

# AutoXP Installation Guide

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# Revision History

Revision Level	Date	Comments
A	02/2018	Initial release (ECO 9358).
B	07/2018	Add CSA Class 1 Div 2 (ECO 9535).
C	07/2019	Revised per ECO 9808.
D	12/2019	Revised per ECO 9890 .



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# Chapter 1

## Product Overview

### Introduction

The Thermo Scientific AutoXP™ is a small, compact explosion proof edition of the Thermo Scientific flow computer product line. The AutoXP combines Thermo Fisher Scientific's long legacy of flow computer knowledge with all the latest technology, e.g., low power, high speed data connectivity, and high accuracy. The AutoXP is designed to provide ultimate flexibility to our customers by providing a unit that can be used as a single-run flow computer or smart multi-variable transmitter. This unit can be configured for both gas and liquid applications utilizing today's most common primary devices.



Figure 1-1. AutoXP

## Using this Manual Safety

This manual provides a description of the product, installation instructions, maintenance, and basic troubleshooting procedures.

The information in this manual is designed to aid personnel to correctly and safely install, operate, and / or maintain the system described; however, personnel are still responsible for considering all actions and procedures for potential hazards or conditions that may not have been anticipated in the written procedures. **If a procedure cannot be performed safely, it must not be performed until appropriate actions can be taken to ensure the safety of the equipment and personnel.** The procedures in this manual are not designed to replace or supersede required or common sense safety practices. All safety warnings listed in any documentation applicable to equipment and parts used in or with the system described in this manual must be read and understood prior to working on or with any part of the system.

The following admonitions are used throughout this manual to alert users to potential hazards or important information. **Failure to heed the warnings and cautions in this manual can lead to injury or equipment damage.**



**Warning** Warnings notify users of procedures, practices, conditions, etc. which may result in injury or death if not carefully observed or followed. The triangular icon displayed with a warning varies depending on the type of hazard (general, electrical). ♦



**Caution** Cautions notify users of operating procedures, practices, conditions, etc. which may result in equipment damage if not carefully observed or followed. ♦

**Note** Notes emphasize important or essential information or a statement of company policy regarding an operating procedure, practice, condition, etc. ♦



**Tip** Tips may also be used in this manual. They are suggestions or things to consider that will help you use the instrument or this manual. ♦



## Security Consideration

**Warning** ThermoFisher Scientific strongly recommends changing passwords before first use/login on this equipment. ▲

## Specific Conditions of Use

1. Do not open when an explosive atmosphere is present.
2. For means of cable transfer only suitably rated II 2 G Ex d IIB IECEx certified entry devices must be used.
3. For means of cable transfer via conduit, a conduit sealing device must be installed within 50mm of the enclosure. Conduit sealing device must be suitably rated for application and meet the requirements of Clause 13.5, IEC60079-1.
4. Any unused entries must be blanked via suitably rated II 2 G Ex d IIB IECEx certified blanking elements.
5. External Cables shall be suitable for use at temperatures of 76°C (T5) and 86°C (T6).

## Chapter 2

# Installation

The following provides a description of the AutoXP and installation procedures. All safety warnings listed in any documentation applicable to equipment and parts used in or with the system described in this manual must be read and understood prior to working on or with any part of the system.

### General Wiring Requirements

1. Installation should be in accordance with ANSI/ISA RP 12.6 and the NEC ANSI/NFPA 70, or Canadian Electrical Code Part 1.
2. All wiring requires a minimum insulation rating of 85°C.
3. Approved conduit seals must be installed within 18 inches (457 mm) of the housing.
4. Equipment must be installed by qualified personnel.
5. Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
6. Service connections can only be used when the atmosphere is known to be safe.
7. Open enclosure only if location is known to be non-hazardous and power is removed from the meter.

The following illustrations provide the overall dimensions (inches) for the AutoXP:

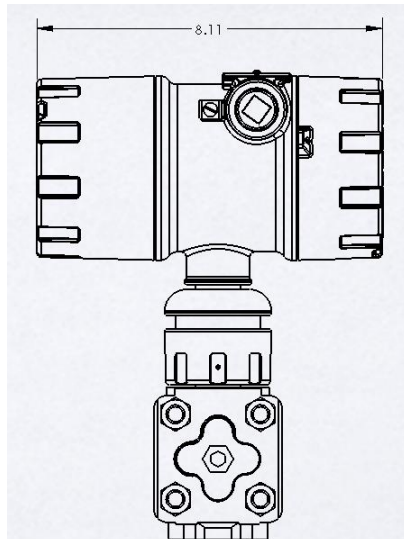
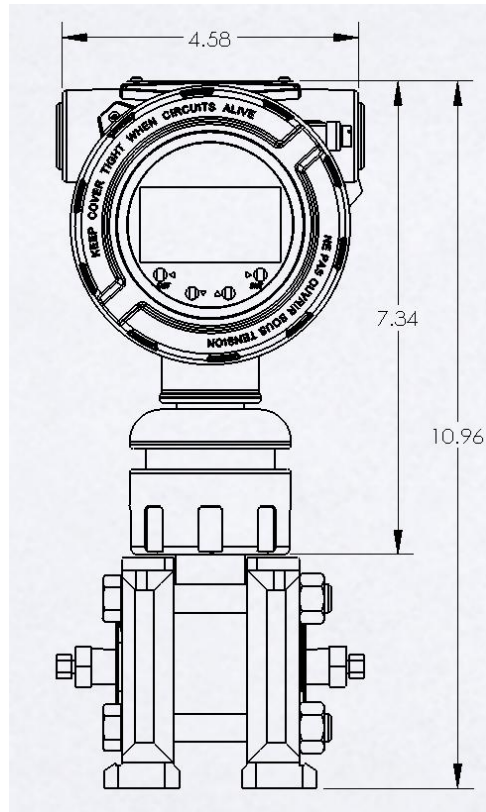


Figure 2-1. AutoXP Dimensions

Enclosure cap locking screw:

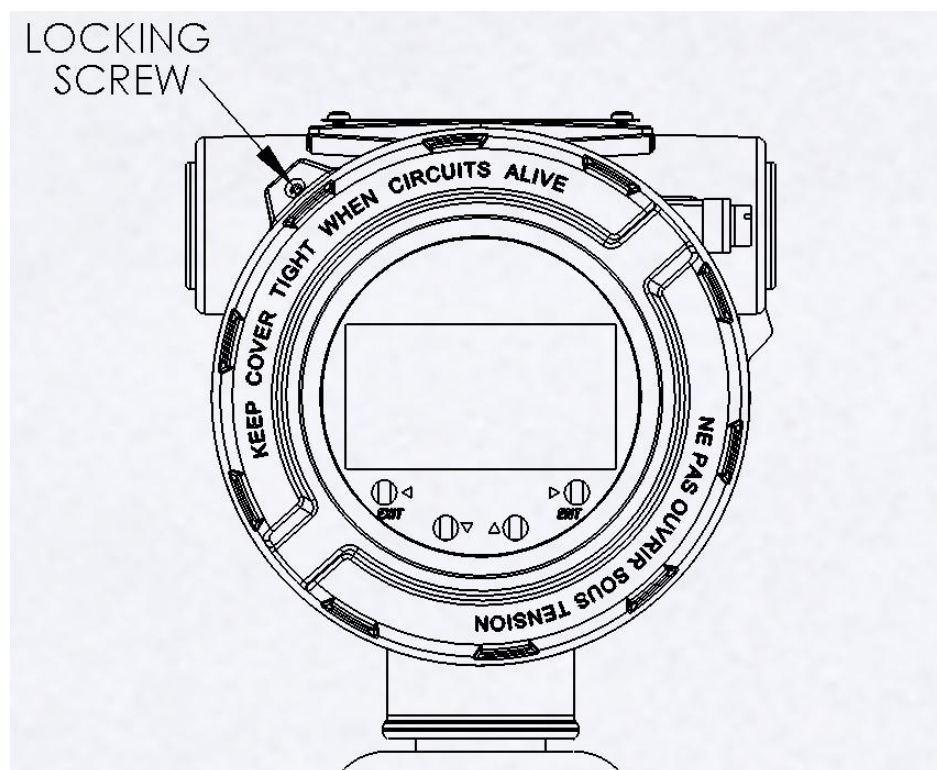


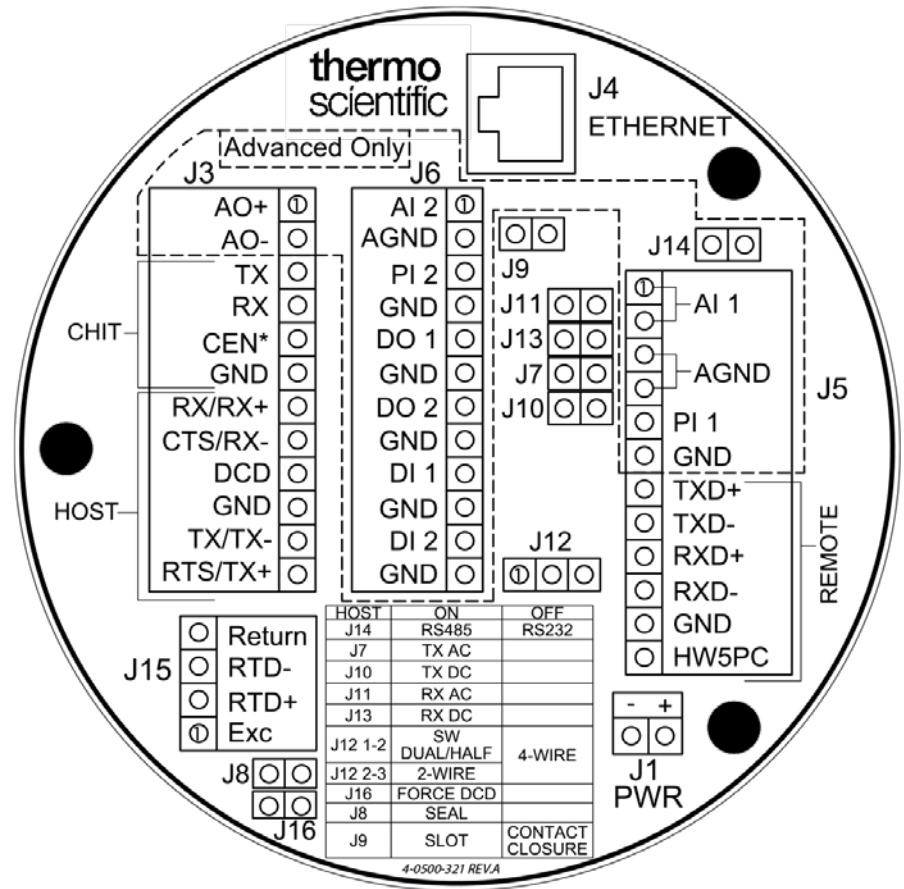
Figure 2-2. Enclosure Cap Locking Screw

List of required tools:

- Flat head screwdriver
- ¼" wrench or socket
- 3/8" wrench
- 3/64" Allen wrench
- 1.5 mm Allen wrench
- Strap wrench

# AutoXP Jumper Locations

The following illustrations provide the AutoXP Jumper Locations.



HOST	ON	OFF
J14	RS485	RS232
J7	TX AC	
J10	TX DC	
J11	RX AC	
J13	RX DC	
J12 1-2	SW DUAL/HALF	4-WIRE
J12 2-3	2-WIRE	
J16	FORCE DCD	
J8	SEAL	
J9	SLOT	CONTACT CLOSURE

