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 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 (Hot parts-wear gloves, for example). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practice, 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:

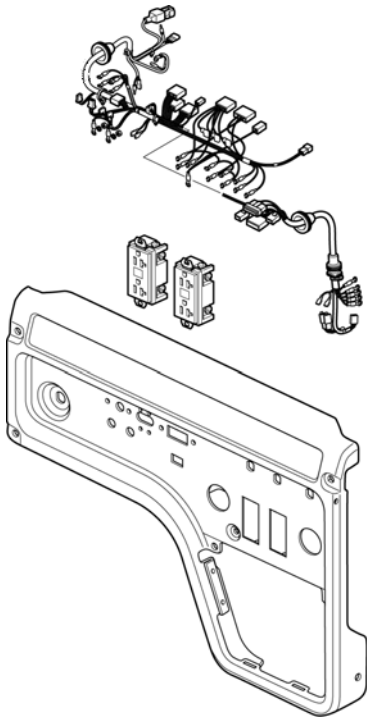
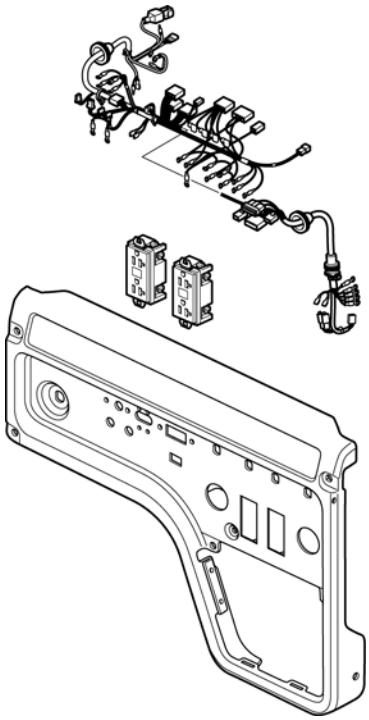
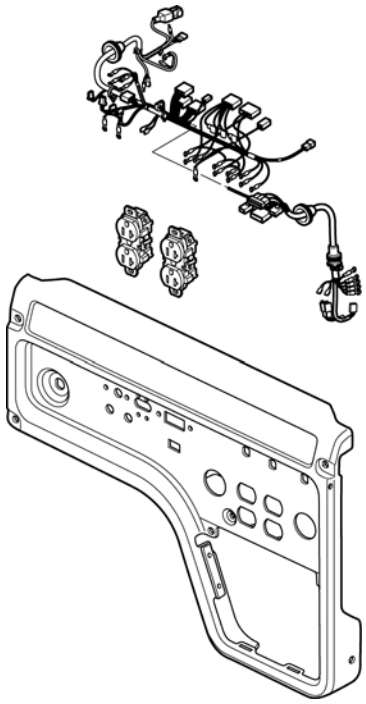
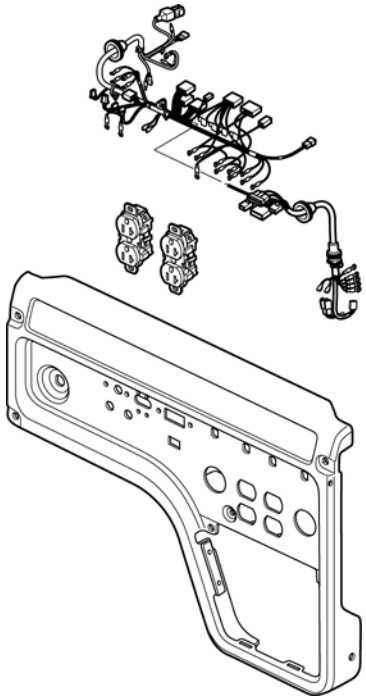
- Read all of the instructions before you begin, and make sure you have the tools, the replacement or repair parts, and the skills required to perform the tasks safely and completely.
- Protect your eyes by using proper safety glasses, goggles, or face shields anytime you hammer, drill, grind, or work 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 engine-power equipment up 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 battery 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.

Item	AT1 type	AT type
Control panel/ control panel wire harness/ receptacle	EM4000SX:  EM5000SXK3/EM6500SXK2: 	EM4000SX:  EM5000SXK3/EM6500SXK2: 

CONTENTS

INTRODUCTION

This manual covers the construction, function, and servicing procedures of the Honda EM4000SX / EM5000SXK3 / EM6500SXK2 generators.

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.

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. American Honda Motor Co., Inc. 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.

SERVICE PUBLICATION OFFICE

Date of Issue: September 2011

SERVICE RULES

- Use genuine Honda 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 reassembly.
- After reassembly, 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 would 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.**

ABBREVIATIONS

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

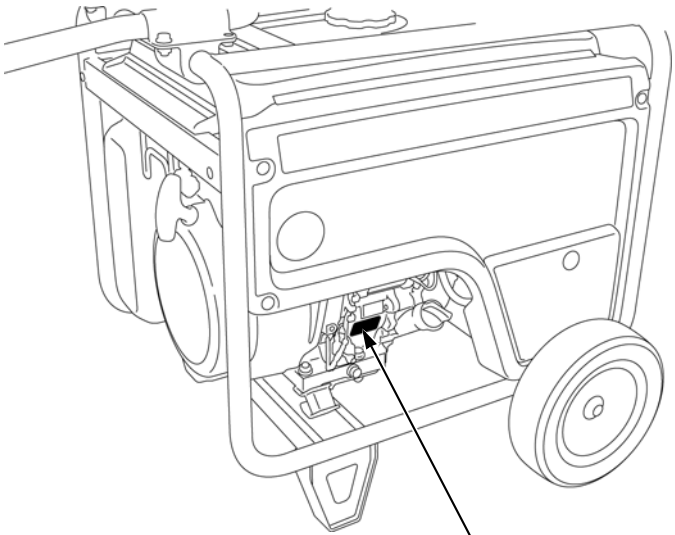
Abbrev. term	Full term
ACG	Alternator
A/F	Air Fuel Ratio
API	American Petroleum institute
Approx.	Approximately
Assy.	Assembly
ATDC	After Top Dead Center
ATF	Automatic Transmission Fluid
ATT	Attachment
AVR	Automatic Voltage Regulator
BAT	Battery
BDC	Bottom Dead Center
BTDC	Before Top Dead Center
BARO	Barometric Pressure
CKP	Crankshaft Position
Comp.	Complete
CMP	Camshaft Position
CT	Current Transformer
CYL	Cylinder
DLC	Data Link Connector
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
GFCI	Ground Fault Circuit Interrupter
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
TP	Throttle Position

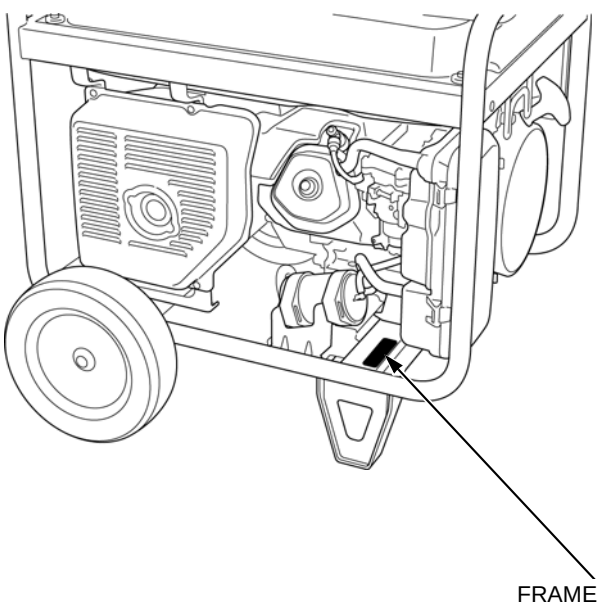
Bl	Black	G	Green	Br	Brown	Lg	Light green
Y	Yellow	R	Red	O	Orange	P	Pink
BU	Blue	W	White	Lb	Light blue	Gr	Gray

1. SPECIFICATIONS

SERIAL NUMBER LOCATION

The engine serial number is stamped on the cylinder barrel, and the frame serial number is on a label on the engine frame. Refer to it when ordering parts or making technical inquiries.





SPECIFICATIONS

DIMENSIONS AND WEIGHTS

Model	EM4000SX	EM5000SXK3	EM6500SXK2
Description code	EBRC	EBMC	EBJC
Overall length	1,043 mm (41.1 in)		1,051 mm (41.4 in)
Overall width	706 mm (27.8 in)		
Overall height	719 mm (28.3 in)		
Dry weight	92.5 kg (203.9 lbs)	103.5 kg (228.2 lbs)	106.0 kg (233.7 lbs)
Operating weight	110.7 kg (244.1 lbs)	119.3 kg (263.0 lbs)	124.2 kg (273.8 lbs)

ENGINE

Model	GX270T2	GX390T2
Description code	GCBHT	GCBDT
Type	4 stroke, overhead valve, single cylinder, inclined by 25°	
Displacement	270 cm^3 (16.5 cu–in)	389 cm^3 (23.7 cu–in)
Bore x stroke	77.0 x 58.0 mm (3.03 x 2.28 in)	88.0 x 64.0 mm (3.46 x 2.52 in)
Compression ratio	8.5: 1	8.2: 1
Ignition system	C.D.I (Capacitor Discharge Ignition) magneto ignition	
Ignition timing (at no load)	B.T.D.C. 10° at 1,400 min^{-1} (rpm)	B.T.D.C. 10° ± 2 at 1,400 min^{-1} (rpm)
Spark plug	BPR5ES (NGK), W16EPR-U (DENSO)	
Lubrication system	Forced spray	
Oil capacity	1.1 ℓ (1.2 US qt, 1.0 Imp qt)	
Recommended oil	SAE 10W – 30 API service classification SJ or later	
Cooling system	Forced air	
Starting system	Recoil starter, Starter motor	
Stopping system	Ignition exciter coil circuit open	
Carburetor	Horizontal type, butterfly valve	
Air cleaner	Semi-dry type	
Governor	Electric system	
Breather system	Reed valve type	
Fuel used	Regular unleaded gasoline with a pump octane rating 86 or higher	

GENERATOR

Model		EM4000SX	EM5000SXK3	EM6500SXK2
Description code		EBRC	EBMC	EBJC
Generator type		2-pole, rotating field type		
Excitation		Self–excitation		
Voltage regulation system		Digital AVR (Automatic Voltage Regulator)		
Phase		Single phase		
Rotating direction		Counterclockwise (Viewed from the generator)		
Rated output	AC	3.6 kVA	4.5 kVA	5.5 kVA
	DC	100 W		
Rated frequency		60 Hz		
AC	Rated voltage	120/240 V		
	Rated current	30.0 A /15.0 A	37.5 A /18.8 A	45.8 A /22.9 A
DC	Rated voltage	12 V		
	Rated current	8.3 A		
Power factor		1.0 Cosθ		

CHARACTERISTICS

Model		EM4000SX	EM5000SXK3	EM6500SXK2
Voltage variation rate	Momentary	15% max.		
	Average	7% max.		
	Average time	5 sec. max.		
Voltage stability		± 1% max.		
Frequency variation rate	Momentary	15% max.		
	Average	7% max.		
	Average time	5 sec. max.		
Frequency stability		1 Hz max.		
Insulation resistance		10 MΩ min.		
AC circuit breaker		17 A	21 A	27 A
DC circuit protector		12 A		
Insulation type		Type B		
Fuel tank capacity		23.5 ℓ (6.21 US gal, 5.17 Imp gal)		
Fuel consumption at rated load		2.32 ℓ (0.613 US gal, 0.510 Imp gal) /Hr.	2.90 ℓ (0.766 US gal, 0.638 Imp gal) /Hr.	3.40 ℓ (0.898 US gal, 0.748 Imp gal) /Hr.
Max. operating hours at rated load		10.1 Hr.	8.1 Hr.	6.9 Hr.
Sound power level (L_{WA}) at rated load		L_{WA} 97.0	L_{WA} 99.0	L_{WA} 99.8

SPECIFICATIONS

DIMENSIONS AND WEIGHTS

Model	EM4000SX	EM5000SXK3	EM6500SXK2
Type	AT1		
Description code	EBRC	EBMC	EBJC
Overall length	1,043 mm (41.1 in)		1,051 mm (41.4 in)
Overall width	706 mm (27.8 in)		
Overall height	719 mm (28.3 in)		
Dry weight	92.5 kg (203.9 lbs)	103.5 kg (228.2 lbs)	106.0 kg (233.7 lbs)
Operating weight	110.7 kg (244.1 lbs)	119.3 kg (263.0 lbs)	124.2 kg (273.8 lbs)

GENERATOR

Model		EM4000SX	EM5000SXK3	EM6500SXK2
Type		AT1		
Description code		EBRC	EBMC	EBJC
Generator type		Double electrode field rotation type		
Excitation		Self–excitation		
Voltage regulation system		Digital AVR (Automatic Voltage Regulator)		
Phase		Single phase		
Rotating direction		Counterclockwise (Viewed from the generator)		
Rated output	AC	3.6 kVA	4.5 kVA	5.5 kVA
	DC	100 W		
Rated frequency		60 Hz		
AC	Rated voltage	120/240 V		
	Rated current	30.0 A /15.0 A	37.5 A /18.8 A	45.8 A /22.9 A
DC	Rated voltage	12 V		
	Rated current	8 A		
Power factor		1.0 Cosθ		

CHARACTERISTICS

Model		EM4000SX	EM5000SXK3	EM6500SXK2
Type		AT1		
Voltage variation rate	Momentary	15% max.		
	Average	7% max.		
	Average time	5 sec. max.		
Voltage stability		± 1% max.		
Frequency variation rate	Momentary	15% max.		
	Average	7% max.		
	Average time	5 sec. max.		
Frequency stability		1 Hz max.		
Insulation resistance		10 MΩ min.		
AC circuit breaker		17 A	21 A	27 A
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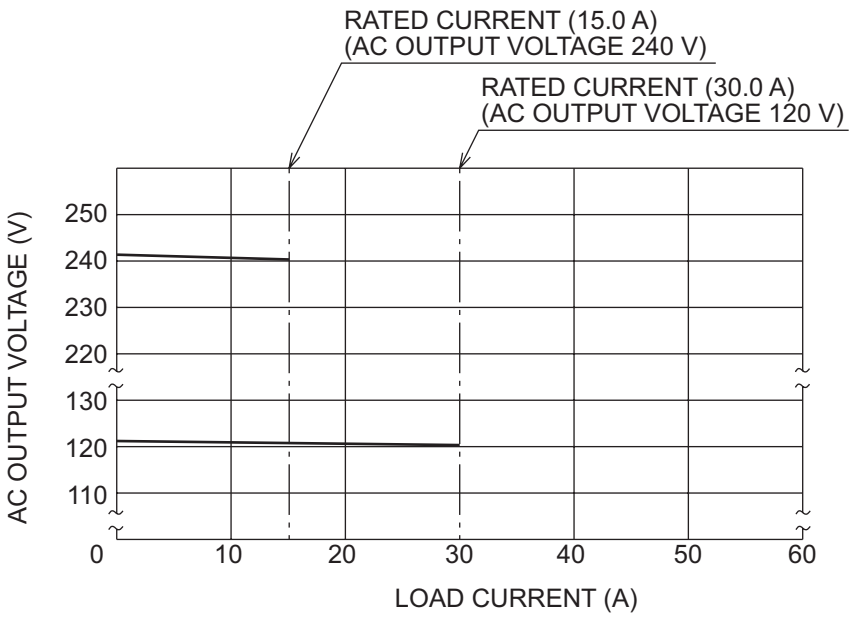
Fuel consumption at rated load		2.32 ℓ (0.613 US gal, 0.510 Imp gal) /Hr.	2.90 ℓ (0.766 US gal, 0.638 Imp gal) /Hr.	3.40 ℓ (0.898 US gal, 0.748 Imp gal) /Hr.
Max. operating hours at rated load		10.1 Hr.	8.1 Hr.	6.9 Hr.

PERFORMANCE CURVES

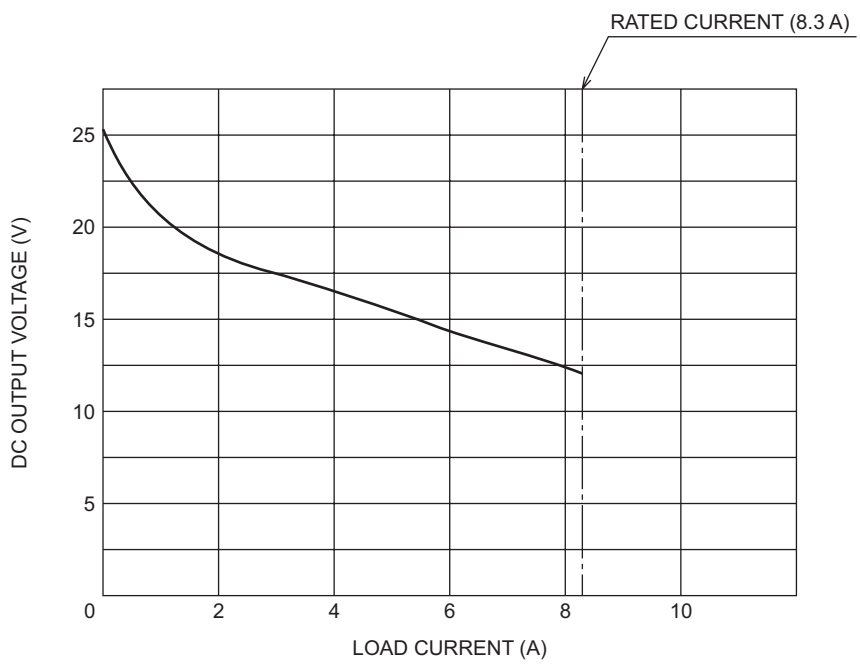
– The curve shows performance of the generator under average conditions.
– Performance may vary to some degree, depending on ambient temperature and humidity.
– The output voltage will be higher than usual when the generator is still cold, immediately after the engine starts.

EM4000SX

AC EXTERNAL CHARACTERISTIC CURVES



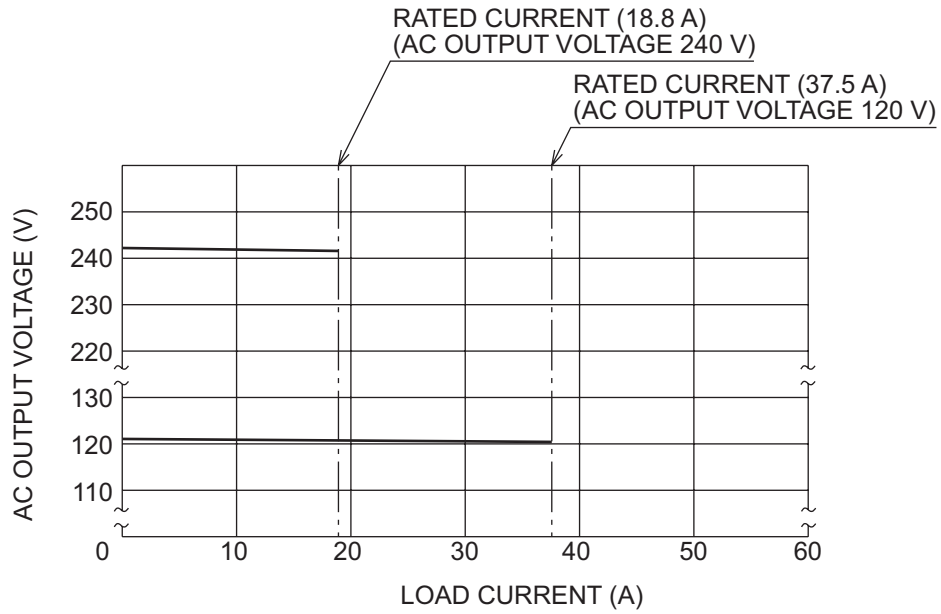
DC EXTERNAL CHARACTERISTIC CURVE (When the auto throttle OFF/When DC is used exclusively)



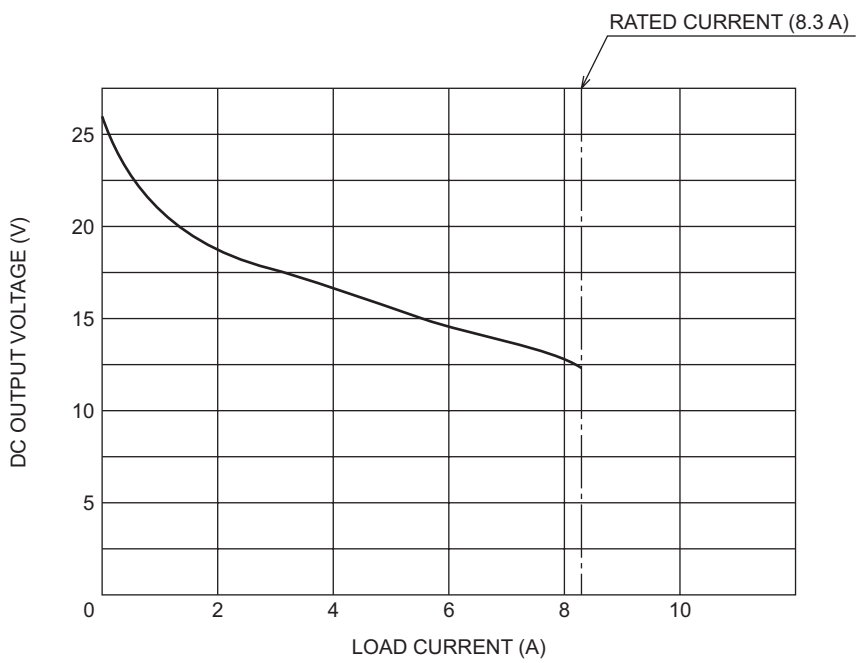
*This DC output characteristic was measured with the condition that condensers (200,000 µF) were parallel-connected.

EM5000SXK3

AC EXTERNAL CHARACTERISTIC CURVES



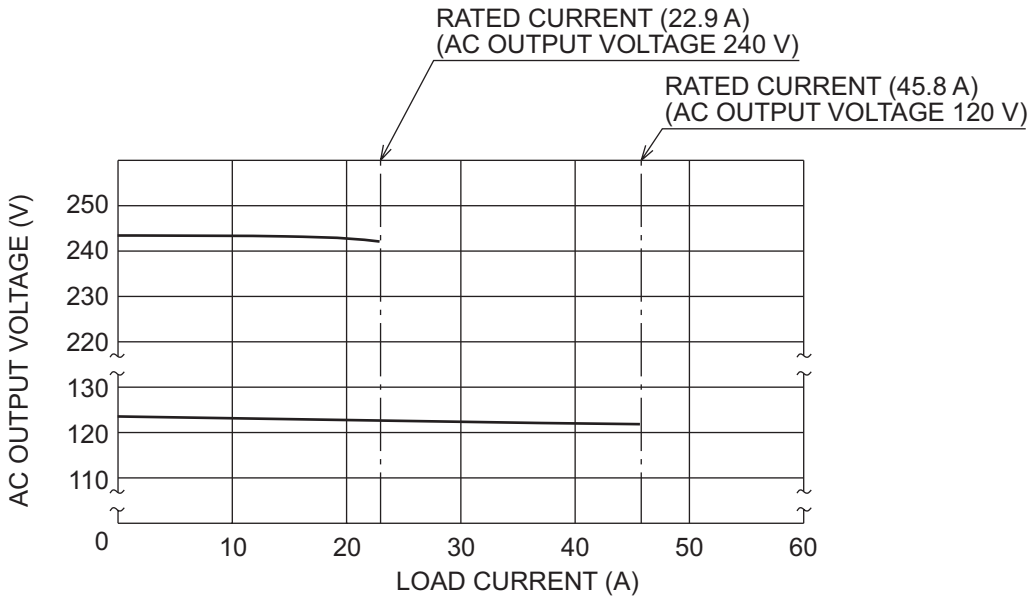
DC EXTERNAL CHARACTERISTIC CURVE (When the auto throttle OFF/When DC is used exclusively)



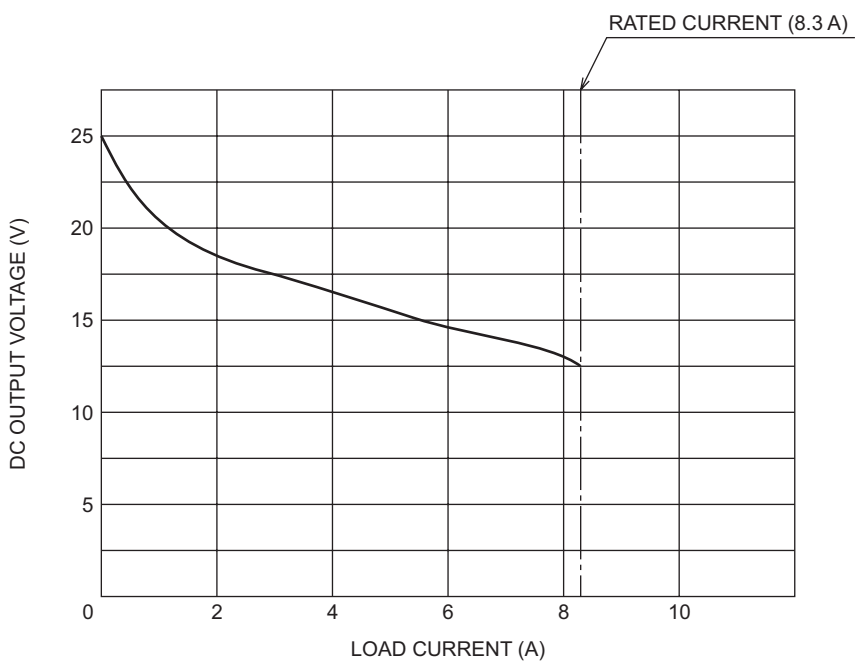
*This DC output characteristic was measured with the condition that condensers (200,000 µF) were parallel-connected.

EM6500SXK2

AC EXTERNAL CHARACTERISTIC CURVES



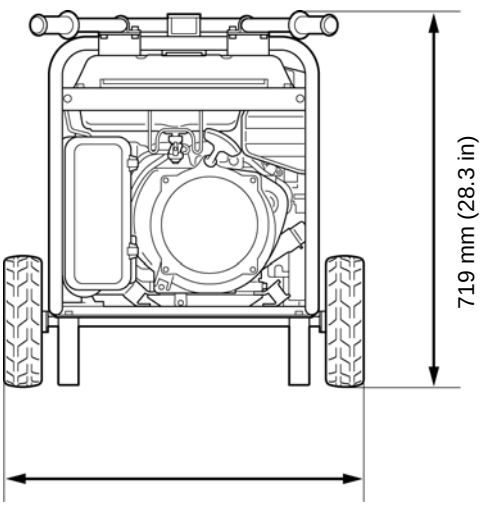
DC EXTERNAL CHARACTERISTIC CURVE (When the auto throttle OFF/When DC is used exclusively)



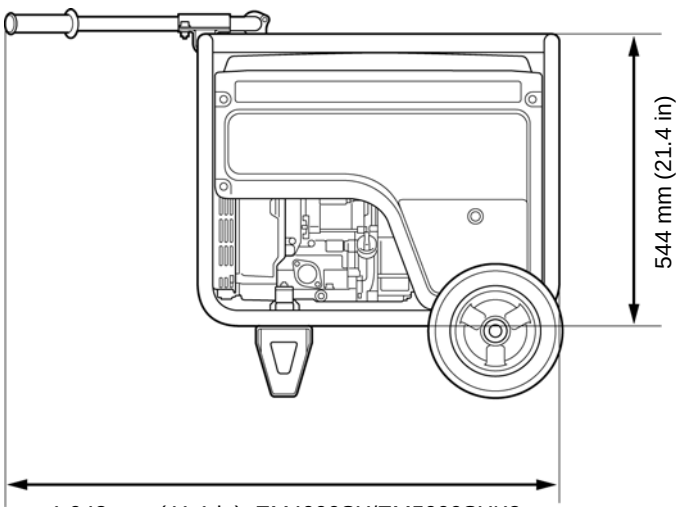
*This DC output characteristic was measured with the condition that condensers (200,000 μF) were parallel-connected.

DIMENSIONAL DRAWINGS

Unit: mm (in)

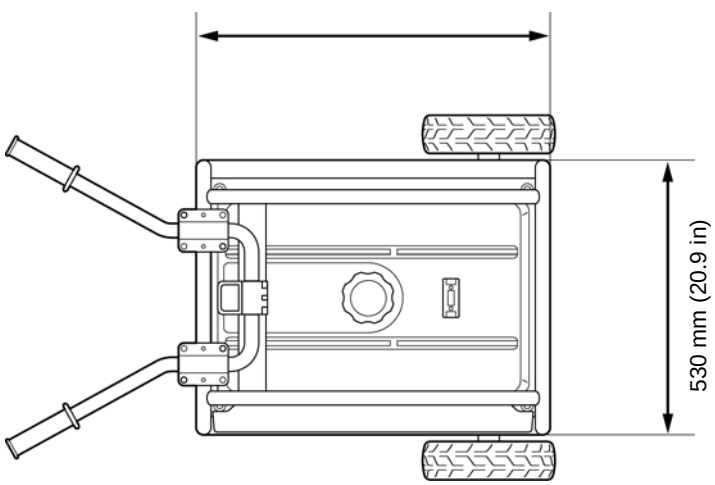


706 mm (27.8 in)



1,043 mm (41.1 in): EM4000SX/EM5000SXK3
1,051 mm (41.4 in): EM6500SXK2

681 mm (26.8 in): EM4000SX/EM5000SXK3
689 mm (27.1 in): EM6500SXK2



2. SERVICE INFORMATION

ELECTRIC PRECAUTIONS

- Hold the connector body to disconnect the connector. Do not disconnect by pulling the wire harness. To disconnect the locking connector, be sure to unlock first, and then disconnect.
- Check the connector terminals are not bent, damaged, or missing before connecting the connector.
- To connect, insert the connector as far as it will go. If the connector is a locking type, be sure the lock is locked securely.
- Check the connector cover for breakage and check that the connector female terminal is not open excessively. Then, connect the connector securely. Check the connector terminal for rust. Remove the rust using emery paper or equivalent material before connecting the connector.
- Set the harness clips in the specified places of the frame securely, and secure the wire harness.
- Clamp the cables securely.
- Clamp the wire harnesses securely so they do not interfere with rotating parts, moving parts, or hot parts.
- Route and connect the wire harnesses properly. Be sure the harnesses are not slack, twisted, or pulled taut.
- Route the wire harnesses properly so they do not contact sharp edges or corners or the ends of bolts and screws on the body.
- If the wire harness contacts the end of the bolts/screws or sharp edges and corners, protect the contact part of the harness with a tube or by winding with electrician’s protective tape. If the wire harness has a grommet, set the grommet securely.
- Take care not to pinch the wire harnesses during installation of a part. If a wire harness has damaged insulation, repair by winding with electrical insulating tape.
- Read the tester manufacturer’s operation instructions carefully before using a tester. Follow the instructions in the Service Manual. Be sure the battery in the tester is fully charged, and check the meter before inspection using the tester.

MAINTENANCE STANDARDS

ENGINE

EM4000SX

Unit: mm (in)

Part	Item		Standard	Service limit
Engine	Maximum engine speed		3,600 ± 100 min^{-1} (rpm)	–
	Auto Throttle® idle speed		2,300 ± 100 min^{-1} (rpm)	–
	Cylinder compression		1.31 MPa (13.3 kgf/cm^2, 189 psi) at 1,400 min^{-1} (rpm)	–
Cylinder	Sleeve I.D.		77.000 – 77.017 (3.0315 – 3.0322)	77.17 (3.038)
Cylinder head	Warpage		–	0.10 (0.004)
Piston	Skirt O.D.		76.975 – 76.985 (3.0305 – 3.0309)	76.85 (3.026)
	Piston-to-cylinder clearance		0.015 – 0.042 (0.0006 – 0.0017)	0.12 (0.005)
	Piston pin bore I.D.		18.002 – 18.008 (0.7087 – 0.7090)	18.042 (0.7103)
Piston pin	Pin O.D.		17.994 – 18.000 (0.7084 – 0.7087)	17.950 (0.7067)
	Piston pin-to-piston pin bore clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.08 (0.003)
Piston rings	Ring side clearance	Top	0.030 – 0.060 (0.0012 – 0.0024)	0.15 (0.006)
		Second	0.030 – 0.060 (0.0012 – 0.0024)	0.15 (0.006)
	Ring end gap	Top	0.200 – 0.350 (0.0079 – 0.0138)	1.0 (0.04)
		Second	0.350 – 0.500 (0.0138 – 0.0197)	1.0 (0.04)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	1.0 (0.04)
	Ring width	Top	1.160 – 1.175 (0.0457 – 0.0463)	1.150 (0.0453)
		Second	1.160 – 1.175 (0.0457 – 0.0463)	1.150 (0.0453)
Connecting rod	Small end I.D.		18.005 – 18.020 (0.7089 – 0.7094)	18.07 (0.711)
	Big end I.D.		33.025 – 33.039 (1.3002 – 1.3007)	33.07 (1.302)
	Big end oil clearance		0.040 – 0.064 (0.0016 – 0.0025)	0.12 (0.005)
	Big end side clearance		0.1 – 0.4 (0.004 – 0.016)	1.0 (0.04)
Crankshaft	Crank pin O.D.		32.975 – 32.985 (1.2982 – 1.2986)	32.92 (1.296)
	Runout		–	0.1 (0.004)
Valves	Valve clearance	IN	0.15 ± 0.02 (0.006 ± 0.001)	–
		EX	0.20 ± 0.02 (0.008 ± 0.001)	–
	Valve stem O.D.	IN	6.575 – 6.590 (0.2589 – 0.2594)	6.44 (0.254)
		EX	6.535 – 6.550 (0.2573 – 0.2579)	6.40 (0.252)
	Valve guide I.D.	IN/EX	6.600 – 6.615 (0.2598 – 0.2604)	6.66 (0.262)
	Guide-to-stem clearance	IN	0.010 – 0.040 (0.0004 – 0.0016)	0.11 (0.004)
		EX	0.050 – 0.080 (0.0020 – 0.0031)	0.13 (0.005)
	Valve seat width		1.0 – 1.2 (0.04 – 0.05)	2.1 (0.08)
	Valve spring free length		39.0 (1.54)	37.5 (1.48)
	Valve spring perpendicularity		–	1.5°
Camshaft	Camshaft O.D.		15.966 – 15.984 (0.6286 – 0.6293)	15.92 (0.627)
	Cam height	IN	31.845 – 32.245 (1.2537 – 1.2695)	31.22 (1.229)
		EX	31.566 – 31.966 (1.2428 – 1.2585)	31.26 (1.231)
Cylinder barrel	Camshaft holder I.D.		16.000 – 16.018 (0.6299 – 0.6306)	16.05 (0.632)
Crankcase cover	Camshaft holder I.D.		16.000 – 16.018 (0.6299 – 0.6306)	16.05 (0.632)
Spark plug	Gap		0.70 – 0.80 (0.028 – 0.031)	–
Ignition coil	Air gap		0.2 – 0.6 (0.01 – 0.02)	–
Carburetor	Main jet		# 82	–
	Float height		13.2 (0.52)	–
	Pilot screw opening		1 turn out	–

EM5000SXK3 / EM6500SXK2

Unit: mm (in)

Part	Item		Standard	Service limit
Engine	Maximum engine speed		3,600 ± 100 min^{-1} (rpm)	–
	Auto Throttle® idle speed		2,300 ± 100 min^{-1} (rpm)	–
	Cylinder compression		1.29 MPa (13.1 kgf/cm^2, 186 psi) at 1,400 min^{-1} (rpm)	–
Cylinder	Sleeve I.D.		88.000 – 88.017 (3.4646 – 3.4652)	88.17 (3.471)
Cylinder head	Warpage		–	0.10 (0.004)
Piston	Skirt O.D.		87.975 – 87.985 (3.4636 – 3.4640)	87.85 (3.459)
	Piston-to-cylinder clearance		0.015 – 0.042 (0.0006 – 0.0017)	0.12 (0.005)
	Piston pin bore I.D.		20.002 – 20.008 (0.7875 – 0.7877)	20.042 (0.7891)
Piston pin	Pin O.D.		19.994 – 20.000 (0.7872– 0.7874)	19.950 (0.7854)
	Piston pin-to-piston pin bore clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.08 (0.003)
Piston rings	Ring side clearance	Top	0.030 – 0.060 (0.0012 – 0.0024)	0.15 (0.006)
		Second	0.030 – 0.060 (0.0012 – 0.0024)	0.15 (0.006)
	Ring end gap	Top	0.200 – 0.350 (0.0079 – 0.0138)	1.0 (0.04)
		Second	0.350 – 0.500 (0.0138 – 0.0197)	1.0 (0.04)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	1.0 (0.04)
	Ring width	Top	1.160 – 1.175 (0.0457 – 0.0463)	1.150 (0.0453)
		Second	1.160 – 1.175 (0.0457 – 0.0463)	1.150 (0.0453)
Connecting rod	Small end I.D.		20.005 – 20.020 (0.7876 – 0.7882)	20.07 (0.790)
	Big end I.D.		36.025 – 36.039 (1.4183 – 1.4189)	36.07 (1.420)
	Big end oil clearance		0.040 – 0.064 (0.0016 – 0.0025)	0.12 (0.005)
	Big end side clearance		0.1 – 0.4 (0.004 – 0.016)	1.0 (0.04)
Crankshaft	Crank pin O.D.		35.975 – 35.985 (1.4163 – 1.4167)	35.93 (1.415)
	Runout		–	0.1 (0.004)
Valves	Valve clearance	IN	0.15 ± 0.02 (0.006 ± 0.001)	–
		EX	0.20 ± 0.02 (0.008 ± 0.001)	–
	Valve stem O.D.	IN	6.575 – 6.590 (0.2589 – 0.2594)	6.44 (0.254)
		EX	6.535 – 6.550 (0.2573 – 0.2579)	6.40 (0.252)
	Valve guide I.D.	IN/EX	6.600 – 6.615 (0.2598 – 0.2604)	6.66 (0.262)
	Guide-to-stem clearance	IN	0.010 – 0.040 (0.0004 – 0.0016)	0.11 (0.004)
		EX	0.050 – 0.080 (0.0020 – 0.0031)	0.13 (0.005)
	Valve seat width		1.0 – 1.2 (0.04 – 0.05)	2.1 (0.08)
	Valve spring free length		39.0 (1.54)	37.5 (1.48)
	Valve spring perpendicularity		–	1.5°
Camshaft	Camshaft O.D.		15.966 – 15.984 (0.6286 – 0.6293)	15.92 (0.627)
	Cam height	IN	32.398 – 32.798 (1.2755 – 1.2913)	32.10 (1.264)
		EX	31.885 – 32.285 (1.2553 – 1.2711)	31.59 (1.244)
Cylinder barrel	Camshaft holder I.D.		16.000 – 16.018 (0.6299 – 0.6306)	16.05 (0.632)
Crankcase cover	Camshaft holder I.D.		16.000 – 16.018 (0.6299 – 0.6306)	16.05 (0.632)
Spark plug	Gap		0.70 – 0.80 (0.028 – 0.031)	–
Ignition coil	Air gap		0.2 – 0.6 (0.01 – 0.02)	–
Carburetor	Main jet		# 105	–
	Float height		13.2 (0.52)	–
	Pilot screw opening		1 – 3/4 turns out	–

GENERATOR

EM4000SX

Unit: mm (in)

Part	Item	Standard	Service limit
Stator	Main winding 1 resistance	0.5 ~ 0.9 W	–
	Main winding 2 resistance	0.5 ~ 0.9 W	–
	DC winding resistance	0.4 ~ 0.6 W	–
	Exciter winding resistance	0.8 ~ 1.4 W	–
Rotor	Field winding resistance	36 ~ 54 W	–
Carbon brush	Brush length	9.0 mm (0.354 in)	5.0 mm (0.197 in)

EM5000SXK3

Unit: mm (in)

Part	Item	Standard	Service limit
Stator	Main winding 1 resistance	0.3 ~ 0.5 W	–
	Main winding 2 resistance	0.3 ~ 0.5 W	–
	DC winding resistance	0.3 ~ 0.5 W	–
	Exciter winding resistance	0.7 ~ 1.1 W	–
Rotor	Field winding resistance	48 ~ 72 W	–
Carbon brush	Brush length	9.0 mm (0.354 in)	5.0 mm (0.197 in)

EM6500SXK2

Unit: mm (in)

Part	Item	Standard	Service limit
Stator	Main winding 1 resistance	0.2 ~ 0.4 W	–
	Main winding 2 resistance	0.2 ~ 0.4 W	–
	DC winding resistance	0.3 ~ 0.5 W	–
	Exciter winding resistance	0.8 ~ 1.2 W	–
Rotor	Field winding resistance	48 ~ 72 W	–
Carbon brush	Brush length	9.0 mm (0.354 in)	5.0 mm (0.197 in)

TORQUE VALUES

ENGINE

Item		Thread Dia. and pitch (mm)	Torque values			Remarks
			N·m	kgf·m	lbf·ft	
Crankcase cover bolt		M8 x 1.25	24	2.4	18	
Cylinder head bolt		M10 x 1.25	35	3.6	26	Apply engine oil to the threads and seating surface.
Oil drain bolt		M12 x 1.5	22.5	2.3	17	
Connecting rod special bolt		M8 x 1.25	14	1.4	10	Apply engine oil to the threads and seating surface.
Rocker arm pivot special bolt		M8 x 1.25	24	2.4	18	Apply engine oil to the threads and pivot area.
Rocker arm pivot adjusting nut		M6 x 0.5	10	1.0	7	
Spark plug		M14 x 1.25	18	1.8	13	
Flywheel special nut	EM4000SX	M16 x 1.5	128	13.1	94	Degrease the crankshaft and flywheel tapered surface. Apply engine oil to the threads and seating surface.
	EM5000SXK3 / EM6500SXK2	M16 x 1.5	170	17.3	125	
Fan cover stud bolt mounting nut		M10 x 1.25	40	4.1	30	
Fan cover stud bolt		M8 x 1.25	23	2.3	17	
ECM screw/washer		M4 x 0.7	2.1	0.21	1.5	
Motor case set screw A/B		M4 x 0.7	2.1	0.21	1.5	
Carburetor jet set screw		M5 x 0.8	0.3	0.03	0.2	
Carburetor drain screw		–	1.5	0.15	1.1	
Float chamber set screw		–	6.9	0.70	5.1	

FRAME

Item	Thread Dia. and pitch (mm)	Torque values			Remarks
		N·m	kgf·m	lbf·ft	
Rubber mount nut	M8 x 1.25	24	2.4	18	
Engine mount nut	M10 x 1.25	34	3.5	25	
Fuel valve nut	M16 x 1.5	23	2.3	17	
Fuel meter screw	M5 x 0.8	4	0.41	3.0	
Carburetor mount nut	M6 x 1.0	8.5	0.87	6.3	
Air cleaner case bolt	M5 x 0.8	5.4	0.55	4.0	
Rotor bolt	M10 x 1.25	44	4.5	32	Degrease the rotor and crankshaft tapered surface.
Rear housing cover bolt	M6 x 1.0	9.8	1.0	7.2	
Generator cooling fan screw	M5 x 0.8	4.8	0.49	3.5	
Front housing bolt	M8 x 1.25	24	2.4	18	
Control panel mount bolt	M8 x 1.25	27	2.8	20	
Receptacle mount nut	M4 x 0.7	1.3	0.13	1.0	
Circuit protector mount nut	M11 x 1.0	1.8	0.18	1.3	
Combination switch mount nut	M18 x 1.0	7	0.71	5.2	
Junction box plate mount bolt	M6 x 1.0	8	0.82	5.9	
Exhaust pipe nut	M8 x 1.25	24	2.4	18	

STANDARD TORQUE VALUES

Item	Thread dia. (mm)	Torque values		
		N·m	kgf·m	lbf·ft
Screw	4 mm	2.0	0.20	1.5
	5 mm	4.3	0.44	3.2
	6 mm	9	0.92	6.6
Bolt and nut	5 mm	5.3	0.54	3.9
	6 mm	10	1.0	7
	8 mm	22	2.2	16
	10 mm	34	3.5	25
	12 mm	54	5.5	40
Flange bolt and nut	5 mm	5.3	0.54	3.9
	6 mm	12	1.2	9
	8 mm	23	2.3	17
	10 mm	39	4.0	29
SH (Small head) flange bolt	6 mm	9	0.92	6.6
CT (Cutting threads) flange bolt (Retightening)	5 mm	5.4	0.55	4.0
	6 mm	12	1.2	9

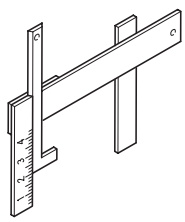
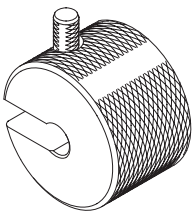
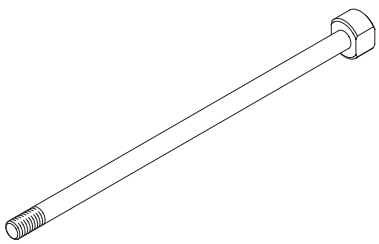
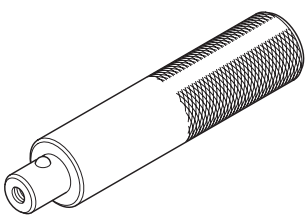
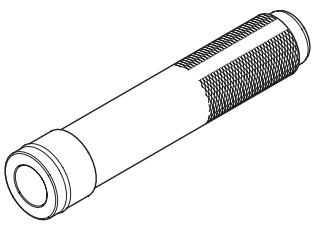
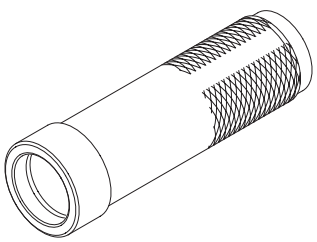
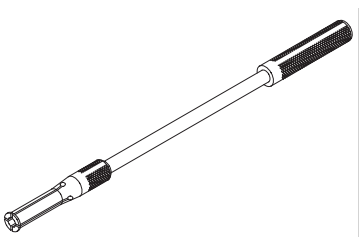
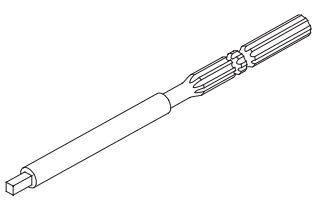
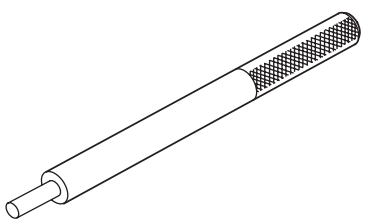
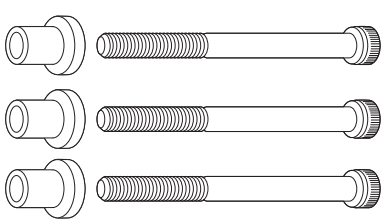
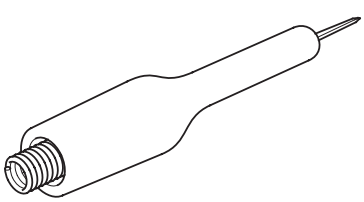
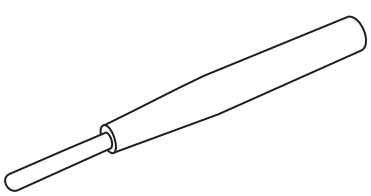
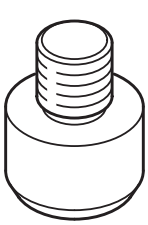
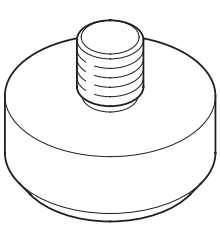
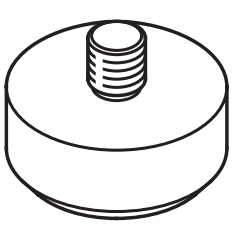
LUBRICATION & SEAL POINT

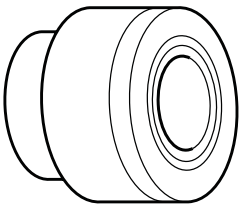
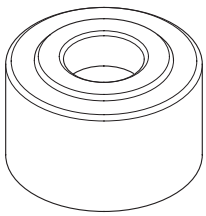
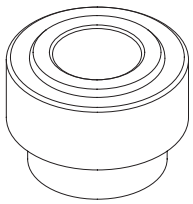
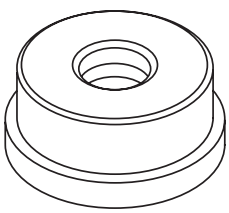
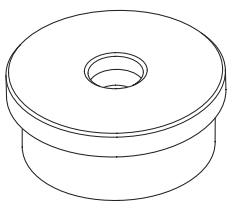
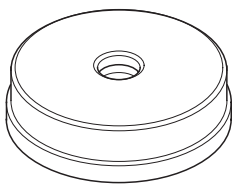
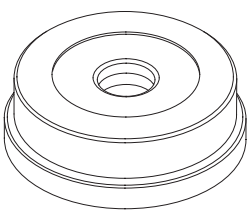
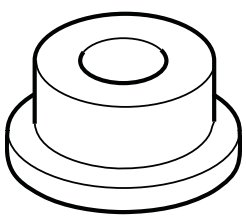
Location	Material	Remarks
Crank pin and gears	Engine oil	
Piston outer surface		
Piston rings		
Piston pin outer surface		
Cylinder barrel inner surface		
Connecting rod big and small end		
Connecting rod bolt threads and seating surface		
Camshaft cam profile and journal		
Valve lifter stem, stem end and slipper		
Valve stem sliding surface and stem end		
Valve rocker arm tappet surface and pivot		
Rocker arm pivot threads and pivot		
Flywheel nut threads and seating surface		
Cylinder head bolt threads and seating surface		
Balancer shaft gear and journal		
Oil seal lip	Multi-purpose grease	
O-ring		
Recoil starter case cutout		
Recoil starter ratchet		
Recoil starter spring retainer inside		
Crankcase cover matching area	Hondabond HT, Hondabond 4 or equivalent	See page 12-3
Recoil starter center screw threads	Hondalock 1 or Threebond ® 2430 or equivalent	

TOOLS

SPECIAL TOOLS

Special tools used in this manual can be ordered using normal American Honda parts ordering procedures.

Float level gauge 07401-0010000 	Remover weight 07936-371020A 	Sliding shaft 07736-0010101 
Driver, 15 x 135 mm 07749-0010000 	Driver, 22 mm I.D. 07746-0020100 	Driver, 40 mm I.D. 07746-0030100 
Bearing remover, 15 mm 07936-KC10500 	Valve guide reamer, 6.612 mm 07984-ZE20001 Valve guide reamer, 6.6 mm 07984-ZE2000D 	Valve guide driver, 6.6 mm 07942-6570100 
Puller collar set 07APC-ZY1A100 	Test probe 07ZAJ-RDJA100 	Back probe adapter 07TAZ-001020A 
Pilot, 15 mm 07746-0040300 	Pilot, 30 mm 07746-0040700 	Pilot, 35 mm 07746-0040800 

Inner bearing driver attachment, 35 mm I.D. 07746-0030400 	Attachment, 20 mm I.D. 07746-0020400 	Attachment, 30 mm I.D. 07746-0030300 
Bearing driver attachment, 32 × 35 mm 07746-0010100 	Bearing driver attachment, 45 × 50 mm 07946-6920100 	Bearing driver attachment, 52 × 55 mm 07746-0010400 
Bearing driver attachment, 62 × 64 mm 07947-6340400 	Bearing driver attachment, 72×75mm 07746-0010600 	

COMMERCIALLY AVAILABLE TOOLS

Tool name	Tool number	Application
Digital multimeter	FLU88	Electrical testing
Valve seat cutter, 30 x 45 degree	NWYCU128	Valve seat reconditioning
Valve seat cutter, 60 degree	NWYCU114	
Solid pilot bar, 6.6 mm	NWY100-6.60	
T handle	NWYTW505	
Valve lapper	LIL21100	
Strap wrench	S-17	Flywheel removal
Flywheel puller	OTC7403	
Compression gauge	EEPV303A	Compression testing
Leak down tester	KLIAT1006M	Cylinder leak down

There are two convenient ways to order: online or by toll-free phone.

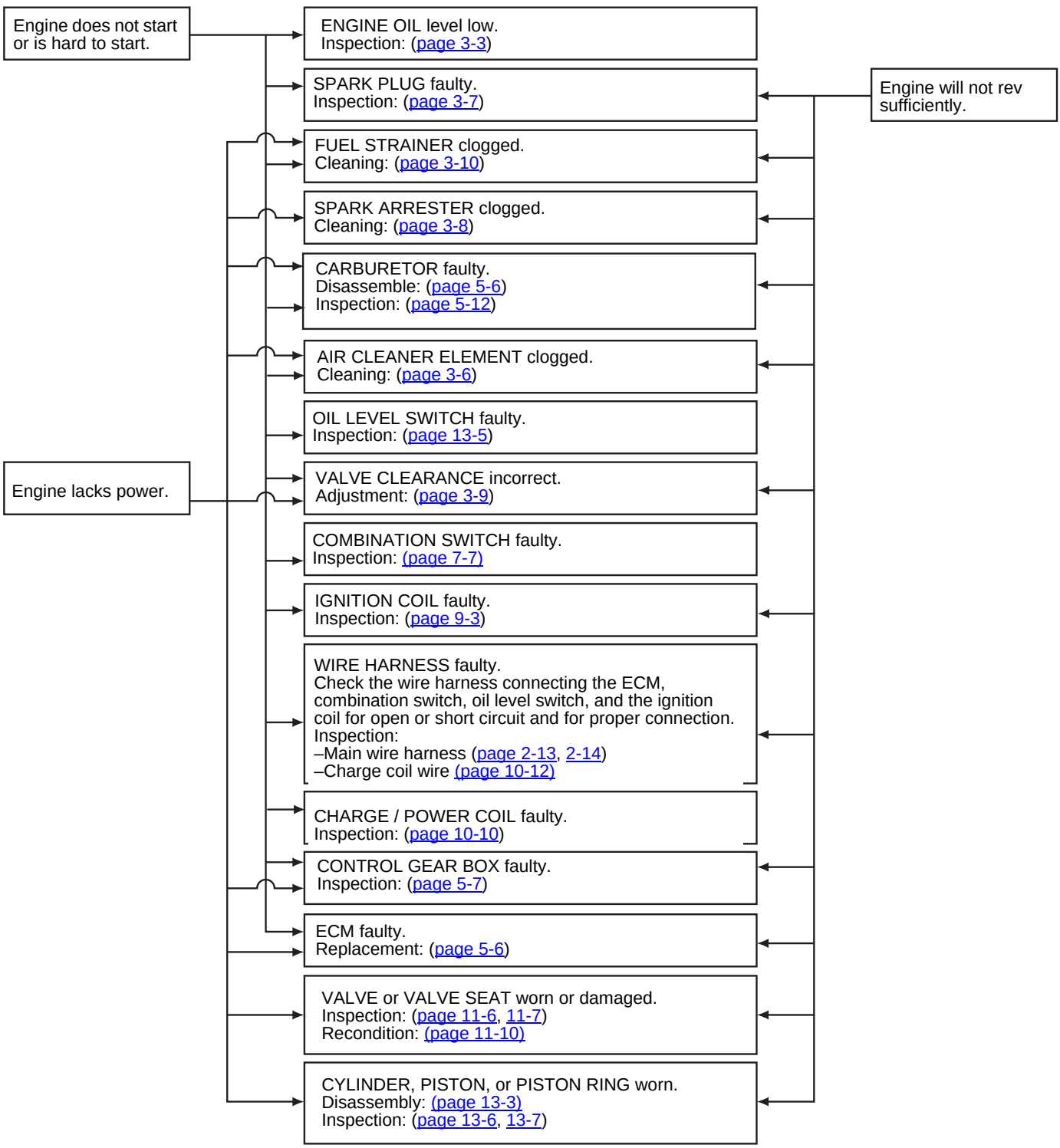
- To order online, go to the iN: SERVICE>Tools>Tool and Equipment Program>Online Catalog, and then search by model number.
- To order online, go to the iN: SERVICE>Tools>Tool and Equipment Program>Online Catalog, and then search by model number.

BEFORE TROUBLESHOOTING

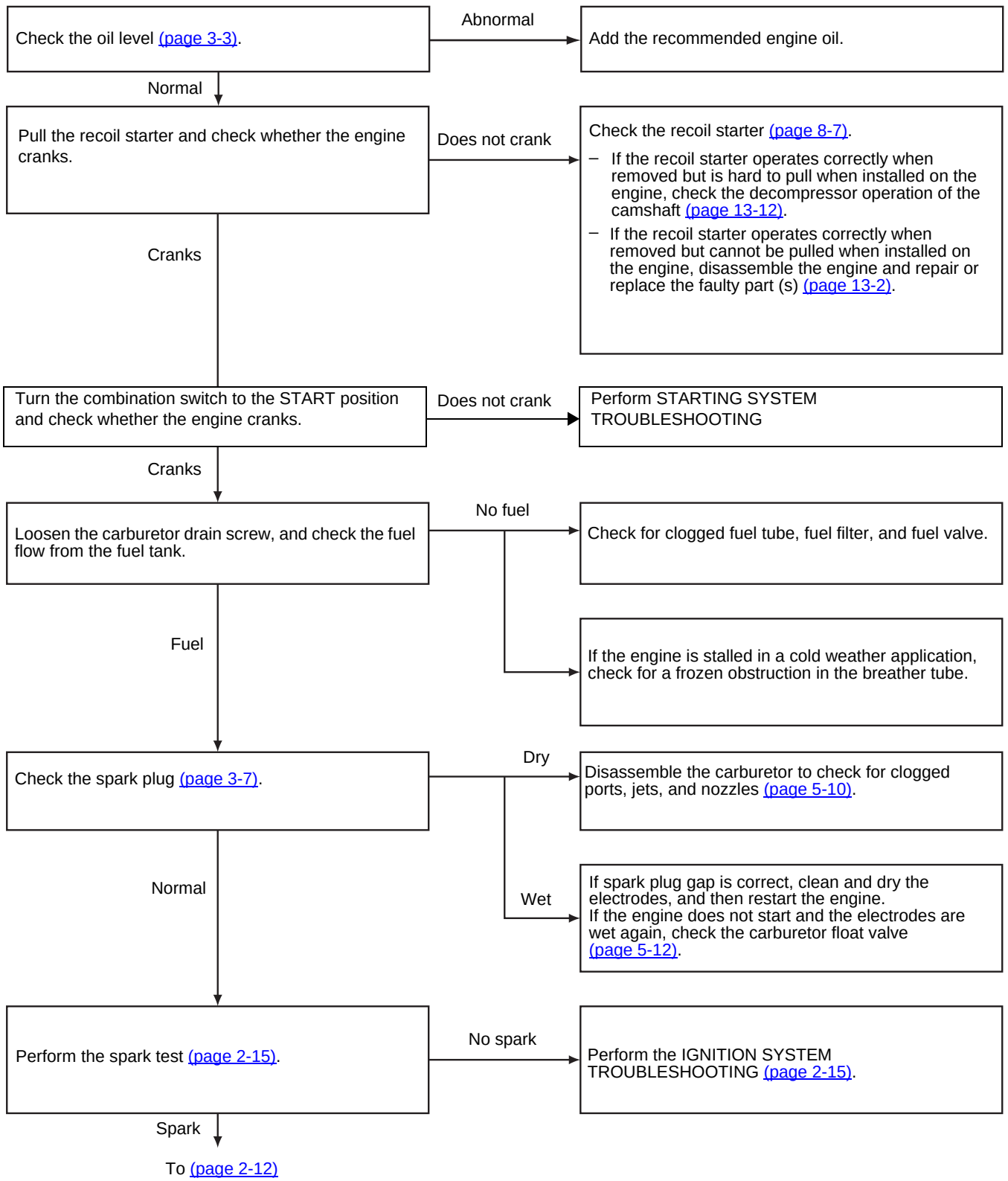
- Use a known-good battery for troubleshooting.
- Check that the connectors are connected securely.
- Check for sufficient fresh fuel in the fuel tank.
- Read the circuit tester's operation instructions carefully, and observe the instructions during inspection.
- Disconnect the battery cable before continuity inspection.

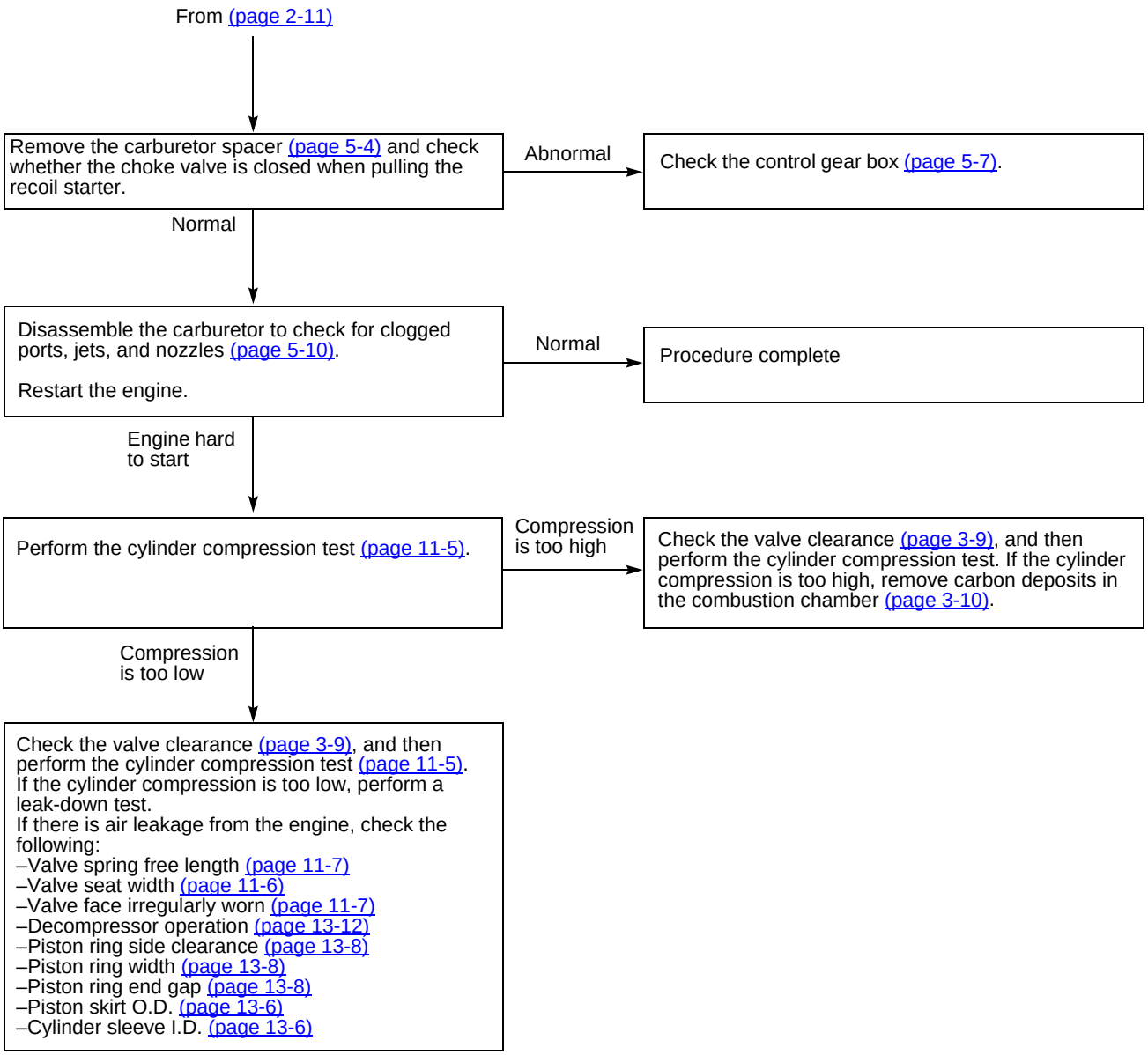
ENGINE TROUBLESHOOTING

GENERAL SYMPTOMS AND POSSIBLE CAUSES

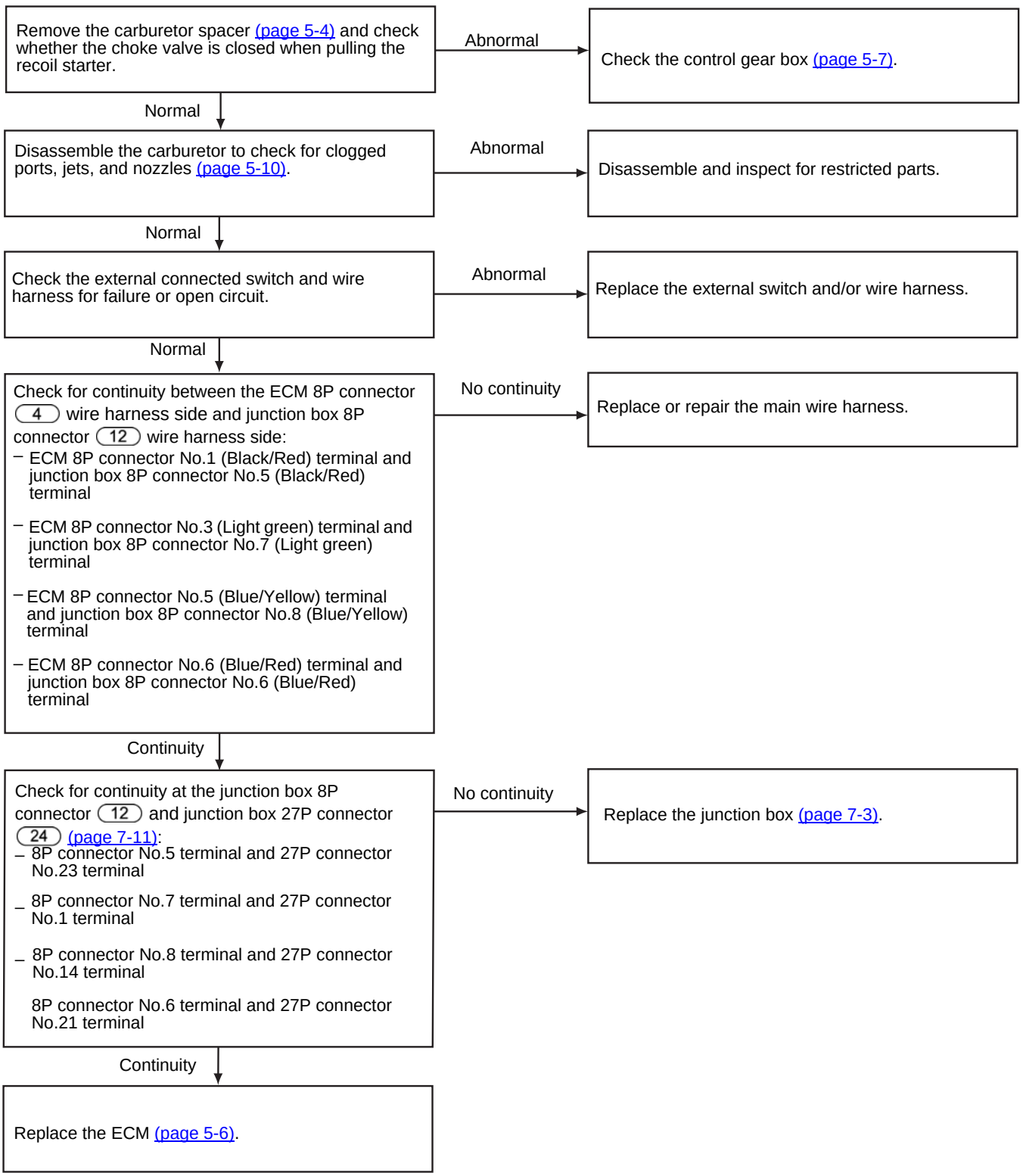


HARD STARTING




From (page 2-11)
Remove the carburetor spacer (page 5-4) and check whether the choke valve is closed when pulling the recoil starter.
Abnormal
Check the control gear box (page 5-7).
Normal
Disassemble the carburetor to check for clogged ports, jets, and nozzles (page 5-10).
Restart the engine.
Normal
Procedure complete
Engine hard to start
Perform the cylinder compression test (page 11-5).
Compression is too high
Check the valve clearance (page 3-9), and then perform the cylinder compression test. If the cylinder compression is too high, remove carbon deposits in the combustion chamber (page 3-10).
Compression is too low
Check the valve clearance (page 3-9), and then perform the cylinder compression test (page 11-5).
If the cylinder compression is too low, perform a leak-down test.
If there is air leakage from the engine, check the following:
–Valve spring free length (page 11-7)
–Valve seat width (page 11-6)
–Valve face irregularly worn (page 11-7)
–Decompressor operation (page 13-12)
–Piston ring side clearance (page 13-8)
–Piston ring width (page 13-8)
–Piston ring end gap (page 13-8)
–Piston skirt O.D. (page 13-6)
–Cylinder sleeve I.D. (page 13-6)

ENGINE SPEED DOES NOT STABILIZE



ENGINE DOES NOT STOP WHEN COMBINATION SWITCH IS TURNED OFF

Check the combination switch (page 7-7).

Abnormal → Replace the combination switch.

Normal ↓

Check for continuity between the ignition coil 4P connector (7) wire harness side and combination switch 2P connector (13) wire harness side:

- Ignition coil 4P connector No.1 (Black) terminal and combination switch 2P connector No.2 (Black) terminal
- Ignition coil 4P connector No.2 (Red) terminal and combination switch 2P connector No.1 (Red) terminal

Continuity → Replace or repair the wire harness.

No continuity ↓

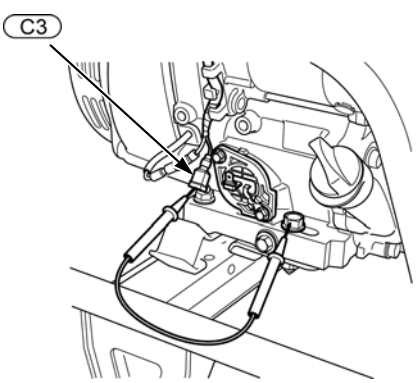
Check the ignition coil (page 9-3).

Replace the ignition coil if abnormalities are found, and recheck.

ENGINE DOES NOT STOP WHEN ENGINE OIL LEVEL IS LOW

Start the engine.

Disconnect the oil level switch wire connector (C3) (Yellow) terminal, and short the wire harness side to engine ground using a jumper wire.



Engine stops → Replace the oil level switch (page 13-4).

Engine does not stop ↓

- Check for open circuit in the yellow wire between the oil level switch and ignition coil.
- Check for open circuit in junction box circuit (page 7-11).

IGNITION SYSTEM TROUBLESHOOTING

⚠WARNING

Gasoline is highly flammable and explosive.
If ignited, gasoline can burn you severely.

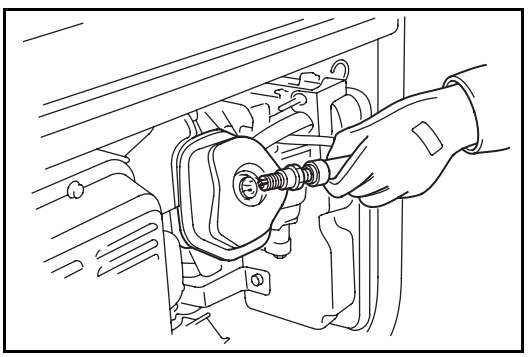
- Be sure there is no spilled fuel near the engine.
- Place the spark plug away from the spark plug holes. Unburned gas can ignite if it is left in the cylinder.
- Loosen the carburetor drain screw to drain the carburetor thoroughly. Pull the recoil starter several times to release the unburned gas from the cylinder before test.

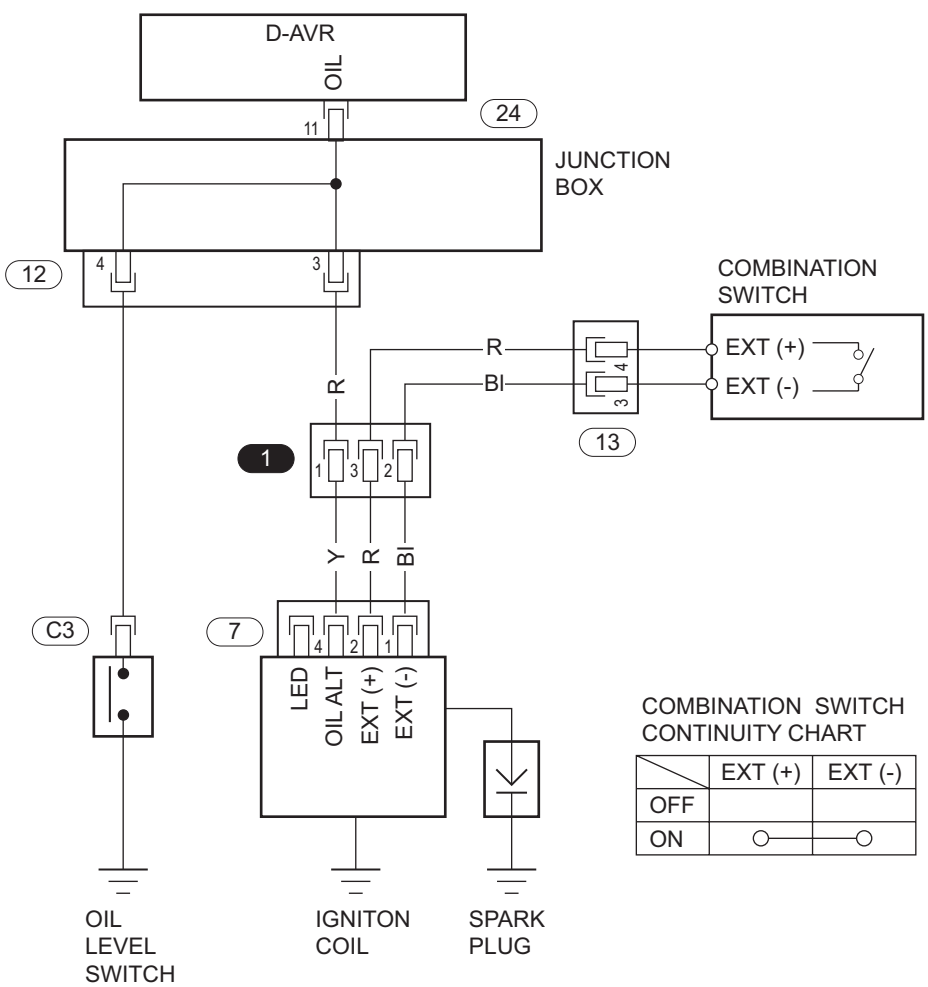
Spark Test

Remove the spark plug cap and spark plug.

Install the spark plug to the spark plug cap and ground the side electrode against the cylinder head cover.

Turn the engine switch to the ON position, pull the recoil starter and check to see if sparks jump across the electrodes.

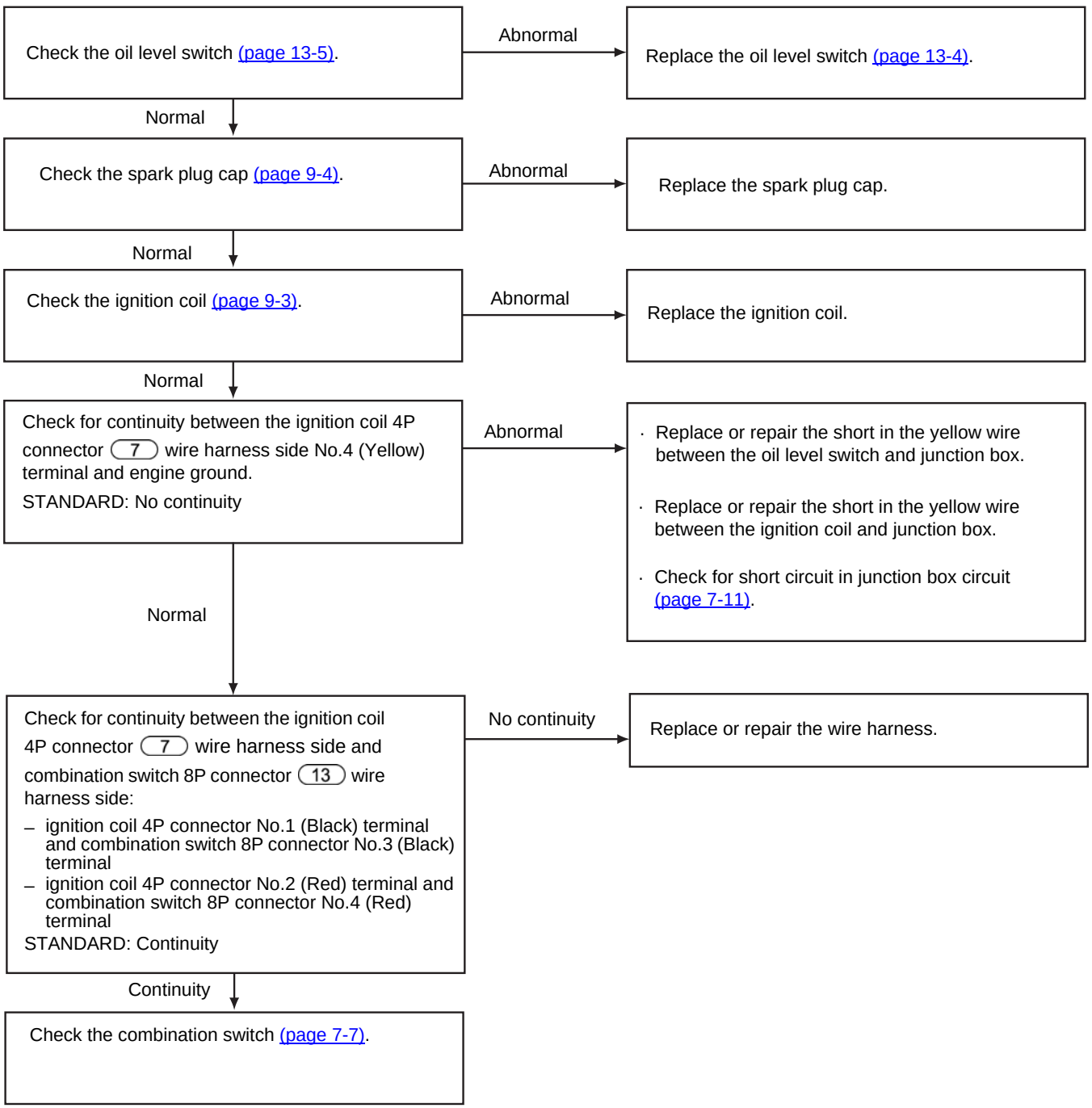




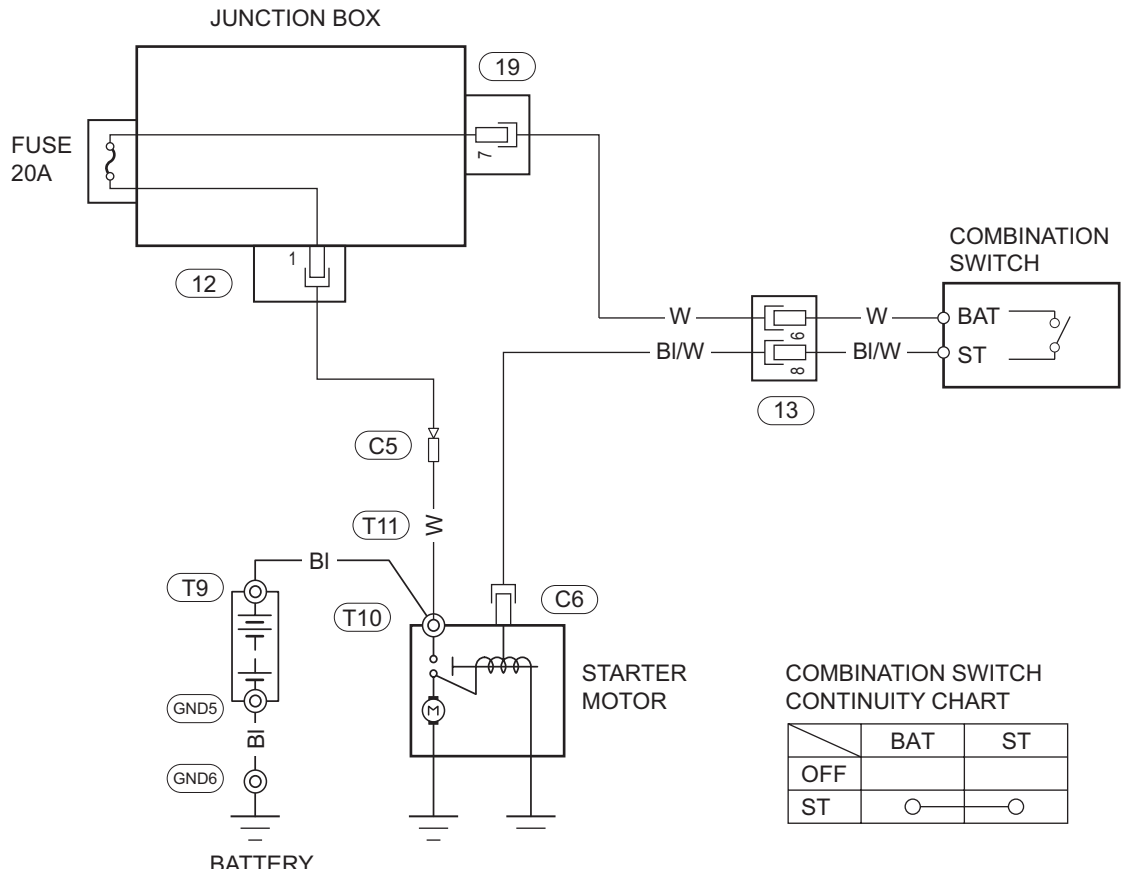
COMBINATION SWITCH CONTINUITY CHART

	EXT (+)	EXT (-)
OFF		
ON	○——	——○

- Check the engine oil level before troubleshooting.



