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FEATURES

- Single-phase multifunction power meter
- Mounts to 35 mm DIN
- Two pulsed outputs for active and reactive energy indication
- Modbus RTU protocol
- IP51 protection from condensation
- RS485 communication port
- Self-supplied power supply
- 6-digit digital LCD display
- 1% meter accuracy
- Meets EN 50470-3 as a safe and effective class B monitor
- Class I kVarh according to EN 62053-23
- Data saving for at least 20 years when turned off

RS PRO 1 Phase LCD Digital Power Meter with Pulse Output, 119mm Cutout Height, Type Electronic

RS Stock No.: 871-8302



RS Professionally Approved Products bring to you professional quality parts across all product categories. Our product range has been tested by engineers and provides a comparable quality to the leading brands without paying a premium price.

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Product Description

This single-phase, LCD digital power meter from RS PRO lets you measure the power consumption of machinery or applications across a wide range of parameters without having to install multiple meters. With dual-pulsed outputs and built-in Modbus communications protocol, it's compatible with building management systems (BMS) and remote monitoring systems. It also works as a 45 A direct connected meter, so there's no need for current transformers.

The meter provides readings of class I accuracy as defined by the EN 62053-2 standard for electricity metering equipment and class I for reactive energy accuracy (kVArh) in accordance with EN 62053-23. It's certified as a safe and effective class B monitor according to EN 50470-3 and conforms to ANSI/ESD S20.20:2014 and BS EN 61340-5-1:2007 on electrostatic discharge.

General Specifications

Meter Type	Electronic
Display Type	LCD
Number of Digits	6
Meter Accuracy	1%
Communication Port Type	Modbus RTU protocol RS485 Port
Mounting type	DIN-rail mounting
Auxiliary	Self-supplied Power Supply
Type of measurement	Voltage, Frequency, Current, Power Factor, kW, kVA, kVAr, Import kWh, Export kWh, Total kWh
Colour	White
Applications	Heating and lighting applications

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Electrical Specifications

Number of Phases	1
Pulse Output	Yes
Maximum Measurement	9999999.9 (Active) kWh, 9999999.9 (Reactive) kVarh
Minimum Measurement	0kWh
Measurement Range	0 to 99999.99 (Active)kWh
Current Range	5A to 45A
Frequency	50Hz - 60Hz ±2%
Dielectric Strength	4kV for 1 minute
Rated Current	45A
Rated Voltage	230VAC, 110VAC
Maximum Power Consumption in VA	10VA
Maximum Power Consumption in W	≤2W
Rated Impulse Withstand Voltage	6kV-1.2μS waveform

Mechanical Specifications

Cut-out Height	119mm
Cut-out Width	17.5mm
Depth	62mm
Depth	62mm

Operation Environment Specifications

Minimum Temperature	-25°C
Maximum Temperature	+55°C
Storage Temperature	-30°C to +70°C
Operating Humidity	≤ 85%
Storage Humidity	≤ 95%

Protection Category

IP Rating	IP51

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Approvals

Compliance/Certifications	CE, RoHS Compliant, ANSI/ESD S20.20:2014 and BS EN 61340-5-1:2007, EN 62053-23, EN50470-3, EN62053-21



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Meter Specifications

- Nominal voltage 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 Rage 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
- Data Communication Port RS485 Modbus RTU
- Data Save > 20 years when power off.

RS485 Communication Specifications

- Bus Type RS485
- Protocol MODBUS RTU With 16bit CRC
- Baud Rate 1200(default), 4800, 9600
- Address Range 1-247 User Settable
- Bus Loading 32 Meters Per Bus
- Range 1000m
- Parity EVEN (default), Odd, None
- Stop Bit 1
- Data Bits 8

Modbus Protocol Implementation

This section provides basic information for interfacing the Smart meter to a Modbus Protocol network. RS485 is a bidirectional, full or half-duplex communication bus structure consisting of a single Master and at least one Slave. The maximum number of slaves can vary widely from system to system however; most manufacturers cap the max number of slaves between 16 and 32. Most RS485 signals operate ideally on a DC bias of 5 volts. The signals are driven alternately from each other. That is, each line operates inversely from the other and each is also referenced to the other from an electrical standpoint. The receiver looks at the difference, not the absolute voltage value, of the two signals. This is referred to as the "Line Bias" and it is critical in RS-485 applications. A bias difference of higher than 0.3v is generally accepted as valid but can be as high as 0.7v, depending on the system. Absolute values below this are considered "undefined" or "grey" and may result in either a high or low reading by the receiver. In many nonisolated applications, a "signal ground" or "shield" connection is provided in addition to the 2 data lines however, this is not necessary as the signals are referenced to each other and not to absolute ground. It is only provided as a ground point for the communication cable shielding. It is important to note that the shield ground should only be connected at a single trunk end in non-isolated applications. If grounds are tied together in non-isolated systems, even a slight voltage difference, between the absolute ground points, will create a "ground loop" condition which can cause serious damage to the equipment. Note that in isolated equipment, the above does not apply as there is no direct connection between the ground points however, in all applications, proper cable shield grounding should be practiced to eliminate and/or reduce electrical interference.

