SP-016

Layer N Heat Flux Thermopile Smart Probe

layer N
by OMEGA

- **Reads Heat Flux Thermopiles and performs automatic Temperature compensation**
- **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. The optional M12-S-M-FM connector can be utilized to easily connect wire leads typically found on heat flux sensors to your SP-016.

The SP-016 supports any single thermopile sensor input (mV/W/m^2) and an additional thermocouple input for temperature compensation.

Intuitive Configuration

Configure your Layer N Smart Probe using SYNC's intuitive configuration interface.

Edge Control and Built in I/O

The Layer N SP-016 features 2 configurable digital I/O pins. These can be used for a myriad of applications including driving relays, physical alarms, or sensing dry contacts like door switches. The SP-016 can also be utilized as an edge controller, with autonomous independent decision-making capabilities to generate local alarms or provide control outputs based on sensor inputs.

Smart Core Enabled

Smart core is integral to all Layer N Smart Probes. This powerful suite of advanced features enable plug and play connectivity, alarms and notifications, data assurance, data logging, and storage.

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.
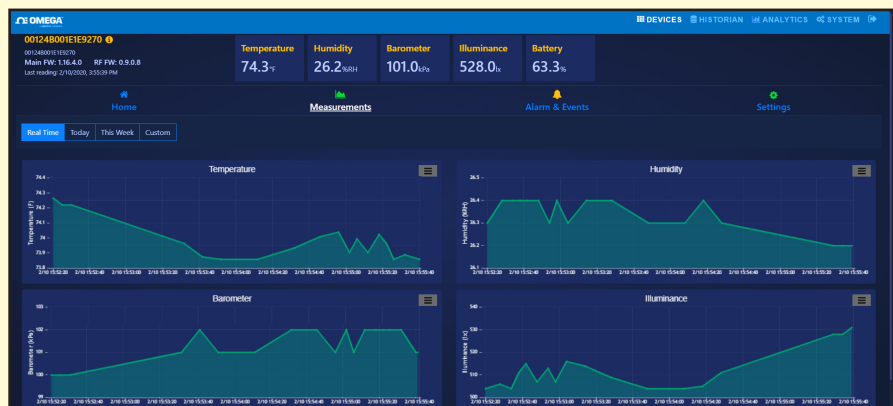
Specifications

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 85ºC (-40 to 185ºF)
> *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.

ACCURACY FOR mV INPUT

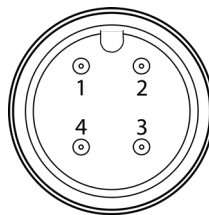| Range	Accuracy
±60 mV	±0.02% or ±4 uV

Stability over Temperature: ±1 uV/C

Thermocouple Types

Type	Range	Accuracy
J	-210ºC to 1200ºC	± 0.5ºC
K	-160ºC to 1372ºC	± 0.5ºC
T	-190ºC to 400ºC	± 0.5ºC
E	-200ºC to 1000ºC	± 0.5ºC
N	-100ºC to 1300ºC	± 0.5ºC
R	40ºC to 1788ºC	± 0.5ºC
S	100ºC to 1768ºC	± 0.5ºC
B	640ºC to 1820ºC	± 0.5ºC
C	0ºC to 2320ºC	± 0.8ºC

Temperature Stability @ 25ºC: 0.04 C/C

M12 4-Pin Wiring

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

M12 8-Pin Wiring
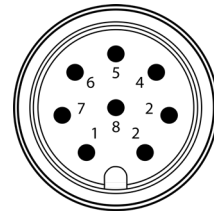
Pin	Name	Function
Pin 1	DIO 0	Discrete I/O Signal 0
Pin 2	INTR	Interrupt Signal
Pin 3	SCL	I2C Clock Signal
Pin 4	SDA	I2C Data Signal
Pin 5	Shield	Shield Ground
Pin 6	DIO 1	Discrete I/O Signal 1
Pin 7	GND	Power Ground
Pin 8	3.3VDD	Power Supply

Layer N SP-016

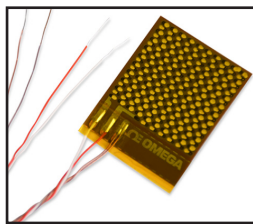| Model Number	Description
SP-016-1	Heat Flux Smart Probe with Compensated Thermocouple interface, with discrete I/O

Layer N Smart Interface

Layer N Smart Probes require a Layer N Smart Interface to operate and connect to your Layer N Ecosystem. Wired and Wireless options are available.

Model Number	Description
IF-001	USB Smart Interface
IF-002	RS485/Modbus Smart Interface
XW-ED	2.4 GHz Wireless Transmitter, Smart Probes - *requires ZW-REC*
XW-ED-PRO	2.4 GHz Wireless Transmitter and Edge Controller, Smart Probes - *requires ZW-REC*

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 - *enables access to I/O pins*
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

HFS-5   **+**   M12-S-M-FM   **+**   SP-016-1   **+**   IF-001