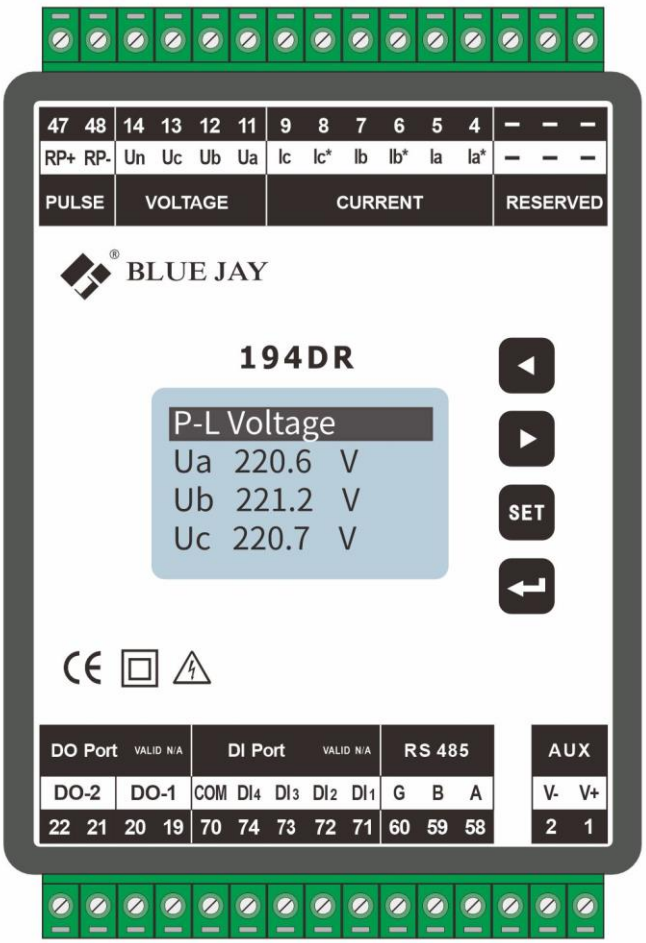
BJ-194DR

Din-Rail Multi-Function Power Monitor

User Manual



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Read me

When you use BJ-194… Series multi-function meter, be sure to read this user manual carefully, and be able to fully understand the implications, the correct guidance of operations in accordance with user manual, which will help you make better use of BJ-194… Series multi-function meter, and help to solve the various problems at the scene.

1. Before the meter turning on the power supply, be sure that the power supply within the provisions of the instrument;

2. When installation, the current input terminal must non-open, voltage input terminals must Non-short circuit;

3. Communication terminal (RS232/RS485 or Ethernet) is strictly prohibited to impose on high pressure;

4. Be sure the instrument wiring consistent with the internal system settings;

5. When communicating with the PC, instrument communication parameters must be consistent with the PC.

Please read this user manual carefully
Please save this document

Directory

1.- SUMMARIZE

BJ-194DR Multi-Function Power Monitor designed for din-rail mounting, it is a high-end multifunction power meter. Using dot matrix LCD screen, can more easily display more electrical parameters on the same screen. The power monitor provides a communication interface to connect with the PC monitoring system, supports RS485 interface MODBUS communication protocol, and can upload the data collected by measurement and equipment status. It can be widely used in electric power, communication, railway, transportation, environmental protection, petrochemical, steel and other industries to monitor the power consumption of AC equipment.

It can measure all of the power parameters in power grid:

Current,	Energy (Active/Reactive),	*Max demand,
Voltage,	Power factor	*Harmonics factor,
Frequency,	*Multi- tariffs(TOU) ratio	*Voltage crest factor,
Active power,	*Current harmonics 2~51th,	*Current K-factor,
Reactive power,	*Voltage harmonics 2~51th,	*Unbalance
Apparent power,	*Voltage and current THD%,	*Pulse output
Relay output		

Note: * Functions are optional, details please refer ***Chapter 2.1***

BJ-194DR provide 5* virtual alarm trigger, and max 100 lists event logging, real-time saving DI/DO act events or electrical parameter limit Overrun event capture, easy for tracing for transformers, generators, capacitor banks and motors of the distributed detection, automatic control system, on-line monitoring display. With optional expansion modules, it can also transmit the parameter into 2*Relay output (2DO) and 4*Switch input (4DI).

Rail design makes it possible to install in various monitoring boxes and use in outdoor environment (-20~60°C) The integrated advanced electrical parameter and logging function can replace the general power recorder to perform real-time online monitoring, with the advantages of improving system reliability making the on-site wiring convenient and reduce system cost.

With serial port, BJ-194DR can connect with PC or other host device; and use Modbus to set programming and read the data. Based on this power meters, you can simply set up a monitoring system with the IPC and central software.

APPLICATIONS

-. All power parameter measurement;
-. Energy measurement and electrical fire monitor and control;
-. Replacing the three-phase power meter, three phase electricity transmitter;
-. Transformers, generators, capacitors and electric motors distributed detection;
-. Medium and low voltage systems;
-. SCADA, EMS, DCS integrators.

2. - FEATURES

2.1.- Electricity Metering

By means of an internal microprocessor it simultaneously measures:

Parameter	Symbol	A-phase	B-phase	C-phase	Total
Single phase voltage	V	●	●	●	/
*Phase-phase voltage	V	●	●	●	/
Current	A	●	●	●	/
Frequency	Hz	/	/	/	●
Power factor	COSΦ	●	●	●	●
Apparent power	VA	●	●	●	●
Active power	W	●	●	●	●
Reactive power	Var	●	●	●	●
Apparent energy	VAh	●	●	●	●
Active energy	Wh	●	●	●	●
Reactive energy	Varh	●	●	●	●
Multi- tariffs energy record	Wh	/	/	/	▲
Max demand (W / Var / VA)	MAX	/	/	/	▲
Voltage / frequency deviation	---	▲	▲	▲	/
Voltage / current unbalance	---	/	/	/	▲
Individual harmonic (2~51th)	---	▲	▲	▲	/

Note:

Phase-phase voltage is Uab, Ubc, Uca, voltage data determined by the different wirings.

/: No such function
●: Display and communications.
▲: Optional function

The BJ-194DR delivers the visualization of parameters listed above by means of 1.6 dot matrix LCD screen. It shown multiple electrical parameters in total 16 monitor screens, folded some parameter in sub-screen.

2.2.- Technical parameters

-. Power Supply

AC/DC 90~240VAC/DC

-. Power Consumption

AC< 4VA

-. Signal Input

Voltage:	100 / 220 / 380VAC (Customer specified)
Current:	AC2.5mA/AC 1A or/5A (Customer specified)
Frequency:	45-55Hz
Voltage overload:	2 times 10 seconds, 1.2 times in continues
Current overload :	10 times 1 seconds, 1.2 times in continues

-. Accuracy

Current :	0.2 class @RMS
Active energy:	0.5 class IEC-62053-22
Reactive energy:	1.0 class IEC-62053-23

-. EMC Test Compatible

IEC 61000-4-2 Level-4
IEC 61000-4-3 Level-4
IEC 61000-4-4 Level-4
IEC 61000-4-5 Level-3

-. Insulation Resistance

Input, output, power supply to shell> 5MΩ

-. Isolation

AC 2KV RMS / Min @ Input / output / power supply

-. Case Material

ABS fireproof materials

-. Dimension

89(W) X 128(H) X 41(D) mm

-. Weight

About 300g

-. Installation

Fixed in a standard 35mm (1.38 inch) DIN rail

-. Environment

Working environment:	-10 ~ 55°C/ less than 93% RH (Non-condensing)
Storage environment:	-30 ~ 70°C/ less than 70% RH (Non-condensing)

3.- INSTALLATION AND START-UP

The manual you hold contains information and warnings that the user should respect in order to guarantee a proper operation of all the instrument functions and keep it in safety conditions. The instrument must not be powered on and used until its definitive assembly is on the cabinet's door.

