GENCONNECT REMOTE MONITOR

Installation Manual

GENconnect Inc.

DANGER	This product is not intended for use in critical applications such as nuclear facilities or life support.
WARNING	This product must be installed by a qualified and trained professional. Please contact GENconnect at **1-437-553-1976** for referral to a qualified dealer in your area.

GENconnect Remote Monitor

NOTES:

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3 OVERVIEW

NOTE: The installation described in this manual is mainly for Generac Residential/Commercial air cooled and basic liquid cooled generators. **Industrial or other two-wire start systems will need a relay kit (optional) or GENconnect can custom configure your generator setup remotely.** See “Alternative Wiring Options” on page 26 for more details.

3.1 SAFETY PRECAUTIONS

The following symbols are used in this document to indicate important safety precautions. Please follow all suggested precautions.

⚠ DANGER	Death or serious injury will occur if this precaution is not followed.
⚠ WARNING	Death or serious injury may occur if this precaution is not followed.
⚠ CAUTION	Minor or moderate injury may occur if this precaution is not followed.

3.2 MONITORING DEVICE PRECAUTIONS

- Do not remove the cover of the monitoring device. There are static-sensitive devices inside which can easily be destroyed.
- Do not allow any of the wires coming from the monitoring device to come into contact with AC line voltages, which would likely destroy the device.
- After clipping any unused wires coming from the monitoring device, ensure that they are secured to prevent any electrical contact with other wires from the monitoring device, or any metal parts or other electrical wiring or connection points.
- All wiring must be routed and secured to prevent movement and to keep away from any hot or moving parts of the generator.
- Ensure that where the cable from the monitoring device passes into the generator housing, it is protected from abrasion. If a hole is drilled, use an appropriately sized rubber grommet in the hole to protect the cable, and keep water out of the generator.
- If possible, ensure that there is a drip loop just before the cable enters the generator, to keep water out of the generator.

- Take care to avoid damaging the gasket between the monitoring device cover and body, to ensure that it remains environmentally sealed.
- Do not over-tighten the monitoring device mounting screws, to avoid cracking the case.
- Do not dispose of a monitoring device in fire. Dispose as hazardous waste according to local regulations.

3.3 Kit Contents

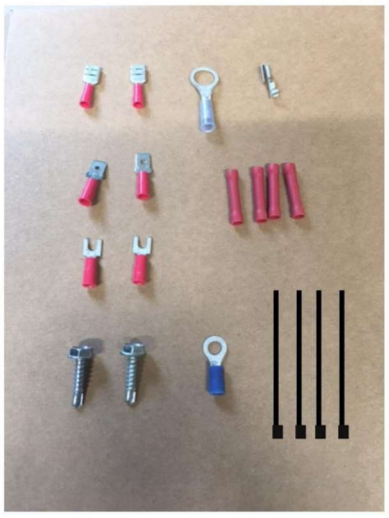
The installation kit contains the following:

- A monitoring device with interface cable
- An inverter (for utility power sensing)
- A bag of small parts, some or all of which may be required, depending on the generator

Figure 1 - Installation kit

Figure 2 - Monitoring device

Figure 3 - Inverter



- Female Quick Disconnect x 2
- Male Quick Disconnect x 2
- Spade Terminals x 2
- Self-tapping screws x 2
- Large Ring Terminal x1
- Double Male/Female Quick Connect x 1
- Butt end connectors x 4
- Small Ring Terminal x 1
- Cable zip ties x 4

Figure 4 - Small parts bag

3.4 How it Works

The monitoring device uses a cellular data connection to send information about the generator to a backend system "in the cloud", where the data is processed and stored. From there, notifications about important events (such as utility power on/off, generator started/stopped, generator fault, and so on) are sent via email to both the generator owner and the generator's servicing dealer.

The status of the generator can also be checked using a web app that can be viewed on any smartphone, tablet, or computer.

