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**NOTE**

This Service Manual excludes information for engine.

In case you need service information for engine, please refer to the Robin EX series OHC Engine Service Manual.
# 1. SPECIFICATIONS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>SGX3500</th>
<th>SGX5000</th>
<th>SGX7500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Brush, self-exciting, 2-pole, single phase</td>
<td>AVR type</td>
<td></td>
</tr>
<tr>
<td>Voltage regulation system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC Output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage- Frequency V–Hz</td>
<td></td>
<td></td>
<td>120/240–60</td>
</tr>
<tr>
<td>Rated current</td>
<td>A</td>
<td>26.6/13.3</td>
<td>37.5/18.7</td>
</tr>
<tr>
<td>Rated output</td>
<td>VA (W)</td>
<td>3200</td>
<td>4500</td>
</tr>
<tr>
<td>Maximum output</td>
<td>VA (W)</td>
<td>3500</td>
<td>4900</td>
</tr>
<tr>
<td>Power factor</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Safety device type</td>
<td></td>
<td>No-Fuse Breaker</td>
<td></td>
</tr>
</tbody>
</table>

**GENERATOR**

<table>
<thead>
<tr>
<th>Model</th>
<th>EX21D</th>
<th>EX30D</th>
<th>EX40D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>SUBARU, Air-cooled, 4-stroke, OHC, Gasoline Engine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Displacement</td>
<td>Ml(cu.in.)</td>
<td>211(12.88)</td>
<td>287(17.51)</td>
</tr>
<tr>
<td>Fuel</td>
<td>Automotive Unleaded Gasoline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel tank capacity</td>
<td>L(U.S.gal)</td>
<td>11</td>
<td>22.5</td>
</tr>
<tr>
<td>Engine oil capacity</td>
<td>L(U.S.gal)</td>
<td>0.6 (0.16)</td>
<td>1.0 (0.26)</td>
</tr>
<tr>
<td>Spark plug</td>
<td>TORCH E6RC (NGK BR–6HS)</td>
<td>NGK–BR–6HS</td>
<td></td>
</tr>
<tr>
<td>Starting system</td>
<td>Recoil starter</td>
<td>Electric starter / Recoil</td>
<td></td>
</tr>
<tr>
<td>Direction of rotation</td>
<td></td>
<td>Counter clockwise</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>mm(in)</td>
<td>683</td>
<td>748</td>
</tr>
<tr>
<td>Width</td>
<td>mm(in)</td>
<td>617</td>
<td>717</td>
</tr>
<tr>
<td>Height</td>
<td>mm(in)</td>
<td>645</td>
<td>734</td>
</tr>
<tr>
<td>Dry weight</td>
<td>kg(lb)</td>
<td>53.3kg</td>
<td></td>
</tr>
</tbody>
</table>

Specifications : Subject to change without notice.

NOTE

Dimentions are in dry weight including two wheels, handles and battery.

In dimentions, handles are being closed.
2. PERFORMANCE CURVES

SGX3500
SGX5000

![Graph of SGX5000 performance parameters]

- Current (A)
- Output (VA)
- Voltage (V)
- Frequency (Hz)

The graph shows the relationship between current and output (VA) with constant voltage and frequency.
SGX7500
3. GENERAL DESCRIPTION
SERIAL NUMBER
Serial number is stamped on the label stuck on the fuel tank.
NOTE: Always specify serial number when inquiring about the generator or ordering spare parts in order to get correct parts and suitable service.

CONSTRUCTION

[Diagram of generator parts: Earth Terminal, Brush Holder, AVR Unit, End Cover, Stator Bolt, Rear Cover, Front Cover, Prod No./Ser No. Label]
4. RANGE OF APPLIANCES THAT CAN BE POWERED BY GENERATOR

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 light 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 equipped with the fluorescent lamp, the more power shall be required to light 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 than 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) Motor driven appliances which are initially loaded, 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 than 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 item (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 of power consumption

Some appliances have no indication of 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
- Fluorescent lamp . . . . . 0.7 to 0.8

The smaller the motor, the lower the efficiency.

**Example 1:** A 40W fluorescent lamp means that its luminous output is 40W. Its efficiency is 0.7 and accordingly, power consumption will be \(40 \div 0.7 = 57\) W. As explained in Item (2), multiply this power consumption value of 57 W 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 40 W fluorescent lamps.

