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ADL 系列导轨式安装电能表

ADL Series Guide Rail Electricity meters

(ADL10/ADL100/ADL300/ADL3000)

安装使用说明书 V1.1

Installation and Operation Instruction V1.1

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一、概述 General

ADL10, ADL100, ADL300, ADL3000 系列导轨式安装电能表是安科瑞电气所推出的新一代电能表。

该电能表采用 LCD 显示, 可进行时钟、费率时段等参数设置, 并具有电能脉冲输出功能; 可用 RS485 通讯接口与上位机实现数据交换, 极大地方便了用电自动化管理。

该电能表具有体积小、精度高、可靠性好、安装方便等优点, 性能指标符合国标 IEC62053-21、IEC62053-22 对电能表的各项技术要求。

ADL10, ADL100, ADL300, ADL3000 Series guide rail Electricity meters is a new generation miniature electricity meter developed by Acrel Electric, resulting from many years experience in designing Electricity meters.

LCD display and electricity pulse output function is installed in the power meter, clock, rate period parameters can be set also. Data swap with the super ordination machine Via RS485 Communication interface greatly facilitating the power automated administration.

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

二、产品规格 Product specification

产品型号 Type	精度等级 Accuracy class	额定电压 Rated voltage	电流规格 Current specification	脉冲常数 Pulse constant
ADL10	1.0	220V	5(30)A	3200 imp/kWh
ADL100	1.0	220V	1.5(6)	12800 imp/kWh
			5(20)	3200 imp/kWh
			10(40)	1600 imp/kWh
			20(80)	800 imp/kWh
ADL300/ ADL3000	1.0/0.5	3×220/380V 3×380	3×1.5(6)A	6400imp/kWh
			3×5(20)A	1600imp/kWh
			3×10(40)A	800imp/kWh
			3×20(80)A	400imp/kWh

三、技术参数 Technical parameter

项目 Item	技术指标 Technical Value			
	ADL10	ADL100	ADL300	ADL3000
精度等级 Accuracy class	有功: 1 级 Active: 1 Class			有功: 0.5 级 Active: 0.5 Class 无功: 2 级 Reactive: 2 Class
工作电压 Operational voltage	正常工作电压范围: 0.9~1.1Un, Normal Operational voltage range: 0.9~1.1Un, 极限工作电压范围: 0.7~1.2Un Limit Operational voltage range: 0.7~1.2Un			
参比频率 Reference frequency	50Hz			
起动电流 Starting current	直接接入 Direct connecting	0.004Ib		
	经 CT 接入 Via CT connecting	0.002In		
功耗 Power consumption	电压线路 Voltage line	≤10VA/相 ≤10VA/ phase		
	电流线路 Current line	<4VA/相 <4VA/ phase		
电能脉冲输出 Electricity pulse output	脉冲宽度: 80ms±20ms Pulse width: 80ms±20ms 光耦隔离 Photo isolator			
数字通信 Digital communication	RS485, MODBUS-RTU (其他协议可定制) RS485, MODBUS-RTU (Costumed other protocol)			
时钟误差 Clock error	≤0.5s/d			
温度范围 Temperature range	正常工作温度: -25℃~+65℃, Normal working temperature: -25℃~+65℃, 存储温度: -40℃~+70℃ Storage temperature: -40℃~+70℃			
相对湿度 Relative humidity	≤95% (无凝露) (No condensation)			
外形尺寸 (长×宽×高) Outline (L×W×H) (mm)	18×91×64	76×89×74	126×91×74	

四、安装与接线 Installing and wiring

4.1 安装外形图及接线图 Installing outline drawing and Wiring diagram

4.1.1 外形尺寸（单位:mm） Outline dimension (unit: mm)

