Panel Guardian -2 Users Manual

Great 0/4   Great 0/4
D: 0 mA   D: 0 mA
P: 21.1 C   P: 21.5 C
R: 21.8 C   R: 21.3 C

Temp Alarm   Panel OK   Current Alarm

Acknowledge

See User's Manual for operating instructions
Product of Smart Ag Solutions
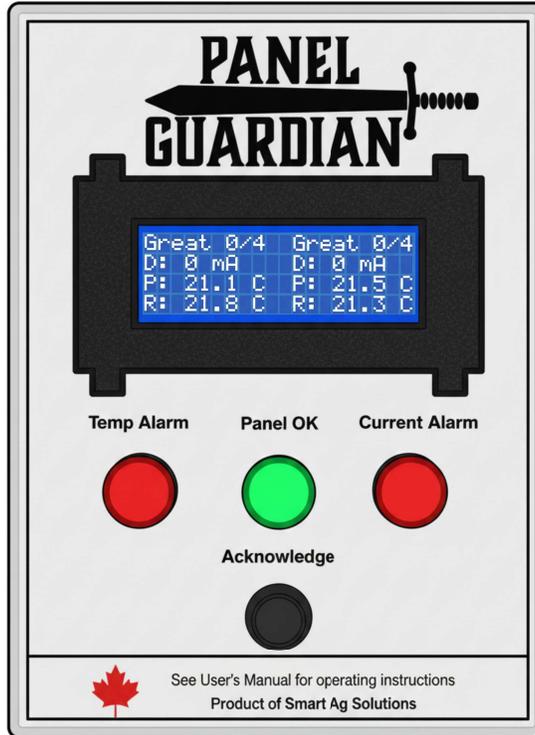
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Description

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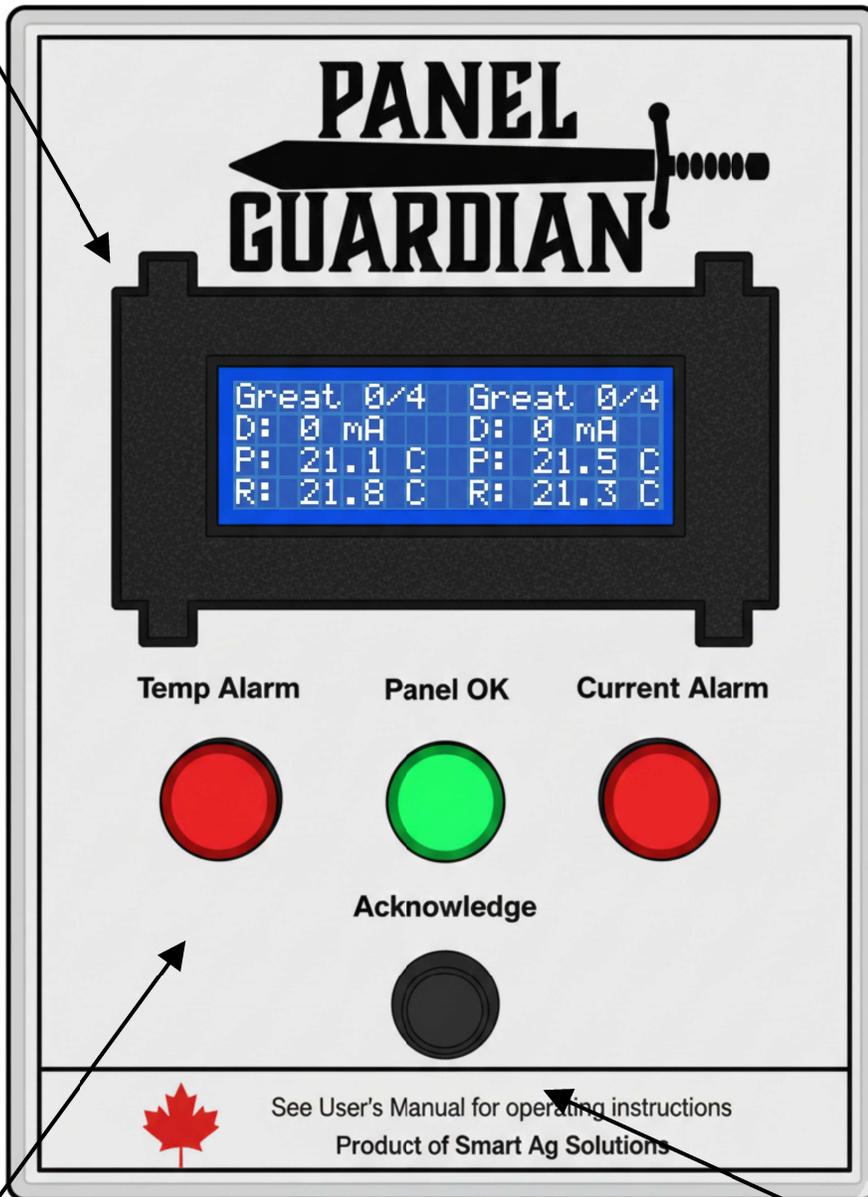**Monitored system:** sends direct text or email alerts to mobile devices upon detecting unsafe conditions.

