

GE Industrial
Sensing



Model UTX878
Ultrasonic Flowmeter

Abridged Manual



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Abridged Manual

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Model UTX878 is a GE Panametrics product. GE Panametrics has joined other GE high-technology sensing businesses under a new name—GE Industrial Sensing.



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Warranty

Each instrument manufactured by GE Infrastructure Sensing, Inc. 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 Infrastructure Sensing, Inc.. Fuses and batteries are specifically excluded from any liability. This warranty is effective from the date of delivery to the original purchaser. If GE Infrastructure Sensing, Inc. determines that the equipment was defective, the warranty period is:

- one year for general electronic failures of the instrument
- one year for mechanical failures of the sensor

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

1. Notify GE Infrastructure Sensing, Inc., 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 Infrastructure Sensing, Inc. will issue a RETURN AUTHORIZATION number (RA), and shipping instructions for the return of the instrument to a service center will be provided.
2. If GE Infrastructure Sensing, Inc. 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 Infrastructure Sensing, Inc. 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 Infrastructure Sensing, Inc. 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.

Introduction

To ensure safe and reliable operation of the Model UTX878 Ultrasonic Flowmeter, the system must be installed and programmed in accordance with the guidelines established by GE Infrastructure Sensing, Inc. engineers. Those guidelines, explained in detail in this guide, include the following topics:

- Unpacking the Model UTX878 system
- Selecting suitable sites for the electronics enclosure and the transducers
- Installing the transducers
- Installing the electronics enclosure
- Wiring the electronics enclosure
- Programming the UTX878

!WARNING!

Be sure to follow all applicable local safety codes and regulations for installing electrical equipment. 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 B, *CE Mark Compliance, of the User's Manual.*

Unpacking

Carefully remove the electronics enclosure and the transducer/cable assembly 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.

Site Considerations

Because the relative location of the transducers and the electronics enclosure is important, use the guidelines in this section to plan the UTX878 installation.



Figure 1: UTX878 Enclosure in Typical Installation

Electronics Enclosure Location

The standard UTX878 electronics enclosure (shown in *Figure 1* above) is epoxy-coated aluminum rated for weatherproof NEMA 4X, IP67 applications. 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.

Transducer Location	<p>For a given fluid and pipe, the Model UTX878's accuracy depends primarily on the location and spacing of the transducers. In addition to accessibility, when planning for transducer location, adhere to the following guidelines:</p> <ul style="list-style-type: none">• 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 with downward flow should be avoided in order to insure a full pipe at the measurement point.
Cable Lengths	<p>Locate the electronics enclosure as close as possible to the transducers. GE Infrastructure Sensing, Inc. can supply UTX878 transducer cables in fixed lengths from 10 ft (3 m) up to 100 ft (30 m) in length for remote location of the electronics enclosure.</p>
Transducer Cables	<p>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. Do not run the transducer cables along a pipe with a surface temperature over 75°C (167°F).</p> <p>IMPORTANT: <i>Use only the cables and transducers that have been supplied with the UTX878.</i></p>
Mounting the UTX878 Electronics Enclosure	<p>The standard Model UTX878 electronics package is housed in a epoxy-coated aluminum weatherproof NEMA 4X, IP67 enclosure suitable for indoor or outdoor use. Refer to Chapter 7, <i>Specifications</i>, of the <i>User's Manual</i> for the mounting dimensions and the weight of this enclosure.</p>

Making the Electrical Connections

This section contains instructions for making all the necessary electrical connections to the Model UTX878 flow transmitter. Refer to *Figure 2* on the next page for a complete wiring diagram.

!ATTENTION EUROPEAN CUSTOMERS!

To meet CE Mark requirements, all cables must be installed as described in Appendix B, *CE Mark Compliance*, of the *User's Manual*.

!WARNING!

Always disconnect the line power from the Model UTX878 before removing the front cover.

Preparing the Unit Before Making Electrical Connections

Prepare the unit as described below before making any electrical connections.

1. Disconnect any previously wired power line from the unit.
2. Remove the screws on the front cover.
3. Install any required cable clamps on the appropriate conduit holes on the bottom of the enclosure.

Proceed to the next section to make the desired wiring connections.