If the instrument is not used as manufacturer's specifications, the protection of the instrument will be damaged.

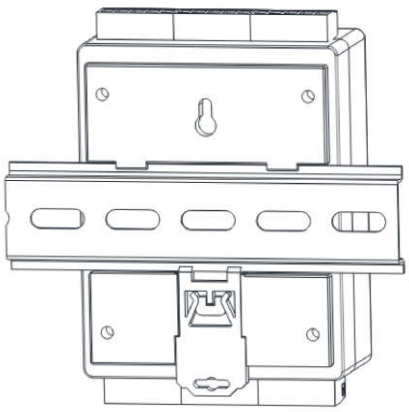
When any protection failure is suspected to exist (for example, it presents external visible damages), the instrument must be immediately powered off. In this case contact a qualified service representative.

3.1.- Installation

Mounting

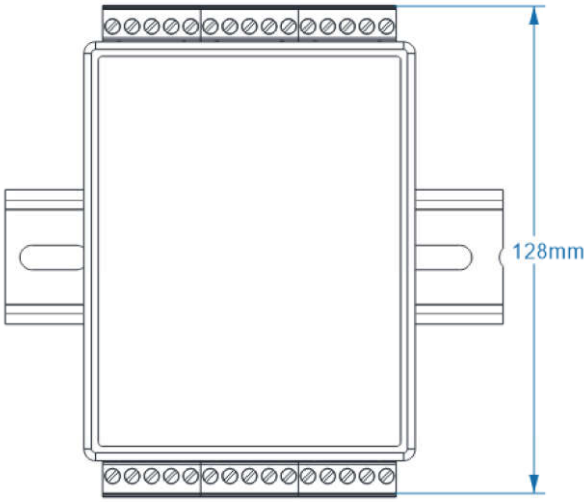
Instrument is to be mounted on 35mm Din-rail. Keep all connections into the cabinet. Please note that with the instrument powered on, the terminals could be dangerous to touch and cover opening actions or elements removal may allow accessing dangerous parts. Therefore, the instrument must not be used until this is completely installed.

Step-1	Fasten a section of 35 mm DIN rail (at least 8 inches long) to the mounting surface with appropriate hardware.
Step-2	Use the white plastic clips on the back of the MCM2600 meter to clip the meter onto the rail.
Step-3	Verify that the meter is securely fastened to the wall.

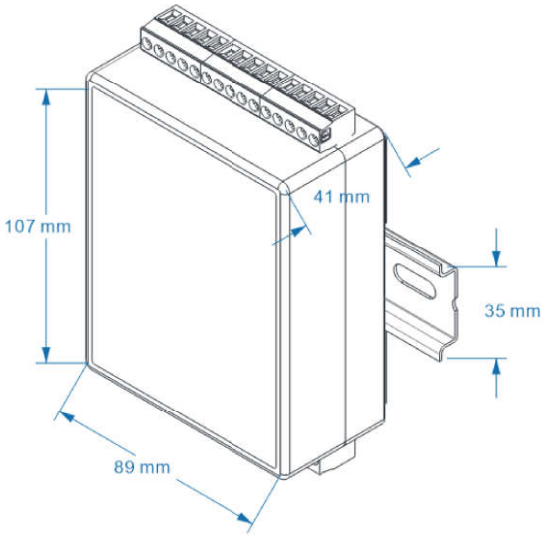


There have one flaps cover, can sealed by lead wire to protect unauthorized access terminal block, to achieve physical anti-theft function. Also capable of completely shielding the terminal head to prevent accident electrical shock.

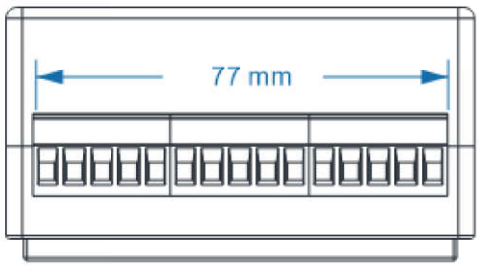
Dimension: **Unit: mm**



Front view



Side view



upper view

Notes:

Input signal: BJ-194… Series using a separate acquisition calculate for each measurement channel, to ensure consistent in use, for different load forms, it's a variety of connection mode. Access wire shall be met: the current is 2.5 square mm and the voltage is 1.5 square mm.

Voltage input:

Input voltage should not exceed the rated input voltage products (120Vac or 450Vac),
Otherwise, you should use PT. Suggest 1A fuse be installed in the voltage input side.

Current Input:

Standard input current is 5A, if greater than 5A should use external CT.
When the CT is connected with other instruments, make sure wiring methods be used in series.

Warning: Before remove the current input connection, must be sure to disconnect the primary circuit or shorted secondary circuit of CT. In order to facilitate disassembly, please do not connect to CT directly, and the terminal block is suggested.

Sequence of wire:

Warning: Please make sure that the input voltage and current corresponding to the same phase, sequence, and the same direction; Otherwise, the Values and symbols will be wrong!! (Power and Energy)

The input network configuration of instrument depends on the CT number of the system:
in the condition of 2 CT, select the three-phase, three-lines two components;
in the condition of 3 CT, select the three-phase, four-lines three component mode.

Instrument connection mode, set of the instrument (programming input network NET) should be the same load wiring as measured wiring. Otherwise, the measurement instrument will lead to incorrect voltage or power.

In three-phase three-wire mode, the voltage measurement and voltage display is the line voltage;
In three-phase four-wire mode, he voltage measurement and voltage display is the phase voltage.

Auxiliary power:

BJ-194… Series with universal (AC / DC) power input, if not for a special statement, we provide the 220V(AC/DC) or 110V(AC/DC) power interface for standard products. Instruments limit work power supply: AC / DC: 90-240V, please ensure that the auxiliary power can match with BJ-194… Series meter to prevent damage to the product.

A. Suggest install 1A fuse in the side of fire line.
B. For the areas with poor power quality, suggest install lightning surge suppressor and rapid burst suppressor to prevent lightning strikes.

3.2.- Connection Terminal

Upper :connection terminal

47	48	14	13	12	11	9	8	7	6	5	4
RP+	RP-	Un	Uc	Ub	Ua	C-phase Current		B-phase Current		A-phase Current	

47 Active energy pulse output (+)
48 Active energy pulse output (-)
11. Voltage A-phase input
12. Voltage B-phase input
13. Voltage C-phase input
14. Neutral Voltage input
4. Current A-phase - S1
5. Current A-phase - S2
6. Current B-phase - S1
7. Current B-phase - S2
8. Current C-phase - S1
9. Current C-phase - S2

Lower: connection terminal

22	21	20	19	70	74	73	72	71	60	59	58	2	1
DO2		DO1		COM	DI4	DI3	DI2	DI1	GND	485B	485A	AUX	

19. Digital output channel_1 (+)
20. Digital output channel_1 (-)
21. Digital output channel_2 (+)
22. Digital output channel_2 (-)
70. Digital input COMM (-)
71. Digital input channel_1 (+)
72. Digital input channel_2 (+)
73. Digital input channel_3 (+)
74. Digital input channel_4 (+)
58. RS-485 (+)
59. RS-485 (-)
60. RS-485 (GND)
1. Supply voltage input: 220V
2. Supply voltage input: 0V

Note:

The terminal pin will change depends on special order requirement; please refer to the sticker on the meter!

