



SERVICE MANUAL

EF2800i

FOREWORD

This manual was written by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to put an entire mechanic's education into one manual, so it is assumed that persons using this book to perform maintenance and repairs on Yamaha generators have a basic understanding of the mechanical precepts and procedures inherent to generator repair technology. Without such knowledge, attempted repairs or service to this model may render it unfit for use and/or unsafe.

Yamaha Motor Company Ltd. is continually striving to further improve all models manufactured by Yamaha. Modifications and significant changes in specifications or procedures will be forwarded to all Authorized Yamaha dealers and will, where applicable, appear in future editions of this manual.

NOTE:

This Service Manual contains information regarding periodic maintenance to the emission control system. Please read this material carefully.

HOW TO USE THIS MANUAL

PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notation.



The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

WARNING

Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the machine.

CAUTION:

A CAUTION indicates special precautions that must be taken to avoid damage to the machine.

NOTE:

A NOTE provides key information to make procedures easier or clearer.

MANUAL FORMAT

The procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspection operations.

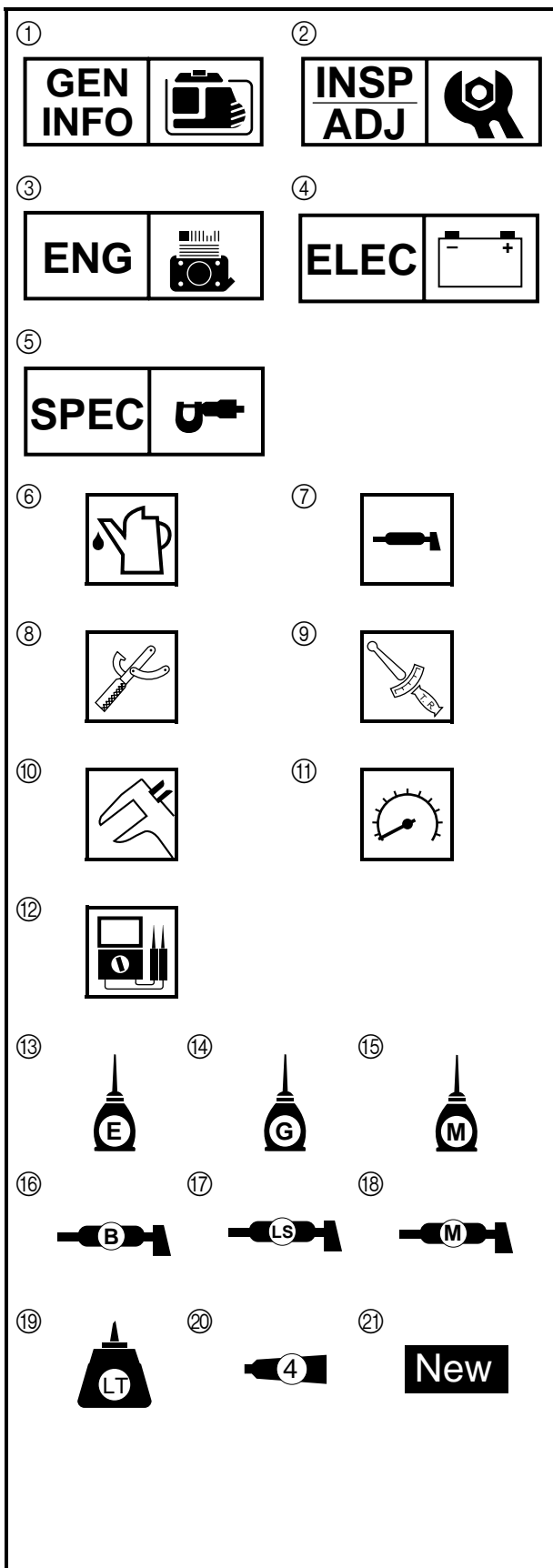
In this revised format, the condition of a faulty component will precede an arrow symbol and the course of action required will follow the symbol, e.g.,

- Bearings
Pitting/damage → Replace.

EXPLODED DIAGRAM

Each chapter provides exploded diagrams before each disassembly section for ease in identifying the correct disassembly and assembly procedures.

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SERVICE MANUAL
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ILLUSTRATED SYMBOLS (Refer to the illustration)

Illustrated symbols ① through ⑤ are designed as thumb tabs to indicate the chapter's number and content.

- ① General information
- ② Periodic inspections and adjustments
- ③ Engine
- ④ Electrical
- ⑤ Specifications






Illustrated symbols ⑥ through ⑫ are used to identify the specific tools and test equipment.

- ⑥ Filling fluid
- ⑦ Lubricant
- ⑧ Special tool
- ⑨ Tightening
- ⑩ Wear limit, clearance
- ⑪ Engine speed
- ⑫ Ω , V, A

Illustrated symbols ⑬ through ⑳ in the exploded diagram indicate the grades of lubricant and the locations of the lubrication points.

- ⑬ Apply engine oil
- ⑭ Apply gear oil
- ⑮ Apply molybdenum disulfide oil
- ⑯ Apply wheel bearing grease
- ⑰ Apply lightweight lithium-soap base grease
- ⑱ Apply molybdenum disulfide grease
- ⑲ Apply a locking agent (LOCTITE®)
- ⑳ Apply Yamaha bond
- ㉑ Use a new one

INDEX

GENERAL INFORMATION	
	GEN INFO 1
PERIODIC INSPECTIONS AND ADJUSTMENTS	
	INSP ADJ 2
ENGINE	
	ENG 3
ELECTRICAL	
	ELEC 4
SPECIFICATIONS	
	SPEC 5

CHAPTER 1. GENERAL INFORMATION

MACHINE IDENTIFICATION	1-1
SERIAL NUMBER	1-1
STARTING SERIAL NUMBER	1-1
IMPORTANT INFORMATION	1-2
PREPARATION FOR REMOVAL AND DISASSEMBLY	
CAUTION ON SERVICE	1-2
NOTES ON SERVICE	1-2
ALL REPLACEMENT PARTS	1-3
GASKETS, OIL SEALS, AND O-RINGS	1-3
BEARINGS AND OIL SEALS	1-3
SPECIAL TOOLS AND TESTERS	1-4

CHAPTER 2. PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION	2-1
MAINTENANCE INTERVALS CHART	2-1
PERIODIC MAINTENANCE/ LUBRICATION INTERVALS	2-1
ENGINE	2-2
ENGINE OIL LEAKAGE CHECKING	2-2
OIL LEVEL CHECKING	2-2
OIL REPLACEMENT	2-3
FUEL LEAKAGE	2-4
FUEL COCK STRAINER INSPECTION	2-4
FUEL TANK FILTER	2-5
AIR FILTER ELEMENT	2-6
MUFFLER	2-7
VALVE CLEARANCE ADJUSTMENT	2-8
COMPRESSION PRESSURE	2-10
RATED ENGINE SPEED	2-11
BREATHER HOSE	2-11

ELECTRICAL	2-12
SPARK PLUG	2-12
ENGINE SWITCH	2-13
ECONOMY SWITCH	2-13
PILOT LIGHT	2-13
RECEPTACLE	2-14
DC CIRCUIT BREAKER	2-14

CHAPTER 3. ENGINE

CONTROL PANEL	3-1
CONTROL BOX COVER AND FUEL TANK	3-3
MUFFLER AND AIR CLEANER	3-4
BREATHER HOSE INSTALLATION ...	3-5
MUFFLER ASSEMBLY	3-5
CONTROL UNIT AND AC-CDI UNIT	3-6
ENGINE	3-7
CYLINDER HEAD COVER AND CYLINDER HEAD	3-8
PUSH ROD INSPECTION	3-10
CYLINDER HEAD INSPECTION	3-10
CYLINDER HEAD ASSEMBLY	3-11
BREATHER HOSE ASSEMBLY	3-11
VALVE	3-12
VALVE AND VALVE SPRING REMOVAL	3-13
VALVE AND VALVE SPRING INSPECTION	3-13
VALVE AND VALVE SPRING REMOVAL	3-14
LOCKER ARM INSPECTION	3-14
VALVE SEAT INSPECTION	3-15
VALVE LAPPING	3-16
VALVE AND VALVE SPRING ASSEMBLY	3-17
RECOIL STARTER	3-18
RECOIL STARTER DISASSEMBLY	3-20
RECOIL STARTER INSPECTION	3-20
RECOIL STARTER ASSEMBLY	3-21

GENERATOR	3-23
MAGNETO ROTOR AND STATOR	
COIL ASSEMBLY REMOVAL	3-25
MAGNETO ROTOR AND STATOR	
COIL ASSEMBLY INSTALLATION ...	3-26
CRANKCASE COVER AND	
CAMSHAFT	3-28
CAMSHAFT INSPECTION	3-29
VALVE LIFTER INSPECTION	3-30
CAMSHAFT ASSEMBLY	3-30
CRANKCASE COVER	
INSPECTION	3-30
CRANKCASE COVER	
INSTALLATION	3-30
PISTON, CONNECTING ROD,	
CRANKSHAFT AND CRANKCASE	3-31
CRANKCASE (CYLINDER)	
INSPECTION	3-32
PISTON AND PISTON PIN	
INSPECTION	3-32
PISTON RING INSPECTION	3-34
CRANKSHAFT INSPECTION	3-34
CONNECTING ROD OIL CLEARANCE IN-	
SPECTION	3-35
PISTON RING AND PISTON	
ASSEMBLY	3-36
CRANKSHAFT ASSEMBLY	3-37
CARBURETOR	3-38
FLOAT HEIGHT INSPECTION	3-40
CHOKE CABLE INSTALLATION	3-41
THROTTLE CONTROL MOTOR	3-41
TROUBLESHOOTING	3-42
THROTTLE CONTROL SYSTEM	3-48

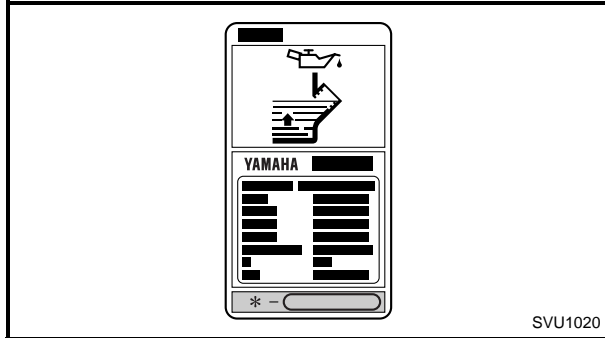
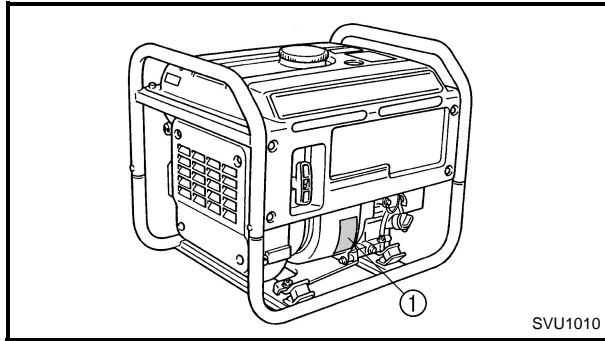
CHAPTER 4. ELECTRICAL

ELECTRICAL COMPONENTS	4-1
CIRCUIT DIAGRAM	4-2
SWITCHES	4-3
CHECKING SWITCH CONTINUITY ...	4-3

IGNITION SYSTEM	4-4
TROUBLESHOOTING CHART	4-4
GENERATOR SYSTEM	4-9
TROUBLESHOOTING CHART	4-9
CHARGING SYSTEM	4-11
TROUBLESHOOTING	4-11

CHAPTER 5. SPECIFICATIONS

GENERAL SPECIFICATIONS	5-1
MAINTENANCE SPECIFICATIONS	5-3
ENGINE	5-3
GENERATOR AND ELECTRICAL	5-6
TIGHTENING TORQUE	5-7
GENERAL TORQUE	
SPECIFICATIONS	5-8
DEFINITION OF UNITS	5-8
WIRE ROUTING DIAGRAM	5-9
CONTROL BOX PANEL	
AND BEHIND CONTROL BOX	5-9
ENGINE AND GENERATOR	5-10



GENERAL INFORMATION

MACHINE IDENTIFICATION

SERIAL NUMBER

The serial number is printed on a label ① which is affixed to the generator as shown.

NOTE:

The first three characters of this number are for model identification, the remaining digits are the unit production number.

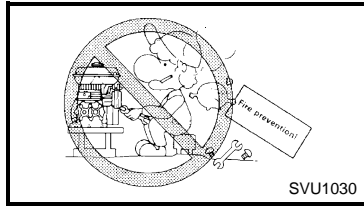
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STARTING SERIAL NUMBER

7VU-200101~

NOTE:

Designs and specifications are subject to change without notice.

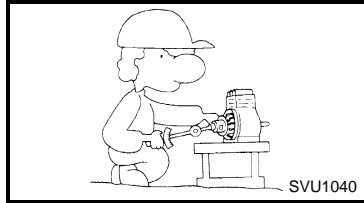


IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY

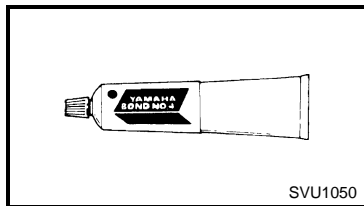
CAUTION ON SERVICE

1. Fire prevention
When servicing the engine, always keep the engine and yourself away from fire.

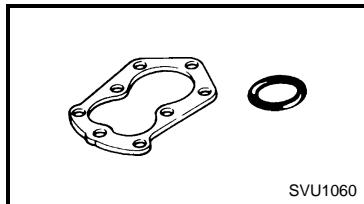


NOTES ON SERVICE

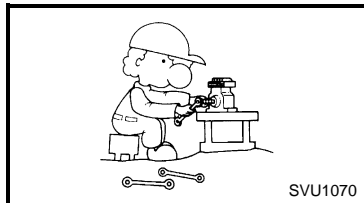
1. Correct tools
Be sure to use the correct special tool for the job to guard against damage.



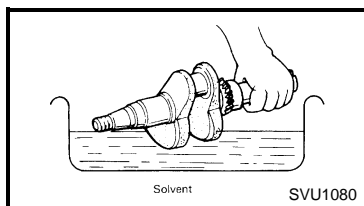
2. Oil, grease and seals
Be sure to use genuine Yamaha oils, grease and sealers, or the equivalents.



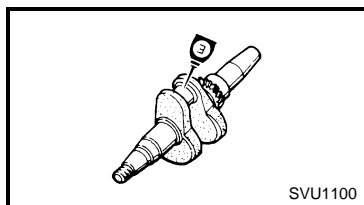
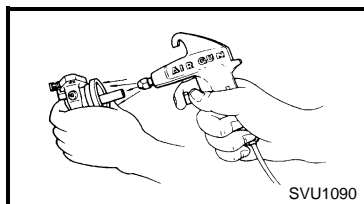
3. Expendable parts
Always replace the gaskets, O-rings, cotter pins and circlips with new parts when servicing engine.



4. Tightening torque
Be sure to follow torque specifications. When tightening bolts, nuts or screws, start with the largest-diameter fastener and work from an inner position to an outer position in a crisscross pattern.



5. Notes on disassembly and assembly
 - a. Parts should be cleaned in solvent and blown dry with compressed air after disassembly.



- b. Contact surfaces of moving parts should be oiled when reassembled.
 - c. Make sure that the parts, move smoothly after each section of the machine is assembled.

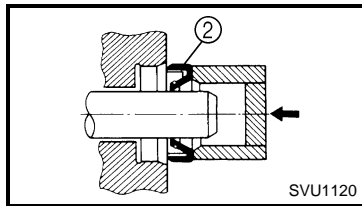
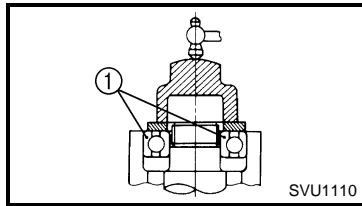


ALL REPLACEMENT PARTS

We recommend the use of genuine Yamaha parts for all replacements. Use oil and/or grease, recommended by Yamaha, for assembly and adjustment.

GASKETS, OIL SEALS, AND O-RINGS

1. All gaskets, seals, and O-rings should be replaced when an engine is overhauled. All gaskets surfaces, oil seal lips, and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.



BEARINGS AND OIL SEALS

Install the bearing(s) ① and oil seal(s) ② with their manufacture's marks or numbers facing outward. (In other words, the stamped letters must be on the side exposed to view.) When installing oil seal(s), apply a light coating of light-weight lithium base grease to the seal lip(s). Oil the bearings liberally when installing.

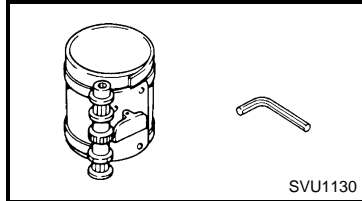
CAUTION:

Do not use compressed air to spin the bearings dry. This causes damage to the bearing surfaces.



SPECIAL TOOLS AND TESTERS

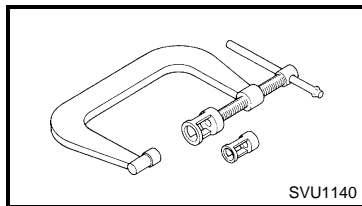
The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques.



1. Piston ring compressor

P/N. YU-33294, 90890-05158

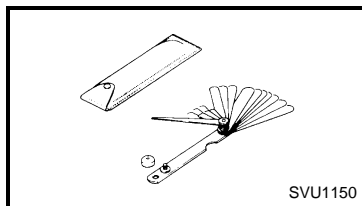
This tool is used to compress the piston rings when installing the piston.



2. Valve spring compressor

P/N. YM-01253, 90890-01253

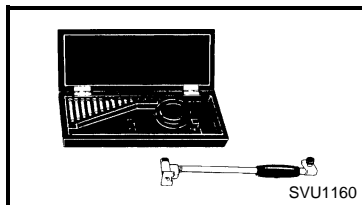
This tool is used to remove the valve springs.



3. Thickness gauge

P/N. YU-26900-9, 90890-03079

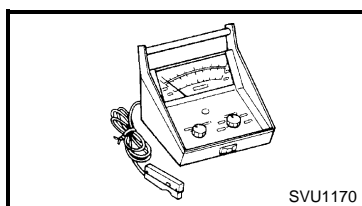
This gauge is used to adjust valve clearance, piston clearance and piston ring end gap.



4. Cylinder gauge

Commercially obtainable

This instrument is used for checking cylinder bore size and condition.



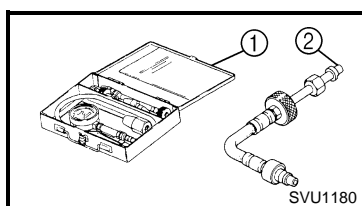
5. Inductive tachometer

P/N. YU-8036-A

Engine tachometer

P/N. 90890-03113

This instrument is used for reading engine r/min.



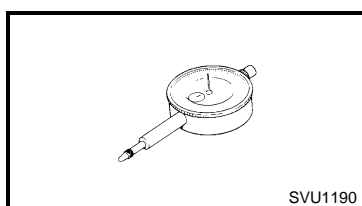
6. Compression gauge ①

P/N. YU-33223, 90890-03081

Adapter ②

P/N. YU-33223-3, 90890-04082

This gauge is used for checking engine compression.



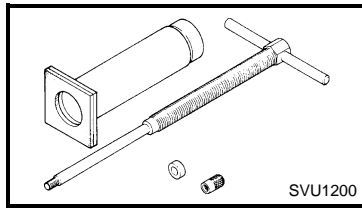
7. Dial gauge

P/N. YU-03097, 90890-03097

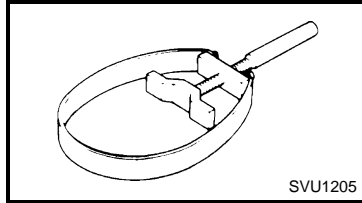
This instrument is used for checking crankshaft side clearance.

SPECIAL TOOLS AND TESTERS

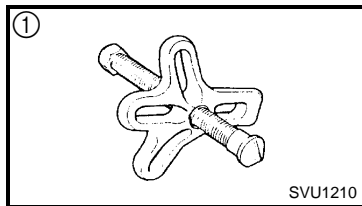
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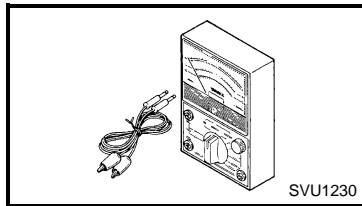
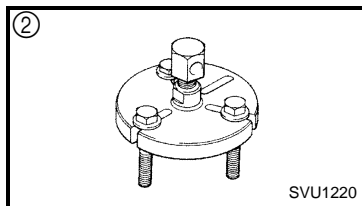
8. Piston pin puller
P/N. YU-01304, 90890-01304
This tool is used to remove the piston pin.



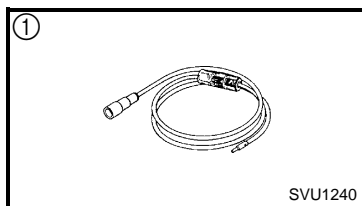
9. Sheave holder
P/N. YS-01880, 90890-01701
This tool is necessary for holding the flywheel.



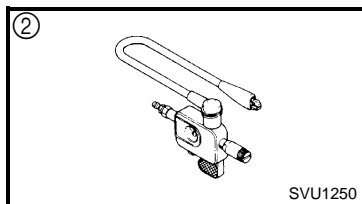
10. Rotor puller
① P/N. YU-33270
② P/N. 90890-01362
This tool is necessary for removing the flywheel.



11. Pocket tester
P/N. YU-03112, 90890-03112
This instrument is necessary for checking the electrical system.



12. Dynamic spark tester ①
P/N. YM-34487
Ignition checker ②
P/N. 90890-06754
This instrument is necessary for checking the ignition system components.





PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable machine operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies to machines already in service as well as new machines that are being prepared for sale. All service technicians should be familiar with this entire chapter.

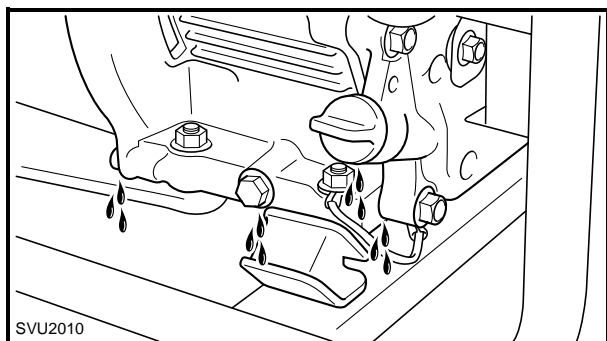
MAINTENANCE INTERVALS CHART

Proper periodic maintenance is important. Especially important are the maintenance services related to emissions control. These controls not only function to ensure cleaner air but are also vital to proper engine operation and maximum performance. In the following maintenance tables, the services related to emissions control are indicated as “*” in the chart.

PERIODIC MAINTENANCE/LUBRICATION INTERVALS

Item	Remarks	Pre-Operation check (daily)	Initial	Every		
			1 month or 20 Hr	3 months or 50 Hr	6 months or 100 Hr	12 months or 300 Hr
*Spark plug	Check condition, adjust gap and clean. Replace if necessary.			●		
*Valve clearance	Check and adjust when engine is cold.					●
*Crankcase breather system	Check breather hose for cracks or damage. Replace if necessary.					●
*Idle speed	Check and adjust engine idle speed.					●
*Exhaust system	Check for leakage. Retighten or replace gasket if necessary.	●				
	Check muffler screen and spark arrester. Clean/replace if necessary.					●
Engine oil	Check oil level.	●				
	Replace.		●		●	
*Air filter	Clean. Replace if necessary.			●		
Fuel filter	Clean fuel cock and fuel tank filter. Replace if necessary.				●	
Fuel line	Check fuel hose for cracks or damage. Replace if necessary.	●				
*Choke knob	Check choke operation.	●				
Cooling system	Check for fan damage.					●
Starting system	Check recoil starter operation.	●				
*Decarbonization	More frequently if necessary.					●
Fittings/fasteners	Check all fittings and fasteners. Correct if necessary.				●	

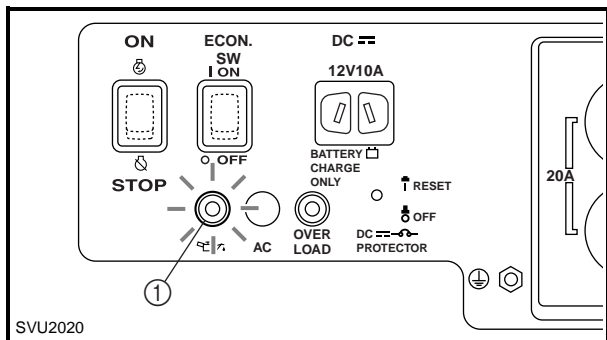
*: Related to emission control system.



ENGINE

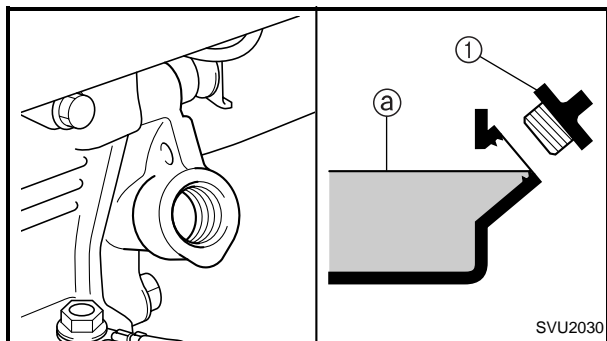
ENGINE OIL LEAKAGE CHECKING

1. Check the areas outside of the engine for oil leakage.
Oil leakage → Replace the gasket, oil seal, or O-ring.



OIL LEVEL CHECKING

1. Check:
 - Oil level with oil warning light ①
Check whether the oil warning light flashes by operating the recoil starter.
Oil warning light flashes → Add oil.
Oil warning light does not flash → OK



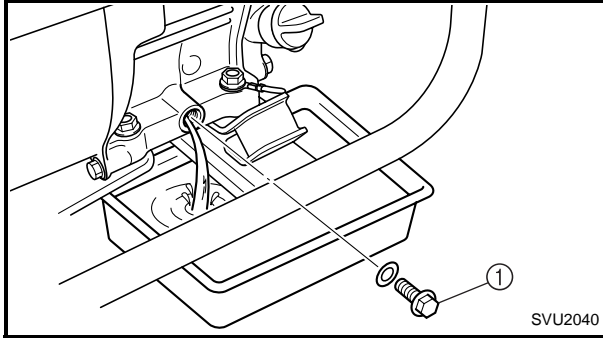
2. Remove:
 - Oil filler cap ①
3. Check:
 - Check that the engine oil is at the specified level ②.

Oil level checking steps:

- Place the engine on a level surface.
 - Warm up the engine for several minutes.
 - Stop the engine.
 - Check that the engine oil is at the specified level ②. Add oil if necessary.
4. Install:
 - Oil filler cap

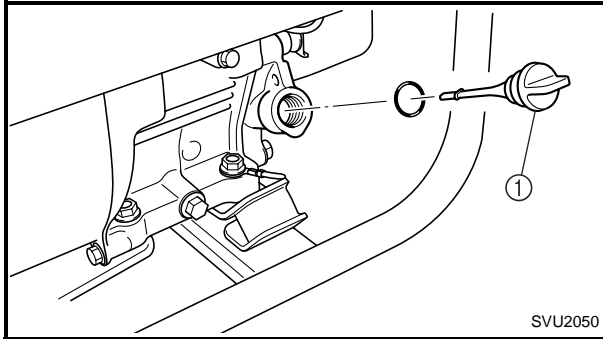
OIL REPLACEMENT

1. Warm up the engine for several minutes.
2. Stop the engine.
3. Place a receptacle under the engine.
4. Remove:
 - Oil filler cap
5. Tilt the engine to drain the oil completely.




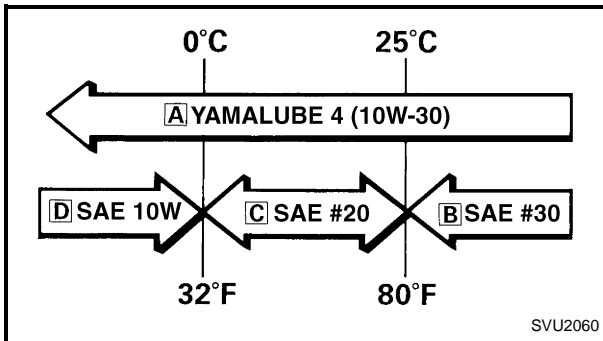
6. Tighten:
 - Oil drain bolt ①

	Oil drain bolt: 17 Nm (1.7 m · kg, 12 ft · lb)
---	---



7. Remove:
 - Oil filler cap ①
8. Fill:

	Recommended oil: A YAMALUBE 4 (10W-30) or SAE 10W-30 type SE B SAE #30 C SAE #20 D SAE 10W Engine oil quantity: 0.6 L (0.53 Imp qt, 0.63 US qt)
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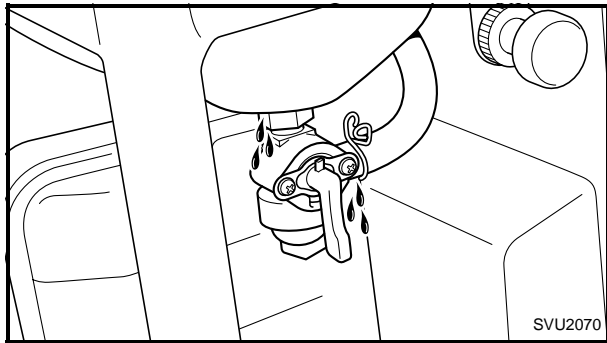


NOTE: _____
 Recommended engine oil classification:
 API Service "SE" or "SF", if not available, "SD".

9. Install:
 - Oil filler cap

FUEL LEAKAGE/ FUEL COCK STRAINER INSPECTION

INSP
ADJ

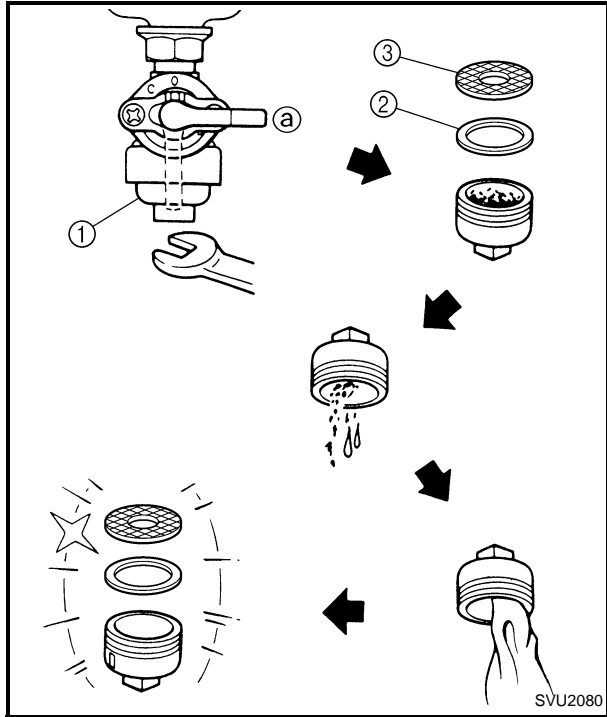


FUEL LEAKAGE

1. Check:
 - Leakage
Check at fuel tank, fuel cock, fuel hose, and carburetor.

CAUTION: _____

Replace hose every four years.



FUEL COCK STRAINER INSPECTION

1. Turn the fuel cock to the "OFF" (a) position, detach the strainer cup, and then remove the debris from inside the cup.
2. Remove:
 - Fuel cock cup (1)
 - Gasket (2)
 - Strainer (3)
3. Inspect:
 - Fuel cock cup
Dirt/debris → Clean.
 - Gasket (2)
Damage → Replace.
 - Strainer (3)
Dirt/debris → Clean.

NOTE: _____

Clean the cup with solvent, and then dry it thoroughly.

4. Install:
 - Strainer
 - Gasket
 - Fuel cock cup



Fuel cock cup:
1.3 Nm (0.13 m · kg, 0.94 ft · lb)

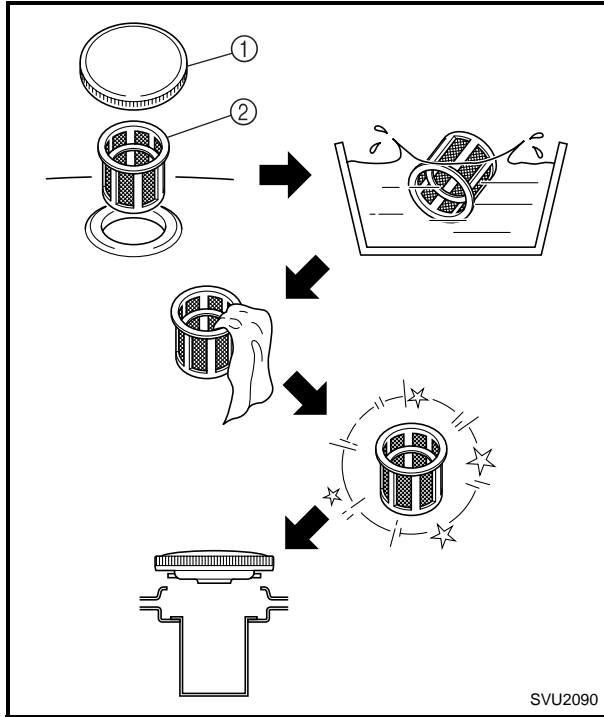
CAUTION: _____

Securely install the strainer cup to prevent fuel leaks.

FUEL TANK FILTER

⚠ WARNING

Do not smoke, and keep away from open flames, sparks, or any other source of fire when handling or in the vicinity of fuel.



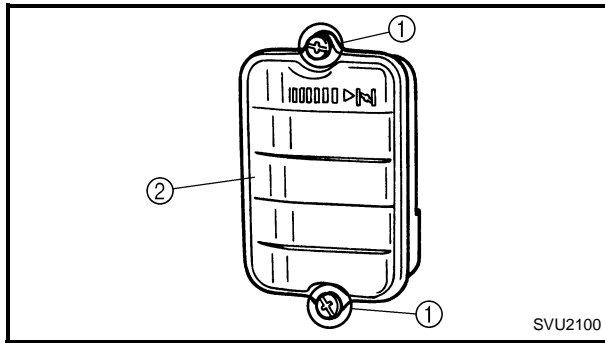
1. Remove:
 - Fuel tank cap ①
 - Fuel tank filter ②
2. Inspect:
 - Fuel tank filter
 - Damage → Replace.
3. Clean:
 - Fuel tank filter

NOTE: _____
Clean the fuel tank filter with solvent, and then dry it thoroughly.

4. Install:
 - Fuel tank filter
 - Fuel tank cap

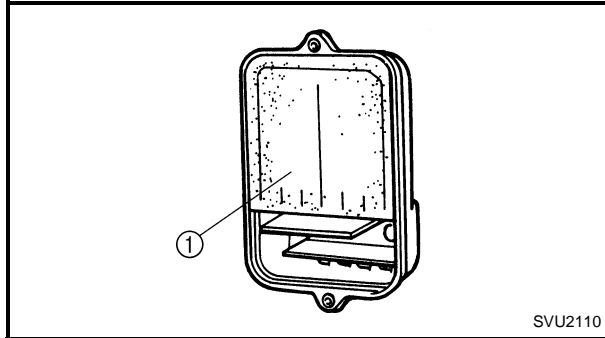
⚠ WARNING

Be sure the tank cap is tightened securely.

