Model-SATC

Integral Mount

Magnetic Flow-meter

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NOTICE: Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing, using, or maintaining this product.

CAUTION: The products described in this document are NOT designed for Nuclearqualified applications.

Using non-nuclear qualified products in applications that require nuclearqualified hardware or products may cause inaccurate readings.

Procedures and instructions in this manual may require special precautions to ensure the safety of the personnel performing the operations.

Information that raises potential safety issues is indicated by a warning symbol  .

Refer to the safety messages listed at th e beginning of each section before performing an operati on preceded by this symbol.

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SECTION 1:INTRODUCTION

This manual provides instructions for installing, configuring, operating, and troubleshooting the Model YLZ-3 Integral Mount Magnetic Flowmeter System.

1.1 SYSTEM DESCRIPTION

A complete magnetic flowmeter system consists of two components: the Model YLZ-3 microprocessor-based integral-mount magneti flowmeter transmitter and a flowtube.The flowtube is installed in-line with process piping, either vertically or horizontally. Coils located on opposite sides of the flowtube create a magnetic field, and conductive liquid moving through the magnetic field generates a voltage that is detected by two electrodes.The transmitter controls the generation of the magnetic field and senses the voltage detected by the electrodes. Based on the sensed voltage, the transmitter calculates a flow rate and produces analog and frequency output signals proportional to this flow rate.

1.2 SAFETY MESSAGES

Procedures and instructions in this manual may require special precautions to ensure the safety of the personnel performing the operations. Refer to the safety messages listed at the beginning of each section before performing any operations.

SECTION 2:INSTALLATION

This section covers the installation procedures for the Model YLZ-3 Magnetic Flowmeter System.

2.1 SAFETY MESSAGES

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol.  Please refer to the following safety messages before performing an operation preceded by this symbol.

2.2 WARNINGS

Explosions could result in death or serious injury:

- Verify that the operating atmosphere of the flowtube and transmitter is consistent with the appropriate hazardous locations certifications.
- Do not remove the transmitter cover in explosive atmospheres when the circuit is alive.
- Before connecting a HART-based communicator in an explosive atmosphere, make sure the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Both transmitter covers must be fully engaged to meet explosion-proof requirements.

Failure to follow safe installation and servicing guidelines could result in death or serious injury:

- Make sure only qualified personnel perform the installation.
- Do not perform any service other than those contained in this manual unless qualified.

High voltage that may be present on leads could cause electrical shock:

- Avoid contact with leads and terminals.

2.3 PRE-INSTALLATION

There are several pre-installation steps that make the installation process easier. They include identifying the options and configurations that apply to your application, setting the hardware switches if necessary, and consideration of mechanical, electrical, and environmental requirements. Please remember that the flowtube liner is vulnerable to handling damage. Never place anything through the flowtube for the purpose of lifting or gaining leverage.Liner damage can render the flowtube useless.

2.3.1 Identify Options and Configurations

Standard application of the Model YLZ-3 includes control of the flowtube coils and one or more following configurations or options:

- 4–20 mA Output
- Pulse Output
- RS485 Communications
- HART (Optional)

Be sure to identify the options and configurations that apply to your situation, and keep a list of them nearby during the installation and configuration procedures.

2.3.2 Mechanical Considerations

The mounting site for the Model YLZ-3 Integral Mount Transmitter should provide enough room for secure mounting, easy access to the conduit ports, full opening of the transmitter covers, and easy readability of the local operator interface (LOI) screen (**see Figure 2-1**).The LOI can be rotated in 90° increments. This should be performed prior to installing the magnetic flowmeter system.

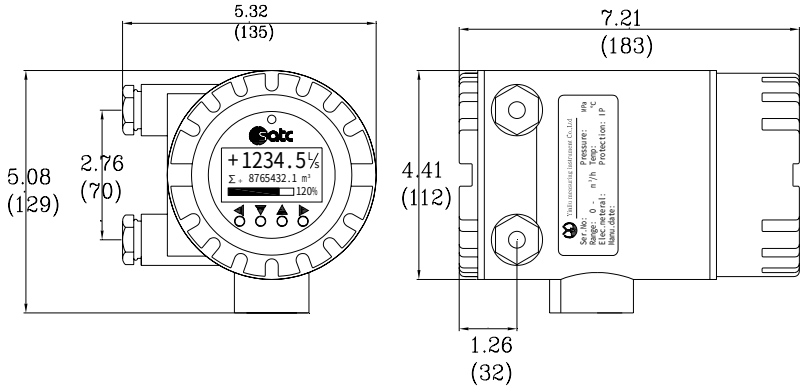


Figure 2-1 Model YLZ-3 Dimensional Drawings

2.4 ELECTRICAL CONSIDERATIONS

Before making any electrical connections to the Model YLZ -3, consider the following standards and be sure to have proper power supply, conduit, and other accessories.

2.4.1 Conduit Connections

The Model YLZ-3 Integral Mount Magnetic Flowmeter Transmitter has a M20 *1.5 conduit connections.

2.4.2 Transmitter Input Power

The Model YLZ-3 Transmitter is designed to be powered by voltages ranging from 90V to 250V AC(50 to 60 Hz) or 15V–30 V DC. Units powered with an AC power supply should be connected to standard AC connections for 90V AC or 250V AC. Units powered by a 15V–30V DC power supply have special considerations.

2.4.3 DC Power Requirements

Units powered with 15V–30V DC may draw up to 2 amps of current. As aresult, the input power wire must meet certain gauge requirements. **Table 2-1** show the maximum wire length for corresponding supply voltages, wire gauges, and wire type.

Types of Power supply wires		Maximum Length of the Wire for Each Corresponding Power Supply Source		
Wire Gauge	**Milliohms/ft Annealed Cu**	**30 V Supply (ft)**	**24 V Supply (ft)**	**20 V Supply (ft)**
20	10.15	1230	625	365
18	6.385	1955	990	585
16	4.016	3110	1580	930
14	2.525	4950	2515	1485
12	1.588	7870	3995	2360
10	0.999	12510	6355	3750

Table 2-1 Length of Annealed Copper Wires

2.4.4 Disconnects

The supply wires should be connected to the device through an external disconnect or circuit breaker. The disconnect or circuit breaker should be clearly labeled and located near the transmitter.

2.4.5 Overcurrent Protection

Model YLZ-3 requires overcurrent protection of the supply lines. Maximum rating of overcurrent devices are as follows:

Power System	Fuse Rating
110 V ac	250 V; 1 Amp, Quick Acting
220 V ac	250 V; 1 Amp, Quick Acting
18 to 36 V dc	250 V; 1 Amp, Quick Acting

2.5 ENVIRONMENTAL CONSIDERATIONS

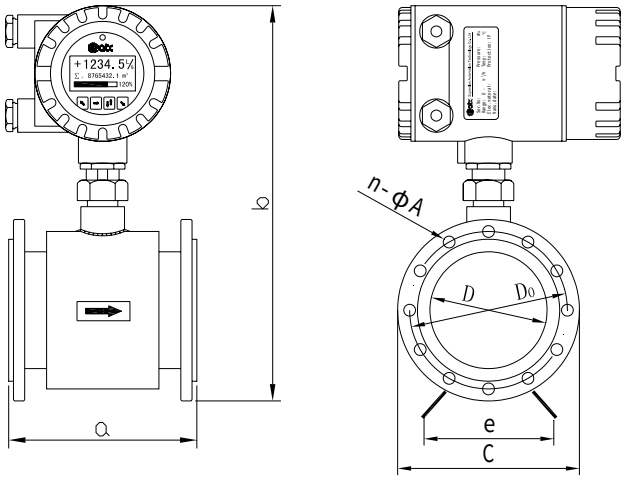
To ensure maximum transmitter life, avoid excessive heat and vibration.Typical problem areas include high-vibration lines with integrally Mounted transmitters, warm-climate installations in direct sunlight, and outdoor installations in cold climates. Because the Model YLZ-3 System requires external power, access to a suitable power source must be ensured. Overheating will damage the flowtube. Do not encapsulate the flowtube with heating elements.

