



JOTA Site Electrical Power Setup Safety Information and Procedures Handbook

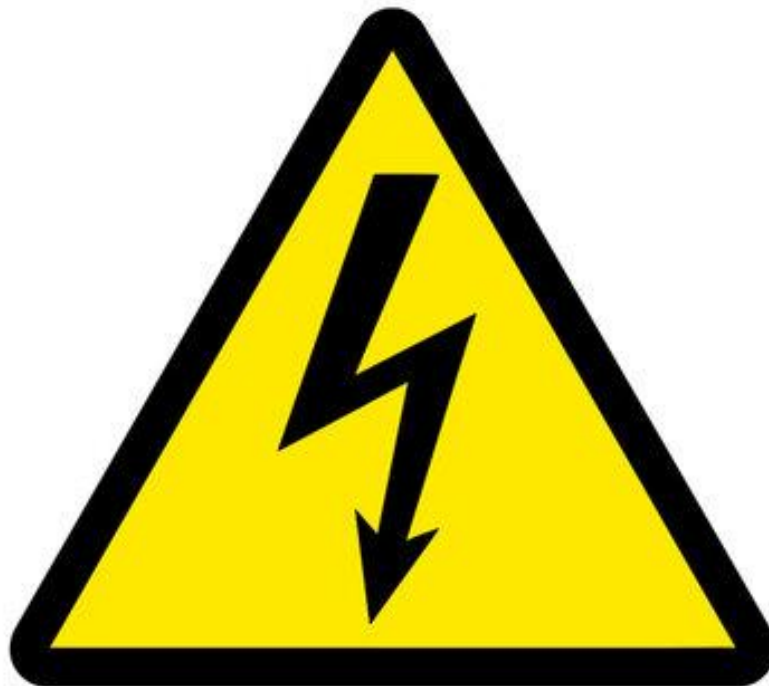


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JOTA at Boree – Power Setup Safety Information and Procedures

INTRODUCTION

For the Jamboree On The Air (JOTA) amateur radio station, an activity of the Boree Regatta, at Bonna Point, Kurnell, mains electrical power is NOT available.

Power to operate radio equipment, lighting, computers etc, is sourced from a combination of portable petrol generator and VRLA batteries.

All of the above and other associated equipment, has the potential to be hazardous to people and the environment, such as;

- Electric Shock or Electrocution
- Fire and Explosion
- Gas Poisoning (carbon monoxide)
- Chemical Poisoning and Pollution (petrol)
- Burns (petrol and acid)
- Injury (lifting heavy weights)
- Injury (trips and falls)

The following information and procedures have been prepared to minimise the risks associated with installation and operation of the power equipment at JOTA at the Boree Regatta.

Before commencing work installing and / or operating the electrical equipment, please read this manual. Should you be unsure or require additional information, contact the SGARS Coordinator before proceeding.

1. Purpose

Mains electrical power is **not available** at the SGARS JOTA amateur radio station at the Endeavour Boree Regatta, Bonna Point, Kurnell.

Electrical power for radio equipment, lighting, computers and other equipment is therefore provided using a combination of:

- A portable **1,000-watt, 230 VAC petrol generator**;
- Two **230 VAC to 13.8 VDC power supplies**;
- Two **12 VDC VRLA batteries**;
- Four **sealed lithium ion batteries** and associated chargers (for the fox hunt transmitters).

The purpose of this procedure is to establish safe methods for the installation, operation, monitoring, refuelling and removal of the electrical equipment used by SGARS during JOTA.

All members and volunteers involved in the installation or operation of the equipment must follow these procedures.

2. Potential Hazards

The electrical equipment and associated fuel and batteries have the potential to cause injury, damage or environmental harm.

Potential hazards include:

- **Electric shock or electrocution**
- **Fire or explosion**
- **Carbon monoxide poisoning**
- **Chemical poisoning or environmental pollution from petrol**

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- Burns from hot equipment, petrol or battery chemicals
- Injury from lifting or moving heavy equipment
- Trips and falls caused by cables or equipment
- Battery short circuits and high-current heating
- Battery chemical leakage or spillage

All reasonable precautions must be taken to eliminate or minimise these risks.

3. General Electrical Safety

All electrical equipment, cables, power boards and extension leads must be inspected before use.

All 230 VAC extension leads and power boards to be **tested and tagged by a suitably qualified and authorised person** before being placed into service.

Cable installation

All cables must be installed and secured so that they do not create a trip hazard.

