

SIEMENS

SITRANS F

Flowmeters SITRANS FUG1010 IP65 NEMA 7 Quick Start

Operating Instructions (Compact)

<u>Introduction</u>	1
<u>Installation</u>	2
<u>Commissioning</u>	3
<u>Troubleshooting/FAQs</u>	4
<u>Appendix A</u>	A

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

CAUTION

with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE

indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Proper use of Siemens products

Note the following:

WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be adhered to. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of the Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Table of contents

1	Introduction.....	5
1.1	Items supplied.....	5
1.2	Safety Notes.....	5
2	Installation	13
2.1	Application Guidelines	13
2.2	Mounting the Flowmeter	13
3	Commissioning	17
3.1	Connecting Power.....	17
3.2	Flowmeter connection using RS-232.....	19
3.3	Navigating the Menu	21
3.4	Setting the Parameters	23
3.5	Transducer Installation.....	27
3.5.1	General Information	27
3.5.2	Final Setup.....	33
4	Troubleshooting/FAQs.....	35
4.1	Troubleshooting	35
4.2	Alarm Letter Codes and Descriptions.....	37
A	Appendix A.....	39
A.1	I/O Connections and Wiring.....	39
A.2	Technical Data	43

Tables

Table 3- 1	Color Codes	18
Table 3- 2	Magnetic Sensor Function Chart	22
Table 3- 3	Common Gases for Clamp-On Measurement (at 200 PSIA & 60°F / 14 bar & 15.5°C).....	25
Table 3- 4	Pipe Configuration Option List Definitions	26
Table 3- 5	Transducer Selection Chart	27
Table 3- 6	CC129 Damping Material Thickness for Clamp-On Gas systems.....	29
Table 4- 1	Troubleshooting Tips	35
Table A- 1	Part Numbers and Connection Diagrams	39
Table A- 2	FUG1010 Input/Output Wiring (TB1)	39
Table A- 3	FUG1010 Input/Output Wiring (TB2)	41
Table A- 4	Part Numbers and Connection Diagrams	42

Table A- 5	FUG1010DX Input/Output Wiring (TB1)	42
Table A- 6	FUG1010DX Input/Output Wiring (TB2)	43

Figures

Figure 2-1	Pipe Mounting 1010 and Mounting Bracket Locations	14
Figure 3-1	Input Power Connector (P8) Wiring	18
Figure 3-2	Serial Port Program Menu Screen	19
Figure 3-3	RS-232 Interface Cable Wiring	20
Figure 3-4	Magnetic Wand and LCD Display	22
Figure 3-5	Reflect Mount with Mounting Frame and Spacer Bar	30
Figure 3-6	Transducer	31
Figure 3-7	Transducer Installation.....	31
Figure 3-8	Connecting Transducers to Flowmeter	32

Introduction

This Quick Start Guide is for the Siemens SITRANS FUG1010 Compact IP65 (NEMA 7) Dual Channel flowmeters. It illustrates a typical setup using D-Series transducers in the Reflect mode (for Direct Mode see flowmeter manual). These procedures can also be applied to other single and multi-channel models as well.

1.1 Items supplied

- SITRANS F Flowmeter
- SITRANS F literature CD
- Quick Start Guide
- For additional items refer to your packing slip.

1.2 Safety Notes

Quick Start Safety Information for Hazardous Areas

**! DANGER**

Explosion Hazard. Will Cause Death, Serious Injury or Property Damage.

Restrict use and repair to qualified personnel.

! DANGER

Death or severe personal injury and/or equipment and property damage will result if proper Hazardous (Classified) Locations installation precautions are not taken.

! DANGER

The use of unauthorized parts in the repair of the equipment, tampering by unqualified personnel, or operation with the cover open in a Hazardous (Classified) Location will result in dangerous conditions which will cause death, serious injury, and/or equipment and property damage.

Follow all safety instructions contained or referenced herein.

⚠ DANGER

Explosion hazard

Death or severe personal injury and/or equipment and property damage will result due to improper installation or use of this equipment when located in a Hazardous (Classified) Location.

- Install as directed.
- Disconnect power source before servicing.
- Keep cover closed when equipment is operating.

⚠ WARNING

Qualified personnel

This flow meter system may only be set up and used in conjunction with this Quick Start and the instructions on the electronic media provided. Installation, maintenance and operation of the flow meter system may only be performed by qualified personnel. Within the context of this Quick Start, qualified persons are defined as persons who have the skills and knowledge related to the construction and operation of the electrical equipment and installations and have received safety training to recognize and avoid the potentially explosive hazards involved.

Qualified personnel possesses the following qualifications

1. Is trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety practices.
2. Is trained in the proper care and use of protective equipment such as rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc., in accordance with established safety practices.
3. Is trained in rendering first aid

Note

This Quick Start does not purport to cover all details or variations in equipment, or to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise, which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local Siemens sales office (www.siemens.com). The contents of this Quick Start shall not become part of or modify any prior or existing agreement, commitment or relationship. The sales contract contains the entire obligation of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements contained herein do not create new warranties or modify the existing warranty.

Quick Start Safety Information for Hazardous Areas

Note

Ratings under this heading apply to specific model families

Check Your Model Number:

FUE1010 7ME3500, FUG1010, 7ME3610, FUH1010 7ME3600 and FUS1010 7ME3530 only;

FM-CSA installation

Read, understand and follow all safety instructions on the electronic media provided. This equipment is rated for use in hazardous (classified) locations as stated below and must be installed according to the 1010-304 installation drawing provided on the media. Failure to install the equipment in the prescribed manner will result in unsafe operation. Follow all local jurisdictional safety codes when operating this equipment. When properly installed the equipment meets the following FM – CSA ratings.

Flow Meter

- Intrinsically safe connections Class I and II, Division 1, Groups A, B, C, D, E, F and G;
- Nonincendive for Class I, Division 2, Groups A, B, C and D;
- Suitable for Class II Division 2 Groups F and G outdoor (Type 4X)
- Temperature code T5 at an ambient of 40°C



Transducers

- Intrinsically safe Class I and II, Division 1, Groups A, B, C, D, E, F and G;
- Nonincendive for Class I, Division 2, Groups A, B, C and D;
- Suitable for Class II Division 2 Groups F and G outdoor (Type 4X)
- Temperature code T6 at an ambient of 40°C


ATEX installation

Read, understand and follow all safety instruction on the electronic media provided. This equipment complies with Directive 94/9/EC and is rated for use in potentially explosive atmospheres. The equipment markings are shown and explained below. Equipment must be installed according to the 1010-389 installation drawing provided on the media. Failure to install the equipment in the prescribed manner will result in unsafe operation. Follow all regional safety laws when operating this equipment. When properly installed the equipment meets the following ATEX ratings as stated in EC-Type Examination Certificate KEMA03ATEX1134

Flow Meter Markings and Explanations

-  II (1) G [EEx ia] IIC – Flow meter located in the non-hazardous area with intrinsically safe circuits of category Ex ia, which can be connected to Category 1 transducers
-  II 3 (1) G EEx nC [ia] IIC T5 – Category 3 Flow meter located in Zone 2 hazardous area with intrinsically safe circuits of category Ex ia, which can be connected to Category 1 transducers in Zone 0
- IP65 – Ingress protection against solid bodies, rating of dust-tight and against liquid, rating of water jets

Transducers Markings and Explanations

-  II 1 G EEx ia IIC T5 – Category 1 Transducers located in Zone 1 hazardous area with intrinsically safe circuits of category Ex ia for use in potentially explosive atmosphere containing gases
- IP65 – Ingress protection against solid bodies, rating of dust-tight and against liquid, rating of water jets

Quick Start Safety Information for Hazardous Areas

Note

Ratings under this heading apply to specific model families

Check Your Model Number:

FUS1010 7ME3532, 7ME3533, FUH1010 7ME3602, 7ME3603, FUG1010, 7ME3612 and 7ME3613 only;

FM-CSA installation

Read, understand and follow all safety instruction on the electronic media provided. This equipment is rated for use in hazardous (classified) locations as stated below and must be installed according to the 1010-443 installation drawing provided on the media. Failure to install the equipment in the prescribed manner will result in unsafe operation. Follow all local jurisdictional safety codes when operating this equipment. When properly installed the equipment meets the following FM – CSA ratings:

Flow Meter

- Explosionproof for Class I, Division1, Groups B, C, D;
- Dust-ignitionproof for Class II, Division 1, Groups E, F and G
- Intrinsically safe connections for Class I and II, Division 1, Groups A, B, C, D, E, F and G;
- Nonincendive for Class I, Division 2, Groups A, B, C and D;
- Suitable for Class II Division 2 Groups F and G outdoor (Type 4X)





Transducers

- Intrinsically safe connections Class I and II, Division 1, Groups A, B, C, D, E, F and G;
- Nonincendive for Class I, Division 2, Groups A, B, C and D;
- Suitable for Class II Division 2 Groups F and G outdoor (Type 4X)
- Temperature code T6 at an ambient of 40°C


