AutoMITTER PRO

Smart Multi-Variable Transmitter
User Guide
P/N 1-0497-033

Revision F

Part of Thermo Fisher Scientific

Thermo SCIENTIFIC

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Revision History

Revision Level	Date	Comments
A	08-08	Initial release (ERO 5985).
B	03-09	Revised per ECO 6861.
C	02-10	Revised per ECO 7307.
D	08-14	Revised per ECO 8324.
E	11-14	Revised per ECO 8484.
F	10-16	Revised per ECO 8934.

Contents

Chapter 1
Product Overview

Introduction

The Thermo Scientific AutoMITTER PRO provides for remotely located differential pressure, static pressure, and temperature measurements. Typically, these measurements are used to calculate flow using an orifice fitting. The unit is small, lightweight, and may be directly mounted to the orifice fitting.

Each unit provides one static pressure input, one differential pressure input, and one temperature input. Digital measurement data is routed to the flow computer using a four-wire RS485 interface. The Thermo Scientific AutoMATE® MEB, AutoPILOT®, and AutoPILOT® PRO flow computers can support up to four AutoMITTER PRO runs, and the Thermo Scientific AutoEXEC can support up to 15.

Units are connected to the flow computer in a daisy chain fashion with a maximum cable length of 2000 feet (609.6 m) for CSA and cUS applications. ATEX units are connected to the flow computer in a "star" fashion with a maximum cable length of 100 feet (30.48 m).

System Components

The AutoMITTER PRO system consists of the enclosure and the main board.

Enclosure

Two types of enclosures are offered with the AutoMITTER PRO. The NEMA 4X enclosure is available in fiberglass or stainless steel. The IP54 enclosure is available in stainless steel.

Main Board

The main board holds the connector for the transducer, the socket for the characterization EEPROM, and the connector for wiring from the SIB (RS485 communication and power). Configuration jumpers and switches are also provided on the main board.

Using this Manual

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. ♦

Chapter 2
The Main Board

The AutoMITTER PRO main board (P/N 3-0497-465) holds the connector for the transducer 10-pin connector (P1) and the characterization EEPROM socket (U7). To access these, you will need to remove the enclosure cover and the main board cover plate.

Tip The connector outline must match up when connecting the transducer. If the transducer is replaced with one that requires an external characterization EEPROM IC, the EEPROM shipped with the transducer must be placed in the socket (U7). •

Following are the jumper configurations for the main board, which are classified as software or hardware configuration.

Table 2–1. Main board jumper configurations

Jumper	Description
J6*	Enable the connection to AutoPILOT PRO, AutoPILOT, AutoMATE, and AutoEXEC.
J1*	Constant power. Enable the connection to AutoEXEC.
J3	Enable EFM Floating Point Modbus.
J4	Watch dog.
SW1	Remote address (1–16).
SW2	3-wire or 4-wire RTD selection.

*Both J1 and J6 must be set to enable connection to AutoEXEC. Only J6 must be set to enable connection to AutoPILOT PRO, AutoPILOT, and AutoMATE.

Caution Placing the jumper in J4 will eventually degrade the battery autonomy of the system. •

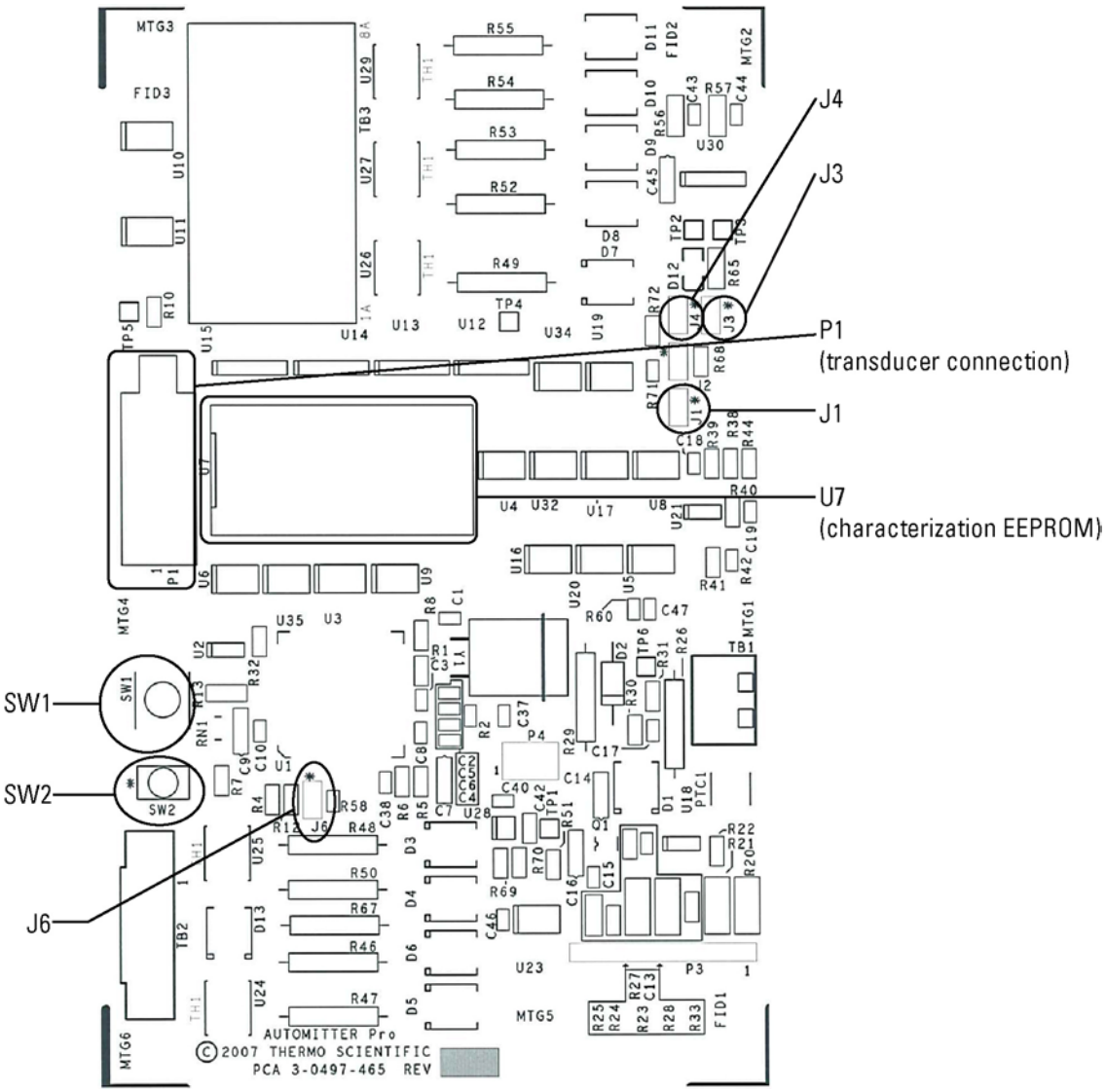

Figure 2–1. AutoMITTER PRO main board

Chapter 3
Installation

Warning Prior to installation, the site must be made a safe area as per NEC (USA) or IEC (International) regulations. Failure to do so may result in hazardous conditions. ♦

Caution Download all flow data before removing power. The flow computer must be cold-started to recognize the AutoMITTER PRO unit(s). ♦

Supporting Documentation

In addition to these instructions, refer to the following documents as required for your application:

- Thermo Scientific AutoCONFIG™ Help, AutoCONFIG startup guide (1-0485-068), and applicable flow computer documentation for programming instructions
- AutoPILOT PRO control drawing (0-0500-114): Depicts basic instrument applications
- AutoMITTER PRO general assembly drawing (0-0497-516 for ATEX or 0-0500-517 for CSA/cUS): Depicts basic instrument applications (provided in the drawing appendix)
- AutoMITTER Safety Interface System control drawing (P/N 0-0443-1035): Depicts basic instrument applications
- Documentation supplied with the transducer

Required Hardware & Software

You will need the following hardware and software to install the unit(s):

- Flow computer with AutoMITTER safety interface board (P/N 3-0443-1021 for ATEX or 3-0443-918 for CSA)
- PC with Microsoft® Windows® operating system (Windows NT®, Windows® 98 2nd Edition, Windows® XP, or later versions) installed
- AutoCONFIG configuration software

Mounting the Enclosure onto the Transducer

This section provides instructions on mounting the AutoMITTER PRO enclosure onto a transducer (direct mounting). If the unit is already mounted onto a transducer, go to "Pole Mounting" (next section). In addition to these instructions, reference the transducer documentation.

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. ♦

Tip The instructions for mounting stainless steel and fiberglass enclosures are the same. ♦

1. Remove the enclosure cover.

2. Remove the main board cover plate, the main board, and the mounting bracket according to "Replacing the Main Board" in Chapter 5.

3. If necessary, remove the transducer cover plate and its hardware from the bottom of the enclosure. The transducer cover plate hardware consists of four bolts, four sealing washers, a gasket, and four nuts.

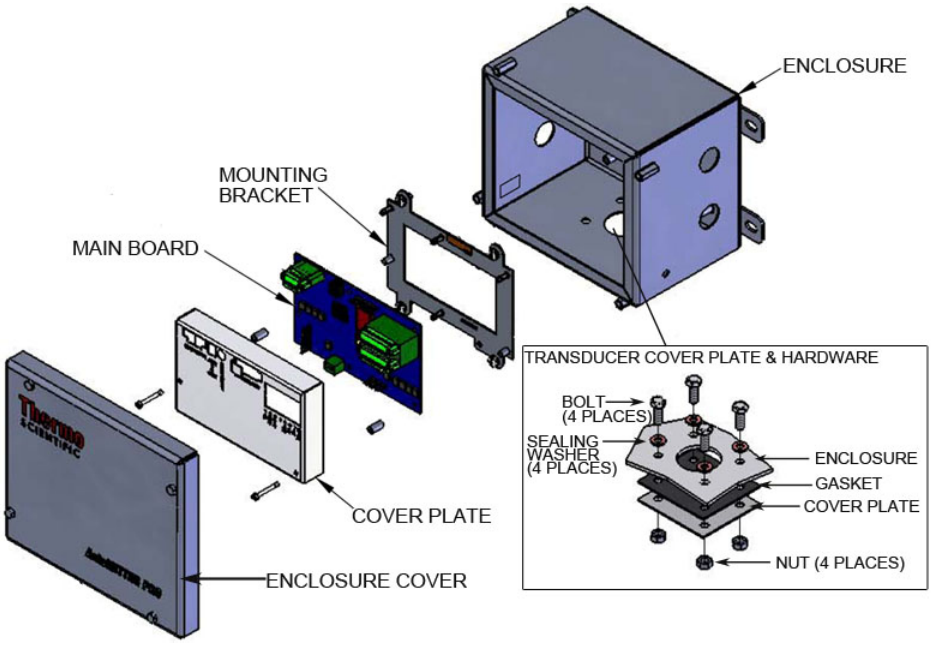

Figure 3–1. Direct mounting steps 1–3 (stainless steel enclosure shown)

4. Install the transducer mounting bracket onto the transducer, and install the transducer grommet over the bracket.

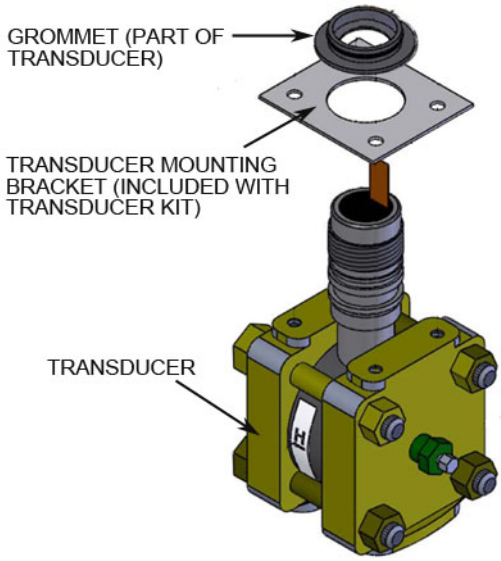

Figure 3–2. Direct mounting step 4

5. Orient the transducer so that the "H" tag is facing the same direction as the front of the enclosure, and insert the transducer into the bottom of the enclosure.

6. Secure the transducer to the enclosure using the sealing washers and bolts. Before tightening the bolts, connect the ground wire to the bolt closest to the ground lug in the enclosure.

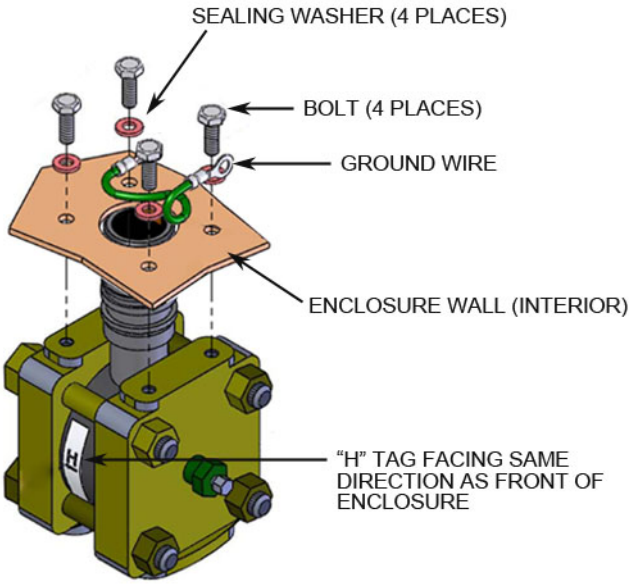

Figure 3–3. Direct mounting steps 5–6

7. Connect the ground wire to the ground lug in the enclosure.

8. Reinstall the mounting bracket and the main board (reference "Replacing the Main Board" for details.

9. Route the transducer 10-pin connector over the main board and plug it into P1.

10. Install the characterization EEPROM on the main board at U7.

11. Reinstall the main board cover plate, and replace the cover.

Pole Mounting

You can mount the AutoMITTER PRO 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.

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. •

Tip Pole mounting instructions for stainless steel and fiberglass enclosures are the same. •

1. With the enclosure upright, align the holes of one mounting channel with the top set of mounting tabs on the enclosure.