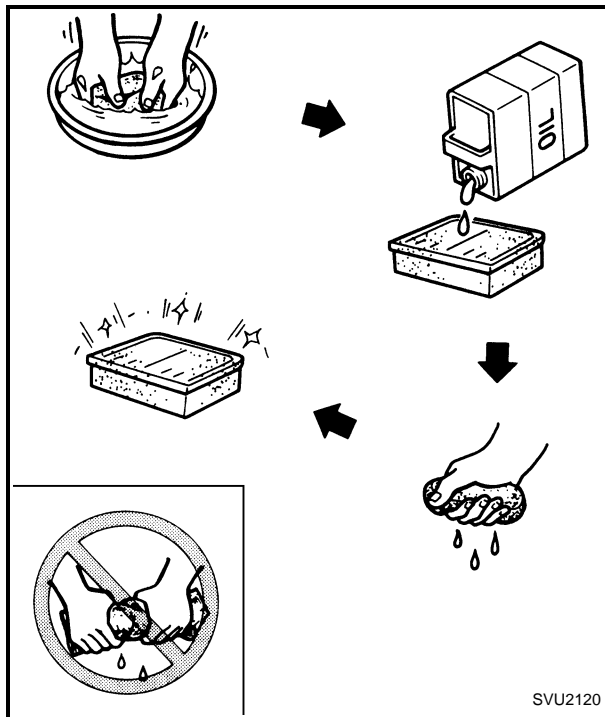


AIR FILTER ELEMENT

1. Remove:
 - Screws ①
 - Air filter case cover ②



2. Remove:
 - Air filter element ①



3. Inspect:
 - Element
 - Damage → Replace.
 - Clogging → Wash the element in a solvent, and then dry it thoroughly.
 - Oil the element and squeeze out the excess oil.

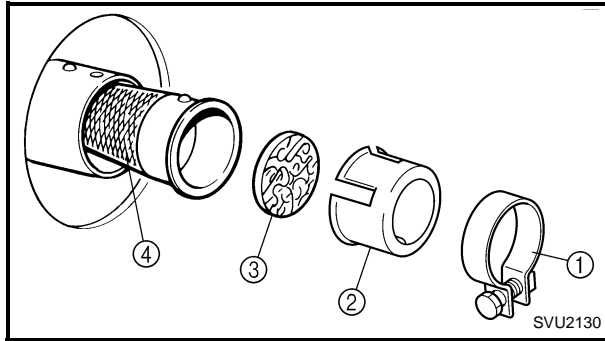
CAUTION: _____

- Do not wring out the element: this could cause it to tear.
- Do not wash the element in gasoline or in acidic, alkaline, or organic solvents.

4. Install:
 - Air filter element
 - Air filter case cover
 - Screws

CAUTION: _____

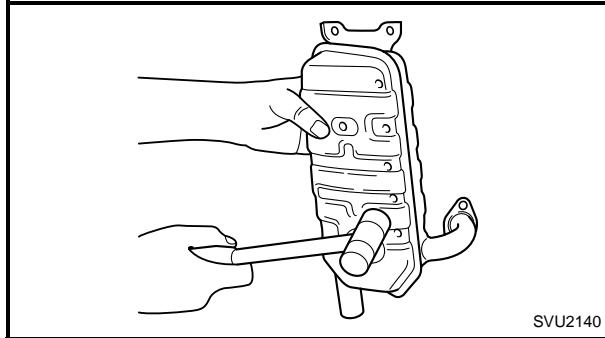
The engine should never run without the element, otherwise excessive piston and/or cylinder wear may result.



MUFFLER

1. Remove:

- Muffler
Refer to “MUFFLER AND AIR CLEANER” in CHAPTER 3.
- Muffler band ①
- Muffler cap ②
- Muffler screen ③
- Spark arrester ④

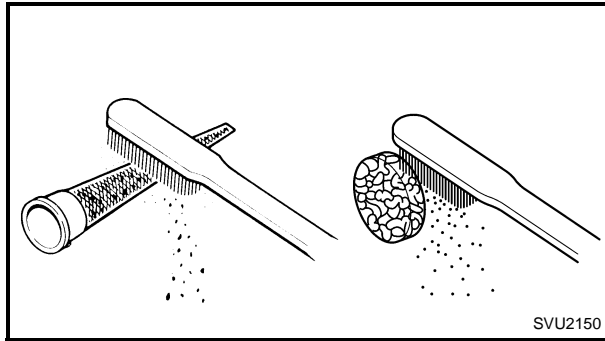


2. Decarbonize:

- Muffler
Tap on the muffler in the area shown in the illustration to loosen carbon buildup, and then shake it out of the end of the muffler.

CAUTION:

Don't use a wire to clean, otherwise the noise damping material may come out, and the damping effect may be reduced.



3. Decarbonize:

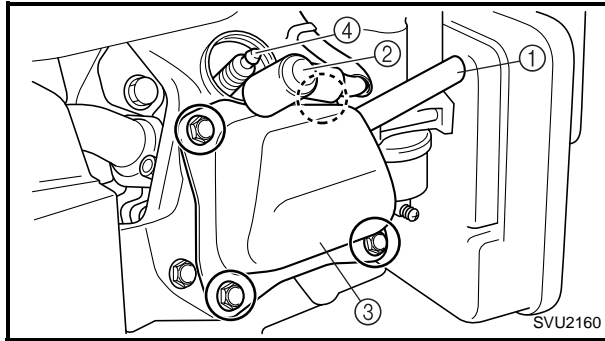
- Muffler screen
- Spark arrester

4. Install:

- Spark arrester
- Muffler screen
- Muffler cap
- Muffler band
- Muffler

Refer to “MUFFLER AND AIR CLEANER” in CHAPTER 3.

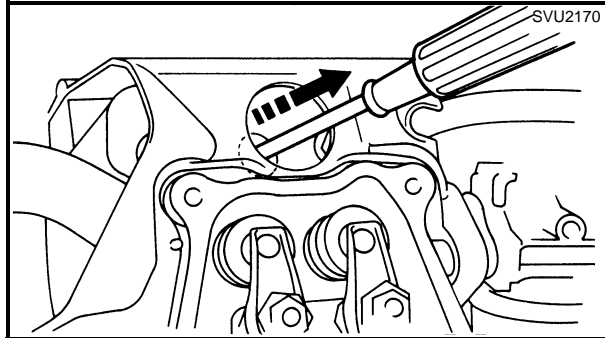
VALVE CLEARANCE ADJUSTMENT



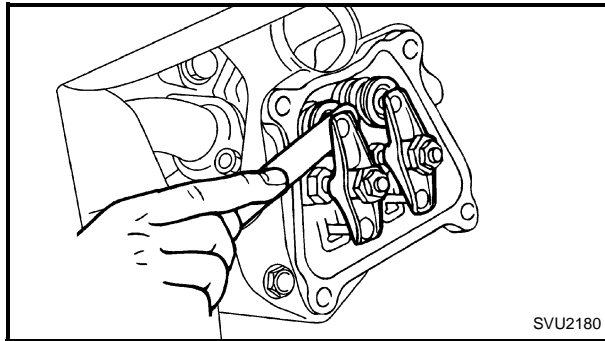
VALVE CLEARANCE ADJUSTMENT

1. Remove:

- Breather hose ①
- Spark plug cap ②
- Cylinder head cover ③
- Spark plug ④



- ### 2. Gently operate the starter rope to bring the piston to the top-dead-center of its compression stroke (when the screwdriver inserted into the spark plug hole reaches the highest position).



3. Measure:

- Valve clearance
Out of specification → Adjust.

NOTE:

Valve clearance must be measured when the engine is cool to the touch.

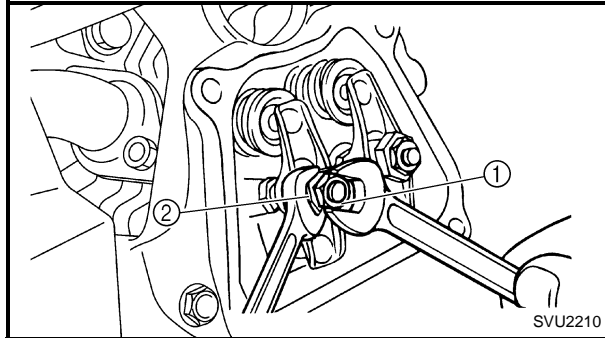
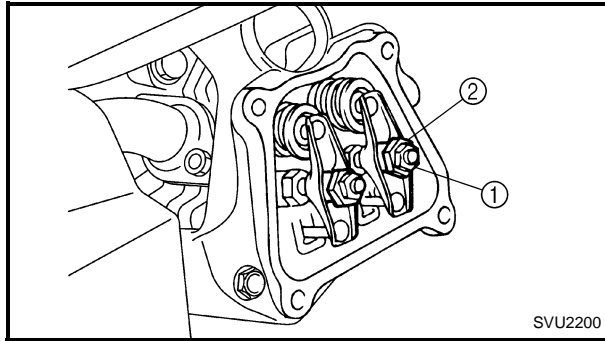


Intake Valve (cold)
0.1 mm (0.004 in)
Exhaust Valve (cold)
0.1 mm (0.004 in)



Thickness gauge:
YU-26900-9, 90890-03079

VALVE CLEARANCE ADJUSTMENT




4. Adjust:
- Valve clearance

Adjustment steps:


- Loosen the locknut ①.
- Turn the adjuster ② in or out to obtain the proper clearance.

Adjuster	Valve clearance
Turn in	Decrease
Turn out	Increase

- Tighten the locknut ①.

	<p>Locknut: 10 Nm (1.0 m · kg, 7.2 ft · lb)</p>
---	--

5. Install:
- Cylinder head cover
 - Breather hose
 - Spark plug
 - Spark plug cap

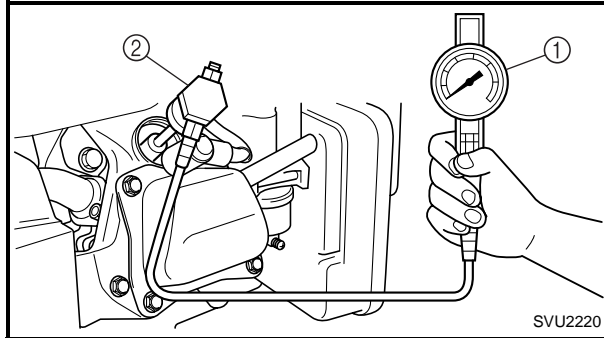
	<p>Cylinder head cover bolt: 10 Nm (1.0 m · kg, 7.2 ft · lb) Spark plug: 18 Nm (1.8 m · kg, 13 ft · lb)</p>
---	--

COMPRESSION PRESSURE

NOTE:

Measure the compression after checking and adjusting the valve clearance.

1. Warm up the engine for several minutes.
2. Remove:
 - Spark plug



3. Connect:
 - Compression gauge ①
 - Adapter ②



Compression gauge:
YU-33223, 90890-03081
Adapter:
YU-33223-3, 90890-04082

4. Measure:
 - Compression
 To measure the compression, pull the recoil starter until the needle stops rising on the compression gauge.



Standard compression pressure:
400 ~ 600 kPa
(4 ~ 6 kg/cm², 57 ~ 85 psi)

⚠ WARNING

To prevent sparking when cranking the engine, ground the high-tension cord.

Testing steps (below minimum level):

- Squirt a few drops of oil into the cylinder.
- Measure the compression again.


Reading	Diagnosis
If higher than without oil	<ul style="list-style-type: none"> • Worn cylinder, piston, and piston ring
If the same as without oil	<ul style="list-style-type: none"> • Defective piston, ring(s), valve(s), and cylinder head gasket • Improper valve timing and valve clearance

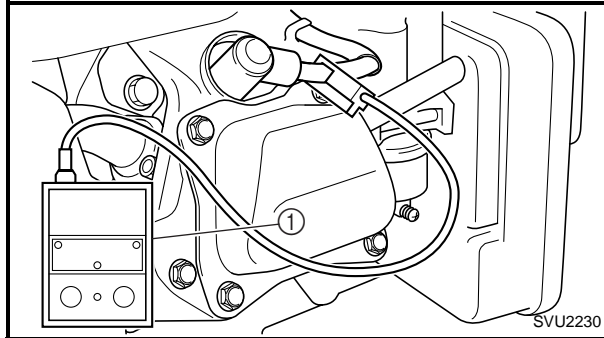
Testing steps (above maximum level):

- Check the cylinder head, valve surfaces, and piston crown for carbon deposits.

5. Install:

- Spark plug


	Spark plug: 18 Nm (1.8 m · kg, 13 ft · lb)
---	---

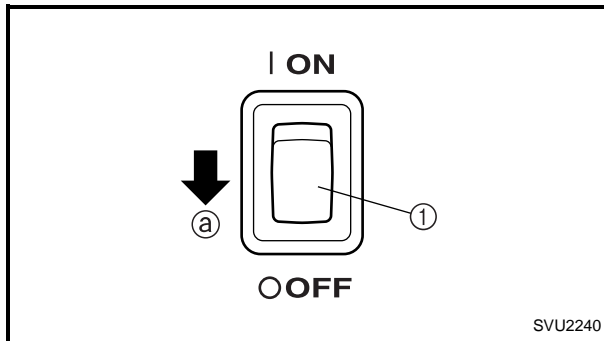


RATED ENGINE SPEED

1. Connect:

- Inductive tachometer ①

	Inductive tachometer: YU-8036-A Engine tachometer: 90890-03113
---	---



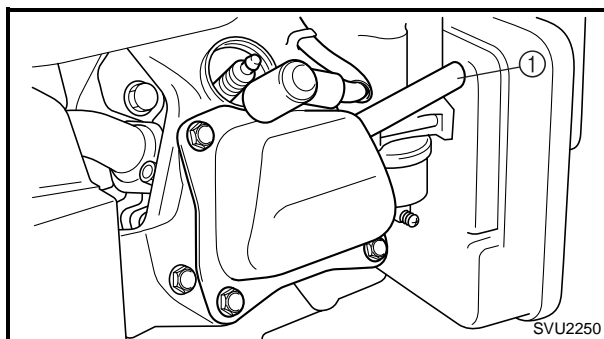
2. Inspect:

- Rated engine speed
Specified engine speed → OK
Out of specification → Refer to “TROUBLESHOOTING” in CHAPTER 3.

Inspection steps:

- Operate the engine (with no load).
- Turn economy switch ① to “OFF” ②.
- Measure the rated engine speed.

	Rated engine speed: 3,550 r/min
---	--



BREATHER HOSE

1. Inspect:

- Breather hose ①
Cracks/damage → Replace.
Poor connection → Correct.



**ELECTRICAL
SPARK PLUG**

⚠ WARNING

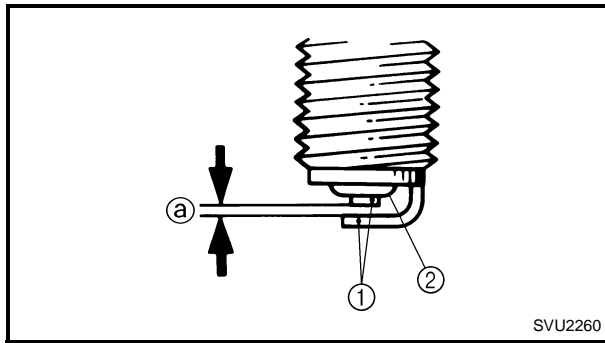
Inspect and adjust the areas around the cylinder head after the engine has cooled down completely.

CAUTION:

Before removing the spark plug, use compressed air to clean the cylinder head cover to prevent dirt from falling into the engine.

1. Remove:

- Spark plug cap
- Spark plug



SVU2260

2. Inspect:

- Electrode ①
Wear/damage → Replace.
- Insulator color ②

3. Measure:

- Spark plug gap ③
Use a wire gauge or thickness gauge.
Out of specification → Regap.



**Spark plug gap:
0.7 ~ 0.8 mm (0.028 ~ 0.031 in)**

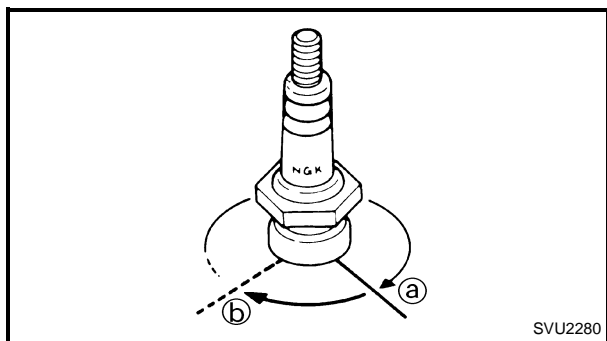
If necessary, clean the spark plug with a spark plug cleaner.

**Standard spark plug (with resistor):
BPR4ES (NGK)**



SVU2270

Before installing the spark plug, clean the gasket surface and plug surface.

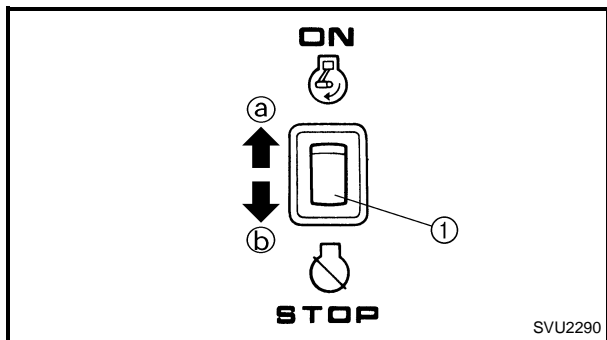


4. Tighten:
- Spark plug



Spark plug:
18 Nm (1.8 m · kg, 13 ft · lb)

NOTE: _____
To prevent thread damage, finger tighten (a) the spark plug before tightening it to the specified torque (b).

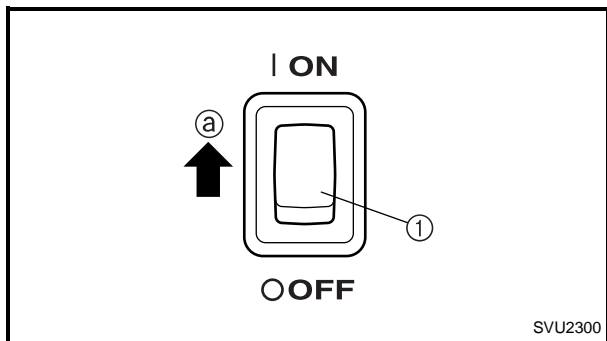


ENGINE SWITCH

1. Check:
- Engine switch ①

Checking steps:

- Set the engine switch ① to "ON" (a).
- Start the engine.
- Check that the engine stops when the switch is set to "STOP" (b).

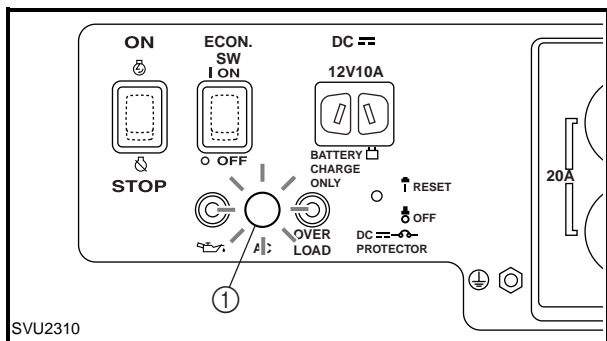


ECONOMY SWITCH

1. Check:
- Economy switch ①

Checking steps:

- Set the economy switch ① to "ON" (a).
- Start the engine.
- Turn the switch of the electric device connected to the AC outlet "ON" and "OFF" to check whether the engine speed increases and decreases.

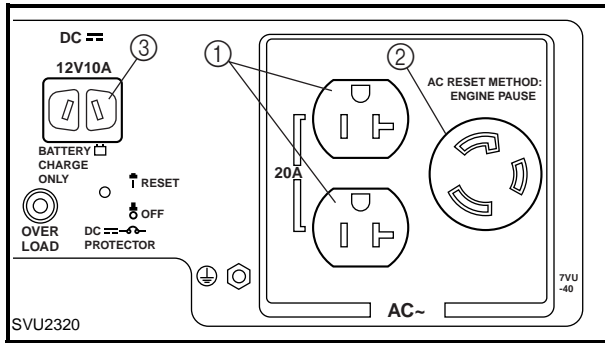


PILOT LIGHT

1. Check:
- Pilot light ①

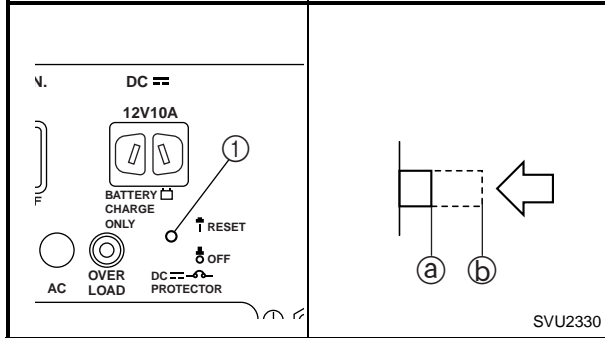
Checking steps:

- Start the engine.
- Make sure that the pilot light ① turns on.



RECEPTACLE

- Check:
 - AC receptacles (20 A) ①
 - AC receptacle (30 A) ②
 - DC receptacle (12 V, 10 A) ③
 Cracks/damage → Replace.
 Poor connection → Correct.



DC CIRCUIT BREAKER

- Check:
 - DC circuit breaker

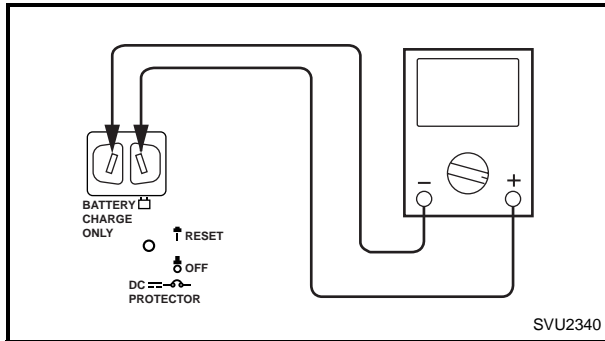
Checking steps:

- Press the reset button ① to the position of "RESET" ①.
- Connect the pocket tester (DC 20 V).



Pocket tester:
YU-03112, 90890-03112

- Start the engine.
- Set the economy switch to "OFF".
- Measure the DC voltage.



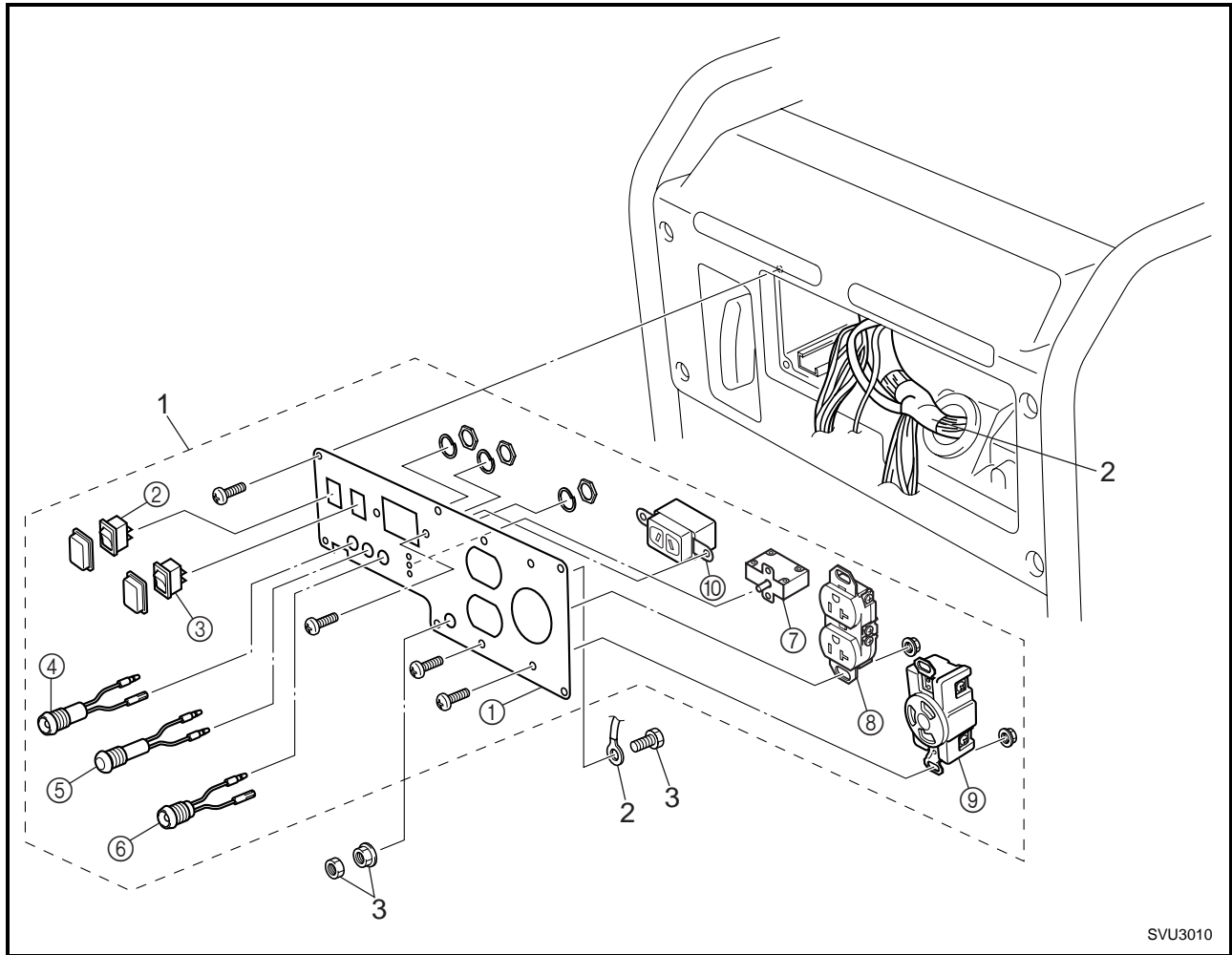
DC voltage:
More than 12 V at 3,550 r/min
(with no load at AC output current)

- Set the reset button to "OFF" ②.
Voltage is zero → OK



ENGINE

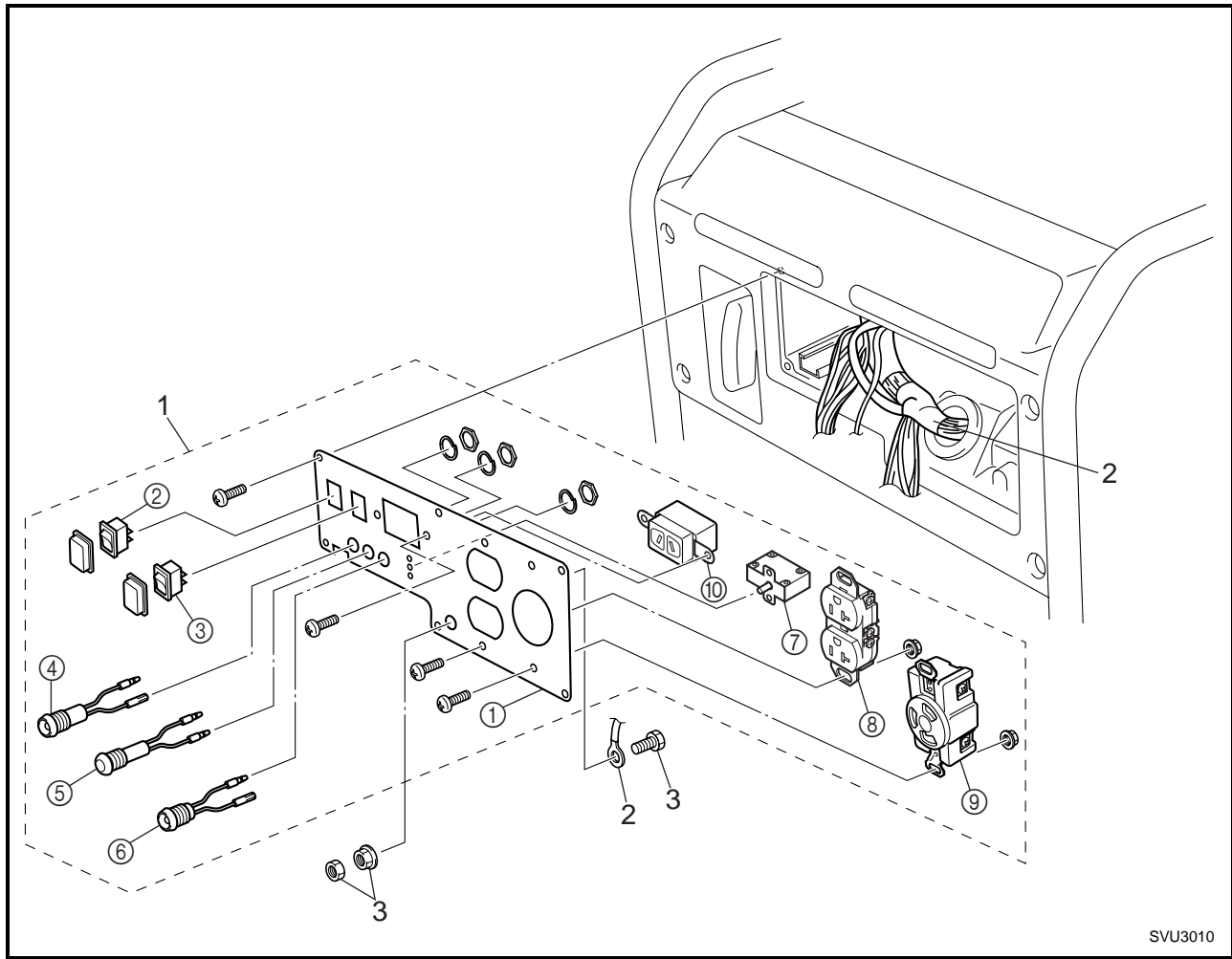
CONTROL PANEL



SVU3010

3

Order	Job name/Part name	Q'ty	Remarks
	Control panel assembly removal		Remove the parts in the order listed below.
1	Control panel assembly	1	
2	Wire harness	1	Disconnect all couplers and lead wires.
3	Ground terminal	1	
			For installation, reverse the removal procedure.

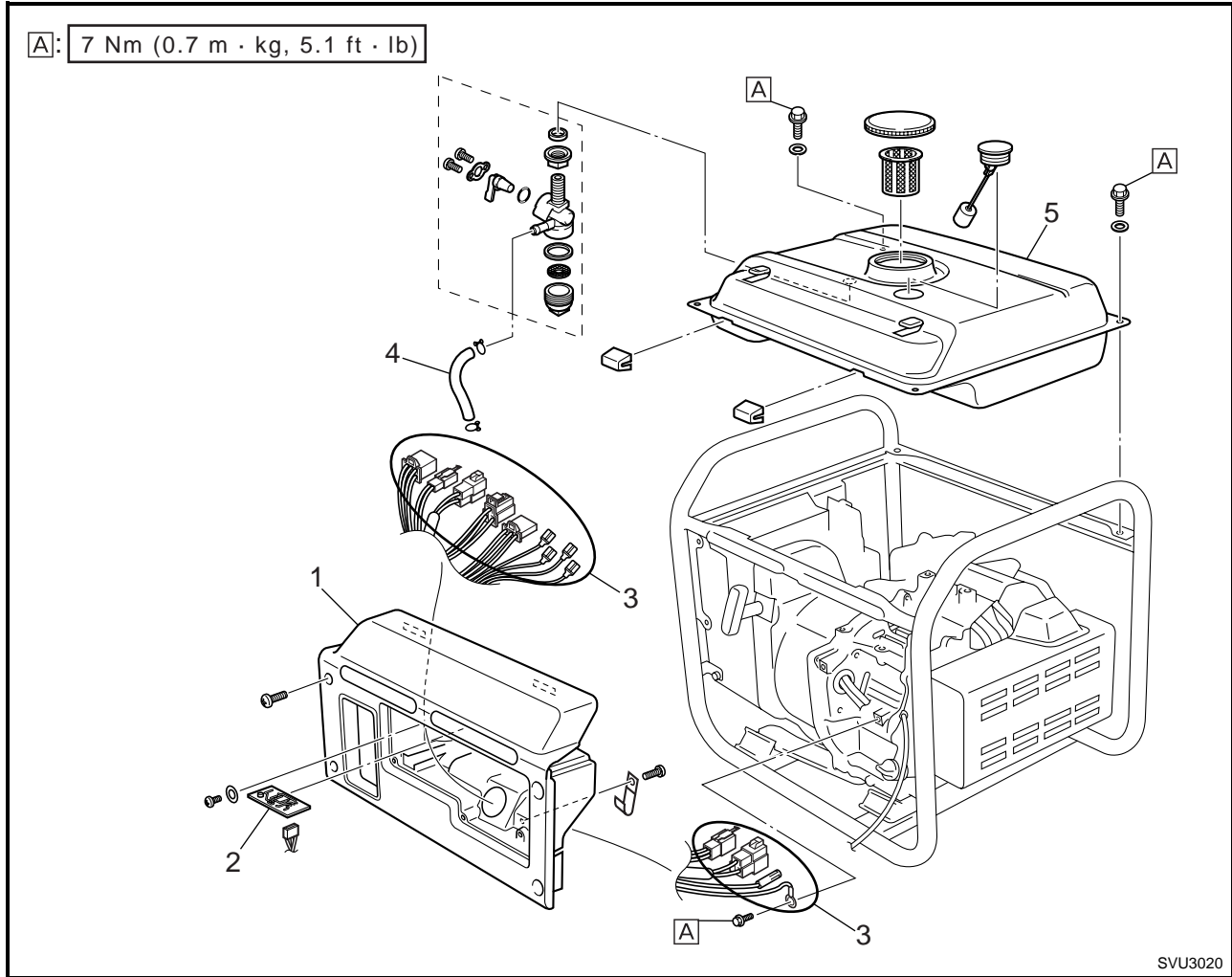


SVU3010

Order	Job name/Part name	Q'ty	Remarks
	Control panel disassembly		Remove the parts in the order listed below.
①	Control panel	1	
②	Engine switch	1	
③	Economy switch	1	
④	Oil warning light	1	
⑤	Pilot light	1	
⑥	Over load warning light	1	
⑦	DC circuit breaker assembly	1	
⑧	AC receptacle (20 A)	1	
⑨	AC receptacle (30 A)	1	
⑩	DC receptacle (12 V-10 A)	1	
			For assembly, reverse the disassembly procedure.



