

ADL Series DIN Rail Watt-hour Meter

Operation Manuel

VERSION: 20090228



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1. GENERAL

Acrel

ADL Series DIN rail watt-hour meter is a kind of smart energy meter. There are 2 types: the single phase watt-hour meter ADL-100 and the 3-phase watt-hour meter ADL-300. It adopts micro-electronics technique, and it has many advantages such as compact, light, delicate, accurate. With their good capability of anti-emi and low-power, they comply with international standard IEC 60136:2000 and IEC 60512:1988.

2. DESIGNATION



2.2 SPECIFICATION

MODEL	TYPE	class	Un (V)	In (A)	Pulse constant (imp/kWh)
ADL100	With CT	— 1.0	220V	1.5 (6)	12800
				5 (20)	3200
	Without			10 (40)	1600
				20 (80)	800

MODEL	TYPE	class	Un (V)	In (A)	Pulse constant (imp/kWh)
ADL300	With CT	1.0	3×220/380V	1.5 (6)	6400
				5 (20)	1600
	Without			10 (40)	800
				20 (80)	400

3. TECHNICAL FEATURE

Baramatar		Value	Value			
Faran	eter	ADL100	ADL300			
Accura	асу	1.0				
Un		220V	3×220/380V			
In		1.5(6)A, 5(20)A, 10(4	10)A, 20(80)A			
Freque	ency	50Hz or 60)Hz			
Voltage supply		normal: 0.9 ~ 1.1Un ; maximal: 0.7 ~ 1.2Un				
Starting	With CT	0.004lb				
current	With CT	0.002In				
oonsumption	For voltage	≤5VA / phase				
consumption	For current	<4VA / phase				
Output of pulse		Width of pulse: 80ms±20ms				
		open-collector photo-coupler pulse				
Digital communication		RS485, MODBUS-RTU				

Clock error	≤0.5s/d		
	normal: -10℃ ~ +65℃,		
Environment	maximal: -20℃ ~ +70℃,		
	storage: -40°C ~ +80°C		
Relative humidity	≤95% (without dewing)		
Outline (L×W×H)	76×89×74 (mm) 126×89×74 (mm)		

4. INSTALLATION AND WIRING

4.1 Installation photo and Wiring photo

4.1.1 Outline (unity: mm)

1) Single phase ADL100



Photo 1 single phase ADL100 outline





4.1.2 Installation photo

ADL series watt-hour meter is installed by standard 35mm DIN rail, as photo 3



Photo 3

4.1.3 Wiring photo

ADL series meter is coded directly or is coded by CT.

(1) single phase ADL100



Photo 7 In 3-phase with CT

4.2 Attention of wiring

4.2.1 This meter has to be installed on the drying indoor, and in the standard 35mm DIN rail.

4.2.2 Please wire according to the wiring photo. If the meter is wired directly, you must have attention of the direction of input and output line. If the meter is wired by CT, you must have attention of polarity of secondary.

5. Operation guide

5.1 The front

5.1.1 Single phase ADL100



Photo 8 single phase ADL100

Code	Name	State	Function
1	LCD		LCD display
2	pulse	LED lightening	Display by power pulse
3	peak	LED lightening	Current tariff is Peak tariff
4	Flat	LED lightening	Current tariff is flat tariff
5	valley	LED lightening	Current tariff is valley tariff

Description of panel:

5.1.2 3 phases ADL300



Photo 9 3 phases ADL300 panel

Code	Name	State	Function
1	LCD		LCD display
2	Pulse	LED ON	Display by power pulse
3	A phase	LED ON	A phase with power
4	B phase	LED ON	B phase with power
5	C phase	LED ON	C phase with power
6	Negative	LED ON	Indication of negative
7	Spike	LED ON	Current tariff is spike tariff
8	Peak	LED ON	Current tariff is Peak tariff
9	Flat	LED ON	Current tariff is flat tariff
10	Valley	LED ON	Current tariff is valley tariff

Description of panel:

5.2 Function

Measurement

- Count and store the energy by total, spike, peak, flat and valley.
- It stores the frozen data for 3 months,
 The default data of frozen measurement is the end each month.
- After power off, all stored data exists for more than 10 years.

Clock and tariff / zone

- The error of clock is < 0.5s/day, it can switch automatically according calendar, time and leap year.
- Single phase ADL100 can be programmed as 3 rates: peak, flat and valley and as 8 zones of day; the minimal interval of zone is 1 minute.

