

SERVICE MANUAL

# INVERTER GENERATOR

P3200ie & P4300ie



Cummins **Onan**



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*This manual covers only alternator and control unit portion of the generator.*

*As to the servicing information of engine portion, please refer to the "EX13, E17, EX21 and EX27" service manual.*

*The specifications and information included in this manual were in effect at the time of printing.*

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# 1. SPECIFICATIONS

Model				RG2800i			P3200i			P4300i		
Alternator	Type			Multi-Pole, Rotating Field Inverter Generator								
	Frequency Hz			50 / 60								
	AC	Rated Output kVA		2.5			2.8			3.8		
		50Hz	Voltage V	110	220	230	110	220	230	110	220	230
			Rated Current A	22.7	11.4	10.9	25.5	12.7	12.2	34.5	17.3	16.5
		60Hz	Voltage V	120	240	—	120	240	—	120	240	—
			Rated Current A	20.8	10.4	—	23.3	11.7	—	31.7	15.8	—
		Power Factor			1.0							
	DC	Rated Output W		100								
		Voltage V		12								
		Current A		8.3								
	Voltage Regulator			PWM Controlling								
Voltage Regulation			Within 10%									
Engine	Model			EX17			EX21			EX27		
	Type			Air-Cooled 4-stroke OHC Gasoline engine								
	Displacement mL(cc)			169			211			265		
	Fuel			Unleaded Automobile Gasoline								
	Fuel Tank Capacity L			10.0						10.8		
	Continuous Operating Hours at Rated Output h			7.0			6.0			4.5		
	Lubrication Oil Capacity L			0.6						1.0		
	Ignition System			Solid-state flywheel magneto								
	Spark Plug			NGK BR6HS								
	Starting System			Recoil Starter						Electric Starter / Recoil		
	Equipment	Over-current Protection										
For AC Output			Electronic Circuit Breaker									
For DC Output			Circuit Breaker									
Oil Sensor			STD									
Multi Monitor			STD									
Dimensions L×W×H mm			487×432×475						523×477×508			
Dry Weight kg			37			38			52.5			

Specifications are subject to change without notice.

Model				RG2800iS			P3200i			P4300i		
Alternator	Type			Multi-Pole, Rotating Field Inverter Generator								
	Frequency Hz			50 / 60								
	AC	Rated Output kVA		2.5			2.8			3.8		
		50Hz	Voltage V	110	220	230	110	220	230	110	220	230
			Rated Current A	22.7	11.4	10.9	25.5	12.7	12.2	34.5	17.3	16.5
		60Hz	Voltage V	120	240	—	120	240	—	120	240	—
			Rated Current A	20.8	10.4	—	23.3	11.7	—	31.7	15.8	—
		Power Factor			1.0							
	DC	Rated Output W		100								
		Voltage V		12								
		Current A		8.3								
Voltage Regulator			PWM Controlling									
Voltage Regulation			Within 10%									
Engine	Model			EX17			EX21			EX27		
	Type			Air-Cooled 4-stroke OHC Gasoline engine								
	Displacement mL(cc)			169			211			265		
	Fuel			Unleaded Automobile Gasoline								
	Fuel Tank Capacity L			10.8						12.8		
	Continuous Operating Hours at Rated Output h			7.6			6.5			5.3		
	Lubrication Oil Capacity L			0.6						1.0		
	Ignition System			Solid-state flywheel magneto								
	Spark Plug			NGK BR6HS								
	Starting System			Recoil Starter			Electric Starter / Recoil					
	Equipment	Over-current Protection			Electronic Circuit Breaker							
For AC Output												
For DC Output			Circuit Breaker									
Oil Sensor			STD									
Multi Monitor			STD									
Dimensions L×W×H mm			537×482×583						580×527×618			
Dry Weight kg			54			59			74			

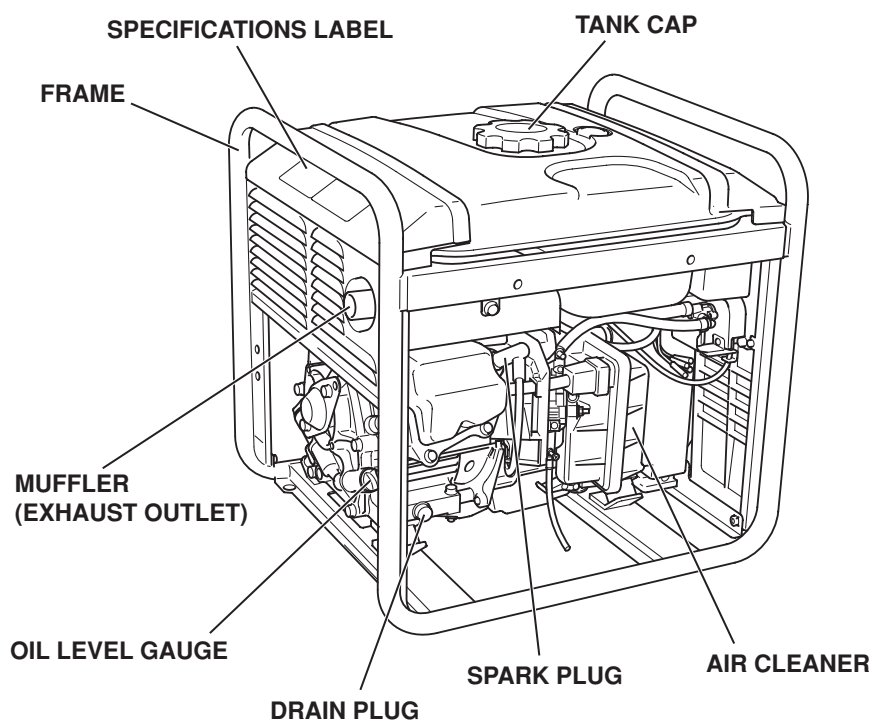
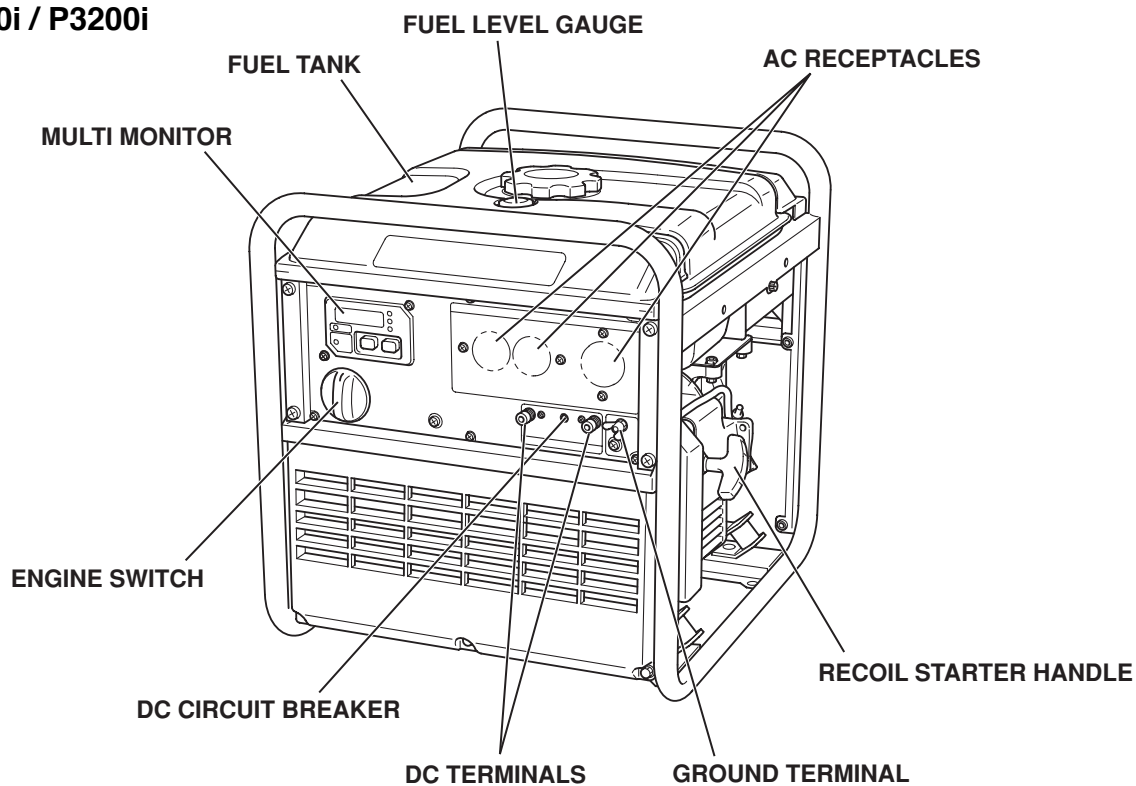
Specifications are subject to change without notice.

## 2. GENERAL DESCRIPTION

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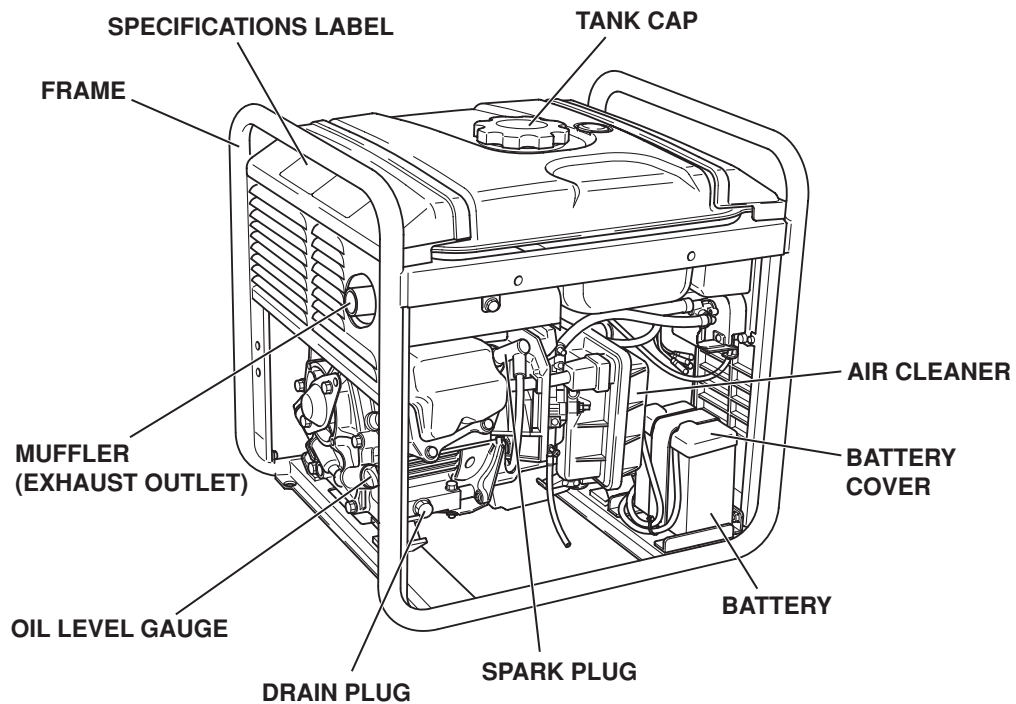
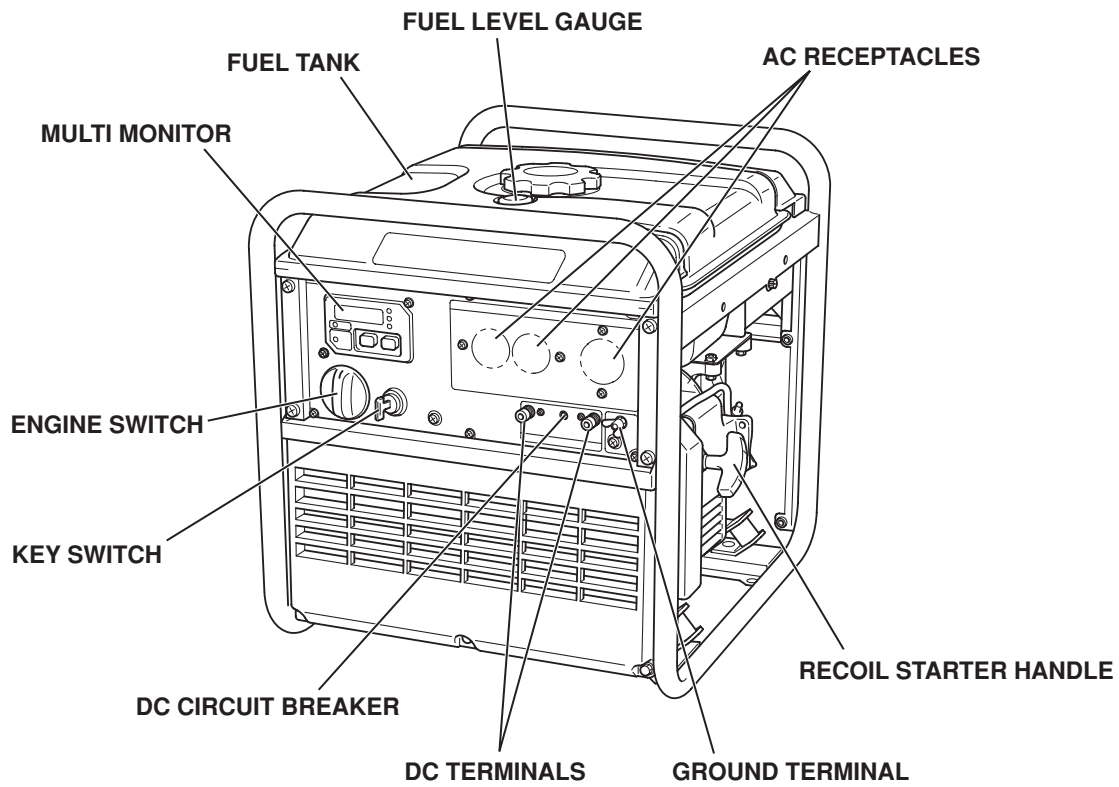
### 2-1-1) EXTERNAL VIEW OF GENERATOR : OPEN FRAME TYPE

RG2800i / P3200i



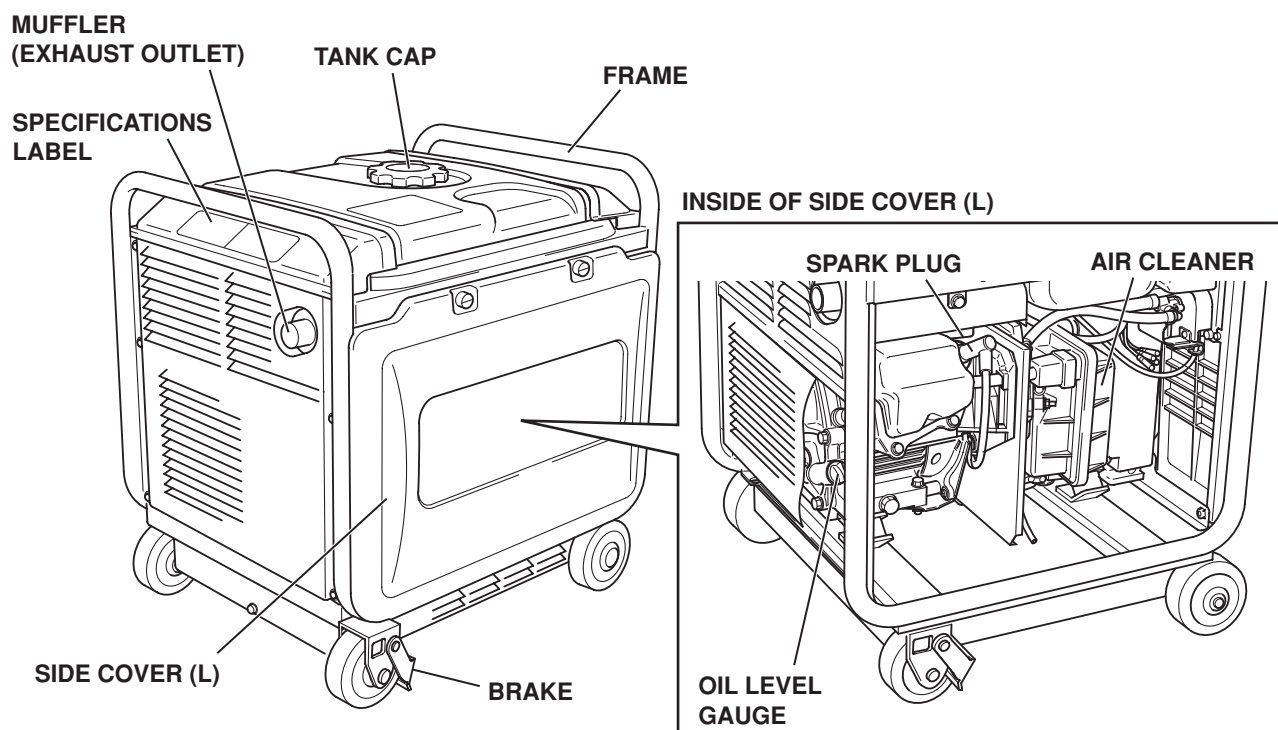
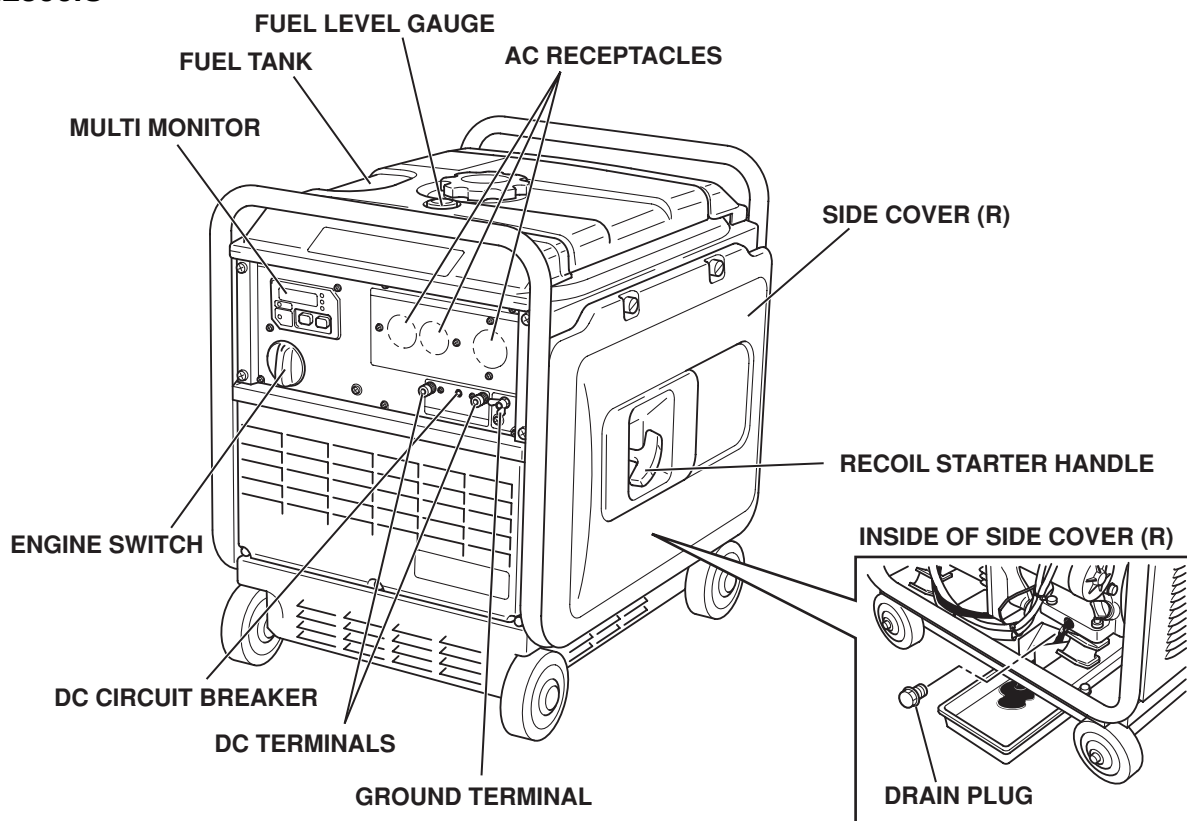
## 2-1-2) EXTERNAL VIEW OF GENERATOR : OPEN FRAME TYPE WITH ELECTRIC STARTER

**P4300i**



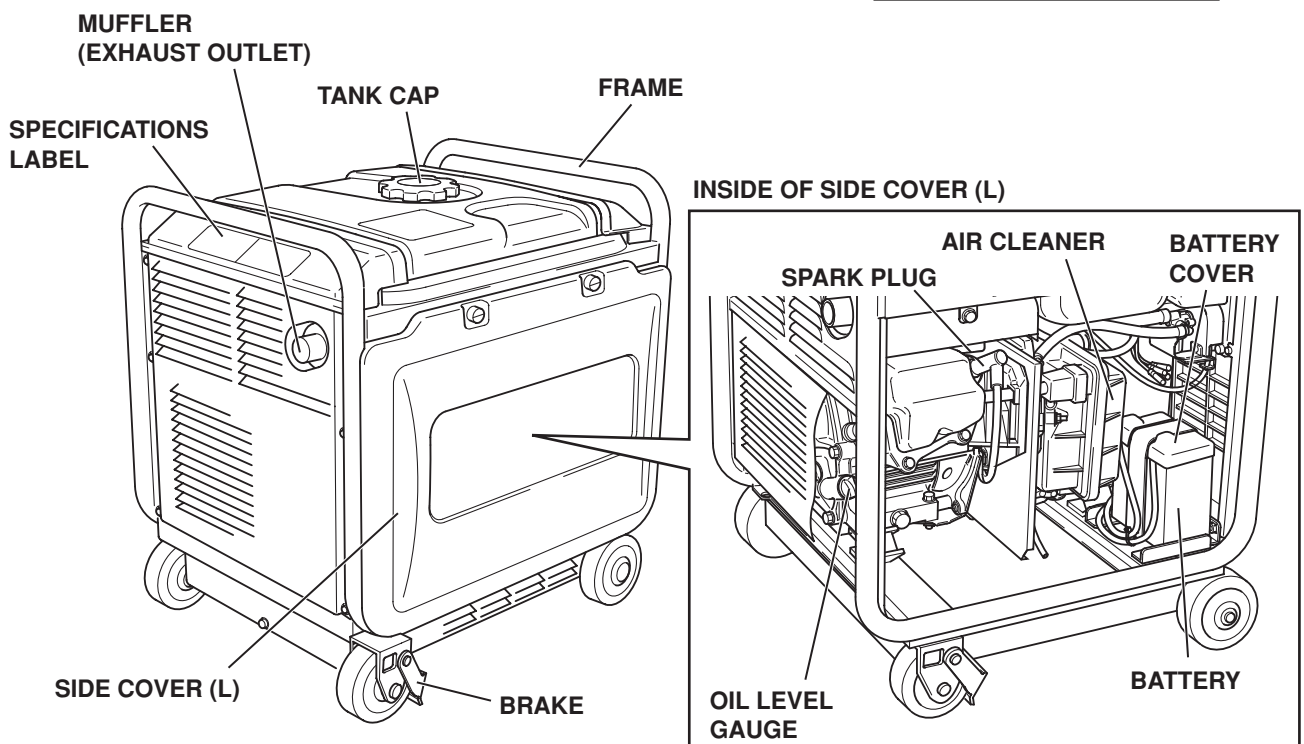
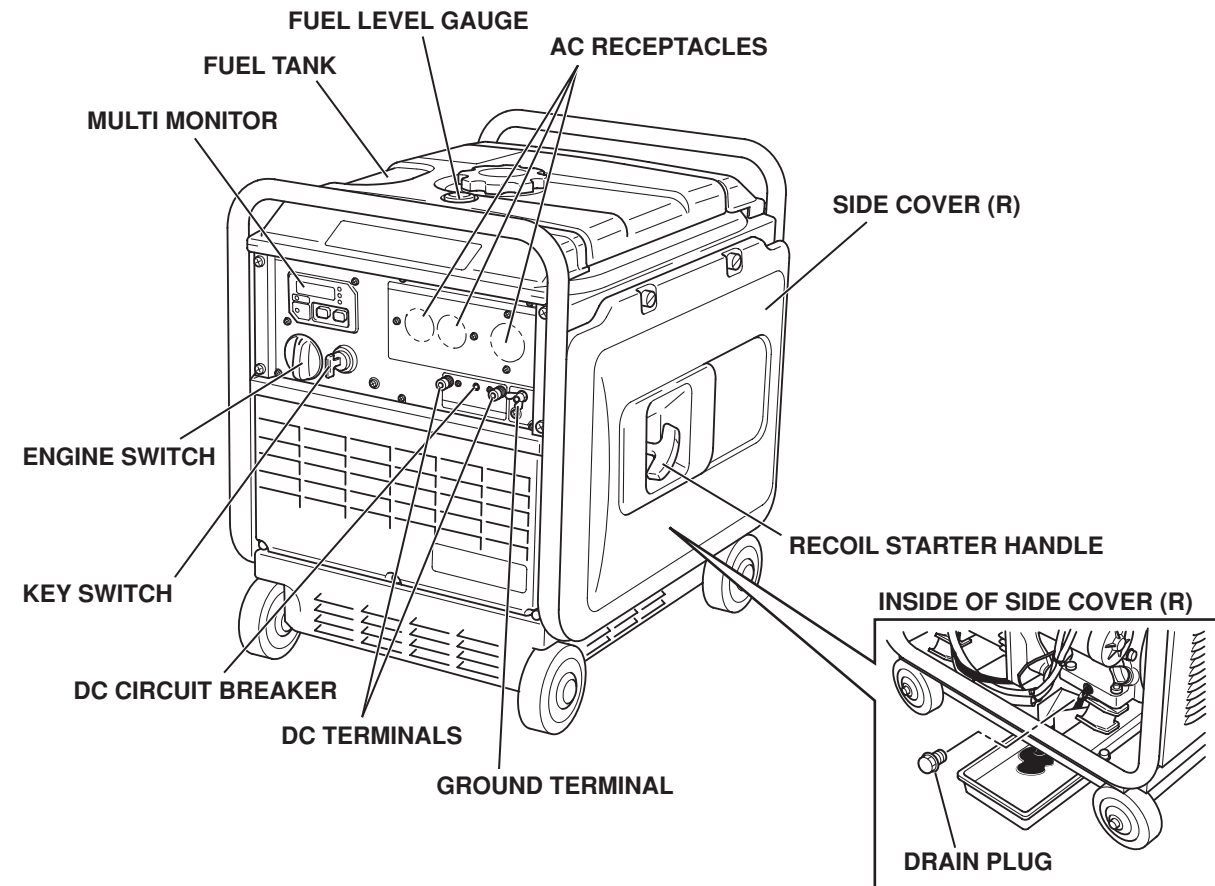
## 2-1-3) EXTERNAL VIEW OF GENERATOR : SOUND PROOF TYPE

