Bove® Technology

Installation & User Guide

BECO Y
Ultrasonic Water Meter

Read this Guide before installing the meter

Thank you for choosing our products

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the meter' s performance and functions.
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CONTENT

1. General Information

Please note that the following installation conditions must be obeyed:
Pressure requirement: MAP16.
Electromagnetic environmental class: E2
Mechanical environmental class: M1
Mechanical environmental condition: O
Installation requirement: There must be a minimum of 25 cm between signal cables and other installations.
Note: Seal or any safety marks on the meter must not be damaged or removed and doing so will void the warranty and calibration of the meter.

2. Technical Specification

2.1 Flow sensor

The flow sensor is a device used to measure the velocity of flow by using the principle of ultrasound. It can measure the average velocity along the path of an emitted beam of ultrasound by averaging the difference in measured transit time between the pulses of ultrasound propagating into and against the direction of the flow. The flow measurement is based on an acoustic wave time of flight principle. The flow meter body is equipped with 2 ultrasonic transducers facing 2 acoustic reflectors.

Flow sensor data:

Manufacturer	*Bove*
Type	*BECO Y*
Accuracy class	*Class 2*
MAP	*16 bar*
Max pressure loss	*≤ 63 kPa*
Max admissible temperature (optional)	*50℃ / 70℃*
Limits of temperature (Θ min and Θ max) (optional)	*0.1-50℃ / 0.1-70℃*
Installation requirements	*No straight pipe required*
Basic mounting orientation and other specified orientations	*360°*

Mechanical environmental condition	*O*
Electromagnetic environmental class	*E2*
Mechanical environmental class	*M1*

2.2 Calculator

The calculator is a device that calculates the flow volume consumed based on signals from the flow sensor. It's also the meter's control, display, and data store part.

Calculator data:

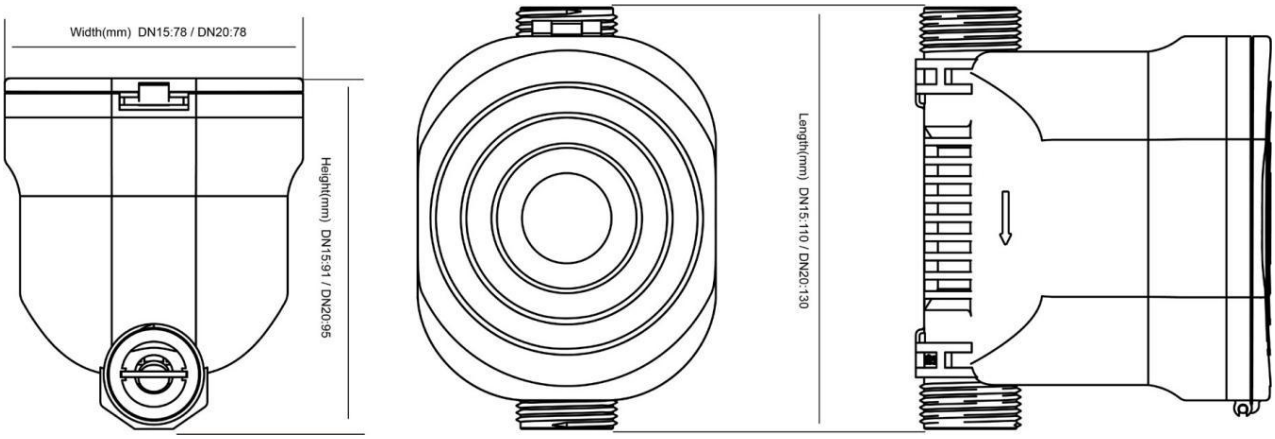
Manufacturer	*Bove*
Mechanical environmental condition	*O*
Electromagnetic environmental class	*E2*
Mechanical environmental class	*M1*
Display unit	*m^3, L*
Battery power supply requirements	*See chapter 4 "Power supply"*
Power Consumption	*Average 20uA, Peak 4mA*
Pulse input device class	*N/A*
Max permissible flow sensor signal (Pulse rate)	*N/A*
Output signal for normal operation	*IrDA*
Liquid if other than water	*N/A*

