

# WIRELESS BATTERY MONITOR



CellSPY Wireless Battery Monitors are designed to measure and continuously report the following parameters:

- DC voltage across the battery terminals
- AC ripple voltage across the battery terminals
- Battery's ohmic value
- Temperature at negative battery post

There are three sensor types for different measurement ranges:

- CSPY-400-0 (batteries with nominal voltage 2 - 12 V)
- CSPY-400-1 (batteries with nominal voltage 12 V - 16 V)
- CSPY-400-2 (batteries with nominal voltage 1.2 V)

CellSPY measures the battery's ohmic value of both metallic and chemical paths. Unlike other monitors on the market, which consume 10s and 100s of Amps during internal ohmic value measurements, CellSPY "gets the job done" using 1A of load current for a fraction of a second.

Thanks to its advanced DSP-based noise filtering, ultra-fast 24 bit ADC's and negligible current dissipation, CellSPY is the smallest and most technologically advanced Battery Monitor on the market today.

## OPERATING SPECIFICATIONS

DC Voltage Measurement:	Range 1.2 V - 16 V Resolution 1 mV Accuracy 0.5 %
Temperature Measurement:	Range 0 °C - 80 °C Resolution +/- 1 °C Accuracy +/- 1 °C
Impedance Measurement:	Range 0 - 65 mΩ Resolution 1 μΩ Accuracy Better than 3 %
AC (Ripple) Voltage Measurement:	Range up to 1000 mV Resolution 1 mV Accuracy 1 % Max Freq 400 Hz (no attenuation)
Wireless Communication:	Frequency ISM Band - 2.4 GHz DSSS Range indoor > 50 m (expandable with repeaters)

Approvals:	CE FCC RoHS
Operating Temp.:	32 °F to 140 °F (0 °C to 60 °C)
Storage Temp.:	32 °F to 140 °F (0 °C to 60 °C)
Humidity:	5 - 85 %, non-condensing
Dimensions & Weight:	2.9" x 1.2" x 0.5" (74 mm x 32 mm x 13 mm) 2.2 oz (60 g)
Enclosure:	Material: PC Degree of protection: IP40 IK code: IK08

### KEY ATTRIBUTE

CellSPY can measure a battery's ohmic value in a very noisy environment with negligible power dissipation, making itself, almost "invisible" to the monitored battery.

# WIRELESS CURRENT TRANSDUCER



EMSYS's Unique Dual-Core Wireless Current Transducer (WCT-400-10-1000-30) provides accurate Load AND Charge DC current monitoring.

Thanks to its Dual-Core Technology, the Wireless Current Transducer measures DC current of 1A or 1000A with the same high accuracy.

It uses field proven Hall Effect based circuitry to provide a superior solution for DC applications, with minimal risk of permanent magnetization.

Its wide power supply range (12 - 60 VDC) allows it to be powered from almost any DC power source. Plug and Play installation, Non-Invasive Design and Wide Power Supply range are just a few of its key features.

## OPERATING SPECIFICATIONS

DC Current Measurement:	Range: 0 - 1000 A Resolution: 0.1 A Accuracy (up to 10 A): 1 % or better Accuracy (up to 1000 A): 1 % or better Linearity ( full range): 1 % or better
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Power Supply:	Range: 12 - 60 VDC Power Disipation > 200 mW
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Wireless Communication:	Frequency ISM Band - 2.4 GHz DSSS Range indoor > 50 m (expandable with repeaters)
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Approvals:	CE FCC RoHS
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Operating Temp.:	32 °F to 140 °F (0 °C to 60 °C)
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Storage Temp:	32 °F to 140 °F (0 °C to 60 °C)
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Humidity:	5 - 85 %, non-condensing
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Dimensions & Weight:	2.9" x 1" x 3.1" (74 mm x 26 mm x 80 mm) 10.2 oz (290 g)
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Enclosure:	Material: PC Degree of protection: IP40 IK code: IK08
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### KEY ATTRIBUTE

A key attribute of the EMSYS Wireless Current Transducer is high accuracy and linearity of measurements across operating range.

# WIRELESS AMBIENT MONITOR



The Wireless Ambient Monitor (WAM-400) measures ambient temperature which is useful in detecting faulty air conditioning or improper ventilation.

Additionally Ambient monitors can be used in conjunction with our CellSPY battery monitors to detect an early thermal runaway.

Our web-based application will compare the ambient monitor's readings with the battery temperatures collected by CellSPY monitors. If the "delta" between those two readings exceeds a preset threshold, the user will be alerted immediately with an email or SMS. It can be powered directly from the DC Bus (12 - 60 VDC) or from an internal battery.

Ambient Monitors are not limited to temperature measurement, and may measure ambient humidity and pressure as well.

Battery powered ambient sensors offered include:

- WAM-400-B-TP (measuring ambient temperature and pressure)
- WAM-400-B-TH (measuring ambient temperature and humidity)
- WAM-400-B-TPH (measuring ambient temperature, pressure and humidity)

## OPERATING SPECIFICATIONS

Ambient Temperature Measurement:	Resolution: 0.01 °C Accuracy: +/- 0.01 °C Range: 0 - 60 °C (32 - 140 °F)
Ambient Humidity Measurement:	Resolution: 1 % Accuracy: +/- 5 % Range: 5 - 85 %
Ambient Pressure Measurement:	Resolution: 0.5 hPa Accuracy: +/- 0.5 hPa Range: 300 - 1200 hPa
Power Supply:	WAM-400: 12 - 60 VDC WAM-400-B-x: Powered from the internal battery
Wireless Communication:	Frequency ISM Band - 2.4 GHz DSSS Range indoor > 50 m (expandable with repeaters)

Approvals: 

Operating Temp.: 32 °F to 140 °F (0 °C to 60 °C)

Storage Temp.: 32 °F to 140 °F (0 °C to 60 °C)

Humidity: 5 - 85 %, non-condensing

Dimensions: 3.4" x 1" x 0.4" (86 mm x 26 mm x 11 mm)

& Weight: 1.6 oz (45 g)

Enclosure: Material: PC  
Degree of protection: IP40  
IK code: IK08

### KEY ATTRIBUTE

The difference between ambient and cell temperature, as recorded by Wireless Ambient Monitors and CellSPYs, respectively, is an excellent parameter for an early thermal runaway detection.

# WIRELESS RELAY



The Wireless Relay (WRL-400) provides a way to remotely disconnect the power supply to a UPS. It is a key element of the Thermal Runaway prevention system.

In the event of a thermal runaway the relay is able to automatically disconnect the power supply from the UPS. Opening and closing functions can also be controlled manually in the EMSYS WebConfig application. The Relay is powered from any 12 - 60 VDC power source.

## OPERATING SPECIFICATIONS

Relay Output:	Normally Opened Normally Closed
Wireless Communication:	Frequency ISM Band - 2.4 GHz DSSS Range indoor > 50m (expandable with repeaters)
Power Supply:	12 - 60 DCV
Operating Temp.:	32 °F to 140 °F (0 °C to 60 °C)
Storage Temp:	32 °F to 140 °F (0 °C to 60 °C)
Humidity:	5 - 85 %, non-condensing

Dimensions & Weight:	5.4" x 1" x 0.6" (138 mm x 26 mm x 14 mm) 1.2 oz (35 g)
Enclosure:	Material: ABS Degree of protection: IP40 IK code: IK08
Approvals:	CE FCC RoHS

### KEY ATTRIBUTE

EMSYS Wireless Relay can disconnect the power supply and eliminate one of the key preconditions for Thermal Runaway.