Document No.M02-0100000112

# Smart Gas Meter
# HXG 110


## *User manual*

***V01***

Pictures and illustrations

The pictures in this document are for demonstration purpose only. Real products might be slightly different according to market conditions and customer choices.

Applicability of documents

At the time of printing, all specifications, and descriptions in this document were verified to be accurate. Nevertheless, continuous improvement is our goal and we reserve the right to revise with our product updates.

Errors or mistakes

Please communicate any errors or omissions in this document with an email to:
dennis@hxgroup.com

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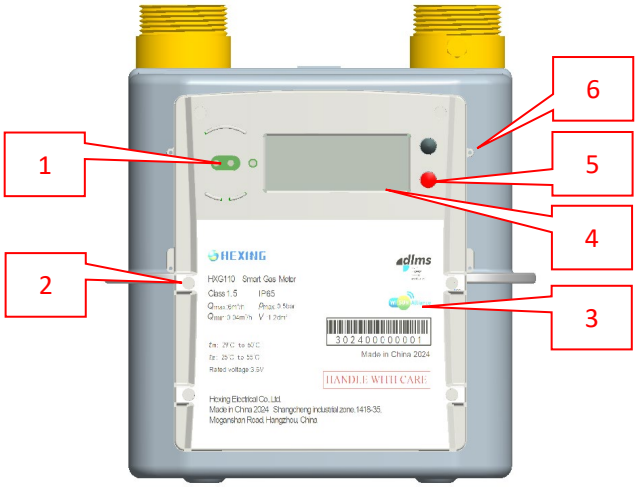
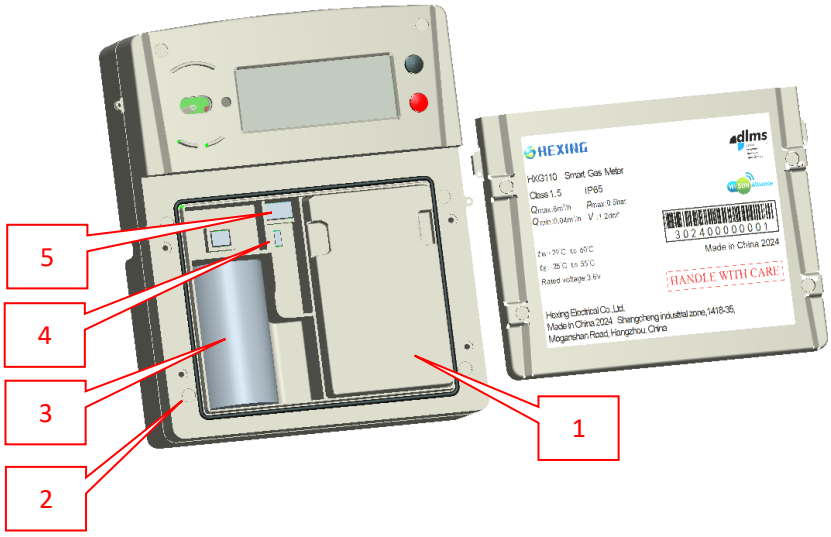
# Quick Guide

## Appearance




External：

1. Optical Communication Port
2. Seal
3. Communication Module
4. Battery Compartment
5. LCD
6. Button
7. Seal Hole




Internal：

1. Communication Module
2. Seal
3. Main Battery
4. Valve switch
5. Open cover detector

## User Interface

The user interface consists of two operator buttons and one LCD display.

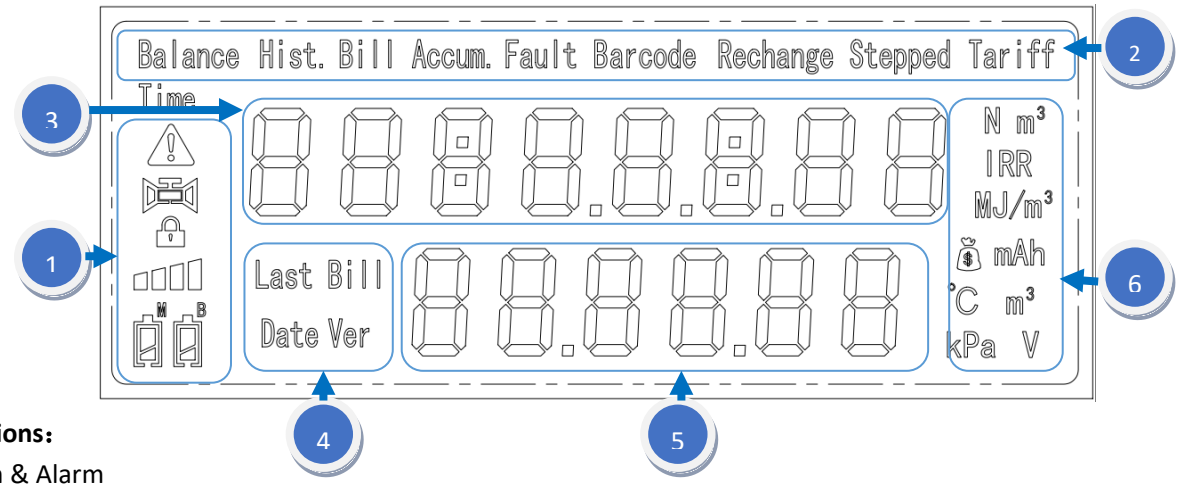
### Button

A short press of any button on the right will wake up the LCD display. Otherwise, the LCD remains OFF to improve battery life.

Use a short press of the buttons for scrolling.

Long press any button will trigger the remote communication (A fool-proofing design).

### LCD Display(English version)




**Descriptions:**

1. Icon & Alarm
2. Main Menu: Indicates main functions, refer to “Main menu & Secondary menu” for details.
3. Main Display: displays numeric values for the corresponding menu.
4. Secondary Menu: indicates secondary functions, refer to “Main menu & Secondary menu” for details.
5. Secondary Display: provides an auxiliary display.
6. Unit: provides the “Units” for the corresponding menu.

