MUST BE INSTALLED BY A LICENSED ELECTRICIAN!

Panel Guardian -2 Installation Manual

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Description

The Panel Guardian provides 24/7 monitoring of electrical panels by tracking temperature differences between the panel interior and ambient room temperature, as well as current imbalances between incoming power wires. A higher panel temperature indicates potential issues like faulty breakers or loose connections, while current differences signal ground leaks or wiring faults. These metrics generate an Alert Factor score from 0 to 4 for quick status assessment.

Real-time data displays on a user-friendly local interface, with live and historical views accessible via a compatible iOS/Android mobile app in monitored mode. Weekly Email reports detail panel health, and users can easily manage multiple panels. The system supports Wi-Fi connectivity for seamless remote monitoring.

Alarm Systems

Panel Guardian offers two flexible alarm options.

Hardwired system: activates relay contacts to integrate with existing farm controllers, barn monitors, or security systems, triggering notifications through those platforms.

Monitored system: sends direct text or email alerts to mobile devices upon detecting unsafe conditions.

One or Both options can be used.

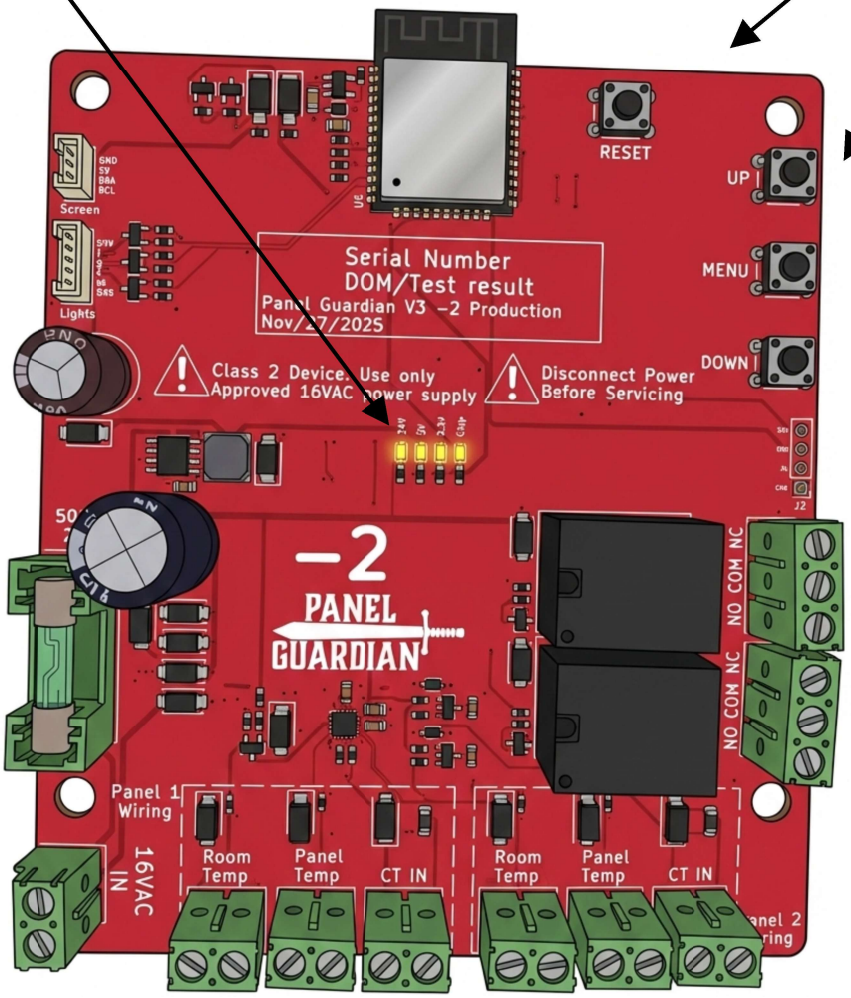
Both options enable prompt action, such as calling an electrician, to prevent escalation to fires or equipment failure. Alerts focus on early detection, protecting investments in agricultural or industrial settings.