CONTROL BOX COVER AND FUEL TANK

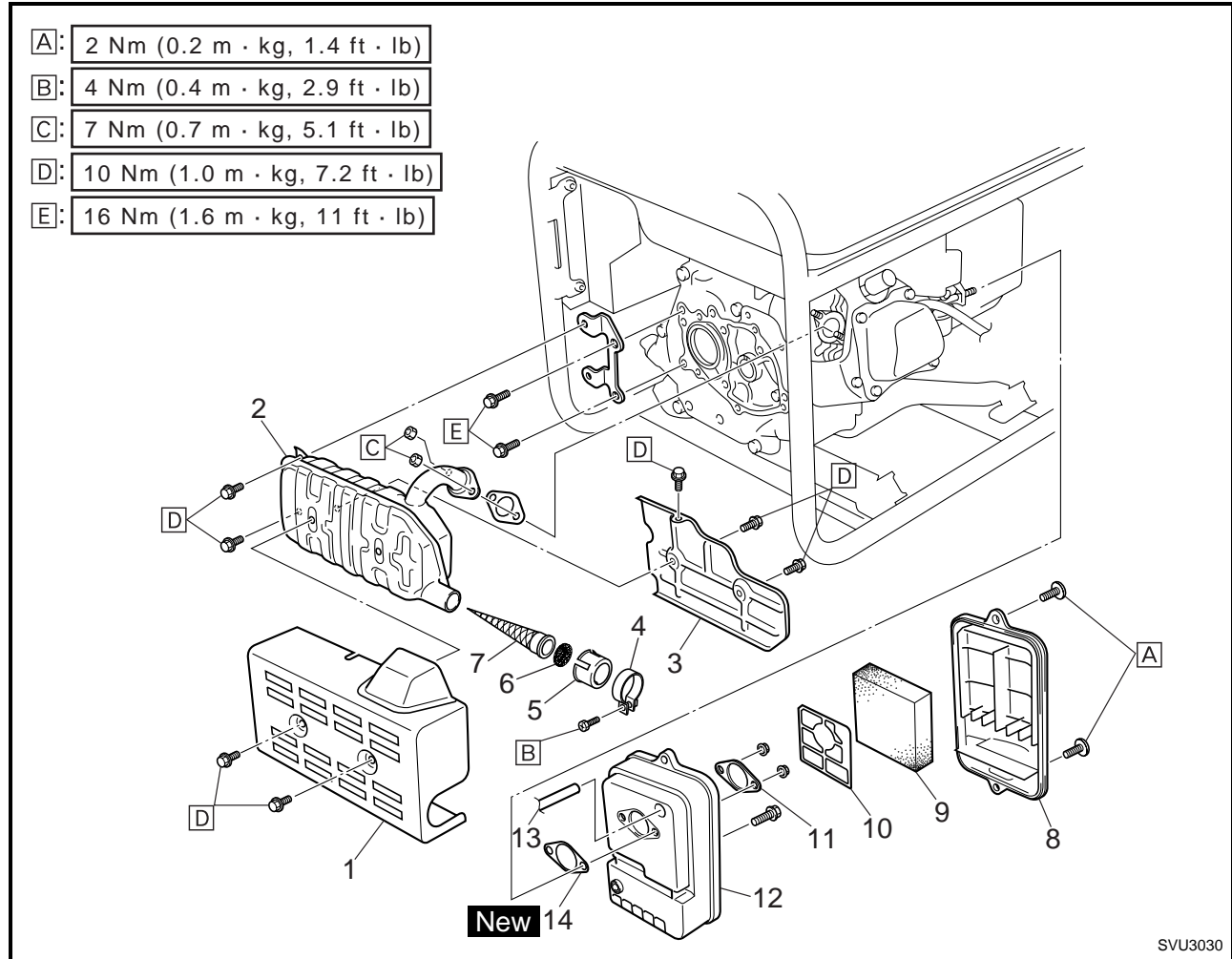


SVU3020

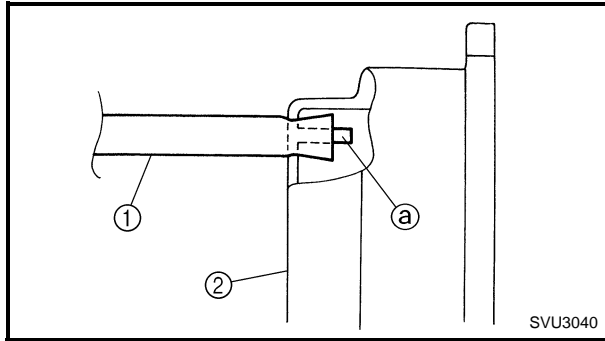
Order	Job name/Part name	Q'ty	Remarks
	Control box cover and fuel tank removal		Remove the parts in the order listed below.
1	Control panel assembly		
1	Control box cover	1	
2	Oil warning unit	1	
3	Wire harness	1	Disconnect all couplers, lead wires and connections.
4	Fuel hose	1	Set the fuel cock "OFF" position.
5	Fuel tank	1	
			For installation, reverse the removal procedure.



MUFFLER AND AIR CLEANER



Order	Job name/Part name	Q'ty	Remarks
	Muffler and air cleaner removal		Remove the parts in the order listed below.
1	Muffler protector 1	1	
2	Muffler	1	
3	Muffler protector 2	1	
4	Muffler band	1	
5	Muffler cup	1	
6	Muffler screen	1	
7	Spark arrester	1	
8	Air filter case cover	1	
9	Air filter element	1	
10	Metal gasket	1	
11	Plate	1	
12	Air filter case	1	
13	Breather hose	1	
14	Gasket	1	
			For installation, reverse the removal procedure.

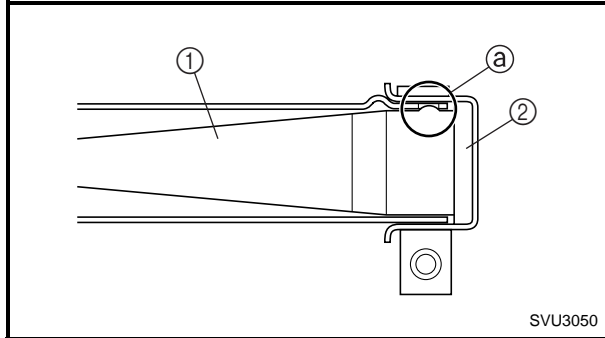


BREATHER HOSE INSTALLATION

1. Install:
 - Breather hose ①
 - Air filter case ②

NOTE: _____

Contact the end of the breather hose ① to the stopper ③ of the air filter case ②.

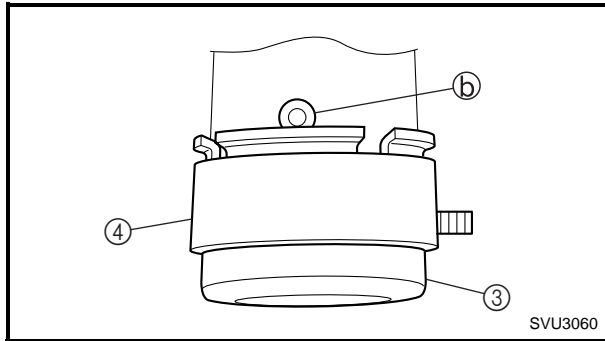


MUFFLER ASSEMBLY

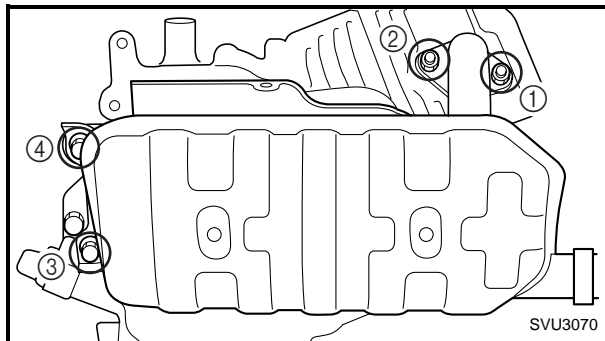
1. Install:
 - Spark arrester ①
 - Muffler screen ②
 - Muffler cap ③
 - Muffler band ④

NOTE: _____

- Align the protrusion ③ located outside the spark arrester with the upper hole in the tail pipe.
- Align the rim of the muffler cap ③ with the protrusion ④ of the tail pipe.
- Contact the protrusion against the rim of the muffler cap ③, without allowing it to enter the slit.




	<p>Muffler band: 4 Nm (0.4 m · kg, 2.9 ft · lb)</p>
---	--



2. Install:
 - Muffler nuts ① and ②
 - Muffler bolts ③ and ④

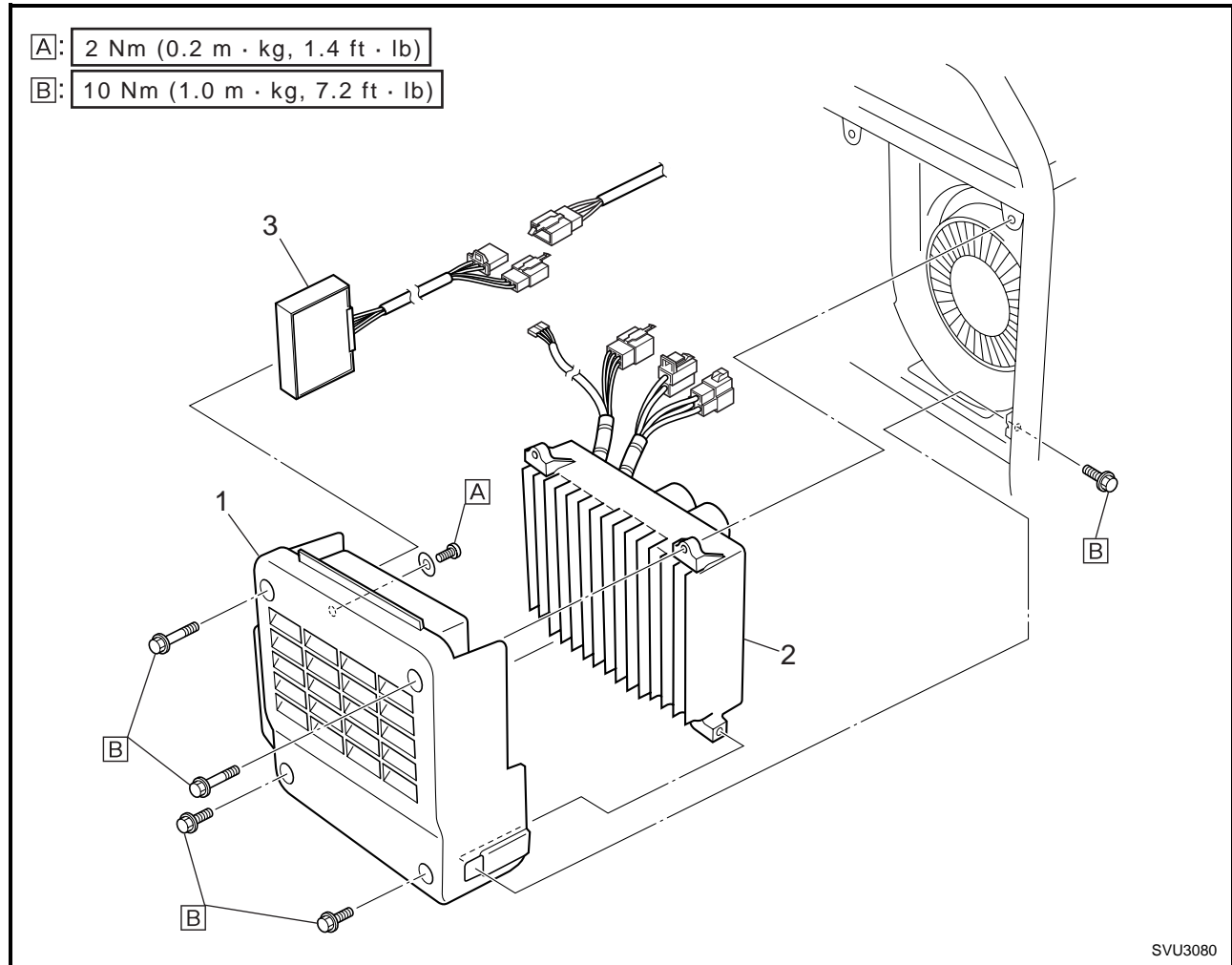
NOTE: _____

Tighten the nuts and bolts to the specified torques in order from ① to ④.

	<p>Muffler nut: 7 Nm (0.7 m · kg, 5.1 ft · lb)</p> <p>Muffler bolt: 10 Nm (1.0 m · kg, 7.2 ft · lb)</p>
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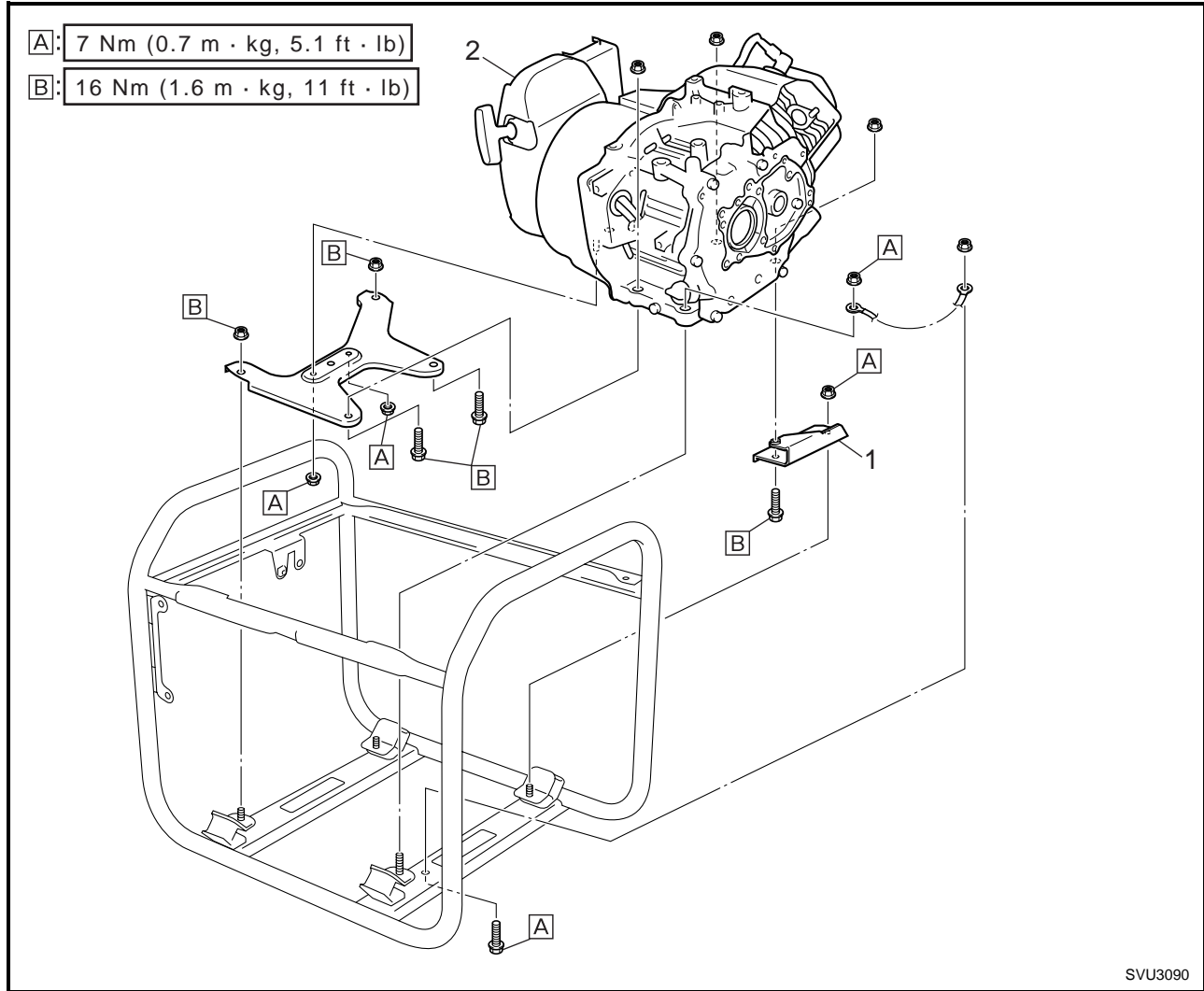
CONTROL UNIT AND AC-CDI UNIT



Order	Job name/Part name	Q'ty	Remarks
	Control unit and AC-CDI unit removal		Remove the parts in the order listed below.
	Air cleaner assembly		Refer to "MUFFLER AND AIR CLEANER".
	Throttle control motor coupler		Refer to "CARBURETOR".
1	Control unit cover	1	
2	Control unit	1	
3	AC-CDI unit	1	
			For installation, reverse the removal procedure.



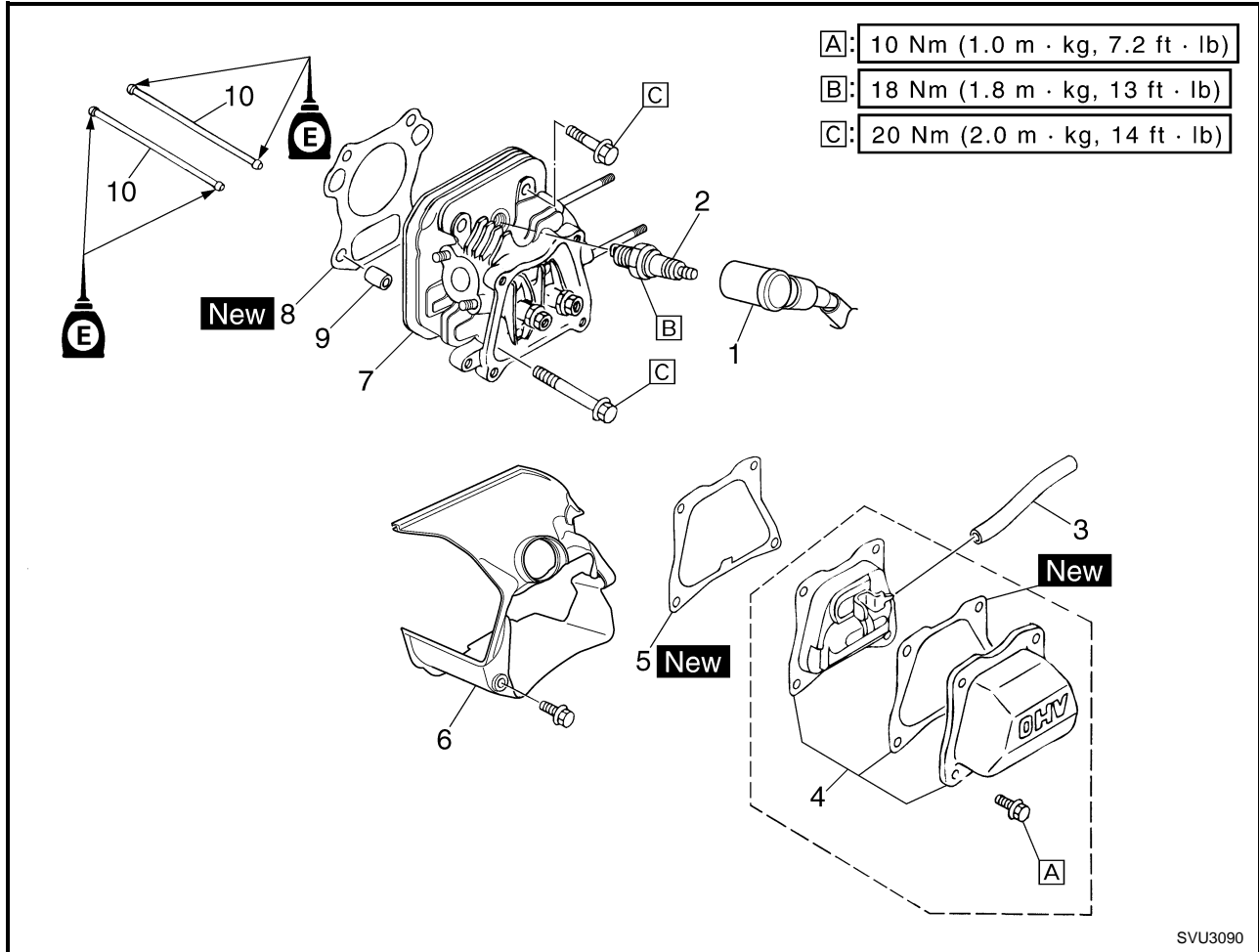
ENGINE



Order	Job name/Part name	Q'ty	Remarks
	Engine removal		Remove the parts in the order listed below.
	Engine oil		Refer to "OIL REPLACEMENT" in CHAPTER 2.
	Control box cover and fuel tank assembly		Refer to "CONTROL BOX COVER AND FUEL TANK".
	Muffler assembly and air cleaner assembly		Refer to "MUFFLER AND AIR CLEANER".
	Control unit and AC-CDI unit		Refer to "CONTROL UNIT AND AC-CDI UNIT".
	Carburetor assembly		Refer to "CARBURETOR".
1	Engine bracket	1	
2	Engine assembly	1	
			For installation, reverse the removal procedure.



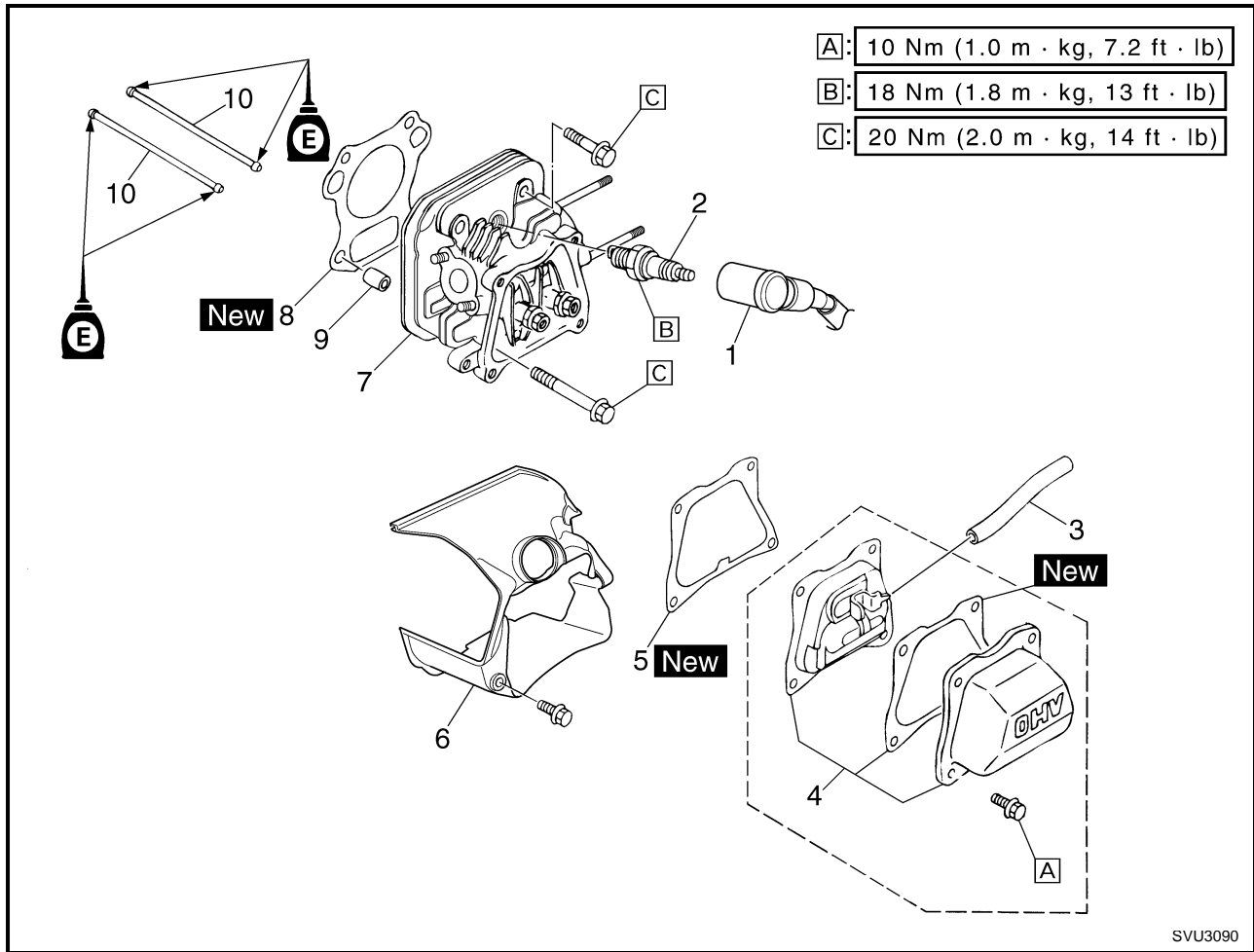
CYLINDER HEAD COVER AND CYLINDER HEAD



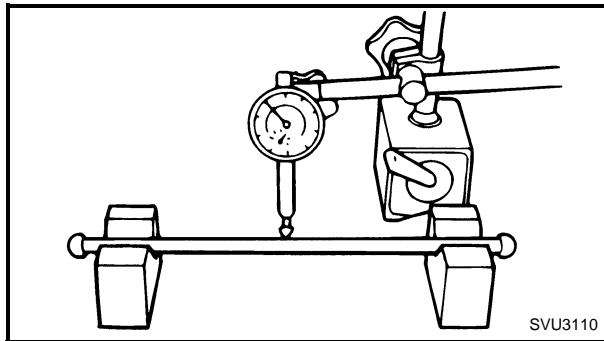
Order	Job name/Part name	Q'ty	Remarks
	Cylinder head cover and cylinder head removal		Remove the parts in the order listed below.
	Control box cover and fuel tank assembly		Refer to "CONTROL BOX COVER AND FUEL TANK".
	Muffler assembly and air cleaner assembly		Refer to "MUFFLER AND AIR CLEANER".
	Control unit cover and control unit		Refer to "CONTROL UNIT AND AC-CDI UNIT".
	Carburetor assembly		Refer to "CARBURETOR".
	Recoil starter, fan case cover, and fan case		Refer to "RECOIL STARTER".
1	Spark plug cap	1	
2	Spark plug	1	
3	Breather hose	1	
4	Cylinder head cover	1	
5	Gasket	1	
6	Air shroud	1	
7	Cylinder head assembly	1	
8	Cylinder head gasket	1	

CYLINDER HEAD COVER AND CYLINDER HEAD

ENG



Order	Job name/Part name	Q'ty	Remarks
9	Dowel pin	2	For installation, reverse the removal procedure.
10	Push rod	2	



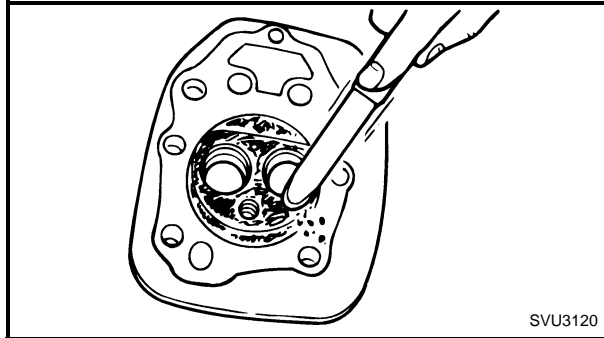
PUSH ROD INSPECTION

1. Measure:
 - Push rod runout



Runout limit:
0.5 mm (0.02 in)

Out of specification → Replace.



CYLINDER HEAD INSPECTION

1. Inspect:
 - Cylinder head combustion chamber
Check the combustion chamber for carbon deposits
Carbon deposits → Remove.

NOTE:

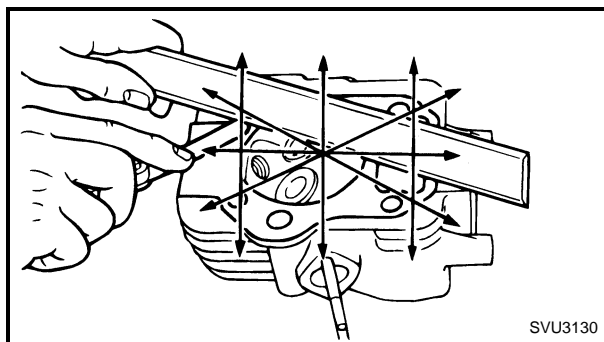
Be sure not to damage the contact surface of the cylinder.

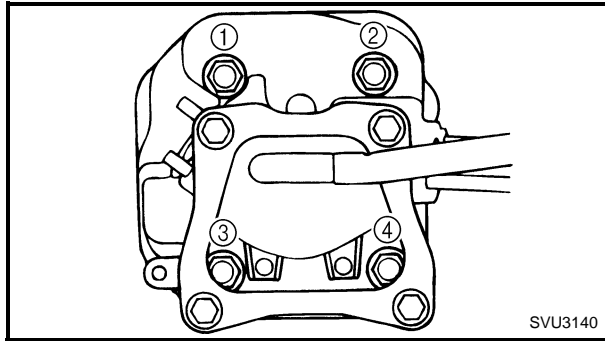
2. Inspect:
 - Cylinder head
Cracks/damage around the hole of spark plug → Replace.
3. Measure:
 - Cylinder head warpage
Measure the warpage on the contact surface of the cylinder head at six points using the straight edge and thickness gauge.



Warpage limit:
0.05 mm (0.002 in)

Out of specification → Resurface or replace.





CYLINDER HEAD ASSEMBLY

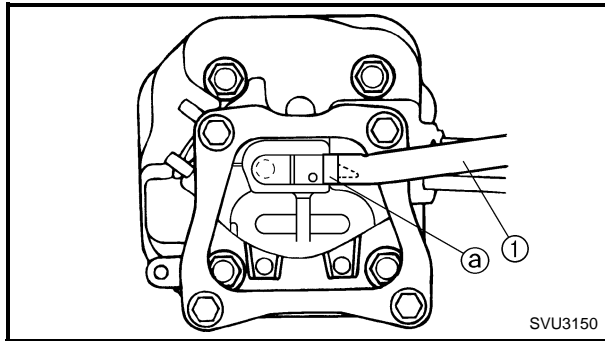
1. Install:
 - Cylinder head bolts ① to ④.

NOTE: _____

Tighten the bolts to the specified torque in two steps and in order from ① to ④.



Cylinder head bolts:
20 Nm (2.0 m · kg, 14 ft · lb)



BREATHER HOSE ASSEMBLY

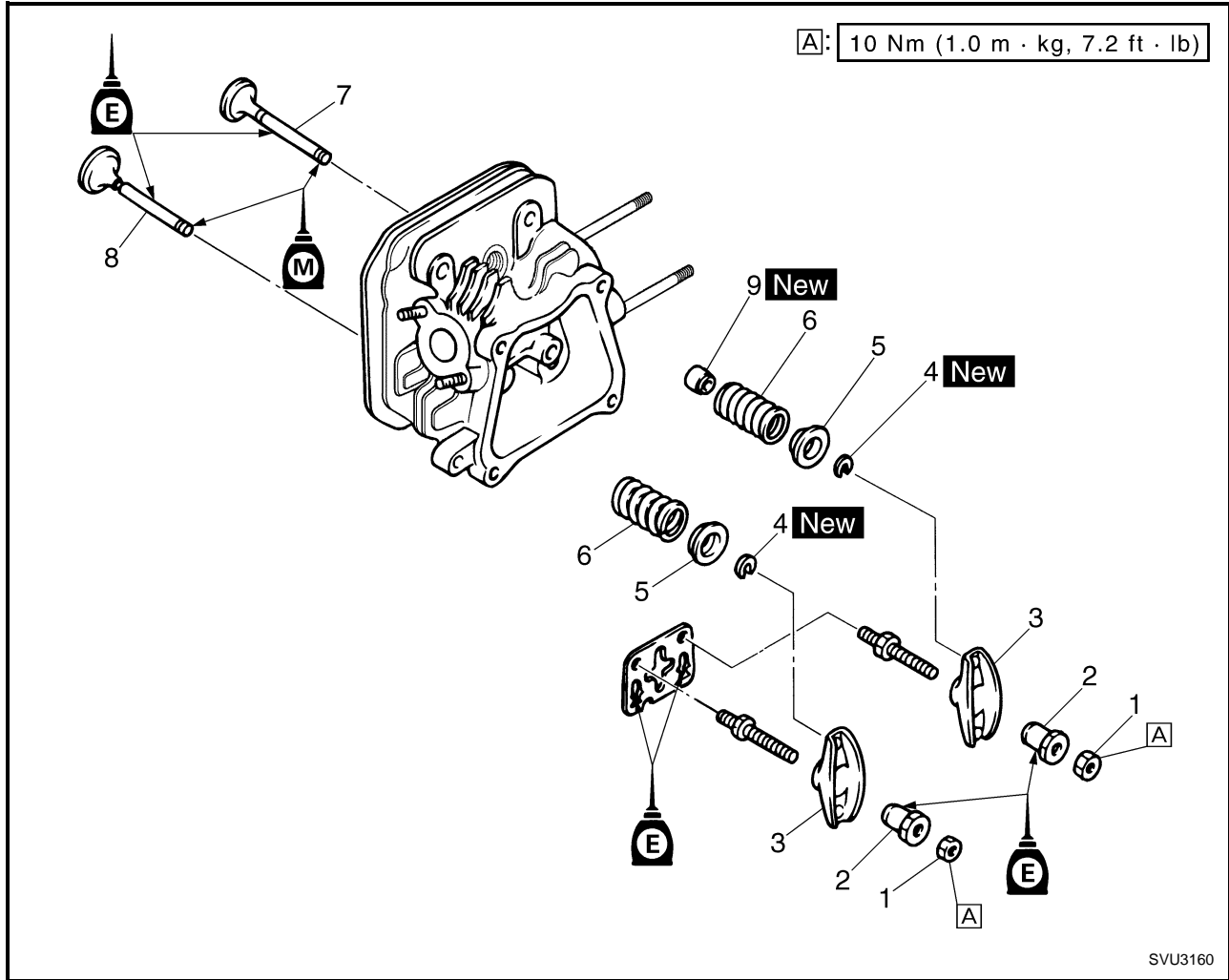
1. Inspect:
 - Breather hose ①

NOTE: _____

Contact the end of the breather hose to the reed valve stopper ②.

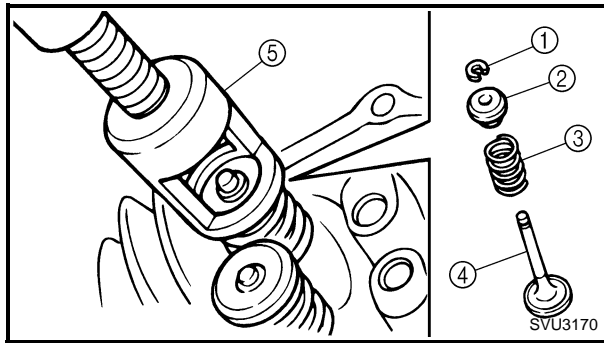


VALVE



SVU3160

Order	Job name/Part name	Q'ty	Remarks
	Valve removal		Remove the parts in the order listed below.
	Cylinder head assembly		Refer to "CYLINDER HEAD COVER AND CYLINDER HEAD".
1	Lock nut	2	
2	Adjuster	2	
3	Locker arm	2	
4	Valve cotter	2	
5	Valve spring retainer	2	
6	Valve spring	2	
7	Valve (intake)	1	
8	Valve (exhaust)	1	
9	Valve stem seal	1	
			For installation, reverse the removal procedure.



VALVE AND VALVE SPRING REMOVAL

1. Remove:

- Valve cotter ①
- Valve spring retainer ②
- Valve spring ③
- Valve ④

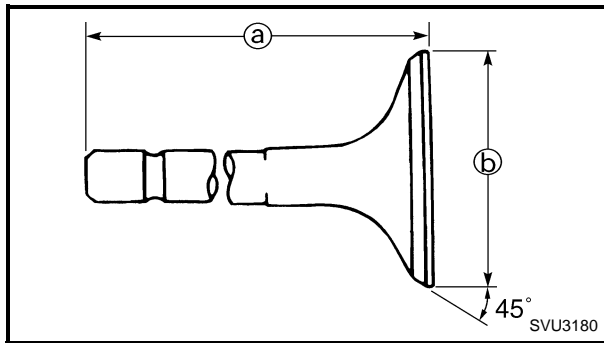
Remove the parts using the valve spring compressor ⑤.

NOTE:

Do not compress the spring more than necessary.



Valve spring compressor:
YM-01253, 90890-01253



VALVE AND VALVE SPRING INSPECTION

1. Measure:

- Valve stem length ①
- Valve face diameter ②



Valve stem length:
Intake: 65.9 mm (2.59 in)
Exhaust: 66.2 mm (2.61 in)
Valve face diameter:
Intake: 24.0 mm (0.94 in)
Exhaust: 22.0 mm (0.87 in)

Out of specification → Replace.

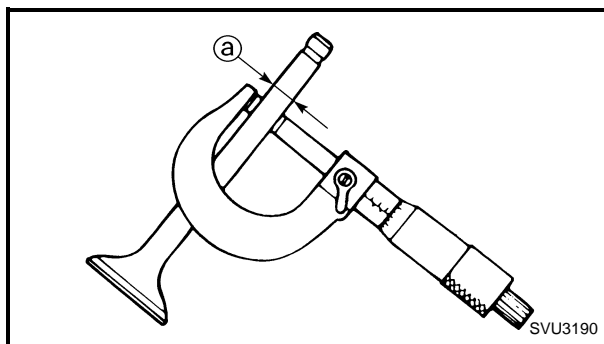
2. Measure:

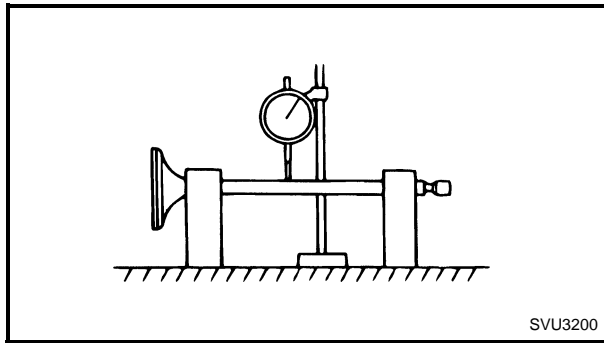
- Valve stem diameter ①



Valve stem diameter:
Intake and exhaust: 5.5mm (0.22 in)
Wear limit
Intake: 5.4 mm (0.21 in)
Exhaust: 5.4 mm (0.21 in)

Out of specification → Replace.





