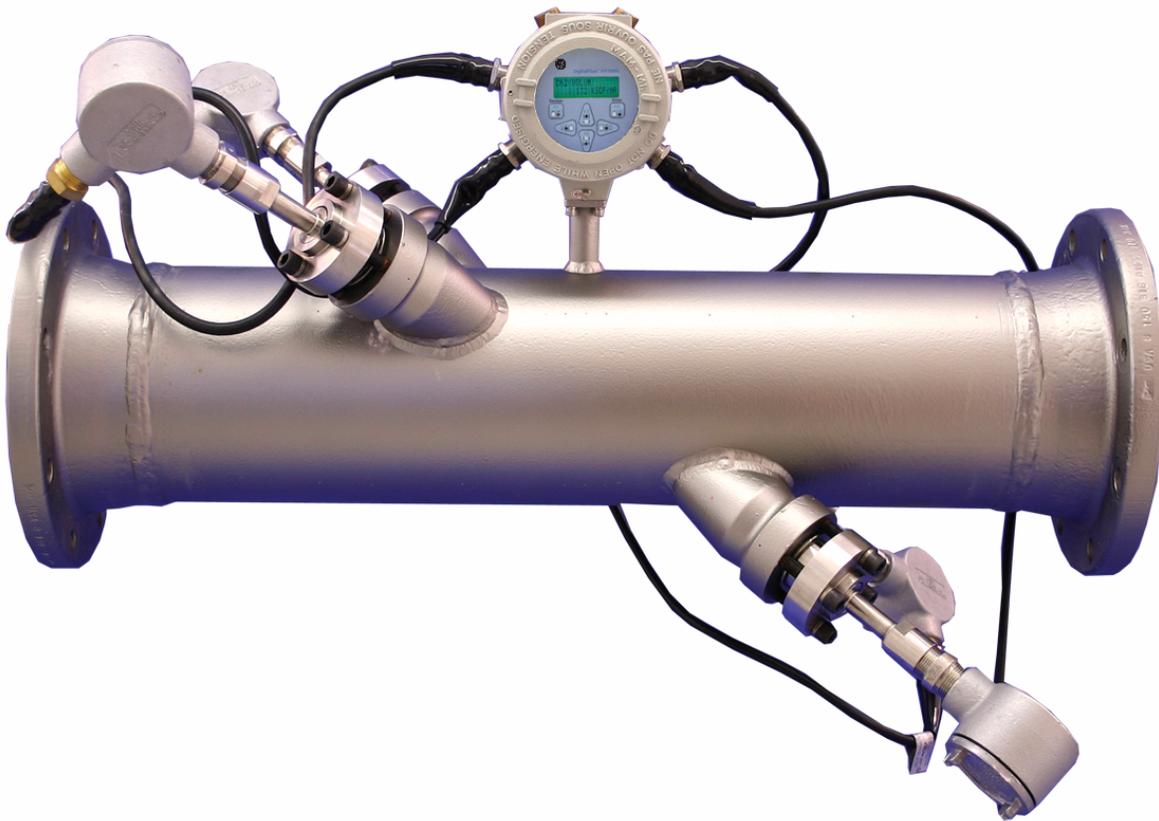


DigitalFlow™ XMT868i

*Ultrasonic Flow Transmitter for Liquids
(1 & 2-Channel)*

Startup Guide



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Startup Guide

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[no content intended for this page]

Information Paragraphs

- **Note** paragraphs provide information that provides a deeper understanding of the situation, but is not essential to the proper completion of the instructions.
- **Important** paragraphs provide information that emphasizes instructions that are essential to proper setup of the equipment. Failure to follow these instructions carefully may cause unreliable performance.
- **Caution!** paragraphs provide information that alerts the operator to a hazardous situation that can cause damage to property or equipment.
- **Warning!** paragraphs provide information that alerts the operator to a hazardous situation that can cause injury to personnel. Cautionary information is also included, when applicable.

Safety Issues

WARNING! It is the responsibility of the user to make sure all local, county, state and national codes, regulations, rules and laws related to safety and safe operating conditions are met for each installation.

Auxiliary Equipment

Local Safety Standards

The user must make sure that he operates all auxiliary equipment in accordance with local codes, standards, regulations, or laws applicable to safety.

Working Area

WARNING! Auxiliary equipment may have both manual and automatic modes of operation. As equipment can move suddenly and without warning, do not enter the work cell of this equipment during automatic operation, and do not enter the work envelope of this equipment during manual operation. If you do, serious injury can result.

WARNING! Make sure that power to the auxiliary equipment is turned OFF and locked out before you perform maintenance procedures on the equipment.

Qualification of Personnel

Make sure that all personnel have manufacturer-approved training applicable to the auxiliary equipment.

Personal Safety Equipment

Make sure that operators and maintenance personnel have all safety equipment applicable to the auxiliary equipment. Examples include safety glasses, protective headgear, safety shoes, etc.

Unauthorized Operation

Make sure that unauthorized personnel cannot gain access to the operation of the equipment.

Environmental Compliance

Waste Electrical and Electronic Equipment (WEEE) Directive

GE Measurement & Control Solutions is an active participant in Europe's *Waste Electrical and Electronic Equipment* (WEEE) take-back initiative, directive 2002/96/EC.



The equipment that you bought has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems. Those systems will reuse or recycle most of the materials of your end life equipment in a sound way.

The crossed-out wheeled bin symbol invites you to use those systems.

If you need more information on the collection, reuse and recycling systems, please contact your local or regional waste administration.

Visit <http://www.ge-mcs.com/en/about-us/environmental-health-and-safety/1741-weee-req.html> for take-back instructions and more information about this initiative.

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Chapter 1. Installation

1.1 Introduction

To ensure safe and reliable operation of the Model XMT868i Flowmeter, the system must be installed in accordance with the guidelines established by GE engineers. Those guidelines, explained in detail in this chapter, include the following topics:

- Unpacking the Model XMT868i system
- Selecting suitable sites for the electronics enclosure and the flowcell/transducers
- Installing the flowcell/transducers

Note: *See the enclosed Transducer Installation Guide for detailed instructions on transducer installation.*

- Installing optional temperature transmitters
- Installing the electronics enclosure
- Wiring the electronics enclosure

WARNING! The Model XMT868i flow transmitter can measure the flow rate of many fluids, some potentially hazardous. The importance of proper safety practices cannot be overemphasized.

Be sure to follow all applicable local safety codes and regulations for installing electrical equipment and working with hazardous fluids or flow conditions. Consult company safety personnel or local safety authorities to verify the safety of any procedure or practice.

!ATTENTION EUROPEAN CUSTOMERS!

To meet CE Mark requirements, all cables must be installed as described in Appendix A, *CE Mark Compliance*.

1.2 Unpacking

Carefully remove the electronics enclosure, the transducers, and the cables from the shipping containers. Before discarding any of the packing materials, account for all components and documentation listed on the packing slip. The discarding of an important item along with the packing materials is all too common. If anything is missing or damaged, contact the factory immediately for assistance.

1.3 Site Considerations

Because the relative location of the flowcell and the electronics enclosure is important, use the guidelines in this section to plan the XMT868i installation. Figure 1 shows a typical installation.

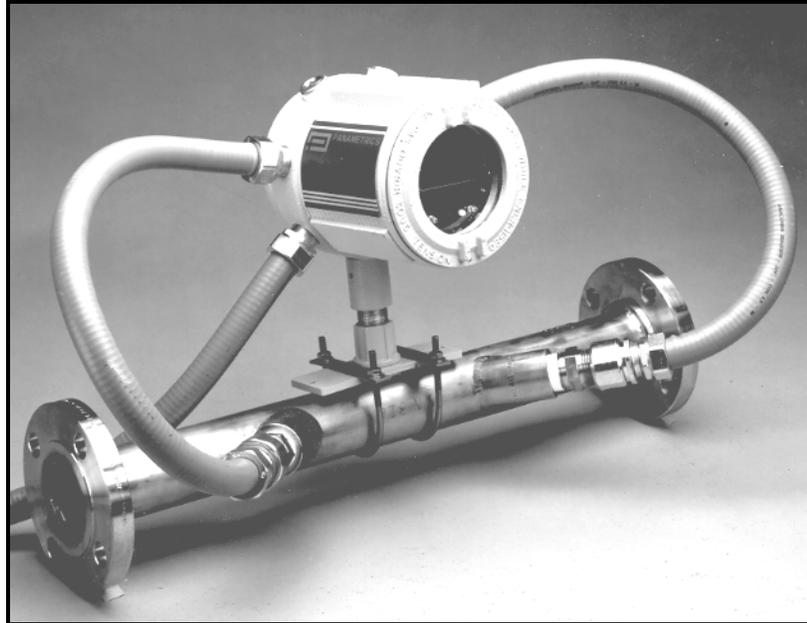


Figure 1: A Typical Model XMT868i System

1.3.1 Electronics Enclosure Location

The standard Model XMT868i electronics enclosure is a powder-coated, cast-aluminum, Type-7/4X explosion-proof enclosure, and an optional stainless-steel enclosure is available. Typically, the enclosure is mounted as close as possible to the transducers. When choosing a site, make sure the location permits easy access to the electronics enclosure for programming, maintenance and service.

Note: *For compliance with the European Union's Low Voltage Directive (73/23/EEC), this unit requires an external power disconnect device such as a switch or circuit breaker. The disconnect device must be marked as such, clearly visible, directly accessible, and located within 1.8 m (6 ft) of the Model XMT868i.*

1.3.2 Flowcell Location

Ideally, choose a section of pipe with unlimited access; for example, a long stretch of pipe that is above ground. However, if the flowcell is to be mounted on an underground pipe, dig a pit around the pipe to facilitate installation of the transducers.

1.3.3 Transducer Location

For a given fluid and pipe, the Model XMT868i's accuracy depends primarily on the location and alignment of the transducers. In addition to accessibility, when planning for transducer location, adhere to the following guidelines:

- Locate the transducers so that there are at least 10 pipe diameters of straight, undisturbed flow upstream and 5 pipe diameters of straight, undisturbed flow downstream from the measurement point. Undisturbed flow means avoiding sources of turbulence in the fluid such as valves, flanges, expansions, and elbows; avoiding swirl; and avoiding cavitation.
- Locate the transducers on a common axial plane along the pipe. Locate the transducers on the side of the pipe, rather than the top or bottom, since the top of the pipe tends to accumulate gas and the bottom tends to accumulate sediment. Either condition will cause increased attenuation of the ultrasonic signal. There is no similar restriction with vertical pipes. However, vertical pipes should be avoided in order to insure a full pipe at the measurement point.

1.3.4 Cable Lengths

Locate the electronics enclosure as close as possible to the flowcell/transducers, preferably directly on the flowcell. However, GE can supply transducer cables up to 1,000 ft (300 m) in length for remote location of the electronics enclosure. If longer cables are required, consult the factory for assistance.

1.3.5 Transducer Cables

When installing the transducer cables, always observe established standard practices for the installation of electrical cables. Do not route transducer cables alongside high amperage AC power lines or any other cables that could cause electrical interference. Also, protect the transducer cables and connections from the weather and corrosive atmospheres.

Note: *If you are using your own cables to connect the transducers to the electronics console, they must have electrical characteristics identical to the cables supplied by GE. For transducer frequencies up to 2 MHz, the cables in each pair must be the same length within ± 4 in. (10 cm). For transducer frequencies above 2 MHz, the cables in each pair must be the same length within ± 0.5 in. (1.25 cm).*

1.4 Installing a Flowcell

A flowcell is the section of pipe where the transducers are mounted. It can be created either by mounting the transducers on the existing pipeline or by mounting them on a spoolpiece. A spoolpiece is a separately manufactured pipe section, matched to the existing pipe, which contains ports for mounting the transducers. This approach allows the transducers to be aligned and calibrated before inserting the spoolpiece into the pipeline.

Figure 1 on page 2 shows a typical Model XMT868i spoolpiece, with a mounting bracket to hold the electronics enclosure. For detailed instructions on installing the transducers and/or spoolpiece, refer to the supplied drawings and the enclosed GE *Liquid Transducer Installation Guide* (916-055).

1.5 Installing Temperature Transmitters

Optional temperature transmitters may be installed as part of the flowcell, near the ultrasonic transducer ports. Be sure to observe the siting requirements given earlier in this chapter. These transmitters should send a 0/4-20 mA signal to the Model XMT868i. In turn, the XMT868i must be fitted with a suitable option card to process the signals and to provide the required 24 VDC power to the transmitters. Any desired transmitters or sensors may be used, but they must have an accuracy equal to 0.5% of the reading or better.

Note: *Resistive Thermal Devices (RTDs) are a good choice for measuring the temperature.*

Typically, a 1/2" NPT female threaded port is used to mount the transmitters on the flowcell. If the pipeline is insulated, the coupling may need to be extended to provide convenient access. Of course, other types of mounting ports, including flanged ports, may be used for the transmitters.

Figure 2 shows a typical mounting arrangement for a temperature transmitter. The temperature transmitter should protrude 1/4 to 1/2 way into the pipe.

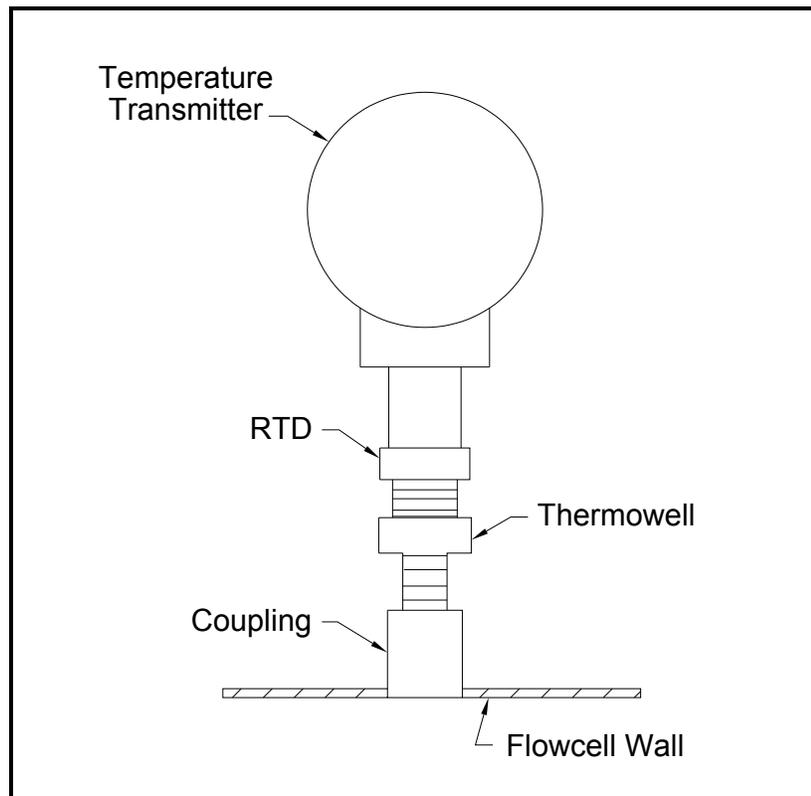


Figure 2: Typical Temperature Transmitter Mounting

1.6 Mounting the XMT868i Electronics Enclosure

The standard model XMT868i electronics package is housed in a Type-4X weather-resistant enclosure suitable for indoor or outdoor use. Refer to Figure 8 on page 21 for the mounting dimensions and the weight of this enclosure.

The Model XMT868i electronics enclosure is fitted with a mounting boss that has a single 3/4" NPTF threaded hole at its center and four 1/4-20 tapped holes at its corners. By using this mounting boss, the electronics enclosure may be mounted by any of the typical techniques shown in Figure 9 on page 22.

WARNING! Proper grounding of the XMT868i chassis is required to prevent the possibility of electric shock. See Figure 9 on page 22 to locate the chassis grounding screw.

IMPORTANT: *Since the IREX keys do not work properly in direct sunlight, be sure to position the XMT868i with an optional sunshield or out of direct sunlight.*

1.7 Making Electrical Connections

This section contains instructions for making all the necessary electrical connections to the Model XMT868i flow transmitter. Refer to Figure 10 on page 23 for a complete wiring diagram.

Except for the power connector, all electrical connectors are stored on their terminal blocks during shipment and may be removed from the enclosure for more convenient wiring. Simply, feed the cables through the conduit holes on the side of the enclosure, attach the wires to the appropriate connectors and plug the connectors back into their terminal blocks.

!ATTENTION EUROPEAN CUSTOMERS!
To meet CE Mark requirements, all cables must be installed as described in
Appendix A, *CE Mark Compliance*.

Refer to Figure 3 on page 6 and prepare the Model XMT868i for wiring by completing the following steps:

WARNING! Always disconnect the line power from the Model XMT868i before removing either the front cover or the rear cover. This is especially important in a hazardous environment.

1. Disconnect any previously wired power line from the unit.
2. Loosen the set screw on the rear cover.
3. Place a rod or long screwdriver across the cover in the slots provided, and rotate the cover counterclockwise until it comes free from the enclosure.
4. Install any required cable glands in the appropriate conduit holes around the side of the enclosure.

CAUTION! To ensure safe and reliable operation of the flowmeter, be sure to install and tighten all cable glands in accordance with the gland manufacturer's instructions.

5. Note the labels inside the rear cover to assist in wiring the power and option card connections. Also, Figure 11 on page 24 shows the rear cover option card labels for every available option card configuration.

Proceed to the appropriate section of this chapter to make the desired wiring connections.

1.7 Making Electrical Connections (cont.)

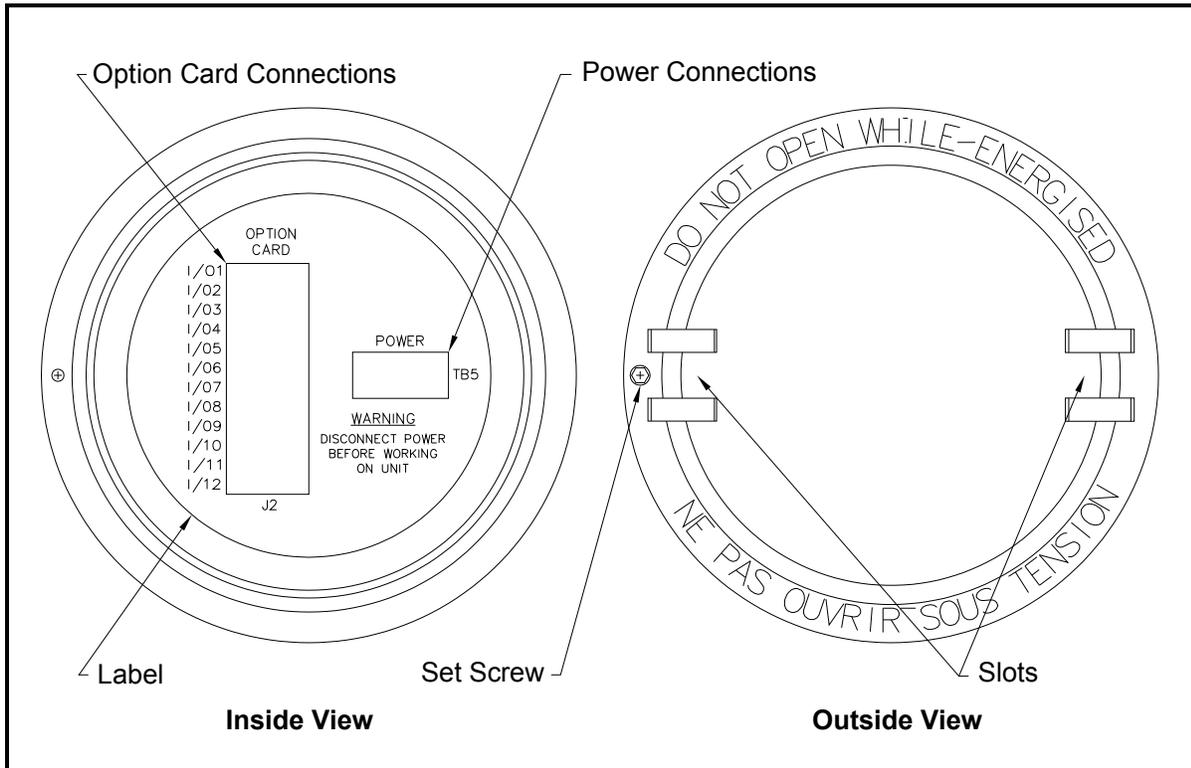


Figure 3: Rear Cover with Connection Labels

1.7.1 Wiring the Line Power

The Model XMT868i may be ordered for operation with power inputs of 100-120 VAC, 220-240 VAC, or 12-28 VDC. The label on the side of the electronics enclosure lists the meter's required line voltage and power rating. The fuse size is listed in Chapter 4, *Specifications*. Be sure to connect the meter only to the specified line voltage.

