# *Electromagnetic Water-meter*

# *Transmitter: BT803*

# Operation & maintenance Manual

# Content

# 1. Overview

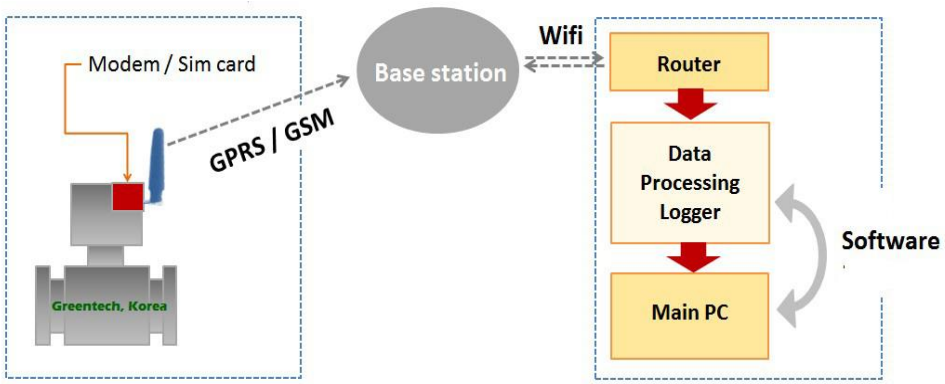
**BT803** is a kind of battery powered electromagnetic converter.
This electromagnetic converter is capable of being used together with common electromagnetic flow meter sensor, with the flow rate measurement accuracy up to 0.5 level.

A new type of battery powered meter will be developed by connecting the **BT803** converter to a common electromagnetic flow meter.
The standard configuration of **BT803** battery powered electromagnetic converter has a lithium battery, which is capable of working 3 to 6 years consecutively. If a high-capacity battery is applied, the convertor will have longer working time.

**BT803** battery powered electromagnetic converter has GPRS and CDMA wireless data transmission function, RS485modbus protocol (external power supply or battery-powered) communication function,
and SRD mode wireless network communication system to realize date collection and management.
Stainless steel outer covering is applied to **BT803** battery powered electromagnetic converter to meet IP68-level seal protection requirement, which means the convertor can be used in underground and other damp places.

# 2. Features

- Ambient temperature: -20°C~50°C
- Ambient humidity: ≦95%
- Degree of protection by enclosure: IP68
- Flow velocity measurement range: 0~15m/s
- Medium conductivity: pure water >5μs/cm
- Applicable measurement diameter: DN10~DN800
- Supporting precision class: Class 0.5
- Measurement parameters: instantaneous flow rate and instantaneous flow velocity
- Record parameter: total cumulative flow volume and date
- Detection alarm parameters: detection alarms for fluid empty pipe and excitation current
- Calibration output signal: unit volume flow pulse
- Communication manners: RS485 (Modbus protocol) and GPRS by IEC 60870-5-104
- Battery operating time



