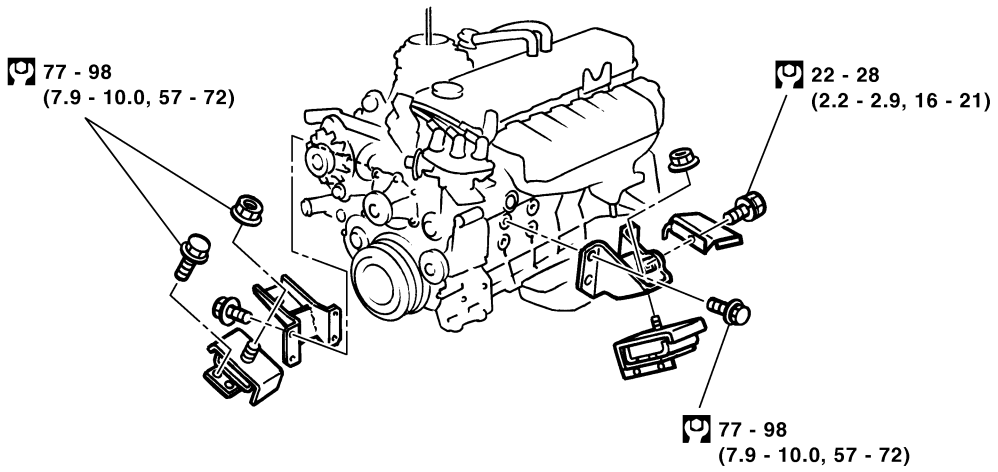
SECTION EM

MODIFICATION NOTICE:

- Engine mounting parts have been modified.
- Models with three way catalyst have been introduced for the Middle East.
- TB48DE engine has been introduced for Europe. For information and specifications other than those not described here, refer to Y61 series Service Manual, Supplement-V 1st Revision (Publication No. SM1E-Y61EG1).
- TD42Ti engine has been introduced for Australia. For information and specifications other than those not described here, refer to Y61 series Service Manual, Supplement-III 3rd Revision (Publication No. SM9E-Y61CG3).

CONTENTS

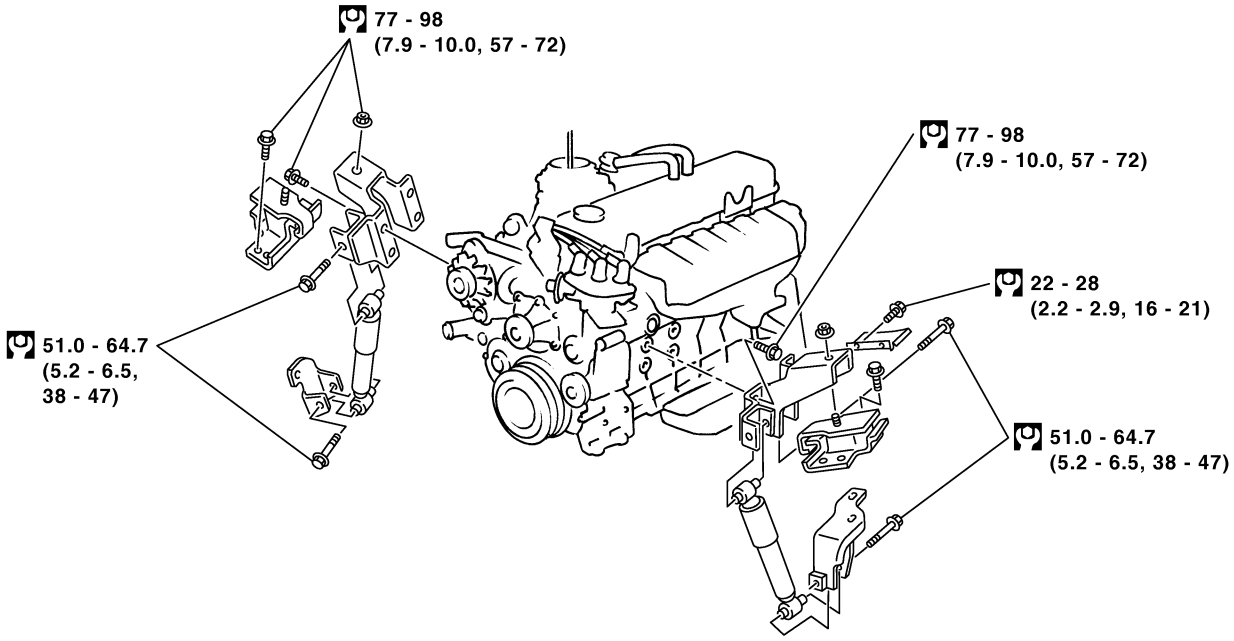
Except for the Middle East



: N•m (kg-m, ft-lb)

SEM959G

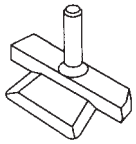
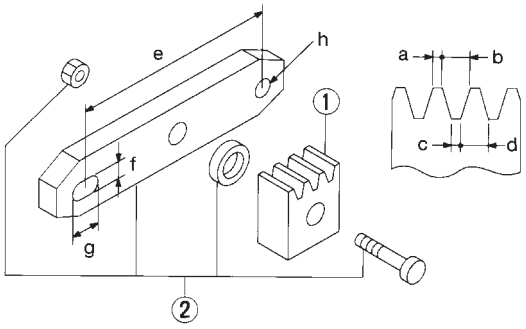
For the Middle East



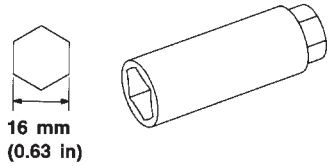
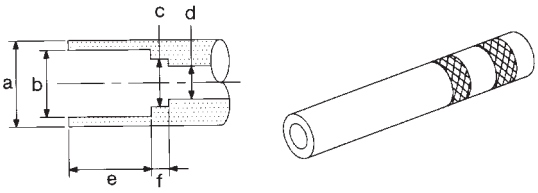
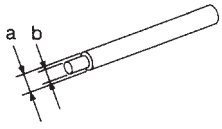
: N•m (kg-m, ft-lb)

SEM060H

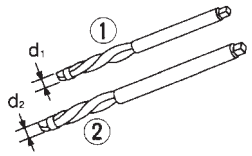
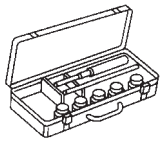
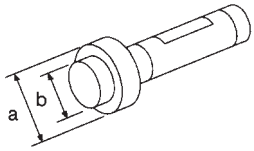
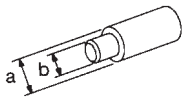
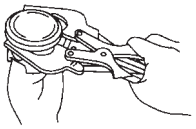
Special Service Tools

Tool number Tool name	Description	
KV10111100 Seal cutter	 NT046	Removing steel oil pan and timing chain case
KV101056S0 Ring gear stopper 1 KV10105630 Adapter 2 KV10105610 Plate	 NT617	Preventing crankshaft from rotating **a: 3 (0.12)** **b: 6.4 (0.252)** **c: 2.8 (0.110)** **d: 6.6 (0.260)** **e: 107 (4.21)** **f: 14 (0.55)** **g: 20 (0.79)** **h: 14 (0.55) dia.** Unit: mm (in)

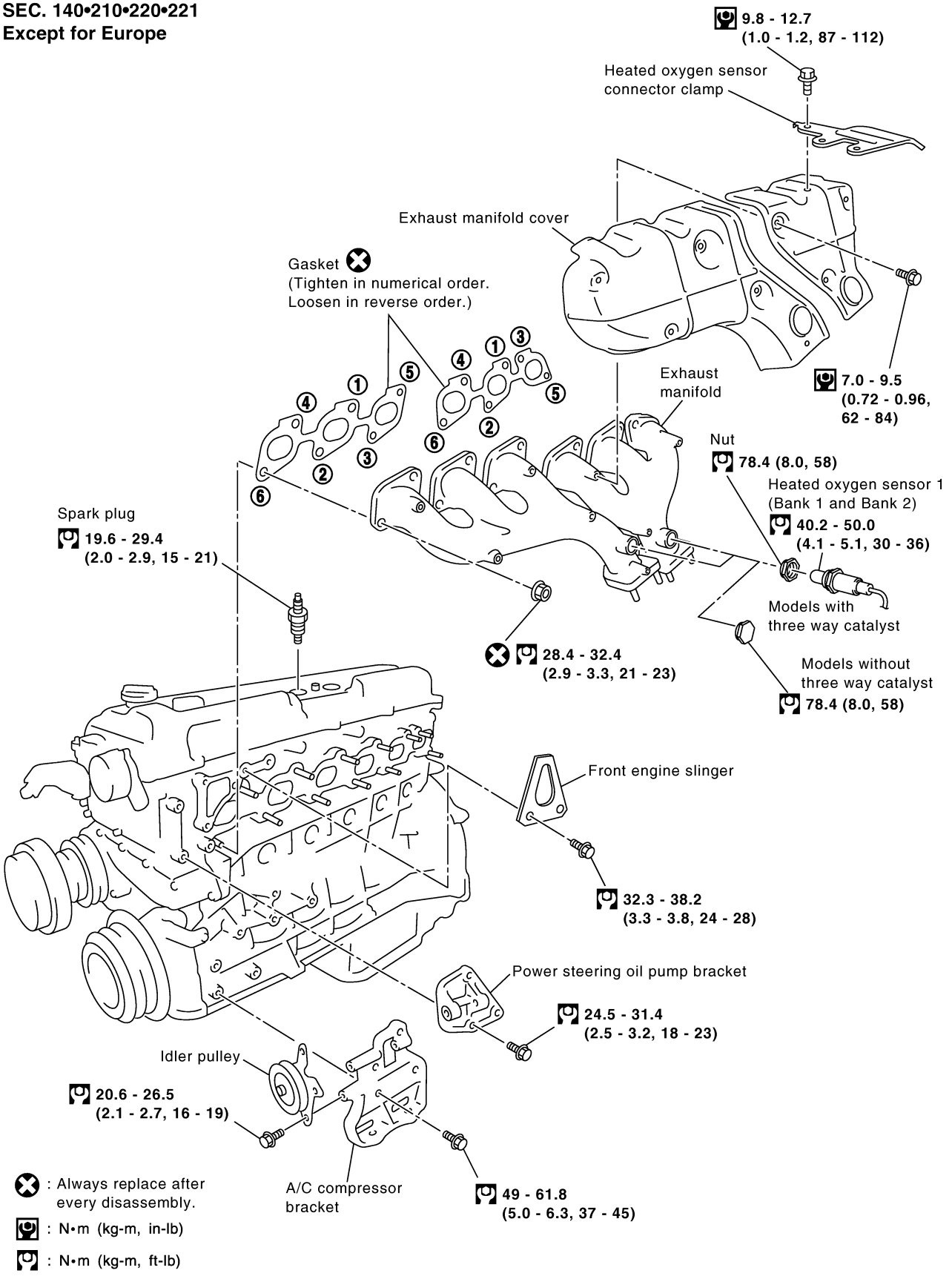
Commercial Service Tools

Tool name	Description	
Spark plug wrench	 NT047	Removing and installing spark plug
Valve oil seal drift	 NT602	Installing valve oil seal **a: 25 (0.98) dia.** **b: 14.4 (0.567) dia.** **c: 11.8 (0.465) dia.** **d: 10 (0.39)** **e: 11 (0.43)** **f: 9 (0.35)** Unit: mm (in)
Valve guide drift	 NT015	Removing and installing valve guide **Intake & Exhaust** **a = 10 mm (0.39 in) dia.** **b = 6.5 mm (0.256 in) dia.**

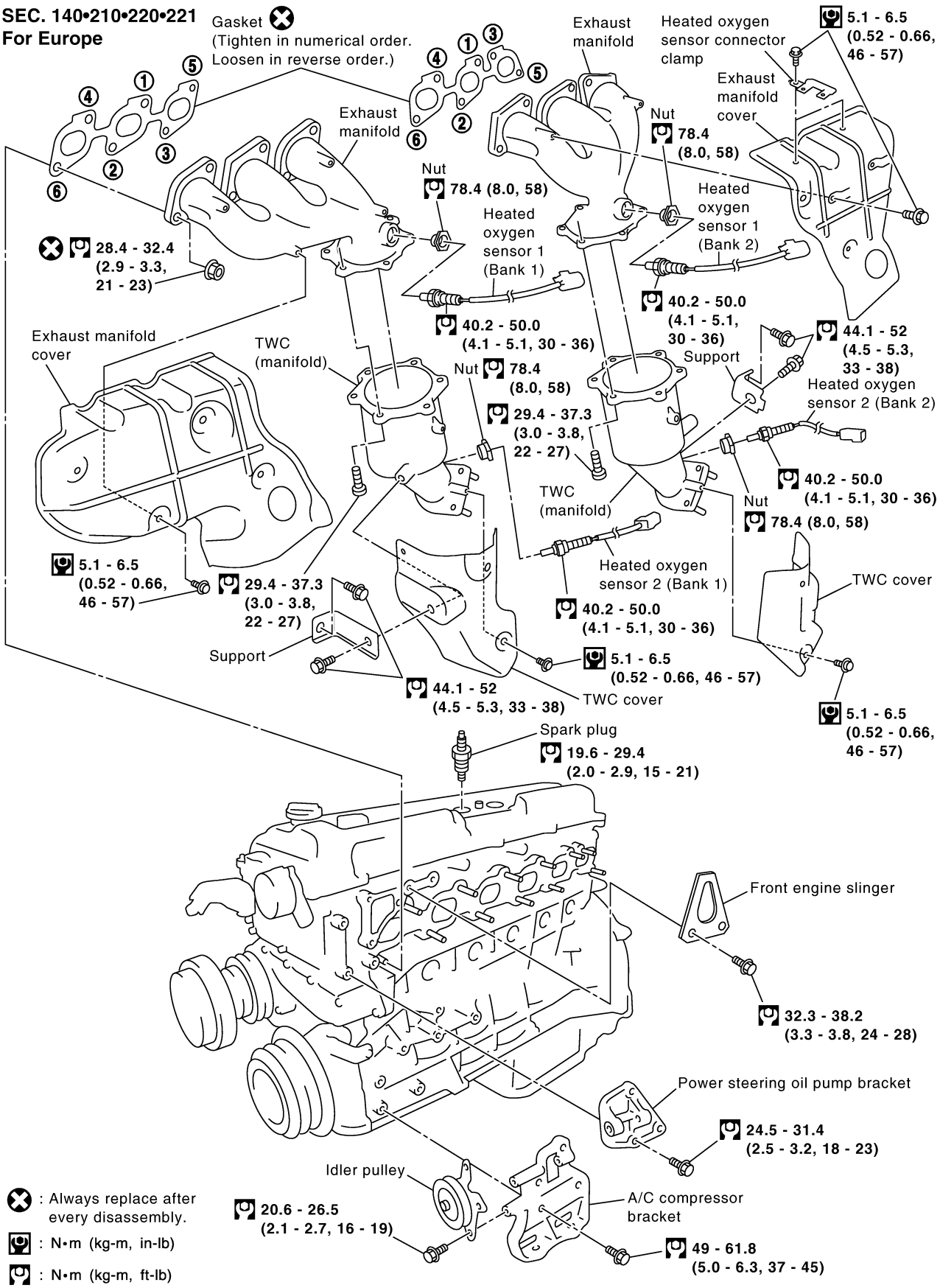
Commercial Service Tools (Cont'd)

Tool name	Description	
Valve guide reamer	 NT016	Reaming valve guide ① or hole for oversize valve guide ② **Intake & Exhaust** **d_1 = 7.000 mm (0.2756 in) dia.** **d_2 = 11.19 mm (0.4406 in) dia.**
Valve seat cutter set	 NT048	Finishing valve seat dimensions
Front oil seal drift	 NT049	Installing front oil seal **a = 80 mm (3.15 in) dia.** **b = 58 mm (2.28 in) dia.**
Piston pin drift	 NT074	Removing and installing piston pin **a = 22.5 mm (0.886 in) dia.** **b = 12.5 mm (0.492 in) dia.**
Piston ring expander	 NT030	Removing and installing piston ring

