



# OWNER'S MANUAL



## GENERATOR SET RGM12Y — 12 kW

Yanmar Engine | Stamford Alternator | Deep Sea Electronics Controller

EPA Final Tier 4 / Stage 5 Certified • Powered by Yanmar

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## 2. Introduction

Thank you for choosing the RGM12Y generator set from RoyalGen. You are now the owner of a premium power generation equipment, designed and assembled in Canada to meet the most demanding requirements for emergency and mobile applications.

The RGM12Y integrates the most renowned components in the industry: a Yanmar 3TNV88F diesel engine known for its legendary reliability, a Stamford SOL2-G1 alternator — world's #1 —, a Deep Sea

Electronics DSE4620-06 automatic controller, and a SmartGen BAC4812-KP battery charger. The assembly is built with CSA component and meets EPA Final Tier 4 / Stage 5 environmental certifications.

This manual has been written to guide you through the installation, operation, maintenance, and troubleshooting of your generator set. Please read it carefully before first commissioning and keep it readily accessible for future reference.

#### **IMPORTANT**

Failure to follow the safety, operation, and maintenance instructions in this manual may result in serious injury, death, or significant property damage. The manufacturer's warranty is conditional upon compliance with the procedures described in this document.

## 3. Safety and Precautions

Operator safety and the safety of persons near the generator set is the absolute priority. Read and understand all safety instructions before using this equipment.

### 3.1 Safety Pictograms

| Signal                                                                                             | Meaning                                                                                   |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
|  <b>DANGER</b>  | A hazardous situation that <b>WILL</b> result in death or serious injury if not avoided.  |
|  <b>WARNING</b> | A hazardous situation that <b>COULD</b> result in death or serious injury if not avoided. |
|  <b>CAUTION</b> | A hazardous situation that could result in minor or moderate injuries if not avoided.     |
| <b>NOTICE</b>                                                                                      | Important information related to preventing property damage to equipment.                 |

### 3.2 General Precautions

#### **⚠ DANGER — CARBON MONOXIDE**

Never operate the generator set in an enclosed or inadequately ventilated space. Exhaust gases contain carbon monoxide (CO), an odorless and deadly gas. CO inhalation can cause death within minutes.

#### **⚠ WARNING — FLAMMABLE FUEL**

Diesel fuel is flammable. Never smoke or use open flames near the fuel tank or during refueling. Stop the engine before refueling. Immediately wipe up any fuel spills.

- **Radiator Cap:** Never remove the radiator cap when the engine is hot. Pressurized coolant can cause severe burns. Allow the engine to cool before any intervention.
- **Moving Parts:** Keep hands, clothing, and hair away from moving parts (fan, belts, flywheel). Never work on the engine while it is running.
- **Personal Protective Equipment (PPE):** Wear work gloves, eye protection, and hearing protection during operation and maintenance of the generator set.
- **Electrical System:** Disconnect the negative battery cable before any work on the electrical system. Never short-circuit the battery terminals.
- **High-Pressure Fuel System:** Wait 10 to 15 minutes after engine shutdown before working on the fuel system. High-pressure fuel can penetrate the skin and cause serious injury.
- **Children and Animals:** Keep children and pets at a safe distance during generator set operation.

## **3.3 Electrical Precautions**

#### **⚠ DANGER — ELECTROCUTION RISK**

The generator set output produces 120/240V AC voltage that can cause fatal injuries by electrocution. Never touch live terminals or conductors.

- **Transfer Switch:** Never connect the generator set to a building's electrical grid without a certified transfer switch, properly installed by a qualified electrician. Failure to comply can result in electrocution of utility workers.
- **Grounding:** Ensure proper grounding of the generator set at all times, in accordance with the Canadian Electrical Code.
- **Wet Conditions:** Do not operate the generator set in wet conditions without adequate protection. Keep hands dry when handling electrical connections.

## 4. Generator Set Overview

### 4.1 General Description

The RGM12Y is a fully enclosed and sound-attenuated diesel generator set, delivering 12 kW continuous power and 13.2 kW emergency power. It was designed for residential, commercial, and mobile backup applications requiring a reliable, quiet, and compact power source.

#### Distinctive Features:

- Yanmar diesel engine — proven reliability and low operating costs
- Stamford alternator — world reference in power generation
- 100% instantaneous load pickup capacity (Block Load)
- CSA-compliant components and construction
- 12V glow plugs for cold weather starting
- Fully mechanical fuel injection — simplicity and durability
- Integrated SmartGen 5A battery charger
- 120V / 500W engine block heater with circulator (standard)

- Quick-drain valves for engine oil and coolant
- 100-liter fuel tank (approximately 30 hours at 75% load)
- Low fuel level alarm

## 4.2 Key Specifications

| Parameter         | Value              |
|-------------------|--------------------|
| Model             | RGM12Y             |
| Continuous Power  | 12 kW              |
| Emergency Power   | 13.2 kW / 13.2 kVA |
| Voltage           | 120/240V           |
| Frequency         | 60 Hz              |
| Power Factor      | 1.0                |
| Emergency Current | 55 A               |
| Rotation Speed    | 1800 RPM           |