To obtain the necessary data from the generator, the monitoring device requires three sensor connections:

- Common Fault (see on page 16)
- Utility Power (see on page 17)
- Generator Running (see on page 19)

For power, the monitoring device is connected to 12VDC power inside the generator (see section 4.4.5 on page 20). The monitoring device also contains its own backup battery, so it can continue to report for quite some time even when the generator battery is very discharged or dead.

3.5 One-Time Preparations

You will need to do the following steps only once, after which you can install any number of remote monitoring devices.

☐ **Obtain a user account.** Either GENconnect or your dealership will provide you with a user id and password, which you will use to log in to the app.

TIP: As long as you have cookies enabled, your user id and password will be remembered on each of your devices for easy login. However, you can log out of the application if necessary using the menu in the upper right corner.

☐ **Bookmark the app.** On your smartphone or other device that you will have with you during monitoring device installations, browse to genconnect.ca, then click on the "Login" link. Login with your user account, then create a bookmark in your browser so you can easily return to it.

TIP: You can use your browser's "add to home screen" feature to add a home screen icon for one-click access to the app.

TIP: You can click icon in the app and enter a monitoring device's ESN to quickly find it. Note that new devices may be found under Inventory, while devices that were previously installed will be found under Home.

☐ **Cellular reception.** The monitoring device reports the cellular signal strength that it is receiving, and this value is available in the app. However, it can only do this if it has a good enough signal.

For this reason, it is advisable that you have a cellphone that is on the same network as the monitoring device. [In Canada, this is the Bell and Telus network, In the US it is AT&T and T-Mobile]

If you haven't already, you should get familiar with how many 'bars' represent a good signal on *your* phone, so that you can use it to check the signal at the installation site to determine the best place to install the monitoring device.

TIP: There are cell tower locator apps available in the app stores, and many websites that show cell tower locations. These can be helpful in determining the direction where you will find the best signal for a given generator location.

The monitoring device reports the signal strength as "RSSI" (Received Signal Strength Indicator). This is always a negative number, where closer to zero means a stronger signal. The following table gives a guideline for interpreting RSSI values.

RSSI	Signal Strength
Greater than -70	Excellent
-70 to -85	Good
-86 to -100	Fair
-101 to -110	Poor
Less than -110	Very Bad or No Signal

3.6 Tools Needed

Ensure you have the following items with you for installation.

- multimeter or probe
- crimper
- side cutter
- 10mm socket and ratchet
- Allen keys
- impact driver
- drill

4 INSTALLATION

⚠WARNING	Make the generator safe by removing the fuse from the battery charger in the control panel, and disconnecting the battery.
⚠CAUTION	If the generator was run prior to installing the monitoring device, allow time for it to cool before proceeding.

4.1 PREPARATION

NOTE: Steps 1-6 should be done before going to the installation site.

☐ **Step 1:** Confirm the site location has cellular coverage using the Network Coverage map website link under www.genconnect.ca → Dealer Tools

☐ **Step 2:** Make note of the **ESN** number on the back of the monitoring device. This will not be possible after it is mounted. You will need the ESN to locate the device in the app, and also later for sending generator parameters to your office (see The Paperwork, on page 22).

☐ **Step 3:** Contact your office with the ESN so that they can Activate the monitoring device's cellular data. You should do this as much in advance of the actual installation as possible.

☐ **Step 4:** Charge the monitoring device with a 12VDC source (for example, hookup to a spare genset battery). Be sure to connect the **black** wire to the **negative** terminal and the **red** wire to the **positive** terminal. Do this where there is a good cellular signal.

☐ **Step 5:** The monitoring device will connect to the cellular network (the orange LED will blink until it is connected, then will go solid). The device will perform a firmware update, if necessary. This will cause a reboot, and a re-connection to the cellular network. When the orange light has stopped blinking and is solid, the monitoring device is ready to install.

