Level Measurement

Split Ultrasonic Level Meter

General Description

ultrasonic level measuring instrument, taking the advantages of various many level measuring instruments, is a universal one characterized by total digitalized and humanized design. It has perfect level monitoring, data transmission and man-machine communication.

It is featured by strong anti-interference performance; free setting of upper and lower limits and online output regulation, on-site indication, optional analog, switching value, and RS485 output and easy connection with main unit. The cover, made of waterproof engineering plastics, is small and firm with ABS probe. Therefore, it is applicable for various fields concerning level measuring and monitoring. According to the practical situation, it also can add other modules, such as RS 485, current output; it can be match with PLC better.

Features

- Sensor: Low power consumption, easy to install and locate, standard 4-20mA output, can be using as level gauge alone.
- The probe can be made for IP68, anti-corrosion, explosion, small blind, low power consumption, large range
- 16 key operation. The human-machine communication between can be more efficient.
- Backup and recovery parameter set.
- Measure for level, volume, weight.
- Set a filter value to remove
- Output HART, it can be directly communication with other instruments. (Optional)
- Mini SD data collection and GPRS communication are optional.

Measuring Principle

Ultrasonic level meter adopt ultrasonic theory that sonic wave come across barrier then reflect to transducer, according to the time and speed, distance from barrier and transducer can be got. Measurement formula as below:

D = V * T / 2

D: Measure Distance

V: Speed of sound in air

T: Time of sound in air

Specifications

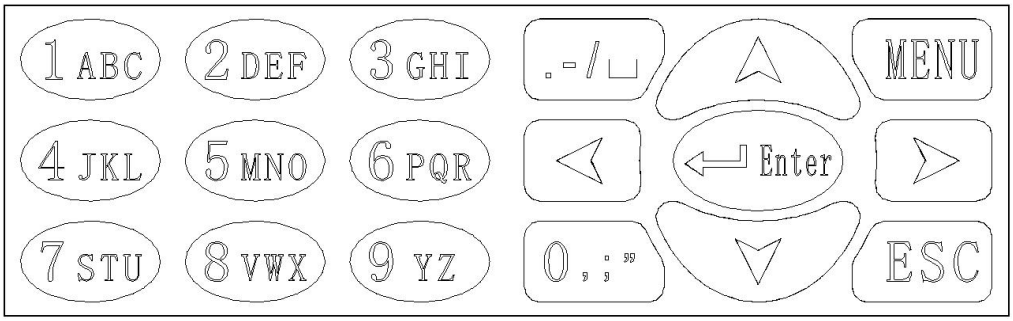
Sense Range	3m; 5m; 8m; 10m; 12m; 15m; 20m; 25m; 30m
Blind Area	<0.3m-1.5m
Accuracy	±0.3%F.S
Display	LCD
Resolution	1mm
Keyboard	16 key
Output	4~20mA（standard）; 0~20mA; 1~5V; 0~5V; 0-10V; 1-10V; RS485; HART 4 relays (Contact capacity AC:5A 250V DC:10A 120V)
Consumption	<8W
Material	ABS
Secondary Meter Dimension	240mm×184mm×110mm
Sensor Size	Φ65mm×119mm×G1 1/2(3m) Φ74mm×137mm×M60(5-15m) Φ109mm×194mm×M30(20-30m)
Installation Size	G1 1/2(3m); M60x2 (5-15m); M30X1.5 (20-30m)
Sensor Cable	10m (optional)
Operating Surroundings	normal temperature, normal pressure
Protection Degree	IP53 for instrument IP65 for sensor (optional)

Applications

Electricity, mines, factories, urban sewage waterways, control systems and other related fields, such as: Sedimentation pool, Coal washing process, Wastewater treatment, etc.

