

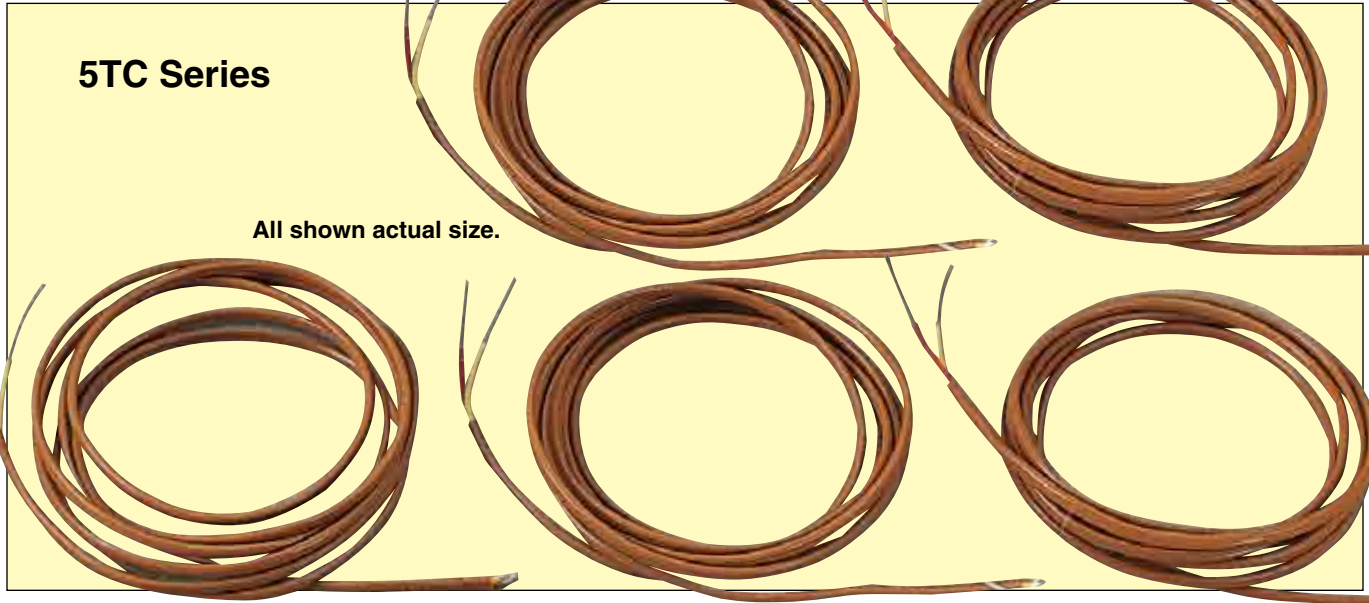
# Ready-Made Insulated Thermocouples with Stripped Leads



**MEETS OR EXCEEDS SPECIAL LIMITS OF ERROR (SLE) AND EN 60584-2: Tolerance Class 1**

**Convenient Packages of 5**

**Custom Lengths, Insulations, and Configurations Available**



**5TC Series**

All shown actual size.

- ✓ Available from Stock in Convenient 5-Packs
- ✓ PFA, Kapton®, or Glass Braid Insulation
- ✓ 20, 24, 30, 36 and 40 AWG Wires
- ✓ 1 and 2 m (40 and 80") Lengths Standard
- ✓ NIST Calibration Available
- ✓ OEM Quantities Available

“TT” PFA insulation

“GG” Glass braid insulation



Fine 40-Gage PFA Wire

KAPTON® Insulation

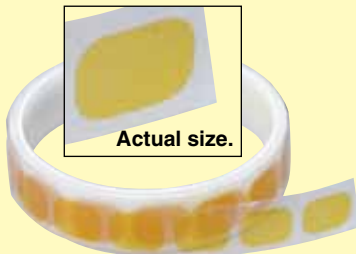
**Now Available!**  
**M8/M12 CONNECTORS**



## Also Available TAP Adhesive Labels

Thermocouple Adhesive Labels secure wire probes to surfaces. TAP adhesive labels have a thickness of 0.064 mm (0.0022") and can be used at a maximum temperature of 180°C (356°F). They are made of a polyimide film with a silicone pressure sensitive adhesive.

Visit us online for details and ordering information.



Actual size.

Model TAP, roll of 100 adhesive labels, shown smaller than actual size.

