WISE AI 4.0 ®
MEASURE TO MANAGE

User Manual for WUFS-905 Electro Magnetic Flow Sensors

Advanced Water Metering Solutions

Smart Measurement Technology That You Can Trust

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About Us

At WiseAir Technologies, our mission is to empower industries with innovative and advanced measurement solutions for compressed air and gases. With over 20 years of expertise in the field of compressed air management, we have developed smart, reliable, and state-of-the-art products that are both accurate and easy to use. Our focus is on incorporating cutting-edge technologies like M2M communication and the Industrial Internet of Things (IIoT) to bring increased automation, improved communication, and self-monitoring to industrial processes.

Our WA range of smart IIoT sensors can be easily integrated into existing manufacturing and energy management software to enhance data collection, exchange, and analysis for improved productivity and efficiency.

Our Network

Our Smart Sensors are Developed with Design and Technology Support from Our Partners Across North America, Europe and Asia. With Our Strong Network of Partners, we offer Seamless and Best-in-Class Service to Our Customers.

Artificial Intelligence and Machine Learning Software
Our software are programmed to analysis and self Diagnose the Measured Datas

Smart IIOT Sensors
For measurement of Flow, Power, Dew Point and Pressure

Product Experts
Product Specialists with Decades of Experience in Compressed Air Measurement and Management

Simplify Your Compressed Air Management With Our Smart Technology

Compressed Air Systems are Dynamic and Highly In-Efficient. Hence they Require Continuous Monitoring for Sustained Benefits. With Our WiseAir 4.0 Smart Sensors and M2M / AI Softwares Your Compressed Air System is Measured, Analysed and Improved Over Time.

With Our Seamless and Detailed Analytical Reports You Can Keep Track Of Your Compressed Air Systems Efficiency with Minimal Human Intervention.

Our Services

We Offer Free Assessment Services to Identify the HotSpots For Improvements and Develop Road Maps for Sustainable Results. Our Product Specialists Can Also Offer You Customised Plans for Monitoring the Key Performance Factors Of Your Compressed Air System.

Connect with Our Expert Product Specialists to Learn How Your Factory Can Begin to Realize Energy and Cost Savings with Our Advanced Solutions.

Call Us
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Email Us
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Understand The True Costs Of Compressed Air

In a Compressor's Life Cycle More than 80 % of its Operating Costs is Spent Towards its Energy. Hence Monitoring and Managing Compressors at their Peak Energy Efficiency will give Significant Energy Savings.
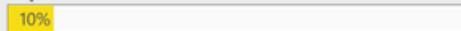
Our Smart Sensors Can Provide Vital Informations Like Flow, Power, Dew Point and Pressure. When Our Sensors are Networked with Our AI Software Programs, All the Measured Datas are Analysed and Reported To You With Suggested Action Plans in Real Time.

Manage Your Compressed Air System Efficiently and Effortlessly With Our WiseAir Smart Sensors and AI Softwares.
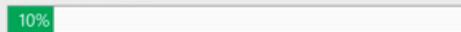
Energy Costs

80%

Capital Costs

10%

Maintenance Costs

10%

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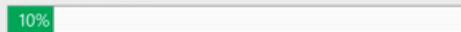
Energy Costs
80%

Capital Costs
10%

Maintenance Costs
10%

Table of Contents

Notices

Please read this manual in full and carefully observe the notes and instructions before and during installation, operation and maintenance. The manufacturer cannot be held liable for any damage which occurs as a result of noncompliance with this manual.

Do not tamper with device. Should the device be tampered with in any manner other than a procedure which is described and specified in this manual, the warranty is cancelled and the manufacturer is exempt from liability.

The product is designed exclusively for the described application. Use of this product in conditions not specified in this manual or, contrary to the manufacturer's instructions, is considered improper handling of the product and will void your warranty. The manufacturer will not be held liable for any damages resulting from improper use of the product.

This manual should be read carefully by relevant personnel and the end user**.** This manual should be kept with the product and be made available as needed. **Once you install or use the product, you accept that you have read, understood and complied with this manual**.

WiseAir Technologies endeavours to make the content of this manual correct but is not responsible for omissions or errors and the consequences caused. In case of any doubts or questions regarding this manual or the product, please contact WiseAir Technologies

⚠️ Warnings

Ignoring warnings can lead to serious injury and/or cause damage!

When handling, operating or carrying out maintenance on this product, personnel must employ safe working practices and observe all local health & safety requirements and regulations.

Improper operation or maintenance of this product could be dangerous and result in an accident causing damage to machinery or injury or death.

The manufacturer cannot anticipate every possible circumstance which may represent a potential hazard. Warnings in this manual cover the most common potential hazards and are therefore not all-inclusive. If the user employs an operating procedure, an item of equipment or a method of working which is not specifically recommended by the manufacturer they must ensure that the product will not be damaged or made unsafe and that there is no risk to persons or property.

NEVER CHANGE ORIGINAL COMPONENTS WITH ALTERNATIVES.

⚠️ Electrical Safety

Any contact with energised parts of the product may lead to an electrical shock which can lead to serious injuries or death. The user shall take all measures necessary to protect against electrical shock.

Consider all local and national regulations for electrical installations. The system must be disconnected from any power supply during maintenance work.

Any electrical work on the system is only allowed by authorised qualified personnel.

Storage and transportation

- The temperature range for transporting the sensor is between -10°C to 60°C (14°F to 140°F).
- The temperature range for storing the sensor is between -10°C to 50°C (14°F to 122°F) and the humidity is <90%, no condensation. Avoid direct UV and solar radiation during storage.

Cleaning

If you need to clean the sensor it is recommended to use a clean, dry cloth. For stubborn marks, use distilled water or isopropyl alcohol only.

Please note: contamination on the sensor tip will affect calibration and accuracy of the sensor. Removal of the contamination may not fix the issue.

Contact WiseAir Technologies or your local distributor for calibration.

Disposal

Electronic devices are recyclable material and do not belong in the household waste. The product, accessories and its packing material must be disposed according to local statutory requirements.

About Electromagnetic Flow Meters

WiseAir Technologies electromagnetic flow meters are designed for measuring the flow rate of an electrically conductive liquid in manufacturing and industrial settings.

Electromagnetic flowmeters are based on Faraday's law of electromagnetic induction. Two electromagnetic coils at the upper and lower ends of the flow meter generate a constant or alternating magnetic field.

When the conductive medium flows through the electromagnetic flowmeter, the induced electromotive force can be detected between the left and right electrodes on the wall of the flowmeter tube.

The magnitude of the induced electromotive force is proportional to the electrically conductive medium flow rate, the magnetic induction density of the magnetic field, and the width of the conductor (the inner diameter of the flowmeter measuring tube). The flow rate of the medium is then calculated based on these measurements.

$$E=K×B×V×D$$

Where: E—Induced electromotive force

K—Meter constant B—Magnetic induction

density V—Average flow speed in the cross-

section of the measuring tube D—Inner

diameter of measuring tube
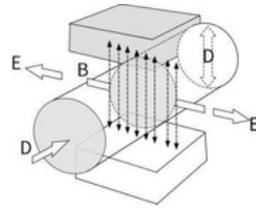
WiseAir Technologies electromagnetic flow meter has no moving parts, rotating gears, turbines or bearings. The flow meter provides realtime flow rates, total volume, velocity and mass flow in a single unit with both Modbus RTU and 4-20mA outputs.The bi-directional ability allows the flow directions to be detected and recorded separately.

Made from corrosion resistant 304 stainless steel, a titanium probe and PTFE liner, these flowmeters are incredibly durable and made for most industrial environments.

