

GENERAC[®]

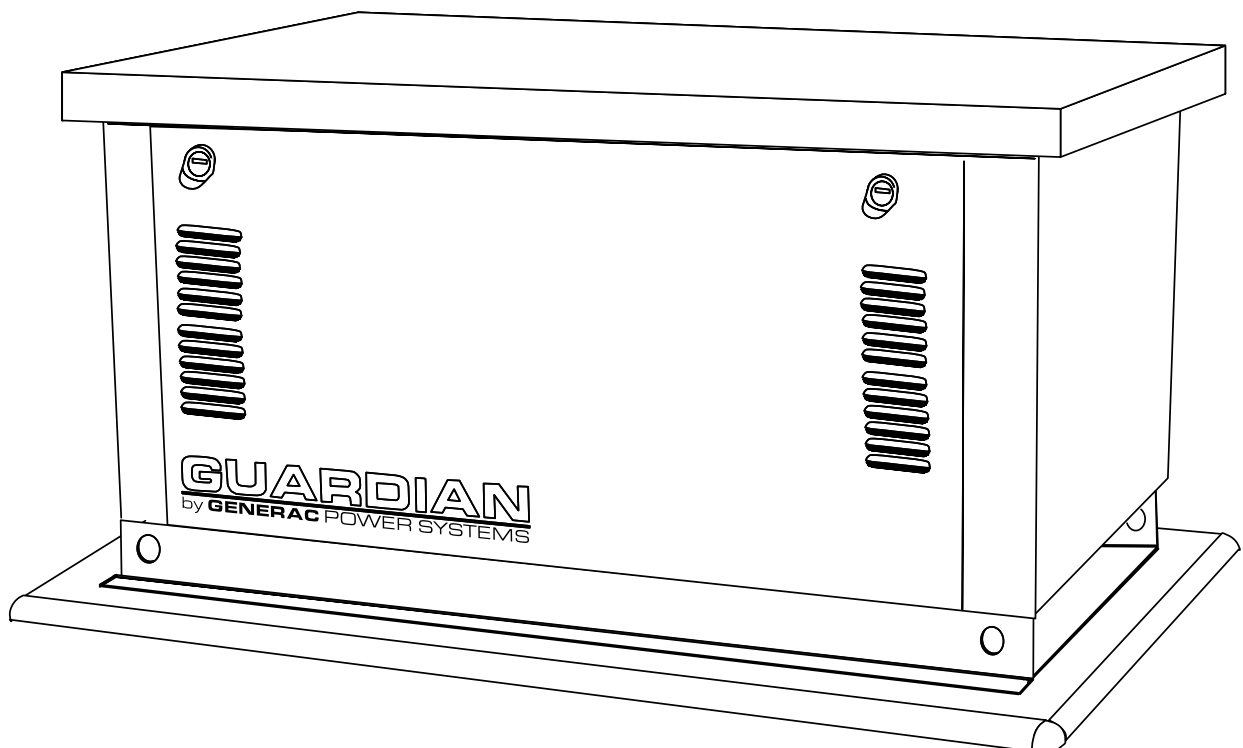
POWER SYSTEMS, INC.

Post Installation Start-up and Adjustment Manual

GUARDIAN[™]
by **GENERAC[®]** POWER SYSTEMS

**Air-cooled, Prepackaged
Standby Generators**

Models:
04109-2 (8 kW)
04079-2 (10 kW)



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1.1 BEFORE INITIAL START-UP

Before starting, complete the following:

1. Set the generator's Auto/Off/Manual switch to the OFF position.
2. Turn OFF the utility power supply to the transfer switch using the means provided (such as the utility main line circuit breaker).
3. Check the engine crankcase oil level and, if necessary, fill to the dipstick FULL mark with the recommended oil. Do not fill above the FULL mark.
4. Check the fuel supply. Gaseous fuel lines must have been properly purged and leak tested in accordance with applicable fuel-gas codes. All fuel shutoff valves in the fuel supply lines must be open.