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

<table>
<thead>
<tr>
<th>Applications</th>
<th>Applicable Wattage(approx. W)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SGX3500</td>
</tr>
<tr>
<td>Incandescent lamp, Heater</td>
<td>3200</td>
</tr>
<tr>
<td>Fluorescent lamp, Electric tool</td>
<td>1750</td>
</tr>
<tr>
<td>Mercury lamp</td>
<td>1250</td>
</tr>
<tr>
<td>Pump, Compressor</td>
<td>800</td>
</tr>
</tbody>
</table>

*Table.4-1*
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. Table 4–2 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. Table 4–2 shows voltage drops per 100 meters of cable.

<table>
<thead>
<tr>
<th>Nominal cross section (mm²)</th>
<th>A.W.G.</th>
<th>Allowable current</th>
<th>No. of strands / strands dia.</th>
<th>Resistance (Ω/100m)</th>
<th>Current Amp.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1A 3A 5A 8A 10A 12A 15A</td>
<td></td>
</tr>
<tr>
<td>0.75</td>
<td>18</td>
<td>7</td>
<td>30/0.18</td>
<td>2.477</td>
<td>2.5V 7.5V 12.5V – – – –</td>
</tr>
<tr>
<td>1.25</td>
<td>16</td>
<td>12</td>
<td>50/0.16</td>
<td>1.486</td>
<td>1.5V 4.5V 7.5V 12V 15V 18V – – – –</td>
</tr>
<tr>
<td>2.0</td>
<td>14</td>
<td>17</td>
<td>37/0.26</td>
<td>0.952</td>
<td>1V 3V 5V 8V 10V 12V 15V – – – –</td>
</tr>
<tr>
<td>3.5</td>
<td>12 to 10</td>
<td>23</td>
<td>45/0.32</td>
<td>0.517</td>
<td>– 1.5V 2.5V 4V 5V 6.5V 7.5V – – –</td>
</tr>
<tr>
<td>5.5</td>
<td>10 to 8</td>
<td>35</td>
<td>70/0.32</td>
<td>0.332</td>
<td>– 1V 2V 2.5V 3.5V 4V 5V – – –</td>
</tr>
</tbody>
</table>

Voltage drop indicates as \[ V = \frac{1}{100} \times R \times I \times L \]

R means resistance (Ω/100 m) on the above table.
I means electric current through the wire (A).
L means the length of the wire (m).
The length of wire indicates round length, it means twice than the length from generator to electrical tools.
(6) AC Receptacle
AC receptacles are used for taking AC output power from the generator. Based on rated current, 3 kinds of receptacle are prepared.

The rated current for each receptacle is shown as follows;

CAUTION
Be careful not to use the receptacles beyond the specified amperage limits to prevent burning.

CAUTION
To connect the appliance the rocking type receptacle, insert the plug in to the receptacle and then turn it clockwise to rock.
Check the amperage of the receptacles used referring to table.4–3, and be sure not to take a current exceeding the specified amperage.
Be sure that the total wattage of all appliances does not exceed the rated output of the generator.

<table>
<thead>
<tr>
<th>Style</th>
<th>Ampere</th>
<th>Receptacle</th>
<th>AC plug</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Receptacle Icon" /></td>
<td>up to 20A</td>
<td>NEMA 5-20R</td>
<td>NEMA 5-20P</td>
<td>GFCI (Ground Fault Circuit Interrupter) Receptacle, duplex</td>
</tr>
<tr>
<td><img src="image" alt="Receptacle Icon" /></td>
<td>up to 30A</td>
<td>NEMA L5-30R</td>
<td>NEMA L5-30P</td>
<td>Locking Receptacle</td>
</tr>
<tr>
<td><img src="image" alt="Receptacle Icon" /></td>
<td>up to 30A</td>
<td>NEMA L14-30R</td>
<td>NEMA L14-30P</td>
<td>Locking Receptacle</td>
</tr>
</tbody>
</table>

Table. 4–3

**NOTE:**
When the AC circuit breaker turns off during operation, the generator must be overloaded or the appliance must be with defect. Stop the generator immediately, check the appliance and / or generator for overloading and have repaired if necessary, by Robin America dealer or service shop.

