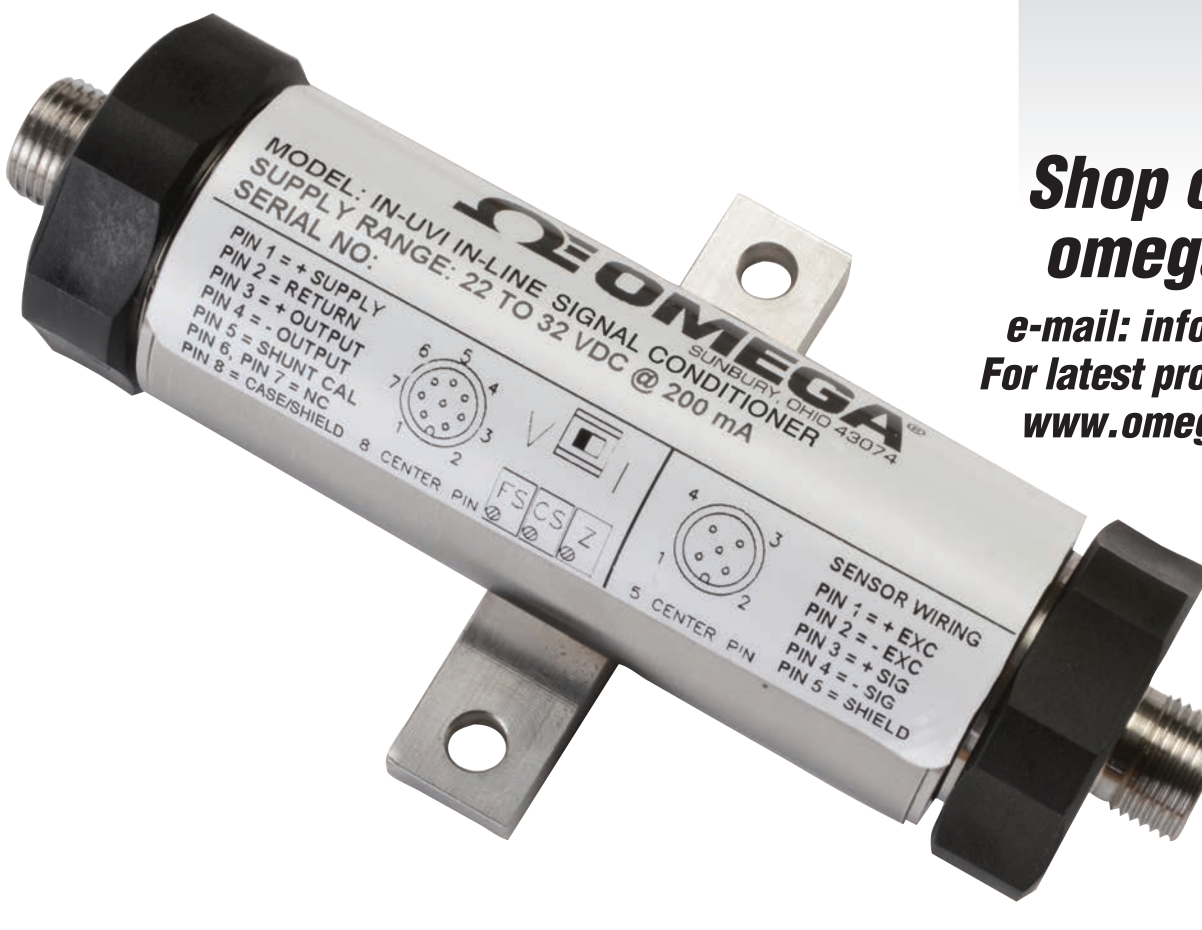
1 YEAR WARRANTY

OMEGA®

User's Guide



Shop online at omega.com℠

e-mail: info@omega.com

For latest product manuals: www.omegamanual.info

IN-UVI
Universal In-line Signal Conditioner

omega.com   info@omega.com

Servicing North America:

U.S.A.: Omega Engineering, Inc., One Omega Drive, P.O. Box 4047
Stamford, CT 06907-0047 USA
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.