 Never operate the engine with the oil level below the "Add" mark on the dipstick. Doing this could damage the engine.


1.2 BATTERY INSTALLATION

Fill the battery with the proper electrolyte fluid if necessary and have the battery fully charged before installing it.

Before installing and connecting the battery, complete the following steps:

1. Set the generator's Auto/Off/Manual switch to OFF.
2. Turn off utility power supply to the transfer switch.



 If the Auto/Off/Manual switch is not set to its OFF position, the generator can crank and start as soon as the battery cables are connected. If the utility power supply is not turned off, sparking can occur at the battery posts and cause an explosion.

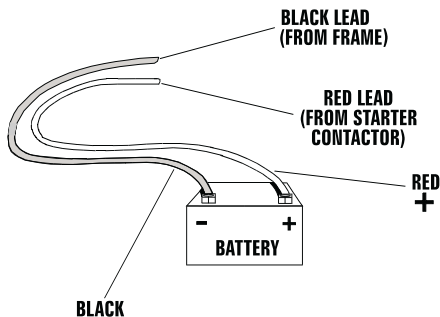
Battery cables were factory connected at the generator (Figure 1.1). Connect cables to battery posts as follows:

1. Connect the red battery cable (from starter contactor) to the battery post indicated by a positive, POS or (+).
2. Connect the black battery cable (from frame ground) to the battery post indicated by a negative, NEG or (—).

NOTE:

Damage will result if battery connections are made in reverse.

Figure 1.1 – Battery Cable Connections

**NOTE:**

With the battery installed and utility power source voltage available to the transfer switch, the battery receives a trickle charge while the engine is not running, to prevent self-discharge. The trickle charge feature cannot be used to recharge a discharged battery.

1.3 CHECK TRANSFER SWITCH OPERATION

Refer to Section 2.5 (Page 9), of the owner's manual for manual operation procedures.

⚠ **WARNING** ⚠

- ⚠ Do not attempt manual transfer switch operation until all power voltage supplies to the transfer switch have been positively turned off. Failure to turn off all power voltage supplies will result in extremely hazardous and possibly fatal electrical shock.

1.4 ELECTRICAL CHECKS

Complete electrical checks as follows:

1. Turn on the utility power supply to the transfer switch using the means provided (such as a utility main line circuit breaker).

⚠ **DANGER** ⚠

- ⚠ The transfer switch is now electrically "hot." Contact with "hot" parts will result in extremely hazardous and possibly fatal electrical shock. Proceed with caution.
2. Use an accurate AC voltmeter to check utility power source voltage across terminals N1 and N2. Nominal line-to-line voltage should be 240 volts AC.
 3. Check utility power source voltage across terminals N1 and the transfer switch neutral lug; then across terminal N2 and neutral. Nominal line-to-neutral voltage should be 120 volts AC.

4. When certain that utility supply voltage is compatible with transfer switch and load circuit ratings, turn OFF the utility power supply to the transfer switch.
5. Set the generator's main circuit breaker to its OFF (or open) position. Initial tests will be conducted at no-load condition.
6. On the generator panel, set the Auto/Off/Manual switch to MANUAL. The engine should crank and start.
7. Let the engine warm up for about five minutes to allow internal temperatures to stabilize. Then, set the generator's main circuit breaker to its ON (or closed) position.

⚠ **DANGER** ⚠

- ⚠ Proceed with caution! Generator power voltage is now supplied to the transfer switch. Contact with live transfer switch parts will result in dangerous and possibly fatal electrical shock.
8. Connect an accurate AC voltmeter and an AC frequency meter across transfer switch terminal lugs E1 and E2. Voltage should be 242-252 volts; frequency should read about 61-63 Hertz.
 9. Connect the AC voltmeter test leads across terminal lug E1 and neutral; then across E2 and neutral. In both cases, voltage reading should be 121-126 volts AC.
 10. Set the generator's main circuit breaker to its OFF (or open) position. Let the engine run at no-load for a few minutes to stabilize internal engine generator temperatures.
 11. Set the generator's Auto/Off/Manual switch to OFF. The engine should shut down.

