

Startup and Onsite Test Procedure

This form is required for emergency power supply systems compatible with NFPA110 standard and prime power supply systems using 5 kW or larger generator sets and 30-4000 amp transfer switches.

Date: mo. _____ day _____ yr. _____

Number: _____

Distributor		
Distributor Name		Warranty I.D. No.
Address		
City	State	ZIP/Postal Code/Country
Telephone		
Generator Set Information		
Model	Engine Model	
Spec No.	Engine Serial No.	
Serial No.		

User		
Owner's Name		
Address		
City	State	ZIP/Postal Code/Country
Telephone		
Transfer Switch Information		
Model		
Serial No.		
Options		

Checklist

A load bank, if required for full-load tests, should be connected to the emergency side of the transfer switch. Before beginning tests, the generator set must be in a cold start condition and loads protected by the emergency power supply system must be at their normal operating level. The generator set master switch and transfer switch mode selector should both be in the AUTO position.

- ☐ 1. Simulate a normal power failure by opening all circuit breakers or remove fuses supplying normal power to the building or facility. Observe and record the following:
- Number of seconds elapsed between normal source interruption and start of engine cranking: _____
 - Number of seconds elapsed between start of engine cranking and engine starting: _____
 - Number of seconds elapsed between engine starting and reaching rated speed (rated Hz on frequency meter): _____
 - Number of volts above rated voltage (overshoot) upon startup: _____ volts
 - Number of hertz above rated frequency (overshoot) upon startup: _____ Hz
 - Number of seconds for voltage and frequency to achieve steady-state after load is transferred to generator: _____
 - Voltage _____, frequency (Hz) _____, amperes _____ at steady state.

- ☐ 2. Check and record the following at the listed intervals after startup:

Intervals (min.)	Oil Pressure	Water Temperature	Battery Charging Rate
5	_____ psi	_____ °F	_____ volts/amps
10	_____ psi	_____ °F	_____ volts/amps
15	_____ psi	_____ °F	_____ volts/amps
30	_____ psi	_____ °F	_____ volts/amps
45	_____ psi	_____ °F	_____ volts/amps
60	_____ psi	_____ °F	_____ volts/amps

During this one-hour test run, record load variations in amperes and any resulting effect on generator voltage and frequency.

1 _____	5 _____	9 _____
2 _____	6 _____	10 _____
3 _____	7 _____	11 _____
4 _____	8 _____	12 _____

- ☐ 3. Restore normal power by closing circuit breakers or replace fuses.
- Record the time elapsed between normal power restoration and retransfer to normal power for each transfer switch (15 minutes minimum).
1 _____ 2 _____ 3 _____ 4 _____ 5 _____
 - Record the time elapsed between retransfer to normal power and generator set shutdown: _____

- ☐ 4. After completing steps 1 through 3, place the generator set master switch to the OFF/RESET position and allow the generator set to cool for five minutes.

- ☐ 5. Immediately after the five-minute generator set cooldown period, perform a two-hour, full-load test. Use the building load, if adequate, or use a load bank of sufficient size to supplementally provide load equaling 100% of nameplate standby rating, less deration for the site conditions.

Place the generator set master switch in the RUN position. As soon as the generator set reaches rated frequency, apply full load as described above.

Record the following as the generator set is started and the load is applied:

- Number of seconds elapsed between the start of engine cranking and engine starting: _____
- Number of seconds elapsed between the engine's starting and reaching rated speed (rated Hz on frequency meter): _____
- Number of volts above rated voltage (overshoot) upon load application: _____ volts
- Number of hertz above rated frequency (overshoot) upon startup: _____ Hz
- Number of seconds for voltage and frequency to achieve steady-state after load application: _____
- Check and record the following at the listed intervals:

Intervals (min.)	Oil Pressure	Water Temperature	Battery Charging Rate
15	_____ psi	_____ °F	_____ volts/amps
30	_____ psi	_____ °F	_____ volts/amps
45	_____ psi	_____ °F	_____ volts/amps
60	_____ psi	_____ °F	_____ volts/amps
75	_____ psi	_____ °F	_____ volts/amps
90	_____ psi	_____ °F	_____ volts/amps
105	_____ psi	_____ °F	_____ volts/amps
120	_____ psi	_____ °F	_____ volts/amps

- Transfer to normal power. Allow the generator set to shut down. Disconnect any load bank used in the two-hour test.