SEC. 140•210•220•221
Except for Europe

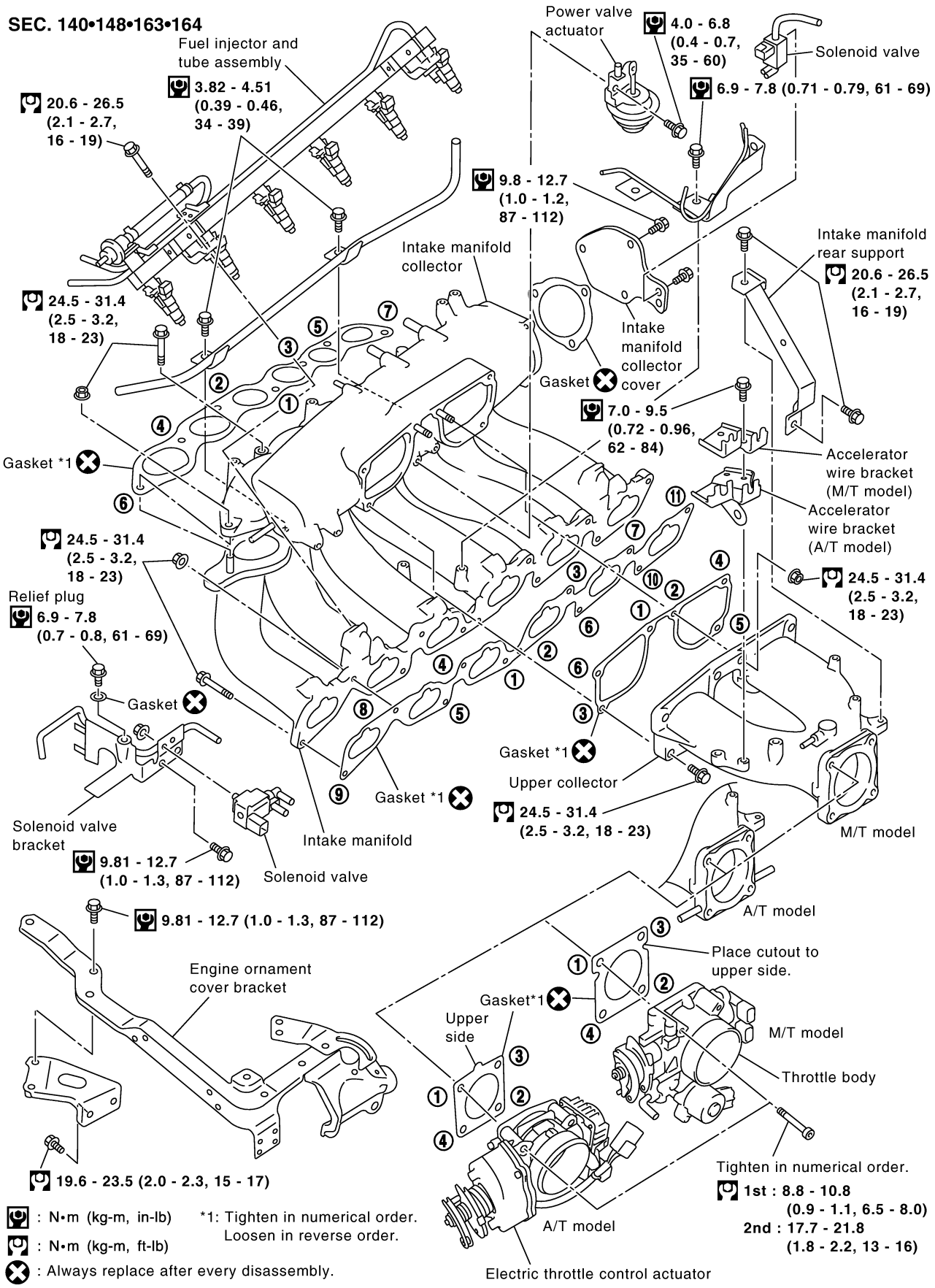


SEM822GB


SEC. 140•210•220•221
For Europe
Gasket
(Tighten in numerical order. Loosen in reverse order.)
Exhaust manifold
Heated oxygen sensor connector clamp
5.1 - 6.5 (0.52 - 0.66, 46 - 57)
Exhaust manifold cover
Nut
78.4 (8.0, 58)
Exhaust manifold
Nut
78.4 (8.0, 58)
Heated oxygen sensor 1 (Bank 2)
Heated oxygen sensor 1 (Bank 1)
28.4 - 32.4 (2.9 - 3.3, 21 - 23)
40.2 - 50.0 (4.1 - 5.1, 30 - 36)
40.2 - 50.0 (4.1 - 5.1, 30 - 36)
44.1 - 52 (4.5 - 5.3, 33 - 38)
Exhaust manifold cover
TWC (manifold)
Nut
78.4 (8.0, 58)
Support
Heated oxygen sensor 2 (Bank 2)
29.4 - 37.3 (3.0 - 3.8, 22 - 27)
40.2 - 50.0 (4.1 - 5.1, 30 - 36)
TWC (manifold)
Nut
78.4 (8.0, 58)
5.1 - 6.5 (0.52 - 0.66, 46 - 57)
29.4 - 37.3 (3.0 - 3.8, 22 - 27)
Heated oxygen sensor 2 (Bank 1)
TWC cover
40.2 - 50.0 (4.1 - 5.1, 30 - 36)
Support
5.1 - 6.5 (0.52 - 0.66, 46 - 57)
44.1 - 52 (4.5 - 5.3, 33 - 38)
TWC cover
5.1 - 6.5 (0.52 - 0.66, 46 - 57)
Spark plug
19.6 - 29.4 (2.0 - 2.9, 15 - 21)
Front engine slinger
32.3 - 38.2 (3.3 - 3.8, 24 - 28)
Power steering oil pump bracket
24.5 - 31.4 (2.5 - 3.2, 18 - 23)
Idler pulley
20.6 - 26.5 (2.1 - 2.7, 16 - 19)
A/C compressor bracket
49 - 61.8 (5.0 - 6.3, 37 - 45)
: Always replace after every disassembly.
: N•m (kg-m, in-lb)
: N•m (kg-m, ft-lb)

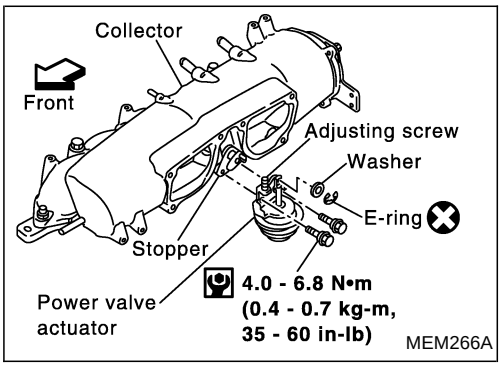
SEM018H

SEC. 140•148•163•164



: N•m (kg-m, in-lb)
: N•m (kg-m, ft-lb)
: Always replace after every disassembly.
*1: Tighten in numerical order. Loosen in reverse order.

SEM044H



DISASSEMBLY

1. Remove washer and E-ring.
2. Remove actuator assembly.
3. Disconnect shaft lever from actuator rod.

ASSEMBLY

1. Connect shaft lever with actuator rod.
2. Install actuator assembly with stopper.
3. Install washer and E-ring.

- **Use a new E-ring.**

ADJUSTMENT

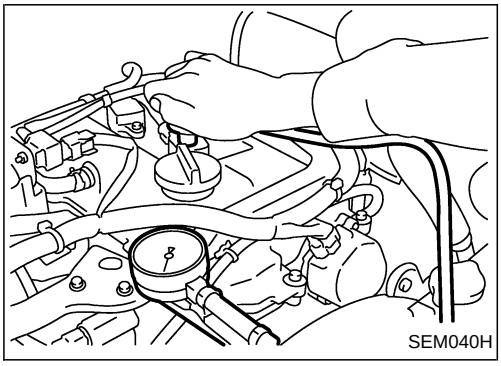
1. Apply vacuum pressure of 33.3 to 40.0 kPa (333 to 400 mbar, 250 to 300 mmHg, 9.84 to 11.81 inHg) to the actuator.
2. Loosen adjusting screw until it is separated from the lever.
3. Screw in adjusting screw until it contacts the shaft lever, and then screw it in two turns ±45°.
4. Apply vacuum pressure of 40.0±13.3 kPa (400±133 mbar, 300±100 mmHg, 11.81±3.94 inHg) to the actuator. Switch on and off power valve to check more than three times if the valve operates smoothly with no play or looseness.

Measurement of Compression Pressure

1. Warm up engine.
2. Turn ignition switch OFF.
3. Release fuel pressure.
   Refer to procedure without CONSULT-II of “Fuel Pressure Release” in EC section.

Remove fuel pump fuse until the end of step 9.

4. Disconnect ignition coil harness connector.
5. Remove air intake duct, upper collector, throttle body (or electric throttle control actuator), ignition coil and all spark plugs.


SEM040H

6. Attach a compression tester to No. 1 cylinder.
7. Crank the engine and record the highest gauge indication.
8. Repeat the measurement on each cylinder as shown below.

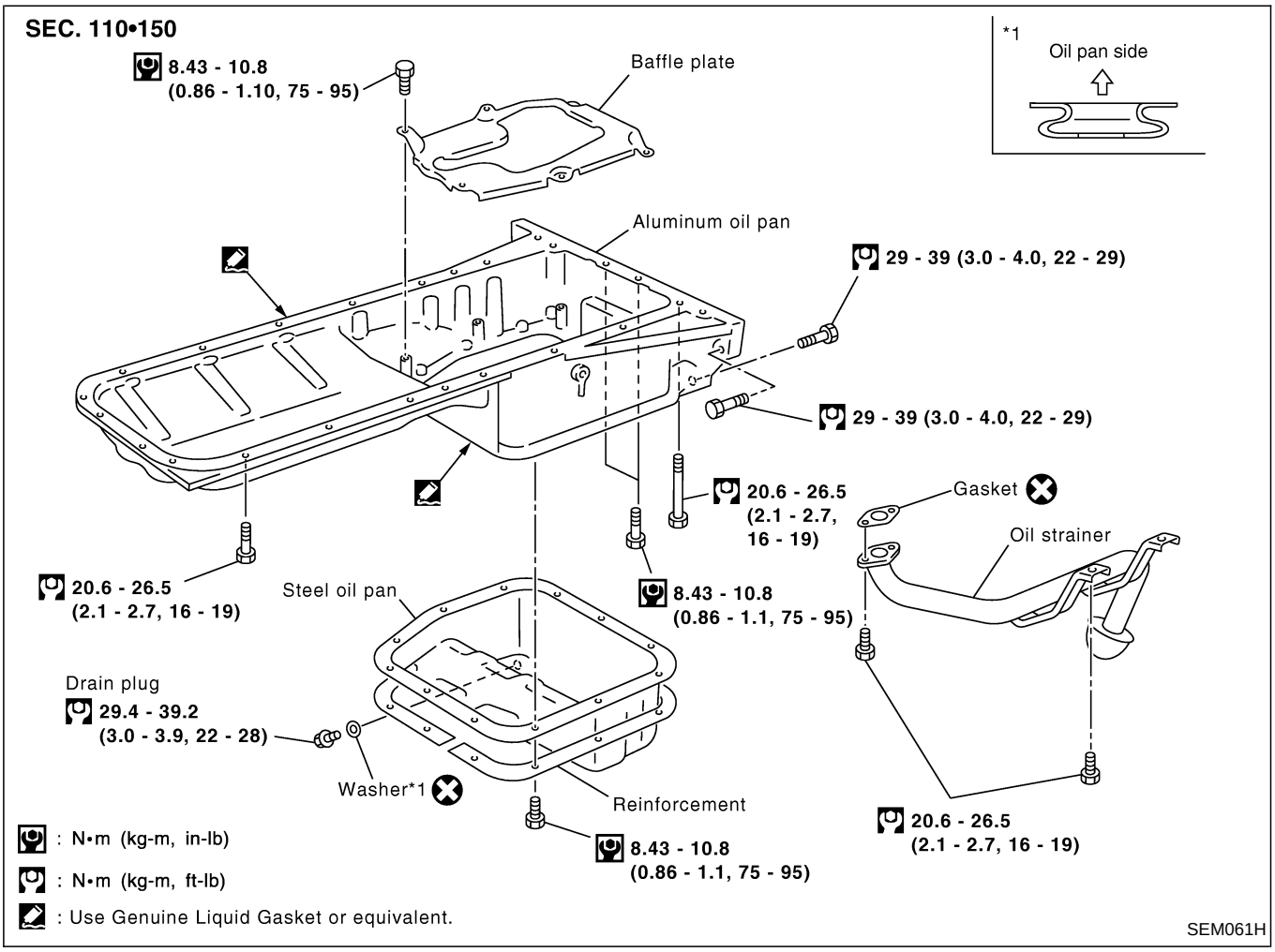
- **Always use a fully-charged battery to obtain specified engine revolution.**

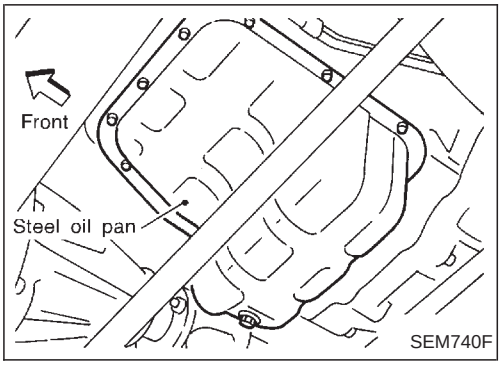
Compression pressure: kPa (bar, kg/cm^2, psi)/rpm
Standard
1,226 (12.26, 12.5, 178)/200
Minimum
1,030 (10.30, 10.5, 149)/200
Difference limit between cylinders:
98 (0.98, 1.0, 14)/200

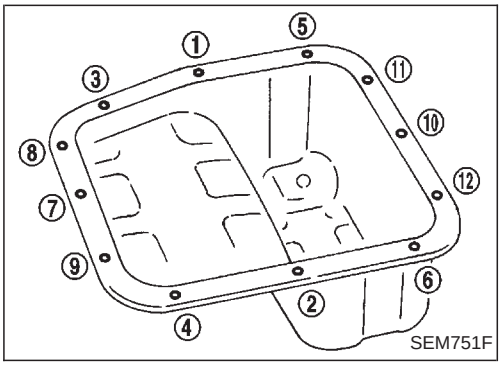
9. If cylinder compression in one or more cylinders is low, pour a small amount of engine oil into cylinders through the spark plug holes and retest compression.

- **If adding oil helps the compression, piston rings may be worn or damaged. If so, replace piston rings after checking piston.**
- **If pressure stays low, a valve may be sticking or seating improperly. Inspect and repair valve and valve seat. (Refer to SDS.) If valve or valve seat is damaged excessively, replace them.**
- **If compression in any two adjacent cylinders is low and if adding oil does not help the compression, there is leakage past the gasket surface. If so, replace cylinder head gasket.**

10. Install removed parts in reverse order of removal.





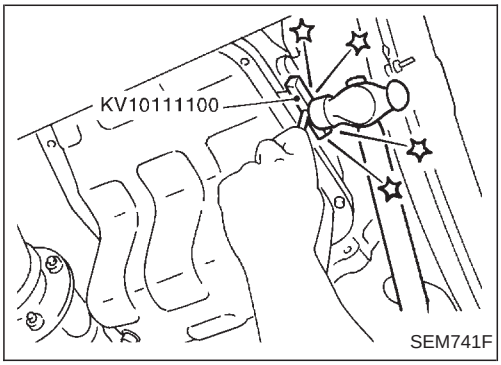


Removal

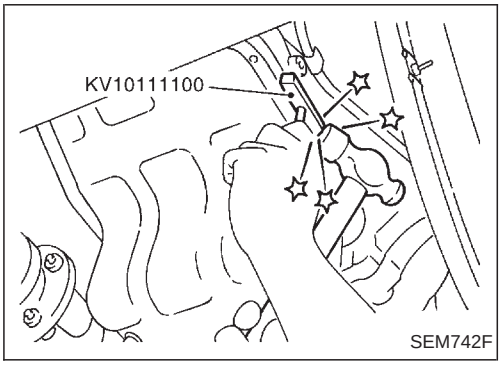
1. Remove engine undercover.
2. Drain engine oil.
3. Remove steel oil pan bolts.

- Loosen steel oil pan bolts in reverse order.

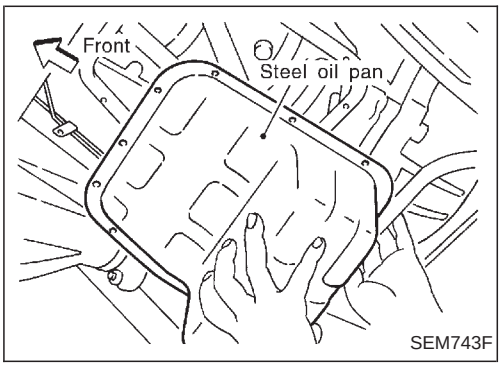
Removal (Cont'd)



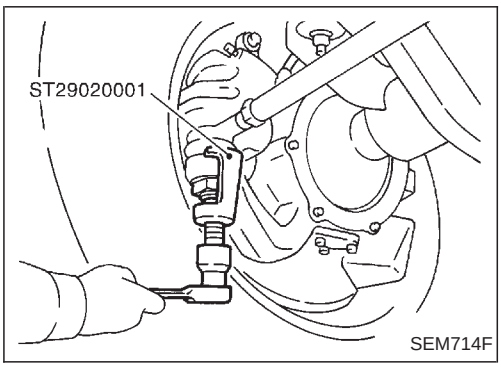
4. Remove steel oil pan.
a. Insert seal cutter (SST) between aluminum oil pan and steel oil pan.
- **Be careful not to damage aluminum mating surface.**
- **Do not insert screwdriver, or oil pan flange will be deformed.**



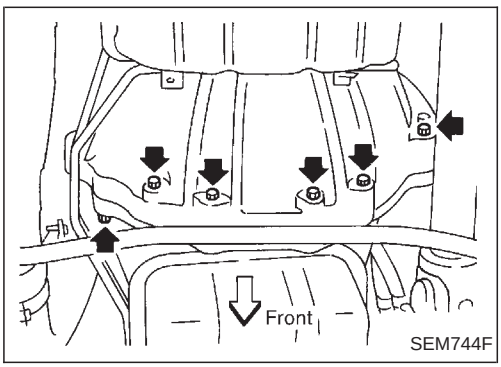
b. Slide seal cutter by tapping on the side of the tool with a hammer.