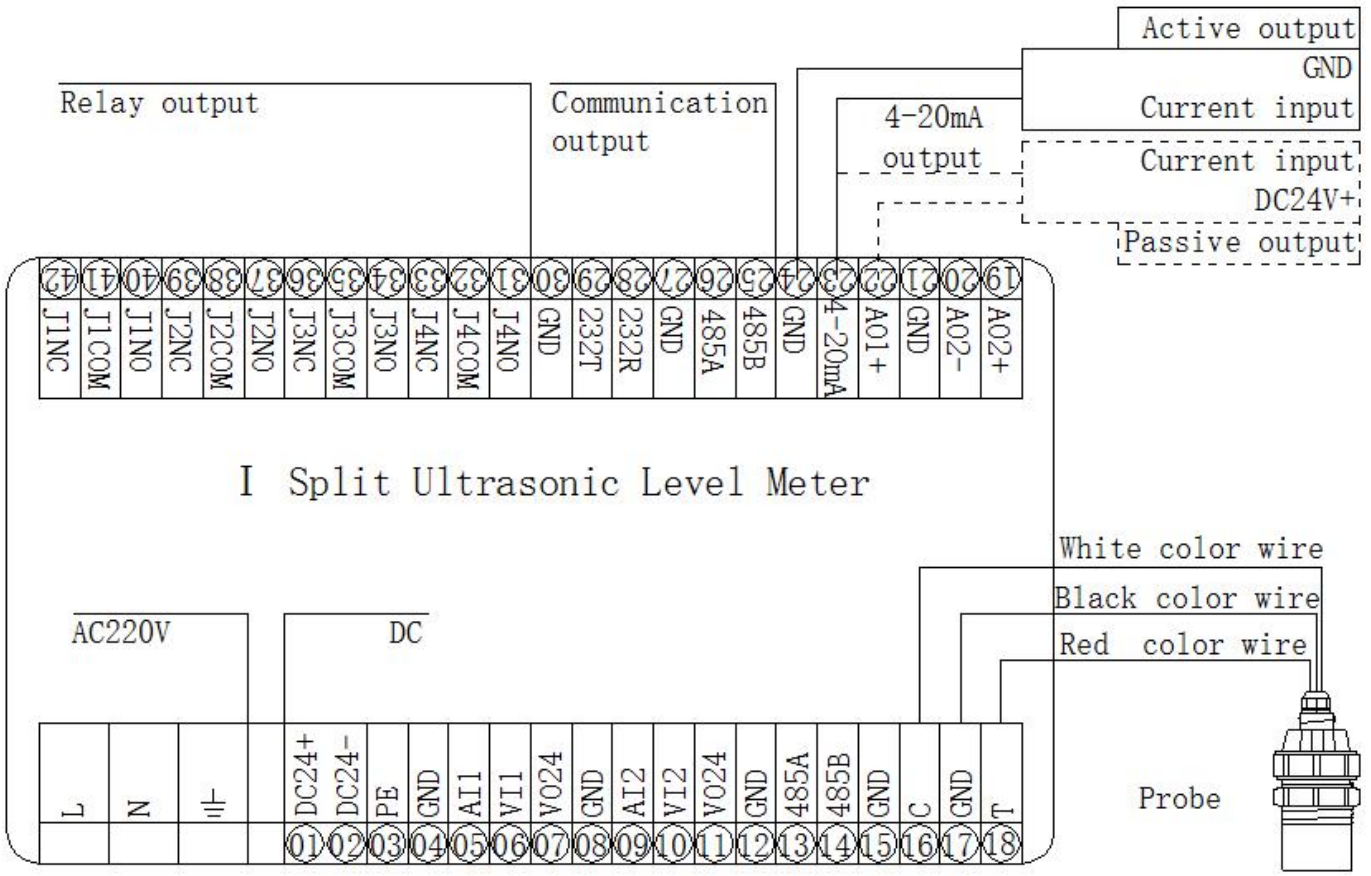
Installation & Operation

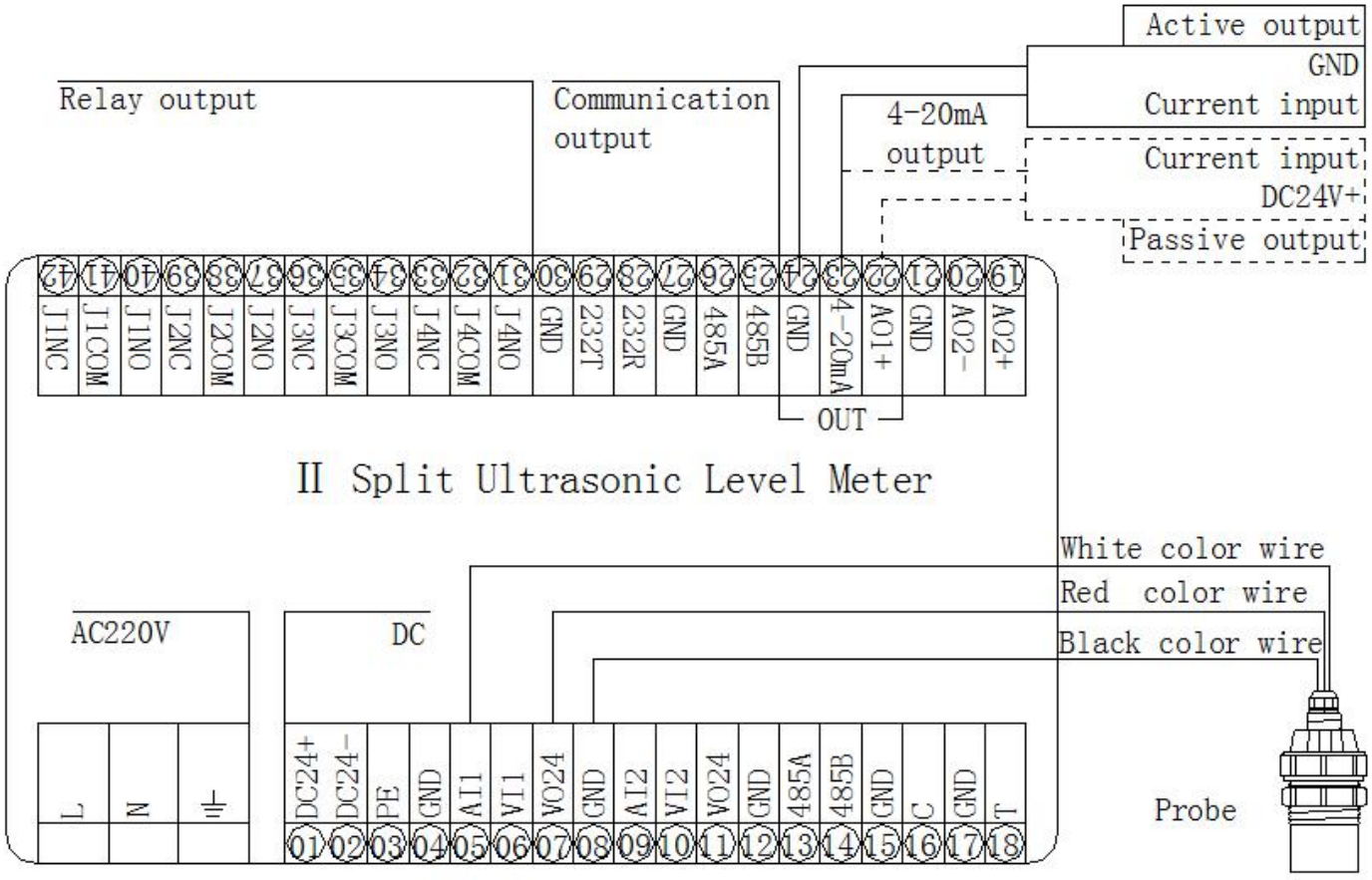
Panel Instruction



MENU	Menu / Return	Input Password after pressing menu	ESC	Cancel	Back to the Previous Level
<	Left Move Button	Cursor left	.-/␣	Symbol	Input symbol
>	Right Move Button	Cursor right	0 , ; "	"0"	Input "0"
Enter	Confirm / Save	Confirm, Save Enter the Menu	∧ ∨	Contextual Move	Select menu Up/Downwards

Wiring


Active output
GND
Current input
Relay output
Communication output
4-20mA output
Current input
DC24V+
Passive output
J1NC J1COM J1NO J2NC J2COM J2NO J3NC J3COM J3NO J4NC J4COM J4NO GND 232T 232R GND 485A 485B GND 4-20mA AO1+ GND AO2- AO2+
I Split Ultrasonic Level Meter
White color wire
Black color wire
Red color wire
AC220V
DC
L N ⏚
DC24+ DC24- PE GND AII1 VII1 VO24 GND AII2 VII2 VO24 GND 485A 485B GND C GND T
Probe