### RG2800iS

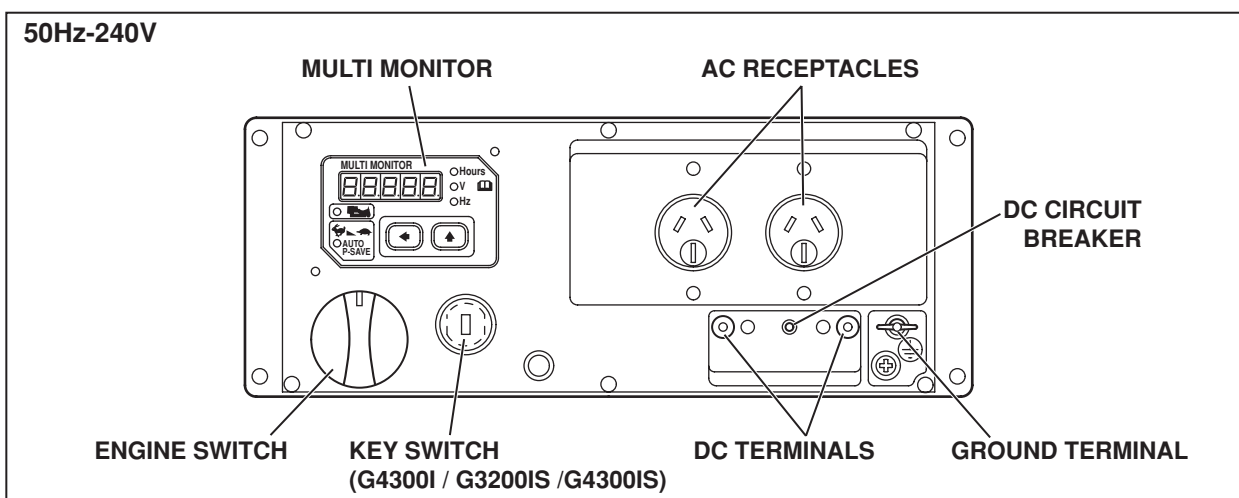
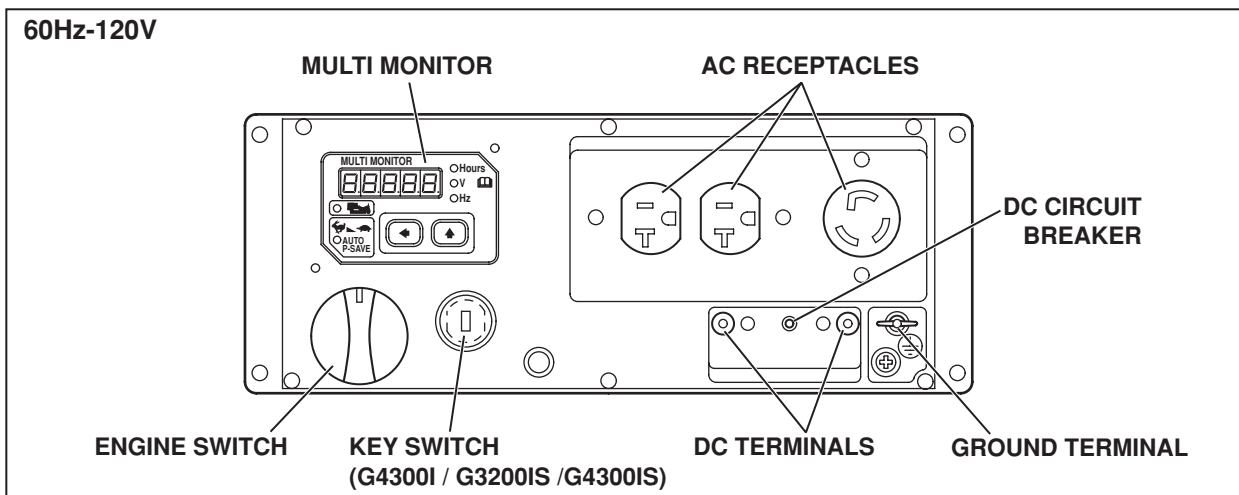
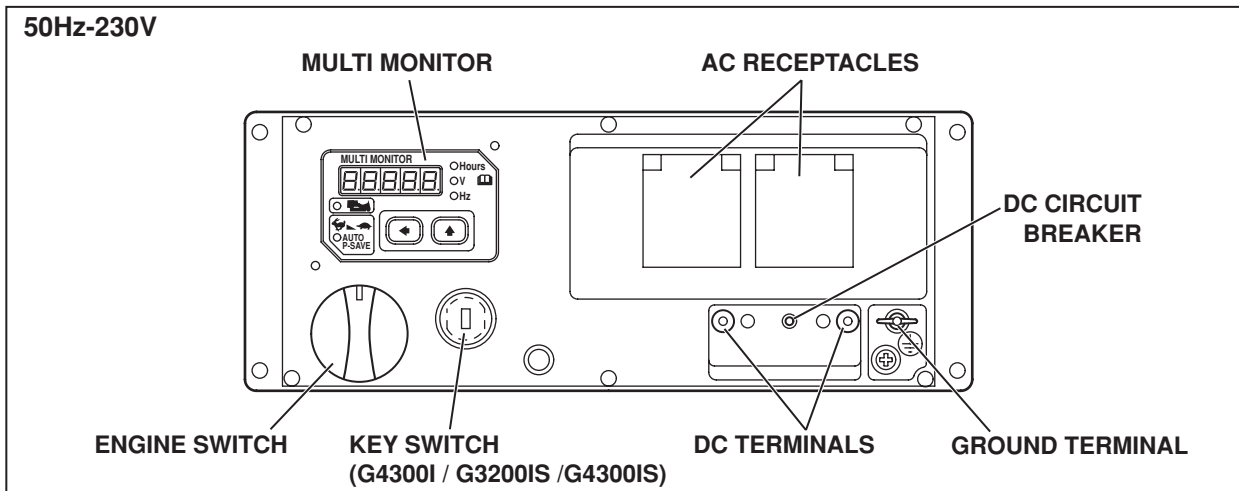


## 2-1-4) EXTERNAL VIEW OF GENERATOR : SOUND PROOF TYPE WITH ELECTRIC STARTER

P3200i / P4300i






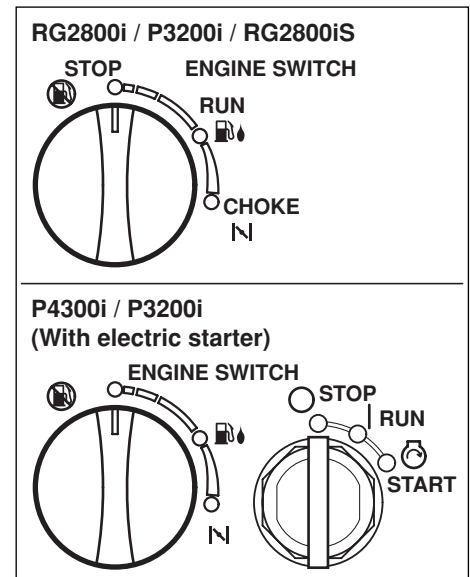
## 2-2) CONTROL PANEL



## (1) ENGINE SWITCH

The engine switch is designed for easy operation with the interlocking mechanism between the fuel cock and the choke furnished.

 <b>CHOKE</b>	To start the engine, turn the knob to the position. (Choke valve is closed.)
 <b>RUN</b>	Keep the knob in this position after the engine starts. (The engine can be started with the knob at this position when the engine is warm.)
 <b>STOP</b>	To stop the engine, return the knob to the position. (The fuel cock is closed as well.)



## (2) KEY SWITCH for electric starting models.

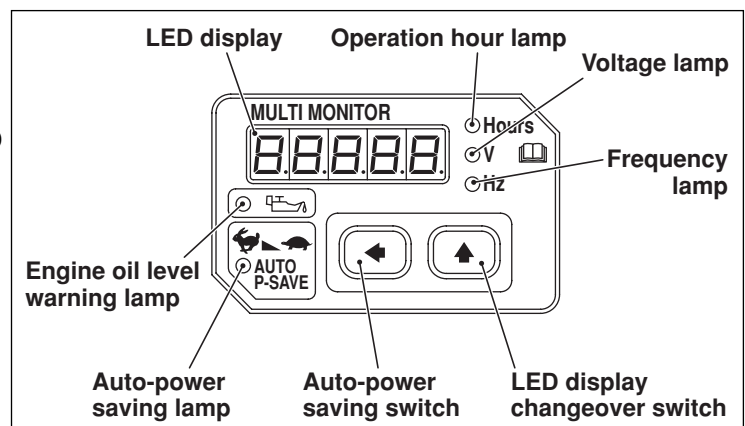
To start the engine with electric starter.

## (3) MULTI MONITOR

### ■ LED display

Operation hour, voltage and frequency are indicated in turns by means of depressing the LED display changeover switch. In addition, "O\_Lod" (overload) will be indicated when the generator is in the overload condition or appliance(s) is out of order.

In this case, stop the engine immediately and check the appliance and/or generator for overloading. After the check and remedy, restarting the engine will resume displaying in the normal manner.



### ■ Operation hour lamp

Lamp (red) is turned on when LED display is changed over into operation hour indication.

### ■ Voltage lamp

Lamp (red) is turned on when LED display is changed over into voltage indication.

### ■ Frequency lamp

Lamp (red) is turned on when LED display is changed over into frequency indication.

### ■ LED display changeover switch

When depressing this switch, indication in LED display is changed over in turns; operation hour → voltage → frequency → operation hour.

When starting the engine, operation hour is indicated in LED display at first.

### ■ Auto-power saving switch

When depressing this switch, auto-power saving function is activated.

### ■ Auto-power saving lamp

Lamp (green) is turned on while auto-power saving function is activated.

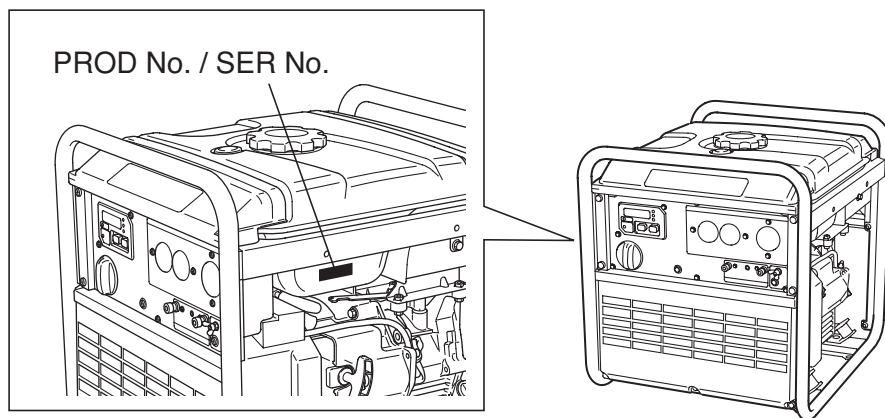
### ■ Engine oil level warning lamp

When the engine oil level is lower than the specified level, the lamp is turned on. Then engine will be stopped.

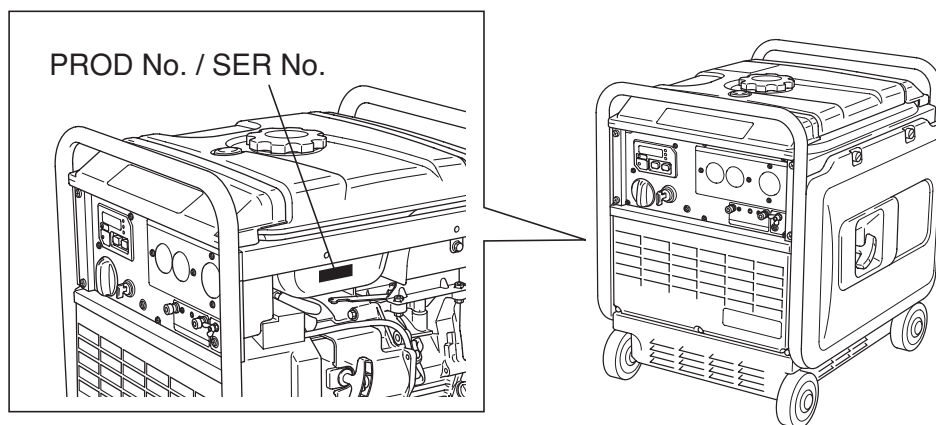
## 2-3) LOCATION OF SERIAL NUMBER AND PRODUCTION NUMBER

Generator serial number and production number are stamped on the label stuck on the side of fuel tank.  
For soundproof type models, remove the side cover (R) to check these numbers.

### RG2800i / P3200i / P4300i



### RG2800iS / P3200i / P4300i



*NOTE : When inquiring about your generator or ordering spare parts, always give us the Model, Serial Number and Production Number.*

## 2-4) ALTERNATOR

8P Connector for battery  
charging and others.

4P Connector for output wires

Diode Rectifier

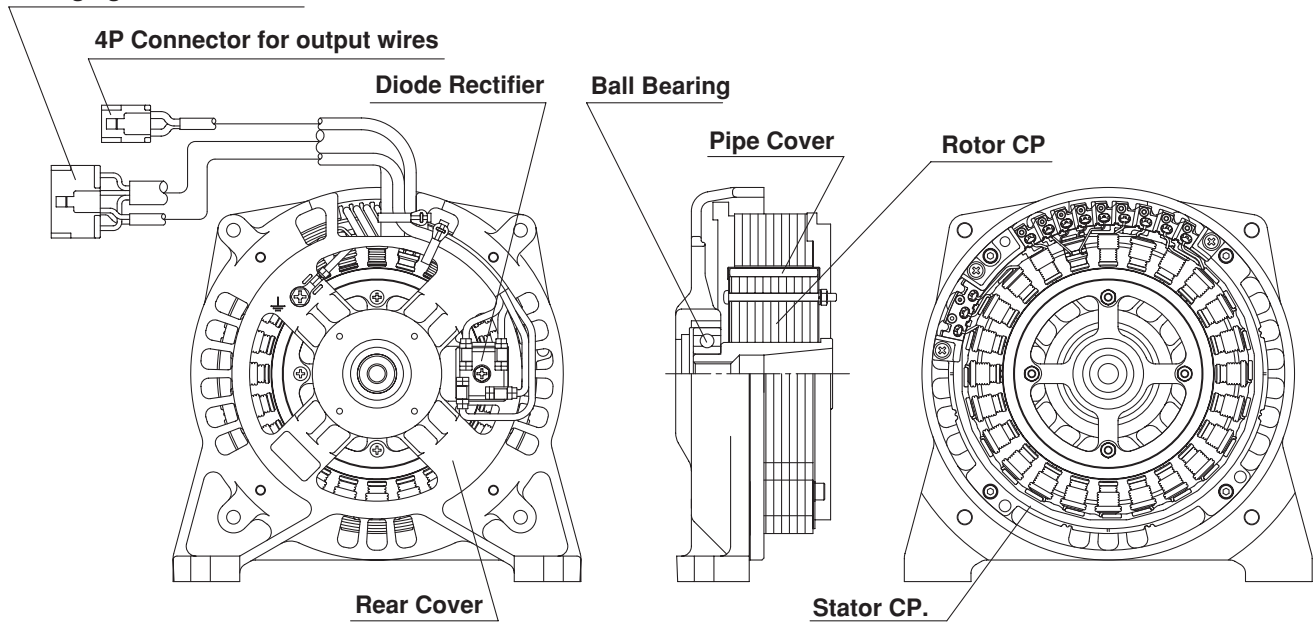
Ball Bearing

Pipe Cover

Rotor CP

Rear Cover

Stator CP.



### 3. RANGE OF APPLICATIONS

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Generally, the power rating of an electrical appliance indicates the amount of work that can be done by it. The electric power required for operating an electrical appliance is not always equal to the output wattage of the appliance. The electrical appliances generally have a label showing their rated voltage, frequency, and power consumption (input wattage). The power consumption of an electrical appliance is the power necessary for using it. When using a generator for operating an electrical appliance, the power factor and starting wattage must be taken into consideration.

In order to determine the right size generator, it is necessary to add the total wattage of all appliances to be connected to the unit.

Refer to the followings to calculate the power consumption of each appliance or equipment by its type.

**(1) Incandescent lamp, heater, etc. with a power factor of 1.0**

Total power consumption must be equal to or less than the rated output of the generator.

**Example :** A rated 3000W generator can turn thirty 100W incandescent lamps on.

**(2) Fluorescent lamps, motor driven tools, light electrical appliances, etc. with a smaller power factor**

Select a generator with a rated output equivalent to 1.2 to 2 times of the power consumption of the load. Generally the starting wattage of motor driven tools and light electrical appliances are 1.2 to 3 times larger than their running wattage.

**Example :** A rated 250 W electric drill requires a 400 W generator to start it.

*NOTE 1: If a power factor correction capacitor is not applied to the fluorescent lamp, the more power shall be required to drive the lamps.*

*NOTE 2: Nominal wattage of the fluorescent lamp generally indicates the output wattage of the lamp. Therefore, if the fluorescent lamp has no special indication as to the power consumption, efficiency should be taken into account as explained in Item (5) on the following page.*

**(3) Mercury lamps with a smaller power factor**

Loads for mercury lamps require 2 to 3 times the indicated wattage during start-up.

**Example :** A 400 W mercury lamp requires 800 W to 1200 W power source to be turned on. A rated 3000 W generator can power two or three 400 W mercury lamps.

**(4) Initially loaded motor driven appliances such as water pumps, compressors, etc.**

These appliances require large starting wattage which is 3 to 5 times of running wattage.

**Example :** A rated 900 W compressor requires a 4500 W generator to drive it.

*NOTE 1: Motor-driven appliances require the aforementioned generator output only at the starting. Once their motors are started, the appliances consume about 1.2 to 2 times their rated power consumption so that the excess power generated by the generator can be used for other electrical appliances.*

*NOTE 2: Motor-driven appliances mentioned in items (3) and (4) vary in their required motor starting power depending on the kind of motor and start-up load. If it is difficult to determine the optimum generator capacity, select a generator with a larger capacity.*

##### (5) Appliances without any indication as to power consumption

Some appliances have no indication as to power consumption; but instead the work load (output) is indicated. In such a case, power consumption is to be worked out according to the numerical formula mentioned below.

$$\frac{(\text{Output of electrical appliance})}{(\text{Efficiency})} = (\text{Power consumption})$$

Efficiencies of some electrical appliances are as follows :

Single-phase motor . . . . .0.6 to 0.75 (The smaller the motor, the lower the efficiency)

Fluorescent lamp . . . . .0.7 to 0.8

**Example 1:** A 40W fluorescent lamp means that its luminous output is 40W. Its efficiency is 0.7 and accordingly, power consumption will be  $40 \div 0.7 = 57\text{W}$ . As explained in **Item (2)**, multiply this power consumption value of 57W by 1.2 to 2 and you will get the figure of the necessary capacity of a generator. In other words, a generator with a rated output of 1000W capacity can light nine to fourteen 40W fluorescent lamps.

**Example 2 :** Generally speaking, a 400W motor means that its work load is 400W. Efficiency of this motor is 0.7 and power consumption will be  $400 \div 0.7 = 570\text{W}$ . When this motor is used for a motor-driven tool, the capacity of the generator should be multiplied by 1.2 to 3 and 570W as explained in the **Item (3)**.  $570 \text{ (W)} \times 1.2 \text{ to } 3 = 684 \text{ (W) to } 1710 \text{ (W)}$

Applications	Applicable Wattage (W)		
	RG2800i RG2800iS	P3200i	P4300i
	50Hz / 60Hz		
Incandescent lamp, Heater, etc	approx. 2500	approx. 2800	approx. 3800
Fluorescent lamp, Electric tool, etc	approx. 1300	approx. 1400	approx. 1900
Mercury lamp, etc	approx. 800	approx. 1000	approx. 1600
Pump, Compressor, etc	approx. 500	approx. 600	approx. 800

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**NOTES : Wiring between generator and electrical appliances**

**1. Allowable current of cable**

Use a cable with an allowable current that is higher than the rated input current of the load (electrical appliance). If the input current is higher than the allowable current of the cable used, the cable will become excessively heated and deteriorate the insulation, possibly burning it out. The table below shows cables and their allowable currents for your reference.

**2. Cable length**

If a long cable is used, a voltage drop occurs due to the increased resistance in the conductors decreasing the input voltage to the load (electrical product). As a result, the load can be damaged. The table below shows voltage drops per 30 meters of cable.

Cross sectional mm <sup>2</sup>	Allowable Current A	Cable Resistance Ω/100m	Voltage drops per 30 meters of cable					
			5A	10A	15A	20A	25A	30A
1.25	12	1.486	4.5V	8.9V	*	*	*	*
2.0	17	0.952	2.8V	5.7V	8.6V	*	*	*
3.5	23	0.517	1.6V	3.1V	4.7V	6.2V	*	*
5.5	35	0.332	1.0V	2.0V	3.0V	4.0V	5.0V	6.0V

Voltage drop indicates as  $V = \frac{1}{100} \times R \times I \times L$       R : Resistance (Ω/100m)  
I : Electric current (A)  
L : Length (m)

The length of wire (L) indicates round length, which is the length from the generator to the electrical tools and back.

<Example>    R : Resistance    1.25mm<sup>2</sup>=1.48Ω/100m  
                  I : Electric current    10A  
                  L : Length    30m

The voltage drop of the case described above is

$$V = \frac{1.48\Omega \times 10A \times (30m \times 2)}{100} \div 8.9 (V)$$

## 4. MEASURING AND CHECKING PROCEDURES

### 4-1) MEASURING INSTRUMENTS

#### (1) VOLTMETER

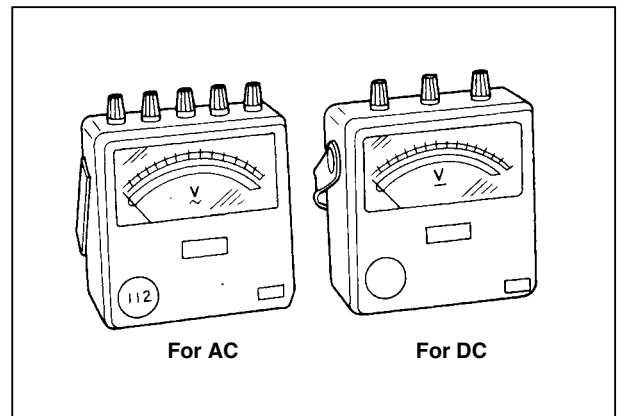
AC voltmeter is necessary.

The approximate AC voltage ranges of the voltmeters to be used for various types of generators are as follows :

0 to 150 V : Type with an output voltage of 110 or 120 V

0 to 300 V : Type with an output voltage of 220, 230 or 240 V

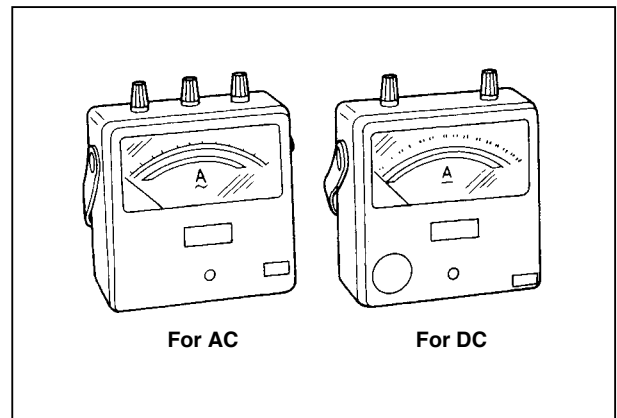
0 to 150 V, 0 to 300 V : Dual voltage type



#### (2) AMMETER

AC ammeter is necessary.

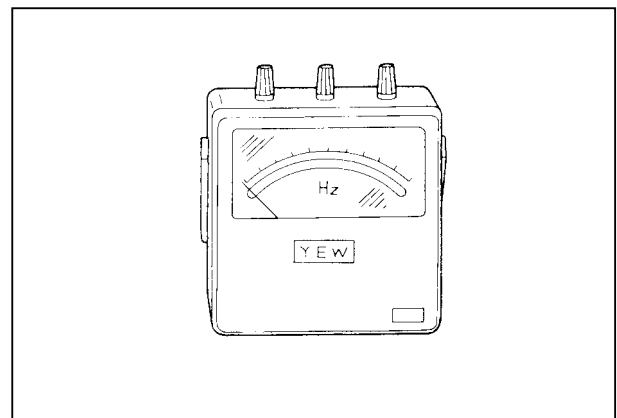
An AC ammeter with a range that can be changed according to the current rating of a given generator is most desirable. (About 10 A, 20 A, 100 A)



#### (3) FREQUENCY METER

Frequency range : To cover 45 to 65Hz

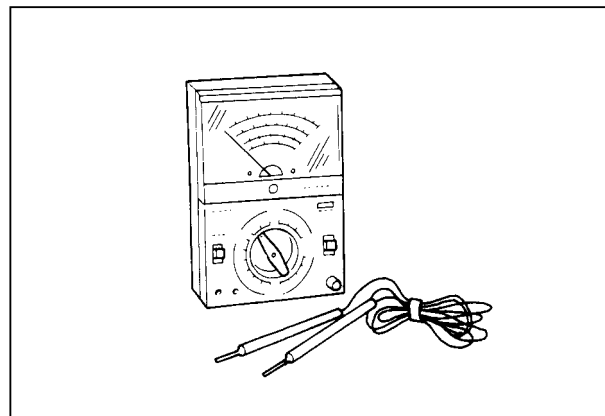
*NOTE : Be careful of the frequency meter's input voltage range.*



#### (4) CIRCUIT TESTER

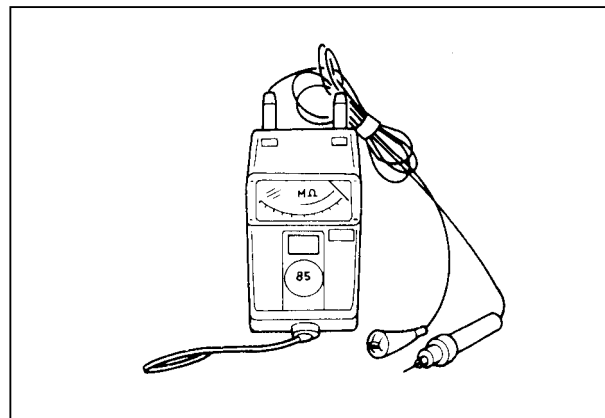
For measuring resistance, etc.

*NOTE : The ordinary circuit tester may cause erroneous readings due to their measuring method.  
Use a high-grade, precise circuit tester to check the generator components.*



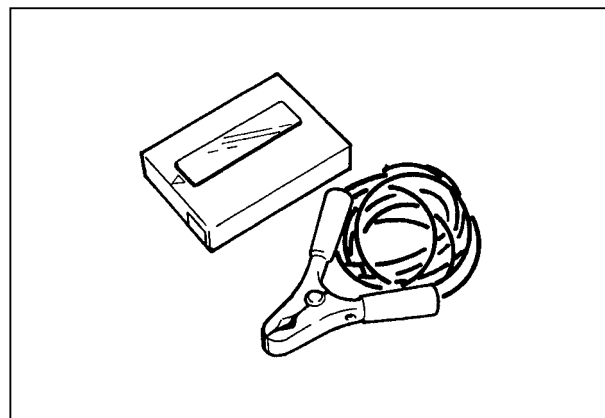
#### (5) MEAGER TESTER

Used for measuring generator insulation resistance.  
Select the one with testing voltage range of 500V.



#### (6) TACHOMETER

Use the contactless type tachometer for checking engine speed.

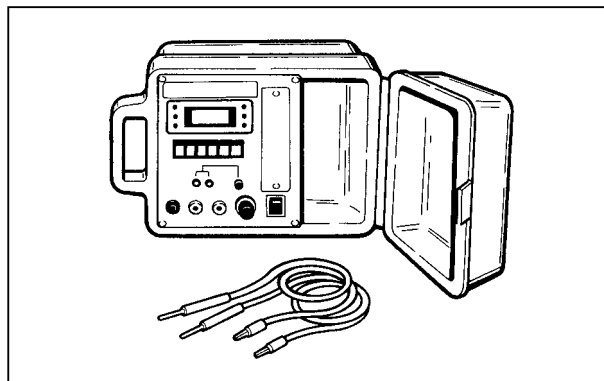


#### (7) CUMMINS ONAN GENERATOR TESTER

The Cummins Onan generator tester is exclusively designed for fast, easy diagnosis and repair of Cummins Onan generators.

The Cummins Onan generator tester has the following features :

- 1) Functions of voltmeter, frequency meter, megger tester, capacitance meter and circuit tester are combined in one unit.
- 2) Fast and easy readout by digital indicator.
- 3) Built-in automatic battery checker indicates the time to change batteries.
- 4) Tester and accessories are installed in a handy, sturdy case for easy carrying.



#### ●SPECIFICATIONS

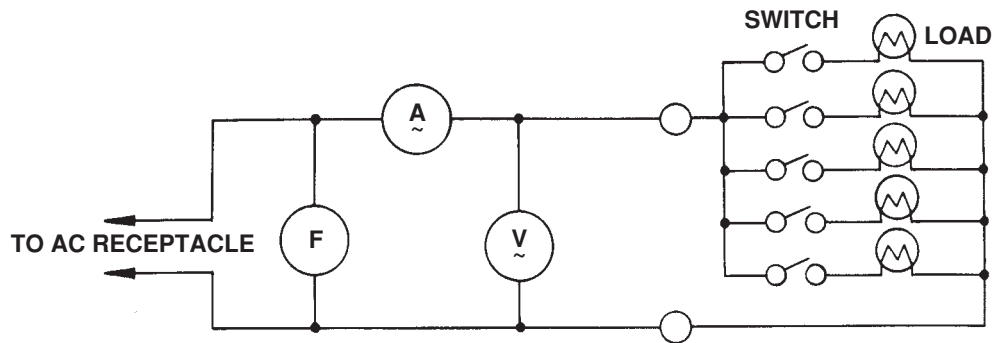
MODEL		Tester
Part Number		388-47565-08
Measuring Range	Voltage	0 to 500 V AC
	Frequency	25 to 70 Hz
	Resistance	0.1 to 1,999 $\Omega$
	Condenser Capacity	10 to 100 $\mu$ F
	Insulation Resistance	3M $\Omega$
Circuit Protector		Fuse
Power Source		2 x 6F44P (006P) Dry Cell Battery
Accessories		Test leads with needle probes ... 1 set Test leads with jack plugs ... 1 set
Dimensions (L x W x H)		285 mm x 200 mm x 110 mm
Weight		1.6 kg

The Cummins Onan generator tester can be ordered from Cummins Onan generator distributors by the following part number:

**Cummins Onan Part Number : 388-47565-08**

If you do not have a Cummins Onan generator tester, use the instruments described in the following section for checking generator parts.