Benefits of measuring liquid flow

- Improve product quality and consistency
- Reduce waste and contamination
- Reduce operating costs
- Improve system performance and reliability
- Understand peak and average demands
- Reduce downtime and lost production
- Identify leaks and poor usage

Specifications

	Liquid Flow Meter	
Liquid Mediums	• Industrial and Domestic Water • Sewage • Salt and Sea water • Non-Corrosive wastewater • Acetic and Nitric Acid • Potassium, Sodium, Ammonium and Calcium Hydroxides • Aqua Regia • Other liquids available on request	
	Measurement Range	
Measurement Principal	Faraday's law of electromagnetic induction	
Medium conductivity	>50us/cm	
Medium Temperature Range	-20 to +100 °C	-4 to 212°F
	Accuracy	
Measurement Accuracy	Flow speed > 1m/s $\quad$ ±0.5% Flow speed < 1m/s $\quad$ ±0.5% ±2mm/s	
Repetitiveness	0.15%	
Maximum Temperature Measurement Error	±0.1°C	
	Outputs	
Output	Analogue: 4 to 20mA (3 wire) / Digital: RS485 Modbus / RTU	
Output signals	Flow rate, total volume, velocity and mass flow	
	Power	
Power Supply	100VAC~240VAC, <15 W	
	Other Information	

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Display Bi-Directional	In-built Monochrome LCD / Yes	
Pipe Diameters Flange	DN15-DN150 - Other sizes available on request	
Connection	DIN	
IP Rating	IP65	
Installation Type	Permanent installation	
Warranty Period	12 months	
Ambient Temperature	-10 to +55°C	-22 to +158°F
Rated Pressure	0-16 bar	0-232 psi
	Materials	
Casing	304 Stainless Steel	
Electrode	Titanium	
Liner	PTFE	

Flow Range

Flow velocity: 0.5m/s~5m/s

Pipe Size			Flow Range (m3/hr)		Flow Range (gpm)	
DN	ID (mm)	Inches	Min	Max	Min	Max
15	15	1/2"	0.4	4.0	1.8	17.6
20	20	3/4"	0.8	8.0	3.5	35.2
25	25	1"	1.2	12.0	5.3	52.8
32	32	1.25"	2.0	20.0	8.8	88
40	40	1.5"	3.0	30.0	13.2	132
50	50	2"	5.0	50.0	22.0	220
65	65	2.5"	8.0	80.0	35.2	352
80	80	3"	12.0	120.0	52.8	528
100	100	4"	20.0	200.0	88.0	880
150	150	6"	32.0	320.0	140.8	1408
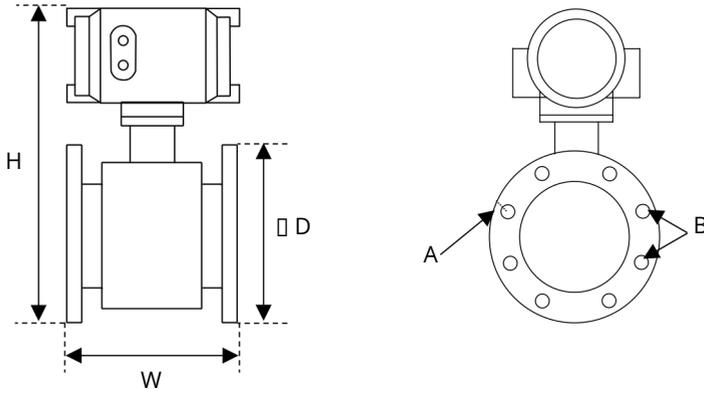
Dimensions (mm)

DN	W Width from outer edge of flange	H Height	D Diameter of Flange	A Centre of hole to edge of Flange	B No. holes & hole diameter
	Dimensions (mm)				
15	200	326	95	65	4 x 14
20	200	326	105	75	4 x 14
25	200	316	115	85	4 x 14
32	200	331	135	100	4 x 18
40	200	339	145	110	4 x 18
50	200	358	160	125	4 x 18
65	200	370	180	145	4 x 18
80	200	389	195	160	8 x 18
100	250	410	215	180	8 x 18
125	250	440	245	210	8 x 18
150	300	469	280	240	8 x 23

Flow Meter Box

Each flowmeter box comes with:

√
    1 x Electromagnetic Flow Meter – Inline style, configured for your liquid type.

Optional: 5-meter data cable

Electromagnetic Flow Meter

Optional Accessories
The following accessories are available for the flow meter. Talk to your local distributor or WiseAir Technologies for pricing.

Data Cables

Cloud-based Data Acquisition and Analysis software

Installation Overview

Step1–Find asuitable section of pipe

- The minimum distance of straight, unobstructed pipe must be:
    - o   at least 10 pipe diameters (10DN) upstream of the flow meter
    - o   at least 5 pipe diameters (5DN) downstream of the flow meter
- Make sure the pipe is full of water. Avoid pipe sections where bubbles can form

Step 2 – Install Flow Meter

Step 3 – Wire the sensor

Step 4 – Check / update the sensor settings

Step 5 (optional) – Connect the sensor to your SCADA or energy management system

Step 6 – Fill out the Commissioning Report (last page of this manual)

Installation – Mechanical

⚠️ **WARNING!** Incorrect installation can damage the sensor or cause it to work incorrectly.

🛈 Notes

- **Before installing the sensor, make sure it is rated for your system** (refer to the "Specifications" section).
  - o Use of the product outside specified ranges or operating parameters can lead to malfunctions and may damage the product or system.
- The electromagnetic flowmeter must be installed in a dry and ventilated place.
- The flow meter is designed for indoor use. If using outside, you will need to protect it from sunlight and rain.
- Always use a spanner / wrench to install the product.
- Only use pressure rated materials and parts when installing and maintaining the product Do not allow the flow meter to be flooded.
- Do not use this product in explosive areas.
- Do not install the flow meter in the following locations:
  - o Places with large temperature variation. Avoid high temperature radiation from nearby equipment. If the flow meter must be installed in a hot environment, heat insulation and ventilation measures must be taken.
  - o Environments with corrosive gases. If the flow meter must be installed in a corrosive environment, and ventilation and anti-corrosion measures must be taken
  - o Pipes or environments with strong vibrations. If the flow meter must be installed on a free vibrating pipe, brackets should be fixed to the pipe, on either side of the flow meter.
  - o near motors, transformers, or other power sources which are prone to cause electromagnetic interference, near the frequency converter or obtain power from the power distribution cabinet of the frequency converter to avoid interference.
- Do not disassemble the product.
- Please observe local and national regulations before/during installation and operation.

