YURRO
Rack PDU Solution

SIPDU Series DC/AC RS485 Instrument Manual

Catalog

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1. Overview

"Orient" AC/DC RS485 dual serial port intelligent instrument (hereinafter referred to as "instrument") is a power instrument integrating metering, LCD display and communication, which can measure voltage, current, power, frequency, power factor, electric energy . The communication interface supports MODBUS-RTU communication protocol. This meter can be used for DC, single-phase AC, and three-phase AC, but it needs to be specified for DC power supply when purchasing ,

2. Working principle

This instrument series adopts high-precision sampling and metering, high-speed MCU for data processing, rich LCD screen and non-volatile memory. The instrument has voltage and current sampling input interfaces, two RS485 communication interfaces; two key inputs and segment code LCD display.

3. Technical indicators

Items			performance parameters
Specifications			DC-Single/Three Phase
Measure	DC Voltage	Input range	0.8~1.2Un Un=300VDC 0.8~1.2Un Un=230VAC 0.8~1.2Un Un=3X230/400VAC
		Frequency	45~65Hz
		Resistance	>2MΩ
	AC Voltage	Specification of current	DC：0.01~75A AC：0.02~63A
		TDP	<2VA
	Voltage		Accuracy ±1%
	Current		Accuracy ±1%
	Power		Accuracy ±1%
Measure		Energy	Electrical Energy (Accuracy Class 1)
communication		Interface and Communication Protocol	RS485 port: Modbus RTU protocol
		Communication address range	Modbus RTU:0~247;
		Baud rate	600bps~19200bps; default 9600bps
Environment		Operating temperature	- 10℃~+50℃
		Storage temperature	- 15℃~+60℃
		Relative humidity	≤95% (no condensation)
		Altitude	less than 1500 meters
Working power			DC power supply (range: 240V~360VDC) AC power supply (range: 184V~276VAC)
Size			Dimensions (mm): 126*44.39*46.22mm
Weight			94.9g

4. Instrument Features

★ Voltage, current, power, frequency, power factor, electric energy measurement;

★ Standard dual RJ45 communication ports, convenient for cascade connection, the maximum number of cascades is 32;

★ Maximum communication distance: 500 meters;

★ Power input surge protection 1KV;

★ Hot-swappable design: The energy meter can be hot-swapped, which is convenient for on-site installation and maintenance.

★ Small size, compact structure, length, width and height: 126*44.39*46.22mm.

★ The communication accuracy rate is 100%, and the communication success rate is >99.99%

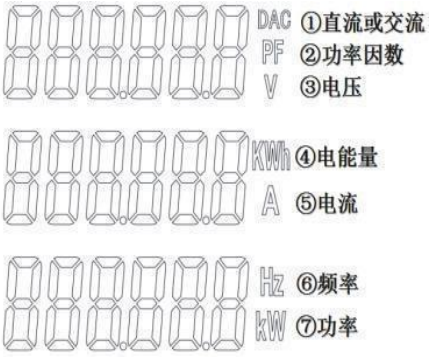
★ Multiple simple IO ports can be expanded: it needs to be expanded according to the customer's customization, and the types included are as follows:

① Expand temperature and humidity, access control interface.

② Extend the on-off monitoring of circuit breakers and switches.

5. Operation and display

5.1. LCD full screen and display instructions



No 5.1 LCD full screen introduction

5.2 , Press the button to turn the screen to display instructions ★

Introduction of key functions in key scrolling display mode

The instrument has two function switching keys, one up key and one down key: press the key once to display the contents of the 2.3 directory sequentially from the first line; when the instrument sounds and lights alarm, Press any key to silence the alarm when it sounds.

