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Electromagnetic Flowmeter Signal Converter
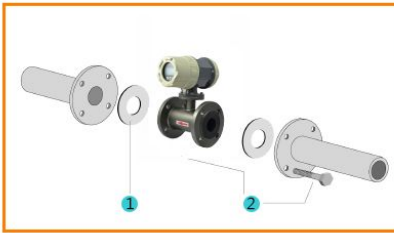
User Manual

Operation Instructions

Electromagnetic
Flowmeter

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Preface

Thank you for purchasing our products!

This manual is about meter functions, settings, connection methods, operation flow, and methods to resolute fault.Please read this manual carefully before operation and use it correct.

After reading it, please properly keep it in the place where you may read it any time for operation reference.

Note

Modification of this manual contents will not be notified as a result of factors like function upgrading.

We try our best to guarantee that the manual content is accurate, if you find something wrong or incorrect, please contact us.

Any reprint and copy of manual content is strictly prohibited either in whole or in part.

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Catelog

Chapter 1 Safety Instructions

1.1 Manufacturer's Safety Instructions

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Product Liability and Warranty

The operator judges whether the flowmeter serves the purpose, and bear the responsibility for it.The manufacturer does not assume the consequences caused by operator's misuse of meter. Wrong installation and operation of flow meter (system) will lead to deprival of warranty rights.In addition, the corresponding "standard sales terms" applies as well, and the clause is the basis of purchase contract.

Document Details

In order to avoid harm or damage to the equipment when used improperly, please make sure to read the information in this document.In addition, you must comply with national standards, safety regulations and accident prevention rules.

If you can't understand the document content, please turn to the manufacturer for help.The manufacturer will not take the responsibility for property loss or physical injuries due to misunderstanding of the information contained in the document.

This document will help you to establish favorable operating conditions so as to make sure that you use the equipment in a safe and effective way.In addition, something of particular attention and safety measures in the document are marked by the following marks.

Display Convention

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The following symbols will make it easier for you to use this document.

Danger !

This symbol signifies related safety tips.

Warning !

Such warnings must be paid attention to. Slight negligence may also leads to serious health threat, and may damage the equipment itself or the operating factory facilities.

Attention !

Such warnings must be paid attention to. Any slight negligence may also leads to functional fault of the equipment itself.

Tips !

This symbol signifies related important information concerning operating instrument

1.2 Safety Instructions for Operators

Warning !

Only corresponding personnel who got trained and authorized are allowed to install, use, operate and maintain the equipment.This   document will help you to establish favorable operating conditions so as to make sure that you use the equipment in a safe and effective way.

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Chapter 2 equipment introduction

2.1 Scope of Delivery

Tips !

Please check whether the boxes are damaged or not, and whether they have been handled roughly or not. Please report the damage to the deliverer and the manufacturers.

Attention !

Please check the packing list to make sure that all the goods you receive are integrated.

Attention !

Please check the name plate of the equipment, and confirm whether the supply is the same as your order.Check whether voltage on the nameplate is correct. If incorrect, please contact manufacturers.

Detachable
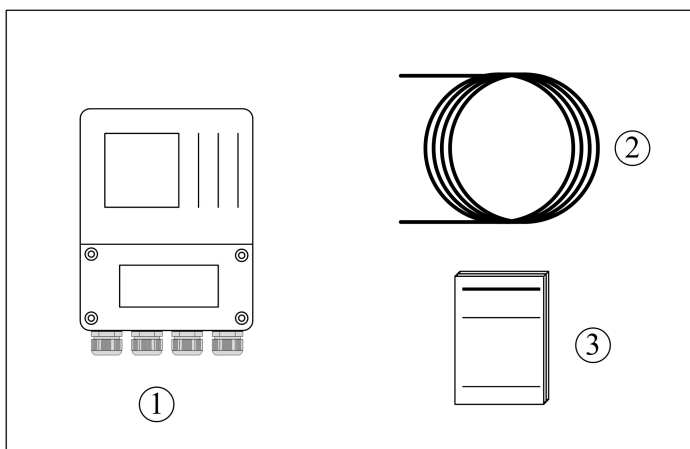
Order-oriented meter

1. Order-oriented meter
2. Signal cable (optional)
3. Document (Operation manual)

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Integrated
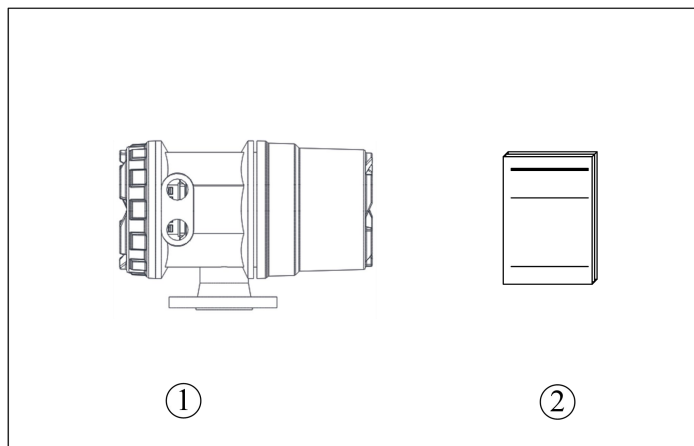
1.   Order-oriented meter
2.   Document (Operation manual)

2.2 Equipment Introduction

Electromagnetic flowmeter is only applicable to measure the flow of conductive liquid.The fresh supply of equipment is in factory setting condition, and only when manufacturers set the appropriate parameters,can it work well.

Detachable
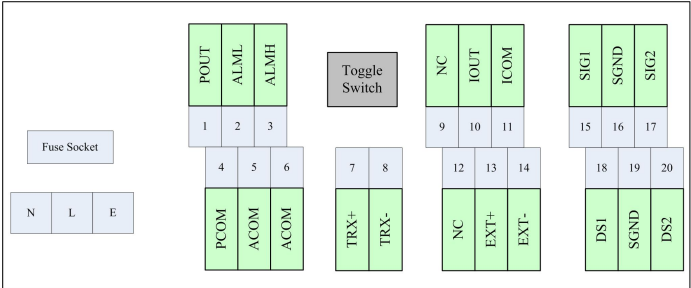
L , N , E :	220V AC Supply
IOUT+ , ICOM- :	4-20mA Output Connection
POUT+ , PCOM- :	Pulse/Frequency Output Connection
ALML , ALMH , ACOM :	Dual Alarm Output
TRX+ , TRX- :	485 Serial Communication Interface
SIG1 , SIG2 , SGND :	Electrode Signal
DS1 , DS2 :	Electrode Screening
EXT+ , EXT- :	Excitation Signal

Integration
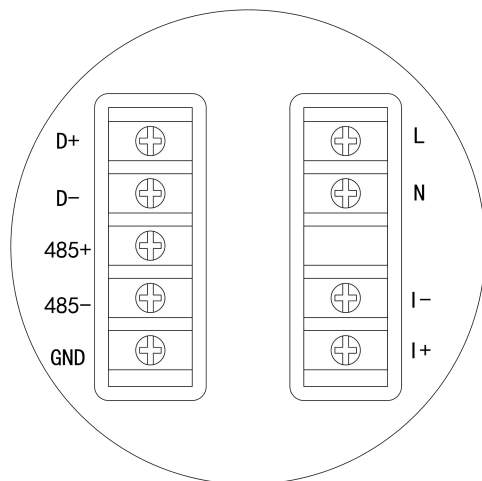
L , N :	220V AC Supply
I+ , I- :	4-20mA Output Connection
D+、D- :	Pulse/Frequency/Alarm Output Connection
485+ , 485- :	485 Serial Communication Interface

2.3 Nameplate

Attention !

Please check the name plate of the equipment, and confirm whether the supply is the same as your order.Check whether electricity supply on the nameplate is correct. If incorrect, please contact manufacturers.

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Type	
E-Supply	
Serial No.	

Chapter 3 installation

3.1 Installation Tips

Attention！

Please check whether the boxes are damaged or not, and whether they have been handled roughly or not.

Attention！

Please check the packing list to make sure that all the goods you receive are integrated.

Attention！

Please check the name plate of the equipment, and confirm whether the supply is the same as your order.Check whether voltage and E-supply on the nameplate is correct. If incorrect, please contact manufacturers.

3.2 Storage

- Set aside the meter in a dry and dust-free place.
- Avoid making it exposed to sunlight directly for a long time.
- The equipment should be stored in its original packaging.

3.3 Installation Requirements

Attention！

In order to guarantee installation works well, it is necessary to take the following measures.

- Leave enough space on the side.
- Stop the converter from subjecting to violent vibration.