Table of Contents

Page

List of Figures

Section 1

1.1 Introduction

The OMEGA Model IN-UVI In-Line signal conditioner is housed in a rugged stainless steel enclosure. The signal conditioner is connected between a load cell or pressure transducer and a readout instrument or a DAQ system. The Model IN-UVI signal conditioner supplies a highly regulated bridge excitation voltage to the transducer and converts the millivolt signal from the transducer to a voltage (0-5, 0–10, ±5, ±10 Vdc) or a current (4-20 mA or a 12 mA ±8 mA) which is isolated from the input power supply. The IN-UVI In-Line features include two selectable excitation voltages (either 5 volt or 10 volts Vdc), programmable gain instrumentation signal conditioner for signals from .5 mV/V to 4 mV/V and a wide adjustment range on the zero and span. The in-line also includes a buffered solid-state shunt calibration feature for quick field calibration and checking of calibration.

1.2 Specifications

Input Power:	22 to 32 Isolated from output
Input Current:	90 mA Max (Must be capable of supplying 200 mA)
Voltage Output:	±5 Volts, ±10 Volts at 2 mA Max
Output Resistance:	60 Ohms
Noise:	10 mV Peak to Peak @ 3 mV/V Voltage Mode (10 Vdc) 20 uA Peak to Peak Current Mode
Short Circuit Protection:	Yes + Output to – Output
Current Output:	4-20 mA, 12 mA ZERO ±8 mA Outputs Field Programmable
Maximum Load Resistance:	700 Ohms at 20 mA
Operating Temperature:	-20 to 60°C (0 to 140°F)
Time Constant:	200 us (0 to 63%)
Excitation Voltage:	5 or 10 Vdc field Programmable
Excitation Max Current:	30 mA @ 10 Vdc
Sensor Input Range:	0.5 mV/V to 4 mV/V in 0.5 steps @ 10 Vdc EXC
Shunt Cal:	Yes (can be remotely activated)
Environmental Protection:	IP65
Long Term Zero Drift:	0.1%/Year of FS
Temperature Effects	
Zero:	±0.001%/°F (Auto zero front end of FS)
Span:	±0.0025%/°F of FS
Linearity:	±0.01% of FS
Zero Adjustment Range:	±30% of FS
Span Adjustment Range:	±20% Fine Span of FS ±40% Coarse Span of FS
EMC Affect:	<0.15% per EN 61326-1 (Industrial)
TRANSDUCER REQUIREMENTS	
Bridge Excitation:	5 Vdc or 10 Vdc
Bridge Sensitivity:	1 to 8 mV/V @ 5 Vdc EXC, 0.5 to 4 mV/V for 10 Vdc EXC
Bridge Resistance:	350 to 5,000 Ω*