2. Facing the front of the enclosure, align one flat washer with one mounting tab, and insert a cap screw through the mounting tab and the mounting channel.

3. Facing the rear of the enclosure, place a flat washer and lock washer over the cap screw, and fasten with a nut.

4. Repeat steps 2–3 for the other side of the mounting channel.

5. Align the holes of the second mounting channel with the bottom set of mounting tabs, and repeat steps 2–3 to secure it to the enclosure.

6. On the pole, install the two pipe clamps using the hardware provided.

7. Align the mounting channels on the enclosure with the grooves on the pipe clamps, and slide the enclosure onto the clamps.

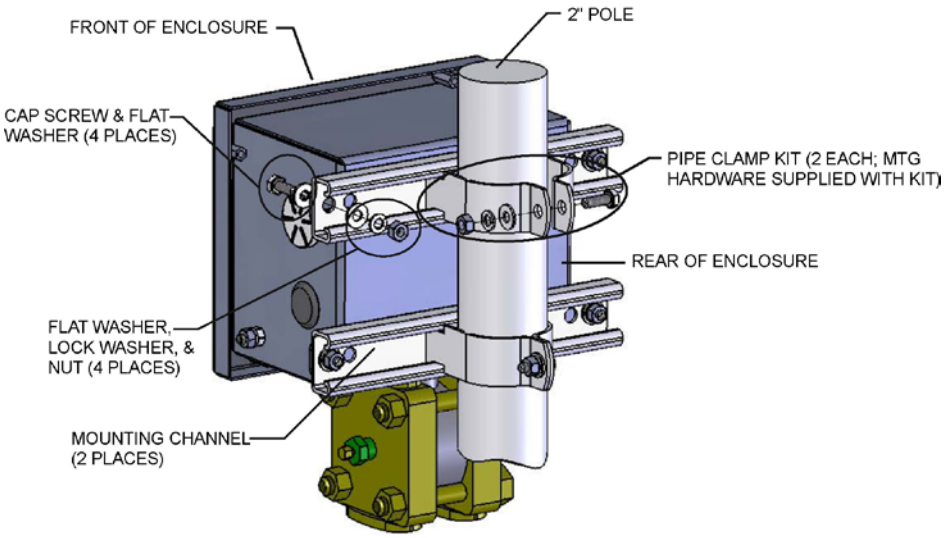

Figure 3–4. Pole mounting (stainless steel enclosure shown)

8. Locate the enclosure ground terminal at the side of the enclosure (marked with the ground symbol). Connect the terminal to earth ground using 11 AWG or larger stranded wire.

Warning Connect the enclosure ground terminal to earth ground before making any other connections. ♦

9. For installation in wet or dry gas flow applications, refer to Figure 3–5.

Caution To prevent the heavier liquid components from entering into the process heads of the flow transducer, mount the transducer above the process lines and have the impulse lines from the process slope up to the transducer or go directly up from the process lines to the transducer. ♦

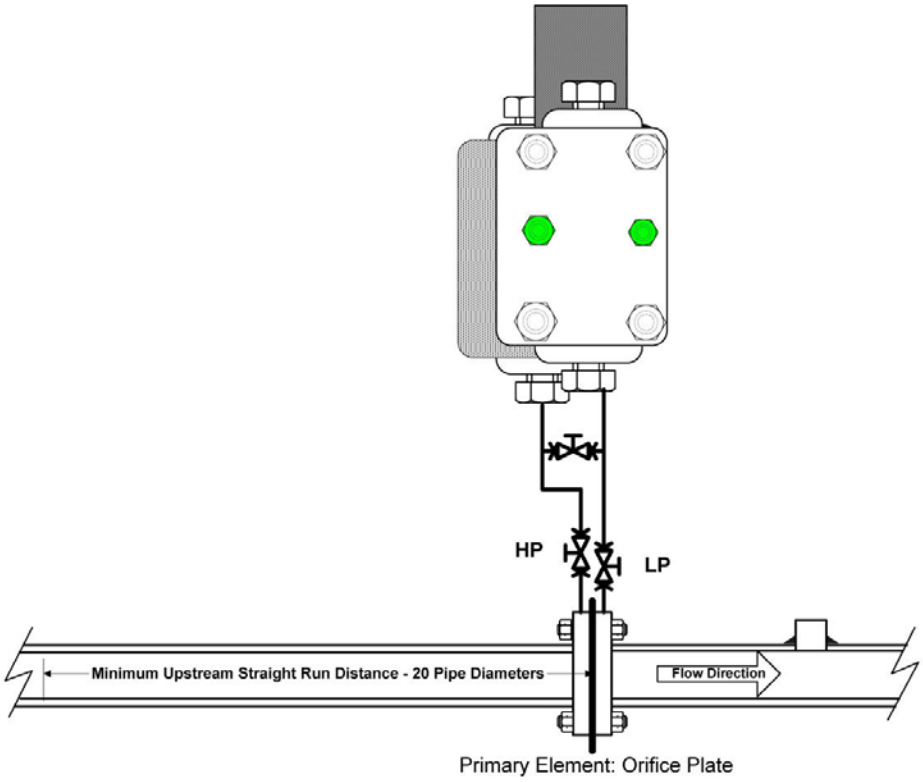

Figure 3–5. Recommended installation for wet or dry gas flow measurement (horizontal line)

Unit Addressing

SW1 (labeled "ADDRESS SETTING" on the main board cover plate) is used to assign the unit address. Use a small screwdriver and turn the arrow on SW1 to the correct position. Number 1 on the switch indicates a unit address of 1. Number 2 on the switch indicates a unit address of 2, etc. The default unit address is 1.

Warning Do not change switch settings unless the area is known to be non-hazardous. •

RTD

Follow the steps below to connect the RTD to the AutoMITTER PRO.

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. ♦

1. Remove the AutoMITTER PRO cover.

2. Route the RTD probe wiring into the RTD port, which is located on the left side of the enclosure, and tighten the cord grip to prevent leaks.

3. Connect the RTD wiring to the Phoenix four-position connector according to one of the tables below. If using a four-wire RTD, discard the jumper.

Warning Do not change switch settings unless the area is known to be non-hazardous. ♦

Table 3–1. Wiring for three-wire RTD

Pin	RTD color	Signal
1	Jumper to 2	RTDCURRENT
2	White	RTD +
3	Red	RTD -
4	Red	RTDRTN

Table 3–2. Wiring for three-wire RTD and extension cable

Pin	RTD color	Ext. cable color	Signal
1	Jumper to 2	Red	RTDCURRENT
2	White	White	RTD +
3	Red	Black	RTD -
4	Red	Green	RTDRTN

Table 3–3. Wiring for four-wire RTD

Wire	RTD color	Signal
1	Red	RTDCURRENT
2	Red	RTD +
3	White	RTD -
4	White	RTDRTN

Caution The maximum RTD cable length is 25 feet (7.62 m).

4. Set SW2 as 3-wire or 4-wire. Flip it up for 4-wire or down for 3-wire.

5. Replace the enclosure cover.

RS485 & Power

The RS485 interface is enabled and power is supplied through connection to a Thermo Scientific AutoMITTER safety interface board (SIB). In addition to the material in this section, reference the documentation provided with the SIB and the associated flow computer.

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. ♦

CSA & cUS

Follow these steps to connect the RS485 and power wiring to a unit with CSA and cUS approvals.

1. Remove the enclosure cover.

2. Route the RS485 and power wires from the SIB through the wiring access cutout on the right side of the enclosure.

3. Connect the communication wires to the eight-pin connector according to Table 3-4.

Table 3–4. Wiring for RS485 & Power for CSA or cUS

Connector Position	Signal	SIB	Signal on next AutoMITTER PRO
1	V+	Vo	V+
2	GND	GND	GND
3	GND		Cable Shield connect only
4	NC		NC
5	RX+	TX+	RX+
6	RX-	TX-	RX-
7	TX-	RX-	TX-
8	TX+	RX+	TXD+

Tip The TX and RX signal pairs are swapped between the SIB and the first AutoMITTER PRO unit. Additional units are wired pin-to-pin from the last AutoMITTER PRO.

4. If installing more than one unit, connect the daisy-chained cable according to Table 3-4.

5. Replace the enclosure cover when wiring is complete.

ATEX

The steps below apply to units with ATEX approvals.

1. Remove the enclosure cover.

2. Route the RS485 and power wires through the wiring access cutout on the right side of the enclosure.

3. Connect the communication wires according to Table 3-5.

Table 3–5. Wiring for RS485 & Power for ATEX

Connector Position	Signal	SIB
1	V+	Vo1
2	GND	GND
3	GND	
4	NC	
5	RX+	TX+_1 (2, 3, 4)
6	RX-	TX-_1 (2, 3, 4)
7	TX-	RX-_1 (2, 3, 4)
8	TX+	RX+_1 (2, 3, 4)

Tip The TX and RX signal pairs are swapped between the SIB and the AutoMITTER PRO.

4. If installing more than one unit, connect each unit to the SIB in order, i.e. connect the second unit to TX+_2, TX-_2, RX-_2, and RX+_2.

5. Replace the enclosure cover when wiring is complete.

Hazardous Area Installations

Guidelines

The AutoMITTER PRO has been designed to satisfy the requirements of Clause 1.2.7 of the essential Health and Safety Requirements such that it will not give rise to physical injury when handled properly. The instrument does not produce excessive surface temperature, nor does it emit infra red, electromagnetic, or ionizing radiation.

Before starting installation, ensure all power connections are isolated and take precautions to prevent power from being restored while work is taking place. Hazardous area installations forbid the use of tools or equipment that could produce an explosion hazard by causing a spark or imposing excessive mechanical stress.

The instrument must be installed in a manner to avoid exposure to thermal or mechanically induced stresses, and, in addition, the instrument should not be exposed to chemically aggressive substances beyond the expected levels. The instrument is not intended to be exposed to significant conditions of dust build-up.

The following instructions apply to equipment covered by certifcate number ITS 16 ATEX 201078 for the AutoMITTER PRO:

1. The equipment may be used with flammable gases and vapors with apparatus Groups Ia and IIB and with temperature classes T1, T2, T3, and T4.

2. The equipment is only certified for use in ambient temperatures in the range -40°C to +80°C and should not be used outside this range.

3. The certification of this equipment relies on the following materials used in its construction:

   Stainless steel.

   If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.

   Aggressive substances – e.g. solvents that may affect polymeric materials

   Suitable precautions – e.g. regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals.

4. The certificate number has an "X" suffix that indicates that the following special condition of certification applies:

   Earth bonding: The enclosure must be earth bonded back to the source of the power supply using a 4 mm^2 cross-sectional area conductor using the earth lug provided on the enclosure.

Marking

The AutoMITTER PRO is marked for use in hazardous areas in accordance with the ATEX Directive. It is marked as follows.

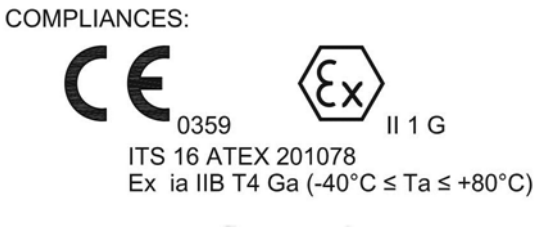

Figure 3–6.

Repair

In the event of a fault condition, the AutoMITTER PRO cannot be serviced by the customer. Repair of this equipment shall be carried out by the manufacturer or in accordance with the applicable code of practice.

Transducers

In addition to the MV3000 series transducers, there are two additional transducers now available for use in the AutoMitter Pro. These are the MVX700 and MVX800. More details on these transducers are available in the Maintenance, Specifications and Drawings Sections of this manual.

Chapter 4
Getting Started

Caution Download all flow data before removing power. The flow computer must be cold-started to recognize the AutoMITTER PRO unit(s). ♦

After you have installed the AutoMITTER PRO(s) and the made the required connections, start up the flow computer so that it will recognize the new unit(s).

1. Open AutoCONFIG. Go to **Tools > Cold Start**.

2. Let the unit run for 30 seconds. During this period, the unit boots up the configuration and calibration data created when the unit was manufactured.

3. If using the AutoEXEC or AutoPILOT PRO with the transmitter, some steps need to be taken to ensure they work together. Continue to one of the following sections if using the transmitter with an AutoEXEC or AutoPILOT PRO.

Configuring for Use with AutoEXEC

Several steps must be taken to ensure the AutoMITTER PRO works properly with an AutoEXEC. You can do this manually or using the Measurement Config wizard in AutoCONFIG. Both are described below.

Manual Configuration

1. Open AutoCONFIG and go to **Communication(s) > 96-Communication Port(s) > 485 Port #1/#2**.

2. Set the Mode to **Master**. The screen will change.

3. For every AutoMITTER PRO installed, you will need a separate Modbus master. If you have four transmitters installed, configure the first one by setting the Comm. Block Ref. parameter to **1** and the Comm. Block parameter to **Modbus Master**. Click the **Apply** button.

   Set up the second transmitter by setting the Comm. Block Ref. parameter to **2** and the Comm. Block parameter to **Modbus Master**. Click the **Apply** button. Set up the remaining transmitters in the same manner.