1 ADL10

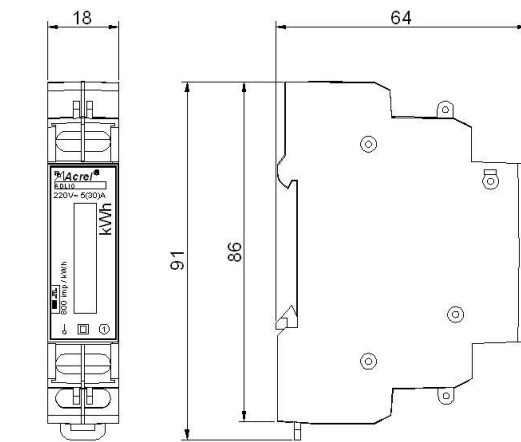


图 1 ADL10 外形图

Figure 1 ADL10 outline drawing

2 ADL100

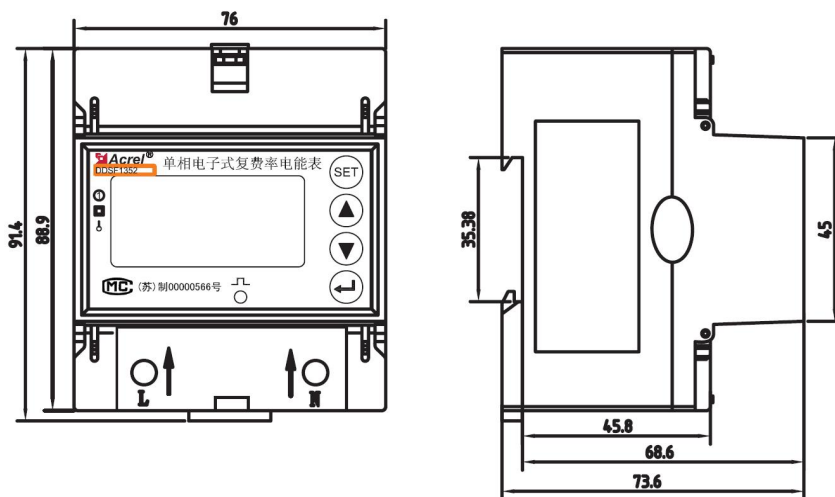


图 2 ADL100 外形图 Figure

Figure2 ADL100 outline drawing

3 ADL300/ADL3000

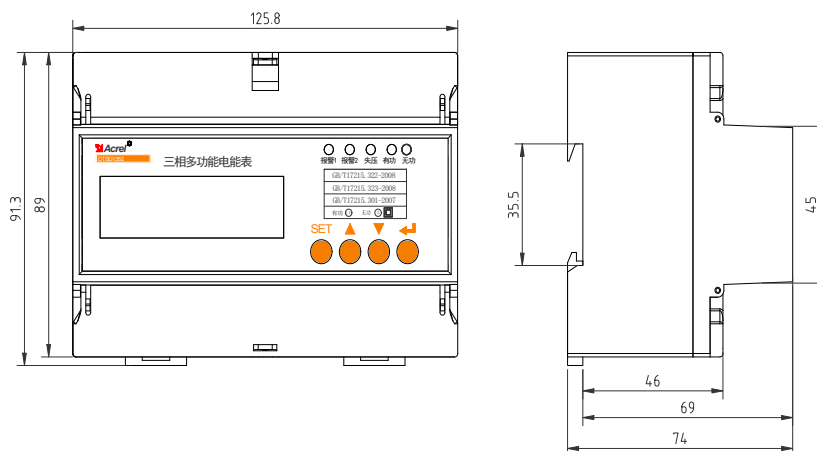


图 3 ADL300/ADL3000 外形图

Figure3 ADL300/ADL3000 outline drawing

4.1.2 安装图 Installation diagram

该系列导轨式安装电能表采用 35mm 标准导轨安装方式，如下图 4

This series guide rail power meters adopt 35mm standard guide rail installing mode, shown as figure 4

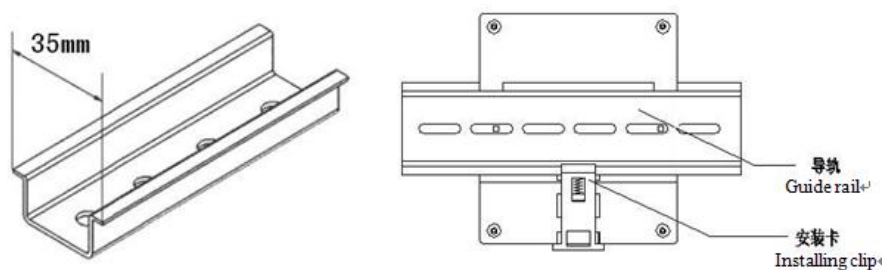


图 4 安装图

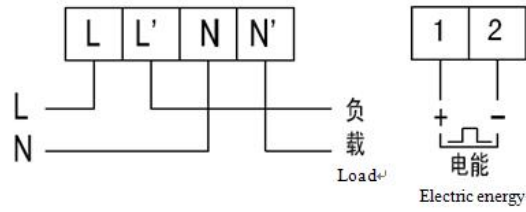
Figure4 installation diagram

4.1.3 接线图 Wiring diagram

该系列导轨式安装电能表支持直接接入和经电流互感器 CT 接入两种接线方式。

This Series guide rail power meters support two connection modes of direct connecting or connection via Current transformer CT.

1 ADL10



2 ADL100

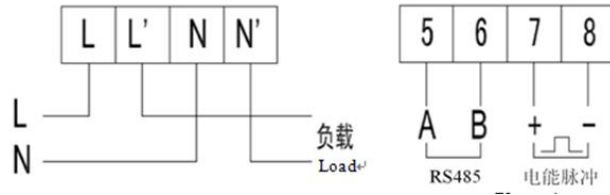
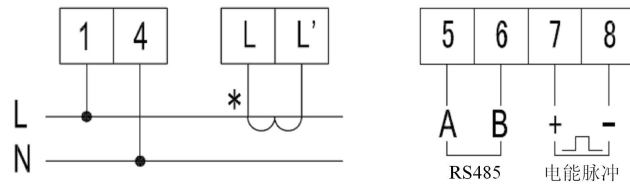


图 5 直接接入

Figure 5 Direct connecting



电能脉冲 Electric energy pulse

图 6 经 CT 接入

Figure 6 Via CT connecting

3 ADL300/ADL3000

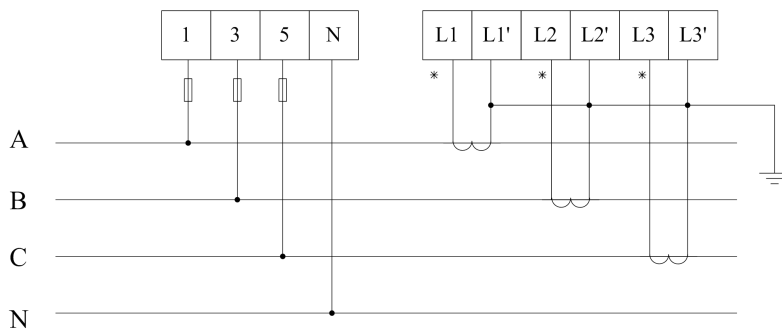


图 7 三相四线经 CT 接入

Figure 7 Three phase four wire Via CT connecting

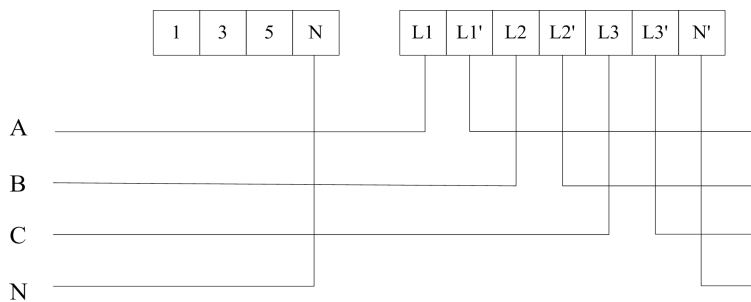


图 8 三相四线直接接入

Figure 8 Three phase four wire direct connecting

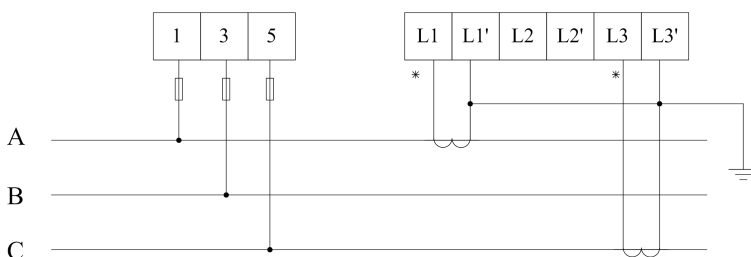


图 9 三相三线经 CT 接入

Figure 9 Three phase three wire via CT connecting

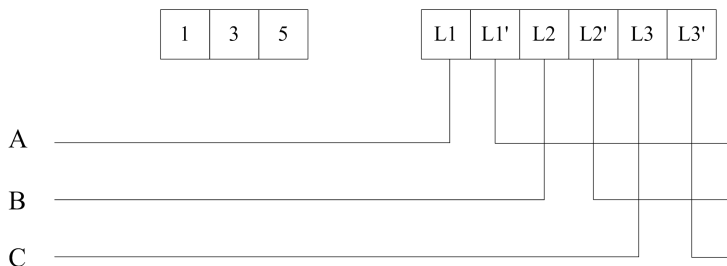


图 10 三相三线直接接入

Figure 10 Three phase three wire direct connecting

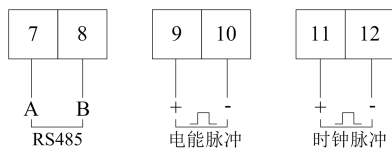


图 11 通讯、电能、时钟

Figure 11 communication、Electric energy、Clock

注：实际接线时请以仪表侧接线图为准。

Note: Actual connection according to the Wiring diagram on the side of the meter.