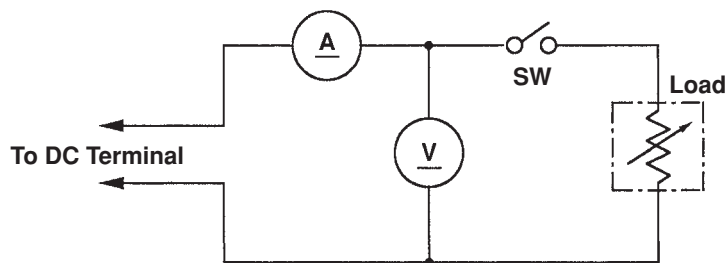
## 4-2) AC OUTPUT MEASURING



Use a circuit above for measuring AC output. A hot plate or lamp with a power factor of 1.0 may be used as a load. Adjust the load and rpm, and check that the voltage range is as specified in the following table at the rated amperage and rated rpm.

Model	Specification				
	120V / 60Hz	220V / 50Hz	230V / 50Hz	240V / 60Hz	
RG2800i P3200i P4300i	117–130	215–238	225–248	235–259	Voltage range

## 4-3) DC OUTPUT MEASURING



Measurement of DC output is executed with the switch turned ON while the current is regulated at 8.3A by adjusting the load to the generator. If the voltage is within the range from 6V to 14V, the voltage output is normal.

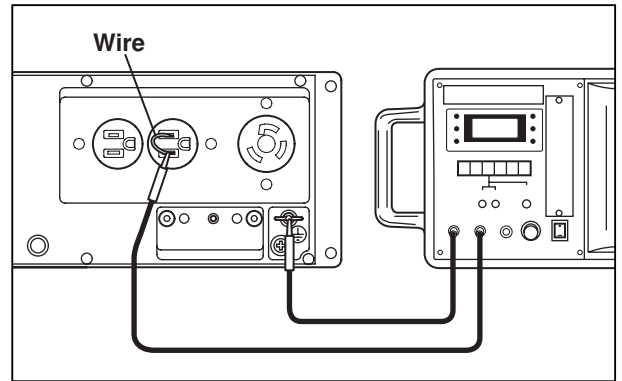
**NOTE :** If a battery is connected as a load to the generator, the DC output voltage will increase by approximately 1 to 2 V.

Therefore, carefully observe the electrolyte level and do not overcharge the battery.

## 4-4) MEASURING INSULATION RESISTANCE

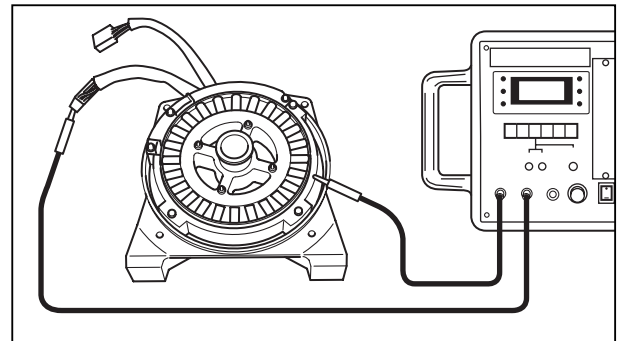
Use a Cummins Onan generator tester in megger tester mode or use a megger tester to check the insulation resistance. Connect a megger tester to one of receptacle output terminals and the ground terminal, then measure the insulation resistance. An insulation resistance of 1 megohm or more is normal. (The original insulation resistance at the time of shipment from the factory is 10 megohm or more.) If it is less than 1 megohm, disassemble the generator and measure the insulation resistance of the stator, rotor and control panel individually.

*NOTE : Connect across the two output terminals of a receptacle using a wire as shown in the figure right before checking.*



### (2) STATOR

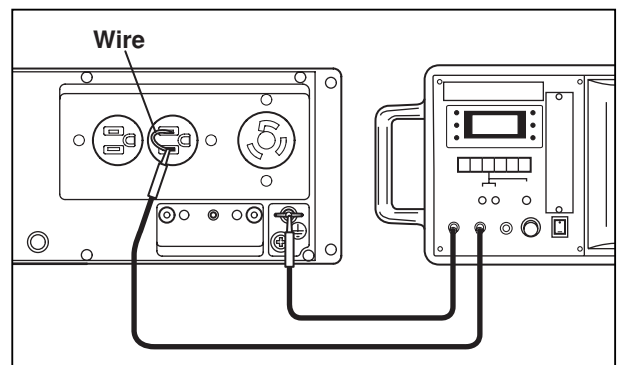
Check the insulation resistance between red lead and core, blue lead and core, and white lead and core respectively. Should any reading is less than 1 megohm, the stator is faulty.



### (3) CONTROL PANEL

Measure the insulation resistances between the live parts and the grounded parts.

*NOTE : Connect across the two output terminals of a receptacle using a wire as shown in the figure right should the inverter unit is still connected to the control panel.*



Any part where the insulation resistance is less than  $1\text{M}\Omega$  has faulty insulation, and may cause electric leakage and electric shock.

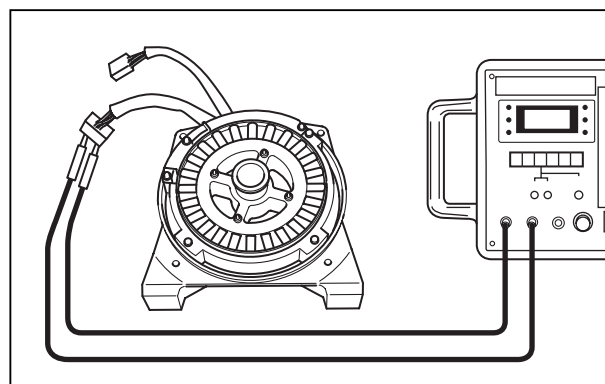
Replace the faulty part.

## 4-5) CHECKING FUNCTIONAL MEMBERS

### (1) STATOR

Disengage connectors on the wires from stator and check the resistance between the wires using a circuit tester referring to the table below.

*NOTE : If the circuit tester is not sufficiently accurate, it may not show the values given and may give erroneous readings. Erroneous readings will also occur when there is a wide variation of resistance among coil windings or when measurement is performed at ambient temperature different from 20°C (68°F).*



Unit: Ohms ( $\Omega$ )

Connector	Wire Color	Voltage Spec.	RG2800i RG2800iS	P3200i RG3200iS	P4300i RG4300iS
4P Connector (AC Output Wires)	Red – White	110, 120	1.1	0.8	0.5
		220, 230, 240	4.0	2.8	2.1
	White – Blue	110, 120	1.1	0.8	0.5
		220, 230, 240	4.0	2.8	2.1
	Blue – Red	110, 120	1.1	0.8	0.5
		220, 230, 240	4.0	2.8	2.1
8P Connector	White – White		0.2	0.2	0.2
	Brown – Brown		0.1	0.1	0.1
Rectifier Connector	Yellow – Yellow		0.1	0.1	0.1

### (2) INVERTER UNIT

Check if there is any change of color or blister in the filling resin.

Also check that no change of color or breakage is visible on any electronic component or wire or connector of the inverter unit.

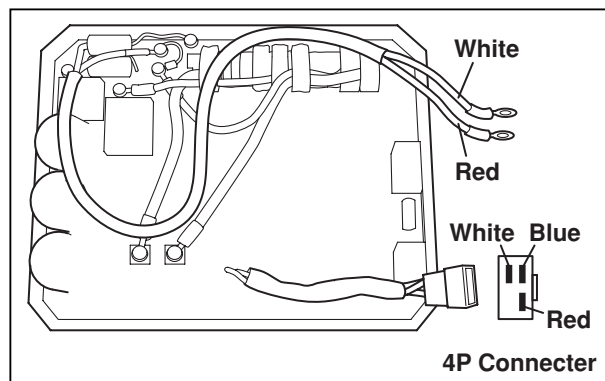
Check the conductivity between the output wires and the 4P connector as per the tables below:

#### Output Wires

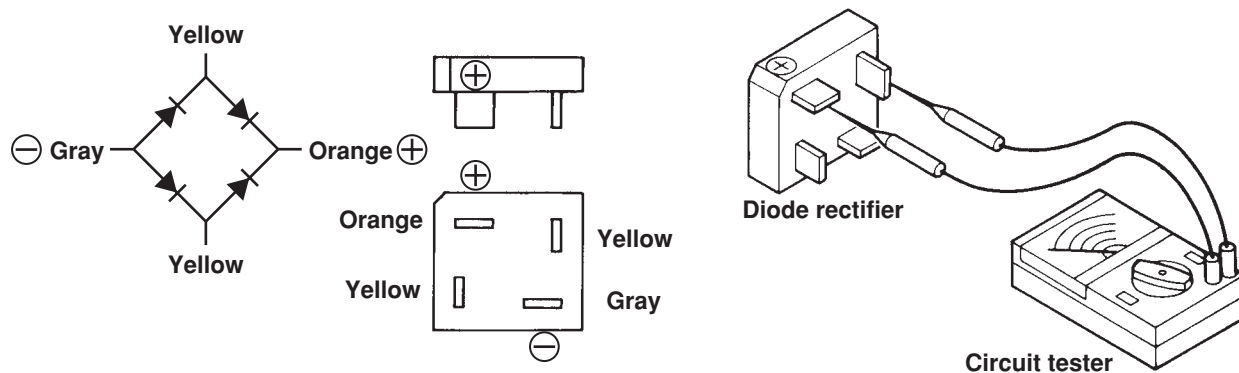
110V, 120V Specs.			220V, 230V, 240V Specs.		
	Red	White		Red	White
Red		0.6 k $\Omega$	Red		2.7 k $\Omega$
White	0.6 k $\Omega$		White	2.7 k $\Omega$	

#### 4P Connector

	Red	White	Blue
Red		5 M $\Omega$	5 M $\Omega$
White	5 M $\Omega$		5 M $\Omega$
Blue	5 M $\Omega$	5 M $\Omega$	



### (3) DIODE RECTIFIER



The circuit inside the diode rectifiers is as shown in the chart above.

Check continuity between each terminal by using a circuit tester.

The rectifier is normal when continuity is as follows:

#### Checking table for analogue circuit tester

Analogue circuit tester		Apply black $\ominus$ needle of the circuit tester			
		Yellow	Yellow	Orange	Gray
Apply red $\oplus$ needle of the circuit tester	Yellow	—	No continuity	No continuity	Continuity
	Yellow	No continuity	—	No continuity	Continuity
	Orange	Continuity	Continuity	—	Continuity
	Gray	No continuity	No continuity	No continuity	—

#### Checking table for digital circuit tester

Digital circuit tester		Apply red $\oplus$ needle of the circuit tester			
		Yellow	Yellow	Orange	Gray
Apply black $\ominus$ needle of the circuit tester	Yellow	—	No continuity	No continuity	Continuity
	Yellow	No continuity	—	No continuity	Continuity
	Orange	Continuity	Continuity	—	Continuity
	Gray	No continuity	No continuity	No continuity	—

**NOTE 1 :** Because of the difference of measuring method between the analogue circuit tester and the digital circuit tester, polarity of tester needles should be reversed.

**NOTE 2 :** "Continuity" means forward direction characteristics of the diode, and different from short circuit condition (in which a pointer of the tester goes out of its normal scale), shows resistance to some extent.  
When results of the checking indicates failure even in one section, replace with a new one.

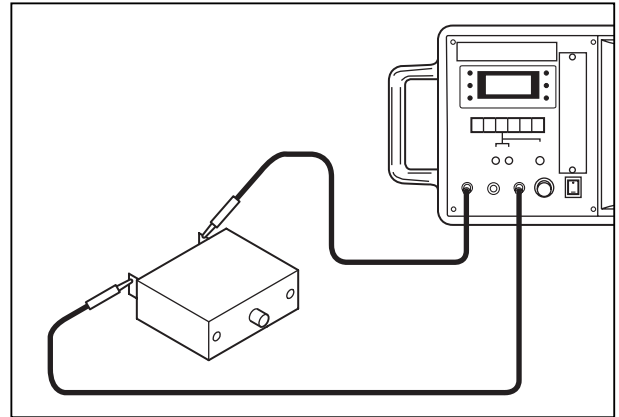
**NOTE 3 :** Some analogue testers like "Simpson" brand operate as some as digital testers.

### (4) AC RECEPTACLES

Check that no live part or wire or plastic part is burnt.

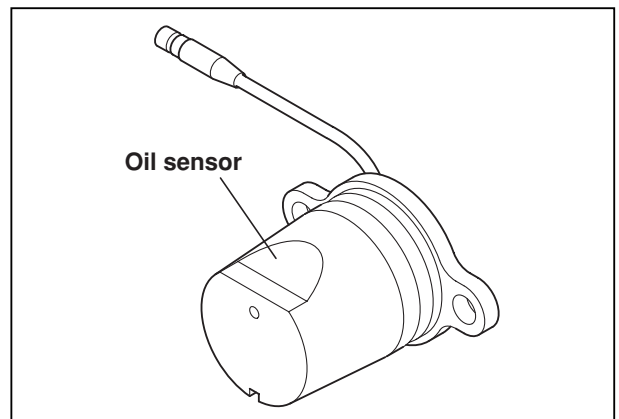
#### (5) DC CIRCUIT BREAKER

Check that there is continuity between the two terminals of DC circuit breaker when its push button is pressed.



#### (6) FLOAT TYPE OIL SENSOR

Check the oil sensor when it is installed on the engine.  
Check that sufficient engine oil is filled in the crankcase.  
Check that there is continuity between the lead wire of oil sensor and the ground (engine crankcase) when the oil level is above the minimum level mark of oil gauge.  
Check that there is no continuity as above when the oil level is below the minimum level mark of oil gauge.



## 5. DISASSEMBLY AND ASSEMBLY

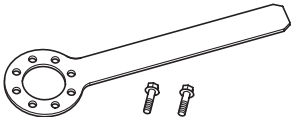
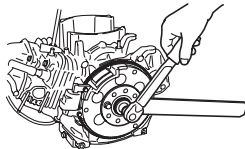

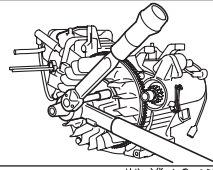
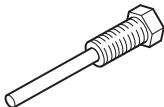
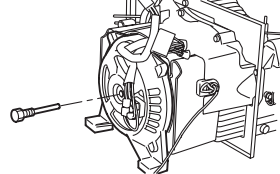
### 5-1) PREPARATION AND PRECAUTIONS

- (1) Be sure to memorize the location of individual parts when disassembling the generator so that the generator can be reassembled correctly. Tag the disassembled part with the necessary information to facilitate easier and smoother reassembly.
- (2) For more convenience, divide the parts into several groups and store them in boxes.
- (3) To prevent bolts and nuts from being misplaced or installed incorrectly, replace them temporarily to their original position.
- (4) Handle disassembled parts with care; clean them before reassembly using a neutral cleaning fluid.
- (5) Remove the battery before disassembling the generator. (Electric start models)
- (6) Use all disassembly/assembly tools properly, and use the proper tool for each specific job.
- (7) Be sure to attach the foam rubber linings inside the covers on their original position when reassembling the generator. When deformation or damage or falling-off of foam rubber lining is found, replace it with new part. Failure to do so will result in poor performance and durability of the generator.
- (8) Bind the wires and fuel pipes using wire bands as they have been done in original configuration.

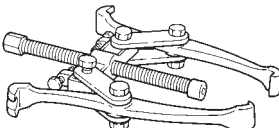
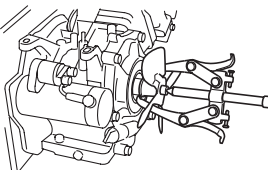
*NOTE : As to detailed information for servicing procedures on engine portion, please refer to Cummins Onan engine service manual for models EX13/17/21/27.*

### 5-2) SPECIAL TOOLS

Use correct tools to prevent unnecessary effort and giving damages to the parts.

Part Number	Part Name	Shape	Usage
33B9990101	FLYWHELL HOLDER		
33B9990201	DRIVESHAFT HOLDER		
33B9990501	ROTOR PULLER		

*NOTE : Use a puller to remove the fan that is installed on the engine shaft of soundproof type models.*

Ordinary tool Available in the market	PULLER		
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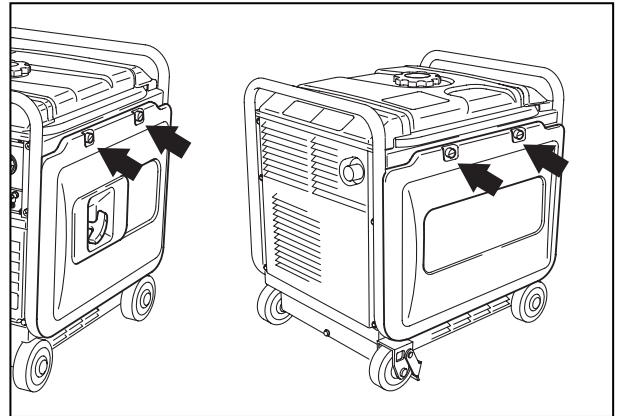
## 5-3) DISASSEMBLY PROCEDURES

### 5-3-1 SIDE COVER (L) and (R)

Take off the four bolts and remove the side cover (L) and (R) from the frame.

M6 x 20mm Cover Bolt : 4 pcs.

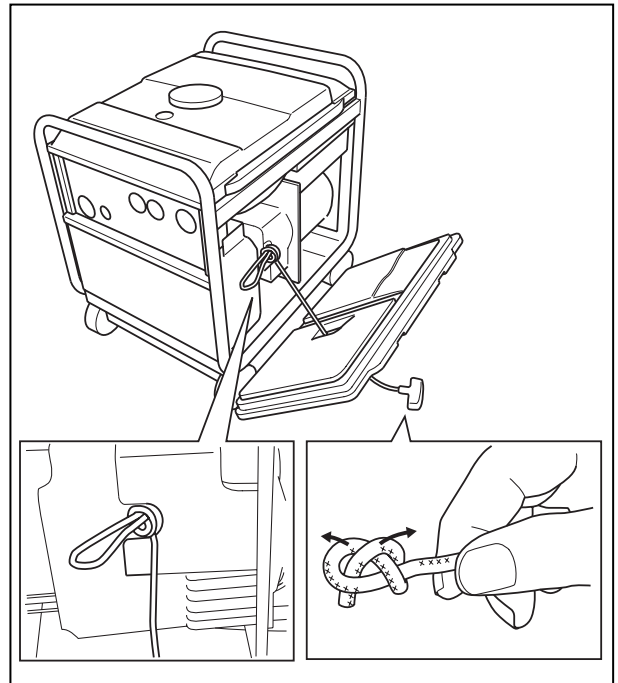
Tools : Screw driver



### 5-3-2 STARTER HANDLE

Make a knot on the recoil starter rope inside the side cover in order to prevent the rope from being fully rewound into the starter.

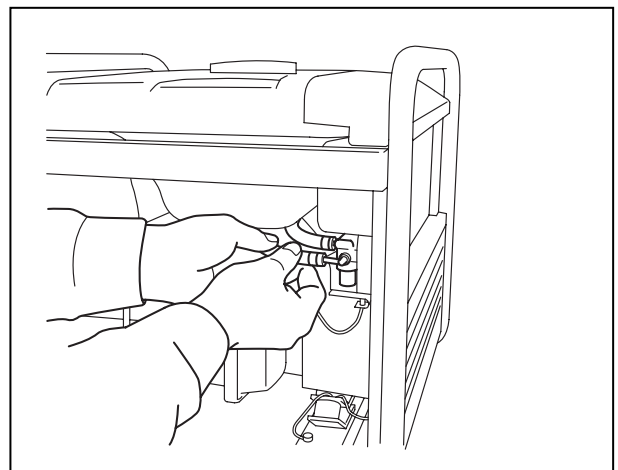
Rewind the knot at the rope-end inside the starter handle to remove the handle.



### 5-3-3 FUEL PIPES, FUEL STRAINER and BATTERY CABLES

(1) Turn the engine switch to “STOP” position to close the fuel cock.

(2) Disconnect the two fuel pipes from the fuel strainer.

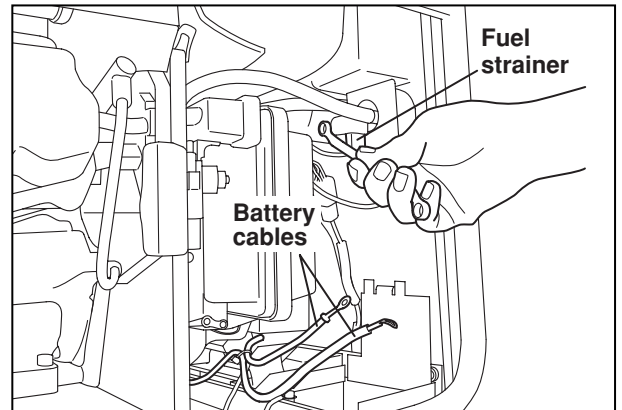


(3) Remove the fuel strainer.

**[ For electric start models ]**

(4) Remove the battery cover and disconnect battery cables.

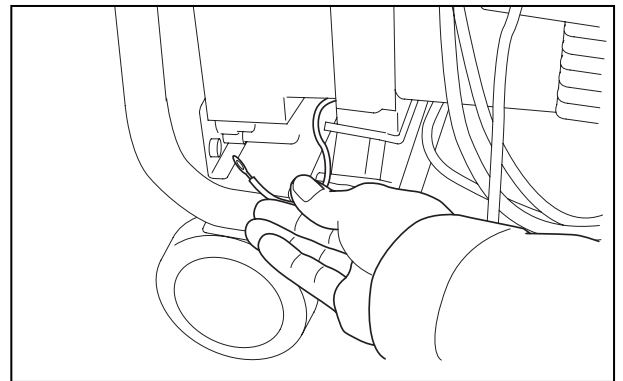
(5) Remove the battery from frame.



**5-3-4 GROUNDING WIRE**

Remove the grounding wire at the right bottom side of control panel.

M6 Nut : 1pce.

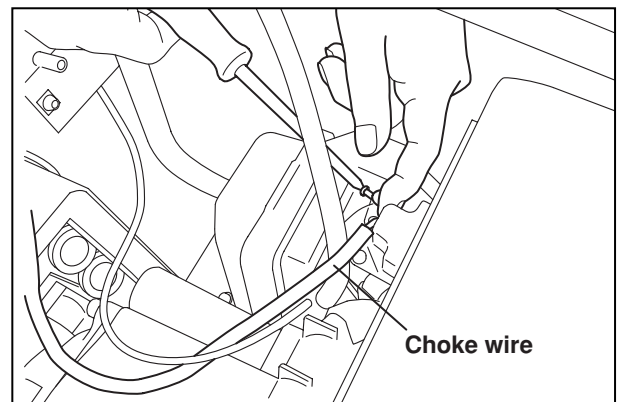


**5-3-5 CHOKE WIRE**

Loosen the screw that fixes the choke wire to carburetor choke lever.

Turn the engine switch to "CHOKE" position to disconnect the choke wire from the choke lever.

Tools : Screw driver



**5-3-6 CONTROL PANEL and INVERTER UNIT**

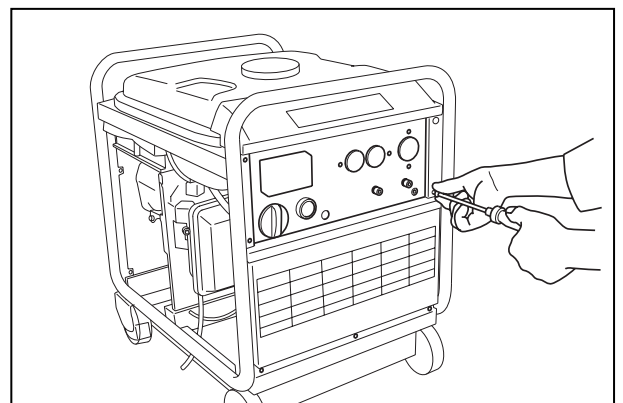
(1) Loosen the four screws and remove the upper front cover.

M6 x 18mm Screw : 4pcs.

(2) Loosen the two bolts and remove the lower front cover.

M6 x 18mm Flange bolt : 2pcs.

Tools : Screw driver



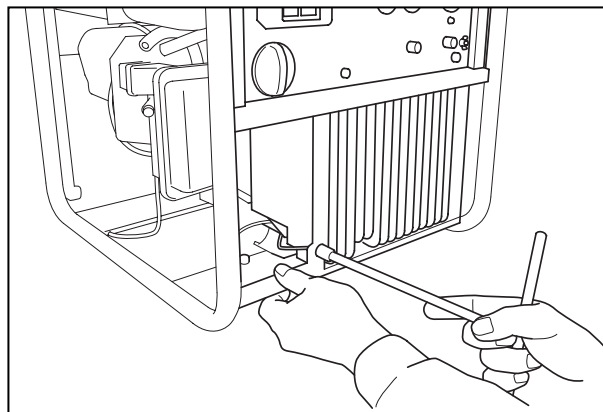
(3) Loosen the five bolts and remove the cover bracket from the inverter unit.

M6 x 12mm Flange bolt : 2pcs.

M6 x 18mm Flange bolt : 2pcs.

M6 x 25mm AY Bolt : 1pce.

**NOTE :** At this step, electric wires are still connected to the control panel. Therefore, do not try to separate the control panel forcibly. Separate the control panel after removing fuel tank at "**5-3-9 FUEL TANK**".

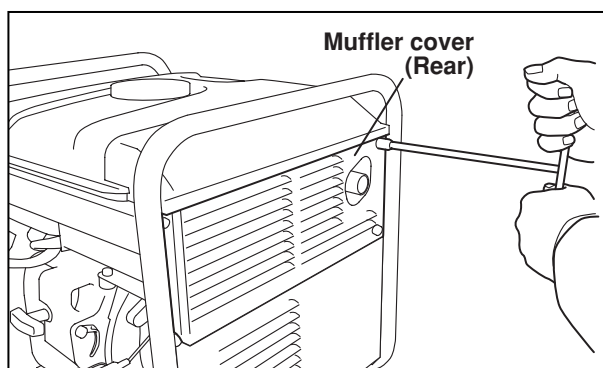


### 5-3-7 REAR COVER

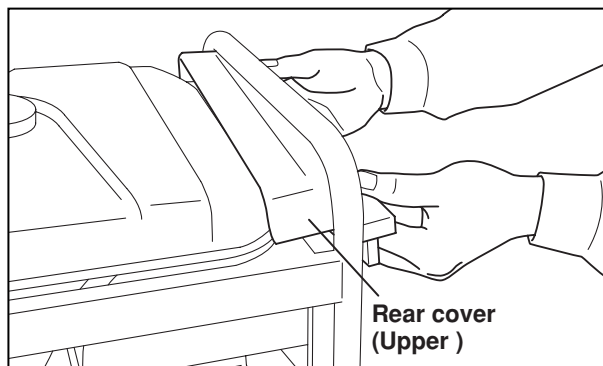
(1) Remove the muffler cover.

M6 x 18mm Flange bolt : 6pcs.

Tools : 10mm Box wrench



(2) Remove the upper rear cover.

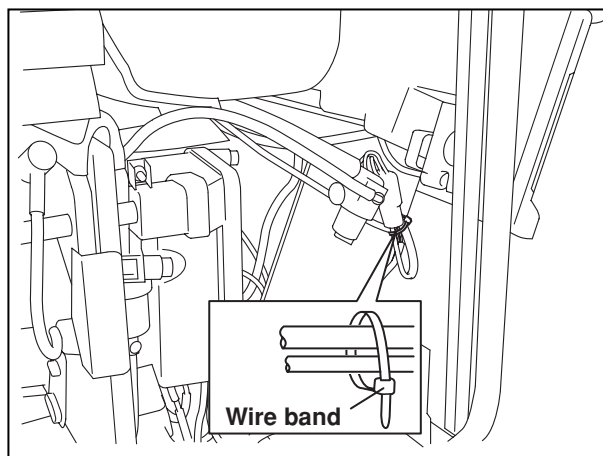


### 5-3-8 WIRE BAND

Cut the wire bands that are binding wires behind the control panel.

For electric start models, cut the wire band that is binding battery cables also.

Tools : Nipper



### 5-3-9 FUEL TANK

Loosen the four bolts and remove the fuel tank from frame.