---

**CAUTION**

The duplex 120V receptacle is protected by a GFCI (Ground Fault Circuit Interrupter). GFCI shuts off the output current from the duplex 120V receptacle when a ground fault occurs in the generator or the appliance. Please note that other receptacles are not protected by GFCI.

Turn the AC circuit breaker to the position "ON".

Turn on the switch of the appliance.
GFCI RECEPTACLE
After starting the engine, check the GFCI for proper functioning by the following test procedures.
・ Push the TEST button, The RESET button will pop out exposing the word TRIP. Power is now off at the outlets protected by the GFCI, indicating that the device is functioning properly.
・ If TRIP does not appear when testing, do not use the generator. Call a qualified electrician.
・ To restore power, push RESET button.

If the RESET button pops out during operation, stop the generator immediately and call a qualified electrician for checking generator and appliances.

CONNECTING TO DOMESTIC CIRCUIT (HOUSE WIRING)

This generator is neutral floating type.
If a generator is to be connected to residential or commercial power lines, such as a stand by power source during power outage, all connections must be by a licensed electrician.
Failure in connection may result in death, personal injury, damage to generator, damage to appliances, damage to the building's wiring or fire.

(a) When connecting a SUBARU generator to a house wiring, generator output power must be taken from the 240V-4P receptacle.
(b) Install a transfer switch.
A transfer switch is to transfer the load from the generator to commercial power source. This switch is necessary to prevent accidents caused by the recovery from power outage. Use a transfer switch of the correct capacity.
Install transfer switch in between the meter and the fuse or AC breaker box.

If the neutral wire of house wiring is grounded, be sure to ground the ground terminal of the generator, Otherwise an electric shock may occur to the operator.
5. MEASURING PROCEDURES

5-1 MEASURING INSTRUMENTS

(1) VOLTMETER
   AC voltmeter is necessary.
   Ranges of voltage to be used for our various types of generators are as follows:
   0 to 150V : Type of voltage range as 110 or 120 V
   0 to 300V : Type of voltage range as 220, 230 or 240 V
   0 to 150V, 0 to 330V : Dual voltage type

(2) AMMETER
   AC ammeter is necessary.
   AC ammeter capable of changing the range as 10A, 20A, and 100A is preferable.

(3) FREQUENCY METER
   Frequency meter, capable of measuring 45 to 65 HZ is necessary.

NOTE : Be careful of the frequency meter’s input voltage range.
(4) CIRCUIT TESTER
   For measuring resistance, etc.

(5) MEGGER TESTER
   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.
5–2 AC OUTPUT MEASURING

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Rated Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGX3500</td>
<td>239–249</td>
</tr>
<tr>
<td>SGX5000</td>
<td>239–249</td>
</tr>
<tr>
<td>SGX7500</td>
<td>239–249</td>
</tr>
</tbody>
</table>

5–3 MEASURING INSULATION RESISTANCE
(1) GENERATOR

Use a Megger tester to check insulation resistance. Disconnect the GREEN lead wire for ground. Connect a Megger tester to one of receptacle’s output terminals and the ground terminal to measure insulation resistance. Then, measure the same between the other terminal and the ground terminal. Move on to different receptacles respectively.
An insulation resistance of 1 megohm and more than the same 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 insulation resistance of stator, rotor and control panel individually.

(2) STATOR
Measure insulation resistance between each lead wire and the core.

(3) ROTOR
Measure insulation resistance between the slip ring and the core.

(4) CONTROL PANEL
Measure insulation resistance between the live parts and the grounded parts.

Any part whose insulation resistance is less than $1\,\text{M}\Omega$, its insulation is faulty, and may cause electric leakage and electric shock. Replace faulty part.
6. CHECKING FUNCTIONAL MEMBERS

6-1 RECEPTACLES
Using a circuit tester, check continuity between the two terminals at the rear of the receptacles while the receptacle is mounted on the control panel.
When continuity is found between the output terminals of the receptacle with a wire connected across these terminals, the receptacle is normal.
When the wire is removed and no continuity is found between these terminals, the receptacles are also normal.

6-2 CIRCUIT BREAKER
Check continuity between each of two terminals at the rear of the circuit breaker while it is mounted on the control panel.
Normally, there is continuity between each of the two when the circuit breaker is on, while there is no continuity when the circuit breaker is off.