Note: *For compliance with the European Union's Low Voltage Directive (73/23/EEC), this unit requires an external power disconnect device such as a switch or circuit breaker. The disconnect device must be marked as such, clearly visible, directly accessible, and located within 1.8 m (6 ft) of the Model XMT868i.*

Refer to Figure 10 on page 23 to locate terminal block TB5 and connect the line power as follows:

WARNING! Improper connection of the line power leads or connecting the meter to the incorrect line voltage may damage the unit. It may also result in hazardous voltages at the flowcell and associated piping as well as within the electronics enclosure.

1.7.1 Wiring the Line Power (cont.)

1. Prepare the line power leads by trimming the line and neutral AC power leads (or the positive and negative DC power leads) to a length 0.5 in. (1 cm) shorter than the ground lead. This ensures that the ground lead is the last to detach if the power cable is forcibly disconnected from the meter.
2. Install a suitable cable clamp in the conduit hole indicated in Figure 10 on page 23. If possible, avoid using the other conduit holes for this purpose, to minimize any interference in the circuitry from the AC power line.

!ATTENTION EUROPEAN CUSTOMERS!

To meet CE Mark requirements, all cables must be installed as described in Appendix A, CE Mark Compliance.

3. Strip 1/4-in. of insulation from the end of each of the three line power leads.
4. Route the cable through the conduit hole and connect the line power leads to terminal block TB5, using the pin number assignments shown in Figure 10 on page 23.
5. Leaving a bit of slack, secure the power line with the cable clamp.

WARNING! Make sure both covers, with their O-ring seals, are installed and the set screws tightened before applying power in a hazardous environment.

CAUTION! The transducers must be properly wired before applying power to the meter.

Proceed to the next section to continue the initial wiring of the Model XMT868i flow transmitter.

1.7.2 Wiring Transducers

Before wiring the XMT868i transducers, complete the following steps:

- Disconnect the main power from the electronics enclosure.
- Remove the rear cover and install all required cable clamps.

WARNING! Before connecting the transducers, take them to a safe area and discharge any static buildup by shorting the center conductor of the transducer cables to the metal shield on the cable connector.

Note: For transducer frequencies below 2 MHz, the cable lengths must be within 4 in. (10 cm) of each other. If the transducer frequency exceeds 2 MHz, the cable lengths must be within 0.5 in. (1.25 cm) of each other.

1. Locate the CH1 transducer cables and connect them to the two CH1 transducers in the flowcell. Feed the free ends of the cables through the selected conduit hole in the electronics enclosure.
2. If an optional lightning protector is being installed, connect it between the meter and the transducers.
3. Refer to the wiring diagram in Figure 10 on page 23 and connect the transducer cables to terminal block J3. Then, secure the cable clamp.

Note: The RED cable leads are the SIG(+) leads and the BLACK cable leads are the RTN(-) leads.

!ATTENTION EUROPEAN CUSTOMERS!
To meet CE Mark requirements, all cables must be installed as described in
Appendix A, CE Mark Compliance.

4. For a 2-Channel XMT868i, repeat steps 1-2 to connect the CH2 transducers to terminal block J4. It is not required that both channels of a 2-Channel unit be connected.
5. If wiring of the unit has been completed, reinstall the rear cover on the enclosure and tighten the set screw.

Note: A channel must be activated before it can begin taking measurements. See Chapter 2, Initial Setup, for instructions.

1.7.3 Wiring Standard 0/4-20 mA Analog Outputs

The standard configuration of the Model XMT868i flow transmitter includes two isolated 0/4-20 mA analog outputs (designated as outputs 1 and 2). Connections to these outputs may be made with standard twisted-pair wiring, but the current loop impedance for these circuits must not exceed 600 ohms.

To wire the analog outputs, complete the following steps:

1. Disconnect the main power to the unit and remove the rear cover.
2. Install the required cable clamp in the chosen conduit hole on the side of the electronics enclosure.
3. Refer to Figure 10 on page 23 for the location of terminal block J1 and wire the analog outputs as shown. Secure the cable clamp.

Note: *Analog outputs 1 and 2 in the wiring diagram correspond to analog outputs A and B in Slot 0 in the XMT868i software.*

!ATTENTION EUROPEAN CUSTOMERS!

To meet CE Mark requirements, all cables must be installed as described in Appendix A, CE Mark Compliance.

4. If wiring of the unit has been completed, reinstall the rear cover on the enclosure and tighten the set screw.

WARNING! **Make sure both covers, with their o-ring seals, are installed and the set screws tightened before applying power in a hazardous environment.**

Note: *Prior to use, the analog outputs must be set up and calibrated. See Chapter 1, Calibration, of the Service Manual for detailed instructions.*

Proceed to the next section to continue the initial wiring of the unit.

1.7.4 Wiring the Serial Port

The Model XMT868i flow transmitter is equipped with a built-in serial communications port. The standard port is an RS232 interface, but an optional RS485 interface is available upon request. Proceed to the appropriate sub-section for wiring instructions. For more information on serial communications refer to the *EIA-RS Serial Communications* manual (916-054).

1.7.4a Wiring the RS232 Interface

Use the serial port to connect the Model XMT868i flow transmitter to a printer, an ANSI terminal or a personal computer. The RS232 interface is wired as Data Terminal Equipment (DTE), and the signals available at terminal block J1 are shown in Table 1. Refer to Figure 10 on page 23 and complete the following steps:

1. Disconnect the main power to the unit and remove the rear cover.
2. Install the required cable clamp in the chosen conduit hole on the side of the electronics enclosure.
3. Use the information in Table 1 to construct a suitable cable for connecting the Model XMT868i to the external device. If desired, an appropriate cable may be purchased from GE.

Table 1: RS232 Connection to DCE or DTE Device

| J1 Pin # | Signal Description | DCE DB25 Pin # | DCE DB9 Pin # | DTE DB25 Pin # | DTE DB9 Pin # |
|-------------|---------------------------|----------------------|---------------------|----------------------|---------------------|
| 5 | DTR (Data Terminal Ready) | 20 | 4 | 20 | 4 |
| 6 | CTS (Clear to Send) | 4 | 7 | 5 | 8 |
| 7 | COM (Ground) | 7 | 5 | 7 | 5 |
| 8 | RX (Receive) | 2 | 3 | 3 | 2 |
| 9 | TX (Transmit) | 3 | 2 | 2 | 3 |

Note: *Signal names that imply direction (e.g., transmit and receive) are named from the point of view of the DTE device (the GE meter is usually considered the DTE device). When the RS232 standard is strictly followed, these signals are labeled with the same name and pin # on the DCE device side as well. Unfortunately, the convention is not followed because the DTE and DCE side get confused. Therefore, connections that imply direction are changed to reflect their direction on the DCE side.*

4. Feed the flying leads end of the cable through the conduit hole and wire it to terminal block J1. Connect the other end of the cable to the printer, ANSI terminal or personal computer, and secure the cable clamp.

!ATTENTION EUROPEAN CUSTOMERS!

To meet CE Mark requirements, all cables must be installed as described in Appendix A, CE Mark Compliance.

After the wiring has been completed, consult the *User's Manual* for the external device to configure it for use with the XMT868i.

1.7.4b Wiring the RS485 Interface

Use the optional RS485 serial port to network multiple XMT868i flow transmitters to a single computer terminal. As an option, the standard RS232 port on the XMT868i may be configured as a two-wire, half-duplex RS485 interface.

IMPORTANT: *The XMT868i must be configured at the factory for RS485 operation. The maximum cable length for RS485 is 4000 ft (1200 m).*

To wire the RS485 serial port, refer to Figure 10 on page 23 and complete the following steps:

1. Disconnect the main power to the unit and remove the rear cover.
2. Install the required cable clamp in the chosen conduit hole on the side of the electronics enclosure.
3. Feed one end of the cable through the conduit hole, wire it to terminal block J1 and secure the cable clamp. Use the information in Table 2 to wire a suitable cable for connecting the XMT868i to the external device.

Table 2: RS485 Connections

| J1 Pin # | Signal Description |
|----------|--------------------|
| 9 | Data + |
| 8 | Data - |
| 7 | Shield |
| 6 | Not Used |
| 5 | Not Used |
| 4 | Not Used |

!ATTENTION EUROPEAN CUSTOMERS!
To meet CE Mark requirements, all cables must be installed as described in
Appendix A, CE Mark Compliance.

4. If wiring of the unit has been completed, reinstall the rear cover on the enclosure and tighten the set screw.

Proceed to the next section to continue the initial wiring of the unit.

1.7.5 Wiring Option Cards

The XMT868i can accommodate one option card in Slot 1 and one option card in Slot 2. The following types of option cards are available only in the combinations listed in Table 22 on page 69:

- Alarm Relays (Slot 1)
- Analog Inputs (Slot 1)
- Totalizer/Frequency Outputs (Slot 1)
- RTD Inputs (Slot 1)
- Analog Outputs (Slot 1)
- MODBUS Communications (Slot 2)
- MODBUS/TCP Communications (Slot 2)
- Ethernet (Slot 2)
- Foundation Fieldbus (Slot 2)
- Data logging (Slot 2) - *no wiring required*

1.7.5a Preparing for Wiring

Wiring any option card installed in Slot 1 requires completion of the following general steps:

1. Disconnect the main power to the unit and remove the rear cover.
2. Install a cable clamp in the chosen conduit hole on the side of the electronics enclosure and feed a standard twisted-pair cable through this conduit hole.
3. Locate the 12-pin terminal block (J2) in Figure 10 on page 23 and wire the option card as indicated on the label inside the rear cover (see Figure 3 on page 6 and Figure 11 on page 24). Secure the cable clamp.

IMPORTANT: *Because of the attached wiring label, all rear covers must remain with their original meters.*

!ATTENTION EUROPEAN CUSTOMERS!

To meet CE Mark requirements, all cables must be installed as described in Appendix A, CE Mark Compliance.

4. If wiring of the unit has been completed, reinstall the rear cover on the enclosure and tighten the set screw.

Note: *Prior to use, the option card must be set up and calibrated. See Chapter 1, Programming Site Data, in the Programming Manual and Chapter 1, Calibration, in the Service Manual for detailed instructions.*

For more specific instructions on particular option cards, proceed to the appropriate sub-section(s) that follow.

1.7.5b Wiring an Alarms Option Card

Each alarms option card includes two or four general-purpose *Form C* relays (designated as A, B, C and D).

The maximum electrical ratings for the relays are listed in Chapter 4, *Specifications*. Each of the alarm relays can be wired as either *Normally Open* (NO) or *Normally Closed* (NC).

In setting up an alarm relay, it may be wired for either *conventional* or *fail-safe* operation. In fail-safe mode, the alarm relay is constantly energized, except when it is triggered or a power failure or other interruption occurs. See Figure 4 for the operation of a normally open alarm relay in both conventional and fail-safe mode.

Connect each alarm relay in accordance with the wiring instructions shown on the label inside the rear cover (see Figure 3 on page 6 and Figure 11 on page 24).

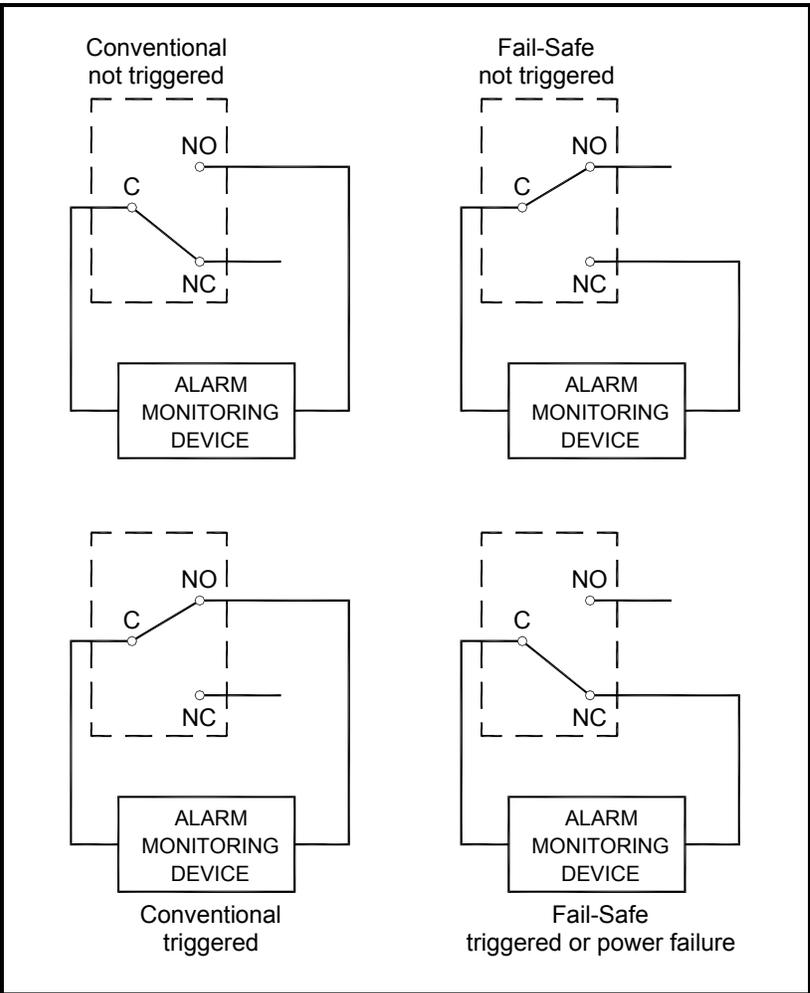


Figure 4: Conventional and Fail-Safe Operation

1.7.5c Wiring a 0/4-20 mA Analog Inputs Option Card

This option card includes two or four isolated 0/4-20 mA analog inputs (designated as A, B, C and D), each of which includes a 24 VDC power supply for loop-powered transmitters. Either input may be used to process the temperature signal, while the other input is used to process the pressure signal.

Note: To enter programming data during operation of the meter, it will be necessary to know which input is assigned to which process parameter. This information should be entered in Appendix B, Data Records.

The analog inputs, which have an impedance of 118 ohms, should be connected with standard twisted-pair wiring. Power to the transmitters may be supplied either by the integral 24 VDC power supply on the analog input option card or by an external power supply. Figure 5 shows typical wiring diagrams, with and without an external power supply, for one of the analog inputs.

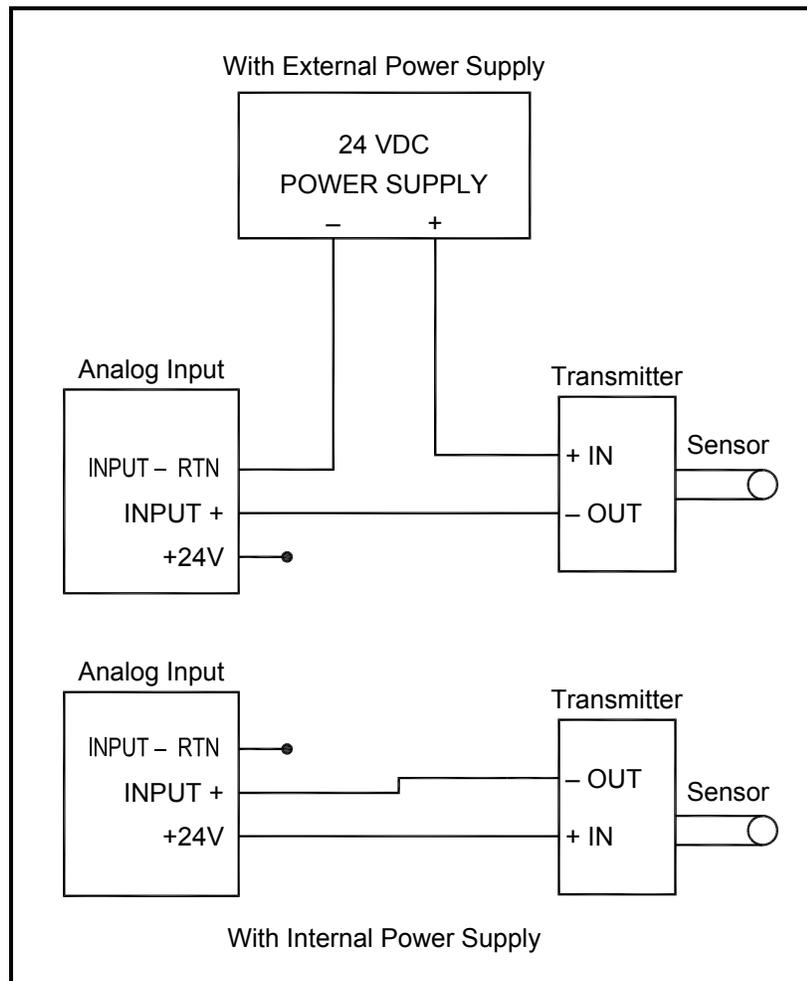


Figure 5: Analog Input Wiring Diagram

1.7.5c Wiring a 0/4-20 mA Analog Inputs Option Card (cont.)

Wire the analog inputs as shown on the label in the rear cover (see Figure 3 on page 6 and Figure 11 on page 24).

Note: The analog inputs option card can be calibrated with the Model XMT868i's built-in analog outputs. However, be certain that the analog outputs have been calibrated first. See Chapter 1, Calibration, in the Service Manual for the appropriate procedures.

1.7.5d Wiring a Totalizer and Frequency Output Option Card

Each totalizer and frequency output option card provides two or four outputs (designated as A, B, C, and D).

Wire this option card in accordance with the connections shown on the label in the rear cover (see Figure 3 on page 6 and Figure 11 on page 24). Figure 6 shows sample wiring diagrams of a totalizer output circuit and a frequency output circuit. Refer to *Electrical Specifications* on page 61 for the load and voltage requirements.

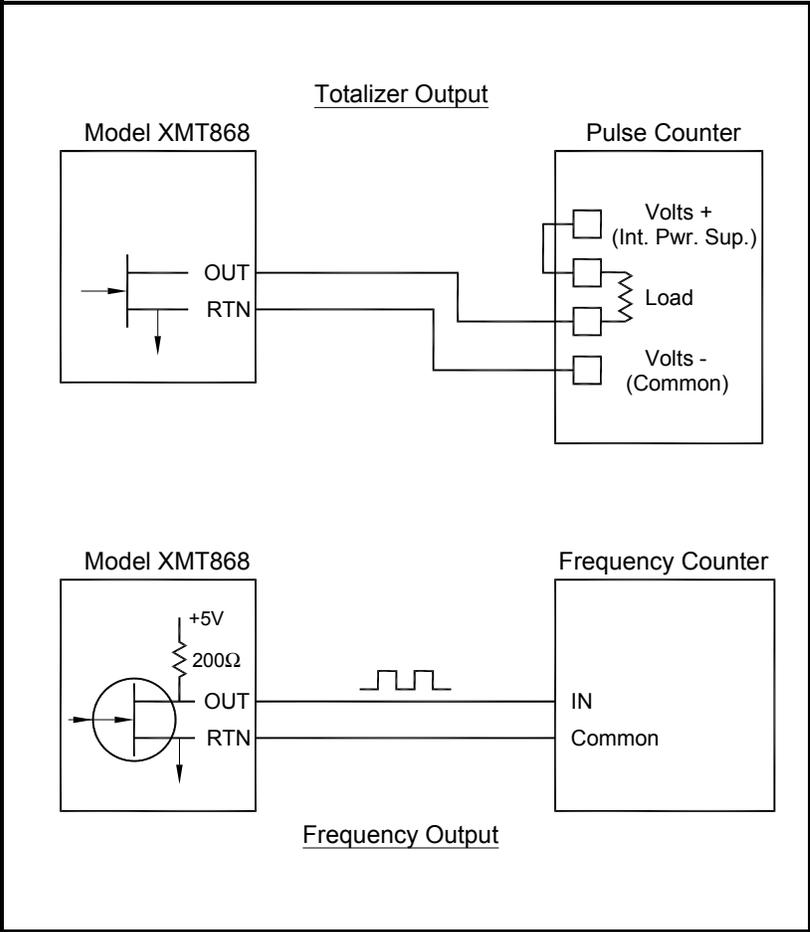


Figure 6: Totalizer and Frequency Output Wiring

1.7.5e Wiring an RTD Inputs Option Card

The Model XMT868i RTD (Resistance Temperature Device) inputs option card provides two direct RTD inputs (designated as A and B). Each RTD input requires three wires, and should be connected as shown on the label in the rear cover (see Figure 3 on page 6 and Figure 11 on page 24).

