BIMCO™

BOMBAY INSTRUMENT MFG. CO.

AN ISO 9001:2015 CERTIFIED COMPANY

Portable Handheld Doppler flow meter

user's manual

MODEL NO.: BIMCO-HLB-4

One: Product introduction

Figure 3 internal packing

The product measures the flow rate according to the principle of ultrasonic Doppler Effect, and the water temperature is measured by a pressure sensor measuring the water level and temperature sensor. The housing is made of PVC plastic for an effective waterproof seal. The

interior is powered by a 12V class rechargeable battery.

 Use the Modbus communication protocol to communicate with the handset using the RS485 bus.

 Underwater sensor equipment is easy to install. It has a metal base fixture for easy installation.

All devices are electronically designed, with wide voltage supply, low power consumption, and no mechanical parts. With measurement

Accurate and stable advantages, high reliability and strong anti-interference.

A wide range of applications. It can be applied in various water environments from tap water to Yellow River water.

Two: Product principle

Principle of Doppler sea flow meter: When the ultrasonic source and the observer make relative motion, the frequency received by the observer will be different from the frequency of the ultrasonic source. Therefore, the small particles and small bubbles moving with the water relative to the ultrasonic transducer also cause the change of the receiving frequency of the transducer, and increase with the increase of the speed of the floating motion in the water, thereby measuring the Doppler shift, The flow rate of the water at which the Doppler current meter is located is also measured. Multiply by the cross-sectional area of the channel and wait until the traffic information.

Mainly used for irrigation open channels, municipal sewers, hydrological basins and other occasions. It is especially suitable for low water levels and can work with water levels over 15 cm. In regular pipelines and channels, the water depth is measured by a pressure sensor on the flow meter, and the ultrasonic sensor measures the flow rate to calculate the flow rate.

Because Doppler flow measurement uses the speed of sound propagation in water, and the speed of sound propagation in water is closely related to water temperature, a temperature sensor is built in for temperature measurement to correct the speed of sound.

The liquid level depth measurement uses a pressure sensor to measure the distance of the flow sensor from the liquid level.

The handheld memory has trapezoidal, rectangular, circular and other channel profile models, which can easily calculate the flow of common channels.

Three: Product technical indicators

3.1 Performance parameter

Content	Range	Accuracy
Flow rate range (m/s)	0.02m/s-5.0m/s	±1.0% ， ±1cm/s
Water temperature range (°C)	-10℃~60℃	±1℃
Water depth measurement range (m)	0.05m-10m	0.5%±0.5cm
Instantaneous flow range	1L/s—99.99m³/s	
Cumulative flow	0.1m³-999999m³	
Electrical Content	Range	Remarks
Working voltage (v)	7.2V-15V	DC
Flow consumption (mA)	≤65 mA	12vdc

Working water depth (M)	0.15m-50m	
Data update period (S)	8s	

3.2 Other parameters

1. Built-in rechargeable battery, charging once for continuous use time: 24 hours;

2. Handset storage: 32M bytes, RS232 serial port reads storage data;

3. The default length of the cable: 10 meters;

3. Stainless steel measuring bracket height 2 meters;

4. The liquid crystal display is 128*128 dot matrix.

5. Suitcase length and width: 72 cm * 32 cm * 26 cm

Four. Instrument function and button introduction

4,1 main unit housing jack position and function introduction

The handset has two outlets, one for the three-pin socket, for powering the internal rechargeable battery. One is a five-pin socket for connecting to an underwater Doppler flow meter.

RS232 socket hole: DB9's standard serial port socket at the bottom of the handset for communication with the computer.

Host display screen: In the upper half of the handheld, the rectangular box is the display screen, and the data and operation interface are displayed here.

Host operation panel: The lower part of the main unit is the operation panel for the user to control the operation of the instrument.

4.2 Button introduction

The instrument has six types of function keys, as shown below:

1. Power On/Off Key I/O: When the power is turned on, the I/O is the power on/off button. Press and hold for 3 seconds, release it and turn it on.

When shutting down, you must press and hold for 3 seconds, release, the LCD screen goes out, confirm the off when you return to the initial main interface.

machine.

2.▲ and ▼: can work on the sampling time, working interval, parameter input, up and down position;

3. Back button ESC: You can return to the previous interface of the system.

4. OK button ENTER: Confirm or save the entered parameters.

5. Number keys: There are 0, 1, 2, 4, 5, 6, 7, 8, 9 digital input keys for various digital settings.

6. Delete key DEL key: delete some data.

Five. Instrument connection

1. Use AC power (first time use): Please remove the accessory battery charger

Plug the DC plug into the charging jack (three-pin jack) on the handheld and the AC plug on the other end into the AC 220V jack.

During the charging process, it is recommended that the handheld be in the off state, whether it is full of the LED indicator on the observation charger, and the charger indicator will turn green when it is full.

Note: The first use is recommended to be fully charged before use.

2. Before using the instrument, the flow sensor must be connected to the water handheld host to form a complete system. The flow meter is placed in the measuring water.

After that, the five-pin plug at one end of the cable is inserted into the five-pin socket of the handheld, and the instrument can be inserted and tightened to work normally.

Six. Instructions

6.1 Power on and power off operations

When the power is turned on, the I/O button is the power on/off button. Press and hold the I/O button for 3 seconds to release it and turn it on. When shutting down, you must press and hold the I/O button for 3 seconds to return to the initial main interface, release it, and the LCD screen goes out to confirm the shutdown.

After booting up, display the company logo and product model, and then press ENTER, the following main interface is displayed

6.2 Main interface

1. Parameter setting
2. Collect data
3. Record query

In the main interface menu, there are three types of functions: setting, collecting, and querying.