## 4.3 Dimensions and Weight

| Parameter | Value   |
|-----------|---------|
| Length    | 1670 mm |
| Width     | 780 mm  |
| Height    | 1080 mm |
| Weight    | 670 kg  |

# 5. Technical Specifications

## 5.1 Performance

| Parameter         | Value    |
|-------------------|----------|
| Output Voltage    | 120/240V |
| Emergency Power   | 13.2 kVA |
| Power Factor      | 1.0      |
| Continuous Power  | 12 kW    |
| Emergency Current | 55 A     |

## 5.2 Noise Levels

| Distance | Noise Level |
|----------|-------------|
| 1 meter  | 68 dB(A)    |
| 7 meters | 63 dB(A)    |

## 5.3 Fuel Consumption

| Load | Consumption |
|------|-------------|
| 25%  | 1.7 L/h     |
| 50%  | 2.63 L/h    |
| 75%  | 3.31 L/h    |
| 100% | 4.42 L/h    |

**Tank Capacity:** 100 liters

**Approximate runtime at 75% load:** 30 hours

# 6. Diesel Engine — Yanmar 3TNV88F

## 6.1 Engine Specifications



| Parameter                 | Value                             |
|---------------------------|-----------------------------------|
| Manufacturer              | Yanmar                            |
| Model                     | 3TNV88F-UG6GE                     |
| Type                      | 4-stroke diesel, direct injection |
| Number of Cylinders       | 3                                 |
| Displacement              | 1642 cc                           |
| Bore x Stroke             | 88 mm x 90 mm                     |
| Compression Ratio         | 21:1                              |
| Aspiration                | Naturally Aspirated               |
| Injection                 | Direct, mechanical                |
| Rotation Speed            | 1800 RPM                          |
| Emergency Power           | 15.7 kW                           |
| Speed Regulation          | 5.00%                             |
| Governor                  | Mechanical                        |
| Maximum Overspeed (2 min) | 2250 RPM                          |

## 6.2 Lubrication

| Parameter             | Value               |
|-----------------------|---------------------|
| Sump Capacity         | 6.7 liters          |
| Normal Oil Pressure   | 44 psi              |
| Low Pressure Shutdown | 7 psi               |
| Oil Change Interval   | 500 hours or 1 year |
| Oil Classification    | API CF or higher    |

**SAE Viscosity Recommendations by Ambient Temperature:**

| SAE Grade  | Temperature Range | Note                     |
|------------|-------------------|--------------------------|
| SAE 10W-30 | -20°C to +30°C    | Recommended general use  |
| SAE 15W-40 | -10°C to +40°C    | Temperate to hot climate |
| SAE 5W-30  | -30°C to +20°C    | Cold climate             |

## 6.3 Air Intake System

| Parameter                      | Value   |
|--------------------------------|---------|
| Maximum Air Filter Restriction | 2.9 kPa |

## 6.4 Exhaust System

| Parameter           | Value          |
|---------------------|----------------|
| Exhaust Flow        | 112 cfm        |
| Exhaust Temperature | 1007°F (542°C) |
| Maximum Restriction | 1.42 PSI       |

## 6.5 Diesel Fuel

### NOTICE — FUEL QUALITY

The use of non-compliant fuel may damage the injection system and void the engine warranty.

- Use only diesel fuel compliant with ASTM D975 No. 2D S15 — Ultra Low Sulfur Diesel.
- Sulfur content must not exceed 15 ppm.
- Recommended cetane number: 45 or higher.
- Never use kerosene, gasoline, or biodiesel beyond B20.

- Store fuel in clean containers, protected from moisture and condensation.
- Replace rubber fuel hoses every 2 years or 2000 hours.

## 6.6 Coolant

| Parameter             | Value                          |
|-----------------------|--------------------------------|
| Total System Capacity | 8 liters                       |
| Antifreeze Type       | Yanmar Long Life Coolant (LLC) |
| Radiator Cap          | 13 PSI                         |
| Fan Power             | 0.5 kW                         |
| Engine Block Heater   | 120V / 500W (standard)         |

- Use ethylene glycol-based antifreeze of Long Life Coolant (LLC) type, compliant with ASTM D6210.
- Mix ratio per manufacturer's instructions (typically 50/50 antifreeze/distilled water).
- Replace coolant every 2000 hours or 2 years.
- Never mix different types of antifreeze.

# 7. Alternator — Stamford SOL2-G1

## 7.1 Alternator Specifications

| Parameter         | Value                                     |
|-------------------|-------------------------------------------|
| Manufacturer      | Stamford (Cummins Generator Technologies) |
| Model             | SOL2-G1                                   |
| Insulation Class  | Class H                                   |
| Protection Rating | IP23                                      |
| Bearings          | 1 ball bearing                            |

| Parameter                       | Value             |
|---------------------------------|-------------------|
| Winding                         | 4-wire            |
| Total Harmonic Distortion (THD) | < 5%              |
| Instantaneous Load Capacity     | 100% (Block Load) |

## 7.2 Alternator Maintenance

The Stamford SOL2-G1 alternator is designed for long-term reliable operation with minimal maintenance. Follow these recommendations:

- **Cleanliness:** Keep the alternator clean and dry. Remove dust, debris, and moisture from ventilation openings.
- **Winding Insulation:** Periodically inspect the condition of winding insulation. Insulation resistance below 1 MOhm indicates a potential problem.
- **Bearing:** Check the ball bearing condition. Abnormal noise or vibration indicates replacement is needed.
- **Connections:** Verify that all terminal connections are properly tightened and free of corrosion.

