

Mobile Generator Setup, Grounding, and Load Testing SOP

1.0 Maintenance Objective & Frequency

The objective of this procedure is to ensure the mobile generator is set up safely, properly grounded to prevent electrical shock and equipment damage, and load tested to verify its capacity and voltage regulation under load. This PM is performed annually or after any major repair, and before deployment to a critical site.

2.0 Lockout/Tagout (LOTO) & Safety

- **Electrical Isolation:** Disconnect the generator from all loads and open the main breaker. Verify zero voltage at the output terminals using a calibrated voltmeter.
- **Engine Isolation:** Place the engine start/run switch in the OFF position and remove the battery negative terminal to prevent accidental starting.
- **Fuel Isolation:** Close the fuel supply valve if the generator is equipped with one.
- **PPE:** Wear Class 0 rubber insulating gloves (rated for 1000V AC), safety glasses with side shields, steel-toed boots, and hearing protection. Use a fire extinguisher rated for electrical fires nearby.

3.0 Required Tools, Parts & Lubricants

- Calibrated digital multimeter (CAT III 600V minimum)
- Clamp-on AC ammeter (1000A capacity)
- Ground rod (copper-clad steel, 5/8 inch diameter x 8 feet long)
- Ground rod driver or sledgehammer
- Copper grounding cable (6 AWG minimum, insulated)
- Ground rod clamp (bronze or copper, UL listed)
- Load bank (resistive, rated for generator kW capacity)
- Load bank control cable and connectors
- Personal lock and tag set
- Non-contact voltage tester
- Insulated hand tools (screwdrivers, wrenches)
- Generator operator manual

4.0 Step-by-Step Maintenance Procedure

1. Perform LOTO as per Section 2.0. Verify zero voltage at the generator output terminals with a calibrated multimeter.
2. Position the generator on a level, dry surface at least 5 meters from any building openings. Ensure exhaust points away from structures and air intakes.

3. Drive the ground rod into the earth at least 2.4 meters (8 feet) deep, leaving 15 cm (6 inches) above ground. Use the ground rod driver or sledgehammer.
4. Attach the ground rod clamp to the top of the ground rod. Connect one end of the 6 AWG copper grounding cable to the clamp and tighten to 20 Nm (15 ft-lbs). Route the cable to the generator's grounding lug.
5. Connect the other end of the grounding cable to the generator's grounding lug. Clean the lug surface with a wire brush if corroded. Torque the lug nut to 25 Nm (18 ft-lbs). Verify continuity between the lug and the ground rod using the multimeter (should read less than 1 ohm).
6. Reconnect the battery negative terminal. Start the generator and let it warm up for 5 minutes at no load. Check for any abnormal noises, vibrations, or fluid leaks.
7. Using the multimeter, measure and record the no-load voltage at the generator output terminals. For a 208/120V system, expect 208-220V line-to-line and 120-127V line-to-neutral.
8. Connect the load bank to the generator output using the appropriate cables and connectors. Ensure the load bank is set to 0% load initially.
9. Gradually apply load in 25% increments (25%, 50%, 75%, 100%) of the generator's rated kW capacity. Hold each step for 5 minutes. At each step, record voltage, current (using clamp meter), frequency (using multimeter), and engine RPM (if tachometer available). Voltage should remain within $\pm 5\%$ of rated voltage and frequency within 60 Hz ± 0.5 Hz.
10. At 100% load, run the generator for 30 minutes. Monitor coolant temperature, oil pressure, and exhaust temperature (if equipped). Shut down immediately if any parameter exceeds OEM limits.
11. Reduce load to 0% and let the generator run at no load for 5 minutes to cool down. Then shut down the generator.
12. Disconnect the load bank and remove the grounding cable from the generator lug. Coil and store all cables properly. Remove LOTO and restore the generator to standby configuration.

5.0 Verification & Return to Service

1. Verify that all recorded voltage, current, and frequency readings during load testing are within OEM specifications. Compare against previous test results for trend analysis.
2. Perform a final visual inspection of all connections, cables, and the generator enclosure. Ensure no tools or debris remain inside the generator compartment.
3. Start the generator and run for 5 minutes at no load to confirm stable operation. Measure output voltage and frequency one final time.
4. Complete the PM work order in ServiceGrid, attaching all recorded data and any observations. Sign off and mark the generator as ready for service.

Regulatory Disclaimer: This document is a generic maintenance template provided for educational and informational purposes only. It does not constitute professional engineering or reliability advice. The end-user assumes all liability for validating all step sequences, torque specs, and LOTO protocols against specific machinery OEM manuals before deployment to a live production floor.