

B ENGINE

SECTION **EM**

ENGINE MECHANICAL

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PRECAUTIONS

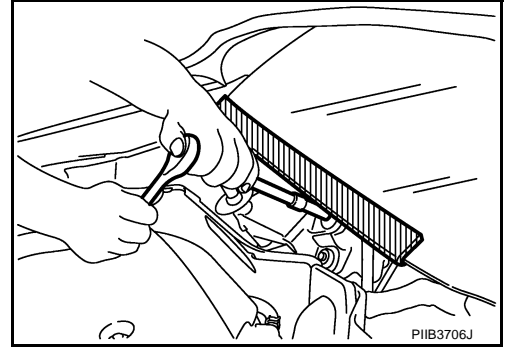
PRECAUTIONS

PFP:00001

Precautions for Procedures without Cowl Top Cover

NBS003FC

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precautions for Battery Service

NBS003FD

Before disconnecting the battery, lower both the driver and passenger windows. This will prevent any interference between the window edge and the vehicle when the door is opened/closed. During normal operation, the window slightly raises and lowers automatically to prevent any window to vehicle interference. The automatic window function will not work with the battery disconnected.

Precautions for Drain Engine Coolant

NBS00002

Drain engine coolant when engine is cooled.

Precautions for Disconnecting Fuel Piping

NBS00003

- Before starting work, make sure no fire or spark producing items are in the work area.
- Release fuel pressure before disconnecting and disassembly.
- After disconnecting pipes, plug openings to stop fuel leakage.

Precautions for Removal and Disassembly

NBS00004

- When instructed to use special service tools, use specified tools. Always be careful to work safely, avoid forceful or uninstructed operations.
- Exercise maximum care to avoid damage to mating or sliding surfaces.
- Cover openings of engine system with tape or equivalent, if necessary, to seal out foreign materials.
- Mark and arrange disassembly parts in an organized way for easy troubleshooting and re-assembly.
- When loosening bolts and nuts, as a basic rule, start with the one furthest outside, then the one diagonally opposite, and so on. If the order of loosening is specified, do exactly as specified. Power tools may be used in the step.

Precautions for Inspection, Repair and Replacement

NBS00005

Before repairing or replacing, thoroughly inspect parts. Inspect new replacement parts in the same way, and replace if necessary.

Precautions for Assembly and Installation

NBS00006

- Use torque wrench to tighten bolts or nuts to specification.
- When tightening bolts and nuts, as a basic rule, equally tighten in several different steps starting with the ones in center, then ones on inside and outside diagonally in this order. If the order of tightening is specified, do exactly as specified.
- Replace with new gasket, packing, oil seal or O-ring.
- Dowel pins are used for several parts alignment. When replacing and reassembling with dowel pins, make sure that dowel pins are installed in the original portion.
- Thoroughly wash, clean, and air-blow each part. Carefully check engine oil or engine coolant passages for any restriction and blockage.
- Avoid damaging sliding or mating surfaces. Completely remove foreign materials such as cloth lint or dust. Before assembly, oil sliding surfaces well.
- Release air within route when refilling after draining engine coolant.

PRECAUTIONS

- After repairing, start engine and increase engine speed to check engine coolant, fuel, engine oil, and exhaust gases for leakage.

Parts Requiring Angle Tightening

NBS00007

- Use angle wrench [SST: KV10112100 (BT8653-A)] for the final tightening of the following engine parts:
 - Cylinder head bolts
 - Main bearing cap bolts
 - Connecting rod cap bolts
 - Crankshaft pulley bolt
- Do not use a torque value for final tightening.
- The torque value for these parts are for a preliminary step.
- Ensure thread and seat surfaces are clean and coated with engine oil.

Precautions for Liquid Gasket REMOVAL OF LIQUID GASKET SEALING

NBS00008

- After removing mounting bolts and nuts, separate the mating surface using seal cutter [SST] and remove old liquid gasket sealing.