STARTER MOTOR DOES NOT OPERATE



Check the battery condition (page 15-3).
- Abnormal → Replace with a known-good battery. If the battery runs down again, perform the CHARGING SYSTEM TROUBLESHOOTING (page 2-38).
- Normal ↓

Check the battery voltage between the starter motor side positive (+) battery cable terminal and engine ground.
- Low voltage → Replace positive (+) battery cable.
- Normal ↓

Check the fuse in the control panel (page 7-7).
- Blown → Replace the fuse.
- Not blown ↓

Check the combination switch (page 7-7).
- Abnormal → Replace the combination switch (page 7-3).
- Normal ↓

Check the starter solenoid (page 9-8)
- Abnormal → Replace the starter solenoid (page 9-7).
- Normal ↓

Disassemble the starter motor and check each part (page 9-7).
- Abnormal → Repair or replace worn parts as necessary.

EM4000SX GENERATOR TROUBLESHOOTING

⚠ WARNING

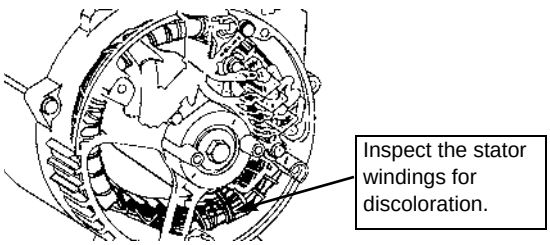
High voltage and electrical current present. Touching the non-insulated portions of the meter leads or generator wiring can cause shock or electrocution. Wear insulated gloves and avoid handling non-insulated wiring.

Use a load bank (available through the Honda Tool and Equipment Program or the Parts Division) to verify the customer's initial complaint and the generator's performance after the repairs (see page 5-2 of the Generator Troubleshooting Manual).

COMPLAINT: Abnormal output (none, low, or high) at receptacle.
Normal: 120 VAC ± 10.

The circuit breaker and circuit protectors must be in the ON position, Auto Throttle® switch in the OFF position, and the voltage selector switch in the "120/240" position.

Inspect the stator for discoloration. Replace if necessary. Call Techline.



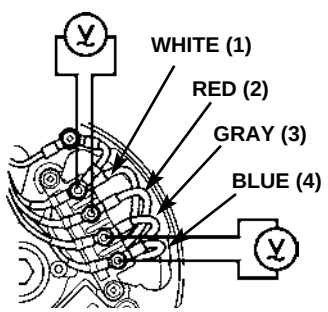
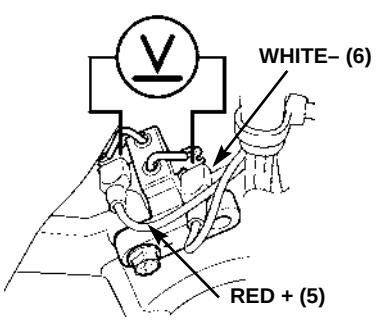
1) Check the engine rpm.
Standard no-load speed: 3,600 rpm

NG → See ENGINE SPEED DOES NOT STABILIZE on (page 2-13)

OK ↓

OK ↓

2) Remove the generator end cover. Perform the following checks with all wires connected.
Run the engine at 3,600 rpm and check for the specified voltages at the generator end as shown.

Description	Color/Test Points (#)	Specified Voltages	Test Point Location (page 2-23)
Main Winding I Main Winding II	 White (1), Red (2) Gray (3), Blue (4)	 120 VAC ± 10 120 VAC ± 10	
Check brush voltage.	Red+ (5), White– (6)	25 ~ 35 VDC	

NG ↓

OK ↓

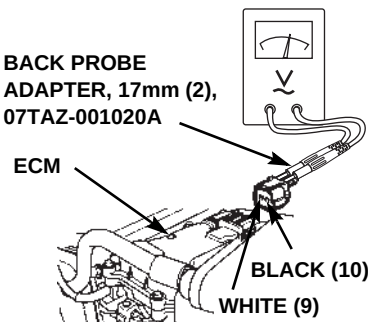
Proceed to step 3.

Proceed to step 13.

OK ←

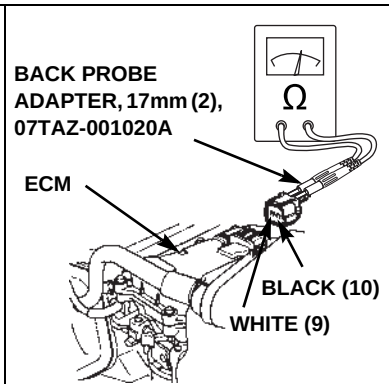
Stop the engine. Check continuity between the generator terminals and receptacles. Repair as necessary.

EM4000SX

	Description	Color/Test Points (#)	Specified Voltages	Test Point Location (page 2-23)
3)	Stop the engine. Unplug the power coil 2-pin connector from the ECM. Operate the recoil starter and measure the AC output of the power coil at the 2-pin connector (engine side). Use the test probes shown to probe the back (wire side) of the connector terminals, or you can use special tool 07ZAJ-RDJA110 to probe the front connector terminals. Be careful not to bend the terminals.	White (9), Black (10)	5 ~ 10 VAC	

OK → Reconnect the 2-pin connector to the ECM.
Proceed to step 5.

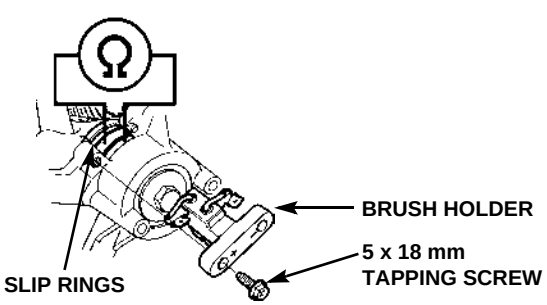
NG ↓

4)	Measure the resistance of the power coil at the 2-pin connector (engine side). Use the test probes shown to probe the back (wire side) of the connector terminals, or you can use special tool 07ZAJ-RDJA110 to probe the front connector terminals. Be careful not to bend the terminals.	White (9), Black (10)	2.9 ~ 4.5 Ω	

NG → Replace the power coil.
Repeat step 2.

OK → Problem in the flywheel.
Replace the flywheel.
Repeat step 2.

5) Disconnect the brush wires and remove the brush holder.
Clean and inspect the slip rings.
Check the rotor field winding resistance at the slip rings.
Rotor Field Winding Resistance: 45 ~ 55 Ω



OK → Proceed to step 6.

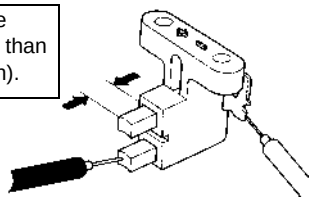
HIGH → Reclean the slip rings.
Repeat step 5.

LOW → Defective rotor. Call Techline before replacing.
Repeat step 2.

EM4000SX

6) Closely inspect the brushes for length, freedom of movement, continuity between brush tip and wire terminal, and for unusual wear.

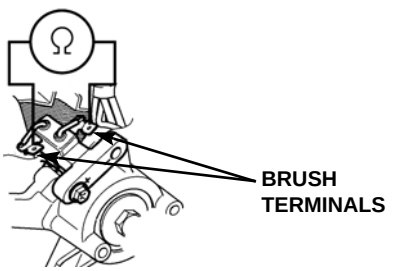
Replace if the length is less than 5 mm (0.20 in).



NG → Replace the brushes. → OK → Repeat step 2.

OK

7) Install the brushes.
Check the rotor field winding resistance across the brush terminals:
Rotor Field Winding Resistance Through Brushes: 45 ~ 55 Ω
Rotor field winding resistance through the brushes should be relatively close to the field winding resistance across the slip rings (see step 5).



HIGH → Reclean the slip rings. Replace the brushes if necessary. → Repeat step 7.

LOW → Defective rotor. Call Techline before replacing. → Repeat step 2.

OK

8) Remove the four 5 mm nuts and lock washers.

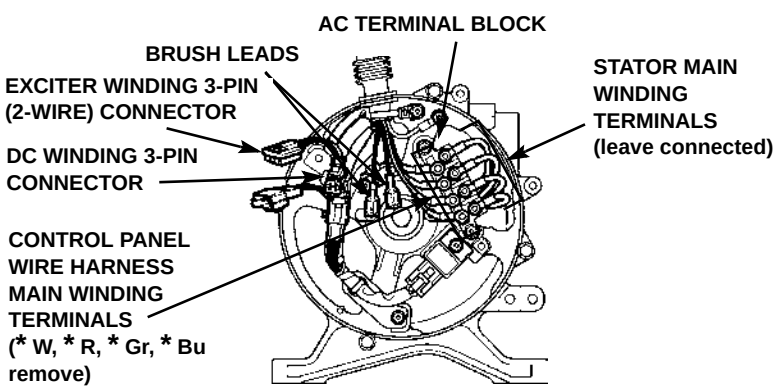
Remove the control panel wire harness main winding terminals (* W, * R, * Gr, * Bu) from the AC terminal block.

Leave the stator main winding terminals attached to the AC terminal block.

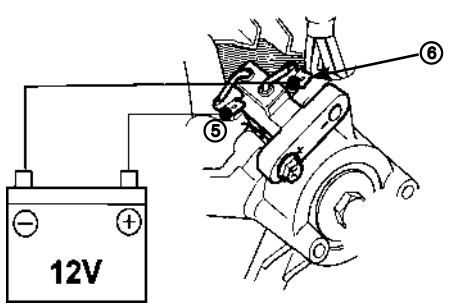
Disconnect the exciter winding 3-pin (2-wire) connector.

Disconnect the DC winding 3-pin connector.

Remove the brush leads from the brush holder.

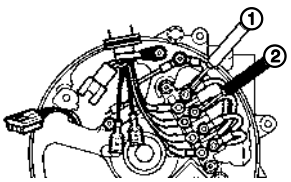
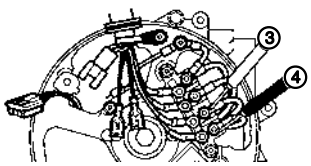
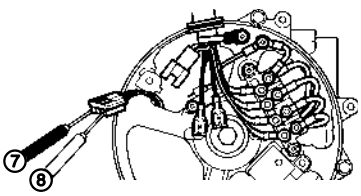
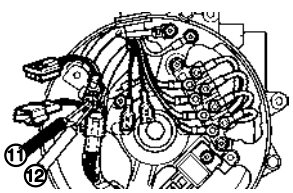
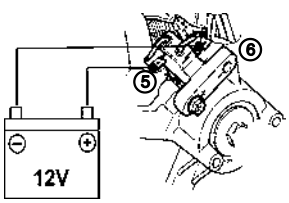


9) Connect a known good fully charged 12-volt battery to the brush terminals.
To prevent damage to the generator, do not reverse the battery leads. Make sure the positive (+) battery lead is connected to the positive (+) brush Terminal (5). Make sure the negative (-) battery lead is connected to the negative (-) brush terminal (6).



EM4000SX

10) Run the unit at 3,600 rpm, and check the following voltages at the test points shown below.

Winding	Color and Test Points (#)	Test Point Location (page 2-23)	Specified Voltage	Measured Voltage	Faulty Component (replace or inspect)
Main Winding I	White (1), Red (2)		61 VAC ± 6	Low	Stator
Main Winding II	Gray (3), Blue (4)		61 VAC ± 6	Low	Stator
Exciter Winding	Blue (7), Blue (8)		45 VAC ± 5	Low	Stator
DC Winding	Brown (11), Brown (12)		15 VAC ± 3	Low	Stator
Brushes	Red+ (5), White– (6)		12 VDC ± 1	Low	Test the battery.

ALL OK → Proceed to step 11.

NG → If all the windings test low, retest the following: battery voltage, engine rpm, and rotor, and then perform the Rotor Current Draw Test (page 2-24).

If one or more windings test low, call Techline for authorization to replace the stator.

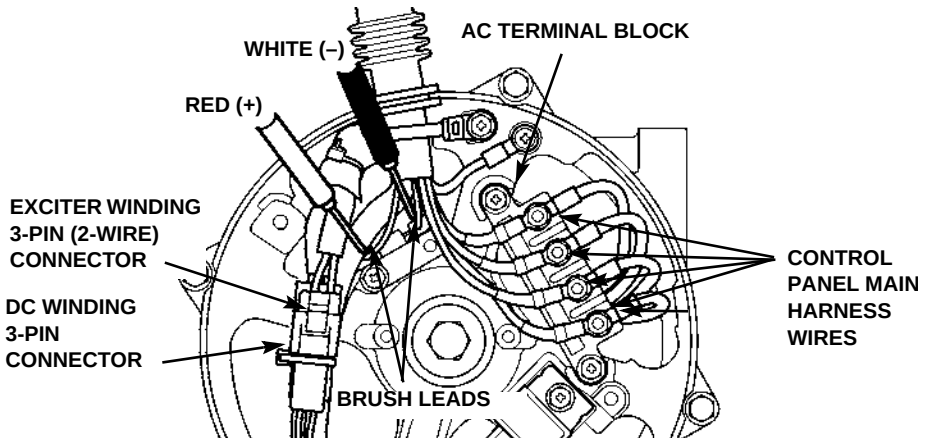
Proceed to step 11.

EM4000SX

11) Disconnect the 12V battery.

Reconnect the exciter winding 3-pin (2-wire) connector, DC winding 3-pin connector, brush leads, and control panel wires to their normal operating configuration.

Attach a voltmeter to the brush leads to measure DC voltage.



12) Start the engine. Immediately check the brush voltage.
Brush Voltage: 25 ~ 35 VDC
If brush voltage is high or low, turn off the engine at once.

Out of specification →
Defective AVR.
Call Techline before replacing.
Repeat step 11.

OK ↓

13) Load bank test the generator. The generator must match the load.
Maximum output:
120V, 4.0 kVA, 33.3 Amps
240V, 4.0 kVA, 16.6 Amps
Rated output:
120V, 3.6 kVA, 30.0 Amps
240V, 3.6 kVA, 15.0 Amps

OK ↓

14) Problem is in the load or customer usage. Verify generator usage.

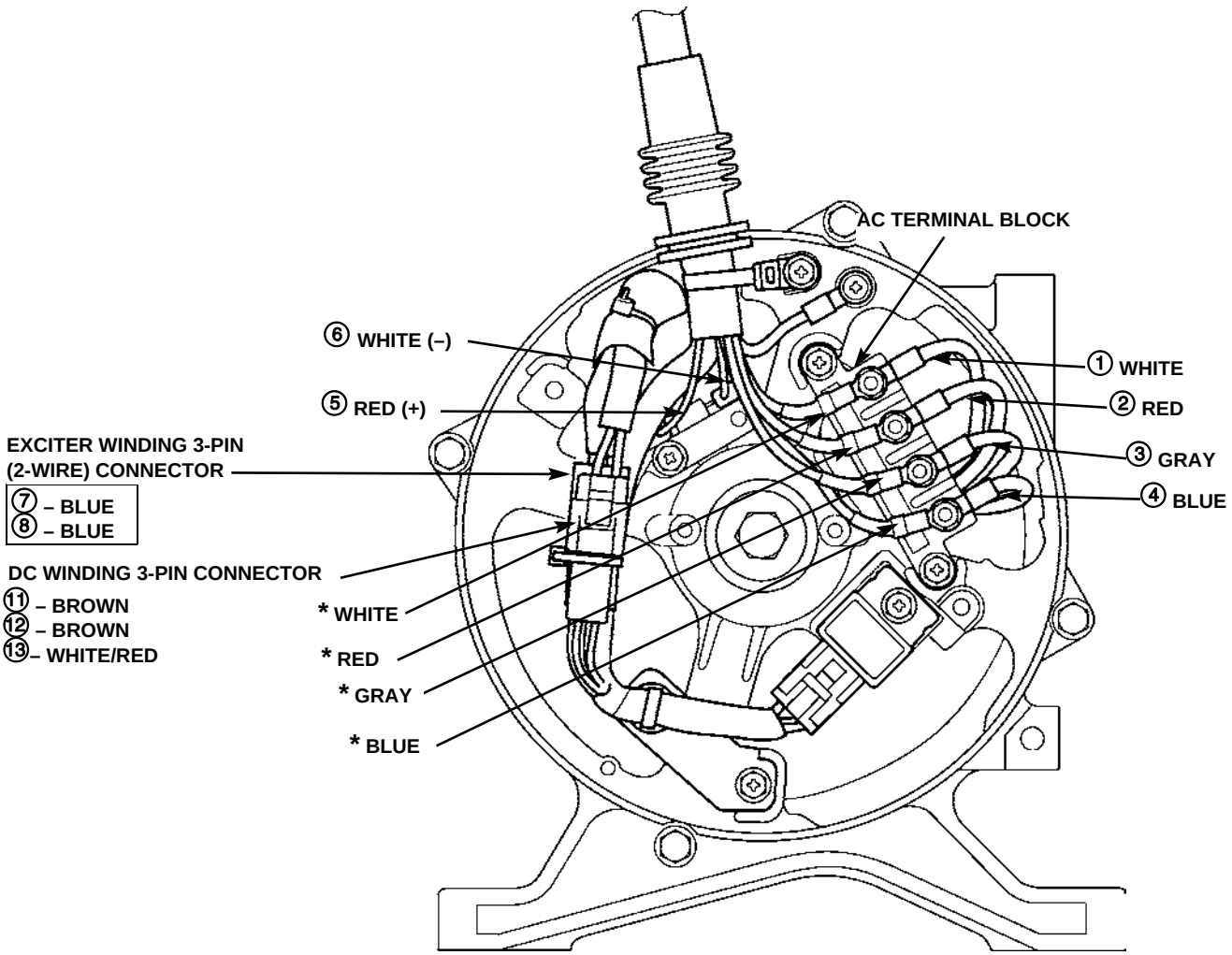
NG ↓

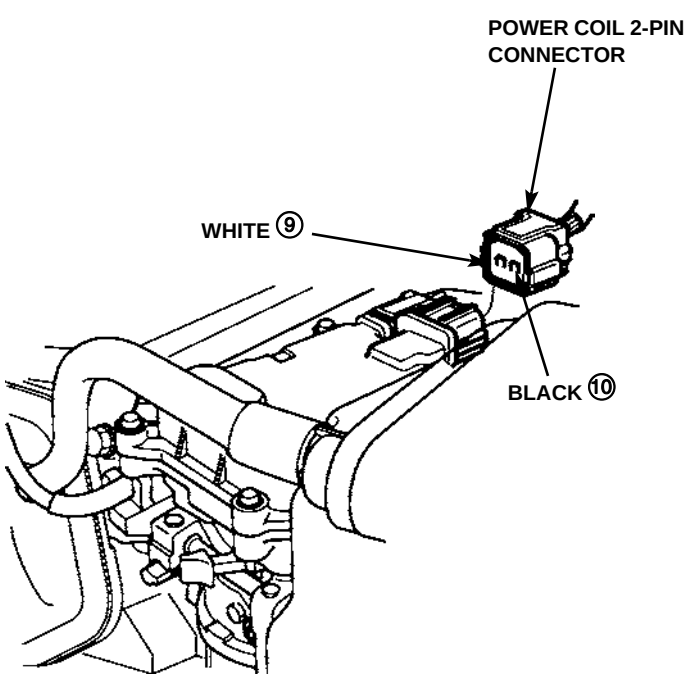
Engine performance problem. Check the following:
- Carbon deposits in combustion chamber or spark arrester.
- Fuel system.
- Engine compression.
- Ignition system.

↓

Repair as necessary and repeat step 13.

GENERATOR TEST POINTS — EM4000SX





* Remove these wires from the AC terminal block when performing the 12-volt battery test.

ROTOR CURRENT DRAW TEST

Rotor resistance may test OK with the rotor in a static position. However, with forces acting on the rotor spinning at rated engine rpm, the rotor windings may actually short or open, causing the rotor to not develop the proper field strength. Consequently, the generator will develop low ac or dc output.

The rotor current draw test can be used as a dynamic test to verify the rotor's condition with the engine operating at rated rpm.

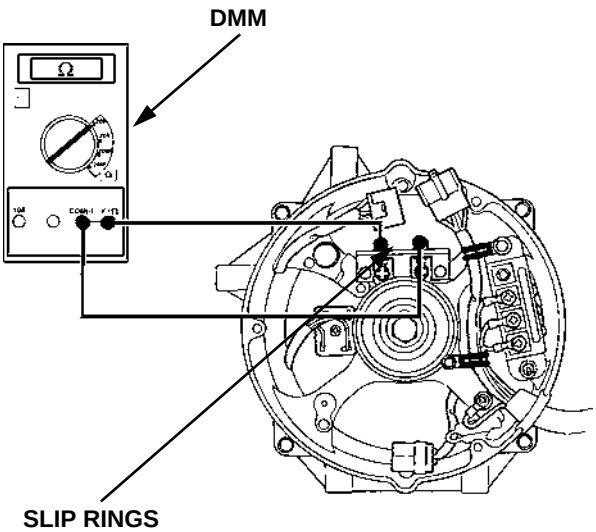
Equipment Needed

- Known good 12-volt battery
- DMM (Digital MultiMeter) that measures a minimum of 3 amps
- 3 amp circuit breaker
  (P/N 38240-ZE2-840)
- Calculator

Procedure

1. Disconnect the AVR brush leads from the brush terminals.
2. Remove the AVR from the generator.
3. Using a digital DMM, accurately measure the rotor field winding resistance across the brush terminals.

   Record your reading_____



4. Using a digital DMM, accurately measure the battery voltage.

   Record your reading_____

5. Use a calculator to divide the voltage measured in Step 4 by the resistance measured in Step 3 to determine the expected current flow through the field winding.

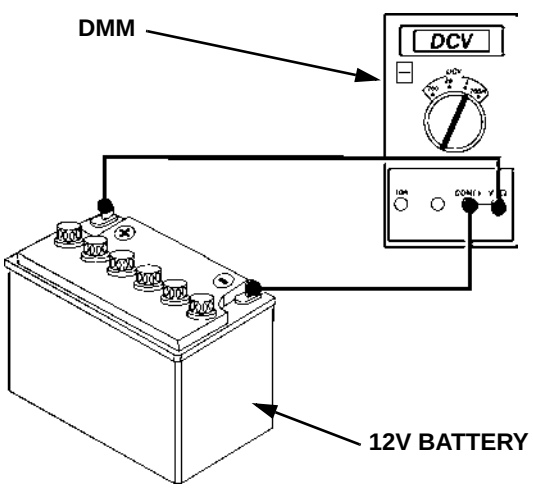
   EXAMPLE:

   Battery voltage: 12.4 VDC

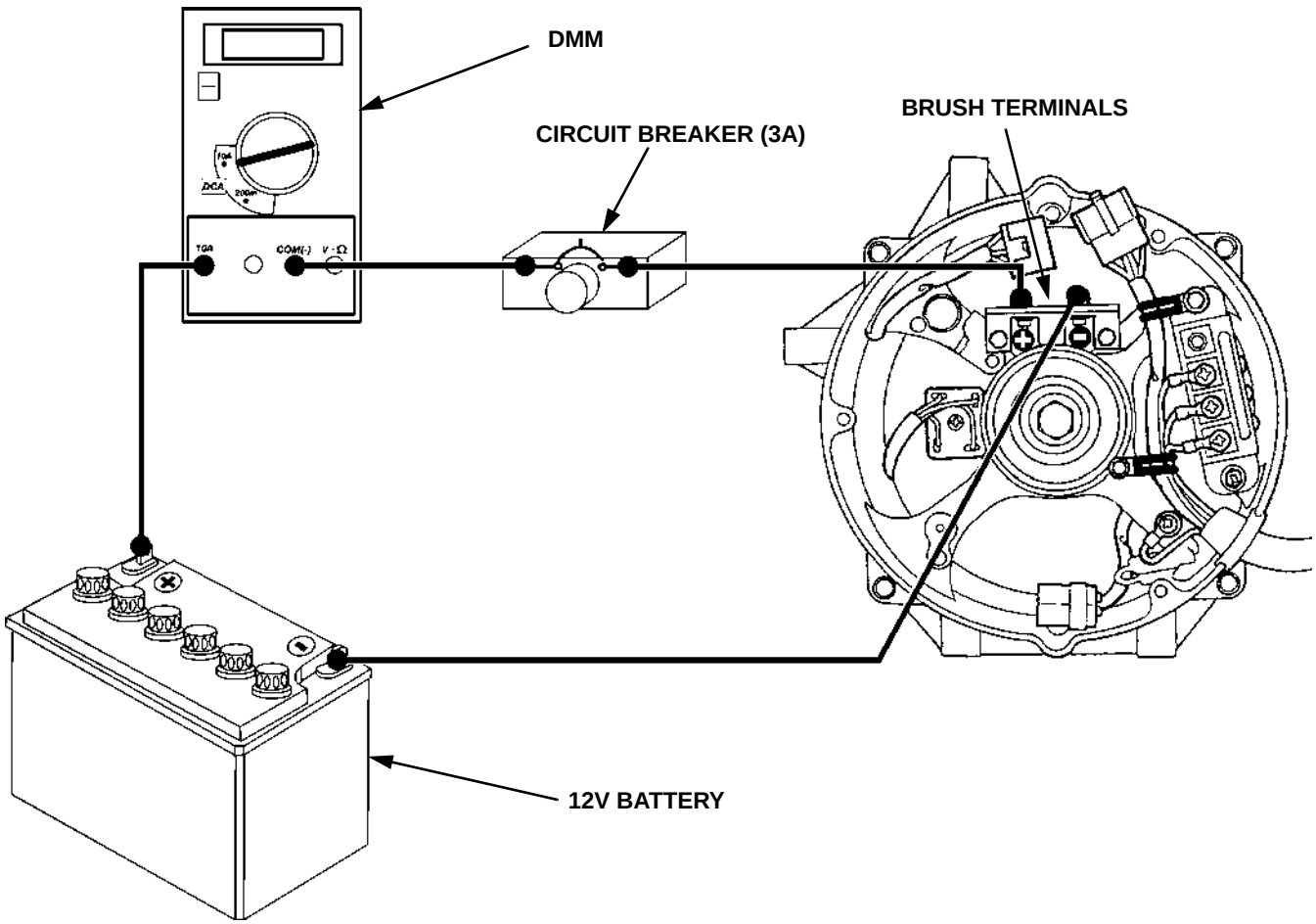
   Rotor resistance measurement: 67.0 Ω.

   I = V/R = 12.4/67 = 0.185 amps

   The current flow through the field winding should be 0.185 amps (185 milliamperes).



Current Draw Test Measurement



1. Connect the positive (+) test lead of the DMM to the positive (+) side of the 12-volt battery.
2. Connect the negative (-) test lead of the DMM to one side of the 3 amp circuit breaker.
3. Connect a test lead from the other side of the circuit breaker to the positive (+) brush terminal.
4. Connect a test lead from the negative (-) battery terminal to the negative (-) brush terminal.
5. Record the current draw through the field winding before starting the generator.
6. Compare the value you measured to the value you calculated. If they are very different, check your connections, your calculation, the circuit breaker, and the DMM. The measured and calculated values should be very close.
7. Start the engine. Running at rated no-load speed, record the current draw.
8. Compare the current draw measurement with the engine running to the current draw measurement with the engine stopped.

   If the measurements are significantly different:

   HIGH or the circuit breaker pops open—rotor is shorted. Defective rotor. Call Techline before replacing.

   LOW or NO current measurement—rotor is open. Defective rotor. Call Techline before replacing.

EM5000SXK3 GENERATOR TROUBLESHOOTING

⚠ WARNING

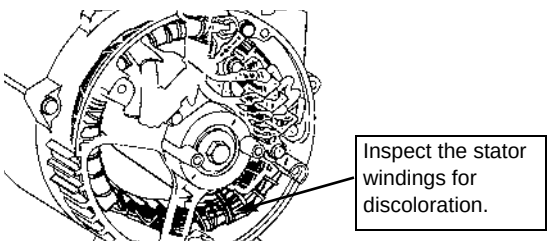
High voltage and electrical current present. Touching the non-insulated portions of the meter leads or generator wiring can cause shock or electrocution. Wear insulated gloves and avoid handling non-insulated wiring.

Use a load bank (available through the Honda Tool and Equipment Program or the Parts Division) to verify the customer's initial complaint and the generator's performance after the repairs (see page 5-2 of the Generator Troubleshooting Manual).

COMPLAINT: Abnormal output (none, low, or high) at receptacle.
Normal: 120 VAC ± 10.

The circuit breaker and circuit protectors must be in the ON position, Auto Throttle® switch in the OFF position, and the voltage selector switch in the "120/240" position.

Inspect the stator for discoloration. Replace if necessary. Call Techline.



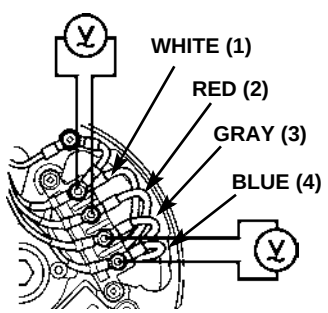
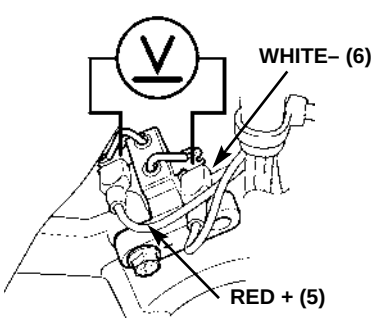
1) Check the engine rpm.
Standard no-load speed: 3,600 rpm

NG → See ENGINE SPEED DOES NOT STABILIZE on (page 2-13)

OK ↓

OK ↓

2) Remove the generator end cover. Perform the following checks with all wires connected.
Run the engine at 3,600 rpm and check for the specified voltages at the generator end as shown.

Description	Color/Test Points (#)	Specified Voltages	Test Point Location (page 2-31)
Main Winding I Main Winding II	White (1), Red (2) Gray (3), Blue (4)	120 VAC ± 10 120 VAC ± 10	
Check brush voltage.	Red+ (5), White– (6)	27 ~ 33 VDC	

NG ↓

Proceed to step 3.

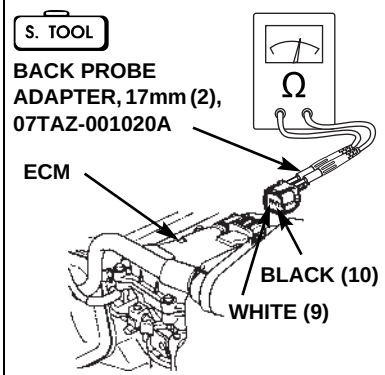
OK ↓

Stop the engine. Check continuity between the generator terminals and receptacles. Repair as necessary.

OK →

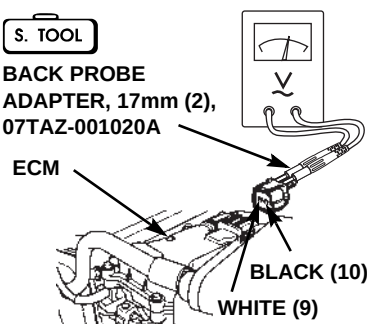
Proceed to step 13.

EM5000SXK3

	Description	Color/Test Points (#)	Specified Voltages	Test Location (page 2-31)
3)	Stop the engine. Unplug the power coil 2-pin connector from the ECM. Operate the recoil starter and measure the AC output of the power coil at the 2-pin connector (engine side). Use the test probes shown to probe the back (wire side) of the connector terminals, or you can use special tool 07ZAJ-RDJA110 to probe the front connector terminals. Be careful not to bend the terminals.	White (9), Black (10)	5 ~ 10 VAC	

OK → Reconnect the 2-pin connector to the ECM.
Proceed to step 5.

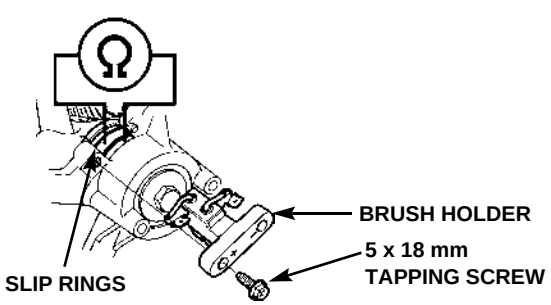
NG ↓

4)	Measure the resistance of the power coil at the 2-pin connector (engine side). Use the test probes shown to probe the back (wire side) of the connector terminals, or you can use special tool 07ZAJ-RDJA110 to probe the front connector terminals. Be careful not to bend the terminals.	White (9), Black (10)	2.9 ~ 4.5 Ω	

NG → Replace the power coil.
Repeat step 2.

OK → Problem in the flywheel.
Replace the flywheel.
Repeat step 2.

5) Disconnect the brush wires and remove the brush holder.
Clean and inspect the slip rings.
Check the rotor field winding resistance at the slip rings.
Rotor Field Winding Resistance: 58 ~ 68 Ω



OK → Proceed to step 6.

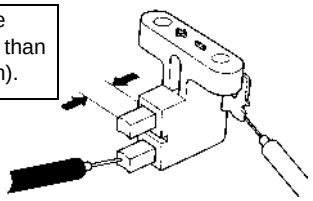
HIGH → Reclean the slip rings.
Repeat step 5.

LOW → Defective rotor. Call Techline before replacing.
Repeat step 2.

EM5000SXK3

6) Closely inspect the brushes for length, freedom of movement, continuity between brush tip and wire terminal, and for unusual wear.

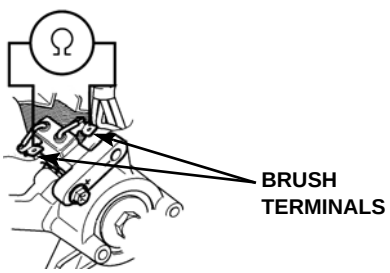
Replace if the length is less than 5 mm (0.20 in).



NG → Replace the brushes. → OK → Repeat step 2.

OK

7) Install the brushes.
Check the rotor field winding resistance across the brush terminals:
Rotor Field Winding Resistance Through Brushes: 58 ~ 68 Ω
Rotor field winding resistance through the brushes should be relatively close to the field winding resistance across the slip rings (see step 5).



HIGH → Reclean the slip rings. Replace the brushes if necessary. → Repeat step 7.

LOW → Defective rotor. Call Techline before replacing. → Repeat step 2.

OK

8) Remove the four 5 mm nuts and lock washers.

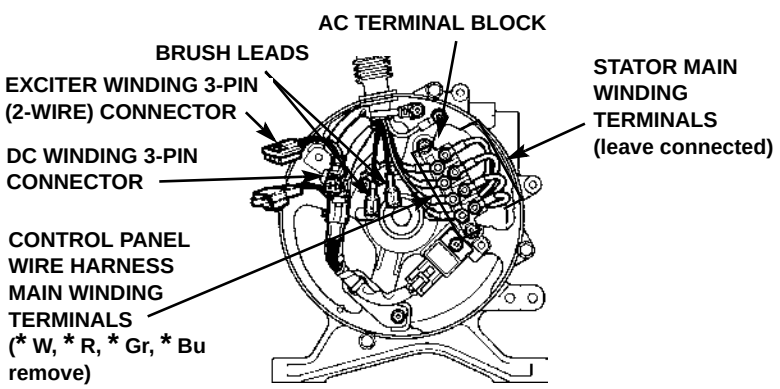
Remove the control panel wire harness main winding terminals (* W, * R, * Gr, * Bu) from the AC terminal block.

Leave the stator main winding terminals attached to the AC terminal block.

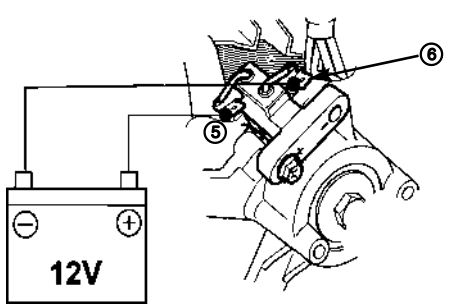
Disconnect the exciter winding 3-pin (2-wire) connector.

Disconnect the DC winding 3-pin connector.

Remove the brush leads from the brush holder.

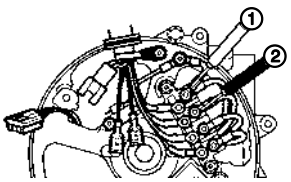
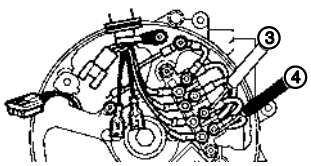
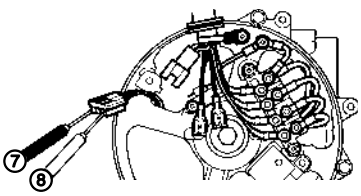
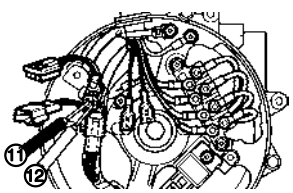
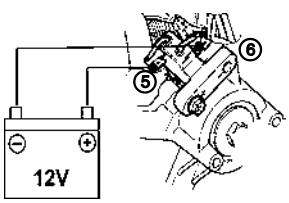


9) Connect a known good fully charged 12-volt battery to the brush terminals.
To prevent damage to the generator, do not reverse the battery leads. Make sure the positive (+) battery lead is connected to the positive (+) brush Terminal (5). Make sure the negative (-) battery lead is connected to the negative (-) brush terminal (6).



EM5000SXK3

10) Run the unit at 3,600 rpm, and check the following voltages at the test points shown below.

Winding	Color and Test Points (#)	Test Point Location (page 2-31)	Specified Voltage	Measured Voltage	Faulty Component (replace or inspect)
Main Winding I	White (1), Red (2)		61 VAC ± 6	Low	Stator
Main Winding II	Gray (3), Blue (4)		61 VAC ± 6	Low	Stator
Exciter Winding	Blue (7), Blue (8)		39 VAC ± 3	Low	Stator
DC Winding	Brown (11), Brown (12)		15 VAC ± 3	Low	Stator
Brushes	Red+ (5), White– (6)		12 VDC ± 1	Low	Test the battery.

ALL OK → Proceed to step 11.

NG → If all the windings test low, retest the following: battery voltage, engine rpm, and rotor, and then perform the Rotor Current Draw Test (page 2-24).

If one or more windings test low, call Techline for authorization to replace the stator.

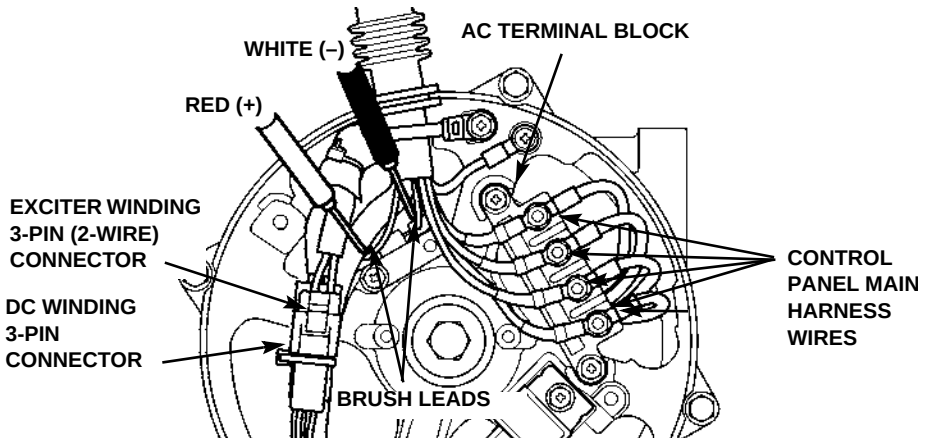
Proceed to step 11.

EM5000SXK3

11) Disconnect the 12V battery.

Reconnect the exciter winding 3-pin (2-wire) connector, DC winding 3-pin connector, brush leads, and control panel wires to their normal operating configuration.

Attach a voltmeter to the brush leads to measure DC voltage.



12) Start the engine. Immediately check the brush voltage.
Brush Voltage: 27 ~ 33 VDC
If brush voltage is high or low, turn off the engine at once.

Out of specification →
Defective AVR.
Call Techline before replacing.
Repeat step 11.

OK ↓

13) Load bank test the generator. The generator must match the load.
Maximum output:
120V, 5.0 kVA, 41.7 Amps
240V, 5.0 kVA, 20.8 Amps
Rated output:
120V, 4.5 kVA, 37.5 Amps
240V, 4.5 kVA, 18.8 Amps

OK ↓

14) Problem is in the load or customer usage. Verify generator usage.

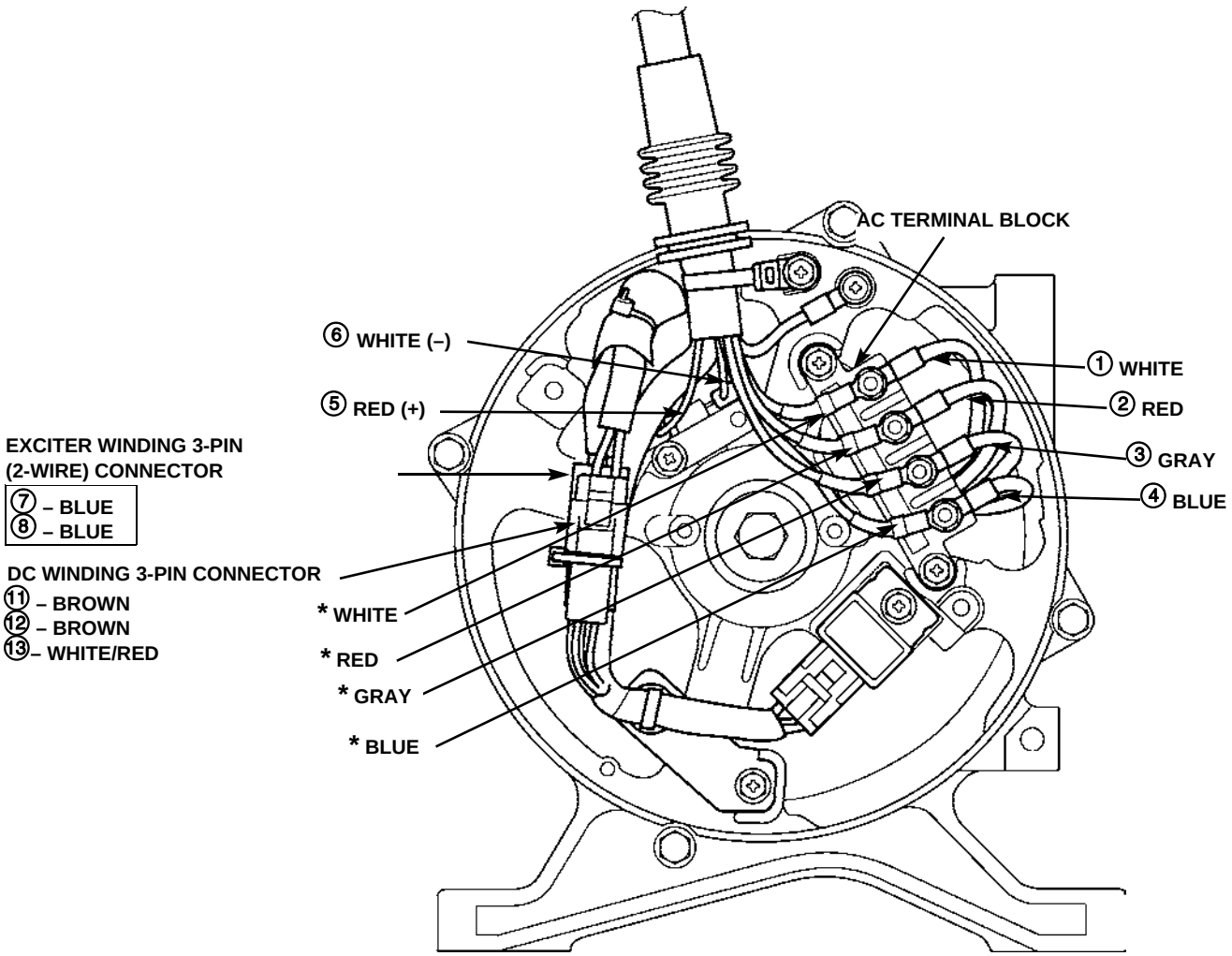
NG ↓

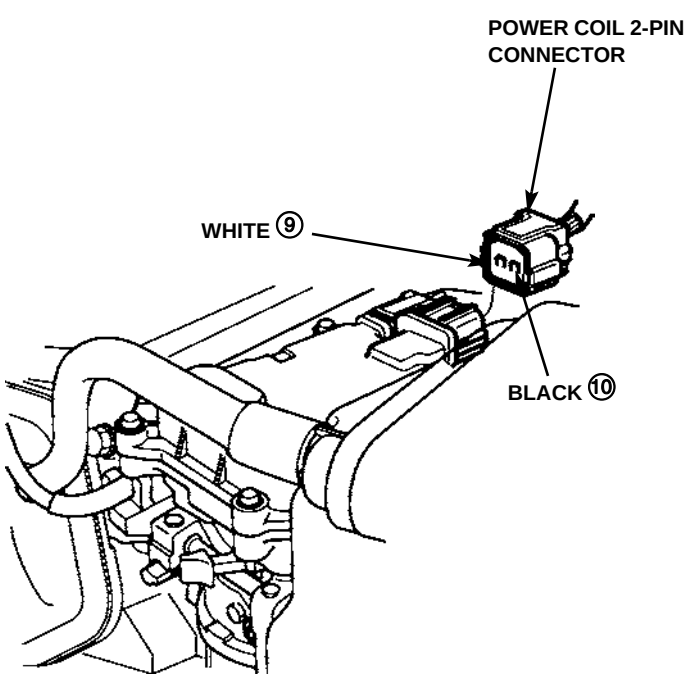
Engine performance problem. Check the following:
- Carbon deposits in combustion chamber or spark arrester.
- Fuel system.
- Engine compression.
- Ignition system.

↓

Repair as necessary and repeat step 13.

GENERATOR TEST POINTS — EM5000SXK3





* Remove these wires from the AC terminal block when performing the 12-volt battery test.

EM6500SXK2 GENERATOR TROUBLESHOOTING

⚠ WARNING

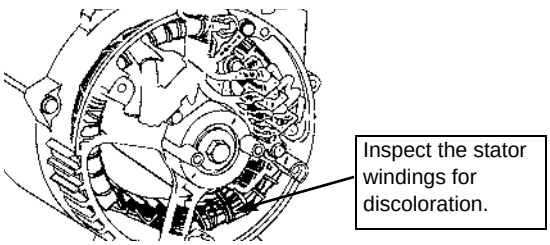
High voltage and electrical current present. Touching the non-insulated portions of the meter leads or generator wiring can cause shock or electrocution. Wear insulated gloves and avoid handling non-insulated wiring.

Use a load bank (available through the Honda Tool and Equipment Program or the Parts Division) to verify the customer's initial complaint and the generator's performance after the repairs (see page 5-2 of the Generator Troubleshooting Manual).

COMPLAINT: Abnormal output (none, low, or high) at receptacle.
Normal: 120 VAC ± 10.

The circuit breaker and circuit protectors must be in the ON position, Auto Throttle® switch in the OFF position, and the voltage selector switch in the "120/240" position.

Inspect the stator for discoloration. Replace if necessary. Call Techline.



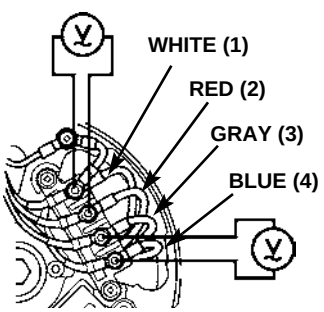
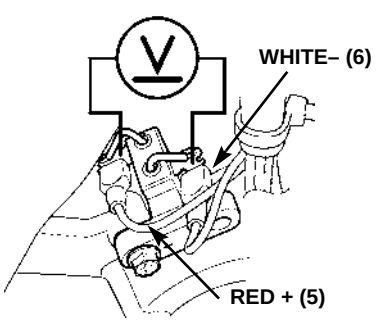
1) Check the engine rpm.
Standard no-load speed: 3,600 rpm

NG → See ENGINE SPEED DOES NOT STABILIZE on (page 2-13)

OK ↓

OK ↓

2) Remove the generator end cover. Perform the following checks with all wires connected.
Run the engine at 3,600 rpm and check for the specified voltages at the generator end as shown.

Description	Color/Test Points (#)	Specified Voltages	Test Location (page 2-37)
Main Winding I Main Winding II	White (1), Red (2) Gray (3), Blue (4)	120 VAC ± 10 120 VAC ± 10	
Check brush voltage.	Red+ (5), White– (6)	27 ~ 33 VDC	

NG ↓

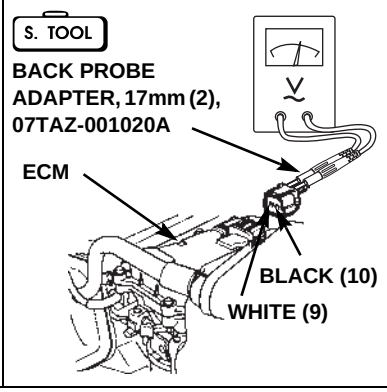
OK ↓

Proceed to step 3.

OK ← Stop the engine. Check continuity between the generator terminals and receptacles. Repair as necessary.

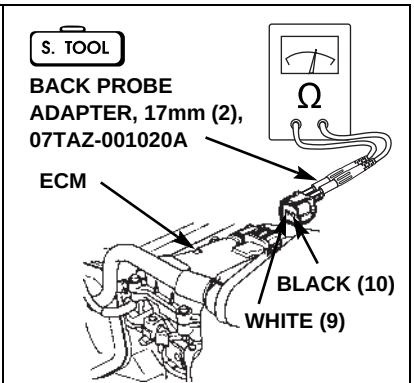
Proceed to step 13.

EM6500SXK2

	Description	Color/Test Points (#)	Specified Voltages	Test Location (page 2-37)
3)	Stop the engine. Unplug the power coil 2-pin connector from the ECM. Operate the recoil starter and measure the AC output of the power coil at the 2-pin connector (engine side). Use the test probes shown to probe the back (wire side) of the connector terminals, or you can use special tool 07ZAJ-RDJA110 to probe the front connector terminals. Be careful not to bend the terminals.	White (9), Black (10)	5 ~ 10 VAC	

OK → Reconnect the 2-pin connector to the ECM.
Proceed to step 5.

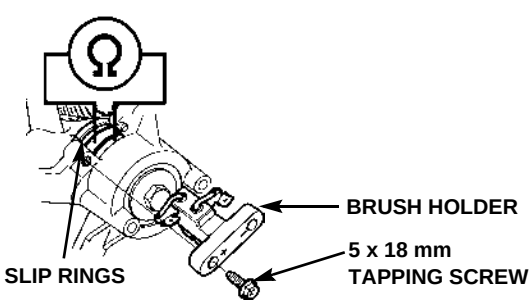
NG ↓

4)	With the engine off, measure the resistance of the power coil at the 2-pin connector (engine side). Use the test probes shown to probe the back (wire side) of the connector terminals, or you can use special tool 07ZAJ-RDJA110 to probe the front connector terminals. Be careful not to bend the terminals.	White (9), Black (10)	2.9 ~ 4.5 Ω	

NG → Replace the power coil.
Repeat step 2.

OK → Problem in the flywheel.
Replace the flywheel.
Repeat step 2.

5) Disconnect the brush wires and remove the brush holder.
Clean and inspect the slip rings.
Check the rotor field winding resistance at the slip rings.
Rotor Field Winding Resistance: 58 ~ 66 Ω



OK → Proceed to step 6.

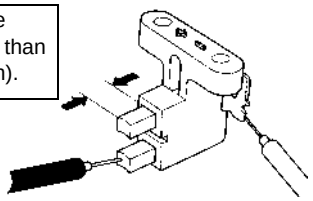
HIGH → Reclean the slip rings.
Repeat step 5.

LOW → Defective rotor. Call Techline before replacing.
Repeat step 2.

EM6500SXK2

6) Closely inspect the brushes for length, freedom of movement, continuity between brush tip and wire terminal, and for unusual wear.

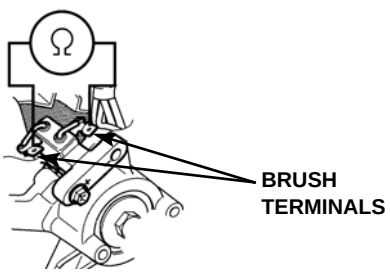
Replace if the length is less than 5 mm (0.20 in).



NG → Replace the brushes. → OK → Repeat step 2.

OK →

7) Install the brushes.
Check the rotor field winding resistance across the brush terminals:
Rotor Field Winding Resistance Through Brushes: 58 ~ 66 Ω
Rotor field winding resistance through the brushes should be relatively close to the field winding resistance across the slip rings (see step 5).



HIGH → Reclean the slip rings. Replace the brushes if necessary. → Repeat step 7.

LOW → Defective rotor. Call Techline before replacing. → Repeat step 2.

OK →

8) Remove the four 5 mm nuts and lock washers.

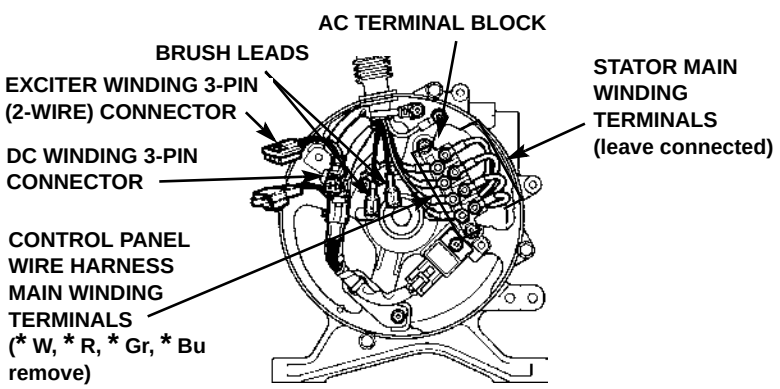
Remove the control panel wire harness main winding terminals (* W, * R, * Gr, * Bu) from the AC terminal block.

Leave the stator main winding terminals attached to the AC terminal block.

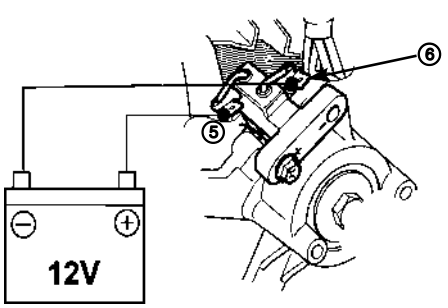
Disconnect the exciter winding 3-pin (2-wire) connector.

Disconnect the DC winding 3-pin connector.

Remove the brush leads from the brush holder.

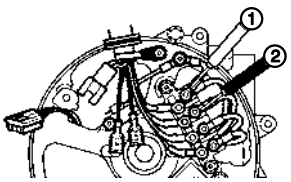
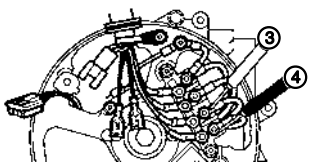
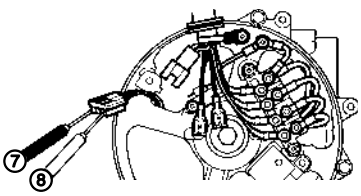
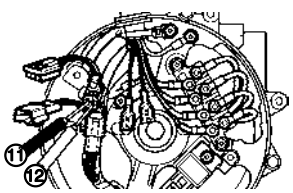
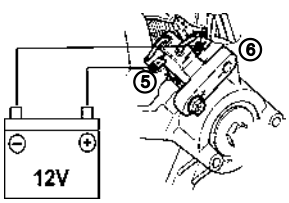


9) Connect a known good fully charged 12-volt battery to the brush terminals.
To prevent damage to the generator, do not reverse the battery leads. Make sure the positive (+) battery lead is connected to the positive (+) brush Terminal (5). Make sure the negative (-) battery lead is connected to the negative (-) brush terminal (6).



EM6500SXK2

10) Run the unit at 3,600 rpm, and check the following voltages at the test points shown below.

Winding	Color and Test Points (#)	Test Point Location (page 2-37)	Specified Voltage	Measured Voltage	Faulty Component (replace or inspect)
Main Winding I	White (1), Red (2)		61 VAC ± 6	Low	Stator
Main Winding II	Gray (3), Blue (4)		61 VAC ± 6	Low	Stator
Exciter Winding	Blue (7), Blue (8)		39 VAC ± 3	Low	Stator
DC Winding	Brown (11), Brown (12)		15 VAC ± 3	Low	Stator
Brushes	Red+ (5), White– (6)		12 VDC ± 1	Low	Test the battery.

ALL OK

Proceed to step 11.

NG

If all the windings test low, retest the following: battery voltage, engine rpm, and rotor, and then perform the Rotor Current Draw Test (page 2-24).

If one or more windings test low, call Techline for authorization to replace the stator.

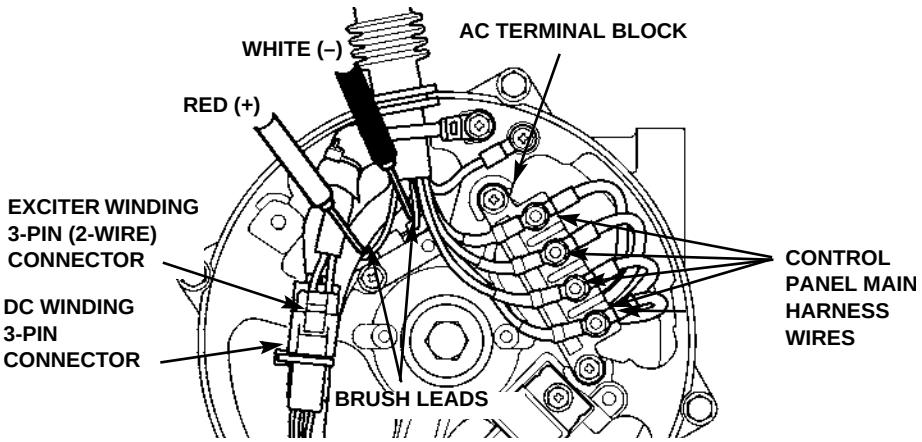
Proceed to step 11.

EM6500SXK2

11) Disconnect the 12V battery.

Reconnect the exciter winding 3-pin (2-wire) connector, DC winding 3-pin connector, brush leads, and control panel wires to their normal operating configuration.

Attach a voltmeter to the brush leads to measure DC voltage.



12) Start the engine. Immediately check the brush voltage.
Brush Voltage: 27 ~ 33 VDC
If brush voltage is high or low, turn off the engine at once.

Out of specification →
Defective AVR.
Call Techline before replacing.
Repeat step 11.

OK ↓

13) Load bank test the generator. The generator must match the load.
Maximum output:
120V, 6.5 kVA, 54.2 Amps
240V, 6.5 kVA, 27.1 Amps
Rated output:
120V, 5.5 kVA, 45.8 Amps
240V, 5.5 kVA, 22.9 Amps

OK ↓

14) Problem is in the load or customer usage. Verify generator usage.

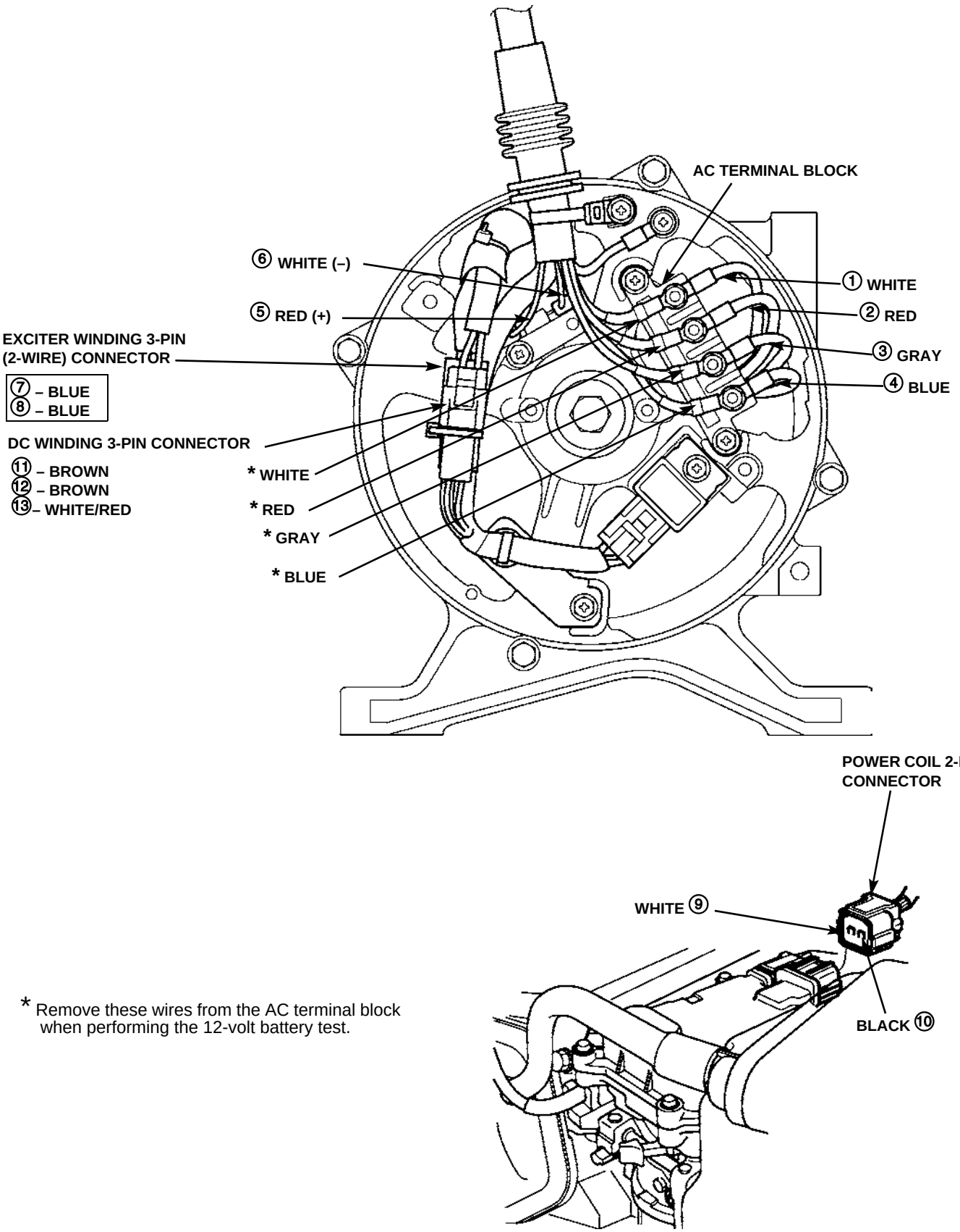
NG ↓

Engine performance problem. Check the following:
- Carbon deposits in combustion chamber or spark arrester.
- Fuel system.
- Engine compression.
- Ignition system.

↓

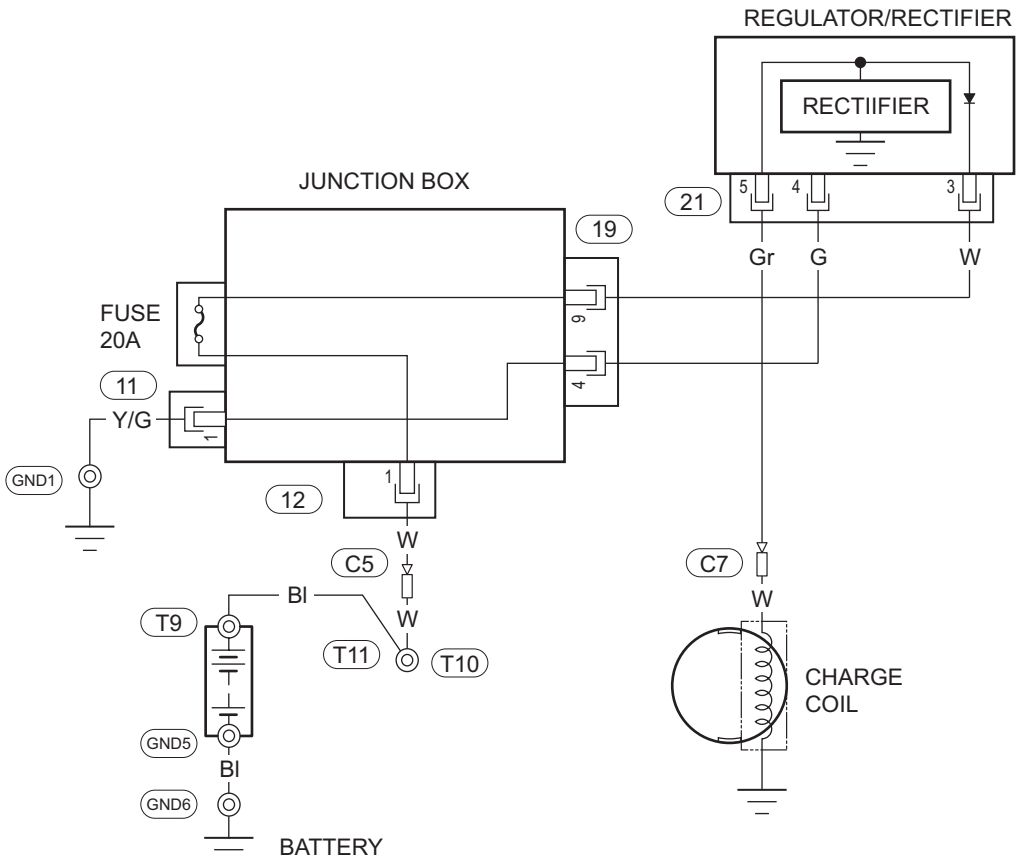
Repair as necessary and repeat step 13.

GENERATOR TEST POINTS — EM6500SXK2



* Remove these wires from the AC terminal block when performing the 12-volt battery test.

CHARGING SYSTEM TROUBLESHOOTING



Check the fuse (page 7-7).
- Abnormal → Replace the fuse.
- Normal → Check the charge coil (page 10-12).

Check the charge coil (page 10-12).
- Abnormal → Replace the charge coil (page 9-5).
- Normal → Check for continuity between the junction box terminals (page 7-11).

Check for continuity between the junction box terminals (page 7-11).
- Abnormal → Replace the junction box (page 7-3).
- Normal → Check for open circuit in wire harness.

Check for open circuit in wire harness.
- Abnormal → Repair or replace the wire harness.
- Normal → Replace the regulator/rectifier (page 7-3).

HOW TO READ CONNECTOR DRAWINGS

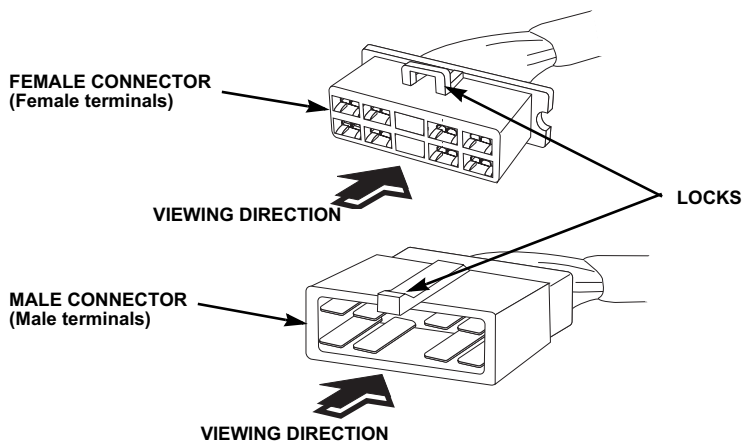
Connector drawings show the terminal arrangement, terminal No., number of pins and the shape of terminal (male or female). Both the male and female connectors are shown for the common connectors, while only the main wire harness side connectors are shown for the dedicated connectors.

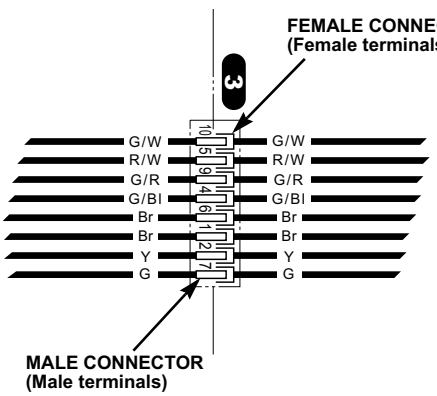
Double frame connectors represent male connectors and the single frame connectors represent female connectors.

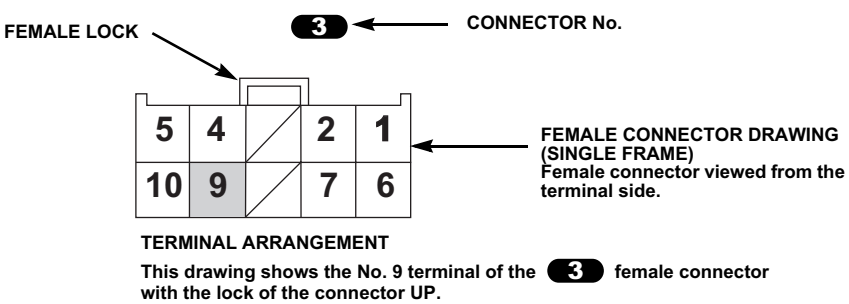
The gender of the connector is determined by the type of terminals the connector contains. Male connectors have male terminals. Female connectors have female terminals. Typically, the smaller plastic plastic shell of a female connector inserts inside the larger plastic shell of a male connector when they are joined.

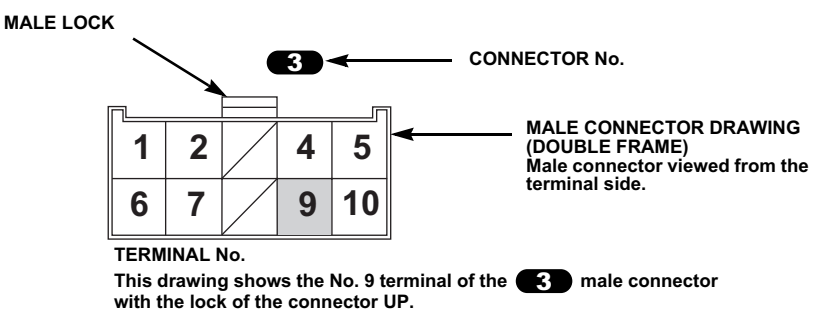
Terminals in a female connector are numbered from left to right, top to bottom looking at the wire side. Terminals in a male connector are numbered from left to right, top to bottom looking at the terminal side.

Both the male and female connectors are shown by viewing them from the terminal side.



