



Environmental Analysis Program

Pomona College
Biogeochemistry Laboratory

SOP-F101

Electrical Power in the Field

Standard Operating Procedure

SOP Number	SOP-F101
Revision	0.2
Author(s)	Kay Sterner, Katheryn Kornegay
Date	2026-06-26
Organization	EA Program, Pomona College

FOR INTERNAL USE ONLY

This document is the property of the Environmental Analysis Program at Pomona College.
Unauthorized distribution is not permitted.

Table of contents

1 Purpose	1
2 Scope	2
3 Responsibilities	2
4 Definitions	2
5 Safety and Hazards	3
5.1 Required PPE	3
5.2 Emergency Procedures	3
6 Equipment and Materials	3
7 Procedure	4
7.1 Pre-Start Checks	4
7.2 Starting the Honda EU2000i	4
7.3 Starting the Ryobi RYi2200A	4
7.4 Storage	5
7.5 Extension Cord Safety	5
8 Maintenance	5
8.1 General (Both Units)	5
8.2 Ryobi RYi2200A Maintenance Schedule	5
8.3 Honda EU2000i Maintenance Schedule	6
9 Quality Control	7
10 References	7
11 Training Record	7

1. Purpose

Electrical power in the field can come from infrastructure sources (such as outdoor or indoor outlets), portable generators, or solar power. This SOP outlines the risks associated with using electricity in the field and develops strategies to mitigate those risks.

2. Scope

- **Applies to:** Use of portable generators (Honda EU2000i and Ryobi RYi2200A) and extension cords for powering field equipment
- **Does not apply to:** Permanent electrical installations or solar panel systems (to be covered in a future SOP)
- **Location:** All EA Program field sites

3. Responsibilities

Role	Responsibility
Lab PI	Approve SOP, ensure training compliance
Trained Personnel	Follow this SOP, perform generator maintenance
New Students	Read and understand this SOP before operating generators; complete SOP-F001 Field Safety training

4. Definitions

- **Carbon monoxide (CO):** A colorless, odorless, tasteless toxic gas produced by incomplete combustion of gasoline and other fuels; displaces oxygen in the bloodstream and is rapidly fatal at elevated concentrations; never operate a generator in any enclosed or semi-enclosed space.
- **Carburetor:** The engine component that mixes air and fuel in the correct ratio for combustion; must be drained before storage of 30 days or more to prevent gum and varnish deposits from clogging fuel passages.
- **Choke:** A valve in the carburetor air intake that restricts airflow to enrich the fuel mixture during cold starts; must be moved to the OPEN or RUN position after the engine warms up to prevent over-fueling.
- **Eco-throttle:** An automatic throttle control (Honda EU2000i) that reduces engine speed when load demand is low, improving fuel economy and reducing noise; must be switched OFF during startup.
- **Ethanol-free gasoline:** Fuel containing no ethanol additive; recommended for small engines because ethanol absorbs water, degrades rubber fuel lines, and causes carburetor deposits during storage.
- **Fuel stabilizer:** A chemical additive mixed into gasoline before storage to prevent oxidation and gum formation; required when the generator will not be used for 30 days or more.
- **Ground fault:** An unintended electrical path between a live conductor and the ground or equipment casing; a leading cause of electrocution; mitigated by using grounded extension cords and GFCI protection.
- **Grounded extension cord:** An extension cord with a three-prong plug that includes a ground conductor; required for all generator connections to provide a safe fault-current return path.
- **Inverter generator:** A generator that produces AC power through an electronic inverter circuit, yielding cleaner, more stable voltage and frequency than a conventional generator;

both the Honda EU2000i and Ryobi RYi2200A are inverter generators, making them suitable for powering sensitive electronic field instruments.

- **Spark arrestor:** A fine wire-mesh screen fitted to the exhaust outlet that prevents hot carbon particles from escaping and igniting surrounding combustible material; required by law in many fire-prone areas; must be inspected and cleaned periodically.
- **Spark plug gap:** The distance between the center and ground electrodes of a spark plug; must be within the manufacturer-specified range (0.024–0.028 in for both units) for reliable ignition.

5. Safety and Hazards

Hazards

- **Carbon monoxide:** Engines emit carbon monoxide. Never use a generator inside an enclosed area (home, garage, crawl space). Fatal fumes can build up even with a fan or open doors and windows. Only operate generators outdoors, away from open windows, vents, or doors.
- **Fire and explosion:** Gasoline and its vapors are extremely flammable. Allow the engine to cool at least 2 minutes before refueling. Always use fresh gasoline. Never operate the generator near combustible materials.
- **Electrical shock:** Generators produce powerful voltage. Never operate under wet conditions and take precautions to protect the generator from rain and snow.
- **Electrocution / home wiring:** Never plug a generator directly into a home outlet. A qualified electrician must install a Power Transfer Switch for any home connection.
- **Heat from cables:** Ensure cables are rated for the current being carried. Never leave cables coiled, as coiled cords can generate excessive heat.

5.1. Required PPE

- ☐ Closed-toed shoes
- ☐ Work gloves (when handling hot engine components or refueling)
- ☐ Hearing protection (if operating near the generator for extended periods)

5.2. Emergency Procedures

Use a battery-powered carbon monoxide detector in the area where you are running a generator. If the alarm sounds, move to fresh air immediately and shut down the generator. Refer to [SOP-F001 Field Safety](#) for general field emergency procedures.