## Main Menu & Secondary Menu

| Area | Description(English) | Description(Persion) |
|---|---|---|
| 1 | Icon&Alarm | |
| 2 | Main Menu | |
| 3 | Main display | |
| 4 | Secondary Menu | |
| 5 | Secondary display | |
| 6 | Unit | |

## Marks

| Sq. | Menu | Explanation |
|---|---|---|
| 1 |  | Balance for prepaid mode display only |
| 2 |  | Historical data |
| 3 |  | Accumulated Bill |
| 4 |  | Fault |
| 5 |  | Barcode |
| 6 |  | Recharge for prepaid mode display only |
| 7 |  | Stepped mode; Cooperate with the main display content to know which step is currently in |
| 8 |  | Price for each step |
| 9 |  | Current time |
| 10 |  | Bill of last month |
| 11 |  | Bill of current month |
| 12 |  | Date |
| 13 |  | Firmware version |

## Icons

| Sq. | Icons & Unit | Explanation |
|---|---|---|

| | | |
|---|---|---|
| |  | Alarm(Event code will be displayed accodingly) |
| |  | Valve ON |
| |  | Valve Off |
| |  | Valve locked |
| |  | Signal quality Good |
| |  | Signal quality Acceptable |
| |  | Signal quality Weak |
| |  | Signal quality Bad |
| |  | Main battery Full |
| |  | Main battery Weak |
| |  | Main battery Low |
| |  | Backup battery Full |
| |  | Backup battery Weak |

| | | |
|---|---|---|
| |  | Backup battery Low |
| |  | Gas volume in Standard Condition |
| |  | Gas volume in Working Condition |
| |  | Currency |
| |  | Reserved for thermal mass measurement |
| |  | Icon for Money |
| |  | Battery capacity |
| |  | Temperature |
| |  | Pressure |
| |  | Voltage |

# 1. General

HXG110 is a series of smart gas meters designed following EU standards and referring to large scale smart meter application experiences in Asia-Pacific countries. It supports multi-type communication technologies: NB-IoT, Wi-Sun etc., and with communication modules replaceable onsite without changing basic meter or upgrading meter firmware.

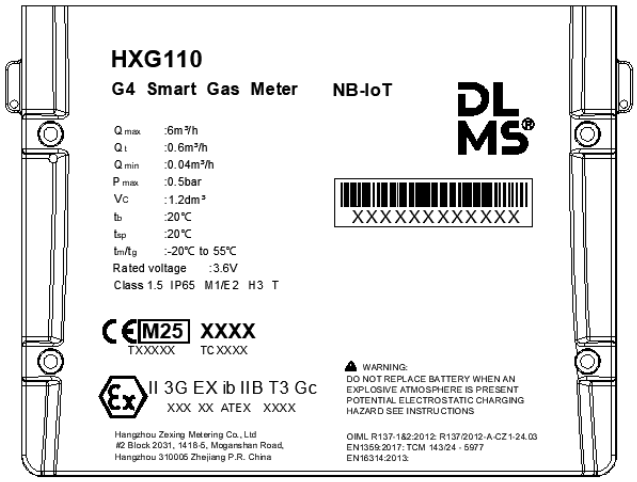
The modular design improves meter adaptability to future communication technologies, guaranteeing ROI for meter assets, assisting in global utility digital transformation.

This manual provides use and maintenance instructions for the HXG110 series smart meters.

HXG110 smart meters support different specifications: G1.6/2.5/4/6, applicable for measurement in domestic occasions. It incorporates a mechanical diaphragm gas volume metering device with an electronic smart controller to realize accurate metering, data processing, as well as valve control with system.

## 1.1. Identification

The various models of HXG110 can be distinguished by the nameplate shown in the figure below (located on the front cover of the device), where the symbols and data information are as the G4 example below:




| HEXING - Manufacturer | | | |
|---|---|---|---|
| **HXG110** | | | |
| **Qmax** | Max flow rate | **$t_m$** | Ambient temp. |
| **Qmin** | Min flow rate | **$t_g$** | Gas temp. |
| **Qt** | Transitional flow rate | **V** | Cyclic volume |
| **Pmax** | Max working pres. | **Class 1.5** | Accuracy |
| **$t_b$** | Base temp. | **$t_{sp}$** | Central temp. |
| Wi-SUN mark<br>NB-IoT mark | | DLMS protocol supported | |
| Meter serial number barcode | | | |

Once the module was replaced with a keypad one, the meter can be easily switched to STS prepaid mode. However a new cover shall be replaced as well to fit the numeric keypad module. See the picture below:

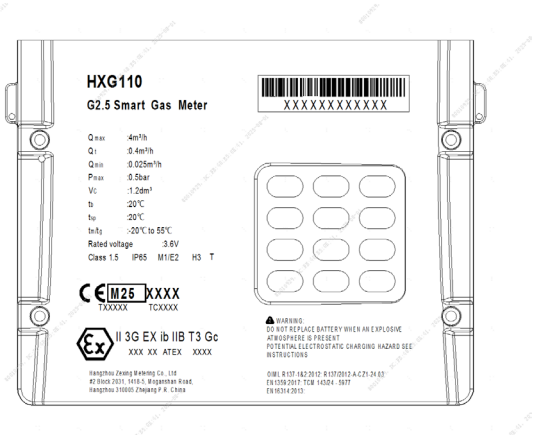



Figure 1 A special version of the keypad module

**Model:** HXG110

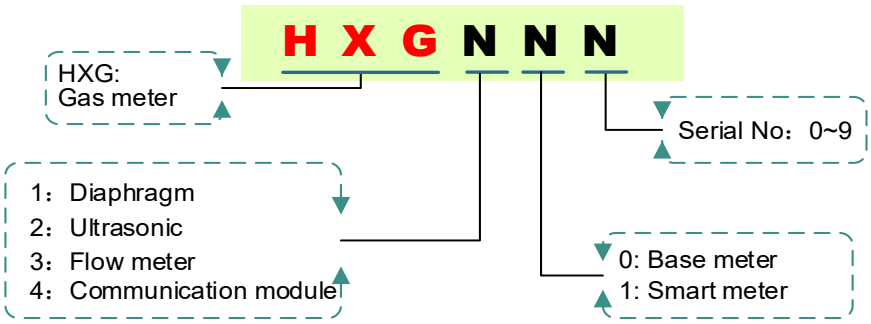
Manufacturer: Hangzhou Zexing metering Co., Ltd.

Address: No. 1418-5, Moganshan Road, Shangcheng Industrial Zone, Hangzhou, China

European Importer: XXXXXXXXXXXXXXX

Address: XXXXXXXXXXXXXXXXXXX

Description:

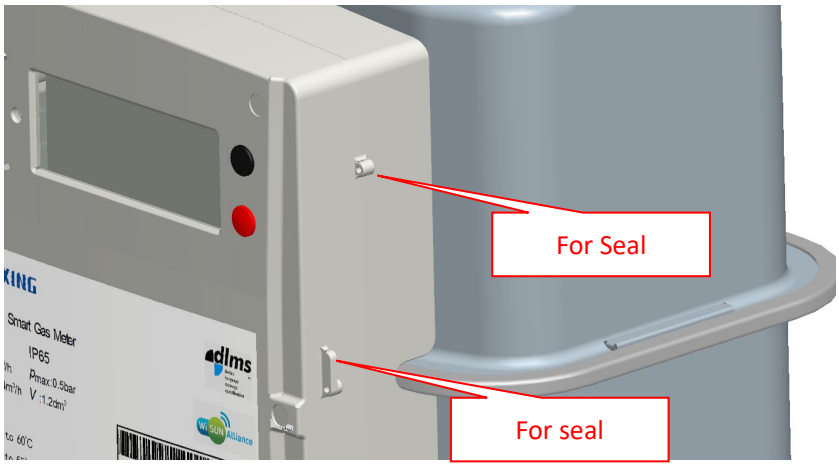



## 1.2. Packaging Content

The overall package includes: HXG110 smart gas meter (with qualification mark) and two connector protective covers. The product manual and related certificates are placed in the packing box as required.