# 3. Instrument display and operation

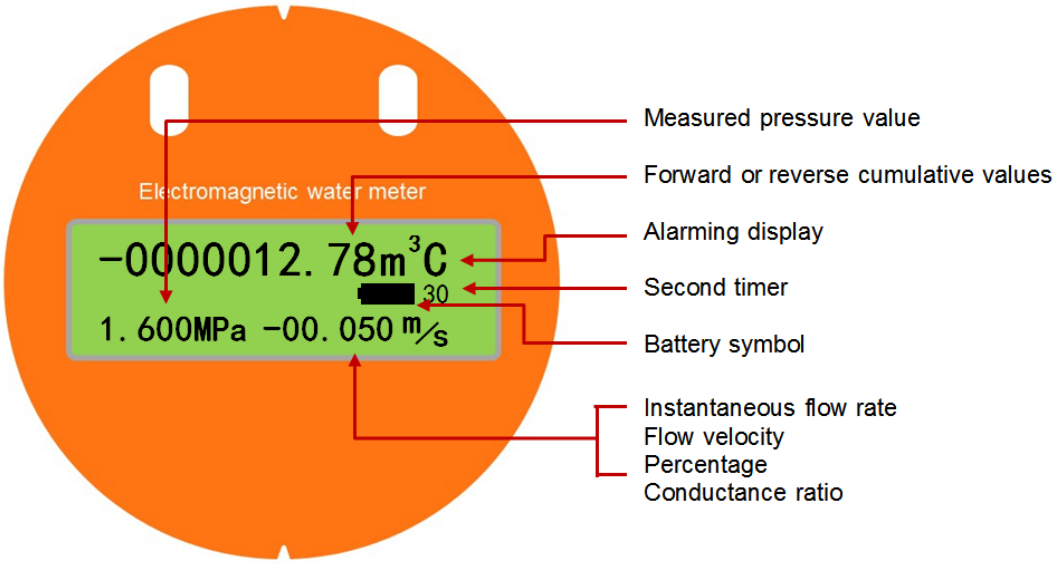



Fig. 3.1 LCD for Converter

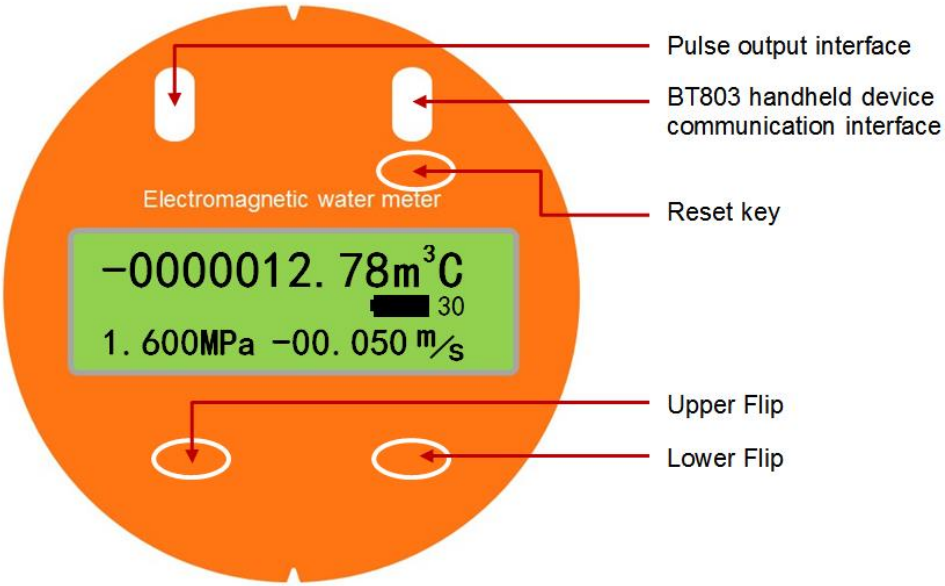



Fig. 3.2 BT803 convertor LCD and magnetic key operating position

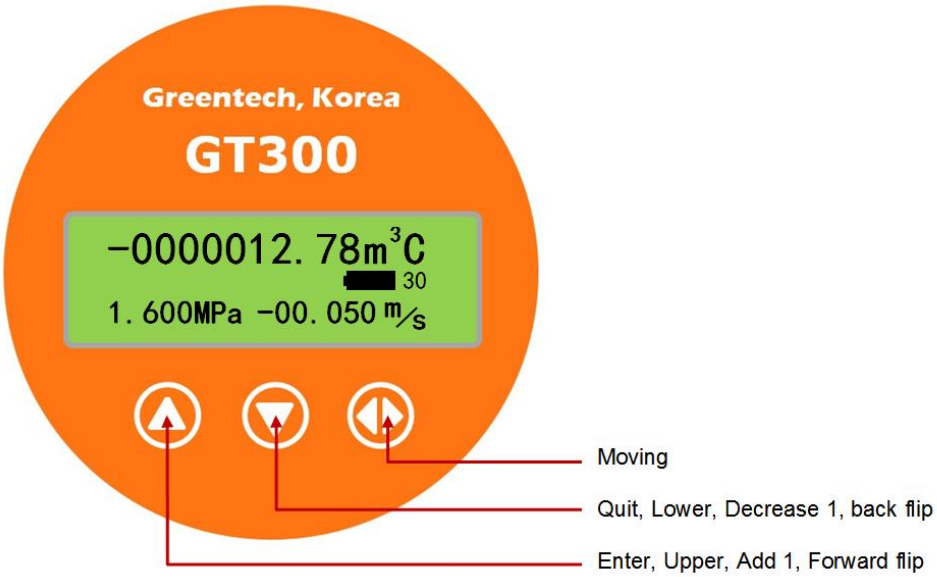



Fig. 3.3 BT803 handheld LCD and operation

## 3.1 Meter Mode

**Test mode:** when **BT803** handheld is assembled, meter enters in test mode. Via infrared transmission, convertor outputs pulse signal to complete the correction or parameter setting. The test mode can last for 3 hours and then quit the mode and enter measurement mode.

**Measurement mode:** measurement mode is applied when the convertor is powered on or in use. Under measurement mode, meter can complete flow, velocity and empty pipe parameter measurement and conduct RS485 or GRPR communication via infrared transmission.

Sleep mode: Since the meter is factory sealed, the user is not convenient to open it, the meter power switch is turned on when the meter leaves the factory. To save power during the meter transportation, the meter is set to sleep mode. When the meter is in sleep mode, there is no output display and power is saved. So before using the meter, the user need to wake the meter up on basis of the method from 3.2. What's more, the meter will turn on the sleep mode automatically when the meter stay in the conditions of empty pipe or the signal wire hung in the air. At this time, there is no output and display, either. But the user need not to wake-up the meter, it will turn to the measure mode automatically when the meter detects the normal flow or full pipe.

## 3.2 Meter Wake-up

When the meter is to use, user can follow the following steps using **BT803** handheld.

**Step1:** Assemble **BT803** handheld on **BT803** convertor, and meter automatically starts and enters into test mode.

**Step2:** Press "Moving", the meter version will be displayed and then "Meter Parameter Setting" is displayed.

**Step3**: Refer to 3.5 Parameter Setting, change the "Meter Sleep Password" in "Measurement Mode Parameter" to 00000 and go back to test mode.

**Step4:** Remove **BT803** handheld.

**Step5:** Aligned the magnetic pen with the reset button on the right (Fig. 3.2) and then remove the magnetic pen, the meter will reset automatically once and leave the sleep mode to measurement mode (the battery symbol is displayed in the right of the middle line of the LCD, second timer accumulates once around 15S ).

## 3.3 Sleep Mode Setting

If the user intends to set the meter into sleep mode, refer to “3.5 Parameter Setting” to set the “Meter Sleep Password” to 23130 and go back to test mode.

## 3.4 Change between Measurement Mode and Test Mode

### 3.4.1 Measurement Mode into Test Mode

In measurement mode, assemble **BT803** handheld on **BT803** convertor and meter starts automatically and enters in to test mode. (The battery symbol is displayed in the right of the middle line of the LCD, second timer accumulates once around 15S.) The meter pulse output starts.

### 3.4.2 Test Mode into Measurement Mode

When need to enter measurement mode under test mode, remove **BT803** handheld and press “Reset” Button (Fig. 3.2) on the convertor LCD by magnetic pen.

## 3.5 Parameter Setting

### 3.5.1 Parameter Setting and Function Button Operation

If parameter setting or modify is applied, make sure the meter is under parameter setting mode. In the test mode, press “Moving” to enter “Meter Parameter Setting” function selection display, press “Moving” to move the cursor to “Upper”, press “Upper” and enter the password “00000”. After entering the password, press “Moving” to move the cursor to “Upper”, press “Upper” to enter the main operating menu. If intend to change the main menu, press “Upper” or “Lower”. Refer to the figure below:

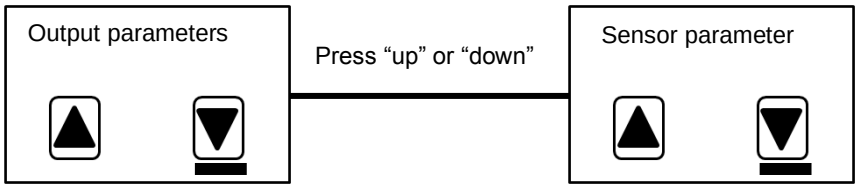



Fig. 3.5.1

If intends to set submenu parameter, move cursor to “Upper”, press “Upper” and enters submenu of the present main menu. Move cursor to “Upper” and press “Upper” to set the parameter of the submenu.