4.2 安装注意事项及方法 Installing method and notice

4.2.1 电能表应装在室内通风干燥的地方，采用 35mm 标准导轨方式安装。

The electric energy meter should install in indoor, with good dry and ventilation condition, adopt 35mm standard guide rail

4.2.2 安装接线时应按照电能表侧面的接线图进行接线，最好用铜接线头接入。对于直接接入式电能表接线时应注意进线和出线方向，并将螺钉拧紧，避免因接触不良而引起电能表工作不正常；经电流互感器接入式的电能表接线时应注意电流互感器次级的极性。

Installing connection according to the wiring diagram on the electric energy meter side. , copper connector is a good choice. For direct connecting mode, pay attention to the direction of inlet and outlet , tightening screws to prevent electric energy meter work abnormal of bad contact; When connecting electric energy meter via current transformer, pay attention to the polarity of current transformer secondary.

五、使用说明 Application description

5.1 功能 Function

计量 Metering

- ADL10 可实现单相有功电能计量功能；

ADL10 can achieve measurement function of Single-phase active electric energy

- ADL100 可进行单相有功正、反向电能的计量，并具有功率方向指示功能；电能量按总、尖、峰、平、谷分别累计、存储；

ADL100 can achieve measurement function of positive, reversing of Single-phase active electric energy, It also has the function of power direction indication; Electric energy is accumulated and stored according to Total, peak, flat, valley power respectively;

- ADL300EF 可进行三相有功正、反向电能的计量，并具有功率方向指示功能；电能按总、尖、峰、平、谷分别累计、存储；

ADL300EF can achieve measurement function of positive, reversing of three-phase active electric energy, and with power direction indication function; Electric energy is accumulated and stored according to Total, spike, peak, flat, valley power respectively;

- ADL3000 可进行正、反向有功电能，输入、输出无功电能的计量，同时可测量 A、B、C 三相电压，三相电流，各相和总有功功率、无功功率、视在功率、功率因数及电网频率，

并具有最大需量记录功能，电能按有、无功及正、反向总、尖、峰、平、谷分别累计、存储；

ADL3000 can measure positive, reversing Active electric energy, Import, output reactive electric energy, At the same time it can measure A, B, C three-phase voltage, three-phase current, each phase, total active power, reactive power, apparent power, power factor, power frequency, and maximum demand record. Electric energy is accumulated and stored according to Total, peak, flat, valley power respectively;

注：除 ADL10 外，其余型号具有电能数据冻结功能(默认冻结时间为每月末 24 时),电表内可存储 3 个月的冻结数据；所有存储数据断电后不丢失，并能保持 10 年以上。

NOTE: Except ADL10, Other models have electric energy data freezing function ;Three months frozen data is stored in meter; All saved data can hold more than 10 years after power off.

时钟及时段费率(ADL100/ADL300/ADL3000)

Clock and period of time rate(ADL100/ADL300/ADL3000)

- 时钟误差在 0.5s/天以内，具有日历、计时和闰年自动切换功能

Clock error is within 0.5s / day, with automatic switching function for calendar, clocking and leap year

- ADL100 可编程设置尖、峰、平、谷 4 种费率，日时段可设 14 个时段； ADL300、ADL3000 可编程设置一年 4 个时区，2 个时段表，14 个日时段数及尖、峰、平、谷 4 种费率，时段最小间隔为 1 分钟。

ADL100、 ADL300、 ADL3000 can program setting 4 time zones of one year, 2 time table, 14 periods of one day ,our rate of spike, peak, flat, valley

显示 Display

- ADL10 只显示有功总电能
ADL10 only can show the total active power
- 电能脉冲用红色 LED 灯指示
Electricity Pulse is indicated by red LED

输出 Output

- 有、无功电能脉冲输出，用于校表、远程电能采集

Function of active electric energy pulse output is used for calibration, collecting electric energy.

- 无源光电隔离型输出端口，脉冲宽度：80ms±20ms

Passive photo-electro isolating type output port, pulse width: 80ms±20ms

通信 Communication

- 通信接口：RS485

Communication interface: RS485

- 通信协议：MODBUS-RTU（其他可定制）

Communication protocol: MODBUS-RTU (other protocol can be customized)

- 通信速率：9600bps（默认）、4800bps、2400bps、1200bps 可选

Communication rate: 9600bps (default), 4800bps, 2400bps, 1200bps optional

编程功能 Programming function

- 电表地址设置

Meter address setting

- 时间日期设置

Time date setting

- 费率时段设置

Rate period of time setting

- 电量底数清零设置

kWh base number clearing setting

- 抄表和电能管理功能

Meter reading and power management functions

- 通过 RS485 或 ZIGBEE 组成有线或无线网络进行远程自动抄表，实现电能的智能化管理。

RS485 or ZIGBEE Composed of a wired or wireless network for remote automatic meter reading achieves power of intelligent management.