★ Automatically display items in rotation

DC and single-phase AC

1	Voltage /Current/Power
2	Energy, Power Factor (AC), Frequency (AC)
3	Voltage alarm upper limit, voltage alarm lower limit
4	Current alarm lower limit, current alarm lower limit

Three-phase AC

1	Voltage	6	Three-phase unbalance/neutral current/frequency (three-phase instrument)
2	Current	7	Voltage alarm upper limit,
3	Power	8	voltage alarm lower limit
4	Power Factor (AC)	9	Current alarm lower limit
5	Energy	10	current alarm lower limit

★ Press the key to turn the screen to display the item

DC and single-phase AC

1	Voltage /Current/Power
2	Energy, Power Factor (AC), Frequency (AC)
3	Voltage alarm upper limit, voltage alarm lower limit
4	Current alarm lower limit, current alarm lower limit
5	Software version, communication address, baud rate

three-phase AC

1	Voltage	7	Voltage alarm upper limit,
2	Current	8	voltage alarm lower limit
3	Power	9	Current alarm lower limit
4	Power Factor (AC)	10	current alarm lower limit
5	Energy	11	Software version, communication address, baud rate
6	Three-phase unbalance/neutral current/frequency (three-phase instrument)		

DC button scrolling display

Single-phase AC key flip display

Three-phase AC button flip screen display

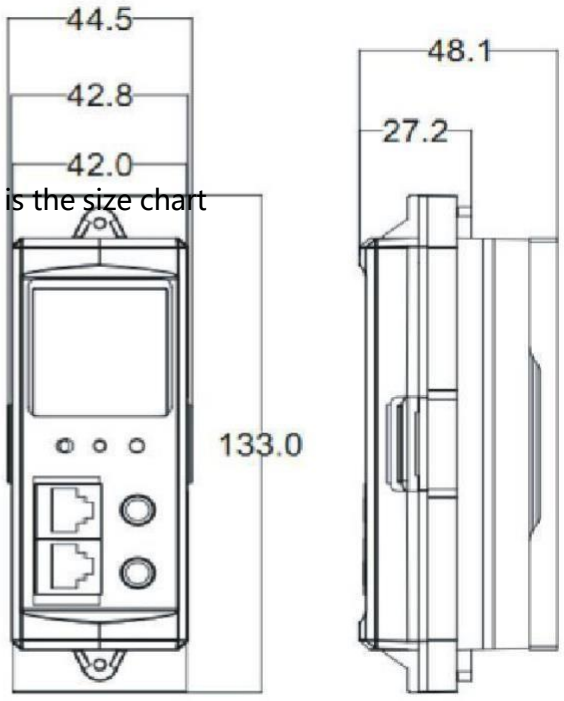
5.3 , button setting parameter description

★ Introduction to key functions in setting mode

Function of the button	Press and hold (more than 5 seconds) the down button to switch the switch and enter the voltage and current threshold modification mode. At this time, the LCD screen will display the current The previous voltage and current thresholds, and a segmented liquid crystal is blinking. In this mode, short press the up and down buttons to modify the flashing position Parameter value, press and hold the button to change the flashing digit, after all the digits are completed, press and hold (more than 10 seconds) the down button to switch the switch back, the meter Restart and automatically save the voltage and current alarm threshold parameters; if there is no operation for 2 minutes during the modification process, it will automatically save Exit, the voltage and current thresholds will not be changed; other parameter settings are completed by the host computer, please refer to Section 7.

6. Installation and Wiring

picture6.1,physical dimension



The above is the real picture The above is the size chart

The above is the real picture **The above is the size chart**

6.2, Precautions for instrument installation

★ The instrument should be installed in a dry, well-ventilated place away from heat sources and strong electric (magnetic) fields;

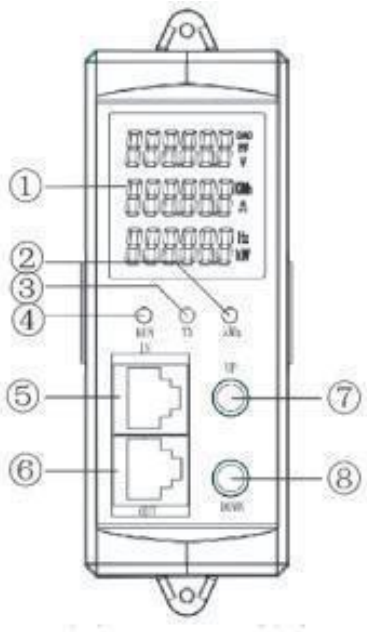
★ The working environment temperature is:-10 ℃ ~ +50 ℃ , Humidity: ≤95%(no condensation);

★ The instrument must be installed firmly to prevent safety accidents caused by vibration;

★ Requirements for electrical connection wires: two columns for voltage input and current input2.54mmDouble row of pins. instrument insertionPDUbody, to ensure that the instrument is installed in place, use the3*8screw tight;RS485Standard network cable for communication.

