

DDS3102-P1
DIN-Rail Mounted
Single-phase Monitor

User Manual
(V1.0)

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1 OverView

1.1 Product Introduction

DDS3102-P1 DIN-Rail Mounted Single-phase Monitor is a small size single phase which could be used in PV inverter monitoring and controlling. The monitor can measure voltage, current, active power, power factor, frequency, positive and negative active electric energy, etc. The Monitor can record the positive active power and electric quantity for 2days at an interval of 5 minutes. It has RS-485 communication and supports Modbus-RTU protocol.

The monitor is used in Australian and European markets, and it meets the certification requirements of the Australian and European markets.

The monitor meets the following standards:

IEC 62053-21

IEC 62321

IEC 61326-1:2021

IEC 61010-1:2010/AMD1:2016

Modbus-RTU

1.2 Product Feature

The monitor adopts high precision sampling measurement unit and high speed MCU data process unit, it can achieve high precision wide range accurate measuring and fast data analysis; adopts non-volatile memory to store various data, it can satisfy long term storage of data and none lost in power down situation; compatible with RS-485 communication ports and industrial standard communication regulations, which is easy and flexible for network setup.

2 Technical Specification

Table 2 Technical specification

Item	Technical Specifications
Wiring form	single-phase

Measurement	Voltage	Rated voltage Un: AC240V Measurement range: 0.7Un~1.2Un Power consumption: < 0.05VA(Single phase) Accuracy: RMS 0.5 % Resolution ratio: 0.01V
	Current	Current:20(100)A(Through external transformer) Measurement range: 0.004Ib ~Imax Power consumption:< 0.05VA(Single circuit rated current) Accuracy: RMS 0.5 % Resolution ratio: 0.001A
	Power	Accuracy: 0.5% Resolution ratio: 0.001kW
	Power system frequency	Measurement range: 45 Hz~65 Hz Accuracy: 0.5% Resolution ratio: 0.01 Hz
Metering	Active energy	Accuracy level: Level 1 Resolution ratio: 0.01 kWh
Digital signal	Power pulse output	One-channel active energy pulse output
Communication	RS-485communication interface	Interface type: Two-wire half duplex Communication rate: 2400bps~9600bps Protocol: Modbus-RTU
Signal Lamp	LED	Two signal LED: 1、 working indicator LED 2、 pulse LED
Environment	Extreme working temperature	-25℃~+75℃
	Relative humidity	≤ 95%(no condensation)
Others	Working power supply	No need an external power supply (directly get power) Power consumption: ≤1.5W, 4VA
	Installation	DIN rail way installation 35mm standard rail installation
	Size	Size (mm, LWH): 117×18×65
	Weight	About 200g(include CT)
	Size	Size (mm, LWH): 126×90×74
	MTIF	≥10 years

3 Function Introduction

3.1 Measurement function of paramonitors

Function		description
Measurement function	Voltage	V
	Current	I
	Active power	P
	frequence	F
	Power factor	PF

	Active electric energy	It can measure positive and negative active electric energy and combined active electric energy
Communication function		Support Modbus communication protocol, communication baud rate can be set (up to 9600)

