

ADL200-WF  
Single Phase Electronic Meter

Installation and Use Manual V1.0

Acrel Electric Co., Ltd.

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Manual revision record

Data	Old version	New version	Remarks
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## 1 Overview

ADL200-WF single phase electric meter is designed for active power and electric energy data on photovoltaic inverter, in the same time it can measure the electrical parameters like voltage, current, power and so on. There is also RS485 and WiFi can be chosen to communicate with inverter and host computer, which is convenient for users to monitor, collect and manage power consumption. This electricity meter has advantages of smaller volume, high precision, good EMC, easily installing etc. All meters meet the related technical requirements of electricity meter in the IEC62053-21、IEC62053-22 standards.

## 2 Function

Function	Function description	Function provide
Measurement of kWh	Single-phase active kWh (positive and negative), 3 months historical energy data frozen storage	■
Measurement of electrical parameters	Voltage, Current, Active power, Reactive power, Apparent power, Power factor and Frequency	■
Pulse output	Active energy pulse output	■
Communication	Communication interface: RS485, Communication protocol: MODBUS-RTU	■

(■: Standard; )

## 3 Technical parameter

### 3.1 Electric performance

Input voltage	Reference voltage	AC 220V
	Reference frequency	50Hz
	Power consumption	<10VA
Input current	Basic current	10A
	Maximum current	80A
	Starting current	4%I <sub>b</sub>
	Consumption	<4VA

Measurement performance	Accuracy of measuring	1 class
	Range of measuring	000000.00~99999999kWh
Active pulse	Pulse width	$80 \pm 20\text{ms}$
	Pulse constant	1000imp/kWh
Communication	Interface	RS485(A+, B-)
	Connection mode	Shielded twisted pair conductors
	Protocol	MODBUS-RTU、DL/T645-07、DL/T645-97

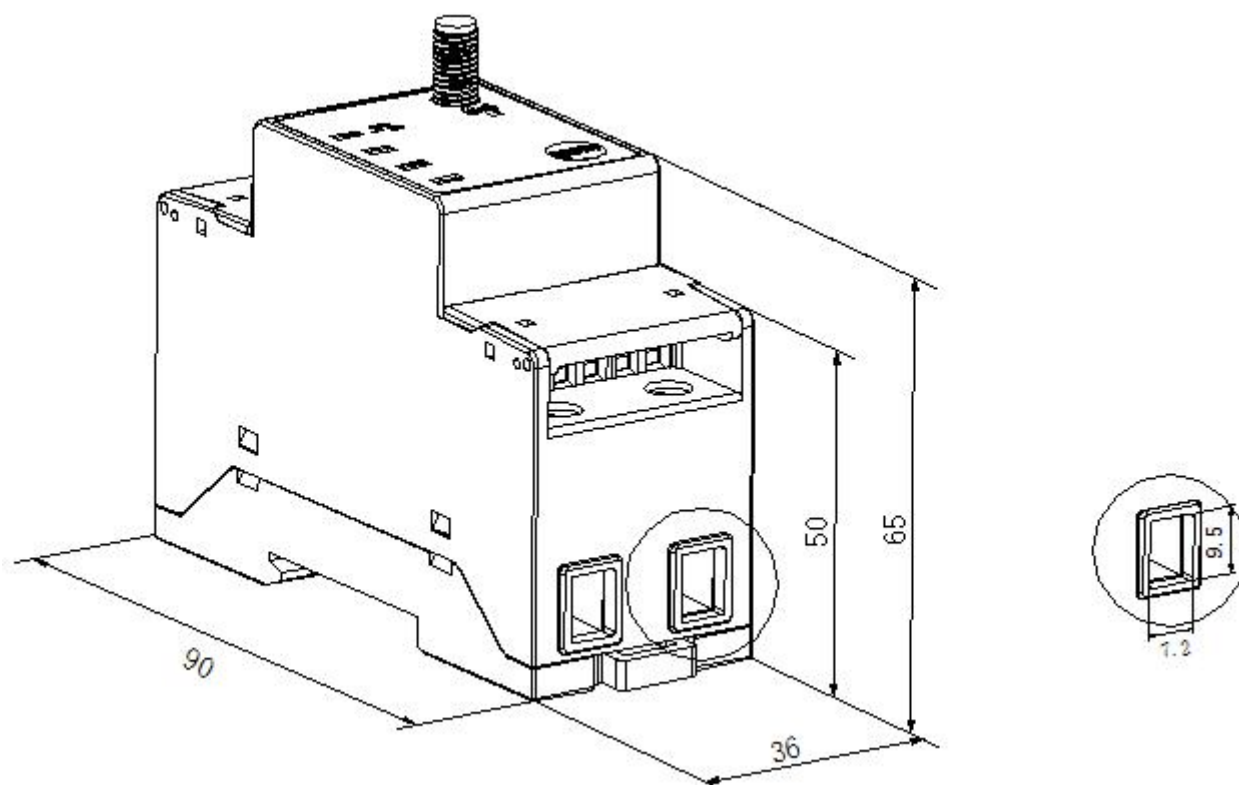
### 3. 2 Mechanical performance

Outline	Length × Width × Height	90mm×36mm×65mm
Strong current terminal Torque	<1.8Nm	