2.3 Complete meter

Manufacturer				*Bove*				
Flow Measurement								
Type	DN (mm)	Flow Rate (m^3/h) @R800			Dimensions (mm)			Connection
		Q_1	Q_2	Q_3	Length	Width	Height	———
BECO Y	15	0.00312	0.005	2.5	110	78	91	G¾"
	20	0.005	0.008	4	130	78	95	G1"
Water temperature range (optional)				*0.1-50℃ / 0.1-70℃*				
Q_3/ Q_1 (optional)				*R250 / R400 / R500 / R800*				
Accuracy				*Class 2*				
Maximum permissible error in upper flow rates range $Q_2 \leqslant Q \leqslant Q_4$				*± 2%(at θ ≤ 30°C)* *± 3% (at θ > 30°C)*				

Maximum permissible error in lower flow rates range $Q_1 \leqslant Q < Q_2$	*± 5%*
Type of liquid	*Drinking Water*
Installation requirements	*No straight pipe required*
Basic mounting orientation and other specified orientations	*360°*
Display & Indication	
Display unit options	*m^3, L*
Display LCD	*10-digit*
Indicator range	*0.00001 m^3 to 99999.99999 m^3*
Time to LCD off	*Always on*
Environmental Requirement	
Mechanical environmental condition	*O*
Electromagnetic environmental class	*E2*
Mechanical environmental class	*M1*
Ambient temperature	*5 ~ 55°C (Indoor and non-condensing)*
Storage temperature	*-20 ~ 60°C*
Protection Class	*IP68*
Interface & Communication	
Output signal for communication	***Wired communication***
	N/A
	Wireless communication
	LoRaWAN/ Sigfox/ Wireless M-Bus/ NB-IoT/ LoRaWAN & Wireless M-Bus/ 4G (CAT1)
Output display/signal for testing	*IrDA*
Others	
Data log	*24 / 120 logs (daily/weekly/monthly)*
Material	*Composite material, environment friendly, and portal water suitable*

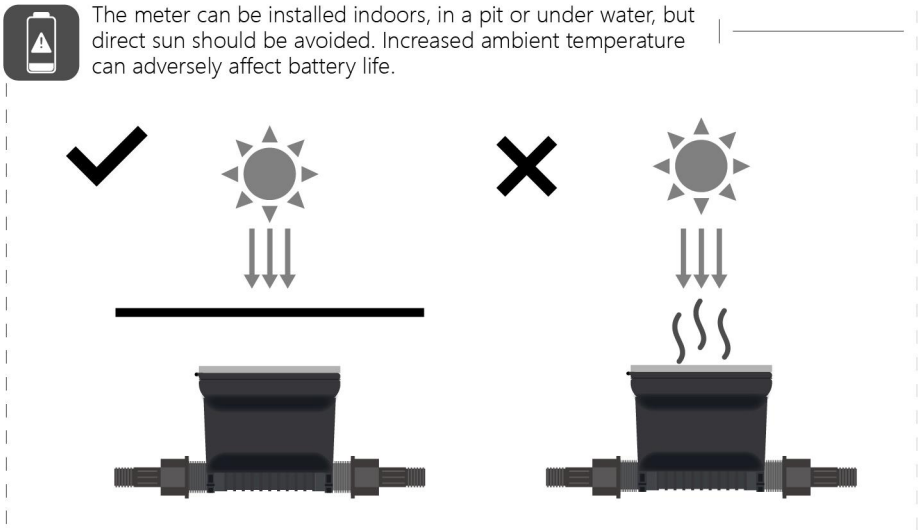
2.4 Physical dimensions



3. Installation

3.1 Requirements for installation environment

BECO Y series ultrasonic water meter has been designed for indoor installation in non-condensing environments with ambient temperatures from 5~55°C.



- The meter must not be under any mechanical stress when installed in the pipe.
- The meter must be protected against pressure shocks in the pipe.
- Protection class IP68 allows long-term submergence, provided that all cable unions have been correctly mounted and that the plastic cover has been properly fastened.
- Make sure the meter is installed sufficiently far away from possible sources of electromagnetic interference (switches, electric motors, fluorescent lamps, etc.).
- All control cables must be drawn separately and not parallel to e.g. power cables or other cables with the risk of inducing electromagnetic interference. There must be a distance of min. 25cm between signal cables and other installations.

- If two or more meters are to be installed shall be in parallel, the axis-center distance between two meters shall be at least 135mm minimum.

