

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.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact BOVE TECHNOLOGY.
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## 1. General Information

Please note that the following installation conditions must be obeyed:

Pressure requirement: MAP16.

Electromagnetic environmental class: E1

Mechanical environmental class: M1

Mechanical environmental condition: B

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	<i>Bove</i>
Type	<i>BECO Y</i>
Accuracy class	<i>Class 2</i>
MAP	<i>16 bar</i>
Max pressure loss	<i>≤ 63 kPa</i>
Max admissible temperature (optional)	<i>30°C / 50°C / 70°C</i>
Limits of temperature (Θmin and Θmax) (optional)	<i>0.1-30°C / 0.1-50°C / 0.1-70°C</i>
Installation requirements	<i>No straight pipe required</i>
Basic mounting orientation and other specified orientations	<i>360°</i>
Mechanical environmental condition	<i>B</i>
Electromagnetic environmental class	<i>E1</i>
Mechanical environmental class	<i>M1</i>

### 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:

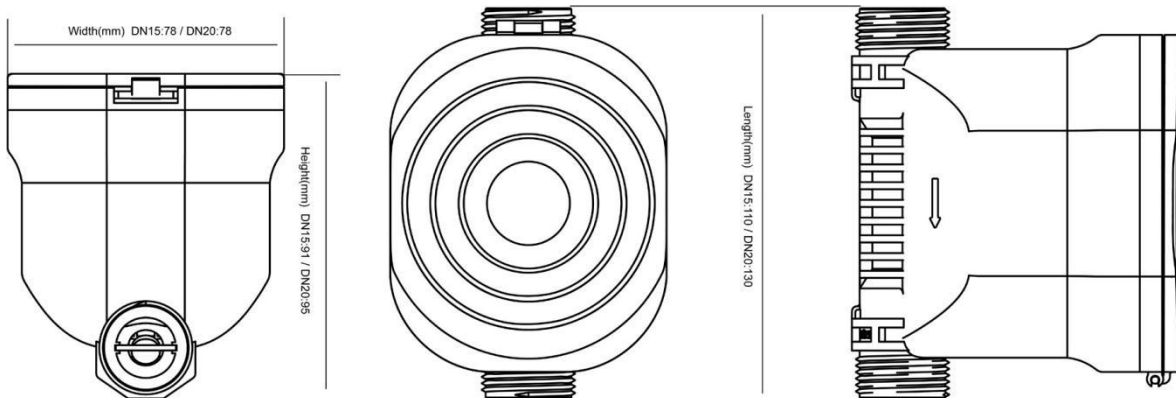
Manufacturer	<i>Bove</i>
Mechanical environmental condition	<i>B</i>
Electromagnetic environmental class	<i>E1</i>
Mechanical environmental class	<i>M1</i>
Display unit	<i>m<sup>3</sup>, L</i>
Battery power supply requirements	<i>See chapter 4 "Power supply"</i>
Power Consumption	<i>Average 20uA, Peak 4mA</i>
Pulse input device class	<i>N/A</i>
Max permissible flow sensor signal (Pulse rate)	<i>N/A</i>
Output signal for normal operation	<i>IrDA</i>
Liquid if other than water	<i>N/A</i>

### 2.3 Completer meter

Manufacturer		<i>Bove</i>						
Flow Measurement								
Type	DN (mm)	Flow Rate (m <sup>3</sup> /h) @R800			Dimensions (mm)			Connection
		Q <sub>1</sub>	Q <sub>2</sub>	Q <sub>3</sub>	Length	Width	Height	
BECO Y	15	0.00312	0.005	2.5	110	78	91	G <sup>3</sup> / <sub>4</sub> '
	20	0.005	0.008	4	130	78	95	G1'
Water temperature range (optional)		<i>0.1-30°C / 0.1-50°C / 0.1-70°C</i>						
Q <sub>3</sub> / Q <sub>1</sub> (optional)		<i>R250 / R400 / R500 / R800</i>						
Accuracy		<i>Class 2</i>						
Maximum permissible error in upper flow rates range Q <sub>2</sub> ≤ Q ≤ Q <sub>4</sub>		<i>± 2 % (at θ ≤ 30°C) ± 3% (at θ &gt; 30°C)</i>						
Maximum permissible error in lower flow rates range Q <sub>1</sub> ≤ Q < Q <sub>2</sub>		<i>± 5%</i>						
Type of liquid		<i>Water</i>						
Installation requirements		<i>No straight pipe required</i>						
Basic mounting orientation and other specified orientations		<i>360°</i>						