### 3. 3 Work environment

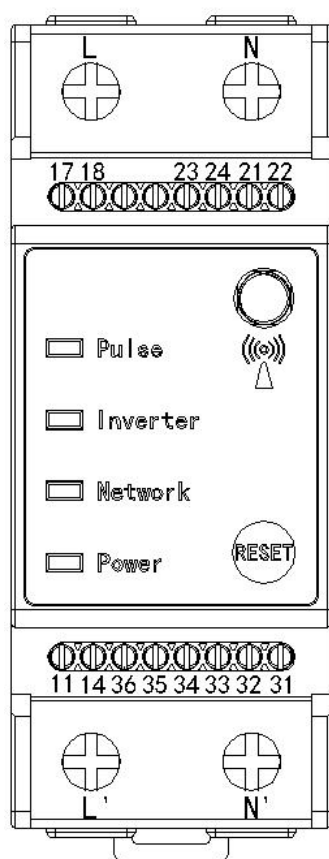
Temperature range	Work temperature	-25℃~55℃
	Storage Temperature	-40℃~70℃
Relative humidity		≤95%(No condensation)
Altitude		<2000m

#### 4 Outline (unit: mm)



Meter outlook and size

## 5 wiring and installing



Function description	Terminal number	Terminal description
Live Wire	L	Live Wire input
	L'	Live Wire output
Naught wire	N	Naught wire input
	N'	Naught wire output
Active energy pulse output	17	Active energy pulse output +
	18	Active energy pulse output -
WiFi module 485	23	485+/A
	24	485-/B
Metering module 485	21	485+/A
	22	485-/B
5V input Auxiliary power supply	11	5V
	14	GND
DRED Interface	36	REF GEN/0
	35	COM LOAD/0
	34	DRM4/8
	33	DRM3/7
	32	DRM2/6
	31	DRM1/5

## 6 Diagnosis, analysis and elimination of common faults

communication failure

**Failure performance:** After the meter is powered on, it cannot communicate with the host computer normally.

**Troubleshooting:** 1. The voltage value between the communication output A and B of the measuring instrument should be between  $+(4.4-4.5)V$ ;

2. Check whether the communication wiring method is correctly wired according to the wiring diagram (that is, the communication terminal A/B of the instrument should correspond to the communication serial port A/B);

## 7 Operation and display

Key description

Long press 3S to restart the WiFi module.

## 8 Communication description

### 8.1 Communication protocol

The meters adapt Modbus. Please refer to the relevant standards for more information. The multi-tariff data mean nothing when multi-tariff function (F) is not applied.

isplay description

### 8.2 MODBUS Address list

Address	Variable	Length	Attributes	Note
0000H	Current combined total active energy	4	R	unit: 0.01kWh
0002H	Current combined spike active energy	4	R	
0004H	Current combined peak active energy	4	R	
0006H	Current combined flat active energy	4	R	
0008H	Current combined valley active energy	4	R	
000AH	Code	2	R	
000BH	Voltage	2	R	unit: 0.1V
000CH	Current	2	R	unit: 0.01A
000DH	Active power	2	R	unit: 0.001kW
000EH	Reactive power	2	R	unit: 0.001kvar
000FH	Apparent power	2	R	unit: 0.001kVA
0010H	Power factor	2	R	unit: 0.001
0011H	Frequency	2	R	unit: 0.01Hz
0012H	Year, month	2	R/W	
0013H	Day, hour	2	R/W	
0014H	Minute, second	2	R/W	
0015H High 8 bits	Address	1	R/W	0~254
0015H Lower 8 bits	Communication baud rate	1	R/W	00:1200 01:2400 02:4800 03:9600 04:19200
0016H	Light time	2	R/W	
0017H~0021H	Reserve			
0022H	Total active energy of last month	4	R	unit: 0.01kWh
0024H	Spike active energy of last month	4	R	
0026H	Peak active energy of last month	4	R	
0028H	Flat active energy of last month	4	R	
002AH	Valley active energy of last month	4	R	
002CH	Total active energy of last 2 month	4	R	
002EH	Spike active energy of last 2 month	4	R	
0030H	Peak active energy of last 2 month	4	R	