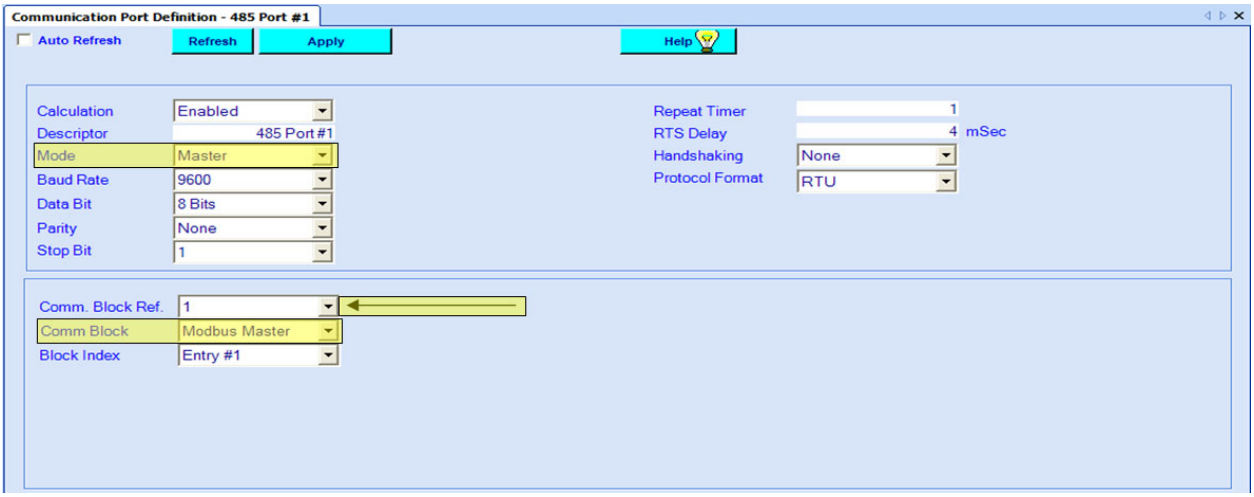

Figure 4–1. Creating a Modbus master entry

4. Configure each Modbus master set up in the previous step. To do this, go to **Communication(s) > 98-Modbus Master**. Select **Entry#1** for the first AutoMITTER PRO, and set the parameters on this page as follows:

   - Master Comm: Enable

   - AutoMITTER mode: Enabled

   - Address: 1(This must match the address set in the AutoMITTER PRO. See "Unit Addressing" in Chapter 3.)

   - Protocol Format: Modbus RTU

   - Start Register: 7001

   - Num Entries: 7

   Leave the remaining parameters at their default settings.

   Connect registers to Table 17. To do this, right-click on the Table 17 **Current Value** parameter (Field 4) select **Copy**. Right-click on the register and selct **Paste**. (Meter run temperature, differential pressure, and static pressure values will be connected to the Table 17 entries later.) Click **Apply**.

   To configure the second AutoMITTER PRO, select **Entry#2** and set the parameters as described above. Repeat this process for each Modbus master (each AutoMITTER PRO installed).

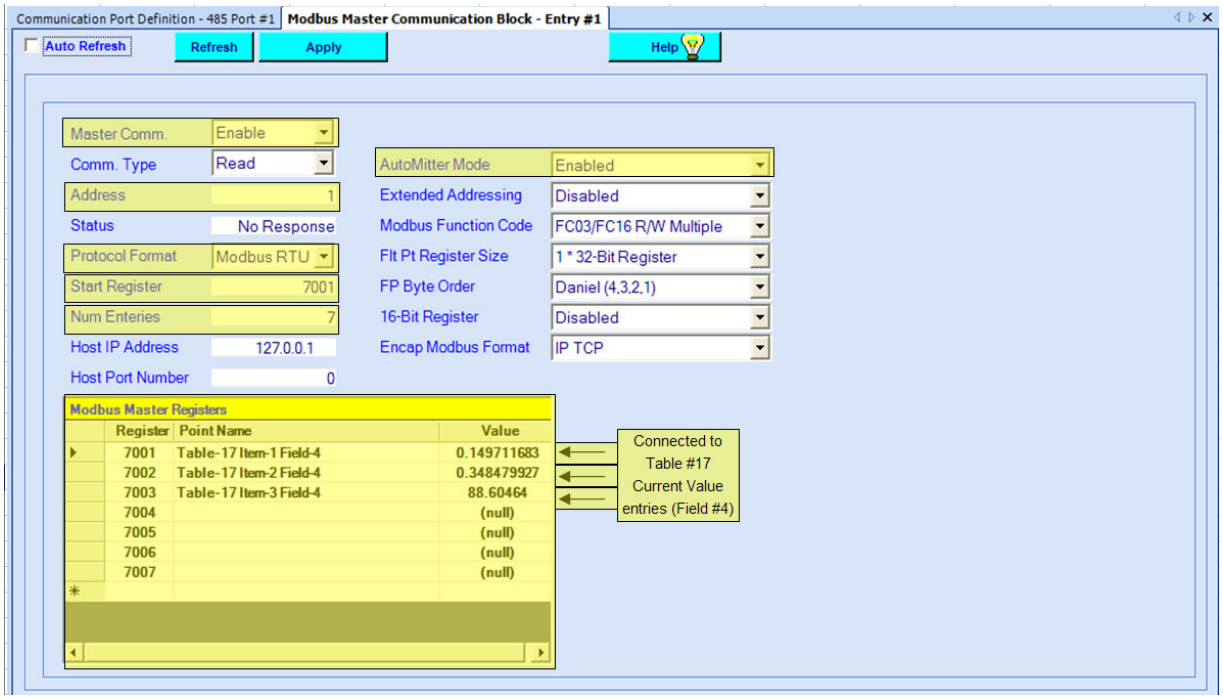

Figure 4–2. Configuring the Modbus master

5. Go to **Calculation(s) > 38-Differential Pressure Flow** and select the appropriate entry (DP Flow Calc#1, #2, etc.). If necessary, enable the calculation and set the static data parameters.

Note For more information on configuring static data, reference the AutoCONFIG help system (index keyword "static data"). ♦

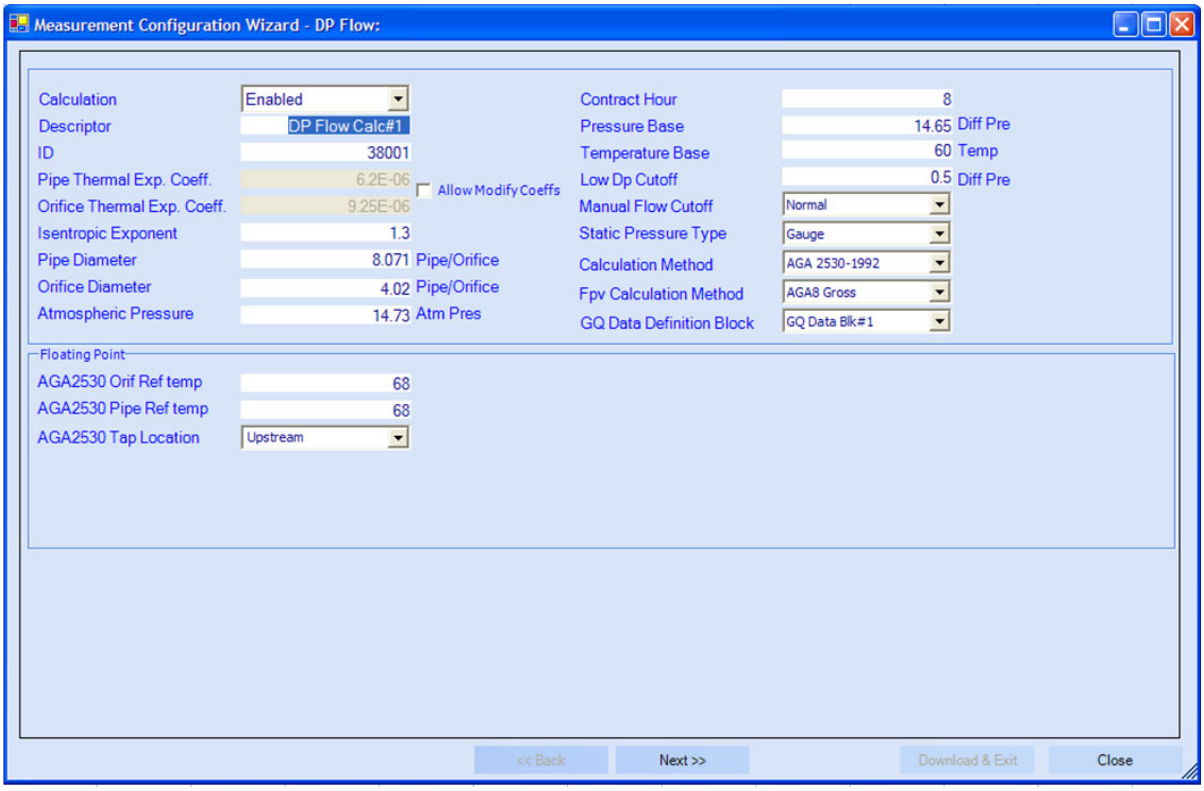

Figure 4–3. Static parameters for DP flow (orifice meter run)

6. Click the **Instantaneous** tab and connect the temperature, differential pressure, and static pressure parameters to Table #17 (connected to the Modbus master entries earlier).

   As an example, for the first AutoMITTER PRO, connect differential pressure to Entry #1 Field #4 (Current Value), static pressure to Entry #2 Field #4, and temperature to Entry #3 Field #4.

   Repeat this for each AutoMITTER PRO.

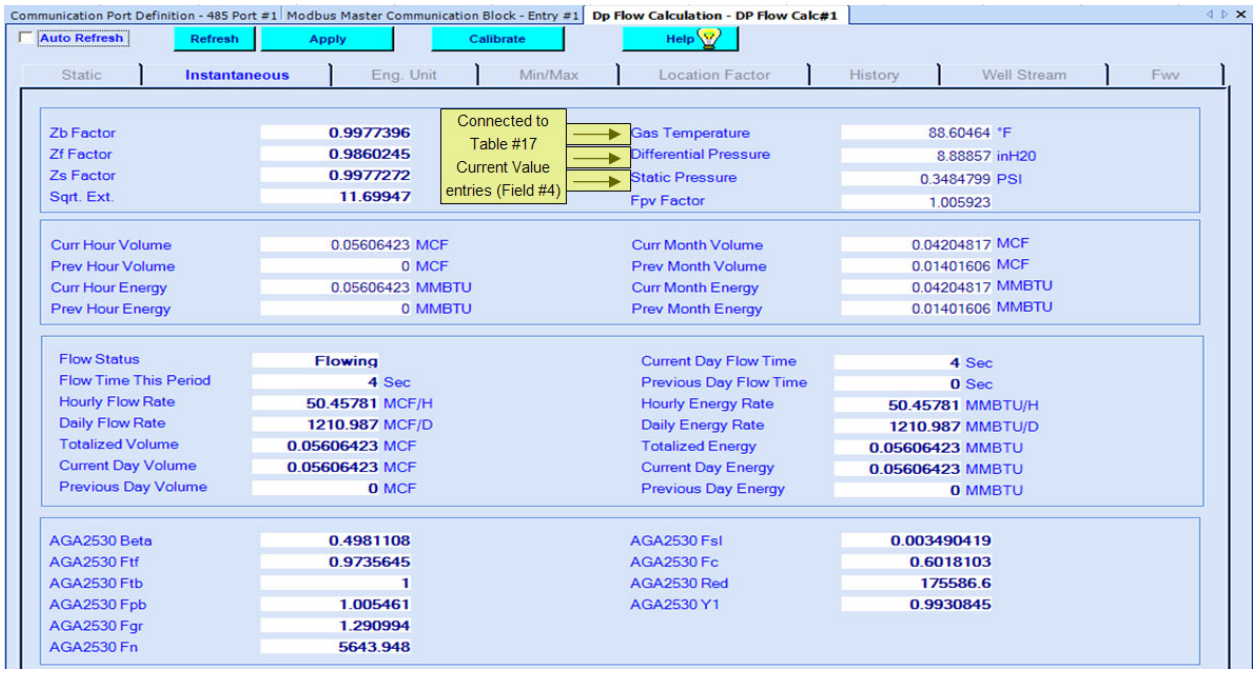

Figure 4–4. Instantaneous data parameters to connect to Table #17 entries

7. If the communication board has 2-wire/4-wire jumpers, set jumpers JP1 through JP6 to 4-wire (JP-1, JP-2, and JP-5 for first RS485 port; JP-3, JP-4, and JP-6 for second RS485 port).

8. Use the Calibration wizard in AutoCONFIG to calibrate the AutoMITTER PRO. Reference the AutoCONFIG help system (index keyword “calibration wizard”) for instructions.

Using the Measurement Config Wizard

Follow this procedure to use the Measurement Config wizard.

1. Complete steps 1–4 of the manual configuration procedure above.

2. Right-click on **DP Flow Calc#1**. Select **Config Wizard**.

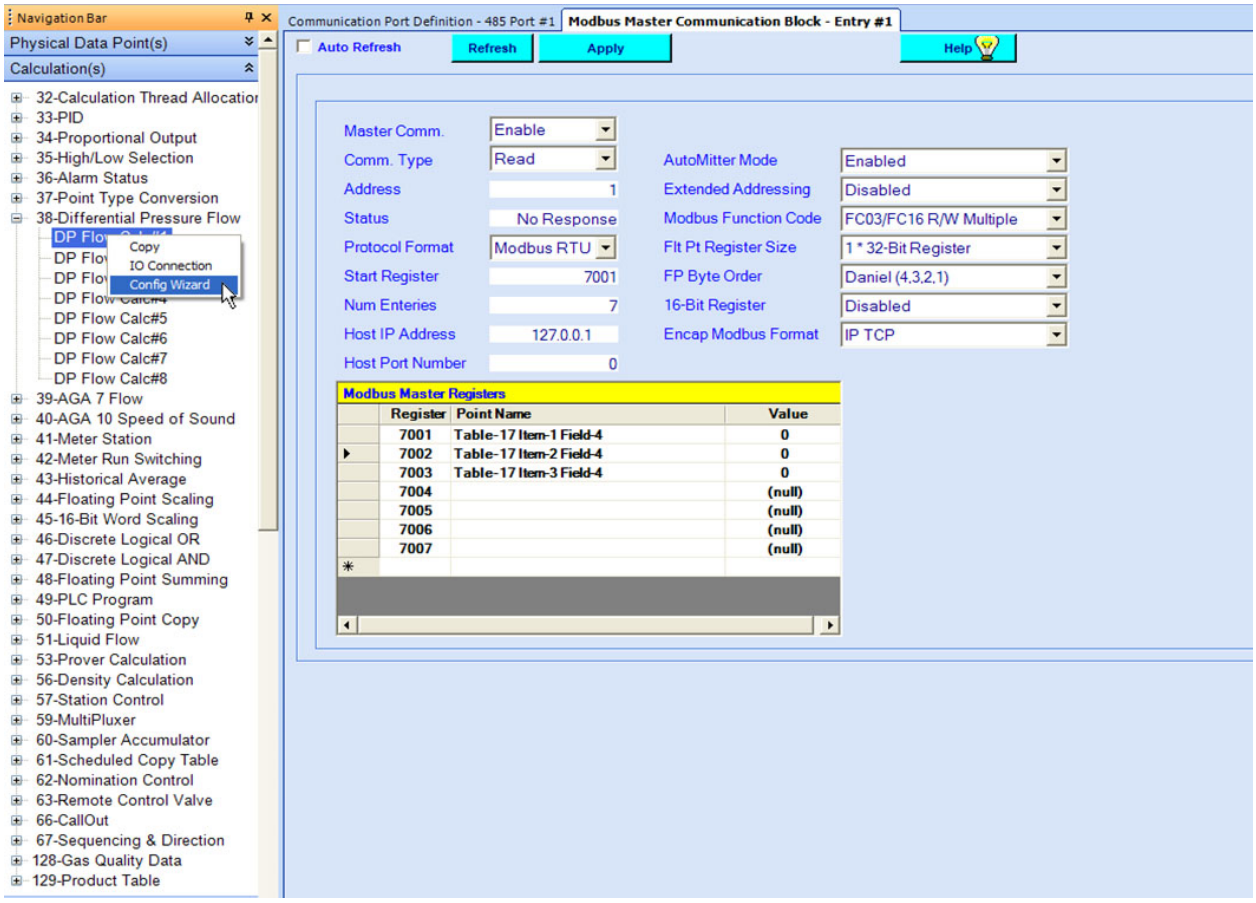

Figure 4–5. Starting the wizard

3. A small screen will appear informing you that the software is collecting data. After several seconds, the first screen of the Measurement Config wizard is displayed.