NOTE:

It is important that you do not proceed until you are certain that generator AC voltage and frequency are correct and within the stated limits. Generally, if both AC frequency and voltage are high or low, the engine governor requires adjustment. If frequency is correct, but voltage is high or low, the generator's voltage regulator requires adjustment.

1.5 GENERATOR TESTS UNDER LOAD

To test the generator set with electrical loads applied, proceed as follows:

1. Set generator's main circuit breaker to its OFF (or open) position.
2. Set the generator's Auto/Off/Manual switch to OFF.
3. Turn OFF the utility power supply to the transfer switch, using the means provided (such as a utility main line circuit breaker).

⚠ WARNING ⚠

⚠ Do not attempt manual transfer switch operation until all power voltage supplies to the transfer switch have been positively turned off. Failure to turn off all power voltage supplies will result in extremely hazardous and possibly fatal electrical shock.

4. Manually set the transfer switch to the STANDBY position, i.e., load terminals connected to the generator's E1/E2 terminals. The transfer switch operating lever should be down.
5. Set the generator's Auto/Off/Manual switch to MANUAL. The engine should crank and start immediately.
6. Let the engine stabilize and warm up for a few minutes.
7. Set the generator's main circuit breaker to its ON (or closed) position. Loads are now powered by the standby generator.
8. Turn ON electrical loads. Apply an electrical load equal to the full rated wattage/ampere capacity of the installed generator.
9. Connect an accurate AC frequency meter across terminal lugs E1 and E2. Voltage should be greater than 230 volts; frequency should be greater than 58 Hertz.
10. Let the generator run at full rated load for 20-30 minutes. Listen for unusual noises, vibration or other indications of abnormal operation. Check for oil leaks, evidence of overheating, etc.
11. When testing under load is complete, turn OFF electrical loads.
12. Set the generator's main circuit breakers to their OFF (or open) positions.
13. Let the engine run at no-load for a few minutes.
14. Set the Auto/Off/Manual switch to OFF. The engine should shut down.

1.6 CHECKING AUTOMATIC OPERATION

To check the system for proper automatic operation, proceed as follows:

1. Check that the Auto/Off/Manual switch is set to OFF.
2. Manually set the transfer switch to the UTILITY position, i.e., load terminals connected to the utility power source side.
3. Turn ON the utility power supply to the transfer switch, using the means provided (such as a utility main line circuit breaker).
4. Set the Auto/Off/Manual switch to AUTO. The system is now ready for automatic operation.
5. Turn OFF the utility power supply to the transfer switch.

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With the Auto/Off/Manual switch at AUTO, the engine should crank and start when the utility source power is turned OFF. After starting, the transfer switch should connect load circuits to the standby side. Let the system go through its entire automatic sequence of operation.

With the generator running and loads powered by generator AC output, turn ON the utility power supply to the transfer switch. The following should occur:

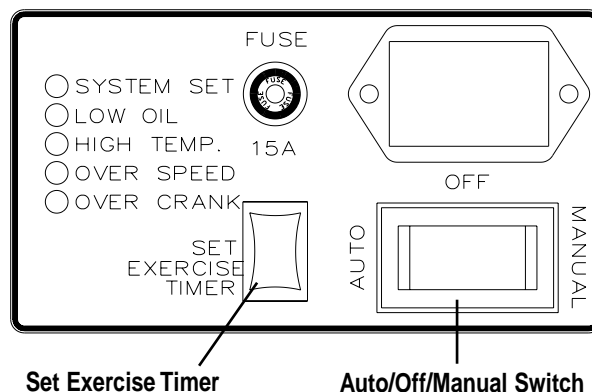
- After about six seconds, the switch should transfer loads back to the utility power source.
- About one minute after retransfer, the engine should shut down.

1.7 SETTING THE EXERCISE TIMER

Your generator is equipped with an exercise timer (Figure 1.2). Once it is set, the generator will start and exercise once every seven days, on the day of the week and at the time of the day that you complete the following sequence. For example, if you want the generator to exercise on sundays at 6:00 PM, you will need to complete the sequence at that exact time.