0032H	Flat active energy of last 2 month	4	R	
0034H	Valley active energy of last 2 month	4	R	
0036H	Total active energy of last 3 month	4	R	
0038H	Spike active energy of last 3 month	4	R	
003AH	Peak active energy of last 3 month	4	R	
003CH	Flat active energy of last 3 month	4	R	
003EH	Valley active energy of last 3 month	4	R	
0040H~0044H	Reserve			
0045H	Status		R/W	Bit0: 0-(EF) , 1-(EEF) Bit1: 0-(Up and down) 1-(down and Up) Bit3: 0-PQS, 1-RMS
0046H~0047H	Reserve			
0048H	Parity	2	R	0000:None 0002:Even
0049H	Table number			
004AH				
004BH				
004CH	Serial number	2	R/W	
004DH		2		
004FH		2		
0050H~0067H	Reserve			
0068H	Current forward active total energy	4	R	unit: 0.01kWh
006AH	Current forward active spike energy	4	R	
006CH	Current forward active peak energy	4	R	
006EH	Current forward active flat energy	4	R	
0070H	Current forward active valley energy	4	R	
0072H	Current reversing active total energy	4	R	
0074H	Current reversing active spike energy	4	R	
0076H	Current reversing Active peak energy	4	R	
0078H	Current reversing active flat energy	4	R	
007AH	Current reversing Active valley energy	4	R	
007CH~0081H	Time zone table No. 1 Time zone 1 start time: day Time zone 1 start time: month ..... Time zone table No. 4 Time zone 4 start time: day	3×4	R/W	Time zone table No. 01 First table 02 Second table

	Time zone 4 start time: month			
0082H~0096H	Time period table No. 1: Period 1 rate No Start time of the first period: minutes Start time of the first period: hour ..... Period 14 rate No Starting time of the 14th period: minutes Starting time of the 14th period: hour	$3 \times 14$	R/W	Time period table No. 01 spike 02 peak 03 flat 04 valley
0097H~00ABH	Time period table No. 2: Period 1 rate No Start time of the first period: minutes Start time of the first period: hour ..... Period 14 rate No Starting time of the 14th period: minutes Starting time of the 14th period: hour	$3 \times 14$	R/W	Time period table No. 01 spike 02 peak 03 flat 04 valley
00AC~00AFH	Reserve			
00B0H	Current total reactive energy	4	R	unit: 0.01kVarh
00B2H	Current spike reactive energy	4	R	
00B4H	Current peak reactive energy	4	R	
00B6H	Current flat reactive energy	4	R	
00B8H	Current valley reactive energy	4	R	
00BAH	Current forward reactive total energy	4	R	
00BCH	Current forward reactive spike energy	4	R	
00BEH	Current forward reactive peak energy	4	R	
00C0H	Current forward reactive flat energy	4	R	
00C2H	Current forward reactive valley energy	4	R	
00C4H	Current reversing reactive total energy	4	R	
00C6H	Current reversing reactive spike energy	4	R	
00C8H	Current reversing reactive peak energy	4	R	
00CAH	Current reversing reactive flat energy	4	R	
00CCH	Current reversing reactive valley energy	4	R	
00CEH~1FFFH	Reserve			
2000H	Voltage	2	R	unit: 0.1V
2001H	Current	2	R	unit: 0.01A
2002H	Active power	2	R	unit: 0.001kW
2003H	Reactive power	2	R	unit: 0.001kvar
2004H	Apparent power	2	R	unit: 0.001kVA
2005H	power factor	2	R	unit: 0.001

2006H	Current forward active total energy	4	R/W	unit: 0.01kWh
2008H	Current reversing active total energy	4	R/W	
200AH~52 FFH	Reserve			
5300H	Voltage	4	R	Float
5302H	Current	4	R	
5304H	Active power	4	R	
5306H	Reactive power	4	R	
5308H	Apparent power	4	R	
530AH	Power factor	4	R	
530CH	Frequency	4	R	

Notes:

1. All data is read-only and the function code is 03.

### 8.3 DL/T645-2007 protocol data identification

Number	Identification code	Data format	Byte	Unit	Function		Variable
					R	W	
1	00000000	XXXXXX.XX	4	kWh	*		Current combined total active energy
2	00000100	XXXXXX.XX	4	kWh	*		Current combined spike active energy
3	00000200	XXXXXX.XX	4	kWh	*		Current combined peak active energy
4	00000300	XXXXXX.XX	4	kWh	*		Current combined flat active energy
5	00000400	XXXXXX.XX	4	kWh	*		Current combined valley active energy
6	0001FF00	XXXXXX.XX	20	kWh	*		Current forward active energy data block
7	0002FF00	XXXXXX.XX	20	kWh	*		Current reversing active energy data block
8	00000001	XXXXXX.XX	4	kWh	*		Total active energy of last day
9	00000101	XXXXXX.XX	4	kWh	*		Spike active energy of last day
10	00000201	XXXXXX.XX	4	kWh	*		Peak active energy of last day
11	00000301	XXXXXX.XX	4	kWh	*		Flat active energy of last day
12	00000401	XXXXXX.XX	4	kWh	*		Valley active energy of last day
13	0000FF01	XXXXXX.XX	20	kWh	*		Active energy data block of last day
14	00000002	XXXXXX.XX	4	kWh	*		Total active energy of last 2 day
15	00000102	XXXXXX.XX	4	kWh	*		Spike active energy of last 2 day
16	00000202	XXXXXX.XX	4	kWh	*		Peak active energy of last 2 day
17	00000302	XXXXXX.XX	4	kWh	*		Flat active energy of last 2 day
18	00000402	XXXXXX.XX	4	kWh	*		Valley active energy of last 2 day
19	0000FF02	XXXXXX.XX	20	kWh	*		Active energy data block of last 2 day

20	02010100	XXX. X	2	V	*		Voltage
21	02020100	XXX. XXX	3	A	*		Current
22	02030100	XX. XXXX	3	kW	*		Active power
23	02040100	XX. XXXX	3	kvar	*		Reactive power
24	02050100	XX. XXXX	3	kVA	*		Apparent power
25	02060100	X. XXX	2		*		Power factor
26	02800002	XX. XX	2	H	*		Frequency
27	04000101	YYMMDDWW	4	Year/ Month/ Day	*	*	Date and week
28	04000102	hhmmss	3	Day/ Minute/ Second	*	*	Time
29	04000402	XXXXXXXXXXXX	6		*	*	Table No
30	04010000	MMDDNN	3*4				Time zone table
31	04010001	hhmmNN	3*14		*	*	Time period table No. 1:
32	04010002	hhmmNN	3*14		*	*	Time period table No. 2:

#### 8.4 DL/T645-1997 protocol data identification

Number	Identification code	Data format	Byte	Unit	Function		Variable
					R	W	
1	9010	XXXXXX. XX	4	kWh	*		Current combined total active energy
2	9011	XXXXXX. XX	4	kWh	*		Current combined spike active energy
3	9012	XXXXXX. XX	4	kWh	*		Current combined peak active energy
4	9013	XXXXXX. XX	4	kWh	*		Current combined flat active energy
5	9014	XXXXXX. XX	4	kWh	*		Current combined valley active energy
6	901F	XXXXXX. XX	20	kWh	*		Current forward active energy data block
7	902F	XXXXXX. XX	20	kWh	*		Current reversing active energy data block
8	9410	XXXXXX. XX	4	kWh	*		Total active energy of last month
9	9411	XXXXXX. XX	4	kWh	*		Spike active energy of last month
10	9412	XXXXXX. XX	4	kWh	*		Peak active energy of last month
11	9413	XXXXXX. XX	4	kWh	*		Flat active energy of last month
12	9414	XXXXXX. XX	4	kWh	*		Valley active energy of last month
13	941F	XXXXXX. XX	20	kWh	*		Active energy data block of last month
14	9810	XXXXXX. XX	4	kWh	*		Total active energy of last 2

							mouth
15	9811	XXXXXX. XX	4	kWh	*		Spike active energy of last 2 mouth
16	9812	XXXXXX. XX	4	kWh	*		Peak active energy of last 2 mouth
17	9813	XXXXXX. XX	4	kWh	*		Flat active energy of last 2 mouth
18	9814	XXXXXX. XX	4	kWh	*		Valley active energy of last 2 mouth
19	981F	XXXXXX. XX	20	kWh	*		Active energy data block of last 2 mouth
20	B611	XXX	2	V	*		Voltage
21	B621	XX. XX	2	A	*		Current
22	B631	XX. XXXX	3	kW	*		Active power
23	B641	XX. XX	2	kvar	*		Reactive power
24	B651	X. XXX	2		*		Power factor
25	C010	YYMMDDWW	4	Year/ Month/ Day	*	*	Date and week
26	C011	hhmmss	3	Day/ Minute/ Second	*	*	Time
27	C032	XXXXXXXXXXXX	6		*	*	Table No

Note: 1. The highest bit of instantaneous power indicates the direction, 0 positive, 1 negative, Value range: 0.0000 ~ 79.9999.

2. The highest power factor indicates the direction, 0 positive and 1 negative, and the value range is 0.000 ~ 1.000.

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