Figure 2-3. AutoXP Terminal Board Jumper Locations

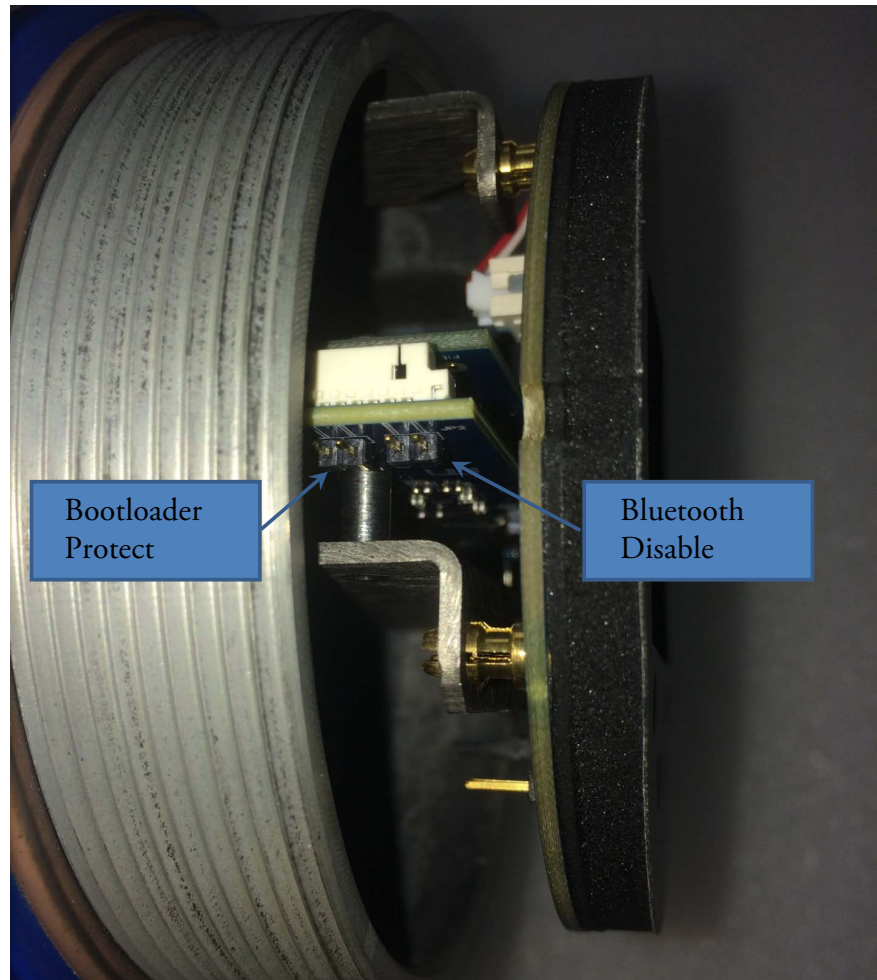


Figure 2-4. Bootloader Protect and Bluetooth Disable Jumpers



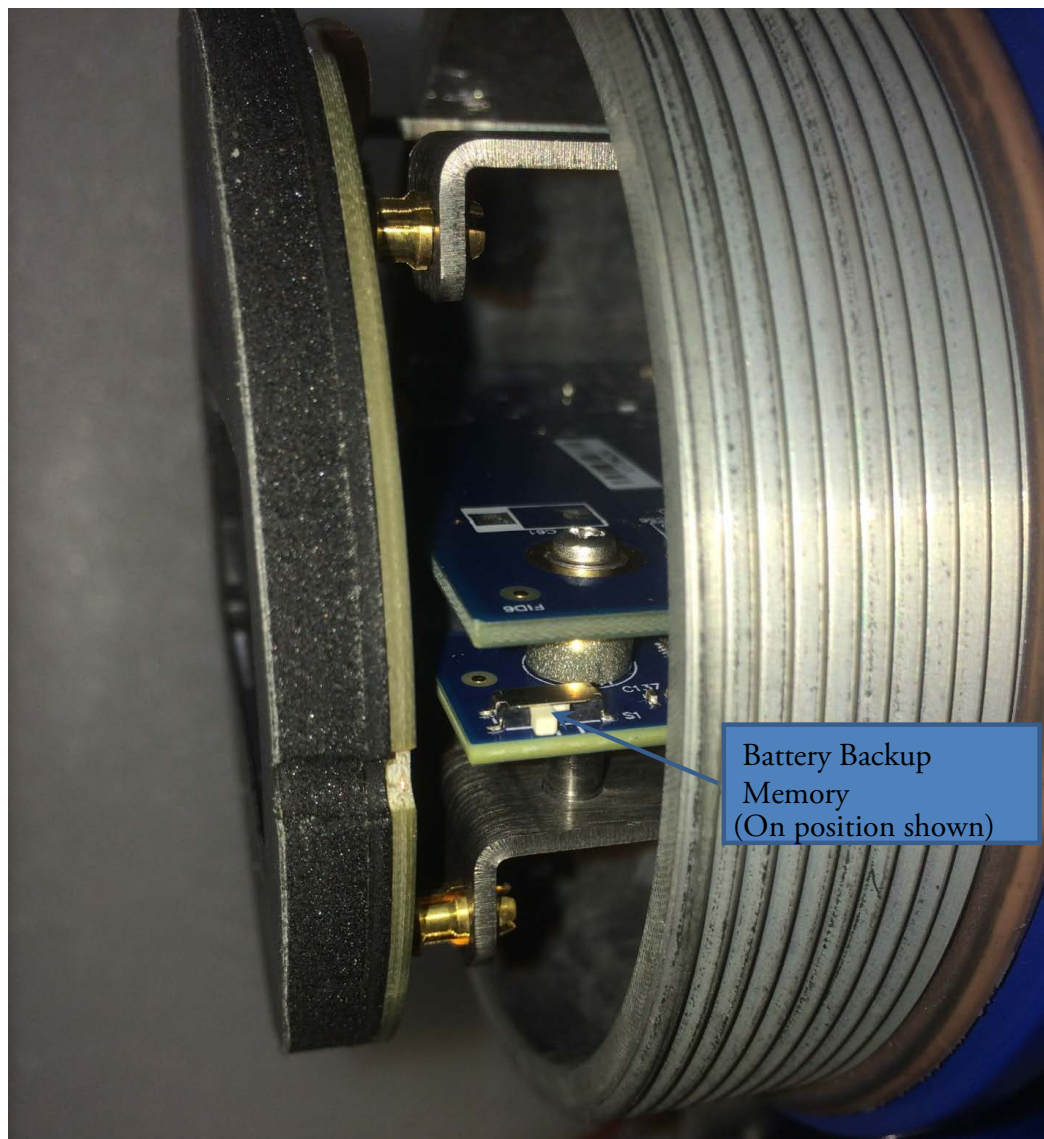


Figure 2-5. Battery Backup Memory Jumper (ON position)

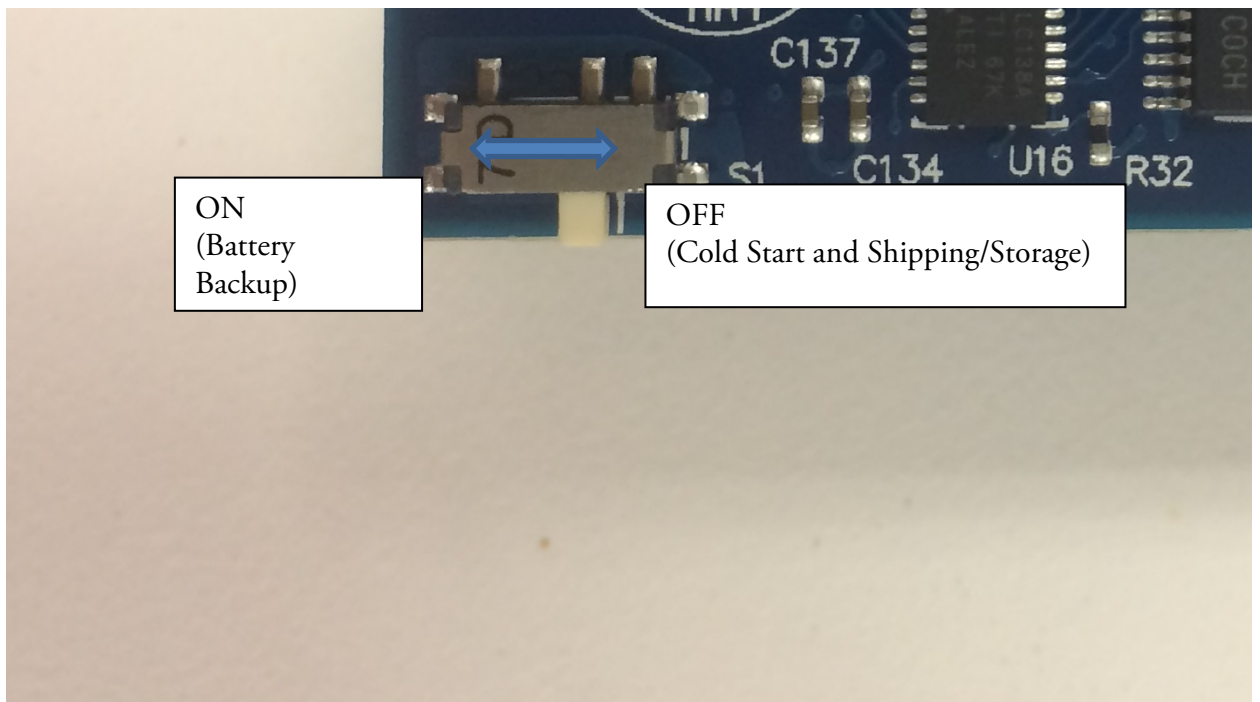


Figure 2-6. Battery Backup (ON and OFF position)