ATEX installation

Read, understand and follow all safety instruction on the electronic media provided. This equipment is rated for use in explosive atmospheres as stated below and must be installed according to the 1010-464 installation drawing provided on the media. Failure to install the equipment in the prescribed manner will result in unsafe operation. Follow all regional safety laws when operating this equipment. When properly installed the equipment meets the following ATEX ratings as stated in EC-Type Examination Certificate KEMA03ATEX1134

Flow Meter Markings and Explanations

-  II (1) G [EEx ia] IIC – Flow meter located in the non-hazardous area with intrinsically safe circuits of category Ex ia, which can be connected to Category 1 transducers for use in potentially explosive atmosphere containing gases
-  II 3 (1) G EEx nC [ia] IIC T5 (Tamb = 0° TO + 60°C) – Category 3 Flow meter located in Zone 2 hazardous area with intrinsically safe circuits of category Ex ia, which can be connected to Category 1 transducers in Zone 0 for use in potentially explosive atmosphere containing gases
-  II 2 (1) G EEx d [ia IIC] IIB T5 (Tamb = 0° TO + 50°C) – Category 2 Flow meter located in Zone 1 hazardous area with intrinsically safe circuits of category Ex ia, which can be connected to Category 1 transducers for use in potentially explosive atmosphere containing gases (Model families FUG1010 7ME3612 and 7ME3613 only)
-  II 2 (1) G EEx d [ia IIC] IIB+H2 T5 (Tamb = 0° TO + 50°C) – Category 2 Flow meter located in Zone 1 hazardous area with intrinsically safe circuits of category Ex ia, which can be connected to Category 1 transducers for use in potentially explosive atmosphere containing gases
- IP66 – Ingress protection against solid bodies, rating of dust-tight and against liquid, rating of heavy seas

Transducers Markings and Explanations

-  II 1 G EEx ia IIC T5 – Category 1 Transducers located in Zone 1 hazardous area with intrinsically safe circuits of category Ex ia for use in potentially explosive atmosphere containing gases
- IP65 – Ingress protection against solid bodies, rating of dust-tight and against liquid, rating of water jets

Quick Start Safety Information for Hazardous Areas

Note

Ratings under this heading apply to specific model families

Check Your Model Number:

FUS1010 7ME3531, FUH1010, 7ME3601, FUG1010 7ME3611 only;

FM-CSA installation

Read, understand and follow all safety instruction on the electronic media provided. This equipment is rated for use in hazardous (classified) locations as stated below and must be installed according to the 1010-341 installation drawing provided on the media. Failure to install the equipment in the prescribed manner will result in unsafe operation. Follow all local jurisdictional safety codes when operating this equipment. When properly installed the equipment meets the following FM–CSA ratings:

Flow Meter

- Explosionproof for Class I, Division1, Groups B, C, D;
- Dust-ignitionproof for Class II, Division 1, Groups E, F and G
- Intrinsically safe connections for Class I and II, Division 1, Groups A, B, C, D, E, F and G;
- Nonincendive for Class I, Division 2, Groups A, B, C and D;
- Suitable for Class II Division 2 Groups F and G outdoor (Type 4X)


Transducers

- Intrinsically safe Class I and II, Division 1, Groups A, B, C, D, E, F and G;
- Nonincendive for Class I, Division 2, Groups A, B, C and D;
- Suitable for Class II Division 2 Groups F and G outdoor (Type 4X)
- Temperature code T6 at an ambient of 40°C


ATEX installation

Read, understand and follow all safety instruction on the electronic media provided. This equipment is rated for use in explosive atmospheres as stated below and must be installed according to the 1010-422 installation drawing provided on the media. Failure to install the equipment in the prescribed manner will result in unsafe operation. Follow all regional safety laws when operating this equipment. When properly installed the equipment meets the following ATEX ratings as stated in EC-Type Examination Certificate KEMA03ATEX2133

Flow Meter

-  II 2 (1) G EEx d [ia] IIB+H2 – Category 2 Flow meter located in Zone 1 hazardous area with intrinsically safe circuits of category Ex ia, which can be connected to Category 1 transducers for use in potentially explosive atmosphere containing gases
- IP65 – Ingress protection against solid bodies, rating of dust-tight and against liquid, rating of water jets

Transducers

-  II 1 G EEx ia IIC T5 – Category 1 Transducers located in Zone 1 hazardous area with intrinsically safe circuits of category Ex ia for use in potentially explosive atmosphere containing gases
- IP65 – Ingress protection against solid bodies, rating of dust-tight and against liquid, rating of water jets

Installation

2.1 Application Guidelines

Basic Requirements

- Determine pipe material and dimensions.
- Avoid vertical pipes flowing in a downward direction.
- Avoid installation of transducers on the top and bottom of horizontal pipes, if possible.
- Select a location with the longest straight run of pipe.
- Identify upstream piping configuration (elbow, reducer, etc.).
- Pipe surface should be smooth and, if necessary, free of paint.
- Avoid pressure reduction components upstream.
- Avoid mounting on or near weld seams.

Additional Requirements for Liquid Applications

- Pipe must be full during set-up.

Additional Requirements for Gas Applications

- Pipe must be fully pressurized during set-up.

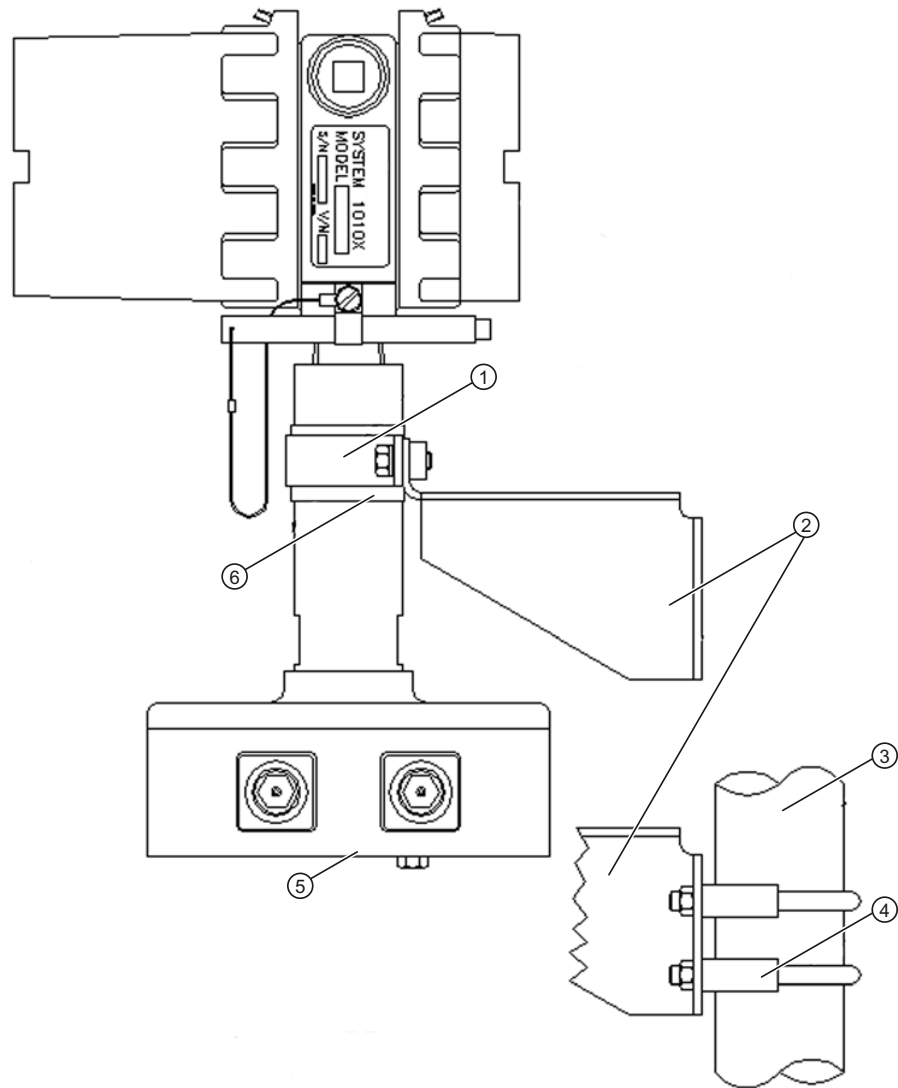
2.2 Mounting the Flowmeter

Wall Mounting

The flowmeter can be mounted on any wall surface including wood, metal or concrete. Use the appropriate bolts and screws as needed for your mounting application. (See figure below for mounting bracket locations.)

Pipe Mounting

For installation on pipe use Pipe Mount Kit CQO:1012XMB-1 (optional - see catalog) See figure below.



- | | |
|---|--|
| ① Clamp | ④ U-Bolt Assembly for standard 2-inch (2.38in/6.0452cm) pipe. (Hardware supplied.) |
| ② Mounting Bracket (Hardware not supplied for wall mounting.) | ⑤ Transducer Cable Entry Ports |
| ③ Pipe | ⑥ Position Plastic Strip Under Clamp |

Figure 2-1 Pipe Mounting 1010 and Mounting Bracket Locations

Note

Use conduit fittings or cable glands on all cables.

