

ACR系列谐波仪表

ACR Series Harmonic Meters

总部：安科瑞电气股份有限公司
地址：上海市嘉定马东工业园区育绿路253号
电话：021-69158300 69158301 69158302
传真：021-69158303
服务热线：800-8206632
邮编：201801
E-mail: ACREL001@vip.163.com

生产基地：江苏安科瑞电器制造有限公司
地址：江阴市南闸镇东盟工业园区东盟路5号
电话：0510-86179966 86179967 86179968
传真：0510-86179975
邮编：214405
E-mail: JY-ACREL001@vip.163.com

安装使用说明书V1.1

Installation and operation instruction V1.1

安科瑞电气股份有限公司
ACREL CO.,LTD

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This company reserve power of revision of product specification described in this manual, without notice. Before ordering, please consult local agent for the latest specification of product.

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1 概述 General

ACR谐波仪表包括ACR220ELH, ACR230ELH, ACR320ELH, ACR330ELH等多款仪表,是本公司按IEC标准设计,与国际先进技术同步的综合电力监控仪表。

该系列产品具有全面的三相交流电量测量、复费率电能计量、四象限电能计量、谐波分析、电网质量分析、遥信输入、遥控输出以及网络通讯等功能,其中ACR230ELH/ACR330ELH 同时还具有电网波形实时跟踪显示和SOE事件记录功能,主要用于对电网供电质量的综合监控诊断及电能管理。

ACR Harmonic meters include multiple products, such as ACR220ELH, ACR230ELH, ACR320ELH, ACR330ELH etc, are the integrated electric power monitoring meters, developed by Shanghai ACREL, conforming to IEC standard, with international.

They have many functions such as full-scale three Phase AC electric parameter measurement, multi-rate electric energy metering, four-quadrant electric energy metering, harmonic analysis, electric network quality analysis, remote signaling input, remote control Output, Network Communication function etc. of which, ACR230ELH / ACR330ELH has electric network wave form real time tracking display and SOE Event record function, mainly using for integrated monitoring and power management of electricity quality of electric network .

2 产品规格及功能特点 Specification and features

2.1 系列产品规格 Product specification

型号Type	ACR220ELH	ACR230ELH	ACR320ELH	ACR330ELH
功能特性 Functional performance				
显示方式 Display mode				
	LCD (字段式) LCD (Field)	LCD (点阵式) LCD(Dot-matrix)	LCD (字段式) LCD (Field)	LCD (点阵式) LCD(Dot-matrix)
实时测量 Real-time measurement				
电流/电压/频率/功率因数 Current/voltage/frequency /power factor	√	√	√	√
有功/无功/视在功率 Active power/Reactive power /Apparent power	√	√	√	√
四象限电能计量 Four-quadrant electric energy metering	√	√	√	√
最大需量 Maximum demand	×	√	×	×
复费率电度 KWH Multi-rate	√	√	√	√
电能质量检测 Power quality detection				
分次谐波 Sub-harmonic	√(2-31)	√(2-31)	√(2-31)	√(2-31)
总谐波含量 (THD) Total Harmonic Distortion(THD)	√	√	√	√
电压波峰系数 (CF) Crest facotr (CF)	√	√	√	√
电压波形因子 THFF	√	√	√	√
电流K系数 (KF) Current K coefficient (KF)	√	√	√	√
电压电流不平衡度 (UF) Unbalance factor (UF)	√	√	√	√

峰值电压 Peak Voltage	×	√	×	√
电压电流序量 Voltage/current sequence	×	√	×	√
波形跟踪显示 Wave form tracking display	×	√可调 √tunable	×	√可调 √tunable
数据记录 Data record				
事件记录 Event record	×	√	×	√
报警 Alarm	×	× (可设置) × (user set)	×	√
内置时钟 Clock embedded	√	√	√	√
通讯 Communication				
RS485接口/Modbus协议 RS485interface / Modbus Protocol	√	√	√	√
开关量 Switching				
D/DO(K)	√(4D/2DO)	√(4D/2DO)	√(4D/3DO)	√(4D/3DO)
模拟量 (M) Analog (M)				
变送输出 (4-20mA) Transmitting output (4-20mA)	×	×	×	√

3 技术参数 Technical parameter

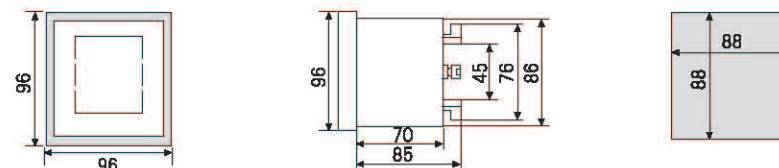
技术参数 Technical parameter		指标 Value
输入 Input	网络 Network	三相三线、三相四线 3 – phase 3 – wire, 3 – phase 4 wire
	频率 Frequency	45~65Hz
	电压 Voltage	额定值: AC 57.7V/100V、220V/380V(400V) Rating: AC 57.7V/100V, 220V/380V(400V)
		过负荷: 1.2 倍额定值 (连续) ; 2 倍额定值/1秒 Overload: 1.2 – fold rating (continuous); 2 – fold rating /1 second
		功耗: < 0.2VA (每路) Consumption: < 0.2VA
	电流 Current	额定值: AC 1A、5A Rating: AC 1A, 5A
		过负荷: 1.2 倍额定值 (连续) ; 10倍额定值/1秒 Overload: 1.2 – fold rating (continuous); 10 – fold rating /1 second
功耗: < 0.2VA (每路) Consumption: < 0.2 A		
输出 Output	电能 Electric energy	输出方式: 集电极开路的光耦脉冲 Output mode: Open – collector photocoupler pulse
		脉冲常数: 见接线图 Pulse constant: See wiring diagram
	通讯 Communication	RS485接口、Modbus–RTU协议 RS485 INTERFACE, Modbus–RTU protocol
开关量输入 Switching input		干接点输入, 内置电源 Dry contact input, built-in power supply
开关量输出 Switching output		输出方式: 继电器常开触点输出 Output mode: Relay NO contact output 触点容量Contact capacity: AC: 250V 3A DC: 30V 3A

测量精度 Measuring accuracy	频率0.05Hz、无功电能1级、其它0.5级; Frequency 0.05Hz, reactive electric energy 1 class, other 0.5 class
电源 Power supply	AC/DC 85~270V; ACR230ELH/ACR330ELH点阵式液晶 功耗≤6VA ACR230ELH/ACR330ELH dot-matrix liquid crystal Consumption ≤6VA ACR220ELH/ACR320ELH字段式液晶 功耗≤4VA ACR220ELH/ACR320ELH Field crystal Consumption≤4VA
安全性 Safety	工频耐压: 电源、电压电流输入回路之间, 各输入端子(并联)和外壳之间AC 2kV/1min; 电源与开关量输入回路、通讯回路、变送输出回路, 各输入端子分别与各输出端子之间AC1.5kV/1min; power – frequency withstand voltage: In between power supply Voltage input circuit, Current input circuit; In between each input terminal (parallel connection) and housing AC2kV/1min; In between power supply and Switching input circuit, Communication circuit, transmitting output circuit, each input terminal, each output terminal AC1.5kV/1min; 绝缘电阻: 输入、输出端对机壳>100MΩ Insulation resistance: input, Output terminal to housing >100MΩ
环境 Environment	工作温度Working temperature: -10℃~+45℃; 储存温度Storage temperature: -20℃~+70℃; 相对湿度Relative humidity: ≤95% 不结露; 海拔高度Altitude: ≤2500m;

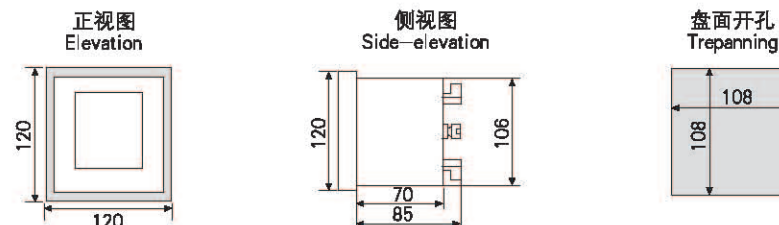
4 安装接线说明 Instruction of installing connection

4.1 安装尺寸 Installing size

ACR220ELH / ACR230ELH



ACR320ELH / ACR330ELH

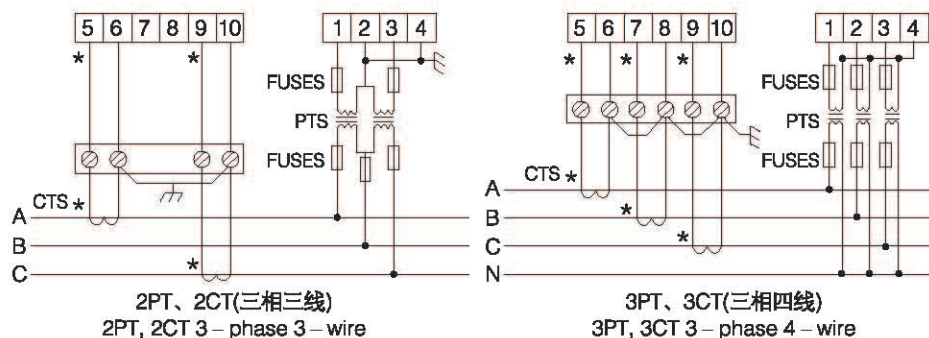


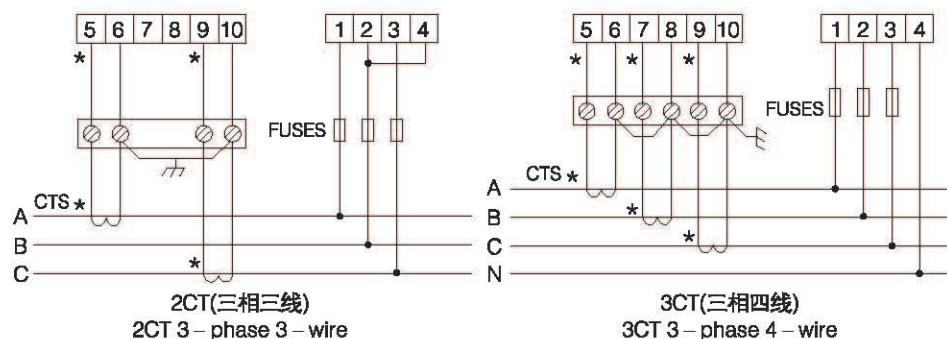
4.2 接线方法 Method of connection

4.2.1 仪表下排端子接线方法 Method of connection for Lower row terminal of meter

下排端子: “5, 6, 7, 8, 9, 10” 为电流输入信号的端子号; “1, 2, 3, 4” 为电压输入信号的端子号

Lower row terminal: Terminal number of current input signal as "5, 6, 7, 8, 9, 10"; Terminal number of voltage input signal as "1, 2, 3, 4"



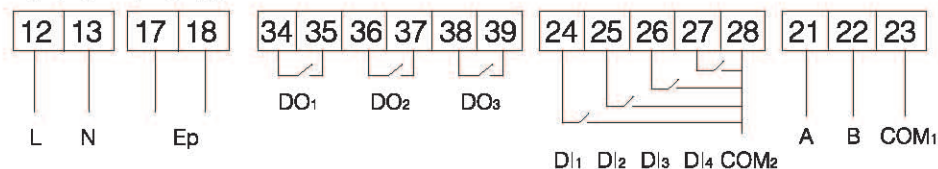


4.2.2 仪表上排端子接线方法 Method of connection for Upper row terminal of meter

上排端子: “12, 13” 为辅助电源端子号、
“17, 18” 为有功电能脉冲输出端子号、“34, 35” “36, 37” 或 “34, 35” “35, 36” 分别为两路开关量输出端子号, “38, 39” 为第三路开关量输出或报警输出端子, “24, 25, 26, 27, 28” 为开关量输入端子号, 55, 56, 59 为变送输出端子号, “21, 22, 23” 为通讯端子号。

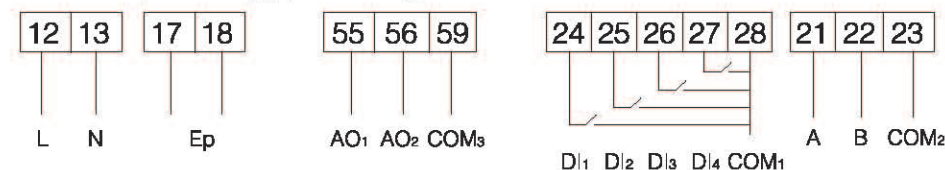
(COM1, COM2, COM3不可短接)