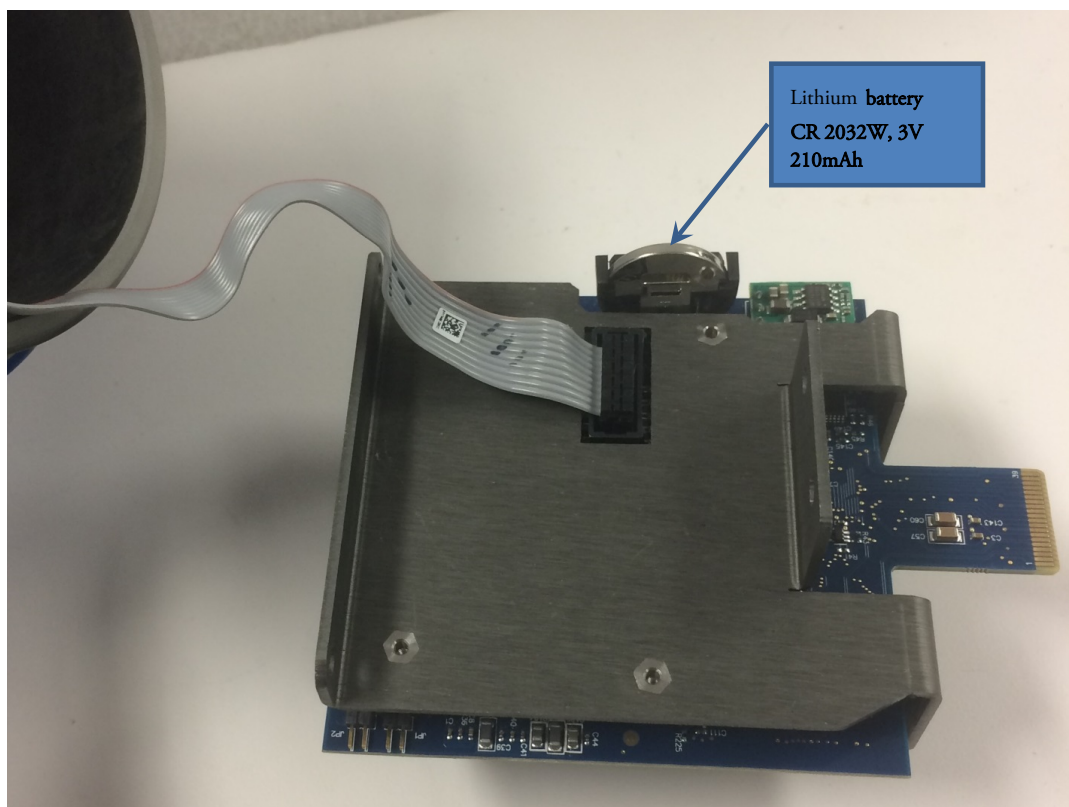


Figure 2-7. Backup Battery

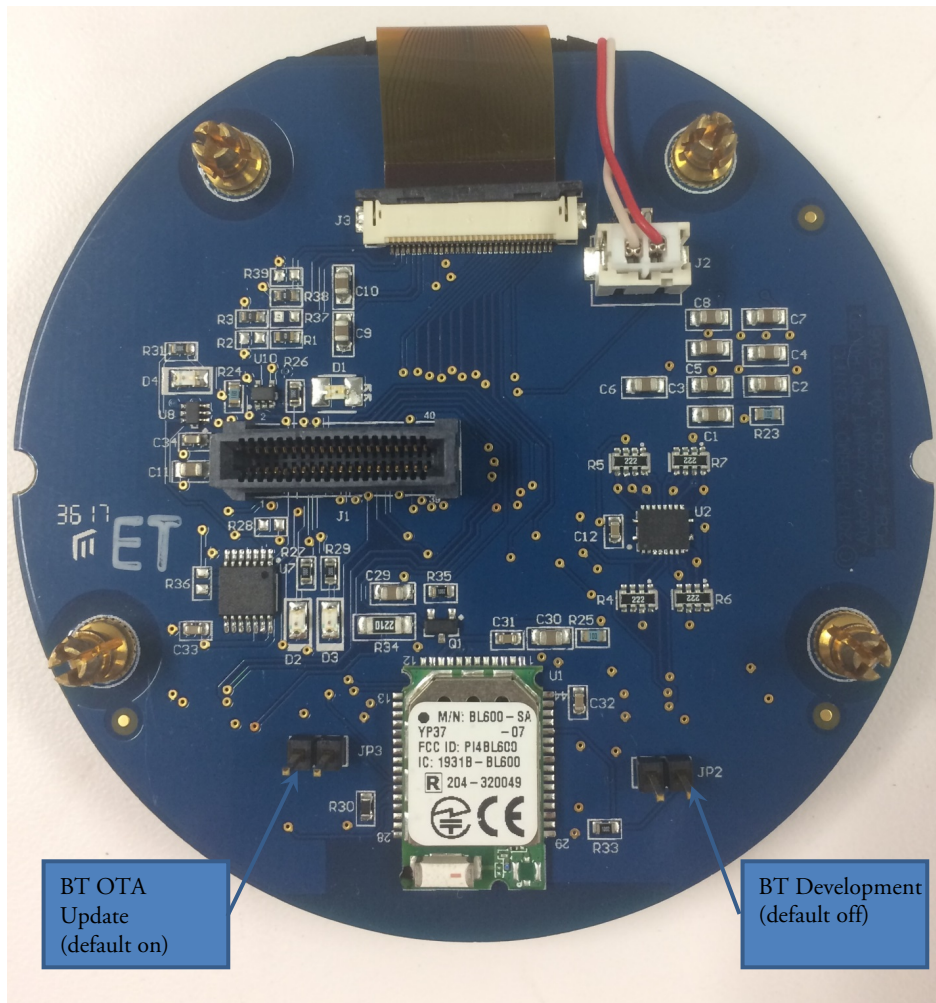


Figure 2-8. BT OTA Update and BT Development jumpers

## Default Jumper Settings

<u>HMI Board</u>		<u>Terminal Board</u>	
JP2	Off	J7	Off
JP3	On	J8	Off
		J9	Off
<u>CPU Board</u>		J10	Off
JP1	On	J11	Off
JP2	Off	J12	On Positions 2-3
<u>I/O Board</u>		J13	Off
JP3	Off	J14	Off
		J16	Off

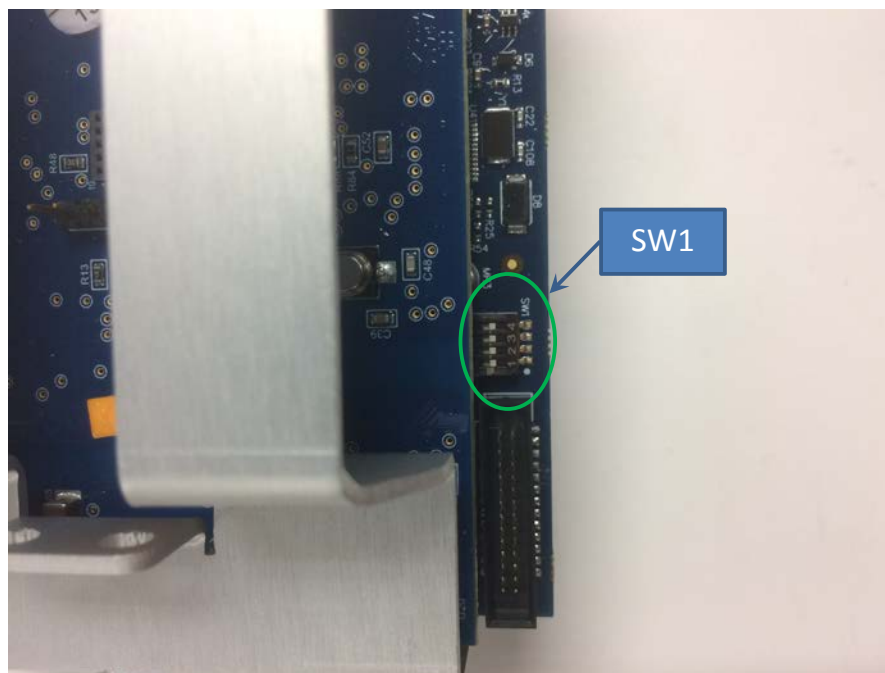


Figure 2-9. Main Board Switch SW1 Location

Table 2-1. Main Board Switch SW1 Default Conditions

SW1	Description	Function	Default
1	Boot loader selection	CPU runs the boot loader upon power-up when the switch is on.	Off
2	Debugger selection	CPU runs the debugger upon power-up when the switch is on. Function not available.	Off
3	Continuous power on	System stays in wake-up mode when the switch is on.	Off
4	System reset	Momentarily switch on to reset the system.	Off