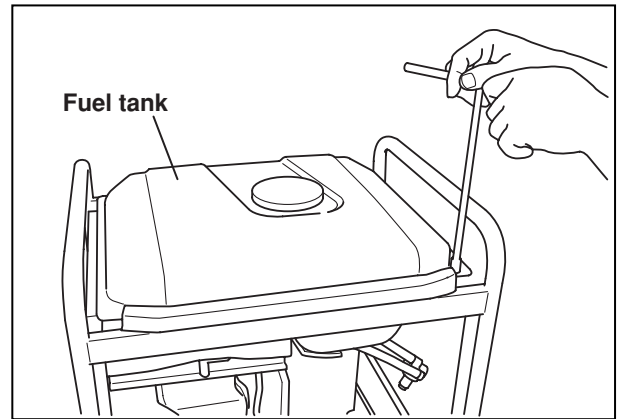
M6 x 20mm Flange reamer bolt : 4pcs.

Rubber : 4pcs.

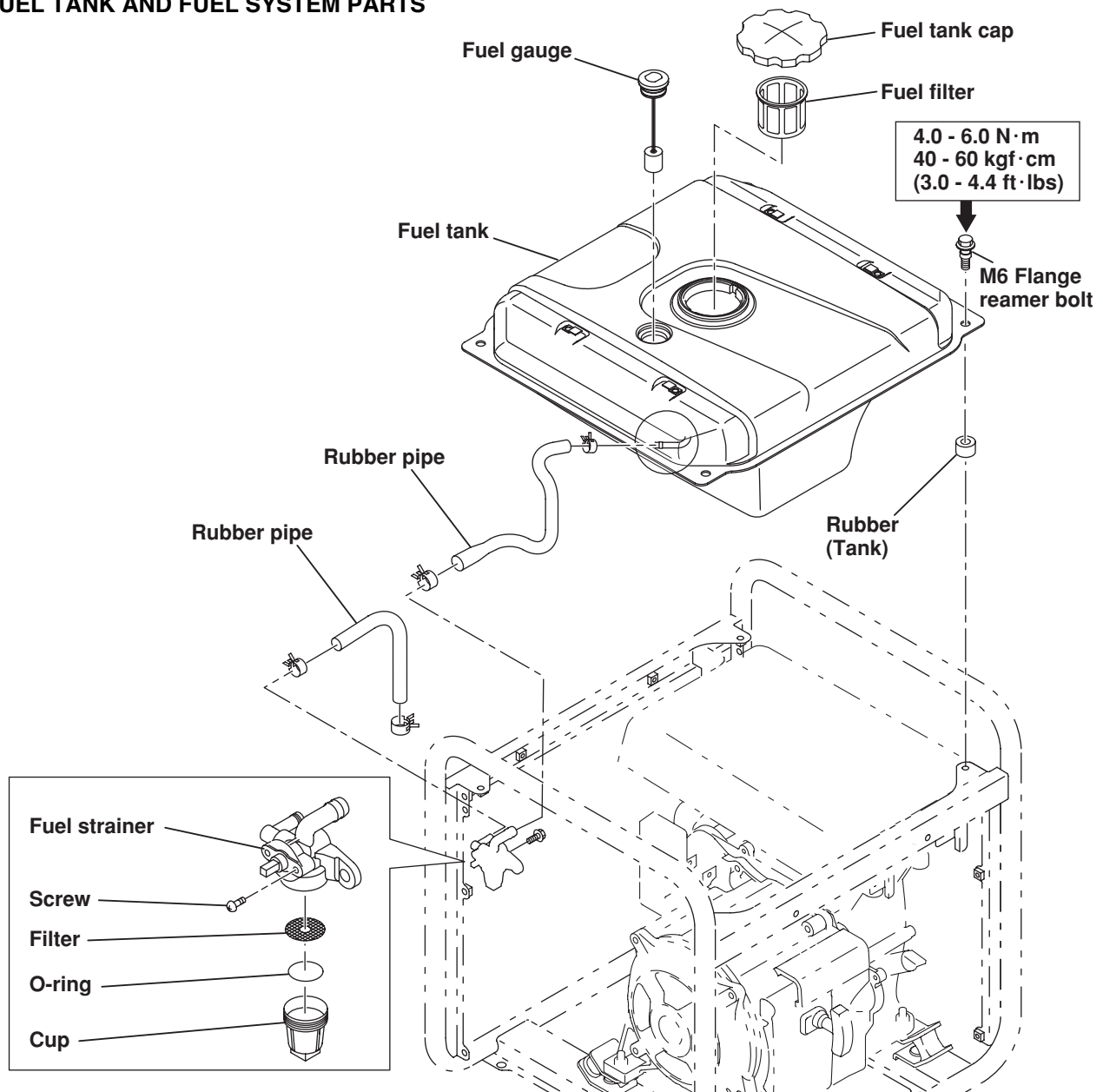
Tools : 10mm Box wrench

*NOTE1 : Be sure to drain fuel from the tank before removing the tank.*

*NOTE2 : Take care not to misplace the four mounting rubbers for the tank.*

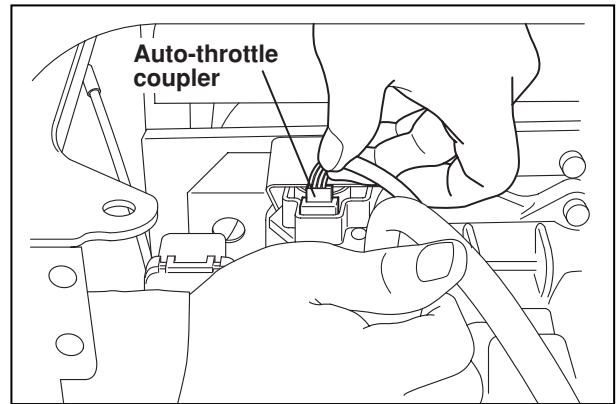


### FUEL TANK AND FUEL SYSTEM PARTS



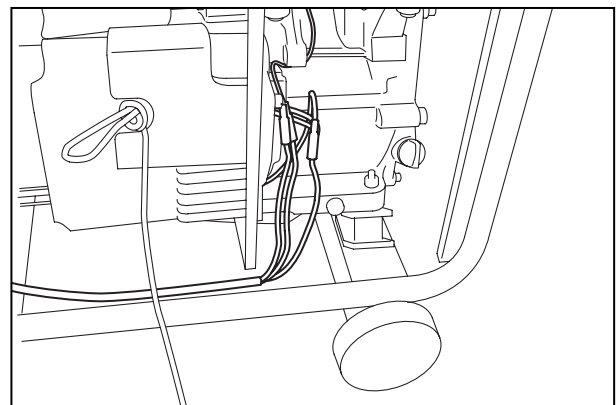
### 5-3-10 AUTOTHROTTLE COUPLER

Disengage the coupler from the auto-throttle unit of carburetor.

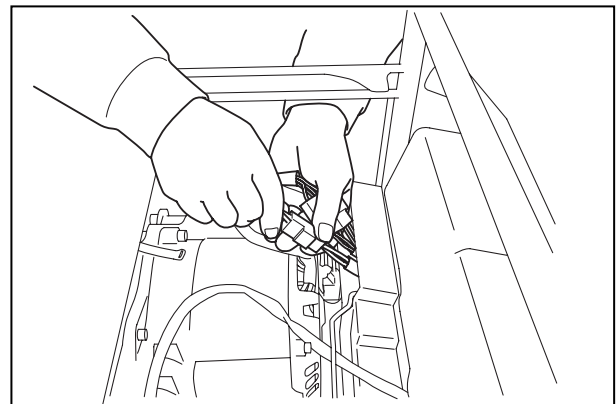


### 5-3-11 WIRE HARNESS

(1) Disengage the couplers of wire harness from the control panel and monitor unit.

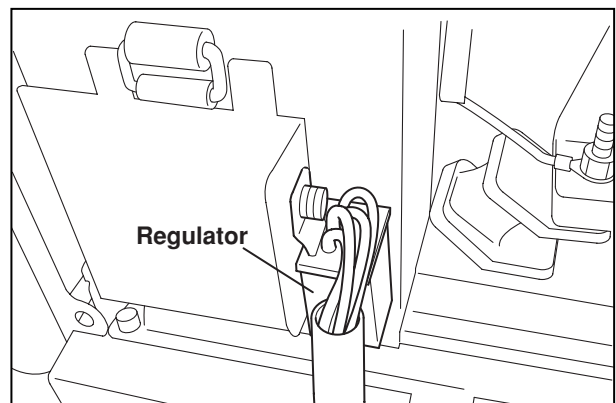


(2) Disengage the couplers of wire harness from the control panel, inverter unit and the alternator.



(3) For electric start models, remove the regulator mount bolt, and disconnect the wire harness from the starter motor.

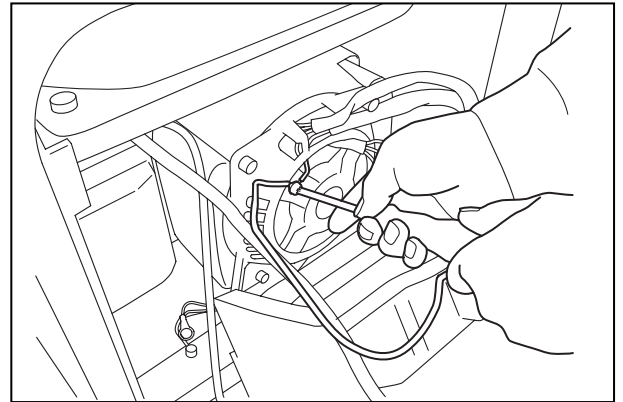
M6 x 8mm Flange bolt : 1pce.



### 5-3-12 GROUNDING WIRE (2)

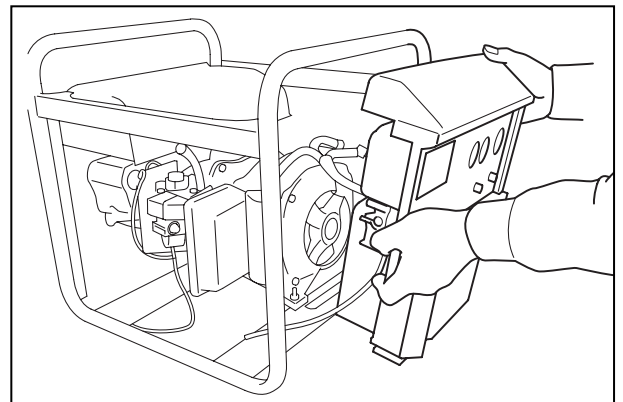
Disconnect the two grounding wires from the alternator and the inverter unit.

Tools : Screw driver

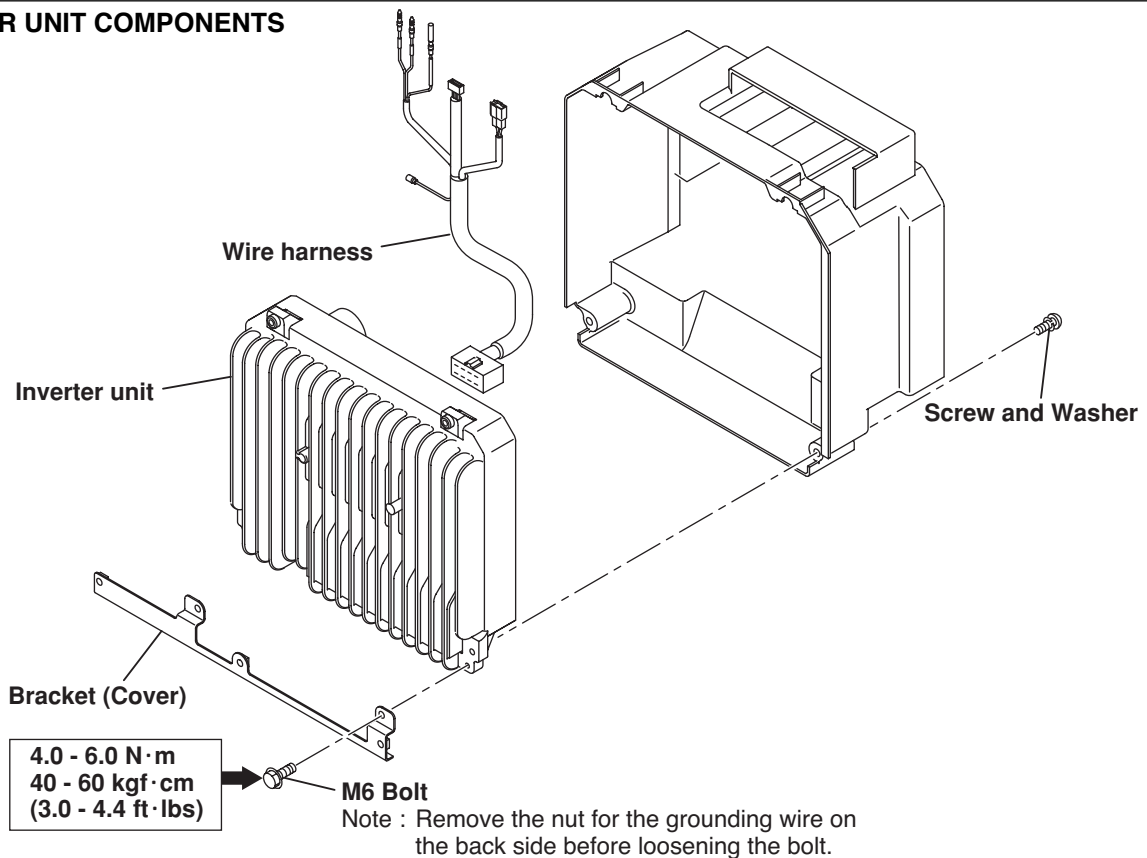


### 5-3-13 CONTROL BOX and INVERTER UNIT

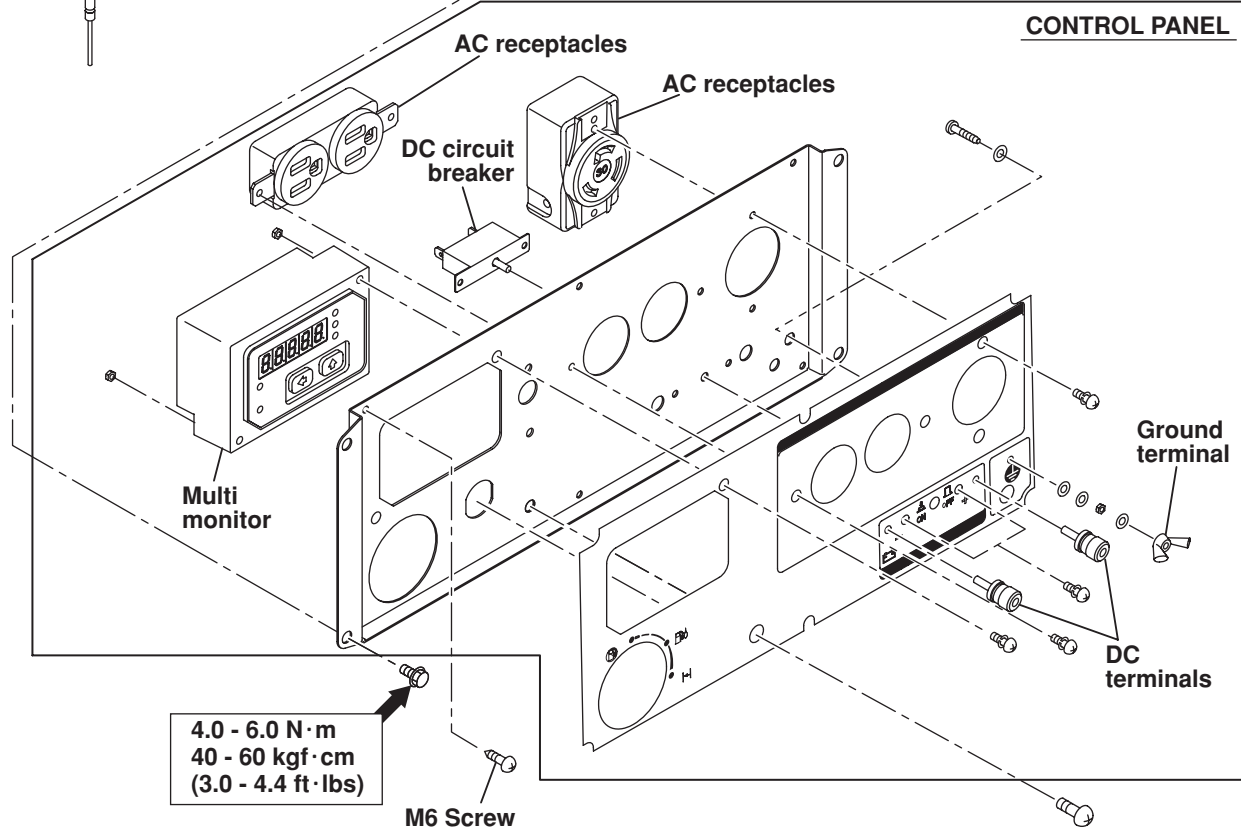
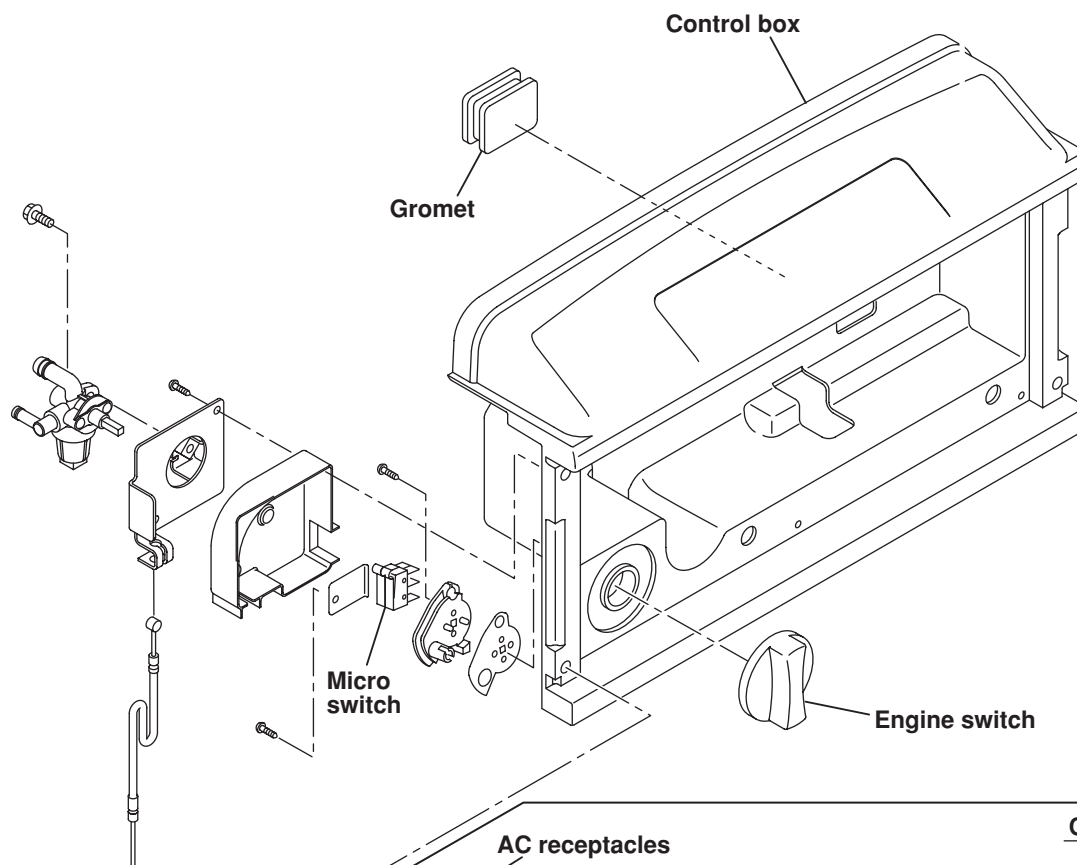
Removing the cover bracket from the bottom of the inverter unit, separate the control box and inverter unit.  
For further taking apart, refer to "**INVERTER UNIT COMPONENTS**" and "**CONTROL BOX COMPONENTS**".



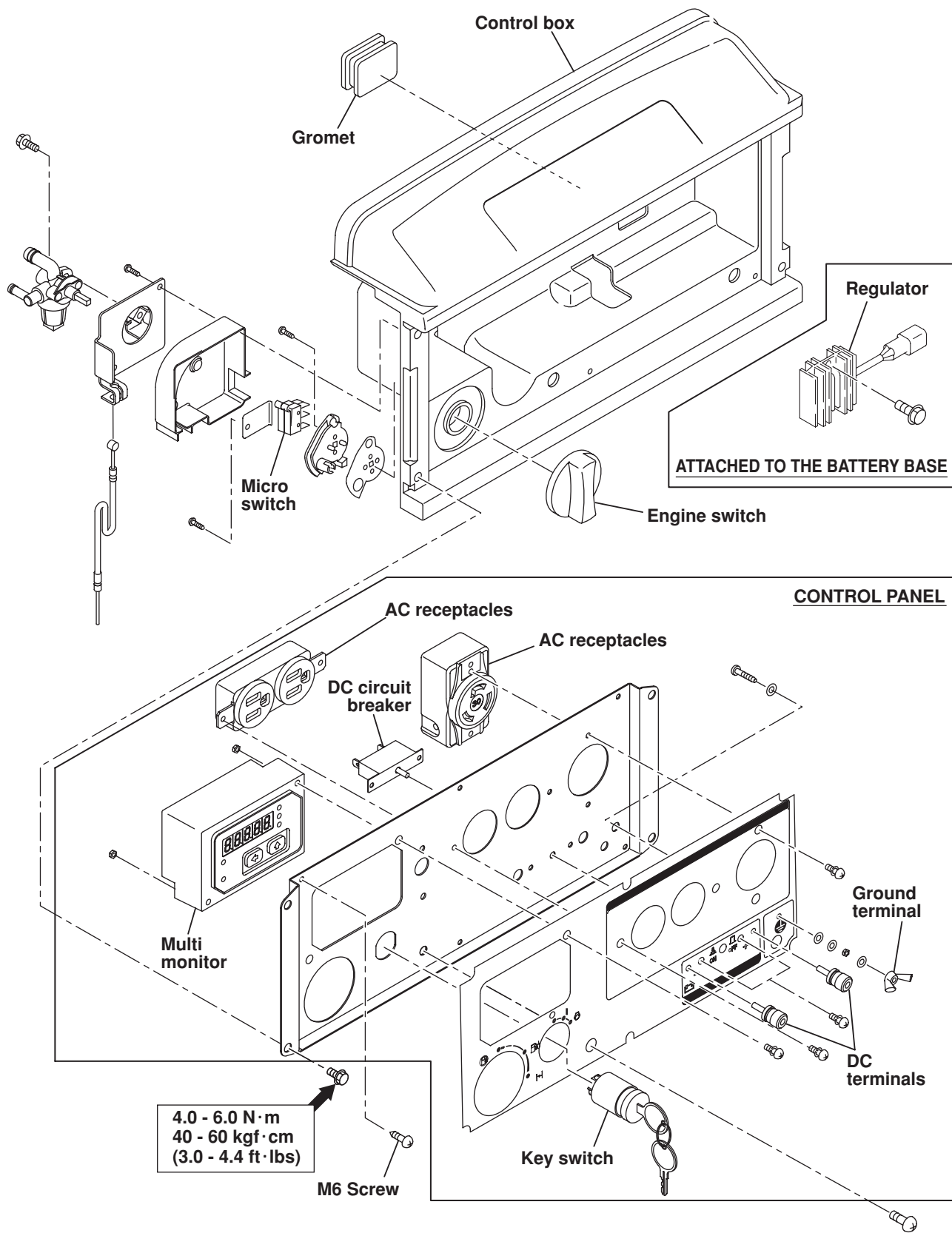
### INVERTER UNIT COMPONENTS



## CONTROL BOX COMPONENTS (RG2800i / P3200i / RG2800iS)

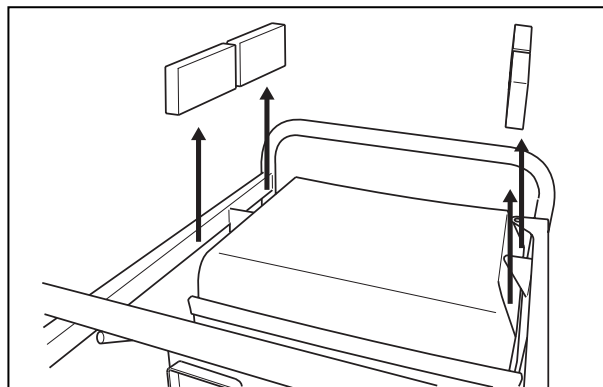


## CONTROL BOX COMPONENTS (P4300i)



### 5-3-14 FOAM RUBBER INSULATORS

Remove the foam rubber insulators from the gaps between frame and fuel tank.

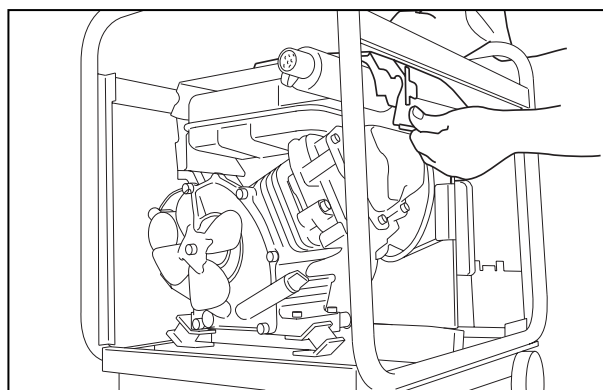


### 5-3-15 MUFFLER COVER

Loosen the four bolts and remove the muffler cover (L) pushing it inward.

M6 x 12mm Flange bolt : 4pcs.

Tools : 10mm Box wrench

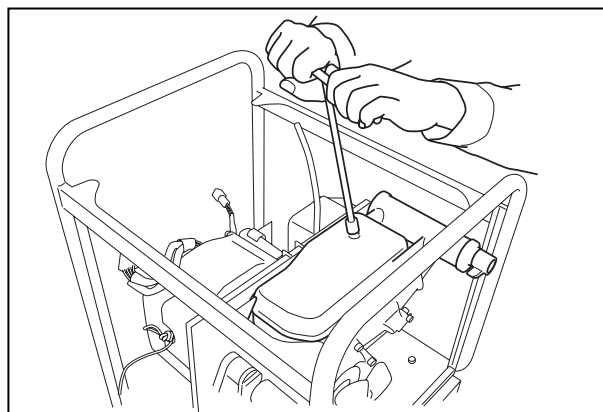


### 5-3-16 MUFFLER

(1) Loosen the two M8 nuts and remove the muffler.

M8 Flange nut : 2 pcs.

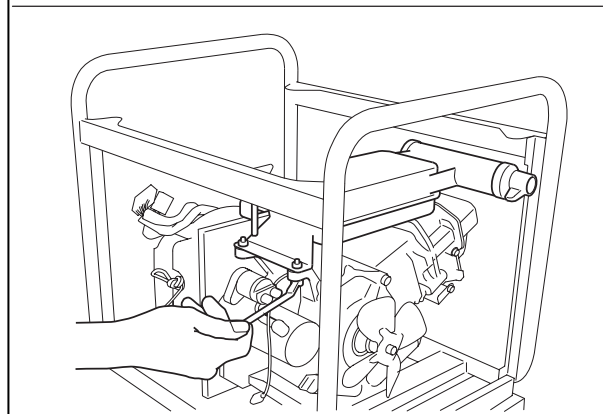
Tools : 12mm Box wrench



(2) Loosen the two M6 bolts and remove the muffler bracket.

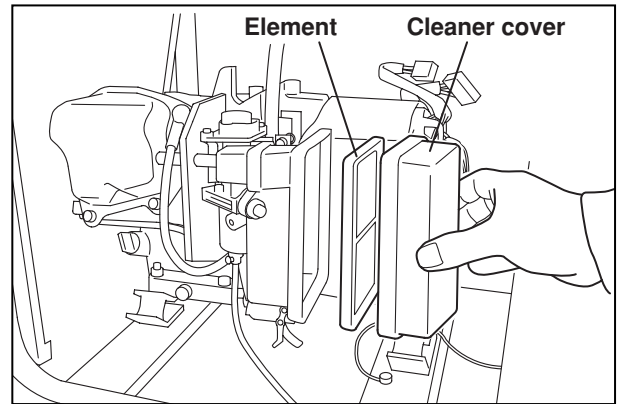
M6 x 23mm Flange bolt : 2pcs.

Tools : 10mm Box wrench



### 5-3-17 AIR CLEANER and CARBURETOR

- (1) Remove the air cleaner cover and element from the air cleaner.