3 phases ADL300 can be programmed as 4 rates: spike, peak, flat and valley and 8 zones of day; the minimal interval of zone is 1 minute

Display

- LCD displays 7 digitals
- It can loop display, the interval is 4s
- Pulse and the current rate and zone are indicated by LED

Output

• Active pulse output is for calibration and count of energy. Width of pulse: 80ms±20ms

Communication

- Interface: RS485
- Protocol: MODBUS-RTU
- Speed: 9600bps (default), 4800bps, 2400bps, 1200bps optioned

5.3 Display

5.3.1 Single phase ADL100 display

In the default state, ADL100 loop displays time, date, total kWh, peak, flat, valley, voltage and current. Display interval is 4s.

NO	TYPE	FORMAT	EXPLANATION			
1	Time	HH:mm:SS	hour: minute: second			
It is 12 o'clock now.						
If LED of peak tariff is ON, it is peak tariff now :						

12:00:00

2	Date	YY.MM.DD	year month day
		It is February 1st 2	2008
			201

rel			Shanghai Acrel (C o.,]
0	T . (.)) A /h	XXXXX.XX or	5 integers, 2 decimals or	
3	Iotal KVVN	XXXXXX.X	6 integers, 1 decimals	
	(th	ne decimal can move au	utomatically)	
	Tł	ne total kWh is 46.32kW	/h right now.	
		0004,8	5. 32 ^{kWh}	
4	Deek	XXXXX.XX or	5 integers, 2 decimals or]
4	Peak	XXXXXX.X	6 integers, 1 decimal	
		The peak energy is 24	4.12kWh	
		1000	1. 12 ^{kWh}	
_		XXXXX.XX or	5 integers, 2 decimals or	
5	Flat	XXXXXX.X	6 integers, 1 decimal	
		The flat energy 12.1	l0kWh	
		000 lja	2.10 ^{kWh}	-
6	Valley	XXXXX.XX or	5 integers, 2 decimals or	