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.

Display Screen
Info Display

See page 5

Fig 1, Panel Layout

Temp Alarm **Panel OK** **Current Alarm**

Acknowledge

See User's Manual for operating instructions
Product of Smart Ag Solutions

Acknowledge button
Button for acknowledging alarms
See page 4

Status LED's
LED's to indicate alarms
See page 4

Status LED's
LED's for troubleshooting

See page 9

Buttons
Up, Menu, Down & Reset Buttons
See page 6

Fig 2, Board layout

500 mA Fuse

16 VAC IN

Room & Panel Probe Inputs

Current & Temp Alarm Contacts

Current Transformer In
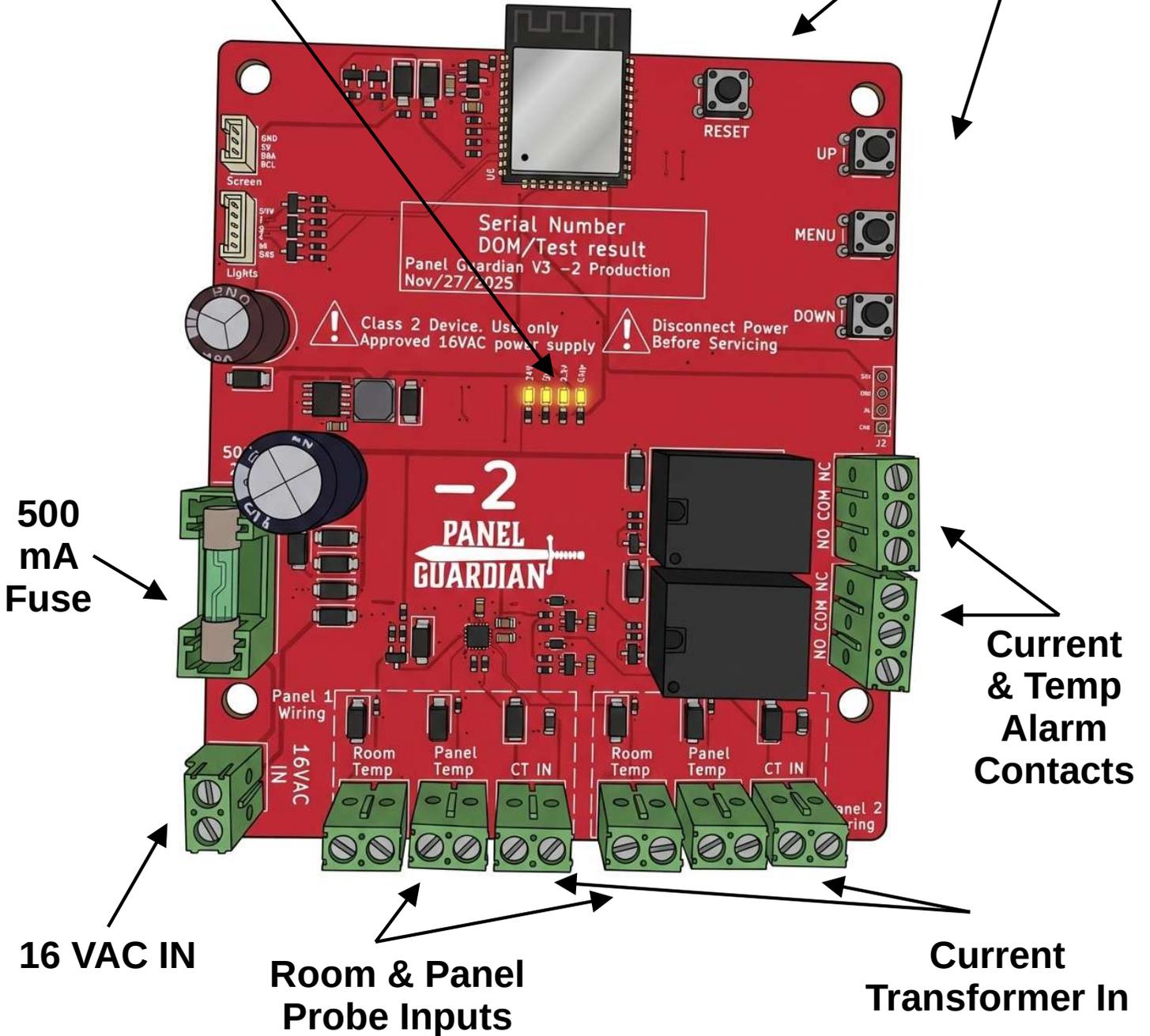
For More info, see the Installation manual