5.2 显示说明 Display description

5.2.1 键显功能

ADL100、ADL3000、ADL300 具有键显功能，通过面板上的上、下按键可顺序查看单相或 A、B、C 三相电流、电压、有功功率、无功功率、视在功率、功率因数、电网频率、有功/无功总、尖、峰、平、谷电能，有功/无功反向总、尖、峰、平、谷电能，表地址、软件版本号、显示自检等。液晶显示内容及数据格式说明如下：

ADL100、ADL3000、ADL300 has button display function, through the last and next button on the panel, can measure current or A, B, C three-phase current, voltage, active power, reactive power, apparent power, power factor, power frequency, with/without power total, tip, peak, flat, valley power, with/without power reverse power reverse total, spike, peak, flat, valley power, table addresses, software version number, display self-test, etc. LCD display content and data format is described as follows:

1	当前电流值 Existing Current value	XX.XX	两位整数，两位小数 2 bit integer, 2 bit decimal
显示内容表示当前 C 相电流有效值为 5.01A Displaying content show existing Current C phase effective value is 5.01A			



2	当前电压值 Current voltage value	XXX.X	三位整数，一位小数 3 bit integer, 1 bit decimal
显示内容表示当前 C 相电压有效值为 220.0V Displaying content show current C phase voltage effective value is 220.0V			



3	当前有功功率值 Current active power	XXX.XX	三位整数，二位小数 3 bit integer, 2 bit decimal
显示内容表示当前 A 相有功功率为 3.3kW Displaying content show current A phase active power is 3.3kW			



注：在 ADL3000 中 A、B、C 各相的有功功率、无功功率、视在功率、功率因数、电压、电流的标识字符分别显示为 PA、Pb、PC、qA、qb、qc、SA、Sb、SC、PFA、PFb、PBC、UA、Ub、UC、IA、Ib、IC。

Note: In ADL3000, Logo characters of the Active power, reactive power, apparent power, power factor, voltage, current of A, B, C phase each phase is PA、Pb、PC、qA、qb、qc、SA、Sb、SC、PFA、PFb、PBC、UA、Ub、UC、IA、Ib、IC

5.3 通信说明 Communication description

5.3.1 RS485/MODBUS-RTU 通信方式

RS485/MODBUS-RTU Communication Mode

- 通信接口：RS485

Communication interface: RS485

- 通信接线方式：二线制（RS485+、RS485-），屏蔽双绞线

Communication connection mode: Two-wire (RS485+, RS485-), shielded twisted pair conductors

- 通信工作方式：半双工

Communication working mode: Half-duplex

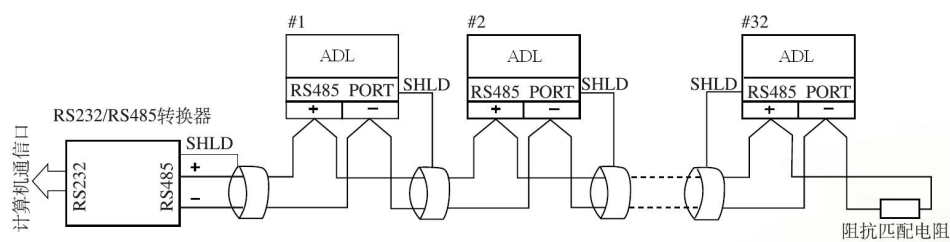
- 通信速率：9600bps（默认）、4800bps、2400bps、1200bps 可选

Communication speed: 9600bps (default), 4800bps, 2400bps, 1200bps optional

5.3.2 通信接线 Communication connection

- 通信连接的线形连接方式

Linear connection mode with Communication connection



阻抗匹配电阻：

Impedance matched resistance

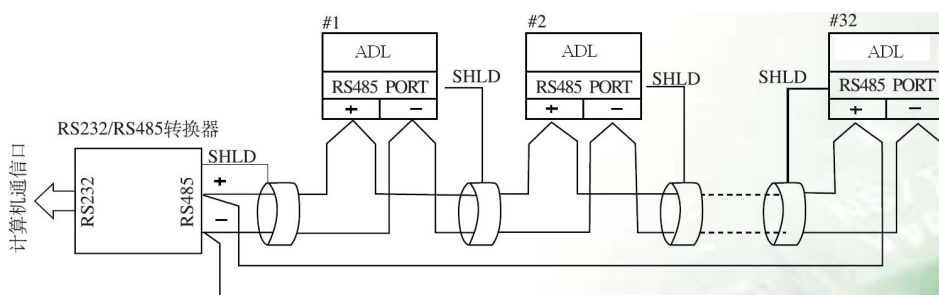
RS232/RS485 转换器：

RS132/RS485 transformer

计算机通信口： Computer communication port

- 通信连接的环形连接方式

Ring connection mode with Communication connection



5.3.3 通信协议 Communication protocol

ADL 系列导轨式安装电能表使用 MODBUS-RTU 通讯协议，MODBUS 协议详细定义了校验码、数据序列等，这些都是特定数据交换的必要内容。MODBUS 协议在一根通讯线上使用主从应答式连接（半双工），这意味着在一根单独的通讯线上信号沿着相反的两个方向传输。首先，主计算机的信号寻址到一台唯一的终端设备（从机），然后，终端设备发出的应答信号以相反的方向传输给主机。

ADL Series guide power meters MODBUS-RTU Communication protocol, MODBUS protocol to define the check code, data sequence etc. in detail, they are necessary content for specific data exchange. MODBUS protocol use master/slave responding connection (half duplex) on the same Communication line. After host computer finding the only one terminal device (slave computer), the terminal device sends answering signal and transmit to host computer.

MODBUS 协议只允许在主机（PC，PLC 等）和终端设备之间通讯，而不允许独立的终端设备之间的数据交换，这样各终端设备不会在它们初始化时占据通讯线路，而仅限于响应到达本机的查询信号。

MODBUS protocol can only permitted to used between host computer (PC,PLC etc.) and terminal device, thus to prohibit the data exchange between independent terminal devices. In this way, every terminal device does not occupy Communication line in their initialization, only responding to

the enquiry signal from host.

(1) 传输方式 Transmission mode

信息传输为异步方式，并以字节为单位，在主机和从机之间传递的通讯信息是 10 位字格式，包含 1 个起始位、8 个数据位（最小的有效位先发送）、无奇偶校验位、1 个停止位。

The information transmit in asynchronous mode in bytes, the Communication information transmitting between the host computer and the slave computer is the 10 bits format, including one Initial bit, 8 data bit (Firstly transmitting the least effective bit), without parity check bit, 1 stop bit.

(2) 数据帧格式 Data frame format

地址码 Address code	功能码 Function code	数据区 Data area	CRC 校验码 CRC check code
1 字节 1 byte	1 字节 1 byte	n 字节 n byte	2 字节 2 byte

地址码：地址码在帧的开始部分，由一个字节（8 位二进制码）组成，十进制为 0~255，在 ADL 系列电能表中只使用 1~247,其它地址保留。这些位标明了用户指定的终端设备的地址，该设备将接收来自与之相连的主机数据。每个终端设备的地址必须是唯一的，仅仅被寻址到的终端会响应包含了该地址的查询。当终端发送回一个响应，响应中的从机地址数据便告诉了主机哪台终端正与之进行通信。

Address code: address code is located at beginning of frame, composed of one byte (8 Bits binary system code), decimal system is 0~255, in the ACR meters, just 1~247 is used, other address is Reserved. These bits indicate terminal device address specified by users, this device will receive the connecting host computer data. Every terminal device has only one address, only the addressing terminal respond to enquiry including this address. When terminal is transmitting one responding, the responding slave address data tell host computer that which terminal is it.

