

News No.	Issue Date
P/P-388	Mar. 2014

SOME PARTS OF CHANGES

Applicable Information	Publication No.	Applicable Page
EU10i	62Z4000	8-9, 8-10

CHANGE LOCATION

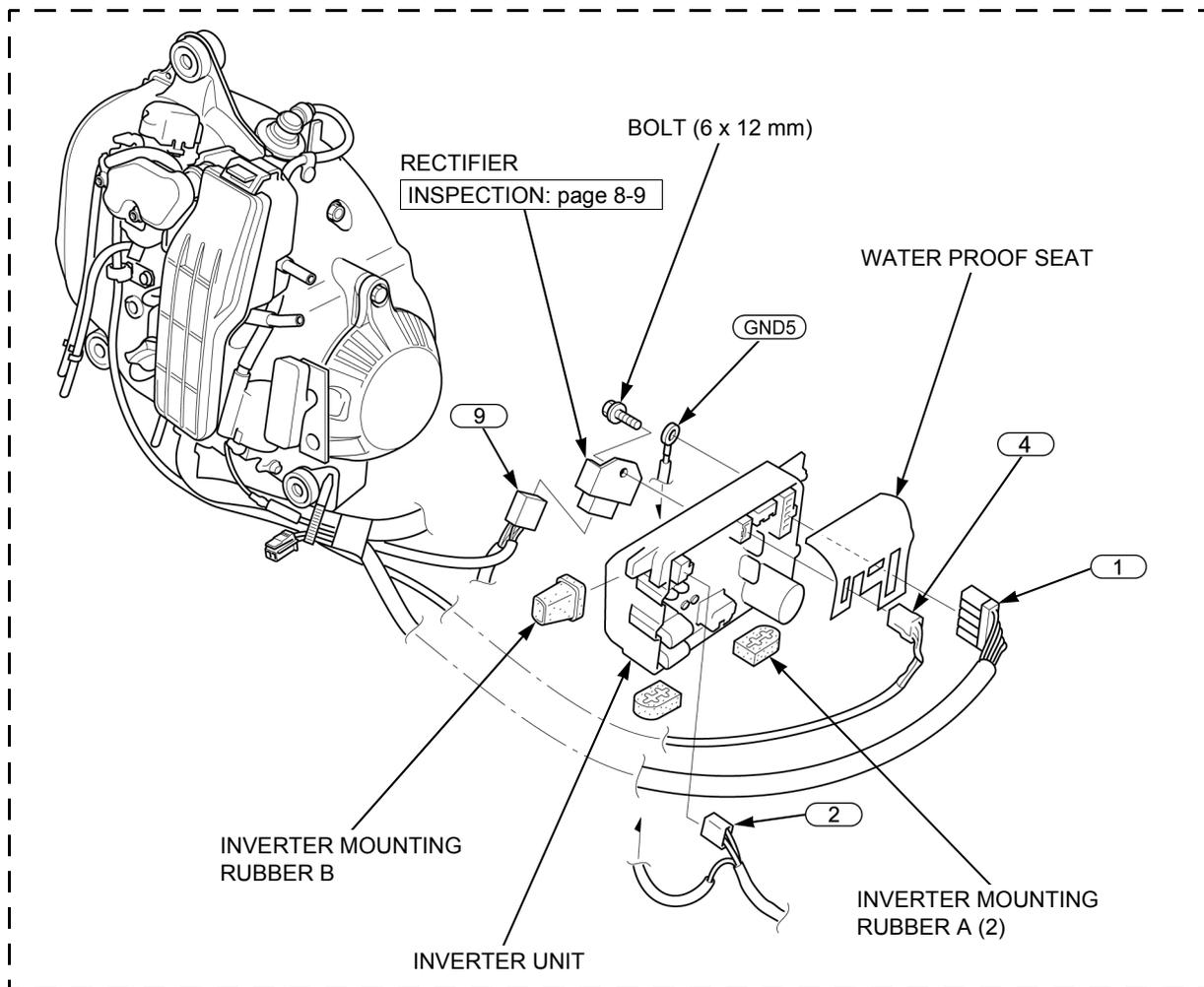
The changed instructions are shown in [] .

INVERTER UNIT REMOVAL/INSTALLATION

Remove the fuel tank (page 6-3).

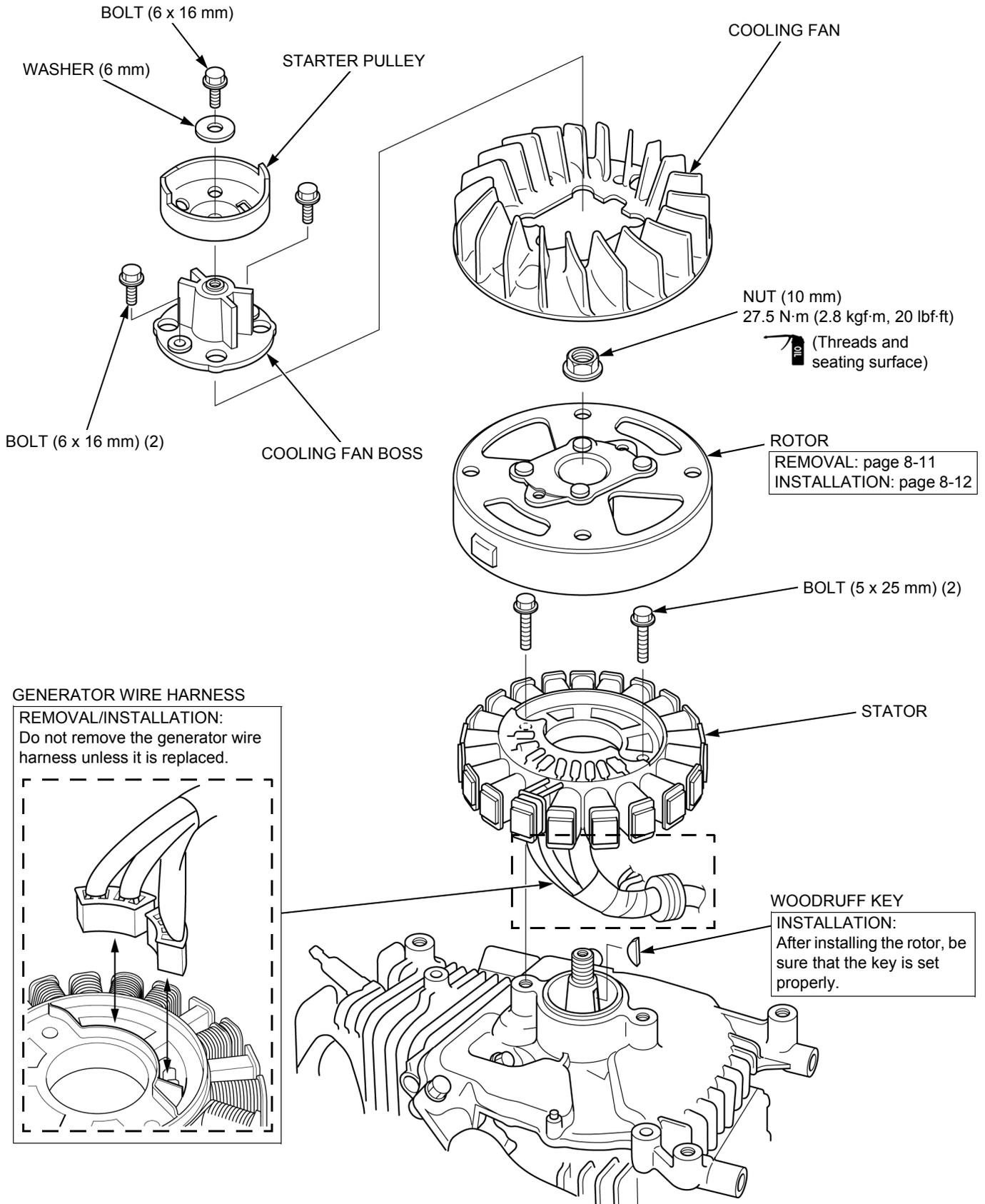
NOTE:

- When installing, route the wire harness properly (page 2-8).



GENERATOR REMOVAL/INSTALLATION

Remove the shroud (page 13-3).



How to use this manual

A Few Words About Safety

SERVICE INFORMATION

The service and repair information contained in this manual is intended for use by qualified, professional technicians. Attempting service or repairs without the proper training, tools, and equipment could cause injury to you and/or others. It could also damage this Honda product or create an unsafe condition.

This manual describes the proper methods and procedures for performing service, maintenance, and repairs. Some procedures require the use of special tools. Any person who intends to use a replacement part, service procedure, or a tool that is not recommended by Honda must determine the risks to their personal safety and the safe operation of this product.

If you need to replace a part, use Honda Genuine parts with the correct part number or an equivalent part. We strongly recommend that you do not use replacement parts of inferior quality.

For Your Customer's Safety

Proper service and maintenance are essential to the customer's safety and the reliability of this product. Any error or oversight while servicing this product can result in faulty operation, damage to the product, or injury to others.

⚠ WARNING

Improper service or repairs can create an unsafe condition that can cause your customer or others to be seriously hurt or killed.

Follow the procedures and precautions in this manual and other service materials carefully.

For Your Safety

Because this manual is intended for the professional service technician, we do not provide warnings about many basic shop safety practices (e.g., Hot parts-wear gloves). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practices, we recommend that you do not attempt to perform the procedures described in this manual.

Some of the most important general service safety precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing service and repair procedures. Only you can decide whether or not you should perform a given task.

⚠ WARNING

Failure to properly follow instructions and precautions can cause you to be seriously hurt or killed.

Follow the procedures and precautions in this manual carefully.

Important Safety Precautions

Make sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and using safety equipment. When performing any service task, be especially careful of the following:

- Read all of the instructions before you begin, and make sure you have the tools, the replacement or repair parts, and the skills required to perform the tasks safely and completely.
- Protect your eyes by using proper safety glasses, goggles, or face shields anytime you hammer, drill, grind, or work around pressurized air, pressurized liquids, springs, or other stored-energy components. If there is any doubt, put on eye protection.
- Use other protective wear when necessary, for example gloves or safety shoes. Handling hot or sharp parts can cause severe burns or cuts. Before you grab something that looks like it can hurt you, stop and put on gloves.
- Protect yourself and others whenever you have equipment hoisted in the air. Anytime you lift this product with a hoist, make sure that the hoist hook is securely attached to the product.

Make sure the engine is off before you begin any servicing procedures, unless the instruction tells you to do otherwise. This will help eliminate several potential hazards:

- Carbon monoxide poisoning from engine exhaust. Be sure there is adequate ventilation whenever you run the engine.
- Burns from hot parts. Let the engine and exhaust system cool before working in those areas.
- Injury from moving parts. If the instruction tells you to run the engine, be sure your hands, fingers, and clothing are out of the way.

Gasoline vapors and hydrogen gasses from batteries are explosive. To reduce the possibility of a fire or explosion, be careful when working around gasoline or batteries.

- Use only a nonflammable solvent, not gasoline, to clean parts.
 - Never store gasoline in an open container.
 - Keep all cigarettes, sparks, and flames away from the battery and all fuel-related parts.
-

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How to use this manual

INTRODUCTION

This manual covers the service and repair procedures for the Honda EU10iT1 generator.

All information contained in this manual is based on the latest product information available at the time of printing. We reserve the right to make changes at anytime without notice.

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As you read this manual, you will find information that is preceded by a **NOTICE** symbol. The purpose of this message is to help prevent damage to this Honda product, other property, or the environment.

SAFETY MESSAGES

Your safety and the safety of others are very important. To help you make informed decisions, we have provided safety messages and other safety information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing these products. You must use your own good judgement.

You will find important safety information in a variety of forms, including:

- Safety Labels – on the product.
- Safety Messages – preceded by a safety alert symbol  and one of three signal words, DANGER, WARNING, or CAUTION. These signal words mean:

 DANGER You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

 WARNING You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

 CAUTION You CAN be HURT if you don't follow instructions.

- Instructions – how to service these products correctly and safely.

ALL INFORMATION, ILLUSTRATIONS, DIRECTIONS, AND SPECIFICATIONS INCLUDED IN THIS PUBLICATION ARE BASED ON THE LATEST PRODUCT INFORMATION AVAILABLE AT THE TIME OF APPROVAL FOR PRINTING. Honda Motor Co., Ltd. RESERVES THE RIGHT TO MAKE CHANGES AT ANY TIME WITHOUT NOTICE AND WITHOUT INCURRING ANY OBLIGATION WHATSOEVER. NO PART OF THIS PUBLICATION MAY BE REPRODUCED WITHOUT WRITTEN PERMISSION. THIS MANUAL IS WRITTEN FOR PERSONS WHO HAVE ACQUIRED BASIC KNOWLEDGE OF MAINTENANCE ON Honda PRODUCTS.

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SERVICE PUBLICATION OFFICE

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SERVICE RULES

- Use Honda Genuine or Honda-recommended parts and lubricants or their equivalents. Parts that do not meet Honda's design specifications may damage the unit.
- Use the special tools designed for the product.
- Install new gaskets, O-rings, etc. when reassembling.
- When torquing bolts or nuts, begin with larger-diameter or inner bolts first and tighten to the specified torque diagonally, unless a particular sequence is specified.
- Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before assembly.
- After assembly, check all parts for proper installation and operation.
- Many screws used in this machine are self-tapping. Be aware that cross-threading or overtightening these screws will strip the threads and ruin the hole.

Use only metric tools when servicing this unit. Metric bolts, nuts and screws are not interchangeable with non-metric fasteners. The use of incorrect tools and fasteners will damage the unit.

SYMBOLS

The symbols used throughout this manual show specific service procedures. If supplementary information is required pertaining to these symbols, it will be explained specifically in the text without the use of the symbols.

	Replace the part(s) with new one(s) before assembly.
	Use the recommended engine oil, unless otherwise specified.
	Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1:1).
	Use multi-purpose grease (lithium based multi-purpose grease NLGI #2 or equivalent).
	Use marine grease (water resistant urea based grease).
	Apply a locking agent. Use a medium strength locking agent unless otherwise specified.
	Apply sealant.
	Use automatic transmission fluid.
○ x ○ (○)	Indicates the diameter, length, and quantity of metric bolts used.
page 1-1	Indicates the reference page.

How to use this manual

ABBREVIATIONS

Throughout this manual, the following abbreviations are used to identify the respective parts or systems.

Abbreviated term	Full term
ACG	Alternator
API	American Petroleum Institute
Approx.	Approximately
Assy.	Assembly
ATDC	After Top Dead Center
ATF	Automatic Transmission Fluid
ATT	Attachment
AVR	Automatic Voltage Regulator
BAT	Battery
BDC	Bottom Dead Center
BTDC	Before Top Dead Center
BARO	Barometric Pressure
CKP	Crankshaft Position
Comp.	Complete
CMP	Camshaft Position
CYL	Cylinder
DLC	Data Link Connector
D-AVR	Digital Automatic Voltage Regulator
EBT	Engine Block Temperature
ECT	Engine Coolant Temperature
ECM	Engine Control Module
EMT	Exhaust Manifold Temperature
EOP	Engine Oil Pressure
EX	Exhaust
F	Front or Forward
GND	Ground
HO2S	Heated Oxygen sensor
IAB	Intake Air Bypass
IAC	Idle Air Control
IAT	Intake Air Temperature
I.D.	Inside diameter
IG or IGN	Ignition
IN	Intake
INJ	Injection
L.	Left
MAP	Manifold Absolute Pressure
MIL	Malfunction Indicator Lamp
O.D.	Outside Diameter
OP	Optional Part
PGM-FI	Programmed-Fuel Injection
P/N	Part Number
Qty	Quantity
R.	Right
SAE	Society of Automotive Engineers
SCS	Service Check Signal
STD	Standard
SW	Switch
TDC	Top Dead Center

Bl	Black	G	Green	Br	Brown	Lg	Light green
Y	Yellow	R	Red	O	Orange	P	Pink
Bu	Blue	W	White	Lb	Light blue	Gr	Gray

1. SPECIFICATIONS

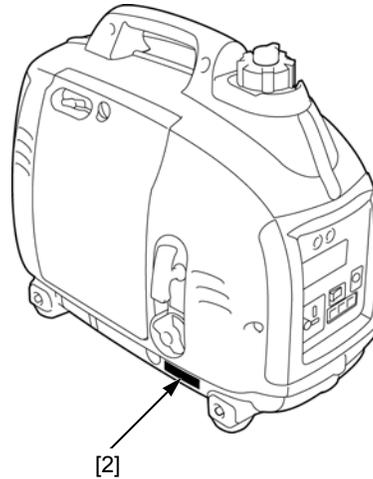
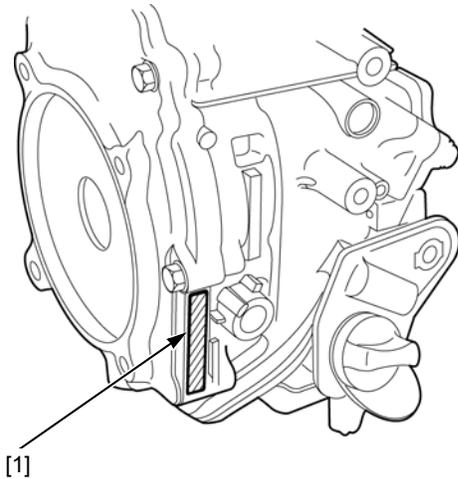
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SPECIFICATIONS

SERIAL NUMBER LOCATION

The engine serial number [1] is stamped on the cylinder barrel, and the frame serial number [2] is shown at the underside of the L. side cover.

Refer to it when ordering parts or making technical inquiries.



SPECIFICATIONS

DIMENSIONS AND WEIGHTS

Model	EU10IT1	
Type	Except GW1	GW1
Description code	EAAT	
Overall length	451 mm (17.8 in)	456 mm (18.0 in)
Overall width	242 mm (9.5 in)	
Overall height	379 mm (15.0 in)	
Dry weight	13.0 kg (28.7 lbs)	
Operating weight	15.0 kg (33.1 lbs)	

ENGINE

Model	GXH50T
Description code	GCBWT
Type	4 stroke, overhead valve, single cylinder
Displacement	49.4 cm ³ (3.01 cu-in)
Bore x stroke	41.8 x 36.0 mm (1.65 x 1.42 in)
Compression ratio	8.0 ± 0.5 : 1
Cooling system	Forced air
Ignition system	Full transistor
Ignition timing	B.T.D.C. 30° ± 2°
Spark plug	LR4C-E (NGK)
Carburetor	Float type, Horizontal, butterfly valve type
Air cleaner	Semi-dry type
Governor	Electronic control type
Lubrication system	Forced splash
Oil capacity	0.25 Liter (0.26 US qt, 0.22 Imp qt)
Recommended oil	SAE 10W-30 API service classification SE or higher
Starting system	Recoil starter
Stopping system	Primary circuit ground
Fuel used	Regular unleaded gasoline with a pump octane rating 86 or higher

GENERATOR

Model		EU10iT1			
Description code		LL0, LL1, LT, LB	SS0, SS1, SK1, SB	RR0, RR1	RG
Type		EAAT			
Generator type		Multi-electrode field rotation type			
Generator structure		Self-ventilation, drip-proof type			
Excitation		Self-excitation			
Voltage regulation system		PWM (Pulse width modulation)			
Phase		Single phase			
Rotating direction		Clockwise (Viewed from the generator)			
Rated output	AC	900 VA			
	DC	96 W			
Rated frequency		60 Hz		50 Hz	
AC	Rated voltage	120 V	220 V		230 V
	Rated current	7.5 A	4.1 A		3.9 A
DC	Rated voltage	12 V			
	Rated current	8 A			
Power factor		1.0 cosθ			
Frequency regulation		DC-AC conversion (Inverter type)			

Model		EU10iT1			
Description code		CL, G, B, F, W	GW1	RH	U
Type		EAAT			
Generator type		Multi-electrode field rotation type			
Generator structure		Self-ventilation, drip-proof type			
Excitation		Self-excitation			
Voltage regulation system		PWM (Pulse width modulation)			
Phase		Single phase			
Rotating direction		Clockwise (Viewed from the generator)			
Rated output	AC	900 VA			
	DC	96 W			
Rated frequency		50 Hz			
AC	Rated voltage	230 V		240 V	
	Rated current	3.9 A		3.8 A	
DC	Rated voltage	12 V			
	Rated current	8 A			
Power factor		1.0 cosθ			
Frequency regulation		DC-AC conversion (Inverter type)			

SPECIFICATIONS

CHARACTERISTICS

Model		EU10iT1			
Type		LL0, LL1, LT, LB	SS0, SS1, SK1, SB	RR0, RR1	RG
Voltage variation rate	Momentary	10% max.			
	Average	6% max.			
	Average time	3 sec. max.			
Voltage stability		within $\pm 1\%$			
Frequency variation rate	Momentary	1% max.			
	Average	1% max.			
	Average time	1 sec. max.			
Frequency stability		within $\pm 0.1\%$ Hz			
Insulation resistance		10 M Ω min.			
AC circuit protector		9.4 A	4.9 A		
DC circuit protector		10 A			
Insulation type		Type E			Type B
Fuel tank capacity		2.1 Liters (0.55 US gal, 0.46 Imp gal)			
Fuel consumption		0.65 Liter (0.172 US gal, 0.143 Imp gal)/Hr.			
Max. operating hours at rated load		3.2 Hr.			
Guaranteed sound power level (L _{WA})		L _{WA} 86 dB (A)			

Model		EU10iT1			
Type		CL, G, B, F, W	GW1	RH	U
Voltage variation rate	Momentary	10% max.			
	Average	6% max.			
	Average time	3 sec. max.			
Voltage stability		within $\pm 1\%$			
Frequency variation rate	Momentary	1% max.			
	Average	1% max.			
	Average time	1 sec. max.			
Frequency stability		within $\pm 0.1\%$ Hz			
Insulation resistance		10 M Ω min.			
AC circuit protector		4.9 A			
DC circuit protector		10 A			
Insulation type		Type B		Type F	
Fuel tank capacity		2.1 Liters (0.55 US gal, 0.46 Imp gal)			
Fuel consumption		0.65 Liter (0.172 US gal, 0.143 Imp gal) /Hr.			
Max. operating hours at rated load		3.2 Hr.			
Guaranteed sound power level (L _{WA})		-		L _{WA} 86 dB (A)	

PERFORMANCE CURVE

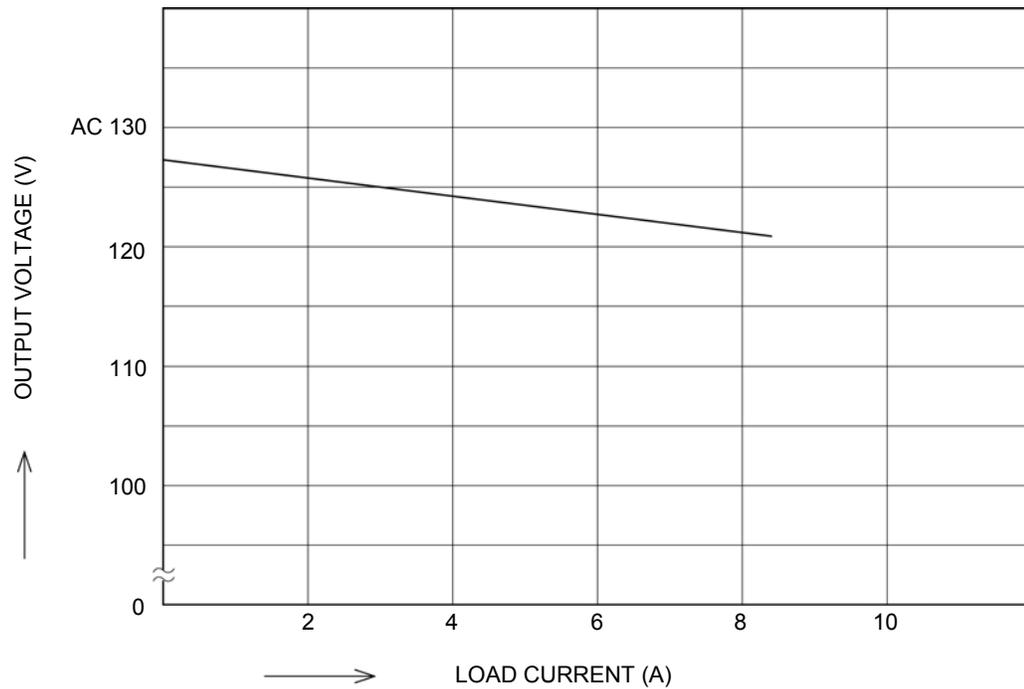
The curve shows performance of the generator under average conditions.

Performance may vary to some degree depending on ambient temperature and humidity.

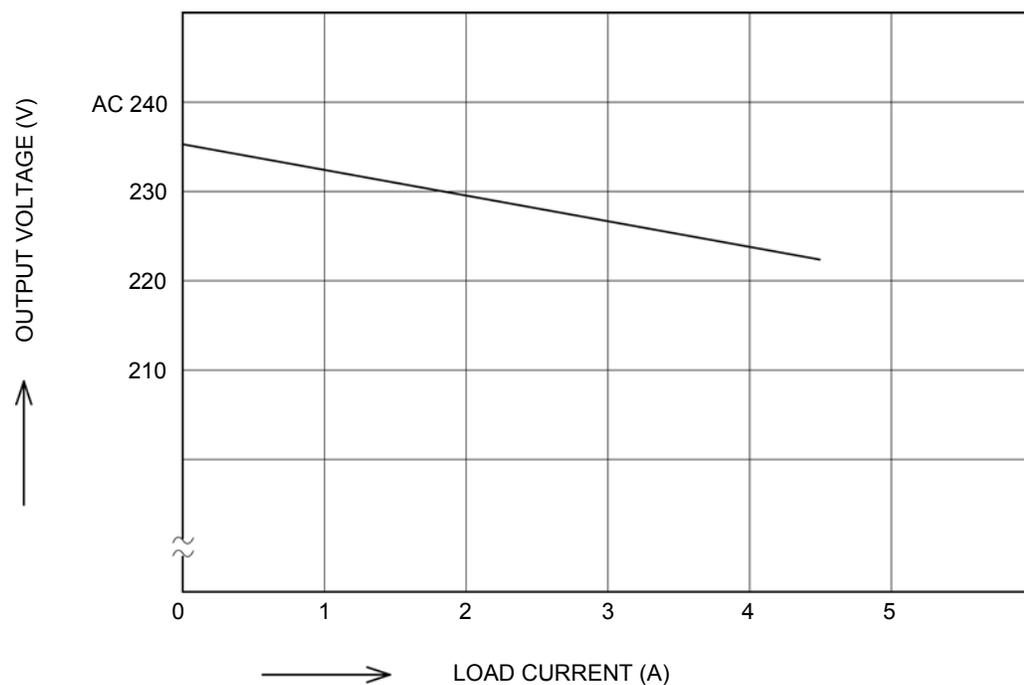
The output voltage will be higher than usual when the generator is still cold, immediately after the engine starts.

AC EXTERNAL CHARACTERISTIC CURVE

LL0, LL1, LT, LB TYPES

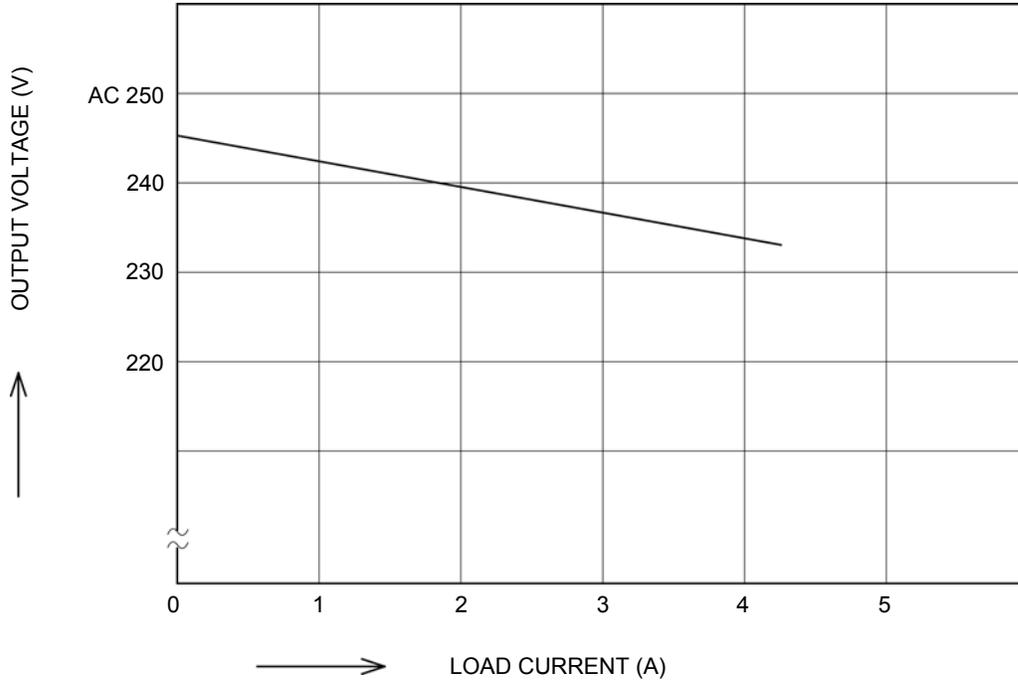


SS0, SS1, SK1, SB, RR0, RR1 TYPES



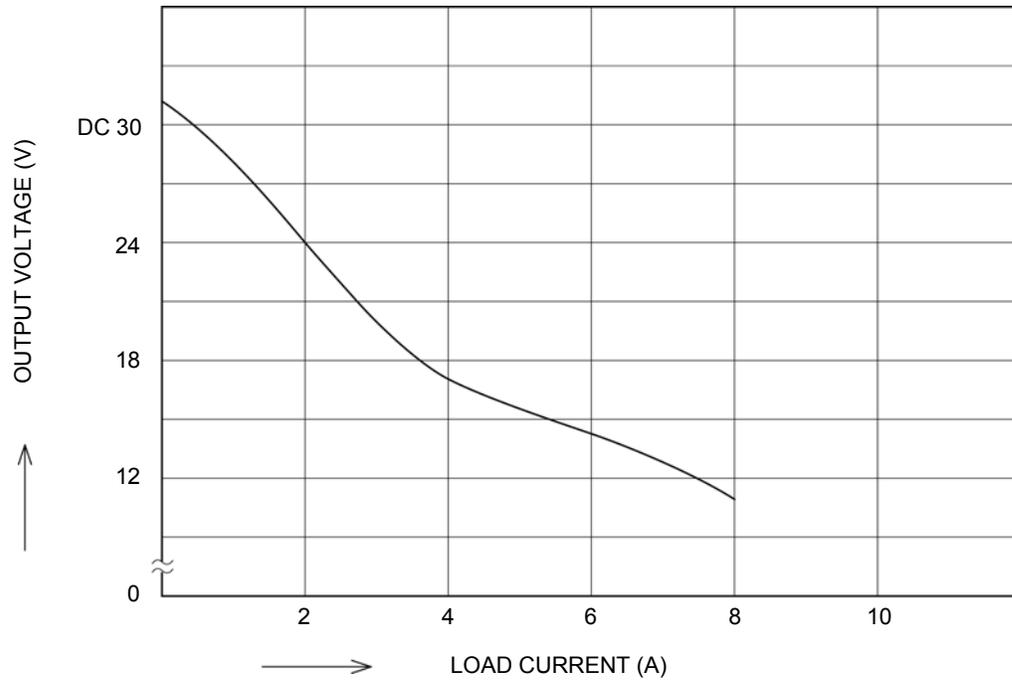
SPECIFICATIONS

G, B, F, W, GW1, U, RH, RG, CL TYPES



DC EXTERNAL CHARACTERISTIC CURVE

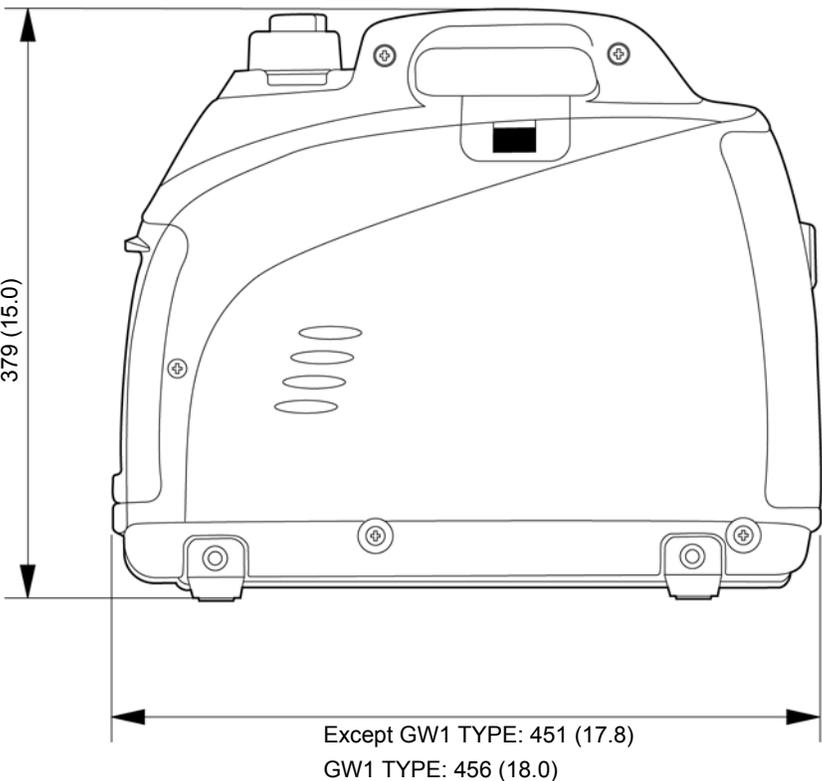
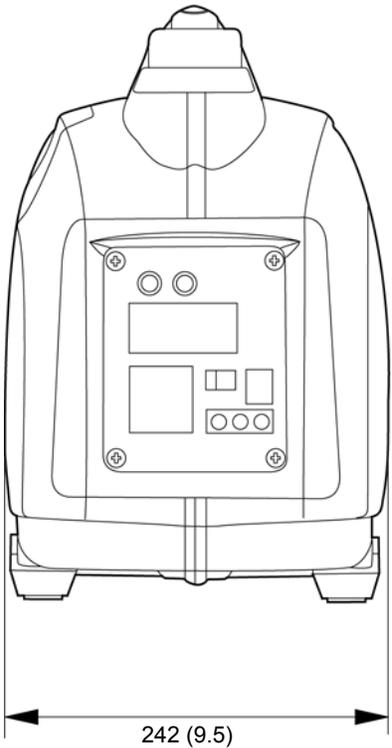
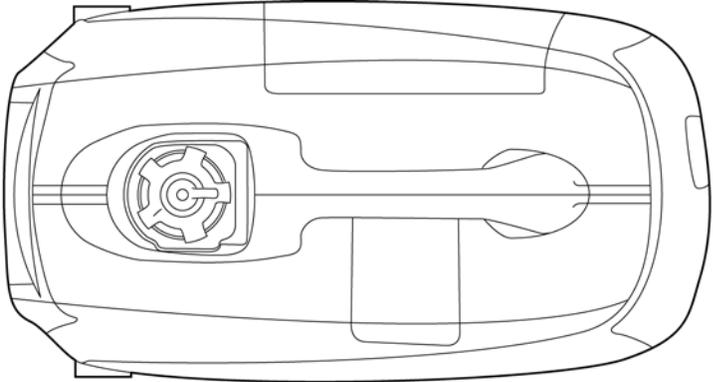
With Eco-Throttle OFF



This DC output characteristic was measured under the condition with capacitors (100,000 μ F) were connected in parallel.

DIMENSIONAL DRAWINGS

Unit: mm (in)



MEMO

2. SERVICE INFORMATION

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SERVICE INFORMATION

MAINTENANCE STANDARDS

ENGINE

Unit: mm (in)

Part	Item		Standard	Service limit
Engine	Engine speed [Eco-Throttle OFF]		4,000 – 6,000 min ⁻¹ (rpm) [5,500 – 6,000 min ⁻¹ (rpm)]	–
	Cylinder compression		0.42 MPa (4.3 kgf/cm ² , 61.2 psi)/ 1,000 min ⁻¹ (rpm)	–
Cylinder block	Sleeve I.D.		41.800 – 41.815 (1.6457 – 1.6463)	41.900 (1.6496)
	Camshaft roller journal I.D.		5.000 – 5.018 (0.1968 – 0.1976)	5.050 (0.1988)
	Valve lifter roller journal I.D.		5.000 – 5.018 (0.1968 – 0.1976)	5.050 (0.1988)
	Rocker arm roller journal I.D.		4.000 – 4.018 (0.1575 – 0.1582)	4.050 (0.1594)
Piston	Skirt O.D.	Except GW1 TYPE	41.770 – 41.790 (1.6445 – 1.6453)	41.700 (1.6417)
		GW1 TYPE	41.746 – 41.790 (1.6435 – 1.6453)	41.700 (1.6417)
	Piston-to-cylinder clearance	Except GW1 TYPE	0.010 – 0.045 (0.0004 – 0.0018)	0.120 (0.0047)
		GW1 TYPE	0.010 – 0.069 (0.0004 – 0.0027)	0.120 (0.0047)
	Piston pin bore I.D.		10.002 – 10.018 (0.3938 – 0.3944)	10.050 (0.3957)
Piston pin	Pin O.D.		9.994 – 10.000 (0.3935– 0.3937)	9.950 (0.3917)
	Piston pin-to-piston pin bore clearance		0.002 – 0.024 (0.0001 – 0.0009)	0.100 (0.0039)
Piston rings	Ring side clearance	Top	0.015 – 0.050 (0.0006 – 0.0020)	0.12 (0.005)
		Second	0.015 – 0.050 (0.0006 – 0.0020)	0.12 (0.005)
	Ring end gap	Top	0.150 – 0.300 (0.0059 – 0.0118)	0.600 (0.0236)
		Second	0.150 – 0.300 (0.0059 – 0.0118)	0.600 (0.0236)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	1.0 (0.04)
	Ring width	Top	0.77 – 0.79 (0.030 – 0.031)	0.72 (0.028)
		Second	0.97 – 0.99 (0.038 – 0.039)	0.92 (0.036)
Connecting rod	Small end I.D.		10.006 – 10.017 (0.3939 – 0.3944)	10.050 (0.3957)
	Big end I.D.		15.000 – 15.011 (0.5906 – 0.5910)	15.040 (0.5921)
	Big end oil clearance		0.016 – 0.038 (0.0006 – 0.0015)	0.100 (0.0039)
	Big end side clearance		0.1 – 0.6 (0.004 – 0.024)	0.8 (0.031)
Crankshaft	Crankpin O.D.		14.973 – 14.984 (0.5895 – 0.5899)	14.940 (0.5882)
Valves	Valve clearance	IN	0.06 – 0.10 (0.002 – 0.004)	–
		EX	0.09 – 0.13 (0.004 – 0.005)	–
	Valve stem O.D.	IN	3.970 – 3.985 (0.1563 – 0.1569)	3.900 (0.1535)
		EX	3.935 – 3.950 (0.1549 – 0.1555)	3.880 (0.1528)
	Guide-to-stem clearance	IN	0.015 – 0.048 (0.0006 – 0.0019)	0.098 (0.0039)
EX		0.050 – 0.083 (0.0020 – 0.0033)	0.12 (0.005)	

SERVICE INFORMATION

Part	Item		Standard	Service limit
Valve guide	Valve guide I.D.	IN/EX	4.000 – 4.018 (0.1575 – 0.1582)	4.060 (0.1598)
Valve spring	Free length	IN/EX	23.7 (0.93)	22.8 (0.90)
Camshaft	Cam height	IN/EX	27.772 – 28.172 (1.0934 – 1.1091)	26.972 (1.0619)
	Camshaft roller bearing I.D.		5.020 – 5.050 (0.1976 – 0.1988)	5.100 (0.2008)
Crankcase side cover	Camshaft roller journal I.D.		5.000 – 5.018 (0.1968 – 0.1976)	5.050 (0.1988)
	Valve lifter roller journal I.D.		5.000 – 5.018 (0.1968 – 0.1976)	5.050 (0.1988)
Camshaft roller	O.D.		4.990 – 5.000 (0.1965 – 0.1969)	4.950 (0.1949)
Valve lifters	Journal I.D.		5.005 – 5.025 (0.1970 – 0.2012)	5.050 (0.1988)
Valve lifter roller	O.D.		4.990 – 5.000 (0.1965 – 0.1969)	4.950 (0.1949)
Rocker arms	Journal I.D.		4.005 – 4.025 (0.1577 – 0.1585)	4.050 (0.1594)
Rocker arm roller	O.D.		3.990 – 4.000 (0.1571 – 0.1575)	3.950 (0.1555)
Spark plug	Gap		0.6 – 0.7 (0.024 – 0.028)	–
Ignition coil	Resistance	Primary side	0.7 – 1.1 Ω	–
		Secondary side	12 – 21 kΩ	–
	Spark plug cap resistance		7.5 – 12.5 kΩ	–
Ignition pulse generator	Air gap (at rotor)		0.4 – 0.6 (0.016 – 0.023)	–
	Resistance		28 – 36 Ω	–
Carburetor	Main jet		#58	–
	Float height		12.0 (0.47)	–
	Pilot screw opening		2-5/8	–

GENERATOR

Part	Item	Terminals		Standard	Service limit
Stator	AC winding resistance	1	1 – 2	1.4 – 2.1 Ω	–
			1 – 3	1.4 – 2.1 Ω	–
			2 – 3	1.4 – 2.1 Ω	–
	Sub winding resistance	1	4 – 5	0.3 – 0.5 Ω	–
	DC winding resistance	9	3 – 4	0.1 – 0.2 Ω	–
Exciter winding resistance	1	1 – 3	0.5 – 0.9 Ω	–	

TORQUE VALUES

ENGINE TORQUE VALUES

Item	Thread Dia. (mm)	Torque values		
		N·m	kgf·m	lbf·ft
Spark plug	M10 x 1.0	11.8	1.2	9
Valve adjuster lock nut	M5 x 0.5	5.5	0.56	4.1
Oil case bolt	M5 x 0.8	7.3	0.74	5.4
Crankcase side cover bolt	M5 x 0.8	7.3	0.74	5.4
Connecting rod bolt (*1)	M5 x 0.8	5.9	0.6	4.4
Head cover bolt	M5 x 0.8	5.9	0.6	4.4

(*1): Apply oil to the threads and seating surface.

SERVICE INFORMATION

FRAME TORQUE VALUES

Item	Thread Dia. (mm)	Torque values		
		N·m	kgf·m	lbf·ft
Rotor nut	M10 x 1.25	27.5	2.8	20
Fan cover stud bolt	M5 x 0.8	5.9	0.6	4.4
Maintenance cover screw	M6 x 1.0	2.3	0.23	1.7
Fuel pump self-tapping screw	M5	0.8	0.08	0.6
Fuel valve self-tapping screw	M5	1.4	0.14	1.0
Engine switch plate self-tapping screw	M5	0.8	0.08	0.6
Cable clamp self-tapping screw	M5	0.8	0.08	0.6
Ignition coil self-tapping screw	M6	1.8	0.18	1.3
Muffler protector screw	M5 x 0.8	2.3	0.23	1.7
Control panel screw	M5 x 0.8	2.3	0.23	1.7
Front cover screw	M5 x 0.8	2.3	0.23	1.7
Ground screw	M5 x 0.8	2.3	0.23	1.7
Shroud screw	M4 x 0.7	0.9	0.09	0.7
Engine stop switch self-tapping screw	M3	0.18	0.018	0.1
Carburetor drain screw	M6 x 1.0	1.5	0.15	1.1
Recoil starter bolt	M5 x 0.8	4.8	0.49	3.5
Ignition pulse generator bolt	M5 x 0.8	6.0	0.6	4.4

STANDARD TORQUE VALUES

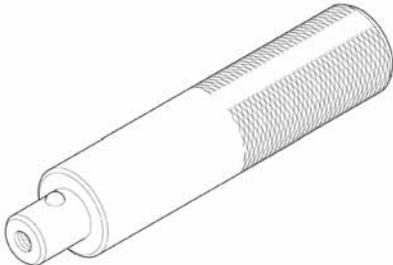
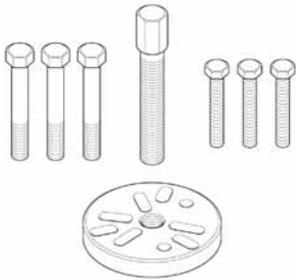
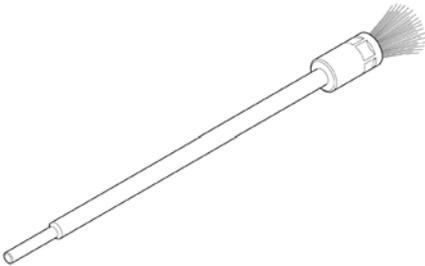
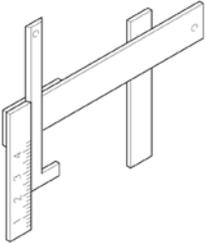
Item	Thread Dia. (mm)	Torque values		
		N·m	kgf·m	lbf·ft
Screw	3 mm	1	0.1	0.7
	4 mm	2.1	0.2	1.5
	5 mm	4.2	0.4	3.1
	6 mm	9	0.9	6.6
Flange bolt and nut	4 mm	3.4	0.35	2.5
	5 mm	5.4	0.55	4.0
	6 mm	10	1.0	7
	8 mm	26.5	2.7	20
CT (Cutting threads) flange bolt (Retightening)	5 mm	5.4	0.55	4.0
	6 mm	10	1.0	7
SH (Small head) flange bolt	6 mm	9	0.9	6.6

LUBRICATION & SEAL POINT

Material	Location	Remarks
Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1:1)	Piston outer surface and piston pin hole	
	Piston pin outer surface	
	Piston ring entire surface	
	Cylinder inner surface	
	Crankshaft pin	
Engine oil	Connecting rod big and small end inner surface	
	Crankshaft gear teeth	
	Rocker arm roller entire surface	
	Valve lifter roller entire surface	
	Camshaft roller entire surface	
	Camshaft gear teeth, journal, cam lobes and decompressor area	
	Valve lifter journal and slipper surface	
	Rocker arm journal and pivot	
	Valve stem sliding surface and stem end	
	Valve spring entire surface	
	Rotor nut threads and seating surface	
	Connecting rod bolt threads and seating surface	
	Governor weight holder gear teeth	
	Each bearing rotating area	
Multi-purpose grease	Each O-ring entire surface	Insulator, oil level switch
	Oil seal lips	
Threebond® 1206, 1216E, 1207B, or equivalent	Cylinder block oil case mating surface	See page 15-4
	Cylinder block crankcase side cover mating surface	See page 14-6
Threebond® 1207B, or equivalent	Head cover mating surface	
	Breather tube outer surface	See page 13-3
LOCTITE® 638, or equivalent	Limiter cap inside	

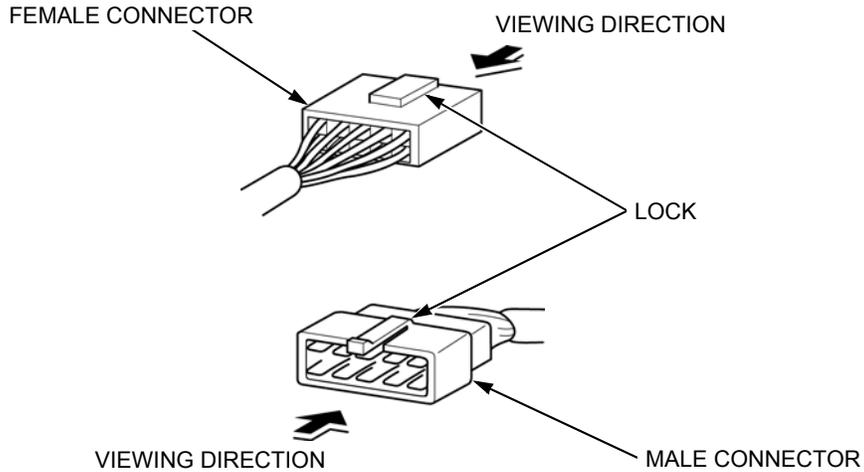
SERVICE INFORMATION

TOOLS

<p>Attachment, 24 x 26 mm 07746-0010700</p> 	<p>Pilot, 17 mm 07746-0040400</p> 	<p>Driver 07749-0010000</p> 
<p>Flywheel puller 07935-8050004</p> 	<p>Cleaning brush 07998-VA20100</p> 	<p>Float level gauge 07401-0010000</p> 

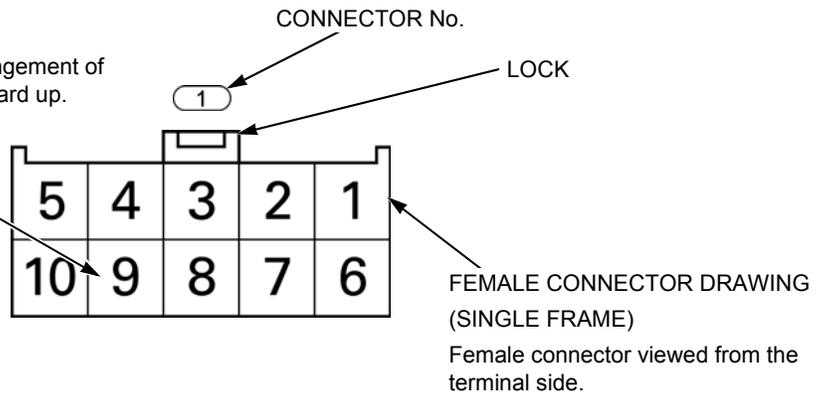
HOW TO READ CONNECTOR DRAWINGS

Connector drawings show the terminal arrangement, terminal No., number of pins and the shape of terminal (male or female). Both the male and female connectors are shown for the common connectors, while only the main wire harness side connectors are shown for the dedicated connectors. The double frame connectors represent the male connectors and the single frame connectors represent the female connectors. Both the male and female connectors are shown by viewing them from the terminal side. Male connectors have male terminals, and female connectors have female terminals.