ACR320ELH / ACR330ELH



辅助电源 Auxiliary power Electric energy pulse 开关量 (继电器) 输出 Switching input (relay) Output

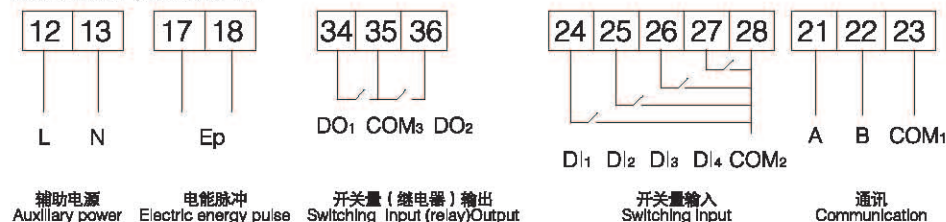
ACR330ELH (4-20mA 变送 Transmitting)



辅助电源 Auxiliary power Electric energy pulse 变送输出 Transmitter Output

Upper row terminal: “12, 13” as Terminal number of auxiliary power, “17, 18” as Terminal number of active electric energy pulse output, “34, 35” “36, 37” or “34, 35” “35, 36” as Terminal number of 2-channel switching output respectively, “38, 39” as Terminal number of 3-channel switching output or alarm output, “24, 25, 26, 27, 28” as Terminal number of switching input, 55, 56, 59 as Terminal number of transmitting output, “21, 22, 23” as Terminal number of communication. (COM1, COM2, COM3 can not be short circuit)

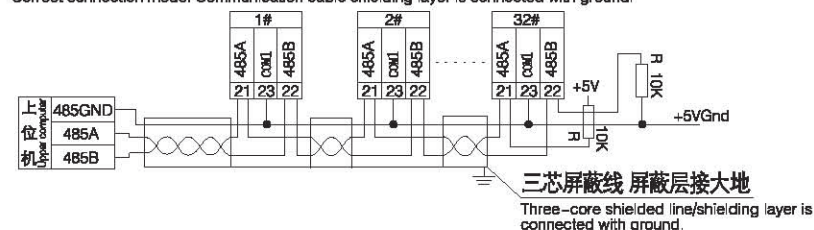
ACR220ELH/ACR230ELH



关于通讯部分的接线实例如下图所示:

Four connection mode in communication section are shown as following:

正确接线方式: 通讯电缆屏蔽层接大地
Correct connection mode: Communication cable shielding layer is connected with ground.



建议最末端仪表的A、B之间加匹配电阻, 阻值范围为120Ω~10kΩ。

Recommendation of adding matched resistance between A, B of the last meter, the rated resistance range is 120Ω~10kΩ.

5 包装 Package

包装内含下列项目: 主机 (含插拔式端子排)、安装支架、出厂检验报告、合格证 (防伪标签)、安装使用说明书。

The package include following items: Principal (including plug-in group terminal blocks), installing supporter, delivery inspection report, certificate (anti-forging tag), installation and operation instruction.

在打开产品包装时, 请仔细检查是否有损坏, 如有任何损坏请及时通知ACREL公司或代理商, 并请保留损坏的外包装, 本公司将及时予以更换。

When unwrapping the package, check carefully for damage, if any, please inform ACREL company or agent, and keep the damaged external packing for inspection. If it is responsibility of ACREL company or agent, will replace it in time.

6 工程施工注意事项 Notice in engineering construction

6.1 电压输入 Voltage input

输入电压应不高于产品的额定输入电压（100V或400V）的120%，否则应考虑使用PT；

在电压输入端须安装1A保险丝；

需根据产品的PT接线方式来设定产品的接线方式，方法如下：

Input Voltage shall not be greater than 120% of rated input Voltage (100V or 400V), otherwise, using PT shall be considered;

On voltage input terminal, 1A fuse shall be installed;

Set product connection mode as per the product PT connection mode, shown as follows:

接线方式 Connection mode	选择 Selection
2元件 2 component	3P3L
3元件 3 component	3P4L

6.2 电流输入 Current input

标准额定输入电流为1A 或5A，要求使用外部CT（建议使用接线排，不要直接接CT，以便于拆装）；

要确保输入电流与电压相对应，相序一致，方向一致；

如果使用的CT回路上连有其它仪表，接线应采用串接方式；

去除产品的电流输入连线之前，一定要先断开CT一次回路或者短接二次回路！

Standard rated input current is 1A or 5A, the external CT shall be used (Advising to use the line bank, instead of connecting CT directly, to facilitate dismantling);

Ensure input current matching with voltage, Phase sequence is identical, direction is identical;

If the used CT connecting with other meter, connection shall adopt tandem connection mode;

Before removing product's current input connection, firstly, cut off CT primary circuit or shorted secondary circuit !

6.3 通讯接线 Communication connection

仪表提供异步半双工RS485通讯接口，采用MODBUS-RTU协议，各种数据信息均可在通讯线路上传送。理论上在一条线路上可以同时连接多达128个网络电力仪表，每个网络电力仪表均可设定其通讯地址（Addr）。通讯连接建议使用屏蔽双绞线，线径不小于0.5mm²。布线时应使通讯线远离强电电缆或其他强电场环境。

This series meter provides asynchronism half duplex RS485 Communication interface, adopts MODBUS-RTU protocol, various data information may be transmitting on the Communication line. Theoretically, on the same line, meters up to 128 may be connected at the same time, each meter can set up its Communication address (Addr). Communication connection recommendation of shielded twisted pair wire, its linear diameter is no less than 0.5mm², when wiring, the Communication line shall be far away from strong current cable or other strong electric field environment.

7 操作说明 Operation description

7.1 ACR220ELH/ACR320ELH操作指南：

7.1 ACR220ELH/ACR320ELH Operating guide:

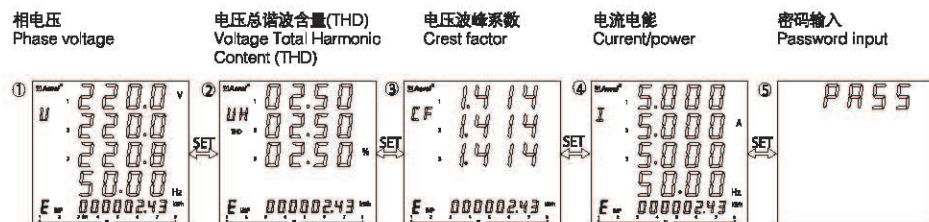
7.1.1 按键功能说明

7.1.1 Button function description

SET键 SET	测量模式下，连续按该键4次进入编程模式，仪表提示输入密码CODE，输入正确密码（0001）后，可对仪表进行编程设置； Under measuring mode, press this button in succession for four (4) times to enter the programming mode, meter prompt password input CODE, after type in correct password (0001) to set up meter programming; 编程模式下，用于返回上一级菜单 Under programming mode, this button is used for return to previous menu
左键 Left	测量模式下，按该键对显示项目向上翻页； Under measuring mode, press this button can page up the display items; 编程模式下，用于同级菜单的四位数循环移位（被选中位处于闪烁状态） Under programming mode, this button is used for 4-bit circular shift of the same menu (the bit selected is in flickering)
右键 Right	测量模式下，按该键对显示项目向下翻页； Under measuring mode, press this button can page down the display items; 编程模式下，用于同级菜单的所选位的数值修改（可修改位处于闪烁状态；修改范围为“0-9”） Under programming mode, this button is used for numerical value revising of selected bit of the same menu (the bit revising is in flickering; revising range as "0-9")
回车键 Enter	编程模式下，用于确认菜单项目的选择和参数的修改 Under programming mode, this button is used for confirming selection of menu item and revision of parameter

SET键循环切换显示 如下图所示:

SET circular switching is displaying in below diagram:



注: 以上各SET循环界面下文中用①, ②, ③, ④, ⑤表示

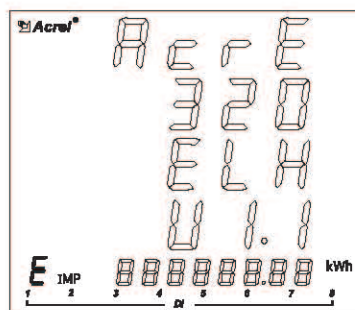
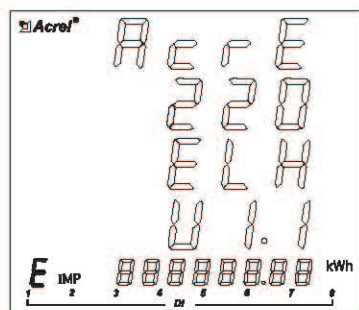
Note: Above SET circular interface is shown as ①, ②, ③, ④, ⑤ respectively

7.1.2 仪表开机瞬间显示为仪表版本信息:

7.1.2 The first displaying information after starting is the meter version information

仪表开机瞬间显示为仪表版本信息, 之后即显示相电压或线电压

The first displaying information after starting is the meter version information, then is the Phase voltage or line voltage.

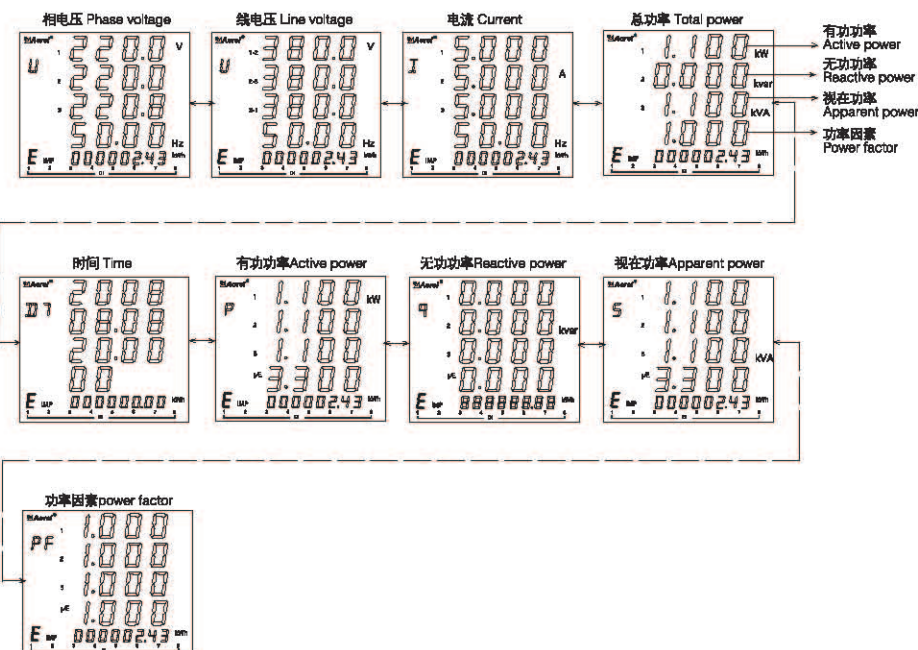


7.1.3 测量参数 Measuring parameter

电力参数 Power parameter

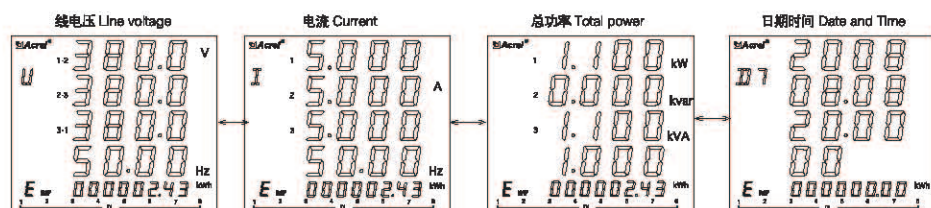
A: 对三相四线系统, 仪表上电后显示 ①相电压, 按左键或右键可如下图切换显示其它界面:
相电压↔线电压↔电流↔总功率(功率因数)↔时间↔有功功率↔无功功率↔视在功率↔功率因数。

A: For three phase four wire system, after power up, the meter display: ①Phase voltage, press the Left or Right button can switch and display other interface as following: Phase voltage↔Line voltage↔Current↔Total power (power factor)↔Time↔Active power↔Reactive power↔Apparent power↔power factor.