功能码：功能码告诉了被寻址到的终端执行何种功能。下表列出了该系列仪表用到的功能码，以及它们的意义和功能。

Function code: function code tells the target terminal to execute what function. Below table list: Function code used in this Series meters, and their meaning and function.

功能 Function	定义 Definition	操作 Operation
03H/04H	读数据寄存器 Read data register	获得一个或多个寄存器的当前二进制值 Obtain current binary system value of one or

		multiple register
10H	预置多寄存器 Preset multi- register	设定二进制值到一系列多寄存器中 Set binary system value into a series of multi-registe

数据区：数据区包含了终端执行特定功能所需要的数据或者终端响应查询时采集到的数据。这些数据的内容可能是数值、参考地址或者设置值。例如：功能码告诉终端读取一个寄存器，数据区则需要指明从哪个寄存器开始及读取多少个数据，内嵌的地址和数据依照类型和从机之间的不同内容而有所不同。

Data area: data area includes the data needed by terminal for executing specific function, or the collected data when terminal is responding enquiry. Content of these data could be value, reference address or setting value. For example: The function code tell terminal to Read one register, the data area need to specify the starting register and Read how many data, the built-in address and data have different content depending on type and slave computer.

CRC 校验码：错误校验（CRC）域占用两个字节，包含了一个 16 位的二进制值。CRC 值由传输设备计算出来，然后附加到数据帧上，接收设备在接收数据时重新计算 CRC 值，然后与接收到的 CRC 域中的值进行比较，如果这两个值不相等，就发生了错误。

CRC check code: Error check (CRC) domain occupies 2 byte, including one 16 bit binary system value. CRC value is calculated by transmission device, and then attached to the data frame, the receiving device, while receiving; it calculates the CRC value again, then comparing it with the receiving CRC domain value, if these two values are not equal, it an error occurs.

生成一个 CRC 的流程为：Flow for forming one CRC:

- 1、预置一个 16 位寄存器为 0FFFFH（全 1），称之为 CRC 寄存器。

Preset one 16 bit register as 0FFFFH(All-1), called as CRC register.

- 2、把数据帧中的第一个字节的 8 位与 CRC 寄存器中的低字节进行异或运算，结果存回 CRC 寄存器。

8 bit of data frame first byte and low byte of CRC register carry out exclusive or operation, then save its result back to CRC register.

- 3、将 CRC 寄存器向右移一位，最高位填以 0，最低位移出并检测。

Right shift CRC register for one bit, the most significant bit is filled with 0, the least significant bit is shifted out and tested.

4、如果最低位为 0，重复第三步（下一次移位）；如果最低位为 1，将 CRC 寄存器与一个预设的固定值（0A001H）进行异或运算。

If the least significant bit is 0, repeat the third step (next shift); if the least significant bit is 1, CRC register and preset fixed value specified (0A001H) carry out exclusive or operation.

5、重复第三步和第四步直到 8 次移位。这样处理完了一个完整的八位。

Repeat the third step and the fourth step until shift for 8 times, the complete 8 bit is done.

6、重复第 2 步到第 5 步来处理下一个八位，直到所有的字节处理结束。

Repeat the second step to the fifth step to treat next 8 bit until all the byte is treated.

7、最终 CRC 寄存器的值就是 CRC 的值。此外还有一种利用预设的表格计算 CRC 的方法，它的主要特点是计算速度快，但是表格需要较大的存储空间，该方法此处不再赘述，请参阅相关资料。

The CRC register final value is CRC value. Besides, there is another CRC calculation method by preset table, its main feature is fast calculating speed, but large saving space is needed, please refer to related data.

5.3.4 通信应用格式详解 Expatiating for communication applicable format

(1) 功能码 03H: 读寄存器 Function 03H: read register

此功能允许用户获得设备采集与记录的数据及系统参数。主机一次请求的数据个数没有限制，但不能超出定义的地址范围。

This function allow user to obtain data and parameters collected and recorded by equipment. Data amount of once requested by host computer have no limit. but the address should be in range .

下面的例子是从 01 号从机读 1 个采集到的基本数据（数据帧中每个地址占用 2 个字节）。采集的数据为总电能 E（占用 4 个字节），其地址为 00H

Following example is one basic data read from 01 slave (each address in data frame occupy 2 bytes). The collected data is the total electric energy E (occupy 4 bytes), other address is 00H

(2) 功能码 10H: 写寄存器 2) Function code 10H: writing register

功能码 10H 允许用户改变多个寄存器的内容，该仪表中时间日期、费率时段等可用此功能号写入。主机一次最多可以写入 16 个(32 字节)数据。

Function code 10H allows the user to change the contents of multiple registers .Time, date, rate

period of time etc. in meter can be written by this function code. The one shot maximum write in data (32 byte) of host computer is 16.

下面的例子是预置地址为 01 的仪表日期和时间 08 年 02 月 01 日，12 时 00 分 00 秒。

Below meter example show: Preset address 01, date, time: 12:00:00, 01/02/2008.

主机发送 Master transmitting		发送信息 Transmitted information	从机返回 Slave returning		返回信息 Returning information
地址码 Address code		01H	地址码 Address code		01H
功能码 Function code		10H	功能码 Function code		10H
起始地址 Initial address	高字节 High byte	00H	起始地址 Initial address	高字节 High byte	00H
	低字节 Low byte	12H		低字节 Low byte	12H
寄存器数量 Register No.	高字节 High byte	00H	寄存器数量 Register No.	高字节 High byte	00H
	低字节 Low byte	03H		低字节 Low byte	03H
字节数 Byte number		06H	CRC 校验码 CRC check code		高字节 High byte 20H
0012H 待写入数据 Data to be written	高字节 High byte	08H	低字节 Low byte		0DH
	低字节 Low byte	02H			
0013H 待写入数据 Data to be written	高字节 High byte	01H			
	低字节 Low byte	0CH			
0014H 待写入数据 Data to be written	高字节 High byte	00H			
	低字节 Low byte	00H			
CRC 校验码 CRC check code	高字节 High byte	FFH			
	低字节 Low byte	A8H			