## To Order

Model No. ANSI Color Code	AWG Gage	Diameter mm (in)	Insulation
5TC-GG-(*)-20-(**)	20	0.81 (0.032)	Glass Braid
5TC-GG-(*)-24-(**)	24	0.51 (0.020)	Glass Braid
5TC-GG-(*)-30-(**)	30	0.25 (0.010)	Glass Braid
5TC-GG-(*)-36-(**)	36	0.13 (0.005)	Glass Braid
5TC-TT-(*)-20-(**)	20	0.81 (0.032)	PFA
5TC-TT-(*)-24-(**)	24	0.51 (0.020)	PFA
5TC-TT-(*)-30-(**)	30	0.25 (0.010)	PFA
5TC-TT-(*)-36-(**)	36	0.13 (0.005)	PFA
5TC-TT-(*)-40-(**)	40	0.08 (0.003)	PFA
5TC-KK-(*)-20-(**)	20	0.81 (0.032)	Kapton®
5TC-KK-(*)-24-(**)	24	0.51 (0.020)	Kapton®
5TC-KK-(*)-30-(**)	30	0.25 (0.010)	Kapton®

\* Insert calibration J, K, T, or E. \*\* Specify length, insert “36” for 1 m or “72” for 2 m length.

**Note:** For GG or TT wire, additional cost per additional 300 mm (12") per package of 5.

For KK wire, additional cost per additional 300 mm (12") per package of 5.

For a male straight M8 plug add “M8-S-M” to the model number for additional cost, for a male straight M12 plug add “M12-S-M” to the model number for additional cost.

For a male right-angled M8 plug add “M8-R-M” to the model number for additional cost, for a male right-angled M12 plug add “M12-S-M” to the model number for additional cost.

**Ordering Example:** 5TC-TT-K-30-36, 5 pack, PFA insulated thermocouples, Type K calibration (CHROMEQA®-ALOMEGA®), 30 AWG, 1 m (40") long, stripped lead termination.

# IF-001

## USB Smart Interface



- USB to Smart Probe Interface
- USB 2.0 Compliant
- SYNC and Omega Enterprise Gateway support
- Modbus RTU, Modbus ASCII compatible
- Simple command line interface

The Omega IF-001 Smart Interface cable provides an easy way to configure and monitor Omega Smart Probes. The USB 2.0 compliant device appears as a serial port and is compatible with Windows, iOS, and Linux.

The IF-001 provides a Modbus RTU or Modbus ASCII interface to the entire smart sensor register set.

An integrated command line interface allows for quick smart sensor register configuration and monitoring using standard terminal emulators.

The 8-pin M12 connector provides 3.3 Vdc power for external Smart Sensor probe with an integrated power monitor to protect against short circuits.



### Specifications

#### Environmental

**Environmental Rating:** NEMA 6 IP67 when mated (M12 end only)

**Operating Temperature:** -20 to 80°C (-4 to 176°F), non-condensing

**Vibration:** 10 Gs at 10 Hz to 500 Hz (M12 end only)

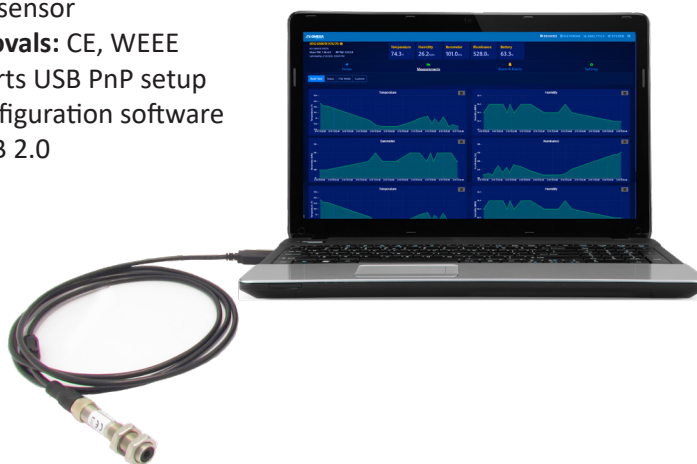
#### General

**Power:** USB Powered. Supplies up to 100 mA to sensor

**Agency Approvals:** CE, WEEE

**Setup:** Supports USB PnP setup and SYNC configuration software

**Interface:** USB 2.0



### Modbus Smart Interface

Model Number	Description
IF-001	Smart Probe USB Interface

## Layer N Smart Probes

Compatible 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.