Status LED's

The Panel Guardian has 3 LED's to give you a quick way to see your panel status from a distance.

Temp Alarm Light: this light has 3 states, Solid, Fast Blink, Slow Blink
Solid: Temp alarm active
Fast Blink: Temp problem, alert factor 3
Slow Blink: A temp alarm came and went away, waiting to be acknowledged

Panel OK Light: this light has 1 state, Solid, when alert factor is less then 2 and all previous alarms have been acknowledged

Current Alarm Light: this light has 3 states, Solid, Fast Blink, Slow Blink
Solid: Current alarm active
Fast Blink: Current problem, alert factor 3
Slow Blink: A Current alarm came and went away, waiting to be acknowledged

Acknowledge Button

After an alarm came and went away, a count begins on screen how long ago that alarm was, and the according alarm Light will be blinking slow, when you press the acknowledge button this clears the alarm.

Reading the Screen

Alert Factor

Panel Status

Current
difference

Panel Temp

Room Temp

```
Great 0/4    Great 0/4
D:  0 mA     D:  0 mA
P: 21.1 C    P: 21.5 C
R: 21.8 C    R: 21.3 C
```

Panel 1   Panel 2

Panel Status: What shape the panel is in, *Alarms and Status are displayed here*
Alert Factor: see page 8
Current difference: current imbalance between incoming power wires
Panel & Room Temps: Panel and Room Temperatures