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3.4 Wall-hung Installation (Detachable)

Attention！

We don't supply installation materials and tools.Please use installation materials and tools that meet the occupational health standards and conform to safety regulations.
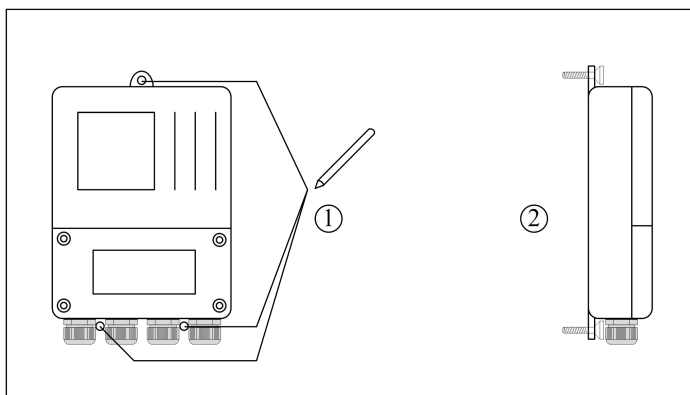
Make a mark on the wall, and fix the converter onto the wall with a drill and expansion screw.

Attention！

Install the equipment one close to another
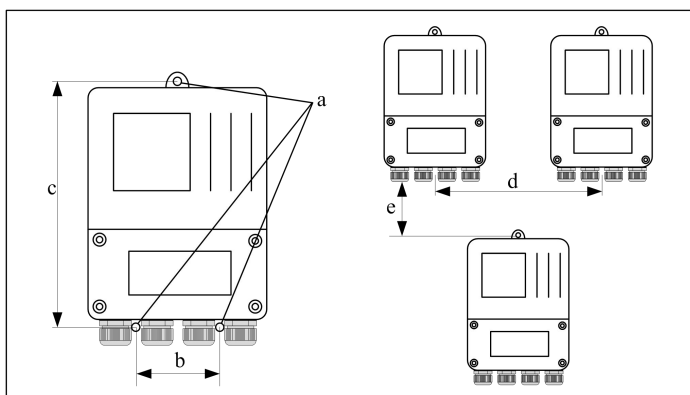
Size	[mm]
a	Φ7
b	70
c	233.5
d	>328
e	>214

3.5 Chulk Installation（Integrated）

Attention！

We don't supply installation materials and tools.Please use installation materials and tools that meet the occupational health standards and conform to safety regulations.
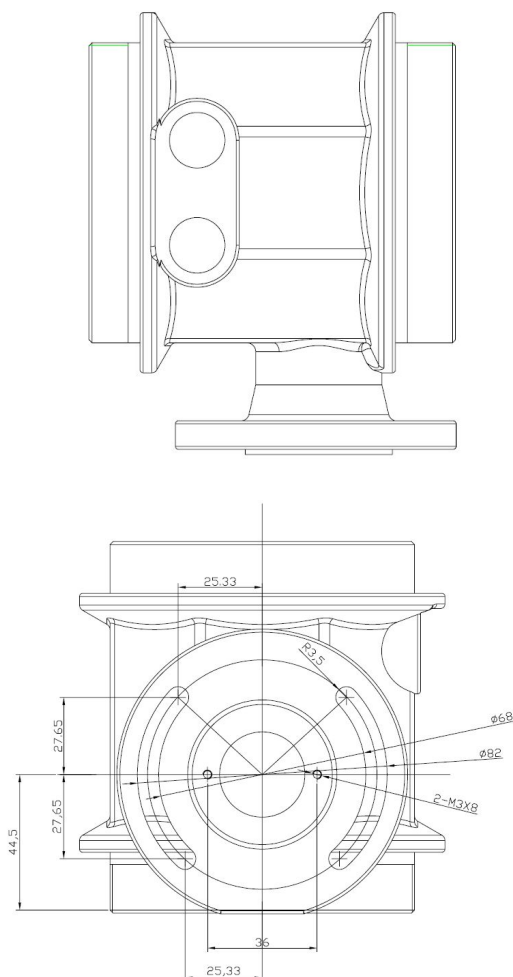
Chuck Size Drawing   Unit：mm

Chapter 4 Electrical connections

4.1 Safety Tips

Danger !

Only when power is cut off can we do all the work about electrical connections.Please pay full attention to the voltage on the nameplate!

Danger !

Please observe national installation regulations

Danger !

Please strictly observe local occupational health and safety regulations. Only those who have got properly trained are allowed to operate on the electrical equipment.

Tips !

Please check the name plate of the equipment, and confirm whether the supply is the same as your order.Check whether voltage and E-supply on the nameplate is correct. If incorrect, please contact manufacturers.

4.2 Electric Cables Used for Detachable Meter

Tips for Signal Cable A

Tips !

Signal Cable A with dual screening can ensures the accuracy of the measured value in the transmission.

Pay attention to the following tips :

- Please lay the signal cable firmly.
- Allow to lay the signal cable in the water or earth.

- In accordance with EN 50625-2-1,IEC60322-1,Insulation materials shall be fire-retardant.
- Signal wires do not contain halogens or plasticizers, and still has flexibility in case of low temperature.
- Connected to interior screening via several drain wires(1)
- Connected to exterior screening via several drain wires(6)

Tips for Signal Cable C

Danger !

Use a two-core copper wire with screening as field current cables. Screening must be connected to the housing of measurement sensor.

Tips !

Field current cables do not belong to the scope of supply.

4.3 Manufacture of Signal Cable (Detachable)

Tips !

We don't supply installation materials and tools.Please use installation materials and tools that meet the occupational health standards and conform to safety regulations.

Signal Cable Structure
- Signal cable is a cable with dual screening and it is used to measure the signal between the measurement sensor and the signal converter.
- Bending Radius : ≥50mm/2"
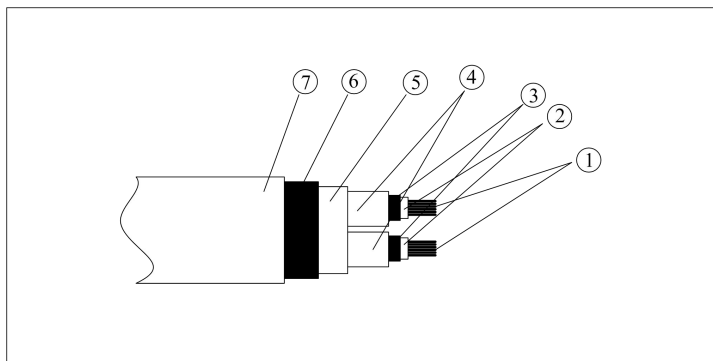
1.   Conductor , 0.5mm^2 Cu /AWG20

2.   Insulating barrier

3.   Several drain wires (1) used for Interior screening(10) , 1.0mm mm^2/AWG17

4.   Insulating barrier

5.   Adhesive tape

6.   Several drain wires (6) used for Exterior screening(60)

7.   Outer coat

Signal Cable Structure

Tips !

We don't supply installation materials and tools.Please use installation materials and tools that meet the occupational health standards and conform to safety regulations.

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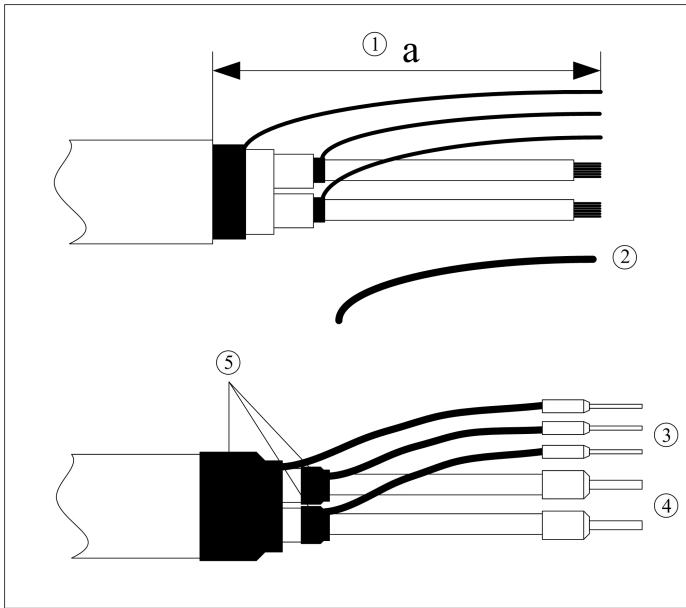
a = 80mm

1. Strip the sheath to the length of 80mm
2. Cut off the interior screening and the exterior screening and cover the insulation sheath on several drain wires.
3. Press tubular end onto several drain wires.
4. Press tubular end onto the conductor.
5. Cover the heat-shrinkable sleeves onto the signal cable and heat-shrink.