5. Remove steel oil pan.

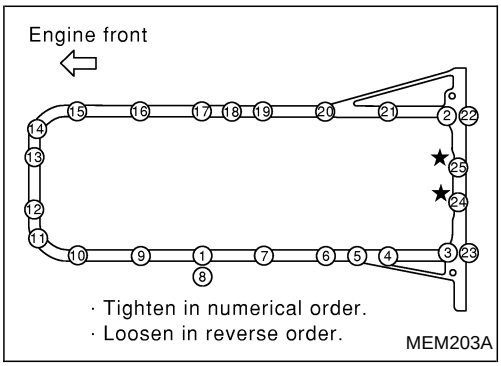


6. Disconnect left side of the tie rod end.
Refer to "STEERING LINKAGE" in ST section.

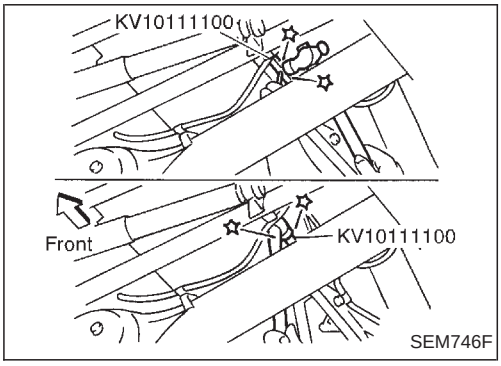


7. Remove transmission bolts.

Removal (Cont'd)



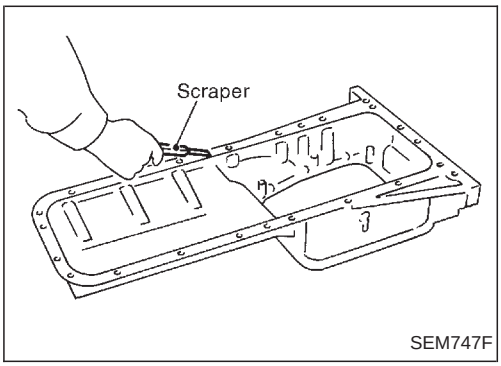
8. Remove aluminum oil pan bolts.
- Loosen aluminum oil pan bolts in reverse order.



9. Remove aluminum oil pan using seal cutter (SST).
- **Be careful not to damage aluminum mating surface.**
- **Do not insert screwdriver, or oil pan flange will be deformed.**

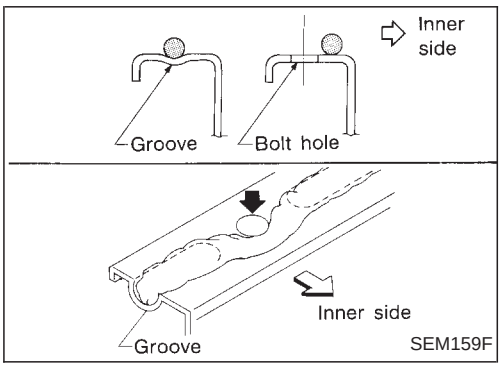
10. Remove oil strainer.

Installation

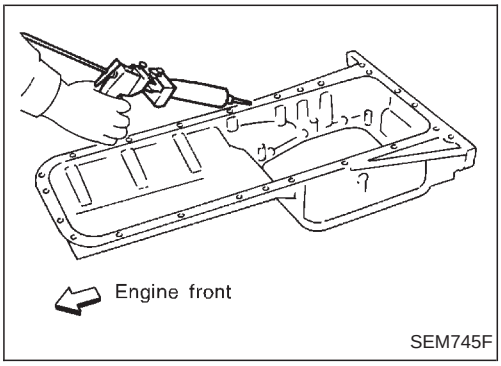


1. Install oil strainer.
2. Install aluminum oil pan.

a. Use a scraper to remove all traces of old liquid gasket from mating surfaces.
- Also remove traces of old liquid gasket from mating surface of cylinder block, front cover and steel oil pan.
- **Remove old liquid gasket from the bolt hole and thread.**

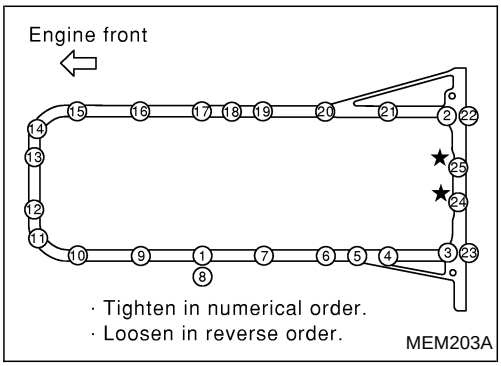


b. Apply a continuous bead of liquid gasket to mating surface of aluminum oil pan.
- **Use Genuine Liquid Gasket or equivalent.**



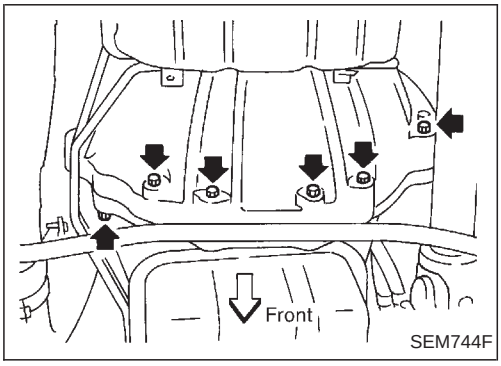
c. Apply liquid gasket to inner sealing surface as shown in figure.
- **Be sure liquid gasket is 3.5 to 4.5 mm (0.138 to 0.177 in) in diameter.**
- **Attaching should be done within 5 minutes after coating.**

Installation (Cont'd)

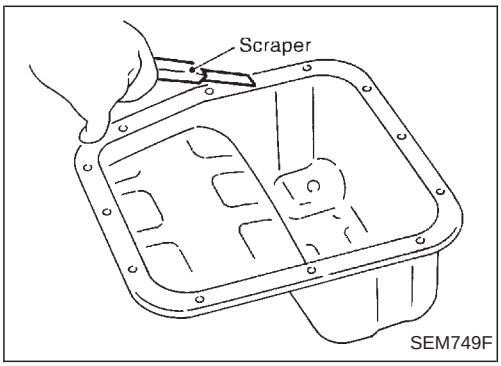


d. Install aluminum oil pan.
- Apply liquid gasket to the shank of the bolts marked with ★.
- Use Genuine Liquid Gasket or equivalent.
- Tightening should be done within 5 minutes after coating.
- Tighten bolts in numerical order.

Tightening torque:
★: 8.43 - 10.8 N·m (0.86 - 1.1 kg-m, 75 - 95 in-lb)
Others: 20.6 - 26.5 N·m (2.1 - 2.7 kg-m, 16 - 19 ft-lb)

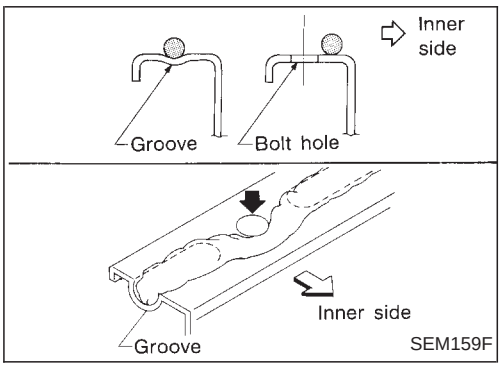


3. Install the transmission bolts. Refer to Service Manual NISSAN Y61 SUPPLEMENT-V 1st Revision (Publication No. SM1E-Y61EG1), AT-199.

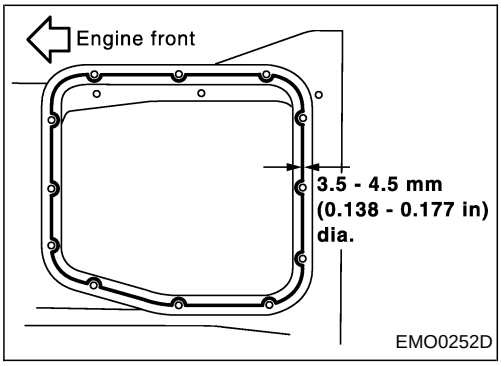


4. Install steel oil pan.

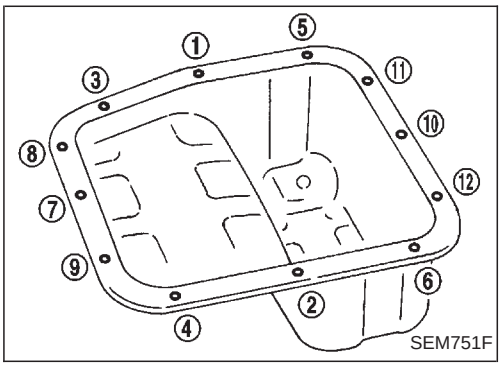
a. Use a scraper to remove all traces of old liquid gasket from mating surfaces.
- Also remove traces of old liquid gasket from mating surface of aluminum oil pan.



b. Apply a continuous bead of liquid gasket to mating surface of aluminum oil pan.
- **Use Genuine Liquid Gasket or equivalent.**
- **Be sure liquid gasket is 3.5 to 4.5 mm (0.138 to 0.177 in) in diameter.**
- **Attaching should be done within 5 minutes after coating.**



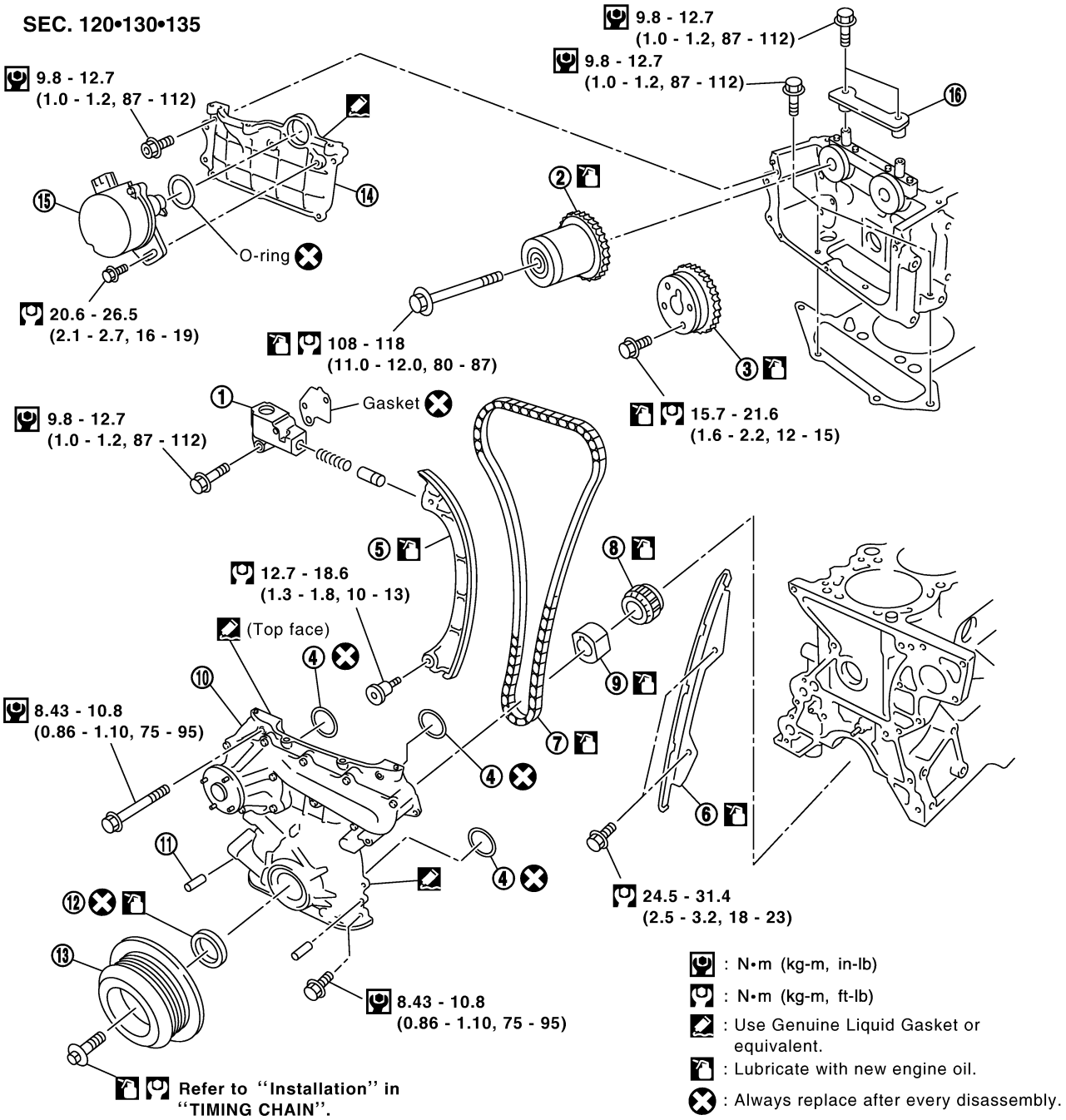
Installation (Cont'd)



c. Install steel oil pan.
- **Tighten in numerical order as shown in the figure.**
- **Wait at least 30 minutes before refilling engine oil.**

4. Connect left side of the tie rod end.
   Refer to "STEERING LINKAGE" in ST section.
5. Install in reverse order of removal for remaining steps paying attention to the following.
- After refilling engine oil, check engine oil level.
- Start engine and check that there is no leakage of engine oil.

Components



SEM062H

1. Chain tensioner
2. Camshaft sprocket (Intake)
3. Camshaft sprocket (Exhaust)
4. O-ring
5. Timing chain slack guide
6. Timing chain tension guide
7. Timing chain
8. Crankshaft sprocket
9. Oil pump drive spacer
10. Front cover
11. Dowel pin
12. Front oil seal
13. Crankshaft pulley
14. Cylinder head front cover
15. Camshaft position sensor
16. Chain guide

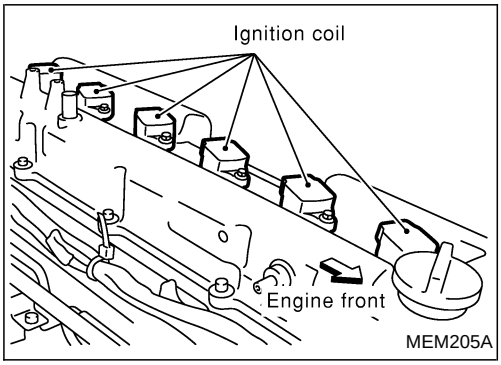
Components (Cont'd)

CAUTION

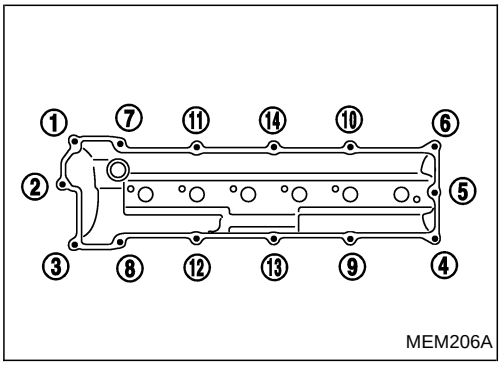
- **After removing timing chain, do not turn and camshaft separately, or valves will strike piston heads.**
- **When installing chain tensioner, oil seats, or other sliding parts, lubricate contacting surfaces with new engine oil.**
- **Apply new engine oil to bolt threads and seat surfaces when installing camshaft sprocket and crankshaft pulley.**
- **When removing front cover, remove camshaft position sensor, then remove timing chain from engine.**
- **Be careful not to damage sensor edges.**

Removal

1. Release fuel pressure.
   Refer to "Fuel Pressure Release" in EC section.
2. Remove engine undercover.
3. Drain engine oil.
4. Drain engine coolant from radiator.
   Be careful not to spill engine coolant on drive belts.
5. Remove radiator and radiator shroud.
   Refer to "Radiator" in LC section.
6. Remove the following belts.
   - A/C compressor drive belt
   - Power steering oil pump drive belt
   - Alternator drive belt
7. Remove fan coupling with fan.
8. Remove power steering oil pump and power steering oil pump bracket.
9. Remove A/C compressor idler pulley.
10. Remove alternator and alternator bracket.
11. Remove oil pans. Refer to EM-10, "Removal".
12. Remove air duct from intake manifold collector.