1.7.5f Wiring a 0/4-20 mA Analog Outputs Option Card

The analog outputs option card includes two isolated 0/4-20 mA outputs (designated as A and B). Connections to these outputs may be made with standard twisted-pair wiring, but the total current loop impedance for these circuits must not exceed 1,000 ohms. Wire this option card with the connections shown on the label in the rear cover (see Figure 3 on page 6 and Figure 11 on page 24).

1.7.5g A Specific Example

To illustrate the procedures described in the previous sections for wiring the option cards, a specific example may prove helpful. Assume that an XMT868i is equipped with an option card numbered *703-1223-08*. Table 22 on page 69 in Appendix B, *Data Records*, indicates that this option card includes two analog current inputs and two standard alarm relays.

By referring to Figure 11 on page 24, you can see that the appropriate connection diagram for this option card is the first one from the left in the middle row. This label should also be found inside the rear cover of the XMT868i. Based on this information, wiring of the Input/Output connections to terminal block J2 should be completed as shown in Table 3.

Table 3: Wiring a 703-1223-08 Option Card

| J2 Pin # | Description | Connection |
|----------|-------------|------------------|
| 1 | Alarm A | Normally Open |
| 2 | Alarm A | Common |
| 3 | Alarm A | Normally Closed |
| 4 | Alarm B | Normally Open |
| 5 | Alarm B | Common |
| 6 | Alarm B | Normally Closed |
| 7 | Out C | +24 V to Input C |
| 8 | Input C | Signal (+) |
| 9 | Input C | Return (-) |
| 10 | Out D | +24 V to Input D |
| 11 | Input D | Signal (+) |
| 12 | Input D | Return (-) |

1.7.5h Wiring the MODBUS Option Card

The MODBUS option card uses the RS485 standard for MODBUS communication. The MODBUS card must be installed in Slot 2. The RS485 standard allows up to 32 nodes (drivers and receivers) on one multidrop network, at distances up to 4,000 ft (1,200 m). GE recommends using 24-gauge (24 AWG) twisted-pair wire with a characteristic impedance of 120 ohms and 120-ohm termination at each end of the communications line.

Note: *The MODBUS option card provides its own RS485 connections. Thus, the meter can have its serial port configured as RS232 and still provide RS485 MODBUS signals.*

IMPORTANT: *Because the MODBUS option card uses pins 1 and 2 on terminal block J2, only those option cards that do not use these pins may be installed in Slot 1, while a MODBUS card is installed in Slot 2. Specifically, only the option cards designated as “OI” and “OR” in Figure 11 on page 24 are compatible with the MODBUS option card.*

To link the XMT868i to the control system (refer to Figure 7):

1. Connect the MODBUS – wire to pin #2, the inverting or negative connection.
2. Connect the MODBUS + wire to pin #1, the non-inverting or positive connection.
3. Pin #3 has no connection.

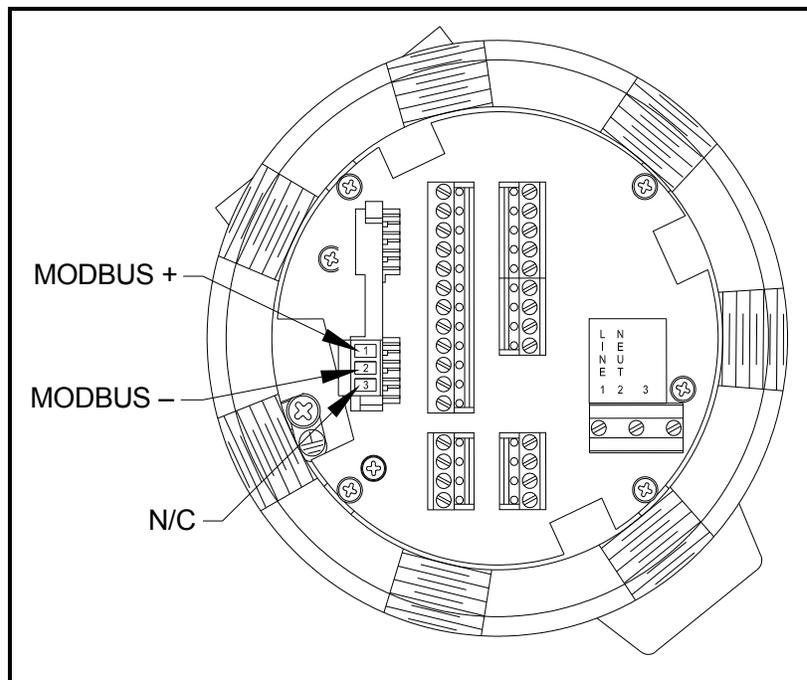


Figure 7: The RS485 MODBUS Terminal Block Connector

1.7.5i Wiring the MODBUS/TCP Interface

Customers can also use a modified XMT868i that provides a MODBUS/TCP interface to communicate to an internal network. An optional MODBUS/TCP card with a unique MAC (IP) address (installed only in slot 2) includes an RJ45 connector. To connect the MODBUS/TCP-enabled XMT868i to the network, insert the jack of an RJ45 cable into the RJ45 connector, route the cable through one of the conduit holes using an appropriate cable clamp, and wire the other end of the cable to the Ethernet network according to the manufacturer's instructions. See Figure 12 on page 25.

Note: *The MAC address for a specific XMT868i is included with customer documentation. For more information on setting up the MAC address, refer to Chapter 6 of the Programming Manual.*

1.7.5j Wiring the Ethernet Interface

A modified XMT868i can use the Ethernet interface to communicate to a local area network. An optional Ethernet card with a unique MAC (IP) address (installed only in slot 2) includes an RJ45 connector. To connect the Ethernet-enabled XMT868i to the network, insert the jack of an RJ45 cable into the RJ45 connector, route the cable through one of the conduit holes using an appropriate cable clamp, and wire the other end of the cable to the Ethernet network according to the manufacturer's instructions. An external connection is required between the Ethernet option card and the XMT868i's RS232 connector, as shown in Table 4 and Figure 12 on page 25.

Note: *The MAC address for a specific XMT868i is included with customer documentation. For more information on setting up the MAC address, refer to Appendix C of the Programming Manual.*

Table 4: RS232 to Ethernet Interconnections

| XMT868i Type | Terminal Block | Terminal Block |
|--------------|------------------------|-------------------------|
| Terminal | RS232 on Rear Board | TB1 on Ethernet Card |
| | TX | Pin 1 |
| | RX | Pin 2 |
| | COM | Pin 3 |

1.7.5k Wiring the Foundation Fieldbus Interface

To connect the Foundation Fieldbus interface to the XMT868i, make the network connections at J8, pins 1 and 2, as shown in drawing Y of Figure 12 on page 25. As an option, you can connect a shield to J8 pin 3, depending on the network wiring.

No connections are made to J9 under normal operation. If you need to reset the network board to factory defaults:

1. Connect a jumper between J9 pin 2 and J9 pin 3.
2. Power cycle (i.e., turn off and on) the XMT868i.
3. Ten seconds after the power has been restored to the XMT868i, remove the jumper to return the network board to normal operation.

1.7.5l Data Logging Option Card

The XMT868i can be fitted with a data logging option card, which must be installed in Slot 2. The data logging option card increases the XMT868i's memory by up to 2 MB.

!ATTENTION EUROPEAN CUSTOMERS!

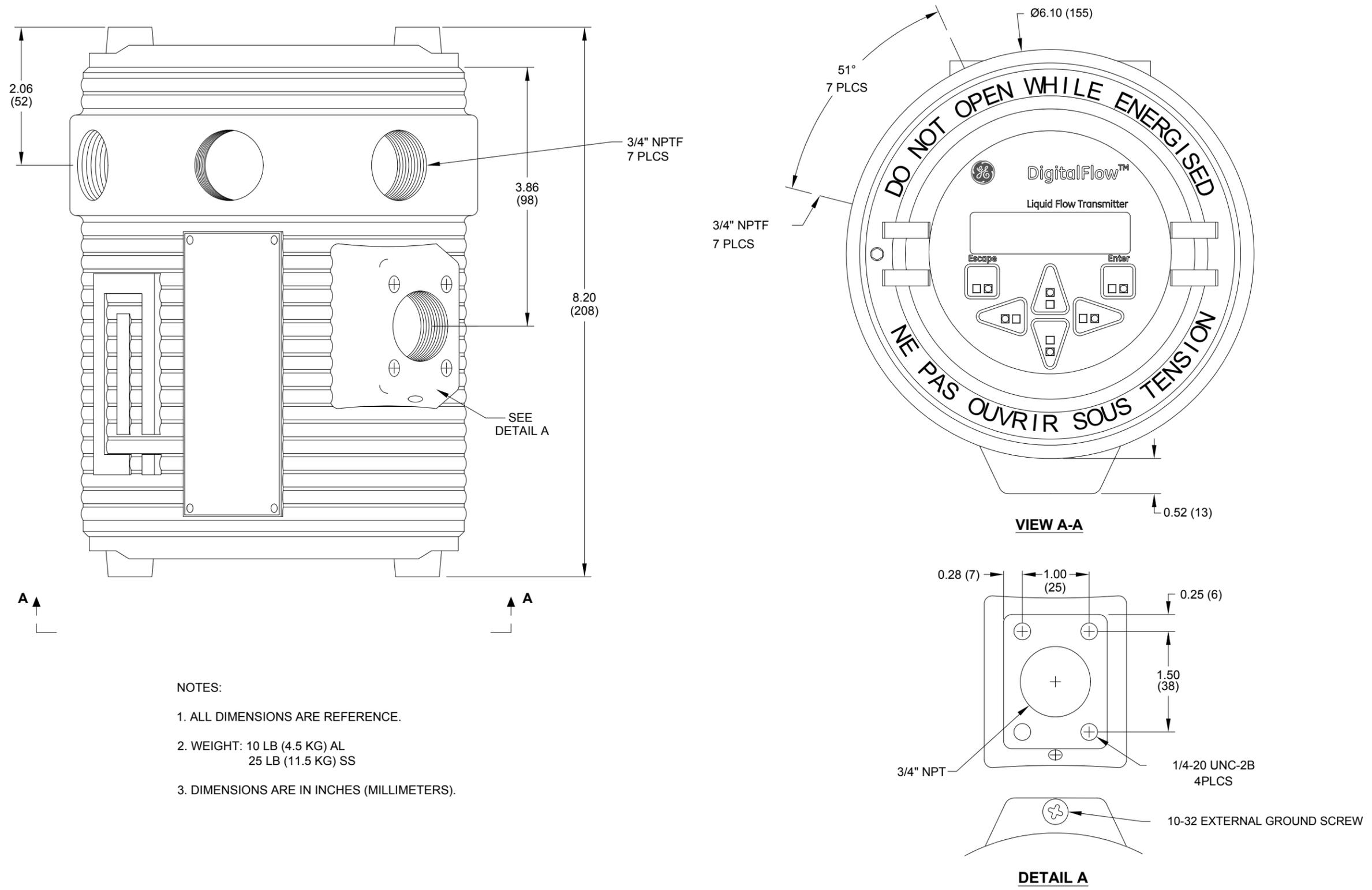
To meet CE Mark requirements, all cables must be installed as described in Appendix A, *CE Mark Compliance*.

1.7.5m Procedure Options

After the XMT868i has been completely installed and wired, proceed to Chapter 2, *Initial Setup*, to program the meter for taking flow rate measurements.

WARNING! Make sure both covers, with their o-ring seals, are installed and the set screws tightened before applying power in a hazardous environment.

[no content intended for this page]



- NOTES:
1. ALL DIMENSIONS ARE REFERENCE.
 2. WEIGHT: 10 LB (4.5 KG) AL
25 LB (11.5 KG) SS
 3. DIMENSIONS ARE IN INCHES (MILLIMETERS).

Figure 8: Model XMT868i Outline and installation (ref. dwg #712-1318)

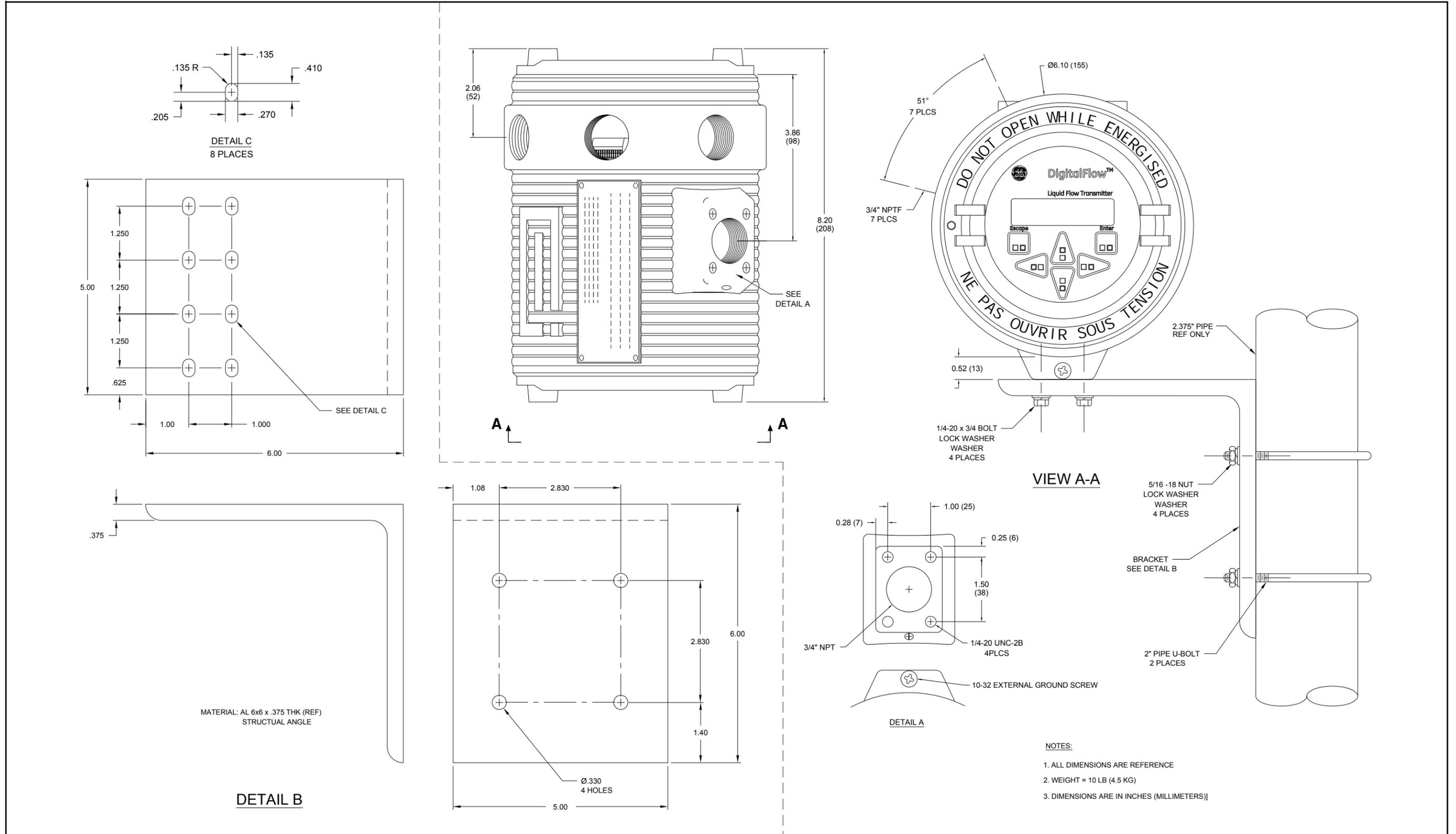


Figure 9: Model XMT868i Outline and Installation - Right Angle Mounting Bracket (ref. dwg #712-1317)

NOTE: For compliance with the European Union's Low Voltage Directive (73/23/EEC), this unit requires an external power disconnect device such as a switch or circuit breaker. The disconnect device must be marked as such, clearly visible, directly accessible and located within 1.8 m (6 ft) of the Model XGS868i.

| J2 - INPUT/OUTPUT CONNECTIONS* | | | | | | | | | | | | |
|--------------------------------|--|------|------|------|------|------|------|------|------|-------|-------|-------|
| Pin # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Designation | I/O1 | I/O2 | I/O3 | I/O4 | I/O5 | I/O6 | I/O7 | I/O8 | I/O9 | I/O10 | I/O11 | I/O12 |
| Description | *See the wiring label inside the rear cover and Figure 1-11. | | | | | | | | | | | |

| J5 - MODBUS CONNECTION | | |
|------------------------|-------------|-------------|
| Pin # | Designation | Description |
| 1 | + | MODBUS + |
| 2 | - | MODBUS - |
| 3 | N/C | N/C |

| J1 - RS232/RS485 / 4-20 OUTPUT | | |
|--------------------------------|-------------|---------------------|
| Pin # | Designation | Description |
| 1 | TX(RS485+) | Transmit / + |
| 2 | RX(RS485-) | Receive / - |
| 3 | COM (SHLD) | Ground |
| 4 | CTS | Clear To Send |
| 5 | DTR | Data Terminal Ready |
| 6 | AOUT B- | 4-20 Output 2 RTN |
| 7 | AOUT B+ | 4-20 Output 2 SIG |
| 8 | AOUT A- | 4-20 Output 1 RTN |
| 9 | AOUT A+ | 4-20 Output 1 SIG |

NOTE: Enclosure is shown from the rear with the rear cover removed.

| J4 - CH2 TRANSDUCER CONNECTION (optional) | | |
|---|-------------|-------------------------------------|
| Pin # | Designation | Description |
| 1 | CH2UP | Upstream Transducer SIG(+) |
| 2 | CH2RTN | Upstream Transducer Analog RTN(-) |
| 3 | CH2RTN | Downstream Transducer Analog RTN(-) |
| 4 | CH2DN | Downstream Transducer SIG(+) |

| J3 - CH1 TRANSDUCER CONNECTION | | |
|--------------------------------|-------------|-------------------------------------|
| Pin # | Designation | Description |
| 1 | CH1UP | Upstream Transducer SIG(+) |
| 2 | CH1RTN | Upstream Transducer Analog RTN(-) |
| 3 | CH1RTN | Downstream Transducer Analog RTN(-) |
| 4 | CH1DN | Downstream Transducer SIG(+) |

| DC POWER INPUT | |
|----------------|---------------|
| Pin # | Description |
| 1 | Line Positive |
| 2 | Line Negative |
| 3 | No Connection |

| AC POWER INPUT | |
|----------------|--------------|
| Pin # | Description |
| 1 | Line Power |
| 2 | Line Neutral |
| 3 | Earth Ground |

