



Technology Solutions

TEK-FLUX 1400A

Electromagnetic Flow Meter

Instruction Manual

Document Number: IM-1400A



www.tek-trol.com

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.

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1 Safety Instructions

1.1 Intended Use

Tek-Flux 1400A is used to measure flow rate of electrically conductive liquids. Typical applications are found in all industries e.g., Metallurgy industry, Water and wastewater, Agriculture and irrigation, Food and beverage industry, Pharmaceutical industry.

1.2 Safety Instructions from the Manufacturer

1.2.1 Disclaimer

The manufacturer will not be held accountable for any damage that happens by using its product, including, but not limited to direct, indirect, or incidental and consequential damages.

Any product purchased from the manufacturer is warranted in accordance with the relevant product documentation and our Terms and Conditions of Sale.

The manufacturer has the right to modify the content of this document, including the disclaimer, at any time for any reason without prior notice, and will not be answerable in any way for the possible consequence of such changes.

1.2.2 Product Liability and Warranty

The operator shall bear authority for the suitability of the device for the specific application. The manufacturer accepts no liability for the consequences of misuse by the operator. Wrong installation or operation of the devices (systems) will cause the warranty to be void. The respective Terms and Conditions of Sale, which forms the basis for the sales contract shall also apply.

1.2.3 Information Concerning the Documentation

To prevent any injury to the operator or damage to the device it is essential to read the information in this document and the applicable national standard safety instructions. This operating manual contain all the information that is required in various stages, such as product identification, incoming acceptance and storage, mounting, connection, operation and commissioning, troubleshooting, maintenance, and disposal.

1.3 Safety Precautions

You must read these instructions carefully prior to installing and commissioning the device. These instructions are an important part of the product and must be kept for future reference. Only by observing these instructions, optimum protection of both personnel and the environment, as well as safe and fault-free operation of the device can be ensured.

For additional information that are not discussed in this manual, contact the manufacturer.

Warnings and Symbols Used

The following safety symbol marks are used in this operation manual and on the instrument.



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



NOTE

Indicates that operating the hardware or software in this manner may damage it or lead to system failure.

1.4 Packaging, Transportation and Storage

1.4.1 Packaging

The original package consists of

1. Tek-Flux 1400A Electromagnetic Flow Meter
2. Documentation



1



2

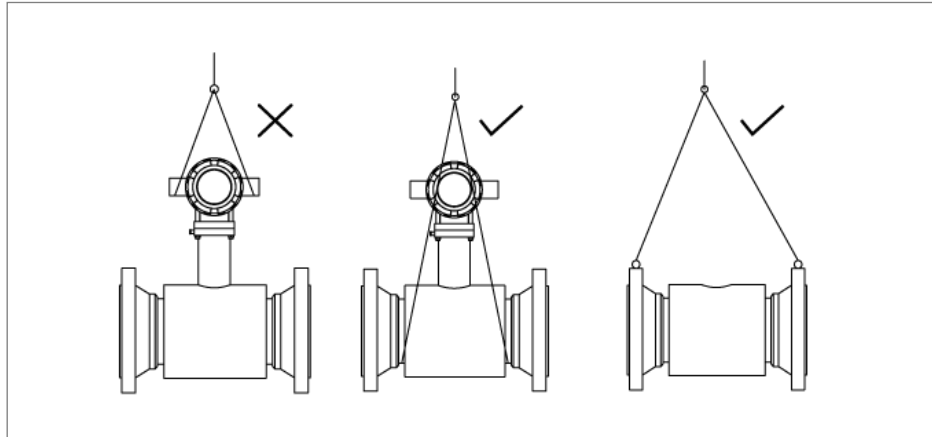


NOTE

Unpack and check the contents for damages or signs of rough handling. Report damage to the manufacturer immediately. Check the contents against the packing list provided.

1.4.2 Transportation

- Avoid impact shocks to the device and prevent it from getting wet during transportation.
- Verify local safety regulations, directives, and company procedures with respect to hoisting, rigging, and transportation of heavy equipment.
- Transport the product to the installation site using the original manufacturer's packing whenever possible.



1.4.3 Storage

If this product is to be stored for a long period of time before installation, take the following precautions:

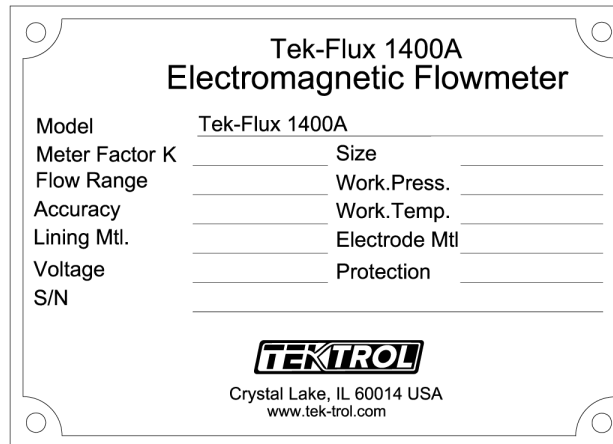
- Store your product in the manufacturer's original packing used for shipping.
- Storage location should conform to the following requirements:
 - Free from rain and water
 - Free from vibration and impact shock
 - At room temperature with minimal temperature and humidity variation
- Before storing a used flow meter remove any fluid from the flow meter line completely. Properties of the instrument can change when stored outdoors.

1.4.4 Nameplate

The nameplate lists the order number and other important information, such as design details and technical data

i **NOTE**

Check the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.



2 Product Description

This section covers the reference and specification data, as well as ordering information.

2.1 Introduction

Electromagnetic flow meters are also called as Magmeters. They are non-contact instruments used for measuring the volumetric flow rates of any fluids that can adequately conduct electricity in closed pipelines. These instruments are highly accurate, reliable, and stable devices that are used in various high-pressure industrial processes.

2.2 Measuring Principle

The Tek-Flux 1400A Electromagnetic flow meter operates on the principle of Faraday's Law of Induction. According to this principle, any change in the magnetic flux linked to an electric circuit causes an electromotive force (or voltage) to be induced in this circuit. The induced voltage is therefore directly proportional to the rate of change of magnetic flux with time.

The flow meter typically consists of two electromagnetic coils that are mounted on opposite sides of a non-magnetic measuring tube. Two electrodes are fitted inside the tube to detect the voltage generated by the conducting fluid. Although these electrodes come into contact with the fluid, they do not obstruct its flow.

When current is applied to the coils, they generate an alternating magnetic field across the cross-sectional area of the tube. A fluid flowing through the magnetic field acts as a conductor, and a voltage is induced. The induced voltage is picked up by the electrodes and sent to a transmitter that is either mounted on the flow meter or connected remotely. The transmitter calculates the volumetric flow rate and displays the output.

The induced voltage is calculated using the following equation:

$$U = B \times d \times v$$

Where,

U = Voltage Induced by the Conducting Fluid

B = Magnetic Flux Density

d = Distance Between the Electrodes

v = Average Velocity of the Conductor (i.e. fluid flowing in the tube through the magnetic field)

Since the magnetic flux density and the distance between the electrodes remain constant, the induced voltage is directly proportional to the conductor velocity.

The value of the velocity is used to calculate the volumetric flow rate as follows:

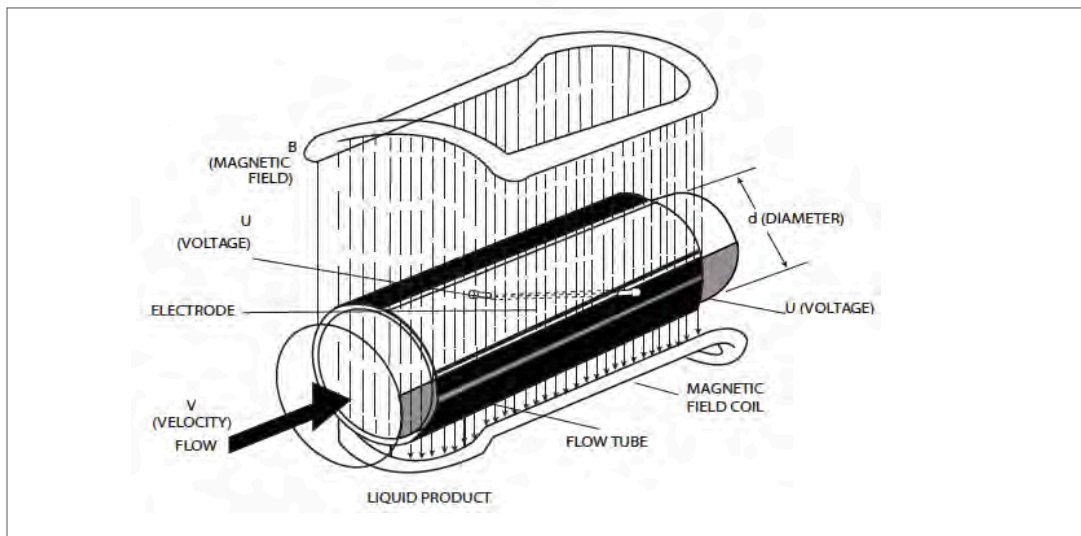
$$Q = A \times v$$

Where,

Q = Flow Rate

A = Area

v = Average velocity



Operation of an Electromagnetic Flow Meter

2.3 Specifications

2.3.1 Technical

Accuracy		±0.5%	
Repeatability		0.15%	
Ambient temperature	Sensor (Remote Type)	-4°F to 158°F (-20°C to +70°C)	
	Converter	-4°F to 158°F (-20°C to +70°C)	
	Integral Type	14°F to 122°F (-10°C to +50°C)	
Humidity		5% to 95% RH (no frost)	
Vibration Frequency		55Hz	
Amplitude		0.55mm	
Ambient magnetic field		≤400A/m	
Fluid Temperature	Integral Type	≤176°F	
	Separate Type	Rubber Lining	≤176°F
		PTFE Lining	≤248°F
Nominal Pressure		Limited to Flange Rating	
Power Supply		18 to 36 VDC, 85 to 260 VAC	
Enclosure		Sensor: IP68, Converter: IP65	
Output Signal		Pulse and 4 to 20 mA	
Digital Communication		Modbus, RS485 or HART	
Electrode Material		316SS or Hastelloy C	
Lining Material		PTFE or Hard Rubber	
Flange Material		Carbon Steel	
Measuring Tube Material		Stainless Steel	

2.3.2 Electrode Material Selection

Electrode Material	Application
316SS	Used for measuring water, wastewater, inorganic acid, organic acid or another corrosive medium.
Hastelloy-C	Used for measuring oxidizing acid such as nitric acid, mixed acid, and vitriol mixed liquid, also oxydic salt such as Fe ⁺⁺ , Cu ⁺⁺ , other oxidizing agent such as pyochloride solution whose temperature is higher than normal and seawater.

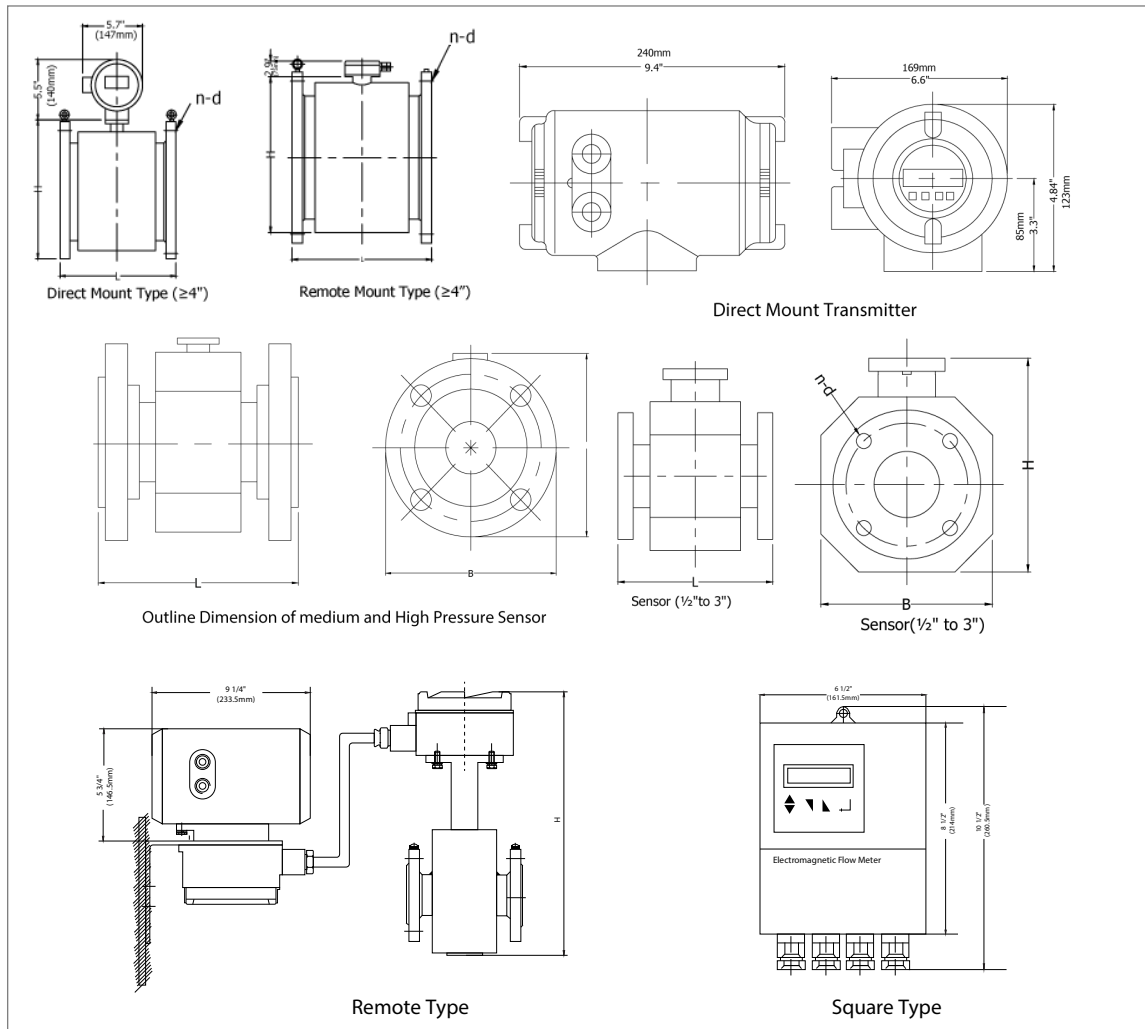
2.3.3 Lining Material

Lining material	Main performance	Application scope
PTFE	<ul style="list-style-type: none"> Stable chemical performance, resists acid, alkali, saline solution and organic solvent. Does not resist the corrosion of chlorine trifluoride, liquid oxygen at high flowrate and ozone Common wear-resisting property 	-112°F to 248°F Highly corrosive medium such as concentrated acid and concentrated alkaline
Synthetic rubber	<ul style="list-style-type: none"> Excellent elasticity, good breaking tenacity, good wear- resisting property. Resist acid solution, aqueous alkali and saline solution at normal low concentration of acid solution, Not resist corrosion from oxidant medium 	<176°F Neutral abrasive pulp, slurry and coal slurry

2.3.4 Flow Range and Nominal Diameter Selection

Inch(ft)	Velocity	
	0.98 to 32.80 ft/sec	0.3 to 10 m/s
	gal/min	m ³ /hr
½" (0.04)	0.8 to 28.2	0.19 to 6.4
1" (0.08)	2.4 to 77.9	0.53 to 17.7
2" (0.16)	9.4 to 312.6	2.13 to 71.0
3" (0.25)	23.9 to 796.9	5.43 to 181
4" (0.33)	37.4 to 1246	8.49 to 283
5" (0.41)	58.6 to 1946.1	13.3 to 442
6" (0.5)	84.1 to 2800.2	19.1 to 636
8" (0.66)	149.3 to 4975.2	33.9 to 1130
10" (0.83)	233.8 to 7793.1	53.1 to 1770
12" (1)	335.5 to 11183.3	76.2 to 2540
18" (1.5)	757.3 to 25184.4	172 to 5720
20" (1.66)	933.4 to 31128.3	212 to 7070
24" (2)	1347.3 to 44909.2	306 to 10200
28" (2.33)	1831.6 to 60979.7	416 to 13850