AC CIRCUIT BREAKER (Type 1)

<table>
<thead>
<tr>
<th>AC CIRCUIT BREAKER</th>
<th>Frequency</th>
<th>Rated output</th>
<th>Max voltage</th>
<th>Rated fault current</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGX3500</td>
<td>60Hz</td>
<td>3200VA</td>
<td>250V</td>
<td>18.75A</td>
</tr>
<tr>
<td>SGX5000</td>
<td></td>
<td>4500VA</td>
<td>250V</td>
<td>25A</td>
</tr>
<tr>
<td>SGX7500</td>
<td></td>
<td>6700VA</td>
<td>250V</td>
<td>37.5A</td>
</tr>
</tbody>
</table>

AC CIRCUIT BREAKER (Type 2)

<table>
<thead>
<tr>
<th>AC CIRCUIT BREAKER</th>
<th>Frequency</th>
<th>Rated output</th>
<th>Rated voltage</th>
<th>Rated fault current</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGX7500</td>
<td>60Hz</td>
<td>6700VA</td>
<td>125V</td>
<td>20A</td>
</tr>
</tbody>
</table>
6-3 STATOR
Disengage connectors on the wires from stator and check the resistance between wires with a circuit tester referring to the following table.

**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 temperatures different from 20 °C (68 °F).

### Rotor Assembly

1) Field coil

Remove the brush holder and measure resistance between the slip rings.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>60Hz</th>
<th>120V/240V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotor (slip ring)</td>
<td>Rotor (slip ring)</td>
<td>Rotor (slip ring)</td>
</tr>
<tr>
<td>RGX3500</td>
<td>RGX3500</td>
<td>RGX3500</td>
</tr>
<tr>
<td>RGX5000</td>
<td>RGX5000</td>
<td>RGX5000</td>
</tr>
<tr>
<td>RGX7500</td>
<td>RGX7500</td>
<td>RGX7500</td>
</tr>
<tr>
<td>AC WINDING 1 BLACK①-WHITE</td>
<td>AC WINDING 2 BLACK②-WHITE</td>
<td>SUB COIL Blue-Blue</td>
</tr>
<tr>
<td>0.72</td>
<td>0.72</td>
<td>0.62</td>
</tr>
<tr>
<td>0.39</td>
<td>0.39</td>
<td>0.93</td>
</tr>
<tr>
<td>0.31</td>
<td>0.31</td>
<td>0.99</td>
</tr>
<tr>
<td>AC WINDING 1 GREEN-Black</td>
<td>HOUR MATER COIL Red-White</td>
<td>AC WINDING 1 Green-Black</td>
</tr>
<tr>
<td>0.05</td>
<td>0.68</td>
<td>0.05</td>
</tr>
<tr>
<td>0.09</td>
<td>0.34</td>
<td>0.09</td>
</tr>
<tr>
<td>0.08</td>
<td>0.26</td>
<td>0.08</td>
</tr>
</tbody>
</table>

**NOTE:** If the circuit tester is not sufficiently accurate, it may not show the values given and may give erroneous readings. Erroneous reading will also occur when there is a wide variation of resistance among coil windings or when measurement is performed at ambient temperatures different from from 20° C (68° F).
2) Cleaning Slip rings
   The slip ring surfaces must be uniformly bright. Slip rings showing black spots, excessive wear, or uneven wear must be repaired. A stained slip ring lowers generator efficiency and output voltage. Polish the slip rings with fine sandpaper while turning the rotor until rough spots disappear. Care should be taken not to touch the rotor coils with the sandpaper.

6–5 BRUSH
   The brushes should be smooth when they contact the slip rings. If not, polish the brushes with sandpaper. A brush that is not smooth produces arcs between the brush and slip ring. It is a cause of possible damage. Usable brush lengths are from 5 mm to 11 mm (0.20 “ to 0.43”). A brush shorter than 5 mm should be replaced, because decreased contact pressure between the brush and slip ring lowers generator efficiency and output voltage.

6–6 A.V.R. (AUTOMATIC VOLTAGE REGULATOR)
   1) Features
      This A.V.R. is to control the field current in order to maintain the output voltage for the AC current, which generated by the magnetic flux by the field coil.
   2) A.V.R. trouble may be identified by outside (simply looking at the A.V.R.), or by the inter–lead resistance with a tester, or mount it in the generator and operating it.
(a) A.V.R. TROUBLE IDENTIFICATION by APPEARANCE

If an A.V.R. electronic part is burnt dark, or the surface epoxy resin is melted, it often indicates A.V.R. trouble.

