ADL200

安装使用说明书 V1.0

Installation and operation instruction V1.0

安科瑞电气股份有限公司

申　　明

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1 概述 Overview

ADL200 单相电子式电能表主要用于计量低压网络的单相有功电能，同时可测量电压、电流、功率等电量，并可选配 RS485 通讯功能，方便用户进行用电监测、集抄和管理。可灵活安装于配电箱内，实现对不同区域和不同负荷的分项电能计量，统计和分析。性能指标符合国标 IEC62053-21、IEC62053-22 对电能表的各项技术要求。

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 power meter has advantages of smaller volume, high precision, good EMC, easily installing etc, All meters meet the related technical requirements of electronic power meter in the IEC62053-21、IEC62053-22 standards.

2 主要功能 Function

功能 Function	功能说明 Function description	功能配置 Function provide
电能计量 Measurement of kWh	总电能计量（反向计入正向），3 个月历史电能数据冻结存储 Single-phase active kWh (positive and negative)，3 months historical energy data frozen storage	■
电量测量 Measurement of electrical parameters	U、I 、P、Q、S、PF、F 测量 Voltage, Current, Active power, Reactive power, Apparent power, Power factor and Frequency	■
LCD 显示 LCD Display	8 位段式 LCD 显示 8 bits section LCD display	■
按键编程 Key programming	3 按键可编程设置密码、通讯地址、波特率、复费率和通讯协议。 3 keys to set parameters like code, address, baud rate, multi-tariff and communication protocol	■
脉冲输出 Pulse output	有功电能脉冲输出 Active energy pulse output	■
复费率 Multi-tariff	4 个时区、2 个时段表、14 个日时段、4 个费率 Adapt 4 time zones, 2 time interval lists, 14 time interval by day and 4 tariff rates	□F
通讯	RS485 接口，MODBUS-RTU Communication interface: RS485, Communication protocol: MODBUS-RTU	■C

Communication		

(■：标配 Standard；□：可选 Optional)

3 技术参数 Technical parameter

3.1 电气特性 Electric performance

电压输入 Input voltage	额定电压 Reference voltage	AC 220V
	参比频率 Reference frequency	50Hz
	功耗 Power consumption	<10VA
电流输入 Input current	基本电流 Basic current	10A
	电流规格 Maximum current	80A
	起动电流 Starting current	4‰I_b
	功耗 Consumption	<4VA
测量性能 Measurement performance	测量精度 Accuracy of measuring	1级
	测量范围 Range of measuring	000000.00~99999999kWh
时钟精度 Clock accuracy		误差≤0.5s/d
有功脉冲 Active pulse	脉冲宽度 Pulse width	80±20ms
	脉冲常数 Pulse constant	1000imp/kWh
通信 Communication	接口 Interface	RS485(A+、B-)
	介质 Connection mode	屏蔽双绞线 Shielded twisted pair conductors
	协议 Protocol	MODBUS-RTU

