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ADF300L
Series multi-user metering box

Installation manual V1.3

ACREL Co., LTD

Declare

Acrel reserves the right to modify the product specifications herein without notification. Please consult the local agent about the latest specifications before placing a purchase order.

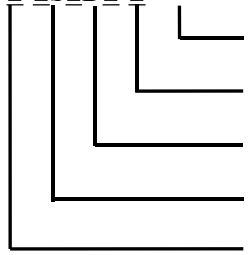
Contents

1 Overview

ADF300L Series of multi-user metering box can be measured 12 largest single-phase three-phase or 36 circuits, can support multiple single three hybrid installation again. This series of metering box for accurately IEC 62053-21。

2 Product specification

ADF300L-□-□S□D□-□



Control type: none; 4G: 4Gcommunication IC：Card swiping function

Control type: none: metrological type； Y: Prepaid type

Single-phase circuit：1-36

Three-phase circuit：1-12

Series model： I： Single-phase 12 circuits; II: single-phase 24 circuits; III: single-phase 36 circuits

3 Technical parameters

3.1 Electrical characteristics

Table 1 Electrical characteristics

Parameters / Model		ADF300L-I	ADF300L-II	ADF300L-III
Voltage input	Rated voltage	3×220/380V		
	Reference frequency	50Hz		
	Power consumption	<20VA		
Energy metering		Total active energy measurement, total reactive energy measurement (reverse included forward)		
Electricity measurement		U、I、P、Q、S、PF、F		
Display		8-digit segment LCD display, backlight display		
Switch		8 Switch output		
Current input	Input Current	maximum 3*200A	maximum 3*250A	maximum 3*250A
	Output current	10(60)A		
	Starting current	4‰Ib		
Measuring performance	measurement accuracy	Level 1		
Pulse	Pulse output	1 active pulse output		
	Pulse Width	80ms±20ms		
	Pulse constant	1600 imp/kWh		
communication	interface	Infrared communication		
	interface	2 RS485 (communication line needs shielded twisted pair)		
	protocol	MODBUS-RTU		

Surroundings	Temperature	Operating temperature：-20℃~+60℃， storage temperature：-30℃~+70℃
	Humidity	≤95%RH，No condensation, no corrosive gas place
	Altitude	≤2000m

3.2 Mechanical properties

Table 2 Mechanical characteristics (unit: mm)

Mechanical properties	ADF300L-I	ADF300L-II	ADF300L-III
Dimensions(Length ×Width ×Height)	332×376×132	492×376×132	672×376×132
Maximum wiring capacity (flexible cable)	The voltage inlet cable (rectangular section) is 25mm×9mm, and the voltage outlet cable (circular section) is 25mm^2		
Installation method	Wall mount, fixed with 4 M8 screws		

4 The main function

Table 3 main functions

model	Types of	Most users	Anti-Stealing	Remote meter reading	remote control	Timing control	Strong control	Overload protection	Power consumption query	Remaining battery query
ADF300L-I	Metering type	4S or12D	√	√					√	
	Prepaid	4SY or12DY	√	√	√	√	√	√	√	√
ADF300L-II	Metering type	8S or24D	√	√					√	
	Prepaid	8S Or 24DY	√	√	√	√	√	√	√	√
ADF300L-III	Metering type	12S Or 36D	√	√					√	
	Prepaid	12SY Or 36DY	√	√	√	√	√	√	√	√

5 Outline and installation dimensions (unit: mm)

5.1 Precautions for use

The incoming line of the ADF300L series multi-user metering box should be used in conjunction with the matching plastic case circuit breaker, and the outgoing line should be used in conjunction with the matching miniature circuit breaker; the outlet terminal should be tightened with double screws. It is strictly forbidden to use only one screw to tighten and fix.