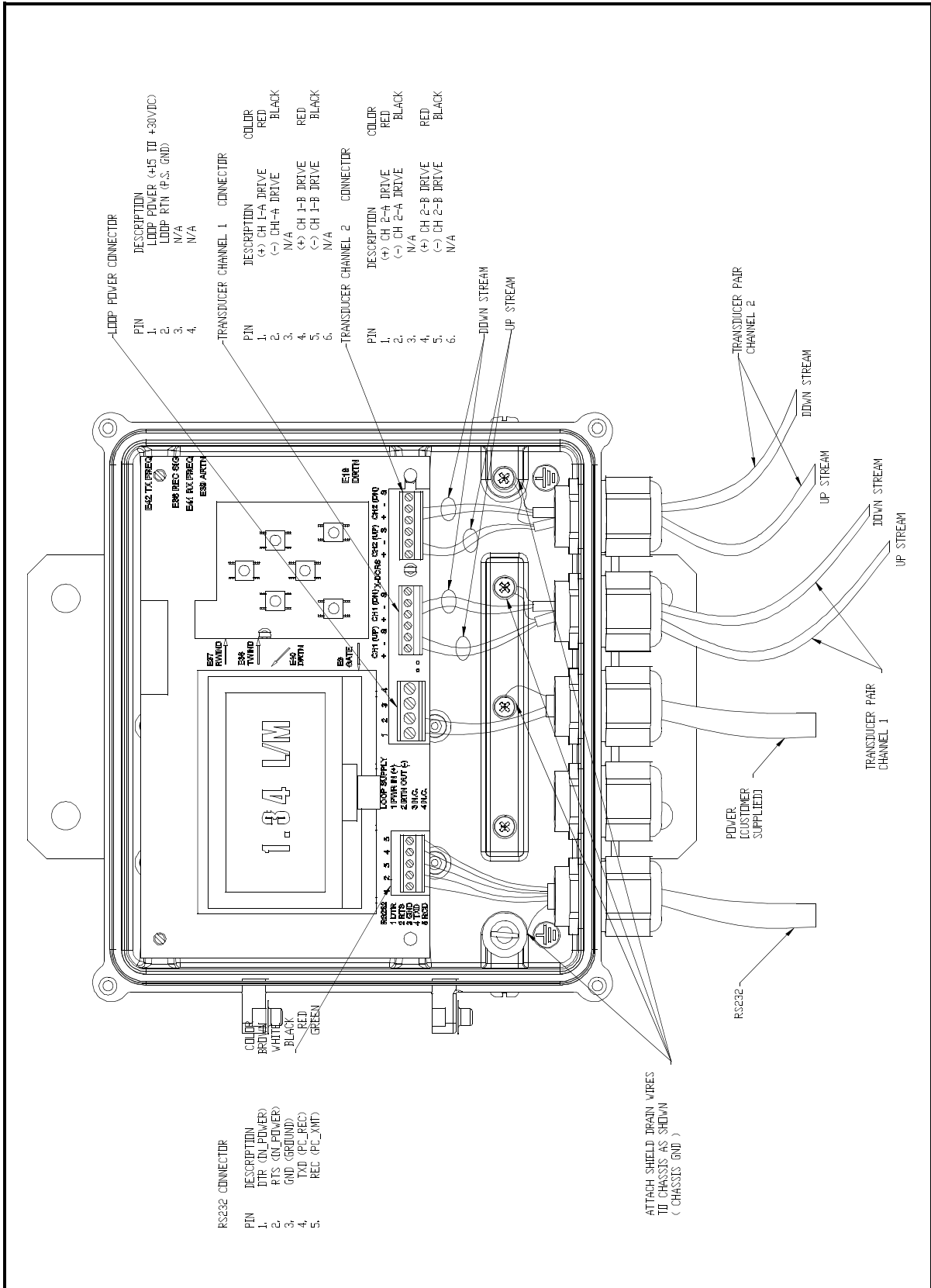


Figure 2: UTX878 Wiring Diagram (Dwg. #702-528_2)

Wiring the Line Power

The Model UTX878 operates on 15-30 VDC loop power. The label on the side of the electronics enclosure lists the meter's required line voltage and power rating. Be sure to connect the meter only to the specified line voltage and with a shielded cable.

Refer to *Figure 2* on the previous page to locate the power terminal block and connect the line power as follows:

1. Follow the instructions on page 6 to prepare the unit before you connect power.
2. Connect the UTX878 case to the earth ground with a grounding cable.
3. Strip 1/4-in. of insulation from the end of each of the two line power leads.
4. Route the shielded cable through the conduit hole and connect the power leads to the power terminal block as shown in *Figure 2*. Tie the shield drain wire to the ground bus bar inside the UTX878, but leave the shield wire open on the power supply end (to avoid AC ground loops and for CE certification).
5. Leaving a small amount of slack, secure the power line with the cable clamp.

Note: *If you are using a 4-20 mA loop current measuring resistor, add the resistor in series with the power supply Loop_Rtn end (TB3-2). You must configure the loop current measuring equipment as follows:*

- *The negative side (-) of the probe goes to the power supply side of the resistor.*
 - *The positive side (+) of the probe goes to the UTX878 side of the resistor.*
6. If you are installing the UTX878 for the first time, replace the front cover, tighten the screws, and see the next page to unlock and program the meter and determine the transducer spacing.

Unlocking and Locking the UTX878

To prevent unauthorized tampering with either the display or the user program, the UTX878 offers a pair of security codes. Once you have set the security level, an operator requires one of these codes to change either the display (Prog Lock) or the display and the user program (Full Lock).