B: 对三相三线系统, 仪表上电后显示“线电压”, 按左、右键可如下图切换显示其它界面:
线电压 $\longleftrightarrow$ 电流 $\longleftrightarrow$ 总功率(功率因数) $\longleftrightarrow$ 时间。

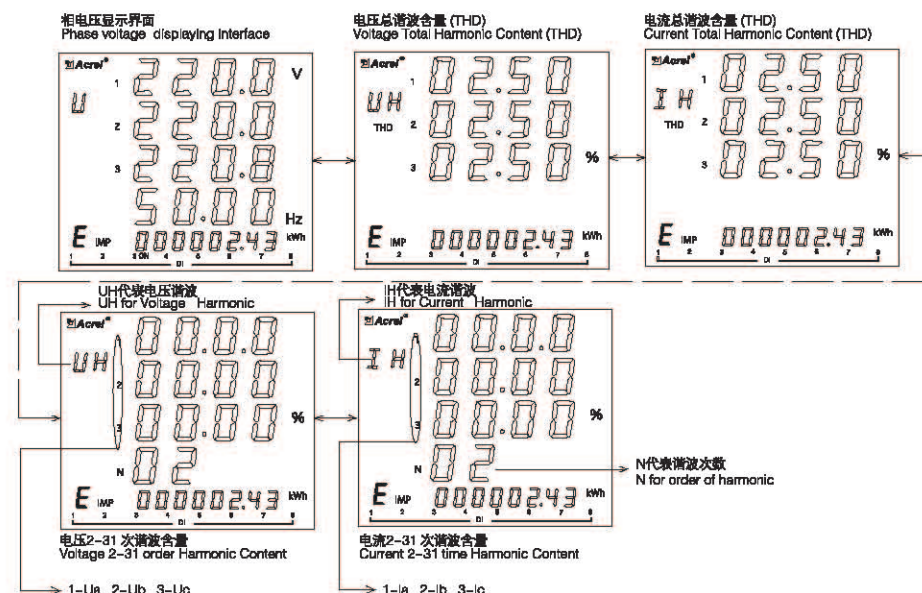
B: For three phase three wire system, after power up, the meter display: "Line voltage", press the Left, Right button can switch and display other interface as following: Line voltage $\longleftrightarrow$ Current $\longleftrightarrow$ Total power (power factor) $\longleftrightarrow$ Time.



II 谐波参数 Harmonic parameter

仪表显示①相电压显示界面, 按SET键切换到②电压总谐波含量界面后, 按左、右键可切换显示其它界面: 电压总谐波含量 $\longleftrightarrow$ 电流总谐波含量 $\longleftrightarrow$ 电压2-31次谐波(按左右键分别查看2-31次各次电压谐波) $\longleftrightarrow$ 电流2-31次谐波(按左右键分别查看2-31次各次电流谐波)。

Meter display: ①Phase voltage displaying interface, press SET button, after switch to ②Voltage Total Harmonic Content interface, press the Left, Right button can switch and display other interface as following: Voltage Total Harmonic Content $\longleftrightarrow$ Current Total Harmonic Content $\longleftrightarrow$ Voltage 2-31 order Harmonic (press the Left, Right button can look over Voltage 2-31 order Harmonic respectively) $\longleftrightarrow$ Current 2-31 order Harmonic (press the Left, Right button can look over Current 2-31 order Harmonic respectively).



III 电网质量参数 Power quality parameter

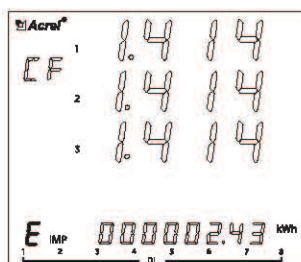
仪表显示①相电压显示界面, 按SET键切换到③电压波峰系数界面后按左、右键可切换显示其它界面: 电压波峰系数 $\longleftrightarrow$ 电压波形因子 $\longleftrightarrow$ 电流K系数 $\longleftrightarrow$ 电压电流不平衡度。

Meter display: ①Phase voltage displaying interface, press SET button, after switch to ③Voltage Wave peak coefficient interface, press the Left, Right button can switch and display other interface as following: Crest factor $\longleftrightarrow$ THFF $\longleftrightarrow$ Current K factor $\longleftrightarrow$ Unbalance factor of voltage and current.

电压波峰系数(CF) Voltage crest factor (CF)

电压波峰系数为电压谐波叠加后可能出现的最大值(基波峰值与所有谐波的峰值叠加)与有效值的比值, 如考虑电压畸变对线路绝缘配合的影响则需要注意电压峰值。无谐波情况下CF值为1.414。

Crest factor is the ratio of the possible maximum value resulting from overlapped voltage harmonic and the RMS. (fundamental wave Peak value overlapped with peak value of all harmonic), When considering voltage distortion affect on the line insulation co-ordination, must attach importance to voltage peak value. In ideal status, the sine wave CF value is 1.414.

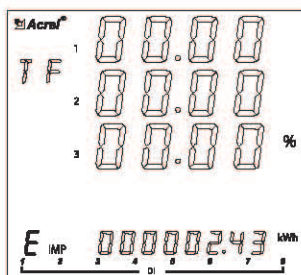


电压波峰系数
Crest factor

电话波形因子 THHF :

谐波干扰会引起通讯系统的噪声，降低通话的清晰度；耳朵和话机对于50Hz的电压电流的灵敏度很低，对于1KHz附近的电压电流的灵敏度最高；在欧洲采用国际电报电话咨询委员会(CCITT)用噪声权系数Pn计入各次谐波对电信的干扰，用电话波形因子来表示。理想情况下值为0.00%

Harmonic jamming may result in Communication system noise, reducing talking clearness; human ear and telephone set have very low sensitivity to 50Hz voltage current, have the highest sensitivity to voltage current near 1KHz; in Europe, the Pseudo-Noise coefficient Pn of International Telephone and Telegraph Consultative Committee (CCITT) is used to count jamming from each order harmonic, displaying with Telephone wave form factor. In ideal status, the value is 0.00%.



电话波形因子
Telephone wave form factor

电流K系数 Current K factor:

电流K系数是用来标识变压器因为谐波而产生的热效应的一个数值。这是一个计算值。K系数越高，因为谐波造成的发热就越严重，与KVA一起使用来选择替换变压器来处理非线性、谐波数值高的负载。

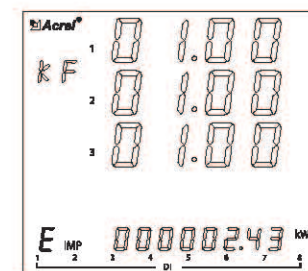
K系数变压器：这种变压器可以标识热效应。对谐波有比较大的负载，比如一台K-4的变压器等同于可承受4倍一般变压器正常的发热情况。

理想情况下KF值为1.00

Current K factor is a value to mark heating transformer from harmonic. This is a calculated value. The higher, the K coefficient, the greater the heat from harmonic. Using k factor with KVA, select the alternative transformer to handle nonlinearity, high order harmonic load.

K factor transformer: This transformer can marks heating effect. Transformer with higher K coefficient can bear higher harmonic, for instance, the enduring heating of one K-4 transformer equal to 4-fold normal heating of common transformer.

In ideal status, the KF value is 1.00

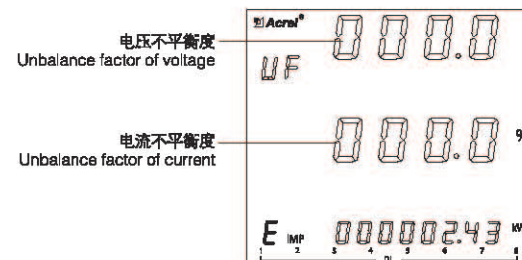


电流K系数
Current K coefficient

电压电流不平衡度 Unbalance factor of voltage and current:

三相供电系统中，如果缺相或三相的电压，电流有效值不等，或者三个相电压或电流的相位差不为120度时，则称此三相电压或电流不平衡。在电流电压平衡的情况下UF均为0.0%。

In three Phase power supply system, if voltage or current amplitude or effective value of three phase is different, or voltage or current phase difference of three phase is not 120 degree, so these three Phase voltage or current is called as unbalance. When voltage / current are in balance, UF is 0.0%.



电压电流不平衡度
Unbalance factor of voltage and current

IV费率电度（显示电能为二次侧电能）

KWH-rate (Electric energy display is Secondary side Electric energy)

仪表开机后显示①相电压显示界面时，按SET键切换到④电流电能显示界面后，按左右键切换显示：EIMP(总吸收有功电能) ↔ EEXP (总释放有功电能) ↔ E  (总感性无功电度) ↔ E  (总容性无功电度) ↔ 本月EIMP (F1) ↔ 本月EIMP (F2) ↔ 本月EIMP (F3) ↔ 本月EIMP (F4) ↔ 上月EIMP (F1) ↔ 上月EIMP (F2) ↔ 上月EIMP (F3) ↔ 上月EIMP (F4) ↔ 上上月EIMP (F1) ↔ 上上月EIMP (F2) ↔ 上上月EIMP (F3) ↔ 上上月EIMP (F4)。

注：1、四象限电能分别指吸收有功电能、释放有功电能、感性无功电能、容性无功电能，一般来说用户读取吸收有功电能EIMP；复费率的电能计量将一天最多分为8个时段，3种费率（F1-有功峰电能，F2-有功平电能，F3-有功谷电能）来完成电能的分时计量。

2、F4表示该月总的复费率有功电能。

After power up, meter display ① Phase voltage displaying interface, press SET button, after switch to ④ Current/power display interface, press the Left, Right button can switch and display other interface as following: EIMP (Total capture active electric energy) ↔ EEXP (Total release active electric energy) ↔ E  (Total inductive reactive electric energy) ↔ E  (Total capacitive reactive electric energy) ↔ This month EIMP (F1) ↔ This month EIMP (F2) ↔ This month EIMP (F3) ↔ This month EIMP (F4) ↔ Last month EIMP (F1) ↔ Last month EIMP (F2) ↔ Last month EIMP (F3) ↔ Last month EIMP (F4) ↔ Month before last EIMP (F1) ↔ Month before last EIMP (F2) ↔ Month before last EIMP (F3) ↔ Month before last EIMP (F4)。

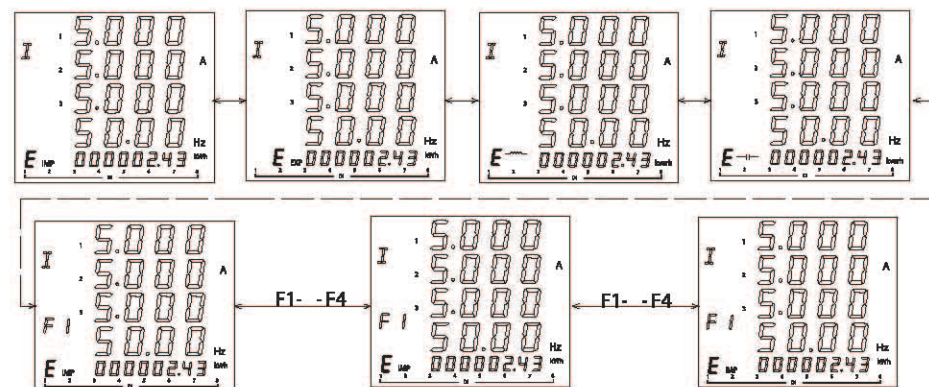
Note: 1. Four-quadrant electric energy refer to capture active electric energy, release active electric energy, inductive reactive electric energy, capacitive reactive electric energy respectively, generally, user read capture active electric energy EIMP; Multi-rate electric energy metering divide 24 hours up to 8-period of time, three rates (F1- active Peak Electric energy, F2-active Flat Electric energy, F3-active valley Electric energy) to accomplish sharing-time metering of electric energy.