☐ **Step 6:** At the generator site, you will need to find the best location for mounting the monitoring device, which is where the cellular signal is most consistently strong.

As a first rough estimate, you can use your cell phone to see where you get the most "bars". On most phones, getting two bars is about the minimum for a good signal.

However, to find exactly where to mount the monitoring device, you will need to power it up and see whether it can connect to the cellular network, and what its reported RSSI is. If you previously charged the device, it should be powered up already. If not, you can temporarily connect the monitoring device to a 12VDC source, such as the generator battery or one you have with you.

Open the app on your smartphone and locate the monitoring device. If it shows "no" for Device Reporting, that means the signal isn't good enough – the orange LED will probably also be blinking. In this case, try another location. The best location is a line-of-sight to the nearest cell

tower, avoiding obstructions like buildings and trees. Even just moving the device to the other side of the generator can improve the reception.

Once the app shows “yes” for Device Reporting, you can see what the RSSI is at the device itself. If you change the location of the device, you will need to generate an ‘event’ so that the device reports its new RSSI to the backend. The easiest way to do this is to touch the **Black wire** to the **Orange wire** to create a ‘fault’.

Move the monitoring device into the best position to get a minimum "fair" reading (RSSI of -100 or better.)

If you cannot get a strong enough signal, use a junction box and 5-wire cable and raise the monitoring device to a position that receives a better signal.

When you have a good signal, move on to the next steps.

4.2 Mounting the Monitoring Device

Mount the monitor to either the side of the generator or to a wall, depending on where the best signal strength was found.

For mounting to the generator, the self-tapping screws in the kit may be used.

For mounting to other surfaces, such as wood, concrete, or brick, use an appropriate screw and/or anchor for the surface material.

NOTE: For mounting on newer Generac generators you will have to remove the side panel first.

Figure 5 - Monitoring device mounted on generator

4.3 ROUTING THE CABLE

☐ **Step 1:** Cut wire to length leaving enough to reach the starter from where the monitor is mounted.

☐ **Step 2:** Strip back the outer shielding so 6 inches of shielding remains inside the generator.

Figure 6 - Cable shielding stripped back 6"

☐ **Step 3:** Separate the wires:

- Black (ground)
- Red (positive power, 12 VDC)
- White (engine running)
- Blue (utility power)
- Orange (common fault)

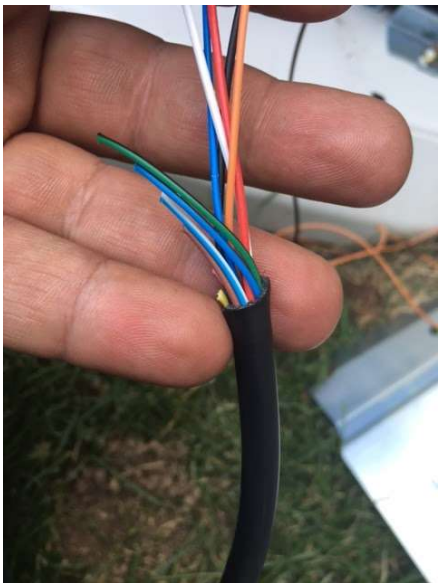


Figure 7 - Unused wires clipped

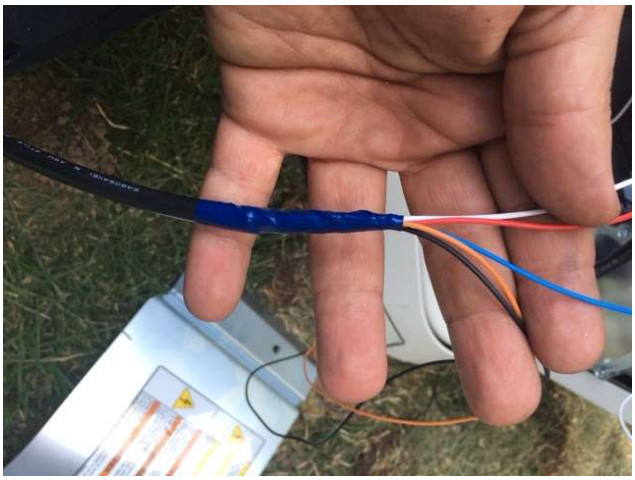


Figure 8 - Five wires: two for power, three for sensors

☐ **Step 4:** The remaining wires are not required for this application and can be removed or coiled up with a zip tie (not included).