5.2 Product Size

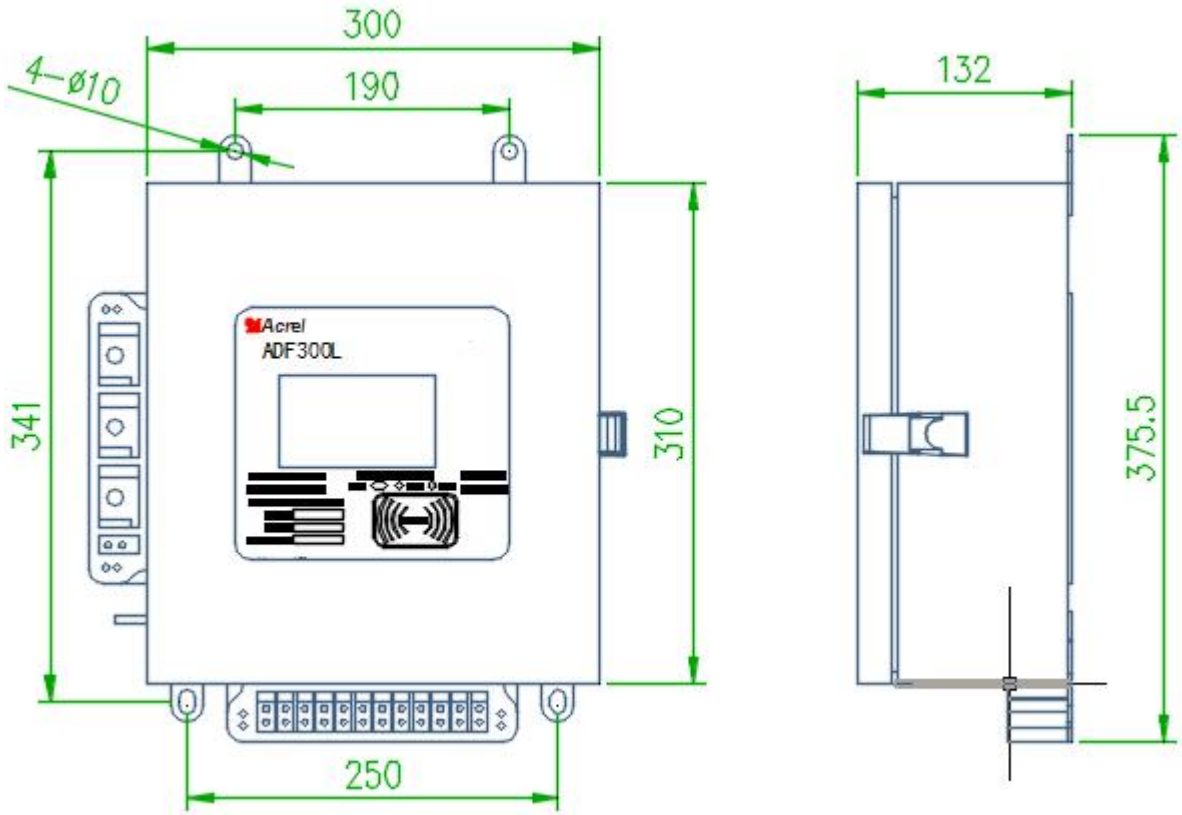


Figure 1 Dimensions of ADF300L-I

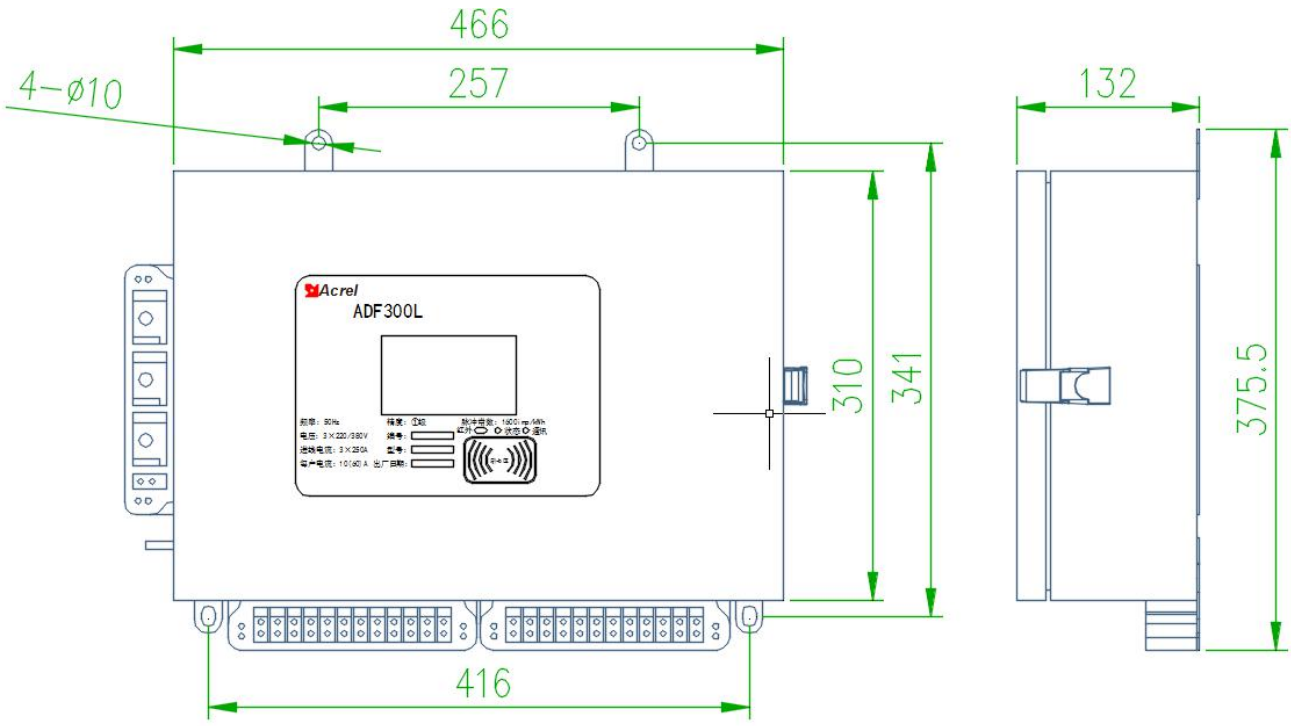


Figure 2 Dimensions of ADF300L-II

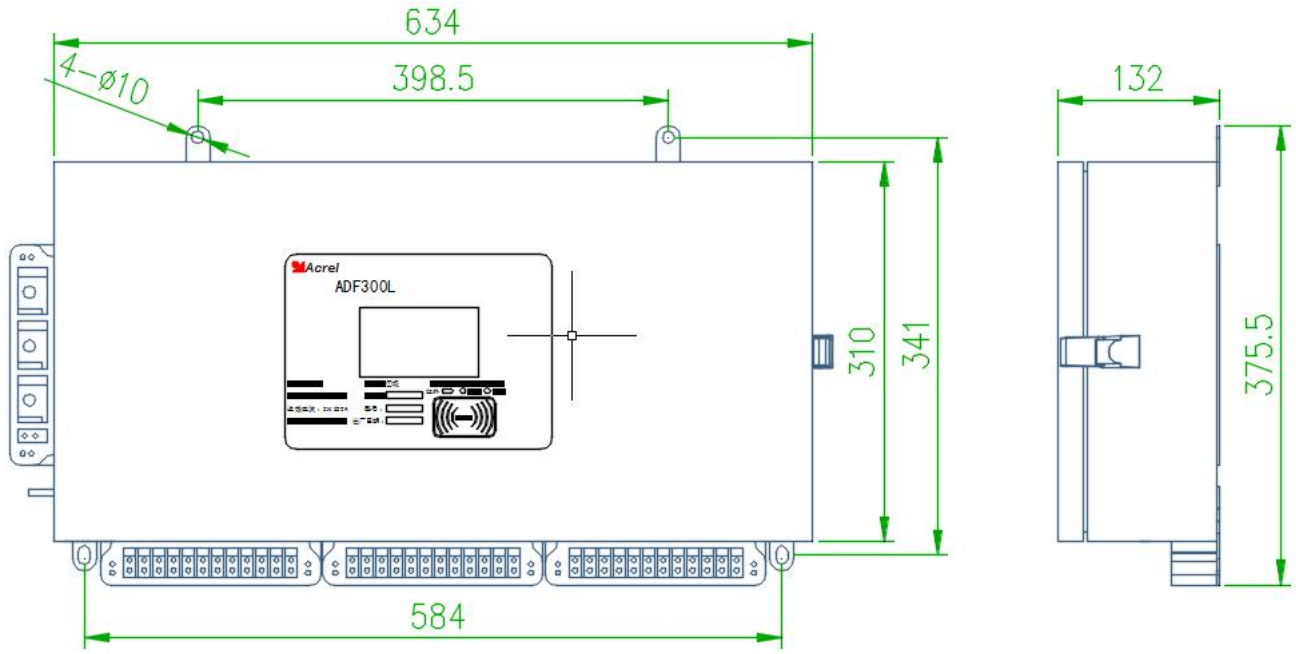


Figure 3 Dimensions of ADF300L-III

6 Wiring and installation

- ADF300L The series of multi-user metering boxes are hung vertically on the suspension and fixed with four M8 screws.
- Pay attention to good contact between the ground wire and the box.