6	Valley	XXXXX.XX or	5 integers, 2 decimals or	
		~~~~~	6 integers, i decimal	
		The valley energy	y 10.10kWh	
		000		

		·	
7	Voltage U	XXX.X	3 integer, 1 decimals
		U č	<b>? 2 0 . 0</b> v



10	Indication of RS485, the phone sign figures meter is under communication.
	<b>00045.32</b>
11	Indication of low power: Please change the battery
	<b>00046.32</b> km

#### 5.3.2 3 phases ADL300 display

In the default state, ADL300 loop displays time, date, total kWh, spike, peak, flat, valley, Display interval is 4s.

NO	TYPE	FORMAT	EXPLANATION		
1	Time	HH:mm:SS	hour: minute: second		
It is 12 o'clock now.					
If LED of peak tariff is ON, it is peak tariff now :					

# 12:00:00

2	Date	YY.MM.DD	year month day
		It is February 1st 2	2008

# 105080

3	Total energy	XXXXXX.XX or XXXXXX.X	5 integers, 2 decimal or 6 integers, 1 decimal		
(the decimal can move automatically)					
The total kWh is 46.32kWh right now.					



4	Spike	XXXXX.XX or XXXXXX.X	5 integers, 2 decimal or 6 integers, 1 decimal
		The spike energy	[,] 57.52kWh
		000	s 1.20 kWh

5	Dook	XXXXX.XX or	5 integers, 2 decimal or
5	r can	XXXXXX.X	6 integers, 1 decimal
		The peak energy	24.12kWh
		0002	P <b>H. 12</b> kWh
0	Flat	XXXXX.XX or	5 integers, 2 decimal or
Ö	Flat	XXXXXX.X	6 integers, 1 decimal
		The flat energy	12.10kWh
		000	<b>12. 10</b> ^{kWh}
7	Vallev	XXXXX.XX or	5 integers, 2 decimal or
	valicy	XXXXXX.X	6 integers, 1 decimal
		The valley energ	y 0.10kWh
		000	1 <b>0</b> . , 1 <b>0</b> ^{kWh}
8	Indication of RS	485, the phone sig	n figures meter is under communication.
5.4 Commu 5.4.2 Wiring • Wiring	Inications g linearly /RS485	DL SPORT SHLD RS485	T T T T T T T T T T T T T T
Swi		'n,	
• winng	юор	#1	#2 #32
RS23 Sw PC	2/RS485 /itch	ADL RS485 PORT SHLD + -	ADL RS485 PORT + - + -

#### 5.4.3 Protocol (MODBUS-RTU)

(1) Transmission mode

1 start bit

8 data bits

No parity

1 stop bit

(2) Frame format

Address code	Function code	Data area	CRC check code
1byte	1byte	n bytes	2 bytes

Address code is at beginning of frame, with 1 byte, decimal is 0~255. 1~247 can be used, the other is reserved. Each address code is unique.

Function code figures the functions of meters. .

Function	Definition	Operation
03H/04H	Read register	Obtain current binary system value of one or multiple register
10H	Multi register	Set binary system value into a series multi-register

Data area includes the measured data by ADL or the ADL's parameters.

CRC code occupies 2 bytes, including 1 hex value. CRC value is calculated by transmission device, and then it is attached to the data frame. While receiving, the receiving device calculates the CRC value again. If these 2 values is not equal, it shows a error.

#### 5.4.4 Function code

(1) Function code 03H: Read register

This function permits user to obtain data and system parameters collected and recorded by the device. The data number requested by host computer for each time has no limit, but does not exceed the address range specified by Definition.

The following example is No. 01 slave computer Read 1 collected basic data (data frame every address occupy 2 byte). The measure data is total energy (4 bits), its address is 00H.

Master transmitting		Transmitting	Slo	vo roturo	Return
		information	Slave return		information
Addre	ess code	01H	Add	ress code	01H
Funct	ion code	03H	Fund	ction code	03H
Initial	High byte	00H	Byte quantity		04H
address	Low byte	00H	Register	High byte	00H
Register	High byte	00H	quantity	Low byte	12H
quantity	Low byte	02H	Register	High byte	D6H
CPC and a	High byte	C4H	quantity	Low byte	87H
	Low byte	0BH	CRC	High byte	44H
			code	Low byte	34H

(2) Function code 10H: Read-in register

Function code 10H permit user to change content of multiple registers, System parameters, switching output condition etc. may be written by using the function. Maximum once read-in data for the host computer is 16 (32 byte) data.

Below example shows: Preset address 01 is meter's date February 1st 2008 and time 12 o'clock.

## Shanghai Acrel Co.,Ltd

Master	transmitting	Transmitting	Slav	re return	Return
	5	Information		information	
Addı	ress code	01H	Addro	ess code	01H
Fund	ction code	10H	Func	tion code	10H
Initial	High byte	00H	Initial	High byte	00H
address	Low byte	12H	address	Low byte	12H
Register	High byte	00H	Register	High byte	00H
quantity	Low byte	03H	quantity	Low byte	03H
Byte	quantity	06H	CDC and	High byte	20H
0012H	High byte	08H		Low byte	0DH
data to be read-in	Low byte	02H			
0013H	High byte	01H			
data to be read-in	Low byte	0CH			