2.6 INSTALLATION PROCEDURES

These installation tasks provide detailed mechanical and electrical installation procedures.

2.6.1 YLD Specifications and Reference Data

Size(mm)	Pressure Limits (MPa)	Outline Size(mm) a	b	c	e	Flange Size(mm) D	D_0	n×A	Weight (kg)
10	4.0	200	387	90		10	60	4×14	6
15	4.0	200	387	95		15	65	4×14	6
20	4.0	200	387	105		20	75	4×14	6
25	4.0	205	365	115		25	85	4×14	7
32	4.0	205	385	140		32	100	4×18	9
40	4.0	205	392	150		40	110	4×18	10
50	4.0	205	405	165		50	125	4×18	12
65	1.6	205	440	185		65	145	4×18	17
80	1.6	205	440	200		80	160	8×18	17
100	1.6	255	450	220		100	180	8×18	22
125	1.6	255	460	250		125	210	8×18	24
150	1.6	306	520	285		150	240	8×22	35
200	1.0	357	578	340		200	295	8×22	45
250	1.0	450	632	395	310	250	350	12×23	84
300	1.0	500	702	445	310	300	400	12×23	102
350	1.0	500	792	505	450	350	460	16×23	123
400	1.0	600	836	565	450	400	515	16×26	147
450	1.0	600	862	615	450	450	565	20×26	212
500	1.0	600	942	670	450	500	620	20×26	209
600	1.0	600	1013	780	610	600	725	20×30	252
700	1.0	700	1115	895	610	700	840	24×30	352
800	1.0	800	1212	1015	610	800	950	24×35	462



2.6.2 Handling

All parts should be handled carefully to prevent damage. Whenever possible, transport the system to the installation site in the original shipping containers. The flowtube is shipped with end covers to protect it from mechanical damage and normal unrestrained distortion. End covers should not be removed until just before installation. Keep shipping plugs in conduit connections until conduits are connected and sealed.All flowtube liners are vulnerable to handling damage. Never place anything through the flowtube for the purpose of lifting or gaining leverage. Liner damage can render the flowtube useless.Flanged flowtubes have different lifting and transportation guidance.Refer to **Figure 2-2** for correct handling techniques.

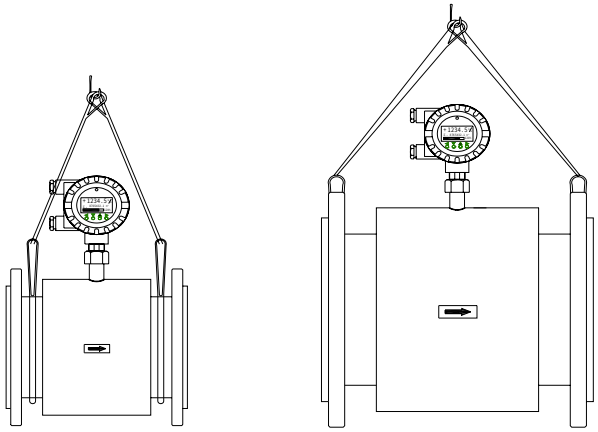


Figure 2-2 Flowtube Support for Handling

2.6.3 Flow tube Mounting

Physical mounting of a flowtube is similar to installing a typical section of pipe. Only conventional tools, equipment, and accessories (such as bolts, gaskets, and grounding hardware) are required.

- **Calibration**

CBM magnetic flowmeter systems are wet- calibrated at the factory and need no further calibration during installation.

- **Upstream Downstream Piping**

To ensure specific accuracy over widely varying process conditions, install the flowtube with a minimum of five straight upstream and two pipe diameters downstream from the electrode plane, as shown in **Figure 2-3**. This flowtube placement is usually adequate to allow for disturbances created by elbows, valves, and reducers.

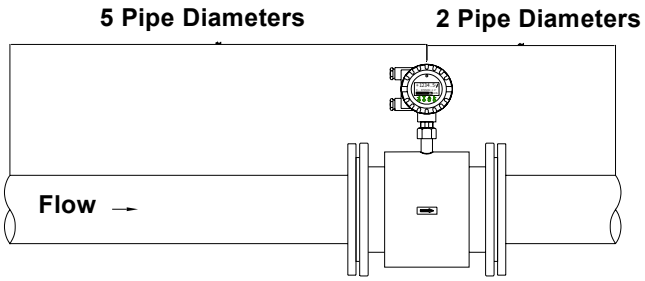


Figure 2-3 Ups tream and Downstream Straight Pipe Diameter

2.6.4 Flowtube Orientation

- **Vertical Installation**

Vertical installation allows upward proce ss fl uid flow and is ge nerally preferred. Upward flow keeps the cross-sectional area full, regardless of flow rate. Orientation of the electrode plane is unimportant in vertical installations.

NOTE :

As shown in **Figure 2-4**, avoid d ownward vertical flows where b ack pres sure is inadequate to ensure that the flowtube remains full.

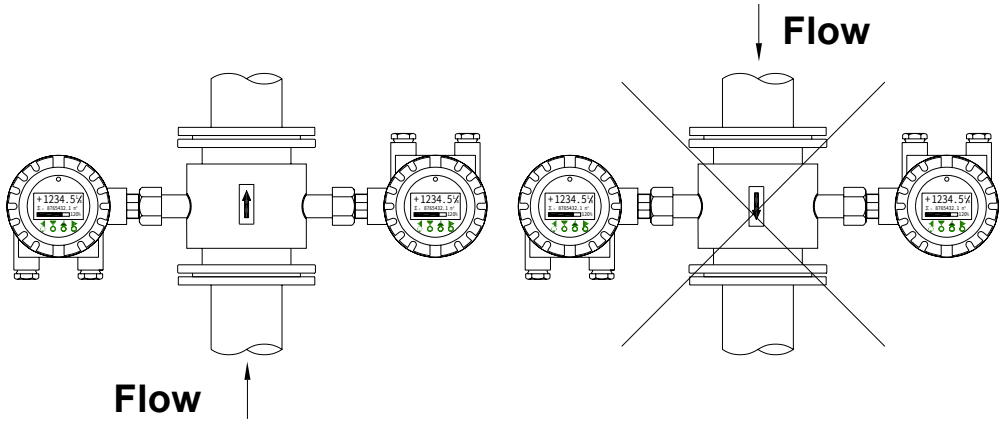


Figure 2-4 V ertical Flowtube Orientation

- **Horizontal Installation**

Horizontal installation should be restricted to low piping sections that are norm ally full. Orient the electro de plane to within 45 degrees of horizontal in horizontal installations. A deviation of m ore than 45degrees of horizontal would place an electrode at or near the t op of the flowtube–m aking it m ore susceptible to insulation by air or entrapped gas at the top of the flowtube. **Figure 2-5**.

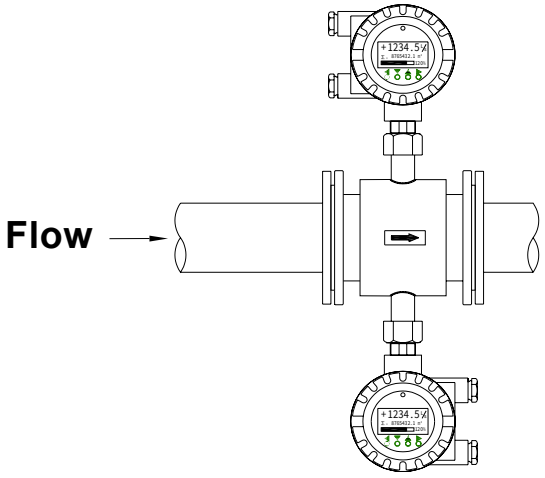


Figure 2-5 Horizont al Flowtube Orientation

- **Incline Installation**

An inclined installatio n, as shown in **Figure 2-6**, is an acceptable installation technique. This tends to keep the cross-sectional area full.

