

Tek-Flux 1400B

Insertion Electromagnetic Flowmeter



Quick Start Guide

1. Before you begin

Before installation check the model, specifications, and installation location for the transmitter. Follow the full User Guide for detailed installation and other information.



Make sure only qualified personnel perform the installation



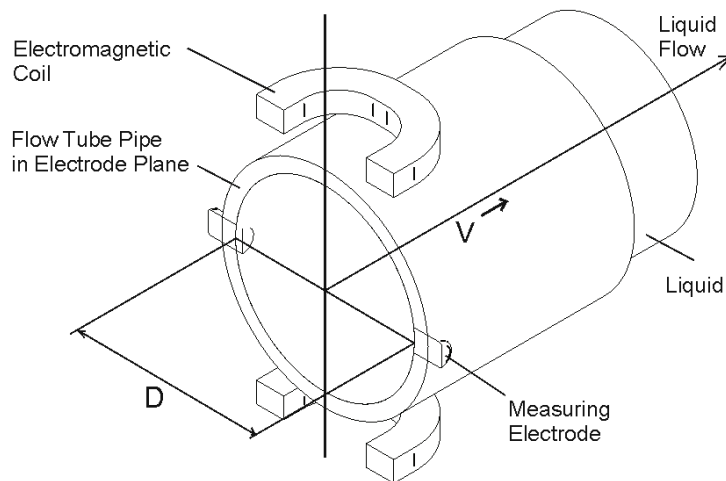
Do not perform any service other than those contained in this manual unless qualified

2. Unpack

Tek-Flux 1400B Insertion Electromagnetic Flowmeter

3. Flow computation basics

All parts should be handled carefully to prevent damage. Whenever possible, transport the system to the installation site in the original shipping containers. The flow tube 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.



4. Display

The user interface comprises of backlit LCD readout in a configuration 2 rows of 16 characters each, and a set of three tactile keys. The Flowmeter has different modes, and the LCD displays information relevant to each of the four modes – Run, Program, Info and Clear respectively.

The tactile keys in conjunction with the LCD, enable switching between different modes, reading static information and runtime values, setting and programming new values and selecting between certain functional options. This process of navigation takes you through different Screens - each Screen being a collection of information relevant to that particular Screen. The Screens are part of an internal Menu structure.

To help you navigate through the above Menu, it is useful to understand the nature of the actions of the three tactile switches.



UP key

- Move to the next option within a Menu level
- Increment the value of the digit by one
- Move to the next value of a parameter



DOWN/ RIGHT key

- Move to the previous option within a Menu level
- Decrement the value of the digit by one
- Move to the previous value of a parameter

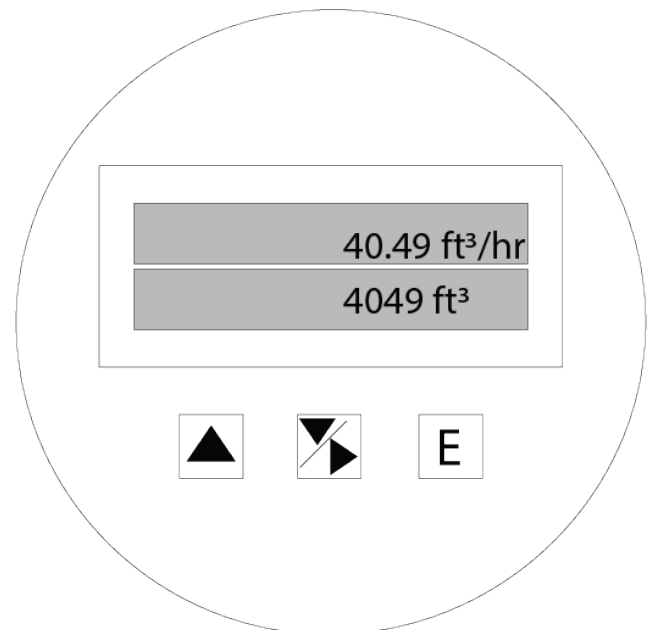


DOWN/ RIGHT key

- Move to the right digit
- Move from the rightmost digit to the leftmost

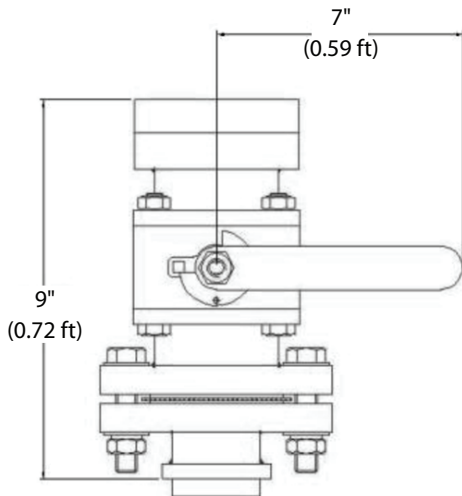
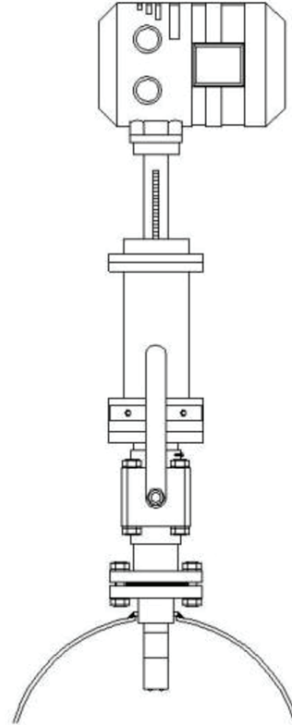
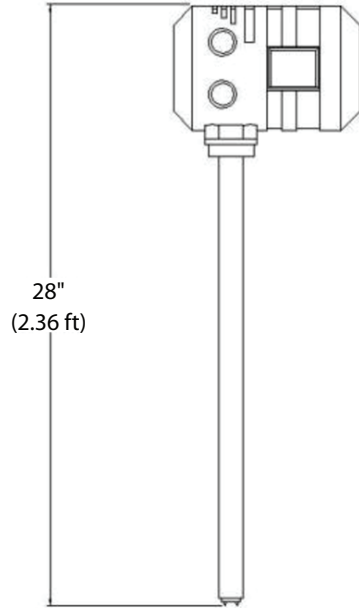