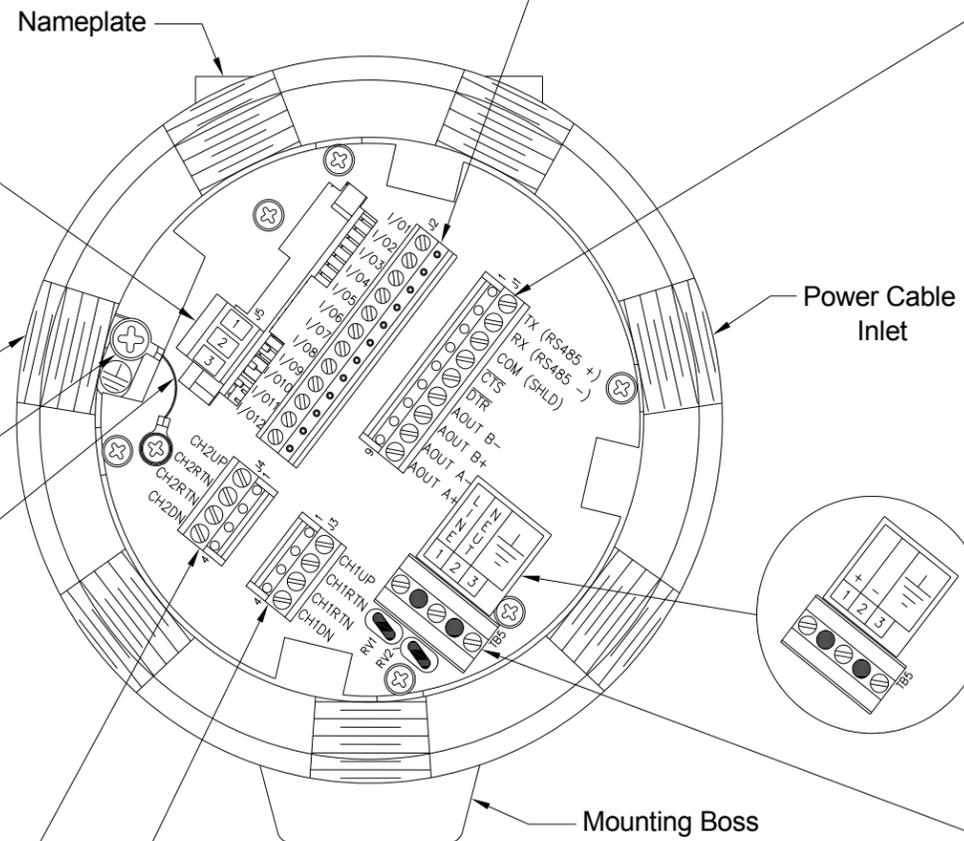


Figure 10: Model XMT868i Wiring Diagram (ref. dwg 702-646)

| -01 (AA,HH) | | -02 (FF,TT,FT,CT,CF) | | -03 (FO,TO,CO) | | -04 (FA,FH,TA,TH,CA,CH) | | -05 (CI,TI,FI) | | -06 (CR,FR,TR) | |
|-------------|---------------|----------------------|---------|----------------|---------|-------------------------|---------------|----------------|---------------|----------------|----------|
| Pin 1 | ALARM A - NO | Pin 1 | OUT - A | Pin 1 | OUT - A | Pin 1 | OUT - A | Pin 1 | OUT - A | Pin 1 | OUT - A |
| 2 | ALARM A - COM | 2 | RTN - A | 2 | RTN - A | 2 | RTN - A | 2 | RTN - A | 2 | RTN - A |
| 3 | ALARM A - NC | 3 | NC | 3 | NC | 3 | NC | 3 | NC | 3 | NC |
| 4 | ALARM B - NO | 4 | OUT - B | 4 | OUT - B | 4 | OUT - B | 4 | OUT - B | 4 | OUT - B |
| 5 | ALARM B - COM | 5 | RTN - B | 5 | RTN - B | 5 | RTN - B | 5 | RTN - B | 5 | RTN - B |
| 6 | ALARM B - NC | 6 | NC | 6 | NC | 6 | NC | 6 | NC | 6 | NC |
| 7 | ALARM C - NO | 7 | OUT - C | 7 | NC | 7 | ALARM C - NO | 7 | OUT C - +24V | 7 | RTD - C |
| 8 | ALARM C - COM | 8 | RTN - C | 8 | NC | 8 | ALARM C - COM | 8 | INPUT C - + | 8 | COMM - C |
| 9 | ALARM C - NC | 9 | NC | 9 | NC | 9 | ALARM C - NC | 9 | INPUT C - RTN | 9 | COM - C |
| 10 | ALARM D - NO | 10 | OUT - D | 10 | NC | 10 | ALARM D - NO | 10 | OUT D - +24V | 10 | RTD - D |
| 11 | ALARM D - COM | 11 | RTN - D | 11 | NC | 11 | ALARM D - COM | 11 | INPUT D - + | 11 | COMM - D |
| 12 | ALARM D - NC | 12 | NC | 12 | NC | 12 | ALARM D - NC | 12 | INPUT D - RTN | 12 | COM - D |

| -07 (CIR) | | -08 (AI,HI) | | -09 (OI) | | -10 (OR) | | -11 (AR,HR) | | -12 (II) | |
|-----------|---------------|-------------|---------------|----------|---------------|----------|----------|-------------|---------------|----------|---------------|
| Pin 1 | OUT - A | Pin 1 | ALARM A - NO | Pin 1 | NC | Pin 1 | NC | Pin 1 | ALARM A - NO | Pin 1 | OUT A - +24V |
| 2 | RTN - A | 2 | ALARM A - COM | 2 | NC | 2 | NC | 2 | ALARM A - COM | 2 | INPUT A - + |
| 3 | NC | 3 | ALARM A - NC | 3 | NC | 3 | NC | 3 | ALARM A - NC | 3 | INPUT A - RTN |
| 4 | OUT - B | 4 | ALARM B - NO | 4 | NC | 4 | NC | 4 | ALARM B - NO | 4 | OUT B - +24V |
| 5 | RTN - B | 5 | ALARM B - COM | 5 | NC | 5 | NC | 5 | ALARM B - COM | 5 | INPUT B - + |
| 6 | NC | 6 | ALARM B - NC | 6 | NC | 6 | NC | 6 | ALARM B - NC | 6 | INPUT B - RTN |
| 7 | OUT C - +24V | 7 | OUT C - +24V | 7 | OUT C - +24V | 7 | RTD - C | 7 | RTD - C | 7 | OUT C - +24V |
| 8 | INPUT C - + | 8 | INPUT C - + | 8 | INPUT C - + | 8 | COMM - C | 8 | COMM - C | 8 | INPUT C - + |
| 9 | INPUT C - RTN | 9 | INPUT C - RTN | 9 | INPUT C - RTN | 9 | COM - C | 9 | COM - C | 9 | INPUT C - RTN |
| 10 | RTD - D | 10 | OUT D - +24V | 10 | OUT D - +24V | 10 | RTD - D | 10 | RTD - D | 10 | OUT D - +24V |
| 11 | COMM - D | 11 | INPUT D - + | 11 | INPUT D - + | 11 | COMM - D | 11 | COMM - D | 11 | INPUT D - + |
| 12 | COM - D | 12 | INPUT D - RTN | 12 | INPUT D - RTN | 12 | COM - D | 12 | COM - D | 12 | INPUT D - RTN |

| -13 (RR) | | -14 (IR) | | -15 (FHII) | | -16 (HART) | | -17 (HART/OI) | | -18 (F(F)HH) | | -19 (HART/RI) | |
|----------|----------|----------|---------------|------------|-----------------|------------|-------------|---------------|--------------|--------------|-------------|---------------|--------------|
| Pin 1 | RTD - A | Pin 1 | OUT A - +24V | Pin 1 | A-FREQ OUT | Pin 1 | +HART/OUT-A | Pin 1 | +HART/OUT-A | Pin 1 | A-FREQ OUT | Pin 1 | +HART/OUT-A |
| 2 | COMM - A | 2 | INPUT A - + | 2 | A-FREQ RTN | 2 | -HART/OUT-A | 2 | -HART/OUT-A | 2 | A-FREQ RTN | 2 | -HART/OUT-A |
| 3 | COM - A | 3 | INPUT A - RTN | 3 | A-NC | 3 | NC | 3 | NC | 3 | A-NC | 3 | NC |
| 4 | RTD - B | 4 | OUT B - +24V | 4 | B-ALARM NO | 4 | NC | 4 | NC | 4 | B-FREQ OUT | 4 | NC |
| 5 | COMM - B | 5 | INPUT B - + | 5 | B-ALARM COM | 5 | NC | 5 | NC | 5 | B-FREQ RTN | 5 | NC |
| 6 | COM - B | 6 | INPUT B - RTN | 6 | B-ALARM NC | 6 | NC | 6 | NC | 6 | B-NC | 6 | NC |
| 7 | RTD - C | 7 | RTD - C | 7 | C- +24 OUT | 7 | NC | 7 | OUT C - +24V | 7 | C-ALARM NO | 7 | RTD-A |
| 8 | COMM - C | 8 | COMM - C | 8 | C-ANALOG IN+ | 8 | NC | 8 | INPUT C - + | 8 | C-ALARM COM | 8 | COMM-A |
| 9 | COM - C | 9 | COM - C | 9 | C-ANALOG IN RTN | 9 | NC | 9 | INPUT D-RTN | 9 | C-ALARM NC | 9 | COM-A |
| 10 | RTD - D | 10 | RTD - D | 10 | D- +24v OUT | 10 | NC | 10 | OUT D - +24V | 10 | D-ALARM NO | 10 | OUT D - +24V |
| 11 | COMM - D | 11 | COMM - D | 11 | D-ANALOG IN+ | 11 | NC | 11 | INPUT D - + | 11 | D-ALARM COM | 11 | INPUT D - + |
| 12 | COM - D | 12 | COM - D | 12 | D-ANALOG IN RTN | 12 | NC | 12 | INPUT C-RTN | 12 | D-ALARM NC | 12 | INPUT D-RTN |

NOTE:
R = RTD Input
A = Standard Alarm
H = Hermetic Alarm
F = Frequency Output
T = Totalizer Output
I = Current Input
C = Current Output
O = Blank/No Connection

Figure 11: Option Card Connection Labels (ref. dwg #442-615)

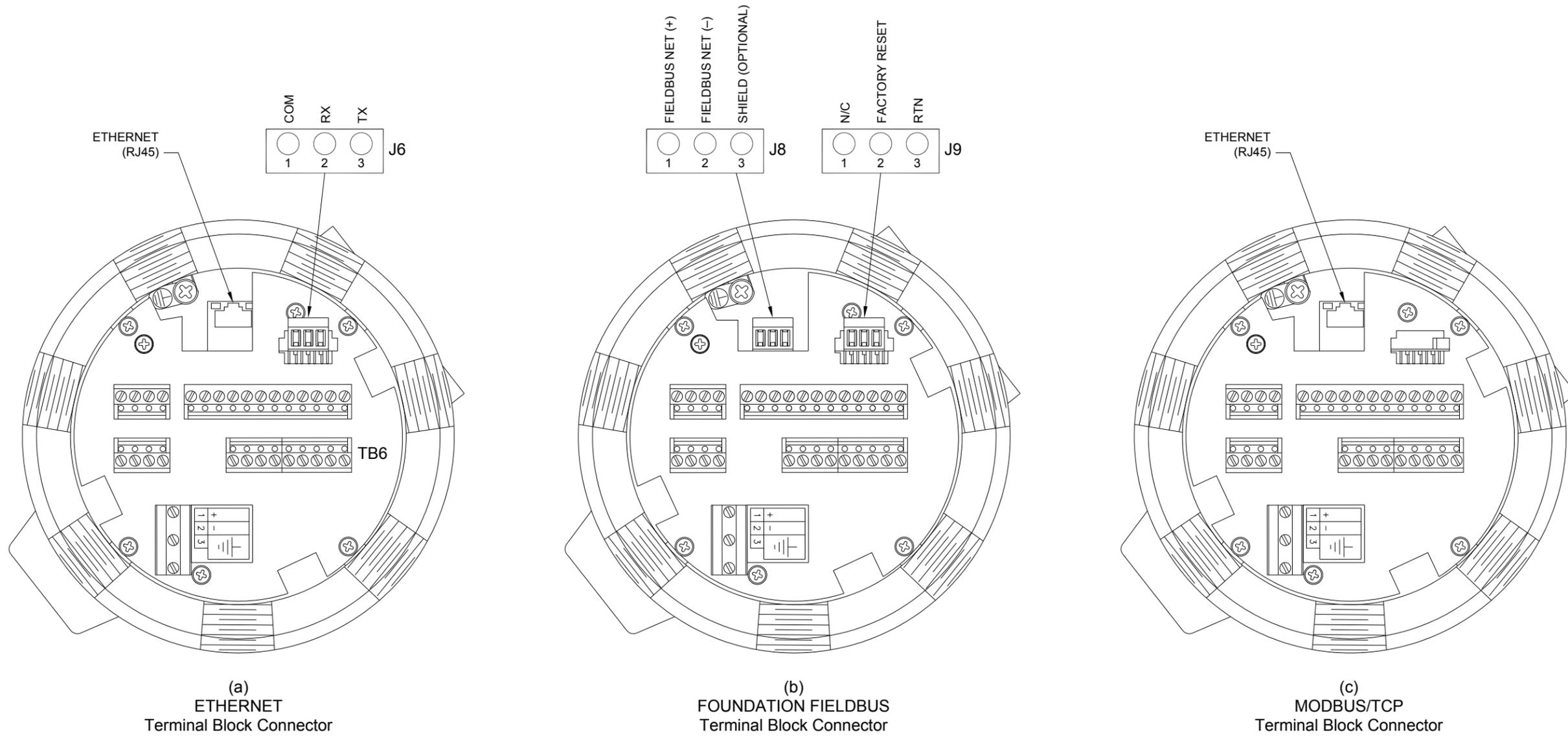


Figure 12: Ethernet, Foundation Fieldbus and MODBUS/TCP Terminal Block Connections

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Chapter 2. Initial Setup

2.1 Introduction

This chapter provides instructions for programming the minimum amount of data required to place the Model XMT868i flowmeter into operation. Before the Model XMT868i can begin taking measurements and displaying valid data, the current system and pipe parameters must be entered. In addition, a 2-Channel meter requires that each channel be activated prior to use. Additional programming options provide access to the more advanced features of the Model XMT868i, but this information is not required to begin taking measurements.

Note: *See the Programming Manual for information on those User Program features not covered in this chapter.*

You can program the XMT868i using either the infrared keypad on the lower part of the glass enclosure, or **PanaView™**, a PC-based, non-resident software program that communicates with the XMT868i using its RS232 serial port. PanaView supplements basic XMT868i functions with several additional capabilities. With PanaView, you can:

- load and save site file data
- create and save graph and log files
- display text output and graphs of live measurement data
- create custom templates for displaying text, graph and log data
- interface with multiple GE instruments.

This chapter focuses on programming using the infrared keypad. For information on programming the XMT868i using PanaView, refer to Appendix C of the *Programming Manual*.

2.2 XMT868i Enclosure Infrared Keypad

The window at the top of the XMT868i enclosure includes the components shown in Figure 13.

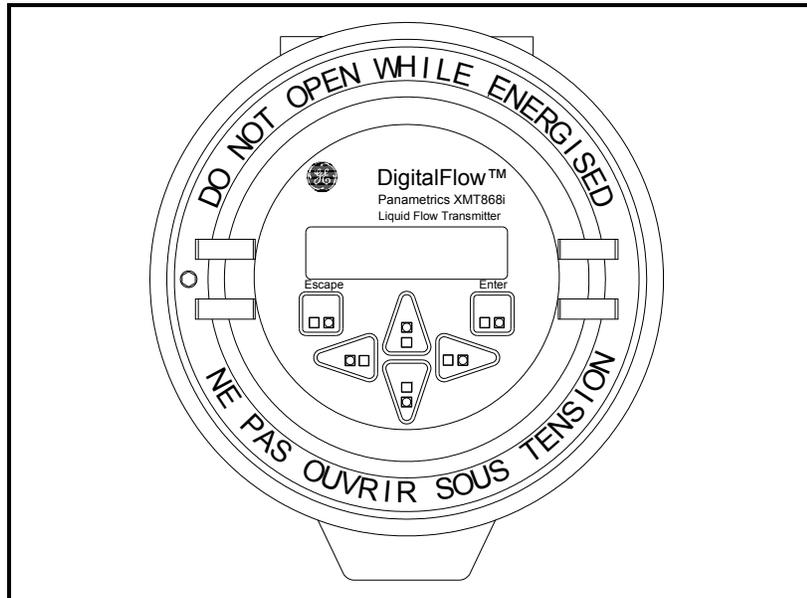


Figure 13: The Enclosure Window

IMPORTANT: *The XMT868i's infrared keypad permits programming of the instrument through the glass faceplate without removing the cover. Thus, all programming procedures may be performed while the unit is installed in a hazardous area.*

Six keys on the infrared keypad enable users to program the XMT868i:

- [Enter] - confirms choice of a specific option and data entry within the option
- [Escape] - allows users to exit from a specific option without entering unconfirmed data
- [△] and [▽] - enable users to highlight a specific window in the display option or to scroll through a list of options (parameters, letters, and numbers 0-9 as well as the negative sign and decimal point) in a menu
- [◀] and [▶] - enable users to scroll to a specific option, among choices in an option, or to a character in a text entry.

When you power up the XMT868i, the display first shows the model and software version:



2.2 XMT868i Enclosure Infrared Keypad (cont.)

The meter then starts to display measured parameters.

| | | |
|-----|-------|------|
| CH1 | VEL | E1 |
| | 10.00 | Ft/s |

To enter the *Keypad Program*, press the [Escape] key, followed by the [Enter] key, and the [Escape] key again. Each successive key must be entered within 10 seconds of the prior key.

As a guide in following the programming instructions in this chapter, the relevant portions of the Model XMT868i menu map have been reproduced in Figure 14 on page 45 and Figure 15 on page 46. Proceed to the following sections to enter data in the Channel or GLOBL menus.

IMPORTANT: *If the keypad has not been pressed for 10 minutes, the XMT868i exits the Keypad Program and returns to displaying measurements. The meter retains any configuration changes that were confirmed with the [Enter] key, and restarts as if the operator had completed the programming cycle.*

2.3 Entering Data in the Global Menu

To begin programming your meter, you must select the system units from the GLOBL menu as discussed below. Refer to Figure 14 on page 45 and remember to record all programming data in Appendix B, *Data Records*.

Note: *Refer to the Programming Manual for information on the other submenus in the GLOBL menu.*

2.3.1 Entering Global System Data

The GLOBL-SYSTM submenu is used to enter several general system parameters (e.g., English or metric units). For units with 2 channels, this menu is also used to compute parameters such as the sum, difference or average of the channel 1 and channel 2 signals. When calculating the SUM, DIF or AVE readouts, data from the GLOBL-SYSTM submenu is used. Any conflicting data entered in the Channel System submenu is overridden.

1. In the *Keypad Program*, scroll to PROG and press [Enter].
2. In the PROG menu, scroll to GLOBL and press [Enter].
3. In the Global PROGRAM menu, scroll to SYSTM and press [Enter].
4. The first prompt asks for a *Meter Message*. Enter a numeric or text message (up to 16 characters) and press [Enter].
5. Scroll to the desired *System Units* selection (either metric or English) and press [Enter]. The XMT868i will display all parameters and measurements in the designated units.
 - For a single-channel XMT868i, the program returns to the Global PROGRAM menu. Scroll to CH1 or CH2 to enter the Channel menu discussed on page 34.
 - For a 2-channel meter, proceed to step 6.

2.3.1a Volumetric Units

6. Scroll to the desired *Volumetric Units* for the flow rate display and press [Enter]. Table 5 lists the available volumetric units.

Table 5: Available Volumetric Units

| English | Metric |
|---|--|
| GAL/S = gallons/second | L/S = Liter/sec |
| GAL/M = gallons/minute | L/M = Liter/min |
| GAL/H = gallons/hour | L/H = Liter/hr |
| MGD = mega gallons/day | ML/D = mega liters/day |
| ft ³ /s = Cubic ft/sec | m ³ /s = Cubic m/sec |
| ft ³ /m = Cubic ft/min | m ³ /m = Cubic m/min |
| ft ³ /h = Cubic ft/hr | m ³ /h = Cubic m/hr |
| ft ³ /d = Cubic ft/day | m ³ /d = Cubic m/day |
| Mft ³ /d = mega cubic feet/day | Mm ³ /d = mega cubic meters/day |
| BBL/S = Barrel/sec | BBL/S = Barrel/sec |
| BBL/M = Barrel/min | BBL/M = Barrel/min |
| BBL/H = Barrel/hr | BBL/H = Barrel/hr |
| BBL/D = Barrel/day | BBL/D = Barrel/day |
| MBL/D = mega barrels/day | MBL/D = mega barrels/day |
| A-I/S = Acre-inch/sec | |
| A-I/M = Acre-inch/min | |
| A-I/H = Acre-inch/hr | |
| A-I/D = Acre-inch/day | |
| A-F/S = Acre-feet/sec | |
| A-F/M = Acre-feet/min | |
| A-F/H = Acre-feet/hr | |
| A-F/D = Acre-feet/day | |

7. Scroll to the desired number of *Vol Decimal Digits* (digits to the right of the decimal point) in the volumetric flow display, and press [Enter].