Figure 4 Wiring diagram

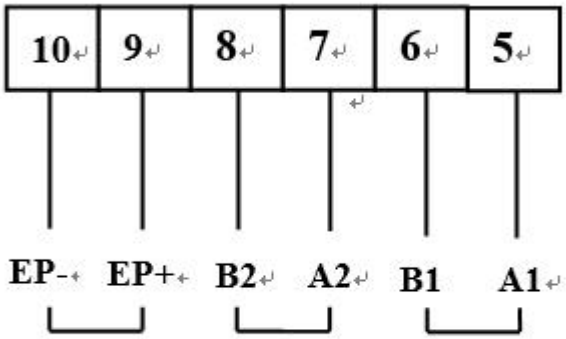


Figure 5 Side terminal wiring

7 Function Description

7.1 Active energy metering

Each metering board can measure the total power consumption of each user, and the reverse is included in the forward.

7.2 Relay control (prepaid type only)

7.2.1 No fee shutdown (prepaid control)

When the user uses electricity, the total power consumption of the user is incremented, and the remaining power of the user is decremented. When the user's remaining power is 0, the electric energy meter will automatically

switch off, and only after the user purchases the electricity can the electricity be restored.

7.2.2 Timed power-off (time control)

The multi-user electric energy meter can control the user's power consumption. The electric energy meter can set the automatic power-off and power-on time through the background management software to facilitate the user's power management.

7.2.3 Overload power failure (negative control)

The multi-user electric energy meter can set the user's maximum load power. When the user's actual power is greater than the set value, the metering box automatically cuts off the power supply circuit of the user, the power does not exceed the maximum load power set value, and the customer has a vicious load identification requirement. The metering box can be automatically judged. If it is judged to be a vicious load, the user's power supply will be cut off. After a period of time (settable), the power supply can be automatically restored.

7.2.4 Forced power off (forced control)

The multi-user metering box can be controlled by the back-end management system this time, so that the management center can deal with emergencies in time.

Note: Among the above four controls, when the forced control is turned on, the other controls are invalid.

8 Show description

8.1 Display example

Figure 6

Figure 7

Figure 6 User 1 is a three-phase trip user, with a power consumption of 200 kWh, and the remaining amount is negative 100 yuan;

Figure 7 User 2 is a single-phase user who has not tripped, with a power consumption of 200 kWh and a remaining amount of 100 yuan.

9 Communication description

9.1 letter of agreement

This electric energy meter adopts MODBUS-RTU. For the specific protocol format, please refer to the relevant protocol standards, which will not be repeated here. When the multiple rate function F is not selected, the corresponding multiple rate data item is meaningless.

When using Modbus protocol for communication, the function code for reading data is 03H, and the function code for writing data is 10H.