4 Installation and Wiring

4.1 Outline and installation dimension (unit:mm)

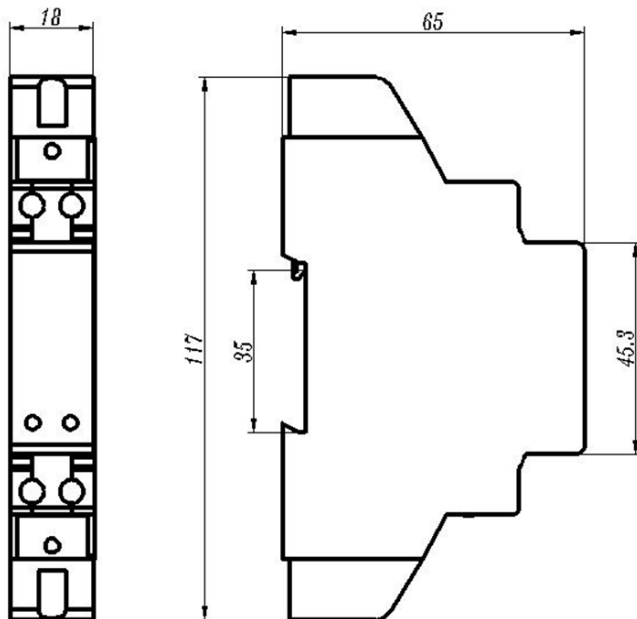


Figure 4.1 Dimension diagram

4.2 Installation precautions

- ♦ The monitor should be installed in a dry, well-ventilated and away from sources of heat and strong electric (magnetic) field in place.
- ♦ The monitor must be securely installed to prevent vibrations from accidents.
- ♦ In the consideration of installation and maintenance, ease of operation and safety, the installation location of the monitor should stay around enough space.
- ♦ Electrical connection requirements: voltage input lines, power lines with 1.5 mm² multi-strand copper wire flame, RS485 communication 1.0 mm² shielded twisted pair.

4.3 Terminal connection

4.3.1 Wiring terminals diagram of monitor

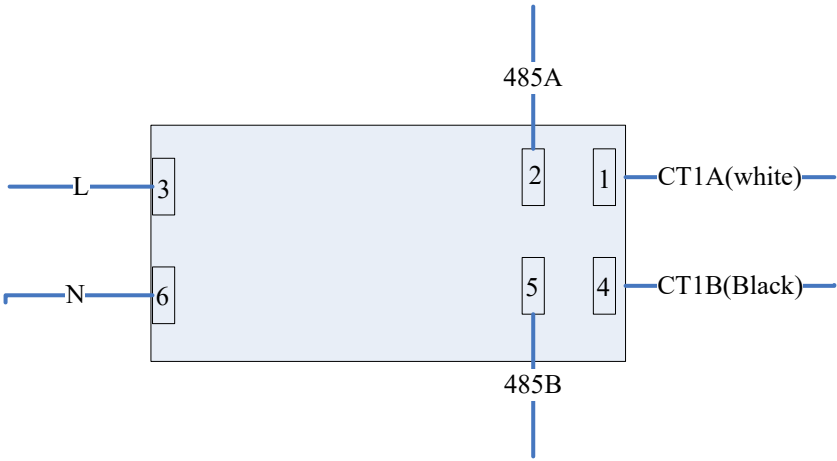


Figure 4.3 signal wiring diagram

4.3.2 Description of wiring terminals

1) Description of main terminals identification

Table 4.3 Description of main terminals identification

Identification	Description
3	Battle line
6	Zero line
1	Current transformer 1 input termiral(white)
4	Current transformer 1 output termiral(black)
2	485 terminal A
5	485 terminal B

5 Current Transformer

5.1 Parameter standard

Current Transformer	
Specifications	10(100)A/2.5mA 0.5 20Ω

Characteristic	Parameter	Characteristic	Parameter
Primary basic current	10A	Secondary basic current	2.5mA
Accuracy class	0.5 level	Secondary load	20Ω
working frequency	50Hz~400Hz	Environmental requirements	ROHS

5.2 Current Transformer diagram



6 Communication

6.1 Features

- ◆ Provide 1 optical isolation RS-485 communication.
- ◆ Used standard Modbus-RTU protocol
- ◆ User can choose the communication baud rate, the default baud rate is 9600bps.
- ◆ User can change Modbus adder, the default adder is 32.
- ◆ Shielded twisted pair shall be used, and the longest bus shall not exceed 1200 meters.
- ◆ Only communication between host (PC, PLC, etc.) and slave (instrument terminal) is allowed, and data exchange between independent instrument terminals is not allowed.
- ◆ The monitor is support the MODBUS function code are "0x03", "0x04", "0x06", "0x10".

