

SDM01

Smart Energy Monitors with Split-core Current Transformers

Datasheet



Product Description

SDM01 smart energy monitor is a monitoring device that consists of a 18mm-width (1MW) monitor installed at DIN rail and three split-core current transformers (CTs). Functioning as a professional 3-phase energy meter, it accurately measures real-time voltage, current, power and energy data, with wireless and/or wired communication options available for data transmission.

Product Highlights

- Bi-directional measurement: Measure power and energy flow in both consumption and generation.
- Real-time monitoring: Monitor key electrical data like Voltage, Current, and Power in real time.
- Easy installation: Monitoring module requiring only 1MW at DIN rail and associating with compact split-core CTs
- Versatile communication: A wide range of communication options including Wi-Fi, Zigbee, BLE, Modbus etc.
- Local Automation: Enable local UDP broadcasting and HTTP requests, ideal for DLB¹⁾ and zero export for HEMS²⁾

Typical applications

- Real-time home energy monitoring and metering
- Energy-usage monitoring for small business³⁾
- Electrical monitoring for commercial buildings⁴⁾ and infrastructures
- Electrical monitoring for industry energy efficiency projects
- Dynamic load balancing and zero export to grid with solar generation⁵⁾

1) DLB: Dynamic Load Balancing

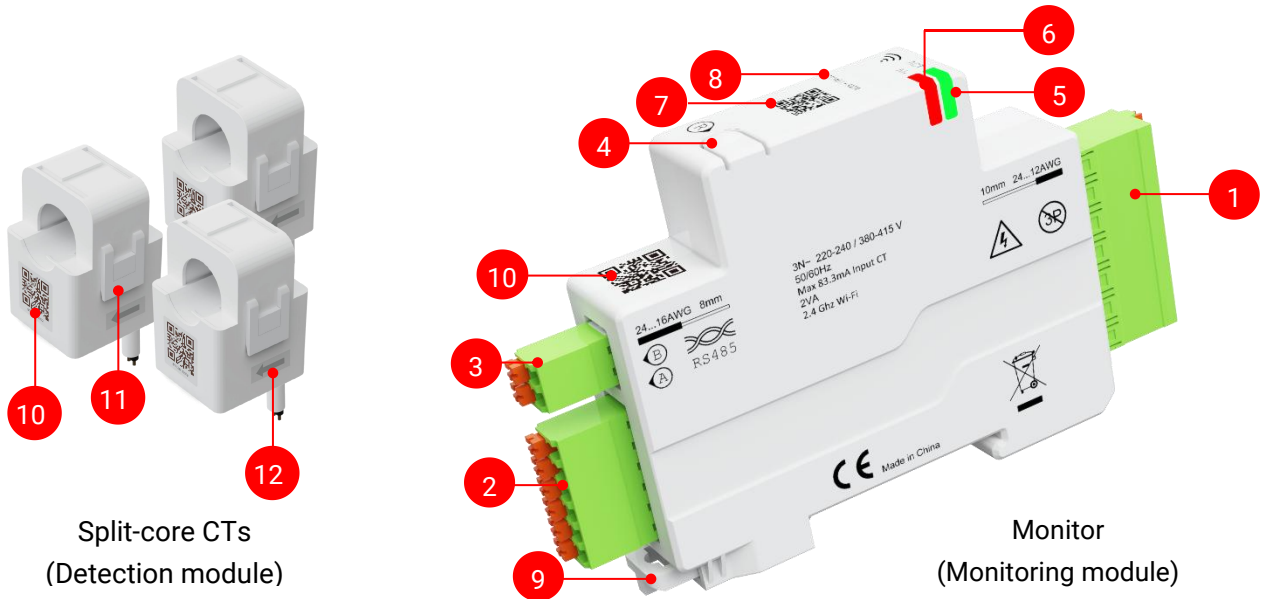
2) HEMS: Home Energy Management System

3) Small business: Café, restaurant, shop, renting apartment etc.