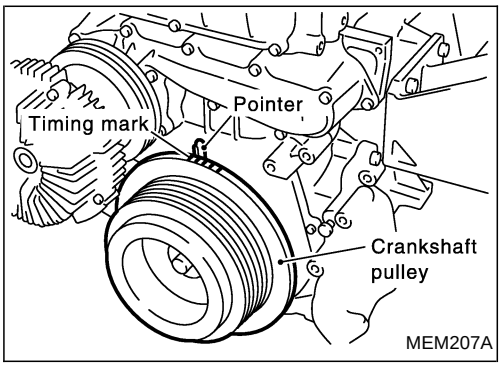


13. Remove vacuum hoses, fuel hoses, and so on.
14. Remove ignition coils.

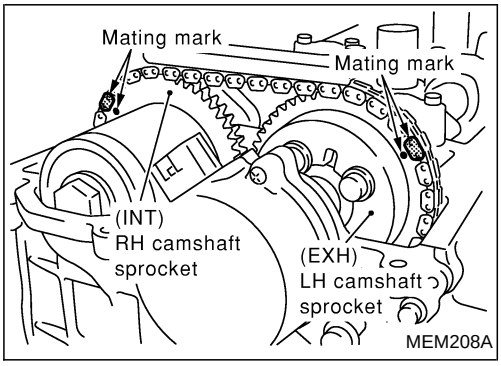


15. Remove rocker cover bolts in numerical order as shown in the figure.

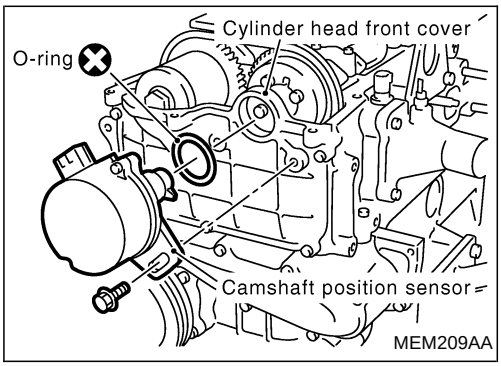
Removal (Cont'd)



16. Set No. 1 piston at TDC on its compression stroke.

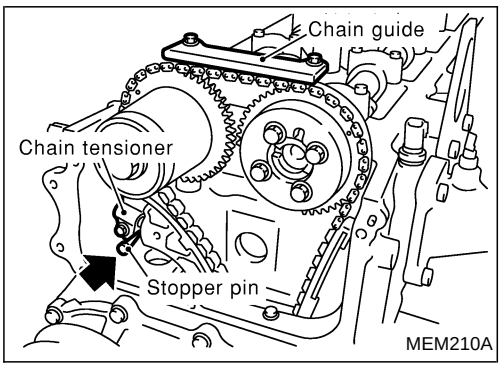


- **Rotate crankshaft until mating mark on camshaft sprocket is set at position indicated in figure.**

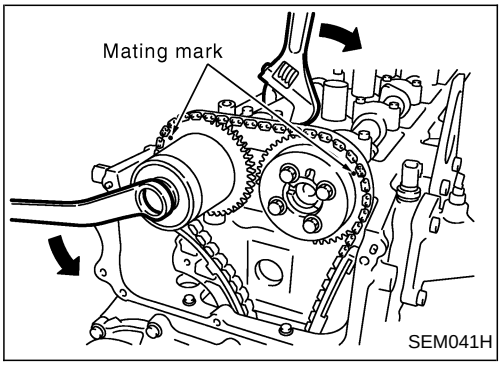


17. Remove camshaft position sensor.
- **Do not allow any magnetic materials to contact the camshaft position sensor.**
- **Be careful not to drop or damage sensor.**

18. Remove cylinder head front cover using Seal cutter [SST: KV10111100].



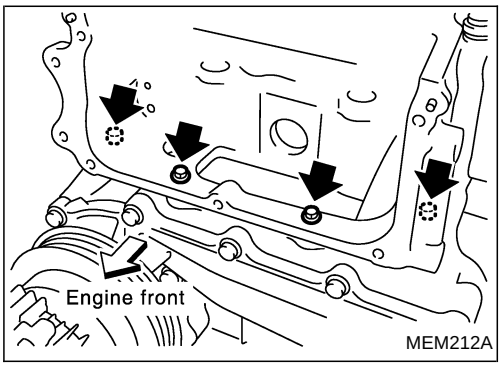
19. Remove timing chain guide from camshaft bracket.
20. Attach a suitable stopper pin to chain tensioner to hold plunger at its compressed position.
21. Remove chain tensioner.



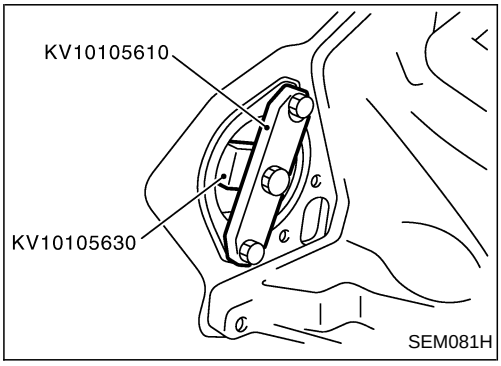
22. Loosen camshaft sprocket bolts holding camshaft at hexagonal area.
- **Apply paint to timing chain and camshaft sprockets for alignment during installation.**

23. Remove camshaft sprockets.

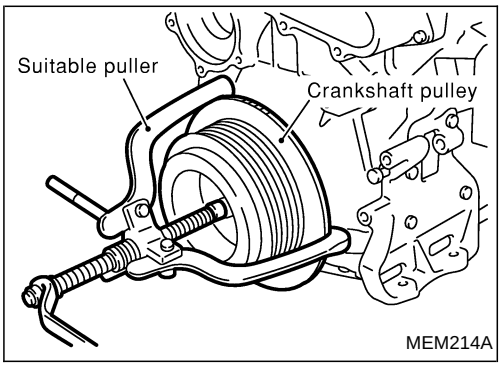
Removal (Cont'd)



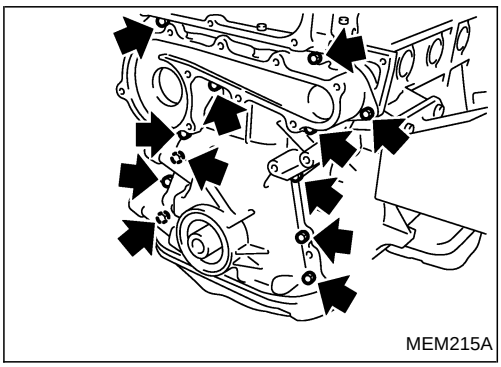
24. Remove front cover bolts at cylinder head front side.



25. Remove starter motor, and set ring gear stopper (SST) using mounting bolt holes of starter motor.

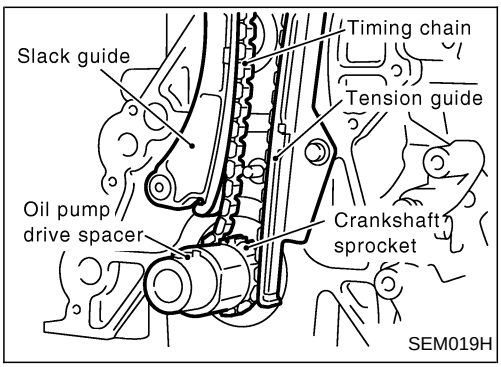


26. Loosen crankshaft pulley bolt.
27. Remove crankshaft pulley with a suitable puller.



28. Remove water pump pulley and water pump. Refer to "Water Pump" in LC section (Publication No. SM1E-Y61EG1).
29. Remove front cover bolts as shown.
30. Remove front cover carefully using Seal cutter [SST: KV10111100].

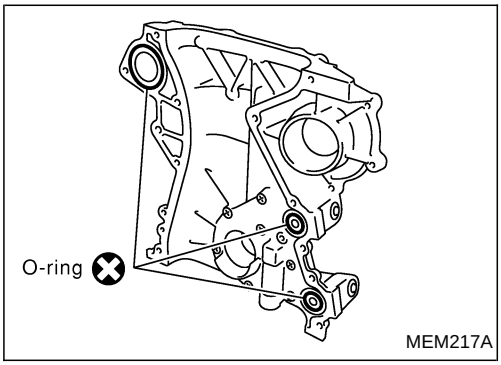
- **Be careful not to damage or bend front end of cylinder head gasket.**
- **If cylinder head gasket is damaged, replace it with a new one.**



31. Remove timing chain.
32. Remove oil pump drive spacer.
33. Remove tension guide and slack guide.
34. Remove crankshaft sprocket.

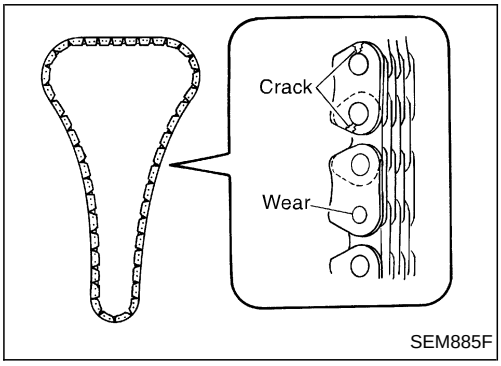
Removal (Cont'd)

35. Remove O-rings from front cover.



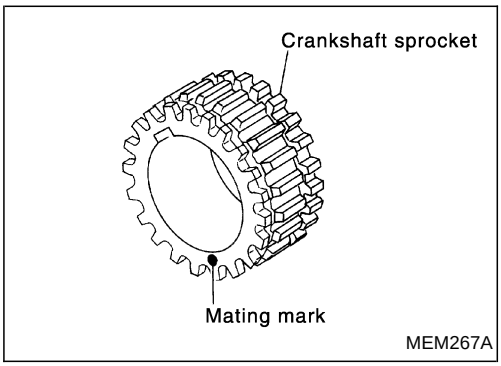
Inspection

Check for cracks and excessive wear at roller links. Replace if necessary.

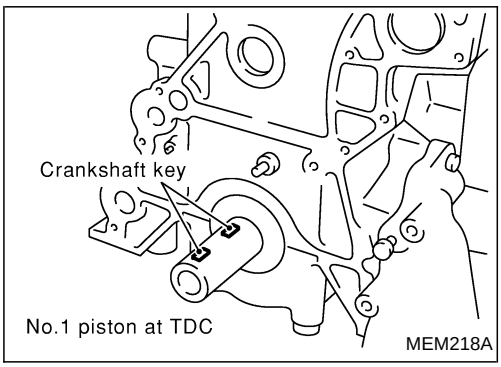


Installation

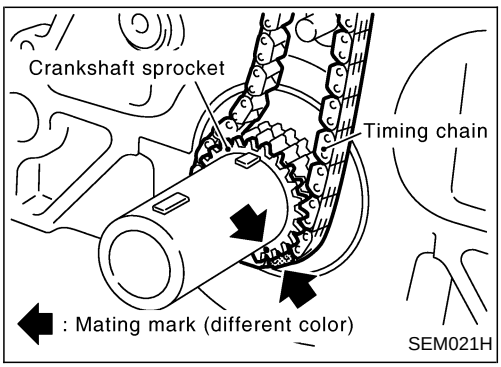
1. Install crankshaft sprocket on crankshaft.
- **There is no installation direction.**



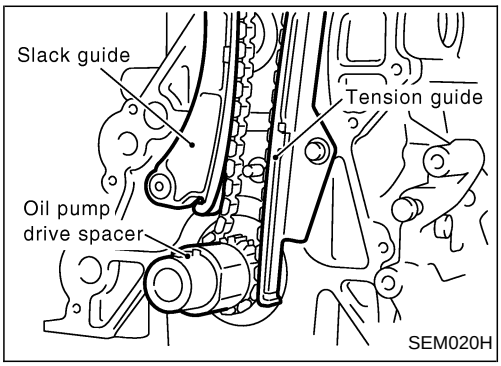
2. Position crankshaft so that No. 1 piston is at TDC and key way is at 12 o'clock.



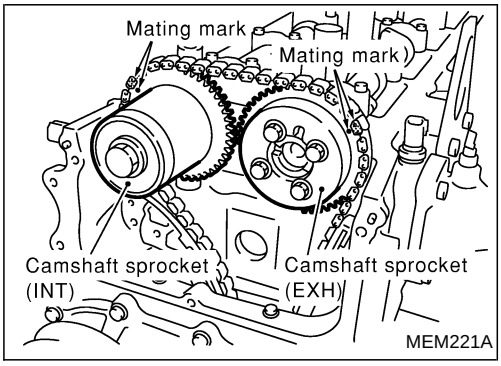
3. Install timing chain on crankshaft sprocket.
- **Support chain with a suitable tool to keep the mating mark aligned.**



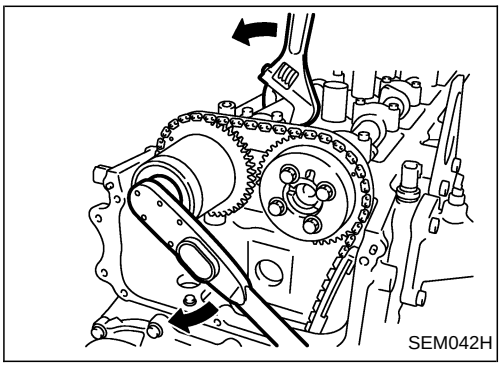
Installation (Cont'd)



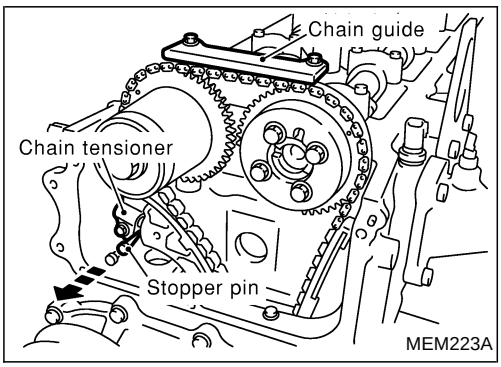
4. Install timing chain slack guide and timing chain tension guide.



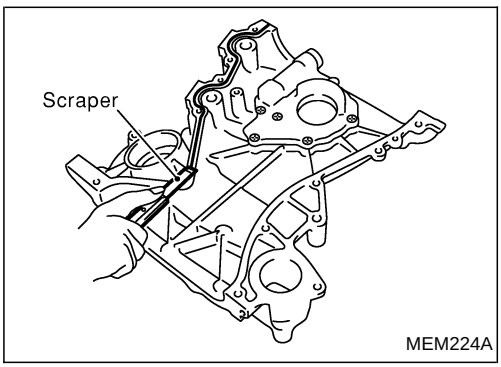
5. Install camshaft sprocket.
- **Set timing chain by aligning mating marks with those of camshaft sprockets.**



6. Install camshaft sprocket bolts and tighten them to specified torque holding camshaft at hexagonal area.
- **Apply new engine oil to bolt threads and seat surface.**

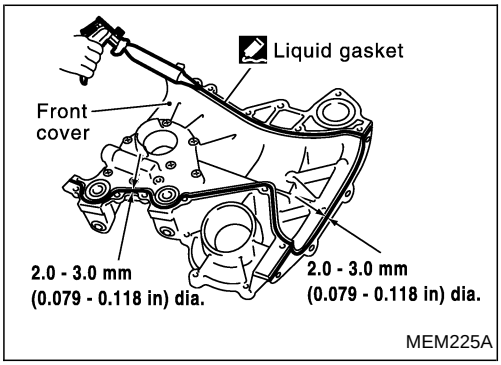


7. Install chain tensioner.
- **Before installing chain tensioner, insert a suitable pin into pin hole of chain tensioner to keep plunger compressed.**
- **After installing chain tensioner, remove the pin to release plunger.**
8. Install timing chain guide to camshaft bracket.

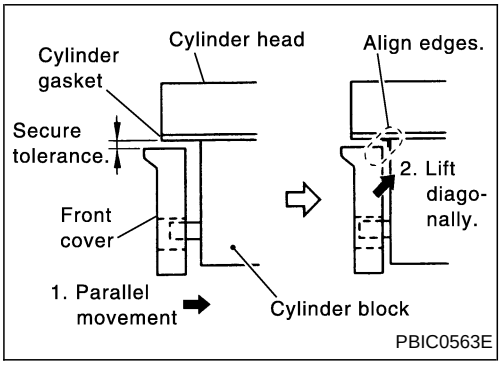


9. Replace front oil seal with new one, and remove all traces of liquid gasket from mating surface using a scraper.
- Also remove traces of liquid gasket from mating surface of cylinder block.
- For front oil seal replacement, refer to "FRONT OIL SEAL", EM-24.