Display & Indication	
Display unit options	<i>m<sup>3</sup>, L</i>
Display LCD	<i>10-digit</i>
Indicator range	<i>0.00001 m<sup>3</sup> to 99999.99999 m<sup>3</sup></i>
Time to LCD off	<i>Always on</i>
Environmental Requirement	
Mechanical environmental condition	<i>B</i>
Electromagnetic environmental class	<i>E1</i>
Mechanical environmental class	<i>M1</i>
Ambient temperature	<i>5 ~ 55°C (Indoor and non-condensing)</i>
Storage temperature	<i>-20 ~ 60°C</i>
Protection Class	<i>IP68</i>
Interface & Communication	
Output signal for communication	<b>Wired communication</b>
	<i>RS485/ M-Bus</i>
	<b>Wireless communication</b>
	<i>LoRaWAN / Sigfox</i>
Output display/signal for testing	<i>IrDA/ RS485/ M-Bus</i>
Others	
Data log	<i>24 logs (daily/weekly/monthly)</i>
Material	<i>Composite material, environment friendly, and portal water suitable</i>

## 2.4 Physical dimensions



## 3. Power Supply

BECO Y consists of combinations with the following types of batteries (The SPC battery and the 26500 battery are used as a whole, and the SPC does not need to be used as a separate power supply.).

Type	Lithium Battery	
Model No.	ER26500	SPC
Rated capacity	8500mAh	45mAh
Rated voltage	3.6V	3.6V
Max recommended continuous operating current	150mA	500mA
Max pulse current	300mA	2000mA
Reference weight	52g	10g
Max dimension	26.2x50mm	15x20mm
Operating temperature	-60°C ~ +85°C	

## 4. Interface & Communication

### 4.1 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.

### 4.2 M-BUS(Optional)

Cable: connected with galvanic isolation

Voltage: 50V max.

Current: M-Bus loads

Addressing: primary or secondary

Note: A higher frequency is not allowed and may result in meter malfunction!

Data transmission in the compatibility mode (= standard, one data frame) or in the full mode (3 data frames) possible.

If the meter is equipped with “M-Bus” , it is delivered with a two wire cable, which can be lengthened with a cable 2 x 0.75mm<sup>2</sup> (put a distributing box). Pay attention to the proper polarity in case of the pulse output. If the meter is read out via M-bus, the allowed mean frequency of reading must not be exceeded. Any more reading is not allowed and may result in a damage to meter.

#### 4.3 RS485 (Optional)

Cable: connected with four-core cable

Voltage: 5-24V.

Version/Color	RS-485
<i>Red</i>	VCC
<i>Black</i>	GND
<i>Yellow</i>	A
<i>Green</i>	B

#### 4.4 LoRaWAN (Optional)

Class	<i>Class A</i>
Network Access Mode	<i>OTAA or ABP</i>
Transmitting Power	<i>11 dBm(max)</i>
Data transmission	<i>Each 6h as default</i>

#### 4.5 Sigfox (Optional)









RCZ Serial	<i>RCZ 1</i>	<i>RCZ 2/4</i>
EIRP/dBm (max)	<i>16</i>	<i>24</i>
Data transmission	<i>Configurable</i>	



