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ADL200

Installation and operation instruction V1.5

Acrel Co., Ltd.

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1 Overview

ADL200 single phase electric meter is designed for single phase active energy measurement on low voltage system, in the same time it can measure the electrical parameters like voltage, current, power and so on. There is also RS485 can be chosen. 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)	■
Measurement of electrical parameters	Voltage, Current, Active power, Reactive power, Apparent power, Power factor and Frequency	■
LCD Display	8 bits section LCD display	■
Key programming	3 keys to set parameters like code, address, baud rate, multi-tariff	■
Pulse output	Active energy pulse output	■
Multi-tariff	Date and time 3 months historical energy data frozen storage Adapt 14 time zones, 8 time interval lists, 14 time interval by day and 8 tariff rates	□F
Communication	Communication interface:RS485, Communication protocol: MODBUS-RTU	■

(■：Standard；□：Optional)

3 Technical parameter

3.1 Electric performance

Input voltage	Reference voltage	AC 220V
	Voltage range	AC 75~260V
	Reference frequency	50Hz
	Power consumption	<10VA
Input current	Basic current	10A
	Maximum current	80A
	Starting current	4‰Ib
	Consumption	<4VA
Measurement performance	Accuracy of measuring	1 class
	Range of measuring	000000.00~42949672.95kWh
Clock accuracy		Error≤0.5s/d

Active pulse	Pulse width	80±20ms
	Pulse constant	1000imp/kWh
Communication	Interface	RS485(A+、B-)
	Connection mode	Shielded twisted pair conductors
	Protocol	MODBUS-RTU