NOTE:

As shown in **Figure 2-6**, avoid declining i nstallations where back pressure is inadequate to ensure that the flowtube remains full.

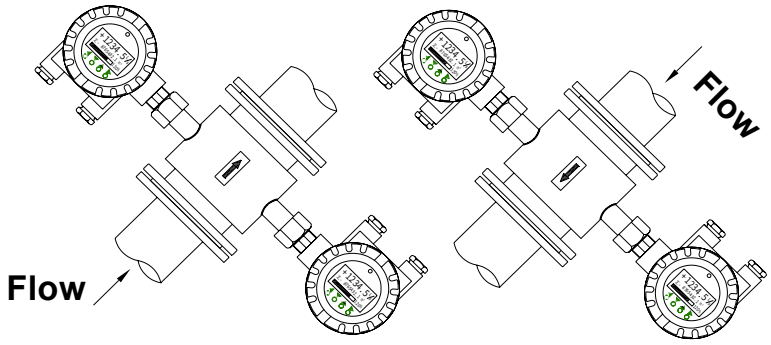


Figure 2-6 Incline or Decline Flowtube Orientation

2.6.5 Flow Direction

The flowtube should be mounted so that the FORWARD end of the flow arrow, shown on the flowtube identification tag, points in the direction of flow through the tube (see **Figure 2-7**).

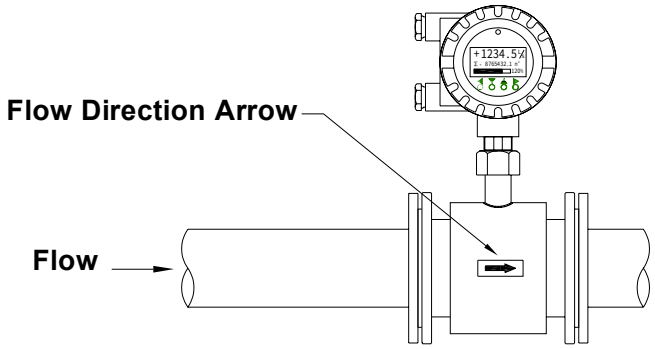


Figure 2-7 Flow Direction

2.6.6 Gaskets

The flowtube requires gaskets at each of its connections to adjacent equipment or piping. The gasket material selected must be compatible with the process fluid and operating conditions, and must not damage the liner. (see **Figure 2-8**).

NOTE:

To avoid possible flowtube damage, do not use metallic or spiral wound gaskets.

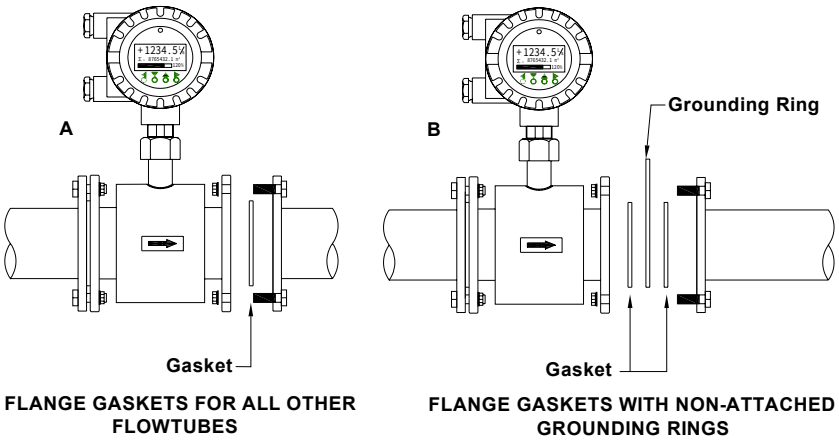


Figure 2-8 Flange Gaskets

2.6.7 Flange Bolts

Flowtube sizes and torque values for Class 150 and Class 300 flanges are listed in **Table 2-2**. Tighten flange bolts in the incremental sequence shown in **Figure 2-9**. Correct flange bolt tightening is crucial for proper flowtube operation and life. All bolts must be tightened in the proper sequence to the specified torque limits. Failure to observe these instructions could result in severe damage to the flowtube lining and possible flowtube replacement. Always check for leaks after tightening flange bolts. All flowtubes require a second torquing 24 hours after initial flange bolt tightening.

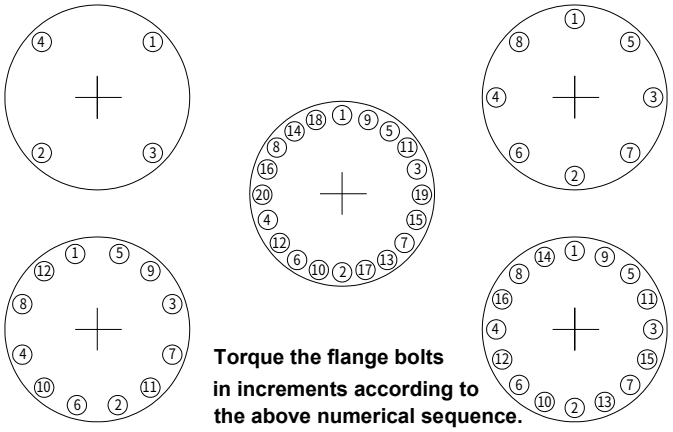


Figure 2-9 Flange Bolt Torquing Sequence

NOTE:

Torque the flange boltsin increments according to the above numerical sequence.

Nominal Flowtube Size (inches)	Flange Bolt Torque Specifications in Foot-Pounds	
	Class 150 Flange	Class 300 Flange
0.5	10	10
1	10	10
1.5	17	22
2	25	17
3	45	35
4	35	50
6	60	65
8	80	60
10	70	65
12	80	80
14	100	--
16	90	--
18	125	--
20	125	--
24	150	--
30	150	--
36	200	--

Table 2-2 Flange Bolt Torque Specifications

2.6.8 Grounding

Grounding the flowtube is one of the m ost important details of flowtube installation. Proper grounding ensures that only the volta ge induced in the flowtubes magnetic field is measured.

NOTE:

Consult factory for installati ons requiring cathodic protecti on or situations where high currents or high potential exist in the process.

Figure 2-10
Grounding for Conductive Unlined Pipe and Grounding for Conductive Lined Pipe with Grounding Electrodes.

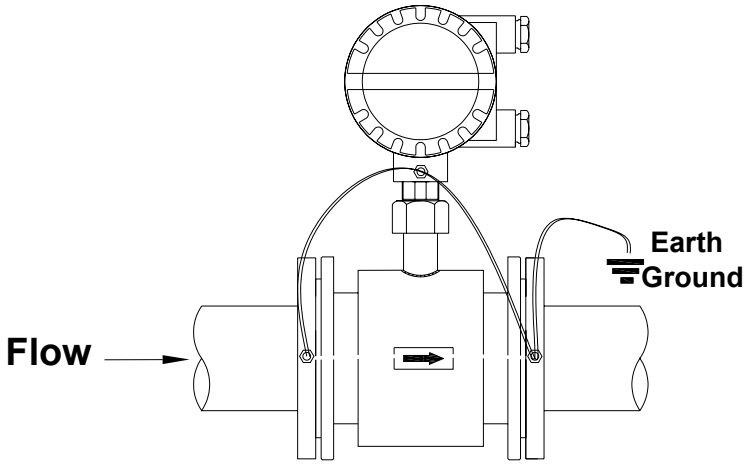
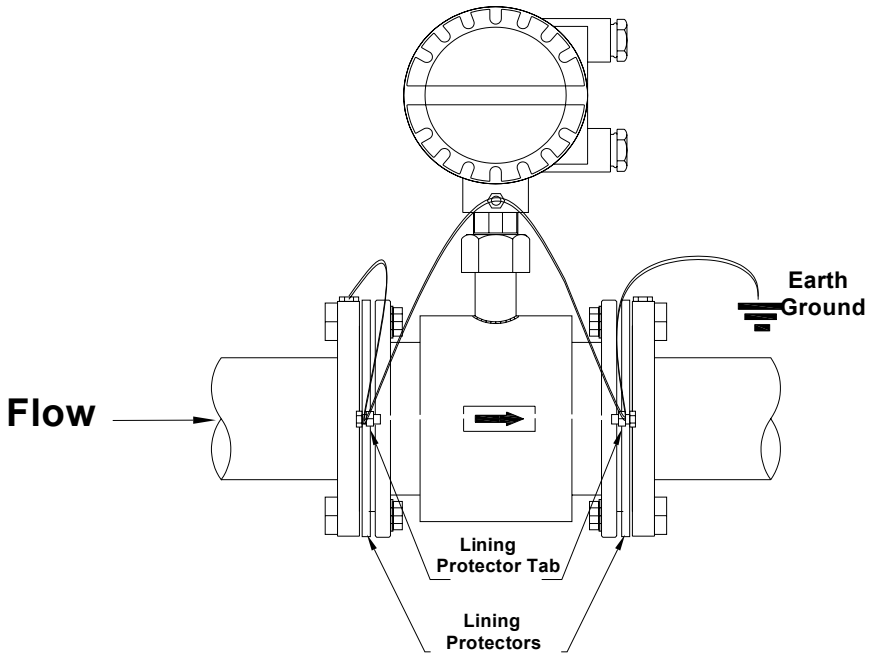