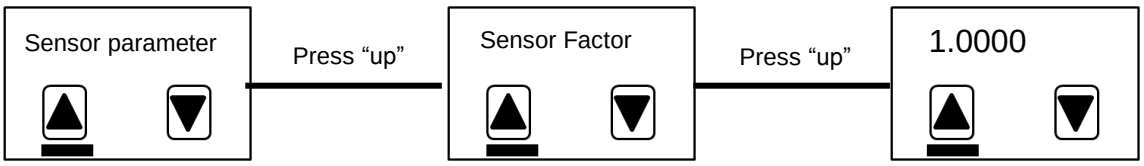



Fig. 3.5.2

### 3.5.2 Function Selection Display

Press “Moving” to function selection display, and press “Enter” to select. There are four functions to select:

| Parameter No. | Function Content | Description |
|---|---|---|
| 1 | Meter Parameter Setting | Select the function to enter parameter setting |
| 2 | Gross Record Cleaning | Select the function to clear gross record |
| 3 | Monthly Gross Record | Select the function to record gross of 32 months<br>Record forward and reverse flow separately |
| 4 | GPRS Para.Set | Used for communication of GPRS |

*Table 3.1*

Meter parameter set or modify must be done in test mode. The following steps need to follow to enter parameter setting status by press buttons on the operating panel.

### 3.6 Gross Zero Cleaning

**Step 1:** Follow “3.5 Parameter Setting” to set “Gross Zero Password” and back to test mode.

**Step 2:** In test mode, press “moving”. (Meter version will be displayed and 5s later, “Meter Parameter Setting” is displayed.)

**Steps 3:** Press “Upper”, “Gross Zero Cleaning” is displayed.

**Steps 4:** Input the “Gross Zero Password” set in step 1 and move cursor to “Enter”, press “Enter” and the meter displays “00000”, gross zero cleaning is done.

**Step 5:** Press “Moving” to move cursor to “Lower”, press “Lower”, meter is back to test mode.

**Note:**

1. The sleep mode is set when the meter leaves the factory (the LCD is not lighted), user needs to use **BT803** handheld to wake up the meter for normal use (refer to 3.2); When using the meter, set the “Sleep Password” into other non-sleep password to avoid the affecting of the meter normal use.
2. When the meter is waked up, the meter is in test mode. Meter correction or parameter setting can be done in the test mode. Measurement or communication need to be done under measurement mode.

# 4. Converter Wiring

## 4.1 Definition of Signal Lines

**BT803** battery powered convertor has two groups of wiring: signal line group and excitation line group. Two groups are connected to different sensors separately. Pay attention to avoid any possible damage to meters because of incorrect wiring.

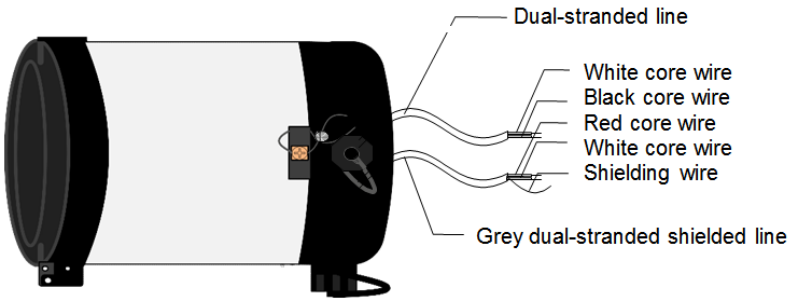



Fig. 4.1 BT803 Signal Line

The signal lines are marked as follows:

Black dual-stranded plastic line: White core wire Connect with exciting current

Black core wire Connect with exciting current

Grey dual-stranded shielded line: Connect the Red core wire to “signal 1”

: Connect the White core wire to “signal 2”

: Connect the Shielding wire to “signal ground”

## 4.2 Converter Interface Definition and Wiring (Optional)

### 4.2.1 Convertor Waterproof Interface Definition

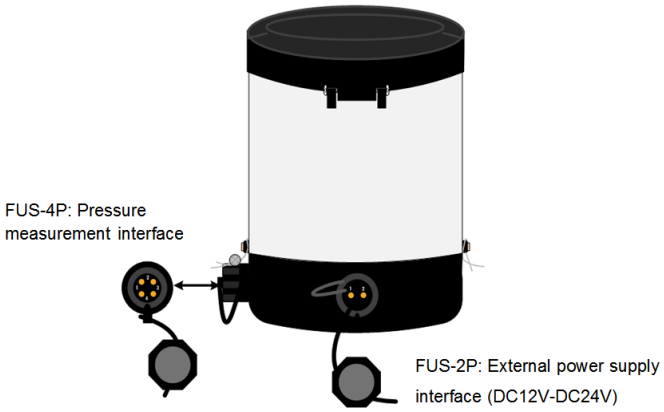



Fig. 4.2a BT803 Convertor Waterproof Interface Definition


FUS-2P: External power supply interface

1- External power supply, positive (DC12V-DC24V)

2- External power supply, negative


FUS-4P: Pressure measurement interface

1- Pressure signal, positive ] Pressure input interface

2- Pressure signal, negative

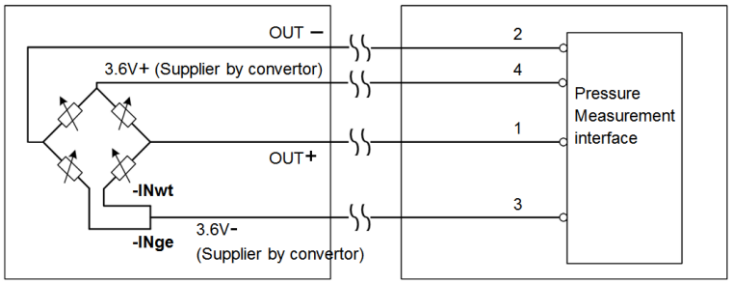
3- Power supply signal, positive ] Power output in the instrument

4- Power supply signal, negative

Note: Rotate from the gap in counter clockwise are 1, 2, 3, 4.