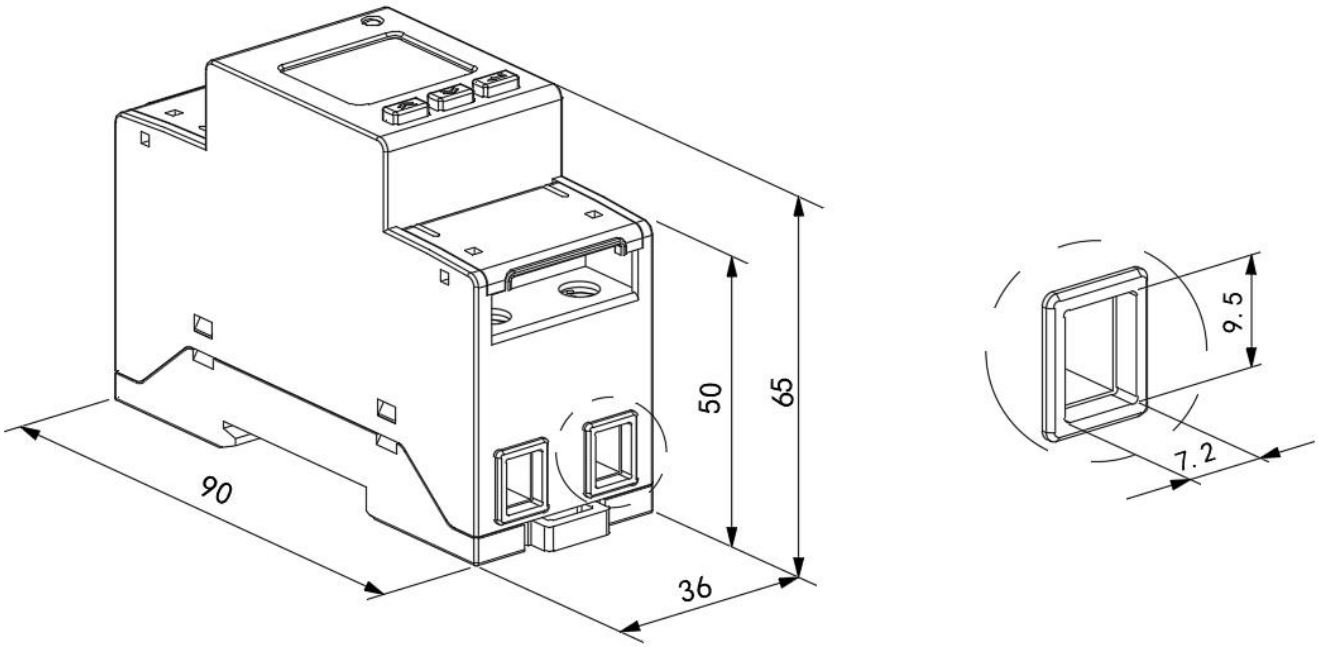
3.2 Mechanical performance

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

3.3 Work environment

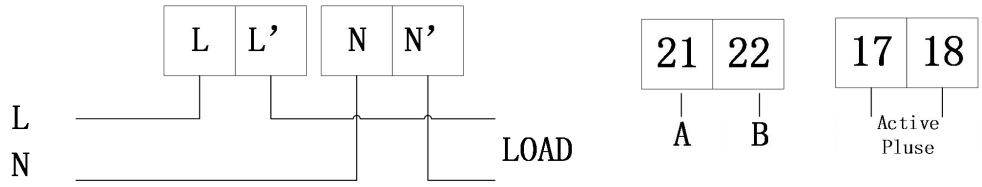
Temperature range	Work temperature	-25℃~55℃
	Storage Temperature	-40℃~70℃
Relative humidity		≤95%(No condensation)
Altitude		<2000m

4 Outline (unit: mm)



Meter outlook and size

5 wiring and installing



Note: Voltage signal wiring torque should be 3-4N·m, RS485, active energy pulse wiring torque should be 0.5N·m.

6 Diagnosis, analysis and elimination of common faults

6.1 Auxiliary power failure

Failure performance: the meter flashes and does not light up after being powered on.

Troubleshooting:

1. Check whether the wiring of the auxiliary power supply is consistent with the wiring diagram of the instrument, and whether the wiring is loose or falling off;

2. Use a multimeter to measure whether the input voltage value of the auxiliary power supply is within the normal working voltage range of the instrument.

6.2 Signal input failure

Failure performance: After the meter is powered on, the display power or energy count is not accurate.

Troubleshooting: Switch the display interface of the meter to the power (active P, power factor λ) interface, check whether the power display is negative and whether the power factor is between 0.8-0.95, and then check whether the input and output of the current signal line are reversed (That is, the incoming line of the current must be consistent with the incoming end of the instrument), And consistent with the wiring on the meter.

6.3 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

7.1 Key description

Key icon	Key name	Key function
	Key up	View voltage and current in the view interface Up and flashing shift in the programming interface

	Key down	View power in the view interface Scroll down and modify flashing bits in the programming interface
	Key setting	View electrical energy in the viewing interface Long press 3S to enter/exit the menu Short press OK in the programming interface to save the settings

7.2 display description

Show total energy when connected. Change information while pressing down key. Display information as following.

	U、I、F、Time、MODBUS Address、Baud、parity、Version、ALL－display；
	Total active power、total reactive power、total apparent power、total power factor；
	Total active energy, forward active total energy, reverse active total energy, total active energy at various rates, total reactive energy, forward reactive total energy, reverse total reactive energy, total reactive energy at various rates

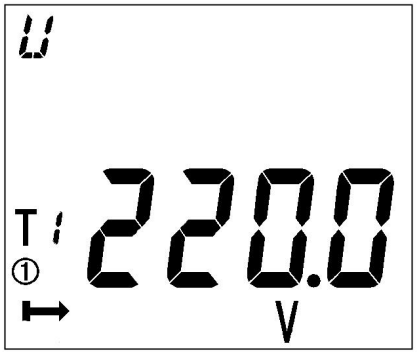
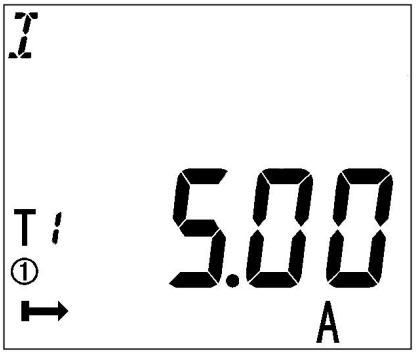
Note：