3. Measure:

- Valve stem runout

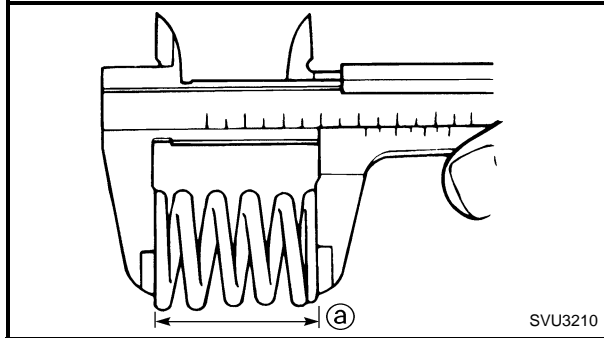


Runout limit:
0.01 mm (0.0004 in)

Out of specification → Replace.

NOTE:

The value is half of that indicated on the dial gauge.



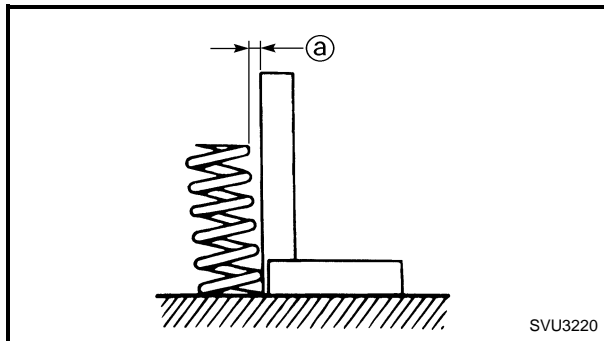
4. Measure:

- Valve spring free length ^a



Valve spring free length:
Intake and exhaust: 26.5 mm
(1.04 in)
Limit: 25.0 mm (0.98 in)

Out of specification → Replace.



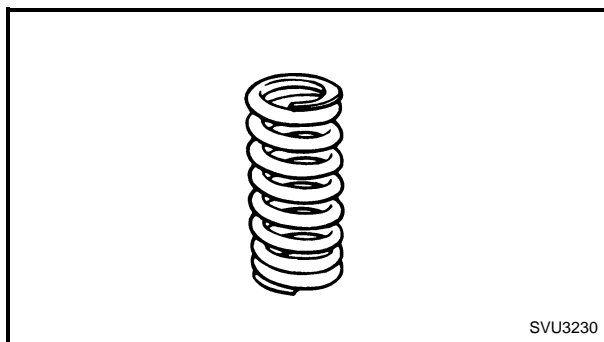
5. Measure:

- Valve spring tilt ^a



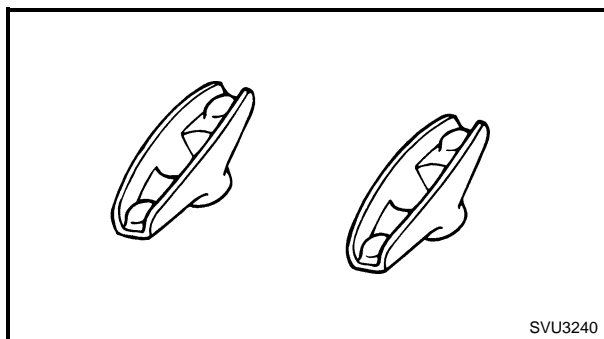
Tilt limit:
1.6 mm (0.06 in)

Out of specification → Replace.



6. Inspect:

- Valve spring contact surface
More than 2/3 of the contact surface does not contact → Replace.

**LOCKER ARM INSPECTION**

1. Inspect:

- Locker arm
Wear/damage/cracks → Replace.

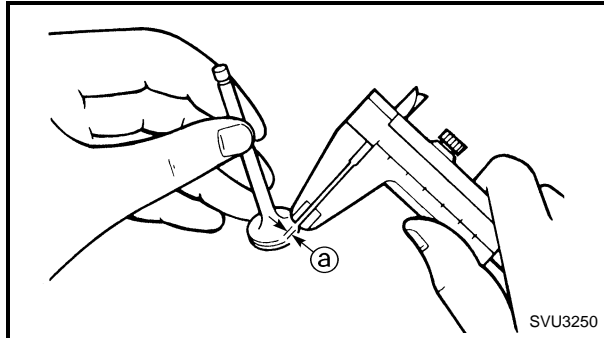


VALVE SEAT INSPECTION

1. Remove carbon deposits from the valve face and valve seat.
2. Apply a small amount of coarse mechanic's blueing dye (Dykem) to the valve face.
3. Insert the valve into the valve guide and use a valve lapper to contact the valve face with the valve seat.

NOTE:

Do not rotate the valve while the valve face is contacting the valve seat.



4. Measure:

- Valve face contact width (a)
Make sure that the contact width along the entire valve face is within specifications.

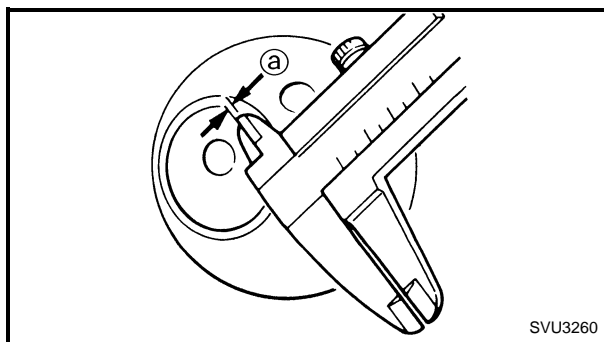


Valve face contact width (intake and exhaust):

0.7 mm (0.03 in)

Limit: 1.7 mm (0.067 in)

Out of specification/rough/eccentric wear → Replace.



5. Measure:

- Valve seat contact width (a)
Make sure that the contact width along the entire valve seat is within specifications.

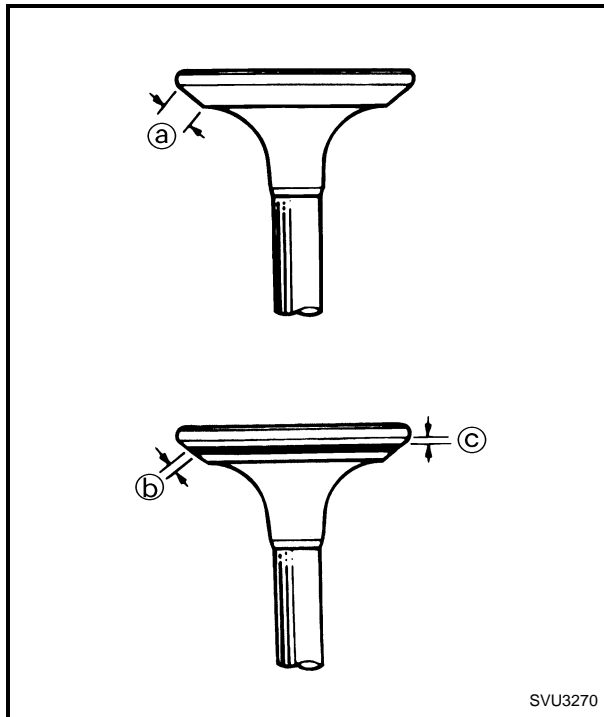


Valve seat contact width (intake and exhaust):

0.7 mm (0.03 in)

Limit: 1.7 mm (0.067 in)

Out of specification/rough/eccentric wear → Replace.



6. Remove the carbon deposits on the valve face ① and valve seat.

- Valve face contact seat width ①
- Valve margin thickness ②

Apply a small amount of coarse mechanic's blueing dye (Dykem) to the valve seat.

Press the valve through the valve guide and onto the valve seat to make a clear impression.

- Valve margin thickness
Out of specification → Replace.
- Valve face contact width
Out of specification → Replace.

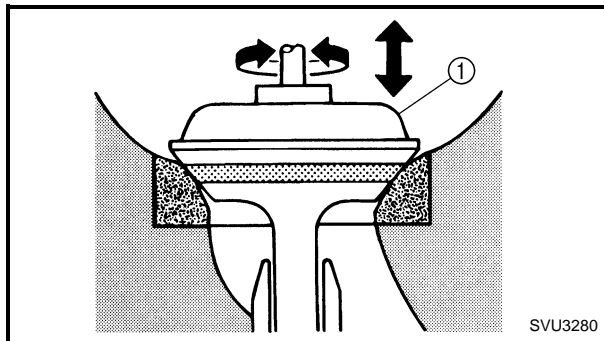


Valve seat width:

0.7 mm (0.03 in)

Valve margin thickness:

0.3 mm (0.012 in)



VALVE LAPPING

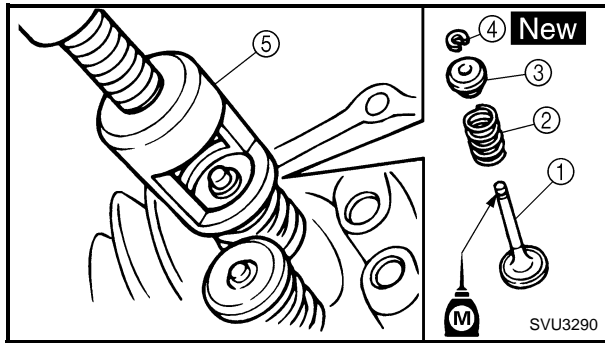
1. Apply a coarse lapping compound evenly on the valve face. Lap the valve by tapping and rotating the valve lapper ① clockwise and counterclockwise.
2. Clean off all of the lapping compound from the valve face and valve seat. Apply fine lapping compound on the valve face and lap the valve as in step 1.
3. If the contact width on the valve face shines white along the entire face, apply mechanic's blueing dye (Dykem) to make sure that there are traces of even contact in the center of the valve face.

CAUTION:

Do not let the lapping compound enter the gap between the valve stem and the valve guide.

NOTE:

After every lapping procedure, clean off the compound from the valve face and valve seat.



VALVE AND VALVE SPRING ASSEMBLY

1. Install:

- Valve ①
- Valve spring ②
- Valve spring retainer ③
- Valve cotter ④ **New**

Apply a small amount of molybdenum disulfide oil to the valve stem and use the valve spring compressor ⑤ to install the parts.



Valve spring compressor:
YM-01253, 90890-01253

CAUTION:

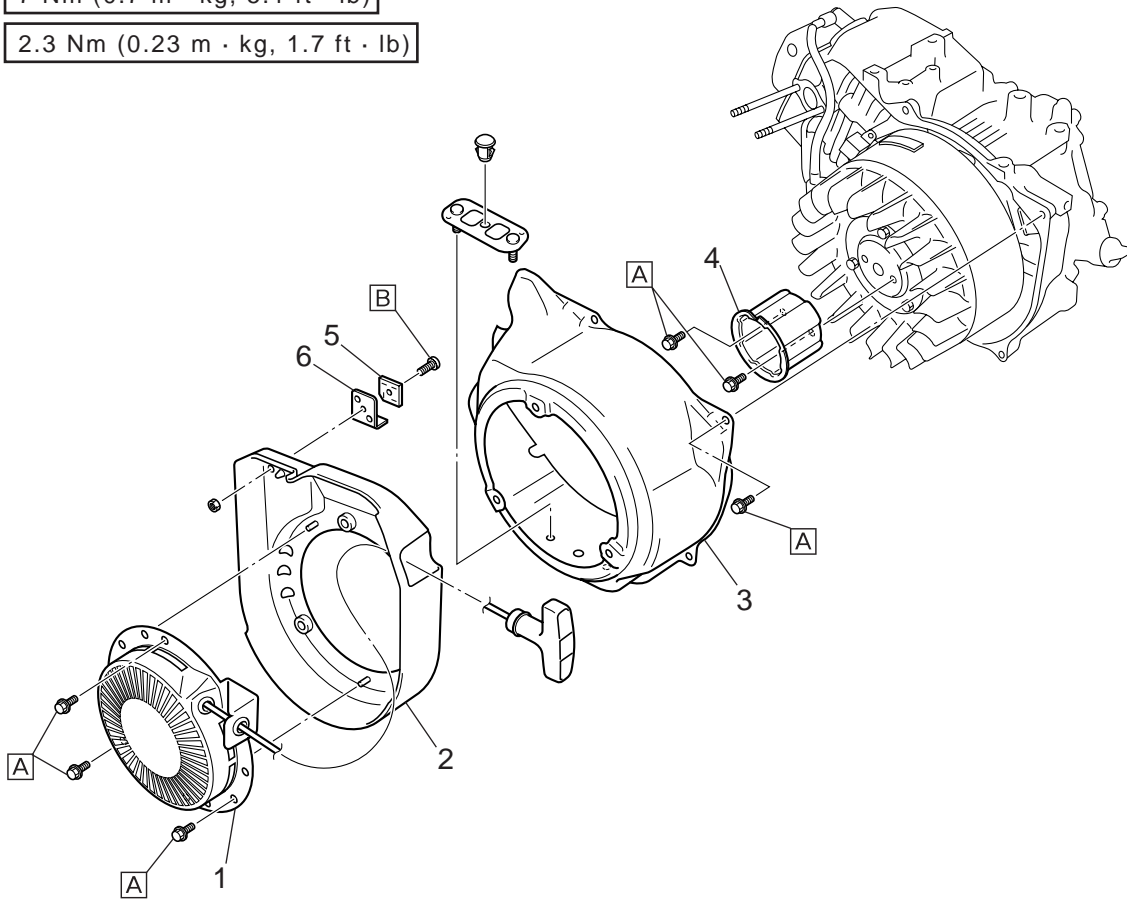
Do not compress the valve spring more than necessary.



RECOIL STARTER

A: 7 Nm (0.7 m · kg, 5.1 ft · lb)

B: 2.3 Nm (0.23 m · kg, 1.7 ft · lb)

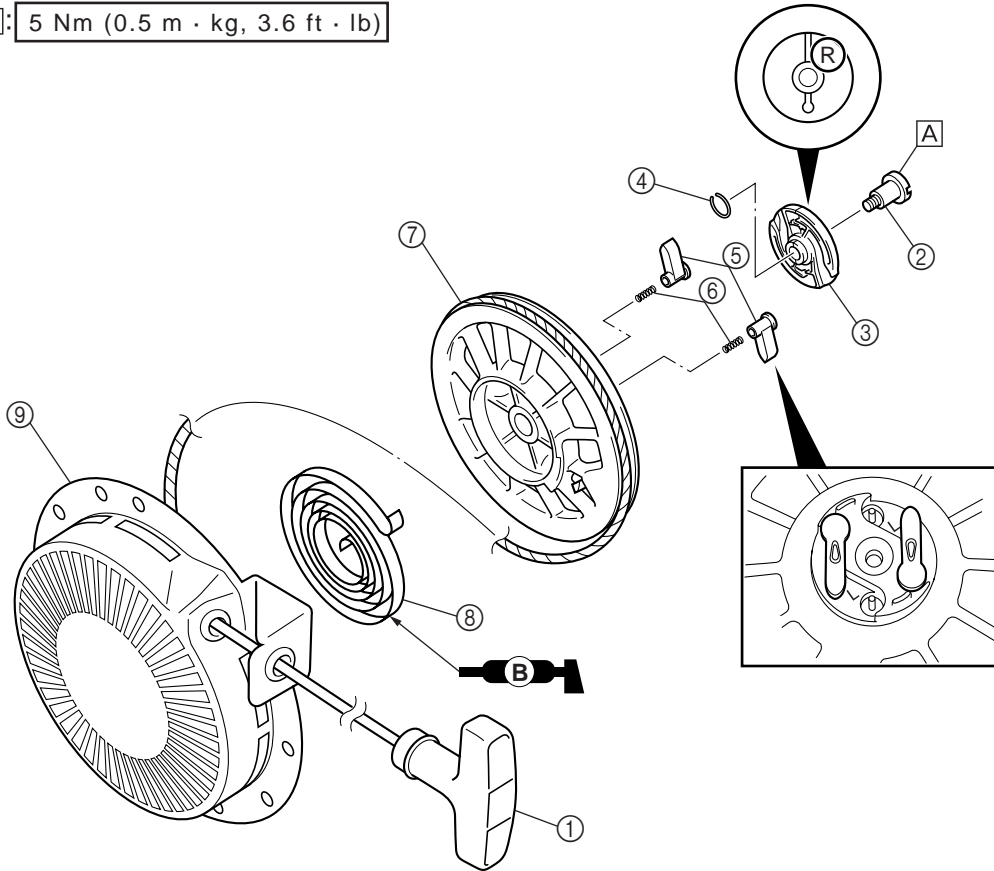


SVU3300

Order	Job name/Part name	Q'ty	Remarks
	Recoil starter removal		Remove the parts in the order listed below.
	Control box cover and fuel tank		Refer to "CONTROL BOX COVER AND FUEL TANK".
	Air cleaner assembly		Refer to "MUFFLER AND AIR CLEANER".
	Control unit cover, control unit		Refer to "CONTROL UNIT AND AC-CDI UNIT".
	Engine mount nut (M6)		Refer to "ENGINE".
	Carburetor assembly		Refer to "CARBURETOR".
1	Recoil starter assembly	1	
2	Fan case cover	1	
3	Fan case	1	
4	Starter pulley	1	
5	Rectifier	1	
6	Plate	1	
			For installation, reverse the removal procedure.

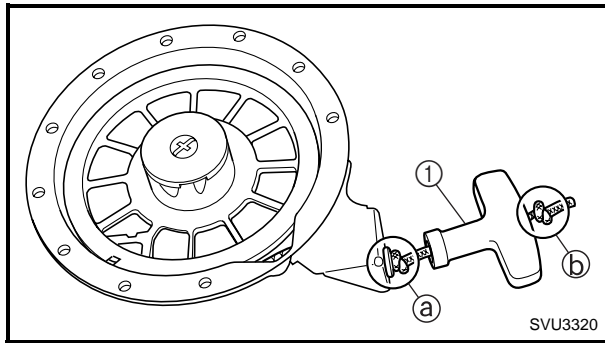


A: 5 Nm (0.5 m · kg, 3.6 ft · lb)



SVU3310

Order	Job name/Part name	Q'ty	Remarks
	Recoil starter disassembly		Remove the parts in the order listed below.
①	Starter handle	1	
②	Bolt	1	
③	Drive plate	1	
④	Clip	1	
⑤	Drive pawl	2	
⑥	Spring	2	
⑦	Sheave drum	1	
⑧	Starter spring	1	
⑨	Starter case	1	
			For assembly, reverse the disassembly procedure.

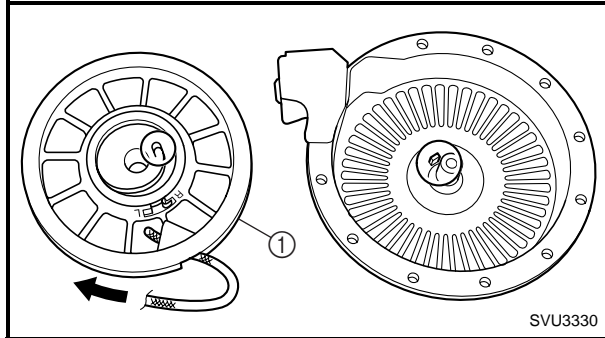


RECOIL STARTER DISASSEMBLY

1. Remove:
 - Starter handle ①

NOTE:

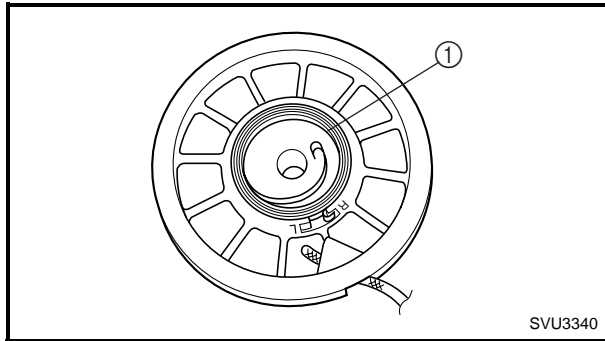
Make a knot ① at the end of the starter rope to prevent the rope from being retracted into the starter case. Then, undo the knot ② at the starter handle to remove starter handle ①.



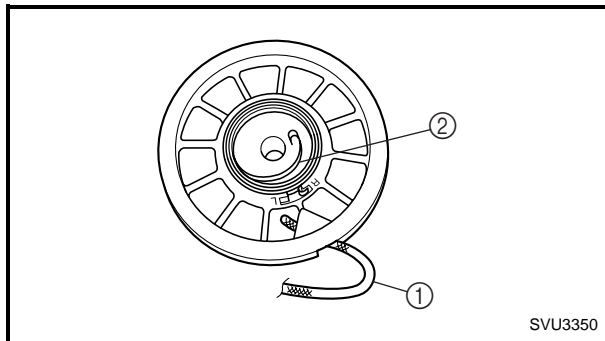
2. Remove:
 - Drum sheave ①

CAUTION:

Be sure to press down on the drum sheave, because the spring will spring out suddenly when it is removed from the sheave drum.



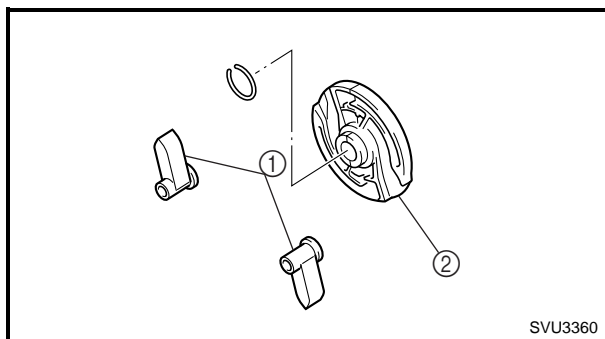
3. Remove:
 - Starter spring ①



RECOIL STARTER INSPECTION

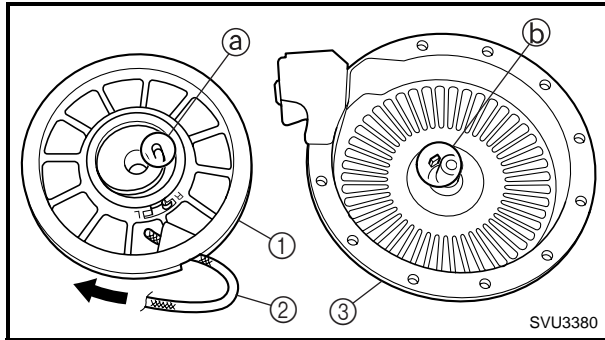
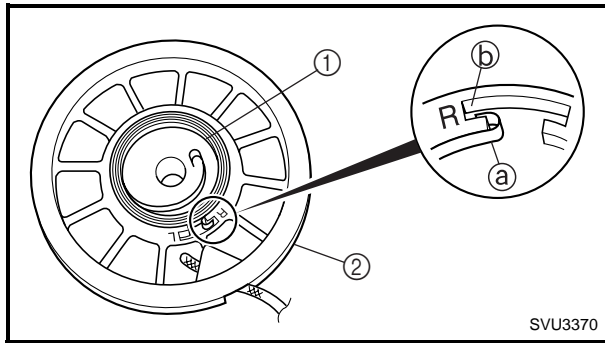
1. Inspect:
 - Starter rope ①
2. Inspect:
 - Starter spring ②

Damage/deterioration → Replace.



3. Inspect:
 - Drive pawl ①
 - Drive plate ②

Wear/damage → Replace.



RECOIL STARTER ASSEMBLY

1. Install:

- Starter spring ①
- Sheave drum ②

NOTE:

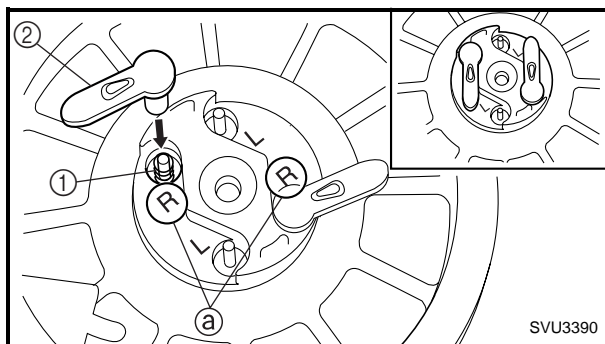
Engage starter spring outer hook (a) with groove (b) marked "R" on the sheave drum (2). Carefully wind the spring counterclockwise and place it on the sheave drum (2).

2. Install:

- Sheave drum ①
- Starter rope ②
- Starter case ③

NOTE:

- Wind the starter rope (2) clockwise two turns on the sheave drum (1).
- Engage starter spring inner hook (a) with the strut (b) of the starter case (3) and install the parts.

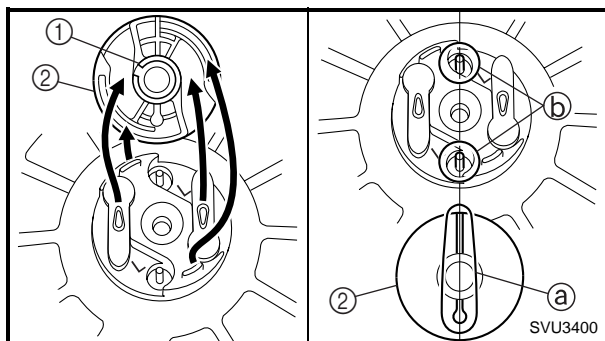


3. Install:

- Spring ①
- Drive pawl ②

NOTE:

Install the spring (1) and drive pawl (2) to the "R" mark (a).

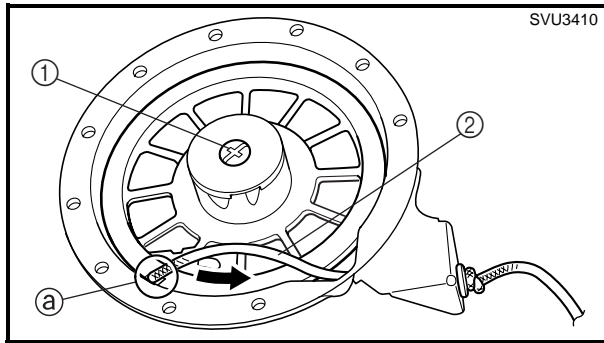


4. Install:

- Clip ①
- Drive plate ②

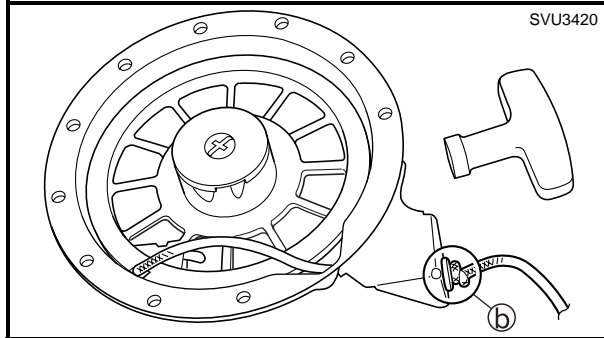
NOTE:

Align the groove (a) of the drive plate (2) with the sheave drum strut (b), and then install the parts.



5. Install:

- Bolt ①
After tightening the bolt, place starter rope ② in the cutout ③ in the sheave drum, and wind it counterclockwise four turns.



NOTE:

Make a knot ④ at the end of the starter rope to prevent the rope from being retracted into the recoil starter case.



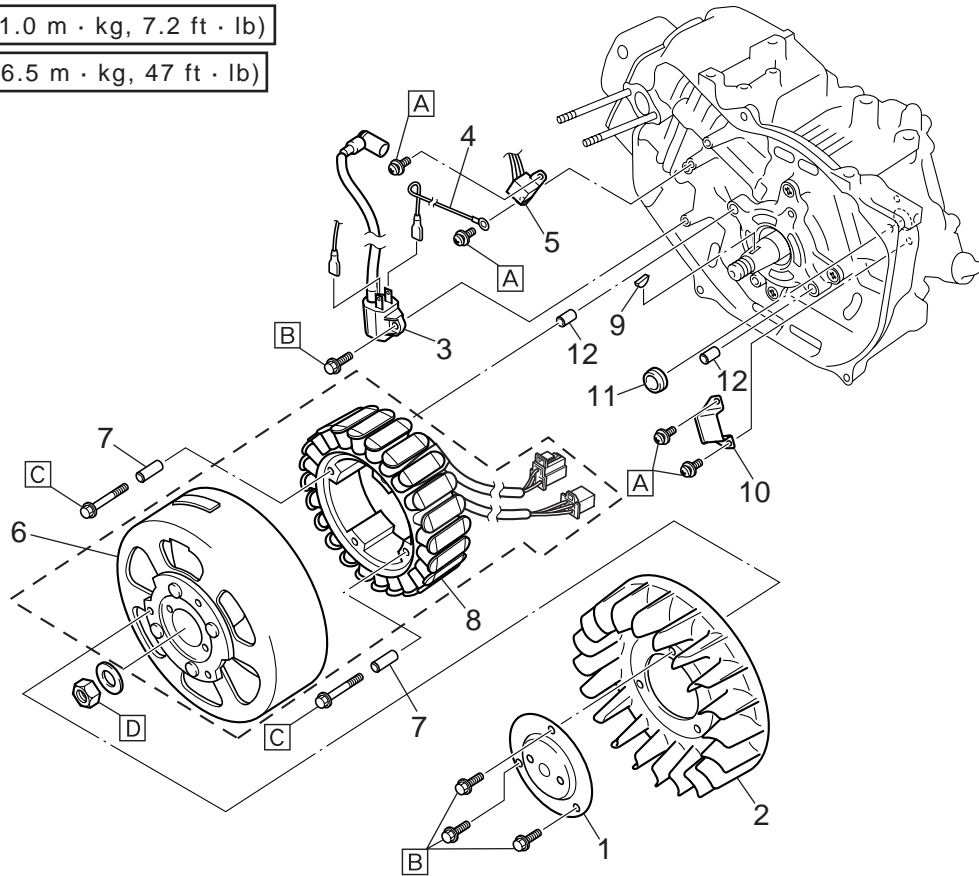
GENERATOR

A: 4 Nm (0.4 m · kg, 2.9 ft · lb)

B: 7 Nm (0.7 m · kg, 5.1 ft · lb)

C: 10 Nm (1.0 m · kg, 7.2 ft · lb)

D: 65 Nm (6.5 m · kg, 47 ft · lb)



SVU3430

Order	Job name/Part name	Q'ty	Remarks
	Generator removal		Remove the parts in the order listed below.
	Engine assembly		Refer to "ENGINE".
	Spark plug cap		Refer to "CYLINDER HEAD COVER AND CYLINDER".
	Recoil starter, fan case cover, fan case		Refer to "RECOIL STARTER".
1	Spacer	1	
2	Fan	1	
3	Ignition coil	1	
4	Ground lead wire	1	
5	Pulser coil	1	
6	Magneto rotor	1	Remove the magneto rotor and stator coil assembly as a set.
7	Tube	2	
8	Stator coil assembly	1	
9	Woodruff key	1	
10	Clamp	1	

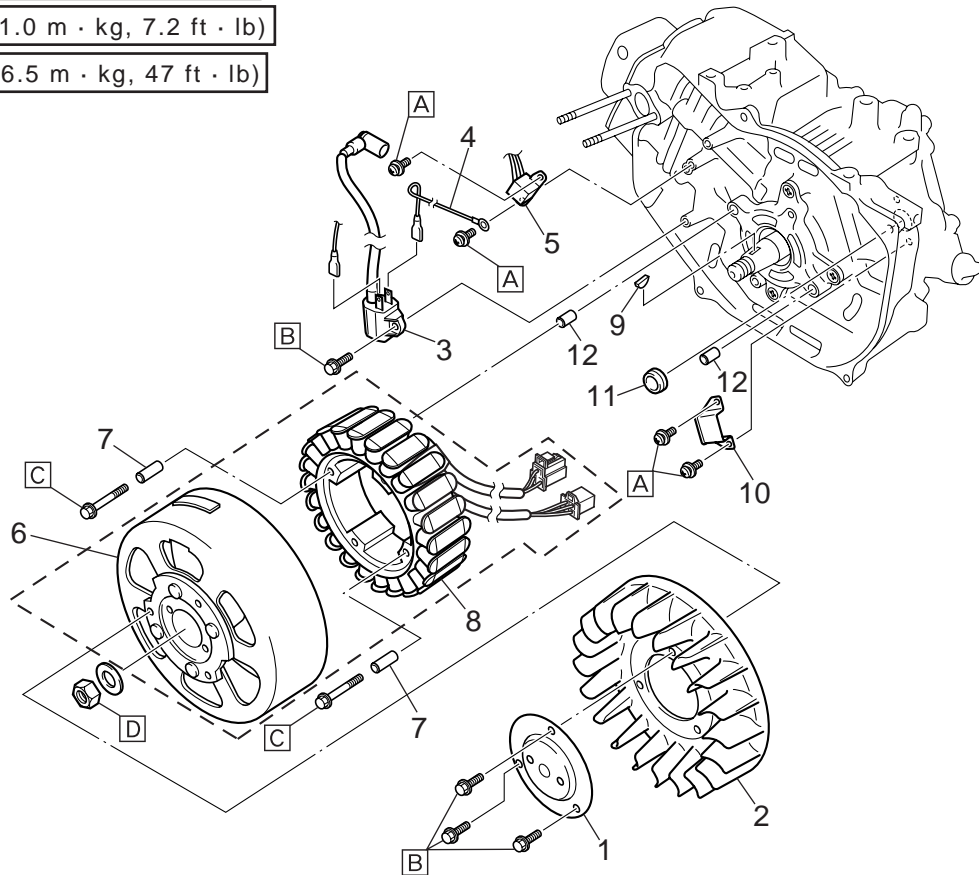


A: 4 Nm (0.4 m · kg, 2.9 ft · lb)

B: 7 Nm (0.7 m · kg, 5.1 ft · lb)

C: 10 Nm (1.0 m · kg, 7.2 ft · lb)

D: 65 Nm (6.5 m · kg, 47 ft · lb)



SVU3430

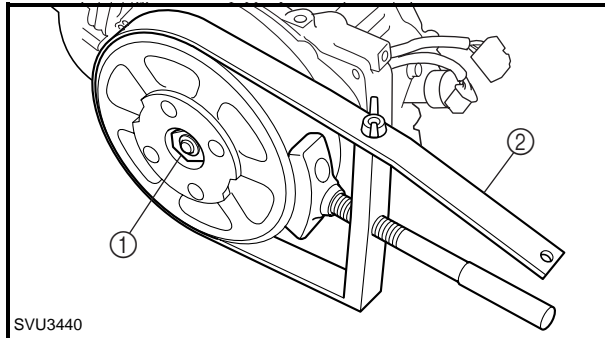
Order	Job name/Part name	Q'ty	Remarks
11	Grommet	1	For installation, reverse the removal procedure.
12	Dowel pin	2	



MAGNETO ROTOR AND STATOR COIL ASSEMBLY REMOVAL

CAUTION:

The magnetic force of the magneto rotor is very strong. Therefore, be sure to remove the magneto rotor and stator coil assembly together as a set, otherwise they may be damaged.



SVU3440

1. Remove:

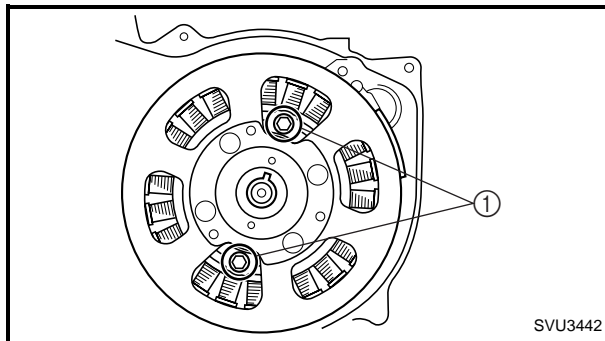
- Magneto rotor nut ①

NOTE:

Attach the primary sheave holder ② to hold the magneto rotor.