2.4 Dimensional Drawings



Size in (mm)	Sensor Dimensions in (mm)			Flange Connection Dimension in (mm)	Net Weight lbs (kg)
	L	B	H		
1/2" (15)	7 3/4" (196.75)	5 1/8" (127.75)	8 3/4" (216.5)	1/8"(3) - ϕ 1/2"(15)	17.63 (8)
1" (25)	7 3/4" (196.75)	5 1/2" (140)	9" (225)	1/8"(3) - ϕ 1/2"(15)	26.45 (12)
2" (50)	7 3/4" (196.75)	6 3/4" (167.25)	10 1/4" (255.75)	1/4"(6) - ϕ 1/2"(15)	39.68 (18)
3" (80)	7 3/4" (196.75)	7 3/4" (196.75)	11 1/4" (280.5)	1/4"(6) - ϕ 1/2"(15)	57.32 (26)
4" (100)	9 3/4"(246)	9 1/4" (231.25)	11 1/2" (285.25)	1/4"(6) - ϕ 3/4"(21)	66.13 (30)
5" (125)	9 3/4"(246)	10 1/2" (265.5)	12 3/4" (319.75)	1/4"(6) - ϕ 3/4"(21)	79.36 (36)
6" (150)	11 3/4" (292.25)	11 3/4" (292.25)	13 3/4" (344.25)	1/4"(6) - ϕ 3/4"(21)	92.59 (42)
8" (200)	13 3/4" (344.25)	13 1/2" (334.5)	15 1/4" (378.75)	3/8"(9) - ϕ 3/4"(21)	121.25 (55)
10" (250)	15 3/4" (393.5)	16" (400)	17 1/2" (437.75)	3/8"(9) - ϕ 3/4"(21)	154.32 (70)
12" (300)	19 3/4" (492)	18 1/8"(452.75)	20 1/4" (506.75)	3/8"(9) - ϕ 3/4"(21)	187.39 (85)
18" (450)	23 1/2" (590.5)	25 1/4" (629.75)	27 1/4" (679)	3/4"(18) - ϕ 1"(25)	330.69 (150)
20" (500)	23 1/2" (590.5)	28 1/4" (703.5)	30" (750)	3/4"(18) - ϕ 1 1/4"(32)	440.92 (200)
24" (600)	23 1/2" (590.5)	33 1/8" (826.75)	34 3/4" (866)	3/4"(18) - ϕ 1 1/2"(39)	573.20 (260)
28" (700)	27 1/2" (688.75)	35 1/4" (880.75)	38 1/4" (954.5)	3/4"(21) - ϕ 1"(25)	793.66 (360)

2.5 Model Chart

Example	Tek-Flux 1400A	025	1	I	HC	1	1	T	EA	Tek-Flux 1400A-25-1-I-HC-1-1-T-EA
Series	Tek-Flux 1400A									Electromagnetic Flow meter
Size		015 025 040 050 080 100 150 200 250 300 450 500 600 700								1/2" (Only PTFE Liner / HC Electrodes) 1" (Only PTFE Liner / HC Electrodes) 1 1/2" (Only PTFE Liner / HC Electrodes) 2" 3" 4" 6" 8" 10" 12" 18" 20" 24" 28"
Transmitter			1 2							Direct Mount Remote Mount (comes with 30 ft. of cable)
Output				I S H						4-20mA, Pulse 4-20mA, Pulse, Modbus RS-485 4-20mA with HART, Pulse
Electrodes					SS HC X					316L SS Hastelloy C (Adder only for 2" or larger) Special
Process Connection						1 2 3 6				150# ANSI Flange AWWA Flange 300# ANSI Flange 600# ANSI Flange
Power Supply							1 2			18 - 28 VDC 85 - 260 VAC
Liner Material								H T		Hard Rubber PTFE (Adder only for 2" or larger)
Options									IP68 EA FC	IP68 Submersible Sensor Rating (Remote Only) Extended Accuracy (0.3%) Factory Configuration

Note: Please note that when ordering a PTFE lined meter that grounding rings are included and do not have an additional cost

3 Installation

This section covers instructions on installation and commissioning. Installation of the device must be carried out by trained, qualified specialists authorized to perform such works.

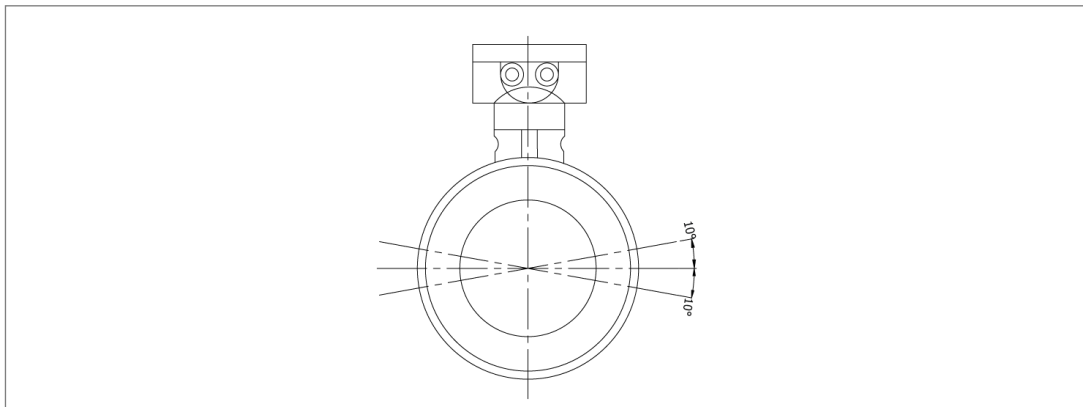


CAUTION

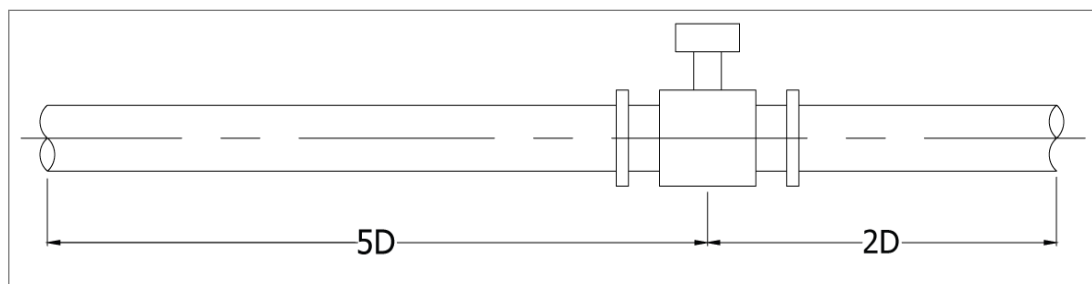
- When removing the instrument from hazardous processes, avoid direct contact with the fluid and the meter.
- All installation must comply with local installation requirements and local electrical code

3.1 Correct Mounting Point

Correct mounting point is important for the installation of a flow meter. Wrong point may influence measuring accuracy or flow meter service life, or even damage the flow meter. The axis for measuring electrode shall be approximate to horizontal direction. (Angle with horizontal line shall be no more than 10°)



At flow meter upstream, there should be straight pipe no less than $5D$ and no less than $2D$ at flow meter downstream. (D is the inner diameter of the flow meter)



3.2 Requirements for Measuring Flow meter Accuracy

- Medium must be conductive.
- The pipe should be completely filled with the medium.
- Medium conductivity should be homogeneous to avoid severe disruption. If chemical substances need be injected into the pipe, the injection should be operated at upstream side of flow meter;
- Magnetic flow meter system should be connected to the ground;
- There must be a straight pipe run no less than 5DN at flow meter upstream and 2DN at flow meter downstream. (DN is the internal diameter of the pipeline);
- Do not install the flow meter near large electrical machine or transformer in order to avoid the electromagnetic interference.