Fig. 4.2b Definition of BT803 converter waterproof wire connector

### 4.2.2 Convertor Pressure Measurement Interface and Pressure Sensor Wiring




Pressure sensor BT803 connector

## 4.3 Flow Rate Calibration

First, useΦ20 copper, cut to 1700mm long (can be extended if necessary) to make ground nail buried 1500mm (Note: When buried nails, nail tips in spreading a layer of wood chips carbon, then pour brine); Second, solder 4mm2 copper wire to the ground nail, and finally ground to the sensor flange, grounding rings, pipe flanges, refer to Fig. 4.3.

Note: stainless steel is required to fixed ground screw, spring washer, and flat washer.

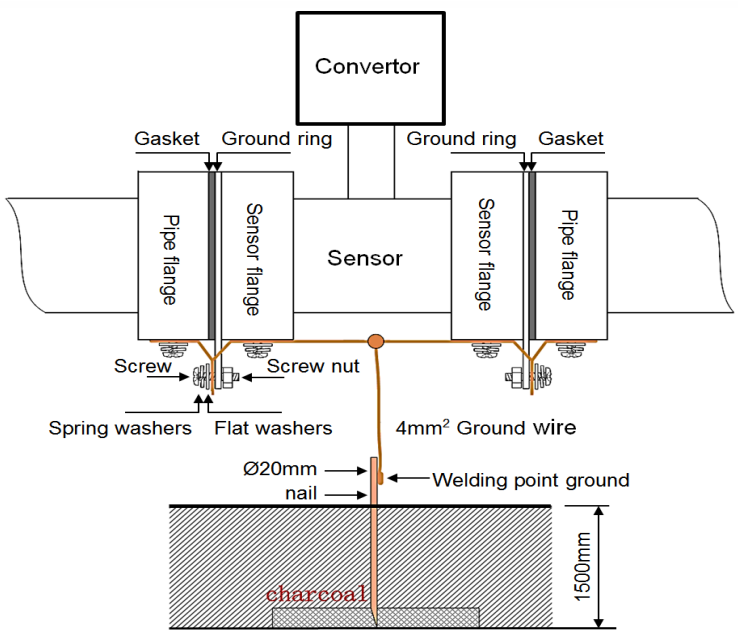



Fig. 4.3 Convertor Grounding Schematic

## 4.4 Flow Test

### 4.4.1 Pulse Output Wiring

For need for the flow test, **BT803** has pulse output signal to output pulse per unit volume. In order to ensure good seal, the pulse output interface is designed to infrared transmit, use dedicated **BT803** handheld, when doing the user calibration, refer to the wiring diagram below. Pulse output signal only works in flow test mode, and in measurement mode, pulse output signal is turned off.