*Time constant 0 – 63%: 200 μS for a 350 Ω bridge/1.2 mS for a 5000 Ω bridge

1.3 Layout and Controls

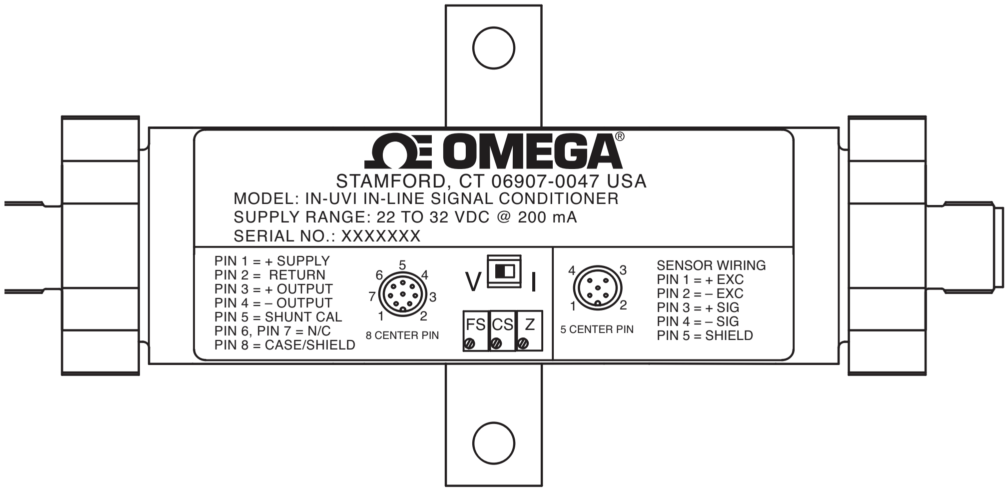


Figure 1-1. Outline Of In-line Signal Conditioner

The IN-UVI in-line is rated IP-65 with the end caps and hex nuts in place. Behind the two plastic hex nut and removable connectors are switches and potentiometers for setting up the signal conditioner for the required excitation, sensitivity and output type as follows.

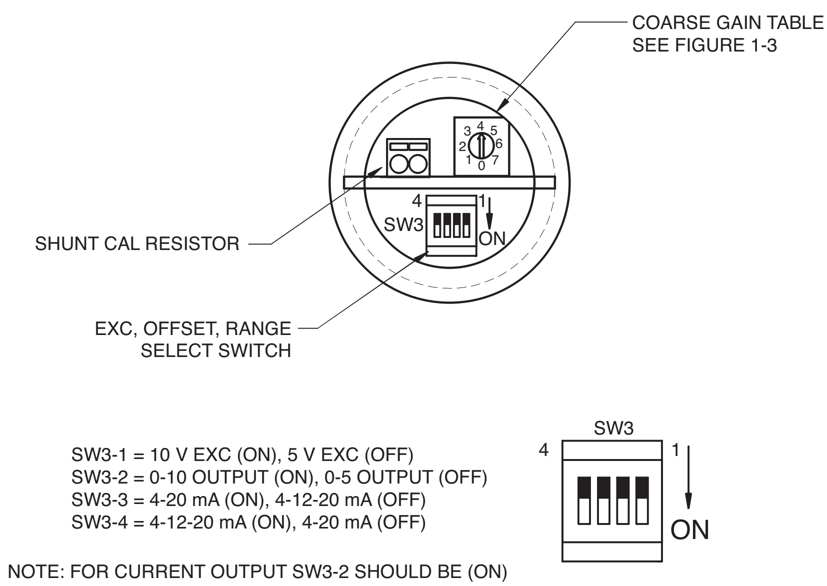


Figure 1-2. Adjustments Behind The 5 PIN M12 Connector

GAIN CHART		
SETTING	5V EXC	10V EXC
0	1 mV/V	.5 mV/V
1	2 mV/V	1 mV/V
2	3 mV/V	1.5 mV/V
3	4 mV/V	2 mV/V
4	5 mV/V	2.5 mV/V
5	6 mV/V	3 mV/V
6	7 mV/V	3.5 mV/V
7	8 mV/V	4 mV/V

Figure 1-3. Gain Chart In mV/V for the Coarse Gain Switch (See Figure 1-2)

