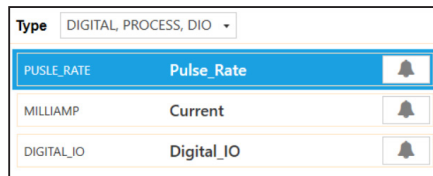


Active High/Active Low Circuit Example

Configuring Process Input (Mixed Mode)

The SP-013 can accept one digital pulse input and one process input when set to the mixed (DIGITAL, PROCESS or DIGITAL, PROCESS, DIO) input mode is selected. To use these features, follow these steps:

Caution: All three inputs share the same ground connection.



SYNC interface mixed mode configuration

Step 1: Click the **Inputs Configuration Tab** on SYNC and choose an input type that lists **Digital, Process** from the **Type** dropdown.

Step 2: Click the Digital or Process input that you will configure.

Step 3: Configure your device inputs to your preferred settings.

Pairing a Sensing Device

Refer to either the Wireless Pairing or Wired Pairing instructions as applicable:

Wireless Pairing

Pairing your wireless Smart Interface (IF-006) and attached Smart Probe is made easy with a one-button pairing system between the IF-006 and the Layer N Gateway.

Step 1: Push the pairing button once on your IF-006. The LED Status Indicator will blink green indicating it is in Pairing Mode.

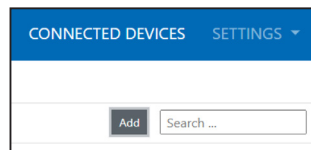
Step 2: Quickly push the pairing button on the Layer N Gateway. The LED on the Gateway will blink green indicating the Gateway is in Pairing Mode.

When the IF-006 has been successfully paired to the Layer N Gateway, the LEDs will stop blinking on both devices.

Wired Pairing

Wired Smart Probes connected directly to a Layer N Gateway with an IF-001 cable or IF-002 will need to be added to the Gateway Internal User Interface.

The Connected Devices tab is the default page set once you are signed into the internal gateway UI. From here, you can add devices to your gateway to have them appear in your Layer N Cloud account.



To add a device to the gateway from the internal gateway web UI, begin by clicking the **Add** button at the top right of the web page and fill out the **Add Device** menu according to the device specifications.

For more information regarding wired or wireless pairing, refer to the Layer N Gateway User's Manual available on the Omega website.

Once the SP-013 has been successfully paired to a Layer N Gateway the device may be placed in its final sensing location. Readings will transmit to the Layer N Cloud or OEG according to the rate set in the Layer N Cloud or OEG settings and subscription tier.



SP-013
Layer N Digital Interface Smart Probe

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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.

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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.

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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-013 Digital Pulse Input Smart Probe. For additional information regarding your SP-013, refer to the User Manual available on the Omega website.

Materials

Included with your SP-013

- SP-013 Unit
- Quick Start Guide

Additional Materials Needed

- An M12.5-S-M-FM screw terminal accessory
- A Layer N Smart Interface
- A Windows 7,8, 9, 10, or 11 OS PC or laptop with Omega's free SYNC configuration software
- A compatible Layer N Gateway
- A Layer N Cloud account or a qualifying Omega Enterprise Gateway license tier (Pro, Business, or Business Pro)

Optional Materials

- M12.8-T-SPLIT Sensor Splitter (For DIO access)
- M12.8-S-M-FM Screw Terminal Accessory (For DIO access)



Important: A Layer N Smart Interface is required to connect your SP-013 to SYNC configuration software. For a list of available Smart Interfaces, visit the Omega website.

Before you Begin

Users must have a registered Layer N Cloud account or a qualifying Omega Enterprise Gateway (OEG) license to complete the setup process and view sensor data.

For Layer N Cloud setups, the user will need to first register a Layer N Gateway to the account before the Smart Probe and Smart Interface can be paired.

If the Layer N Smart Probe will be paired wirelessly with an IF-006, the Layer N Gateway firmware must be updated. Layer N Gateways update automatically upon first-time setup. For instructions on how to manually update Layer N Gateway firmware, refer to the Layer N Gateway User's Manual.



Important: If the user intends on pairing the Smart Probe using a Layer N IF-006 to an existing Layer N Gateway, it is required to update the Gateway firmware to version 1.0.9 or higher to ensure the Gateway and IF-006 communicate and operate correctly.

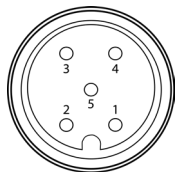
Connecting Wire Leads to the SP-013

Wire leads providing digital pulse inputs can be connected to an M12.5-S-M-FM screw terminal accessory that can then be attached to the 5-pin connector of the SP-013.