2.3.1b Totalizer Units

8. Scroll to the desired *Totalizer Units* for the totalized flow rate display (listed in Table 6), and press [Enter].

Table 6: Totalizer Units

| English | Metric |
|------------------------------------|-------------------------------------|
| GAL = Gallons | L = Liters |
| MGAL = mega gallons | ML = Megaliters |
| ft ³ = Cubic feet | m ³ = Cubic meters |
| Mft ³ = mega cubic feet | Mm ³ = mega cubic meters |
| BBL = Barrels | BBL = Barrels |
| MBBL = mega barrels | MBBL = mega barrels |
| AC-IN = Acre-inches | |
| AC-FT = Acre-feet | |

9. Scroll to the desired number of *Decimal Digits* (digits to the right of the decimal point) in the totalized flow display, and press [Enter].

The program now varies, depending on whether you have activated *Mass Flow* (see the *Programming Manual* for details) or the *Energy Option* in one of the Channel PROGRAM options.

- If you have activated *Mass Flow*, continue to step 1 on page 32.
- If you have activated the *Energy Option* (but not *Mass Flow*), skip to step 1 on page 33.
- If you have activated neither option, the XMT868i returns to the Global PROGRAM window. Press [Escape] to return to the PROG menu. Then scroll to CH1 or CH2 and press [Enter] to program the Channel menu.

2.3.1c Programming Mass Flow Data

1. Scroll to the desired *Mass Flow Units* for flow rate display (listed in Table 7), and press [Enter].

Table 7: Available Mass Flow Units

| English | Metric |
|--|-------------------------------|
| LB = Pounds | KG = Kilograms |
| KLB = KiloPounds (Thousands of Pounds) | Tonne = Metric Tons (1000 KG) |
| MMLB = MegaPounds | |
| TONS (2000 LB) | |

2. Scroll to the desired *Mass Flow Time Units* (from seconds to days), and press [Enter].
3. Scroll to the desired number of *Decimal Digits* (digits to the right of the decimal point) in the mass flow rate display, and press [Enter].
4. Scroll to the desired *Mass Totals* (units for the totalized mass flow rate display, listed in Table 7 on page 32), and press [Enter].
5. Scroll to the desired number of *Mass Decimal Digits* (digits to the right of the decimal point) in the totalized mass flow rate display, and press [Enter].

The program varies, depending on whether or not you have enabled the *Energy Option*.

- If you have not enabled the option, the XMT868i returns to the Global PROGRAM window. Press [Escape] to return to the PROG menu and scroll to the Channel PROGRAM.
- If you have enabled the option, continue to the next page.

2.3.1d Programming the Energy Option

1. Scroll to the desired *Power Units* (listed in Table 8) and press [Enter].

Table 8: Available Power Units

| English | Metric |
|--------------------------------|-----------------------------|
| kBTUh = Thousands of BTUs/hour | kCALs = Kilocalories/second |
| MMBTU = Millions of BTUs/hour | kCALm = Kilocalories/minute |
| kW = Kilowatt | kCALh = Kilocalories/hour |
| TONS = Tons of refrigerant | kCALd = Kilocalories/day |
| | MCals = Megacalories/second |
| | MCALm = Megacalories/minute |
| | MCALh = Megacalories/hour |
| | MCALd = Megacalories/day |
| | kW = Kilowatt |
| | MW = Megawatt |

2. Scroll to the desired number of *Power Decimal Digits*, and press [Enter].
3. Scroll to the desired *Total Energy Units* (shown in Table 9), and press [Enter].

Table 9: Available Total Energy Units

| English | Metric |
|------------------------------|----------------------|
| kBTU = Thousands of BTUs | kCAL = Kilocalories |
| MMBTU = Millions of BTUs | MCAL = Megacalories |
| kWHr = Kilowatt-hour | kWHr = Kilowatt-hour |
| TONS = Tons (of refrigerant) | MWHr = Megawatt-hour |

4. Scroll to the desired number of *Energy Decimal Digits*, and press [Enter].

You have completed entering selections in this option. The program returns to the Global PROGRAM menu. Scroll to CH1 or CH2 and press [Enter] to program the Channel menu on the next page.

2.4 Entering Data in the Channel Menu

The Channel menu is used to enter data specific to each channel. Refer to Figure 14 on page 45 and remember to record all programming data in Appendix B, *Data Records*.

Note: *In this manual, only the programming of Channel 1 will be described. To program Channel 2 of a 2-Channel meter, simply repeat the same procedures presented for Channel 1.*

2.4.1 Selecting the Channel Measurement Method

The ACTIV submenu permits selection of the desired measurement method.

1. In the *Keypad Program*, scroll to PROG and press [Enter].
2. In the PROG menu, scroll to the desired channel (CH1 or CH2) and press [Enter].

Note: *In the 1-Channel XMT868i, CH2 does not appear.*

3. In the Channel PROGRAM menu, scroll to ACTIV and press [Enter].
4. The option offers two choices: OFF and TRANS (Transit-Time). Scroll to the desired option for this channel and press [Enter].

Note: *In the 1-Channel XMT868i, OFF does not appear.*

The XMT868i returns to the Channel PROGRAM menu. Scroll to the SYSTM option.

2.4.2 Entering Data in the Channel System Option

1. From the Channel PROGRAM menu, scroll to the SYSTM option and press [Enter].
2. The first prompt asks for the *Channel Label*. Use the four scrolling keys to enter the desired label (in any numeric or text combination up to three characters) in the right pane, and press [Enter].
3. The next prompt asks for the *Channel Message*. Enter the desired text in the same manner as the channel label, and press [Enter].
4. The program now asks if you want the *Energy Option*, which enables flow measurement in a heating or cooling system. Scroll to *Off* or *On*, and press [Enter].
5. The next prompt asks for the *Volumetric Units*. Scroll through the available units (from the list shown in Table 10) and press [Enter] when you reach the desired unit.

Note: Refer to the SYSTM option of the GLOBL menu to choose between English and metric measurements.

Table 10: Available Volumetric Units

| English Volumetric Units | Metric Volumetric Units |
|--|--|
| GAL/S - U.S. Gallons per Second | L/S = Liters per Second |
| GAL/M - U.S. Gallons per Minute | L/M = Liters per Minute |
| GAL/H - U.S. Gallons per Hour | L/H = Liters per Hour |
| MGD - Mega U.S. Gallons per Day | ML/D = MegaLiters per Day |
| ft ³ /s - Cubic Feet per Second | m ³ /s = Cubic Meters per Second |
| ft ³ /m - Cubic Feet per Minute | m ³ /m = Cubic Meters per Minute |
| ft ³ /h - Cubic Feet per Hour | m ³ /h = Cubic Meters per Hour |
| ft ³ /d - Cubic Feet per Day | m ³ /d = Cubic Meters per Day |
| Mf ³ /d - Mega Cubic Feet per Day | Mm ³ /d = Mega Cubic Meters per Day |
| BBL/S - Barrels per Second | BBL/S = Barrels per Second |
| BBL/M - Barrels per Minute | BBL/M = Barrels per Minute |
| BBL/H - Barrels per Hour | BBL/H = Barrels per Hour |
| BBL/D - Barrels per Day | BBL/D = Barrels per Day |
| MBL/D - Mega Barrels per Day | MBL/D = Mega Barrels per Day |
| A-I/S - Acre-inches per second | N/A |
| A-I/M - Acre-inches per minute | N/A |
| A-I/H - Acre-inches per hour | N/A |
| A-I/D - Acre-inches per day | N/A |
| A-F/S - Acre-feet per second | N/A |
| A-F/M - Acre-feet per minute | N/A |
| A-F/H - Acre-feet per hour | N/A |
| A-F/D - Acre-feet per day | N/A |

2.4.2 Entering Data in the Channel System Option (cont.)

6. Scroll to the desired number of *Vol Decimal Digits* (digits to the right of the decimal point) in the volumetric flow display, and press [Enter].
7. Scroll to the desired *Totalizer Units* for the totalized flow rate display (listed in Table 11), and press [Enter].

Table 11: Totalizer Units

| English | Metric |
|------------------------------------|-------------------------------------|
| GAL - U.S. Gallons | L - Liters |
| MGAL - Mega U.S. gallons | ML - Megaliters |
| ft ³ - Cubic Feet | m ³ - Cubic Meters |
| Mft ³ - Mega Cubic Feet | Mm ³ - Mega Cubic Meters |
| BBL - Barrels | BBL - Barrels |
| MBBL - Megabarrels | MBBL - Megabarrels |
| AC-IN - Acre-inches | |
| AC-FT - Acre-feet | |

8. Scroll to the desired number of *Decimal Digits* (digits to the right of the decimal point) in the totalized flow rate display, and press [Enter].

The program now varies, depending on whether you have activated *Mass Flow* (see the *Programming Manual* for details) or the *Energy Option*.

- If you have activated *Mass Flow*, continue to step 1 on the next page.
- If you have activated the *Energy Option* (but not *Mass Flow*), skip to step 1 on page 38.
- If you have activated neither option, the XMT868i returns to the Channel PROGRAM window. Proceed to the PIPE option.

2.4.2a Programming the Mass Flow Option

1. Scroll to the desired *Mass Flow Units* for flow rate display (listed in Table 12), and press [Enter].

Table 12: Available Mass Flow Units

| English | Metric |
|--|--------------------------------|
| LB = Pounds | Kilograms |
| KLB = KiloPounds (Thousands of Pounds) | Tonnes = Metric Tons (1000 KG) |
| MMLB = MegaPounds | |
| TONS (2000 LB) | |

2. Scroll to the desired *Mass Flow Time Units* (from seconds to days), and press [Enter].
3. Scroll to the desired number of *Decimal Digits* (digits to the right of the decimal point) in the mass flow rate display, and press [Enter].
4. Scroll to the desired *Mass Totals* (units for the totalized mass flow rate display, listed in Table 12), and press [Enter].
5. Scroll to the desired number of *Mass Decimal Digits* (digits to the right of the decimal point) in the totalized mass flow rate display, and press [Enter].

The program varies, depending on whether or not you have enabled the *Energy Option*.

- If you have not enabled the option, the XMT868i returns to the Channel PROGRAM window. Proceed to the PIPE option.
- If you have enabled the option, continue to the next page.

2.4.2b Programming the Energy Option

1. Scroll to the desired *Power Units* (listed in Table 13) and press [Enter].

Table 13: Available Power Units

| English | Metric |
|--|---|
| kBTU _h = Thousands of BTUs/hour | kCALs = Kilocalories/second |
| MMBTU = Mega BTUs/hour | kCAL _m = Kilocalories/minute |
| kW = Kilowatt | kCAL _h = Kilocalories/hour |
| TONS = Tons (2000 LB) | kCAL _d = Kilocalories/day |
| | MCALs = Megacalories/second |
| | MCAL _m = Megacalories/minute |
| | MCAL _h = Megacalories/hour |
| | MCAL _d = Megacalories/day |
| | kWATT = Kilowatt |
| | MWATT - Megawatt |

2. Scroll to the desired number of *Power Decimal Digits*, and press [Enter].
3. Scroll to the desired *Total Energy Units* (shown in Table 14), and press [Enter].

Table 14: Available Total Energy Units

| English | Metric |
|---------------------------------|---------------------------------|
| kBTU = Thousands of BTUs/hr | kCAL = Kilocalories |
| MMBTU = Mega BTUs/hour | MCAL = Megacalories |
| kW _h = Kilowatt-hour | kW _h = Kilowatt-hour |
| TONS = Tons (2000 LB) | MW _h - Megawatt-hour |

4. Scroll to the desired number of *Energy Decimal Digits*, and press [Enter].
5. Scroll to highlight if you are using a *Heating or Cooling System*, and press [Enter].
6. The final prompt asks whether you want to conduct *Flow Measurement* at the point of RTN (Return, where the liquid exits) or of SPPLY (Supply, where the liquid enters). Scroll to the appropriate choice, and press [Enter].

You have completed entering data in the SYSTM option. The meter returns to the Channel PROGRAM menu. Proceed to the next page to enter PIPE parameters.

2.4.3 Entering Pipe Parameters

Enter the transducer and pipe parameters using the PIPE submenu. While following the programming instructions, refer to Figure 15 on page 46.

1. From the Channel PROGRAM menu, scroll to the PIPE option and press [Enter].
2. The first prompt asks for the *Transducer Number*.
 - For a standard transducer, enter the number engraved on the transducer head in the right pane, and press [Enter].
 - If there is no number engraved on the transducer head, press the right arrow key to scroll to the *Special* option, enter an assigned number (from 91 to 99), and press [Enter].

IMPORTANT: *Special transducers, which have no engraved number on the head, are rarely used. Examine the transducer head carefully for a number.*

The menu now varies, depending on your selection in step 2.

- If you entered the number for a standard clamp-on transducer, proceed to the *Pipe Material* prompt in step 4.
- If you entered the number for a standard wetted transducer, proceed to the *Pipe OD* prompt in step 5.
- If you entered the number for a special transducer, proceed to step 3 below.

2.4.3a Special Transducers

Note: *For special transducers, GE will supply a transducer data sheet with programming information.*

3. For special transducers:
 - a. The program first asks for the *Wedge Type*. Press the appropriate transducer type (Rayleigh clamp-on, shear clamp-on, or wetted).

Note: *GE will supply the information required for steps b through f with the transducers.*

- b. Press the appropriate *Frequency* (from 500 kHz to 5 MHz).
- c. Enter the *Time Delay (Tw)* value supplied by GE and press [Enter].

If you have selected a special wetted transducer, the program now goes to step 5. But if you have selected a clamp-on transducer, three more prompts appear.

- d. Enter the *Wedge Angle* of the transducer (the angle of the ultrasonic transmission, in degrees) and press [Enter].
- e. Enter the *Wedge Temperature* and press [Enter].
- f. Enter the *Wedge Soundspeed* and press [Enter].

2.4.3b Pipe Material

4. Scroll to the appropriate *Pipe Material* from the supplied list. For some materials (shown in Table 15), the program displays additional selections. At the desired choice, press [Enter].

Table 15: Pipe Material Choices

| Material | Types |
|---------------|--|
| Steel | Carbon Steel Stainless Steel |
| Iron | Ductile Iron Cast Iron |
| Copper | no additional selection required |
| Aluminum | no additional selection required |
| Brass | no additional selection required |
| Copper Nickel | 70%Cu/30%Ni - 70/30 Copper/Nickel 90%Cu/10%Ni - 90/10 Copper/Nickel |
| Glass | Pyrex Heavy Silicate Flint Light Borate Crown |
| Plastic | Nylon Polyethylene Polypropylene PVC (Polyvinyl Chloride), CPVC Acrylic |
| OTHER | Enter the soundspeed of the pipe material and press [Enter]. If the soundspeed is unknown, refer to the <i>Sound Speeds and Pipe Size Data</i> manual (914-004). |

2.4.3c Pipe OD

5. To select the appropriate *Pipe OD Unit* type from the list shown in Table 16, scroll to the right side of the screen, and use the up and down arrow keys to step through the list. Press [Enter]. Then enter the known pipe outside diameter or circumference on the left side and press [Enter].

Obtain the required information by measuring either the pipe outside diameter (OD) or circumference at the transducer installation site. The data may also be obtained from standard pipe size tables found in *Sound Speeds and Pipe Size Data* (914-004).

Table 16: Available Pipe OD Units

| English | Metric |
|--------------------------------------|---|
| inch | mm = millimeters |
| feet | m = meters |
| in/PI = pipe circumference in inches | mm/PI = pipe circumference in millimeters |
| ft/PI = pipe circumference in feet | m/PI = pipe circumference in meters |

6. Use the arrow keys to enter the known *Pipe Wall Thickness* (in inches or mm) and press [Enter].

If you are using clamp-on transducers, skip to step 9 below.

2.4.3d Path and Axial Lengths

7. To enter the *Path Length*:

- a. Use the [▷] arrow key to highlight the path length unit type at the right of the screen. Then use the [△] and [▽] arrow keys to scroll to the desired unit type.
- b. Use the [◁] arrow key to return to the numeric entry on the left, and enter the path length of the ultrasonic signal. Press [Enter].

Note: *If a spoolpiece was ordered with the meter, the transducer signal path length (P) and the transducer signal axial length (L) are engraved on the flowcell and/or are included in the documentation supplied with the meter. For on-site transducer installations, refer to Appendix C, Measuring P and L Dimensions, for instructions.*

8. In the same manner, enter the appropriate *Axial Length L* unit type and axial length of the ultrasonic signal, and press [Enter]. Skip to step 10 on page 42.

2.4.3e Pipe Lining

9. Scroll to the appropriate choice to indicate whether you have a *Pipe Lining*.
 - a. If you have selected *Yes*, then select the *Lining Material* from the supplied list.
 - If OTHER is selected, enter the lining sound speed, and press [Enter].
 - b. Then enter the lining thickness and press [Enter].

2.4.3f Tracking Windows

10. Press the appropriate choice to indicate whether you want *Tracking Windows*. These windows are used to detect the receive signal when you are unsure of the fluid sound speed.

2.4.3g Fluid Type

11. Press the appropriate *Fluid Type*. The selections for fluid type vary depending on whether:

- the *Energy Option* is ON or OFF; and
- the *Tracking Window* is enabled or disabled.

Refer to Table 17 if *Energy Option* is OFF, or to Table 18 if *Energy Option* is ON.

Note: *Some of the fluid types may require additional selections, as shown in the following tables.*

Table 17: Fluid Types for ENERGY OFF

| Tracking Windows = | | | |
|--------------------|--|------------------|--|
| NO | Additional Selections | YES | Additional Selections |
| Water | Normal Water Sea Water Note: If Normal Water is selected, enter the Water Temperature and press [Enter]. | Water, 0-100C | No additional selections required. |
| Oil | Lube Oil Crude Oil | Water, 0-260C | No additional selections required. |
| Methanol (25 C) | No additional selections required. | Oil, Tracking | No additional selections required. |
| Ethanol (25C) | No additional selections required. | OTHER | Enter Minimum Soundspeed and press [Enter]. Then enter Maximum Soundspeed and press [Enter]. |
| LN2 | No additional selections required. | | |
| Freon | No additional selections required. | | |
| OTHER | Enter the fluid soundspeed and press [Enter]. | | |

Table 18: Fluid Types for ENERGY ON

| Tracking Windows = | | | |
|-----------------------|---|-----------------------|--|
| NO | Additional Selections | YES | Additional Selections |
| Water | Enter Water Temperature and press [Enter]. | Water, 0-260C | No additional selections required. |
| Water, Glycol Mixture | Enter Fluid Soundspeed and press [Enter]. Then enter Percentage of Water and press [Enter]. | Water, Glycol Mixture | Enter Percentage of Water and press [Enter]. |
| OTHER | Enter Fluid Soundspeed and press [Enter]. | OTHER | Enter Minimum Soundspeed and press [Enter]. Then enter Maximum Soundspeed and press [Enter]. |

2.4.3h Reynolds Correction

12. Scroll to the appropriate choice to indicate whether you want *Reynolds Correction*.

- If *Off* is selected, enter the *Calibration Factor* and press [Enter].
- If *Activ* is selected, the program asks for *KV Input Selection*. Scroll to *SIGS (Signals)*, *SOUND (Soundspeed)* or *STATC*.
 - If *SIGS* or *SOUND* is selected, enter the *Calibration Factor* and press [Enter].
 - If *STATC* is selected, enter the *Kinematic Viscosity* and press [Enter]. Then enter the *Calibration Factor* and press [Enter].
- For wetted transducers, the program returns to the Channel PROGRAM menu. You have completed entering PIPE parameters.
- For clamp-on transducers, proceed to step 13 below.