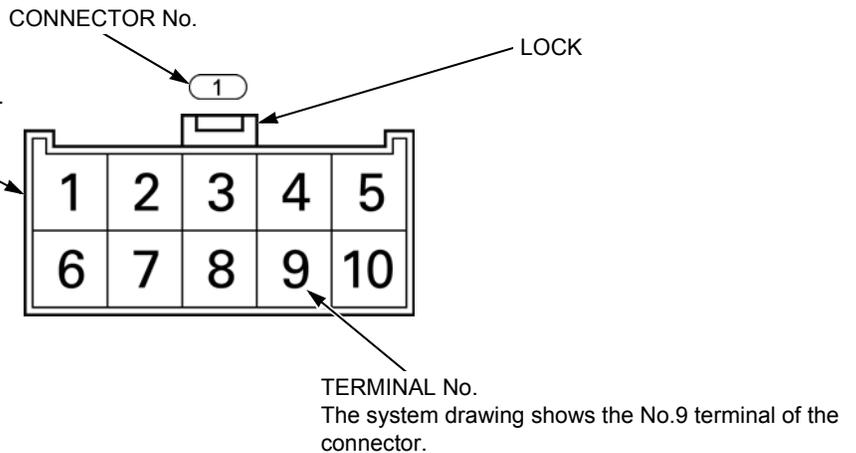
TERMINAL ARRANGEMENT

The connector drawing shows the terminal arrangement of the connector with the lock of the connector toward up.



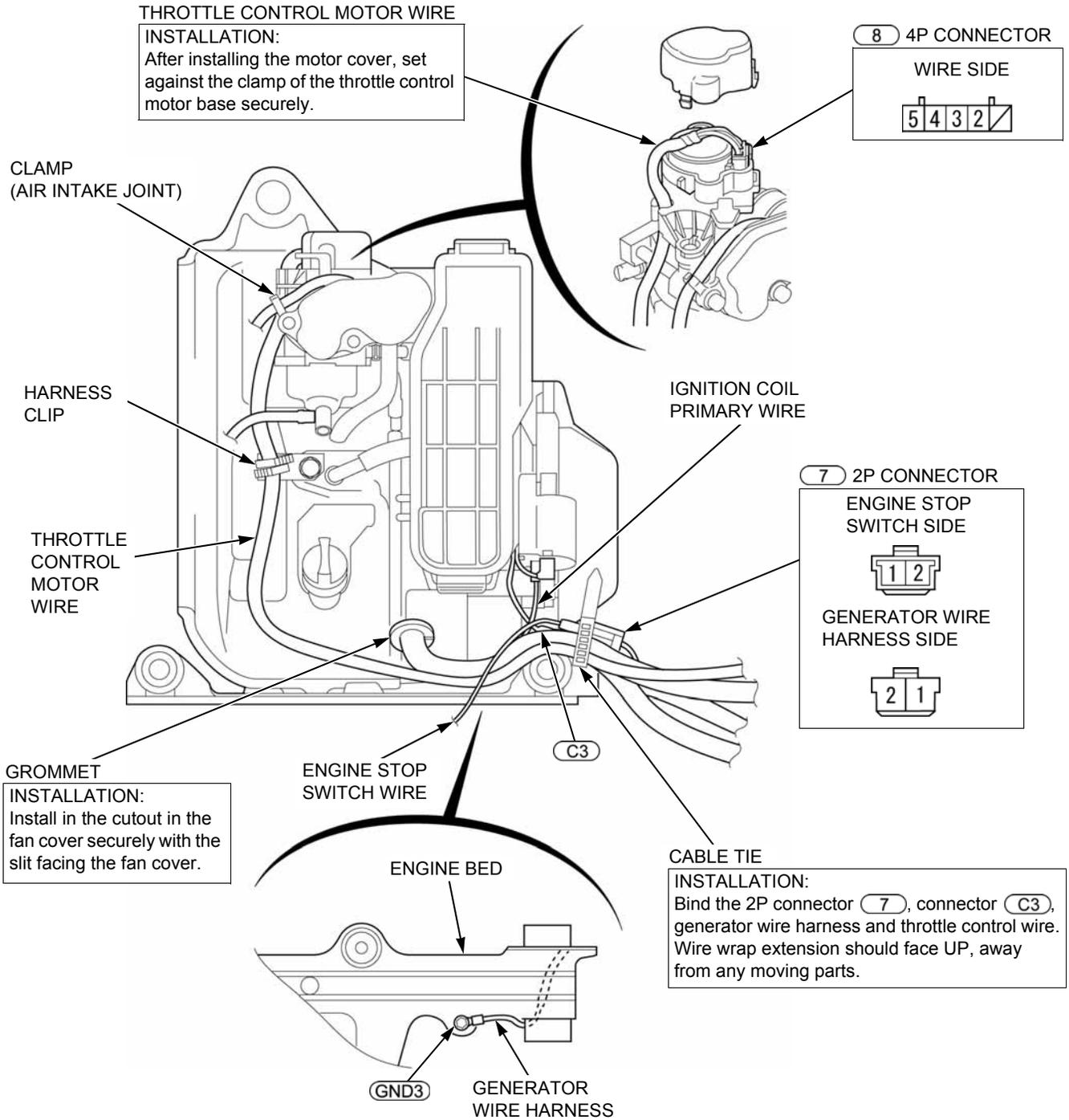
MALE CONNECTOR DRAWING (DOUBLE FRAME)

Male connector viewed from the terminal side.



SERVICE INFORMATION

CABLE/HARNESS ROUTING



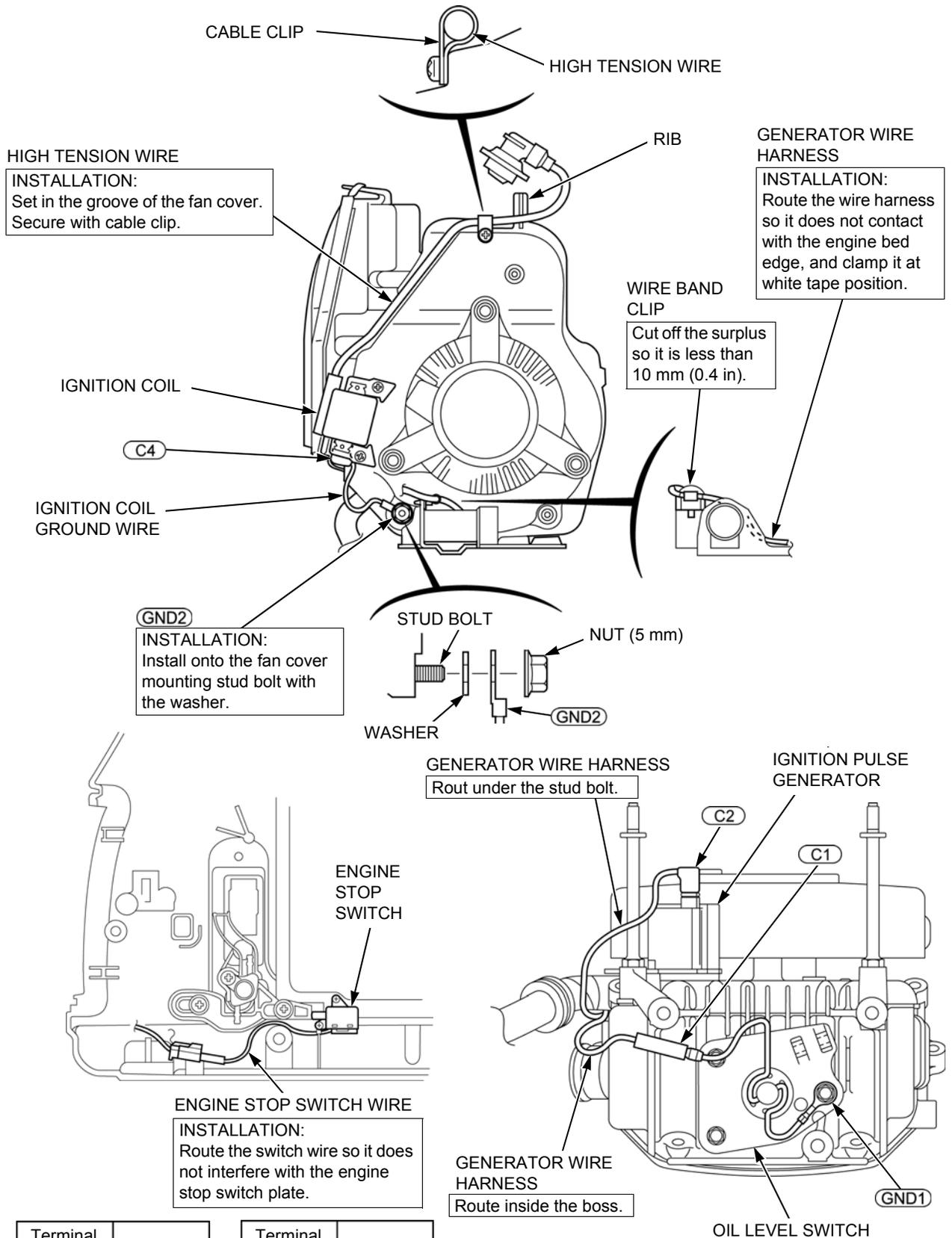
8

Terminal number	Wire color
1	-
2	Bu
3	R
4	Y
5	W

7

Terminal number	Wire color
1	Y/G
	G
2	Bl

Terminal number	Wire color
GND3	Y/G
	G
C3	Bl

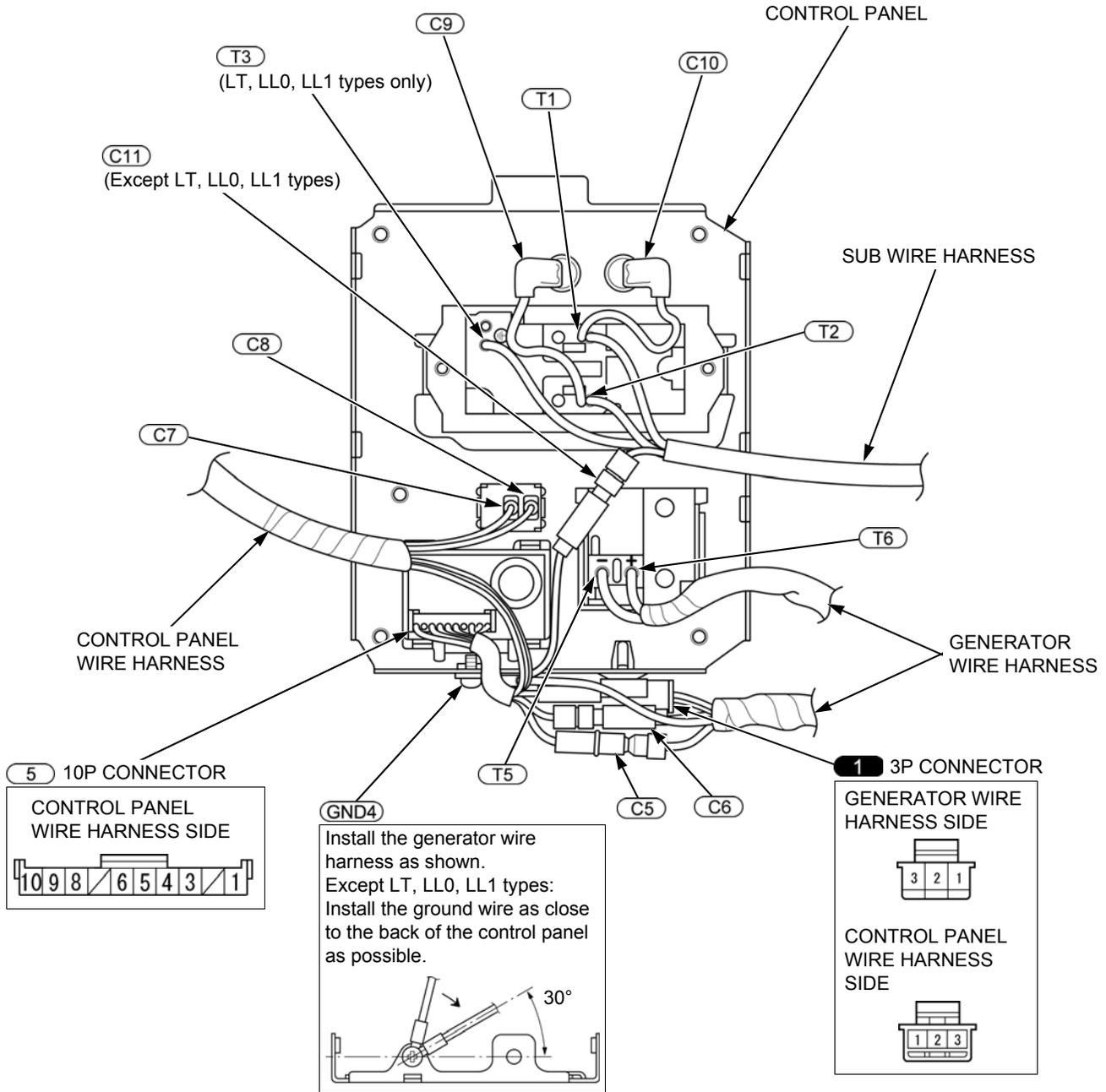


Terminal number	Wire color
C1	Y
C2	Bu
C4	G

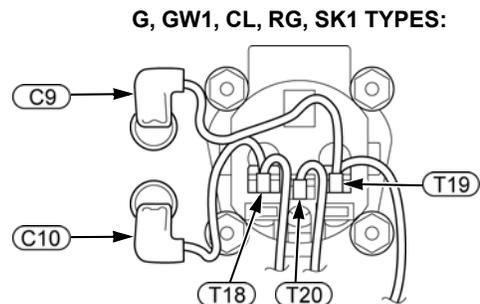
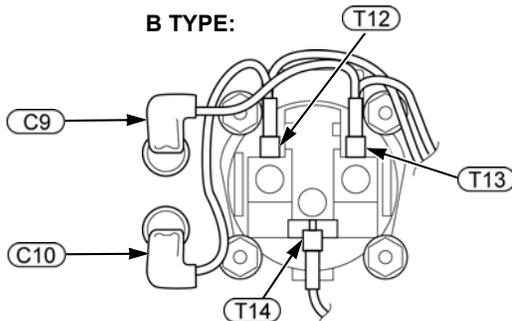
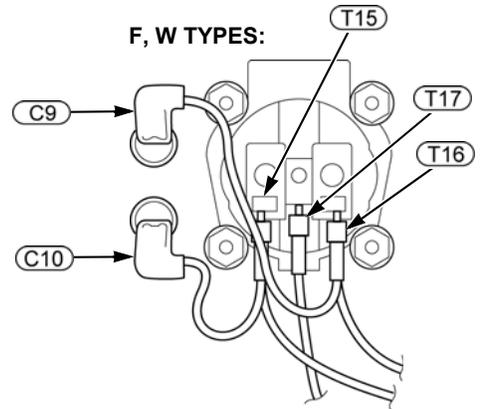
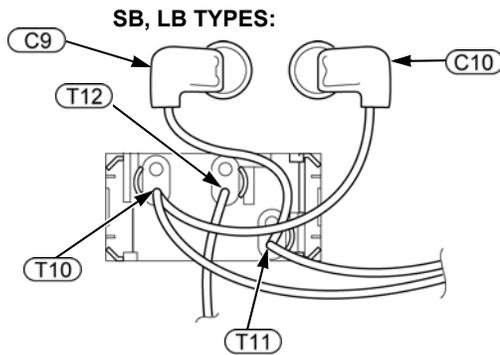
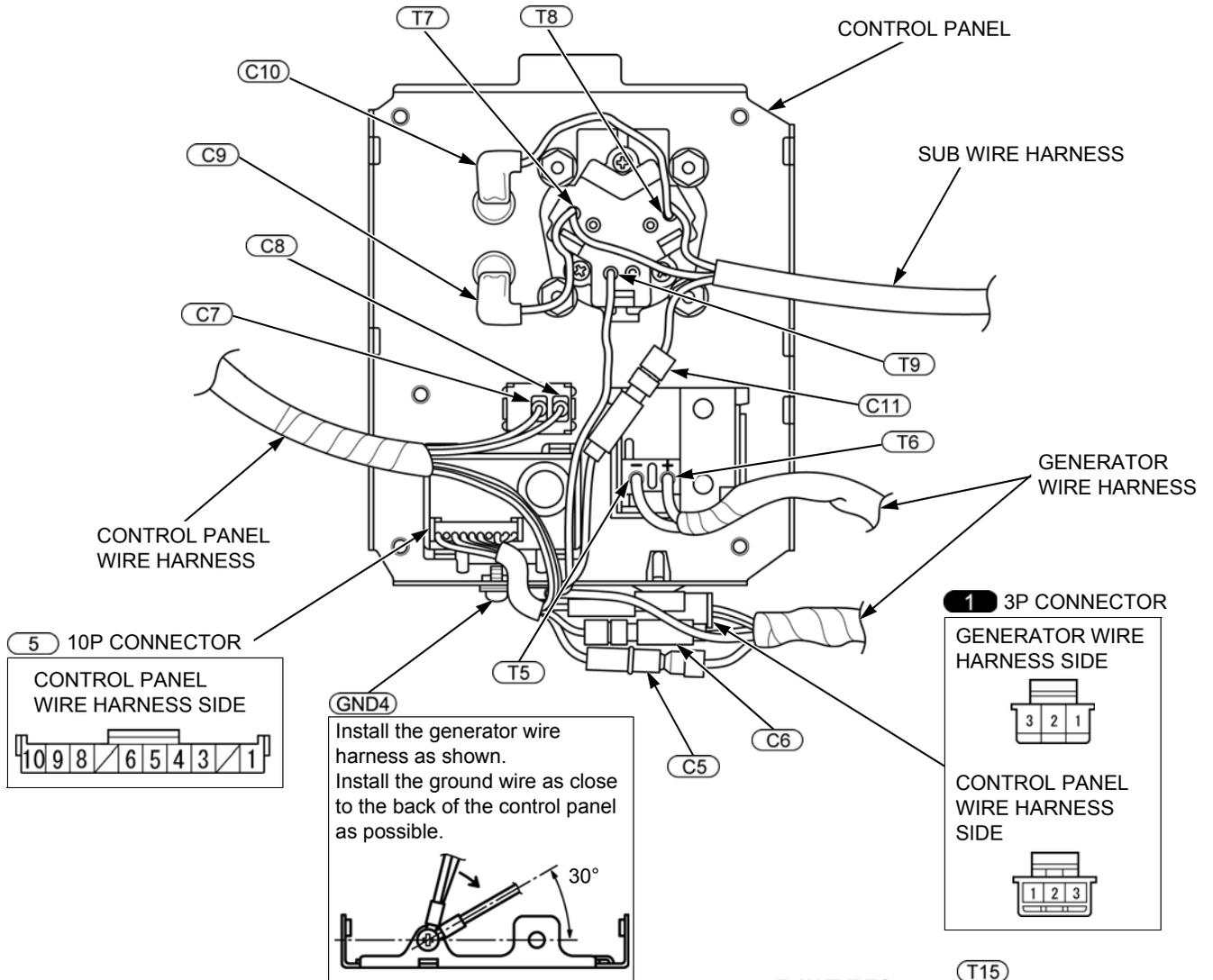
Terminal number	Wire color
GND1	G
GND2	G

SERVICE INFORMATION

LT, RH, LL0, LL1, RR0, RR1, SS0, SS1 TYPES:



U TYPE:



SERVICE INFORMATION

LT, LL0, LL1 TYPES:

5

Terminal number	Wire color
1	Bl
2	-
3	Y
4	Bu
5	G
6	Bl/Bu
7	-
8	G/R
9	G/Bl
10	R/W

1

Terminal number	Wire color
1	G
2	Bu
3	Bl/Bu

Terminal number	Wire color
C5	Bl
C6	Y
C7	R/W
C8	R/Y
C9	R
C10	R
GND4	G

Terminal number	Wire color
T1	R
T2	R
T3	G
T5	Bl/R
T6	W/R

RH, RR0, RR1 TYPES:

5

Terminal number	Wire color
1	Bl
2	-
3	Y
4	Bu
5	Y/G
6	Bl/Bu
7	-
8	G/R
9	G/Bl
10	R/W

1

Terminal number	Wire color
1	Y/G
2	Bu
3	Bl/Bu

Terminal number	Wire color
C5	Bl
C6	Y
C7	R/W
C8	R/Y
C9	R
C10	R
C11	Y/G
GND4	Y/G

Terminal number	Wire color
T1	R
T2	R
T5	Bl/R
T6	W/R

U TYPE:

5

Terminal number	Wire color
1	Bl
2	-
3	Y
4	Bu
5	Y/G
6	Bl/Bu
7	-
8	G/R
9	G/Bl
10	R/W

1

Terminal number	Wire color
1	Y/G
2	Bu
3	Bl/Bu

Terminal number	Wire color
(C5)	Bl
(C6)	Y
(C7)	R/W
(C8)	R/Y
(C9)	R
(C10)	R
(C11)	Y/G
(GND4)	Y/G

Terminal number	Wire color
(T5)	Bl/R
(T6)	W/R
(T7)	R
(T8)	R
(T9)	Y/G

LB TYPE:

5

Terminal number	Wire color
1	Bl
2	-
3	Y
4	Bu
5	G
6	Bl/Bu
7	-
8	G/R
9	G/Bl
10	R/W

1

Terminal number	Wire color
1	G
2	Bu
3	Bl/Bu

Terminal number	Wire color
(C5)	Bl
(C6)	Y
(C7)	R/W
(C8)	R/Y
(C9)	R
(C10)	R
(C11)	G
(GND4)	G

Terminal number	Wire color
(T5)	Bl/R
(T6)	W/R
(T10)	R
(T11)	R
(T12)	G

SERVICE INFORMATION

SB TYPE:

5

Terminal number	Wire color
1	Bl
2	-
3	Y
4	Bu
5	G
6	Bl/Bu
7	-
8	G/R
9	G/Bl
10	R/W

1

Terminal number	Wire color
1	G
	Y/G
2	Bu
3	Bl/Bu

Terminal number	Wire color
(C5)	Bl
(C6)	Y
(C7)	R/W
(C8)	R/Y
(C9)	R
(C10)	R
(C11)	G
	Y/G
(GND4)	Y/G

Terminal number	Wire color
(T5)	Bl/R
(T6)	W/R
(T10)	R
(T11)	R
(T12)	G

SS0, SS1, SK1 TYPES:

5

Terminal number	Wire color
1	Bl
2	-
3	Y
4	Bu
5	G
6	Bl/Bu
7	-
8	G/R
9	G/Bl
10	R/W

1

Terminal number	Wire color
1	G
	Y/G
2	Bu
3	Bl/Bu

Terminal number	Wire color
(C5)	Bl
(C6)	Y
(C7)	R/W
(C8)	R/Y
(C9)	R
(C10)	R
(C11)	Y/G
(GND4)	Y/G

SS0, SS1 TYPES:

Terminal number	Wire color
(T1)	R
(T2)	R
(T5)	Bl/R
(T6)	W/R

SK1 TYPE:

Terminal number	Wire color
(T5)	Bl/R
(T6)	W/R
(T18)	R
(T19)	R
(T20)	Y/G

G, GW1, CL, RG, B, F, W TYPES:

5

Terminal number	Wire color
1	Bl
2	-
3	Y
4	Bu
5	Y/G
6	Bl/Bu
7	-
8	G/R
9	G/Bl
10	R/W

1

Terminal number	Wire color
1	Y/G
2	Bu
3	Bl/Bu

B TYPE:

Terminal number	Wire color
(T5)	Bl/R
(T6)	W/R
(T12)	R
(T13)	R
(T14)	Y/G

Terminal number	Wire color
(C5)	Bl
(C6)	Y
(C7)	R/W
(C8)	R/Y
(C9)	R
(C10)	R
(C11)	Y/G
(GND4)	Y/G

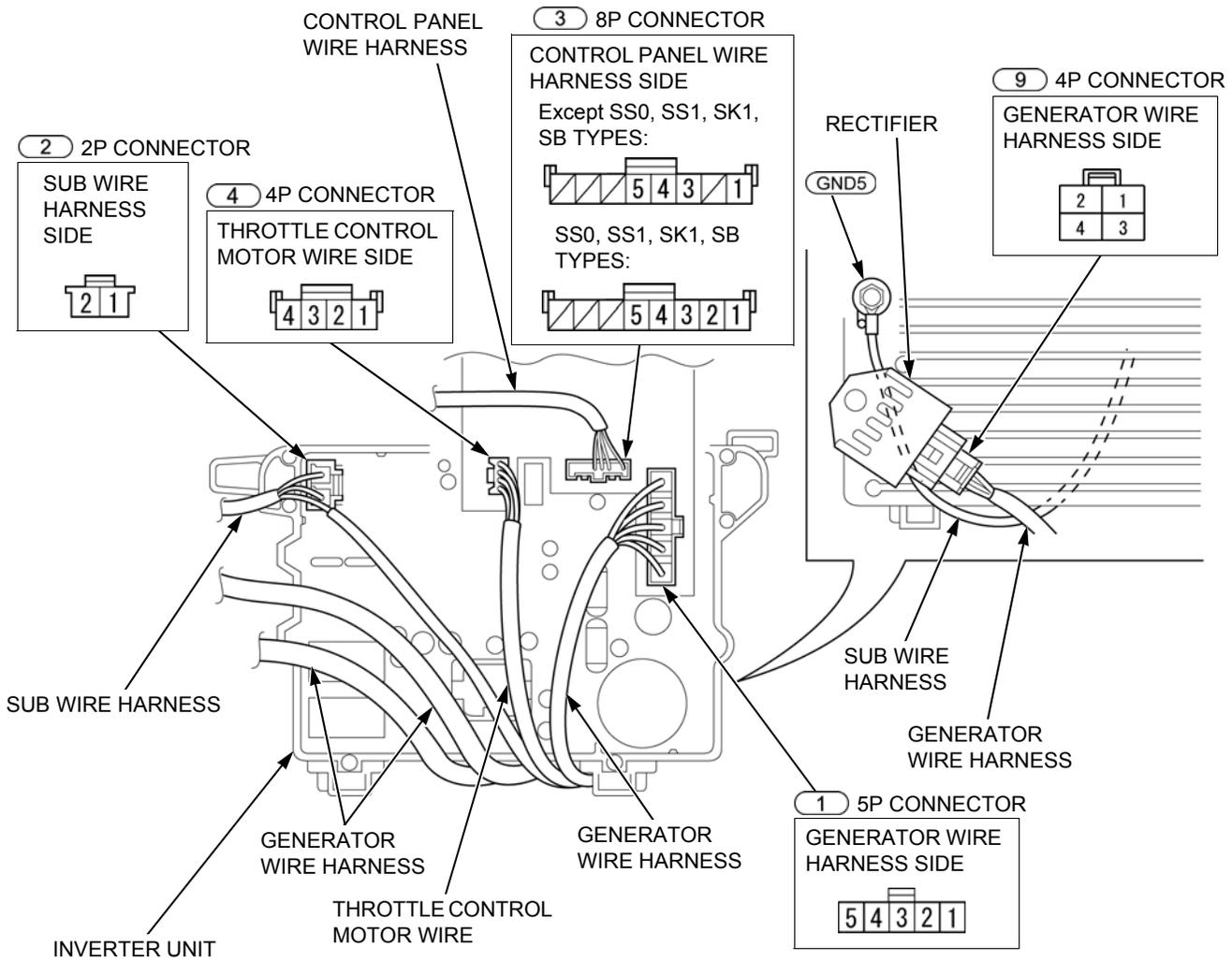
G, GW1, CL, RG TYPES:

Terminal number	Wire color
(T5)	Bl/R
(T6)	W/R
(T18)	R
(T19)	R
(T20)	Y/G

F, W TYPES:

Terminal number	Wire color
(T5)	Bl/R
(T6)	W/R
(T15)	R
(T16)	R
(T17)	Y/G

SERVICE INFORMATION



1	
Terminal number	Wire color
1	R
2	Bu
3	W
4	P
5	Gr

2	
Terminal number	Wire color
1	R
2	R

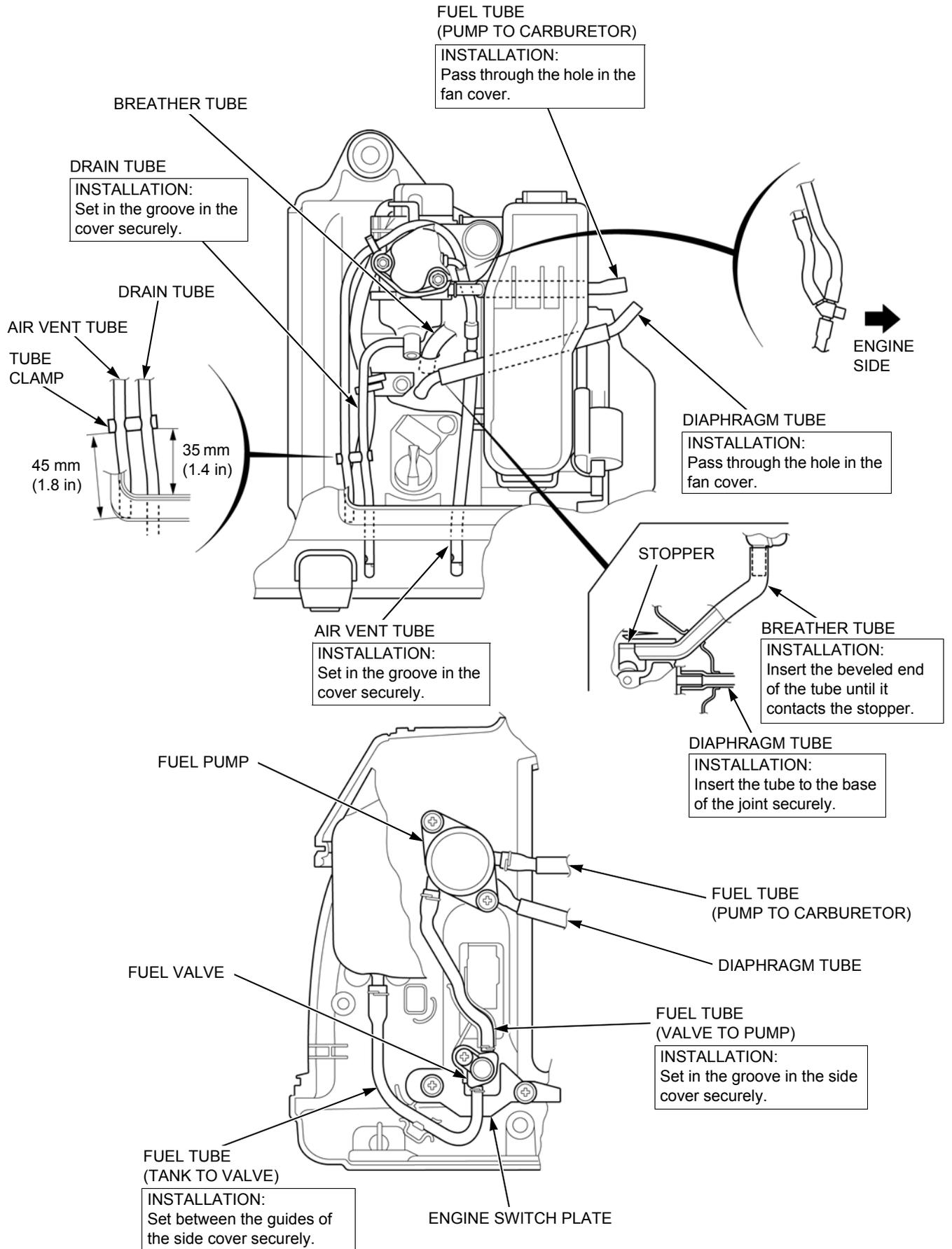
3	
Terminal number	Wire color
1	R/Y
2	R/W
3	G/Bl
4	G/R
5	R/W
6	-
7	-
8	-

Terminal number	Wire color
GND5	G
	G/Y

4	
Terminal number	Wire color
1	W
2	R
3	Bu
4	Y

9	
Terminal number	Wire color
1	W/R
2	Bl/R
3	Br
4	Br

TUBE ROUTING

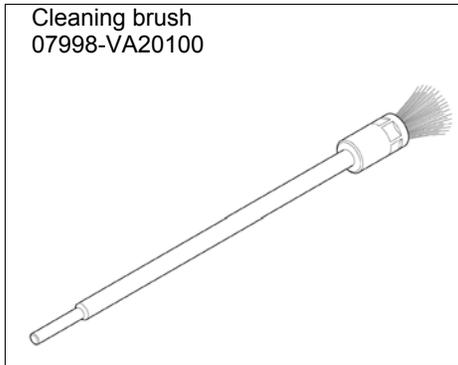


MEMO

TOOL	3-2	SPARK ARRESTER CLEANING.....	3-6
MAINTENANCE SCHEDULE.....	3-2	VALVE CLEARANCE CHECK/ ADJUSTMENT	3-6
ENGINE OIL LEVEL CHECK	3-3	COMBUSTION CHAMBER CLEANING	3-7
AIR CLEANER CHECK/CLEANING	3-4	FUEL TANK AND FILTER CLEANING	3-7
SPARK PLUG CHECK/ADJUSTMENT/ REPLACEMENT.....	3-5	FUEL TUBE INSPECTION.....	3-8

MAINTENANCE

TOOL



MAINTENANCE SCHEDULE

ITEM	Perform at every indicated month or operating hour interval, whichever comes first.	REGULAR SERVICE PERIOD (2)					Refer to page
		Each use	First month or 10 hrs.	Every 3 months or 50 hrs.	Every 6 months or 100 hrs.	Every 2 year or 300 hrs.	
Engine oil	Check level	○					3-3
	Change		○		○		3-3
Air cleaner	Check	○					3-4
	Clean			○ (1)			
Spark plug	Check-adjust				○		3-5
	Replace					○	
Spark arrester (Optional parts)	Clean				○		3-6
Valve clearance	Check-adjust					○	3-6
Combustion chamber	Clean	After every 300 hrs.					-
Fuel tank and filter	Clean	Every year					3-7
Fuel tube	Check	Every 2 years (Replace if necessary)					3-8

(1) Service more frequently when used in dusty areas.

(2) For commercial use, log hours of operation to determine proper maintenance intervals.

ENGINE OIL LEVEL CHECK

LEVEL CHECK

Remove the maintenance cover (page 5-2).

Place the engine on a level surface.

Remove the oil filler cap [1] and check the oil level [2].

If the oil level is low, fill with the recommended oil to the upper level of the oil filler neck.

RECOMMENDED OIL:

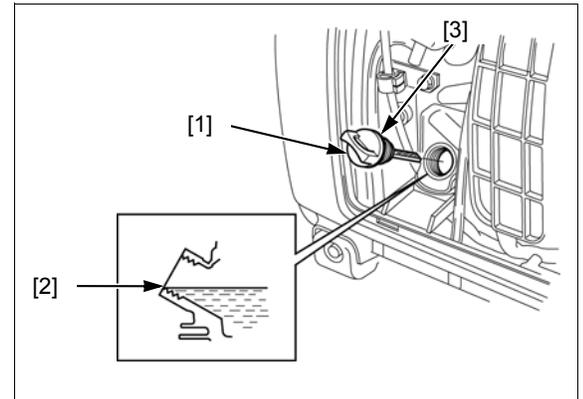
SAE 10W-30

API service classification: SE or higher

Check that the oil filler packing [3] is in good condition; replace it if necessary.

Install and tighten the oil filler cap securely.

Install the maintenance cover (page 5-2).



CHANGE

Drain the used oil while the engine is warm. Warm oil drains quickly and completely.

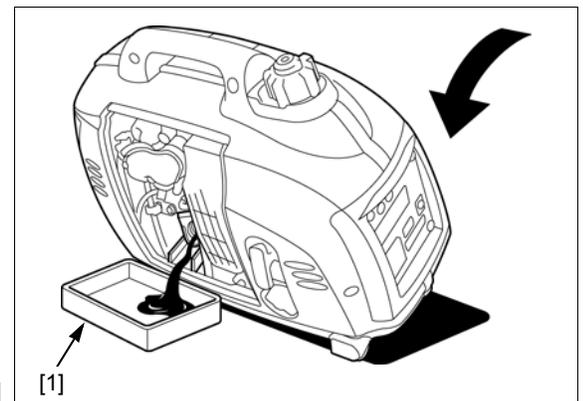
Remove the maintenance cover (page 5-2).

Place the engine on a level surface.

Place a suitable container [1] to collect the drained oil.

Remove the oil filler cap and drain the oil into the suitable container.

Please dispose of used motor oil in a manner that is compatible with the environment. We suggest you take used oil in a sealed container to your local recycling center or service station for reclamation. Do not throw it in the trash, pour it into the ground, or pour it down a drain.



CAUTION

Used engine oil contains substances that have been identified as carcinogenic. If repeatedly left in contact with the skin for prolonged periods, it may cause skin cancer. Wash your hands thoroughly with soap and water as soon as possible after contact with used engine oil.

SAE 10W-30 is recommended for general use. Other viscosities shown in the chart may be used when the average temperature in your area is within the recommended range.

Fill with the recommended oil.

OIL CAPACITY: 0.25 Liter (0.26 US qt, 0.22 Imp qt)

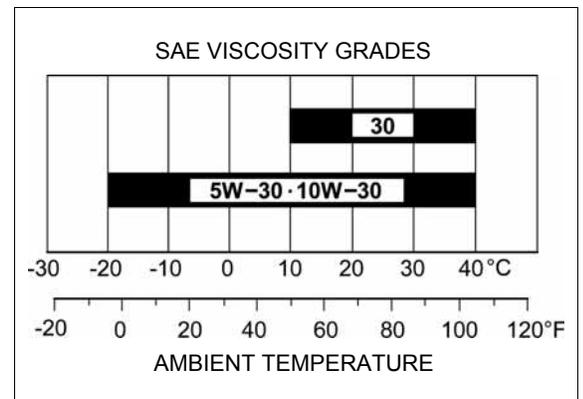
RECOMMENDED OIL:

SAE 10W-30

API service classification: SE or higher

After filling the oil, check the oil level.

Install the maintenance cover (page 5-2).



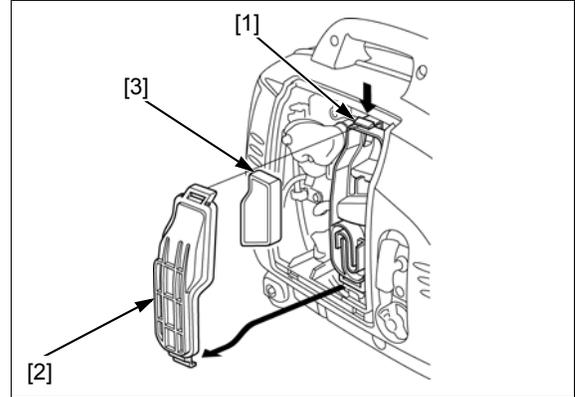
MAINTENANCE

AIR CLEANER CHECK/CLEANING

Remove the maintenance cover (page 5-2).

Disengage the locking tab [1] by pushing it, and remove the air cleaner cover [2].

Remove the air cleaner element [3] from the air cleaner cover.



Clean the air cleaner element in warm soapy water [1], rinse, and allow to dry thoroughly, or clean with a high flash point solvent and allow to dry.

Dip the elements in clean engine oil [2], and squeeze out all the excess oil.

NOTE:

- Excess oil will restrict air flow through the foam element and may cause the engine to smoke at startup.

NOTICE

- *Do not twist to squeeze oil from the air cleaner element. Twisting the element can damage it.*

Install the air cleaner element in the air cleaner case.

Install the air cleaner cover.

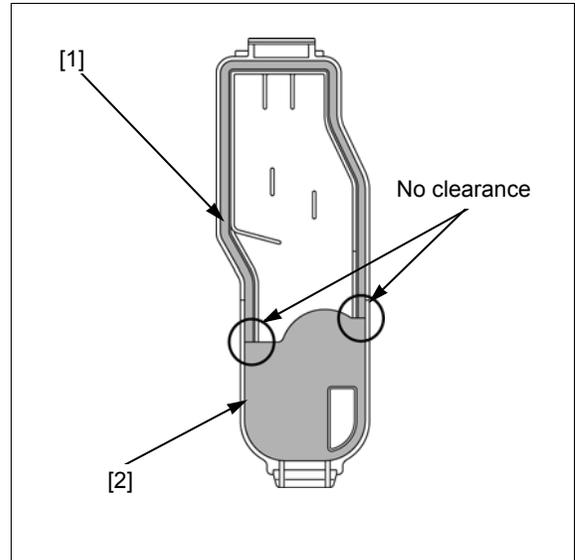
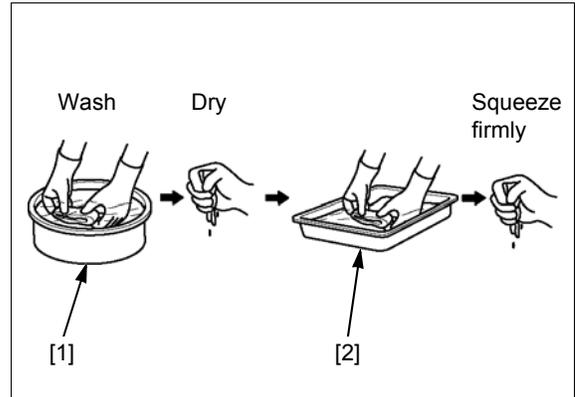
NOTE:

- Align the lower alignment part of the air cleaner cover, and lock the locking tab at the top of the air cleaner cover.
- Be sure that there is no clearance between seal A [1] and B [2].
Replace the cover seals if damaged.

NOTICE

- *A loosely installed air cleaner cover can come off by vibration during running. Operating the engine without an air cleaner element or with a damaged air cleaner element will allow dirt to enter the engine, causing rapid engine wear.*

Install the maintenance cover (page 5-2).

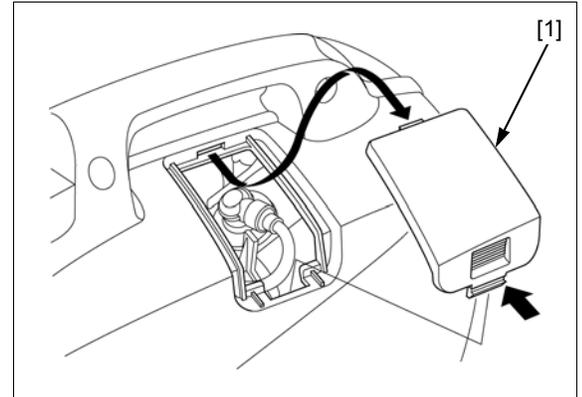


SPARK PLUG CHECK/ADJUSTMENT/ REPLACEMENT

⚠ CAUTION

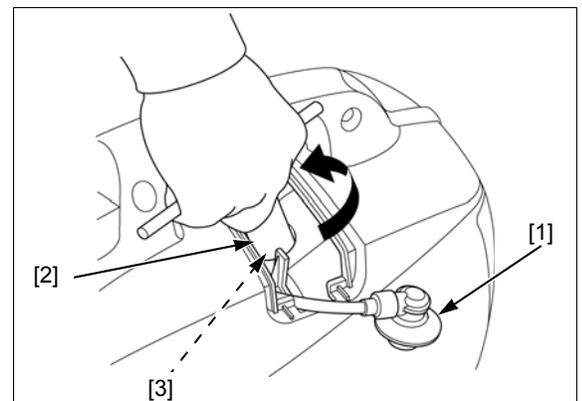
If the engine has been running, the engine will be very hot. Allow it to cool before proceeding.

Remove the plug cover [1].



Clean any dirt from around the spark plug.

Disconnect the spark plug cap [1], and use a spark plug wrench [2] to remove the spark plug [3].



Visually inspect the spark plug. Replace the plug if the insulator [1] is cracked, chipped, or heavily fouled.

Check the sealing washer [2] for damage. Replace the spark plug if the sealing washer is damaged.

SPARK PLUG: LR4C – E (NGK)

Measure the plug gap with a wire-type feeler gauge. If the measurement is out of the specification, adjust by bending the side electrode.

PLUG GAP: 0.6 – 0.7 mm (0.024 – 0.028 in)

Install the spark plug finger tight to seat the washer, and then tighten it to the specified torque.

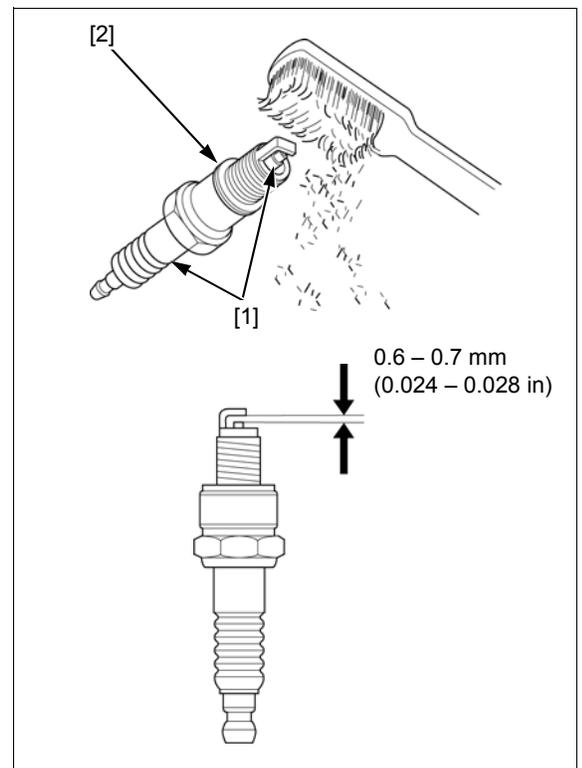
TORQUE: 11.8 N·m (1.2 kgf·m, 9 lbf·ft)

NOTICE

- A loose spark plug can become very hot and can damage the engine. Overtightening can damage the threads in the cylinder head.

