SDM120CT-40mA

Single-phase DIN-rail Multifunction Smart Meter

USER MANUAL
2026 V1.0

Statements

Eastron reserves the right to amend the product specifications in this manual without prior notice. Before placing an order, please contact our company or local agent to get the latest specifications.

CONTENT

Version History

Version	Date	Changes
1.0	2026-07-16	Initial issue

Risk Information

Information for Your Own Safety

This manual is intended to provide key information for the safe operation of the equipment, and foreseeable risks have been assessed and identified. However, the manual cannot cover all potential hazards that may arise under all operating conditions. Operators should exercise caution based on actual site conditions and comply with all applicable safety regulations.

DANGER

Indicates an imminent hazardous situation. If the necessary safety measures are not taken, death or serious injury will result.

WARNING

Indicates a potentially hazardous situation. If the operating instructions are not followed, death or serious injury could result.

CAUTION

Indicates a low-level hazardous situation. If the operating instructions are not followed, minor or moderate injury may result, or property damage and meter damage may occur.

NOTICE

Indicates information that is not directly related to personal safety, but is important for proper operation, performance maintenance, or long-term reliability of the equipment.

Qualified personnel

Operation of the equipment (module, device) described in this manual must only be performed by qualified personnel. Qualified personnel in this manual means people who are authorized to commission, start up, ground and label devices, systems and circuits in accordance with Safety Regulatory standards.

Proper handling

The prerequisites for perfect, reliable operation of the product are proper transport, storage, installation and operation and maintenance. When operating electrical equipment, some parts of this equipment automatically carry dangerous voltages. Improper handling can therefore result in serious injuries or material damages.

- ✧ Use only insulating tools.
- ✧ Do not connect while circuit is live (hot).
- ✧ Place the meter only in dry surroundings.
- ✧ Do not mount the meter in an explosive area or expose the meter to dust, mildew and insects.
- ✧ Make sure the wires are suitable for the maximum current of this meter.
- ✧ Make sure the AC wires are connected correctly before activating the current/voltage to the meter.
- ✧ Do not touch the clamps directly with metal, blank wire or your bare hands as you may get electrical shock.
- ✧ Make sure the protection cover is placed after installation.
- ✧ Installation, maintenance and reparation should only be done by qualified personnel.
- ✧ Never break the seals or open the front cover as this might influence the function, and will void the warranty.

- ✧ Do not drop, or allow strong physical impact on the meter as the high precisely components inside may be damaged.
- ✧ This product is designed to be mounted inside of switchboards or cabinet on DIN rail.
- ✧ This device must have a suitable sized Circuit Breaker feeding the Multi Function Energy Meter so it does not exceed the maximum rated current.
- ✧ The supply wiring of this device shall be suitable sized cable to match the installed circuit breaker.
- ✧ A Disconnection Device (Circuit Breaker) should be installed close to the Multi Function Energy Meter.
- ✧ The Disconnection Device shall be marked as the Disconnection Device for the Multi Function Energy Meter.

Disclaimer

We have checked the contents of this publication and every effort has been made to ensure that the descriptions are as accurate as possible.

However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors contained in the information given. The data in this manual is checked regularly and the necessary corrections are included in subsequent editions. We are grateful for any improvements that you suggest.

Chapter 1. Introduction

1.1 Product Introduction

The SDM120CT-40mA is a current-transformer-connected multifunctional DIN-rail meter for single-phase two-wire power networks. It accurately measures various critical electrical parameters: voltage, current, power, frequency, active energy, reactive energy, forward energy, reverse energy, etc. It is suitable for real-time power monitoring systems and features multifunctionality, versatility, high stability, and long service life.

The meter incorporates a high-speed RS485 communication port supporting up to 9600 bps, making it an ideal choice for power and energy monitoring.

The SDM120CT-40mA is equipped with two pulse outputs (pulse constant, pulse width, and output unit are configurable) and one RS485 communication interface for remote communication and configuration.