5.3.5 通信参量地址表及应用细节 Communication parameter address table and application details

1 ADL100 地址表 address table

数据地址 Address	数据名称 Variable	长度 Length	读/写 R/W	备注 Notes
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0000H	当前总有功电能	4	R	
0001H	Current total electricity			
0002H	当前总有功峰电能	4	R	
0003H	Current peak electric energy			
0004H	当前总有功平电能	4	R	
0005H	Current flat electric energy			
0006H	当前总有功谷电能	4	R	
0007H	Current valley electric energy			
0008H	当前总有功尖电能	4	R	
0009H	Current spike electric energy			
000AH	密码 Code	2	R/W	
000BH	电压U Voltage	2	R	
000CH	电流I Current	2	R	
000DH	有功功率P Active power	2	R	
000EH	无功功率Q Reactive power	2	R	
000FH	视在功率S apparent power	2	R	
0010H	功率因数PF power factor	2	R	
0011H	频率 Frequency	2	R	
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	通信地址波特率 Communication address baud rate	2	R/W	通信地址 address: 1~247 波特率: 1:9600 Baud 2: 4800 Rate: 3:2400 4:1200

0016H ... 0022H	预留 Reserve			
0023H	电流变比CT Current transfer	2	R/W	1-100
0024H	上月总电能	4	R	
0025H	total electric energy of last month			
0026H	上月峰电能	4	R	
0027H	peak electric energy of last month			
0028H	上月平电能	4	R	
0029H	flat electric energy of last month			
002AH	上月谷电能	4	R	
002BH	valley electric energy of last month			
002CH	上月总电能	4	R	
002DH	total electric energy of last 2 month			
002EH	上月峰电能	4	R	
002FH	peak electric energy of last 2 month			
0030H	上月平电能	4	R	
0031H	flat electric energy of last 2 month			
0032H	上月谷电能	4	R	
0033H	valley electric energy of last 2 month			
0034H	上月总电能	4	R	
0035H	total electric energy of last 3 month			
0036H	上月峰电能	4	R	
0037H	peak electric energy of last 3 month			
0038H	上月平电能	4	R/W	
0039H	flat electric energy of last 3 month			
003AH	上月谷电能	4	R	
003BH	valley electric energy of last 3 month			
003CH	正向有功电能	4	R	
003DH	active forward electric energy			
003EH	反向有功电能	4	R	
003FH	active reversing electric energy			
2000H ... 2005H	4个时区 4 time zones	3×4	R/W	
2006H ... 201AH	14时段参数设置信息 14-period of time Parameters setting information	3×14	R/W	第一套时段表 The first time list

201BH	14时段参数设置信息			第二套时段表
...	14-period of time Parameters setting information	3×14	R/W	The second time list
202FH				

2 ADL300 地址表 address table

数据地址 Address	数据名称 Variable	长度	读/写 R/W	备注 Notes
0000H	当前总有功电能 Current total electricity	4	R	
0002H	当前总有功尖电能 Current spike electric energy	4	R	
0004H	当前总有功峰电能 Current peak electric energy	4	R	
0006H	当前总有功平电能 Current flat electric energy	4	R	
0008H	当前总有功谷电能 Current valley electric energy	4	R	
000AH	日期时间 Date, time	6	R/W	
000DH 高字节	通信地址 Address	1	R/W	1~247
000DH 低字节	波特率 Bauds	1	R/W	1: 9600pbs 2: 4800pbs 3: 2400pbs 4: 1200pbs
000EH	保留 reserve			
0001AH	保留 reserve			
0028H ... 002DH	4个时区 4 time zones	3×4	R/W	时区表 Time zone table
002EH	当前正向有功总电能 Current forward active total electric energy	4	R	

0030H	当前正向有功尖电能 Current forward active spike electric energy	4	R	
0032H	当前正向有功峰电能 Current forward active peak electric energy	4	R	
0034H	当前正向有功平电能 Current forward active flat electric energy	4	R	
0036H	当前正向有功谷电能 Current forward active valley electric energy	4	R	
0038H	当前反向有功总电能 Current reversing active total electric energy	4	R	
003AH	当前反向有功尖电能 Current reversing active spike electric energy	4	R	
003CH	当前反向有功峰电能 Current reversing Active peak electric energy	4	R	
003EH	当前反向有功平电能 Current reversing active flat electric energy	4	R	
0040H	当前反向有功谷电能 Current reversing Active valley electric energy	4	R	
0042H	A相电压 voltage of A phase	2	R	
0043H	B相电压 voltage of B phase	2	R	
0044H	C相电压 voltage of C phase	2	R	
0045H	A相电流 electricity of A phase	2	R	
0046H	B相电流 electricity of B phase	2	R	
0047H	C相电流 electricity of C phase	2	R	
0048H	A-B线电压 Voltage between A-B	2	R	
0049H	C-B线电压 Voltage between C-B	2	R	

004AH	A- C线电压 Voltage between A-C	2	R	
004BH	电压变比 PT Voltage transfer	2	R/W	
004CH	电流变比 CT Current transfer	2	R/W	
004DH 高	失压阈值 Threshold of voltage	1	R/W	
004DH 低	失压状态 State of loss voltage	1	R	
004EH	脉冲常数 Pulse constant	2	R	
004FH 高	运行状态 1 Running state 1	1	R/W	
004FH 低	运行状态 2 Running state 2	1	R/W	
005DH	A相有功功率 active power of A phase	2	R	
005EH	B相有功功率 active power of B phase	2	R	
005FH	C相有功功率 active power of C phase	2	R	
0060H	总有功功率 total active power	2	R	
0061H	总功率符号 Sign of total power	2	R	1: 总功率为正, positive 0: 总功率为负, negative
2000H ... 2014H	14时段参数设置信息 14-period of time Parameters setting information	3×14	R/W	第一套时段表 The first time list
2015H ...	14时段参数设置信息 14-period of time Parameters setting information	3×14	R/W	第二套时段表 The second time list

2029H				
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3 ADL3000 地址 address table