0014H	High byte	00H			
data to be read-in	Low byte	00H			
CDC and	High byte	FFH			
CRC code	Low byte	A8H			

#### 5.4.5 the list of communication address and their applications.

(1) list of address of single phase ADL100

Code	Name	R/W	Format of data	Format
0000H	Current total k\Mb		4 bytes / kWb	Dword
0001H			4 bytes / KWII	Dworu
0002H	Current neak k\Wh		1 hytes / kWh	Dword
0003H		17/44		Dword
0004H	Current flat k\Wh	R/W	4 hytes / kWh	Dword
0005H		17.44		Dworu
0006H	Current valley k\\/h		1 hytes / kWh	Dword
0007H				
0008H	Negative k\//b		1 hytes / kWh	Dword
0009H		17/44		Dword
000AH	Poactive kW/b		rosonvo	Dword
000BH			Teserve	Dword
000CH	Voltage	R	XXX.X V	word
000DH	Current	R	XX.XX A	word
000kWhH	Р	R	reserve	word
000FH	Q	R	reserve	word
0010H	Cos	R	reserve	word
0011H	Frequency	R	reserve	word
0012H	Year, month	R/W		word
0013H	Day, hour	R/W		word
0014H	minute, second	R/W	пп.шш.35	word

0015H High byte      address      R/W      001-247      char        0015H Low byte      Communication Speed      R/W      01 — 9600bps (defauit) 02 — 4800bps      char        0016H Low byte      Info of Tariff zone      R/W      high byte: rate of 1 st zone - minute low byte: start time of 1 st zone - nour low byte: start time of 1 st zone - hour low byte: start time of 2 st zone - hour low byte: start time of 2 st zone - hour low byte: start time of 2 st zone - hour low byte: start time of 3 st zone - hour low byte: start time of 3 st zone - hour low byte: start time of 3 st zone - hour low byte: start time of 3 st zone - hour low byte: start time of 3 st zone - hour low byte: start time of 3 st zone - hour low byte: start time of 4 st zone - hour low byte: start time of 4 st zone - hour low byte: start time of 4 st zone - hour low byte: start time of 5 st zone - hour low byte: start time of 5 st zone - hour low byte: start time of 5 st zone - hour low byte: start time of 5 st zone - hour low byte: start time of 5 st zone - hour low byte: start time of 5 st zone - hour low byte: start time of 5 st zone - hour low byte: start time of 5 st zone - hour low byte: start time of 5 st zone - hour low byte: start time of 5 st zone - hour low byte: start time of 5 st zone - hour low byte: start time of 5 st zone - hour low byte: start time of 5 st zone - ninute low byte: start time of 5 st zone - ninute low byte: start time of 5 st zone - ninute low byte: start time of 5 st zone - ninute low byte: start time of 5 st zone - ninute low byte: start time of 5 st zone - ninute low byte: start time of 5 st zone - ninute low byte: start time of 5 st zone - ninute low byte: start time of 5 st zone - ninute low byte: start time of 5 st zone - ninute low byte: start time of 5 st zon	Acrel			Shanghai Acrel (	Co.,Ltd
High byte      Lot of Carl III      Control IIII      Control IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	0015H	address	R/W	001-247	char
0015H      Communication Speed      R/W      01 — 9600bps (default) 02 — 4800bps      char        0016H      Info of Tariff zone      R/W      Inigh byte: rate of 1 ⁴⁷ zone - minute low byte: start time of 1 ⁴⁷ zone - minute      word        0017H      Info of Tariff zone      R/W      Inigh byte: rate of 2 ⁴⁷ zone - nour low byte: rate of 2 ⁴⁷ zone - nour      word        0018H      Info of Tariff zone      R/W      high byte: start time of 2 ⁴⁷ zone - nour      word        0019H      Info of Tariff zone      R/W      high byte: start time of 3 ⁴⁷ zone - nour      word        0018H      Info of Tariff zone      R/W      high byte: start time of 3 ⁴⁷ zone - nour      word        0019H      Info of Tariff zone      R/W      high byte: start time of 4 ⁴⁸ zone - nour      word        001BH      Info of Tariff zone      R/W      high byte: start time of 5 ⁴⁸ zone - nour      word        001CH      Info of Tariff zone      R/W      high byte: start time of 5 ⁴⁸ zone - nour      word        001CH      Info of Tariff zone      R/W      high byte: start time of 5 ⁴⁸ zone - nour      word        001CH      Info of Tariff zone      R/W      high byte: start time of 5 ⁴⁸ zone - nour      <	High byte		1000		onar