Checklist, continued

- ☐ 6. To test cyclic engine cranking and overcrank fault shutdown protection:
 - On gas/gasoline-fueled generator sets, disconnect the coil wire at the distributor cap and ground it or disconnect the ignition system.
 - On diesel-fueled generator sets: unplug the fuel injector harness from ECM on DDC engines with DDEC/MDEC or disconnect wire no. 70 from the injector pump solenoid all other models.
 - Move the generator set master switch to the RUN position. Observe 15-second on-off cranking cycles and maximum 75-second elapsed time from start of cranking to overcrank shutdown. Observe the overcrank lamp on the controller.
 - Move the generator set master switch to the OFF/RESET position.
 - On gas/gasoline-fueled generator sets, reconnect the ignition coil wire or reconnect the ignition system.
 - On diesel-fueled generator sets, reconnect wire no. 70 to the injector pump solenoid.
- ☐ 7. To test overspeed fault shutdown protection:*
 - ☐ This model has an ECM-controlled engine with engine controller logic that prevents manual overspeeding.
 - Move the generator set master switch to RUN to start the generator set. Manually increase the engine speed. Observe generator set shutdown and OVERSPEED lamp on the controller when frequency reaches 70 Hz.
 - Move the generator set master switch to the OFF/RESET position to reset the controller overspeed fault. The NOT-IN-AUTO lamp should light.

For the following tests in steps 8-15, move the generator set master switch to RUN for starting. Move the generator set master switch to the OFF/RESET position to reset after each fault test. Refer to the wiring diagrams in the supplied manuals to locate the circuit wires.

Note: The engine safety switches do not function during the first 30 seconds after startup.

- ☐ 8. Verify the low oil pressure fault shutdown.* The engine should stop after 5 seconds and the controller low oil pressure lamp should light.
 - ☐ This model has an ECM-controlled engine where this field test was not feasible.
- ☐ 9. Verify the high engine temperature fault shutdown.* The engine should stop after 5 seconds and the controller high engine temperature lamp should light.
 - ☐ This model has an ECM-controlled engine where this field test was not feasible.

- ☐ 10. Verify the low water temperature fault shutdown.* The controller low water temperature lamp should light.
 - ☐ This model has an ECM-controlled engine where this field test was not feasible.
- ☐ 11. Verify the anticipatory high engine temperature fault warning.* The controller anticipatory high engine temperature lamp should light.
 - ☐ This model has an ECM-controlled engine where this field test was not feasible.
- ☐ 12. Verify the anticipatory low oil pressure fault warning.* The controller anticipatory low oil pressure lamp should light.
 - ☐ This model has an ECM-controlled engine where this field test was not feasible.
- ☐ 13. Verify the low fuel fault warning. The controller low fuel lamp should light.
- ☐ 14. Verify the battery charger circuit fault warning. The controller battery charger fault lamp should light.
- ☐ 15. Verify the low battery volts circuit fault warning. The controller low battery volts lamp should light.
- ☐ 16. The not-in-auto lamp should flash whenever the generator set master switch is in the OFF/RESET or RUN positions.
- ☐ 17. Press the LAMP TEST button. All indicator lamps should light.
- ☐ 18. Go to the remote emergency stop station(s). Remove the cover and disconnect wire 1 or 1A. The generator set should shut down and the emergency stop lamp on the controller should light. At the remote audiovisual alarm station(s), the alarm horn should sound and the lamp should light. Move the ALARM switch to the SILENCE position to silence the alarm. The lamp should stay lit.

Reconnect wires 1 and 1A at the remote emergency stop station(s).

Reset the generator set controller by moving the generator set master switch to the OFF/RESET position and then to the AUTO position. The alarm at the remote audiovisual alarm station(s) should sound and the lamp should go out. Move the ALARM switch to its NORMAL position to reset and silence the alarm.
- ☐ 19. Verify that the engine block heater and battery heater are installed, energized, and functional in accordance with the generator set manufacturer's temperature for cold start and load acceptance.

Verify that the ambient air temperature in the generator set equipment room or in the outdoor housing/enclosure is not less than 4.5°C (40°F) for level installations.

* Some models with electronic engine controls may limit or prohibit adjusting the engine speed or testing engine faults. Refer to Service Bulletin 626 for details.

Customer Representative Name	Firm	Date mo. day yr.
Customer Representative Name	Firm	Date mo. day yr.
"Authority Having Jurisdiction" Signature	Office/Organization	Date mo. day yr.

WHITE: Distributor

YELLOW: Customer

PINK: Authority Having Jurisdiction

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