   Enable the calculation and set static parameters as necessary. Be sure to set **AGA2530 Tap Location** as **Upstream** for the AutoMITTER PRO.

   When finished, click the **Next** button.

Note For more information on configuring static data, reference the AutoCONFIG help system (index keyword "static data"). ♦

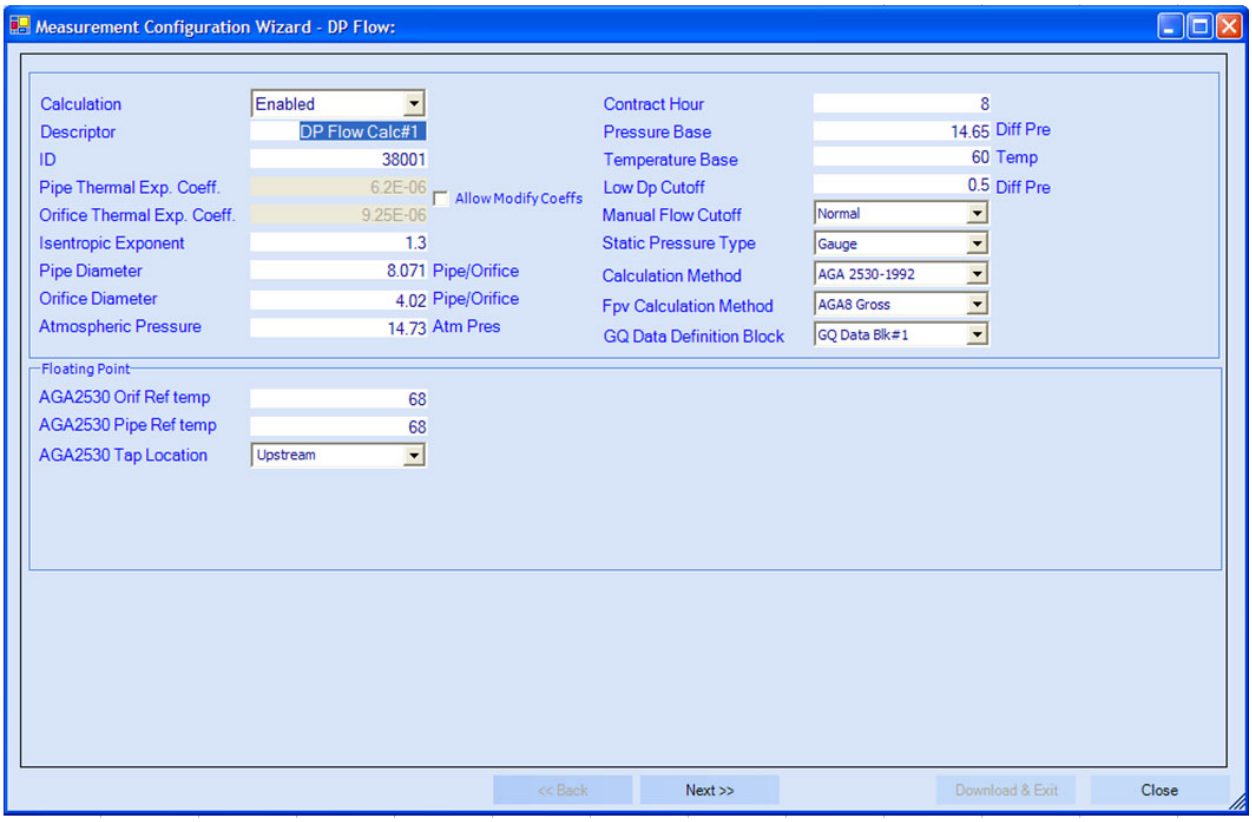

Figure 4–6. Configuring DP flow

4. On the DP Flow Factors screen, enable any factors you are using and set them to the desired value. Change engineering units at this time if necessary.

   When finished, click the **Next** button.

Note For more information on configuring factors or engineering units, reference the AutoCONFIG help system (index keyword "location factor setup", "engineering units", etc.). ♦

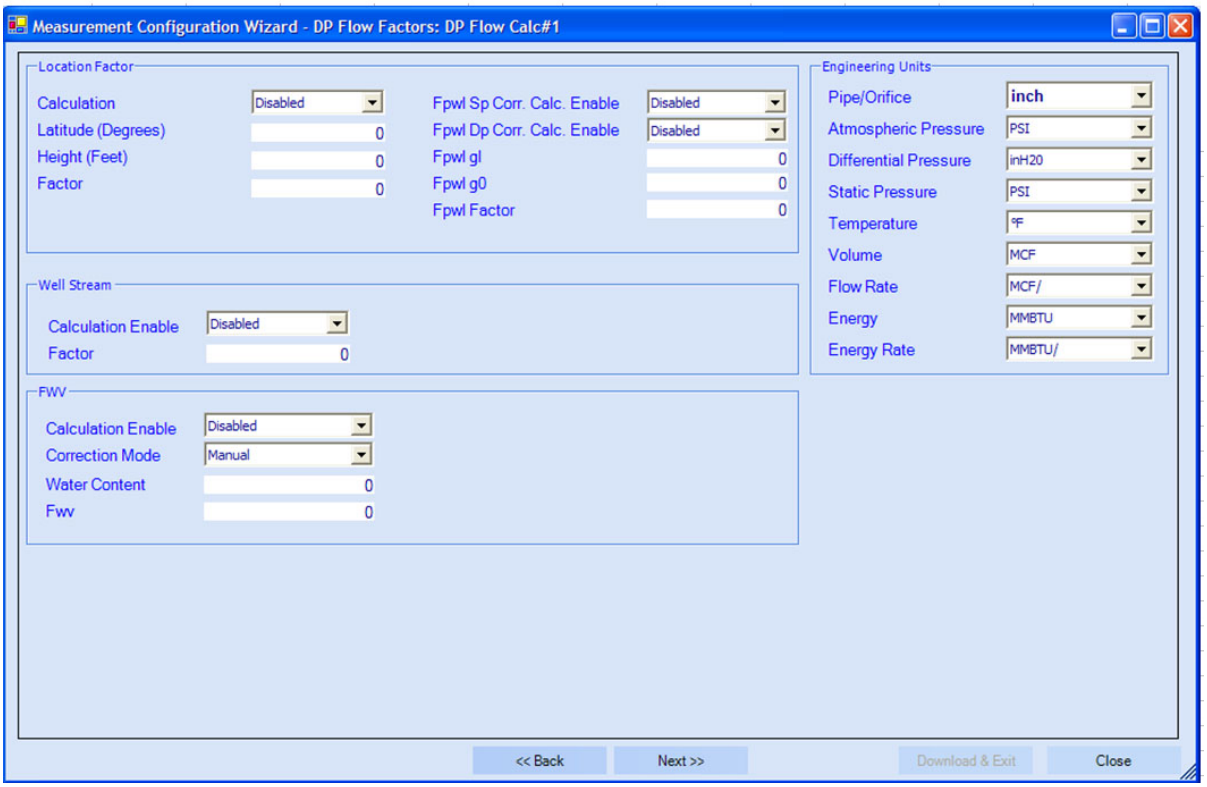

Figure 4–7. Configuring factors and engineering units

5. On the DP Flow Connections page, select **Physical Smart Xducer Input** for all three transducer inputs.

   Then select the physical input connection for each input. For example, for the first AutoMITTER PRO, differential pressure will be on input 1, and so you would select **Smart Xducer#1: Pt 17-1 Descr2.** Static pressure will be on input 2. So select **Smart Xducer#2: Pt 17-2 Descr2.** Finally, the temperature is on input 3, and you would select **Smart Xducer#3: Pt 17-3 Descr2.**

   When finished, click the **Download & Next** button.

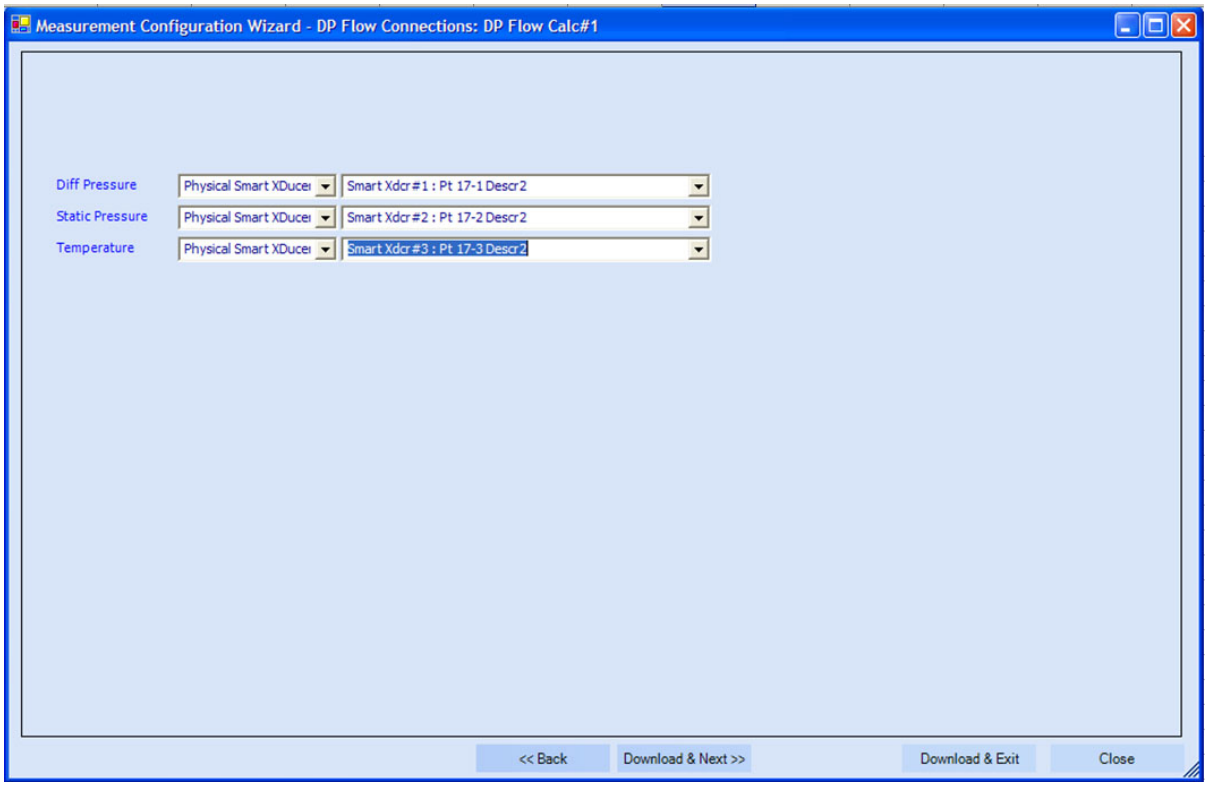

Figure 4–8. Configuring transducer inputs

6. At the Enabling Calculation Confirmation prompt, click **Yes**.

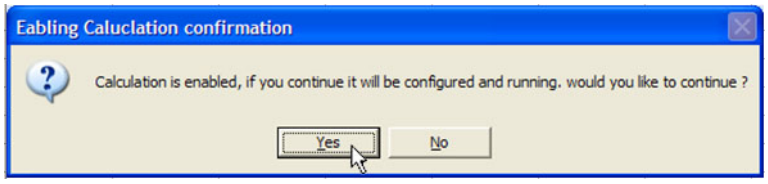

Figure 4–9.