数据地址 Address	数据名称 Variable	长度	读/写 R/W	备注 Notes
0000H	当前总有功电能 Current total electricity	4	R	
0002H	当前总有功尖电能 Current spike electric energy	4	R	
0004H	当前总有功峰电能 Current peak electric energy	4	R	
0006H	当前总有功平电能 Current flat electric energy	4	R	
0008H	当前总有功谷电能 Current valley electric energy	4	R	
000AH	当前正向总有功电能 Current forward active total electric energy	4	R	
000CH	当前正向有功尖电能 Current forward active spike electric energy	4	R	
000EH	当前正向有功峰电能 Current forward active peak electric energy	4	R	
0010H	当前正向有功平电能 Current forward active flat electric energy	4	R	
0012H	当前正向有功谷电能 Current forward active valley electric energy	4	R	
0014H	当前反向有功总电能 Current reversing active total electric energy	4	R	
0016H	当前反向有功尖电能 Current reversing active spike electric energy	4	R	
0018H	当前反向有功峰电能 Current reversing Active peak electric energy	4	R	
001AH	当前反向有功平电能 Current reversing active flat electric energy	4	R	
001CH	当前反向有功谷电能 Current reversing active valley electric energy	4	R	

	Current reversing Active valley electric energy			
001EH	当前总无功电能 Current total reactive electric energy	4	R	
0020H	当前总无功尖电能 Current total reactive spike electric energy	4	R	
0022H	当前总无功峰电能 Current total reactive peak electric energy	4	R	
0024H	当前总无功平电能 Current total reactive flat electric energy	4	R	
0026H	当前总无功谷电能 Current total reactive valley electric energy	4	R	
0028H	当前正向无功总电能 Current forward reactive total electric energy	4	R	
002AH	当前正向无功尖电能 Current forward reactive spike electric energy	4	R	
002CH	当前正向无功峰电能 Current forward reactive spike electric energy	4	R	
002EH	当前正向无功平电能 Current forward reactive flat electric energy	4	R	
0030H	当前正向无功谷电能 Current forward reactive valley electric energy	4	R	
0032H	当前反向无功总电能 Current reversing reactive total electric energy	4	R	
0034H	当前反向无功尖电能 Current reversing reactive spike electric energy	4	R	
0036H	当前反向无功峰电能 Current reversing reactive peak electric energy	4	R	
0038H	当前反向无功平电能 Current reversing reactive flat electric energy	4	R	
003AH	当前反向无功谷电能 Current reversing reactive valley electric energy	4	R	
003CH	日期时间 Date, time	6	R/W	
003FH 高字节	通信地址 Address	1	R/W	1~247
003FH 低字节	波特率 Bauds	1	R/W	1: 9600pbs 2: 4800pbs 3: 2400pbs 4: 1200pbs

0040H	脉冲常数 Pulse constant	2	R	
0041H ... 0046H	4个时区 4 time zones	3×4	R/W	时区表 Time zone table
0047H	保留 reserve			
0053H	保留 reserve			
0061H	A相电压 voltage of A phase	2	R	
0062H	B相电压 voltage of B phase	2	R	
0063H	C相电压 voltage of C phase	2	R	
0064H	A相电流 electricity of A phase	2	R	
0065H	B相电流 electricity of B phase	2	R	
0066H	C相电流 electricity of C phase	2	R	
0067H-0076 H	保留 reserve	2	R	
0077H	频率 frequency	2	R	
0078H	A-B线电压 Voltage between A-B	2	R	
0079H	C-B线电压 Voltage between C-B	2	R	
007AH	B- C线电压 Voltage between A-C	2	R	
007BH	正向有功最大需量 Forward active maximum demand	2	R	
007CH	发生时间 Time of occurrence for the forward active maximum amount	4	R	
007EH	反向有功最大需量 reversing active maximum demand	2	R	
007FH	发生时间 Time of occurrence for the reversing active	4	R	

	maximum amount			
0081H	正向无功最大需量 Maximum forward demand for reactive power	2	R	
0082H	发生时间 Time of occurrence for the forward reactive maximum amount	4	R	
0083H	反向无功最大需量 Maximum reversing demand for reactive power	2	R	
0085H	发生时间 Time of occurrence for the reversing reactive maximum amount	4	R	
0087H	A相正向有功电能 forward active electric energy of A phase	4	R	
0089H	B相正向有功电能 forward active electric energy of B phase	4	R	
008BH	C相正向有功电能 forward active electric energy of C phase	4	R	
008DH	电压变比 PT Voltage transfer	2	R/W	
008EH	电流变比 CT Current transfer	2	R/W	
008FH 高字节	失压阈值 Threshold of voltage	1	R/W	
008FH 低字节	失压状态 State of loss voltage	1	R	
0090H	保留 reserve	2	R	
0091H 高字节	运行状态 1 Running state 1	1	R/W	
0091H 低字节	运行状态 2 Running state 2	1	R/W	
0164H	A相有功功率 active power of A phase	4	R	
0166H	B相有功功率 active power of B phase	4	R	
0168H	C相有功功率 active power of C phase	4	R	

016AH	总有功功率 total active power	4	R	
016CH	A相无功功率 reactive power of A phase	4	R	
016EH	B相无功功率 reactive power of B phase	4	R	
0170H	C相无功功率 reactive power of C phase	4	R	
0172H	总无功功率 total reactive power	4	R	
0174H	A相视在功率 apparent power of A phase	4	R	
0176H	B相视在功率 apparent power of b phase	4	R	
0178H	C相视在功率 apparent power of c phase	4	R	
017AH	总视在功率 total apparent power	4	R	
017CH	A相功率因数 power factor of A phase	2	R	
017DH	B相功率因数 power factor of B phase	2	R	
017EH	C相功率因数 power factor of C phase	2	R	
017FH	总功率因数 total power factor	2	R	
2000H ... 2014H	14时段参数设置信息 14-period of time Parameters setting information	3×14	R/W	第一套时段表 The first time list
2015H ... 2029H	14时段参数设置信息 14-period of time Parameters setting information	3×14	R/W	第二套时段表 The second time list

附：

Attachment:

1、读写属性：“R”只读，读参量用 03H 号命令；“R/W”可读可写，写参量用 10H 号命令。禁止向未列出的或不具可写属性的地址写入。

Belong to Read/ Write: "R" read only, read this parameter use 03H command;"R/W" Readable, writable, write parameter use 10H command. write in address of non-listed, or non-writable

address is forbidden.

- 2、电能表的通讯地址出厂时给出，亦可通过本公司提供的软件读出。

The Communication address of electric energy meter is given with delivery, also read out through the software provided by our company.