Model Number	Description
SP-001-0	Smart Probe IR, 6:1 field of view
SP-001-1	Smart Probe IR, 6:1 field of view, with discrete I/O
SP-002-0	Smart Probe IR, 10:1 field of view
SP-002-1	Smart Probe IR, 10:1 field of view with discrete I/O
SP-003-1	THB Smart Probe with I/O Tube Housing
SP-004-1	TH Smart Probe with I/O Tube Housing
SP-004-4	TH Smart Probe with I/O Bulkhead Housing
SP-005-1	Temperature and RTD Smart Probe with discrete I/O
SP-010-1	Load Cell Smart Probe with discrete I/O
SP-013-1	Digital Interface Smart Probe with discrete I/O
SP-014-1	Process Monitoring Smart Probe with discrete I/O
SP-016-1	Heat Flux Smart Probe with discrete I/O

# GW-001 Series

## Long Range Gateway with Cloud Connectivity



- Free Layer N Standard Cloud service accessible from any connected device<sup>1</sup>
- Easy one-button pairing with Smart Sensor
- Transmits up to 3.2 km<sup>2</sup>
- AES-256 Encrypted wireless link keeps your data secure
- Wireless Gateways can connect up to 256 Smart Sensors<sup>3</sup> per unit.



Interfaces available vary with model

GW-001 Series gateways are designed for long range performance and ease of use. They aggregate data from all connected sensors and transmit it to the Layer N Cloud where it can be securely accessed from your PC, tablet or phone.

### Long Range

The Wireless Gateways utilize Sub GHz Frequency Hopping Spread Spectrum (FHSS) technology to ensure robust, long range communications to Layer N Smart Sensors. Transmission ranges of up to 1.2 km can be achieved when the sensor is powered with the standard AA batteries, and transmission ranges of up to 3.2 km can be achieved with a Smart Sensor in range boost mode powered by a standard external 5V USB power supply.<sup>2</sup>

### Plug and Play

The Layer N Gateway is easily paired to Layer N Smart Sensors with the press of a button and will automatically show up on your Layer N Cloud account. Local data logging for your Smart Sensor devices keeps your data secure in the event of a power or network outage. Reports, History, and E-mail alerts from the Layer N Cloud keep you informed on the status of all your vital processes.

### Secure

Layer N wireless products are designed with state of the art security features to protect your data with robust AES256 encryption and advanced PKA-EC521bit (NIST) elliptic-curve cryptography to protect your data. The gateway features a Trusted Platform Module secure hardware element which protects the safety of all encryption keys and uses X.509 device certificates for secure communication between the gateway and the Layer N Cloud.

### Wireless Standard: GW-001-2

This high performance wireless gateway seamlessly connects to up to 256 long range Layer N Smart Sensor devices. Ethernet connectivity ensures fast, easy connection to the Layer N Cloud. Local access is also available through the built-in web server.

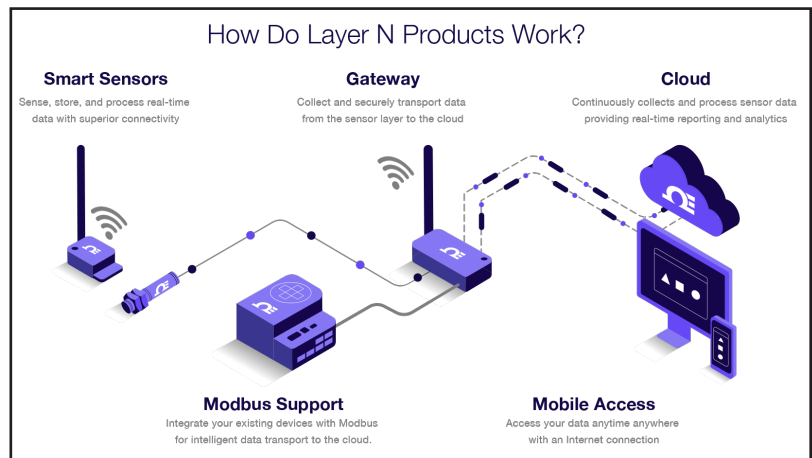
devices. Standard Ethernet connectivity ensures fast, easy connection to the Layer N Cloud.

### Wireless Pro: GW-001-3

The Wireless Pro adds both Modbus TCP and RTU RS232/RS485 device support and two USB ports to enable local smart probe connections. It also features power over Ethernet (POE) which enables the gateway to be remotely powered.

### Wired Standard: GW-001-0

This version is designed specifically for wired applications. It features standard Ethernet connectivity to the Cloud, plus both Modbus RTU RS232/RS485 and Modbus TCP connectivity suitable for a wide range of wired applications.



1. Visit <https://omega.com/en-us/cloud> for subscription options. Total number of sensors that can connect to Layer N Cloud varies with subscription tier.

2. Clear line of sight. Actual range may vary depending on environment and sensor type.

3. 256 sensors are supported at typical update intervals, on the order of 60 minutes, higher data rates or adverse environmental conditions may diminish the number of sensors supported.