Figure 2-11
Grounding for Conductive Unlined Pipe with Lining Protectors and Grounding for Conductive Lined Pipe with Lining Protectors.



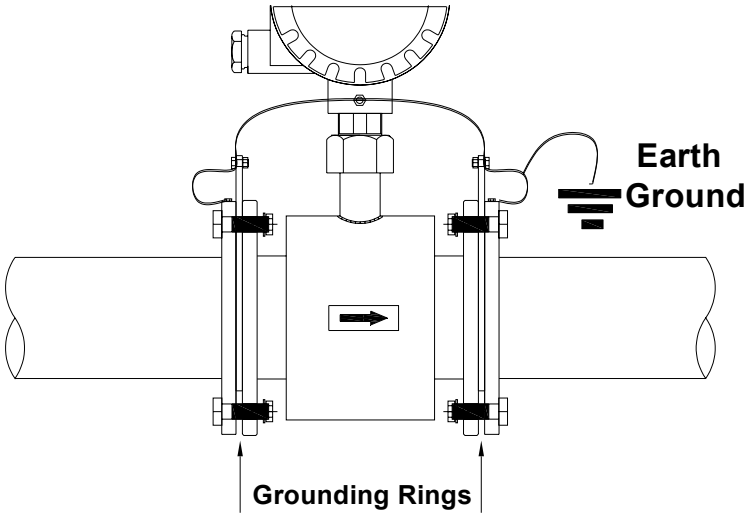


Figure 2-12
Grounding for Conductive Lined Pipe with Grounding Rings

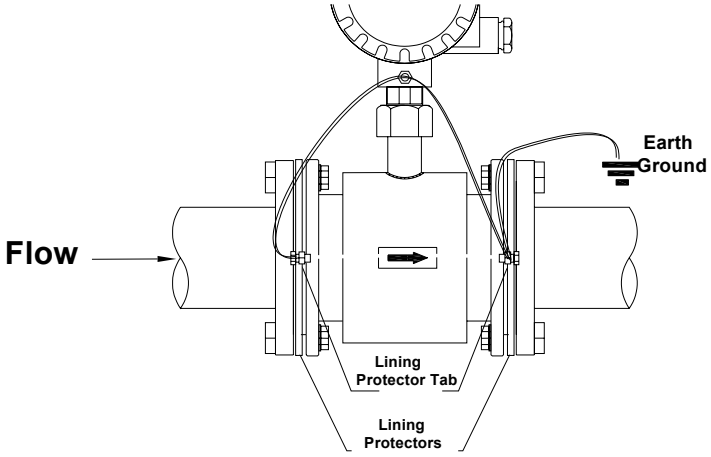


Figure 2-13
Grounding for Non-Conductive Pipe with Lining Protectors

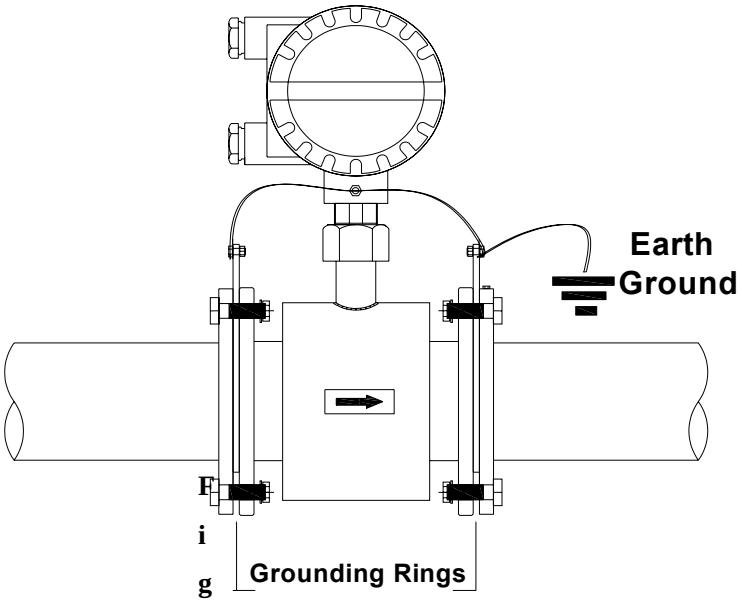
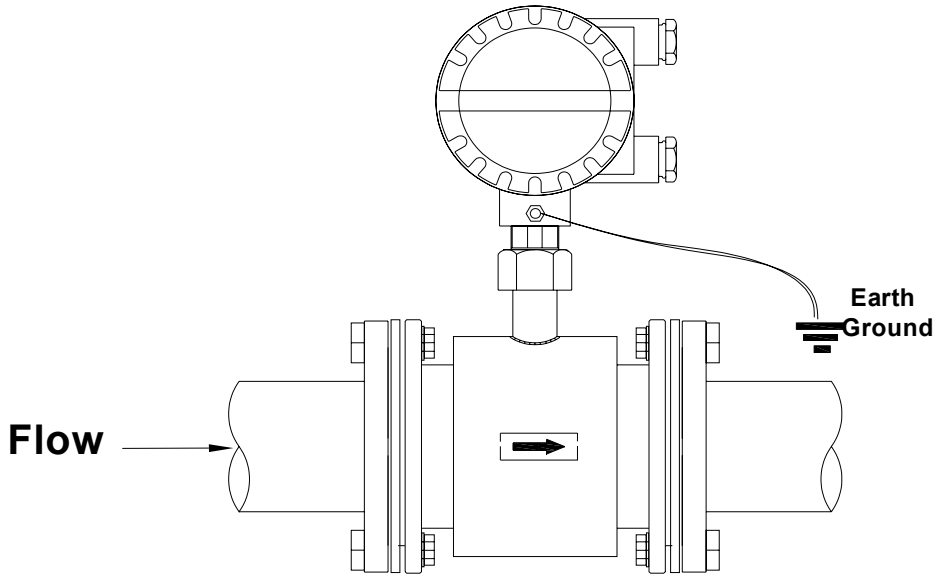


Figure 2-14
Grounding for Non-Conductive Pipe with Grounding Rings

Figure 2-15
Grounding for

Non-Conductive
Pipe with
Grounding Electrodes



2.6.9 Install Conduit

Transmitter junction boxes have ports for M20*1.5 conduit connections.

1. Connect the M20*1.5 conduit to the transmitter in accordance with local or plant electrical codes.
2. Seal unused ports to prevent moisture or other contamination from entering the junction box.

Do not overtighten metal plugs used to seal wiring compartment ports, overtightening can damage the housing.