Unlocking the UTX878

To unlock the display and/or the user program:

1. Press [ESC], [ENT], [ESC]. A Security Check window, similar to *Figure 3* below, opens.

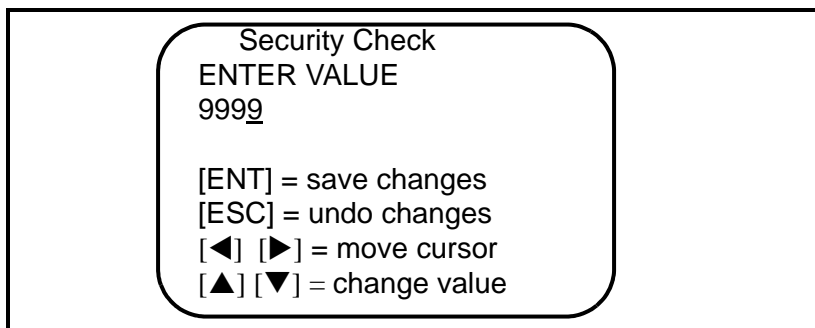


Figure 3: Security Check Window

2. Using the arrow keys, change the code number to the value desired for your security level.
 - For Prog Lock (granting access only to the display), the number is **2719**.
 - For Full Lock (granting access to the display and user program), the number is **7378**.
3. Press [ENT]. The display screen reappears, with the lock removed or partially unlocked. Security will remain at this level until you change the level in the user program, as described on the next page.

Locking the UTX878

You can access the security level in two ways.

From the display screen:

1. Press the [▶] key three times, until the lock in the upper right corner is highlighted.
2. Press [ENT], and proceed to step 4 below.

From the User Program:

1. Press [ESC]. The UTX878 stops displaying data and enters the User Program.
2. Press the [▶] key until *USER* is bracketed.
3. The menu highlights *Set Security*. Press [ENT].
4. The screen shows three options:
 - *Full Lock*, which prevents a user from changing any part of the display or user program without the appropriate code:
 - *Prog Lock*, which allows a user to change the display but not to enter the user program:
 - *Unlocked*, which allows access to both the display and the user program.

Scroll to the desired option and press [ENT] twice.

5. Press [ESC] to return to the User Program, or continue pressing [ESC] to return to the display screen. If you have chosen to fully lock the UTX878, the screen appears similar to *Figure 4* below, with a solid lock in the upper right corner. (For a meter with only the user program locked, the lock shows a keyhole in the center.)

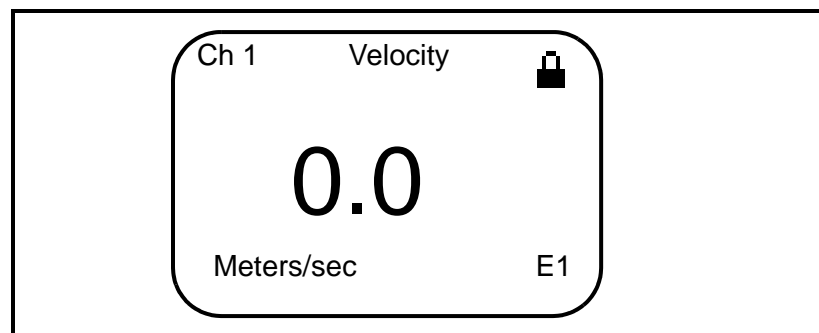


Figure 4: UTX878 Screen with Locked Program

Programming the UTX878

Before you install the transducers, you must program the UTX878 to determine appropriate transducer spacing. The meter requires data in five submenus: *Status*, *Transducer*, *Pipe*, *Fluid* and *Path*. (For information on the other submenus, refer to the *UTX878 User's Manual*.)

Activating a Channel/Path (Status)

In the *Status* submenu of the *PROG* menu, you can activate or deactivate a channel/path. While the channel/path should be activated when you receive your unit, you should verify that the channel/path is active before you begin programming.

To access the *Status* submenu:

1. Press [ESC]. The UTX878 enters the *User Program*.
2. Press the [▶] key until PROG is bracketed in the top left corner and press [ENT].
3. Use the [▲] and [▼] keys to scroll to the desired channel or to 2-path Averaging and press [ENT]. The screen appears similar to *Figure 5* below.

Note: For information on the 2-Path Avg option, see the User's Manual.

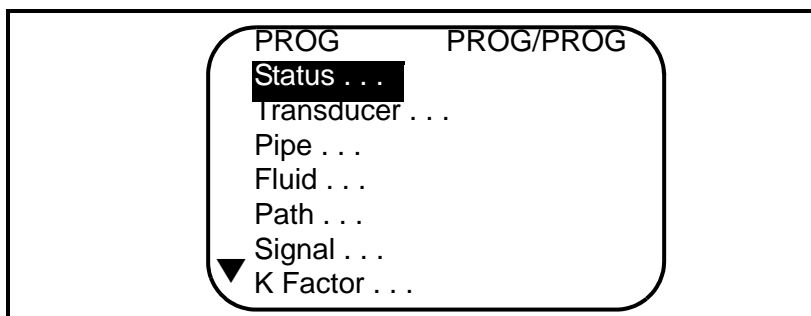


Figure 5: The PROG Menu

4. Press [ENT] to open the *Status* submenu.
5. The screen offers two options, ON and OFF. Use the [▲] and [▼] keys to scroll to the desired selection and press [ENT].