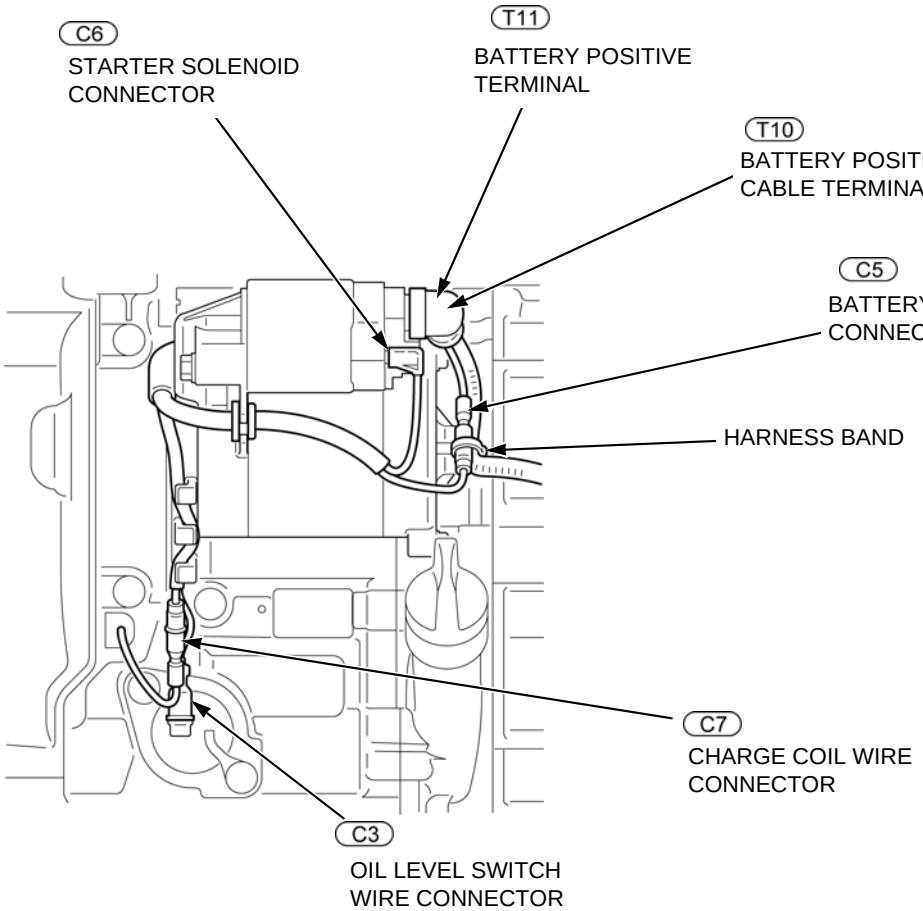




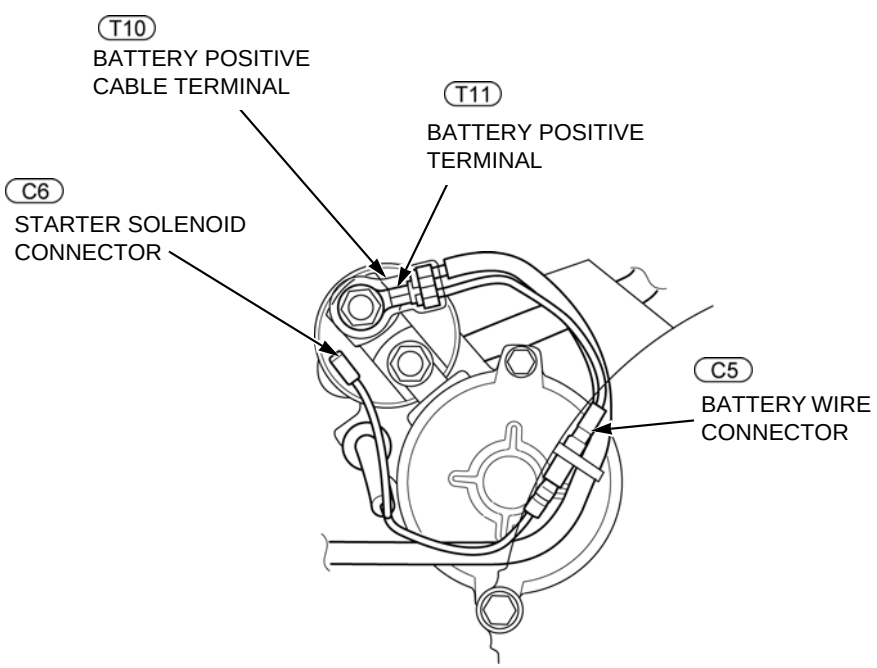


FRAME/ENGINE CABLE/HARNESS ROUTING

ENGINE LOWER SIDE:



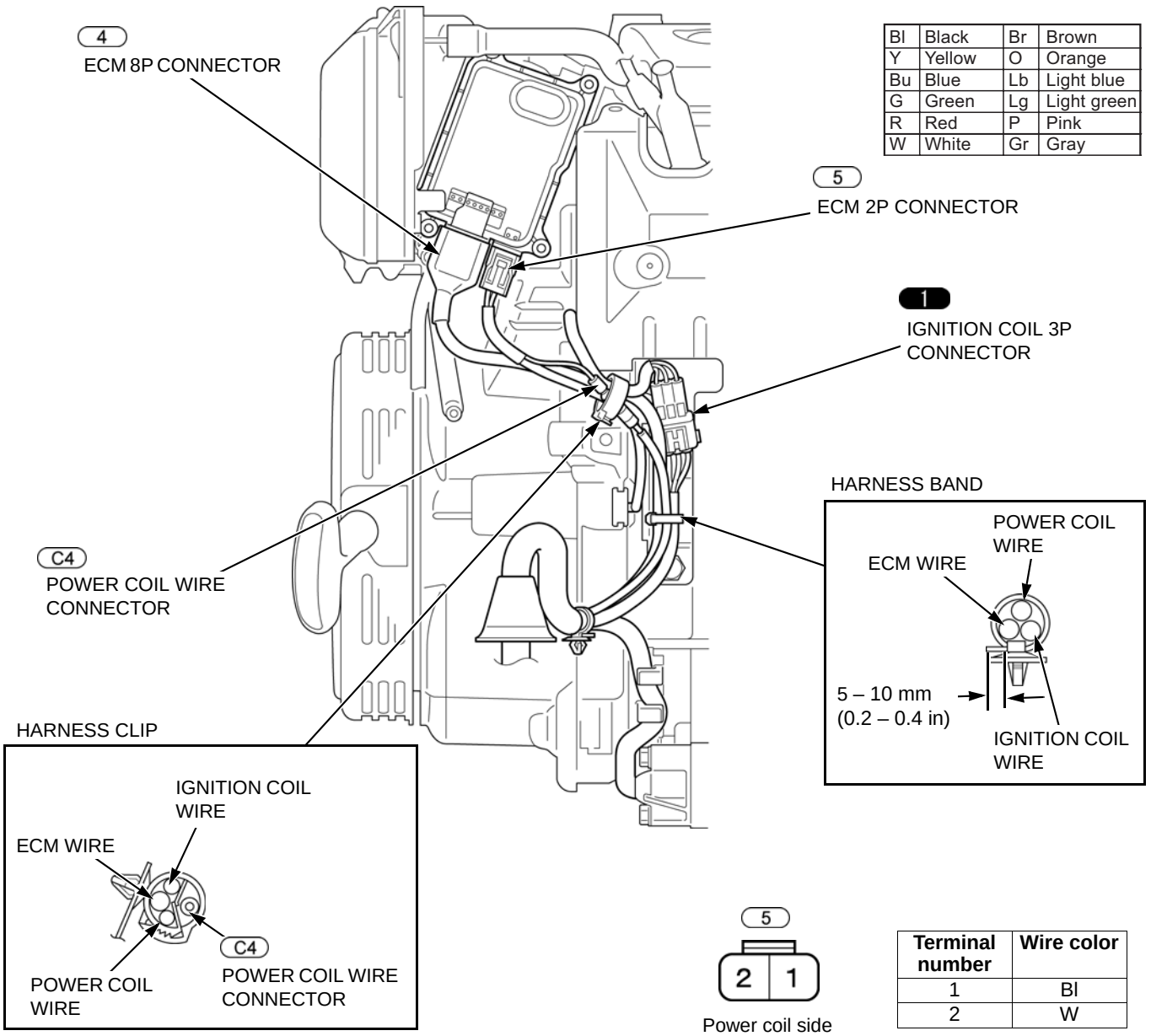
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray



Terminal number	Wire color
C3	Y
C5	W
C6	Bl/W
C7	Gr

Terminal number	Wire color
T10	Bl
T11	W

ENGINE UPPER SIDE:

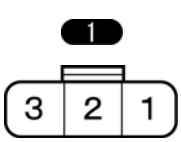


Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

Power coil side

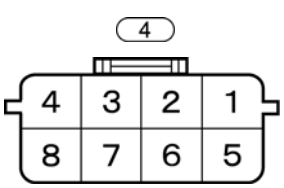
Terminal number	Wire color
1	Bl
2	W

Terminal number	Wire color
C4	Bl



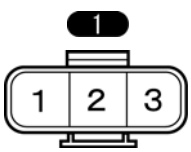
Main wire harness side

Terminal number	Wire color
1	Y
2	Bl
3	R



Main wire harness side

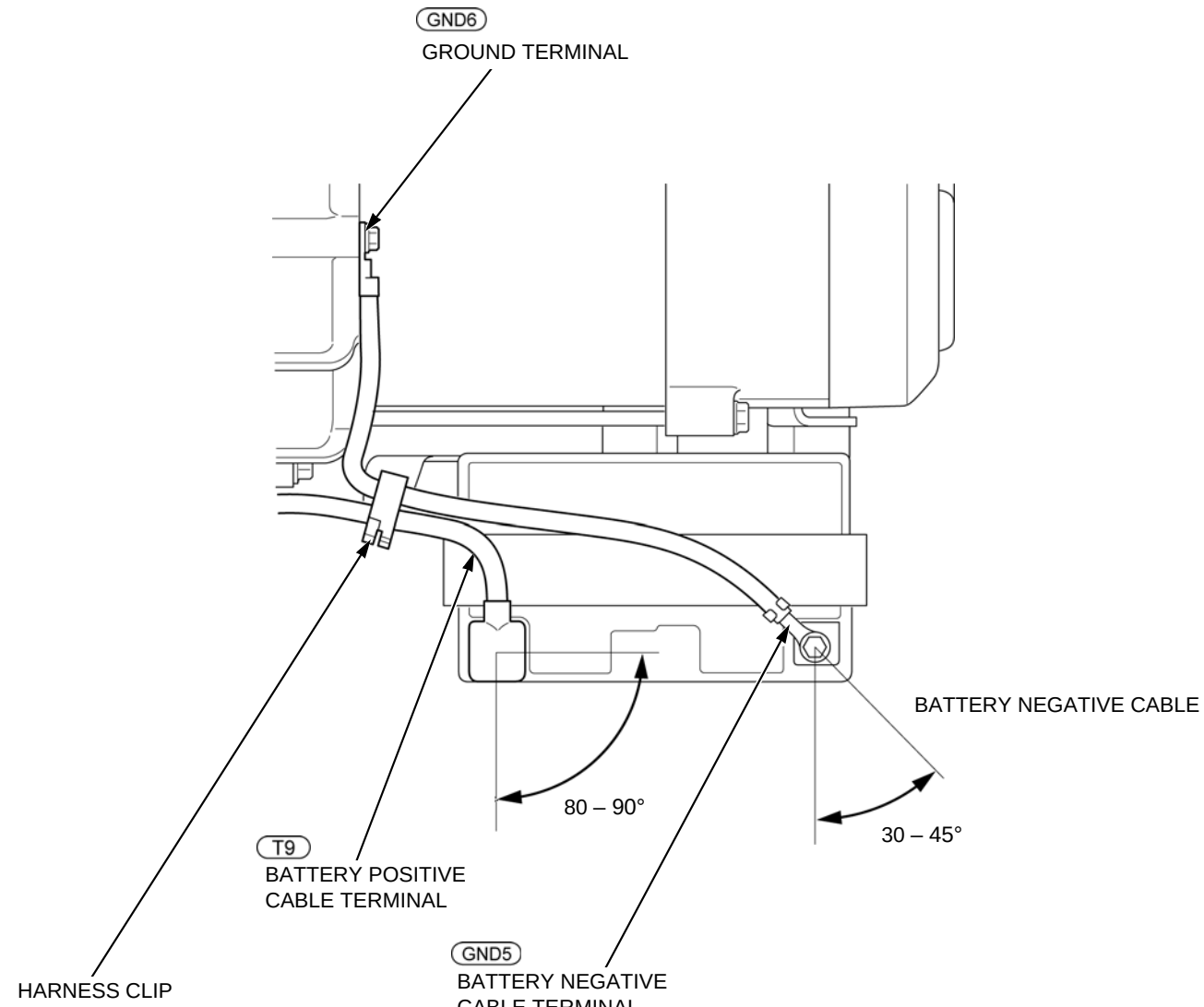
Terminal number	Wire color
1	Bl/R
2	–
3	Lg
4	–
5	Bu/Y
6	Bu/R
7	–
8	–

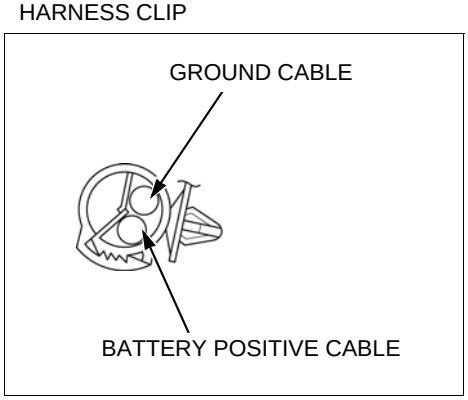


Ignition coil side

Terminal number	Wire color
1	Y
2	Bl
3	R

BATTERY SIDE:



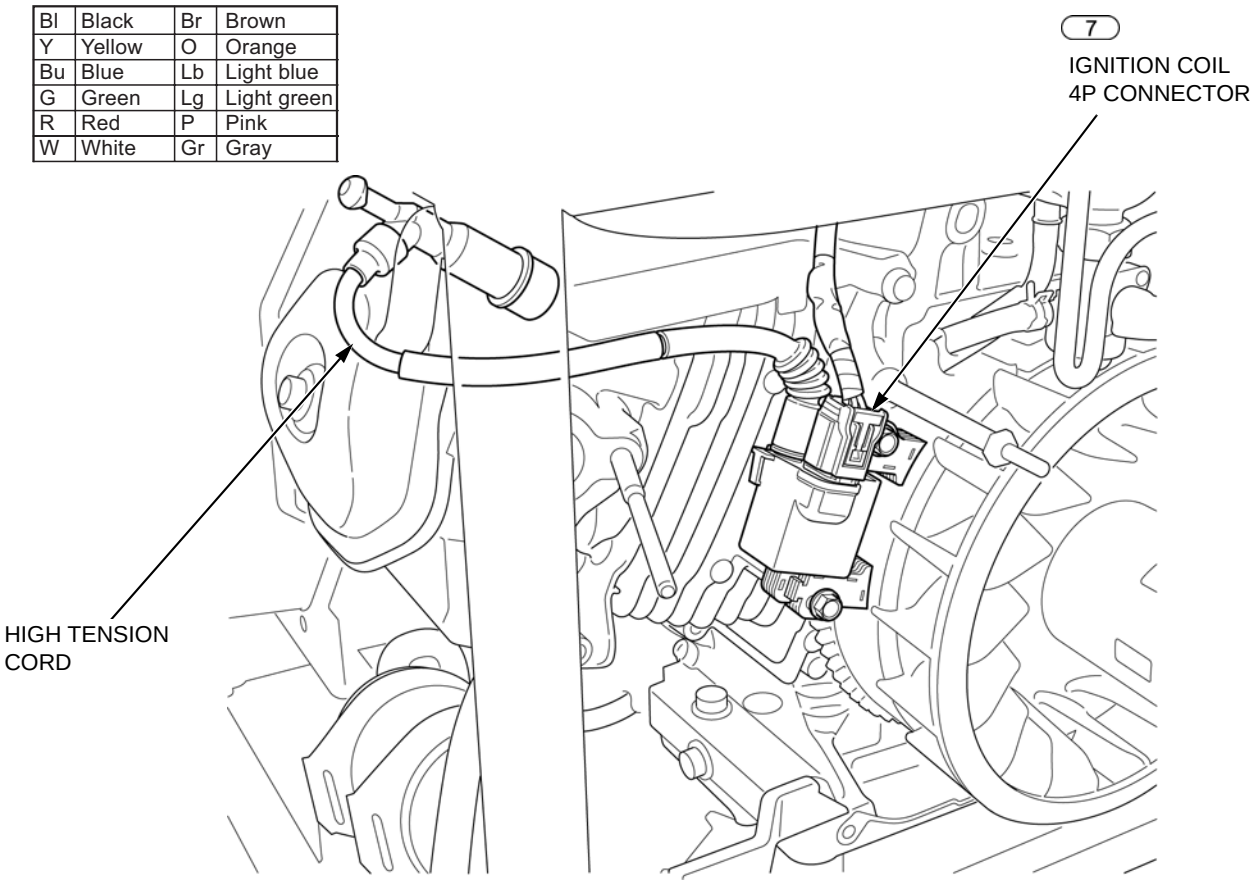


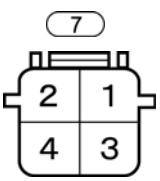
Terminal number	Wire color
T9	Bl

Terminal number	Wire color
GND5	Bl
GND6	Bl

IGNITION COIL SIDE:

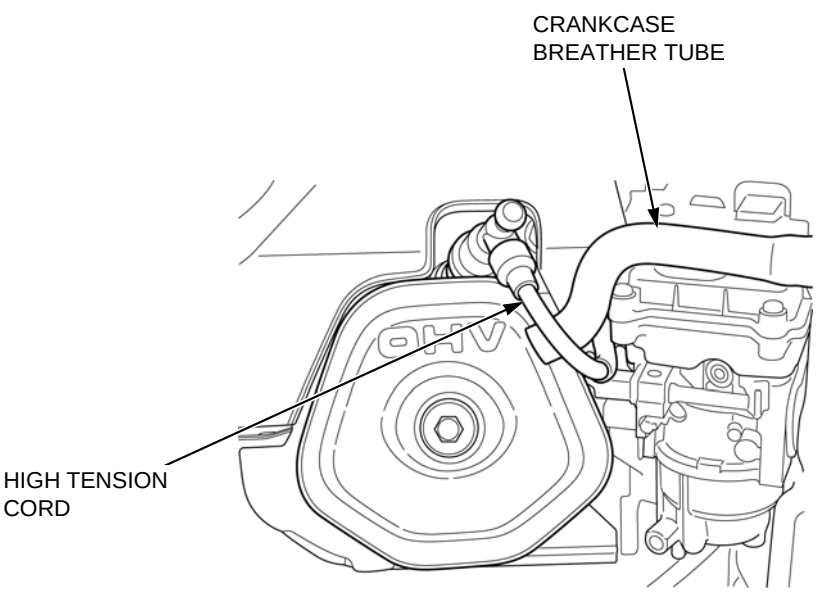
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray



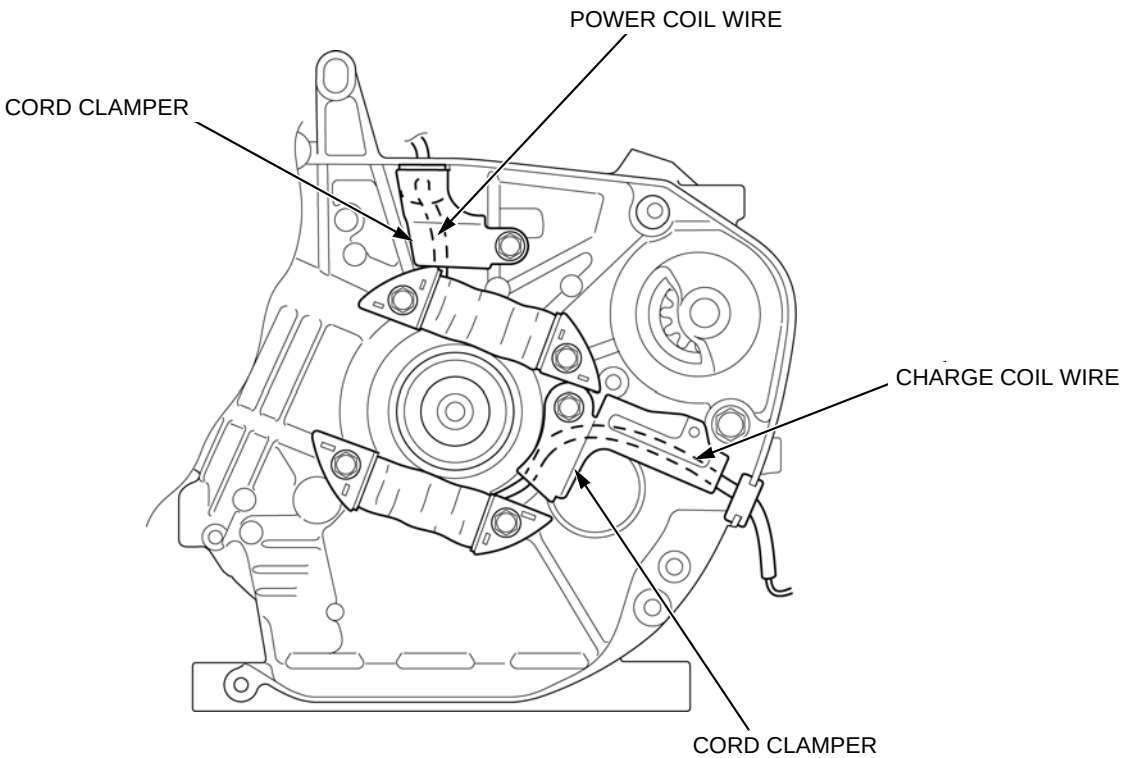


Main wire harness side

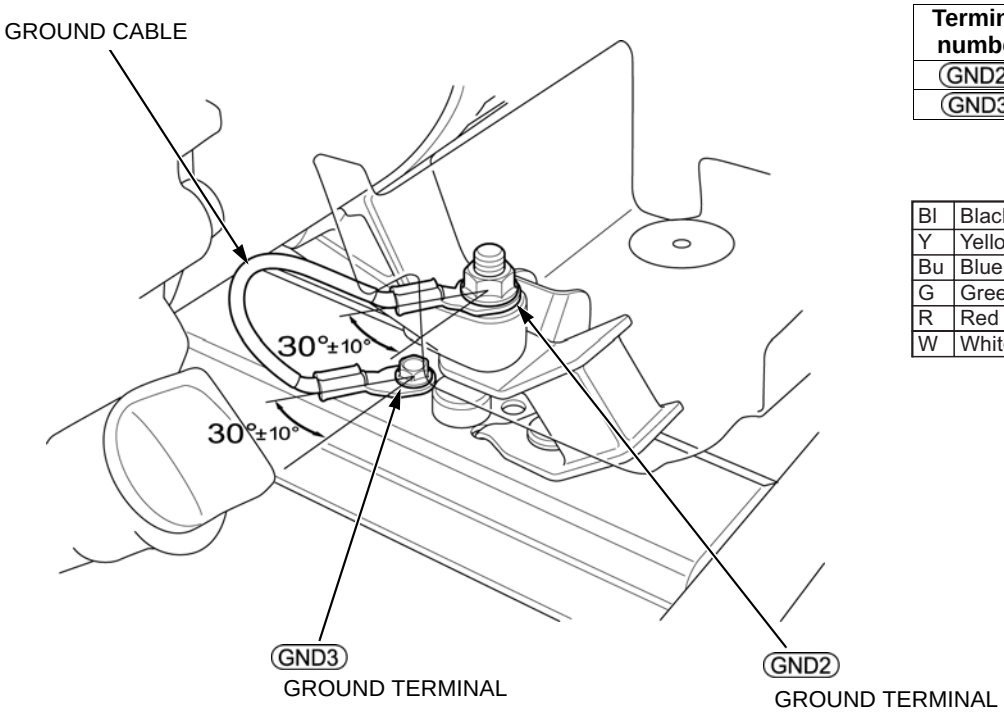
Terminal number	Wire color
1	Bl
2	R
3	–
4	Y



POWER COIL SIDE



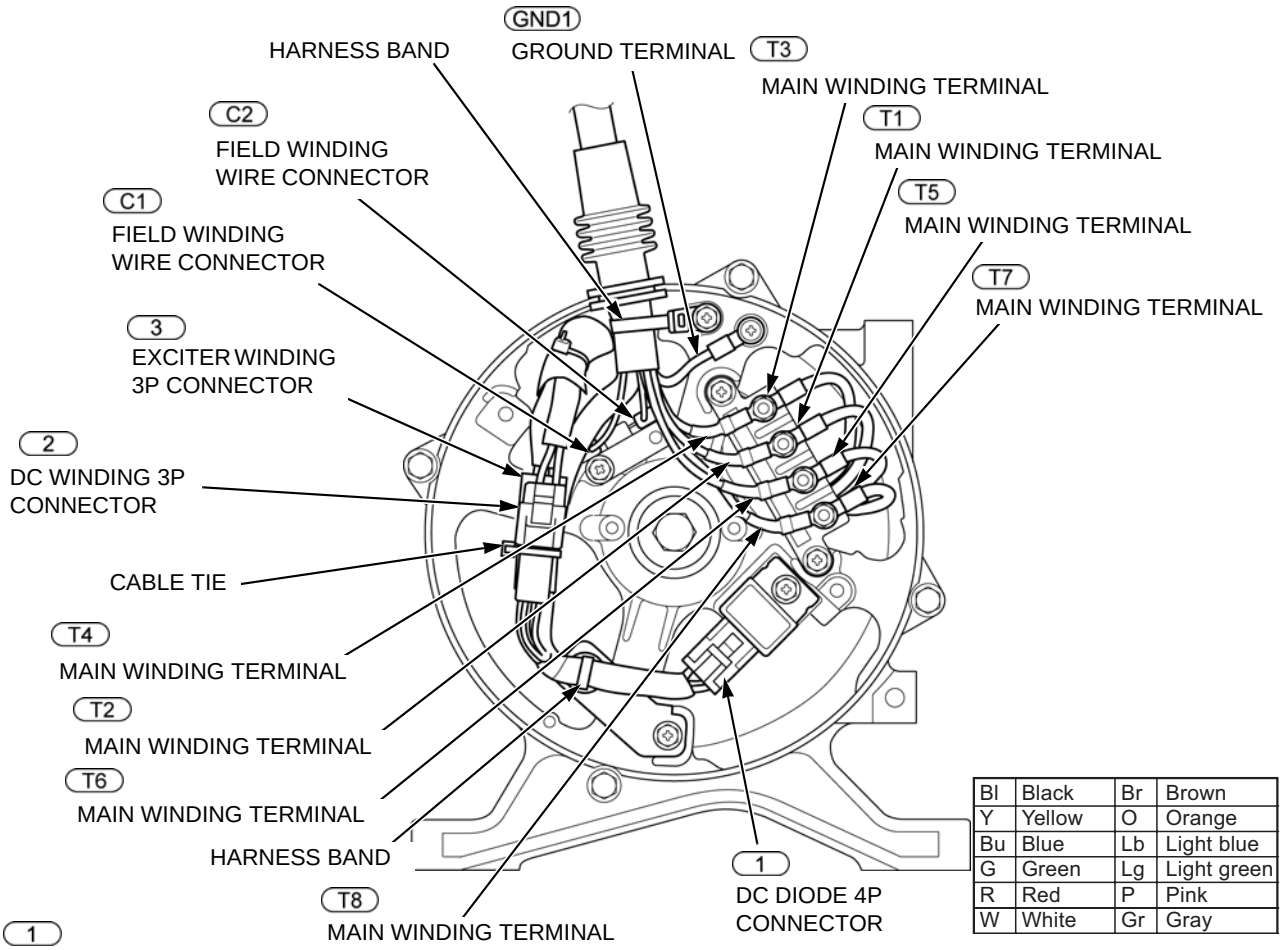
GROUND CABLE:



Terminal number	Wire color
GND2	G
GND3	G

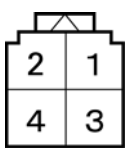
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

GENERATOR SIDE:



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

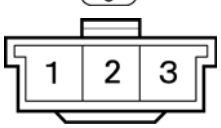
1



MAIN WIRE HARNESS SIDE

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

3



MAIN WIRE HARNESS SIDE

Terminal number	Wire color
1	Bu
2	–
3	Bu

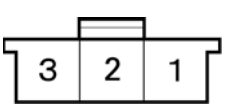
Terminal number	Wire color
C1	R
C2	W

2

MAIN WIRE HARNESS SIDE

Terminal number	Wire color
1	W/R
2	Br
3	Br

3

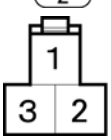


EXCITER WINDING SIDE

Terminal number	Wire color
1	Bu
2	–
3	Bu

Terminal number	Wire color
T1	R
T2	R
T3	W
T4	W
T5	Gr
T6	Gr
T7	Bu
T8	Bu

2



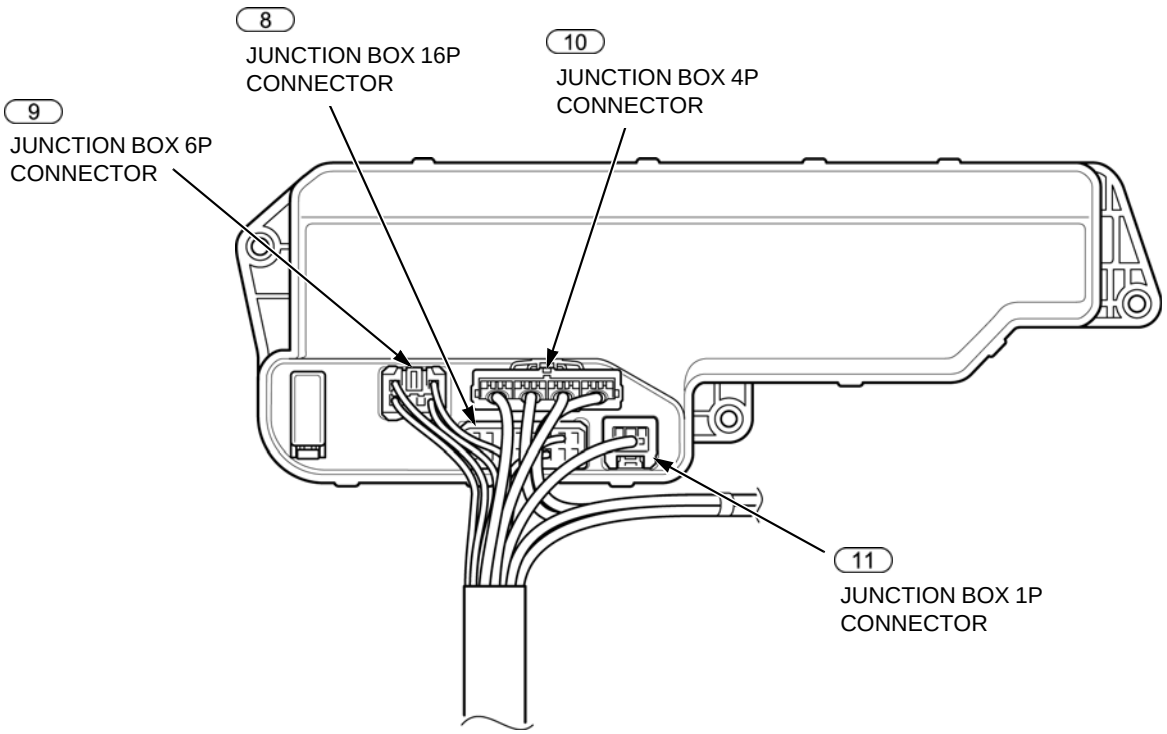
DC WINDING SIDE

Terminal number	Wire color
1	W/R
2	Br
3	Br

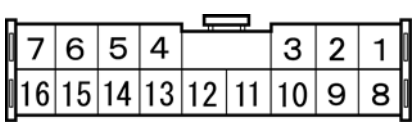
Terminal number	Wire color
GND1	Y/G

CONTROL PANEL HARNESS ROUTING

JUNCTION BOX/GENERATOR SIDE



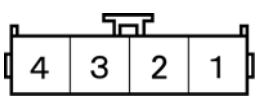
8



MAIN WIRE HARNESS SIDE

Terminal number	Wire color
1	–
2	–
3	Bl/R
4	–
5	–
6	–
7	–
8	–
9	W/R
10	–
11	–
12	–
13	–
14	–
15	–
16	–

10



MAIN WIRE HARNESS SIDE

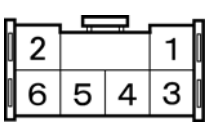
Terminal number	Wire color
1	Gr
2	R
3	W
4	Bu

11

MAIN WIRE HARNESS SIDE

Terminal number	Wire color
1	Y/G

9

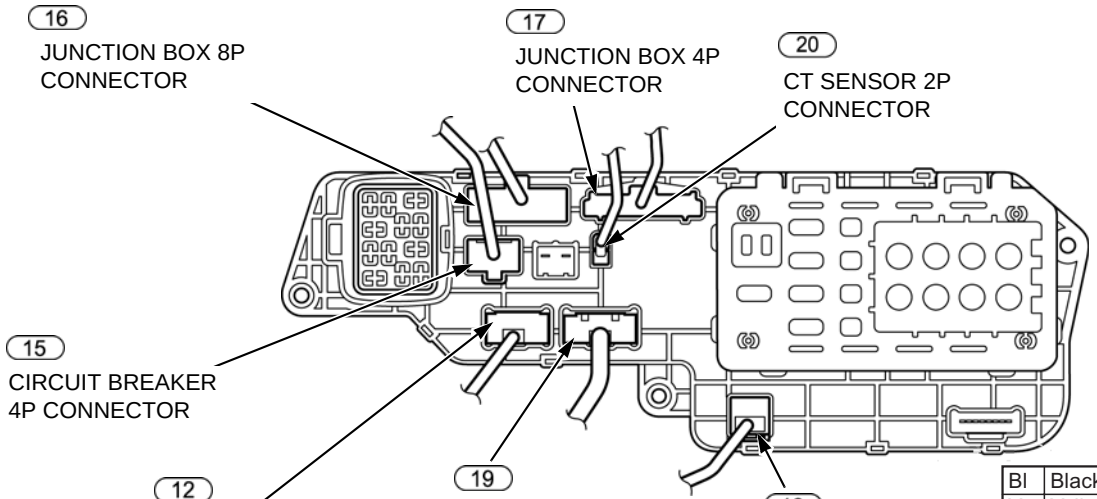


MAIN WIRE HARNESS SIDE

Terminal number	Wire color
1	R
2	W
3	Bu
4	–
5	–
6	Bu

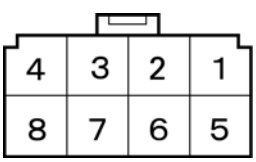
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

JUNCTION BOX/CONTROL PANEL SIDE



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

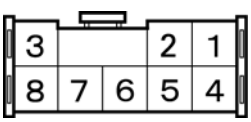
16



MAIN WIRE HARNESS SIDE

Terminal number	Wire color
1	Bu
2	Bu
3	–
4	–
5	R
6	R
7	W
8	W

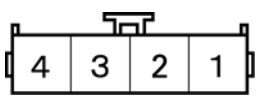
12



MAIN WIRE HARNESS SIDE

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

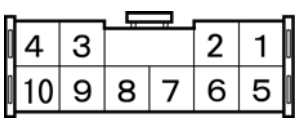
17



MAIN WIRE HARNESS SIDE

Terminal number	Wire color
1	–
2	W
3	Bu
4	G

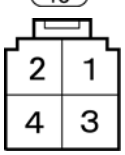
19



MAIN WIRE HARNESS SIDE

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

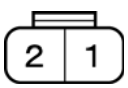
15



MAIN WIRE HARNESS SIDE

Terminal number	Wire color
1	R
2	Bu
3	Br
4	R

20



CT SENSOR SIDE

Terminal number	Wire color
1	Bl
2	W

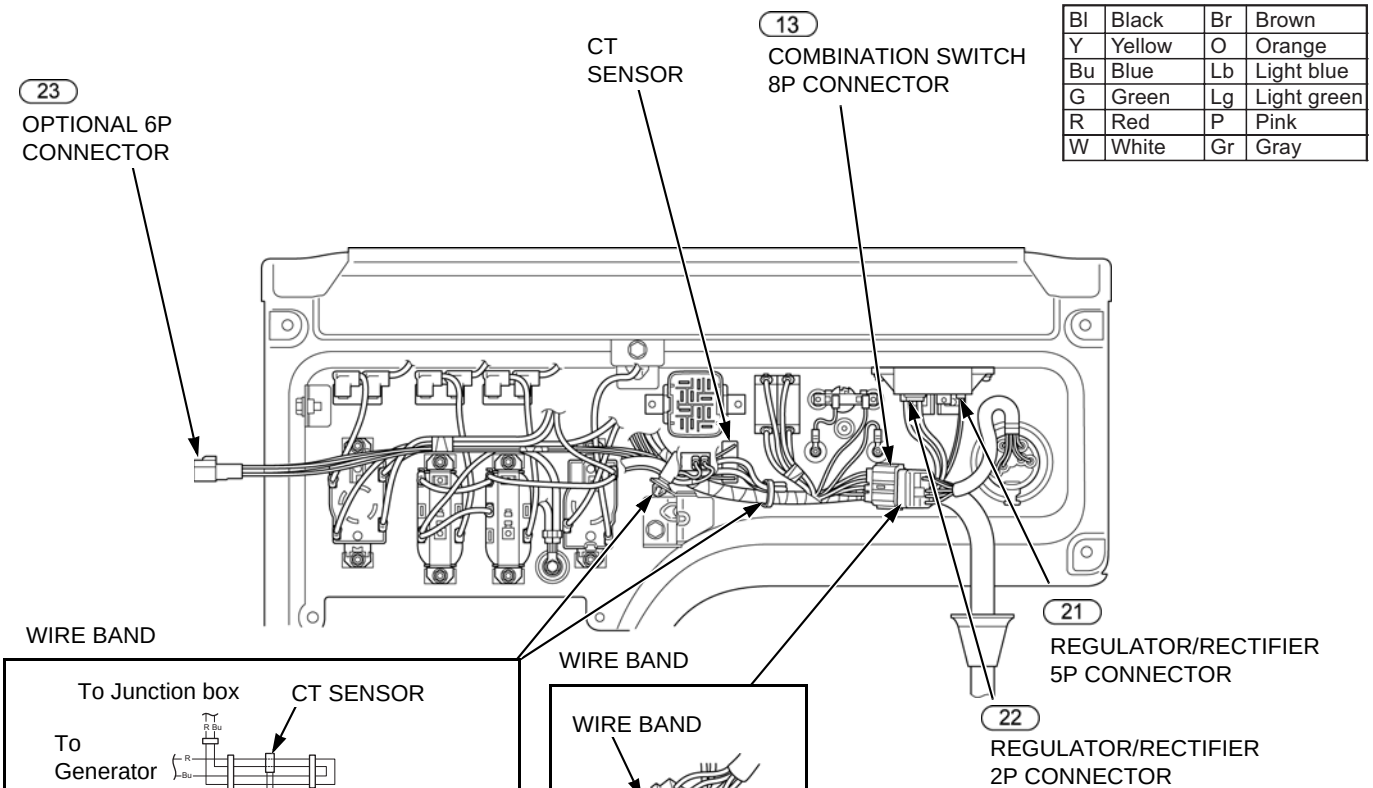
18

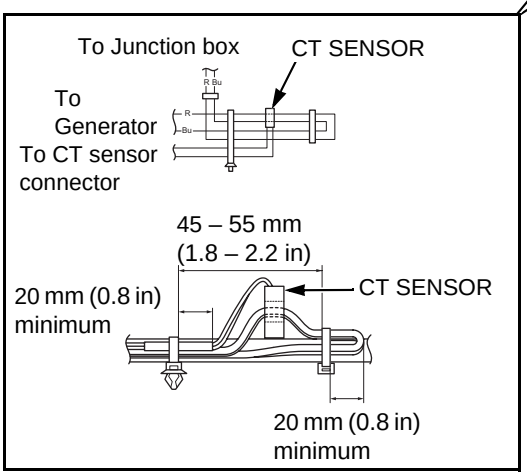
MAIN WIRE HARNESS SIDE

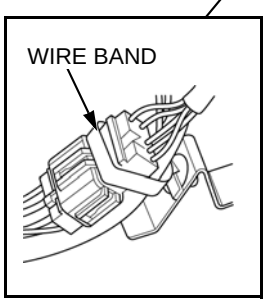
Terminal number	Wire color
1	G

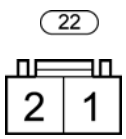
CONTROL PANEL SIDE (CONNECTOR: EM4000SX TYPE)

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



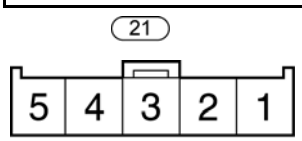






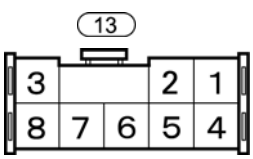
MAIN WIRE HARNESS SIDE

Terminal number	Wire color
1	Bl/W
2	Bl/Y



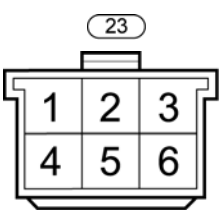
MAIN WIRE HARNESS SIDE

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



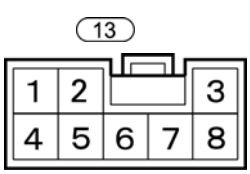
MAIN WIRE HARNESS SIDE

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



MAIN WIRE HARNESS SIDE

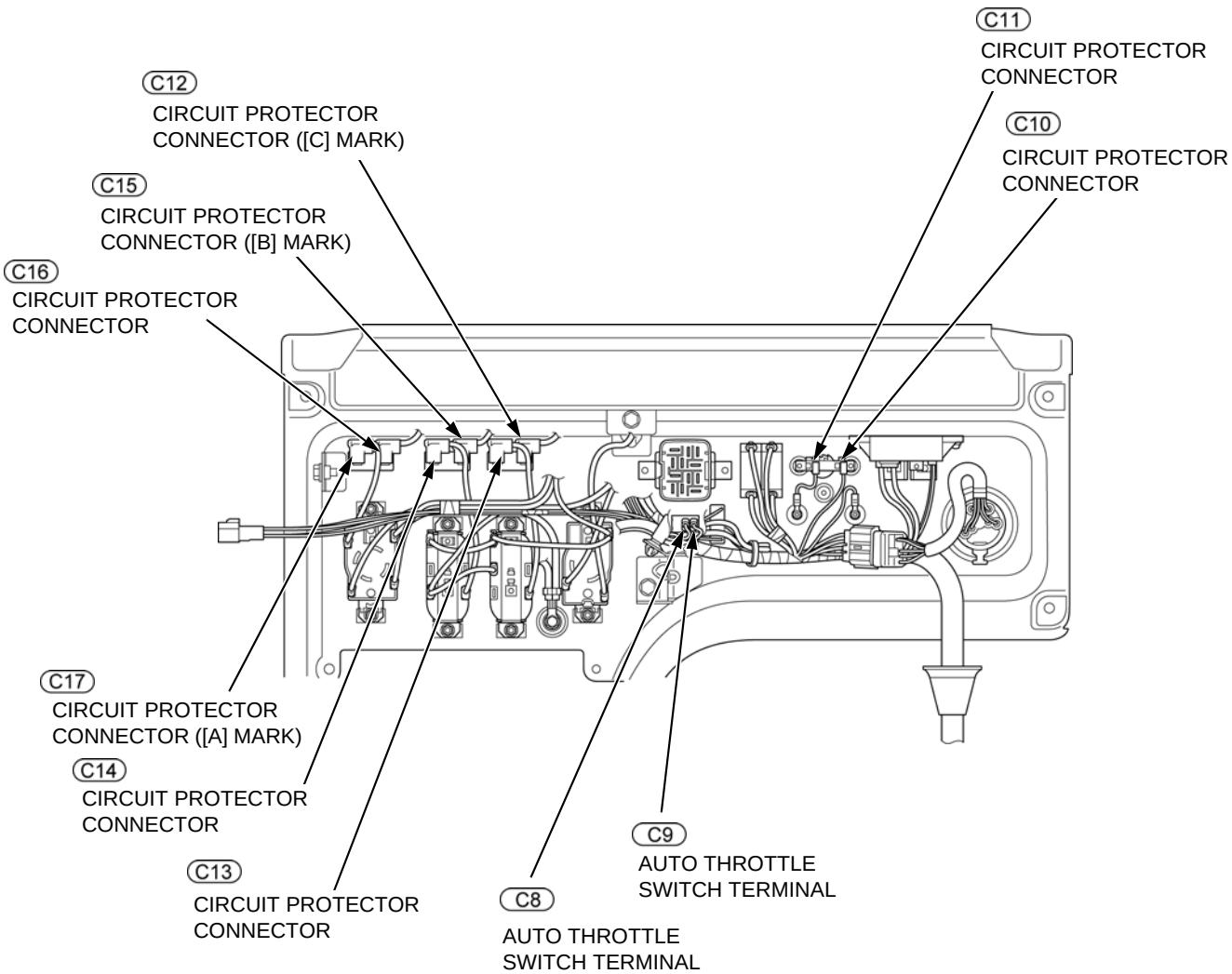
Terminal number	Wire color
1	P
2	–
3	Y
4	G
5	–
6	W/Bu



COMBINATION SWITCH SIDE

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

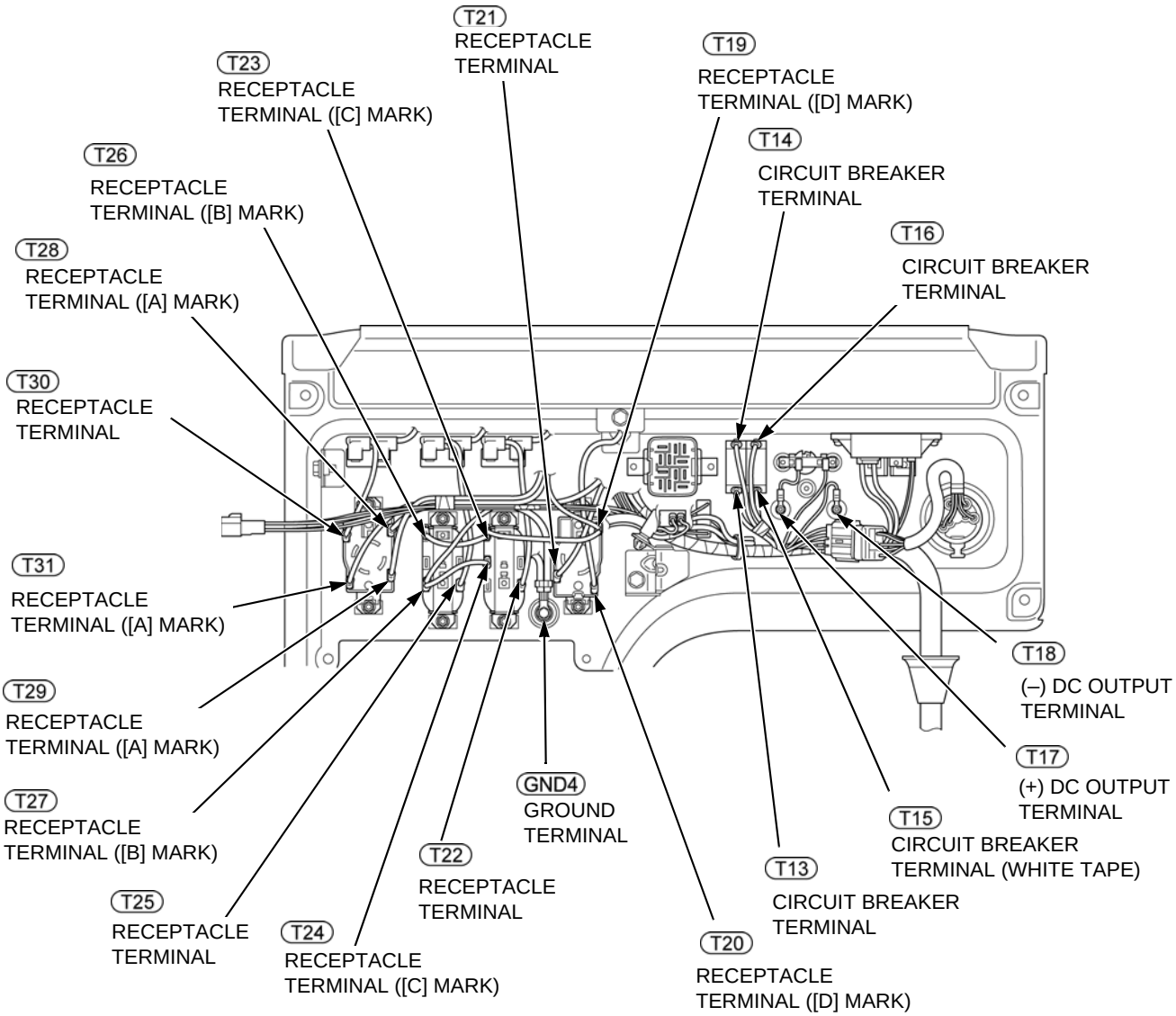
CONTROL PANEL SIDE (WIRE CONNECTOR: EM4000SX TYPE)



Terminal number	Wire color
C8	Bl
C9	Lg
C10	W/R
C11	W/R
C12	R
C13	R
C14	R
C15	Bu
C16	R
C17	R

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

CONTROL PANEL SIDE (TERMINAL: EM4000SX TYPE)



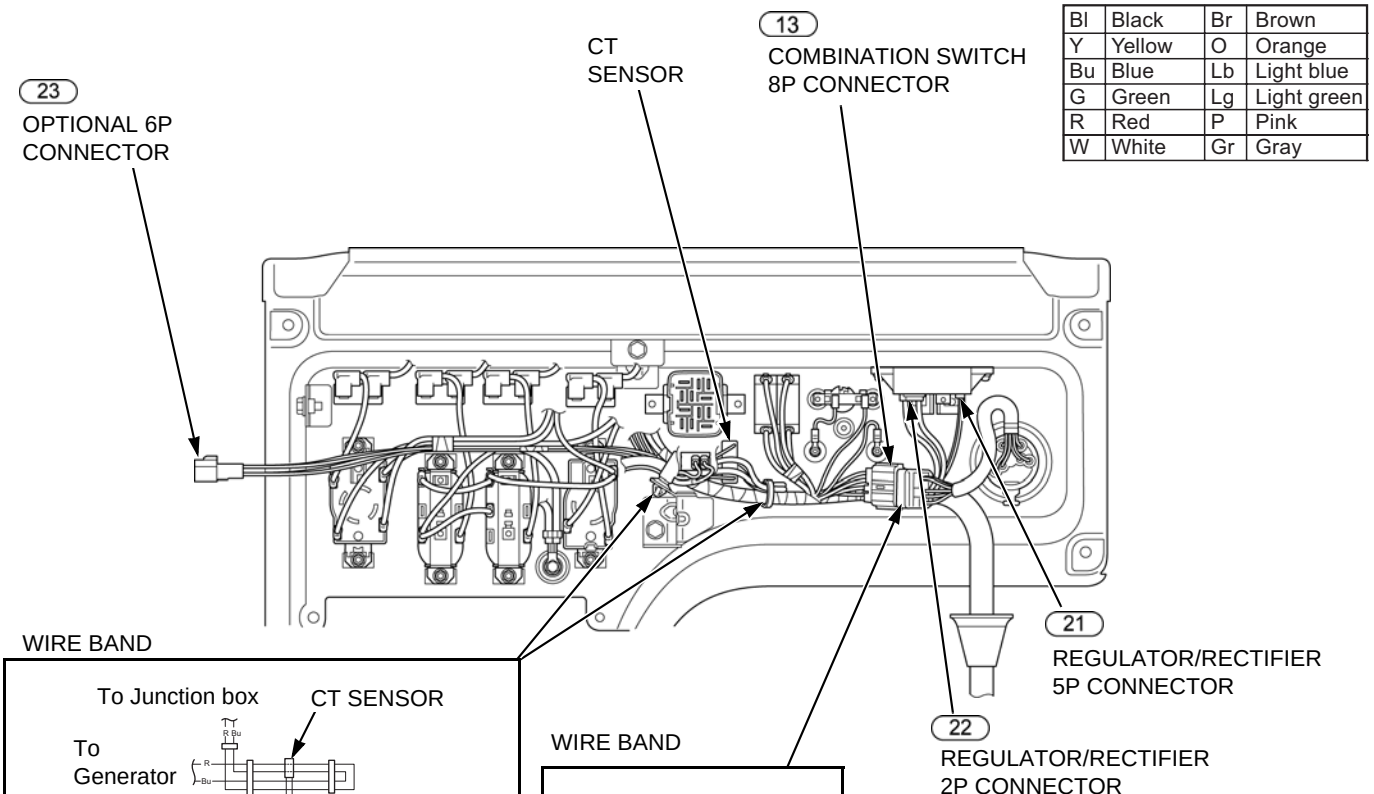
Terminal number	Wire color
T13	Bu
T14	Br
T15	R
T16	R
T17	W/R
T18	Bl/R
T19	G
T20	Bu
T21	W
T22	R
T23	G
T24	W
T25	R
T26	G
T27	W
T28	G
T29	Bu
T30	R
T31	W

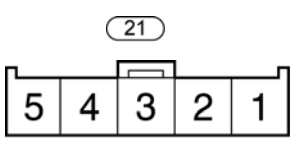
Terminal number	Wire color
GND4	G

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

CONTROL PANEL SIDE (CONNECTOR: EM5000SXK3/EM6500SXK2 TYPE)

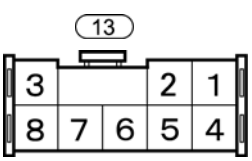
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray





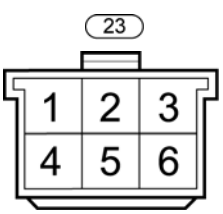
MAIN WIRE HARNESS SIDE

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



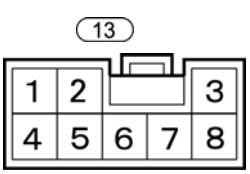
MAIN WIRE HARNESS SIDE

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



MAIN WIRE HARNESS SIDE

Terminal number	Wire color
1	P
2	–
3	Y
4	G
5	–
6	W/Bu



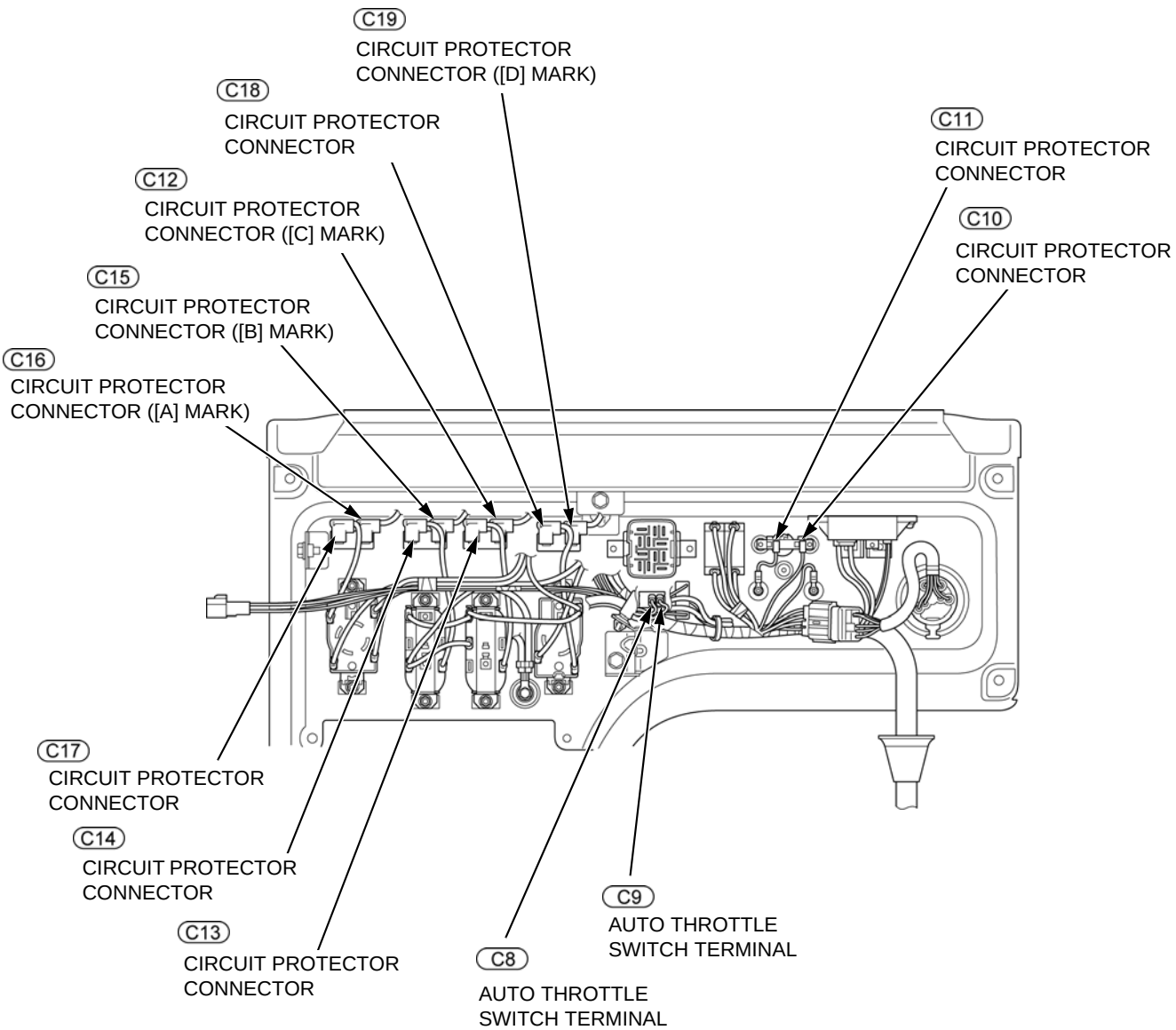
COMBINATION SWITCH SIDE

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

MAIN WIRE HARNESS SIDE

Terminal number	Wire color
1	Bl/W
2	Bl/Y

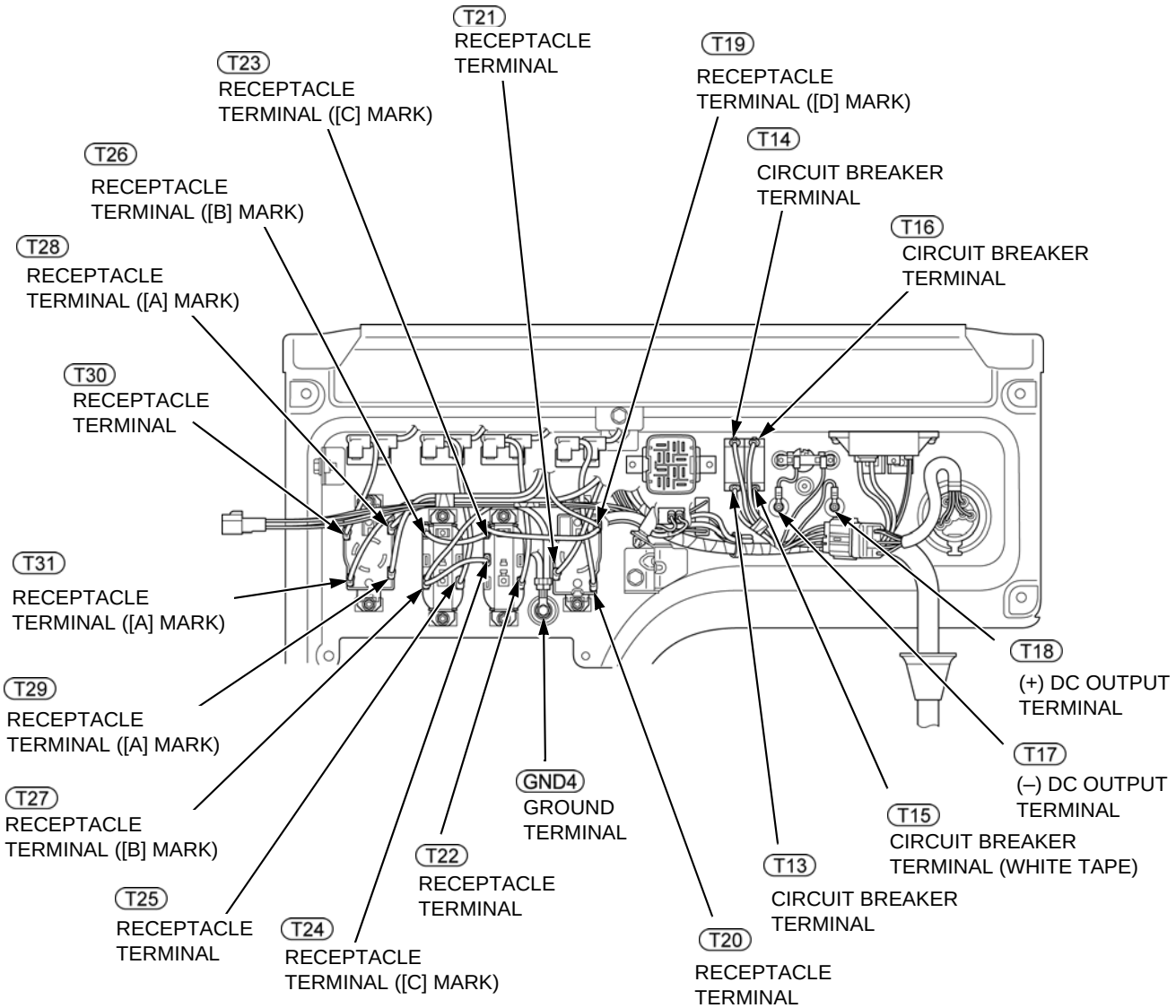
CONTROL PANEL SIDE (WIRE CONNECTOR: EM5000SXK3/EM6500SXK2 TYPE)



Terminal number	Wire color
C8	Bl
C9	Lg
C10	W/R
C11	W/R
C12	R
C13	R
C14	R
C15	Bu
C16	R
C17	R
C18	R
C19	Bu

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

CONTROL PANEL SIDE (TERMINAL: EM5000SXK3/EM6500SXK2 TYPE)



Terminal number	Wire color
T13	Bu
T14	Br
T15	R
T16	R
T17	W/R
T18	Bl/R
T19	G
T20	R
T21	W
T22	R
T23	G
T24	W
T25	R
T26	G
T27	W
T28	G
T29	Bu
T30	R
T31	W

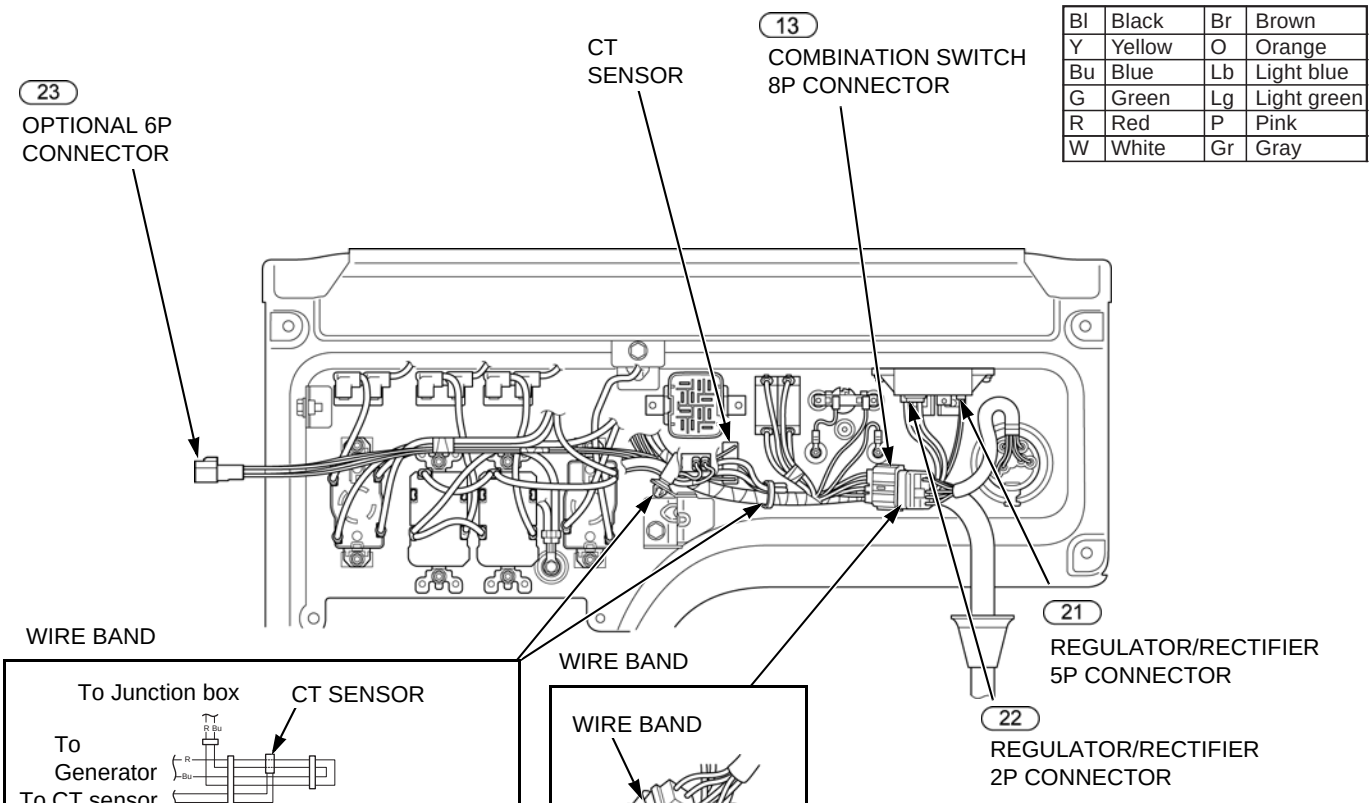
Terminal number	Wire color
GND4	G

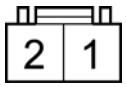
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

CONTROL PANEL HARNESS ROUTING

CONTROL PANEL SIDE (CONNECTOR: EM4000SX AT1 TYPE)

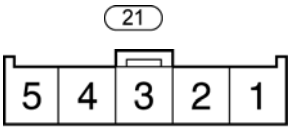
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray





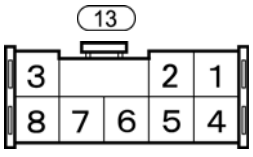
MAIN WIRE HARNESS SIDE

Terminal number	Wire color
1	Bl/W
2	Bl/Y



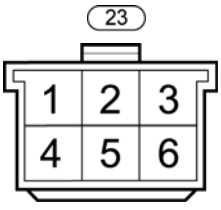
MAIN WIRE HARNESS SIDE

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



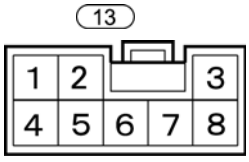
MAIN WIRE HARNESS SIDE

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



MAIN WIRE HARNESS SIDE

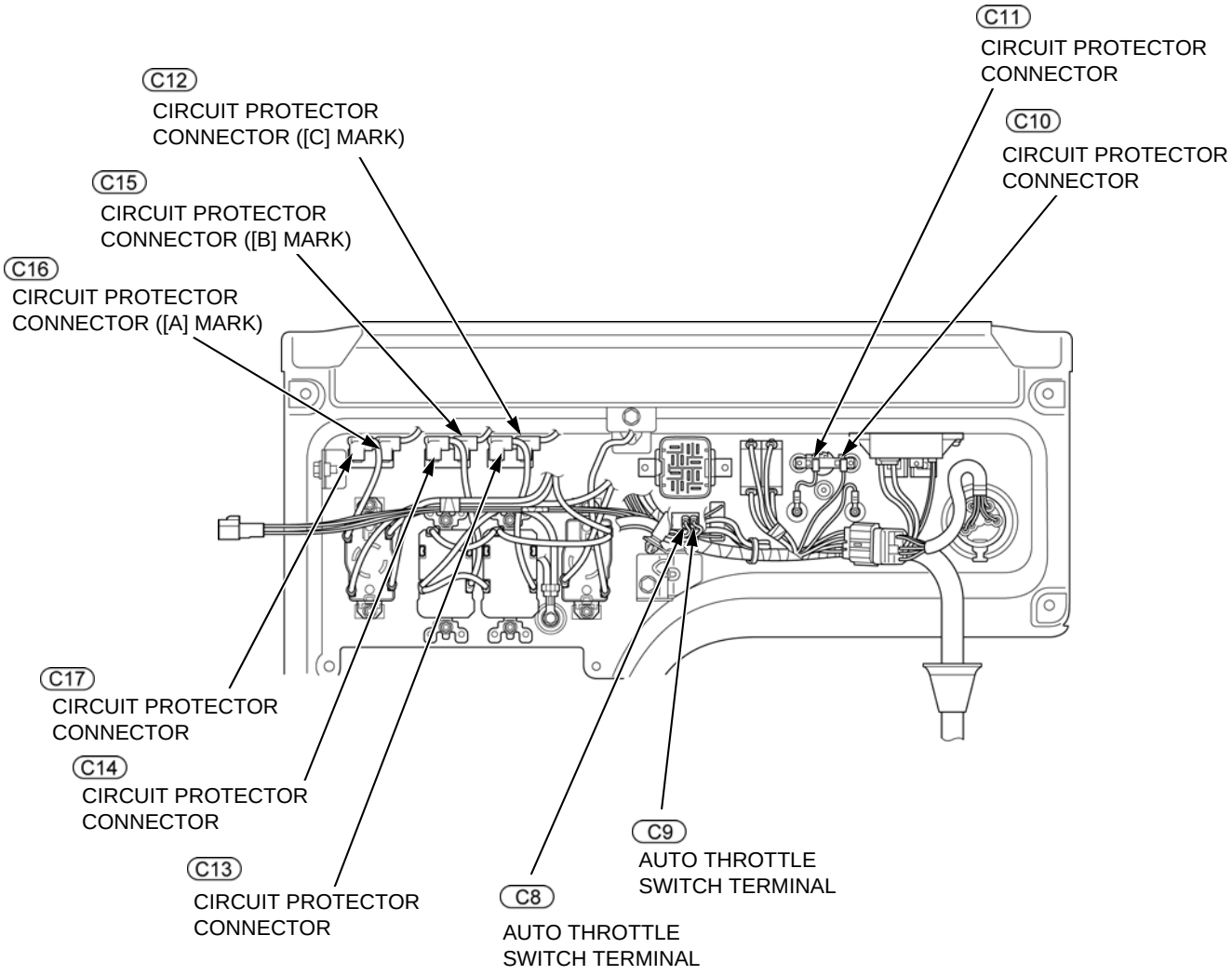
Terminal number	Wire color
1	P
2	–
3	Y
4	G
5	–
6	W/Bu



COMBINATION SWITCH SIDE

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

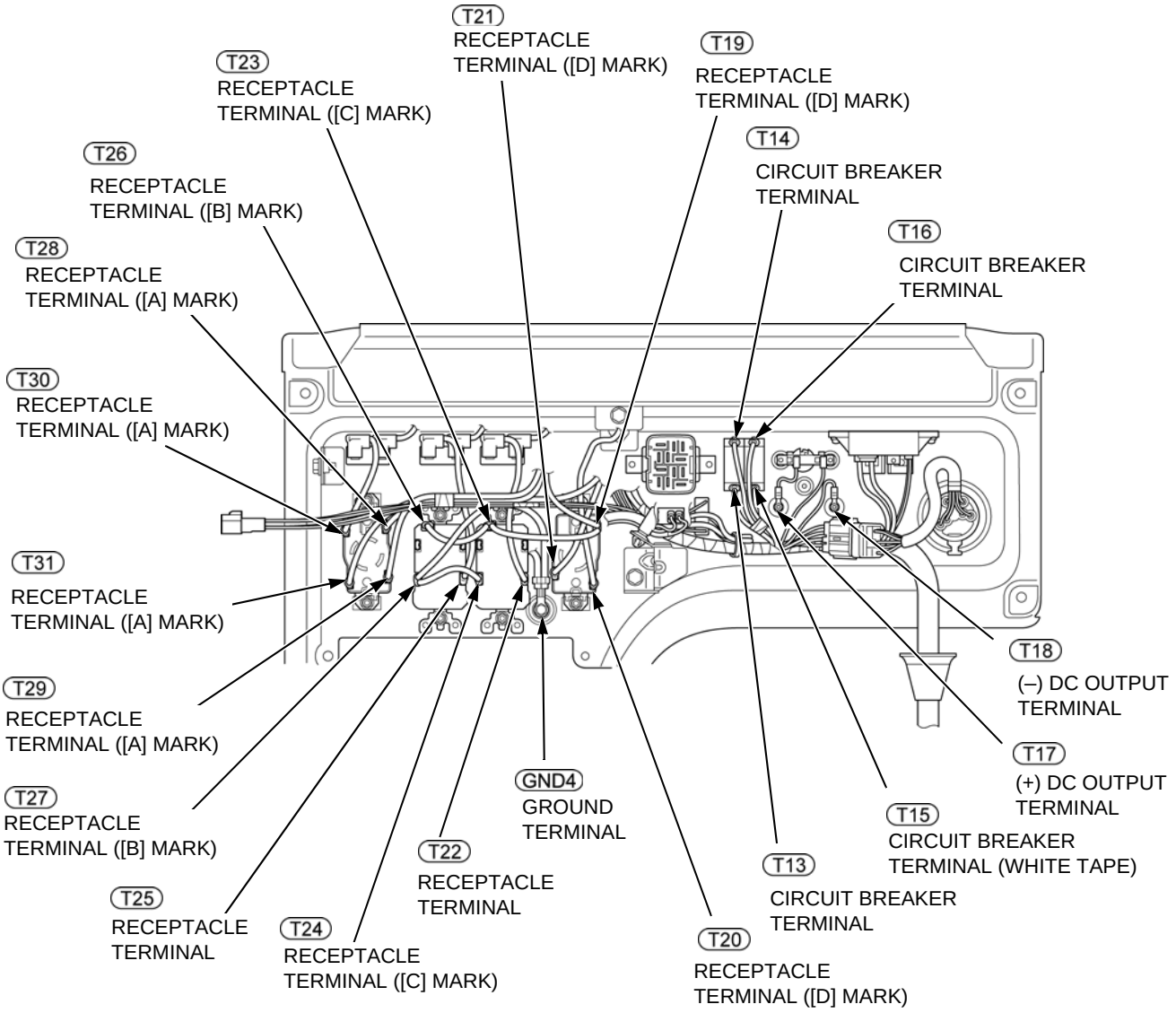
CONTROL PANEL SIDE (WIRE CONNECTOR: EM4000SX AT1 TYPE)



Terminal number	Wire color
C8	Bl
C9	Lg
C10	W/R
C11	W/R
C12	R
C13	R
C14	R
C15	Bu
C16	R
C17	R

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

CONTROL PANEL SIDE (TERMINAL: EM4000SX AT1 TYPE)



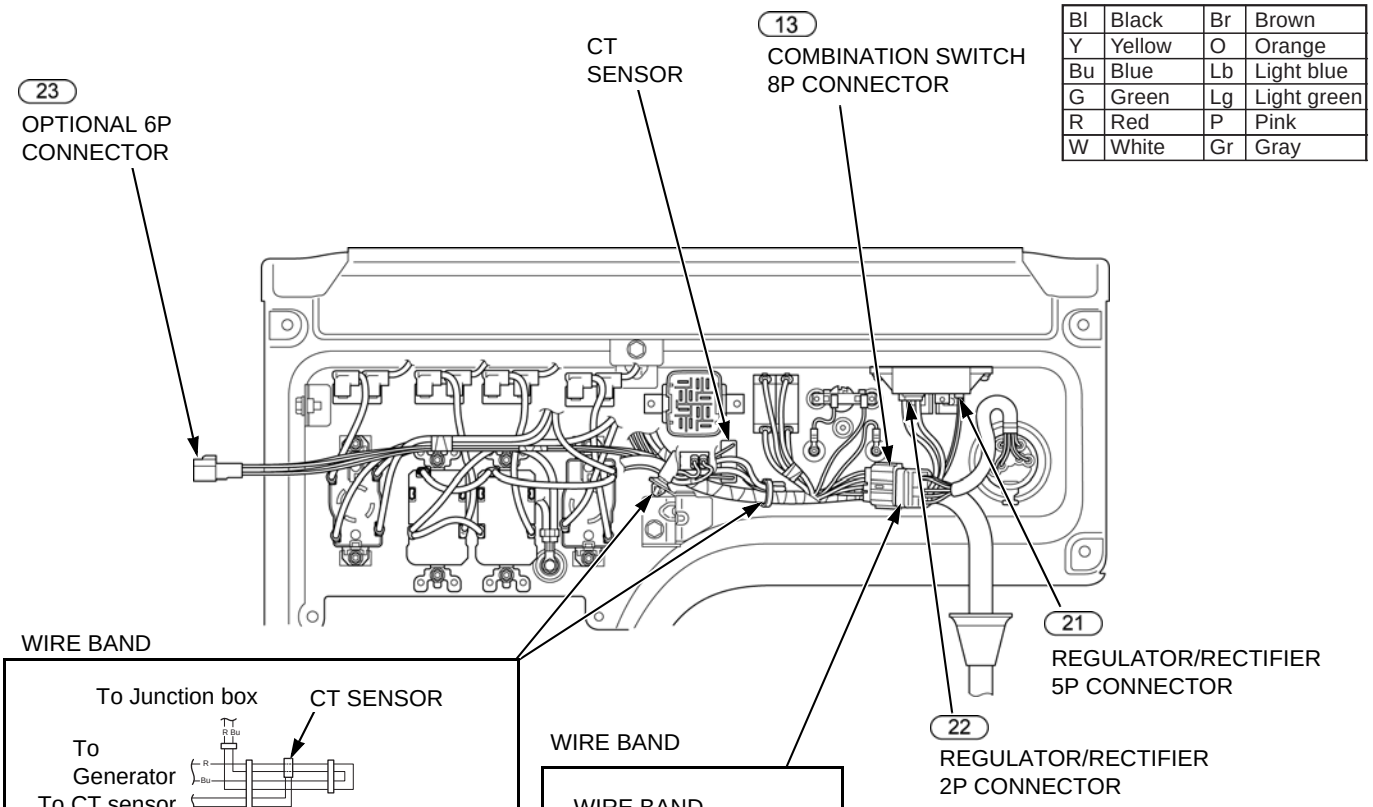
Terminal number	Wire color
T13	Bu
T14	Br
T15	R
T16	R
T17	W/R
T18	Bl/R
T19	G
T20	Bu
T21	W
T22	R
T23	G
T24	W
T25	R
T26	G
T27	W
T28	G
T29	Bu
T30	R
T31	W

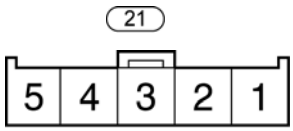
Terminal number	Wire color
GND4	G

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

CONTROL PANEL SIDE (CONNECTOR: EM5000SXK3/EM6500SXK2 AT1 TYPE)

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



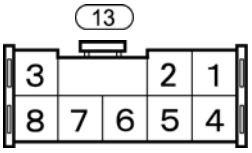


MAIN WIRE HARNESS SIDE

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

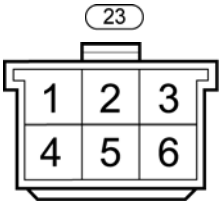
MAIN WIRE HARNESS SIDE

Terminal number	Wire color
1	Bl/W
2	Bl/Y



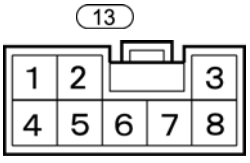
MAIN WIRE HARNESS SIDE

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



MAIN WIRE HARNESS SIDE

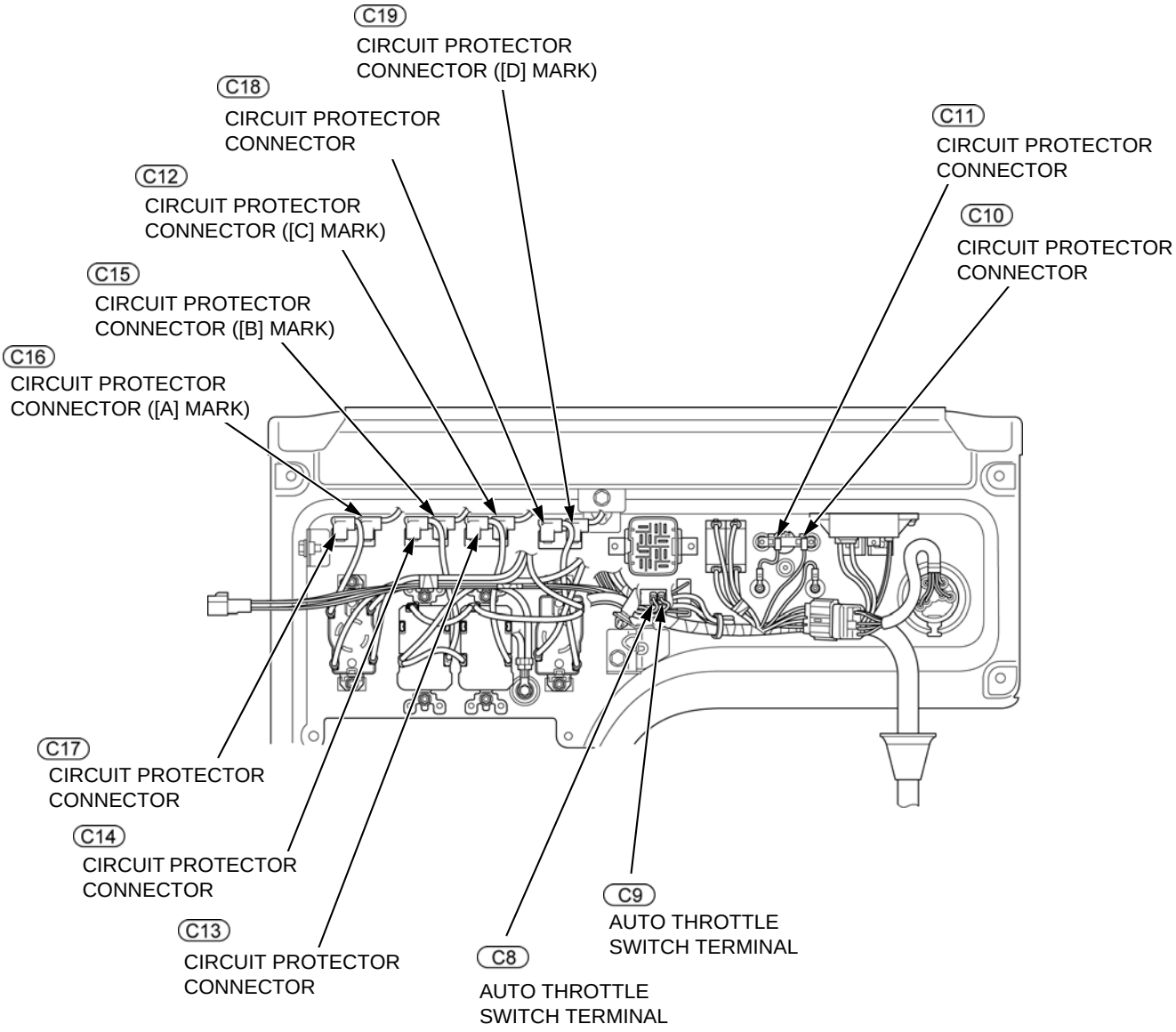
Terminal number	Wire color
1	P
2	–
3	Y
4	G
5	–
6	W/Bu



COMBINATION SWITCH SIDE

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

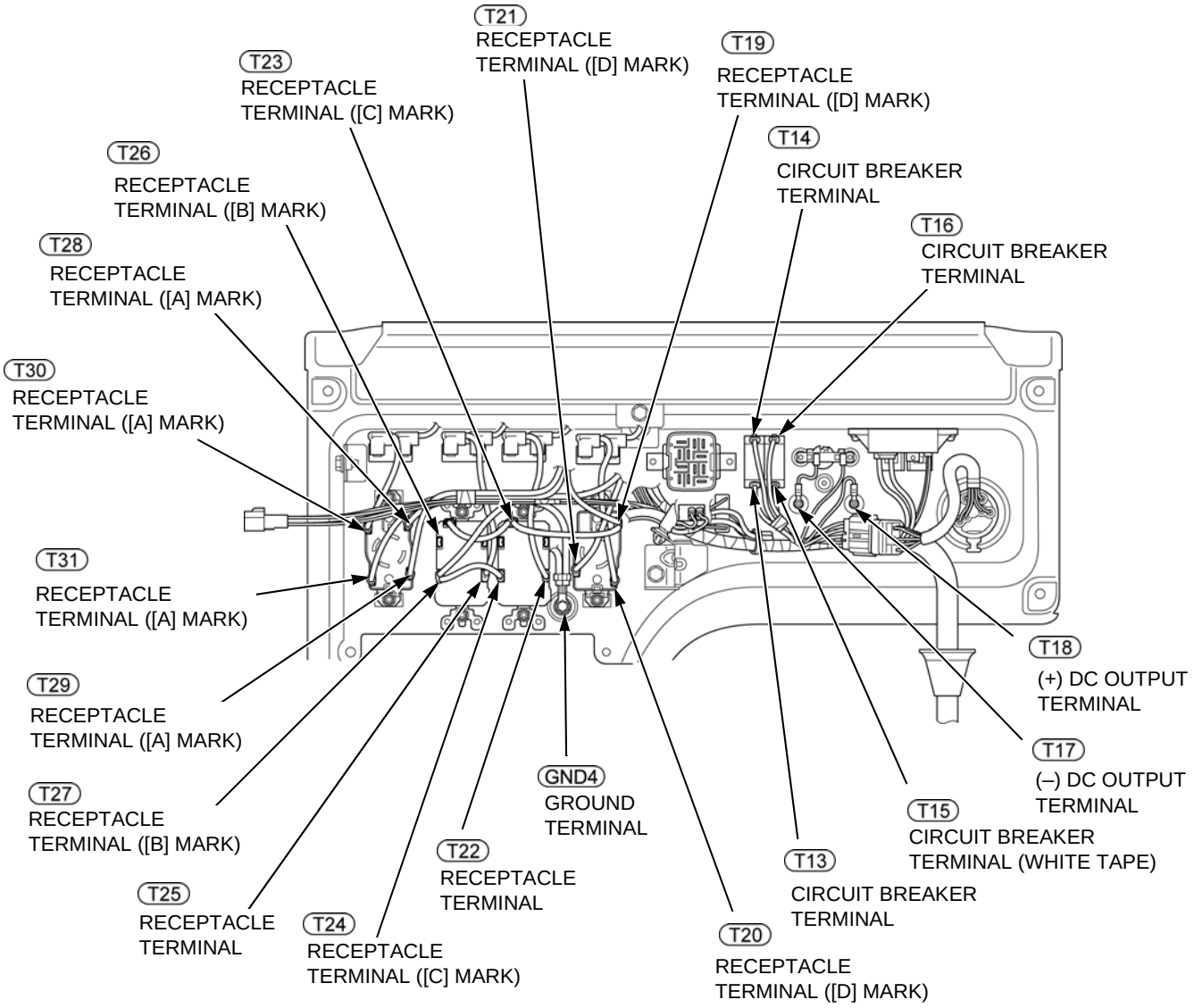
CONTROL PANEL SIDE (WIRE CONNECTOR: EM5000SXK3/EM6500SXK2 AT1 TYPE)



Terminal number	Wire color
C8	Bl
C9	Lg
C10	W/R
C11	W/R
C12	R
C13	R
C14	R
C15	Bu
C16	R
C17	R
C18	R
C19	Bu

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

CONTROL PANEL SIDE (TERMINAL: EM5000SXK3/EM6500SXK2 AT1 TYPE)

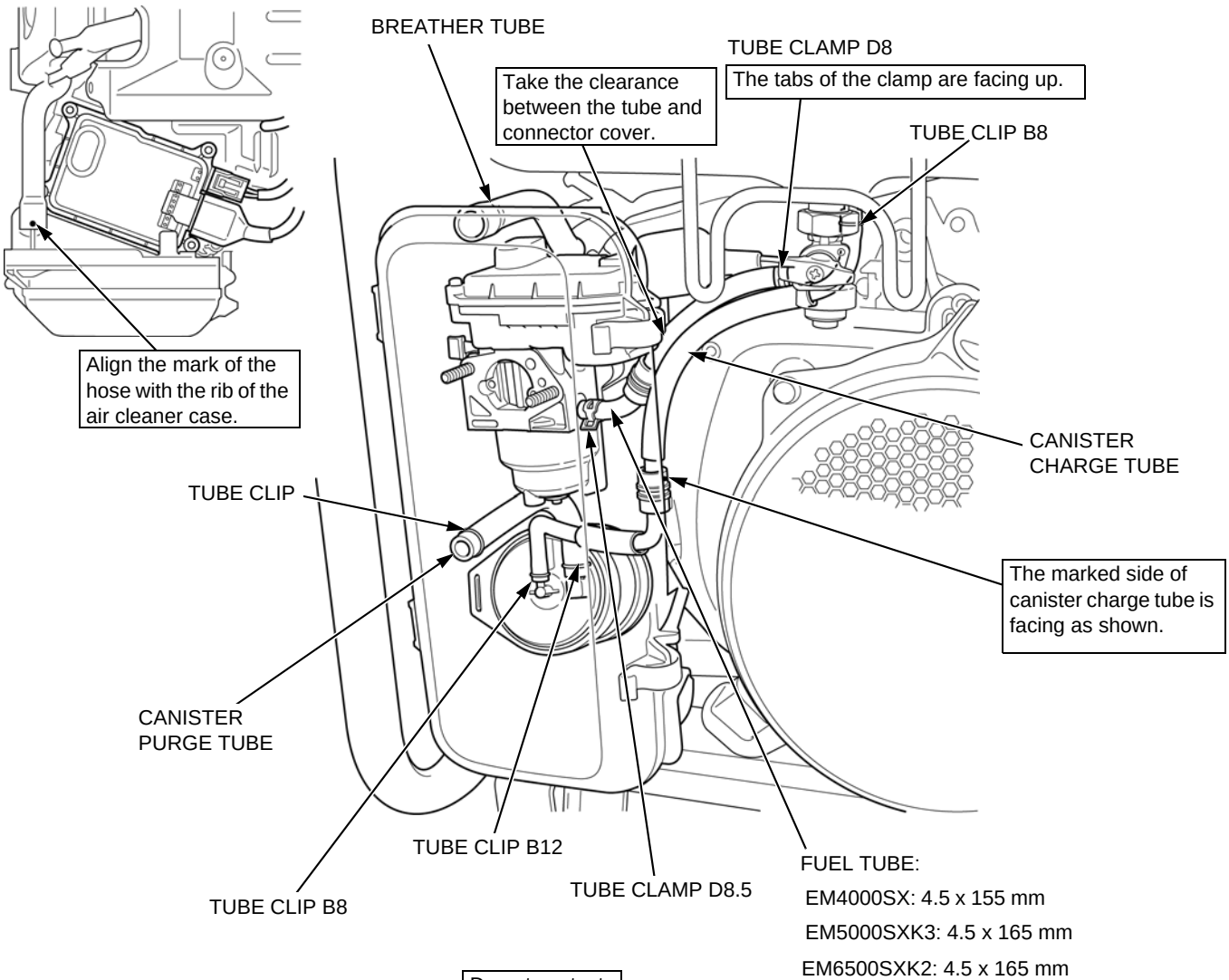


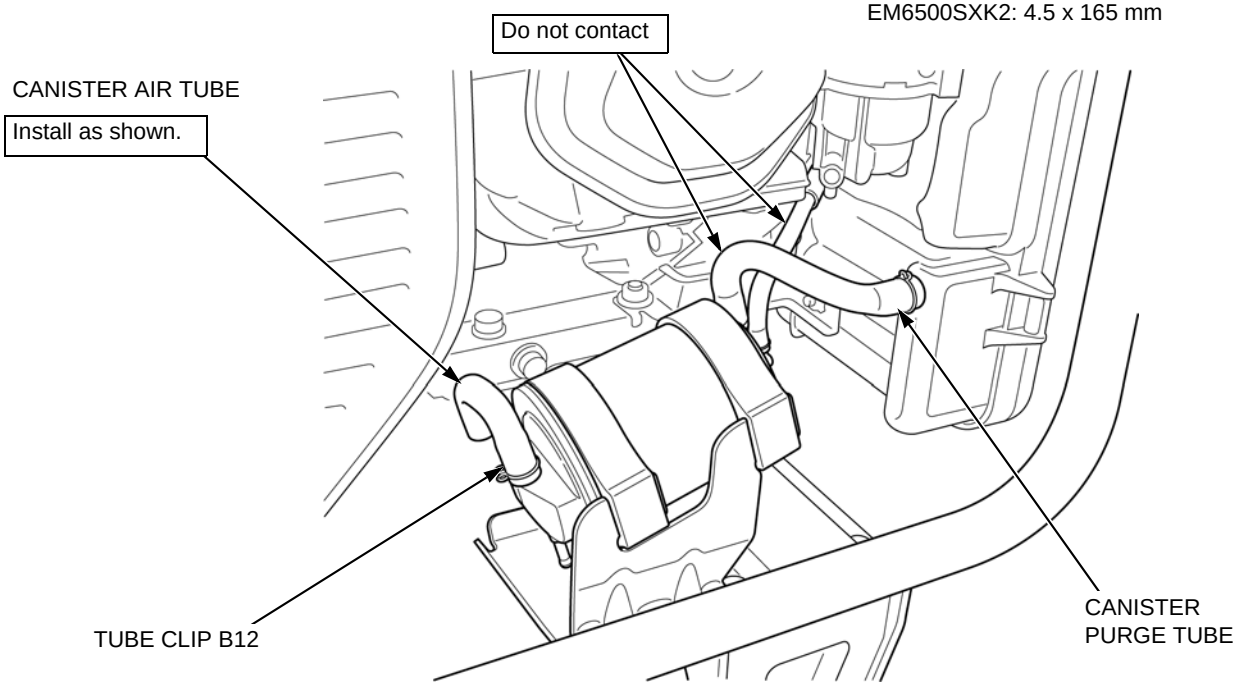
Terminal number	Wire color
T13	Bu
T14	Br
T15	R
T16	R
T17	W/R
T18	Bl/R
T19	G
T20	R
T21	W
T22	R
T23	G
T24	W
T25	R
T26	G
T27	W
T28	G
T29	Bu
T30	R
T31	W

Terminal number	Wire color
GND4	G

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

TUBE ROUTING





3. MAINTENANCE

MAINTENANCE SCHEDULE

ITEM		REGULAR SERVICE PERIOD (2) Perform at every indicated month or operating hour interval, whichever comes first.					
		Each use	First month or 20 hrs.	Every 3 months or 50 hrs.	Every 6 months or 100 hrs.	Every year or 300 hrs.	Refer to page
Engine oil	Check level	○					3-3
	Change		○		○		3-4
Canister	Check	Every 2 years					3-4
Purge tube	Check	Every 2 years					3-5
Charge tube	Check	Every 2 years					3-5
Air cleaner	Check	○					3-6
	Clean			○ (1)			
Sediment cup	Clean				○		3-6
Spark plug	Check–adjust				○		3-7
	Replace					○	3-8
Spark arrester	Clean				○		3-8
Valve clearance	Check–adjust					○	3-9
Combustion chamber	Clean	After every 1,000 hrs.					3-10
Fuel tank & strainer	Clean				○		3-10
Fuel tube	Check	Every 2 years (Replace if necessary)					3-11

(1) Service more frequently when used in dusty areas.
(2) For commercial use, log hours of operation to determine proper maintenance intervals.