7. At the final screen, click the **Done** button.

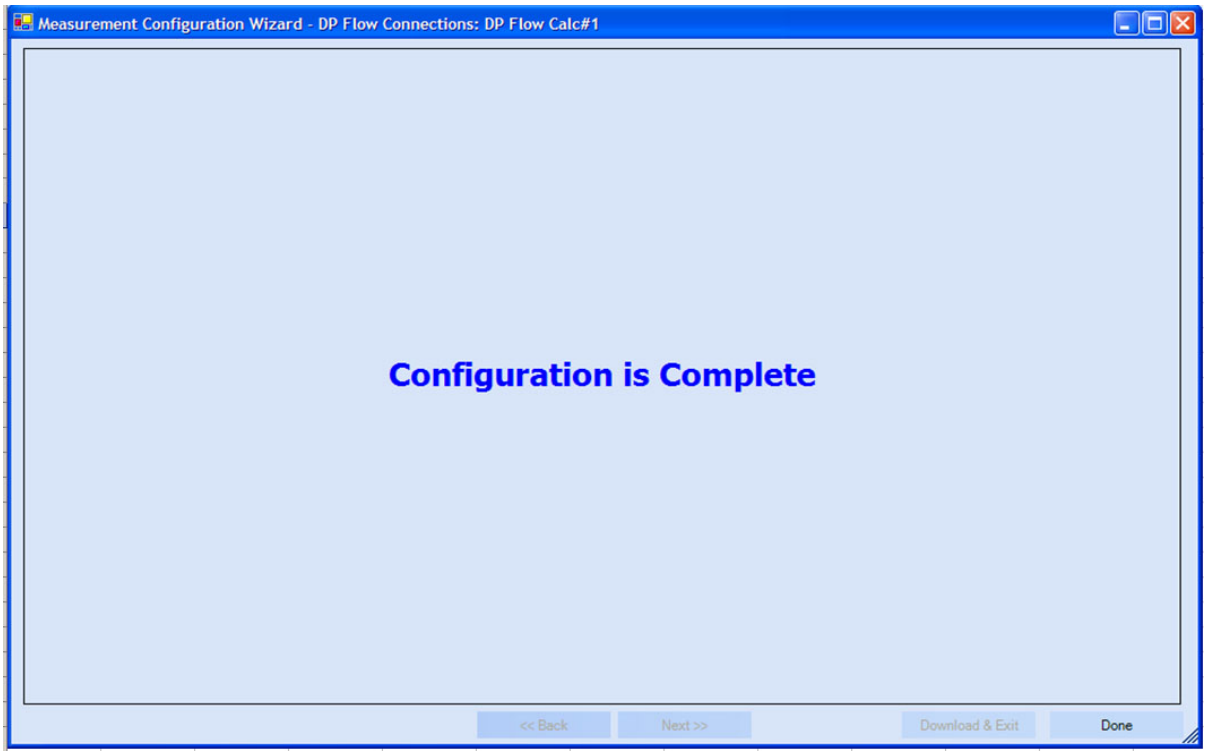

Figure 4–10. Configuration complete

Configuring for Use with AutoPILOT PRO

It is assumed that the required hardware connections have been made and that you have cold started the flow computer as described at the beginning of this chapter. You can do these steps manually or using the Measurement Config wizard in AutoCONFIG. Both are described below.

Manual Configuration

When using the AutoMITTER PRO with an AutoPILOT PRO, the port configuration is automatic, leaving only the steps below.

1. Go to **Calculation(s) > 38-Differential Pressure Flow** and select the appropriate entry (DP Flow Calc#1, #2, etc.). If necessary, enable the calculation and set the static data parameters.

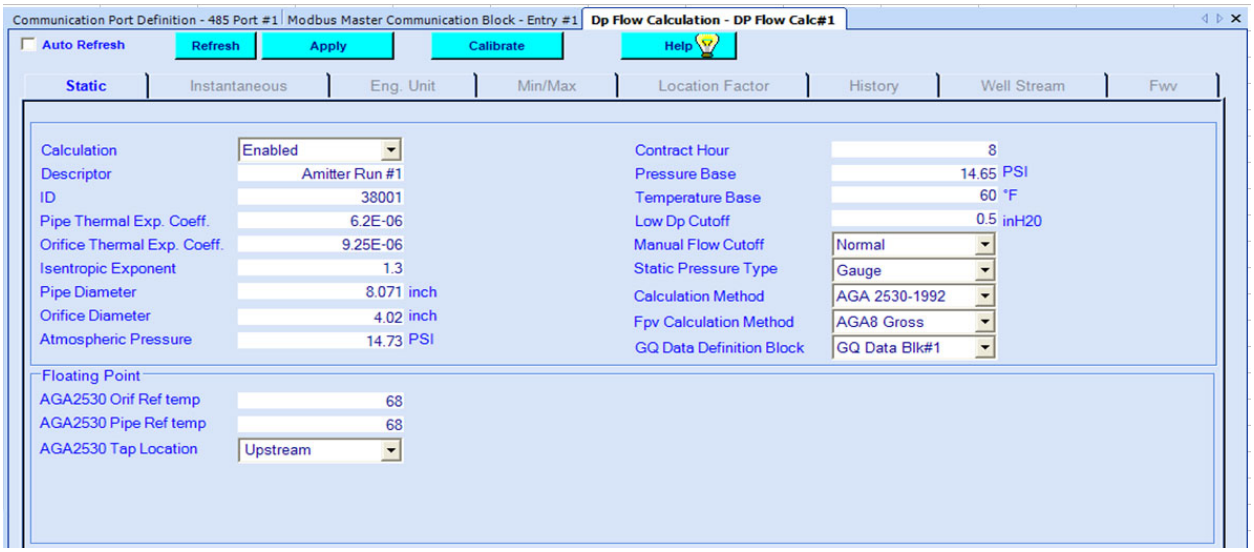

Figure 4–11. Static parameters for DP flow (orifice meter run)

Note For more information on configuring static data, reference the AutoCONFIG help system (index keyword “static data”). •

2. Click the **Instantaneous** tab and connect the temperature, differential pressure, and static pressure parameters to Table #17 (these are automatically connected to the Modbus master).

   As an example, for the first AutoMITTER PRO, connect differential pressure to Entry #1 Field #4 (Current Value), static pressure to Entry #2 Field #4, and temperature to Entry #3 Field #4.

   Repeat this for each AutoMITTER PRO.

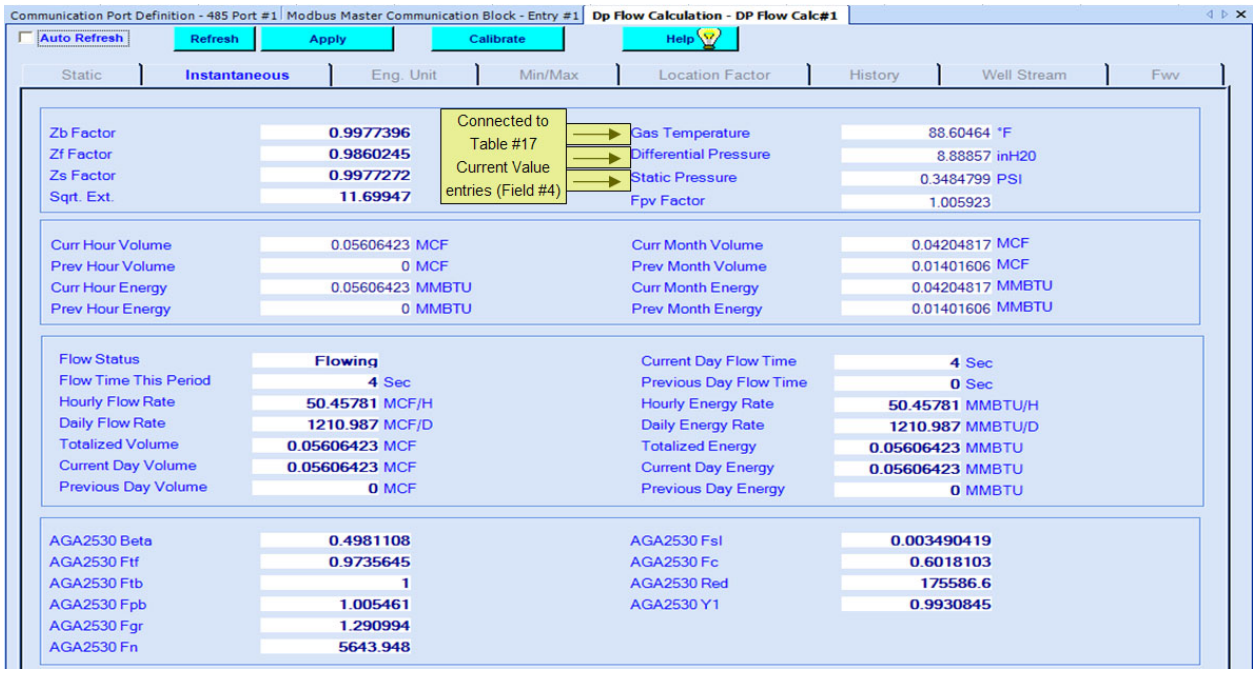

Figure 4–12. Instantaneous data parameters to connect to Table #17 entries

Using the Measurement Config Wizard

Follow this procedure to use the Measurement Config wizard to configure AutoMITTER PRO for use with AutoPILOT PRO.

1. Right-click on **DP Flow Calc#1**. Select **Config Wizard**.

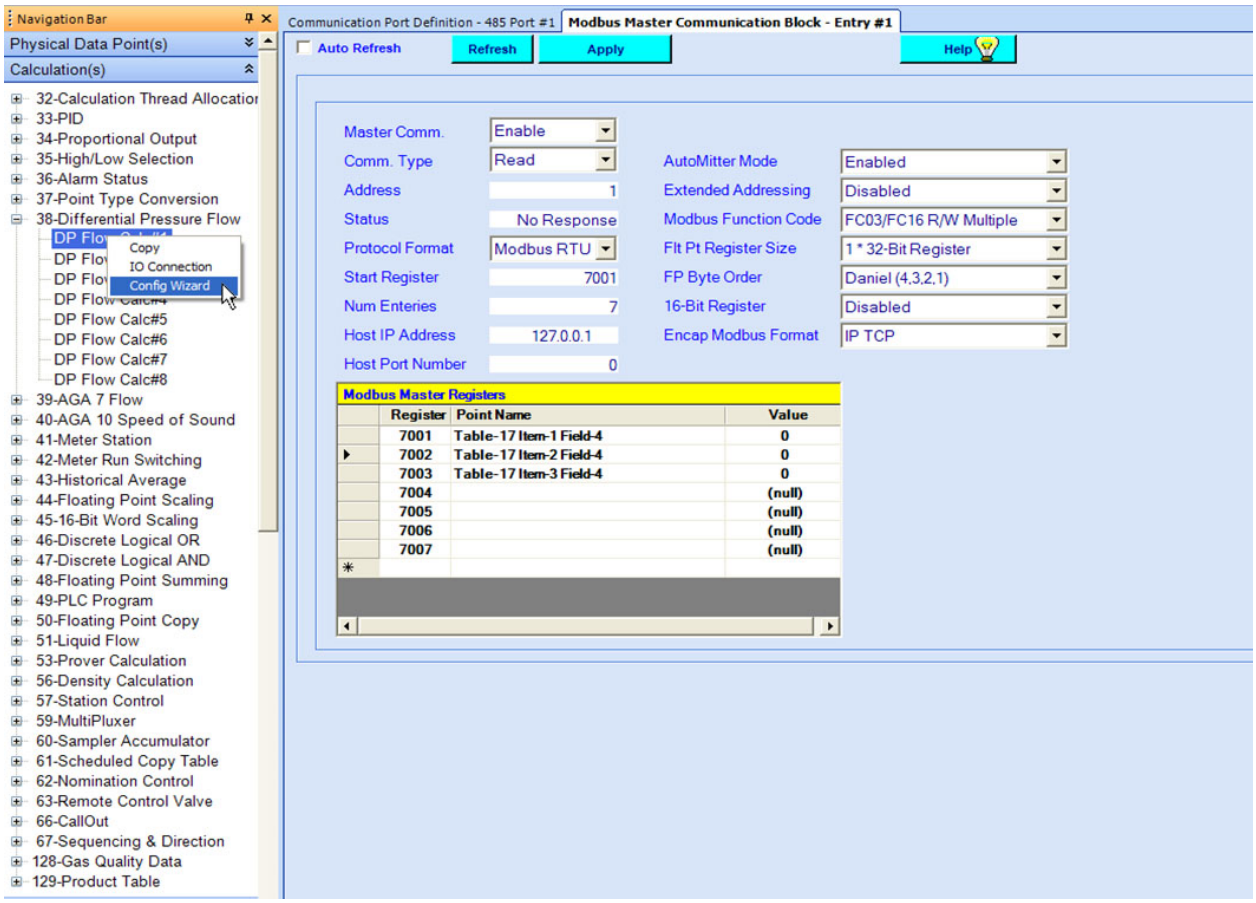

Figure 4–13. Starting the wizard

2. A small screen will appear informing you that the software is collecting data. After several seconds, the first screen of the Measurement Config wizard is displayed.

   Enable the calculation and set static parameters as necessary. Be sure to set **AGA2530 Tap Location** as **Upstream** for the AutoMITTER PRO.

   When finished, click the **Next** button.