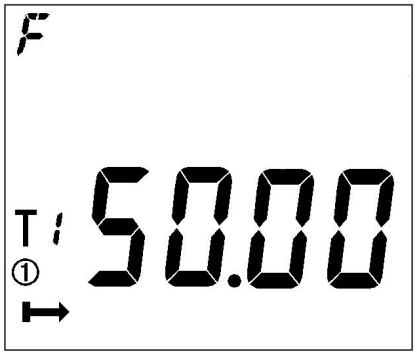
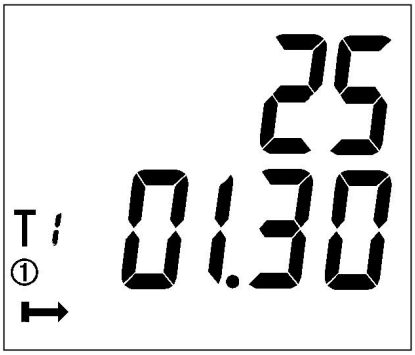
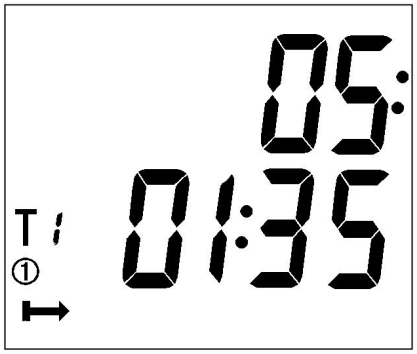
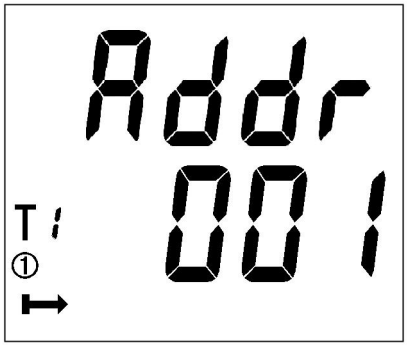
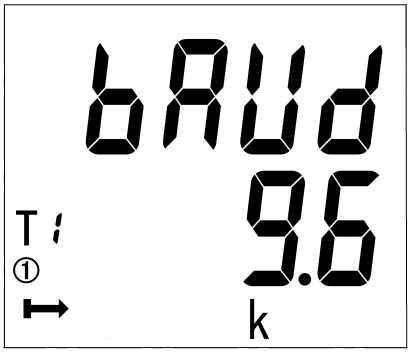
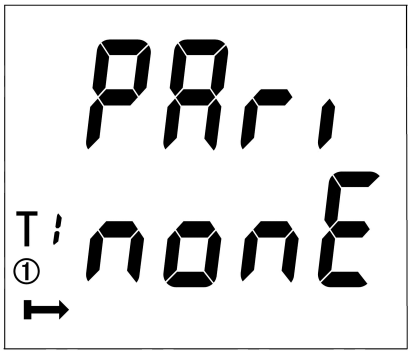
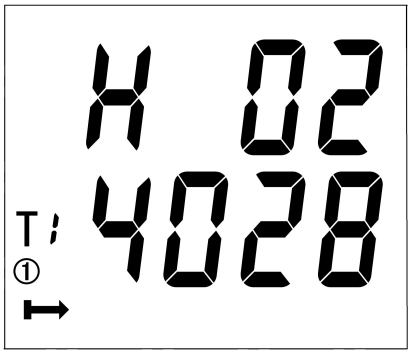
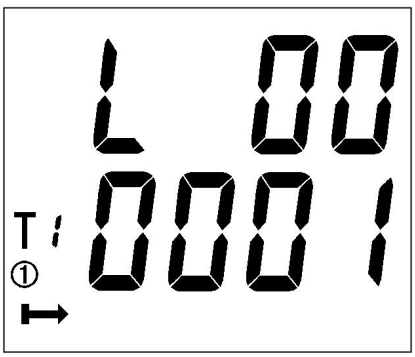
1. Listed above are the names of all display interfaces of the ADL200 meter with multi-tariff function. Three buttons can switch different types of display content, the switching sequence is as described above.