## Pole Mounting

You can mount the AutoXP directly to the orifice fitting or to a two-inch pole. Refer to the following instructions for mounting the enclosure onto a 2-inch pole. Refer to Figure 2-10, Pole Mounting.



**Warning** Ensure that power is off and the area is non-hazardous before performing this procedure. ♦



**Warning** Installation must be carried out in accordance with local site requirements and regulations. ♦

**Note** Use only the hardware supplied in the Pole Mount Kit, ThermoFisher part number 3-0500-541.

1. With the enclosure upright, align the holes of single tab mounting bracket with the groove on the enclosure.
2. Facing the front of the enclosure, use item 3, Figure 2-10, to hold the enclosure against the bracket. Facing the rear of the enclosure, place flat washers and lock washers over the threads on item 3, Figure 2-10, and fasten with nuts.
3. On the pole, install the two pipe clamps using the hardware provided.

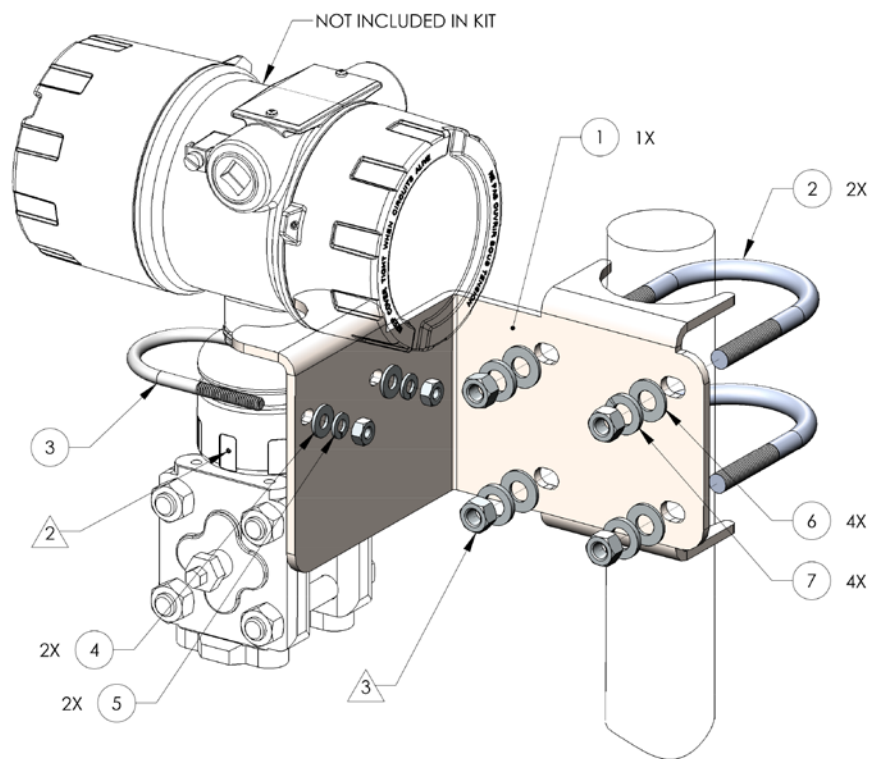


Figure 2-10. Pole Mounting Procedure

Drawing part number 0-0511-001

- 1 Bracket, pole mounting
- 2 U-bolt 2 1/2 " ID, 5/16-18 THD with nuts
- 3 U-bolt 2" ID, 1/4-20 THD with nuts
- 4 Washer 1/4 ID x 5/8 OD flat
- 5 Washer split lock 1/4
- 6 Washer 3/8 ID flat
- 7 Washer split lock 3/8

Loosen set screw (Note 2, Figure 2-10) to adjust meter orientation, maximum 180 degree rotation from starting point.

## Grounding

1. Use copper stranded 12 AWG minimum wire for grounding. See Figure 2-11.
2. Run a grounding wire from enclosure ground lug to earth ground.
3. Keep the grounding wire length as short as possible.
4. Ensure that earth ground and power ground are connected together, either internally or externally.

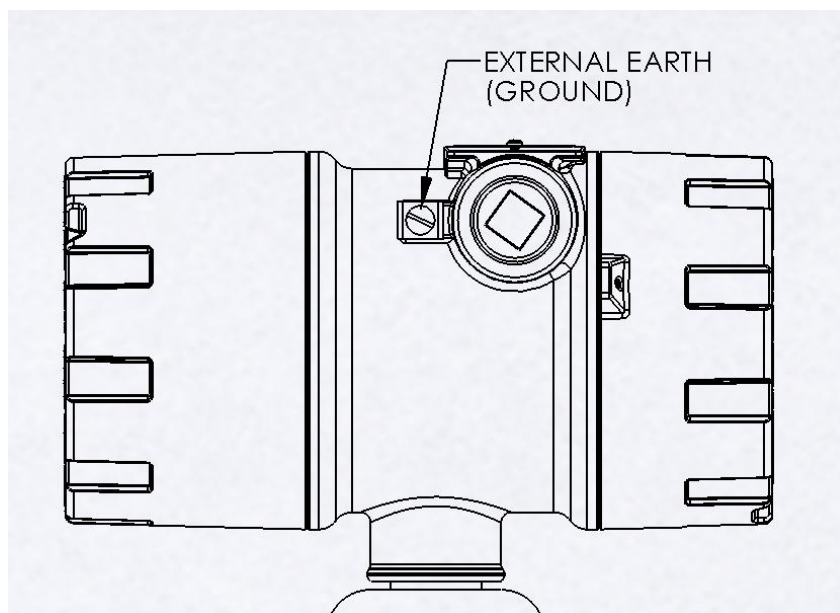


Figure 2-11. External Ground Connection



The following illustration, Figure 2-12, provides the recommended installation for wet or dry gas flow measurement (horizontal line):