MAINTENANCE SCHEDULE

ITEM	REGULAR SERVICE PERIOD (2) Perform at every indicated month or operating hour interval, whichever comes first.	Each use	First month or 20 hrs.	Every 3 months or 50 hrs.	Every 6 months or 100 hrs.	Every year or 300 hrs.	Refer to page
Engine oil	Check level	○					3-3**
	Change		○		○		3-4**
Canister	Check	Every 2 years					3-4**
Purge tube	Check	Every 2 years					3-5**
Charge tube	Check	Every 2 years					3-5**
Air cleaner	Check	○					3-6**
	Clean			○ (1)			
GFCI operation	Check	○					3-2
Sediment cup	Clean				○		3-6**
Spark plug	Check–adjust				○		3-4*
	Replace					○	
Spark arrester	Clean				○		3-7**
Valve clearance	Check–adjust					○	3-7**
Combustion chamber	Clean	After every 1,000 hrs.					3-8**
Fuel tank & strainer	Clean				○		3-9**
Fuel tube	Check	Every 2 years (Replace if necessary)					3-9**

(1) Service more frequently when used in dusty areas.
(2) For commercial use, log hours of operation to determine proper maintenance intervals.

*: Refer to base shop manual (61Z210099)
**: Refer to base shop manual (61Z2100Y)

GFCI OPERATION

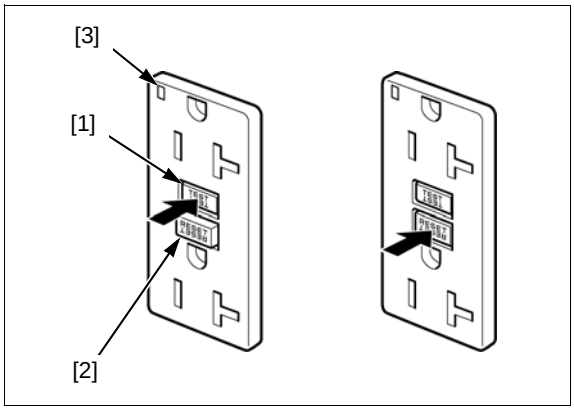
1. Unplug all tools and appliances from the generator.
2. Start the engine.
3. Make sure that the circuit protector is ON.
4. Press the TEST button [1]:

- The RESET button [2] should extend.
- If the GFCI does not function as described, replace the GFCI receptacle [3].

5. Press the RESET button:

- The RESET button should be flush with the base.
- If the RESET button is not flush with the TEST button, replace the GFCI receptacle.

LED operation:
- If there is no fault current, the LED is lit.
- If there is a fault current or you press the GFCI TEST button, the LED goes out.
- If the GFCI is faulty, the LED does not come on. Replace the GFCI receptacle.



ENGINE OIL LEVEL CHECK

Place the engine on a level surface.

Remove the oil filler cap (1), and wipe the oil level gauge (2) clean.

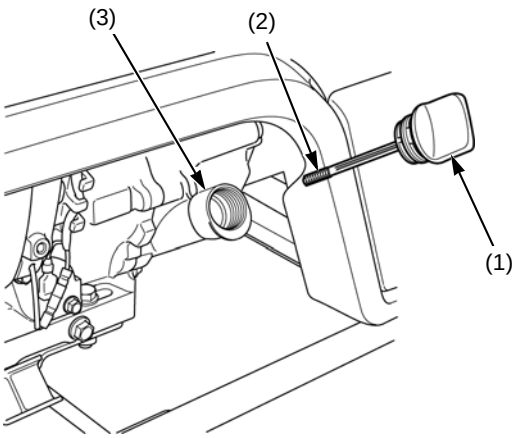
Insert the oil filler cap without screwing it into the oil filler neck (3).

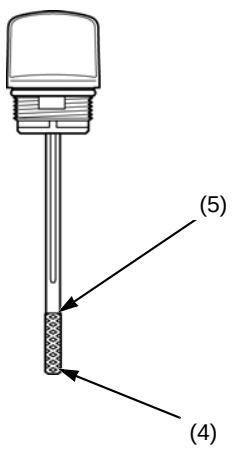
Remove the oil filler cap and check oil level shown on the oil level gauge.
If near or below the lower limit mark (4), fill to the upper mark (5) with the recommended oil.

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.

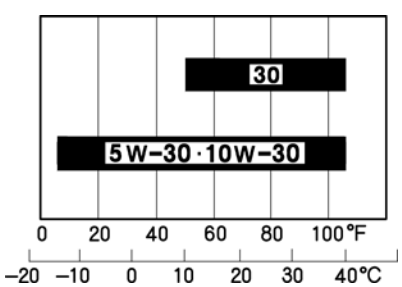
RECOMMENDED OIL:
SAE 10W-30 API service classification SJ or later

Tighten the oil filler cap securely.





SAE VISCOSITY GRADES



AMBIENT TEMPERATURE

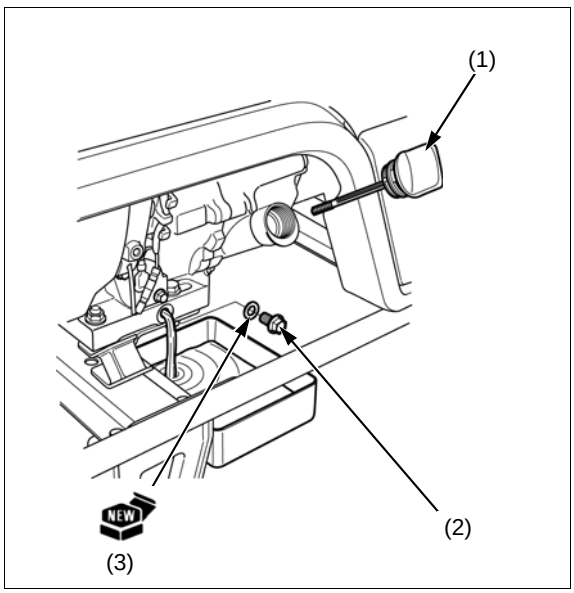
ENGINE OIL CHANGE

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

Place the engine on a level surface, and place a suitable container under the oil drain bolt.

Remove the oil filler cap (1), oil drain bolt (2), and oil drain washer (3) to 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 on 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.

Install a new oil drain washer and tighten the oil drain bolt to the specified torque.

TORQUE: 22.5 N·m (2.3 kgf·m, 17 lbf·ft)

Fill with recommended oil to the upper level mark of the oil filler cap / dipstick (page 3-3).

ENGINE OIL CAPACITY: 1.1 ℓ (1.2 US qt, 1.0 Imp qt)

Tighten the oil filler cap securely.

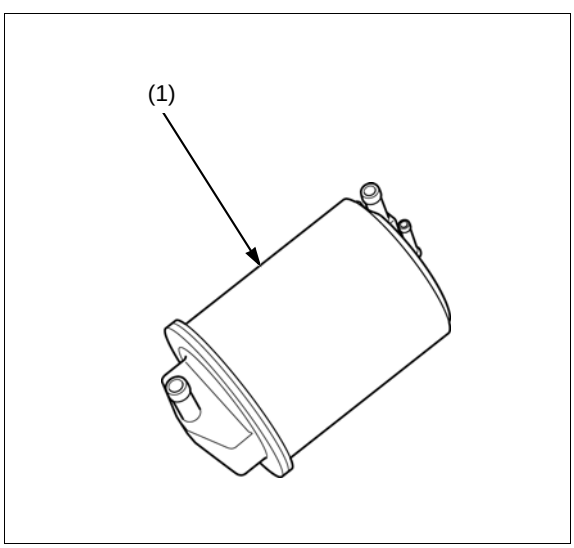
CANISTER INSPECTION

Perform this inspection while the engine is stopped.

Remove the canister (page 5-3).

Check the canister (1) for cracks and damage, and replace it if necessary.

Install the canister in the reverse order of removal (page 5-3).



PURGE TUBE INSPECTION

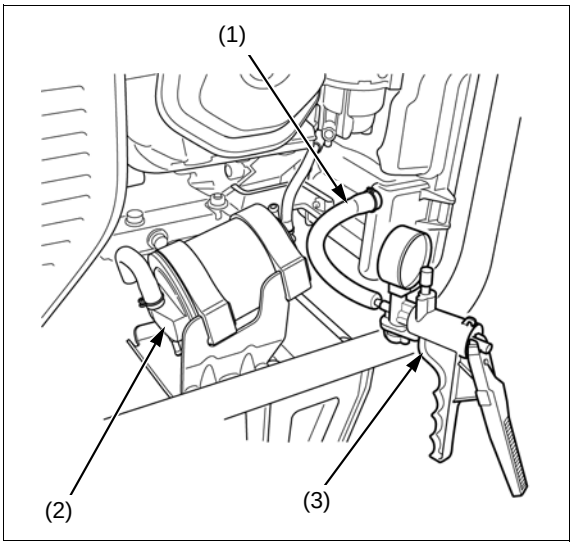
Perform this inspection while the engine is stopped. Before inspection, check the canister purge tube (1) for deterioration or damage.

Disconnect the canister purge tube from the canister (2).

Connect a commercially available hand-operated vacuum pump (3) to the canister purge tube.

Operate the vacuum pump and be sure there is airflow between the air cleaner and the canister purge tube. If there is no airflow, check the canister purge tube for restriction.

Insert the canister purge tube to the canister securely.

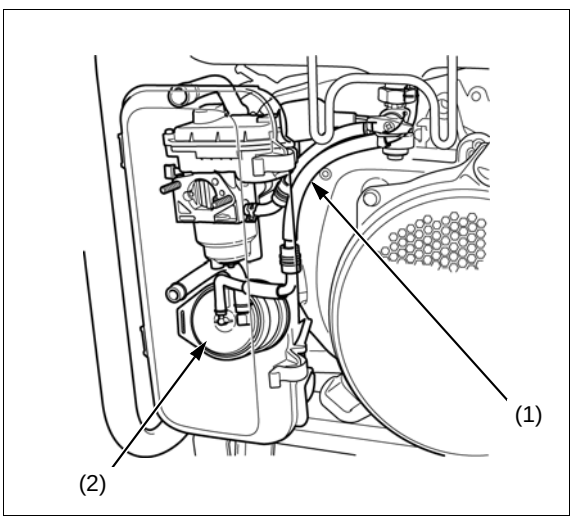


CHARGE TUBE INSPECTION

Perform this inspection while the engine is stopped. Before inspection, check the canister charge tube (1) for deterioration or damage.

Open the fuel tank cap.

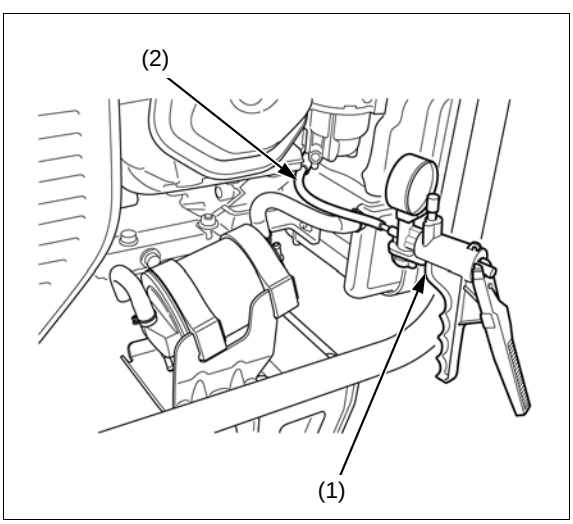
Disconnect the canister charge tube from the canister (2).



Connect a commercially available hand-operated vacuum pump (1) to the canister charge tube (2).

Operate the vacuum pump and be sure that there is airflow between the fuel tank and the canister charge tube. If there is no airflow, check the canister charge tube for restriction.

Install the canister charge tube to the canister securely.

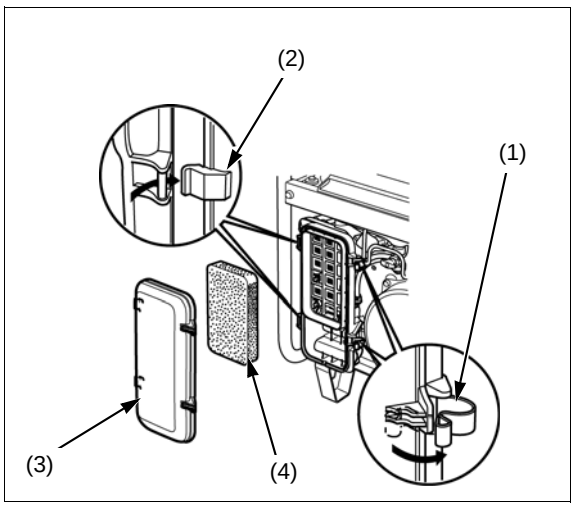


AIR CLEANER CHECK / CLEANING

A dirty air cleaner element will restrict air flow to the carburetor, reducing engine performance. If the engine is operated in dusty areas, clean the air cleaner element more often than specified in the MAINTENANCE SCHEDULE.

NOTICE

Operating the engine without the air cleaner element or with the air cleaner element installed loosely will allow dirt to enter the engine, causing rapid engine wear. Install the air cleaner element securely.



Remove the air cleaner case lid springs (1) and unhook the tabs (2).

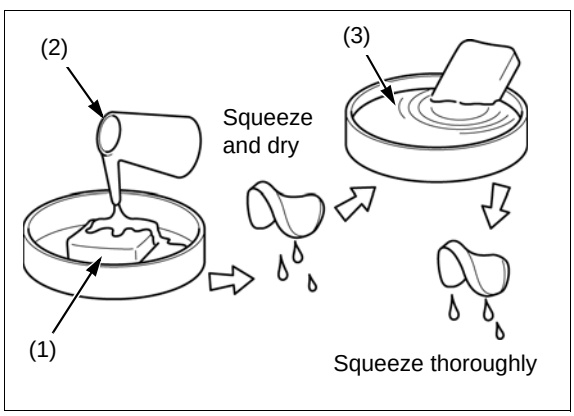
Remove the air cleaner cover (3).

Remove the air cleaner element (4).

Carefully check air cleaner element and replace if damaged.

Clean the element (1) in warm soapy water (2), rinse, and allow to dry thoroughly, or clean with a non-flammable solvent and allow to dry thoroughly.

Dip the filter in clean engine oil (3), and squeeze out all the excess oil.



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

Check the air cleaner cover seal for deterioration or damage. Make sure the air cleaner cover seal is installed securely.

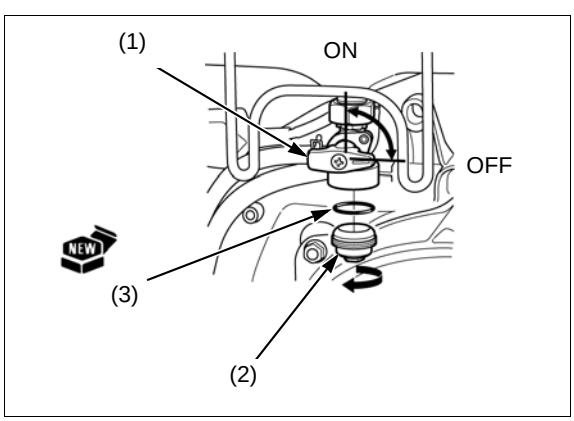
Install the air cleaner in the reverse order of removal.

SEDIMENT CUP 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.

Turn the fuel valve lever (1) to the OFF position.



Remove the sediment cup (2) and the O-ring (3).

Clean the sediment cup with non-flammable solvent and allow it to dry thoroughly.

Install a new O-ring and tighten the sediment cup.

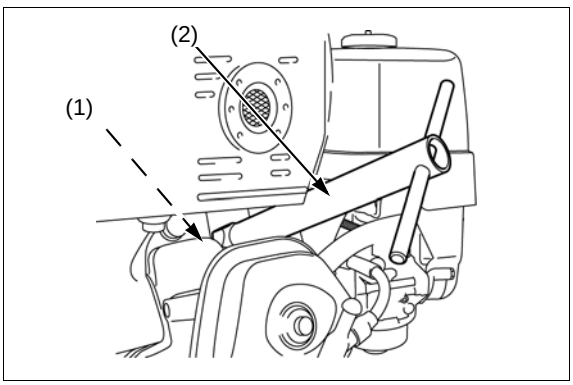
Check the sediment cup for any sign of fuel leakage.

SPARK PLUG CHECK / ADJUSTMENT

⚠CAUTION

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

Remove the spark plug cap, and then remove the spark plug (1) using a spark plug wrench (2).

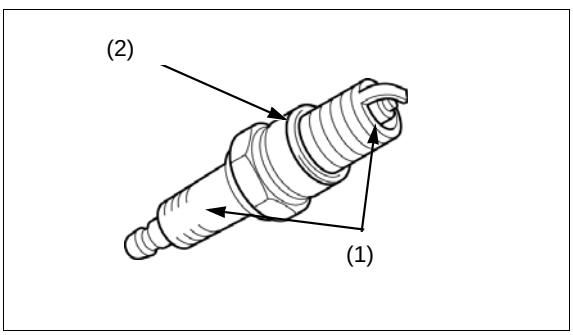


Visually check the spark plug. Replace the plug if it is heavily fouled or the insulator (1) is cracked or chipped.

Check the sealing washer (2) for damage.

Replace the spark plug if the sealing washer is damaged (page 3-8).

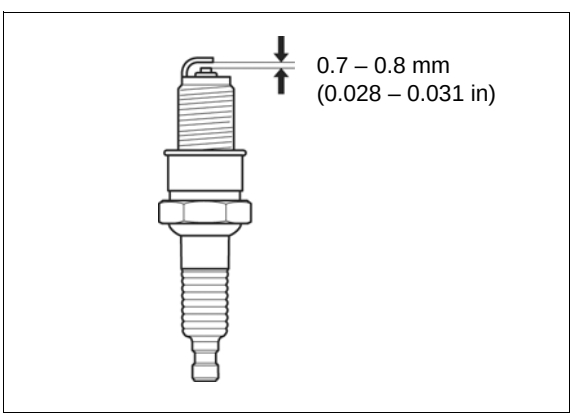
SPARK PLUG: BPR5ES (NGK) W16EPR-U (DENSO)



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: 0.7 – 0.8 mm (0.028 – 0.031 in)

Install the spark plug finger-tight to seat the washer, and then tighten 1/8 – 1/4 turn with a spark plug wrench.



NOTICE

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

Install the spark plug cap securely.

SPARK PLUG REPLACEMENT

⚠CAUTION

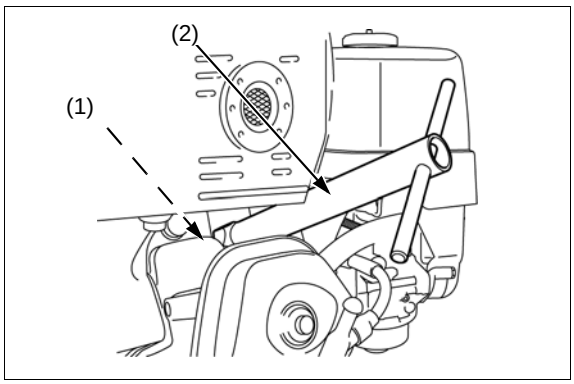
If the engine has been running, the engine will be very hot. Allow it to cool before proceeding.

Remove the spark plug cap, and then remove the spark plug (1) using a spark plug wrench (2).

Verify the new spark plug gap is correct (page 3-7).

Install a new spark plug finger-tight to seat the washer, and then tighten 1/2 turn with a spark plug wrench.

SPARK PLUG: BPR6ES (NGK) W20EPR-U (DENSO)



NOTICE

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

Install the spark plug cap securely.

SPARK ARRESTER CLEANING

NOTICE

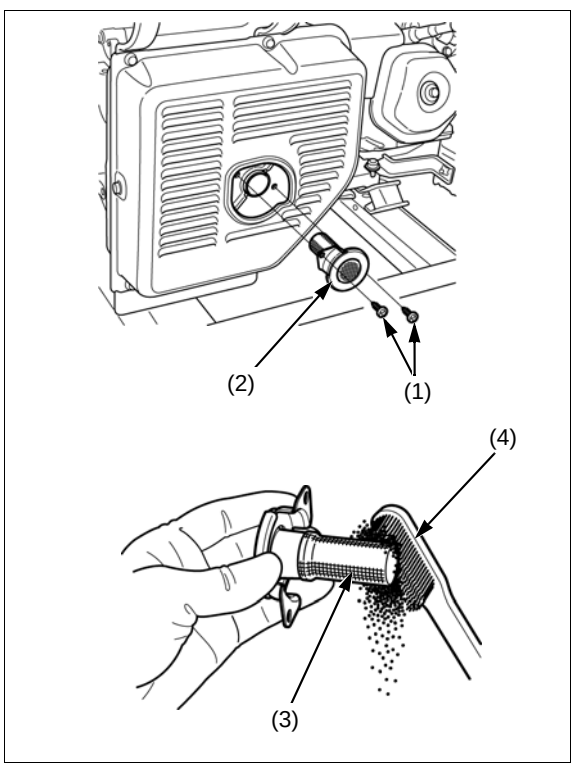
Be careful to avoid damaging the screen.

Remove the two screws (1) and spark arrester (2).

Clean the carbon deposits from the spark arrester screen (3) with a wire brush (4).

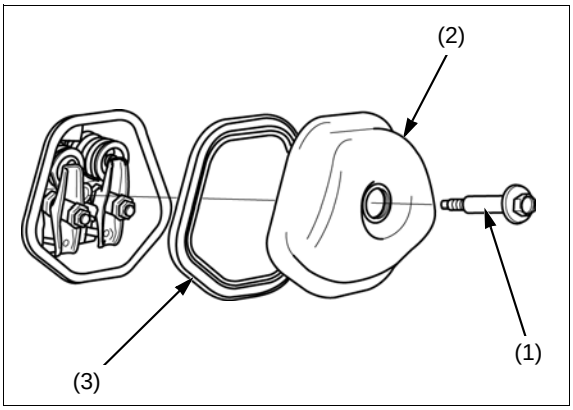
Check the spark arrester screen for damage. If the screen is damaged, replace the spark arrester.

Install the spark arrester in the reverse order of removal.



VALVE CLEARANCE CHECK / ADJUSTMENT

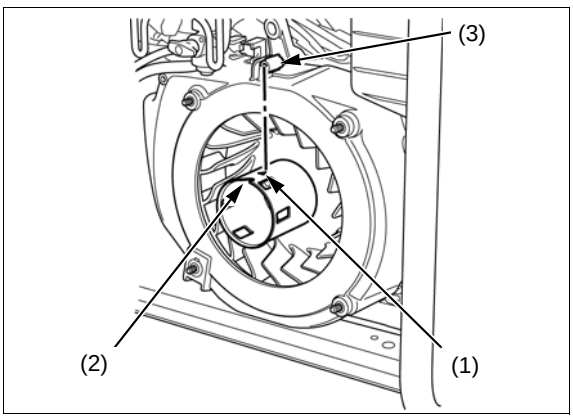
Disconnect the breather hose.
Remove the head cover bolt (1) and head cover (2).
Check the head cover packing (3) for damage or deterioration and replace if necessary.



Disconnect the spark plug cap from the spark plug.

Set the piston near top dead center of the cylinder compression stroke (both valves fully closed) by pulling the recoil starter slowly. When the piston is near top dead center of the compression stroke, the triangle mark (1) and cut-out (2) on the starter pulley will align with the screw boss (3) on the cooling fan cover.

If the exhaust valve is opened, use the recoil starter to turn the crankshaft one additional turn and align the triangle mark on the starter pulley with the top hole on the recoil starter case again.



Insert a thickness gauge (1) between the valve rocker arm (2) and valve stem (3) to measure the valve clearance.

VALVE CLEARANCE:
IN: 0.15 ± 0.02 mm (0.006 ± 0.001 in)
EX: 0.20 ± 0.02 mm (0.008 ± 0.001 in)

If adjustment is necessary, proceed as follows.

Hold the rocker arm pivot (4) and loosen the pivot adjusting nut (5).

Turn the rocker arm pivot to obtain the specified clearance.

VALVE CLEARANCE:
IN: 0.15 ± 0.02 mm (0.006 ± 0.001 in)
EX: 0.20 ± 0.02 mm (0.008± 0.001 in)

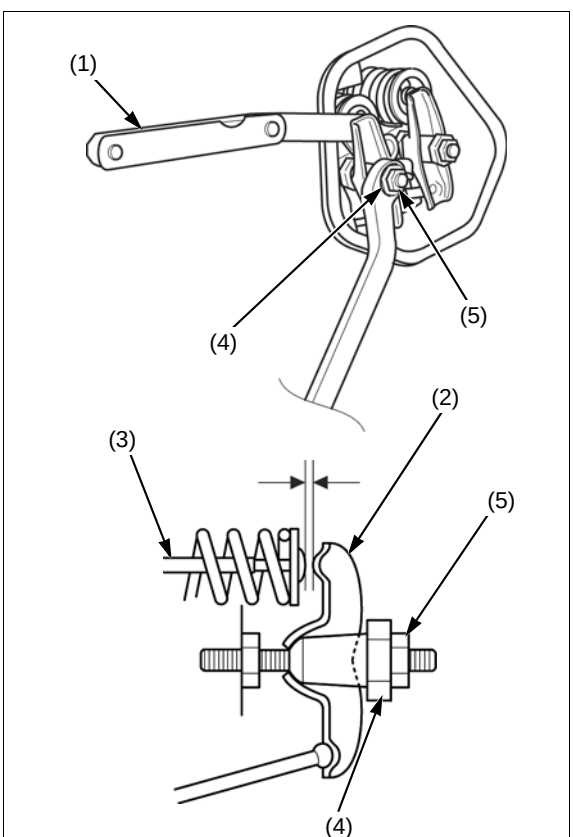
Hold the rocker arm pivot and retighten the pivot adjusting nut to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

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

Attach the cylinder head cover to the cylinder head, and tighten the head cover bolt securely.

Connect the breather hose to the head cover.

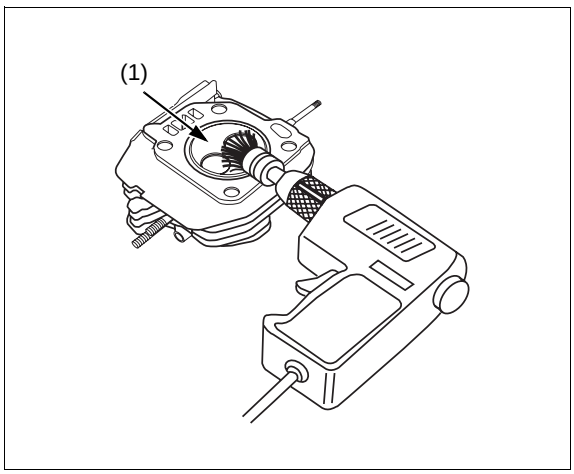


To increase valve clearance: screw out.
To decrease valve clearance: screw in.

COMBUSTION CHAMBER CLEANING

Remove the cylinder head (page 11-3).

Use a drill and soft wire brush to clean any carbon deposits from the combustion chamber (1).



NOTICE

- *Do not remove the valves from the cylinder head when cleaning the combustion camber; this could damage the valve seats.*
- *Do not press the wire brush with force against the combustion chamber; this could damage the cylinder head.*

FUEL TANK AND FUEL STRAINER 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.

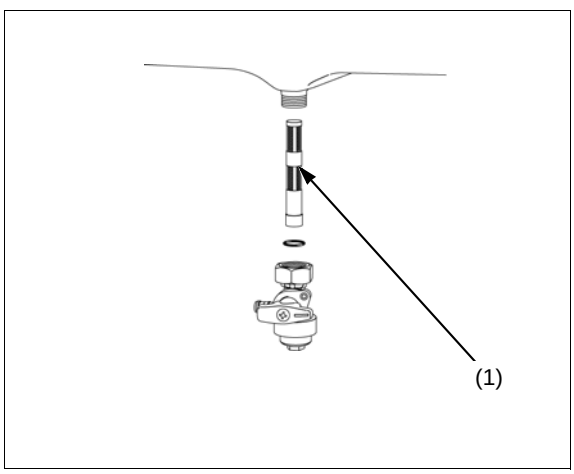
Drain the fuel into a suitable container.

Remove the fuel tank and fuel strainer (page 6-3).

Clean the fuel strainer (1) and fuel tank with non-flammable solvent, and allow them to dry thoroughly.

Install the fuel tank (page 6-2).

Check for any signs of fuel leakage.



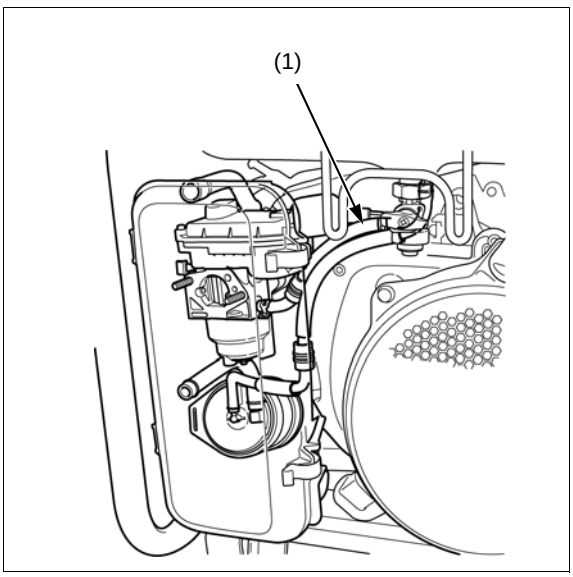
FUEL TUBE CHECK

⚠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.

Check the fuel tube (1) for deterioration, cracks or signs of leakage.

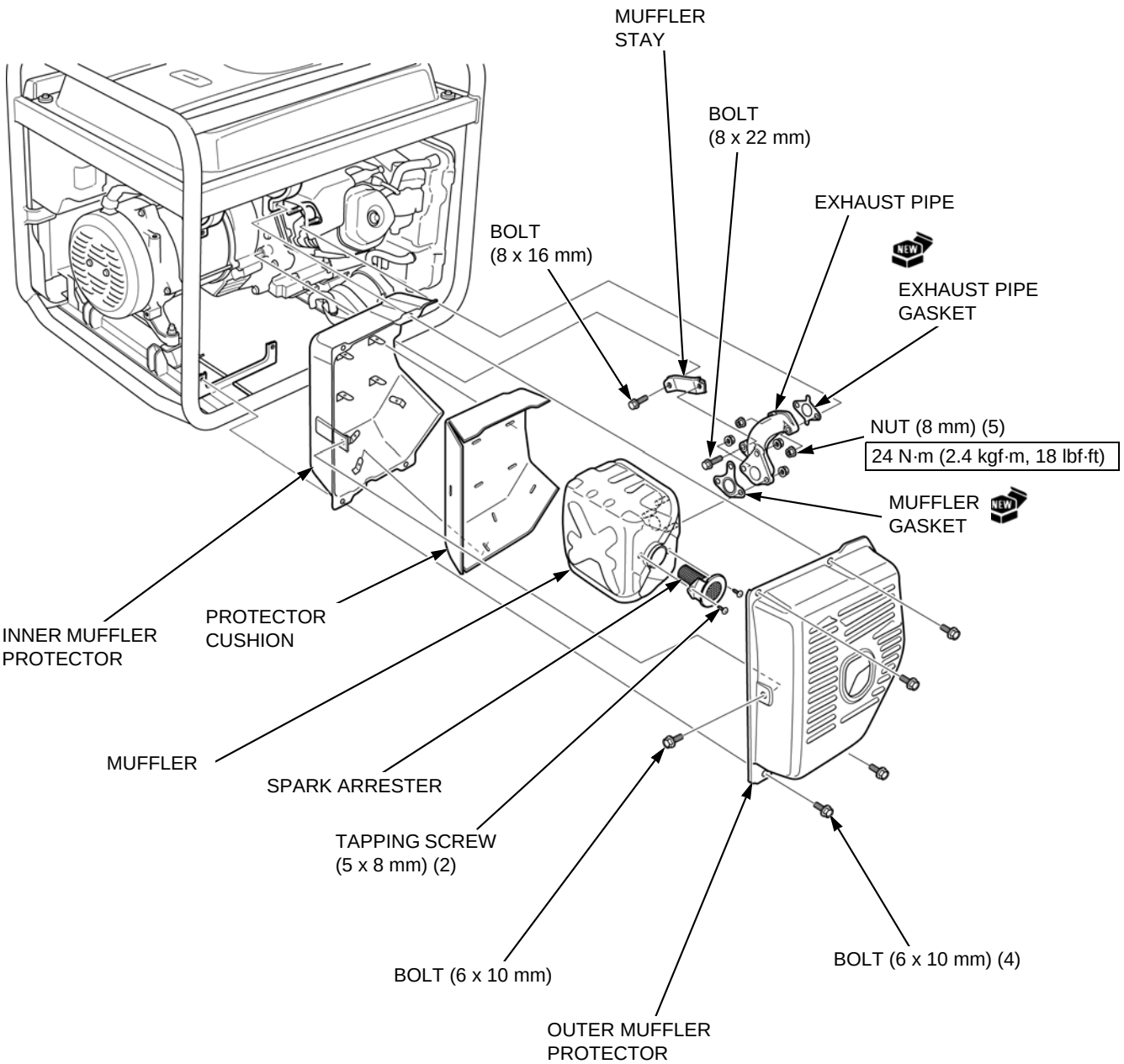


4. MUFFLER

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.

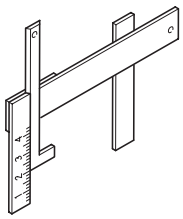


5. AIR CLEANER / CARBURETOR

TOOLS

Special tools can be ordered using normal American Honda parts ordering procedures.

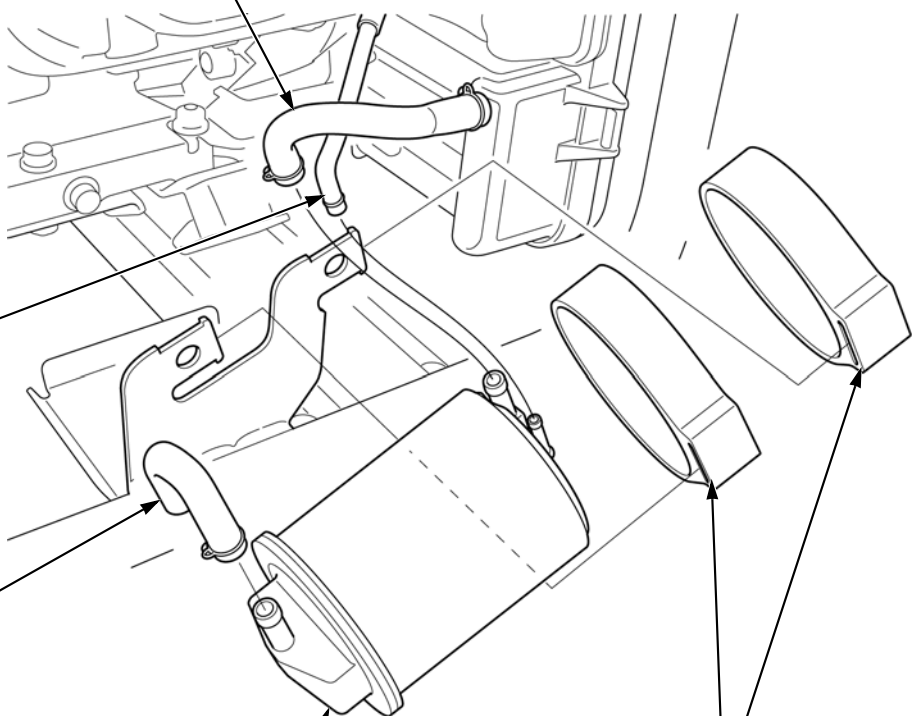
Float level gauge
07401-0010000



CANISTER REMOVAL & INSTALLATION

CANISTER
PURGE TUBE

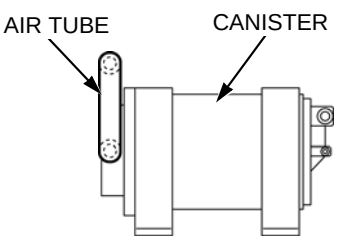
INSTALLATION:
Before installing, check for damage.
Note the installation direction.



CANISTER
CHARGE TUBE

CANISTER AIR TUBE

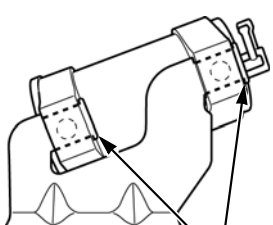
INSTALLATION:
Before installing, check for damage.
Note the installation direction.



Viewed from upper side

CANISTER MOUNT RUBBER (2)

INSTALLATION:
Fit the canister mount rubbers into the mounting tabs of the canister bracket securely.

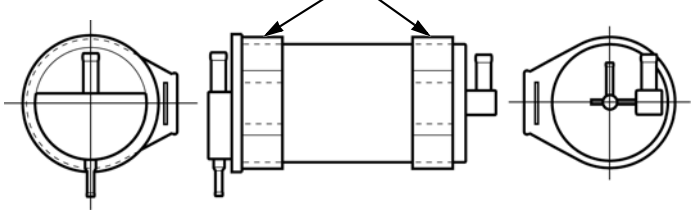


MOUNTHING TAB

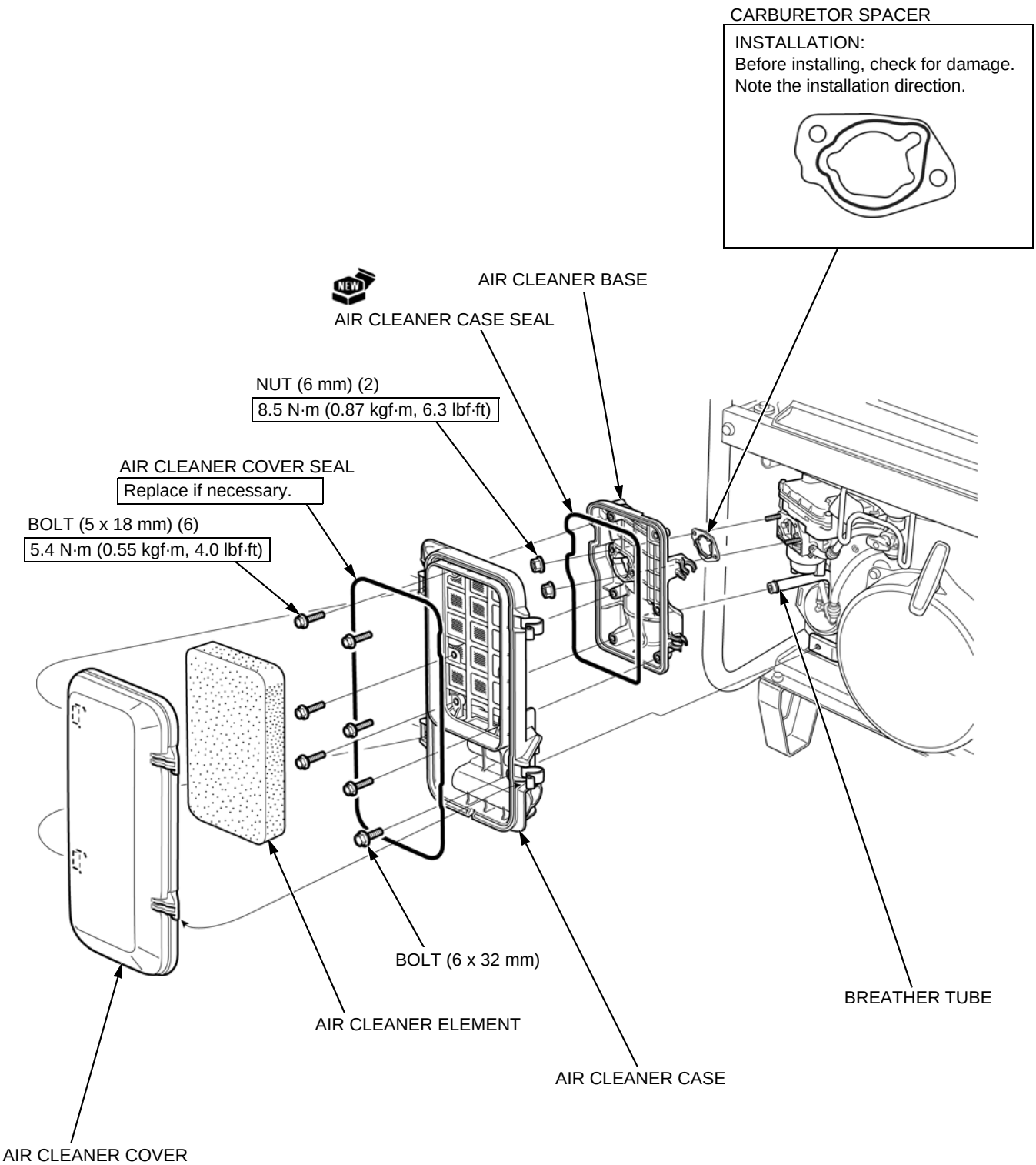
CANISTER

ASSEMBLY:
Install the canister mount rubbers to the canister as shown.

CANISTER MOUNT RUBBER



AIR CLEANER REMOVAL & INSTALLATION



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.

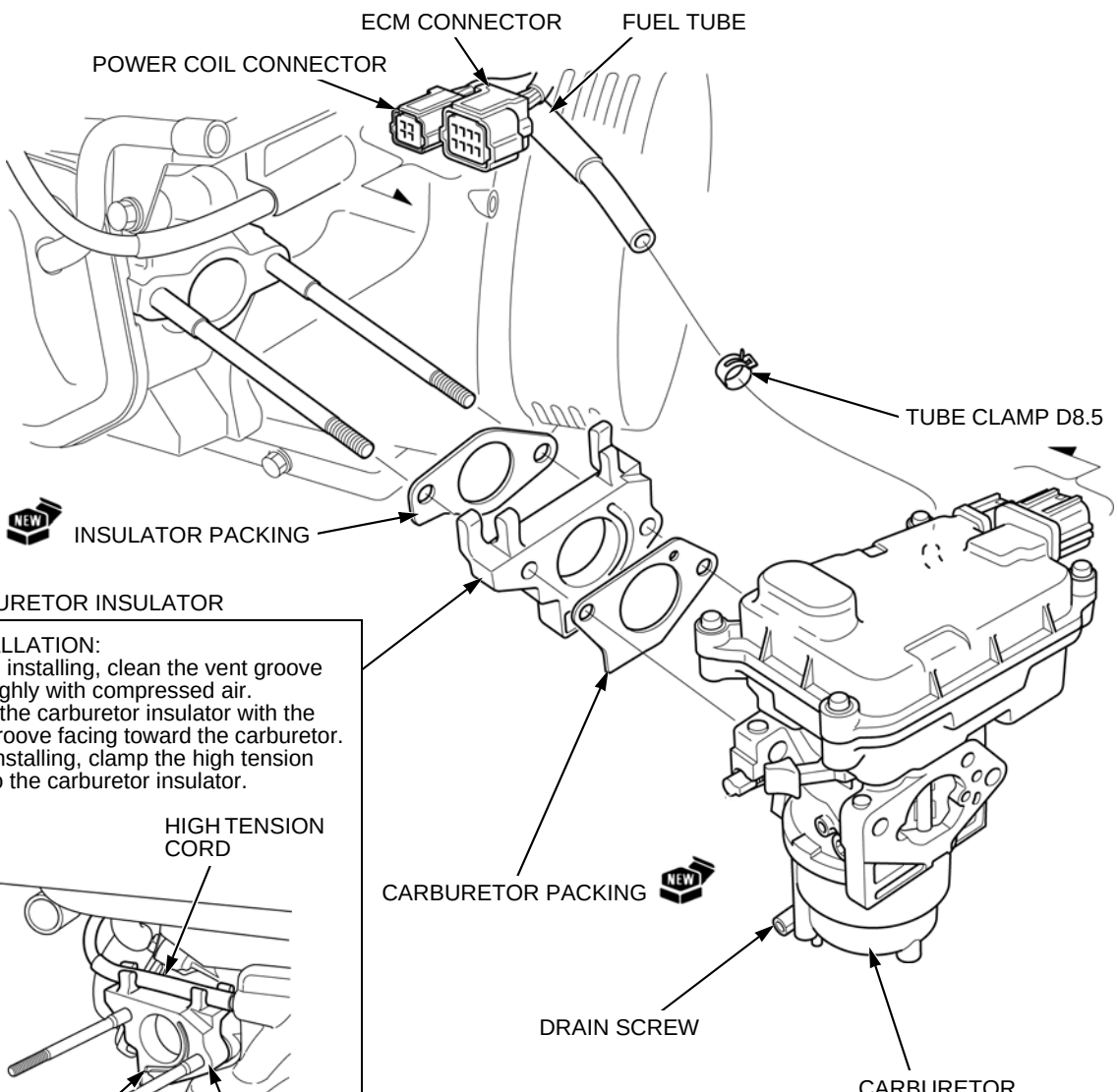
Turn the fuel valve lever to the OFF position.

Remove the air cleaner (page 5-4).

Remove the ECM connector and power coil connector.

Disconnect the fuel tube from the carburetor.

Open the drain screw to drain the carburetor completely.



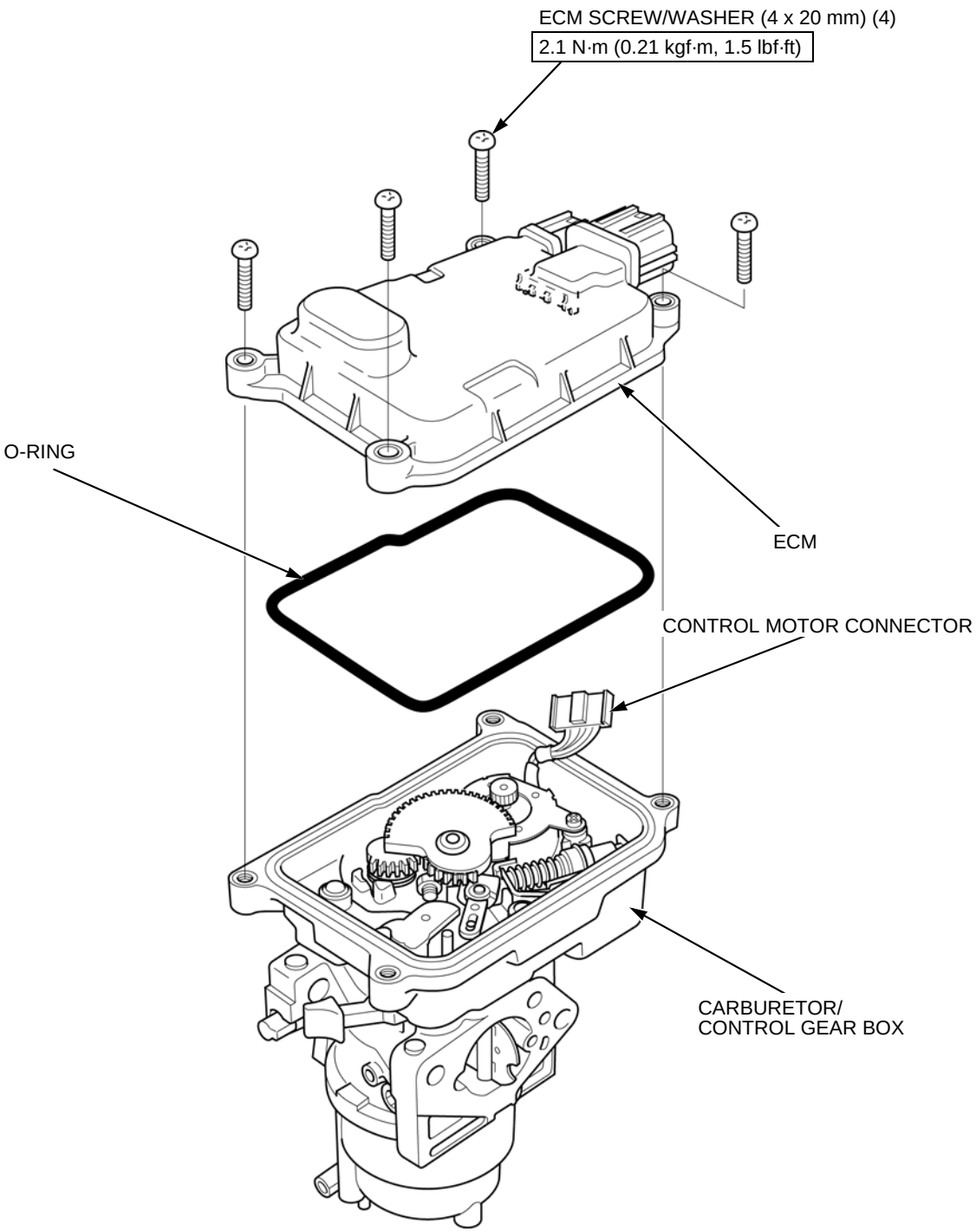
CARBURETOR DISASSEMBLY / ASSEMBLY

ECM REMOVAL & INSTALLATION

Remove the carburetor (page 5-5).

NOTICE

Carefully pull the control motor connector from the ECM. Do not pull on the wires; you might break them or damage the connector.

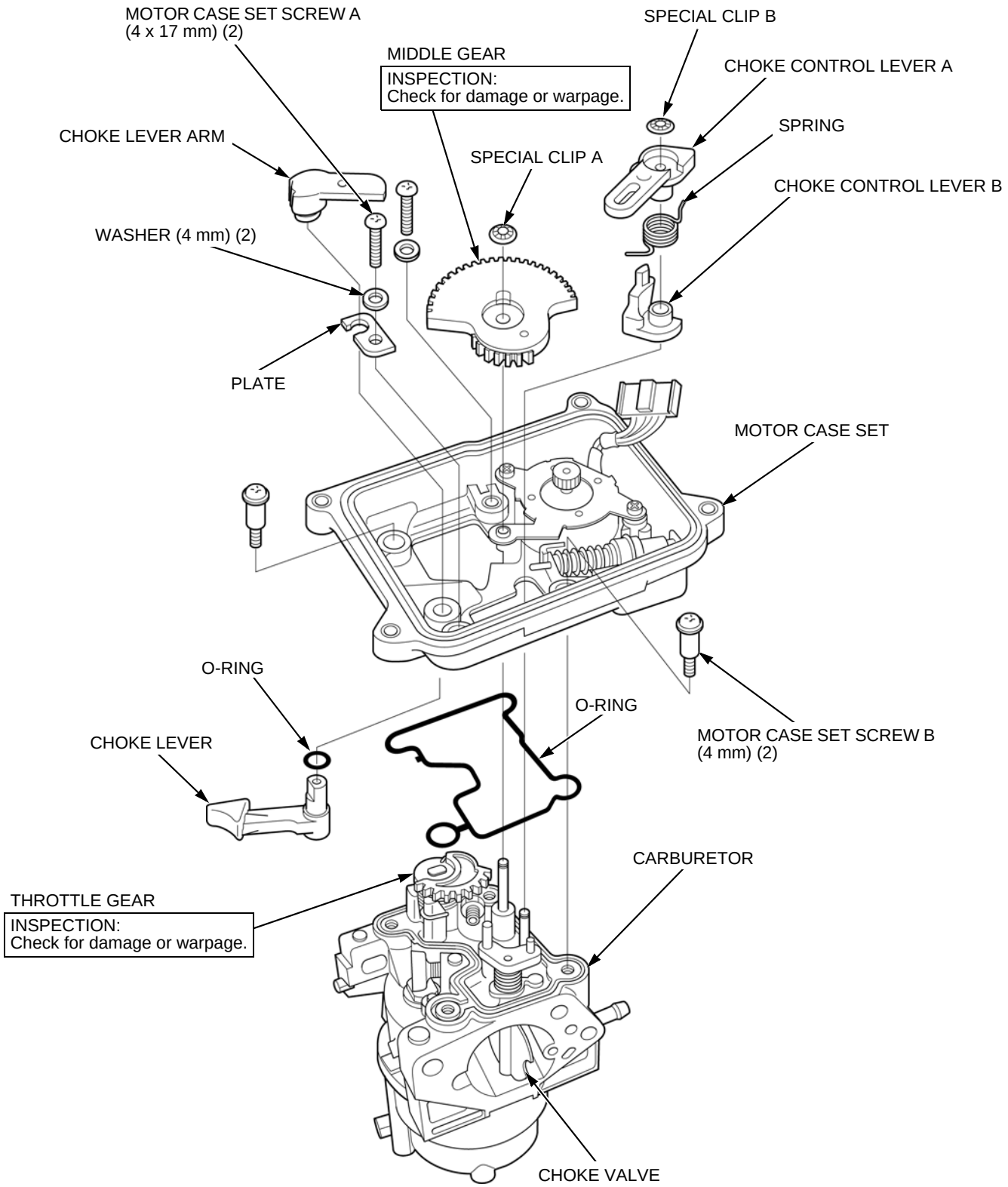


CONTROL GEAR BOX DISASSEMBLY / ASSEMBLY

CONTROL GEAR BOX DISASSEMBLY

Remove the ECM (page 5-6).

When removing the motor case set, hold the choke valve fully open as shown.



CONTROL GEAR BOX ASSEMBLY

Apply grease to the O-rings.

Install the O-ring to the groove of the carburetor Assy. securely.

Install the O-ring and choke lever to the motor case set.

Install the plate to the choke lever arm and install the choke lever arm / plate to the choke lever.

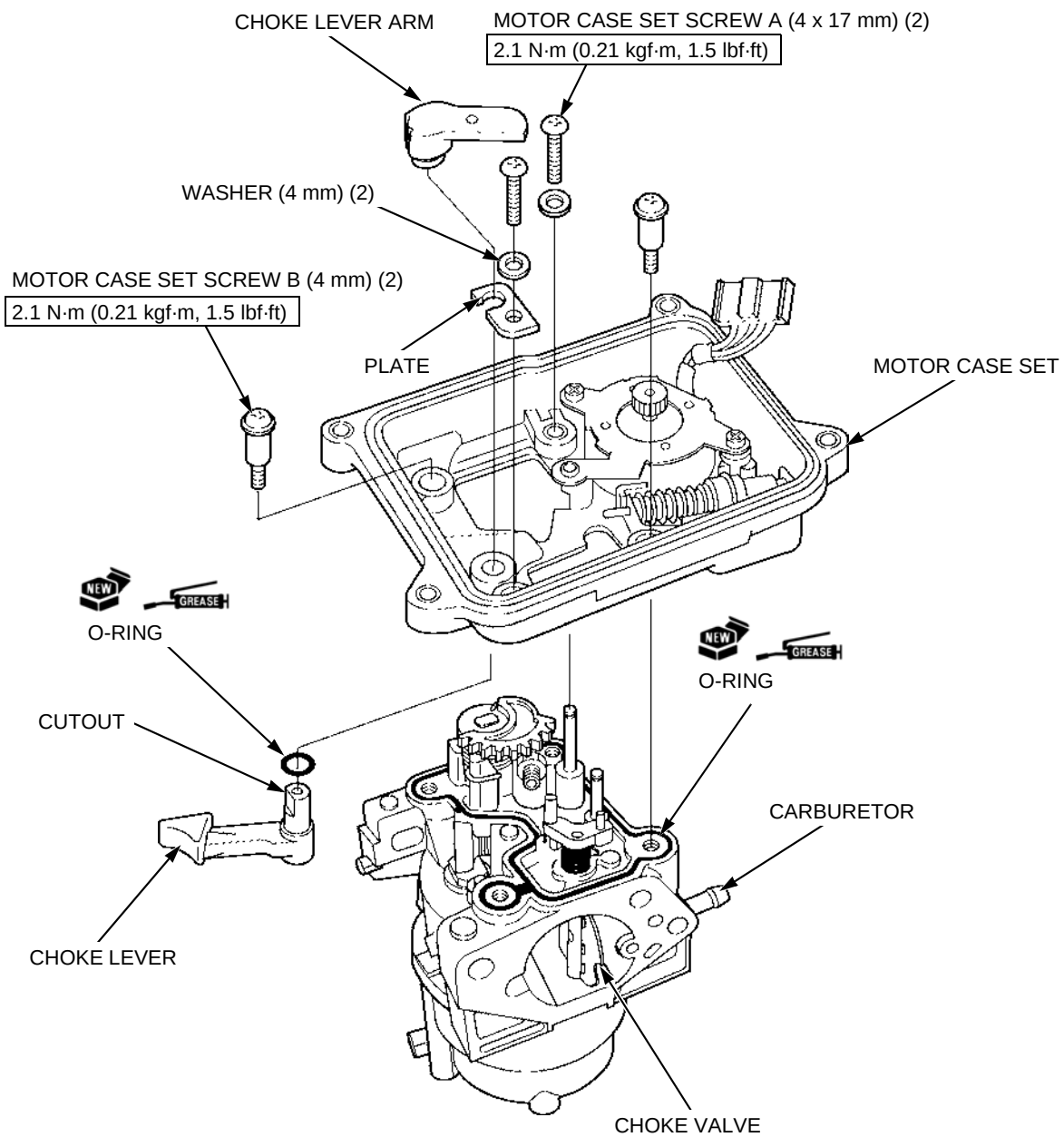
- Align the cutouts of choke lever arm and choke lever.

When installing the motor case set, hold the choke valve fully open as shown.

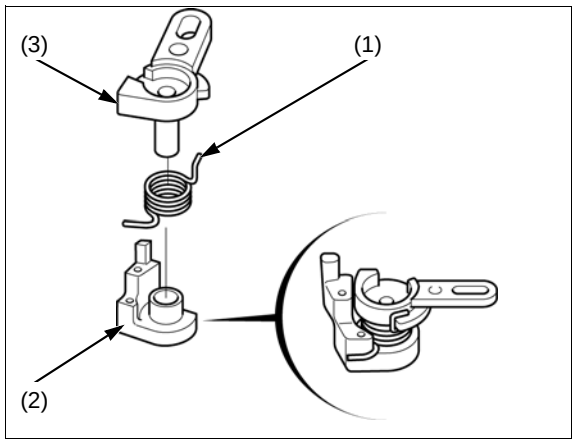
Install the washers and motor case set screws A and B.

Tighten the motor case set screws A and B to the specified torque.

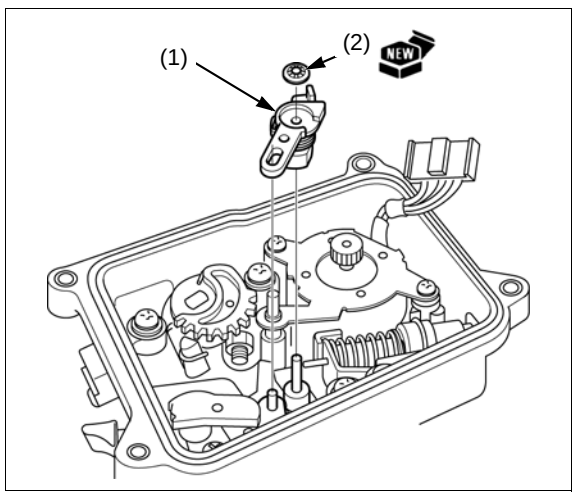
TORQUE: 2.1 N·m (0.21 kgf·m, 1.5 lbf·ft)



Hook the spring (1) to the choke control lever B (2) and choke control lever A (3).



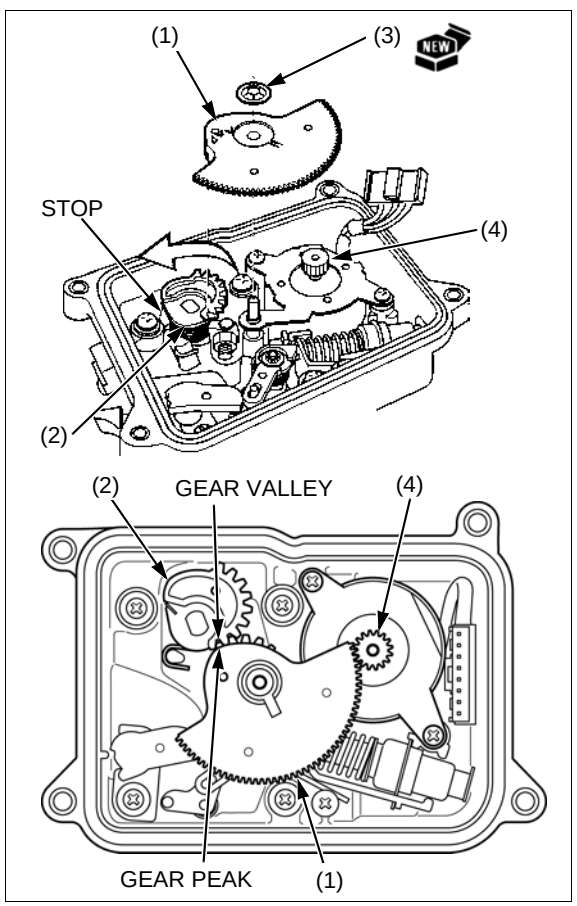
Install the choke control lever (1) and secure with a new special clip B (2).



Install the middle gear (1) to the throttle gear (2).

- Rotate the throttle gear (2) as shown until it bottoms out against the stop.
- Engage the middle gear (1) and throttle gear (2) so that middle gear (1) #1 peak engages the throttle gear (2) #1 valley as shown.
  The middle gear (1) does not require any timing to the throttle control motor gear (4).

Install a new special clip A (3) securely.



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.

⚠CAUTION

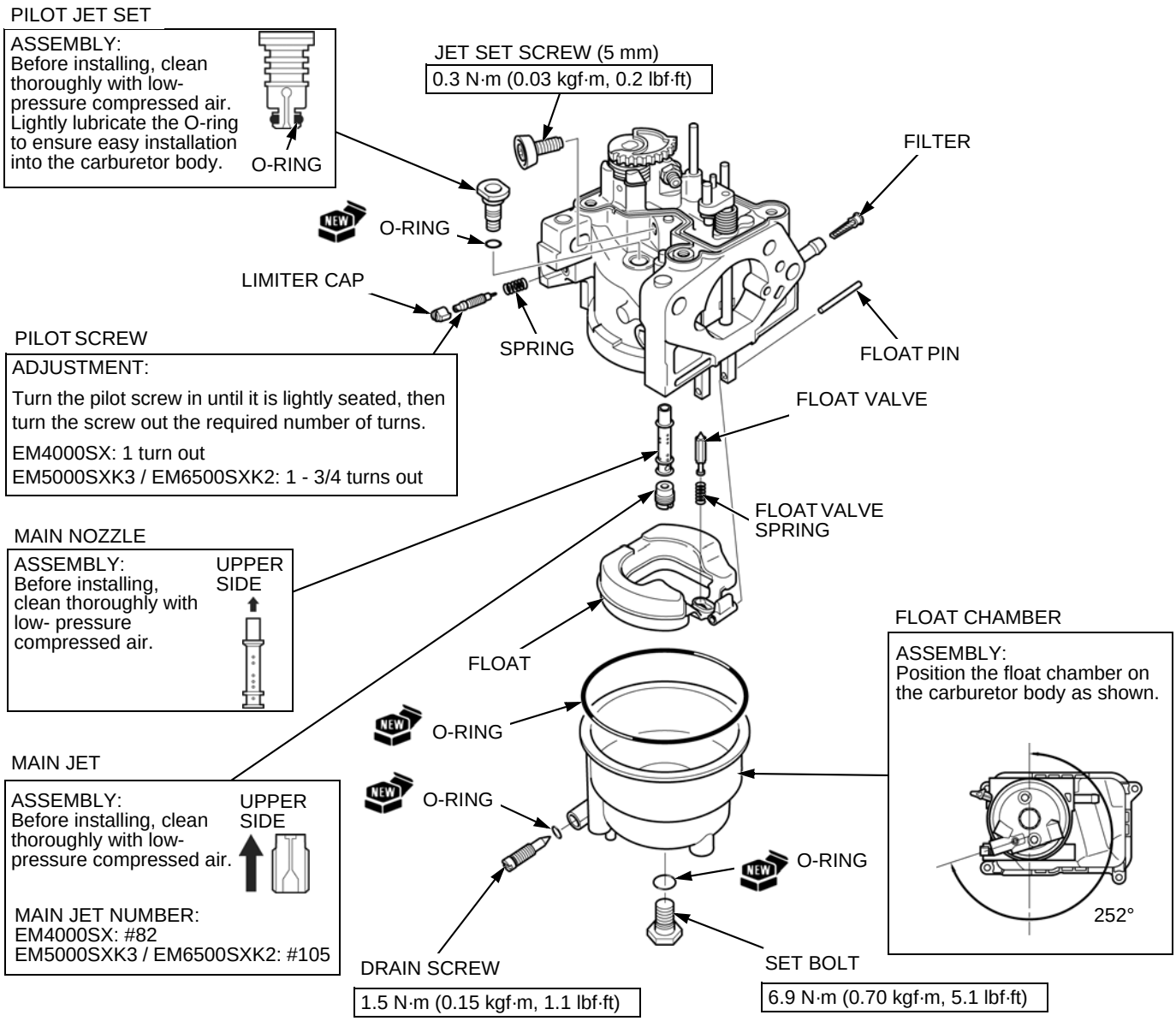
To prevent serious eye injury, always wear safety goggles or other eye protection when using compressed air.

Remove the control gear box (page 5-7).

Before disassembly, clean the outside of the carburetor.

NOTICE

Tampering is a violation of Federal and California law.



CARBURETOR BODY CLEANING

⚠ CAUTION

To prevent serious eye injury, always wear safety goggles or other eye protection when using compressed air.

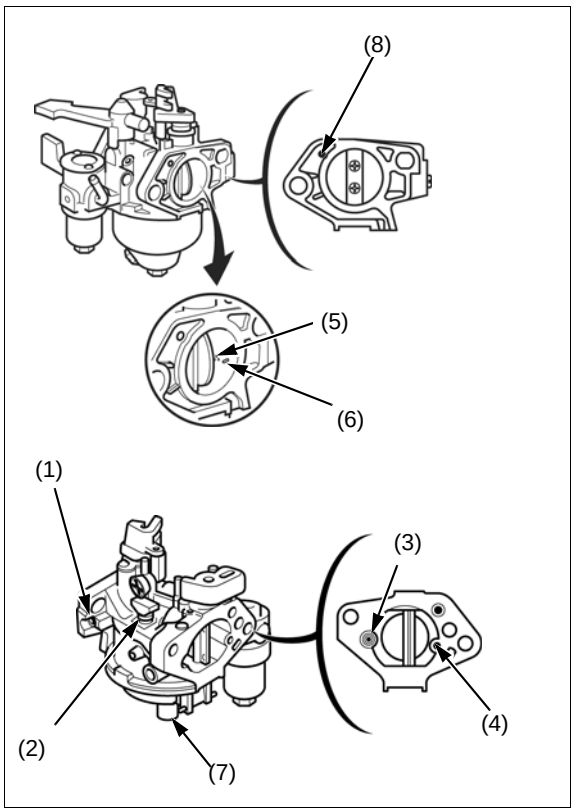
NOTICE

- *Some commercially available chemical cleaners are very caustic. These cleaners may damage plastic parts such as the O-ring, the float and the float seat of the carburetor. Check the container for instructions. If you are in doubt, do not use these products to clean Honda carburetors.*
- *High air pressure may damage the carburetor body. Use low air pressure (30 psi or less) when cleaning passages and ports.*

Clean the carburetor body with non-flammable solvent.

Clean thoroughly the following passages and ports with low-pressure compressed air.

- Pilot screw hole (1)
- Pilot jet hole (2)
- Pilot air jet (3)
- Main air jet (4)
- Transition ports (5)
- Pilot outlet (6)
- Main nozzle holder (7)
- External vent port (8)



CARBURETOR INSPECTION

FLOAT LEVEL HEIGHT

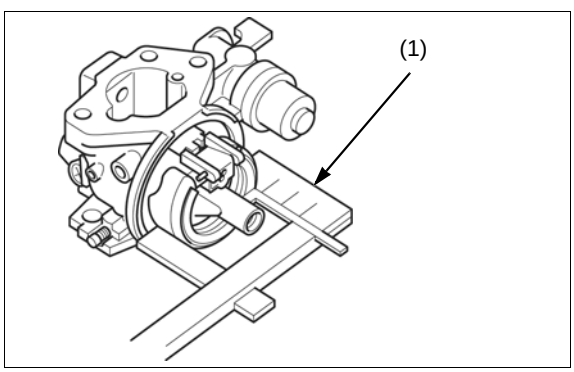
Place the carburetor in the position as shown. Measure the distance between the float top and carburetor body when the float just contacts the seat without compressing the valve spring.

TOOL:
Float level gauge (1) 07401-0010000

FLOAT HEIGHT: 13.2 mm (0.52 in)

If the measured float height is out of specification, check the float valve and the float valve spring (page 5-12).

If the float valve and the float valve spring are normal, replace the float (page 5-6).

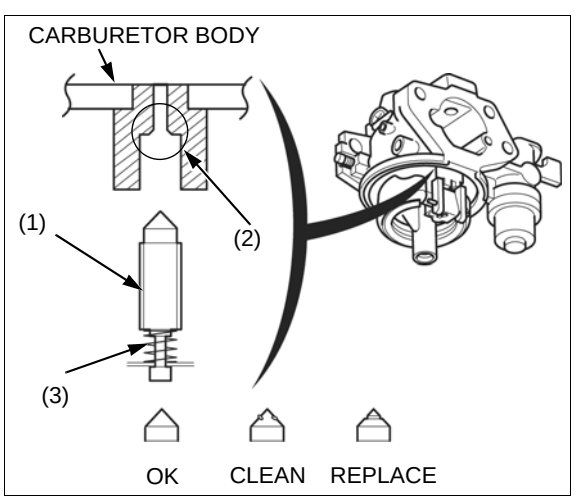


FLOAT VALVE

Check the float valve (1) and its seat (2) for wear or contamination.

Before installation, check for wear or a weak spring (3).

Check the operation of the float valve.



PILOT SCREW REPLACEMENT

Only remove the pilot screw (1) and limiter cap (2) when necessary for repair or to clean stubborn deposits from the pilot circuit passages.

NOTICE

Tampering is a violation of Federal and California Law.

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.

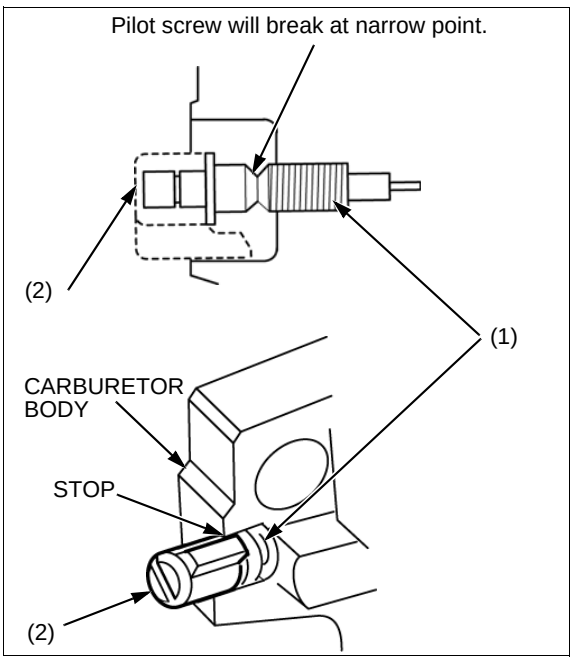
Place the spring on the replacement pilot screw, and install it on the carburetor.

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

Model	Carburetor identification Number (3) + (4)	Pilot screw opening
EM4000SX	BE97A A	1
EM5000SXK3 EM6500SXK2	BE96A A	1 - 3/4

Apply Loctite® 638 to the inside of the limiter cap, then install the cap so the stop 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.



CYLINDER STUD BOLT REPLACEMENT

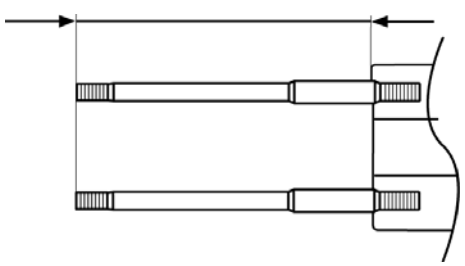
Thread two nuts onto the stud bolt and tighten them together, and then use a wrench to turn the stud bolt out.

Install new stud bolts.

SPECIFIED LENGTH

STUD BOLT (8 x 98)	**82.0 mm (3.23 in)**
STUD BOLT (8 x 106)	**90.0 mm (3.54 in)**
STUD BOLT (8 x 115)	**99.0 mm (3.90 in)**
STUD BOLT (8 x 123)	**107.0 mm (4.21 in)**
STUD BOLT (8 x 131.5)	**115.5 mm (4.55 in)**

STUD BOLT (8 x 98):	82.0 mm (3.90 in)
STUD BOLT (8 x 106):	90.0 mm (3.90 in)
STUD BOLT (8 x 115):	99.0 mm (4.55 in)
STUD BOLT (8 x 123):	107.0 mm (3.90 in)
STUD BOLT (8 x 131.5):	115.5 mm (4.55 in)



CHOKE SET REPLACEMENT

Remove the control gear box (page 5-7).

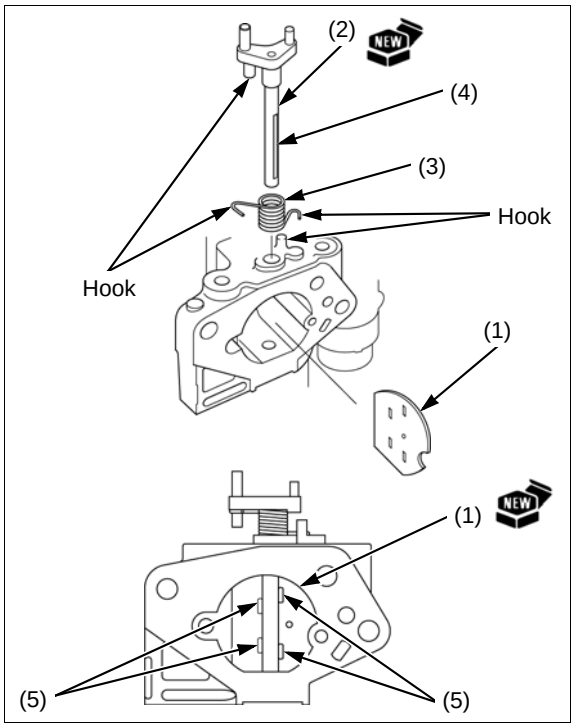
Hold the choke valve fully open and pull out the choke valve plate (1).

Remove the choke shaft (2) and return spring (3).

Install the return spring and new choke shaft with the return spring ends hooked to the bosses.

Insert a new choke valve plate into the slit (4) of the choke shaft.

Be sure the choke shaft is positioned between the projections (5) of the choke valve plate.



CONTROL MOTOR / WAX HEATER INSPECTION

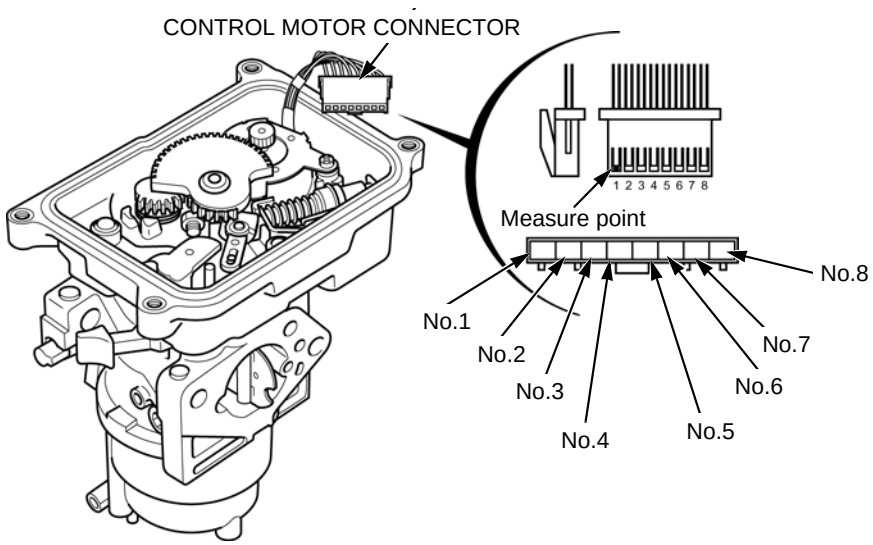
Remove the ECM (page 5-6).

Measure the resistance between the control motor connector terminals.