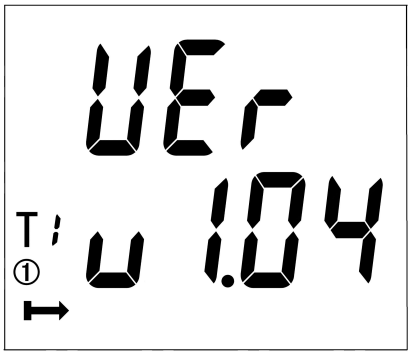
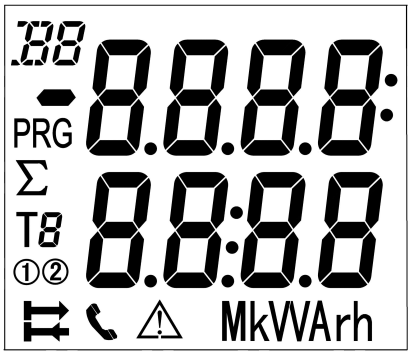
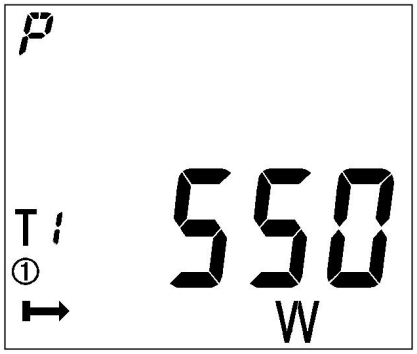
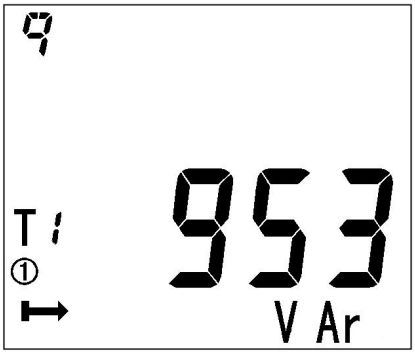
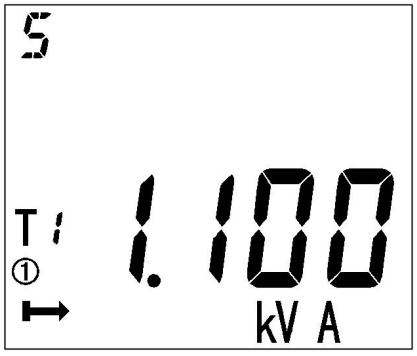
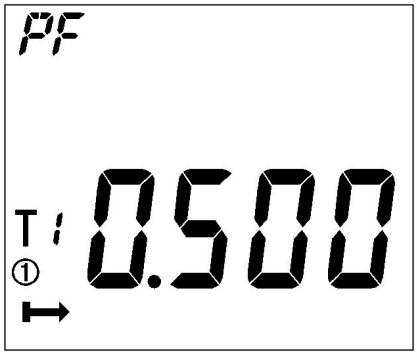
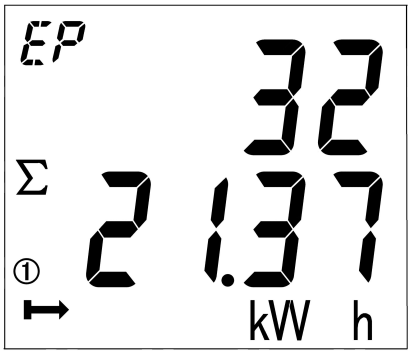
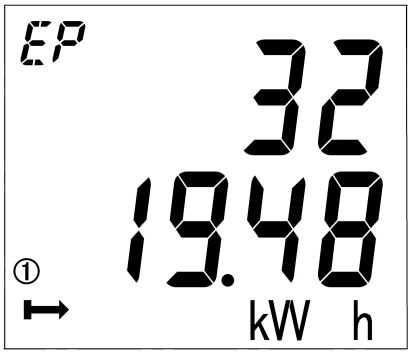
2. For the ADL200 meter without the multi-tariff function, it does not display the date, time and various types of rate energy (the energy in the eight rate periods).