3.2 Before Installation

Prior to installation of the flow sensor, the pipe shall be thoroughly flushed out, and any dirty, stone alike items must be removed from the pipe. Cavitation in the system must be avoided. If a risk of frost exists, empty the system and, if necessary, remove the meter. If the water is soiled, fit the strainer in the pipe before the meter.

3.3 Mounting of Flow Sensor

Consider the dimensions of the water meter, and the distance with surroundings, minimum 3 cm free space.

The meter is to be installed so that the direction of the arrow on the meter housing corresponds to the direction of flow. Avoid the collection of air bubbles in the meter during the installation process.

The connecting pipe at the two ends must be on the same horizontal level. Install horizontally only, not tilted, inclined or overhead. Install the flow sensor into horizontal or up streaming pipelines.

Do not install at highest point of piping to avoid air inside the flow sensor. The flow sensor must not be installed in the positions where swirling flow exists (swirling flow is normally caused by bending pipe), or pulsatile flow exists (pulsatile flow is normally caused by pump, therefore the flow sensor must be installed as far as possible from pump and must not be installed on the outlet of pump) or air may build up.

3.4 Mounting Step

Step 1: Flush the piping system thoroughly before mounting the meter.

Step 2: No straight pipe required.

Step 3: The specific seal gasket and connector only supplied by Bove Technology.

Step 4: On the two sides of the meter, there should be one filter (if the water is soiled) and two shut-off valves.

Step 5: After finishing the above operations, seal the meter only if the sealing has not been done before delivery from factory.

3.5 Installation of non-return valve

The meter can be supplied with a non-return valve (if required) on request. The non-return valve must be installed on the water inlet end of meter when installing.

3.6 After the installation

The tightness must be proved by pressurizing with cold water, slowly filling the pipe on completion of the installation.

Open the shut-off valves carefully and check installation for leakage. While the piping system is operating, check whether the volume displays correctly and the temperatures display corresponding with the actual temperatures (see the display information).

When the response thresholds are exceeded and the flow rate is positive, the volume is

summated.

Make the segment test, in order to display all display segments for test purposes.

The operating hours are counted from initial connection of the battery. The date is incremented daily. As a standard the meter is delivered with the local time, or destination time if required.

4. Power Supply

BECO Y consists of combinations with the following types of batteries.

Type	*Lithium Battery*		
Model No.	*ER26500*	*ER18505*	*SPC*
Rated capacity	*8500mAh*	*4000mAh*	*45mAh*
Rated voltage	*3.6V*	*3.6V*	*3.6V*
Max recommended continuous operating current	*150mA*	*130mA*	*500mA*
Max pulse current	*300mA*	*180mA*	*2000mA*
Reference weight	*52g*	*28g*	*10g*
Max dimension	*26.2×50mm*	*18.7×50.5mm*	*15×20mm*
Operating temperature	*-60°C ～ +85°C*		

5. Interface & Communication

5.1 IrDA

BECO X equipped with an optical interface IrDA to IEC62056-21 as a standard. In addition, one of the following options can be ordered for remote output.

5.2 LoRaWAN (Optional)

Class	*Class A*			
Network Access Mode	*OTAA or ABP*			
Transmitting Power	*12.15 dBm(max)*	*14 dBm(max)*	*20 dBm(max)*	*20 dBm(max)*
Data transmission	*Each 6h as default*			

5.3 Sigfox (Optional)

RCZ Serial	*RCZ 1*	*RCZ 2/4*
EIRP/dBm (max)	*16*	*24*
Data transmission	*Each 6h as default*	*Each 12h as default*

5.4 Wireless M-BUS (Optional)

Frequency	*433 Mhz*	*868 Mhz*
Mode	*T1 or C1*	
Transmitting Power	*10 dBm(max)*	
Data transmission	*Each 1 minute as default*	

5.5 LoRaWAN & Wireless M-BUS (Optional)

For LoRaWAN:

ISM Band	*EU868*
Class	*Class A or Class C*
Network Access Mode	*OTAA or ABP*
Transmitting Power	*16 dBm(max)*
Data transmission	*Each 6h as default*

For Wireless M-BUS:

Frequency	*868 Mhz*
Mode	*T1 or C1*
Transmitting Power	*14 dBm(max)*
Data transmission	*Each 120s as default*

5.6 4G CAT1 (Optional)