IMPORTANT: On any menu, if you scroll to a different option, press [ENT] twice to select that option (once to enter and again to confirm the selection).

6. Press [ESC] (or [ENT] twice if you have selected the other option) to return to the channel menu.

Entering Transducer Parameters

The *Transducer* submenu enables you to enter parameters for preprogrammed or special clamp-on transducers. Remember to record all programmed data in Appendix C, *Data Records*, of the *User's Manual*.

Note: *If you have programmed the Status submenu, proceed directly to Step 4.*

To access the *Transducer* submenu:

1. Press [ESC]. The UTX878 enters the User Program.
2. Press the [▶] key until PROG is bracketed in the top left corner and press [ENT].
3. Use the [▲] and [▼] keys to scroll to the desired *Channel* and press [ENT].
4. Scroll to the *Transducer* submenu and press [ENT].
5. Scroll to *Clamp-on* and press [ENT].
6. Scroll to either *Preprogrammed* (for the standard transducers) or *Other* (for special transducers), and press [ENT].
7. The program also asks for the Wedge Temperature. Scroll to the *Wedge TMP* option and press [ENT]. Then use the [▲] and [▼] keys to enter the temperature, and press [ENT].

Note: *The wedge temperature of the transducer can be approximated by inputting an average value for the surface temperature of the outside pipe wall.*

8. Do one of the following:
 - For preprogrammed transducers, scroll to the desired *Transducer Number* (either UTXDR-407 (2 MHz) or UTXDR-408 (4 MHz)) and press [ENT]. Then press [ESC] three times to return to the PROG menu.
 - For other transducers, refer to the *User's Manual*.

IMPORTANT: *Other (special) transducers have no engraved number on the housing and are rarely used. Examine the transducer housing carefully for a number.*

Entering Pipe Parameters

In the *Pipe* submenu, you can specify preprogrammed or special pipe parameters. Remember to record all programmed data in Appendix C, *Data Records*, of the *User's Manual*. In the PROG menu, scroll to the *Pipe* submenu and press [ENT].

Entering the Pipe Material

1. The menu offers two options, *Material* and *Lining*. Be sure the *Material* option is highlighted, and press [ENT].
2. Two other options now appear, *Preprogrammed* and *Other*. Scroll to the desired option, and press [ENT].
3. The menu now varies with your choice in Step 2.
 - For preprogrammed materials, a list of materials opens. Table 1 below covers the available preprogrammed materials on the list. Press the [▼] or [▲] keys to scroll to the appropriate material. Press [ENT] to confirm the choice.
 - For other materials, the meter asks for the material *Soundspeed*. Press [ENT] to open the window. Then use the arrow keys to enter the known soundspeed, and press [ENT].

Table 1: Preprogrammed Pipe Materials

Pipe Material Category	Specific Material
Al - Aluminum	Rolled or None
Brass	None
Cu - Copper	Annealed, Rolled or None
CuNi - Copper/Nickel	70% Cu 30% Ni or 90% Cu 10% Ni
Glass	Pyrex, Flint, or Crown
Gold	Hard-drawn
Inconel	None
Iron	Armco, Ductile, Cast, Electrolytic
Monel	None
Nickel	None
Plastic	Nylon, Polyethylene, Polypropylene, PVC (CPVC), or Acrylic
Steel	Carbon Steel, Mild or Stainless Steel
Tin	Rolled
Titanium	None
Tungsten	Annealed, Carbide, Drawn
Zinc	Rolled

Entering the Pipe Material
(cont.)

4. The next required parameter is either the outside diameter (*OD*) or the circumference ($OD \times \pi$). Scroll to the measured parameter and press [ENT]. For either measurement, enter the desired value and press [ENT].

Note: *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).*

5. The meter also requires the *Wall Thickness (WT)*. Scroll to the WT option, and press [ENT]. Use the arrow keys to enter the known thickness, and press [ENT].

Note: *To obtain an accurate pipe wall thickness measurement, use an ultrasonic thickness gauge.*

6. If you have selected certain materials (such as carbon or stainless steel, cast iron, PVC and CPVC), the UTX878 offers the option of entering the pipe dimensions by a standardized schedule. (This option does not appear unless you have selected one of these materials; if you have, proceed to step a below.) Once you enter the nominal pipe size and schedule number, the UTX878 determines the OD and wall thickness from an internal table.

- a. Scroll to the *Schedule* option, and press [ENT].
- b. A list of pipe sizes opens, from 15 to 200 mm (0.5 to 8 in.). Scroll to the desired pipe size, and press [ENT].
- c. A list of schedules opens. Scroll to the desired schedule, and press [ENT].

You have finished entering the pipe parameters. Press [ESC] until you return to the *Pipe Material/Lining* window.