Step 1 – Find a suitable section of pipe
Step 1a – Minimum distance of straight pipe

The minimum distance of straight, unobstructed pipe:

- upstream of the flow meter must be at least 10 pipe diameters (10DN)
- downstream of the flow meter must be at least 5 pipe diameters (5DN)

Correct Installation

≥ 10D   ≥ 5D

Direction of flow

≥ 10D   ≥ 5D

Release 1 - 2025

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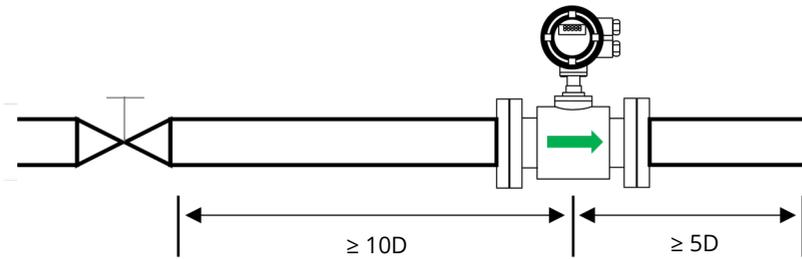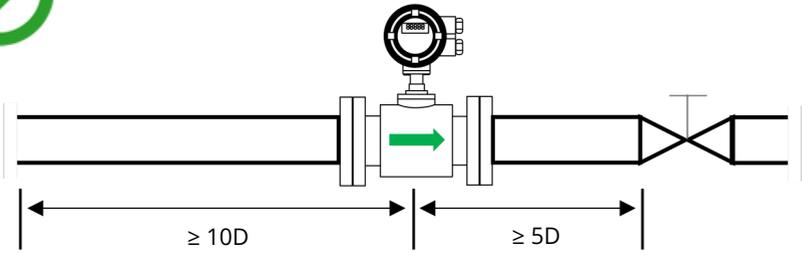
Step 1b – Flow Direction

The flowmeter can be set to automatically detect the positive and negative flow direction.

The flow direction arrow on the sensor casing indicates the positive flow direction. When installing the meter, the flow arrow must be in the direction of the on-site flow.
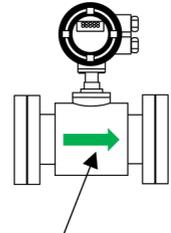
Arrow indicates direction of positive flow

Arrow on flow meter and direction of flow in the pipes are aligned

Direction of flow in the pipe
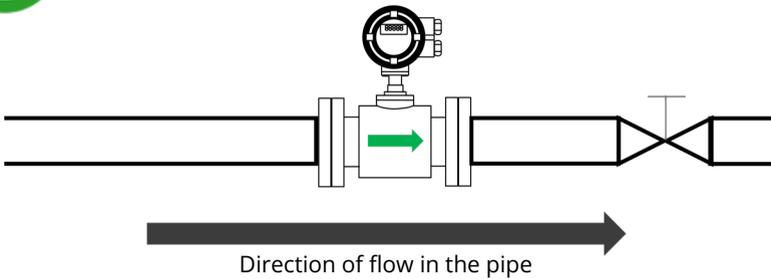
Arrow on flow meter and direction of flow in the pipes in opposite directions

Direction of flow in the pipe
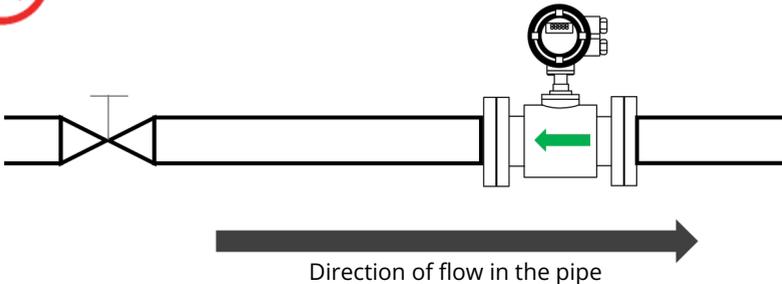
Step 1c – Avoid Empty Space, Bubbles, and Solid Particles

Empty Space - The sensor's electrodes need to be completely submersed in the liquid otherwise incorrect readings can occur.

Bubbles - Pipes should be designed to prevent the air bubbles in the fluids from accumulating on the measurement part of the sensor. If a valve exists near the flowmeter, try to mount the flowmeter on the valve's upstream side to prevent a decrease of pressure and air bubbles forming in the pipe.

Solid Particles – If the liquid contains solid particles, we recommended that the flow meter is installed vertically on a section of pipe with upward flow direction (so the pipe is full of liquid). This may reduce particles from the liquid and will help to evenly wear the sensor lining.

Bubbles can accumulate at the highest point of the pipe

Flow Meter installed on upward flow of liquid

Flow Meter installed at a low point. Pipe should be full of liquid

Pipe might not be full of liquid
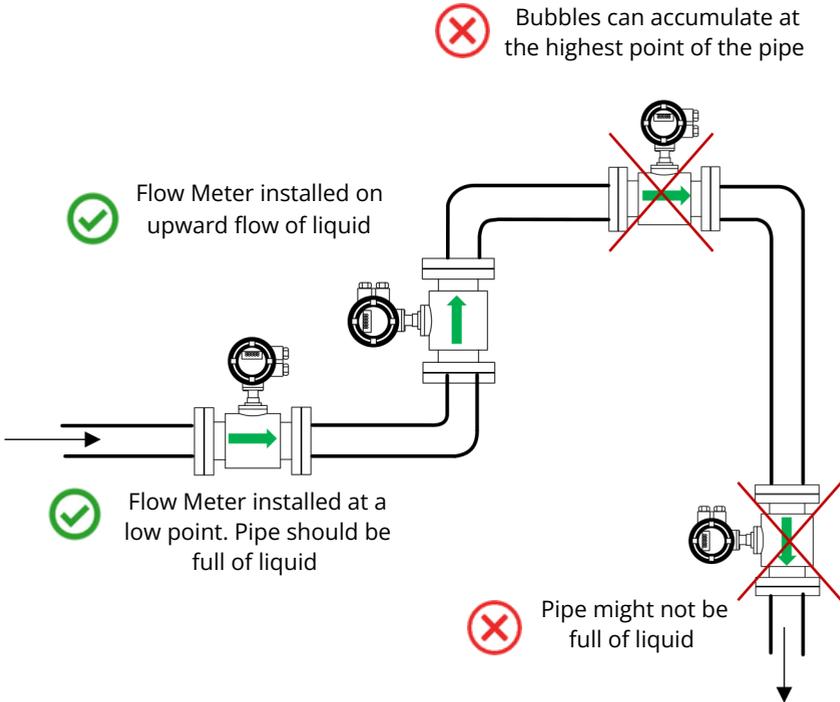
Step 1d – Other Considerations

Other things to consider when finding a suitable location to install the flow meter:

- **Maintenance**
  - o Make sure there is enough space around the flow meter for easy install and maintenance.
  - o The electromagnetic flowmeter could be installed on a bypass pipe to ensure the continuous operation of the system when the flowmeter is out of service.
- **Vibrating Pipes** - If installing the flow meter on free-vibrating pipe, you must add pipe supports on either side of the flow meter.
- **Pumps** - The electromagnetic flowmeter must not be installed on the suction side of a pump.
- For pipes with **open discharges**, the electromagnetic flowmeter must be installed at the bottom section (lower part of the pipe).

Open Discharge
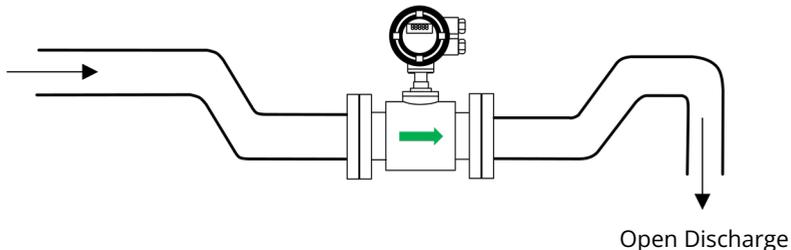
- For locations where fall head of pipes is over 5m, an air valve must be installed on the downstream of the electromagnetic flowmeter
- The flow meter must be installed in a location where **liquid conductivity** is constant. Uneven liquid conductivity can result in incorrect measurements.
- **Injecting chemicals** upstream of the flow meter can cause uneven liquid conductivity and/or damage the lining of the flow meter lining. We suggest you inject chemicals downstream of the flow meter. If chemicals must be injected upstream of the meter, they must be injected at least 30 pipe diameters (30DN) upstream to ensure adequate mixing of liquids.