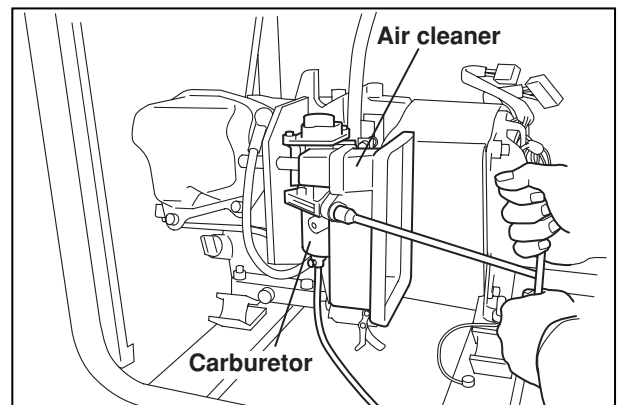


- (2) Loosen the two M6 nuts and one M6 bolt, and remove the air cleaner body.

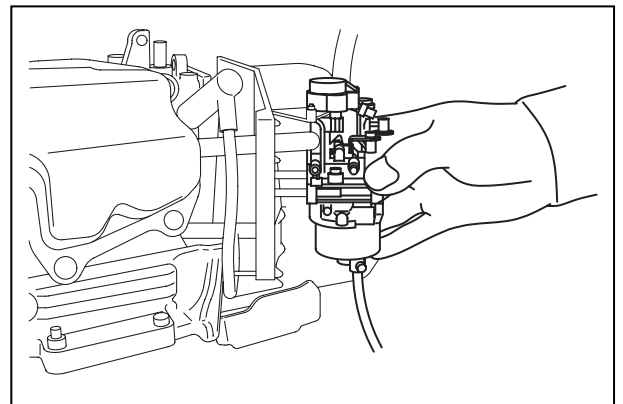
M6 Flange nut : 2pcs.

M6 x 20mm Flange bolt : 1pce.

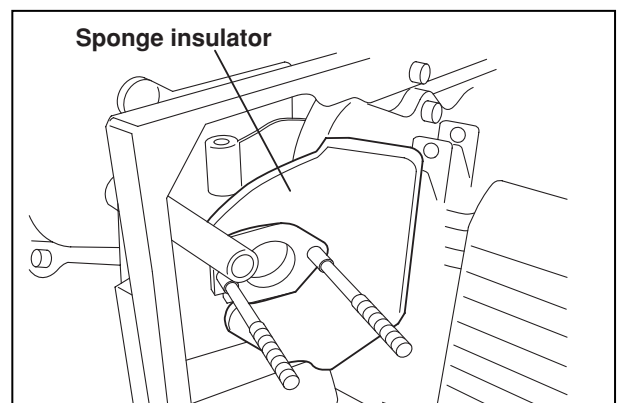
Tools : 10mm Box wrench



- (3) Using caution not to break the gasket, carefully remove the carburetor from the insulator.



- (4) Remove the sponge insulator.



### 5-3-18 ENGINE BLOCK

- (1) Loosen the four M8 nuts that fasten the engine to the mount rubbers, and remove the engine.

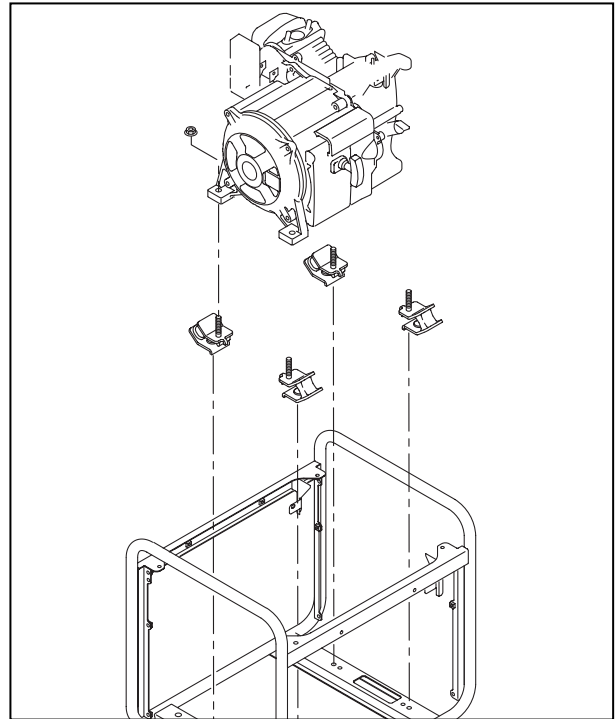
M8 Flange nut : 4pcs.

Tools : 12mm Box wrench

- (2) Remove the mount rubbers from the frame as necessary.

M8 Flange nut : 4pcs.

Tools : 12mm Box wrench



### 5-3-19 CRANKSHAFT COVER (OPEN FRAME TYPE) and COOLING FAN (SOUNDPROOF TYPE)

#### OPEN FRAME TYPE:

Loosen the two M8 bolts and remove the crankshaft cover.

M8 x 12 Flange bolt : 2pcs.

Tools : 12mm Box wrench

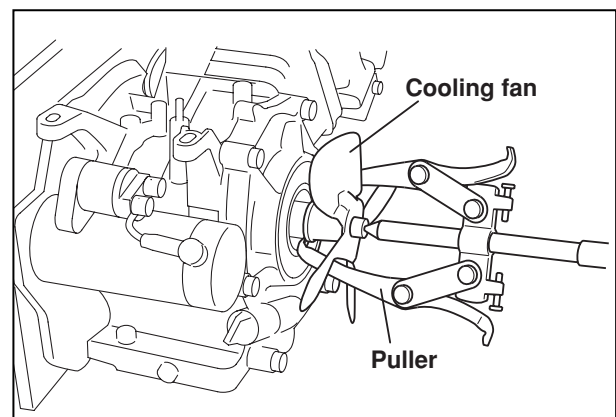
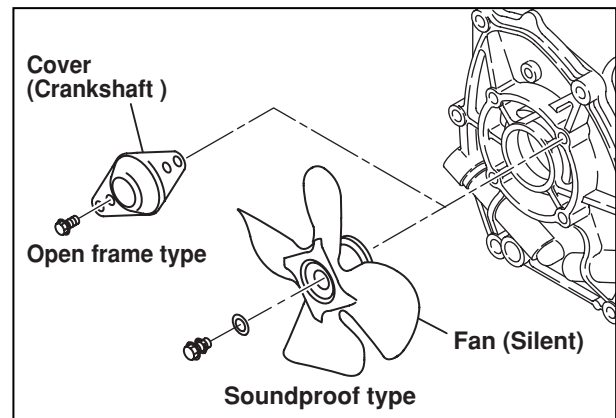
#### SOUNDPROOF TYPE:

After removing the M8 bolt, remove the cooling fan from the crankshaft using an ordinary puller.

M8 x 25 Bolt : 1pce.

Tools : 13mm Box wrench

Puller (Ordinary tool available on the market)

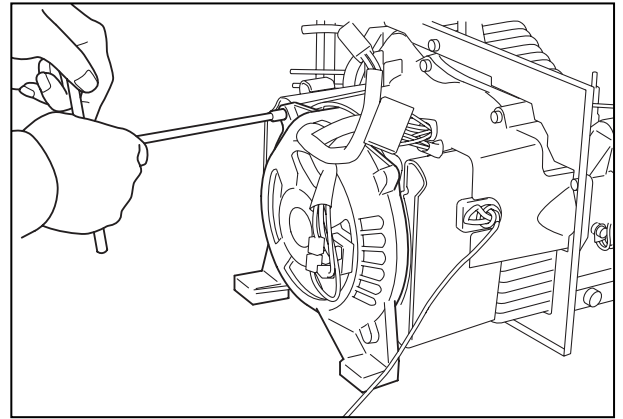


### 5-3-20 REAR COVER

Loosen the four M6 bolts that fasten the rear cover to the blower housing.

M6 x 25mm Bolt : 4pcs.

Tools : 10mm Box wrench



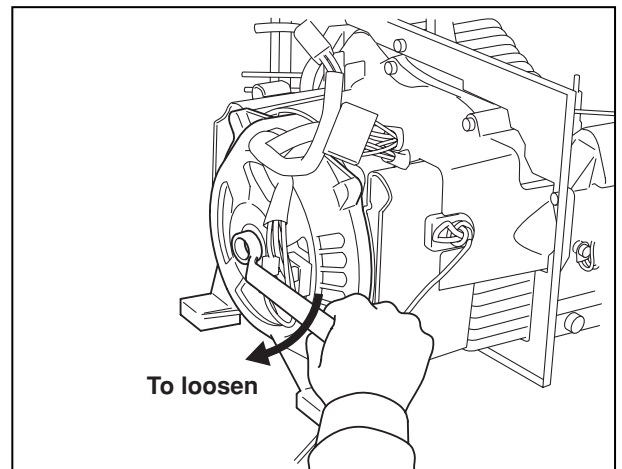
### 5-3-21 THROUGH BOLT and ROTOR

(1) Remove the through bolt.

M10 x 55mm Bolt : 1pce.

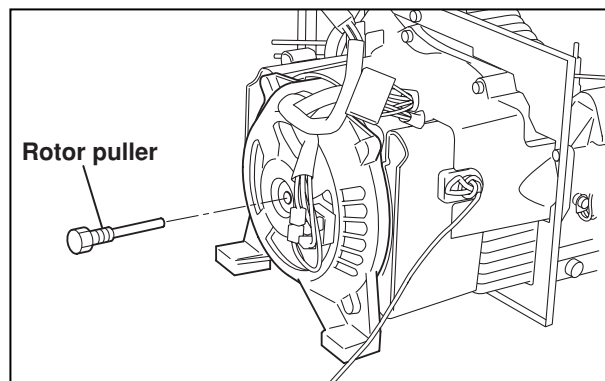
Tools : Socket wrench

**NOTE :** *Since the thread of the through bolt is in reverse direction, turn it clockwise to loosen.*



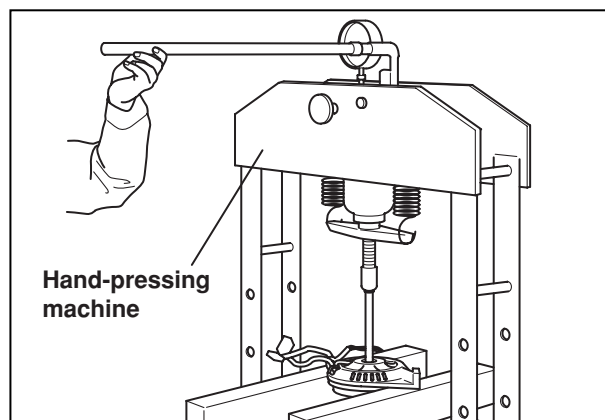
(2) Using a special tool, Rotor Puller, remove the rear cover together with rotor and stator.

Special tools : Rotor Puller (33B9990501)

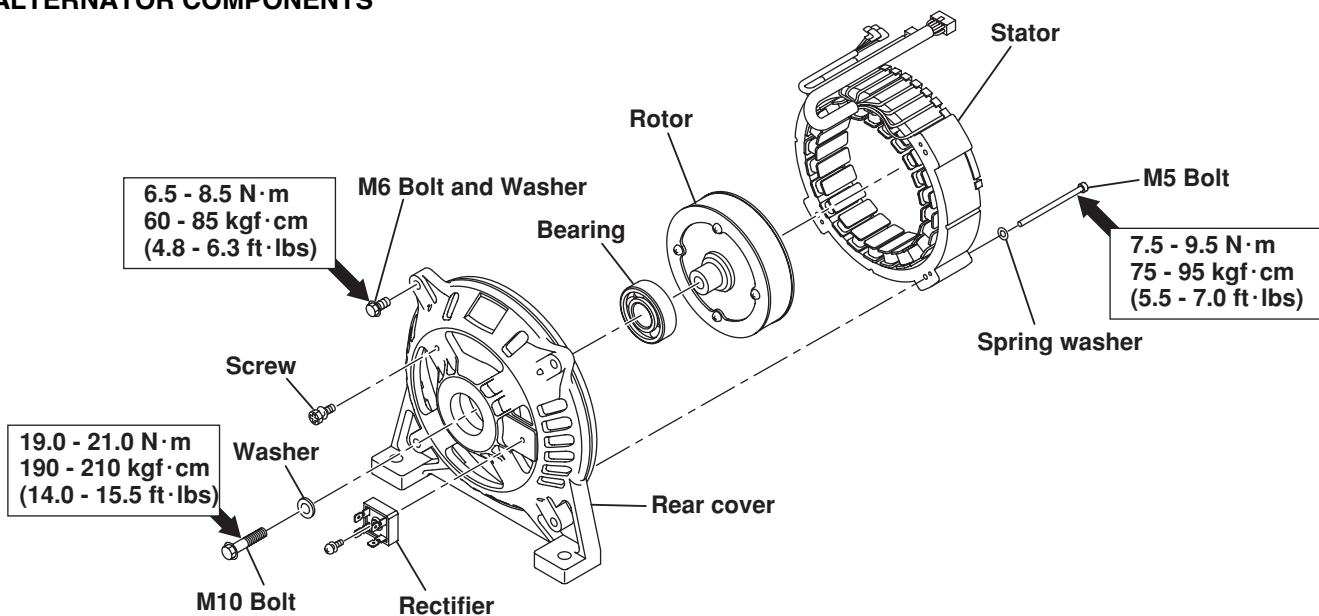


**NOTE 1:** Usually, you do not need to separate the rotor from the stator. However, should it be necessary, use a hand-pressing machine to press out the rotor shaft from the bearing.

**NOTE 2:** Rotor and stator are bound by a strong magnetic force. Use extreme care not to have your fingers pinched by them when handling rotor and stator.



## ALTERNATOR COMPONENTS



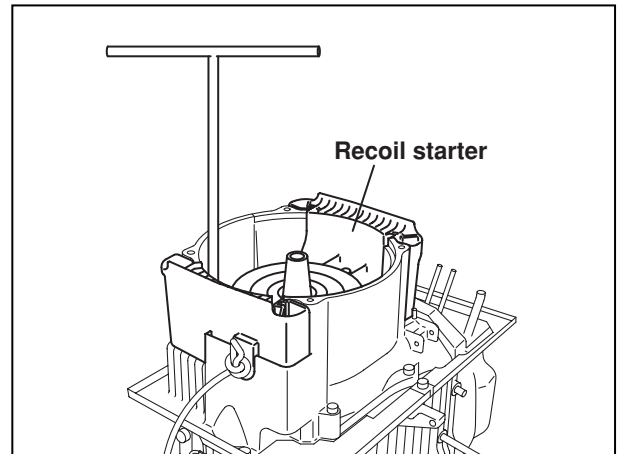
### 5-3-22 RECOIL STARTER

Loosen the three M6 bolts and remove the recoil starter.

M6 x 18mm Flange bolt : 3pcs.

Tools : 10mm Box wrench

*NOTE : Refer to section 5-5 for further instruction for disassembly/reassembly procedures of recoil starter.*



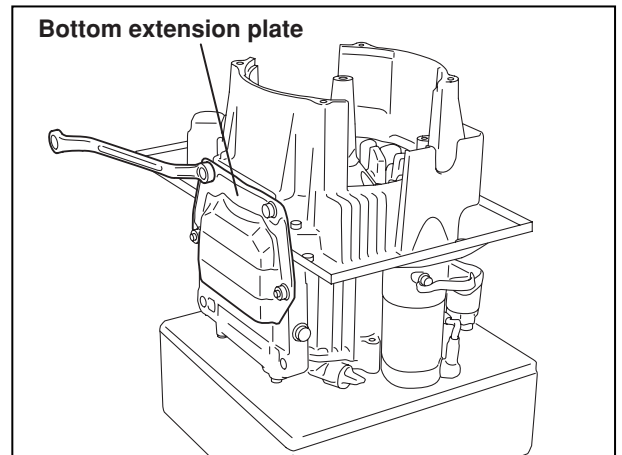
### 5-3-23 BOTTOM EXTENSION PLATE

Loosen the four M8 bolts and remove the bottom extension plate.

M8 x 33mm Flange bolt for crankcase side : 2 pcs.

M8 x 12mm Flange bolt for blower housing side : 2 pcs.

Tools : 12mm Box wrench



### 5-3-24 BLOWER HOUSING

(1) Loosen the four M& bolts and remove the Separator (A/C) and Separator (SEL) from Blower Housing. (for the soundproof type only)

M6 x 8mm Flange bolt : 3pcs.

M6 x 12mm Flange bolt: 1 pce.

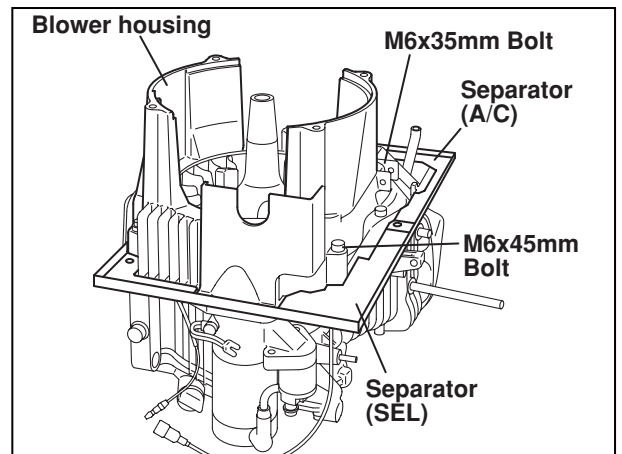
Tools : 10mm Box wrench

(2) Loosen the four M6 bolts and remove the blower housing.

M6 x 35mm Bolt : 1pce.

M6 x 45mm Bolt : 3pcs.

Tools : 10mm Box wrench



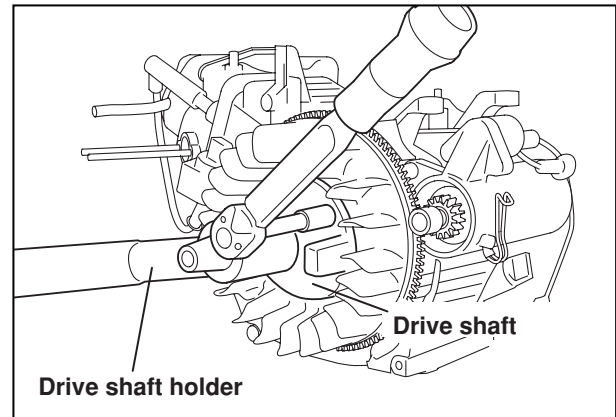
### 5-3-25 DRIVE SHAFT and FAN

Using a special tool “DRIVE SHAFT HOLDER” to hold the drive shaft, loosen the four M8 bolts to remove the Drive Shaft and Fan from the flywheel.

M8 x 27mm Flange bolt : 4pcs.

Tools : 12mm Box wrench

Drive shaft holder (33B9990201)



### 5-3-26 FLYWHEEL

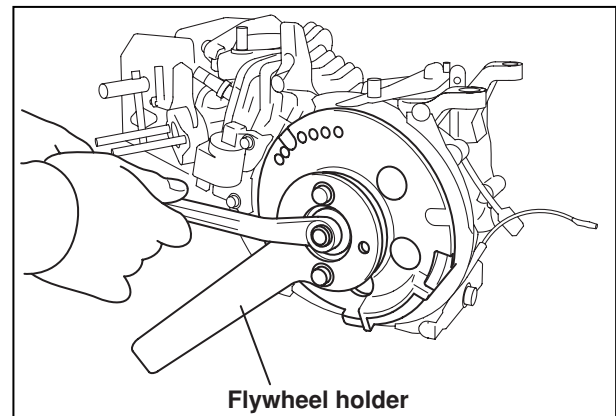
Using a special tool “FLYWHEEL HOLDER” to hold the flywheel, loosen the flywheel nut.  
Remove the flywheel using an ordinary flywheel puller.

M19 Nut : 1pce.

Tools : Socket wrench

Flywheel holder (33B9990101)

Flywheel puller (Available on market)



## 5-4) REASSEMBLY PROCEDURES

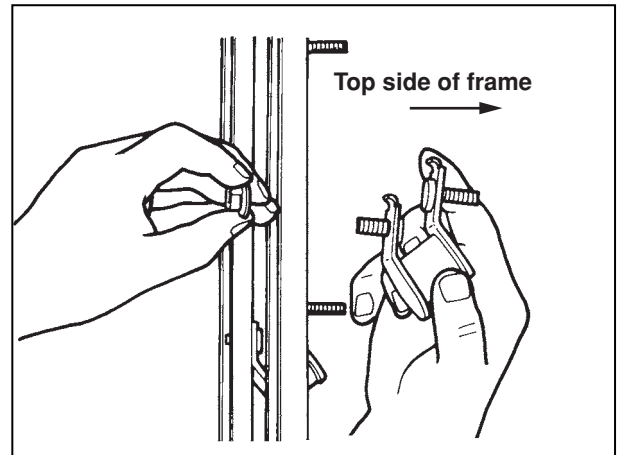
### 5-4-1 MOUNT RUBBERS

Attach the four Mount Rubbers to the frame. Insert the locating tab of mount rubber into the locating hole of the frame and fix it by tightening M8 flange nut.

M8 Flange nut : 4pcs.

<b>Tightening torque : 10.0–12.0 N · m</b>
<b>100–120 kgf · cm</b>
<b>(7.4–8.7 ft · lbs)</b>

*NOTE : The mount rubbers are designed to isolate the vibration most effectively by their original stiffness and shape of rubber. Be sure to use the correct mount rubbers attaching them to the correct position.*



### 5-4-2 SOUND INSULATOR for SOUND-PROOF MODELS

#### (1) WHEELS

Inset the Shafts to the Base Plate (Lower) and assemble the four Wheels to the Shafts.

#### (2) BRAKE

Assemble the Brake to the bottom of rear-left side of the Base Plate (Lower).

M8 x 16mm Bolt : 1 pce.

#### (3) BASE PLATE

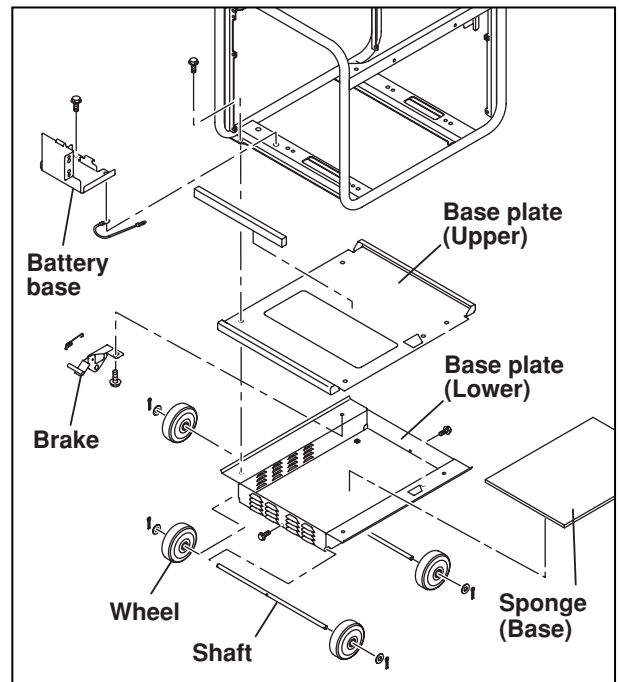
Attach the Sponge (Base) to the Base Plate (Lower). Assemble the Base Plate (Lower) and Base Plate (Upper) to the bottom of frame.

M8 x 16mm Bolt : 4 pcs.

#### (4) BATTERY BASE ( for electric start model only)

Assemble the Battery Base to the frame.

M6 x 12mm Flange bolt : 2 pcs.



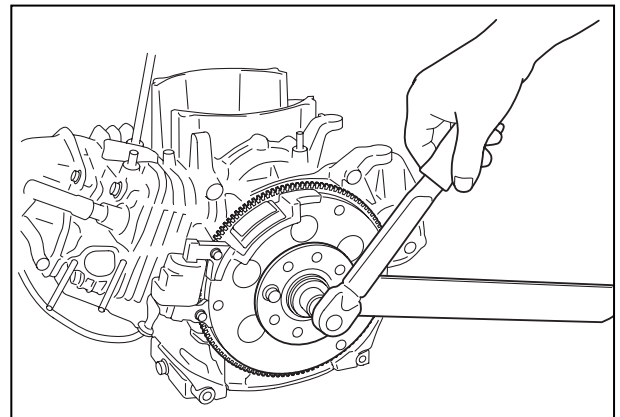
### 5-4-3 FLYWHEEL

*NOTE : Be sure to wipe off oil from the tapered portion of the crankshaft and the hole of flywheel before assembly.*

Install the Flywheel onto the crankshaft and tighten the Flywheel Nut using the special tool “FLYWHEEL HOLDER” to hold the flywheel.

M19 Nut : 1pce. (EX17, 21)

<b>Tightening torque : 59.0–64.0 N · m</b>
<b>590–640 kgf · cm</b>
<b>(43.5–47.2 ft · lbs)</b>

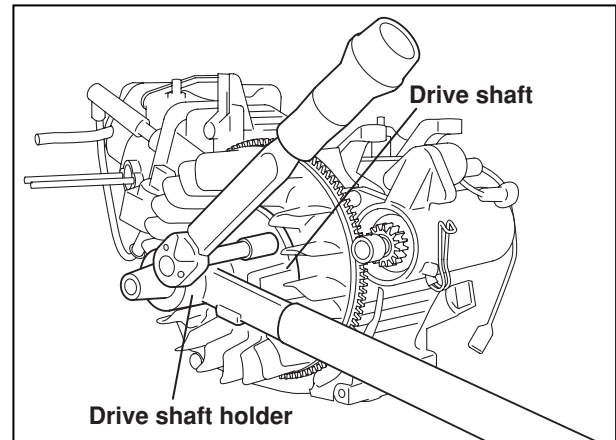


#### 5-4-4 FLYWHEEL FAN and DRIVE SHAFT

- (1) Install the Flywheel Fan to the flywheel so as that the three alignment tabs on the back of flywheel fan to mate with the holes of the flywheel.
- (2) Assemble the Drive Shaft onto the flywheel.  
Tighten the four M8 bolts while holding the drive shaft using the special tool "Drive Shaft Holder".

M8 x 27mm Flange bolt : 4pcs.

<b>Tightening torque : 25.0-27.0 N · m</b>
<b>250-270 kgf · cm</b>
<b>(18.4-19.9 ft · lbs)</b>



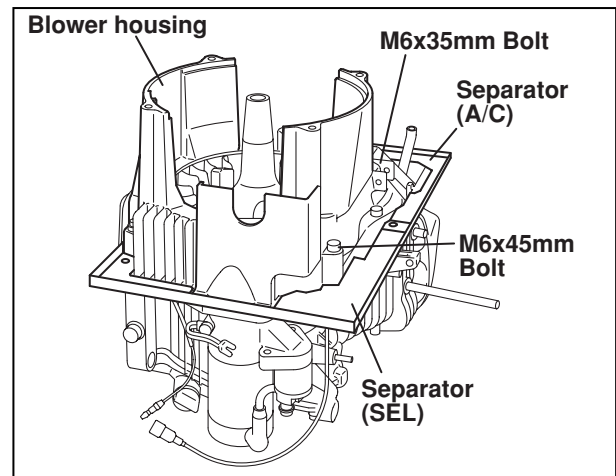
#### 5-4-5 BLOWER HOUSING

- (1) Assemble the Blower Housing onto the crankcase.  
M6 x 35mm Bolt : 1 pce.  
M6 x 45mm Bolt : 3 pcs.

<b>Tightening torque : 8.0-10.0 N · m</b>
<b>80-100 kgf · cm</b>
<b>(5.9-7.4 ft · lbs)</b>

- (2) For the soundproof type only, assemble the Separator (A/C) and Separator (SEL) to the blower housing.  
M6 x 8mm Flange bolt : 3 pcs.  
M6 x 12mm Flange bolt : 1 pce.

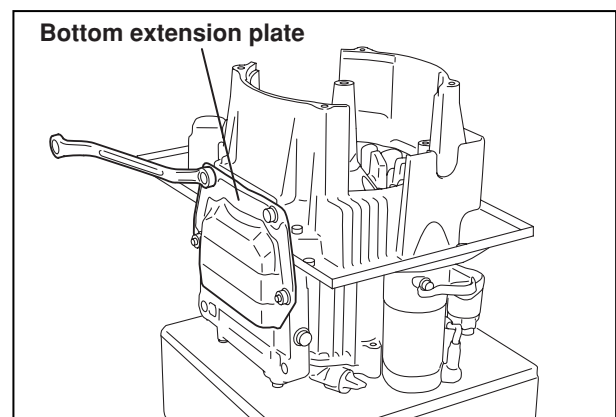
<b>Tightening torque : 4.0-6.0 N · m</b>
<b>40-60 kgf · cm</b>
<b>(3.0-4.4 ft · lbs)</b>



#### 5-4-6 BOTTOM EXTENSION PLATE

- Assemble the Bottom Extension Plate to the engine.
- M8 x 33mm Flange bolt for crankcase side : 2 pcs.  
M8 x 12mm Flange bolt for blower housing side : 2 pcs.

