# SINGLE PHASE (SED102)

## SMART ELECTRICITY METER


## PRODUCT OVERVIEW

The **SED102** Smart Electricity Meter is a single-phase meter designed with high flexibility for input communication. It boasts the capability to simultaneously accommodate up to three modules, comprising two communication modules and one input module.

## FRONT VIEW DESCRIPTION:

### DISPLAY

The digital display on the front cover provides real-time information such as energy consumption, voltage, and current.

### DATA QUERY BUTTON

A button is included for users to query or cycle through different data on the display. This can help users' access additional information or navigate the meter's menu.

### OPTICAL COMMUNICATION INTERFACE

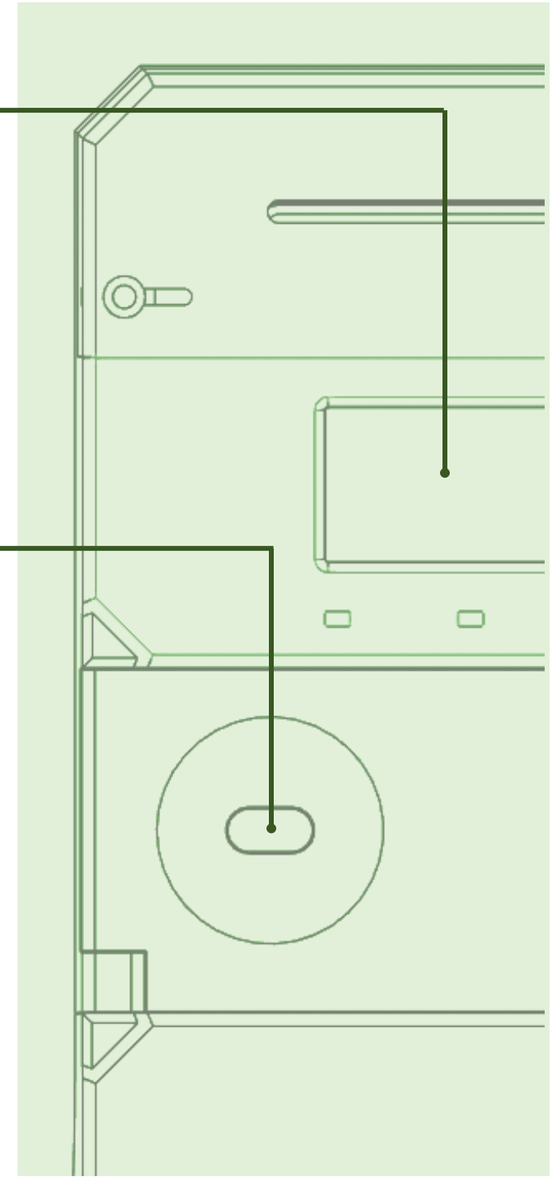
An optical communication interface is present for data exchange. This interface might be used for tasks like connecting to a local data collector or for firmware updates.

### METER INFORMATION

Important meter information is printed on both the front cover and the module door. This could include details like the meter's serial number, model, and other relevant specifications.

### PROGRAM BUTTON

There is a sealable program button that allows for configuration changes or firmware updates. The sealable design ensures that the settings remain secure and tamper resistant.



# MAJOR APPLICATION

The single-phase SED102 smart electricity meter has several major applications:

### Remote Communication and Control:

The meter supports remote communication and control using a CAT.1+2G module. This enables two-way communication with utility providers or other relevant entities.

### Digital Medium for Information Exchange:

The meter utilizes digital media for information exchange. This likely involves the use of digital signals or protocols for transmitting and receiving data, enhancing the efficiency and accuracy of communication.