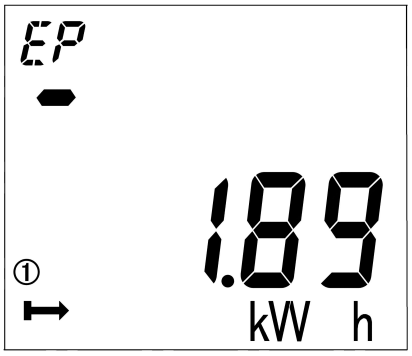
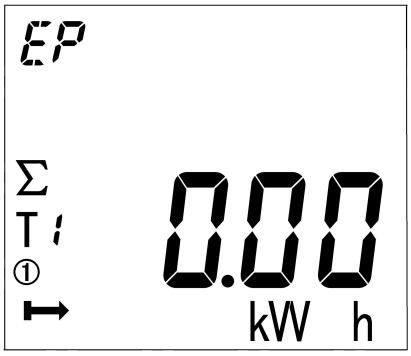
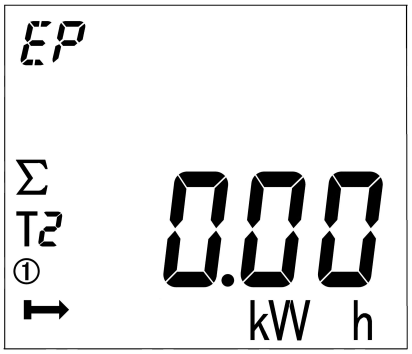
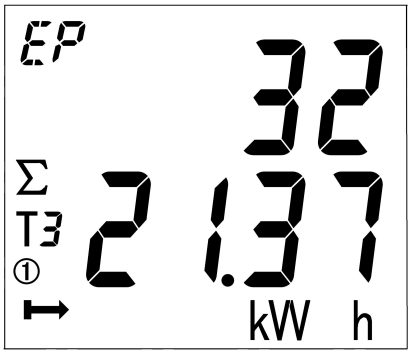
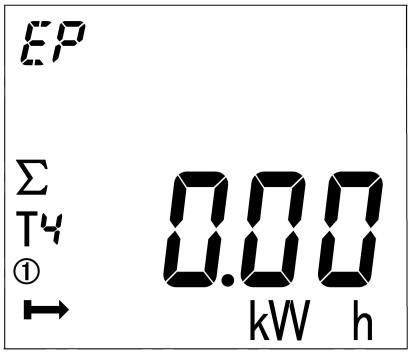
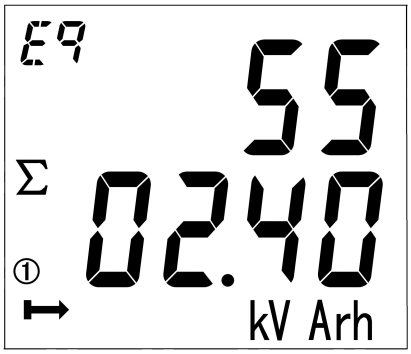
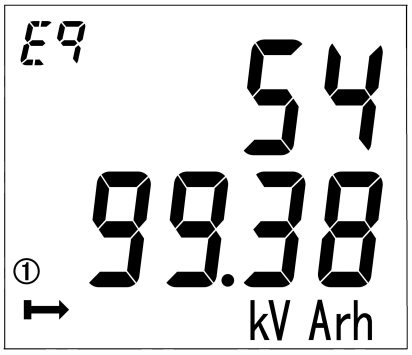
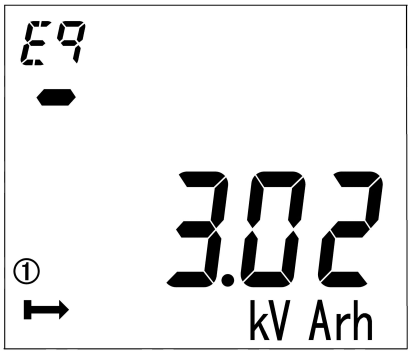
3. The amount of rate energy displayed is determined by the maximum rate of the set time meter, for example, if the maximum rate set is T5 (rate 5), then the meter displays the rate energy 1-5.

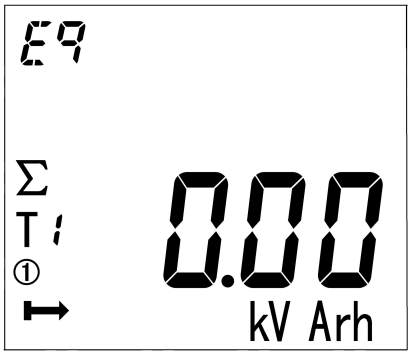
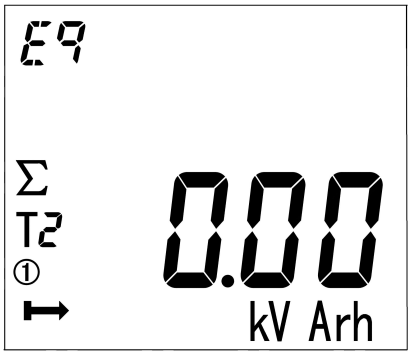
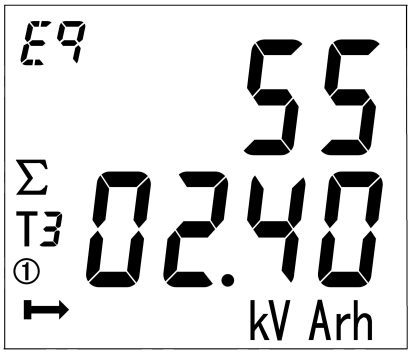
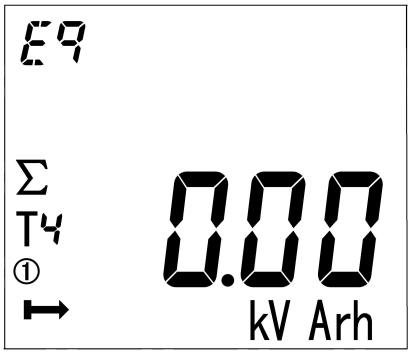
Display interface description