4.4 Manufacture of Magnetic Field Current Cable (Detachable)

Danger !

Use a two-core copper wire with screening as field current cables. Screening must be connected to the housing of measurement sensor.

![sisco]

> **Tips !**
>
> We don't supply installation materials and tools.Please use installation materials and tools that meet the occupational health standards and conform to safety regulations.

1.   Strip the sheath to the length of 80mm
2.   Cut off the interior screening and the exterior screening and cover the insulation sheath on several drain wires.
3.   Press tubular end onto several drain wires.
4.   Press tubular end onto the conductor.
5.   Cover the heat-shrinkable sleeves onto the signal cable and heat-shrink.

![sisco]
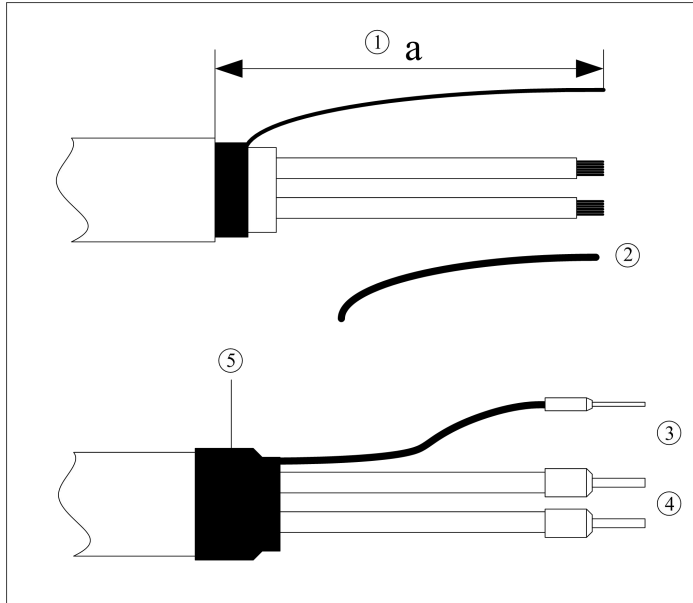
4.5 Connect Signal and Magnetic Field Current Cable

Danger !

Only when power is cut off can you connect signal and magnetic field current conductor.

Danger !

The equipment must be grounded in accordance with regulations so as to protect the operator from electrical shock.

Danger !

In case that equipment be used in explosion danger areas, special notes are given to explosion-proof instructions for safety tips.

Warning !

Please strictly observe local occupational health and safety regulations. Only those who have got properly trained are allowed to operate on the electrical equipment

Detachable

Wire connecting terminal

Terminal description

EXT+	EXT−
Excitation	Excitation

DS1	DS2	SIG1	SGND	SIG2
Screening1	Screening2	Signal1	Ground	Signal2

- EXT+，EXT-：Sensor excitation coils；
- SIG1，SIG2：Sensor electrode；
- SGND：Sensor signal ground；
- DS1 ,DS2 :single-core screening cable connectors (optional) of SIG1，SIG2 respectively；

Integrated
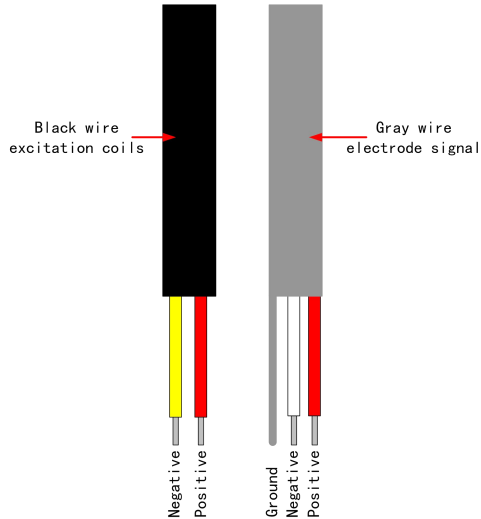
Wiring instructions

- Black wire : Sensor excitation coils , Red stands for Positive , Yellow stands for Negative ;

- Gray wire : Sensor electrode , Red stands for Positive , White stands for Negative , Screening barrier is connected to signal ground ;

4.6 Measurement Sensor Ground

Danger !

There allows no permission of potential difference between measurement sensor and housing or converter protection ground.

- Measurement sensor must be fully grounded
- Grounding conductor should not transfer any disturbing voltage.
- Grounding conductor is not allowed to be connected to other electrical equipment at the same time.

4.7 Connected to Power

Danger !

The equipment must be grounded in accordance with regulations so as to protect the operator from electrical shock.

Detachable

L N G
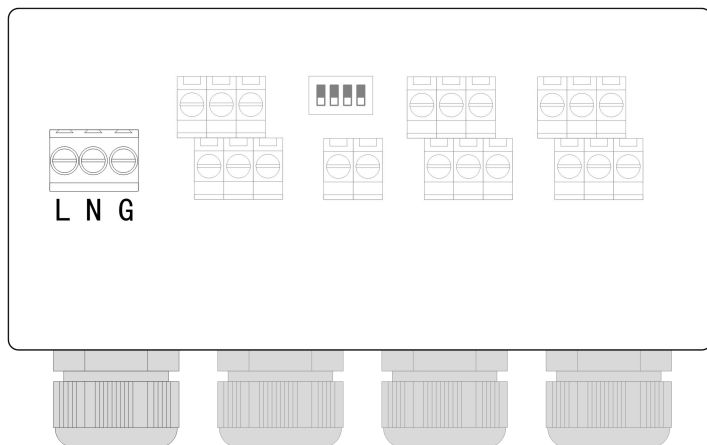
Tips !

Including allowed band : 100VAC -240VAC , 50Hz-60Hz

- L : AC phase line ;
- N : AC neutral line ;
- G : Ground

Integrated

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D+	L
D−	N
485+	
485−	I −
GND	I +
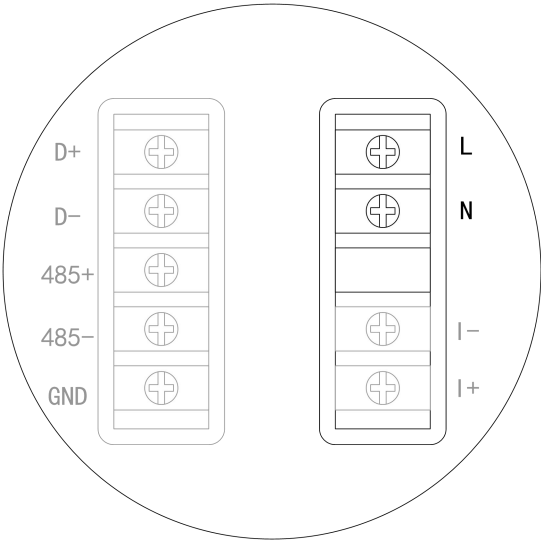
Tips !

Including allowed band : 100VAC -240VAC , 50Hz-60Hz

- L : AC phase line ;
- N : AC neutral line ;

4.8 Output Instruction

Detachable

POUT ALML ALMH   TRX+ TRX−   NC IOUT ICOM
PCOM ACOM ACOM   NC EXT+ EXT−
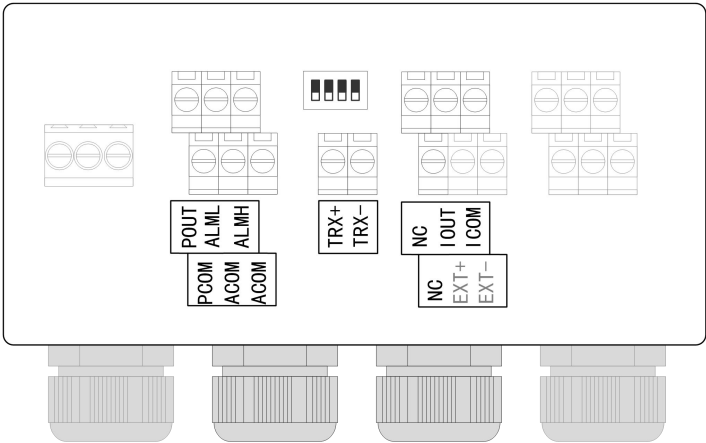
Current Output

- IOUT、ICOM   4-20mA output
- Active mode : when load $R_L \leq 750\Omega$; $I \leq 22mA$
- Current flow percent

Impulse and Frequency Output

- Corresponding terminal is POUT、PCOM
- POUT、PCOM : frequency/impulse connection
- Active mode :