Note

Install weather tight seals at all unused holes using proper cable conduit and close additional holes to IP65 standards.

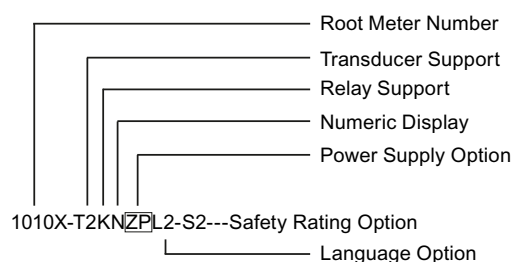
Commissioning

3.1 Connecting Power

⚠ DANGER

Turn off main power before installing AC connections to the flowmeter. Contact with exposed wiring may lead to fire, electric shock, or serious personal injury.

1. Using a 1/16" Hex key, loosen the flowmeter Rear Housing Cover locking setscrew.
2. Unscrew the Rear Housing Cover and remove.
3. Locate power supply connector J8. Use the tables below and the part number of your unit to determine the correct input power source. (See ID label on right side of housing.)



Power Supply Option Code	Power Supply P/N	User Supplied Power
S	1010X-6SS2	90-250 VAC Single Phase
ZN	1010X-6ZNS2	9-36 VDC Negative Ground
ZP	1010X-6ZPS2	9-36 VDC Positive Ground

Note

Power Supply Module P/N label is located inside the front housing cover.

4. Pull the desired length of input power wires through flowmeter case conduit cable hole and into flow meter case before wiring connector.
5. Wire input power connector P8 for AC or DC power depending on power supply provided as shown below. Insert wires into wire entry holes and secure by tightening wire clamp screws (see figure below).

Note

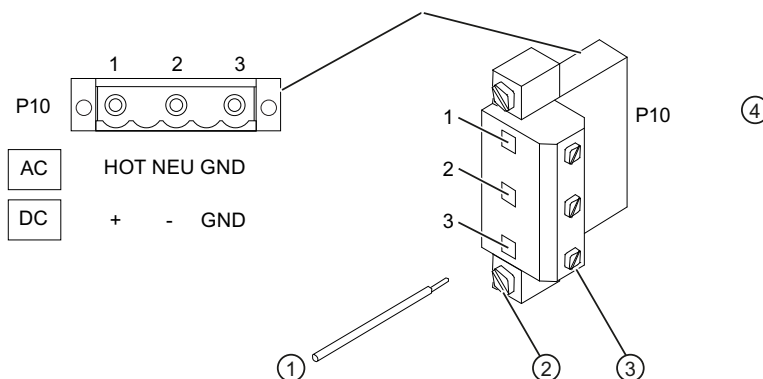
Power Supply connector wires should be stripped AWG 12-18 stranded wire or solid conductors.

Terminal Number	1010X-6SS2	1010X-6ZNS2	1010X-6ZPS2
1	Hot	Positive	Positive
2	Neutral	Negative (Gnd)	Negative (Gnd)
3	Ground	Ground	Ground

6. Plug input power connector P8 into connector J8 and secure using two captive connector mounting screws as indicated below.
7. Secure power input cable with cable clamp to prevent wire breakage.
8. Replace Rear Housing Cover and tighten setscrew.
9. Connect the power cables to the appropriate power source previously selected from the tables above and power up unit (100-250 VAC @ 50/60 Hz or 9-36 VDC).

Note

Loosen Wire Clamp Screw, insert stripped end of wire and then retighten.



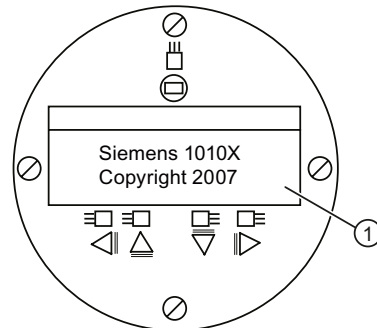
- ① Wire Clamp Screws
- ② Connector Mounting Screws
- ③ Stripped Wire

Figure 3-1 Input Power Connector (P8) Wiring

Table 3- 1 Color Codes

	HOT	NEU	GND
USA	BK	WH	GRN
EU	BR	BL	Y/GRN

10. Within 10 seconds of power-up the main display will become active and an LCD display screen for use with the Magnetic Wand will appear as shown below.



① LCD panel display showing initial screen with copyright notice.

3.2 Flowmeter connection using RS-232

RS-232 Connection

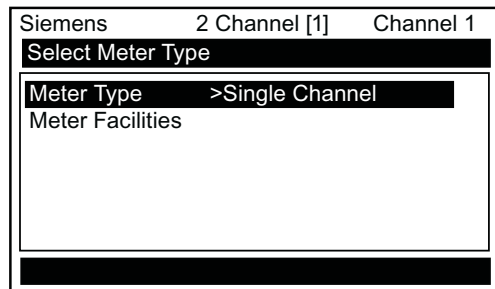


Figure 3-2 Serial Port Program Menu Screen

Flowmeter Communications and Programming via the RS-232 Interface (optional)

Note

Refer to the flowmeter manual for programming the meter using the RS-232 Interface or see Quick Terminal Mode Setup procedure below.

To use the RS-232 Interface to program the flowmeter instead of using the main unit display you must be familiar with the basics of the Windows 95/98/NT/2000/XP HyperTerminal communications program. Most PC computers provide at least one serial port using either a 9-pin or 25-pin D-type connector. The port designation can be either COM 1 or COM 2. Usually, when a computer includes two serial ports, COM 1 will be the 9-pin connector and COM 2 will be the 25-pin connector; however, port designations can vary. **(See Quick Terminal Mode Setup procedure.)**

1. Referring to the schematic below, wire the RS-232 Interface cable.

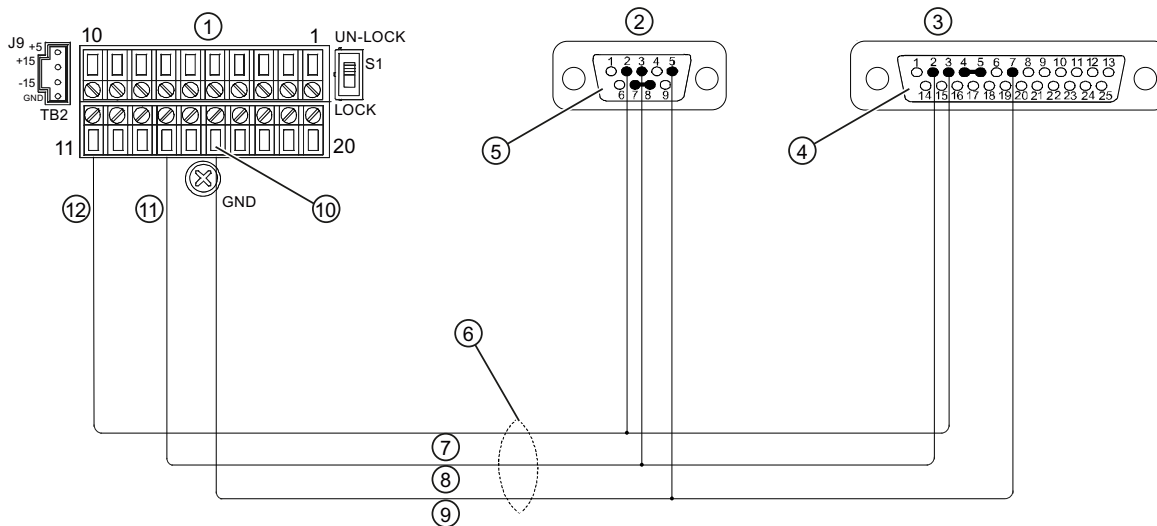
Note

Many newer Laptop PCs are not equipped with serial ports, having USB ports only. These PCs will require a USB RS-232 adapter that can be purchased commercially. Not all of these adapters are suitable. *Siemens has found the best performance is achieved with the adapter from Radio Shack (part#26-183).*

2. Connect the cable between the flowmeter and the PC using either the 9-pin, 25-pin or USB-to-RS-232 cable connector, depending upon the port's architecture.
3. Refer to the flowmeter manual for details for accessing the Installation Menu.

RS-232 Interface Cable - RS-232 Connectors (use 9-pin or 25-pin)

The figure below is the schematic of the serial interface cable (MLFB P/N 7ME3960-0CS00) needed to make the physical connection between the flowmeter and your PC. The wire ends for the flowmeter terminations are stripped for easy insertion into TB2. Note that both connectors have their CTS pin shorted to the RTS pin (pins 4-5 on 25-pin connector and pins 7-8 on 9-pin connector).