☐ **Step 5:** Run the cable through either the intake vents or drill an entry hole in the panel. Use a rubber grommet, not included, to protect the cable from rubbing on the edge of the cut hole.

⚠ **CAUTION**	Check inside the generator panel where you intend to drill the hole, to ensure that the drill bit will not come into contact with any internal wiring or parts.

☐ **Step 6:** Reattach in-line fuse on the inside of the generator using butt connectors, included.

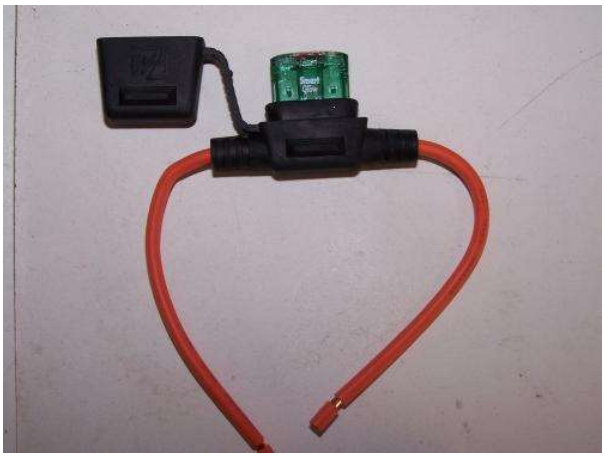


Figure 9 - Inline fuse holder

4.4 CONNECTIONS

4.4.1 Wiring Diagram

The final wiring is as shown in the following diagram. Detailed steps are given in the following sections.

