Type	Range	Accuracy
385, 4 Wire	-200ºC to 850ºC	0.3ºC
385, 3 Wire	-200ºC to 850ºC	0.3ºC
385, 2 Wire	-200ºC to 850ºC	0.6ºC
392, 4 Wire	-200ºC to 660ºC	0.3ºC
392, 3 Wire	-200ºC to 660ºC	0.3ºC
392, 2 Wire	-200ºC to 660ºC	0.6ºC
3916, 4 Wire	-200ºC to 660ºC	0.3ºC
3916, 3 Wire	-200ºC to 660ºC	0.3ºC
3916, 2 Wire	-200ºC to 660ºC	0.6ºC

Setting Alarms

Alarms are set by clicking the 🔔 icon on the desired input signal found in the **Inputs** configuration tab. Setup the threshold and alarm type in the **Condition** section and then select which output to turn on in the **Action** section. The alarm can be set to be latching or non-latching in the **Recovery** section.

ON/OFF Control

To configure ON/OFF Control on a device, navigate to the **Output Configuration Tab** in SYNC and click on the icon located to the right of the available outputs. Clicking the icon will open the **Define ON/OFF Control** dialog box as seen below. Choose the input with the active alarm that you would like to control and set your preferred parameters.

The **Setpoint** establishes the target process value and the **Deadband** establishes the range from the Setpoint that the process value can accept before the output is activated. When **Reverse** control is selected, the output is on when the process value is below the **Setpoint**. When **Direct** control is selected, the output is on when the process value is above the **Setpoint**. Once the ON/OFF Control parameters have been set, click save to finalize the settings.

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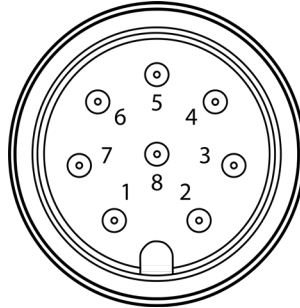
	Name	Function
Pin 1	DIO 0	Discrete I/O Signal 0
Pin 2	INTR	Interrupt Signal
Pin 3	SCL	I2C Clock Signal
Pin 4	SDA	I2C Data Signal
Pin 5	Shield	Shield Ground
Pin 6	DIO 1	Discrete I/O Signal 1
Pin 7	GND	Power Ground
Pin 8	3.3VDD	Power Supply

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
  Configuration: Configurable via IF-001 USB Adaptor and SYNC configuration software
  Software: Compatible with OEG and SYNC configuration software

QUICK START

layer

Probe not included

SP-005
Temperature and RTD Smart Probe

OMEGA

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The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

Introduction

Use this Quick Start Guide to set up your Layer N SP-005 Temperature Monitoring and Control Smart Probe. For additional information regarding your SP-005, refer to the User Manual available on the Omega website.

Materials

Included with your SP-005
• SP-005 Unit
• Quick Start Guide
• M12 5-Pin B Code Screw Terminal accessory available on the Omega website
      -Part Number: M12-S-M-FM

Additional Materials Needed
• Layer N Smart Interface
• Computer/Laptop with Windows OS
• SYNC configuration software
      -Downloadable on the Omega website
• RTD or Thermocouple wires

⚠️ **Important:** An Layer N Smart Interface is required to connect your SP-005 to SYNC configuration software.

Before you Begin

⚠️ **Important:** If you would like to take advantage of the SP-005's plug-and-play feature, simply connect the **Smart Probe** to your **Gateway** with your preferred **Smart Interface** or **wireless transmitter** to begin displaying sensor readings. To adjust the software adjustable features, continue with this quick start guide.

To properly setup the SP-005, ensure the following prerequisites are met:
• Ensure SYNC is downloaded, setup, and running before continuing.

• Ensure you have a Smart Interface compatible with your Smart Probe and your computer running SYNC.

Thermocouple or RTD Connection

Most M12 thermocouple and RTD probes can be connected directly to the SP-005.

Step 1: Assemble your SP-005 by connecting thermocouple or RTD probe to the M12 4-Pin connector of your SP-005.

⚠️ **Important:** If you are connecting wires directly to the SP-005, view the wiring diagrams provided in the sections titled **Thermocouple Interface and Wiring** or **RTD Interface and Wiring** to correctly wire your device.

Connecting your Smart Probe & Interface

Step 1: Connect the SP-005 to your Smart Interface.

Note: **Note:** Locate the position of the keyway as a guide on the SP-005 prior to making the connection.

Step 2: Connect the Smart Interface or Wireless Transmitter to your computer.

SYNC Auto-Detect

Once the SP-005 is connected to your computer, SYNC will automatically detect it and begin displaying temperature readings.

Note: **Note:** If you have successfully connected your SP-005 to SYNC, skip ahead section **Thermocouple Interface and Wiring** or RTD Interface and Wiring.

SYNC Manual Connection

If SYNC does not automatically detect your device, follow these steps:

Step 1: Click on the ➕ icon located on the top left of the SYNC interface.

Step 2: Select End Device / Probe and click **Next**.