Connect the spark plug cap securely.

Install the plug cover.



SPARK ARRESTER CLEANING

⚠ CAUTION

The engine and muffler become very hot during operation, and they remain hot for a while after operation. Be sure that the engine is cool before servicing the spark arrester.

Remove the muffler (page 12-2).

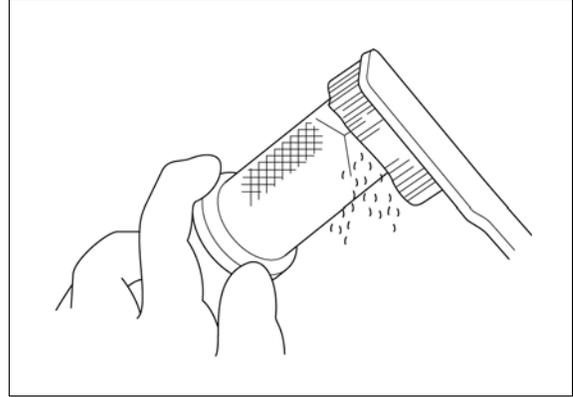
Clean the carbon deposits from the spark arrester screen with a wire brush.

NOTICE

- *Be careful to avoid damaging the screen.*

Check the spark arrester screen for damage. Replace the spark arrester if it is damaged.

Install the removed parts in the reverse order of removal.



VALVE CLEARANCE CHECK/ADJUSTMENT

NOTICE

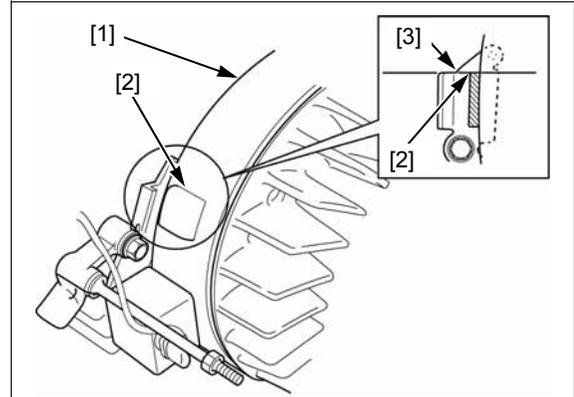
- *Valve clearance inspection and adjustment must be performed with the engine cold.*

Remove the head cover (page 14-2).

Turn the rotor [1] to set the piston at top dead center of the compression stroke.

NOTE:

- The right end of the projection [2] on the rotor should align with the corner [3] of the pulser coil bracket, and both the intake and exhaust valves should close.



Insert a feeler gauge [1] between the rocker arm [2] and valve stem [3] to measure the valve clearance.

VALVE CLEARANCE:

IN: 0.06 – 0.10 mm (0.002 – 0.004 in)

EX: 0.09 – 0.13 mm (0.004 – 0.005 in)

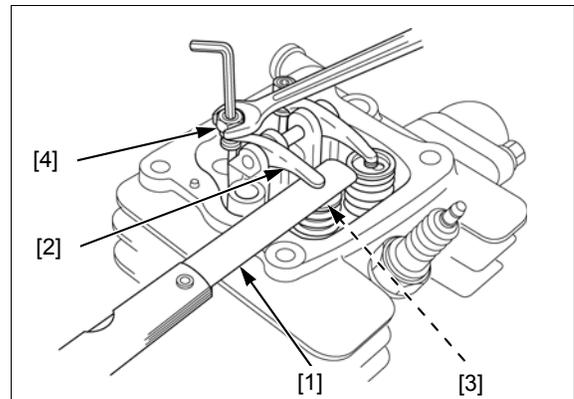
If adjustment is necessary, proceed as follows:

1. Loosen the lock nut [4] and turn the adjusting screw to obtain the specified valve clearance.
2. Hold the adjusting screw, and tighten the lock nut to the specified torque.

TORQUE: 5.5 N·m (0.56 kgf·m, 4.1 lbf·ft)

3. Recheck the valve clearance, and if necessary, readjust the valve clearance.

Install the head cover (page 14-2).



COMBUSTION CHAMBER CLEANING

Remove the piston/connecting rod assembly (page 15-3).

Prepare a cylinder of a thick paper or equivalent material [1], which diameter is as large as the inner wall of the cylinder, and insert the paper into the cylinder.

Attach the special tool to an electric drill and clean any carbon deposits from the combustion chamber.

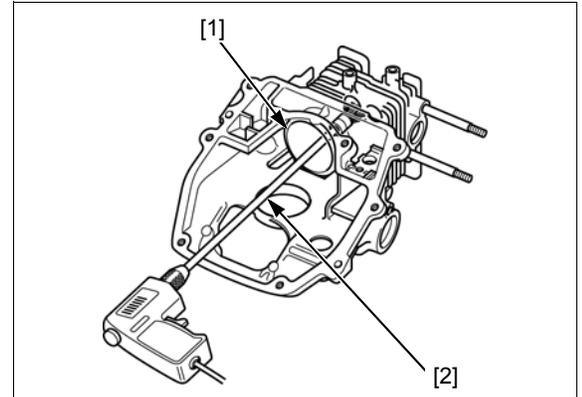
TOOL:

Cleaning brush [2]

07998-VA20100

NOTICE

- Be sure to insert a thick paper into the cylinder to protect the inner wall of the cylinder during clearing of the combustion chamber.
- Do not press the cleaning brush with force against the combustion chamber.



FUEL TANK AND FILTER CLEANING

⚠ WARNING

Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel.

- Keep heat, sparks, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

Drain the fuel from the fuel tank [1] and carburetor.

Remove the side cover (page 5-3).

Disconnect the fuel tube [2] from the fuel tank, and remove the fuel filter [3].

Clean the fuel filter and fuel tank with non-flammable solvent, and allow it to dry thoroughly.

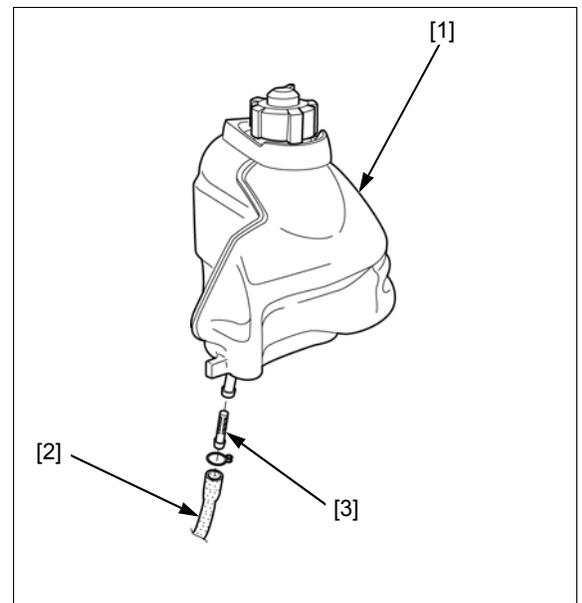
Check the screen of the fuel filter for contamination or damage.

Replace if necessary.

Install the fuel filter into the fuel tank, and connect the fuel tube.

Install the removed parts in the reverse order of removal.

After installation, check for any signs of fuel leakage.



FUEL TUBE INSPECTION

⚠ WARNING

Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel.

- Keep heat, sparks, and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

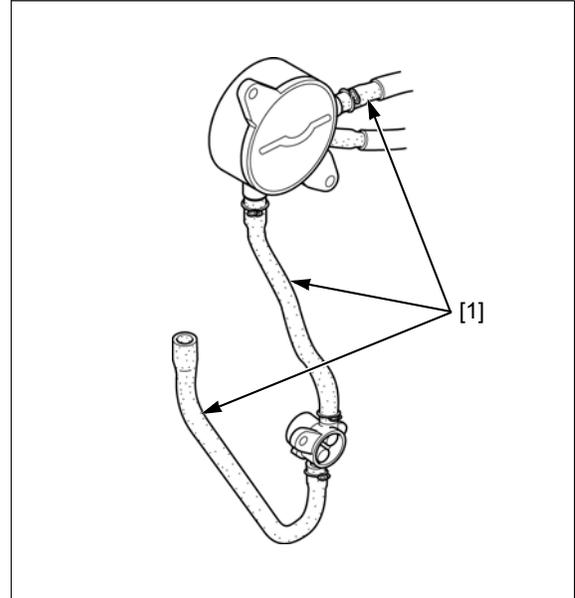
Remove the side cover (page 5-3).

Check the fuel tubes [1] for damage, fuel leakage, corrosion, and other abnormalities.

Check that the fuel tube is not interfering with the neighboring parts.

Replace the fuel tube if there is damage, fuel leakage, or corrosion (page 5-5).

Install the removed parts in the reverse order of removal.



4. TROUBLESHOOTING

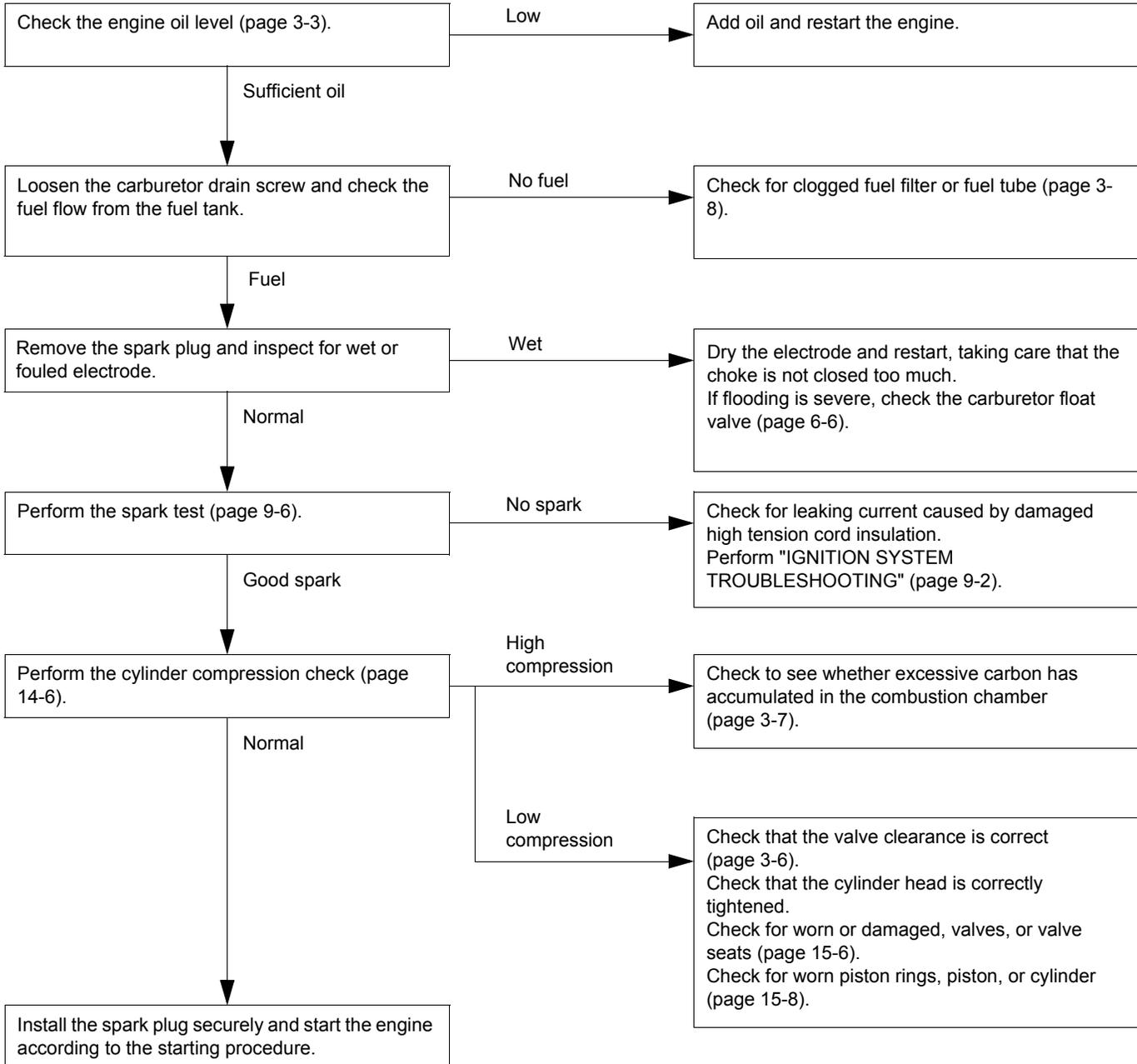
BEFORE TROUBLESHOOTING.....	4-2	ENGINE SPEED DOES NOT INCREASE OR STABILIZE	4-4
HARD STARTING	4-2	ENGINE OIL LEVEL IS LOW, BUT ENGINE DOES NOT STOP	4-5
ENGINE STARTS BUT THEN STALLS	4-3		

TROUBLESHOOTING

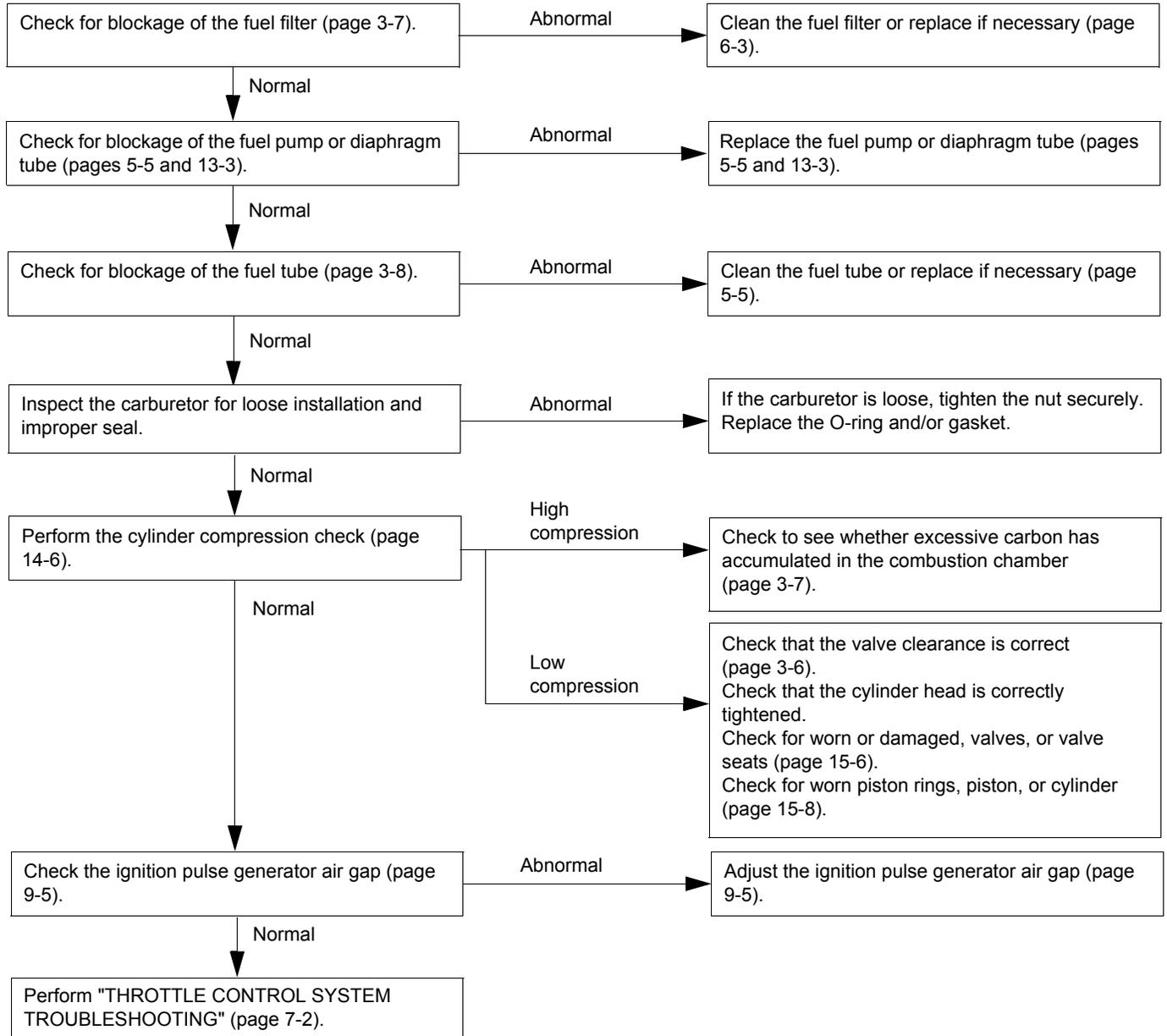
BEFORE TROUBLESHOOTING

- Check that the connectors are connected securely.
- Check for sufficient fresh fuel in the fuel tank.
- Read the circuit tester's operation instructions carefully, and observe the instructions during inspection.

HARD STARTING

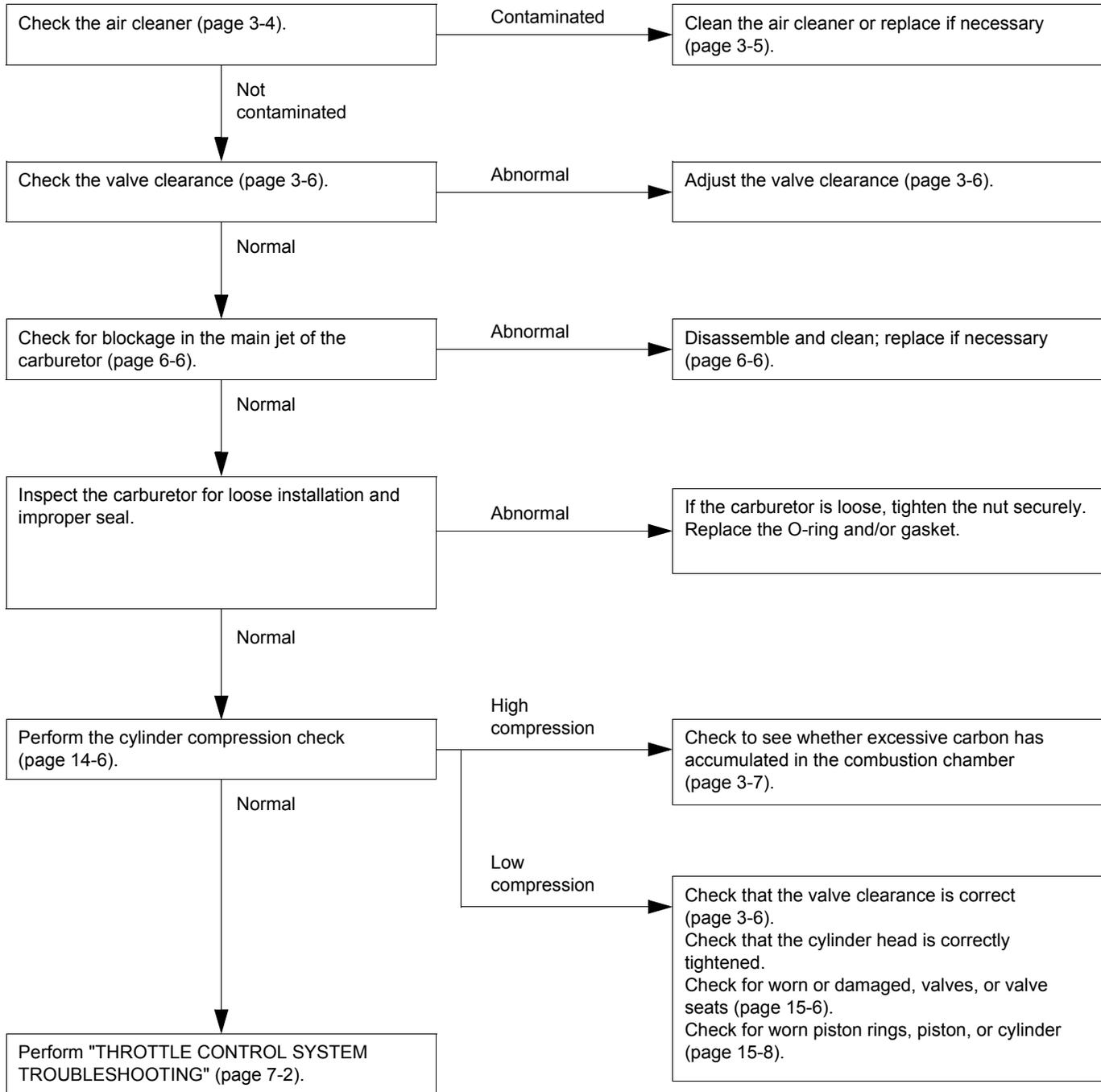


ENGINE STARTS BUT THEN STALLS



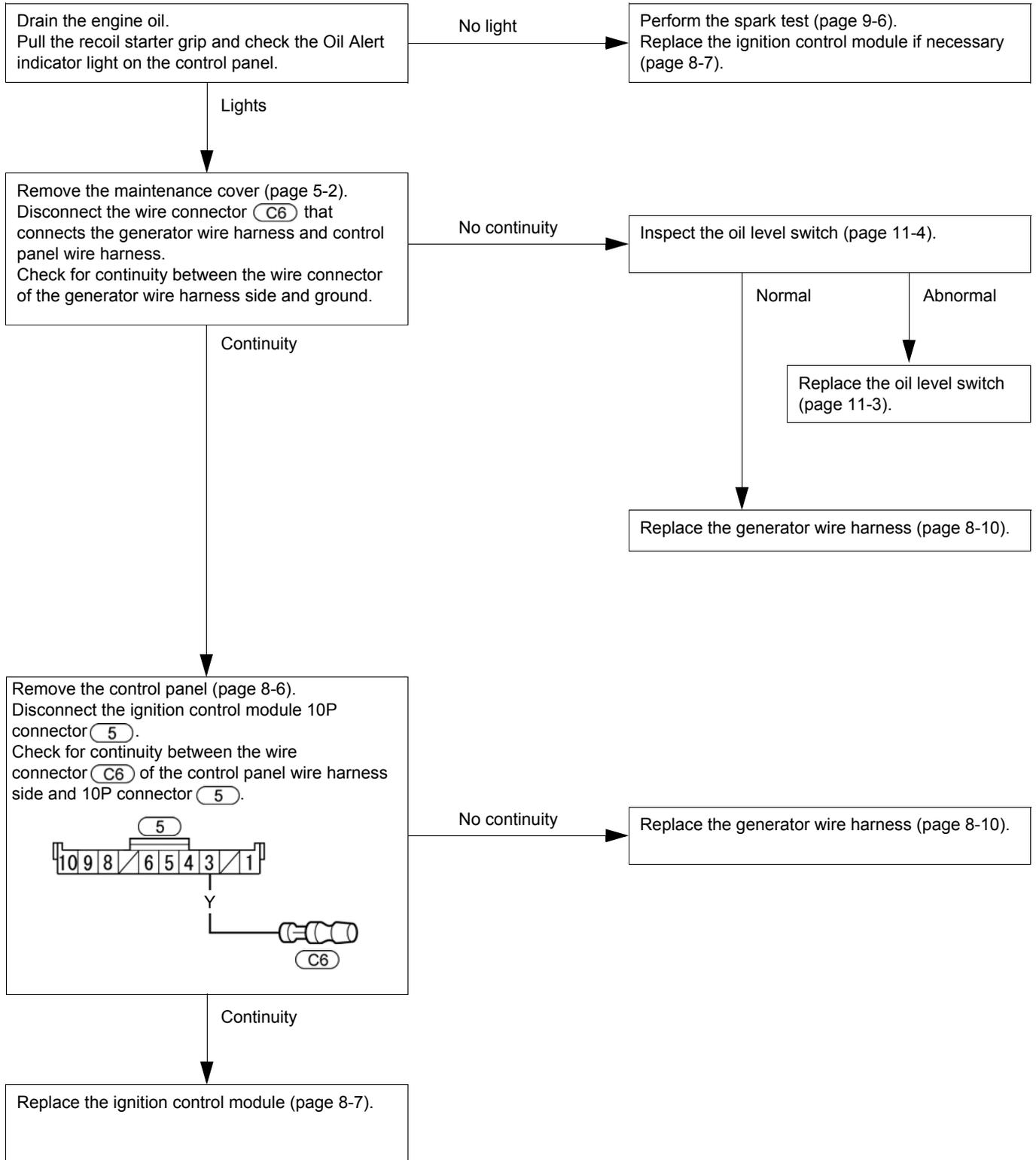
TROUBLESHOOTING

ENGINE SPEED DOES NOT INCREASE OR STABILIZE



ENGINE OIL LEVEL IS LOW, BUT ENGINE DOES NOT STOP

Check the following at the engine on a level surface.



MEMO

**MAINTENANCE COVER REMOVAL/
INSTALLATION**5-2

**FRONT COVER REMOVAL/
INSTALLATION**5-2

**MUFFLER PROTECTOR REMOVAL/
INSTALLATION**5-2

**SIDE COVER REMOVAL/
INSTALLATION** 5-3

**L. SIDE COVER DISASSEMBLY/
ASSEMBLY** 5-5

COVER

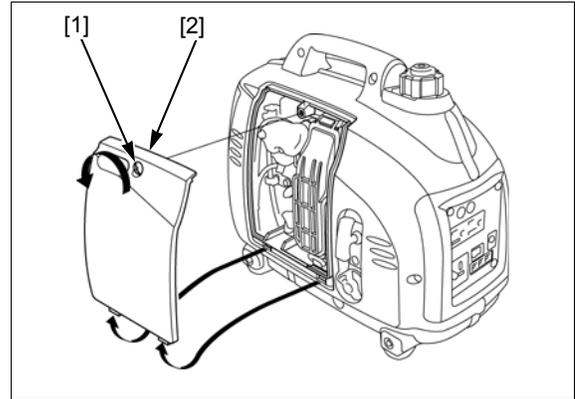
MAINTENANCE COVER REMOVAL/ INSTALLATION

Loosen the screw [1] and remove the maintenance cover [2].

To install the maintenance cover, set it on the L. side cover by aligning the tabs with the holes.

Tighten the maintenance cover screw to the specified torque.

TORQUE: 2.3 N·m (0.23 kgf·m, 1.7 lbf·ft)



FRONT COVER REMOVAL/ INSTALLATION

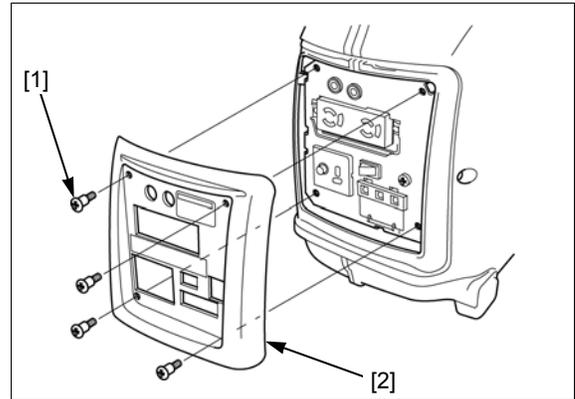
Remove the four screw [1] and front cover [2].

Installation is in the reverse order of removal.

TORQUE:

FRONT COVER SCREW:

2.3 N·m (0.23 kgf·m, 1.7 lbf·ft)



MUFFLER PROTECTOR REMOVAL/ INSTALLATION

Remove the following:

- Four screws (5×16 mm) [1]
- Muffler protector [2]
- Rubber seal [3]

Installation is in the reverse order of removal.

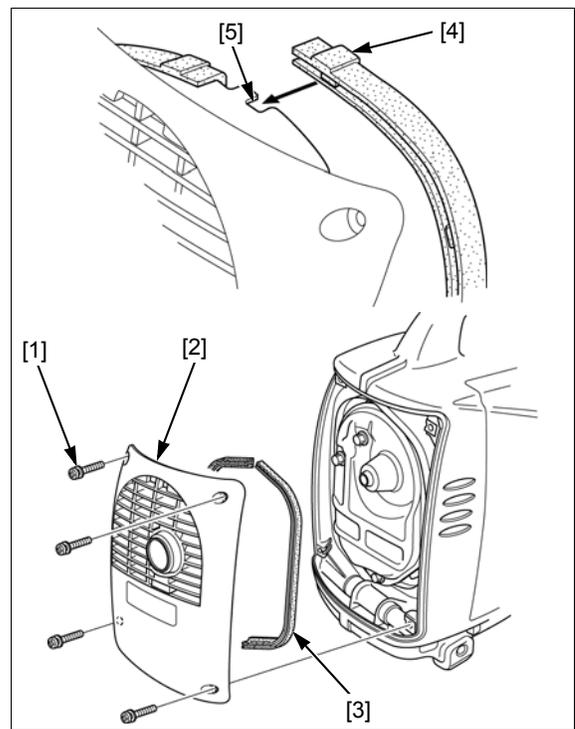
TORQUE:

MUFFLER PROTECTOR SCREW:

2.3 N·m (0.23 kgf·m, 1.7 lbf·ft)

NOTE:

- Be sure that the rubber seal is set on the protector securely.
- Set the rubber seal on the protector by aligning the projection [4] with the groove [5] as shown.



SIDE COVER REMOVAL/ INSTALLATION

REMOVAL

⚠ WARNING

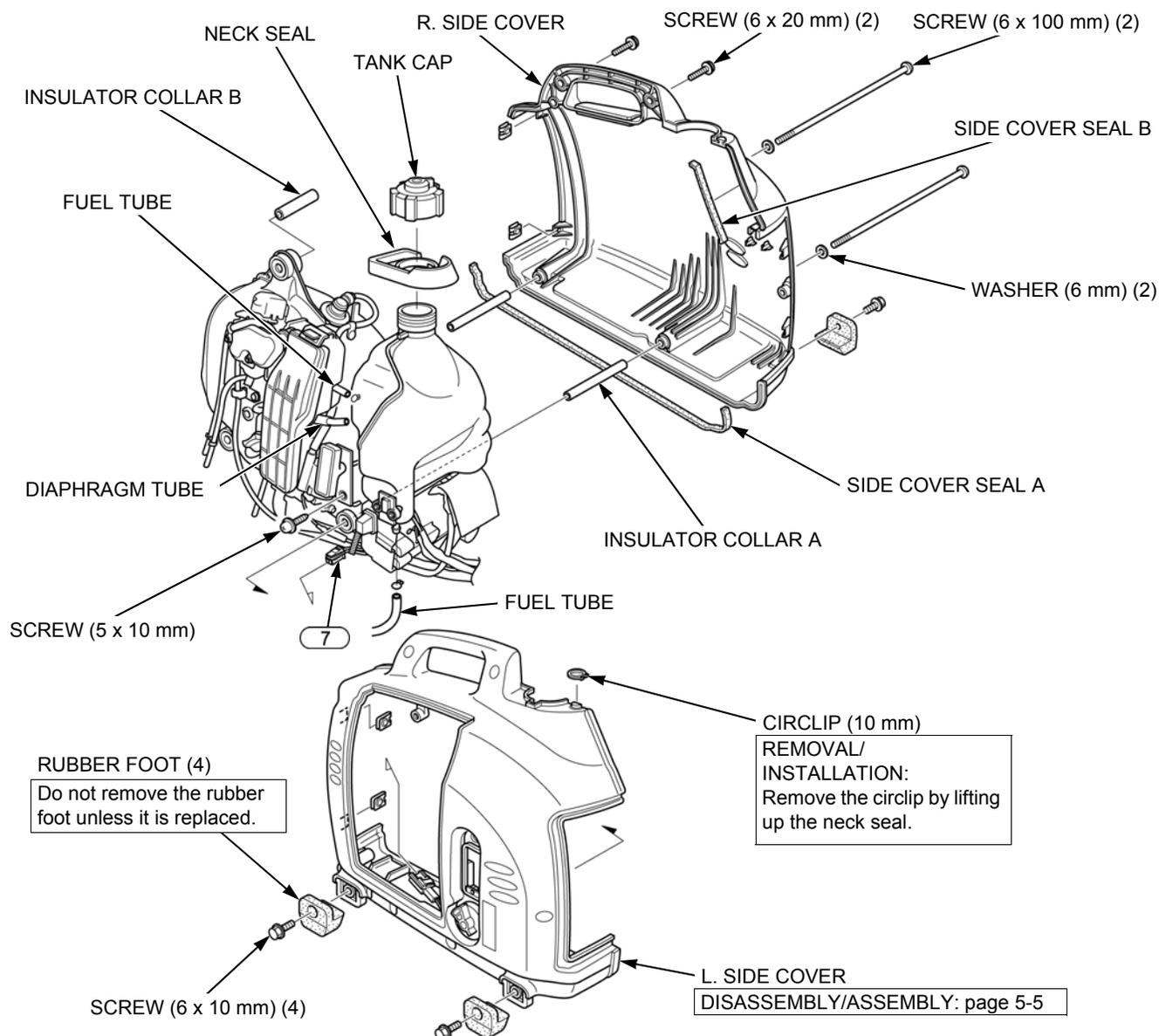
Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel.

- Keep heat, sparks, and flame away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

Drain the fuel from the fuel tank and carburetor.

Remove the following:

- Maintenance cover (page 5-2)
- Muffler protector (page 5-2)
- Control panel (page 8-6)



INSTALLATION

Before installing, check the wire and tube routing in the L. side cover (page 2-8).

Connect the 2P connector (7) and bind it with the cable tie.

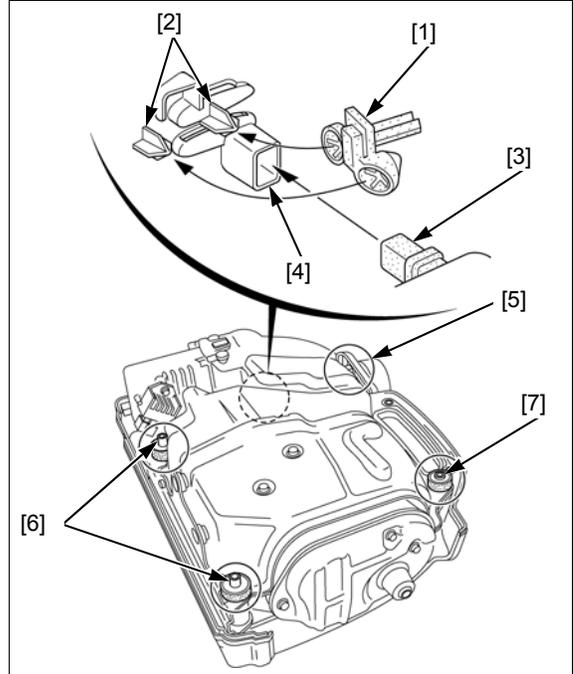
Connect the fuel tube to the fuel tank.

Connect the fuel tube and diaphragm tube to the fuel pump.

Set the engine unit on the L. side cover, and check the following:

- L. tank mounting rubber [1] is set in the groove and over the bosses [2] of the L. side cover.
- Inverter mounting rubber [3] aligns with the set part [4] of the L. side cover.
- L. side cover is set in the groove in the neck seal [5].
- Set the engine bed insulator and shroud insulator in the designated position of the L. side cover. Take care not to allow the washers to come off.

Install the two insulator the collars A [6] and insulator collar B [7] securely.



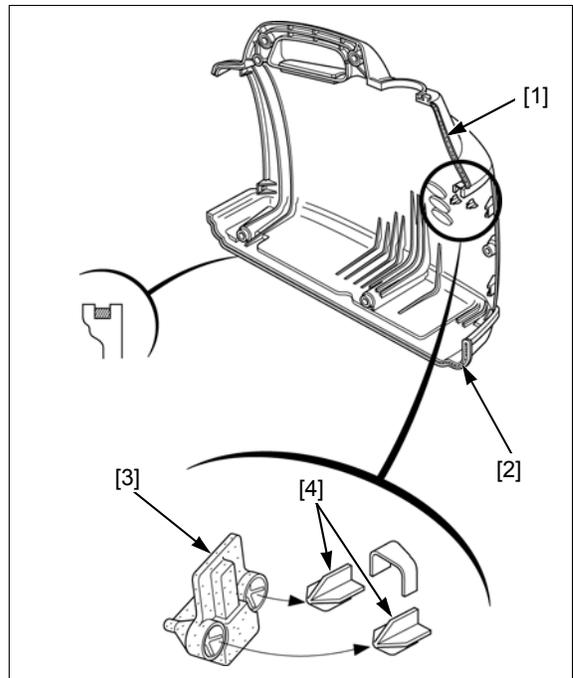
Check to see whether the cover seal A [1] and cover seal B [2] are securely set in the groove in the R. side cover.

Install the R. side cover on the L. side cover, and check the following:

- R. tank mounting rubber [3] is set in the groove and over the bosses [4] of the L. side cover.
- R. side cover is set in the groove in the neck seal.
- R. side cover is securely set in the groove in the L. side cover.

Install the following:

- Two washers (6 mm) and screws (6 x 100 mm) (page 5-3)
- Two screws (6 x 20 mm) (page 5-3)
- Circlip (10 mm) (page 5-3)
- Four rubber feet and screws (6 x 10 mm) (page 5-3)
- Screw (5 x 10 mm) (page 5-3)
- Control panel (page 8-6)
- Muffler protector (page 5-2)
- Maintenance cover (page 5-2)

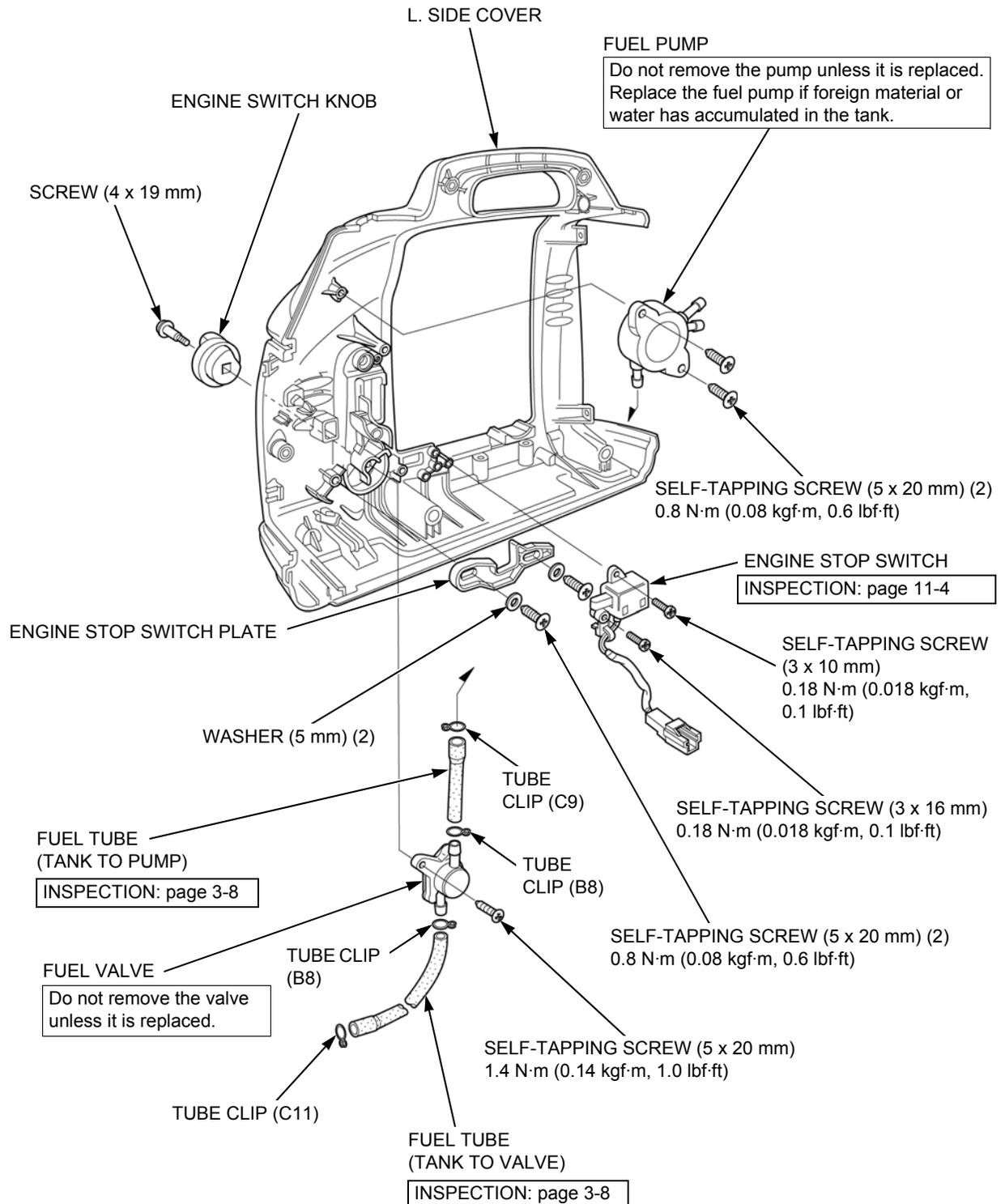


L. SIDE COVER DISASSEMBLY/ ASSEMBLY

Remove the L. side cover (page 5-3).

NOTE:

- When installing, route the wire properly (page 2-8).



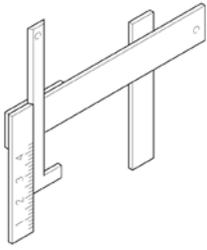
MEMO

TOOL	6-2	CARBURETOR DISASSEMBLY/ ASSEMBLY	6-6
FUEL TANK DISASSEMBLY/ASSEMBLY ...	6-3	FLOAT LEVEL HEIGHT INSPECTION	6-7
AIR CLEANER REMOVAL/ INSTALLATION	6-4	PILOT SCREW REPLACEMENT	6-7
CARBURETOR REMOVAL/ INSTALLATION	6-5		

FUEL SYSTEM

TOOL

Float level gauge
07401-0010000



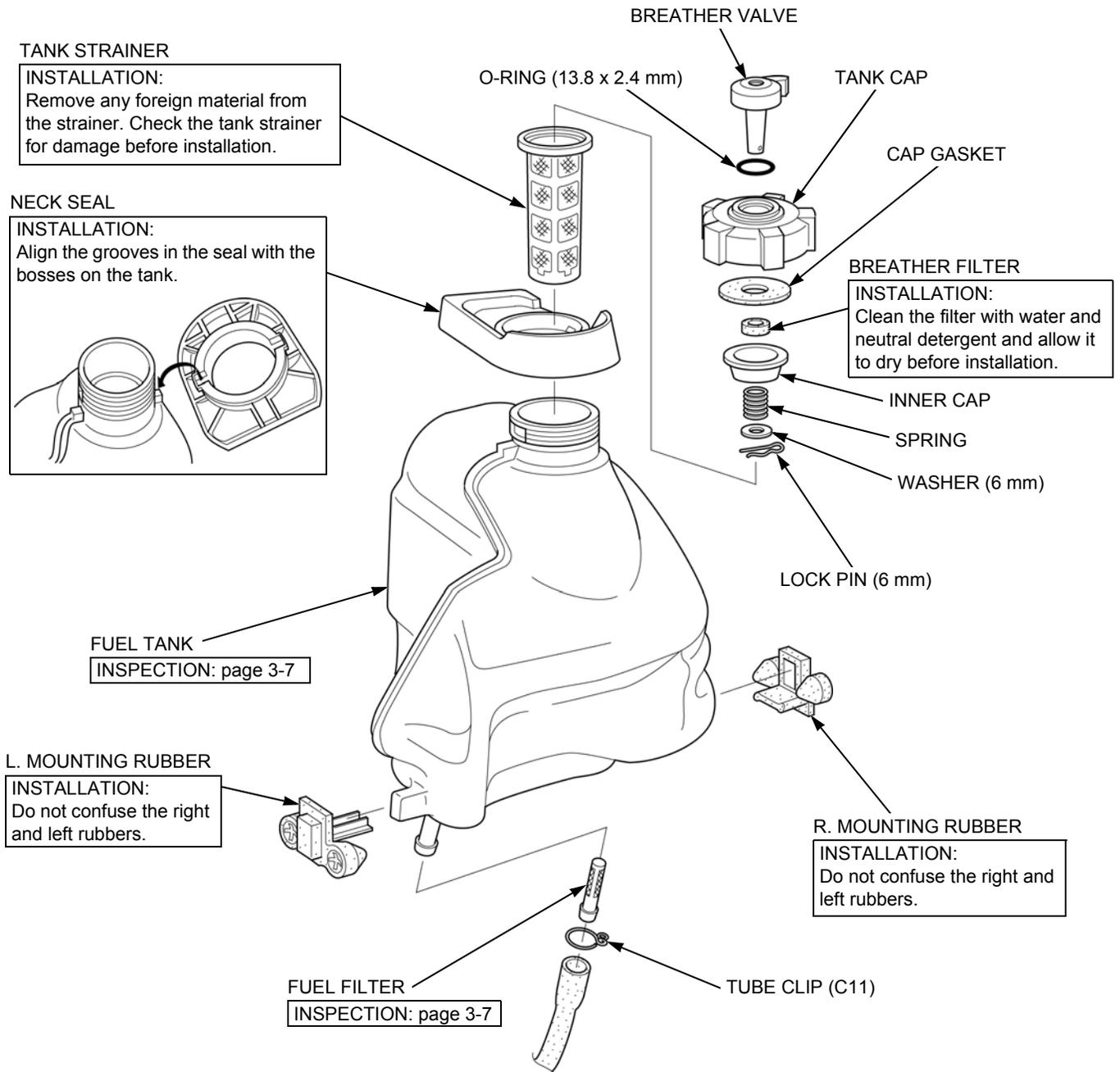
FUEL TANK DISASSEMBLY/ASSEMBLY

⚠ WARNING

Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel.

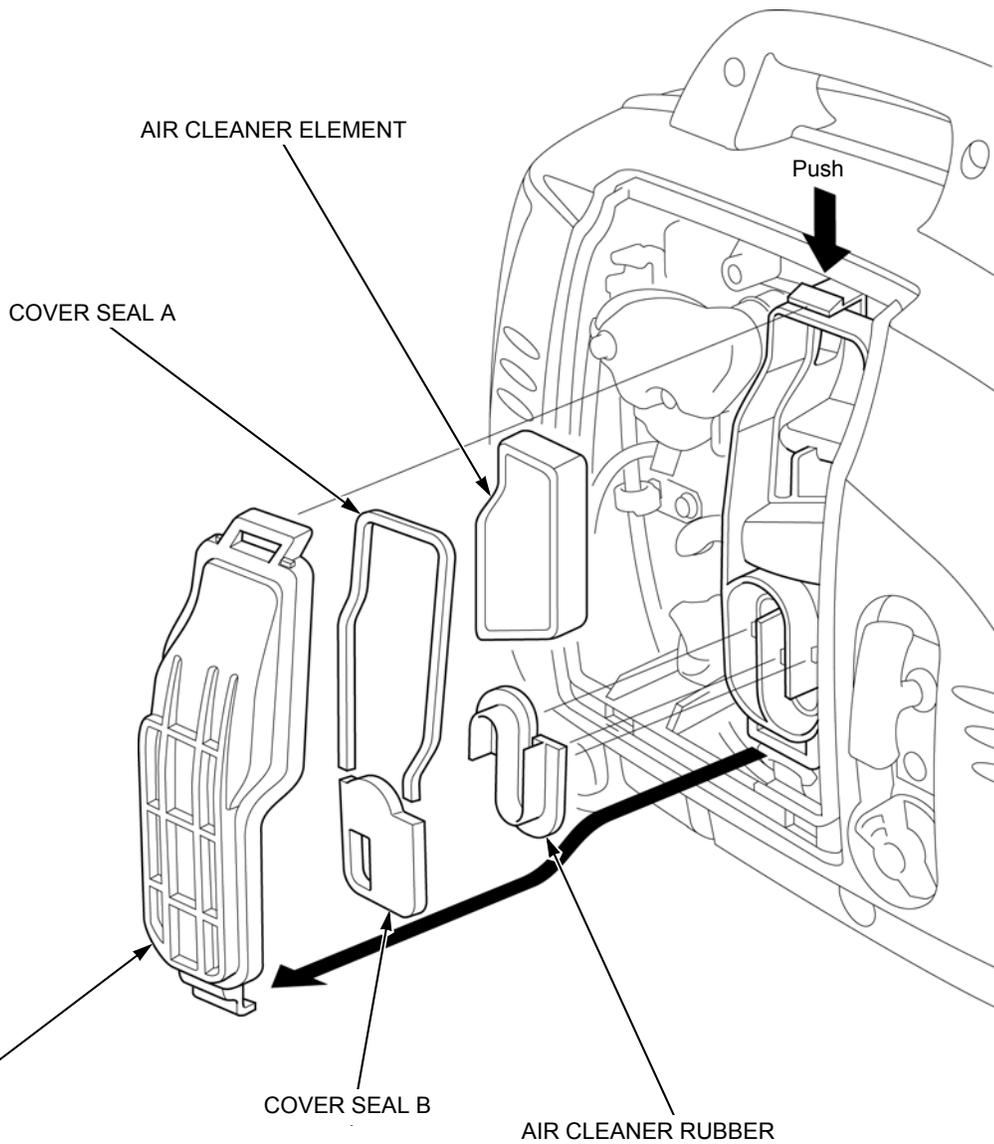
- Keep heat, sparks, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

Remove the side covers (page 5-3).