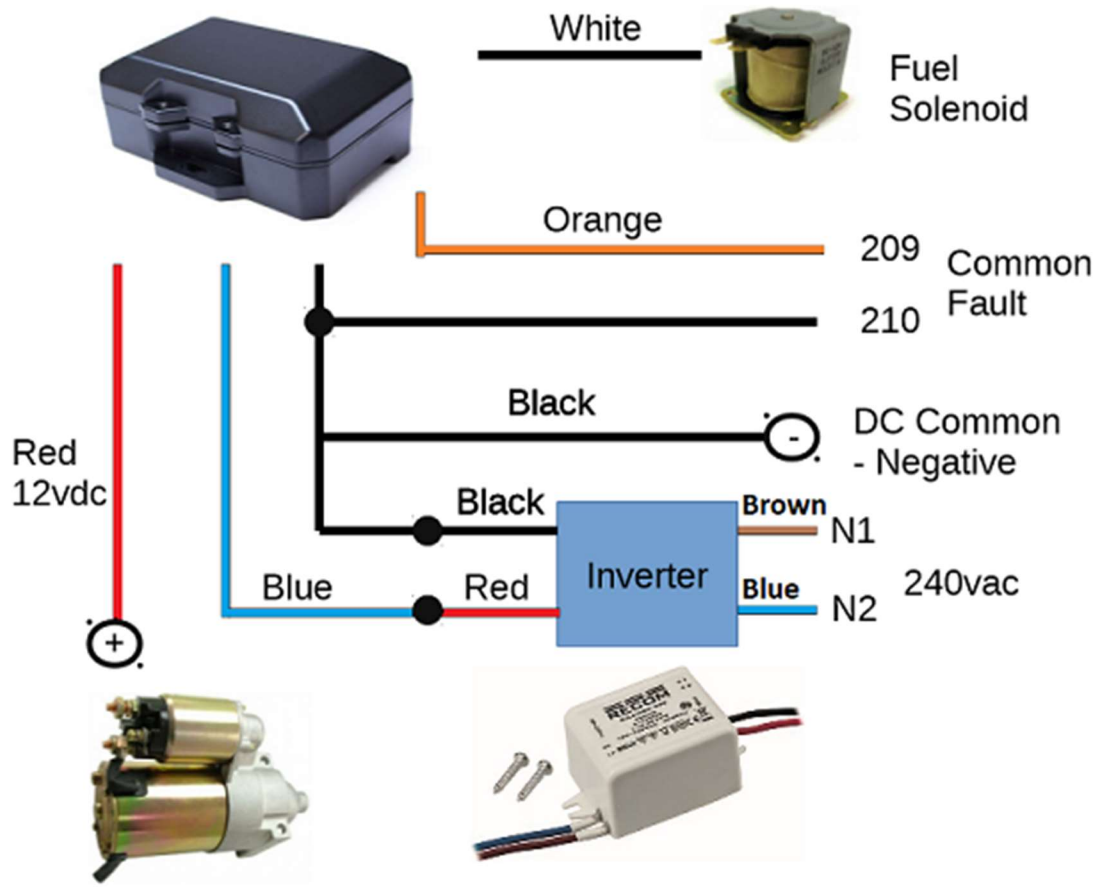
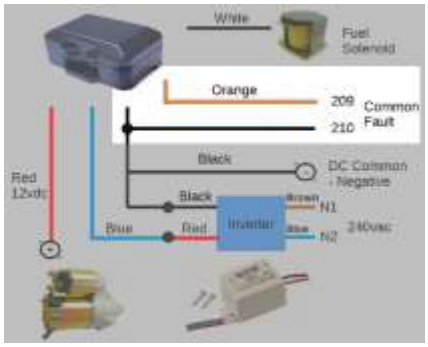


Figure 10 - Final wiring

4.4.2 Common Fault



☐ **Step 1:** Locate connectors/terminal blocks for common fault. (for Generac: 209 and 210)

☐ **Step 2:** Remove 6 inches of wire from the end of the **black wire** and bridge **210** to **DC common**.

☐ **Step 3:** Connect the **orange wire** to **209**.

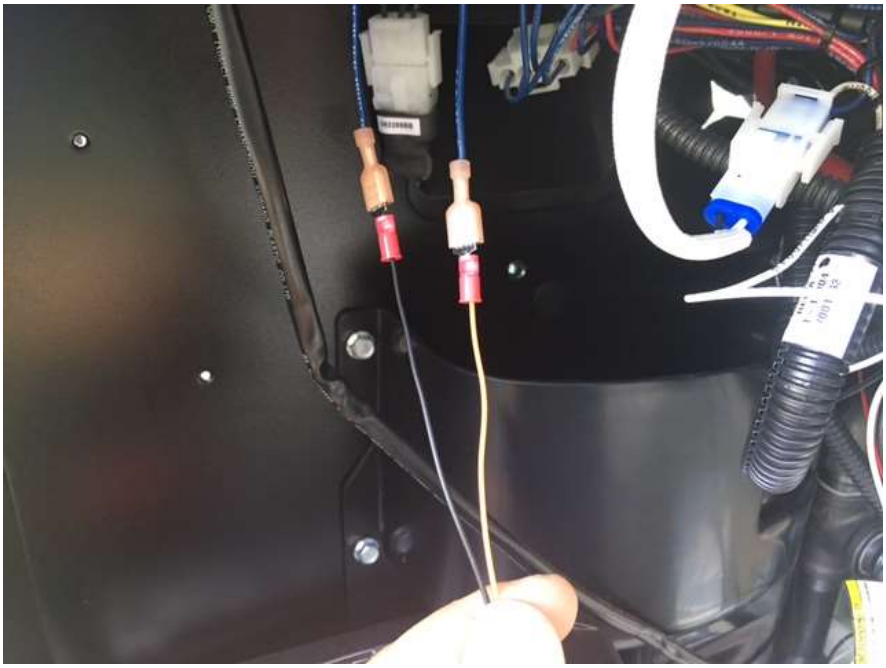
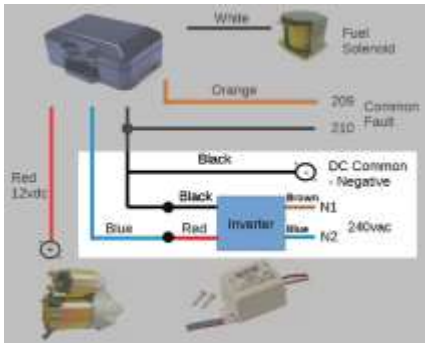