  Need to be connected to external power source : $U_{outer} \leq$ 32VDC

  Darlington transistor output, the maximum withstanding voltage:36VDC, the maximum loaded current: 250mA
- Output electrical isolation: photoelectric isolation, isolation voltage: > 1000VDC ;
- Scale :

  Frequency output : Frequency 5KHz corresponding flux range limit

  Impulse output : corresponding flow rate volume of each pulse (configurable) , output impulse width : 0.1ms ~100ms , duty cycle 1:1 , Fmax <= 5000 cp/s ;
- Wiring diagram :

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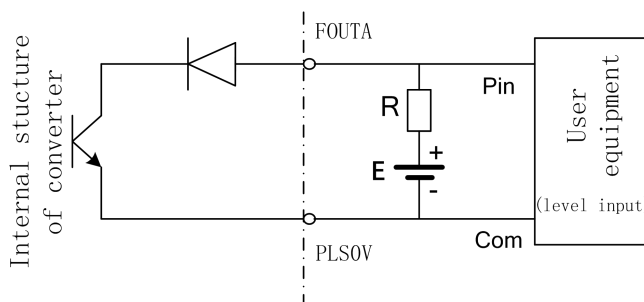
Notes: if impulse output is not through OC output, external power supply is needed.Common counter has a pull-up resistor, signal can be directly connected to the counter.

If counting module needs us to offer pulse output with active mode, we can switch NO.1 switch on the dial switch to "ON".High level is 5 v, low level is less than 1V.

Alarm Condition Output

- ALML、ACOM The 1st alarm output，ALMH、ACOM The 2nd alarm output

- Active mode：

- Need to be connected to external power source：U $_{outer}$ ≤ 32VDC

- Darlington transistor output, the maximum withstanding voltage:36VDC, the maximum loaded current: 250mA

- Output electrical isolation: photoelectric isolation, isolation voltage： > 1000VDC；

- Wiring diagram：
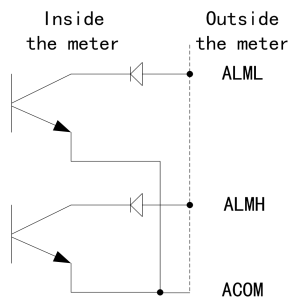
Integrated
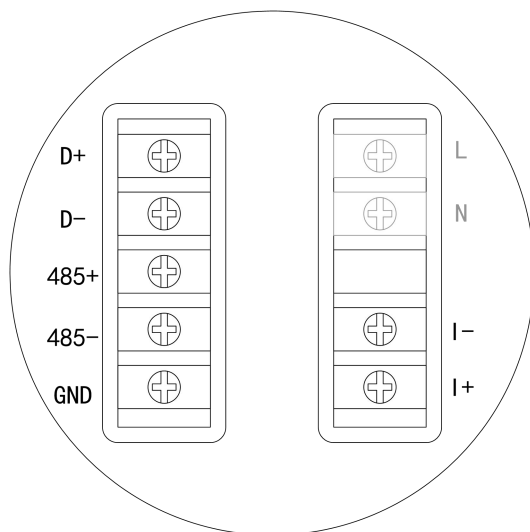
Current Output

- I+、I-   4-20mA output

- Active mode : when load $R_L ≤ 750Ω$; $I ≤ 22mA$

- Current flow percent

Communication Output

- 485+、485-   485 Serial communication output

- Agreement : ModBus RTU

Impulse, Frequency and Alarm output

- Corresponding terminal is D+、D-

- Active mode：high level 24V，drive current 5mA

- Output electrical isolation: photoelectric isolation, isolation voltage：> 1000VDC；

- Scale：

  Frequency output：Frequency 5KHz corresponding flux range limit

  Impulse output：corresponding flow rate volume of each pulse (configurable)，output impulse width：0.1ms ~100ms，duty cycle 1:1，Fmax <= 5000 cp/s；

Chapter 5 Starting

5.1 Switch on the power

Before turning on the power supply, please check whether the installation is correct. Including the followings:

- Flow meter must be installed in compliance with security regulations.
- Power supply connection should be carried out according to regulations.
- Cover electrical connection protective shield and tighten the cover plate
- Check whether the electrical connection of the power supply is correct.

5.2 Switch on the converter

Measuring equipment consists of measurement sensors and signal converters, supply has been ready to be delivered immediately.All operation data in the project has been set according to your order request.

When connected to the power supply, it will carry out a self-test.Then,measuring equipment would immediately start measuring and display current value.

Splash image

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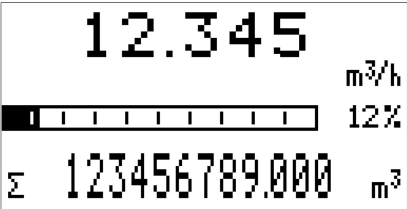
Chapter 6 Operation

6.1 Display and Operation Button
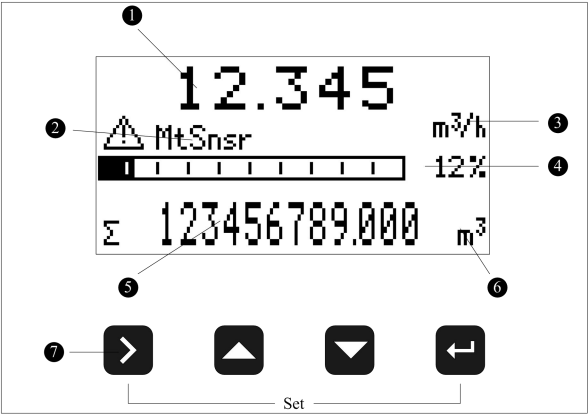
1. Instantaneous flow rate

2. System alarm information

3. Instantaneous flow unit

4. Instantaneous flow in percent of flow

5. Cumulative amount and so on

   Display information[∑+:Positive accumulation、∑-：Direction accumulation、∑：Net accumulation、V：Current flow speed、MT：Current conductivity]

6. Accumulation flow unit

7. Detachable：Capacitive type touch-key

   Integrated：Micro-switch without DOWN ARROW key

Signal	Measuring Mode	Menu Mode	Function Mode	Data Mode
>	-	switch menu categories	-	Data right shift
↙	Switch accumulative amount	Switch menu subclass	confirmation	Confirm data

↑↓	-	-	selection	Change data
>+←	Enter menu	Exit menu	-	-

6.2 Fast Setting Menu

Make it convenient for manufacturer users to set up important parameters   of the equipment fast:

Press 【>】and 【✓】of the parameter at the same time and then enter the parameter setting interface :

Need to input the password :

Fast setting password : 300000 (used to change Fast Setting Menu)

NO.	Parameter Literal	Setting Mode	Parameter Scope	Default
1	sensor latus rectum	selection	3-2000	50
2	flow range	figure	0-99999	50.000
3	sensor modulus	figure	0-99999	1.000
4	zero correction	figure	0-99999	0.0
5	accumulation clearance	selection	Y、N	N
6	flow resection	figure	0-99%	1%
7	time constant	figure	0-99S	2s

6.3 Configuration Specification

NO.	Parameter literal	Setting mode	Password level	Parameter scope	Default
	1-flow				
	Flow range	figure	user	0-99999	50.000
1-0	Set up max. flow literal.Used to calculate max. frequency and current output ; calculate alarm threshold.				
	Flow unit	selection	user	L、 m^3、 Kg、 t /s、 min、 h	m^3/h
1-1	Set up flow unit and calculate density participation, if choosing VU,density will not participate in the computation. If choosing Kg、 t,need to act in concert with1-2 density parameter				
	Fluid density	figure	user	0.000-99.000	1.000
1-2	Used to calculate quality flow , $Q_M= \rho V_M$ when flow unit is volume unit , the parameter will not display. Density unit : g/cm^3				
	Time constant	figure	user	0-99S	2s
1-3	Filter damping coefficient, select the mean value within parameter selected time as instantaneous flow				
	Flow resection	figure	user	0-10%	1%
1-4	Flow below the setting value is considered as zero 0 indicates no resection				
	Flow direction	selection	user	Positive, direction	positive
1-5	Used to change flow direction when polarity of user signal wire is reversed, or sensor is installed reversely, use this function				
	spike suppressor permission	selection	user	Y、 N	N
1-6	Indicate whether to start spike suppression, this function is applied to operating conditions where there are strong interfering signals and it is used to filter out interfering signals. This function needs to be used in conjunction with the 1-9 and 1-10 parameters . But if signal jitter amplitude is greater than that parameters sett in 1-8 and the duration is less than that set in 1-9,the system will consider it as interfering signals and will not display and measure..				
1-7	spike suppressor coefficient	numerical value	user	0-9.999m/s	0.1