Active output
GND
Current input
Relay output
Communication output
4-20mA output
Current input
DC24V+
Passive output
J1NC J1COM J1NO J2NC J2COM J2NO J3NC J3COM J3NO J4NC J4COM J4NO GND 232T 232R GND 485A 485B GND 4-20mA AO1+ GND AO2- AO2+
OUT
II Split Ultrasonic Level Meter
White color wire
Red color wire
Black color wire
AC220V
DC
L N ⏚
DC24+ DC24- PE GND AII1 VII1 VO24 GND AII2 VII2 VO24 GND 485A 485B GND C GND T
Probe

Install Precautions

Sensor should be placed where there is no obstacle between emission surfaces and measured liquid, it also should be far way from feeding throats. (Refer to chart I)

Tank shape should be considered. Some type of container will bring second echo, especially conical and spherical tank. A good installation place will solve the problem. (Refer to chart II)

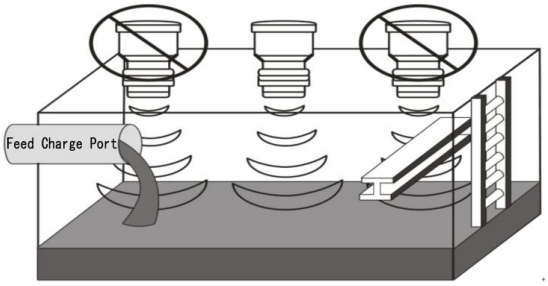
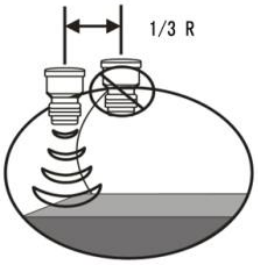


Chart I



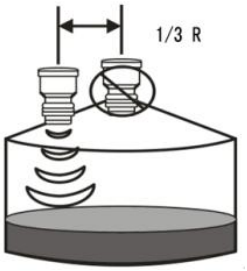


Chart II

Lever meter can be installed by flange, Φ62hole or M60*2 , whatever installation way, make sure the sensor bottom through the installation hole or flange. (Refer to chart III)

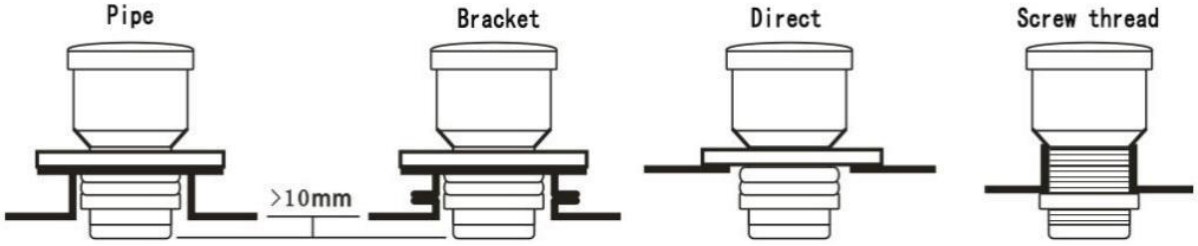


Chart III

If the liquid to be measured has sewage, afloat impurities or fluctuation, use a waveguide and the diameter of the waveguide should over 120mm. (Refer to chart IV)

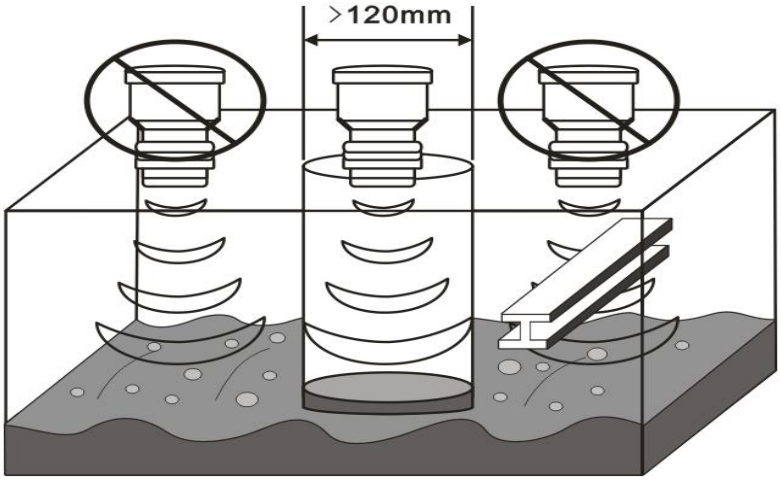
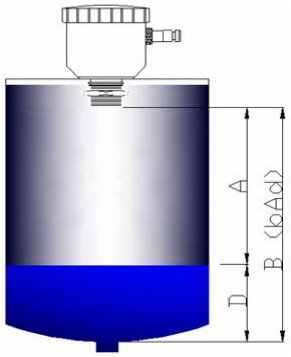