# 8. Controller — Deep Sea Electronics DSE4620-06

## 8.1 Description

The DSE4620-06 is an automatic start/stop controller with utility (mains) monitoring and automatic transfer capability. It features an LCD display showing all operational parameters of the generator set in real time.

## 8.2 Specifications

| Parameter             | Value                      |
|-----------------------|----------------------------|
| Manufacturer          | Deep Sea Electronics       |
| Model                 | DSE4620-06                 |
| Starting              | Auto / Manual              |
| Programmable Exercise | Yes                        |
| Operating Temperature | -30°C to +70°C             |
| Supply Voltage        | 8V to 35V DC               |
| PC Interface          | USB 2.0 (Type A to Type B) |

## 8.3 Operating Modes

| Mode                  | Description                                                                             |
|-----------------------|-----------------------------------------------------------------------------------------|
| <b>STOP / RESET</b>   | Engine stopped. Active alarms are cleared. The unit is out of service.                  |
| <b>AUTO</b>           | Automatic start on mains failure or remote signal. Automatic load transfer and return.  |
| <b>MANUAL / START</b> | Manual engine start. The unit runs at no load until the load transfer command is given. |

## 8.4 Control Buttons

1. **Stop / Reset** — Stops the engine and clears all active alarms. Press and hold for 2 seconds to confirm shutdown.
2. **Auto** — Activates automatic mode. The controller monitors the mains and automatically starts/stops the generator set based on conditions.
3. **Manual / Start** — Initiates the manual start sequence. The engine performs pre-heat then starts. Load must be transferred manually.

## 8.5 Alarms and Protections

| Alarm                         | Action          |
|-------------------------------|-----------------|
| Low Oil Pressure              | <b>Shutdown</b> |
| High Coolant Temperature      | <b>Shutdown</b> |
| Engine Overspeed              | <b>Shutdown</b> |
| Start Failure                 | <b>Shutdown</b> |
| Generator Under/Overvoltage   | <b>Shutdown</b> |
| Generator Under/Overfrequency | <b>Shutdown</b> |
| Low / High Battery Voltage    | <b>Warning</b>  |
| Low Fuel Level                | <b>Warning</b>  |
| Alternator Charge Failure     | <b>Warning</b>  |

## 8.6 Configuration

- The controller is configurable via the built-in front panel editor or via DSE Configuration Suite software on PC.
- PC connection via USB Type A to Type B cable.
- PIN code protection available to restrict access to configuration parameters.
- Refer to Deep Sea Electronics documentation for advanced configuration procedures.

# 9. Battery Charger — SmartGen BAC4812-KP

## 9.1 Description

The SmartGen BAC4812-KP battery charger is a float charger designed to maintain the engine's 12V starting battery at optimal charge during periods of generator set inactivity. It ensures the engine is always ready to start when needed.

## 9.2 Specifications

| Parameter              | Value               |
|------------------------|---------------------|
| Manufacturer           | SmartGen            |
| Model                  | BAC4812-KP          |
| Nominal Input Voltage  | DC 48V              |
| Input Voltage Range    | DC 36V to 72V       |
| Nominal Input Current  | 1A                  |
| No-Load Output Voltage | 13.8V ( $\pm 1\%$ ) |
| Nominal Charge Current | 3A ( $\pm 2\%$ )    |
| Output Fuse            | 6A                  |
| Operating Temperature  | -30°C to +55°C      |
| Weight                 | 0.66 kg             |
| Dimensions             | 143 x 96 x 55 mm    |

## 9.3 Charging Principle

The BAC4812-KP uses an automatic two-stage charging process:

4. **Stage 1 — Constant Current Charging:** The charger delivers the nominal charging current until the battery voltage reaches the preset target value. This stage enables rapid battery recharging.
5. **Stage 2 — Float Charging:** The current gradually decreases as the battery voltage increases. The charger maintains the battery at full charge without risk of overcharging.

## 9.4 LED Indicators

| Indicator       | Color | Meaning                                                                                               |
|-----------------|-------|-------------------------------------------------------------------------------------------------------|
| <b>POWER</b>    | Green | Charger is powered and operating normally.                                                            |
| <b>CHARGING</b> | Red   | Illuminates when charge current exceeds 0.5A. Turns off when current drops below 0.5A (float charge). |

## 9.5 Troubleshooting

| Symptom                                 | Probable Cause    | Corrective Action                                |
|-----------------------------------------|-------------------|--------------------------------------------------|
| Green LED on but no output voltage      | Output fuse blown | Check and replace the 6A output fuse.            |
| Problem persists after fuse replacement | Internal failure  | Unit requires workshop repair. Contact RoyalGen. |

**Fuse Replacement:** Use a flat-blade screwdriver. Turn the fuse holder counterclockwise to remove. Install a new 6A fuse and screw back clockwise.