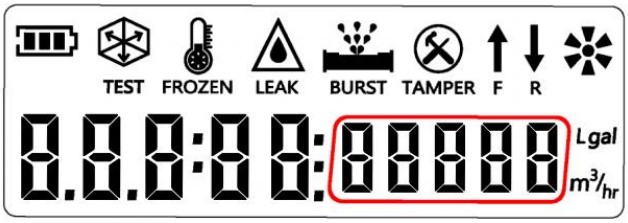
LTE Band	*B1/2/3/4/5/7/8/20/28/66*
Data transmission	*Each 24h as default*

5.7 NB-IoT (Optional)

LTE Band	*B3*	*B5*	*B8*	*B20*	*B28*
Data Transmission	*Each 24h as default*				

6. Operation & Display

BECO Y is fitted with an easily readable LCD, including 10 digits, measuring units, and an information field.

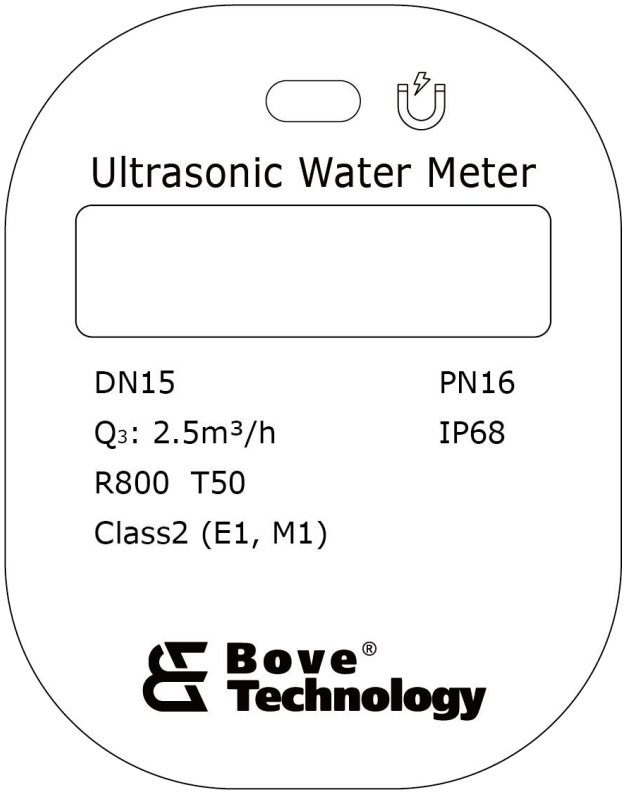


No.	Icon	Name	Meaning
1		*Battery Alert*	*Check details in chapter 5.*
2	TEST	*Calibration Mode*	*Under calibration*
3	 FROZEN	*Temperature Alert*	*Including "Freezing Alert" and "Temperature Alert"* *Check details in chapter 5*
4	 LEAK	*Leakage Alert*	*Check details in chapter 5*
5	 BURST	*Burst Alert*	*Check details in chapter 5*
6	 TAMPER	*Multi-alert*	*Including "Tampering Alert", "EE Error" and "Over Range Alert".* *Check details in chapter 5*
7	 F	*Forward Flow Measuring*	*Always-on means the current menu is "Forward Totalizer".*
8	 R	*Reverse Flow Measuring*	*Blink means the reverse flow is happening.* *Always-on means the current menu is "Reverse Totalizer".*
9		*Pipe state*	*Blink means "empty pipe"* *Always-on means "full pipe"*