Chart IV

Work Mode

This instrument has two mode, the difference as follow. (Refer to Chart V)



Under liquid level mode

B (Installation Height) is the distance from bottom of container to sensor surface, A is the distance between sensor surface and liquid surface, D is the height of liquid, D= B (Installation Height) –A, display value is bottom of container to liquid surface (D).

Under level mode

set bAd=0, display value is distance from sensor surface to liquid surface (A).

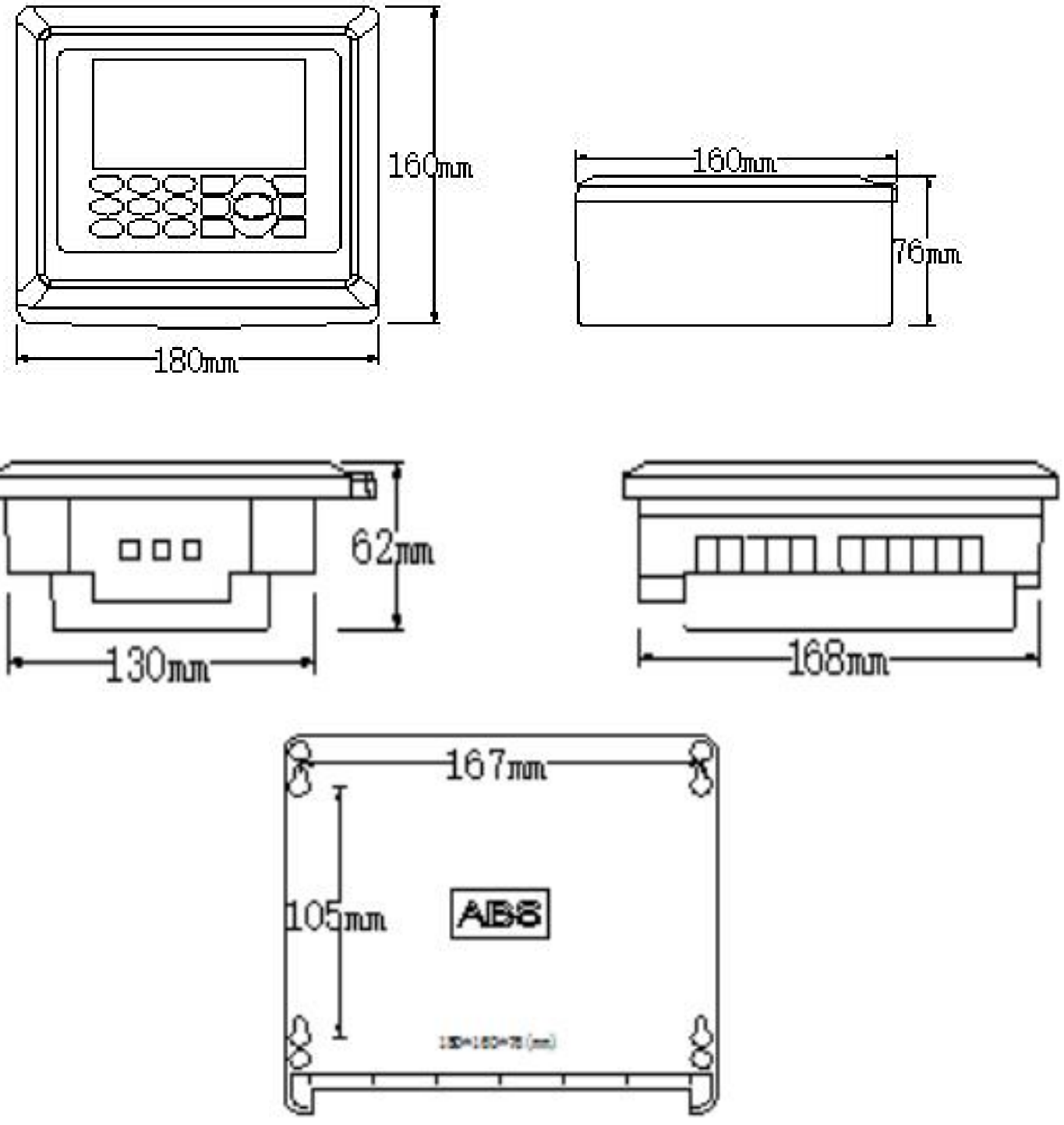
Refer to the tags attached on the instrument for wiring. In order to keep it working reliable and display precise , please electrify >15 minutes before work. When operated outdoors, it should be placed under a sun screen to avoid direct under sunshine and rain. Lightning proof measures should also be taken outdoor.