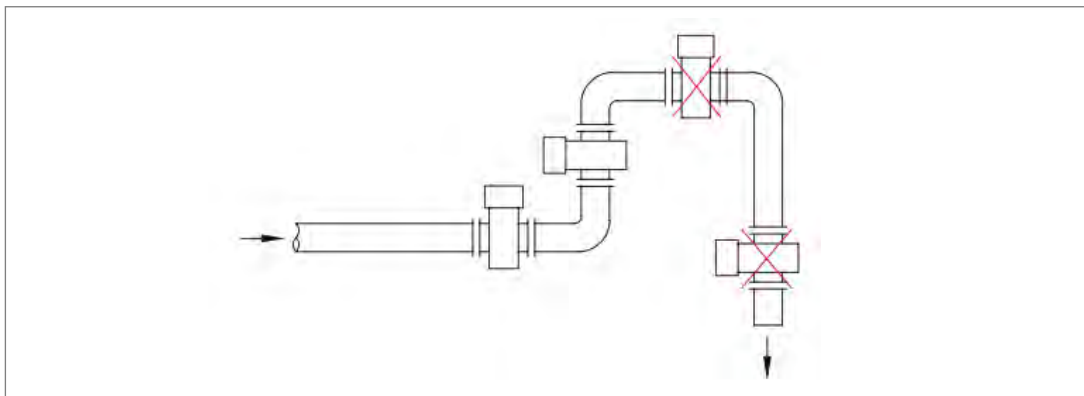
3.3 Installation Condition



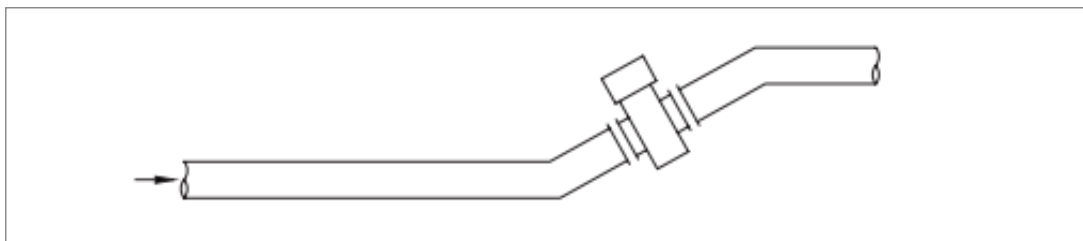
NOTE

Do not expose the electronic unit box to direct sunlight; in case of outdoor installation, use a suitable protection shield.

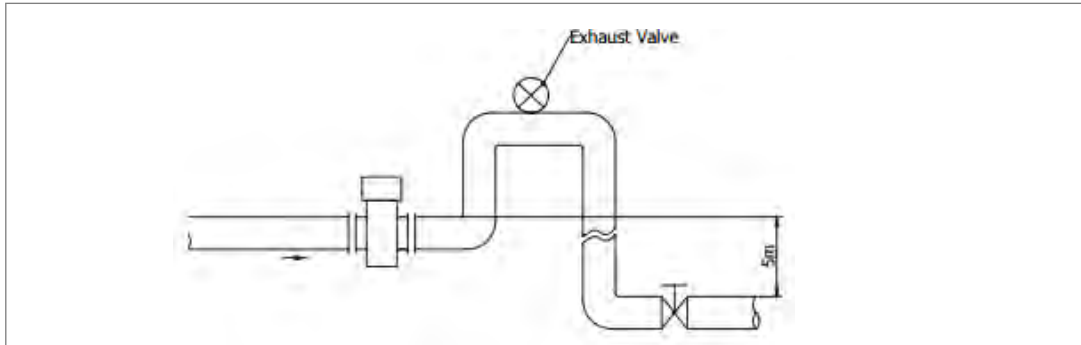
- Install flow meter at relative low of horizontal pipe or in an upward vertical direction. Do not install the flow meter at the highest point of the pipe and in the vertically downward direction



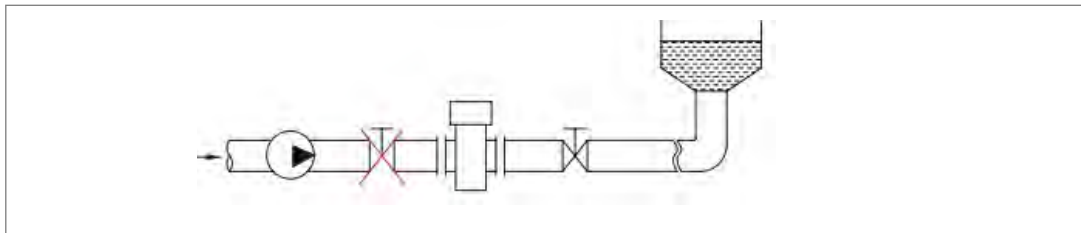
- Install flow meter at the rising pipe



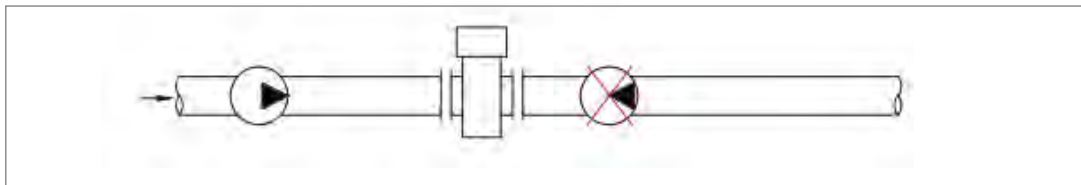
- For installing at open pipe, flow meter should be installed at relative low. If the fall in the pipe is more than 5m, vent valve should be installed at the sensor downstream where it should have back pressure



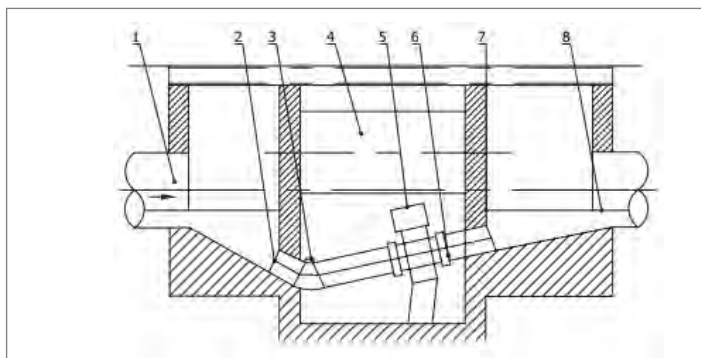
- Control valve and stop valve should be installed at the downstream of sensor and not at the upstream side.



- Sensor should be installed at the outlet of pump and not at the inlet



- Flow meter installation in a measuring well:



1. Inlet	5. Flow meter
2. Entrance gate	6. Nozzle stub
3. Cleaning hole	7. Outlet
4. Overflow pipe	8. Drain Valve

4 Electrical Installations

4.1 Safety Instruction

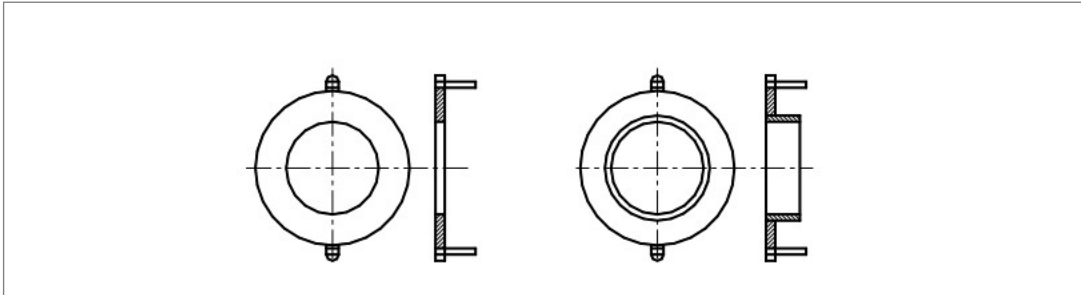
- Please cut off power supply before connecting the device
- Check the cable model before connecting the cable
- Follow procedure for cable into lead collar: at first, loosen the gland nut on lead collar and take off blind; secondly, put gland nut and rubber ring on cable, make the cable through lead collar; finally, straighten out cable, screw gland nut tight to make rubber ring press cable.
- When wire stripping, do not damage insulating layer which should be reserved.

4.2 Grounding

Grounding of Tek-Flux 1400A is very important. Bad grounding will result in abnormal operation. Flow meter sensor part should have separate grounding cable (whose sectional area of copper core should be 1.6mm^2 , ground resistance should be less than 10Ω).

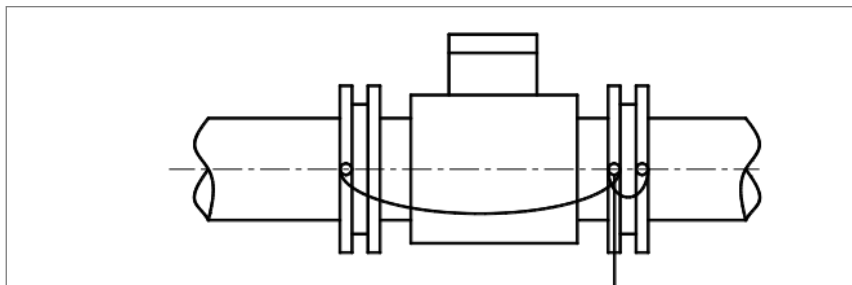
4.2.1 Grounding Ring

If the pipeline connected with sensor is insulative, grounding ring will be needed, the grounding ring is available with 316SS material. If the medium is abrasive, then grounding ring with neck should be selected.