- | | | | |
|---|-------------------------|---|-------------------|
| ① | TB1 | ⑦ | Red Wire |
| ② | 9-PIN SOLDER SIDE | ⑧ | White Wire |
| ③ | 25-PIN SOLDER SIDE | ⑨ | Black Wire |
| ④ | 25-Pin Serial Connector | ⑩ | TB2 of FUS1010 |
| ⑤ | 9-Pin Serial Connector | ⑪ | RX To Flowmeter |
| ⑥ | CABLE PIN 1015CPC-N | ⑫ | TX From Flowmeter |

Figure 3-3 RS-232 Interface Cable Wiring

Quick Terminal Mode Setup

1. Access [HyperTerminal], then select [HyperTerminal.exe].
 2. In [Connection Description] dialog box, enter a connection name (e.g. FUS1010). Click [OK].
 3. In [Phone Number] dialog box, select [Direct to COM 1 (or COM 2)]. Click [OK] to select.
 4. In [Properties] dialog box, enter RS-232 parameters. Click [OK].
 5. At terminal screen, click [File]. Select [Properties].
 6. Select [Settings] tab. At [Emulation] box, select [VT-100].
 7. Select [ASCII Setup]. In [ASCII Sending] uncheck boxes. In [ASCII Receiving] check [Append line feeds to incoming line ends.]. Click [OK].
 8. At Terminal screen, type: Menu. Press <ENTER> to access Installation Menu.
- Hint: Type: Menu 1000 for longer connection time.

3.3 Navigating the Menu

Installation Menu Navigation

The Installation Menu Chart is a multi-level structure divided into three columns from left to right		
Level A - lists the major menu categories.		
Level B - list the menu cells associated with Level A. You can enter data into Level B menu cells		
Level C - lists the Level B data		
Level A	Level B	Level C
	Recall Site Setup	Pump 1 Pump 2
	Channel Enable	
	Create/name Site	
	Site Security	
	Delete Site Setup	
	Save/Rename Site	

Magnetic Wand and LCD Display Panel

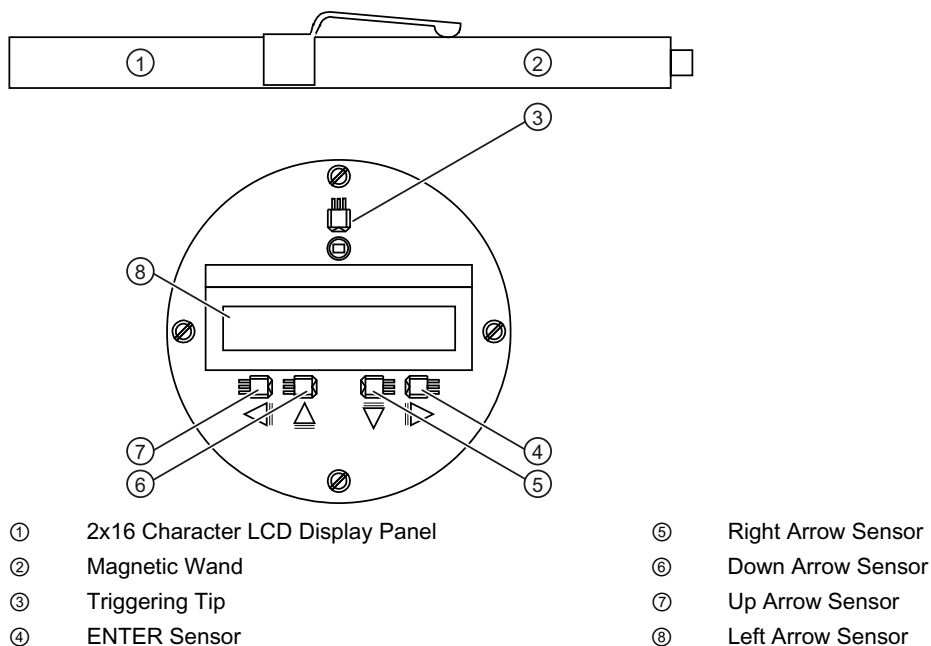
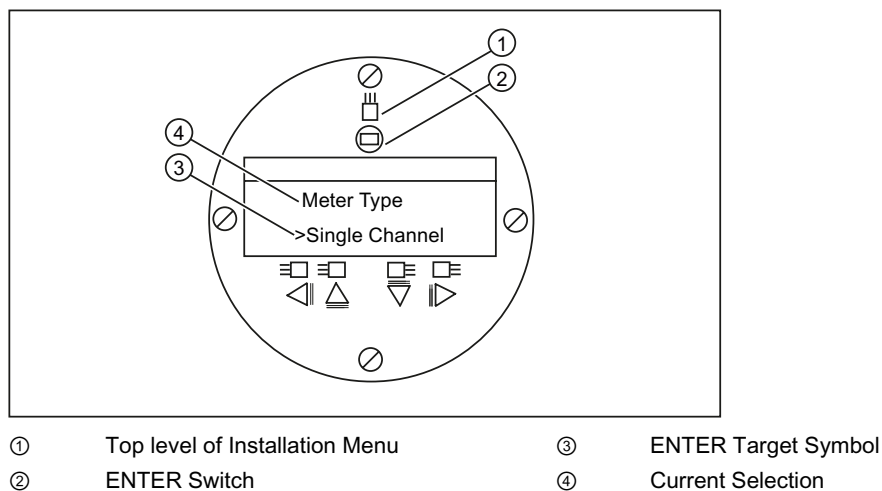


Figure 3-4 Magnetic Wand and LCD Display

Table 3- 2 Magnetic Sensor Function Chart

Sensor	Description
ENTER	Store numeric data, select from option lists, etc.
*Left / Right Arrows	Menu navigation keys move cursor.
Up / Down Arrows	Same as <Left> and <Right> arrows. Scrolls option lists and graphic display screen.

Typical Installation Menu Screen Example



3.4 Setting the Parameters

Flowmeter Programming

Note

Before creating a site select English or metric units from the Meter Facilities menu.

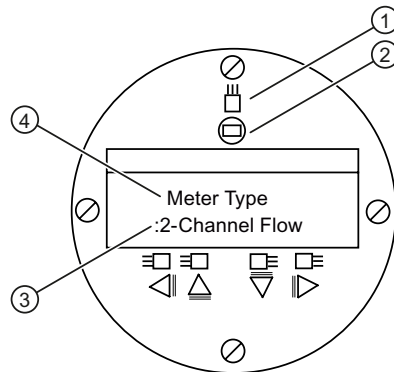
Select Meter Type

1. After power-up, use the Magnetic Wand to trigger the <ENTER> sensor and access the top level of the Installation Menu.
2. **Trigger the Right Arrow> sensor.**
3. Trigger <Up/Down Arrows> to select [2 Channel Flow]

Note

Select [2 Channel Flow] if measuring two different pipes and [Dual Path Flow] if sensors are mounted on the same pipe.

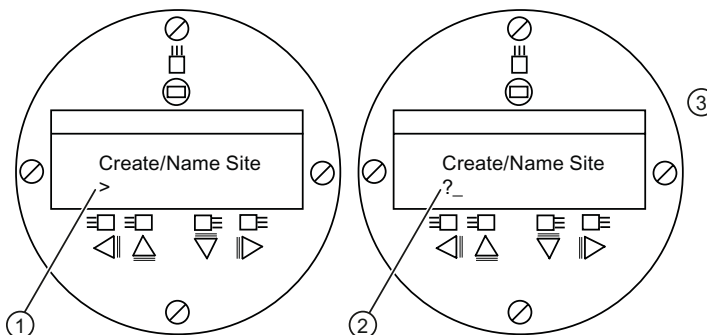
4. Trigger <ENTER> sensor to select meter type: [Channel 1 Clamp-on] appears.
5. To select [Channel 1 Clamp-on] mode, trigger <Right Arrow> sensor.
6. Trigger <ENTER> sensor to select mode. [Channel Setup] menu will appear.



Create a Site

1. Trigger <Right Arrow> and then <Up/Down Arrows> to select [Create/Name Site].
2. **Trigger <Right Arrow> again to select the "?" symbol (see figure below right).**
3. To create site name use the <Up/Down> and <Right Arrow> to select a name.

4. Trigger <ENTER> sensor to save the Site name.



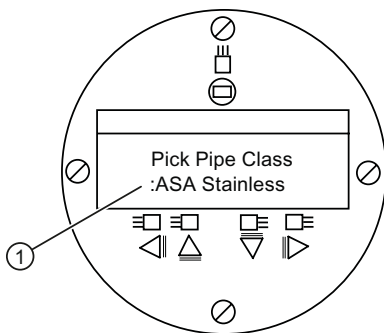
5. Trigger <Left Arrow> and return to [Channel Setup]. Trigger <Down Arrow> to select [Pipe Data].

Select Pipe Class

1. Trigger <Right Arrow> to select [Pick Pipe Class].
2. **Trigger <Right Arrow> again.** Trigger the <Up/Down Arrows> to scroll to desired Pipe Class.
3. Trigger <ENTER> to select Pipe Class.
4. Select Pipe Size from pre-defined list or enter manually. **Trigger <Right Arrow> sensor.** Trigger <Up/Down Arrows> to scroll to select desired Pipe Size.
5. Trigger <ENTER> to save Pipe Size selection.