Main instrument and sensor installation

The sensor is equipped with a fixed ring, pre-reserve a mounting hole in the installation place, put it in, and then tightens the screw ring.

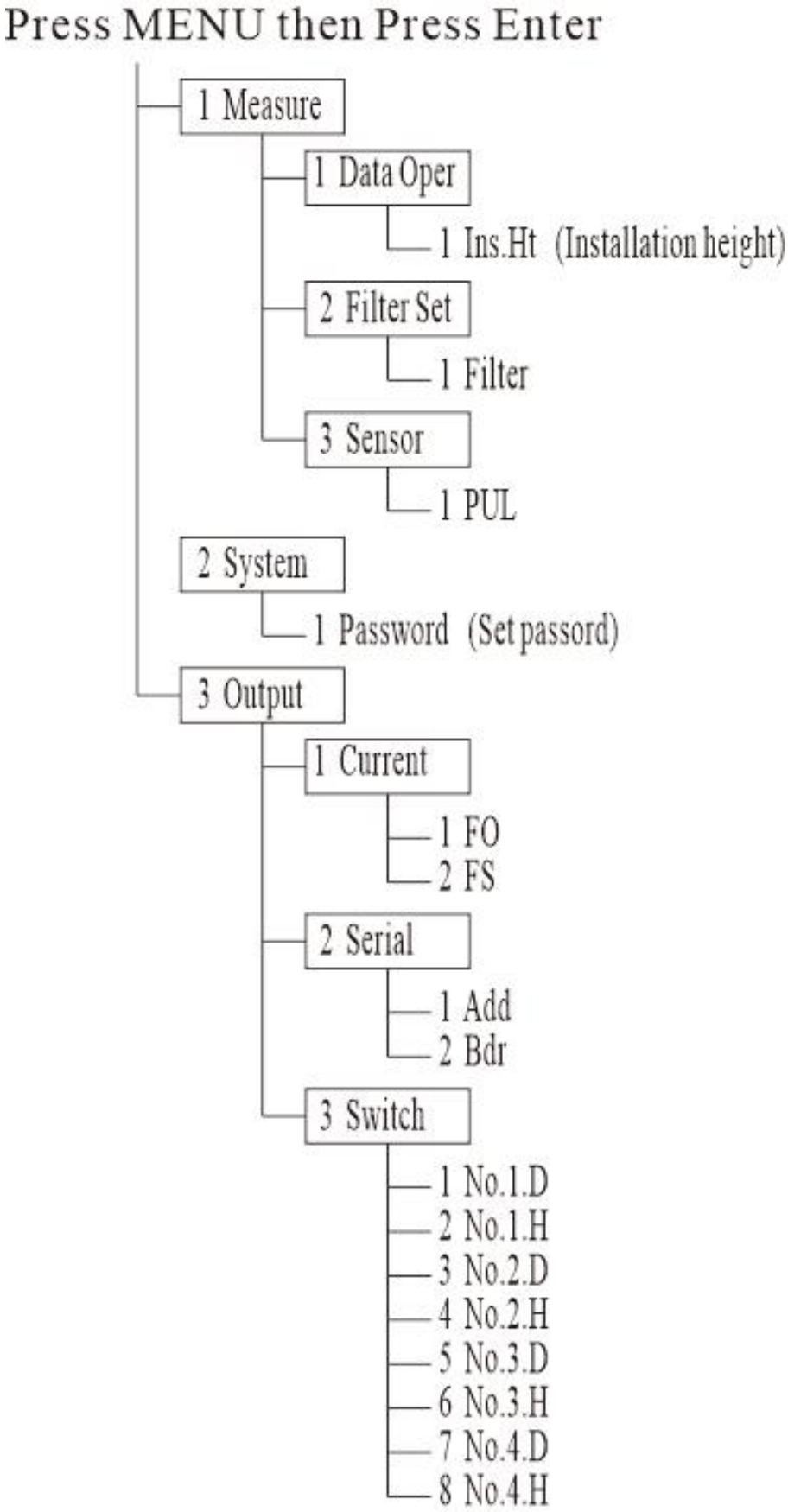
Main instrument is wall mounting, with three fixation plates. Firstly fixed plates with screws to the bottom of the instrument, and then secure it to the pre-drilled mounting holes.