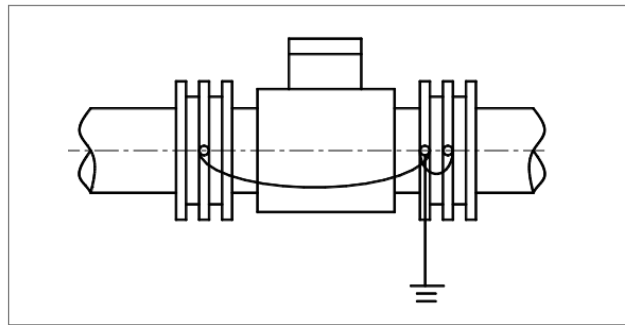


4.2.2 Grounding Mode

- If flow meter is installed in metal pipeline, there should be no insulating coating on pipeline in wall.

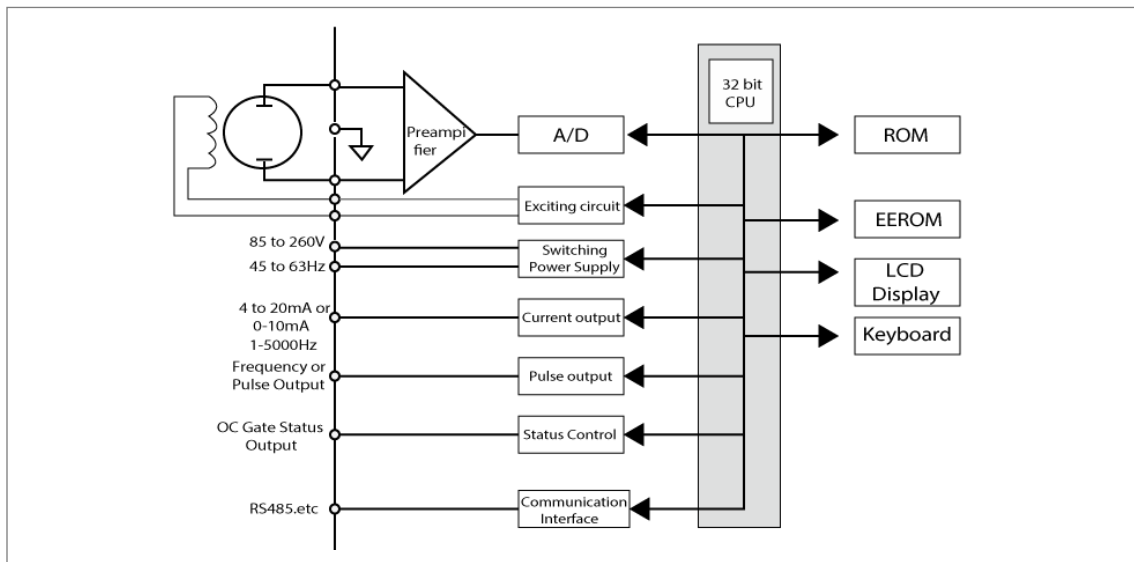


- If flow meter is installed in the pipeline with insulating paint, the inner part of the grounding ring should be painted on both the sides of the sensor.



4.3 Transmitter Connections

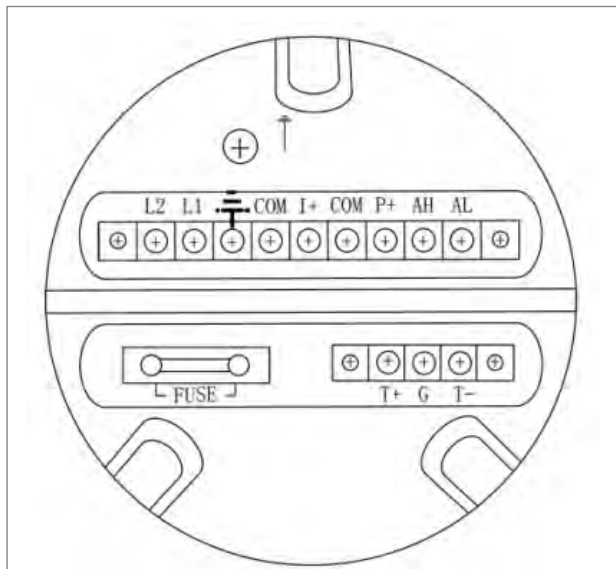
4.3.1 Basic Circuit of the Transmitter



The converter can supply the exciting current to the coil in the sensor of electromagnetic flow meter; the head amplifier amplifies the electromotive force from the sensor and converts it into standard signals of current or frequency so that the signals can be used for displaying, controlling, and processing.

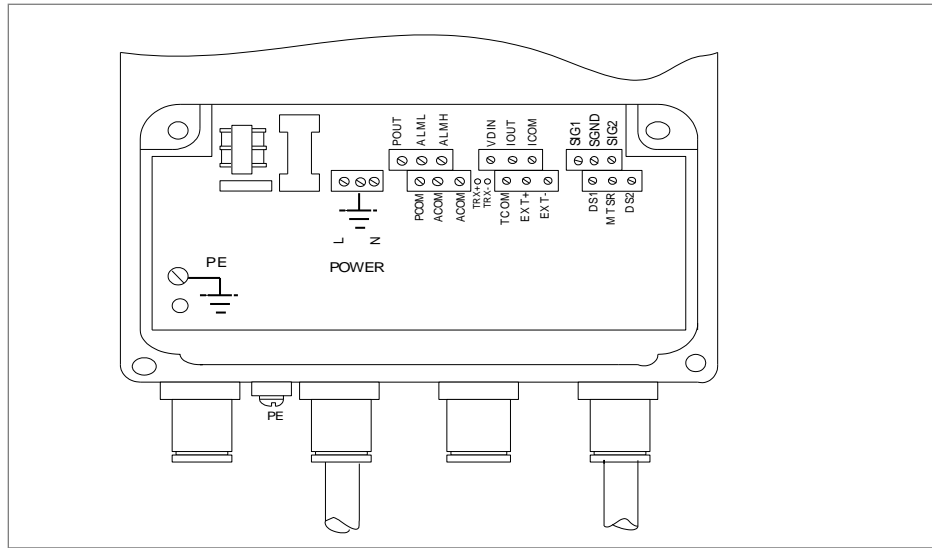
4.3.2 Power Supply wiring

- Wiring for direct mount transmitter



I+	Output Current for Flow Measurement
COM	Output Current (Ground) for Flow Measurement
P+	Frequency (Pulse) Output for Bi-directional Flow
COM	Frequency (Pulse) Output (Ground)
AL	Alarm Output for Low Limit
AH	Alarm Output for Upper Limit
COM	Alarm Output (Ground)
FUSE	Fuse for Power Supply
T+	+Communication Input Signal
T-	-Communication Input Signal
G	RS232 Communication Ground
L1	220V(24V) Power Supply
L2	220V(24V) Power Supply

- Wiring for remote type transmitter



To the mounting sensor	SIG1	Signal1
	SGND	Signal Ground
	SIG2	Signal2
	DS1	Shielded Exciting1
	DS2	Shielded Exciting2
	EXT+	Exciting Current+
	EXT-	Exciting Current-
Analog Current Output	VDIN	Current Two lines 24V Spots
	ICOUT	Analog Current Output
	ICCOM	Analog Current Output Ground
Frequency (Pulse) Output	POUT	Flow Frequency (Pulse) Output
	PCOM	Frequency (Pulse) Output Ground
Two Alarm Outputs	ALMH	Upper Limit Alarm Output
	ALML	Low Limit Alarm Output
	ALCOM	Alarm Output Ground
Communication Input	TRX+	Communication Input
	TRX-	Communication Input
	ALCOM	232 Communication Ground

***Note:- Pulse Output:** Active(Pout,com), **4-20 mA output:** Active(Iout+,com), **Remarks for Pulse Output:** Directly Connect PLC to Pout & com, **Remarks for 4-20 mA output:** Directly Connect PLC to Iout & com, **Diagrams for Pulse:** Active, **Diagrams for 4-20mA:** Active.



CAUTION

Cable should be no more than 328 ft to prevent accuracy and interference.
transmitter should be installed closely to sensor as much as possible.