## 5. Operation & Display

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

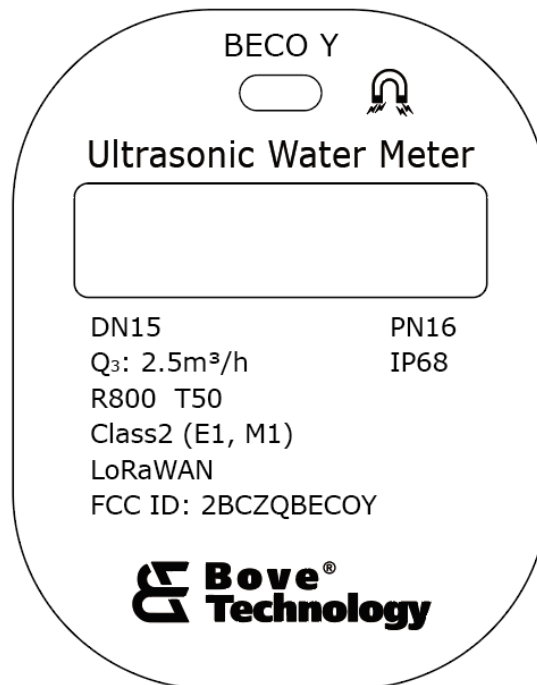


No.	Icon	Name	Meaning
1		Battery Alert	Check details in chapter 5.
2	TEST	Calibration Mode	Under calibration
3	 FROZEN	Temperature Alert	Including "Freezing Alert" and "Temperature Alert" Check details in chapter 5
4	 LEAK	Leakage Alert	Check details in chapter 5
5	 BURST	Burst Alert	Check details in 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	<b>Lgal</b>  $m^3/hr$	<i>Unit</i>	<i>Liter</i> <i>Gallon</i> $m^3$ $m^3/hr$
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### 5.1 Operations on how to display

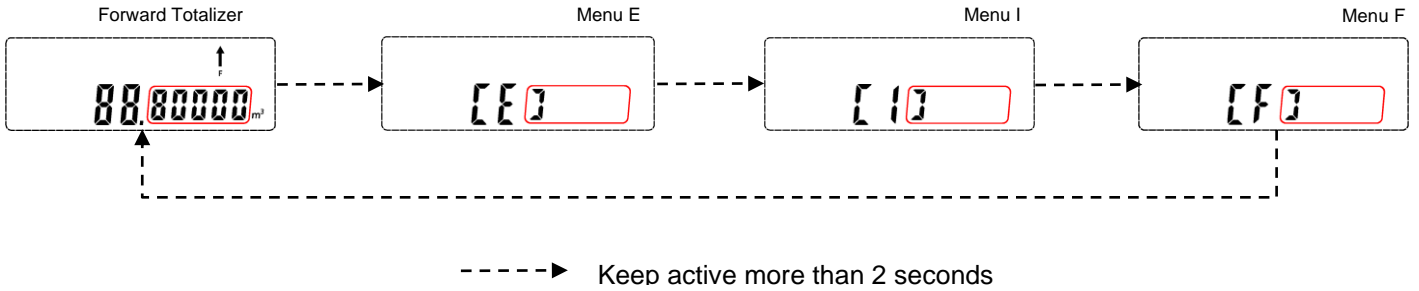
Users may use a magnet to trigger the “magnet icon” position to switch menus as shown in the following nameplate sample. There are two kinds of trigger options, long trigger (more than 2 seconds) and short trigger (less than 2 seconds). If no operations over 3 minutes, the meter will turn back to the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



#### 4.1.1 Menu List (1st level)

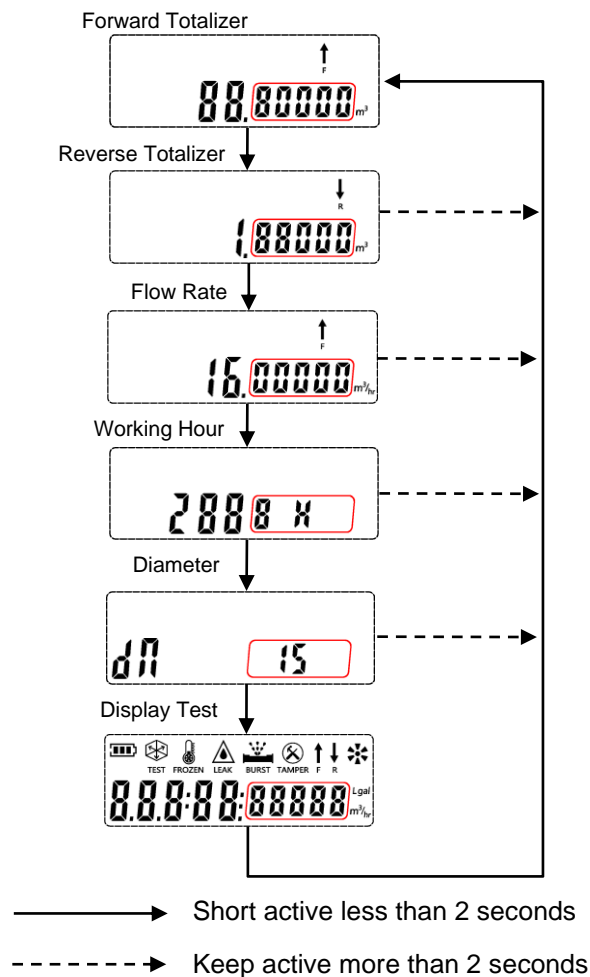
There are 4 kinds of 1<sup>st</sup> level menus, including “Main Menu”, “Menu E”, “Menu I” and