4. - OPERATION MODE

When the device is powered on, the entire symbol will be on, and the meter starts to self-test. After few seconds, the meter is ready for operation and shows firmware, then automatic jump to The first screen.

Button	In Monitor Screen	In Config sub-menu	In Parameter Setup
◀	Screen will move to previous or next page	Move cursor up and down to select function	Move setting cursor to left
▶			Scroll selection number 0 ~ 9
SET	Call out password screen	Exit & roll back to up level menu.	
↵	Call out RTC screen or detail parameter screens(Chapter 5.2)	Confirm the values & Entry or jump to down level menu	

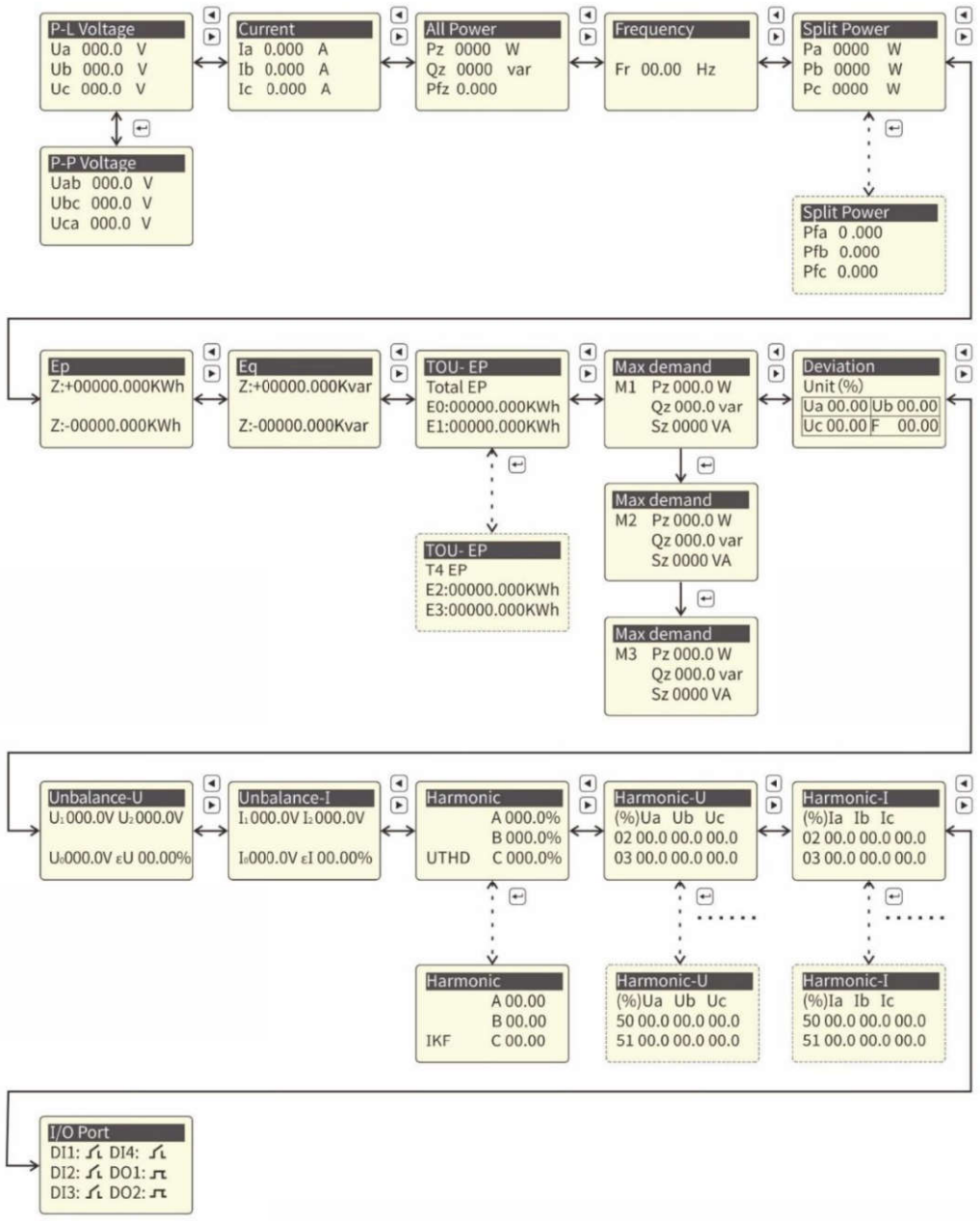
Note:

In Setup menu, if changed the setting value, press SET for exit menu, device will call out confirm screen ask “SAVE”

Then press SET *exit without saving*
press ↵ *save and exit.*

5. - SCREEN DISPLAY

5.1 Overall screen:

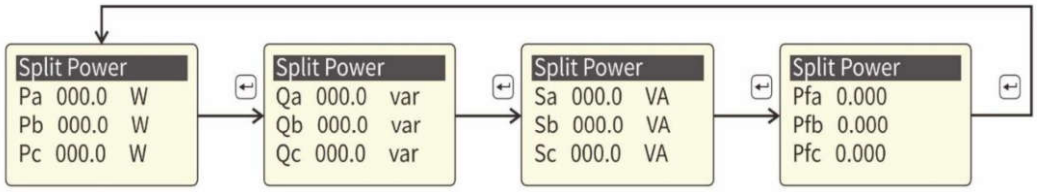


Note:

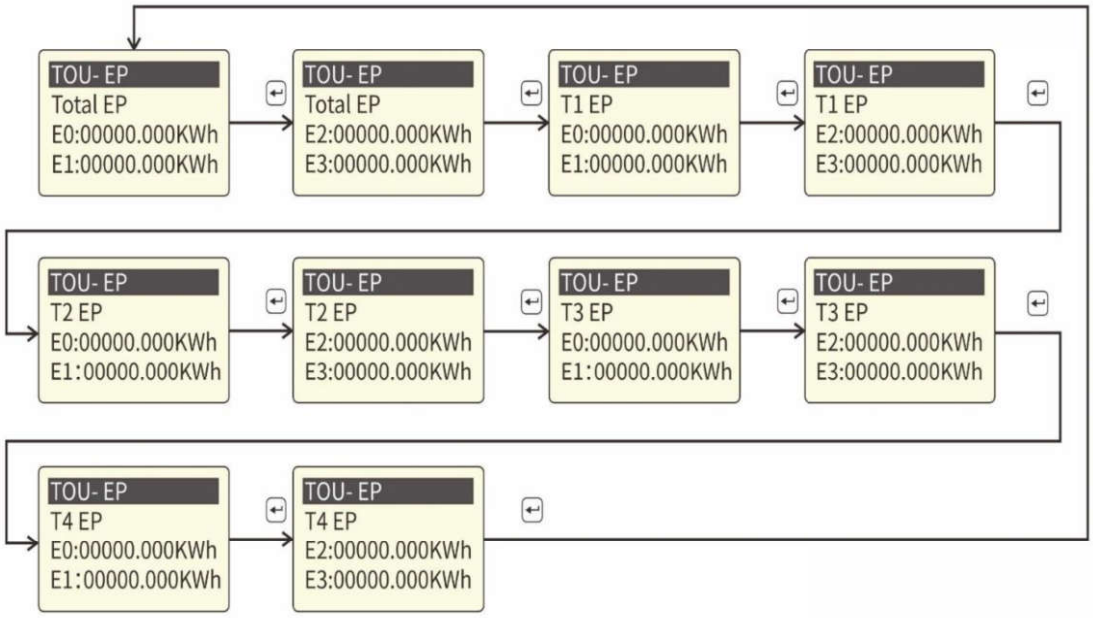
Energy data is displayed in 8-digit decimal format by default. As counter increased, the decimal point position will move right, data increased by 10 times, the unit display changing from KWh to MWh.