6.2 Protocol type

(1) Register data command reading (function code 03H/04H)

Host request	Frame structure	Address code	Function code	Start address	Number of registers	Check code
	Occupied bytes	1 byte	1 byte	2 bytes	2 bytes	2 bytes
	Example	0x01	0x03/0x04	0x00 0x07	0x00 0x01	CRC
Slave response	Frame structure	Address code	Function code	Number of bytes	Register value	Check code
	Occupied bytes	1 byte	1 byte	1 byte	Nbytes	2 bytes
	Example	0x01	0x03/ 0x04	0x02	0x00 0x00	CRC

Note: To ensure normal communication, the number of registers is limited to 29 for each host request

(2) Write a single register (function code "0x06")

Host request	Frame structure	Address code	Function code	Start address	Number of registers	Check code
	Occupied bytes	1 byte	1 byte	2 bytes	2 bytes	2 bytes
	Example	0x01	0x06	0x01 0xF4	0x00 0x32	CRC
Slave response	Frame structure	Address code	Function code	Number of bytes	Register value	Check code
	Occupied bytes	1 byte	1 byte	2 bytes	2 bytes	2 bytes
	Example	0x01	0x06	0x01 0xF4	0x00 0x32	CRC

(3) Write multiple registers (function code "0x10")

Host request	Frame structure	Address code	Function code	Start address	Number of registers	Number of bytes	Register value	Check code
	Occupied bytes	1 byte	1 byte	2 bytes	2 bytes	1 byte	2 bytes	2 bytes

	Example	0x01	0x10	0x01 0xF4	0x00 0x01	0x02	0x00 0x20	CRC
Slave response	Frame structure	Address code	Function code	Start address		Number of registers		Check code
	Occupied bytes	1 byte	1 byte	2 bytes		2 bytes		2 bytes
	Example	0x01	0x10	0x00 0xF4		0x00 0x01		CRC

7 Name and Content of Hazardous Materials in Product

Part name	Hazardous substance					
	Lead	HG	Cadmium	Hexavalent chromium	Polybrominated diphenyl	Polybrominated diphenyl ethers
PCB	O	O	O	O	O	O
Case and nameplate、label	O	O	O	O	O	O
Terminals	O	O	O	O	O	O
<p>This form has been prepared in accordance with IEC 62321.</p> <p>O: Indicates that the content of the hazardous material in all homogeneous materials of the part is below the limit requirement of IEC 62321.</p> <p>X: Indicates that the hazardous substance content in at least one homogeneous material of the part exceeds the limit requirement of IEC 62321.</p>						

8 Use and Maintenance

- ◆ The voltage must be strictly connected according to the voltage level indicated on the label
- ◆ The terminal blocks should be tightened during installation and the monitor should be securely mounted on a sturdy, fireproof, non-vibrating screen. When the monitor is looked up, it shows the best result, so it should be installed vertically.
- ◆ The monitor should be stored in an environment with a temperature of -25℃ to 75℃ and a humidity of ≤95% (non-condensing) and be placed under the conditions of the original package, and the stacking height shall not exceed 5 layers. Monitors should not be stored after unpacking. The place where the monitor is kept should be clean, and the air should not contain enough harmful or gas to cause corrosion
- ◆ The monitor transportation and unpacking should not be severely impacted. It should be transported and stored in accordance with GB/T15464-1995 " General Specifications for Instrument and Instrument Packaging " and GB/T9329 " Instrumental Instrument

Transport, Transport and Storage Basic Environmental Conditions and Test Methods”.

- ♦ The working environment of the monitor should have lightning protection measures.