Entering Pipe Lining Data To access the *Lining* option:

1. From the *Pipe* submenu, scroll to the *Lining* option, and press [ENT].
2. Two options appear, *Material* and *Thickness*. Be sure *Material* is highlighted, and press [ENT].
3. Two other options now appear, *Preprogrammed* and *Other*. Scroll to the desired option, and press [ENT].
4. The menu now varies with your choice in Step 3.
 - For preprogrammed linings, the screen shows a list of *Lining Materials*, listed in Table 2 below. Scroll to the appropriate material. If the pipe has no lining, select *None*. Press [ENT] to confirm the choice.
 - For other materials, the next screen asks for the lining *Soundspeed*. Press [ENT] to open the soundspeed window. Use the arrow keys to enter the known soundspeed, and press [ENT].

Table 2: Preprogrammed Lining Materials

Lining Material Options
None
Tar/Epoxy
Glass (Pyrex)
Asbestos Cement
Mortar
Rubber
Teflon

Note: *If your pipe lining is not on the drop-down list, consult GE Infrastructure Sensing, Inc. for further information.*

5. The meter also requires the *Lining Thickness*. Return to the Lining screen, scroll to the Thickness option, and press [ENT]. Use the arrow keys to enter the known thickness, and press [ENT].

Entering Fluid Data

The *Fluid* submenu allows you to specify the fluid you are measuring, as well as the Reynolds Correction factor and tracking windows. Remember to record all programmed data in Appendix C, *Data Records*, of the *User's Manual*. From the PROG menu, scroll to the *Fluid* submenu and press [ENT] twice.

Entering Fluid Type

1. Two options appear, *Fluid Type* and *Reynolds*. Scroll to *Fluid Type* and press [ENT].
2. Two other options appear, *Normal* and *Tracking*. Tracking refers to Tracking Windows, which are used to detect the receive signal when you are unsure of the fluid sound speed, or when the fluid sound speed changes drastically under process conditions. Scroll to the desired option and press [ENT].
3. You can now select between *Preprogrammed* and *Other* fluids. Scroll to the desired option, and press [ENT].
 - For *Normal* fluids, you can program the expected fluid *Temperature*. Scroll to the *Temperature* option and press [ENT]. Then use the arrow keys to enter the process temperature, and press [ENT].
 - For fluids monitored with a Tracking Window, the meter offers the selections of *Water* (up to either 100 or 260°C) or *Oil*. Scroll to the desired listing and press [ENT].
4. The menu now varies, depending on your selections in steps 2 and 3.
 - If you have selected *Preprogrammed* fluids, the UTX878 supplies a list of preprogrammed fluids. As shown in Table 3 on the next page, the list varies, depending on whether you have selected normal or tracking window fluid types. In either case, scroll to the desired fluid and press [ENT].
 - If you selected *Other*, the UTX878 asks for the fluid soundspeed (for *Normal* fluids) or minimum and maximum soundspeed (for *Tracking Window* fluids). In either case, scroll to the soundspeed option and press [ENT]. Use the arrow keys to enter the appropriate soundspeed, and press [ENT].
5. Press the [ESC] key until you return to the Fluid Type window.

Entering Fluid Data (cont.)

Table 3: Preprogrammed Fluid Types

Tracking Windows Off	Tracking Windows On
Water (0-260°C)	Water (0-100°C)
Sea Water	Water (0-260°C)
Oil (22°C)	Oil
Crude Oil	
Lube Oil (X200)	
Methanol (20°C)	
Ethanol	
LN2 (-199°C)	
Freon (R-12)	
Diesel	
Gasoline	

Entering Reynolds Correction Data

Reynolds Correction is a correction factor based on the *Kinematic Viscosity* and flow rate of the fluid. It is necessary, as the velocity of the fluid measured along a diametrical path must be related to the total area average velocity over the entire pipe cross-section. This factor should be ON in most applications, including all those that use clamp-on transducers. To access *Reynolds Correction* data:

1. From the *Fluid Type* window, scroll to *Reynolds* and press [ENT].
2. The screen shows three options: *Off*, *Single* and *Table*. Scroll to the desired option, and press [ENT].
3. The menu varies, depending on your selection in Step 2.
 - If you select *Off*, no further choices are available.
 - If you select *Single*, the UTX878 will select and automatically display the *Kinematic Viscosity*. To change the value, press [ENT]. Use the arrow keys to change the value (available in document #914-004, *Sound Speeds and Pipe Size Data*), and press [ENT].

Entering Reynolds
Correction Data (cont.)