4) Commercial buildings: office, hotel, shopping malls etc.

5) In addition to whole-home energy monitoring when being installed at the main incoming circuit, the real-time monitoring of bi-directional power flow can provide input for DLB and minimizing grid export from solar generation

Parts Description



| # | Element | Description |
|------|--|--|
| (1) | Connector for voltage take-offs connection | The monitor module powers itself and measures voltage via four cables for X, Y, Z and N connections |
| (2) | Connector for current transformer connection | The Red(+)/Black(-) wires of CT(X), CT(Y), CT(Z) must match the +/- poles of the connector for CT(X), CT(Y), CT(Z) connection |
| (3) | Connector for RS485 communication | Only for product versions with RS485 communication function |
| (4) | Reset button | Reset button Press the button 3~5 seconds to enter the pairing mode |
| (5) | Status LED (ACT) | <input type="checkbox"/> ON, normal using, connect to cloud <input checked="" type="checkbox"/> Flashing at 2Hz, in pairing mode <input checked="" type="checkbox"/> Flashing at 0.5Hz, paired, searching for cloud <input checked="" type="checkbox"/> Flashing at 0.25Hz, self-checking failed ¹⁾ <input checked="" type="checkbox"/> Flashing at 1Hz, communication failed ²⁾ |
| (6) | Alarm LED (AL) | <input checked="" type="checkbox"/> Flashing at 1Hz, alarm reminding ³⁾ |
| (7) | Product QR code | Device information containing manufacturing batch |
| (8) | Product model | Refer to page 4~7 for ordering information |
| (9) | Locking clip for DIN rail mounting | The monitoring module can be installed at 35mm DIN rail |
| (10) | Calibration ID | The calibration ID at the split-core CT must match the one at the monitoring module, to achieve the maximal level of measurement accuracy |
| (11) | Split-core CT locking clasp | The locking clasp must be firmly locked for accurate measurement |
| (12) | Positive energy flow direction | Positive energy flow direction for installation of CT(X), CT(Y) and CT(Z) |

Remark:

- 1) Please try restarting the device - disconnecting power supply, switching on, then pairing the device again.
- 2) Input voltage is too low to ensure the internal communication module working properly.
- 3) Please check the device wiring and the alarm information at the APP immediately.

Technical Specification

| # | Technical specification | |
|-----|---|---|
| 101 | Rated operating voltage U_n | 220~240 VAC phase to neutral, 50/60 Hz 380~415 VAC phase to phase, 50/60 Hz ¹⁾ |
| 102 | Max current I_{max} | 80A / 120A / 200A |
| 103 | Over-voltage category | III |
| 104 | Rated insulating voltage U_i | 440V |
| 105 | Rated impulse withstand voltage U_{imp} | 4kV |
| 106 | Pollution degree | 3 |
| 107 | Protection degree | IP20 |
| 108 | Reference standard for measurement tolerance: IEC 61557-12 | Voltage: Class 0.5 Current: Class 1 Active power: Class 1 Forward active energy: Class 1 |
| 109 | Power consumption | Normal using: 1.5 Watt Pairing mode: 2.0 Watt |
| 110 | Rated operating temperature | -25~70 °C |
| 111 | Size: Height x Width x Depth | Monitoring Module: 113.7mm x 18.0mm x 65.9mm Split-core CT: Refer to mechanical outline page |
| 112 | Reference standard: | IEC 61557-12 IEC 61326-1 ETSI EN 300 328 ETSI EN 301 489-1 ETSI EN 301 489-17 |
| 113 | Integrated communication option ²⁾ | Wi-Fi; Zigbee; Modbus |

Remark:

- 1) Not suitable for IT system.
- 2) SDM01 is designed with a modular hardware platform that can be extended for more communication options - Z-wave, Thread, LoRaWAN, EEBus, DL645 etc.