<b>Tightening torque : 18.0-22.0 N · m</b>
<b>180-220 kgf · cm</b>
<b>(13.3-16.2 ft · lbs)</b>



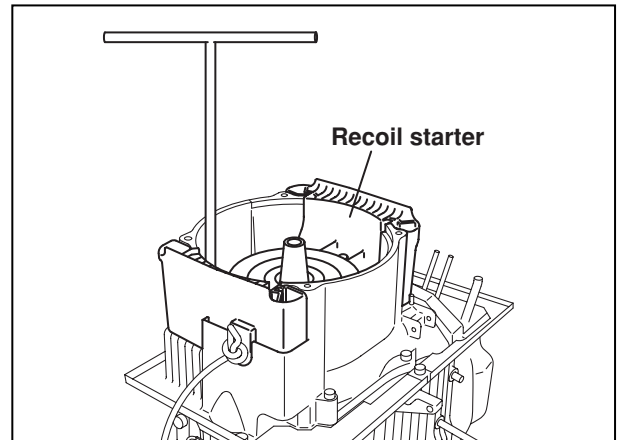
#### 5-4-7 RECOIL STARTER

Assemble the Recoil Starter to blower housing.

M6 x 18mm Bolt : 3pcs.

<b>Tightening torque : 6.5-8.5</b>	<b>N · m</b>
<b>65-85</b>	<b>kgf · cm</b>
<b>(4.8-6.3)</b>	<b>ft · lbs)</b>

*NOTE : Refer to section 5-5 for further instruction for disassembly/reassembly procedures of recoil starter.*



#### 5-4-8 REAR COVER

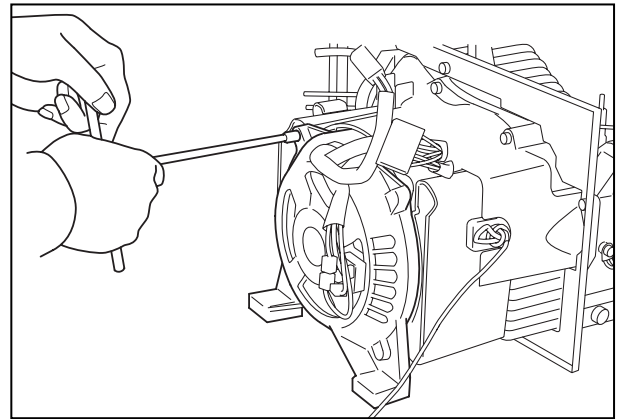
Assemble the Rear Cover to the blower housing.

M6 x 25mm Bolt : 4pcs.

<b>Tightening torque : 6.5-8.5</b>	<b>N · m</b>
<b>65-85</b>	<b>kgf · cm</b>
<b>(4.8-6.3)</b>	<b>ft · lbs)</b>

##### <CAUTION>

***Be extremely careful not to have your finger pinched between the rotor and stator due to the strong magnetic force between them.***



#### 5-4-9 THROUGH BOLT (thread in reverse direction)

Insert the Through Bolt into the center of rotor shaft and tighten it.

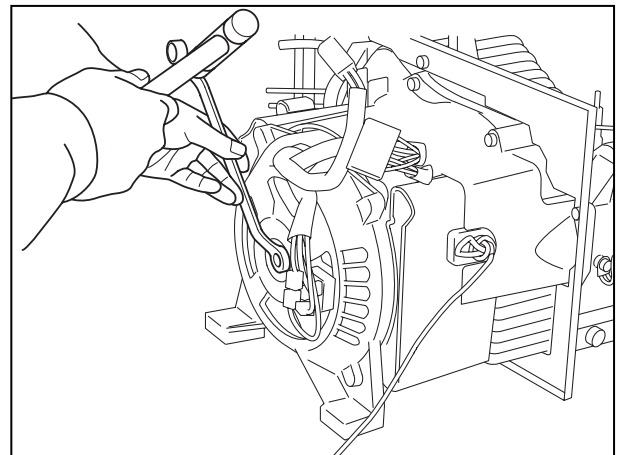
M10 Through Bolt : 1 pce.

<b>Tightening torque : 19.0-21.0</b>	<b>N · m</b>
<b>190-210</b>	<b>kgf · cm</b>
<b>(14.0-15.5)</b>	<b>ft · lbs)</b>

Tools : M14 Socket wrench

***NOTE : The thread of the Through Bolt is in reverse direction.***

***Therefore, torque it counter-clockwise to tighten it.***



#### 5-4-10 COVER (CRANKSHAFT) for the frame type FAN (SILENT) for the soundproof type

For the frame type generator:

Assemble the Cover (Crankshaft) to the main bearing cover.

M8 x 12mm Flange bolt : 2 pcs.

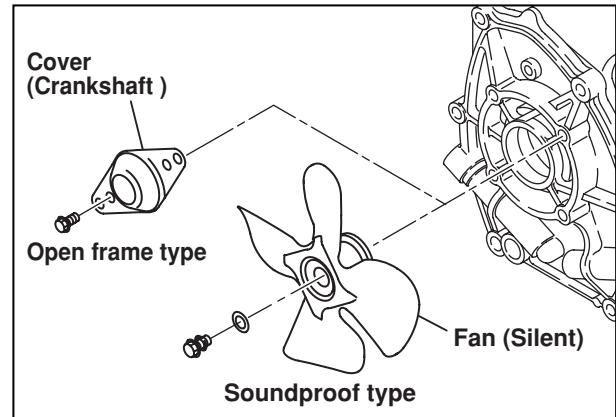
For the soundproof type generator:

Assemble the Fan (Silent) to the crankshaft.

M8 x 25mm Bolt : 1 pce.

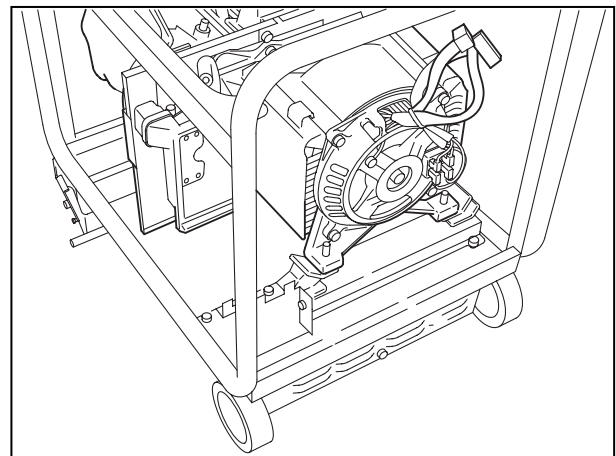
M8 plain washer : 1 pce.

<b>Tightening torque : 18.0-22.0 N · m</b>
<b>180-220 kgf · cm</b>
<b>(13.3-16.2 ft · lbs)</b>



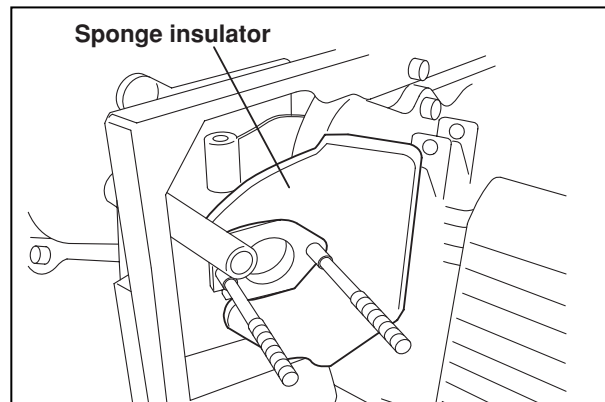
#### 5-4-11 INSTALLATION OF ENGINE ALTERNATOR ASSEMBLY ONTO FRAME

Install the engine and alternator assembly onto frame carefully aligning the bolts of mounting rubbers into the engine/alternator base.



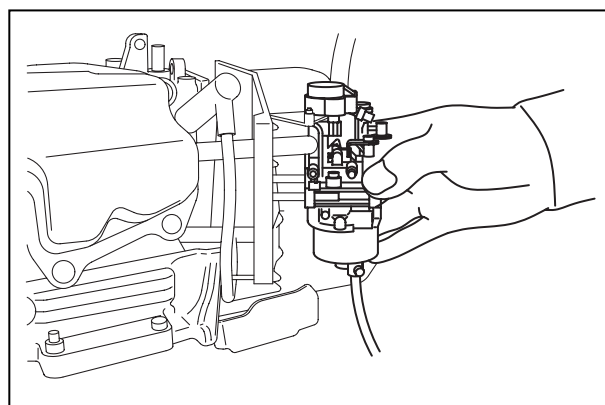
### 5-4-12 CARBURETOR

(1) Install the Sponge Insulator around the intake flange.



(2) Install the Carburetor to the intake flange.

**NOTE:** Be sure to attach the gasket between the carburetor and the intake flange.



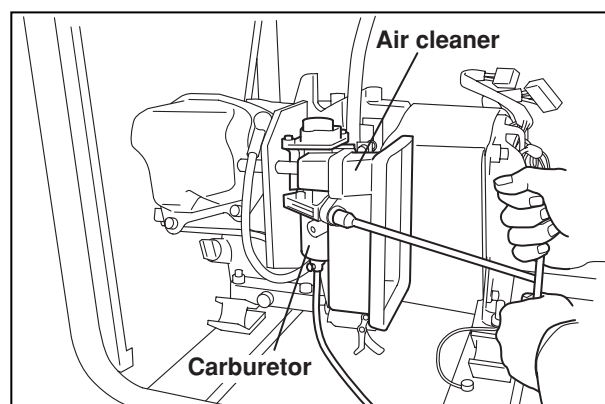
### 5-4-13 AIR CLEANER BASE

Attach the Air Cleaner Base to the carburetor and fix with two M6 bolts and one M6 Flange bolt.

M6 Flange nut : 2 pcs.

M6 x 20mm Flange bolt : 1 pce.

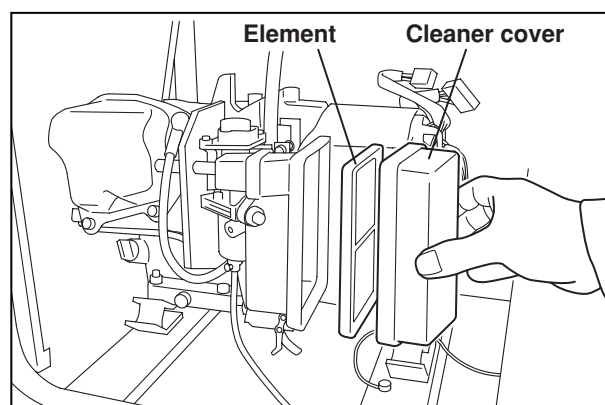
<b>Tightening torque : 6.0-8.0</b>	<b>N · m</b>
<b>60-80</b>	<b>kgf · cm</b>
<b>(4.4-5.9</b>	<b>ft · lbs)</b>



### 5-4-14 AIR CLEANER ELEMENT

Assemble the Air Cleaner Element and the Air Cleaner Cover to the air cleaner base.

Wash the cleaner element if it is dirty before reassembly.

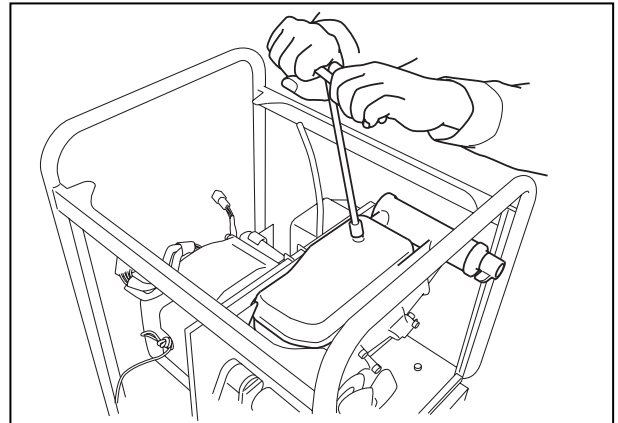


### 5-4-15 MUFFLER

Install the muffler to the engine.

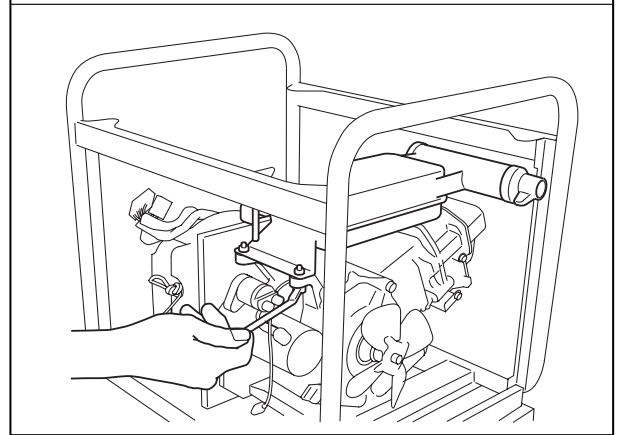
M8 Flange nut : 2 pcs.

<b>Tightening torque : 17.0-19.0 N · m</b>
<b>170-190 kgf · cm</b>
<b>(12.5-14.0 ft · lbs)</b>



M6 x 23mm Flange bolt : 2 pcs.

<b>Tightening torque : 4.0-6.0 N · m</b>
<b>40-60 kgf · cm</b>
<b>(3.0-4.4 ft · lbs)</b>

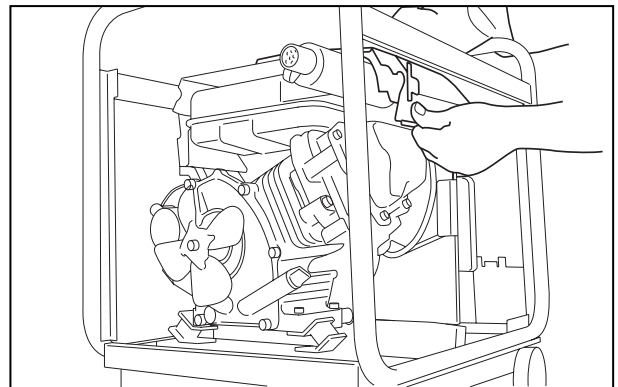


### 5-4-16 MUFFLER COVER

Attach the Muffler Cover to the muffler.

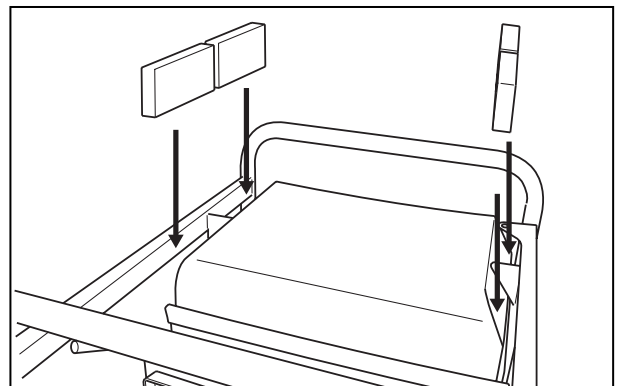
M6 x 12mm Flange bolt : 4 pcs.

<b>Tightening torque : 4.0-6.0 N · m</b>
<b>40-60 kgf · cm</b>
<b>(3.0-4.4 ft · lbs)</b>



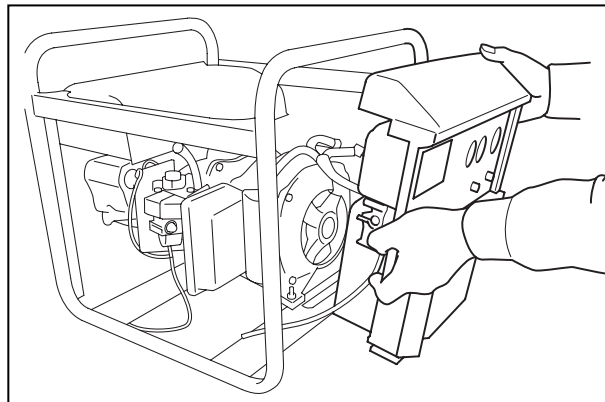
### 5-4-17 SPONGE

Install the Sponges between the fuel tank and the frame as shown in the figure right.



#### 5-4-18 CONTROL BOX and INVERTER UNIT

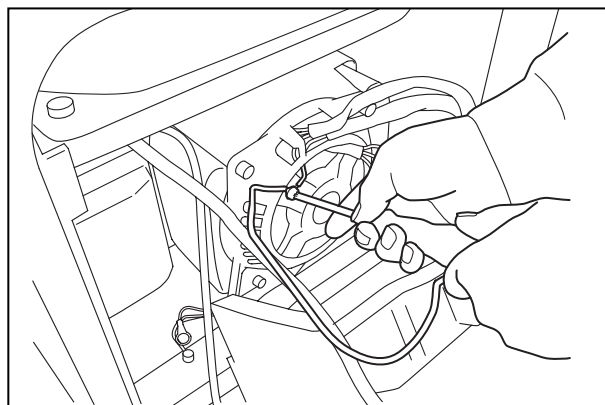
- (1) Temporarily assemble the Control Box and Inverter Unit.
- (2) Connect the wire harness to the control box and inverter unit.



#### 5-4-19 GROUNDING WIRES

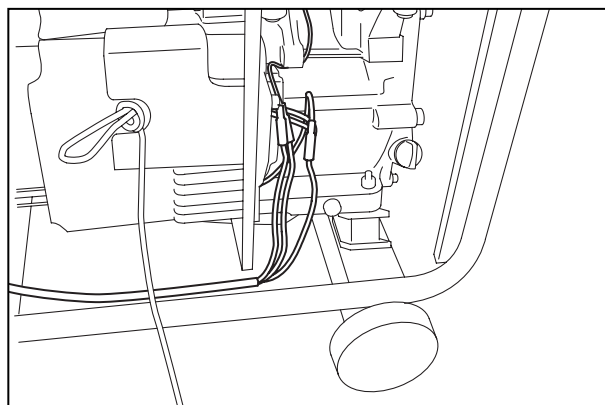
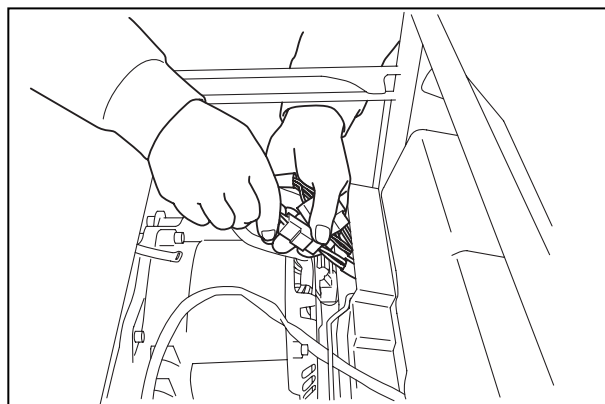
Fasten the ground wire from the alternator and the one from the inverter unit together to the rear cover with a screw.

Tools : Screw driver

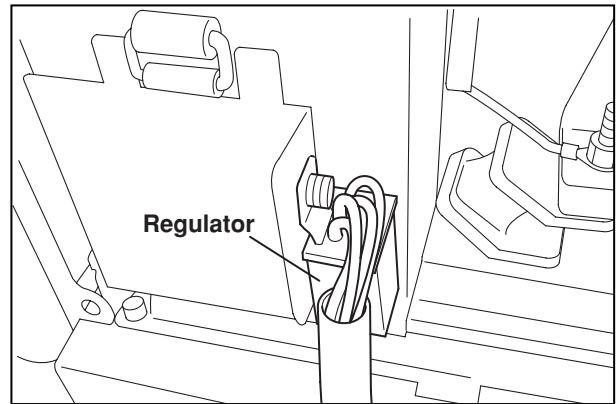


#### 5-4-20 CONNECTION OF WIRING HARNESS

- (1) Engage the connectors of wiring harness between the control panel, inverter unit and the alternator.
- (2) Engage the couplers of wiring harness between the control panel and the inverter unit.
- (3) For electric starting models, connect the wires to the starting motor.  
The battery cable (positive) to pass below the alternator to connect to the battery.

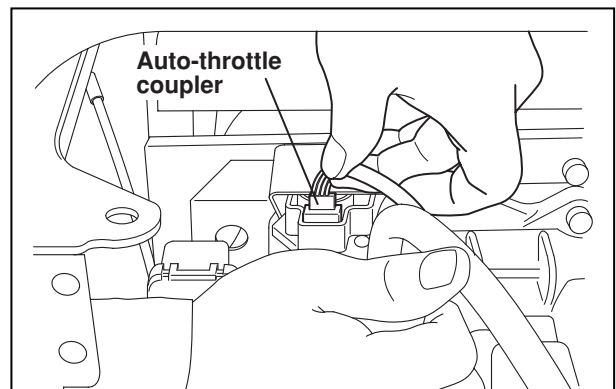


- (4) Install the regulator to the battery box.  
M6 x 8mm Flange bolt : 1 pce.



#### 5-4-21 AUTO THROTTLE

- (1) Connect the wires to Auto Throttle Unit of the carburetor.
- (2) Temporarily connect the choke cable to the carburetor choke lever.

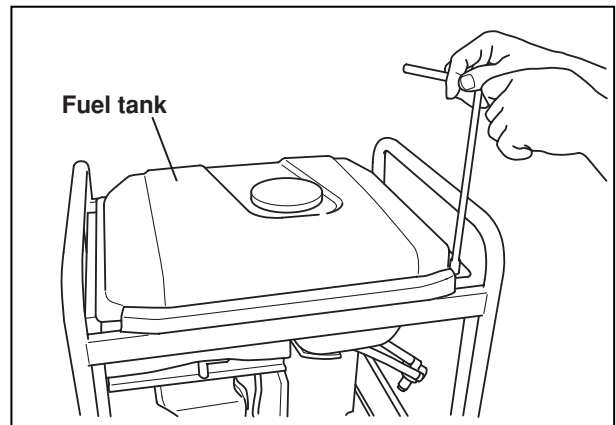


#### 5-4-22 FUEL TANK

- (1) Install the fuel tank onto the frame. Be sure to insert the mount rubbers between the tank and the frame.  
M6 x 20mm Flange bolt : 4 pcs.  
Mount Rubbers : 4 pcs.

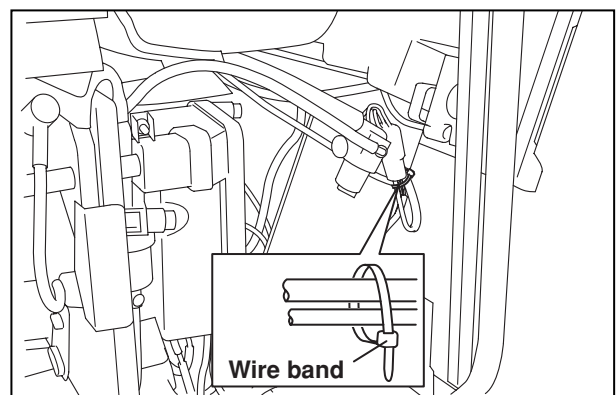
<b>Tightening torque : 4.0-6.0</b>	<b>N · m</b>
<b>40-60</b>	<b>kgf · cm</b>
<b>(3.0-4.4</b>	<b>ft · lbs)</b>

- (2) Attach two pieces of Rubber Seal (Tank).
- (3) Attach the Sponge Seal (Muffler).



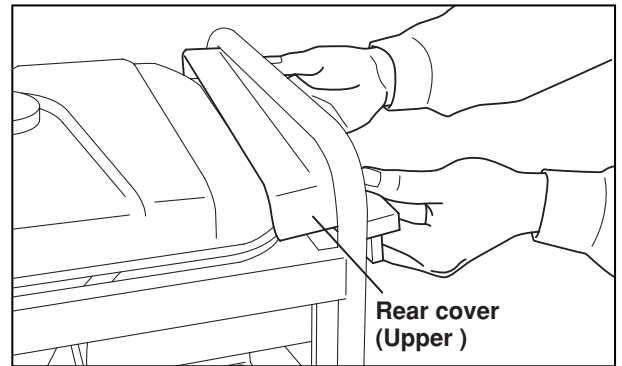
#### 5-4-23 CLAMPING OF THE CHOKE CABLE AND GROUND WIRES

Clamp the choke cable and ground wires using a wire band.



#### 5-4-24 REAR COVER (UPPER) and MUFFLER COVER (REAR)

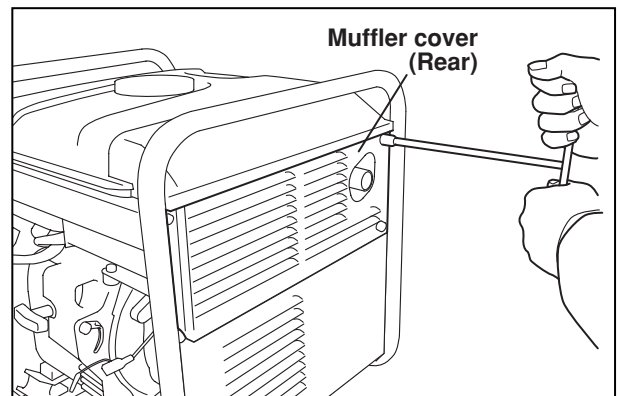
- (1) Attach the Rear Cover (Upper) first to the frame.



- (2) Install the Muffler Cover (Rear) onto the Rear Cover (Upper) and the frame.

M6 x 18mm Flange bolt : 6pcs.

<b>Tightening torque : 4.0-6.0</b>	<b>N · m</b>
<b>40-60</b>	<b>kgf · cm</b>
<b>(3.0-4.4</b>	<b>ft · lbs)</b>



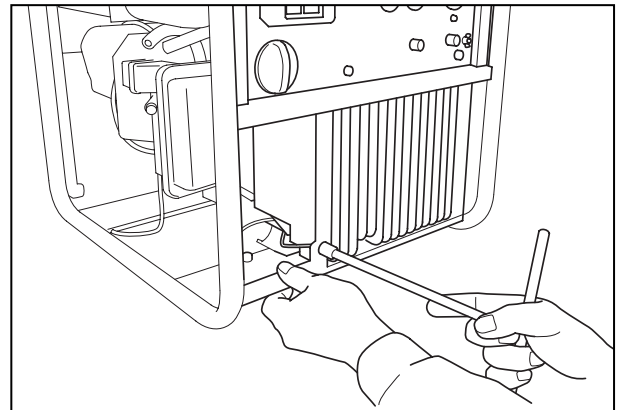
#### 5-4-25 CONTROL PANEL and INVERTER UNIT

- (1) Assemble the Bracket (Cover) to the inverter unit.

M6 x 18mm Flange bolt : 2 pcs.

M6 x 25mm Flange bolt : 1 pce. (for right side of the inverter unit)

<b>Tightening torque : 4.0-6.0</b>	<b>N · m</b>
<b>40-60</b>	<b>kgf · cm</b>
<b>(3.0-4.4</b>	<b>ft · lbs)</b>



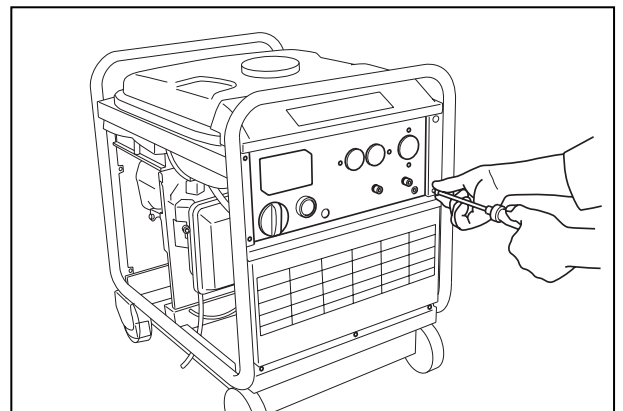
- (2) Assemble the Front Cover (Lower) below the Front Cover (Upper)

M6 x 18mm Flange bolt : 2 pcs.

- (3) Attach the Front Cover (Upper).

M6 x 18mm Screw : 4 pcs.

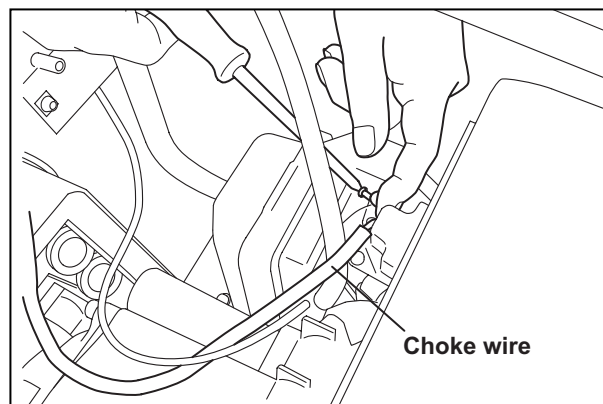
<b>Tightening torque : 4.0-6.0</b>	<b>N · m</b>
<b>40-60</b>	<b>kgf · cm</b>
<b>(3.0-4.4</b>	<b>ft · lbs)</b>



#### 5-4-26 CHOKE WIRE

Fix the Choke wire to the carburetor choke lever making sure that the choke valve is fully closed when engine switch is turned to "CHOKE" position.