* The battery and communication module are assembled or not assembled in advance as per customer requirements.

Seal design:


For Seal
For seal
Smart Gas Meter
IP65
dlms

# 2. Safety

## 2.1. Safety Instruction

The HXG110 series is approved according to the EU ATEX directive, and is designed comply with the protection requirements of Ex ia IIA T3 G, ambient temperature range -25°~55°C. The HXG110 series meets the harmonized CENELEC standards relevant to the compliance with the EHSR requirements (Essential Health and Safety Requirements).

The product is approved for installations in Zone 2 Group IIA, and the Mechanical & Electromagnetic environments is M1/E2 correspondingly. Do not use this product in hazardous areas not covered by its certifications.
Gas family:

- Methane gas, town gas, propane and butane.
- Gases from the first to the third family (UNI EN 437).
- Mixtures of Natural Gas and Hydrogen (with the hydrogen component not exceeding 20%).

The following signs will be used in this manual:

⚠ Caution: the meter may be broken
⚠ Warning: it may cause harm to people
⚠ Danger: there may be fatal risk

## 2.2. Electrostatic Discharge

The HXG110 series is approved for installation in areas with low explosion risk (risk only for short periods). In these areas, sparks produced from electrostatic discharges could generate explosions in extreme cases. Although during normal operation there is no presence of dangerous potentials on the product, the use of dissipative footwear and a damp cloth is recommended during the installation and maintenance.

⚠ **Warning: Remember to take protection measures against electrostatic discharges during installation or use of this product.**

Manufacturer denies all liabilities resulting from the risks and consequences caused by the non-compliance with these provisions.

## 2.3. Device Connection

There is no interface on HXG110 for connection with external devices.
Through the internal communication module, the device automatically carries out remote data interaction. It is recommended to use the manufacturer dedicated service tool (Hextool) for data interaction through optical port during onsite maintenance.

## 2.4. Power Supply

The battery pack in HXG110 is ATEX approved. The battery pack consists of two lithium batteries, one for main power

supply, and the other as back up battery. The battery connection socket design is easy and clear, supporting only one-direction assembly.

⚠ **Caution: The battery pack is non-rechargeable. Use only the model complying with the electric certifications for necessary battery replacement.**

Refer to chapter 8 “Disposal” for more details about disposal of waste battery.

The original battery is sufficient for at least 10 years work under normal reference operation conditions.

## 2.5. General Attention

The installation and operation must be in compliance with the provisions and regulations in force.
Manufacturer is not liable for damages resulting from failure to follow instructions and inappropriate use.
When installing, using and maintaining this product, users must strictly abide by the product instructions and the following standards：IEC60079-14: Explosive atmospheres - Part 14: Electrical installations design, selection and erection

⚠ **Caution: All installation and maintenance works must be performed by qualified personnel.**

⚠ **It is not allowed to damage the case，indicator, seal or marks.**

⚠ **Explosive gas components may react with plastic materials, resulting in potential hazards**

**Spare Parts**
Any technical changes are forbidden. Use only original spare parts.

**Transportation**
All meters shall be transported in vertical position.
After examination upon receipt of cargo, any shipping damage shall be reported immediately.
Make sure that the gas meter will not get any impact load.

**Storage**
All meters must be stored in vertical position, in dry location during ambient conditions. (Refer to ANNEX B for reference environmental parameters.)

# 3. Product

## 3.1. Composition

HXG110 series has the following characteristics：

- IP65
- Integrated Temperature sensor
- Optical communication port
- Family design of controller and LCD
- 2 user buttons

Each part can be configured upon customer needs:

- Base meter
  - G1.6
  - G2.5
  - G4
  - G6
- Communication module:
  - NB-IoT
  - Wi-Sun
  - Numeric keypad

**The entire meter consists of two parts:**

A base meter integrated with:

- Mechanical and measurement performance design comply /refer to standards EN1359 and OIML R137
- Integrated temperature sensor
- Built-in shut off valve.

An AFD integrated with:

- Electronic control unit(with integrated memory) comply /refer to standards EN16314
- Replaceable communication module marked NB-IoT , Wi-SUN, or numeric keypad.
- Replaceable battery(Main battery) and Non-replaceable battery(Backup battery)