	Spike amplitude				
1-8	spike suppressor time	selection	user	160-2400mS	
	Spike duration				
1-9	Flow correction permission	selection	manufacture	Y、N	N
	Indicate whether to start flow correction function. Nonlinear correction function is, in principle,used for linear adjustment with small flow rate below (0.5M/s), The function design has 4 pieces of correction, divided into 4 flow velocity points and 4 correction coefficients. Correspond flow velocity of correction points must meet the following conditions: Correction point 1 ≥ correction point 2 ≥ correction point 3 ≥ correction points 4 ≥ 0. Correction calculation was handled on the curve of the original sensor flow coefficient, therefore, turn off the non-linear correction function, and mark sensor coefficient.Then allow non-linear correction function and set the correction coefficient according to the sensors nonlinear marked, correct them piece by piece.If the coefficient set is right ,do not need to remark. Original velocity in the formula is actual speed,and velocity after correction is correction speed.The formula of correction calculation is as follows: In correction point 1 ＞ original flow velocity ≥ correction point 2 interval; correction flow velocity = correction coefficient 1 x original flow velocity; In correction point 2 ＞ original flow velocity ≥ correction point 3 interval; correction flow velocity = correction coefficient 2 x original flow velocity; In correction point 3 ＞ original flow velocity ≥ correction point 4 interval; correction flow velocity = correction coefficient 3 x original flow velocity; In correction point 4 ＞ original flow velocity ≥ 0 interval; correction flow velocity = correction coefficient 4 x original flow velocity; Notes：when setting correction point，meet the following condition： correction point 1 ＞ correction point 2 ＞ correction point 3 ＞ correction point ＞ 0 Intermediate value of correction coefficient is 1.0000,if coefficient is higher than 1,set flow velocity correction high; if coefficient is less than 1,set flow velocity correction low.				
	Flow correction	figure	factory	0.0-99.999	0.5

NO.	Type	Selection	Password level	Coefficient range	Default
	point 1				
	Flow correction point 1,when flow function is off,the coefficient will not display.				
1-11	Flow correction coefficient 1	figure	manufacture	0.0-99.999	1.000
	Flow correction coefficient 1，when flow function is off,the coefficient will not display.				
1-12	flow correction point 2	figure	factory	0.0-99.999	0.5
	Flow correction point 2,when flow function is off,the coefficient will not display.				
1-13	Flow correction coefficient 2	figure	manufacture	0.0-99.999	1.000
	Flow correction coefficient 2，when flow function is off,the coefficient will not display.				
1-14	flow correction point 3	figure	factory	0.0-99.999	0.5
	Flow correction point 3,when flow function is off,the coefficient will not display.				
1-15	Flow correction coefficient 3	figure	manufacture	0.0-99.999	1.000
	Flow correction coefficient 3，when flow function is off,the coefficient will not display.				
1-16	flow correction point 4	figure	factory	0.0-99.999	0.5
	Flow correction point 4,when flow function is off,the coefficient will not display.				
1-17	Flow correction coefficient 4	figure	manufacture	0.0-99.999	1.000
	Flow correction coefficient 4，when flow function is off,the coefficient will not display.				
2-output					
NO.	Type	Selection	Password level	Coefficient range	Default
2-0	Direction output permission	selection	user	Y，N	N
	Flow is correction,whether need to 4-20mA output, positive flow output function should not be off.				
2-1	adjust K	figure	user	0-99999	1.000
	Used to adjust current output value，$I = Kx + B$				
2-2	adjust B	figure	user	0-99999	0.000

	Used to adjust current output value , I = Kx + B				
2-3	Output current	display	user	4.00-20.00	--
	Display current current of ma				
	3-impulse/frequency/alarm（integrated）				
3-0	impulse output type	selection	user	frequency、equivalence、alarm（integrated）	frequency
	User selects impulse equivalence or frequency output				
3-1	Transistor state	selection	user	high/low level	High level
	Select the state before equivalence or frequency outputs				
3-2	Max. frequency	figure	user	0-5000	2000
	Set frequency value corresponding to max. instantaneous flow				
	When selecting frequency output, the coefficient display				
3-3	Equivalence [impulse]	selection	user	$0.001L-1m^3$	1.0L
	Set the accumulation that each impulse stands for				
	When selecting equivalence output, the coefficient display				
	4-accumulation				
4-0	Accumulation unit	selection	user	L、m^3	m^3
	Unit of accumulation				
4-1	Accumulation clearance	selection	factory	Y、N	N
	Clear total accumulation				
4-2	Positive accumulation integer	figure	factory	0-999999999	0
	Set the part of positive accumulation integer				
4-3	Positive accumulation decimal	figure	factory	0.0-0.999	0.0
	Set the part of positive accumulation decimal				
4-4	Negative accumulation integer	figure	factory	0-999999999	0
	Set the part of negative accumulation integer				

NO.	Type	Selection	Password level	Coefficient range	Default
4-5	Negative accumulation decimal	figure	factory	0.0-0.999	0.0
	Set the part of negative accumulation decimal				

5-alarm contact 1

NO.	Type	Selection	Password level	Coefficient range	Default
5-0	Alarm1 transistor state	selection	user	high/low level	High level
	In non-alarm state,the contact output high/low level				
5-1	Alarm output permission	selection	user	Y/N	N
	Allow contact 1 to output master switch				
5-2	Allow alarm1 fault	selection	user	Y/N	N
	Allow system malfunction alarm output to switch on or off, when alarm output permission is N, this parameter will not display. For example: excitation circuit openness, insufficiency of excitation current stable time , excitation line and signal ground short circuit, etc				
5-3	Allow alarm1 air control	selection	user	Y/N	N
	Allow Empty pipealarm output to switch on or off, and the system finds air controller.When alarm output permission is N, this parameter will not display.				
5-4	Allow alarm1 max.	selection	user	Y/N	N
	Allow max. flow alarm output to switch on or off, and when instantaneous flow is higher than set flow value specified in 7-1 .When alarm output permission is N, this parameter will not display.				
5-5	Allow alarm1 min.	selection	user	Y/N	N
	Allow min. flow alarm output to switch on or off, and when instantaneous flow Is lower than set flow value specified in 7-2 .When alarm output permission is N, this parameter will not display.				

5-6	Allow alarm1 impulse (detachable)	selection	user	Y/N	N
	Allow flow impulse transfinite alarm output to switch on or off, and when in equivalence impulse output mode,the number of impulse per second is more than 5,000,alarm rings.When alarm output permission is N, this parameter will not display.				
6-alarm contact 2 (detachable)					
6-0	Alarm 2 transistor state	selection	user	high/low level	High level
	In non-alarm state,the contact outputs high/low level				
6-1	Alarm output permission	selection	user	Y/N	N
	Allow contact 2 to output master switch				
6-2	Allow alarm 2 fault	selection	user	Y/N	N
	Allow system malfunction alarm output to switch on or off, when alarm output permission is N, this parameter will not display. For example: excitation circuit openness, insufficiency of excitation current stable time , excitation line and signal ground short circuit, etc				
6-3	Allow alarm 2 Air control	selection	user	Y/N	N
	Allow empty pipe alarm output to switch on or off, and the system finds air controller.When alarm output permission is N, this parameter will not display.				
6-4	Allow alarm 2 max.	selection	user	Y/N	N
	Allow max. flow alarm output to switch on or off, and when instantaneous flow is higher than set flow value specified in 7-1 .When alarm output permission is N, this parameter will not display.				
6-5	Allow alarm 2 min.	selection	user	Y/N	N
	Allow min. flow alarm output to switch on or off, and when instantaneous flow Is lower than set flow value specified in 7-2 .When alarm output permission is N, this parameter will not display.				