Status LED's
LED's for troubleshooting

See page 15

Buttons
Up, Menu, Down & Reset Buttons
See page 9

Fig 1, Board layout



500 mA Fuse
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16 VAC IN
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Current & Temp Alarm Contacts
NO/NC contacts for hardwired alarm

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Room & Panel Probe Inputs
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Room & Panel Probe Inputs
Temp probe input Panel 2

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Current Transformer In
Input from CT Panel 2

See page 5

16 VAC Transformer Wiring

Install the supplied Class 2 16 VAC transformer in an electrical box according to local electrical regulations.
For troubleshooting we recommed wiring the transformer on its own 120V 15 Amp circuit breaker
Wire the 16 VAC transformer output to the 16 VAC input of the Panel Guardian. **We recommend 18-22 AWG.** *(see Fig 1 page 2 for location)*

Fig 2, 16VAC Transformer

DANGER: High Voltage Hazard
Electrical panels contain lethal voltages that can cause severe injury or death.
De-energize the panel and verify zero voltage before touching any conductors.

WARNING: Risk of Fire or Shock

Improper wiring, loose connections, or use of oversized breakers can lead to overheating, fire, or equipment damage. Never bypass fuses or Circuit Breakers.

Fuse

The Panel Guardian Has a 500mA Fuse for Board protection, this is a standard **250V 0.5A 5x20mm** glass fuse
(see Fig 1 page 2 for location)

WARNING: Live Voltage Hazard

Disconnect power before servicing Panel Guardian!

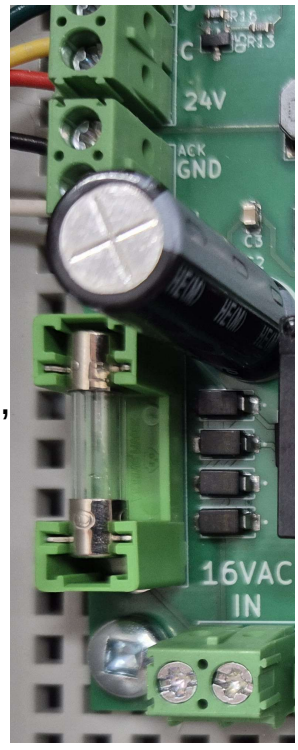


Fig 3, Fuse

Alarm Contacts Wiring

The Panel Guardian has 2 Alarm relays. These both have NO/NC positions.
Temp alarm Relay: Activates when the Panel Guardian detects a temperature (High Temp diff, Low Temp, High Temp) anomaly
Current alarm Relay: Activates when the Panel Guardian detects a current anomaly
(see Fig 1 page 2 for locations)

These Contacts Should be wired directly to your farm security system, Barn Controller or any other system that can immediately alert you.

We Recommend wiring both contacts to your alarm system, regardless of having the Monitored system enabled

Contacts maximum rating:
(resistive load)
switched power 280 W or 277 VA
switched current 15 A (AC), 10 A (DC)
switched voltage 30 VDC or 277 VAC

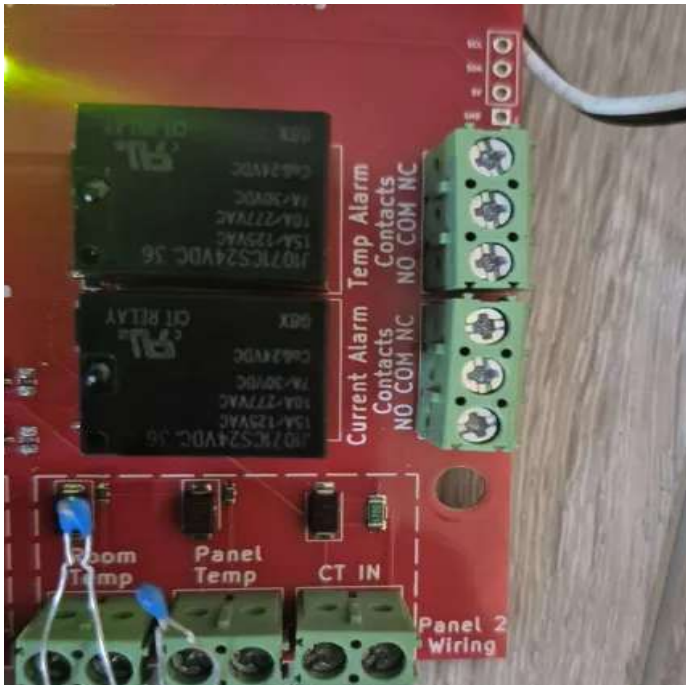


Fig 4, Relay Contacts

Current Transformer Wiring

The Panel Guardian uses a Current transformer for detecting current leakage to ground. On the -2 unit there is 2 CT connections, One for each panel