1.2 Product Characteristics

- Compact and elegant design
- 40mA CT input, with user-adjustable CT ratio
- Multi-parameter measurement with configurable display scrolling
- Support communication with AMR and SCADA systems
- Communication address configurable via front-panel key
- White backlit LCD display for easy data reading
- DIN Rail mounting 35mm

1.3 Application Scenarios

The SDM120CT-40mA is a multifunctional power meter designed for power monitoring in power systems, utility facilities, industrial applications, and residential premises. It is suitable for power transmission and distribution, AC charging stations, solar photovoltaic systems, and other applications. Its comprehensive communication capabilities make it ideal for various real-time power monitoring systems.

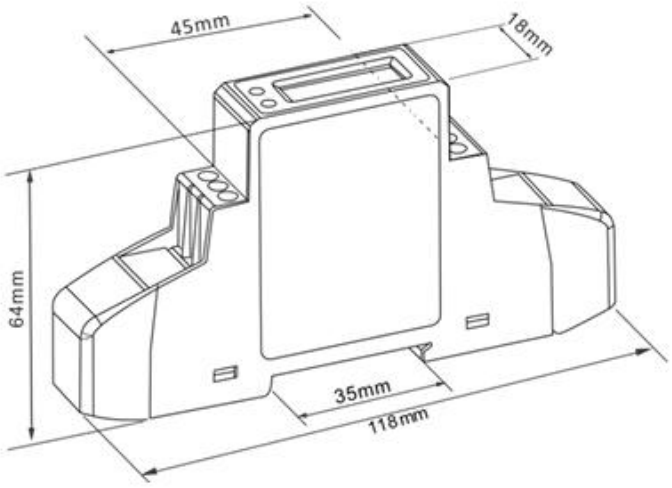
Chapter 2. Technical Parameters

2.1 Specifications

Electrical Characteristics		
Type of Measurement		RMS
Measurement Accuracy	Voltage	± 0.5%
	Current	± 0.5%
	Frequency	± 0.2%
	Power Factor	± 0.01
	Active Power	± 1%
	Reactive Power	± 1%
	Apparent Power	± 1%
	Active Energy	Class 1 per IEC62053-21 Class B per EN50470-3
	Reactive Energy	Class 2 IEC 62053-23
Data update rate		100ms
Technical parameters	Voltage AC (Un)	230V(L-N)
	Voltage Range	184-276 V AC (L-N)
	Frequency	45-65Hz
	Current Input	Primary: 5-9999 A Secondary: 40 mA
	Over Current Withstand	20Imax for 0.5S
	AC Voltage Withstand	4KV/1min
	Impulse Voltage Withstand	6kV – 1.2/50μS waveform
	Voltage Circuit Power Consumption	≤ 2W/10VA
	Current Circuit Power Consumption	≤0.05VA
Mechanical Characteristics		
IP Degree of Protection (IEC 60529)		IP51 (indoor)
Dimensions (WxHxD)		18* 118* 64mm
Mounting		DIN Rail 35mm
Material of Meter Case		Self-extinguishing UL 94 V-0
Mechanical Environment		M1
Environmental Characteristics		
Operating Temperature		-25℃ ~ +55℃
Storage Temperature		-40℃ ~ +70℃
Operation humidity		≤90% Non-condensing
Storage humidity		≤95% Non-condensing
Pollution Degree		II
Altitude		≤2000m

Vibration	10Hz ~ 150Hz, IEC 60068-2-6
Electromagnetic Compatibility	
Electrostatic Discharge	IEC 61000-4-2
Immunity to Radiated Fields	IEC 61000-4-3
Immunity to Fast Transients	IEC 61000-4-4
Surge (Impulse) Immunity	IEC 61000-4-5
Conducted Immunity	IEC 61000-4-6
Immunity to Magnetic Fields	IEC 61000-4-8
Immunity to Voltage Dips	IEC 61000-4-11
Radiated Emissions	CISPR 32
Conducted Emissions	CISPR 32
Safety	
Measurement category (IEC61010- 1)	CAT III
Installation Category	CAT III
Over-voltage Category	CAT III
Protective Class	II
Interface 1	RS485
Interface 1 Protocol	MODBUS RTU
Communication Address	1 to 247
Transmission Mode	Half Duplex
Data Type	Floating Point
Transmission Distance	1000m Maximum
Transmission Speed	1200/2400/4800/9600(Default)bps
Parity	NONE(Default)/ODD/EVEN
Stop Bits	1/2
Response Time	<100 ms