Note For more information on configuring static data, reference the AutoCONFIG help system (index keyword "static data"). ♦

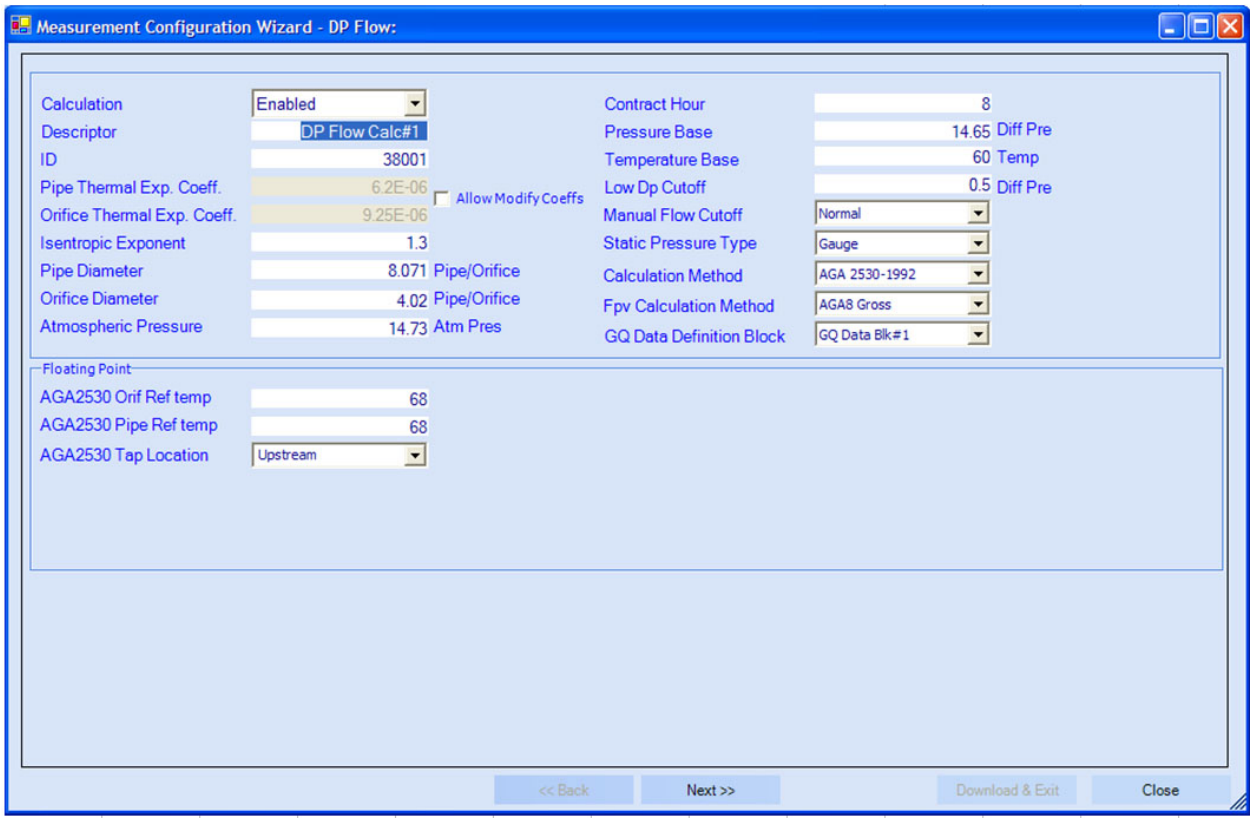

Figure 4–14. Configuring DP flow

3. On the DP Flow Factors screen, enable any factors you are using and set them to the desired value. Change engineering units at this time if necessary.

   When finished, click the **Next** button.

Note For more information on configuring factors or engineering units, reference the AutoCONFIG help system (index keyword "location factor setup", "engineering units", etc.). ♦

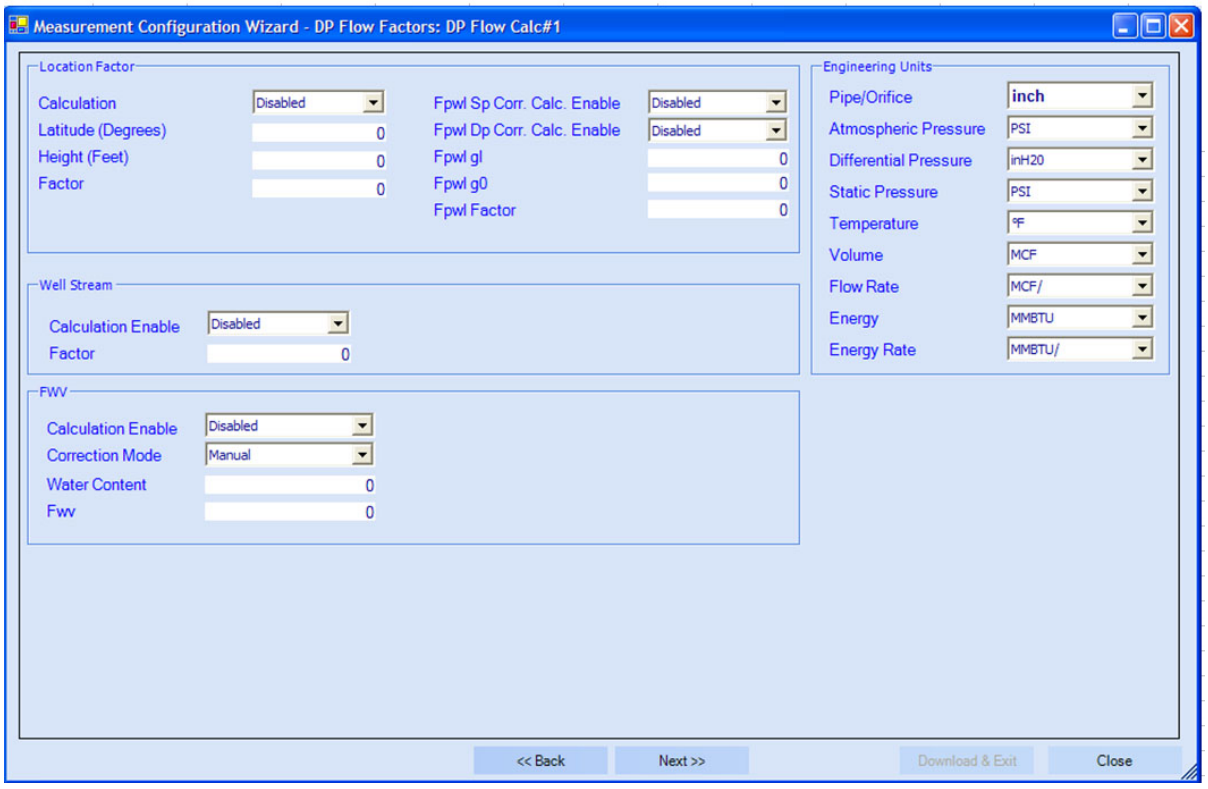

Figure 4–15. Configuring factors and engineering units

4. On the DP Flow Connections page, select **Physical Smart Xducer Input** for all three transducer inputs.

   Then select the physical input connection for each input. For example, for the first AutoMITTER PRO, differential pressure will be on input 1, and so you would select **Smart Xducer#1: Pt 17-1 Descr2.** Static pressure will be on input 2. So select **Smart Xducer#2: Pt 17-2 Descr2.** Finally, the temperature is on input 3, and you would select **Smart Xducer#3: Pt 17-3 Descr2.**

   When finished, click the **Download & Next** button.

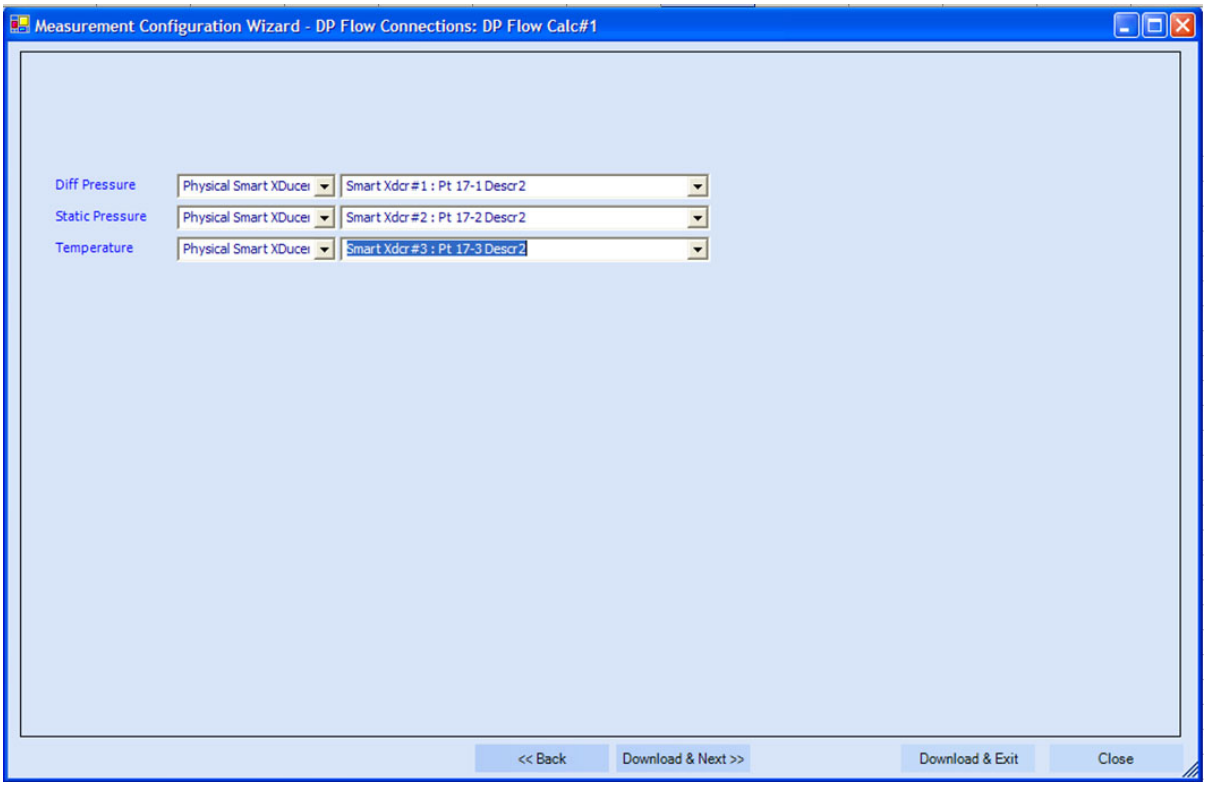

Figure 4–16. Configuring transducer inputs

5. At the Enabling Calculation Confirmation prompt, click **Yes**.

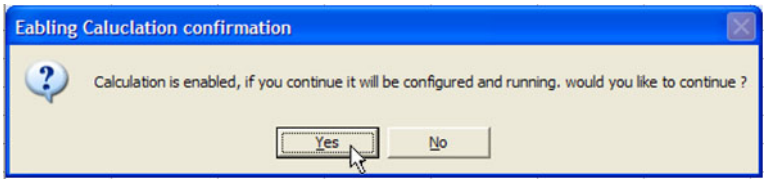

Figure 4–17.

6. At the final screen, click the **Done** button.

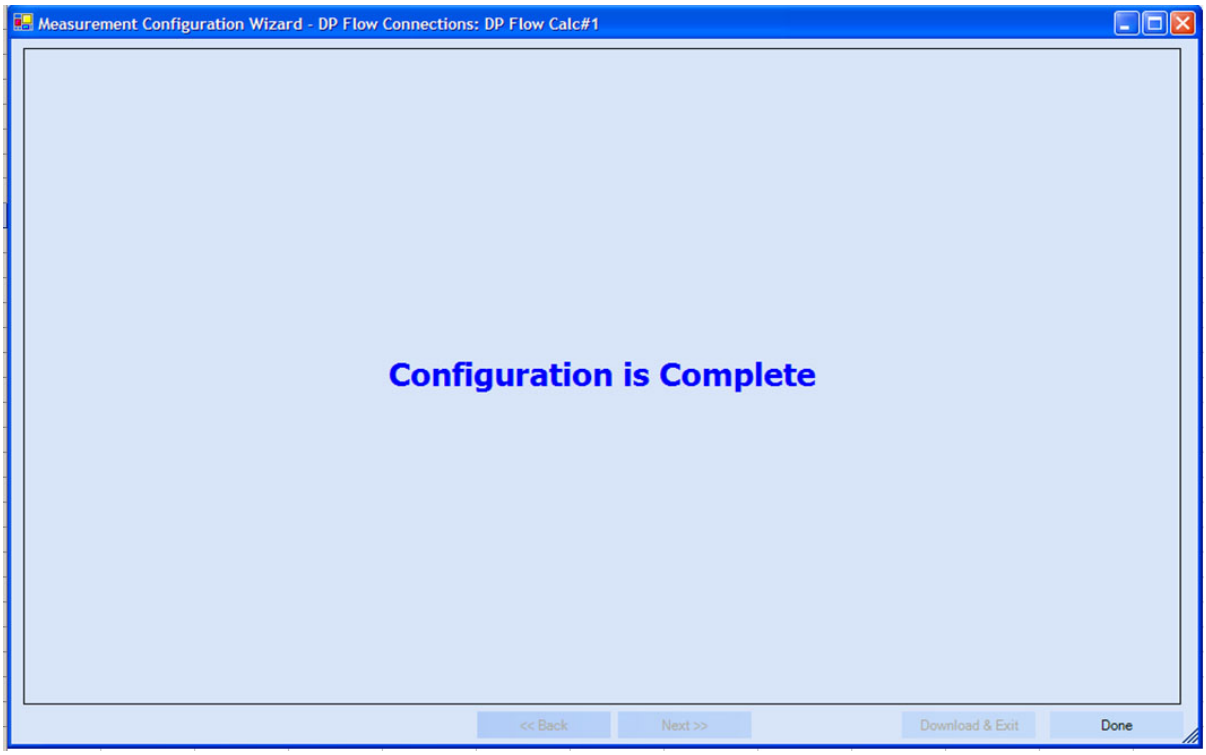

Figure 4–18. Configuration complete

Chapter 5
Maintenance

Replacing the Main Board

Follow the procedure below to replace the AutoMITTER PRO main board.

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. ♦

Tip The instructions for replacing the main board are the same for both types of enclosures. ♦

1. Remove the enclosure cover.
2. Disconnect the RS485 and power wiring.
3. Remove the main board cover plate by loosening the captive screws
4. Remove the characterization EEPROM (at U7) and the two standoffs from the main board. Do not discard them, as you will need to install them onto the replacement board.
5. Disconnect the transducer 10-pin connector (from P1).
6. Lift up on the main board so that it disengages from the mounting bracket.
7. Install the new board by aligning it with the standoffs on the mounting bracket and pressing down so that it snaps into place.
8. Connect the transducer 10-pin connector to U7.

9. Plug the EEPROM into P1, and install the two standoffs.

10. Align the cover plate so that the captive screws can be installed into the standoffs. Tighten the screws.

11. Connect the RS485 and power wiring.

12. Replace the enclosure cover.

Chapter 6
Troubleshooting & Support

Common Error Messages

1. SMT Comm Error: The flow computer is unable to communicate with the AutoMITTER PRO. Check for wiring errors between the flow computer and the AutoMITTER PRO. Refer to "RS485 & Power Connections" in Chapter 3.

2. SMT Rev/Addr Bad: The AutoMITTER PRO PCA is unable to communicate with the Honeywell transducer. Check the wiring connections between the PCA and the transducer. Refer to "RS485 & Power Connections" in Chapter 3.

3. SMT EPROM Bad: Honeywell EEPROM is not the proper one for the transducer. The EEPROM barcode serial number must match the barcode serial number on the transducer body.