(b) IDENTIFYING A.V.R. TROUBLE by CHECKING INTER–LEAD RESISTANCE

Check the inter–lead resistance of the A.V.R. with a tester, referring to the following table. If the tester readings vary greatly from the values specified in the table, the A.V.R. is faulty.

NOTE : Take tester inaccuracy into account in reading the tester

(c) IDENTIFYING A.V.R. TROUBLE by MOUNTING and OPERATING in THE GENERATOR

SCR or transistor damage cannot be detected by simply looking at the A.V.R. or checking the lead resistance. Check it by mounting the possible faulty A.V.R. in a normal generator, or mount a normal A.V.R. in a generator which fails to generate voltage.

*Checking table for analogue circuit tester (Resistance).

**SGX3500**

<table>
<thead>
<tr>
<th>SGX3500/60Hz–120/240V</th>
<th>Apply red ? needle of the circuit tester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>Red</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>w-1</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>w-2</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>Blue-1</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>Blue-2</td>
<td>&gt;50k</td>
</tr>
</tbody>
</table>

**SGX5000**

<table>
<thead>
<tr>
<th>SGX5000/60Hz–120/240V</th>
<th>Apply red ? needle of the circuit tester</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>Red</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>Green</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>Black</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>Blue-1</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>Blue-2</td>
<td>&gt;50k</td>
</tr>
</tbody>
</table>

**SGX7500**

<table>
<thead>
<tr>
<th>SGX7500/60Hz–120/240V</th>
<th>Apply red ? needle of the circuit tester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>Red</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>Yellow-1</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>Yellow-2</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>Blue-1</td>
<td>&gt;50k</td>
</tr>
<tr>
<td>Blue-2</td>
<td>&gt;50k</td>
</tr>
</tbody>
</table>
6–7 OIL SENSOR

1. Disconnect wires coming from the sensor at the connection.
2. Loosen the sensor to remove it from the engine.
3. Plug the opening of oil filler hole (created after sensor is removed) with suitable means such as oil gauge.
4. Connect the removed wires again with the oil sensor.
5. Start the engine with the oil sensor removed and confirm if:
   a. Engine stops after 5 seconds which is normal, or
   b. Engine does not stop after more than 10 seconds which is unusual.

NOTE: The sensor will not operate properly when wire is broken or poorly connected. Check the wires for correct connection. If it fails to stop within 5 seconds after the wirings have checked, the sensor is wrong. Replace the sensor with new one.

6–7–1 SPECIFICATIONS

<table>
<thead>
<tr>
<th>Type</th>
<th>Float type (with lead switch incorporated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance (at FULL oil level)</td>
<td>100 M ohms or over</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-30 to +180 degree Celsius</td>
</tr>
</tbody>
</table>

6–7–2 CONSTRUCTION AND OPERATION

Disconnect wires coming from the sensor. The oil sensor is composed of the float, permanent magnet incorporated into the float and the oil sensor.

In accordance with the oil level, the float moves up and down.
When the oil level is upper level, the float moves up.
When the oil level is lower level, the float moves down.
The permanent magnet is close to the lead switch, and the lead switch is activated by the magnetic force.

NOTE: With regards to the wiring diagram, please refer to the section 9 (Page 43).
7. DISASSEMBLY AND ASSEMBLY

7-1 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 by 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: If information for servicing procedures on engine necessary, please refer to Robin engine service manual for “EX series”.

7-2 DISASSEMBLY PROCEDURES
7-2-1 FUEL TANK
(1) Disconnect rubber pipe from carburetor.
   Open fuel valve and discharge fuel from the fuel tank.
   (Connect rubber pipe to carburetor.)
(2) Disconnect the rubber pipe from strainer.
   Disconnect the rubber pipe from canister.
(3) Remove the fuel tank from the frame.
   M6 bolt and washer …· 2 pcs
   Take off rubber mount for fuel tank …· 2 pcs

7-2-2 MUFFLER
(1) Remove the Muffler Cover.
   M6 flange bolt …· 4 pcs
   (Take off rubber for insulation …· 2 pcs)
(2) Loosen flange bolt for the muffler bracket.
   (5/16-18 x 38 . . . 1PC (SGX3500))
   M8 flange bolt ..... 2