Ordering Information

Product part 1 – Combined Wi-Fi and Modbus communication

| # | Ordering number | Description |
|---|-----------------|--|
| 1 | SDM01-TWM-08 | SDM01, 3×80A SCT-A/Φ 10.2, 3P+N, Wi-Fi+Modbus, Tuya Cloud Integration ¹⁾ + Modbus Slave |
| 2 | SDM01-TWM-12 | SDM01, 3×120A SCT-A/Φ 16, 3P+N, Wi-Fi+Modbus, Tuya Cloud Integration ¹⁾ + Modbus Slave |
| 3 | SDM01-TWM-20 | SDM01, 3×200A SCT-A/Φ 20, 3P+N, Wi-Fi+Modbus, Tuya Cloud Integration ¹⁾ + Modbus Slave |
| 4 | SDM01-EWM-08 | SDM01, 3×80A SCT-A/Φ 10.2, 3P+N, Wi-Fi+Modbus, Customer-specific Cloud Integration ²⁾ + Modbus Slave |
| 5 | SDM01-EWM-12 | SDM01, 3×120A SCT-A/Φ 16, 3P+N, Wi-Fi+Modbus, Customer-specific Cloud Integration ²⁾ + Modbus Slave |
| 6 | SDM01-EWM-20 | SDM01, 3×200A SCT-A/Φ 20, 3P+N, Wi-Fi+Modbus, Customer-specific Cloud Integration ²⁾ + Modbus Slave |

Remark:

1) Tuya CB3S Wi-Fi & Bluetooth module (BK7231N SoC) is used for product versions connecting to Tuya cloud. Smart Life- an APP owned by Tuya Smart- can be used to access the device for Modbus configuration.

2) ESP8685-WROOM-01 Wi-Fi & Bluetooth module (ESP8685H4 SoC) is used for product versions supporting customer-specific cloud integration. An embedded configuration webpage in the monitor can be accessed locally via browser for Modbus configuration.

Ordering Information

Product part 2 –Wi-Fi communication

| # | Ordering number | Description |
|---|-----------------|--|
| 1 | SDM01-TW0-08 | SDM01, 3×80A SCT-A/Φ 10.2, 3P+N, Wi-Fi, Tuya Cloud Integration ¹⁾ |
| 2 | SDM01-TW0-12 | SDM01, 3×120A SCT-A/Φ 16, 3P+N, Wi-Fi, Tuya Cloud Integration ¹⁾ |
| 3 | SDM01-TW0-20 | SDM01, 3×200A SCT-A/Φ 20, 3P+N, Wi-Fi, Tuya Cloud Integration ¹⁾ |
| 4 | SDM01-EW0-08 | SDM01, 3×80A SCT-A/Φ 10.2, 3P+N, Wi-Fi+BLE, Customer-specific Cloud Integration ²⁾ |
| 5 | SDM01-EW0-12 | SDM01, 3×120A SCT-A/Φ 16, 3P+N, Wi-Fi+BLE, Customer-specific Cloud Integration ²⁾ |
| 6 | SDM01-EW0-20 | SDM01, 3×200A SCT-A/Φ 20, 3P+N, Wi-Fi+BLE, Customer-specific Cloud Integration ²⁾ |

Remark:

1) Tuya CB3S Wi-Fi & Bluetooth module (BK7231N SoC) is used for product versions connecting to Tuya cloud. Smart Life- an APP owned by Tuya Smart- can be used to access the device. Also, Tuya Integration at Home Assistant OS and Tuya Smart API can be used to access the device indirectly via Tuya Smart cloud.

2) ESP8685-WROOM-01 Wi-Fi & Bluetooth module (ESP8685H4 SoC) is used for product versions supporting customer-specific cloud integration. An embedded configuration webpage in the monitor can be accessed locally via browser. This version supports local UDP broadcasting and Http request, which is specifically optimized for DLB and grid zero export.