### Keypad and Button Input Unit:

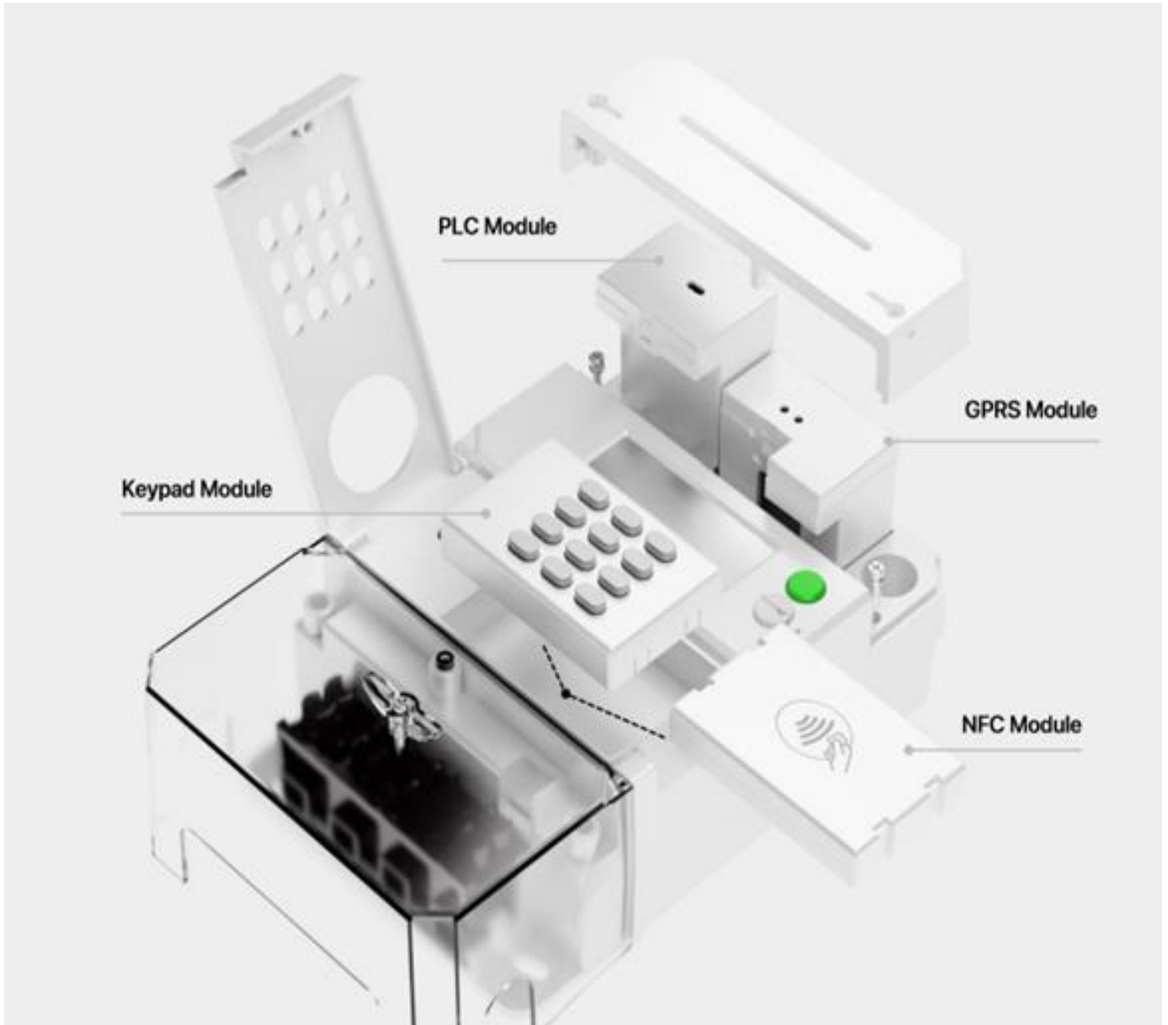
The inclusion of a keypad and button input unit allows for user interaction. Users can input commands, query data, or navigate through the meter's features using the keypad and buttons

### Infrared Communication:

Infrared communication capability is included, allowing the meter to communicate with other devices or systems using infrared signals.

### DLMS/COSEM Specification:

The meter adheres to the DLMS/COSEM (Device Language Message Specification/Companion Specification for Energy Metering) standard. This specification facilitates interoperability and allows the meter to connect seamlessly with the master station or other devices that also comply with the standard.