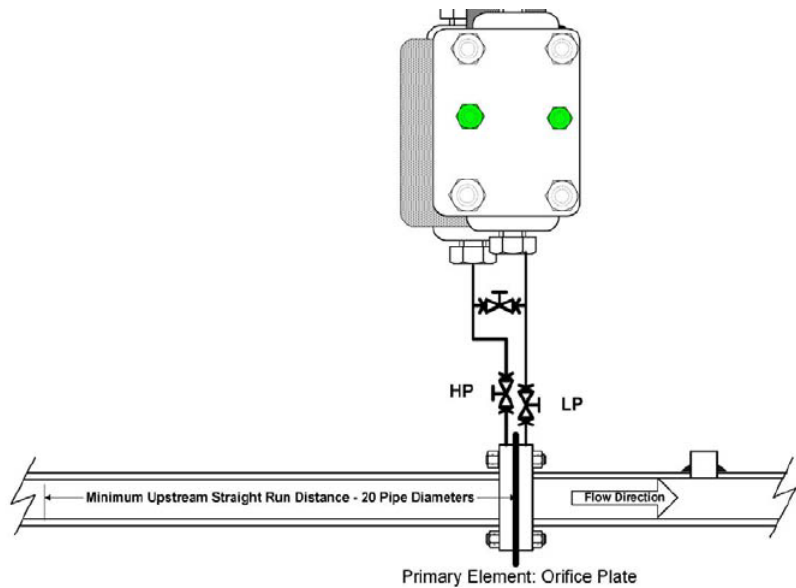


Figure 2-12. Installation for wet or dry gas flow

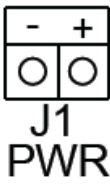
The following table provides the recommended wire gauges to be used for the AutoXP installation:

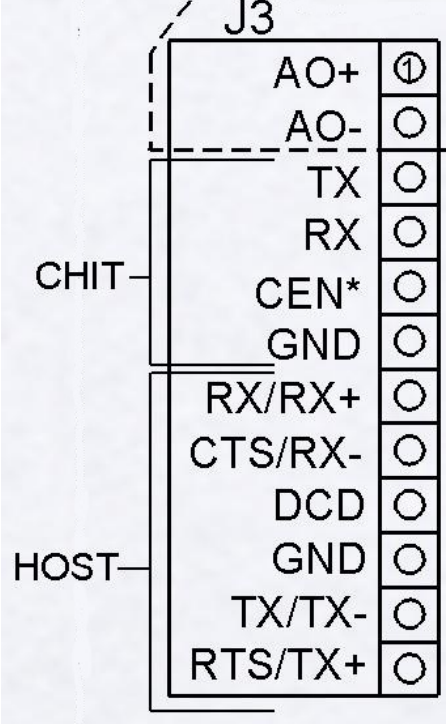
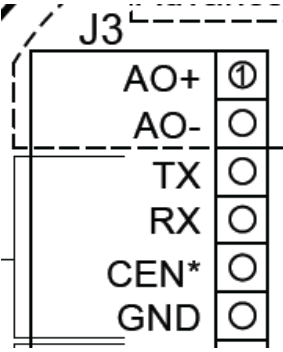
Table 2-2. Connection data


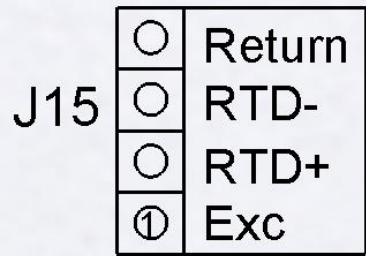
Conductor cross section solid minimum	0.2 mm <sup>2</sup>
Conductor cross section solid maximum	1.5 mm <sup>2</sup>
Conductor cross section flexible minimum	0.2 mm <sup>2</sup>
Conductor cross section flexible maximum	1.5 mm <sup>2</sup>
Conductor cross section flexible with ferrule, without plastic sleeve minimum	0.2 mm <sup>2</sup>
Conductor cross section flexible with ferrule, without plastic sleeve maximum	1.5 mm <sup>2</sup>
Conductor cross section flexible with ferrule, with plastic sleeve minimum	0.2 mm <sup>2</sup>
Conductor cross section flexible with ferrule, with plastic sleeve maximum	0.75 mm <sup>2</sup>
Conductor cross section AWG minimum	24/0.2 mm <sup>2</sup>
Conductor cross section AWG maximum	16/1.3 mm <sup>2</sup>

The following table provides the wiring instructions used for the AutoXP installation:

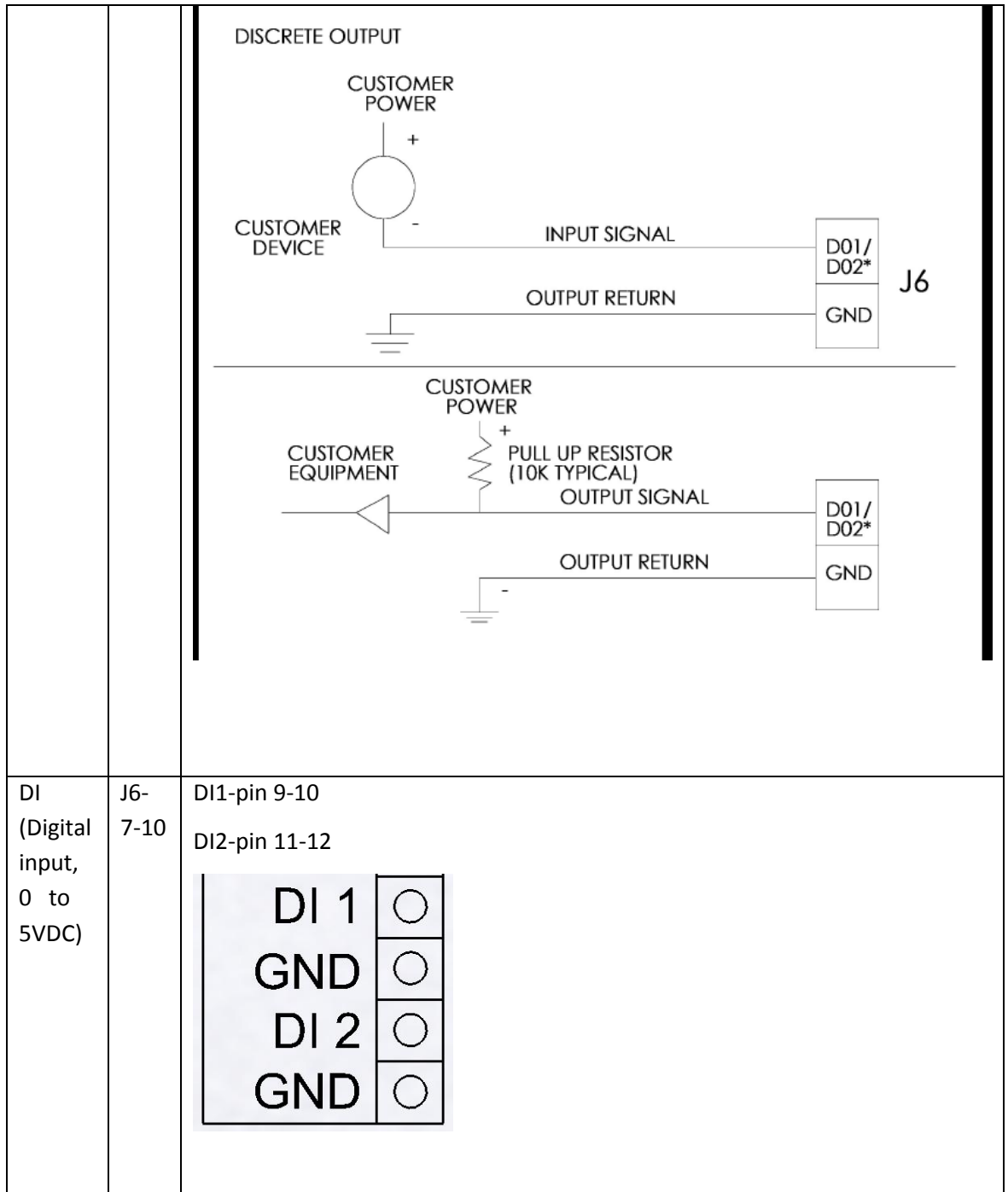
Table 2-3. Wiring Instructions

Function	Pin Number	Details
Input power	J1-1 (+) J1-2 (-)	10-30 VDC @ 2Watt minimum, customer supply must include 2 amp slow-blow fuse  
Serial Host port	J3	Configurable: J3-pin 7-12 (RS232); J3-pin 7-10, 11-12 (RS485 4-wire); J3-pin 7-10, 11-12 (RS485 2-wire; jumped TX+/RX+, TX-/RX-) recommended 26 AWG; twisted pair for RS485