Number of Traverses

13. Scroll to the appropriate *Number of Traverses* (from 1 to 5) and press [Enter].

14. Accept the value for the *Transducer Spacing* by pressing [Enter].

Note: *The XMT868i automatically calculates the transducer spacing. You should not enter a different value unless specifically instructed by the factory.*

PanaView returns to the Channel PROGRAM menu. You have completed entering PIPE parameters.

Note: *The site data programmed in this chapter is automatically stored in the meter's non-volatile RAM (NVR). If the power to the meter is disconnected, the same site data will be applied when the unit is next powered on.*

2.4.3i Procedure Options

Proceed to Chapter 3, *Operation*, for instructions on taking measurements. Or refer to the *Programming Manual* for instructions on programming the Model XMT868i's advanced features.

[no content intended for this page]

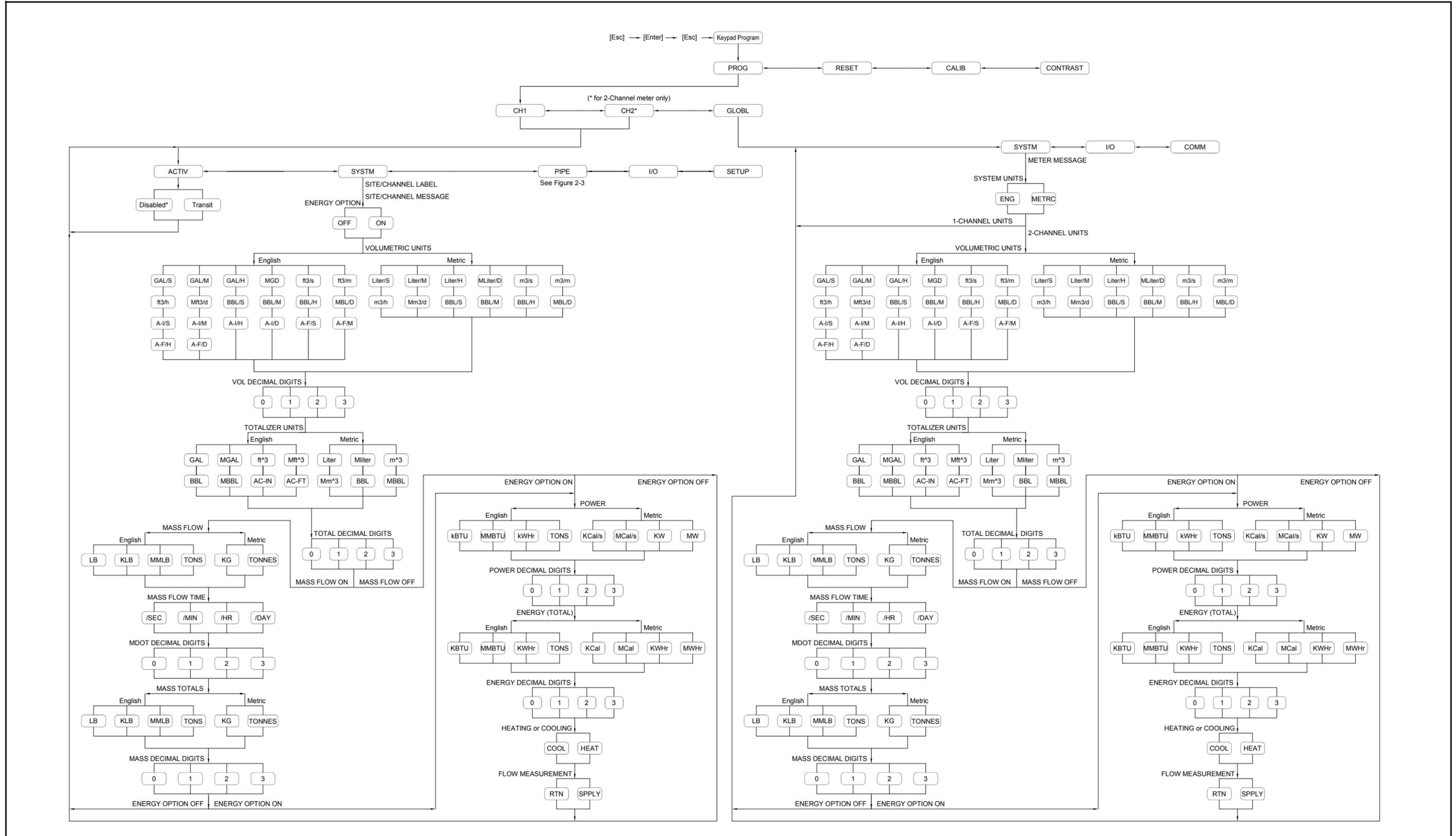


Figure 14: Channel-ACTIV, SYSTM and GLOBL-SYSTM Menu Map

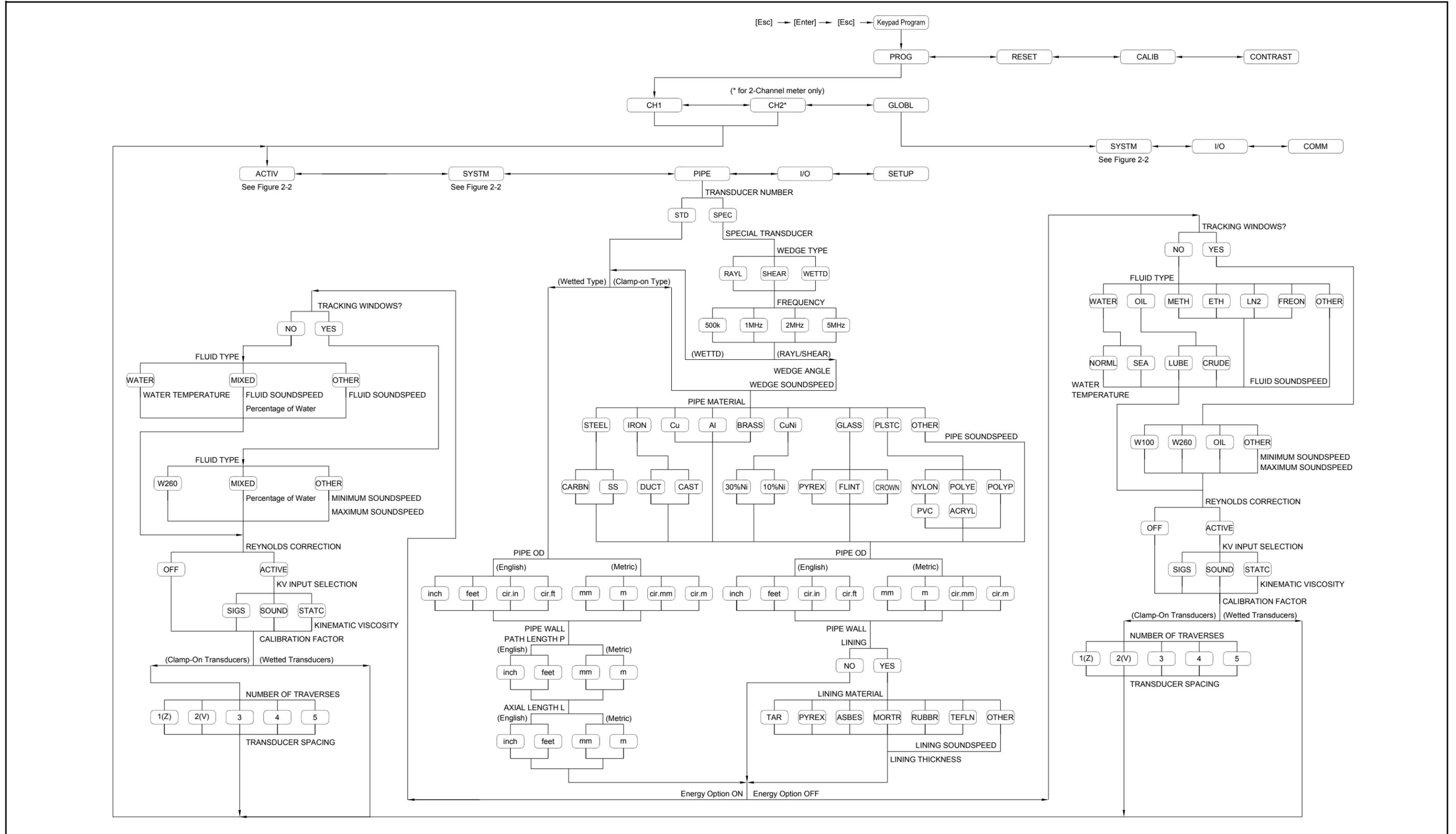


Figure 15: Channel-PIPE Menu Map

Chapter 3. Operation

3.1 Introduction

See Chapter 1, *Installation*, and Chapter 2, *Initial Setup*, to prepare the Model XMT868i system for operation. When the meter is ready to take measurements, proceed with this chapter. The following specific topics are discussed:

- Powering Up
- Using the Display
- Taking Measurements
- Pausing Measurement

Note: *All inputs and outputs of the Model XMT868i are calibrated at the factory, prior to shipment. If it becomes necessary to recalibrate any of the inputs and/or outputs, see Chapter 1, Calibration, of the Service Manual for instructions.*

WARNING! To ensure the safe operation of the Model XMT868i, it must be installed and operated as described in this manual. In addition, be sure to follow all applicable local safety codes and regulations for the installation of electrical equipment.

3.2 Powering Up

Because the Model XMT868i does **not** have an ON/OFF switch, it will power up as soon as the connected power source is energized.

Note: *For compliance with the European Union's Low Voltage Directive (73/23/EEC), this unit requires an external power disconnect device such as a switch or circuit breaker. The disconnect device must be marked as such, clearly visible, directly accessible, and located within 1.8 m (6 ft) of the Model XMT868i.*

There are three methods for obtaining readings from the XMT868i:

- Built-in LCD display
- PanaView software on a computer
- Device to read the XMT868i's analog output

At least one of the above display options must be installed in order to obtain flow rate readings from the meter.

Immediately upon power up the software version display appears. Then, the meter performs a series of internal checks, which take about 45 seconds, prior to displaying the flow rate data.

CAUTION! **The XMT868i conducts the FRAM (non-volatile RAM) test only on the first powering up. If the screen displays the message, "Program Memory Fault Detected," consult the factory immediately. Otherwise, the XMT868i will not repeat the test and may not properly save programmed values.**

Note: *If the Model XMT868i fails any of the internal checks (see Chapter 2, Error Codes, in the Service Manual), try disconnecting the power and then repowering the unit. If the meter continues to fail any of the internal checks, contact the factory for assistance.*

After successfully performing the internal checks, the Model XMT868i begins taking measurements and the software version display is replaced by a measurement mode display. Proceed to the appropriate section for instructions on using the LCD display and the PanaView display option.

Note: *As a minimum, the system and pipe parameters (for each installed channel of a 2-channel meter) must be entered before the Model XMT868i can display valid data. Refer to Chapter 2, Initial Setup, for specific instructions.*

3.3 The LCD Display

The components of the LCD display are shown in Figure 16, along with a typical mass flow rate readout.

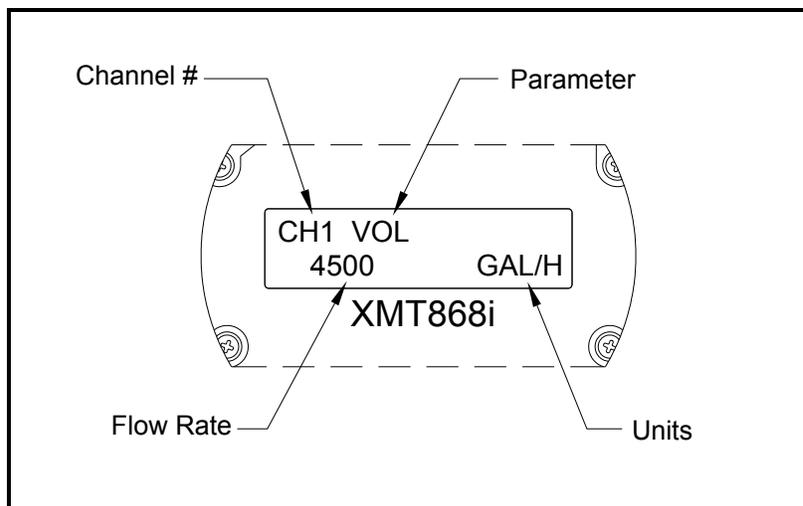


Figure 16: A Typical LCD Flow Rate Display

As shown in Figure 16, the display screen includes the following information:

- Channel Number
- Flow Parameter
- Units of Measure
- Flow Rate Value

The example in Figure 16 uses the default display settings. However, the first three items in the list above may be reprogrammed to display a variety of alternative choices. See the *Programming Manual* for detailed instructions on programming these parameters.

Note: *The LCD backlight flashes to signal errors. If the backlight is off when an error is detected, the display is illuminated briefly; if the backlight is already on, the light is interrupted briefly. Error code messages may appear in the upper right corner of the LCD display. For information about these error codes and how to respond to them, refer to Chapter 2, Error Codes, in the Service Manual.*

Proceed to the *Taking Measurements* section to use the XMT868i.

3.4 The Optional PanaView Display

The components of the PanaView text display appear in Figure 17, along with a typical flow rate readout.

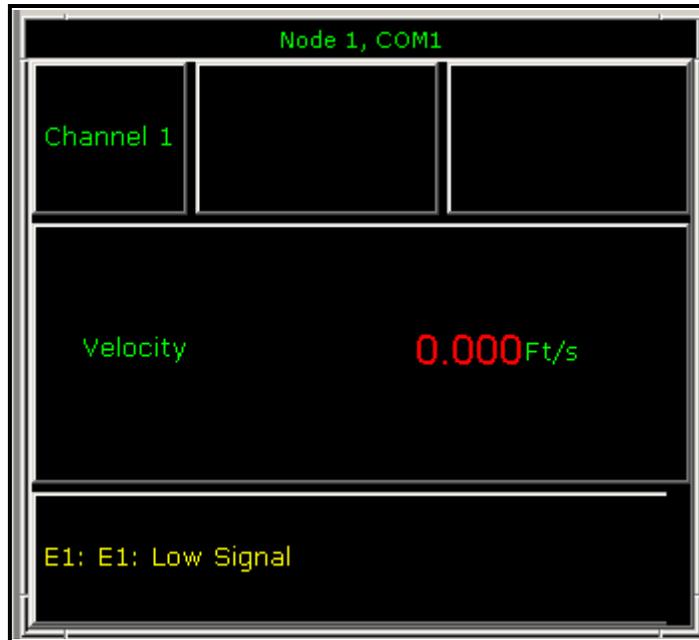


Figure 17: A Typical PanaView Text Display Pane

As shown in Figure 17, the text pane includes the following information:

- Channel Number
- Flow Parameter
- Units of Measure
- Flow Rate Value

The example in Figure 17 is typical, but the first three items in the list above may be reprogrammed to display a variety of alternative choices. See the next section for detailed instructions on programming these parameters.

Note: *Error code messages may appear in the lower left corner of the PanaView text display window. For information about these error codes and how to respond to them, refer to Chapter 2, Error Codes, in the Service Manual.*

Proceed to the *Taking Measurements* section to use the XMT868i.

3.5 Taking Measurements

The Model XMT868i is capable of displaying several different variables in a variety of formats. However, this manual will only discuss the basic measurement displays using the LCD display or the PanaView display. Refer to Chapter 2, *Displaying Data*, in the *Programming Manual* for instructions on setting up alternate choices. Also, refer to the *Programming Manual* and/or the *PanaView User's Manual* to use PanaView or the analog outputs to obtain the flow rate data.

3.5.1 Programming the LCD

Note: *When you first initialize the XMT868i, the number of LCD parameters is set to OFF. You must program the LCD to display any measured parameters.*

Through the *Keypad Program*, you can program the LCD display to display up to four variables in sequence. Complete the following steps to program the LCD display:

1. Power up the XMT868i and wait until it has initialized.
2. Press [Escape]. [Enter], [Escape].
3. In the *Keypad Program* window, scroll to PROG and press [Enter].
4. In the PROG menu, scroll to GLOBL and press [Enter].
5. Scroll to I/O and press [Enter].
6. Scroll to LCD and press [Enter].
7. The window now asks for the # of LCD Parameters. Scroll to the desired number (from OFF through 1-4 and KEY) and press [Enter].

The OFF setting switches the measurement display off, while the KEY setting enables users to change the measurement display using the arrow keys, without accessing the *Keypad Program*. If you select KEY:

- To view a parameter other than the one currently displayed, press the [◀] and [▶] keys to scroll through the various parameters.
- To view the channel measurements on a two-channel XMT868i, press the [△] or [▽] keys until you have reached the desired channel and measurement.

For a 1-Channel XMT868i, the data for Channel 1 is displayed automatically, and you can skip to step 9. However, for a 2-Channel meter, the channel data to be displayed must be specified at the following prompt.

3.5.1 Programming the LCD (cont.)

8. Scroll to the desired *Channel option*, as listed in Table 19.

Table 19: Channel Options

| Option | Description |
|--------|---------------|
| CH1 | Channel 1 |
| CH2 | Channel 2 |
| SUM | CH1+CH2 |
| DIF | CH1-CH2 |
| AVE | $(CH1+CH2)/2$ |

9. For each channel, select the desired *Measurement Parameter*, as shown in Table 20.

Table 20: Output Measurement Options

| Option Bar Choice | Description |
|-------------------|--|
| VEL | Flow Velocity |
| VOLUM | Volumetric Flow |
| +TOTL | Forward Totalized Volume Flow |
| -TOTL | Reverse Totalized Volume Flow |
| TIME | Total Flow Measurement Time |
| MDOT | Mass Flow |
| +MASS | Forward Totalized Mass Flow |
| -MASS | Reverse Totalized Mass Flow |
| POWER | Energy Flow Power |
| +ENRG | Forward Energy Flow |
| -ENRG | Reverse Energy Flow |
| SS up | Signal strength for the upstream transducer. |
| SS do | Signal strength for the downstream transducer. |
| Soundspeed | Measured speed of sound in the fluid. |
| DAC up | AGC DAC count for upstream gain setting. |
| DAC do | AGC DAC count for downstream gain setting. |
| T up | Upstream ultrasonic signal transit time. |
| Tdown | Downstream ultrasonic signal transit time. |
| DELTA | Transit time difference between upstream and downstream signals. |
| REYN# | Current velocity/reynolds number. |
| K (RE) | K factor, based on the Reynolds number. |
| PEAK% | Percentage of peak (set to +50 by default). |

Table 20: Output Measurement Options (cont.)

| Option Bar Choice | Description |
|-------------------|---|
| THETA | Theta 3 is the angle between the ultrasonic beam and the normal to the pipe wall. It is calculated from measured transit time and the clamp-on parameters (clamp-ons only). |
| Qup | Displays the signal quality for the upstream transducer. |
| Qdown | Displays the signal quality for the downstream transducer. |
| AMPup | Displays the value for the signal amplitude of the upstream transducer. |
| AMPdn | Displays the value for the signal amplitude of the downstream transducer. |
| P#up | Displays signal peaks for the upstream transducer. |
| P#dn | Displays signal peaks for the downstream transducer. |
| NFup | Displays the normalization factor for the upstream transducer. |
| NFdn | Displays the normalization factor for the downstream transducer. |
| Cxdcr | Displays the speed of sound in the transducer (clamp-on only). |
| TEMPs | Displays the temperature for the supply input (energy measurement). |
| TEMPr | Displays the temperature for the return input (energy measurement). |
| Ts-Tr | Difference between supply input and return input measurement (energy measurement). |
| DENSs | Displays the density for the supply input (energy measurement). |
| DENSr | Displays the density for the return input (energy measurement). |
| DELTh | Displays the delta enthalpy which is the difference between the supply and return. Enthalpy is a measure of energy contained in the fluid (energy measurement). |

Note: *The measurement units that appear in these prompts are those selected in the GLOBL-SYSTM menu earlier in this section. Also, when differences in one channel's programming invalidate an output previously chosen for the other, the measurement defaults to the nearest selectable item in the parameter list.*

The previous two prompts repeat until all of the specified # of LCD Parameters have been set up. When all of the display parameters have been set up, the meter returns to the Global I/O window. To leave the *Keypad Program*, press the [Escape] key three times.