Sheave holder:
YS-01880, 90890-01701



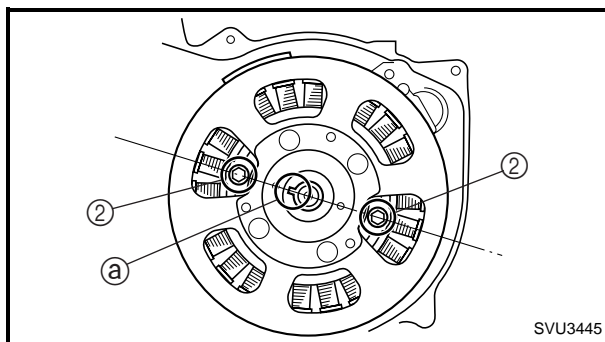
SVU3442

2. Remove:

- Stator coil assembly bolts ①

NOTE:

Turn the magneto rotor until the stator coil assembly bolts are visible through the holes in the rotor, and then remove the bolts.



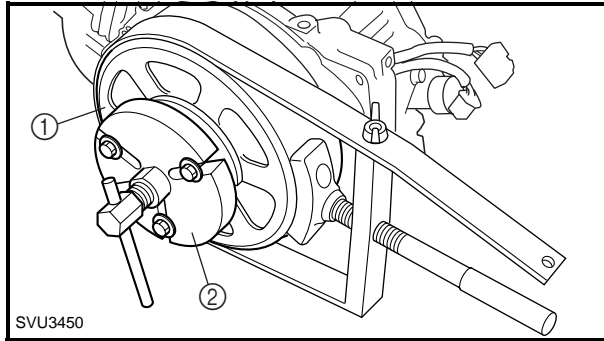
SVU3445

3. Remove:

- Stator coil assembly bolts ②
- Tubes

NOTE:

- Turn the magneto rotor until the stator coil assembly bolts are visible through the holes in the rotor, and then remove the bolts.
- Align the keyway ③ of the magneto rotor with the stator coil assembly bolts ② so that they are in a straight line. The piston is at top dead center when keyway and bolts are in this position.



4. Remove:

- Magneto rotor ①

NOTE:

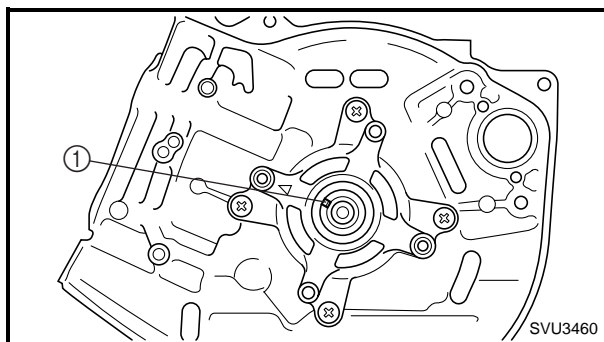
- Remove the magneto rotor ① together with the stator coil assembly using the magneto rotor puller ②.
- Fully tighten the tool holding bolts, making sure the tool body is parallel with the magneto rotor. If necessary, one screw may be backed out slightly to level the tool body.

CAUTION:

The magnetic force of the magneto rotor is very strong. Therefore, do not change the position of the magneto rotor and stator coil assembly during or after removal, otherwise they may be damaged.



Rotor puller:
YU-33270, 90890-01362



MAGNETO ROTOR AND STATOR COIL ASSEMBLY INSTALLATION

1. Install:

- Woodruff key ①

CAUTION:

Be sure to remove any oil or grease from the tapered portion of the magneto rotor using a cloth dampened with thinner.

2. Install:

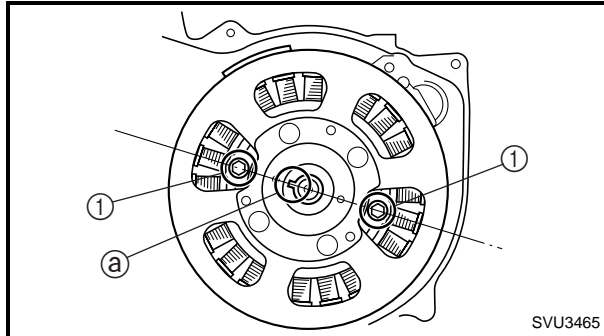
- Magneto rotor
- Stator coil assembly
- Washer
- Magneto rotor nut

**CAUTION:**

Be sure to remove any oil or grease from the tapered portion of the magneto rotor using a cloth dampened with thinner.

NOTE:

When installing the magneto rotor, make sure the woodruff key is properly seated in the key way of the crankshaft.



3. Install:

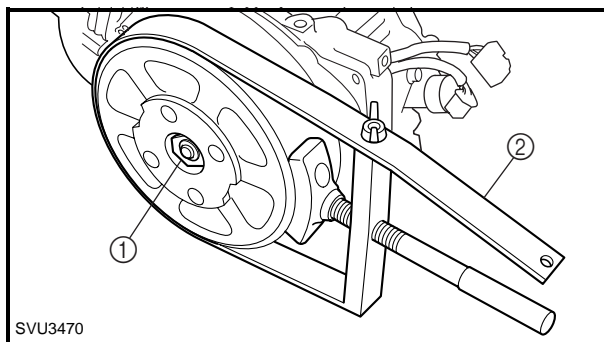
- Stator coil assembly bolts ①
- Tubes



Stator coil assembly bolts:
10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE:

- Turn the magneto rotor until the stator coil assembly bolts are visible through the holes in the rotor, and then remove the bolts ①.
- Align the keyway ② of the magneto rotor with the stator coil assembly bolts ① so that they are in a straight line. The piston is at top dead center when keyway and bolts are in this position.



4. Tighten:

- Magneto rotor nut ①
- Washer



Magneto rotor nut:
65 Nm (6.5 m · kg, 47 ft · lb)

NOTE:

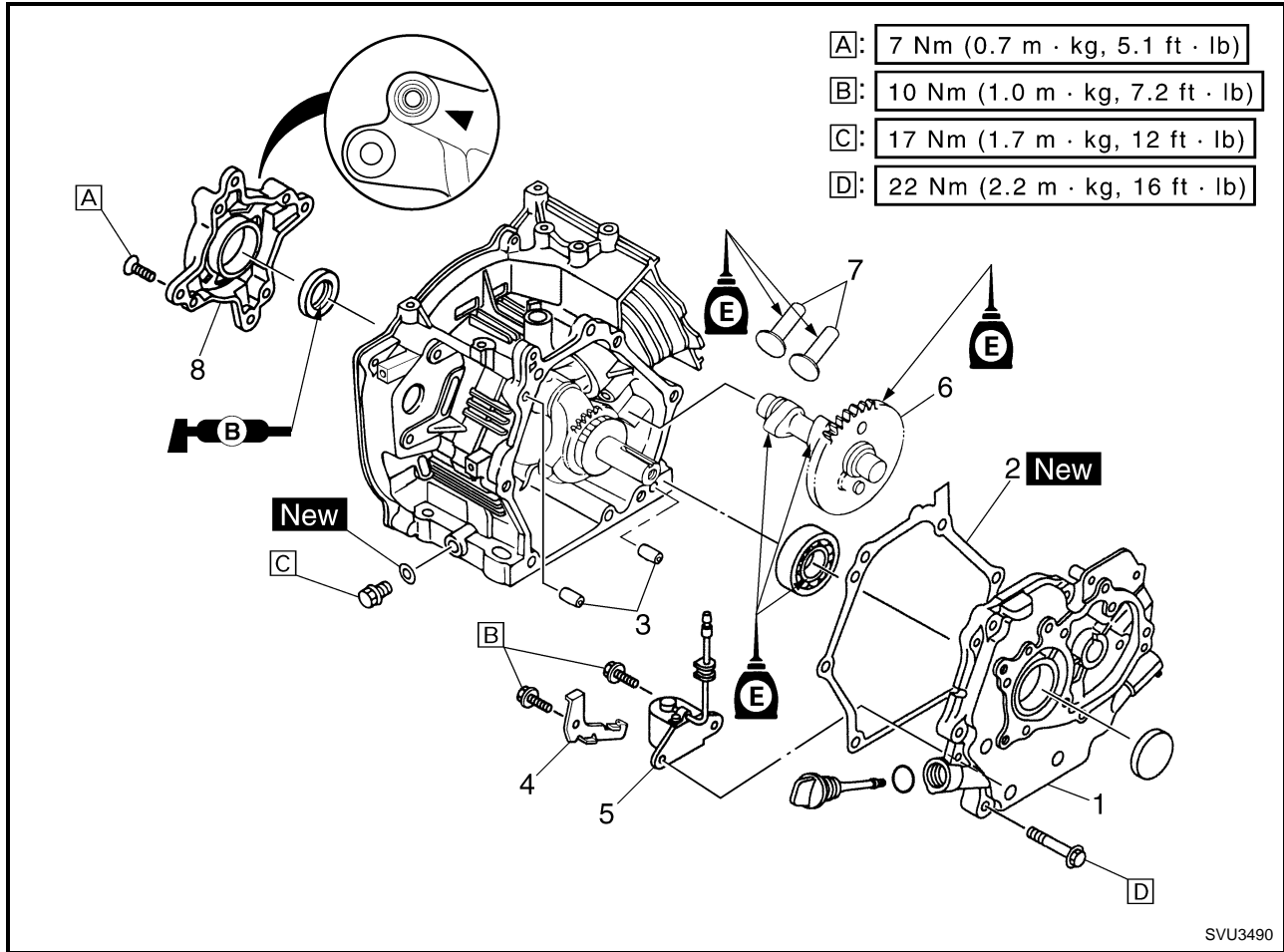
Tighten the magneto rotor nut ① using the primary sheave holder ②.



Sheave holder:
YS-01880, 90890-01701

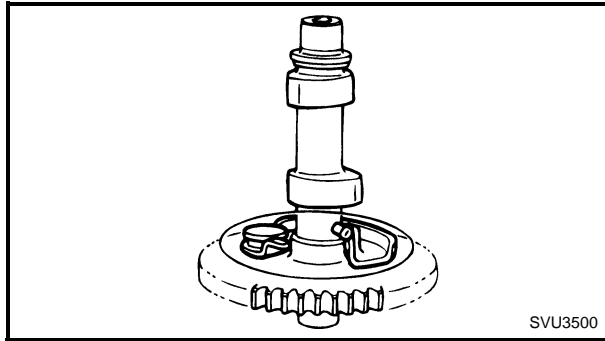


CRANKCASE COVER AND CAMSHAFT



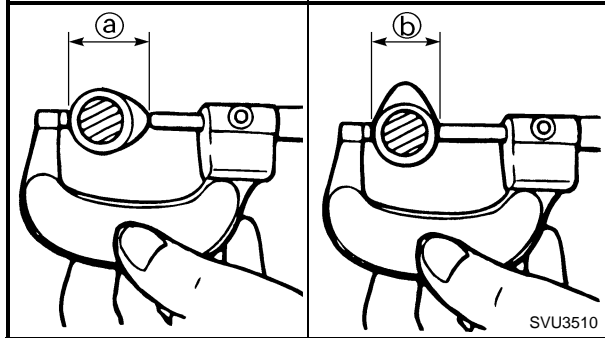
SVU3490

Order	Job name/Part name	Q'ty	Remarks
	Crankcase cover and camshaft removal		Remove the parts in the order listed below.
	Engine assembly		Refer to "ENGINE".
	Cylinder head assembly		Refer to "CYLINDER HEAD COVER AND CYLINDER HEAD".
	Recoil starter, fan case cover, fan case, fan, magneto rotor, and stator coil		Refer to "RECOIL STARTER" and "GENERATOR".
1	Crankcase cover	1	
2	Gasket	1	
3	Dowel pin	2	
4	Bracket	1	
5	Oil level switch	1	
6	Camshaft	1	
7	Valve lifter	2	
8	Bracket	1	
			For installation, reverse the removal procedure.



CAMSHAFT INSPECTION

1. Inspect:
 - Camshaft
Damage → Replace.

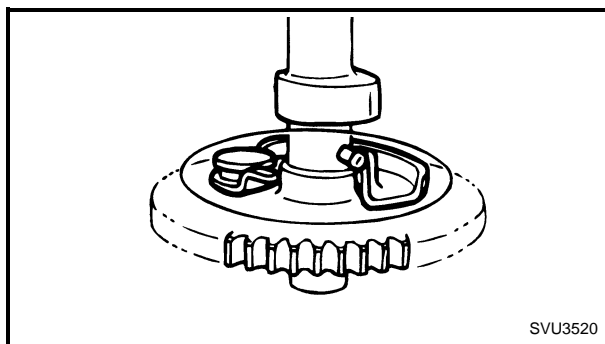


2. Measure:
 - Cam lobes length (a) and (b)
Out of specifications → Replace.

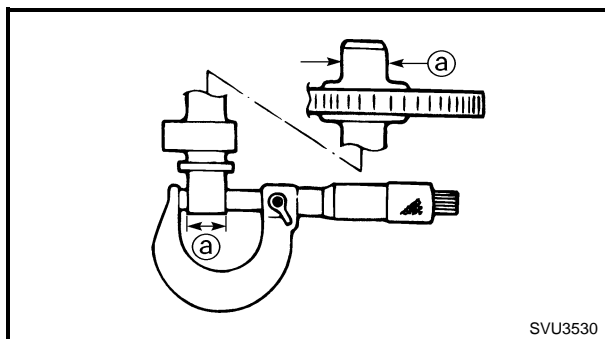


Cam lobes length:

- Intake**
- (a): 26.9 ± 0.05 mm
(1.06 ± 0.002 in)
 - (b): 22.0 ± 0.05 mm
(0.87 ± 0.002 in)
- Exhaust**
- (a): 26.68 ± 0.05 mm
(1.05 ± 0.002 in)
 - (b): 22.03 ± 0.05 mm
(0.87 ± 0.002 in)



3. Inspect:
 - Surface of camshaft gear teeth
 - Decompressor
Wear/damage → Replace.

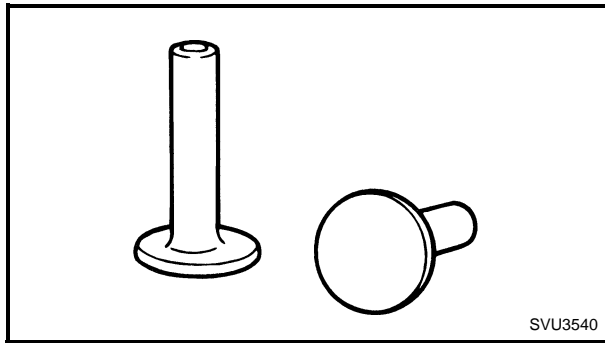


4. Measure:
 - Camshaft diameter (a)
Out of specification → Replace.



Camshaft diameter:

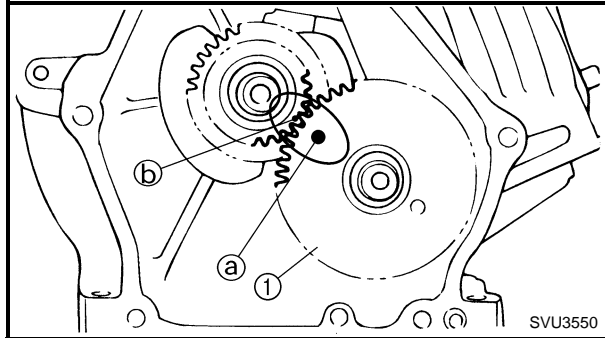
- $14.965 \sim 14.990$ mm
($0.5892 \sim 0.5902$ in)
- Wear limit: 14.950 mm (0.59 in)**



SVU3540

VALVE LIFTER INSPECTION

1. Inspect:
 - Valve lifter
 Damage → Replace.



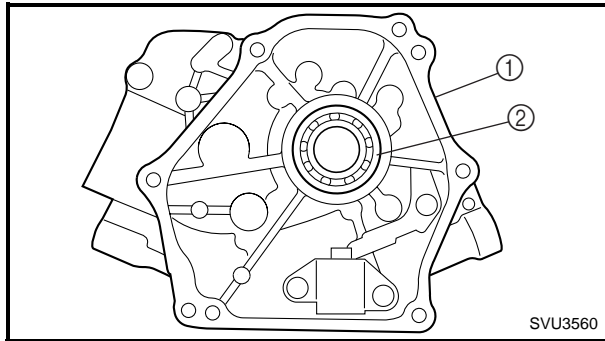
SVU3550

CAMSHAFT ASSEMBLY

1. Install:
 - Camshaft ①

CAUTION:

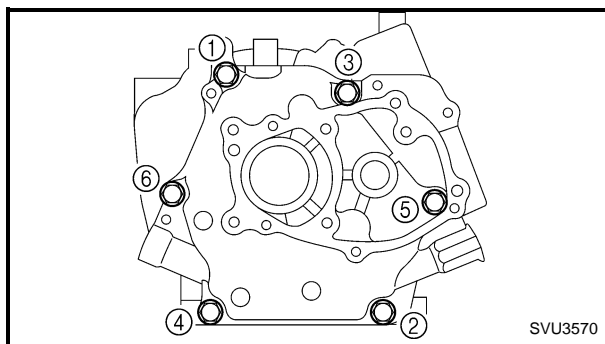
Be sure to align the hole ① of camshaft gear with the crankshaft gear mark ②.



SVU3560

CRANKCASE COVER INSPECTION

1. Inspect:
 - Crankcase cover ①
 - Bearing ②
 Damage → Replace.
 Noise/wear/rotational failure → Replace.



SVU3570

CRANKCASE COVER INSTALLATION

1. Install:
 - Crankcase cover bolts ① to ⑥

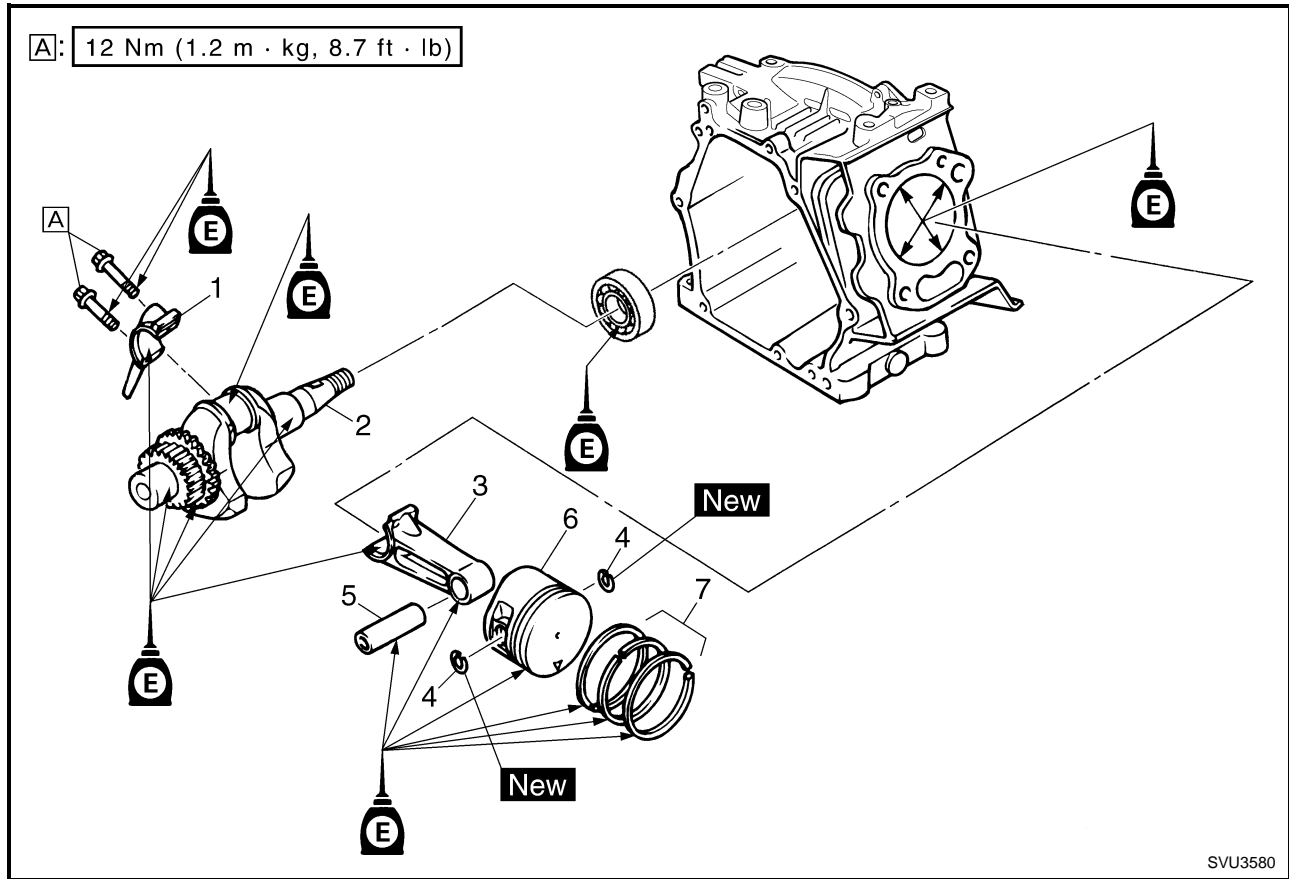
NOTE:

Tighten the bolts to the specified torque in two steps and in order from ① to ⑥.



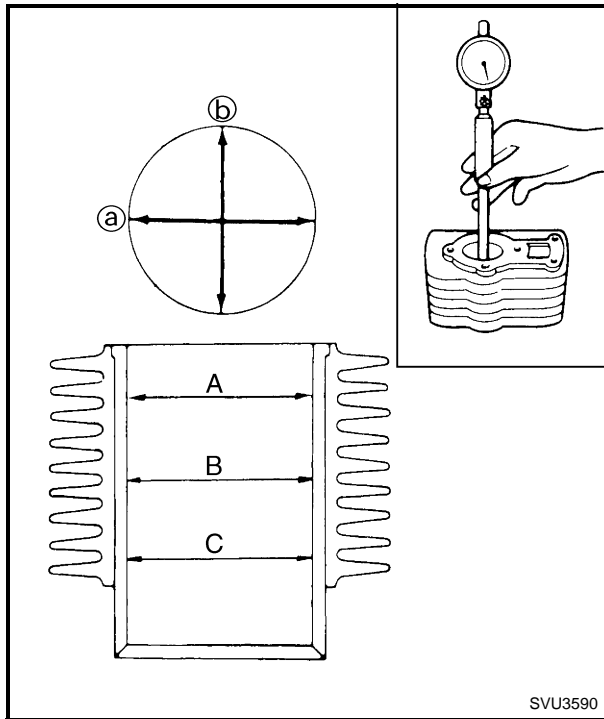
Crankcase cover bolts:
22 Nm (2.2 m · kg, 16 ft · lb)

PISTON, CONNECTING ROD, CRANKSHAFT AND CRANKCASE



SVU3580

Order	Job name/Part name	Q'ty	Remarks
	Piston, connecting rod, crankshaft and crankcase removal Engine assembly Cylinder head assembly Recoil starter, fan case cover, and fan case Fan, magneto rotor, and stator coil assembly Crankcase cover and camshaft		Remove the parts in order listed. Refer to "ENGINE". Refer to "CYLINDER HEAD COVER AND CYLINDER HEAD". Refer to "RECOIL STARTER". Refer to "GENERATOR". Refer to "CRANKCASE COVER AND CAMSHAFT".
1	Connecting rod cap	1	
2	Crankshaft	1	
3	Connecting rod	1	
4	Piston pin circlip	2	
5	Piston pin	1	
6	Piston	1	
7	Piston ring	3	
			For installation, reverse the removal procedure.



SVU3590

CRANKCASE (CYLINDER) INSPECTION

- Measure:
 - Cylinder inside diameter

NOTE:

Take side to side (a) and front to back (b) measurements at each of the three locations A, B, C (total of six measurements), and then find the average of the measurements.

Maximum wear = Maximum A, B, C.

Cylinder taper = Maximum A – Minimum C.

Out of specification → Replace.



Cylinder inside diameter:

66.00 ~ 66.02 mm

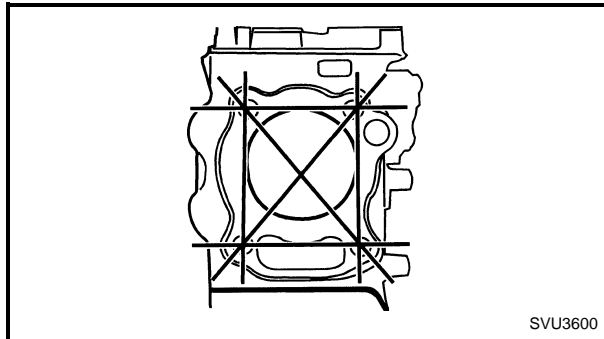
(2.5984 ~ 2.5990 in)

Cylinder inside diameter wear limit:

66.020 mm (2.5990 in)

Cylinder taper limit:

0.05 mm (0.002 in)



SVU3600

- Measure:

- Cylinder warpage

NOTE:

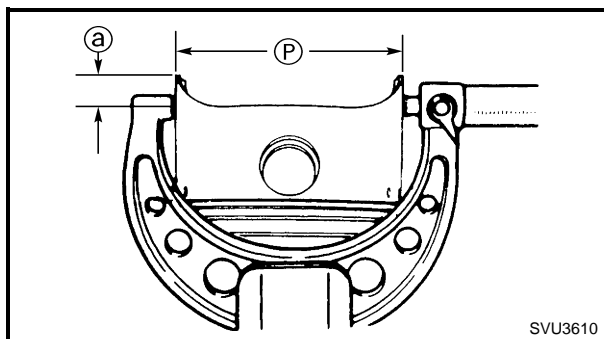
Measure the warpage on the contact surface of the cylinder head at six points using a straight edge and thickness gauge.

Out of specification → Resurface or replace.



Warpage limit:

0.05 mm (0.002 in)



SVU3610

PISTON AND PISTON PIN INSPECTION

- Measure:

- Piston skirt diameter (P)

(a) = 10 mm (0.4 in) from the piston bottom edge

Out of specification → Replace.



Piston skirt diameter:

66.0 mm (2.598 in)

Wear limit:

65.9 mm (2.594 in)



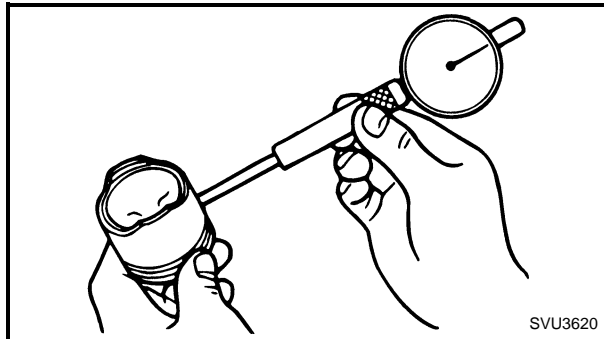
2. Measure:

- Piston clearance
Out of specification → Rebore or replace cylinder and replace piston and piston rings.



Piston clearance:
0.015 ~ 0.040 mm
(0.00059 ~ 0.00157 in)

Piston clearance =
Cylinder inside diameter –
Piston skirt diameter

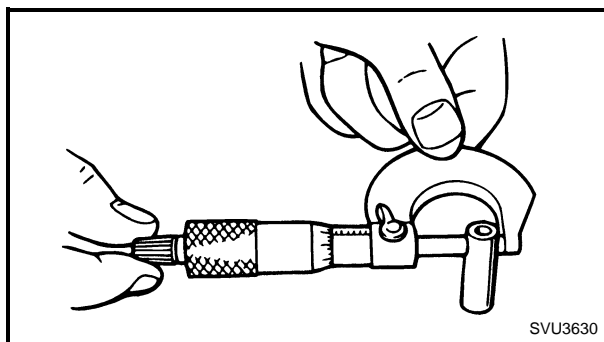


3. Measure:

- Piston pin hole inside diameter
Out of specification → Replace.



Piston pin hole inside diameter:
16.002 ~ 16.013 mm
(0.6300 ~ 0.6304 in)
Wear limit:
16.020 mm (0.6307 in)

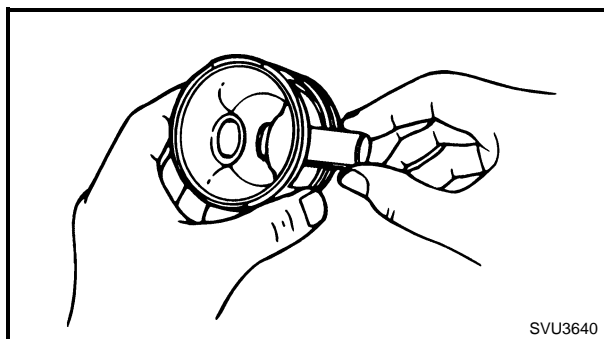


4. Measure:

- Piston pin diameter
Out of specification → Replace.

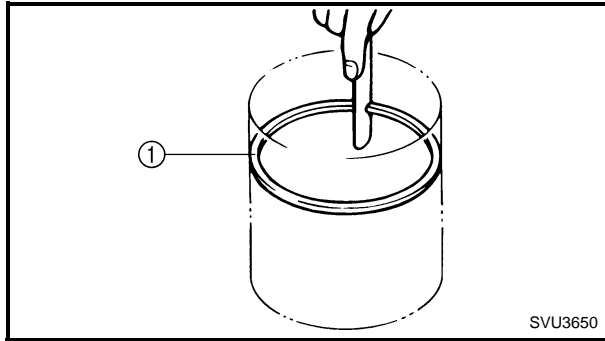


Piston pin diameter:
15.995 ~ 16.000 mm
(0.6297 ~ 0.6299 in)
Wear limit:
15.950 mm (0.6280 in)



5. Inspect:

- Check that the piston pin enters smoothly into the piston pin hole.
If the piston pin fits tightly into the piston, check the piston pin hole. If there is any protrusion, use a knife or scraper to gently remove it so that the piston pin can be pushed in gently with your fingers.



SVU3650


PISTON RING INSPECTION

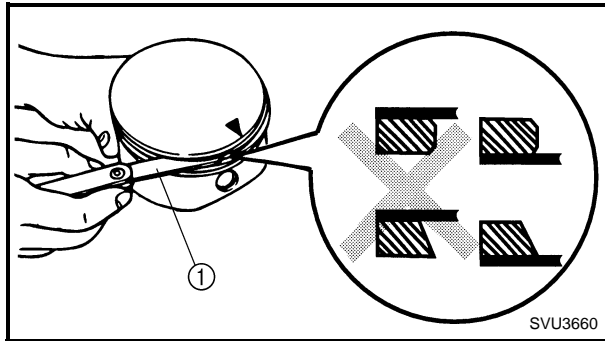
1. Measure:

- Piston ring end gap
Out of specification → Replace.

NOTE:

Insert the piston ring ① into the cylinder, and push it approximately 5 mm (0.2 in) into the cylinder. Push in the ring with the piston crown so that the ring is at right angles to the cylinder bore.


	Ring end gap	Wear limit
Top ring	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)	0.9 mm (0.0354 in)
2nd ring	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)	0.9 mm (0.0354 in)
Oil ring	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)	0.9 mm (0.0354 in)



SVU3660

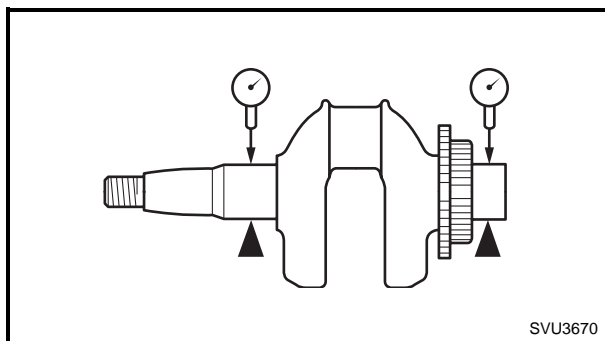
2. Measure:

- Piston ring side clearance
Out of specification → Replace.
Use a thickness gauge ①.

	Piston ring side clearance	Wear limit
Top ring	0.04 ~ 0.08 mm (0.0016 ~ 0.0031 in)	0.1 mm (0.0039 in)
2nd ring	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)	

NOTE:

- Clean carbon deposits from the piston ring grooves and rings before measuring the side clearance.
- Measure the side clearance at several portions.




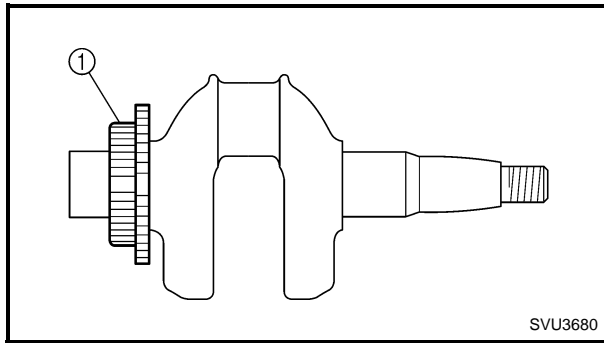
SVU3670

CRANKSHAFT INSPECTION

1. Measure:

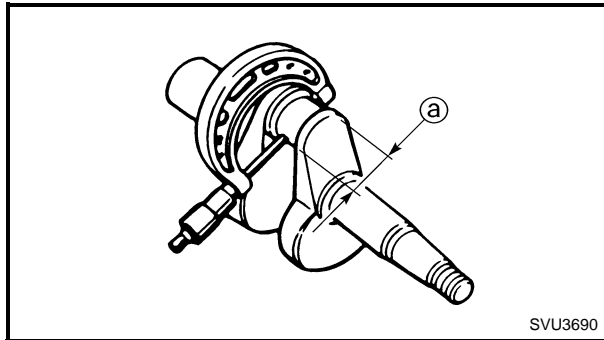
- Crankshaft runout limit
Use a dial gauge.
Out of specification → Replace.

	Runout limit: 0.04 mm (0.0016 in)
---	---



2. Inspect:

- Crankshaft gear ①
Wear/damage → Replace.



3. Measure:

- Crank pin outside diameter ②
Wear/damage → Replace.
Use a micrometer.
Out of specification → Replace.

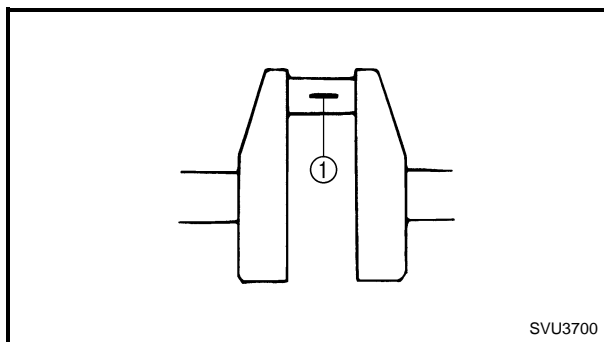


Crank pin outside diameter:
28.0 mm (1.102 in)
Wear limit:
27.9 mm (1.098 in)

CONNECTING ROD OIL CLEARANCE INSPECTION

NOTE:

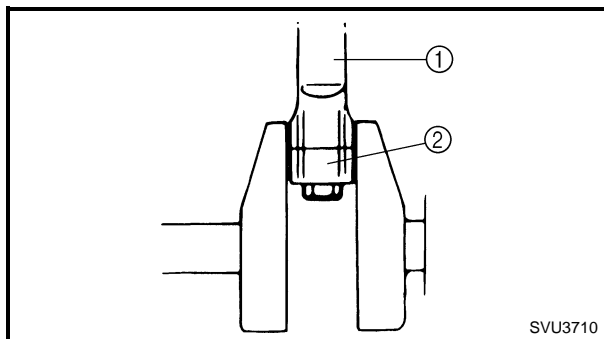
Measure the oil clearance if replacing the crankshaft or connecting rod.



1. Place a piece of Plastigauge ① on the crank pin horizontally.

NOTE:

Clean off oil from all parts thoroughly.



2. Install:

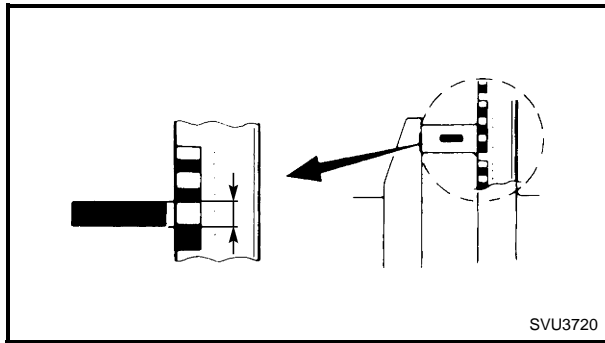
- Connecting rod ①
- Connecting rod cap ②

NOTE:

Tighten the cap bolts so that the crankshaft does not move while the oil clearance is being measured.