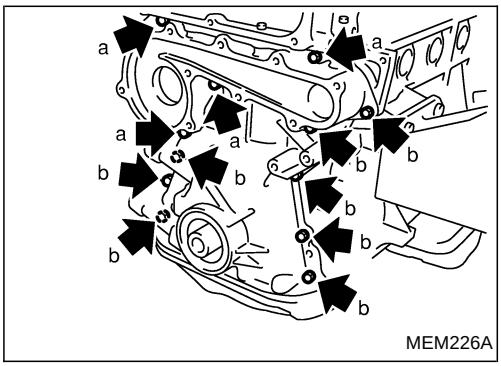
Installation (Cont'd)



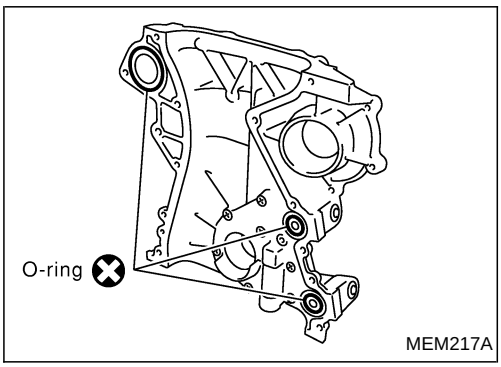
10. Apply a continuous bead of liquid gasket to mating surface of front cover.
- **Use Genuine Liquid Gasket or equivalent.**
- **Attaching should be done within 5 minutes after coating.**



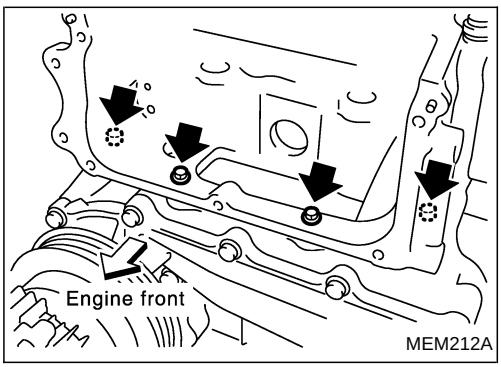
11. Install front cover.
- **Lift front cover at an angle and install it to mounting position so that front cover will come in contact with both cylinder head gasket lower surface and cylinder block front surface at the same time.**
- **Be careful not to damage cylinder head gasket.**



Bolt No.	Tightening torque N·m (kg-m, in-lb)	Bolt length mm (in)
a.	6.9 - 9.5 (0.70 - 0.97, 61 - 84)	45 (1.77)
b.		16 (0.63)

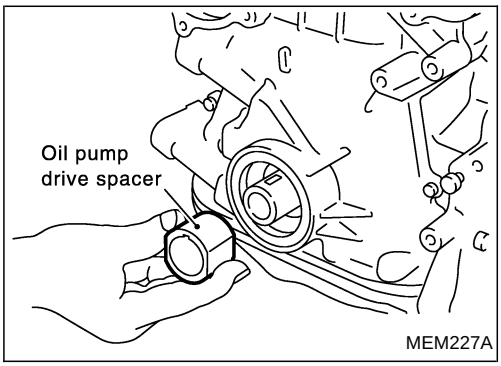


- **Make sure three O-rings are present and new ones.**
- **Be careful not to damage oil seal when installing front cover.**

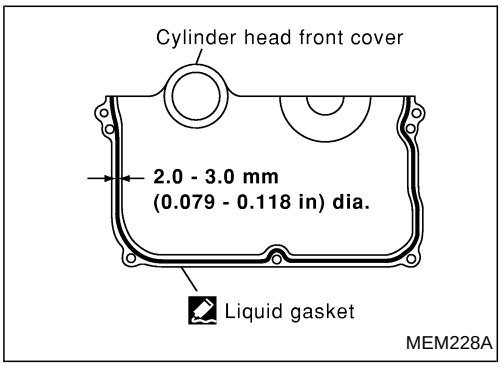


12. Install front cover bolts at cylinder head front side.

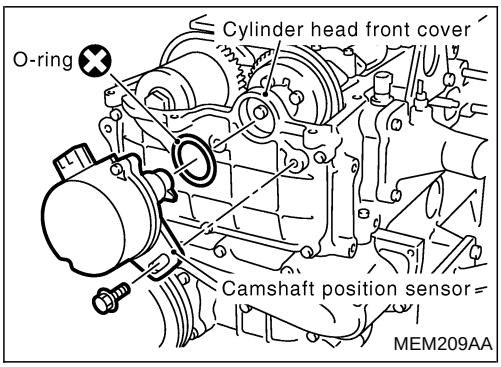
Installation (Cont'd)



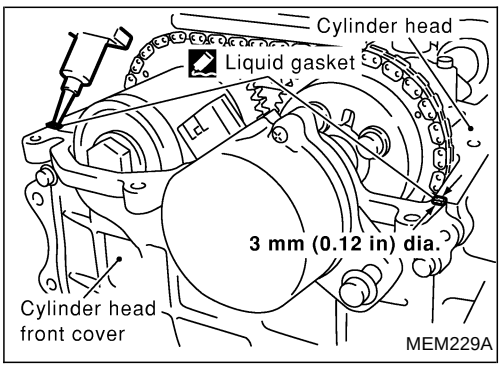
13. Install oil pump drive spacer.
14. Install water pump and water pump pulley.
    Refer to "Water Pump" in LC section.
15. Install idler pulley and bracket.
16. Install oil pan. Refer to EM-12, "Installation".
17. Install crankshaft pulley.
- **Tightening procedure**
  - **a. Tighten bolt to 54.0 to 63.8 N·m (5.5 to 6.5 kg-m, 39.8 to 47.0 ft-lb).**
  - **b. Turn bolt 120 to 125 degrees clockwise using marks provided on bolt flange.**
    Turning for one mark equals 120 degrees.
18. Remove ring gear stopper.
19. Install starter motor.



20. Install cylinder head front cover.
- **Apply liquid gasket to cylinder head front cover.**
- **Use Genuine Liquid Gasket or equivalent.**

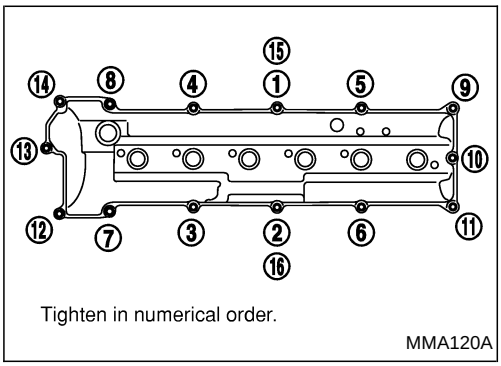


21. Install camshaft position sensor with new O-ring.



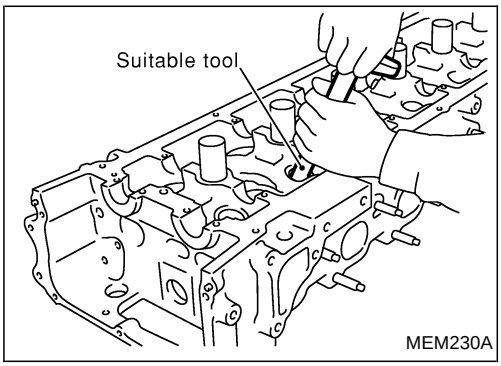
22. Before installing rocker cover, apply a continuous bead of liquid gasket to mating surface of cylinder head.
- **Use Genuine Liquid Gasket or equivalent.**

Installation (Cont'd)



Tighten in numerical order.
MMA120A

23. Install rocker cover with new rocker cover gasket and tighten bolts in numerical order as shown in the figure.
24. Install ignition coils.
25. Install alternator and alternator bracket.
26. Install power steering oil pump and power steering oil pump bracket.
27. Install fan coupling with fan.
28. Drive belts.
    For adjusting drive belt deflection, refer to "Checking Drive Belts" in MA section.
29. Reinstall parts in reverse order of removal.

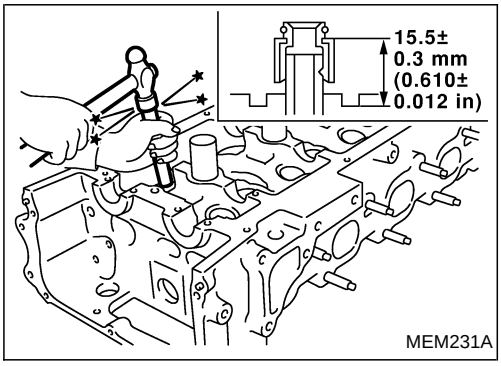


Replacement

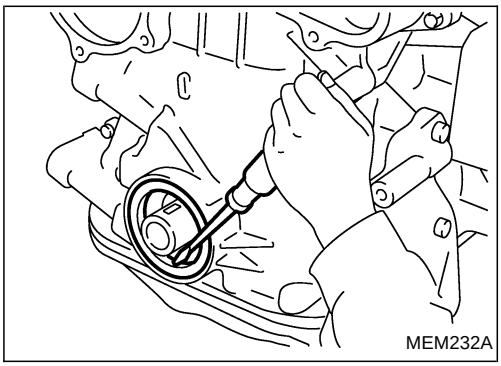
VALVE OIL SEAL

1. Remove rocker cover.
2. Remove camshaft.
3. Remove valve spring. Refer to “Removal”, EM-31 (Publication No. SM1E-Y61EG1).
4. Remove valve oil seal with suitable tool.

Piston concerned should be set at TDC to prevent valve from falling.



5. Apply new engine oil to new valve oil seal, and install it with [SST: KV10116300] to dimension as shown.



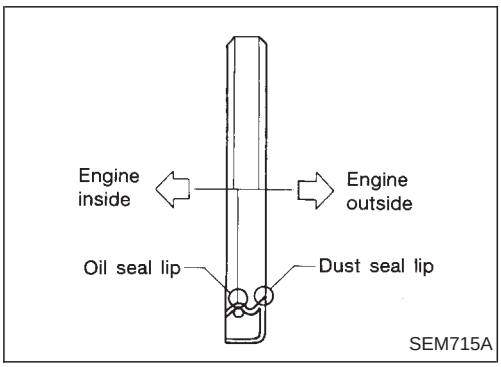
FRONT OIL SEAL

1. Remove the following parts:

- Engine under cover
- Radiator and radiator shroud: Refer to “Radiator” in LC section.
- Drive belts and cooling fan
- Crankshaft pulley and oil pump drive spacer: Refer to “TIMING CHAIN”, EM-15.

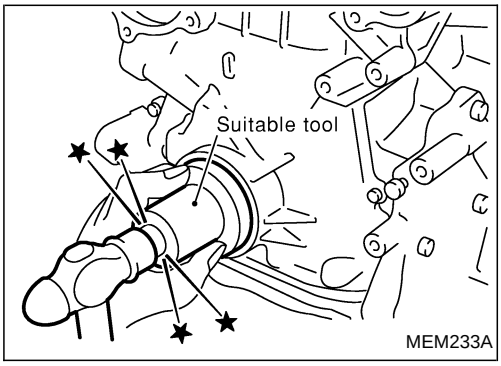
2. Remove front oil seal from front cover.

- **Be careful not to scratch front cover.**



3. Apply new engine oil to new oil seal and install it using a suitable tool.

- Install new oil seal in the direction as shown in the figure.

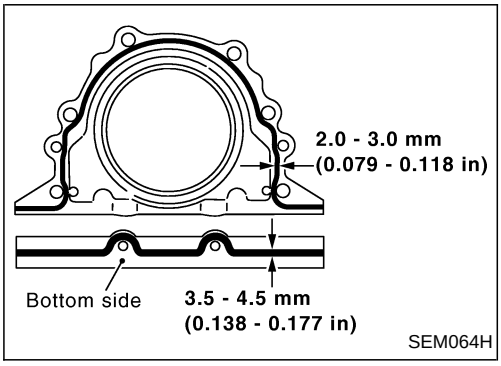


Replacement (Cont'd)

REAR OIL SEAL

1. Separate clutch assembly or automatic transmission. Refer to "REMOVAL AND INSTALLATION" in MT or AT section.
2. Remove flywheel or drive plate.
3. Remove bolts fixing from both rear and bottom sides.
4. Remove rear oil seal retainer assembly using Seal cutter [SST: KV10111100].
5. Remove traces of liquid gasket from mating surface of cylinder block and oil pan using scraper.

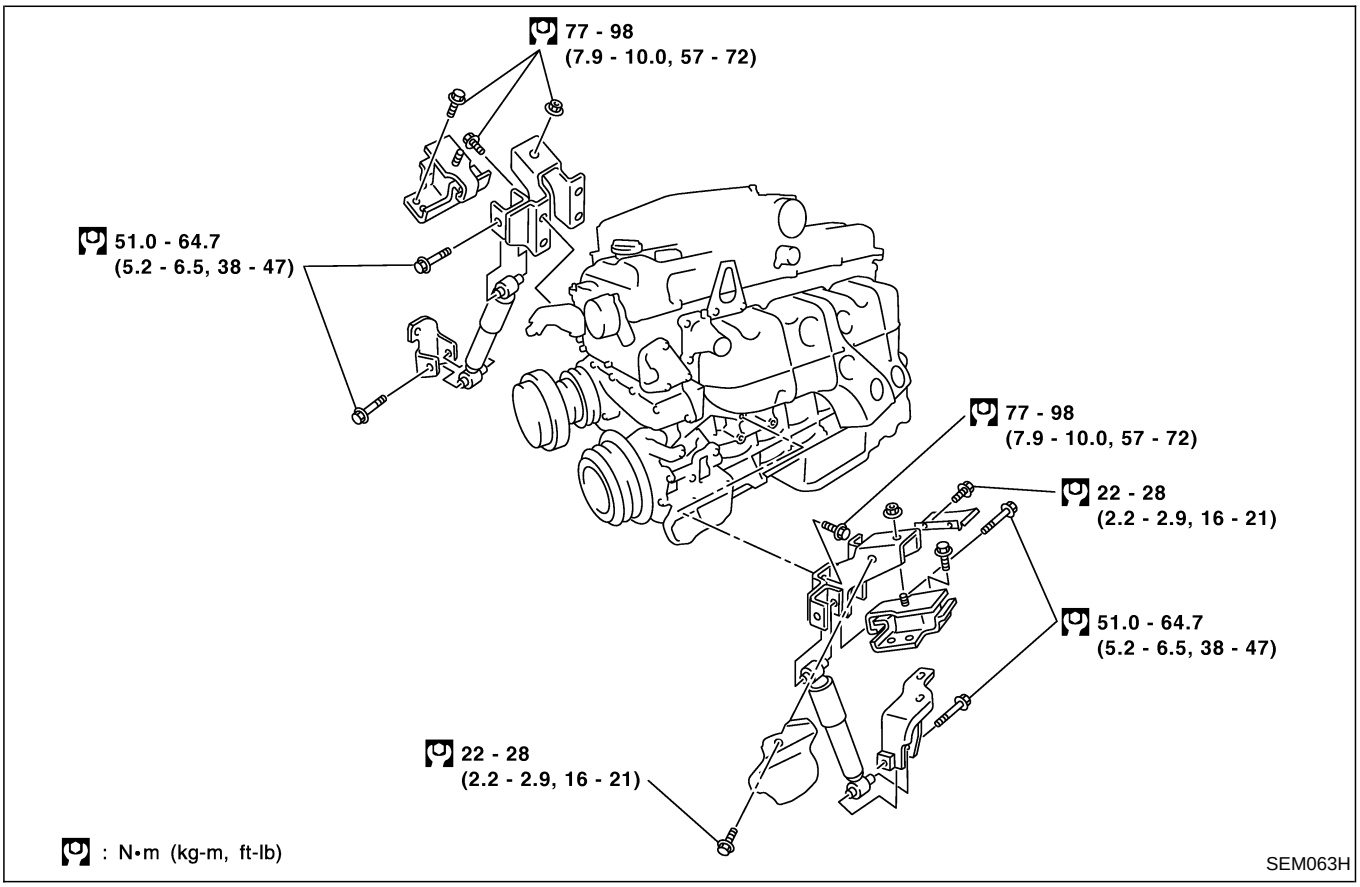
- **Replace oil seal and retainer assembly as a single unit.**



6. Apply a continuous bead of liquid gasket to mating surfaces of rear oil seal retainer (both for cylinder block and oil pan sides).

- **Use Genuine Liquid Gasket or equivalent.**

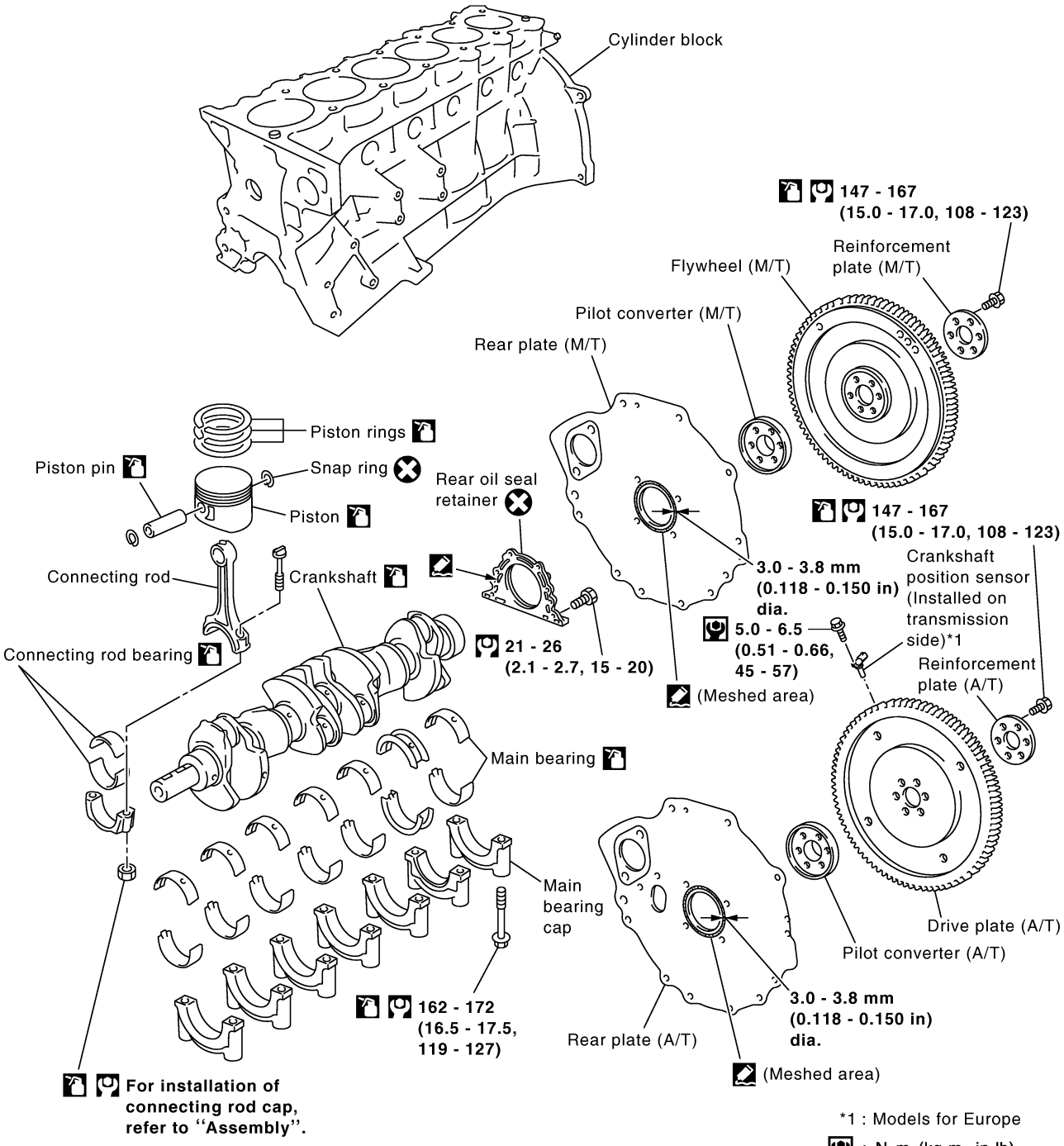
a. Coat of liquid gasket should be maintained within 2.0 to 3.0 mm (0.079 to 0.118 in) and 3.5 to 4.5 mm (0.138 - 0.177 in) dia. range.
b. Attach oil seal retainer to cylinder block within 5 minutes after coating.
c. Wait at least 30 minutes before refilling engine oil or starting engine.