Status messages

```
DIFF! 4/4    Great 0/4
D: 757 mA    D:  0 mA
P: 22.9 C    P: 22.0 C
R: 22.7 C    R: 22.1 C
```
Panel 1 Current Difference alarm

```
TEMP! 4/4    Great 0/4
D:  0 mA     D:  0 mA
P: 37.8 C    P: 22.3 C
R: 25.8 C    R: 25.6 C
```
Panel 1 Temp Difference alarm

```
HTEMP 0/4    Great 0/4
D:  0 mA     D:  0 mA
P: 47.4 C    P: 24.0 C
R: 55.2 C    R: 30.9 C
```
Panel 1 High Temp alarm

```
LTEMP 0/4    Great 0/4
D:  0 mA     D:  0 mA
P:-21.3 C    P: 21.8 C
R: 21.3 C    R: 21.5 C
```
Panel 1 Low Temp alarm

```
T: 30M0/4
D:  0 mA
P: 23.2 C
R: 22.9 C
```
Temp Difference alarm 30 Mins ago

```
NWIFI 0/4
D:  0 mA
P: 22.6 C
R: 22.8 C
```
No WiFi Connection

```
D: 20M0/4
D:  0 mA
P: 23.2 C
R: 22.9 C
```
Current Difference alarm 20 Mins ago

```
Great 0/4    DIFF! 4/4
D:  0 mA     D: 757 mA
P: 22.0 C    P: 22.9 C
R: 22.1 C    R: 22.7 C
```
Panel 2 Current Difference alarm

```
Great 0/4    TEMP! 4/4
D:  0 mA     D:  0 mA
P: 22.3 C    P: 37.8 C
R: 25.6 C    R: 25.8 C
```
Panel 2 Temp Difference alarm

```
Great 0/4    HTEMP 0/4
D:  0 mA     D:  0 mA
P: 24.0 C    P: 47.4 C
R: 30.9 C    R: 55.2 C
```
Panel 2 High Temp alarm

```
Great 0/4    LTEMP 0/4
D:  0 mA     D:  0 mA
P: 21.8 C    P:-21.3 C
R: 21.5 C    R: 21.3 C
```
Panel 2 Low Temp alarm

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: xxxxxx

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: *(if the Panel temp – Room temp is above this value is a alert factor 4 and a alarm)*
Max Temp Diff:
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 Adjustment
Continued from page 8

Parameter 6: *(if either probe goes under this value it is a alarm)*
Min Temp Alert
Range: -45-5 C
Default: 5
Recommend: 5
Increment   1 C

Parameter 7:
WiFi Enabled *(See the WiFi setup section in the installation manual)*
Range: YES/NO
Default: NO
Recommend: _
Increment   _

Parameter 8:
WiFi Run Setup *(See the WiFi setup section in the installation manual)*
Range: YES/NO
Default: NO
Recommend: _
Increment   _

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

Parameter 10:   *(after the current goes over the Max current Diff parameter, how*
Over Current Alarm Delay   *many seconds until alarm)*
Range: 0-5 seconds   *It is only recommended to decrease this*
Default: 5   *parameter when you are trying to catch*
Recommend: 5   *extremely short duration anomalies*
Increment   1 second

Alert Factor Defined

Alert Factor is a quick way to See how your panel is doing, it is a 5 step system

0 – Panel is great
1 – Panel is OK
2 – Panel has a concern, still OK
3 – Panel has a problem, not an alarm yet
4 – Panel has an alarm

How is is calculated:

Current and Temp are calculated separately at first, then combined to give you a simple alert factor

Current:

Max current diff is set in the max current diff parameter on page x

0 is under 50 mA
1 is over 50 mA but under Max current diff / 4 * 2
2 is Over Max current diff / 4 * 2
3 is Over Max current diff / 4 * 3
4 is Over Max current diff

Example: Max current diff is 700
0 is under 50 mA
1 is Over 50 but under 350
2 is Over 350
3 is Over 525
4 is Over 700

Temp:

Max temp diff is set in the max temp diff parameter on page x

0 is under 2.5 C
1 is over 2.5 C but under Max temp diff / 4 * 2
2 is Over Max temp diff / 4 * 2
3 is Over Max temp diff / 4 * 3
4 is Over Max temp diff

Example: Max temp diff is 10 C
0 is under 2.5 C
1 is Over 2.5 C but under 5
2 is Over 5 C
3 is Over 7.5 C
4 is Over 10 C

These are added together, then averaged and then rounded up to the nearest whole 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 3)
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	Check Temp probe connections, check resistance they will be ~10k Ohms at 25C
Not connecting to WiFi (NWIFI)	Check WiFi Signal strength, try reentering network info (see installation manual)

Contact and support

Contact:
PanelGuardian.com
Daniel.SmartAgSolutions@gmail.com
+1-519-492-3314

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