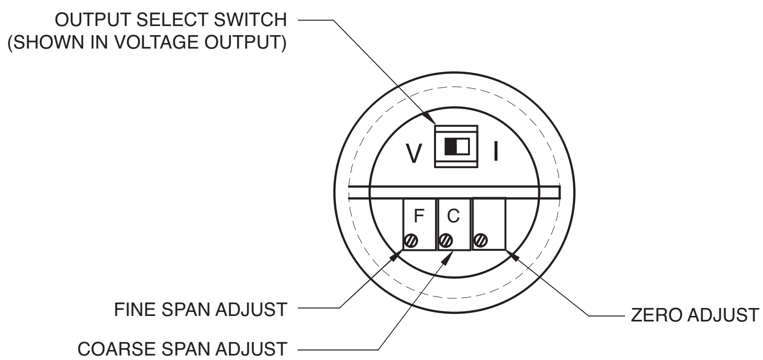


Figure 1-4. Adjustments Behind 8 PIN M12 Connector

Section 2

2.1 Transducer Input Cables And Optional M12 Connector With Screw Termination.

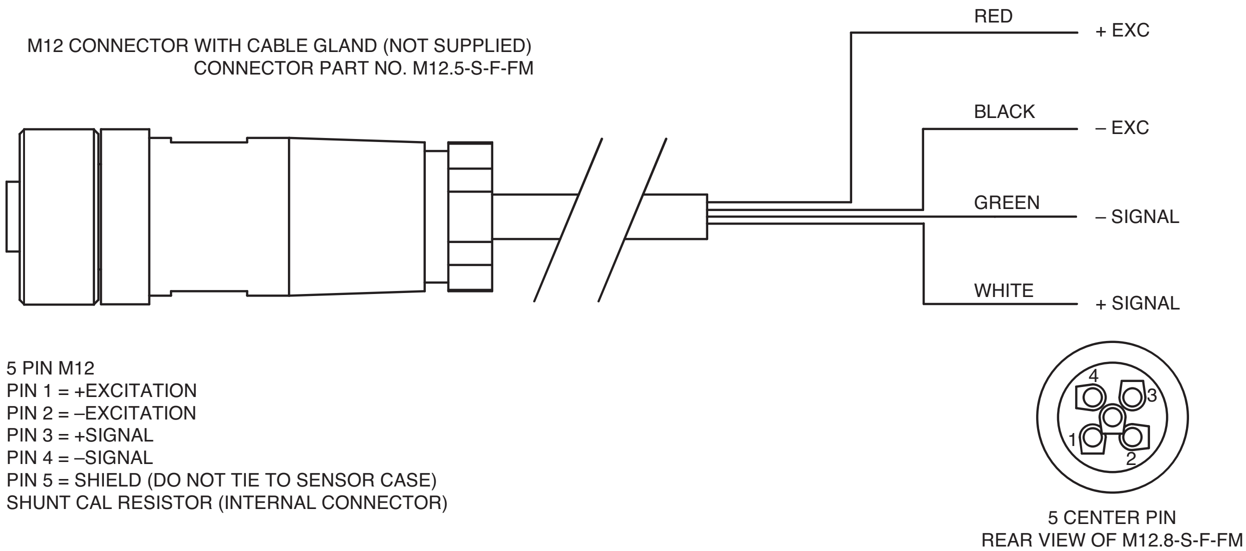


Figure 2-1. Transducer Cable

The wiring color code shown is for LCFD load cell. Check the transducer spec calibration sheet for the transducer wiring code or color code. Cable should be a minimum of Omega part no. TX4-XXX bulk cable available on the Omega website (http://www.omega.com/pptst/PX_WIRE.html). The shield should be tied to Pin 5 on the IN-UVI but do not connect the shield to the transducer case. For cable assemblies with connectors pre-wired for load cells and pressure transducers see the CA series on the Omega website (http://www.omega.com/pptst/CA_Series.html) or contact a sales engineer.