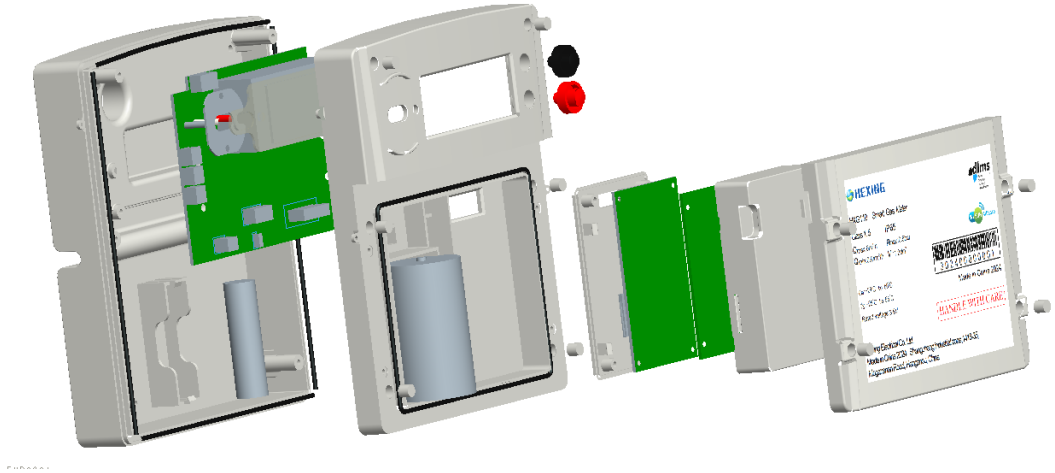


Figure 2 AFD with RC module

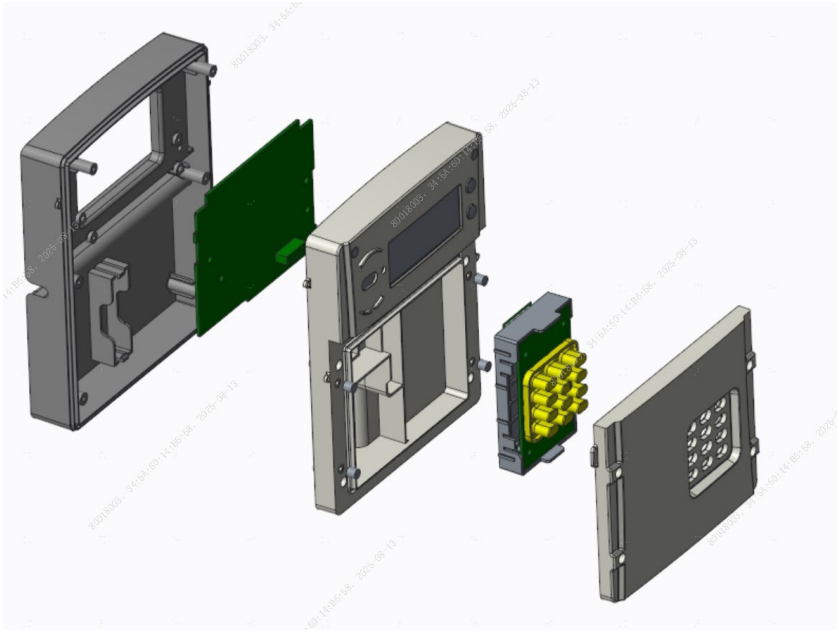


Figure 3 AFD with keypad module

## 3.2. Key Features

HXG110 series integrates the most cutting-edge Internet of Things (IoT) technology, with remote communications, large storage capacity, high performance, high sensitivity, secure and reliable, supporting diversified application scenarios, etc. Features include:

- Supports DLMS protocol, module hot-plug on site without firmware upgrade.
- All communications are encrypted, ensure data security, integrity and traceability.
- Powerful data computing capability. Large memory keeps storage of the latest 1 year's gas using data and 60 event logs.
- Low power consumption design, battery pack support 10 years with normal operation.
- Built-in high accuracy temperature sensor for temperature compensation.
- Measurement resolution complying with EN1359, supporting real time monitoring of extremely low flows and reverse flows.
- Meter and system event logs, alarms, and valve control mechanisms, to realize comprehensive security and business management.
- It can be integrated with the gas company MDC system, billing system, online payment system, etc. through IoT data platform，TCP/IP, or Ad-Hoc Network, allowing digital gas applications, including prepayment, post-payment, tiered pricing, remote pricing, real time billing, electronic billing, remote payment, etc.
- Use the dedicated service tool for easy on-site maintenance.

# 4. Main Functions

## 4.1. Smart Valve Control

The smart valve control of HXG110 is designed in compliance with the regulations in EN1359.

The built-in valve can reach the same lifetime as the meter. In cooperation with the system operator, the valve can provide automatic off-valve, remote and manual on valve.

### 4.1.1. Valve Status Statement

The HXG110 valve can be configured as an ordinary off valve or an authorizing off valve.

- Ordinary off valve: valve can be opened by local manual operation on meter.
- Authorizing off valve: need remote authorization from system before manual valve open operation.

### 4.1.2. Automatic-Off Valve

1. Remote Command
   Gas Company sends off valve commands remotely in the system as per business demand, such as payment overdue, stop of service, etc.
2. Security Off Valve
   Before reopening valve after an off valve command, there will be 60s countdown checking gas flow in case any appliance stayed on, valve will be closed automatically if gas flow detected within the countdown.
3. Abnormal Gas Flow
   Off valve occurs automatically at gas overflow ($\geqslant$1.2Qmax), or reverse gas flow.
4. Meter Cover Open
   Off valve occurs on detection of meter front cover open (such as battery replacement, tamper, etc.).
5. Battery OFF
   When the battery power is lower than battery threshold, off valve commands will be triggered.
6. Abnormal Measurement
   The damage of metering sensor or magnetic interference will trigger the off valve.
7. Prolonged - No Communication
   Optional function: automatic off valve if there have been no communications within a specified period. This function is disabled in default state and must be activated through system command.
8. Prolonged – No Gas Use
   Optional function: is an automatic off valve if no gas has been used in days. This function is disabled in default state, and must be activated through system command.

### 4.1.3. Valve Open

⚠ **Danger: To ensure safety, the final step of valve opening must be completed manually on site.**

1. Open valve by local button: open valve through local button operation.
2. Remote command valve opening: the valve opening command is issued through remote communication to authorize

local valve opening.

3. Open valve with service tool: only for professional maintenance personnel or authorized staff use.

#### 4.1.3.1. Ordinary Valve Opening

When the valve icons , are displayed alternately on the LCD, the valve opening operation needs to be completed through local button operation：

1. Short press the middle button to open the valve.
2. Once the valve is opened, meter LCD displays 60s countdown for safety detection, please do not use gas during this period, otherwise the safety valve shutoff function will be triggered. If valve shutoff is triggered within this 60s countdown, the valve can be opened again by pressing the middle button (safe valve opening).

#### 4.1.3.2. Valve Opening at Ordinary Maintenance

1. When a battery, SIM card or communication module replacement is performed (the icon is displayed with the valve lock icon ), "Remote Valve Opening Authorization" (valve opening command) must be obtained from server in advance.
2. Press the button until LCD displays "SEND", release the button to trigger the communication between meter and the server, representing communication is on. At this time, valve icon will be displayed alternately and the authorized closing valve icon will disappear. Then open the valve by pressing any button, for which the operation is the same as **4.1.3.1 Ordinary Valve Opening**.

#### 4.1.3.3. Others

For any other valve opening operations other than the above two situations, please contact gas company personnel with senior authority.

## 4.2. Communication

The communication function of HXG110 series products has the following characteristics：

- Multiple communication modes available and expandable：
  1. NB-IoT
     - B1: 2100 MHz
     - B3: 1800 MHz
     - B5: 850 MHz
     - B20: 800 MHz
     - B28: 700 MHz
  2. Wi-Sun
     EU868 / US915
  3. STS keypad module
- Communication module replaceable on-site.
- Third-party communication module compatible, to support communication protocol customization.
- The OBIS (Object Identification System) codes following the standard of EN 13757.
- A local communication portal is reserved for factory calibration used only.
- Communication interval can be flexibly configured to realize peak-shift communication and reduce the concurrent processing pressure of the server.

- Configurable backstage settlement, with hourly gas consumption log, realize flexible and diverse billing management.