AIR CLEANER REMOVAL/INSTALLATION

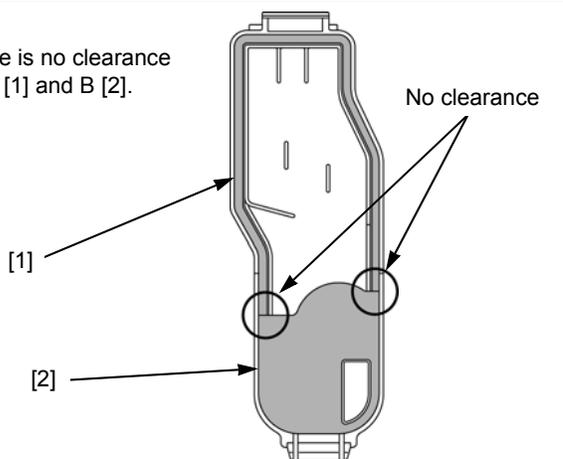
Remove the maintenance cover (page 5-2).



AIR CLEANER COVER

INSTALLATION:

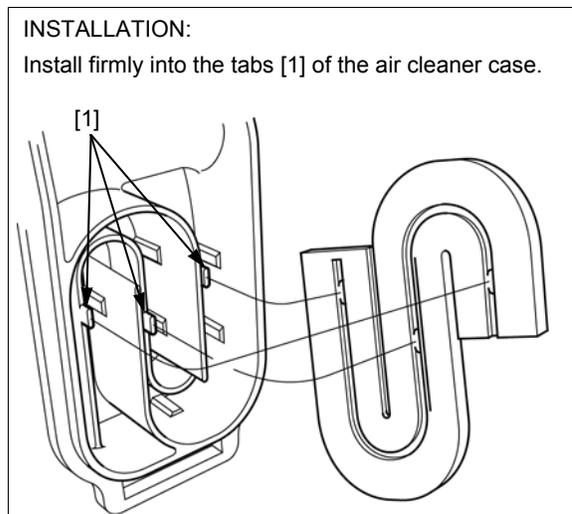
Be sure that there is no clearance between seals A [1] and B [2].



AIR CLEANER RUBBER

INSTALLATION:

Install firmly into the tabs [1] of the air cleaner case.



CARBURETOR REMOVAL/INSTALLATION

⚠ WARNING

Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel.

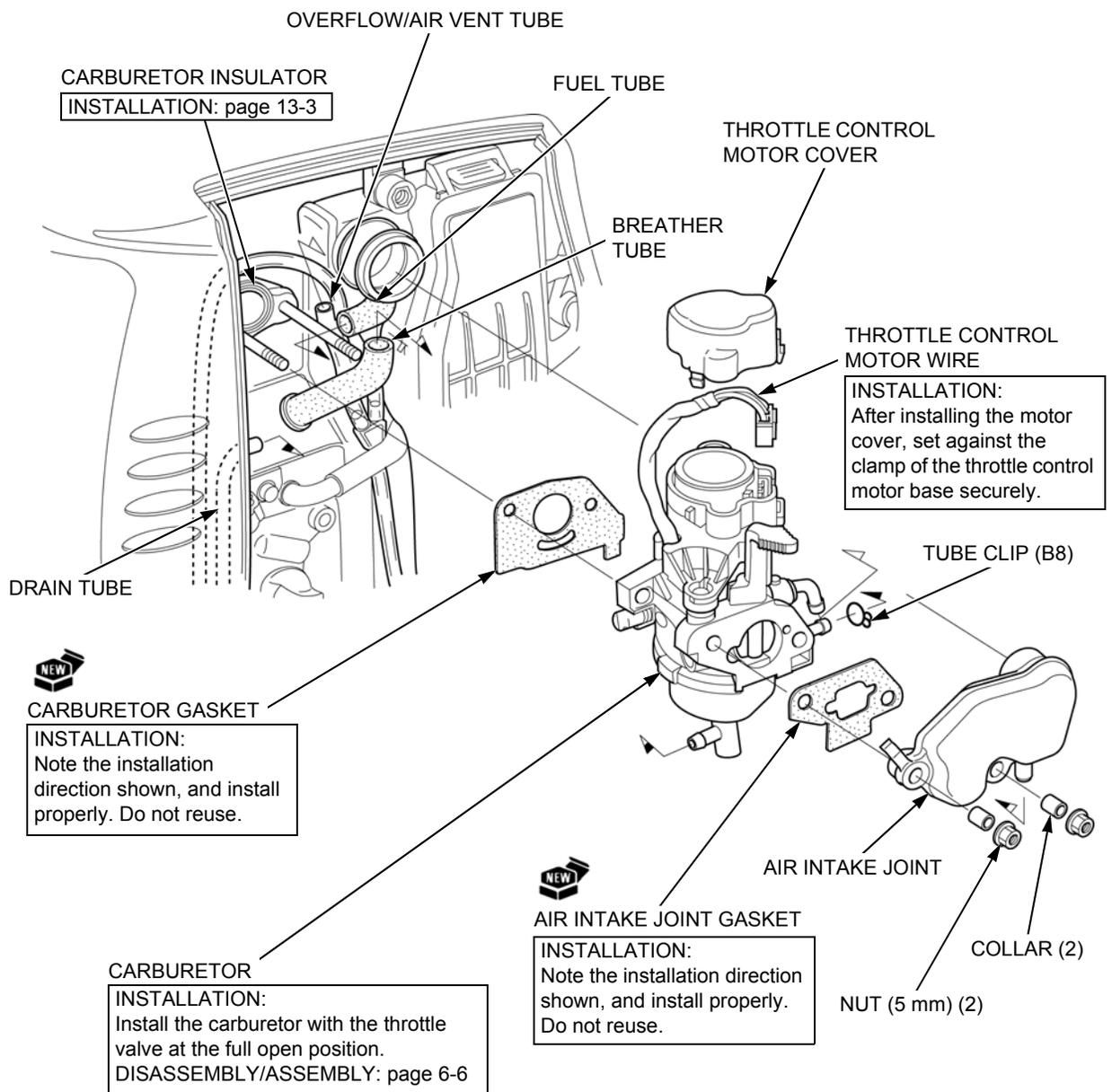
- Keep heat, sparks, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

Loosen the drain screw to drain the carburetor thoroughly before removal.

Remove the maintenance cover (page 5-2).

NOTE:

When installing, route the wire and tubes properly (page 2-8).



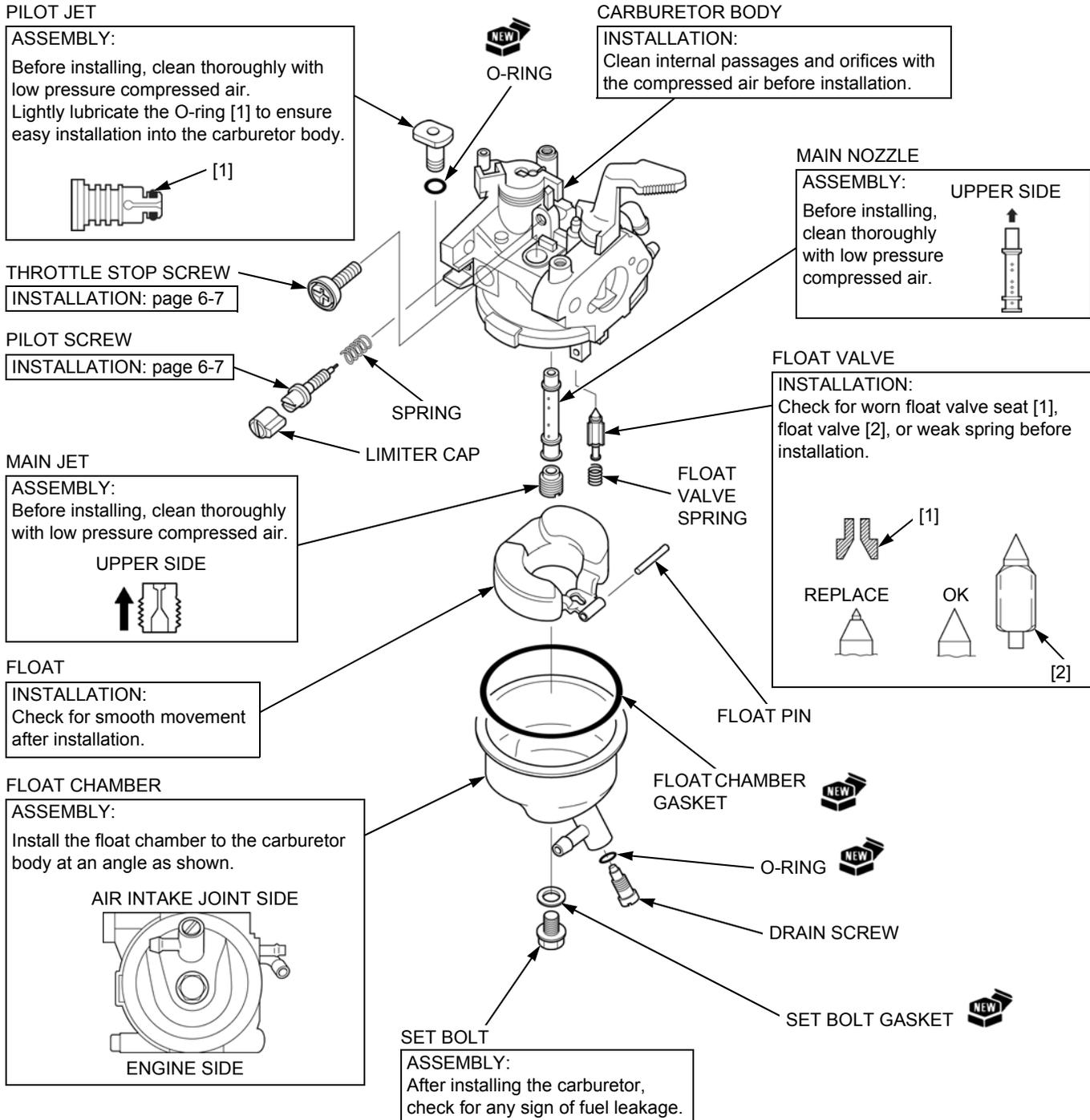
CARBURETOR DISASSEMBLY/ASSEMBLY

⚠ WARNING

Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel.

- Keep heat, sparks, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

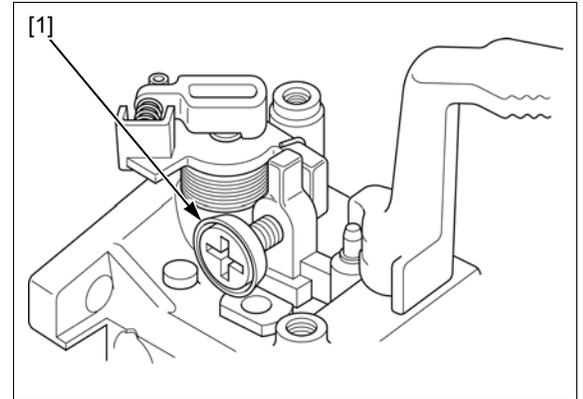
Remove the throttle control motor (page 7-4).



THROTTLE STOP SCREW

Install the throttle stop screw [1] after installing the pilot jet.

Install so that the throttle valve is fully closed and the screw end does not come out of the bracket.



FLOAT LEVEL HEIGHT INSPECTION

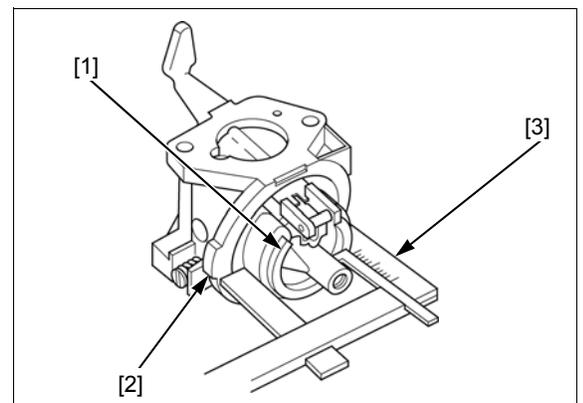
Place the carburetor in the position shown, and measure the distance between the float top [1] and carburetor body [2] when the float just contacts the seat without compressing the valve spring.

TOOL:

Float level gauge [3] 07401-0010000

FLOAT HEIGHT: 12.0 mm (0.47 in)

If the height is outside the specification, replace the float and float valve and recheck the height.



PILOT SCREW REPLACEMENT

Only remove the pilot screw [1] and limiter cap [2] when necessary for repair or for cleaning stubborn deposits from the pilot circuit passages.

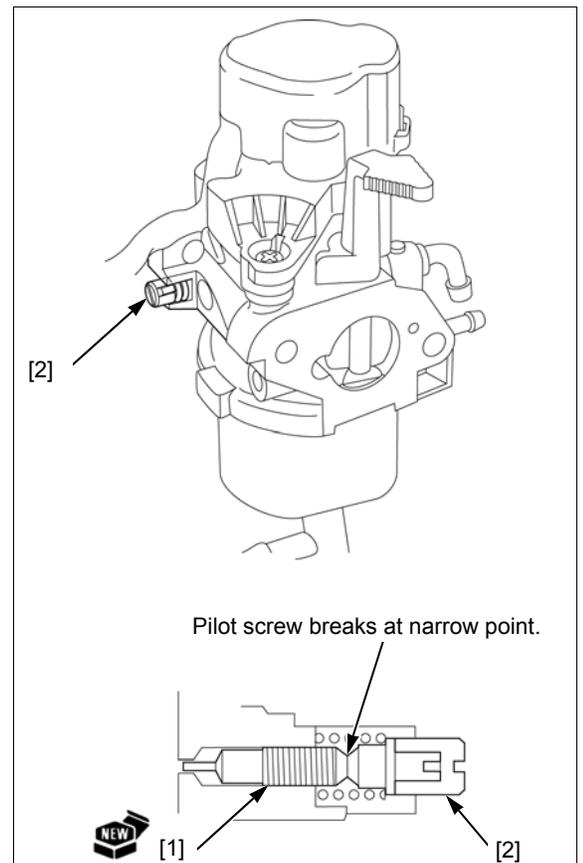
Removal of the limiter cap requires breaking the pilot screw. A new pilot screw and limiter cap must be installed.

When the limiter cap has been broken off, remove the broken pilot screw.

Place the spring on the replacement pilot screw, and install it on the carburetor.

Turn the pilot screw in until it is lightly seated, and then turn it out the required number of turns.

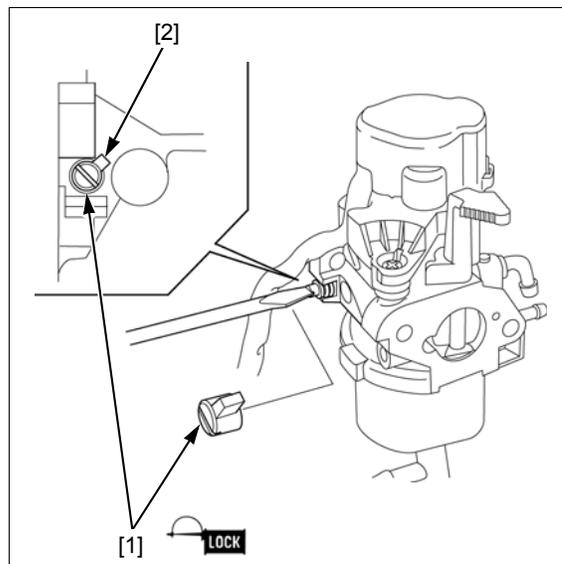
Pilot screw opening: 2-5/8 turns out



FUEL SYSTEM

Apply LOCTITE® 638, or equivalent to the inside of the limiter cap [1], and then install the cap so its stop [2] prevents the pilot screw from being turned counterclockwise.

Be careful to avoid turning the pilot screw while installing the limiter cap. The pilot screw must stay at its required setting.



7. GOVERNOR SYSTEM

THROTTLE CONTROL SYSTEM
TROUBLESHOOTING.....7-2

THROTTLE CONTROL MOTOR REMOVAL/
INSTALLATION.....7-4

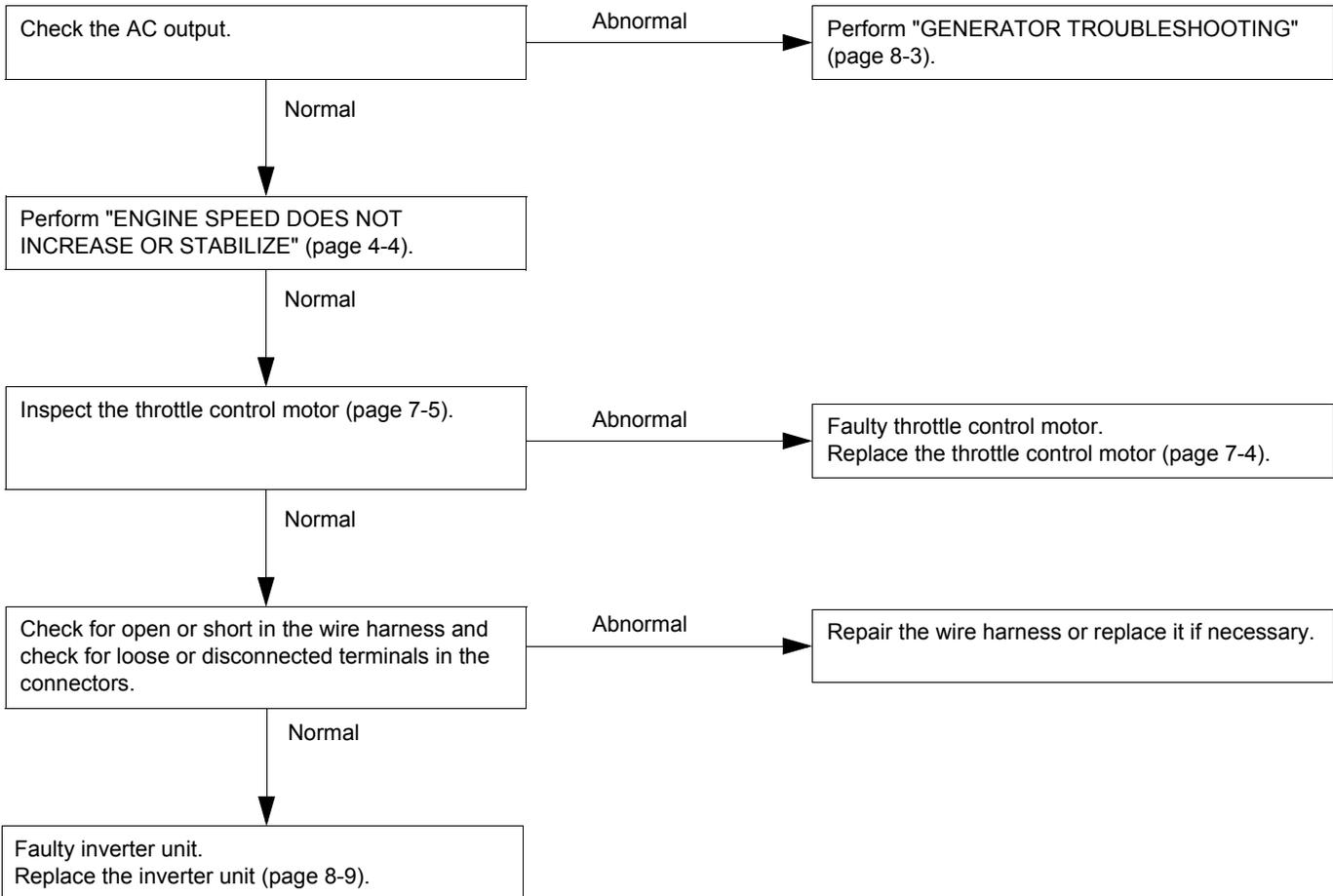
Eco-Throttle SWITCH INSPECTION 7-5

THROTTLE CONTROL MOTOR
INSPECTION..... 7-5

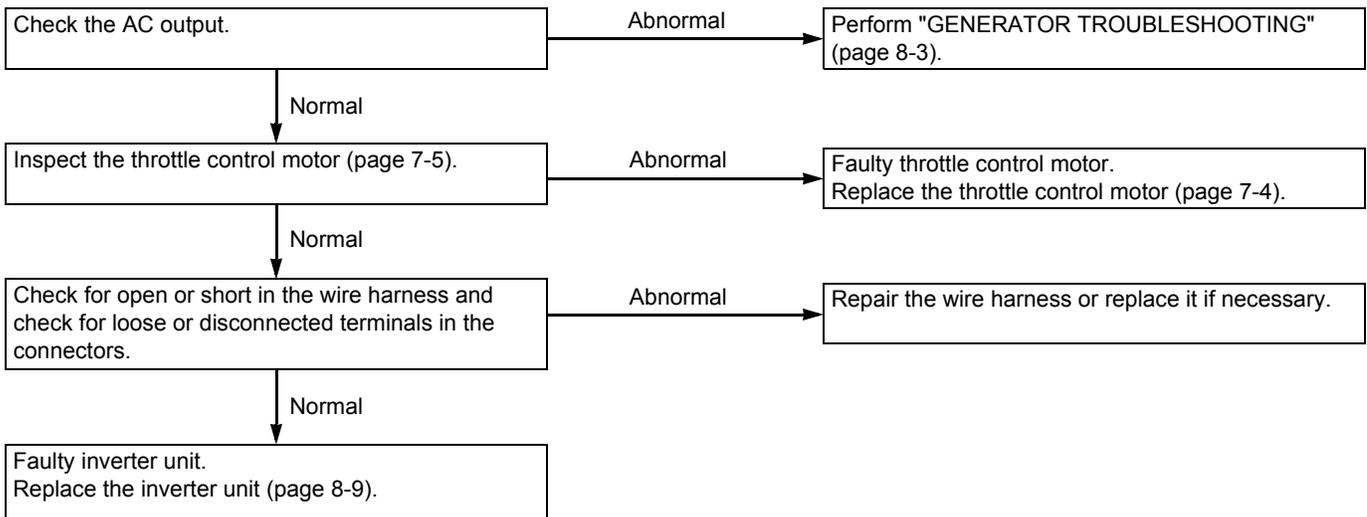
GOVERNOR SYSTEM

THROTTLE CONTROL SYSTEM TROUBLESHOOTING

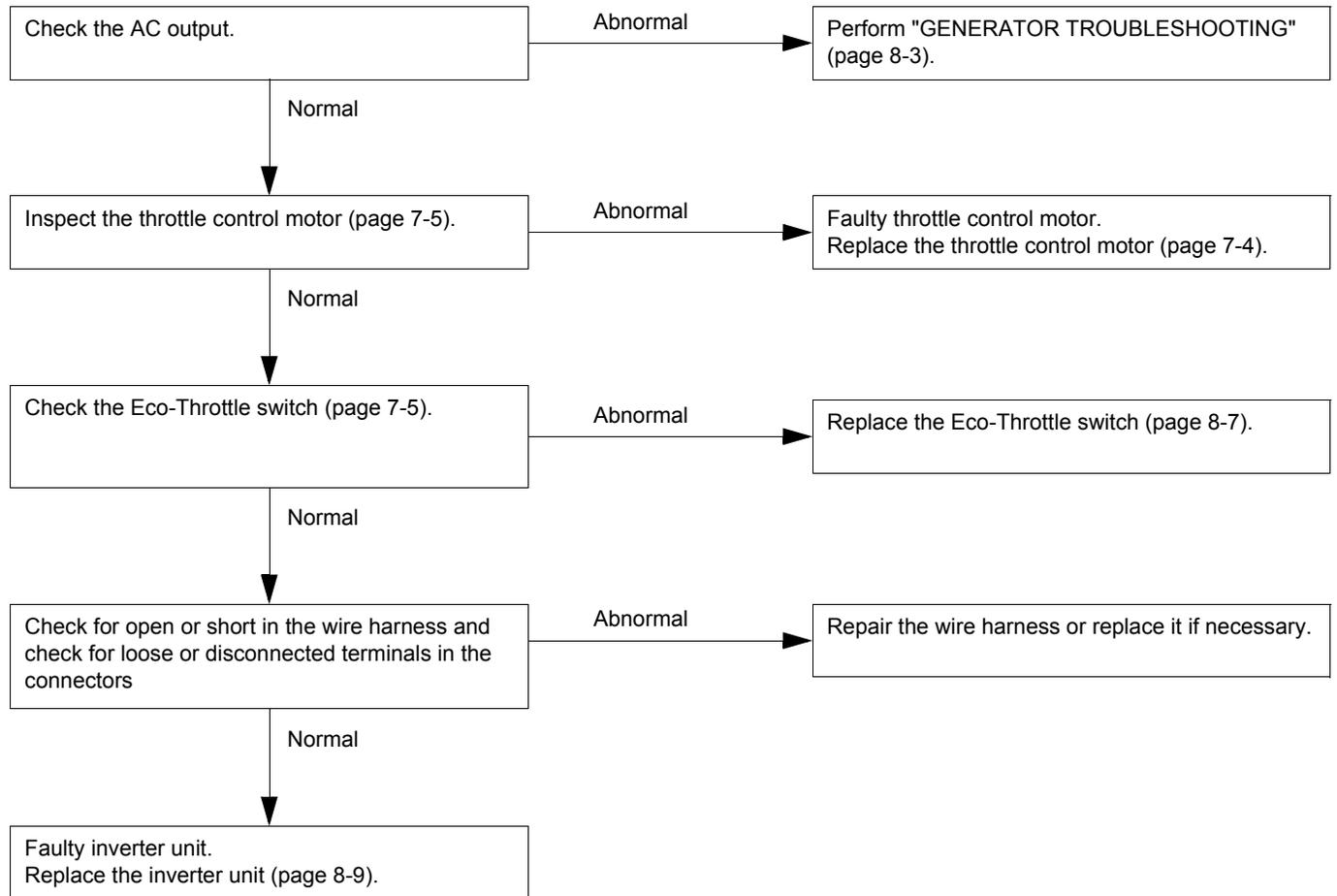
Engine Speed is Too High, Unstable



LOW ENGINE SPEED



**Engine Speed Does Not Increase With ECO Throttle System OFF Under No Load
 Engine Speed Does Not Decrease With ECO Throttle System ON Under No Load
 Engine Speed Does Not Increase by Connecting Load With ECO Throttle System ON**



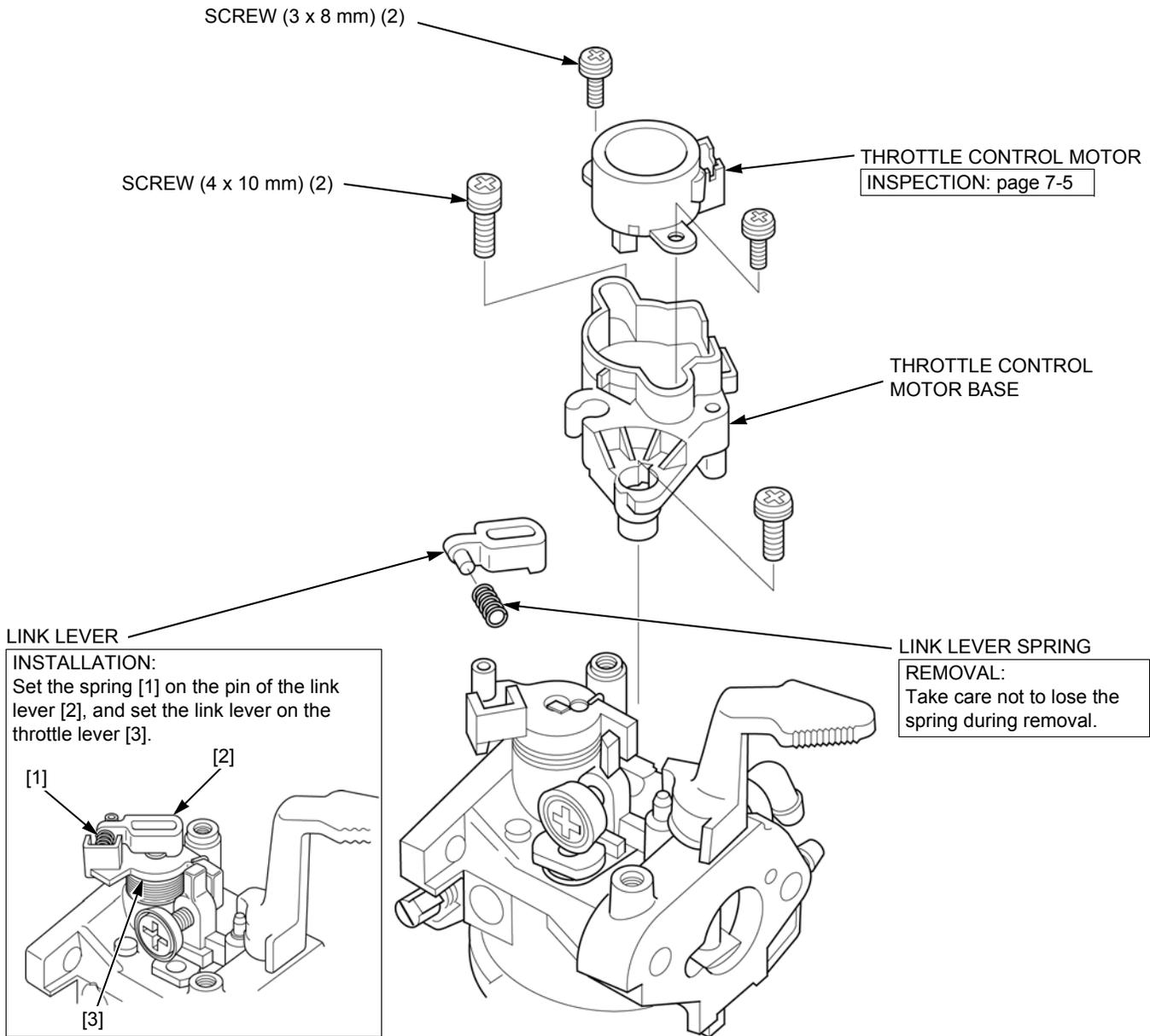
THROTTLE CONTROL MOTOR REMOVAL/INSTALLATION

⚠ WARNING

Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel.

- Keep heat, sparks, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

Remove the carburetor (page 6-5).



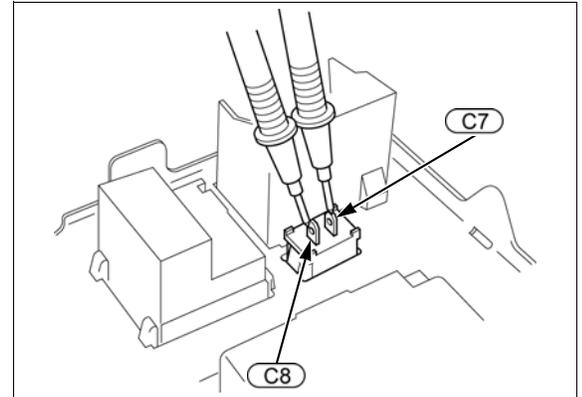
Eco-Throttle SWITCH INSPECTION

Remove the control panel (page 8-6).

Disconnect the connectors from the Eco-Throttle switch.

Check for continuity between the Eco-Throttle switch terminals.

There must be no continuity with the switch turned ON, and continuity with the switch turned OFF.



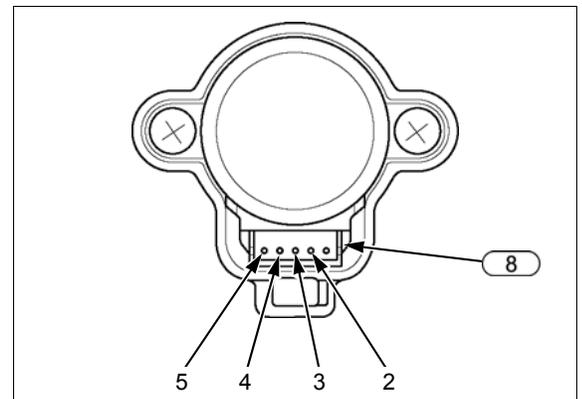
THROTTLE CONTROL MOTOR INSPECTION

Remove the carburetor (page 6-5).

Measure the resistance between the throttle control motor connector terminals.

Terminal	Standard resistance
2 - 4	50 - 70 Ω
3 - 5	

If the resistance is outside the specification, replace the throttle control motor (page 7-4).



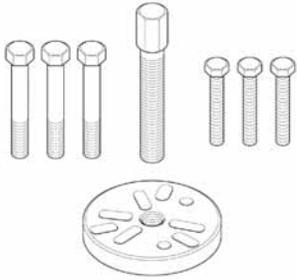
MEMO

8. GENERATOR/CHARGING SYSTEM

TOOL	8-2	INVERTER UNIT REMOVAL/ INSTALLATION	8-9
GENERATOR TROUBLESHOOTING.....	8-3	RECTIFIER INSPECTION.....	8-9
CONTROL PANEL REMOVAL/ INSTALLATION.....	8-6	GENERATOR REMOVAL/ INSTALLATION	8-10
CONTROL PANEL DISASSEMBLY/ ASSEMBLY	8-7	GENERATOR INSPECTION	8-13

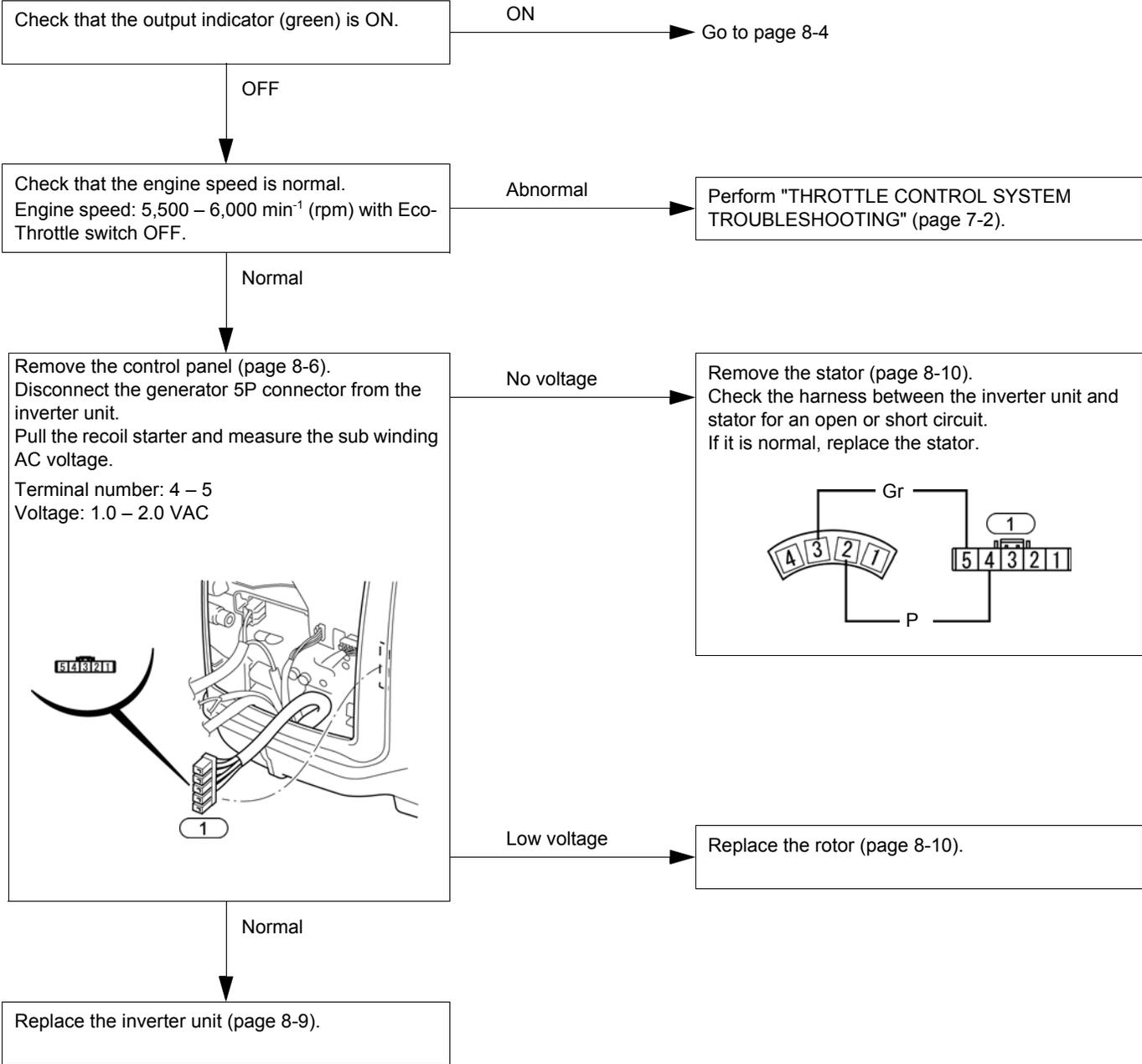
TOOL

Flywheel puller
07935-8050004

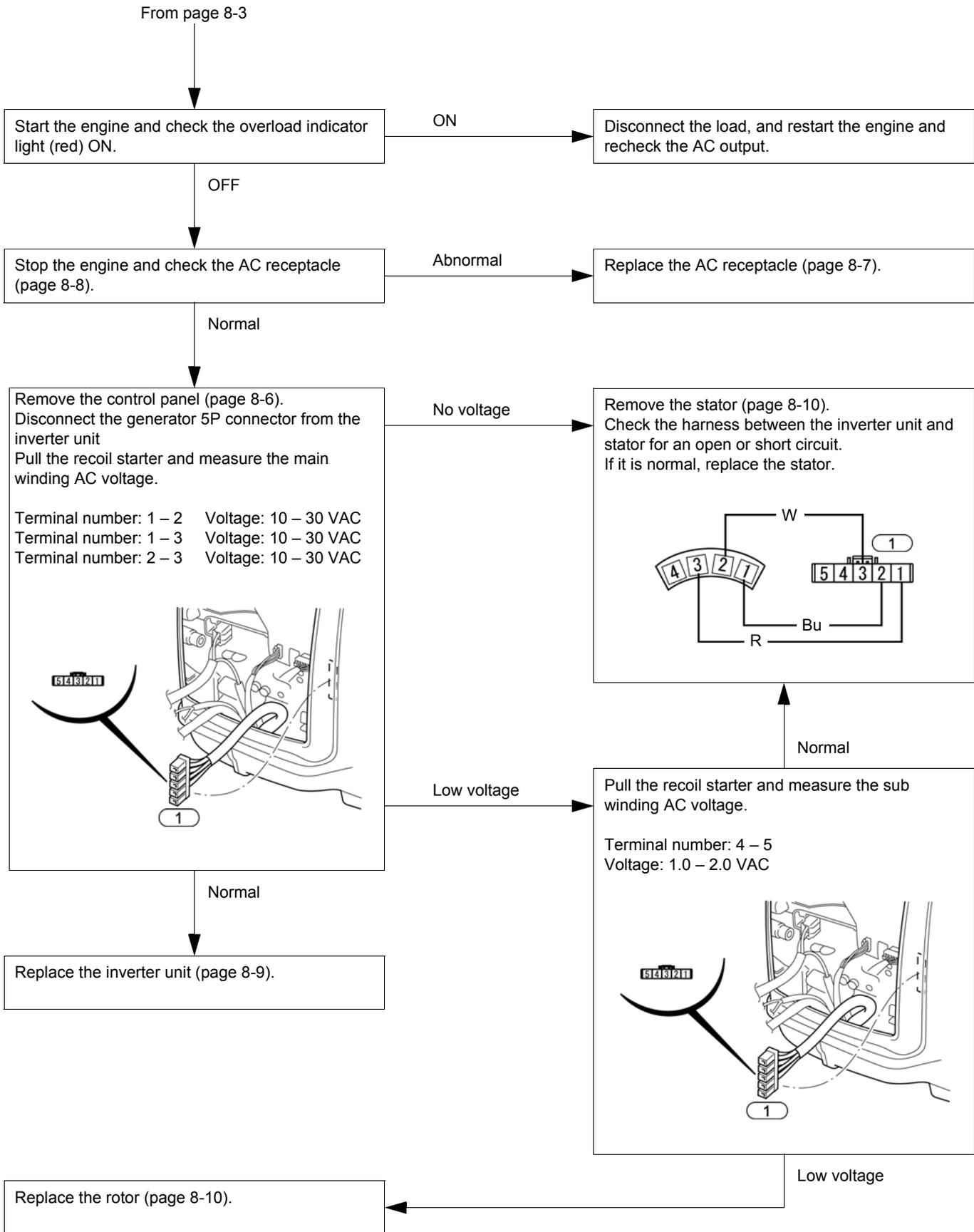


GENERATOR TROUBLESHOOTING

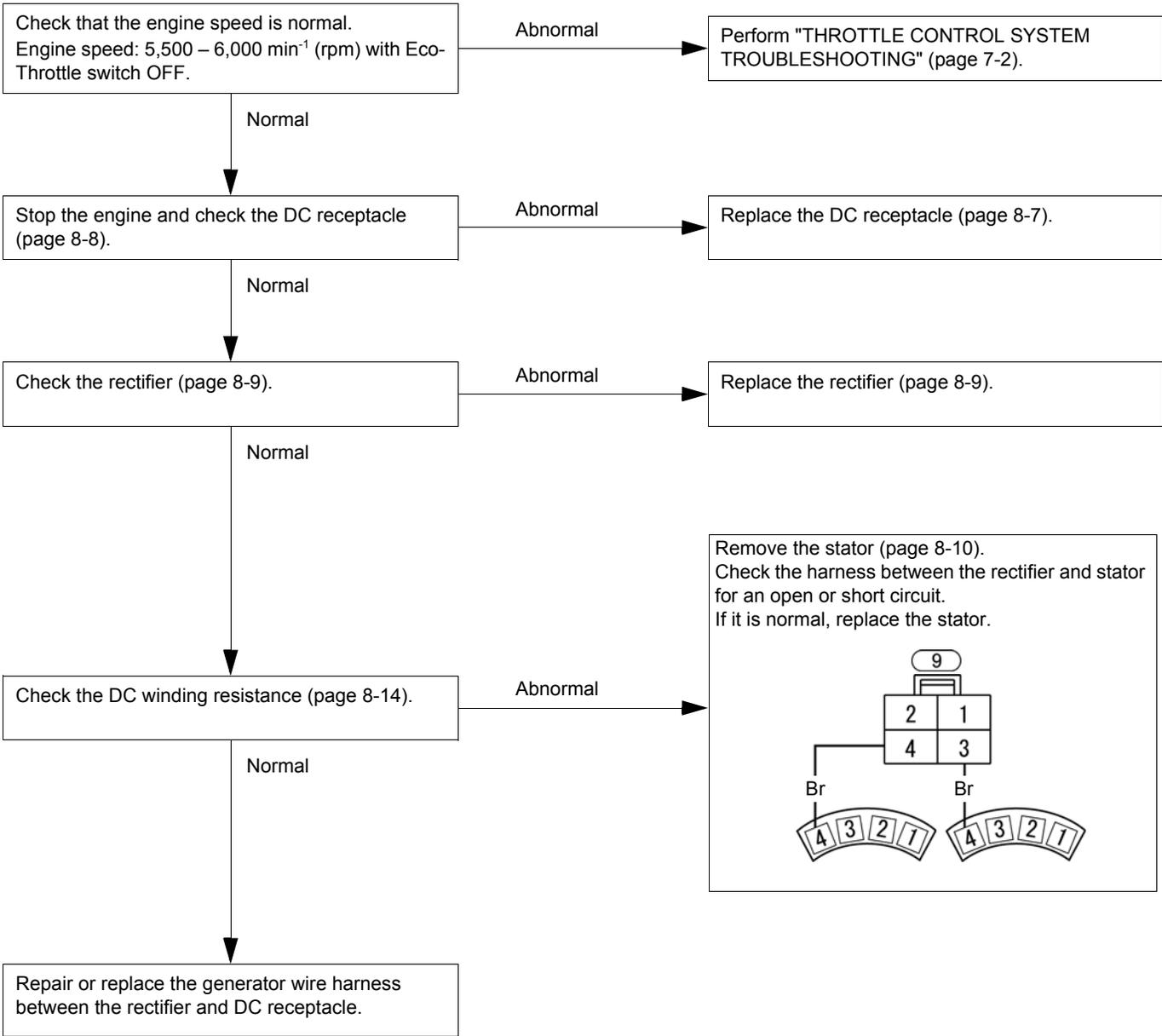
No or low AC output



GENERATOR/CHARGING SYSTEM



No DC output



CONTROL PANEL REMOVAL/INSTALLATION

Remove the front cover (page 5-2).

NOTE:

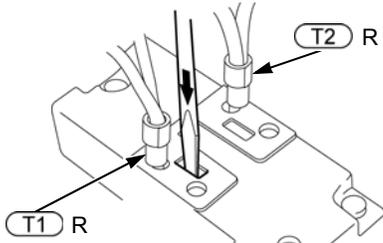
- When installing, route the wire harness properly (page 2-8).

LL1 TYPE shown:

AC OUTPUT TERMINAL

REMOVAL:
Install a small screwdriver or equivalent tool into the groove and pull out the wire.