2.2 Dimensions



Width: 18 mm
Height: 118 mm
Depth: 64mm

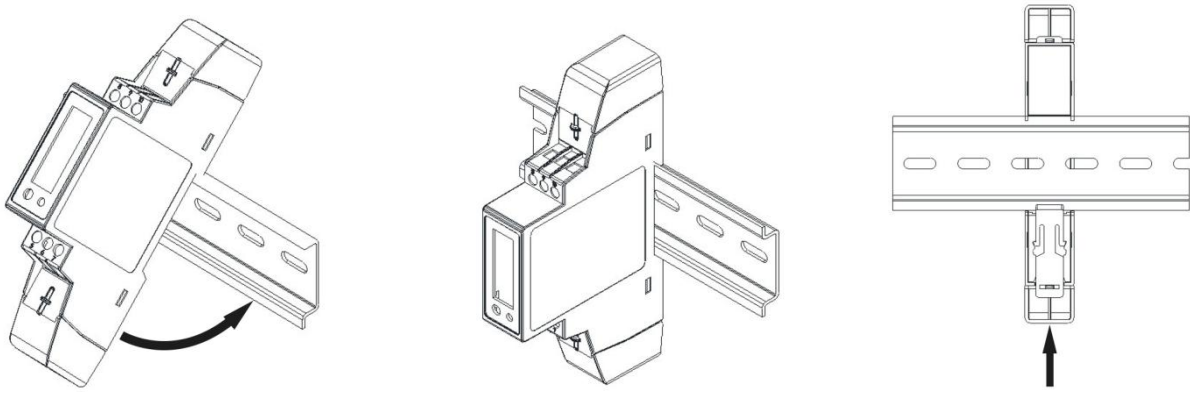
2.3 Mounting

Step 1: Select a 35mm-wide DIN rail, Pull down the back-end clip on the meter to unlock the mounting mechanism.

Step 2: Align Upper Slot with DIN Rail. Position the upper slot of the meter's DIN rail groove onto the DIN rail, ensuring full contact (see Figure 1).

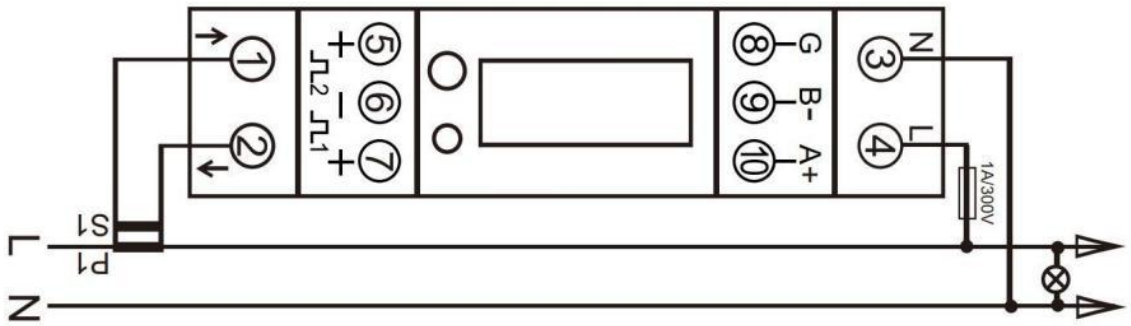
Step 3: Following the direction indicated in Figure 1, engage the lower slot of the DIN rail groove onto the DIN rail until audibly seated (see Figure 2).

Step 4: Push up the back-end clip to lock the meter firmly onto the DIN rail (see Figure 3).



① ② ③

2.4 Wiring Diagram



Wiring Guide

Terminal ①~④	Measurement Connection	Screw Connection
	Strip Length	9-10mm
	Screw	M4
	Rigid/Supple	2.5-10mm² (12~8AWG)
	Tightening Torque	1.5Nm
	Model	PH2
Terminal ⑤~⑩	Measurement Connection	Screw Connection
	Strip Length	5-6mm
	Rigid/Supple	0.5-1.5mm² (22 ~ 14AWG)
	Tightening Torque	0.4Nm
	Model	PH0

Chapter 3. Operation

3.1Button Functions

Button Definitions:

	◆ measurement mode: Short press: switch display screen; Long press: enter setup mode； ◆ setup mode： Long press: set parameters.