2.6.10 Power Connections

To connect power to the transmitter, complete the following steps:

1. Ensure that the power source and connecting cable meet the requirements outlined in **Table 2-1**.
2. Turn off the power source.
3. Open the power terminal cover.
4. Run the power cable through the conduit to the transmitter.
5. Loosen the terminal cable guard for the input power terminals L and N or + and -.
6. Connect the power cable leads as follows:
   For an AC-powered transmitter:

• Connect AC Ground to a grounding lug.

• Connect AC Neutral to terminal N.

• Connect AC Line to terminal L.

For a DC-powered transmitter:

• Connect DC Ground to a grounding lug.

• Connect + DC.

• Connect – DC.

The DC-powered transmitter has a different terminal block and different electronics that are not compatible with an AC-powered transmitter.

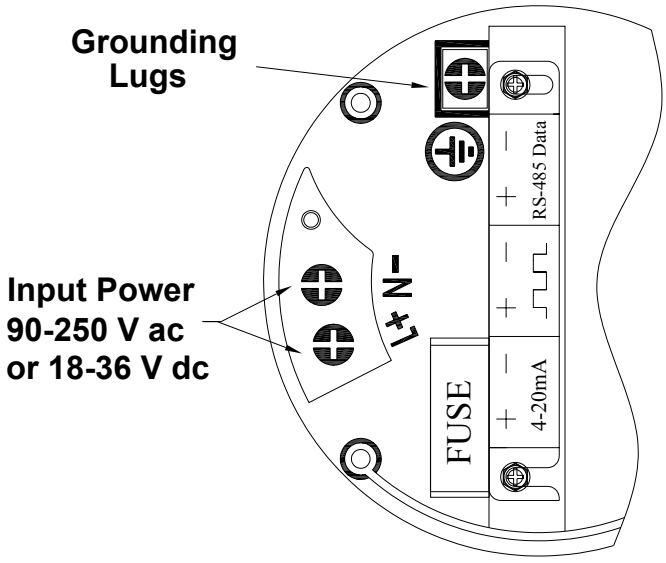


FIGURE 2-16 Power Connections.

2.7 OUTPUT

If your application of the Model YLZ-3 includes an externally powered 4–20 mA loop, or pulse output, certain requirements may apply in addition to those previously listed. Satisfy these requirements before attempting to install and operate the Model YLZ-3.

2.7.1 Connect 4–20 mA Loop External Power Source

The 4–20 mA output loop is powered either internally or externally.

- **Internal**

The loop may be powered from the transmitter itself. Resistance in the loop must be 1,000 ohms or less. If a HART-based communicator or a distributed control system (DCS) is used, it must be connected across a minimum of 250 ohms resistance in the loop.

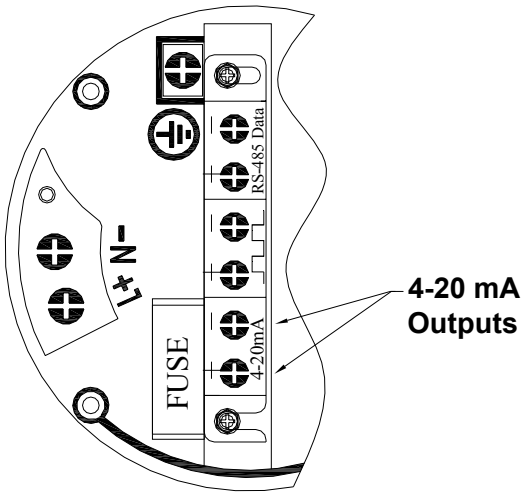


Figure 2-17 4–20 mA Loop Power Connections.

2.7.2 Connect Pulse Output

The Pulse Output function provides an isolated switch-closure frequency output signal that is proportional to the flow through the flowtube. The signal is normally used in conjunction with an external totalizer or control system. If your application uses the pulse output option, complete the following steps to connect the signal cable to the transmitter:

1. Ensure that the power source and connecting cable meet the requirements outlined above and in **Table2-1**.
2. Turn off the transmitter power sources.
3. Run the signal cable into the transmitter.
4. Connect the two wires that convey switch closure information to the + and – terminals.

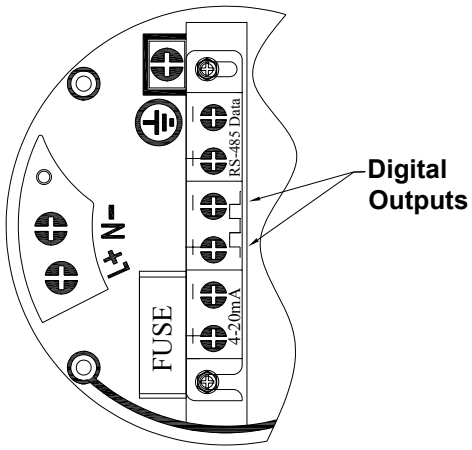


Figure 2-18 Pulse Output Connections

2.7.3 Connect RS485 Communication

The RS485-Based communication provides a half-duplex, asynchronous media to transmit data, transmit speed should be 1200bps, 2400bps, 4800bps, 9600bps, 1 start bit, 8data bit and 1 stop bit, the parity mode should be NONE, EVEN or ODD, all of above options can be changed in LOI(**Section 3: Local Operator Interface**)

If your application uses the RS485 communication option, complete the following steps to connect the signal cable to the transmitter:

1. Ensure that the power source and connecting cable meet the requirements outlined above and in **Table2-1**.
2. Turn off the transmitter power sources.
3. Run the signal cable into the transmitter.
4. Connect the two wires that to the RS485 data +(A) and –(B) terminals.

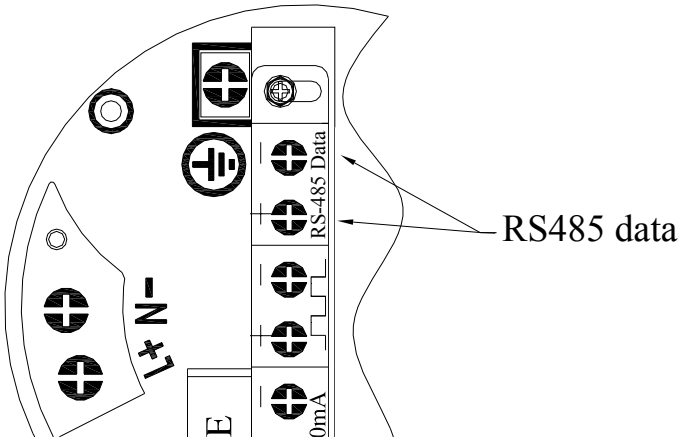


Figure 2-19 RS485 Connections

2.8 QUICK START-UP

Once the magnetic flowmeter system is installed and communication is established, final configuration of the transmitter must be completed. You may perform these functions with the LOI ,Specific instructions regarding these functions are provided in (**Section 3: Local Operator Interface**) To initiate a basic flowmeter system start-up, only two parameters are required:

1. Set Units
2. Output Range

If your application of the magnetic flowmeter system involves more

advanced functions such as multi drop or pulse output, additional configuration steps may be required to enable full functionality. See (**Section 3: Local Operator Interface**)

2.8.1 Installation Check and Guide

Use this guide to check new installations of Magnetic Flowmeter Systems that appear to malfunction.

Before You Begin

Be sure that power to your system is off before beginning these checks.

Transmitter

1. Check for correct flowtube line size entered in the software. (The line size value is listed on the flowtube nameplate.)
2. Check that the analog range of the transmitter matches the analog range in the control system.

Flowtube

1. For horizontal flow installations, ensure that the electrodes are in a plane such that they remain covered by process fluid.
2. For vertical or inclined installations, ensure that process fluid is flowing up into the flowtube to keep the electrodes covered by process fluid.
3. Ensure that the grounding straps on the flowtube are connected to grounding rings, lining protectors, or the adjacent pipe flanges. Improper grounding will cause erratic operation of the system.

Process Fluid

1. Process fluid conductivity should be 5 μmhos per centimeter, minimum.
2. Process fluid must be free of air and gasses.
3. Flowtube should be full of process fluid.