## Specifications

### Wireless Communication

Frequency\*: 915 MHz

Range\*\*: Up to 3.2 km

\*Wireless communication is only available on qualifying variants

\*\*Maximum range possible when Smart Sensor is powered by USB and without obstruction

### Power

AC Adapter: DC 12V @ 2A

Power over Ethernet\*: IEEE 802.3at compatible Type 1 Class 3

\*PoE only available on Wireless Pro variant

### Interface\*

RJ45: 2x ports

USB: 2x USB 2.0

DC Jack: DC 12V power input

Serial Port: RS232/RS485

Alarm: SSR 36VDC 100mA

Antenna: One Antenna for Sub-1G

\*Interfaces available vary according to model purchased

### Environmental

Rating: IP40

Operating Temperature: -20°C to 65°C, non-condensing

### Mechanical

Dimensions: 170 mm L x 100 mm W x 42 mm H (6.69" x 3.93" x 1.65")

## Certifications

Contains FCC ID: WR3-MOD16370915

Contains IC ID: 8205A-MOD16370915

### Emission & Immunity for EMI/EMS

FCC: FCC Part 15B

CE: EN 301 489-1/-3

### Radio Frequency & Human Exposure/SAR

FCC: FCC Part 15C (15.247)

FCC MPE

CE: EN 300 220

EN 62311 MPE

### Safety

LVD: EN 62368-1

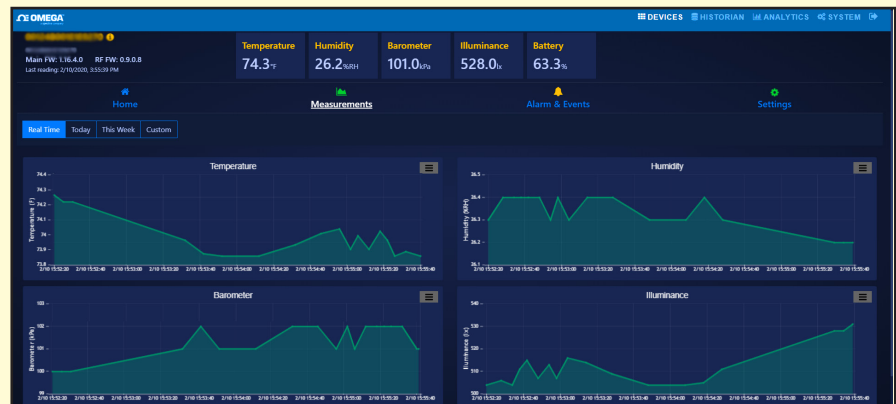


## General

Max number of Smart Sensors: Up to 256 Smart Sensors can connect to a wireless gateway unit

### 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.



## Variants

Model Number	Description
GW-001-0	Wired IIoT Gateway Standard
GW-001-2-NA	Wireless IIoT Gateway Standard
GW-001-3-NA	Wireless IIoT Gateway Pro

## Smart Sensors

The Layer N ecosystem supports a variety of Smart Sensors. Up to 256 Smart Sensors can connect to a GW-001 unit. We currently offer the following options.

Model Number	Description
SS-001-1-NA	Temperature and Humidity Smart Sensor - 915MHz
SS-001-3-NA	Temperature, Humidity, Barometric Pressure, Light Smart Sensor - 915MHz

# SS-002 Series

## Wireless TC and RTD Smart Sensors with Cloud Connectivity



- **SS-002: Configurable sensor mix of Temperature, Humidity, Barometric Pressure, Light sensor, Thermocouple, RTD, or Contact Closure**
- **Free Layer N Standard Cloud service accessible from any connected device<sup>1</sup>**
- **Easy setup with one-button pairing**
- **Transmits up to 1.2 km with standard AA batteries<sup>2</sup>**
- **Transmits up to 3.2 km when powered with USB<sup>2</sup>**
- **AES-256 Encrypted wireless link keeps your data secure**
- **Local data logging up to 10,649 data points<sup>3</sup>**



Probe sold separately

Layer N SS-002 Smart Sensors provide an external 3-wire RTD, thermocouple, or contact closure solution in addition to the built in suite of precision internal sensing elements that come standard with the SS-001 to accurately measure environmental conditions for a wide range of applications.

The SS-002-0 offers a configurable choice of an external thermocouple, RTD, or DIN (contact closure).

The SS-002-1 offers a configurable mix of any three of the four internal sensors: Temperature, Humidity, Barometric Pressure, Ambient Light, **AND** one external sensor option: Thermocouple, RTD, or DIN (contact closure).

### Plug and Play

Layer N Smart Sensors are easily paired to the Layer N Gateway with the press of a button, and will automatically show up on your Layer N Cloud Account. The Layer N Gateway can connect up to 256 Smart Sensors<sup>4</sup> per unit. Local data logging keeps your data secure in the event of a power or network outage. Reports, History, and E-mail alerts from the Layer N Cloud keep you informed on the status of all your vital processes.