1. Verify or place the "Auto/Off/Manual" switch in the AUTO position.
2. Hold down the "Set Exercise Timer" switch until the generator starts (approximately 10 seconds) and then release.

Figure 1.2 — Setting the Exercise Timer



3. The generator will start and run for approximately 12 minutes and then shut down automatically. The exerciser is now set to run at the same time and day every week.

NOTE:

The exerciser will only work in the AUTO mode and will not work unless this procedure is performed. The exerciser will need to be reset every time the 12 volt battery is disconnected and then reconnected. The exerciser WILL NOT work if dip switch 2 (Remote Not Auto) is ON.

1.8 ADJUSTING THE LOAD BLOCK


When the natural gas system is being used, the load block is fitted with an adjustment screw that has been calibrated to provide maximum power. However, because of variations in the Btu content of natural gas across the country, it may be necessary to readjust the load block.

- Connect a frequency meter to the output of the generator.
- Start the unit and apply full load according to the following chart:

Unit	120 Volts	240 Volts
8 kW	66.7 amps	33.3 amps
10 kW	83.3 amps	41.6 amps

- Allow the unit to stabilize; then, turn the adjustment screw slowly clockwise or counterclockwise and watch the frequency.
- When the highest frequency is reached, turn the adjustment screw counterclockwise 1/4 turn.
- The fuel system is now set.
- For LP gas operations, the hose and blanking plug must be reconfigured as shown in Figure 1.4, (Page 7) of the owner's manual. The unit is set to provide maximum power using LP gas.

WARNING

-  Do not make any unnecessary adjustments. Factory settings are correct for most applications. However, when making adjustments, be careful to avoid overspeeding the engine.

1.9 ENGINE GOVERNOR ADJUSTMENT

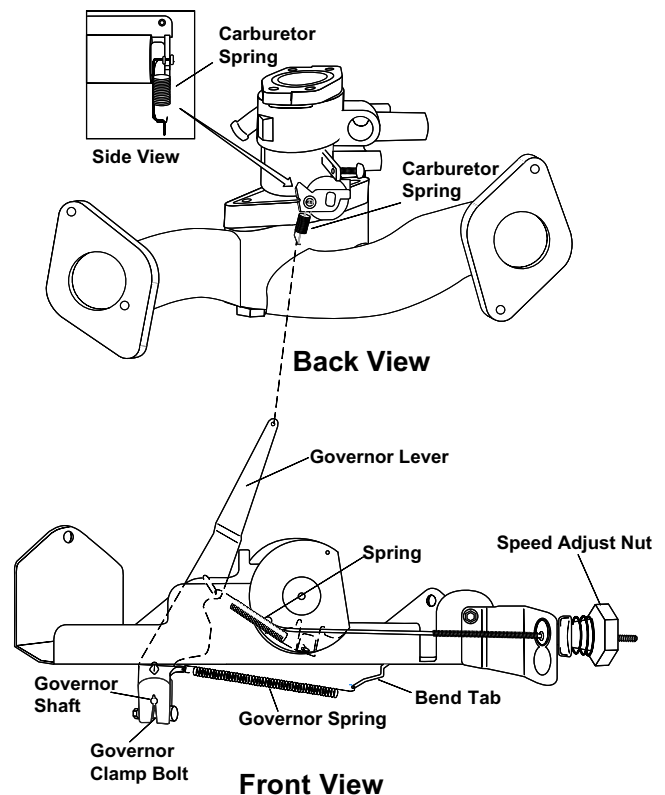
If both AC frequency and voltage are correspondingly high or low, adjust the engine governor as follows:

◆ 1.9.1 8 KW AND 10 KW UNITS

1. Loosen the governor clamp bolt (Figure 1.3).
2. Push the spring end of the governor lever clockwise to the wide open throttle position of the lever.
 - Hold the governor lever at wide open throttle and, with a screwdriver, rotate the governor shaft fully clockwise.
 - Before tightening, verify that the governor lever is pushed all the way onto the governor shaft.
 - While holding the governor shaft fully clockwise and the governor lever at wide open throttle, tighten the governor clamp bolt to 130 inch-pounds (8 N-m).