3.2 Installation Display

Connect the wire and power on the meter to enter the normal measurement state. The screen display is as follows:

Display	Description
	Full-screen display on power-up
	Software version
	Firmware number
	Total active energy – display cycling: 0000.00 → 9999.99 → 10000.0 → 99999.9 → 0000.00

3.3 Basic information display

The following parameters can be viewed by pressing the buttons:

Display	Description

	Total active energy in kWh
	Imported active energy in kWh
	Exported active energy in kWh
	voltage
	Current.
	Active Power
	Frequency
	Power Factor
	Communication address Range: 001~247 Default: 001
	Baud rate Option: 1.2K,2.4k, 4.8k, 9.6k bps Default: 9.6k bps

	Parity bit Option: NONE, EVEN, Odd Default: NONE
	CT ratio
	Software version

3.4 Setup Mode

After long-pressing the button for 3 seconds to enter setup mode, holding register parameters can be configured via communication.

Settings interface	Set status	Optional configuration
	Long press the key, the display shows SET to enter setting mode.	
		Communication address setting: ① Long press to show address screen. ② Long press again to enter address edit: the most significant digit starts blinking; if no operation for 3 seconds, the cursor automatically moves to the next digit. When the least significant digit blinks for 3 seconds without operation, the current value is automatically saved. ③ While a digit is blinking, short press to increase the value. Range: 1-247 Default: 1
		CT1 Setting: In setting mode, briefly press the button to switch to the CT1 interface. Long press the button to enter CT1 setting, then briefly press to select the setting. If no operation is performed for 3 seconds, the current setting will be automatically saved. Available options: 5, 10, 20, 30, 40, 50, 75, 100, 125, 150, 200, 250, 300, 400, 600 Default: 5

Chapter 4.Communication Protocol

4.1 Summary

Modbus RTU is a protocol based on serial communication, its frame structure is compact and efficient. A complete Modbus RTU frame includes the following parts:

Field	Length	Explain
Device address	One byte	The address of the machine is 1 to 247, with 0 reserved for broadcast addresses.
Function code (1)	One byte	Indicates the type of operation requested by the master device (such as reading registers, writing coils, etc.).
Data fields	Variable	Contains specific data such as register addresses and register values that are requested or responded to.
CRC check	Two bytes	Used to verify the integrity of frames and ensure the reliability of data transmission.

(1): Common function codes:

01: Read Coils

02: Read Discrete Inputs

03: Read the Holding register

04: Read the Input register

05: Write to Single Coil

16: Write to Multiple register

4.2 Modbus Frame Format

(1) Request frame

First byte Last byte

From the machine device address	Function code	The starting address of the register (high byte)	The starting address of the register (lower byte)	Number of registers (high byte)	Number of registers (lower byte)	CRC check (low byte)	CRC check (high byte)

The meaning of each byte is as follows:

1. Device address (byte 1): The host device specifies which slave device to communicate with through this address.
2. Function code (byte 2): Defines the type of operation requested by the host device.
3. Register starting address (bytes 3 and 4): indicates the starting address of the register to be operated. Byte 3 is the high byte, and byte 4 is the low byte. For example, 00 01 indicates that the register address is 0x00 01 .
4. Register number (byte 5 and byte 6): indicates the number of registers to be read or written. Byte 5 is the high byte and byte 6 is the low byte. For example, 00 02 indicates that two registers are read.
5. CRC check (bytes 7 and 8): Used to verify the integrity of a frame. CRC check is based on all bytes in the frame (from the device address to the data field). Byte 7 is the low byte (the lowest valid bit), and byte 8 is the high byte (the highest valid bit).

(2) Normal response frame

First byte Last byte

From the machine device address	Function code	Number of bytes	First register data (high byte)	First register data (low byte)	Second register data (high byte)	Second register data (low byte)	CRC check (low byte)	CRC check (high byte)

The meaning of each byte is as follows:

1. Device address (byte 1): Consistent with the device address in the request frame, indicating the slave device address of the response.

2. Function code (byte 2): Consistent with the function code in the request frame, indicating the operation type.

3, number of bytes (bytes 3): indicates the number of bytes returned by the data. For example, if two registers are read and each register is 2 bytes, then the number of bytes is 4.