2.2 Power Supply and Output Cable

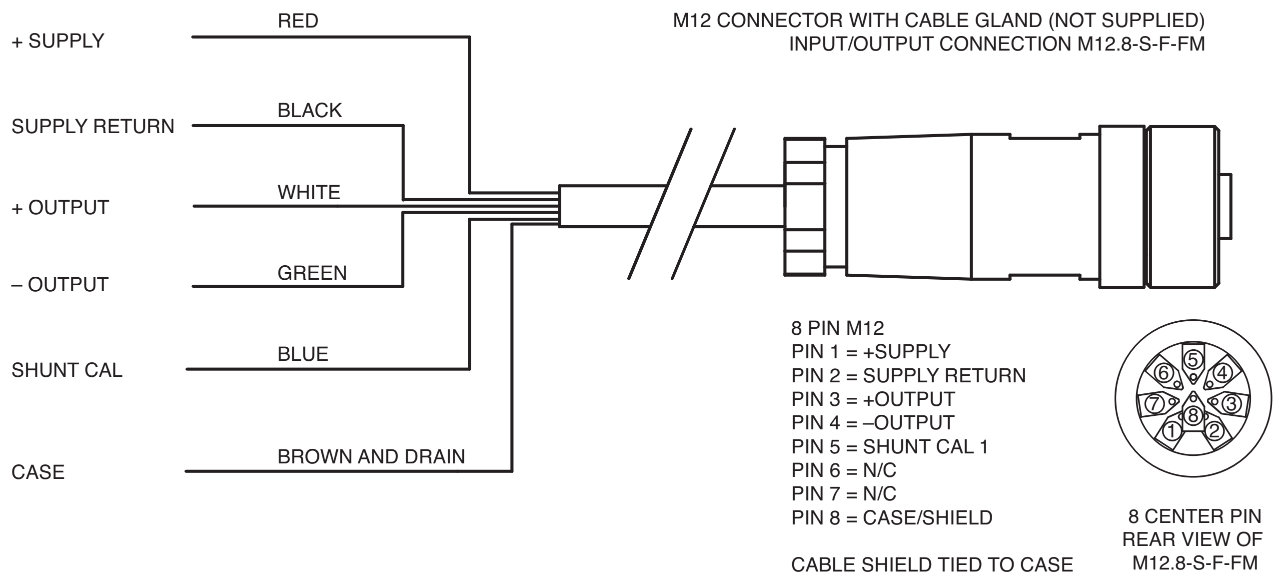


Figure 2-2. Wiring Using TX8 Cable

OMEGA cable TX8-XXX, a general purpose eight conductor cable with a PVC jacket, can be used to wire the input/output cable shown above. Check wiring color if another cable is used." TX8-XXX bulk cable available on the Omega website (http://www.omega.com/pptst/PX_WIRE.html).

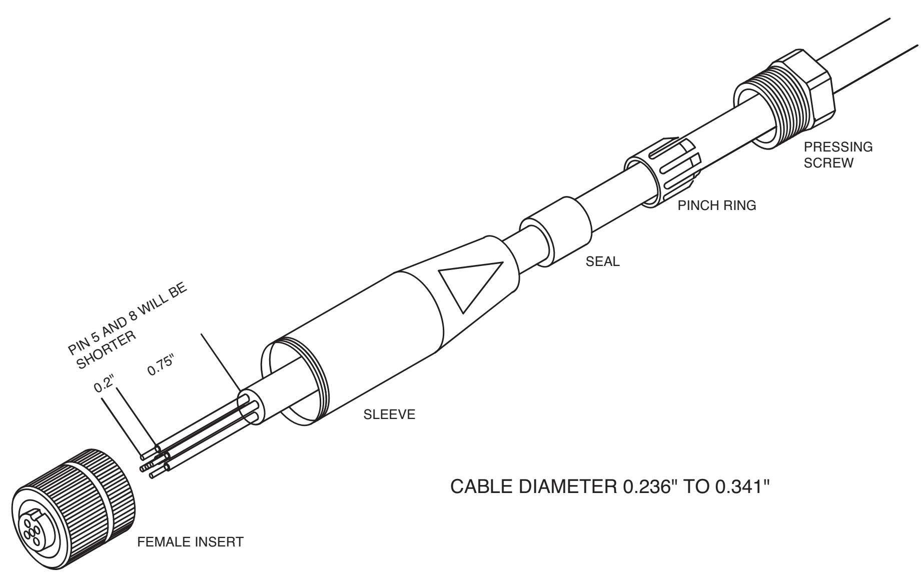


Figure 2-3. Assembly Of M12.5 And M12.8 Connectors

After wiring the transducer proceed to the setup before powering the in-line.