- If you select *Table*, the screen displays three options: *Units*, *Rows Used* and *Edit Table*.
 - a. If you scroll to *Units* and press [ENT], the screen displays three more options: *Velocity*, *Soundspeed* and *Diagnostic*. If you select either *Velocity* or *Soundspeed* and press [ENT], the screen displays the measurement units (either metric or English). Press [ESC] or [ENT] to return to the previous screen. But if you scroll to *Diagnostic* and press [ENT], the meter asks for the type of signal to be used, *Signal Strength Up* or *Signal Strength Dn*. Scroll to the appropriate signal, and press [ENT].
 - b. If you select *Rows Used*, the program asks for the number of *rows* you wish to use. Enter the desired number (from 2 to 20) and press [ENT].
 - c. If you select *Edit Table*, the table opens with a series of *rows*. Scroll to the desired row, and press [ENT].
 - d. For each row, the screen displays the Reynolds Correction number (**X**) and the Kinematic Viscosity (**KV**). If you wish to change either value, scroll to the value and press [ENT]. Use the arrow keys to change the value (available in document #914-004, *Sound Speeds and Pipe Size Data*), and press [ENT].
 - e. Repeat steps c and d until you have programmed all of your available data (from 2 to 20 rows).

Press [ESC] until you return to the PROG menu, or continue pressing [ESC] until the display screen reappears.

Entering Path Data

In the *Path* submenu, you can specify and check the path taken by the transducer signal. Remember to record all programmed data in Appendix C, *Data Records*, of the *User's Manual*. From the PROG menu, scroll to the *Path* submenu and press [ENT].

1. The meter first asks for the number of *Traverses*, or times the signal crosses the pipe. Press [ENT], scroll to the number of traverses for your installation, and press [ENT] to confirm the entry.

Note: *The great majority of UTX878 applications call for two traverses. Figure 6 below illustrates signal paths for a typical two-traverse installation.*

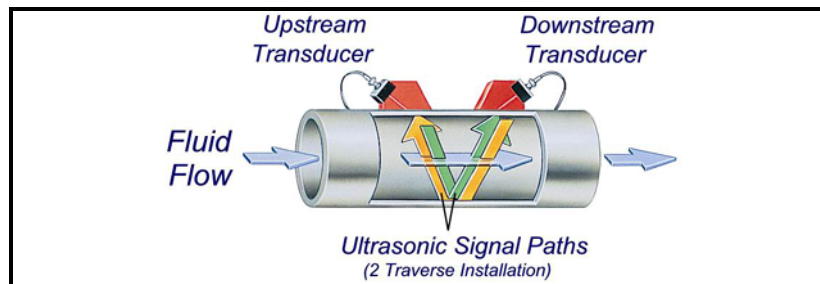


Figure 6: Signal Paths for a Two-Traverse Installation

2. The remaining prompt displays the *Transducer Spacing*, as calculated from the information entered. Use this number to set the spacing of the transducers (the minimum spacing is 0.9 in.). If necessary, you can overwrite the spacing to match the actual physical spacing of the transducers. Press [ENT] to open the Spacing window, and use the arrow keys to change the value. Then press [ENT] to confirm the value.

IMPORTANT: *It is recommended that you do not use a spacing other than the one calculated by the UTX878. However, if you do use a different spacing, do not change the spacing by more than $\pm 10\%$ from that calculated by the UTX878.*

Press [ESC] until you return to the PROG menu, or continue pressing [ESC] until the display screen reappears.

Installing the Transducers

The transducers that have been specially designed for use with the UTX878 are available in two models: 4 MHz for 1/2 to 2 in. pipes and 2 MHz for 2 to 8 in., and typically support 2-traverse applications. The preattached cables come in lengths from 6 to 100 ft. (*figure 7* below shows a typical UTX878 transducer).

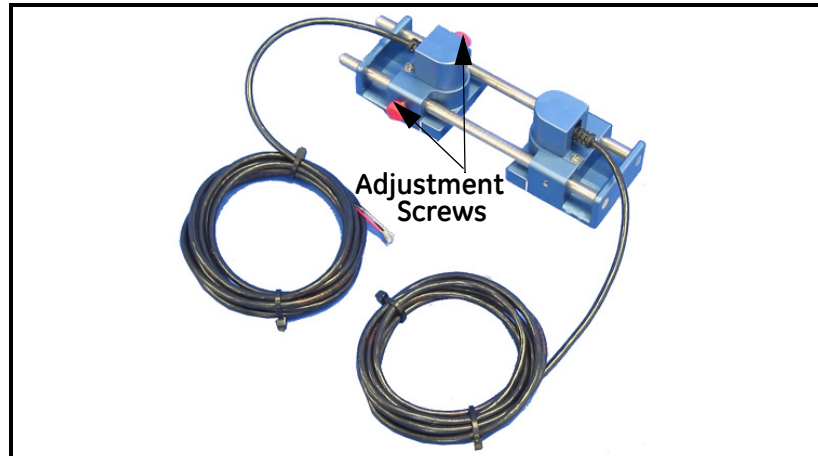


Figure 7: UTX878 Transducer/Cable Assembly

Setting Transducer Spacing

To set the desired transducer spacing:

1. Loosen the red screws on the adjustable transducer (shown in *Figure 7* above).
2. Slide the adjustable transducer on the rails until you have positioned it at the desired spacing. The physical spacing of the transducers must match the Transducer Spacing parameter calculated in the *Path* submenu (as discussed on the previous page). Use the ruler on the rails and the white tick mark on the transducer housing to assist in setting the correct spacing.
3. Tighten the red screws to secure the transducer to the rails.