10	Lgal $m^3/_{hr}$	*Unit*	*Liter* *Gallon* *m^3* *m^3/hr*

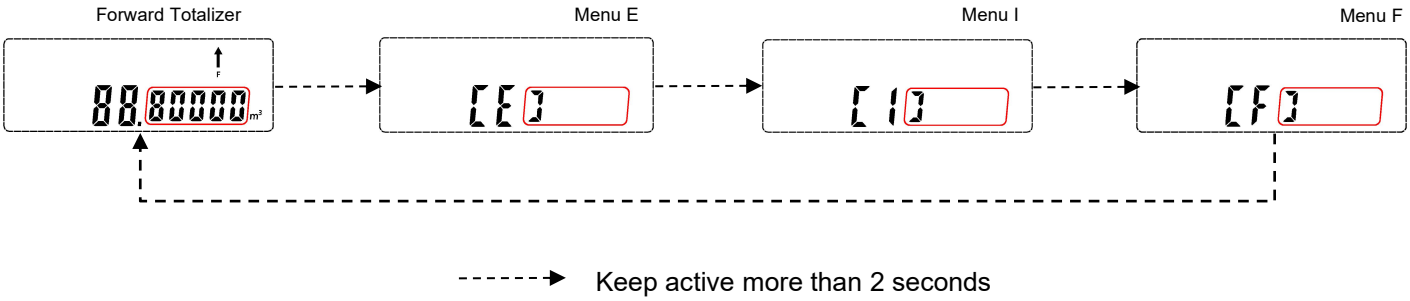
6.1 Operations on how to display

Users may use a magnet to trigger the “magnet icon” position to switch menus as shown in the following nameplate sample. There are two kinds of trigger options, long trigger (more than 2 seconds) and short trigger (less than 2 seconds). If no operations over 3 minutes, the meter will turn back to the default screen, “Forward Totalizer” screen under “Main Menu”.



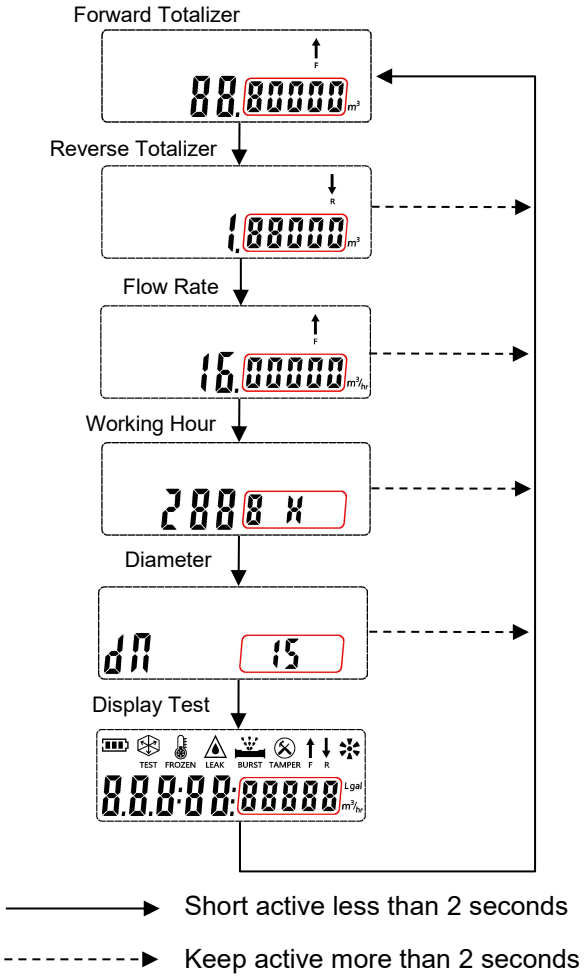
6.1.1 Menu List (1st level)

There are 4 kinds of menus, including “Main Menu”, “Menu E”, “Menu I” and “Menu F”. Users can switch the 1st level menus by long trigger (more than 2 seconds).