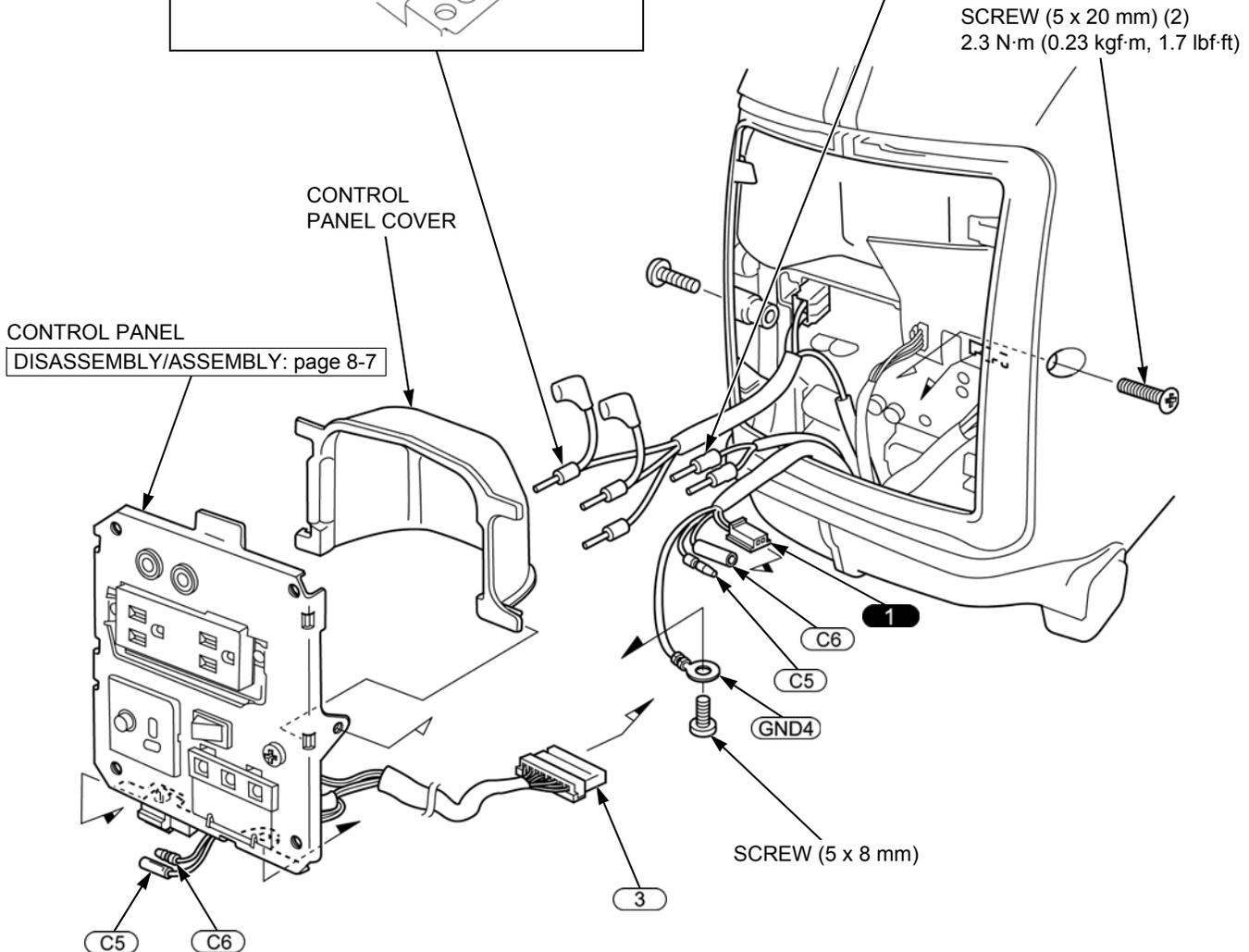
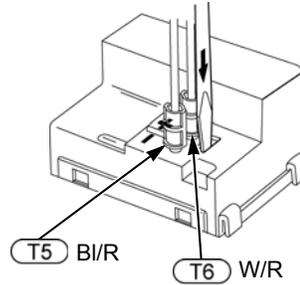
INSTALLATION:
Connect the terminal as shown.



DC OUTPUT TERMINAL

REMOVAL:
Install a small screwdriver or equivalent tool into the groove and pull out the wire.

INSTALLATION:
Connect the terminal as shown.

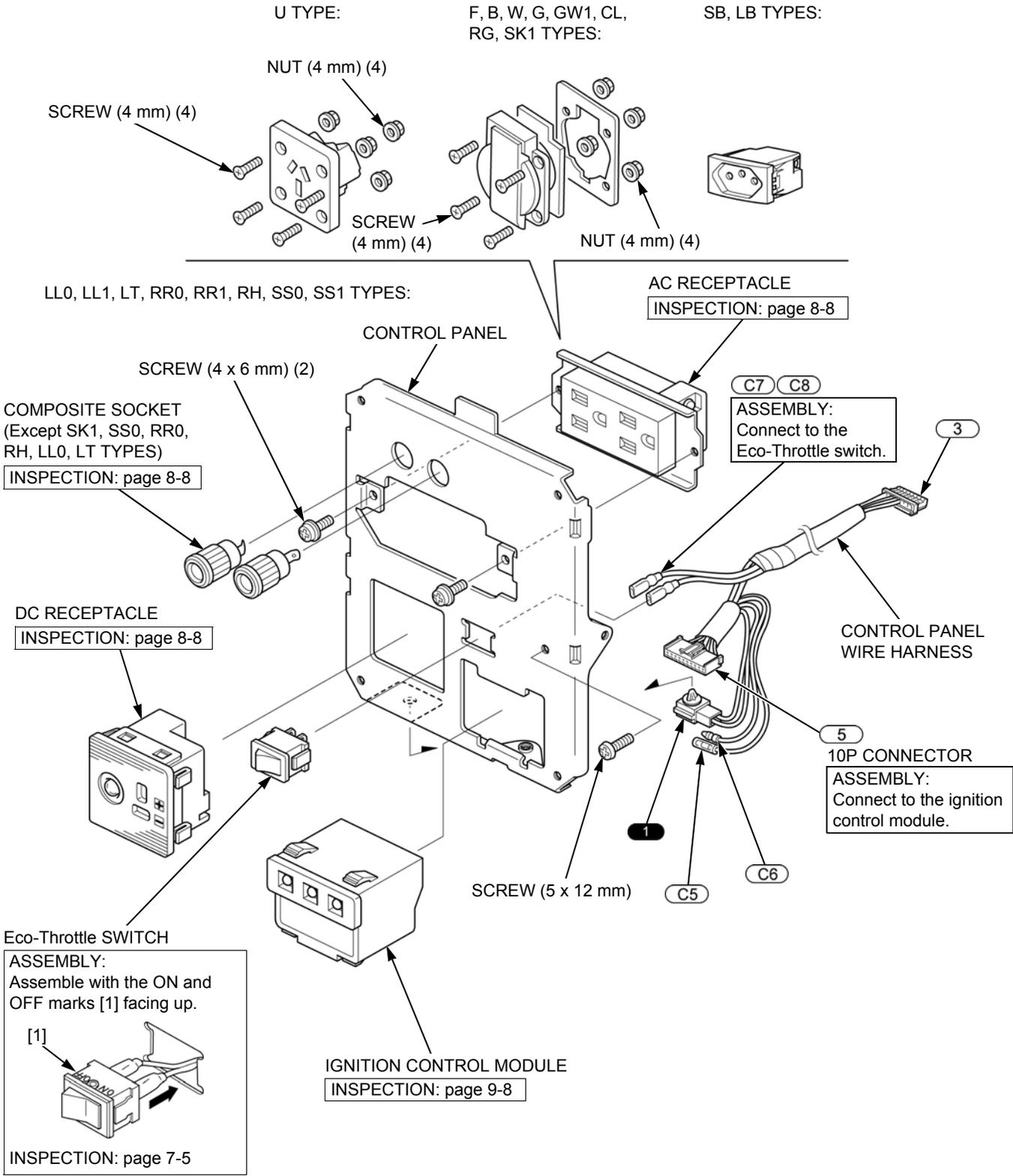


CONTROL PANEL DISASSEMBLY/ASSEMBLY

Remove the control panel (page 8-6)

NOTE:

- When installing, route the wire harness properly (page 2-8).



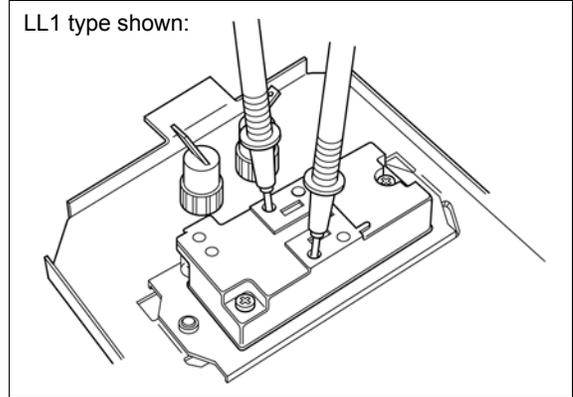
GENERATOR/CHARGING SYSTEM

AC RECEPTACLE INSPECTION

Connect both terminals of the receptacle with a jumper wire to short. There must be continuity between the lead wire terminals.

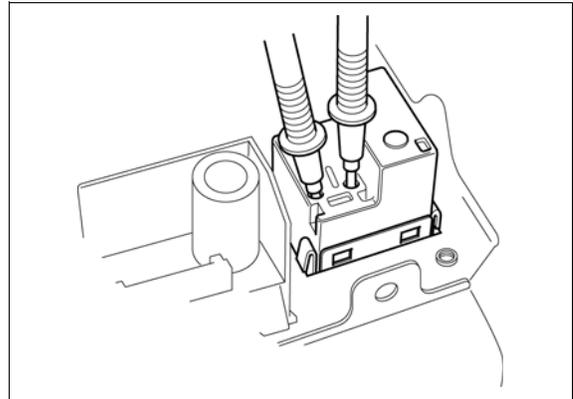
LL0, LL1, LT, RR0, RR1, RH, SS0, SS1 types: There must be continuity between the ground terminal of the receptacle and the receptacle installation fitting.

LL1 type shown:



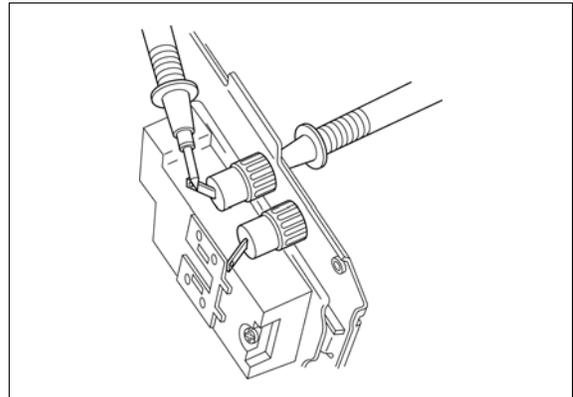
DC RECEPTACLE INSPECTION

Connect both terminals of the receptacle with a jumper wire to short. There must be continuity between the lead wire terminals with the circuit protector ON.



COMPOSITE SOCKET INSPECTION (EXCEPT SK1, SS0, RR0, RH, LL0, LT TYPES)

There must be continuity between the outlet and terminal.

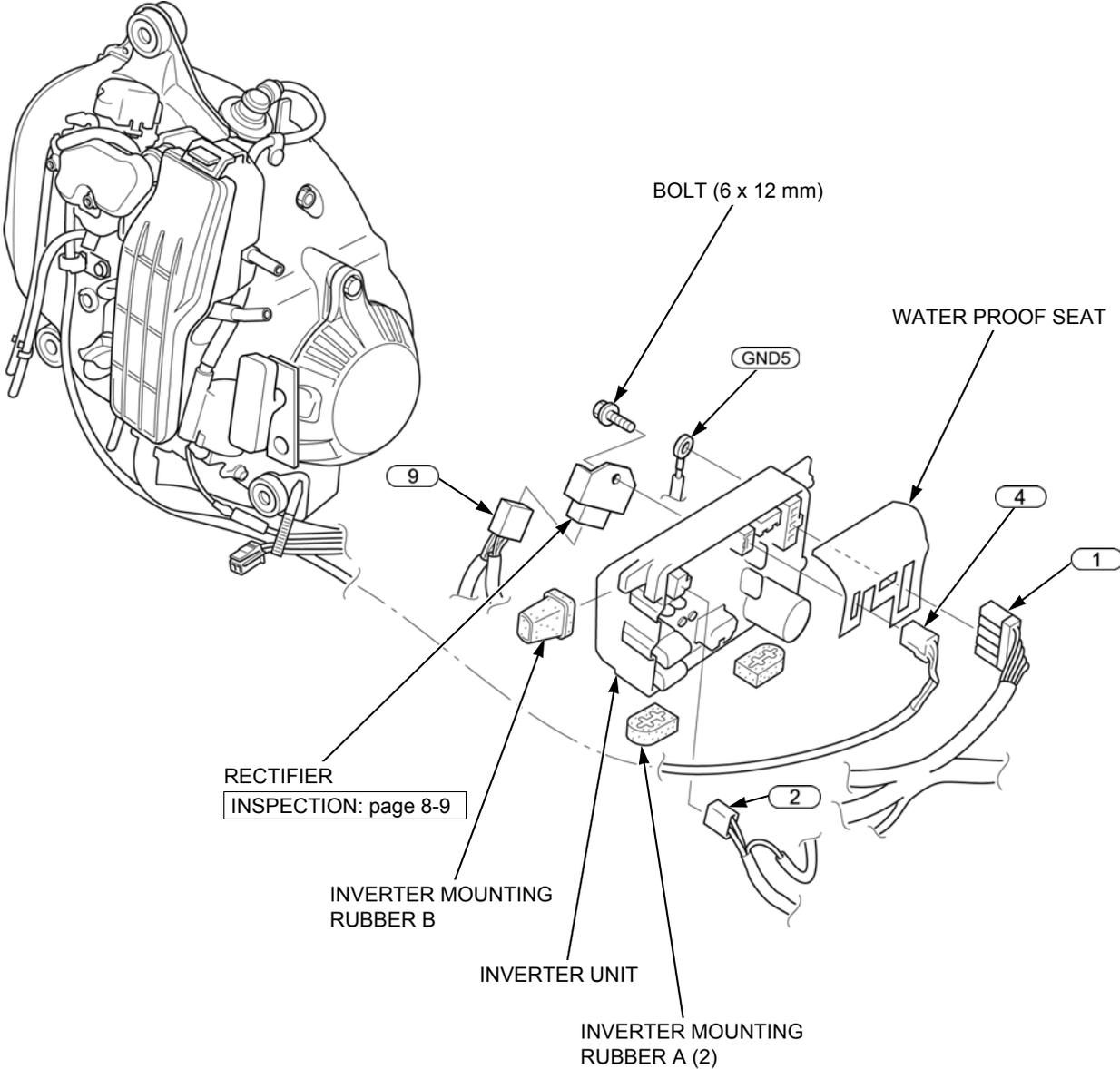


INVERTER UNIT REMOVAL/INSTALLATION

Remove the fuel tank (page 6-3).

NOTE:

- When installing, route the wire harness properly (page 2-8).



RECTIFIER INSPECTION

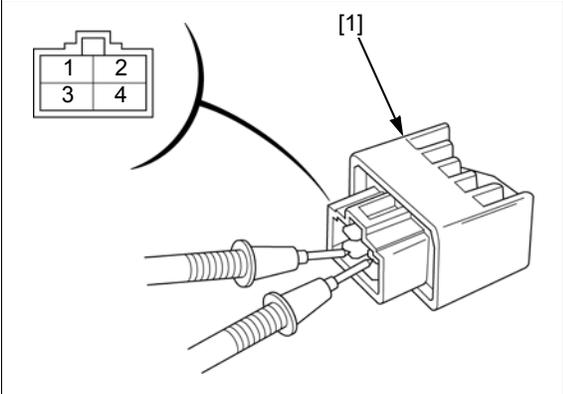
Remove the rectifier (page 8-9)

Check for continuity between the terminals according to the table below.

		Tester probe (+)			
		1	2	3	4
Tester probe (-)	1	-	∞	∞	∞
	2	Continuity	-	Continuity	Continuity
	3	Continuity	∞	-	∞
	4	Continuity	∞	∞	-

NOTE:

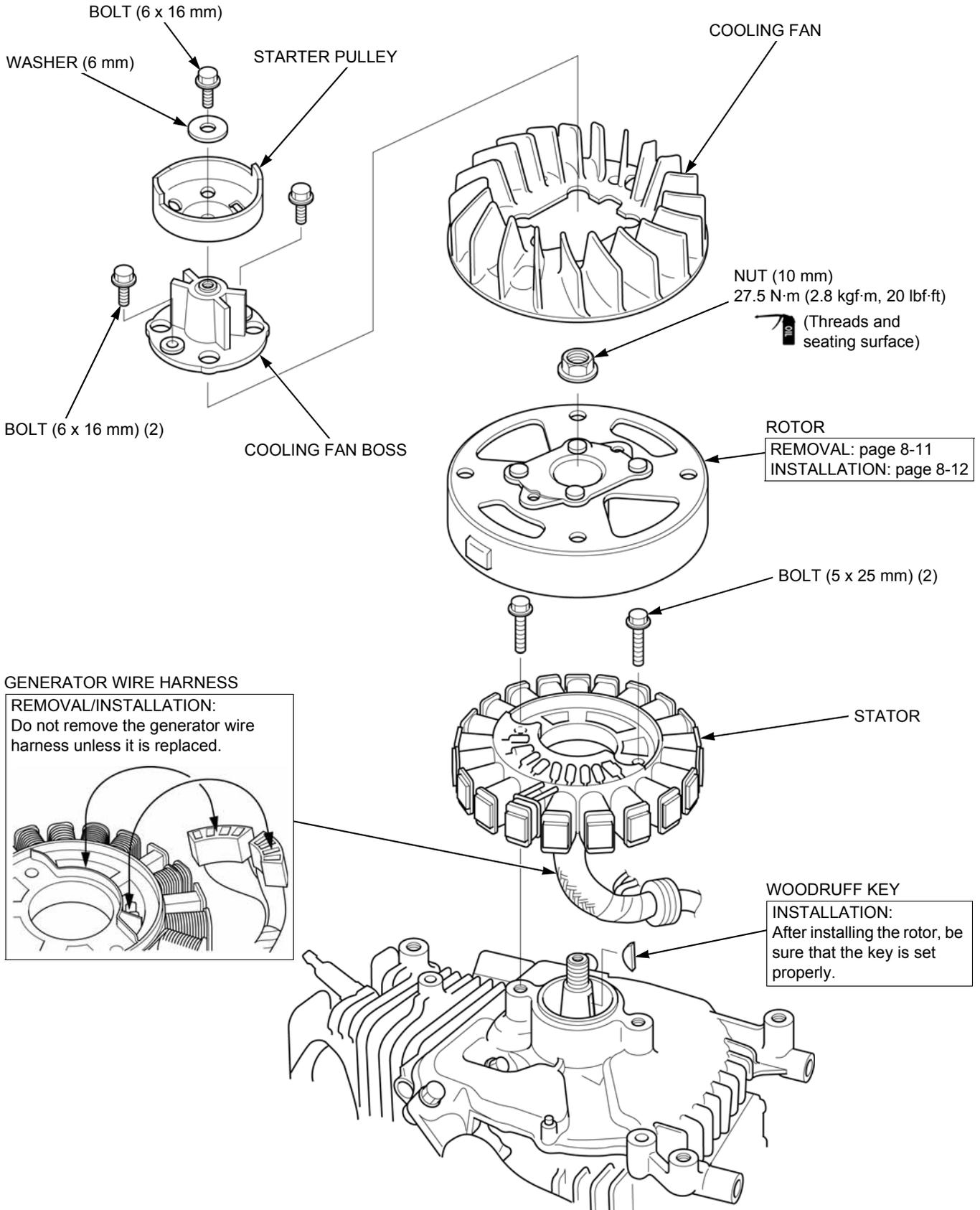
- The polarity is reversed on some testers. Read the tester manufacturer's instructions.



GENERATOR/CHARGING SYSTEM

GENERATOR REMOVAL/INSTALLATION

Remove the shroud (page 13-3).



ROTOR REMOVAL

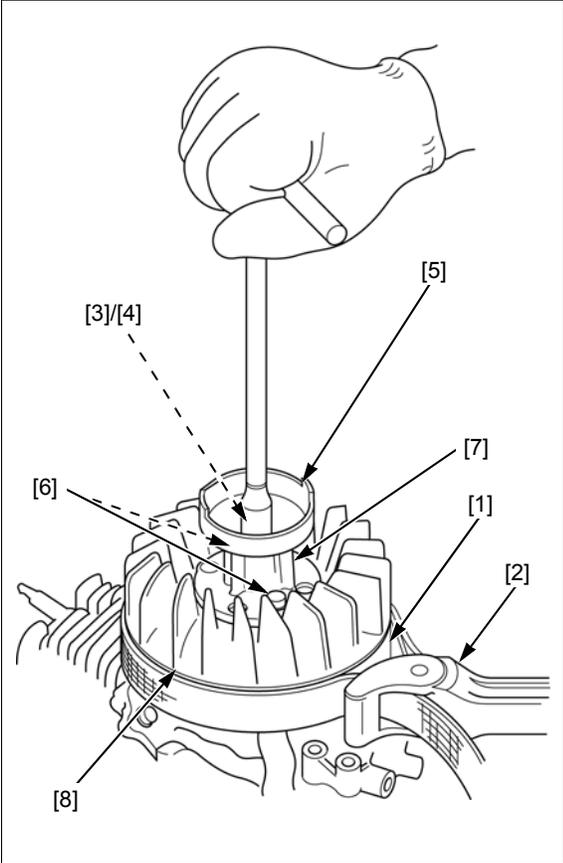
NOTICE

- Do not strike any part of the rotor when removing it. The rotor may be damaged.

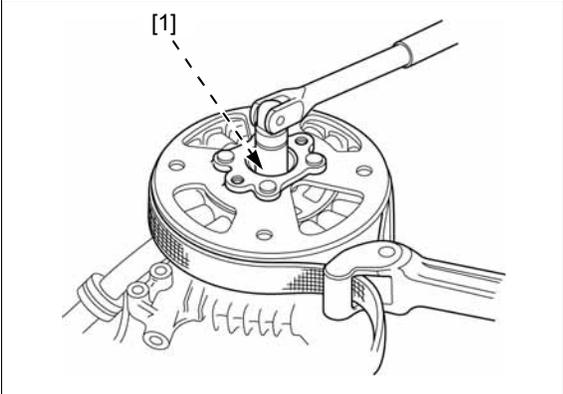
Hold the rotor [1] with a commercially available strap wrench [2].

Remove the following parts:

- Bolt (6 x 16 mm) [3]
- Washer (6 mm) [4]
- Starter pulley [5]
- Two bolts (6 x 16 mm) [6]
- Cooling fan boss [7]
- Cooling fan [8]

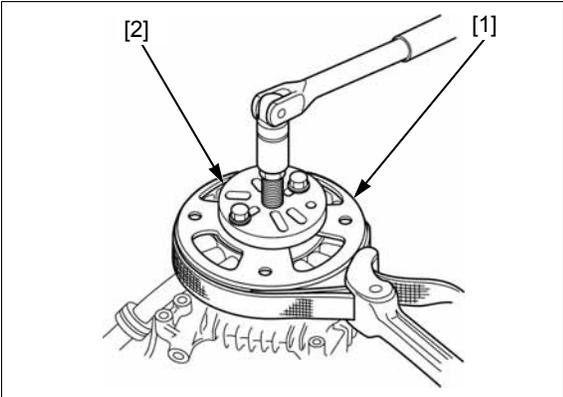


Remove the nut (10 mm) [1].



Remove the rotor [1] using the special tool.

TOOL:
FLYWHEEL PULLER [2] 07935-8050004



GENERATOR/CHARGING SYSTEM

ROTOR INSTALLATION

Clean any oil from the tapered portions of the rotor and crankshaft.

Check for any foreign material attracted to the inside of the rotor before installation.

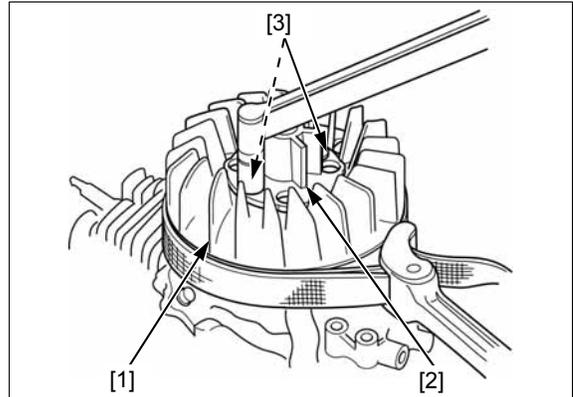
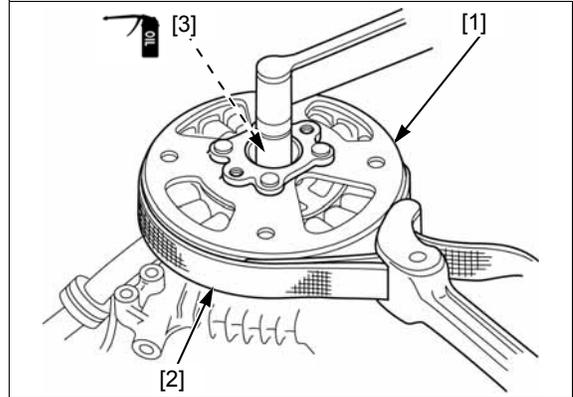
Install the rotor [1] by aligning the key slot with the woodruff key on the crankshaft.

Hold the rotor with a commercially available strap wrench [2].

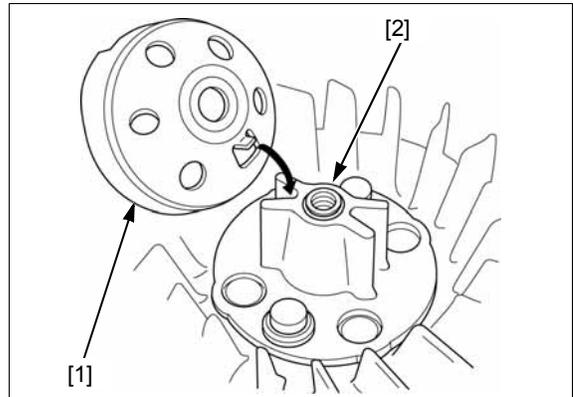
Apply a light coat of engine oil to the threads and seating surface of the rotor nut (10 mm) [3], and tighten it to the specified torque.

TORQUE: 27.5 N·m (2.8 kgf·m, 20 lbf·ft)

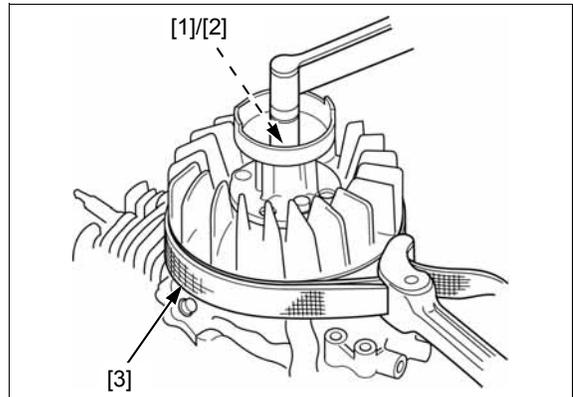
Install the cooling fan [1] and cooling fan boss [2], and tighten the two bolts (6 x 16 mm) [3].



Align the locking tab of the starter pulley [1] with the groove in the cooling fan boss [2], and install the pulley.



Install the washer (6 mm) [1] and bolt (6 x 16 mm) [2].
Remove the strap wrench [3].



GENERATOR INSPECTION

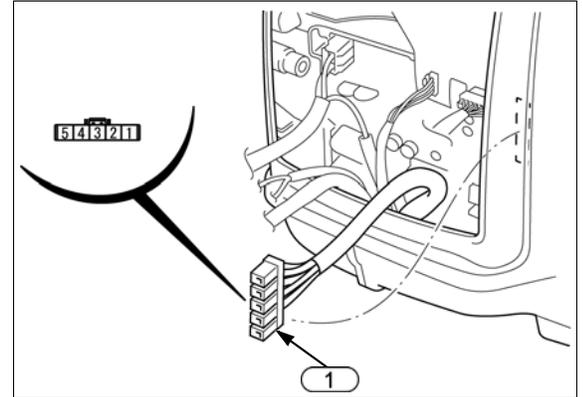
MAIN WINDING

Remove the control panel (page 8-6).

Disconnect the generator wire harness 5P connector (1) from the inverter unit.

Measure the resistance between the terminals of the connector (1) according to the table below.

Terminal number	Resistance
1 - 2	1.4 - 2.1 Ω
1 - 3	1.4 - 2.1 Ω
2 - 3	1.4 - 2.1 Ω



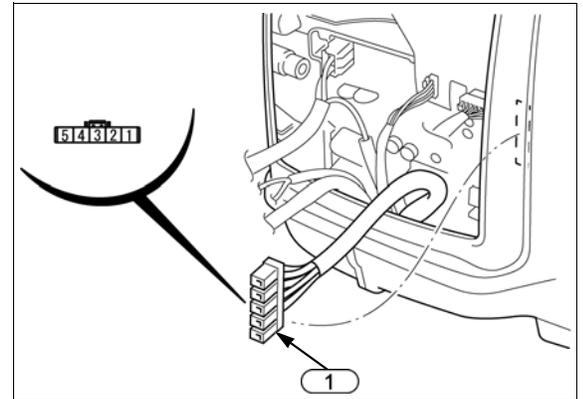
SUB WINDING

Remove the control panel (page 8-6).

Disconnect the generator wire harness 5P connector (1) from the inverter unit.

Measure the resistance between the terminals of the connector (1) according to the table below.

Terminal number	Resistance
4 - 5	0.3 - 0.5 Ω

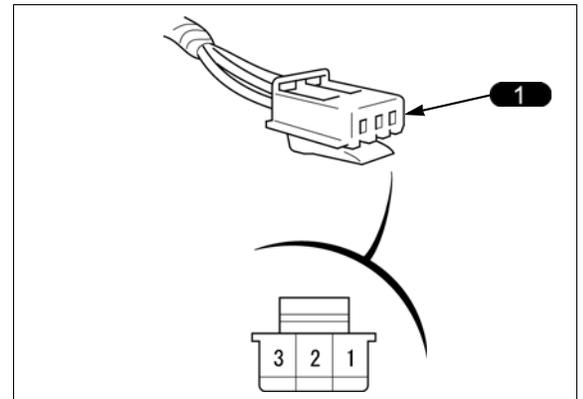


EXCITER WINDING

Remove the control panel (page 8-6).

Measure the resistance between the terminals of the connector (1) according to the table below.

Terminal number	Resistance
1 - 3	0.5 - 0.9 Ω



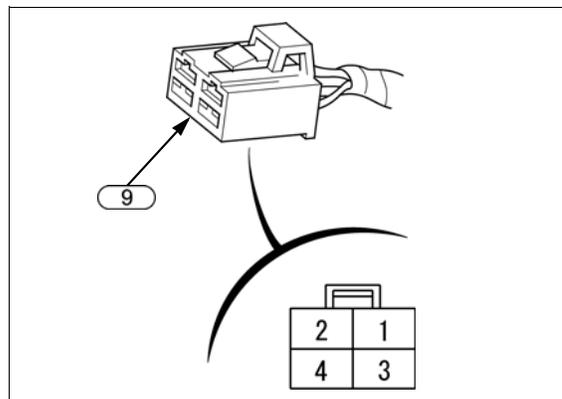
GENERATOR/CHARGING SYSTEM

DC WINDING

Remove the inverter unit (page 8-9).

Measure the resistance between the terminals of the connector 9 according to the table below.

Terminal number	Resistance
3 - 4	0.1 - 0.2 Ω

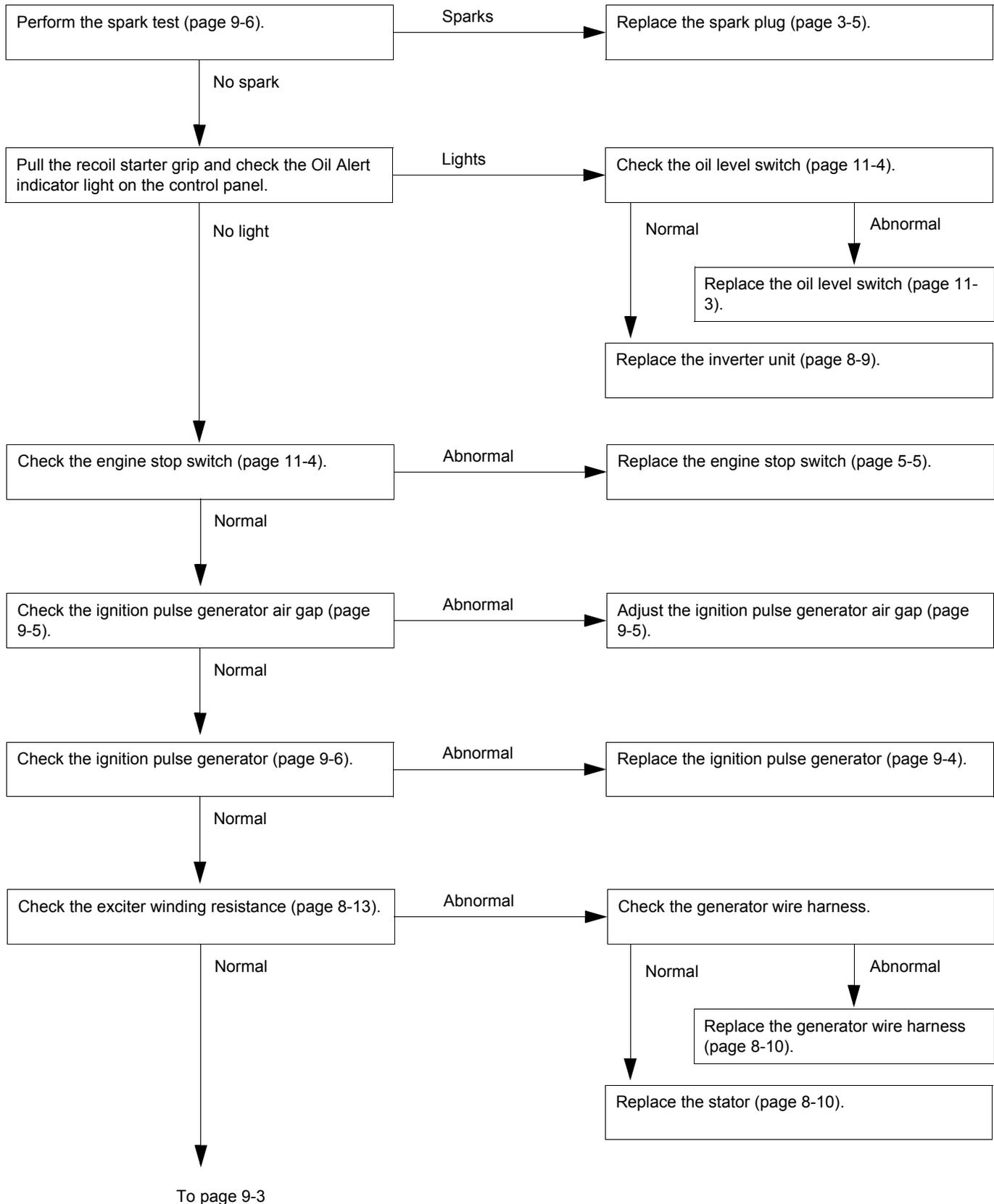


9. IGNITION SYSTEM

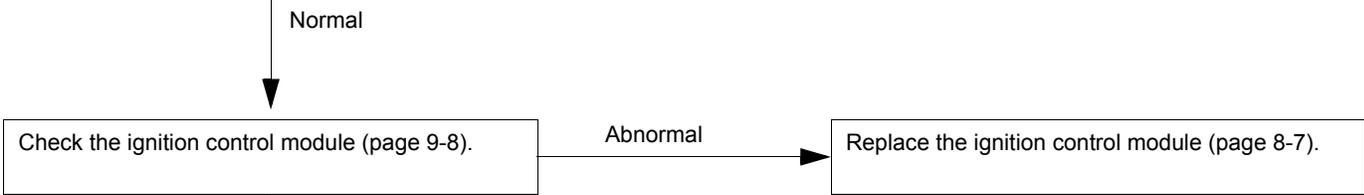
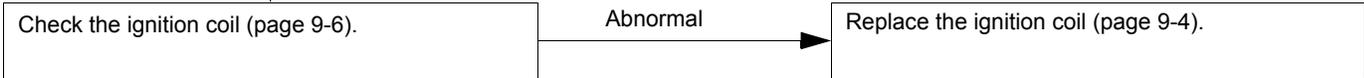
IGNITION SYSTEM TROUBLESHOOTING.....	9-2	IGNITION PULSE GENERATOR INSPECTION.....	9-6
IGNITION COIL/IGNITION PULSE GENERATOR/FAN COVER REMOVAL/INSTALLATION.....	9-4	IGNITION COIL INSPECTION	9-6
SPARK TEST	9-6	IGNITION CONTROL MODULE INSPECTION.....	9-8

IGNITION SYSTEM TROUBLESHOOTING

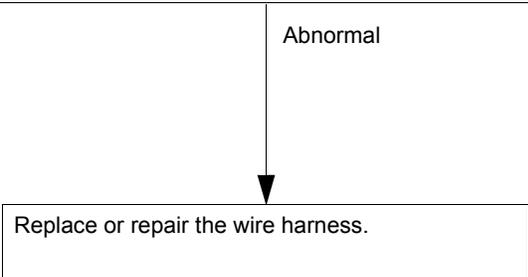
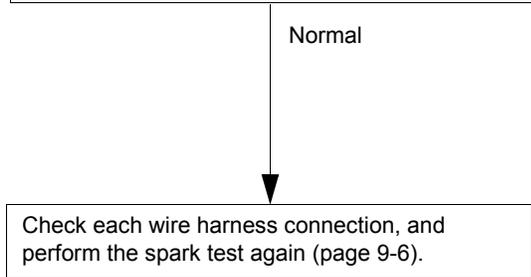
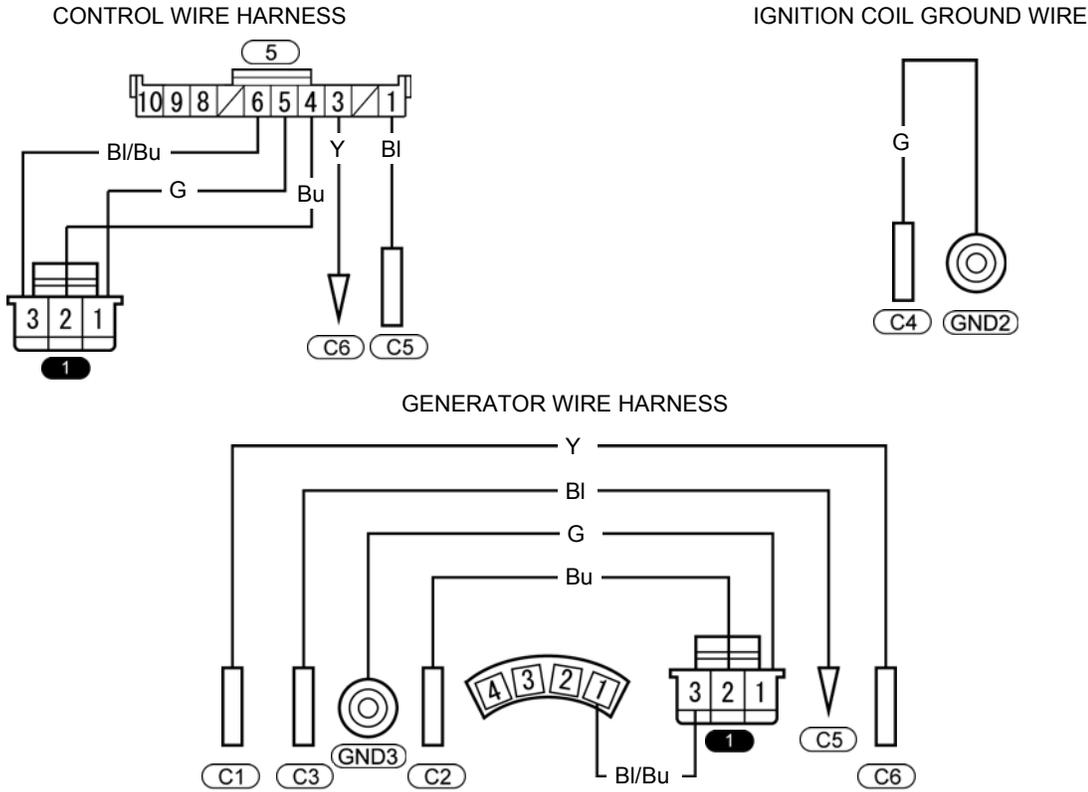
Engine does not start with sufficient oil in the crankcase



From page 9-2



Check the control wire harness, generator wire harness and ignition coil ground wire.



IGNITION SYSTEM

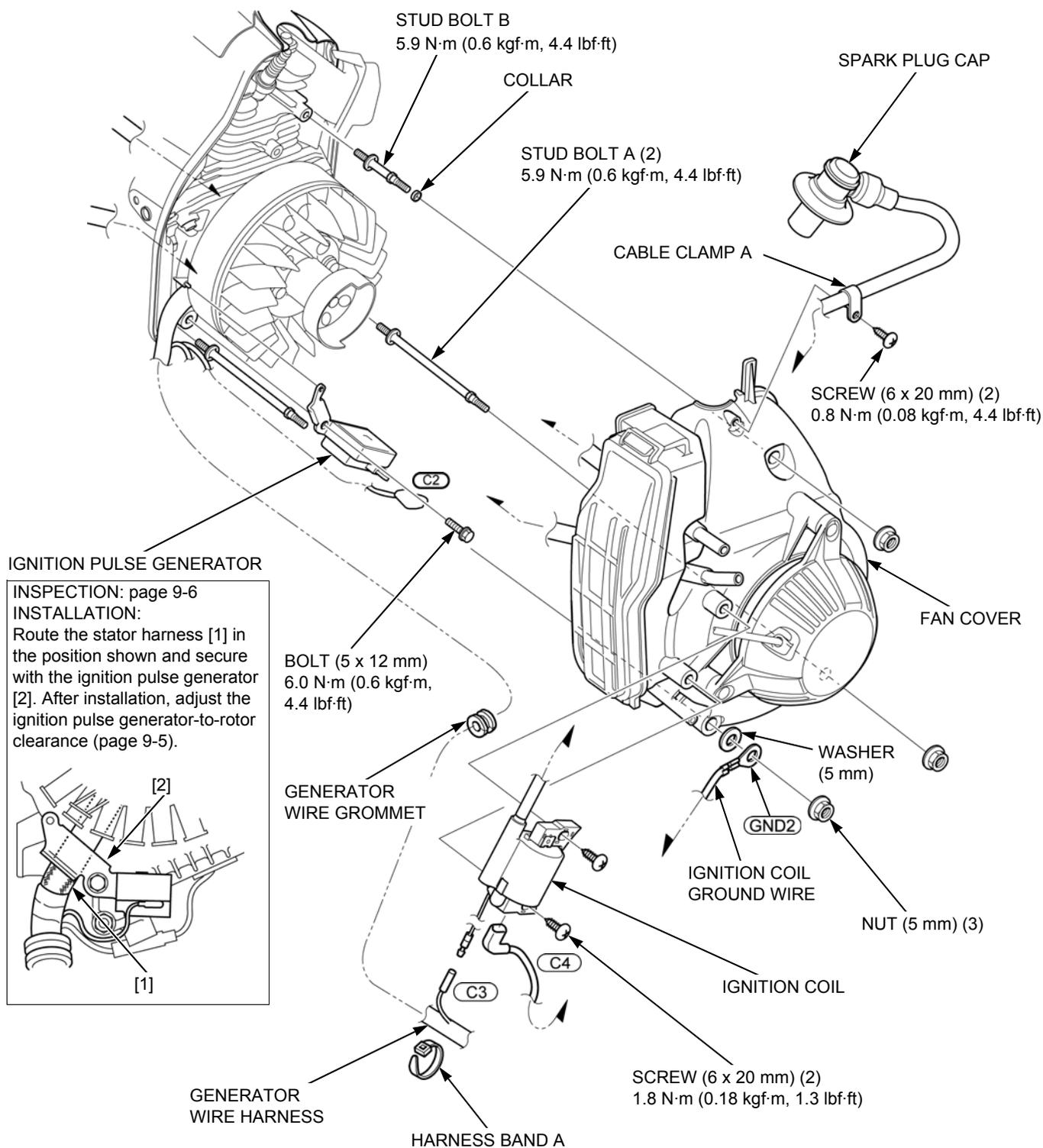
IGNITION COIL/IGNITION PULSE GENERATOR/FAN COVER REMOVAL/INSTALLATION

Remove the following:

- Air intake joint (page 6-5)
- Inverter unit (page 8-9)

NOTE:

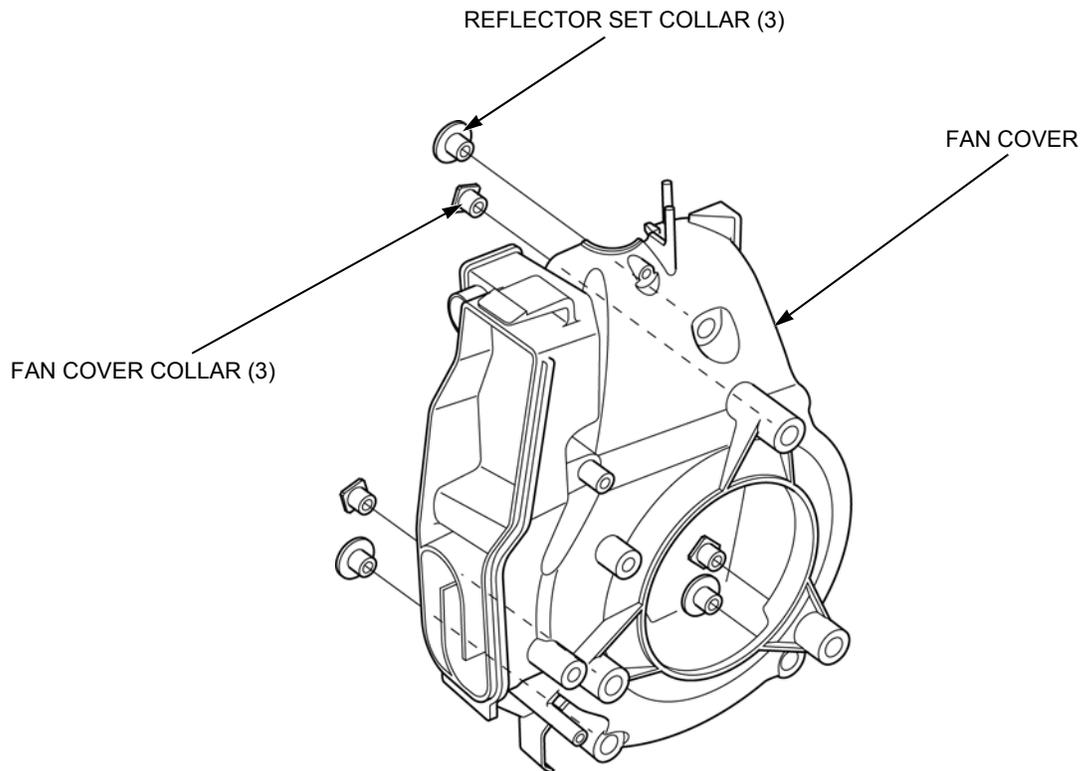
- When installing, route the tube properly (page 2-17).



FAN COVER DISASSEMBLY/ ASSEMBLY

Remove the following:

- Air cleaner (page 6-4)
- Recoil starter (page 10-2)



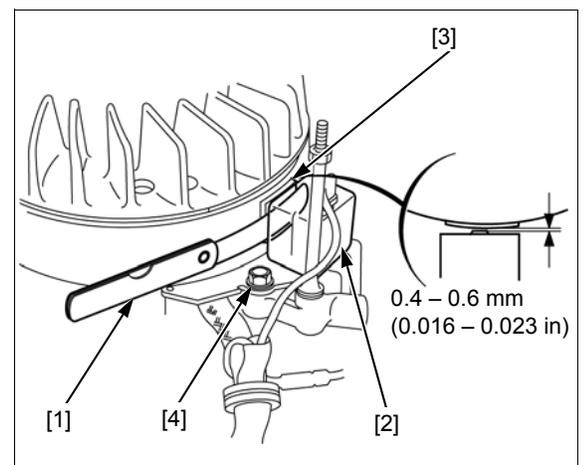
IGNITION PULSE GENERATOR AIR GAP ADJUSTMENT

Insert a feeler gauge [1] between the ignition pulse generator [2] and the rotor projection [3].