Step 2 – Mechanical Installation

- Seal gaskets installed between flanges must have good corrosion resistance and must not protrude into the interior of the pipe.

- Avoid welding or flame cutting near the flow meter to prevent the lining from being deformed due to heat.

- Bolts, nuts and thread information is in the 'Specifications' section of this manual. Use suitable flat washers and spring washer with the bolts.

- **Maintenance** - Regularly tighten the bolts during daily use to prevent looseness of the bolts.
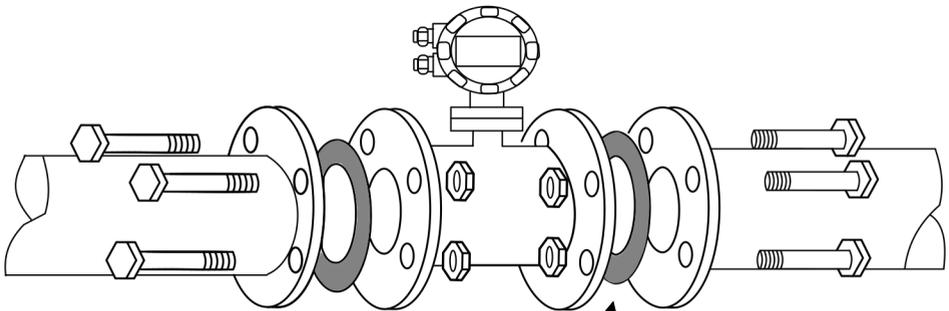
When the flowmeter is installed, the inner diameter of sealing washers shall be slightly larger than that of the pipe to avoid interference to the fluids in the pipe.

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Installation – Electrical

⚠️ **WARNING!** Incorrect wiring can damage the sensor or cause it to work incorrectly.

Notes:

- The Electromagnetic Flow Meter uses **24vDC power supply.**
- Consider all local and national safety requirements and regulations for electrical installations.
- **The system must be disconnected from any power supply during installation and maintenance work.**
- Any electrical work on the system is only allowed by authorised and qualified personnel.

Connection descriptions
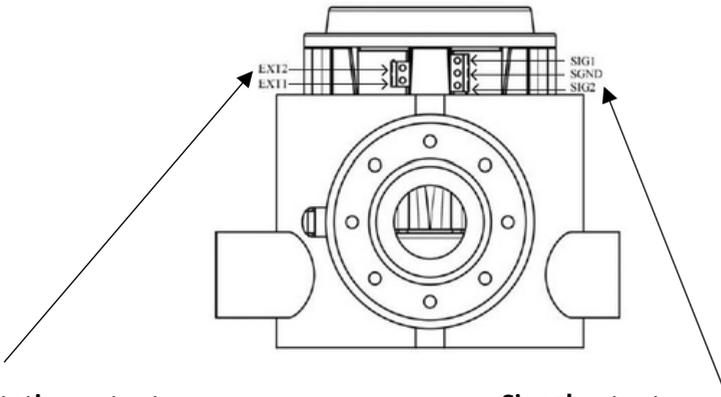
Excitation output

- EXT1 - Sensor excitation coil positive terminal
- EXT2 - Sensor excitation coil negative terminal

Signal output

- SIG1-The positive electrode sensor signal
- SIG2--The negative electrode sensor signal
- SGND--Signal ground

Wiring
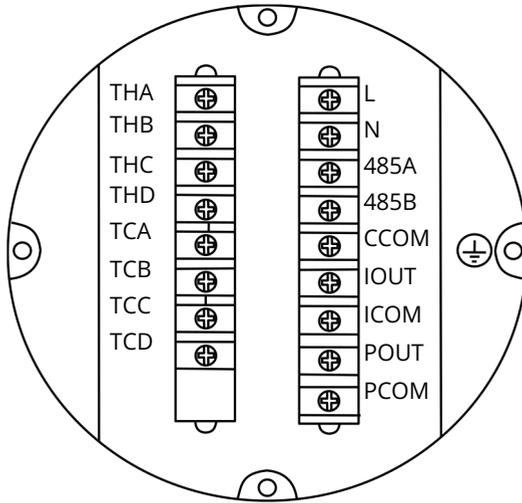
Pin	Description
THA, THB, THC, THD	Water supply temperature (Pt1000)
TCA, TCB, TCC, TCD	Return water temperature (Pt1000)
L	230 v AC (positive pole)
N	(negative pole)
485A, 485B, CCOM	Modbus-RTU (RS485) communication
	485A = Modbus + | 485B = Modbus - CCOM = Modbus ground
IOUT, ICOM	4-20mA output connection
POUT, PCOM	Pulse/Frequency/Relay out
⏚	Ground - connect ground wire to ground screw
Note: the left terminal is the BTU meter terminal	

Grounding - The flow signal produced by the sensor is very weak, usually on the microvolt or millivolt level. Therefore, preventing the influence of external electrical interference is important. Grounding is a very effective measure to address the effects of electrical interference.

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Using the Display
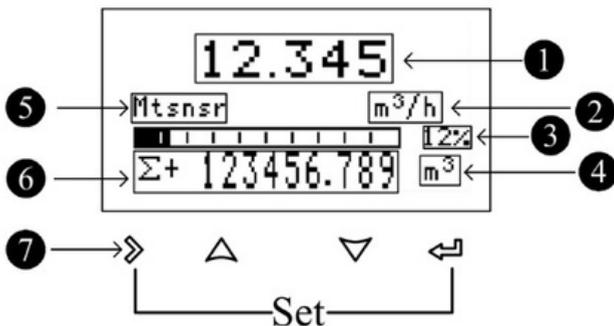
1. Real-time flow
2. Real-time flow unit
3. Real-time flow in percent of flow
4. Accumulation flow unit
5. System alarm information (see next page)
6. Cumulative amount:

   [Σ+]: Positive flow accumulation | [Σ-]: Negative flow accumulation
   [Σ]: Net flow accumulation | [V]: Current velocity
   [MT]: Current conductivity

7. Operation keys: mechanical / photoelectric keys (see table below)

Operation Key	Measuring Mode	Menu Mode	Function Mode	Data Mode
≫	-	Switch Menu categories	-	Data right shift
↵	Switch accumulative amount	Switch menu subclass -	Confirmation	Confirm data Change data
△ ▽	-	Exit Menu	Selection	-
≫ + ↵	Enter Menu		-	

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System Alarm Information
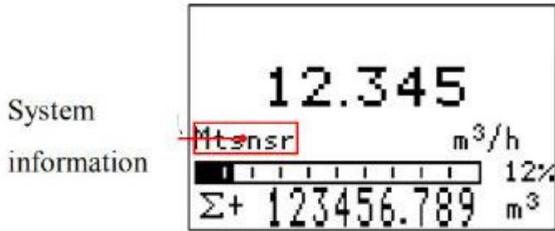
The flow meter's self-diagnosis function will display an alarm message on general faults.

Display Message	Alarm Meaning
	If the system information section is blank, the system is working well.
Mtsnsr	Sensor is detecting an empty pipe
Hi	The current real-time flow rate exceeds the setting flow limit
Lo	The current real-time flow rate is below the setting flow lower limit
Pls	The pulse output frequency exceeds the setting frequency upper limit
AD_Hi	Sensor signal is greater than the AD sampling of the upper limit
Rng	The current real-time flow rate exceeds the setting flow limit
Rng_Hi	The current real-time flow rate exceeds system AD sampling limit
Pls_Hi	The range scope set by user exceeds the upper limit of pulse output

Setting up the Flow Meter

After installing the flow meter, you should check / edit the sensor's settings. At a minimum, you should do the Quick Set up. For full configuration details, see the following pages.