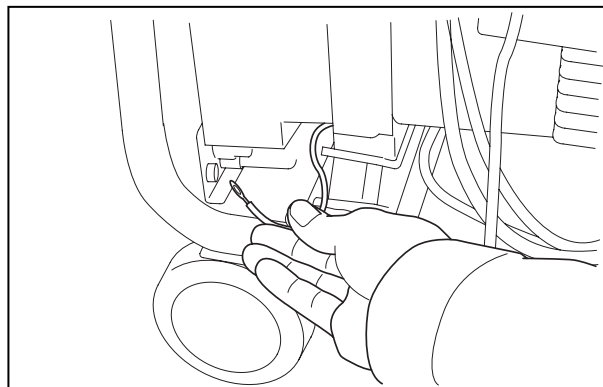
*NOTE : Be sure to install the return spring.*



#### 5-4-27 GROUND WIRE

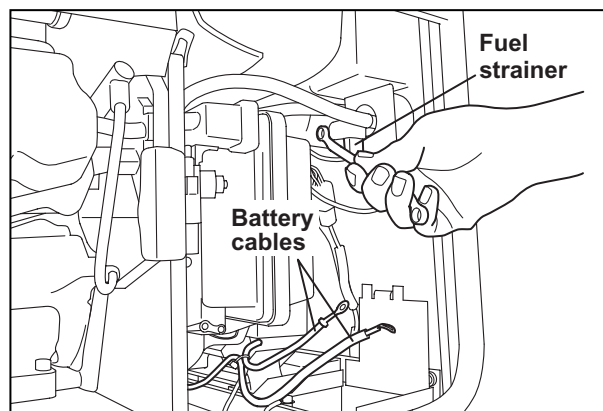
Fasten the ground wire to the frame.

M6 Nut : 1pce.



#### 5-4-28 FUEL STRAINER, FUEL PIPE and BATTERY CABLES

- (1) Align the shaft of engine switch to the Fuel Strainer Cock when the engine switch is in "STOP" position and the fuel cock closed.



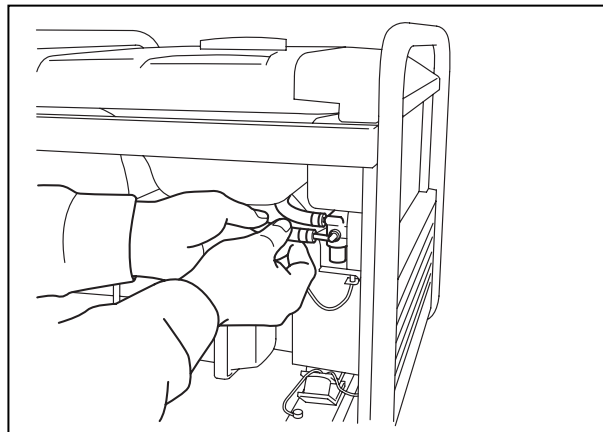
*NOTE: Battery information below*

	RG4300iS	RG3200iS
Brand	Model	Model
Yuasa	YB12AL-A2	YTX7L-BS
Yuasa	YB12AL-A2	
GS	GM12AZ-3A-2	GTX7L-BS
FB	FB12AL-A	FTX7L-BS

Dimension:136L×82W×162H / RG4300iS

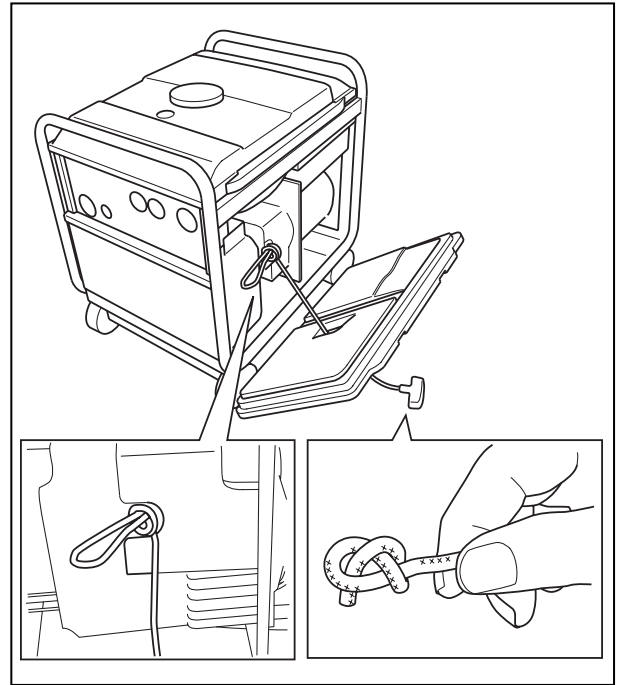
Dimension:114L×71W×131H / RG3200iS

- (2) Connect the fuel pipe from carburetor to the fuel strainer. Clamp the fuel pipe with a hose clamp.
- (3) For electric start models, connect the battery cables to the battery making sure the polarity of the cables.



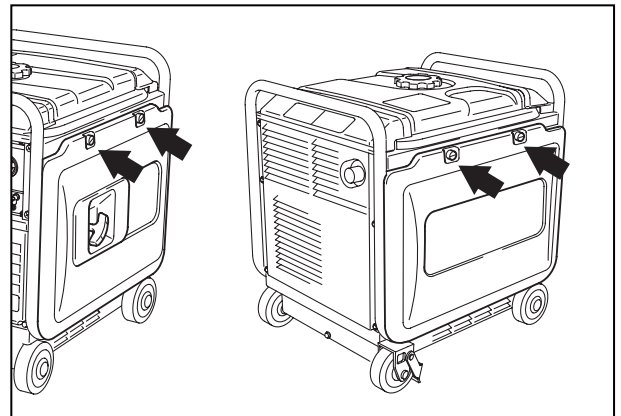
#### 5-4-29 RECOIL STARTER HANDLE

- (1) Pass the starter rope through the side cover (R) and then the starter handle.  
Make a figure eight knot to hold the rope end in the starter handle.
- (2) Release the knot inside the side cover that has been made while disassembly procedure to keep the rope.



#### 5-4-30 SIDE COVER

- (1) Engaging the lower end of side cover with the frame securely, attach the side cover (R) and side cover (L) to the frame.
- (2) Secure the side covers to the frame using the four cover bolts and spacers.



## 5-5) RECOIL STARTER

**Tools used :** Long-nose pliers, retaining-ring pliers, protective goggles

The recoil starter of this device is located between the alternator assembly and the engine, so remove the recoil starter after removing the alternator assembly.

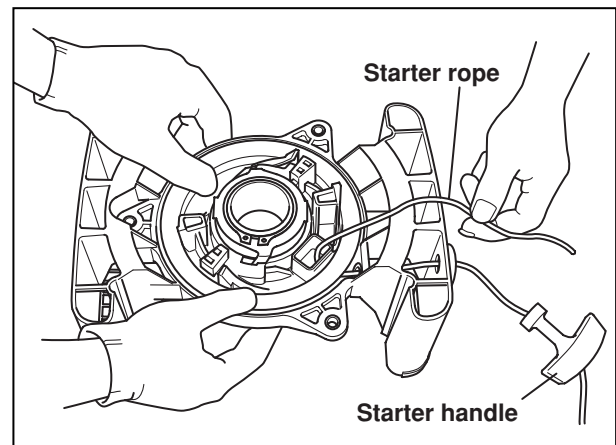
### **Caution :**

Please wear protective goggles before starting disassembly

### **1) Disassembly procedures**

(1) Unhook the spring.

- 1 Hold the starter handle, and pull out the starter rope.
- 2 Pull out all of the rope, and align the rope guide and the knot of the rope inside the reel.
- 3 Be sure to hold the reel with both thumbs so your fingers do not become be entangled.
- 4 Pull the knot of the rope out from the reel, loosen the knot, then pull it up from the starter handle side (this should be done by two people).
- 5 Slowly rewind the rope until the reel stops while controlling the reel with both thumbs.

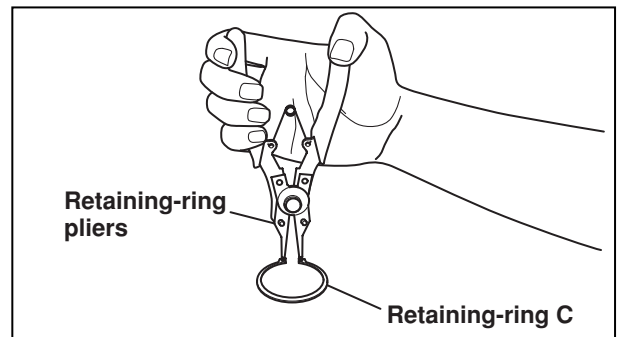


### **Caution :**

The pull of the spring is maximized while the rope is fully pulled out. Please do not release it suddenly, or relax your grip.

(2) Remove the small parts.

- 1 Hold the case, and remove the retaining-ring C with the ring pliers.
- 2 Beginning at the top, remove the retaining-ring, friction plate, and ratchet.

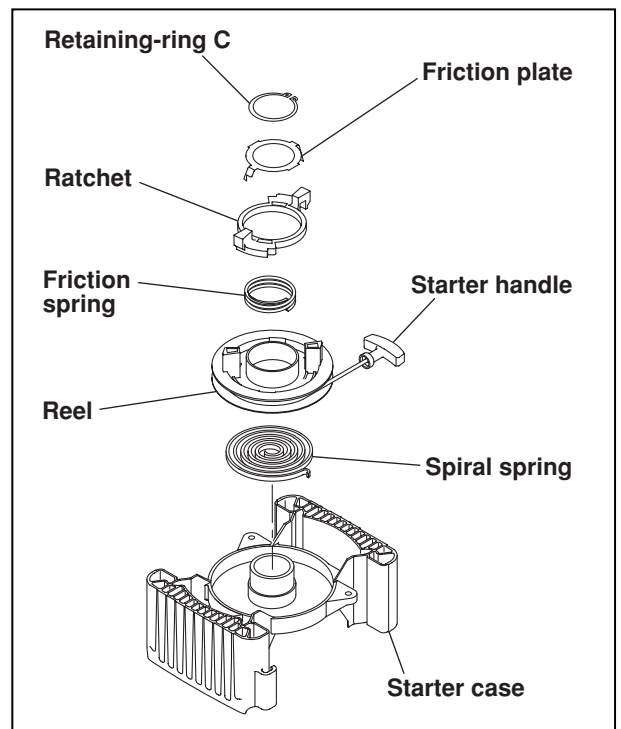


(3) Remove the reel.

- 1 Move the reel to left and right at a 1/4 turns several times until it moves smoothly, gently holding it down.
- 2 Slowly lift the reel, removing it from the case.
- 3 Repeat (3) 1 and (3) 2 if the spring assembled in the reel sticks out.

**Caution :**

The reel is disassembled with the spring still assembled, so place it on a flat table without dropping, or shaking.



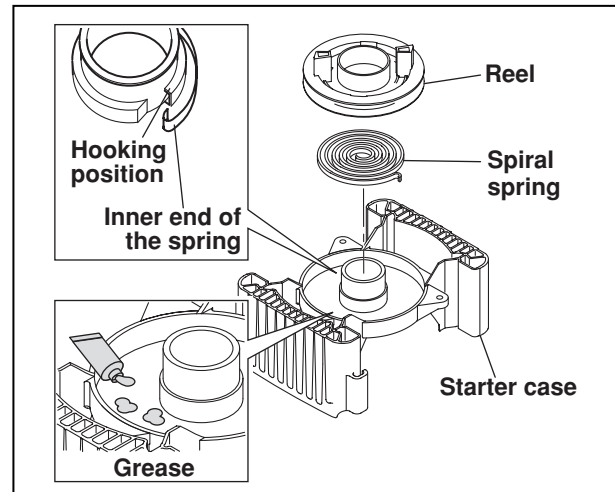
Disassembly is completed.

**Caution:**

Please wear protective goggles before starting assembly.

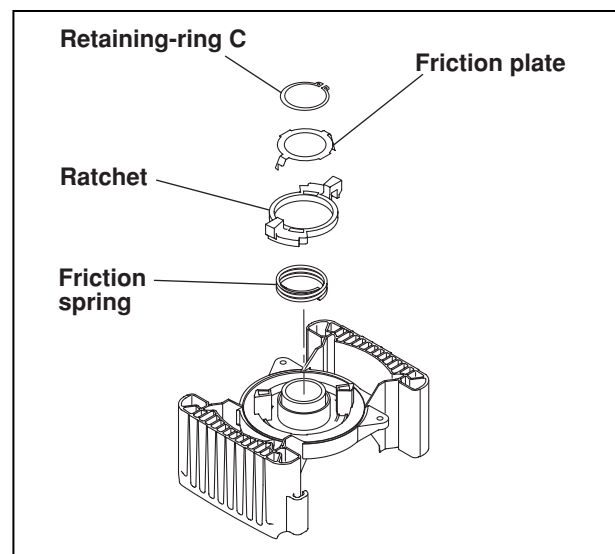
**2) Assembly procedure**

- (1) Assemble the reel into the case.
- 1 Apply grease to the case.
  - 2 Properly orient the inner end of the spring installed in the reel.
  - 3 Hold the reel so that the shaft and hook part can be caught on the inner end of the spring, and softly drop into the case from the top.
  - 4 Move the reel gently in the counter-clockwise direction, making sure that the spring catches.



- (2) Install the ratchet and friction spring.

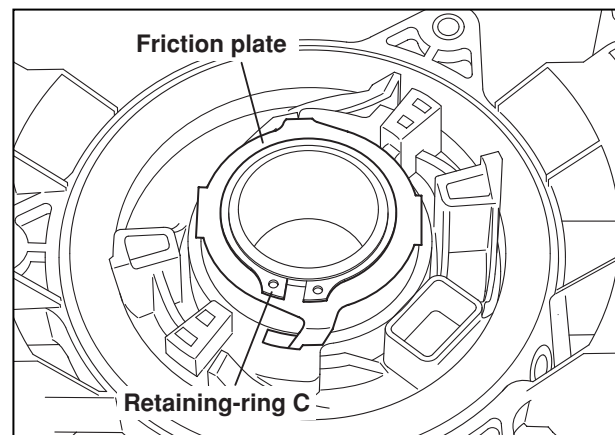
Install the ratchet and friction spring into the reel.



- (3) Installation of friction plate and retaining ring C.  
Install by putting the Tab of friction plate into the hole of the ratchet.

Fasten with the retaining ring C.

Be sure that the retaining ring is fitted into the grooves.

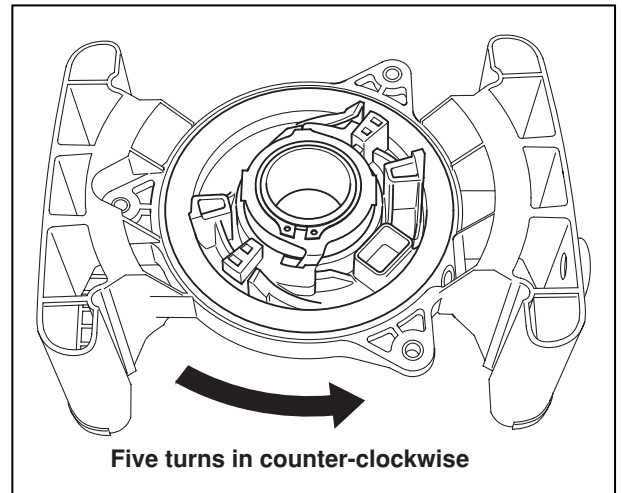


(4) Wind the spiral spring.

- 1 Holding the case, turn the reel five turns in counter-clockwise.
- 2 Fix the reel in the position that the rope hole of reel aligns with the rope guide.

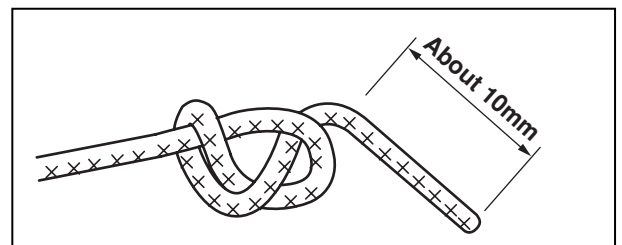
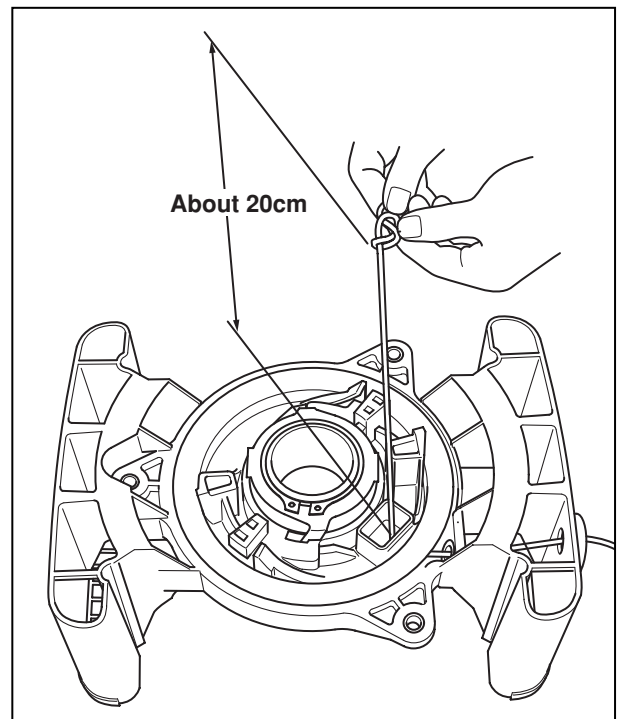
**Caution:**

Do not release the pressure to hold the reel while winding the spiral spring. The spring force is strong and cause sudden rewinding if you release the pressure.



(5) Inserting the rope. (this should be done by two people)

- 1 Thread the rope end through the rope guide and the rope hole of the reel, and pull 20cm out from the reel.
- 2 Tight the end of the rope.
- 3 Fix the rope end to the reel.
- 4 Hold the rope at the distance 50cm from the rope guide. Hold securely.
- 5 Gently release the reel and have it wind the rope on the reel until the knot reaches the rope guide.



Assembly is completed.

※These are the disassembly and assembly procedures, please be sure to review the following item checklist to insure that the parts securely installed.

### 3) Checking items after assembly

(1) Try to pull the starter handle for 2 to 3 times.

(a) When the starter handle is difficult to pull, please make sure the parts, etc., are installed in the right direction.

(b) When the ratchet does not operate, please re-check if there are any missing parts such as the spring.

(2) Pull the starter handle and try to pull the starter rope out to the limit.

(a) When the starter rope does not return smoothly, or the starter handle is hangs down loosely, please add grease or mobile oil in the rotating and friction parts.

If it still does not work, rewind 1~2 times.

(In that case, confirm that the spring is not under pressure by following the previous procedure.)

(b) Please re-assemble from the beginning if there was the sound when the spring was removed and the starter rope does not re-winded into the reel.

### 4) When . . .

(1) The spring pops out

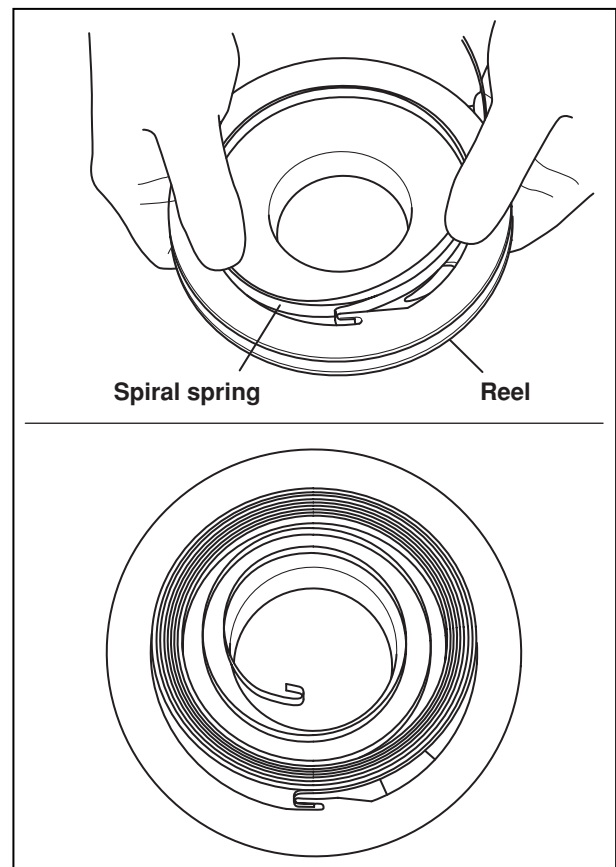
(a) Hook the end hook of the spring to the notched part of the reel, and attach the spring, applying pressure with your fingers so that it isn't released from the groove. **(Please wear gloves)**

(b) Hook the inside hook of the spring to the claw of the starter case while turning.

※ Please refer to assembly procedures.

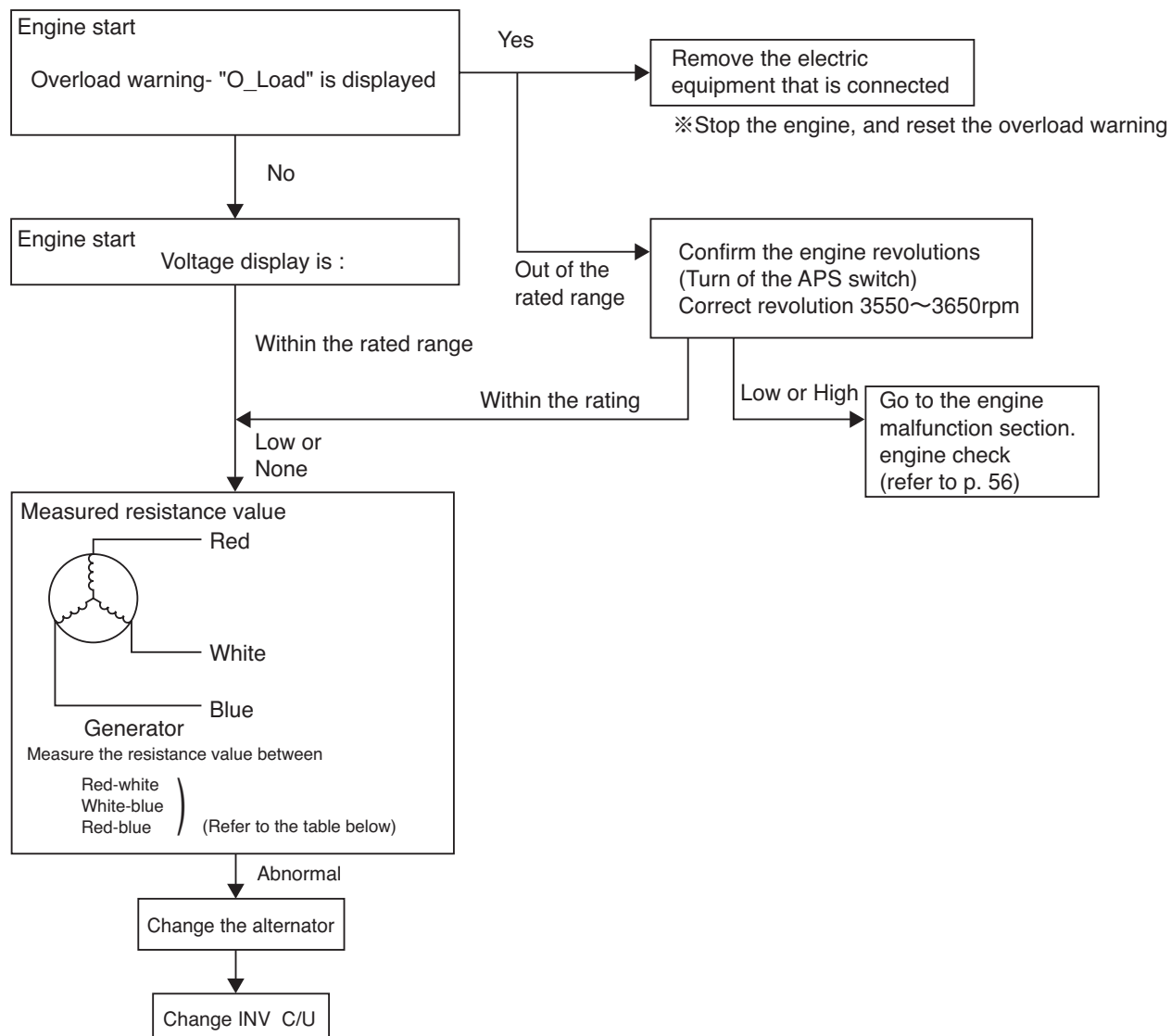
(2) Oil refill

At the end of the season or when disassembling, add grease (preferably one that is heat resistant, if possible) or mobile oil to rotation parts, friction parts, and the spring.