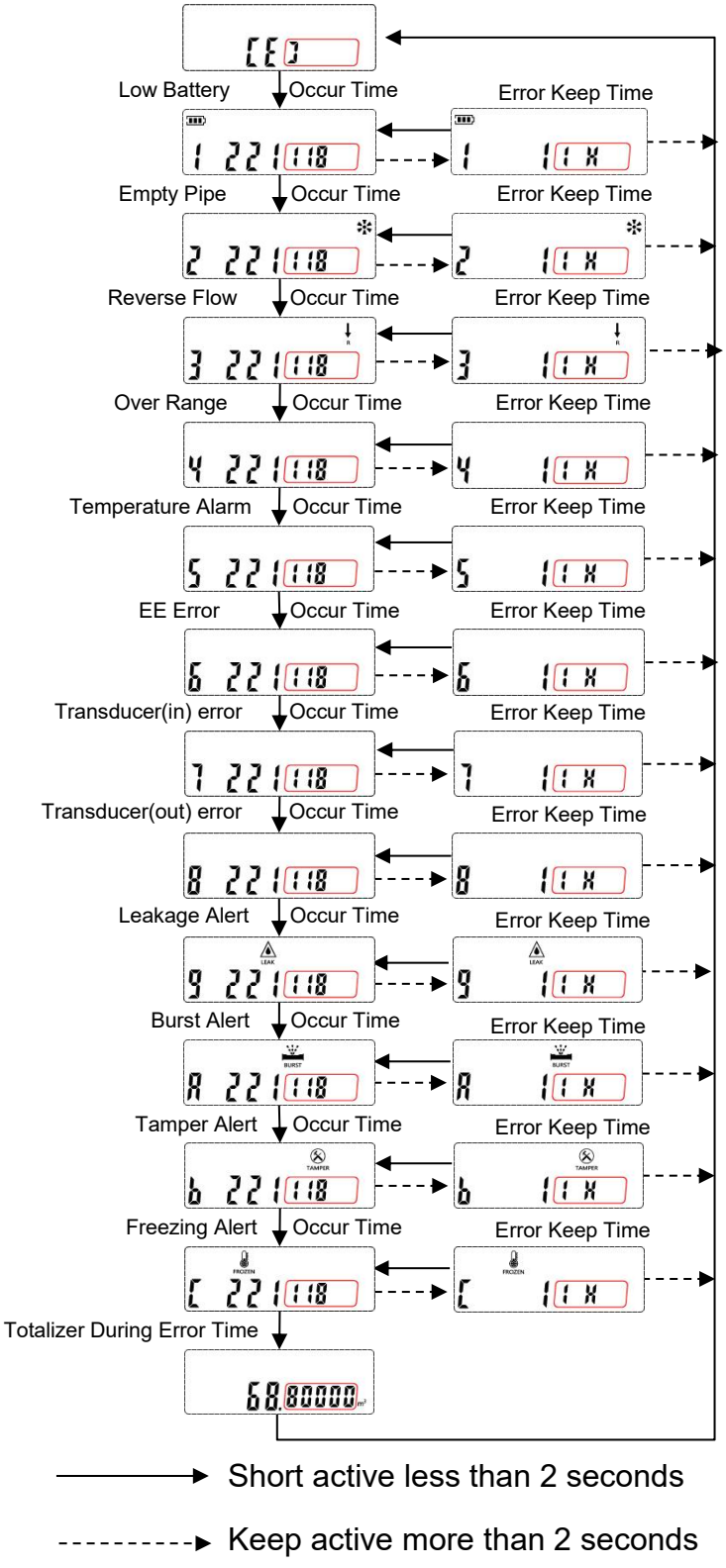
6.1.2 Main Menu

There are 6 screens under “Main Menu”, including “Forward Totalizer”, “Reverse Totalizer”, “Instant Flow rate”, “Working Hours”, “Diameter” and “All Display”. Users can switch these 6 screens by short trigger (less than 2 seconds).