Installation steps:

1. Shut Off all power to the Panel

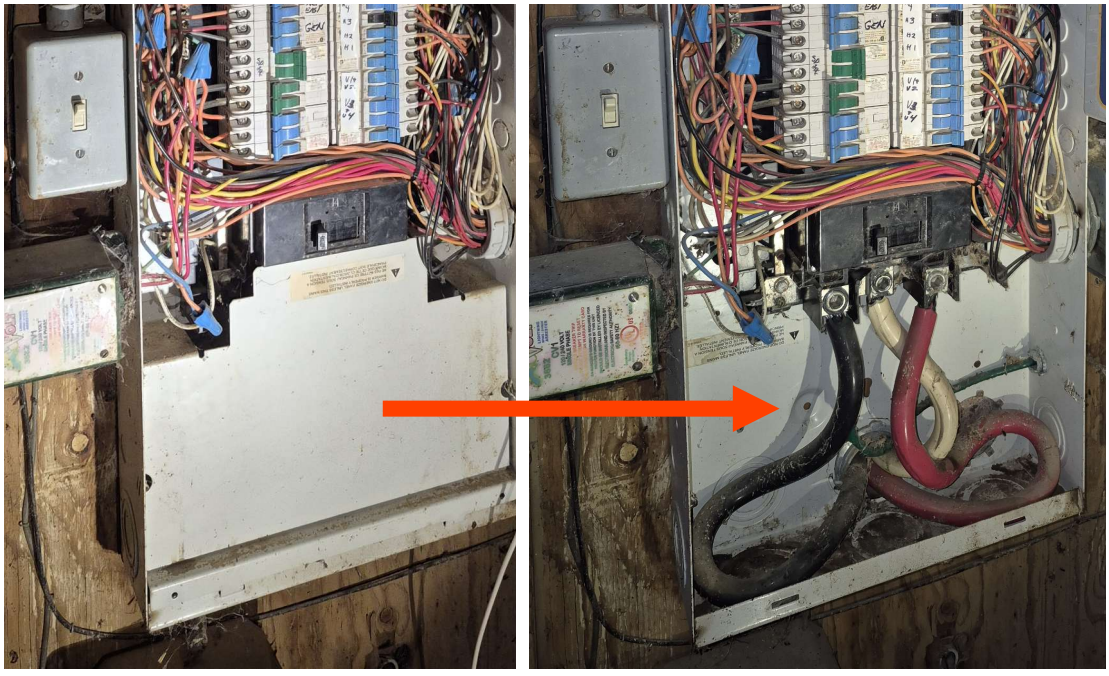
Shut off power before the main breaker, this typically is a disconnect or other Breaker panel

DANGER: High Voltage Hazard

Electrical panels and transformers contain lethal voltages that can cause severe injury or death. De-energize the panel and verify zero voltage before touching any conductors.

2. Open up the Breaker Panel, and get right to the main breaker wires

Typically, panels will have a main breaker shield after removing the front cover, remove this as well to get right to the Main wires



Current Transformer Wiring

Continued from page 4

3. Wire CT to Panel Guardian and Open CT

Wire the terminals on the CT to the CT In Terminals on the Panel Guardian, Use 18-22 AWG
(see Fig 1 page 2 for location)

Open CT by loosening the bolts on either end of the CT

Fig 5, Open CT

Fig 6, CT Terminals

4. Place CT around Main wires

Place the CT around main power wires (L1, L2 and Neutral)
NOT the ground wire.
We recommend you fasten the CT to the panel

5. Close up and apply power to the Panel

Note: you will want to read the Temp probe wiring section before doing this!
Repeat on Panel 2

Temp Probes Wiring

The Panel Guardian uses 2 temperature probes monitor temp difference, the -2 Unit has 4 connections for temp probes, 2 for each Panel
Installation steps:

1. Shut Off all power to the Panel

Shut off power before the main breaker, this typically is a disconnect or other Breaker panel

DANGER: High Voltage Hazard

Electrical panels and transformers contain lethal voltages that can cause severe injury or death. De-energize the panel and verify zero voltage before touching any conductors.