9.2 MODBUS Mailing address description As figure 8：

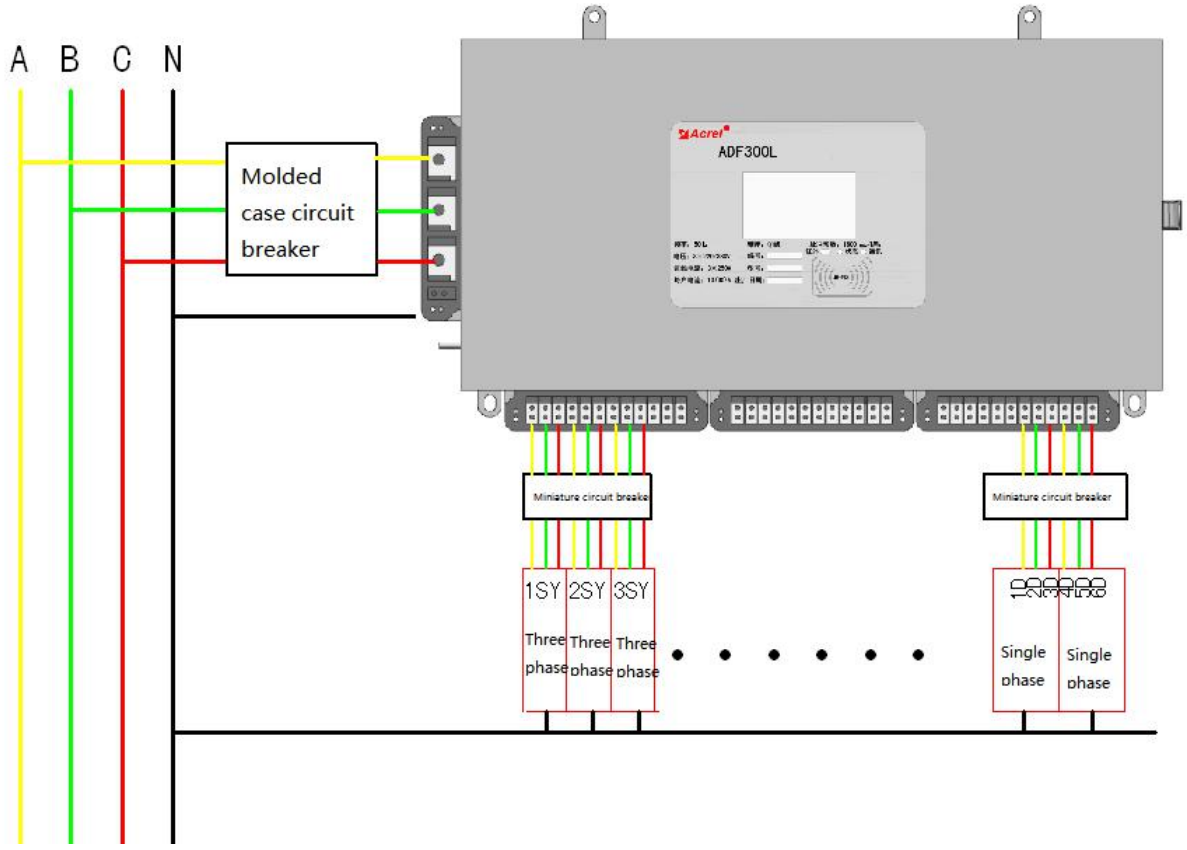


Figure 8 Schematic of the communication address

For 36-channel metering box, assuming the box number is N, the address of each loop is (N, N+1, N+2, ... N+35) from left to right, and the box number can be set through communication.

The box numbers connected to the same bus must be different, and the value of the box number is（1、 37 、73....）;

The three households on the left are three-phase, and the correspondence addresses are in order 1、 4 、 7(The box number is 1);

The six households on the right are single-phase, and the correspondence addresses from left to right are 31、32、33、34、35、36。

9.3 MODBUS Correspondence address table

Table 4 Communication address table

starting address	data item	R/W	length	Base unit	Remarks
0x0300	Single phase voltage	R	2	0.1V	U（Unsigned integer, the same below）
0x0301	Single phase current	R	2	0.01A	U
0x0302	Single-phase active power	R	2	0.001kW	I（Signed integer, the same below）
0x0303	Single phase reactive	R	2	0.001kvar	I

	power				
0x0304	Single phase power factor	R	2	0.001	I
0x0305	Single phase frequency	R	2	0.01Hz	U
0x0306 0x0307	Single-phase active energy	R	4	0.01kWh	U
0x0308 0x0309	Single-phase reactive energy	R	4	0.01kvarh	U
0x030A 0x030B	Single-phase residual energy	R	4	0.01 kWh	I
0x030C 0x030D	Single-phase total power purchase	R	4	0.01 kWh	U
0x030E	Single-phase power purchases	R	2	/	U
0x030F 0x0310	Single-phase basic electricity	R	4	0.01 kWh	U
0x0311	Single-phase status word	R	2	/	U
0x0312 0x0313	Single-phase basic power remaining	R	4	0.01 kWh	I
0x0314	Reserved	R	2	/	U
0x033F	A Phase voltage	R	2	0.1V	U
0x0340	B Phase voltage	R	2	0.1V	U
0x0341	C Phase voltage	R	2	0.1V	U
0x0342	A Phase current	R	2	0.01A	U
0x0343	B Phase current	R	2	0.01A	U
0x0344	C Phase current	R	2	0.01A	U
0x0345	Total active power	R	2	1W	I
0x0346	A Phase active power	R	2	0.001kW	I
0x0347	B Phase active power	R	2	0.001kW	I
0x0348	C Phase active power	R	2	0.001kW	I
0x0349	Total reactive power	R	2	0.001kvar	I
0x034A	A Phase reactive power	R	2	0.001kvar	I
0x034B	B Phase reactive power	R	2	0.001kvar	I
0x034C	C Phase reactive power	R	2	0.001kvar	I