The electrical interface is 2-wire RS485, via 2 screw terminals. Connection should be made using twisted pair screened cable (Typically 22 gauge Belden 8761 or equivalent). All "A" and "B" connections are daisy chained together. Line topology may or may not require terminating loads depending on the type and length of cable used. Loop (ring) topology does not require any termination load. The impedance of the termination load should match the impedance of the cable and be at both ends of the line. The cable should be terminated at each end with a 120 ohm (0.25 Watt min.) resistor. 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 each the meters can be set to any value between 1 and 247. Broadcast mode (address 0) is not supported.

The modbus protocol function code used to read data is 04/03, the modbus protocol function code to write data is 10.

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Part 1 Register - 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	V	Float	00	00
30007	Current	A	Float	00	06
30013	Power	W	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

Modbus Protocol Implementation - Continued

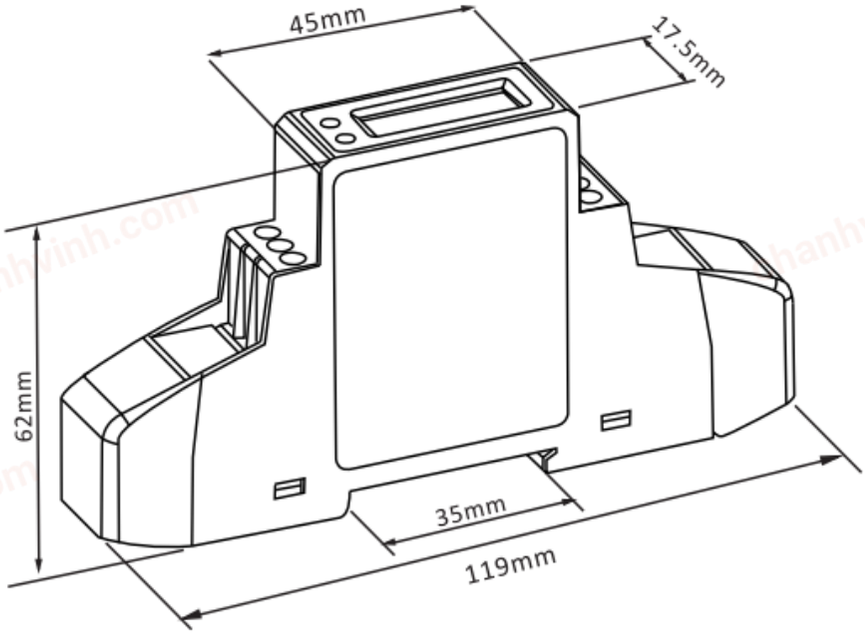
Part 2 Register - to be written with function code 10, and read by function code 03:

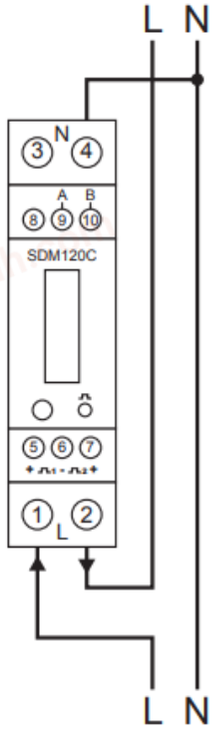
Address (Register)	Input Register Parameter		Modbus Protocol Start Address Hex		Key
	Parameter	Format	High Byte	Low Byte	
40021	Meter Address ID	Float	00	14	A
40029	Baud Rate	Float	00	1C	B
463745	Time of Display in turns	BCD	F9	00	C
463761	Pulse 1 Output	Hex	F9	10	D
463777	Measurement Mode	Hex	F9	20	E
463793	Pulse 1 Output Mode	Hex	F9	30	F

Key:
A - Ranges from 001-247, requires a restart to become effective. Default ID is 1.
B - Unit is BPS - 5=1200, 0=2400 (Default), 1=4800, 2=9600, requires a restart to become effective.
C - 0-30 seconds, Default is 0 (does not display in turns).
D - Unit is kWh/imp - 0000=0.001, 0001=0.01, 0002=0.1, 0003=1.0 - Example 0003=1 Pulse Per kWh.
E - 0001=Import Engergy (Default), 0002=Import + Export Energy, 0003=Import - Export Energy.
F - 0000=LED flashes for Import & Export (Default), 0001=LED flashes for Import, 0002=LED flashes for Export.

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Dimensions & Wiring Diagram





Specification to change without notice.