After leaving the *Keypad Program*, the XMT868i will reset itself and will begin to display the parameters specified in this section. If more than one parameter was set up, each of the parameters will be displayed in sequence, with a pause of several seconds between display changes.

3.5.2 Using the LCD Display

To use the programmed LCD display for obtaining flow rate data, simply power on the XMT868i as described earlier in this chapter. Then, read the flow rate directly from the display, as shown in Figure 16 on page 49.

Note: *See Chapter 2, Displaying Data, in the Programming Manual to customize the contents of the LCD display.*

3.5.3 PanaView Display

Power up PanaView, establish communications with the XMT868i and enter the required startup parameters, as described in Chapter 2, *Initial Setup*. Then, proceed as follows:

Note: See Chapter 2, *Initial Setup*, in this manual and/or Chapter 1, *Programming Site Data*, in the Programming Manual for complete instructions on entering startup data using PanaView.

1. In PanaView, pull down the *Output* menu, as shown in Figure 18, and click on the *Text Display* option.

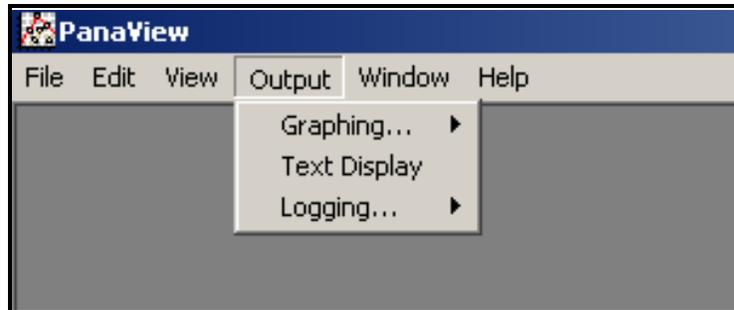


Figure 18: The Output Menu

Note: The *Text Display* window that appears after Step 1 is actually stacked on top of any previously opened windows (such as the *Meter Browser* window).

2. Using the *Window* menu, as described in the *PanaView User's Manual*, arrange the open windows in the desired format. For this discussion, Figure 19 shows the *Text Display* window in its maximized (full-screen) size.

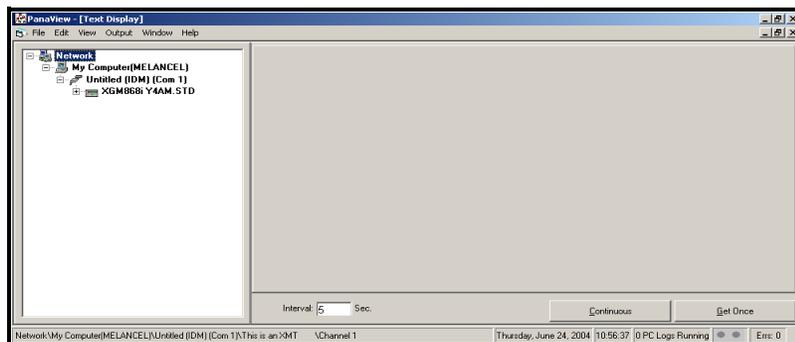


Figure 19: The Text Display Window

3. The left pane of the *Text Display* window contains the standard PanaView network tree. Expand the XMT branch, and double-click on the desired channel. (On 2-channel units, you can also display the SUM, DIFF or AVG parameters.)

3.5.3 PanaView Display (cont.)

4. From the expanded tree, double-click on the desired flow parameter to display it in the right pane of the window.
5. Before actual data values can be displayed in the text pane, activate one of the following data collection modes (see Figure 19):

- Click on the [Get Once] option button at the bottom of the right pane in the *Text Display* window. The current value of the selected process parameter, as specified in the PanaView network tree, is displayed in the right pane of the *Text Display* window.

or

- Enter an “*interval*” in the text box at the bottom of the right pane in the *Text Display* window, or check the “*Max. Comm Rate*” box to collect readings as fast as the system allows (1 sec). Then, click on the [Continuous] option button to begin collecting data for display in the right pane of the *Text Display* window.

Note: *Any value entered in the “Interval” text box is overridden if the “Max. Comm Rate” box is checked.*

The right pane now appears similar to Figure 17 on page 50.

6. If the [Continuous] option was selected in Step 5 above, click on the [Stop] option button, which has replaced the original [Continuous] option button, to terminate data collection.

The *Text Display* window may be left open while other tasks are performed, or it may be closed by clicking on the lower [X] control button at the far right of the menu bar.

IMPORTANT: *If you click on the upper [X] control button at the far right of the PanaView title bar, you will exit PanaView completely.*

3.5.3a Displaying Multiple Process Parameters

The procedure for displaying a single process parameter in a text screen may be repeated to simultaneously display multiple process parameters. To do so, proceed as follows:

1. Display the first process parameter in a text screen, as described in the previous section.
2. Repeat Step 1 for any desired additional process parameters, by double clicking on them in the PanaView network tree. PanaView automatically tiles the multiple text screens in the right pane of the *Text Display* window, as shown in Figure 20.

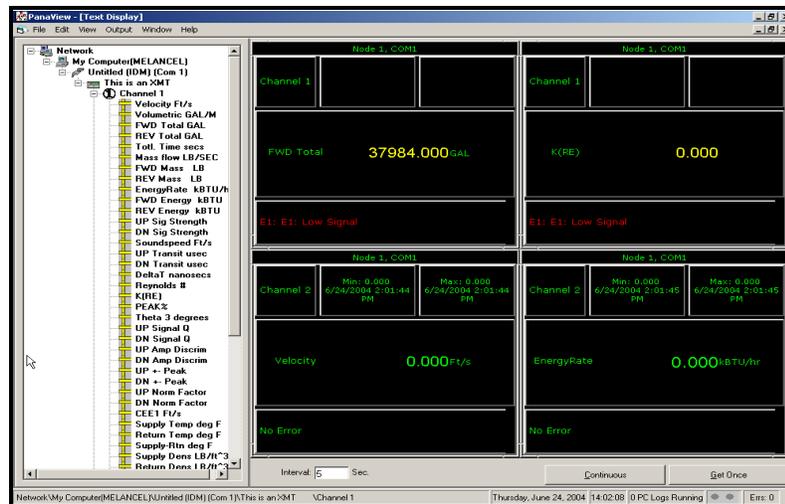


Figure 20: Multiple Text Screens in the *Text Display* Window

3. As in any standard Windows application, the multiple text screens may be resized by dragging their borders. Also, the individual panes within a parameter's text screen may be resized by dragging the borders within that text screen.
4. To close an open text screen, right click anywhere within that screen (except in the title bar or the error section) and click on the [Remove] option that pops up in the context menu.

Note: After resizing or removing any of the multiple text screens, the default tiled layout may be restored by opening the Window menu (see the PanaView User's Manual) and clicking on the Tile Output Displays option.

3.5.3b Displaying Multiple Text Windows

The procedures for displaying one or more process parameters in a single *Text Display* window may be repeated to open multiple *Text Display* windows. To do so, proceed as follows:

1. To open another *Text Display* window and display the desired process parameter(s) in the new window, repeat the steps in *PanaView Display*.
2. Arrange the multiple *Text Display* windows as desired using the *Window* menu (see the *PanaView User's Manual*).

3.5.4 Pausing Measurement

On occasion, it might become necessary for the XMT868i to stop taking measurements. Through PanaView, you can direct the XMT868i to pause measurements without cutting off power from the meter.

1. From the meter tree in the *New Meter Browser*, click on the XMT entry.
2. Expand the *Edit Functions* option, and double-click on the *Pause Measurement* entry. A window opens similar to Figure 21.

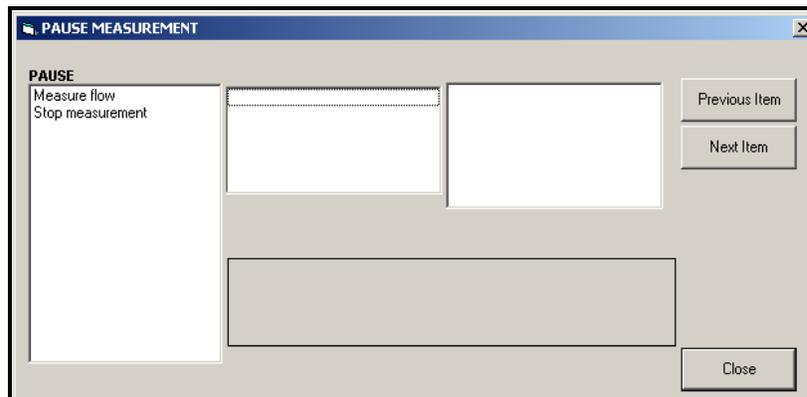


Figure 21: The *Pause Measurement* Window

3. To pause current measurements, double-click on the *Stop measurement* option. The window closes, and the XMT868i stops taking measurements.
4. To restart measurement, double-click on the *Pause Measurement* entry, and then on the *Measure flow* option. The XMT868i resumes flow measurement.

3.5.4a Procedure Options

The *Startup Guide* is intended to provide only those instructions necessary to get the XMT868i installed and operating. By following the instructions in this chapter, the Model XMT868i can be set up to display the desired channel option and the desired measurement parameter, using either the LCD display or PanaView.

To utilize the more advanced capabilities of the Model XMT868i, refer to the *Programming Manual* and/or the *Service Manual* for the instrument. Also, refer to the *PanaView User's Manual* for instructions on using the PanaView software with the XMT868i.

Chapter 4. Specifications

4.1 General

The general specifications for the Model XMT868i flow transmitter are divided into the following categories:

4.1.1 Hardware Configuration

Channel Options:

Standard: 1 Channel.

Optional: 2 Channel (2 pipes or 2 paths per pipe).

Mode Options:

Transit-Time.

Package Options:

Standard:

Epoxy-coated aluminum Type 7/4X, IP66

Explosion proof Class I, Div. 1, Groups B, C & D. Class II, Groups E, F & G; Class III

Flameproof  II 2 GD EEx d IIC T5/T6

Optional:

Stainless steel Type 7/4X.

Explosion proof Class I, Div. 1, Groups B, C & D. Class II, Groups E, F & G; Class III

Flameproof  II 2 GD EEx d IIC T5/T6

Dimensions:

Standard housing: 10 lb (4.5 kg); 8.2 x 6.6 in. (208 x 168 mm).

Optional housing: 30 lb (13.6 kg); 8.2 x 6.6 in. (208 x 168 mm).

4.1.2 Environmental

Operating Temperature:

-40° to 140°F (-40° to 60°C).

Storage Temperature:

-67° to 167°F (-55° to 75°C).

4.1.3 Flow Accuracy (Velocity)

Accuracy specifications assume a fully developed flow profile and a straight run of 10 pipe diameters upstream and 5 pipe diameters downstream.

±0.5% of reading (achievable with process calibration)

Typical Clamp-On Flow Accuracy (Velocity)

Pipe Diameter (ID) > 6 in. (150 mm): ±1% to 2% of reading

Pipe Diameter (ID) ≤ 6 in. (150 mm): ±2 to 5% of reading

Typical Wetted Flow Accuracy (Velocity):

±1% of reading

Note: Accuracy depends on pipe size, installation and whether measurement is one-path or two-path.

4.1.4 Range

Transit-Time Mode:

-40 to 40 ft/s (-12.2 to 12.2 m/s).

4.1.5 Rangeability (Overall)

400:1.

4.1.6 Repeatability

±0.1% to 0.3 of reading

4.1.7 Energy Accuracy (% of Reading):

The accuracy of the energy measurement is a combination of the accuracy of the flow and temperature measurements.

Transit-Time Mode:

Accuracy of 1% is typical for calibrated systems.

Note: Above specifications require a straight run of 10 pipe diameters upstream and 5 pipe diameters downstream.

4.1.8 Fluid Types

Transit-Time Mode:

Acoustically-conductive fluids. This includes most clean liquids and many with entrained solids or gas bubbles (the maximum void fraction depends on the transducer, interrogation carrier frequency, path length and pipe configuration). Consult the factory for additional information.

4.2 Electrical

The electrical specifications for the Model XMT868i flow transmitter are divided into the following categories:

4.2.1 Power Supply

Options:

Standard: 95 to 240 VAC, 50/60 Hz, $\pm 10\%$.

Optional: 12 to 28 VDC, $\pm 5\%$.

Power Consumption:

20 W maximum.

4.2.2 Operating Modes

Flow Measurement:

Standard: Correlation Transit-Time™ Mode with clamp-on or wetted transducers.

Energy Measurement (optional):

To calculate energy flow rate, use Analog Input Board for transmitters. Use RTD Input Board for direct RTDs.

4.2.3 European Compliance

This unit complies with EMC Directive 2004/108/EC and 2006/95/EC Low Voltage Directive (Installation Category II, Pollution Degree 2), and transducers comply with PED 97/23/EC for DN<25.

4.2.4 Input/Output

Digital Display:

2-line x 16-character LCD display, LED backlight, configurable to display up to 4 measurement parameters in sequence, or to scroll through measurement parameters

Digital Communications:

Standard: RS232 serial port for PC, terminal or printer.

Optional: RS485 serial port for multi-user network.

RS485 MODBUS communication

MODBUS/TCP

OPC Server

Ethernet

Foundation Fieldbus

Analog Outputs (built-in):

Standard: Two isolated 0/4–20 mA, 600 Ω max. load.

Option Cards:

Optional Inputs/Outputs of the following types may be added:

1. *Analog Inputs:* two isolated 0/4-20 mA inputs, 24-V loop power.
2. *RTD Inputs:* two isolated 3-wire RTD inputs;
Span -148° to 662°F (-100° to 350°C), 100 Ω Pt., Alpha 385.
3. *Analog Outputs:* two isolated 0/4–20 mA analog outputs, 1000 Ω maximum load.
4. *Data Logging:* 128 kB or 2 MB memory.
5. *Totalizer or Frequency Outputs:* two or four optically isolated pulse or frequency outputs, 100 VDC/3 A/1 W/10 KHz max.

Totalizer Mode: one pulse per defined unit of parameter
(e.g., 1 pulse/gal).

Frequency Mode: pulse frequency proportional to magnitude of parameter (e.g., 10 Hz = 1 gal/min).

6. *Alarm Relays:* two or four Form-C relays

General Purpose: 120 VAC, 28 VDC max., 5 A max.,
DC: 30 W max., AC: 60 VA max.

Note: *The above optional inputs/outputs are available only in specific combinations. Consult GE or see Table 22 on page 69 for details.*

4.2.5 Additional Options

PC-Interface Software:

PanaView™ software option links the XMT868i to a PC. Software package includes CD and manual.

4.3 Transducer

4.3.1 Wetted Transducers

Material:

Standard: 316 Stainless Steel.

Optional (for isolating PanAdapta Plugs[®]): Hastelloy, Monel, Titanium, Duplex, CPVC, PVDF and others.

Process Connection:

Standard: 1-in. NPTM, 3/8-in. NPTM.

Optional: RF flange, socket weld, fuse bond and others.

Maximum Pressure:

Standard: 0 to 3,000 psig (0.1013 to 20 MPa).

Optional: Higher pressures on request.

Temperature Range:

Standard: -40° to 212°F (-40° to 100°C).

Optional (overall range): -310° to 932°F (-190 to 500°C).

Mounting:

Spoolpiece, hot tap, or cold tap.

Area Classifications:

Standard: General-purpose

Optional:

Explosion proof: Class I, Div. 1, Groups B, C & D; Class II, Groups E, F and G; Class III

Flameproof:  II 2 G EEx d IIC T6

Weatherproof: Type 4/IP65.

Submersible.

Note: *Wetted transducers for special applications and flowcells are also available. Consult the factory for details.*

4.3.2 Clamp-On Transducers

Temperature Range:

Standard: -40° to 300°F (-40° to 150°C).

Optional (overall range): -310° to 572°F (-190° to 300°C).

Mounting:

SS chain or strap, welded or magnetic clamping fixtures.

Area Classifications:

Standard: General-purpose

Optional:

Explosion proof: Class I, Div. 1, Groups B, C & D; Class II, Groups E, F and G; Class III

Flameproof: Ex II 2 G EEx md IIC T6-T3.

Weatherproof: Type 4/IP65. [no content intended for this page]

Submersible.

Note: *Clamp-on transducers for special applications and flowcells are also available. Consult the factory for details.*

4.3.3 Transducer Cables

Length:

Standard: Pair of coaxial cables, type RG62 aU,
length to 3 ft (1 m).

Optional: Lengths up to 1000 ft (330 m) maximum.

4.3.4 Temperature Transducers (optional)

Type:

Loop-powered 3-wire platinum RTDs; clamp-on and wetted (thermowell) types are available.

Range:

-4° to 500°F (-20° to 260°C), not all extremes of parameters can be achieved simultaneously.

Accuracy:

0.27°F (0.15°C), wetted RTDs, matched pairs.

4.4 Pipe Size and Materials

4.4.1 Wetted Transducers

Materials:

All metals and most plastics. (Consult the factory for concrete, glass and cement.)

Pipe Sizes:

Transit-Time Mode: Inside diameter 1 to 200 in.

4.4.2 Clamp-on Transducers

Materials:

All metals and most plastics. (Consult the factory for concrete, composite materials and highly corroded or lined pipes.)

Pipe Sizes:

Transit-Time Mode:

Outside Diameter: 0.5 to 300 in. (12.7 mm to 7.6 m) and larger.

Pipe Wall Thickness:

Up to 3 in. (76.2 mm).

4.5 Flowcell

4.5.1 Tilted Diameter

Pipe Sizes:

Standard: 2 to 200 in. (50 to 5,000 mm).

Optional: >200 in.

Material:

Standard: Stainless steel; carbon steel; plastics; fiberglass.

Optional: Other metals; plastics; etc.

Process Connection:

Standard: Straight (welding); 150-lb flange; 300-lb flange.

Optional: MJ; Victaulic; RTJ flanged; cold tap.

Wetted Transducer Connection:

1" NPTM for 6 in. or greater pipe sizes; 3/8" NPTM for 2 to 5 in. sizes.

Interrogation:

Standard: Conventional 45° tilted-diameter; one or more traversals.

Optional: Mid-radius chord; multi-chords including multiple paths.

Appendix A. CE Mark Compliance

A.1 Introduction

For CE Mark compliance, the Model XMT868i flow transmitter must be wired in accordance with the instructions in this appendix.

IMPORTANT: *CE Mark compliance is required only for units intended for use in EC countries.*

A.2 Wiring

The Model XMT868i must be wired with the recommended cable, and all connections must be properly shielded and grounded. Refer to Table 21 for the specific requirements.

Table 21: Wiring Requirements

| Connection | Cable Type | Ground Termination |
|------------------|---|-------------------------------|
| Transducer | Armored RG62 a/U | Grounded using a cable gland. |
| Input/ Output | Armored 22 AWG shielded (e.g. Baystate #78-1197) with armored material added to outside of jacket | Grounded using a cable gland. |
| Power | Armored 14 AWG 3 conductor | Grounded using a cable gland. |

Note: *If the Model XMT868i is wired as described in this appendix, the unit will comply with the EMC Directive 89/336/EEC.*

[no content intended for this page]

Appendix B. Data Records

B.1 Available Option Cards

The XMT868i can accommodate one option card in Slot 1 and one in Slot 2. The available configurations are listed in Table 22.