		
	Voltage 220.0V	Current 5.00A

		
	Frequency	Date(1/30/25)
		
	Time(5:01:35)	Modbus address
		
	Baud rate	Parity
		
	High 6 digits of 645 protocol meter number	Low 6 digits of 645 protocol meter number

		
	Software version number	LCD full display
		
	Total active power 550W	Total reactive power 953var
		
	Total apparent power 1.100kVA	Power factor 0.500
		
	Current combined total active energy **3221.37kWh**	Current forward active total energy

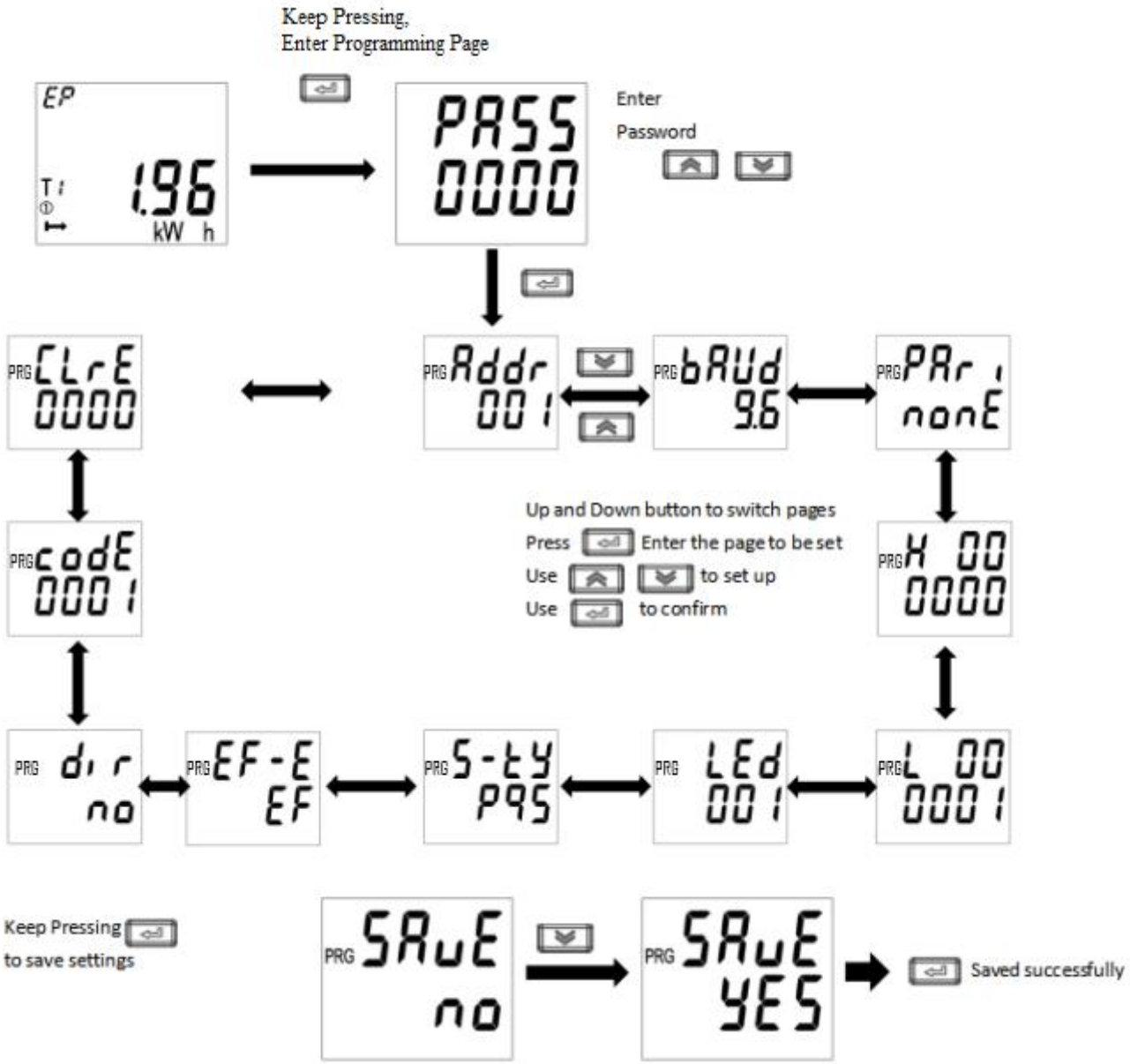
		
	Current reversing active total energy	Current combined spike active energy
		
	Current combined peak active energy	Current combined flat active energy
		
	Current combined valley active energy	Current total reactive energy(5502.40kvarh)
		
