Aspen™10

Edge Device for a Single Sensor

Makes a Sensor IoT Cloud Connected

Overview

The revolutionary Aspen™10 Internet of Things (IoT) Edge Device allows users to easily connect their environmental sensor to the cloud. It is rugged and durable and may be mounted outdoors without the need for a second enclosure. It has an integrated solar panel and internal rechargeable battery, making the Aspen 10 a truly self-sustaining device.

The Aspen 10 is also small and compact, which makes it easy to install in a variety of locations without disturbing the environment it is monitoring. An integrated IoT cellular modem allows the Aspen 10 to transmit data to the cloud,

and a global positioning system (GPS) receiver provides automated installation location.

Setting up the Aspen 10 to read your sensor is quick and easy thanks to a sensor interface technology that allows automatic identification of any sensor with an SDI-12 identification. The Aspen 10 publishes this ID to the cloud, in return receiving a customized measurement configuration and program for your specific sensor and application. You can then monitor your data from anywhere.

Benefits and Features

- IoT device using local cellular networks as the low-power wide-area network (LPWAN)
- Cellular CAT M1 for worldwide roaming
- Geolocation to automatically determine the edge device's location
- Solar charging to keep the IoT device operational indefinitely using just a few hours of daily sunlight
- Internal rechargeable LiFePO4 battery with reserve power for more than one month's operation without charge for all supported sensors
- Smart sensor detection and identification
- Smart sensor power automatic optimization for the attached sensor

- Simple zip tie system for mounting to almost anything
- Water-resistant enclosure for installation in most environments
- On/off switch for simple operation
- Status LED for operation without a smartphone
- Near field communication (NFC)/Bluetooth for operation with a smartphone to allow on-site analysis through the CampbellGo™ app
- Optimal security using Message Queuing Telemetry Transport (MQTT) with Transport Layer Security (TLS) mutual authentication

For comprehensive details, visit www.campbellsci.com/aspen10.

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Detailed Description

The Aspen 10 is a multipurpose, compact, entry-level edge device with a simple plug-and-play interface. Supported sensors measure hydrological, meteorological, environmental, and industrial phenomena. The Aspen 10 is part of the IoT and makes sensor data accessible anywhere via the Aspen 10's compatibility with the MQTT protocol and its integration with CampbellCloud™. The Aspen 10 provides maintenance-free sensor power and automates cellular connectivity, data storage, and data forwarding to CampbellCloud, where users can both visualize their data and manage API access.

The Aspen 10 is similar to a full Campbell Scientific system and comprises a data logger, wiring terminals, enclosure, solar panel, charge regulator, battery, modem, and antenna—all in one small package.

Compatible sensors are cabled using an eight-pin M12 connector. A detect pin lets the Aspen 10 know that it has connected to a sensor with an SDI-12 capability of self-identification. After identifying the sensor, the Aspen 10 connects to CampbellCloud to retrieve the appropriate configuration and program for that sensor, which enable the edge device to power the sensor appropriately and make accurate analog or digital measurements.

A free app, CampbellGo, enables secure NFC/Bluetooth pairing between a phone and the Aspen 10. This greatly simplifies the installation process with real-time sensor readings, diagnostic tools, and data-to-cloud delivery information while you are on-site. This gives you confidence that everything is working from end to end before leaving the installation site.

All of this allows you to collect data from the selected sensor in the location you need from practically anywhere on the globe.

Specifications

Processor	32-bit arm cortex (CPU)	**Digital I/O**	Terminals configured for SDI-12
Memory	■ 2 MB flash ■ 640 KB SRAM	**Certifications**	CB Certificate Number NO127343
Program Execution Period	1 s to 1 day; 1 s increments	**Dimensions**	16.2 x 8.0 x 5.8 cm (6.4 x 3.2 x 2.3 in.)
Real-Time Clock Resolution	±1 s	**Weight**	■ 395 g (0.9 lb) for -ST option ■ 352 g (0.8 lb) for -XT option
Real-Time Clock Accuracy	Synchronized with CampbellCloud once per day		
Operating Temperature Range	■ -20 to +60°C (standard) ■ -40 to +75°C (extended) ■ Outdoor environment	**Power**	
Maximum Scan Rate	1 s	**Battery**	*Note: Charge and discharge characteristics are controlled internally according to battery type.*
Communications Protocols	SDI-12, HTTP(S), MQTT	**Battery for -20° to +60°C (-ST) Option**	3.2 Vdc, 7.2 Ah, Li-Po PHD26650
Case Material	■ High-impact-resistant and UV-resistant ASA, recycle code 7 ■ IP65 water-resistant rated, Gore-Tex breathability	**Battery for -40° to +75°C (-XT) Option**	3.65 Vdc, 5.6 Ah, Li-ion Saft MP176065 xtd

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Average Current Drain	
	▪ <0.35 uA (deep sleep)
	▪ <1 mA (idle)
	▪ 10 uA (ultra-low power) for 5 Vdc sensor power supply
	▪ 5 mA for 5 Vdc sensor power supply
	▪ 14.3 mA for 8 Vdc sensor power supply
	▪ 30 mA for 12 Vdc sensor power supply

Power Output

-NOTE-	Regulated 5, 8, or 12 Vdc (disabled when battery capacity <0.5 Ah)
5 Vdc Current Limit	▪ 30 mA (ultra-low power) ▪ 210 mA
8 Vdc Current Limit	210 mA
12 Vdc Current Limit	210 mA

Communications

Protocols	SDI-12
Internet Protocols	HTTP(S), MQTT
Near Field Communication (NFC)	Target device compatible with CampbellGo
Bluetooth Low Energy (BLE)	▪ Compatible with CampbellGo ▪ Maximum distance of 50 m (165 ft)
SDI-12	One SDI-12-compliant terminal meets SDI-12 Standard v 1.4.

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