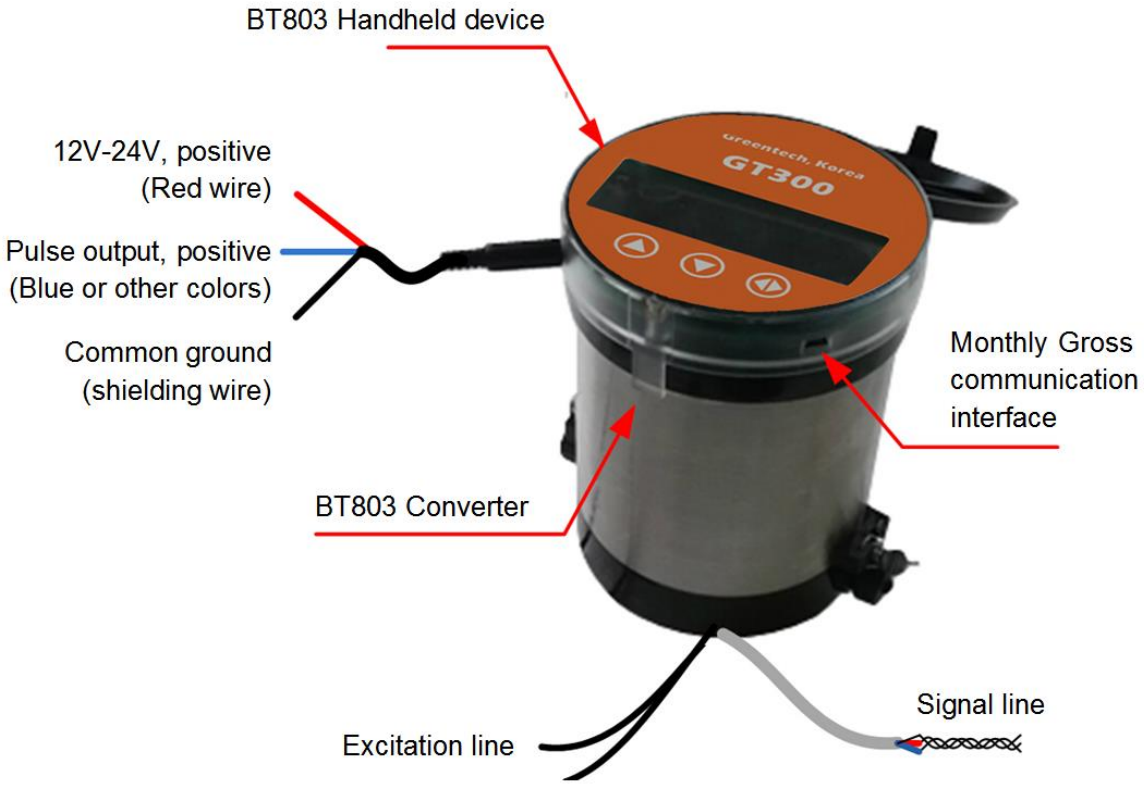



Fig. 4.4 Pulse Output Wiring

### 4.4.2 Wiring between Pulse Output and Calibration System

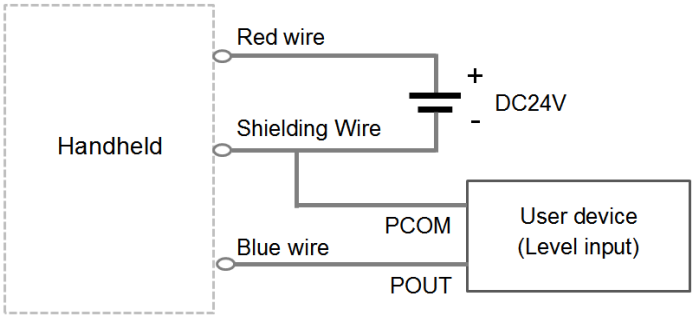



Fig. 4.2.2 Pulse Output and Calibration System Connection

### 4.4.3 Parameter Setup for Pulse Output

- The maximum test pulse output rate is 1000Hz, pulse width is 500μS. When doing meter test, pulse output equivalent is used to set the pulse output rate. The maximum pulse output should less than 1000HZ to avoid over limit, resulting in calibration error.
- For example, use DN800 flow meter, when the flow rate is 10m/s, the flow is 18095m3/h. If the pulse output equivalent is 7.5L, there are 670.2 pulses output per second.
- Pulse output rate should not be selected too high to avoid approaching the upper limit of the output rate, causing the output pulse loss and affecting the accuracy of the instrument calibration.

- To avoid counting synchronization error between calibration system and calibrated meter, **BT803** battery powered converter requires calibration count each time is longer than 4 minutes.

# 5. Meter parameters

The parameters of **BT803** battery powered converter are: measurement mode parameter, flow measurement parameter, meter output parameter, sensor parameter, flow correction parameter, pressure measurement parameter, communication parameter, time parameter, factory calibration parameter and flow gross parameter. The definitions of the parameters are as below:

## 5.1 Measurement Mode Parameter

### 5.1.1 Measurement Mode Selection

There are two measurements modes: Intermittent measurement mode, continuous measurement using external power supply.

a. Intermittent measurement mode: this mode is based on measurement time interval parameter and measure in a time interval. The time interval is from 3 to 30 seconds.

b. Continuous measurement using external power supply: in this mode, the meter automatically recognizes power supply and selects the operating mode according to power supply (when it is external power supply, the mode is continuous measurement mode; when it is battery-powered, the mode is intermittent measurement mode. Test mode can be changed automatically to measurement mode if in three minutes there is no operation).

### 5.1.2 Measurement Interval Time

In the measurement mode, meter measurement interval time can be set from 3 seconds to 30 seconds (meter factory defaults settings is 15 seconds. If the setting is less than the 15S, working an hour later, meter setting will automatically become 15S).

### 5.1.3 Sleep Password

When the sleep password is “23130”, the instrument will start the sleep mode.

## 5.2 Flow Measurement Parameter

### 5.2.1 Measuring Pipe Size

Sensor pipe size scope of **BT803** battery powered electromagnetic converter is 10 to 800 mm. 10,15,20,25,32,40,50,65,80,100,125,150,200,250,300,350,400,450,500,600,700,800.

### 5.2.2 Flow Calculation Unit

Flow Calculation Units are L/h, L/m, L/s, $m^3$/h, $m^3$/m , $m^3$/s, UKG and USG. User can select the unit according to actual status.

### 5.2.3 Range Setting

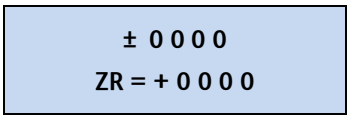
Flow range setting means upper limit flow value setting, and lower limit flow value is set “0” automatically.

### 5.2.4 Flow Direction Choosing

When doing debugging, if the flow direction is not consistent, users do not have to change the excitation line or signal line connection, and just reset the flow direction parameters.

### 5.2.5 Flow Zero-point Correction

Make sure the senior is full and the fluid is in stationary state when doing the flow zero-point correction. Flow zero-point is shown as velocity of flow, mm/s. Zero-point correction displayed as below:




Upper large characters: corrected flow zero-point.

Lower small characters: ZR means measured zero-point;

When ZR display is not “0”, do correction to make ZR display to “0”. Note: if correct upper line character and ZR increases, change the “+, -” in lower line to make sure ZR display to be zero.

The corrected flow zero-point is the compound value of sensor, and shall be recorded in sensor list and label. The unit is mm/s, and the sign is in opposite with corrected value.

### 5.2.6 Small-Signal Elimination Point

Small signal elimination point setting is showed by flow. When applied small signal elimination, the flow, gross, pulse output are also eliminated, only the velocity of flow is displayed.

### 5.2.7 Measurement Damping Time

Long measurement damping time can improve the stability of instrument flow rate indication and output signal, applicable for pulse flow rate measurement of total cumulative amount. Short measurement time shows superior measurement responding speed, applicable for production process control. The setup for measurement damping time has several options (the damping time is only available for calibration mode).

### 5.2.8 Reverse Flow Measurement

**BT803** convertor has reverse flow output disable function, when "Forbidden", no output display of the flow, pulse and cumulated gross, only the flow rate display; When the "Allowance", converter works properly.

### 5.2.9 Measurement Flow Frequency Threshold

In the measurement mode, in order to fast-track measure upheaval flow meter to determine the flow rate change, when the flow rate change is greater than measured flow frequency threshold, the instrument starts fast tracking measurements to ensure the accuracy of the measurement. When the flow rate change is less than measured flow frequency threshold, the meter measures by measurement time interval.

## 5.3 Instrument Output Parameter

### 5.3.1 Pulse Output Allowance

If “Forbidden”, pulse output function in measurement mode is off. If “Allowance”, pulse output function in measurement mode is on.

### 5.3.2 Output Pulse Unit

There are four output pulse units: $m^3$, L, UKG and USG.

### 5.3.3 Output Pulse Equivalent

Pulse coefficient is pulse equivalent, and the range is from 0.001 to 59.999. Output pulse equivalent unit is in consistence with the selected pulse output type, and used to measure pulse output.

## 5.4 Sensor Parameter Values

### 5.4.1 Sensor Coefficient

Sensor coefficient is electromagnetic flow meter calibration coefficient. The coefficient obtained from the actual calibration, and stenciled onto the sensor plate. Users shall input the coefficient factor into **BT803** converter parameter table.

### 5.4.2 Excitation Mode Selection

There are four excitation modes to select: 1/8.5 frequency (mode 1), 1/10.5 frequency (mode 2), 1/12.5 frequency (mode 3), 1/16.5 frequency (mode 4).