SECTION 3:LOCAL OPERATOR INTERFACE

The LOI option is an operator communications center for the Model YLZ-3. Through the LOI, the operator can access any transmitter function for changing configuration parameter settings, checking totalized values, or other functions.

3.1 SAFETY MESSAGES

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol.  Please refer to the following safety messages before performing an operation preceded by this symbol.

3.2 WARNINGS

Explosions could result in death or serious injury:

- Verify that the operating atmosphere of the flowtube and transmitter is consistent with the appropriate hazardous locations certifications.
- Do not remove the transmitter cover in explosive atmospheres when the circuit is alive.
- Before connecting a HART-based communicator in an explosive atmosphere, make sure the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Both transmitter covers must be fully engaged to meet explosion-proof requirements.

Failure to follow safe installation and servicing guidelines could result in death or serious injury:

- Make sure only qualified personnel perform the installation.
- Do not perform any service other than those contained in this manual unless qualified.

High voltage that may be present on leads could cause electrical shock:

- Avoid contact with leads and terminals.

3.3 LOI FEATURES

The LOI option contains a four-line, 16-character liquid crystal display (LCD) that is back-lit and visible from any angle. There are four touch keys on the pad, and a infrared decoder to receive keys that on the remote encoder. **Table 3-1** lists and details the functions of the LOI keys.

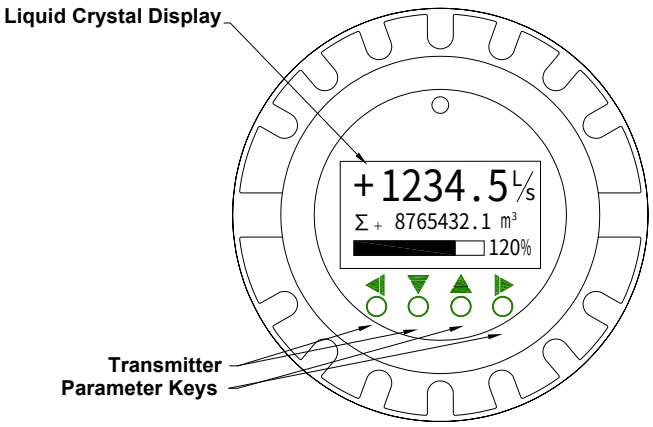


Figure 3-1 Model YLZ-3 Local Operator Interface

LOI Key	Function Performed
←	Enter,Moves to the previous display field. Save parameters
←(3s)	Enter browse parameters
↑	Moves the cursor to the next higher field. Changes user-selected variables in a field to next higher value. Changes parameters on a predefined list. Change display page Change parameters page when browsing parameters
↓	Moves the cursor to the next lower field. Changes user-selected variables in a field to next lower value. Changes parameters on a predefined list. Change display page Change parameters page when browsing parameters
↓(3s)	Toggle keypad lock
→	Enter menu Moves cursor to next user-selected variable. Changes parameters on a predefined list. Aborts a chosen operation. Aborts browse parameters
← ↑	Adjust contrast
← ↓	Adjust contrast
← →	Zero trim

3.4 LOI ROTATION

Each magnetic flowmeter installation is different from application to application; therefore, the LOI display can be rotated to accommodate various setups using the following procedure:

1. Remove power from the transmitter.
2.  Screw and remove the LOI cover. Do not remove the cover in explosive atmospheres when the circuit is alive.
3. Unfasten the 4 screws that attach the LOI assembly to the main circuit assembly.
4. Carefully remove the LOI assembly by pulling it away from the transmitter.
5. Position the LOI in a preferred 90° rotation.
6. Fasten the 4 screws that attach the LOI to the main circuit assembly.
7. Replace the LOI cover.

3.5 DATA ENTRY

The LOI keypad has no numerical keys. Enter numerical data using the following procedure:

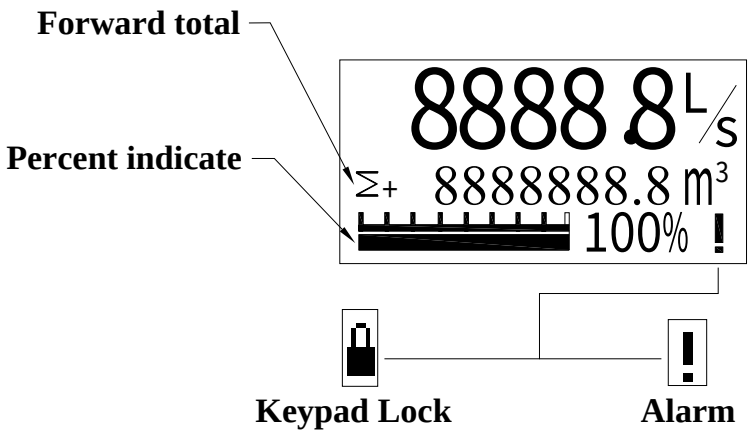
1. Access the appropriate function.
2. Use → to highlight the digit you want to enter or change.
3. Use ↑ or ↓ to change the highlighted value.

   For numerical data, ↑ or ↓ toggles through the digits **0–9**, **decimal point**, For alphabetical data, they toggle through the letters of the alphabet **A–Z**, digits **0–9**, and the symbols **&**, +, –, *, /, **$**, **@**, **%,** and the **blank space**.(↑ or ↓ is also used to toggle through pre-determined choices that do not require data entry.)
4. Use → to highlight and change other digits you want to change.
5. Press ← when the desired choice is displayed on the screen.

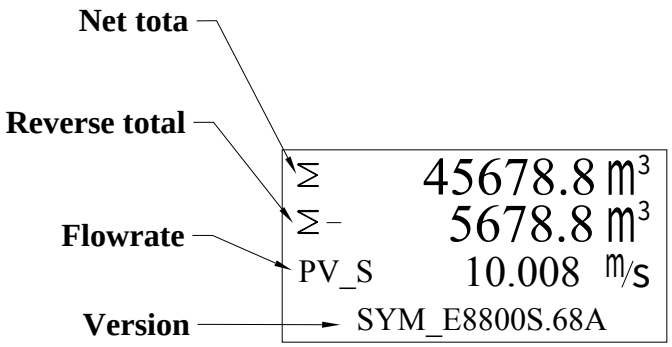
3.6 DISPLAY PAGE

The YLZ-3 has three pages to display data and status, Press ↑ or ↓ to change page.