4. Data Fields (Bytes 4 to 7): These contain the register data returned by the slave device. Floating-point numbers (Float) are split into two 16-bit registers (4 bytes), with each register occupying 2 bytes. Use big-endian (Big-Endian) format, where Register 1 represents the high 16 bits (Bytes 1 and 2), and Register 2 represents the low 16 bits (Bytes 3 and 4). For example: the return data is 12 345678, where 12 34 indicates the value of the first register is 0x12 34 , and 56 78 indicates the value of the second register is 0x56 78 .

5. CRC check (bytes 8 and 9): Used to verify the integrity of the response frame. The CRC check is based on all bytes in the frame (from the device address to the data field).

(3) Abnormal response frame

First byte Last byte

From the machine device address	Abnormal function code (Feature code + 0x80)	Exception code	CRC check (low byte)	CRC check (high byte)

The meaning of each byte is as follows:

1. Device address (byte 1): Confirm whether the slave device address is consistent with the request frame.

2. Abnormal function code (byte 2): Check whether the highest bit of the function code is 1. Abnormal function code = normal function code + 0x80.

3. Exception code (byte 3): Illegal request.

4. CRC check (bytes 4 and 5): Used to verify the integrity of the response frame. CRC check is based on all bytes in the frame (from the device address to the data field).

4.3 Input Registers

Function code	Description
04	Read Input Register

Address (Register)	Input Register Parameter				Modbus Protocol Start Address Hex	
	Description	Length (bytes)	Data Format	Unit	High bytes	Low bytes
30001	L1 line to neutral RMS volts	4	Float	V	00	00
30007	L1 RMS current	4	Float	A	00	06
30013	L1 active power	4	Float	W	00	0C
30019	L1 apparent power	4	Float	VA	00	12
30025	L1 reactive power	4	Float	VAr	00	18
30031	L1 power factor	4	Float	None	00	1E
30071	Frequency	4	Float	Hz	00	46
30073	Import active energy	4	Float	kWh	00	48
30075	Export active energy	4	Float	kWh	00	4A
30077	Import reactive energy	4	Float	kVArh	00	4C
30079	Export reactive energy	4	Float	kVArh	00	4E
30085	Total active power demand	4	Float	W	00	54
30087	Maximum total active power demand	4	Float	W	00	56
30089	Import active energy demand	4	Float	W	00	58
30091	Maximum Import active power demand	4	Float	W	00	5A
30093	Export active power demand	4	Float	W	00	5C
30095	Maximum export active power demand	4	Float	W	00	5E
30259	L1 current demand	4	Float	A	01	02
30265	Maximum L1 current demand	4	Float	A	01	08
30343	Total kWh	4	Float	kWh	01	56
30345	Total kVarh	4	Float	kVArh	01	58

pour:

1. Special parameter description plus mark, here is the description.

Example:

The host sends a request frame to read the L1 phase voltage (register: 30001):

field	Value (hexadecimal)	explain
Device address	0x01	The address of the meter is 1
Function code	0x04	Read the input register
Start address high byte	0x00	The high byte of the starting address of the register
Low byte of starting address	0x00	The low byte of the starting address of the register
Register count high byte	0x00	Read the high byte of the register count
Register count low byte	0x02	Read the low byte of the register count
The CRC check the low byte	0x71	The CRC check the low byte
The CRC check the high byte	0xCB	The CRC check the high byte

After receiving the request, the meter device returns the data in the register. Assuming that the L1 phase voltage

stored in the register is 230V:

field	Value (hexadecimal)	explain
Device address	0x01	The address of the meter is 1
Function code	0x04	Read the input register
Number of bytes	0x04	Number of bytes of data returned (2 registers x 2 bytes)
Data byte 1	0x43	The high byte of the first register
Data low byte 1	0x66	The low byte of the first register
Data high byte 2	0x00	The high byte of the second register
Data low byte 2	0x00	The low byte of the second register
The CRC check the low byte	0x0E	The CRC check the low byte
The CRC check the high byte	0x1F	The CRC check the high byte

* The hexadecimal 0X43660000 is converted to decimal as 230.