Small diameter sensor excitation system exciting small caliber, 1/8.5 frequency should be selected. Large diameter sensor excitation system exciting large caliber, 1/16.5 frequency should be selected. In use, first select excitation mode 1, if the meter displays flow rate zero is too high or SYS, then select mode 2 to mode 4. Note: excitation mode shall be in consistent with calibration mode.

### 5.4.3 Sensor Encoder

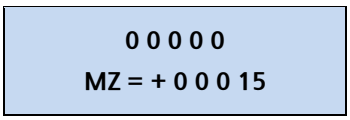
Sensor encoder is used by the factory to record the sensor.

### 5.4.4 Empty Pipe Alarm Threshold

**BT803** measures the resistance between the two electrodes of the sensor to determine whether the pipe is empty. In the measurement mode, when the pipe is full, observe the fluid measured resistance value (R%), then take 1.5 to 2 times of the measured values to set the empty pipe alarm threshold . When the pipe is empty, the resistance between the electrodes increases, if the threshold is exceeded, empty pipe alarming is triggered.

### 5.4.5 Empty Pipe Zero Correction

User can do empty pipe zero-point correction. When doing the calibration, make sure the senior is full. Empty pipe zero-point correction displayed as below:




Upper large characters: calibrated empty pipe zero-point.

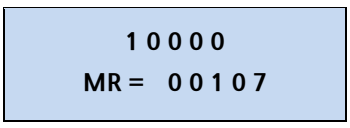
Lower small characters: MZ means measured zero-point;

According to the actual measured conductivity R%, do correction to make MZ=5 – 10.

Note: if increase upper line character and MZ decreases.

### 5.4.6 Full Pipe Zero-point Correction

User can do full pipe zero-point correction when the conductivity R% is small. When doing the calibration, make sure the senior is empty. Full pipe zero-point correction displayed as below:




Upper large characters: calibrated full pipe zero-point.

Lower small characters: MR means measured zero-point;

Increase upper line character and MR decreases. Decrease upper line character and MR increases. User can correct MR to proper value based on actual needs (it is suggested that MR is around 100), the conductivity obtained in empty pipe is actual corrected MR.

According to the actual measured conductivity R%, do correction to make MZ=5 – 10.

**Note:** if add upper line character and ZR decreases.

## 5.5 Flow Correction Parameters

### 5.5.1 Flow Correction Allowance

The parameter is used to select whether meter linear correction will do. If “Forbidden”, correction will not do; if “Allowance”, correction will do.

### 5.5.2 Flow Rate Correction Points 1-4

Details refer to Annex 2.

## 5.6 Pressure Measurement Parameters (Optional)

### 5.6.1 Pressure Measurement Allowance

The parameter is used to select whether the pressure measure will do. If “Forbidden”, measurement will not do; if “Allowance”, measurement will do.

### 5.6.2 Pressure Zero-point and Full Scale Correction

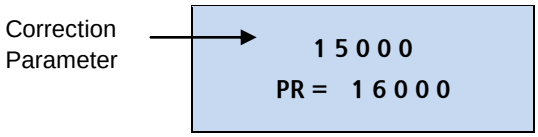
Pressure correction method: First according to defined interface, connect pressure sensor with converter. Adjust pressure sensor to zero, correct pressure zero PZ to 0, and then adjust pressure sensor to the full-scale, correct pressure full-scale PR to full scale value.

### 5.6.3 Pressure Measurement Units

1.000 Kpa, 10.00 Kpa, 100.0 Kpa, 1.000 Mpa, 10.00 Mpa, 100.0 Mpa.

### 5.6.4 Pressure Measurement Gain

When the pressure coefficient value of full-scale correction is more than 20000, it is indicating that the pressure sensor signal is too small, and the pressure measurement gain should be increase one level.




## 5.7 Communication Parameters

### 5.7.1 Communication Addresses

Communication address means address range when doing data communication. The address range is from 01 to 99 and address 0 is reserved.

### 5.7.2 Communication Interval Time

Communication interval time is used to send data to communication terminal, set range: 01 ~ 59999S.The interval time is shorter, the greater the meter communication modules power consumption and the faster the data updates. The factory default time interval is 60S, users can change according to the actual needs.

## 5.8 Time Parameter

Time parameter is used to set Year, Month, Day, Hour, Minutes and Second. Time parameter is used in Day and Month gross records.

## 5.9 Factory Calibration Parameters

### 5.9.1 Language

There are Chinese and English in **BT803** convertor for users.

### 5.9.2 Factory Calibration Coefficient

Factory calibration coefficient the special coefficient of sensor-made-factory and the factory use this coefficient to unite **BT803** converters to make sure all the Meters can interchange by 0.1%.

### 5.9.3 Factory Calibration Parameter

Used by the factory.

### 5.9.4 Convertor Coder

Convertor coder records the time the convertor leaves the factory and the number.

## 5.10 Flow Gross Parameter

### 5.10.1 Flow Integrating Unit

9 bit calculator is applied and the upper limit is 999999999.

Flow Integrating Units are: 0.001L, 0.010L, 0.100L, 1.000L, 0.001$m^3$, 0.010 $m^3$, 0.100 $m^3$ and 1.000 $m^3$, 0.001UKG, 0.01UKG, 0.1UKG, 1.000UKG, 0.001USG, 0.01USG, 0.1USG, 1.000USG.

### 5.10.2 Gross Cleaning Password

User can use upper level password to set gross cleaning password. Enter function selection menu, press the page key to enter into gross cleaning menu to set the gross cleaning password, and complete the gross cleaning.

### 5.10.3 Forward and Reverse Gross High and Low Bit

Gross high and low bit setting can change the flow gross value which is used in meter maintenance and replacement. User use third level password to change the flow gross value and generally cannot exceed the maximum value of counter (999999999).