	Current forward reactive total energy	Current reversing reactive total energy

		
	Current spike reactive energy	Current peak reactive energy
		
	Current flat reactive energy	Current valley reactive energy

Note:The above shows the interface with multi rate, TX in the lower left corner indicates that the meter is currently running on rate X (except for the energy interface), ① indicates that it is currently running on time list 1, if function F is not selected, there is no such labeling as TX and ①. In addition, the arrow to the right indicates that the meter is upwardly inwardly and downwardly outwardly for the positive power direction.

7.3 Programming display menu

Press at any main menu and get in interface, and then press show , and enter the code. If you enter a wrong code, it will show “0000” and enter the code again; and if you enter a right code, you can set the parameter. After setting the parameter, it will show and save the change by pressing and quit without save by pressing .



7.4 Configurable data items

Configurable items description

Mum	Secondly menu		
	Symbol	Meaning	Range
1	ADDR	Communication address	1-254
2	Baud	Baud setting	1200、2400、4800、9600、19200、38400
3	Pari	Parity setting	None、Odd、Even
4	LED	Background light setting	0-255 minutes， 0 ever bright
5	S-TY	Apparent power calculation	PQS,RMS
6	EF-E	Set multi-tariff	EF-YES E-NO
7	DIR	Current direction	no-forward yes-reverse
8	CoDE	Code setting	1-9999

8 Communication description

8.1 Communication protocol

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

8.2 MODBUS Address list

Address	Variable	Length	Attributes	Note
0000H	Current combined total active energy	4	R	UINT32 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	UINT16
000BH	Voltage	2	R	UINT16 unit：0.1V
000CH	Current	2	R	UINT16 unit：0.01A
000DH	Active power	2	R	INT16 unit：0.001kW
000EH	Reactive power	2	R	INT16 unit：0.001kvar
000FH	Apparent power	2	R	UINT16 unit：0.001kVA
0010H	power factor	2	R	INT16 unit：0.001
0011H	Frequency	2	R	UINT16 unit：0.01Hz
0012H	Year, month	2	R/W	Separate analysis of the high and low 8 bits
0013H	Day, hour	2	R/W	
0014H	Minute, second	2	R/W	
0015H	Address	1	R/W	0~254
0015H	Communication baud rate	1	R/W	00:1200 01:2400 02:4800 03:9600 04:19200 05:38400
0016H	Background light time	2	R/W	0-255 minutes， 0 ever bright
0017H~ 0021H	Reserve			
0022H	Total active energy of last month	4	R	UINT32 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	2	R/W	Bit0:0-E-no， 1-EF-YES； Bit1:0-forward， 1-reverse; Bit3：0-PQS 1-RMS.
0046H~ 0047H	reserve			
0048H	parity	2	R	0000: None 0001: Odd 0002: Even
0049H~ 0067H	reserve			
0068H	Current forward active total energy	4	R	
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	UINT32 unit：0.01kWh
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	
007C~ 00AFH	reserve			
00B0H	Current total reactive energy	4	R	
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	UINT32 unit：0.01kvarh
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	Current total active energy	4	R	UINT32 unit：0.01kWh
2002H	Current rate 1 (spike) active energy	4	R	
2004H	Current rate 2 (peak) active energy	4	R	
2006H	Current rate 3 (flat) active energy	4	R	
2008H	Current rate 4 (valley) active energy	4	R	
200AH	Current rate 5 active energy	4	R	
200CH	Current rate 6 active energy	4	R	
200EH	Current rate 7 active energy	4	R	
2010H	Current rate 8 active energy	4	R	
2012H	Current forward active total energy	4	R	
2014H	Current forward active rate 1 energy	4	R	
2016H	Current forward active rate 2 energy	4	R	
2018H	Current forward active rate 3 energy	4	R	
201AH	Current forward active rate 4 energy	4	R	
201CH	Current forward active rate 5 energy	4	R	
201EH	Current forward active rate 6 energy	4	R	
2020H	Current forward active rate 7 energy	4	R	
2022H	Current forward active rate 8 energy	4	R	
2024H	Current reversing active total energy	4	R	
2026H	Current reversing active rate 1 energy	4	R	
2028H	Current reversing active rate 2 energy	4	R	
202AH	Current reversing active rate 3 energy	4	R	
202CH	Current reversing active rate 4 energy	4	R	
202EH	Current reversing active rate 5 energy	4	R	
2030H	Current reversing active rate 6 energy	4	R	
2032H	Current reversing active rate 7 energy	4	R	
2034H	Current reversing active rate 8 energy	4	R	
2036H	Current total reactive energy	4	R	UINT32 unit：0.01kvarh
2038H	Current rate 1 (spike) reactive energy	4	R	
203AH	Current rate 2 (peak) reactive energy	4	R	
203CH	Current rate 3 (flat) reactive energy	4	R	
203EH	Current rate 4 (valley) reactive energy	4	R	
2040H	Current rate 5 reactive energy	4	R	
2042H	Current rate 6 reactive energy	4	R	
2044H	Current rate 7 reactive energy	4	R	
2046H	Current rate 8 reactive energy	4	R	
2048H	Current forward reactive total energy	4	R	
204AH	Current forward reactive rate 1 energy	4	R	
204CH	Current forward reactive rate 2 energy	4	R	
204EH	Current forward reactive rate 3 energy	4	R	