Ordering Information

Product part 3 – Zigbee communication

| # | Ordering number | Description |
|---|-----------------|--|
| 1 | SDM01-TZ0-08 | SDM01, 3×80A SCT-A/ Φ 10.2, 3P+N, Zigbee, Tuya Zigbee Cluster ¹⁾ |
| 2 | SDM01-TZ0-12 | SDM01, 3×120A SCT-A/ Φ 16, 3P+N, Zigbee, Tuya Zigbee Cluster ¹⁾ |
| 3 | SDM01-TZ0-20 | SDM01, 3×200A SCT-A/ Φ 20, 3P+N, Zigbee, Tuya Zigbee Cluster ¹⁾ |
| 4 | SDM01-UZ0-08 | SDM01, 3×80A SCT-A/ Φ 10.2, 3P+N, Zigbee, Standard Zigbee Cluster |
| 5 | SDM01-UZ0-12 | SDM01, 3×120A SCT-A/ Φ 16, 3P+N, Zigbee, Standard Zigbee Cluster |
| 6 | SDM01-UZ0-20 | SDM01, 3×200A SCT-A/ Φ 20, 3P+N, Zigbee, Standard Zigbee Cluster |

Remark:

1) Tuya ZS3L Zigbee module (EFR32MG21 SoC) with Tuya's proprietary Zigbee clusters/attributes is used in the device. In addition to be connected by Tuya Zigbee gateway, the devices can be identified by universal Zigbee coordinators for Zigbee2Mqtt integration.

Ordering Information

Product part 4 –Modbus communication

| # | Ordering number | Description |
|---|-----------------|---|
| 1 | SDM01-CCM-08 | SDM01, 3× 80A SCT-A/ Φ 10.2, 3P+N, Modbus |
| 2 | SDM01-CCM-12 | SDM01, 3×120A SCT-A/ Φ 16, 3P+N, Modbus |
| 3 | SDM01-CCM-20 | SDM01, 3×200A SCT-A/ Φ 20, 3P+N, Modbus |

Installation Notice

Please note before starting Installation

- **SDM01 should be installed, operated, serviced and maintained ONLY by qualified professionals.** Qualified professionals refer to those who have the skills, license and knowledge related to the manufacture, operation and installation of electrical equipment. They are trained to detect and avoid risks.
- SDM01 should not be installed if, while unpacking, any damage is observed.
- SDM01 must be installed inside electrical panels or switchboards, behind a door or plate, so that they are inaccessible for unauthorized persons. The electric panels must meet the requirements of the applicable standards (IEC 61439-1) and installed in compliance with current installation and safety rules (IEC 61140).
- All relevant local, regional, and national regulations must be respected while installing and using SDM01.
- SDM01 manufacturer is not liable in case the instructions mentioned in this document and other referred documents are not respected.



HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- **SDM01 should be installed, operated, serviced and maintained ONLY by qualified professionals.**
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462, DL/T 320 or local equivalent.
- Turn off all power supply sources before installing and during maintenance of this equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Do not use a SDM01 for voltage testing purposes. A Voltage Tester must be used instead.

Failure to follow these instructions can result in death, serious injury, or equipment damage.



FIRE HAZARD

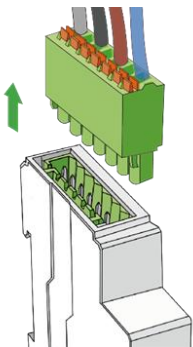
- SDM01 must be associated with an easily accessible upstream protection and circuit-breaker system.
- The ends of voltage take-offs cables must be adjusted to the according equipment and device. Such an adjustment can only be handled by qualified professionals.

Failure to follow these instructions can result in death, serious injury, or equipment damage.