Unit: Ω

	No.5 (R)	No.6 (G)	No.8 (Bu)
No.1 (Y)	52 – 90	–	–
No.2 (O)	52 – 90	–	–
No.3 (Br)	–	52 – 90	–
No.4 (Bl)	–	52 – 90	–
No.7 (W)	–	–	36 – 98

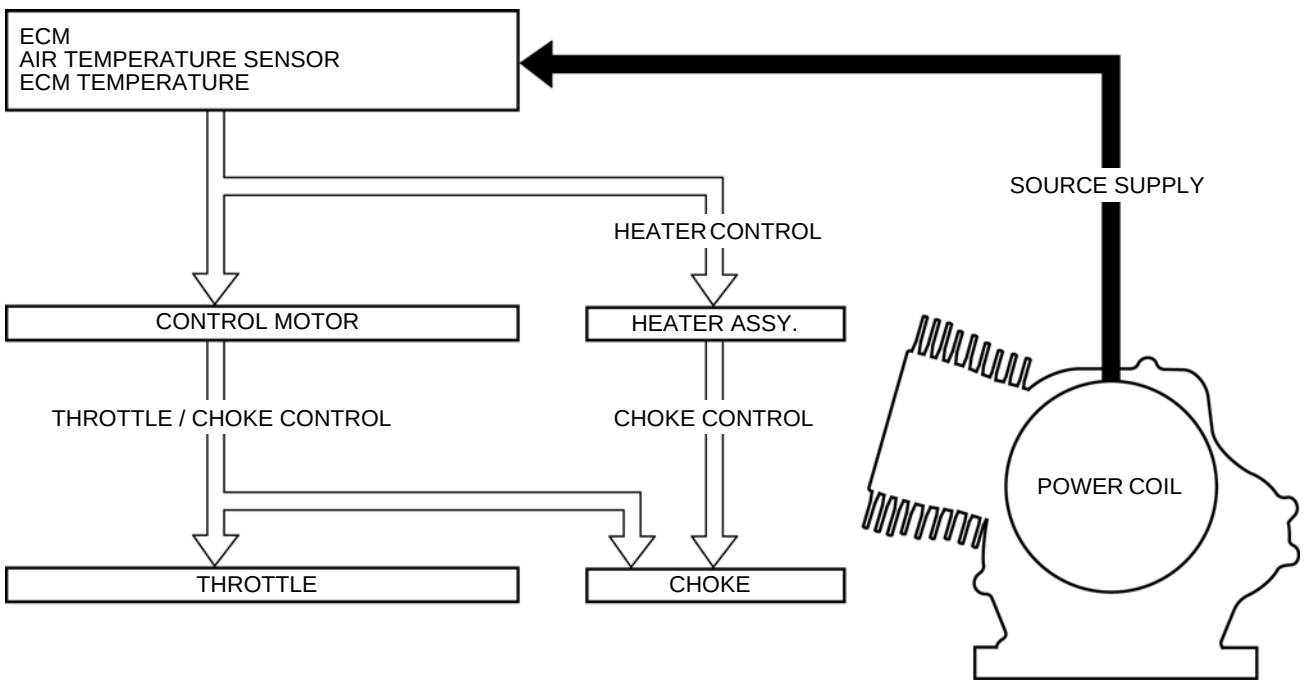
If the measured resistance is out of the specification, replace the motor case set (page 5-6).



TECHNICAL FEATURES / STR (Self Tuning Regulator) GOVERNOR

OUTLINE

This engine has a STR (Self Tuning Regulator) governor that enables stable engine starting and fast engine warm-up with no manual operation before and after engine starting.
The STR governor controls both throttle valve and choke valve with one throttle control motor inside the carburetor. The heater, combined with a thermally-linked wax unit (Heater Assy.), controls the choke valve while starting a warm or cold engine.
The battery is not required to actuate the STR governor. The recoil starter allows the STR to function.



CONSTRUCTION

CHOKE SHAFT

Transmits the driving power from the choke control lever to the choke valve.

MANUAL CHOKE LEVER

Used to close the choke by hand if the engine is hard to start; move the lever by hand to the open position when the engine warms up.

CHOKE CONTROL LEVER

Transmits the driving power from the control motor or heater Assy. to the choke shaft.

THROTTLE GEAR

Transmits driving power to the throttle valve.

MIDDLE GEAR

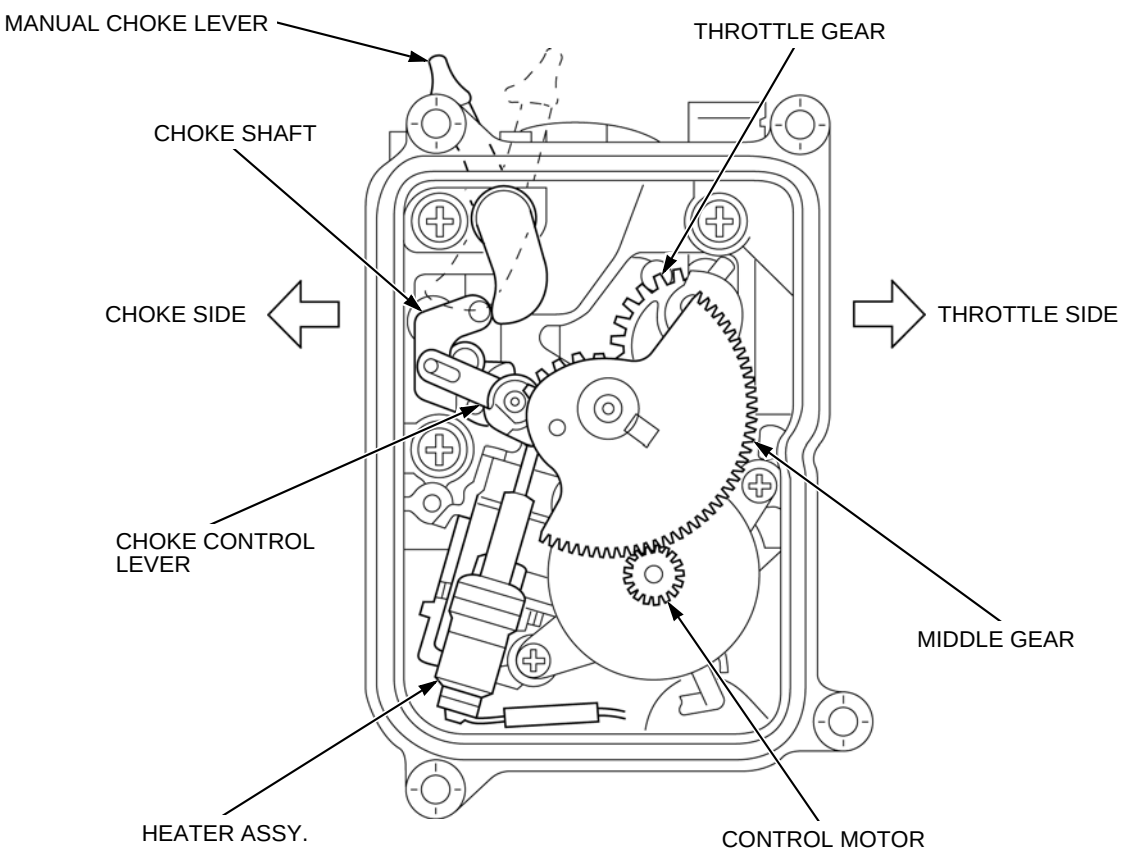
- Transmits the driving power to the throttle gear.
- Adjusts the driving power from the choke control lever to the choke lever with its cam.

CONTROL MOTOR

Controls the throttle and choke opening value after starting the engine.

HEATER ASSY.

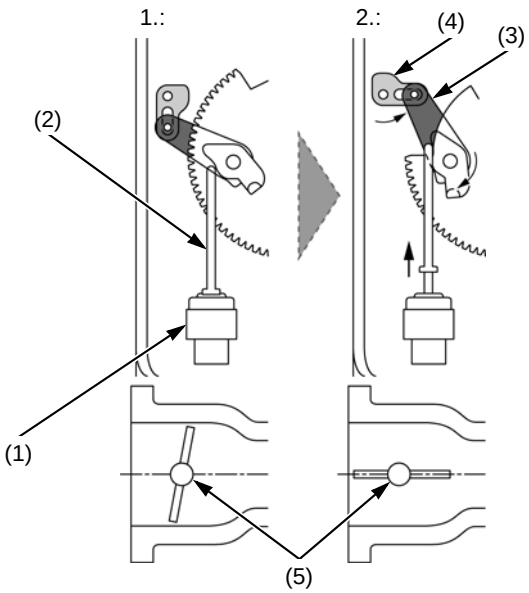
– THERMALLY-LINKED WAX UNIT
  – Adjusts the choke valve opening value by its characteristics when starting.
– HEATER
  – Warms up the thermally-linked wax by current from the ECM.



FUNCTION

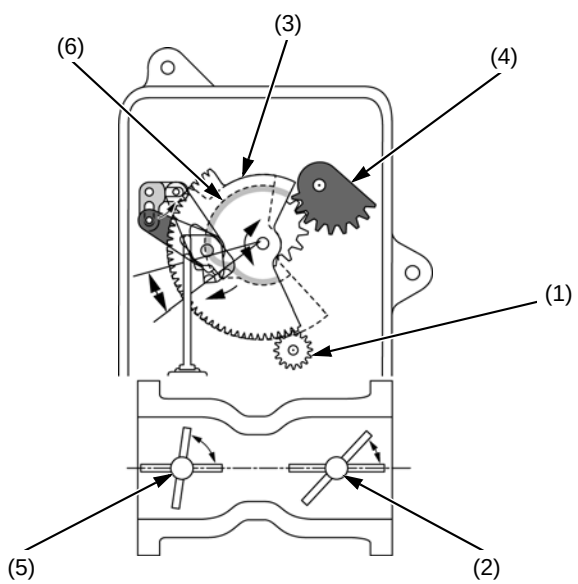
When starting:

1. The thermally-linked wax (1) is expanded due to the ambient temperature, so the shaft (2) connected to the wax is moved.
2. The shaft connected to the wax pushes the choke control lever (3), which moves the choke shaft (4) to adjust the choke valve (5) opening so it is appropriate for the ambient temperature.



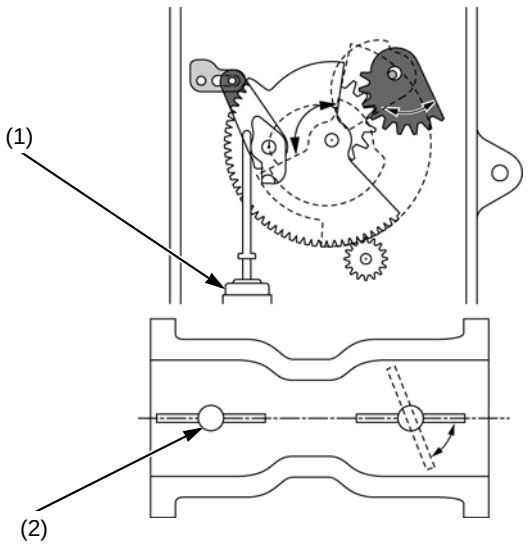
After starting – Engine warming up:

The ECM turns the control motor (1) to adjust the throttle valve (2) by turning the middle gear (3) which engages the throttle gear (4) which is linked to the throttle valve. At this time, the engine speed is maintained constantly at approximately 3,000 min^{-1} (rpm) since the choke valve (5) opening is restricted with the choke control cam (6) on the middle gear.



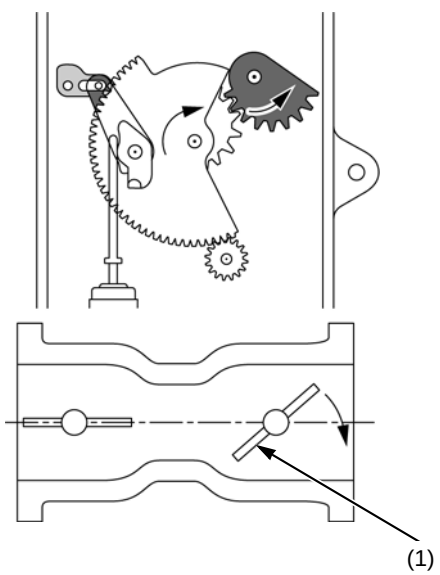
Engine warming up – Normal running:

The ECM applies current to the heater Assy. (1) to warm up the thermally-linked wax and open the choke valve (2). The ECM shifts to normal running mode after detecting that warm-up is complete by receiving temperature data from the sensor, and stops the current to the heater.



When stopping:

When stopping the engine by turning the engine stop switch to the OFF position, the ECM opens the throttle valve (1) to the full open position.



6. FUEL TANK

FUEL TANK 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.

Turn the fuel valve to the OFF position.

Disconnect the fuel tube (1) from the fuel tank (2).

Drain the gasoline from the fuel tank completely by opening the fuel valve and catching the gasoline in an approved container.

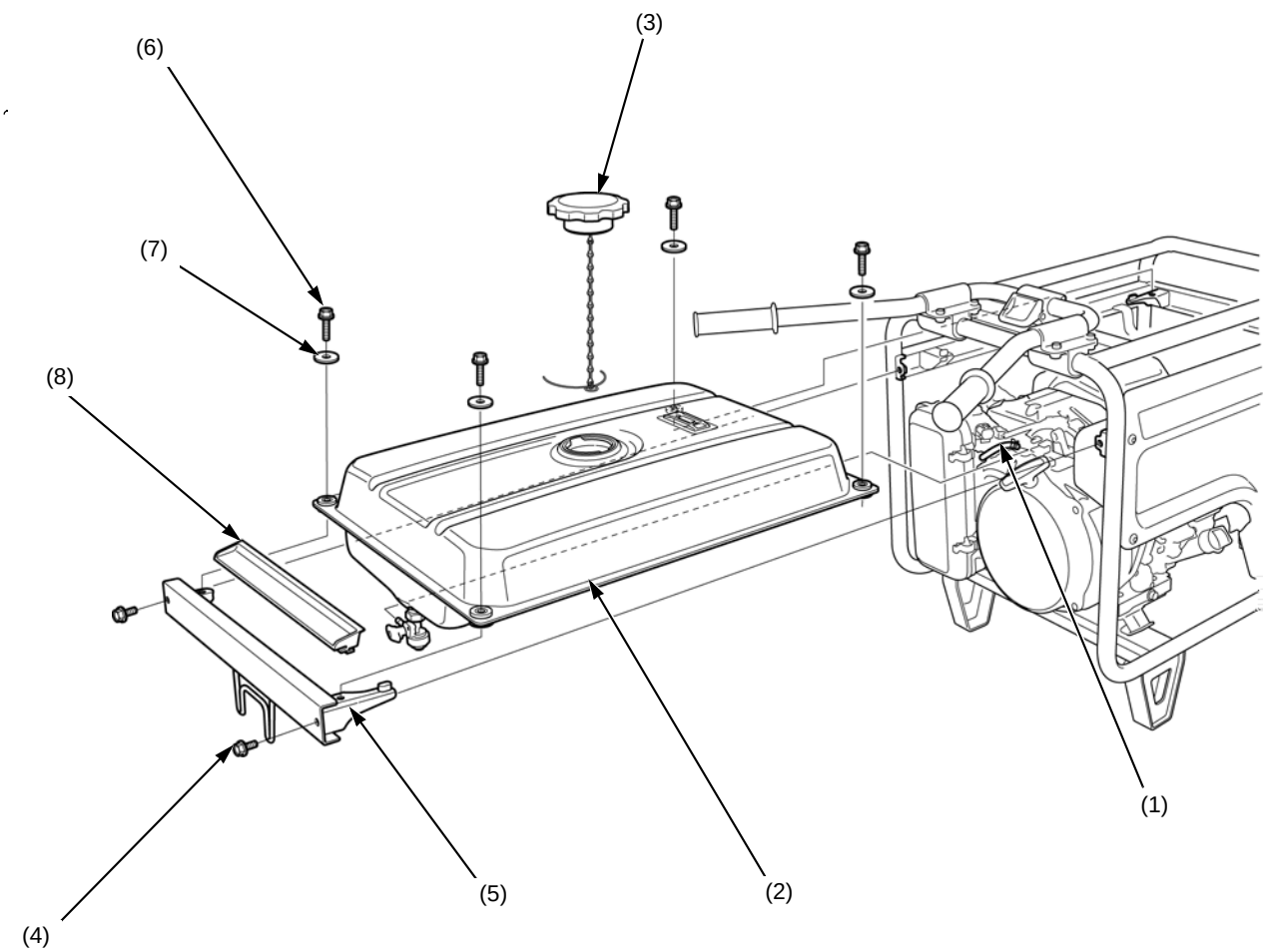
Remove the fuel tank cap (3) from the fuel tank.

Remove the two bolts (4) and side frame (5).

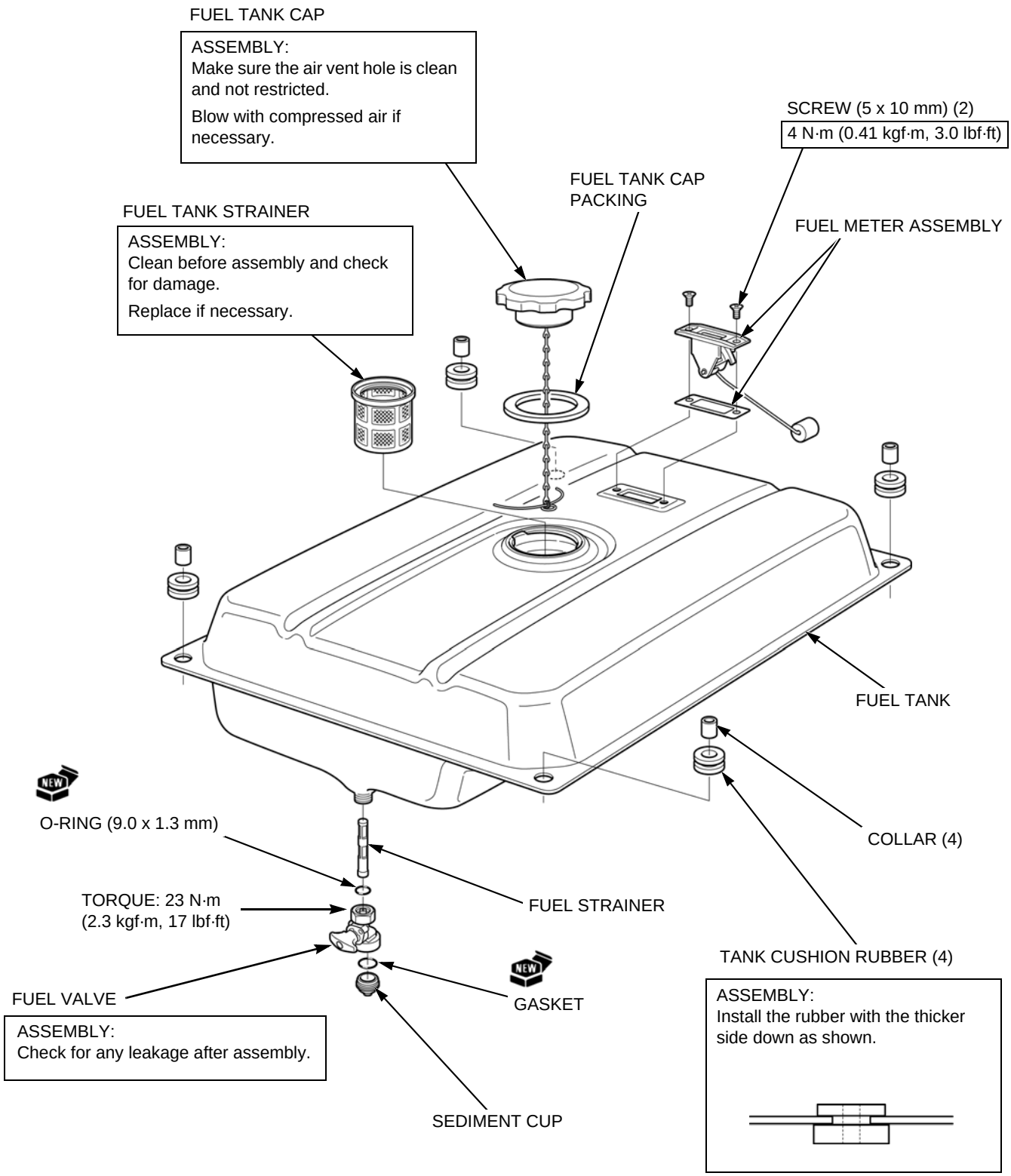
Remove the four bolts (6) and four washers (7).

Lift the fuel tank slightly and remove it from the frame by pulling the tank toward the recoil starter side.

Remove the fuel tank rubber (8) from the fuel tank.



FUEL TANK DISASSEMBLY / ASSEMBLY

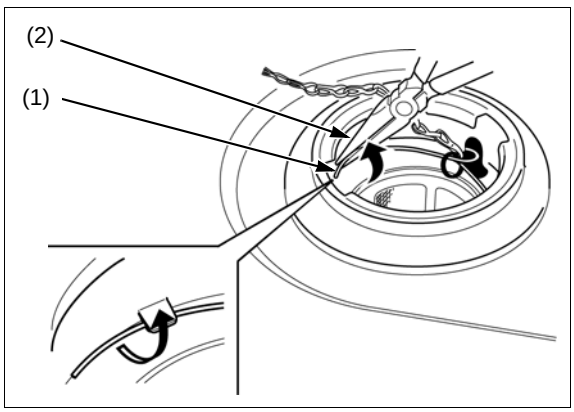


FUEL TANK CAP

REMOVAL

Open the fuel tank cap.

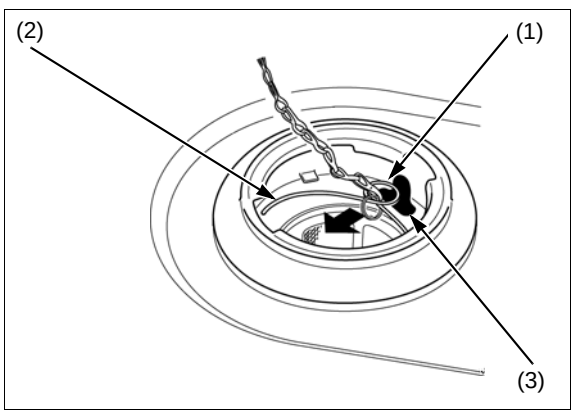
Unhook one tip of the anchor (1) using pliers (2), and then unhook the other tip in the same manner.



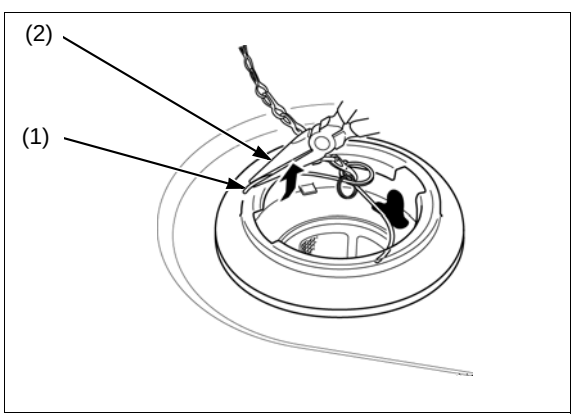
NOTICE

Never force the anchor when removing it.

Draw the loop (1) of the anchor (2) from the hole (3) of the fuel filler neck using pliers.



Pull one tip of the anchor (1) out of the fuel filler neck using pliers (2), and then pull the other tip out in the same manner.



NOTICE

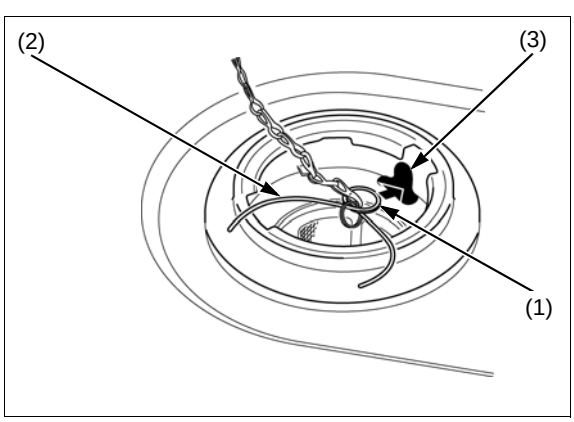
Be careful to avoid damaging the breather pipe in the fuel filler neck.

Remove the anchor from the filler neck.

INSTALLATION

Attach the loop part (1) of the anchor (2) in the hole (3) of the fuel filler neck.

Hook the tips of the anchor in the reverse order of removal.

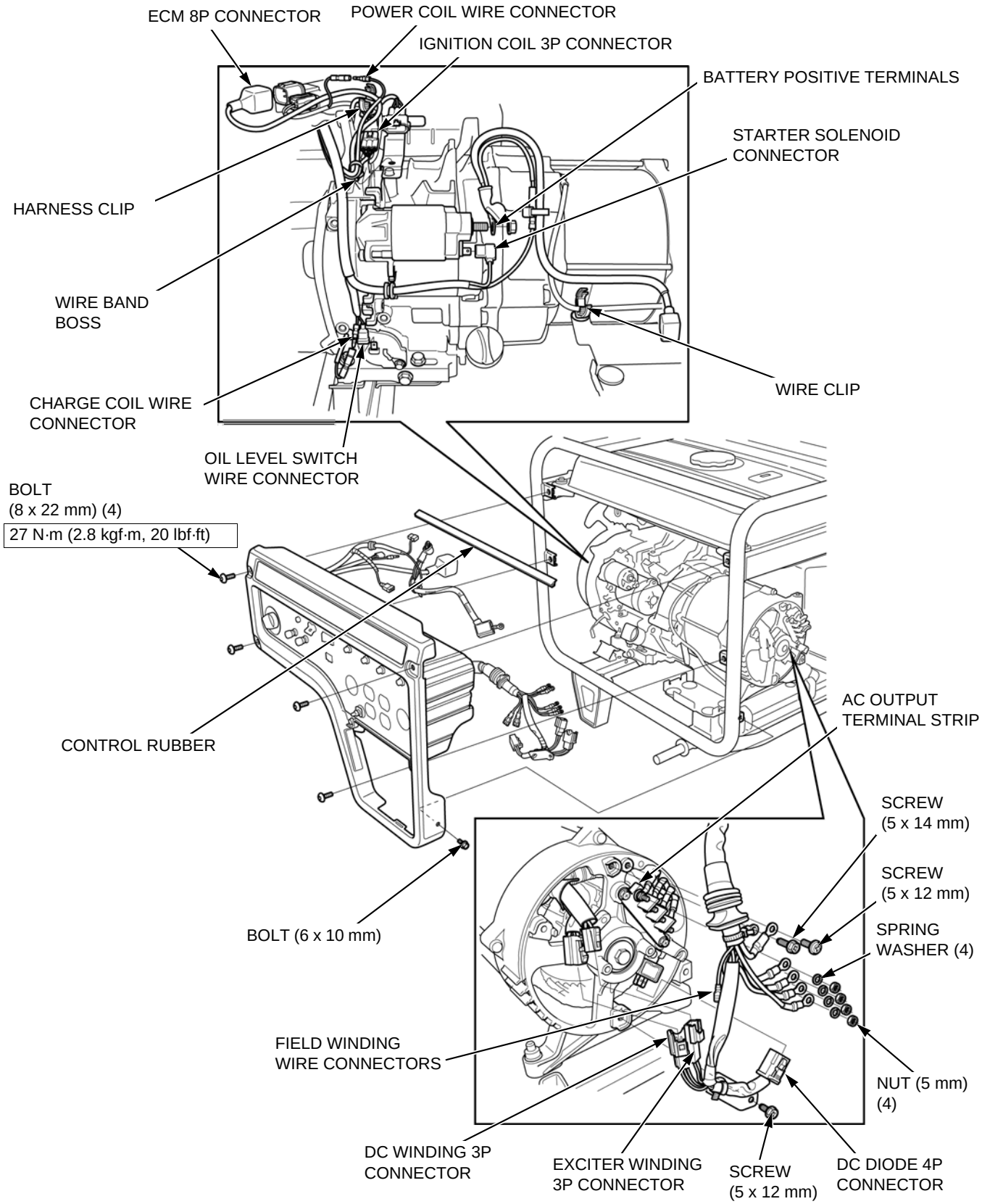


7. CONTROL PANEL

CONTROL PANEL REMOVAL/INSTALLATION

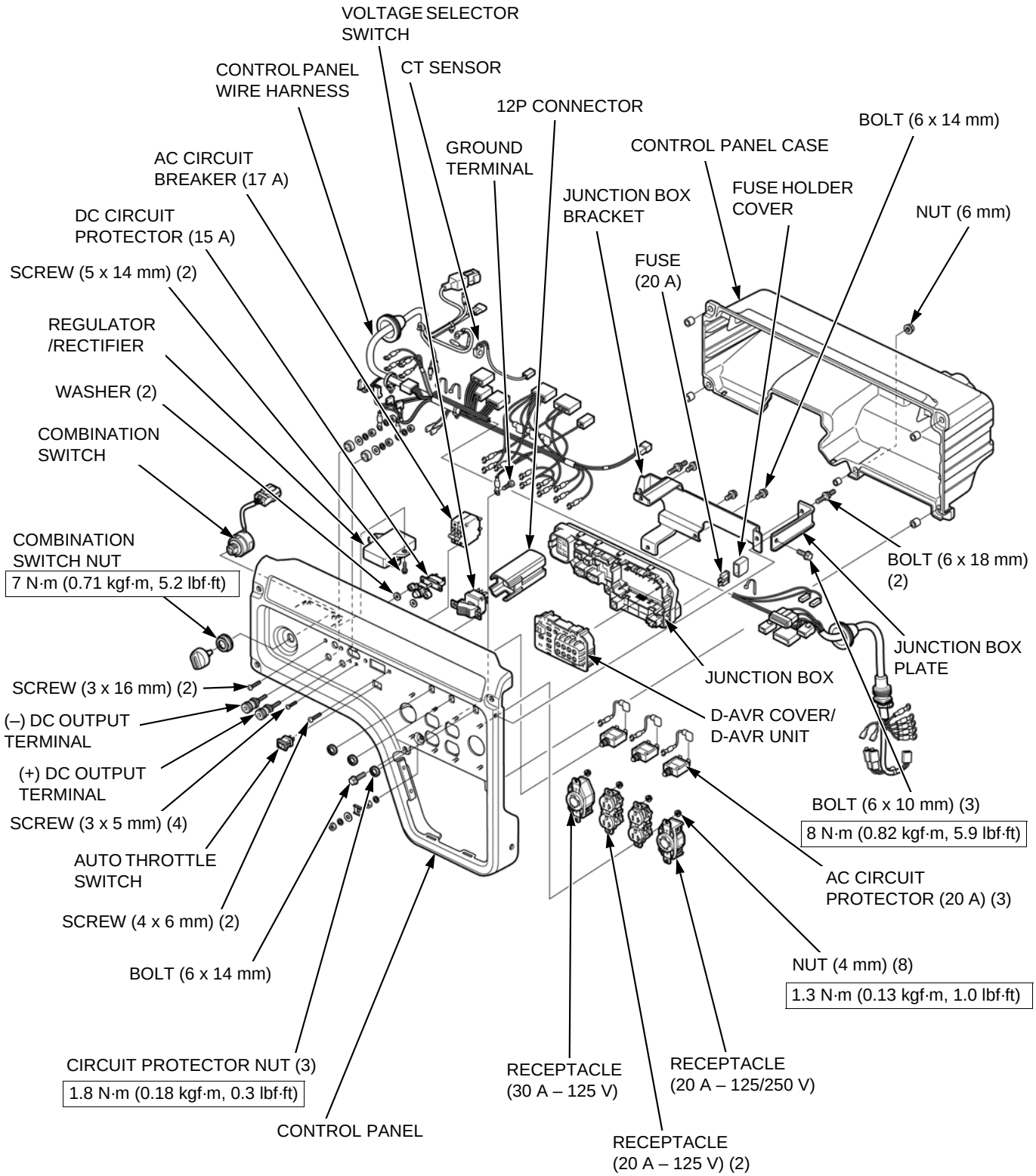
Remove the following:

- Battery terminals (page 15-2)
- Generator end cover (page 10-7)

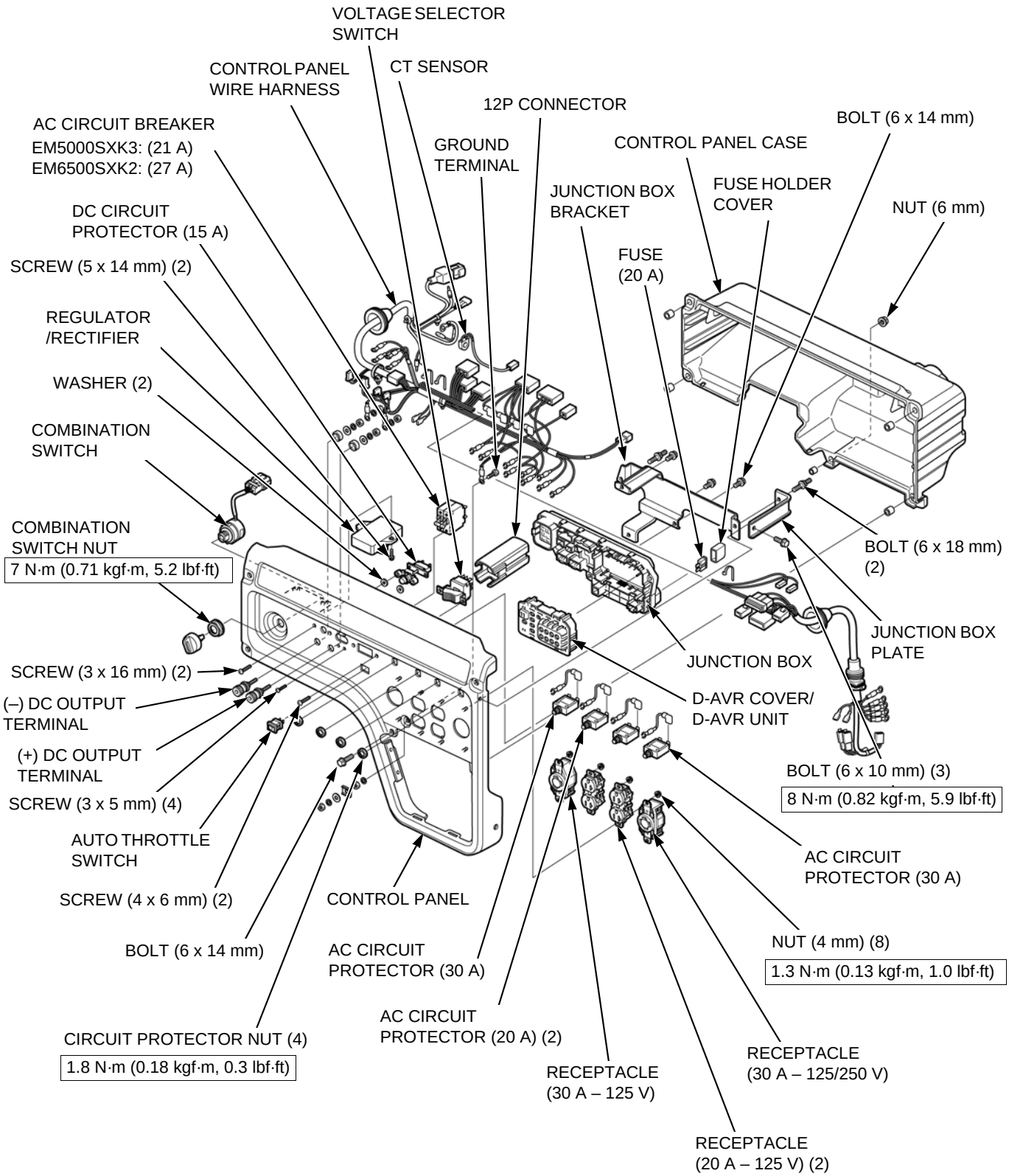


CONTROL PANEL DISASSEMBLY/ASSEMBLY

EM4000SX type

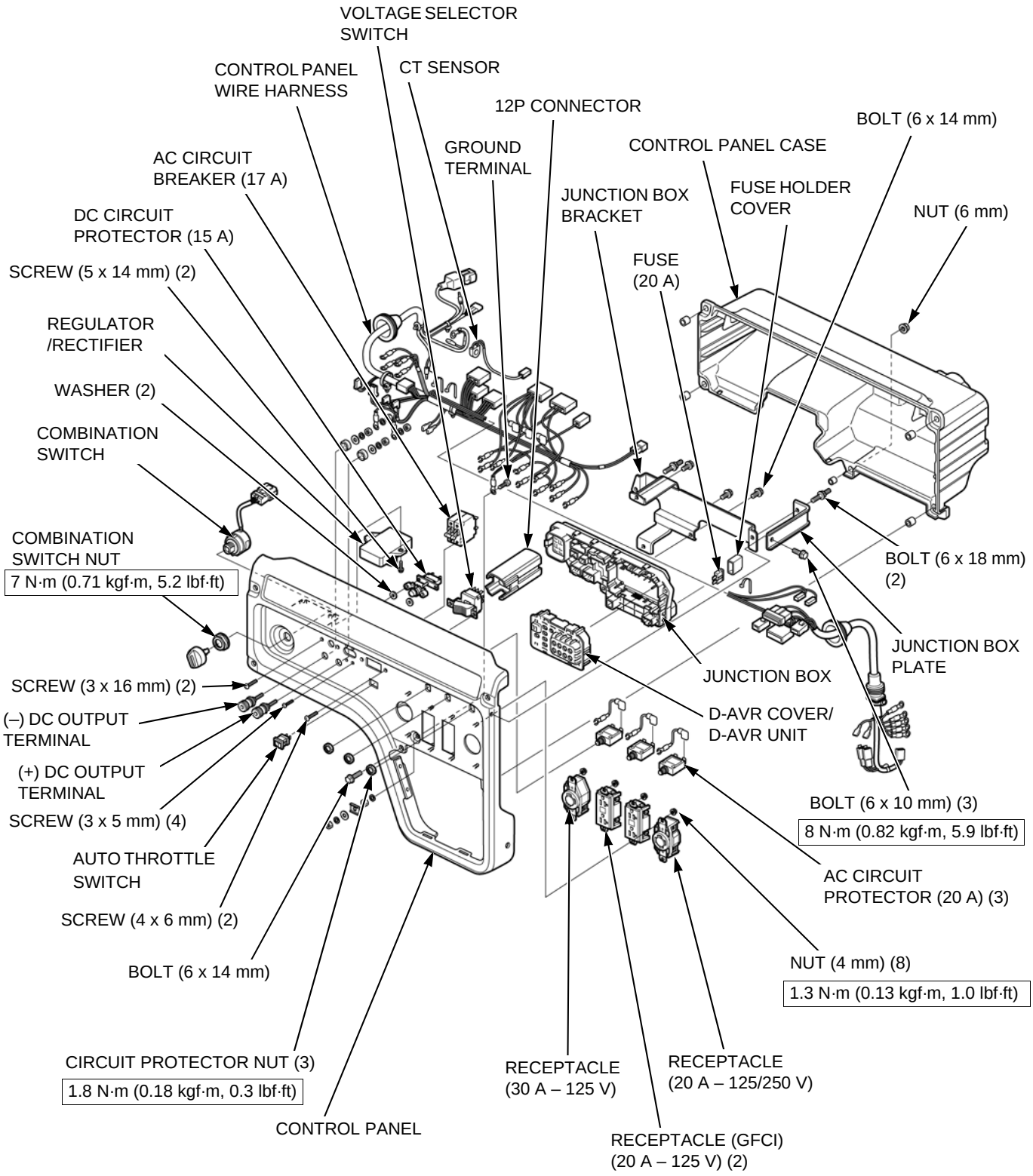


EM5000SXK3/EM6500SXK2 type

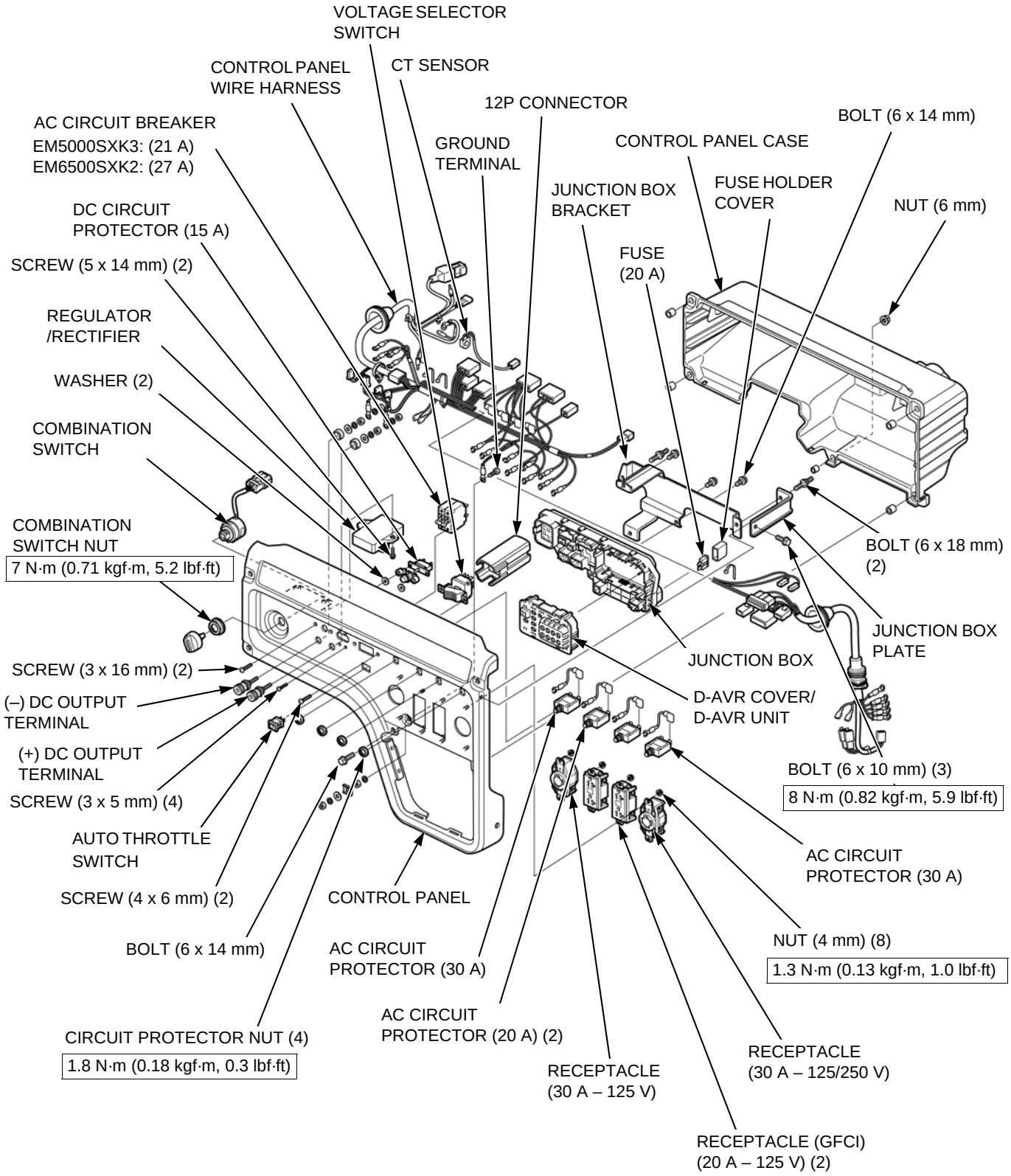


CONTROL PANEL DISASSEMBLY/ASSEMBLY

EM4000SX type



EM5000SXK3/EM6500SXK2 type



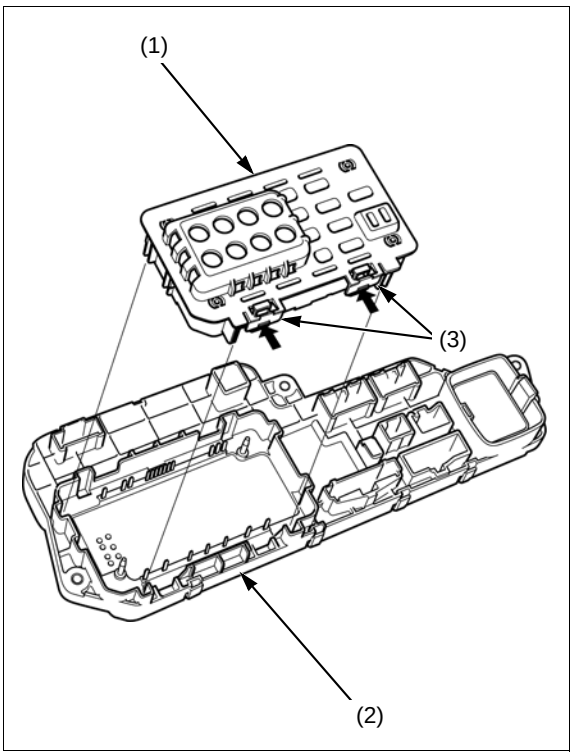
D-AVR COVER/D-AVR UNIT REMOVAL/ INSTALLATION

Remove the junction box (page 7-3).

Remove the D-AVR cover/D-AVR unit (1) from the junction box (2) by pushing the two tabs (3) and lifting up the D-AVR cover.

Installation is in the reverse order of removal.

- When installing the D-AVR cover to the junction box, push the D-AVR cover into the junction box until fully seated.

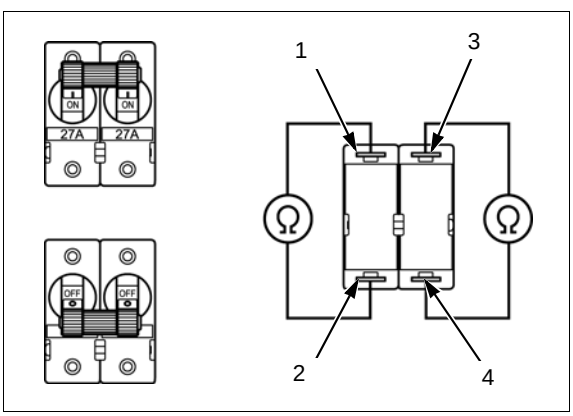


AC CIRCUIT BREAKER INSPECTION

Remove the circuit breaker (page 7-3).

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

	Position	
Terminal	**OFF**	**ON**
1	**No Continuity**	**Continuity**
2		
3	**No Continuity**	**Continuity**
4		

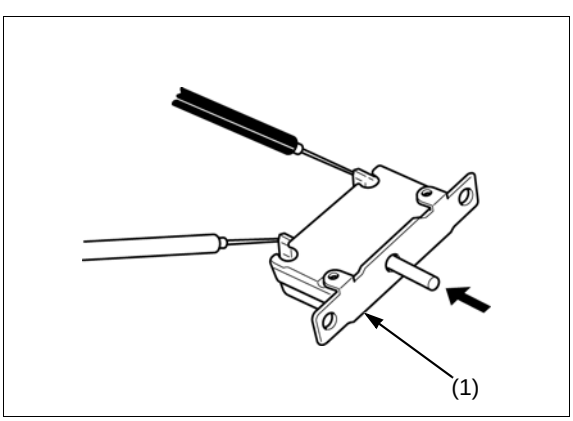


DC CIRCUIT PROTECTOR INSPECTION

Remove the circuit protector (1) (page 7-3).

Check continuity between the terminals. There should be continuity in the ON position (button in) and no continuity in the OFF position (button out). Replace the circuit protector if the correct continuity is not obtained.

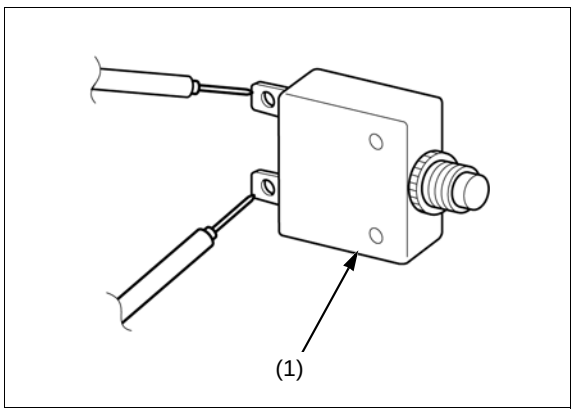
Switch position	Continuity
ON	**Yes**
OFF	**No**



AC CIRCUIT PROTECTOR INSPECTION

Remove the circuit protector (1) (page 7-3).

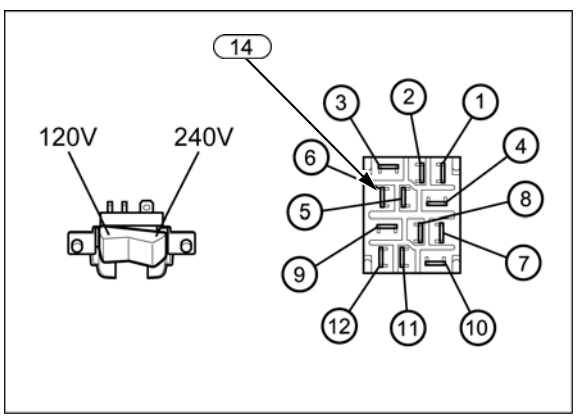
There should be continuity in the ON position (button in). Replace the circuit protector if the correct continuity is not obtained.



VOLTAGE SELECTOR SWITCH INSPECTION

Remove the voltage selector switch (page 7-3).

Check for continuity between the voltage selector switch 12P connector (14) terminals shown in the table below.



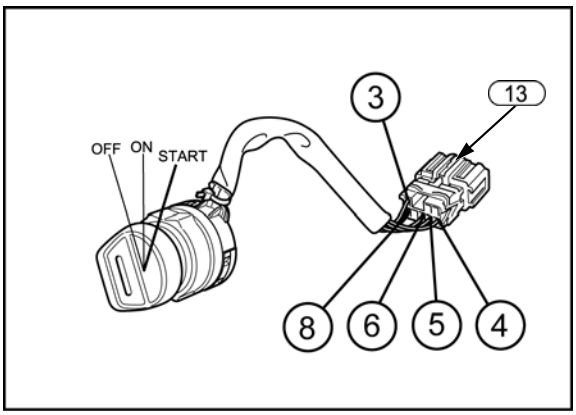
Terminal / Position	1	2	3	4	5	6	7	8	9	10	11	12
120V		○—○			○—○			○—○			○—○	
240V	○—○			○—○			○—○			○—○		

COMBINATION SWITCH INSPECTION

Remove the combination switch (page 7-3).

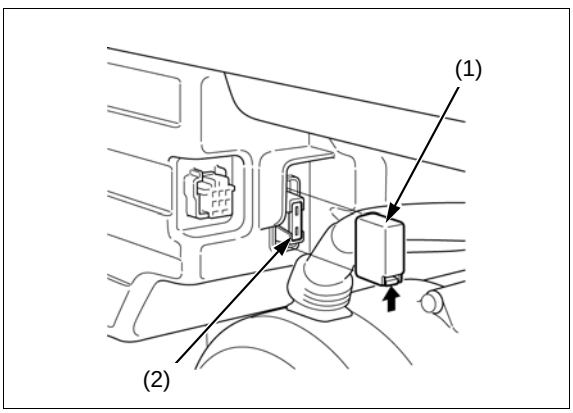
Check for continuity between the combination switch 8P connector (13) terminals shown in the table below.

	EXT (+)	EXT (-)	LD	BAT	ST
OFF					
ON	○—○		○—○		
ST	○—○		○—○	○	○
	④	③	⑤	⑥	⑧



FUSE INSPECTION

Remove the fuse holder cover (1) and fuse (2) from back of the control panel and check to see if it is blown.

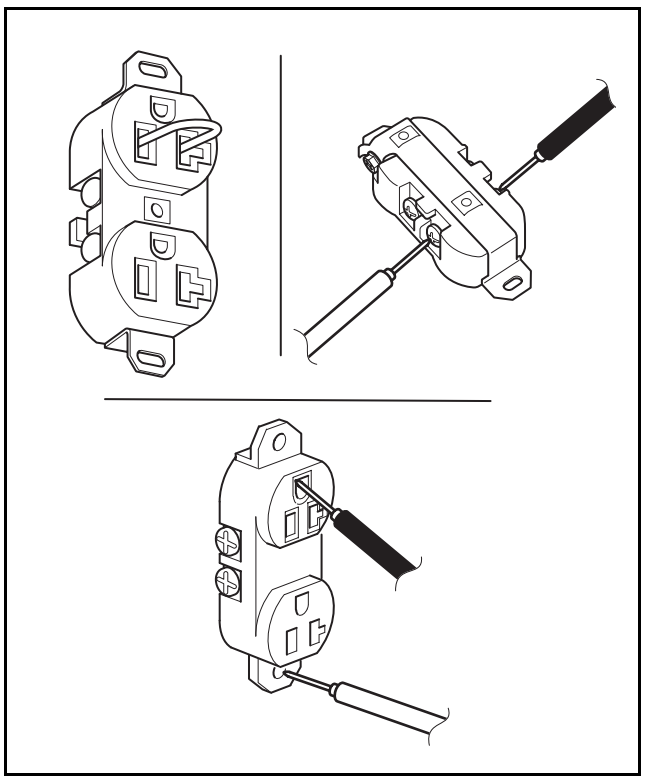


AC RECEPTACLE INSPECTION

Connect both terminals of the receptacle with a jumper wire to short them.

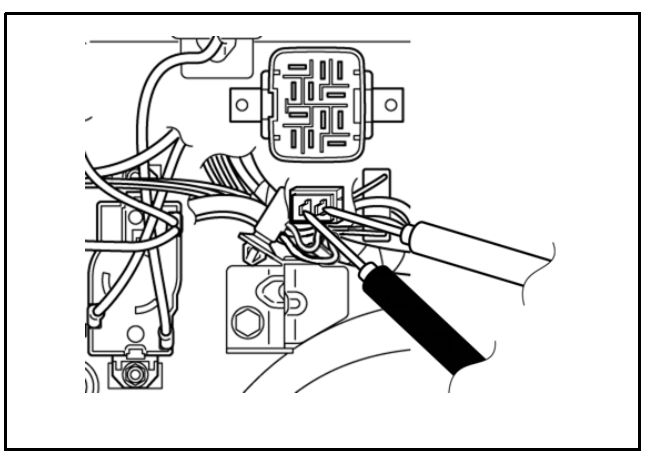
There should be continuity between the terminals.

There should be continuity between the ground terminal of the receptacle and the receptacle installation fitting.



AUTO THROTTLE SWITCH TEST

There should be continuity between the switch leads with the switch in the ON position, and no continuity with the switch in the OFF position.



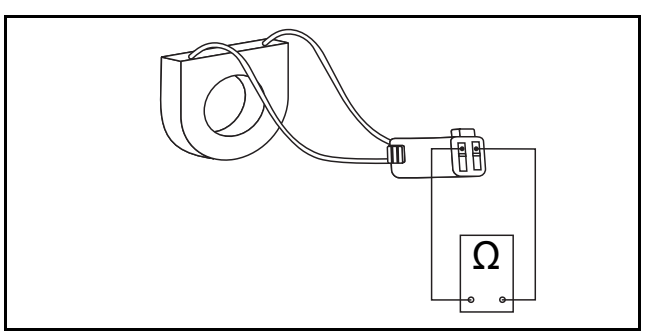
CT SENSOR INSPECTION

Remove the CT sensor 2-pin connector (white and black wires) from the underside of the junction box.

Measure the resistance between the black and white wires.

Resistance: 18 ±2 Ω

If the resistance is not within the specified range, replace the CT sensor (page 7-9).



CT SENSOR

The CT (Current Transformer) sensor detects the load on the generator by detecting current flow in the main windings.

REMOVAL

Remove the junction box bracket from the control panel leaving the junction box attached to the bracket.

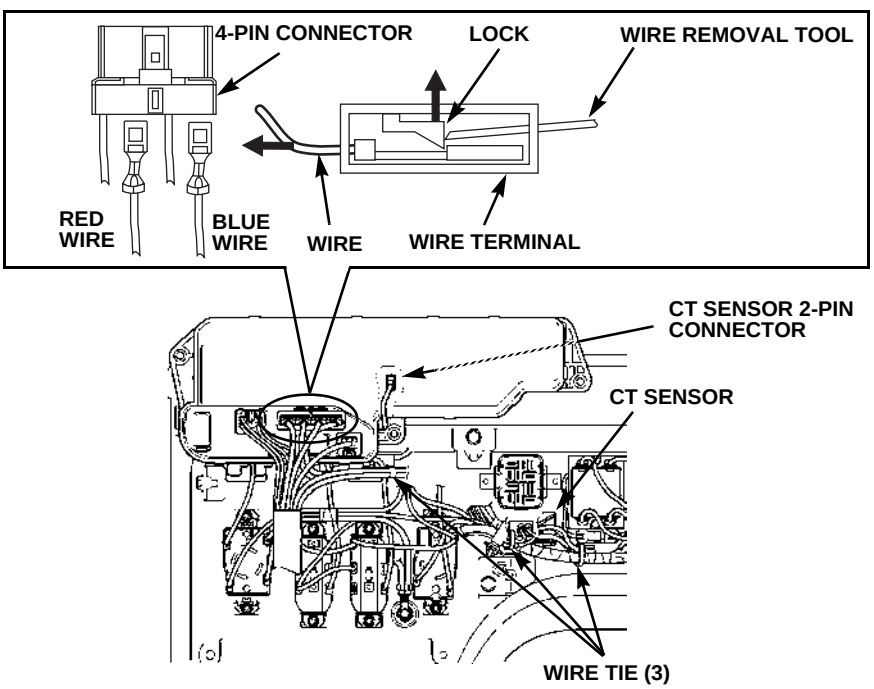
Remove the junction box 4-pin connector.

Using a wire removal tool, remove the RED and BLUE wires from the junction box 4-pin connector.

Remove the CT sensor 2-pin connector (white and black wires) from the underside of the junction box.

Cut the 3 wire ties.

Route the RED and BLUE wires through the CT sensor, and then remove the CT sensor.



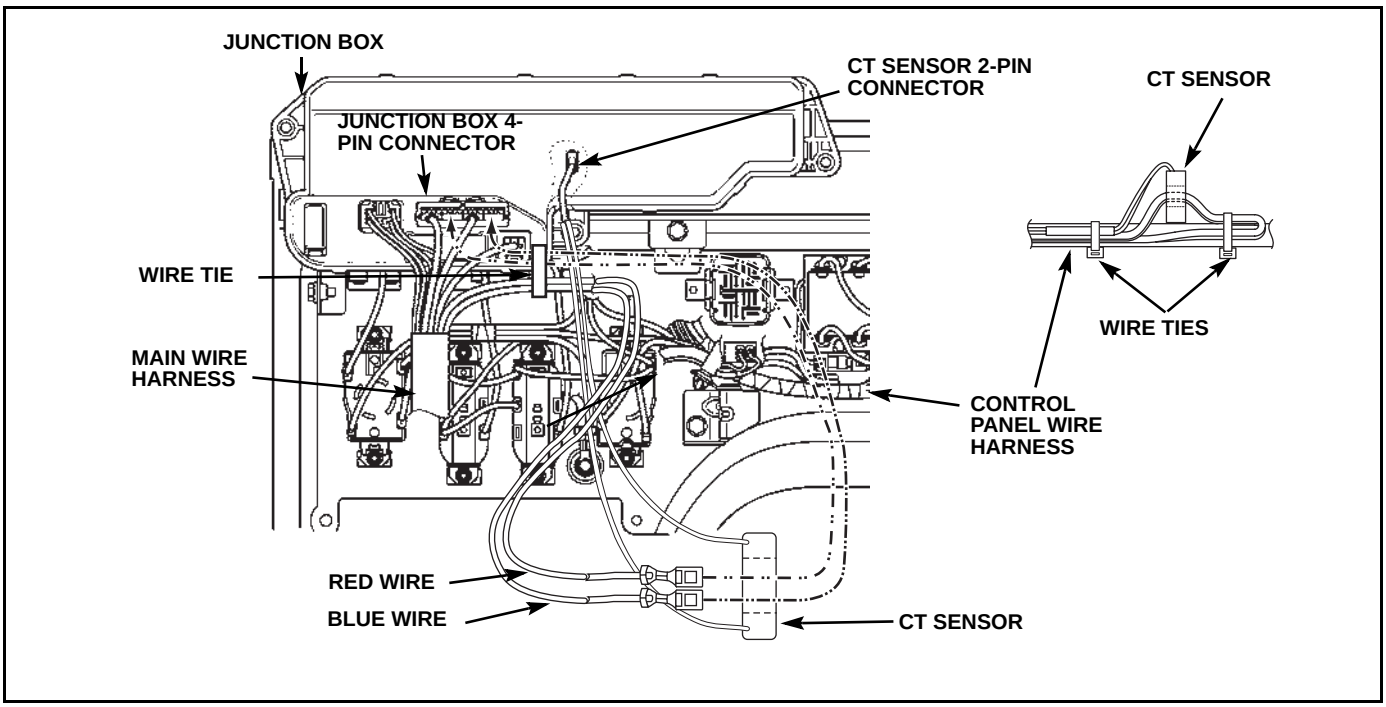
INSTALLATION

Route the RED and BLUE wires from the main wire harness through the CT sensor as shown.

Reconnect the RED and BLUE wires to the junction box 4-pin connector.

Connect the CT sensor 2-pin connector to the underside of the junction box.

Install three new wire ties in the locations shown.

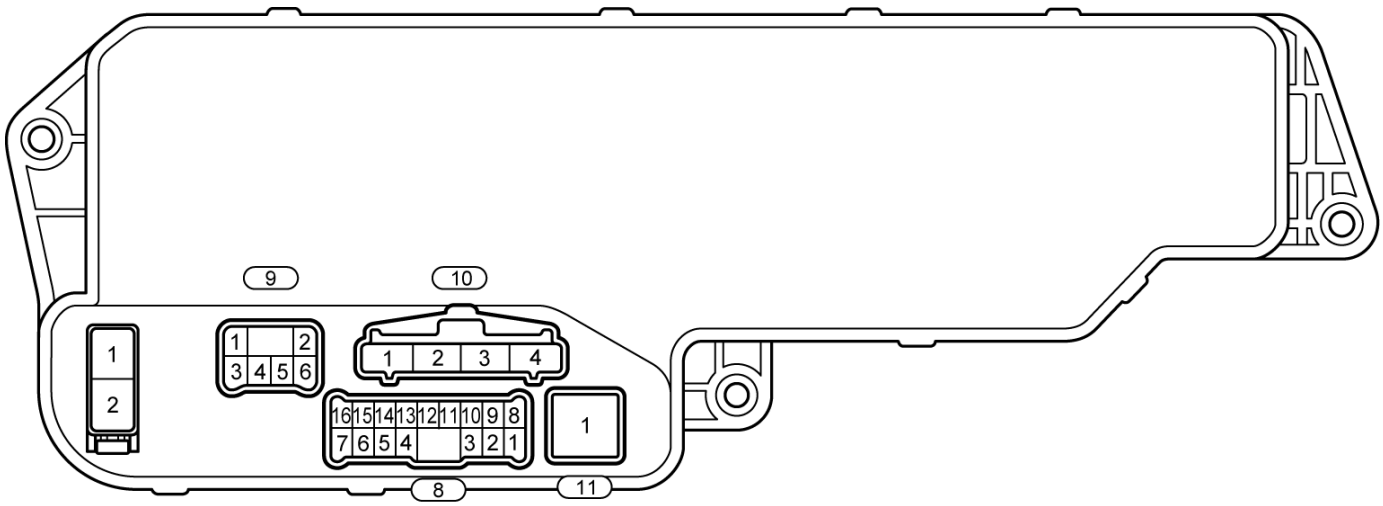


JUNCTION BOX INSPECTION

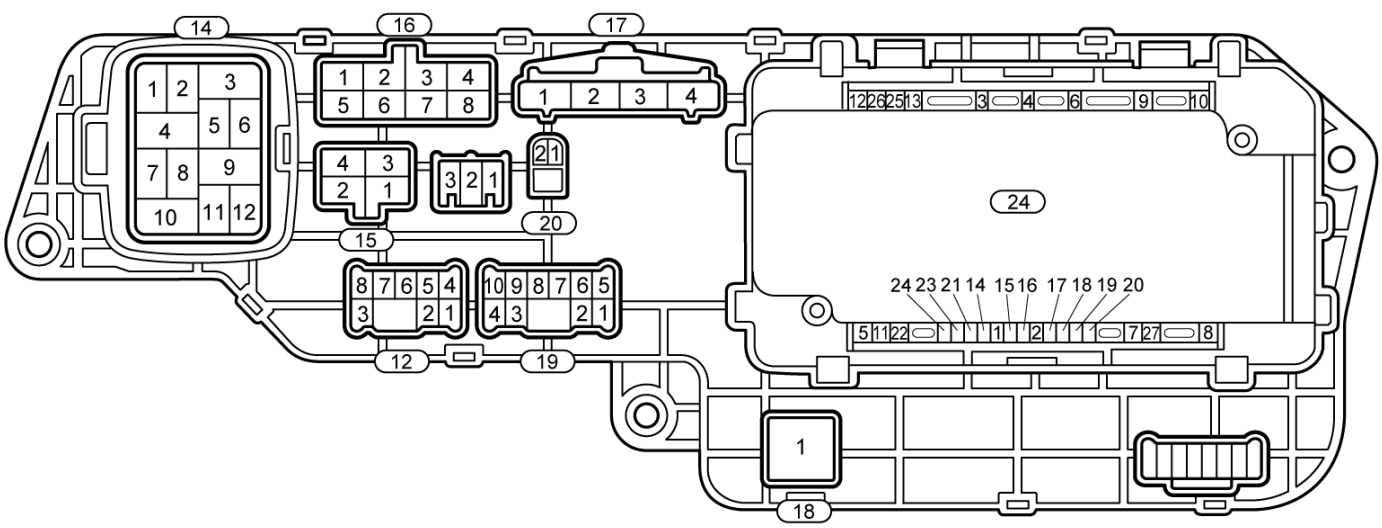
Remove the junction box (page 7-3).

Check for continuity between each junction box terminal as shown on page 7-12.

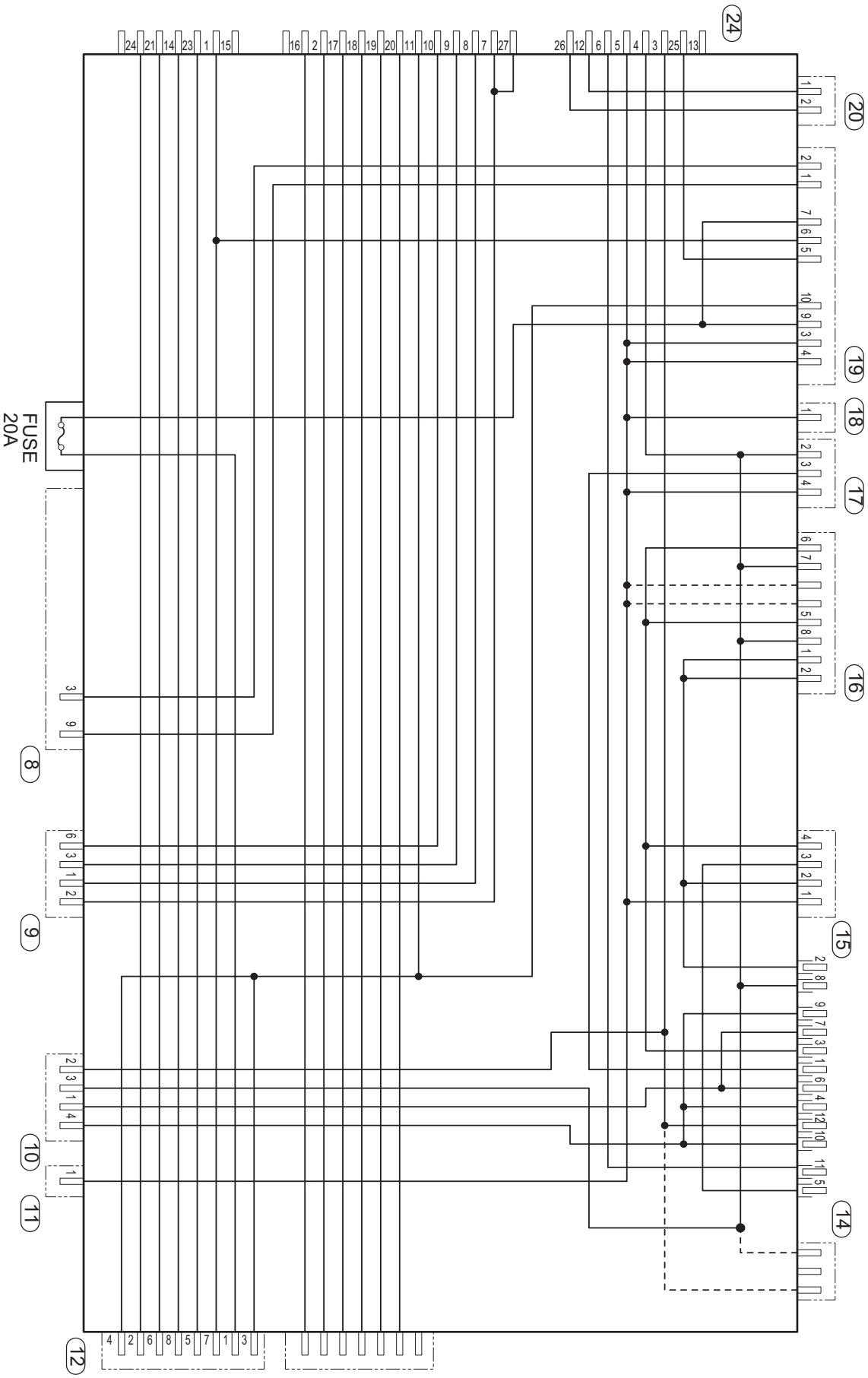
JUNCTION BOX
(GENERATOR SIDE)



JUNCTION BOX
(CONTROL PANEL SIDE)

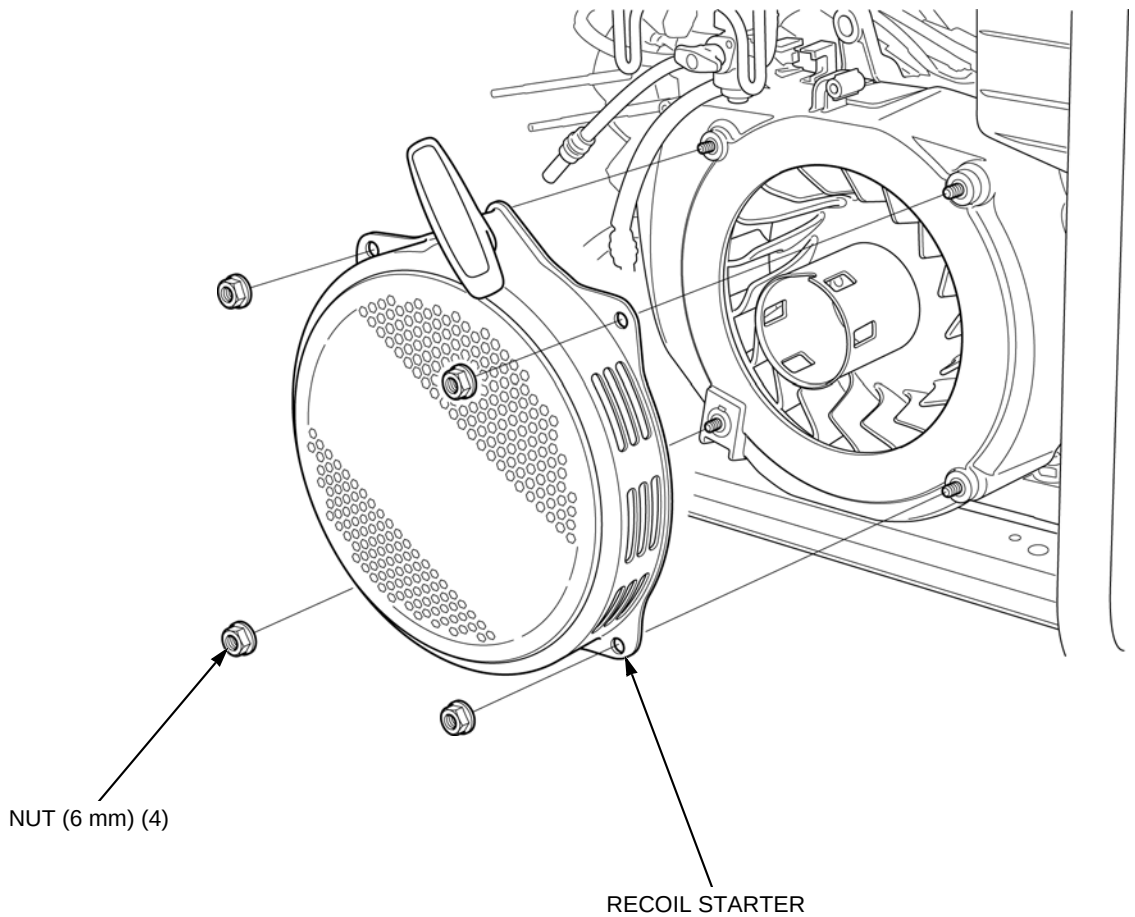


JUNCTION BOX INNER CIRCUIT



8. RECOIL STARTER

RECOIL STARTER
REMOVAL & INSTALLATION

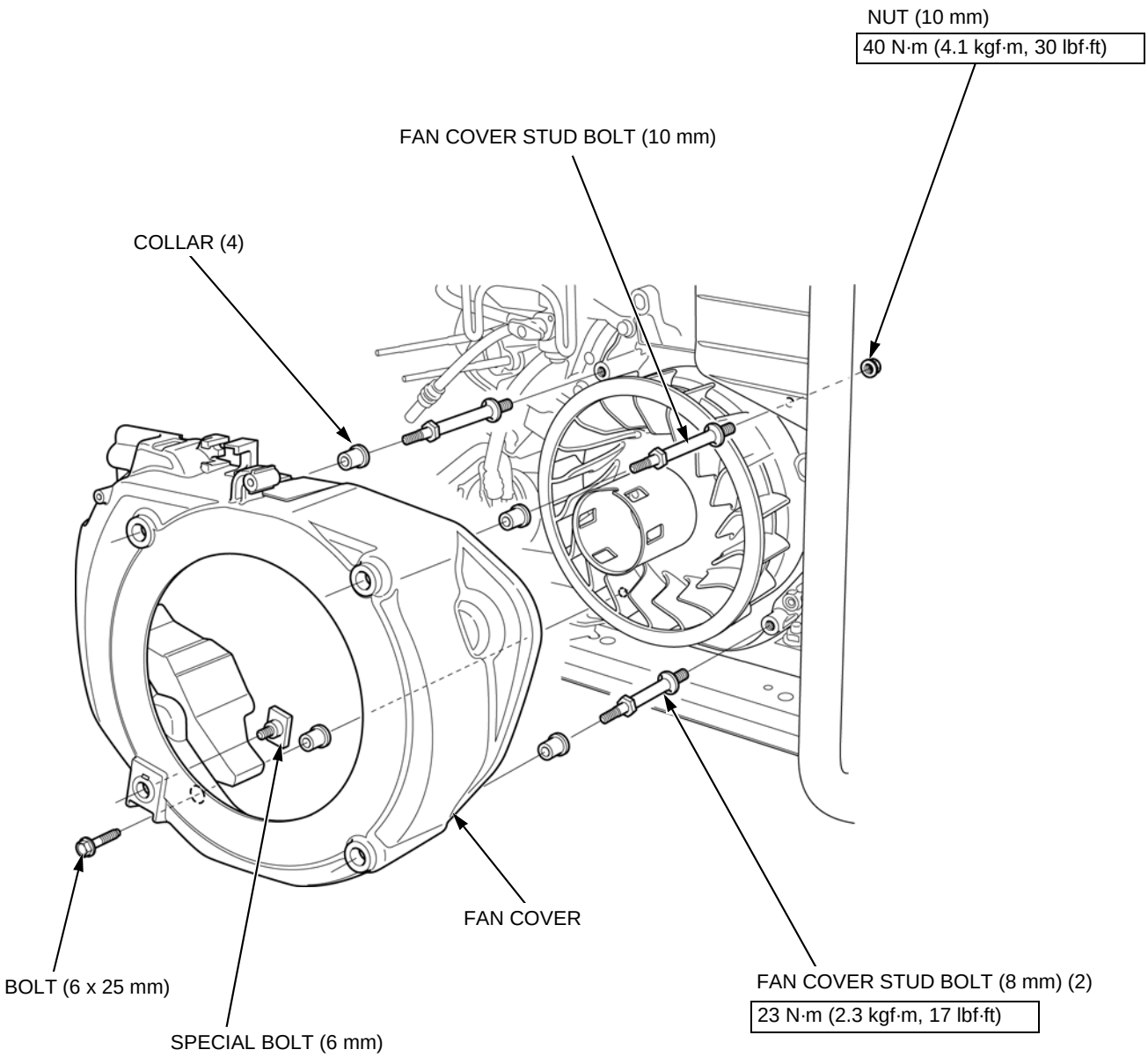


FAN COVER REMOVAL & INSTALLATION

Remove the following:

– Recoil starter (page 8-2)
– Carburetor (page 5-5)

When installing, refer to HARNESS AND TUBE ROUTING (page 2-40).

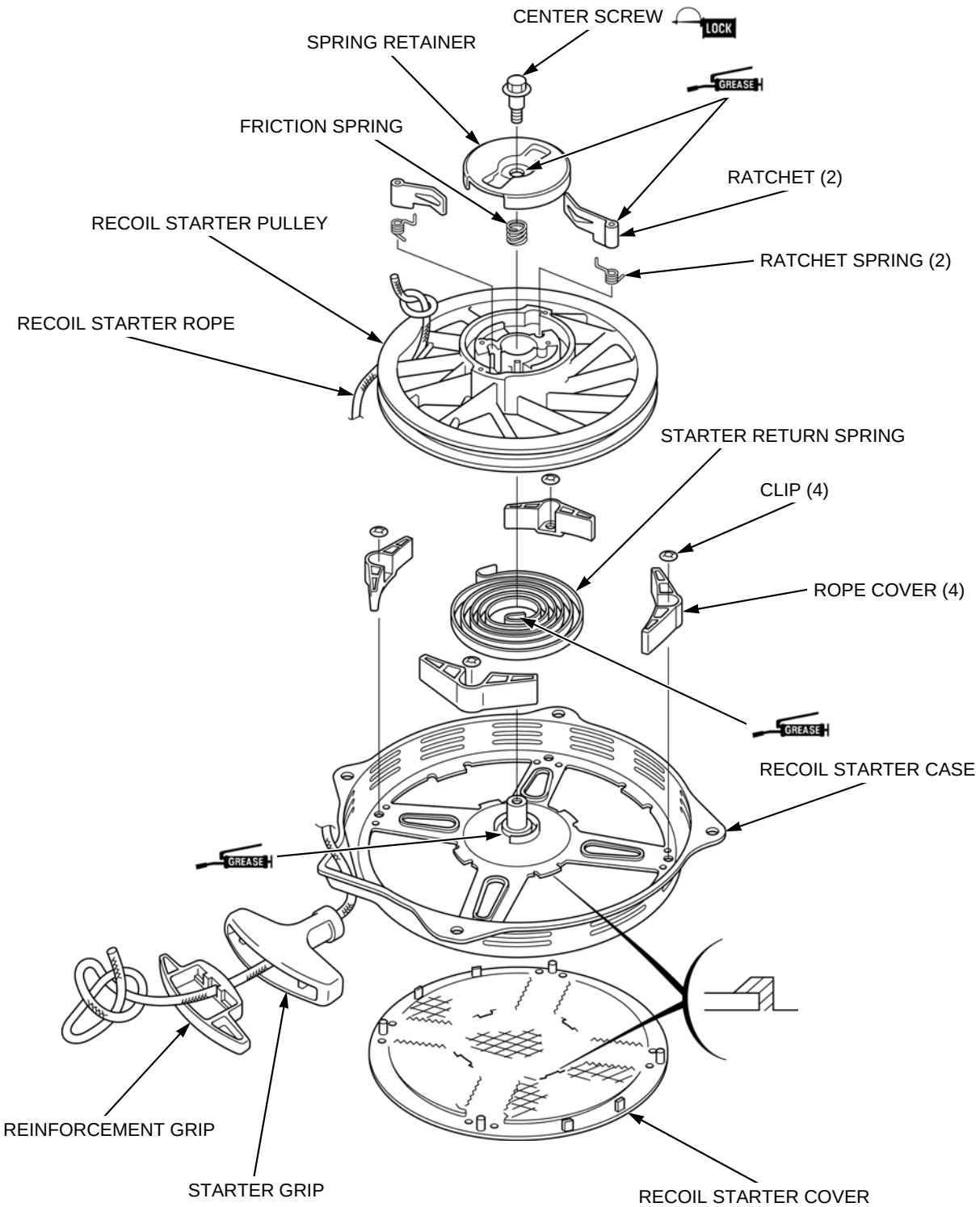


RECOIL STARTER DISASSEMBLY

⚠CAUTION

To prevent serious eye injury, always wear safety goggles or other eye protection when handling compressed springs.

Remove the recoil starter (page 8-2).



RECOIL STARTER ASSEMBLY

⚠CAUTION

To prevent serious eye injury, always wear safety goggles or other eye protection when handling compressed springs.

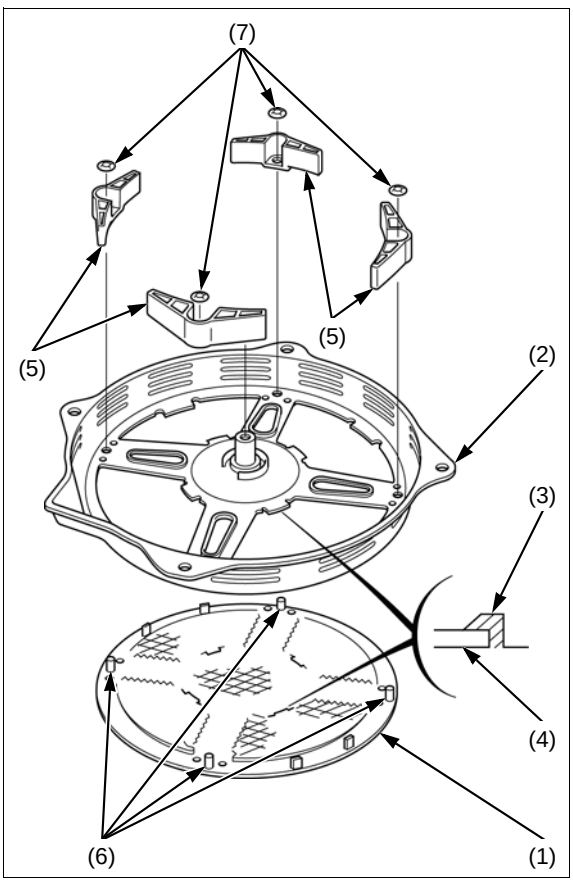
Install the recoil starter cover (1) to the recoil starter case (2).