4.4 Holding Registers

Function code	Description
10	Write parameter holding register
03	Read parameter holding register

Address Register	**Parameter**	**Modbus Protocol Start Address Hex**		**Valid range**	**Mode (ro: read only wo: write only r/w: read/write)**
		High bytes	**Low bytes**		
40003	Demand Period	00	02	Demand Period time, default 60, unit min. Range: 0 to 60, 0 represents real-time update (demand updated every 1 second). **Length : 4 bytes** **Data Format : Float**	r/w
40013	Relay Pulse Width	00	0C	Write relay on period in milliseconds: 60, 100 or 200, default 60ms. **Length : 4 byte** **Data Format : Float**	r/w
40019	Parity and Stop Bit	00	12	Write the network port parity/stop bits for MODBUS Protocol, where: 0 = One stop bit and no parity 1 = One stop bit and even parity 2 = One stop bit and odd parity 3 = Two stop bits and no parity	r/w

				Default: 0 = One stop bit and no parity **Length: 4 bytes** **Data Format: Float**	
40021	Modbus Address	00	14	Write the Modbus Address address: 1 to 247 for MODBUS Protocol, default 1. **Length : 4 bytes** **Data Format : Float**	r/w
40029	Baud Rate	00	1C	Write the baud rate for MODBUS Protocol, where: 0 = 2400 baud 1 = 4800 baud 2 = 9600 baud 5=1200baud Default:2 = 9600 baud **Length : 4 bytes** **Data Format : Float**	r/w
40051	CT1	00	32	CT Primary current Ranges from 5 to 9999， Default ID is 5 Length : 4 byte Data Format : Float	r/w
40061	Backlit time	00	3C	Range 0~121, 0 means backlit always on, 121 means backlit always off. Default: 60 min. **Length : 4byte.** **Data Format : Float.**	r/w
40087	Pulse 1 output mode	00	56	Write MODBUS Protocol input parameter for pulse out 1: 0001: Import active energy, 0002: Import + export active energy, 0004: Export active energy, (default). 0005: Import reactive energy, 0006: Import + export reactive energy, 0008: Export reactive energy, **Length : 4byte** **Data Format : Float**	r/w
461457	Reset	F0	10	00 00: reset the Maximum demand **Length: 2 bytes** **Data Format:Hex**	wo

463745	Time of scroll display	F9	00	Range：0-30s Default 0:does not display in turns **Length : 2 byte** **Data Format : BCD**	r/w
463761	Pulse 1 output	F9	10	0000:0.001kWh/imp(default) 0001:0.01kWh/imp 0002:0.1kWh/imp 0003:1kWh/imp **Length : 2 byte** **Data Format : HEX**	r/w
463779	Metering mode	F9	20	00 01: Total = Import; 00 02: Total = Import + export; 00 03: Total = Import – export; **Length : 2 byte** **Data Format : HEX**	r/w
464513	Serial number	FC	00	Serial number. Length: 4 byte. **Data Format: unsigned int32.** **Note: Only read.**	ro

pay attention to:

1. Special parameter description plus mark, here is the description.

Example:

The host sends a request frame and reads the demand cycle (register: 40003):

Field	Value (hexadecimal)	Explain
Device address	0x01	The address of the meter is 1
Function code	0x03	Read the hold register
Start address high byte	0x00	The high byte of the starting address of the register
Start address low byte	0x02	The low byte of the starting address of the register
Register count high byte	0x00	Read the high byte of the register count
Register count low byte	0x02	Read the low byte of the register count
The CRC check the low byte	0x65	The CRC check the low byte
The CRC check the high byte	0xCB	The CRC check the high byte

After receiving the request, the meter returns the data in the register. Suppose the demand cycle stored in the register is 60 minutes:

Field	Value (hexadecimal)	Explain
Device address	0x01	The address of the meter is 1
Function code	0x03	Read the hold register
Number of bytes	0x04	Number of bytes of data returned (2 registers x 2 bytes)
Data high byte 1	0x42	The high byte of the first register

Data low byte 1	0x70	The low byte of the first register
Data high byte 2	0x00	The high byte of the second register
Data low byte 2	0x00	The low byte of the second register
The CRC check the low byte	0xEF	The CRC check the low byte
The CRC check the high byte	0x90	The CRC check the high byte