### Advanced Features

Advanced Omega Level N features may be configured through SYNC software and include selective data extraction, measurement and device traceability, local alarms and adaptive transmission rates to reduce data congestion and extend battery life.

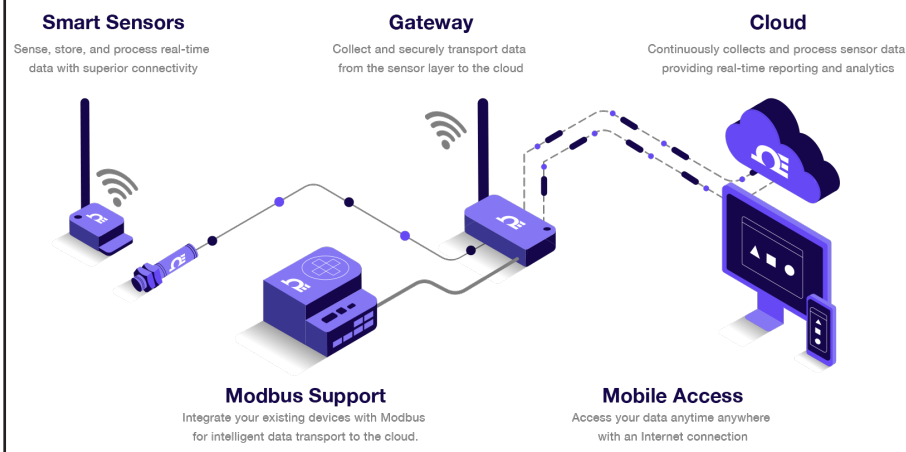
### Secure

Layer N wireless products are designed with state of the art security features to protect your data with robust AES256 encryption and advanced PKA-EC521bit (NIST) elliptic-curve cryptography to protect your data.

### Long Range

The SS-002 utilizes Sub GHz Frequency Hopping Spread Spectrum (FHSS) technology to ensure robust, long range communications. Transmission ranges of up to 1.2 km can be achieved with the standard AA batteries and transmission ranges of up to 3.2 km can be achieved when powered by a standard 5V micro USB cable<sup>2</sup>.

### How Do Layer N Products Work?



## Specifications

### Wireless Communication

**Frequency:** 915 MHz

**Range:** Up to 3.2 km\*

\*When powered by USB, without obstruction

### Power

**Alkaline Battery:** 2x AA batteries (included)

**Lifetime:** Up to 1.5 years with frequency of 1 reading per hour

**USB Power\*:** 500mA @ 5V

\*Micro USB cable not included

### Environmental

#### Operating Conditions for Base Unit

**Battery Powered:** -15°C to 55°C, non-condensing

**USB Power:** -20°C to 65°C, non-condensing

**Rating:** IP40

### General

**Software:** Compatible with SYNC configuration software and Layer N Cloud

## Thermocouple Types

Type	Range	Accuracy
J	-210°C to 1200°C	±1.0°C
K	-160°C to 1372°C	±2.0°C
T	-190°C to 400°C	±1.5°C
E	-200°C to 1000°C	±1.0°C
N	-100°C to 1300°C	±2.0°C
R	140°C to 1788°C	±5.0°C
S	200°C to 1768°C	±5.0°C
B	640°C to 1820°C	±5.0°C
C	0°C to 2000°C	±5.0°C
Cold Junction Calibration		±0.5°C

## RTD Types

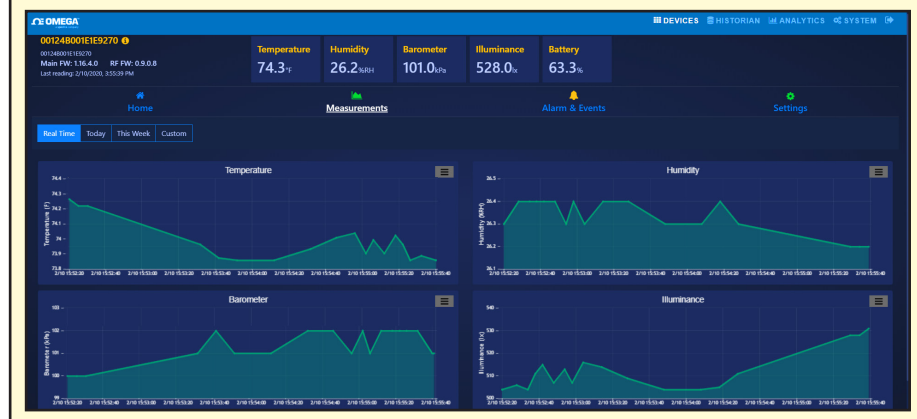
Type	Ohm	Range	Accuracy
385, 3 Wire	100, 500, 1000	-200°C to 850°C	1.5°C
392, 3 Wire	100	-200°C to 660°C	1.5°C
3916, 3 Wire	100	-200°C to 660°C	1.5°C