6.3, instrument introduction

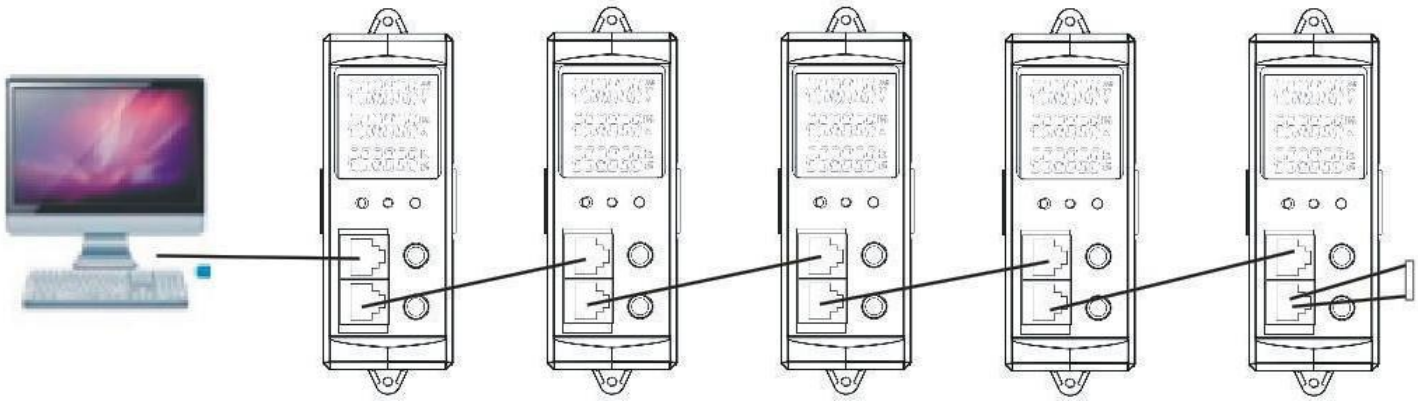
① 液晶显示屏;
② 电能量指示灯;
③ 通信指示灯;
④ 运行指示灯;
⑤ RS485 接口输入,
Pin4(蓝)485 B端 ,
Pin5(蓝白)485 A端;
⑥ RS485 接口输出;
⑦ 按键上;
⑧ 按键下;



Note:RJ45The color of the wiring may be wrong, according to the picture on the end of • is1terminal.

7. Description of communication protocol

7.1,This instrument adopts MOBUS-RTU protocol, the physical channel adopts Rs485 Standard, the topology of the network is as follows.



picture7.1Communication Network Topology Diagram

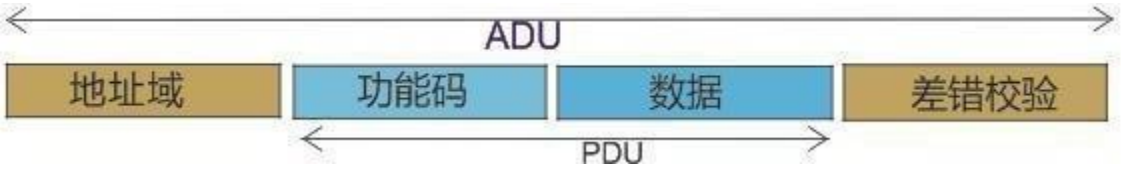
When RS485 there are many instruments on the bus, it is recommended to RS485 Both ends of the bus and a120ohm resistance to improve the anti- interference ability of the bus.

7.2, Byte features

Use modbus RTU Protocol, and as a slave device, the host needs to send a request command to obtain the protocol data content, and the command must be followed modbus RTU Related framing features.

7.3, Frame features

1indivual MODBUS-RTU The message consists of four parts: address field, function code, data and error check, as shown in the figure.



picture7.3message structure

★Address field

Each slave has a unique address. When the master wants to communicate with this slave, it must send out the same address code as the address of the slave. The slave receives the information sent by the master. Execute the corresponding action only when they are exactly the same. In this instrument, the address code of the slave is in 1~253 between. The factory address code default setting is1. ★ Function code

This instrument supports4Class function code: read input register0x04, read holding register0x03, write a single holding register0x06, write multiple holding registers0x10.