ENTER key



Quick Start Guide

5. Dimension



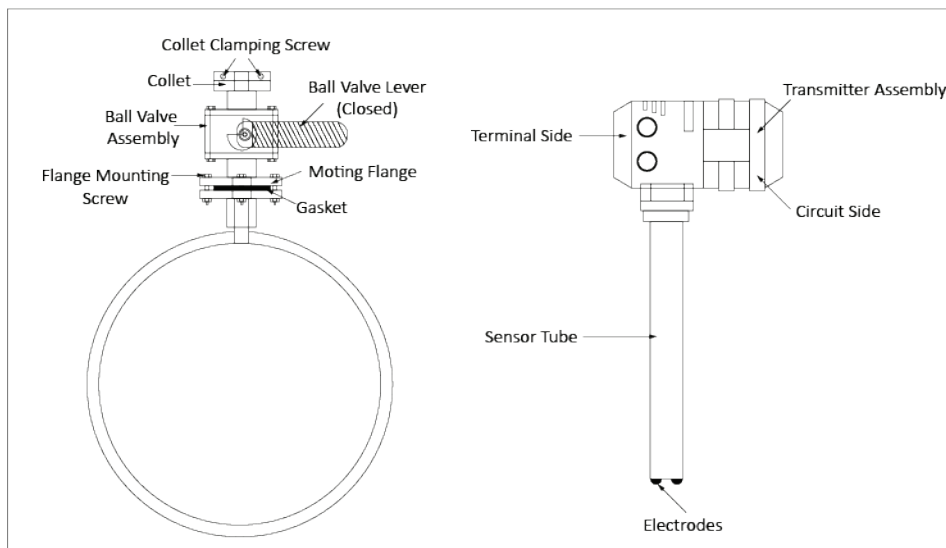
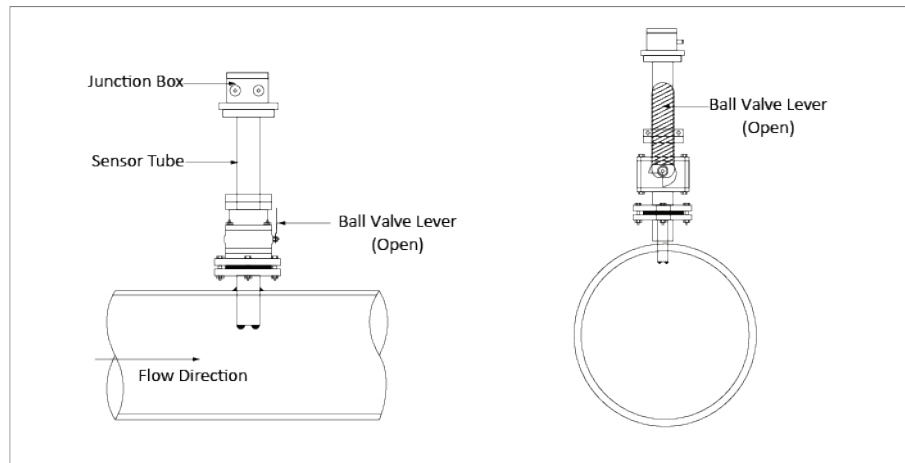
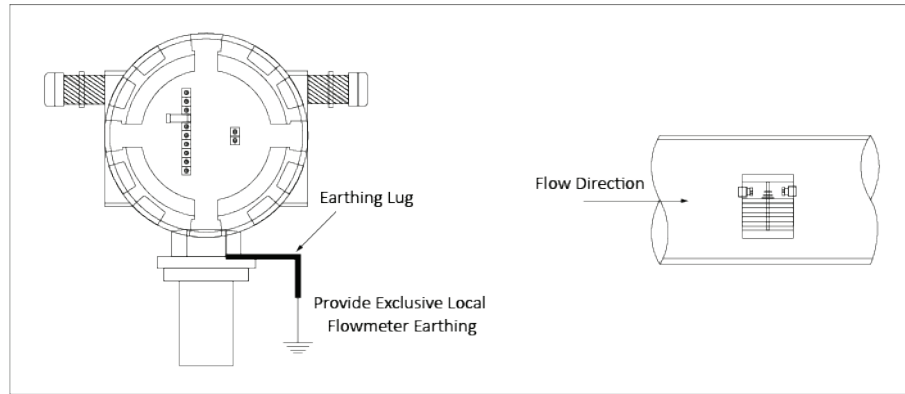
6. Preinstallation Check