5.2 Detail parameter screen:

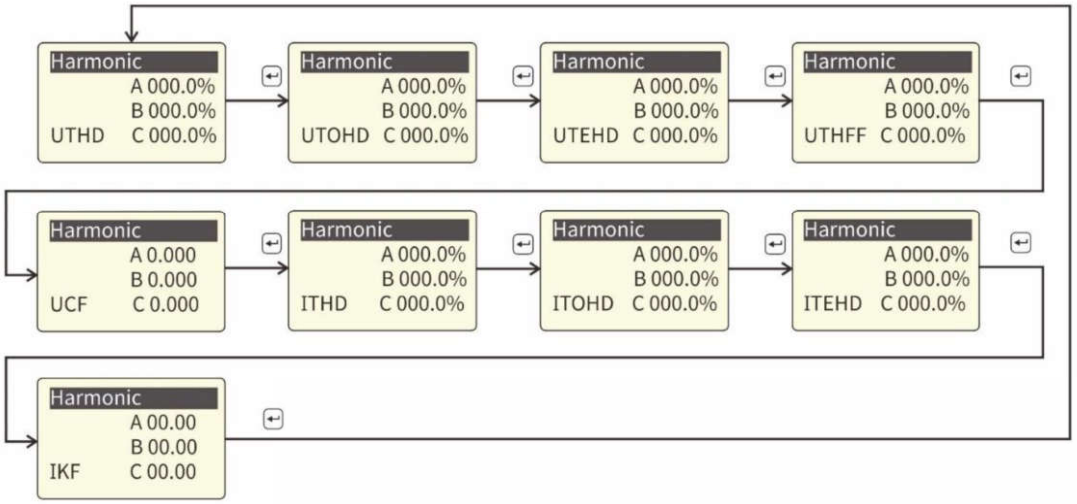
5.2.1 The Detail Information of Split Power



5.2.2 The Detail Information of TOU-EP



5.2.3 The Detail Information of Harmonic

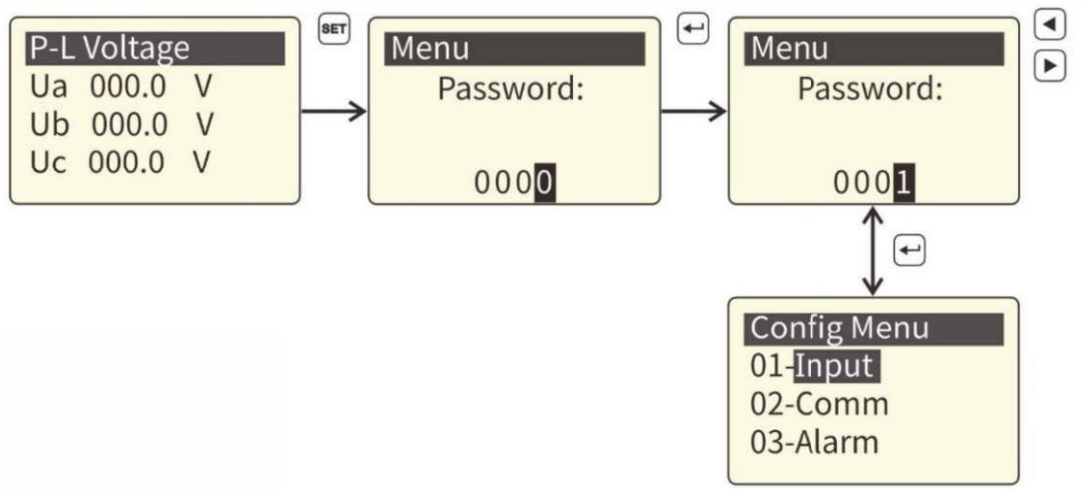


Note:

Not all parameter pages are displayed, if the corresponding function is not selected, the page will be skipped.

6. - SETUP PROCEDURE

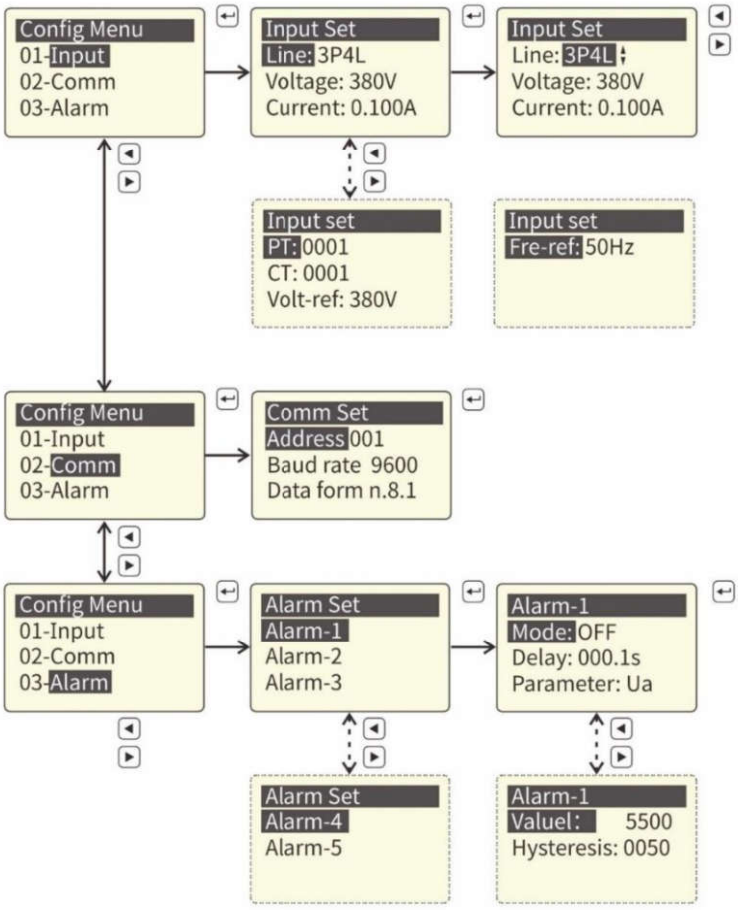
The SETUP procedure of the BJ-194… is performed by means of several SETUP options. There has a password to protect unexpectedly enter the Setup menu. Once into the Setup menu, use the keyboard to select different options and enter required variables:



Note:

In root menu there have 8 sub-menus for different parameter setup, if your 194DR do not have related function, the Setup page will disable, can skip the sub-menu

6.1.- Input signal & Comm port & Alarm Setup



Input signal setup

Communication setup

Alarm threshold setup

(Chapter 6.1.1)

6.1.1- Alarm setup description

BJ-194DR provide 5* [Virtual Alarm] for remote communication, defined in “Alarm-1”, “Alarm-2” … “Alarm-5”. When meter detect the parameter raise to or drop to pre-setting limit, it will be shown in register and SOE. If meter equipped physical DO port, the relay can be triggered by the linkage configuration.

