

## POWERWATCH SENSOR TECHNICAL SPECIFICATIONS

Updated: September 11, 2024

### INTRODUCTION

PowerWatch detects power outages, outage durations, voltage quality metrics, and grid frequency. It sends data back in real-time over the cellular network. Notable features include: a unique deployment method (plug the PowerWatch sensor into a normal outlet and you are done!), battery backup and local data storage to allow for data collection on very unstable grids, and an embedded global SIM card to connect to local cell networks. PowerWatch integrates with a powerful cloud analytics platform for high-quality insights and key performance indicators.

### GRID MEASUREMENTS

PARAMETER	SUB- PARAMETER	DESCRIPTION	VALUE
Power Quality Measurements	Voltage	Maximum voltage measurement error ( $E_{vrms}$ )	0.5 $V_{rms}$
		Voltage spike measurement threshold ( $V_{spike}$ )	400 $V_{rms}$
		Minimum time of voltage spike ( $T_{spike}$ )	5 $\mu s$
	Frequency	Maximum frequency measurement error ( $E_f$ )	50 $\mu s$
		Outage detection time error (Assumes network connection within 2 days) ( $E_{t\_out}$ )	500 ms
Power Outage Measurements		Restoration detection time error (for outages less than 48 hours) ( $E_{t\_restore}$ )	500 ms
		Restoration detection time error (for outages greater than 48 hours) ( $E_{t\_restore\_l}$ )	15 s

### OPERATING REQUIREMENTS

PARAMETER	SUB-PARAMETER	VALUE
Power Consumption ( $P_d$ )	Sleep	0.075 W
	Nominal	0.5 W
	Maximum	10.4 W
Voltage ( $V_{dd}$ )	Nominal	85 to 305 $V_{ac_{rms}}$
	Maximum (pre-fuse)	3000 $V_{ac_{rms}}$
Frequency ( $f_{dd}$ )	Nominal	47 to 63 Hz
Temperature ( $T_A$ )	Nominal	-10 to 40 C
	Maximum	-20 to 85 C

### PHYSICAL CHARACTERISTICS

PARAMETER	VALUE
Weight	235 g

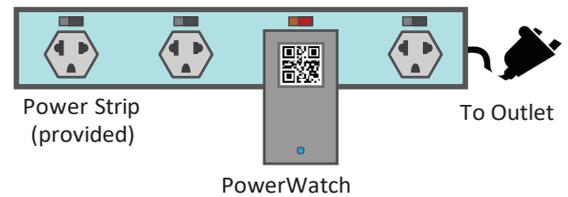
## POWERWATCH SENSOR STANDARD OPERATING PROCEDURES

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### INSTALLATION METHOD

1. In collaboration with the respondent, find a room location where sensor measurements are most beneficial (e.g. this may be room(s) where it is most important to have reliable power supply).
2. Within the room, find a wall outlet location that is relatively hidden and out of the way. This will reduce the likelihood that the power strip and/or PowerWatch sensor are unplugged or occupy a valuable wall outlet.
3. Plug the power strip securely into the wall outlet. Do NOT use multiple power strips connected to one another. Plug the sensor into the power strip.
4. Make sure the power switch for the wall outlet AND the power strip are both turned "on".
5. Do NOT unplug the power strip or the PowerWatch, and do not shut the outlet off. Only unplug when it is necessary for safety. PowerWatch should stay plugged in during surges (the sensor can handle surges).

#### Installation on Provided Power Strip



### POWERWATCH SENSOR LIGHTS (TROUBLESHOOTING)

LIGHT	MEANING	LIGHT	MEANING
<b>Light blue and pulsing slowly</b>	The sensor is connected to power AND is connected to a cellular network. The sensor is functioning as expected.	<b>Yellow/orange and pulsing slowly</b>	The sensor is connected to cellular network BUT is not receiving power. If there is a power outage, then this is OK. If there is no outage, ensure power is being supplied to the power strip.
<b>Light blue and blinking quickly</b>	The sensor is connected to power BUT is not connected to a cellular network. If other sensors at this site are showing this same light, then cellular network connectivity is the issue. This cannot be resolved; keep the sensor plugged in. If it is not a network issue, swap the sensor with a replacement sensor.	<b>Yellow/orange and blinking quickly</b>	The sensor is trying to connect to a cellular network but is not connected. There is nothing that can be done; keep the sensor plugged in.
<b>No light</b>	The battery is discharged. Plug in the sensor and wait a few minutes for the light to appear.	<b>Any other issues</b>	Contact nLine at <a href="mailto:info@nline.io">info@nline.io</a>