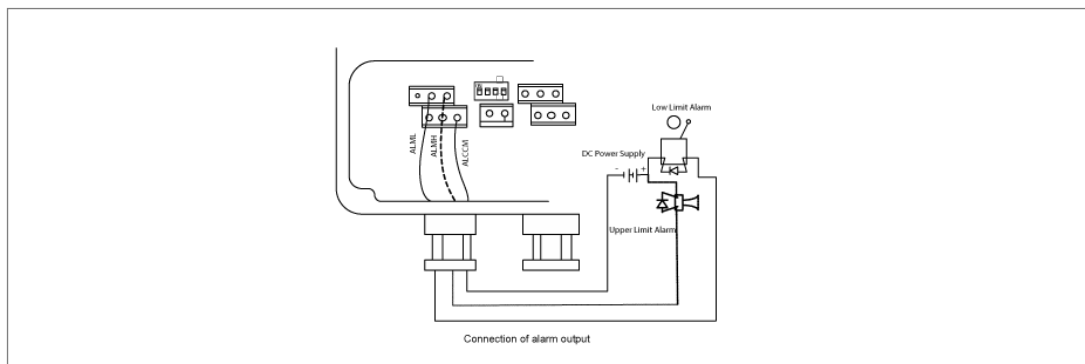
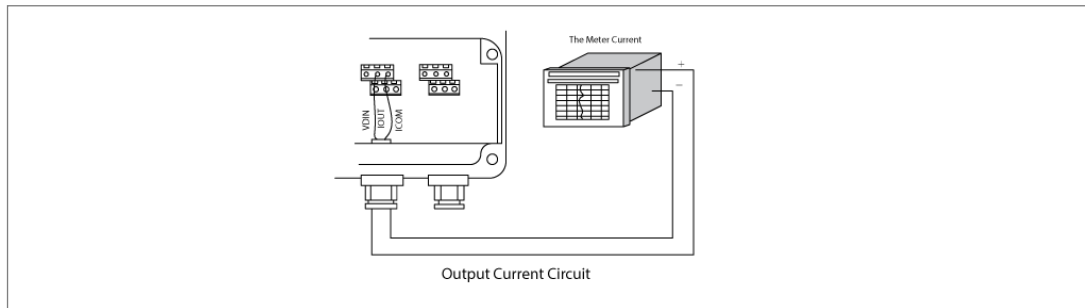
NOTE

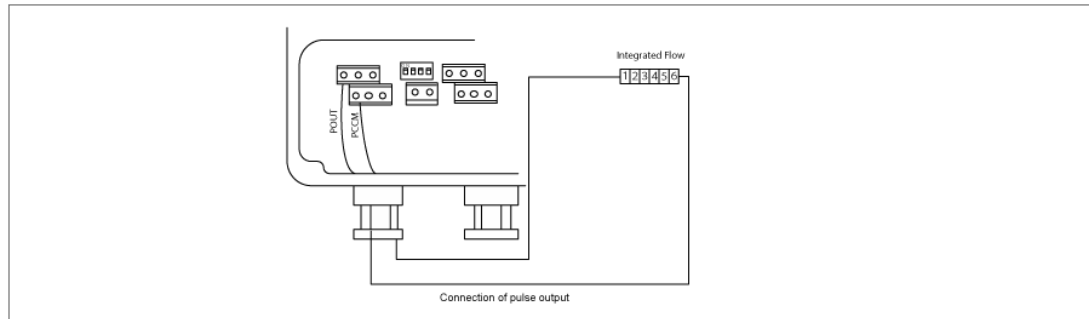
For remote type flow meter, when flow conductivity is more than $50\mu\text{S}/\text{cm}$, flow signal cable should be shield signal cable with polyvinyl chloride jacket and metal net; when flow conductivity is less than $50\mu\text{S}/\text{cm}$ or the signal is transmitted for long distance, double shield signal cable with equipotential double cores should be used.

4.4 Connection of Cable

4.4.1 Output and Power Cable

All cables for signal transferring and for the power supply must be prepared by users. However, care must be taken to choose the cables that meet the upper limit load of consuming current. When the DIP switch next to the terminal is set to ON, the converter inside can provide +28V power supply and up-pull $10\text{k}\Omega$ resistance to Output Frequencies (PUL) to isolated OC gate, Alarm Output (ALMH, ALML), and Status Control (INSW). Therefore, when the converter has a frequency output and works together with the sensor, the DIP switch can be set to ON, getting frequency signals from P_{OUT} and P_{COM} terminals. When the inductive load is connected to transmitter, a diode should be used.





4.5 Digital Output

The transmitter has two output signals: frequency and pulse output. The user can choose only one type of output.

4.5.1 Frequency Output

Frequency output range is 0 to 5000Hz and corresponding the percent of flux.

$$F = \frac{\text{Measured Value}}{\text{Full Scale Value}} \times \text{Frequency Range}$$

The upper limit of the frequency output can be adjusted from 0 to 5000 Hz; the lower frequency can be adjusted from 0 to 1000 Hz or 0 to 5000 Hz. The frequency output mode can be used in the control application, because it corresponds to the percent of flux. Users can choose pulse output when the equipment is applied to count mode.

4.5.2 Pulse Output Mode

The pulse output mainly applies in count mode. A pulse output delegates a unit flux, such as 1l or 1m³ etc. The pulse output unit divides into 0.001l, 0.01l, 0.1l, 1l, 0.001m³, 0.01m³, 0.1m³, 1m³. When users choose the pulse unit, the match of the flux range of flow meter and pulse unit should be noted. For volume flux, the count formula is as follows:

$$Q_L = 0.0007854 \times D^2 \times V \text{ (l/s)}$$

or

$$Q_M = 0.0007854 \times D^2 \times V \times 10^{-3} \text{ (m}^3\text{/s)}$$

Note:

D is the diameter of the nozzle (mm)

V is the velocity of flow (m/s)

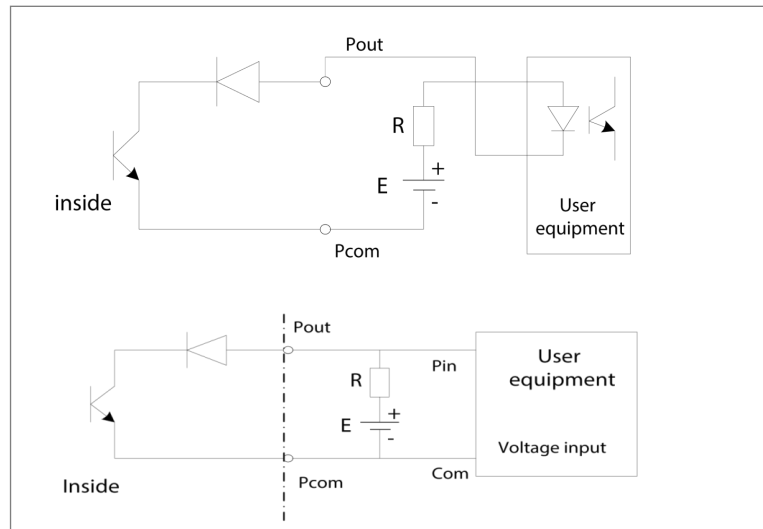
4.5.3 The Connection of Digital Output

Digital output has two connected points: digital output connected point, digital ground point, with the following symbols:

P_{OUT} - digital output point

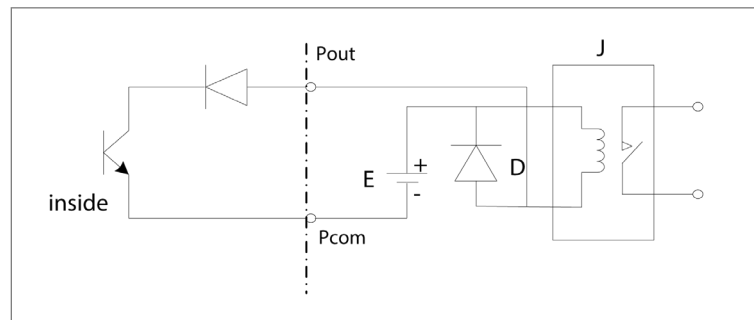
P_{COM} - digital ground point

4.5.4 Digital Output Connection as Photoelectric Coupling (PLC etc.)



Commonly, the user's photoelectric coupling current is about 10 mA, so $E/R=10$ mA, where $E=5$ to 24V.

4.5.5 Digital Output Connection as Relay



Commonly, the relay needs E as 12V or 24V. D is an extended diode, most middle relays now have this diode inside. If not have, the user can connect one outside.

4.6 Simulation Signal Output and Calculation

4.6.1 Simulation Signal Output

There are two signal systems: 0 to 10 mA and 4 to 20 mA. The user can select from the parameter setting.