IGNITION PULSE GENERATOR AIR GAP:
0.4 – 0.6 mm (0.016 – 0.023 in)

If the air gap is out of specification, loosen the bolts (5 x 12 mm) [4] and push the ignition pulse generator firmly toward the rotor and tighten the bolts to the specified torque.

TORQUE: 6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)



IGNITION SYSTEM

SPARK TEST

⚠ CAUTION

Never hold the high-tension cord with wet hands while performing this test.

Check for the following before conducting the spark test.

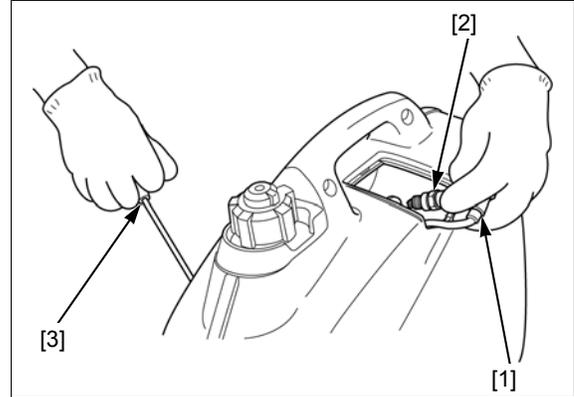
- Faulty spark plug
- Loose spark plug cap
- Water in the spark plug cap (leaking ignition coil secondary voltage)

Remove the plug cover (page 3-5), and disconnect the spark plug cap [1].

Connect a known-good spark plug [2] to the spark plug cap and ground the spark plug to the frame.

Turn the engine stop switch to the ON position.

Crank the engine by pulling the recoil starter and check whether sparks jump across the electrodes.



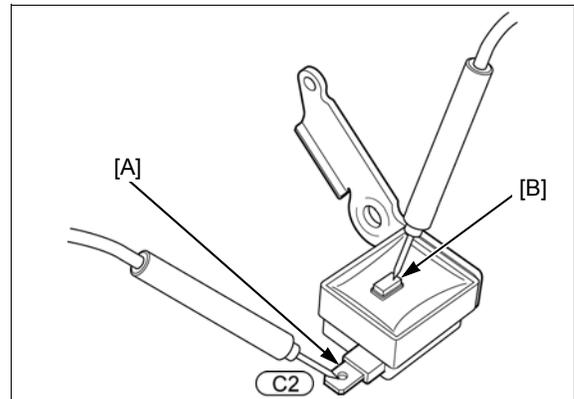
IGNITION PULSE GENERATOR INSPECTION

Remove the ignition pulse generator (page 9-4).

Measure the resistance between the terminals A and B shown.

RESISTANCE: 28 – 36 Ω

If measured resistance is out of specification, replace the ignition pulse generator.



IGNITION COIL INSPECTION

PRIMARY SIDE

Remove the ignition coil (page 9-4).

Measure the resistance of the primary coil by attaching one ohmmeter probe to the ignition coil wire terminal

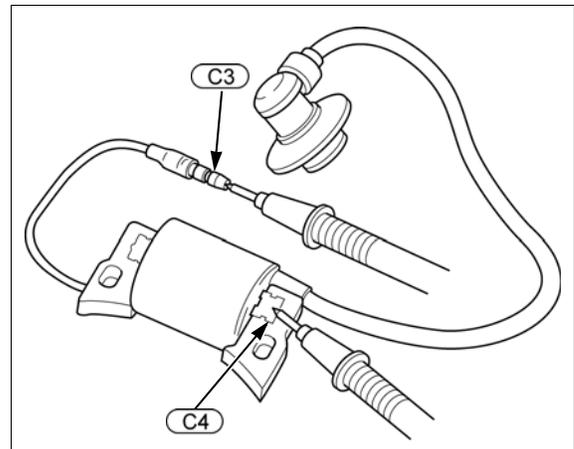
C3

and the other to the ignition coil ground terminal

C4.

RESISTANCE: 0.7 – 1.1 Ω

If measured resistance is out of specification, replace the ignition coil.

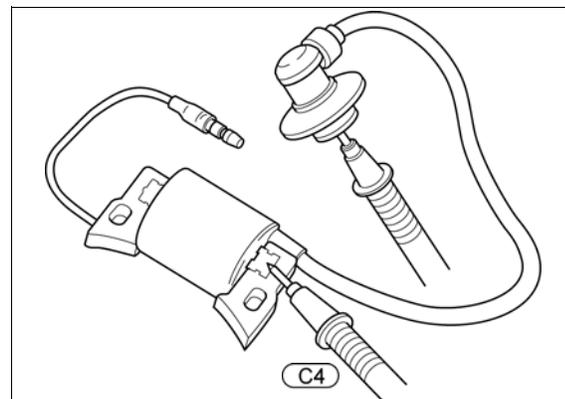


SECONDARY SIDE

Measure the resistance of the secondary coil by attaching one ohmmeter probe to the spark plug cap and the other to the ignition coil ground terminal (C4).

RESISTANCE: 12 – 21 k Ω

If measured resistance is out of specification, replace the ignition coil.



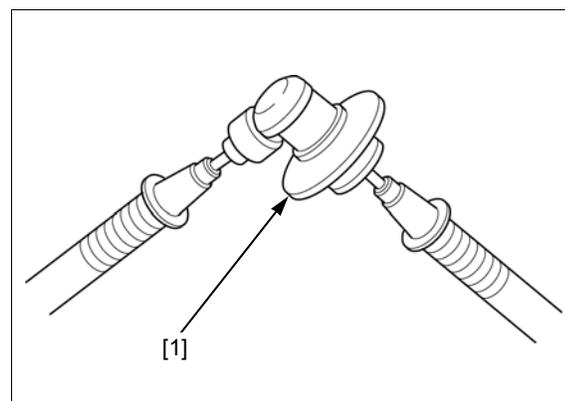
SPARK PLUG CAP

Remove the spark plug cap [1].

Measure the resistance of the spark plug cap by attaching one ohmmeter probe as shown.

RESISTANCE: 7.5 – 12.5 k Ω

If measured resistance is out of specification, replace the spark plug cap.



IGNITION SYSTEM

IGNITION CONTROL MODULE INSPECTION

Do not disconnect the connector and terminal during inspection.

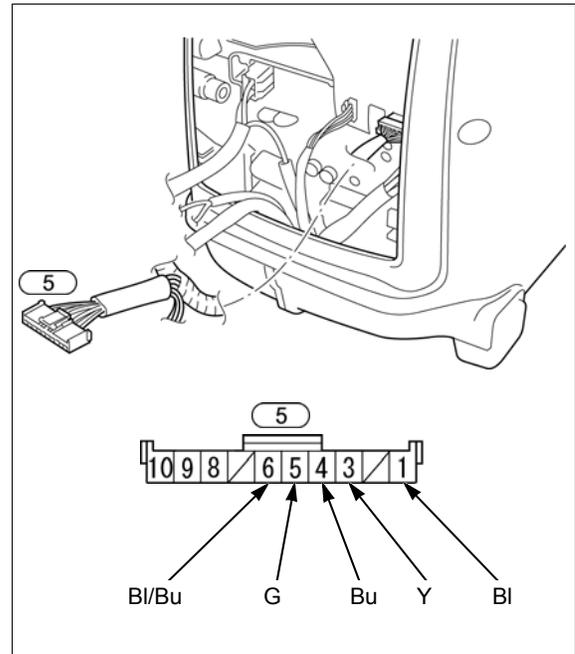
Remove the control panel (page 8-6).

Disconnect the 10P connector (5) from the ignition control module.

Turn the engine stop switch to the ON position.

Test the wire harness according to the table below.

If it is normal, replace the ignition control module.



Terminal number	Circuit	Test and result
1	Primary coil	Measure the resistance to engine ground. Resistance: 0.7 – 1.1 Ω
3	Oil level switch	Check for continuity to engine ground. There should be no continuity with correct oil level.
4	Ignition pulse generator	Measure the resistance to engine ground. Resistance: 28 – 36 Ω
5	Ground	Check for continuity to engine ground. There should be continuity.
6	Exciter winding	Measure the resistance to engine ground. Resistance: 0.5 – 0.9 Ω

10. STARTING SYSTEM

RECOIL STARTER REMOVAL/
INSTALLATION10-2

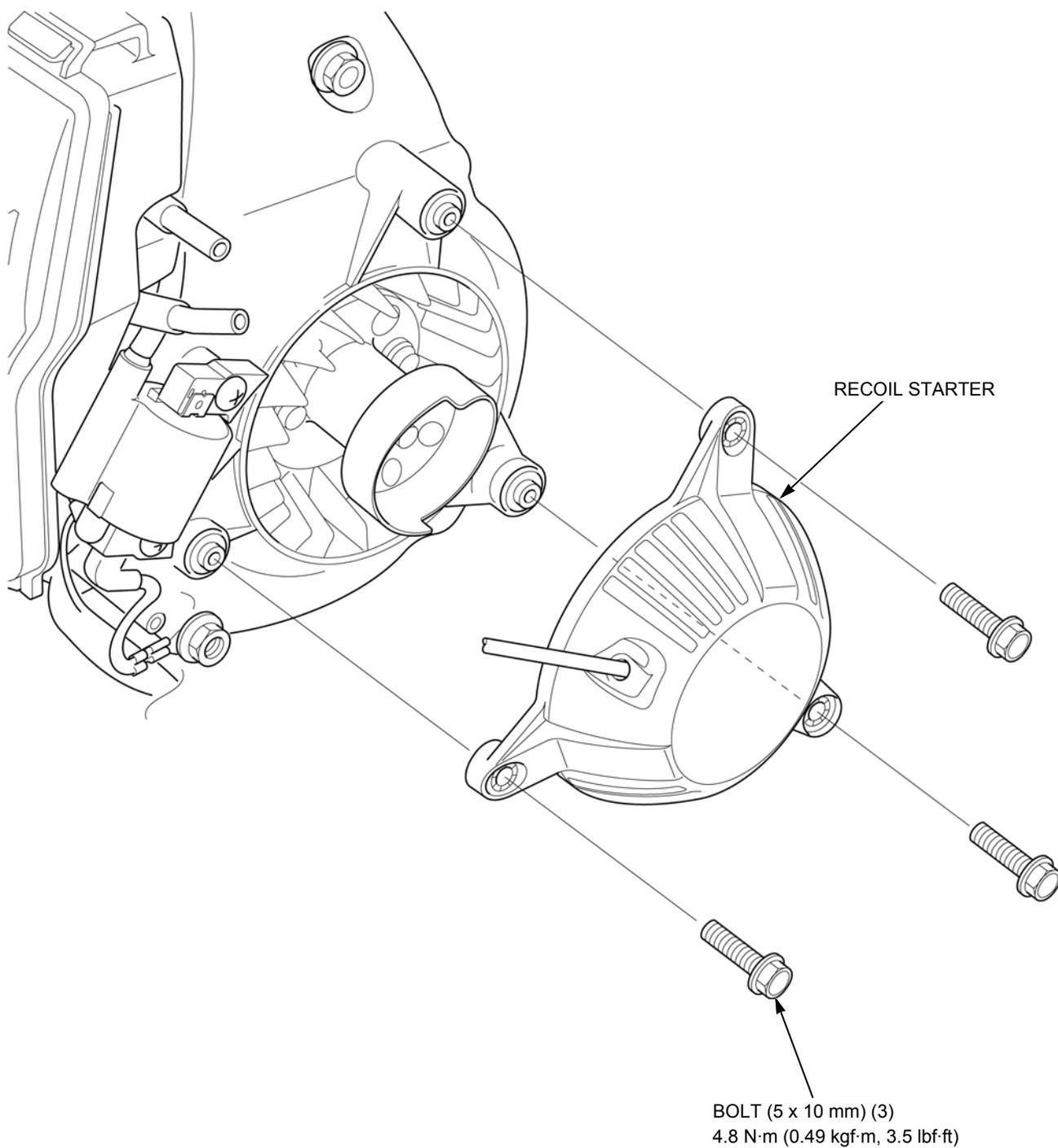
RECOIL STARTER DISASSEMBLY/
ASSEMBLY 10-3

RECOIL STARTER INSPECTION 10-6

STARTING SYSTEM

RECOIL STARTER REMOVAL/INSTALLATION

Remove the inverter unit (page 8-9).



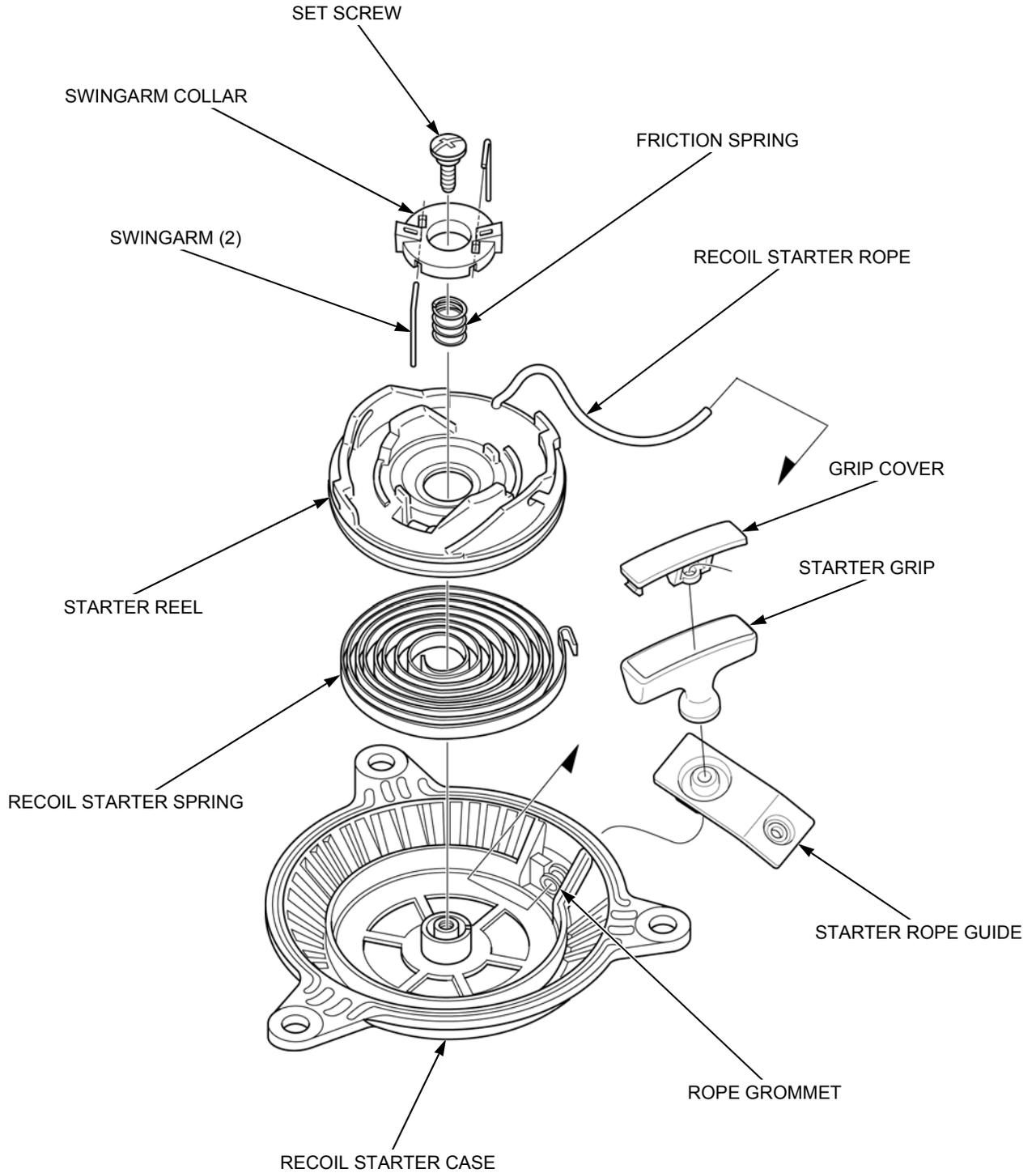
RECOIL STARTER DISASSEMBLY/ASSEMBLY

⚠ CAUTION

- Wear gloves and eye protection.
- During disassembly, take care not to allow the return spring to come out from the spring cover.

DISASSEMBLY

Remove the recoil starter (page 10-2).



STARTING SYSTEM

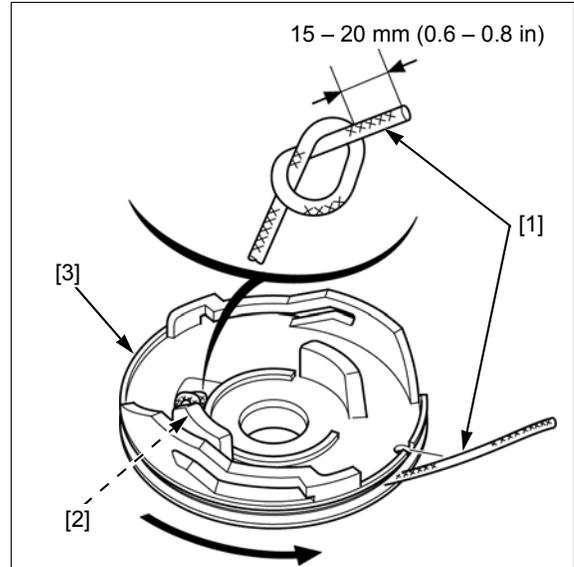
ASSEMBLY

⚠ CAUTION

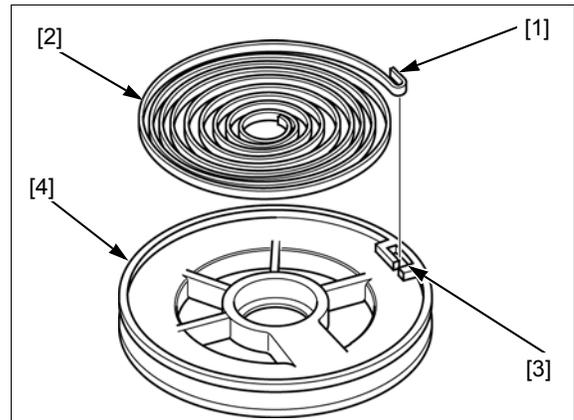
- Wear gloves and eye protection.
- During disassembly, take care not to allow the return spring to come out from the spring cover.

Pass the starter rope [1] through the rope hole [2] in the reel and make an overhand knot at the rope end.

Wind the rope around the recoil starter reel [3] in the direction of the arrow.

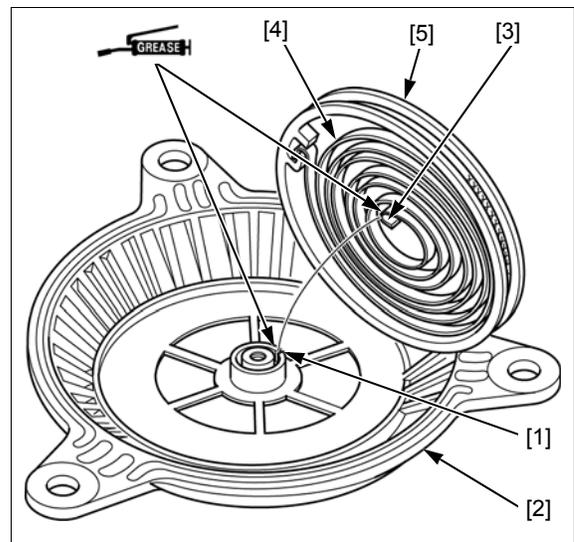


Set the hook [1] at the outer end of the recoil starter spring [2] in the groove [3] in the starter reel [4].

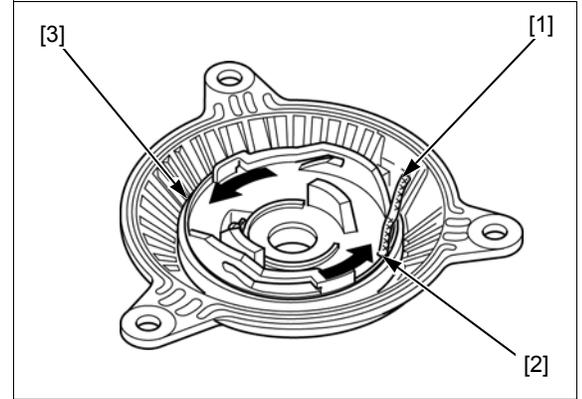


Apply grease to the groove [1] of the recoil starter case [2] and inner end [3] of the recoil starter spring [4].

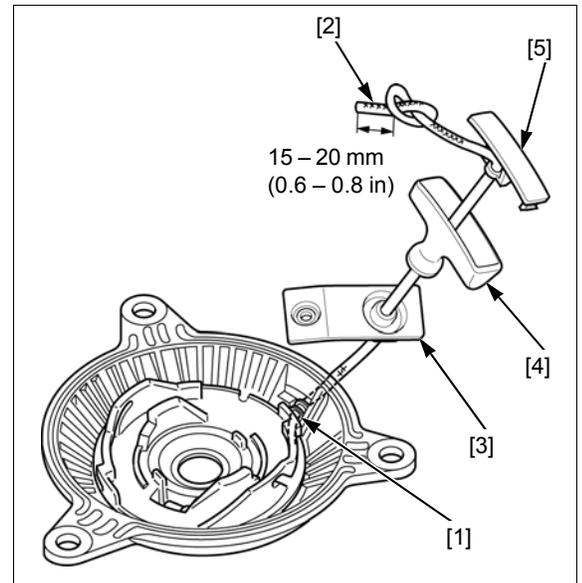
Align the hook at the inner end of the recoil starter spring with the groove in the case so that the hook sets in the groove, and install the reel [5] in the case.



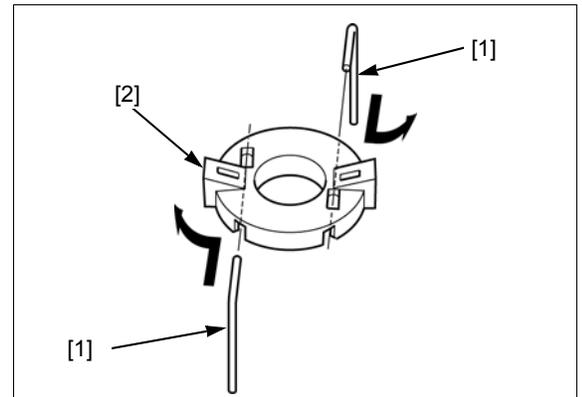
Pass the starter rope [1] through the cutout [2] in the starter reel [3], and turn the starter reel approximately 3 turns in the direction of the arrows to preload the spring.



Make sure that the rope grommet [1] is in place.
Pass the rope [2] through the grommet, starter rope guide [3], starter grip [4] and grip cover [5].
Make an overhand knot at the rope end.



Install the swingarms [1] into the collar [2] as shown.



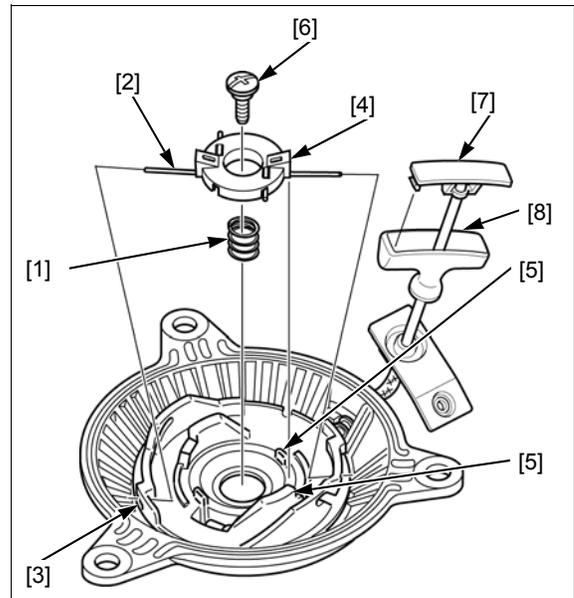
STARTING SYSTEM

Install the friction spring [1].

Insert the swingarms [2] into the grooves [3] in the starter reel, and set the collar so the projections [4] are positioned between the projections [5] of the starter reel.

Install the set screw [6] and tighten it.

Install the grip cover [7] into the starter grip [8].

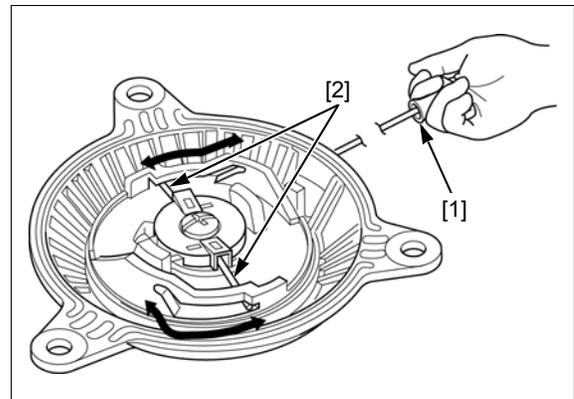


RECOIL STARTER INSPECTION

RECOIL STARTER OPERATION

Remove the recoil starter (page 10-2).

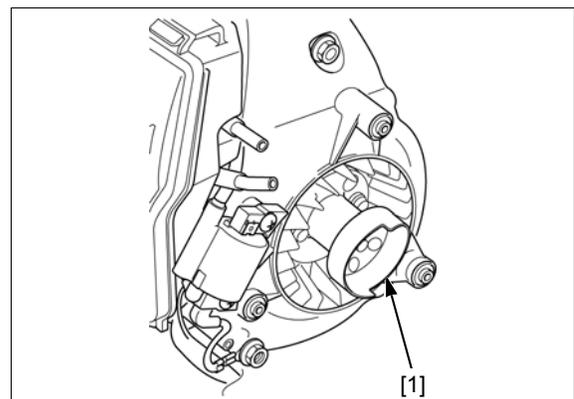
Pull the starter grip [1] several times and check that the swingarms [2] operate properly.



STARTER PULLEY

Remove the recoil starter (page 10-2).

Inspect the starter pulley [1] for deformation and the swing arm contacting areas for wear.



11. OTHER ELECTRICAL

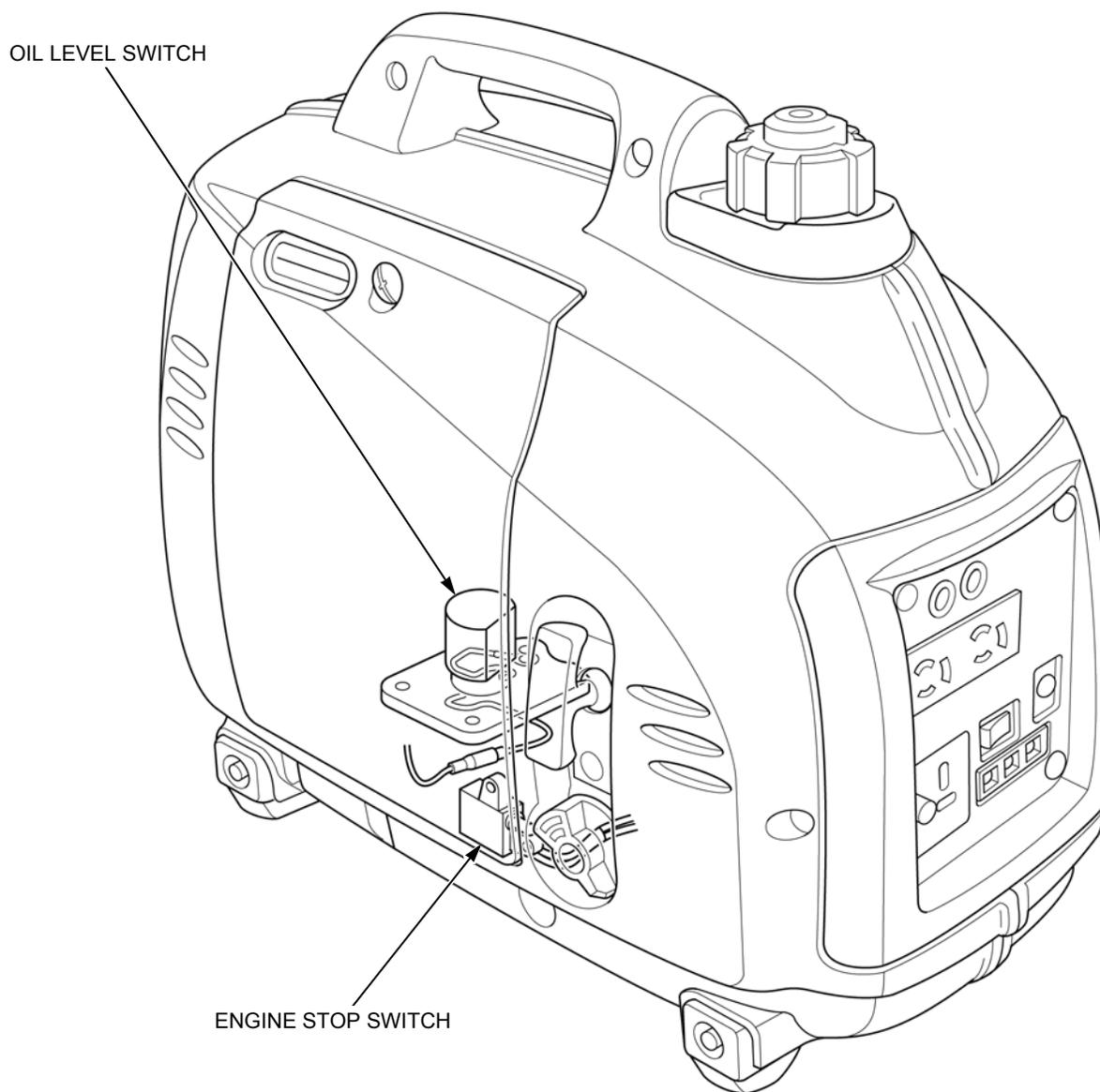
COMPONENT LOCATION11-2

OIL LEVEL SWITCH REMOVAL/
INSTALLATION.....11-3

OIL LEVEL SWITCH INSPECTION 11-4

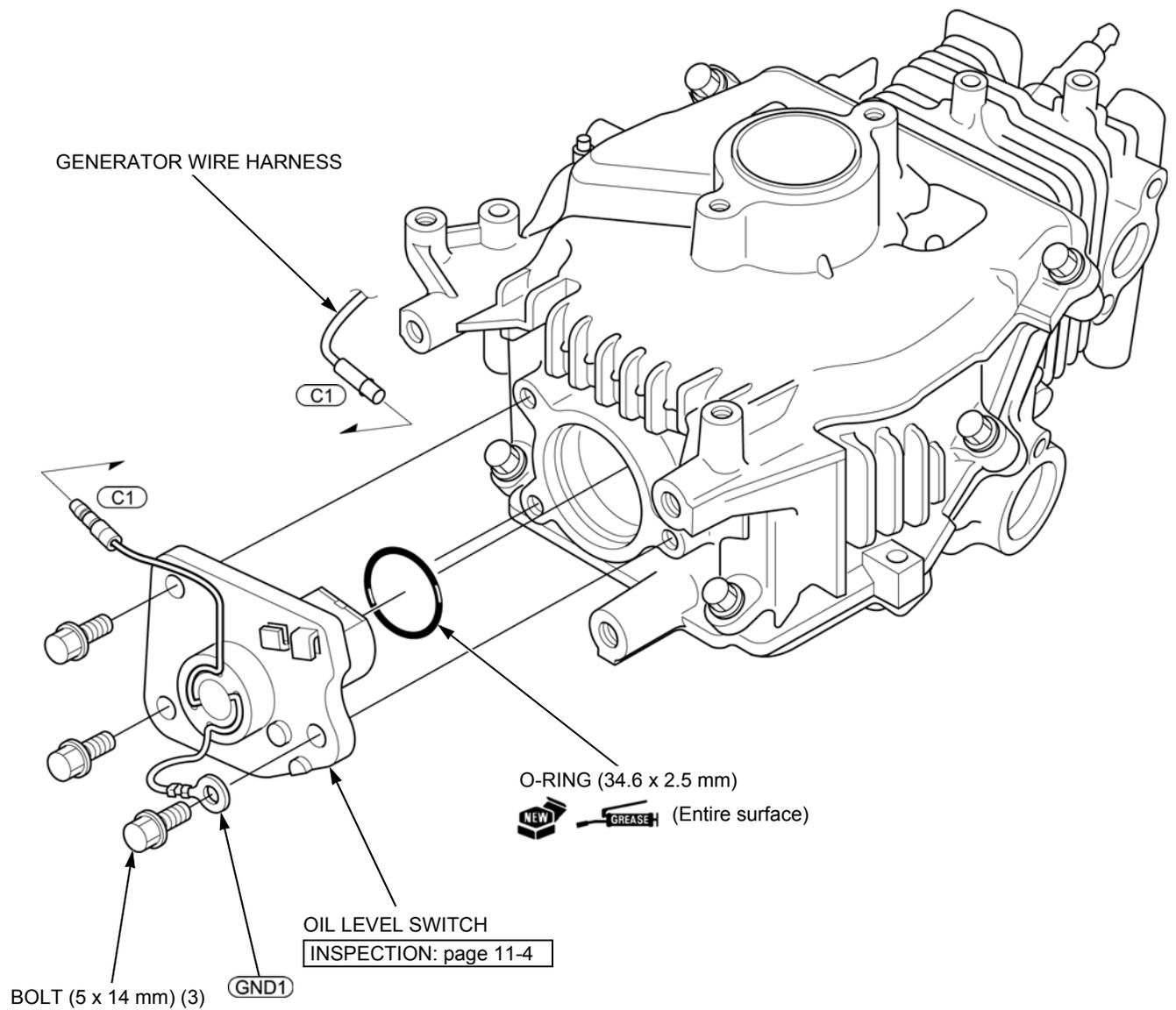
ENGINE STOP SWITCH INSPECTION 11-4

OTHER ELECTRICAL
COMPONENT LOCATION



OIL LEVEL SWITCH REMOVAL/INSTALLATION

Remove the shroud (page 13-3).



OIL LEVEL SWITCH INSPECTION

Remove the oil level switch (page 11-3).

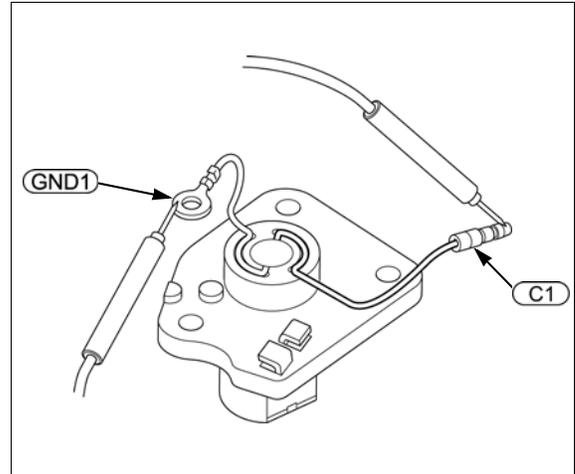
Check continuity between the oil level switch wire connector (C1) and ground terminal (GND1).

The oil level switch is normal if there is no continuity with the switch set upside down.

There must be continuity between the wires with the switch set right side up.

Suspend the switch in a container filled with oil and check the float operation.

The switch is normal if there is continuity between the wires initially, and no continuity when the switch is immersed in the oil.



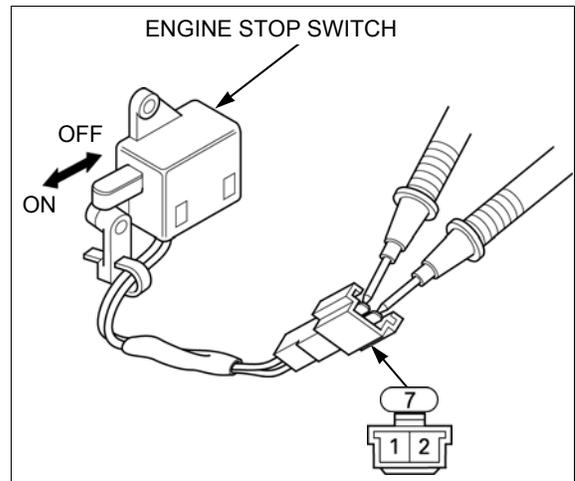
ENGINE STOP SWITCH INSPECTION

Remove the maintenance cover (page 5-2).

Disconnect the engine stop switch 2P connector (7).

Check the continuity between the terminals at each switch position.

Terminal	Switch position	
	ON	OFF
1 - 2	No continuity	Continuity



MUFFLER REMOVAL/INSTALLATION.....12-2

MUFFLER

MUFFLER REMOVAL/INSTALLATION

⚠ CAUTION

The muffler becomes very hot during operation and remains hot for a while after stopping the engine.

Be careful not to touch the muffler while it is hot. Allow it to cool before proceeding.

Remove the muffler protector (page 5-2).

MUFFLER

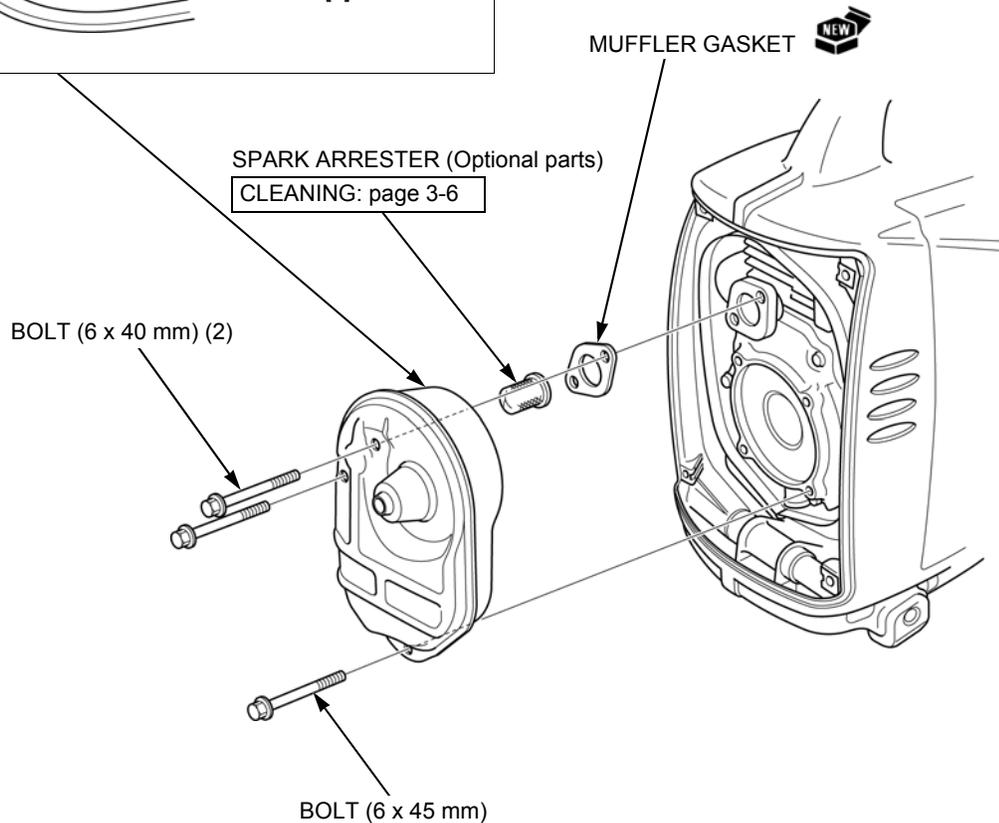
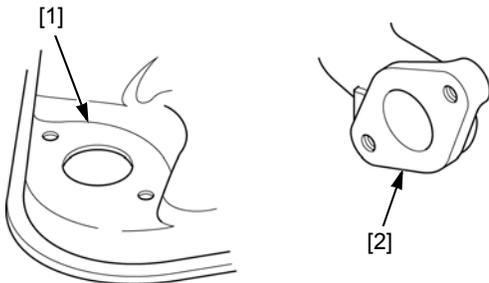
INSTALLATION:

Remove the carbon deposits by lightly tapping the outer flange with a plastic hammer before installation.

Be careful not to damage the muffler seal part [1].

If the muffler seal part is damaged, replace the muffler.

Check the exhaust manifold mating surface [2].



13. GENERATOR/ENGINE REMOVAL/INSTALLATION

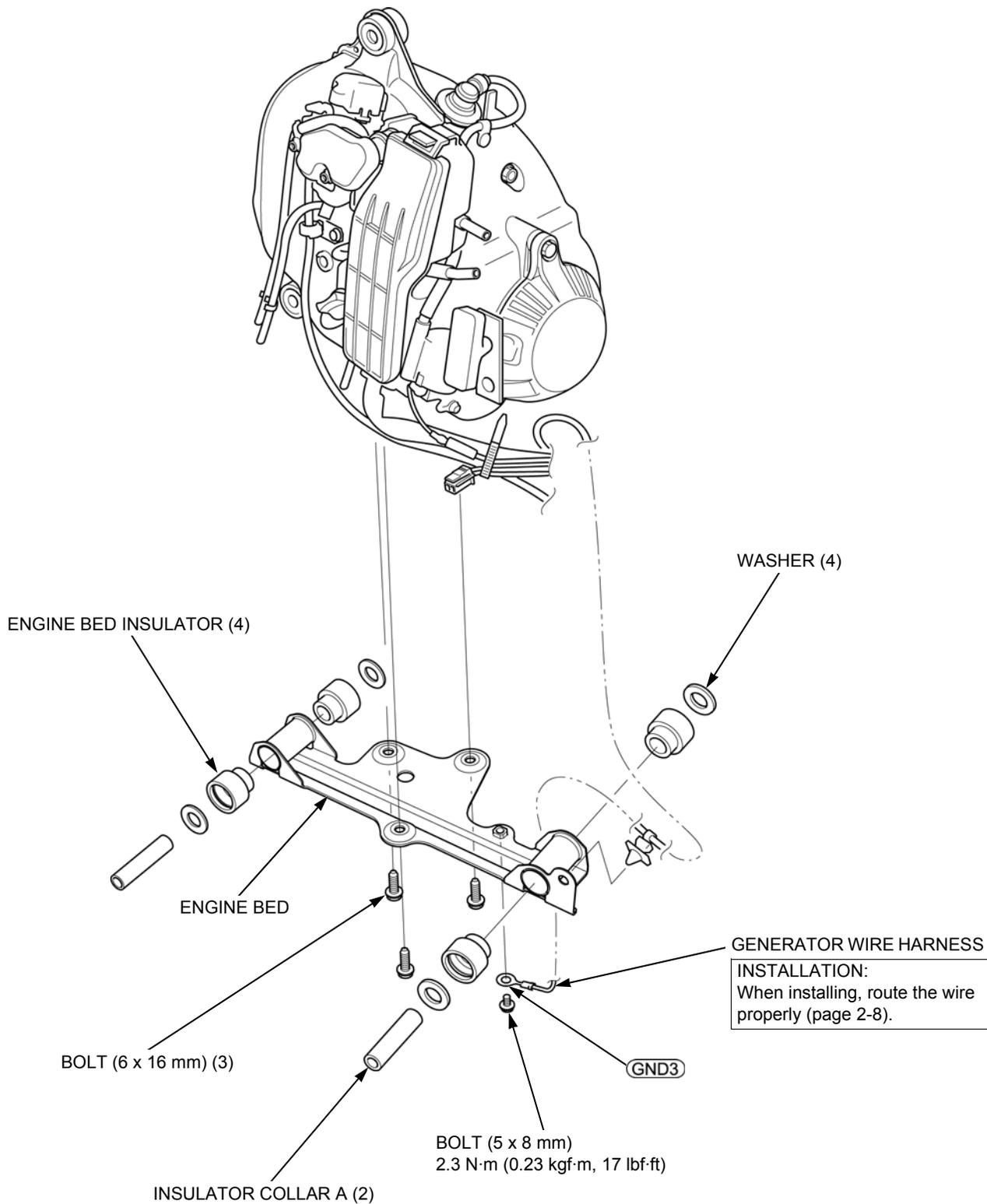
**GENERATOR/ENGINE REMOVAL/
INSTALLATION13-2**

SHROUD REMOVAL/INSTALLATION 13-3

GENERATOR/ENGINE REMOVAL/INSTALLATION

GENERATOR/ENGINE REMOVAL/INSTALLATION

Remove the inverter unit (page 8-9).



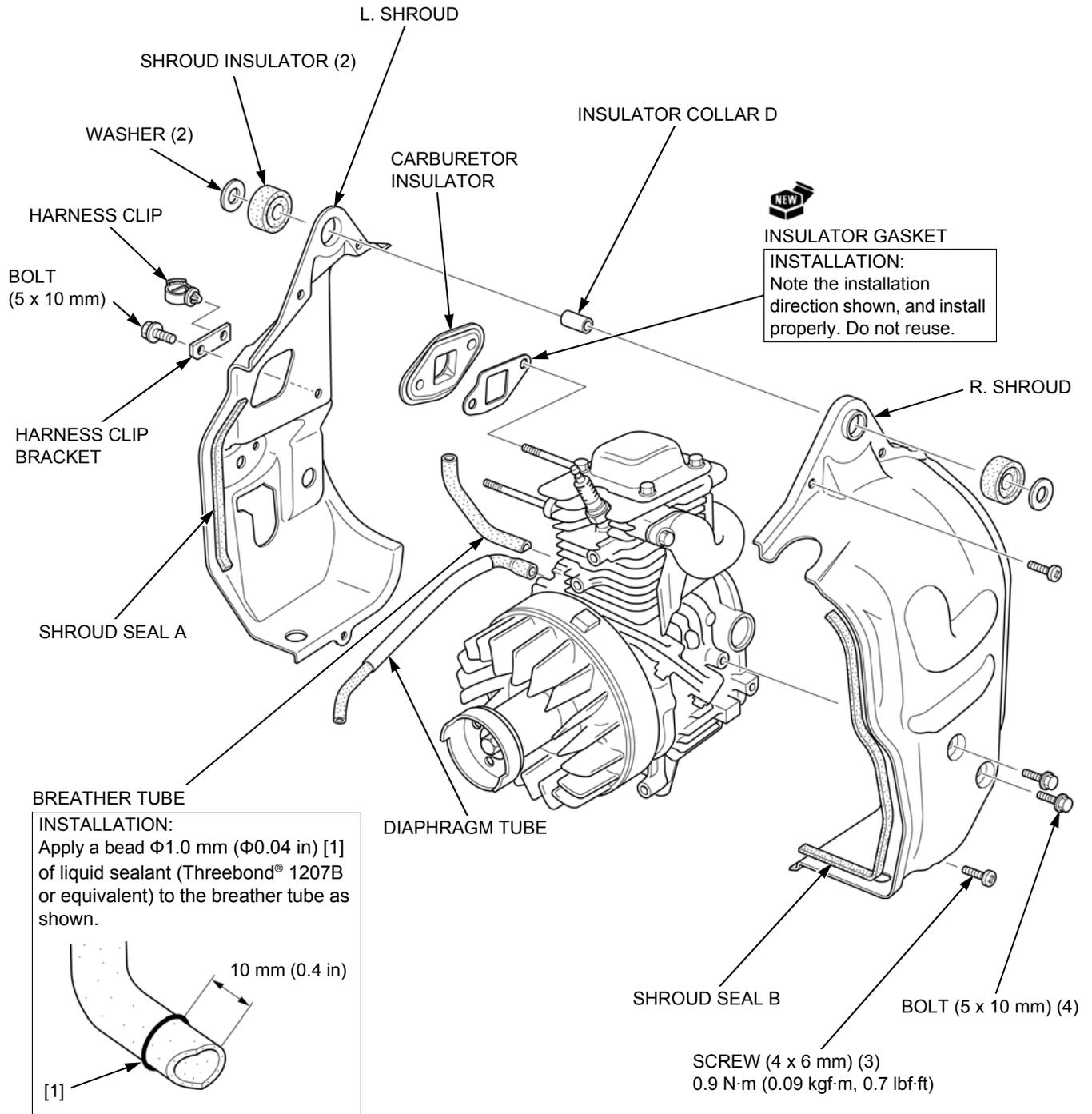
SHROUD REMOVAL/INSTALLATION

Remove the following:

- Fan cover (page 9-4)
- Engine bed (page 13-2)

NOTE:

- When installing, route the tubes properly (page 2-8).