- Cables must not be laid across walkways or pedestrian pathways.
 - Cables accessible to Boree participants or members of the public must be routed safely and protected from damage.
 - 230 VAC cables within the operating tents should be kept off the ground.
 - Electrical connections exposed to weather must be suitably protected against moisture.
 - Power boards must not be placed where they can be exposed to water or accidental damage.
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4. Generator Installation

The SGARS JOTA Coordinator will nominate the location for the generator.

The generator should be located reasonably close to the JOTA tents to minimise the length of extension leads, while ensuring that it is positioned away from areas normally used by Boree participants and members of the public.

Generator location

The generator must:

- Be located **outdoors in an open and well-ventilated area**.
- Never be operated inside a tent, building, vehicle or other enclosed or poorly ventilated structure.
- Be positioned so that exhaust gases cannot enter tents, buildings, vehicles or other occupied areas.
- Be positioned on stable, level ground.
- Be kept away from pedestrian traffic.
- Be protected from accidental contact by members of the public.

Before positioning the generator, clear combustible material from an area extending approximately **2 metres around the generator**, including:

- Leaves
- Twigs
- Grass and undergrowth

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- Rubbish
- Other readily combustible material

The generator is a two-person lift. **Do not attempt to lift or move the generator alone.**

Weather protection

The generator is **not weatherproof** and must be protected from rain while ensuring that adequate ventilation is maintained.

A small trampoline or similar overhead shelter, approximately **2 m × 2 m**, may be positioned approximately **1.8 m (6 ft) above the generator** to provide protection from falling rain.

The shelter must not restrict ventilation or allow exhaust gases to accumulate around the generator.

5. Generator Fuel

The generator uses a four-stroke engine.

Use **premium unleaded petrol**, either 95 or 98 octane, as specified for the generator.

Do not use two-stroke fuel or a petrol/oil mixture.

Fuel containers must be securely stored in a suitable **bunded or dished container** capable of containing fuel should a container leak or spill.

Fuel must be kept away from ignition sources and stored in an area inaccessible to members of the public.

Fuel containers must be positioned at least **2 metres from the generator**.

A suitable **Class B fire extinguisher** and a **20-litre container of water** are to be readily available approximately 2 metres from the generator.

The generator and fuel-storage area must be **roped off and clearly signposted** to prevent unauthorised access.

6. Generator Electrical Protection

The electrical protection equipment supplied for the generator must be installed by an appropriately authorised person.

The supplied **Residual Current Device (RCD) / safety switch or equivalent electrical protection device** is to be installed at the generator supply in accordance with the equipment manufacturer's instructions and applicable electrical requirements.

An earth stake must be installed and connected to the generator and RCD protection, by the competent person responsible for the electrical setup.

Before connecting the electrical supply:

1. Ensure the generator is switched off.
2. Ensure the RCD/safety switch is in the **OFF** position.
3. Connect the required earth connection in accordance with the approved arrangement.
4. Connect the protection device to the generator's 230 VAC outlet.
5. Check all connections before energising the supply.

The electrical protection arrangement must be checked by the suitably qualified person before the generator supply is placed into service.

7. Generator Operating Conditions

The generator has a rated output of approximately **1,000 watts**.

The generator output should be monitored during operation.

The power monitoring/protection device supplied for the JOTA installation provides a visual indication of:

- Supply voltage
- Supply frequency
- Load current

The normal target supply voltage is approximately **230 VAC** and the normal frequency is approximately **50 Hz**.

Significant variation in frequency may indicate that the generator engine is operating too slowly or too quickly.

The generator must not be operated beyond its rated capacity.

The total connected load must take into account the starting and operating requirements of connected equipment.

8. Generator Power Monitoring and Protection

A purpose-designed **power monitoring and protection device** is to be connected between the generator and the JOTA electrical distribution system.

This device:

- Monitors the generator output voltage;
- Monitors the supply frequency;
- Displays the load current; and
- Disconnects the connected mains-powered equipment if the generator voltage falls below approximately **220 V** or rises above approximately **240 V**, according to its configured limits.

The monitoring/protection device is to be connected at the end of the extension lead supplying the first JOTA tent.

All other mains-powered equipment must be supplied from the output of this device.

This includes:

- Additional extension leads
 - Power boards
 - 230 VAC to 13.8 VDC power supplies
 - Computers
 - Monitors
 - Chargers
 - Other mains-powered equipment
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9. Main Generator Extension Lead

Heavy-duty extension lead(s) are to be used between the generator and the JOTA tents.

Before installation, each extension lead must have been inspected, tested and tagged by a suitably qualified person.

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Extension leads must **not be laid on the ground** where they could create a trip hazard or be damaged.