2. F4 is for Total multi-rate active Electric energy of this month.

3、抄表日为自然月，每月月底的23:59:59

跳到次日1日00:00:00时自动会把当月有功电能IMP (F1-F4)数值放入“上月有功EIMP (F1-F4)”显示界面中，上月有功电能EIMP (F1-F4)数值放入“上上月有功EIMP (F1-F4)”显示界面中，同时“本月有功EIMP (F1-F4)”显示值清零。

3. Meter reading day adopt nature month, when jumping from 23:59:59 of this month to 00:00:00 of first day of next month, total multi-rate active electric energy of this month EIMP (F1-F4) is automatically put on 'last month active electric energy EIMP(F1-F4)' displaying interface, and last month active electric energy EIMP(F1-F4) is automatically put on 'Month before last active electric energy EIMP(F1-F4)' displaying interface, while 'Month active electric energy EIMP (F1-F4)' is clearing its display value.



本月/上月/上上月 E(IMP) F1-峰, F2-平, F3-谷, F4-总(F2-F4省略, 按左右键即可显示)
This month / Last month / Month before last(IMP)F1-Peak, F2-Flat, F3-Valley,
F4-Total (F2-F4 omitted, press Left / Right button to display)

7.1.4 系统设置 System settings

I 编程菜单 Menu programming

仪表开机后显示 ①相电压显示界面，按 SET 键切换到 ⑤PASS (输入密码 “0001”) 进入菜单编程界面，按左右键依次显示如下：

After power up, meter display ①Phase voltage displaying interface, after press SET to switch to ⑤PASS (input password “0001”) enter menu programming interface, press Left/Right button, the displaying sequence as following:

第一级菜单 First menu	第二级菜单 Second menu	说明 Description
$\ln Pt$	0 ~ 9999	电压变比 Voltage transformation ratio 例：10KV/100V 即设为0100 150A/5A 即设为0030
$\ln Ct$	0 ~ 9999	电流变比 Current transformation ratio Case: 10KV/100V set for 0100 150A/5A set for 0030
$\ln E$	3P3L、3P4L	接线方式 (三相三线、三相四线) Connection mode (3-phase 3-wire; 3-phase 4-wire)
$\ln V$	100、400	电压等级 Voltage grade
$\ln I$	1、5	电流等级 Current grade
$PAddr$	1 ~ 247	通讯地址 Communication address
$bPUD$	4800、9600、19200、38400	通讯波特率 Communication Baud rate
545	$Clr.E$	按回车键，电能清零 Press ENTER, Electric energy reset
ΓnE	依次显示年、月、日、 时、分、秒 Display year, moth, day, hour, minute, second orderly	设置当前时间 Set current time
$PLd1$	0 ~ 255	设置为0时，继电器1为电平控制方式； 设置为1~255时，继电器1为脉冲控制方式， 单位：0.01秒 设置的值为脉冲触发时间 setting as 0, relay1adopt level control mode; setting as 1~255, relay1adopt pulse control mode, Unit: 0.01Second Setting value as pulse triggering time
$PLd2$	0 ~ 255	设置为0时，继电器2为电平控制方式； 设置为1~255时，继电器2为脉冲控制方式， 单位：0.01秒 setting as 0, relay2adopt level control mode; setting as 1~255, relay2adopt pulse control mode, Unit: 0.01Second

$PLd3$	0 ~ 255	设置为0时，继电器3为电平控制方式； 设置为1~255时，继电器3为脉冲控制方式， 单位：0.01秒 (注：ACR220ELH没有第三路继电器， 该项设置无效) setting as 0, relay3adopt level control mode; setting as 1~255, relay3adopt pulse control mode, Unit: 0.01Second (Note: ACR220ELH without 3-channel relay, this setting is disable)
$rt-1$	3 --- 0000 (可设) 3 --- 0000 (settable)	表示在00: 00 ~ 03: 00时间段中，费率为3-谷 Within 00: 00 ~ 03: 00 time period, rate as 3-Valley
$rt-2$	2 --- 0300 (可设) 2 --- 0300 (settable)	表示在03: 00 ~ 06: 00时间段中，费率为2-平 Within 03: 00 ~ 06: 00 time period, rate as 2-Flat
$rt-3$	2 --- 0600 (可设) 2 --- 0600 (settable)	表示在06: 00 ~ 09: 00时间段中，费率为2-平 Within 06: 00 ~ 09: 00 time period, rate as 2-Flat
$rt-4$	1 --- 0900 (可设) 1 --- 0900 (settable)	表示在09: 00 ~ 12: 00时间段中，费率为1-峰 Within 09: 00 ~ 12: 00 time period, rate as 1-Peak
$rt-5$	2 --- 1200 (可设) 2 --- 1200 (settable)	表示在12: 00 ~ 15: 00时间段中，费率为2-平 Within 12: 00 ~ 15: 00 time period, rate as 2-Flat
$rt-6$	1 --- 1500 (可设) 1 --- 1500 (settable)	表示在15: 00 ~ 18: 00时间段中，费率为1-峰 Within 15: 00 ~ 18: 00 time period, rate as 1-Peak
$rt-7$	2 --- 1800 (可设) 2 --- 1800 (settable)	表示在18: 00 ~ 21: 00时间段中，费率为2-平 Within 18: 00 ~ 21: 00 time period, rate as 2-Flat
$rt-8$	2 --- 2100 (可设) 2 --- 2100 (settable)	表示在21: 00 ~ 00: 00时间段中，费率为2-平 Within 21: 00 ~ 00: 00 time period, rate as 2-Flat
$BLcd$	0 --- 255 (可设) 0 --- 255 (settable)	设置为0时，背光常亮； 设置为1~255时，背光在1~255秒后熄灭，单位：1秒 setting as 0, backlight lights; setting as 1~255, after 1~255Second backlight go out, Unit: 1 Second

注：A：开关量输出：采用继电器输出，继电器触点有两种控制方式：1、电平方式（继电器触点常开或常闭）；2、脉冲方式（继电器闭合一段时间后断开，持续时间可调由 $PLdn$ 控制）

B：电能复费率计量：复费率的电能计量将一天最多分为8个时段，三种费率来完成电能的分时计量，所有的操作都依据仪表内部精确 RTC 的时间实现，根据需求可通过仪表的编程键盘设置8种时段和三种不同的费率，或者通过仪表的RS485接口写入 $rt-n$ 的控制字（手动设置或通讯写入费率时段时必须保证下一时段所设置的时间大于上一时段所设置的时间，否则可能会出错）。

Note: A: Switching output: adopt relay output, relay contacts have two control modes: 1. Level mode (relay contact adopt NO or NC); 2. Pulse mode (relay is closed for some time then is breaking, the duration may be adjustable, controlled by;

B: KWH multi-rate metering: KWH multi-rate metering divide 24 hours (one day) up to 8-time period, and adopt three rates to accomplish sub-metering and sub-billing of electric energy, all the operation are based on precise RTC time in the meter, the 8-time period, and adopt three rates can be set by meter programming key pad according to demand, or through meter RS485 interface write in Control Word (Manual setting or communication write in rate-time period must guarantee that the setting time for next time period shall be greater than the setting time for last time period, if not, error may occur).

II 系统设置流程图 (末页附图)

System setting flow chart (attached drawing at the last page)

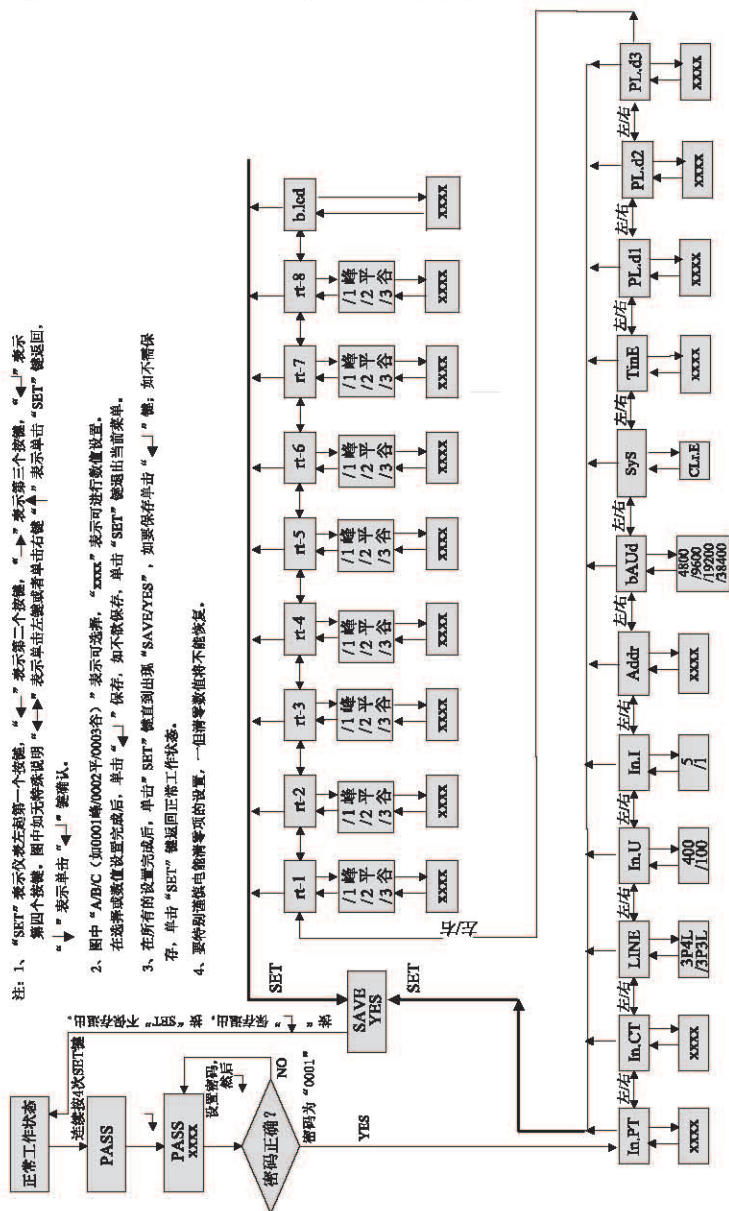
系统设置图

注: 1、“SET”表示设置左起第一个参数,“←”表示第二个参数,“→”表示第三个参数,“↑”表示第四个参数。图中如无特殊说明“←”表示单击左键或单击右键,“↑”表示单击“SET”键返回,“↓”表示单击“←”键确认。

2、图中“A/B/C (如0001峰/0002平/0003谷)”表示可选择,“xxxx”表示可进行数值设置。

3、在设置或数值设置完成后,单击“←”保存,如不需保存,单击“SET”键退出当前菜单。

4、要特别清除电能清零等项的设置,一旦清零数值将不能恢复。



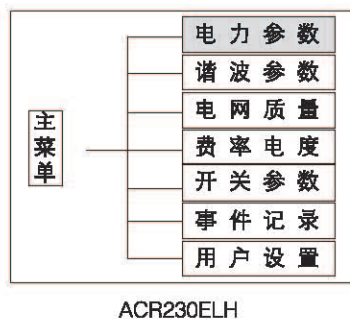
7.2 ACR230ELH / ACR330ELH操作指南

ACR230ELH / ACR330ELH Operating guide

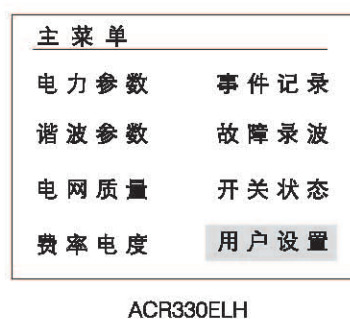
7.2.1 主菜单 Main menu:

仪表接通电源后, 瞬间显示界面为软件版本号, 之后屏幕即刻显示为相电压界面, 此时按SET键可进入主菜单界面。进入主菜单后, 可按下键或下键选择所需查看的项目, 当所需查看的项目处于反白状态时按回车键进入该项目。

After power on, the twinkling display interface is the software version number, then display Phase voltage interface at once, at this time, pressing SET key can enter Main menu. After entering Main menu, press the Up/Down button to select the item to be looking over, when this item is in whitening status, to press Enter key entering this item.