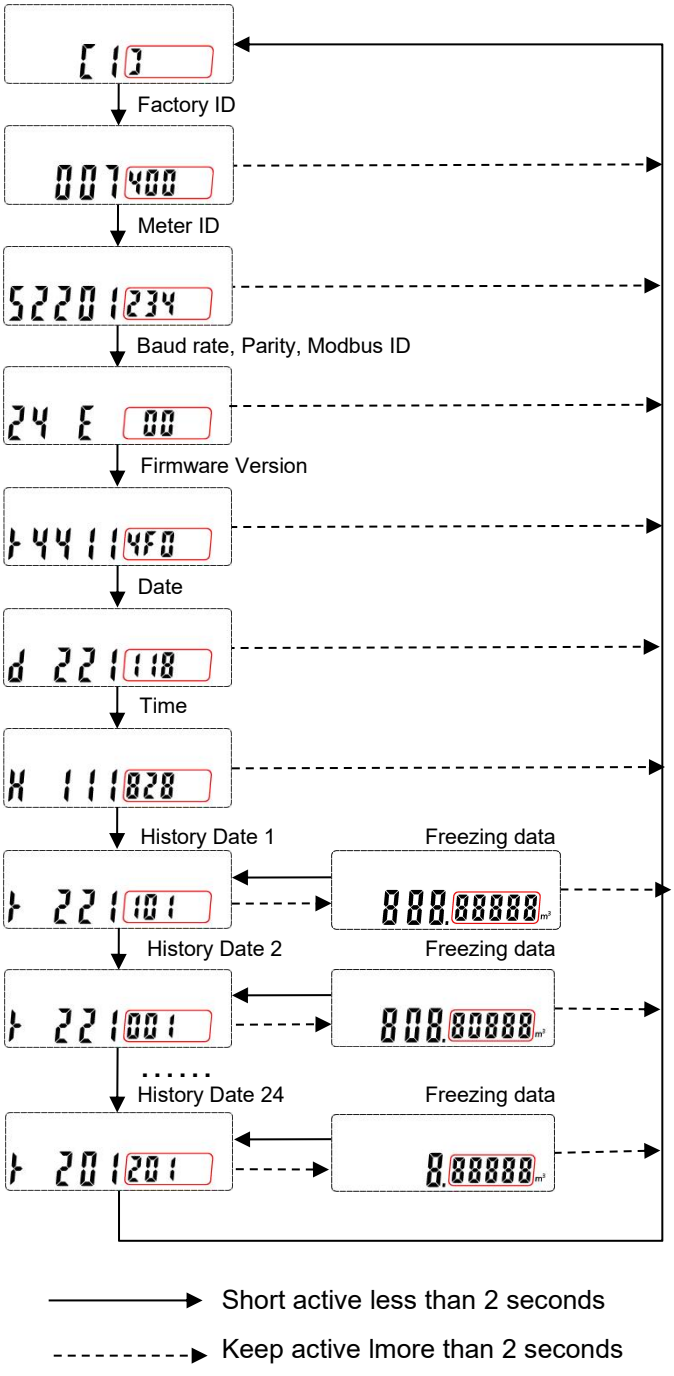
6.1.3 Menu E

Users can switch the screens under Menu E by short trigger (less than 2 seconds) to check the alert/error information.



6.1.4 Menu I

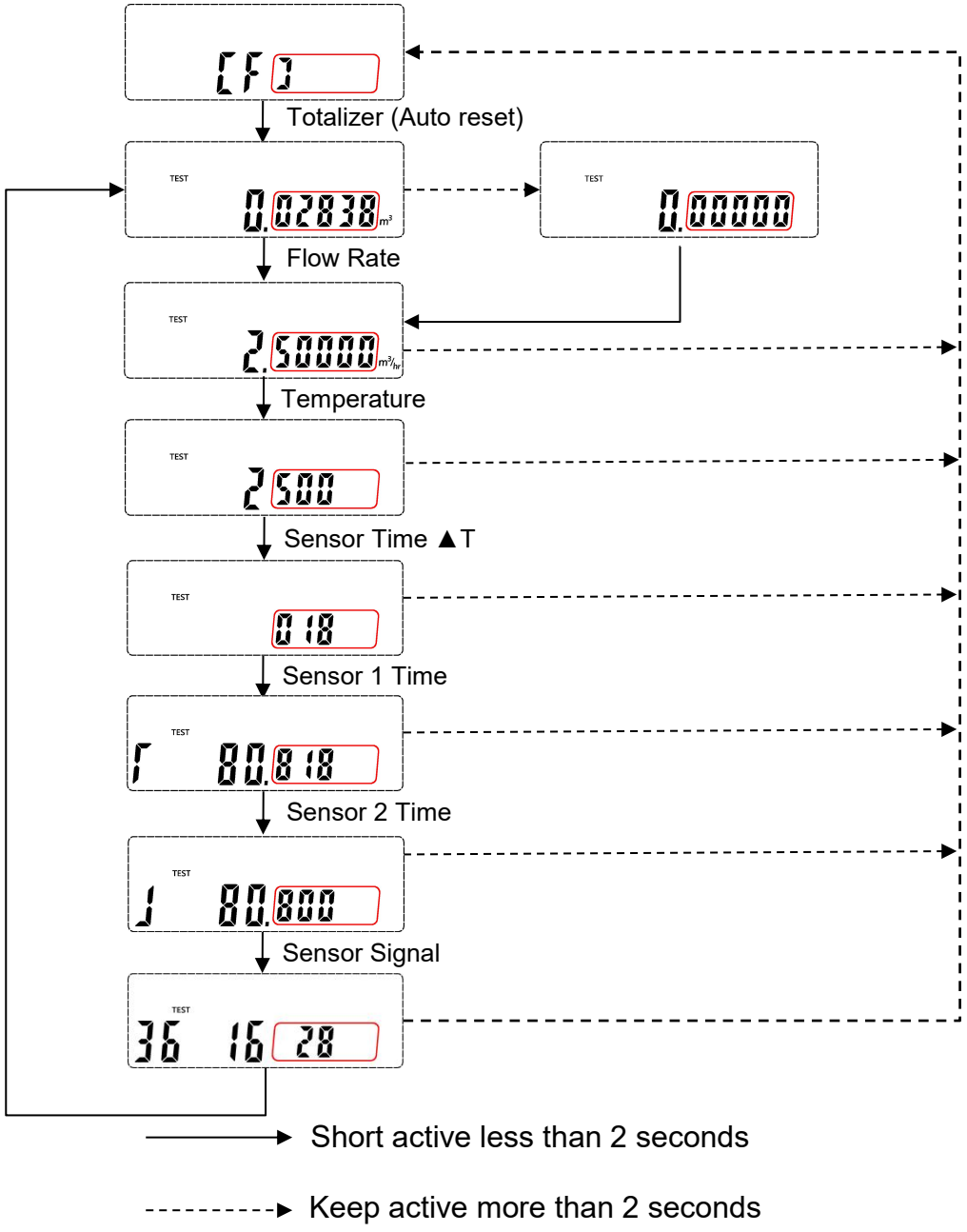
Users can switch the screens under Menu I by short trigger (less than 2 seconds) to check the meter parameters, logs, etc.