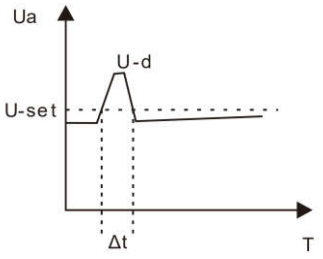
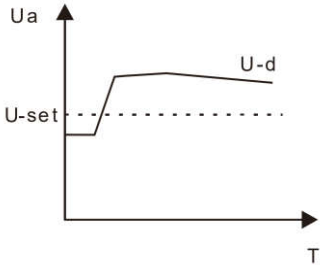
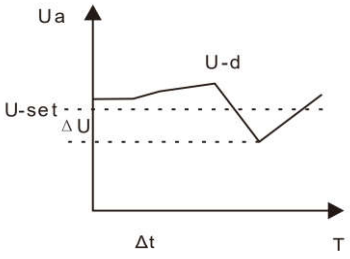
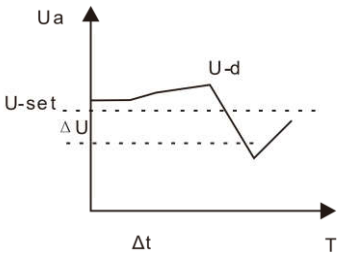
Sub-setting	Settings value	Definition
Mode	OFF / Upper Limit / Lower Limit	**Default OFF**
Delay*	0.1~999.9s	After the preset parameter over the setting value in the specified delay, Virtual Alarm will trig. **Default 0.1s**
Parameter	U_a / U_b / U_c / U_{ab} / U_{bc} / U_{ac} / U_{abc} I_a / I_b / I_c / I_{abc} P_a / P_b / P_c / Ps Q_a / Q_b/ Q_c / Q_s S_a / S_b/ S_c / S_s PF / Fr DI_1 / DI_2 / DI_3 / DI_4 / DI_5 / DI_6	Parameter be trigged. **Notes**: U_{abc}, I_{abc} mean any value in phase P_s, Q_s, S_s mean total value in three phase Not all value above in screen, depends on sub-mode of BJ-194DR.
Value	0~9999	Trig threshold, value related to secondary side, units. Voltage - 0.1V Current - 0.001A Active power - 0.1W Reactive power - 0.1VAR Power factor - 0.001 Frequency- 0.01HZ **Default is 5500**
Hysteresis*	0~9999	When the measurement parameter falls back lower / over this exceed value, the alarm will be released. **Default is 0050**

*** Delay & Hysteresis value**

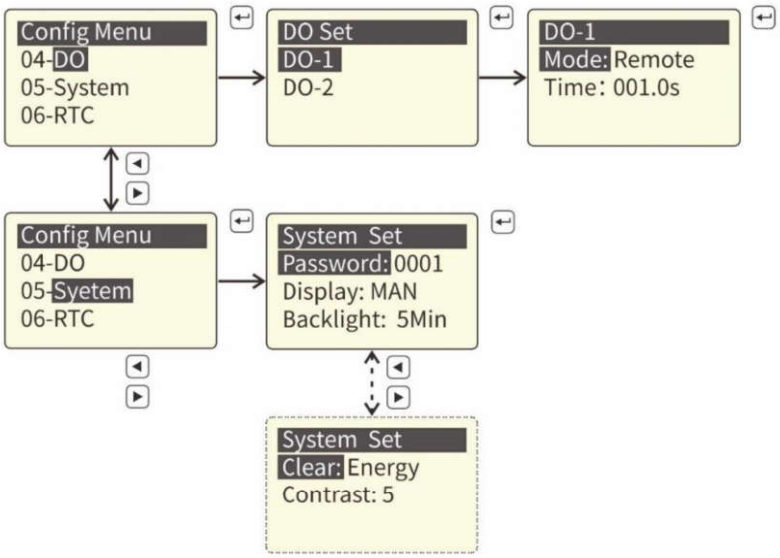
Example in upper limit alarm of A phase voltage:

U-d mean detected **Ua**

U-set mean Alarm value of A phase

Alarm will not trigged		If Δt < Delay setting value, The Alarm will not trig, that can avoid influence of the transient electrical parameters.
Alarm trigged		When U-d over U-set, and after delay setting time cool down, the value still over U-set, the alarm trigged.
Alarm will not released		If ΔU < Hysteresis value, The Alarm will not release, that can avoid influence of parameter unexpected fluctuations.
Alarm released		When U-d lower than (U-set - Hysteresis) , The Alarm will release.

6.2.- Digital output & System Setup



Digital output setup (chapter 6.2.1)

System parameter setup

Clear: can be write by RS485 command*

Note:

Customers can write commands through RS485 or through the screen to clear the energy data to 0.

Once the secondary side value of the internal memory reaches to 2^{32}(4294,967,296), counter automatically reset to 0.

6.2.1- DO setting (Optional)

BJ-194DR optional physical 2*DO port, if not choose this port, this chapter is invalid.

The physical DO relay standard is 5A 250VAC / 5A 30VDC.

Sub-setting	Settings value	Definition
Mode	[Remote] / [Alarm-X] [OFF] / [NO]	[Remote] - DO act by RS-485 control command [Alarm-X] - DO act when Alarm-X be trigged [OFF] – DO always closed, cannot control [NO] – DO always opened, cannot control **Default Remote**
Time	0.0~999.9s	000.0 - Level type signal, contact coil will close when trigged. 000.1~999.9 - Pulse type signal, value for width. Contact coil will close in the pulse width time, then release. **Note**: In [Alarm-X] the value setting is valid **Default 0.1s**

***Remote mode operation**

In [Remote] mode, user can use function code 05 to trig single relay, device RS-485 port follow MODBUS-RTU protocol, command as following:

Host inquiry:

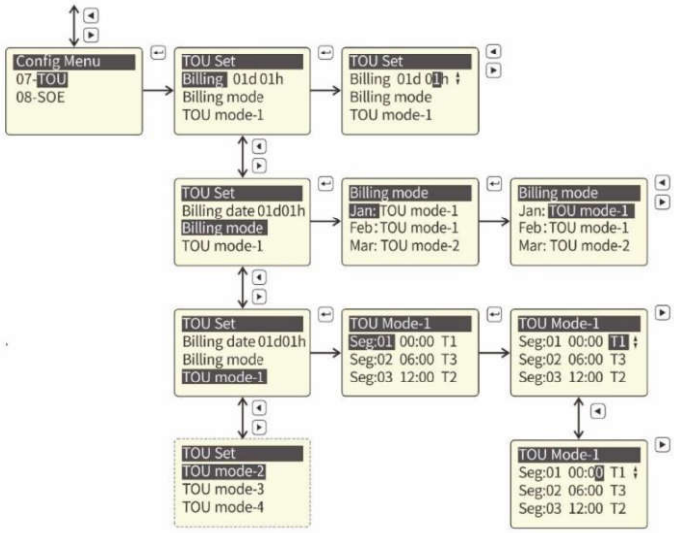
Address	Code	No.1 Relay register	Relay value (FF00:close; 0000: open)	CRC
01	05	00 01	FF 00	DD FA

Slave response:

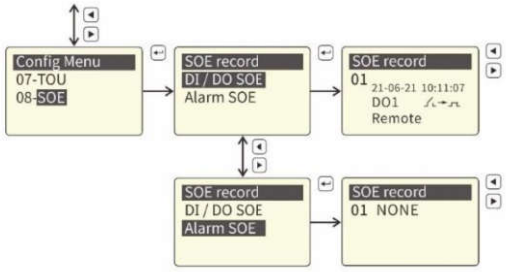
Address	Code	No.1 Relay register	Relay value (FF00:close; 0000: open)	CRC
01	05	00 01	FF 00	DD FA