Figure 11 - Common fault connections

4.4.3 Utility Power

⚠WARNING	For safety, turn off the generator and turn off the main disconnect breaker on the transfer switch.



☐ **Step 1:** Connect the remote monitor **blue wire** to the **red wire** on the inverter with a butt connector.

☐ **Step 2:** Connect the **black wire** on the inverter to **DC common**.

Figure 12 - Utility power inverter

☐ **Step 3:** Connect the **brown wire** from the inverter to **N1.**

☐ **Step 4:** Connect the **blue wire** from the inverter to **N2**.

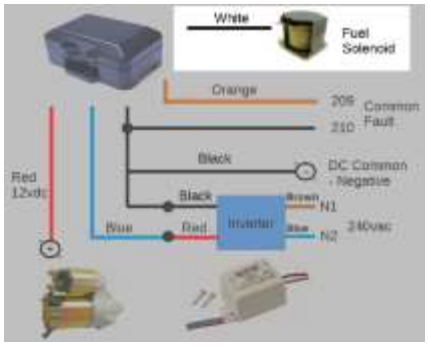
NOTE: On newer Generac models you may need to remove the N1/N2 terminal block with an Allen key.

Figure 13 - Inverter connections

☐ **Step 5:** Secure the inverter using a zip tie, as shown below.

Figure 14 - Inverter secured with zip tie

4.4.4 Generator Running



☐ **Step 1:** Identify the fuel solenoid positive (12V) side.

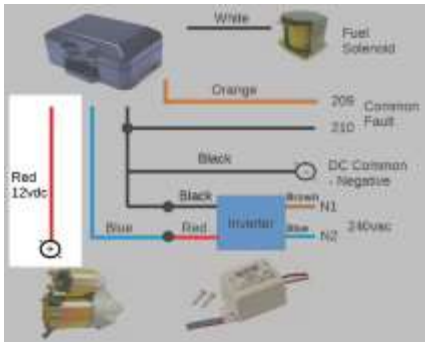
NOTE: ALWAYS verify the correct side with a multimeter or probe.

☐ **Step 2:** Using a double spade connector (included) connect the **white wire** to the fuel solenoid positive (12V) side.

Figure 15 - Double spade connector

Figure 16 - Generator running connected to fuel solenoid

4.4.5 Monitoring device Power



☐ **Step 1:** Pull the **red wire** from the monitoring device through the firewall and attach a ring connector.

☐ **Step 2:** Attach the ring connector to the starter where there is a constant 12VDC.