0015H Low byte      Communication Speed      R/W      02 — 4800bps 03 — 2400bps      char        0016H      Info of Tariff zone      R/W      high byte: rate of 1 ⁴⁴ zone - hour low byte: start time of 1 ⁴⁴ zone - hour low byte: start time of 1 ⁴⁵ zone - hour low byte: start time of 2 ⁴⁷ zone - hour low byte: start time of 2 ⁴⁷ zone - hour low byte: start time of 2 ⁴⁷ zone - hour low byte: start time of 2 ⁴⁷ zone - hour low byte: start time of 3 ⁴⁷ zone - hour low byte: start time of 3 ⁴⁷ zone - hour low byte: start time of 3 ⁴⁷ zone - hour low byte: start time of 3 ⁴⁷ zone - hour low byte: start time of 3 ⁴⁷ zone - hour low byte: start time of 3 ⁴⁷ zone - hour low byte: start time of 3 ⁴⁷ zone - hour low byte: start time of 4 ⁴⁸ zone - hour low byte: start time of 4 ⁴⁸ zone - hour low byte: start time of 5 ⁴⁸ zone - hour low byte: start time of 5 ⁴⁸ zone - hour low byte: start time of 5 ⁴⁸ zone - hour low byte: start time of 5 ⁴⁸ zone - hour low byte: start time of 5 ⁴⁸ zone - hour low byte: start time of 6 ⁴⁸ zone - hour low byte: start time of 6 ⁴⁸ zone - hour low byte: start time of 6 ⁴⁸ zone - hour low byte: start time of 6 ⁴⁸ zone - hour low byte: start time of 6 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte: start time of 7 ⁴⁸ zone - hour low byte:				01 —— 9600bps (default)	
Low byte	0015H	Communication Speed	R/W	02 — 4800bps	char
04      1000000      10000000      100000000      1000000000000000000000000000000000000	Low byte			03 — 2400bps	0.10.1
0016H      Info of Tariff zone      R/W      high byte: start time of 1 st zone - minute low byte: start time of 2 rd zone - minute low byte: start time of 2 rd zone - minute low byte: start time of 2 rd zone - minute low byte: start time of 2 rd zone - minute low byte: start time of 2 rd zone - minute low byte: start time of 3 rd zone - minute low byte: start time of 3 rd zone - minute low byte: start time of 3 rd zone - minute low byte: start time of 3 rd zone - minute low byte: start time of 3 rd zone - minute low byte: start time of 4 th zone - minute low byte: start time of 4 th zone - minute low byte: start time of 4 th zone - minute low byte: start time of 4 th zone - minute low byte: start time of 4 th zone - minute low byte: start time of 4 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low b				04 — 1200bps	
OUTH      Info of Tariff zone      R/W      Ingh byte: start time of 1 st zone - minute      Word        0017H      Info of Tariff zone      R/W      high byte: start time of 2 nd zone - hour low byte: start of 3 rd zone - minute      word        0018H      Info of Tariff zone      R/W      high byte: start time of 2 nd zone - minute low byte: start time of 3 rd zone - minute      word        0019H      Info of Tariff zone      R/W      high byte: start time of 3 rd zone - minute      word        001AH      Info of Tariff zone      R/W      high byte: start time of 3 rd zone - minute      word        001AH      Info of Tariff zone      R/W      high byte: start time of 4 th zone - minute      word        001CH      Info of Tariff zone      R/W      high byte: start time of 5 th zone - minute      word        001CH      Info of Tariff zone      R/W      high byte: start time of 5 th zone - minute      word        001CH      Info of Tariff zone      R/W      high byte: start time of 5 th zone - nour      word        001FH      Info of Tariff zone      R/W      high byte: start time of 7 th zone - minute      word        001FH      Info of Tariff zone      R/W      high byte: start time of	0016H	Info of Tariff zone	R/W	high byte: rate of 1 st zone	word
0017H  Info of Tariff zone  R/W  high byte: start time of 1 st zone - hour low byte: rate of 2 rd zone - minute low byte: start time of 3 rd zone - minute low byte: start time of 3 rd zone - nour  word    0019H  Info of Tariff zone  R/W  high byte: start time of 3 rd zone - minute low byte: start time of 3 rd zone - nour  word    0019H  Info of Tariff zone  R/W  high byte: start time of 3 rd zone - nour low byte: start time of 3 rd zone - nour  word    001AH  Info of Tariff zone  R/W  high byte: start time of 3 rd zone - nour low byte: start time of 4 th zone - nour  word    001BH  Info of Tariff zone  R/W  high byte: start time of 5 th zone - nour low byte: start time of 5 th zone - nour  word    001CH  Info of Tariff zone  R/W  high byte: start time of 5 th zone - nour low byte: start time of 5 th zone - nour  word    001BH  Info of Tariff zone  R/W  high byte: start time of 5 th zone - nour low byte: start time of 5 th zone - nour  word    001KWhH  Info of Tariff zone  R/W  high byte: start time of 7 th zone - nour low byte: start time of 7 th zone - nour  word    0020H  Info of Tariff zone  R/W  high byte: start time of 7 th zone - nour  word    0021H  Info of Tariff zone  R/W  high byte: start time of 7 th zone - nour  word    0022H  Odot Tar				low byte: start time of 1 st zone - minute	word