NO.	Type	Selection	Password level	Coefficient range	Default
6-6	Allow alarm2 impulse	selection	user	Y/N	N
	Allow flow impulse transfinite alarm output to switch on or off, and when in equivalence impulse output mode,the number of impulse per second is more than 5,000,alarm rings.When alarm output permission is N, this parameter will not display.				
7-alarm setting					
NO.	Type	Selection	Password level	Coefficient range	Default
7-0	Max. flow value alarm	figure	user	0-110%	100%
	Set max. flow value alarm and percentage of range				
7-1	Min. flow value alarm	figure	user	0-100%	0%
	Set min. flow value alarm and percentage of range				
7-2	Alarm difference setting	figure	user	0-10%	1%
	Used to eliminate the disturbance when alarming Max. Elimination condition：instantaneous flow 小于<max. Alarm value – return difference Min. Elimination condition：instantaneous flow 小于>min. Alarm value + return difference				
7-3	Display alarm permission	selection	user	Y/N	N
	Allow to display alarm information on the switch of key frame				
8-system					
8-0	Display accuracy	figure	user	0-4	2
	Decimal of instantaneous flow				
8-1	contrast	figure	user	0-100%	50%
	Contrast of LCD				
8-2	Meter place	figure	user	1-247	8
	Modbus RTU meter place of communication protocol				
8-3	Baud rate	selection	user	1200、2400、4800、9600、19200	9600
	Baud rate of physical serial communication				
8-4	Even-odd check	selection	user	No/odd/even	no

	Check ways of physical serial communication				
8-5	User password	number	user	00000-999999	000000
	User-level password , used to check and modify user-level parameter group, When using factory mode to enter , the parameter will not display Factory original value : 200000				
8-6	Factory password	number	factory	00000-999999	100000
Speci ficati on	Factory-level password , used to check and modify all the parameter group, When using user mode to enter , the parameter will not display Factory original value : 100000				
	9-electrode parameter				
9-0	Empty pipe threshold value	figure	factory	0-100%	50%
	threshold value to judge empty pipe alarm ,				
9-1	Actual electrical conductivity	display	factory		
	Display equivalent value of fluid actual electrical conductivity General natural water : when full pipe equivalent value <200 , empty pipe equivalent value >1200 (Actual and fluid electrical conductivity are related to the length of the measuring line and when wiring distance is20 m,it is recommended to use double shielded wire, otherwise it will affect the check function of empty pipe)				
9-2	Empty pipe check permission	selection	factory	Y , N	Y
	Whether setting is on to start empty pipe check				
9-3	Empty pipe check max.	figure	factory	0-9999	1200
	For empty pipe,equivalent value of actual electrical conductivity , general natural water can directly adopts the default。 For special fluid,need to watch the value of 9-1 , enter 9-3				
9-4	Empty pipe check min.	figure	factory	0-9999	200
	For empty pipe,equivalent value of actual electrical conductivity , general natural water can directly adopts the default。 For special fluid,need to watch the value of 9-1 , enter 9-4				
	10-sensor				

10-0	Sensor coding	figure/sig nal	factory	16 位/0-9、A-Z	
	Used to mark the sensor				
10-1	Factory ID number	figure	factory		
	Identification number of products				
10-2	Sensor latus rectum	selection	factory	See Page 7	
	Sensor caliber				
10-3	Zero adjustment	selection	factory	-9.999-9.999	0.000
	Code value of sensors in the stationary full pipe condition (average value in 30 seconds) Generally,if code value is within the scope of 0.000 + / - 1 when sensor has good symmetry and wiring (good shielding) ,it does not have to be adjusted.				
10-4	Sensor coefficient	figure	factory	0-99999	
	Manufacturer sensor,with respect to the coefficient of standard signal source, is easy to change the converter without sensor replacement. More details in the section of sensor coefficient calibration				
10-6	Zero adjustment	figure	factory	0-99999	
	Used to calibrate nonlinear of sensor for small flow below (0.3m/s) . More details in the section of sensor coefficient calibration				
10-8	Excitation mode	selection	factory	Mode 1,2	Mode 2
	Selection of excitation frequency Mode 1：3.125Hz Mode 2：6.25Hz				
10-9	Excitation check permission	selection	factory	Y，N	Y
	Whether setting is on to check the abnormal situation, (including excitation line cut, insufficiency of excitation current stable time , excitation line and signal ground short circuit and so on)				

6.4 Operation Specification

Coefficient Selection and Adjustment

Press 【>】and 【↙】at the same time,and the meter enters parameter setting interface :

Then need to input the password :

Original user password : 200000 (used to modify user-level parameter)

Original factory password : 100000 (used to modify factory-level parameter)

Original factory password : 300000 (fast setting parameter)

After entering configuration parameters,modify the parameter by the following steps:

User uses 【>】button to switch among different menus , use 【↙】button to switch among different parameters in the menu ,and store parameter value after adjustment , use 【↑】and 【↓】button to adjust parameter value.

Adjust "Max. Flow"

```
┌─────────────────────┐
│  Max. Flow          │          Press【↑】to enter
│      +00000.0000    │          edlting condition
│                     │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│  Max. Flow          │          Press【〉】to move the
│      ▉00050.0000    │          light cursor to the
│                     │          right
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│  Max. Flow          │          Press【✓】to
│      +▉0050.0000    │          save paemission
│                     │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│  Max. Flow          │
│      +00050.0000    │
│                     │
└─────────────────────┘
          │
    ┌─────┴──────────────┐
    ▼                    ▼
┌──────────────┐    ┌──────────────┐
│ Flow unit    │    │ Positive input│
│     m^3      │    │ permission    │
│              │    │       N       │
└──────────────┘    └──────────────┘
 press【✓】to move    【〉】to enter
 the next parameter    next menu group
```
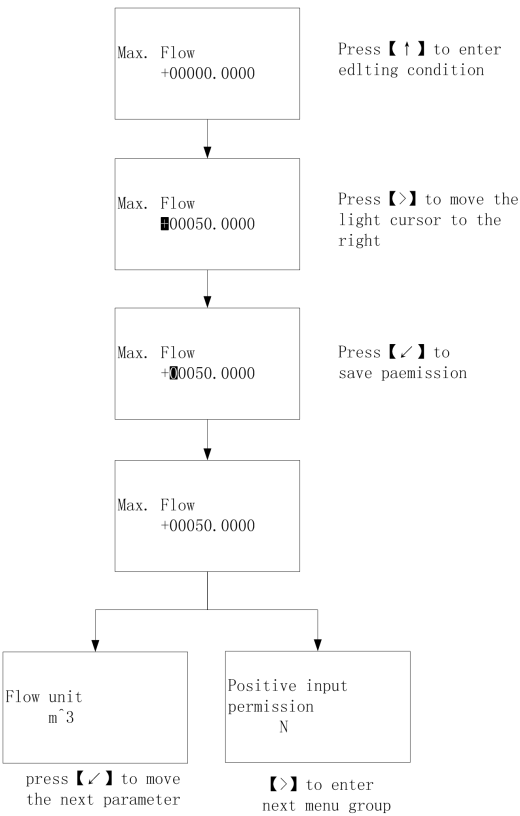
Key Frame

Display the frame when turning on the equipment

"∑+" :Positive accumulation , ∑- :Negative accumulation, Σ":Net accumulation , "v" :current flow speed ,

12.458
m³/h
23%
Σ+ 568746.128   m³

【✓】

12.458
m³/h
23%
Σ- 568746.128   m³

【✓】

12.458
m³/h
23%
Σ 568746.128   m³

【✓】

12.458
m³/h
23%
v   1.245   m/s

【〉+✓】

Possword
000000

【↑】 and 【↓】 modify the parameter, 【✓】 confirm

Possword is wrong,only allowed to correct accuray display

Password confirmed ,enter the group modification interface

【〉】

Accuracy display
3

Max. Flow
+00020.000

【〉】

sisco
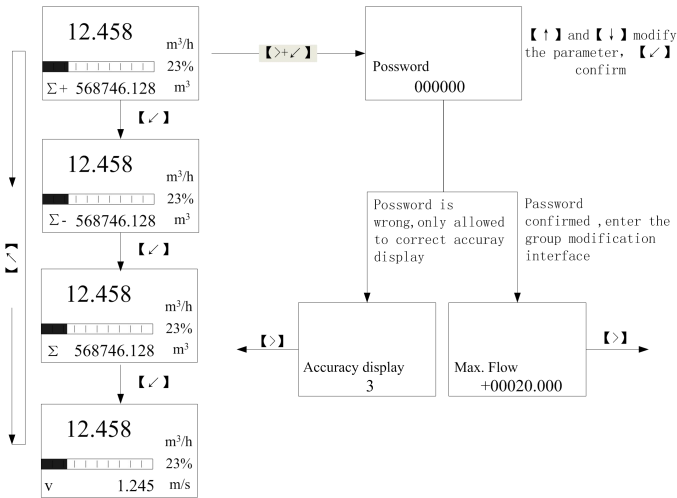
6.5 Factory Setting Operation

Setting of Sensor Parameter

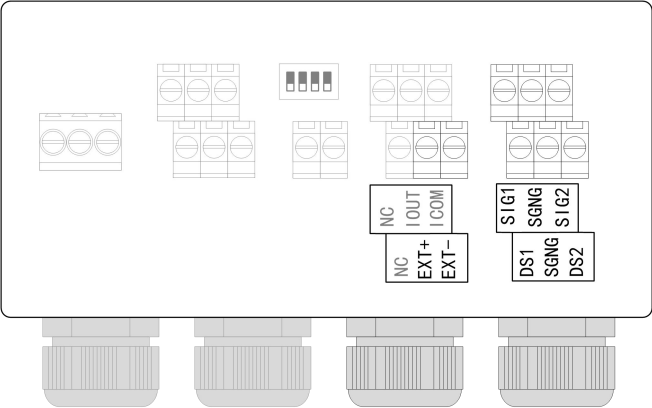The electromagnetic flowmeter generally adopts the following 3 marking methods on-pot site.