★ Data

Including several parts such as data register address, quantity and register content.

★ Error checking

The CRC16 result of the sequence of bytes from the address field to the data field. The low byte comes first, and the high byte follows. The generator polynomial for CRC16 is $x^{16} + x^{15} + x^2 + 1$, the initial value is 0xFFFF.

7.4, input register -Ox04instruction

No	Items	Resolution	Unit	Characteristic	Parameter
1	Version Information	/	/	Read only	
2	Reserve	/	/	Read only	
3	Reserve	/	/	Read only	
4	A phase voltage	0.1	V	Read only	
5	A phase current high	0.001	A	Read only	
6	A phase current low	0.001	A	Read only	
7	A phase active power	0.001	kW	Read only	
8	A phase reactive power	0.001	kVar	Read only	

9	A phase apparent power	0.001	kVA	Read only	
10	A phase power factor	0.001	/	Read only	
11	Phase A active energy high level	0.001	kWh	Read only	
12	Phase A active energy low level	0.001			
13	Phase A reactive energy high level	0.1V	kVarh	Read only	
14	Phase A reactive energy low level	0.001		Read only	
15	B phase voltage	0.001	V	Read only	
16	B phase current high	0.001	A	Read only	
17	B phase current low	/	A	Read only	
18	B phase active power	/	kW	Read only	
19	B phase reactive power	0.001	kVar	Read only	
20	B phase apparent power	0.001	kVA	Read only	
21	B phase power factor	0.001	/	Read only	
22	Phase B active energy high level	0.001	kWh	Read only	
23	Phase B active energy low level				
24	Phase B reactive energy high level	0.001	kWh	Read only	
25	Phase B reactive energy low level				
26	C phase voltage	0.1	V	Read only	
27	C phase current high	0.001	A	Read only	
28	C phase current low	0.001	A	Read only	
29	C phase active power	0.001	kW	Read only	
30	C phase reactive power	0.001	kVar	Read only	
31	C phase apparent power	0.001	kVA	Read only	
32	C phase power factor	0.001	/	Read only	
33	Phase C active energy high level	0.001	kWh	Read only	
34	Phase C active energy low level			Read only	
35	Phase C reactive energy high level	0.001	kVarh	Read only	
36	Phase C reactive energy low level				
37	Combined active power	0.001	kW	Read only	
38	Combination reactive power	0.001	kVar	Read only	
39	Combined Apparent Power	0.001	kVar	Read only	
40	combined power factor	0.001	/	Read only	
41	Combined phase active energy high level	0.001	kWh		
42	Combined phase active energy			Read only	

	low level				
43	Combined phase reactive energy high level	0.001	kVarh	Read only	
44	Combined phase reactive energy low level				
45	Reserve	/	/	Read only	
46	Neutral current	0.01		Read only	
47	Reserve	/	/	Read only	
48	Three-phase unbalance	1%		Read only	
49	Grid frequency	0.001	Hz	Read only	
50	Reserve	/	/	/	/
51					
52					
53					
54					
55	Phase A voltage over limit state	/	/	Read only	0 does not exceed the limit, 1, exceeds the upper limit, 2, exceeds the lower limit
56	Phase B voltage over limit state	/	/	Read only	0 does not exceed the limit, 1, exceeds the upper limit, 2, exceeds the lower limit
57	Phase C voltage over limit state	/	/	Read only	0 does not exceed the limit, 1, exceeds the upper limit, 2, exceeds the lower limit
58	Phase A current over limit state	/	/	Read only	0 does not exceed the limit, 1, exceeds the upper limit, 2, exceeds the lower limit
59	Phase B current over limit state	/	/	Read only	0 does not exceed the limit, 1, exceeds the upper limit, 2, exceeds the lower limit
60	Phase C current over limit state	/	/	Read only	0 does not exceed the limit, 1, exceeds the upper limit, 2, exceeds the lower limit
61	Reserve	/	/	/	/
62	Neutral current over-limit status	/	/	Read only	0 does not exceed the limit, 1, exceeds the upper limit
63	Three-phase unbalance alarm	/	/	Read only	0 normal, 1, over limit