2050H	Current forward reactive rate 4 energy	4	R	
2052H	Current forward reactive rate 5 energy	4	R	
2054H	Current forward reactive rate 6 energy	4	R	
2056H	Current forward reactive rate 7 energy	4	R	
2058H	Current forward reactive rate 8 energy	4	R	
205AH	Current reversing reactive total energy	4	R	
205CH	Current reversing reactive rate 1 energy	4	R	
205EH	Current reversing reactive rate 2 energy	4	R	
2060H	Current reversing reactive rate 3 energy	4	R	
2062H	Current reversing reactive rate 4 energy	4	R	
2064H	Current reversing reactive rate 5 energy	4	R	
2066H	Current reversing reactive rate 6 energy	4	R	
2068H	Current reversing reactive rate 7 energy	4	R	
206AH	Current reversing reactive rate 8 energy	4	R	
206CH	Total active energy of last month	4	R	
206EH	Rate 1 (Spike) active energy of last month	4	R	
2070H	Rate 2 (Peak) active energy of last month	4	R	
2072H	Rate 3 (Flat) active energy of last month	4	R	
2074H	Rate 4 (Valley) active energy of last month	4	R	
2076H	Rate 5 active energy of last month	4	R	
2078H	Rate 6 active energy of last month	4	R	
207AH	Rate 7 active energy of last month	4	R	
207CH	Rate 8 active energy of last month	4	R	
207EH	Total active energy of last 2 month	4	R	
2080H	Rate 1 active energy of last 2 month	4	R	
2082H	Rate 2 active energy of last 2 month	4	R	UINT32 unit：0.01kWh
2084H	Rate 3 active energy of last 2 month	4	R	
2086H	Rate 4 active energy of last 2 month	4	R	
2088H	Rate 5 active energy of last 2 month	4	R	
208AH	Rate 6 active energy of last 2 month	4	R	
208CH	Rate 7 active energy of last 2 month	4	R	
208EH	Rate 8 active energy of last 2 month	4	R	
2090H	Total active energy of last 3 month	4	R	
2092H	Rate 1 active energy of last 3 month	4	R	
2094H	Rate 2 active energy of last 3 month	4	R	
2096H	Rate 3 active energy of last 3 month	4	R	
2098H	Rate 4 active energy of last 3 month	4	R	
209AH	Rate 5 active energy of last 3 month	4	R	
209CH	Rate 6 active energy of last 3 month	4	R	
209EH	Rate 7 active energy of last 3 month	4	R	
20A0H	Rate 8 active energy of last 3 month	4	R	
20A2H-	reserve			

52FFH				
5300H	Voltage	4	R	Float unit: Voltage: V Current: A Active power: W Reactive power: var Apparent power: VA
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	
530EH-EFFFH	reserve			
F000H-F006H	serial number	14	R	BCD code