(3) Remove the muffler from the generator set.
   M8 flange nut ..... 2

(4) Remove the muffler gasket

7–2–3 CABLES AND CONTROL BOX
(1) Remove the end cover.
   M6 flange bolt . . . 2 pcs.
(2) Cut plastic band for wires.
(3) Loosen nuts on the wiring board and
    disconnect all wiring from the control box.
    Loosen bolt and disconnect an earth wire.
(4) Disconnect connector for the AVR and terminals for the Brush holder.
(5) Remove the AVR unit, and the brush holder.
(6) Disconnect primary wire between the control box and the Engine.
(7) Remove the control box from the frame.
    Bolt . . . .4 pcs
7–2–4 ALTERNATOR

(1) Disconnect grand wire from the Rear cover.

(2) Loosen bolts for the rear cover and the stator.
   - Flange bolt M6 . . . . 4pcs.

(3) Loosen nuts for rubber mount

(4) Put wooden support under the alternator

(5) Remove rubber mounts from the rear cover

(6) Remove the stator cover from the alternator.

(7) Remove the rear cover and the stator
   - By using plastic hammer

*NOTE*) Stator is heavy. Be careful do not hit the coil of the stator to the rotor.
(8) Loosen through bolt for the rotor.

SGX3500 M8 X 233mm
SGX5000 M10 X 260mm
SGX7500 M10 X 260mm

(9) Fix the generator set as the rotor upwards

(10) Use a bolt and oil as a tool for pulling out the rotor by following procedures:
1. Pour engine oil into center hole of the rotor shaft up until shaft end.
2. Prepare a bolt with the following thread size:
   - M10 X 1.25 (SGX3500)
   - M14 X 2 (SGX5000)
   - M16 X 2 (SGX7500)
3. Apply a few turns of seal tape around tip of the bolt
4. Screw the bolt into the thread of the rotor shaft.
5. Tighten the bolt by using a socket wrench until the rotor comes off loose.
* The hydraulic pressure inside the rotor shaft takes apart the rotor from the engine shaft.

(11) Remove the front cover.
   M8 × 20 flange bolt . . . 4 pcs.
7–3 COMPONENT PARTS

(1) Generator assembly

SGX3500

COMPONENT PARTS

- Generator assembly SGX3500

COMPONENT PARTS

- ROBOT

COMPONENT PARTS

- STATOR

COMPONENT PARTS

- BOLT

COMPONENT PARTS

- WASHER

COMPONENT PARTS

- ROTOR

COMPONENT PARTS

- STATOR COVER

COMPONENT PARTS

- REAR COVER

COMPONENT PARTS

- AVR

COMPONENT PARTS

- FRONT COVER

COMPONENT PARTS

- THROUGH BOLT

COMPONENT PARTS

- WIRING BOARD

COMPONENT PARTS

- END COVER

COMPONENT PARTS

- #BOLT

COMPONENT PARTS

- #BOLT

COMPONENT PARTS

- X = BRUSH HOLDER

COMPONENT PARTS

- 20–24 N.m

COMPONENT PARTS

- 200–240 kgf. cm

COMPONENT PARTS

- 8–12 N.m

COMPONENT PARTS

- 80–120 kgf. cm
(2) Fuel tank

SGX3500
(3) Frame and accessories

Battery (SGX7500)

Battery holder

(frame and accessories)
7-4 ASSEMBLY PROCEDURES

7-4-1 ENGINE and FRAME

(1) Attach the mount rubbers to the frame. Insert the setting tongue of mount rubber into the hole on the frame and tighten the nut from the bottom of the frame.

M8 flange nut . . . 4 pcs.

<table>
<thead>
<tr>
<th>Tightening torque:</th>
<th>18.0-25.0 N·m</th>
<th>180-250 kgf·cm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(13.3-18.5 ft-lbs)</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: The mount rubbers are selected to reduce vibration most effectively by model. Be sure to use the correct mount rubber for your generator. Although mount rubbers have the same appearance, their characteristics are different.

(2) Install the engine into the frame from the side of it. Tighten the nuts over the mount rubber bolts to fix.

NOTE: Tighten nut together with air cleaner bracket in air cleaner side. (SGX3500 / 5000)

SGX3500 / 5000
M8 flange nut . . . 2 pcs.