- a. Re-confirm the compatibility of the process liquid with the materials of the Flow Sensor liner and the electrodes as ordered by you.
 - If the process liquid is a mixture of different components, confirm the compatibility of all the components.
 - Make sure that the electrical conductivity of the liquid is greater than 10 μ Siem.
 - Many process liquids are designated by generic names. But these may contain certain contaminants in traces. These traces may also be harmful to the Flowmeter. Therefore, check the compatibility of such traces as well.
 - Note that the severity of corrosion of materials depends upon the temperature and the concentration of the process liquid.
 - The corrosion due to service liquid will reduce the life of the Flowmeter.
- b. Confirm that the available supply voltage and its frequency (for AC supply) are in accordance with the specifications of the Flowmeter.
- c. Ensure that the selected Flowmeter size is suitable for the flow rate to be measured. Note that the velocity under normal conditions should be between 0.2 mis and 12 mis.
- d. Confirm that an appropriate Earth pit is available for proper Grounding.

7. Sensor Installation

The Flowmeter can be installed at any arbitrary location in the pipeline as long as the installation requirements are satisfied. At the same time, care should be exercised when selecting the installation site to assure that moisture cannot enter into the connection area.

- A ball valve assembly with Weld Neck Flange will be supplied in advance.
- A hole of 1.96" diameter is to be made on the pipe line. The Weld Neck Flange is to be welded into the Pipe Line for Flowmeter installation.
- Put a gasket between Weld neck Flange and Ball Valve Assembly.
- Mount Ball Valve Assembly on the Weld Neck Flange by aligning Weld Neck Flange and Ball Valve Assembly Bottom Flange. Ensure Ball Valve Lever Alignment is with respected to the Flow direction as shown in the figure.
- The Ball Valve Assembly Mounting Bolts are provided (M 10 X 3.93") The mounting bolts are to be tightened. Follow diametrically opposite tightening Sequence.
- Loosen the Collet Clamping Screws provided on the periphery of collect at the Top of Ball Valve Assembly.
- According to the theory of velocity profiles for fully developed turbulent flow in the pipe line, the average velocity point is located at a distance of $1/8 D$ from the pipe wall where D is the internal pipe diameter.
- We insert up to 10% of Pipe Diameter.
- Before Sensor is inserted, the insertion length is marked on the Sensor.
 - a) Measure the length of Assembly from Pipe Surface to Collet Top. (Say X)
 - b) Say Insertion Length is Y .
 - c) Say Pipe Thickness is Z .
 - d) Now mark the length of $X + Y + Z$ starting from Electrodes and up.
- Now open Ball Valve lever fully. Slowly insert the Flow meter's Sensor, passing through the hole.
- Up to the length marked on the Sensor. The Flow Transmitter direction should be as per the drawing.
- Once, the Insertion Length is achieved, tighten the Collet Clamping Screws.
- For the Flowmeter installation in a pit, for proper installation, commissioning and maintenance of the Flowmeter, the pit dimensions have to be at least 2 mtr X 2 mtr.
- Kindly ensure that the pit is covered with the protective cover. The pit should be waterproof so that in rainy season it should not get flooded or submerged in water.