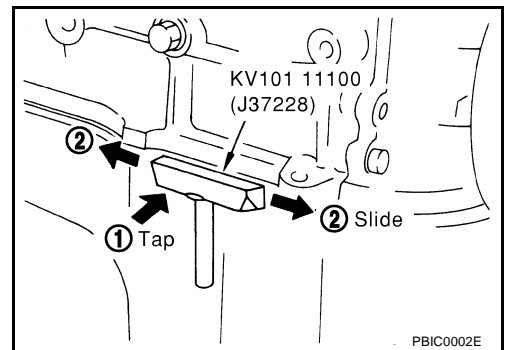
CAUTION:

Be careful not to damage the mating surfaces.

- Tap seal cutter to insert it, and then slide it by tapping on the side as shown in the figure.
- In areas where seal cutter [SST] is difficult to use, use plastic hammer to lightly tap the parts, to remove it.

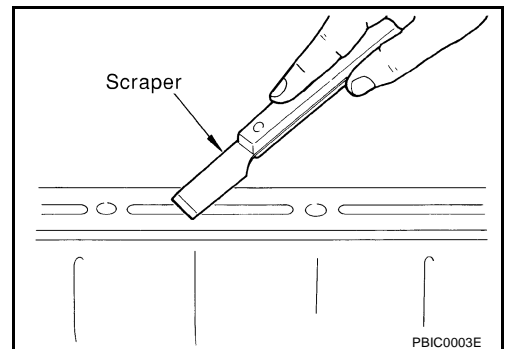
CAUTION:

If for some unavoidable reason tool such as screwdriver is used, be careful not to damage the mating surfaces.



LIQUID GASKET APPLICATION PROCEDURE

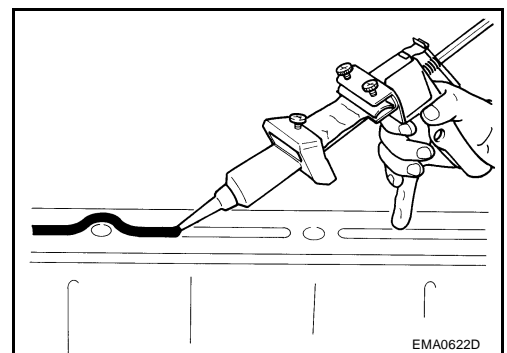
1. Using scraper, remove old liquid gasket adhering to the gasket application surface and the mating surface.
 - Remove liquid gasket completely from the groove of the gasket application surface, mounting bolts, and bolt holes.
2. Wipe the liquid gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.



3. Attach liquid gasket tube to tube presser [SST: WS39930000 (—)].

Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-47, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#).

4. Apply liquid gasket without breaks to the specified location with the specified dimensions.
 - If there is a groove for liquid gasket application, apply liquid gasket to the groove.

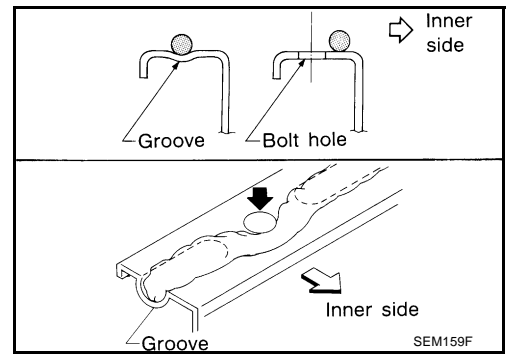


PRECAUTIONS

- As for bolt holes, normally apply liquid gasket inside the holes. Occasionally, it should be applied outside the holes. Make sure to read the text of this manual.
- Within five minutes of liquid gasket application, install the mating component.
- If liquid gasket protrudes, wipe it off immediately.
- Do not retighten mounting bolts or nuts after the installation.
- After 30 minutes or more have passed from the installation, fill engine oil and engine coolant.