NOTE: Remove the air cleaner cover for easier installation.
NOTE: When tightening the nuts, slightly lift the engine so that the weight is not applied to the mount rubbers.
(3) Install the engine into the frame from the side of it. Insert the bolt of mount rubbers into the hole on the mount base. Tighten the nuts over the mount rubber bolts to fix.

M8 nut/washer/lock washer . . . 2 pcs ea.

Tightening torque : 18.0-25.0 N•m
180-250 kgf•cm
(13.3-18.5 ft•lbs)

Tighten the temporally fixed bolt and nut for mount base.

*NOTE : When tightening the nuts, slightly lift the engine so that the weight is not applied to the mount rubbers.*

7-4-2 FRONT COVER

(1) Put the front cover on the main bearing cover.

**SGX3500 / 5000 / 7500**

M8 flange bolt . . . 4 pcs.

Tightening torque : 20 – 24 N.m
200 – 240 Kgf. Cm
(14.8 – 17.8 ft.lbs)

7-4-3 ROTOR

(1) Clean oil, grease and dust from the crank shaft and taper hole of the rotor shaft.

(2) Mount the rotor on the crank shaft.

Tighten the through bolt.

flange bolt . . . 1 pc.
SGX3500
Through bolt

<table>
<thead>
<tr>
<th>Tightening torque</th>
<th>N.m</th>
<th>Kgf. Cm</th>
<th>ft.lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 - 24</td>
<td>200 - 240</td>
<td>14.8 - 17.8</td>
<td></td>
</tr>
</tbody>
</table>

SGX5000 / 7500
Through bolt

<table>
<thead>
<tr>
<th>Tightening torque</th>
<th>N.m</th>
<th>Kgf. Cm</th>
<th>ft.lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>38 - 46</td>
<td>380 - 460</td>
<td>28.2 - 34.1</td>
<td></td>
</tr>
</tbody>
</table>

7-4-4 STATOR
(1) Put the rear cover and stator on the front cover through rotor.
   Make rotor bearing into the rear cover by hammer.
(2) Tighten rear cover bolts evenly.
   flange bolt . . . 4 pc.

Tighten the earth wire together with rear cover bolt and connect to the frame.

NOTE: Tighten the bolts evenly and in turns.

<table>
<thead>
<tr>
<th>Tightening torque</th>
<th>N.m</th>
<th>Kgf. Cm</th>
<th>ft.lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 - 12</td>
<td>80 - 120</td>
<td>5.9 - 8.9</td>
<td></td>
</tr>
</tbody>
</table>

(3) Fix stator cover
(4) Fix rubber mount between the rear cover and the frame.

   nut . . . 4 pcs.

7–4–5 CONTROL BOX

(1) Put the control box on the frame.
   Bolt . . . 4 pcs.

(2) Connect the primary wire to the engine.

(3) Fix the brush holder and the AVR unit
   M6 bolt . . . 1 pc.
   M6 bolt . . . 2 pcs.
   Connect terminals for the brush holder and connector for the AVR.

NOTE: If the brush is installed oblique to the slip ring, there is possibility of the brush holder could be broken when the screw is tightened; or the brush may be broken when generator is started. Make this process carefully.
(4) Fix wires on the wiring board and tighten with washers and nuts.
(5) Connect the ground wire and tighten with bolt.
(6) Clamp wires by plastic band.

(7) Put the end cover to the rear cover.

M6 bolt . . . 2 pcs.

7–4–6 MUFFLER and MUFFLER COVER
(1) Put the muffler gasket on exhaust flange and muffler on the generator set.
   M8 flange nut . . . 2 pcs.
   M8 bolt . . . 2 pcs.
(3) Put the muffler cover on the muffler
   M6 flange bolts . . . 4 pcs.
   Put the insulation rubber to the cover

7-4-7 FUEL TANK

(1) Mount the fuel tank on the frame.
   Put the mount rubber to the fuel tank.
   M6 flange bolt . . . 2 pcs.

Connect the rubber pipe to the strainer.
Connect the rubber pipe from canister to the fuel tank.
7–5 CHECKING, DISASSEMBLY and REASSEMBLY of the CONTROL PANEL

7–5–1 CHECKING OF THE CONTROL PANEL
Dis-assemble the control box assy. from frame. Remove the control panel from control box and check each components and wiring. Refer to Section 6 for the detail of checking procedure for the components in the front panel.

