


5

Setting Alarms

Alarms are set by clicking the  icon in SYNC 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.

Condition:

Sensor: **Input0** Above 100 for 0 (s)

Action:

Transmit Notification

Turn On Output0

Change Transmission interval to 0 (s)

Recovery:

Duration (s)

Clear Alarm After 0 And Reset Transmission interval

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.

Define ON/OFF Control - Output0

☒ Enable Control

Inputs Setpoint

Input0 0

Output Control Actions DeadBand

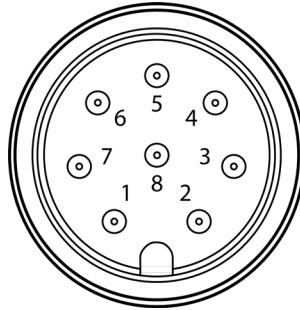
Output0 Reverse 0

Save Cancel

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.

6

Layer N Digital Connector Diagram



| | 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 |

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
Configuration: Configurable via Layer N Smart Interface and SYNC configuration software
Software: Compatible with OEG and SYNC configuration software

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair or calibration,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

OMEGA is a trademark of OMEGA ENGINEERING, INC.

© Copyright 2019 OMEGA ENGINEERING, INC. All rights reserved. This document may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without the prior written consent of OMEGA ENGINEERING, INC.

QUICK START

CE

layer



SP-016
Heat Flux Smart Probe

OMEGA

omega.com info@omega.com

Servicing North America:

U.S.A. Headquarters: Omega Engineering, Inc.
 800 Connecticut Ave. Suite 5N01, Norwalk, CT 06854
 Toll-Free: 1-800-826-6342 (USA & Canada only)
 Customer Service: 1-800-622-2378 (USA & Canada only)
 Engineering Service: 1-800-872-9436 (USA & Canada only)
 Tel: (203) 359-1660 Fax: (203) 359-7700
 e-mail: info@omega.com

For Other Locations Visit omega.com/worldwide

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-016 Heat Flux Smart Probe. For additional information regarding your SP-016, refer to the User Manual available on the OMEGA website.

Materials

Included with your SP-016

- SP-016 Unit
- Quick Start Guide

Additional Materials Needed

- Layer N Smart Interface
- Computer/Laptop with Windows OS
- SYNC configuration software
 - Downloadable on the Omega website
- Heat Flux sensor such as OMEGA *HFS-5*
- M12-S-M-FM connector
 - Sold separately on the OMEGA website

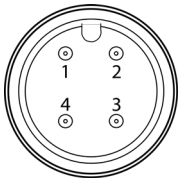
Before you Begin

To properly setup the SP-016, 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.

Heat Flux Sensor Connection

Use the provided 4-Pin wiring diagram to connect your heat flux sensor to your SP-016.



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

Connecting your Smart Probe & Interface

Step 1: Connect the SP-016 to your Layer N Smart Interface.

Note: Locate the position of the keyway as a guide on the SP-016 prior to making the connection.

Step 2: Connect the Smart Interface to your computer.

SYNC Auto-Detect

Once the SP-016 is connected to your computer, SYNC will automatically detect it and begin displaying temperature readings.

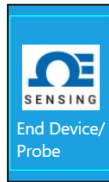
Note: If you have successfully connected your SP-016 to SYNC, skip ahead section **Heatflux Sensor Configuration**

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**.



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**.

Heat Flux Sensor Configuration

The SP-016 provides heat flux measurements in W/m². The SP-016 also offers discrete I/O. To use these features, follow these steps:

Step 1: Click the **Inputs** configuration tab on SYNC and choose the **Heatflux** input type from the **Type** drop down.

Note: Refer to your heat flux sensor data sheet for Sensitivity, Gain, and Offset values. Units for Sensitivity are measured in: **mV/(W/m²)**

To access the discrete I/O, click the relevant input type from the **Type** drop down that lists DIO.

Thermocouple Configuration

The SP-016 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 an input type that includes **TC** 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.

| 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 | -220°C to 1000°C | 0.4°C |
| N | -100°C to 1300°C | 0.4°C |
| R | 40°C to 1768°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 |

Cold Junction Calibration

Note: Refer to your heat flux sensor data sheet for Sensitivity, Gain, and Offset values. Units for Sensitivity are measured in: **mV/(W/m²)**

The SP-016 has automatic Cold Junction Compensation and is factory calibrated so that in most cases it needs no adjustment. However, for increased accuracy, Cold Junction Calibration can be performed as described below.

Note: The default thermocouple type is K-type. When using a different TC type, ice-point calibration must be completed to ensure accurate readings.

Step 1: Ensure your thermocouple has been configured in the previous section and click **Calibration** beneath the input interface.

Step 2: Insert probe into 0°C reference and allow it to stabilize. Once the Thermocouple is stable in a 0°C (32°F) environment, click **Calibrate**.