SDM120C

Smart Mini Power

smartprocess
control & instrumentation

Product Description

One-phase energy analyzer with two pulse outputs, indicating for active and reactive energy metering , and one RS485 communication port for remote meter reading and management. Housing for DIN-rail mounting, IP51 protection degree. Direct connection up to 45A.Various important electrical parameters are measured and displayed.

Technical Data

- **Performance criteria**

Operating humidity	≤ 85%
Storage humidity	≤ 95%
Operating temperature	-25°C - +55°C (3K6)
Storage temperature	-30°C - +70°C
International standard	IEC 62053-21
Accuracy class	0.5 or 1.0
Protection against penetration of dust and water	IP51
Insulating encased meter of protective class	II

- **Meter specifications**

Nominal voltage(Un)	230V AC 110V AC
Operational voltage	0.7-1.3Un
Insulation capabilities:	
- AC voltage withstand	4KV for 1 minute
- Impulse voltage withstand	6kV-1.2μS waveform
Basic current (Ib)	5A
Maximum rated current (Imax)	45A
Operational current range	0.4% Ib-Imax
Over current withstand	20Imax for 0.01s
Operational frequency range	50-60Hz ±2%
Internal power consumption	≤ 2W / 10VA
Test output flash rate (RED LED)	1000imp/kWh
Pulse output rate	1000imp/kWh
Consumption indicator (RED LED)	Flashing at load running
Data communication port	RS485 Modbus RTU
Data save	>20 years when power off

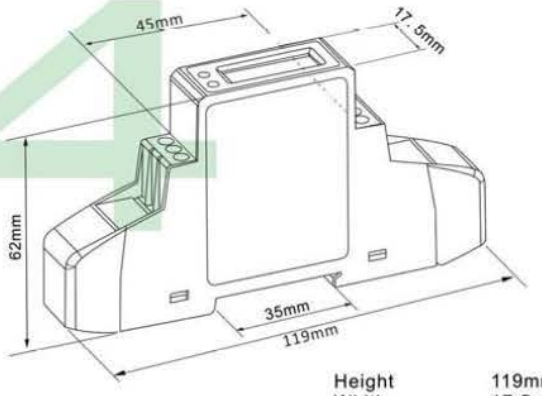
- **RS485 communication specifications**

Bus type	RS485
protocol	MODBUS RTU with 16 bit CRC
baud rate	1200(default)2400, 4800,9600
Address range	1-247 user settable
Bus Loading	32 meters per bus
Rage	1000M
Parity	EVEN (default)/ODD/NONE
Stop bit	1
Data bits	8

Features

- Class 1 kWh according to EN62053-21
- Class B according to EN50470-3
- Class 1 kvarh according to EN62053-23
- Accuracy ±0.5 Current / Voltage /Power
- Max. energy reading:99999.9 kWh/kVarh
- Instantaneous variables:V,A,W,Wdmd,Wdmd max,var,PF,Hz etc.
- 1-DIN module
- Self power supply
- Protection degree IP51
- 2 pulse outputs
- 1 RS485 communication port
- Modbus RTU protocol

Dimensions

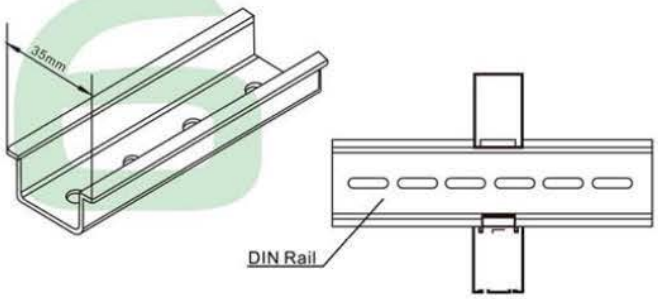


Height	119mm
Width	17.5mm
Depth	62mm
Weight	0.1Kg(net)