7–5–2 DISASSEMBLY
(1) Remove the end cover and disconnect the wires to the control panel.
(2) Remove the control box assy. from the frame and remove the control panel.
(3) After disconnecting individual wires, remove the control panel components.

7–5–3 REASSEMBLY
(1) Install the receptacles, circuit breakers, terminals, switches, etc. on the control panel and wire them.

NOTE: Circuit diagrams are shown in Section 9. Colored wires are used for easy identification, and are of the correct capacity and size. Use heat-resistant type wires (permissible temperature range 75°C or over) in the specified gauge shown in the circuit diagrams.

(2) Connect the wires of control panel components.
(3) Attach the control panel to the control box and assemble control box assy. to the frame.

Control box AY
SGX3500
(SGX5000), 7500 E.S.
8. TROUBLESHOOTING

8–1 NO AC OUTPUT
8–1–1 CHECKING STATOR
(1) Remove control panel and disconnect stator wires at the connectors.

(2) Measure resistance between terminals on stator wire.
   Refer to Table of Section 6–3 STATOR for normal resistance.
   If stator is faulty, replace it with a new one.

(3) Check insulation resistance between the stator core and each stator wire by using an insulation tester.
   If insulation is bad, replace the stator with a new one.

8–1–2 CHECKING ROTOR
1) Field coil
Remove the brush holder and measure resistance between the slip rings. Refer to Section 6–4 ROTOR ASSEMBLY for normal Resistance

NOTE: Tester is not so accurate that we need to consider its range of error indication.
We are unable to expect correct indication, if resistance between those coils vary remarkably or ambient temperature is different from 20° C (68° F).
2) Cleaning Slip rings

The slip ring surface should be uniformly bright. Slip ring showing black spots, excessive wear, or uneven wear has to be repaired. Stained slip ring lowers generator efficiency and output voltage. Polish the slip ring with fine sandpaper while turning the rotor until rough spots disappear. Be careful not to touch the rotor coils with the sandpaper.

3) Checking brush

Check brush referring to STEP 6–5.

8–2 AC VOLTAGE IS TOO HIGH OR TOO LOW

8–2–1 CHECKING ENGINE SPEED

If the engine speed is too high or too low, adjust it to the rated r.p.m.

[How to adjust engine r.p.m.]

* Loosen the lock nut on the adjusting screw.
* Turn the adjusting screw clockwise to decrease engine speed or counterclockwise to increase engine speed.

Normal engine speed at no load: 3700 to 3900 rpm

8–2–2 CHECKING STATOR

Check the stator referring to Step 8–1–1.

8–2–3 CHECKING ROTOR

Check the rotor referring to Step 8–1–2.
8–3 AC VOLTAGE IS NORMAL AT NO-LOAD, BUT NO OUTPUT AVAILABLE WHEN CONNECTING WITH LOAD.

8–3–1 CHECK THE ENGINE SPEED.
If the engine speed is low, adjust it to the rated r.p.m.
*Refer to Step 8–2–1 for engine speed adjustment.

8–3–2 CHECK THE TOTAL WATTAGE OF APPLIANCES CONNECTED TO THE GENERATOR.
Refer to Section 4 “RANGE OF APPLICATIONS” for the wattage of the appliances.
If the generator is overloaded, reduce the load to the rated output of the generator.

8–3–3 CHECK THE APPLIANCE FOR TROUBLE.
If the appliance is faulty, repair it.

8–3–4 CHECK IF THE ENGINE IS OVERHEATED.
If the cooling air inlet and/or cooling air outlet is clogged with dirt, grass, chaff or other debris, remove it.

8–3–5 CHECK THE INSULATION OF THE GENERATOR.
(1) Stop the engine. Remove the control panel, and disconnect the connector of GREEN lead for ground.
(2) Measure the insulation resistance between the live terminal of the receptacle and the ground terminal.
If the insulation resistance is less than 1MΩ, disassemble the generator and check the insulation resistance of the stator, rotor and the live parts in the control box.
(Refer to Section 5–4.)
Any part where the insulation resistance is less than 1MΩ, the insulation is faulty and may cause electric leakage.
Replace the faulty part.
9. WIRING DIAGRAM

SGX3500

SGX5000
ISSUE EMD-GS7809