## 4.3. Data Storage

With reference to WELMEC 7.2, HXG110 series implements the following services:

- Store recent daily gas consumption records of 365 days.
- Store hourly gas consumption records of 60 days.
- Store Monthly gas consumption records of 120 months.
- Store up to 60 latest event records.
- Store Historical bill of recent 120 months.
- Store 60 operation records.
- Data protected against power failure.

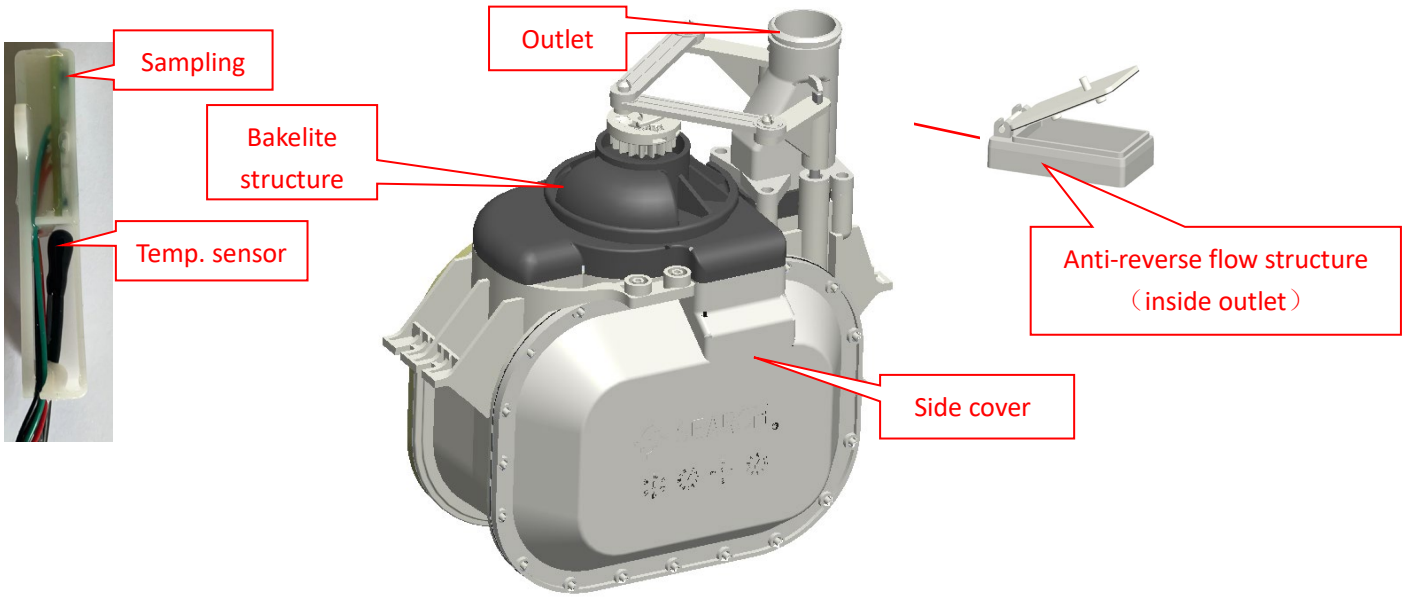
## 4.4. Acquisition

HXG110 series is composed of diaphragm gas meters and smart control modules (Additional Function Devices).

There are four gas chambers in the meter, which are separated by two membranes. When the gas flows through, different pressures are generated in the four gas chambers to make the membrane reciprocate. After a series of transmission mechanisms through the sensing system, the mechanical motion is converted into electrical signals and sent to the control module. The diaphragm gas meter has a built-in valve, which can be used to cut off the gas flow.

The HXG110 series can be equipped with built-in temperature sensor for temperature compensation (see the picture below). The smart controller collects the measurement signal and temperature signal of the diaphragm gas meter to realize working condition measurement and standard condition conversion. The design complies with provisions in MID directive 2014/32/EU.

The anti-reverse flow design is also displayed below.



## 4.5. Events & Alarms

HXG110 series performs real-time self-diagnosis based on operating conditions:
The gas meter will conduct self-test at 00 a.m. every day to check clock, data storage and other function status. If there is an abnormality, the data will be stored and generating corresponding event code. Some will launch the report immediately.

- For general operating errors, it will give an alarm (LCD display event code).
- For general abnormal events, it will record the event, generate an alarm, and close the valve (the LCD displays an error code and an alarm icon).
- For serious abnormal events involving metering and gas safety, it will close the valve, record the event, generate an alarm, and immediately report to the server (LCD displays event code, alarm icon and the communication icon).

See ANNEX A for details.

## 4.6. Safety & Anti-Fraud

Gas meters are legal measurement equipment and protected by law. Specifically, HXG110 implements the following services with reference to provisions of WELMEC 7.2:

- HXG110 series gas meters are protected by mechanical seals. Unauthorized disassembly of the meters will leave visible and irreparable traces.
- Illegally entry into the meter causes event recording, launch valve closing and report the corresponding event through remote communication.
- All communications of HXG110 series are encrypted following DLMS protocol.
- All event records and gas consumption logs are time stamped.

## 4.7. Hextool (optional)

Manufacturer developed the service tool (Hextool) to better support on-site maintenance and configuration management along with HXG110.

- Local communication between mobile phone and HXG110 through adapter and Infrared port.
- Read real-time operating status in the meter including measurement data, network status, valves, temperature, alarms and other information.
- Onsite valve operation, query history records and reasons of valve operations (authorization required).
- Read historical data and event records.
- The internal status code can be inquired, a diagnosis report can be generated for fast triage and debug.
- Online identity verification, strict background authority management and monitoring, and user access history acquirable.

Hextool is an optional tool, please contact us if required.

## 4.8. Others

**DST configuration, local time zone configuration.**
DST can be configured according to the set start date and end date. When the start date of daylight saving time is reached, meter clock is automatically set to 1 o 'clock on the same day. When reaching the end of daylight saving time, meter clock automatically sets 1 o 'clock of the day after the end of daylight saving time to 0 o 'clock.

**Automatic clock synchronization.**

Each time the wireless communication, system will send the time to the meter, and meter will synchronize the clock after judging the clock format is normal.