6.3.- RTC & TOU Setup & SOE Record

Real Time Clock setup(1)*



Multi-tariff setup
(chapter 6.3.1)*



Log record of DI/DO event(2)*

Log record of Alarm trig event(2)*

Notes:

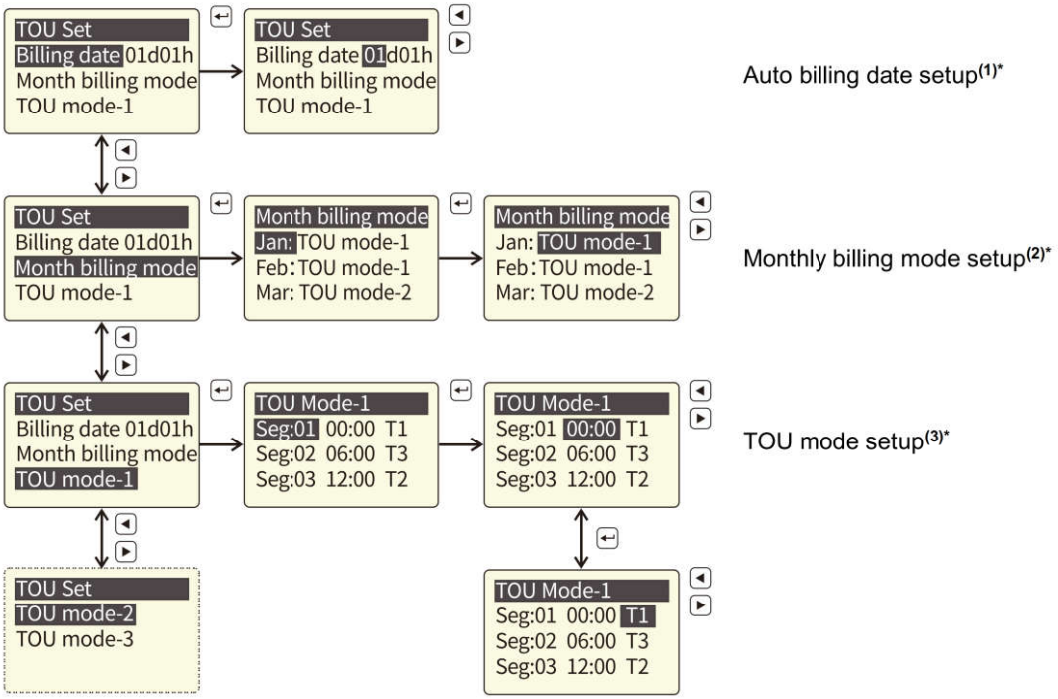
(1) If select TOU function, there will also have RTC function, the build-in RTC support automatic leap year, in regular working condition do not need special modify, the battery inside provide 5 years' life that meter do not powered on.

(2) SOE record 20lists of I/O port trig, 80 lists record for Alarm-X trig status, sort from latest event to oldest. (No.1 event are the latest one). Also can be read log info in register.

Warming: Please ensure RTC setup are correctly, otherwise the timestamp will be error. If change RTC, the timestamp already existed does not auto modify to new RTC!

6.3.1- Multi-tariff (TOU)setup (Optional)

BJ-194J provides last 3 months of TOU energy record. The TOU function separate one day in to 12 segments billing interval.



Notes:

(1) Meter default automatic billing time is the meter reading time at 0:00 on the 1st of each month, electrical energy of present month will be frozen to previous month value, the electrical energy of previous month will be frozen to the month before last month.

Electrical data of this month will be clear and re-start record. User can modify the automatic billing time freely, optional day 1-28 of each month.

-. If re-set billing time miss the last billing time, meter will immediately record billing;

-. If power off during the billing time, meter will immediately record billing after power recover.

(2) BJ-194DR provides 4 types different billing mode, each month can choose different billing mode, that suit for various situation.

(3) There have 12 segment for setup different 4 types tariff, Seg-1 for record starting time point in one day.

7.- PULSE OUTPUT

BJ-194DR provides 1* pulse output for the active energy.

The host / PLC / DI module can cumulative the data of both the active and reactive power energy sent by the pulse from opt coupler relay.

1). Electrical specification: voltage VCC ≤ 48V, Iz ≤ 50mA.

2). Pulse: 5000 imp / kWh, pulse up to 80ms.
This means: When the device detects 1 kWh, the port will generate 5000 pulse

Note:
1 kWh energy is for *secondary side energy data*, if there have PT and CT accessed; primary side energy data is “1 kWh ×PT ratio× CT ratio”.

Voltage (V)	Current (A)	Pulse constant (imp / kWh)
380 or 220	5	5000
	1	20000
100	5	20000
	1	80000

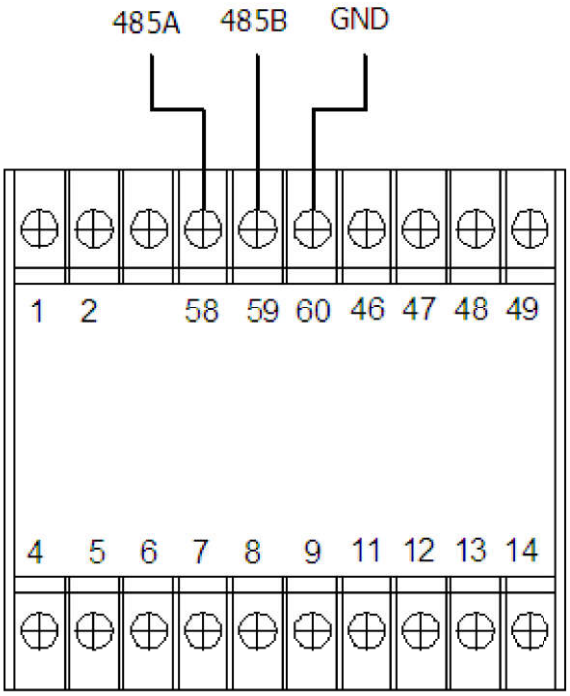
Example: In measure time “T”, the received total pulse is “N”,
Primary side input of voltage is 10Kv
Primary side input of current is 400A.
Secondary side measurement range is 100V and 5A.

In the time “T”, energy accumulated is: N / 20000 × 100 × 80

8.- COMMUNICATION INTERFACE

8.1.- Connection for RS485 BUS

The composition of the RS-485 cabling must be carried out with a meshed screen cable (minimum 3 wire), diameter of not less than 0.5mm, with a maximum distance of 1,200 m between the BJ-194… and the master unit. This Bus may connect a maximum of 32pcs BJ-194…



Notes:

-. For communication with the master unit, user can choose RS-485 to RS-232 converter or RS485 to USB adapter to use.
-. For expand the number of devices in the communication network, a signal repeater can be used.
-. Full range of BJ-194… meter RS485 PIN number is 58,59,60.
-. Due to product modifications or special requirements, the interface pin place may be change. For details, please refer to product label on the rear side.