Meter size and mounting sizes as picture at right:



Menu

IType I


Press MENU then Press Enter
1 Measure
1 Data Oper
1 Ins.Ht (Installation height)
2 Filter Set
1 Filter
3 Sensor
1 PUL
2 System
1 Password (Set passord)
3 Output
1 Current
1 FO
2 FS
2 Serial
1 Add
2 Bdr
3 Switch
1 No.1.D
2 No.1.H
3 No.2.D
4 No.2.H
5 No.3.D
6 No.3.H
7 No.4.D
8 No.4.H

Type II

First class	Second class	Third class
Data	Value	Voltage
		Variable1~10
		01~02 Current output
		01 Percentage
	Flux Value	Second Flux
		Hour Flux
		Accumulative
		Accumulative Times
Input	I1 Analog Input	I1 Variable
		I1 Range Start
		I1 Range End
		I1 Ins. Ht
		I1 Filter
		I1 Calibration Start
		I1 Calibration End
	I2 Analog Input	I1 Variable
		I1 Range Start
		I1 Range End
		I1 Ins. Ht
		I1 Filter
		I1 Calibration Start
		I1 Calibration End
	Serial Input	Start of Variable
		Start Address
		Number
		Cycle
		Timeout
		Protocol
		Modbus Command
	Data Calculation	Input Custom Formula
	Settings	Input Variables
Flow	Flume Selection	Triangular, Parshall, Rectangular,
	S. Unit	L /k㎥ -H/㎥ -H
	A. Unit	L /k㎥ -H/㎥ -H
	Zero Clearing	
	Flow Custom Formula	
	Standard Number	1~25
	Parameter C	
	Parameter N	
	Weir Width	
	Channel Width	

	Weir Height	
	Low	
	High	
	Hour	
	Day	
	Month	
	Year	
Display	Contrast	
	Backlight Delay	
	Low Power Consumption	
	Main Display	
System	Password	0000
	Language	EASY/中文/English
	Admin Password	2006
	Menu Shielding	
	Clock	
	Clock Tuning	
	Safe Voltage	
	Backup	
	Restore	
Output	Current	01 F0
		01 FS
		01 L. Regul.
		01 H. Regul.
		02 F0
		02 FS
		02 L. Regul.
		02 H. Regul.
		Configuration
	Serial	Add.
		Bdr.
		Parity bit
		Custom Sinks 自定义接收
		Custom Send
	Switch	No.1 D.
		No.1 H.
		No.2 D.
		No.2 H.
		No.3 D.
		No3 H.
		No.4 D.
		No.4 H.
		Configuration
Data Collect	Timing	
	Collect L.	
	Collect H.	

	File Name	
	Data Format	
	Check Item	
Telecommunication	Upload	Model/Timing/ Upper/Lower
	Message	Signal Quality/ Content/Phone1
	GPRS	Domain/IP/Port/ID/ Enrolment/Query Data/Query interval

Relay output setting

This instrument has 4 relays output. When uses relay control, it must be set control point: D and H. D for relay start point, H for relay end point. X for display value. It works as follows:

When D<H

X<D close	D	D<X<H retain	H	X>H Disconnect

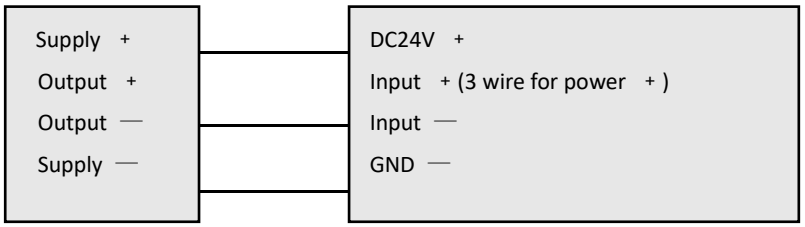
When D>H

X>D close	D	D>X>H retain	H	X<H Disconnect

External Meter Schematic

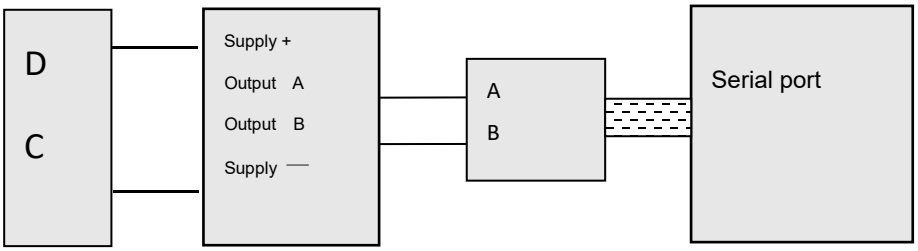
Wiring diagram of current (voltage) output connecting with secondary instrument

Level Meter Secondary Instrument



Serial output connecting with PC

Power Level meter 485-232 PC



Trouble shooting

No.	problem	probable reason	remedy
1	Not working when power on, no display, no sound of sensor	1. power is not connected or “+””-”polarities are connected reversely; 2. too low voltage resulting no working or too high resulting damage	1. Check to ensure correct wiring as instructed. 2.use 12-24V DC supply, contact with distributor
2	No display of sensor but with sound	1. Operation of turning off display has been carried out. 2. connected to high voltage, damaging display chip	1. Press “B” to turn on display; 2. Contact with distributor.
3	With sound and display, but the values not change with distance	1. Too low input voltage leading to abnormal instrument. 2. The sensor or power driver damaged.	1. Use 12-24V DC supply 2. Contact with distributor
4	With display and sound, no change with distance or irregular fluctuation of values	1. Too deflective installation 2. Improper setting of pulse intensity, leading to great residual vibration or diffraction 3. More than 2 instruments on stream, interfering each other 4. Too much electromagnetic disturbance in working area	1. Adjust the axis of sensor vertical to surface to be measured 2. In general with range of 1-3m, transmit intensity is 2-5. 3. Try to eliminate interference 4. Find out disturbance source and shield from it.
5	With sound of sensor, “Lon” or “out” displayed	1. Exceeding measure range 2. Too close between surface and sensor 3. Improperly used for high dust, foam or steam content fields, or too high or too low working temperature; improper setting of pulse intensity	1. Adjust actual range with permitted 2. Adjust working conditions as required 3. Change transmitting intensity until stable display
6	With sound of sensor, display deviations exceeding 10cm	1. Non vertical installation, leading to multiple reflection 2. Installed too close to wall, sonic wave reflected midway 3. Check for correct setting of E 4. Check for correct display of temperature	1. Adjust installation positions several times. 2. Correctly set E value 3. For large temperature difference, adjust “CB” to proper value.
7	Abnormal 4-20mAoutput; too high or low, fluctuating	1. Too large load resistance 2. Measurement range FS changed, output tuning AL or AH changed 3. Undesired supply rectification and filtering	1. Lower load resistance 2. Readjust FS, AL or AH 3. Replace with DC regulated supply with larger capacity
8	Serial port incommunicable	1. Reverse connecting of A and B ports , incorrect dr of serial ports 2. Wrong serial port bPS 3. Erroneous serial port style tr	1. Change wiring, reset para., same with those of main unit

Main specification

Sense range: FS= 2 m

Unusable area: ≤■300mm; □600mm; □≤60mm; □other

Accuracy: ■±0.3％×max range; □±2mm; □other

Display Resolution: 1mm

Output: □0-20mA; ■4-20mA; □0-5V; □1-5V;

□0-10V; □1-10V; □RS485; ■ Relays

Working temperature: ■normal; □-10-60℃; □other

Working pressure: ■normal; □other

Working humidity: ≤80%RH

Storage temperature: -40-85 Deg. C

Storage humidity: ≤70%RH

Working voltage: 220V AC ro 24V DC

Normal power consumption: <1.5W