

# Start-Up Inspection For Generac Power Systems Industrial Product



Dealer Information		Technician Information	
Dealership Name		Name	
Account #		Tech ID #	
Address		Phone #	
		E-mail Address	
Phone #		Tech Signature	

Owner Information		Installing Contractor Information	
Company Name		Company Name	
Name and Title of Individual Responsible for Equipment		Project Manager/Site Supervisor	
E-mail Address		E-mail Address	
Address		Address	
Phone #		Phone #	

Site Information			
Facility Name		Utility Voltage	
Address		Size of Utility Disconnect	
		External Components (Transformers, UPS, Load Factor Correction, etc.)	
GPS Coordinates		<input type="checkbox"/> Yes <input type="checkbox"/> No    If Yes, please list components:	
Application	<input type="checkbox"/> MPS	<input type="checkbox"/> Prime Power	<input type="checkbox"/> Stand Alone
Date of Start-up			

<p><b><u>Generator Information</u></b></p> <p>Model #: _____</p> <p>Serial #: _____</p>	<p><b><u>Engine Information</u></b></p> <p>Serial #: _____</p> <hr/> <p><b><u>Alternator Information</u></b></p> <p>Serial #: _____</p>
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**PRE-START CHECKS**

**Inspect for the following:**

- No freight damage (components tight, straight, etc.) Reminder: Freight damage is the responsibility of the shipper and should have been noted on delivery.
- Manuals present
- Unit secured to pad.
- Remove fuse(s) from generator control panel.
- Proper belt alignment and tensions.
- Governor rod/throttle movement and clearance.
- Fluid levels (oil, coolant, battery(ies), governor, etc.).
- Connect a gas manometer to the inlet side (1/8" pipe plug) of the secondary regulator for monitoring purposes.
- Correct fuel and exhaust plumbing (see installation manual for sizing/connections).
- Remove cable tie from rain cap.
- Adequate air flow and ventilation.
- Correct AC wire sizes and connections (verify with electrician).
- Correct DC and communication wire sizes and connections (verify with electrician) (Routed separately from AC wires per manufacturer recommendation).
- Proper size battery(ies) per customer order.
- Block heaters, battery charger, etc. properly matched with utility supply voltage per customer order.
- Verify electrical connections made at battery charger & block heater.
- Verify remote start Wires 0 & 183 are pulled and connected inside lower control panel of generator and inside transfer switch.
- Verify communications wires (RS-485), and power wires (for RAP/RRP) are pulled and terminated correctly inside control panel, remote annunciator, and transfer switch.

**WARNING: reversed polarity of DC power lines to annunciator will cause damage to annunciator and/or engine control panel... NOT WARRANTABLE!**

- Verify the AUTO/OFF/MANUAL switch is in "OFF" position.
- Connect battery(ies) - positive cable first, then negative.
- Re-insert the generator control panel fuse(s).
- Using Genlink-DCP & RS232 download XML file and save to your computer.
- Grounding rod installed.

- Close the AC circuit breaker to block heater and battery charger.
- Block heater is operational (feel heater discharge hose for heat, and listen).
- Battery charger is operational (refer to WIB06-8-S)
- Visually inspect entire area looking for loose papers, plastic wrappings, leaves, anything that may blow around and get caught in radiator or alternator and remove them.
- Verify all AC electrical connections are tight at the circuit breaker and transfer switch.
- Battery charge DC voltage present. \_\_\_\_\_ VDC
- Battery charge DC amperage present. \_\_\_\_\_ Amps
- Inspect louvers; check mechanical linkages, verify proper operation (open/close manually). Ensure properly wired to engine run relay to ensure louvers open when unit starts.
- Check all hoses, clamps, fittings for leaks or damage.
- Check all electrical connections on the generator; wiring, wire ties, clamps, terminal ends, connectors; tighten or repair as necessary.
- Check all electrical plugs throughout the generator. Ensure each plug is seated correctly and fully inserted into its receptacle.
- MPS System: Verify panel type in Genlink-DCP under "Regulator Settings Configuration menu" (i.e. PM-PC, PM-GC, PM-SC, etc.) Enable Manual Backup Mode.
- MPS System: PLS Installed?       Yes     No  
If YES, Enable Automatic with PLS Backup Mode.

Fuel type: \_\_\_\_\_

**PREPARATION FOR START-UP**

- Using Genlink-DCP save the units configuration (.xml) file.
- Inside the transfer switch set the maintenance disconnect switch to "MANUAL" position.
- Bleed the fuel system of air (prime diesel system).
- Open the generator's main line circuit breaker.
- Gaseous Unit: Record the inlet static gas pressure at the secondary regulator with a manometer. Invert Digital Output Channel 2 (Run Circuit) through the operators interface.