2.3 Setup

Use the following procedure for setting up the excitation, the coarse gain and install the shunt calibration resistor if used, see Section 3 for shunt Cal calculations:

1. Remove the HEX nut from the in-line with the 5 pin M12 connector to access the switches and with a twisting action remove the connector.
2. Determine the EXCITATION VOLTAGE required by the transducer being used from the transducer calibration data sheet.
3. Set the EXCITATION Switch using SW3-1 OFF for 5 volts, ON for 10 volts excitation: (See Figure 1-2 for location of SW3).
4. Determine the sensitivity of the transducer in mV/V from the transducer calibration sheet.
5. Set the COARSE GAIN SWITCH (See Figure 1-2 for location of switch) to the nearest mV/V setting in the corresponding excitation column in Figure 1-3.
6. Determine the type of output desired voltage or current:

   For 5 volts output SW3-2 is OFF.

   For 10 volts output SW3-2 is ON.

   For 4-20 mA current output SW3-2, SW3-3 are ON and SW3-4 is OFF.

   For a 4-12-20 mA current output used with tension-compression load cells or compound pressure sensors (12 mA is ZERO). SW3-2, SW3-4 are ON and SW3-3 is OFF. See Figure 1-2 for locations and chart.
7. If the transducer or load cell has a shunt calibration resistor value, it can be installed inside the IN-UVI at this time in the spring-cage connector shown in Figure 1-2. The resistor leads can be bent and cut to a length of 0.5 inches from the body of the resistor and pushed into the connector using needle nose pliers. The resistor can be removed by inserting a small blade of a slotted screwdriver (0.4 x 2 mm TIP) into the slot above the resistor to release the spring holding the resistor leads. Be sure to locate the resistor away from the case or the PCB on the connector.
8. Replace the connector by carefully reinstalling the connector and O-ring assembly with a twisting action. The O-ring should completely be inside the IN-UVI housing with metal of the connector housing is touching the metal case. Replace the hex nut.
9. Remove the HEX nut from the in-line with the 8 pin M12 connector to access the adjustment potentiometers and output type switch. Remove the connector with a twisting action. Set the output type switch to either voltage or current as required.
10. The INPUT/OUTPUT cable should be wired as shown in Figure 2-2. The supply return (PIN 2) and negative output (PIN 4) should be grounded to earth to prevent damage from voltage transient. If the Shunt Cal is being used, it is activated by connecting PIN 5 to PIN 1 by a switch or some type of jumper. The system should be similar to the system in Figure 2-4.