# 6. Performance indices

- Environmental Temperature: -20°C~50°C
- Relative Humidity: ≦95%
- Outer Covering Protection Level: IP65
- Flow Speed Measurement Range :0-15m/s
- Conductivity: Clean water >5 μs/cm
- Measuring Diameter: DN10---DN800
- Matching Accuracy Class: 0.5
- Measurement Parameter: instantaneous flow, instantaneous flow rate
- Record Parameter: cumulated gross Flow
- Detection and Alarm Parameters: Fluid empty pipe detection alarm, excitation current detection alarm
- Scaled Output Signal: Unit volume flow pulse
- Communication Mode: RS485 (Modbus protocol), GPRS
- Battery Working Time

Table 6.1.1 Corresponding Table of Battery life and Interval Measurement Time (Excitation Mode 1)

| Loop measurement time | 50mA excitation time | 20mA excitation time |
|---|---|---|
| 30s | 120 months | 200 months |
| 15s | 60 months | 100 months |
| 14s | 56 months | 93 months |
| 13s | 52 months | 86 months |
| 12s | 48 months | 79 months |
| 11s | 44 months | 73 months |
| 10s | 40 months | 66 months |
| 9s | 36 months | 59 months |
| 8s | 32 months | 53 months |
| 7s | 28 months | 46 months |
| 6s | 24 months | 39 months |
| 5s | 20 months | 33 months |
| 4s | 16 months | 26 months |
| 3s | 12 months | 19 months |

Table 6.1.2 Battery Life Coefficient Corresponding Excitation Mode

| Excitation Mode | Mode 1 | Mode 2 | Mode 3 | Mode 4 |
|---|---|---|---|---|
| Battery Life Coefficient | 1.0 | 0.85 | 0.75 | 0.60 |

When the sensor has large diameter, the corresponding excitation cycle is long (see excitation mode parameter), therefore there is more power consumption.

# 7. Alarming Information

There are three kinds of alarming information: S—system alarming, M—empty pipe alarming, C—small signal cut alarming. If S displays, it is possible that converter exciting breaks or convertor excitation frequency mode selection inappropriate.

# 8. Error Disposition

## 8.1 No Display

* Check whether the power is on
* Check whether the power fuse is in good condition
* Check whether the power voltage meets the requirement

## 8.2 Excitation Mode Alarming

* Check whether excitation wiring EX1and EX2 is open circuit
* Check whether the total sensor excitation coil resistance is less than 150Ω
* If the items above are in normal, then the convertor is malfunctioned

## 8.3 Empty Pipe Alarming

* Check whether the fluid is full of the senior pipe
* Connect SIG1, SIG2 and SIGGND to short circuit, if the empty pipe alarming “Empty Pipe” disappeared, the meter is in normal condition; otherwise, the error may cause by low fluid conductance, wrong setting of empty pipe threshold or range.
* Check whether the signal wiring is correct
* Check whether the senior pole is in normal condition
  If the flow is zero, the displayed conductance ratio shall be less than 100%
  If there is liquid in pipe, the resistance between SIG, SIG2 and SIGGND shall be less than 50kΩ.(If the medium is water, it is better to use pointer multi-meter to do the test and there is charge and discharge during the testing.)
* The DC voltage between DS1and DS2 shall be less than 1V, otherwise, it means the sensor pipe pole is polluted and cleaning is needed.

## 8.4 Flow Measurement Inaccurate

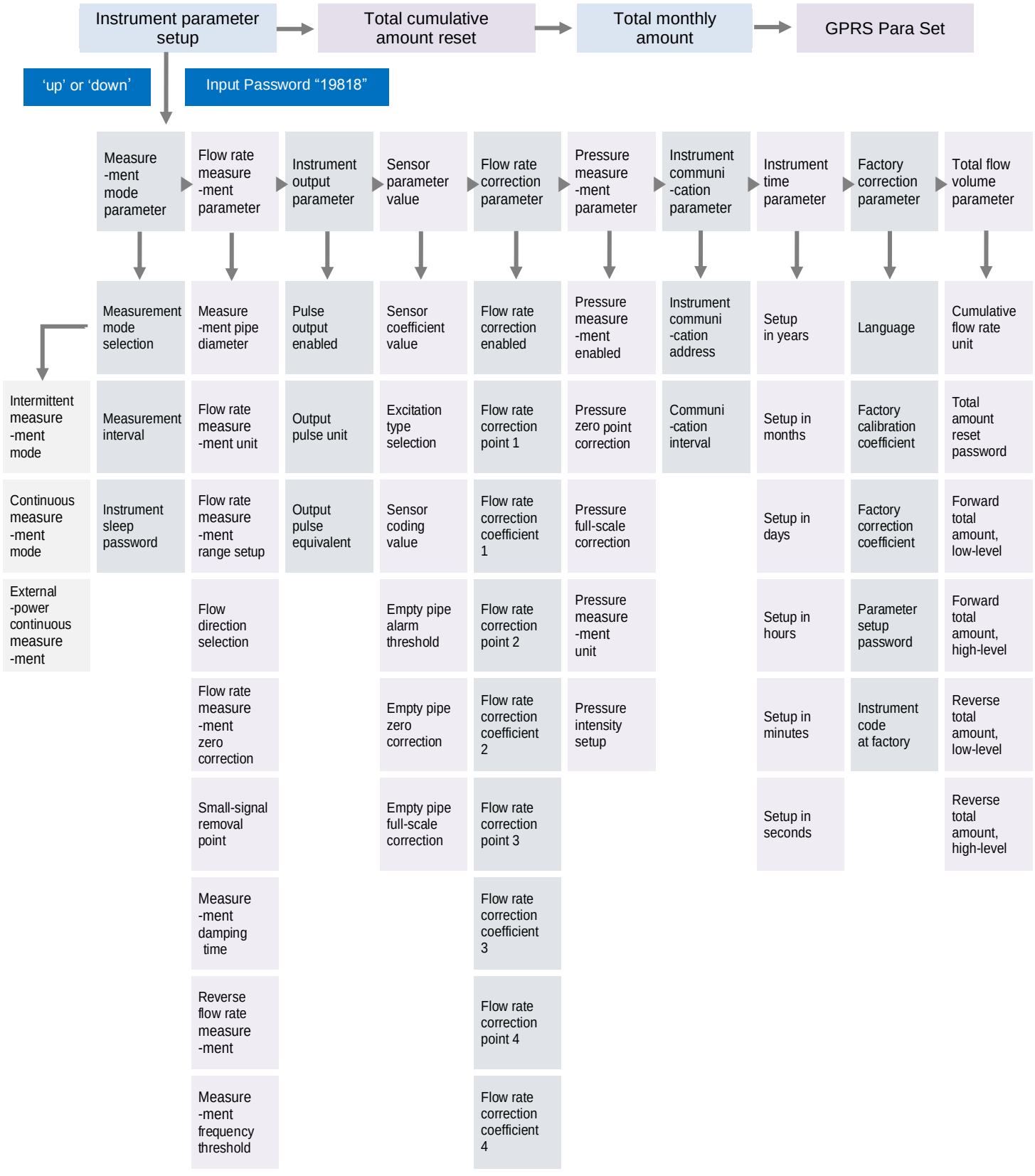
* Check whether the liquid is full of sensor pipe
* Check whether the signal cable is in normal condition
* Check the sensor parameter and zero-point is set by sensor label or factory calibration