9 Warranty Terms

- 1) Our products are researched, developed, designed, manufactured and sold in accordance with relevant national standards, and the product quality meets national regulations
- 2) We have the right not to provide warranty service if any of the following circumstances causes product failure:
 - ♦ Product exceeds the maximum life of the design;
 - ♦ The product has not been properly installed, operated or maintained in accordance with the "User Manual " and national regulations;
 - ♦ The user modifies or adjusts the product, or the manufacturer seal is incomplete or damaged.
 - ♦ It is not a product that our sales department regularly sells, or our company can't judge whether the product is manufactured by the original manufacturer or is suspected of cutting prices to sell products across regions, counterfeiting, etc.
 - ♦ Producer's exemption provided by force majeure and other laws and regulations.
- 3) In addition to the provisions of the above exemption clause, our company provides one-year replacement and two-year warranty guarantees since the product was sold;
- 4) During the warranty period, if the product has been identified by our quality department or an authoritative organization as a quality defect, our company will strictly follow the promise to replace or repair the defective product. If the product exceeds the quality assurance period, our company will provide 3 years of maintenance according to the product design life, and the after-sales expenses such as accessories and labor will be charged according to the market price at the time of the after-sales service;
- 5) Our company has the final power of interpretation of the above warranty terms and reserves the right to unilaterally and reasonably change or terminate these terms. Any update will be subject to the updated content.

Appendix A MODBUS protocol Registers Address Table

A.1 General settings parameters list

Modbus Address	content	Data type	Remarks	
0x01F4	Second	xx	Unsigned	
0x01F5	Minute	xx	Unsigned	
0x01F6	Hour	xx	Unsigned	
0x01F7	Week	xx	Unsigned	
0x01F8	Day	xx	Unsigned	
0x01F9	Month	xx	Unsigned	
0x01FA	Year	xx	Unsigned	
0x01FB	postal address	xx	Unsigned	Default value : 32
0x0225	parity	0:none,1:even, 2:odd	Unsigned	Default value : none
0x0226	Baud rate	0x10:2400, 0x20:4800, 0x40:9600	Unsigned	Default value: 9600bps
0x0227	Total clearing (electric energy and load curve clearing)	1:clear 0:No clear	Unsigned	
0x0228	load curve clearing	1:clear 0:No clear	Unsigned	

A2 Address table of electrical parameter data register

A2.1 Active electric energy and real-time data

Modbus address	content	Data type	Remarks	
0x0000-0x0001	Current combined active electric energy	xxxxxx.xx kwh	Long Inverse	
0x0002-0x0003	Current positive active electric energy	xxxxxx.xx kwh	Long Inverse	
0x0004-0x0005	Current reverse active electric energy	xxxxxx.xx kwh	Long Inverse	
0x0006	Voltage	xxx.x V	Unsigned	

0x0007-0x0008	Current	xxx.xxx A	Long Inverse	
0x0009-0x000A	Active Power	xx.xxxx kW	Long Inverse	
0x000B	Power factor	x.xxx	Signed	
0x000C	Frequency	xx.xx Hz	Unsigned	

A2.1 Load curve data

Modbus address	content	Data type	Remarks	
0x1000	Recorded points		Unsigned	Last day 8 +2*288 +2*288 =1160Byte
0x1001	Year		Unsigned	
0x1002	Month		Unsigned	
0x1003	Day		Unsigned	
0x1004	Positive active power point 1	xx.xxx kw	Unsigned The average value of power in 5 minutes is 5 minutes, and the first point recorded is 0. If the power is cut off, 0 will be compensated	
0x1005	Positive active power point 2			
0x1006	Positive active power point 3			
...	...	...		
0x1123	Positive active power point 288			
0x1124	Positive active energy point 1	xx.xx kwh	Unsigned The current positive active power increment, the first point recorded in the whole 5 minutes, is 0 points, such as power failure to compensate 0	
0x1125	Positive active energy point 2			
0x1126	Positive active energy point 3			
...	...	...		
0x1243	Positive active energy point 288			
0x1500	Recorded points			Current
0x1501	Year			day

0x1502	Month			
0x1503	Day			
0x1504-0x1623	Positive active power point			
0x1624-0x1743	Positive active energy			

Note: The curve shall be cleared when the time is adjusted from front to back>48 hours.
The curve shall not be processed when the time is adjusted from front to back≤48 hours,
and the point shall be supplemented when the time is adjusted from back≤48 hours. Restore
the power-off time after power-off.

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