ACR230ELH



ACR330ELH

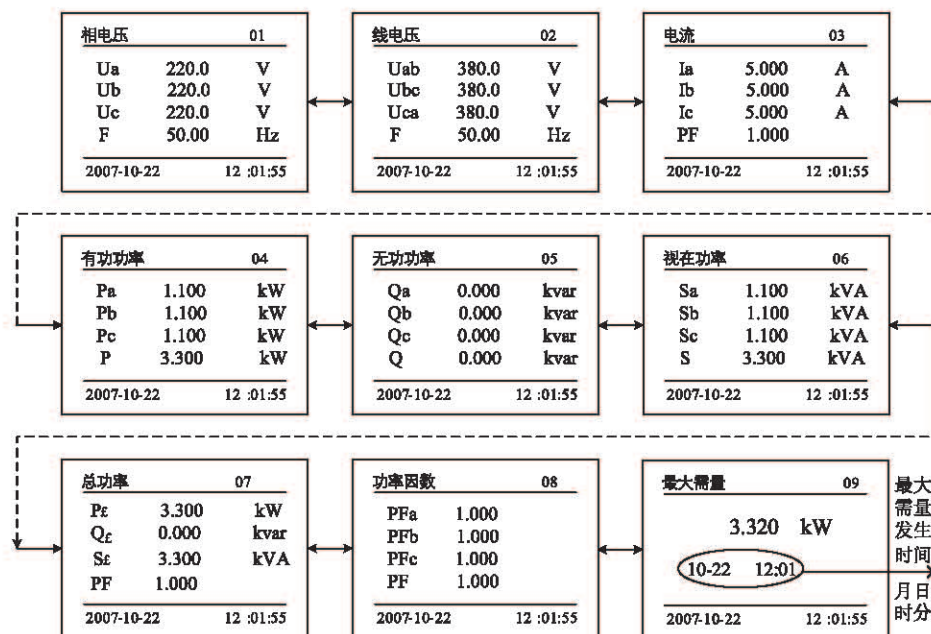
7.2.2 电力参数 Power parameter:

A 对三相四线系统, 仪表上电 (或选中电力参数后按回车键) 显示如下图所示01界面 (相电压), 按上、下键可切换显示其它界面: 相电压←线电压←电流←有功功率←无功功率←视在功率←总功率←功率因数←最大需量 (仅在ACR230ELH中有此参数)。

注: 只有在功率的情况下才会有最大需量

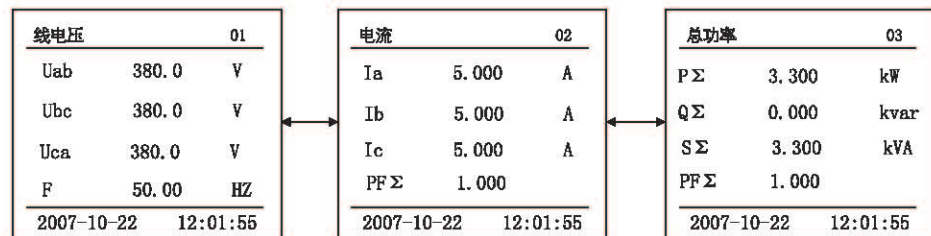
A For three-phase four-wire system, meter is power on (or select Power parameter and press Enter key), displaying below diagram 01 interface (Phase voltage), pressing the Up/Down button to switch, to display other interface: Phase voltage←Line voltage←current←Active power←Reactive power←Apparent Energy←Total power←power factor←maximum demand (This parameter Only in ACR230ELH)

Note: Only in active condition, the maximum demand may occur.



B 对三相三线系统, 仪表上电 (或选中电力参数后按回车键) 显示如下图所示01界面 (线电压), 按上、下键可切换显示其它界面: 线电压 $\leftrightarrow$ 电流 $\leftrightarrow$ 总功率。

B For three-phase three-wire system, meter is power on (or select Power parameter and press Enter key), displaying below diagram 01 interface (Line voltage), pressing the Up/Down button to switch, to display other interface: Line voltage $\leftrightarrow$ current $\leftrightarrow$ Total power.



7.2.3 谐波参数 Harmonic parameter

仪表在选中谐波参数后按回车键进入谐波参数界面, 此时谐波数据处于反白状态, 按回车键查看电压电流谐波数据。

After selecting harmonic parameter to press Enter key entering harmonic parameter interface, when harmonic data is in whitening status, press Enter key to look over voltage current harmonic data.

谐波数据处于反白状态时, 按回车键进入谐波数据界面, 该界面显示2-7次电压谐波, 按上键或下键可切换显示其他次数电压和电流谐波数据和总谐波THD, 最高可测量到31次谐波。

When harmonic data is in whitening status, to press Enter key entering harmonic data interface, this interface display 2-7 order voltage harmonic, press the Up/Down button can switch to display other order voltage and current harmonic data and total harmonic THD, the maximum measuring order is the 31 order harmonic.

注: 谐波数据【(分次谐波幅值/基波幅值) × 100%为百分比含量】

Note: the harmonic data "(Sub-harmonic amplitude / Amplitude of the Fundamental Wave) × 100% = percentage content".

谐波参数

谐波数据
谐波棒图
谐波波形

谐波数据处于反白状态时, 按上键或下键选择谐波棒图, 然后按回车键进入谐波棒图界面, 该界面显示A相电压和电流的谐波棒图, 按上键或下键可切换显示B、C两相的谐波棒图。

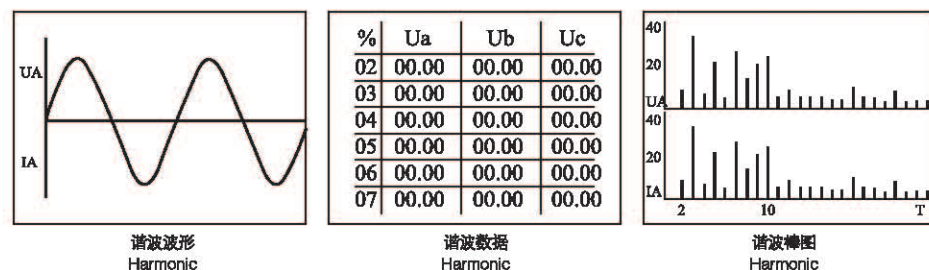
When harmonic data is in whitening status, press the Up/Down button to select harmonic bar graph, then to press Enter key entering harmonic bar graph interface, this interface display harmonic bar graph of A Phase voltage and current, press the Up/Down button can switch display harmonic bar graph of B, C two Phase.

注: 棒图显示最高显示到21次。

Note: The highest bar graph display is up to 21 order.

谐波数据处于反白状态时，按上键或下键选择谐波波形，然后按回车键进入谐波波形界面，该界面显示A相电压和电流的波形，按上键或下键可切换显示B相电压和电流的波形、C相电压和电流的波形、三相电压波形和三相电流波形。

注：该项目可用来检查接线是否正确以及当前电网中的电压电流的实际情况。



7.2.4 电网质量 Power quality

注1：ACR330ELH仪表在主菜单中选电网质量后按回车键进入电网质量界面，此时波峰系数处于选中状态，可按上下键选择要查看的内容，接着按回车键即可查看相应的电网质量参数。ACR230ELH仪表在选中电网质量后按回车键进入波峰系数界面，按上下键即可查看其它的电网质量参数。(如下图)

When harmonic data is in whitening status, press the Up/Down button to select harmonic wave form, then to press Enter key entering harmonic wave form interface, this interface display wave form of A Phase voltage and current, press the Up/Down button can switch to display wave form of B Phase voltage and current, display wave form of C Phase voltage and current, three Phase voltage wave form and three Phase current wave form.

Note: Using this item can check: incorrect connection and actual electric network voltage/current status.

Note 1: After selecting electric network quality in ACR230ELH main menu, press Enter key entering Wave peak coefficient interface, Press up and down keys to look over other Electric network quality parameter. (as below diagram).

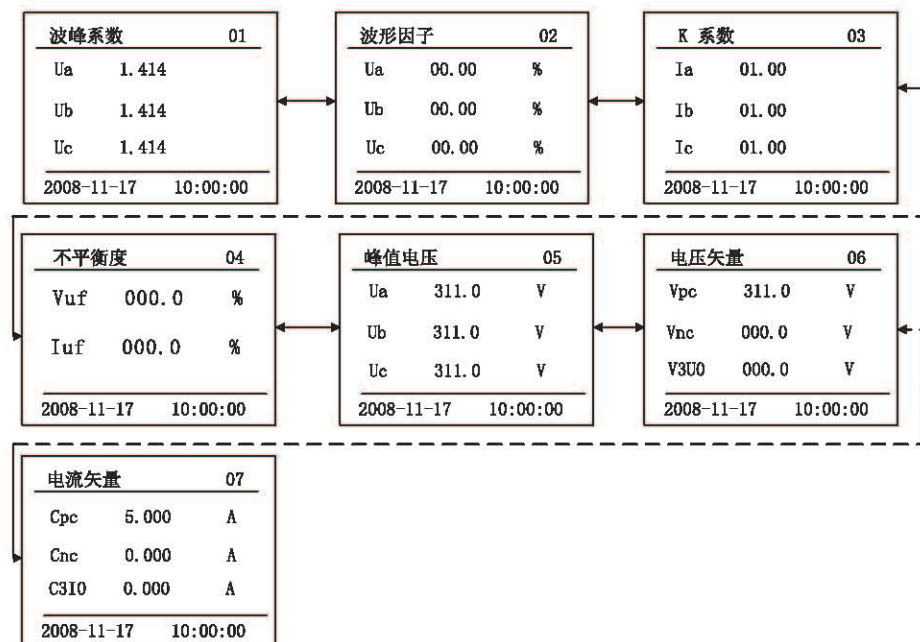
电网质量	
波峰系数	峰值电压
电压波形因子	电压矢量
电流K系数	电流矢量
不平衡度	

注2：

Vpc—正序电压
Vnc—负序电压
V3u0—零序电压
Cpc—正序电流
Cnc—负序电流
C3I0—零序电流

Note 2:

Vpc—Positive sequence voltage
Vnc—negative sequence voltage
V3u0—zero sequence voltage
Cpc—positive sequence current
Cnc—negative sequence current
C3I0—zero sequence current



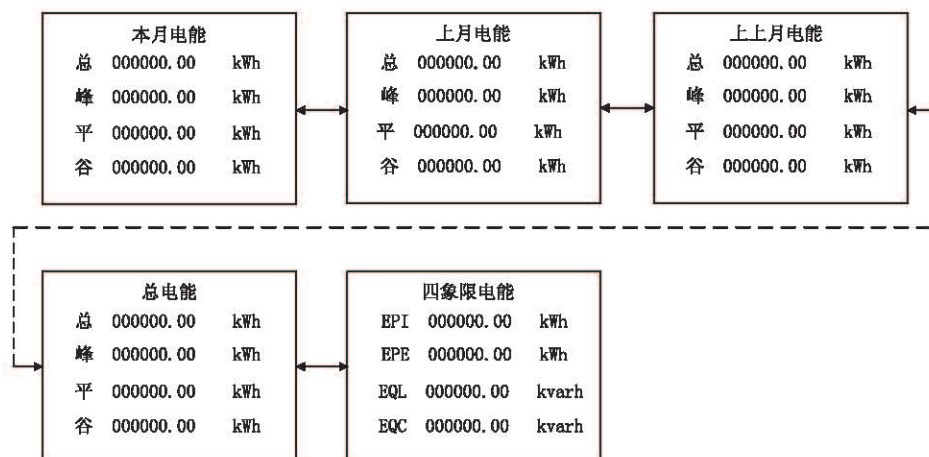
7.2.5 费率电度 KWH-rate

仪表在选中费率电度后按回车键显示本月复费率电能，此时按上键或下键切换显示上月、上上月、总的复费率电能以及四象限电能。注：该系列仪表电能显示为二次侧电能，四象限电能分别指吸收有功电能、释放有功电能、感性无功电能、容性无功电能。

注：此处电度均为二次侧值。

Note: The electric energy display in this meter is the secondary side electric energy, the four-quadrant electric energy refer to capture active electric energy, release active electric energy, inductive reactive electric energy, capacitive reactive electric energy respectively.

Note: These KWH value are secondary side electric energy value.



7.2.6 SOE事件记录 Event record

仪表在选中事件记录后按回车键显示开关量输入输出的动作信息。如下图（ACR330ELH）所示第1条记录表示08年11月1日11:01:45时第1路开关量输入分；第2条记录表示08年11月1日10:31:40时第1路开关量输入合；第3条记录表示08年11月1日10:01:45时第3路继电器报警（失压报警 失压故障时电压为25.3V）；按上下键可查看其它记录，共保存16条记录。

After selecting Event record, press Enter key to display operation information of Switching input/output. As below diagram (ACR330ELH) shown, the first record in right figure show: At 01/11/2008,11:01:45, the First channel Switching input is OFF; the second record in right figure show: At 01/11/2008, 10:31:40, the First channel Switching input is ON; The third record in right figure show: At 01/11/2008,10:01:45, the Third channel relay is alarming (No voltage alarm, for no voltage fault, the voltage is 25.3 V); if pressing Up/Down button can look over other record, total of 16 records can be saved.