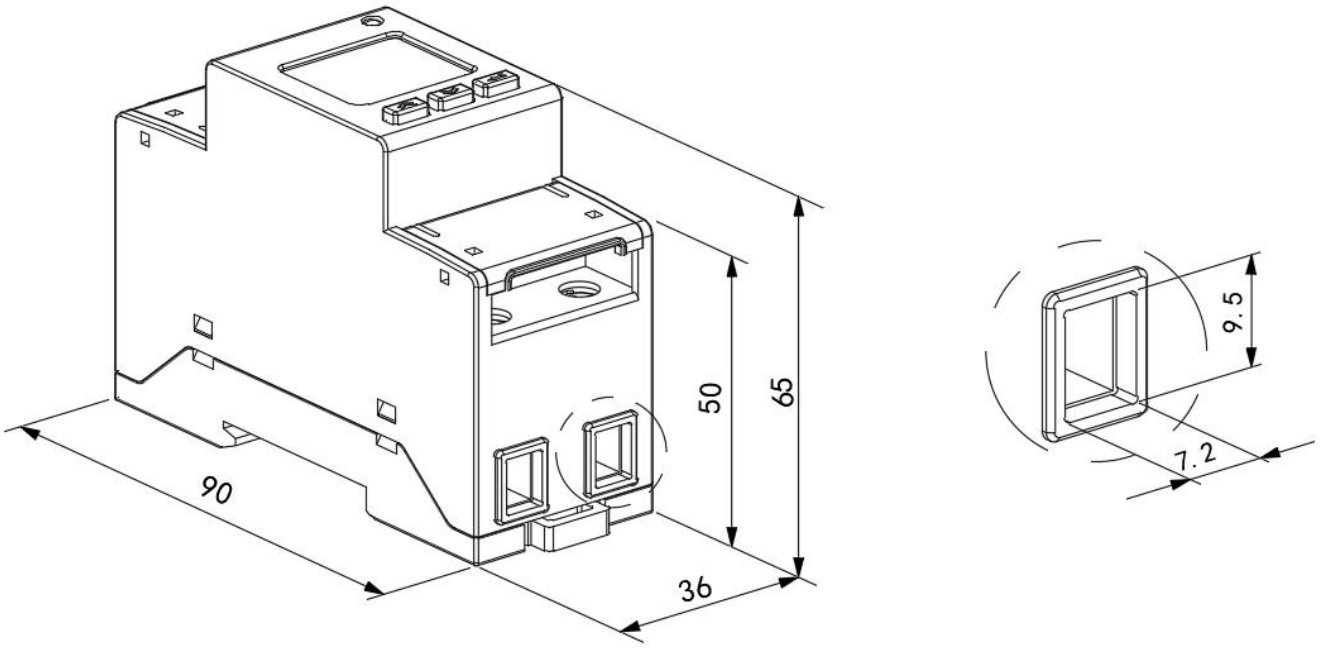
3.2 机械特性 Mechanical performance

外形尺寸 Outline	长×宽×高 Length × Width × Height	90mm×36mm×65mm（2 模数）
强电端子扭矩 Strong current terminal Torque	<1.8Nm	

3. 3 环境条件 Work environment

温度范围 Temperature range	工作温度 Work temperature	-25℃~55℃
	存储温度 Storage Temperature	-40℃~70℃
湿度 Relative humidity		≤95%（无凝露）(No condensation)
海拔 Altitude		<2000m

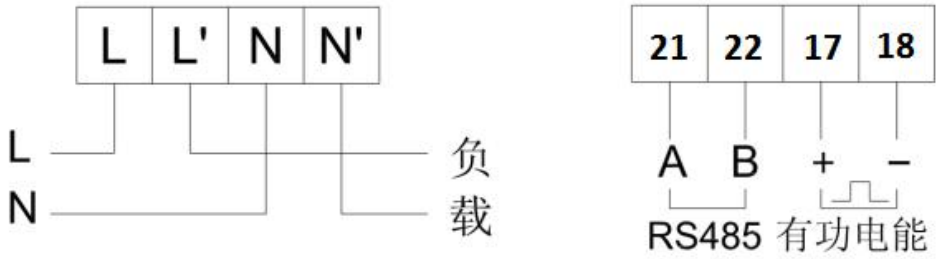
4 外形尺寸（单位：mm） **Outline (unit: mm)**



仪表外形尺寸

Meter outlook and size

5 接线与安装 wiring and installing



6 常见故障的诊断分析及排除方法 Diagnosis, analysis and elimination of common faults

6.1 辅助电源故障 Auxiliary power failure

故障表现：仪表通电后闪烁、不亮等。

故障排除：1.检查辅助电源的接线与仪表的接线图是否一致，接线是否有松动或脱落现象；

2.使用万用表测量辅助电源输入电压值是否在仪表正常工作电压值范围内。

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 信号输入故障 Signal input failure

故障表现：仪表通电后显示功率或电能计数不准。

故障排除：将仪表显示界面切换至功率（有功 P、功率因数 λ）界面，检查功率显示是否为负以及功率因数是否在 0.9-0.95 之间，后再检查电流信号线进、出线是否接反（即电流的进线一定要与仪表的进线端一致），并与仪表上的接线图一致。

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 0.9-0.95, 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 通讯故障 communication failure

故障表现：仪表通电后无法与上位机正常通讯。

故障排除：1.测量仪表通讯输出 A、B 之间的电压值应在+(4.4-4.5)V 之间；

2. 检查通讯接线方式是否按照接线图要求正确接线（即仪表的通讯接线端子 A/B 要与通讯串口 A/B 相对应）；

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 操作与显示 Operation and display

7.1 按键功能说明 Key description

按键图标 Key icon	按键名称 key name	按键功能 Key function
	向上键 Key up	查看界面中查看电压电流 编程界面中上翻及闪烁移位 View voltage and current in the view interface Up and flashing shift in the programming interface
	向下键 Key down	查看界面中查看功率 编程界面中下翻及修改闪烁位 View power in the view interface Scroll down and modify flashing bits in the programming interface
	编程确定键 Key setting	查看界面中查看电能 长按 3S 进入/退出菜单 编程界面中短按确定保存设置 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 显示说明 display description