2. Open up the Breaker Panel

Panel Probe:
After the lid is removed, find the highest inside face on your panel and attach the Magnet equipped probe to that face (see Fig 7 page 8) and run the wire back to the Panel Guardian and Connect to the Panel Temp terminal (see Fig 1 page 2 for location)

Room Probe:
Mount the Room temp probe at least 5 cm (2”) away from the outside the Panel in a open location to detect room temp,
Alternatively, if the Breaker Panel and Panel Guardian are in the same room and less than 1.5 m (5’) apart, the Room probe can be installed just outside the Panel Guardian (Fig 8)
Run the wire back to the Panel Guardian and Connect to the Room Temp Terminal (see Fig 1 page 2 for location)

Ensure all crossings with High Voltage wires are at 90 degrees!

Temp Probes Wiring

Continued from page 7

3. Close up and apply power to the Panel

Note: you will want to read the Current Transformer wiring section before doing this! ***Repeat for Panel 2***

Fig 7, Panel Temp probe on highest breaker panel face

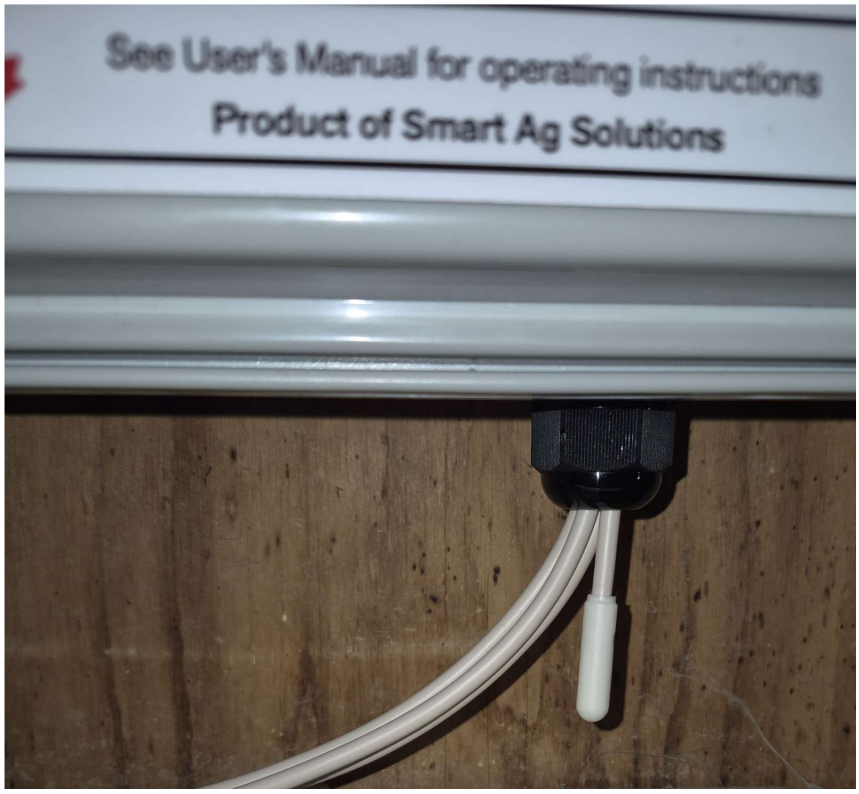


Fig 8, Room Temp probe just outside of Panel Guardian

First Power Up

After all the wiring is completed, you are ready for power up.
Shut off all Breakers except the main on the breaker panel
Turn on the Breaker for the Panel Guardian's 16VAC transformer.
The screen should come on and display data. The current diff should be zero or very close, and the temperatures should be fairly close to ambient temp

If nothing or strange symptoms occur, check the troubleshooting guide on page 15

Parameter Adjustment

The Panel Guardian has several adjustable Parameters to optimize for your specific setup.