- Align the recoil starter cover pawls (3) with the recoil starter case tabs (4).

Install the rope cover (5) to the recoil starter cover bosses (6).

Install the clips (7) securely.

- Replace the clips if necessary.

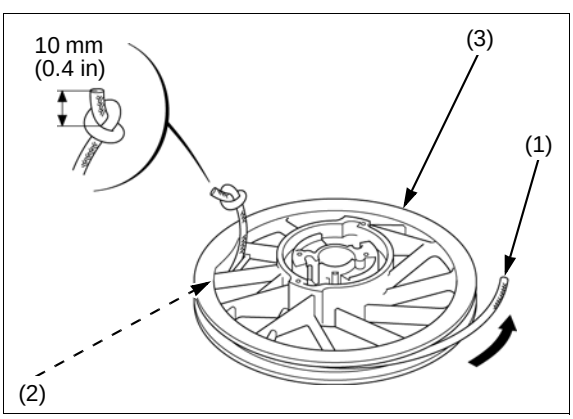


Pass the recoil starter rope (1) through the hole (2) of the recoil starter pulley (3), and then tie the rope as shown.

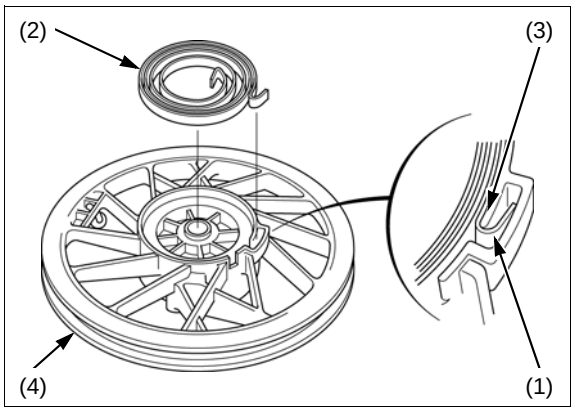
NOTICE

Before installing the recoil starter rope, check for fray or wear.

Wind the recoil starter rope onto the recoil starter pulley counterclockwise.

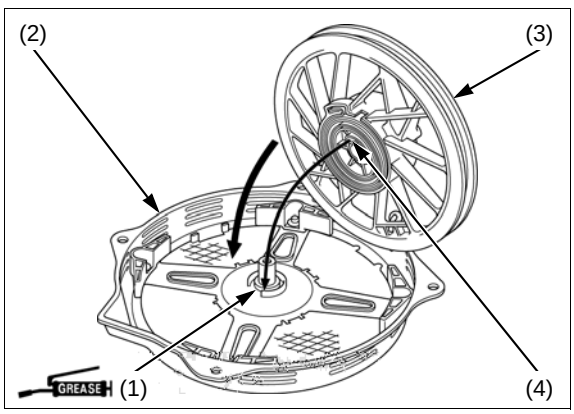


Hook the outer hook (1) of the starter return spring (2) to the groove (3) of the recoil starter pulley (4), and then install the starter return spring by winding it.



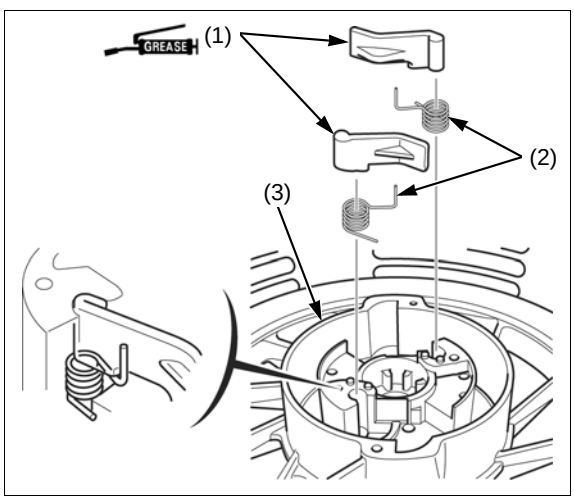
Apply grease to the cutout (1) of the recoil starter case (2).

Set the recoil starter pulley (3) to the recoil starter case by aligning the inner hook (4) of the starter return spring with the cutout of the recoil starter case.



Apply grease to the two ratchets (1).

Install the two ratchets and the two ratchet springs (2) to the recoil starter pulley (3) as shown.

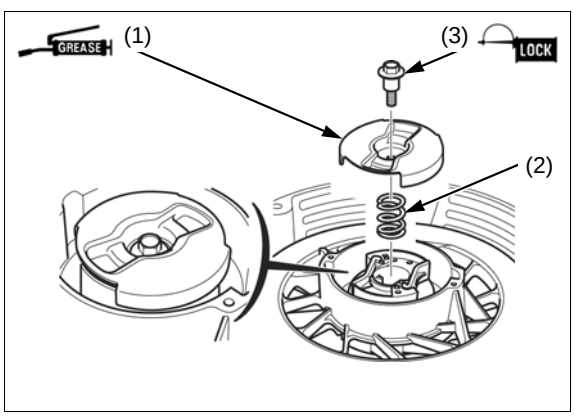


Apply grease to the inside of the spring retainer (1).

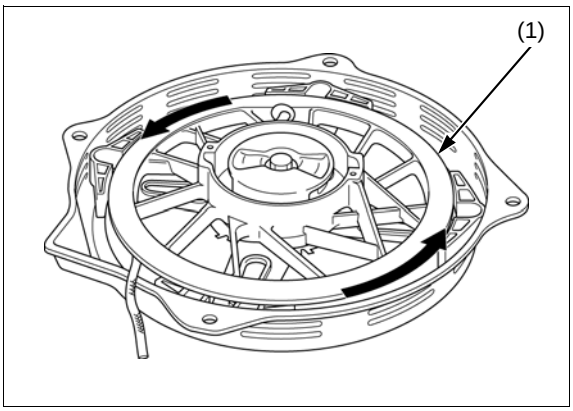
Set the friction spring (2) and the spring retainer to the recoil starter pulley in the direction as shown.

Apply locking agent (Hondalock 1, Threebond® 2430, or equivalent) to the threads of the center screw (3).

Hold the spring retainer and tighten the center screw securely.

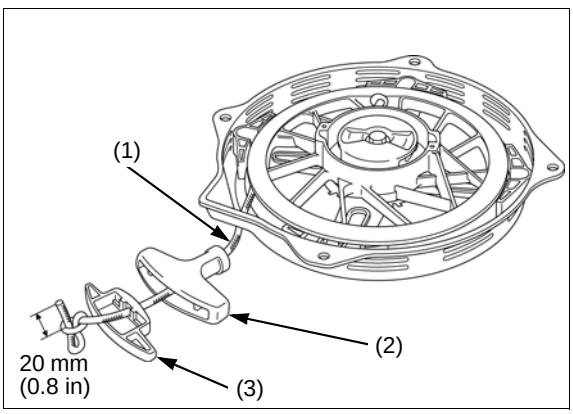


Turn the recoil starter pulley (1) more than 2 turns counterclockwise to preload the starter return spring. Be sure to hold the recoil starter pulley.



Pass the recoil starter rope through hole (1) of the recoil starter case, the starter grip (2), and reinforcement grip (3), and then tie the rope as shown.

Check the recoil starter operation (page 8-7).

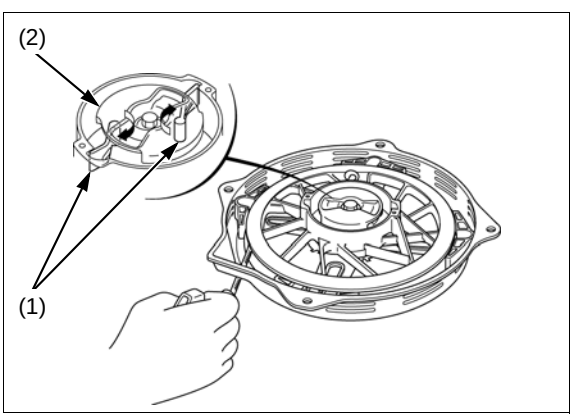


RECOIL STARTER INSPECTION

RECOIL STARTER OPERATION

Remove the recoil starter (page 8-2).

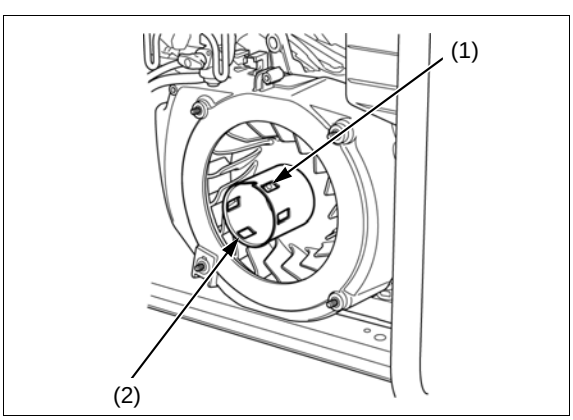
Pull the starter grip several times to inspect that the ratchets (1) are operated properly (the ratchet ends come out from the spring retainer (2) and retract when the rope is allowed to be retracted into the recoil case.



STARTER PULLEY

Remove the recoil starter (page 8-2).

Inspect the square holes (1) of the starter pulley (2) for deformation.

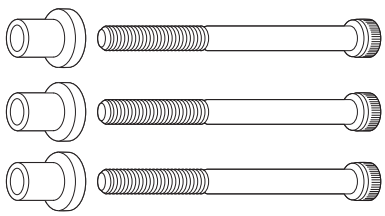


9. FLYWHEEL / STARTER MOTOR

TOOLS

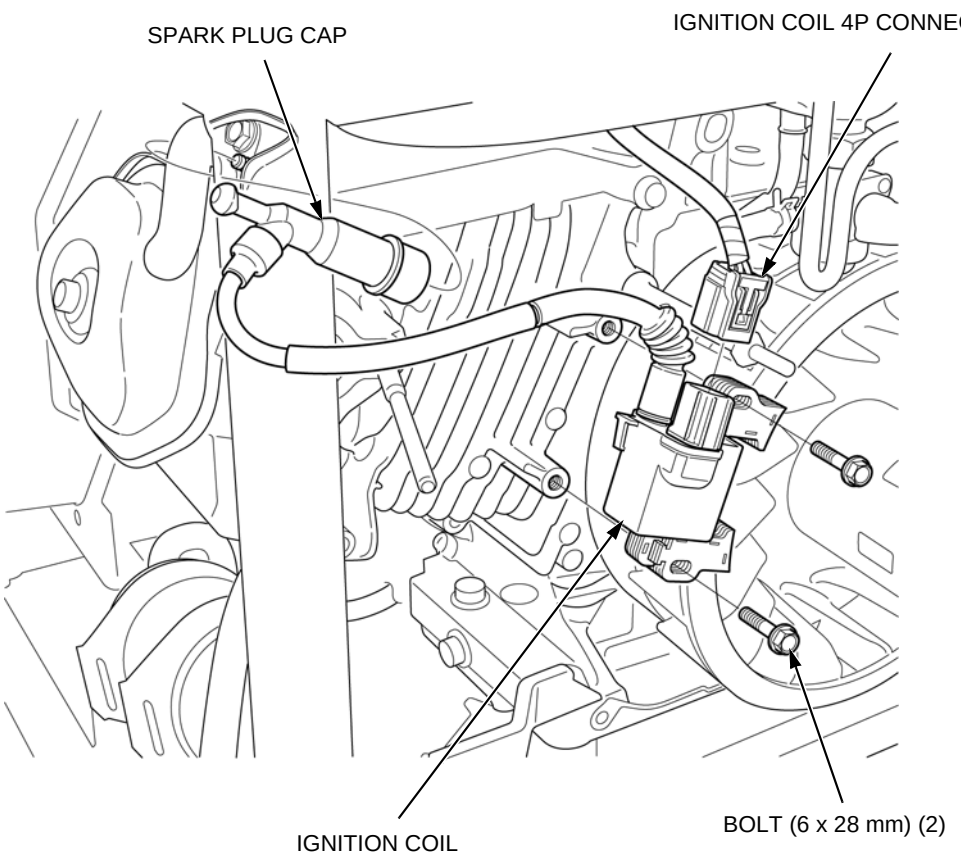
Special tools used in this manual can be ordered using normal American Honda parts ordering procedures.

Puller collar set
07APC-ZY1A100



IGNITION COIL REMOVAL

Remove the fan cover (page 8-3).



IGNITION COIL INSPECTION

Disconnect the spark plug cap from the spark plug.

Remove the spark plug cap from the high tension cord (1).

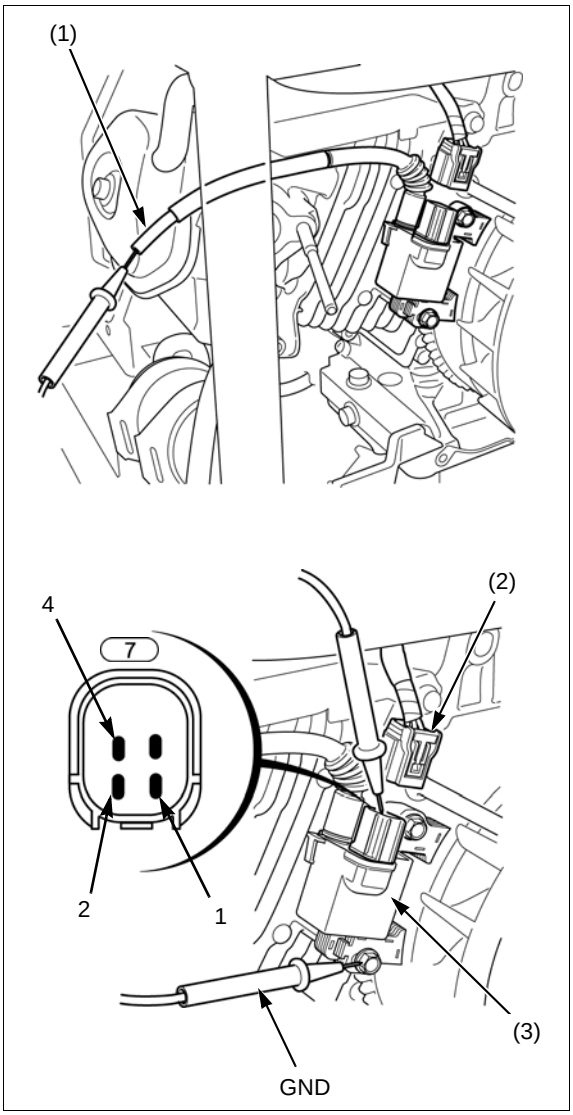
Disconnect the engine wire harness 4P connector (7) (2) from the ignition coil (3).

Measure the resistance between the terminals and be sure that the measurements are within the specifications shown in the table below.

Use a tester that is equivalent to or higher than the performance specified, internal resistance: 20 kΩ/VDC, 9 kΩ/VAC.

Be careful not to touch the metallic part of the tester probe with your fingers; otherwise, the correct resistance value cannot be obtained.

Read the tester manufacturer's operation instructions carefully before operating the tester. Follow the instructions of the Service Manual. Be sure the tester's battery is fully charged, and check the meter before using the tester.



Unit: kΩ

			(+) Probe				
			GND	HIGH-TENSION CORD	7 Terminal number		
					1	2	4
(-) Probe	GND			6 - 11	∞	1 - 10	5 - 30
	HIGH-TENSION CORD		6 - 11		∞	7 - 24	12 - 47
	7 Terminal number	1	∞	∞		∞	∞
		2	5 - 14	10 - 26	∞		6 - 26
		4	∞	∞	∞	∞	

IGNITION COIL INSTALLATION

Attach the ignition coil (1) and loosely tighten the two 6 x 28 mm flange bolts (2).

Insert the thickness gauge (3) of proper thickness between the ignition coil and the flywheel.

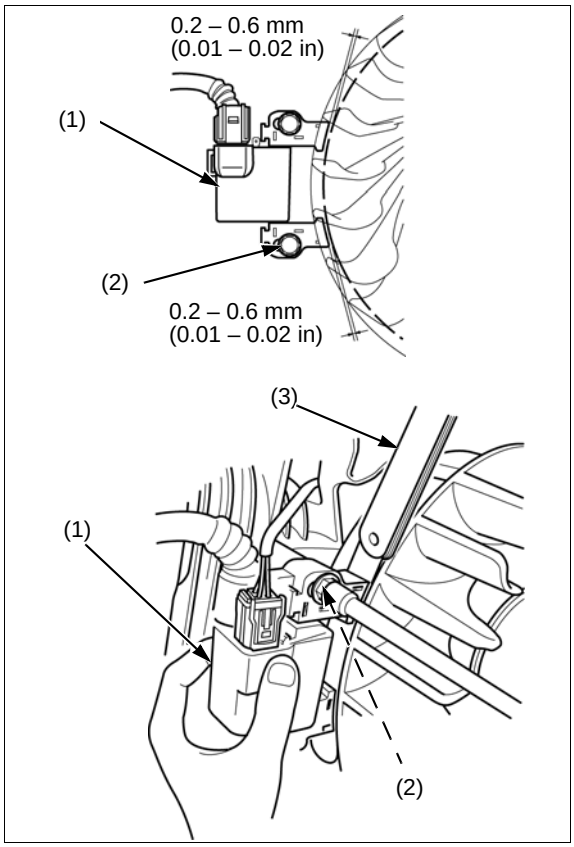
IGNITION COIL AIR GAP:
0.2 – 0.6 mm (0.01 – 0.02 in)

NOTICE

Adjust the ignition coil air gap equally on both sides.

Push the ignition coil firmly against the flywheel and tighten the 6 x 28 mm flange bolts securely.

Remove the thickness gauge.



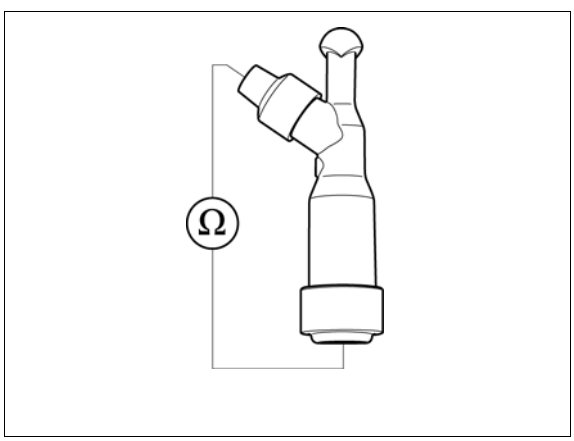
SPARK PLUG CAP INSPECTION

Remove the spark plug cap from the high tension cord.

Attach the tester probes to the spark plug cap as shown and measure the resistance.

Resistance: 7.5 – 12.5 kΩ

Replace the spark plug cap if the resistance is out of specification.



COOLING FAN/FLYWHEEL/POWER COIL/CHARGE COIL REMOVAL/ INSTALLATION

Remove the following:

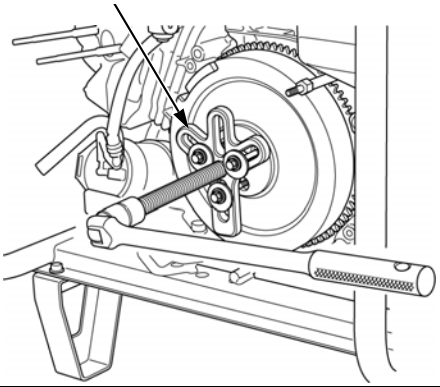
– Fan cover (page 8-3)
– Ignition coil (page 9-2)

FLYWHEEL

REMOVAL:
- Before removing the flywheel, remove the ignition coil.
- Use a flywheel puller (commercially available) to remove the flywheel. Do not hit the flywheel with a hammer.

INSTALLATION:
Before installing, degrease the tapered surface of the flywheel and crankshaft.

FLYWHEEL PULLER
(commercially available)

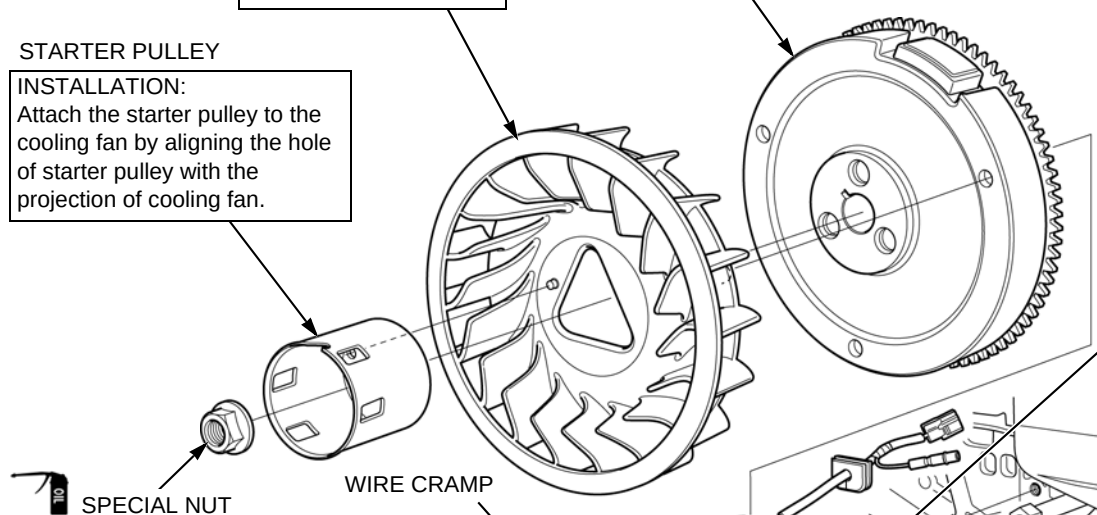


COOLING FAN

INSTALLATION:
Attach the cooling fan to the flywheel by aligning the three projections of cooling fan with the holes of flywheel.

STARTER PULLEY

INSTALLATION:
Attach the starter pulley to the cooling fan by aligning the hole of starter pulley with the projection of cooling fan.



REMOVAL/INSTALLATION:
Hold the flywheel by placing a screwdriver in the starter pulley.

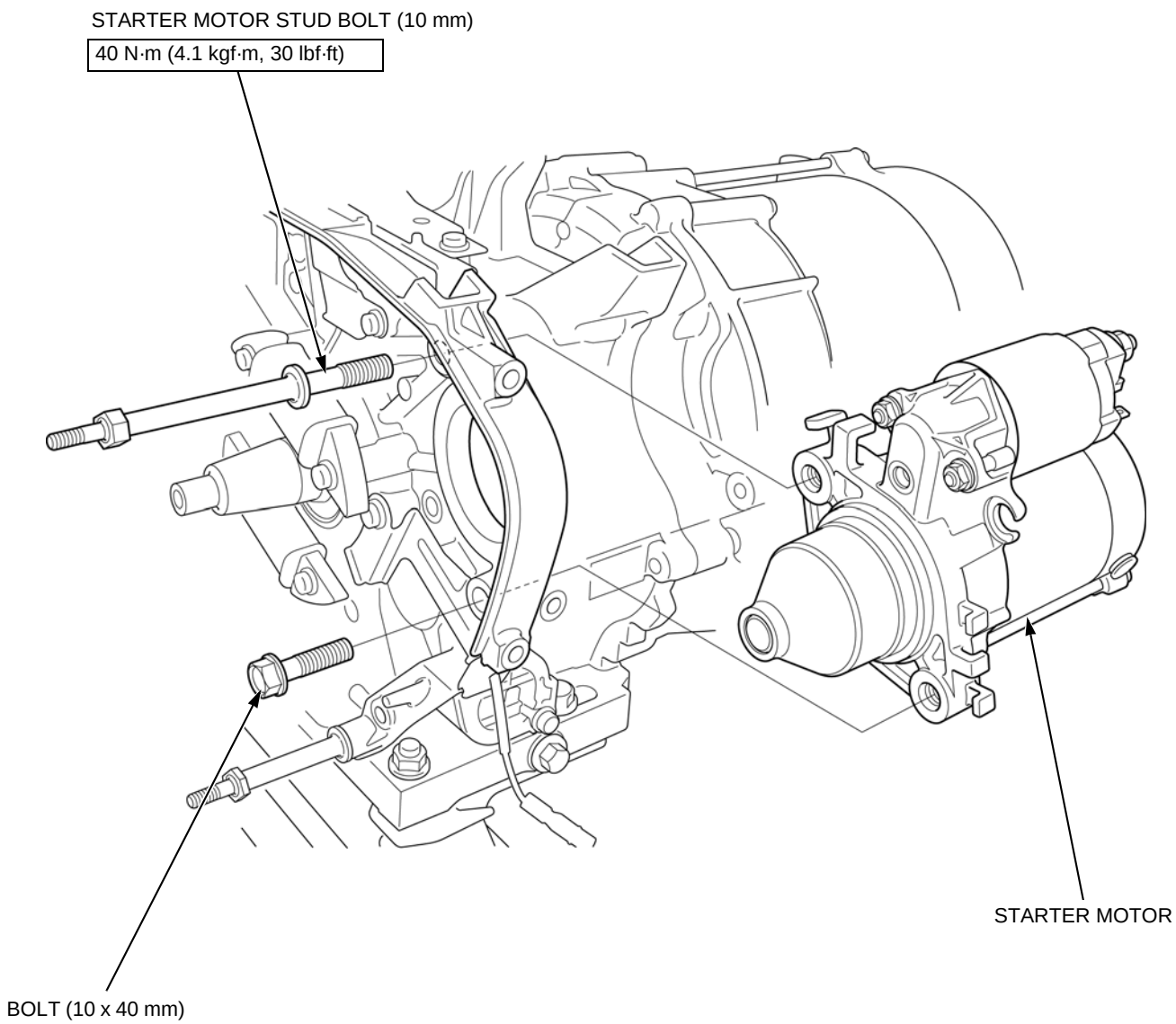
TORQUE:
EM4000SX:
128 N·m (13.1 kgf·m, 94 lbf·ft)
EM5000SXK3/EM6500SXK2:
170 N·m (17.3 kgf·m, 125 lbf·ft)

STARTER MOTOR REMOVAL/ INSTALLATION

Disconnect the starter solenoid wires from the starter motor.

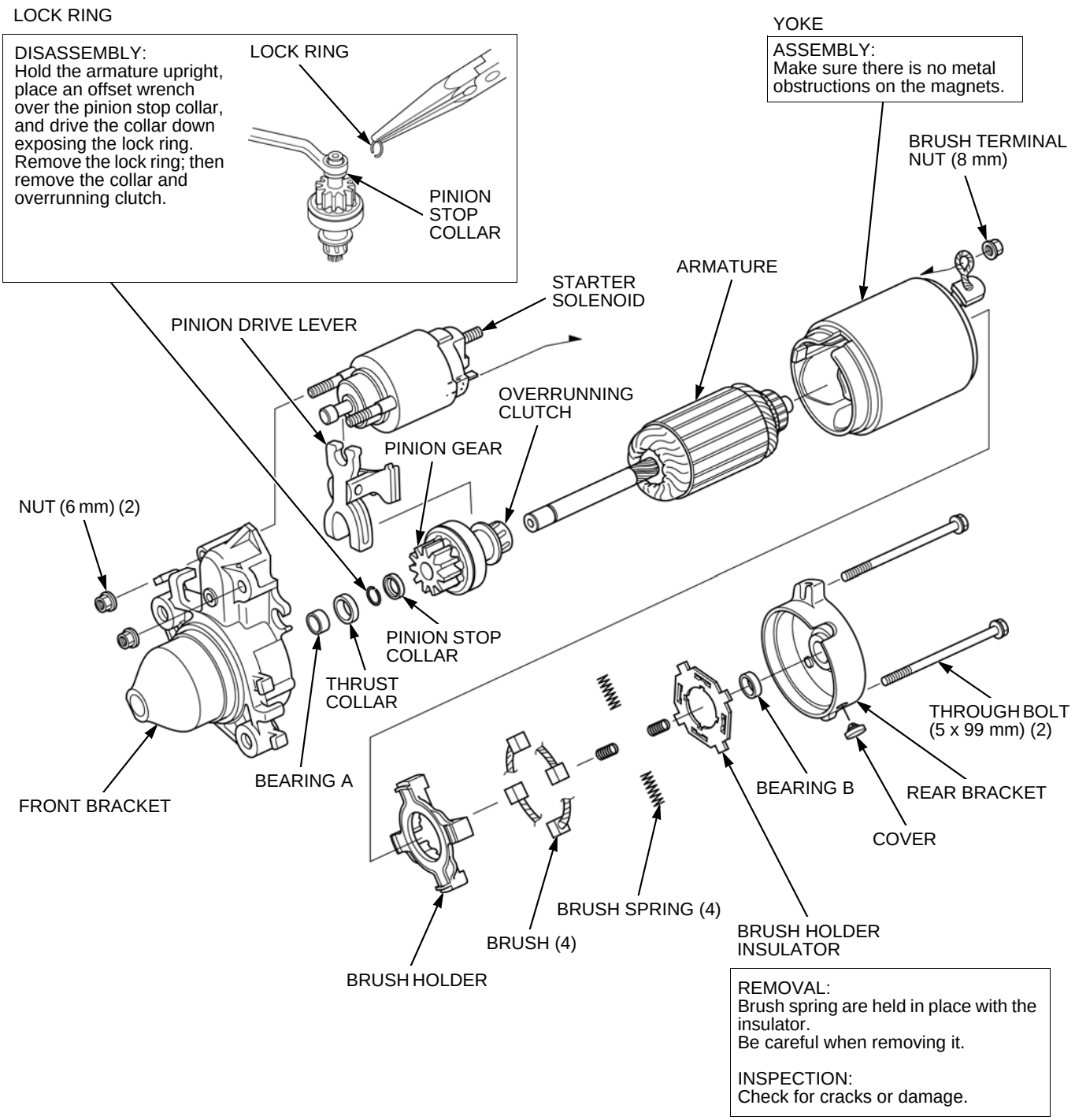
Remove the following:

– Flywheel (page 9-5)
– Control panel (page 7-2)



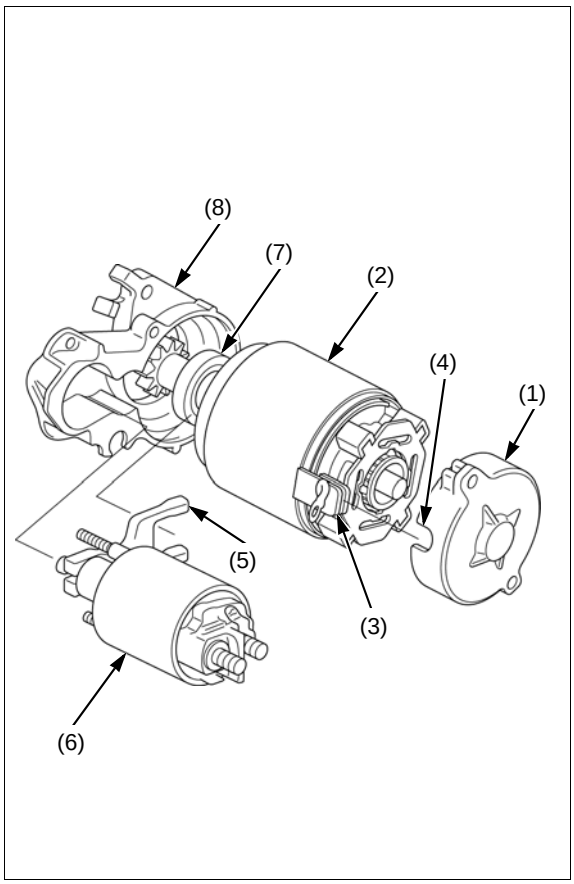
STARTER MOTOR DISASSEMBLY/ASSEMBLY

Remove the starter motor (page 9-6).



FRONT BRACKET/REAR BRACKET ASSEMBLY

Install the rear bracket (1) to the armature/yoke (2) by aligning the brush terminal grommet (3) with the cutout (4) of the rear bracket.
Attach the pinion drive lever (5) to the starter solenoid (6). Set the pinion drive lever to the overrunning clutch (7).
Hold the pinion drive lever, starter solenoid, and yoke together, and install the front bracket (8).
Tighten the through bolts to secure the front bracket and rear bracket (page 9-7).



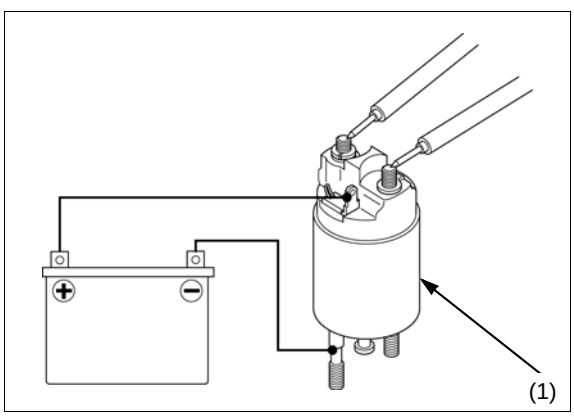
STARTER MOTOR INSPECTION

STARTER SOLENOID

Remove the starter solenoid (1) (page 9-7).

Connect a 12 V battery between the starter terminal and the switch body and check for continuity between the terminals.

Continuity should exist when the battery is connected and not exist when the battery is disconnected.

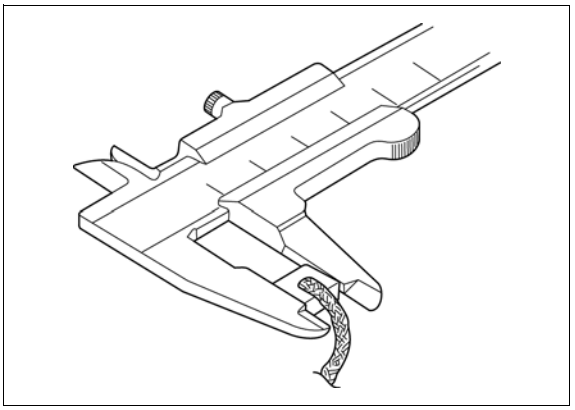


BRUSH LENGTH

Measure the brush length.

If the brush length is less than the service limit, replace the brush (page 9-11).

STANDARD: 10 mm (0.4 in)
SERVICE LIMIT: 6 mm (0.2 in)

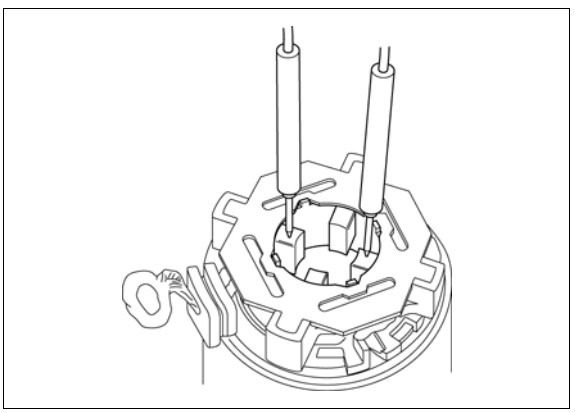


BRUSH CONTINUITY CHECK

Check for continuity between the brushes.

There should be continuity between both the positive brushes.
There should be continuity between both the negative brushes.
There should be no continuity from either positive brush to either negative brush.

If the correct continuity of the brushes is not obtained, replace the brushes (page 9-11).

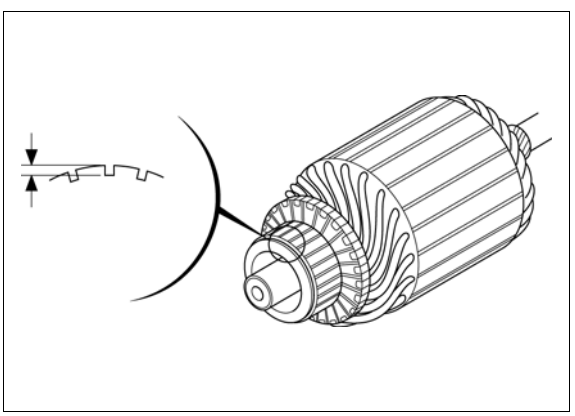


ARMATURE MICA DEPTH

Visually inspect the commutator surface for dust, rust, or other damage. If necessary, wipe it with a clean lint-free cloth. If rusted or damaged, dress with a fine emery cloth.

When the mica is clogged, or its depth is smaller than the service limit value, recut the grooves using a hacksaw blade or a small file.

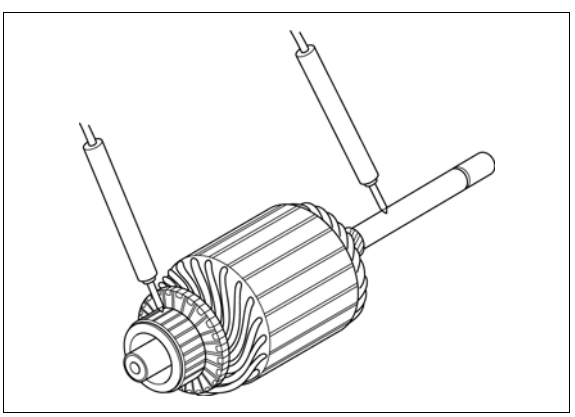
SERVICE LIMIT: 0.2 mm (0.01 in)



ARMATURE CONTINUITY CHECK– COMMUTATOR TO SHAFT

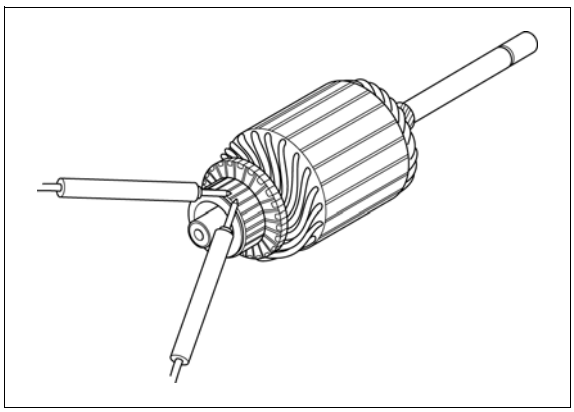
Check for continuity between the commutator and the armature shaft.

Replace the armature if continuity exists between any of the commutator segments and the armature shaft (page 9-7).



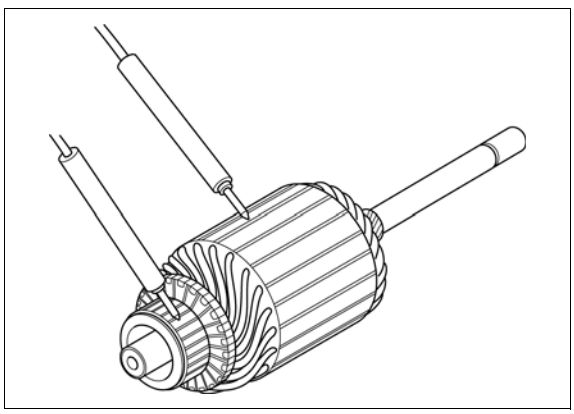
ARMATURE CONTINUITY CHECK– COMMUTATOR SEGMENTS

Check for continuity between each segment. If an open circuit (no continuity) exists between any two segments, replace the armature (page 9-7).



ARMATURE CONTINUITY CHECK– COMMUTATOR TO CORE

Check for continuity between the commutator segments and the armature coil core.
Replace the armature if continuity exists between any of the commutator segments and the armature coil core (page 9-7).



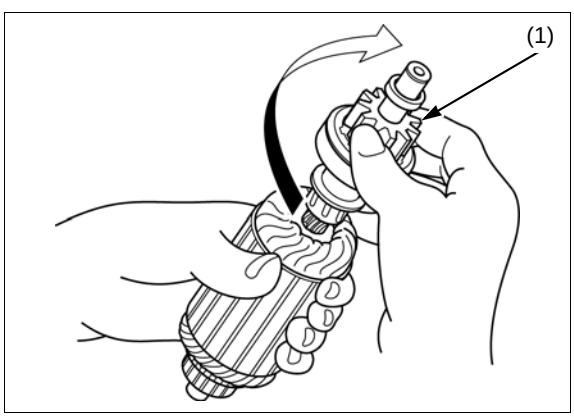
OVERRUNNING CLUTCH

Hold the pinion gear (1) as shown and check that the gear turns clockwise and slides smoothly.

If necessary, apply oil or replace the overrunning clutch.

Check the pinion gear for wear or damage, and replace the overrunning clutch if necessary.

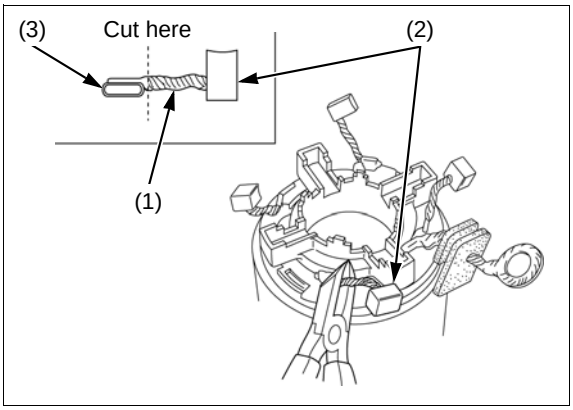
If the pinion gear is worn or damaged, the flywheel ring gear must be inspected.



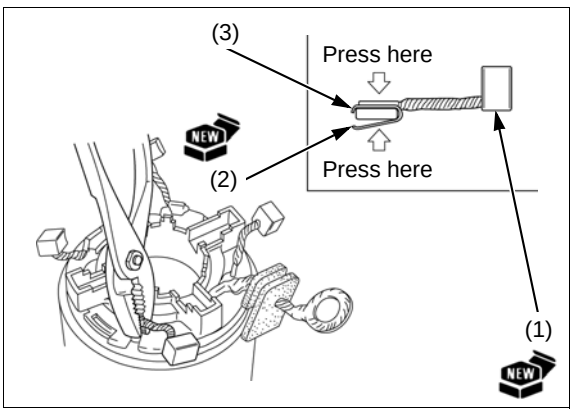
BRUSH REPLACEMENT

Cut off the brush lead (1) at the point shown and remove the brush (2).

Remove the remaining brush lead and deposited solder from the terminal (3).

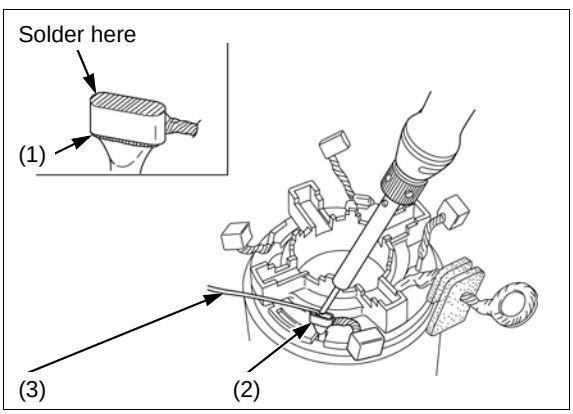


Hold a new brush (1) in the same direction of the removed brush and put a new plate (2) over the new brush and terminal (3), and press it using a pair of pliers as shown.



Solder the plate (1) on the terminal (2).

- Before soldering, heat the pressed part of the plate enough to make sure solder (3) reaches the end of the pressed part.
- Prevent solder from flowing down the brush lead.
- Do not allow solder to run down onto the field winding of the yoke.
- File the brush so that the brush and commutator can fit using emery paper #500 or #600.

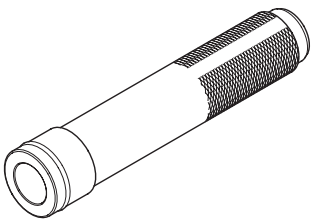
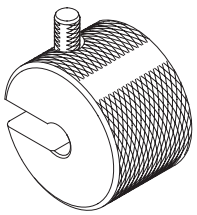
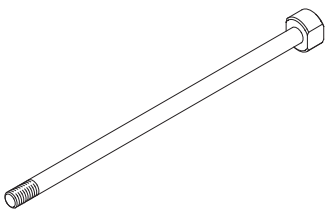
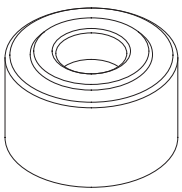


MEMO

10. GENERATOR

TOOLS

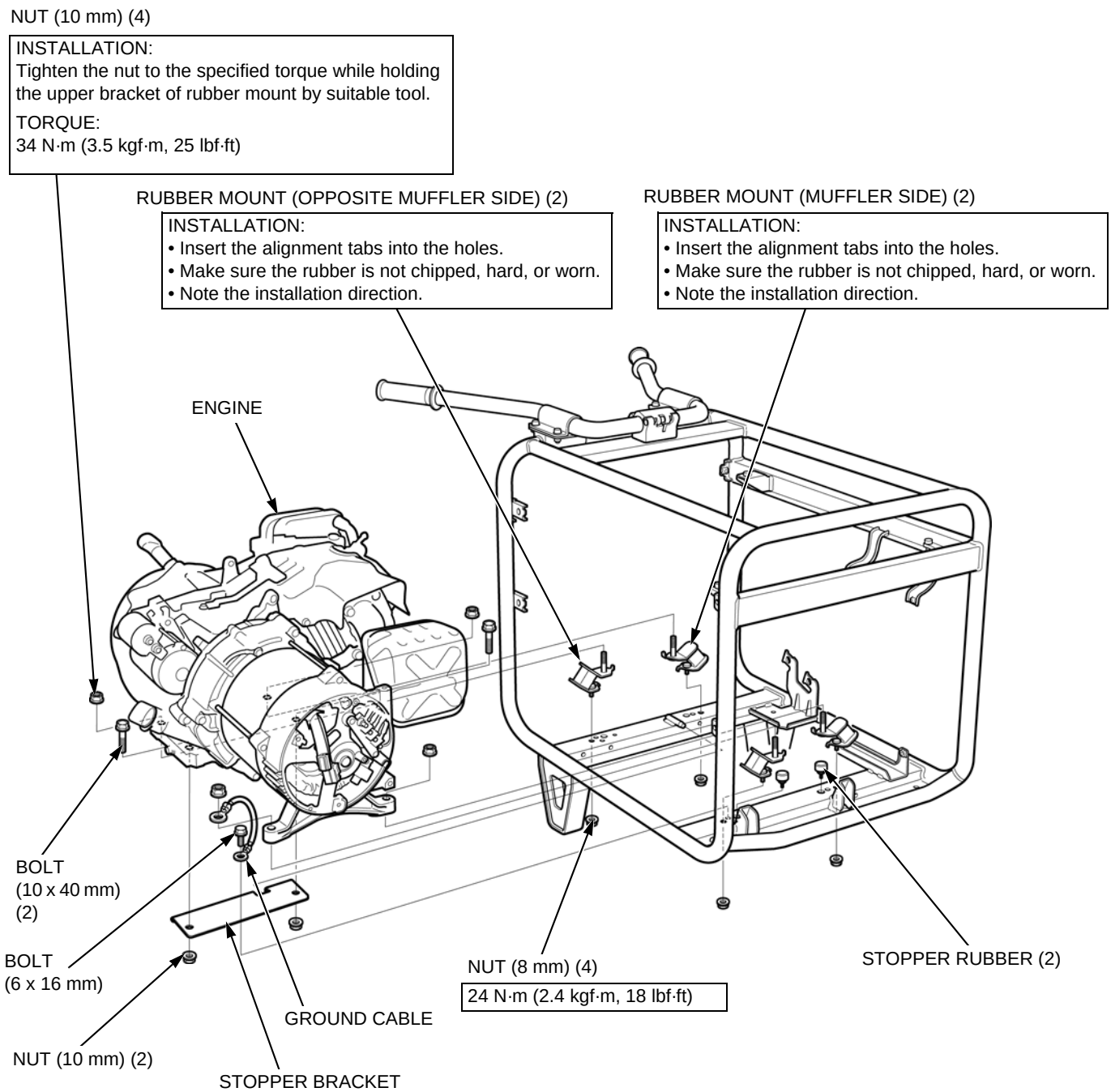
Special tools used in this manual can be ordered using normal American Honda parts ordering procedures.

Driver, 22 mm I.D. 07746-0020100	Remover weight 07936-371020A	Sliding shaft 07736-0010101	Attachment, 20 mm I.D. 07746-0020400
			

ENGINE REMOVAL & INSTALLATION

Remove the following:

- Fuel tank (page 6-2)
- Control panel (page 7-2)
- Muffler protector (page 4-2)

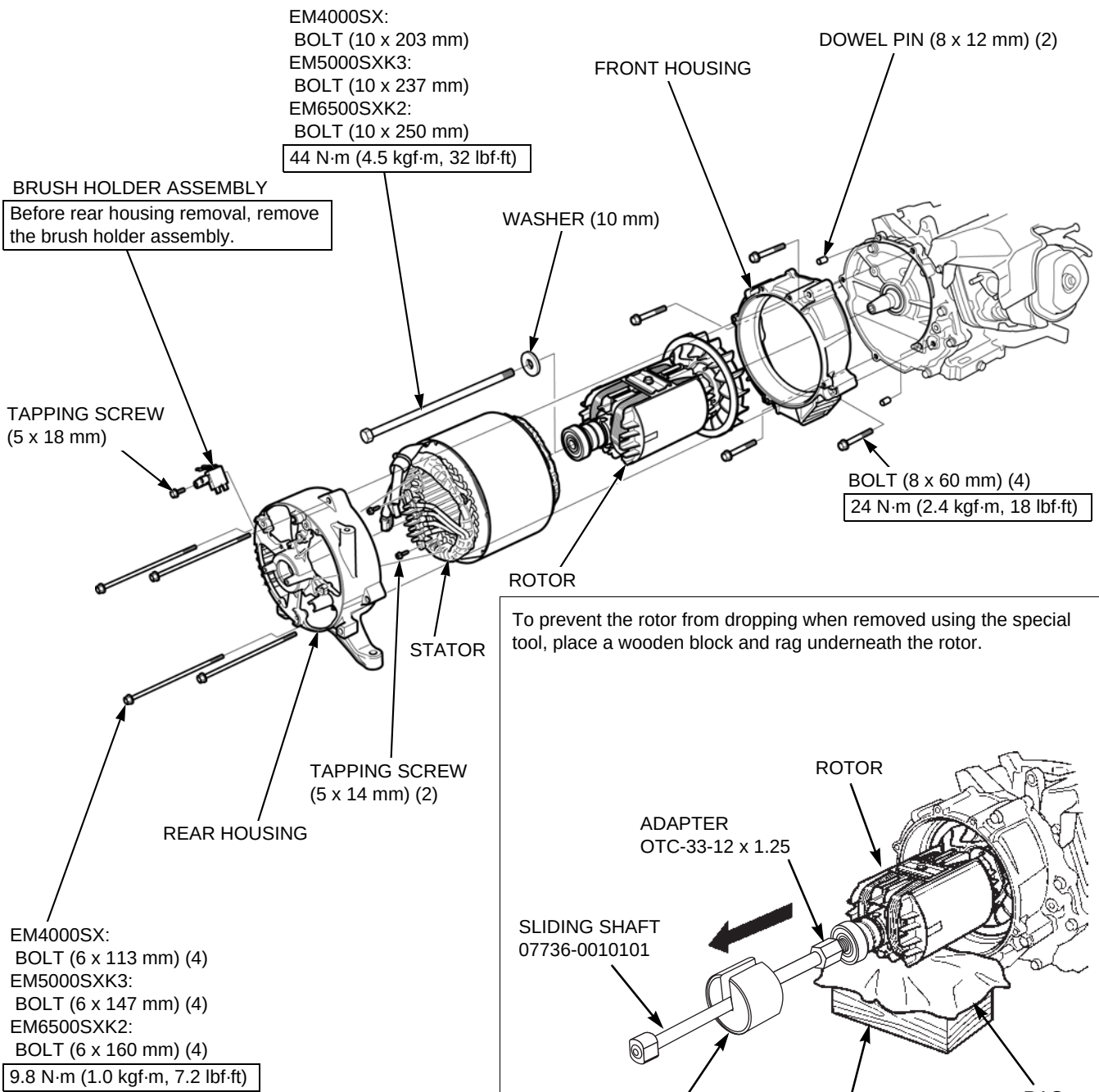


GENERATOR REMOVAL

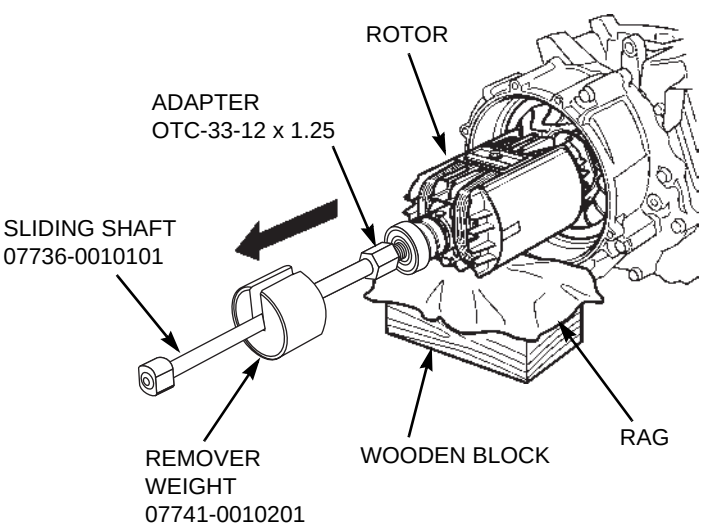
NOTICE

- *Take care not to damage the stator coil and rotor coil when removing & installing them.*
- *Do not strike any part of the rotor when removing it. The rotor may be damaged.*
- *Place the stator core side down. Do not set the stator on the coil end. The coils may be damaged.*
- *If for some reason it is necessary to place the stator with the coil side down, be sure to lay it gently on top of cloth or other similar padding.*

Remove the engine (page 10-3).



To prevent the rotor from dropping when removed using the special tool, place a wooden block and rag underneath the rotor.



GENERATOR INSTALLATION

Rotate the crankshaft and align the ▽ mark (1) on the starter pulley with the screw boss (2) of recoil starter case.
Make sure the piston is at top dead center on the compression stroke.

Install two dowel pins (3) and front housing (4).
Install and tighten four bolts (5).

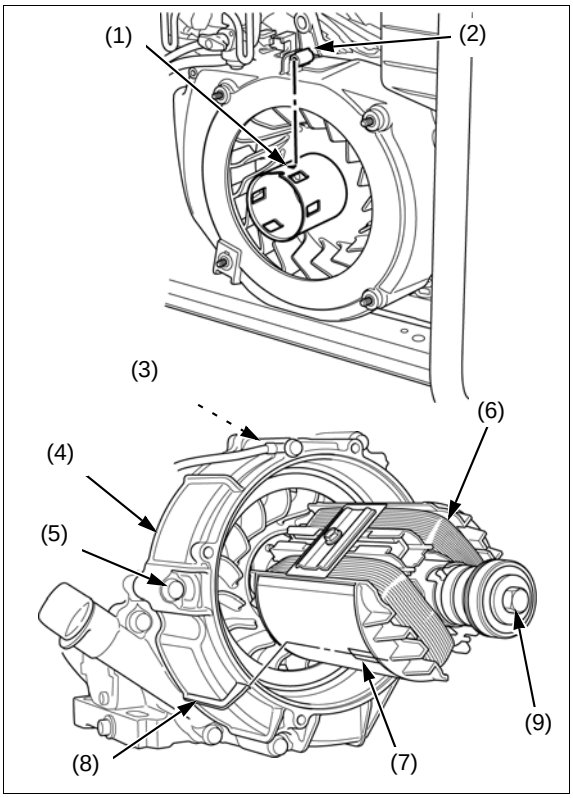
TORQUE: 24 N·m (2.4 kgf·m, 18 lbf·ft)

Degrease the tapered surface of the rotor and crankshaft.

Install the rotor (6) to crankshaft by aligning magnet (7) of rotor and rib (8) of front housing.

Install and tighten bolt (9) to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 32 lbf·ft)



Install the stator to the engine by aligning the ribs (1) and ▽ marks (2) of the front housing.

Install the rear housing (3).
Install and tighten the four bolts (4) to the specified torque in a crisscross pattern.

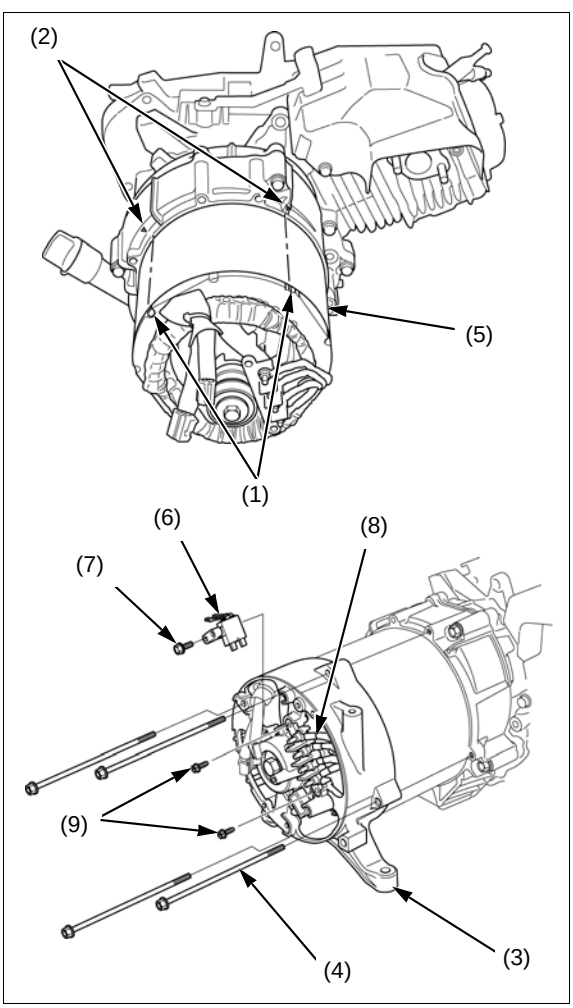
TORQUE: 9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)

After rear housing installation, check the following:

- There is no clearance between the front housing and stator cover (5).
- Rotor turns smoothly by pulling the recoil rope.

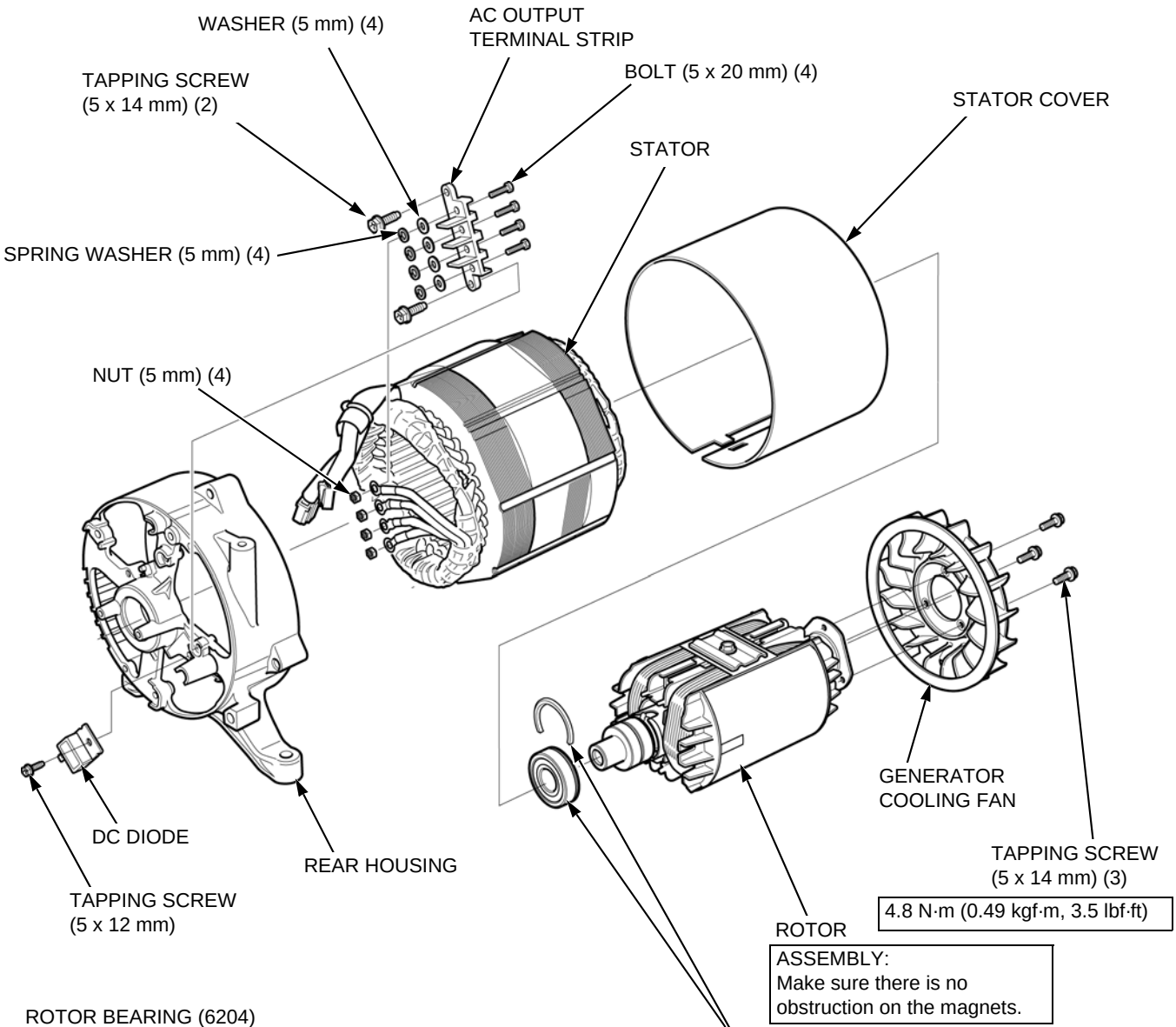
Install the brush holder assembly (6) and tighten the screw (7).

Install the AC output terminal strip (8) and tighten the two screws (9).



GENERATOR DISASSEMBLY / ASSEMBLY

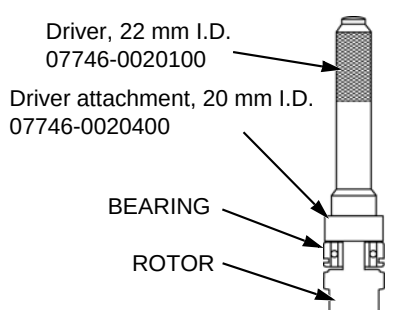
Remove the generator (page 10-4).



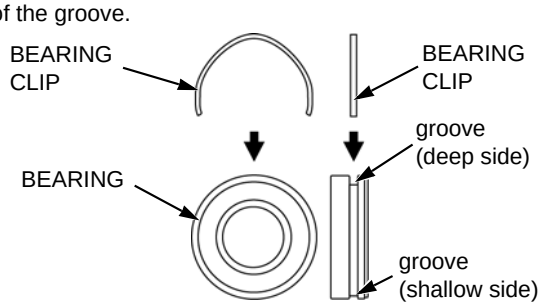
ROTOR BEARING (6204)

REMOVAL:
Be careful not to damage the slip rings. Avoid contact with the slip ring area during bearing removal and installation.
When replacing the bearing, always use a new bearing with clip.

INSTALLATION:
Install the bearing with the grooved end towards the rotor, using the special tools.



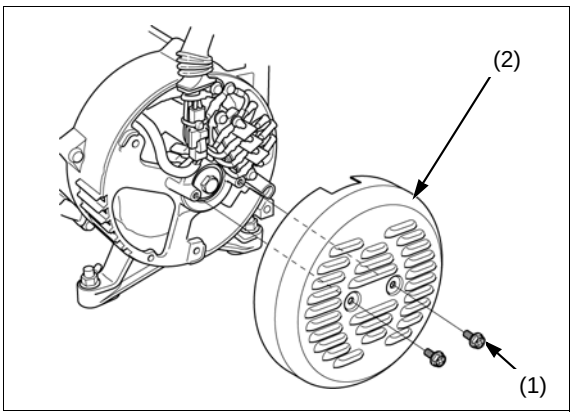
Install the bearing clip in the bearing groove so the gap is at the shallow part of the groove, and the raised area of the clip is centered in the deepest part of the groove.



GENERATOR END COVER REMOVAL & INSTALLATION

Remove the two screws (1) and generator end cover (2).

Installation is in the reverse order of removal.



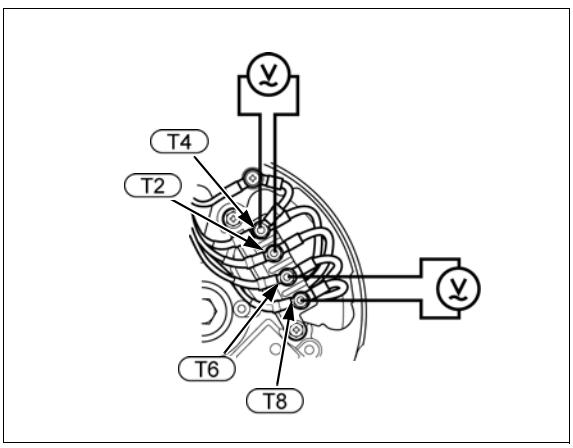
MAIN WINDING INSPECTION

VOLTAGE INSPECTION

Remove the generator end cover (page 10-7).

Start the engine and measure the AC voltage between the terminals according to the table below.

Main winding terminal	Voltage (VAC)
T2 (Red) and T4 (White)	110 - 130
T6 (Gray) and T8 (Blue)	110 - 130

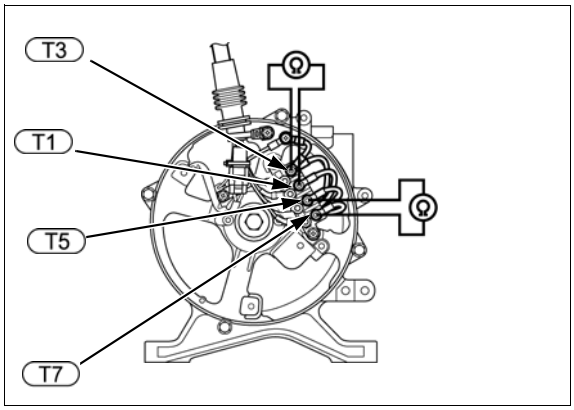


CONTINUITY INSPECTION

Remove the generator end cover (page 10-7).

Remove the nuts and disconnect the main winding terminal (T2), main winding terminal (T4), main winding terminal (T6), and main winding terminal (T8).

Measure the resistance between the stator side terminals according to the table below.



	Main Winding terminal	Resistance (Ω) (at 20 °C / 68 °F)
EM4000SX	**(T1) (Red) and (T3) (White)**	**0.5**
	(T5) (Gray) and (T7) (Blue)	**0.5**

	Main Winding terminal	Resistance (Ω) (at 20 °C / 68 °F)
EM5000SXK3	**(T1) (Red) and (T3) (White)**	**0.4**
	(T5) (Gray) and (T7) (Blue)	**0.4**

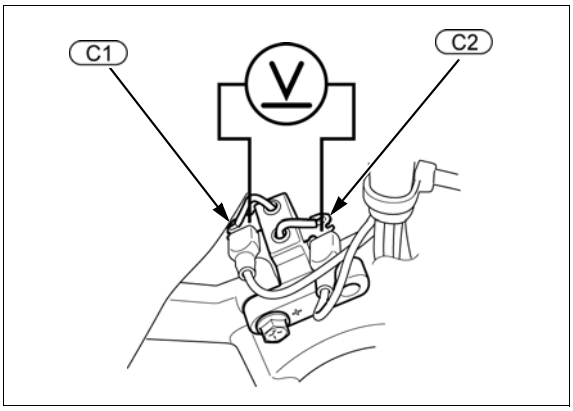
	Main Winding terminal	Resistance (Ω) (at 20 °C / 68 °F)
EM6500SXK2	**(T1) (Red) and (T3) (White)**	**0.3**
	(T5) (Gray) and (T7) (Blue)	**0.3**

If the specified resistance is zero or infinity, replace the stator.

FIELD WINDING INSPECTION

Remove the generator end cover (page 10-7).

Start the engine and measure the DC voltage at the brush terminals.



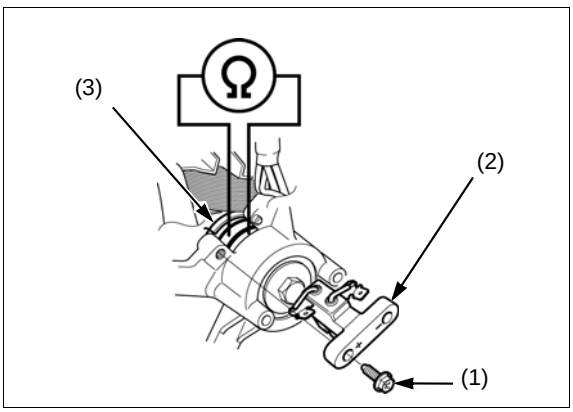
EM4000SX:

Field winding terminal	Voltage (VDC)
C1 (Red) and C2 (White)	About 25

EM5000SXK3 / EM6500SXK2:

Field winding terminal	Voltage (VDC)
C1 (Red) and C2 (White)	About 30

If the specified voltage is not obtained, stop the engine and remove the screw (1) and brush holder assembly (2).



Measure the resistance between the slip rings (3).

Type	Resistance (Ω) (at 20 °C / 68 °F)
EM4000SX	47
EM5000SXK3	60
EM6500SXK2	62

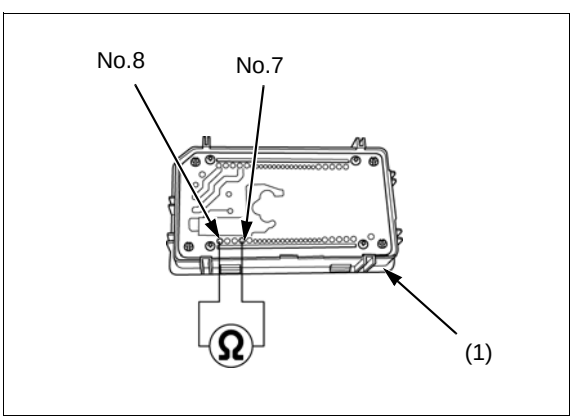
If the specified resistance is zero or infinity, clean the slip rings or replace the rotor.

D-AVR UNIT INSPECTION

Remove the D-AVR cover / D-AVR unit (page 7-5).

Measure the resistance between the D-AVR unit (1) No.7 terminal and No.8 terminal.

- In testing at the D-AVR unit terminal, always use the test probe. Insert the test probe into the terminal, and then attach the digital multimeter probe to the test probe.
- Do not connect the probes to the soldered part.



TOOLS:
Test probe **07ZAJ-RDJA110**

Resistance: **1.0 kΩ maximum**

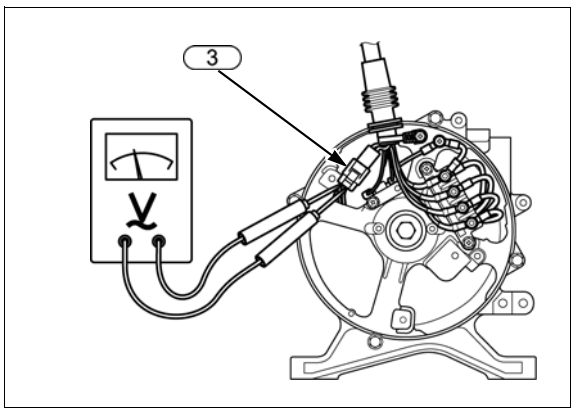
If the specified resistance is zero or infinity, replace the D-AVR cover / D-AVR unit.

EXCITER WINDING INSPECTION

Remove the generator end cover (page 10-7).

Start the engine and measure the AC voltage between the exciter winding 3P connector (3) No.1 (Blue) terminal and No.3 (Blue) terminal with connector connected.

STANDARD VOLTAGE: About 90 VAC

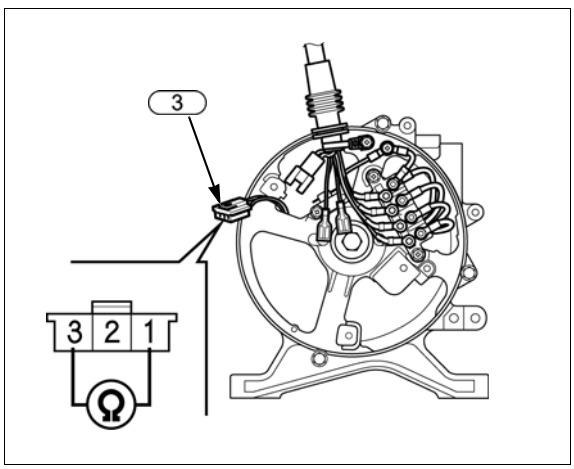


If the specified voltage is not obtained, stop the engine and disconnect the exciter winding 3P connector (3).

Measure the resistance between the exciter winding 3P connector stator side No.1 (Blue) terminal and No.3 (Blue) terminal.

Type	Resistance (Ω) (at 20 °C / 68 °F)
EM4000SX	1.2
EM5000SXK3	1.0
EM6500SXK2	0.9

If the specified resistance is zero or infinity, replace the stator.



POWER COIL INSPECTION

Disconnect the power coil 2P connector from the ECM (1).

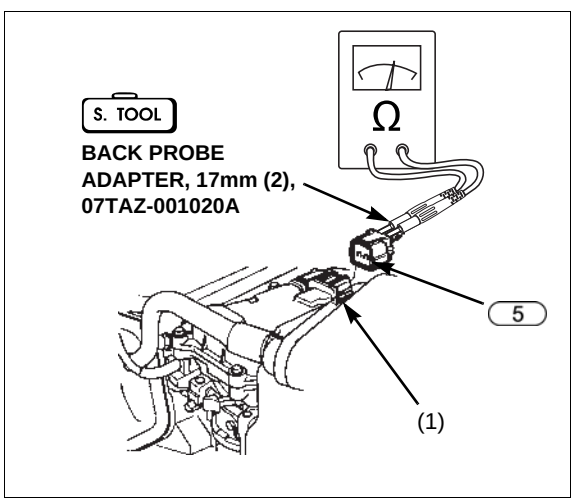
Measure the resistance between the power coil 2P connector (5) terminals of the power coil side.

Resistance: 2.9 – 4.5 Ω

Use the test probes shown to probe the back (wire side) of the connector terminals, or you can use special tool 07ZAJ-RDJA110 to probe the front connector terminals. Be careful not to bend the terminals.

TOOLS:

Back probe adapter, 17 mm	**07TAZ-001020A**
	or
Test probe	**07ZAJ-RDJA110**



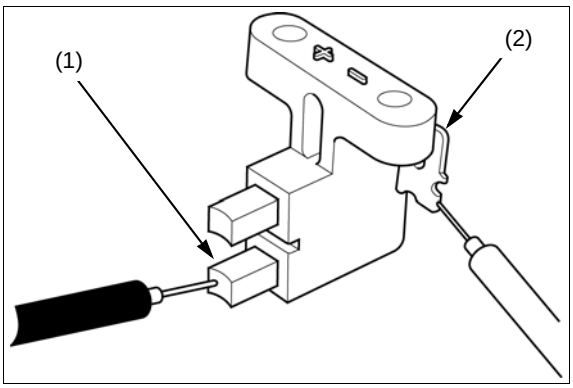
BRUSH HOLDER ASSEMBLY INSPECTION

CONTINUITY INSPECTION

Remove the brush holder assembly (page 10-4).

Check for continuity between the each brush tip (1) and wire terminal (2).

There should be no continuity.



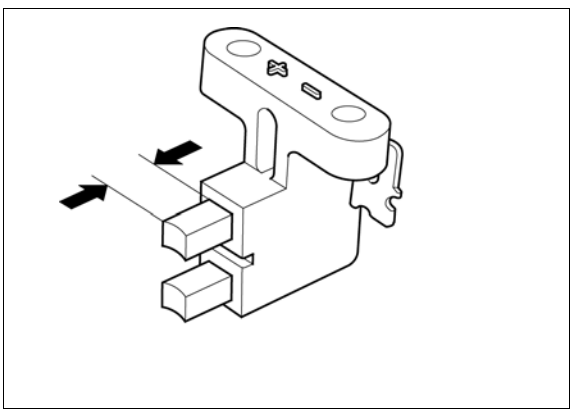
BRUSH LENGTH MEASUREMENT

Remove the brush holder assembly (page 10-4).

Measure the brush length.

If the brush length is less than the service limit, replace the brush holder assembly.

STANDARD: 9.0 mm (0.35 in)
SERVICE LIMIT: 5.0 mm (0.20 in)



DC DIODE INSPECTION

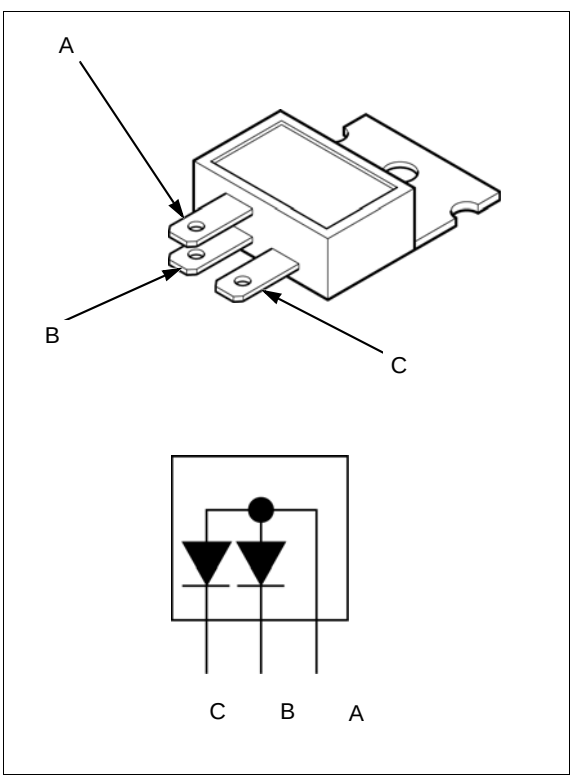
Remove the DC diode (page 10-6).

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

CONTINUITY:

		(+) probe		
		A	**B**	**C**
(–) probe	**A**	**–**	**NO**	**NO**
	B	**YES**	**–**	**NO**
	C	**YES**	**NO**	**–**

- Some meters show current flow from negative (–) to positive (+), others show flow from positive (+) to negative (–). The polarity of the meter does not matter when testing diodes. As long as the meter shows current flowing one way and not the other the diode is good.



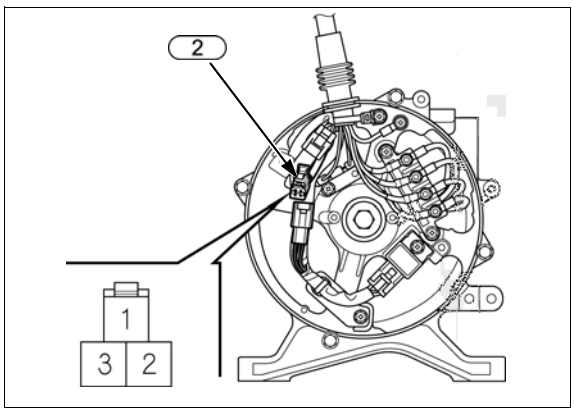
DC WINDING INSPECTION

Remove the generator end cover (page 10-7).

Disconnect the DC winding 3P connector (2).

Measure the resistance between the DC winding 3P connector stator side No.1 (White/Red) terminal and No.2 (Brown) terminal.

Type	Resistance (Ω) (at 20 °C/68 °F)
EM4000SX	0.25
EM5000SXK3	0.23
EM6500SXK2	0.21



Measure the resistance between the DC winding 3P connector (2) stator side No.1 (White/Red) terminal and No.3 (Brown) terminal.

Type	Resistance (Ω) (at 20 °C/68 °F)
EM4000SX	0.25
EM5000SXK3	0.23
EM6500SXK2	0.21

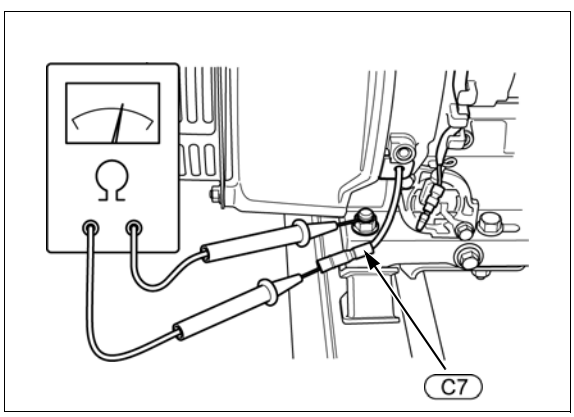
if the specified resistance is zero or infinity, replace the stator.

CHARGE COIL INSPECTION

With the engine stopped, disconnect the charge coil wire connector (C7).