OOTH      Into Grind Line 2010      Now      low byte: rate of 2 rd zone      Word        0018H      Info of Tariff zone      R/W      high byte: start time of 2 rd zone - minute low byte: start time of 3 rd zone - minute low byte: start time of 3 rd zone - minute low byte: start time of 3 rd zone - minute low byte: start time of 4 th zone - minute low byte: start time of 4 th zone - minute low byte: start time of 4 th zone - minute low byte: start time of 4 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 7 th zone - minute low byte: start time of 7 th zone - minute low byte: start time of 7 th zone - minute low byte: start time of 7 th zone - minute low byte: start time of 7 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: sta	0017H	Info of Tariff zone	R/W	high byte: start time of 1 st zone - hour	word
0018H      Info of Tariff zone      R/W      high byte: start time of 2 nd zone - minute low byte: start time of 3 rd zone - hour      word        0019H      Info of Tariff zone      R/W      high byte: start time of 3 rd zone - minute low byte: start time of 3 rd zone - minute low byte: start time of 3 rd zone - minute low byte: start time of 3 rd zone - minute low byte: start time of 3 rd zone - minute low byte: start time of 3 rd zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 5 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 7 th zone - minute low byte: start time of 7 th zone - minute low byte: start time of 7 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute			1000	low byte: rate of 2 nd zone	word
OOTONT      Intro of Name 2 And Not Name 2 And OUTEN      Not Name 2 And Not Name 2 And Name	0018H	Info of Tariff zone		high byte: start time of 2 nd zone - minute	word
0019HInfo of Tariff zoneR/Whigh byte: rate of 3'd zone - minute low byte: start time of 4th zone - minute low byte: rate of 4th zone - minute low byte: start time of 4th zone - minute low byte: start time of 4th zone - minute low byte: start time of 5th zone - minute low byte: start time of 7th zone - minute low othe0021HInfo of Tariff	001011		17/44	low byte: start time of 2 nd zone - hour	word
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OUTERInitio of Tariff zonePVWlow byte: start time of 4 th zone - hour high byte: rate of 5 th zone low byte: start time of 5 th zone - minuteword001CHInfo of Tariff zoneR/Whigh byte: start time of 5 th zone - nour low byte: start time of 5 th zone - hour low byte: start time of 6 th zone - hour low byte: start time of 6 th zone - nour low byte: start time of 6 th zone - nour low byte: start time of 6 th zone - nour low byte: start time of 6 th zone - nour low byte: start time of 6 th zone - nour low byte: start time of 6 th zone - nour low byte: start time of 7 th zone - nour low byte: start time of 7 th zone - nour low byte: start time of 7 th zone - nour low byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nourWord0021HInfo of Tariff zoneR/WHigh byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: low byte: start time of 8 th zone - nour low byte: low byte: start time of 8 th zone - nour low byte: low byte: low byte: start time of 8 th zone - nour low byteWord0022HTotal kWh this monthR/W4 bytes / kWhDword0028HValley kWh this monthR/W4 bytes / kWhDword0028HOtal kWh last monthR/W	001011	Info of Toriff Tono		high byte: start time of 4 th zone - minute	word
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OUTCHInto of Tariff zoneN/WIow byte: start time of 5 th zone - minuteWord001DHInfo of Tariff zoneR/Whigh byte: start time of 5 th zone - hour low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - minute low byte: start time of 6 th zone - nourword001kWhHInfo of Tariff zoneR/Whigh byte: start time of 6 th zone - nour low byte: start time of 7 th zone - nourword001FHInfo of Tariff zoneR/Whigh byte: start time of 7 th zone - nour low byte: start time of 7 th zone - nour low byte: start time of 7 th zone - nour low byte: rate of 8 th zoneword0020HInfo of Tariff zoneR/Whigh byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: rate of 8 th zone - nourword0021HInfo of Tariff zoneR/Whigh byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nourword0022HTotal kWh this monthR/W4 bytes / kWhDword0026HPeak kWh this monthR/W4 bytes / kWhDword0028HValley kWh this monthR/W4 bytes / kWhDword0022HOtal kWh last monthR/W4 bytes / kWhDword0028HOtal kWh last monthR/W4 bytes / kWhDword002CHPeak kWh last monthR/W4 bytes / kWhDword002FHFlat kWh last monthR/W4 bytes / kWhDword <td>004.011</td> <td></td> <td></td> <td>high byte: rate of 5th zone</td> <td></td>	004.011			high byte: rate of 5 th zone	