### Protective PCB Board:

The electric meter's PCB (Printed Circuit Board) is coated with protective paint. This protective layer serves as a barrier against moisture, dust, and pests, ensuring the durability and reliability of the meter in various environmental conditions. The SED102 smart electricity meter offers a range of advanced features for communication, control, and measurement, making it suitable for modern energy management systems. These capabilities contribute to more efficient energy usage, billing, and overall utility operations.

### Load Switch and other auxiliary equipment:

The load switch may enable remote control of electrical loads, contributing to demand response and load management strategies.

### Measurement Unit:

The meter includes a measurement unit responsible for accurately measuring electricity consumption. This unit ensures precise data collection for billing and monitoring purposes.

### Display Unit:

A display unit is integrated into the meter, providing real-time information about energy consumption, voltage, and current. Users can easily access and monitor their electricity usage

### Real-Time Clock Unit:

The meter incorporates a real-time clock unit, enabling it to timestamp data and events accurately. This feature is crucial for time-of-use billing and tracking consumption patterns over specific time periods.

# FEATURES

The characteristics of the single-phase SME102 smart electricity meter are as follows:

### Plug-In Remote Communication Module:

The meter supports a plug-in remote communication module, allowing for flexible communication options and easy upgrades

### Plug-In Input Module (Keypad/NFC):

It features a plug-in input module, supporting either a keypad or Near Field Communication (NFC) technology for user interaction and data input.

### DLMS/COSEM Specification:

It features a plug-in input module, supporting either a keypad or Near Field Communication (NFC) technology for user interaction and data input.

### Software Upgrade locally or remotely:

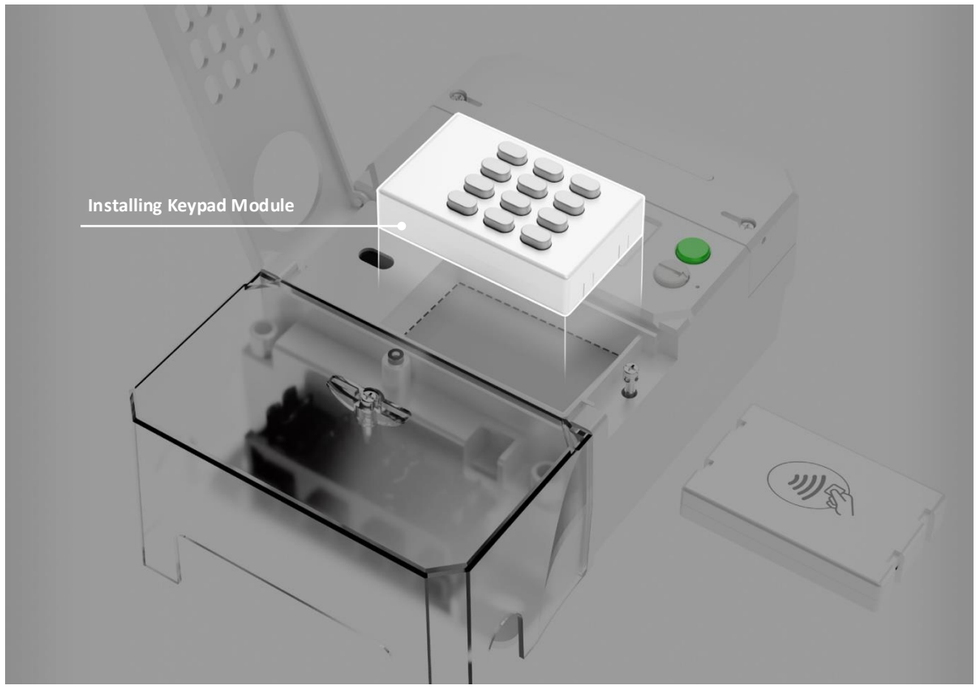
The meter supports software upgrades, which can be performed either locally or remotely. This ensures that the meter can stay up-to-date with the latest features and security enhancements.