上电后显示总有功电能。可通过三类查看键实现翻屏显示。各类显示页面顺序说明如下：

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

	电压、电流、频率、时间、MODBUS 协议地址、波特率、校验位、DL/T645 地址、软件版本号、全显检测； U、I、F、Time、MODBUS Address、Baud、parity、DL/T645、Version、ALL－display；
	总有功功率、总无功功率、总视在功率、总功率因数； Total reactive power、total reactive power、total apparent power、total power factor；
	总有功电能、正向有功总电能、反向有功总电能、总有功尖电能、总有功峰电能、总有功平电能、总有功谷电能、总无功电能、正向无功总电能、反向无功总电能、总无功尖电能、总无功峰电能、总无功平电能、总无功谷电能。 Total active energy, forward active total energy, reverse active total energy, total

	active spike energy, total active peak energy, total active level energy, total active valley energy, total reactive energy, forward reactive total energy, reverse Total reactive energy, total reactive spike energy, total reactive peak energy, total reactive flat energy, total reactive valley energy.

注：

Note：

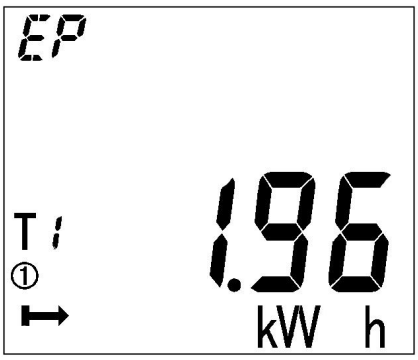
1、以上所列为 ADL200 带有复费率功能的仪表所有显示界面名称，三个按键可切换不同类型的显示内容，切换顺序如上所述；

2、对于 ADL200 不带有复费率功能的仪表，不显示日期、时间及各类的分时电能（即尖、峰、平、谷四种费率时段的电能）。

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

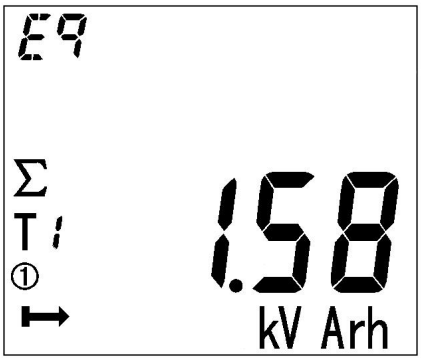
2、For the ADL200 meter without the double rate function, it does not display the date, time and various types of time-sharing energy (the energy in the four rate periods of sharp, peak, flat and valley).