ACR230ELH与之类似，“ON”和“OFF”相应表示开关量开和关。

ACR230ELH is similar, "ON" and "OFF" is for switching ON and OFF respectively.

01	DI1	2008-11-01
	ON	11:01:45
02	DI2	2008-11-01
	ON	10:31:40
03	DI1	2008-11-01
	OFF	10:01:45

ACR230ELH

01	2008-11-01	DI1	
DI	11:01:45	分	
02	2008-11-01	DI1	
DI	10:31:40	合	
03	2008-11-01	DO3	U
DO	10:01:45	025.3V	

ACR330ELH

7.2.7 故障录波（根据客户需要另做说明）

Fault oscillogram (Description on request of user)

7.2.8 开关状态 Switch status

仪表在选中开关状态后按回车键显示开关量状态显示界面。开关状态显示当前相关的开关量输入与继电器输出实时状态，其中开关量输入供电采用表内+5V电源，开关量输出为一对无源继电器触点。当有开关量输入或输出时，相应的指示位由分变为合。

After selecting switch status, press Enter key to display Switching status indicate interface. Switch status indicate related Switching input and relay output status, in it, switching input power supply adopt +5V power, Switching output is a pair of passive relay contact. If Switching input or Output occur, corresponding indication bit from OFF changing to ON.

开关状态	
DI1=分	DO1=分
DI2=分	DO2=分
DI3=分	
DI4=分	

ACR230ELH

DO1	DO2	DO3	
分	分	分	
DI1	DI2	DI3	DI4
分	分	分	分

ACR330ELH

7.2.9 用户设置 User setting

进入主菜单后，按上键或下键选择用户设置项，按回车键出现密码输入项，此时按上键或下键可使光标在个、十、百、千位上移动，当该位处于反白状态时，可按左右键对该位数字增减，密码（默认为0001）输入正确后按回车键进入用户设置界面。

After entering main menu, press the Up/Down button to select user set up item, press Enter key appear password input item, here press the Up/Down button to move cursor onto ones place, tens place, hundreds place, thousands place, when this bit is in whitening status, press the Left/Right button to increase / decrease digital, after input correct password (default as 0001) press Enter key, to enter user set up interface.



ACR330ELH (带变送)
ACR230ELH (with transmitting)

a) 系统设置 System set up:

进入用户设置界面后，按上下键选择系统设置，然后按回车键进入系统设置界面。在系统设置界面下按上下键需要改变的项，使之处于反白状态，按左右键选择接线方式（三相四线、三相三线、单相）、电压等级（380V、100V）、电流等级（5A、1A）或更改电压变比和电流变比。

After entering user set up interface, press the Up/Down button select system set up, then press Enter key to enter system set up interface. Under system set up interface, press the Up/Down button to select item to be changed, to enable it in whitening status. Under whitening status, press the Left/Right button to select connection mode (3-phase 4-wire, 3-phase 3-wire, Single phase), voltage grade (380V, 100V), current grade (5A, 1A) or revise voltage transformation ratio and current transformation ratio.

系统设置	接线方式	三相四线
	电压等级	380V
	电流等级	5A
	电压变比	0001
	电流变比	0001

b) 通讯设置 Communication set up:

进入用户设置界面后，按上下键选择通讯设置，按回车键进入通讯设置界面。在通讯设置界面下按上下键需要改变的项，使之处于反白状态，按左右键改变通讯地址（1~247）或选择通讯波特率【4800bps（ACR330ELH不可选）、9600bps、19200bps、38400bps】。

After entering user set up interface, press the Up/Down button to select communication set up, then press Enter key to enter communication set up interface. Under communication set up interface, press the Up/Down button to select item to be changed, to enable it in whitening status. Under whitening status, press the Left/Right button to change Communication Address (1~247) or to select Communication baud rate 【4800bps (ACR330ELH No-selecting), 9600bps, 19200bps, 38400bps】.

通讯设置	通讯地址	001
	波特率	9600

c) 费率设置 Rate set up:

进入用户设置界面后, 按上下键选择费率设置, 并按回车键进入费率设置界面。在费率设置界面下, 按上下键选择欲设置项, 按左右键修改设置项值。仪表可设置8个时段、三种费率, 如下表所示:

注: 设置费率时间时后面的时间一定要比前面的大, 否则会出错

After entering user set up interface, press the Up/Down button to select rate set up, then press Enter key to enter rate set up interface. After entering rate set up interface, press the Up/Down button to select item to be set, press the Left/Right button to revise item setting value. This meter can set up 8 time periods, 3 rates, shown as below table:

Note: Manual setting rate-time period must guarantee that the setting time for next time period shall be greater than the setting time for last time period, if not, error may occur.

序号 No.	时间 Time	描述 Description
1	00:00	在00:00~06:00时间段中, 费率为平 Within 00:00~06:00 period of time, rate as Flat
2	06:00	在06:00~08:00时间段中, 费率为平 Within 06:00~08:00 period of time, rate as Flat
3	08:00	在08:00~10:00时间段中, 费率为平 Within 08:00~10:00 period of time, rate as Flat
4	10:00	在10:00~12:00时间段中, 费率为峰 Within 10:00~12:00 period of time, rate as Peak
5	12:00	在12:00~14:00时间段中, 费率为峰 Within 12:00~14:00 period of time, rate as Peak
6	14:00	在14:00~16:00时间段中, 费率为平 Within 14:00~16:00 period of time, rate as Flat
7	16:00	在16:00~22:00时间段中, 费率为平 Within 16:00~22:00 period of time, rate as Flat
8	22:00	在22:00~00:00时间段中, 费率为平 Within 22:00~00:00 period of time, rate as Flat

费率设置

1 平	00:00	6 平	14:00
2 平	06:00	7 平	16:00
3 平	08:00	8 平	22:00
4 峰	10:00		
5 峰	12:00		

d) 开关设置: (默认为电平方式)

Switch set up: (Default as level mode)

进入用户设置界面后, 按上下键选择开关设置, 并按回车键进入开关设置界面。按上下键选择预设置项目 (DO1/DO2), 按左右键修改触发方式 (电平/脉冲/报警DO1), 在脉冲方式下, 还可设置脉冲触发延时时间。

After entering user set up interface, press the Up/Down button to select switch set up, then press Enter key to enter switch set up interface. Press the Up/Down button to select pre-set item (DO1/DO2), press the Left/Right button to revise trigger mode (electrical level/pulse/AlarmDO1), under pulse mode, to set pulse triggering delay is possible.

开关	DO1=	0000ms
设置	DO2=	0000ms

e) 报警设置: (出厂默认报警关闭)

Alarm set up: (Delivering default alarm closed)

进入用户设置界面后, 按上下键选择报警设置 (ACR330ELH为第三路继电器输出, ACR230ELH为第一路继电器输出), 然后按回车键进入报警设置界面。按上下键选择欲设置项目, 按左右键修改设置项目值。报警设置可设置过压、欠压、过流、电压电流不平衡报警。例: 如要设置电压超过264V、小于100V、电流大于5A报警, 则将数值分别设为264.0、100.0、5.000。若以上值设为0时默认该项报警关闭。

After entering user set up interface, press the Up/Down button to select alarm setting (ACR330ELH third channel relay Output, ACR230ELH first channel relay Output), then press Enter key to enter alarm setting interface. Press the Up/Down button to select item to be set, press the Left/Right button to revise setting item value. Alarm setting can set over voltage alarm, under voltage alarm, over current alarm, voltage/current unbalance alarm. For example: If a specified alarm for voltage exceed 264V, <100V, current >5A is needed, the related setting shall be 264.0, 100.0, 5.000. Setting=0, default this alarm OFF.

注: ACR230ELH如需设置报警, 则在开关设置的触发方式设置中选择为报警。

Note: For ACR230ELH, if alarm setting is needed, then in the triggering mode set optional, the Alarm is selected.

报警	DO3 U	<	000.0
设置	DO3 U	>	000.0
	DO3 I	>	0.000
	DO3 VUF	>	000.0
	DO3 IUF	>	000.0

f) 时间设置 Time setting:

进入用户设置界面后,按上下键选择时间设置,然后按回车键进入时间设置界面。进入时间设置界面后,按上下键选择欲设置项目,按左右键修改设置项目值。

注:不合法时间不可保存(例如:不合法时间2008年1月5日25点05分则无法输入)

时间 设置	2000 - 01 - 05
	18: 05: 22
	背光常亮 关

After entering user set up interface, press the Up/Down button to select Time set up, then press Enter key to enter Time set up interface. After entering Time set up interface, press the Up/Down button to select item to be set, press the Left/Right button to revise setting item value.

Note: The illegal time can not be saved (For example: Illegal time 05/01/2008 25:05 can not be input)

g) 变送设置 Transmitting set up (ACR330ELH):

两路模拟量输出选择,模拟变送输出可选择将电网中常见的26个

电量(UA、UB、UC、UAB、UBC、UCA、IA、IB、IC、PA、PB、PC、P总、

QA、QB、QC、Q总、SA、SB、SC、S总、PFA、PFB、PFC、PF、F)隔离变送输出为4~20mA的直流信号。Max1或Max2对应二次额定值,取最高四位整数(小数点忽略)不足补0。

例:第一路变送M1对应Ia,第二路变送M2对应Ic,Max1及Max2表示对应20mA的Ia、Ic的值(二次)。

Two channel analog output selection, analog transmitting output selection include 26 electric parameters in power network (UA, U, UC, UAB, UBC, UCA, IA, IB, IC, PA, PB, PC, P Total, QA, QB, QC, Q Total, SA, SB, SC, S Total, PFA, PFB, PFC, PF, F) 4~20mA DC signal adopt isolated transmitting output. 1. Max1 or Max corresponding to secondary side rating, take integer up to 4-bit (without decimal point) zero fill to 4-bit.

Example: The first channel transmitting M1 corresponding to Ia, the second channel transmitting M2 corresponding to Ic, Max1 and Max2 corresponding to 20mA Ia, Ic value (secondary side)

变送 设置	Max1 =	5000
	Max2 =	5000
	M1 =	Ia
	M2 =	Ic

h) 参数清除/其他设置 Parameter clearing/other setting:

进入用户设置界面后,按上下键选择参数清除(ACR330ELH)/其它设置(ACR230ELH),然后按回车键进入参数清除界面。按上下键选择欲设置项目,按左右键清除设置项目值。电度清零界面包括抄表日设置,清除电度和事件清除。

注:如需清除电度则选择“是”,再按回车键后,电能将被清零并且不可恢复,同时最大需量(仅在ACR230ELH中有此参数)的数据也被清零。

After entering user set up interface, press the Up/Down button to select Parameter clearing (ACR330ELH)/other setting (ACR230ELH), then press Enter key to enter Parameter clearing interface. After entering Time set up interface, press the Up/Down button to select item to be set, press the Left/Right button to clear setting item value. KWH-value zero clearing interface include to set Meter reading day, to clear KWH-value and event.

Note: When clearing KWH-value, after select "Yes" and press Enter key, Electric energy will be zero clearing and can not be restored. While the maximum demand data (only in ACR230ELH) will be zero clearing.

其它设置	
清除电度	否
清除事件	否
背光常亮	否

ACR230ELH

参数 清除	抄表日	25
	清除电度	否
	事件清除	否

ACR330ELH

i) 版本信息: 开机显示版本信息、用户也可在该界面下查看仪表相关版本信息。

i) Version information: When operating, the version information is displaying, under this interface, user can look over the related version information.

j) 设置保存: 在用户设置好相关的参数后,按回车键出现数据保存的界面,如需要保存按左键选择“是”然后回车;如不需要保存选择“否”然后回车,可退出设置界面。

数据保存	
是	否

j) Save setting: After setting related parameters, user press Enter key, save data? interface appear, if needed, press left key to select "Yes" and press Enter key; if not needed, to select "No" and press Enter key to exit interface setting.