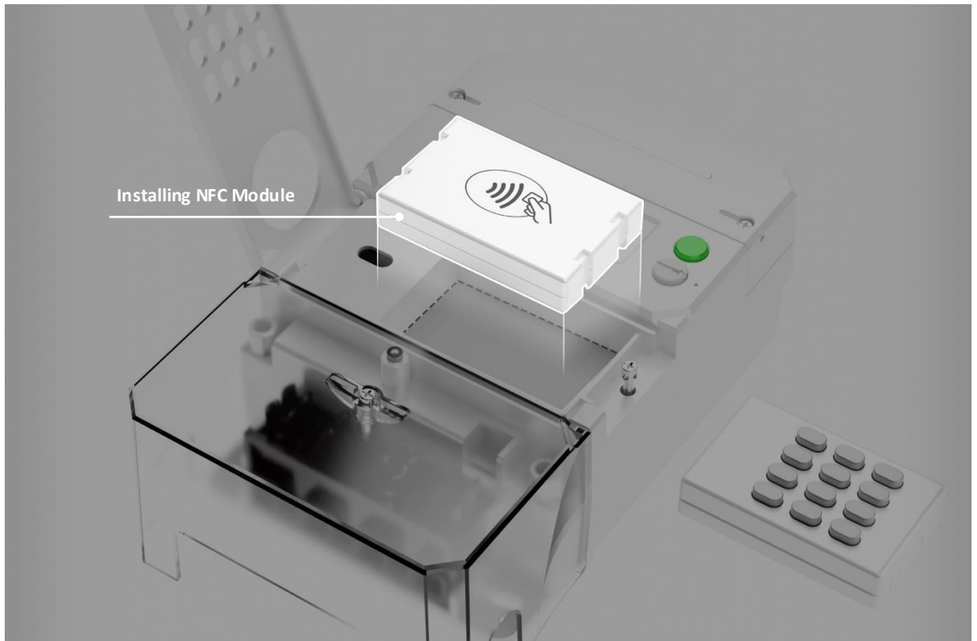
### Communication Data Encryption:

Communication data encryption is implemented to ensure highly reliable and secure communication between the meter and external systems.

### Internal Magnetic Latching Relay:

An internal large capacity magnetic latching relay is included, supporting load control through parameter configuration or communication commands. This allows for efficient management of electrical loads.




### STS Standard:

The meter complies with the STS (Standard Transfer Specification) standard, which is often used for secure and standardized token-based prepayment systems. These characteristics collectively contribute to the functionality, reliability, and versatility of the SED102 smart electricity meter in various applications, offering advanced features for both users and utility providers.

### Active Energy Accuracy:

The meter has a high level of accuracy for active energy measurement, complying with Class 1 standards as per EC62053-21.

### Wide Range of Current Measurement:

The load switch may enable remote control of electrical loads, contributing to demand response and load management strategies.

### Data Display:

It provides data display functionality, including information presented on the meter's LCD display. Users can access real-time data about energy consumption, voltage, current, and more.

### Grid Parameter Detection:

The meter can detect grid parameters in real-time, including power, voltage, current, power factor, etc. This information is crucial for monitoring and managing the electrical grid.