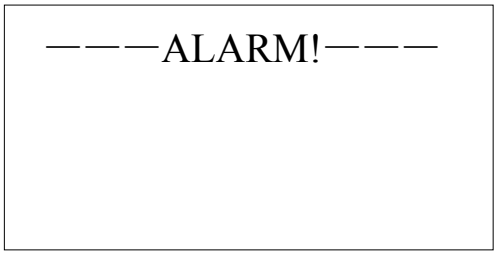
- **Primary page**



- **Secondary page**

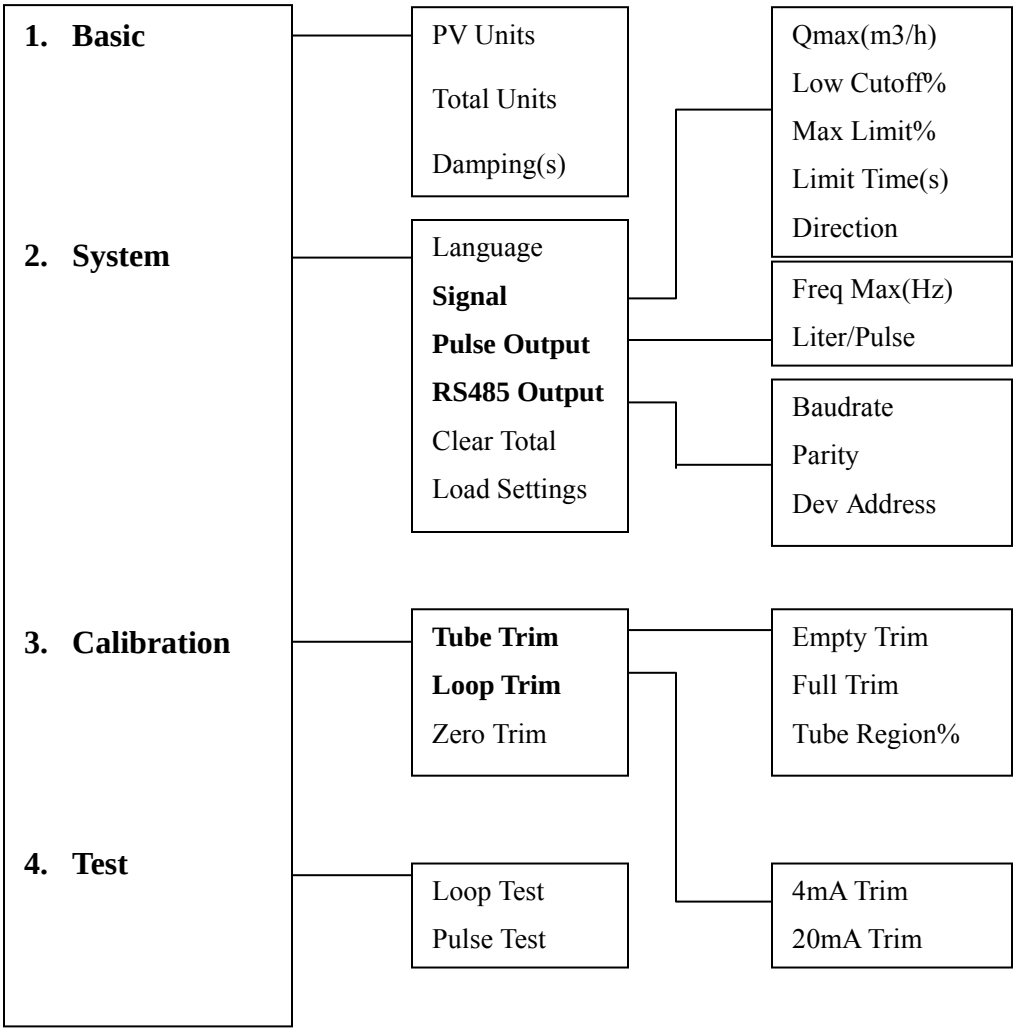


- **Alarm page**



If there is no alarm, this page will not appear.

3.7 LOI MENU



3.7.1 Basic Configuration

- **Basic→** PV Units

PV Units variable specifies the format in which the flow rate will be displayed. Units should be selected to meet your particular metering needs. The choices are shown below:

L/s: Liter/Sec m3/s: CuMetre/Sec G/s: gal/Sec

L/m: Liter/Min m3/m: CuMetre/Min G/m: gal/Min

L/h: Liter/Hour m3/h: CuMetre/Hour G/h: gal/Hour

- **Basic→** Total Units

Total Units variable specifies the form at in w hich the total will be displayed. Units should be selected to m eet your par ticular metering needs. The choices are shown below:

L: Liter m 3: CuMetre G : gal

- **Basic→** Damping(s)

Damping(S) allows selection of a res ponse ti me, in seconds, to a step change in flow rate. It is m ost of ten used to sm ooth fluctuations in output.

3.7.2 System Configuration

- **System→** Language

Language allows s election of a l anguage for operate i nterface, The choices are shown below:

CHINESE ENGLISH

- **System→ Signal →**Qmax(m3/h)

Reset the **Qmax(m3/h)** to change the size of th e range (or span) . Under normal ci rcumstances, t he **Qmax** s hould be set to a value nea r the maximum expected flow rate.

This value relative to 20mA output and maximum frequency output.

- **System→ Signal →** Low Cutoff %

Low Cutoff allows you to sp ecify the fl ow, between 0.0-9.9%Qm ax, below which the outputs are driven to zero flow.The un its f ormat for low flow cu toff can not b e cha nged. It is alw ays displa yed as per cent of Qma x regardless of the for mat sel ected. Th e low cut off value applies to both forward and reverse flows.

- **System→ Signal →** Max Limit%

The maximum percent limit is a tolerance band set up on either side of the running average. The percentage value refers to deviation from the running average. For example, if the running average is 100 L/Sec, and a 2 percent maximum limit is selected , then the acceptable range is from 98 to 102 L/Sec.Values within the limit are accepted while values outside the limit are analyzed to determine if they are a noise spike or an actual flow change.if this parameter equal to 0.0, this function would be disabled.

- **System→ Signal →** Limit Time(s)

This parameter forces the output and running average values to the new value of an actual flow rate change that is outside the percent limit boundaries. It thereby limits response time to flow changes to the time limit value rather than the length of the running average. For example, if the number of samples selected is 120, then the response time of the system is 10 seconds. In some cases this may be unacceptable. By setting the time limit, you can force the Model YLZ-3 to clear the value of the running average and re-establish the output and average at the new flow rate once the time limit has elapsed. This parameter limits the response time added to the loop. A suggested time limit value of 3 seconds is a good starting point for most applicable process fluids.

- **System→ Signal →** Direction

This parameter allows you to specify the flow **Direction,** The choices are shown below:

Fwd: FORWARD Rev: REVERSE

- **System→ Pulse Output→** Freq Max(Hz)

This parameter allows you to specify the maximum frequency output relative to Qmax

For example: Qmax=100L/h FreqMax=2000Hz

FlowRate = 50L/h

Frequency output = (FlowRate / Qmax)*FreqMax = 1000Hz

- **System→ Pulse Output→** Liter/Pulse

This parameter allows you to specify volume pass through the flowtube every pulse time. If this parameter equal to 0.0, then this output mode is invalid, transmitter automatically use **Freq Max** to determine pulse output.

When selecting pulse output scaling, remember that the maximum pulse rate is 5000 Hz. With the 110 percent overrange capability, the absolute limit is 5500 Hz. For example, if you want the Model YLZ-3 to pulse every time 0.01L pass through the flowtube, and the flow rate is 5000 L/min, you will exceed the 5000 Hz full-scale limit:

(5000L/min)/(60sec/min * 0.01L/p) = 8333.33Hz

The best choice for this parameter depends upon the required resolution, the number of digits in the totalizer, the extent of range required, and the maximum counter input frequency.

- **System→ RS485 Output →**Baudrate

This parameter allows you to specify the baudrate of RS485 communication**,** The choices are shown below:

1200 2400 4800 9600

- **System→ RS485 Output →**Parity

This parameter allows you to specify the parity of rs485 communication**,** The choices are shown below:

NONE ODD EVEN

- **System→ RS485 Output →**Dev Address

This parameter allows you to specify the device address of RS485 communication, RS485 support multidrop communication, this parameter is used to identify each transmitter on a bus.

- **System→** Clear Total

Run this function to clear Forward,Reverse,and Net Total.

- **System→** Load Settings

If some parameter is corrupted , induce transmitter can not work correctly, run this function to restore all parameters.

3.7.3 Calibration Configuration

- **Calibration→ Tube Trim→** Empty Trim

In order to check flowtube whether empty or full, must perform **empty Trim** before use this function, confirm the flowtube is empty and dry, Then run this function. The transmitter completes the procedure Automatically in about 15 seconds, and record eigenvalue of empty flowtube.

- **Calibration→ Tube Trim→** Full Trim

In order to check flowtube whether empty or full, must perform **Full trim** before use this function, confirm the flowtube is full, then run this function. The transmitter completes the procedure automatically in about 15 seconds, and record eigenvalue of full flowtube.

- **Calibration→ Tube Trim→** Tube Region %

This parameter allows you to specify the sensitivision of checking the flowtube whether empty or full. The value more great, would be more easy to check the flowtube whether empty or full. If this parameter equal to 0.0, this function would be disabled.

- **Calibration→ Loop Trim→**4mA Trim/20mA Trim

For maximum accuracy, the analog output should be calibrated and, if necessary, trimmed for your system loop. The **4–20 mA Output Trim** procedure alters the conversion of the digital signal into an analog 4–20 mA output.