## 10. Operation

### 10.1 Daily Pre-Start Checks

Perform the following checks every day before starting the generator set:

6. Check engine oil level (between upper and lower marks on the dipstick).
7. Check coolant level in the expansion tank.
8. Check fuel level in the tank.
9. Visual inspection for oil, fuel, or coolant leaks.
10. Check for damaged or missing parts.
11. Inspect electrical harnesses for wear or damage.
12. Check hose condition (cracks, splits, leaks).
13. Check and clean radiator fins if necessary.
14. Check the water separator for water accumulation.

### 10.2 Starting Procedure

#### Manual Start

15. Ensure all daily checks have been completed.
16. Verify the water separator fuel valve is in the OPEN position.



17. Turn the key to the ON position — the glow plug indicator lights up.
18. Wait for the glow plug indicator to turn off (approximately 15 seconds for a direct injection engine).
19. Turn the key to the START position.
20. Release the key as soon as the engine starts (the key returns to ON position).
21. Do NOT hold the key in the START position for more than 15 seconds.
22. If the engine fails to start, wait for complete engine stop, then wait 30 seconds before retrying.

### **Automatic Start (AUTO Mode)**

23. Press the AUTO button on the DSE4620 controller.
24. The controller continuously monitors the mains power supply.
25. Upon mains failure, the controller automatically starts the engine.
26. Load is automatically transferred after the warm-up period.
27. When mains power returns, the controller transfers the load back to mains and stops the engine after a cooldown period.

## **10.3 Checks During Operation**

- **Oil Pressure:** Normal value of 44 psi. If pressure drops below 7 psi, the engine will shut down automatically.
- **Coolant Temperature:** Monitor the indicator on the panel. Excessive temperature will trigger a protective shutdown.
- **Leaks:** Visually check for oil, fuel, or coolant leaks.
- **Abnormal Noises:** Be alert to any unusual noise or vibration.
- **Exhaust Smoke:** Excessive white or black smoke may indicate a mechanical problem requiring investigation.

## **10.4 Shutdown Procedure**

28. Remove the load from the generator set (transfer to mains or disconnect equipment).
29. Let the engine idle for 5 minutes (cooldown period).
30. Turn the key to the OFF position.
31. Remove the key.

#### NOTICE

Never abruptly stop the engine under full load. The 5-minute idle cooldown period is essential to protect the turbo (if applicable), seals, and extend engine life.

## 11. Periodic Maintenance

Strict adherence to the maintenance schedule is essential to ensure the reliability, performance, and longevity of your generator set. It is also a condition of the manufacturer's warranty.

### 11.1 Maintenance Schedule

| Task                       | Daily | 50h | 250h | 500h | 1000h | 2000h |
|----------------------------|-------|-----|------|------|-------|-------|
| Check engine oil level     | ✓     |     |      |      |       |       |
| Check coolant level        | ✓     |     |      |      |       |       |
| Check fuel level           | ✓     |     |      |      |       |       |
| Complete visual inspection | ✓     |     |      |      |       |       |
| Check water separator      | ✓     |     |      |      |       |       |
| Drain water separator      |       | ✓   |      |      |       |       |
| Check battery and recharge |       | ✓   |      |      |       |       |
| Check/adjust fan belt *    |       | ✓   | ✓    |      |       |       |
| Drain fuel tank            |       |     | ✓    |      |       |       |
| Clean air filter           |       |     | ✓    |      |       |       |

| Task                          | Daily | 50h | 250h | 500h | 1000h | 2000h |
|-------------------------------|-------|-----|------|------|-------|-------|
| Engine oil change + filter ** |       |     |      | ✓    |       |       |
| Replace fuel filter           |       |     |      | ✓    |       |       |
| Clean water separator         |       |     |      | ✓    |       |       |
| Replace air filter            |       |     |      | ✓    |       |       |
| Check valve clearance         |       |     |      |      | ✓     |       |
| Replace coolant               |       |     |      |      |       | ✓     |
| Check/replace hoses           |       |     |      |      |       | ✓     |

\* First check at 50h, then every 250h.

\*\* Oil change: every 500 hours or 1 year for the 3TNV88F engine.

## 11.2 Engine Oil Change

### CAUTION

Used engine oil is hot. Wear heat-resistant gloves. Collect used oil in an approved container and dispose of it in accordance with local environmental regulations.

#### Procedure:

32. Run the engine to operating temperature, then shut it down.
33. Place an approved container under the oil drain plug.
34. Remove the oil filler cap to allow crankcase ventilation.
35. Remove the drain plug and let the oil drain completely.
36. Reinstall the drain plug. Torque: 53.9 to 63.7 N-m.
37. Replace the oil filter — apply a thin coat of fresh oil on the new filter gasket, hand-tighten then turn 1 additional turn.
38. Fill with fresh oil to the upper mark on the dipstick (6.7 liters total capacity).