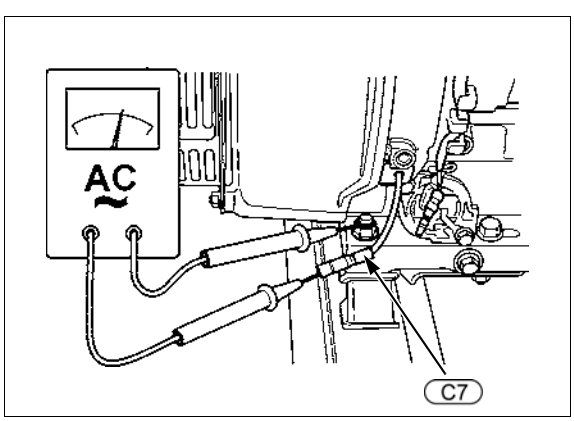
Measure the resistance between the charge coil wire connector (C7) charge coil side (White) terminal and engine ground.

Resistance: **2.8 ~ 4.5 Ω**



Start the engine and run at 3,600 rpm with Auto Throttle off. Measure the AC voltage between the charge coil wire connector (C7) charge coil side (White) terminal and engine ground.

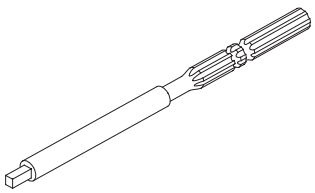
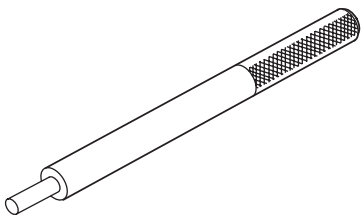
AC Output: **46 ~50 VAC at 3,600 rpm**



11. CYLINDER HEAD / VALVES

TOOLS

Special tools used in this manual can be ordered using normal American Honda parts ordering procedures.

Valve guide reamer, 6.612 mm 07984-ZE20001 Valve guide reamer, 6.6 mm 07984-ZE2000D 	Valve guide driver, 6.6 mm 07942-6570100 

CYLINDER HEAD REMOVAL & INSTALLATION

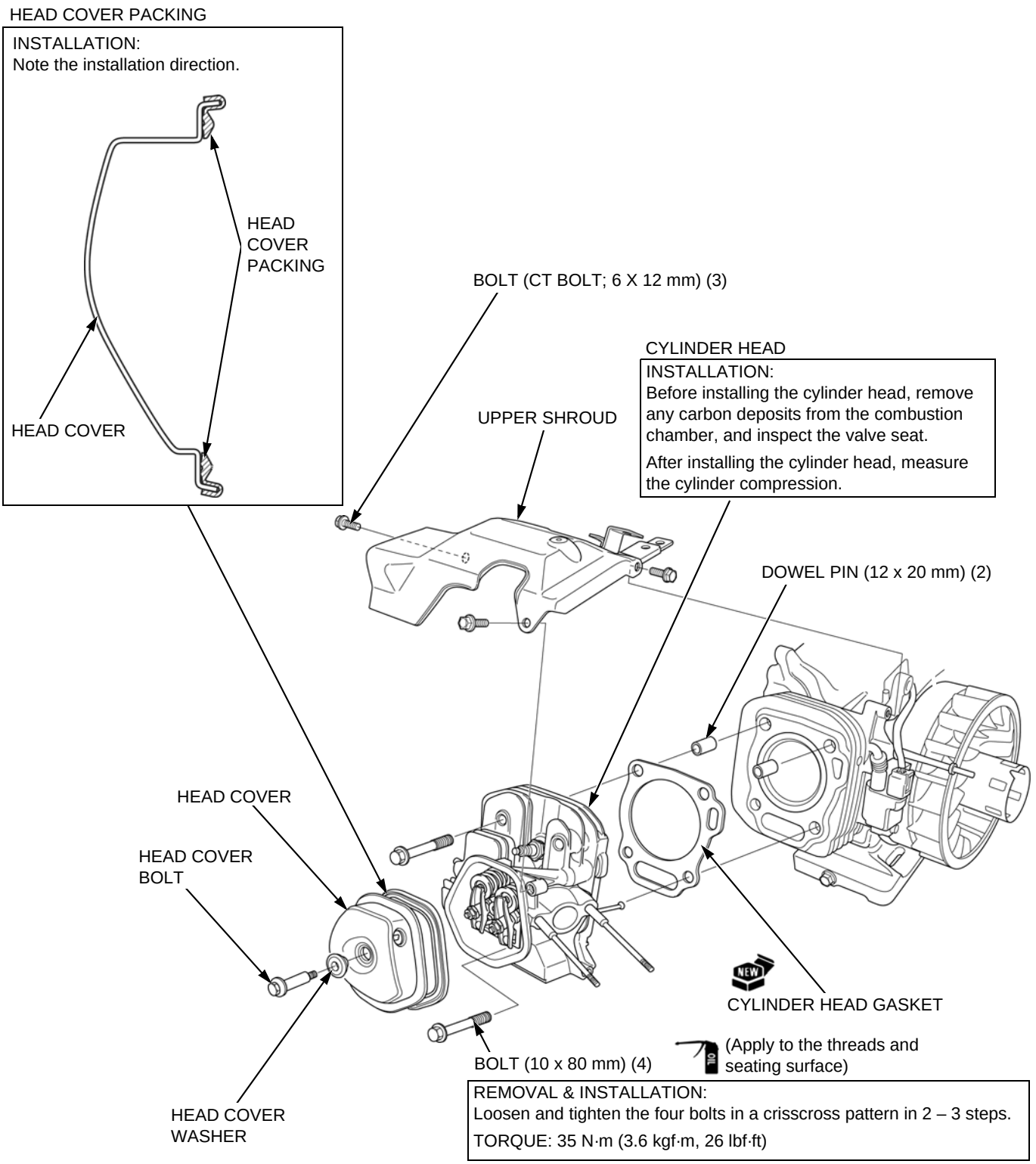
Set the piston at top dead center of the cylinder compression stroke (page 3-9).

Remove the following parts:

– Carburetor / carburetor insulator (page 5-5)
– Muffler (page 4-2)
– Engine (page 10-3)

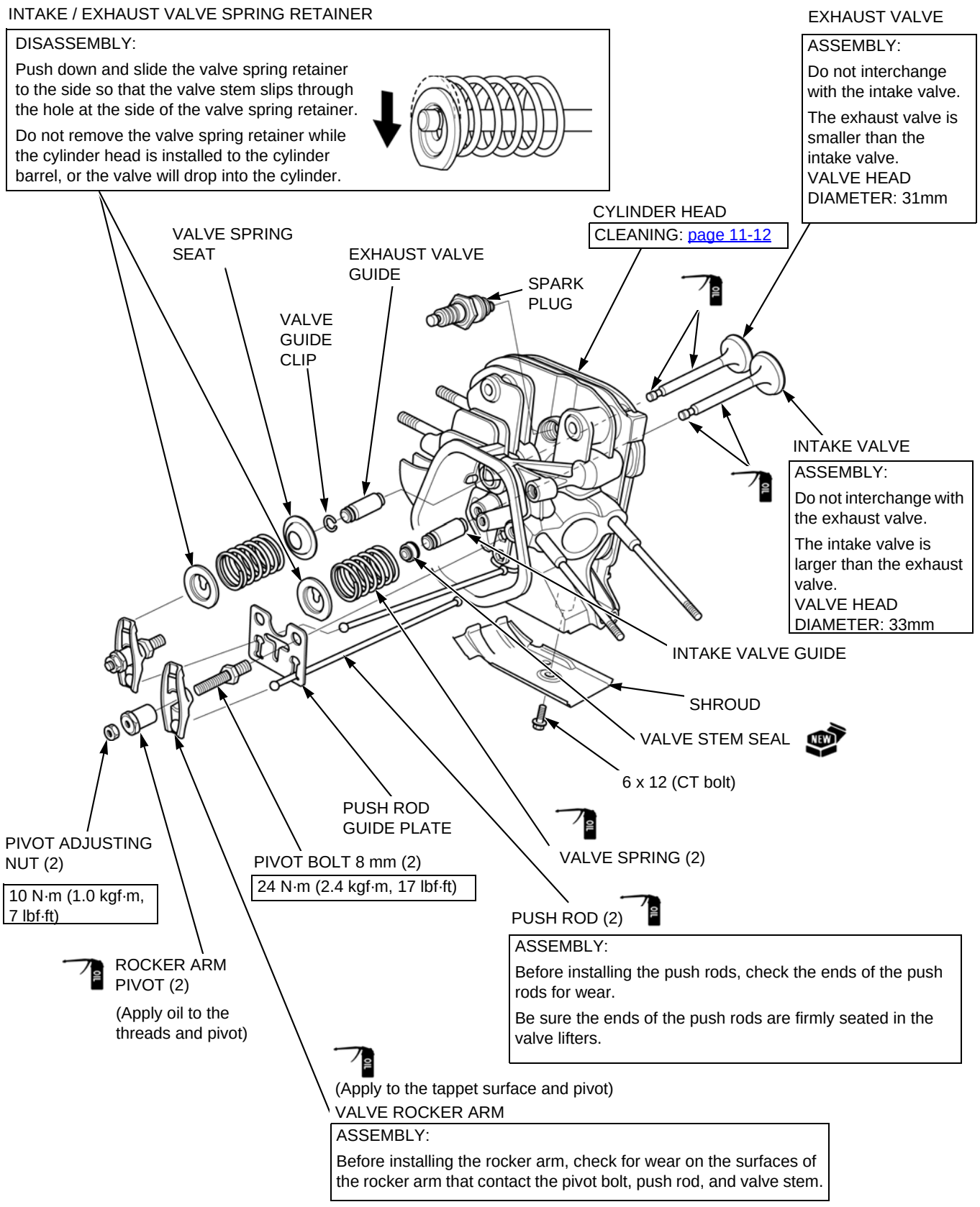
Installation is in the reverse order of removal.

Check the valve clearance, and if necessary, adjust the clearance (page 3-9).



CYLINDER HEAD DISASSEMBLY / ASSEMBLY

Remove the cylinder head (page 11-3).



CYLINDER HEAD / VALVES INSPECTION

CYLINDER COMPRESSION CHECK

Start the engine and warm up to normal operating temperature.

Stop the engine.

Turn the fuel valve lever to the OFF position, and then remove the drain screw to drain the carburetor.

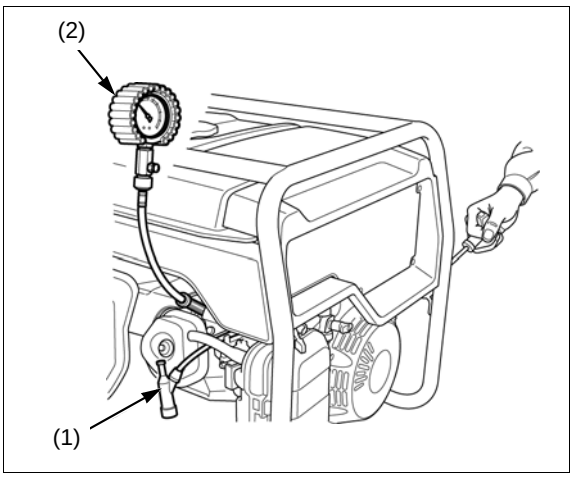
Remove the spark plug cap (1) from the spark plug.

Remove the spark plug using a spark plug wrench.

Pull the recoil starter several times to expel unburned gas.

Attach a commercially available compression gauge (2) to the spark plug hole.

Pull the recoil starter forcefully to measure stable cylinder compression.



CYLINDER COMPRESSION:
EM4000SX:
1.31 MPa (13.3 kgf/cm^2, 189 psi) / 1,400 min^{-1} (rpm)
EM5000SXK3 / EM6500SXK2:
1.29 MPa (13.1 kgf/cm^2, 186 psi) / 1,400 min^{-1} (rpm)

CYLINDER HEAD WARPAGE

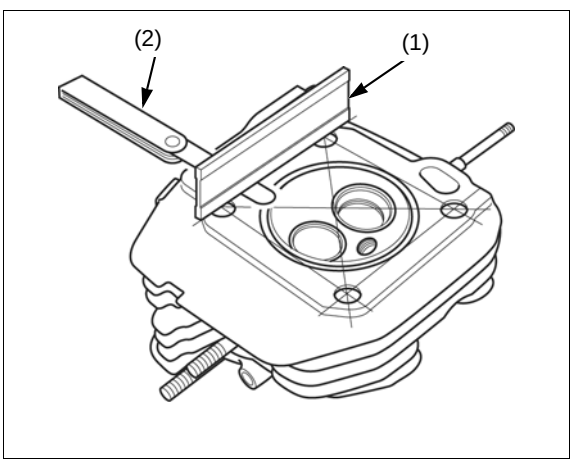
Remove the carbon deposits from the combustion chamber (page 3-10).

Check the spark plug hole and valve areas for cracks.

Check the cylinder head warpage using a straightedge (1) and thickness gauge (2).

SERVICE LIMIT: 0.10 mm (0.004 in)

If the measurement is more than the service limit, replace the cylinder head (page 11-3).



VALVE SEAT WIDTH

Remove the carbon deposits from the combustion chamber (page 3-10).

Inspect each valve for face irregularities.

If necessary, replace the valve (page 11-4).

Apply a light coat of Prussian Blue or erasable felt-tipped marker ink to each valve seat.

Insert the valve, and snap it closed against its seat several times. Be sure the valve does not rotate on the seat.

The transferred marking compound will show any area of the valve face that is not concentric.

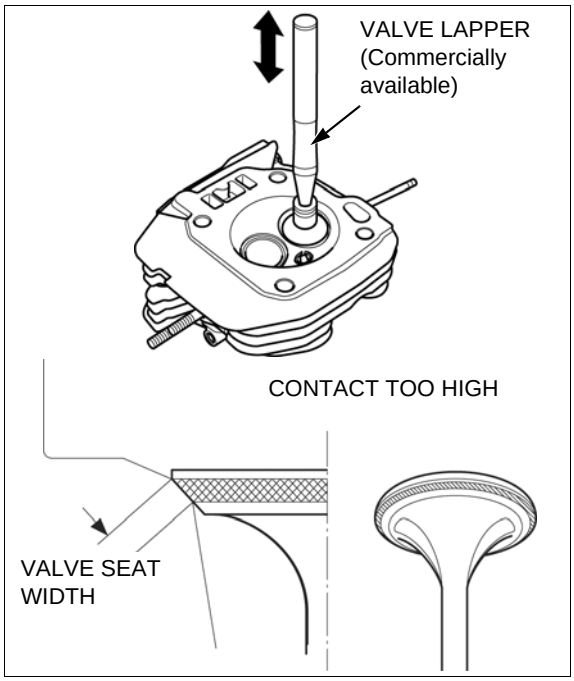
Measure the valve seat width of the cylinder head.

STANDARD: 1.0 – 1.2 mm (0.04 – 0.05 in)
SERVICE LIMIT: 2.1 mm (0.08 in)

If the measurement is more than the service limit, recondition the valve seat (page 11-10).

Check whether the valve seat contact area of the valve is too high.

If the valve seat is too high or too low, recondition the valve seat (page 11-10).



VALVE GUIDE I.D.

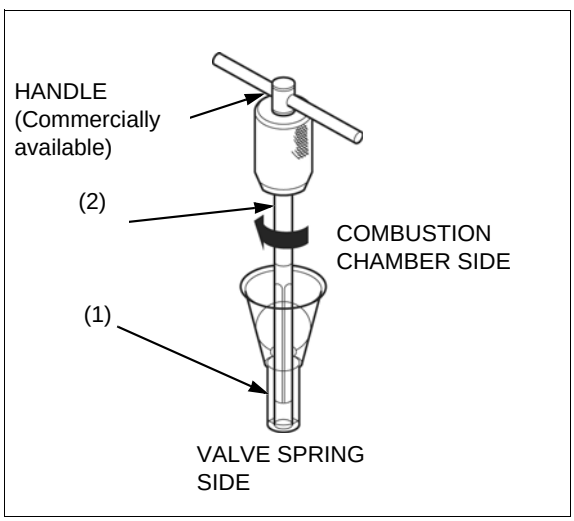
Ream the valve guide (1) to remove any carbon deposits before measuring.

TOOL:
Valve guide reamer 6.612 mm (2) 07984-ZE20001

NOTICE

Turn the special tool (valve guide reamer) clockwise, never counterclockwise.

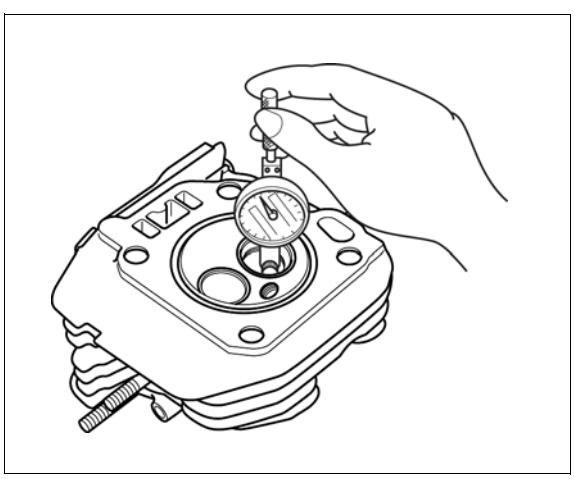
Continue to rotate the special tool while removing it from the valve guide.



Measure and record each valve guide I.D.

STANDARD: 6.600 – 6.615 mm (0.2598 – 0.2604 in)
SERVICE LIMIT: 6.66 mm (0.262 in)

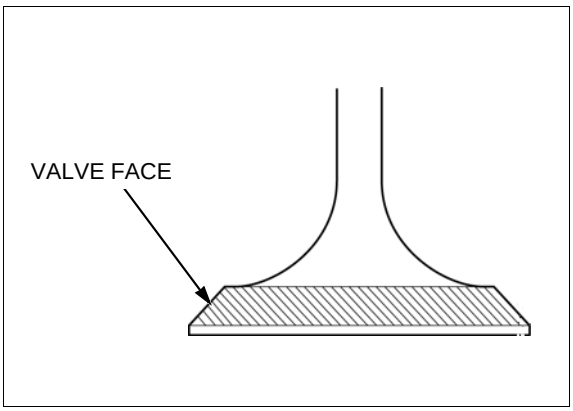
If the measured valve guide I.D. is more than the service limit, replace the valve guide (page 11-9).



VALVE FACE

Inspect each valve for face irregularities.

If necessary, replace the valve (page 11-4).



VALVE STEM O.D.

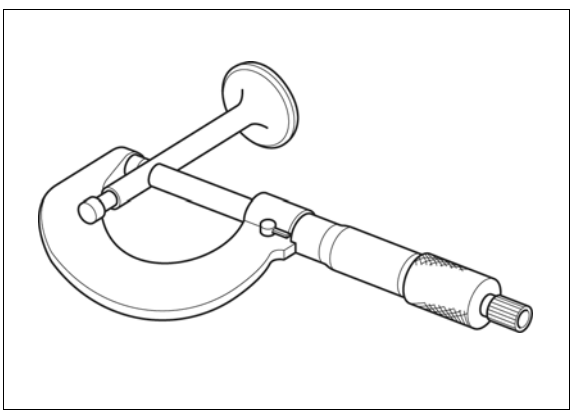
Inspect each valve for bending or abnormal stem wear.

If necessary, replace the valve (page 11-4).

Measure and record each valve stem O.D.

STANDARD:	**IN:**	**6.575 – 6.590 mm (0.2589 – 0.2594 in)**
	EX:	**6.535 – 6.550 mm (0.2573 – 0.2579 in)**
SERVICE LIMIT:	**IN:**	**6.44 mm (0.254 in)**
	EX:	**6.40 mm (0.252 in)**

If the measurement is less than the service limit, replace the valve (page 11-4).



GUIDE-TO-STEM CLEARANCE

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

STANDARD:	**IN:**	**0.010 – 0.040 mm (0.0004 – 0.0016 in)**
	EX:	**0.050 – 0.080 mm (0.0020 – 0.0031 in)**
SERVICE LIMIT:	**IN:**	**0.11 mm (0.004 in)**
	EX:	**0.13 mm (0.005 in)**

If the calculated clearance is more than the service limit, replace the following:

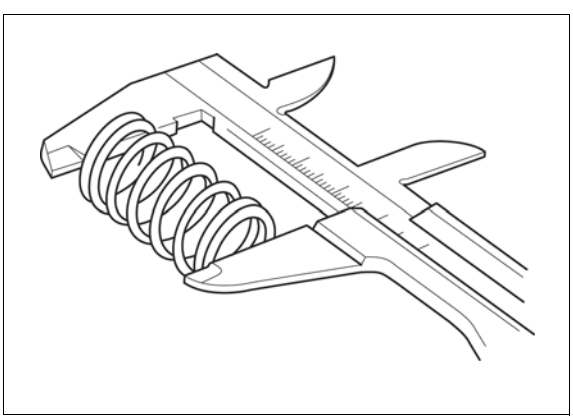
– Valves (page 11-4)
– Valve guide (page 11-9)

VALVE SPRING FREE LENGTH

Measure the valve spring free length.

STANDARD:	**39.0 mm (1.54 in)**
SERVICE LIMIT:	**37.5 mm (1.48 in)**

If the measured length is less than the service limit, replace the valve spring (page 11-4).

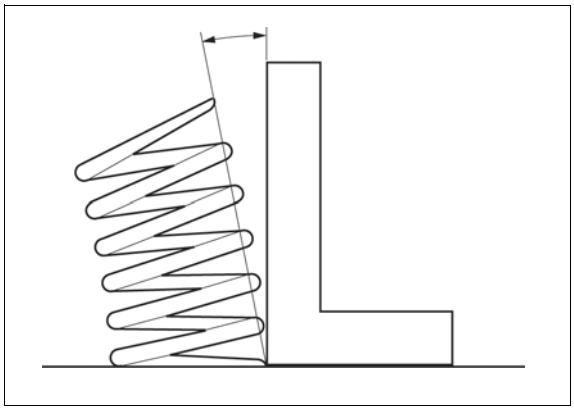


VALVE SPRING PERPENDICULARITY

Measure the valve spring perpendicularity.

SERVICE LIMIT: 1.5°

If the measured perpendicularity is more than the service limit, replace the valve spring (page 11-4).

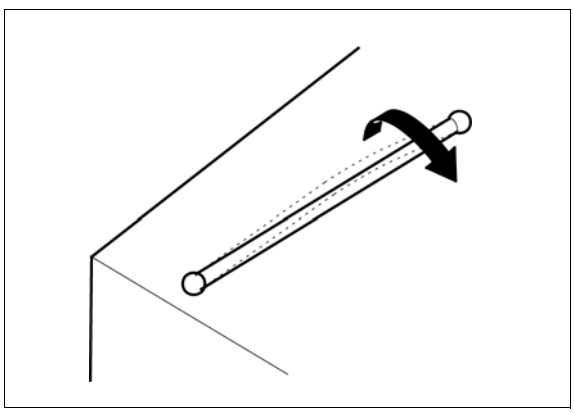


PUSH ROD RUNOUT

Check both ends of the push rod for wear.

Check the push rod for straightness.

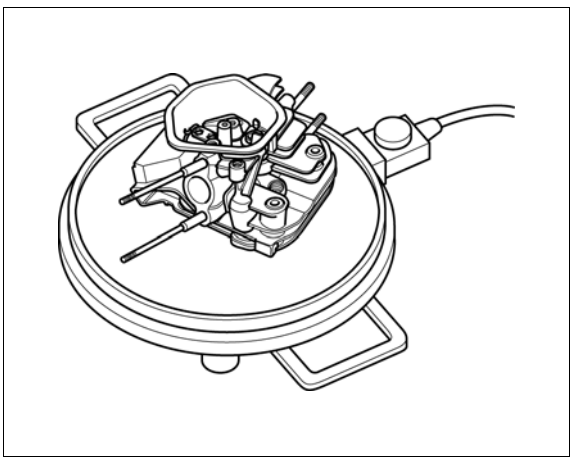
If necessary, replace the push rod (page 11-4).



VALVE GUIDE REPLACEMENT

Chill the replacement valve guides in the freezer section of a refrigerator for about an hour.

Use a hot plate or oven to heat the cylinder head evenly to 150°C (300°F).



⚠ CAUTION

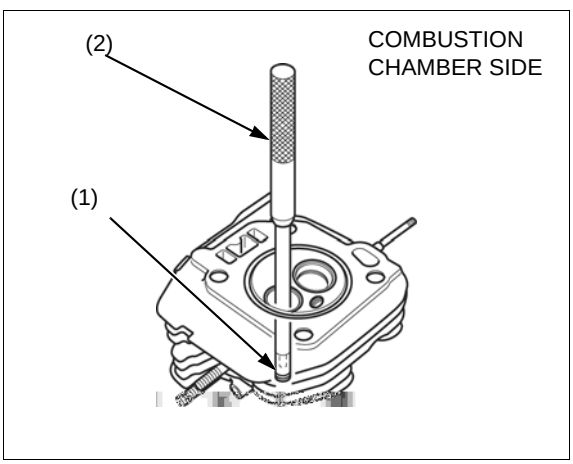
To avoid burns, use heavy gloves when handling the heated cylinder head.

NOTICE

- *Do not use a torch to heat the cylinder head; warpage of the cylinder head may result.*
- *Do not get the cylinder head hotter than 150°C (300°F); excessive heat may loosen the valve seat.*

Remove the heated cylinder head from the hot plate and support it with wooden blocks.

Drive the valve guides (1) out of the cylinder head from the combustion chamber side.



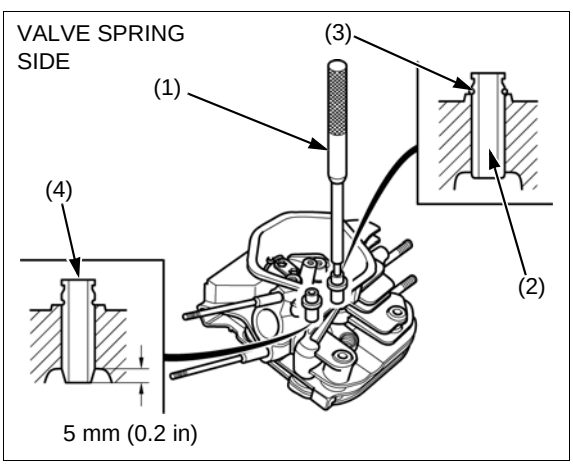
TOOL:
Valve guide driver 6.6 mm (2) 07942-6570100

NOTICE

When driving the valve guides out, be careful not to damage the cylinder head.

Remove the new valve guides from the refrigerator one at a time as needed.

Install the new valve guides from the valve spring side of the cylinder head.



TOOL:
Valve guide driver 6.6 mm (1) 07742-6570100

Exhaust valve guide (2):

Drive the exhaust valve guide until the valve guide clip (3) is fully seated as shown.

Intake valve guide (4):

Drive the intake valve guide to the specified height (measured from the end of the valve guide to the cylinder head as shown).

IN VALVE INSTALLATION HEIGHT:
5 mm (0.2 in)

After installing the valve guide, check the guide for damage.

Replace the valve guide if damaged.

Let the cylinder head cool to room temperature.

Ream the valve guide (page 11-10).

VALVE GUIDE REAMING

For best results, be sure the cylinder head is at room temperature before reaming valve guides.

Coat the reamer and valve guide with cutting oil.

TOOL:
Valve guide reamer 6.6 mm (1) 07984-ZE2000D

Rotate the reamer clockwise through the valve guide the full length of the reamer.

NOTICE

Turn the special tool (valve guide reamer) clockwise, never counterclockwise.

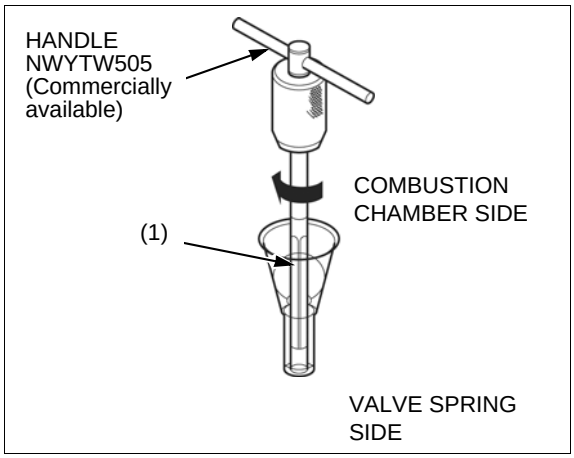
Continue to rotate the special tool while removing it from the valve guide.

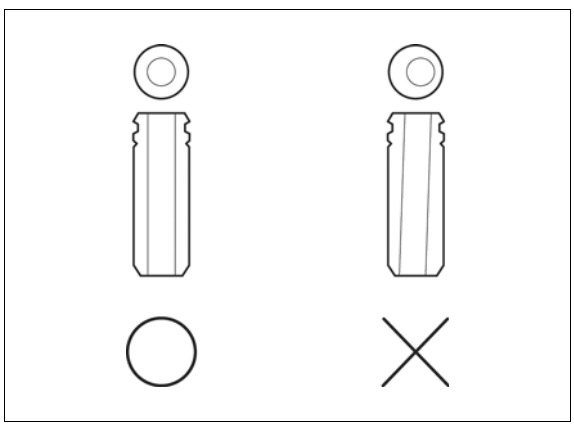
Thoroughly clean the cylinder head to remove any cutting residue.

Check the valve guide bore; it should be straight, round, and centered in the valve guide. Insert the valve and check operation. If the valve does not operate smoothly, the guide may have been bent during installation.

Replace the valve guide if it is bent or damaged.

Check the valve guide-to-stem clearance.





VALVE SEAT RECONDITIONING

Thoroughly clean the combustion chamber and valve seats to remove carbon deposits (page 3-10).

Apply a light coat of Prussian Blue or erasable felt-tipped marker ink to the valve seat.

Insert the valve, and snap it closed against its seat several times. Be sure the valve does not rotate on the seat. The transferred marking compound will show any area of the seat that is not concentric.

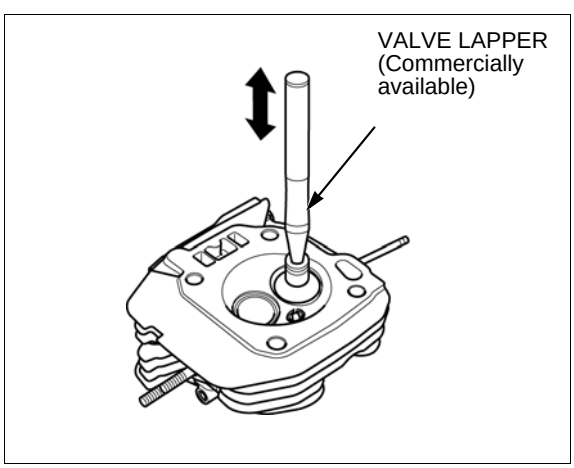
Measure the valve seat width of the cylinder head.

STANDARD: 1.0 – 1.2 mm (0.04 – 0.05 in)
SERVICE LIMIT: 2.0 mm (0.08 in)

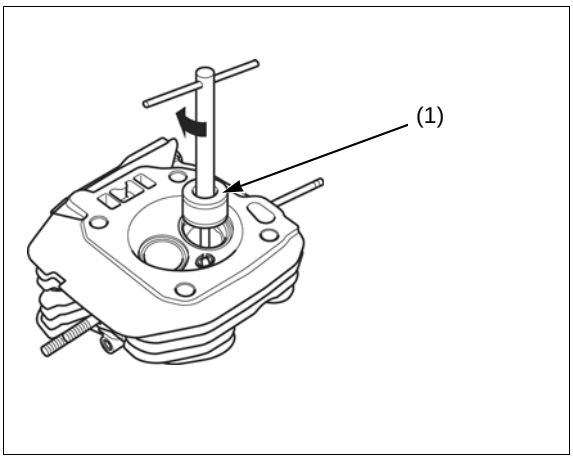
If the measurement is more than the service limit, recondition the valve seat.

Check whether the valve seat contact area of the valve is too high or too low.

If the valve seat is too high or too low, recondition the valve seat.



Valve seat cutters (1) / grinder or equivalent valve seat refacing equipment is recommended to correct a worn valve seat.



NOTICE

Turn the cutter clockwise, never counterclockwise. Continue to turn the cutter as you lift it from the valve seat.

The 30° cutter removes material from the top edge (contact too high).

TOOLS:

Solid pilot bar, 6.6 mm	**NWY100-6.60**
Cutter, 30 x 45 degrees	**NWYCU128**

The 60° cutter removes material from the bottom edge (contact too low).

TOOLS:

Solid pilot bar, 6.6 mm	**NWY100-6.60**
Cutter, 60 degree	**NWYCU114**

Be sure that the width of the finished valve seat is within specification.

STANDARD: **1.0 – 1.2 mm (0.04 – 0.05 in)**
SERVICE LIMIT: **2.0 mm (0.08 in)**

Make a light pass with the 45° cutter to remove any possible burrs at the edge of the seat.

TOOLS:

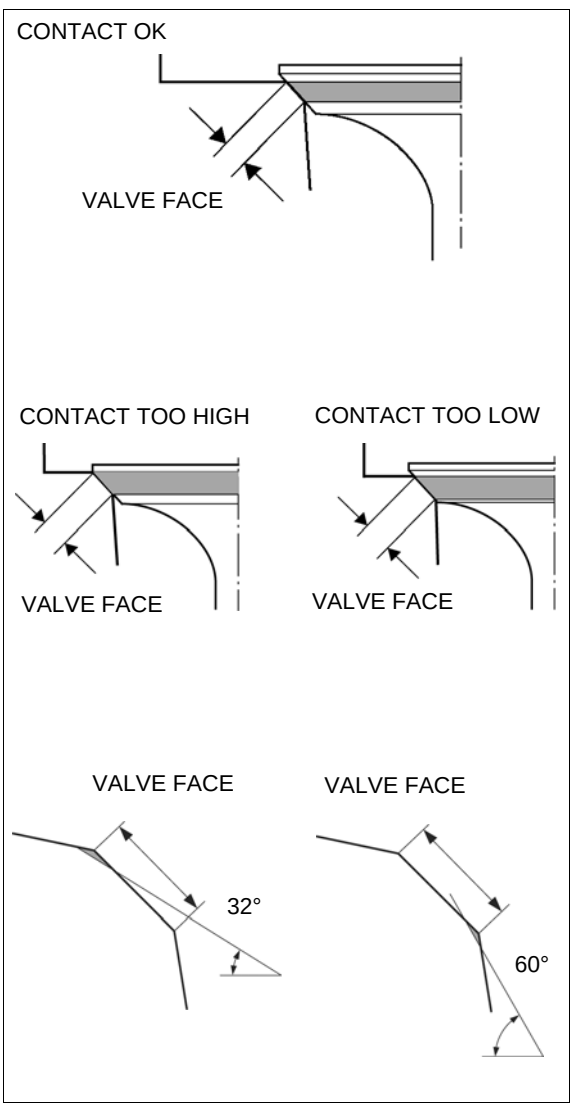
Solid pilot bar, 6.6 mm	**NWY100-6.60**
Cutter, 30 x 45 degrees	**NWYCU128**

After resurfacing the seats, inspect for even valve seating.

Apply Prussian Blue compound or erasable felt-tipped marker ink to the valve seat. Insert the valve, and snap it closed against its seat several times. Be sure the valve does not rotate on the seat.

The seating surface, as shown by the transferred marking compound, should have good contact all the way around.

Thoroughly clean the cylinder head to remove all cutting residue.



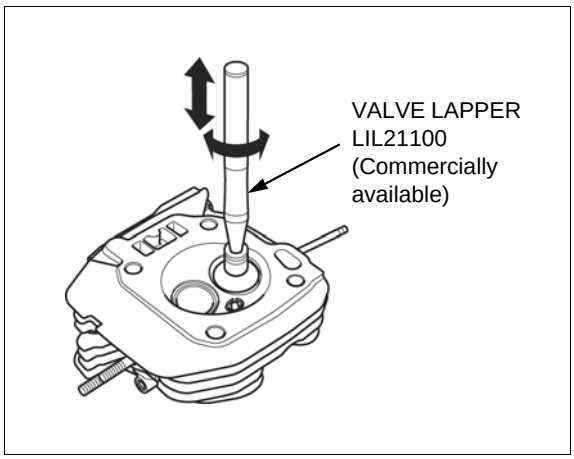
Lap the valves into their seats, using a commercially available valve lapper and lapping compound.

After lapping, wash all residual compound off the cylinder head and valve.

NOTICE

- *Do not push the valve against the seat with force during lapping. Apply a light pass with the valve lapper.*
- *Avoid lapping the valve in the same position as it causes uneven wear. Lap the valve by turning the lapper slowly.*
- *Take care not to allow the lapping compound to enter the gap between the stem and guide.*

Adjust the valve clearance after assembly (page 3-9).



COMBUSTION CHAMBER CLEANING

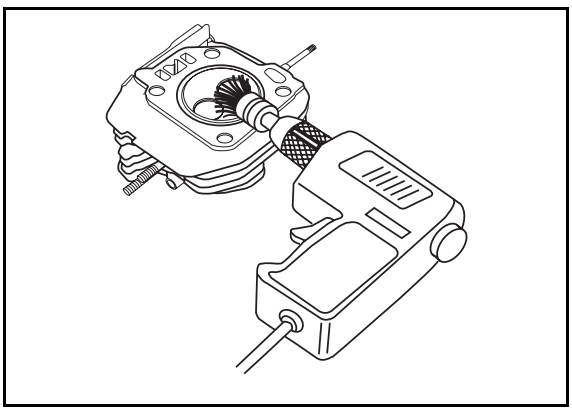
Remove the cylinder head (page 11-3).

Attach a soft wire brush to an electric drill and clean any carbon deposits from the combustion chamber.

NOTICE

Do not remove the valves from the cylinder head when cleaning the combustion chamber; this could damage the valve seats.

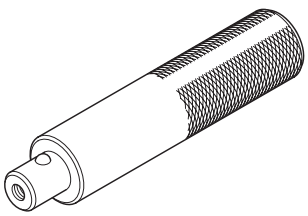
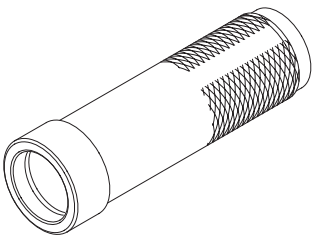
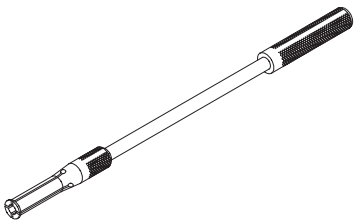
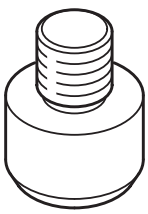
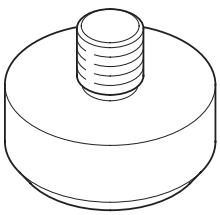
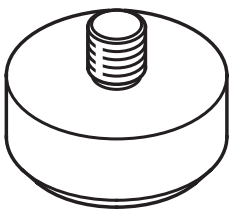
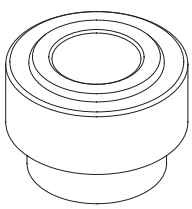
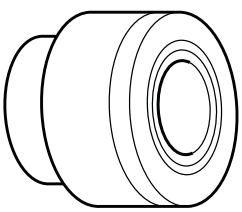
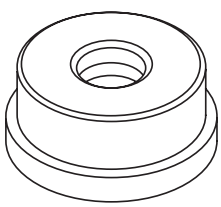
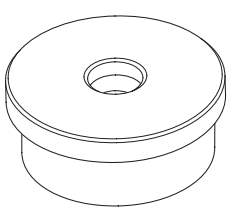
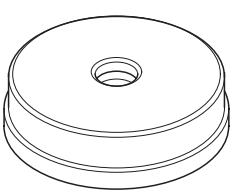
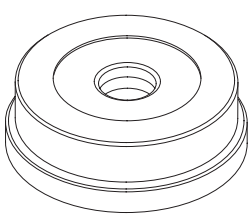
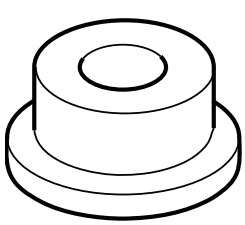
Do not press the wire brush with force against the combustion chamber; this could damage the cylinder head.



12. CRANKCASE COVER

TOOLS

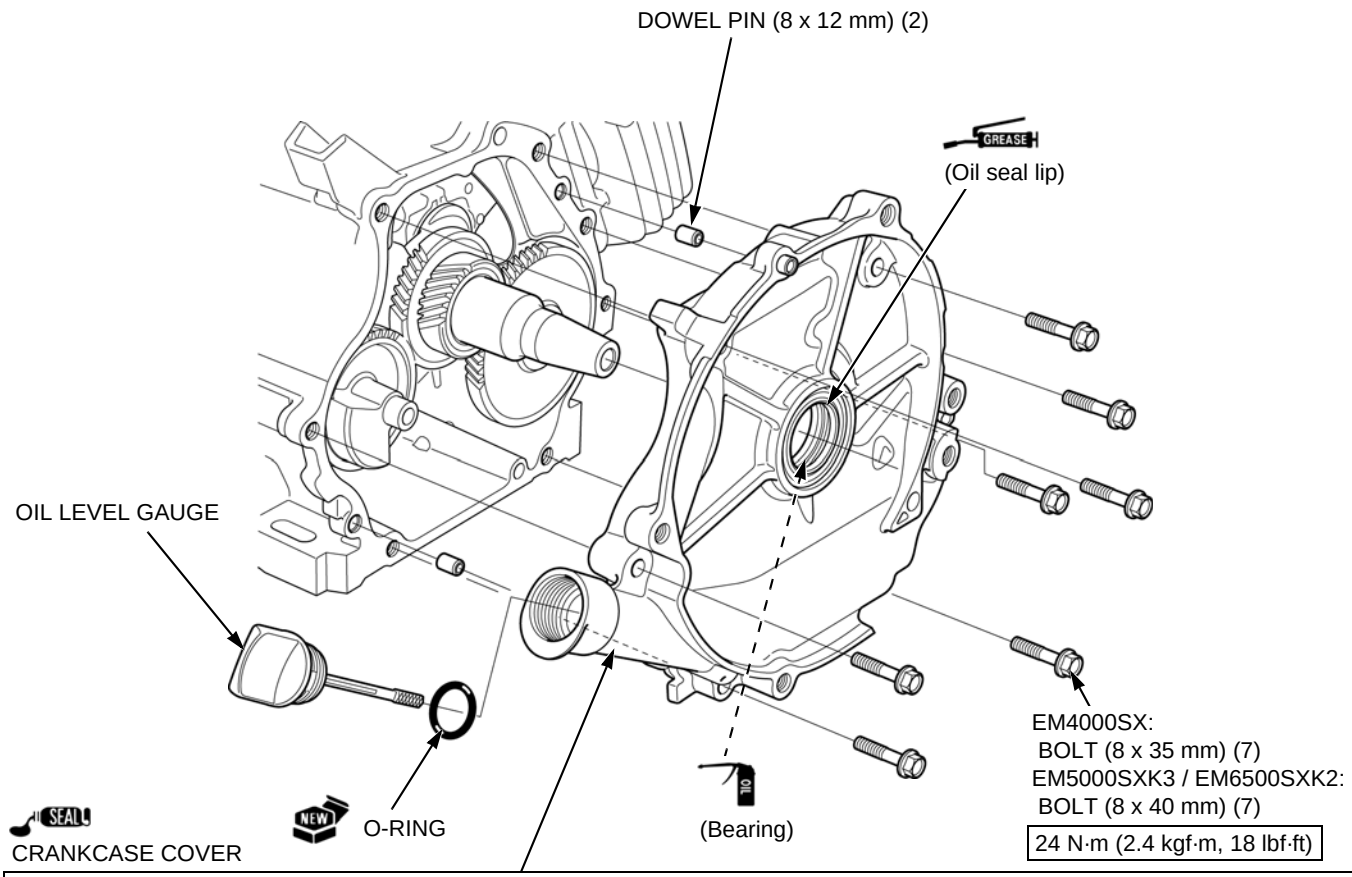
Special tools used in this manual can be ordered using normal American Honda parts ordering procedures.

Driver, 15 x 135 mm 07749-0010000 	Driver, 40 mm I.D. 07746-0030100 	Bearing remover, 15 mm 07936-KC10500 
Pilot, 15 mm 07746-0040300 	Pilot, 30 mm 07746-0040700 	Pilot, 35 mm 07746-0040800 
Attachment, 30 mm I.D. 07746-0030300 	Inner bearing driver attachment, 35 mm I.D. 07746-0030400 	Bearing driver attachment, 32 × 35 mm 07746-0010100 
Bearing driver attachment, 45 × 50 mm 07946-6920100 	Bearing driver attachment, 52 × 55 mm 07746-0010400 	Bearing driver attachment, 62 × 64 mm 07947-6340400 
Bearing driver attachment, 72×75mm 07746-0010600 		

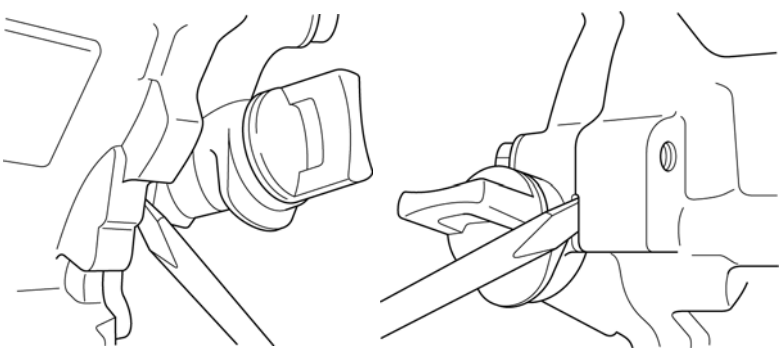
CRANKCASE COVER REMOVAL & INSTALLATION

Drain the engine oil (page 3-4).

Remove the generator (page 10-4).



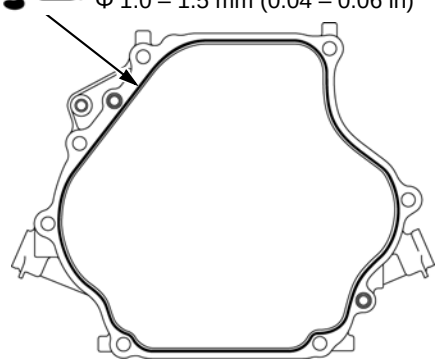
REMOVAL:
Insert a screwdriver into the recess as shown and remove the crankcase cover from the cylinder barrel by gentry prying the screwdriver.



INSTALLATION:
Clean the mating surfaces of the crankcase cover and the cylinder barrel with a degreasing cleaning agent or a clean shop towel.
Apply liquid sealant (Hondabond HT, Hondabond 4, or equivalent) to the mating surface on the crankcase cover as shown.

Wait for 30 minutes after assembly. Do not add oil or start the engine during this period.

SEAL Apply a bread about Φ 1.0 – 1.5 mm (0.04 – 0.06 in)



CRANKCASE COVER INSPECTION

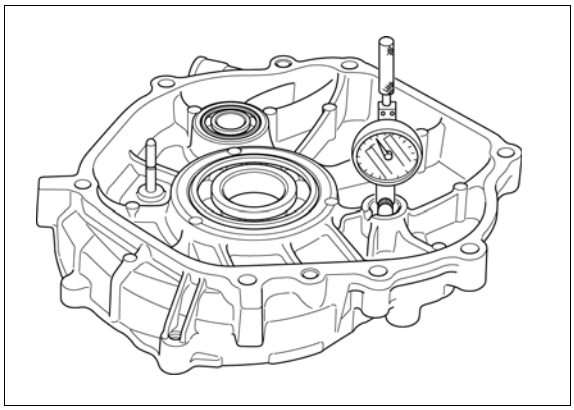
CAMSHAFT HOLDER I.D.

Measure the camshaft holder I.D. of the crankcase cover.

STANDARD: 16.000 – 16.018 mm (0.6299 – 0.6306 in)
SERVICE LIMIT: 16.05 mm (0.632 in)

If the measurement is more than the service limit, replace the crankcase cover (page 12-3).

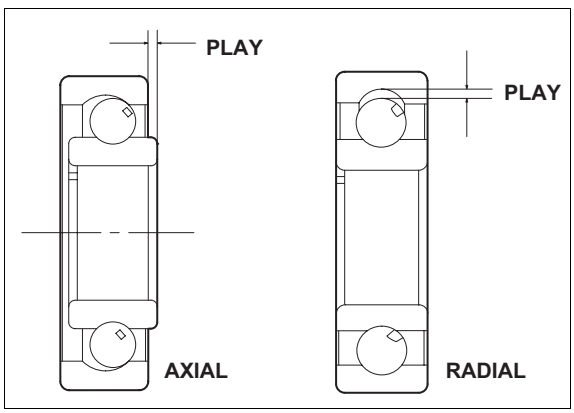
Inspect the camshaft O.D. (page 13-11) with this inspection.



RADIAL BALL BEARING INSPECTION

Clean the bearing in solvent and dry it.

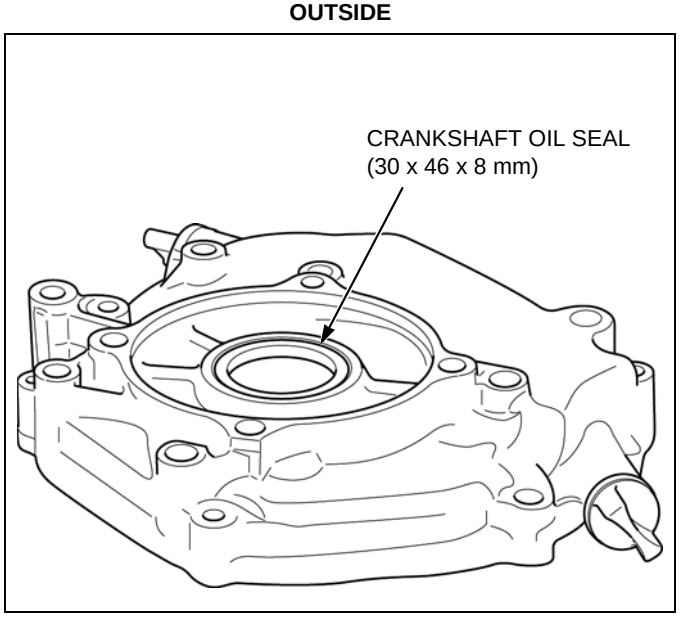
Spin the bearing by hand and check for play. Replace the bearing if it is noisy or has excessive play.



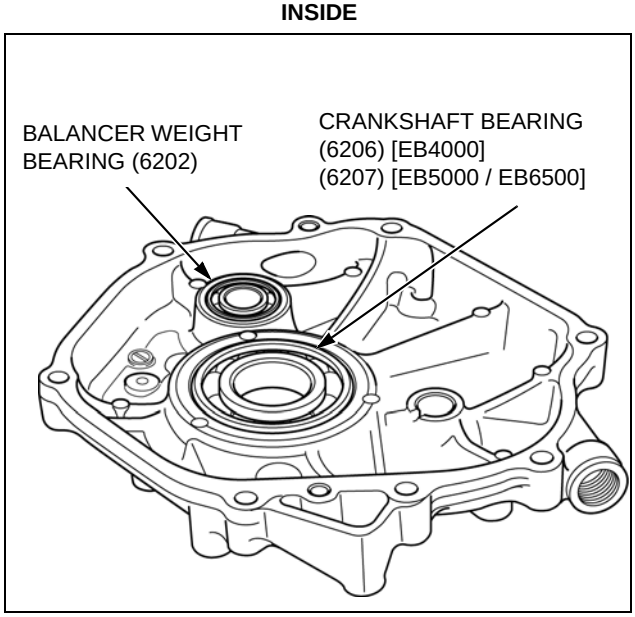
CRANKCASE COVER BEARING AND SEAL REPLACEMENT

LOCATION

OUTSIDE



INSIDE



CRANKSHAFT OIL SEAL—OUTSIDE (30 x 46 x 8 mm) [EB4000] (35 x 52 x 8 mm) [EB5000 / EB6500]

Remove the oil seal from the crankcase cover.

Apply grease to the lip of a new oil seal (1).

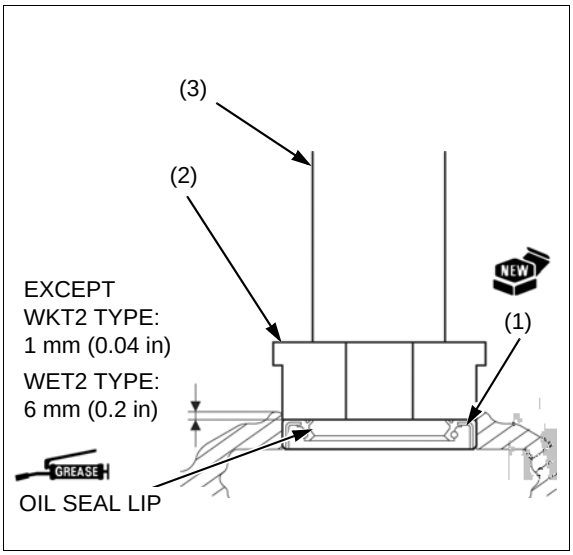
Drive the oil seal in the position as shown using the special tools.

EB4000 TOOLS:

Attachment 45 x 50 mm (2)	**07946-6920100**
Driver 15 x 135 mm (3)	**07749-0010000**

EB5000 / EB6500 TOOLS:

Attachment 52 x 55 mm (2)	**07746-0010400**
Driver 15 x 135 mm (3)	**07749-0010000**



CRANKSHAFT BEARING—INSIDE (6206 or 6207)

Drive out the radial ball bearing (1).

Apply oil to the circumference of a new bearing (2).

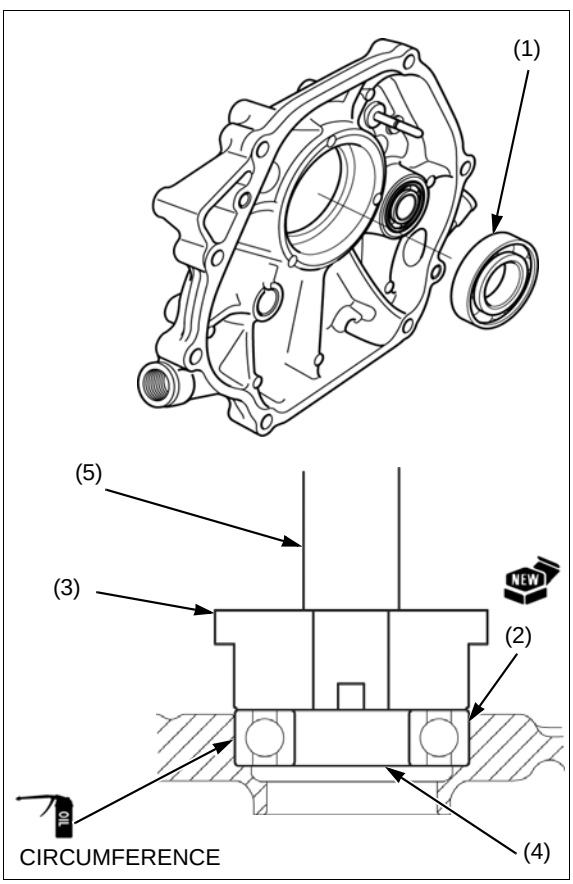
Drive the radial ball bearing until it is fully seated on the end using the special tools.

EB4000 TOOLS:

Attachment 62 x 64 mm (3)	**07947-6340400**
Pilot 30 mm (4)	**07746-0040700**
Driver 15 x 135 mm (5)	**07749-0010000**

EB5000 / EB6500 TOOLS:

Attachment 72 x 75 mm (3)	**07746-0010600**
Pilot 35 mm (4)	**07746-0040800**
Driver 15 x 135 mm (5)	**07749-0010000**



BALANCER WEIGHT BEARING—INSIDE (6202) [EB5000 / EB6500 ONLY]

Pull out the radial ball bearing (1) using the special tools.

TOOLS:

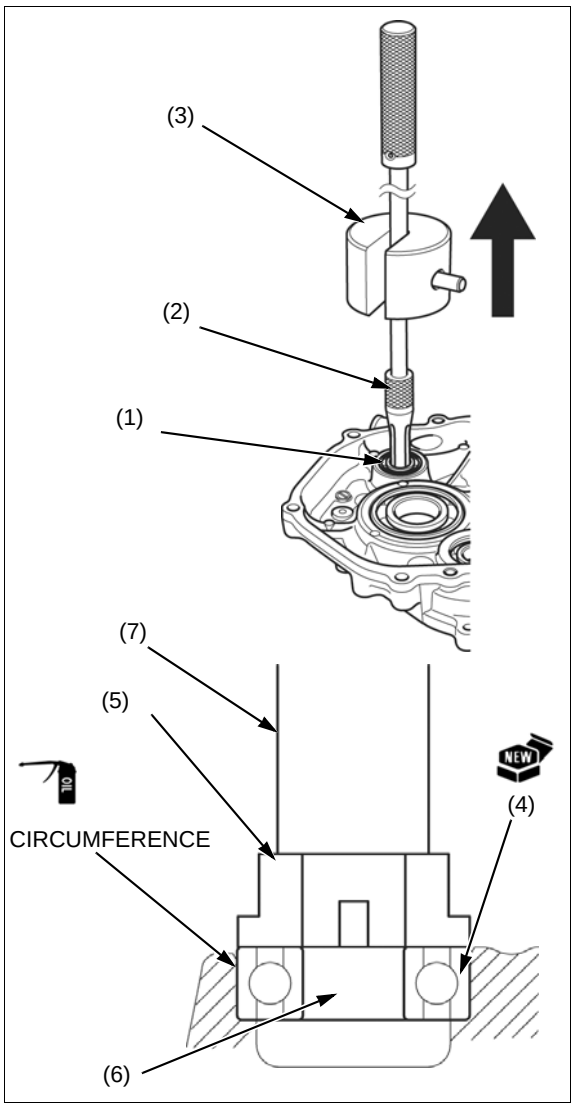
Bearing remover, 15 mm (2)	**07936-KC10500**
Remover weight (3)	**07741-0010201**

Apply oil to the circumference of a new bearing (4).

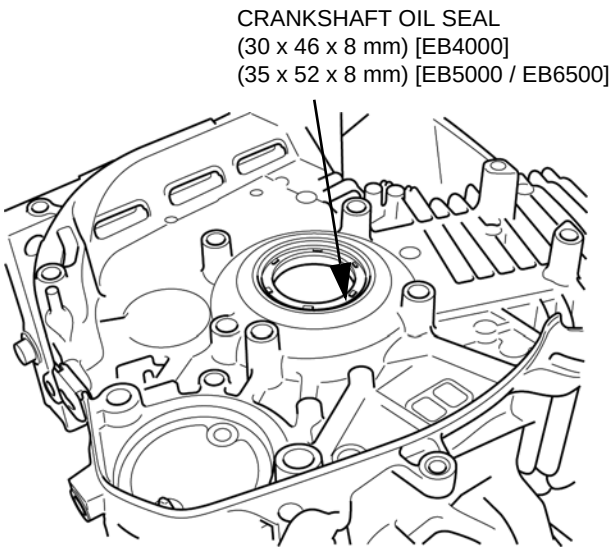
Drive the radial ball bearing until it is fully seated on the end using the special tools.

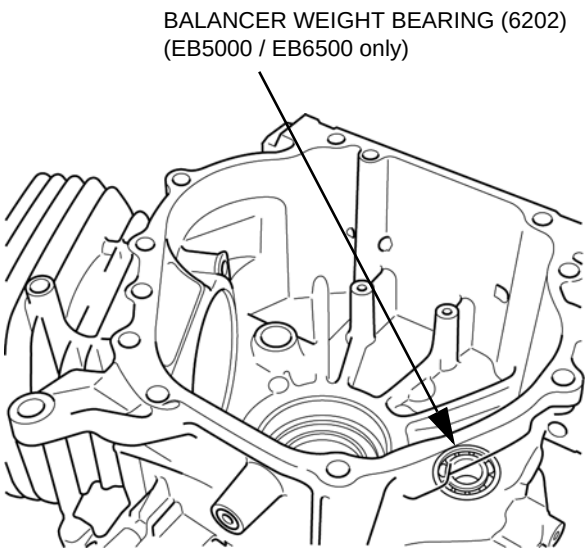
TOOLS:

Attachment, 32 x 35 mm (5)	**07746-0010100**
Pilot, 15 mm (6)	**07746-0040300**
Driver (7)	**07749-0010000**



CRANKCASE BEARING AND SEAL REPLACEMENT





CRANKSHAFT OIL SEAL (30 x 46 x 8 mm) [EB4000] (35 x 52 x 8 mm) [EB5000 / EB6500]

Remove the oil seal from the cylinder barrel.

Apply grease to the lip of a new oil seal (1).

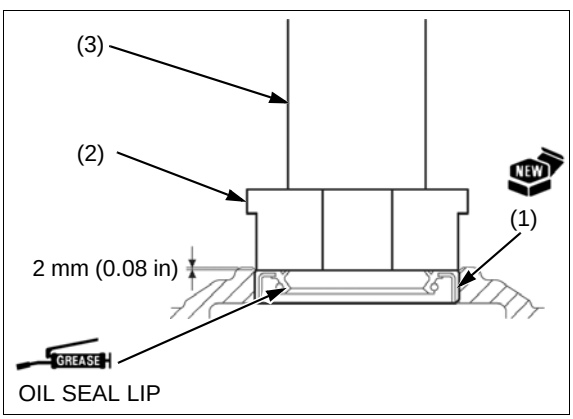
Drive the oil seal in the position as shown using the special tools.

EB4000 TOOLS:

Attachment 45 x 50 mm (2)	**07946-6920100**
Driver 15 x 135 mm (3)	**07749-0010000**

EB5000 / EB6500 TOOLS:

Attachment 52 x 55 mm (2)	**07946-6920100**
Driver 15 x 135 mm (3)	**07749-0010000**



BALANCER WEIGHT BEARING (6202) [EB5000 / EB6500 ONLY]

Pull out the radial ball bearing (1) using the special tools.

TOOLS:

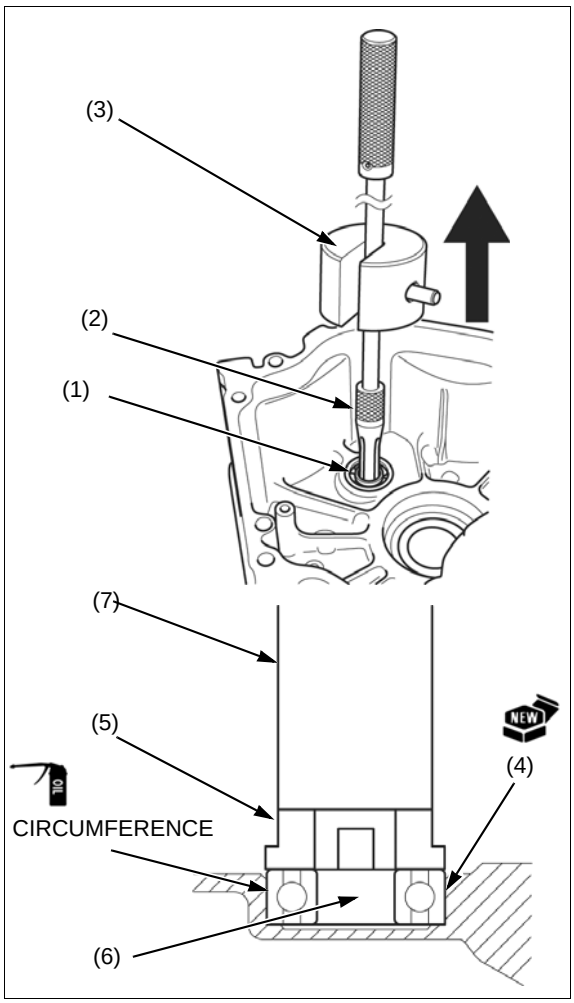
Bearing remover, 15 mm (2)	**07936-KC10500**
Remover weight (3)	**07741-0010201**

Apply oil to the circumference of a new bearing (4).

Drive the radial ball bearing until it is fully seated on the end using the special tools.

TOOLS:

Attachment, 32 x 35 (5)	**07746-0010100**
Pilot, 15 mm (6)	**07746-0040300**
Driver (7)	**07749-0010000**



CRANKSHAFT BEARING REPLACEMENT (FLYWHEEL SIDE)

CRANKSHAFT BEARING (6206)

Install the 16 mm special nut (1) tightening the flywheel to protect the crankshaft threads.

Pull out the radial ball bearing (2) using a commercially available bearing puller (3).

Apply oil to the inner surface of the new bearing (4) inner race (5).

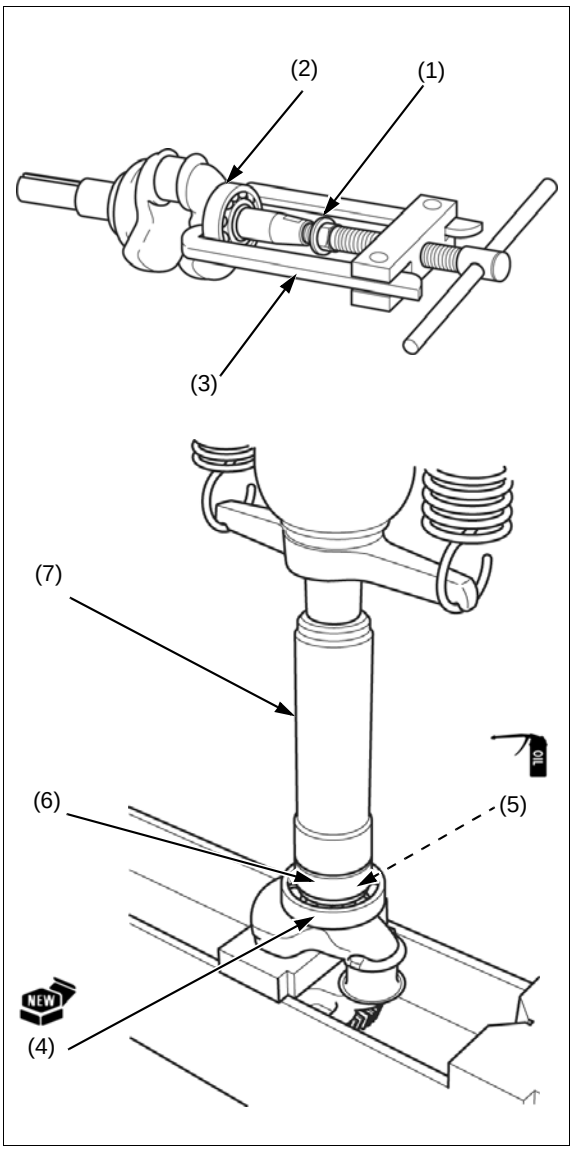
Drive the radial ball bearing until it is fully seated on the end of the crankshaft using the special tools and hydraulic press.

EB4000 TOOLS:

Attachment 30 mm I.D. (6)	**07746-0030300**
Inner driver 40 mm I.D. (7)	**07746-0030100**

EB5000 / EB6500 TOOLS:

Attachment 35 mm I.D. (6)	**07746-0030400**
Inner driver 40 mm I.D. (7)	**07746-0030100**

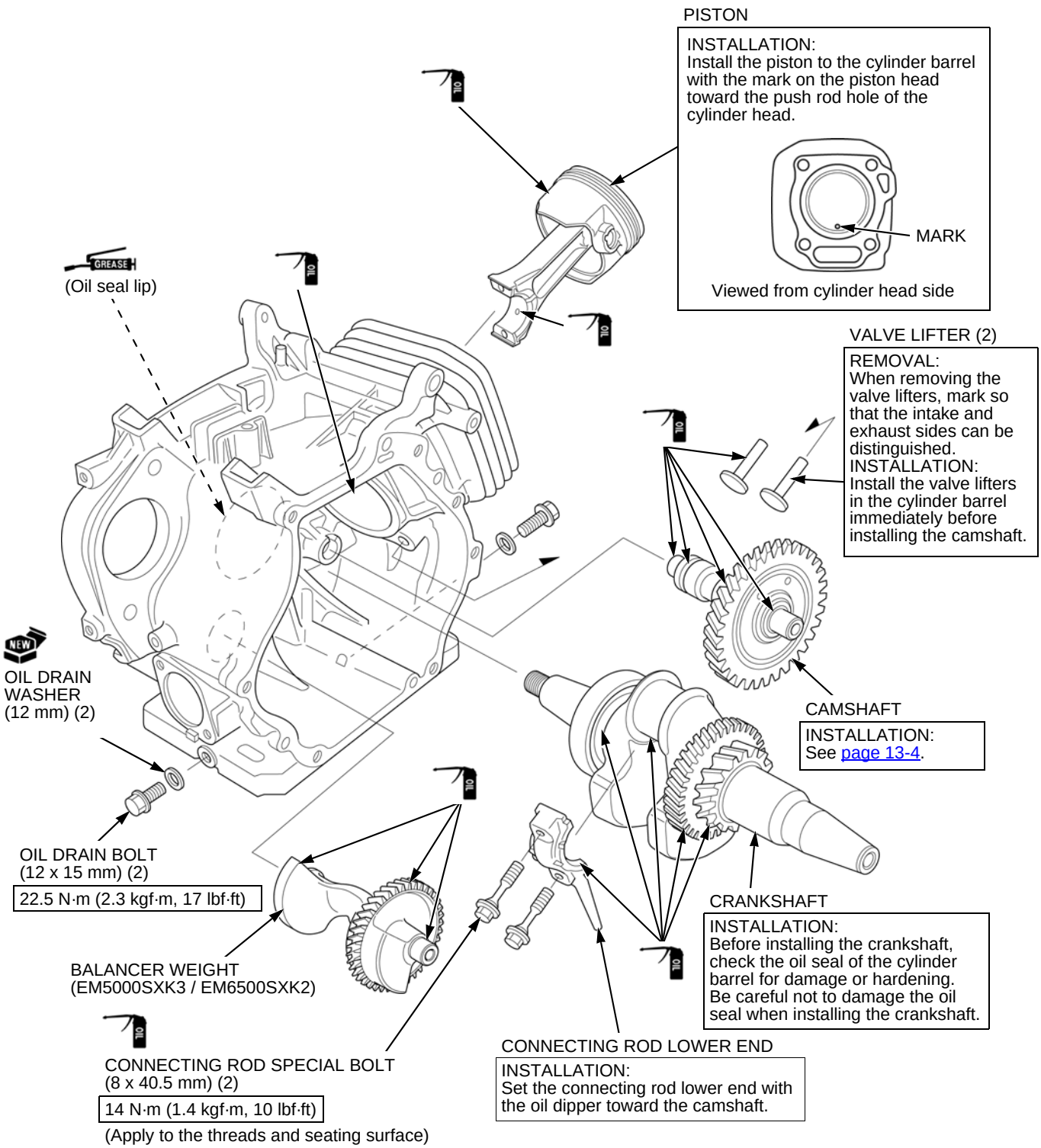


13. CRANKSHAFT / BALANCER / PISTON

CRANKSHAFT / BALANCER / PISTON REMOVAL & INSTALLATION

Remove the following:

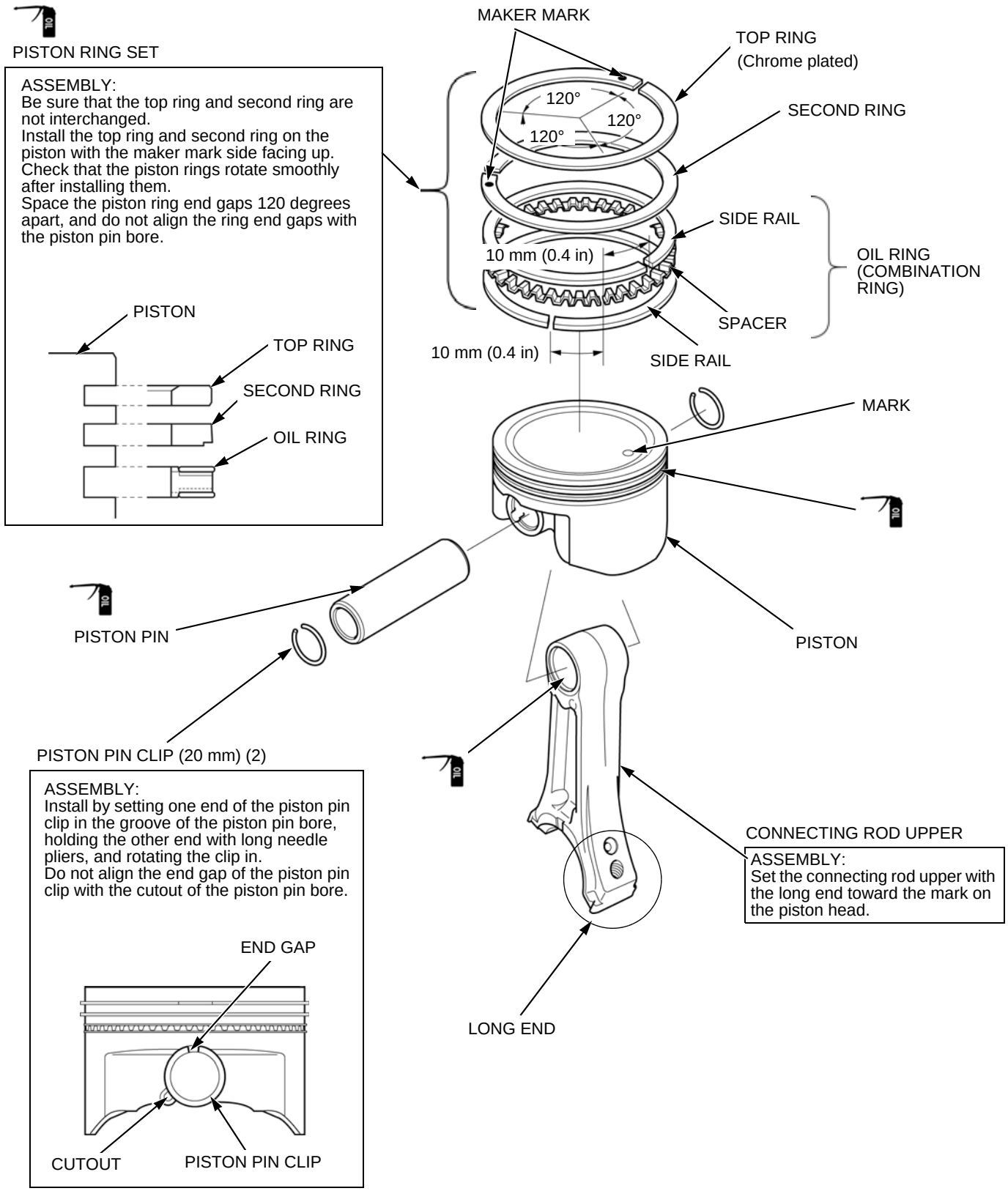
- Cylinder head (page 11-3)
- Flywheel (page 9-5)
- Crankcase cover (page 12-3)



PISTON DISASSEMBLY / ASSEMBLY

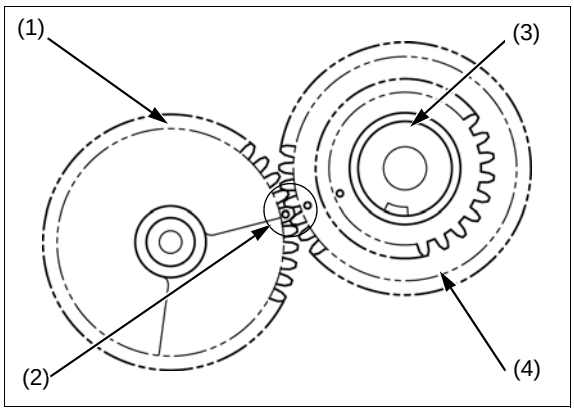
Remove the piston (page 13-2).

NOTE: Honing should be performed on engines with cast iron sleeves (page 13-9)

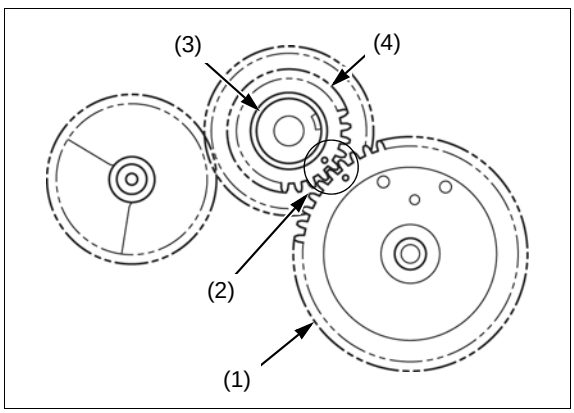


BALANCER WEIGHT / CAMSHAFT INSTALLATION (EXCEPT EM4000SX)

Install the balancer weight (1) to the cylinder barrel by aligning the punch marks (2) of the balancer weight and the crankshaft (3) (marked on the balancer drive gear (4)).



Install the camshaft (1) to the cylinder barrel by aligning the punch marks (2) of the camshaft and the crankshaft (3) (marked on the timing gear (4)).



OIL LEVEL SWITCH REMOVAL & INSTALLATION

Drain the engine oil (page 3-4).

Disconnect the oil level switch connector (1).

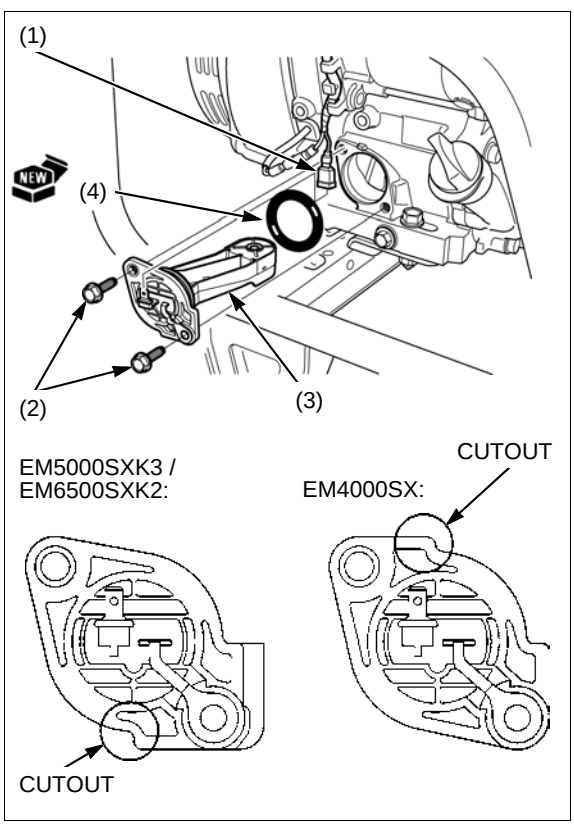
Remove the two flange bolts (2), oil level switch (3), and O-ring (4).

Installation is in the reverse order of removal.

- Replace the O-ring with a new one.
- Lubricate the O-ring with oil before installing the oil level switch.
- Make sure the piston is at TDC (top dead center) before installing the oil level switch.

NOTICE

- *Install the oil level switch to the crankcase securely as shown.*
- *Wrong assembly can cause engine trouble.*



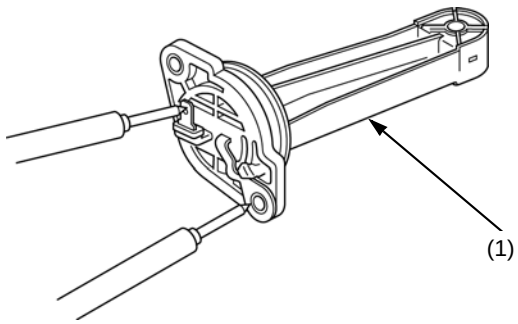
OIL LEVEL SWITCH INSPECTION

Remove the oil level switch (page 13-4).

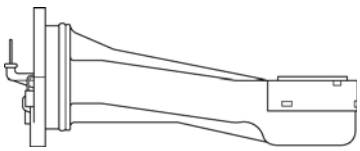
Check for continuity between the oil level switch terminals as follows:

1. Hold the oil level switch (1) in the direction as shown. There should be continuity.
2. Hold the switch in the direction as shown. There should be no continuity.
3. Hold the switch in the direction as shown and dip the float section of the switch into a container of oil. There should be no continuity.

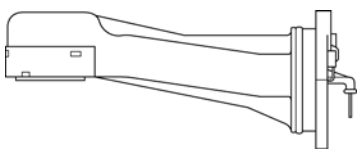
If the correct continuity is not obtained, replace the oil level switch (page 13-4).



DIRECTION OF THE SWITCH INSPECTED IN STEP 1 AND 3:



DIRECTION OF THE SWITCH INSPECTED IN STEP 2:



CYLINDER BLOCK INSPECTION

CAM SHAFT HOLDER I.D.

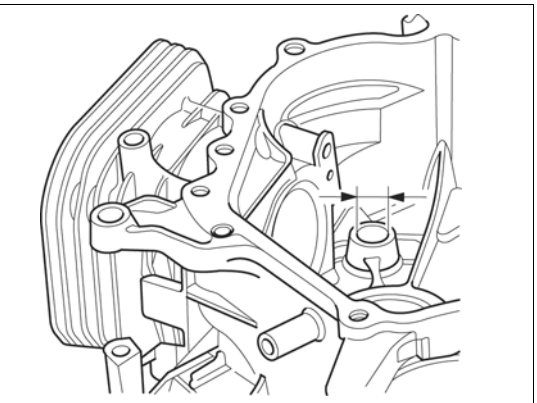
CYLINDER BARREL SIDE

Measure the camshaft holder I.D. of the cylinder barrel.