0x034D	Total power factor	R	2	0.001	I
0x034E	A Phase power factor	R	2	0.001	I
0x034F	B Phase power factor	R	2	0.001	I
0x0350	C Phase power factor	R	2	0.001	I
0x0351	Frequency	R	2	0.01Hz	U
0x0352 0x0353	A Phase active energy	R	4	0.01 kWh	U
0x0354 0x0355	B Phase active energy	R	4	0.01 kWh	U
0x0356 0x0357	C Phase active energy	R	4	0.01 kWh	U
0x0358 0x0359	A Phase active energy	R	4	0.01kvarh	U
0x035A 0x035B	B Phase active energy	R	4	0.01kvarh	U
0x035C 0x035D	C Phase active energy	R	4	0.01kvarh	U
0x035E 0x035F	Total active energy	R	4	0.01 kWh	U
0x0360 0x0361	Total reactive energy	R	4	0.01kvarh	U
0x0362 0x0363	Remaining amount	R	4	0.01 yuan	I
0x0364 0x0365	Total electricity purchase amount	R	4	0.01 yuan	U
0x0366	Times of electricity purchase	R	2	/	U
0x0367 0x0368	Base amount	R	4	0.01yuan	U
0x0369	Running status word	R	2	/	U
0x036A 0x036B	Basic electricity surplus	R	4	0.01yuan	U
0x036C	Reserve	R	2	/	U
Compound rate zone					

0x0400 0x0401	Single phase active peak energy	R/W	4	0.01 kWh	U
0x0402 0x0403	Single phase active peak energy	R/W	4	0.01 kWh	U
0x0404 0x0405	Single phase active flat electric energy	R/W	4	0.01 kWh	U
0x0406 0x0407	Single phase active valley power	R/W	4	0.01 kWh	U
0x0408 0x0409	Single phase reactive energy	R/W	4	0.01kvarh	U
0x040A 0x040B	Single phase reactive peak energy	R/W	4	0.01kvarh	U
0x040C 0x040D	Single phase reactive power	R/W	4	0.01kvarh	U
0x040E 0x040F	Single phase reactive valley power	R/W	4	0.01kvarh	U
0x0430 0x0431	Three phase active peak energy	R/W	4	0.01 kWh	U
0x0432 0x0433	Three phase active peak energy	R/W	4	0.01 kWh	U
0x0434 0x0435	Three phase active level electric energy	R/W	4	0.01 kWh	U
0x0436 0x0437	Three phase active valley power	R/W	4	0.01 kWh	U
0x0438 0x0439	Three phase reactive energy	R/W	4	0.01kvarh	U
0x043A 0x043B	Three phase peak reactive power	R/W	4	0.01kvarh	U
0x043C 0x043D	Three phase reactive power	R/W	4	0.01kvarh	U
0x043E 0x043F	Three phase reactive valley power	R/W	4	0.01kvarh	U
Prepaid area					
0x0500	Single phase prepaid	R/	2	/	U

	switch	W			
0x0501 0x0502	Single phase peak price	R/W	4	0.01 yuan/kWh	U
0x0503 0x0504	Single phase peak price		4		U
0x0505 0x0506	Single phase flat price		4		U
0x0507 0x0508	Single phase valley price		4		U
0x0509 0x050A	Single phase alarm amount 1	R/W	4	0.01yuan	U
0x050B 0x050C	Single phase alarm amount 2	R/W	4	0.01yuan	U
0x050D 0x050E	Amount of new single phase electricity purchase	R/W	4	0.01yuan	U
0x050F	Single phase power purchase times	R/W	2	/	U
0x0510 0x0511	Single phase base amount	R/W	4	0.01yuan	U
0x0512	Single phase prepaid switch	R/W	2	/	U
0x0536	Three phase prepaid switch	R/W	2	/	
0x0537 0x0538	Three phase peak price	R/W	4	0.01yuan/kWh	U
0x0539 0x053A	Three phase peak price		4		U
0x053B 0x053C	Three phase flat price		4		U
0x053D 0x053E	Three phase valley price		4		U
0x053F 0x0540	Three phase alarm amount 1	R/W	4	0.01yuan	U
0x0541 0x0542	Three phase alarm amount 2	R/W	4	0.01yuan	U