Step 1: Use the pin layout diagram below to connect the wire leads to the M12.5-S-M-FM accessory.



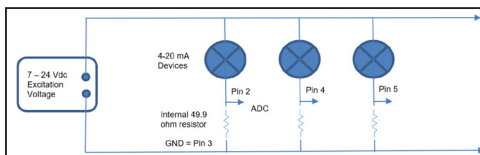
Note: An M12.5-S-M-FM connector can be used to connect wire leads to your SP-013.



Smart Probe M12 5-pin female connector front view

Pin	Digital Mode	Mixed Mode
Pin 1	Excitation Power (3.3 V _{DC} , 100 mA)	Excitation Power (3.3 V _{DC} , 100 mA)
Pin 2	DIN 0/Pulse A	DIN 0/ Pulse A
Pin 3	Ground Reference	Ground Reference
Pin 4	DIN 2/Enable/ Direction/ Pulse B	Process 0
Pin 5	DIN 1/Reset	DIN 1/Reset

4-20 mA Connection



4-20 mA 5-pin wiring

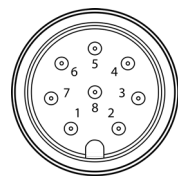
Connecting your Smart Probe & Interface

Step 1: Connect the SP-013 to your Layer N Smart Interface.



Note: Locate the position of the keyway as a guide on the SP-013 prior to making the connection.

Step 2: Connect the Smart Interface with Smart Probe attached to a computer running SYNC configuration software.

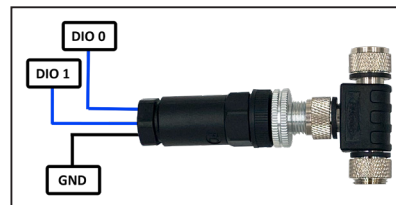


Smart Probe M12 8-pin male connector front view

	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

Discrete I/O

If the smart probe discrete I/O will be utilized, an **M12.8-T-SPLIT** and an **M12.8-S-M-FM** will need to be connected between the Smart Interface and Smart Probe. Refer to the previous pin diagram and the diagram below to connect the accessories:



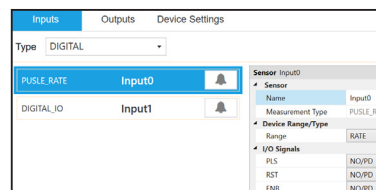
M12.8-T-SPLIT and M12.8-S-M-FM for DIO access

Smart Probe SYNC Configuration

The Smart Probe can be configured using Omega's free SYNC configuration software. Once the SP-013 is connected to the computer, SYNC will automatically detect it and begin displaying readings.

Configuring Digital Inputs

The SP-013 accepts digital pulse inputs and may be configured to monitor the on/off state of the input signals, the pulse rate or pulse duty cycle of the primary input, or the pulse delay between two signals. To use these features, follow these steps:



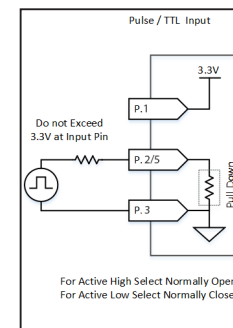
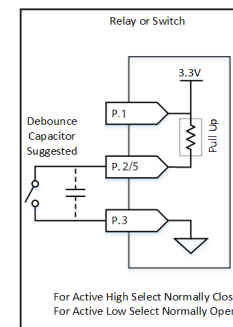
SYNC interface digital input

Step 1: Click the **Inputs Configuration Tab** on SYNC and choose the **Digital** input type from the **Type** drop down.

Select the type of digital input in the **Device Range/Type** drop down in SYNC. The following types are available:

Selection	Measurement	Description
DIN	Digital Input	3-bit Binary Digital Input
RATE	Frequency	Measure the Frequency of Rising or Falling Edges
WIDTH	Pulse Width	Measure the active time of a signal
DUTY	Duty Cycle	Measure the % of active time of a signal
DELAY	Delay Timer	Measure the time between the rising edges of Pulse A and Pulse B
COUNT	Up Counter/ Totalizer	Counter with Enable and Reset
U/D_CNT	Up/Down Counter/ Totalizer	Counter with Direction and Reset

Each of the two input pins can be independently set to either have an internal 1.5k **Pull Up (PU)** or **Pull Down (PD)** and can be set to be either Active High or Active Low by selecting **Normally Open (NO)** or **Normally Closed (NC)**. Some typical circuits are shown below:



Active High/Active Low Circuit Example