To Adjust Parameters, simply press and hold the menu button until a message appears that you have entered system setup
Press up or down to adjust parameter value, and menu to go to the next parameter

To Exit, simply wait 10 seconds

Parameter 1:
SYSTEM INFO (no editable info)
Software Version: Vx.x.xx
Serial Number Panel 1: xxxxxx
Serial Number Panel 2: xxxxxx

Parameter Adjustment

Continued from page 9

Parameter 2:
C or F temp unit *(Celsius "C" Fahrenheit "F")*
Range: C/F
Default: C
Recommend: _
Increment _

Parameter 3:
Max Current Diff *(Above this value is a alert factor 4 and a alarm)*
Range: 100-950 mA
Default: 750
Recommend: 450
Increment 50 mA

Parameter 4:
Max Temp Diff: *(if the Panel temp – Room temp is above this value is a alert factor 4 and a alarm)*
Range: 5-15 C
Default: 10
Recommend: 10
Increment 1 C

Parameter 5: *(if either probe goes over this value it is a alarm)*
Max Temp Alert
Range: 30-50 C
Default: 40
Recommend: 35
Increment 1 C

Parameter 6: *(if either probe goes under this value it is a alarm)*
Min Temp Alert
Range: -15-5 C
Default: 5
Recommend: 5
Increment 1 C

Parameter Adjustment

Continued from page 10

Parameter 7:
WiFi Enabled *(See the WiFi setup section on page 12)*
Range: YES/NO
Default: NO
Recommend: _
Increment _

Parameter 8:
WiFi Run Setup *(See the WiFi setup section on page 12)*
Range: YES/NO
Default: NO
Recommend: _
Increment _

Parameter 9:
Relay Off Delay *(after alarm goes away, how many seconds the relays stay on for before going back to normal state)*
Range: 1-35 seconds
Default: 5
Recommend: 5
Increment 1 second

Parameter 10: *(after the current goes over the Max current Diff parameter, how many seconds until alarm)*
Over Current Alarm Delay
Range: 0-5 seconds
Default: 5
Recommend: 5
Increment 1 second

It is only recommended to decrease this parameter when you are trying to catch extremely short duration anomalies

WiFi Setup

How to connect the Panel Guardian to WiFi

Connection steps:

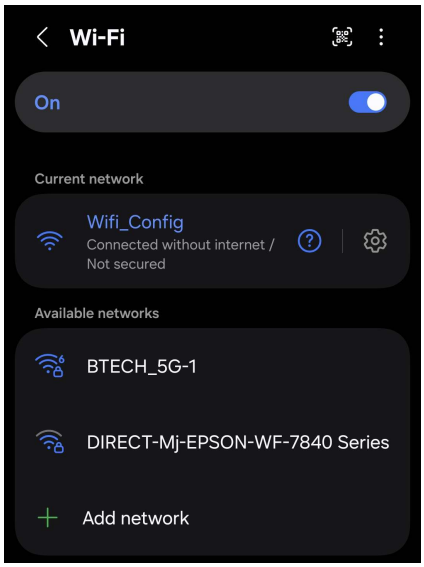
1. Enter the Menu

Enter the Menu (See parameter adjustment on page 9) and navigate to the WiFi enabled parameter. Change it to Yes

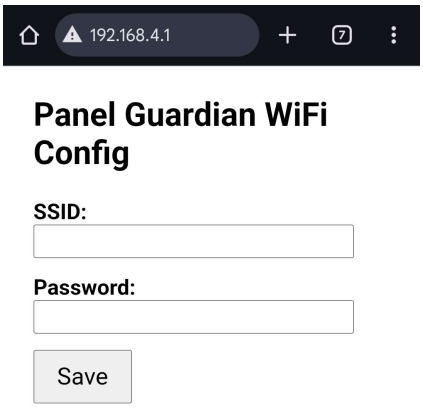
Next, continue to the next parameter (Run WiFi Setup) and change it to to Yes as well.

Wait 10 seconds to exit the menu, and the Panel Guardian will restart

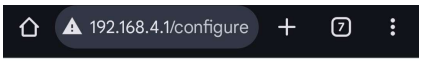
2. Connect to the Panel Guardian



1. On your Smartphone, go to the WiFi connections in settings and you should see a network called Wifi_Config, connect to this network. *Note: there will be no internet on the network!*



2. On your Smartphone, Open a web browser and type **192.168.4.1** you should see a page like this *if you don't, confirm that you are connected to the Wifi_Config network.* Enter your WiFi Network name into the **SSID** field and your network password to the **Password** field and press **Save**



3. After pressing Save, you will see a screen like this, the Panel Guardian will try to connect to the network you entered. *If it does not connect, check that your WiFi Has good signal where the Panel Guardian is, or Reenter your Network information*