Wiring Diagram

Terminal 1: L-in
Terminal 2: L-out
Terminals 3 & 4: Neutral wire
Terminals 5 & 6 & 7: Pulse output
Terminals 9 & 10:RS485 port

Installation Diagram



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SDM120C Smart Meter Modbus Protocol Implementation

The electrical interface is 2-wire RS485,via 2 screw terminal.Connection should be made using twisted pair screened cable(Typically 22 gauge Belden 8761 or equivalent).A total maximum length of 3900 feet(1200 meters) is allowed for the RS485 network.A maximum of 32 electrical nodes can be connected,including the controller.The address of SDM120C smart meter can be set to any value between 1 and 247. Broadcast mode(address 0)is not supported.

All data values in the SDM120C smart meter are transferred as 32 bit IEEE754 floating print numbers,therefore each SDM120C smart meter value is transferred using two Modbus Protocol registers.All register read requests and data write requests must specify and even number of registers.Attempts to read/write and odd number of registers prompt the SDM120C smart meter to return a Modbus Protocol exception message.

The Modbus Protocol establishes the format for the master's query by placing into it the device address,a function code defining the requested action,any data to be sent,and an error checking field.The slave's response message is also constructed using Modbus Protocol.

Modbus Protocol function code **04/03** is used to read data.
For example, to request 01 04 00 00 00 02 CRC to read the voltage
to request 01 04 00 12 00 02 CRC to read apparent power

Modbus Protocol function code **10** is used to write data.
For example, to request 01 10 00 14 00 02 04 **40 00 00 00** CRC to set meter address as 02(Hex 40 00 00 00 equals float 2)
to request 01 10 00 1C 00 02 04 **40 00 00 00** CRC to set baud rate as 9600(Hex 40 00 00 00 equals float 2)

The detailed register map information of SDM120C are as follows:

Part 1 register

*Parameters to be read by function code **04**:

Address (Register)	Input Register Parameter			Modbus Protocol Start Address Hex	
	Parameter	Units	Format	High byte	Low byte
30001	Voltage	Volts	Float	00	00
30007	Current	Amps	Float	00	06
30013	Power	Watts	Float	00	0C
30019	Active apparent power	VA	Float	00	12
30025	Reactive apparent power	VAr	Float	00	18
30031	Power factor	None	Float	00	1E
30071	Frequency	Hz	Float	00	46
30073	Import active energy	kWh	Float	00	48
30075	Export active energy	kWh	Float	00	4A
30343	Total active energy	kWh	Float	01	56

Part 2

*Parameters to be setted by function code **10**,and to be read by function code **03**.

Address (Register)	Input Register Parameter		Modbus Protocol Start Address Hex		Description
	Parameter	Format	High byte	Low byte	
40021	Meter ID	Float	00	14	Ranges from 1 to 247,and requires a restart to become effective.Default ID is 1. It can also be modified via the display set-up menus.
40029	Baud rate	Float	00	1C	0:2400bps(default) 1:4800bps 2:9600bps 5:1200bps Requires a restart to become effective.
463745	Time of display in turns	BCD	F9	00	0-30s Default 0:does not display in turns
463761	Pulse1 output	Hex	F9	10	0000:0.001kWh/imp(default) 0001:0.01kWh/imp 0002:0.1kWh/imp 0003:1kWh/imp
463777	Measurement mode	Hex	F9	20	0001:mode 1(default) 0002:mode 2 0003:mode 3
463793	Pulse1 output mode	Hex	F9	30	0000:Import+export energy,bothLEDs of import and export energy light on(default) 0001:Import energy,only the LED of import energy lights on 0002:Export energy,only the LED of export energy lights on

- **Notes:**

Model 1: Measure imported energy,Total energy=Imported energy(default).
Model 2: Measure imported energy and exported energy, Total energy=Imported energy+exported energy.
Model 3: Measure imported energy and exported energy, Total energy=Imported energy- exported energy.

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