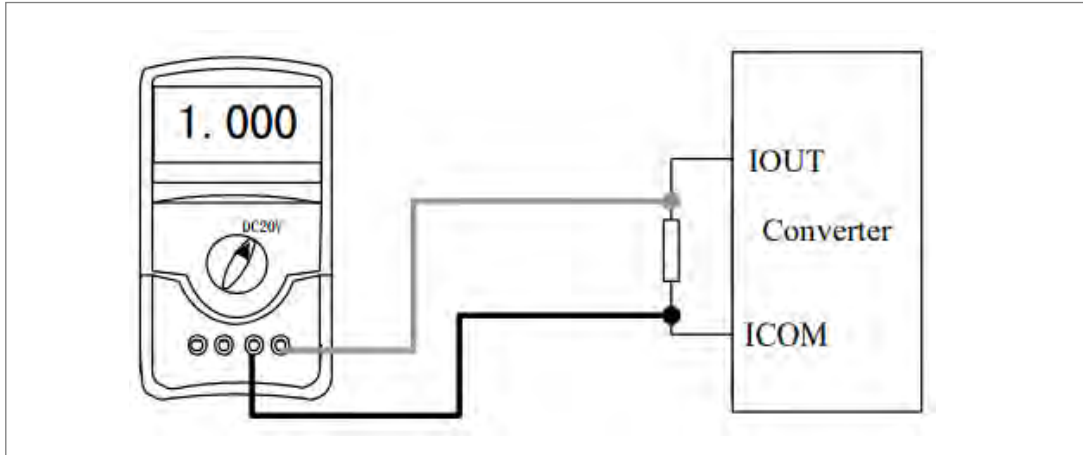
The inner simulation signal output is 24V under 0 to 20 mA. It can drive 750Ω resistance.

The percent flux of simulation signal output is:

$$I_o = \frac{\text{Measured Value}}{\text{Full Scale Value}} \times \text{the scale of current} + \text{the zero point of current}$$

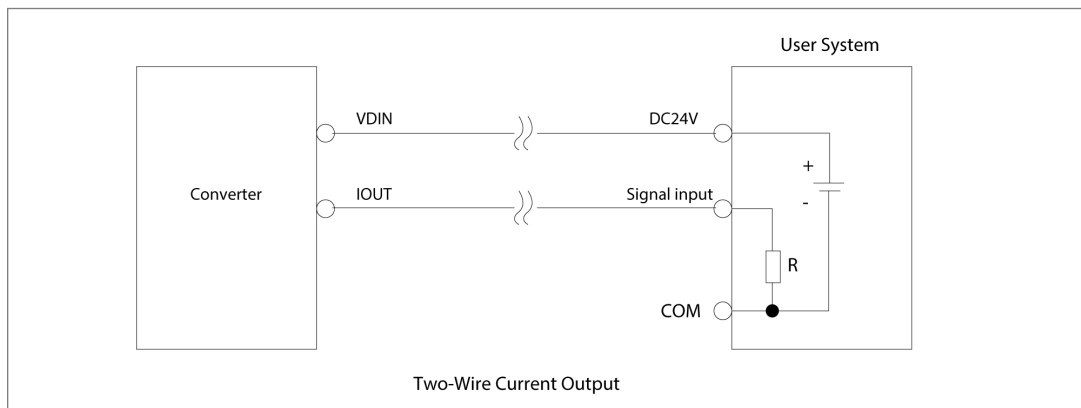
4.6.2 Simulation Signal Output Adjust

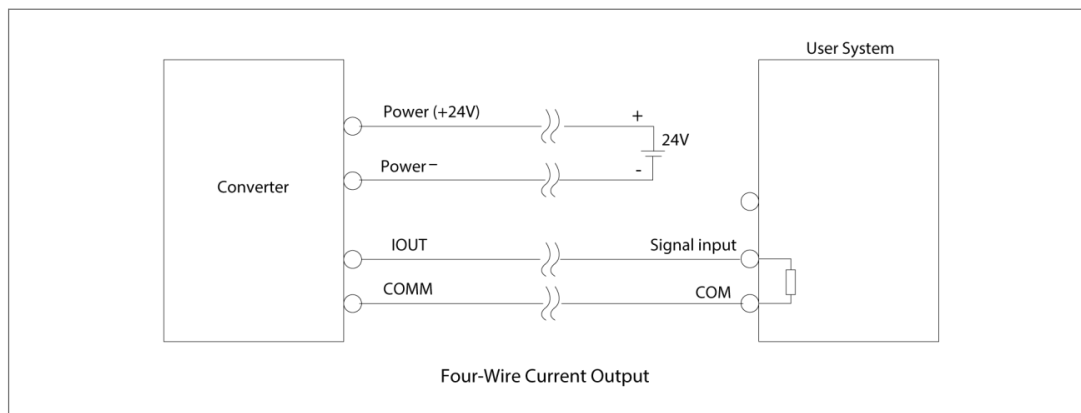
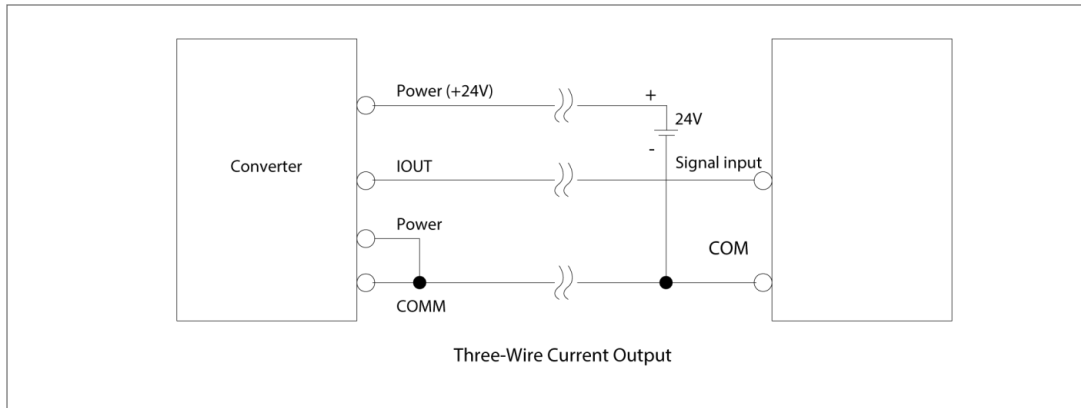
- The converter adjusts the Preparative
When the converter has been running for 15 minutes, the inside of the converter becomes stabilized. The preparative is 0.1% ampere meter or 250Ω, 0.1% voltage instrument



- Current Zero is Correct
When the converter is in parameter setting, select to “Analog Zero” and press enter. The standard of signal fountain is set to “0.”. Adjust the parameter and make sure the ampere meter is 4 mA (± 0.004 mA).
- The Full-Scale Current is Correct
Select “Analog Range” to enter. Adjust the converter parameter and make sure the ampere meter is 20 mA (± 0.004 mA). Adjust the current between zero and full range, the current function of the converter should reach exactness. The line degree of the current output of conversion should be controlled within the scope of 0.1%.
- Current Line Degree Checking
You can place the standard signal source at 75%, 50%, 25%, and check the line degree of current output.

4.6.3 Transmitter Connection of Current Output



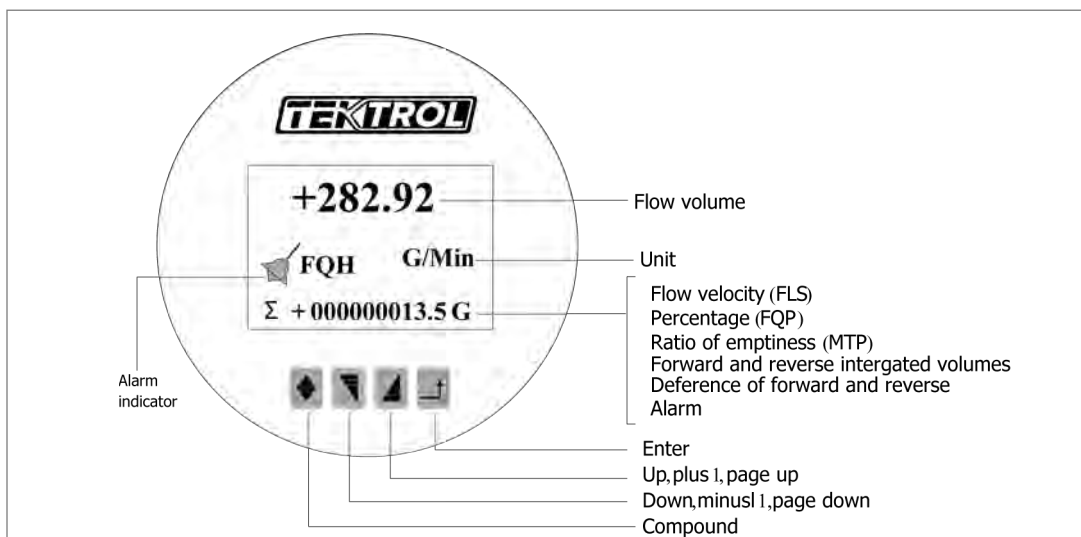


5 Operation

This section covers operation techniques and guidelines.