8.2.- MODBUS © protocol

Modbus RTU Frame Format:

Address code	**1 BYTE**	*Slave device address **1-247***
Function code	**1 BYTE**	*Indicates the function codes like read coils / inputs*
Data code	**4 BYTE**	*Starting address, high byte* *Starting address, low byte* *Number of registers, high byte* *Number of registers, low byte*
Error Check code	**2 BYTE**	*Cyclical Redundancy Check (**CRC**)*

MODBUS FUNCTIONS:

Code	Meaning	Description
FUNCTION 01	Read Coil Status	*Only valid when equipped DO port*
FUNCTION 02	Read Input Status	*Only valid when equipped DI port*
FUNCTION 03	Reading of n Words	*This function permits to read all the electrical parameters of the BJ194…series.*
FUNCTION 05	Force Single coil	*Details reference **chart 6.2.1*** *When DO in remote control mode can work*
FUNCTION 06	Preset Single register	***Disable in default*** *If need valid this code, please contact Blue Jay Sales Team before your order!*

Note:

Float data follow **IEEE754**, float low bit first, high bit next. (**CD AB**)

8.3.- Register Map

8.3.1.- Basic power data—Primary Side (Read only)

Register	Data	Byte mode		Instruction
0x00	Ua	float	2	Phase to Line Voltage, Unit: V
0x02	Ub	float	2	
0x04	Uc	float	2	
0x06	Uab	float	2	Phase to Phase Voltage, Unit: V
0x08	Ubc	float	2	
0x0a	Uca	float	2	
0x0c	Ia	float	2	Three phase Current, Unit: A
0x0e	Ib	float	2	
0x10	Ic	float	2	
0x12	Pa	float	2	Individual phase active power, Unit: kW
0x14	Pb	float	2	
0x16	Pc	float	2	
0x18	P∑	float	2	Total active power, Unit: kW
0x1a	Qa	float	2	Individual phase reactive power, Unit: kVar
0x1c	Qb	float	2	
0x1e	Qc	float	2	
0x20	Q∑	float	2	Total reactive power, Unit: kVar
0x22	Sa	float	2	Individual phase apparent power, Unit: kVA
0x24	Sb	float	2	
0x26	Sc	float	2	
0x28	S∑	float	2	Total apparent power, Unit: kVA
0x2a	PFa	float	2	Individual phase power factor, 0~1.000
0x2c	PFb	float	2	
0x2e	PFc	float	2	
0x30	cosQ	float	2	Total power factor, 0~1.000
0x32	FR	float	2	Frequency, Unit:0.01Hz
0x34	Ep+	float	2	Positive active energy, Unit: kWh
0x36	Ep-	float	2	Negative active energy, Unit: kWh
0x38	Eq+	float	2	Inductive reactive power, Unit: kVarh
0x3a	Eq-	float	2	Capacitive reactive power

8.3.2.- Basic power data—Secondary Side (Read only)

Register	Data	Byte mode		Instruction
0x100	Ua	int	1	Phase to Line Voltage, Unit: 0.1V
0x101	Ub	int	1	
0x102	Uc	int	1	
0x103	Uab	int	1	Phase to Phase Voltage, Unit: 0.1V
0x104	Ubc	int	1	
0x105	Uca	int	1	
0x106	Ia	int	1	Three phase Current, Unit: 0.001A
0x107	Ib	int	1	
0x108	Ic	int	1	
0x109	Pa	int	1	Individual phase active power, Unit: W
0x10a	Pb	int	1	
0x10b	Pc	int	1	
0x10c	P∑	int	1	Total active power, Unit: W
0x10d	Qa	int	1	Individual phase reactive power, Unit: Var
0x10e	Qb	int	1	
0x10f	Qc	int	1	
0x110	Q∑	int	1	Total reactive power, Unit: Var
0x111	Sa	int	1	Individual phase apparent power, Unit: VA
0x112	Sb	int	1	
0x113	Sc	int	1	
0x114	S∑	int	1	Total apparent power, Unit: VA
0x115	PFa	int	1	Individual phase power factor, 0~1.000
0x116	PFb	int	1	
0x117	PFc	int	1	
0x118	cosQ	int	1	Total power factor, 0~1.000
0x119	FR	int	1	Frequency, Unit:0.01Hz
0x11a	Ep+	Int32	2	Positive active energy, Unit: Wh
0x11c	Ep-	Int32	2	Negative active energy, Unit: Wh
0x11e	Eq+	Int32	2	Inductive reactive power, Unit:Varh
0x120	Eq-	Int32	2	Capacitive reactive power
0x122	Ang_Ua	int	1	A phase voltage angle, unit 0.1 degrees
0x123	Ang_Ub	int	1	B phase voltage angle
0x124	Ang_Uc	int	1	C phase voltage angle
0x125	Ang_Ia	int	1	A phase current angle
0x126	Ang_Ib	int	1	B phase current angle
0x127	Ang_Ic	int	1	C phase current angle

8.3.3.- Device status data (optional function)

Register	Data	Byte mode		Instruction
0x200	DO	int	1	Digital output: Bit 0~1 show channel 1and channel 2 status 0 for open, 1 for closed
0x201	DI	int	1	Digital input: Bit 0~3 show channel 1 to channel 4 status 0 for open, 1 for closed
0x202	Alarm	int	1	Virtual alarm status Bit 0~4 show Alarm_1 to Alarm_5 0 for no act, 1 for trigged
0x20A	TOU_year	int	1	Internal RTC real time clock: Year - Month - Date - Time - Minutes - Seconds-Day
0x20B	TOU.month	int	1	
0x20C	TOU.date	int	1	
0x20D	TOU.hour	int	1	
0x20E	TOU.minute	int	1	
0x20F	TOU.seconds	int	1	
0x210	TOU.day	int	1	

8.3.4.- Advanced electrical parameter (optional function)

Register	Data	Byte mode		Instruction
0x300	Pde	float	2	Present active power demand, Unit: W
0x302	Qde	float	2	Present reactive power demand, Unit: var
0x304	Sde	float	2	Present apparent power demand, Unit: VA
0x306	PzM1	float	2	Active power demand in present month
0x308	QzM1	float	2	Reactive power demand in present month
0x30a	SzM1	float	2	Apparent power demand in present month
0x30c	PzM2	float	2	Active power demand in last month
0x30e	QzM2	float	2	Reactive power demand in last month
0x310	SzM2	float	2	Apparent power demand in last month
0x312	PzM3	float	2	Active power demand in month before last month
0x314	QzM3	float	2	Reactive power demand in month before last month
0x316	SzM3	float	2	Apparent power demand in month before last month
0x318-0x31F	/	float	2	Reversed
0x320	V_{δ}+	float	2	Positive sequence voltage in primary side
0x322	V_{δ}-	float	2	Negative sequence voltage in primary side
0x324	V_0	float	2	Zero sequence voltage in primary side
0x326	I_{δ}+	float	2	Positive sequence current in primary side
0x328	I_{δ}-	float	2	Negative sequence current in primary side
0x32A	I_0	float	2	Zero sequence current in primary side
0x32C	eU	float	2	Voltage unbalance, eU = (V_{δ}- / V_{δ}+)%
0x32E	eI	float	2	Current unbalance, eI = (I_{δ}- / I_{δ}+)%
0x330	Va_d	float	2	A phase voltage deviation
0x332	Vb_d	float	2	B phase voltage deviation
0x334	Vc_d	float	2	C phase voltage deviation
0x336	F_d	float	2	Frequency deviation

8.3.5.- Multi- tariffs ratio data (optional function)