The host sends out a request frame and sets the demand cycle to 15 minutes (register: 40003):

Field	Value (hexadecimal)	Explain
Device address	0x01	The address of the meter is 1
Function code	0x10	Write to multiple registers
Start address high byte	0x00	The high byte of the starting address of the register
Start address low byte	0x02	The low byte of the starting address of the register
Register count high byte	0x00	Write the high byte of the number of registers
Register count low byte	0x02	Write the low byte of the number of registers
Number of bytes	0x04	Number of bytes written into data (2 registers x 2 bytes)
Data high byte 1	0x41	The high byte of the first register
Data low byte 1	0x70	The low byte of the first register
Data high byte 2	0x00	The high byte of the second register
Data low byte 2	0x00	The low byte of the second register
The CRC check the low byte	0x67	The CRC check the low byte
The CRC check the high byte	0x91	The CRC check the high byte

After receiving the request, the meter sets the demand cycle to 15 minutes and returns a response frame:

Field	Value (hexadecimal)	Explain
Device address	0x01	The address of the meter is 1
Function code	0x10	Write to multiple registers
Start address high byte	0x00	The high byte of the starting address of the register
Low byte of starting address	0x02	The low byte of the starting address of the register
Register count high byte	0x00	Write the high byte of the number of registers
Register count low byte	0x02	Write the low byte of the number of registers
The CRC check the low byte	0xE0	The CRC check the low byte
The CRC check the high byte	0x08	The CRC check the high byte

Chapter 5.Current Transformer Specification

1.**Product Name: Split-core Current Transformer**

2.**Product Model：ESCT-TA16 100A/40mA**

3.**Main Technical Parameters of the Product：**

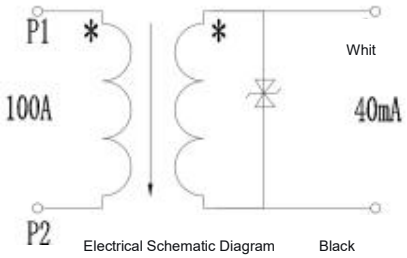
Item	Symbol	Technical Parameter	Item	Symbol	Technical Parameter
Operating Frequency	f	50Hz-60Hz	Insulation Resistance	-	500MΩ/500V/min
Rated Primary Current	I_n	100A	Power Frequency Withstand Voltage	-	4KV/1mA/1min(with cable)
Rated Secondary Current	I_o	40mA	Operating Temperature	Ta	-40℃ ~+70℃
Accuracy Class	-	0.5 级	Storage Temperature	Ts	0℃ ~+40℃
Turns through core	I	1turn	Linearity	%	0.5

4.**Definition of Primary, Secondary and Polarity Terminals:**

4.1 Primary and secondary definition: The primary is the cable passing through the core; the secondary is the lead-out wires.

4.2 Polarity (same-name terminal) definition: Primary P1 in, P2 out. The secondary circuit must never be opened.

4.3 Schematic diagram of the transformer is as follows:



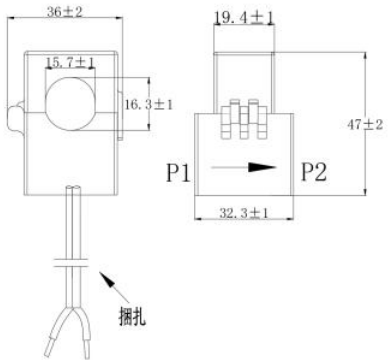
Electrical Schematic Diagram

5.Primary Technical Requirements for Instrument Transformers：

5.1 Housing color black.

5.2 Output configuration: 2x0.3mm^2 black/white ribbon cable, 1.0m length, tinned terminals. (Customizable per client requirements).

5.3 Dimensions refer to the diagram below.



5.4 Transformer Error Requirements.

Accuracy Class	Error (ratio difference) within ± (%) At the following currents				Error (phase displacement) within ± (') At the following currents			
	0.05In	0.2In	In	1.2In	0.05In	0.2In	In	1.2In
0.5	0.5	0.5	0.5	0.5	90	90	90	90

IF you have any question, please feel free to contact our sales team.

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