Quick Set up

Press ⟩ and ↵ atthesametimetoenterthe Quick Set Up menu

The default **password for quick set up = 300000**

No.	Parameter	Parameter Range	Default value	Comments
1	Sensor drift diameter	3 -2000	50	
2	Flow Range	0 - 99999	35.000	Set the maximum flow limit value
3	Sensor coefficient	0 - 99999	1.0	
4	Zero correlation	0 - 99999	0.0	
5	Accumulation reset	Y, N	N	
6	Flow remove	0 – 99%	1%	
7	Time constant	0 – 99s	2s	
8	Exit configuration	Y, N	N	

Configuration Details

Various parameters of the flow meter can be configured by the user, as shown in the following tables:

- Table 1 – Flow parameters
- Table 2 – Current Output
- Table 3 – Pulse / Frequency/ Alarm Output
- Table 4 – Alarm parameters
- Table 5 – System settings, e.g. language, Modbus settings, password

You may need to use password = **200000** to change the parameters below.

Table 1 – Flow Parameters

These parameters can be changed by the user.

Table 11 Quick configuration

NO.	Parameter	Setting mode	Parameter range	Default
1*01	Direction	Select	Forward / Reverse	Forward
1*02	Flow range	Digit	0.1*Maximum ~1.2*Maximum	Maximum
1*03	Flow unit	Select	(L; kg; m3; t; ft3; US gal; US bbl; UK gal; UK bbl)/ (h; min; s)	m3/h
1*04	Cumulative reset	Select	Forward reset / Reverse reset	-
1*05	Communication address	Digit	000~126	008
1*06	Language	Select	中文/English, Korean, Spanish, and Russian.	ENGLISH

Table 12 Detailed Configuration

NO.	Parameter	Setting mode	Password level	Parameter range	Default
	1-Quick configuration				
1*01	FlowDirection	Select	Quick	Forward/Reverse	Forward
	Used to change the direction of flow, when negative pole and positive pole signal cable are reversely connected, or the sensor is reversely installed, activate this function.				
1*02	Flowrange	Figure	Quick	0.1*Maximum ~1.2*Maximum	Maximum
	Set the maximum flow limit value. Used to calculate the frequency, current output limit calculation and alarm threshold calculation, etc.				
1*03	Flowunit	Select	Quick	(L; kg; m3; t; ft3; US gal; US bbl; UK gal; UK bbl)/(h; min; s)	m3/h
	When entering this menu configuration option, press $\circledR$ to select time units/volume units. Choose volume unit ,such as L, m3, gal; the density will not calculated; Choose mass unit such as kg, t; need 1-2 density parameter.				
1*04	Accumulation reset	Select	Quick	Forward/Reverse reset	-
	Select the corresponding function, press **[Enter key]** ,and the corresponding cumulative amount will be reset; Net cumulative value=positive cumulative value - negative cumulative value. Clearing the cumulative value in either direction will have an impact on the net cumulative value.				
1*05	Address	Figure	Quick	000~126	008
	Communication Protocol instrument address based on the RS485 protocol Modbus RTU.				
1*06	Language	Select	Quick	中 文 /English,	ENGLISH

NO.	Parameter	Setting mode	Password level	Parameter range	Default
				Korean, Spanish, and Russian.	
	Set system language, supporting five types of language.				
2-Flow set					
2*01	Bidirectional measurement	Select	User	Open/Close	Open
	Allow measurement of flow from the reverse direction when open, only measure forward flow when close.				
2*02	Flowdirection	Select	User	Forward/Reverse	Forward
	Same as 1*01.				
2*03	Flowunit	Select	User	(L; kg; m3; t; ft3; US gal; US bbl; UK gal; UK bbl)/(h; min; s)	m3/h
	Same as 1*03.				
2*04	Fluiddensity	Figure	User	(0.01~5)g/cm3	1
	Set fluid density				
2*05	Max.range	Read-only	User	--	--
	The maximum range that can be set, this configuration item is read-only.				
2*06	Flowrange	Figure	User	0.1*Maximum ~1.2*Maximum	Maximum
	Same as 1*02.				
2*07	Flowcutoff	Figure	User	0~10%	1%
	Flow volume is regarded as zero if it is below the setting value Zero means not removing.				
2*08	Dampingtime	Figure	User	0s~99s	--
	Damping coefficient of the filter, select the average selected within the time parameter as the real-time flow.				

NO.	Parameter	Setting mode	Password level	Parameter range	Default
2*09	Filter	Select	User	ON/OFF	OFF
	A digital filter is included in the converter specifically for pulsating or noisy flow signals. It smoothes the displayed indication value and current output. Turn on the filter, the damping value setting can be reduced, and the response time of the converter is not affected. The "filtering" mode is selected using the up or down keys and turned on by pressing **[Enter key]**				
2*11	Instantaneous correction	Read-only	User	--	--
	Correction of instantaneous flow.				
2*12	Accumulation unit	Read-only	User	L; kg; m3; t; ft3; US gal; US bbl; UK -- gal; UK bbl	
	This unit is read-only and related to the pulse output unit.				
2*13	Accumulation reset	Select	User	Forward/Reverse reset	-
	Same as 1*04.				
2*14	Average	Select	User	Nocalculated/ Calculated	No calculated
	When you need to calculate the average value, select "Calculated" and press ⓔⓃⓣ Afterwaitingforthecalculationtocomplete,thecalculated percentage average will be automatically displayed.				
	3-Output set				
3*01	Pulseoutput type	Select	User	High/Lowpower level	Lowpower level
	Choose active output or passive output.				
3*02	Pulsecoefficient	Figure	User	0.001~9999.9	--
	The default value of 10.It is also influenced by the highest frequency, so that the frequency corresponding to the range does not exceed 5kHz. Settings that exceed the range will be restricted within the range.				
3*03	Pulsewidth	Figure	User	0.1~2000ms	--

NO.	Parameter	Setting mode	Password level	Parameter range	Default
	The maximum pulse width is also limited by a proportion not exceeding 50%.				
3*04	Pulseunit	Select	User	L; kg; m3; t; ft3; US gal;USbbl;UK gal; UK bbl	m3
	This unit will also affect the cumulative unit.				
3*05	Address	Figure	User	000~126	008
	Same 1*05.				
3*06	Baudrate	Select	User	4800/9600/19200/ 38400/57600/ 115200	9600
	Baud rate of serial communication.				
3*07	Even-oddcheck	Select	User	None / Even check / Odd check	None
	Verification mode of serial communication.				
3*08	Endianness	Select	User	2143; 4321; 1234; 3412	2143
	Byte exchange sequence of serial communication				
3*09	Outputcurrent	Figure	User	3.6mA~22.8mA	0mA
	Converter fixed current output for calibrating (4-20) mA output, 0mA means normal output.				
3*11	4mAcalibration	Figure	User	3.6mA~4.4mA	
	4mA calibration current value, written value is the measured value when the output current is 4mA.				
3*12	20mAcalibration	Figure	User	18mA~22.8mA	
	20mA calibration current value, written value is the measured value when the output current is 20mA.				
4-Limit & Error					
4*01	Alarmpermission	Select	User	Open / Close	Close