Note

Pre-programmed Pipe Size and relevant pipe parameters will appear in menu cells. To enter dimensions manually if pre-programmed dimensions do not match application, refer to flowmeter manual for details.

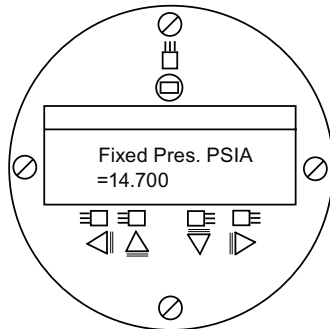


Select Gas Parameters

It is recommended to edit the Gas Parameters before continuing. If reliable data is available for gas specific heat ratio, gas viscosity, sound velocity or gas compressibility factor, these settings should be modified. It is particularly important that the approximate (nominal) operating pressure be entered to allow for proper flow profile compensation.

Setting Fixed Pressure

At the Gas Parameters menu, scroll down to [Fixed Pres. PSIA]. Press the <Right Arrow> to select and edit the default Fixed Pressure value by entering approximate nominal operating pressure. (See table for additional gas parameter values.)



The table below indicates the viscosity, specific heat ratio and estimated sound velocity (Vs) for some common gases. The default Gas Parameters are suitable for natural gas.

Table 3- 3 Common Gases for Clamp-On Measurement (at 200 PSIA & 60°F / 14 bar & 15.5°C)

Gas	Viscosity (cp)	Spec. heat Ratio (Cp/Cv)	Estimated Vs (m/s)
Carbon Monoxide	0.017	1.43	348
Ethane	0.010	1.32	281
Helium	0.019	1.66	1006
Hydrogen	1.410	1.41	1306
Methane	0.011	1.35	437
Natural Gas	0.011	1.33	400
Nitrogen	0.017	1.42	348
Oxygen	0.020	1.42	324

Standard Volume Compensation

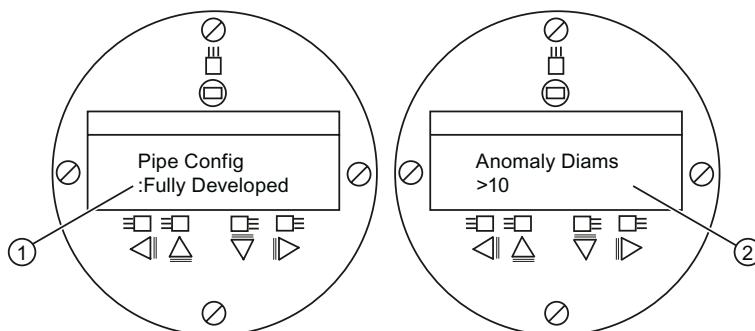
If a direct standard volume output is required from the meter, then the entry of an AGA8 compensation table may be needed. Refer to the flowmeter manual for further details on configuring the meter for standard volume compensation.

Select CC129 Thickness

After selecting the appropriate transducer size (see paragraph 5 Transducer Installation) determine the corresponding damping material final thickness using Table 2 and transfer entry to menu cell.

Select Pipe Configuration

1. Scroll down to [Pipe Config] and press the <Right Arrow>.
2. Select a configuration that approximates the conditions upstream of your transducer mounting location. (Refer to the Pipe Configuration Option List Definitions table.)
3. Press the <Right Arrow> to save the selection.



Select Anomaly Diams

1. Trigger <Right Arrow> sensor to select [Anomaly Diams]..
2. Trigger <Right Arrow> to select "=" sign.
3. Trigger <Up/Down Arrows> to select number of pipe diameters.
4. Trigger <ENTER> to save selection.
5. To return to the top menu level, continue to trigger the <Left Arrow>.

Table 3- 4 Pipe Configuration Option List Definitions

Options	Definitions
Fully Developed	Fully developed flow, as would be expected for very long straight pipe runs or installation downstream of a flow condition.
1 Elbow	Single 90 degree Elbow upstream of transducer installation.
Dble Elbow+	Double out-of-plane Elbows upstream of transducer installation.
Dble Elbow-	Double in-plane Elbows upstream of transducer installation.
Valve	Not available at this time.
Expander	Pipe expansion upstream of transducer installation.
Reducer	Pipe reduction upstream of transducer installation.
Norm Entry	Not available at this time.
Header Inlet	Header or pipe manifold upstream of transducer installation.
Intrusions	Not available at this time.

3.5 Transducer Installation

3.5.1 General Information

Mounting Supplies

The following items will be needed to mount the transducers:

- Flat blade screwdriver
- Mounting Frames or Mounting tracks
- Tape, chalk and a ruler or measuring tape
- Mounting Straps
- Spacer Bar
- Mounting Guide (for Direct Mount)
- CC129 Pipe Damping Film
- Ultrasonic coupling compound
- Transducers (matched set)

Transducer Selection

Refer to the Transducer Selection Chart to select the correct transducer size.

Note

Selection chart lists High Precision transducers for steel pipe with outer diameter/wall thickness ration >10.

Table 3- 5 Transducer Selection Chart

Transducer Size Code	Pipe Wall (mm)		Pipe Wall (inches)	
	Min.	Max.	Min.	Max.
B1H	2.0	3.0	0.08	0.12
B2H	3.0	4.1	0.12	0.16
B3H	2.7	3.3	0.106	0.128
C1H	4.1	5.8	0.16	0.23
C2H	5.8	8.1	0.23	0.32
D1H	8.1	11.2	0.32	0.44
D2H	11.2	15.7	0.44	0.62
D3H	7.4	9.0	0.293	0.354
D4H	15.7	31.8	0.62	1.25

Table 3- 6 CC129 Damping Material Thickness for Clamp-On Gas systems

Transducer Size	CC129-1A Lit P/N	Required Layers	Final Thickness (in)	Final Thickness (mm)
B1H	CC129-1A-1	1	0.027	0.69
B2H	CC129-1A-1	1	0.027	0.69
B3H	CC129-1A-1	1	0.027	0.69
C1H	CC129-1A-1	1	0.027	0.69
C2H	CC129-1A-1	1	0.027	0.69
D1H	CC129-1A-2	2	0.054	1.37
D2H	CC129-1A-3	3	0.081	2.06
D3H	CC129-1A-2	2	0.054	1.37
D4H	CC129-1A-4	4	0.108	2.74

Operating Temperature Range	Installation Temperature Range
-23 to 93°C (-10 to 250°F)	0 to 50°C (32 to 120°F)

Note

After Transducers are mounted scroll to [Install Complete?] and select [Install].

Note

Check to make sure that the transducers are a matched set with the same serial numbers and marked with an "A" and "B" (e.g., 19256A and 19256B).

Reflect Mount using Mounting Frames and Spacer Bar

- After receiving the spacing index from the Installation Menu, prepare the pipe surface area where the transducers will be mounted.
- Degrease the surface and remove any grit, corrosion, rust loose paint, etc.

Before beginning refer to the Reflect Mount Installation diagram example below.

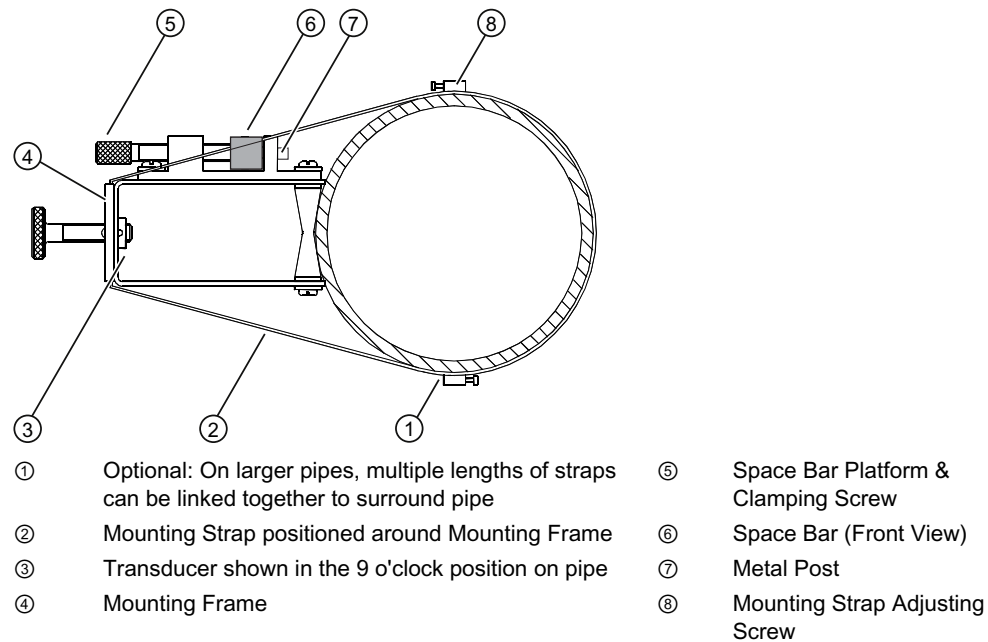


Figure 3-5 Reflect Mount with Mounting Frame and Spacer Bar

Installation Procedure (See figure 3-7 for reference)