Gaseous Static fuel pressure: \_\_\_\_\_ Inches W.C./PSI

**Overcrank Check:**

- Test the overcrank circuit.

**Gaseous Units:** Disable both the run and cold start fuel system.

Disconnect the run circuit (wire 14/219) at the fuel solenoids; disconnect the crank circuit (wire 56) at the cold start fuel solenoid.

**Diesel Units:**

**Non-CANbus Units** - Disconnect the Governor driver (in the connection box).

**CANbus Units** – Disconnect both the Cam and Crank sensors (disconnect the plugs).

With the fuel system disabled, place the AUTO/OFF/MANUAL switch in the "AUTO" mode. Close the 2-wire start circuit (Wires 0 (178) and 183) at the transfer switch connections to make the unit complete its full crank/rest cycle and latch out on a "Shutdown Overcrank" condition.

Number of crank cycles completed \_\_\_\_\_

**RUNNING CHECKS**

**Gaseous Units:**

- Cranking fuel pressure \_\_\_\_\_ Inches W.C./PSI

- Running WITHOUT load fuel pressure: \_\_\_\_\_ Inches W.C./PSI

- Check DC alternator output Volts: \_\_\_\_\_  
Amps: \_\_\_\_\_

- Record No-load HZ: \_\_\_\_\_

- Calibrate Generator AC output voltage.

No-load voltage before calibration:

Actual (meter) A-B (A/N) \_\_\_\_\_ B-C (B/N) \_\_\_\_\_ C-A (A/B) \_\_\_\_\_

Display A-B (A/N) \_\_\_\_\_ B-C (B/N) \_\_\_\_\_ C-A (A/B) \_\_\_\_\_

No-load voltage after calibration:

Actual (meter) A-B (A/N) \_\_\_\_\_ B-C (B/N) \_\_\_\_\_ C-A (A/B) \_\_\_\_\_

Display A-B (A/N) \_\_\_\_\_ B-C (B/N) \_\_\_\_\_ C-A (A/B) \_\_\_\_\_

- Test ALL automatic shutdowns (low oil pressure, low coolant level, high coolant temperature, and overspeed).

- Engine coolant temperature (hot running): \_\_\_\_\_ degrees

- Engine oil pressure (hot running): \_\_\_\_\_ PSI
- Check for coolant, fuel, oil, and exhaust leaks and open louvers.

**Complete the following:**

**Current Calibration is required on MPS units to ensure accurate load sharing between units on the common bus. On Industrial standalone units it is highly recommended to ensure accurate kW and kW Hour readings. It is desirable to calibrate the current in the 25% to 75% load range of each unit. This can be accomplished by using the customer/building load and/or load banks as needed.**

- Close the generator's main line circuit breaker.
- Check for proper voltage and phase rotation at (each) transfer switch.
- Load Generator against Load Bank and/or building load.
- Calibrate Current Channels at 25% to 75% load.

Current readings before calibration:

Actual (meter) A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_

Display A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_

Current readings after calibration:

Actual (meter) A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_

Display A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_

**MPS Units:**

- Calibrate Bus voltage.

Bus voltage before calibration:

Actual (meter) A-B \_\_\_\_\_ B-C \_\_\_\_\_ C-A \_\_\_\_\_

Display A-B \_\_\_\_\_ B-C \_\_\_\_\_ C-A \_\_\_\_\_

Bus voltage after calibration:

Actual (meter) A-B \_\_\_\_\_ B-C \_\_\_\_\_ C-A \_\_\_\_\_

Display A-B \_\_\_\_\_ B-C \_\_\_\_\_ C-A \_\_\_\_\_

Run Unit against Load Bank and/or customer load to 25% to 75% load.

Record load voltage.

A-B (A/N) \_\_\_\_\_ B-C (B/N) \_\_\_\_\_ C-A (A/B) \_\_\_\_\_

Target voltage: \_\_\_\_\_

Record Load Current (amperage):

A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_

Unit Rated Current - \_\_\_\_\_ kVA \_\_\_\_\_ P.F.