显示界面举例



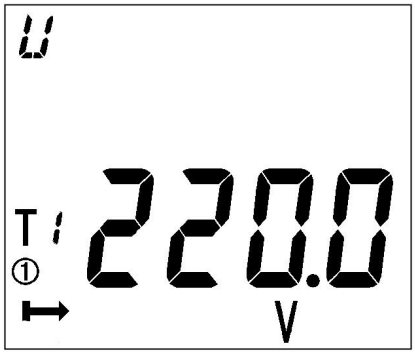
当前有功总电量 1.96kWh

Current total active energy



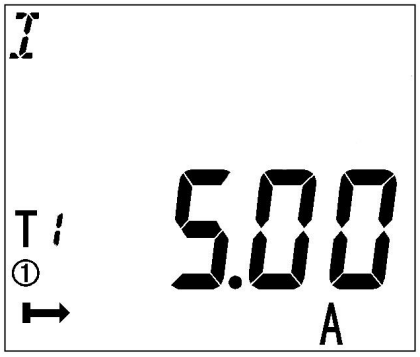
当前无功总电量 1.58kWh

Current total reactive energy



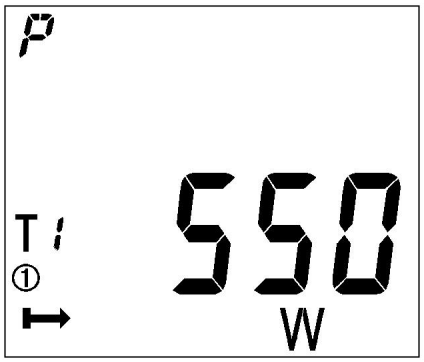
当前电压 220.0V

Voltage



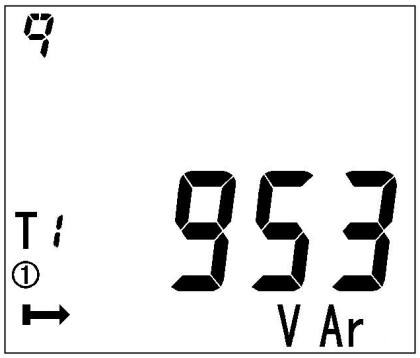
当前电流 5.00A

Current



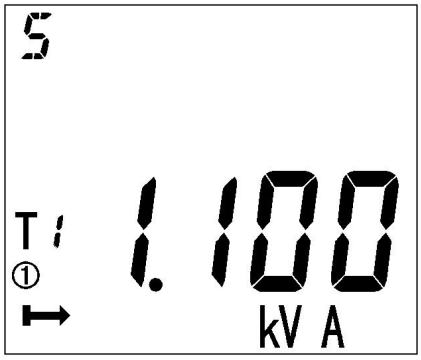
当前总有功功率 550W

Current total active power 550W



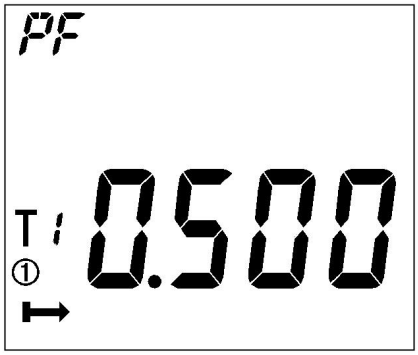
当前总无功功率 953VAr

Current total reactive power 953VAr



当前总视在功率 1.100kVA

Current total apparent power 1.100kVA



当前总功率因数 0.500

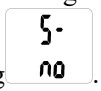
Current total power factor 0.500

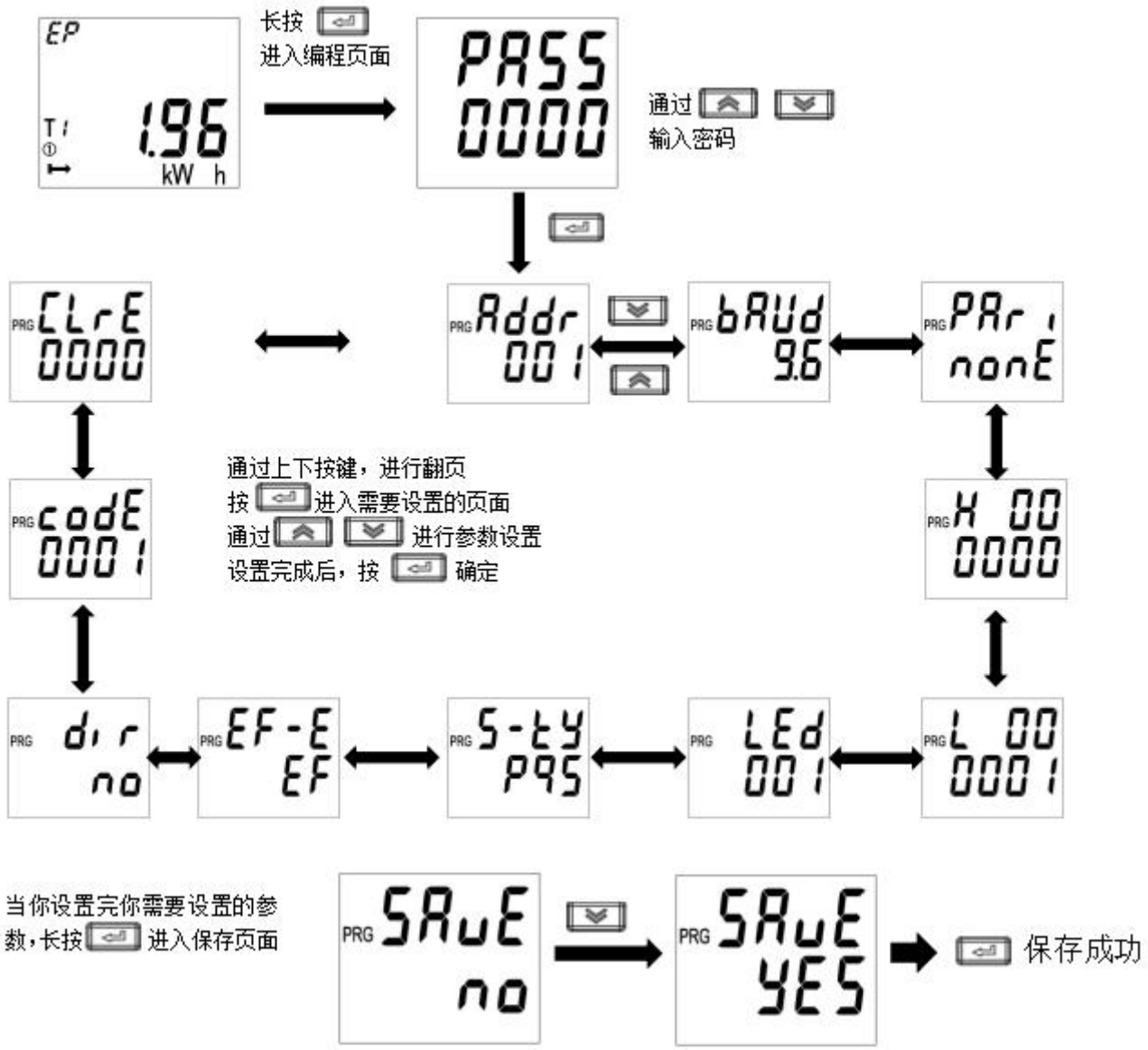
注：以上只是显示界面的一部分，其他界面显示模式与上图类似，可根据界面中显示的信息来判断显示含义。