Quick Start Guide

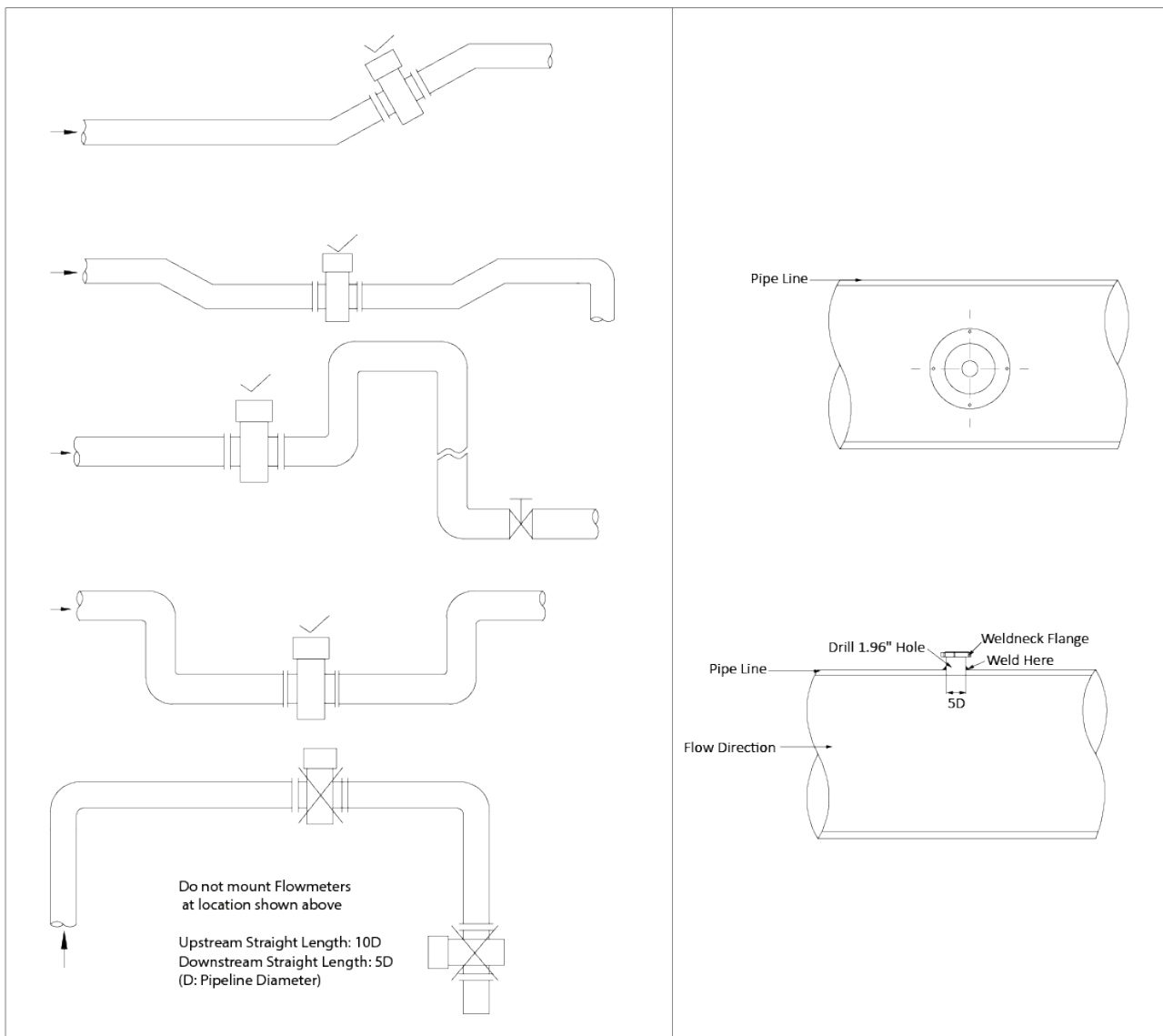
8. Transmitter Installation

Integral Type Transmitter

- In case of an Integral Type Flowmeter, the Transmitter comes pre-mounted atop the Flow Sensor and therefore gets physically installed along with the Flow Sensor/sensor. Install the Flow Sensor as described in section 5 'Sensor Installation'.
- The images below show the Integral Type Transmitter mounted on the Flow Sensor.

Protecting the Transmitter

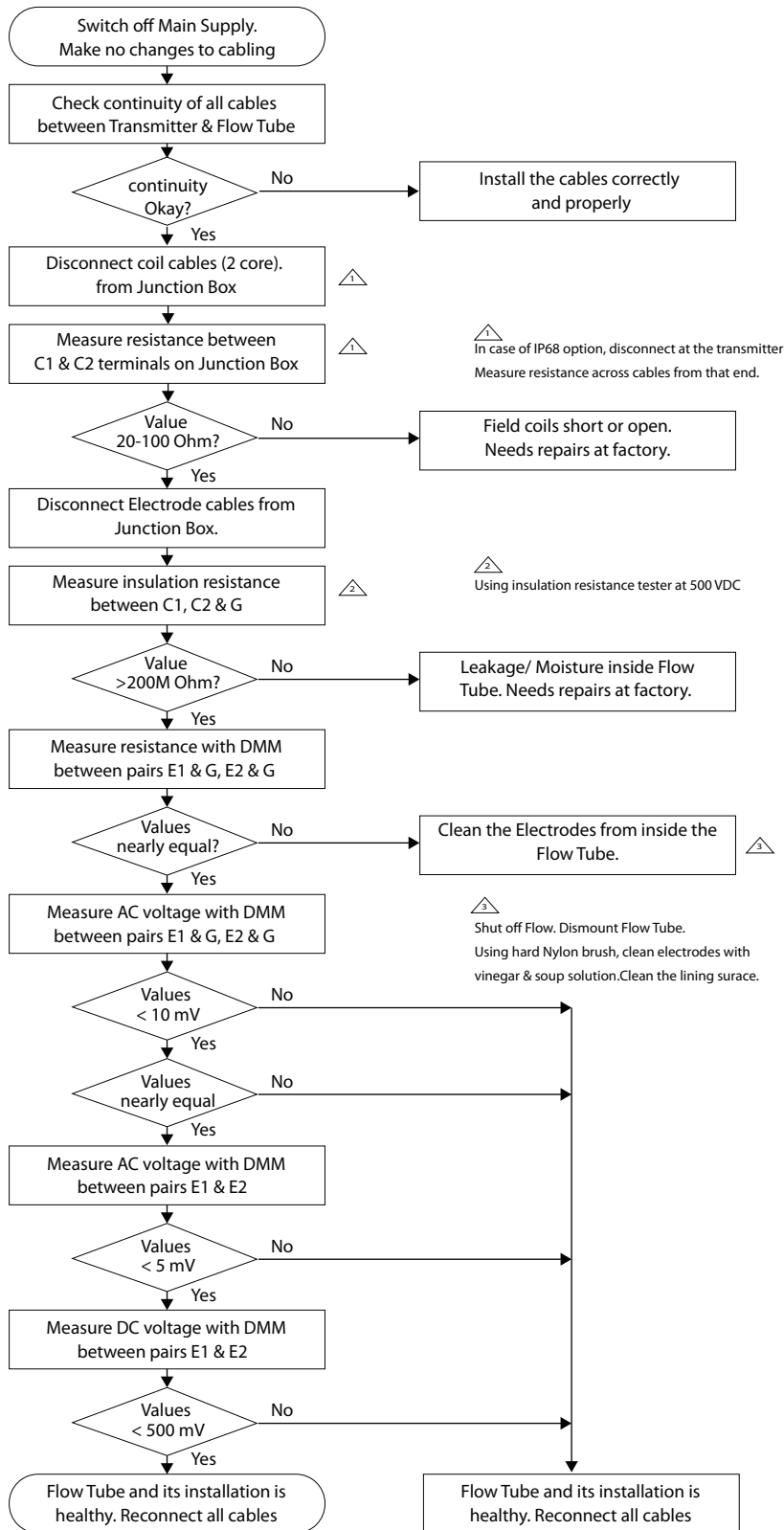
Provide a weather-shade/ canopy to protect the Transmitter from direct exposure to sunlight, rain or any other dropping fluids. This will help enhance the useful life of the Transmitter.