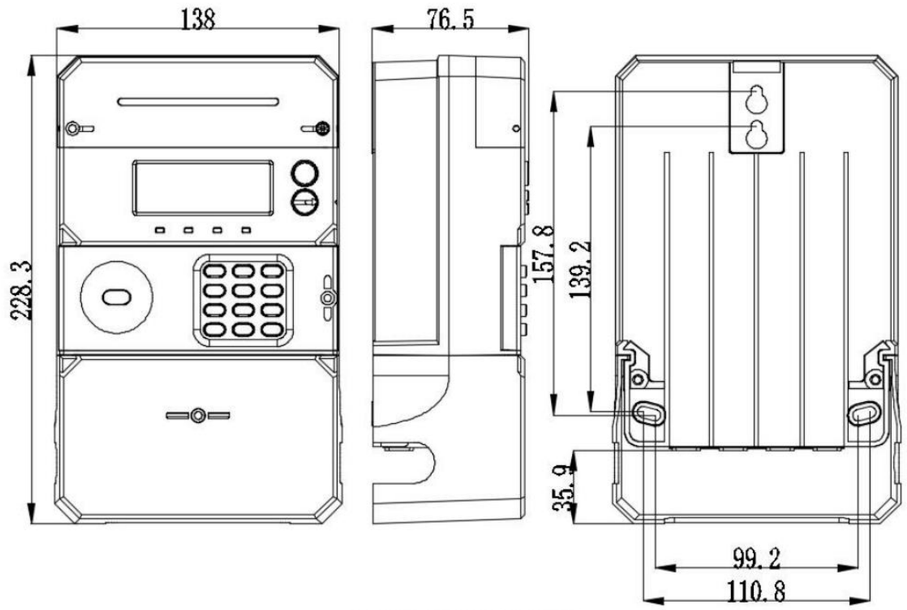
### Changeable Battery:

The meter supports a changeable battery, ensuring that the display remains functional even in the absence of power. This is important for continuous monitoring and data retrieval.

### Real-Time Clock:

A real-time clock is integrated into the meter, providing accurate timestamping for data and events

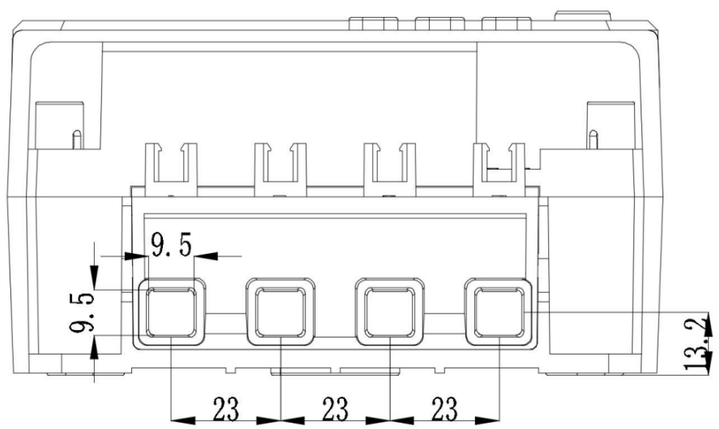
# DIMENSIONS




*ALL UNITS ARE IN MM (MILIMETER)

# TERMINAL

The meter is for front projection mounting. The terminal holes and screws are moving cage type.

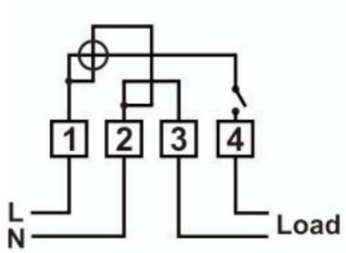



# STANDARDS

| IEC Standard | Description |
|---|---|
| IEC62053-21 | Static meters for active energy (class 1) |
| IEC62053-23 | Static meters for reactive energy (class 2) |
| IEC 62052-11 | Electricity metering equipment (a.c.) – General requirements, tests and test conditions –Part 11: Metering equipment |
| IEC62053-31 | Pulse output devices for electromechanical and electronic meters |
| IEC60695-2-11 | Specifies a test method on an end product. It is intended to simulate the effects of thermal stresses produced by an electrically heated source to represent a fire hazard. This test method is used to check that, under defined test conditions, an end product exposed to an electrically heated source has either a limited ability to ignite or, if it ignites, a limited ability to propagate flame. |
| IEC 62056-21 | Electricity metering – data exchange for meter reading, tariff and load control – Part 21Direct local data exchange |
| IEC62056-42 | " Electricity metering – Data exchange for meter reading, tariff and load control – Part 42:Physical layer services and procedures for connection-oriented asynchronous data exchange" |
| IEC62056-61 | Electricity measurement – meter reading, tariff control and load control data exchange: OBIS |
| IEC62056-62 | Electricity measurement – meter reading, tariff control and load control data exchange: Interface |
| IEC62056-46 | Electricity measurement – meter reading, tariff control and load control data exchange: HDLC protocol data link layer |
| IEC62056-53 | Electricity measurement – meter reading, tariff control and load control data exchange: COSEM application layer |
| IEC62056-47 | Electricity measurement – meter reading, tariff control and load control data exchange: IPv4network COSEM transmit |
| IEC62055-31 | Payment systems - Part 31: Particular requirements - Static payment meters for active energy (classes 1 and 2) |
| IEC62055-41 | Electricity metering – Payment systems –Part 41:Standard transfer specification (STS) – Application layer protocol for one-way token carrier systems |
| IEC62055-51 | Electricity metering – payment systems - Part 51: Standard Transfer Specification – Physical Layer Protocol for one-way numeric and magnetic card token carriers |