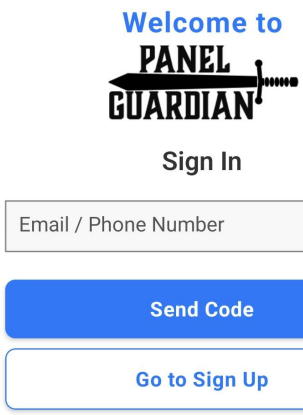
App Setup

App Connection steps:

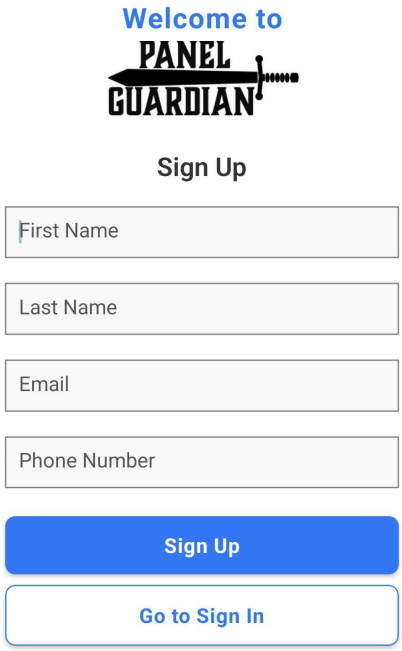
1. Download the App

Available on both the Apple App and
Google Play Store, search Panel Guardian and Install

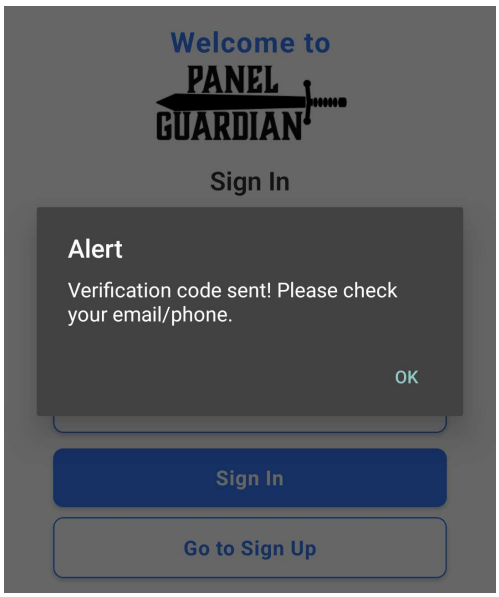
2. Sign up, and create an account, and Log In



*1. After downloading the app, you will see this screen, if you have a account sign in, if not, create one! Press **Go to Sign Up** to start*



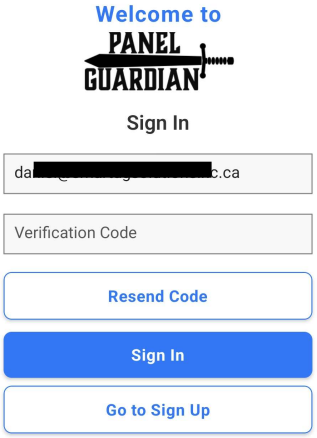
*2. Enter your information into all the Fields, then press **Sign Up***



*3. Next, enter your email/phone number and press **Send Code***

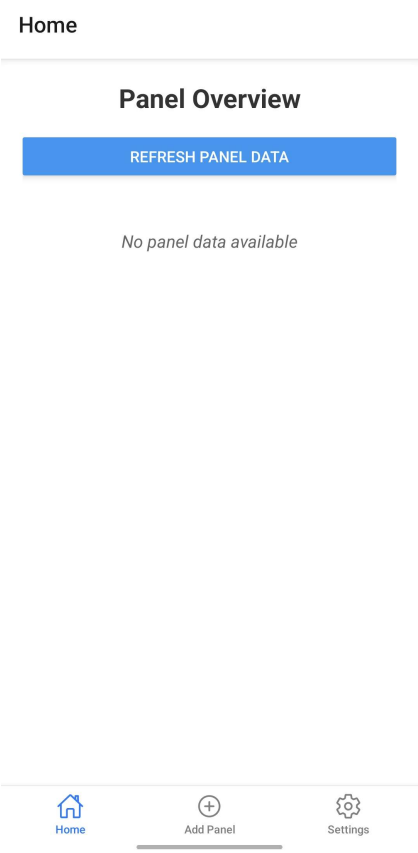
4. Check your Email for a verification code