Where practical, cables may be suspended using:

- Tree branches, where suitable and safe;
- Rope catenaries;
- Tent poles; or
- Other suitable supporting structures.

In open areas accessible to Boree participants and the general public, overhead cables should be maintained at a minimum height of approximately **1.8 metres (6 ft)** above ground level.

Care must be taken to ensure that cables are not damaged by the method used to support them.

10. Cable Connections and Weather Protection

Any connection or join in an extension lead that is exposed to weather must be enclosed in the supplied **weatherproof clip-on protective cover** or other suitable weatherproof protection.

The socket at the end of the main generator extension lead should be located **inside the first JOTA tent**.

Where power is required in the second JOTA tent, the extension lead supplying that tent should originate from the first tent and be installed using the same safe cable-support arrangements.

The connection at the second tent must also be located inside the tent and protected from moisture.

11. Power Distribution Within the JOTA Tents

Mains power may be distributed within the JOTA tents using suitable:

- Short extension leads
- Power distribution boards
- Power supplies
- Other approved electrical equipment

All electrical equipment and extension leads must be appropriately inspected, tested and tagged before use.

Power boards

Power boards must:

- Be located on tables; or
- Be securely suspended from suitable tent structures or sound-baffle boards;
- Remain visible and accessible; and
- Be protected from water and accidental damage.

Power boards must **not** be placed:

- On the ground;
- Under tables; or
- In locations where they cannot be readily inspected.

Internal cables

Mains extension leads inside the tents must be suspended from the top of tent poles, sound-baffle boards or other suitable support points.

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Ropes may be used to form a catenary where appropriate.

Mains cables must not be run across the floor.

12. Battery Safety

The two 12 VDC VRLA batteries are capable of delivering very high currents and must be treated with care.

Potential hazards include:

- Injury from lifting heavy batteries;
- Injury or chemical spillage if a battery is dropped;
- Release of chemical vapour caused by incorrect charging;
- High current and heating caused by short circuits;
- Possible explosion resulting from a serious short circuit.

Handling batteries

- Ask a second person for assistance when lifting or moving heavy batteries.
- Keep the pathway clear before moving a battery.
- Do not carry a battery through an area obstructed by equipment or furniture.
- Take care not to drop or damage batteries.

Battery terminals

Battery terminals must be protected against accidental contact.

Use suitable insulated terminal covers, boots or other insulating material.

All battery connections must be **fused as close as practicable to the battery** to provide protection against short circuits.

Tools used when making battery connections should have insulated handles.

Avoid placing tools or other conductive objects across battery terminals.

Charging

Only approved battery chargers or suitable power supplies are to be used.

Batteries must not be left unattended while charging.

The batteries used for the JOTA installation must be of **sealed construction**, as specified for the equipment.

13. Generator Refuelling

Refuelling must only be undertaken by people familiar with the generator and its safe operation.

Two people are required for refuelling. One person must remain available with the fire extinguisher.

Before refuelling:

1. Stop the generator.
2. Allow the generator and engine components to cool sufficiently before refuelling.
3. Ensure there are no ignition sources nearby.
4. Have the fire extinguisher immediately available.
5. Use a suitable nozzle or funnel to control the flow of petrol.

During refuelling:

- Do not overfill the fuel tank.

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- Avoid spilling petrol.
- Do not allow fuel to run onto the ground.
- If fuel is spilled, stop the operation and clean up the spill safely.

After refuelling:

1. Replace and secure the fuel cap.
2. Wipe away any fuel that may have been spilled onto the generator.
3. Return the fuel container to the bunded storage area.
4. Check the generator and surrounding area.
5. Restart the generator when safe to do so.
6. Check the displayed voltage and frequency.

If you are unfamiliar with the generator, do not attempt to refuel or operate it without assistance.

14. Electrical Equipment During Operation

During JOTA operation, the electrical installation should be periodically observed for:

- Damaged cables;
- Loose connections;
- Water ingress;
- Overheating;
- Unusual smells;
- Unusual generator noise;
- Abnormal voltage or frequency readings;
- Excessive generator load; and
- Any other unsafe condition.

If an unsafe condition is identified, **disconnect the affected equipment and notify the JOTA Coordinator.**

Do not attempt electrical repairs unless suitably qualified and authorised to do so.

15. Electrical Pack-down and Removal

Pack-down should be undertaken in a controlled manner, particularly while members of the public and Boree participants may still be present.

Before commencing pack-down:

1. Stop the generator.
2. Disconnect the generator from the electrical supply system.
3. Disconnect the batteries.
4. Cover exposed battery terminals.
5. Remove the batteries safely.