NO.	Parameter	Setting mode	Password level	Parameter range	Default
	Open or close alarm function allows.				
4*02	Max.alarmvalue	Figure	User	0%~120%	120%
	Set the max alarm value , range percentage.				
4*03	Min.alarmvalue	Figure	User	0%~120%	0%
	Set the min alarm value , range percentage.				
4*04	Hysteresis	Figure	User	0%~5%	0.5%
	Used to eliminate the alarm disturbance Upperlimiteliminationconditions:real-timeflowislessthantheupperlimit alarm value minus return difference. Lower limit elimination conditions: real-time flow is greater than the lower limit alarm value plus return difference.				
4*05	Error current selection	Select	User	4mA/High/Low	4mA
	When the system malfunctions, select the 4mA,high and low current output				
4*06	High error currentvalue	Figure	User	23.5mA~24.5mA	24mA
	When the system malfunctions,output current high value.				
4*07	Low error currentvalue	Figure	User	3.2mA~3.9mA	3.8mA
	When the system malfunctions,output current low value.				
5-Empty pipe					
5*01	Empty pipe alarm	Select	User	Open/Close	Open
	Set whether to enable empty detection function.				
5*02	Empty threshold	Figure	User	0~16000	--
	Threshold for empty pipe alarm judgment.				
5*03	Conductivity equivalent	Read-only	User	--	--
	This item is the conversion value of the internal reading code value of the				

NO.	Parameter	Setting mode	Password level	Parameter range	Default
	system, not the actual conductivity value, and only serves as a reference for judging conductivity (or judging empty or full pipes).				
6-Sensor Setting					
6*01	Sensorzero point	Read-only	User	--	--
	Sensor factory zero point, read-only.				
6*02	Sensor coefficient	Read-only	User	0.5~10	--
	Sensor coefficient.				
6*03	Diameter	Select	User	0~35 (Diameter code)	--
	Diameter of sensor.				
6*04	Zeroadjustment Figure		User	-100~100	--
	Zero adjustment of sensor.				
7-Test Mode					
7*01	Simulationmode Select		User	Notsimulated/ Percentage	Not simulated
	This setting disappears after power failure, and this function simulates a normal state, which is the function used during testing.				
7*02	Simulationvalues Figure		User	--	--
	Thissettingiseffectiveafterturningonsimulationmodeanddisappears after power failure.				
8-System					
8*01	Language	Select	User	Chinese/English, Korean, Spanish, and Russian.	ENGLISH
	Same as 1*06.				
8*02	Version	Read-only	User	--	--
	Software version information.				

NO.	Parameter	Setting mode	Password level	Parameter range	Default
8*03	TagNO.	Read-only	User	--	--
	Decimal places.				
8*04	Restorefactory	Select	User	Yes / No	No
	Restore factory parameter settings.				
8*05	LCDcontrast	Select	User	1~9	5
	Display contrast settings				
HART Setting (optional)					
9*01	Polling Address	Select	User	00~63	00
	Sets the polling address.				
9*02	Loop Current	Select	User	ON/OFF	On
	Sets the loop current mode. When turned off, the output is fixed at 4 mA.				
9*03	TagNo.	Select	User	26 English letters	TAG
	Sets the tag. Up to 8 characters can be entered.				

Operating instruction

Parameter selection and adjustment

[Enter key] , press passwords to enter different On the main page, press configurations. After entering the corresponding configuration page, the position indicated by the cursor is the menu level (element). Press **[Right key]** to move the cursor, press **[Downkey]** toadddata,and press**[Enterkey]** toconfirm selectionandsave. Press**[Returnkey]** toreturntothepreviousmenucorrespondingtothepermission. After modifying the password, you can directly enter the monitoring main interface. To re-enter the configuration, you need to enter the permission password again.

For example, if you need to modify the flow range, **the specific menu operation is as follows:**

```
- - - Quick config- - -
        1 * 0 2
        Flow range
```

```
---Flow range---
  0 0 0 0 5 . 6 0 0          Press〔 Enter key〕to enter editing condition.
```

```
---Flow range---
  0 0 0 ■ . 6 0 0          Press ▷ to move the light cursor .
```

```
---Flow range---
  0 0 0 ■ . 6 0 0          Press ▽ to modify parameters.
```

```
---Flow range---
    Su  c  ce  s     . 6  0 0   Press〔Enter key〕to save data.
```
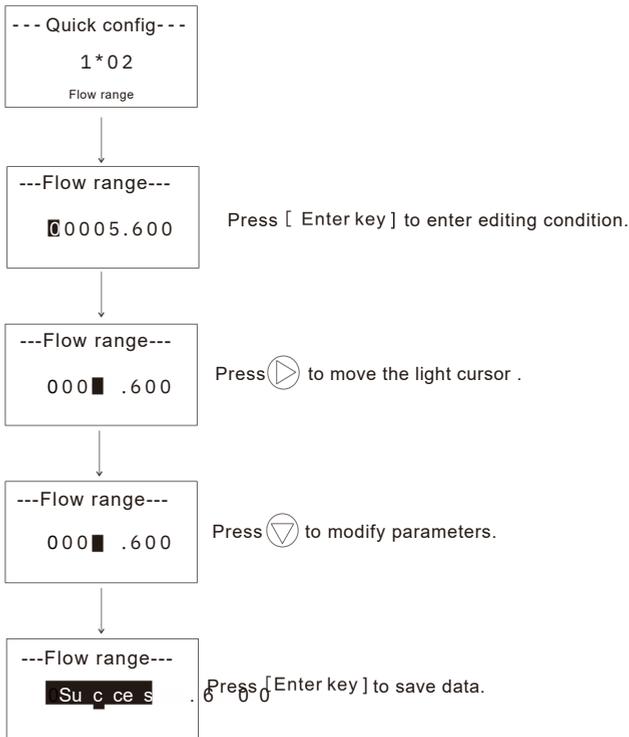
Fig.30 Example of operation

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Display measurement

Thispagewilldisplayafterstart up.

∑+:Positive flowaccumulation   ∑ - : Negativeflowaccumulation
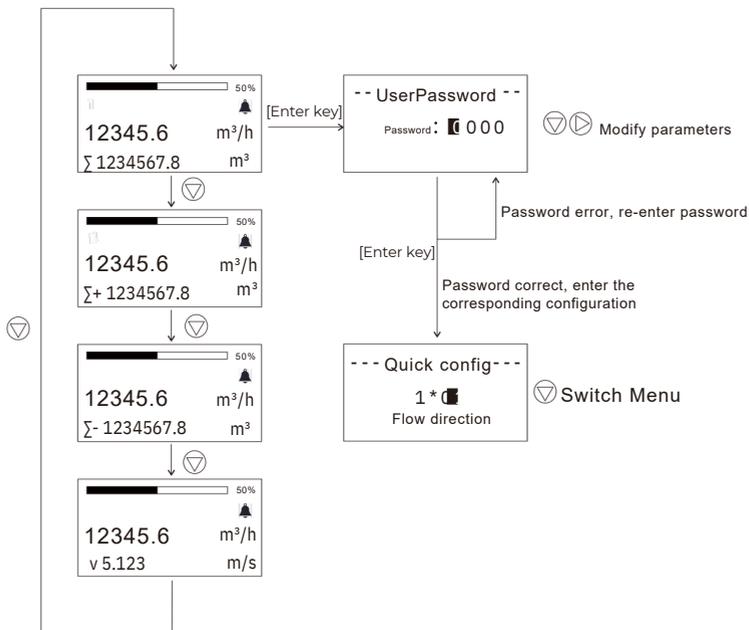
∑ : Net flow accumulation   V : Current velocity