6.1.5 Menu F

The following photo shows “Menu F” (Calibration mode only). In “Menu F”, “Accumulated Volume” can be reset automatically, when the flow is zero and starts to exceed the preset value then the current accumulated volume is clear to zero. Also, the value can be reset by a long-trigger (more than 2 seconds). Meter will exits the calibration mode if no operation for 2 hours.

Note: Preset value is pre-set to make sure zero calculation when there’s no water flow in the pipe, usually the value equals to 0.1% of Q_3. This mode is for meter flow accuracy test.



6.2 Monthly Data

The calculator stores the following values for 24 months at each end of month - Volume (meter reading)

From the month set day display, press the button shortly to enter the previous month's values.

The month values can also be read out via the optical interface and other communication ports.

7. Alert and Error

No.	Item	Definition	Reset Solution
1	*Battery Alert*	*The meter battery is low.*	*Meter can work at least 3 months after the battery alert happens, the user needs to change the meter within 3 months.*
2	*Empty Pipe Alert*	*The pipe is not full or with air bubbles. Meter will not measure once this alert happens.*	*Put meter into the pipeline; Make pipe full of water; Release air bubbles.*
3	*Reverse Flow Alert*	*The current flow directions reversed against the arrow indicated on the meter body.*	*Install meter with correct direction.*
4	*Over Range Alert*	*The current flow rate is higher than Q4.*	*Reduce flow rate.*
5	*Water Temperature Alert*	*The current water temperature is higher than 60 ℃.*	*Lower the water temperature.*
6	*EE Error*	*The meter storage component, EEPROM, is having errors.*	*Replace the meter.*
7	-	*Reserve*	-
8	-	*Reserve*	-
9	*Leakage Alert*	*Constant flow rate which is lower than Q1 happens for more than 8 hours.*	*No leakage (defined as left description) happens for more than 3 days.*
A	*Burst Alert*	*Constant flow rate which is higher than Q3 happens for more than 8 hours.*	*No burst (defined as left description) happens for more than 3 days.*

B	*Tampering Alert*	*Meter data is tampered.*	*No auto-reset method in the field needs to be maintained/rest through the factory method.* *Users should refer to the manufacturer, supplier, or service team for support.*
C	*Freezing Alert*	*The current water temperature is lower than 4 ℃.*	*Higher the water temperature.*

Corporate Profile

Bove provides comprehensive solutions on flow metering and control to over 30 countries in the globe. We design and manufacture range of flow metering solutions and IoT (internet of things) consumer products, which includes high accuracy water meter, thermal energy meter, testing bench, smart communication software for residential, commercial and industrial sectors. Since 2009 Bove has always been moving on the edge of technology to deliver state of the art products and solutions to customers all around the world.

A couple of our engineers are dedicated in metering and Communication industry for over 10 years, core team are previously working in Huawei, Baidu, IBM, and CitiGroup, etc. With these talents Bove are able to provide prompt services and reliable products to our global customers.

Bove is committed to address the unique challenges that the residential and industry are facing, including increasing customer demand, water scarcity, and environment conservation. With hope, honor and our hard and quality work, we are looking to future to make Bove one of the best brands in metering industry in the world.

Our Mission

To exceed our customers expectation by providing prompt, quality and reliable technology.

Our Vision

Creating an Eco Society