8 通讯说明 Communication description

8.1 概述 General

ACR系列谐波仪表通讯采用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。

Communication of ACR Harmonic meters adopt MODBUS-RTU Communication protocol, MODBUS protocol define check code, data sequence etc. in detail, these are necessary content for specific data exchange.

8.2 通讯地址表 Communication Address Table

地址 Address	名称 Name	类型 Type	备注 Note	字 Byte
0	仪表地址 Meter address	R/W	仪表在网络节点中的地址(001--127) Network node meter Address(001--127)	1
1	通讯速率 Communication speed	R/W ACR230ELH ACR330ELH	ACR230ELH	1
			0--2400bps; 1--4800bps; 2--9600bps; 3--19200bps; 4--38400bps.	
		R/W ACR220ELH ACR320ELH	0--9600bps; 1--19200bps; 2--38400bps.	
2	通讯校验方式 Communication check mode	R/W	0--无校验位(默认的方式); 0--No parity bit (Default mode); 1--奇校验位; 1--Odd parity bit; 2--偶校验位; 2--Even parity bit.	1
			0--单相; 0--Single phase; 1--3相3线; 1--3-phase 3-wire; 2--3相4线; 2--3-phase 4-wire.	
3	接线方式 Wiring mode	R/W ACR230ELH ACR330ELH	0--3相3线; 0--3-phase 3-wire; 1--3相4线; 1--3-phase 4-wire.	1
		R/W ACR220ELH ACR320ELH	0--3相3线; 0--3-phase 3-wire; 1--3相4线; 1--3-phase 4-wire.	

4	电压等级 Voltage grade	R/W ACR230ELH ACR330ELH	0--100V; 1--380V.	1
		R/W ACR220ELH ACR320ELH	0--100V; 1--400V.	
5	电流等级 Current grade	R/W	0--1A、1--5A.	1
6	电压变比 Voltage transformation ratio	R/W	电压变比(0001--9999). Voltage transformation ratio(0001--9999).	1
7	电流变比 Current transformation ratio	R/W	电流变比(0001--9999). Current transformation ratio(0001--9999).	1
8	背光延时时间 Backlight delay time	R/W 仅 Only ACR320ELH ACR220ELH	设置为0时，背光常亮; Setting as 0, backlight lights; 设置为1--255时，背光在1--255秒后熄灭。 Setting as 1--255, after 1--255 seconds backlight go out.	1
9	开关量延时时间 Switching delay time	R/W 仅 Only ACR320ELH ACR220ELH	设置为0时，继电器1为电平控制方式; Setting as 0, relay 1 adopt level control mode; 设置为1--255时，继电器1为脉冲控制方式，单位0.01秒。 Setting as 1--255, relay 1 adopt pulse control mode, Unit: 0.01 second.	1
10	开关量延时时间 Switching delay time	R/W 仅 Only ACR320ELH ACR220ELH	设置为0时，继电器2为电平控制方式; Setting as 0, relay 2 adopt level control mode; 设置为1--255时，继电器2为脉冲控制方式，单位0.01秒。 Setting as 1--255, relay 2 adopt pulse control mode, Unit: 0.01 second.	1
11	开关量延时时间 Switching delay time	R/W 仅 Only ACR320ELH	设置为0时，继电器3为电平控制方式; Setting as 0, relay 3 adopt level control mode; 设置为1--255时，继电器3为脉冲控制方式，单位：0.01秒 Setting as 1--255, relay 3 adopt pulse control mode, Unit: 0.01 second	1

21-23	复费率时段1 Multi-rate time period1	R/W	复费率信息分为8个时段、三种费率； 每个时段占三个字：第一个字为时、 第二个字为分、第三个字为费率种类； 三种费率分别为：1—峰、2—平、 3—谷。 Information about multi-rate: 8 time period, 3 rates; Each period of time occupies 3 bytes: The first byte is for hour, the second byte is for minute, the third byte is for rate: 1—Peak, 2—Flat, 3—valley;	3
24-26	复费率时段2 Multi-rate time period2	R/W		3
27-29	复费率时段3 Multi-rate time period3	R/W		3
30-32	复费率时段4 Multi-rate time period4	R/W		3
33-35	复费率时段5 Multi-rate time period5	R/W		3
36-38	复费率时段6 Multi-rate time period6	R/W		3
39-41	复费率时段7 Multi-rate time period7	R/W		3
42-44	复费率时段8 Multi-rate time period8	R/W		3
53	第一路开关量输入 First channel Switching input	RO	有开入时为1，无开入时为0。 Switching as 1, non-switching as 0.	1
54	第二路开关量输入 Second channel Switching input	RO	有开入时为1，无开入时为0。 Switching as 1, non-switching as 0.	1
55	第三路开关量输入 Third channel Switching input	RO	有开入时为1，无开入时为0。 Switching as 1, non-switching as 0.	1
56	第四路开关量输入 Fourth channel Switching input	RO	有开入时为1，无开入时为0。 Switching as 1, non-switching as 0.	1
61	第一路开关量输出 First channel Switching Output	R/W	写1时输出继电器触点闭合， Writing 1, Output relay contact is closed, 写0时输出继电器触点分开。 Writing 0, Output relay contact is opening	1
62	第二路开关量输出 Second channel Switching Output	R/W	写1时输出继电器触点闭合， Writing 1, Output relay contact is closed, 写0时输出继电器触点分开。 Writing 0, Output relay contact is opening	1
63	第三路开关量输出 Third channel Switching Output	R/W ACR330ELH	报警量输出 Alarming output	1
		R/W ACR320ELH	写1时输出继电器触点闭合， Writing 1, Output relay contact is closed, 写0时输出继电器触点分开。 Writing 0, Output relay contact is opening	
69	第一路开关量触发方式 First channel Switching triggering mode	R/W 仅 Only ACR230ELH ACR330ELH	写1时为脉冲触发方式， Writing 1, adopt pulse triggering mode, 写0时为电平触发方式。 Writing 0, adopt level triggering mode.	1
70	第一路开关量脉冲延时时间 First channel Switching pulse delay time	R/W 仅 Only ACR230ELH ACR330ELH	延时0~9999mS时间。 Delay time: 0~9999mS.	1

77	第二路开关量触发方式 Second channel Switching triggering mode	R/W 仅 Only ACR230ELH ACR330ELH	写1时为脉冲触发方式， Writing 1, adopt pulse triggering mode, 写0时为电平触发方式。 Writing 0, adopt level triggering mode.	1
78	第二路开关量脉冲延时时间 Second channel Switching pulse delay time	R/W 仅 Only ACR230ELH ACR330ELH	延时0~9999mS时间。 Delay time: 0~9999mS.	1
85	第三路开关量报警参数 Third channel Switching alarm parameter	R/W 仅 Only ACR330ELH	报警电参量选择。 Alarm electric parameter selection	1
86	第三路开关量报警条件 (大于或小于)选择 Third channel Switching alarm condition selection (above or below)	R/W 仅 Only ACR330ELH	写1时为小于报警下限， Writing 1, below alarm lower limit, 写0时为大于报警上限。 Writing 0, above alarm upper limit.	1
87	第三路开关量报警值 Third channel Switching alarm value	R/W 仅 Only ACR330ELH	报警上下限值 Alarm upper/lower value	1
128	年 Year	R/W	时间；//BCD码格式。 Time; //BCD code format	1
129	月 Month	R/W	时间；//BCD码格式。 Time; //BCD code format	1
130	日 Day	R/W	时间；//BCD码格式。 Time; //BCD code format	1
131	时 Hour	R/W	时间；//BCD码格式。 Time; //BCD code format	1
132	分 Minute	R/W	时间；//BCD码格式。 Time; //BCD code format	1
133	秒 Second	R/W	时间；//BCD码格式。 Time; //BCD code format	1
143-148	事件记录1 Event record 1	RO	SOE事件记录。 SOE EVENT RECORD.	6
149-154	事件记录2 Event record 2	RO	SOE事件记录。 SOE EVENT RECORD.	6
155-160	事件记录3 Event record 3	RO	SOE事件记录。 SOE EVENT RECORD.	6
161-166	事件记录4 Event record 4	RO	SOE事件记录。 SOE EVENT RECORD.	6
167-172	事件记录5 Event record 5	RO	SOE事件记录。 SOE EVENT RECORD.	6
173-178	事件记录6 Event record 6	RO	SOE事件记录。 SOE EVENT RECORD.	6
179-184	事件记录7 Event record 7	RO	SOE事件记录。 SOE EVENT RECORD.	6
185-190	事件记录8 Event record 8	RO	SOE事件记录。 SOE EVENT RECORD.	6

191-196	事件记录9 Event record 9	RO	SOE事件记录. SOE EVENT RECORD.	6
197-202	事件记录10 Event record 10	RO	SOE事件记录. SOE EVENT RECORD.	6
203-208	事件记录11 Event record 11	RO	SOE事件记录. SOE EVENT RECORD.	6
209-214	事件记录12 Event record 12	RO	SOE事件记录. SOE EVENT RECORD.	6
215-220	事件记录13 Event record 13	RO	SOE事件记录. SOE EVENT RECORD.	6
221-226	事件记录14 Event record 14	RO	SOE事件记录. SOE EVENT RECORD.	6
227-232	事件记录15 Event record 15	RO	SOE事件记录. SOE EVENT RECORD.	6
233-238	事件记录16 Event record 16	RO	SOE事件记录. SOE EVENT RECORD.	6
243	相电压Uan Phase Voltage Uan	RO	二次侧 电压小数点位数: 1 Secondary side Voltage decimal point digital: 1	1
244	相电压Ubn Phase Voltage Ubn	RO	二次侧 Secondary side	1
245	相电压Ucn Phase Voltage Ucn	RO	二次侧 Secondary side	1
246	线电压Uab Line Voltage Uab	RO	二次侧 Secondary side	1
247	线电压Ubc Line Voltage Ubc	RO	二次侧 Secondary side	1
248	线电压Uca Line Voltage Uca	RO	二次侧 Secondary side	1
249	相电流Ia Phase Current Ia	RO	二次侧 电流小数点位数: 3 Secondary side Current decimal point digital: 3	1
250	相电流Ib Phase Current Ib	RO	二次侧 Secondary side	1
251	相电流Ic Phase Current Ic	RO	二次侧 Secondary side	1
252	频率 F Frequency F	RO	频率小数点位数: 2 Frequency decimal point digital: 2	1
253-254	A相有功功率Pa Phase A Active power Pa	RO	二次侧 有功功率 小数点位数: 2 Secondary side Active power decimal point digital: 2	2
255-256	B相有功功率Pb Phase B Active power Pb	RO	二次侧 Secondary side	2

257-258	C相有功功率Pc Phase C Active power Pc	RO	二次侧 Secondary side	2
259-260	总有功功率P总 Total Active power PTotal	RO	二次侧 Secondary side	2
261-262	A相无功功率Qa Phase A Reactive power Qa	RO	二次侧 无功功率 小数点位数: 2 Secondary side Reactive power decimal point digital: 2	2
263-264	B相无功功率Qb Phase B Reactive power Qb	RO	二次侧 Secondary side	2
265-266	C相无功功率Qc Phase C Reactive power Qc	RO	二次侧 Secondary side	2
267-268	总无功功率Q总 Total Reactive power QTotal	RO	二次侧 Secondary side	2
269-270	A相视在功率Sa Phase A Apparent power. Sa	RO	二次侧 视在功率 小数点位数: 2 Secondary side Apparent power. decimal point digital: 2	2
271-272	B相视在功率Sb Phase B Apparent power Sb	RO	二次侧 Secondary side	2
273-274	C相视在功率Sc Phase C Apparent power Sc	RO	二次侧 Secondary side	2
275-276	总视在功率S总 Total Apparent power S Total	RO	二次侧 Secondary side	2
277	A相功率因数 Phase A power factor	RO	功率因数 小数点位数: 3 Power factor. decimal point digital: 3	1
278	B相功率因数 Phase B power factor	RO		1
279	C相功率因数 Phase C power factor	RO		1
280	总功率因数 Total power factor	RO		1
281	A相波峰系数 Phase A crest factor	RO	电压波峰系数: 小数点位数: 3 Crest factor, decimal point digital: 3	1
282	B相波峰系数 Phase B crest factor	RO		1
283	C相波峰系数 Phase C crest factor	RO		1
284	A相电话波形因子 Phase A THFF	RO	电话波形因子小数点位数: 2 THFF decimal point digital: 2	1