39. Run the engine for 5 minutes, check for leaks.

40. Shut down the engine, wait 10 minutes, then recheck the oil level on the dipstick.

## 11.3 Fuel Filter Replacement

### **⚠ WARNING — FUEL UNDER PRESSURE**

Wait at least 10 to 15 minutes after engine shutdown before working on the fuel system. High-pressure diesel can penetrate the skin.

#### **Procedure:**

41. Shut down the engine and wait 15 minutes.

42. Close the fuel supply valve.

43. Place an absorbent cloth under the fuel filter.

44. Unscrew the old filter and remove it. Clean the mounting surface.

45. Apply a thin coat of clean diesel on the new filter gasket.

46. Screw the new filter by hand until gasket contact, then tighten 3/4 turn.

47. Open the fuel supply valve.

48. Bleed the fuel system if necessary (refer to the engine section).

49. Start the engine and check for leaks.

## 11.4 Air Filter Maintenance

#### **Cleaning (every 250 hours):**

50. Remove the air filter housing.

51. Carefully remove the filter element to prevent dust from falling into the intake duct.

52. Gently tap the filter element to dislodge dust. Never use high-pressure compressed air.

53. Inspect the element for tears or damage. Replace if damaged.

54. Reinstall the filter element and housing.

**Replacement (every 500 hours or if damaged):** Replace the filter element with an original Yanmar part or approved equivalent.

## 11.5 Battery Maintenance

- **Electrolyte Level:** Check and top up with distilled water if necessary (standard maintenance battery).
- **Terminals:** Clean battery terminals and apply dielectric grease to prevent corrosion.
- **Cables:** Verify that connections are tight and free of corrosion.
- **Recharging:** If engine starting is slow or difficult, recharge the battery with an external charger or verify proper operation of the integrated SmartGen charger.

## 12. Troubleshooting Guide

This chapter provides systematic diagnostic procedures for the RGM12Y generator set. Always observe all safety precautions before performing any troubleshooting. Disconnect the battery and allow the engine to cool before inspecting components. If a fault persists after following these procedures, contact RoyalGen or your authorized dealer.

### WARNING

Disconnect battery cables and lock out the main breaker before performing any electrical troubleshooting. Rotating parts and high voltage can cause serious injury or death.

### 12.1 Quick Diagnostic Flowchart

```
GENERATOR DOES NOT START | └─ Controller screen blank? → Check battery /  
fuse / DC wiring (Section 12.3) | └─ Controller ON but no crank? → Check  
START mode / Emergency Stop / alarms (Section 12.4) | └─ Engine cranks but  
won't fire? → Check fuel supply / air filter / glow plugs (Section 12.2) |  
└─ Engine runs but no AC output? → Check alternator breaker / AVR /  
connections (Section 12.5) | └─ Engine runs but shuts down? → Check oil  
pressure / coolant temp / alarms (Section 12.2)
```

## 12.2 Engine — Yanmar 3TNV88F

| Symptom                          | Possible Cause                               | Remedy                                                                                                    |
|----------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Engine does not crank            | Battery discharged or defective              | Charge or replace battery. Check terminals for corrosion. Clean with baking soda solution.                |
| Engine does not crank            | Starter motor faulty                         | Check starter solenoid click. Inspect wiring. Replace starter if needed.                                  |
| Engine does not crank            | Emergency stop activated                     | Reset the emergency stop button on the DSE4620 controller.                                                |
| Engine cranks but does not start | Fuel tank empty                              | Refill with clean #2 diesel. Bleed fuel system (loosen injector line, crank until fuel flows, retighten). |
| Engine cranks but does not start | Fuel filter clogged                          | Replace fuel filter (Yanmar P/N 119802-55801). Bleed fuel system after replacement.                       |
| Engine cranks but does not start | Air in fuel lines                            | Bleed fuel system: open bleed screw on fuel filter, pump priming lever until air-free fuel flows.         |
| Engine cranks but does not start | Glow plugs not functioning                   | Check 12V supply to glow plugs. Verify glow plug relay. Replace defective plugs.                          |
| Engine cranks but does not start | Air filter blocked                           | Inspect and clean or replace air filter element.                                                          |
| Engine starts then stops         | Low oil pressure                             | Check oil level. Top up with 10W-30 (API CI-4 or higher). Inspect oil pressure sensor.                    |
| Engine starts then stops         | High coolant temperature                     | Check coolant level. Inspect radiator for blockage. Verify fan belt tension. Check thermostat.            |
| Engine starts then stops         | Fuel supply restriction                      | Check fuel lines for kinks, blockages, or air leaks. Replace fuel filter.                                 |
| Engine overheats                 | Low coolant level                            | Top up with 50/50 ethylene glycol mix. Check for leaks at hoses, water pump, and radiator.                |
| Engine overheats                 | Radiator blocked                             | Clean radiator fins with compressed air (blow from engine side outward). Remove debris.                   |
| Engine overheats                 | Fan belt loose or broken                     | Check belt deflection (10–15 mm). Adjust tension or replace belt.                                         |
| Engine overheats                 | Thermostat stuck closed                      | Remove and test thermostat in hot water. Replace if it does not open at 71°C (160°F).                     |
| Engine overheats                 | Engine block heater left on during operation | Disconnect block heater (120V/500W) before starting the generator.                                        |