6.2 Setting parameter operation

Under the main menu, select 1 to enter the parameter settings and enter the parameter setting interface. as follows:

1, Time setting

Enter the year, month, day, hour, minute, and second to complete the setting of time. The device comes with a real-time clock dedicated button battery when the device is turned off.

After that, the year, month, day, hour, minute, and second continue to run. Generally no need to reset.

2, Set the zero point

The customer can set the starting point of zero flow rate, such as the measured data level of the measuring instrument is 0.02cm/s. If the user wants this flow rate to be zero flow rate, you can enter 0.02cm/s at this interface. The flow rate can be calculated from 0.02 cm/s. Generally set to 0.

3, Liquid level compensation

In actual use, the Doppler flow meter installation position is not necessarily at the bottom of the canal, but at a position that represents the overall flow velocity of the canal. For example, 30 cm away from the bottom of the canal, the water depth measured on the Doppler flowmeter is actually the distance from the water surface to the installation position. Therefore, the liquid level compensation compensation value should be input. The installation point is 30 cm from the bottom of the canal. Enter 0.3 m for the compensation. When calculating the true depth value of the canal, the handheld will add the water depth value measured by the Doppler flowmeter to the liquid level compensation value to obtain the true drain depth value.

4、Channel selection

Rectangular section, trapezoidal section, circular section,

You can enter the corresponding interface to set the corresponding parameters.

5, Address settings

When measuring the flow rate of different places, the user can set the corresponding number for different places. When storing the data, the number is stored along with the data, and the subsequent identification and observation.

6, sampling interval

The working interval between each measurement of the flow meter can be set. (This setting is to reduce device power consumption)

6.3 Measurement and data display operations

Under the main menu, select 3 to enter the parameter settings to enter the parameter setting interface. as follows

Flow rate: M/S
Level: M
Second flow: m3/s
Cumulative: m3

Under this interface, the current flow rate can be changed. To save, press Enter to save the current time, station, flow rate, level, instantaneous flow, and accumulated flow into memory.

6.4 Record Query Operation

Under the main menu, select 3 to enter the parameter settings to enter the parameter setting interface. as follows:

```
Store data query
1. Query data
2. Clear data
3. Data Transfer PC
```

1. Select 1 query interface and enter the query data to view historical stored data, including site number, storage time, flow rate, liquid level, second flow, and accumulated traffic. Press ESC to exit.

```
Flow rate: M/S
Level: M
Second flow: m3/s
Cumulative: m3
```

2. Select 2 Query Interface Data Clear to enter the Clear Data interface. Press Enter to clear all historical data and not recover. Press ESC to exit.

```
Storage record
Is the data cleared?
Yes, please press ENTER
No, please press ESC
```

When deleting data, because the amount of data of 32 Mbytes is large, it takes several minutes. Do not shut down at this time. The interface prompts as follows:

```
Storage record
deleting
please wait……
```

After the data deletion is completed, the interface is deleted.

Storage record Delete completed Please quit

3. Enter the data transmission PC. When the handheld is connected to the computer through the DB9 serial port (baud rate 115200, data bit 8, stop is 1), all the historical data can be sent to the serial port assistant for the user to view.

6.5 Operation example

Assumption: If the section of the canal is trapezoidal, the Doppler flowmeter is placed 0.15 meters from the bottom of the river. The measurement site number is 01 and the sampling interval is 15 seconds.

1. In the first operation, first enter the parameter setting interface.

The current time can be set.

The setting zero parameter defaults to 0, no special changes are required. The level compensation is set to 0.15 meters.

Then enter the channel selection, select the trapezoid, and press Enter to enter the parameter setting interface, set the corresponding bottom length and angle, press ESC to exit after the setting is completed.

Enter the address setting interface, set the address number to 01, press ESC to exit after the setting is completed. Enter the sampling interval interface and set the sampling interval to 15S. After the setting is completed, press the ESC key to exit.

After the parameter setting is completed, press ESC to return to the main interface, and enter the acquisition data interface to view the real-time flow rate, liquid level, second flow and accumulated flow.

In this interface, if you need to store the current data, press the Enter key manually, and press it once to store it. Press

The DEL key clears the current interface parameters and restarts the measurement.

SEVEN. Installation requirements

1. The air guiding cable has no air guiding tube because it contains air guiding tube, so it can't be bent too much to prevent it from breaking. Do not use the air guiding cable as the rope of the flow meter, and drag the Doppler flow meter with the air guiding cable;

2. The circular ultrasonic transducer in front of the probe cannot be impacted and scratched;

3. The instrument probe should avoid exposure to the sun for a long time, so as to avoid the temperature being too high and causing malfunction;

4. Use an acoustic Doppler flowmeter where the concentration of sediment is large. Regularly clean the ultrasonic transducer and pressure sensor.

The sludge on it prevents the sludge from clogging the pressure sensor.

EIGHT. Daily maintenance and repair of the instrument

1. After each use of the underwater sensor, immediately wash it with fresh water and dry it with a cloth, put it back in the original suitcase, and put the parts back in place.

2. The cable of the instrument prevents sharp objects from being scratched or punctured.

3. Equipment should be placed in a ventilated and dry place, and should be kept away from corrosive substances. Heavy objects should not be stacked on instruments and equipment.

4. Charge the battery when it is used for the first time or when it is not used for a long time (must be charged with the charger supplied with this instrument).

5. When using in rainy days, be sure to prevent the portable main unit from raining directly.

NINE. Instrument packing list

The complete portable flow meter includes:

First, a suitcase with:

1. Doppler flow meter 1;
2. Handheld unit; 1
3, battery charger 1;
4. Serial data cable 1
5. Measuring rod 1 set
6. Instruction manual 1 copy

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