Once the power sources have been disconnected and made safe, removal of cables and other equipment may commence.

Before lowering any overhead cable or catenary:

- Check that participants, members of the public and other personnel are clear of the area.
- Have one person control the lowering operation.

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- Prevent people from walking underneath the cable while it is being lowered.

Remove all cables, electrical equipment, fuel containers and safety barriers from the site.

Check the area carefully to ensure that no cables, fuel containers, equipment or other materials have been left behind.

16. Working as a Team

The installation and removal of the JOTA electrical system should always be treated as a **team activity**.

Some equipment is heavy or awkward to handle, and assistance should be requested when required. Remember that JOTA is a long and demanding weekend. Volunteers may become tired or distracted.

Do not take unnecessary risks because you are tired or because pack-down needs to be completed quickly.

If you are unsure about any part of the electrical installation or operation:

STOP – ASK FOR ASSISTANCE – DO NOT GUESS.

17. Emergency

In the event of an electrical fault, fire, fuel spill, battery incident or other serious hazard:

1. **Stop the generator if it is safe to do so.**
2. Disconnect electrical equipment if this can be done safely.
3. Keep people away from the affected area.
4. Notify the SGARS JOTA Coordinator.
5. Use the appropriate fire-fighting equipment only if it is safe to do so and you are trained to use it.
6. Contact emergency services where required.
7. Do not re-enter or recommence operation until the area has been declared safe.

For an electrical fire or electrical fault, **do not use water on energised electrical equipment.**

18. Responsibilities

SGARS JOTA Coordinator

The JOTA Coordinator is responsible for:

- Nominating the generator location;
- Ensuring the generator area is suitably isolated from the public;
- Ensuring the electrical installation is established in accordance with this procedure;
- Ensuring appropriate competent persons are available for electrical testing and other specialist tasks;
- Ensuring unsafe equipment is removed from service; and
- Coordinating emergency action where required.

Electrical Tester / Competent Person

The suitably qualified person is responsible for:

- Inspecting and testing electrical equipment and extension leads;

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- Confirming the appropriate electrical protection arrangements;
- Checking the installation before energisation; and
- Advising the JOTA Coordinator of any electrical safety concerns.

Generator Operator

The person operating the generator must:

- Be familiar with the generator;
- Follow the manufacturer's operating instructions;
- Monitor voltage, frequency and load;
- Follow the approved refuelling procedure; and
- Report any abnormal operation immediately.

All Volunteers

All volunteers must:

- Follow this procedure;
 - Keep cables and equipment safely positioned;
 - Keep members of the public away from restricted areas;
 - Report damaged or unsafe equipment;
 - Ask for assistance when handling heavy equipment; and
 - **Stop and seek assistance if unsure about any safety issue.**
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19. Final Pre-Start Checklist

Before the JOTA station is connected to generator power, the following should be checked:

Generator

- ☐ Generator location approved by JOTA Coordinator
- ☐ Generator positioned on stable, level ground
- ☐ Generator in an open, well-ventilated location
- ☐ Exhaust cannot enter tents or occupied areas
- ☐ Combustible material cleared from around generator
- ☐ Generator protected from weather without restricting ventilation
- ☐ Generator exclusion zone established
- ☐ Warning/signage installed

Fuel

- ☐ Correct petrol available
- ☐ Fuel containers securely stored
- ☐ Fuel containers located at least 2 m from generator
- ☐ Bund/dished containment provided
- ☐ Fire extinguisher available
- ☐ 20-litre water container available
- ☐ Fuel area secured from public access

Electrical

- ☐ Extension leads inspected and tested/tagged
- ☐ Electrical protection installed and checked
- ☐ Earthing arrangement checked where applicable

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- ☐ Generator extension lead safely routed
- ☐ Outdoor connections weather protected
- ☐ Cables clear of pedestrian pathways
- ☐ Overhead cables safely supported
- ☐ Power monitoring/protection device connected
- ☐ Power boards safely positioned
- ☐ Internal cables suspended and off the floor

Batteries

- ☐ Batteries safely positioned
- ☐ Terminals insulated/protected
- ☐ Battery connections fused
- ☐ Approved chargers/power supplies being used
- ☐ Battery area clear of obstructions

Final check

- ☐ All personnel clear of restricted areas
 - ☐ Generator ready for operation
 - ☐ Voltage and frequency checked after starting
 - ☐ Load current checked
 - ☐ JOTA Coordinator satisfied that the installation is safe to energise
-