Record kW in display: \_\_\_\_\_ kW

Record kVA in display: \_\_\_\_\_ kVA

Record kVAR in display: \_\_\_\_\_ kVAR

\_\_\_\_\_ Power Factor against Load Bank  
and/or customer load: \_\_\_\_\_

Loaded frequency: \_\_\_\_\_ Hz

Loaded Engine RPM: \_\_\_\_\_ RPM

**Note: Record the fuel pressure at the greatest available load (up to the rating on the unit). Load can be provided by a load bank and/or customer load. The intent here is to verify that the fuel supply piping will provide adequate fuel flow at full rated load. If the fuel pressure drops below the minimum allowed for the unit then the fuel system will need to be checked against the requirements for the unit.**

Gaseous or Bi-fuel Units: Record fuel pressure at Regulator inlet:

Load (kW): \_\_\_\_\_

\_\_\_\_\_ Inches W.C./PSI

If the unit requires adjustment to the PIDs for either Governor or Voltage record the changes here.

Governor P.I.D. settings prior to adjustment:

KP \_\_\_\_\_ KI \_\_\_\_\_ KD \_\_\_\_\_

Governor P.I.D. settings after adjustment:

KP \_\_\_\_\_ KI \_\_\_\_\_ KD \_\_\_\_\_

AVR P.I.D. settings prior to adjustment:

KP \_\_\_\_\_ KI \_\_\_\_\_ KD \_\_\_\_\_

AVR P.I.D. settings after adjustment:

KP \_\_\_\_\_ KI \_\_\_\_\_ KD \_\_\_\_\_

MPS Units Synchronizing P.I.D. Settings Before adjustment

KP \_\_\_\_\_ KI \_\_\_\_\_ KD \_\_\_\_\_ GAIN \_\_\_\_\_

MPS Units Synchronizing P.I.D. Settings After adjustment

KP \_\_\_\_\_ KI \_\_\_\_\_ KD \_\_\_\_\_ GAIN \_\_\_\_\_

**Other Configuration Settings**

Regulator Settings:

AVR Dump Improve  Yes  No

Governor Settings:

Dump Enable  No Dump

Dump

Dump and Hold

De-synch Offset: \_\_\_\_\_ Hz

Using Genlink-DCP & RS232, use the reports menu and save the following files:

Alarm Log; Event Log, Configuration Settings

Using Genlink-DCP save the units configuration (.xml) file.

<p><b><u>Transfer Switch Information</u></b></p> <p>Model #: _____</p> <p>Serial #: _____</p>
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**Complete the following:**

- With both sources disconnected, manually transfer the switch a number of times to each position: check for smooth, non-binding operation.
- Check for proper voltage and phase rotation in transfer switch.

Voltage:

A-B (A/N) \_\_\_\_\_ B-C (B/N) \_\_\_\_\_ C-A (A/B) \_\_\_\_\_

Load amperage:

A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_

Phase rotation:

Generator: \_\_\_\_\_

Utility: \_\_\_\_\_

**GTS/CTTS type Transfer Switches:**

- Check for proper dip switch settings in transfer switch.
- Check the 2-wire start connection.
- Set all timers and sensors and record below.
- Set the Exercise Time/Day – record below.
- Calibrate Utility Voltage Sensing Board.

**HTS/MTS Transfer Switches:**

- Check communication wire (RS485) and/or 2-wire start.

**Note: Make sure the RS485 or 2-wire start wires are run in separate conduit.**

485 Communication NO Parity TWO Stop Bits

Control Panel – MASTER – Baudrate \_\_\_\_\_

Switch – Baudrate \_\_\_\_\_

Slave Address \_\_\_\_\_

- MPS System** MTS Switch(es) – ensure 120Vac Power from service panel to switch.
- Using Genlink set all timers, sensors, etc.

**TRANSFER SWITCH TIMER & SENSOR SETTINGS**

Voltage Pickup (UVB): \_\_\_\_\_

Voltage Dropout (UVB): \_\_\_\_\_

Line Interrupt Delay (UVB): \_\_\_\_\_

Engine Warm-up Time: \_\_\_\_\_

Eng. Minimum Run Time: \_\_\_\_\_

Return to Utility Delay Time: \_\_\_\_\_

Engine Cool-down Time: \_\_\_\_\_

Standby Voltage (GTS)

Load Accept Voltage (HTS): \_\_\_\_\_

Standby Frequency (GTS)

Load Accept Frequency (HTS): \_\_\_\_\_

Signal Before Transfer Time: \_\_\_\_\_

Time Delay Neutral Time: \_\_\_\_\_

Switch Voltage/Phase (HTS): \_\_\_\_\_

Allowable Deviation (HTS): + \_\_\_\_\_ - \_\_\_\_\_

Hysteresis \_\_\_\_\_

Exercise Day(s): \_\_\_\_\_

Time of Day: \_\_\_\_\_ AM/PM

**FUNCTIONAL TEST OF GENERATOR & TRANSFER SWITCH SYSTEM**

- Place the Generator and Transfer Switch in Auto
- Close the generator MLCB
- Open the Utility Disconnect