*5. enter the code sent your Email in the **Verification Code** field*
*And press **Sign In***
*No code? Press **Resend Code***

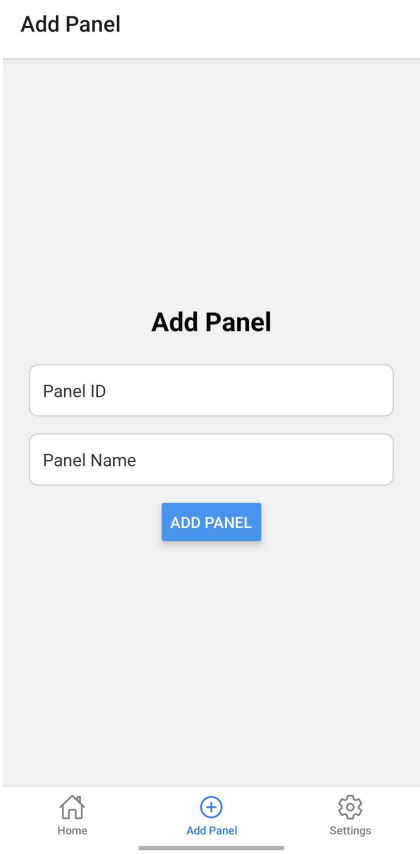


App Setup

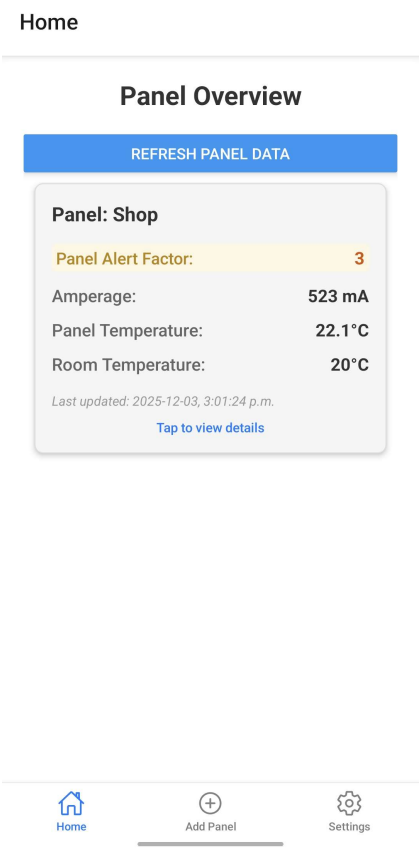
Continued from page 13



*1. You will now see a Screen like this, look to the bottom of your screen and press **Add Panel***



*2. Now, enter your Panel Guardian's Serial Number in the **Panel ID** field. Your Panel Guardian's Serial number can be found on the middle of the Panel Guardians Circuit board or by pressing the menu button. Then give your Panel a Name in the **Panel Name** field (examples: Shop, Barn 1 Main, Barn 2, Shed etc.) and press **ADD PANEL** you will get a message if it was added successfully*



*3. On the Bottom of the screen press **Home,** then press **REFRESH PANEL DATA** your panel should appear On screen. press **Tap to view detail's** to see historical data, Repeat with Panel Guardians Panel 2 Serial Number*

Troubleshooting

High Current Alarm	Current Fault, Shut off breakers until the fault goes away, and diagnose the fault on that circuit
High Temp Diff Alarm	Inside Panel Temp is above a safe value, use a thermal Camera to find the Hot spot in the panel Fix it
High Temp Alarm	One or both of the probes have gone above the set value, resolve the high temp problem
Low Temp Alarm	One or both of the probes have gone below the set value, resolve the Low temp problem
Panel Guardian not coming on	Check that you have 16 VAC power at the 16 VAC in Terminals, Check Fuse (see Page X)
Panel Guardian acting strangely	Look at the centre of the Panel Guardians Circuit board, you should see 3 lights solid and 1 light blinking (4 Lights total) If not, there is a Board fault, contact support
Weird temp values	Reset Panel Guardian, Check Temp probe connections, check resistance they will be ~10k Ohms at 25C
Not connecting to WiFi	Check WiFi Signal strength, try reentering network info (page x)

Contact and support

Contact:
PanelGuardian.com
+1-519-492-3314

Also Check out our YouTube Channel for Installation/Setup tutorials
youtube.com/@SmartAgSolutionsInc