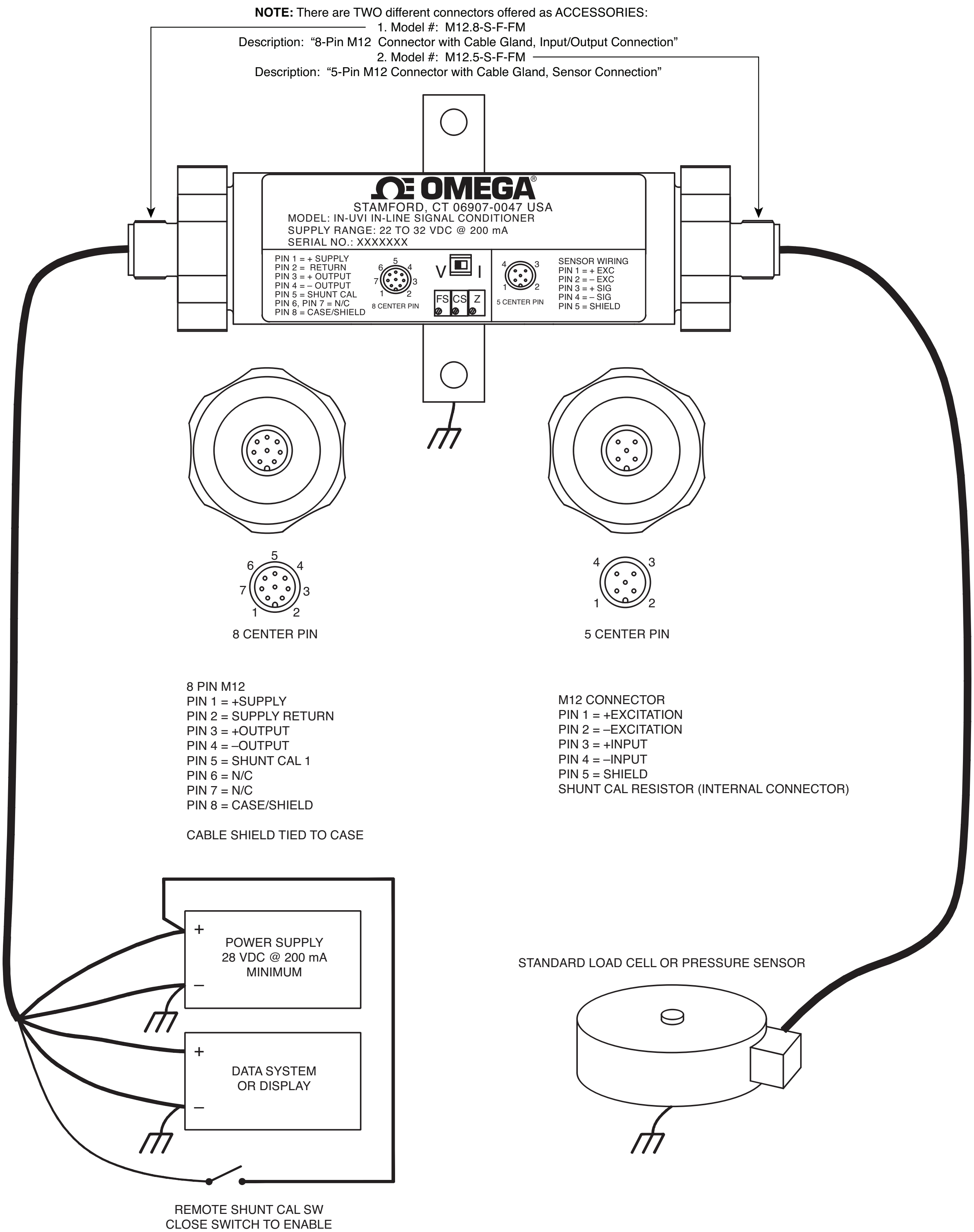


Figure 2-4. Typical IN-UVI System Schematic

11. Connect the INPUT/OUTPUT cable to the in-line and allow the unit to stabilize for 10 minutes.
12. With zero pressure or load applied to the transducer, adjust the zero potentiometer to indicate zero on the readout or voltmeter connected between the +output and -output.
13. Apply full scale pressure or load to the transducer and adjust the coarse span potentiometer to indicate full scale on the readout or voltmeter. Use the fine span potentiometer to trim the full scale as needed.
14. Re-check zero and full scale and adjust as needed.
15. The IN-UVI should be mounted in a location free of vibration with the case connected to earth ground.

NOTES:

3.1 Using Shunt Calibration for Field Setup

Shunt calibration is a method which applies a known resistance across one leg of the transducer and simulates an output as if a load or pressure was applied to the transducer. When performing shunt calibration, the transducer should be at ZERO pressure or load. The full scale output and Shunt Cal output is found on the TRANSDUCER CALIBRATION SHEET along with the Shunt Cal resistor value. In the UN-UVI the internal Shunt Cal resistor is applied across the –Output and the –Excitation, check the transducer Calibration Sheet to make sure this is the correct leg of the bridge to connect the Shunt Cal. If the transducer uses a different leg of the bridge the Shunt Cal resistor will need to be applied manually. This information is used to calibrate the signal conditioner's output and the readout's display with the following equations. Once the transducer is calibrated the ZERO can be adjusted without affecting the calibration of the transducer with IN-UVI's non-interactive adjustments.