RISK OF DAMAGING

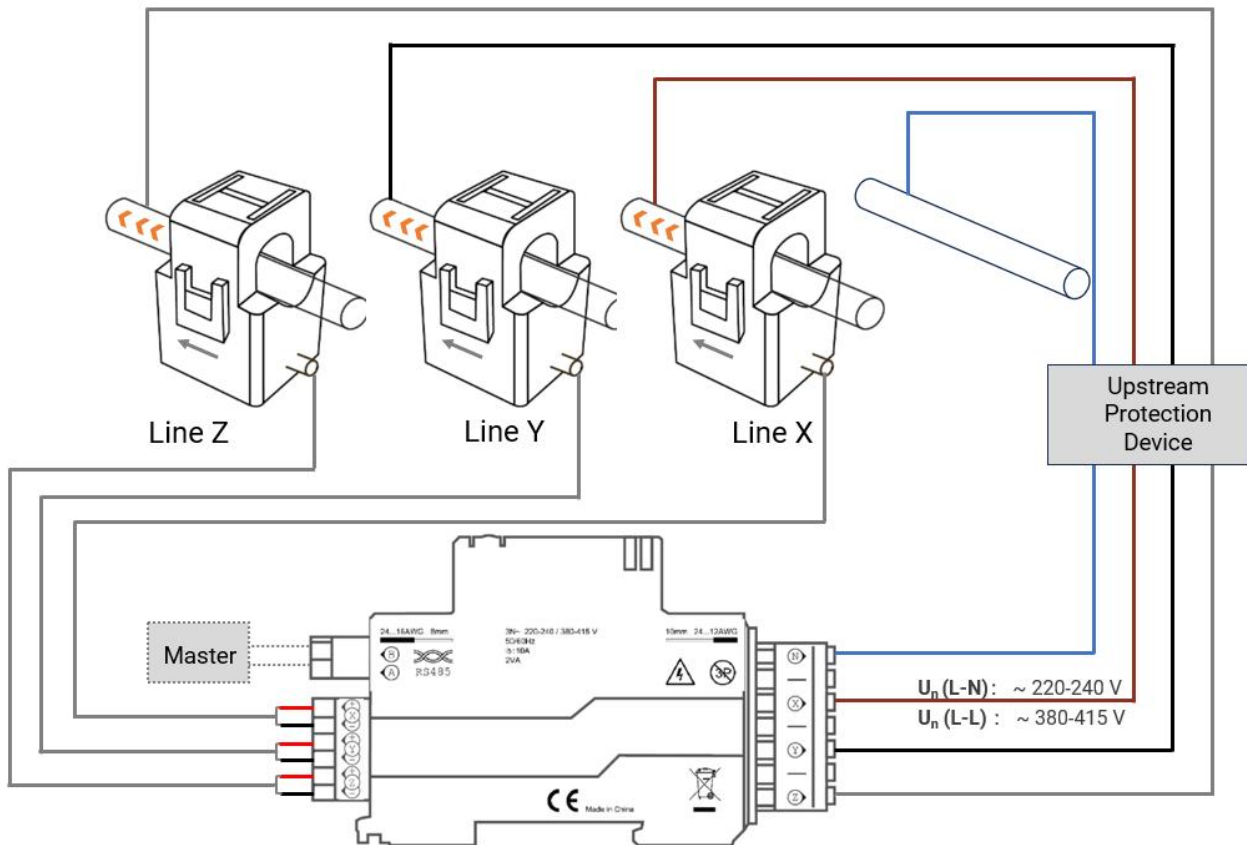
- Comply with the phase and the neutral position. Connect the N pole of the voltage measurement connector to phase voltage is strictly forbidden.
- Please ensure that the split-core current transformers not in direct contact with non-insulated conductors.
- Disconnect the voltage take-offs of SDM01 before performing the dielectric withstand test or insulation measurements.





- Limit the insulation measurements up to 500 VDC.
- SDM01 can only be installed upstream if associated with a contactor, frequency converter or motor starters.

Failure to follow these instructions can result in equipment damage.