| Symptom                         | Possible Cause                   | Remedy                                                                                        |
|---------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------|
| Black exhaust smoke             | Engine overloaded                | Reduce electrical load. Check that load does not exceed 12 kW continuous.                     |
| Black exhaust smoke             | Air filter dirty                 | Clean or replace air filter element.                                                          |
| Black exhaust smoke             | Injector nozzle worn or fouled   | Have injectors serviced by authorized Yanmar dealer.                                          |
| White/blue exhaust smoke        | Engine cold (normal at startup)  | Allow engine to warm up for 3–5 minutes. Normal in cold weather.                              |
| White/blue exhaust smoke        | Incorrect oil grade              | Drain and refill with recommended 10W-30 CI-4 oil.                                            |
| White/blue exhaust smoke        | Worn piston rings or valve seals | Major engine repair required. Contact authorized Yanmar dealer.                               |
| Low oil pressure warning        | Oil level low                    | Check dipstick. Add oil to proper level.                                                      |
| Low oil pressure warning        | Oil filter clogged               | Replace oil filter (Yanmar P/N 129150-35153).                                                 |
| Low oil pressure warning        | Oil viscosity incorrect          | Use recommended grade for ambient temperature (10W-30 for -15°C to +40°C).                    |
| Excessive vibration             | Loose mounting bolts             | Inspect and tighten all engine and alternator mounting hardware. Check anti-vibration mounts. |
| Excessive vibration             | Engine misfiring                 | Check fuel quality, fuel filter, and injectors.                                               |
| Engine speed unstable (hunting) | Governor adjustment needed       | Adjust mechanical governor. Contact authorized dealer if unstable at no-load.                 |
| Engine speed unstable (hunting) | Air leak in fuel system          | Inspect all fuel line connections. Tighten fittings. Replace cracked lines.                   |

## 12.3 Battery and Electrical System

| Symptom                 | Possible Cause                  | Remedy                                                              |
|-------------------------|---------------------------------|---------------------------------------------------------------------|
| Battery will not charge | Charger fuse blown (BAC4812-KP) | Replace 5A fuse inside the charger unit. Use same rating only.      |
| Battery will not charge | Charger POWER LED off           | Verify 48VDC input from controller. Check input wiring IN+ and IN-. |

| Symptom                                      | Possible Cause                 | Remedy                                                                                                                |
|----------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Battery will not charge                      | Battery sulfated or dead       | Test battery under load. Replace if voltage drops below 10.5V under load.                                             |
| Battery will not charge                      | Loose or corroded terminals    | Clean terminals with wire brush. Apply dielectric grease. Torque connections.                                         |
| Charger POWER LED on, CHARGING LED off       | Battery fully charged (normal) | No action needed — charger is in float mode (13.8V).                                                                  |
| Charger POWER LED on, CHARGING LED on steady | Battery charging normally      | No action needed — charger is in bulk/absorption mode.                                                                |
| Battery drains quickly                       | Parasitic draw                 | Check for loads connected to battery. Verify charger float voltage (13.5–14.0V). Adjust VOLT potentiometer if needed. |
| Battery drains quickly                       | Old or degraded battery        | Load test battery. Replace if capacity is below 80% of rated.                                                         |
| 12V system voltage too high                  | Charger over-voltage           | Adjust VOLT potentiometer on BAC4812-KP counterclockwise. Target: 13.8V float.                                        |
| 12V system voltage too low                   | Charger under-voltage          | Adjust VOLT potentiometer on BAC4812-KP clockwise. Target: 13.8V float.                                               |
| Starter engages but cranks slowly            | Battery weak                   | Charge battery fully. If problem persists, replace battery (min. 45Ah recommended).                                   |
| Starter engages but cranks slowly            | Corroded or undersized cables  | Inspect and clean all battery cables. Replace if damaged. Use minimum 4 AWG cables.                                   |

## 12.4 Controller — DSE4620-06

| Symptom / Alarm          | Possible Cause             | Remedy                                                                        |
|--------------------------|----------------------------|-------------------------------------------------------------------------------|
| Display blank / no power | DC supply absent           | Check battery voltage at controller terminals. Verify fuse on DC supply line. |
| Display blank / no power | Wiring fault               | Inspect controller harness connector. Check for broken or loose pins.         |
| "Low Oil Pressure" alarm | Oil level low              | Check and top up engine oil.                                                  |
| "Low Oil Pressure" alarm | Oil pressure sensor faulty | Test sensor with multimeter. Replace if out of spec.                          |