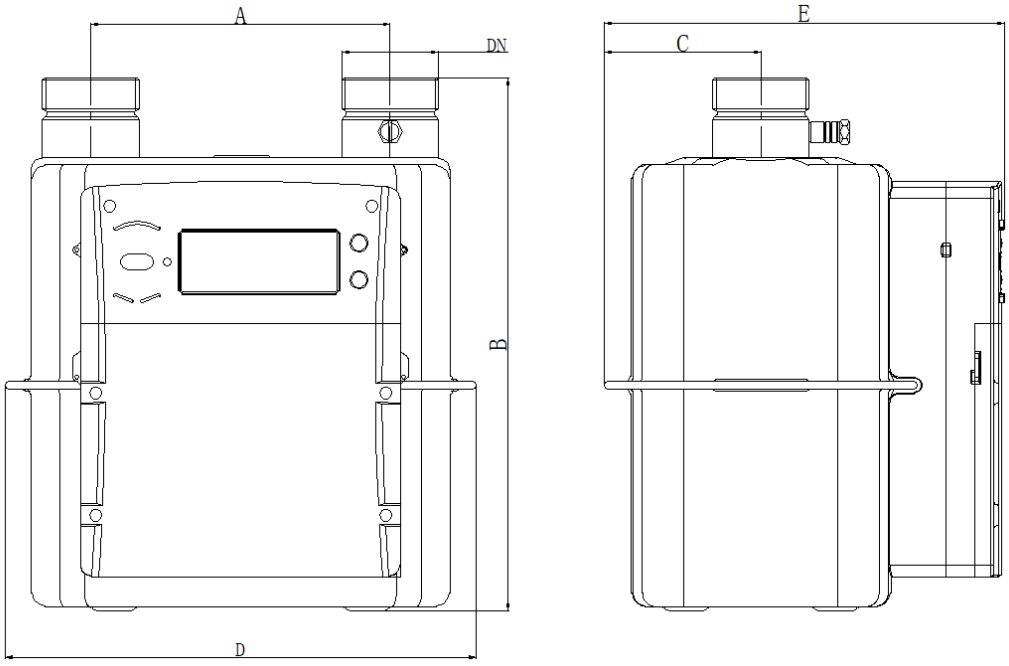
The meter can also be synchronization by infrared communication. After the infrared time instruction is issued, the meter will synchronize the clock.

**For keypad version**, most of the functions are the same, and the firmware in the major control board are totally the same.

# 5. Installation

## 5.1. Basic Information

The general dimensions of HXG110 are shown below：




| Model | G1.6~4 | |
|---|---|---|
| A | 110 | 130 |
| B | 231.5 | 231.5 |
| C | 68 | 68 |
| D | 204.6 | 204.6 |
| E | 174 | 174 |

Unit: mm

| Model | Thread |
|---|---|
| G1.6~2.5 | G1¼"; G3/4"; M30x2, or customized |
| G4 | G1¼"; G3/4"; M30x2, or customized |
| G6 | G1¼" or customized |

## 5.2. Before Installation

⚠ **Caution: The installation, disassembly, inspection, and maintenance of the gas meter must be carried out by qualified professionals and must not be altered or disassembled without authorization. Otherwise, the manufacturer does not take the responsibility of the warranty.**

### 5.2.1. Interference Check

1. The meter shall be installed in locations with vibration or shocks of low significance.
2. Closed locations (indoor or outdoor with protection as specified by the manufacturer) both with condensing humidity, and with non-condensing humidity.
3. Avoid locations with strong electromagnetic disturbances corresponding to those likely to be found in some industrial buildings.

### 5.2.2. Location Check

1. The gas meter should be installed in a room with good heating and ventilation system, and the horizontal distance away from stoves or other fire sources shall be more than 1.5m. It is strictly prohibited to install the meter in a bedroom, bathroom or sealed environment.
2. The meter shall be installed horizontally at the high point of the pipeline and gas inlet and outlet directions shall not be swapped. The connection distance between the inlet and outlet of the gas meter and the pipe should be adequate and must not require any forced connections by twisting, smashing, etc., thus avoiding gas leaks at the connector. A dedicated connector shall be used to guarantee the tightness of the connection.
3. Gas meter should be installed where good communication signal is guaranteed, to prevent unexpected battery power consumption due to weak signal and repeated communication failures. Frequent operation of remote communication and optical port communication will affect batteries' lifetime.
4. Keep the meter away from objects that may shield signals, such as electrical equipment, steel, magnetic materials, etc.

### 5.2.3. Pipe Check

Clean the pipe before installing the gas meter in case of any damage to the inner mechanics due to dust and iron slag from the pipe.

## 5.3. During Installation

⚠ **Caution: Users must strictly abide by the product instructions and the following standard when installing, using or maintaining the device. Reference IEC60079-14: Explosive atmospheres - Part 14: Electrical installations design, selection and erection.**

1. Gas supply system strength test should not be performed when the gas meter is installed.
2. The installation and use environment must meet the technical parameter requirements of the gas meter.

   Ambient/gas temperatures that exceed the meter's operating temperature range, will cause communication failure or battery life reduction.
3. It is forbidden to weld the reducer with the gas meter to the gas pipeline.
4. It is forbidden to install the gas meter on the gas pipeline before the welding work is finished.

## 5.4. After Installation

1. After installation, a leak test must be performed to confirm the pipeline is free of leaks.
2. It is forbidden to purge the gas pipeline after installing the gas meter.
3. After any repairs (which requires battery compartment to be opened), the lead seals should be re-installed, and all lead seals must be installed in the right place.

4. It is forbidden to perform pressure test when the valve is closed.

## 5.5. Precautions for Use

1. Please do not use gas within 60s countdown after opening the valve, otherwise the safety check function will trigger valve shutoff.
2. If gas leakage is detected, meter will close the valve immediately, please open the window for ventilation, and contact the local gas company for assistance.
3. When meter valve closes during usage, and the valve cannot be opened by pressing the middle button - please contact the local gas company.
4. Do not press user buttons unless it is necessary, otherwise the battery life is reduced causing unscheduled battery replacement.
5. Keep the surface of the gas meter clean. Wipe the surface with a damp cloth and then with a dry cloth. Do not use alkaline, acidic, inorganic or organic solvents (gasoline, acetone, etc.) to clean the surface.
6. It is forbidden to install the meter where the gas flow exceeds the maximum permissible flow demonstrated in the instructions or the nameplate.
7. It is forbidden to damage the casing and the indicating device or destroy the seals and marks on the indicating device. Avoid hitting the gas meter.
8. It is forbidden to use gas meters in the environment with magnetic field greater than 200mT.
9. Do not place objects near the gas meter that may cause its heating to + 55˚C.
10. CAUTION: Do NOT replace the battery in explosive environment.

## 5.6. Power Supply

### 5.6.1. Battery Information

The main battery can guarantee stable operation of the gas meter for 10 years.

Backup battery will be activated after the exhaust of main battery and support normal operation for 70 more days.
In this case, it is recommended to replace the main battery and backup battery together immediately.

Changes in the using environment and scene will affect the battery life.

### 5.6.2. Battery Level

The battery level is displayed and can be checked through meter LCD.

Status of the main battery and backup battery can be easily identified by the icons on the right up corner of LCD.

For battery icons, “M” is short for Main Battery, “B” is short for Backup Battery.