Note: *If your application requires one or three traverses, you can remove the adjustable transducer from the rails and use it as a separate transducer at a 180° angle from the stationary transducer, as shown in Figure 8 below.*

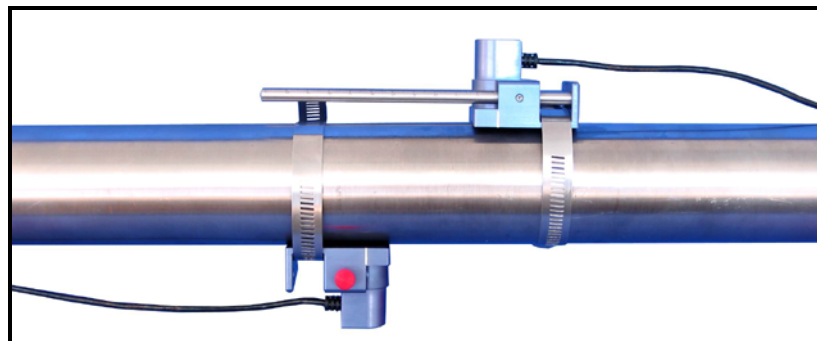


Figure 8: Positioning for 1- or 3- Traverse Applications

Installing the Transducers on the Pipe

Note: *Some pipe preparation may be required before securing the transducers to the pipe. Remove any paint or coating from the surface in contact with the transducers. A flat, smooth surface is ideal.*

1. Apply the supplied couplant to the transducer faces, as shown in *Figure 9* below.

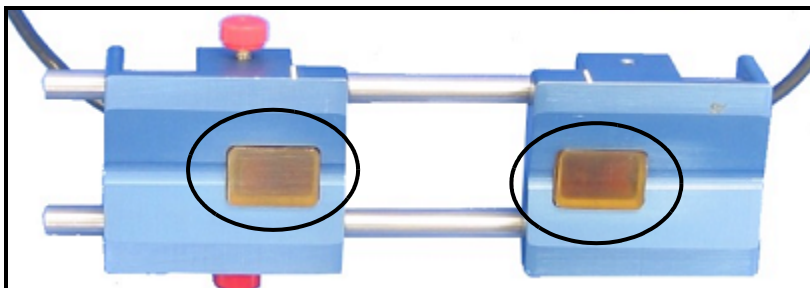


Figure 9: The Transducer Faces

2. Put the transducer fixture at the desired location on the pipe. Secure it with the supplied stainless steel clamps. *Figure 10* below illustrates a typical installation.

Note: *Installation on the sides (at 3 and 9 o'clock) of the pipe is ideal. The top of the pipe might contain bubbles, while the bottom might contain sediment.*

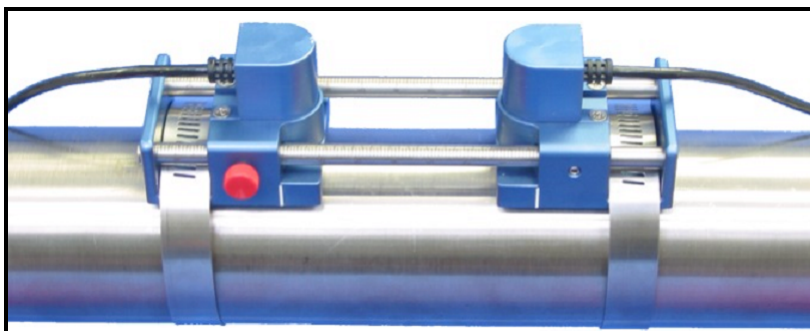


Figure 10: A Typical Transducer Installation

Once on the pipe, an internal spring mechanism ensures proper mechanical pressure by “pressing” the transducer face against the pipe surface. Refer to the next page to wire the transducer cables to the UTX878.

Wiring the Transducers

!WARNING!

Always disconnect the line power from the Model UTX878 before removing the front cover. Before connecting the transducers, discharge any static buildup by shorting the twisted pairs of the transducer cables to the metal shield on the cable connector.

1. Disconnect the line power and remove the screws from the front cover. Refer to the wiring diagram in *Figure 2* on page 5 and connect the transducer cables to the terminal block (**TB-1**) for Channel 1. Then, secure the cable clamp.

Note: *The RED cable leads are the SIG (+) leads and the BLACK cable leads are the RTN (-) leads. The shield cable leads are connected to the ground bus.*

!ATTENTION EUROPEAN CUSTOMERS!

To meet CE Mark requirements, all cables must be installed as described in Appendix B, *CE Mark Compliance*, of the *User's Manual*.

2. For a 2-path averaging UTX878, repeat step 1 to connect the CH2 transducers to the terminal block for Channel 2. It is not required that both channels/paths of a 2-Channel unit be connected.