“Menu F”. Users can switch the 1<sup>st</sup> level menus by long trigger (more than 2 seconds).



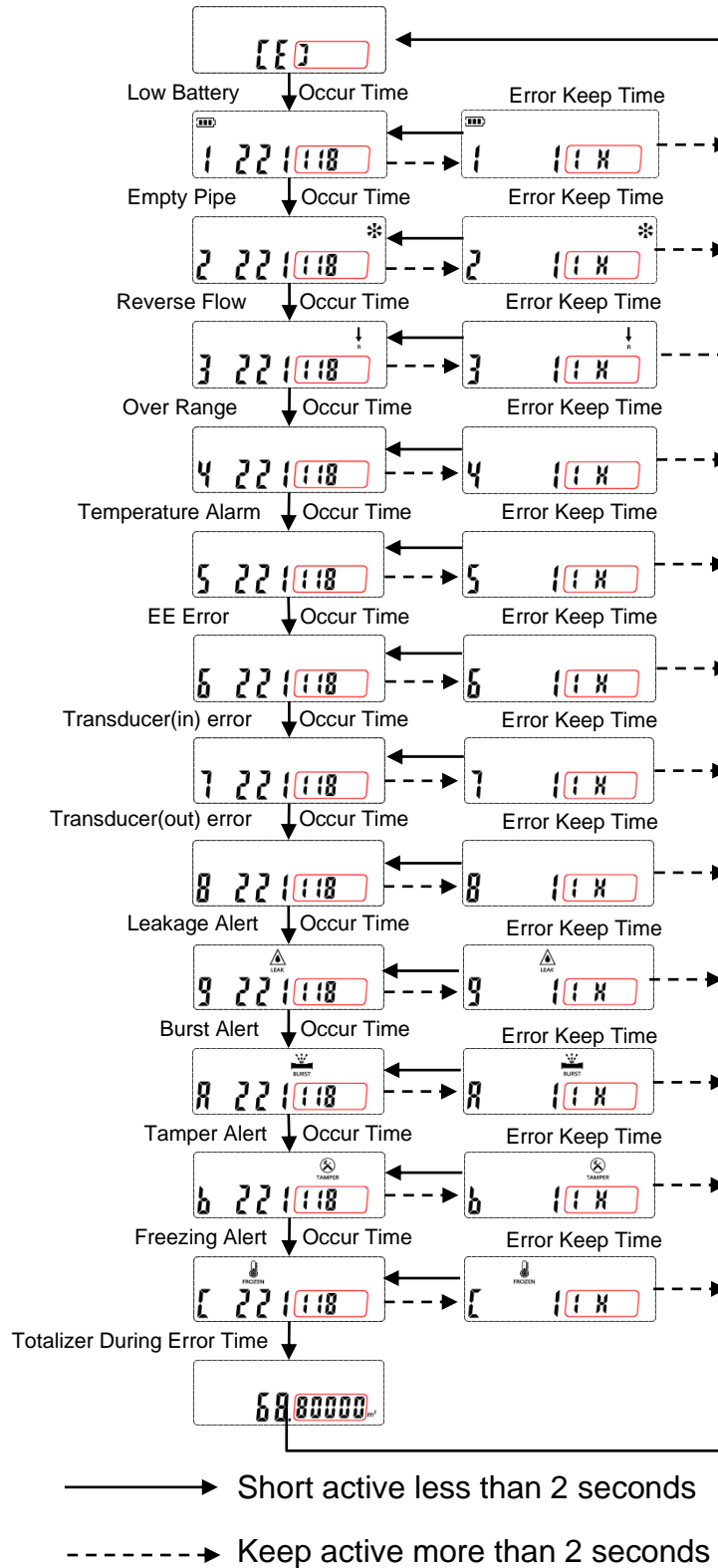
#### 4.1.2 Main Menu

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).