1. On a flat surface, attach the Spacer Bar to a Mounting Frame so that the Reference Hole on the Spacer Bar fits over the metal post on the platform of the frame. Tighten the securing screw.
2. Slide the second Mounting Frame onto the other end of the Spacer Bar and align the Number Index Hole with the metal post on the platform. Then tighten the clamping screw. *Ensure that the angled sides of both frames face away from each other.*
3. Wrap a Mounting Strap around the pipe. Make sure to position it so there is easy access to the mounting strap adjusting screw.
4. At the mounting location, place the Mounting Frame/Spacer Bar Assembly on the pipe so that it rests on the top of the pipe.
5. Engage the end of the Mounting Strap with the Mounting Strap Adjusting Screw.
6. Slide Mounting Strap under the spring clip of one of the Mounting Frames.
7. Tighten the Mounting Strap Screw enough to take up all of the slack, but not enough to prevent rotation of the assembly. *Repeat procedure for the other Mounting Frame.*
8. Rotate the assembly on the pipe to the final conditioned location, ensuring that it is straight along the pipe axis. (Refer to the transducer orientation diagram in Figure 3-7.)
9. Tighten the Mounting Straps to seat the assembly firmly on the pipe. Do not over tighten.
10. Take either transducer and apply a continuous lengthwise 1/8-inch bead of coupling compound across the center of the transducer emitting surface.

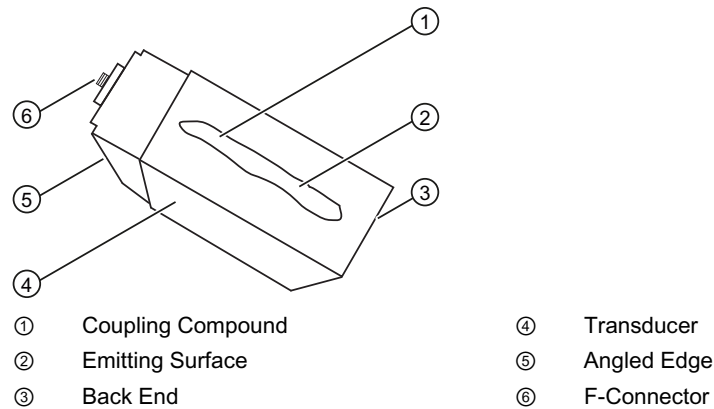


Figure 3-6 Transducer

11. Slide transducer into a Mounting Frames back end first aligning the angled edge of the transducer with the angled edge of the Mounting Frame. Keep transducer from making contact with the pipe until it butts up against the Mounting Frame stop.
12. Tighten the transducer Clamping Screw to hold the transducer in place. *Repeat installation procedure for the other transducer.*

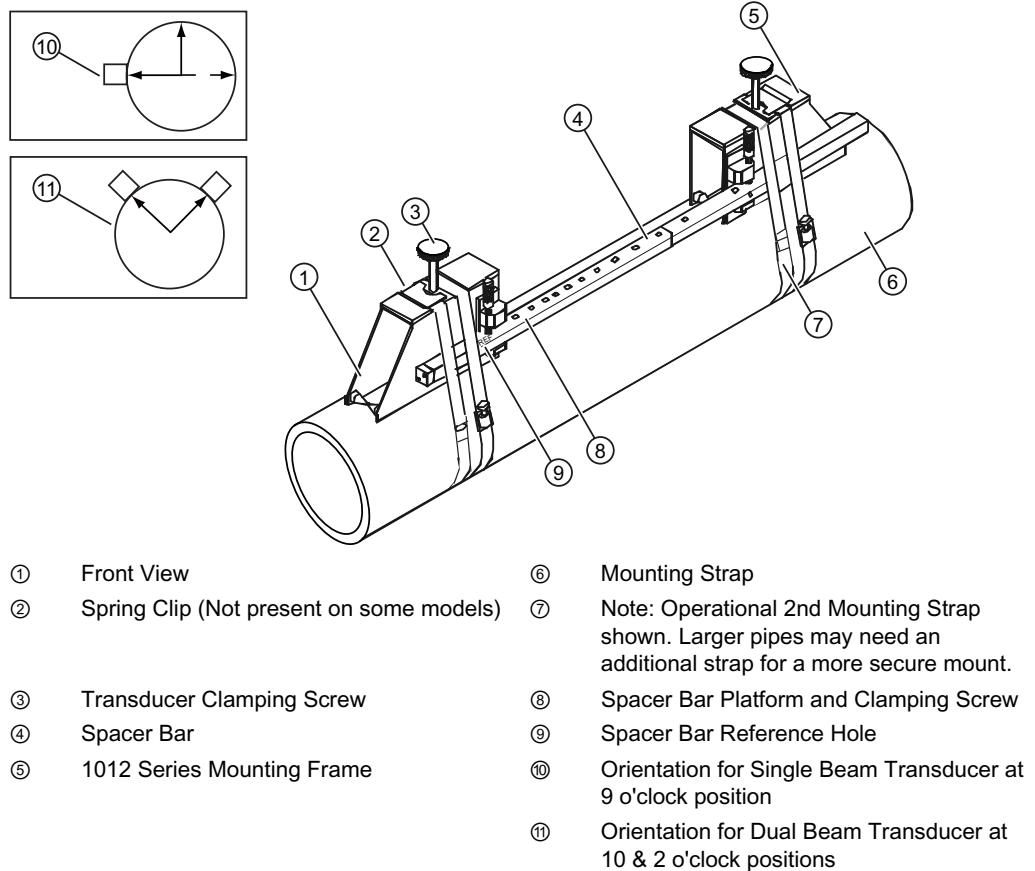
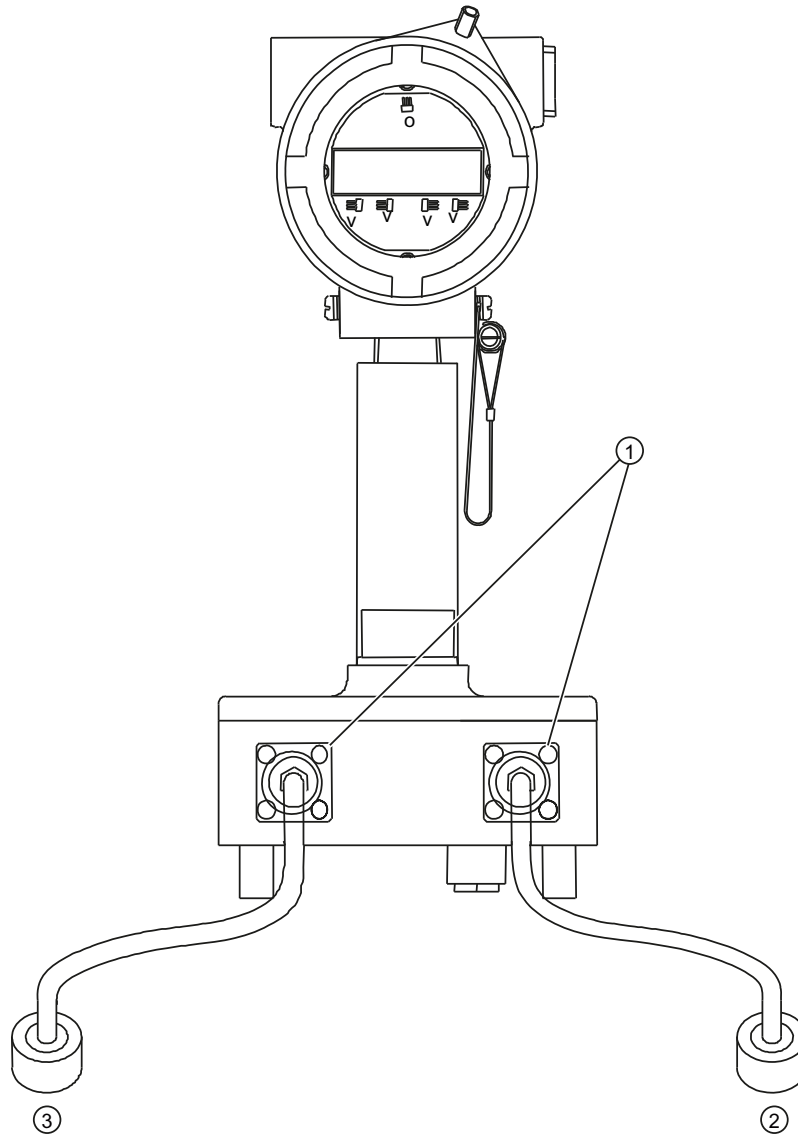


Figure 3-7 Transducer Installation

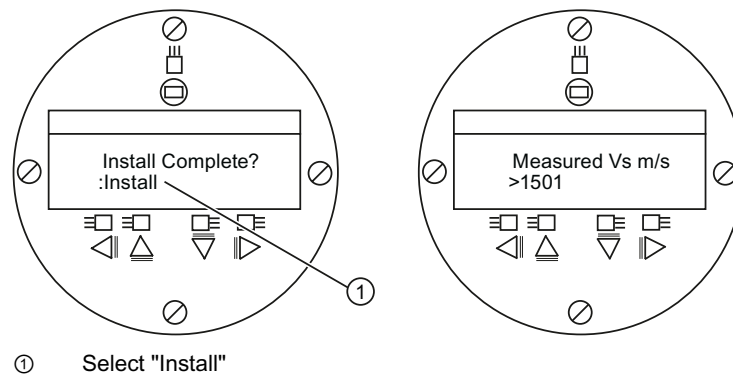
13. Observing the upstream and downstream orientation, attach the UP and DN cables to the transducers and make snug. Attach the other ends to the UP and DN terminals of the flowmeter (see figure below).