001DH  Info of Tariff zone  R/W  high byte: start time of 5 th zone - hour low byte: rate of 6 th zone  word    001kWhH  Info of Tariff zone  R/W  high byte: start time of 6 th zone - minute low byte: start time of 6 th zone - hour  word    001FH  Info of Tariff zone  R/W  high byte: start time of 7 th zone - nour low byte: start time of 7 th zone - minute  word    0020H  Info of Tariff zone  R/W  high byte: start time of 7 th zone - nour low byte: start time of 7 th zone - nour low byte: rate of 8 th zone  word    0021H  Info of Tariff zone  R/W  high byte: start time of 8 th zone - nour low byte: start time of 8 th zone - nour  word    0022H  Info of Tariff zone  R/W  high byte: start time of 8 th zone - nour  word    0022H  Info of Tariff zone  R/W  high byte: start time of 8 th zone - nour  word    0022H  Outal kWh this month  R/W  A bytes / kWh  Dword    0026H  Peak kWh this month  R/W  4 bytes / kWh  Dword    0026H  Flat kWh this month  R/W  4 bytes / kWh  Dword    0028H  Valley kWh last month  R/W  4 bytes / kWh  Dword    0022H  Total kWh last month  R/W  4 bytes / kWh  Dword    002CH  Peak kWh last mont	001CH	Into of Tariff Zone	R/W	low byte: start time of 5 th zone - minute	word
UUTUHInto of Tariff zoneR/WIow byte: rate of 6 th zoneWord001kWhHInfo of Tariff zoneR/Whigh byte: start time of 6 th zone - minute low byte: start time of 7 th zone - hour low byte: start time of 7 th zone - minuteword001FHInfo of Tariff zoneR/Whigh byte: rate of 75 th zone - minute low byte: start time of 7 th zone - minuteword0020HInfo of Tariff zoneR/Whigh byte: start time of 7 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: dow byte: start time of 8 th zone - minute low byte: dow byte: start time of 8 th zone - minute low byte: dow byte: start time of 8 th zone - minute low byte: dow byte: dow byte: dow byte: start time of 8 th zone - minute low byte: dow byt	004511			high byte: start time of 5 th zone - hour	
001kWhH    Info of Tariff zone    R/W    high byte: start time of 6 th zone - minute low byte: start time of 7 th zone - hour low byte: start time of 7 th zone - minute    word      001FH    Info of Tariff zone    R/W    high byte: rate of 75 th zone - minute low byte: start time of 7 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte: start time of 8 th zone - minute low byte:	UUIDH	Into of Tariff zone	R/W	low byte: rate of 6 th zone	word
OD 1kWhH  Info of Tariff zone  R/W  low byte: start time of 6 th zone - hour  Word    001FH  Info of Tariff zone  R/W  high byte: rate of 75 th zone - minute  word    0020H  Info of Tariff zone  R/W  high byte: start time of 7 th zone - hour  word    0021H  Info of Tariff zone  R/W  high byte: start time of 8 th zone - minute  word    0021H  Info of Tariff zone  R/W  high byte: start time of 8 th zone - minute  word    0022H  Otal kWh this month  R/W  high byte: start time of 8 th zone - hour  word    0022H  Total kWh this month  R/W  4 bytes / kWh  Dword    0026H  Peak kWh this month  R/W  4 bytes / kWh  Dword    0027H  Flat kWh this month  R/W  4 bytes / kWh  Dword    0028H  Valley kWh this month  R/W  4 bytes / kWh  Dword    0028H  Valley kWh this month  R/W  4 bytes / kWh  Dword    002CH  Peak kWh last month  R/W  4 bytes / kWh  Dword    002KWHH  O02KWhH  Flat kWh last month  R/W  4 bytes / kWh  Dword    002KWHH  O02KWh last month  R/W  4 bytes / kWh  Dword	004134/611			high byte: start time of 6 th zone - minute	
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0029HValley kWn this monthR/W4 bytes / kWhDword002AH 002BHTotal kWh last monthR/W4 bytes / kWhDword002CH 002CH 002DHPeak kWh last monthR/W4 bytes / kWhDword002kWhH 002FHPlat kWh last monthR/W4 bytes / kWhDword0030HValley kWh last monthR/W4 bytes / kWhDword	0028H		DAA		David
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002kWhH 002FHFlat kWh last monthR/W4 bytes / kWhDword0030HValley kWh last monthR/W4 bytes / kWhDword	002DH	Peak KWh last month	R/W	4 bytes / kWh	Dword
O02FHFlat kWh last monthR/W4 bytes / kWhDword0030HValley kWh last monthR/W4 bytes / kWhDword	002kWhH		<b>_</b>		<b>.</b> .
0030H Valley kWh last month R/W 4 bytes / kWh Dword	002FH	Flat KWh last month	R/W	4 bytes / kWh	Dword
	0030H	Valley kWh last month	R/W	4 bytes / kWh	Dword

# Shanghai Acrel Co.,Ltd

0031H				
0032H	Total kWh	R/W	4 bytes / kWh	Dword
0033H	last last month			
0034H	Peak kWh	R/W	4 bytes / kWh	Dword
0035H	last last month			
0036H	Flat kWh	R/W	/ 4 bytes / kWh	Dword
0037H	last last month			