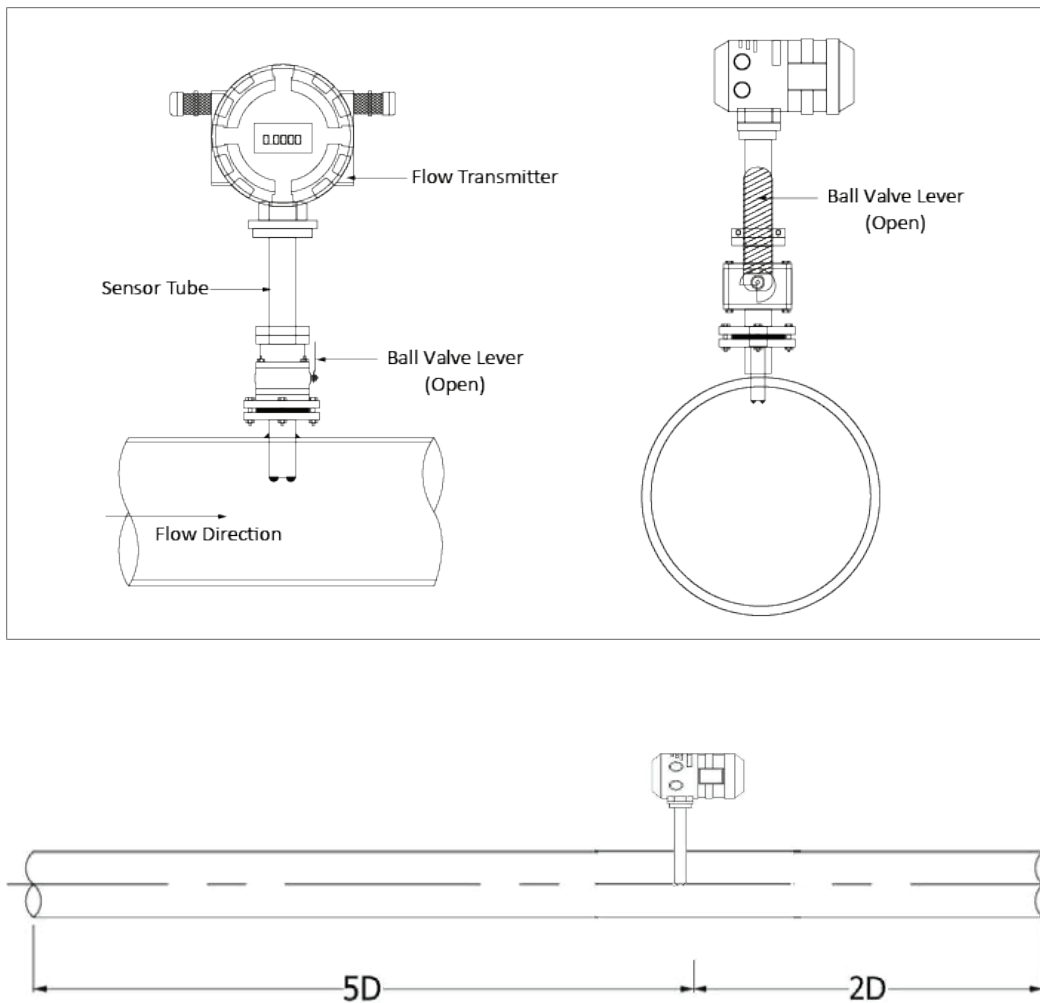


At flowmeter upst ream, there should be straight pipe no less than SD and no less than 2D at flowmeter downstream. (D is the inner diameter of flowmeter)