Connecting rod cap bolt:
12 Nm (1.2 m · kg, 8.7 ft · lb)



3. Remove:

- Connecting rod cap
- Connecting rod

4. Measure:

- Widest portion of the pressed Plastigauge
- Out of specification → Replace crankshaft or connecting rod, and then measure the clearance again.

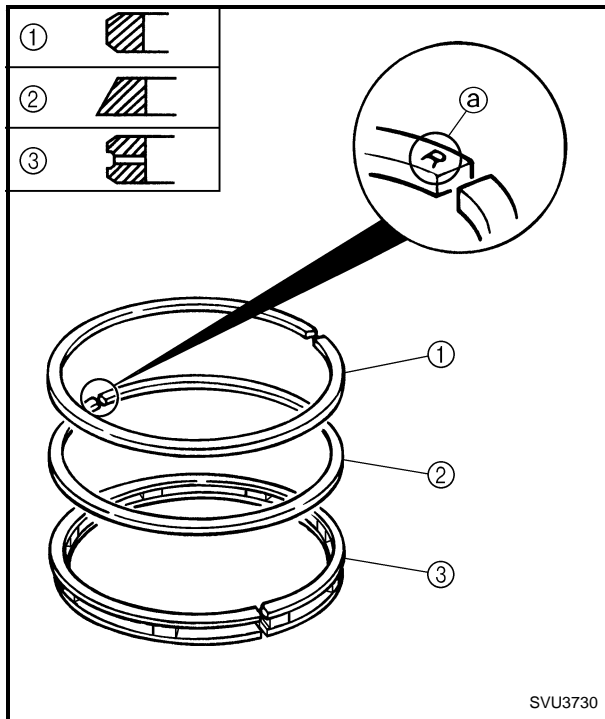


Connecting rod big end oil clearance:

0.015 ~ 0.040 mm
(0.0006 ~ 0.0016 in)

Wear limit:

0.1 mm (0.004 in)



PISTON RING AND PISTON ASSEMBLY

1. Install:

- Top ring ①
- 2nd ring ②
- Oil ring ③

NOTE:

- Be sure to install the second ring so that the manufacturer's mark (a) faces towards the piston head.
- Make sure that the piston rings move smoothly.

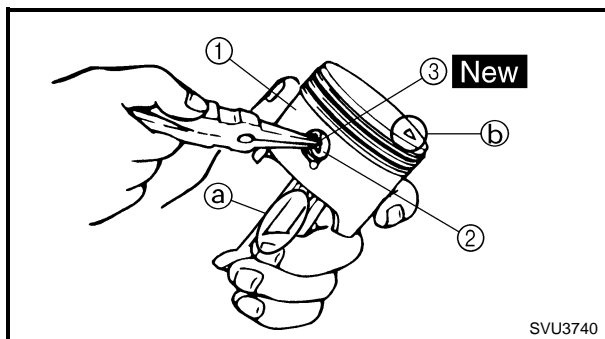
2. Apply 4-stroke engine oil to the inside of the connecting rod small end.

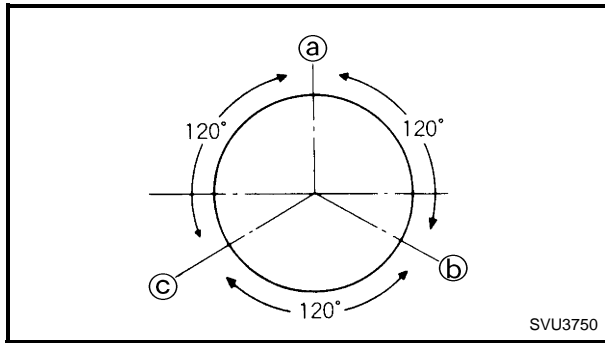
3. Install:

- Piston ①
- Piston pin ②
- Piston pin circlip ③ **New**

NOTE:




- Make sure that the "YAMAHA" mark (a) on the connecting rod faces toward the crankcase cover.
- Make sure that the "▽" mark (b) on the piston head faces toward the push rod.

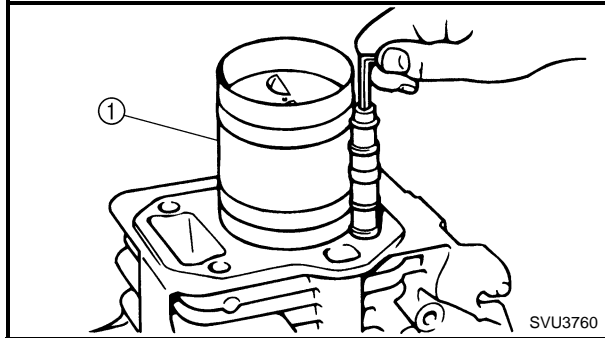





CRANKSHAFT ASSEMBLY

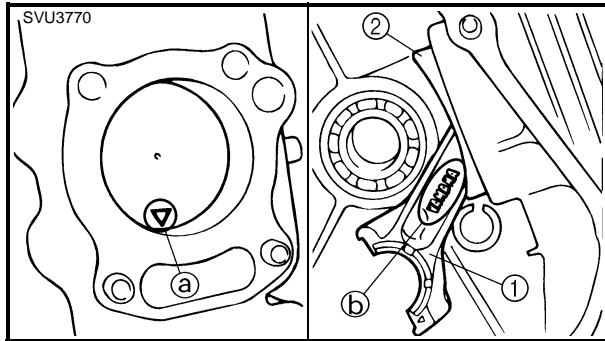
1. Make sure that the end gap of each piston ring is positioned, as shown in the illustration.

Top ring	(a)	
2nd ring	(b)	
Oil ring	(c)	



2. Install:
 - Piston ring compressor ①

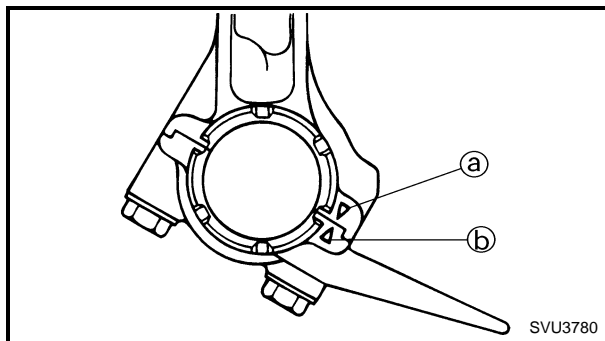
	Piston ring compressor: YU-33294, 90890-05158
---	---



3. Install:
 - Connecting rod ①
 - Piston ②

NOTE:


- Make sure that the “▽” mark (a) on the piston head faces toward the push rod.
- Make sure that the “YAMAHA” mark (b) on the connecting rod faces toward the crankcase cover.



4. Install:
 - Crankshaft
 - Connecting rod cap

NOTE:

Make sure that the “▽” mark (a) on the connecting rod is aligned with the “▽” mark (b) on the rod cap.

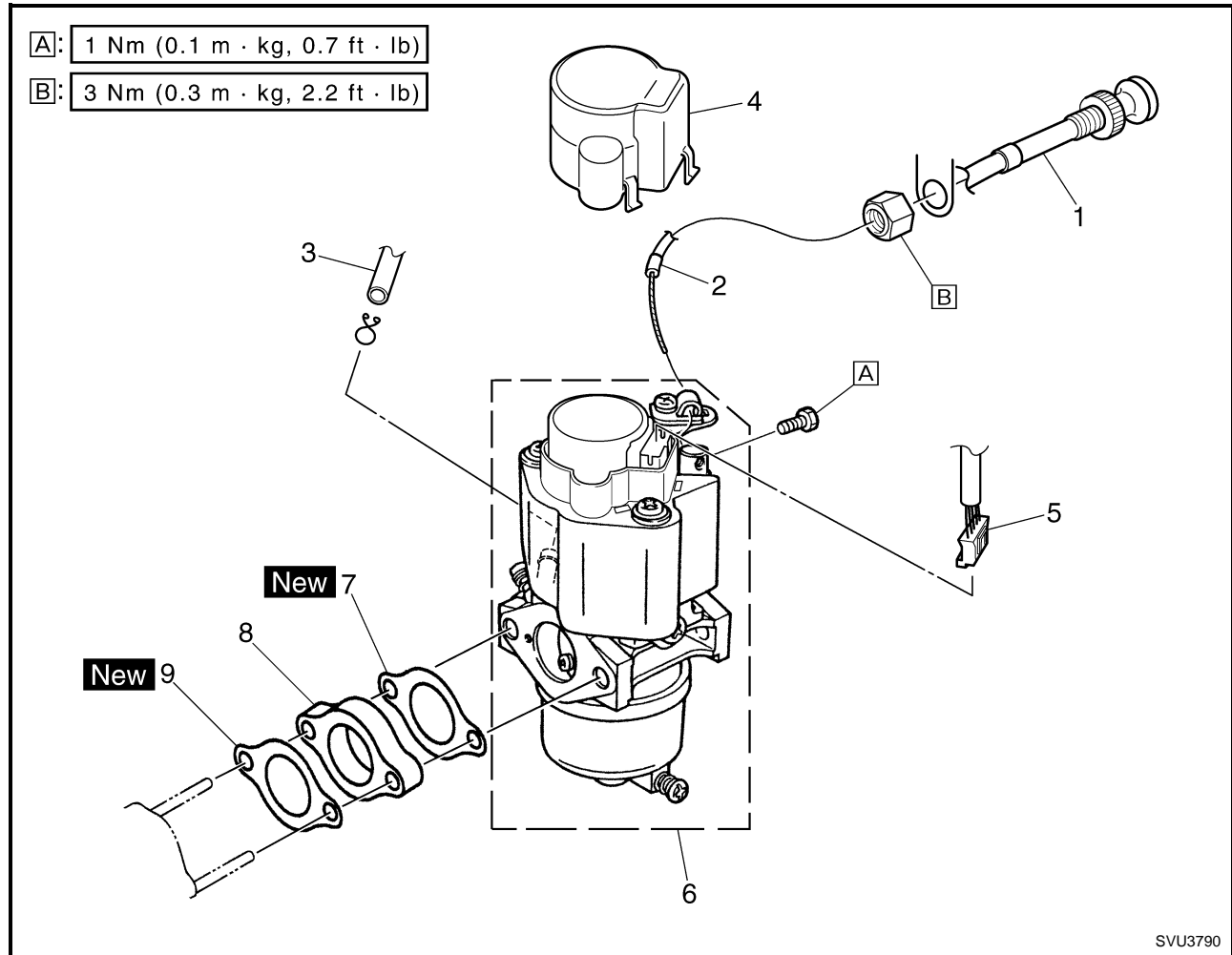
	Connecting rod cap bolt: 12 Nm (1.2 m · kg, 8.7 ft · lb)
---	--

5. Install:
 - Camshaft
 - Crankcase cover

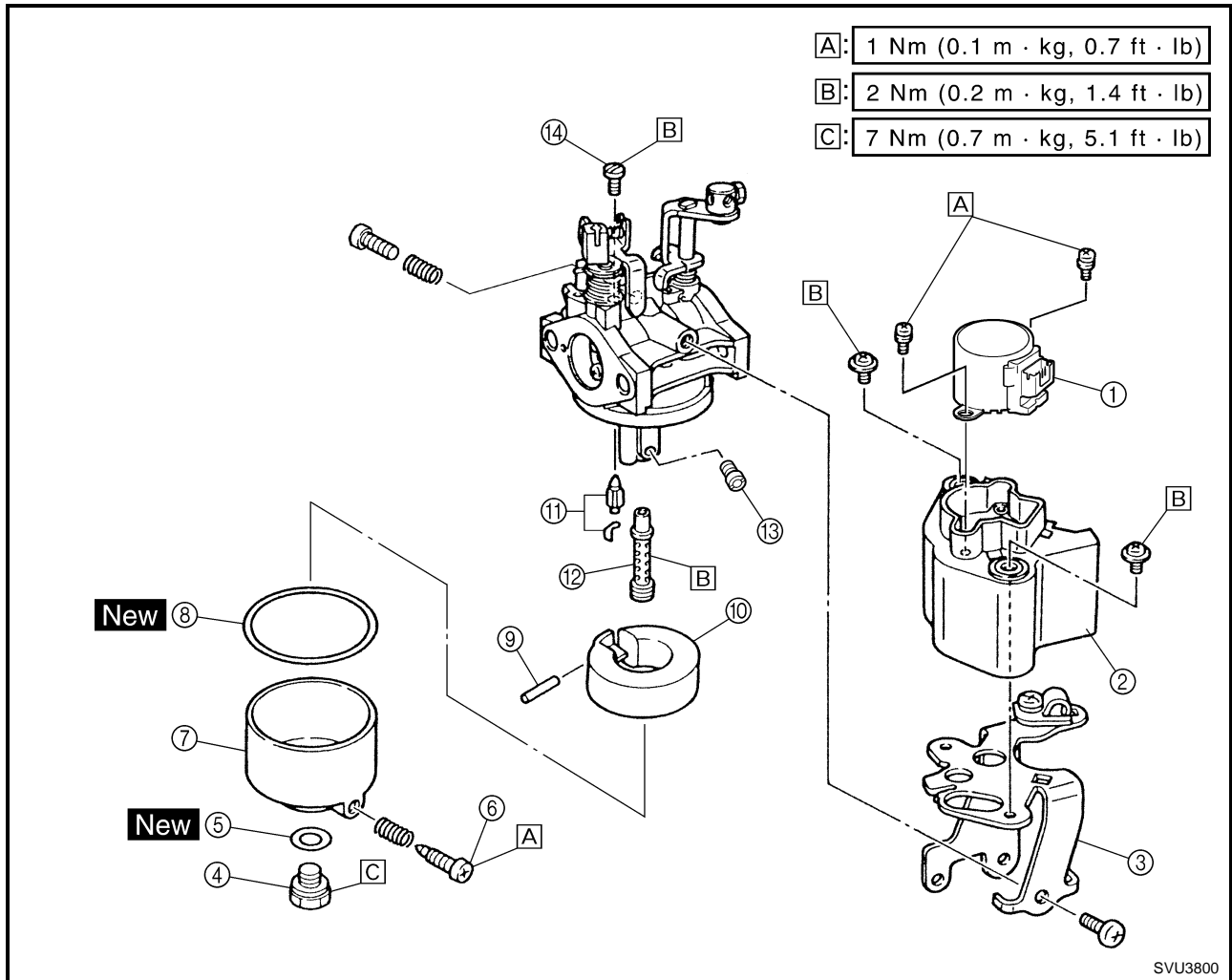
Refer to “CRANKCASE COVER AND CAMSHAFT”.



CARBURETOR

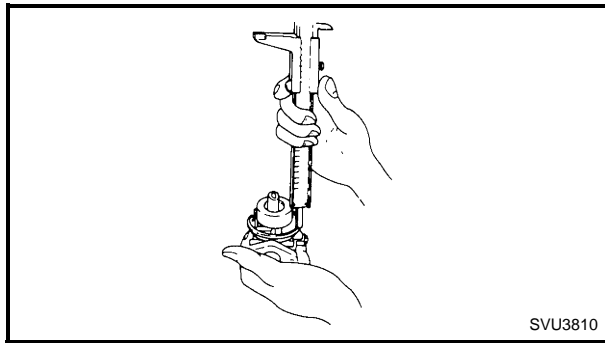


Order	Job name/Part name	Q'ty	Remarks
	Carburetor removal		Remove the parts in the order listed below.
	Air cleaner assembly		Refer to "MUFFLER AND AIR CLEANER".
1	Choke knob	1	
2	Choke cable	1	
3	Fuel hose	1	
4	Throttle control motor cover	1	
5	Throttle control motor coupler	1	
6	Carburetor assembly	1	
7	Gasket	1	
8	Carburetor joint	1	
9	Gasket	1	
			For installation, reverse the removal procedure.



SVU3800

Order	Job name/Part name	Q'ty	Remarks
	Carburetor disassembly		Remove the parts in the order listed below.
①	Throttle control motor assembly	1	
②	Throttle controller bracket	1	
③	Bracket	1	
④	Bolt	1	
⑤	Gasket	1	
⑥	Drain screw	1	
⑦	Float chamber	1	
⑧	Gasket	1	
⑨	Float pin	1	
⑩	Float	1	
⑪	Needle valve	1	
⑫	Main nozzle	1	
⑬	Main jet	1	
⑭	Pilot jet	1	
			For assembly, reverse the disassembly procedure.



SVU3810

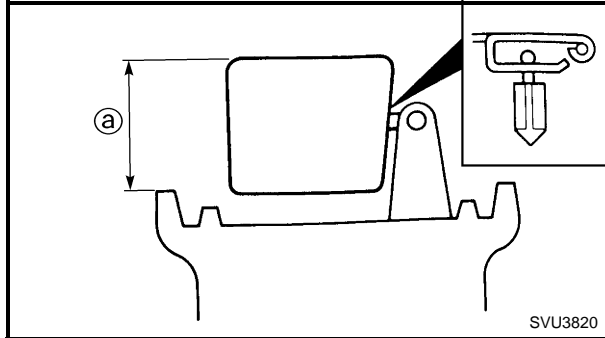
FLOAT HEIGHT INSPECTION

1. Measure:

- Float height
Out of specification → Replace.

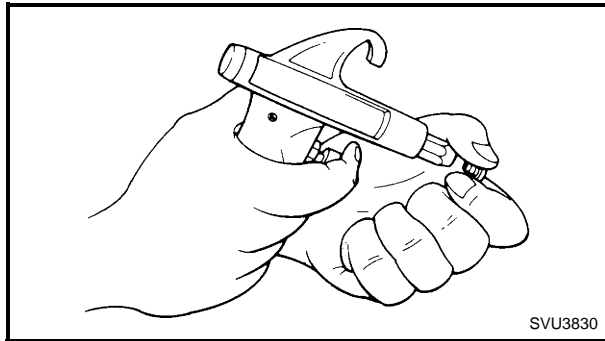
NOTE:

Lift up the float height so that the tip of the float valve lightly contacts the float arm, and then measure the float height ①. (This measurement should be made with the gasket removed.)



SVU3820

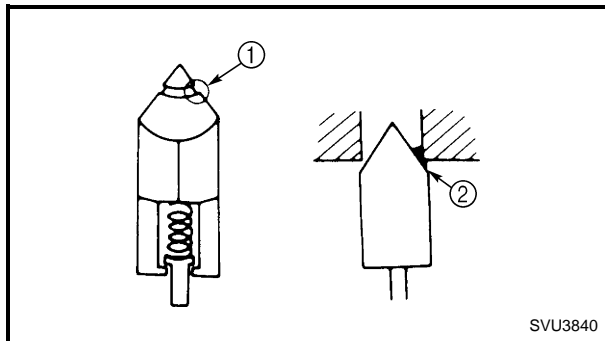
	<p>Float height: 16.0 mm (0.63 in)</p>
--	--



SVU3830

2. Clean:

- Carburetor body
Blow out all passages, jets, and carburetor body with compressed air.

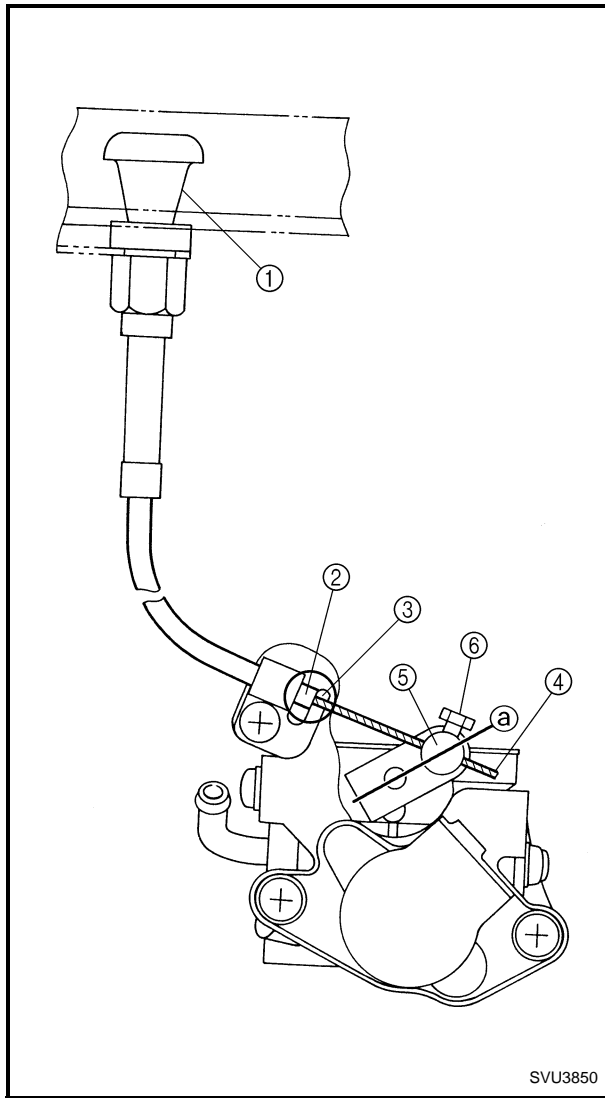


SVU3840

3. Inspect:

- Valve seat
Wear/damage → Replace.
Dirt → Clean.

- ① Wear at groove
- ② Dirt



SVU3850

CHOKE CABLE INSTALLATION

1. Inspect:
 - Choke knob ①

NOTE: _____
 Push the choke knob ① entirely in before installing it to the frame.

2. Install
 - Casing cap (choke cable) ②

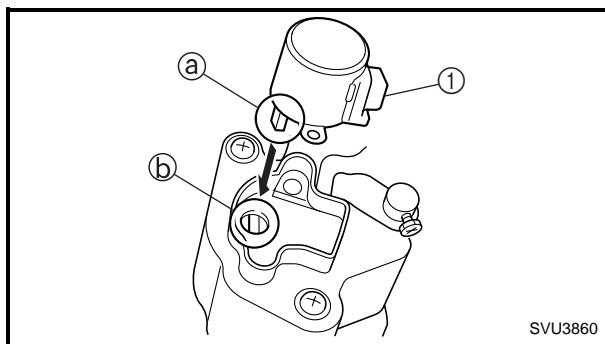
NOTE: _____
 Place the choke knob casing cap against the stay ③.

3. Install:
 - Inner cable ④

NOTE: _____
 Place the carburetor choke valve in its fully open position ①, insert the tip of the inner cable into drum hole ⑤, and then secure it in place with the screw ⑥.



Screw:
1 Nm (0.1 m · kg, 0.7 ft · lb)



SVU3860

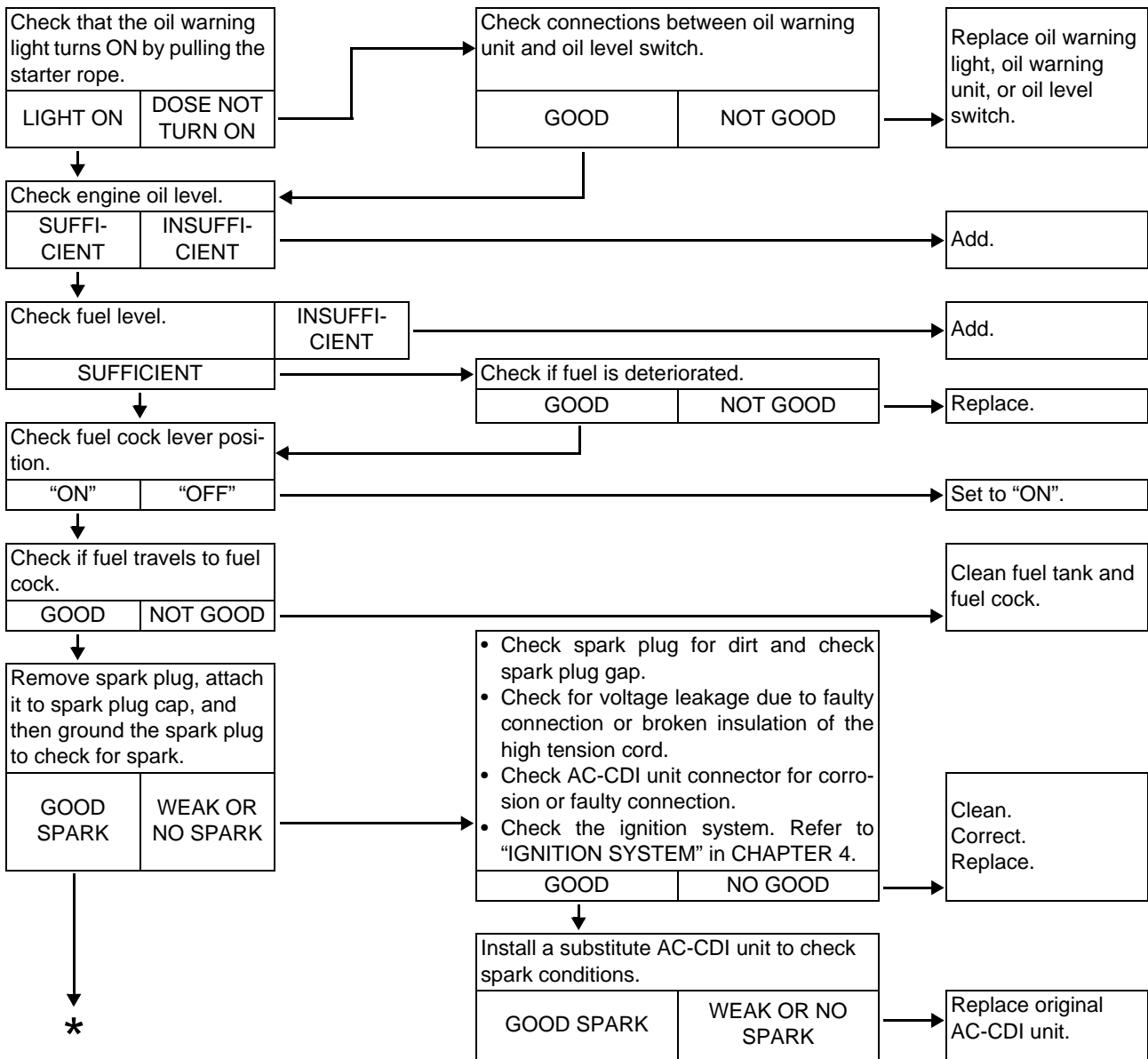
THROTTLE CONTROL MOTOR

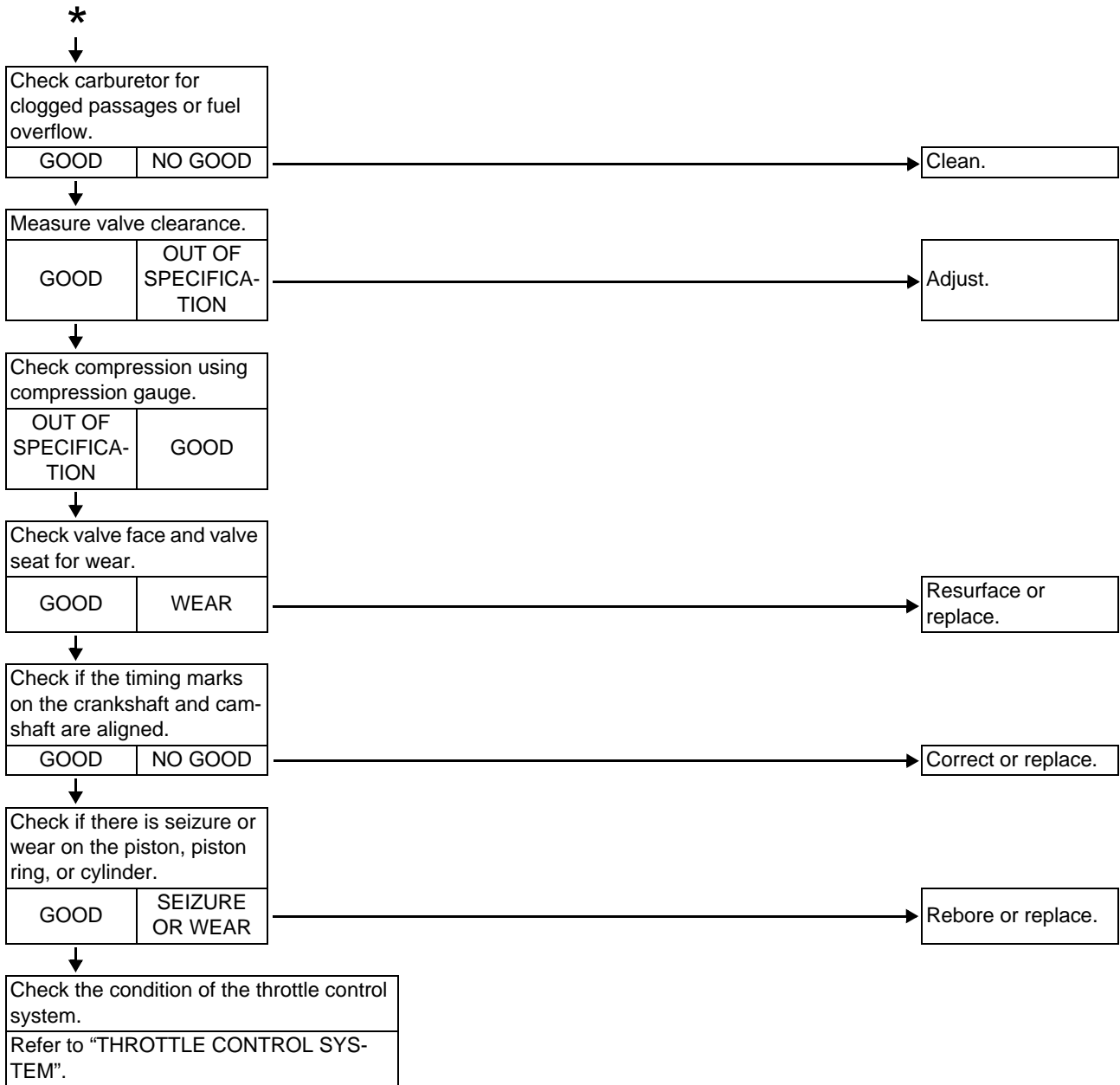
1. Inspect:
 - Throttle control motor ①

- NOTE:** _____
- Install the shaft ① of the throttle control motor by aligning it with the groove ② of the throttle shaft.
 - Install the throttle valve, and then make sure that it moves smoothly.
 - When installing the engine, fully open the throttle valve.