- ① Transducer Cables Connected to Flowmeter
 - ② To Downstream Transducer Channel 1
 - ③ To Upstream Transducer Channel 1
- Figure 3-8 Connecting Transducers to Flowmeter

3.5.2 Final Setup

1. After transducers are mounted scroll to [Install Complete].
2. Trigger <Right Arrow> sensor.
3. Trigger <Down Arrow> to select [Install].
4. Trigger <ENTER>.
5. Observe the Measured Vs window and verify a correct sound velocity measurement (if known).
6. If correct, trigger the <Down Arrow>.
7. **The flowmeter is now ready to report flow.**



See also

Refer to I/O Connection tables for input/output wiring and flowmeter manual for data spanning procedures.

Troubleshooting/FAQs

4.1 Troubleshooting

The following is list of troubleshooting tips and messages that you may encounter. They include explanations, and in some cases, a recommended action. If a problem seems unsolvable, contact your local Siemens Ultrasonic Flow Representative for expert help (www.siemens.com).

Table 4- 1 Troubleshooting Tips

Message	Description
Memory Full!	Response to an attempt to save site data, when data memory is full. Delete an obsolete site or clear Datalogger memory to make room for the new data.
Memory Corrupted!	Memory read error occurred while accessing the active site data.
Chan Not Setup	Response to an attempt to invoke an operation that requires a channel to be enabled. Enable the channel [Channel Setup - Channel Enable - Yes]. Note that a channel cannot be enabled until its transducers are operating.
Clr Active Memory?	Use this function to restore operation if a severe event (e.g., a violent power surge) disrupts system operation. Refer to flow meter manual.
Clr Saved Data?	Use this function to clear Dynamic Memory. Refer to flow meter manual.
<EOT>	Response to a request to output Datalogger data to the printer or the Graphics screen when no Datalogger data exists. Set up the Datalogger.
No Sites - Press <ENTER>	Response while trying to recall/delete a site setup when no sites are stored.
Re-space Index	Upon measuring the liquid sonic velocity (Vs), the meter recommends re-spacing the transducers to improve performance.

Message	Description
Invalid Setup (use Direct Mode)	<p>During the Initial Makeup the system detects invalid transducer spacing, erroneous liquid pipe parameters, or some other factor that prevents it from completing the Initial Makeup. This may be due to one of the following:</p> <ul style="list-style-type: none"> • An out-of-range data entry. • An invalid condition (e.g., overlapping transducers in Reflect Mode). If selecting Direct Mode does not resolve, review all site setup and transducer installation choices particularly data entered for pipe and liquid. • In Reflect Mode the flow meter detects that the pipe wall signal may infringe upon the liquid signal. Use Direct Mode instead. • Trigger <ENTER>, <Up Arrow>, <Down Arrow>, or <Left Arrow> to abort install routine. Continue programming other site data in anticipation of resolving the difficulty later. Call technical support for help, if necessary.
Low Signal - Press <ENTER>	<p>During the Initial Makeup the flow meter decides that the level of the receive signal is insufficient for proper operation. Some reasons for low signal are:</p> <ul style="list-style-type: none"> • Invoking [Install Complete?] on an empty pipe. • Coupling compound insufficient not applied or evaporated. • A disconnected or broken transducer cable. • The pipe needs to be conditioned at the mounting location. • Flush out large air bubbles. • The Xdcr cables are defective or not connected to the correct channel. • The Set Empty routine performed when pipe was NOT actually empty. • If you locate and correct the improper condition immediately, trigger <ENTER> to resume the installation procedure. Otherwise, trigger the <Left Arrow> to abort the installation and conduct a thorough investigation.
Detection Fault	<p>If it appears that the flow meter cannot complete an Initial Makeup. It means that the pipe and/or liquid conditions do not permit a receive signal that meets the flow detection standards. The system will not operate. Attempt to improve operating conditions by reinstalling the transducers at a different spacing offset, or even at a different location on the pipe.</p> <p>Switching from Reflect to Direct Mount may solve the problem. However, operation may not be possible if there is poor liquid, pipe wall sonic conductivity or extreme liquid aeration.</p>

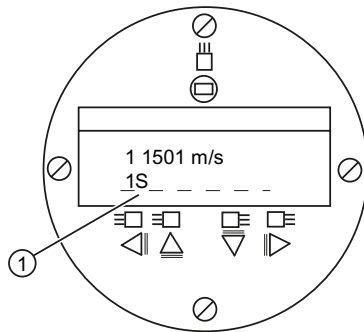
Note

If you receive a Detection Fault message, it is strongly recommended that the Technical Service Department be contacted.

4.2 Alarm Letter Codes and Descriptions

Letter Code	Alarm	Description
S	Spacing	Transducer spacing may need readjustment.
R	Rate	Flow above High setting or below Low setting.
F	Fault	Three continuous seconds without new data update.
T	Turbulence	Current turbulence percentage exceeds the alarm set point.
M	Memory	Last valid reading for a selected interval during Fault condition.
K	Makeup	In-Process Makeup occurred.
I	Interface	Gas Vs exceeds interface alarm set point.
Z	Zeromatic	ZeroMatic signal fault

The display shown below indicates where the Alarm Codes appear on the LCD display screen.



A

Appendix A

A.1 I/O Connections and Wiring

Terminal Block Wiring - 1010DXS2-7

(Refer to manual drawing 1010DXS2-7 sheet 3 of 4. When Barriers are used, isolation is limited to the Barrier's working voltage. Refer to table on manual drawing 1010-341 sheet 3).

These connection diagrams apply to the part numbers listed below.

Table A- 1 Part Numbers and Connection Diagrams

1010DXS2-7 (Sheet 3 of 4) Drawing	
FUG1010	7ME3611a-bc where: b= 1 c= D

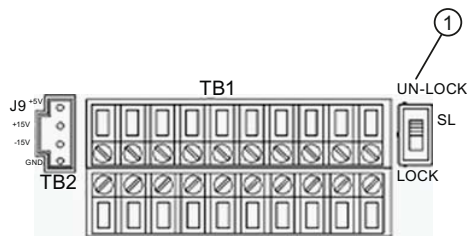
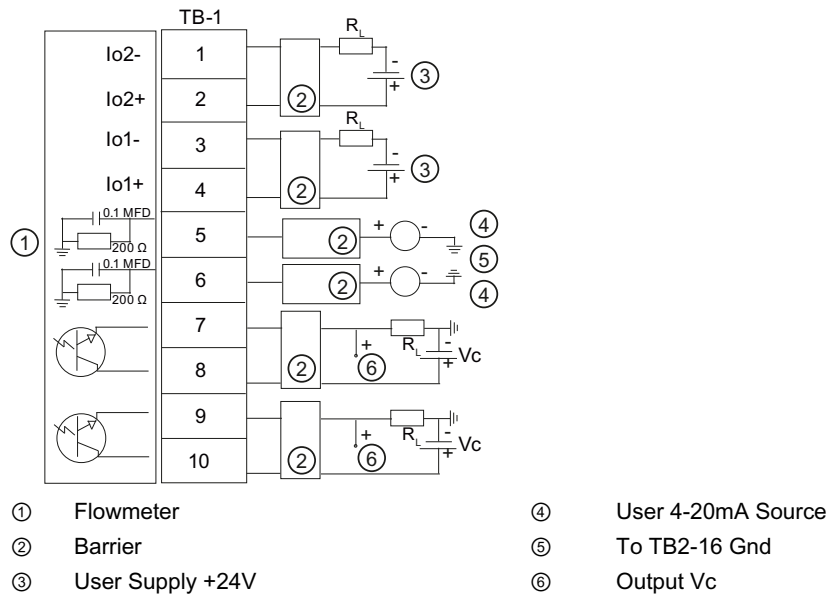


Table A- 2 FUG1010 Input/Output Wiring (TB1)

Pin#	Signal	Function	Description
1	Io2-	Isolated Loop Return	Spannable 4-20mA output proportional to any available data variable assigned under menu control
2	Io2+	Isolated Loop Supply	
3	Io1 -	Isolated Loop Return	
4	Io1 +	Isolated Loop Supply	
5	ANIN 2	4-20mA Input CH. 2	4-20mA input non-isolated)
6	ANIN 1	4-20mA Input CH. 1	
7	Status -1	Status Bit Return	CH. 1 Status Alarm Emitter
8	Status +1	Status Output	CH. 1 Status Alarm Collector
9	Status -2 -	Status Bit Return	CH. 2 Status Alarm Emitter
10	Status +2	Status Output	CH. 2 Status Alarm Collector



Isolated 4-20mA Output TB1-1/3 & TB1-2/4	
R_L	= 1000 ohms (max) w/o Barriers
R_L	= 320 ohms (max) with Barriers
Vc	= Output High and Low
I	= 4-20mA
R_L	= Loop wire resistance (both ways) plus User's input load resistance.