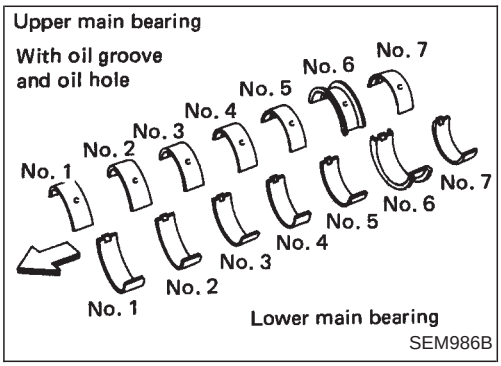
CAUTION:

- **Before removing engine assembly and transmission assembly, be sure to remove crankshaft position sensor on models for Europe.**
- **Be careful not to drop or damage crankshaft position sensor.**

SEC. 110•120•130



SEM043H

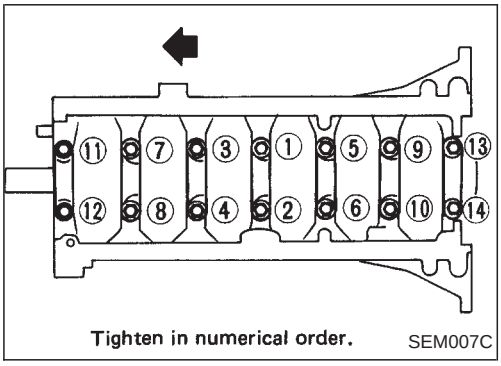


Assembly

CRANKSHAFT

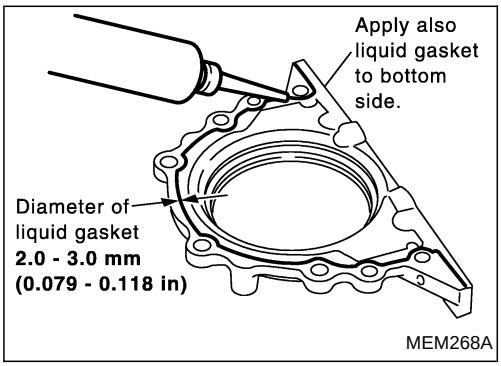
1. Set main bearings in their proper positions on cylinder block and main bearing cap.

- **Do not confuse upper and lower sides of main bearings.**



2. Install crankshaft and main bearing caps and tighten bolts to the specified torque.

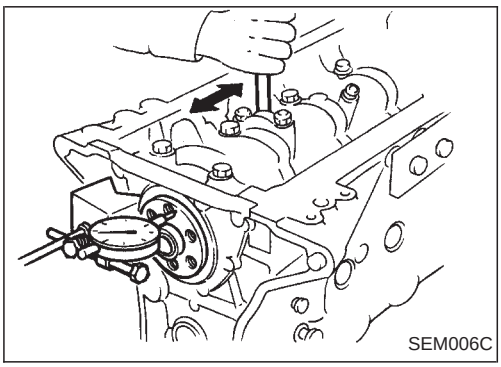
- **Prior to tightening bearing cap bolts, place bearing cap in its proper position by shifting crankshaft in the axial direction.**
- **Tighten bearing cap bolts gradually in two or three stages starting with the center bearing and move outward sequentially.**
- **After securing bearing cap bolts, make sure crankshaft turns smoothly by hand.**



3. Apply a continuous bead of liquid gasket to mating surfaces of rear oil seal retainer (both for cylinder block and oil pan sides).

- **Use Genuine Liquid Gasket or equivalent.**

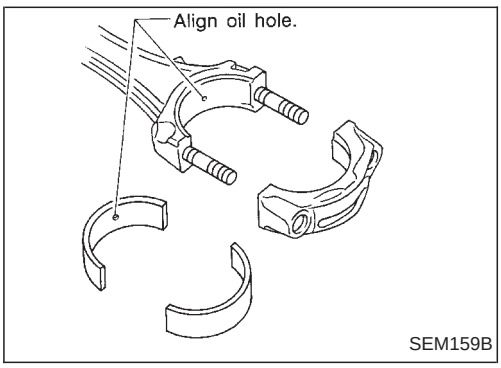
a. Coat of liquid gasket should be maintained within 2.0 to 3.0 mm (0.079 to 0.118 in) dia. range.
b. Attach oil seal retainer to cylinder block within 5 minutes after coating.
c. Wait at least 30 minutes before refilling engine oil or starting engine.



4. Measure crankshaft end play.

Crankshaft end play:
Standard
0.05 - 0.169 mm (0.0020 - 0.0067 in)
Limit
0.3 mm (0.012 in)

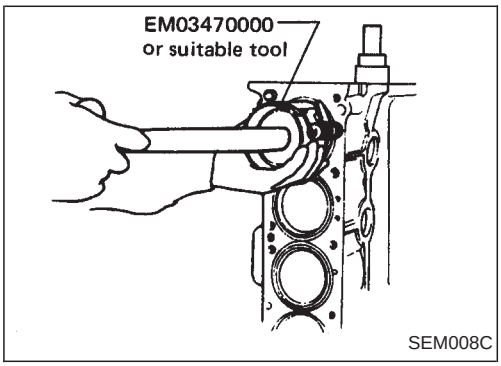
If end play exceeds the limit, replace No. 6 bearing and measure again.
If it still exceeds the limit, replace crankshaft also.



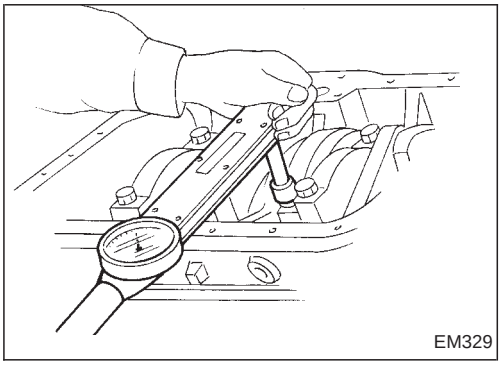
5. Install connecting rod bearings in connecting rods and connecting rod caps.

- Confirm that correct bearings are used. Refer to “Inspection”, EM-47 (Publication No. SM1E-Y61EG1).
- Install bearings so that oil hole in connecting rod aligns with oil hole of bearing.

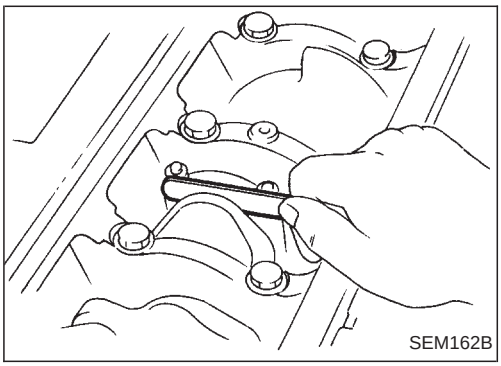
Assembly (Cont'd)



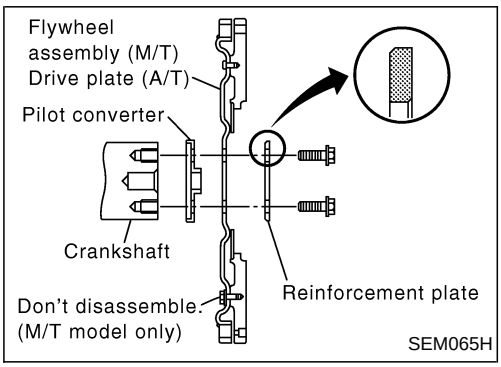
6. Install pistons with connecting rods.
(1) Install them into corresponding cylinders with SST.
- **Be careful not to scratch cylinder wall by connecting rod.**
- **Arrange so that front mark on piston head faces toward front of engine.**



(2) Install connecting rod bearing caps.
Tighten connecting rod bearing cap nuts to the specified torque.
: Connecting rod bearing nut
(1) Tighten to 38 to 40 N·m
(3.9 to 4.1 kg-m, 28 to 30 ft-lb)
(2) Tighten to 67 to 71 N·m
(6.8 to 7.2 kg-m, 49 to 52 ft-lb)
or if you have an angle wrench, tighten bolts to 40 to 45 degrees clockwise.
Angle tightening is preferable.



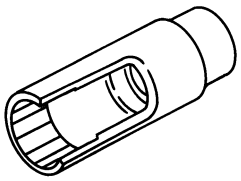
7. Measure connecting rod side clearance.
Connecting rod side clearance:
Standard
0.20 - 0.35 mm (0.0079 - 0.0138 in)
Limit
0.40 mm (0.0157 in)
If clearance exceeds the limit, replace connecting rod and/or crankshaft.



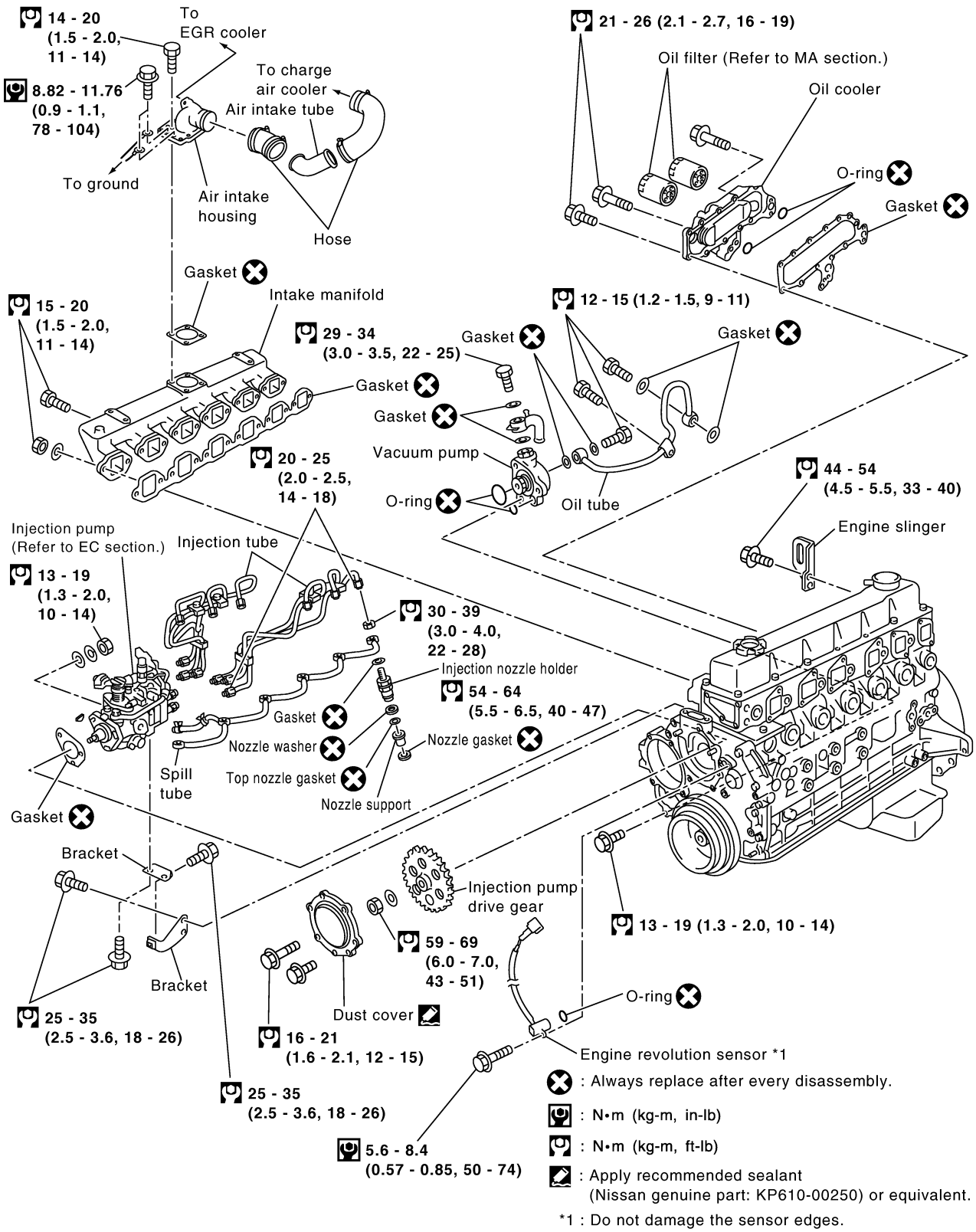
8. Install flywheel (M/T) or drive plate (A/T) as shown in the figure.

SPECIAL SERVICE TOOLS

* Special tool or commercial equivalent

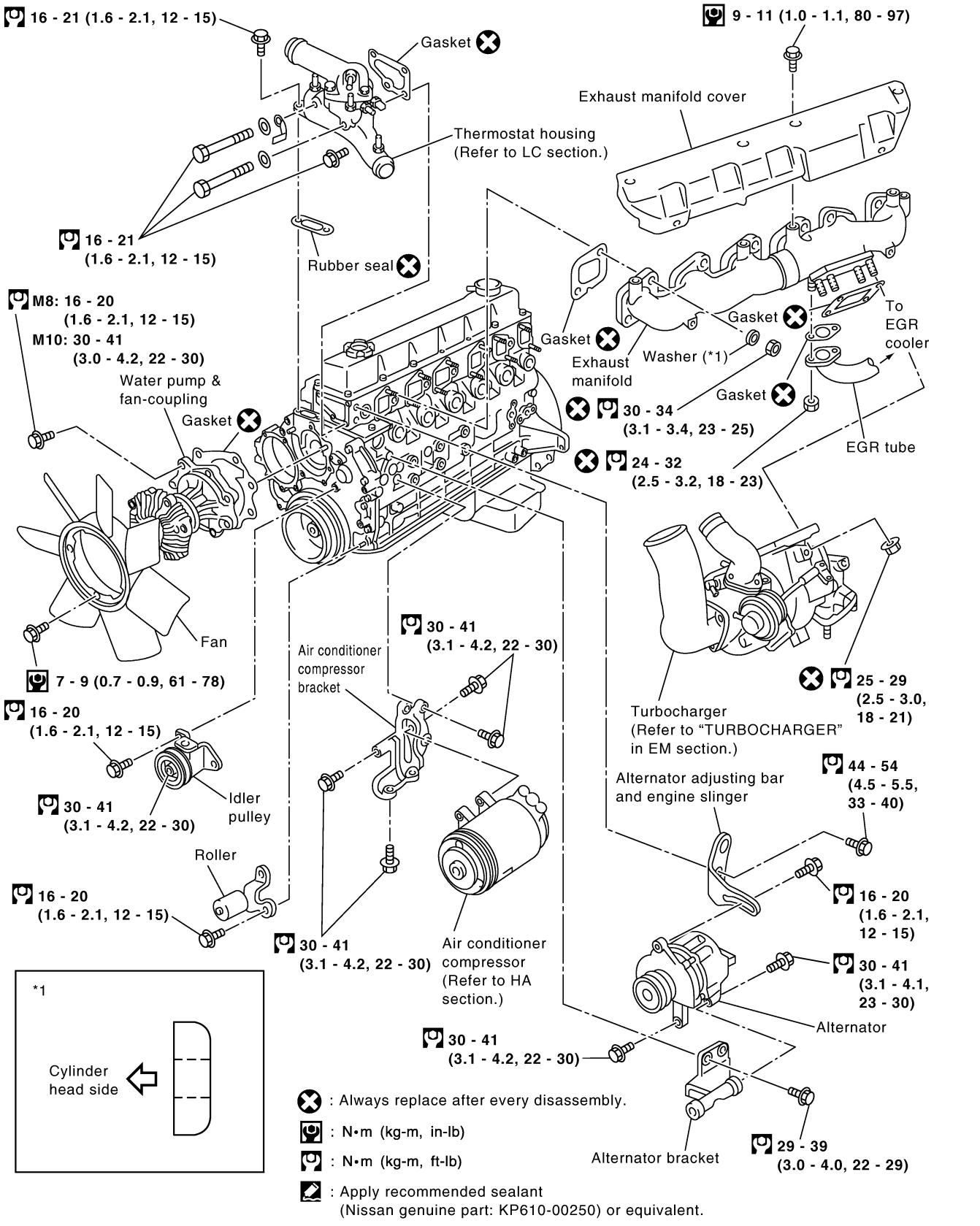
Tool number Tool name	Description
KV11105700 Nozzle holder socket	Tightening or loosening injection nozzle holder  ZZA1127D