TROUBLESHOOTING

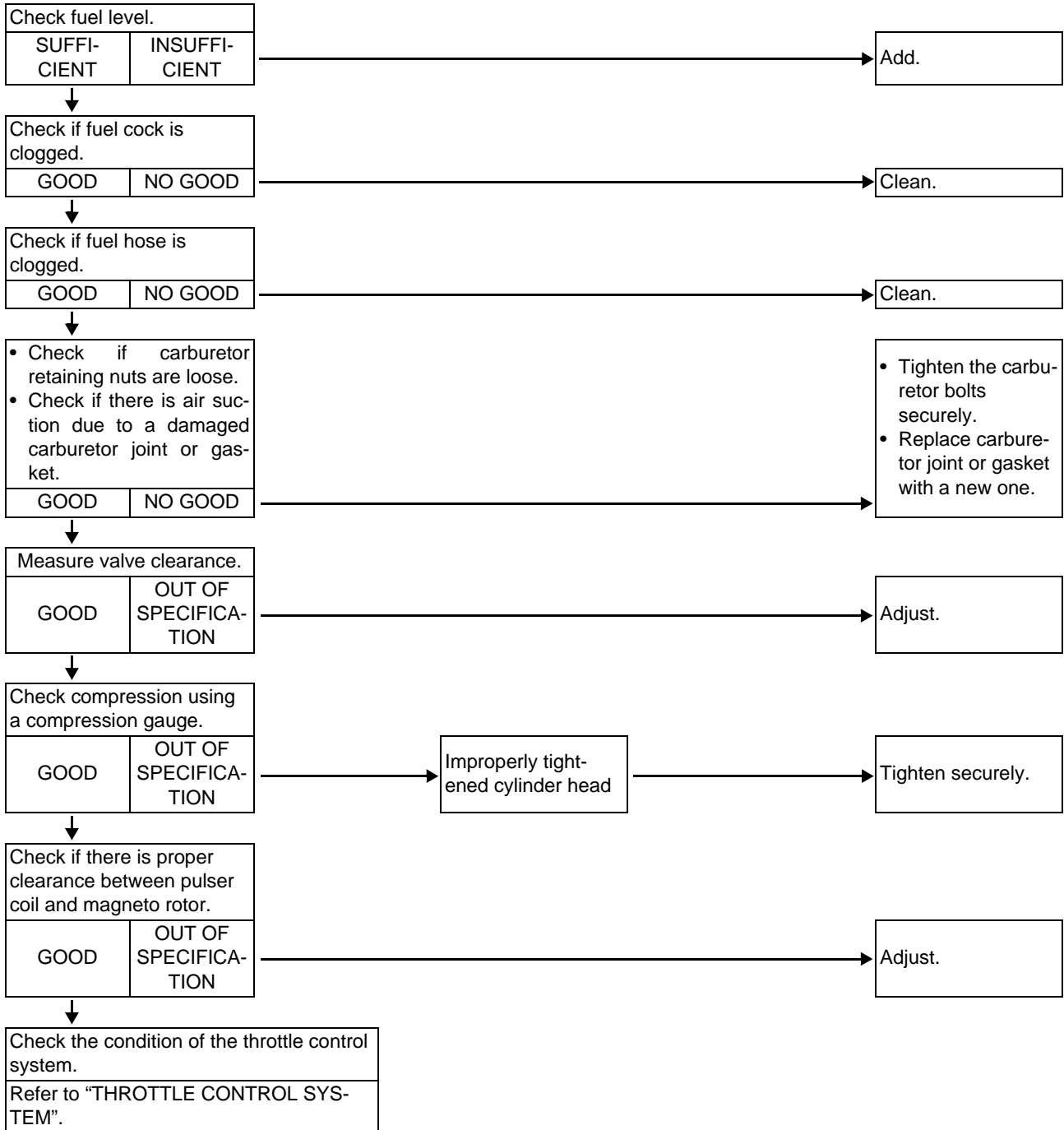
ENGINE DOES NOT START





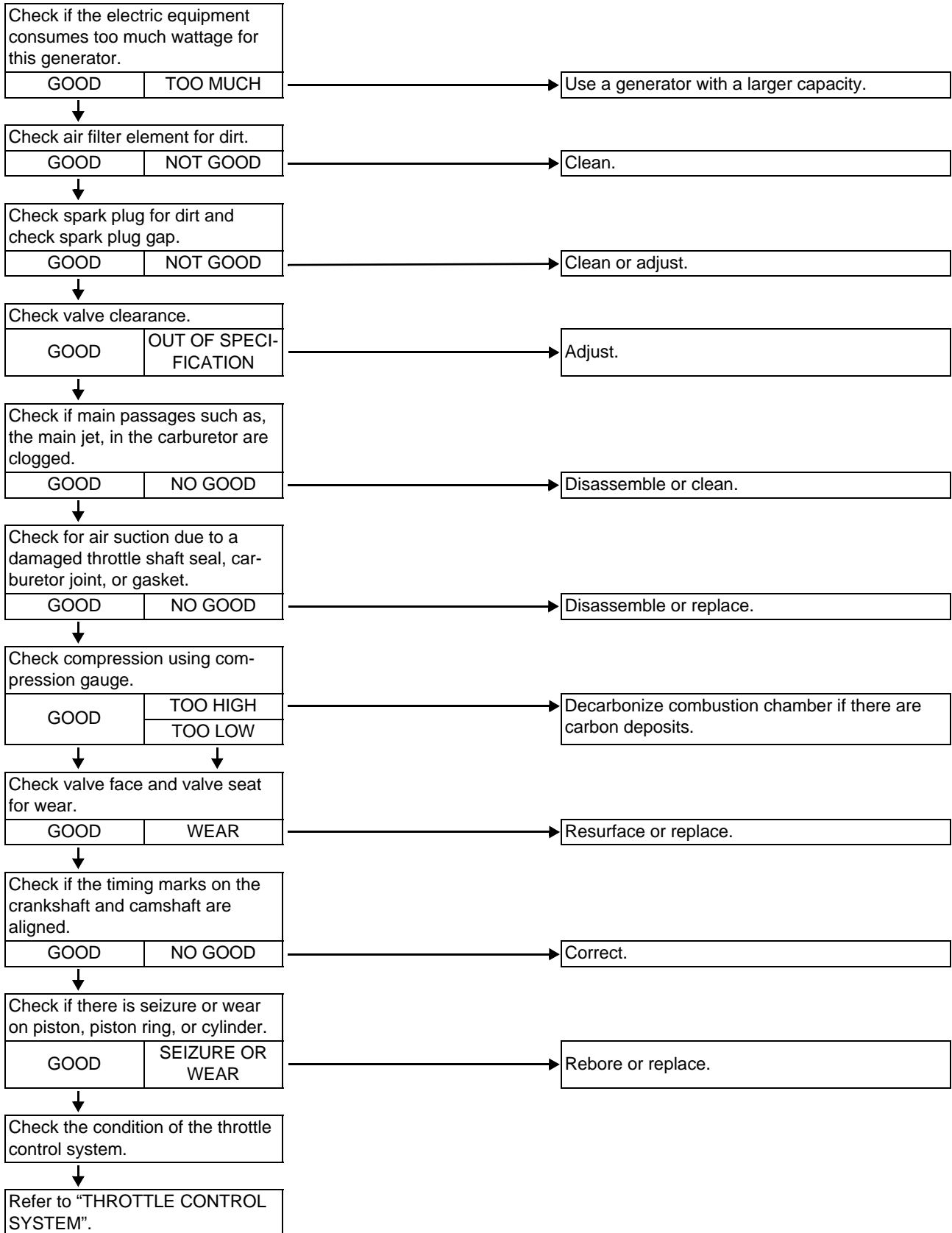


ENGINE STARTS BUT STALLS



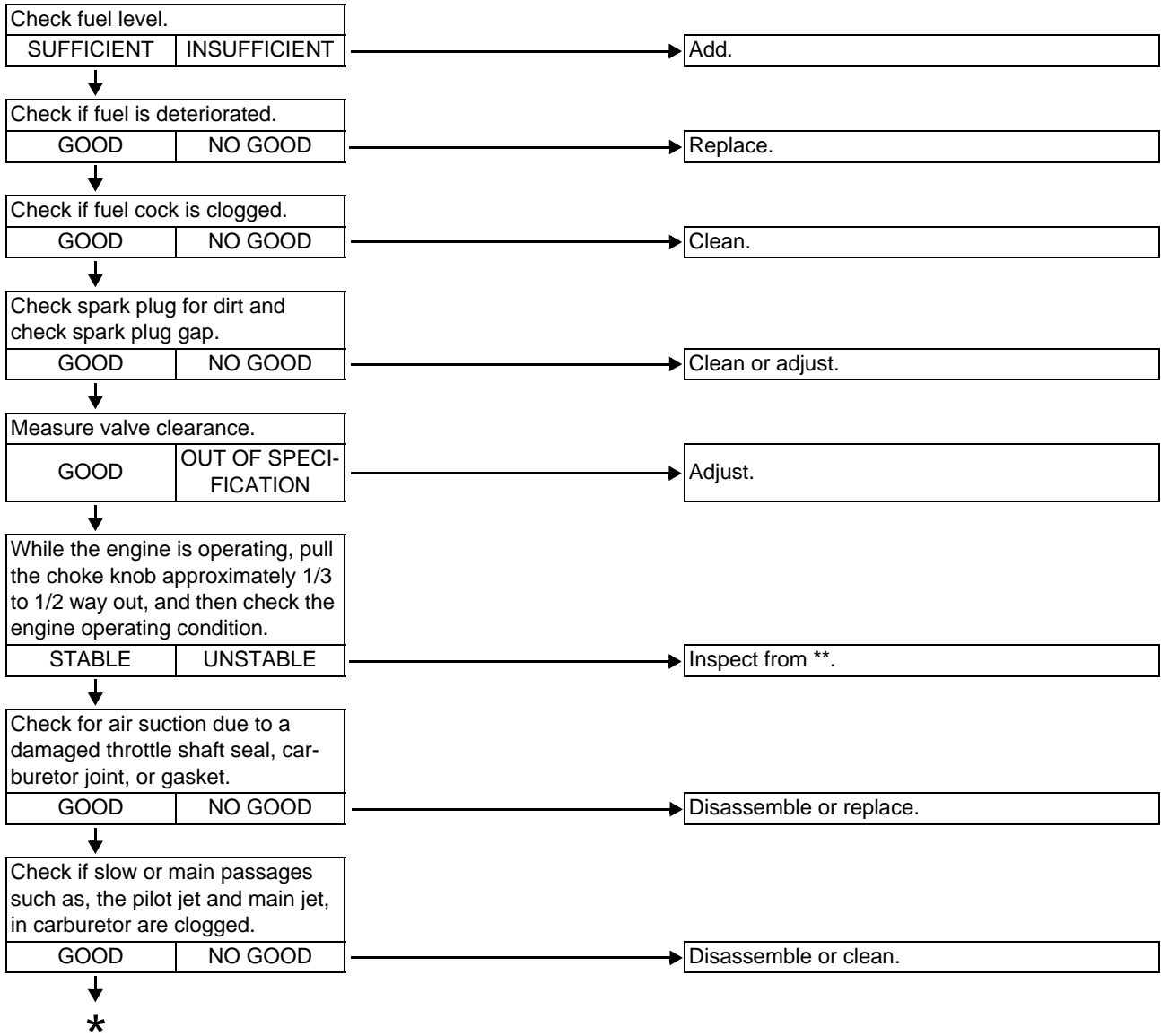


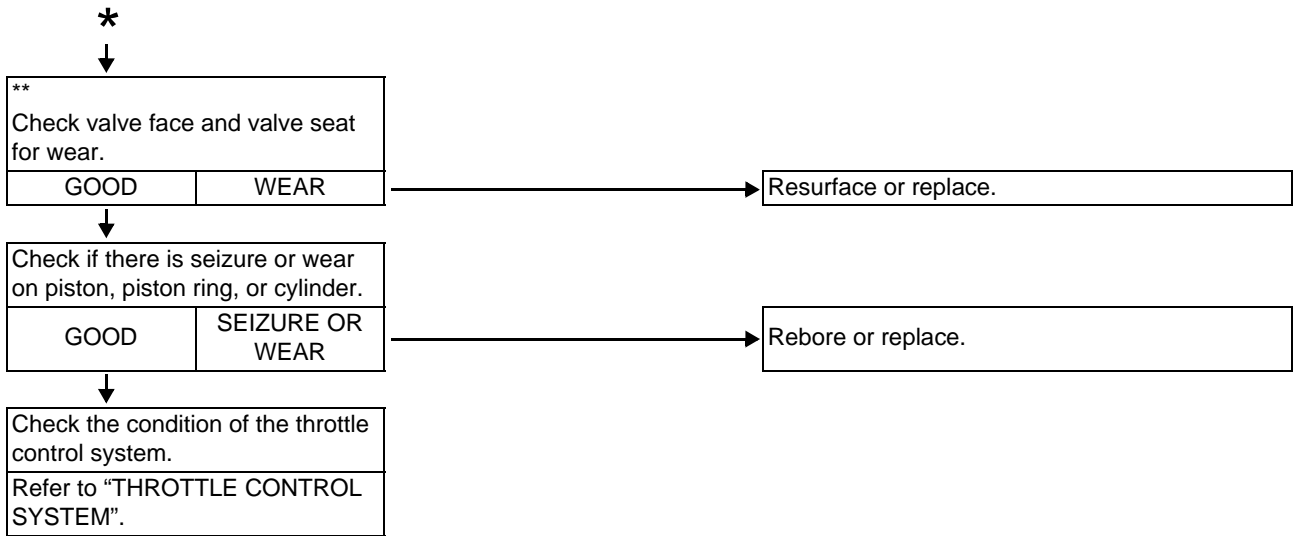
ENGINE SPEED DOES NOT INCREASE





ENGINE SPEED IS UNEVEN







THROTTLE CONTROL SYSTEM

ENGINE DOES NOT START, ENGINE STARTS BUT STALLS, ENGINE SPEED DOES NOT INCREASE, OR ENGINE SPEED IS UNEVEN.

Check AC output.

GOOD	NO GOOD
------	---------

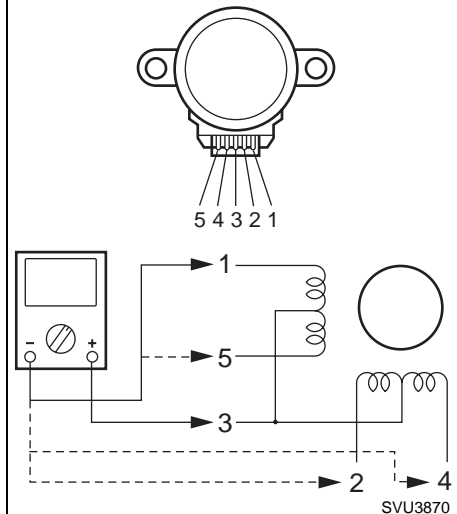
Refer to "GENERATOR SYSTEM" in CHAPTER 4.

Rotate the shaft of the throttle control motor to check if it turns smoothly with slight resistance.

GOOD	NO GOOD
------	---------

Replace the throttle control motor.

Measure the coil resistance between 3-1, 3-2, 3-4, and 3-5 of the throttle control motor. (Tester range: $\Omega \times 100$)
 $250 \Omega \pm 7\% / 25 \text{ }^\circ\text{C} (77 \text{ }^\circ\text{F})$



GOOD OUT OF SPECIFICATION

Replace the throttle control motor.

Check the connections of the wire harness connectors and couplers, and the wires for an open circuit or short circuit.

GOOD	NO GOOD
------	---------

Correct or replace.

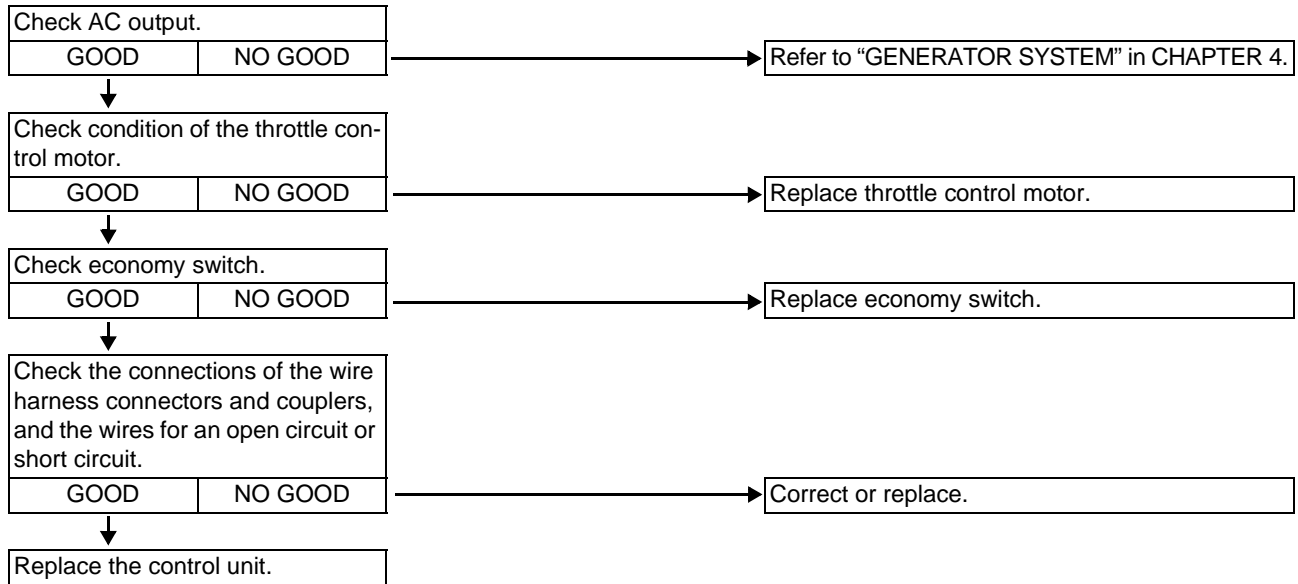
Replace the control unit.

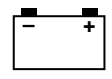


With no load, engine speed does not increase when economy control switch is set to "OFF".

With no load, engine speed does not decrease when economy control switch is set to "ON".

With load, engine speed does not increase when economy control switch is set to "ON".

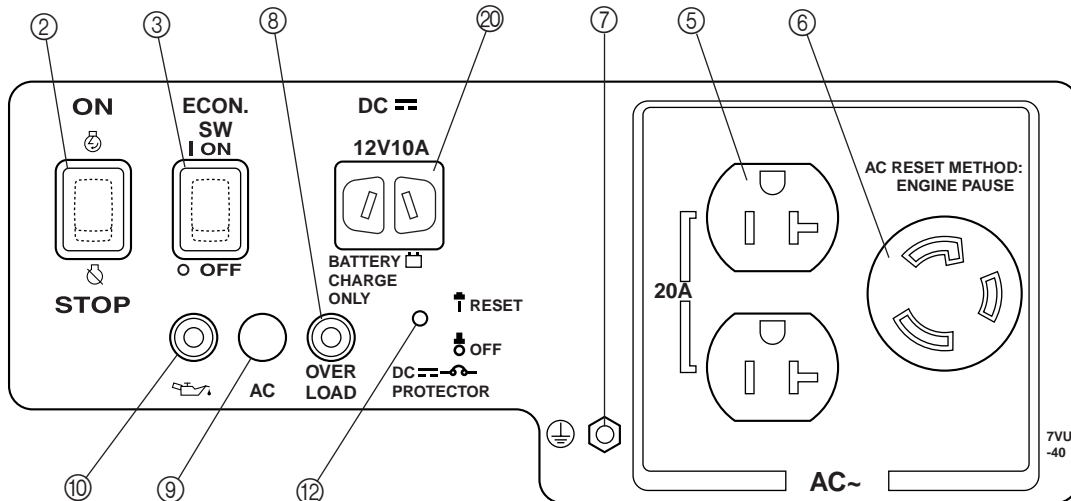
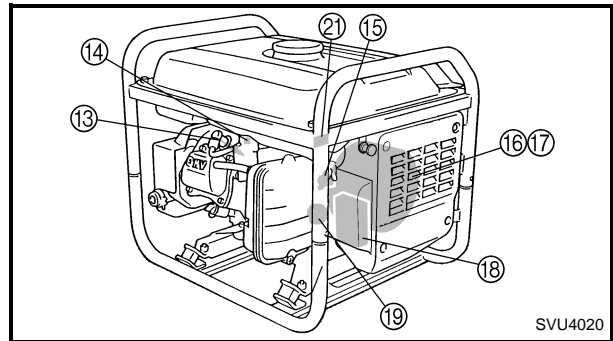
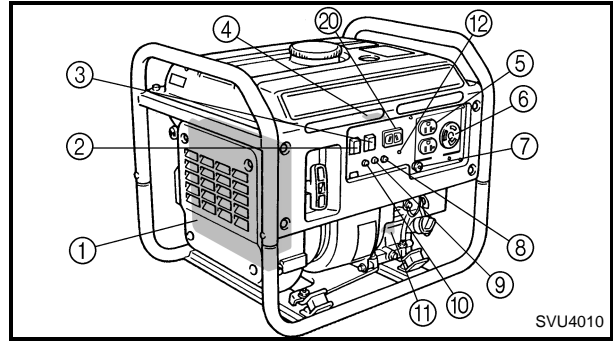




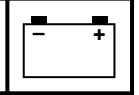
ELECTRICAL

ELECTRICAL COMPONENTS

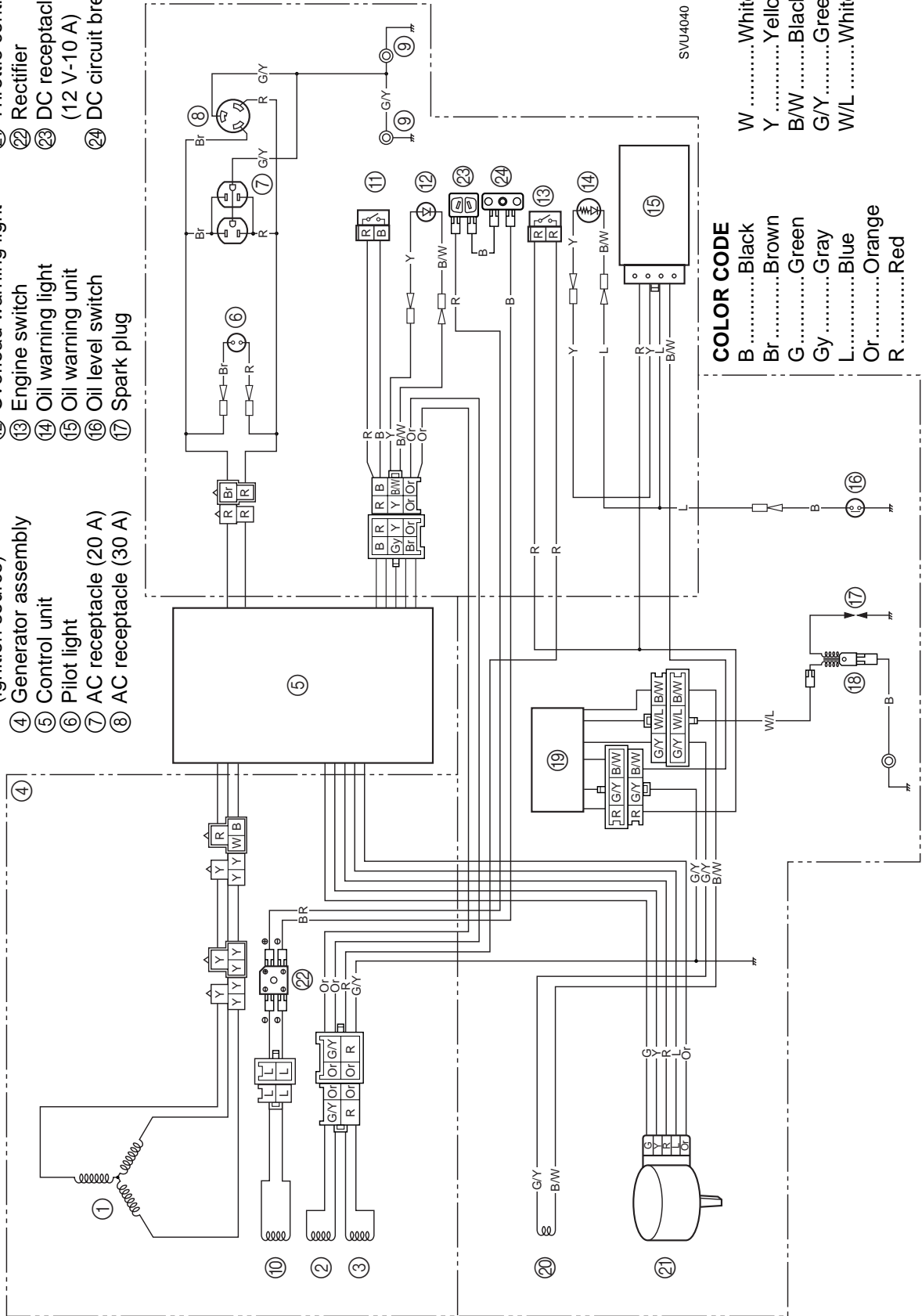
- ① Control unit
- ② Engine switch
- ③ Economy switch
- ④ Oil warning unit
- ⑤ AC receptacle (20 A)
- ⑥ AC receptacle (30 A)
- ⑦ Ground terminal
- ⑧ Overload warning light (Red)
- ⑨ Pilot light (Green)
- ⑩ Oil warning light (Red)
- ⑪ Oil level switch
- ⑫ DC circuit breaker
- ⑬ Spark plug
- ⑭ Throttle control motor
- ⑮ Pulser coil
- ⑯ Magneto rotor
- ⑰ Stator coil assembly
- ⑱ AC-CDI unit
- ⑲ Ignition coil
- ⑳ DC receptacle (12 V-10 A)
- ㉑ Rectifier



SVU4030



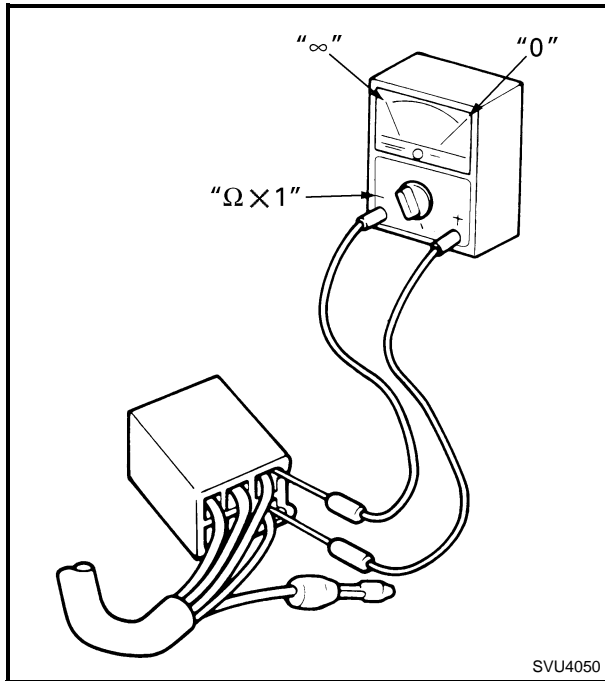
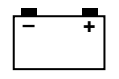
- ① Main coil
- ② Sub coil (AC control)
- ③ Charge coil
- ④ Generator assembly (ignition source)
- ⑤ Generator unit
- ⑥ Pilot light
- ⑦ AC receptacle (20 A)
- ⑧ AC receptacle (30 A)
- ⑨ Ground terminal
- ⑩ DC charge coil
- ⑪ Economy switch
- ⑫ Overload warning light
- ⑬ Engine switch
- ⑭ Oil warning light
- ⑮ Oil warning unit
- ⑯ Oil level switch
- ⑰ Spark plug
- ⑱ Ignition coil
- ⑲ AC-CDI unit
- ⑳ Pulser coil
- ㉑ Throttle control motor
- ㉒ Rectifier
- ㉓ DC receptacle (12 V-10 A)
- ㉔ DC circuit breaker



COLOR CODE

B	.....	Black
Br	.....	Brown
G	.....	Green
Gy	.....	Gray
L	.....	Blue
Or	.....	Orange
R	.....	Red

W	.....	White
Y	.....	Yellow
B/W	.....	Black/White
G/Y	.....	Green/Yellow
W/L	.....	White/Blue



SWITCHES

CHECKING SWITCH CONTINUITY

Use a tester to check the terminals for continuity. If the continuity is faulty at any point, replace the switch.



Pocket tester:

YU-03112, 90890-03112

NOTE:

- Set the pocket tester to "0" before starting a test.
- When testing the switch for continuity the pocket tester should be set to the "x 1" Ω range.
- When checking the switch turn it on and off a few times.



**IGNITION SYSTEM
TROUBLESHOOTING CHART**

NO SPARK OR WEAK SPARK

Inspection steps:

- | | |
|-----------------------------|---------------------------|
| 1. Spark plug | 6. Pulser coil resistance |
| 2. Ignition spark gap | 7. Engine switch |
| 3. Spark plug cap | 8. Oil level switch |
| 4. Ignition coil resistance | 9. Wire harness |
| 5. Charge coil resistance | |

NOTE:

- Remove the following part(s) before troubleshooting.
 - 1) Spark plug
- Use the following special tool(s) for troubleshooting.

	Pocket tester: YU-03112, 90890-03112
--	---

	Dynamic spark tester: YM-34487 Ignition checker: 90890-06754
--	---

- Spark plug
 - Check the spark plug condition.
Refer to "SPARK PLUG" in CHAPTER 2.



NO GOOD

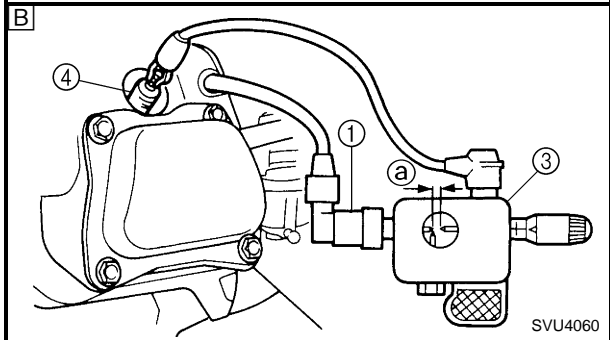
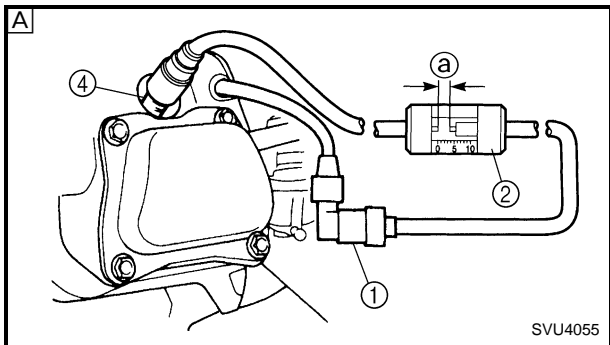


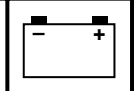
Repair or replace the spark plug.

- Ignition spark gap
 - Disconnect the spark plug cap ① from the spark plug.
 - Connect the dynamic spark tester ② or ignition checker ③ as shown.

Spark plug cap ① → Dynamic spark tester or ignition checker
Dynamic tester lead or ignition checker lead → Spark plug ④

- A For USA
- B Except for USA





- Turn the crankshaft and measure the ignition spark gap ③.

Minimum spark gap:
6 mm (0.24 in)

OUT OF SPECIFICATION OR NO SPARK

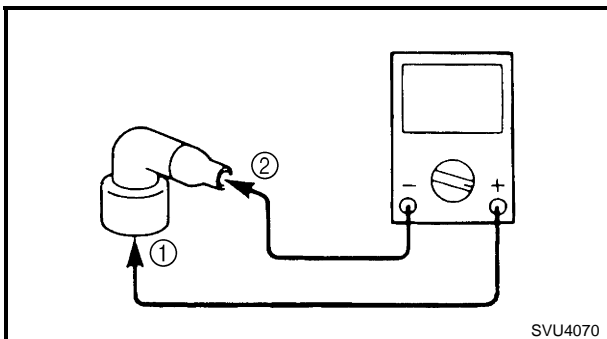
MEETS SPECIFICATION

The ignition system is good.

3. Spark plug cap

- Remove the spark plug cap.
- Connect the pocket tester ($\Omega \times 1k$) to the spark plug.

Tester (+) lead → Spark plug side ①
Tester (-) lead → High-tension cord side ②



Spark plug cap resistance:
4.0 ~ 6.0 k Ω at 20 °C (68 °F)

MEETS SPECIFICATION

NOTE:

- Do not pull out the plug cap from the high-tension cord.
- Remove → Turn the plug cap counterclockwise.
- Install → Turn the plug cap clockwise.
- Inspect the high-tension cord for cracks or deterioration, when install the pug cap.
- Cut 5 mm off the end of the high-tension cord, and then connect it to the plug cap.

OUT OF SPECIFICATION

Replace the spark plug cap.

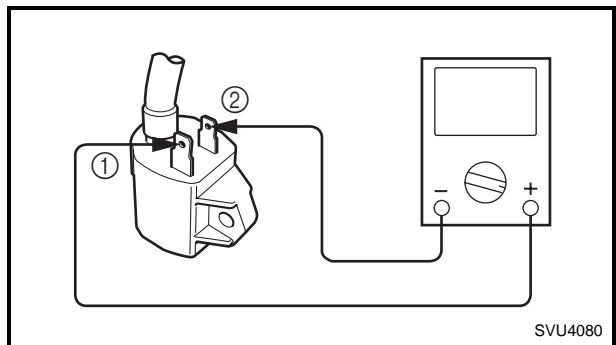
4. Ignition coil resistance

- Remove the ignition coil.
- 1) Primary coil resistance
- Connect the pocket tester ($\Omega \times 1k$) to the primary terminal.

Tester (+) lead → White/Blue terminal ①
Tester (-) lead → Black terminal ②

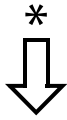
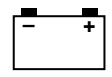
Primary coil resistance:
0.11 $\Omega \pm 15\%$ at 20 °C (68 °F)

MEETS SPECIFICATION
*



OUT OF SPECIFICATION

Replace the ignition coil.



2) Secondary coil resistance

- Connect the pocket tester ($\Omega \times 1$) to the secondary terminal.

Tester (+) lead → High-tension cord ①

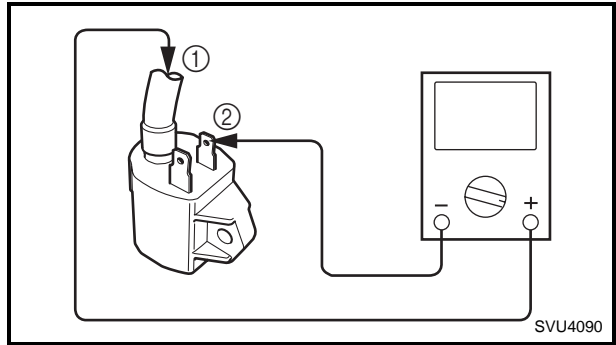
Tester (-) lead → Black terminal ②



Secondary coil resistance:
 $6.7 \text{ k}\Omega \pm 20\%$ at 20 °C (68 °F)



MEETS SPECIFICATION



OUT OF SPECIFICATION

Replace the ignition coil.

5. Charge coil resistance

- Remove the coupler of charge coil ①.
- Connect the pocket tester ($\Omega \times 1$) to the secondary terminal.

Tester (+) lead → Red terminal ②

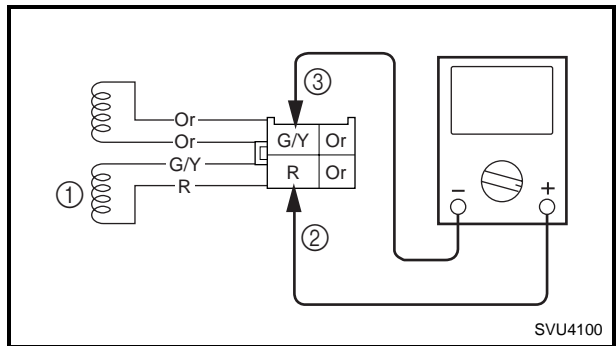
Tester (-) lead → Green/Yellow terminal ③



Charge coil resistance:
 $0.5 \Omega \pm 10\%$ at 20 °C (68 °F)



MEETS SPECIFICATION



OUT OF SPECIFICATION

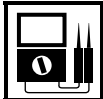
Replace the stator coil assembly.

6. Pulser coil resistance

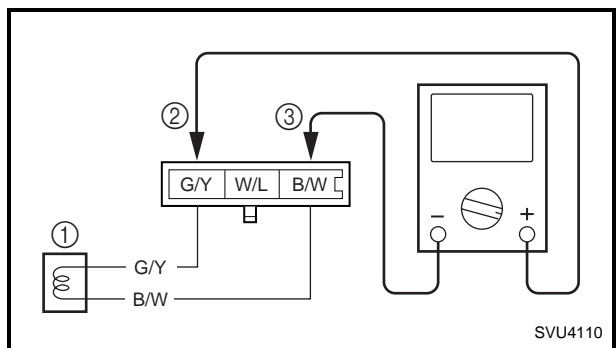
- Disconnect the pulser coil coupler ①.
- Connect the pocket tester ($\Omega \times 100$) to the secondary terminal.

Tester (+) lead → Green/Yellow terminal ②

Tester (-) lead → Black/White terminal ③

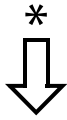
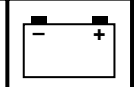


Pulser coil resistance:
 $185 \Omega \pm 20\%$ at 20 °C (68 °F)



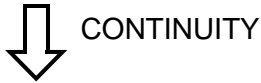
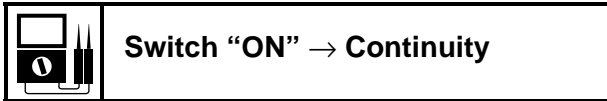
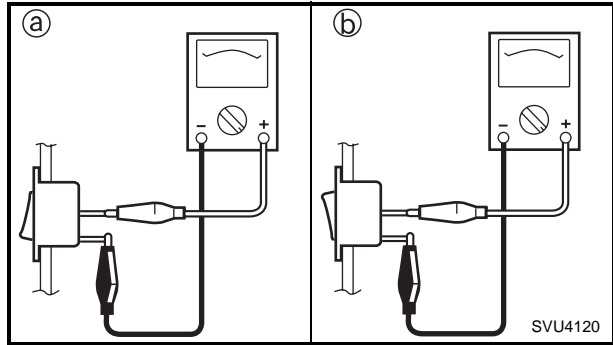
OUT OF SPECIFICATION

Replace the pulser coil.

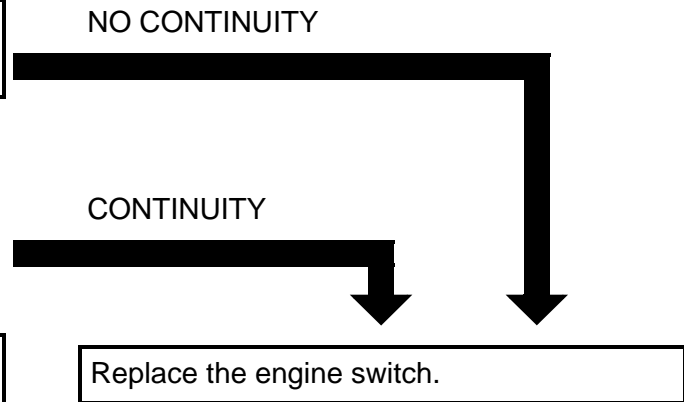


7. Engine switch

- Disconnect the engine switch coupler in the control box.
- Turn the engine stop switch to "ON" ①, and then check the engine stop switch for continuity.
- Connect the pocket tester ($\Omega \times 1k$) to the engine switch terminal.

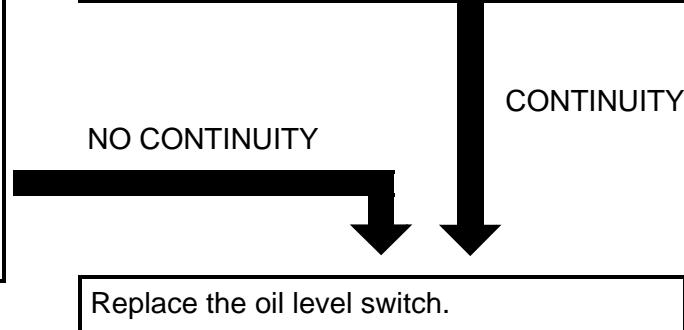
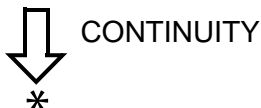
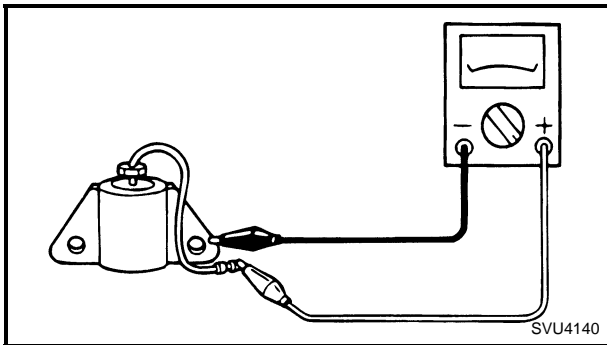
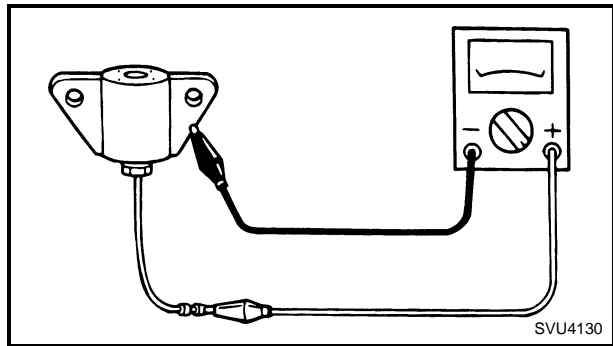


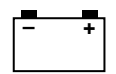
- Turn the engine stop switch to "STOP" ②, and then check the engine stop switch for continuity.