Fig.31 Display Measurement

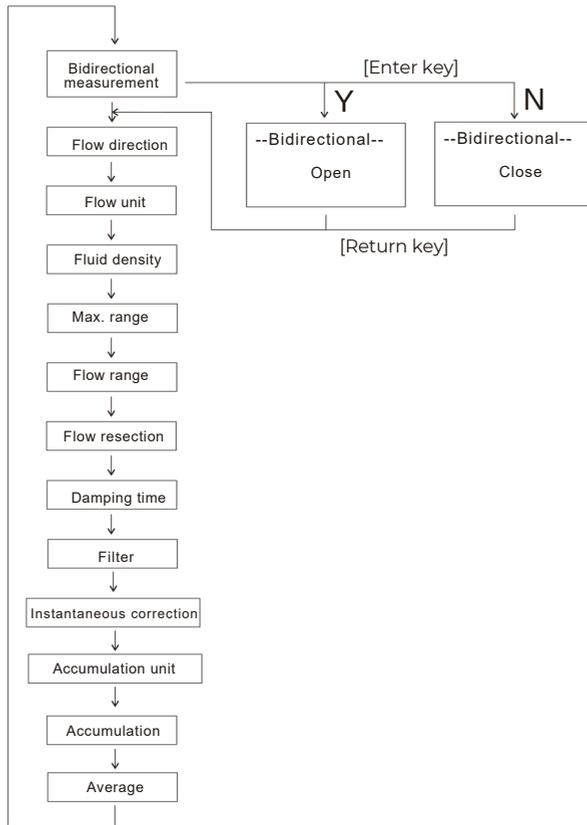**Flow setting**

Fig.32 Flowsetting
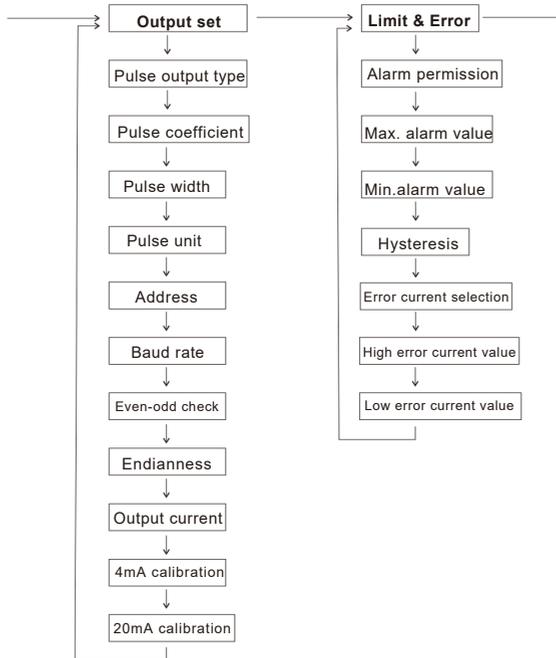
Output, limit & error setting

```
         ┌──────────────────┐        ┌──────────────────┐
 ───────▶│    Output set     │───────▶│   Limit & Error   │────────▶
         └──────────────────┘        └──────────────────┘
                  ↓                            ↓
         ┌──────────────────┐        ┌──────────────────┐
         │ Pulse output type │        │  Alarm permission │
         └──────────────────┘        └──────────────────┘
                  ↓                            ↓
         ┌──────────────────┐        ┌──────────────────┐
         │ Pulse coefficient │        │  Max. alarm value │
         └──────────────────┘        └──────────────────┘
                  ↓                            ↓
         ┌──────────────────┐        ┌──────────────────┐
         │   Pulse width     │        │  Min.alarm value  │
         └──────────────────┘        └──────────────────┘
                  ↓                            ↓
         ┌──────────────────┐        ┌──────────────────┐
         │   Pulse unit      │        │    Hysteresis     │
         └──────────────────┘        └──────────────────┘
                  ↓                            ↓
         ┌──────────────────┐        ┌──────────────────────┐
         │    Address        │        │ Error current selection│
         └──────────────────┘        └──────────────────────┘
                  ↓                            ↓
         ┌──────────────────┐        ┌──────────────────────┐
         │    Baud rate      │        │ High error current value│
         └──────────────────┘        └──────────────────────┘
                  ↓                            ↓
         ┌──────────────────┐        ┌──────────────────────┐
         │  Even-odd check   │        │ Low error current value │
         └──────────────────┘        └──────────────────────┘
                  ↓
         ┌──────────────────┐
         │    Endianness     │
         └──────────────────┘
                  ↓
         ┌──────────────────┐
         │  Output current   │
         └──────────────────┘
                  ↓
         ┌──────────────────┐
         │  4mA calibration  │
         └──────────────────┘
                  ↓
         ┌──────────────────┐
         │ 20mA calibration  │
         └──────────────────┘
```

Fig.33 Output,limit& errorsetting

Empty pipe function, sensor function, test mode, system setting

```
    ┌──────────────┐     ┌──────────────┐    ┌──────────────┐    ┌──────────────┐
───▶│  Empty pipe   │────▶│Sensor Setting │───▶│  Test Mode    │───▶│    System     │────▶
    └──────────────┘     └──────────────┘    └──────────────┘    └──────────────┘
           ↓                    ↓                    ↓                    ↓
 ┌──────────────────┐  ┌──────────────────┐  ┌──────────────────┐  ┌──────────────┐
 │Empty pipe alarm switch│ │Sensor zero point │  │  Simulation mode  │  │   Language    │
 └──────────────────┘  └──────────────────┘  └──────────────────┘  └──────────────┘
           ↓                    ↓                    ↓                    ↓
 ┌──────────────────┐  ┌──────────────────┐  ┌──────────────────┐  ┌──────────────┐
 │Empty pipe alarm threshold││Sensor coefficient│  │ Simulation values │  │   Version     │
 └──────────────────┘  └──────────────────┘  └──────────────────┘  └──────────────┘
           ↓                    ↓                                         ↓
 ┌──────────────────┐  ┌──────────────────┐                       ┌──────────────┐
 │Conductivity equivalent││    Diameter      │                       │    Tag NO.     │
 └──────────────────┘  └──────────────────┘                       └──────────────┘
                             ↓                                           ↓
                       ┌──────────────────┐                  ┌────────────────────────┐
                       │  Zero adjustment  │                  │ Restore factory parameters│
                       └──────────────────┘                  └────────────────────────┘
                                                                         ↓
                                                               ┌──────────────┐
                                                               │  LCD contrast  │
                                                               └──────────────┘
```
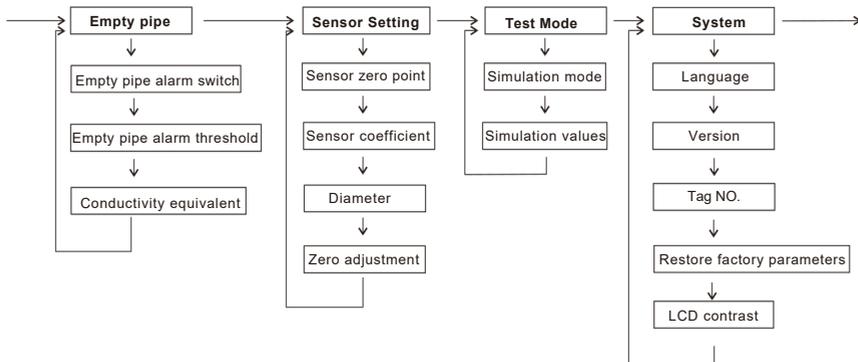
Fig.34 Emptypipefunction,sensor function,testmode,systemsetting

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Functions
System information