Use the following steps to complete this function.

1. Set the loop to manual, if necessary.
2. Connect a precision ammeter to the 4–20 mA loop.
3. Initiate the Output Trim function with the LOI
4. Enter the 4 mA meter value when prompted to do so.
5. Enter the 20 mA meter value when prompted to do so.
6. Return the loop to automatic control, if necessary.

The 4–20 mA trim is now complete. You may repeat the 4–20 mA trim to check the results, or use the analog output test.

- **Calibration→**Zero Trim

Run this function only with the transmitter and flowtube installed in the process. The flow tube must be filled with process fluid at zero flow. Then, begin the auto zero procedure. The transmitter completes the procedure automatically in about 15 seconds.

3.7.4 Test Configuration

- **Test→**Loop Test

The **Loop Test** allows you to drive the transmitter output to a desired electric current output on the 4–20 mA terminals. This capability allows you to check the entire current loop prior to start-up.

- **Test→** Pulse Test

The **Pulse Test** allows you to drive the frequency output at digital output terminals to a desired value. This capability allows you to check auxiliary equipment prior to start-up.

SECTION 4:TROUBLESHOOTING

Problems in the magnetic flowmeter system are usually indicated by incorrect output readings from the system, error messages, or failed tests. Consider all sources when identifying a problem in your system.

4.1 BASIC TROUBLESHOOTING

Symptom	Potential Cause	Corrective Action
Output at 0 mA.	No power to transmitter.	Check power source and connections to the transmitter.
	Analog output improperly configured.	Check the analog power switch. See **Hardware Switches** for proper settings.
	Electronics failure.	Replace the electronics boards.
Output at 4 mA	Transmitter in multidrop mode.	Configure Poll Address to 0 to take transmitter out of multidrop mode.
	Low Flow Cutoff set too high.	Configure Low Flow Cutoff to a lower setting or increase flow to a value above the low flow cutoff.
	Flow is in reverse direction.	Enable Reverse Flow function.
	Shorted coil.	Coil check.
	Empty pipe.	Fill pipe.
	Electronics failure.	Replace the electronics boards.
Pulse output at zero, regardless of flow.	No power to transmitter.	Check power source and connection to the transmitter.
	Wiring error.	Check pulse output wiring at digital output terminals. Refer to wiring diagram for pulse output.
	Reverse flow.	Enable Reverse Flow function.
	Electronics failure.	Replace the electronics boards.

4.2 ADVANCED TROUBLESHOOTING

If your system is experiencing problems and the basic troubleshooting steps do not address your problem, use the following advanced troubleshooting procedures or call your service representative. The procedure for advanced troubleshooting is as follows:

1. Consider symptoms in the basic troubleshooting table.
2. Consider symptoms in the advanced troubleshooting table.
3. Perform the flowtube tests to see if flowtube must be removed from the process line.
4. If the problem persists, contact your sales or service representative.

Process Noise:

In some circumstances, process conditions themselves can cause the meter output to be unstable. The basic procedure for addressing a noisy process situation is outlined below. Complete them in order. When the output attains the desired stability, no further steps are required.

Noisy Conditions Basic Procedure:

1. Change coil drive to 33 Hz.
2. Increase the damping.
3. Activate signal processing.

Symptom	Potential Cause	Corrective Action
Reading doesn't appear to be within rated accuracy	Transmitter, control system, or other receiving device not configured properly.	Check all configuration variables for the transmitter,flowtube, communicator, and/or control system.,Perform a loop test to check the integrity of the circuit.
	Electrode Coating.	Use replaceable electrodes Downsize flowtube to increase flow rate above 3 ft/s. Periodically clean flowtube.
	Air in line.	Move the flowtube to another location in the process line to ensure that it is full under all conditions.
	Flow rate is below 1 ft/s (specification issue).	See accuracy specification for specific transmitter and flowtube.
	Auto zero was not performed when the flowtube is full,or flowrate is zero.	Perform the auto zero function
	Flowtube failure–Shorted electrode.	Perform flowtube tests electrode.
	Flowtube failure–Shorted or open coil.	Perform flowtube tests coil
	Transmitter failure.	Replace the electronics boards.
Noisy Process	Chemical additives upstream of magnetic flowmeter.	Move injection point downstream of magnetic flowmeter, or move magnetic flowmeter.
	Sludge flows–Mining/Coal/Sand/ Slurries (other slurries with hard particles).	Decrease flow rate below 10 ft/s.
	Styrofoam or other insulating particles in process.	Consult factory.
	Electrode coating.	Use replaceable electrodes Downsize flowtube to increase flow rate above 3 ft/s. Periodically clean flowtube.
	Air in line.	Move the flowtube to another location in the process line to ensure that it is full under all conditions.

Meter output is unstable.	Electrode incompatibility.	Check Magnetic Flowmeter Material Selection Guide for chemical compatibility with electrode material.
	Improper grounding.	Check ground wiring. See wiring and grounding procedures.
	High local magnetic or electric fields.	Move magnetic flowmeter (20–25 ft. away is usually acceptable).
	Control loop improperly tuned.	Check control loop tuning.
	Sticky valve (look for periodic oscillation of meter output).	Correct valve sticking.
	Flowtube failure.	Perform Flowtube Tests.
	Analog output loop problem.	Check that the 4–20 mA loop matches the digital value. Perform loop test.

SECTION5: SPECIFICATIONS

5.1 FUNCTIONAL SPECIFICATIONS

Flow Rate Range:

Capable of processing signals from fluids that are traveling between 0.1 to 10 m/s for both forward and reverse flow in all flowtube sizes. Full scale continuously adjustable between –10 to +10 m/s.

Fluid Conductivity:

Fluid must have conductivity of at least 5 microsiemen/cm.

Power Supply:

90–250 V ac 50–60 Hz.

18– 36 V dc.

Power Consumption:

10 watts maximum.

Ambient Temperature Limits:

Operating:

–40 to 165 °F (–40 to 75 °C).

Storage:

–40 to 185 °F (–40 to 85 °C).

Output Signals:

4–20 mA, 0 to 1000 ohm load.

Frequency output, 0 to 10000 Hz

Pulse output, 0-5000Hz

RS485 communication

Reverse Flow:

Allow measure reverse flow.

Output Testing:

Current Source

Transmitter can be commanded to supply a specified current between 4.0 and 20.0 mA.

Frequency Source

Transmitter can be commanded to supply a specified frequency between 0.1 and 10000 Hz.

Turn-on Time:

30 minutes to rated accuracy from power up; 5 seconds from power interruption.

Start-up Time:

0.5 seconds from zero flow.

Low Flow Cutoff:

Adjustable between 0.0 and 9.9%Qmax. Below selected value, output is driven to the zero flow rate signal level.

Humidity Limits:

0–100% RH to 150 °F (65 °C).

Overrange Capability

Signal output continues to 110% of upper range value setting, then remains constant. Out of range message displayed on LOI

Damping

Adjustable between 0.1 and 99 seconds.

Standard Hazardous Locations Certifications:

Exd[ia]iaIICT5.

5.2 PERFORMANCE SPECIFICATIONS

Accuracy:

System accuracy is ±0.5% of rate from 0.2 to 10 m/s, below 0.2 m/s, the system has an accuracy of ±0.0015 m/s. Analog output has the same accuracy as frequency output plus an additional 0.05% of span.

Repeatability

±0.1% of reading.

Response Time

0.2 seconds maximum response to step change in input.

Stability

±0.1% of rate over six months.

Ambient Temperature Effect

±0.25% change over operating temperature range.

5.3 PHYSICAL SPECIFICATIONS

Electrical Connections:

M20*1.5 connections provided on the transmitter housing. Screw terminals provided for all connections. Power wiring connected to transmitter only. Integrally mounted transmitters are factory wired to the flowtube.

Mounting:

Transmitter is mounted integrally with the flowtube.