GENERATOR/ENGINE REMOVAL/INSTALLATION

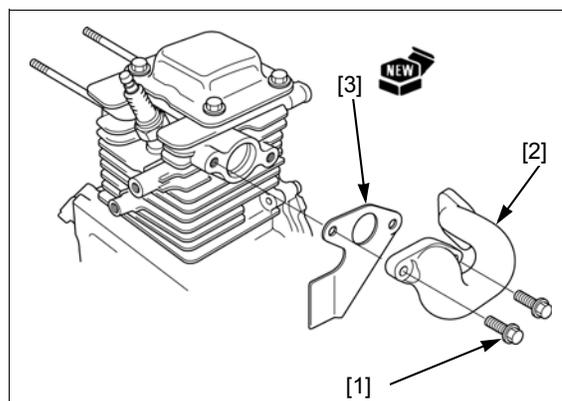
EXHAUST MANIFOLD REMOVAL/ INSTALLATION

Remove the muffler (page 12-2).

Remove the two bolts (5 x 20 mm) [1], exhaust manifold [2] and gasket [3].

Remove the carbon deposits inside of the exhaust manifold.

Install a new gasket and exhaust manifold, then install and tighten the two bolts (5 x 20 mm) securely.



14. ROCKER ARM/CAMSHAFT

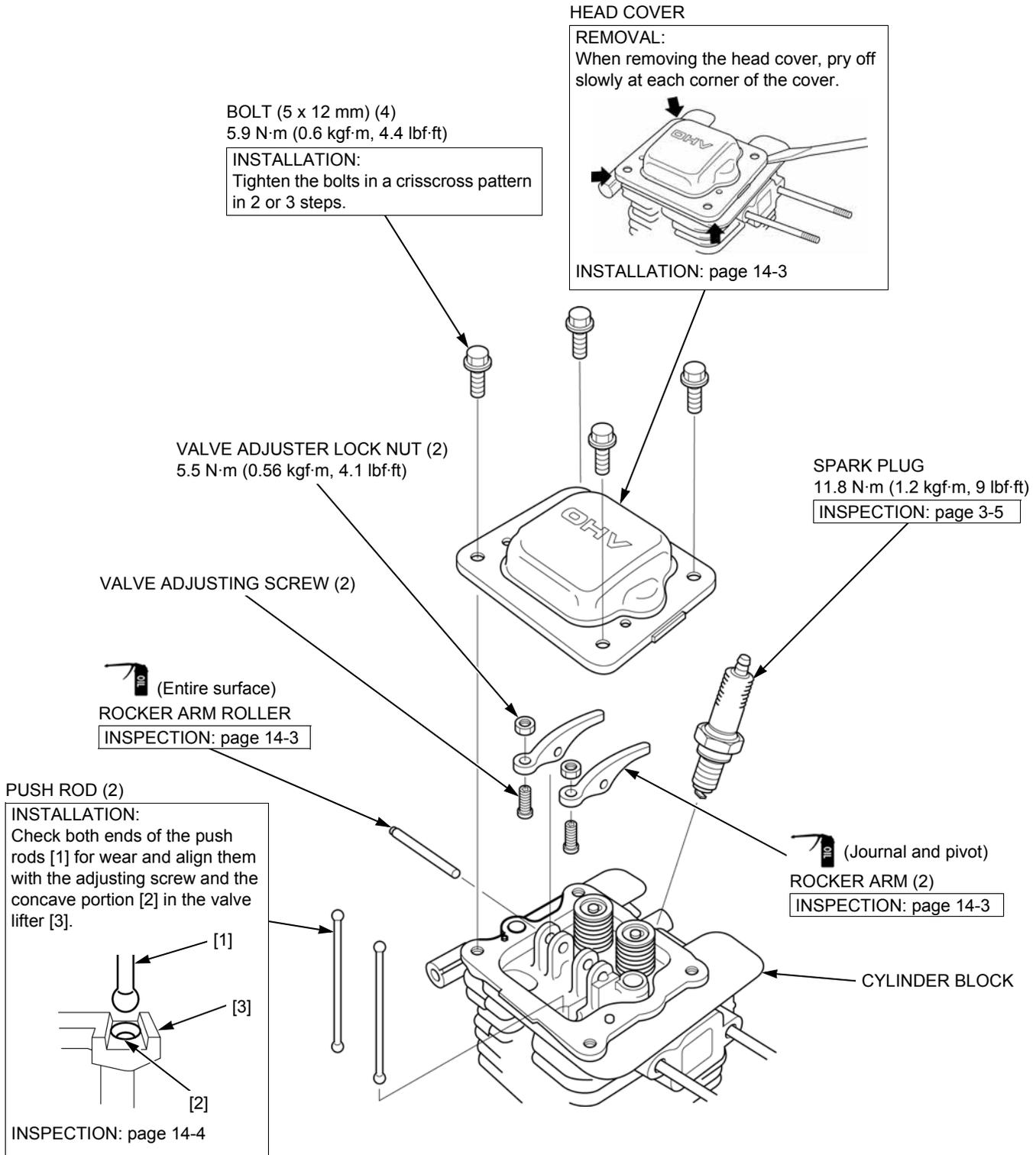
HEAD COVER/ROCKER ARM/PUSH ROD REMOVAL/INSTALLATION.....	14-2	CYLINDER COMPRESSION CHECK.....	14-6
ROCKER ARM/PUSH ROD INSPECTION	14-3	CRANKCASE SIDE COVER/CAMSHAFT/ VALVE LIFTER/CYLINDER BLOCK INSPECTION.....	14-7
CRANKCASE SIDE COVER/CAMSHAFT/ VALVE LIFTER REMOVAL/ INSTALLATION.....	14-5	AIR INTAKE JOINT STUD BOLT REPLACEMENT	14-9

ROCKER ARM/CAMSHAFT

HEAD COVER/ROCKER ARM/PUSH ROD REMOVAL/INSTALLATION

Remove the following:

- Ignition coil/ignition pulse generator/fan cover (page 9-4)
- Shroud (page 13-3)



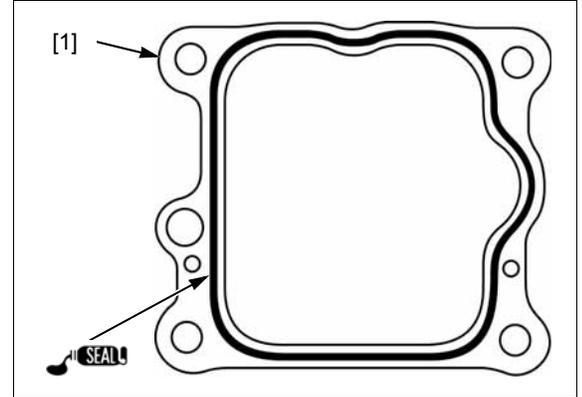
HEAD COVER INSTALLATION

Clean the mating surfaces of the head cover and cylinder block [1] with a degreasing detergent or a clean shop towel.

Apply a bead $\Phi 1.5 - 2.0$ mm ($\Phi 0.06 - 0.08$ in) of liquid sealant (Threebond® 1207B or equivalent) to the mating surface of the cylinder block as shown.

NOTE:

- Assemble the head cover within 3 minutes after application of the liquid sealant.
- Wait for 20 minutes after assembly. Do not add oil or start the engine during this period.



ROCKER ARM/PUSH ROD INSPECTION

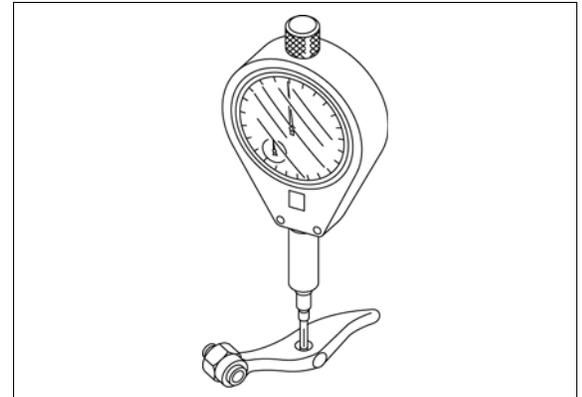
ROCKER ARM JOURNAL I.D.

Measure the rocker arm journal I.D.

STANDARD: 4.005 – 4.025 mm
(0.1577 – 0.1585 in)

SERVICE LIMIT: 4.050 mm (0.1594 in)

If the measurement is more than the service limit, replace the rocker arm.



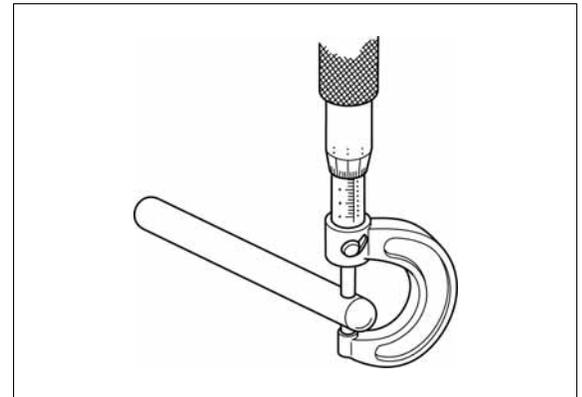
ROCKER ARM ROLLER O.D.

Measure the rocker arm roller O.D.

STANDARD: 3.990 – 4.000 mm
(0.1571 – 0.1575 in)

SERVICE LIMIT: 3.950 mm (0.1555 in)

If the measurement is less than the service limit, replace the rocker arm roller.



ROCKER ARM/CAMSHAFT

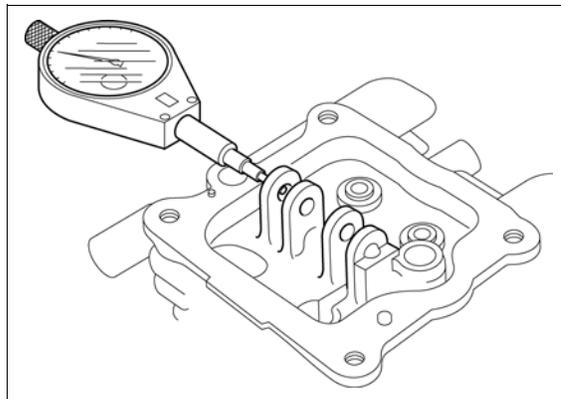
ROCKER ARM ROLLER JOURNAL I.D.

Measure the rocker arm roller journal I.D.

STANDARD: 4.000 – 4.018 mm
(0.1575 – 0.1582 in)

SERVICE LIMIT: 4.050 mm (0.1594 in)

If the measurement is more than the service limit, replace the cylinder block.

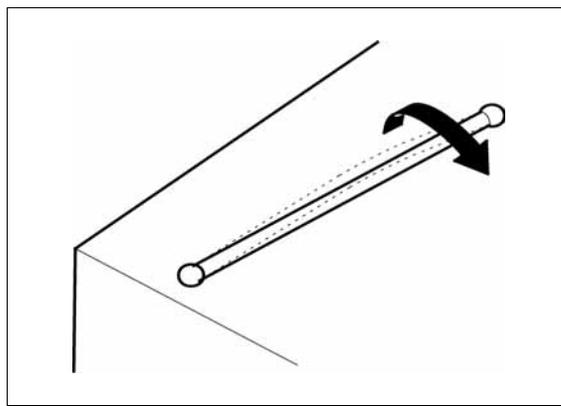


PUSH ROD RUNOUT

Check both ends of the push rod for wear.

Check the push rod for straightness.

If necessary, replace the push rod.



CRANKCASE SIDE COVER/ CAMSHAFT/VALVE LIFTER REMOVAL/ INSTALLATION

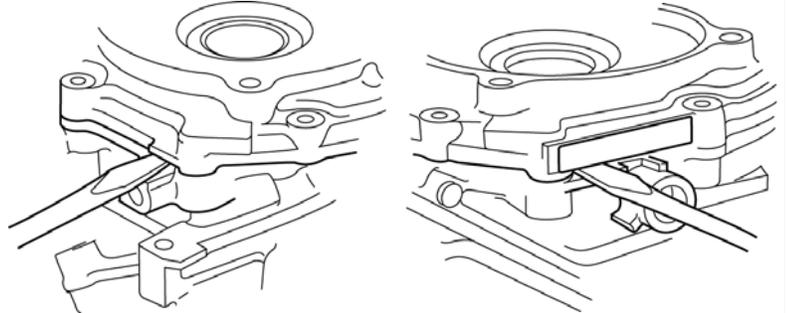
Remove the following:

- Exhaust manifold (page 13-4)
- Head cover/rocker arm/push rod (page 14-2)

CRANKCASE SIDE COVER

REMOVAL:

Insert a screwdriver or equivalent tool into the recess at the positions shown, and remove the crankcase side cover.



INSTALLATION: page 14-6

BOLT (5 x 23 mm) (6)
7.3 N·m (0.74 kgf·m, 5.4 lbf·ft)

WASHER (4.2 x 13 mm)

(Entire surface)

CAMSHAFT ROLLER
INSPECTION: page 14-8

GOVERNOR WEIGHT (Gear teeth)
HOLDER

GOVERNOR HOLDER CLIP

INSTALLATION:
Be sure to set the clip in the groove in the shaft.

(Gear teeth, journal,
cam lobes and
decompressor area)

CAMSHAFT
INSTALLATION: page 14-6
Do not drop the camshaft.
INSPECTION: page 14-8

VALVE LIFTER COLLAR

VALVE LIFTER (2) (Journal and
slipper surface)
INSPECTION: page 14-9

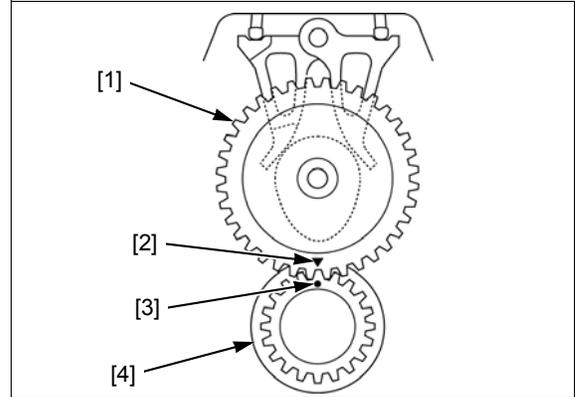
VALVE LIFTER ROLLER (Entire surface)
INSPECTION: page 14-9

DOWEL PIN (6 x 10 mm) (2)

ROCKER ARM/CAMSHAFT

CAMSHAFT INSTALLATION

Install the camshaft [1] by aligning the alignment mark [2] on the camshaft with the timing mark [3] on the crankshaft [4].



CRANKCASE SIDE COVER INSTALLATION

Clean the mating surfaces of the side cover and cylinder block [1] with a degreasing detergent or a clean shop towel.

Apply a bead $\Phi 1.5 - 2.0$ mm ($\Phi 0.06 - 0.08$ in) of liquid sealant (Threebond® 1206, 1216E, 1207B, or equivalent) to the mating surface of the cylinder block as shown.

Install the crankcase side cover (page 14-5).

NOTE:

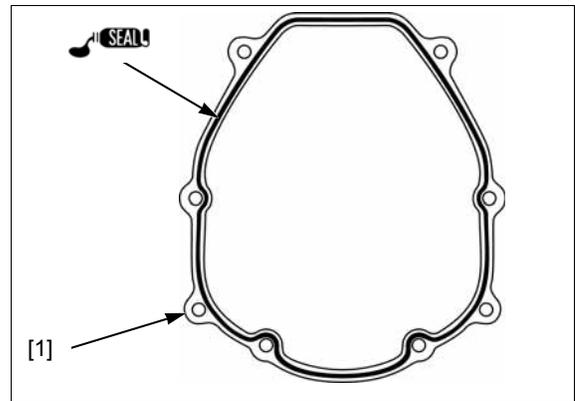
- Assemble the side cover within 3 minutes after application of the liquid sealant.

Install the six bolts (5 x 23 mm) and tighten them in a crisscross pattern in 2 or 3 steps to the specified torque.

TORQUE: 7.3 N·m (0.74 kgf·m, 5.4 lbf·ft)

NOTE:

- Wait for 20 minutes after assembly. Do not add oil or start the engine during this period.



CYLINDER COMPRESSION CHECK

Start the engine and warm up to normal operating temperature.

Turn off the engine stop switch.

Remove the spark plug (page 3-5).

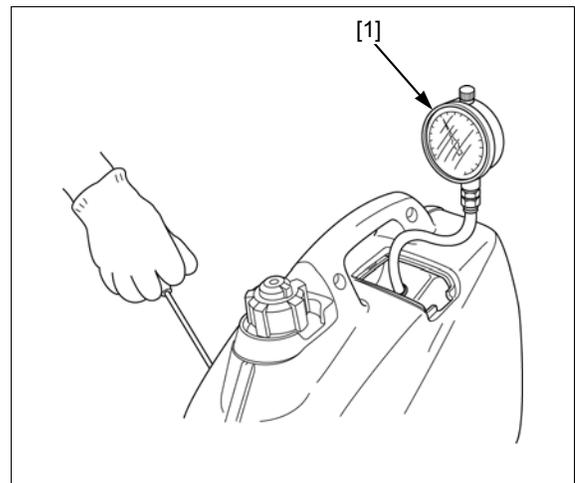
Pull the recoil starter several times to expel unburned gas.

Attach a commercially available compression gauge [1] to the spark plug hole.

Pull the recoil starter forcefully to measure stable cylinder compression.

CYLINDER COMPRESSION:

0.42 MPa (4.3 kgf/cm², 61.2 psi)/1,000 min⁻¹ (rpm)



CRANKCASE SIDE COVER/ CAMSHAFT/VALVE LIFTER/CYLINDER BLOCK INSPECTION

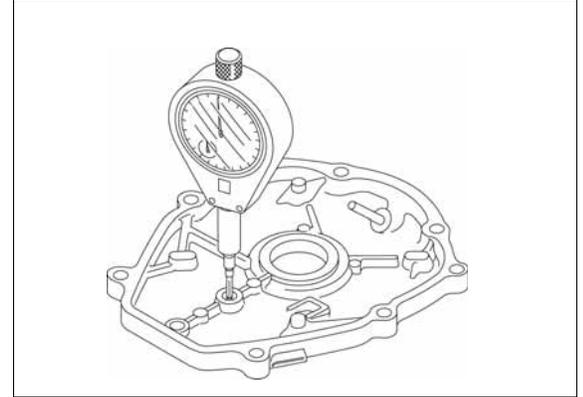
CAMSHAFT ROLLER JOURNAL I.D.

CRANKCASE SIDE COVER SIDE

Measure the camshaft roller journal I.D. of the crankcase side cover.

STANDARD: 5.000 – 5.018 mm
(0.1968 – 0.1976 in)
SERVICE LIMIT: 5.050 mm (0.1988 in)

If the measurement is more than the service limit, replace the crankcase side cover.

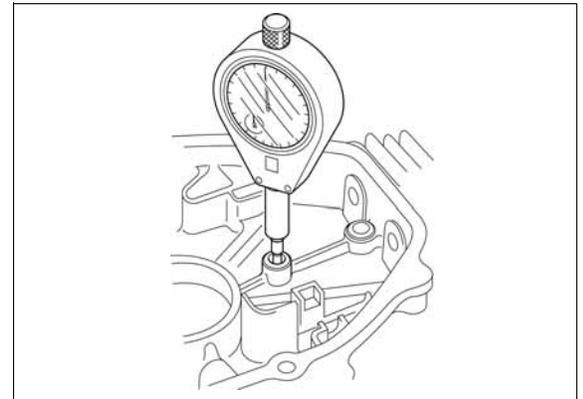


CYLINDER BLOCK SIDE

Measure the camshaft roller journal I.D. of the cylinder block.

STANDARD: 5.000 – 5.018 mm
(0.1968 – 0.1976 in)
SERVICE LIMIT: 5.050 mm (0.1988 in)

If the measurement is more than the service limit, replace the cylinder block.

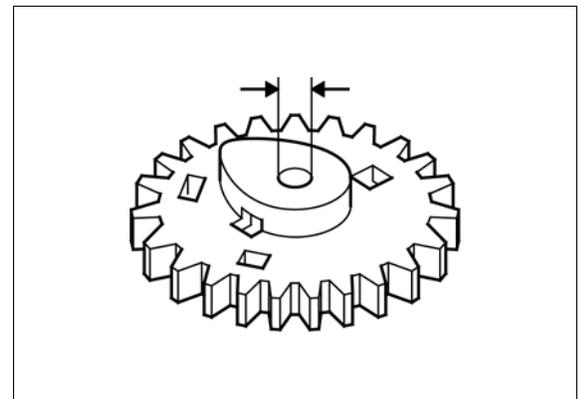


CAMSHAFT SIDE

Measure the camshaft roller journal I.D. of the camshaft.

STANDARD: 5.020 – 5.050 mm
(0.1976 – 0.1988 in)
SERVICE LIMIT: 5.100 mm (0.2008 in)

If the measurement is more than the service limit, replace the camshaft.



ROCKER ARM/CAMSHAFT

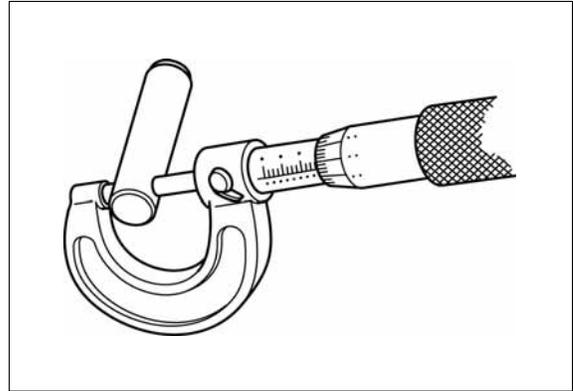
CAMSHAFT ROLLER O.D.

Measure the camshaft roller O.D.

STANDARD: 4.990 – 5.000 mm
(0.1965 – 0.1969 in)

SERVICE LIMIT: 4.950 mm (0.1949 in)

If the measurement is less than the service limit, replace the camshaft roller.



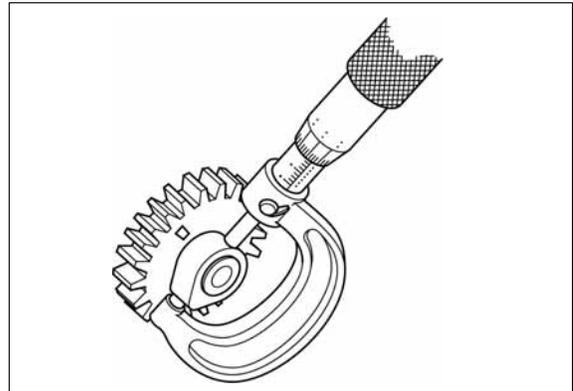
CAMSHAFT CAM HEIGHT

Measure the cam height of the camshaft.

STANDARD: 27.772 – 28.172 mm
(1.0934 – 1.1091 in)

SERVICE LIMIT: 26.972 mm (1.0619 in)

If the measurement is less than the service limit, replace the camshaft.



VALVE LIFTER ROLLER JOURNAL I.D.

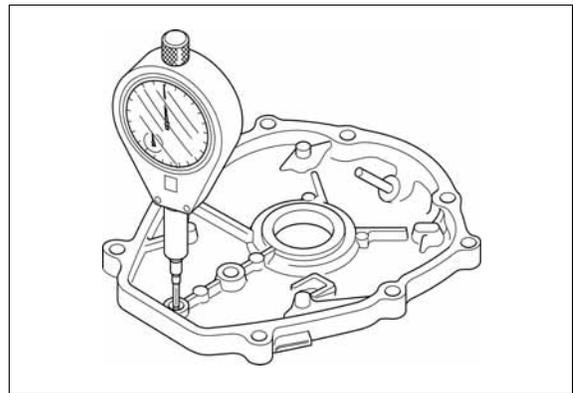
CRANKCASE SIDE COVER SIDE

Measure the valve lifter roller journal I.D. of the crankcase side cover.

STANDARD: 5.000 – 5.018 mm
(0.1968 – 0.1976 in)

SERVICE LIMIT: 5.050 mm (0.1988 in)

If the measurement is more than the service limit, replace the crankcase side cover.



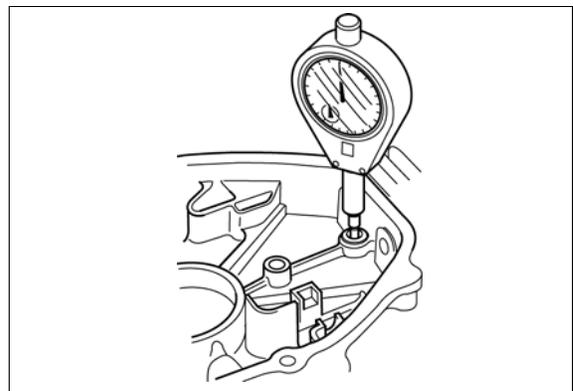
CYLINDER BLOCK SIDE

Measure the valve lifter roller journal I.D. of the cylinder block.

STANDARD: 5.000 – 5.018 mm
(0.1968 – 0.1976 in)

SERVICE LIMIT: 5.050 mm (0.1988 in)

If the measurement is more than the service limit, replace the cylinder block.



VALVE LIFTER SIDE

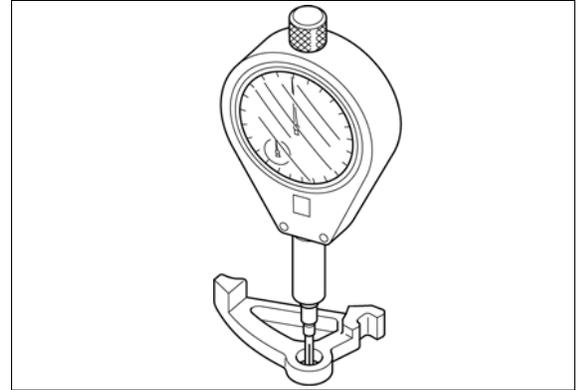
Measure the valve lifter roller journal I.D. of the valve lifter.

**STANDARD: 5.005 – 5.025 mm
(0.1970 – 0.2012 in)**

SERVICE LIMIT: 5.050 mm (0.1988 in)

If the measurement is more than the service limit, replace the valve lifter.

Check the valve lifter roller O.D.



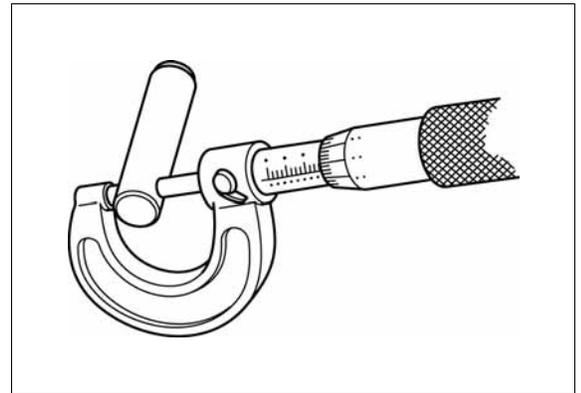
VALVE LIFTER ROLLER O.D.

Measure the valve lifter roller O.D.

**STANDARD: 4.990 – 5.000 mm
(0.1965 – 0.1969 in)**

SERVICE LIMIT: 4.950 mm (0.1949 in)

If the measurement is less than the service limit, replace the valve lifler roller.



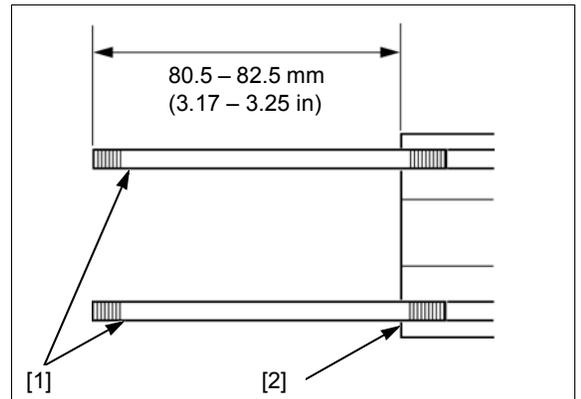
AIR INTAKE JOINT STUD BOLT REPLACEMENT

Remove the stud bolts [1] from the cylinder block [2].

Thread two nuts onto the air intake joint stud bolt and tighten them together; then use a wrench to turn the stud bolt out.

Install and tighten the new stud bolts so that they are specified length.

SPECIFIED LENGTH: 80.5 – 82.5 mm (3.17 – 3.25 in)



MEMO

15. CYLINDER BLOCK

TOOLS.....	15-2	PISTON/CONNECTING ROD DISASSEMBLY/ASSEMBLY.....	15-7
OIL CASE/CRANKSHAFT/PISTON REMOVAL/INSTALLATION.....	15-3	CYLINDER BLOCK/PISTON/CONNECTING ROD/CRANKSHAFT/VALVE INSPECTION.....	15-8
VALVE/VALVE SPRING REMOVAL/ INSTALLATION.....	15-6	CRANKSHAFT OIL SEAL REPLACEMENT	15-14

CYLINDER BLOCK

TOOLS

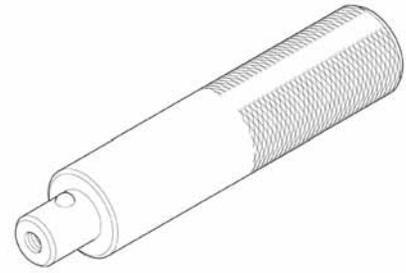
Attachment, 24 x 26 mm
07746-0010700



Pilot, 17 mm
07746-0040400



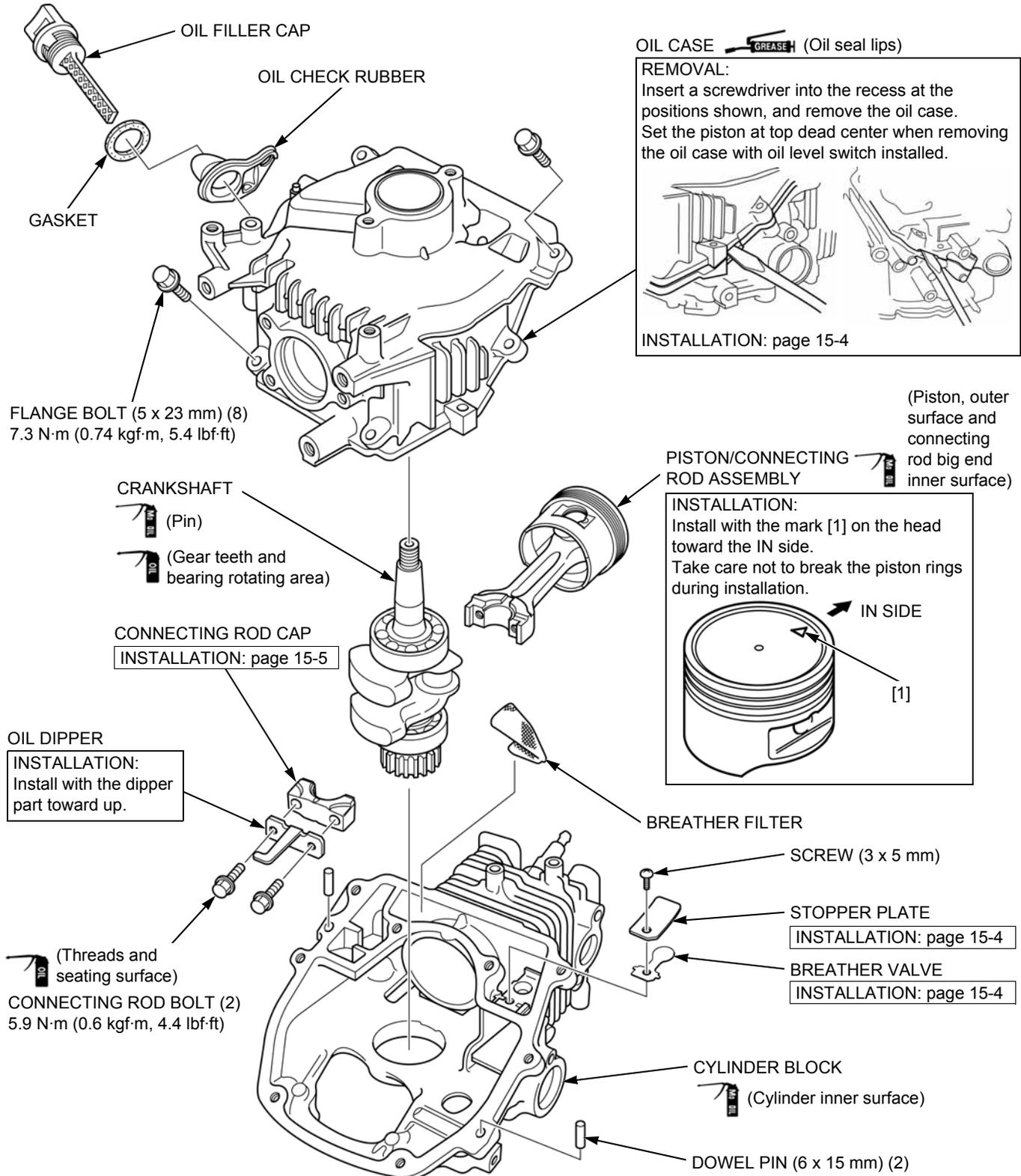
Driver
07749-0010000



OIL CASE/CRANKSHAFT/PISTON REMOVAL/INSTALLATION

Remove the following:

- Generator (page 8-10)
- Crankcase side cover/camshaft/valve lifter (page 14-5)



CYLINDER BLOCK

OIL CASE INSTALLATION

Clean the mating surfaces of the oil case and cylinder block [1] with a degreasing detergent or a clean shop towel.

Install the two dowel pin (6 x 15 mm) into the cylinder block (page 15-3).

Apply a bead $\Phi 1.5 - 2.0$ mm ($\Phi 0.06 - 0.08$ in) of liquid sealant (Threebond® 1207B or equivalent) to the mating surface of the cylinder block as shown.

Install the oil case on the cylinder block (page 15-3).

NOTE:

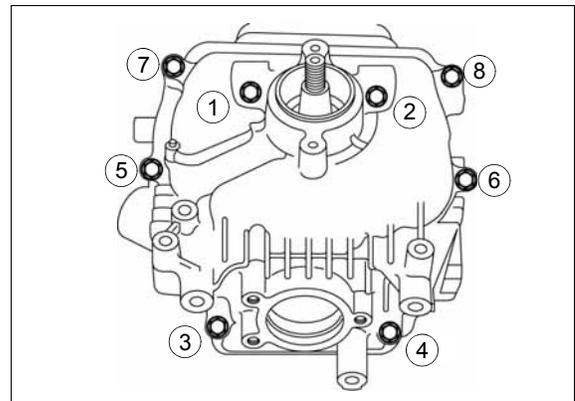
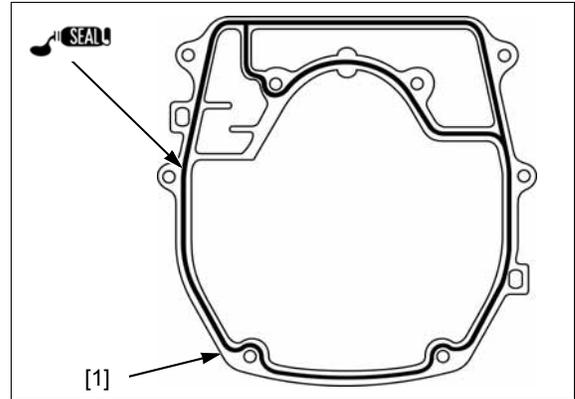
- Assemble the oil case within 3 minutes after application of the liquid sealant.
- If it is hard to install the oil case, install by turning the crankshaft a little.
- Take care not to damage the oil seal lip.

Install the bolts and tighten them to the specified torque in the numbered sequence.

TORQUE: 7.3 N·m (0.74 kgf·m, 5.4 lbf·ft)

NOTE:

- Wait for 20 minutes after assembly. Do not add oil or start the engine during this period.



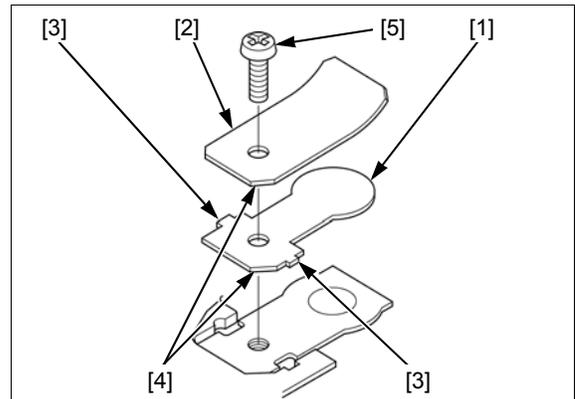
BREATHER VALVE INSTALLATION

Clean the breather valve [1], stopper plate [2] and the valve installation section of the cylinder block.

Install the valve by aligning the projections [3] and chamfered corner [4] with the grooves and chamfer of the cylinder block.

Install the stopper plate by aligning the chamfered corner with the chamfer of the cylinder block.

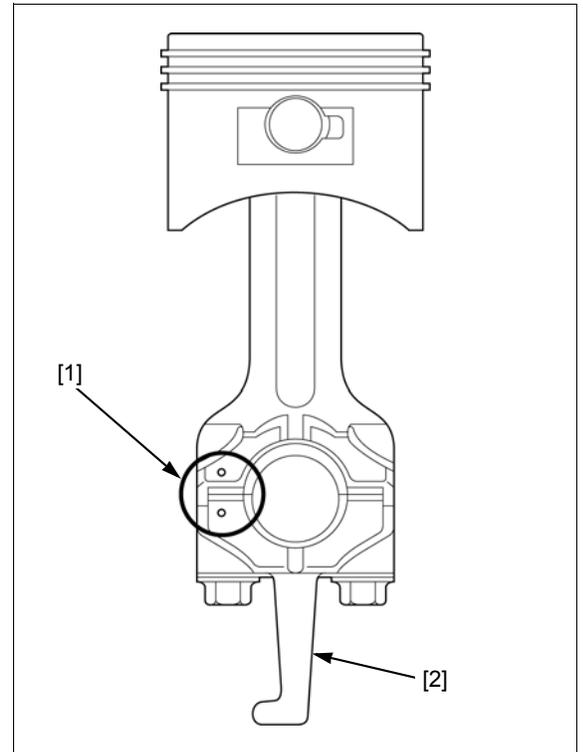
Tighten the screw (3 mm) [5] securely.



**CONNECTING ROD CAP
INSTALLATION**

Install by aligning the alignment marks [1] on the connecting rod big end and the cap.

Install with the oil dipper [2] facing the rotor side.



CYLINDER BLOCK

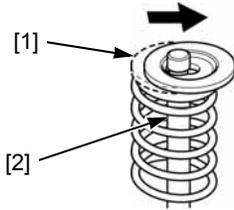
VALVE/VALVE SPRING REMOVAL/INSTALLATION

Remove the oil case/crankshaft/piston/connecting rod assembly (page 15-3).

VALVE SPRING RETAINER (2)

REMOVAL:

Push down and slide the valve spring retainer [1] to the side so that the valve stem [2] slips through the hole at the side of the valve spring retainer.



INSTALLATION:

Install the valve spring retainer while holding the valve with the handle of the a driver or hammer.

 (Entire surface)
VALVE SPRING (2)

VALVE STEM SEAL
(IN side only)



 (Valve stem sliding surface and stem end)

EXHAUST VALVE

INSTALLATION:

Remove carbon deposits before installation.
Check the valve head for damage.
Do not interchange with the intake valve.
The exhaust valve is smaller than the intake valve.

INTAKE VALVE

 (Valve stem sliding surface and stem end)

INSTALLATION:

Remove carbon deposits before installation.
Check the valve head for damage.
Do not interchange with the exhaust valve.
The intake valve is larger than the exhaust valve.

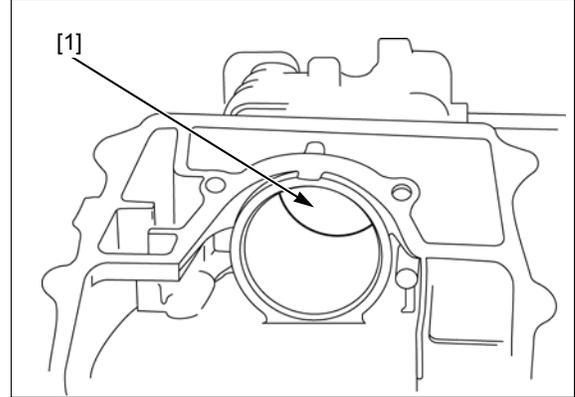
CYLINDER BLOCK

CYLINDER BLOCK/PISTON/ CONNECTING ROD/CRANKSHAFT/ VALVE INSPECTION

COMBUSTION CHAMBER

Check the combustion chamber [1] for damage.

If the combustion chamber is dirty, clean the combustion chamber (page 3-7).



PISTON SKIRT O.D.

Measure and record the piston O.D. at a point 10 mm (0.4 in) from the bottom of the skirt and 90° to the piston pin bore.

Except GW1 TYPE:

STANDARD: 41.770 – 41.790 mm
(1.6445 – 1.6453 in)

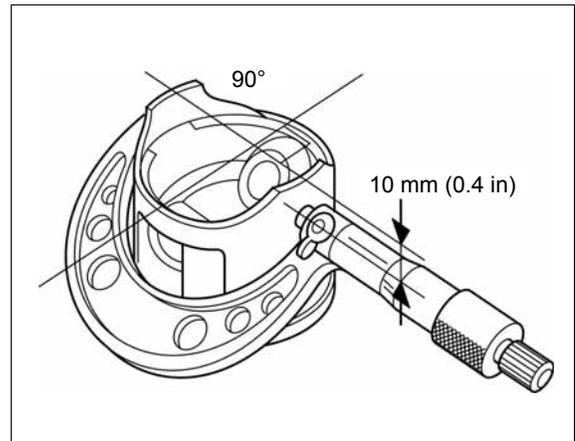
SERVICE LIMIT: 41.700 mm (1.6417 in)

GW1 TYPE:

STANDARD: 41.746 – 41.790 mm
(1.6435 – 1.6453 in)

SERVICE LIMIT: 41.700 mm (1.6417 in)

If the measurement is less than the service limit, replace the piston.



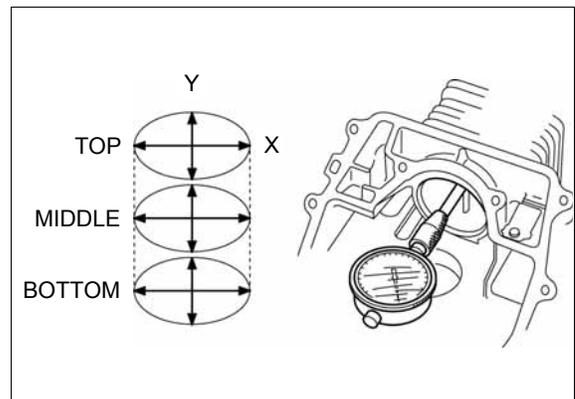
CYLINDER SLEEVE I.D.

Measure and record the cylinder sleeve I.D. at three levels in both the "X" axis (perpendicular to crankshaft) and the "Y" axis (parallel to crankshaft). Take the maximum reading to determine cylinder wear.

STANDARD: 41.800 – 41.815 mm
(1.6457 – 1.6463 in)

SERVICE LIMIT: 41.900 mm (1.6496 in)

If the measurement is more than the service limit, replace the cylinder block.



PISTON-TO-CYLINDER CLEARANCE

Subtract the piston skirt O.D. from the cylinder sleeve I.D. to obtain the piston-to-cylinder clearance.

Except GW1 TYPE:

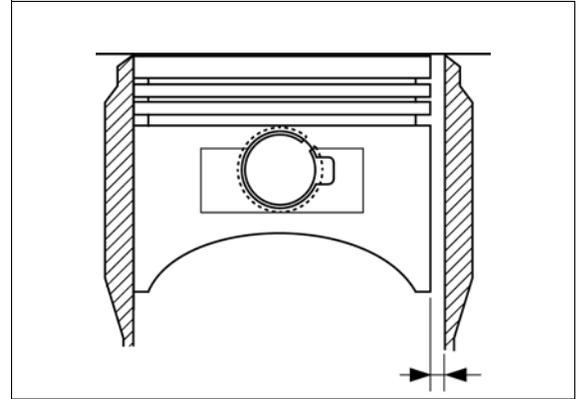
STANDARD: 0.010 – 0.045 mm
(0.0004 – 0.0018 in)
SERVICE LIMIT: 0.120 mm (0.0047 in)

GW1 TYPE:

STANDARD: 0.010 – 0.069 mm
(0.0004 – 0.0027 in)
SERVICE LIMIT: 0.120 mm (0.0047 in)

If the calculated clearance is more than the service limit, replace the piston and recheck the clearance.

If the clearance is still more than the service limit with a new piston, replace the cylinder block.

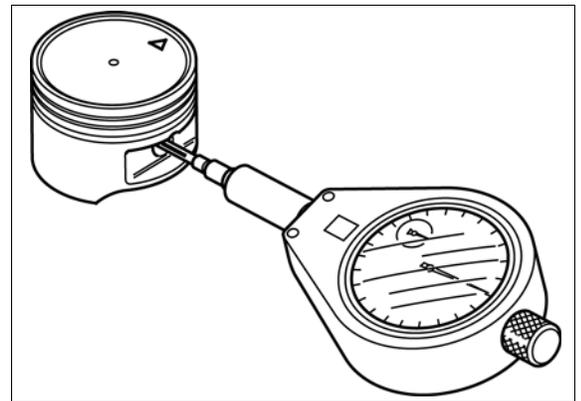


PISTON PIN BORE I.D.

Measure and record the piston pin bore I.D. of the piston.

STANDARD: 10.002 – 10.018 mm
(0.3938 – 0.3944 in)
SERVICE LIMIT: 10.050 mm (0.3957 in)

If the measurement is more than the service limit, replace the piston.

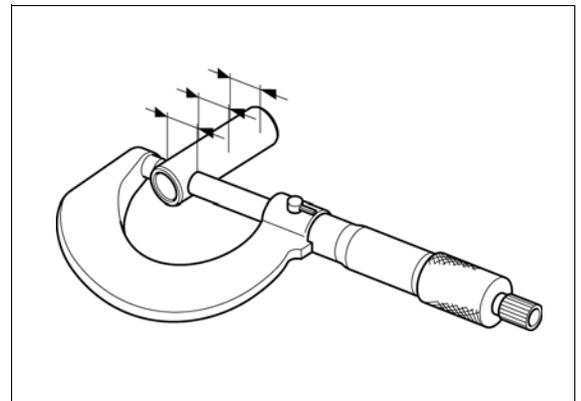


PISTON PIN O.D.

Measure and record the piston pin O.D. at three points (both ends and middle). Take the minimum reading to determine piston pin O.D.

STANDARD: 9.994 – 10.000 mm
(0.3935 – 0.3937 in)
SERVICE LIMIT: 9.950 mm (0.3917 in)

If the measurement is less than the service limit, replace the piston pin.



PISTON PIN-TO-PISTON PIN BORE CLEARANCE

Subtract the piston pin O.D. from the piston pin bore I.D. to obtain the piston pin-to-piston pin bore clearance.

STANDARD: 0.002 – 0.024 mm
(0.0001 – 0.0009 in)
SERVICE LIMIT: 0.100 mm (0.0039 in)

If the calculated clearance is more than the service limit, replace the piston pin and recheck the clearance.