Function	Pin Number	Details
		
Local serial port or CHIT	J3	<p>J3-pin 3-6</p> 

Function	Pin Number	Details
Ethernet	J4	CAT 5 shield cable 
RTD	J15	J15-pin 1-4; 4-wire J15-pin 1-3; 3-wire; with pin 3 and 4 jumped 

<p>AO (analog output)</p>	<p>J3-1 and 2</p>	<p>4-20 mA; loop power customer supply; minimum 10VDC, maximum 30 Vdc</p> <div style="text-align: center;"> <p><b>J3</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">AO+</td> <td style="padding: 5px;">①</td> </tr> <tr> <td style="padding: 5px;">AO-</td> <td style="padding: 5px;">○</td> </tr> </table> <p>ANALOG OUTPUT      LOOP POWER</p> <p>420mA CUSTOMER DEVICE RD</p> <p style="text-align: right;">J3</p> </div>	AO+	①	AO-	○				
AO+	①									
AO-	○									
<p>DO (Digital Out)</p>	<p>J6- 4-6</p>	<p>DO1-pin 5-6; open drain; customer supply power DO2-pin 7-8; open drain; customer supply power</p> <div style="text-align: center;"> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">DO 1</td> <td style="padding: 5px;">○</td> </tr> <tr> <td style="padding: 5px;">GND</td> <td style="padding: 5px;">○</td> </tr> <tr> <td style="padding: 5px;">DO 2</td> <td style="padding: 5px;">○</td> </tr> <tr> <td style="padding: 5px;">GND</td> <td style="padding: 5px;">○</td> </tr> </table> </div>	DO 1	○	GND	○	DO 2	○	GND	○
DO 1	○									
GND	○									
DO 2	○									
GND	○									

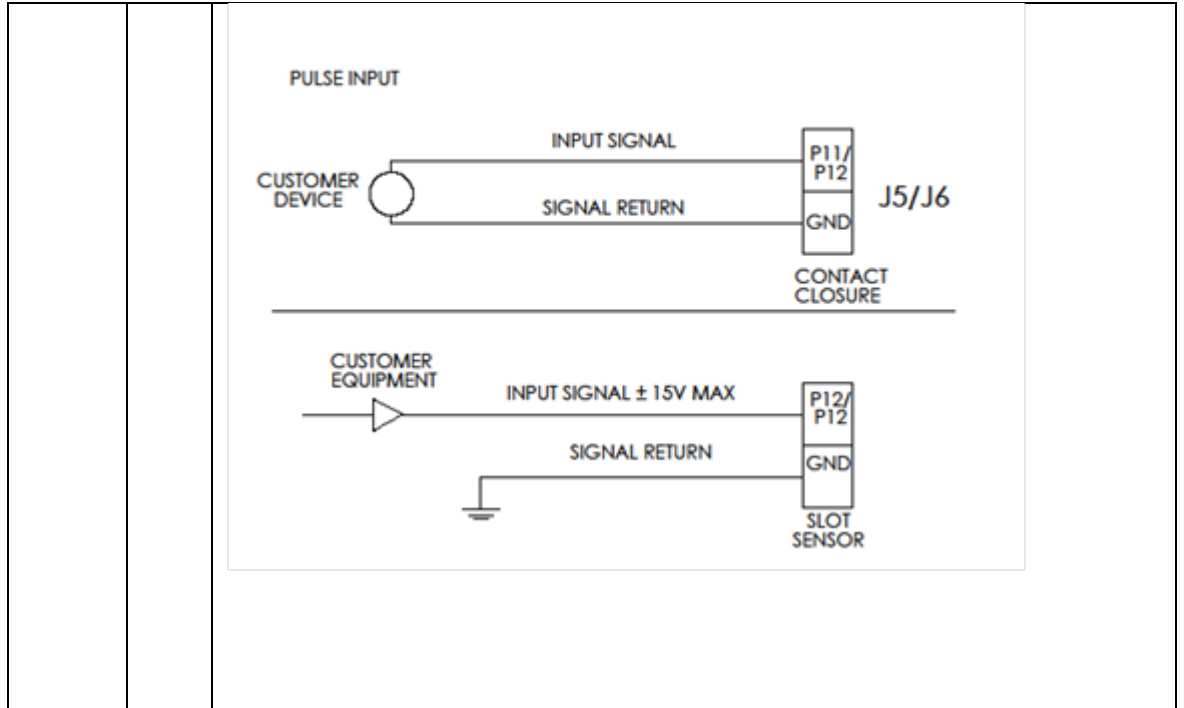


		<p><b>DIGITAL INPUT</b></p>
<p>AI (analog input)</p>	<p>J5;J6</p>	<p>AI1, J5-pin 1-4 (power/signal+; signal-/ground)</p> <p>Thermo Fisher Scientific offers an optional 250 ohms high precision axial lead resistor, P/N 5-1270-250, for converting the 4-20 mA current signal to 1-5V voltage signal, connecting to instrument analog inputs. Contact Thermo Fisher Scientific for resistor availability.</p>

		<p>AI2, J6-pin 1-2 (signal+; ground)</p> <div style="text-align: center;"> <h3>J6</h3> <table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">AI 2</td> <td style="text-align: center; padding: 5px;">①</td> </tr> <tr> <td style="padding: 5px;">AGND</td> <td style="text-align: center; padding: 5px;">○</td> </tr> </table> </div> <div style="text-align: center; margin-top: 20px;"> <p>ANALOG INPUT</p> </div>	AI 2	①	AGND	○				
AI 2	①									
AGND	○									
<p>PI (pulse input)</p>	<p>J5;J6</p>	<p>PI1, J5-pin 5-6 (slot sensor 5KHz; contact closure 300Hz)</p> <div style="text-align: center;"> <table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">PI 1</td> <td style="text-align: center; padding: 5px;">○</td> </tr> <tr> <td style="padding: 5px;">GND</td> <td style="text-align: center; padding: 5px;">○</td> </tr> </table> </div> <p style="margin-top: 20px;">PI2, J6-pin 3-4</p> <div style="text-align: center;"> <table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">PI 2</td> <td style="text-align: center; padding: 5px;">○</td> </tr> <tr> <td style="padding: 5px;">GND</td> <td style="text-align: center; padding: 5px;">○</td> </tr> </table> </div>	PI 1	○	GND	○	PI 2	○	GND	○
PI 1	○									
GND	○									
PI 2	○									
GND	○									



Installation



# Troubleshooting & Support

## Basic Troubleshooting:

Instrument is not running and/or LCD not displaying	<ol style="list-style-type: none"><li>1. Touch wakeup button on the display</li><li>2. Check input voltage polarity</li><li>3. Check input voltage level to be 10 to 30 volts</li><li>4. Replace Terminal board</li></ol>
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## Getting Help

The local representative is your first contact for support and is well equipped to answer questions and provide application assistance. You can also contact Thermo Fisher directly. Contact information is provided below.