## Smart Sensor Device

Measurement	Range	Accuracy
Temperature	-20°C to 70°C	±0.3°C
Humidity @ 25°C	0% to 80%	±2.5%
	80% to 100%	±3.5%
Barometric Pressure @ 25°C	700mbar to 1100mbar	±4mbar
Barometric Pressure @ Full Range	300mbar to 1100mbar	±6mbar
Light	0-43691 illuminance	Relative level only

### 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.



1. Visit <https://omega.com/en-us/cloud> for subscription options. Total number of sensors that can connect to Layer N Cloud varies with subscription tier.
2. Actual range may vary depending on environment.
3. The number of data points available are on a per sensor basis. Local Data can be downloaded using downloadable SYNC configuration software.
4. 256 sensors are supported at typical update intervals, on the order of 60 minutes, higher data rates or adverse environmental conditions may diminish the number of sensors supported.

## Variants

The SS-002 is available in two variants of measurement suites: Both operate on a frequency of 915 MHz.

Model Number	Description
SS-002-0-NA	External Thermocouple, RTD, or DIN (Contact Closure) Smart Sensor - 915MHz
SS-002-1-NA	Configurable mix of 3 of the 4 internal sensors: Temperature, Humidity, Barometric Pressure, Ambient Light <b>AND</b> one external sensor: Thermocouple, RTD, or DIN (Contact Closure) Smart Sensor - 915MHz

## Gateway

A Wireless Gateway is **required** to connect the SS-002 to the Layer N Cloud. We currently offer the following options.

Model Number	Description
GW-001-2-NA	Wireless IIoT Gateway Standard
GW-001-3-NA	Wireless IIoT Gateway Pro

## Thermocouple and RTD Probes

Omega recommends using the following supported thermocouple and RTD probes. Supported probes are not limited to those in this list.

Thermocouple Immersion Probes	Description
TJ36 Series	Heavy Duty Transition Joint Thermocouple Probes, J/K/E/T/N Type, 1/16" to 1/4" lengths, 304/310/316/321 SS or Inconel sheath, multi-diameter
<b>Thermocouple Surface Sensors</b>	
5TC Series	Insulated Thermocouples, J/K/T/E Type, multi-length, 20/24/30/36/40 AWG Wires, PFA or Glass Braid insulation
SA1 Series	Fiberglass-Insulated Self-Adhesive Thermocouple Wire Leads, J/K/T/E Type, 40"/80"/120" length
SA2 Series	Self-Adhesive Molded Silicon Thermocouple, J/K/T/E Type, 40"/80"/120" length
<b>RTD Probes</b>	
PR-10 Series	General Purpose RTD, -200 to 600°C temperature range, 2/3/4 Wire configuration
PR-11 Series	General Purpose RTD with Metal Strain Relief, -200 to 600°C temperature range, 1/4", 3/16", 1/8" diameters, 6"/9"/12"/18"/24" length, provided with a minimum of 36" of 3 conductor, #26 AWG stranded, Nickel Plated Copper, PFA insulated and jacketed cable
PR-20 Series	Short RTD Probe, 2" Length, PFA: -50 to 260°C (-58 to 500°F) Fiberglass: -50 to 450°C (-58 to 842°F) Depending on Cable Selection 2/3/4-Wire available
PRTF-10 Series	General Purpose RTD with PFA Insulated and Jacketed Cables, Temperature Range: -50 to 260°C, multi-diameter, multi-length, 2/3/4-Wire
PRTF-11 Series	RTD Probes with Transition Fittings, Strain Relief Springs and PFA Insulated and Jacketed Cables, -50 to 260°C temperature range, multi-length, multi-diameter, 2/3/4-Wire
<b>RTD Surface Sensors</b>	
RTD-830 Series	Surface Mount RTD, Aluminum Housing, -60 to 230°C temperature range, 3-wire
RTD-800-B Series	Industrial Grade RTD Sensors, 6 Styles: Air, Surface, NPT threaded, Tab Mount, Screw On, or Flange Mount Probe
SA1-RTD Series	SA1-RTD Surface-Mount RTD, Self-Adhesive or Cement On, -73 to 260°C temperature range, 40"/80"/120" length, 3 or 4-Wire