0038H	Valley kWh last last month R/W		4 bytes / kWh	Dword
0039H		r./ VV		

#### (2) 3 phases ADL300 address list

Address	Name of variable	R/W	Format of data	Format
0000H 0001H	Current total kWh	R/W	4 bytes / kWh	Dword
0002H 0003H	Current spike kWh	R/W	4 bytes / kWh	Dword
0004H 0005H	Current peak kWh	R/W	4 bytes / kWh	Dword
0006H 0007H	Current flat kWh	R/W	4 bytes / kWh	Dword
0008H 0009H	Current valley kWh	R/W	4 bytes / kWh	word
000AH	Year, month	R/W		word
000BH	Day, hour	R/W		word
000CH	minute, second	R/W	111.1111.35	word
000DH High byte	address	R/W	0001 ~ 0247	Char
000DH Low byte	Communication Speed	R/W	01 — 9600bps (default) 02 — 4800bps 03 — 2400bps 04 — 1200bps	char
000kWhH	Info of Tariff zone	R/W	high byte: rate of 1 st zone low byte: start time of 1 st zone - minute	word
000FH	Info of Tariff zone	R/W	high byte: start time of 1 st zone - hour low byte: rate of 2 nd zone	word
0010H	Info of Tariff zone	R/W	high byte: start time of 2 nd zone - minute low byte: start time of 2 nd zone - hour	word
0011H	Info of Tariff zone	R/W	high byte: rate of 3 rd zone low byte: start time of 3 rd zone - minute	word
0012H	Info of Tariff zone	R/W	high byte: start time of 3 rd zone - hour low byte: rate of 4 th zone	word
0013H	Info of Tariff zone	R/W	high byte: start time of 4 th zone - minute low byte: start time of 4 th zone - hour	word
0014H	Info of Tariff zone	R/W	high byte: rate of 5 th zone low byte: start time of 5 th zone - minute	word

0015H	Info of Tariff zone	R/W	high byte: start time of 5 th zone - hour low byte: rate of 6 th zone	word
0016H	Info of Tariff zone	R/W	high byte: start time of 6 th zone - minute low byte: start time of 6 th zone - hour	word
0017H	Info of Tariff zone	R/W	high byte: rate of 75 th zone low byte: start time of 7 th zone - minute	word
0018H	Info of Tariff zone	R/W	high byte: start time of 7 th zone - hour low byte: rate of 8 th zone	word
0019H	Info of Tariff zone	R/W	high byte: start time of 8 th zone - minute low byte: start time of 8 th zone - hour	word
001AH	Reserved			
001BH 001CH	Total kWh this month	R/W	4 bytes / kWh	Dword
001DH 001kWhH	Spike kWh this month	R/W	4 bytes / kWh	Dword
001FH 0020H	Peak kWh this month	R/W	4 bytes / kWh	Dword
0021H 0022H	Flat kWh this month	R/W	4 bytes / kWh	Dword
0023H 0024H	Valley kWh this month	R/W	4 bytes / kWh	Dword
0025H	Reserved			
0026H	Total kWh	R/W	4 bytes / kWh	Durand
0027H	last month			Dword
0028H	Spike kWh	R/W	4 bytes / kWh	Dword
0029H	last month			
002AH	Peak kWh	R/W	4 hvtes / kWh	Dword
002BH	last month			Dworu
002CH	Flat kWh	R/W	4 bytes / kWh	Dword
002DH	last month			Biild
002kWhH	Total kWh	R/W	4 bytes / kWh	Dword
002FH	last month			
0030H	Reserved			
0031H	Total kWh	R/W	4 bytes / kWh	Dword
0032H	last last month		·	
0033H	Spike kWh	R/W R/W	4 bytes / kWh	Dword
0034H				
0035H	Peak kvvn		4 bytes / kWh	Dword
0037 1	last last month	R/W	4 bytes / kWh	Dword
0030H	Total k\//h			
003AH	last last month	R/W	4 bytes / kWh	Dword

Note:

1. Read and write: "R" read only, read with the order 03H; "R/W" read and write, write with the order10H. Forbid to write in the address non listed or non able to be written.

2. The address of the meter is decided when it is finished in factory, it can be read by our software.

3. The value of voltage has only one decimal as XXX.X, unit V; if the value of voltage sent by RS485 is 08C6H (2246), the real voltage value is 224.6V; the value of current has 2 decimals as XX.XX, unit A; if the RS485 value is 01F4H (500), the real current value is 5.00A;

4. The value of energy has 4 bytes, unit kWh. High byte is front and low byte is followed; if RS485 value is 0012D687H (1234567), the real kWh value is1234567×0.01=12345.67kWh.

#### 5.5 Attention:

5.5.1 Its capacity of charge is 0.05lb ~ Imax (directly) or 0.02lb ~ Imax (with CT) . And if the capacity overload them, the measurement won't be accurate.

5.5.2 If the meter is wired the network directly, the value is real energy value; If the meter is wired with CT, the real value has to be multiplied the ratio of CT.

#### 6. Typical application



#### 7. Order example

Example1:	Example2:	
TYPE: ADL100-EF/C	TYPE: ADL300-EF/C	
Network: Single phase	Network: 3P4W	
Mode of wiring: Directly	Mode of wiring: With CT	
Un: AC 220V	Un: AC 3×220/380V	
In: 5 (20) A	In: 1.5 (6) A	
Measurable: Total kWh, multi-tariff kWh, U, I	Measurable: Total kWh, multi-tariff kWh,	
Option functions: RS485	Option functions: RS485	
The tariff and zone are indicated in orders	The tariff and zone are indicated in orders	