8. Oil level switch

- Remove the oil level switch from the bottom of the crankcase. Refer to "CRANKCASE COVER AND CAMSHAFT" in CHAPTER 3.
- Connect the pocket tester to the oil level switch for continuity.





9. Wire harness

- Check the terminal of the connector for contamination, rust, or disconnection.



Replace the magneto rotor.

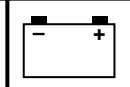


Replace the AC-CDI unit.

DISCONNECTED



Correct or replace the connector.



**GENERATOR SYSTEM
TROUBLESHOOTING CHART**

WEAK OR NO AC CURRENT

Start the engine. Check the overload warning light.		Disconnect the overloaded electric device.	
DOES NOT TURN ON	URNS ON	URNS ON	DOES NOT TURN ON

Start the engine. Check the AC output indicator.		Replace the AC output indicator.	
URNS ON	DOES NOT TURN ON		

Rated engine speed inspection		Check the throttle control system. Refer to "THROTTLE CONTROL SYSTEM" in CHAPTER 3.	
Operate the engine with no load. Set the economy switch to "OFF". 3,550 r/min			
GOOD	OUT OF SPECIFICATION		

Main coil AC voltage inspection

Disconnect the sub coil coupler ①.
Connect the Red and Green/Yellow leads, and then connect the Orange leads.

SVU4150

Disconnect the main coil coupler.
Start the engine.
Connect the pocket tester to the Yellow leads.
Measure the voltage. (Tester range: AC 300 V)

SVU4160

	Main coil AC voltage: 160 ~ 200 V	
	GOOD	TOO LOW DOES NOT GENERATE

Magnetic force is weak.
Replace the magneto rotor.

Main coil resistance measurement

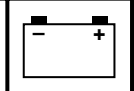
Stop the engine.
Measure the resistance between the Yellow leads.
(Tester range: $\Omega \times 1$)

SVU4170

	Main coil resistance: $0.6 \Omega \pm 20\%$ at 20°C (68°F)	
	GOOD	DISCONNECTED/ SHORT CIRCUIT



Replace the stator assembly.



*
↓

Sub coil AC voltage inspection

Start the engine.
Measure the voltage between the Orange leads of the sub coil ①.

SVU4180

	Sub coil AC voltage: 13.5 ~ 23.0 V
GOOD	TOO LOW DOES NOT GENERATE

Magnetic force is weak.

↓

Replace the magneto rotor.

Sub coil resistance inspection

Stop the engine.
Measure the resistance between the Orange to Orange lead. (Tester range: $\Omega \times 1$)

SVU4190

	Sub coil resistance: 0.14 $\Omega \pm 10\%$ at 20°C (68°F)
GOOD	DISCONNECTED/ SHORT CIRCUIT

Replace the stator coil assembly.

↓

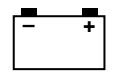
Economy switch continuity inspection

Switch "ON" → Continuity
Switch "OFF" → No Continuity

GOOD	DISCONNECTED
------	--------------

↓

Replace the control unit.



**CHARGING SYSTEM
TROUBLESHOOTING**

NO DC CURRENT

NOTE:

- Choose a battery which meets the following specifications for testing.
Recommended battery capacity:
Minimum: 12 V, 40 Ah
Maximum: 12 V, 120 Ah
- Use the following special tool(s) for troubleshooting.

	Pocket tester: YU-03112, 90890-03112
--	---

	Inductive tachometer: YU-8036-A Engine tachometer: 90890-03113
--	---

1. Battery voltage
 - Connect the pocket tester to the battery terminals.
 - Measure battery voltage.

Tester (+) lead → (+) terminal
Tester (-) lead → (-) terminal

	Sub coil AC voltage: 11.8 V
--	--

OUT OF SPECIFICATION

↓

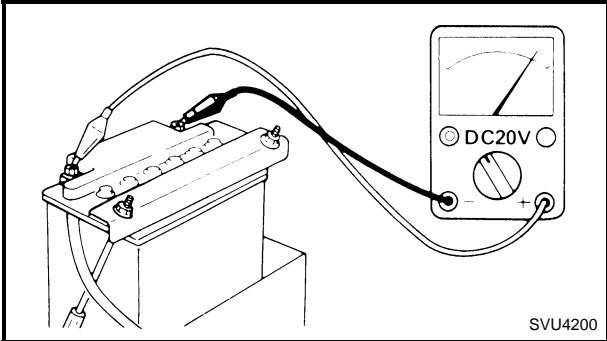
<ul style="list-style-type: none"> • Clean the terminals. • Recharge or replace the battery.
--

	Specific gravity: 1.280
--	--



2. Charging voltage
 - Start the engine.
 - Set the economy switch to "OFF".
(3,550 r/min with no load at AC output current)
 - Measure charging voltage.

	Charging voltage: 14.5 V
--	---

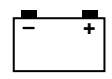


MORE THAN
14.0 V

↓


<p style="text-align: center;">Properly connect the charging system.</p>
--





*
 ↓ LESS THAN
 14.0 V

3. DC charge coil resistance
- Disconnect the DC charge coil ① leads.
 - Connect the pocket tester.
 - Measure the DC charge coil resistance.

 **DC charge coil resistance**
 Blue-Blue: 0.06 ~ 1.00 Ω

↓ GOOD

4. Inspect the rectifier continuity
- Disconnect the rectifier ① leads.
 - Connect the pocket tester (Ω × 1).

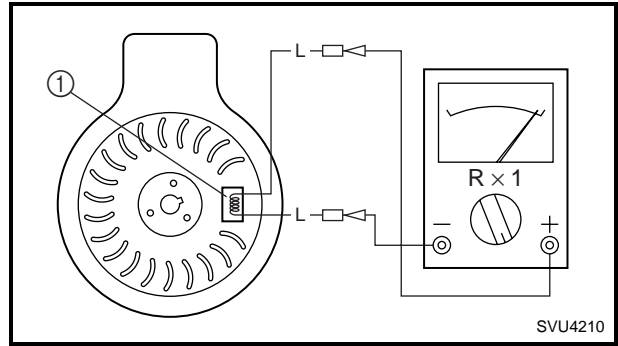
 **Check for continuity at following points:**

Pocket tester connecting point		Continuity
(+) Red	(-) Black	
Red terminal ②	Blue terminal ④	NO
Blue terminal ④	Red terminal ②	YES
Red terminal ②	Blue terminal ⑤	NO
Blue terminal ⑤	Red terminal ②	YES
Black terminal ③	Blue terminal ④	YES
Blue terminal ④	Black terminal ③	NO
Black terminal ③	Blue terminal ⑤	YES
Blue terminal ⑤	Black terminal ③	NO

↓ GOOD

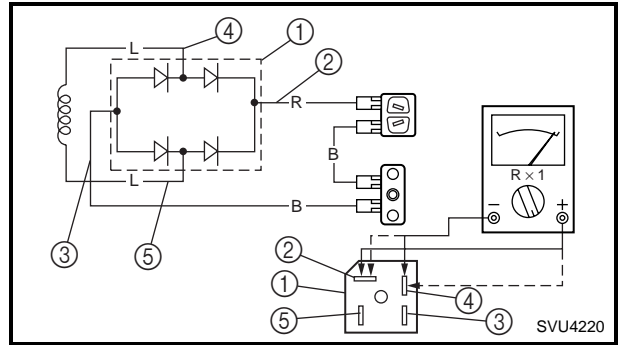
5. Inspect the DC circuit breaker continuity.
- Disconnect the DC circuit breaker ① leads.
 - Connect the pocket tester (Ω × 1).

 **Continuity:**
 "RESET" Position ① → YES
 "POP OUT" Position ② → NO



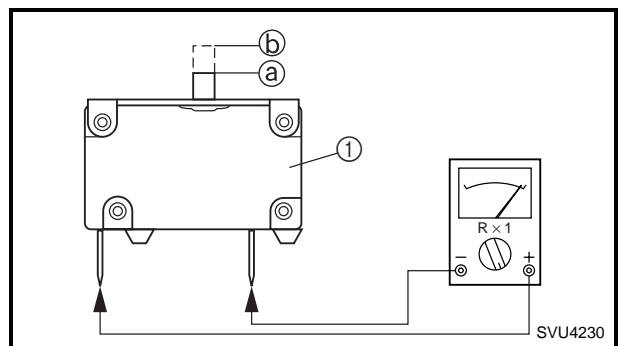
OUT OF SPECIFICATION

Replace the DC charge coil.



NO GOOD

Replace the rectifier.



NO GOOD

Replace the circuit breaker.



SPECIFICATIONS

GENERAL SPECIFICATIONS

Unit	EF2800i
Model code number	7VU2
Dimensions:	
Overall length	mm (in) 487 (19.2)
Overall width	mm (in) 395 (15.6)
Overall height	mm (in) 425 (16.7)
Dry weight	kg (lb) 29 (63.8)
Engine:	
Engine type	4-stroke OHV forced air cooled
Cylinder arrangement	1
Displacement	L (cm ³) 0.171 (171)
Bore × Stroke	mm (in) 66.0 × 50.0 (2.60 × 1.97)
Compression ratio	8.5:1
Rated output	60 Hz · kW (PS)/3,600 r/min 3.3 (4.5)
Rated engine speed	r/min 3,550
Operating hours	60 Hz · Hrs
W/no load	24.9
W/rated load	7.7
Fuel	Unleaded regular gasoline
Fuel tank capacity	L (Imp gal, US gal) 9.0 (1.97, 2.38)
Engine oil capacity	L (Imp qt, US qt) 0.6 (0.53, 0.63)
Engine oil grade	4-stroke engine oil API service classification SE or SF, if not available, SD
<p>The diagram illustrates the oil grade specifications. A large arrow points left, labeled 'YAMALUBE 4 (10W-30)'. Below it, three smaller arrows point right, labeled 'SAE 10W', 'SAE #20', and 'SAE #30'. Vertical lines indicate temperature markers: 0°C and 25°C above the arrows, and 32°F and 80°F below them. The SAE 10W grade is associated with 0°C and 32°F, SAE #20 with 25°C and 80°F, and SAE #30 with 80°F.</p>	
Electrical:	
Ignition system	AC-CDI (Voltage)
Ignition timing	BTDC 23 ± 1°
Spark plug type	BPR4ES (NGK)
Gap	mm (in) 0.7 ~ 0.8 (0.028 ~ 0.031)
Generator:	
Type	Multi pole rotating field magnet
Initial excitation	Permanent magnet
Driving method	Direct connection
Rated power factor	1
Frequency variation	
Instantaneous	Less than 10%
Settling	Less than 0.1%
Settling time	Less than 7 sec



Unit		EF2800i
Voltage fluctuation		
Instantaneous		Less than 20%
Settling		Less than 3%
Settling time		Less than 5 sec
AC output		
Rated voltage	V	120
Frequency	Hz	60
Rated output	kVA	2.5
Rated current	A	20.8
Safety device type		
	AC	Electronic no fuse breaker
	DC	Circuit breaker (No fuse breaker)
Rated engine speed	r/min	3,550
Voltage regulation		Voltage feed back system
Voltage stability		Within $\pm 1\%$
Frequency stability	Hz	Within ± 0.1
Rotating speed control		Throttle motor control type
Wave distortion ratio		Less than 2.5%
Number of phase		Single phase
Insulation resistance	M Ω	Over 10
Insulation type		E type
Receptacle		
	AC	20 A (Duplex) \times 1, 30 A \times 1
	DC	10 A \times 1



**MAINTENANCE SPECIFICATIONS
ENGINE**

Unit		EF2800i
Piston:	mm (in)	
Piston clearance		0.015 ~ 0.040 (0.00059 ~ 0.00157)
<Limit>		0.100 (0.0039)
Piston skirt "D"		66.0 (2.598)
<Limit>		65.9 (2.594)
Measuring point "H"		10.0 (0.4)
Oversize 1st		66.25 (2.6083)
2nd		66.50 (2.6181)
Piston pin hole inside diameter		16.002 ~ 16.013 (0.6300 ~ 0.6304)
<Limit>		16.020 (0.6307)
Piston pin:	mm (in)	
Piston pin diameter		15.995 ~ 16.000 (0.6297 ~ 0.6299)
<Limit>		15.950 (0.6280)
Piston ring:	mm (in)	
Top ring		Barrel face
Type		1.5 × 2.7 (0.059 × 0.106)
Dimensions "B × T"		0.2 ~ 0.4 (0.008 ~ 0.016)
End gap		<Limit> 0.9 (0.0354)
Side clearance		0.04 ~ 0.08 (0.0016 ~ 0.0031)
<Limit>	0.1 (0.0039)	
2nd ring		Taper
Type		1.5 × 2.7 (0.059 × 0.106)
Dimensions "B × T"		0.2 ~ 0.4 (0.008 ~ 0.016)
End gap		<Limit> 0.9 (0.0354)
Side clearance		0.02 ~ 0.06 (0.0008 ~ 0.0024)
<Limit>	0.1 (0.0039)	
Oil ring		Solid
Type		2.5 × 2.7 (0.098 × 0.106)
Dimensions "B × T"		0.2 ~ 0.4 (0.008 ~ 0.016)
End gap		<Limit> 0.9 (0.0354)
Cylinder head:	mm (in)	
Warpage limit		0.05 (0.002)
Cylinder:	mm (in)	
Inside diameter "D"		66.00 ~ 66.02 (2.5984 ~ 2.5990)
<Limit>		66.020 (2.5990)
Taper limit		0.05 (0.002)
Warpage limit		0.05 (0.002)



Unit		EF2800i	
Crankshaft:		mm (in)	
Big end side clearance "A"		0.20 ~ 0.60 (0.008 ~ 0.024)	
<Limit>		0.75 (0.029)	
Runout "B"		0.04 (0.0016)	
<Limit>		28.0 (1.102)	
Crank pin diameter "C"		27.9 (1.098)	
<Limit>			
Connecting rod:		mm (in)	
Small end diameter "A"		16.006 ~ 16.020 (0.6301 ~ 0.6307)	
Oil clearance		0.006 ~ 0.025 (0.0002 ~ 0.0010)	
Big end diameter "B"		28.000 ~ 28.015 (1.1023 ~ 1.1029)	
Oil clearance		0.015 ~ 0.040 (0.0006 ~ 0.0016)	
<Limit>		0.1 (0.004)	
Camshaft:		mm (in)	
Camshaft outside diameter			
Cam dimension			
"A"		IN	EX
		26.9 ± 0.05 (1.06 ± 0.002)	26.68 ± 0.05 (1.05 ± 0.002)
"B"		22.0 ± 0.05 (0.87 ± 0.002)	22.03 ± 0.05 (0.87 ± 0.002)
Camshaft journal		14.965 ~ 14.990 (0.5892 ~ 0.5902)	
<Limit>		14.950 (0.59)	
Valve:		mm (in)	
Valve			
Face diameter "A"	IN	24.0 (0.94)	
	EX	22.0 (0.87)	
Stem diameter "B"	IN	5.5 (0.22)	
	EX	5.5 (0.22)	
Stem length "C"	IN	65.9 (2.59)	
	EX	66.2 (2.61)	
Valve face contact width "D"	IN	0.7 (0.03)	
	EX	0.7 (0.03)	
<Limit>		1.7 (0.067)	
Valve stem runout limit "θ"		0.01 (0.0004)	
		90°	
Valve guide			
Guide inside diameter	IN	5.5 (0.22)	
	EX	5.5 (0.22)	
<Limit>	IN	5.4 (0.21)	
	EX	5.4 (0.21)	
Stem to guide clearance	IN	0.04 ~ 0.06 (0.0016 ~ 0.0020)	
	EX	0.06 ~ 0.08 (0.002 ~ 0.003)	
Valve clearance	IN	0.1 (0.004)	
	EX	0.1 (0.004)	

MAINTENANCE SPECIFICATIONS

SPEC



Unit	EF2800i
Push rod: mm (in) Runout limit	0.5 (0.02)
Valve spring: mm (in) Free length IN EX <Limit> IN EX Set length IN EX Set force IN EX Tilt limit	26.5 (1.04) 26.5 (1.04) 25.0 (0.98) 25.0 (0.98) 21.6 (0.85) 21.6 (0.85) 4.5 kg (9.9 lb) 4.5 kg (9.9 lb) 1.6 (0.06)
Carburetor: mm (in) Type/manufacture I.D. mark Bore size Main jet Min air jet Pilot air jet Pilot outlet Valve seat size Main nozzle Pilot jet Throttle valve Float height "H"	BV20-15/MIKUNI 7VU 10 ø15 #88.8 ø1.8 (0.0709) ø1.1 (0.0433) ø0.9 (0.0354) ø1.8 (0.0709) 31B #37.5 #150 16.0 (0.63)





GENERATOR AND ELECTRICAL

Unit	EF2800i
Generator:	
Main coil AC voltage (3 phase) (V/r/min) (With the throttle control motor coupler disconnected)	130 ~ 160/2,800
Sub coil AC voltage (single phase)(V/r/min) (With the throttle control motor coupler disconnected)	13.5 ~ 23.0/2,800
Coil resistance	
Main coil (Ω ± 10%)	0.6 (Yellow-Yellow)
Sub coil (Ω ± 10%)	0.14 (Orange-Orange)
DC charge coil (Ω ± 10%)	0.5 (Blue-Blue)
Electrical:	
Ignition system	AC-CDI (voltage)
Pulser coil resistance (Ω ± 20%)	185
Ignition timing at 3,800 r/min	BTDC 23°
Primary coil resistance (Ω ± 15%)	0.11
Secondary coil resistance (kΩ ± 20%)	6.7
Charge coil resistance (Ω ± 10%) (ignition source)	0.5
Spark plug cap resistance (kΩ)	4.0 ~ 6.0
Minimum spark gap mm (in)	6 (0.24)



TIGHTENING TORQUE

Item	Tread size	Tightening torque Nm (m·kg, ft·lb)
Spark plug	M14 × 1.25	18 (1.8, 13)
Cylinder head cover	M6 × 1.0	10 (1.0, 7.2)
Cylinder head	M8 × 1.25	20 (2.0, 14)
Oil drain bolt	M10 × 1.25	17 (1.7, 12)
Crankcase cover	M8 × 1.25	22 (2.2, 16)
Connecting rod	M7 × 1.0	12 (1.2, 8.7)
Valve adjuster locknut	M6 × 0.5	10 (1.0, 7.2)
Air filter case cover	M6 × 1.0	2 (0.2, 1.4)
Muffler (nut)	M6 × 1.0	7 (0.7, 5.1)
Muffler (bolt)	M6 × 1.0	10 (1.0, 7.2)
Muffler protector 1, 2	M6 × 1.0	10 (1.0, 7.2)
Muffler stay	M8 × 1.25	16 (1.6, 11)
Muffler band	M5 × 0.8	4 (0.4, 2.9)
Engine mount (nut)	M6 × 1.0	7 (0.7, 5.1)
Engine mount (bolt)	M8 × 1.25	16 (1.6, 11)
Ground lead wire bolt (frame)	M6 × 1.0	7 (0.7, 5.1)
Recoil starter	M6 × 1.0	7 (0.7, 5.1)
Fuel tank	M6 × 1.0	7 (0.7, 5.1)
Fuel cock cup	—	1.3 (0.13, 0.94)
Choke cable tightening screw	—	1 (0.1, 0.7)
Magneto rotor	M14 × 1.5	65 (6.5, 47)
Pulser coil	M5 × 0.8	4 (0.4, 2.9)
AC-CDI unit	M5	2 (0.2, 1.4)
Bracket (stator coil assembly)	M6 × 1.0	7 (0.7, 5.1)
Stator coil assembly	M6 × 1.0	10 (1.0, 7.2)

GENERAL TORQUE SPECIFICATIONS

This chart specifies torque for standard fasteners with standard I.S.O. pitch treads. Torque specifications for special components or assemblies are included in the applicable sections of this book. To avoid warpage, tighten multifastener assemblies in a crisscross fashion, in progressive stages, until full torque is reached. Unless otherwise specifications call for clean, dry treads. Components should be at room temperature.

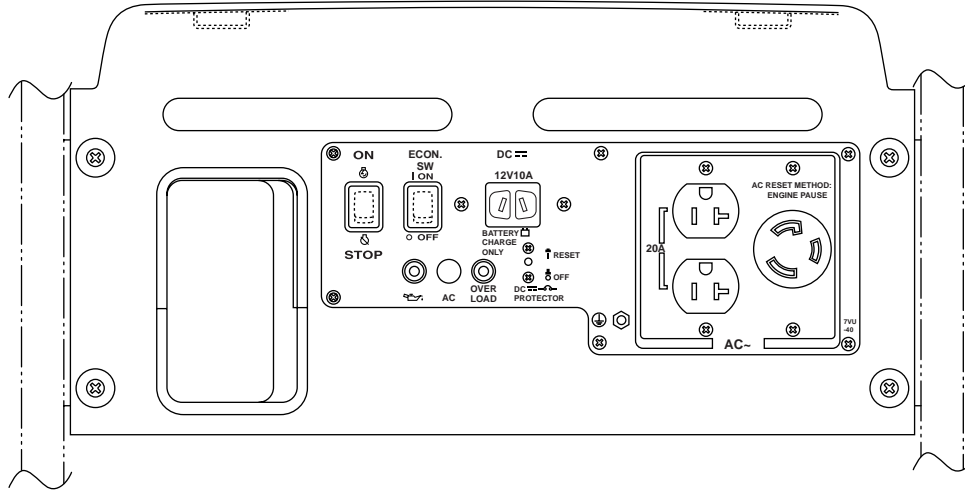
Tread size	Tightening torque		
	Nm	m·kg	ft·lb
M4	2	0.2	1.4
M5	3	0.3	2.2
M6	7	0.7	5.1
M7	10	1.0	7.2
M8	15	1.5	11
M10	30	3.0	22
M12	60	6.0	43

DEFINITION OF UNITS

Unit	Read	Definition	Measure
mm	Millimeter	10^{-3} meter	Length
cm	Centimeter	10^{-2} meter	Length
kg	Kilogram	10^3 gram	Weight
N	Newton	$1 \text{ kg} \times \text{m}/\text{sec}^2$	Force
Nm	Newton meter	$\text{N} \times \text{m}$	Torque
m·kg	Meter kilogram	$\text{m} \times \text{kg}$	Torque
Pa	Pascal	N/m^2	Pressure
N/mm	Newton per millimeter	N/mm	Spring rate
L	Liter	—	Volume or capacity
cm ³	Cubic centimeter	—	
r/min	Rotation per minute	—	Engine speed



WIRE ROUTING DIAGRAM
CONTROL BOX PANEL AND BEHIND CONTROL BOX

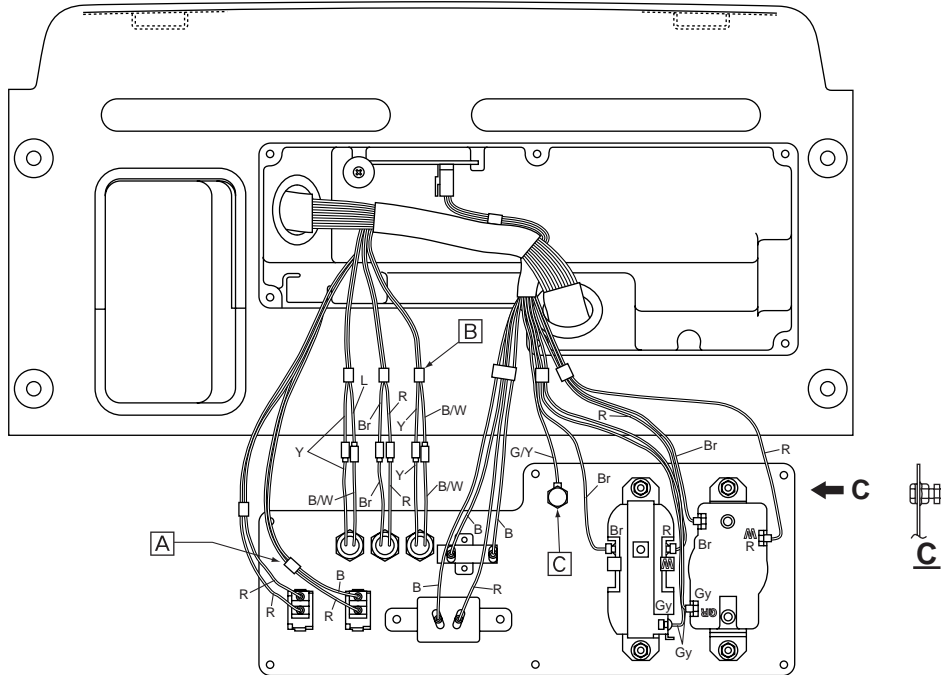


- Ⓐ Black lead with red tape mark
- Ⓑ Black/White and Yellow leads with tape mark
- Ⓒ Ground terminal

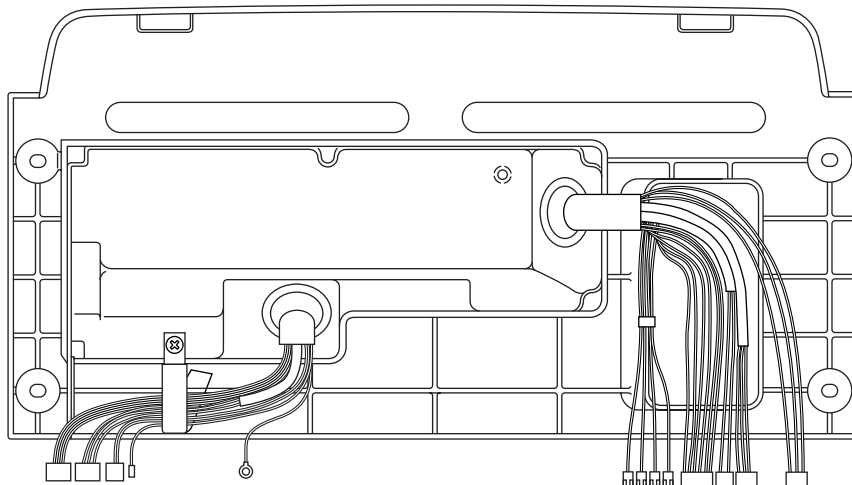
COLOR CODE

- BBlack
- BrBrown
- LBlue
- GyGray
- RRed
- YYellow
- B/WBlack/White
- G/YGreen/Yellow

SVU5010



SVU5020



SVU5030

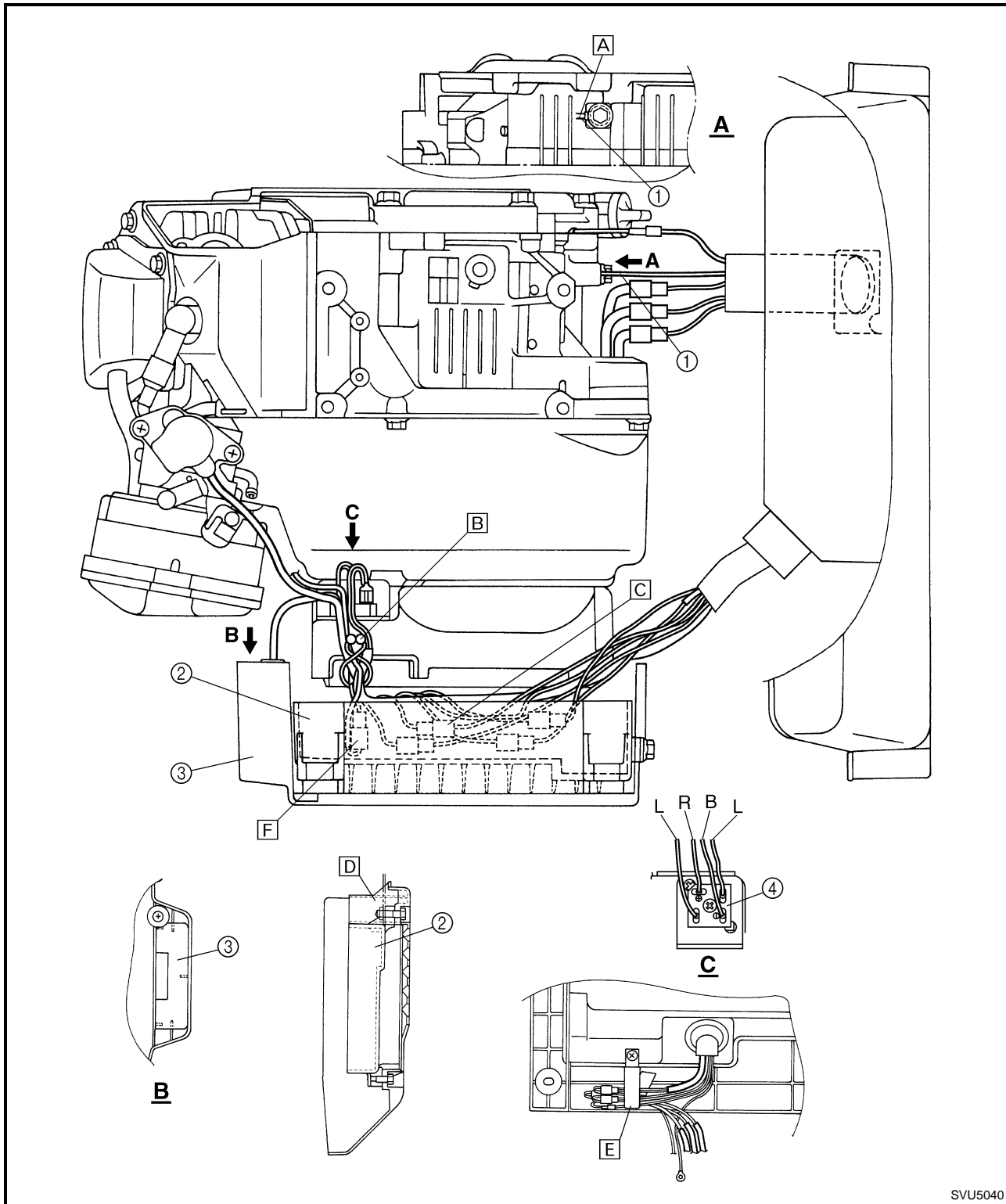


ENGINE AND GENERATOR

- ① Ground terminal
- ② Control unit
- ③ AC-CDI unit
- ④ Rectifier

- A** Tighten the ground terminal so that it faces upward.
- B** Pass the clamp through the hole of the fan case cover, and then fasten the lead wires.

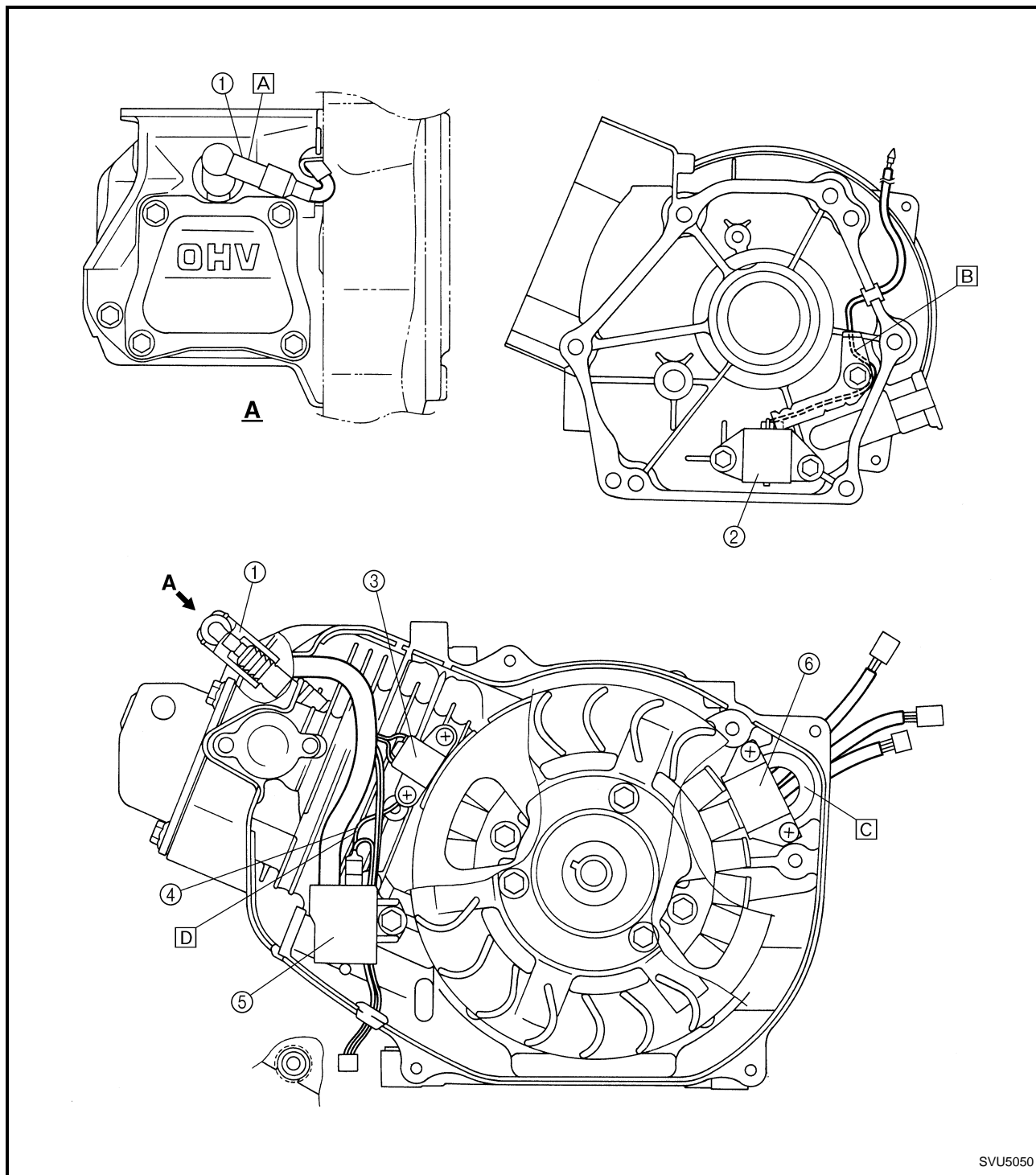
- C** Connect the coupler, and then store them in the space located above the control unit.
- D** Coupler storage space
- E** Connect the lead wires, and then fasten them with a clamp.
- F** Store the AC-CDI connector (red) vertically along the end of the storage space.





- ① Spark plug cap
- ② Oil level switch
- ③ Pulser coil
- ④ Ground terminal
- ⑤ Ignition coil
- ⑥ Clamp

- A Install the spark plug cap.
- B Route the oil level switch lead as shown.
- C Pass the leads through the hole, install and tighten the clamp, and then insert it in the grommet into the hole.
- D Connect the ground lead connector to the ignition coil, and then tighten the ground lead terminal together with the pulser coil.





CIRCUIT DIAGRAM

- | | | |
|---------------------------------|---------------------------|-----------------------------|
| ① Main coil | ⑩ DC charge coil | ⑲ AC-CDI unit |
| ② Sub coil (AC control) | ⑪ Economy switch | ⑳ Pulser coil |
| ③ Charge coil (Ignition source) | ⑫ Over load warning light | ㉑ Throttle control motor |
| ④ Generator assembly | ⑬ Engine switch | ㉒ Rectifier |
| ⑤ Control unit | ⑭ Oil warning light | ㉓ DC receptacle (12 V-10 A) |
| ⑥ Pilot light | ⑮ Oil warning unit | ㉔ DC circuit breaker |
| ⑦ AC receptacle (20 A) | ⑯ Oil level switch | |
| ⑧ AC receptacle (30 A) | ⑰ Spark plug | |
| ⑨ Ground terminal | ⑱ Ignition coil | |

