

# SP-016

## Heat Flux Thermopile Smart Probe



- 1x Heat Flux Thermopile including Thermocouple Temperature Compensation monitoring device
- Optional 2x Digital I/O
- Software configurable through SYNC configuration software
- Modular M12 construction
- OMEGA Smart Core enabled
  - Data Logging
  - Integrated Alarm and Control
  - Plug and Play Device Detection
  - Sensor health monitoring



The Layer N SP-016 Heat Flux Smart Probe provides an easy way to integrate your thermopile-based heat flux sensor to the Layer N Ecosystem. The SP-016 performs the necessary calculations to provide the heat flux measurement in  $W/m^2$ . The SP-016 accepts heat flux sensors through its M12 4-pin connector and Layer N Smart Interfaces through its M12 8-pin connector. Omega offers an optional M12-S-M-FM connector to easily connect wire leads to your SP-016.

The SP-016 supports any single thermopile sensor input ( $mV/W/m^2$ ) and temperature compensation input (thermocouple). Additionally, the SP-016-1 provides 2 open drain discrete inputs/outputs that may be used to detect external switch closures or control external alarms and control relays.

### Smart Core Enabled

Layer N Smart Probes are integrated with an advanced suite of IIoT Smart Core features. These features enable plug and play connectivity, alarms and notifications, data assurance, data logging, and storage.

### Intuitive Configuration

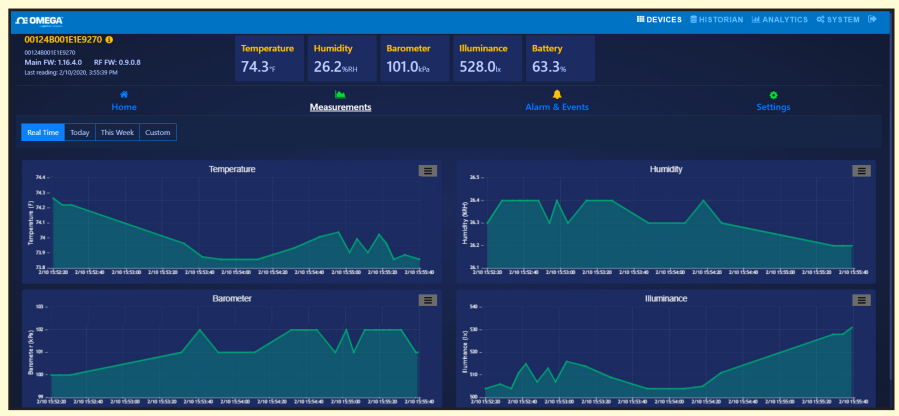
Easily configure your Layer N Smart Probe using SYNC's intuitive configuration interface. Additionally, an integrated command line interface allows for quick serial setup of your Smart Probe and Smart Interface using standard terminal emulators.

### Smart Interface Modularity

Customize your Layer N Ecosystem with modular Smart Interfaces that connect and transmit data from your Smart Probe to the Layer N Cloud.

### Your Data at a Glance with Layer N Cloud

Layer N Cloud consolidates and brings your data to you when you need it, wherever you are. The intuitive cloud interface allows you to monitor and store your data, set alarms and alerts, and provides insights on device activity. Visit the OMEGA website for more details.



## Specifications

### INPUT POWER

**Voltage:**  $2.8 V_{DC} - 3.3 V_{DC}$

### DIO DIGITAL INPUTS

$V_{inHighThreshold} = 2.2 V_{MAX}$

$V_{inLowThreshold} = 0.3 V_{MIN}$

$V_{inMAX} = 30 V_{DC}$

### DIO DIGITAL OUTPUTS

2x Open Drain 100 mA max

$V_{MAX} = 30 V_{DC}$

### ENVIRONMENTAL

**Operating Temperature:** -40 to 85°C (-40 to 185°F)

**Rating:** IP67 when mated

### MECHANICAL

**Dimensions:** 22.1 mm W x 96.7 mm L (0.87" x 3.80") not including mounting tabs

### GENERAL

**Agency Approvals:** CE, EMC 2014/30/EU, LVD 2014/35/EU

**Compatibility:** Compatible with OEG, SYNC configuration software, Layer N Cloud, and Modbus Networks

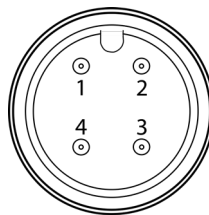
### HEAT FLUX SENSOR VALUES

Refer to the User's Documentation of your heat flux sensor for Sensitivity, Gain, and Offset values. Values are configurable on SYNC configuration software.

## Thermocouple Types

Type	Range	Accuracy
J	-210°C to 1200°C	0.4°C
K	-160°C to 1372°C	0.4°C
T	-190°C to 400°C	0.4°C
E	-200°C to 1000°C	0.4°C
N	-100°C to 1300°C	0.4°C
R	40°C to 1788°C	0.5°C
S	100°C to 1768°C	0.5°C
B	640°C to 1820°C	0.5°C
C	0°C to 2320°C	0.4°C

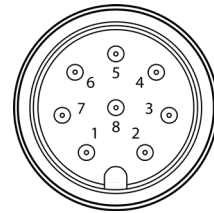
### M12 4-Pin Wiring



Pin	TC TempCO
Pin 1	TC -
Pin 2	Thermopile +
Pin 3	Thermopile -
Pin 4	TC +



### M12 8-Pin Wiring



Pin	Name	Function
Pin 1	DIO 0	Discrete I/O Signal 0
Pin 2	INTR	Interrupt Signal
Pin 3	SCL	I2C Clock Signal
Pin 4	SDA	I2C Data Signal
Pin 5	Shield	Shield Ground
Pin 6	DIO 1	Discrete I/O Signal 1
Pin 7	GND	Power Ground
Pin 8	3.3VDD	Power Supply

## Layer N SP-016

The SP-016 comes with two discrete inputs/outputs. The discrete I/O can be used for a myriad of application including driving relays, physical alarms, or sensing dry contact like door switches. The probe can be configured to act as an edge controller, generating local alarm and control signals based on sensor inputs.

Model Number	Description
SP-016-1	Temperature and RTD Smart Probe with discrete I/O

## Layer N Smart Interface

Layer N Smart Probes require a Layer N Smart Interface to operate and connect to your Layer N Ecosystem. There are both wired and wireless options.

Model Number	Description
IF-001	USB Smart Interface
IF-002	RS485/Modbus Smart Interface

## Accessories

An optional M12 4-pin screw terminal adapter is available for users who wish to connect wire leads directly to the SP-016.

Model Number	Description
HFS-5	Economical heat flux sensor
M12-S-M-FM	M12 4-pin screw terminal adapter
M12.8-T-SPLIT	Smart Probe M12-8 pin shielded T-Splitter - <b>enables access to I/O pins</b>
M12.8-S-M-FM	M12-8 pin Straight Plug Field install connector with screw terminals
DM12CAB-8-1-RA	1m (3.3') cable dual M12-8 connector, right angle terminator
DM12CAB-8-3-RA	3m (9.8') cable dual M12-8 connector, right angle terminator
DM12CAB-8-5-RA	5m (16.4') cable dual M12-8 connector, right angle terminator
DM12CAB-8-1	1m (3.3') cable dual M12-8 straight connector
DM12CAB-8-3	3m (9.8') cable dual M12-8 straight connector
DM12CAB-8-5	5m (16.4') cable dual M12-8 straight connector