If the clearance is still more than the service limit with a new piston pin, replace the piston.

CYLINDER BLOCK

PISTON RING SIDE CLEARANCE

Measure the clearance between each piston ring and ring groove of the piston using feeler gauge.

STANDARD:

Top: 0.015 – 0.050 mm (0.0006 – 0.0020 in)

Second: 0.015 – 0.050 mm (0.0006 – 0.0020 in)

SERVICE LIMIT:

Top: 0.12 mm (0.005 in)

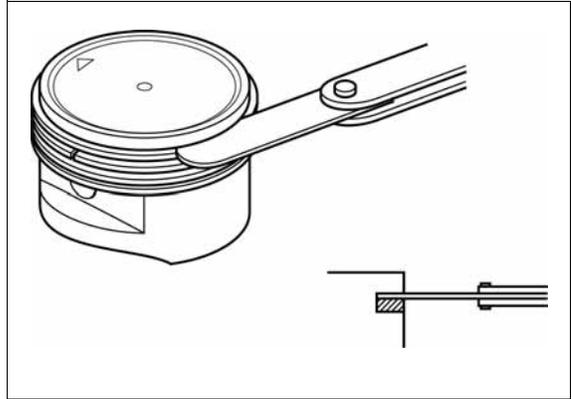
Second: 0.12 mm (0.005 in)

If any measurement is more than the service limit, inspect the piston ring width.

If the piston ring width is normal, replace the piston and reinspect the clearance.

If necessary, replace the piston rings (top, second, oil) as a set and reinspect the clearance.

If the measurement is still more than the service limit with a new piston rings, replace the piston.



PISTON RING WIDTH

Measure each piston ring width.

STANDARD:

Top: 0.77 – 0.79 mm (0.030 – 0.031 in)

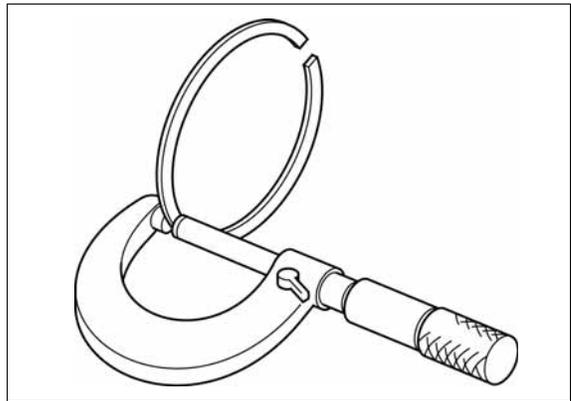
Second: 0.97 – 0.99 mm (0.038 – 0.039 in)

SERVICE LIMIT:

Top: 0.72 mm (0.028 in)

Second: 0.92 mm (0.036 in)

If any measurement is less than the service limit, replace the piston rings (top, second, oil) as a set.



PISTON RING END GAP

Before inspection, check whether the cylinder sleeve I.D. is within the specification (page 15-8).

Insert each piston ring into the bottom of the cylinder sleeve squarely using the piston.

Measure each piston ring [1] end gap using a feeler gauge.

STANDARD:

Top: 0.150 – 0.300 mm (0.0059 – 0.0118 in)

Second: 0.150 – 0.300 mm (0.0059 – 0.0118 in)

Oil

(side rail): 0.20 – 0.70 mm (0.008 – 0.028 in)

SERVICE LIMIT:

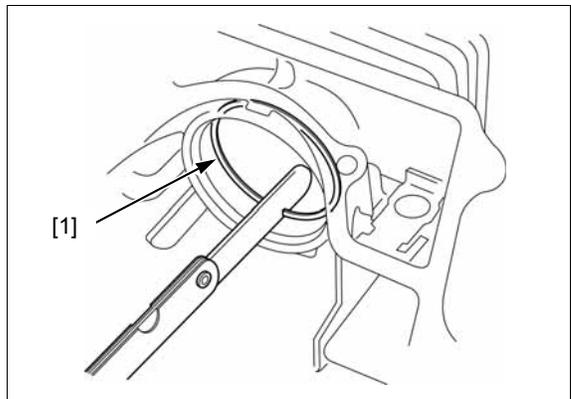
Top: 0.600 mm (0.0236 in)

Second: 0.600 mm (0.0236 in)

Oil

(side rail): 1.0 mm (0.04 in)

If any measurement is more than the service limit, replace the piston rings (top, second, oil) as a set.



CONNECTING ROD BIG END SIDE CLEARANCE

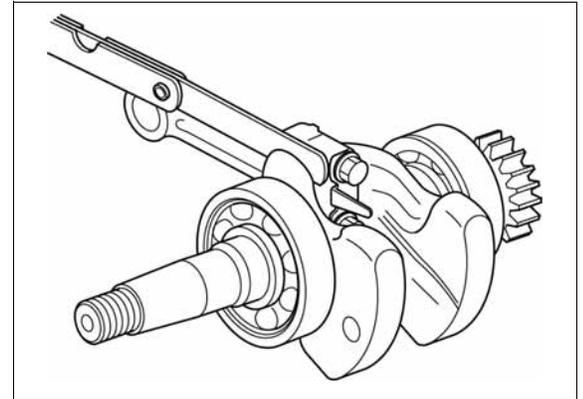
Measure the clearance between the connecting rod big end and crankshaft using a feeler gauge.

STANDARD: 0.1 – 0.6 mm (0.004 – 0.024 in)

SERVICE LIMIT: 0.8 mm (0.031 in)

If the measurement is more than the service limit, replace the connecting rod (page 15-7) and recheck the clearance.

If the clearance is still more than the service limit with the new connecting rod, replace the crankshaft.



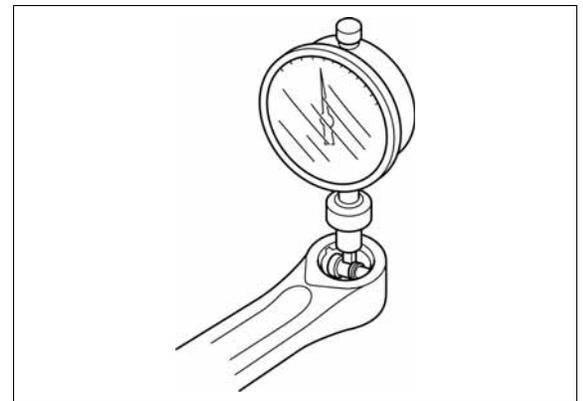
CONNECTING ROD SMALL END I.D.

Measure the connecting rod small end I.D.

STANDARD: 10.006 – 10.017 mm
(0.3939 – 0.3944 in)

SERVICE LIMIT: 10.050 mm (0.3957 in)

If the measurement is more than the service limit, replace the connecting rod.



CONNECTING ROD BIG END I.D.

Apply oil to the connecting rod bolts [1] threads and seating surface.

Set the connecting rod cap [2] to the connecting rod [3] and tighten the connecting rod bolts to the specified torque.

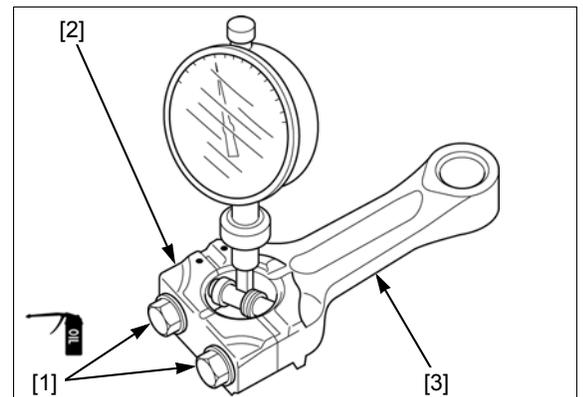
TORQUE: 5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)

Measure the connecting rod big end I.D.

STANDARD: 15.000 – 15.011 mm
(0.5906 – 0.5910 in)

SERVICE LIMIT: 15.040 mm (0.5921 in)

If the measurement is more than the service limit, replace the connecting rod.



CYLINDER BLOCK

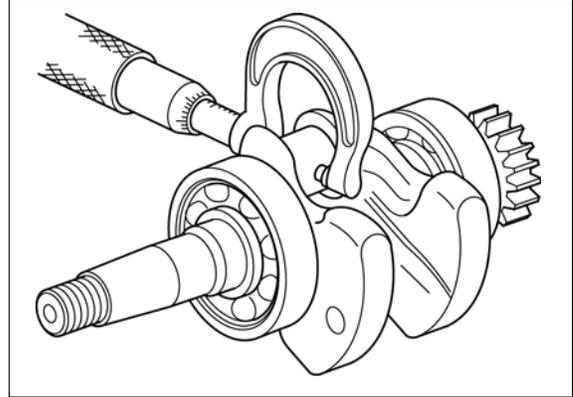
CRANKPIN O.D.

Measure the crankpin O.D. of the crankshaft.

STANDARD: 14.973 – 14.984 mm
(0.5895 – 0.5899 in)

SERVICE LIMIT: 14.940 mm (0.5882 in)

If the measurement is less than the service limit, replace the crankshaft.



CONNECTING ROD BIG END OIL CLEARANCE

Clean all oil from the crankpin and connecting rod big end surfaces.

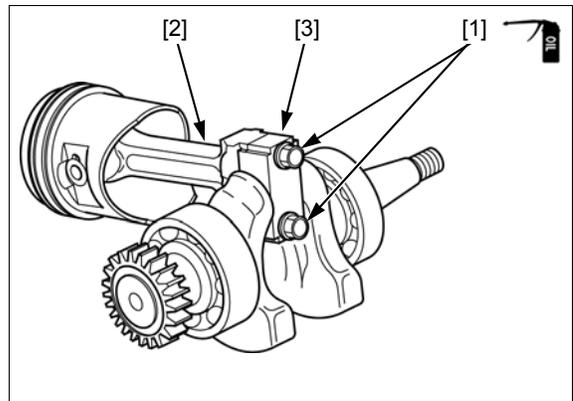
Apply oil to the connecting rod bolts [1] threads and seating surface.

Place a piece of plastigauge on the crankpin, install the connecting rod [2] and the connecting rod cap [3], and tighten the connecting rod bolts to the specified torque.

TORQUE: 5.9 N·m (0.6 kgf·m, 4.4 lbf·ft)

NOTE:

- Do not rotate the crankshaft while the plastigauge is in place.



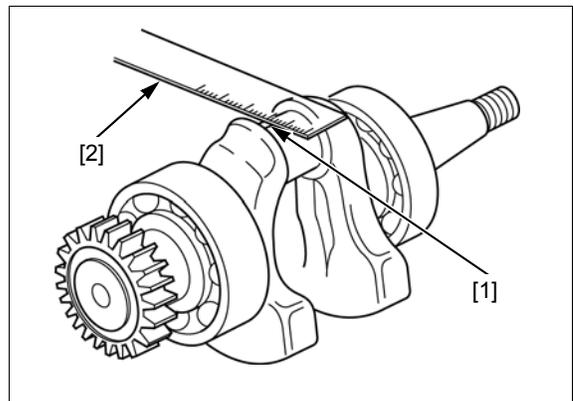
Remove the connecting rod and measure the compressed width of the plastigauge [1] using the scale printed on the bag [2] of the plastigauge.

STANDARD: 0.016 – 0.038 mm
(0.0006 – 0.0015 in)

SERVICE LIMIT: 0.100 mm (0.0039 in)

If the clearance is more than the service limit, inspect the connecting rod big end I.D. and the crankpin O.D.

If necessary replace the part that is not within the service limit and reinspect the clearance.



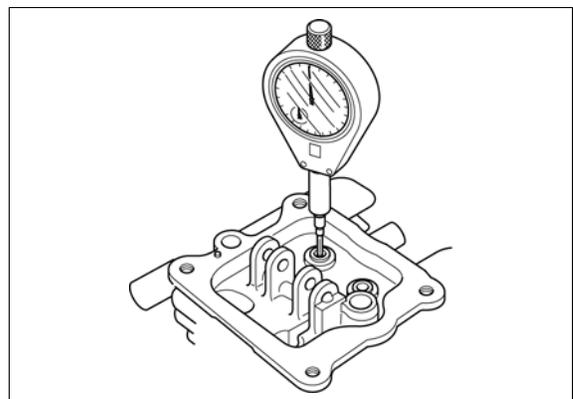
VALVE GUIDE I.D.

Measure and record each valve guide I.D.

STANDARD: 4.000 – 4.018 mm
(0.1575 – 0.1582 in)

SERVICE LIMIT: 4.060 mm (0.1598 in)

If the measured valve guide I.D. is more than the service limit, replace the cylinder block.



VALVE STEM O.D.

Inspect each valve for bending or abnormal stem wear.

If necessary, replace the valve.

Measure and record each valve stem O.D.

STANDARD:

IN: 3.970 – 3.985 mm (0.1563 – 0.1569 in)

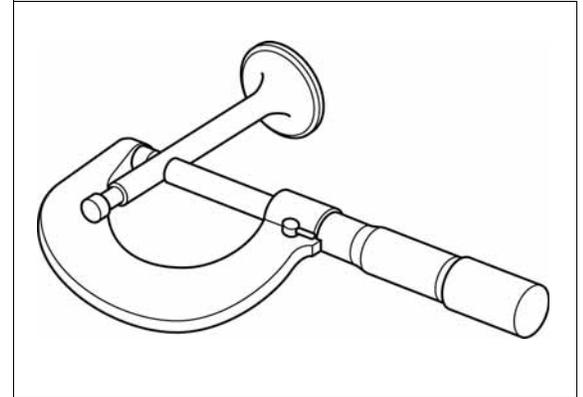
EX: 3.935 – 3.950 mm (0.1549 – 0.1555 in)

SERVICE LIMIT:

IN: 3.900 mm (0.1535 in)

EX: 3.880 mm (0.1528 in)

If the measurement is less than the service limit, replace the valve.

**GUIDE-TO-STEM CLEARANCE**

Subtract each valve stem O.D. from the corresponding valve guide I.D. to obtain the guide-to-stem clearance.

STANDARD:

IN: 0.015 – 0.048 mm (0.0006 – 0.0019 in)

EX: 0.050 – 0.083 mm (0.0020 – 0.0033 in)

SERVICE LIMIT:

IN: 0.098 mm (0.0039 in)

EX: 0.12 mm (0.005 in)

If the calculated clearance is more than the service limit, replace the valve and cylinder block as a set.

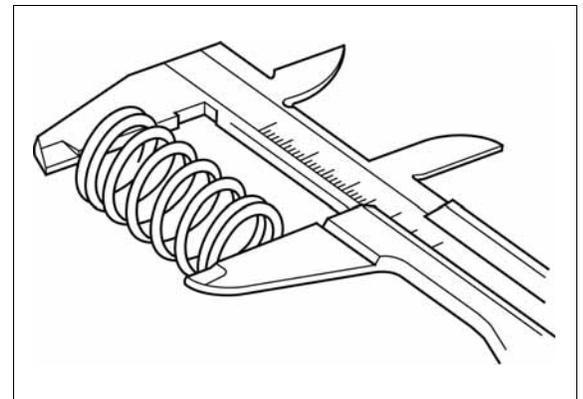
VALVE SPRING FREE LENGTH

Measure the free length of the valve spring.

STANDARD: 23.7 mm (0.93 in)

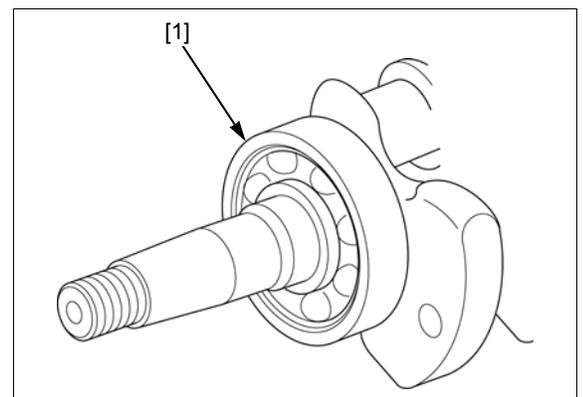
SERVICE LIMIT: 22.8 mm (0.90 in)

If the measured length is less than the service limit, replace the valve spring.

**CRANKSHAFT BEARING**

Turn the inner race of the bearing [1] with your finger and check for play.

Replace the crankshaft if it is noisy or has excessive play.



CYLINDER BLOCK

CRANKSHAFT OIL SEAL REPLACEMENT

Remove the oil seal [1].

Drive a new oil seal into the cylinder block using the special tools as shown.

TOOLS

Driver [2]

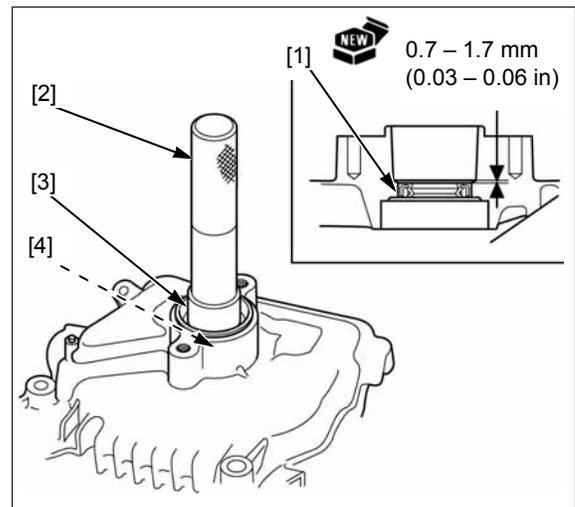
Attachment, 24 x 26 mm [3]

Pilot, 17 mm [4]

07749-0010000

07746-0010700

07746-0040400



16. WIRING DIAGRAM

HOW TO READ A WIRING DIAGRAM &
RELATED INFORMATION16-2

WIRING DIAGRAM 16-3

WIRING DIAGRAM

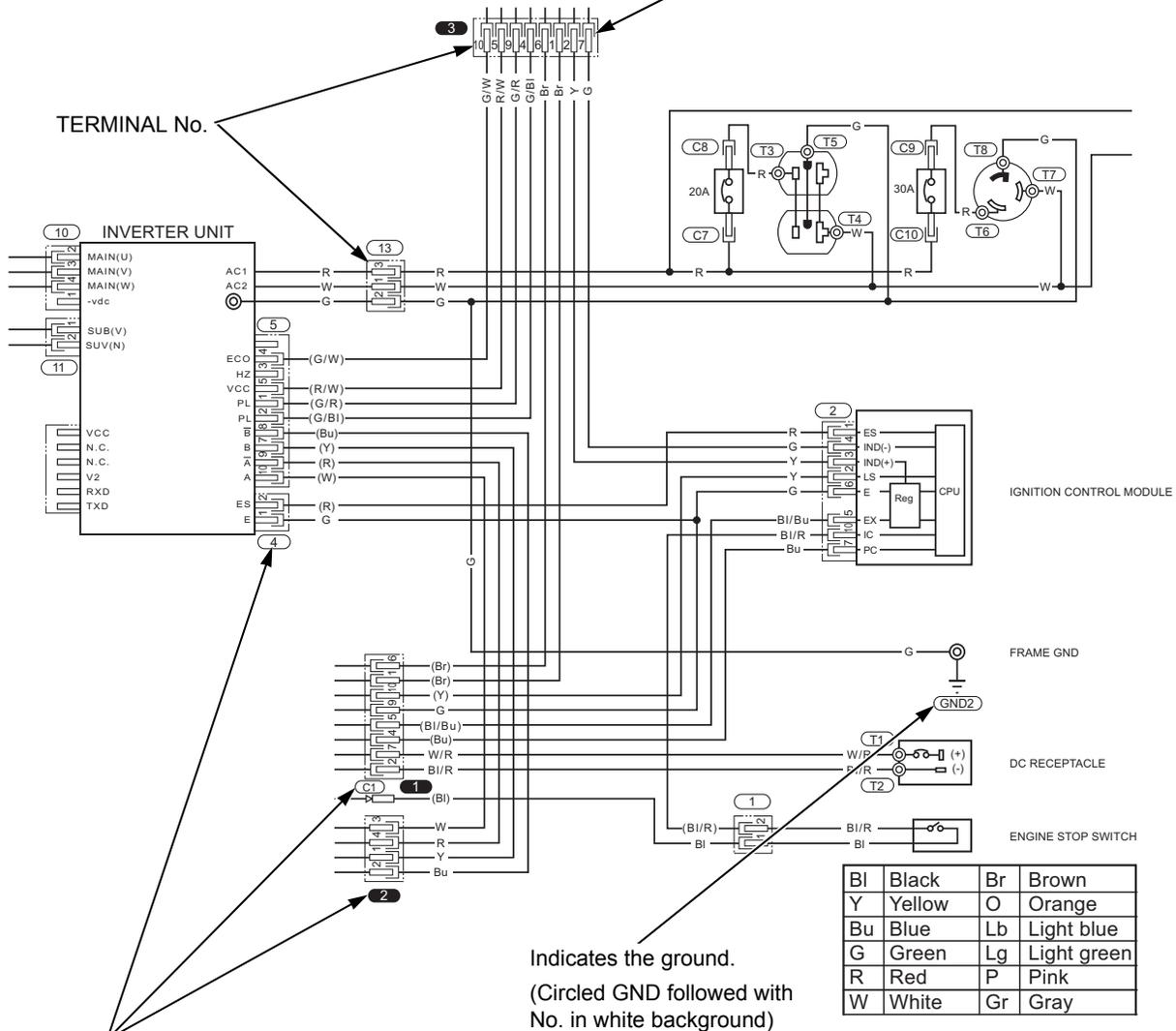
HOW TO READ A WIRING DIAGRAM & RELATED INFORMATION

The wiring diagram, connector general layout drawing, connector drawings, and the symbols used in troubleshooting are explained in this section.

HOW TO READ WIRING DIAGRAM

SYMBOL OF TERMINAL

It shows the shape of each terminal to identify whether it is a male or female terminal.



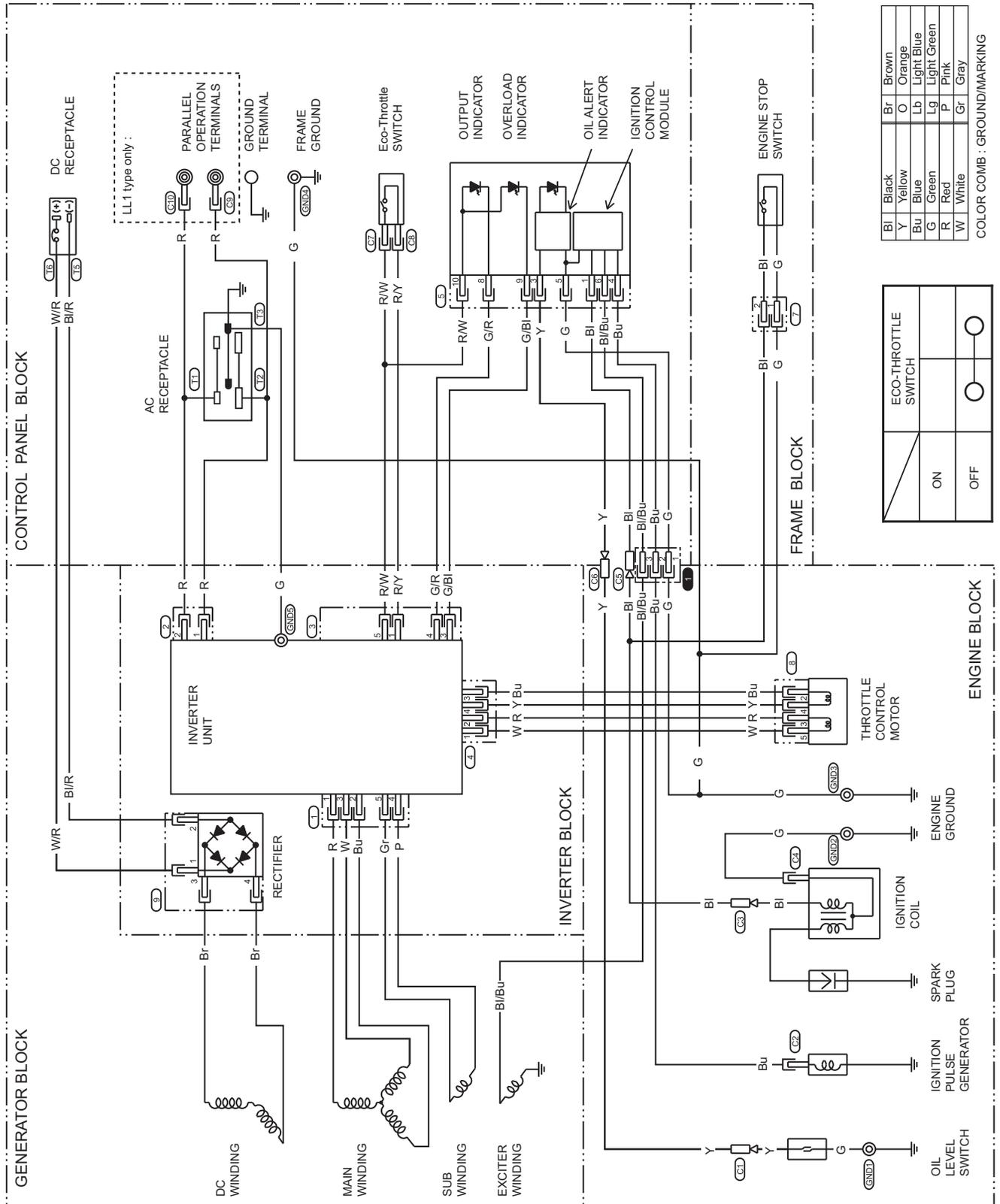
CONNECTOR/TERMINAL No.

Every connector and terminal has a number to help the users find the location and shape of the connector and the terminal arrangement by referring to the "Connector general layout drawing" and/or the "Connector drawing". All the connector/terminal numbers shown in this Service Manual are either of those shown in this section.

- 1** : Connector that relays from a harness to a harness (Circled No. in black background)
- 1** : Connector that connects to electrical equipment (Circled No. in white background)
- C1** : Connector (Circled C followed with No. in white background)
- T1** : Terminal (Circled T followed with No. in white background)
- GND1** : Ground (Circled GND followed with No. in white background)

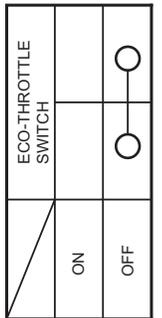
WIRING DIAGRAM

LL0, LL1, LT TYPES:



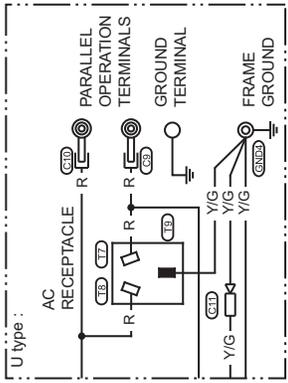
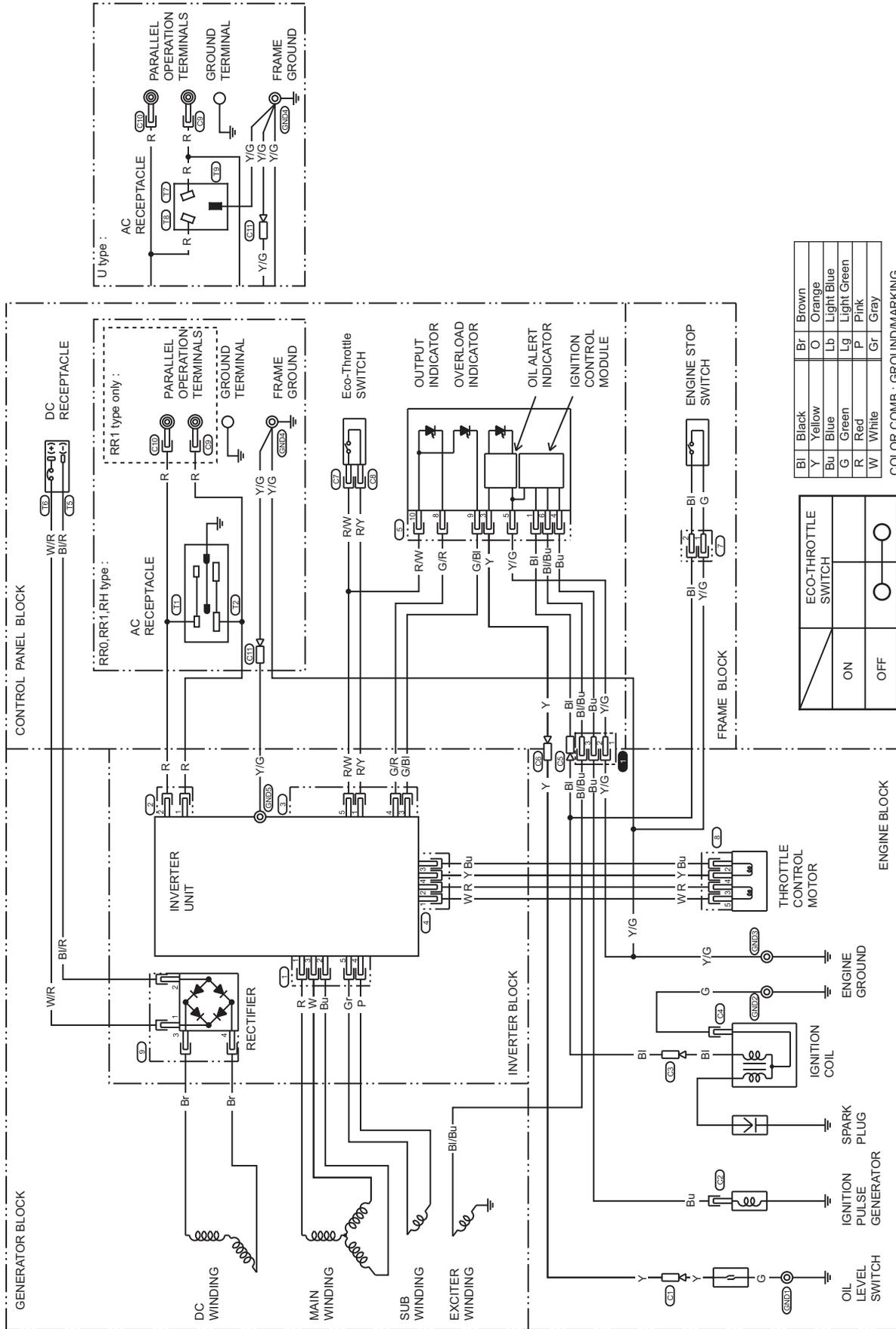
Bl	Black
Y	Yellow
Bu	Blue
G	Green
R	Red
W	White
Br	Brown
O	Orange
Lb	Light Blue
Lg	Light Green
P	Pink
Gr	Gray

COLOR COMB : GROUND/MARKING



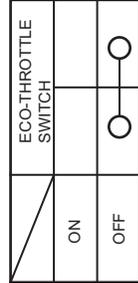
WIRING DIAGRAM

RR0, RR1, RH, U TYPES:

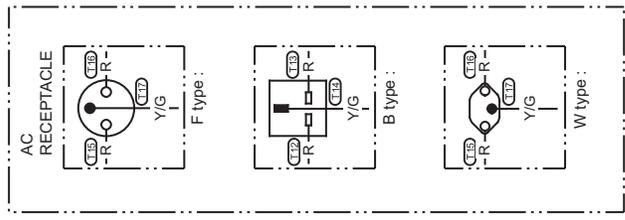
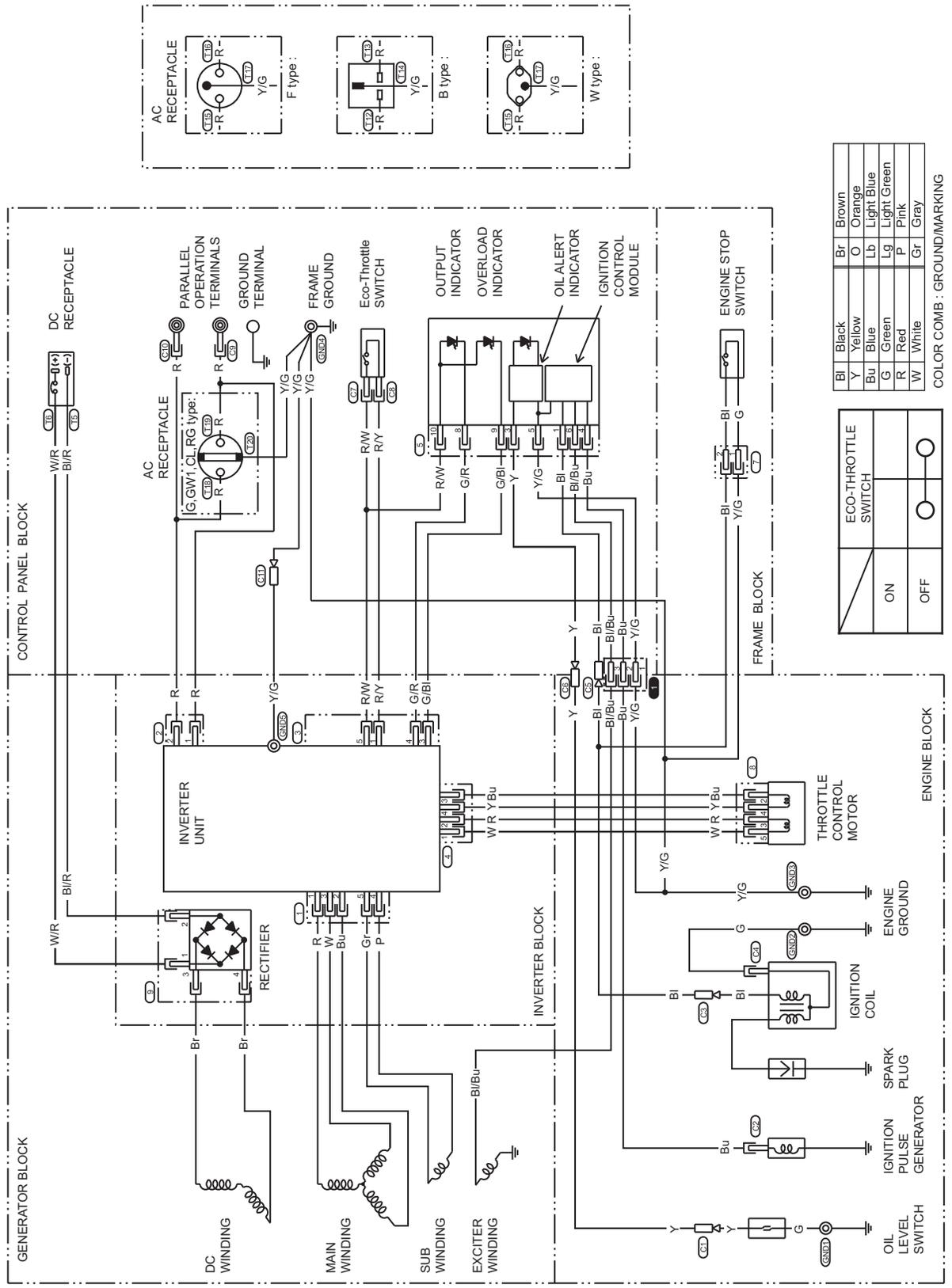


BI	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light Blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

COLOR COMB : GROUND/MARKING

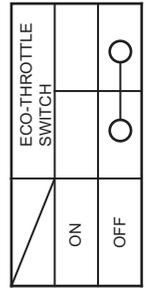


G, GW1, CL, RG, B, F, W TYPES:



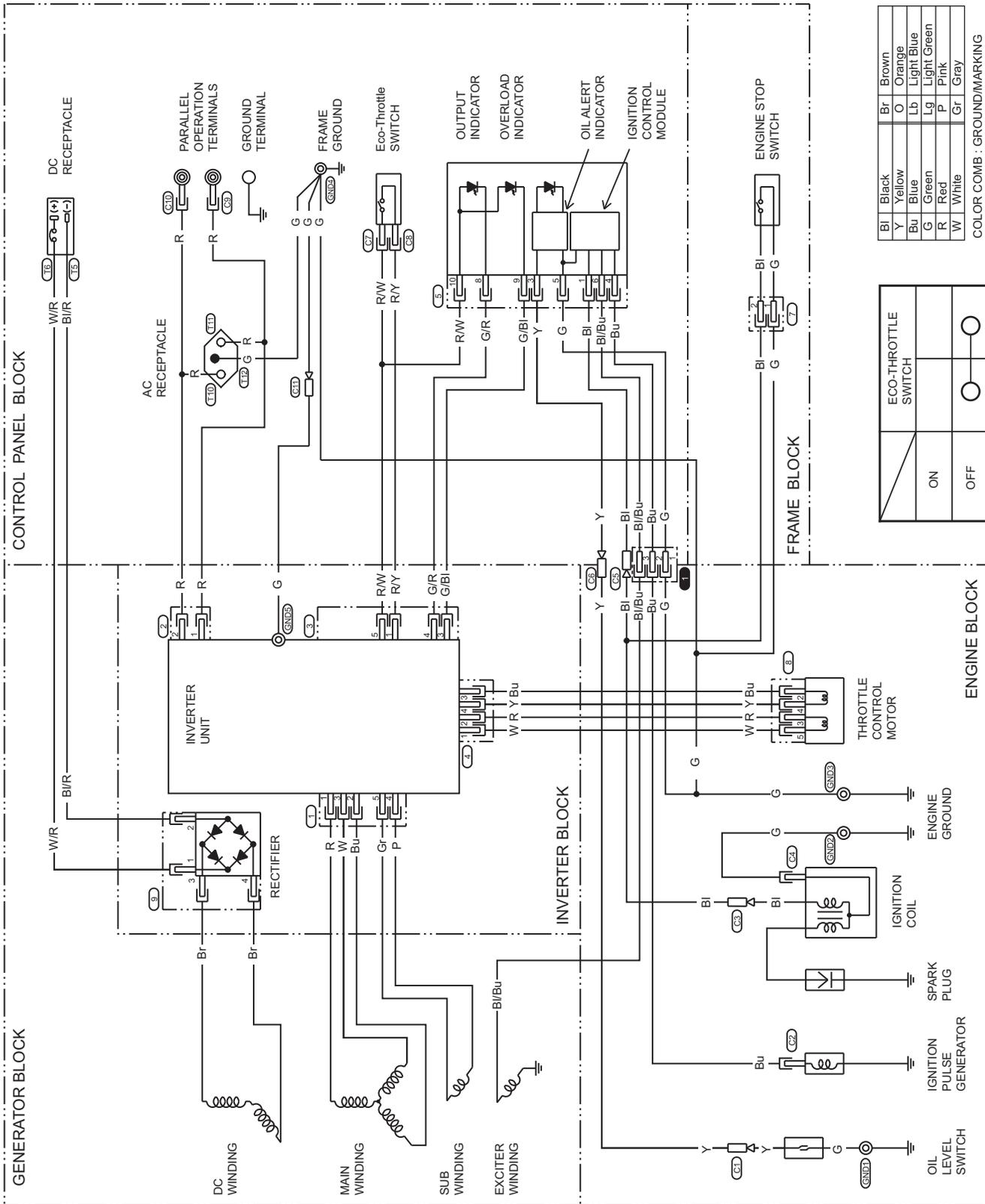
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light Blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

COLOR COMB : GROUND/MARKING

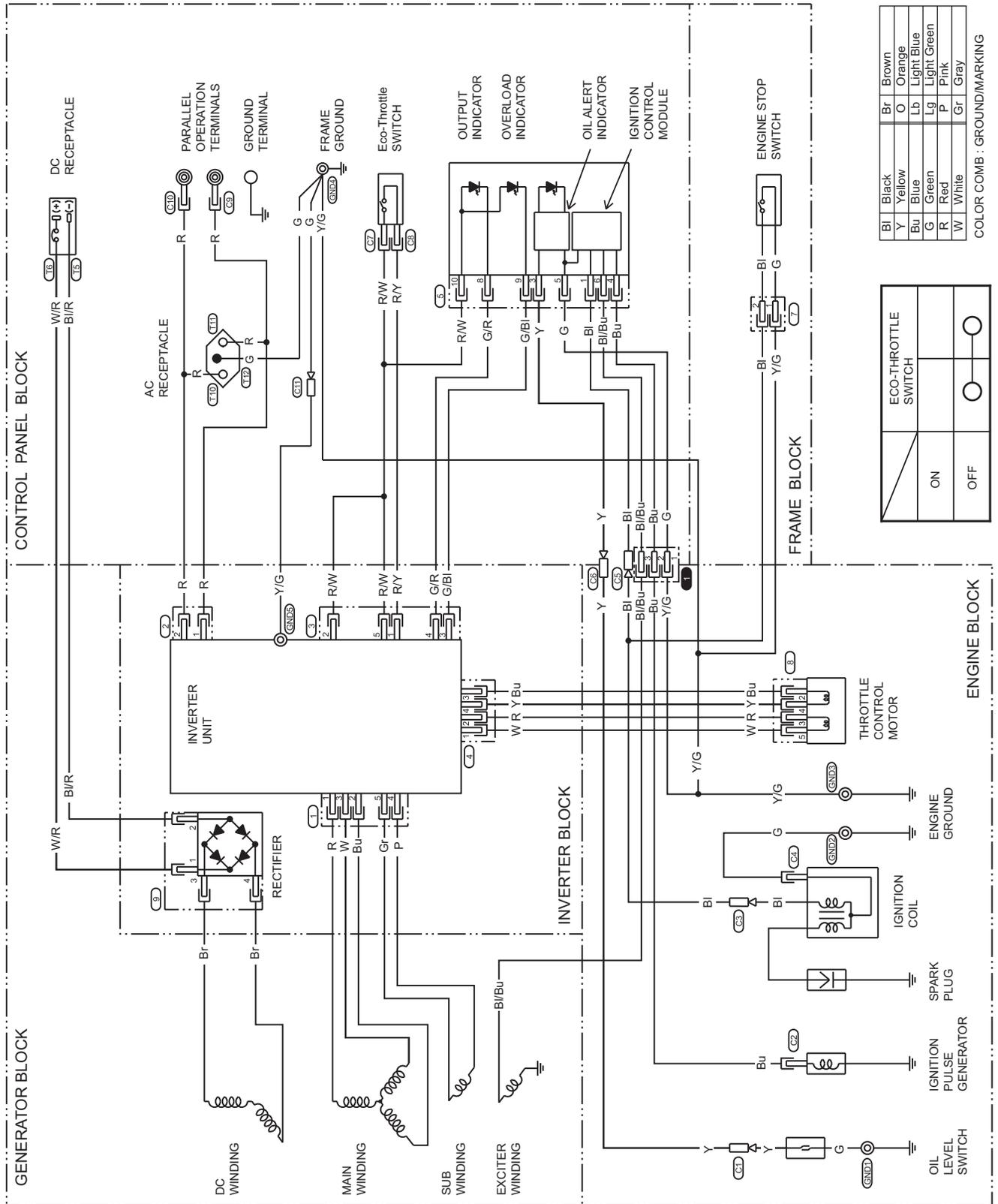


WIRING DIAGRAM

LB TYPE:

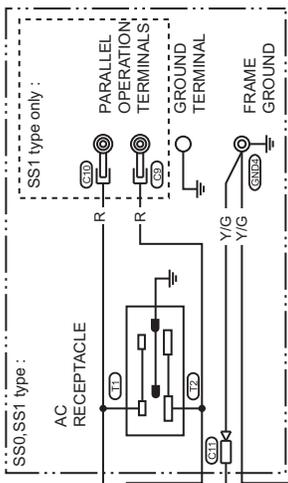
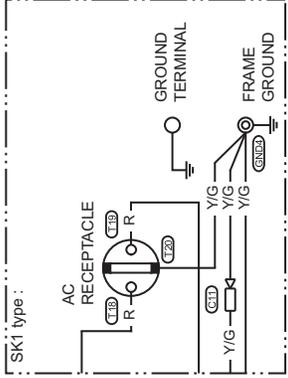
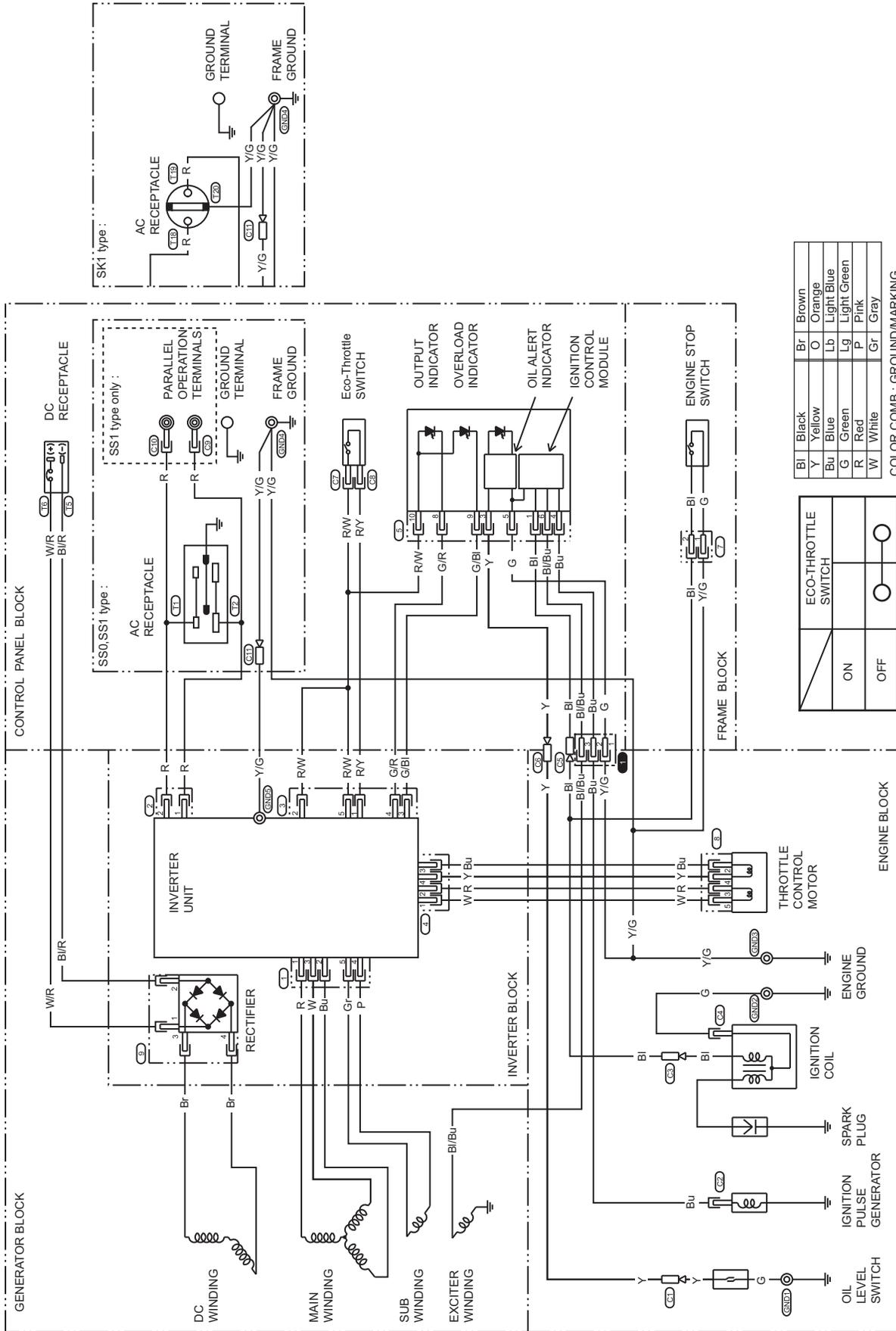


SB TYPE:



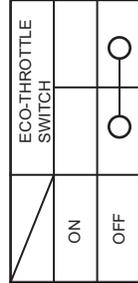
WIRING DIAGRAM

SS0, SS1, SK1 TYPES:



BI	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light Blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

COLOR COMB : GROUND/MARKING



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