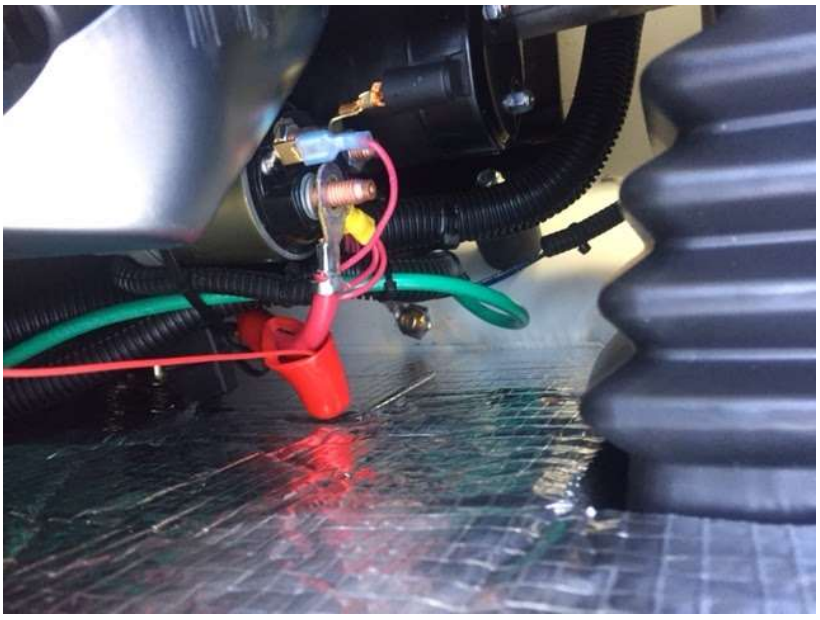


Figure 17 - Monitoring device positive power connected to starter

☐ **Step 3:** Connect the **black wire** from the monitoring device to **DC common**.

4.5 Final Steps

☐ **Step 1:** Reconnect the battery terminals.
☐ **Step 2:** Replace the fuses in the control panel.
☐ **Step 3:** Turn on the transfer switch.

You are now ready to move on to the Functional Test.

NOTE: Don't close up the generator at this time. You will need access to the interior in the next steps.

5 FUNCTIONAL TEST

Perform the following tests, and use the app to check whether the reported condition is correct. Except as noted, the condition shown in the app should update in just a few seconds after the event.

#	Test	Expected Condition in the App
Device Reporting must be "yes" in order to proceed with the remainder of the tests		
1	Run the generator engine.	**Generator** shows "running"
2	Short out the oil pressure switch while the generator is running, to cause a fault.	**Fault** shows "yes"
3	Clear the fault on the control board.	**Fault** shows "no"
4	Stop the generator engine.	**Generator** shows "off"
5	With the generator off, turn off the utility disconnect.	**Utility** will show "off".
6	Wait 3 min, With the generator off, and the utility disconnect.	**Load Side** shows "off".
7	With the generator off, turn on utility disconnect.	**Utility & Load Side** shows "on"
8	Measure the voltage of the generator battery.	Battery Voltage should show a value reasonably close to the measured value.

See General on page 24 if any of the above tests fail.

When the above tests have been completed successfully, you are ready to move on to The Paperwork.

NOTE: Don't close up the generator at this time. You will need access to the control panel in the next steps.

6 THE PAPERWORK

Before closing up the generator, read and record the generator **engine runtime hours** from the control panel.

Next, determine the **exercise interval** for the generator (weekly, biweekly, monthly, or disabled), in accordance with your dealership's policies, the manufacturer's recommendations, and the owner's preferences. If this is not already set in the generator, enter it now.

You can now close up the generator.

Next, determine the **oil change interval**. Suggested intervals are as follows:

- for **Air-cooled** generators: **72 hours**
- for **Liquid Cooled** generators: **100 hours**
- for **Diesel** generators: **400 hours**

Send the following information for this generator to your office and they will configure the settings for the generator in the app.

- **ESN**
- **Engine runtime hours**
- **Exercise interval**
- **Oil change interval**

7 TROUBLESHOOTING

TECH SUPPORT

If you can't resolve an issue using the tips below, call GENconnect Tech Support at:

1-437-553-1976

7.1 FREQUENTLY ASKED QUESTIONS

Where is the "common fault" hooked up on a Generac Generator?