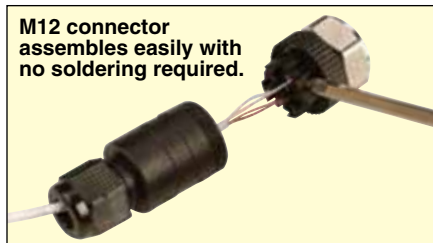
# Field Mountable M8 and M12 Connectors

## Connect to Existing Sensors and Cables

### M8/M12 Series

- ✔ Provide Convenient Connection to Equipment with M8 or M12 Connections
- ✔ Available as Right Angled or Straight Connections
- ✔ IP67 Rated
- ✔ Connectors Include Pins and Sockets Manufactured from Plated Brass

The M12 connectors can be attached to existing sensor or extension cables with #18 to #24AWG conductors and a 4 to 6 mm (.16 to .24") cable diameter in the field by means of screw type connections. The M8 connectors can be soldered to cables with #24AWG conductors, and a 4 to 6 mm (.16 to .24") cable diameter. Male and female connectors, with straight or right angled connection styles provide a wide selection of connection options.



To Order						
Model Number	Connector Size	Number of Pins	Style	Dimensions mm (inch)		
				A	B	D
M8-S-F-FM	M8	3	Straight female connection	37 (1.45)	N/A	12 (0.46)
M8-S-M-FM	M8	3	Straight male connection	45 (1.77)	N/A	12 (0.48)
M8-R-F-FM	M8	3	Right angle female connection	28 (1.10)	19 (0.73)	12 (0.48)
M8-R-M-FM	M8	3	Right angled male connection	35 (1.36)	19 (0.73)	12 (0.48)
M12-S-F-FM	M12	4	Straight female connection	46 (1.81)	N/A	18 (0.71)
M12-S-M-FM	M12	4	Straight male connection	52 (2.05)	N/A	20 (0.79)
M12-R-F-FM	M12	4	Right angle female connection	35 (1.38)	30 (1.18)	20 (0.79)
M12-R-M-FM	M12	4	Right angled male connection	42 (1.65)	31 (1.22)	20 (0.79)
M12.5-S-M-FM	M12	5	Straight female connection	54 (2.13)	N/A	20.2 (0.80)
M12.8-S-M-FM	M12	8	Straight male connector	54 (2.13)	N/A	20.2 (0.80)

**Note:** When adding a connector to a sensor purchase, add the connector part number at the end of the sensor model number (without dashes) for additional cost to the sensor price. **Example:** PR-20-2-100-1/4-2-E-T-M8SMFM = PR-20-2-100-1/4-2-E-T RTD sensor with M8-S-M-FM connector installed on the cable (please specify connector wiring requirements, ie: red wires on pins 1 and 2, white wire on pin 3).  
**Ordering Examples:** M8-S-F-FM, field mountable, 3-pin M8 style connector with a straight female connection.  
M12-R-M-FM, field mountable, 4-pin M12 style connector with a right angled male connection.

# SP-005

## Thermocouple and RTD Temperature Smart Probe



- 2x Thermocouple
- 1x RTD (2, 3, 4-wire)
- Software configurable through SYNC configuration software
- 2x Digital I/O
- 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-005 Thermocouple and RTD Smart Probe provides an easy way to integrate your thermocouple and RTD probes to the Layer N Ecosystem. The SP-005 accepts standard M12 thermocouples and RTDs 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 thermocouples or RTD probes to your SP-005.

### Edge Control and Built in I/O

The Layer N SP-005 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-005 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.

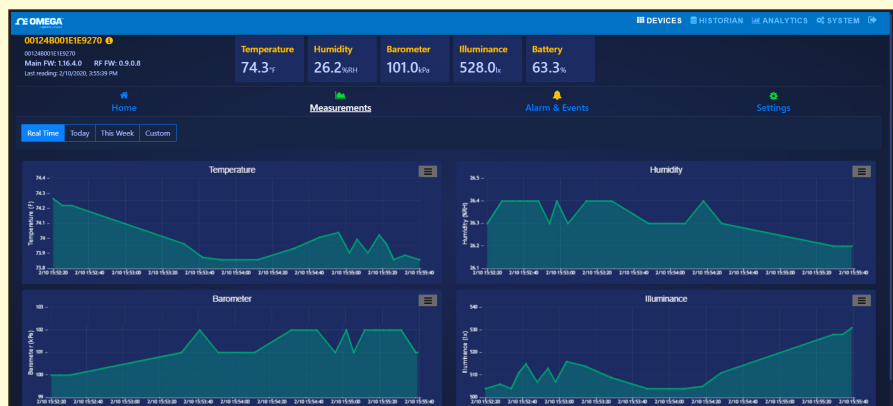
The SP-005 supports up to 2 thermocouple inputs or a single 2, 3, or 4-wire RTD input.