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.
Suite 150
Sugar Land, TX 77478
Phone: 1-800-437-7979

In Europe

Thermo Fisher Scientific
Ion Path
Road Three
Winsford
Cheshire CW7 3GA
United Kingdom
Phone: +44 (0) 1606 548700

On the Web

www.thermofisherscientific.com

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.

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Appendix A
Specifications

Results may vary under different operating conditions.

Table A–1. AutoMITTER PRO specifications

Communications	RS485, maximum serial data rate: 9600 bps Protocol: 8-bit RTU Modbus at 9600 bps
Input Power	5.5–16.0 Vdc
RTD Circuitry (of Unit)	Accuracy: ± 0.10°C (± 0.18°F) for 100-ohm Platinum RTD – 0.00385 coefficient Ambient temperature effect: ± 0.0013°C per 1°C change Repeatability: ± 0.01°C (± 0.018°F)
Current Consumption	Normal operation (unit in sleep mode except during intermittent polling): 6 mA average With continuous polling (unit in awake mode): 12 mA average
Operating Temperature Range	Standard: -40°C to +85°C (-40°F to +185°F) ATEX: -40°C to +80°C (-40°F to +176°F) When connected to RTD: -50°C to +100°C (-58°F to 212°F)
Operating Humidity Range	0–95 %, non-condensing
Safety Listing	CSA: C/US Class I, Div. 1, Groups C & D ATEX: Ⓔx II 1 G Ex ia IIB T4 Ga (-40°C to +80°C) IECEx: Ex nA [ia, Ga] IIB T4 Gc with AutoPILOT PRO, or Ex nA [ia, Ga] IIB T4 Gc with AutoMITTER SIB

Table A–2. MVX 3000 – Differential Pressure

	400"/750 psia	400"/1500 psia	400"/3000 psig
Upper Range Limit (URL)	400 inH2O	400 inH2O	400 inH2O
Turndown Ratio	± 400 to 1	± 400 to 1	400 to 1
Minimum Span	1 inH2O	1 inH2O	1 inH2O
Accuracy[1]	± 0.075%	± 0.075%	± 0.075%
Accuracy[2]	0.0125% ± 0.0625%	0.0125% ± 0.0625%	0.0125% ± 0.0625%

Zero Temperature Effect per 28°C (50°F)[1]	± 0.1%	± 0.1%	± 0.125%
Combined Zero + Span Temperature Effect per 28°C (50°F)[1]	± 0.225%	± 0.225%	± 0.325%
Pressure Effect per 1000 psi[1]	± 0.24%	± 0.12%	± 0.15%
Combined Zero + Span Static Pressure Effect per 1000 psi (70 bar)[1]	± 1.04%	± 0.52%	± 0.35%
Drift	± 0.25 inH2O per year	± 0.25 inH2O per year	± 0.25 inH2O per year

Notes:

[1]Percentage accuracy of calibrated span or Upper Range Value (URV), whichever is greater.

[2]Percentage accuracy for URV below referenced value.

Table A–3. MVX 3000 – Static Pressure

	400"/750 psia	400"/1500 psia	400"/3000 psig
Upper Range Limit (URL)	750 psia	1500 psia	3000 psig
Turndown Ratio	150 to 1	15 to 1	30 to 1
Minimum Span	5 psia	100 psia	100 psig
Accuracy[1]	± 0.075%	± 0.075%	± 0.075%
Accuracy[2]	0.0125% ± 0.0625%	0.0125% ± 0.0625%	0.0125% ± 0.0625%
Zero Temperature Effect[1]	± 0.1%	± 0.1%	± 0.1%
Combined Zero + Span Temperature Effect per 28°C (50°F)[1]	± 0.225%	± 0.225%	± 0.125%
Drift at Reference Conditions	± 0.12 psi per year	± 0.12 psi per year	± 0.75 psi per year

Notes:

[1]Percentage accuracy of calibrated span or Upper Range Value (URV), whichever is greater.

[2]Percentage accuracy for URV below referenced value.

Table A–4. MVX 700 – Differential Pressure

	400”/1500 psia
Upper Range Limit (URL)	400 in H2O
Turndown Ratio	± 400 to 1
Minimum Span	1 inH2O
Accuracy[1]	± 0.0525%
Accuracy[2]	± 0.0625%

Notes:

[1]Percentage accuracy of calibrated span or Upper Range Value (URV), whichever is greater.

[2]Percentage accuracy for URV below referenced value.

Table A–5. MVX 700 – Static Pressure

	400”/750 psia	400”/1500 psia
Upper Range Limit (URL)	750 psia	1500 psia
Turndown Ratio	150 to 1	15 to 1
Minimum Span	5 psia	100 psia
Accuracy[1]	± 0.0550%	± 0.0550%
Accuracy[2]	± 0.008%	± 0.008%

Notes:

[1]Percentage accuracy of calibrated span or Upper Range Value (URV), whichever is greater.

[2]Percentage accuracy for URV below referenced value.

Refer to the following tables for determining Reference Accuracy.

Reference Accuracy [2] (conformance to +/-3 Sigma)

TABLE I

	Model	URL	LRL	Min Span	Maximum Turndown Ratio	Stability (% URL/Year)	Reference Accuracy[1] (% Span)
PV1	MXA745	400 in H_2O/1000mbar	-400 in H_2O/-1000mbar	1 in H_2O/2.5mbar	400:1	0.0625	**0.0525%**
PV2	MXA745	1500 psiA/104 bara	0 psiA/0 bara	100 psiA/7.0 bara	15:1	0.008	**0.0550%**

Zero and span may be set anywhere within the listed (URL/LRL) range limits

Accuracy at Specified Span, Temperature and Static Pressure (Combined Zero & Span, conformance to +/-3 Sigma)

TABLE II

			Accuracy[1] (% of Span)				Temperature Effect (% Span/50°F)		Static Line Pressure Effect (% Span/1000psi)	
	Model	URL	For Spans Below	A	B	C	D	E	F	G
PV1 Dff	MXA745	400 in H_2O	16:1	0.015	0.0375	25	0.150	0.05	0.25	0.05
PV2 Stat	MXA745	1500psiA	6:1	0.015	0.04	250	0.05	0.05	n/a	
			Turn Down Effect $\pm\left[A + B\left(\frac{C}{Span}\right)\right]$ % Span				Temp Effect $\pm\left[D + E\left(\frac{URL}{Span}\right)\right]$ % Span per 28°C (50°F)		Static Effect $\pm\left[F + G\left(\frac{URL}{Span}\right)\right]$ % Span per 1000 psi	

Table A–6. MVX 800 – Differential Pressure

	400”/750 psia
Upper Range Limit (URL)	400 in H2O
Turndown Ratio	± 400 to 1
Minimum Span	1 inH2O
Accuracy[1]	± 0.04%
Accuracy[2]	± 0.0625%

Notes:

[1]Percentage accuracy of calibrated span or Upper Range Value (URV), whichever is greater.

[2]Percentage accuracy for URV below referenced value.

Table A–7. MVX 800 – Static Pressure

	400"/1500 psia	400"/4500 psig
Upper Range Limit (URL)	1500 psia	3000 psia
Turndown Ratio	50 to 1	75 to 1
Minimum Span	100 psia	100 psig
Accuracy[1]	± 0.0375%	± 0.0375%
Accuracy[2]	± 0.008%	± 0.016%

Notes:

[1]Percentage accuracy of calibrated span or Upper Range Value (URV), whichever is greater.

[2]Percentage accuracy for URV below referenced value.

Refer to the following tables for determining Reference Accuracy.

Reference Accuracy [2] (conformance to +/-3 Sigma)

TABLE I

	Model	URL	LRL	Min Span	Maximum Turndown Ratio	Stability (% URL/Year)	Reference Accuracy[1] (% Span)
PV1 Diff	MXA845 MXG870	400 in H_2O/1000mbar	-400 in H_2O/-1000mbar	1 in H_2O/2.5mbar	400:1	0.0625	**0.04%**
PV2 Static	MXA845	1500 psiA/104 bara	0 psiA/0 bara	30 psiA/2.1 bara	50:1	0.008	**0.0375%**
	MXG870	4500 psig/310 barg	-14.7 psig/-1.0 barg	60 psig/4.2 barg	75:1	0.016	

Zero and span may be set anywhere within the listed (URL/LRL) range limits

Accuracy at Specified Span, Temperature and Static Pressure (Combined Zero & Span, conformance to +/-3 Sigma)

TABLE II

			Accuracy[1] (% of Span)				Temperature Effect (% Span/50°F)		Static Line Pressure Effect (% Span/1000psi)	
	Model	URL	For Spans Below	A	B	C	D	E	F	G
PV1 Diff	MXA845	400 in H_2O	16:1	0.015	0.025	25	0.075	0.0250	0.200	0.025
	MXG870	400 in H_2O								
PV2 Static	MXA845	1500psiA	10:1	0.0125	0.025	150	0.055	0.0200	n/a	
	MXG870	4500psig				450				
			Turn Down Effect $\pm\left[A + B\left(\frac{C}{Span}\right)\right]$ % Span				Temp Effect $\pm\left[D + E\left(\frac{URL}{Span}\right)\right]$ % Span per 28°C (50°F)		Static Effect $\pm\left[F + G\left(\frac{URL}{Span}\right)\right]$ % Span per 1000 psi	

Appendix B
Drawings

Note Information presented in this chapter has been regenerated from original drawings. Every effort is made to maintain document accuracy. However, in order to enhance legibility, the documents may have been restructured, and some information may have been intentionally excluded. Therefore, the drawings within this guide may not be exact duplicates of the original drawings. ⬩

Note Drawings in this manual are included for reference only and may not be the current version. Contact the factory if you need a copy of the latest revision. ⬩

Table B–1.

Drawing #	Rev.	Description	Page
0-0497-516	B	AutoMITTER PRO general assembly drawing, ATEX (3 sheets)	42
0-0497-517	B	AutoMITTER PRO general assembly drawing, CSA (2 sheets)	45

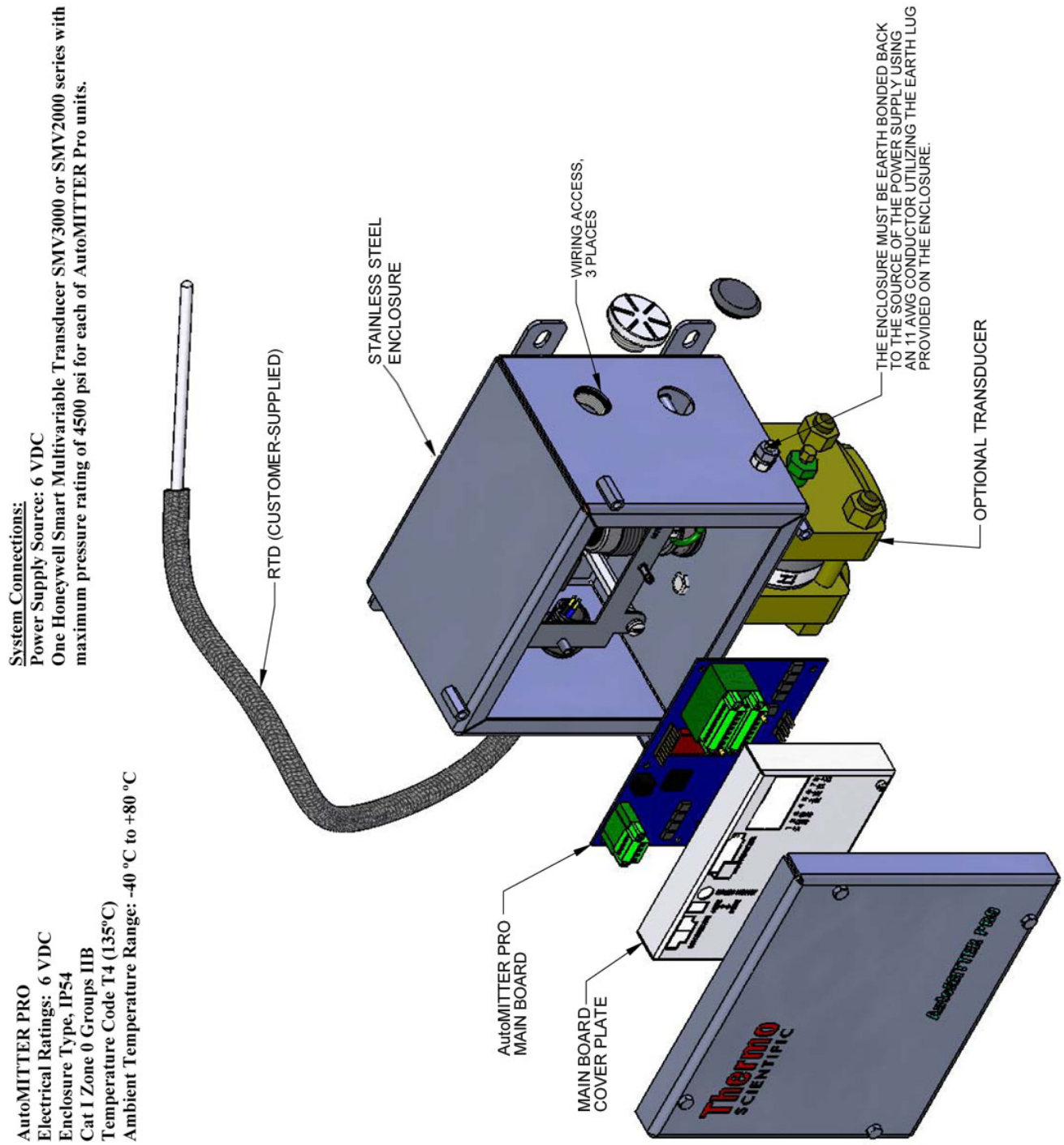

Figure B–1. 0-0497-516: AutoMITTER PRO general assembly drawing, ATEX (sheet 1 of 3)