1. Instantaneous flow mark   1%
2. Frequency/current standard mark   0.5%
3. Weight mark   0.3%

Mark operation flow
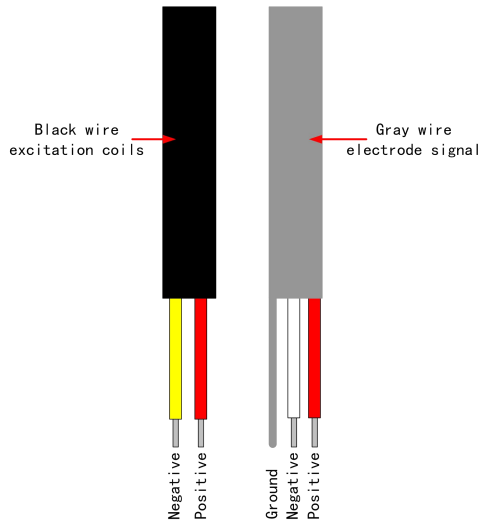
1)   Connected to sensor

Detachable

Terminal specification

- EXT+ , EXT- : Excitation coil connected to to sensor ;
- SIG1 , SIG2 : Electrode connected to sensor ;

- SGND：sensor signal ground；
- DS1 ,DS2 :are single core shielded wire interfaces of SIG1 ,SIG2 respectively (choose to pick up or not) ；

Integrated

Black wire
excitation coils

Gray wire
electrode signal

Negative Positive

Ground Negative Positive
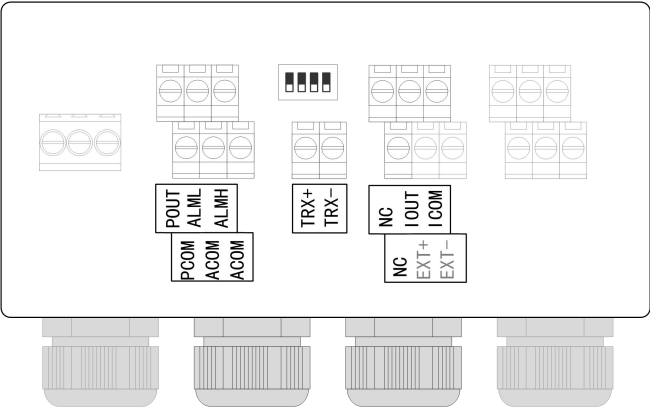
Wiring instructions

- Black wire：Sensor excitation coils，Red stands for Positive，Yellow stands for Negative；
- Gray wire：Sensor electrode，Red stands for Positive，White stands for Negative，Screening barrier is connected to signal ground；

2) **Connected to parameter module**（ instantaneous flow ignores this step ）

   Detachable

- Corresponding terminal POUT、PCOM

- POUT is impulse signal、PCOM is signal ground

- Elementary diagram：
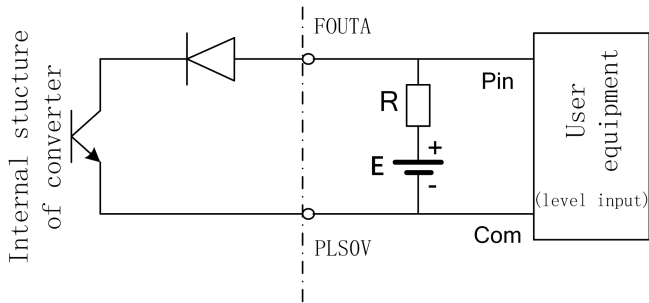
Additional remarks：If impulse output is not through OC gate, need to be connected to external power supply. General counter all wears resistance, and signal can be directly connected to the counter.

If counting module need us to provide active impulse output, we can dial NO.1 on switch dial to "ON". High level is 5 v, and low level is less than 1 v

Integrated

![sisco logo]

```
D+      ⊕          ⊕      L

D−      ⊕          ⊕      N

485+    ⊕

485−    ⊕          ⊕      I+

GND     ⊕          ⊕      I−
```
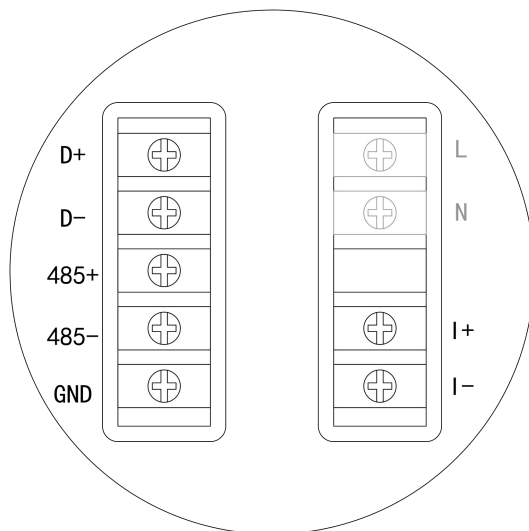
- Corresponding terminals are D+、D-

- D+is impulse signal、D-is signal ground

3) **Zero Adjustment**（Sensor's symmetry is good or does not require small flow below 0.5 m/s, you can ignore this step ）

```
┌─────────────────┐
│                 │
│ Zore adj  2.534 │     press【↑】to enter
│      0          │     editing condition,
│                 │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│                 │
│ Zore adj  2.534 │     press【↑】to change the
│     [Y]         │         parameter to 'Y'
│                 │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│                 │
│                 │     press【↙】to confirm and
│                 │     wait for the completion
│ Zore adj   25   │     of adjustment in 30
│      Y          │     seconds
│                 │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│                 │
│                 │     Zore adjustmnet
│ Zore adj  1.253 │     completion.zero is saved
│      N          │     right now
│                 │
└─────────────────┘
```
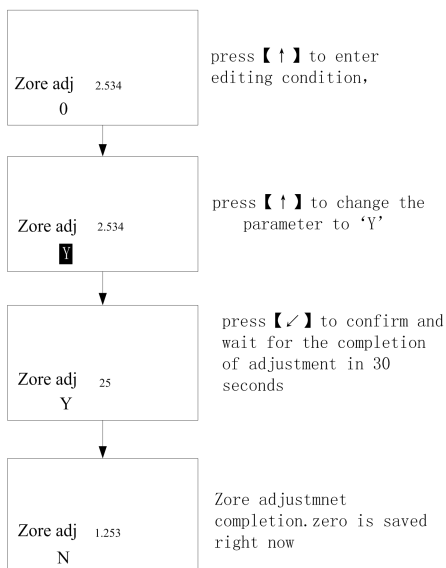
- Shut the valve of the full pipe installed with sensors , and make the pipeline of sensor packaged with water fully and statically.

- After stabilization, enter 10 groups of parameter pictures or fast debugging , zero adjusts in 30 seconds

- Observe zero code value. Generally it is a value close to 0 ± 2, after one time zero adjustment,observe whether the previous results are consistent .Generally fluctuations ±1 are normal

**4)   Calculate Sensor Coefficient**

- Set the flow to frequently-used flow point,generally 50% of flow range,max. flow point may also be chosen.

- When flow stabilizes, record instantaneous flow or the comparison between the number of impulses in certain time and standard table (each manufacturer has some differences in the methods.)

- Calculation of K

- Input the K calculated into the sensor coefficient of 10 groups or fast setting picture.

Chapter 7 functions

7.1 System Information

The flow meter itself has self-diagnosis function, and it can correctly provide the corresponding alarm message for fault of general application except breakdown of the power supply and circuit board hardware.