## 8.5 Handheld Key Failure

If the buttons are unresponsive when aligned handheld to infrared tube, the power button battery insides the handheld may be low. Handheld can be detached to measure button battery voltage. If the value is lower than 2.7V, the handheld cannot work properly. Then button battery needs to be replaced.

Solemnly declare: the manual is applied to common software and if the content is not in consistent with the convertor, refer to the actual product.

# Appendix 1: BT803 Parameter Setting Overview



# Appendix 2: Function of Nonlinear Correction

Nonlinear correction function is applied when the flow is below 0.5m/s. The function has 4 correction phases, which contain 4 correction points and 4 correction parameters. The correction point shall meet the following requirements:

Correction point1> Correction point2> Correction point3> Correction point4>0

Correction is done based on the sensor flow parameter curve. Sensor parameter shall be marked before doing the correction by forbidden the nonlinear correction function. Then allow nonlinear correction function according to the marked sensor parameter, set correction coefficient and do the correction for different phase. If the coefficient is appropriate, there is no need to do the recalibration.

In the formats below, the Original Flow means the actual flow and the Corrected Flow means flow after calibration:

If Correction point 1> Original Flow ≥Correction point 2; Corrected Flow = Correction Parameter 1 ×Original Flow；

If Correction point 2 > Original Flow ≥Correction point 3; Corrected Flow = Correction Parameter 2 ×Original Flow；

If Correction point 3 > Original Flow ≥Correction point 4; Corrected Flow = Correction Parameter 3 ×Original Flow；

If Correction point 4 > Original Flow ≥0; Corrected Flow = Correction Parameter 4 ×Original Flow；

**Note:** When setting the Correction point, make sure

Correction point1> Correction point2> Correction point3> Correction point4>0

The middle of correction parameter is 1.0000, if the parameter in larger than 1, the corrected flow will be higher than the original flow; otherwise, the corrected flow will be lower than the original flow

# Appendix 3: Method to Replace Battery

1. Loosen the screw thread. Refer to Figure 1.
2. Pull the outer covering upwards. Refer to Figure 2
3. Remove the rubber sleeve. Refer to Figure 4.
4. Remove drier. Refer to Figure 5.
5. Unplug every plug in motherboard. Refer to Figure 3.
6. Remove the four fixing screws. Refer to Figure 3.
7. Remove and replace the battery.
8. Assemble in the reverse sequence above.

**Note:** After replacing a new battery, the time parameter in the meter becomes January. 1,2000 automatically, which requires the user to reset the “time parameter” to the current date.

Fig. 1


Fig. 2

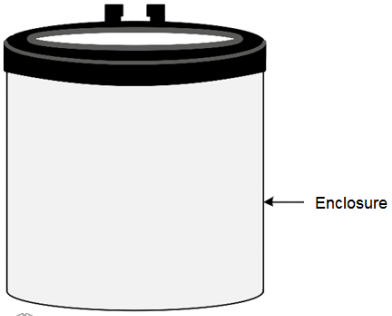
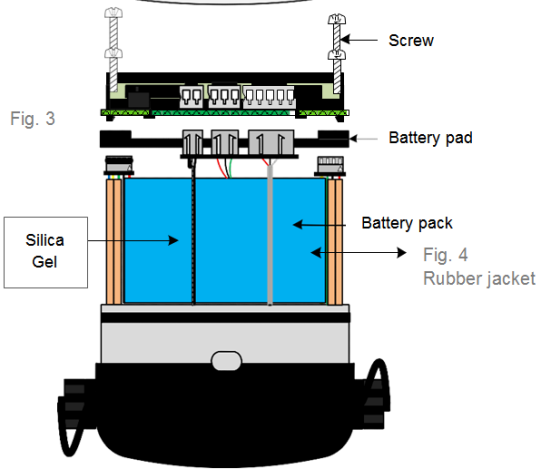



Fig. 3



# Appendix 4: BT803 Information Record Function

**BT803** has 16KB data retention memory inside for record-keeping various types of data.

Date Recorded in **BT803**

| Date | Date Format | Record Method | Record Length | Remark |
|---|---|---|---|---|
| Cumulated Gross | 9 bit decimal | permanent record | 8 byte | |
| Monthly Gross | Date + Gross | cycle record | 32 groups | record 32 months |
| Daily Gross | Date + Gross | cycle record | 32 groups | record 32 days |
| Time Gross | Date + Gross | cycle record | 64 groups | record 64 hours |
| Meter Status | Date + Status | cycle record | 64 groups | record 64 times |

**Note:** the information record function of **BT803** refers to Meter.

**Cycle record:**

New records overwrite the oldest records, record keeping N group. For example, 32 groups monthly gross means a monthly gross record of last month overwrites the record of 32 months ago (two and a half years of records are keeping).

**Date + Gross:**

Record format is Year, Month, Day, Hour and Gross Date.

**Record View Method:**

1. View the record on meter through handheld.
2. Connect the meter to computer through handheld and use software BT803_IRDA to view the monthly gross record.
3. Through RS485 to use PC **BT803**_485 software to view the monthly gross record.

**Note:** After replacing the meter battery, it will automatically record a monthly gross record and the date is January. 1,2000.

The cumulated value is the value of the point of battery replacement. This record is only used as a marker to replace the battery, and does not record the actual monthly gross.