SEC. 135•140•185•186•213



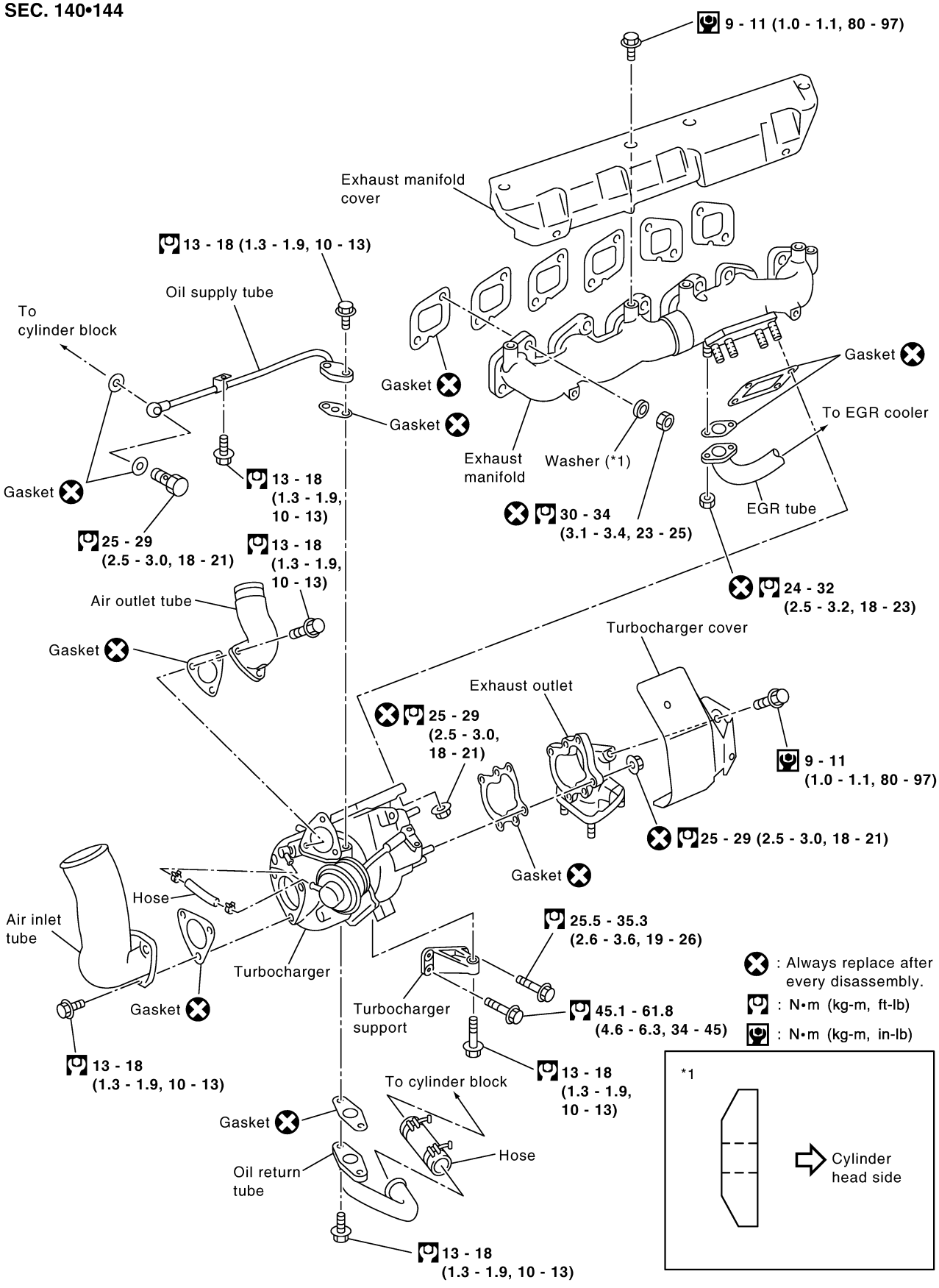
SEM071H

SEC. 135•140•144•210•230



SEM072H

SEC. 140•144



SEM073H

Removal and Installation

Turbocharger should not be disassembled.

1. Remove the following.
- Air duct and charge air cooler components
- Heat shield plates
- Exhaust front tube: Refer to FE section.
- Oil tubes
2. Remove turbocharger support.
3. Remove turbocharger from exhaust manifold.

Inspection

Condition 1: Low engine power

Probable cause	Corrective action
Air leak at the connection of compressor housing and suction hose/inlet tube, or inlet and intake manifold.	Correct the connection.
Exhaust gas leak at the connection of turbine housing and exhaust manifold, connecting tube or exhaust outlet.	Correct the connection or replace gasket.
Wastegate valve is stuck in open position.	Replace turbocharger assembly.
Stuck or worn journal or bearing.	
Broken shaft.	
Sludge on back of turbine wheel.	
Broken turbine wheel.	

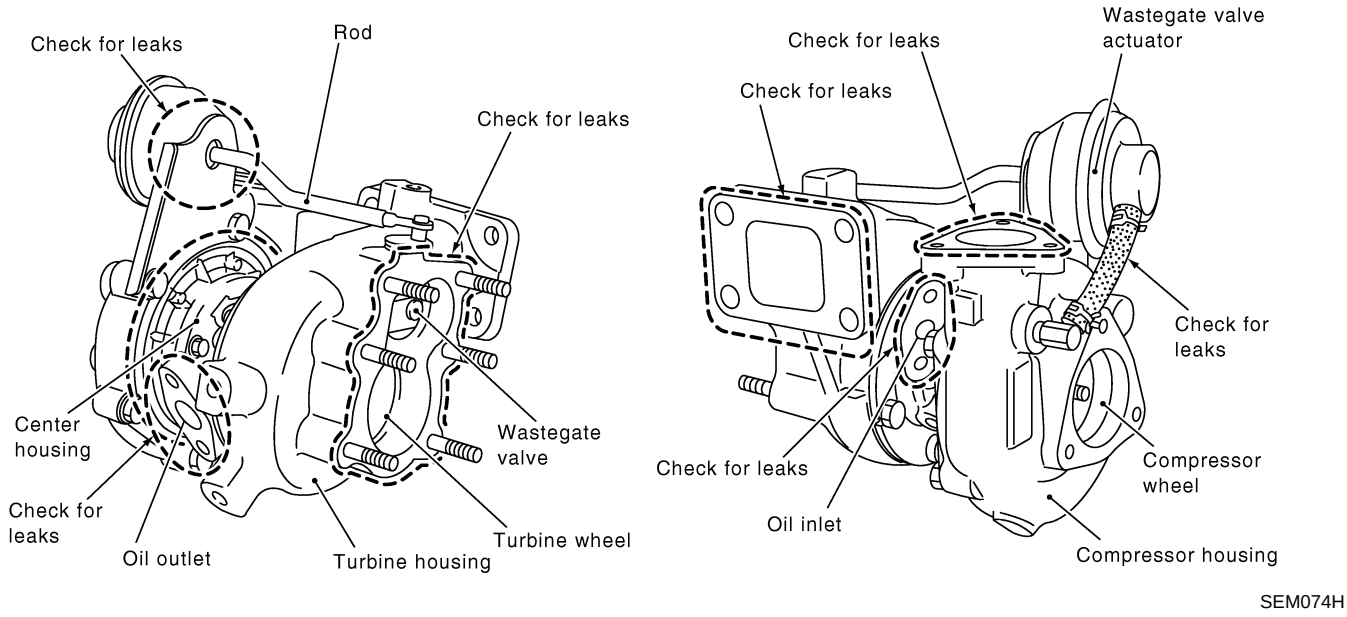
Condition 2: Excessively high engine power

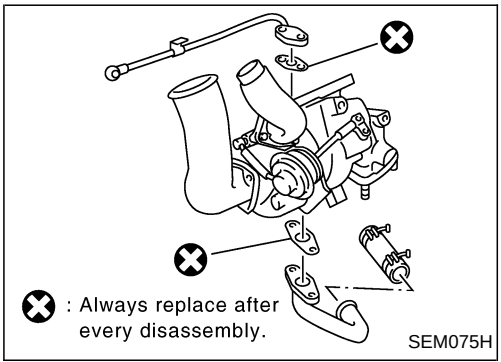
Probable cause	Corrective action
Disconnected or cracked rubber hose of by-pass valve actuator.	Correct or replace rubber hose.
Wastegate valve is stuck in closed position.	Replace turbocharger assembly.
Actuator diaphragm is broken.	

Inspection (Cont'd)

Condition 3: Excessively high oil consumption, or exhaust shows pale blue smoke	
Probable cause	Corrective action
Oil leak at the connection of lubricating oil passage.	Correct the connection.
Oil leak at oil seal of turbine.	Replace turbocharger assembly.
Oil leak at oil seal of compressor.	
Worn journal or bearing.	

Perform the following checks. If NG, replace turbocharger unit.

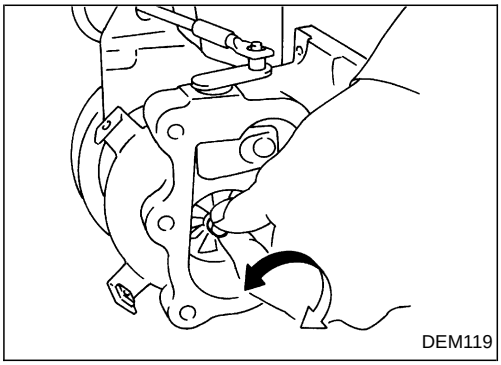




OIL TUBES

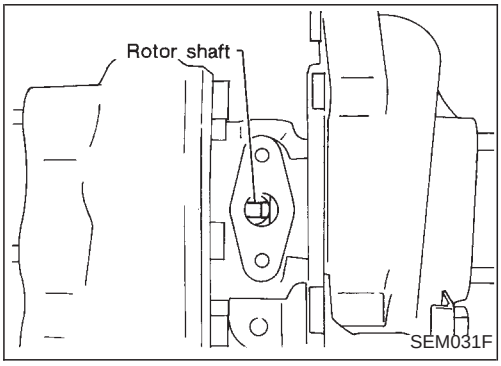
Check tubes for clogging.

Inspection (Cont'd)


DEM119

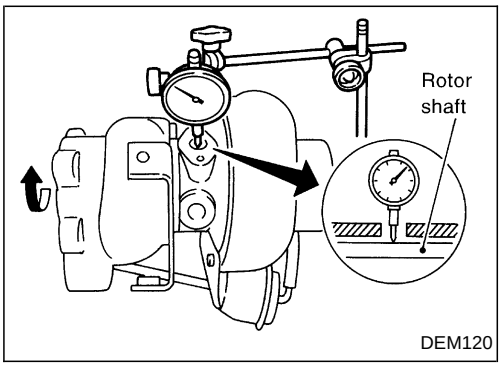
ROTOR SHAFT

1. Check rotor shaft for smooth rotation.



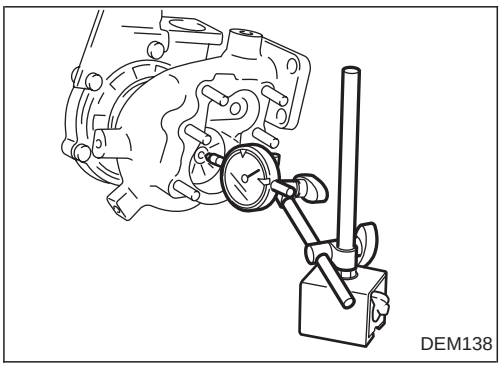
SEM031F

2. Check rotor shaft for carbon deposits.



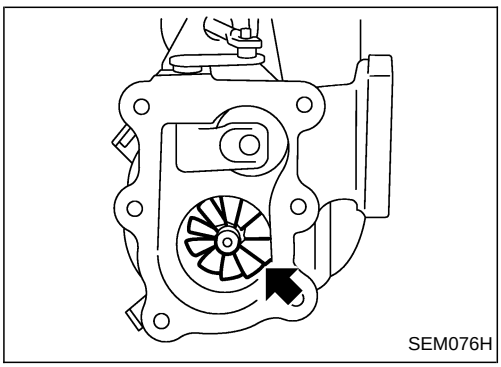
DEM120

3. Measure rotor shaft runout.
   Runout (Total indicator reading):
   Standard
   0.12 - 0.17 mm (0.0047 - 0.0067 in)


DEM138

4. Measure rotor shaft end play.
   End play:
   Standard
   0.05 - 0.10 mm (0.0020 - 0.0039 in)

- **Do not allow wheels to turn when axial play is being measured.**

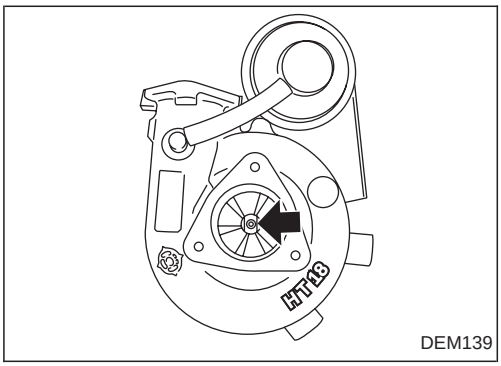

SEM076H

TURBINE WHEEL

Check turbine wheel for the following.

- Oil
- Carbon deposits
- Deformed fins
- Contact with turbine housing

Inspection (Cont'd)

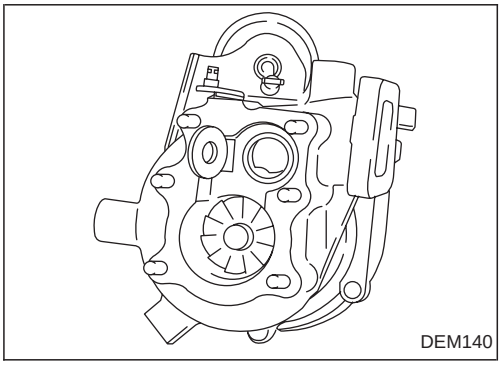


DEM139

COMPRESSOR WHEEL

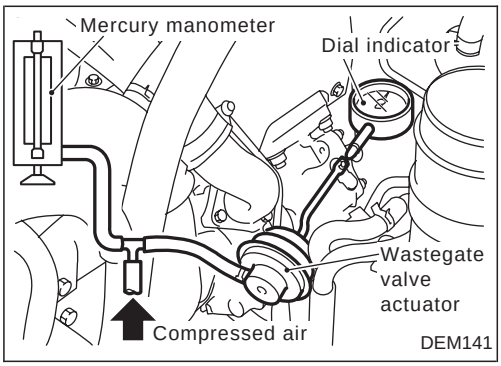
Check compressor wheel for the following.

- Oil
- Deformed fins
- Contact with compressor housing


DEM140

WASTEGATE VALVE

Remove rod pin and check wastegate valve for cracks, deformation and smooth movement. Check valve seat surface for smoothness.



DEM141

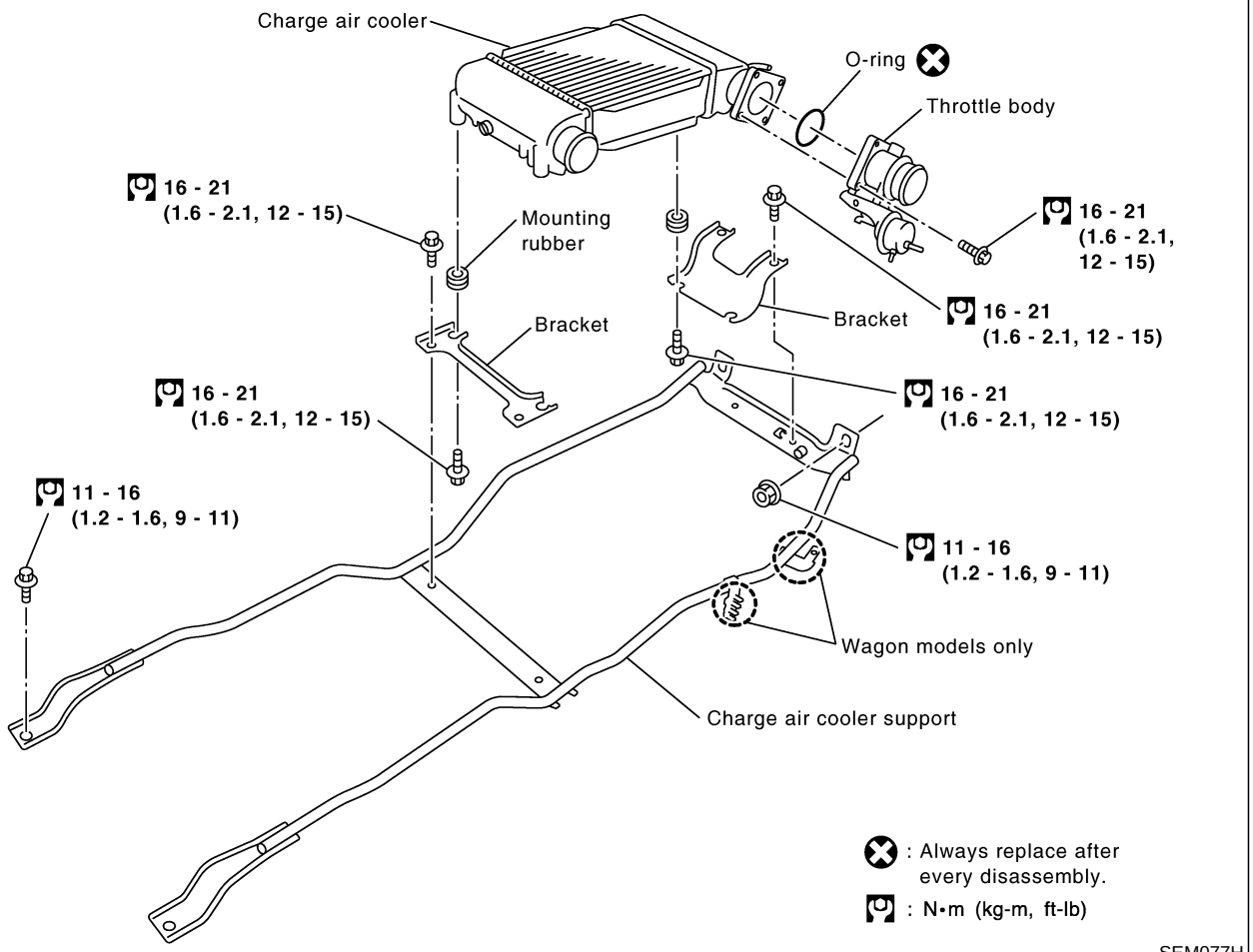
WASTEGATE VALVE ACTUATOR

Check operation of wastegate valve actuator.