5.1 Key and Display

1. Direct mount transmitter keys and LCD screen display



5.2 Parameter Setting



CAUTION

- Make sure the sensor connected to the earth
- Make sure the liquid is still when regulating zero of the instruments
- The electrode and the liquid should be in continuous contact for about 48 hours

5.2.1 Keys' Function

- Keys' function in self- testing way

"Down" key	Down button cycles through data displayed on lower lines
"Up" key	Up button cycles through data displayed on lower lines
"Enter" key	Press it to come into the interface measuring
"Compound" & "Enter"	To enter parameter setting
Under measurement status, adjustment of the LCD contract	Push "Down" & "Compound" or "Up" & "Compound"

- Push "Down" & "Compound" or "Up" & "Compound"

"Down" key	Subtract 1 from the number above cursor
"Up" key	Plus 1 to the number above cursor
"Compound" & "Down"	To shift cursor to left
"Compound" & "Up"	To shift cursor to right
"Enter" key	To enter or exit the submenu; pressure for more than 2s to exit to measuring status



NOTE

When using the "Compound" key, you should press "Compound" key and "Up" key both or "Compound" key and "Down" key both.

To select the zero correction about the flow directly use "Down" or "Up" to Switch.

To set or correct working parameters, the converter should be running in Parameters Setting Way instead of Measuring Status. In Measuring Status, press "Compound" + "Enter" keys getting to the select of parameter and transfer password (0000), and then correct the password with one of the new passwords that are provided by manufacturer. Finally, press the "Compound" + "Enter" keys to work in Parameters Setting Way. There are 6 Passwords in design and among them 4 for deferent operators in secret and 2 are fixed passwords for system operation.

5.2.2 Keys for Selecting Menu

Press “Compound “ + ”Enter” keys to select menu. Press “Up” or “Down” keys to select the parameters.

Code	Function	Notes
1	Parameters Set	Select this function; It can enter the picture of parameter

- **Parameter Setting**
Press “Compound” + “Enter” key, it displays “Parameters Set” function. Input password. Press “Compound” + “Enter” key. This function lets the user access Parameters Setting status. Need to enter parameter code.
- **Menu**
There are 46 parameters of Tek-Flux 1400A, user can set every parameter. The List of Parameters is shown below:

5.2.3 Menu

Parameters of converters can decide the running status, process and output ways as well as state of output. Correct option and setting of parameters can keep the converters running optimally and get higher accuracies of output both in display and in measurement.

There are 6 grades of passwords for setting parameters function. Grades 1 to grade 5 of passwords are for users and grade 6 of password is for manufacturer. Users can reset their passwords of grades 1 to 4 in grade 5.

Users can check converters parameters in any grade of password. However, if users want to change parameters of converters, deferent grade of parameters have to be used by the users.

- **Grade 1 of password (set by manufacturer as 00521):**
Users can only read parameters.
- **Grade 2 of password (set by manufacturer as 03210):**
Users can change parameters codes 1 to 25.
- **Grade 3 of password (set by manufacturer as 06108):**
Users can change parameters codes 1 to 26 and 35 to 37.
- **Grade 4 of password (Please contact Tek-Trol for this password if you need):** Users can change parameters codes 1 to 30 and 35 to 37.
- **Grade 5 of password (Fixed):**
Users can change parameters codes 1 to 46.



NOTE

Password Grade 5 can be set by skilled users. Grade 4 is mainly used for resetting total volume in password. Grades 1 to 3 can be set by anyone.

There are 46 parameters of Tek-Flux 1400A, user can set every parameter. The list of parameters is as shown below:

Code	Parameter	Setting	Grades	Range
1	Language	Select	2	English
2	Comm. Address	Set Count	2	0 to 99
3	Baud Rate	Select	2	600 to 14400
4	Sensor Size	Select	2	
5	Flow Unit	Select	2	l/h, l/m, l/s, m ³ /h, m ³ /m, m ³ /s
6	Flow Range	Set Count	2	0 to 99999
7	Flow Rspns	Select	2	1 to 50
8	Filt Factor	Select	2	0/10/15/30/60/90/120/150/180/240
9	Flow Direct	Select	2	Plus/ Reverse
10	Flow Zero	Set Count	2	0 to ±9999
11	Flow Cutoff	Set Count	2	0 to 599.99%
12	Cutoff Ena	Select	2	Enable/Disable
13	Total Unit	Select	2	0.001, 0.01, 0.1, 1.0 or 10 Gal, M3 or L
14	SegmaN Ena	Select	2	Enable/Disable
15	Analog Type	Select	2	0 to 10mA /4 to 20mA
16	Pulse Type	Select	2	Freque / Pulse
17	Pulse Fact	Select	2	0.001, 0.01, 0.1, 1.0 or 10 Gal, M3 or L
18	Freque Max	Select	2	1 to 5999 HZ
19	Mtsnsr Ena	Select	2	Enable/Disable
20	Mtsnsr Trip	Set Count	2	59999 %
21	Alm Hi Ena	Select	2	Enable/Disable
22	Alm Hi Val	Set Count	2	000.0 to 599.99 %
23	Alm Lo Ena	Select	2	Enable/Disable
24	Alm Lo Val	Set Count	2	000.0 to 599.99 %
25	Sys Alm Ena	Select	2	Enable/Disable
26	Clr Sum Key	Set Count	3	0 to 99999
27	Snsr Code1	User Set	4	Finished Y/M
28	Snsr Code2	User Set	4	Product number
29	Field Type	Select	4	Type1,2,3
30	Sensor Fact	Set Count	4	0.0000 to 5.9999
31	Fwd Total Lo	Correctable	5	00000 to 99999
32	FwdTotal Hi	Correctable	5	00000 to 9999
33	RevTotal Lo	Correctable	5	00000 to 99999
34	RevTotal Hi	Correctable	5	00000 to 9999

35	PlsntLmtEna	Select	3	Enable/Disable
36	PlsntLmtVal	Select	3	0.010 to 0.800m/s
37	Plsnt Delay	Select	3	400 to 2500ms
38	Pass Word 1	User Correct	5	00000 to 99999
39	Pass Word 2	User Correct	5	00000 to 99999
40	Pass Word 3	User Correct	5	00000 to 99999
41	Pass Word 4	User Correct	5	00000 to 99999
42	Analog Zero	Set Count	5	0.0000 to 1.9999
43	Analog Range	Set Count	5	0.0000 to 3.9999
44	Meter Fact	Set count	5	0.0000 to 5.9999
45	Meter Code 1	Factory Set	6	Finished Y/M
46	Meter Code 2	Factory Set	6	Product Serial No

6 Troubleshooting

This section provides troubleshooting techniques for most common operating problems.

6.1 No Display

1. Check the power supply connection
2. Check the power fuse for faults
3. Check the contrast of LCD and adjust

6.2 Exciting Alarm

1. Check the connection of the exciting cables
2. Check the total resistance of sensor's exciting coil resistances (less than 150Ω)
3. If first and second points are OK, then the converter is faulty

6.3 Empty Pipe Alarm

If measured fluid full of testing pipe of sensor:

1. Short circuit three connectors SIG 1, SIG 2, SGND of converter; if no "Empty Alarm" is displayed then the converter works. In this case, it is possible that the conductivity of measured fluid may be limited or the empty threshold of the empty pipe and the range of the empty pipe are incorrectly set
2. Check if the signal cable is OK
3. Check if the electro-poles are OK or not
4. Let the flow be zero, then the displayed conductivity should be less than 100%
5. Resistances of SIG1 to SGND and SIG2 to SGND are all less than 50kΩ (conductivity of water) during measurement operation. (It is better to test the resistances by means of multi-meter with pointer to see the charging process well.

6.4 Measure Flow Disallow

If measured fluid full of testing pipe of sensor, check if the signal cable is OK.




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