Quick Start Guide

Troubleshooting the Transmitter Section





9. Operation

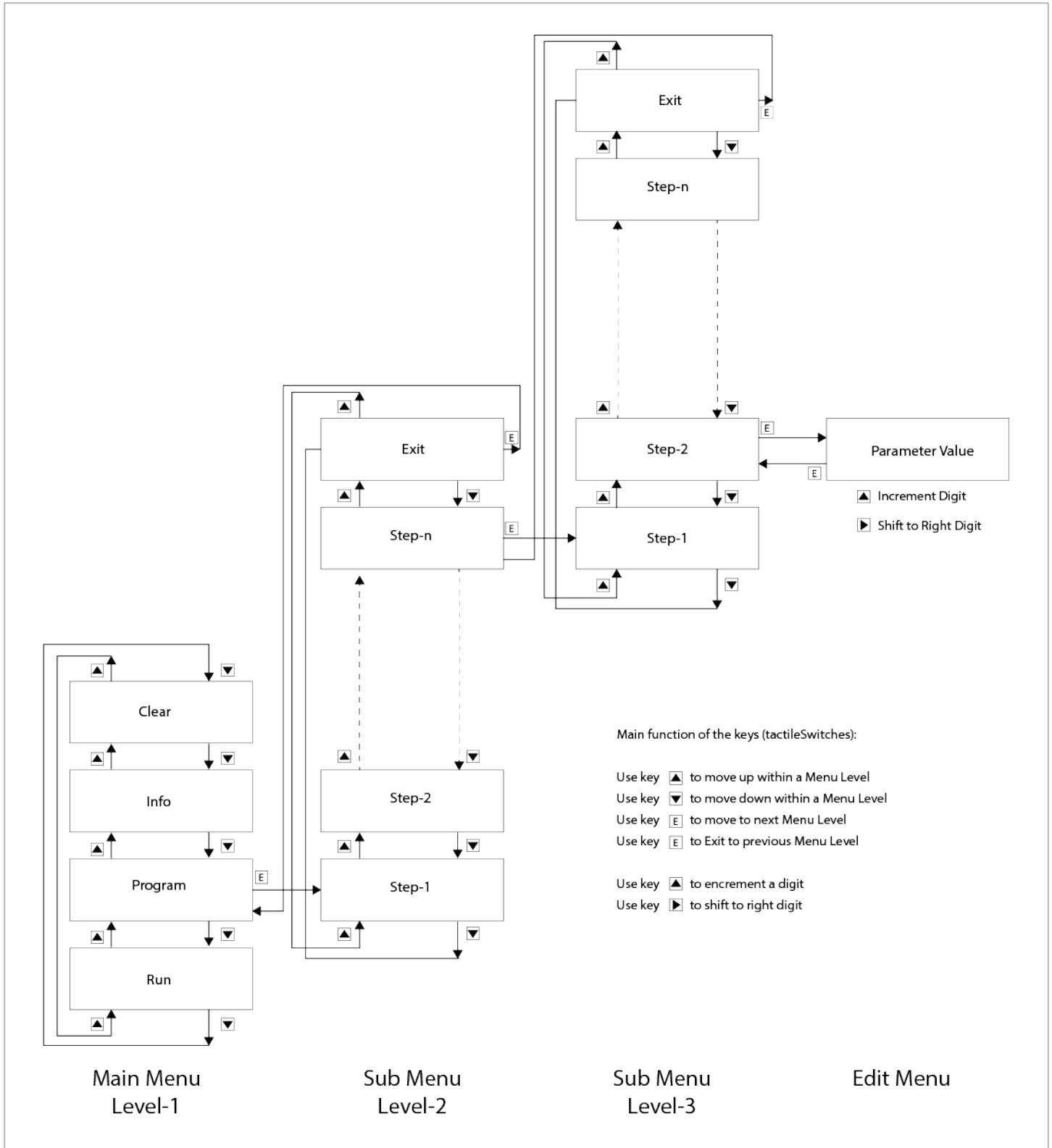
! Please read this section before trying to operate the tactile switches to navigate through the Menu. The 1400B Menu has the following structure. At power ON, the Transmitter LCD momentarily indicates.

- The Flowmeter Model, then
- The Software Version number, then
- The RUN mode indicating the Flow rate, Totalized flow and Flow velocity depending on which parameters have been configured to be displayed.

Hit the ENTER key first to access the 4 main functions using the UP and DOWN keys: Run/ Program/ Info and Clear

Quick Start Guide

Simple Explanation of How to Navigate

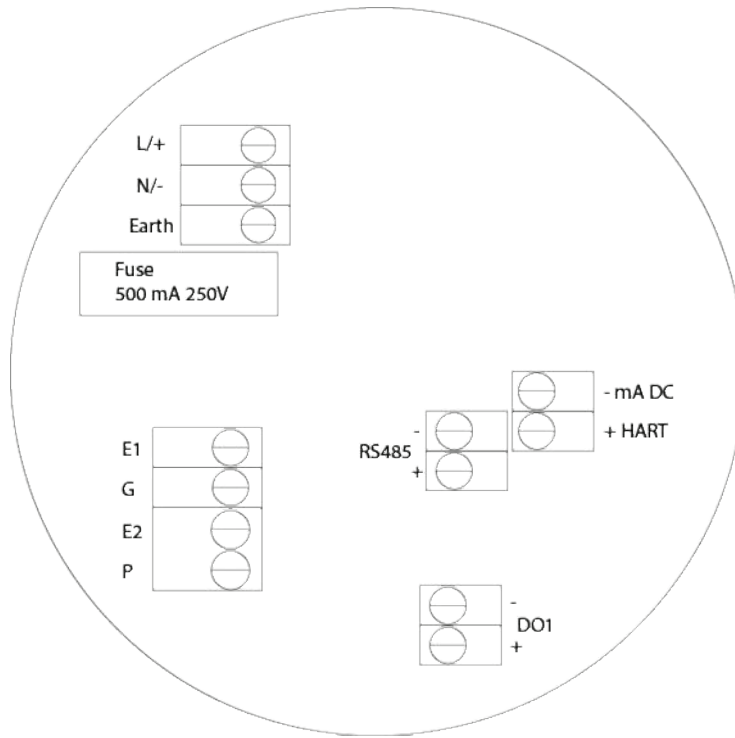


10. Integral Transmitter Terminals

- Unscrew the rear cover of the Transmitter. Read the operating Power Supply voltage indicated on the tag plate, and confirm that the available power supply matches the Transmitter's requirement.
- Make the field connections to the terminals as indicated in the following image



Note that the Coils and Electrodes are internally pre-wired.