	state				
64	Reserve	/	/	/	/
65					
66	Phase A breaker state	/	/	Read only	0, normal, 1, switch off, 2, fault trip
67	Phase B breaker state	/	/	Read only	0, normal, 1, switch off, 2, fault trip
68	Phase C breaker state	/	/	Read only	0, normal, 1, switch off, 2, fault trip
69	Compile time	/	/	Read only	Year
70	Compile time	/	/	Read only	The high bit is the month, the low bit is the date
71	Running time high	/	/	Read only	/
72	Running time low	/	/	Read only	/

7.5, holding registers -0x03,0x06,0x10 instruction

No	Items	Resolution	Unit	Characteristic	Parameter
1	buzzer switch	/	/	read and write	0 is the buzzer off, 1 is the buzzer on.
2	A phase voltage upper limit	0.1	V		
3	A phase voltage lower limit	0.1	V		
4	A phase current upper limit	0.1	A		
5	A phase current lower limit	0.1	A		
6	B phase voltage upper limit	0.1	V		
7	B phase voltage lower limit	0.1	V		
8	B phase current upper limit	0.1	A		
9	B phase current lower limit	0.1	A		
10	C phase voltage upper limit	0.1	V		
11	C phase voltage lower limit	0.1	V		
12	C phase current	0.1	A		

	upper limit				
13	C phase current lower limit	0.1	A		
14	Reserve	/			
15	Zero line current upper limit	0.1	A		
16	Reserve	/	/		
17	Three-phase unbalance degree threshold percentage	1%	/		
18	Reserve	/	/	/	
19					
20					
21					
22					
23					
24					
25					
26	Device restart	/	/	Write only	1: Restart
27	Drain of charge	/	/	Write only	ABC and conjunction are cleared once, and 1 is cleared.

Note: AC and DC related protocols use a unifiedmodbusProtocol content, therefore, different devices can also obtain related data, but in places where it is not supported, the obtained data value is0.

8. Use and maintenance

★ The voltage must be connected in strict accordance with the voltage level marked on the manual.

★ When installing, the screws that fix the instrument should be tightened. The display effect of the ammeter is best when looking up, so it should be installed vertically.

★ The instrument should be stored in an environment with a temperature of - 15°C to 60 ° C and a humidity of ≤ 95% (no condensation). The place where the instrument is kept should be clean, and the air should not contain harmful substances or gases that can cause corrosion.

★ Instrument transportation and unpacking should not be subject to severe shocks, and should be transported and stored in accordance with the provisions of GB/T15464-1995 "General Technical Conditions for Instrument Packaging" and GB/T9329 "Basic Environmental Conditions and Test Methods for Instrument Transportation, Transportation and Storage" .

★ The working environment of the instrument should have lightning protection measures.

9. Warranty

1. Free Service Regulations

★ From the date of purchase of this product, if the user complies with the use requirements stipulated in the manual and it is confirmed that no man-made damage is complete, if the instrument is found not to meet the requirements stipulated in the product standard, the manufacturer will give you a compensation within 12 months. Free repair or replacement, the date of purchase is evidenced by the invoice, receipt (valid certificate recognized by the company) or a copy of the invoice.

★ In case of failure of the product under normal use, the user can contact Orient's

offices all over the country with the invoice and warranty form for warranty matters.

★ The model of the repaired product must be consistent with the model on the warranty sheet, otherwise the warranty will not be granted.

2. Paid Warranty Regulations

★ Man-made damage after inspection.

★ Damage caused by natural disasters such as fires and natural disasters.

★ Faults and damages caused by dropping, water ingress or improper operation during transportation and moving.

★ Faults and damages caused by failure to operate according to the usage methods and precautions required in the instruction manual.

★ There are man-made transformations, disassembly, assembly and malfunctions due to improper use.

★ Consumables and gift items.

★ The product exceeds the free warranty period.

★ When the user has special requirements for the warranty terms, it shall be implemented according to the contract.

★ The user shall be responsible for the transportation costs incurred by the user due to the above reasons.