The flowmeteritselfhasa self-diagnosisfunction, inaddition tothepower supply andcircuitboardhardware failures;itcancorrectlyprovidethecorresponding alarmmessageto thefaultin ageneralapplication.
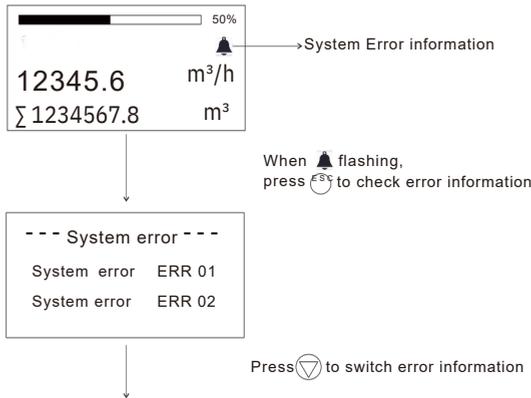

Fig.35 Systeminformation

Table 13 Systeminformation

Display	Alarm content
🔔	On the main page, press**[Return key]**to check errorinformation.
ERR01~04	System error.
ADC error	Signal acquisition chip malfunction The excitation
Excitation current error	current output by the converter is incorrect. Check if the excitation wiring is disconnected.
Signal saturation	The signal exceeds the collection range.
Signal fluctuation exceeds	The sensor signal is unstable, greater than the AD sampling of the upper limit.
Emptypipealarm	The pipeline is not fully filled with the liquid to be

Display	Alarm content
	tested, or the sensor is not grounded properly
Min. flow value alarm	Detected traffic exceeds the set lower limit alarm value
Max. flow value alarm	Detected traffic exceeding the set upper limit alarm value
The flow exceeds the range	The current real-time flow rate exceeds the setting flow limit
Output freq saturation	Output frequency exceeds the collection range
Units mismatch exceeds	Unit setting error
⬆⬇	Reverse flow detected (not configured properly)
C	Low flow cutoff mode
T	Simulation mode

Pulse/Current output

Pulse output

It is mainly used for sensor manufacturer coefficient calibration and user measurement applications. In the third way, configuration parameter settings: The pulse coefficient corresponds to the number of pulses in a measured flow unit. If the pulse coefficient value changes, the cumulative value is maintained in the selected unit. The setting range of the pulse coefficient is from 0.001 to 100000 pulses per unit. Use the selected flow range, pulse width (0.1ms to 1000ms), and pulse units (such as L, m^3). Check the pulse coefficient of the passive input with a mass unit (such as g, kg) and a density correction coefficient. If any of these parameters change, the pulse width cannot exceed 50% of the output frequency cycle when the flow rate is at 100% (duty cycle 1:1). If the input pulse width is large, it will be automatically reduced to 50% of the cycle. Pulse output can only be achieved using counter instruments, not frequency meters.

Current output

Mainly used for transmitting output to other intelligent instruments, such as digital display table, recorder, PLC, DCS, etc.

The current output type: 4 - 20mA.

The current valve corresponds to the real-time flow rate, 20mA corresponds to the range limit, and 4mA corresponds to the range limit.

Conversion relationship

$$I_{Real\ time} = \frac{Q_{Real\ time}}{Q_{max}} 16.00 + 4.00$$

Notice:

Q real time Indicate real-time flow rate

QMax   Indicatecurrentinstrumentrange

I real time Indicate the real-time current value

Communication Settings

Default Modbus Settings

The flow meter has the following default Modbus settings. Settings can be changed to suit system requirements.

Default Modbus RTU (RS485) Settings					
Address	**Baud Rate**	**Frame / Parity / Stop Bit**	**Response Time**	**Response Delay**	**Frame Spacing**
8	9600	8 / N / 1	1 Sec	0 Milliseconds	7 Characters

Modbus Registers

Note: Float/ulong/long type data, Communication transmission is in byte order 2-1-4-3; ushort type data transmission is in accordance with 2-1.

Parameter	Type	Address	Comments
Real-time flow rate	Float	100	
Real-time flow velocity	Float	102	
Flow percentage	Float	104	50 stands for 50%
Electric conductivity	Float	106	
Forward flow accumulation of integer	ulong	108	
Forward flow accumulation of decimal	ulong	110	The decimal part magnifies by 100 times, 123 stands for 0.123
Reverse flow accumulation of integer	ulong	112	
Reverse flow accumulation of decimal	ulong	114	The decimal part magnifies by 100 times, 123 stands for

Parameter	Type	Address	Comments
			0.123
Instantaneous heat	Float	120	
Input temperature	Float	122	
Output temperature	Float	124	
Heat accumulation integer	ulong	126	
Heat accumulation decimal	ulong	128	The decimalpartmagnifies by 100 times,123stands for 0.123
Cooling cumulative integer	ulong	130	
Cooling Cumulative Decimals	ulong	132	The decimalpartmagnifies by 100 times,123stands for 0.123
Heat unit	ushort	134	0x00: kW 0x01: MW 0x02: kJ/h 0x03: MJ/h 0x04: GJ/h
Cumulative heat unit	ushort	135	0x00: kWh 0x01: MWh 0x02: kJ 0x03: MJ 0x04: GJ

Communication Configuration

For 32-bit data (long plastic or floating point) arranged in the communication frame:

Example: Long integer 16909060(01020304H): 03 04 01 02

Floating number 4.00(40800000H): 00 00 40 80

Warranty

WiseAir provides a 12-month warranty for all sensors. The warranty covers materials and workmanship under the stated operating conditions from the date of delivery. Please report any findings immediately and within the warranty time.

If faults occur during the warranty period WiseAir will repair or replace the defective unit, without charge for repair labour and material costs but there is a charge for other services such as labour to remove or reinstall the instrument, transport and packing. Warranty repairs do not extend the period of warranty.

The following damage is excluded from this warranty:

- Improper use and non-adherence to the user manual.
- Use of unsuitable accessories.
- External influences (e.g. damage caused by vibration, damage during transportation, excess heat or moisture).

The warranty is cancelled when one of the following situations occurs:

- The user opens the measurement instrument without a direct request written in this manual.
- Repairs or modifications are undertaken by third parties or unauthorised persons.
- The serial number has been changed, damaged or removed.

Other claims, especially damage occurring on the outside of the instrument (e.g. dents, marks), are not included unless responsibility is legallybinding.

Calibration

The sensor iscalibratedbefore delivery. The calibration dateisprinted on the certificate which is shipped with the sensor.

Trouble Shooting

Problem	Possible Cause	Suggested Fix
Converter flow is negative	1.Thesensor is installed opposite to the fluid flow direction 2. There is a reverse connection between SIG1 and SIG2 or EXT1 and EXT- in the sensor junction box	1. Remove flow meter and reinstall it in the opposite direction (ie, rotate the flow meter 180°) 2. Re-wire the converter
Converter output overrange	1. The flow meter range value is less than the actual measurement value 2. Fluid does not fill the pipe 3. Exciter coil open circuit	1. Expand the flow meter range 2. Close the small flow control valve 3. Rewire
The output signal fluctuates too much	1. There is gas at the sensor electrode, resulting in poor contact between the electrode and the medium 2. Deposits on the electrodes	1. Exclude the gas in the pipeline 2. Clean the electrode
The output signal gradually drifts towards zero	The sensor enters the water 2. Electrodes are covered	1. Replace the sensor 2. Clean the electrode

Need help?

Contact your local distributor. For more

information, contact WiseAir Technologies

- Phone: +91 90477 78715

- WhatsApp: +91 90477 78715

- E-mail: support@wiseair.asia

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