- Read Generac generator manual for location of 209 and 210.
- There is no common fault output on 2008 models and earlier.

Where is the red wire on the inverter hooked up to?

- The wiring diagram shows it connected via the butt end connector to the blue wire.

Where do you hook "common fault" on Hpanel?

- Program aux 1 to common fault,
  or:
- Hook to the buzzer with and use App wiring (see on page 26).

How to hook up a 2-wire start system?

- Contact Tech Support.

Why doesn't RSSI change?

- You have to create an event. For example: touch the orange wire to the black wire to cause a "fault".

7.2 GENERAL TROUBLESHOOTING

7.2.1 No lights on monitoring device (no power)

- Test for 12VDC after fuse.
- Trace black wire with multimeter, put red probe to battery terminal.
- Double check black wire “bridge” to DC common.

STOP HERE IF THE MONITORING DEVICE HAS NO POWER!

There is no point checking any of the following conditions until the device is receiving power.

7.2.2 Device not reporting

- Confirm that the monitoring device has been Activated by your office.
- If checking from your phone, ensure that mobile data is enabled on your phone, and do an Internet speed test such as http://speedtest.googlefiber.net.
- Confirm 1-2 bars on a Bell cell phone near the monitoring device. If less than that, move the monitoring device to a spot that has better reception, using a junction box if necessary to extend the cable.
- Call Tech Support if you have reception on your cell phone, and cannot get Device Reporting.

STOP HERE IF THE MONITORING DEVICE IS NOT REPORTING!

There is no point checking any of the following conditions until the device is reporting (Device Reporting = “yes” in the app).

7.2.3 No “generator running" signal

- Check to see if the white wire is hooked to the 12VDC side of the fuel solenoid (polarity sensitive).
- Check with probe or multimeter that there is voltage present when the generator is actually running.
- If using alternative wiring, confirm variant configuration with your office.

7.2.4 Utility always off

- Common mistake is accidental wiring of blue with black strip, vs Blue wire
- Check the inverter output for approximately 12VDC when the utility power is on, and zero volts when it is off.
- If using alternative wiring, confirm variant configuration with your office.

7.2.5 Fault does not work

- Confirm generator common fault connection and other side is grounded.
- Confirm dry contact open/close.
- If using alternative wiring, confirm variant configuration with your office.
- If the fault signal is active **HIGH**, may need to change Wiring in App.

7.2.6 "Failed to Exercise" notifications not received

- Confirm that generator is set for weekly, biweekly, or monthly exercise.
- Call Tech Support to confirm exercise interval settings in app.

7.2.7 Battery Voltage absent or showing zero in the app

- Test for 12vdc after fuse.

7.2.8 No "next service" date

- Call Tech Support

8 ALTERNATIVE WIRING OPTIONS IN APP

8.1 WIRING VARIANTS

The monitoring device comes set up for Variant 2, which is wired as described in this document.

Other wiring variants may be configured in the App, however, if needed you can ***contact GENconnect to recommend a variant specific to your GenSet.***

As shown in the table below, the four variants are all the combinations of the Utility Power and Fault lines being either active **HIGH** (12/24VDC) or **LOW** (DC Common). (In all variants, Generator Running is active **HIGH**.)

Note that **'active'** refers to the active state of the signal:

- for Generator Running, active means that the generator is **RUNNING**
- for Utility Power, active means that the utility power is **ON**
- for Fault, active means that there **IS** a fault

Variant	**Generator Running** (White Wire)	**Utility Power** (Blue Wire)	**Fault** (Orange Wire)
2	active **HIGH**	active **HIGH**	active **LOW**
3	active **HIGH**	active **HIGH**	active **HIGH**
4	active **HIGH**	active **LOW**	active **LOW**
5	active **HIGH**	active **LOW**	active **HIGH**

For **all** variants:

- Black wire goes to DC Common
- Red wire goes to +12/24 VDC