Time to start generator and transfer to customer Load \_\_\_\_\_ seconds

- Check control panel – record values against customer load

Customer Load:

\_\_\_\_\_ kW \_\_\_\_\_ kVA \_\_\_\_\_ kVAR \_\_\_\_\_ PF

Voltage against Customer Load:

A-B (A/N) \_\_\_\_\_ B-C (B/N) \_\_\_\_\_ C-A (A/B) \_\_\_\_\_

Current against Customer Load:

A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_

- Functional test of Generac supplied accessories (i.e. – remote annunciator, remote relay panel, Genlink, modem, etc.)

**MPS System Controller Information**

Model Number: \_\_\_\_\_

Serial Number: \_\_\_\_\_

**Inspect for the following; use the applicable/appropriate wiring and schematic diagrams:**

- Proper mounting of SC (NEMA 3R outdoors, NEMA 1 indoors).
- 120 VAC power source from service panel on emergency side of supply to the SC and to any MTS switch(es).
- 24 VDC backup power (wire 220F) from two generators to SC (and PLS if installed).
- Two-wire start connections between System Controller (SC) and all transfer switches.
- Two-wire start between SC and Lead Generator IF NO PLS Installed.
- Two-wire start between SC and all generators IF PLS IS installed.
- Load shed and permissive connections between applicable transfer switches and SC, and SC and PLS if PLS installed.
- RS 485 Communication wires from SC to Generators and MTS switches.

NOTE: Ensure all communication wiring and other control wiring is run in separate conduit from the AC power leads.

- Dedicated analog phone line run to SC:  
Number (\_\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_
- All equipment must be grounded per NEC Article 250. Verify ground lug within the SC.

**Close AC circuit breaker to SC/Connect battery, block heater and charger on the PM-PC.**

**Make sure that all generators in the system are already configured for communication with the System Controller (see the training guide).**

- Ensure the light for the battery charger is on by toggling the battery charger reset switch.
- Verify the SC touch screen displays the SC menu options.
- Touch the system status “button” and record the Firmware version.  
\_\_\_\_\_

**Using Genlink-DCP and serial (RS-232) cable, connect to the SC:**

- Save the System Controller Configuration (.xml) file.

- Verify the System Controller Panel Type in the Regulator Settings Configuration Menu; Enable Manual Backup Mode. If the system has a PLS enable the Automatic with PLS backup mode.
- Configure the “Generators” in the System Controller; enter kW, kVAR (.75 times the kW), and verify the correct slave address for each generator.
- Verify that each generator communicates with the SC.
- Program the SC for the proper system voltage in the “System Settings” screen.
- Configure the “System” “Permissive” and “Load Shed” values.

**Perform Generator and Bus Voltage and Current Calibration on Each PM-PC**

- Ensure all generators are in OFF
- Place System Controller Switch in MANUAL
- Calibrate each generator by placing its switch in AUTO. It should start and close the parallel contactor to the bus. With your LOAD BANK connected to the common bus you can now calibrate each generators voltage, bus voltage and current channels.
- Check phase rotation at the generator bus and the transfer switch(es); compare to the utility at each transfer switch.
- Repeat the previous steps for each generator.
- Complete necessary start-up forms on each PM-PC generator set.
- Complete necessary start-up forms for each MTS/GTS switch.
- Once all generators phasing is correct and all are calibrated, place all in AUTO and turn the SC key-switch to MANUAL.
- Verify that all generators parallel to the bus and record the total time to get all on the bus -

\_\_\_\_\_ seconds

- Record load shed and permissive settings.

Load Shed		Permissive (ATS)	
Critical	kW	Critical	kW
Load 1	kW	Load 1	kW
Load 2	kW	Load 2	kW
Load 3	kW	Load 3	kW

- Program PLS controller with the same Generator, Load Shed, Permissive, and transfer delay settings as the SC.

**OPERATIONAL SYSTEM TEST**

- With all generators in AUTO and the SC in AUTO, disconnect Utility at each transfer switch. When all generators are paralleled to the Bus and all switches have transferred, begin testing the Load Sheds and Permissives by shutting down and re-starting generators as needed.
- Verify operation of PLS (per the study guide)
- Return utility to all switches and verify that all units cool down, disconnect and shut down normally.

- Using Genlink-DCP save the SC configuration (.xml) file
- Set up a system exercise using either one (1) transfer switch or the SC-Command Configuration menu.

**Recommended Items:**

- Verify operation of system RAP/RRP and/or individual unit RAP/RRP.
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