3P+N System Wiring Scheme



Note:

- The voltage measurement must match the current measurement – $U_x(I_x)$; $U_y(I_y)$; $U_z(I_z)$, to monitor electrical data correctly.
- SDM01 is not suitable for IT system.
- The energy flowing  in the same direction as the current flow arrow printed on the CT housing  is counted as forward energy.

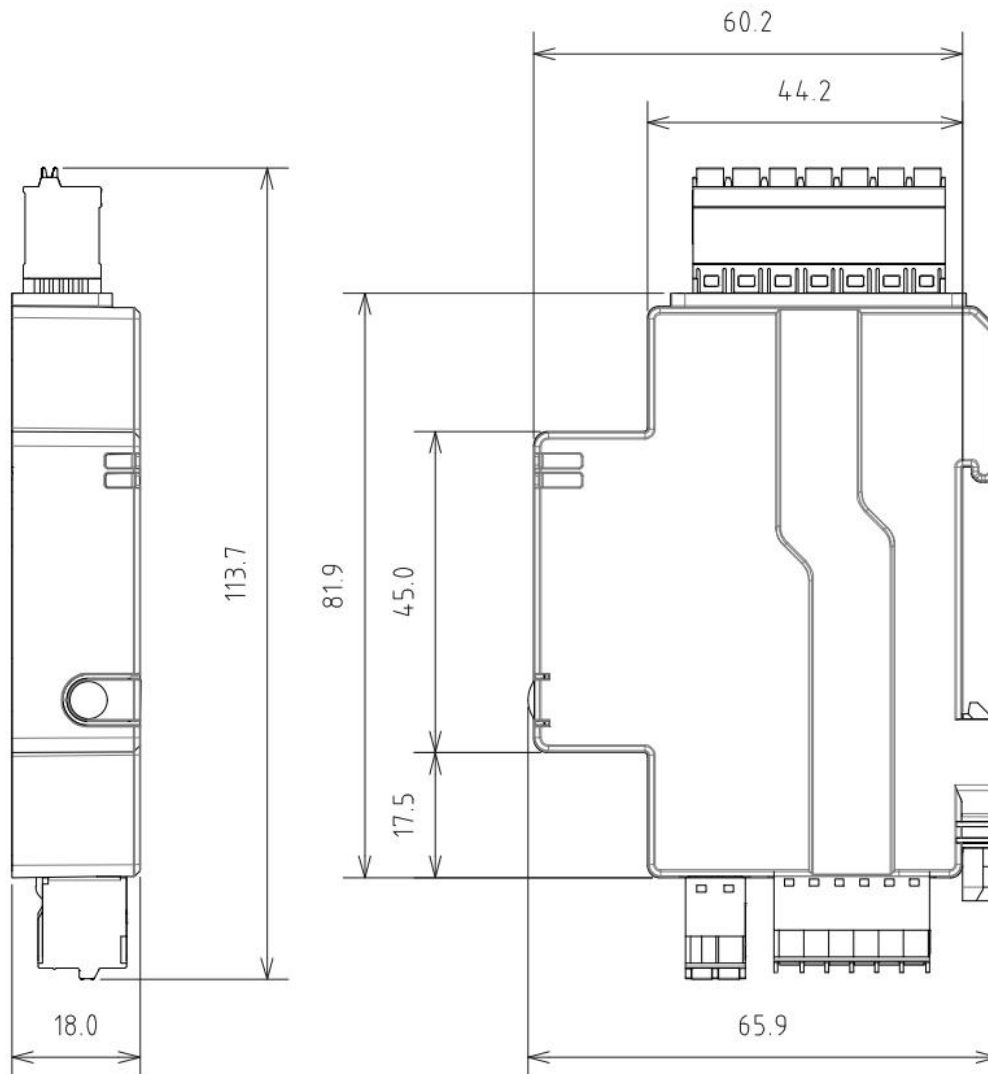


- SDM01 can be damaged, if it is installed downstream of switching devices – such as a contactor, frequency converter or motor starters.
- It can cause product damage, if the blue cable for N connection is connected to phase conductors by mistake