Marking	Description	
L / +	110/ 230VAC	24 VDC
N / -	Neutral	0 VDC
E	Earth	
RS485 +	Modbus	
RS485 -		
DO1 +	Pulse Output	
DO1 -		
mA DC +	Current output	
mA DC -		

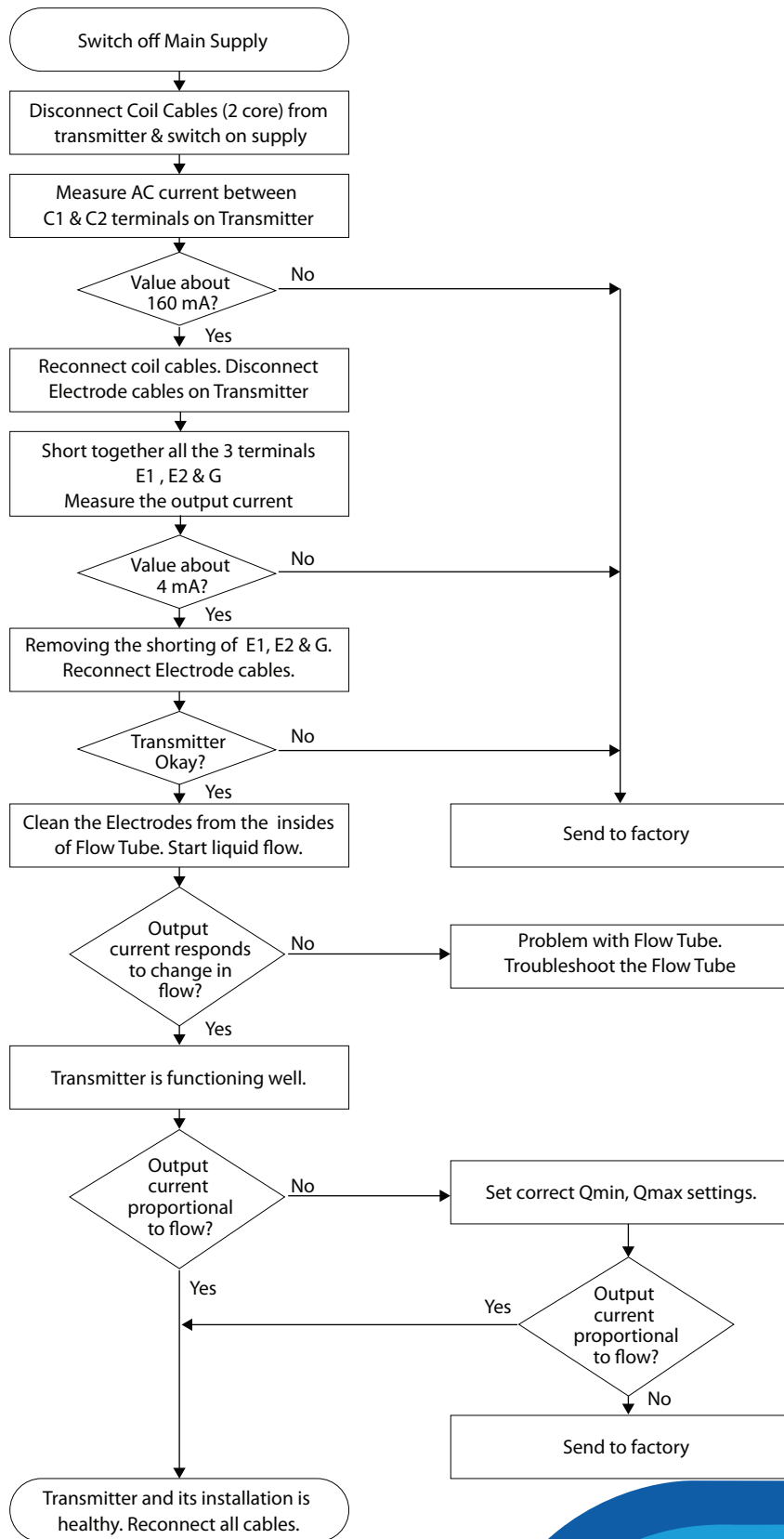
Quick Start Guide

11. Troubleshooting

Quick Checks

No.	Problem Observed	Possible Cause	Corrective Action
1	Transmitter does not power up.	a. Fuse has blown. b. The mains power supply is not as specified.	a. Ensure that the mains power supply is within $\pm 15\%$ of the value specified on the Nameplate. b. Replace the fuse if found to be blown.
2	The output current is not 4 mA DC under zero flow condition.	a. The flow is not essentially zero. There exists a small amount of trickle flow. b. Grounding is not proper.	a. Force the flow to zero by completely shutting off the downside valve and check. b. Correct the grounding.
3	Output current is not steady.	a. Flow itself is not steady but pulsating or irregular. b. Gas or air bubbles are present in the flowing liquid. c. The flowing liquid has a varying conductivity.	a. Allow the flow to stabilize and then check. b. Identify and eliminate the cause of the air or gas bubbles, or wait until liquid is free of bubbles. c. Allow to flowing liquid to attain a stable conductivity. d. Correct the grounding.
4	Output current not proportional to flow.	Qmax values may not be set properly.	Set the Qmax to values correctly corresponding to 20 mA.
5	Display alternates between High Flow and Empty pipe.	Grounding is not proper.	Correct the grounding.
6	Modbus communication issues	a. Wiring is not correct. b. Communication settings are incorrectly set.	a. Correct wiring as per diagram. b. Set correct communication parameters
7	Pulse is not available.	a. Pulse settings are not correct. b. Pulse type is not known.	a. Correct Pulse settings in respective DO section. b. Check your ordering for Active or Open Collector Output.