Note:The above is just a part of the display interface. The display mode of other interfaces is similar to the above figure. You can judge the display meaning according to the information displayed on the interface.

7.3 编程界面 Programming display menu

在测量显示菜单中的任一显示项下，长按可进入“PASS”界面，输入密码后再按，若密码输入错误，则返回“0000”可重新输入；若密码输入正确，则可进行参数设置。设置完成后长按进入“SAVE”界面，选择“YES”再按下则保存后退出，选择“no”再按下则不保存直接退出。

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 可设置数据项 Item can be set

设置菜单说明

Setting item description

序号 Mum	二级菜单 Secondly menu		
	符号 Symbol	含义 Meaning	范围 Range
1	ADDR	通讯地址设置 Communication address	1-254
2	Baud	波特率选择 Baud setting	1200、2400、4800、9600、19200
3	Pari	校验选择 Parity setting	None、Odd、Even
4	HI	DL/T645 高 6 位表号 Hi bits address of DL/T645	000000-999999
5	LO	DL/T645 低 6 位表号 Low bits address of	000000-999999

		DL/T645	
6	LED	背光时间设置 Background light setting	0-255 分钟， 0 为常亮
7	S-TY	视在功率计算方式 Apparent power calculation	PQS,RMS
8	EF-E	复费率功能 Set multi-tariff	EF-带复费率 YES E-不带复费率 NO
9	DIR	电流方向	no-正向 yes-反向
10	CoDE	密码设置 Code setting	1-9999
11	CLrE	清零 Clearing	0-9999

8 通信说明 Communication description

8.1 通信协议 Communication protocol

本电能表采用 MODBUS-RTU 协议或 DL/T645 规约。具体协议格式请参照相关协议标准，此处不再赘述。当复费率功能 F 未选用时，对应的复费率数据项无意义。

The meters adapt Modbus and DL/T645 protocol. 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 通信地址表 Address list

地址 Address	数据项名称 Variable	长度 Length	属性 Attributes	备注 Note
0000H	组合有功总电能 Current total electricity	4	R	单位：0.01kWh
0002H	组合有功尖电能 Current spike electric energy	4	R	
0004H	组合有功峰电能 Current peak electric energy	4	R	
0006H	组合有功平电能 Current flat electric energy	4	R	
0008H	组合有功谷电能 Current valley electric energy	4	R	
000AH	密码 Code	2	R	
000BH	电压 Voltage	2	R	单位：0.1V
000CH	电流 Current	2	R	单位：0.01A
000DH	有功功率 Active power	2	R	单位：0.001kW
000EH	无功功率 Reactive power	2	R	单位：0.001kvar
000FH	视在功率 Apparent power	2	R	单位：0.001kVA
0010H	功率因数 power factor	2	R	单位：0.001
0011H	频率 Frequency	2	R	单位：0.01Hz
0012H	年月 Year, month	2	R/W	

