KOHLER POWER SYSTEMS

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/Dealer		
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 (or master control button) and transfer switch mode selector should both be in the AUTO mode.

☐ 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 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	Voltage (V), Frequency (Hz), Amps. (A)
5	_____psi	_____°F	_____ V, ___ Hz, _____ A
10	_____psi	_____°F	_____ V, ___ Hz, _____ A
15	_____psi	_____°F	_____ V, ___ Hz, _____ A
30	_____psi	_____°F	_____ V, ___ Hz, _____ A
45	_____psi	_____°F	_____ V, ___ Hz, _____ A
60	_____psi	_____°F	_____ V, ___ Hz, _____ A
75	_____psi	_____°F	_____ V, ___ Hz, _____ A
90	_____psi	_____°F	_____ V, ___ Hz, _____ A

☐ 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 (5 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, use the generator set master switch (or master control button) to put the unit in the OFF/RESET mode 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.

Use the generator set master switch (or master control button) to put the unit in the RUN mode. 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 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.

☐ 6. To test cyclic engine cranking and overcrank fault shutdown protection:

- On gas-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 DD/MTU engines with DDEC/MDEC or disconnect wire no. 70 from the injector pump solenoid on all other models.
- Use the generator set master switch (or master control button) to place the unit in the RUN mode. Observe 15-second on-off cranking cycles and maximum 75-second elapsed time from start of cranking to overcrank shutdown. Observe the controller fault lamp and display for an overcrank shutdown.
- Use the generator set master switch (or master control button) to place the unit in the OFF/RESET mode.
- On gas-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.

Checklist, continued

☐ 7. To test overspeed fault shutdown protection:*

☐ This model has an ECM-controlled engine with engine controller logic that prevents manual overspeeding.

- Use the generator set master switch (or master control button) to place the unit in the RUN mode to start the generator set. Manually increase the engine speed. Observe the controller fault lamp and display for an overspeed shutdown when the frequency reaches 70 Hz.
- Use the generator set master switch (or master control button) to place the unit in the OFF/RESET mode to reset the controller overspeed fault. The NOT-IN-AUTO lamp should light.

For the following tests in steps 8–15, use the generator set master switch (or master control button) to place the unit in the RUN mode for starting. Use the generator set master switch (or master control button) to place the unit in the OFF/RESET mode 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 observe the controller fault lamp and display for a low oil pressure shutdown.

☐ 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 observe the controller fault lamp and display for a high engine temperature shutdown.

☐ This model has an ECM-controlled engine where this field test was not feasible.

☐ 10. Verify the low water temperature fault shutdown.* Observe the controller fault lamp and display for a low water temperature shutdown.

☐ This model has an ECM-controlled engine where this field test was not feasible.

☐ 11. Verify the anticipatory high engine temperature fault warning.* Observe the controller fault lamp and display for a high engine temperature warning.

☐ This model has an ECM-controlled engine where this field test was not feasible.

☐ 12. Verify the anticipatory low oil pressure fault warning.* Observe the controller fault lamp and display for a low oil pressure warning.

☐ This model has an ECM-controlled engine where this field test was not feasible.

☐ 13. Verify the low fuel fault warning. Observe the controller fault lamp and display for a low fuel warning.

☐ 14. Verify the battery charger circuit fault warning. Observe the controller fault lamp and display for a battery charger fault warning.

☐ 15. Verify the low battery volts circuit fault warning. Observe the controller fault lamp and display for a low battery volts warning.

☐ 16. The not-in-auto lamp should flash whenever the generator set master switch (or master control button) is in the OFF/RESET or RUN mode.

☐ 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 button 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 putting the generator set master switch (or master control button) to the OFF/RESET mode and then to the AUTO mode. 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 616 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