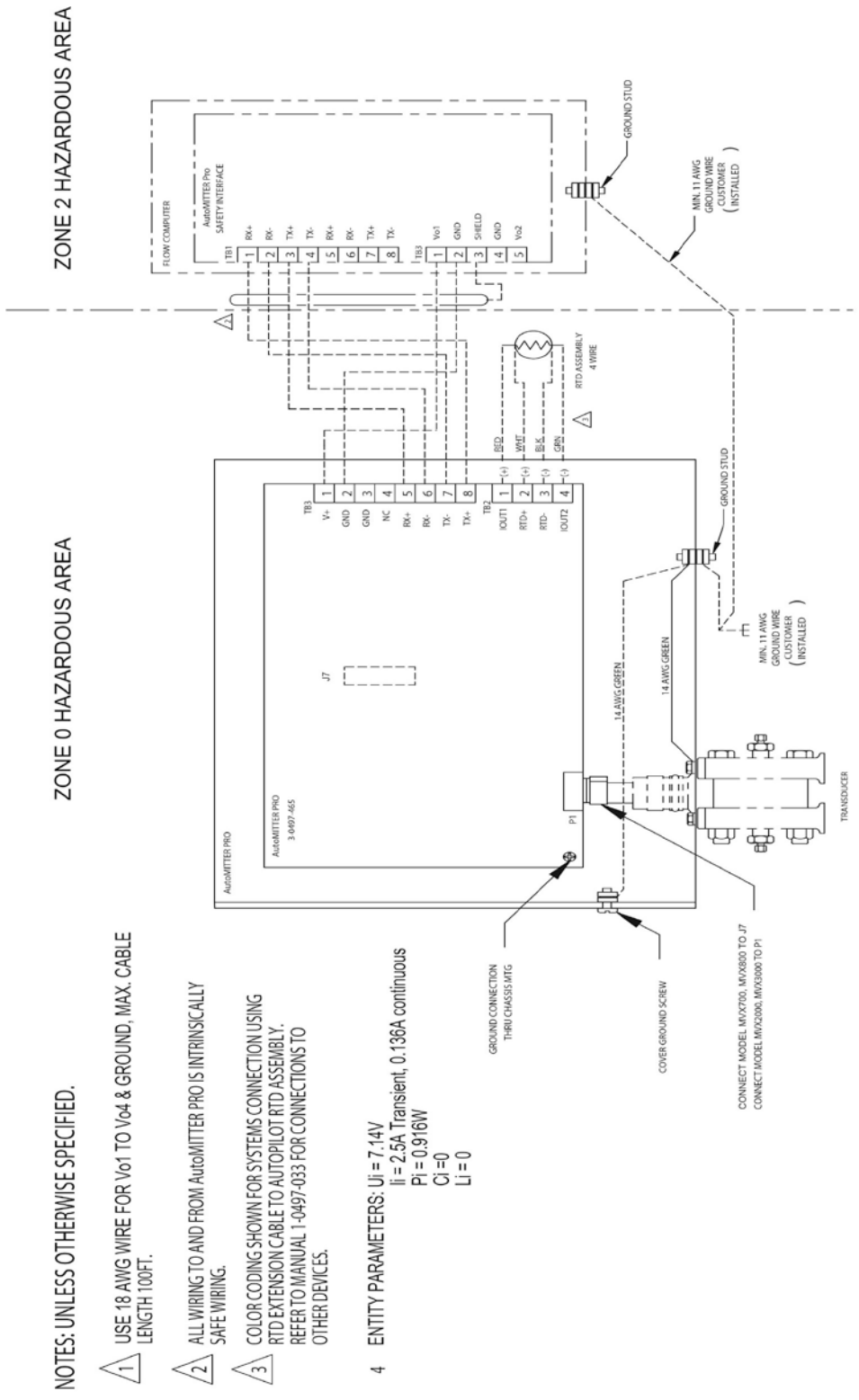

Figure B–2. 0-0497-516: AutoMITTER PRO general assembly drawing, ATEX (sheet 2 of 3)

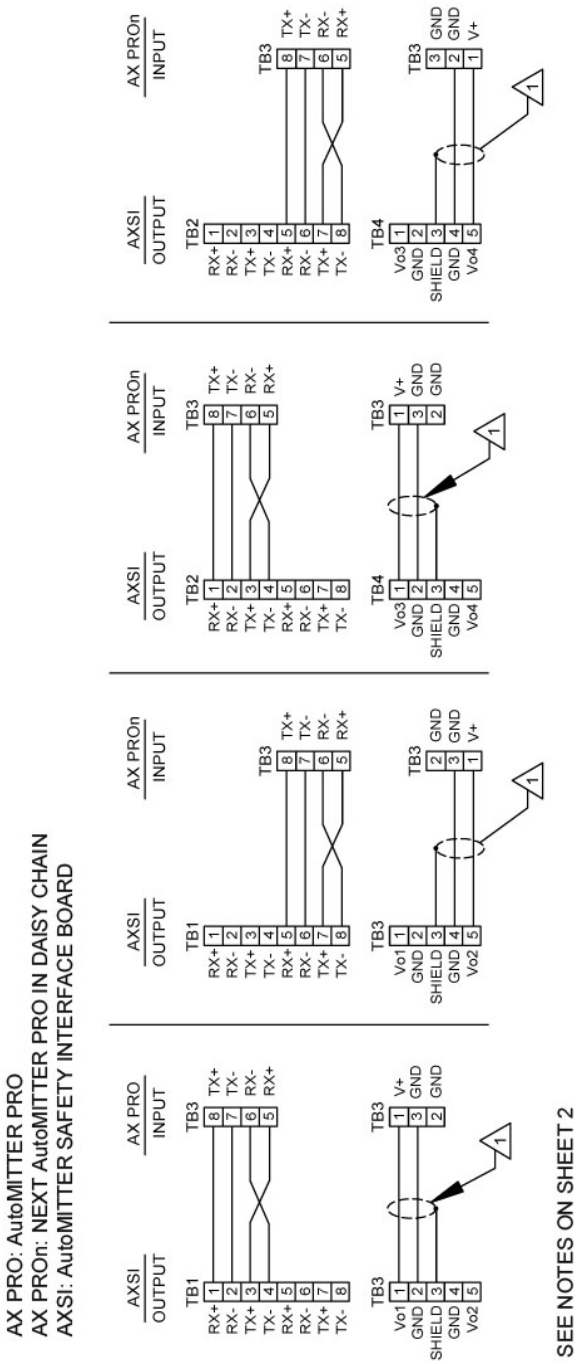

Figure B–3. 0-0497-516: AutoMITTER PRO general assembly drawing, ATEX (sheet 3 of 3)

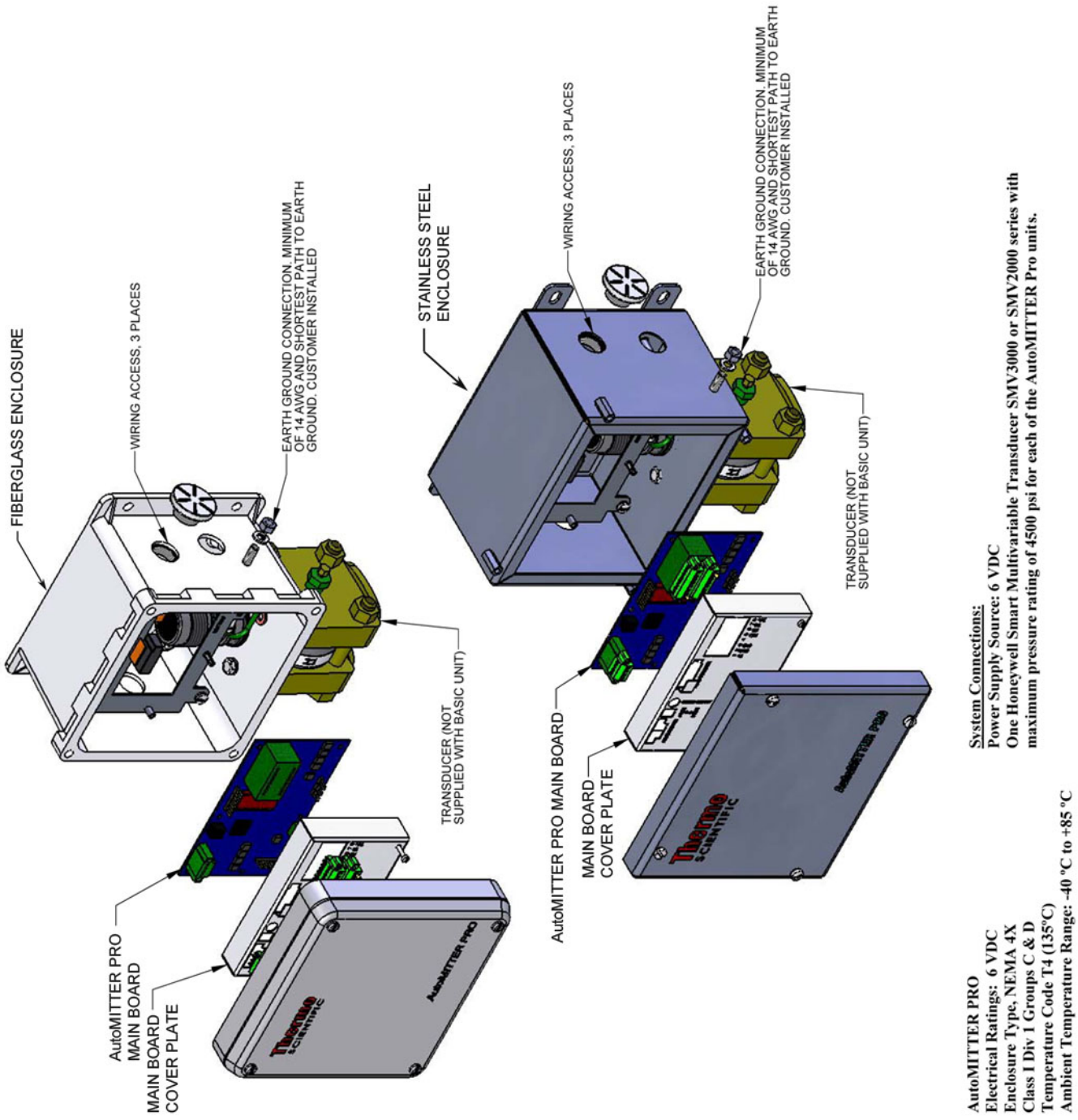

Figure B–4. 0-0497-517: AutoMITTER PRO general assembly drawing, CSA (sheet 1 of 2)

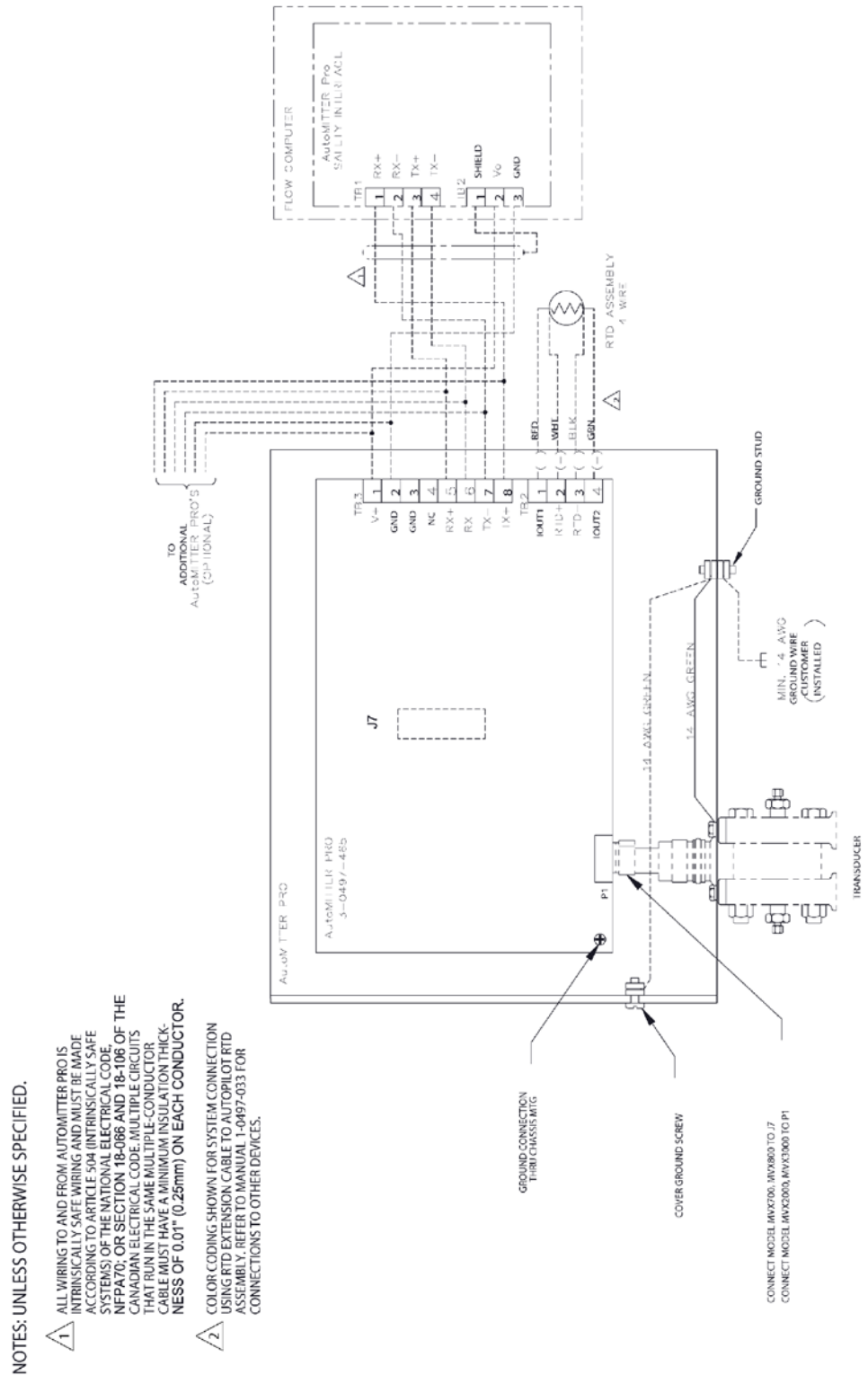

Figure B–5. 0-0497-517: AutoMITTER PRO general assembly drawing, CSA (sheet 2 of 2)

Index

W

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