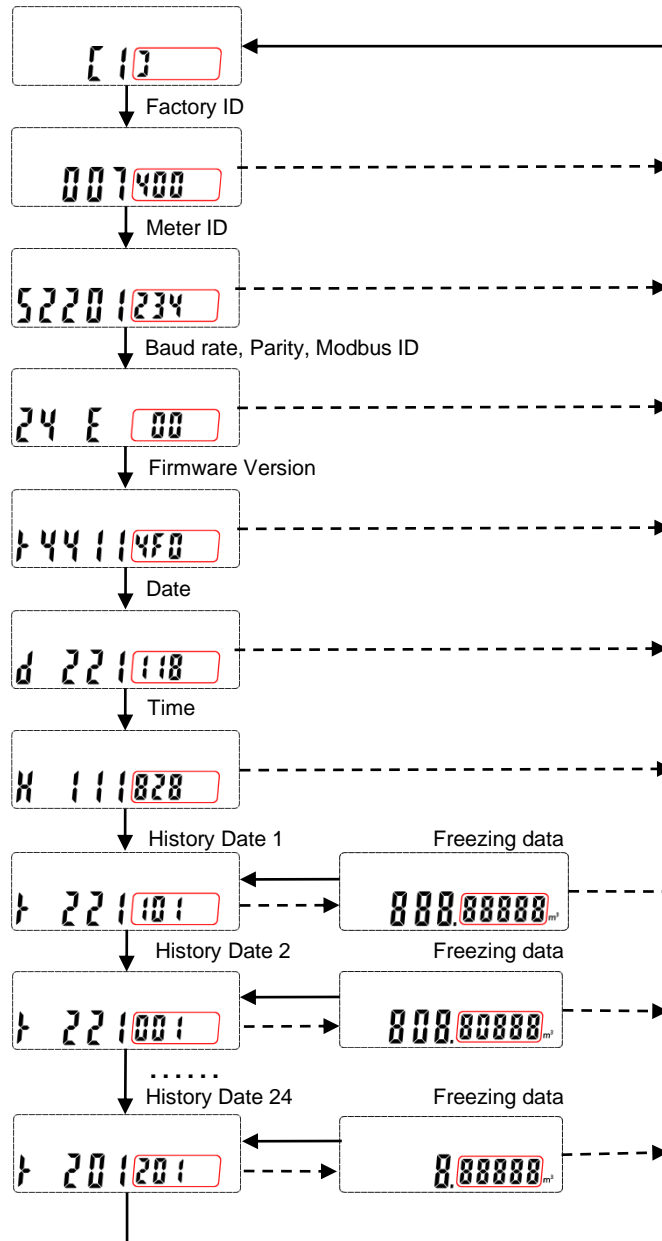
4.1.3 Menu E

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



4.1.4 Menu I

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

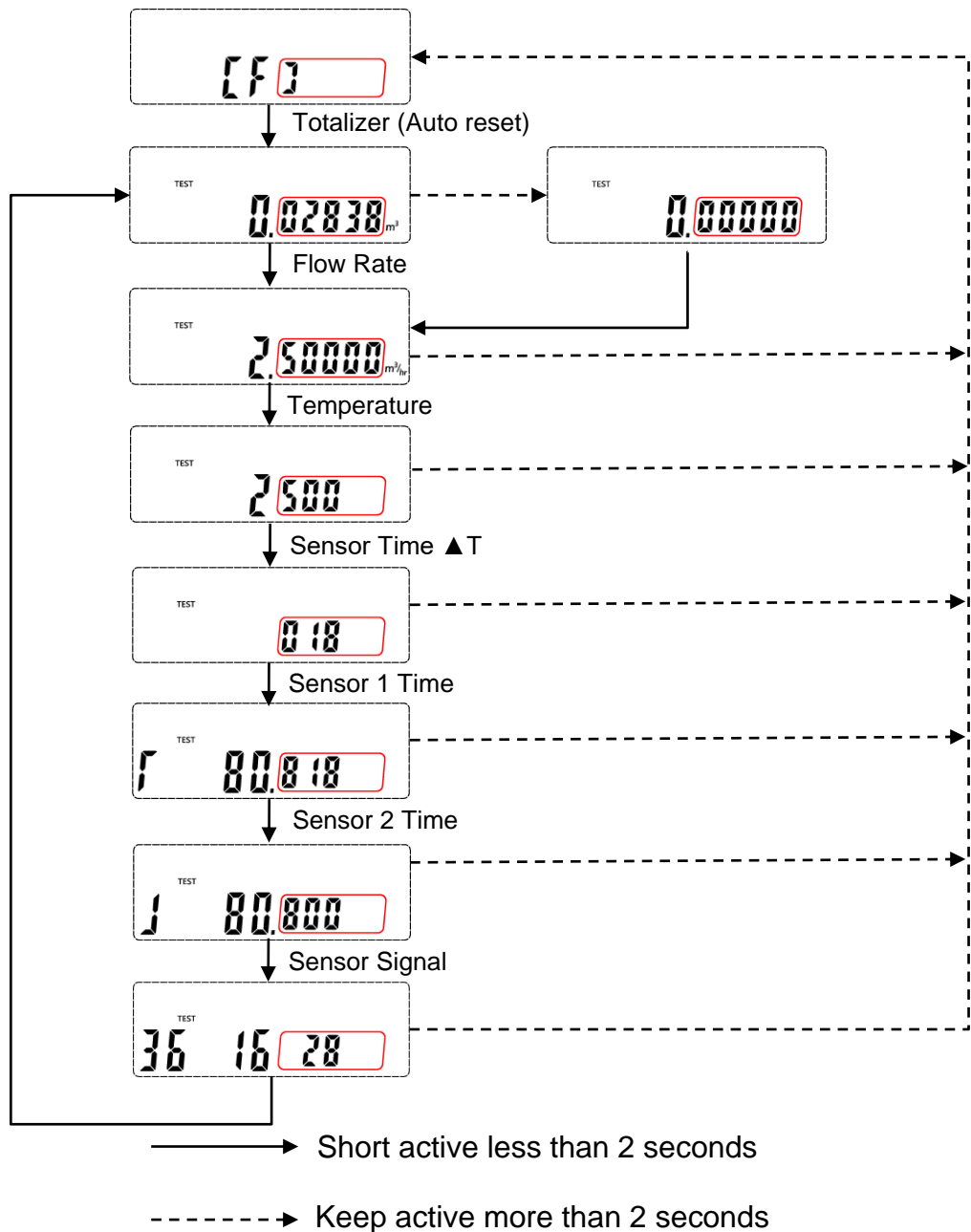


- > Short active less than 2 seconds
- - - - -> Keep active more than 2 seconds

4.1.5 Menu F

The following photo shows “Menu F” (Calibration mode only). In “Menu F”, “Accumulated Volume” can 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 exit 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<sub>3</sub>. **This mode is for meter flow accuracy test.**



## 6. 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.	<ol style="list-style-type: none"> <li>Put meter into the pipeline;</li> <li>Make pipe full of water;</li> <li>Release air bubbles.</li> </ol>
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 °C.	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

			<i>service team for support.</i>
C	<i>Freezing Alert</i>	<i>The current water temperature is lower than 4 °C.</i>	<i>Higher the water temperature.</i>

## 7. FCC regulatory conformance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two

conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

### RF Exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.



## 8. IC regulatory conformance

### IC regulatory conformance

This device complies with CAN ICES-003(B)/NMB-003(B).

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareil est conforme la norme CAN ICES-003 (B)/NMB-003 (B)

Le present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisee aux deux conditions suivantes :

- (1)l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioelectrique subi, meme si le brouillage est susceptible d'en compromettre le fonctionnement.

### RF Exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet equipement est conforme aux limites d' exposition aux rayonnements de la IC tables pour un environnement non contro. Cet equipement doit etre install et fonctionner au moins 20cm de distance d' un radiateur ou de votre corps.

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 softwares 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