Register	Data	Byte mode		Instruction
0x400	E0_tol	long	2	Total cumulative energy
0x402	E0_T1	long	2	T1-T4 cumulative Energy record
0x404	E0_T2	long	2	
0x406	E0_T3	long	2	
0x408	E0_T4	long	2	
0x40a	E1_tol	long	2	Total energy of present month
0x40c	E1 _T1	long	2	T1-T4 Energy record of present month
0x40e	E1 _T2	long	2	
0x410	E1 _T3	long	2	
0x412	E1_T4	long	2	
0x414	E2_tol	long	2	Total energy of last month
0x416	E2_T1	long	2	T1-T4 Energy record of last month
0x418	E2_T2	long	2	
0x41a	E2_T3	long	2	
0x41c	E2_T4	long	2	
0x41e	E3_tol	long	2	Total energy of the month before last month
0x420	E3_T1	long	2	T1-T4 Energy record the month before last month
0x422	E3_T2	long	2	
0x424	E3_T3	long	2	
0x426	E3_T4	long	2	

8.3.6.- THD and Individual harmonic (optional function)

Register	Data	Byte mode		Instruction
0x500	THDUa	int	1	A-phase Voltage THD, unit 0.1%
0x501	THDUb	int	1	B-phase Voltage THD
0x502	THDUc	int	1	C-phase Voltage THD
0x503	THDia	int	1	A-phase Current THD, unit 0.1%
0x504	THDib	int	1	B-phase Current THD
0x505	THDic	int	1	C-phase Current THD
0x508-0x545	HUa	int	62	Each phase voltage individual Harmonic 2~51th, unit 0.1%
0x548-0x586	HUb	int	62	
0x588-0x5C5	HUc	int	62	
0x5C8-0x605	HIa	int	62	Each phase current individual Harmonic 2~51th, unit 0.1%
0x608-0x645	HIb	int	62	
0x648-0x685	HIc	int	62	
0x688	TOHDUa	int	1	Each phase Voltage total odd harmonic distortion, unit 0.1%
0x689	TOHDUb	int	1	
0x68a	TOHDUc	int	1	
0x68b	TEHDUa	int	1	Each phase Voltage total even harmonic distortion, unit 0.1%
0x68c	TEHDUb	int	1	
0x68d	TEHDUc	int	1	
0x68e	THFFUa	int	1	Each phase voltage telephone harmonic form factor, unit 0.1%
0x68f	THFFUb	int	1	
0x690	THFFUc	int	1	
0x691	CFUa	int	1	A phase voltage crest factor, unit 0.001
0x692	CFUb	int	1	B phase voltage crest factor, unit 0.001
0x693	CFUc	int	1	C phase voltage crest factor, unit 0.001
0x694	TOHDIa	int	1	Each phase current total odd harmonic distortion, unit 0.1%
0x695	TOHDIb	int	1	
0x696	TOHDIc	int	1	
0x697	TEHDIa	int	1	Each phase current total even harmonic distortion, unit 0.1%
0x698	TEHDIb	int	1	
0x699	TEHDIc	int	1	
0x69a	KFIa	int	1	A phase current K factor, unit 0.01
0x69b	KFIb	int	1	B phase current K factor, unit 0.01
0x69c	KFIc	int	1	C phase current K factor, unit 0.01

8.3.7.- SOE record (optional function)

Register	Data	Byte mode		Instruction
0x75F~0x763	I/O Event 1~20	int	5	Byte 0: Fault type Byte 1: Fault event No.1 Byte 2,3: Fault value Byte 4: Fault time: Year Byte 5: Fault time: Month Byte 6: Fault Time: Day Byte 7: Fault time: Time Byte 8: Fault time: Minute Byte 9: Fault time: Seconds
0x8EF~0x8F3	Alarm record 1~80	int	5	

Notes:

-. Sort from latest event to oldest.

-. In register have 20lists record for I/O port trig, 80 lists record for Alarm-X trig

Byte 0	Byte 1	
1:DI1 Closed 2:DI2 Closed 3:DI3 Closed 4:DI4 Closed 21:DI1 Opened 22:DI2 Opened 23:DI3 Opened 24:DI4 Opened 51: Alarm_1 trigged 52: Alarm_2 trigged 53: Alarm_3 trigged 54: Alarm_4 trigged 55: Alarm_5 trigged 61: Alarm_1 released 62: Alarm_2 released 63: Alarm_3 released 64: Alarm_4 released 65: Alarm_5 released 101:DO1 Closed 102:DO2 Closed 121:DO1 Opened 122:DO2 Opened	0: Remote control 1: Alarm_1 2: Alarm_2 3: Alarm_3 4: Alarm_4 5: Alarm_5 6: Forced close DO 7: Forced open DO 100: Manually turn off Alarm when trigged 101:UA upper alarm 102:UB upper alarm 103:UC upper alarm 104:UAB upper alarm 105:UBC upper alarm 106:UCA upper alarm 107:UA/UB/UC upper alarm 108:IA upper alarm 109:IB upper alarm 110:IC upper alarm 111:IA/IB/IC3 upper alarm 112:PA upper alarm 113:PB upper alarm 114:PC upper alarm 115:total active power upper alarm 116:QA upper alarm 117:QB upper alarm 118:QC upper alarm 119:total reactive power upper alarm 120:SA upper alarm 121:SB upper alarm 122:SC upper alarm 123:total apparent power upper alarm 124:total power factor upper alarm 125:frequency upper alarm 126:DI1 close alarm 127:DI2 close alarm 128:DI3 close alarm 129:DI4 close alarm 130:DI5 close alarm 131:DI6 close alarm	132:UA lower alarm 133:UB lower alarm 134:UC lower alarm 135:UAB lower alarm 136:UBC lower alarm 137:UCA lower alarm 138:UA/UB/UC lower alarm 139:IA lower alarm 140:IB lower alarm 141:IC lower alarm 142:IA/IB/IC3 lower alarm 143:PA lower alarm 144:PB lower alarm 145:PC lower alarm 146:total active power lower alarm 147:QA lower alarm 148:QB lower alarm 149:QC lower alarm 150:total reactive power lower alarm 151:SA lower alarm 152:SB lower alarm 153:SC lower alarm 154:total apparent power lower alarm 155:total power factor lower alarm 156:frequency lower alarm 157:DI1 open alarm 158:DI2 open alarm 159:DI3 open alarm 160:DI4 open alarm 161:DI5 open alarm 162:DI6 open alarm

8.3.8.- Configuration menu (Read & Write)

Register	Data	Byte mode		Instruction	
0x900	Wiring mode	Int	1	0: 3P4W 1: 3P3W 2CT	2: 3P3W 3CT
0x901	Voltage range	Int	1	0: 100V	1: 380V
0x902	Current range	Int	1	0: 1A	1: 5A
0x903	PT ratio	Int	1	1-9999	
0x904	CT ratio	Int	1	1-9999	
0x905	RS485 address	Int	1	1-247	
0x906	Baud rate	Int	1	0: 2400 1: 4800	2: 9600 3: 19200
0x907	Data format	Int	1	0: n.8.1 1: o.8.1	2: e.8.1 3: n.8.2
0x908	Display control	Int	1	0-9sec, 0 for manual switch mode	
0x909	Password	Int	1	1-9999	

Notes: following only Writable in 06 code

Register	Data	Byte mode		Instruction
0x2000	Reset energy	Int	1	Write 0x0A0A,(2570) for reset
0x3000	Reset SOE	Int	1	
0x4000	Reset demand	Int	1	

Notes:

1. Not all of the data can be read by RS485, the reading address will be unsuccessful.
2. Some software has different definitions of the start bit of register address, there will be offset, please add 1 for the right address. To get more info, please contact technical support tech@cqbluejay.com

For any inquiry about the instrument performance or whether any failure happens, please contact to Blue Jay's technical service.

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