3. Start the engine; let it stabilize and warm up at no-load.
4. Turn the speed adjust nut to obtain a frequency reading of 62 Hertz.
5. When frequency is correct at no-load, check the AC voltage reading. If voltage is incorrect, the voltage regulator may require adjustment.

Figure 1.3 – 8 kW and 10 kW Engine Governor Adjustment



NOTE:

If the engine continues to run fast, use a pair of pliers to bend the bend tab clockwise to release tension on the lower governor spring.

◆ 1.9.2 ADDITIONAL CORROSION PROTECTION

Periodically spray all engine linkage parts and brackets with corrosion inhibiting spray such as WD-40 or a comparable product.

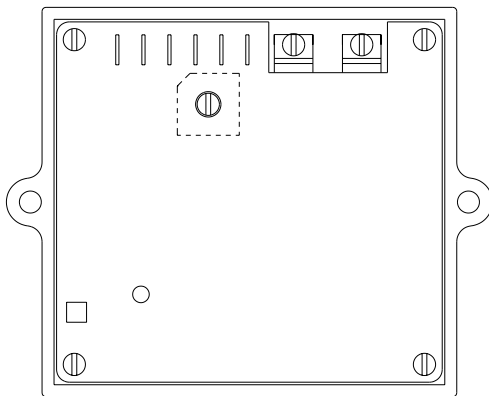
1.10 VOLTAGE REGULATOR ADJUSTMENT

With the frequency between 61-62 Hertz, slowly turn the slotted potentiometer (Figure 1.4) until line voltage reads 244-252 volts.

NOTE:

You must remove the roof to adjust the voltage regulator.

Figure 1.4 – Voltage Adjustment Potentiometer



NOTE:

The voltage regulator is housed in the generator's control panel. The regulator maintains a voltage in direct proportion to frequency at a 2-to-1 ratio. For example, at 62 Hertz, line-to-neutral voltage will be 124 volts.

1.11 ADDITIONAL GENERATOR FEATURES

◆ 1.11.1 8 KW AND 10 KW UNITS

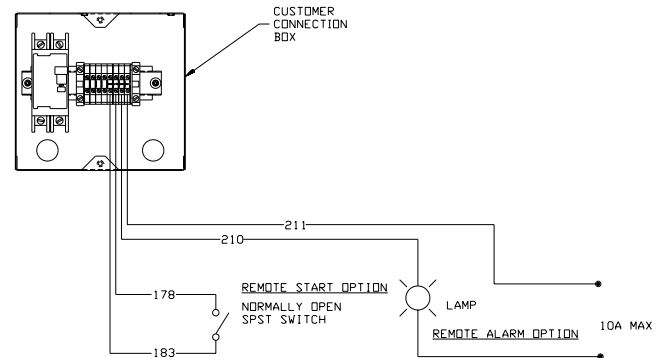
The 8 kW and 10 kW air-cooled Guardians offer additional features that are not factory preset:

1. Remote Start – This allows for remote starting of the generator by means of the #183 (common) and #178 (normally open) lines with the Auto/Off/Manual switch set to AUTO. Closure of the circuit starts the unit; opening of the circuit stops the unit. See Figure 1.5.

NOTE:

This function will work only with the unit in the AUTO mode.

Figure 1.5 – Remote Start/Alarm Options



–Type 14 AWG wire is recommended.

–These options should be wired to the unit by a qualified electrician or Generac/Guardian Authorized Dealer.

2. Remote/Common Alarm – This allows for an alarm, light, horn, etc., to activate when any fault has occurred. Lines #210 (common) and #211 (normally open) provide a “closure” on common fault, which can be used for 120 volts, 10 amps maximum. See Figure 1.5.
3. Remote Not Auto – The generator will not automatically start during a utility failure.

Section 2 – Notes

Guardian Air-cooled Generators

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