### In the United States

Thermo Fisher Scientific  
12320 Cardinal Meadow Dr.  
Sugar Land, TX 77478  
Phone: 800-437-7979  
Fax: 713-272-2272

### In Europe

Thermo Fisher Scientific  
Ion Path  
Road Three  
Winsford  
Cheshire CW7 3GA  
United Kingdom  
Phone: +44 1606 548700

### On the Web

[www.thermofisher.com](http://www.thermofisher.com)

## Warranty

Thermo Scientific products are warranted to be free from defects in material and workmanship at the time of shipment and for one year thereafter. Any claimed defects in Thermo Scientific products must be reported within the warranty period. Thermo Fisher shall have the right to inspect such products at Buyer's plant or to require Buyer to return such products to Thermo Fisher plant.

In the event Thermo Fisher requests return of its products, Buyer shall ship with transportation charges paid by the Buyer to Thermo Fisher plant. Shipment of repaired or replacement goods from Thermo Fisher plant shall be F.O.B. Thermo Fisher plant. A quotation of proposed work will be sent to the customer. Thermo Fisher shall be liable only to replace or repair, at its option, free of charge, products which are found by Thermo Fisher to be defective in material or workmanship, and which are reported to Thermo Fisher within the warranty period as provided above. This right to replacement shall be Buyer's exclusive remedy against Thermo Fisher.

Thermo Fisher shall not be liable for labor charges or other losses or damages of any kind or description, including but not limited to, incidental, special or consequential damages caused by defective products. This warranty shall be void if recommendations provided by Thermo Fisher or its Sales Representatives are not followed concerning methods of operation, usage and storage or exposure to harsh conditions.

Materials and/or products furnished to Thermo Fisher by other suppliers shall carry no warranty except such suppliers' warranties as to materials and workmanship. Thermo Fisher disclaims all warranties, expressed or implied, with respect to such products.

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# Appendix A

## Specifications

Results may vary under different operating conditions.

Table A-1. AutoXP Specifications

System	<ul style="list-style-type: none"> <li>- 32-bit, 60 MHz micro computer unit.</li> <li>- SRAM memory for data storage, 2 MB, battery backed.</li> <li>- Real-time clock (RTC).</li> <li>- Lithium backup battery; voltage monitor for the RTC and SRAM circuits allows for data and configuration retentions in the event of power failure.</li> <li>- Local I/O consisting of             <ul style="list-style-type: none"> <li>- Two analog inputs</li> <li>- One 100-ohm Pt RTD input; full scale <math>\pm 0.6^{\circ}\text{F}</math> over operating temperature range</li> <li>- Two digital outputs</li> <li>- Two digital inputs</li> <li>- Two pulse inputs up to 10 KHz</li> <li>- One local serial communication port</li> <li>- One 4 -20mA analog output</li> <li>- Smart transducer included Connection for remote transducer (AutoMITTER PRO)</li> <li>- One RS232/RS485 host serial communication port</li> <li>- One 10/100 Ethernet communication port</li> </ul> </li> </ul>
Display	128 x 65 pixel graphic LCD
Keypad	Four infra-red touch buttons
Operating Temperature Range	-40°C to +85°C (-40°F to +185°F)
Power Supply	Standard 10–30 Vdc Class 2 power circuit, external power supply.
Safety Listing - CSA	<p>CSA: C/US Class I, Div. 1, Groups B, C &amp; D, T5 (Tamb -40°C to +85°C)</p> <p>CSA: C/US Class I, Div. 2, Groups B, C &amp; D, T4 (Tamb -40°C to +85°C)</p>

Appendix B  
**AutoXP RTD Cable Installation Procedure**

## AutoXP Class I Div 2 RTD Cable Installation Procedure

The following procedures provide installation procedures for the AUTOXP RTD Cable:

1. Unpack and insert the RTD cable into the AUTOXP assembly as shown in Figure 1. Coat the threads of the threaded connector with thread sealant (provided by customer). After feeding the red and white wires into AUTOXP, and after coating the connector with thread sealant, screw the connector into the AUTOXP assembly ensuring that the connector is not cross threaded and securely fastened.

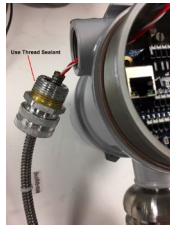


Figure 1. Inserting RTD Cable Assembly

The connector should appear attached as in Figure 2.

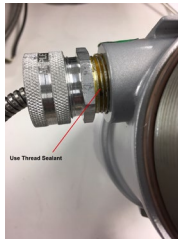


Figure 2. Attached RTD Connector

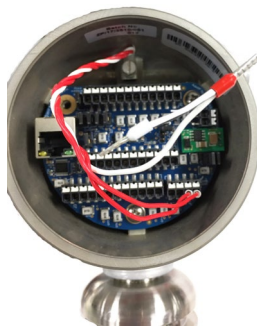


Figure 3. Cable connectors

2. After the RTD Cable wire is inserted, insert the two red wires into pins 1 and two as shown in Figure 3. The white connector and jumper is shown and will be inserted into pins 3 and 4 in the next procedure.

Insert the white wire into pin 3 and the white jumper into pin 3 and 4 as shown in Figure 4.

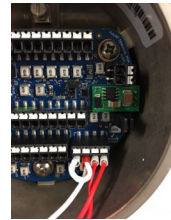


Figure 4. Inserting wires and jumper cables.

3. The completed wiring assembly should appear as in Figure 5.

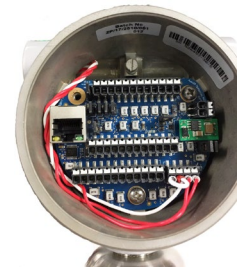


Figure 5. Completed Wiring Assembly

4. The complete AUTOXP wired assembly is shown in Figure 6.



Figure 6. AUTOXP Final Assembly

Figure 7 shows a typical customer installation configuration

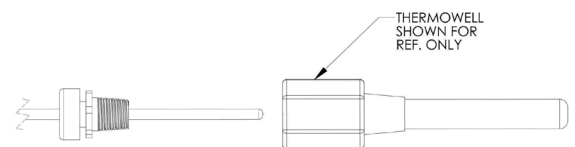


Figure 7. Typical Customer Configurations



**USA**

27 Forge Parkway  
 Franklin, MA 02038  
 Ph: (800) 437-7979  
 Fax: (713) 272-2273  
 orders.process.us@thermofisher.com

**India**

C/327, TTC Industrial Area  
 MIDC Pawane  
 New Mumbai 400 705, India  
 Ph: +91 22 4157 8800  
 india@thermofisher.com

**China**

+Units 702-715, 7th Floor  
 Tower West, Yonghe  
 Beijing, China 100007  
 Ph: +86 10 84193588  
 info.eid.china@thermofisher.com

**Europe**

Ion Path, Road Three,  
 Winsford, Cheshire CW73GA UK  
 Ph: +44 1606 548700  
 Fax: +44 1606 548711  
 sales.epm.uk@thermofisher.com

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