Note: *The UTX878 uses two channels or paths to make more accurate flow measurement by averaging, subtracting or adding the channels/paths together. Disabling a channel will increase the meter response time.*

3. Connect the transducer shield wires to the UTX878 ground bus.
4. Do one of the following:
 - To wire the UTX878 RS232 serial port, refer to the *User's Manual*.
 - If you have completed installation, replace the front cover on the enclosure, tighten the screws and reconnect line power.

The UTX878 is now ready for operation.

Adjusting the 4-20 mA Loop

To ensure proper operation of the UTX878, you must enter the CONFIG menu and set the global parameters for your individual requirements. The available parameters include:

- Metric or English units
- 4-20 Loop Settings (low and high values)

To enter the CONFIG menu from the display screen, press [ESC] (to enter the *User Program*) and press the [▶] key once.

Entering Global Units

In the *Units* submenu, you can choose to display all measurements in either *metric* or *English* formats.

Note: *You cannot choose to display some measurements in English formats and others in metric.*

To access the *Units* submenu:

1. Press [ESC]. The UTX878 enters the *User Program*.
2. Press the [▶] key until CONFIG is bracketed and press [ENT].
3. Press [ENT] to enter the *Units* submenu.
4. Use the [▲] and [▼] keys to scroll to the desired selection (metric or English) and press [ENT]. The UTX878 returns to the CONFIG menu.

IMPORTANT: *In any menu, if you scroll to a different option, press [ENT] twice to select that option (once to enter and again to confirm the selection).*

Entering Base (Zero) and Span Output Values

The *4-20 Loop* submenu enables you to enter the information needed to set up output parameters: unit type, base (zero) and span values, and error handling. To enter data in the *4-20 Loop* submenu:

1. Press [ESC]. The UTX878 enters the *User Program*.
2. Press the [▶] key until CONFIG is bracketed and press [ENT].
3. Press [▼] to reach the *4-20 Loop* submenu, and press [ENT].

Entering Output Type and Units

1. In the *Loop* submenu, press [ENT] to enter the *Units* option.
2. The menu displays five options: Channel 1, Channel 2, AVG, SUM and DIFF. Use the [▲] and [▼] keys to scroll to the desired option, and press [ENT].

Note: Channel 2, AVG, SUM and DIFF are only available for a 2-Channel UTX878.

3. The screen now displays three measurement parameters: *velocity*, *volumetric*, and *soundspeed*. Scroll to the desired selection and press [ENT].
4. The menu now asks for the unit type.
 - For *velocity* or *soundspeed* measurements, the menu offers a single selection (either feet/sec or meters/sec, depending on your choice of units). Press [ENT] to confirm the entry and return to the previous menu.
 - For *volumetric* measurements, the menu offers a list of output units (either metric or English). Scroll to the desired units and press [ENT].

Press [ESC] until you return to the CONFIG menu.

Entering Base and Span Values

1. In the *Loop* option, press [▼] and [ENT] to enter the *Base* option.
2. The *Base* window opens. Use the arrow keys to enter the desired base (4 mA) value for the analog output, and press [ENT].
3. The UTX878 returns to the *Loop* menu. Press [▼] and [ENT] to enter the *Span* option.
4. The *Span* window opens. Use the arrow keys to enter the desired span (20 mA) value for the analog output, and press [ENT].

Trimming 4-20 mA Values via the Keypad

1. In the *User Program*, press the [▶] key until *CAL* is bracketed, with *4-20 Loop* highlighted. Press [ENT].
2. Scroll to *Mode* and press [ENT]. In the *Mode* window, scroll to *Test[Trim]* and press [ENT].
3. Return to the *Loop* window, and scroll to *Percent*.
4. In the *Percent* window, use the arrow keys to set the percentage to 100%. Press [ENT]. Record the value shown on the ammeter.
5. Now use the arrow keys to set the percentage to 0%. Press [ENT]. Record the value shown on the ammeter.
6. Return to the *Loop* window, and scroll to *Base Trim*. Press [ENT].
7. Use the arrow keys to enter the base trim value, the value recorded in step 5. (The loop current should now be the same as the ammeter reading). It should read 4.0 +/-0.01 mA.) Press [ENT].
8. Repeat steps 3 and 4.
9. Return to the *Loop* window, and scroll to *Span Trim*. Press [ENT].
10. Use the arrow keys to enter the span trim value, the value recorded in step 4. (The loop current should now be the same as the ammeter reading. It should read 20.0 +/-0.01 mA.) Press [ENT].
11. Return to the *Loop* window, and scroll to *Mode*. Press [ENT]. Scroll to *Normal*, and press [ENT].

We,

**Panometrics Limited
Shannon Industrial Estate
Shannon, County Clare
Ireland**

declare under our sole responsibility that the

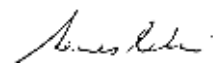
**UTX878 Ultrasonic Flowmeter
including UTXDR-407 & UTXDR-408 Flow Transducers**

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

- EN 61326:1998, Class A, Annex A, Continuous Unmonitored Operation

following the provisions of the 89/336/EEC EMC Directive.

Shannon - April 9, 2004



Mr. James Gibson
GENERAL MANAGER



CERT-DOC-H0



August 2004



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