4-20mA Analog Output TB1-5 & TB1-6	
Do Not Exceed +12VDC when Barriers are used.	
DO Not Reverse Polarity	
Load:	
200 ohms without Barrier plus two way wire resistance.	
320 ohms with Barrier plus two way wire resistance.	

Isolated Status/Alarm or PGEN Outputs	
I	= 7mA (max)
Rc	= Total non-inductive load
Vc output High and Low level for different VC with: R = 4.7K ohms, 0.15 Watt (min)	

Vc (VDC)	VcH (VDC) min	VcL (VDC) max
5	3.5	0.1
12	9.6	0.1
15	12.3	0.1
24	20.1	0.1

Terminal Block Wiring - 1010DXS2-7

(Refer to manual drawing 1010DXS2-7 sheet 4 of 4. When Barriers are used, isolation is limited to the Barrier's working voltage. Refer to table on manual drawing 1010-341 sheet 3).

These connection diagrams apply to the part numbers listed below.

Table A-4 Part Numbers and Connection Diagrams

1010DXS2-7 (Sheet 4 of 4) Drawing	
FUG1010	7ME3611-bc where: b= 2 c= E

Note

Wiring diagram for FUG1010DX TB1 is the same as Table A-1.

Table A-5 FUG1010DX Input/Output Wiring (TB1)

Pin#	Signal	Function	Description
1	Io2 -	Isolated Loop Return	4-20mA output proportional to any available spanned data variable
2	Io2 +	Isolated Loop Supply	
3	Io1 -	Isolated Loop Return	
4	Io1 +	Isolated Loop Supply	
5	ANIN 2	4-20mA Input CH.2	4-20mA Analog input non-isolated
6	ANIN 1	4-20mA Input CH.1	
7	Status -1	Status Bit Return	CH.1 Status Alarm Emitter
8	Status +1	Status Output	CH.1 Status Alarm Collector
9	PGEN-	DPGEN RTN	Isolated PGEN Emitter
10	PGEN+	DPGEN OC	Isolated PGEN Collector

Note

Wiring diagram for FUG1010DX TB2 is the same as Table A-2.

Table A- 6 FUG1010DX Input/Output Wiring (TB2)

Pin#	Signal	Function	Description	
11	Tx	RS-232 Transmit	Standard RS-232 Signals	Standard RS-232 Communication Port
12	RTS	RS-232 Request to Send		
13	DTR	RS-232 Data Terminal Ready		
14	Rx	RS-232 Receive		
15	CTS	RS-232 Clear to Send		
16	GND	Ground		
17	D1 Input	Digital Input CH.1	Isolated Digital Command Lines	Freeze Totalizer CH.1
18	D1 Return	Digital Return		Return
19	D2 Input	Digital Input CH.2		Reset Totalizer CH.2
20	D2 Return	Digital Return		Return

A.2 Technical Data

Temperature Range	Degree of Protection
Operating: 0°C to 50°C (32°F to 122°F)	IP65 NEMA 7
Storage: -20°C to 60°C (-4°F to 140°F)	
Transducer: T1: -40°C to 104.4°C (-40°F to 150°F); T2: 1.11°C to 104.4°C (30°F to 220°F)	

FUG1010 IP65 (NEMA 7) Installation Menu Chart

LEVEL A	LEVEL B	LEVEL C	LEVEL D (see manual)	LEVEL E	LEVEL F
Meter Type	Dual Channel Flow Dual Path Flow Ch1 + 2 Flow Ch1 - 2 Flow	Chan/Path Setup	Recall Site Setup Channel Enable Create/Name Site Site Security Delete Site Setup Save/Rename Site	Enter From List No/Yes Enter Site Name On/Off Enter From List Enter/Clear Site Name	
		Pipe Data	Pipe Pipe Class Select Pipe Size Pipe OD (in) Pipe Material Wall Thickness Pipe ID (in) CC129 Thickness Pipe Configuration Anomaly Diams ThermExpCoef 1/F Mod of Elast PSI	Enter From List Enter From List Numeric Entry Enter From List Numeric Entry Numeric Entry Enter From List Numeric Entry Numeric Entry Numeric Entry	
		Gas Parameters	Base Temp F. Base Pres. PSIA Spec. Heat Ratio Viscosity (cP) Fixed M/W g/mole Estimated Vs m/s Fixed Pres. PSIA Z Base Z Actual AGA8 Comp.	Numeric Entry Numeric Entry Numeric Entry Numeric Entry Numeric Entry Numeric Entry Numeric Entry Numeric Entry No/Yes	
		Pick/Install Xdcr	Install Path Transducer Model Transducer Size Xdcr Mount Mode Spacing Offset Number Index Spacing Method Ltn Value Install Complete?	1,2 Enter From List Enter From List Enter From List View Only View Only View Only View Only No/Install	Select Install
	Operation Adjust		Zero Flow Adjust Damping Control Deadband Control Memory/Fault Set Memory Delay (sec)	Enter From List Time Average / SmartSlew Numeric Entry Fault/Memory N/A	
	Flow Total Units		Flow Vol. Units Std Vol Corr Flow Time Units Flow Disp. Range Flow Disp. Scale Total Vol. Units Totalizer Scale Total Resolution Totalizer Mode Batch/Sample Tot Reset Totalizer	Enter From List No/Yes Enter From List Enter From List Enter From List Enter From List Enter From List Enter From List Enter From List Numeric Entry No/Yes	
	Data Span/Set/Cal		Span Data Set Alarm Levels Calibrate Flowrate Calib. Table 1 Calib. Table 2 Calib. Table 3	Enter From List Enter From List Intrinsic Kc MultiPoint Index Variable Calib. Table 1 Table Active 1 Clear Table 1 Same as Table 1 Same as Table 1	Enter From List New Point No/Yes No/Yes

This Menu Chart applies to:
MLFB - 7ME3611

FUG1010 IP65 (NEMA 7) Installation Menu Chart

<u>LEVEL A</u>	<u>LEVEL B</u>	<u>LEVEL C</u>	<u>LEVEL D (see manual)</u>	<u>LEVEL E</u>	<u>LEVEL F</u>
		Datalogger Setup	Datalogger Mode	Enter From List	
			Datalogger Data	Enter From List	
			Log Time Interval	Enter From List	
			Datalogger Events	Enter From List	
		I/O Data Control	Analog Out Setup	Enter From List	
			Relay Setup	Relay 1	
			Analog Input Setup	lin1, lin2	
		Diagnostic Data	Path Select	1,2	
			Path Enable	No/Yes	
			Flow Data	Enter From List	
			Application Info	Enter From List	
			Gas Data	Enter From List	
			Site Setup Data	Enter From List	
			Test Facilities	Enter From List	
			Print Site Setup	No/Yes	
			Date/Site Created	View only	mm.dd.yy hh.mm.ss
Meter Facilities	Preferred Units	English/Metric			
	Table Setups	Pipe Table	Create/Edit Pipe	Enter From List	
			Delete Pipe	Enter From List	
		Transducer Type	Enter From List		
	Datalogger Ctrl	Output Datalogger	No/Yes		
		Circular Memory	No/Yes		
		EstLogTime Left	View Only		
		Clear Datalogger	No/Yes		
	Memory Control	Data Memory Left	View Only		
		Defragment	No/Yes		
	Analog Output Trim	Trim Io1	Operate / Trim @ 4mA		
		Trim Io2	Operate / Trim @ 4mA		
		Trim Pgen1	Operate / Trim @ 1 kHz		
	RTD Calibrate	RTD1	Factory / User Cal		
	Clock Set	Date (MM.DD.YY)	Enter/Clear Date Format		
		Time (HH.MM)	Enter/Clear Time Format		
	RS-232 Setup	Baud Rate	Enter From List		
		Parity	Enter From List		
		Data Bits	7/8		
		Line Feed	Yes/No		
		Network ID	Numeric Entry		
		RTS Key Time	Enter From List		
	System Info	Version	View Only		
		Reset Data/Time	View Only		mm.dd.yy hh.mm.ss
		Op System P/N	View Only		
		Checksum	View Only		
		Code	View Only		
		System Time	View Only		mm.dd.yy hh.mm.ss