285	B相电话波形因子 Phase B THFF	RO		1
286	C相电话波形因子 Phase C THFF	RO		1
287	A相电流K系数 Phase A Current K factor	RO	K系数小数 点位数: 2 K factor decimal point digital: 2	1
288	B相电流K系数 Phase B Current K factor	RO		1
289	C相电流K系数 Phase C Current K factor	RO		1
299	电压不平衡度 Unbalance factor of voltage	RO	电压不平衡度 小数点位数: 1 Unbalance factor of voltage decimal point digital: 1	1
300	电流不平衡度 Unbalance factor of current	RO	电流不平衡度 小数点位数: 1 Unbalance factor of current decimal point digital: 1	1
301-302	最大需量 Maximum demand	RO	最大需量 小数点位数: 2 Maximum demand decimal point digital: 2	2
303-306	最大需量发生时间 Maximum demand occurrence time	RO	时间; // BCD码格式 (月,日,时,分) Time; // BCD code format (month,day,hour,minute)	4
333-334	本月有功峰电能 This month active Peak Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
335-336	本月有功平电能 This month active Flat Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
337-338	本月有功谷电能 This month active valley Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2

339-340	本月有功总电能 This month active Total Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
341-342	上月有功峰电能 Last month active Peak Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
343-344	上月有功平电能 Last month active Flat Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
345-346	上月有功谷电能 Last month active valley Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
347-348	上月有功总电能 Last month active Total Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
349-350	上上月有功峰电能 Month before last active Peak Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
351-352	上上月有功平电能 Month before last active Flat Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
353-354	上上月有功谷电能 Month before last active valley Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
355-356	上上月有功总电能 Month before last active Total Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
357-358	总有功峰电能 Total active Peak Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
359-360	总有功平电能 Total active Flat Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
361-362	总有功谷电能 Total active valley Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2

363-364	总复费率有功电能 Total multi-rate active Electric energy	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
365-366	正向有功电能 EPI Forward active Electric energy EPI	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
367-368	反向有功电能 EPE Backward active Electric energy EPE	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
369-370	正向无功电能 EQL Forward reactive Electric energy EQL	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
371-372	反向无功电能 EQC Backward reactive Electric energy EQC	RO	二次侧电能, 2位小数点 Secondary side Electric energy, 2-bit decimal point	2
373-402	A相电压2-31次谐波含有率 APhase Voltage 2-31 order harmonic ratio	RO	A相电压2-31次谐波; 小数点位数: 2 APhase Voltage 2-31 order harmonic; decimal point digital: 2	30
403-432	B相电压2-31次谐波含有率 BPhase Voltage 2-31 order harmonic ratio	RO	B相电压2-31次谐波 BPhase Voltage 2-31 order harmonic	30
433-462	C相电压2-31次谐波含有率 CPhase Voltage 2-31 order harmonic ratio	RO	C相电压2-31次谐波 CPhase Voltage 2-31 order harmonic	30
463-492	A相电流2-31次谐波含有率 APhase Current 2-31 order harmonic ratio	RO	A相电流2-31次谐波 APhase Current 2-31 order harmonic	30
493-522	B相电流2-31次谐波含有率 BPhase Current 2-31 order harmonic ratio	RO	B相电压2-31次谐波 BPhase Voltage 2-31 order harmonic	30
523-552	C相电流2-31次谐波含有率 CPhase Voltage 2-31 order harmonic ratio	RO	C相电流2-31次谐波 C Phase Voltage 2-31 order harmonic; decimal point digital: 2	30
553	A相电压总谐波畸变率 A Phase Voltage Total harmonic distortion	RO	A相电压总谐波含量; 小数点位数: 2 A Phase Voltage Total harmonic content; decimal point digital: 2	1

554	B相电压总谐波畸变率 B Phase Voltage Total harmonic distortion	RO	B相电压总谐波含量; 小数点位数: 2 B Phase Voltage Total harmonic content; decimal point digital: 2	1
555	C相电压总谐波畸变率 C Phase Voltage Total harmonic distortion	RO	C相电压总谐波含量; 小数点位数: 2 C Phase Voltage Total harmonic content; decimal point digital: 2	1
556	A相电流总谐波畸变率 A Phase Current Total harmonic distortion	RO	A相电流总谐波含量; 小数点位数: 2 A Phase Current Total harmonic content; decimal point digital: 2	1
557	B相电流总谐波畸变率 B Phase Current Total harmonic distortion	RO	B相电流总谐波含量; 小数点位数: 2 B Phase Current Total harmonic content; decimal point digital: 2	1
558	C相电流总谐波畸变率 C Phase Current Total harmonic distortion	RO	C相电流总谐波含量; 小数点位数: 2 C Phase Current Total harmonic content; decimal point digital: 2	1
559-590	A相电压采样点(32点/波) APhase Voltage sampling point (32 point/wave)	RO	A相电压采样点 APhase Voltage sampling point	32
591-622	B相电压采样点(32点/波) BPhase Voltage sampling point (32 point/wave)	RO	B相电压采样点 BPhase Voltage sampling point	32
623-654	C相电压采样点(32点/波) CPhase Voltage sampling point (32 point/wave)	RO	C相电压采样点 CPhase Voltage sampling point	32
655-686	A相电流采样点(32点/波) APhase Current sampling point (32 point/ wave)	RO	A相电流采样点 APhase Current sampling point	32
687-718	B相电流采样点(32点/波) BPhase Current sampling point (32 point/ wave)	RO	B相电流采样点 BPhase Current sampling point	32
719-750	C相电流采样点(32点/波) CPhase Current sampling point (32 point/ wave)	RO	C相电流采样点 C Phase Current sampling point	32

注:

1、读写属性: "RO" 只读, 读参量用 0X03H 命令; "R/W" 可读可写, 写系统参量用 0X10H 号命令, 禁止向未列出的或不具可写属性的地址写数据。

2、仪表数据采用定点数表示, 小数点位数见地址表; 电压电流谐波数据为百分量表示。

Note:

1, Read/Write attribute: "RO" Read only, this parameter use 03H command; "R/W" Read/Write, system parameter use 10H command, Read in address, which is not listed or without Read/Write attribute, is forbidden.

2, Meter data adopt Fixed-point number, decimal point digital see Address table; voltage/current harmonic data adopt percentage.

8.3 通讯值与实际值对应关系 (约定Val_t为通讯读出值, Val_s为实际值)

8.3.1、电压、电流、功率因数、频率

Voltage, current, power factor, frequency

该系列测量值用Modbus-RTU 通讯规约的03命令读出, 每一个项目占用1个word。通讯值与实际二次侧测量值之间的对应关系如下表:

适用参量 Applied parameter	对应关系 Relation	单位 Unit
电压Uan、Ubn、Ucn、Uab、Ubc、Uca Voltage Uan, Ubn, Ucn, Uab, Ubc, Uca	$Val_s = Val_t / 10$	伏V V
电流IA、IB、IC Current IA, IB, IC	$Val_s = Val_t / 1000$	安培A A
功率因数PFA、PFB、PFC、PFS Power factor value PFA, PFB, PFC, PFS	$Val_s = Val_t / 1000$	无单位 None
频率FR Frequency FR	$Val_s = Val_t / 100$	赫兹Hz Hz

例: 读A相电压Uan, MODSCAN在Integer读数方式下在地址00F4H 栏可读到数据, 即通讯读出值Val_t为2200, 则 $Val_s = Val_t / 10 = 2200/10 = 220V$ 。

8.3.2、有功功率、无功功率、视在功率及电能 (二次侧; W/Var/VA/kWh)

该系列测量值用Modbus-RTU 通讯规约的0x03命令读出, 每一个项目占用两个word。通讯值与实际值之间的对应关系如下: $Val_s = Val_t / 100$; 其中Val_t = 第一个word × 65536 + 第二个word。

8.3 Communication reading value Vs actual value (Take Val_t as Communication reading value, Val_s as actual value)

This series measuring value is read out by Modbus-RTU protocol 03 command, each item occupy one word. Relation between communication value and actual value (secondary side measuring) is shown as below table:

Example: Read A phase voltage Uan, MODSCAN in Integer reading mode, at address 00F4H, data can be read, i.e. communication reading value Val_t is 2200, then $Val_s = Val_t / 10 = 2200/10 = 220V$ 。

8.3.2, Active power, Reactive power, Apparent Energy and Electric energy (Secondary side; W/Var/VA/kWh)

This series measuring value is read out by Modbus-RTU protocol 0x03 command, each item occupy two words. Relation between communication value and actual value is shown as below: $Val_s = Val_t / 100$; in it, $Val_t = \text{First word} \times 65536 + \text{second word}$.

例: 读A相有功功率Pa, MODSCAN在Integer读数方式下在地址00FEH-00FFH: 00FEH通讯读出值为1, 00FFH通讯读出值为26000, 即 $i.e. Val_t = 1 \times 65536 + 26000 = 91536$, 则 $Val_s = Val_t / 100 = 915.36W$ 。

8.3.3、电压波峰系数、电压波形因子、电流K系数、电压波峰值、电流电压正序负序零序分量及不平衡度

该系列测量值用Modbus-RTU 通讯规约的0x03命令读出, 每一个项目占用1个word。通讯值与实际值之间的对应关系如下表:

适用参量 Applied parameter	对应关系 Relation	单位 Unit
电压波峰系数 Crest factor	$Val_s = Val_t / 1000$	无单位 None
电压波形因子 THFF	$Val_s = Val_t / 100$	百分量 None
电流K系数 Current K factor	$Val_s = Val_t / 100$	无单位 None
峰值电压 (二次侧值) Peak voltage (Secondary side value)	$Val_s = Val_t / 10$	伏V V
电压电流不平衡度 Unbalance factor of Voltage and current	$Val_s = (Val_t / 10) \%$	百分量 Percentage

例: 读A相电压波峰系数, MODSCAN在Integer读数方式下在地址0X011C栏可读到数据, 即通讯读出值Val_t为1414, 则 $Val_s = Val_t / 1000 = 1414/1000 = 1.414$

Example: Read A phase active power Pa, MODSCAN in Integer reading mode, at address 00FEH-00FFH: 00FEH communication reading value is 1, 00FFH, communication reading value Val_t is 26000, namely i.e. $Val_t = 1 \times 65536 + 26000 = 91536$, then $Val_s = Val_t / 100 = 915.36W$ 。

8.3.3, Voltage wave peak coefficient, telephone wave form factor, current K coefficient, voltage wave peak value, current / voltage positive sequence negative sequence, zero sequence component and unbalancedness

This series measuring value is read out by Modbus-RTU protocol 0x03 command, each item occupy one word. Relation between communication value and actual value is shown as below table:

Example: Read A phase Voltage wave peak coefficient, MODSCAN in Integer reading mode, at address 0X011C, read data, communication reading value is Val_t is 1414, then $Val_s = Val_t / 1000 = 1414/1000 = 1.414$

8.3.4、电压电流谐波数据

Voltage / current harmonic data

该系列测量值用Modbus-RTU 通讯规约的0x03号命令读出，每一个项目占用1个word。通讯值与实际值之间的对应关系如下： $Val_s = (Val_t / 100) \%$

This series measuring value is read out by Modbus-RTU protocol 0x03 command, each item occupy one word. Relation between communication value and actual value is shown as below: $Val_s = (Val_t / 100) \%$

例：读电流3次谐波含有量，MODSCAN在Integer读数方式下在地址0X11D1栏可读到数据，即通讯读出值Val_t为157，则 $Val_s = (Val_t / 100) \% = 1.57\%$

Example: Read current third harmonics content, MODSCAN in Integer reading mode, at address 0X11D1, read data, communication reading value Val_t is 157, then $Val_s = (Val_t / 100) \% = 1.57\%$

8.3.5、日期时间 Time

该系列测量值包括年、月、日、时、分、秒，用Modbus-RTU 通讯规约的03号命令读出，每一个项目占用1个word，为BCD码格式。

This series measuring value include year, moth, day, hour, minute, second, is read out by Modbus-RTU protocol 0x03 command, each item occupy one word, adopt BCD code format.

例：读年数，MODSCAN在HEX 读数方式下在地址0X0081 栏可直接读出

Example: Read years, MODSCAN in HEX reading mode, at address 0X0081, read data directly.