CAUTION:

If there are specific instructions in this manual, observe them.



PREPARATION

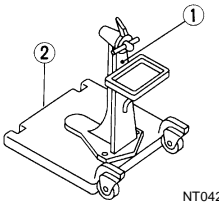
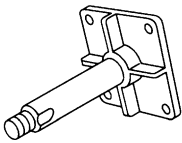
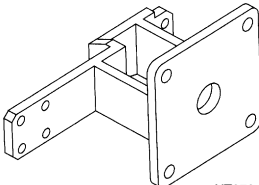
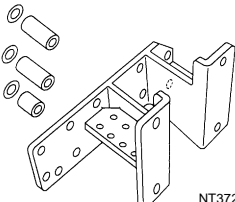
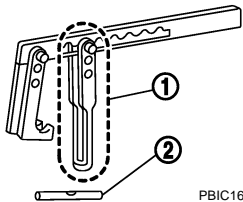
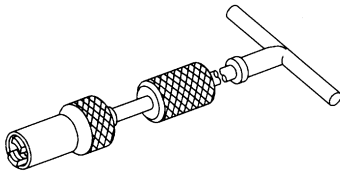
PREPARATION

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Special Service Tools

NBS00009

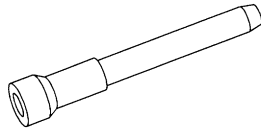
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST0501S000 (—) Engine stand assembly 1. ST05011000 (—) Engine stand 2. ST05012000 (—) Base	Disassembling and assembling engine  NT042
KV10106500 (—) Engine stand shaft	 NT028
KV10117000 (J41262) Engine sub-attachment	KV10117000 has been replaced with KV10117001 (KV10117000 is no longer in production, but it is usable).  NT373
KV10117001 (—) Engine sub-attachment	Installing on cylinder block  NT372
KV10116200 (J26336-A) Valve spring compressor 1. KV10115900 (J26336-20) Attachment 2. KV10109220 (—) Adapter	Disassembling valve mechanism Part (1) is a component of KV10116200 (J26336-A), but Part (2) is not so.  PBIC1650E
KV10107902 (J38959) Valve oil seal puller	Replacing valve oil seal  NT011

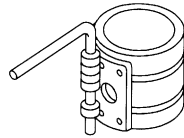
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PREPARATION

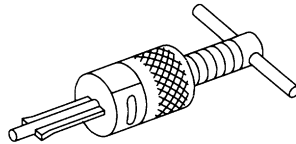
Tool number (Kent-Moore No.) Tool name	Description
— (J39386) Valve oil seal drift	Installing valve oil seal
EM03470000 (J8037) Piston ring compressor	Installing piston assembly into cylinder bore
ST16610001 (J23907) Pilot bushing puller	Removing pilot bushing (M/T models) or pilot converter (A/T models)
KV10111100 (J37228) Seal cutter	Removing oil pan (lower and upper), front and rear timing chain case, etc.
WS39930000 (—) Tube presser	Pressing the tube of liquid gasket
KV10112100 (BT8653-A) Angle wrench	Tightening bolts for bearing cap, cylinder head, etc. in angle
KV10117100 (J3647-A) Heated oxygen sensor wrench	Loosening or tightening heated oxygen sensor 2 For 22 mm (0.87 in) width hexagon nut



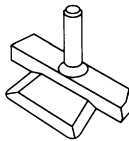
NT024



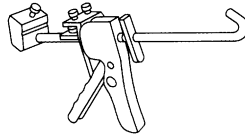
NT044



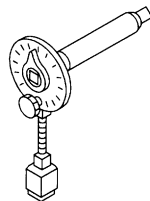
NT045



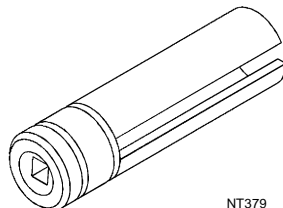
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NT052