### 5.6.3. Power supply design

The main power supply is coming from a high quality 3.6V lithium battery. The static working current should not be greater than 30μA, the daily average working current should not be greater than 50ua, and the maximum working current should not be greater than 500mA.

All functions of the motherboard operate normally when the main power is out, and the backup battery is online for power supply, which is also a 3.6V lithium battery but with lower capacity.

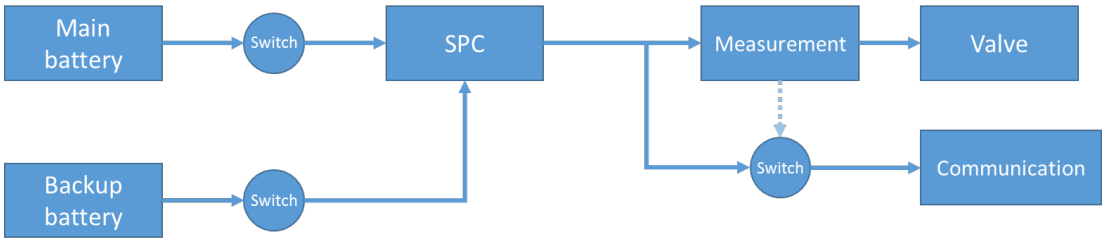
(1) The main lithium battery provides power supply for all devices.

(2) The backup lithium power supply for all equipment.

(3) SPC provides valve and communication power supply support,

(4) The communication power supply is controlled by the metering part.

(5) The main and backup power can be switched




### 5.6.4. Power Consumption Estimation

| | Item | Frequency /month | Retry mechanism | Monthly average consumption(mAh) |
|---|---|---|---|---|
| Meter | Valve open | 10 | 0 | 0.15 |
| | valve close | 10 | 0 | 0.791666667 |
| | Daily usage ≈ 2m³ | 30 | 0 | 5.4 |
| | Static ua/h | 30 | / | 18 |
| | *Monthly total consumption* | | | *24.34166667* |
| | *Annual total consumption* | | | *292.1* |
| | *10 Years total consumption* | | | *2921* |
| Communicaiton module | *Item* | Frequency /month | Retry mechanism | Monthly average consumption(mAh) |
| | *Building connection* | 30 | 5 | 65.7 |
| | *Data reporting* | 30 | 2 | 12.79 |
| | *OTA function* | 0.25 | 0 | 1.20356 |
| | *Static* | 30 | / | 7.29999 |
| | *Monthly total consumption* | | | 86.99355 |
| | *Annual total consumption* | | | 1043.9226 |
| | *10 Years total consumption* | | | 10439.226 |
| Total | Total 10 years consumption(mAh) | 13360.226 | | |
| | Battery Capacity (mAh) | 19000 | | |
| | Battery efficiency （estimated） | 75% | | |
| | True Capacity(mAh) | 14250 | | |
| | Battery redundancy | 6.24% | | |

# 6. Maintenance

## 6.1. Ordinary Maintenance

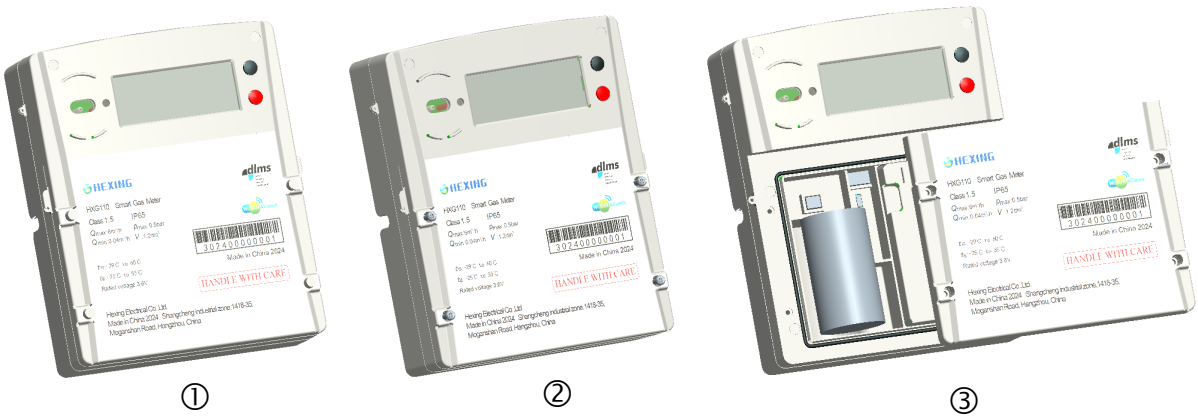
⚠ **Warning: All the maintenance work such as battery, SIM card or communication module replacement shall be performed by professional personnel from the gas company. Any unauthorized operation shall be prohibited to prevent unpredictable risks or dangers.**

### 6.1.1. Battery Replacement

⚠ **Caution: For NB-IoT meters, the SIM card and lithium battery may be installed or not installed at factory upon customer requirements.**
**It is normal for lithium batteries to self-discharge even not in use.**

**Open the front cover will generate an alarm and immediately trigger valve closing.**

**The battery shall not be replaced in flammable or explosive environment.**




① ② ③

Procedures：

1. Remove the seal and screw, open the battery compartment, If the main battery is already installed, the alarm will be triggered. Wait for the completion of communication then remove the main battery.

2. Insert the new battery.

3. Jump this step if this is the first time to replace the battery after leaving the factory. If it is not the first time to replace the battery, a brand new lithium battery of the specified model must be used. Contact authorized personnel to restore battery capacity display in the meter.

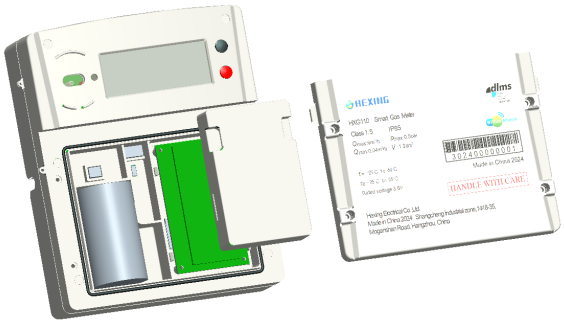
4. After the battery is correctly installed, the LCD will automatically lit. Close the front cover and install cover screw. The front cover screw must be tightened to prevent misreporting cover opening alarm.