### Intuitive Configuration

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

### 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<sub>DC</sub> - 3.3 V<sub>DC</sub>

### 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

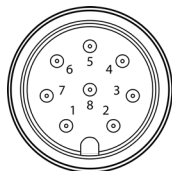
**Dimensions:** 22.1 mm W x 96.7 mm L (0.87" x 3.80") not including mounting tabs

### GENERAL

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

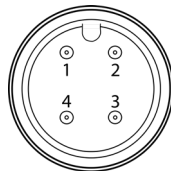
**Compatibility:** Compatible with OEG, SYNC configuration software, Layer N Cloud, and Modbus Networks

## 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

## Thermocouple Wiring

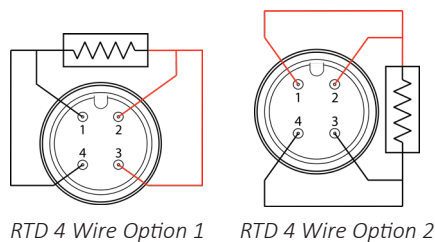


Pin	Thermocouple
Pin 1	TC 2 Negative
Pin 2	TC 1 Positive
Pin 3	TC 1 Negative
Pin 4	TC 2 Positive

## 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

## RTD Wiring

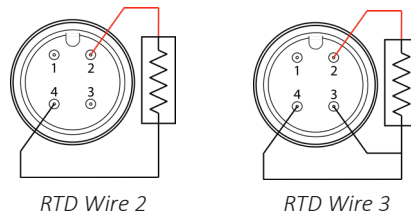


RTD 4 Wire Option 1

RTD 4 Wire Option 2

## RTD Types

Type	Range	Accuracy
385, 4 Wire	-200°C to 850°C	0.3°C
385, 3 Wire	-200°C to 850°C	0.3°C
385, 2 Wire	-200°C to 850°C	0.6°C
392, 4 Wire	-200°C to 660°C	0.3°C
392, 3 Wire	-200°C to 660°C	0.3°C
392, 2 Wire	-200°C to 660°C	0.6°C



RTD Wire 2

RTD Wire 3

## Layer N SP-005

Model Number	Description
SP-005-1	Thermocouple and RTD Temperature Smart Probe with discrete I/O

## Layer N Smart Interface

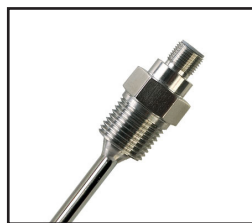
Layer N Smart Probes require a Layer N Smart Interface to operate and connect to your Layer N Ecosystem. There are both wired and wireless options.

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-005.

Model Number	Description
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



M12 Series  
Thermocouple

+



SP-005-1

+



IF-001

## Thermocouple and RTD Probes

Omega recommends using the following supported thermocouple and RTD probes. Supported probes are not limited to those in this list.

### M12 TC Probes

M12 Series	J Type (Stainless Steel) / K Type (Inconel 600) 6" Thermocouple probes, single and dual element configuration, -50 to 85°C (-58 to 185°F) temp range, available in 1/8" or 1/4" diameter
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## Thermocouple and RTD Probes (continued)

### M12 TC Probes (continued)

M12M	J Type (Stainless Steel) / K Type (Inconel 600) multi-length Thermocouple probes, single and dual element configuration, -50 to 90°C (-58 to 194°F) temp range, available in 1/4" or 1/8" diameter
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### M12 TC Cables and Connectors

M12CM Series	Straight and right-angled M12 Field mountable connector sensor end, compensated thermocouple pins, IEC or ANSI color coded cable insulation options, variety of connection methods
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### M12 RTD Probes

PR-21A Series	6" RTD Probes, -50 to 250°C (-58 to 482°F) sensing end, 85°C (185°F) max at connector, Class A, Pt100, or PT1000 element, available in 1/4" or 1/8" probe diameter
PR-22 Series	Multi-Length RTD Probes, -30 to 350°C (-22 to 622°F) Class A probe temp range, -50 to 500°C (-58 to 932°F) Class B probe temp range, -50 to 90°C (-58 to 194°F) connector temp range, available in 1/4" or 1/8" diameter
PR-23 Series	Multi-Length RTD Probes, -30 to 350°C (-22 to 622°F) Class A probe temp range, -50 to 500°C (-58 to 932°F) Class B temp range, -50 to 90°C (-58 to 194°F) connector temp range, 1/8" diameter

### M12 RTD Cables and Connectors

M12C-PVC-4-S-M-R-F-2	M12, 4 pin Straight Plug to Angled Socket cable - 2m
M12C-PVC-4-S-M-R-F-5	M12, 4 pin Straight Plug to Angled Socket cable - 5m