| Symptom / Alarm                                    | Possible Cause                           | Remedy                                                                                                 |
|----------------------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------|
| "High Coolant Temp" alarm                          | Overheating condition                    | See Section 12.2 — Engine overheats.                                                                   |
| "High Coolant Temp" alarm                          | Temperature sensor faulty                | Test sensor resistance vs. temperature chart. Replace if defective.                                    |
| "Low Coolant Temp" alarm                           | Block heater not connected               | Connect and verify 120V/500W block heater. Use timer in cold climates.                                 |
| "Under Speed" alarm                                | Engine cannot reach 1800 RPM             | Check fuel supply, fuel filter, air filter, governor adjustment.                                       |
| "Over Speed" alarm                                 | Governor malfunction                     | Shut down immediately. Do not restart. Contact authorized dealer.                                      |
| "Charge Fail" alarm                                | Alternator not charging battery          | Check alternator belt, battery charger connections, and battery condition.                             |
| "Fail to Start" alarm                              | Engine did not fire after crank attempts | Check fuel, glow plugs, air filter. See Section 12.2.                                                  |
| "Emergency Stop" active                            | E-Stop button pressed                    | Verify safe condition. Pull/twist E-Stop button to release. Press RESET on controller.                 |
| "Over Voltage" alarm                               | AVR malfunction or load dump             | Check alternator output with multimeter. Should read 120V L-N, 240V L-L. Contact dealer if persistent. |
| "Under Voltage" alarm                              | Heavy load or AVR issue                  | Reduce load. Check alternator connections. Verify AVR adjustment.                                      |
| Controller shows "STOP" mode, won't switch to AUTO | Mode switch issue                        | Press and hold AUTO button for 2 seconds. If unresponsive, check wiring to remote start signal.        |
| Alarms won't reset                                 | Active fault still present               | Resolve the underlying fault first, then press RESET. Some alarms require a manual reset sequence.     |
| LCD shows incorrect readings                       | Sensor calibration off or sensor fault   | Verify sensor wiring. Reconfigure using DSE Configuration Suite via USB.                               |

## 12.5 Alternator — Stamford SOL2-G1

| Symptom              | Possible Cause               | Remedy                                                                        |
|----------------------|------------------------------|-------------------------------------------------------------------------------|
| No AC output voltage | Main circuit breaker tripped | Reset the breaker. If it trips again, check for short circuit in load wiring. |

| Symptom                         | Possible Cause                            | Remedy                                                                                                            |
|---------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| No AC output voltage            | AVR (Automatic Voltage Regulator) failure | Check AVR connections. Test residual voltage (should see 5–10V AC). Re-flash if needed. Replace AVR if defective. |
| No AC output voltage            | Loss of residual magnetism                | Flash the exciter field with a 12V battery briefly (2–3 seconds) per Stamford procedure.                          |
| No AC output voltage            | Broken exciter winding                    | Measure exciter resistance with multimeter. Contact Stamford dealer if open circuit.                              |
| Low voltage (below 120/240V)    | Engine speed below 1800 RPM               | Verify speed with tachometer. Adjust governor to 1800 RPM (60 Hz).                                                |
| Low voltage (below 120/240V)    | AVR voltage potentiometer set too low     | Adjust AVR voltage trim clockwise to increase voltage.                                                            |
| Low voltage (below 120/240V)    | Overloaded generator                      | Reduce load below 12 kW / 55A at 240V.                                                                            |
| High voltage (above 130/260V)   | Engine speed above 1800 RPM               | Adjust governor. Verify frequency reads 60 Hz on controller.                                                      |
| High voltage (above 130/260V)   | AVR voltage potentiometer set too high    | Adjust AVR voltage trim counterclockwise to decrease voltage.                                                     |
| Voltage fluctuates              | Unstable engine speed                     | See "Engine speed unstable" in Section 12.2.                                                                      |
| Voltage fluctuates              | Loose alternator wiring                   | Inspect and tighten all alternator terminal connections.                                                          |
| Breaker trips repeatedly        | Short circuit in load                     | Disconnect all loads. Reset breaker. Reconnect loads one at a time to isolate fault.                              |
| Breaker trips repeatedly        | Overload condition                        | Calculate total load. Must not exceed 12 kW continuous / 13.2 kW emergency.                                       |
| Frequency incorrect (not 60 Hz) | Engine RPM not at 1800                    | Adjust governor to achieve 60.0 Hz. Verify with controller display or frequency meter.                            |

## 12.6 Fuel System

| Symptom        | Possible Cause                    | Remedy                                                            |
|----------------|-----------------------------------|-------------------------------------------------------------------|
| Low fuel alarm | Fuel level below sensor threshold | Refill tank with clean #2 diesel fuel. Tank capacity: 100 litres. |

| Symptom                          | Possible Cause                | Remedy                                                                                 |
|----------------------------------|-------------------------------|----------------------------------------------------------------------------------------|
| Fuel leak detected               | Loose fitting or cracked line | Shut down immediately. Locate and repair leak. Replace damaged fuel lines or fittings. |
| Water in fuel                    | Condensation in tank          | Drain water from fuel/water separator. Use fuel additive in cold climates.             |
| Fuel consumption abnormally high | Engine overloaded             | Verify load does not exceed rated capacity.                                            |
| Fuel consumption abnormally high | Injectors leaking or worn     | Have injectors tested and serviced by authorized Yanmar dealer.                        |
| Fuel gauge inaccurate            | Sender unit faulty            | Check fuel level sender wiring and float mechanism. Replace if defective.              |