Table 22: Option Card Configurations

| Card #713- | Slot # | Configuration |
|-----------------|------------------------------------|--|
| 1215-02 | 1 | FF - 4 Frequency Outputs |
| 1215-03 | | TT - 4 Totalizer Outputs |
| 1215-04 | | FT - 2 Frequency Outputs/2 Totalizer Outputs |
| 1215-05 | | FO - 2 Frequency Outputs |
| 1215-06 | | TO - 2 Totalizer Outputs |
| 1215-07 | | AA - 4 Standard Alarms |
| 1215-09 | | FA - 2 Frequency Outputs/2 Standard Alarms |
| 1215-11 | | TA - 2 Totalizer Outputs/2 Standard Alarms |
| 1223-02/1473-02 | | OI - 2 Current Inputs |
| 1223-03/1473-03 | | OR - 2 RTD Inputs |
| 1223-04/1473-04 | | TI - 2 Current Inputs/2 Totalizer Inputs |
| 1223-05/1473-05 | | TR - 2 RTD Inputs/2 Totalizer Inputs |
| 1223-06/1473-06 | | FI - 2 Current Inputs/2 Frequency Inputs |
| 1223-07/1473-07 | | FR - 2 RTD Inputs/2 Frequency Inputs |
| 1223-08/1473-08 | | AI - 2 Current Inputs/2 Standard Alarms |
| 1223-10/1473-10 | | AR - 2 RTD Inputs/2 Standard Alarms |
| 1225-13 | | CO - 2 Current Outputs |
| 1225-14 | | CF - 2 Current Outputs/2 Frequency Outputs |
| 1225-15 | | CT - 2 Current Outputs/2 Totalizer Outputs |
| 1225-16 | | CA - 2 Current Outputs/2 Standard Alarms |
| 1430-03 | RR - 4 RTD Inputs | |
| 1430-04 | IR - 2 RTD Inputs/2 Current Inputs | |
| 1146-02/1332-02 | 2 | 128 KB Memory |
| 1146-03/1332-03 | | 2 MB Memory |
| 1345-04 | | Modbus Communications Protocol |
| 1477-03 | 2 | MODBUS/TCP/IP |
| 1477-01 | 2 | Ethernet |
| 1475-01 | 2 | Foundation Fieldbus |

B.2 Option Cards Installed

Whenever an option card is installed or changed in the XMT868i flow transmitter, record the type of card and any additional setup information in the appropriate row of Table 23.

Table 23: Option Cards Installed

| Slot # | Type of Option Card | Additional Setup Information |
|--------|-----------------------|------------------------------|
| 0 | Analog Outputs (A, B) | |
| 1 | | |
| 2 | | |

B.3 Site Data

After the Model XMT868i flow transmitter has been installed, specific site data must be entered via the *Keypad Program*, prior to operation. Record that information in Table 24.

Table 24: Site Data

| General Information | | | | | |
|---|------------------|--------|----------------------------|------------------|-------|
| Model # | | | Serial # | | |
| Software Vers. | | | Setup Date | | |
| GLOBL-SYSTEM | | | | | |
| Meter Message | | | Vol. Dec. Digits | | |
| System Units | English | Metric | Totalizer Units | | |
| Vol. Units | | | Tot. Dec. Dig. | | |
| GLOBL-I/O-ERROR | | | | | |
| Error Handling | | | 2-Path Error | No | Yes |
| GLOBL-COMM | | | | | |
| Meter Address | | | MOD. Parity | | |
| Baud Rate | | | MOD. Stop Bits | | |
| MOD. Baud Rate | | | MOD. Address | | |
| CHANNEL X-ACTIV | | | | | |
| Channel 1 | | | Channel 2 (if applicable) | | |
| Channel Status | Off ¹ | Trans | Channel Status | Off ¹ | Trans |
| CHANNEL X-SYSTEM | | | | | |
| Channel 1 | | | Channel 2 (if applicable) | | |
| Channel Label | | | Channel Label | | |
| Chan. Message ² | | | Chan. Message ² | | |
| Energy Option | On | Off | Energy Option | On | Off |
| Vol. Units | | | Vol. Units | | |
| Vol. Dec. Digits | | | Vol. Dec. Digits | | |
| Totalizer Units | | | Totalizer Units | | |
| Tot. Dec. Dig. | | | Tot. Dec. Dig. | | |
| Mass Flow | | | Mass Flow | | |
| Mass Flow Time | | | Mass Flow Time | | |
| MDOT Dec. Dig. | | | MDOT Dec. Dig. | | |
| Mass Totals | | | Mass Totals | | |
| Mass Dec. Digits | | | Mass Dec. Digits | | |
| Power | | | Power | | |
| Power Dec. Dig. | | | Power Dec. Dig. | | |
| Energy (Total) | | | Energy (Total) | | |
| Energy Dec. Dig. | | | Energy Dec. Dig. | | |
| Heat. or Cool. | | | Heat. or Cool. | | |
| Flow Meas. | | | Flow Meas. | | |
| ¹ not available for 1-Channel meter, ² "Site Message" for 1-Channel meter | | | | | |

Table 24: Site Data (cont.)

| CHANNELx-I/O | | | | | | | |
|---|-------|--------|-------|--|-----------|--------|-------|
| Zero Cutoff | | | | Temp. Input | Fixed () | Live | |
| Pipe/Transducer Parameters - PIPE | | | | | | | |
| Channel 1 | | | | Channel 2 (if applicable) | | | |
| Trans. Type | STD | SPEC | | Trans. Type | STD | SPEC | |
| Transducer # | | | | Transducer # | | | |
| Special Transducers | | | | Special Transducers | | | |
| Wedge Type | Rayl | Shear | Wettd | Wedge Type | Rayl | Shear | Wettd |
| Frequency Hz | | | | Frequency Hz | | | |
| Trans. Tw | | | | Trans. Tw | | | |
| Wedge Angle | | | | Wedge Angle | | | |
| Wedge Sndspd | | | | Wedge Sndspd | | | |
| Pipe Material | | | | Pipe Material | | | |
| All Clamp-On and Wetted Transducers | | | | All Clamp-On and Wetted Transducers | | | |
| Pipe O.D. | | | | Pipe O.D. | | | |
| Pipe Wall | | | | Pipe Wall | | | |
| Path Length (P) | | | | Path Length (P) | | | |
| Axial Length (L) | | | | Axial Length (L) | | | |
| Lining | Yes | No | | Lining | Yes | No | |
| Lining Material | | | | Lining Material | | | |
| Lining Sndspd | | | | Lining Sndspd | | | |
| Lining Thickness | | | | Lining Thickness | | | |
| Track. Window. | Yes | No | | Track. Window. | Yes | No | |
| Fluid Type | | | | Fluid Type | | | |
| Other/Sndspd | | | | Other/Sndspd | | | |
| % of Water | | | | % of Water | | | |
| Reynolds Corr. | Off | Active | | Reynolds Corr. | Off | Active | |
| KV Input Sel. | Table | Static | | KV Input Sel. | Table | Static | |
| Kin. Visc. | | | | Kin. Visc. | | | |
| Cal. Factor | | | | Cal. Factor | | | |
| # of Traverses | | | | # of Traverses | | | |
| Trans. Spacing | | | | Trans. Spacing | | | |
| Response Time | | | | Response Time | | | |
| CHANNELx-SETUP-ADVANCED FEATURES -MASS FLOW | | | | | | | |
| Mass Flow | No | Yes | | Mass Flow | No | Yes | |
| Static Density | | | | Static Density | | | |
| CHANNELx-SETUP-ADVANCED FEATURES-CODE LENGTH | | | | | | | |
| Code Length | Auto | Short | Long | Code Length | Auto | Short | Long |

Table 24: Site Data (cont.)

| CHx-SETUP-ADVANCED FEATURES-KV/SS | | | | | |
|---|----------------------------|------------|----------------------------|----------------------------|------------|
| KV/SS (or C3) Pairs | | | KV/SS (or C3) Pairs | | |
| # | Sig. Stren./ Soundspeed | Kin. Visc. | # | Sig. Stren./ Soundspeed | Kin. Visc. |
| 1 | | | 1 | | |
| 2 | | | 2 | | |
| 3 | | | 3 | | |
| 4 | | | 4 | | |
| 5 | | | 5 | | |
| 6 | | | 6 | | |
| 7 | | | 7 | | |
| 8 | | | 8 | | |
| 9 | | | 9 | | |
| 10 | | | 10 | | |
| 11 | | | 11 | | |
| 12 | | | 12 | | |
| 13 | | | 13 | | |
| 14 | | | 14 | | |
| 15 | | | 15 | | |
| 16 | | | 16 | | |
| 17 | | | 17 | | |
| 18 | | | 18 | | |
| 19 | | | 19 | | |
| 20 | | | 20 | | |
| CHx-SETUP-ADVANCED FEATURES-MULTIK | | | | | |
| Custom Type | CstV | CstR | CustomType | CstV | CstR |
| K-Factor Table | | | K-Factor Table | | |
| K-Factor # | Vel./Reyn. | K Factor | K-Factor # | Vel./Reyn. | K Factor |
| 1 | | | 1 | | |
| 2 | | | 2 | | |
| 3 | | | 3 | | |
| 4 | | | 4 | | |
| 5 | | | 5 | | |
| 6 | | | 6 | | |
| 7 | | | 7 | | |
| 8 | | | 8 | | |
| 9 | | | 9 | | |
| 10 | | | 10 | | |
| 11 | | | 11 | | |
| 12 | | | 12 | | |
| 13 | | | 13 | | |

Table 24: Site Data (cont.)

| CHx-SETUP-ADVANCED FEATURES-MULTIK (cont.) | | | | | | |
|---|------------|----------|--|------------|------------|----------|
| K-Factor # | Vel./Reyn. | K Factor | | K-Factor # | Vel./Reyn. | K Factor |
| 14 | | | | 14 | | |
| 15 | | | | 15 | | |
| 16 | | | | 16 | | |
| 17 | | | | 17 | | |
| 18 | | | | 18 | | |
| 19 | | | | 19 | | |
| 20 | | | | 20 | | |

Appendix C. Measuring P and L Dimensions

C.1 Measuring P and L

If you are using wetted transducers, the XMT868i requires you to enter the path length (P) and the axial dimension (L). P is the transducer face-to-face distance, and L is the axial projection of P in the flow stream.

To determine L, physically measure the distance between the center of the transducer ports at the inside wall as shown in Figure 22 below, if possible. If not, consult the factory.

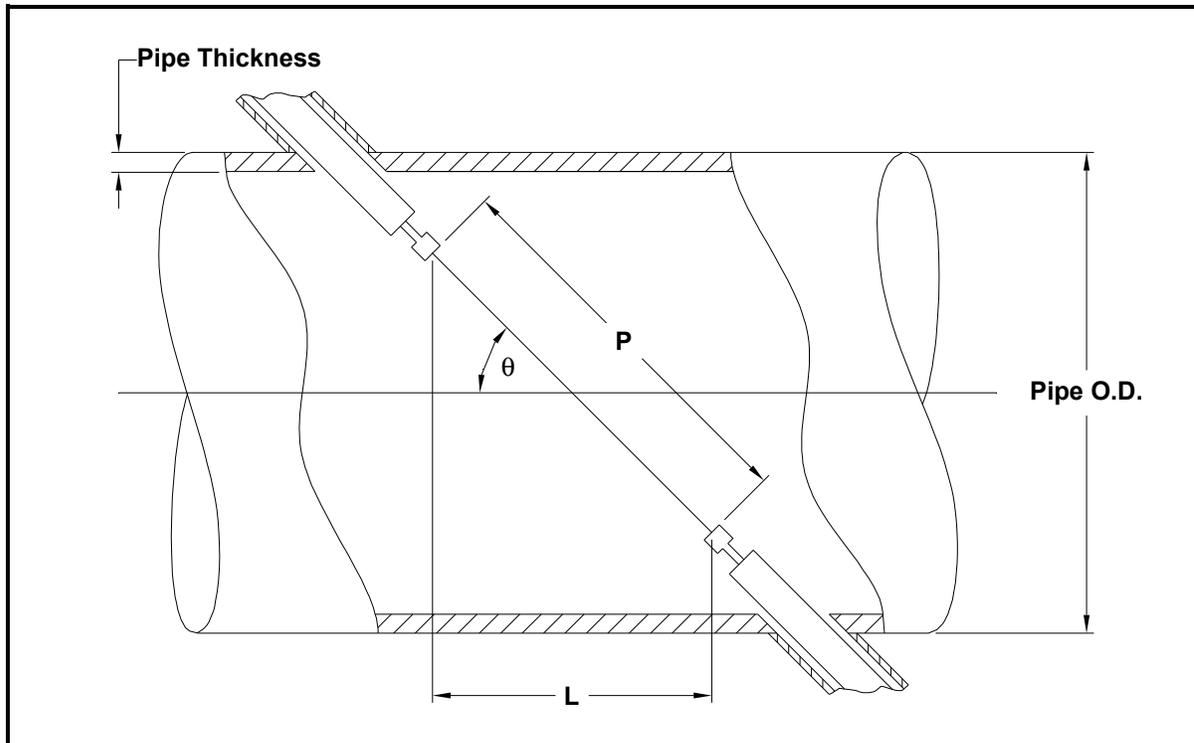


Figure 22: 180° Transducer Installations - Top View

To determine P, you need the following:

- the pipe inside diameter (ID)
- the wall thickness (WT)
- the installed pipe coupling length (CL)
- the transducers face depth (FD)
- the mounting angle (MA)

C.1 Measuring P and L (cont.)

Use Figure 23 below to properly measure the coupling length. Typically, the transducer face is positioned just outside the inside diameter (ID) of the pipe, or slightly retracted inside the coupling.

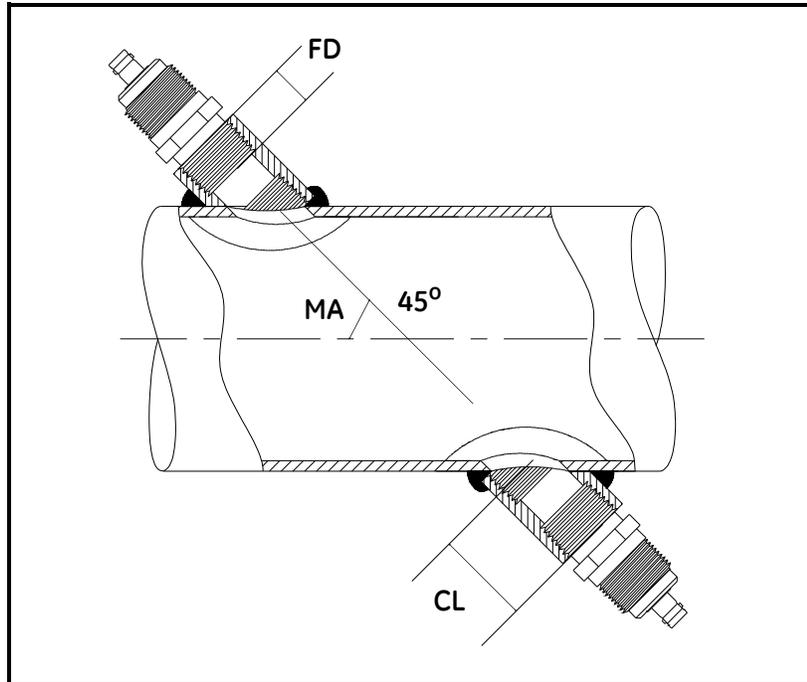


Figure 23: Determining the Pipe Coupling Length

Use the following formula to determine P dimension:

$$[ID + 2(WT)]/(\cos MA) + 2(CL) - FD = P \text{ Dimension.}$$

For example, given the following:

- inside diameter (ID) = 48"
- wall thickness (WT) = 3/8"
- installed coupling length (CL) = 2.0"
- a transducer face depth (FD) = 1.75"
- mounting angle (MA) - 45°

The P dimension would be $[48 + 2(3/8)]/(0.7071) + 2(2.0 - 1.75) = 69.4"$

Warranty

Each instrument manufactured by GE Sensing is warranted to be free from defects in material and workmanship. Liability under this warranty is limited to restoring the instrument to normal operation or replacing the instrument, at the sole discretion of GE Sensing. Fuses and batteries are specifically excluded from any liability. This warranty is effective from the date of delivery to the original purchaser. If GE Sensing determines that the equipment was defective, the warranty period is:

- one year from delivery for electronic or mechanical failures
- one year from delivery for sensor shelf life

If GE Sensing determines that the equipment was damaged by misuse, improper installation, the use of unauthorized replacement parts, or operating conditions outside the guidelines specified by GE Sensing, the repairs are not covered under this warranty.

The warranties set forth herein are exclusive and are in lieu of all other warranties whether statutory, express or implied (including warranties or merchantability and fitness for a particular purpose, and warranties arising from course of dealing or usage or trade).

Return Policy

If a GE Sensing instrument malfunctions within the warranty period, the following procedure must be completed:

1. Notify GE Sensing, giving full details of the problem, and provide the model number and serial number of the instrument. If the nature of the problem indicates the need for factory service, GE Sensing will issue a RETURN AUTHORIZATION NUMBER (RAN), and shipping instructions for the return of the instrument to a service center will be provided.
2. If GE Sensing instructs you to send your instrument to a service center, it must be shipped prepaid to the authorized repair station indicated in the shipping instructions.
3. Upon receipt, GE Sensing will evaluate the instrument to determine the cause of the malfunction.

Then, one of the following courses of action will then be taken:

- If the damage is covered under the terms of the warranty, the instrument will be repaired at no cost to the owner and returned.
- If GE Sensing determines that the damage is not covered under the terms of the warranty, or if the warranty has expired, an estimate for the cost of the repairs at standard rates will be provided. Upon receipt of the owner's approval to proceed, the instrument will be repaired and returned.

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We,

GE Infrastructure Sensing, Inc.
1100 Technology Park Drive
Billerica, MA 01821-4111
U.S.A.

as the manufacturer, declare under our sole responsibility that the product

XMT868 Liquid Ultrasonic Flow Transmitter

to which this document relates, in accordance with the provisions of ATEX Directive 94/9/EC Annex II, meets the following specifications:



Furthermore, the following additional requirements and specifications apply to the product:

- Having been designed in accordance with EN 50014, EN 50018, and EN 50281, the product meets the fault tolerance requirements of electrical apparatus for category “d”.
- The product is an electrical apparatus and must be installed in the hazardous area in accordance with the requirements of the EC Type Examination Certificate. The installation must be carried out in accordance with all appropriate international, national and local standard codes and practices and site regulations for flameproof apparatus and in accordance with the instructions contained in the manual. Access to the circuitry must not be made during operation.
- Only trained, competent personnel may install, operate and maintain the equipment.
- The product has been designed so that the protection afforded will not be reduced due to the effects of corrosion of materials, electrical conductivity, impact strength, aging resistance or the effects of temperature variations.
- The product cannot be repaired by the user; it must be replaced by an equivalent certified product. Repairs should only be carried out by the manufacturer or by an approved repairer.
- The product must not be subjected to mechanical or thermal stresses in excess of those permitted in the certification documentation and the instruction manual.
- The product contains no exposed parts which produce surface temperature infrared, electromagnetic ionizing, or non-electrical dangers.



We,

GE Sensing
1100 Technology Park Drive
Billerica, MA 01821
USA

declare under our sole responsibility that the

DigitalFlow™ IGM878 Industrial Gas Flow Ultrasonic Transmitter
DigitalFlow™ XGM868 Gas Flow Ultrasonic Transmitter
DigitalFlow™ XGS868 Steam Flow Ultrasonic Transmitter
DigitalFlow™ XMT868 Liquid Flow Ultrasonic Transmitter

to which this declaration relates, are in conformity with the following standards:

- EN 60079-0: 2007
- EN 60079-1: 2004
- EN 50281-1-1: 1998
- II 2 GD EEx d IIC T5; ISSeP02ATEX008 (ISSeP, B7340 Colfontaine, Belgium - NoBo 492)
- EN 61326-1: 2006, Class A, Table 2, Industrial Locations
- EN 61326-2-3: 2006
- EN 61010-1: 2001, Overvoltage Category II, Pollution Degree 2

Other standards Used:

- EN 50014: 1997 +A1, A2, A3
- EN 50018: 2000

following the provisions of the 2004/108/EC EMC, 2006/95/EC Low Voltage and 94/9/EC ATEX Directives.

Where products were initially assessed for compliance with the Essential Health and Safety Requirements of the ATEX Directive 94/9/EC using earlier harmonized standards, a subsequent review has determined that "technical knowledge" is unaffected by the current harmonized standards listed above.

The units listed above and any ancillary equipment supplied with them do not bear CE marking for the Pressure Equipment Directive, as they are supplied in accordance with Article 3, Section 3 (sound engineering practices and codes of good workmanship) of the Pressure Equipment Directive 97/23/EC for DN<25.

Billerica - August 2010

Issued



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Certification & Standards, Lead Engineer



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