End Device/Probe
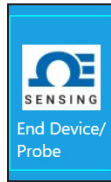
Step 3: Select your **Communication Interface** type from the dropdown and set your preferred Command Timeout, Device Address, and Device ID / Port.
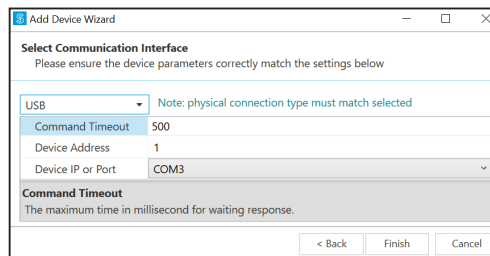
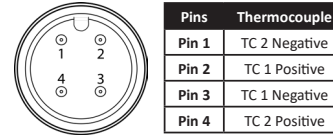**Step 4:** Click **Finish.**

Thermocouple Interface and Wiring

The SP-005 provides interfaces to type J, K, T, E, N, R, S, B, and C thermocouples with the capability of enabling or disabling the open detect feature. To use these features, follow these steps:
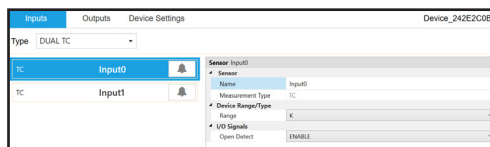
Step 1: Click the **Inputs** configuration tab on SYNC and choose your input type from the **Type** drop down.

Step 2: Click the input you wish to configure and select your thermocouple type from the **Device Range/Type** drop down.

**Step 3:** Click the **Open Detect** drop down and choose to enable or disable it.

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

| Type	Range	Accuracy
J	-210ºC to 1200ºC	0.4ºC
K	160ºC to 1372ºC	0.4ºC
T	190ºC to 400ºC	0.4ºC
E	-220ºC to 1000ºC	0.4ºC
N	-100ºC to 1300ºC	0.4ºC
R	40ºC to 1768ºC	0.5ºC
S	100ºC to 1768ºC	0.5ºC
B	640ºC to 1820ºC	0.5ºC
C	0ºC to 2320ºC	0.4ºC

Cold Junction Compensation

The thermocouple input interface offers cold junction compensation calibration. To achieve proper Ice Point Calibration, you must be able to immerse your thermocouple into an environment that is stabilized at 0ºC (32ºF).

Step 1: Change the input type to **Single TC** or **Dual TC** using SYNC and click **Calibration** beneath the input interface.
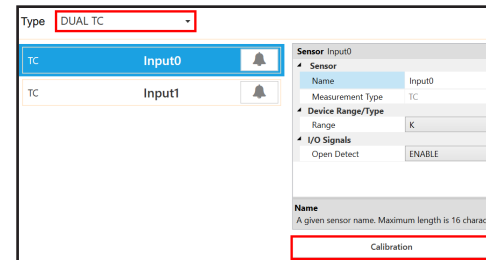
Step 2: Follow the instructions on how to reach a temperature of 0ºC as displayed on SYNC. Once the Thermocouple is stable in a 0ºC environment, click **Calibrate**.
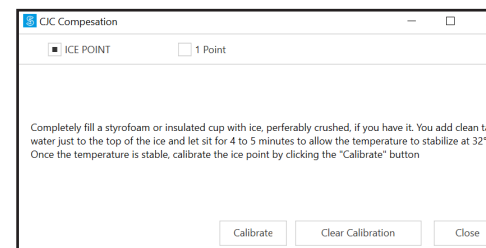

One-Point calibration allows calibration using any arbitrary temperature for thermocouples that do not measure down to 0ºC (32ºF)

RTD Interface and Wiring

The SP-005 provides interfaces to type 100, 500, and 1000 ohm 392 Curve, 100 ohm 3916 curve RTD devices in 2, 3, and 4 wire configurations. To use these features, follow these steps:

Note: **Note:** A single RTD connection is supported.
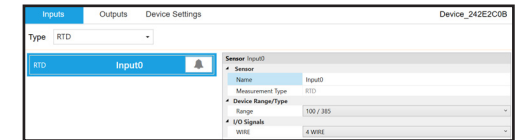
Step 1: Click the **Inputs Configuration Tab** on SYNC and choose your input type from the **Type** drop down.

Step 2: Click the input you wish to configure and select your RTD type from the **Device Range/Type** drop down.

Step 3: Click the **Wire** drop down and choose your wiring configuration.

RTD 4 Wire Option 1

RTD 4 Wire Option 2

RTD 3 Wire

RTD 2 Wire
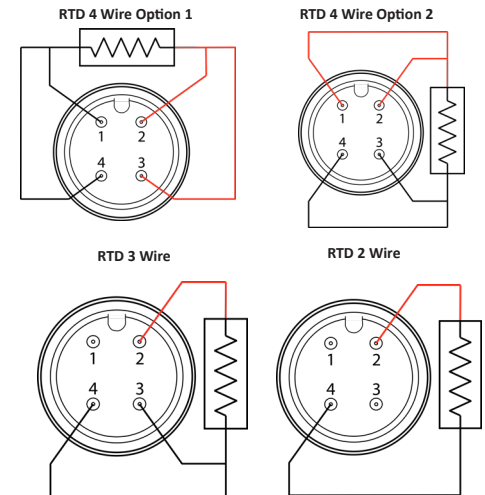
• **2 Wire RTD Connections:** Most useful with high-resistance sensors or in applications where a great deal of accuracy is not required.

• **3 Wire RTD Connections:** This connection is best suited for devices like strain gauges and is most often seen in industrial process and monitoring applications.

• **4 Wire RTD Connections:** A 4 Wire configuration is primarily used in laboratories and other settings where great accuracy is necessary.