- 3、电能表中所测电压值固定为 1 位小数，数据格式为 XXX.X，单位为 V，若通讯读出电压值为 08C6H (2246)，则电压的实际值为 224.6V；所测电流值固定为 2 位小数，数据格式为 XX.XX，单位为 A，若通讯读出电流值为 01F4H (500)，则电流的实际值为 5.00A；

The voltage value detected by electric energy meter is fixed by 1 bit decimal number, data format is XXX.X, unit is V, if Communication read out voltage value is 08C6H (2246), then voltage actual value is 224.6V; the measured current value is fixed by 2 bit decimal number, data format is XX.XX, unit is A, if Communication read out Current value is 01F4H (500), then Current actual value is 5.00A;

- 4、电能表的有、无功功率值固定为 2 位小数，数据格式为 XXX.XX，单位为 kW，若通讯读出有、无功功率值为 1132H (4402)，则有、无功功率的实际值为 0.44kW(kVar)；视在功率值固定为 1 位小数，数据格式为 XXXX.X，单位为 VA，若通讯读出视在功率值为 1132H(4402)，则视在功率的实际值为 440.2VA。

The active and reactive power value by electric energy meter is fixed by 2 bits decimal number, data format is XXX.XX, unit is kW, if communication read out the active and reactive power value is 1132H (4402), then the active and reactive power actual value is 0.44kW(kVar); the apparent power value is fixed by 1 bit decimal number, data format is XXXX.X, unit is VA, if communication read out the apparent power value is 1132H (4402), then the apparent power actual value is 440.2VA.

- 5、电能表中所测电能值占 4 个字节，单位为 kWh。高位在前，低位在后，若读出值为 0012D687H (1234567)，则电能计量值为 $1234567 \times 0.01 = 12345.67 \text{kWh}$ 。

The electric energy value measured by electric energy meter occupy 4 bytes, unit is kWh. The high bit is before the low bit, if the reading value is 0012D687H (1234567), then electric energy Metering value is $1234567 \times 0.01 = 12345.67 \text{kWh}$.

- 6、上述地址表中 14 时段参数设置信息依次为：

Order of 14-period of time parameters setting information of above address table:

7、上述地址表中 4 时区参数设置信息依次为：

Order of 4 time zones parameters setting information of above address table:

14时段参数设置信息 14-period of time Parameters setting information	备注Note
第1时段费率号NN Rate number for 1st period of time	1. 第1时段的起始时间为00:00Starting time for 1st period of time 00:00 2. 在 ADL100 中，费率号与费率段的对应关系如下： 01—峰、02—平、03—谷、04—尖 In ADL100, corresponding relation between rate No. and rate period: 01-peak, 02-flat, 03-valley, 04- spike 3. ADL300 和 ADL3000 中，费率号与费率段的对应关系如下： 01—尖、02—峰、03—平、04—谷 In DTSF1352 (ADL300) and DTSD1352 (ADL3000), corresponding relation between rate No. and rate period: 01- spike, 02-peak, 03-flat, 04-valley 4. 时段表默认为平时段。 The default period is flat.
第1时段开始时间——分mm Start time for 1st period of time - minute	
第1时段开始时间——时hh Start time for 1st period of time -hour	
第2时段费率号NN Rate number for 2st period of time	
第2时段开始时间——分mm Start time for 2st period of time - minute	
第2时段开始时间——时hh Start time for 2st period of time - hour	
.....	
第14时段费率号NN Rate number for 14st period of time	
第14时段开始时间——分mm Start time for 14st period of time - minute	
第14时段开始时间——时hh Start time for 14st period of time - hour	

4时区参数设置信息 4 time zones Parameters setting information	备注Note
第1时区时段表号NN Zone number for 1st time zone	ADL100、 ADL300 和 ADL3000 中时区号与时段表的对应关系如下： 01—第一时段表、02—第二时段表 ADL100、ADL300 and ADL3000, corresponding relation between time zone No. and period of time list: 01-1st period of time list; 02-second period of time list.
第1时区开始时间——日dd Start time for 1st time zone	
第1时区开始时间——月mm Start time for 1st time zone	
第2时区时段表号NN Zone number for 2st time zone	
第2时区开始时间——分mm Start time for 2st time zone	
第2时区开始时间——时hh Start time for 2st time zone	
.....	

第4时区时段表号NN Rate number for 4st time zone	
第4时区开始时间——分mm Start time for 4st time zone	
第4时区开始时间——时hh Start time for 4st time zone	

5.4 注意事项 Notice

5.4.1 电能表的负载能力在 $0.05I_b \sim I_{max}$ （直接接入）或 $0.02I_b \sim I_{max}$ （经电流互感器接入）之间，超过这一负载能力范围，将会使电能计量不准或损坏。

The loading capacity of electric energy meter is $0.05I_b \sim I_{max}$ (direct connecting) or $0.02I_b \sim I_{max}$ (connecting via current transformer), if this loading capacity range is exceeded, the electric energy Metering will be incorrect or damageable.

5.4.2 当电能表直接接入时，其电能示数即为实际用电量；当电能表配用电流互感器接入时，在读取电能示数后必须乘以电流互感器倍率才是其实际用电量。

When electric energy meter is directly connected, its electric energy reading value is the actual kWh; when electric energy meter is equipped with Current transformer, the electric energy reading value must multiply the Current transformer multiplying power to obtain actual kWh.

六、订货范例 Ordering example

例 1:

型 号: ADL100

应用场合: 单相系统

接入方式: 直接接入

额定电压: AC 220V

电流规格: 5 (20) A

测量参数: 总电能、分时复费率电能, 电流, 电压

附加功能: RS485 通信, MODBUS 协议

其 他: 分时时段出厂预设置 (未作说明则按照默认设置出厂)

Example 1:

Type: ADL100

Application: Single phase system Connecting

Mode: Directly connecting

Rated voltage: AC 220V

Current specification: 5 (20) A

Measuring parameter: Total electric energy, time-sharing multi-rate electric energy, Current, voltage

Additional function: RS485 Communication, MODBUS protocol

Others: Time-sharing period for delivery presetting (Default setting for no statement)

例 2:

型 号: ADL300

应用场合: 三相四线系统

接入方式: 经电流互感器接入

额定电压: AC 3×220/380V

电流规格: 1.5 (6) A

测量参数: 总电能、分时复费率电能

附加功能: RS485 通信, MODBUS 协议

其 他: 分时时段出厂预设置 (未作说明则按照默认设置出厂)

Example 2:

Type: ADL300

Application: Three-phase-four-wire system

Connecting mode: Connecting via current transformer

Rated voltage: AC 3×220/380V

Current specification: 1.5 (6) A

Measuring parameter: Total electric energy, time-sharing multi-rate electric energy

Additional function: RS485 Communication, MODBUS protocol

Others: Time-sharing period for delivery pre-setting (Default setting for no statement)

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