Mechanical outline*

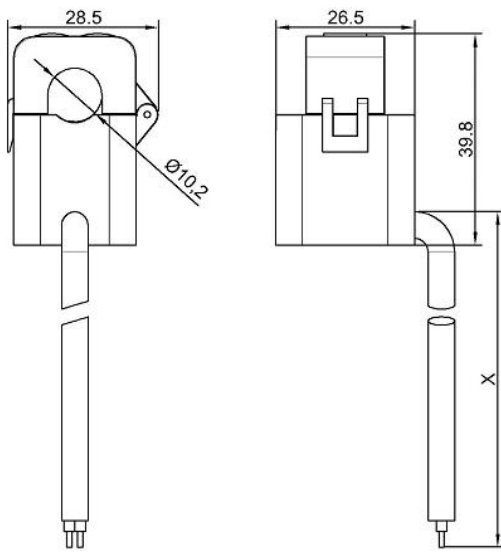
Monitoring module for Din-rail installation

Dimension: Unit in mm

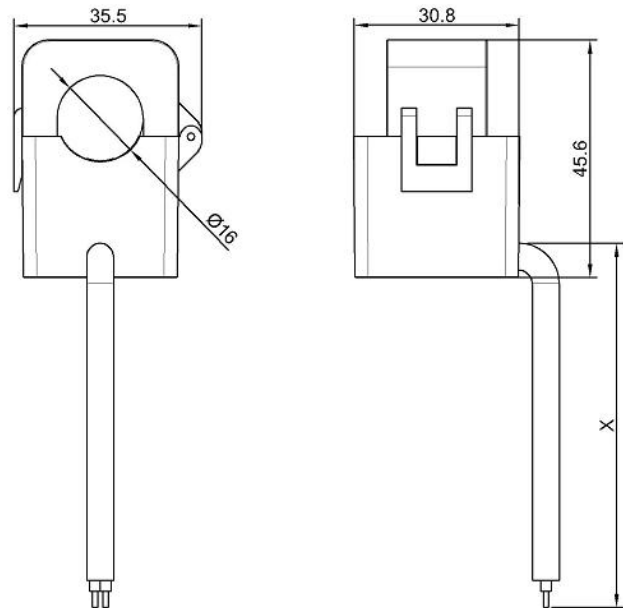


Dimension: Unit in mm

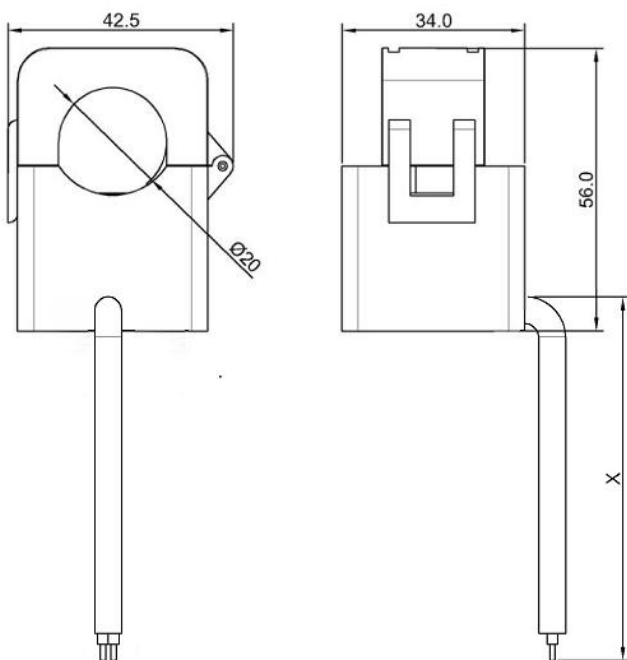
Split-core CT – 80A



Split-core CT – 120A



Split-core CT – 200A



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