6. Equipment and Materials

Item	Notes
Honda EU2000i generator	Portable inverter generator
Ryobi RYi2200A generator	Portable inverter generator
High-capacity extension cords	Must be grounded type, rated for the application
Spare gas container	Filled with ethanol-free gasoline
Synthetic 10W-30 engine oil	Recommended oil type for both generators
Funnel	For adding oil

7. Procedure

7.1. Pre-Start Checks

1. **Check oil level.** If low, use a funnel to add synthetic 10W-30 oil. This does not need to be done every time; check every few weeks. If the generator shuts off after running for about 30 minutes, low oil is the likely cause.
2. **Check gas level.** If low, add ethanol-free gas from the spare container. On the Ryobi, fill to about an inch below the top of the tank. Both generators can be refilled while running. The Ryobi should be refilled after about 4 hours of operation; the Honda after about 6 hours.

7.2. Starting the Honda EU2000i

1. Turn the fuel tank cap vent (black cap on top of the generator) to the ON position. If this is not done, the generator will shut off after a few minutes.
2. Make sure the eco-throttle switch (on the side panel, below the fuel cap vent) is OFF.
3. For a cold start, move the choke (upper left front, near the engine switch) to the CLOSED position (slide the switch to the right).
4. Turn the engine switch to ON.
5. Pull the starter grip quickly several times until the engine starts.
6. Allow the engine a few minutes to warm up, then slowly move the choke to the OPEN position.
7. **To shut down:** Turn the engine switch to OFF. After the engine has cooled, turn the fuel tank cap vent to OFF.

7.3. Starting the Ryobi RYi2200A

1. Make sure the auto idle switch is OFF.
2. Move the choke to approximately halfway across. The marked cold-start position is slightly less than halfway, but the choke needs to go a bit further; you should feel a slight resistance at the correct position.
3. Prime the system by slowly pulling the starter grip several times.
4. Pull the grip quickly until the engine runs.
5. Allow the engine to run for 15–30 seconds, then move the choke all the way across to the RUN position.
6. **To shut down:** Switch the choke back to the OFF position.

7.4. Storage

If you do not plan to use the generator within 30 days, add fuel stabilizer to the gas and drain the carburetor.

7.5. Extension Cord Safety

- Use only grounded extension cords rated for the intended application.
- Always uncoil cords completely and lay them flat in open locations; coiled cords can generate excessive heat.

8. Maintenance

8.1. General (Both Units)

Keep generators in a clean, dry environment, not exposed to dust, dirt, moisture, or corrosive vapors. To clean, use a soft-bristle brush and/or vacuum cleaner to loosen and remove dirt and debris. Clean air vents with air pressure no more than 25 psi. Wipe exterior surfaces with a damp cloth. Perform maintenance more frequently when the generator is used in dusty areas. If you notice a power loss, the exhaust port and muffler may be blocked with carbon deposits; allow only qualified service technicians to clean these.

8.2. Ryobi RYi2200A Maintenance Schedule

Item	Frequency	Notes
Air filter	Check before each use; clean every 3 months or 50 hours; replace every year or 300 hours	Wash with soapy water, rinse, squeeze dry
Engine lubricant	Check before each use; change after first 20 hours, then every 6 months or 100 hours	Drain while warm for faster flow
Spark plug	Check every 6 months or 100 hours; replace every year or 300 hours	Gap: 0.024–0.028 in (0.60–0.70 mm)

Item	Frequency	Notes
Spark arrestor	Clean periodically	Wire brush; inspect screen for damage
Fuel tank / carburetor	Check fuel hose before each use; inspect fuel filter before each use; have tank and filter cleaned by qualified service center every 6 months or 100 hours	Drain both before storage to prevent gum deposits
Valve clearance	Check every year or 300 hours	Service by qualified technician

8.3. Honda EU2000i Maintenance Schedule

Item	Frequency	Notes
Air filter	Check before each use; clean every 3 months or 50 hours	Wash in detergent and warm water or non-flammable solvent; soak in clean engine oil and squeeze excess before re-installing
Engine lubricant	Check before each use; change after first 20 hours, then every 6 months or 100 hours	Fill to upper limit of oil filler neck

Item	Frequency	Notes
Spark plug	Check every 6 months or 100 hours; replace every year or 200 hours	Gap: 0.024–0.028 in (0.60–0.70 mm); new plug: tighten 1/2 turn after seating; used plug: tighten 1/8–1/4 turn
Spark arrestor	Clean every 6 months or 100 hours	Wire brush; inspect screen for damage
Fuel tank / combustion chamber	Clean fuel tank and filter every 6 months or 100 hours; clean combustion chamber every 300 hours; check fuel line every 2 years	Service by authorized Honda dealer
Valve clearance	Check every year or 200 hours	Service by qualified technician

9. Quality Control

TBD – establish routine checks to verify generator output voltage and frequency are within acceptable ranges for field instruments.

10. References

11. Training Record

Before operating generators independently, personnel must:

1. Read this SOP in full

2. Complete [SOP-F001 Field Safety](#) training
3. Review the manufacturer's operating instructions for the generator being used
4. Observe a trained operator start, run, and shut down the generator
5. Perform the startup and shutdown procedure under supervision
6. Be signed off by the PI or designated trainer