# CONNECTION

The wiring diagram is laser printed on the terminal cover of the meter. This provides users with clear guidance on how to connect the meter according to their specific requirements. The Material used for the Microcontroller Unit (MCU) enclosure has good dielectric and mechanical strength with the minimum thickness of 2.0mm, ensuring durability and robustness.




The material used in the MCU enclosure complies with the IEC 60695-2-11 standard, which involves the glow wire test. This standard assesses the fire hazard of electrical equipment by exposing it to a simulated ignition source. These specifications reflect a focus on safety, durability, and compliance with industry standards for the materials used in the construction of the smart electricity meter. The inclusion of the wiring diagram on the terminal cover makes the installation process user friendly and efficient, allowing customers to follow clear instructions for proper connection.

## Auxiliary Terminal Description and Electrical Characteristics

| | |
|---|---|
| 5 6<br>RS485 | RS485 |

# TECHNICAL PARAMETERS

| Parameter | Specification |
|---|---|
| Reference voltage | 220V |
| Working voltage | 60%Un ~ 120%Un |
| Reference current | 5A |
| Maximum current | 100A |
| Accuracy class | Class 1(Active)； |
| Pulse constant | Active: 1000 imp/kWh ；<br>Reactive:1000 imp/kvarh |
| Frequency | (50 ±5%)Hz |
| Temperature | Working temperature range:-40℃～+70℃<br>Store temperature:-40℃～+70℃ |
| Humidity | ≤95% |
| Altitude | 3000m |

| Parameter | Specification |
|---|---|
| Atmospheric pressure | 63kPa-106kPa |
| Relay | Maximum switch current: up to 100A<br>Short circuit <= 10ms: 3000A<br>Mechanical life: >= 300000 OPS<br>Electric life: >= 10000 OPS |
| Wiring | LNNL<br>Connection for overhead and underground system |
| Voltage circuit consumption | ≤ 1W and 5 VA @ 230V |
| Current circuit consumption | 2VA @ 5A, 50Hz, 30° C |
| Starting current | 4‰ Ib |
| Protection degree | IP54 |
| Display format | LCD supports 8 digits<br>Auto scroll mode, manual display mode , power off display mode |
| Button | The left button is used for manual display<br>The right button (sealed) is used for Demand reset |
| Keyboard | 12 keys with audible feedback, meter still IP54 Compliant |
| PCB Board | Conformal coated |
| Average Service life | ≥15 years (Except for the battery, the average life of battery is not less than 10 years) |
| RTC Accuracy | 0.5s/day at reference temperature, comply with IEC 62054-21 |
| Communication interface (optional) | Optical: read and configure the meter locally<br>Remote communication: RS485 / CAT.1+2G |
| Backup-power supply | Internal battery or Extend Replacement Battery. Support RTC, LCD with backlight during AC power off. |
| Measurement | One elements |
| Electrostatic Discharge Immunity | Contact Discharge ：10KV<br>Air Discharge ：16KV |
| HF Electromagnetic Field Immunity | 80 MHz to 2 GHz @10V/m with load; 80 MHz to 2 GHz @30V/mnoload |
| Fast Transient Burst | 4kV |
| Radio Interference Test | Equipment of CISPR 22 Class B |
| Immunity to conducted disturbances induced by radio-frequency fields | 150kHz—80MHz 10V/M |
| Surge/Voltage Immunity | 6KV |
| Impulse Voltage | 8KV |