5. Follow the instructions in 4.1.3.2 to open the valve and return the meter to normal operation status.

### 6.1.2. SIM Card Replacement

⚠ **Caution: NB-IoT requires SIM card installation, Wi-Sun does not.**

**Open the front cover will immediately launch alarm and trigger valve shutoff.**



Procedures：

1. Remove the seal and screw, open the battery compartment, remove the communication module from the rabbet.
2. Insert the SIM card. The SIM card must be installed in the right direction in non-communication state.
3. After the SIM card is correctly installed, plug back the communication module. Close the front cover and install cover screw. The front cover screw must be tightened to prevent misreporting of cover opening alarm.
4. Follow the instructions in 4.1.3.2 to open the valve and return the meter to normal operation status.

### 6.1.3. Communication Module Replacement

⚠ **Caution: Open the front cover will immediately launch the alarm and trigger valve shutoff.**

**The replacement of the communication module shall be operated at non-communication status.**

**The on-site replacement of communication module will not affect the measurement performance of the meter.**

Procedures：

1. Remove the seal and screw, open the battery compartment, and remove the communication module from the rabbet.
2. Plug back the required communication module. Close the front cover and install cover screws. The front cover screw must be tightened to prevent misreporting of cover opening alarm.
3. Follow the instructions in 4.1.3.2 to open the valve and return the meter to normal operation status.

## 6.2. Meter Verification

Each HXG110 product is carefully calibrated before leaving the factory to ensure measurement accuracy.

If onsite inspection is required, please follow the process below:

**Verification Process：**

The meter can be configured to enter the meter verification mode through the local infrared command, and the LCD display both standard condition and metering condition cumulative gas volume.

The meter can enable the LED PULSE output, which can be configured to 1L/PULSE or 2L/PULSE or 5L/PULSE. At this time, the LED will continue to blink accordingly during the gas flow.

Default: 1L/PULSE when the flow rate is less than the transitional flow rate, 2L/PULSE when the flow rate is greater than the transitional flow rate.

**P.S.** The meter has default LED pulse output enabled.

# 7. Disposal

⚠ **Warning: The dismounting the gas meter shall be performed by professional personnel from the gas company. Any unauthorized operation is prohibited to prevent unpredictable risks or dangers.**

The recycling of the HXG110 is in compliance with the requirements of the 2019/19/EU WEEE directive, following the current state of the art of recycling and recovery technology.

For meters that have major failures or have reached the end of service life, they should be properly scrapped:

- Dismount
  1. Open the front cover and take out the battery.
  2. Take out the PCBA, remove the LCD and put them in different category.
  3. Remove the chip from PCBA and put them in different category.
  4. Remove the plastic base from the meter and place it in the relevant category.
  5. Disassemble the case of the base meter, remove the plastic part, and place it in the relevant category.
- Physically dismantle related components according to the following methods.

| Components | Methods |
|---|---|
| PCBA | Electronic waste. Dispose in accordance with local legislation regulations |
| Battery | Hazardous waste. Dispose in accordance with local legislation regulations |
| LCD | Hazardous waste. Dispose in accordance with local legislation regulations |
| Metal parts base meter | Classify and deliver to corresponding recycle sites |
| Plastic parts | Classify and deliver to corresponding recycle sites |

# ANNEX A - Event Code

| Event code | Explaination |
|---|---|
| E-01 | Battery low |
| E-02 | Meter case been disassembled |
| E-03 | Magnetic deteccted |
| E-04 | Prolonged – No Gas Use |
| E-05 | Account not opened, preset value exhausted |
| E-06 | Micro flow detected |
| E-07 | Overflow detected |
| E-08 | Authorized valve closed |
| E-09 | Valve failure |
| E-10 | No network service |
| E-11 | Data interaction failure |
| E-12 | Meter not registered in Network |
| E-13 | Communication module failure |
| E-14 | Storage R/W error |
| E-15 | Time parameter error |

# ANNEX B Technical Parameter

| Model | HXG110 | | | |
|---|---|---|---|---|
| **Specification** | G1.6 | G2.5 | G4 | G6 |
| **Qmin($m^3$/h)** | 0.016 | 0.025 | 0.04 | 0.06 |
| **Qmax($m^3$/h)** | 2.5 | 4 | 6 | 10 |
| **Qt($m^3$/h)** | 0.25 | 0.4 | 0.6 | 1.0 |
| **Cyclic Volume(L)** | 1.2 | | | 2.0 |
| **Pressure Absorption** | ≤200Pa | | | |

| | |
|---|---|
| **Display Accuracy(m3)** | 0.001 |
| **Display Range(m3)** | 0-99999999.99 |
| **Accuracy Class** | Class 1.5 |
| **Max. Permissible Errors** | $Q_{min}≤Q<Q_t$， -3%≤E≤+3%; $Q_t≤Q≤Q_{max}$, -1.5%≤E≤+1.5% |
| **Ambient Temperature ($t_m$)** | -25˚C ~ 55˚C |
| **Gas Temperature ($t_g$)** | -25˚C ~ 55˚C |
| **Storage Temperature** | -20˚C ~ 60˚C |
| **Base Temperature ($t_b$)** | 20˚C/15.56 ˚C |
| **Central Temperature ($t_{sp}$)** | 20˚C |
| **Max. Operating Pressure** | 10kPa |
| **Max. Pressure** | 50kPa |
| **Protection** | IP65 |
| **Valve** | Built-in Valve |
| **Main Communication Model** | NB-IoT/Wi-SUN |
| **Standby/Local Communication** | Optical |
| **Power Supply Voltage** | DC 3.6V |
| **Battery Life** | 10 years(Main battery) |
| **Product Average Life** | 10 years |

# ANNEX C Mechanical & Electromagnetic environments

1. Mechanical environments are classified into classes M1 to M3 as described below.

M1 This class applies to instruments used in locations with vibration and shocks of low significance,e.g. for instruments fastened to light supporting structures subject to negligible vibrations and shocks transmitted from local blasting or pile-driving activities, slamming doors, etc.

M2 This class applies to instruments used in locations with significant or high levels of vibration and shock, e.g. transmitted from machines and passing vehicles in the vicinity or adjacent to heavy machines, conveyor belts, etc.

M3 This class applies to instruments used in locations where the level of vibration and shock is high and very high, e.g. for instruments mounted directly on machines, conveyor belts, etc.

2. Electromagnetic environments are classified into classes E1, E2 or E3 as described below, unless otherwise laid down in the appropriate instrument-specific annexes.

E1 This class applies to instruments used in locations with electromagnetic disturbances corresponding to those likely to be found in residential, commercial and light industrial buildings.

E2 This class applies to instruments used in locations with electromagnetic disturbances corresponding to those likely to be found in other industrial buildings.

E3 This class applies to instruments supplied by the battery of a vehicle. Such instruments shall comply with the requirements of E2 and the following additional requirements:
- voltage reductions caused by energising the starter-motor circuits of internal combustion engines,
- load dump transients occurring in the event of a discharged battery being disconnected while the engine is running.