TRANSDUCER CALIBRATION DATA

Full Scale Output =	____________	mV/V
Shunt Resistor Value =	____________	Ohms
Shunt Cal Output =	____________	mV/V

The following equations are used to calculate output voltage/current:

FORMULA TO CALCULATE OUTPUT VOLTAGE

SHUNT CAL OUTPUT X FULL SCALE VOLTAGE (5 or 10 volts) = OUTPUT VOLTAGE

FULL SCALE OUTPUT

__________________ X ____________________ = ________________

FORMULA TO CALCULATE OUTPUT CURRENT

SHUNT CAL OUTPUT X FULL SCALE OUTPUT (16 or 8 mA) = OUTPUT CURRENT + 4 mA or 12 mA

FULL SCALE OUTPUT

__________________ X _______________ = ________________ + 4 mA or 12 mA

The shunt calibration feature can be used to setup the display engineering units using the following equations:

FORMULA TO CALCULATE ENGINEERING UNITS

SHUNT CAL OUTPUT X FULL SCALE UNITS = ENGINEERING UNITS

FULL SCALE OUTPUT

__________________ X ________________ = _____________

Step 1. Apply power and allow the signal conditioner to warm up.

Step 2. With zero load or pressure on the transducer, adjust the ZERO potentiometer to indicate zero on the voltmeter or ma meter. For current output, the zero will be either 4 milliamps or 12 milliamps depending on the selected setup.

Step 3. Connect a jumper between PIN 5 and PIN 1 of the INPUT/OUTPUT connector (See Figure 2-2) or wire in a switch as shown in Figure 2-3. Adjust the SPAN potentiometer to the calculated voltage or calculated units on the readout instrument or voltmeter.

Step 4. Disconnect the Shunt Cal jumper or release the Shunt Cal switch and repeat steps 2 & 3 if needed.

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.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

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,
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 registered trademark of OMEGA ENGINEERING, INC.

© Copyright 2015 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.

Where Do I Find Everything I Need for Process Measurement and Control? OMEGA...Of Course!

Shop online at omega.com℠

TEMPERATURE

- Thermocouple, RTD & Thermistor Probes, Connectors, Panels & Assemblies
- Wire: Thermocouple, RTD & Thermistor
- Calibrators & Ice Point References
- Recorders, Controllers & Process Monitors
- Infrared Pyrometers

PRESSURE, STRAIN AND FORCE

- Transducers & Strain Gages
- Load Cells & Pressure Gages
- Displacement Transducers
- Instrumentation & Accessories

FLOW/LEVEL

- Rotameters, Gas Mass Flowmeters & Flow Computers
- Air Velocity Indicators
- Turbine/Paddlewheel Systems
- Totalizers & Batch Controllers

pH/CONDUCTIVITY

- pH Electrodes, Testers & Accessories
- Benchtop/Laboratory Meters
- Controllers, Calibrators, Simulators & Pumps
- Industrial pH & Conductivity Equipment

DATA ACQUISITION

- Data Acquisition & Engineering Software
- Communications-Based Acquisition Systems
- Plug-in Cards for Apple, IBM & Compatibles
- Data Logging Systems
- Recorders, Printers & Plotters

HEATERS

- Heating Cable
- Cartridge & Strip Heaters
- Immersion & Band Heaters
- Flexible Heaters
- Laboratory Heaters

ENVIRONMENTAL MONITORING AND CONTROL

- Metering & Control Instrumentation
- Refractometers
- Pumps & Tubing
- Air, Soil & Water Monitors
- Industrial Water & Wastewater Treatment
- pH, Conductivity & Dissolved Oxygen Instruments

M5549/1215