# MECHANICAL STRUCTURE

### Material Used:

- The meter base and cover are made of non-metallic material.
- The material is non-hygroscopic (does not absorb moisture).
- It is UV stabilized, which means it can withstand exposure to sunlight without significant degradation.
- The material is flame retardant, offering safety in the event of a fire.
- It is polished, providing a smooth and aesthetically pleasing surface.
- The material has high impact-resilience, indicating its ability to absorb and withstand impacts without breaking.
- It has low dirt absorption properties, making it easier to clean and maintain. The material used for the terminal block is capable of passing the ISO 75-1 standard. ISO 75-1 is a standard for testing the temperature behavior of plastics.

NON-METALIC

NON-HYGROSCOPIC

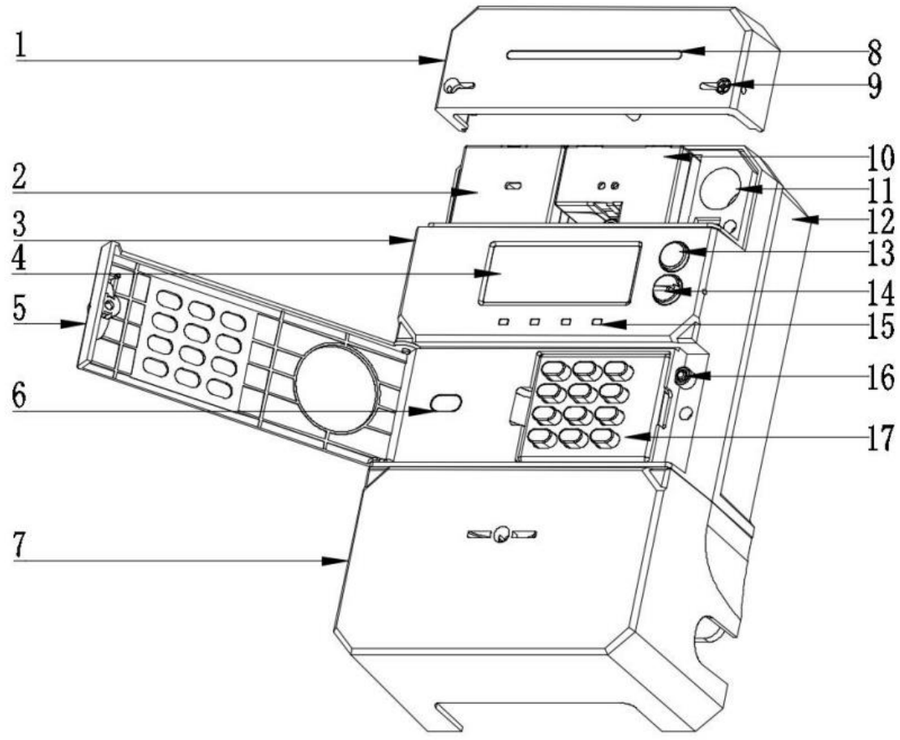
UV STABILIZED

FLAME RETARDANT

ISO 75-1


# CASE COMPONENTS

The case includes various components that are visible from the outside.




| | | | | | |
|---|---|---|---|---|---|
| 1 | Module cover | 2 | Replaceable PLC module | 3 | Top cover |
| 4 | LCD | 5 | Module cover 2 | 6 | Optical port |
| 7 | Terminal cover | 8 | Module LED | 9 | Module cover screw |
| 10 | Replaceable CAT.1+2G module | 11 | Replaceable battery | 12 | Meter base |
| 13 | Display button | 14 | Demand reset button | 15 | Meter LED |
| 16 | Module cover open | 17 | keypad | | |