Troubleshooting the Transmitter Section



Quick Start Guide

12. Modbus RTU Communication Table

The Flowmeter supports Modbus RTU protocol over RS 485. The following parameters are available in Read Holding Registers (Function 3)

Address in Decimal	Data Type	Data Size in bytes	Register Name	Register Description
101	Double	4	Velocity	Flow Velocity (m/s or f/s depends upon unit selected)
105		4	Flow Rate	Flow Rate Positive or Negative
109		4	Pos Totaliser	Positive Totaliser
113		4	Neg Totaliser	Negative Totaliser
117	ulong	2	Flow Direction	1= Forward Flow 2 = Reverse Flow
119		2	Flow Status	1= Flow Zero 2 = Flow On 3 = High Flow 4 = Pipe Empty

Table 4 (Parameters in double)

Address in Decimal	Data Type	Data Size in bytes	Register Name	Register Description
131	Float	2	Velocity	Flow Velocity (m/s or f/s depends upon unit selected)
133		2	Flow Rate	Flow Rate Positive or Negative
135		2	Pos Totaliser	Positive Totalizer, resolution as set
137		2	Neg Totaliser	Negative Totalizer, resolution as set
139	ulong	2	Flow Direction	1= Forward Flow 2 = Reverse Flow
141		2	Flow Status	1= Flow Zero 2 = Flow On 3 = High Flow 4 = Pipe Empty

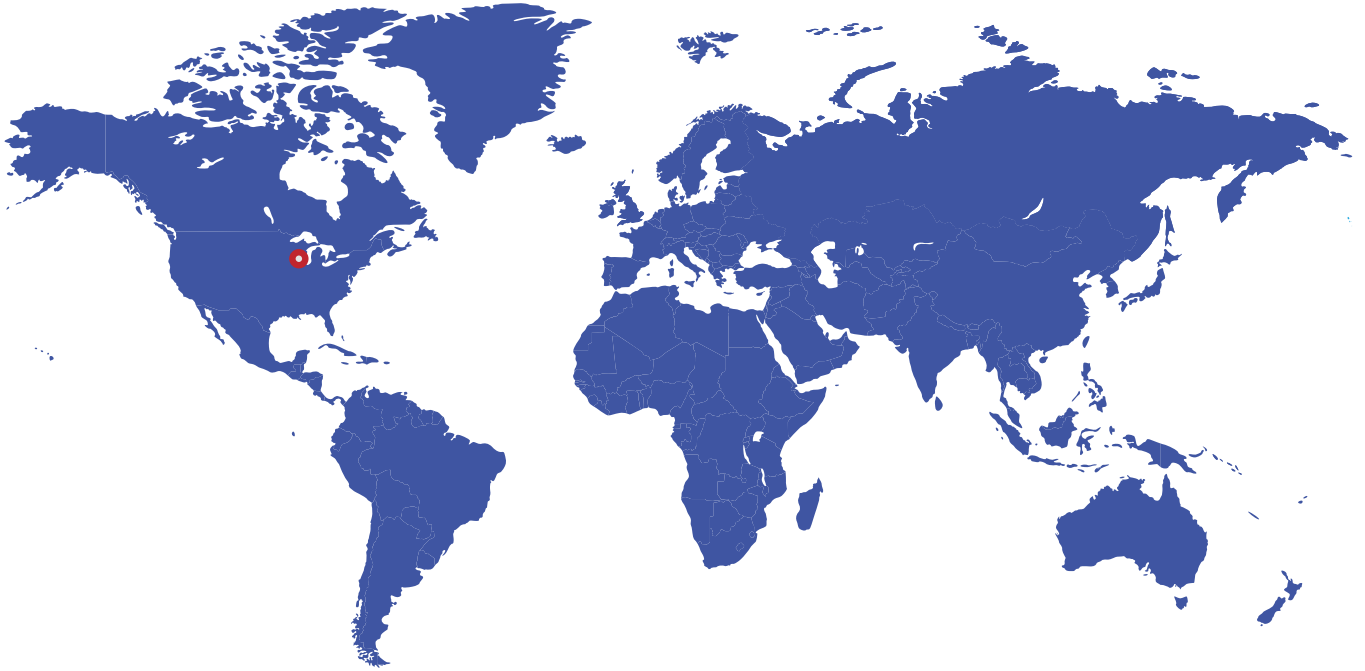
Table 5 (Parameters in float)

Address in Decimal	Data Type	Data Size in bytes	Register Name	Register Description
161	Slong	2	Velocity	Flow Velocity (m/s or f/s depends upon unit selected)
163		2	Flow Rate	Flow Rate Positive or Negative Flow Rate < 100000, resolution 0.0001 Flow Rate >= 100000, resolution 1
165	ulong	2	Pos Totaliser	Positive Totaliser, resolution as set
167		2	Neg Totaliser	Negative Totaliser, resolution as set
169		2	Flow Direction	1= Forward Flow 2 = Reverse Flow
171			Flow Satuts	1= Flow Zero 2 = Flow On 3 = High Flow 4 = Pipe Empty

Table 6 (Parameters in signed long integer)



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