Do not apply more than 96.0 kPa (960 mbar, 720 mmHg, 28.35 inHg) pressure to actuator diaphragm.

Wastegate valve actuator stroke/pressure:
1.5 mm (0.059 in)/85.3 - 90.7 kPa
(853 - 907 mbar, 640 - 680 mmHg,
25.19 - 26.78 inHg)

SEC. 144•163•640



CHECKING CHARGE AIR COOLER

Check charge air cooler for mud or clogging. If necessary, clean charge air cooler as follows.

- Be careful not to bend or damage the charge air cooler fins.

1. Remove charge air cooler.

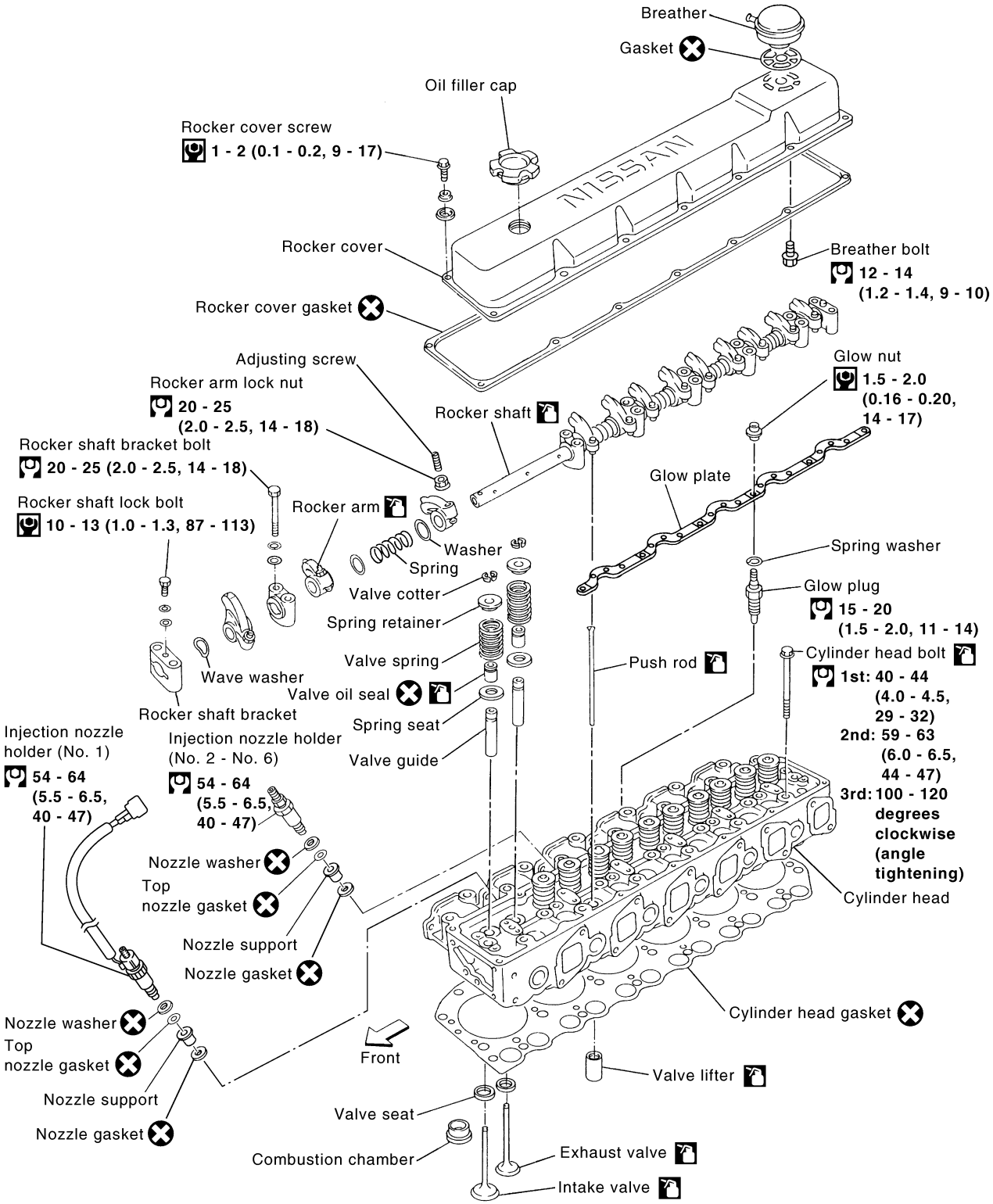
- Before cleaning, securely cover its inlet and outlet with vinyl and wrap them with tape or something to prevent water from getting into the charge air cooler.

2. Apply water by hose to the back side of the charge air cooler core vertically downward.
3. Apply water again to all charge air cooler core surfaces once per minute.
4. Stop washing if any stains no longer flow out from the charge air cooler.
5. Blow air into the back side of charge air cooler core vertically downward.

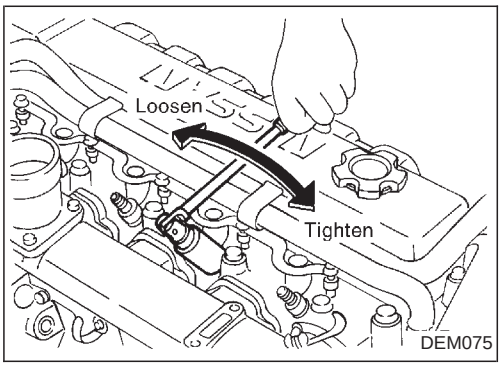
- Use compressed air lower than 490 kPa (5 kg/m^2, 71 psi) and keep distance more than 30 cm (11.8 in).

6. Blow air again into all the charge air cooler core surfaces once per minute until no water sprays out.

SEC. 111•130•185•220



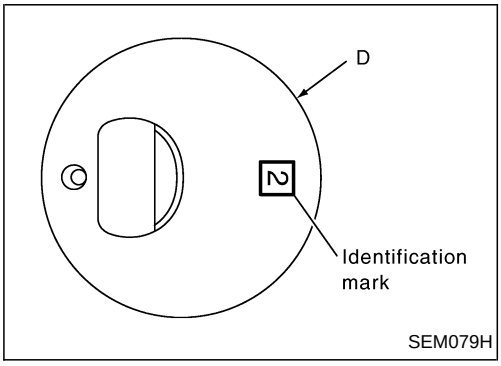
SEM078H



Removal

Remove injection nozzle holder and top nozzle gasket.

- Use nozzle holder socket [SST: KV11105700] for No. 1 nozzle holder.
- Use deep socket wrench for No. 2 to No. 6 nozzle holders.



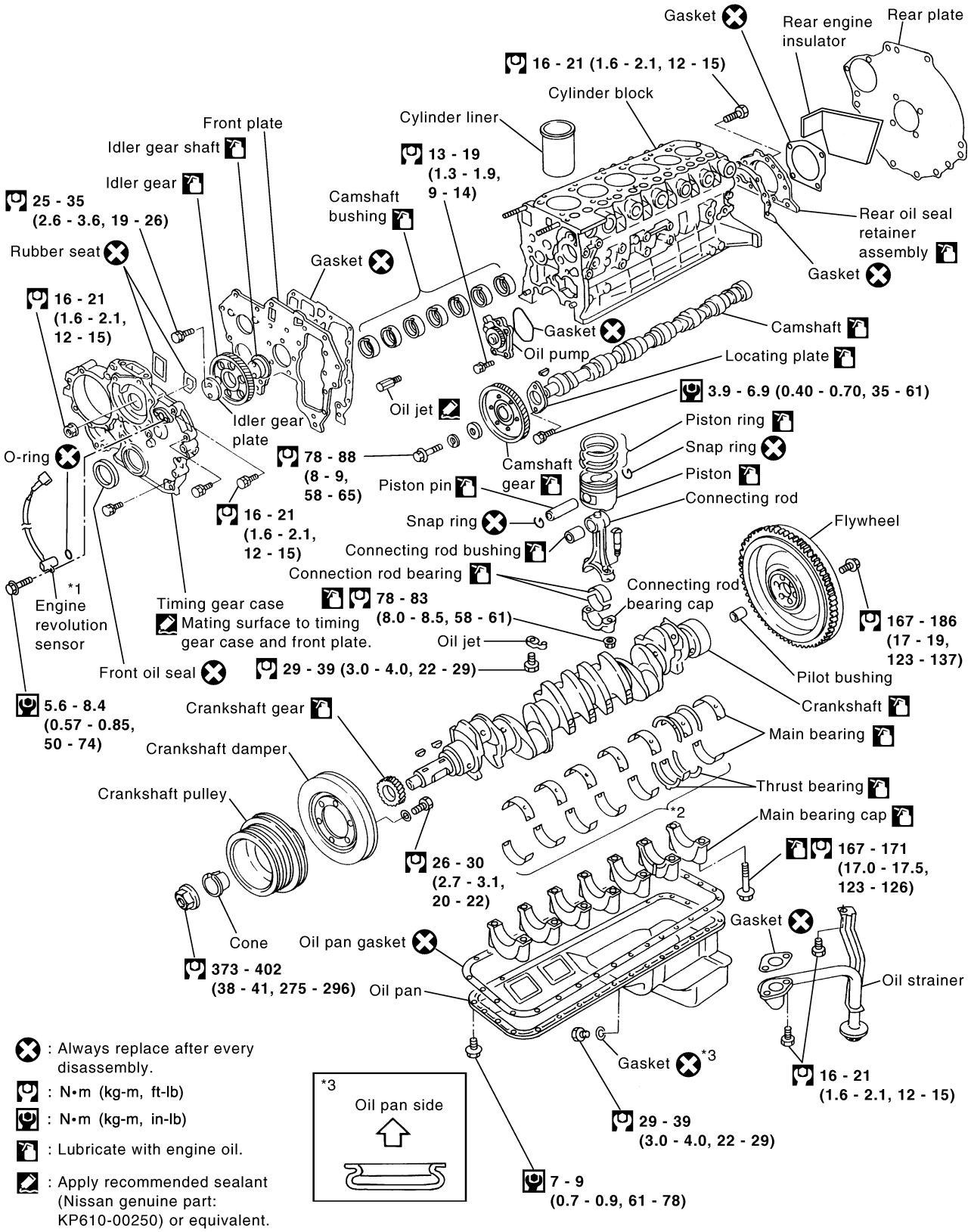
Inspection

COMBUSTION CHAMBER

Identification of combustion chambers

Identification mark (on combustion chamber)	Outer diameter "D" mm (in)
1 place	36.985 - 37.011 (1.4561 - 1.4571)

SEC. 110•120•130•135•150



: Always replace after every disassembly.

: N•m (kg-m, ft-lb)

: N•m (kg-m, in-lb)

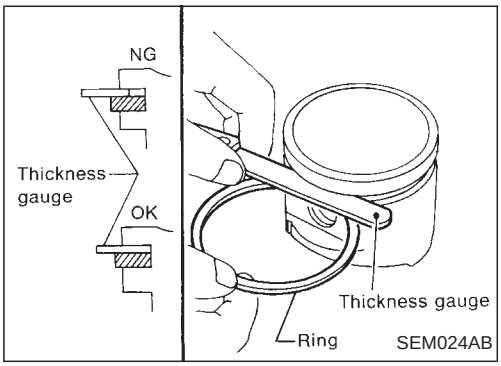
: Lubricate with engine oil.

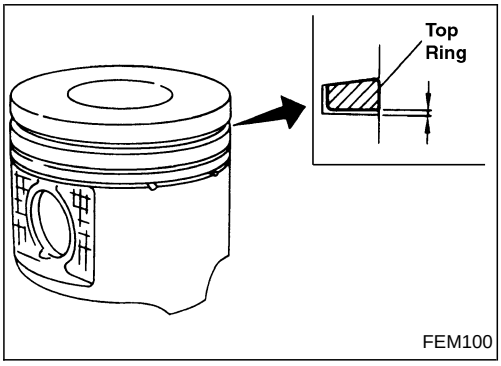
: Apply recommended sealant (Nissan genuine part: KP610-00250) or equivalent.

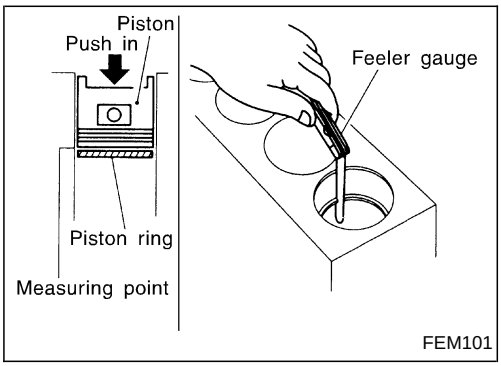
*1: Do not damage the sensor edges.

*2: Keep in correct order.

SEM080H







Inspection

PISTON RING SIDE CLEARANCE

- Using feeler gauge, measure clearance between piston ring and piston ring groove.

Unit: mm (in)

	Standard	Limit
Top ring	0.05 - 0.07 (0.0020 - 0.0028)	0.50 (0.0197)
Second ring	0.04 - 0.08 (0.0016 - 0.0031)	0.30 (0.0118)
Oil ring	0.02 - 0.06 (0.0008 - 0.0024)	0.15 (0.0059)

- Align top ring and external surface of piston. Measure lower side clearance of top ring with top ring pressed onto upper side of ring groove.
- If side clearance exceeds the limit, replace piston ring.
- Check clearance again. If side clearance still exceeds the limit, replace piston.

PISTON RING END GAP

- Check that cylinder bore diameter is within specifications. Refer to EM-145, “PISTON TO CYLINDER BORE CLEARANCE” in Service Manual (Publication No. SM7E-1Y61G1).
- Using piston, press piston ring to cylinder mid point, and measure end gap.

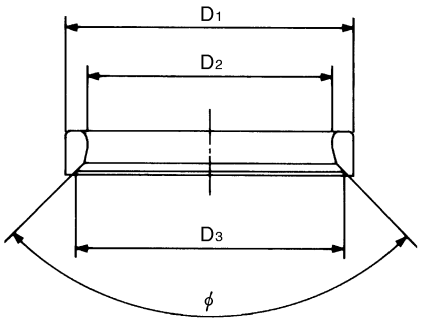
Unit: mm (in)

	Standard (With cylinder liner for factory)	Standard (With cylinder liner for service)	Limit
Top ring	0.25 - 0.45 (0.0098 - 0.0177)	0.35 - 0.60 (0.0138 - 0.0236)	1.5 (0.059)
Second ring	0.50 - 0.65 (0.0197 - 0.0256)	0.60 - 0.80 (0.0236 - 0.0315)	
Oil ring	0.25 - 0.50 (0.0098 - 0.0197)	0.35 - 0.65 (0.0138 - 0.0256)	

Inspection and Adjustment

Valve seat

Unit: mm (in)



SEM146H

Intake	
Outer diameter "D_1"	44.550 - 44.560 (1.7539 - 1.7543)
Inner diameter "D_2"	37.9 - 38.1 (1.492 - 1.500)
Diameter of seat "D_3"	42.5 (1.673)
Cylinder head valve seat diameter	44.500 - 44.515 (1.7520 - 1.7526)
Valve seat face angle "ϕ"	89° - 90°

PISTON RING

Unit: mm (in)

	Standard	Limit
Side clearance		
Top	0.05 - 0.07 (0.0020 - 0.0028)	0.50 (0.0197)
2nd	0.04 - 0.08 (0.0016 - 0.0031)	0.30 (0.0118)
Oil	0.02 - 0.06 (0.0008 - 0.0024)	0.15 (0.0059)
Ring gap		
With cylinder liner for factory		
Top	0.25 - 0.45 (0.0098 - 0.0177)	
2nd	0.50 - 0.65 (0.0197 - 0.0256)	
Oil (rail ring)	0.25 - 0.50 (0.0098 - 0.0197)	
With cylinder liner for service		1.5 (0.059)
Top	0.35 - 0.60 (0.0138 - 0.0236)	
2nd	0.60 - 0.80 (0.0236 - 0.0315)	
Oil ring	0.35 - 0.65 (0.0138 - 0.0256)	