## 6.TROUBLE SHOOTING

### No output power or Low output



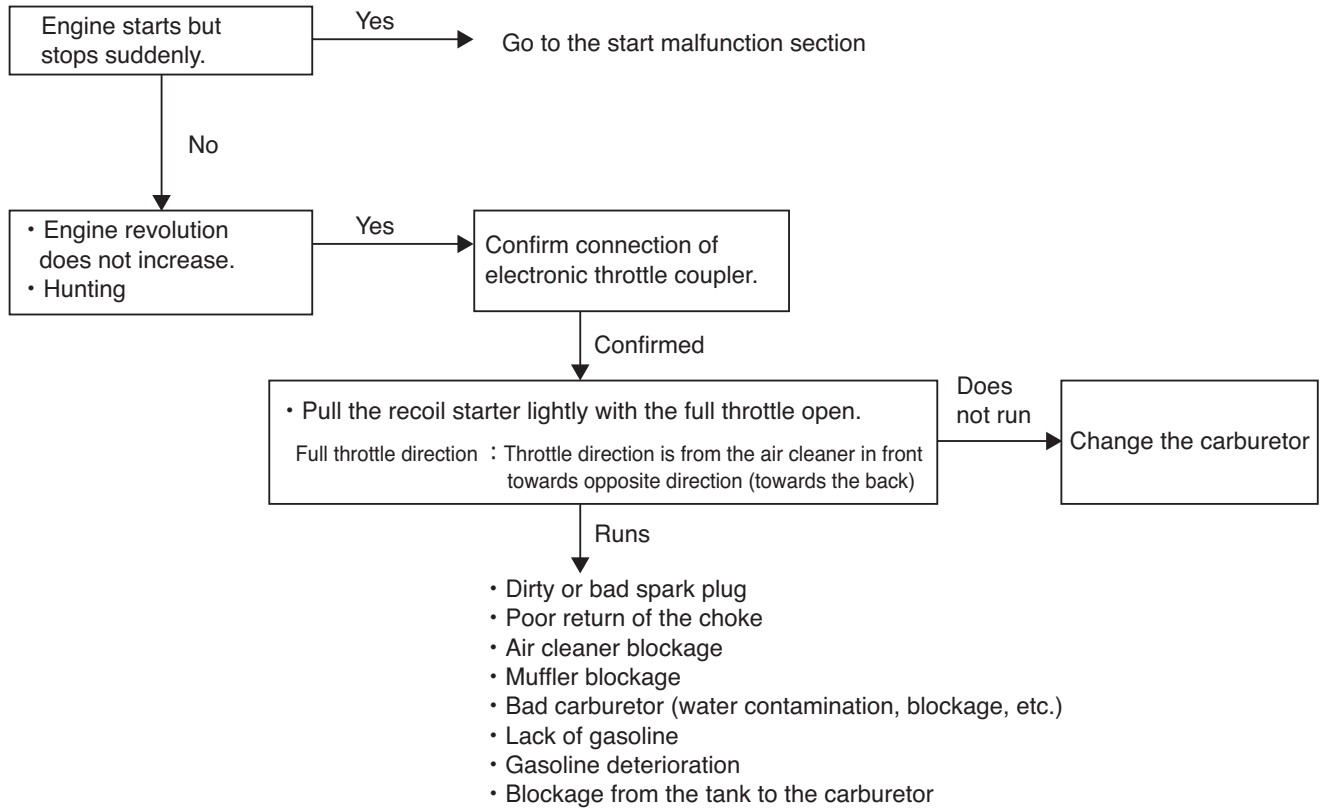
< Resistance value of the stator windings for reference >

Unit: Ohms (Ω)

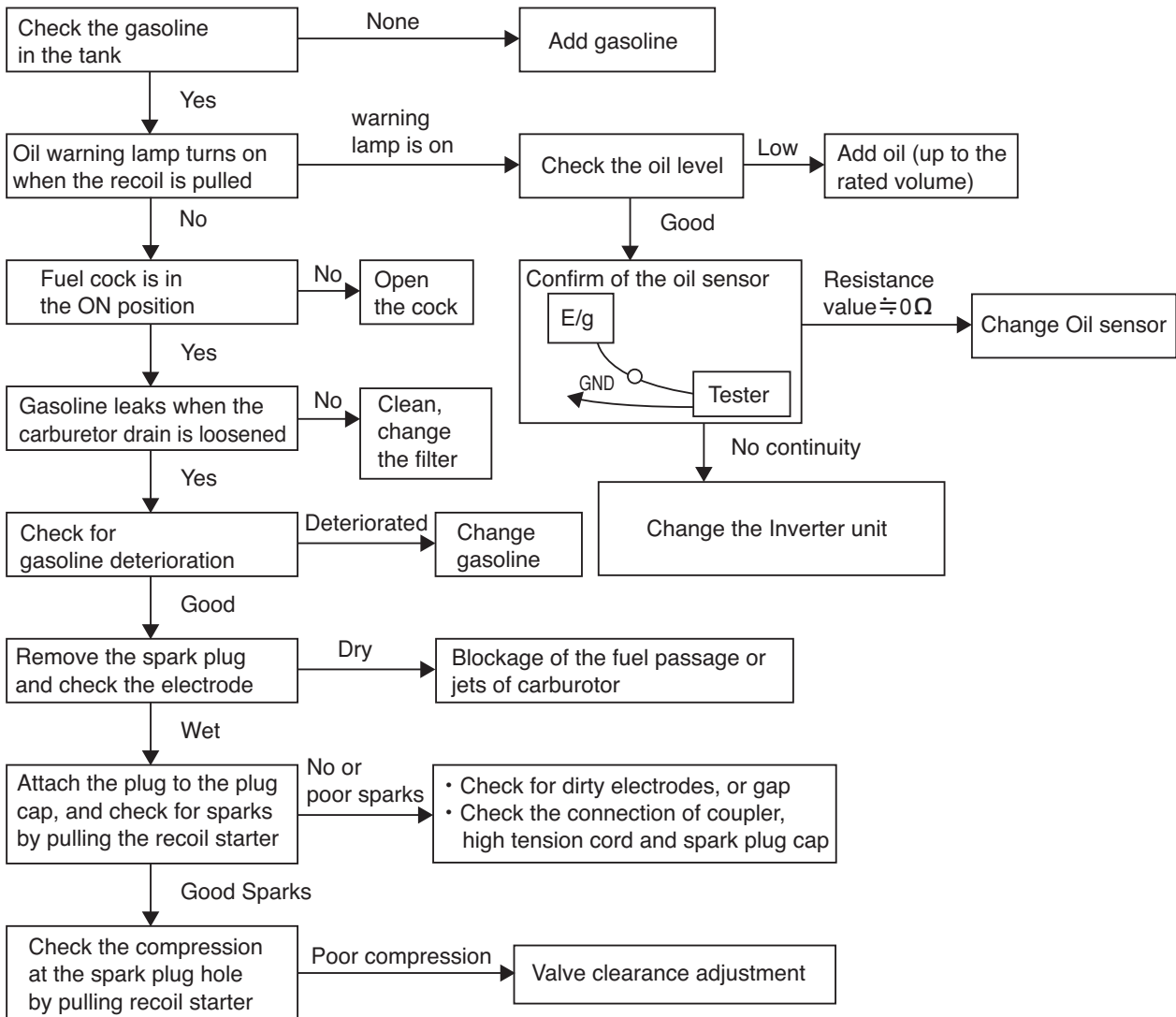
Wire Color	Voltage Spec.	RG2800i RG2800iS	P3200i RG3200iS	P4300i RG4300iS
Red – White	110, 120	1.1	0.8	0.5
	220, 230, 240	4.0	2.8	2.1
White – Blue	110, 120	1.1	0.8	0.5
	220, 230, 240	4.0	2.8	2.1
Blue – Red	110, 120	1.1	0.8	0.5
	220, 230, 240	4.0	2.8	2.1

Surrounding temperature 20°C

## Improper revolutions (Electronic throttle)

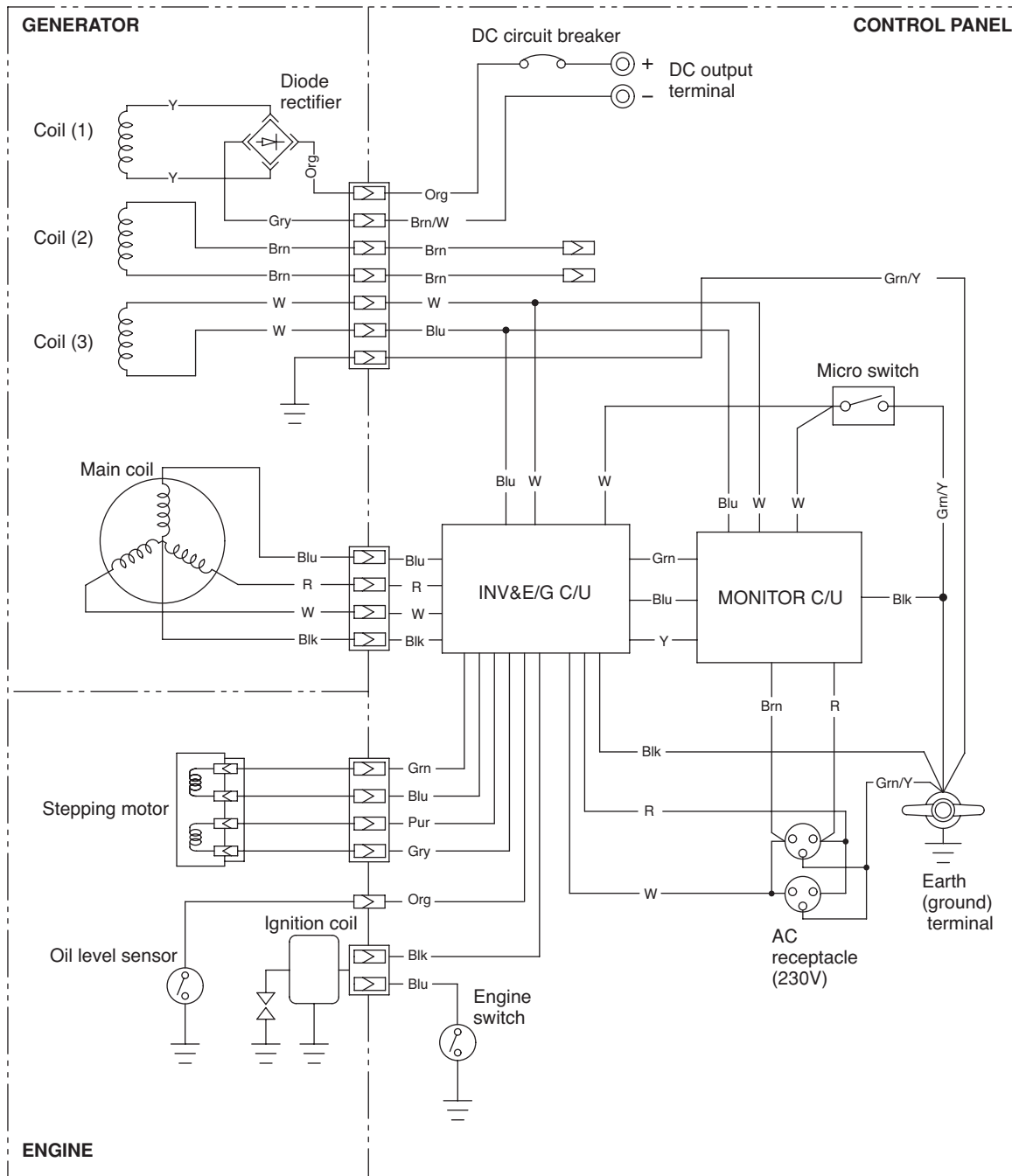


## Engine does not start (Start failure)



## 7. WIRING DIAGRAM

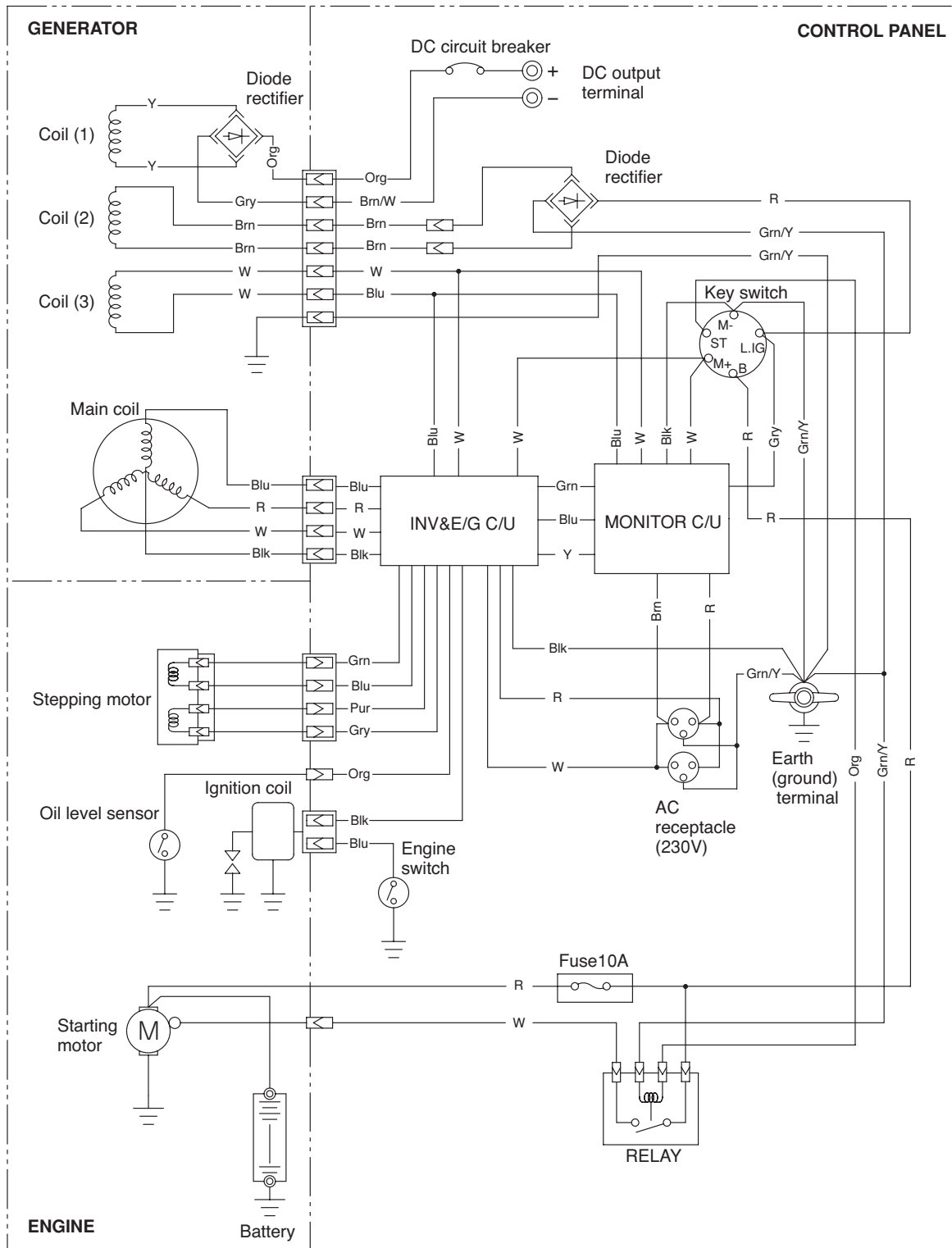
### RG2800i / P3200i / RG2800iS (50Hz-230V) [Recoil starter model]



#### Wiring color cord

Blk : Black	LBlu : Light blue	Grn : Green	Gry : Gray	Y : Yellow	Pur : Purple
Blk/W : Black/White	Brn : Brown	Grn/W : Green/White	R : Red	W/Blk : White/Black	
Blu : Blue	Brn/W : Brown/White	Org : Orange	W : White	Grn/Y : Green/Yellow	

## P4300i (50Hz-230V) [Electric starter model]



### Wiring color cord

Blk : Black  
Blk/W : Black/White  
Blu : Blue

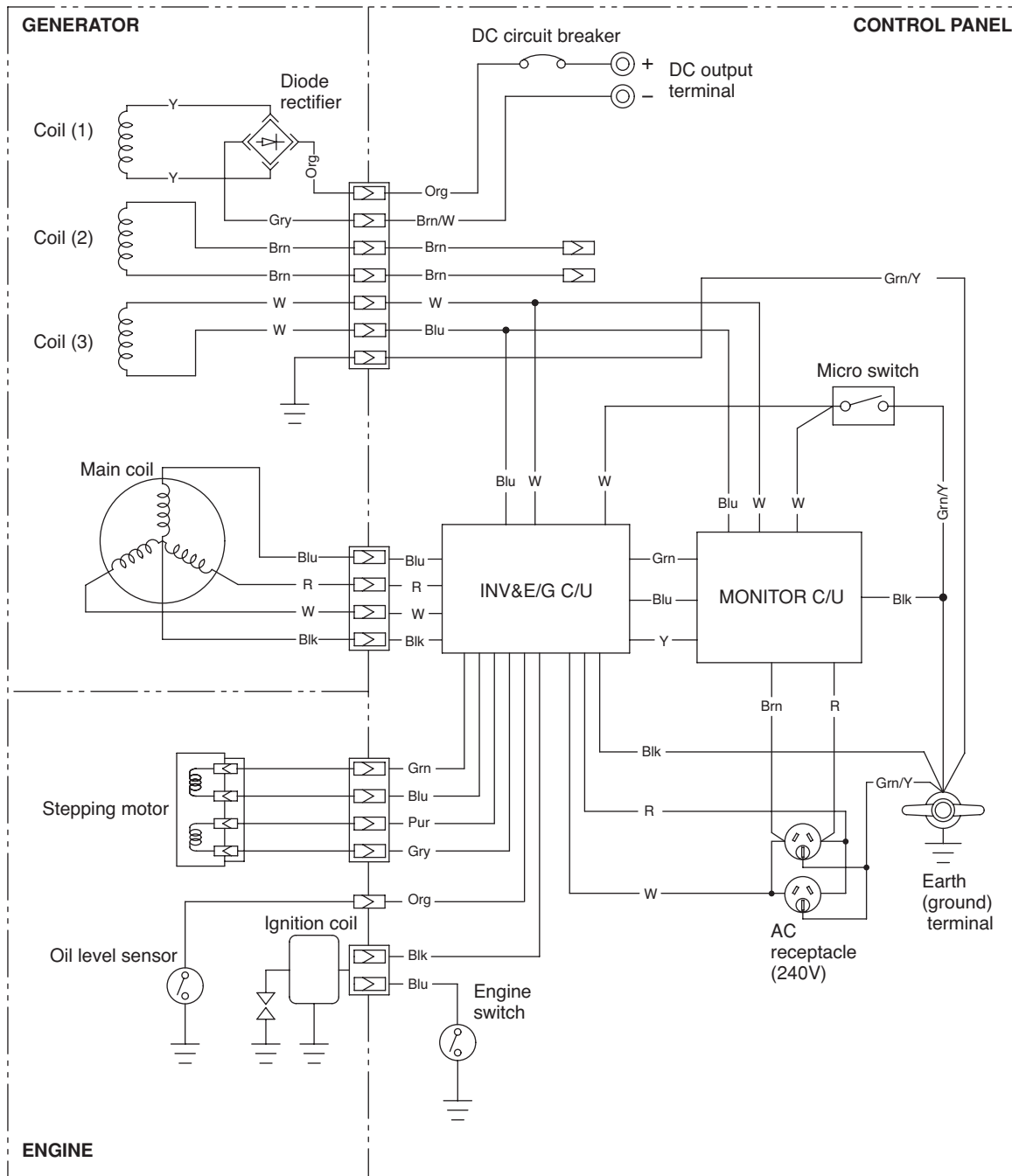
LBlu : Light blue  
Brn : Brown  
Brn/W : Brown/White

Grn : Green  
Grn/W : Green/White  
Org : Orange

Gry : Gray  
R : Red  
W : White

Y : Yellow                      Pur : Purple  
W/Blk : White/Black  
Grn/Y : Green/Yellow

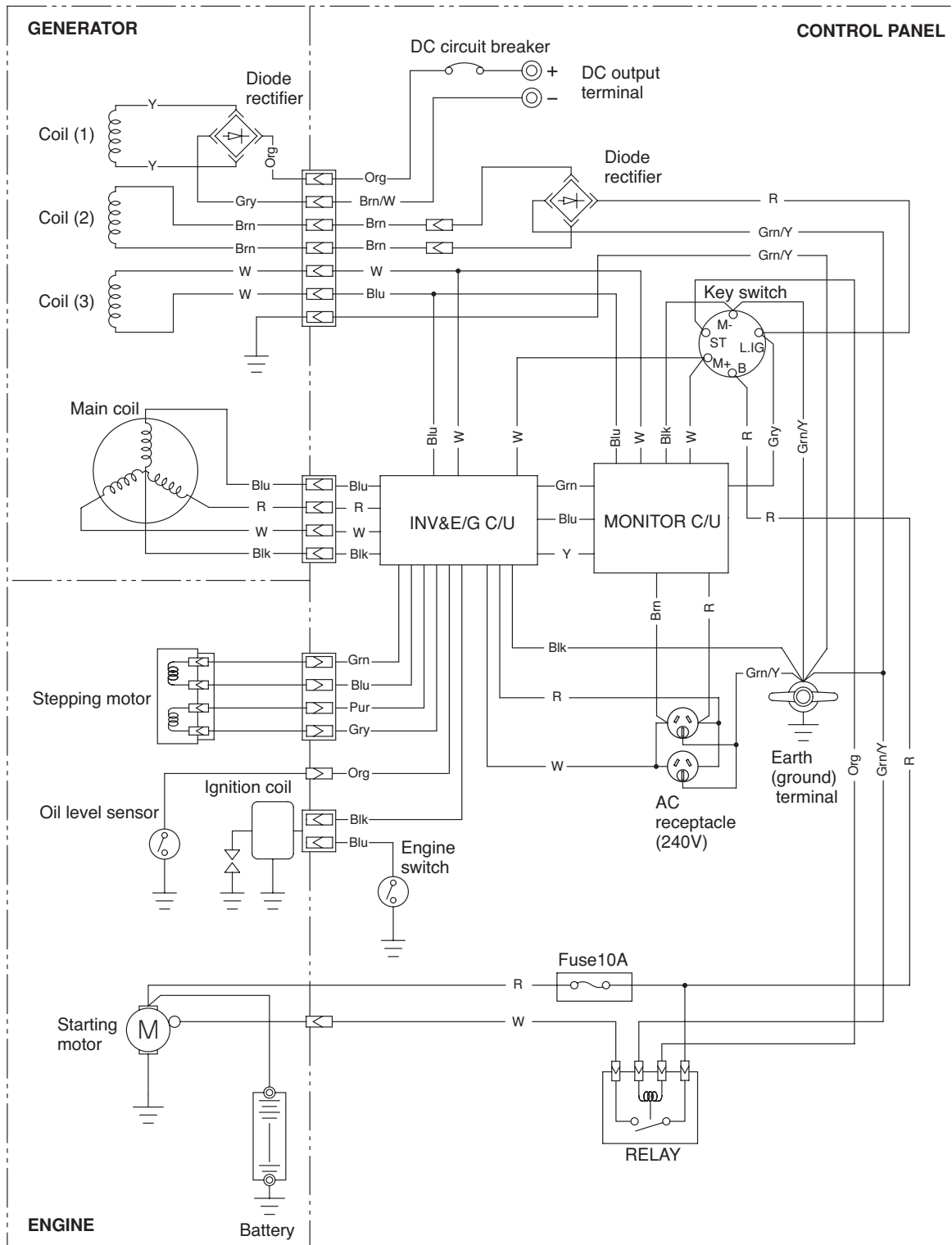
## RG2800i / P3200i / RG2800iS (50Hz-240V) [Recoil starter model]



### Wiring color cord

Blk : Black	LBu : Light blue	Grn : Green	Gry : Gray	Y : Yellow	Pur : Purple
Blk/W : Black/White	Brn : Brown	Grn/W : Green/White	R : Red	W/Blk : White/Black	
Blu : Blue	Brn/W : Brown/White	Org : Orange	W : White	Grn/Y : Green/Yellow	

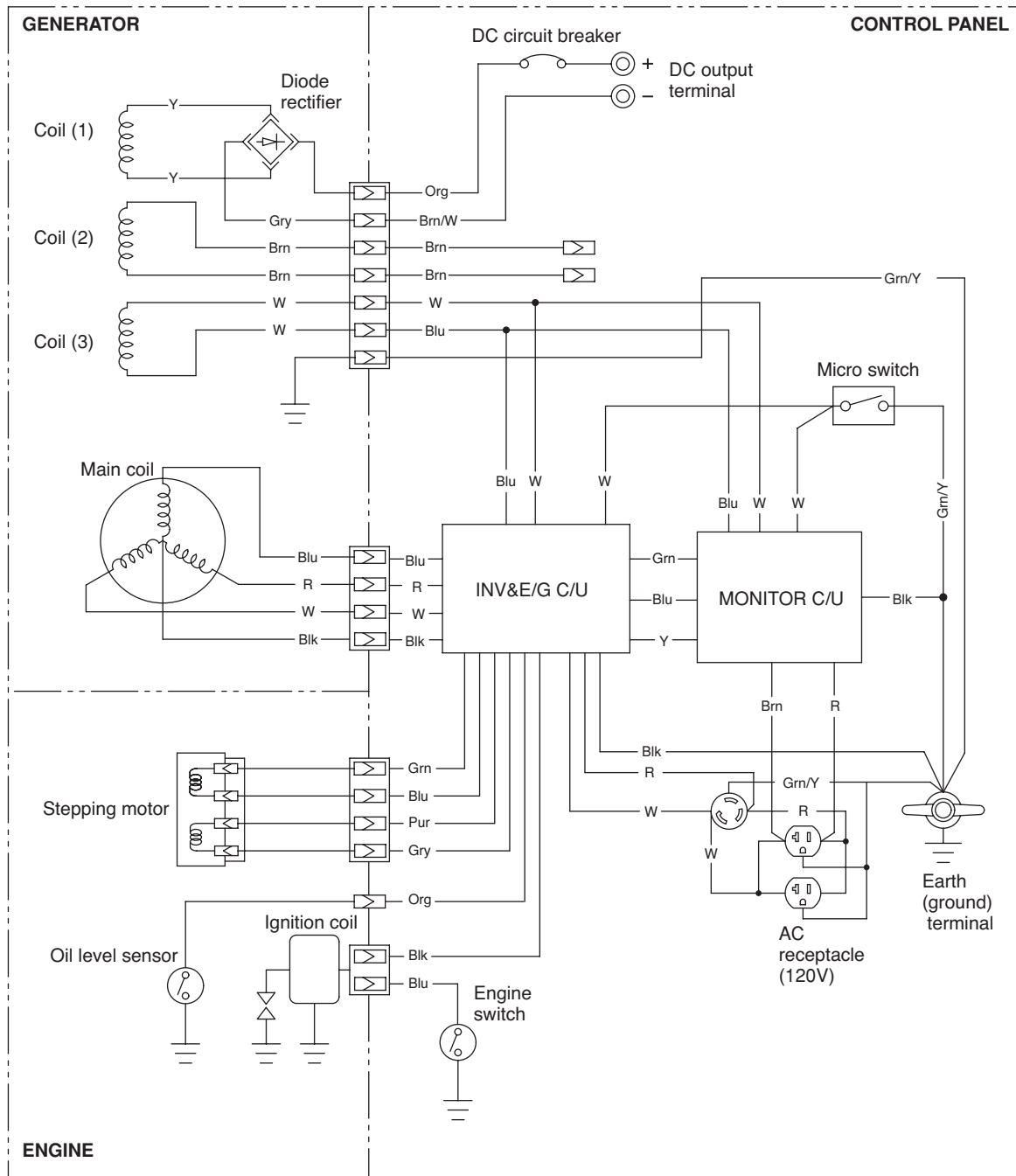
## P4300i (50Hz-240V) [Electric starter model]



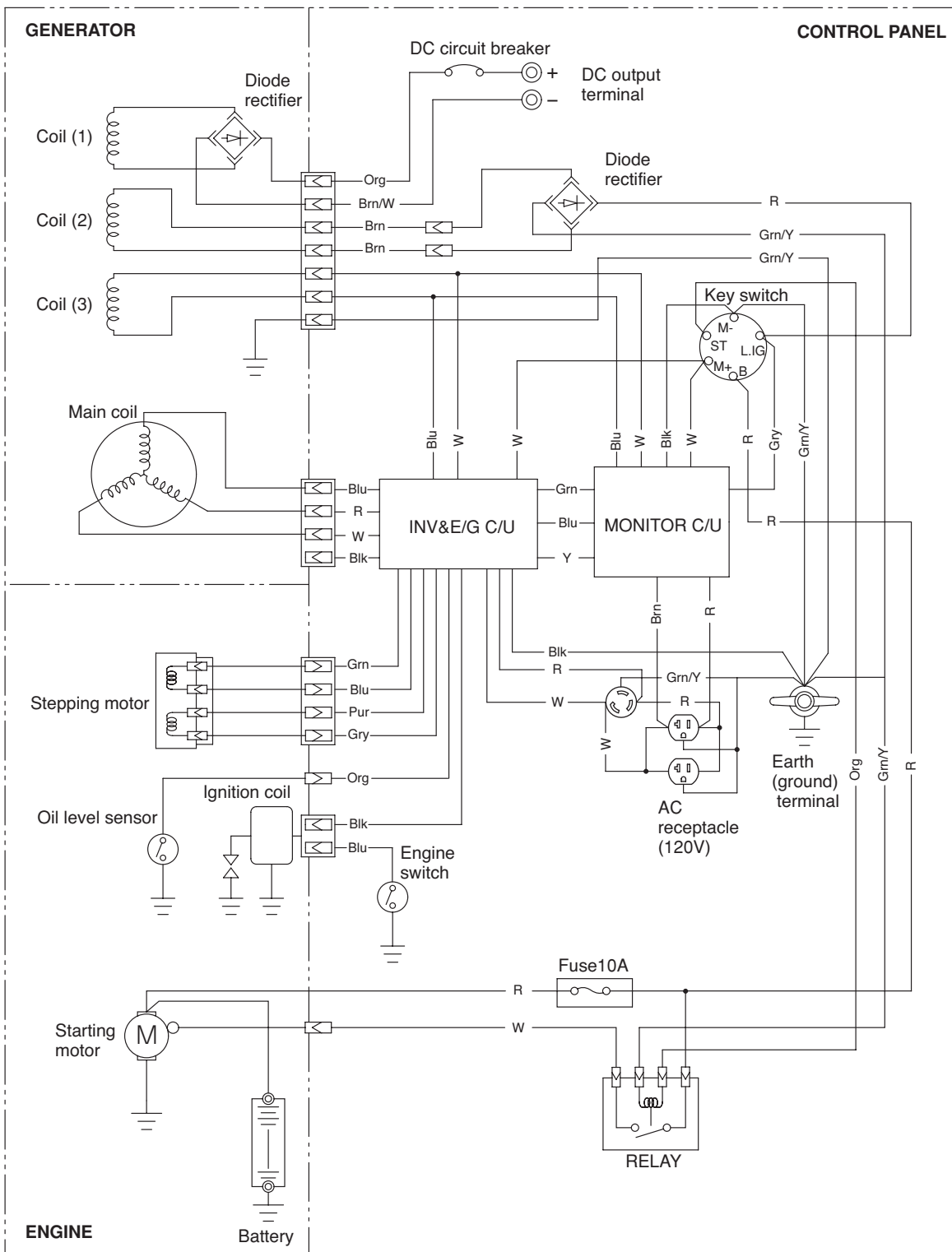
### Wiring color cord

Blk : Black	LBlu : Light blue	Grn : Green	Gry : Gray	Y : Yellow	Pur : Purple
Blk/W : Black/White	Brn : Brown	Grn/W : Green/White	R : Red	W/Blk : White/Black	
Blu : Blue	Brn/W : Brown/White	Org : Orange	W : White	Grn/Y : Green/Yellow	

## RG2800i / P3200i / RG2800iS (60Hz-120V) [Recoil starter model]



## P4300i (60Hz-120V) [Electric starter model]



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