## 12.7 General Troubleshooting Tips

55. Always check the simplest causes first — fuel level, oil level, battery charge, and breaker position.
56. Read the DSE4620 controller display carefully — alarm messages point directly to the fault area.
57. Keep a maintenance log. Many problems can be traced to missed maintenance intervals.
58. Never bypass or disable safety shutdowns — they protect the engine and alternator from catastrophic damage.
59. After any repair, run the generator under no-load for 5 minutes, then apply load gradually to verify the fix.
60. When in doubt, contact RoyalGen at 1 (450) 822-0408 or [email protected].
61. For warranty-covered components, always use authorized service providers: Yanmar dealer (engine), Cummins/Stamford dealer (alternator), Deep Sea Electronics support (controller).

## 13. Long-Term Storage

### 13.1 Preparing for Storage (more than 6 months)

62. Perform a complete engine oil change with filter replacement.

- 63. Fill the fuel tank completely with fresh diesel (to minimize condensation).
- 64. Run the engine for 10 minutes to circulate fresh oil and fuel throughout the system.
- 65. Allow the engine to cool completely.
- 66. Close the fuel valve.
- 67. Disconnect the negative (-) battery cable.
- 68. Remove the battery and store in a cool, dry location. Recharge monthly.
- 69. Seal exhaust and air intake openings to prevent moisture and insect entry.
- 70. Store the generator set in a dry and ventilated location, protected from the elements.

## **13.2 Returning to Service**

- 71. Remove seals from exhaust and air intake openings.
- 72. Reinstall and reconnect the battery (positive cable first, then negative).
- 73. Open the fuel valve.
- 74. Check all fluid levels: oil, coolant, fuel.
- 75. Bleed the fuel system if necessary.
- 76. Perform all daily checks (see section 10.1).
- 77. Start the engine and let it idle for 15 minutes.
- 78. Check all indicators and gauges on the control panel.
- 79. Check for oil, fuel, and coolant leaks.

# 14. Warranty

## 14.1 Warranty Coverage

| Component                                   | Warranty Period                                |
|---------------------------------------------|------------------------------------------------|
| Yanmar Engine                               | 24 months / 2000 hours (whichever comes first) |
| Stamford Alternator (emergency application) | 36 months                                      |
| RoyalGen Generator Set (assembly)           | 12 months / 1500 hours (whichever comes first) |

## 14.2 Conditions

- The warranty is conditional upon compliance with the maintenance intervals prescribed in this manual (see section 11).
- Keep all maintenance receipts and the maintenance log up to date as proof of compliance.
- Use only manufacturer-recommended lubricants, filters, and fluids or approved equivalents.
- Any unauthorized modification to the generator set, engine, alternator, or control system voids the warranty.
- The warranty does not cover normal wear, damage caused by misuse, inadequate storage, or extreme environmental conditions not intended for this equipment.

### TIP

Register your generator set with RoyalGen upon purchase by contacting customer service. Registration facilitates warranty claim processing and allows you to receive important service notices.

# 15. Contact Information and Service

#### ROYALGEN — POWER DENSITY

|                |                                                |
|----------------|------------------------------------------------|
| <b>Address</b> | 120 des Sables, St-Colomban, QC J5K2N1, Canada |
| <b>Phone</b>   | 1 (450) 822-0408                               |
| <b>Email</b>   | info@royalgen.ca                               |

**For Yanmar engine service:** Contact an authorized Yanmar dealer. Have the model number (3TNV88F-UG6GE) and engine serial number ready when calling.

**For DSE controller support:** Deep Sea Electronics — [www.deepseapl.com](http://www.deepseapl.com). The DSE Configuration Suite software is available for free download from the manufacturer's website.

**For Stamford alternator support:** Contact Cummins Generator Technologies through your local distributor.

## 16. MAINTENANCE LOG

Use the following logs to record all maintenance activities performed on your RGM12Y generator set.

Accurate records ensure warranty compliance, optimize service intervals, and support resale value.

## 16.1 General Service & Repair Log

## 16.2 Annual Load Test Log

| Date | Hours | Load (%) | Duration (min) | Voltage (V) | Frequency (Hz) | Result (Pass/Fail) | Technician |
|------|-------|----------|----------------|-------------|----------------|--------------------|------------|
|      |       |          |                |             |                |                    |            |
|      |       |          |                |             |                |                    |            |
|      |       |          |                |             |                |                    |            |
|      |       |          |                |             |                |                    |            |
|      |       |          |                |             |                |                    |            |
|      |       |          |                |             |                |                    |            |
|      |       |          |                |             |                |                    |            |
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**ROYALGEN — POWER DENSITY** | Owner's Manual — RGM12Y

120 des Sables, St-Colomban, QC J5K2N1 | 1 (450) 822-0408 | [email protected]

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