0x0543 0x0544	Three phase new electricity purchase amount	R/W	4	0.01yuan	U
0x0545	Three phase power purchase times	R/W	2	/	U
0x0546 0x0547	Three phase base amount	R/W	4	0.01yuan	U
Time controlled area					
0x0600	Single phase time control switch	R/W	2		U
0x0601	Switch 1, hour 1	R/W	8 x 3		Single phase working day time control table U
0x0602	minute 1, switch 2				
0x0603	Time 2, off 2				
0x0604	switch 3, hour 3				
0x0605	minute 3, switch 4				
0x0606	Hour 4，minute 4				
0x0607	switch 5，Hour 5				
0x0608	Minute 5，switch 6				
0x0609	Hour 6，minute6				
0x060A	Switch 7，Hour 7				
0x060B	Minute 7，Switch 8				
0x060C	Hour 8，Minute 8				
0x060D	Switch 1, hour 1	R/W	8 x 3		Single phase rest day time control table U
0x060E	minute 1, switch 2				
0x060F	Time 2, off 2				
0x0610	switch 3, hour 3				
0x0611	minute 3, switch 4				
0x0612	Hour 4，minute 4				
0x0613	switch 5，Hour 5				
0x0614	Minute 5，switch 6				
0x0615	Hour 6，minute6				
0x0616	Switch 7，Hour 7				
0x0617	Minute 7，Switch 8				
0x0618	Hour 8，Minute 8				

0x0619	Single phase rest day setting word	R/W	2		U
0x064E	Three phase time control switch	R/W	2		U
0x064F	Switch 1, hour 1	R/W	8 x 3	/	Three-phase working day time control table U
0x0650	minute 1, switch 2				
0x0651	Time 2, off 2				
0x0652	switch 3, hour 3				
0x0653	minute 3, switch 4				
0x0654	Hour 4，minute 4				
0x0655	switch 5，Hour 5				
0x0656	Minute 5，switch 6				
0x0657	Hour 6，minute6				
0x0658	Switch 7，Hour 7				
0x0659	Minute 7，Switch 8				
0x065A	Hour 8，Minute 8				
0x065B	Switch 1, hour 1	R/W	8 x 3		Three-phase rest day time control table U
0x065C	minute 1, switch 2				
0x065D	Time 2, off 2				
0x065E	switch 3, hour 3				
0x065F	minute 3, switch 4				
0x0660	Hour 4，minute 4				
0x0661	switch 5，Hour 5				
0x0662	Minute 5，switch 6				
0x0663	Hour 6，minute6				
0x0664	Switch 7，Hour 7				
0x0665	Minute 7，Switch 8				
0x0666	Hour 8，Minute 8				
0x0667	Three phase rest day setting	R/W	2	/	U
Load control area					
0x0700	Single phase negative control switch	R/W	2	/	U
0x0701	Single phase maximum	R/	2	0.001kW	U

	power threshold	W			
0x0702	Single phase active power increment threshold	R/W	2	0.001kW	U
0x0703	Single phase power factor threshold	R/W	2	/	U
0x0704	Single phase negative control times	R/W	2	/	U
0x0705	Allowable times of single phase negative control	R/W	2	/	U
0x0706	Recovery time of single phase negative control	R/W	2	10s	U
0x0707	Single phase voltage loss threshold	R/W	2	0.1V	U
0x0718	Three phase negative control switch	R/W	2	/	U
0x0719	Three phase maximum power threshold	R/W	2	0.001kW	U
0x071A	Three phase active power increment threshold	R/W	2	0.001kW	U
0x071B	Threshold of three phase power factor	R/W	2	/	U
0x071C	Three phase negative control times	R/W	2	/	U
0x071D	Allowable times of three-phase negative control	R/W	2	/	U
0x071E	Three phase negative control recovery time	R/W	2	10s	U
0x071F	Three phase voltage loss threshold	R/W	2	0.1V	U
Strong control area					