0013H	日时 Day, hour	2	R/W	
0014H	分秒 Minute, second	2	R/W	
0015H 高 8 位	地址 Address	1	R/W	0~254
0015H 低 8 位	波特率 Communication baud rate	1	R/W	00 对应 1200 01 对应 2400 02 对应 4800 03 对应 9600 04 对应 19200
0016H	背光时间 light time	2	R/W	
0017H~0021H	保留 Reserve			
0022H	上 1 月组合有功总电能 Total electric energy of last month	4	R	单位：0.01kWh
0024H	上 1 月组合有功尖电能 Spike electric energy of last month	4	R	
0026H	上 1 月组合有功峰电能 Peak electric energy of last month	4	R	
0028H	上 1 月组合有功平电能 Flat electric energy of last month	4	R	
002AH	上 1 月组合有功谷电能 Valley electric energy of last month	4	R	
002CH	上 2 月组合有功总电能 Total electric energy of last 2 month	4	R	
002EH	上 2 月组合有功尖电能 Spike electric energy of last 2 month	4	R	
0030H	上 2 月组合有功峰电能 Peak electric energy of last 2 month	4	R	
0032H	上 2 月组合有功平电能 Flat electric energy of last 2 month	4	R	
0034H	上 2 月组合有功谷电能 Valley electric energy of last 2 month	4	R	
0036H	上 3 月组合有功总电能 Total electric energy of last 3 month	4	R	
0038H	上 3 月组合有功尖电能 Spike electric energy of last 3 month	4	R	
003AH	上 3 月组合有功峰电能 Peak electric energy of last 3 month	4	R	
003CH	上 3 月组合有功平电能 Flat electric energy of last 3 month	4	R	
003EH	上 3 月组合有功谷电能 Valley electric energy of last 3 month	4	R	
0040H~0044H	保留 reserve			
				Bit0:0-非复费率（EF），1-复费率（EEF）；

0045H	状态 status		R/W	Bit1:0-上进下出（Up and down），1-下进上出（down and Up ） Bit3：0-PQS 1-RMS
0046H~0047H	保留 reserve			
0048H	校验方式 parity	2	R	0000:无校验 None 0002:偶校验 Even
0049H	表号 DL/T645 address	2	R/W	MeterID[0][1]
004AH		2		MeterID[2][3]
004BH		2		MeterID[4][5]
004CH~0067H	保留 reserve			
0068H	正向有功总电能 Current forward active total electric energy	4	R	单位：0.01kWh
006AH	正向有功尖电能 Current forward active spike electric energy	4	R	
006CH	正向有功峰电能 Current forward active peak electric energy	4	R	
006EH	正向有功平电能 Current forward active flat electric energy	4	R	
0070H	正向有功谷电能 Current forward active valley electric energy	4	R	
0072H	反向有功总电能 Current reversing active total electric energy	4	R	
0074H	反向有功尖电能 Current reversing active spike electric energy	4	R	
0076H	反向有功峰电能 Current reversing Active peak electric energy	4	R	
0078H	反向有功平电能 Current reversing active flat electric energy	4	R	
007AH	反向有功谷电能 Current reversing Active valley electric energy	4	R	
007C~00	保留			

AFH	reserve			
00B0H	当前总无功电能 Current spike reactive energy	4	R	单位：0.01kVarh
00B2H	当前无功尖电能 Current peak reactive energy	4	R	
00B4H	当前无功峰电能 Current peak reactive energy	4	R	
00B6H	当前无功平电能 Current flat reactive energy	4	R	
00B8H	当前无功谷电能 Current valley reactive energy	4	R	
00BAH	当前正向总无功电能 Current forward reactive total electric energy	4	R	
00BCH	当前正向无功尖电能 Current forward reactive spike electric energy	4	R	
00BEH	当前正向无功峰电能 Current forward reactive peak electric energy	4	R	
00C0H	当前正向无功平电能 Current forward reactive flat electric energy	4	R	
00C2H	当前正向无功谷电能 Current forward reactive valley electric energy	4	R	
00C4H	当前反向总无功电能 Current reversing reactive total electric energy	4	R	
00C6H	当前反向无功尖电能 Current reversing reactive spike electric energy	4	R	
00C8H	当前反向无功峰电能 Current reversing reactive peak electric energy	4	R	
00CAH	当前反向无功平电能 Current reversing reactive flat electric energy	4	R	
00CCH	当前反向无功谷电能 Current reversing reactive valley electric energy	4	R	
00CEH~52FFH	保留 reserve			
5300H	电压 Voltage	4	R	Float 型数据
5302H	电流 Current	4	R	
5304H	有功功率 Active power	4	R	
5306H	无功功率 Reactive power	4	R	

5308H	视在功率 Apparent power	4	R	
530AH	功率因数 power factor	4	R	
530CH	频率 Frequency	4	R	