STANDARD: 16.000 – 16.018 mm (0.6299 – 0.6306 in)
SERVICE LIMIT: 16.05 mm (0.632 in)

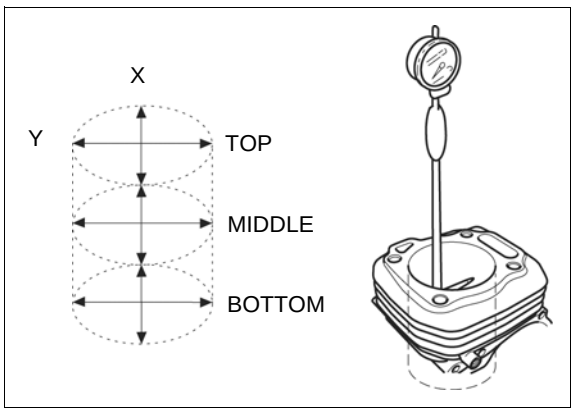
If the measurement is more than the service limit, replace the cylinder barrel (page 13-2).

Inspect the camshaft O.D. (page 13-11) with this inspection.



CYLINDER SLEEVE I.D.

Measure and record the cylinder 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 and taper.



EM4000SX:

STANDARD:	**77.000 – 77.017 mm (3.0315 – 3.0322 in)**
SERVICE LIMIT:	**77.17 mm (3.038 in)**

EM5000SXK3 / EM6500SXK2:

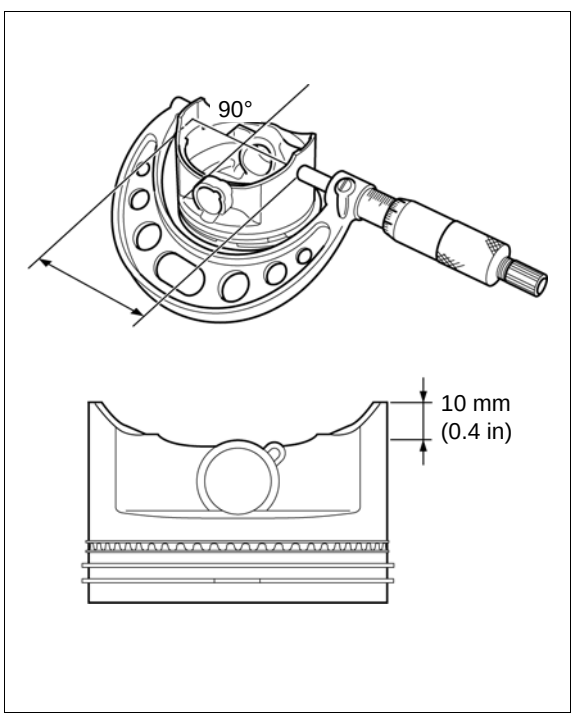
STANDARD:	**88.000 – 88.017 mm (3.4646 – 3.4652 in)**
SERVICE LIMIT:	**88.17 mm (3.471 in)**

If the measurement is more than the service limit, replace the cylinder barrel (page 13-2).

Inspect the piston skirt O.D. (page 13-6) with this inspection.

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 degrees to the piston pin bore.



EM4000SX:

STANDARD:	**76.975 – 76.985 mm (3.0305 – 3.0309 in)**
SERVICE LIMIT:	**76.85 mm (3.026 in)**

EM5000SXK3 / EM6500SXK2:

STANDARD:	**87.975 – 87.985 mm (3.4636 – 3.4640 in)**
SERVICE LIMIT:	**87.85 mm (3.459 in)**

If the measurement is less than the service limit, replace the piston (base shop manual: page 13-2).

Inspect the cylinder sleeve I.D. (page 13-6) with this inspection.

PISTON-TO-CYLINDER CLEARANCE

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

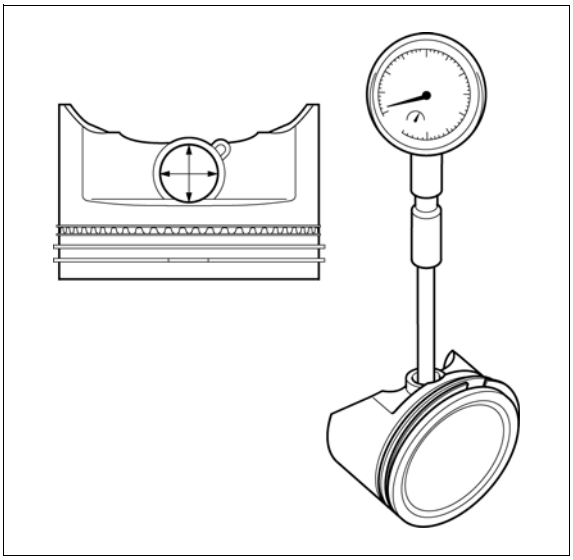
STANDARD:	**0.015 – 0.042 mm (0.0006 – 0.0017 in)**
SERVICE LIMIT:	**0.12 mm (0.005 in)**

If the calculated clearance is more than the service limit, replace the piston (base shop manual: page 13-2) and recheck the clearance.

If the clearance is still more than the service limit with the new piston, replace the cylinder barrel (page 13-2).

PISTON PIN BORE I.D.

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



EM4000SX:

STANDARD:	**18.002 – 18.008 mm (0.7087 – 0.7090 in)**
SERVICE LIMIT:	**18.042 mm (0.7103 in)**

EM5000SXK3 / EM6500SXK2:

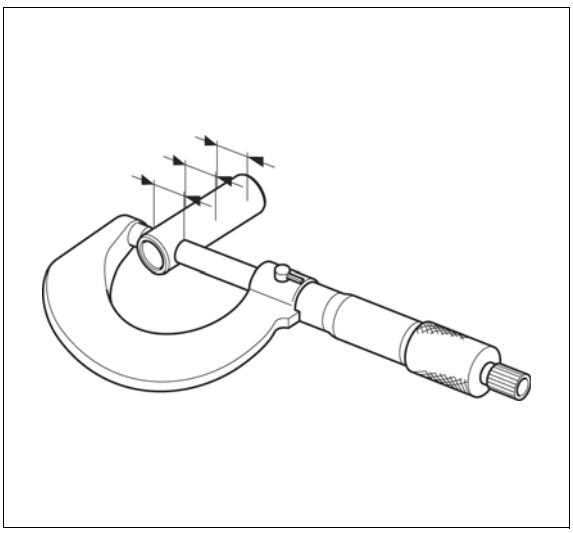
STANDARD:	**20.002 – 20.008 mm (0.7875 – 0.7877 in)**
SERVICE LIMIT:	**20.042 mm (0.7891 in)**

If the measurement is less than the service limit, replace the piston (base shop manual: page 13-2).

Inspect the piston pin O.D. (page 13-7) with this inspection.

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.



EM4000SX

STANDARD:	**17.994 – 18.000 mm (0.7084 – 0.7087 in)**
SERVICE LIMIT:	**17.950 mm (0.7067 in)**

EM5000SXK3 / EM6500SXK2:

STANDARD:	**19.994 – 20.000 mm (0.7872 – 0.7874 in)**
SERVICE LIMIT:	**19.950 mm (0.7854 in)**

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

Inspect the piston pin bore I.D. (page 13-7).

Inspect the connecting rod small end I.D. (page 13-9) with this inspection.

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.

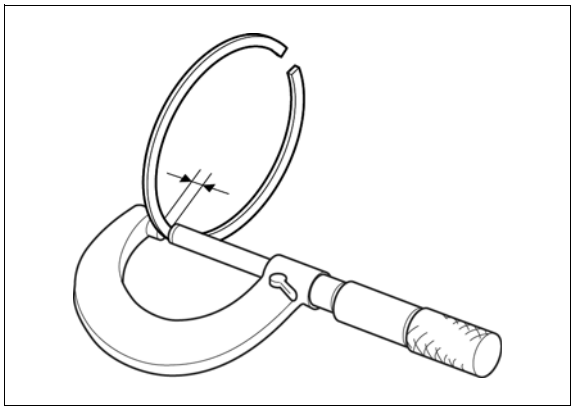
STANDARD:	**0.002 – 0.014 mm (0.0001 – 0.0006 in)**
SERVICE LIMIT:	**0.08 mm (0.003 in)**

If the calculated clearance is more than the service limit, replace the piston pin (base shop manual: page 13-2) and recheck the clearance.

If the clearance is still more than the service limit with the new piston pin, replace the piston (base shop manual: page 13-2).

PISTON RING WIDTH

Measure each piston ring width.

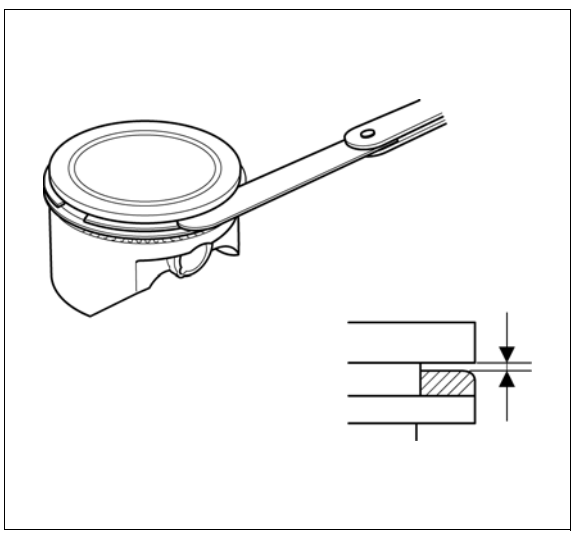


STANDARD:
Top / Second: 1.160 – 1.175 mm (0.0457 – 0.0463 in)
SERVICE LIMIT:
Top / Second: 1.150 mm (0.0453 in)

If any of the measurements is less than the service limit, replace the piston rings (top, second, oil) as a set (base shop manual: page 13-2).

PISTON RING SIDE CLEARANCE

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



STANDARD:
Top / Second: 0.030 – 0.060 mm (0.0012 – 0.0024 in)
SERVICE LIMIT:
Top / second: 0.15 mm (0.006 in)

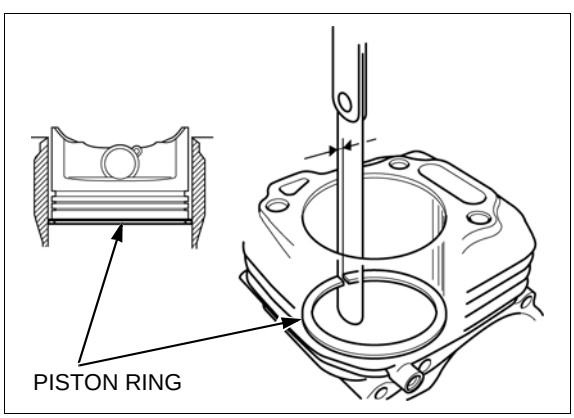
If any of the measurements is more than the service limit, inspect the piston ring width.

If the piston ring width is normal, replace the piston (base shop manual: page 13-2) and reinspect the clearance.
If necessary, replace the piston rings (top, second, oil) as a set (base shop manual: page 13-2) and reinspect the clearance.
If any of the measurements is still more than the service limit with the new piston rings, replace the piston (base shop manual: page 13-2).

PISTON RING END GAP

Before inspection, check whether the cylinder sleeve I.D. (page 13-6) is within the specification.

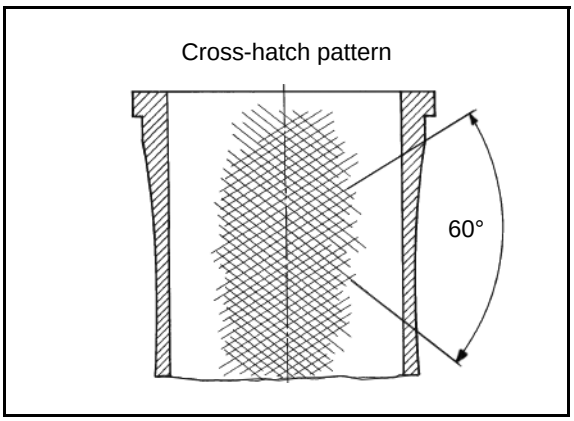
Measure each piston ring end gap using a feeler gauge.



STANDARD:
Top: 0.200 – 0.350 mm (0.0079 – 0.0138 in)
Second: 0.350 – 0.500 mm (0.0138 – 0.0197 in)
Oil (side rail): 0.20 – 0.70 mm (0.008 – 0.028 in)
SERVICE LIMIT:
Top / Second / 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 (base shop manual: page 13-2).

CYLINDER HONING



Apply honing oil to the 400-grit flex honing tool and cylinder wall.

Using a 400 grit honing tool, lightly hone the cylinder in a smooth up-down motion only long enough to remove the surface glaze.

Check your progress often to avoid removing more material than required.

Follow the tool manufacturer's instructions for drill motor speed.

The surface should not be too smooth, but exhibit fine scores in a 60-degree cross-hatch pattern.

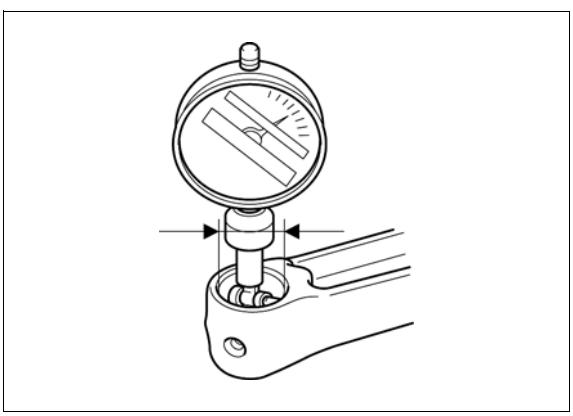
When honing is complete, thoroughly clean the cylinder with hot soapy water and then immediately dry with a lint-free towel.

Never use solvent to clean the cylinder wall as it will redistribute the grit on the cylinder walls.

Check the cylinder I.D. and taper again to make sure they are within service limits.

Apply clean motor oil to the freshly honed surface to prevent oxidation.

CONNECTING ROD SMALL END I.D.



Measure the connecting rod small end I.D.

EM4000SX

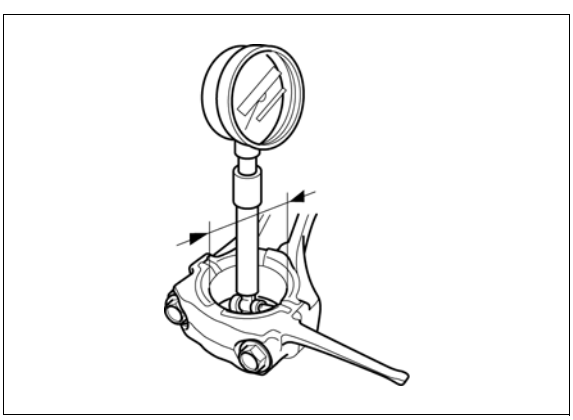
STANDARD:	**18.005 – 18.020 mm (0.7089 – 0.7094 in)**
SERVICE LIMIT:	**18.07 mm (0.711 in)**

EM5000SXK3 / EM6500SXK2:

STANDARD:	**20.005 – 20.020 mm (0.7876 – 0.7882 in)**
SERVICE LIMIT:	**20.07 mm (0.790 in)**

If the measurement is more than the service limit, replace the connecting rod (base shop manual: page 13-2).

CONNECTING ROD BIG END I.D.



Set the connecting rod lower end to the connecting rod upper end.
Apply engine oil to the connecting rod bolt threads and seating surface.
Tighten the connecting rod bolts to the specified torque.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

Measure the connecting rod big end I.D.

EM4000SX:

STANDARD:	**33.025 – 33.039 mm (1.3002 – 1.3007 in)**
SERVICE LIMIT:	**33.07 mm (1.302 in)**

EM5000SXK3 / EM6500SXK2:

STANDARD:	**36.025 – 36.039 mm (1.4183 – 1.4189 in)**
SERVICE LIMIT:	**36.07 mm (1.420 in)**

If the measurement is more than the service limit, replace the connecting rod (page 13-2).

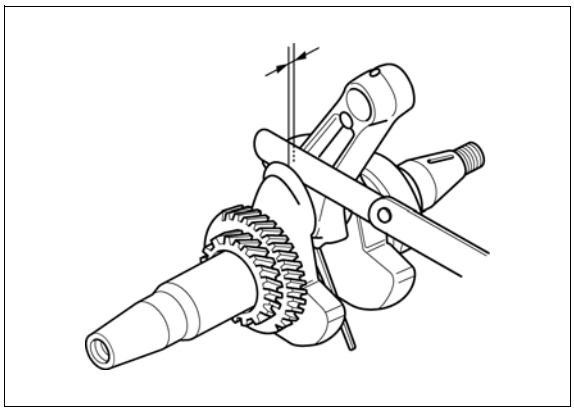
CONNECTING ROD BIG END SIDE CLEARANCE

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

STANDARD: 0.1 – 0.4 mm (0.004 – 0.016 in)
SERVICE LIMIT: 1.0 mm (0.04 in)

If the measurement is more than the service limit, replace the connecting rod (base shop manual: page 13-2) and recheck the clearance.

If the clearance is still more than the service limit with the new connecting rod, replace the crankshaft (page 13-2).



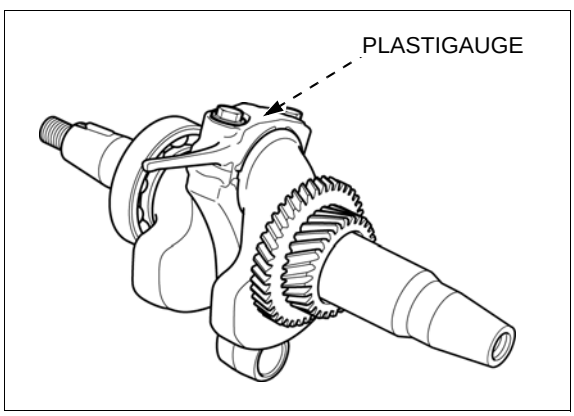
CONNECTING ROD BIG END OIL CLEARANCE

Clean all oil from the crank pin and connecting rod big end surface.

Place a piece of plastigauge on the crank pin, install the connecting rod upper and the connecting rod lower.
Apply engine oil to the connecting rod bolt threads and seating surface.
Tighten the connecting rod bolts to the specified torque.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

NOTE:
Do not rotate the crankshaft while the plastigauge is in place.



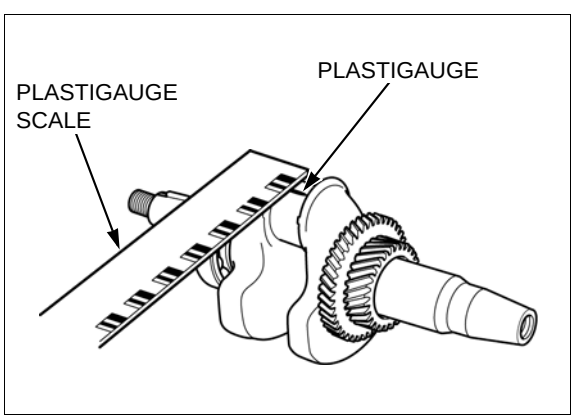
Remove the connecting rod and measure the plastigauge.

STANDARD: 0.040 – 0.064 mm (0.0016 – 0.0025 in)
SERVICE LIMIT: 0.12 mm (0.005 in)

If the clearance is more than the service limit, inspect the following:

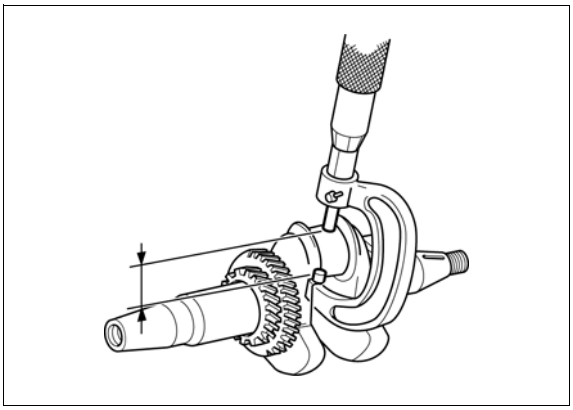
- Connecting rod big end I.D. (page 13-9)
- Crank pin O.D. (page 13-11)

If the part that is not within the service limit is replaced by a new one, reinspect the clearance.



CRANK PIN O.D.

Measure the crank pin O.D. of the crankshaft.



EM4000SX:

STANDARD:	**32.975 – 32.985 mm (1.2982 – 1.2986 in)**
SERVICE LIMIT:	**32.92 mm (1.296 in)**

EM5000SXK3 / EM6500SXK2:

STANDARD:	**35.975 – 35.985 mm (1.4163 – 1.4167 in)**
SERVICE LIMIT:	**35.93 mm (1.415 in)**

If the measurement is less than the service limit, replace the crankshaft (page 13-2).

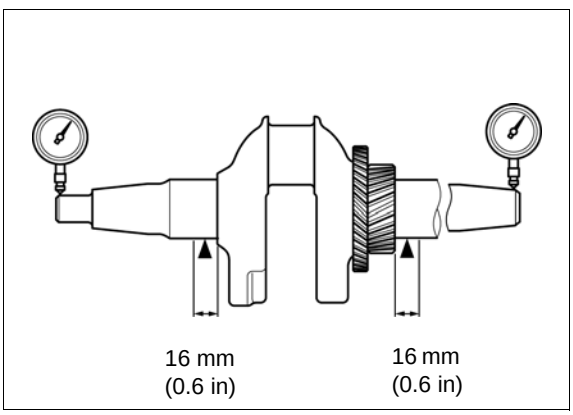
CRANKSHAFT RUNOUT

Remove the crankshaft bearing (base shop manual: page 13-3).

Set the crankshaft on V-blocks and measure the runout using a dial indicator.

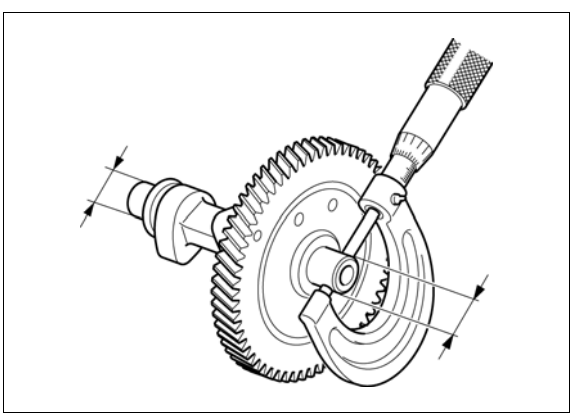
SERVICE LIMIT: 0.1 mm (0.004 in)

If the measured runout is more than the service limit, replace the crankshaft (page 13-2).



CAMSHAFT O.D.

Measure the camshaft O.D. of the camshaft.

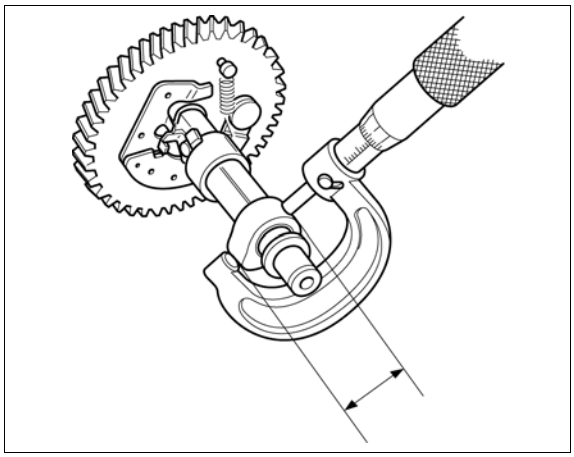


STANDARD: 15.966 – 15.984 mm (0.6286 – 0.6293 in)
SERVICE LIMIT: 15.92 mm (0.627 in)

If the measurement is less than the service limit, replace the camshaft (page 13-2).

CAMSHAFT CAM HEIGHT

Measure the cam height of the camshaft.



EM4000SX:

STANDARD:	**IN:**	**31.845 – 32.245 mm (1.2537 – 1.2695 in)**
	EX:	**31.566 – 31.966 mm (1.2428 – 1.2585 in)**
SERVICE LIMIT:	**IN:**	**31.22 mm (1.229 in)**
	EX:	**31.26 mm (1.231 in)**

EM5000SXK3 / EM6500SXK2:

STANDARD:	**IN:**	**32.398 – 32.798 mm (1.2755 – 1.2913 in)**
	EX:	**31.885 – 32.285 mm (1.2553– 1.2711 in)**
SERVICE LIMIT:	**IN:**	**32.10 mm (1.264 in)**
	EX:	**31.59 mm (1.244 in)**

If the measurement is less than the service limit, replace the camshaft (page 13-2).

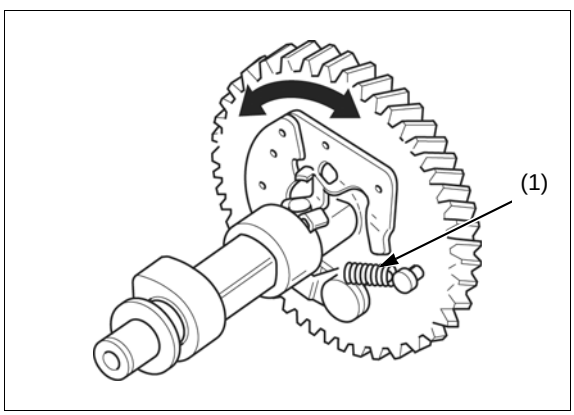
DECOMPRESSOR WEIGHT

Check for worn and weakened spring.

If the return spring (1) is worn or weakened, replace the weight return spring.

Check that the decompressor weight moves smoothly.

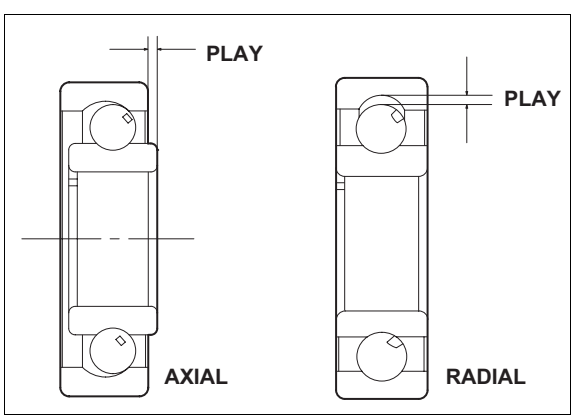
If the decompressor weight does not move correctly, replace the camshaft (page 13-2).



RADIAL BALL BEARING INSPECTION

Clean the bearing in solvent and dry it.

Spin the bearing by hand and check for play. Replace the bearing if it is noisy or has excessive play.

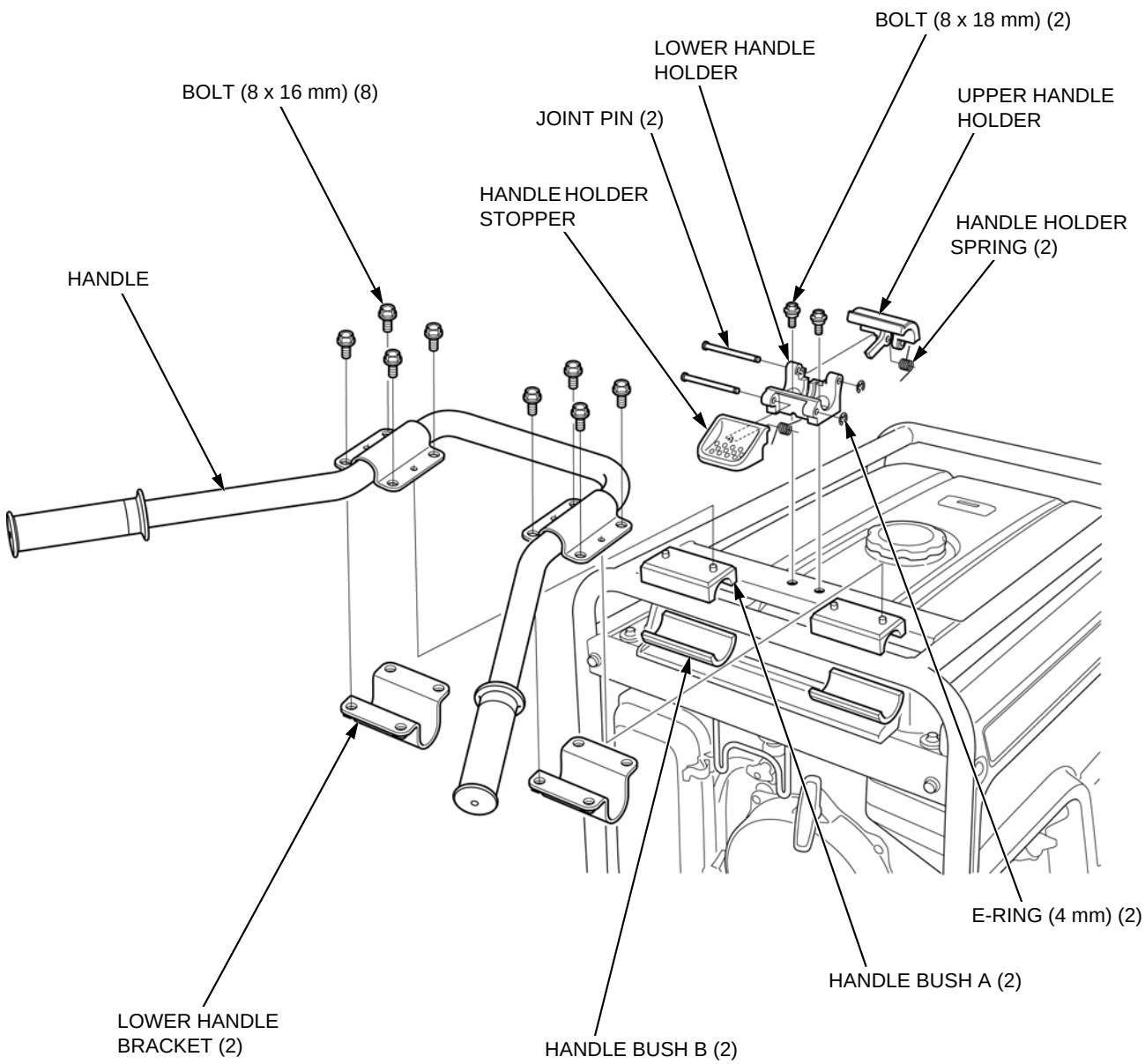


14. FRAME

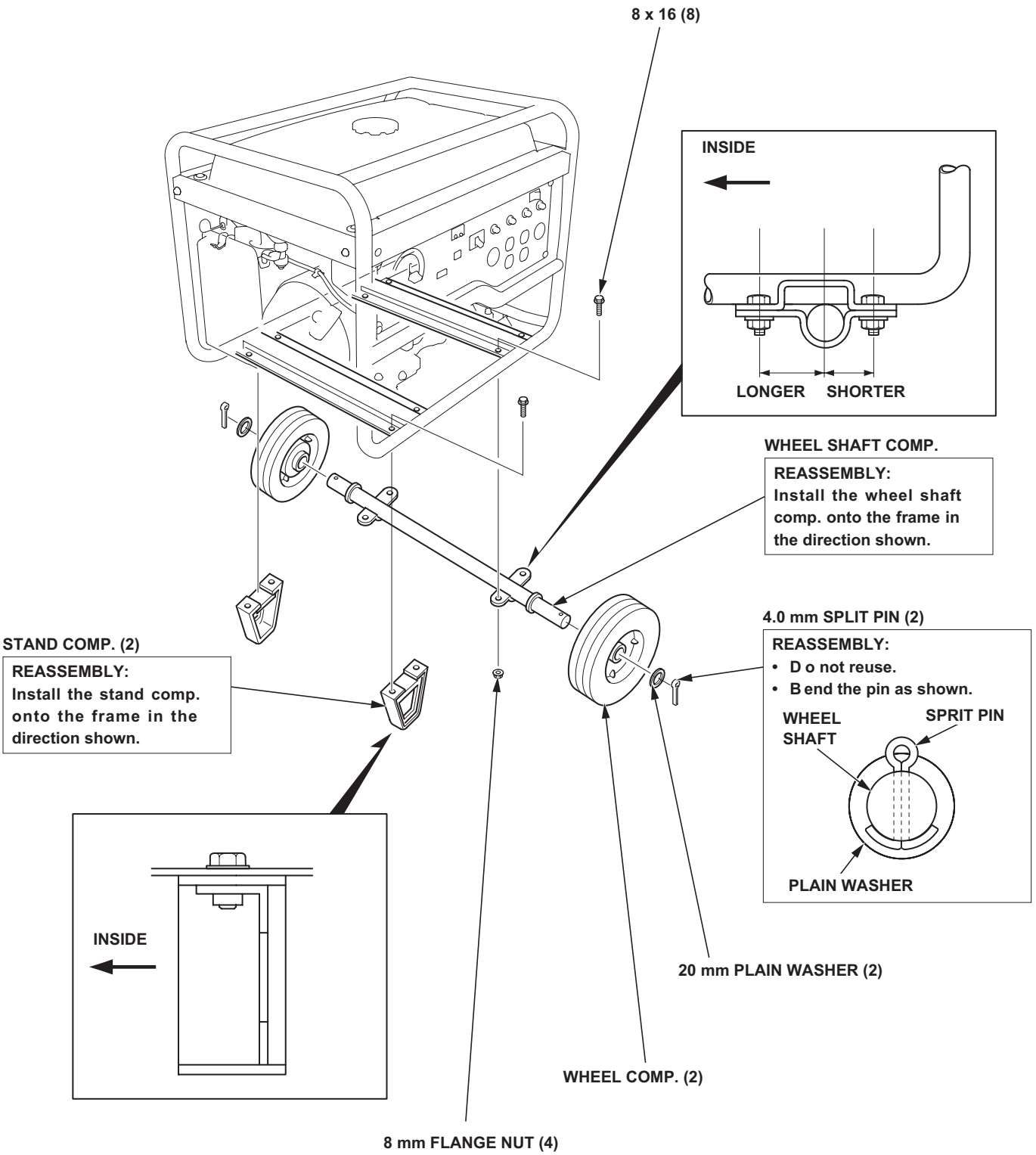
HANDLE REMOVAL & INSTALLATION

Operation must be checked after attaching the handle.

- Check that the handle can be folded smoothly.
- Check that the handle does not hang down by its own weight.

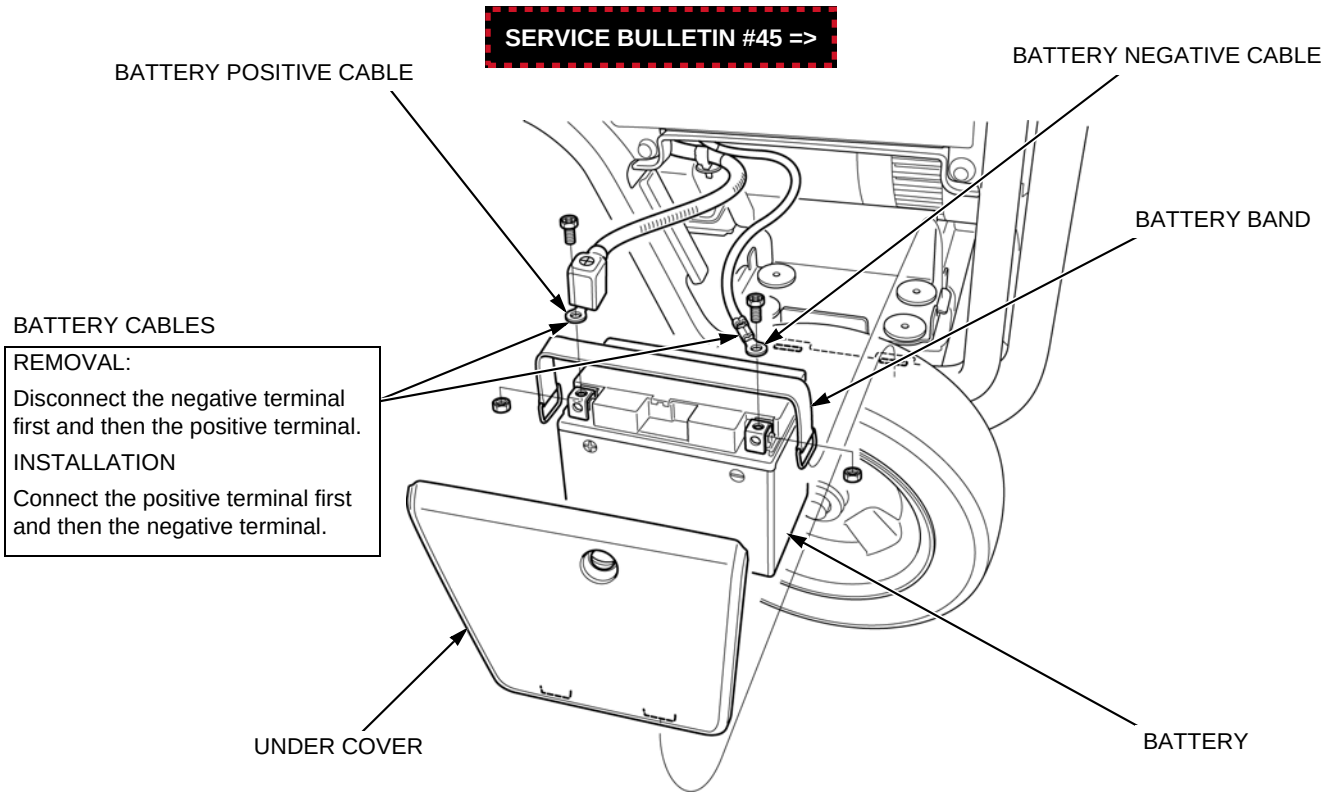


WHEEL DISASSEMBLY & REASSEMBLY

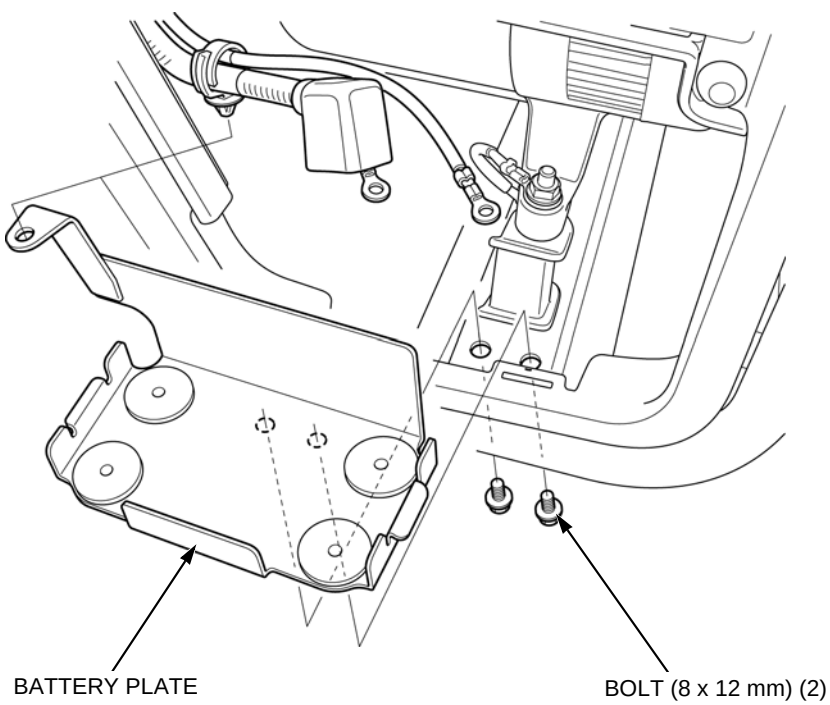


15. BATTERY

BATTERY REMOVAL/INSTALLATION



BATTERY TRAY REMOVAL/INSTALLATION



BATTERY CHARGING

Turn the combination switch OFF.

Remove the battery (page 15-2).

Check the battery for damage.

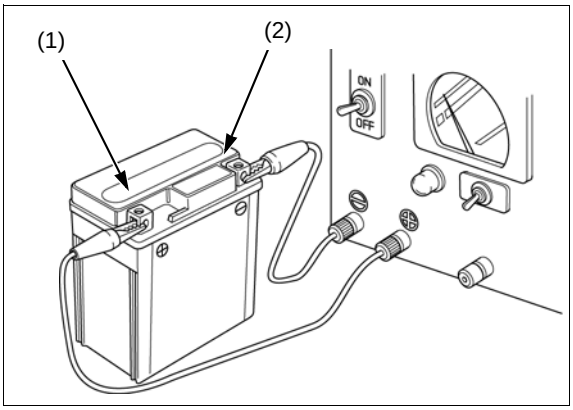
Leave the battery for 30 minutes.

Measure the battery voltage using a commercially available digital multimeter.

VOLTAGE (20°C/68°F):
Fully charged: Above 12.8 V
Under charged: Below 12.4 V

If the battery voltage is below 12.4 V, charge the battery.

Connect the battery charger positive (+) cable to the battery positive terminal (1).
Connect the battery charger negative (–) cable to the battery negative terminal (2).



CHARGING CURRENT/TIME:
Standard: 1.1 A/ 5 – 10 h
Quick: 5.5 A/ 1 h

Leave the battery for 30 minutes.

Measure the battery voltage.

If the battery voltage is below 12.7 V, charge the battery.

If the battery charged, but battery voltage is below 12.7 V, replace the battery with a new one.

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns.
- For battery charging, remove the battery from the generator.
- For battery removing, do not damage the battery terminal and label.
- Turn power ON/OFF at the charger, not at the battery terminal.
- For battery charging, do not exceed the charging current and time specified on the battery.
  Using excessive current or extending the charging time may damage the battery.

MEMO

16. OPERATION

i-AVR (D-AVR / i-GOVERNOR SYSTEM)

OUTLINE

This model adopts D-AVR (Digital Automatic Voltage Regulator) to improve the generating capacity, incorporated with i-Governor which enables precise control in engine speed.

SYSTEM

GENERATOR CONTROL:

The conventional analog AVR relies upon a detection winding to detect the output voltage, which is prone to be affected by the change of temperature and load current.
D-AVR uses an output terminal, eliminating the need of detection winding, which enables more reliable output voltage detection without being affected by the change of temperature or load current.

ENGINE CONTROL:

In a conventional analog AVR system, engine revolution speed increases under no load, while it decreases under heavy load.
The engine speed remains constant in a D-AVR system, regardless of the amount of the load (when the Auto throttle mode is disabled).

AUTO THROTTLE MODE OPERATION:

In an analog AVR system, engine speed is automatically decreased only when there is no load (Auto Throttle function).
The i-AVR system also controls partial throttle position in order to vary the engine speed in accordance with the amount of the load, in addition to the Auto Throttle function under no load.

VOLTAGE REGULATION WHEN OVERLOADED:

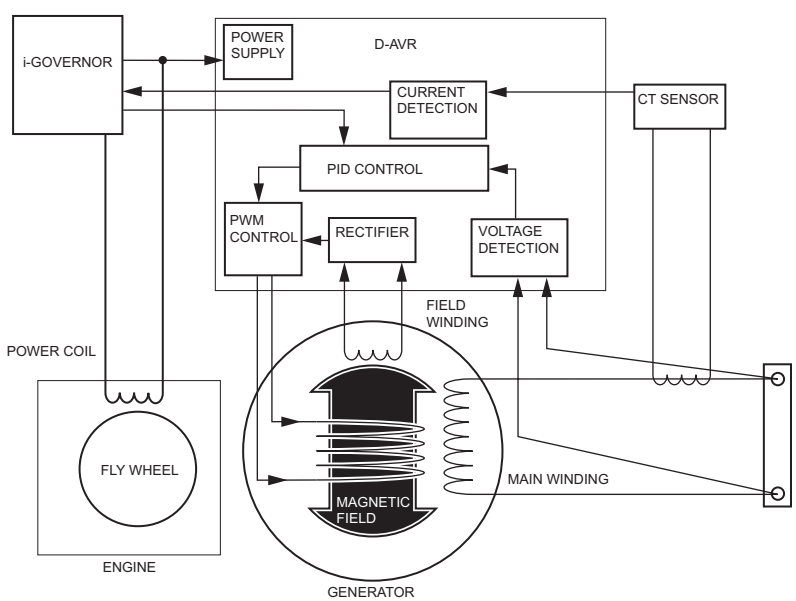
D-AVR optimizes the output voltage by determining if the engine is overloaded according to the throttle position signal from i-Governor.

UNIT POWER SUPPLY:

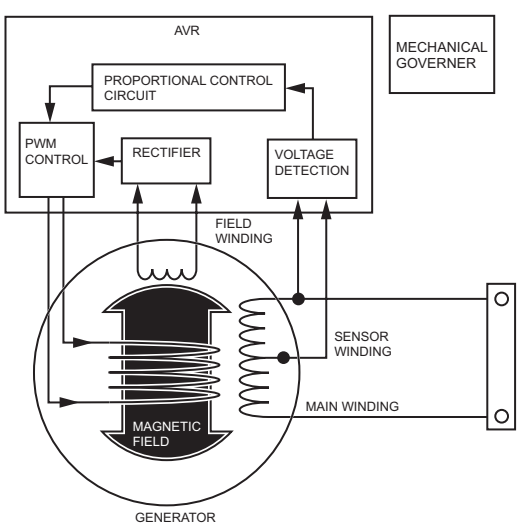
A power coil is installed beside the flywheel in order to provide a power supply for the unit control.

i-AVR

(D-AVR / i-governor cooperation system)



ANALOG AVR + MECHANICAL GOVERNOR:

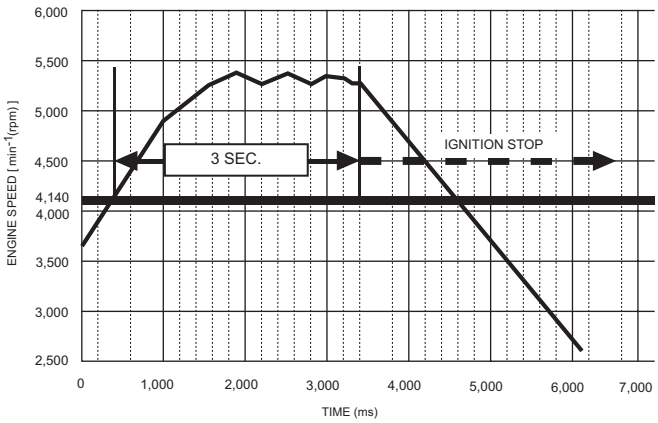


SELF DIAGNOSIS FUNCTION

D-AVR has built-in self diagnosis function, which stops generating voltage by stopping the engine when an abnormal condition of the generator is detected.

OVER-REVVING DETECTING FUNCTION:

This function stops generating voltage by stopping the engine when the engine speed exceeds the specified speed [4,140 min^{-1} (rpm)] for more than three seconds continuously.



ABNORMAL VOLTAGE (EXCESSIVE AC VOLTAGE) DETECTING FUNCTION:

This function stops generating voltage by stopping the engine when the output voltage exceeds the specified voltage (150% of the rated voltage) for more than 0.5 seconds continuously.

ABNORMAL TEMPERATURE DETECTING FUNCTION:

If the generator is overloaded and the internal circuit is overheated, current to the connected appliance (s) may shut off, even though the AC circuit breaker stay ON and the engine keeps running.

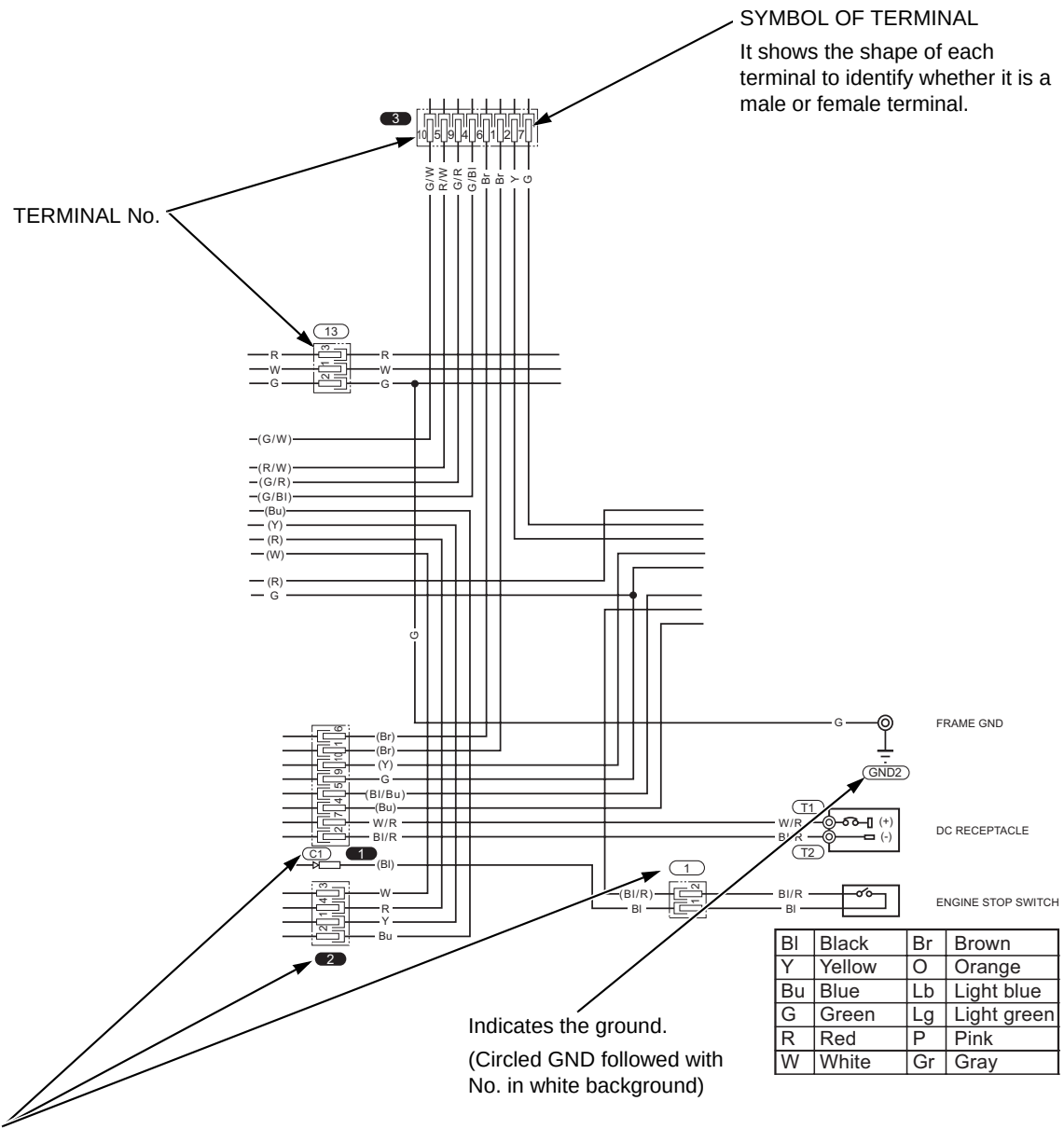
Stop the engine and reduce the electrical load. Allow the generator to cool for a few minutes, and then restart the engine.

17. 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



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

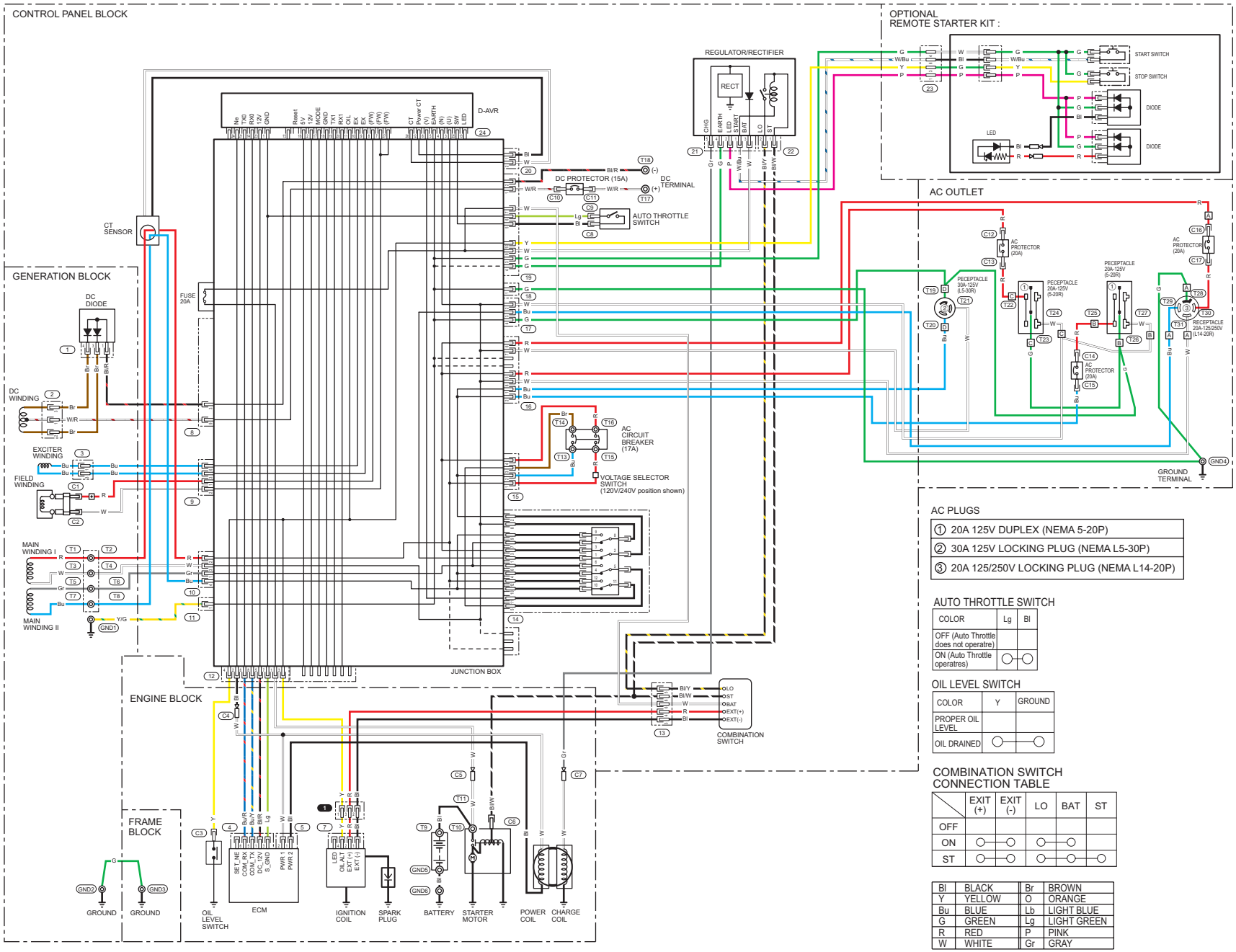
Every connector and terminal has a number to help the users find the location and shape of the connector and the terminal arrangement by referring to the “Connector general layout drawing” and/or the “Connector drawing.” All the connector / terminal numbers shown in this Service Manual are either of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

EM4000SX

EB4000X•EB5000XK3•EB6500X1



AC PLUGS

① 20A 125V DUPLEX (NEMA 5-20P)
② 30A 125V LOCKING PLUG (NEMA L5-30P)
③ 20A 125/250V LOCKING PLUG (NEMA L14-20P)

AUTO THROTTLE SWITCH

COLOR	Lg	Bl
OFF (Auto Throttle does not operatre)		
ON (Auto Throttle operatres)	○	○

OIL LEVEL SWITCH

COLOR	Y	GROUND
PROPER OIL LEVEL		
OIL DRAINED	○	○

COMBINATION SWITCH CONNECTION TABLE

	EXIT (+)	EXIT (-)	LO	BAT	ST
OFF					
ON	○	○	○	○	
ST	○	○	○	○	○

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

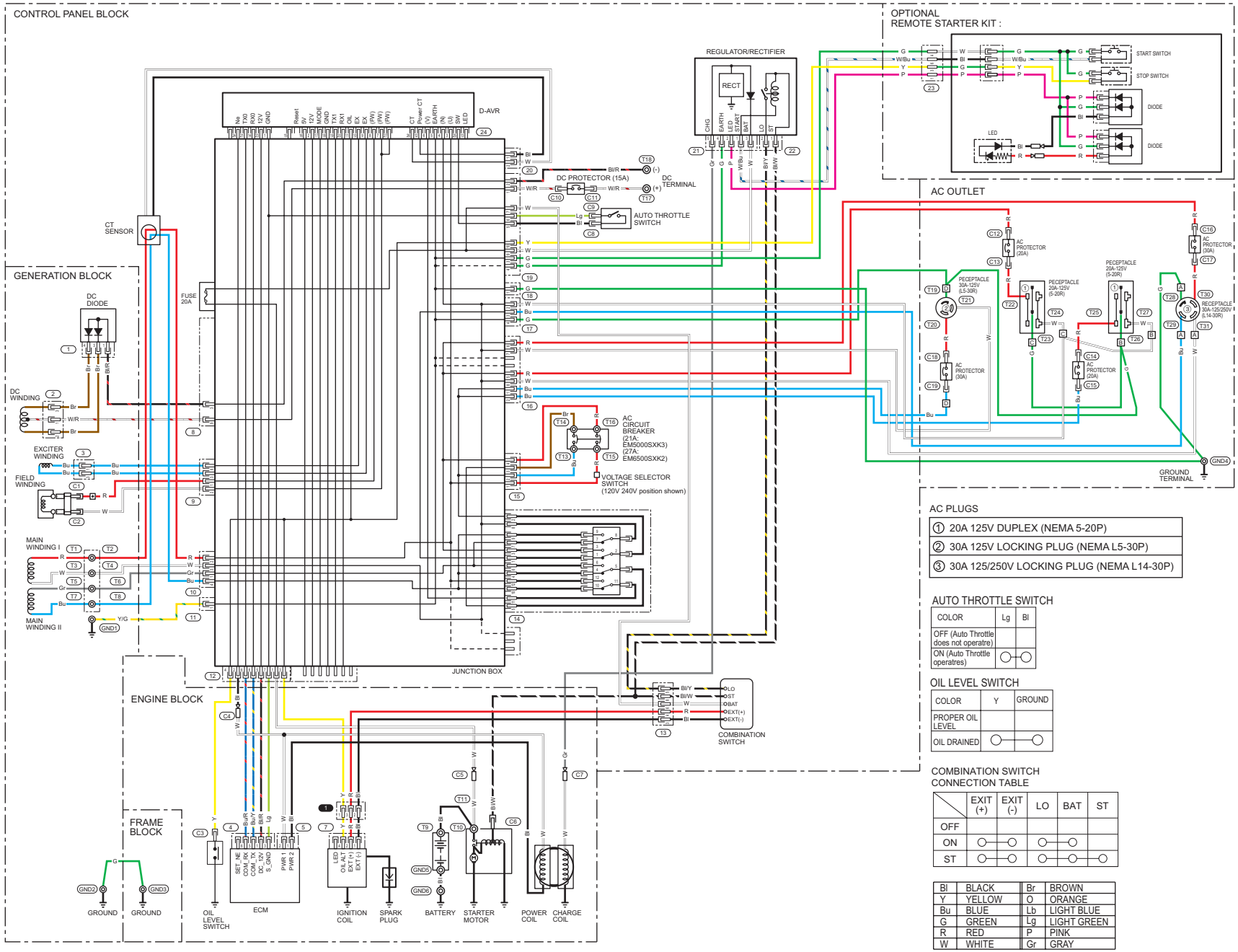
COLOR COMB : GROUND/MARKING

WIRING DIAGRAM

WIRING DIAGRAM

EM5000SXK3 / EM6500SXK2

EB4000X•EB5000XK3•EB6500X1



AC PLUGS

①	20A 125V DUPLEX (NEMA 5-20P)
②	30A 125V LOCKING PLUG (NEMA L5-30P)
③	30A 125/250V LOCKING PLUG (NEMA L14-30P)

AUTO THROTTLE SWITCH

COLOR	Lg	Bl
OFF (Auto Throttle does not operatre)		
ON (Auto Throttle operatres)	○	○

OIL LEVEL SWITCH

COLOR	Y	GROUND
PROPER OIL LEVEL		
OIL DRAINED	○	○

COMBINATION SWITCH CONNECTION TABLE

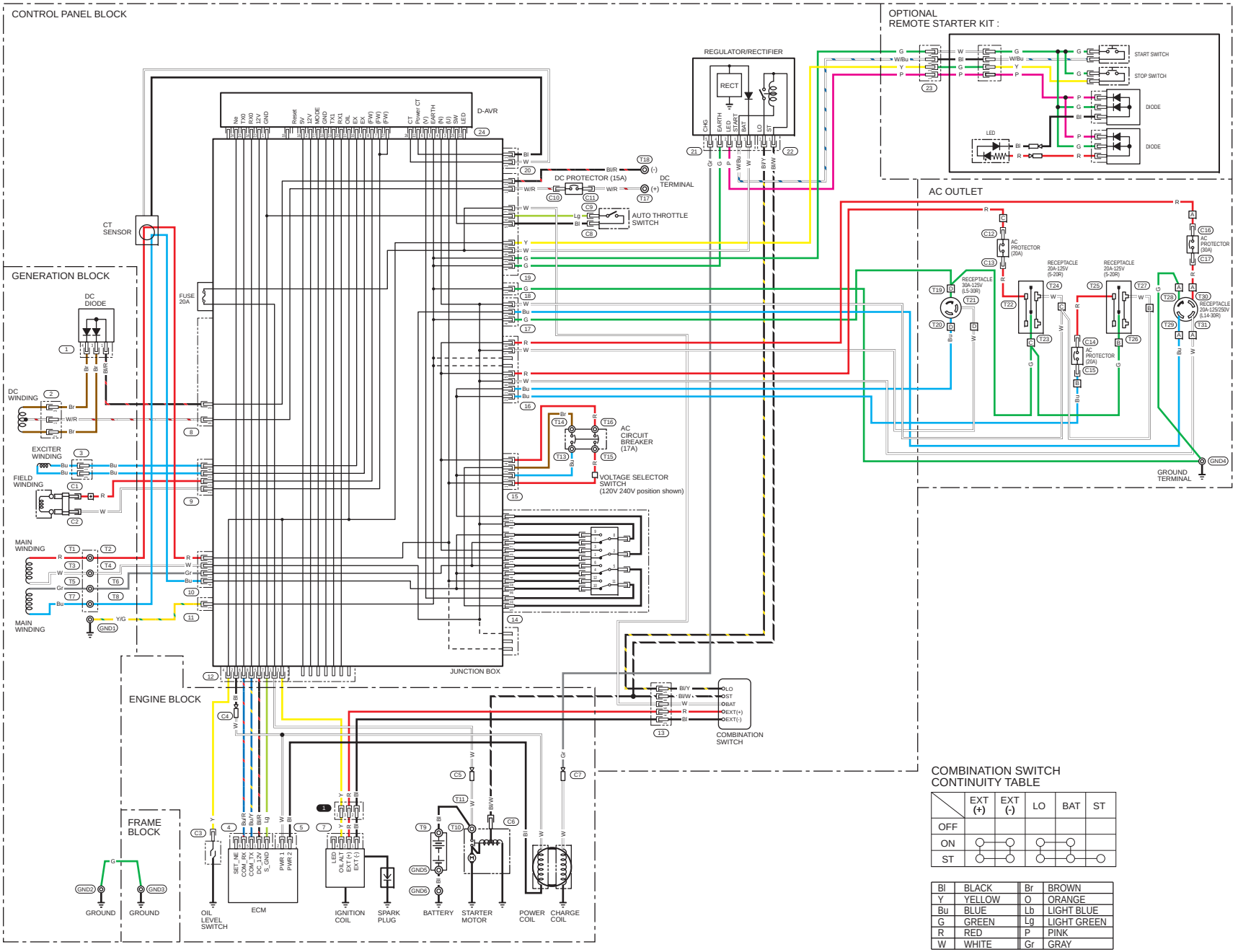
	EXIT (+)	EXIT (-)	LO	BAT	ST
OFF					
ON	○	○	○	○	
ST	○	○	○	○	○

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

EM4000SX AT1 TYPE



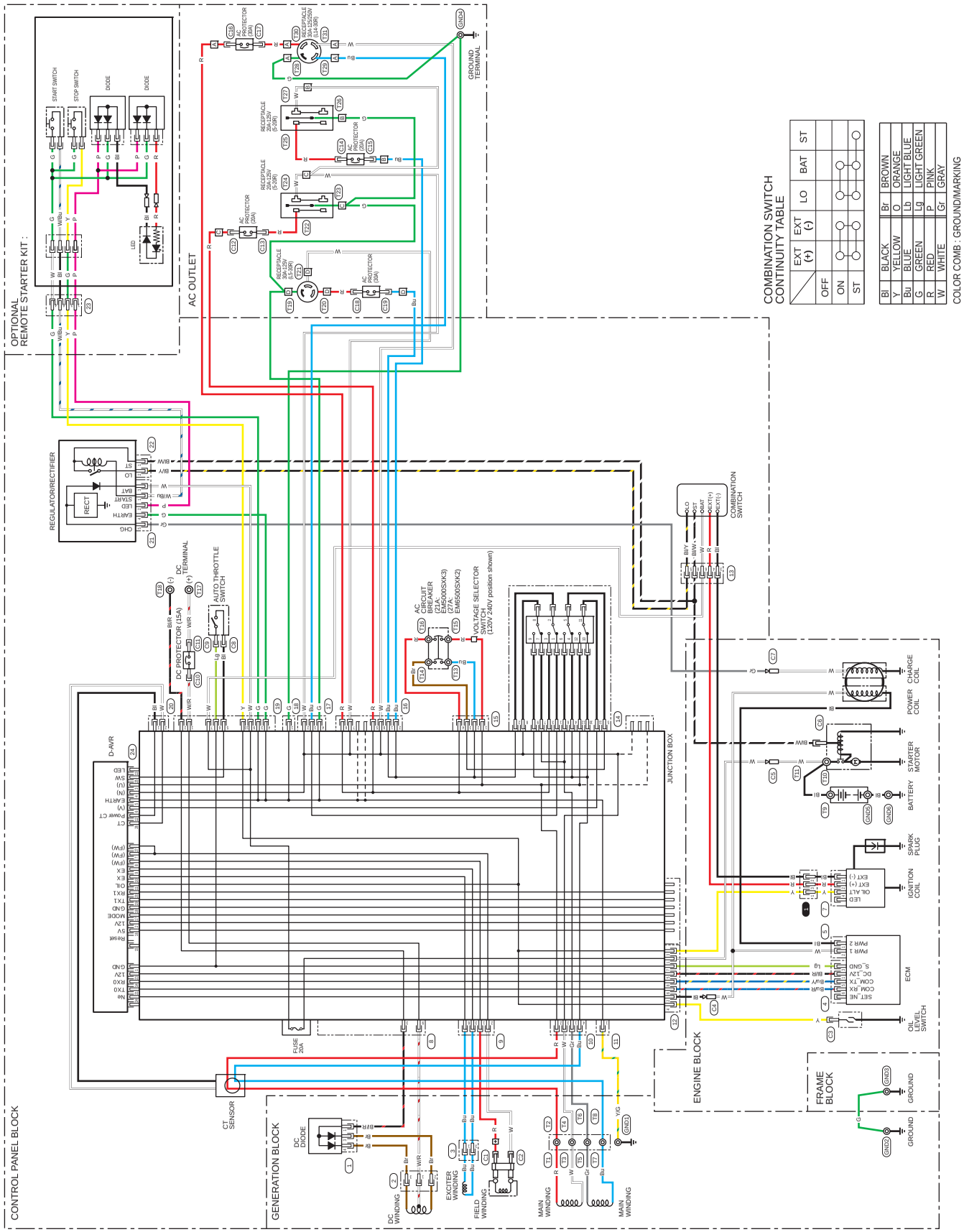
COMBINATION SWITCH CONTINUITY TABLE

	EXT (+)	EXT (-)	LO	BAT	ST
OFF					
ON	●	●	●	●	
ST	●	●	●	●	●

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

EM5000SXK3/EM6500SXK2 AT1 TYPE

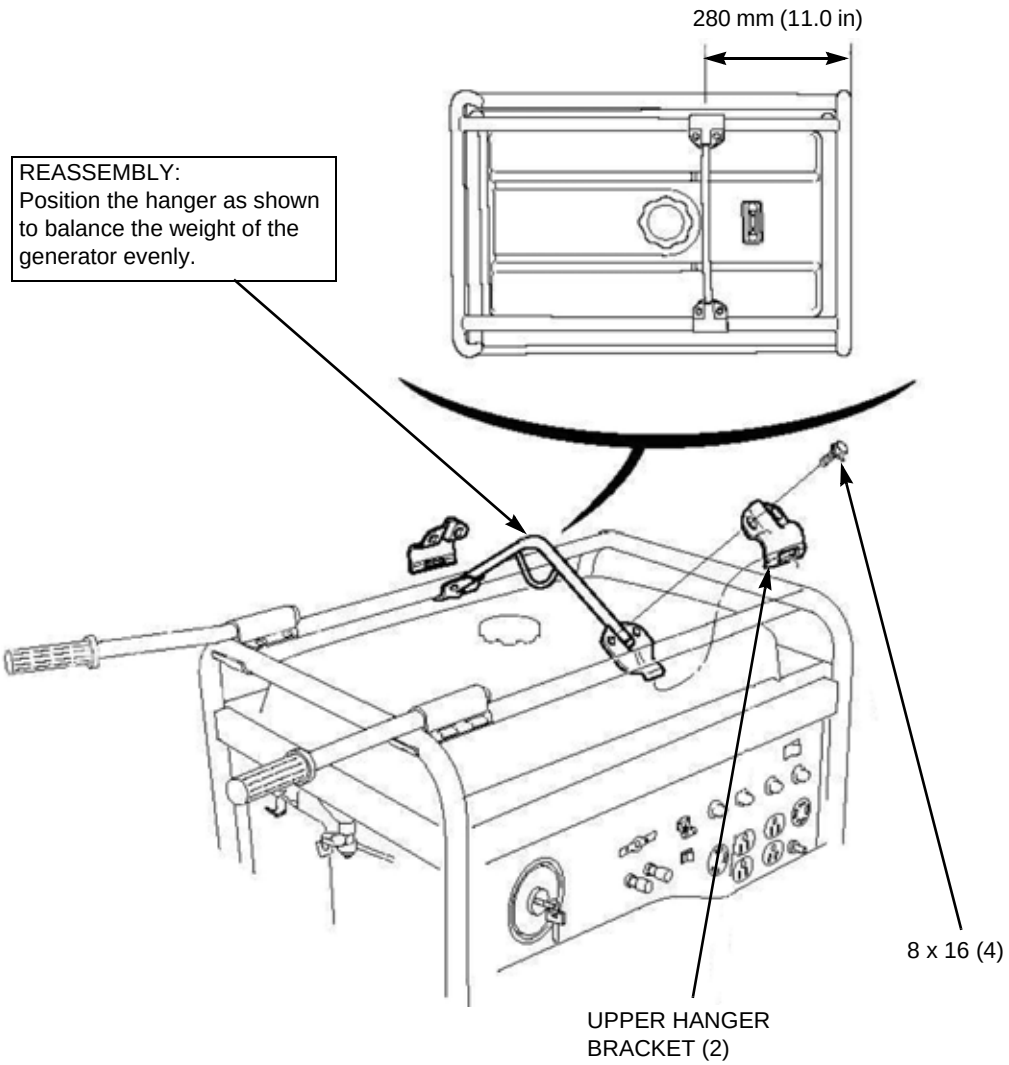


	EXT (+)	EXT (-)	LO	BAT	ST
OFF					
ON					
ST					

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

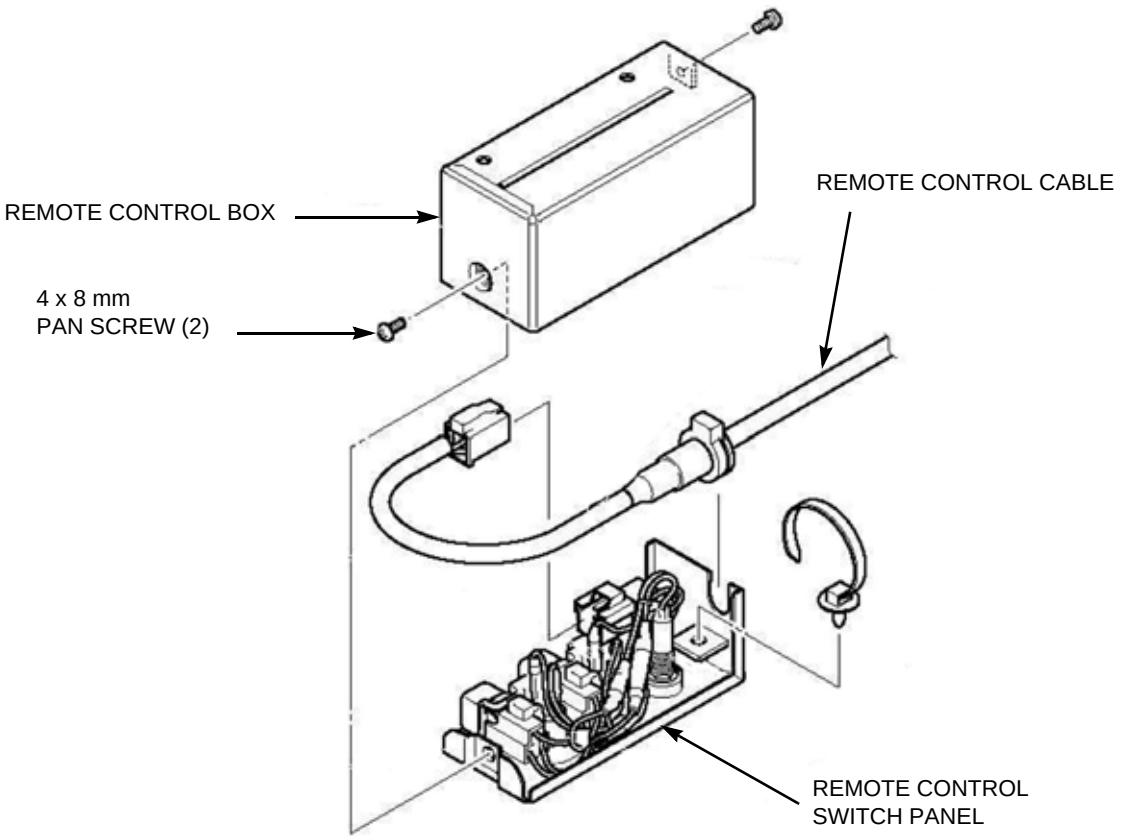
18. OPTIONAL EQUIPMENT

HANGER


280 mm (11.0 in)
REASSEMBLY:
Position the hanger as shown to balance the weight of the generator evenly.
8 x 16 (4)
UPPER HANGER BRACKET (2)

REMOTE CONTROL KIT

DISASSEMBLY

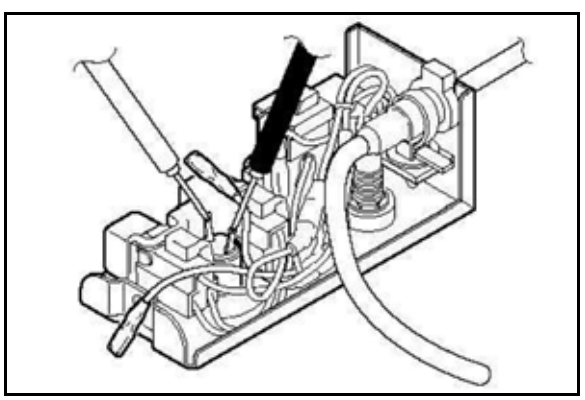


INSPECTION

ENGINE STOP SWITCH

Check the terminals for continuity.

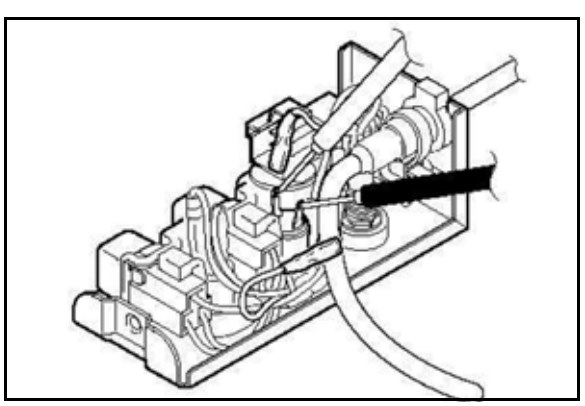
When the button is pushed	Continuity
When the button is not pushed	No continuity



ENGINE START SWITCH

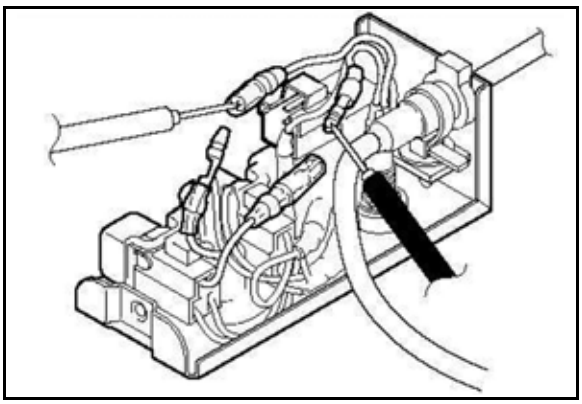
Check the terminals for continuity.

When the button is pushed	Continuity
When the button is not pushed	No continuity



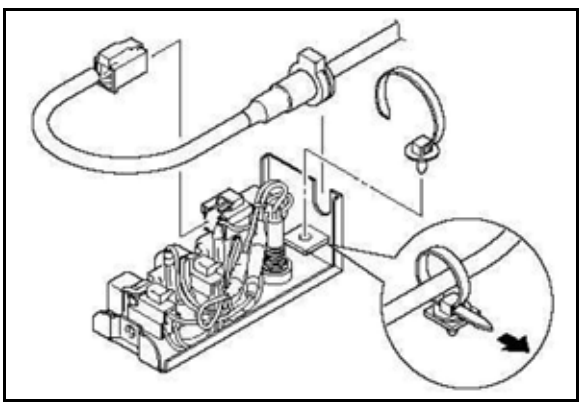
LED

Check the terminals for continuity. Reverse the meter leads and test again. The LED tests good if there is continuity in one direction but not the other.

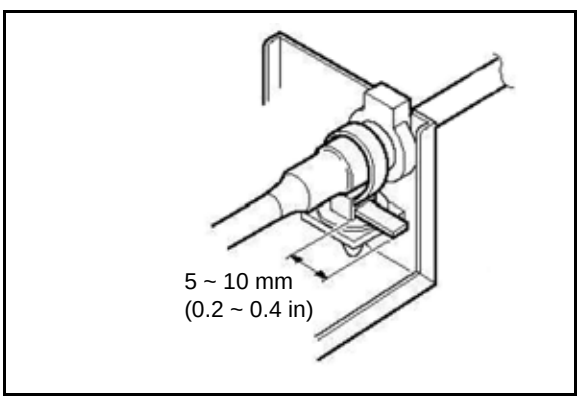


REASSEMBLY

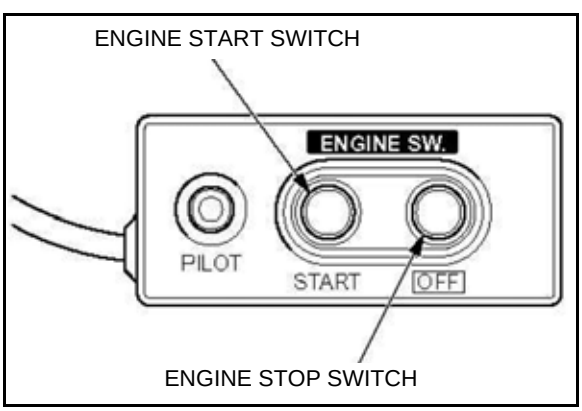
1. Install the cable strap and remote control cable. Connect the remote control cable connector.



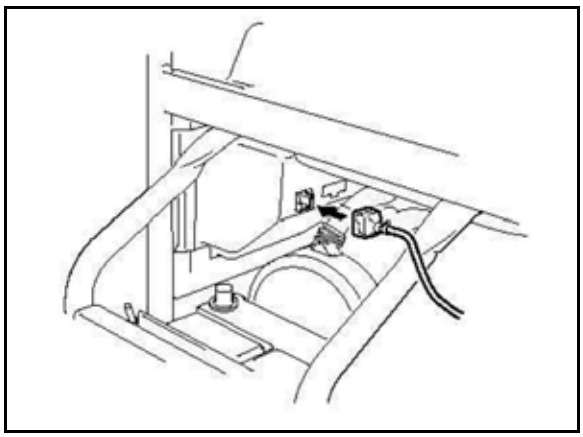
2.Install the remote control cable grommet into the cable strap.



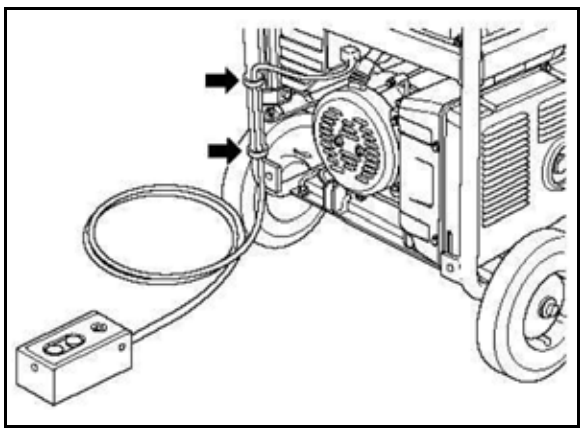
3. Install the remote control box and tighten the pan screw.



4. Install the 6P connector from the back of the control box.



5. Secure the remote control cable to the frame with the two cable straps as shown. Cable strap at the tape position of the remote control cable.



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