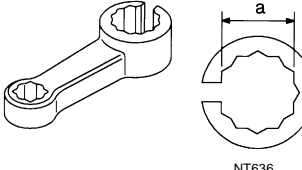
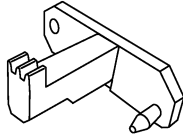



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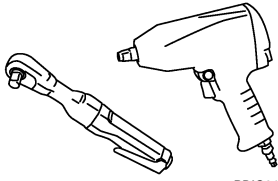
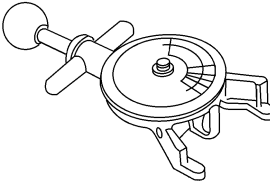
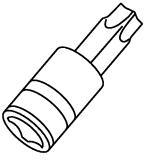
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PREPARATION

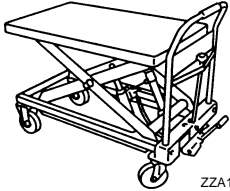
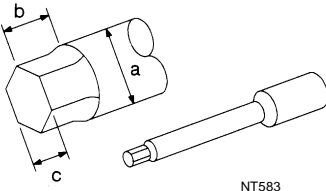
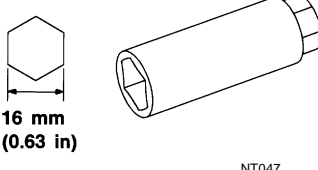

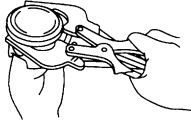
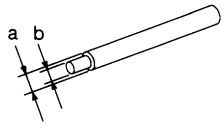
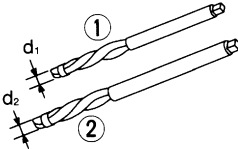
Tool number (Kent-Moore No.) Tool name	Description	A
KV10114400 (J38365) Heated oxygen sensor wrench <div style="text-align: center;">  <p>NT636</p> </div>	Loosening or tightening air fuel ratio sensor 1 a: 22 mm (0.87 in)	EM
KV10117700 (J44716) Ring gear stopper <div style="text-align: center;">  <p>NT822</p> </div>	Removing and installing crankshaft pulley	C D
— (J-45488) Quick connector release <div style="text-align: center;">  <p>PBIC0198E</p> </div>	Removing fuel tube quick connectors in engine room	E F G H

Commercial Service Tools

NBS0000A

(Kent-Moore No.) Tool name	Description	I
Power tool <div style="text-align: center;">  <p>PBIC0190E</p> </div>	Loosening bolts and nuts	J K
(BT3373-F) Belt tension gauge <div style="text-align: center;">  <p>AMA126</p> </div>	Checking drive belt tension	L M
TORX socket <div style="text-align: center;">  <p>PBIC1113E</p> </div>	Removing and installing flywheel Size: T55	

PREPARATION

(Kent-Moore No.) Tool name	Description
(—) Manual lift table caddy	Removing and installing engine
	ZZA1210D
(J24239-01) Cylinder head bolt wrench	Loosening and tightening cylinder head bolt, and used with angle wrench [SST: KV10112100 (BT8653-A)] a: 13 (0.51) dia. b: 12 (0.47) c: 10 (0.39) Unit: mm (in)
	NT583
(—) Spark plug wrench	Removing and installing spark plug
	NT047
(—) Valve seat cutter set	Finishing valve seat dimensions
	NT048
(—) Piston ring expander	Removing and installing piston ring
	NT030
(—) Valve guide drift	Removing and installing valve guide Intake and Exhaust: a: 9.5 mm (0.374 in) dia. b: 5.5 mm (0.217 in) dia.
	NT015
(—) Valve guide reamer	(1): Reaming valve guide inner hole (2): Reaming hole for oversize valve guide Intake and Exhaust: d1 : 6.0 mm (0.236 in) dia. d2 : 10.2 mm (0.402 in) dia.
	NT016