0x0800	Single three phase category	R/W	2	/	0: three phase, 1: single phase
0x0801	Single phase strong control word	R/W	2	/	High 1: open low 1: close
0x0804	Three phase strong control word	R/W	2	/	High 1: open low 1: closed
System parameter area					
0x0900	address 1	R/W	2	/	0~247
0x0901	Baud rate 1	R/W	2	/	
0x0902	Password	R/W	2	/	
0x0903	Number of three-phase circuits	R/W	2	/	0~12
0x0904	Number of single phase circuits	R/W	2	/	0~36
0x0909	Strong control mark	R/W	2	/	not enabled
0x090A	Is the IC card enabled	R/W	2	/	
0x090B	SEC / min	R/W	2	/	
0x090C	Hour / week	R/W	2	/	
0x090D	Day / month	R/W	2	/	
0x090E	Year / reserve	R/W	2	/	
0x090F	Type (number of single phase circuits)	R/W	2	/	0:36 1:24 2:12
0x0910	Total number of single phase circuits	R/W	2	/	Total circuit number of box (single phase)
0x0911	address 2	R/	2	/	Second communication address

		W			
0x0912	Baud rate 2	R/W	2	/	Second channel communication baud rate
0x0913	Blank lower plate control word	R/W	2	/	not enabled
0x0914	Period 1, hour 1	R/W	14 x 3		Multiple rate period 1 U
0x0915	minute 1, period 2				Second communication address
0x0916	Hour 2, minute 2				Second channel communication baud rate
0x0917	Period 3, hour 3				not enabled
0x0918	Minute 3，period 4				
0x0919	Hour 4，Minute 4				
0x091A	Period 5, hour 5				
0x091B	minutes 5, period 6				
0x091C	Hour 6，Minute 6				
0x091D	Period 7, hour 7				
0x091E	minutes 7, period 8				
0x091F	Hour 8，Minute 8				
0x0920	Period 9, hour 9				
0x0921	minutes 9, period 10				Multiple rate period 1
0x0922	Hour 10，Minute 10				U
0x0923	Period 11, hour 11				Multi rate time table 2
0x0924	minutes 11, period 12				U
0x0925	Hour 12，Minute 12				
0x0926	Period 13, hour 13				
0x0927	minutes 13, period 14				
0x0928	Hour 14，Minute 14				
0x0929	Period 1, hour 1	R/W	14 x 3		
0x092A	minute 1, period 2				
0x092B	Hour 2, minute 2				
0x092C	Period 3, hour 3				
0x092D	Minute 3，period 4				Multi rate time table 2
0x092E	Hour 4，Minute 4				U
0x092F	Period 5, hour 5				Time zone table

0x0930	minutes 5, period 6				U
0x0931	Hour 6，Minute 6				
0x0932	Period 7, hour 7				
0x0933	minutes 7, period 8				
0x0934	Hour 8，Minute 8				
0x0935	Period 9, hour 9				
0x0936	minutes 9, period 10				
0x0937	Hour 10，Minute 10				
0x0938	Period 11, hour 11				
0x0939	minutes 11, period 12				
0x093A	Hour 12，Minute 12				
0x093B	Period 13, hour 13				
0x093C	minutes 13, period 14				
0x093D	Hour 14，Minute 14				
0x093E	Period table No. / date: day	R/ W	4 x 3		
0x093F	Date: month / period table No				
0x0940	Date: day / date: month				
0x0941	Period table No. / date: day				
0x0942	Date: month / period table No				Time zone table
0x0943	Date: day / date: month				U
0x0944	Order number 1,2				U
0x0945	Order number 3,4				U
0x0946	backlight time				U

10 Common troubleshooting

- No communication

Check whether the communication line connection is reliable and whether 485a and 485b are connected correspondingly；

Enter the menu setting item to observe whether the address and baud rate options are set correctly；

Use a multimeter to measure whether the voltage of 485a and 485b ports is about 4V. If the box has been

connected to 485 bus, the 485 line of the box should be separated from the bus.

- The voltage and current measured by the instrument is abnormal

  Check whether the wiring is correct and whether the connector is compressed.

- Abnormal power measurement

  Check whether the incoming line ABC phase sequence is correct.

The order of control class is not detailed in the manual due to the space. If you need, please contact our customer service.

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