Display position in measuring picture
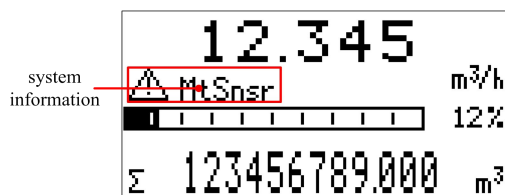
System Information Table

Display	Alarm Contents
MtSnsr	Sensor empty pipe
Hi	Current instantaneous flow higher than max. set flow
Lo	Current instantaneous flow lower than min. set flow
Pls	Impulse output frequency higher than max.set frequency
Coil	Abnormal situation of sensor excitation drive
AD_Hi	Sensor signal lager than max. sample in system AD
AD_Exc	Sensor common-mode voltage fails to adjust the scope to be accepted by the system
Rng	Current instantaneous flow higher than max. Flow set by user
Rng_Hi	Range scope set by user excesses max. sample in system AD
Pls_Hi	Range scope set by user excesses max. impulse output

7.2 Impulse/Frequency/Current Output

Impulse Equivalence Output

Mainly used for manufacture to set coefficient and for user to calculate. Set in Group 3 configuration parameter :

Impulse equivalence output corresponds to accumulation , indicating each impulse corresponds to volume。

For example : Set parameter as 0.1L/p

Current instantaneous flow 3.6m^3/h

 The number of impulse output per sec. : 3.6×1000/3600/0.1 = 10

Notes :

If there are any current that cannot be divided, insufficient section will automatically accumulate to the next second output.The maximum number of pulses output per second is 5000. if instantaneous flow is larger but equivalence is smaller ,the number may exceed 5000, then alarm information of Pls system will appear on the main screen. Users need to reset impulse equivalence parameters.

Frequency Output

Mainly used for factory to set coefficient and for user to calculate. Set in Group 3 configuration parameter :

Frequency corresponds to instantaneous flow , and max. frequency corresponds to the max. flow。

Notes : The max. frequency set is 5000Hz

Current output

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

Type of current output : 4-20mA。

Current corresponds to instantaneous flow , 20mA corresponds to max. range , 4mA corresponds to min. range.

Conversion relation :

Unit : mA

7.3 Serial Communication

This equipment provides standard RS485 serial communication interface, adopts international general standard MODBUS RTU communication protocol, and support number 04 which reads register command.

Register Address

Addresses of communication data and register are as follows:

Parameter	Type	Address	Specifications
flow	long	30001	Shape points。 12.000 indicates 12000。
Flow speed	long	30003	
percentage	long	30005	
--			
flow	float	30011	4-bit floating points.
Flow speed	float	30013	
percentage	float	30015	
--			
Positive accumulation	ulong	30031	4-bit shape.
Negative accumulation	ulong	30033	
Net accumulation	long	30035	

Communication Group

Communication place : 1-247。

Default 8

Baud rate : 1200、2400、4800、9600、19200、38400、57600 ;

Default 9600。

Check : no check、odd check、even check ;

Default no check.

For 32-bit data (long or float) arranged in the communication frame.

For example : Long   16909060(01020304H) :   03 04 01 02

Float   4.00(40800000H) :   00 00 40 80

Chapter 8 Technical parameter

8.1 Technical Parameter

Measurement system

Measuring principle	Faraday's law of electromagnetic induction
Function	Instantaneous flow rate, flow velocity and mass flow rate (when the density is constant)
Module configuration	Measurement system is made up of signal converter and measurement sensor.

Converter

Integrated	

Measurement sensor

Communication

Serial communications	RS485
output	current(4-20mA)、impulse、frequency、mode switch
function	ATC recognition, electrode contamination

Display user interface

Graphic display	Monochrome LCD, white backlight; Size: 128*64 pixels
Display function	2 measurement value pictures (measurements, condition, etc
Language	Chinese
Unit	configurable
Operating unit	3 touch keys

Measurement accuracy

Max measuring error	Measurement value ±0.3% (flow speed 1m/s) ; ±2mm/s (flow speed ＜1m/s)
Repetitiveness	0.2%

Operating environment

Temperature	
Environment	-10℃ － 60℃
Storage	-40℃ － 65℃
Conductivity	
Water	Min 20μS/cm
Others	Min 5μS/cm

Materials

Die-cast aluminum	Standard

Electrical connections

Power supply voltage	100-240VAC , 50/60Hz
Power consumption	Max 10W (20VA)
Signal cable	Used only for Detachable
Dual screening cable	Signal , conductor : $0.5mm^2$ Cu /AWG20
Screening cable	Field , conductor : $0.7mm^2$ Cu

Output

Current output		
function	Measurement of volume and quality (in the case of constant density)	
Setting	scope	4-20mA
	Max	20mA
	Min	4mA
Internal voltage	24VDC	
loading	≤750Ω	
Impulse and frequency output		
function	Set up impulse and frequency output	
Impulse output	basis	Output pulse width :0.25ms ~100ms Duty cycle : 50% (Impulse frequency ≥5H$_z$) $F_{max} \le$ 5000 cp/s
	setting	0.001L – 1m^3
frequency	Max	$F_{max} \le$ 5000H$_z$
	setting	0-5000H$_z$
passive	U$_{outer} \le$ 36VDC	
Status output		
function	Output as alarm	
passive	U$_{outer} \le$ 36VDC	

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8.2 Flowmeter

Unit m/s and m3/h

V[m/s]	0.3	1	3	7
	$Q_{100\%}$ Unit m³/h			
DN[mm]	Min flow	Frequently-used flow		Max flow
2.5	0.01	0.02	0.05	0.14
4	0.01	0.05	0.14	0.35
6	0.03	0.10	0.31	0.70
10	0.08	0.28	0.85	1.96
20	0.34	1.13	3.39	7.91
25	0.53	1.77	5.30	12.39
32	0.87	2.90	8.69	20.27
40	1.36	4.52	13.57	31.67
50	2.12	7.07	21.21	49.48
65	3.58	11.95	35.84	83.62
80	5.43	18.10	54.29	126.67
100	8.48	28.27	84.82	197.92
125	13.25	44.18	132.54	309.25
150	19.09	63.62	190.85	445.32
200	33.93	113.10	339.30	791.70
250	53.01	176.71	530.13	1236.97
300	76.34	254.47	763.41	1781.29
350	103.91	346.36	1039.08	2424.52
400	135.72	452.39	1357.17	3166.73
500	212.06	706.86	2120.58	4948.02
600	305.37	1017.90	3053.70	7125.30
700	415.62	1385.40	4156.20	9697.80
800	542.88	1809.60	5428.80	12667.20
900	687.06	2290.20	6870.60	16031.40
1000	848.22	2827.40	8482.20	19791.80

8.3 Accuracy

Reference condition

- Medium：water
- Temperature：20℃
- Pressure：0.1MPa
- Input subsidiary conduit：≥5DN
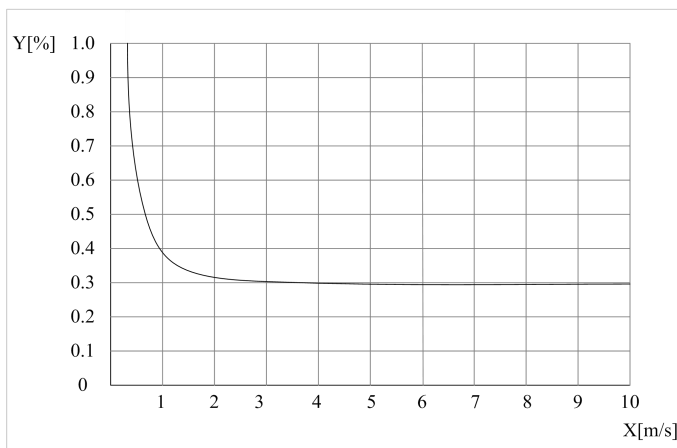
- X[m/s]：flow speed
- Y[%]：deviation of actual investigations （mV）

8.4 Size and Weight

Detachable
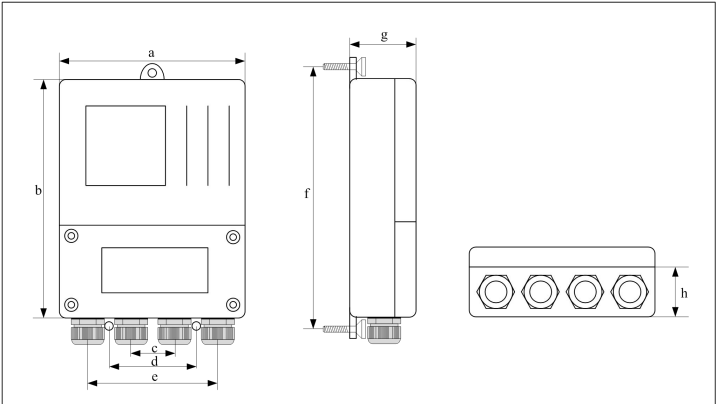
Size[mm]								weight [Kg]
a	b	c	d	e	f	g	h	
164	214.5	34	70	102	233.5	69.7	45.7	0.6

Integrated

Size[mm]				Weight
a	b	c	d	[Kg]
219	147	120	90	0.6