BP400 Operation Manual

Hangzhou BaiYue Electric Co., Ltd

About the Manual

This manual is designed to provide users with basic information of BP400 controller, and focus on introducing the operation of the human-machine interface (HMI).

With regard to the technical characteristics of this controller, please read the "bound-volume edition of BP400　controller technical manual."

Usage of the symbols

Electric warming icon: possibility of electric shock!

Warming icon: that is relative to the concepts of this article.

Information icon: recall the readers the relative facts and conditions.

Warming should be stated clearly for they are related to personal injury. Operation of damaged equipment may result in performance degradation of the device, thus to cause risks of accident or death. The warming labels should be strictly adhered to.

Safety information

All the maintenance, repair, installation and debugging personnel of BP400 ACR controller must be qualified and have read this manual.

Even dangerous voltage at the terminal of the back panel would exist during the seconds when the secondary power supply is cut-off.

The chassis grounding bolt at the back of BP400 must be connected properly.

BP400 can't be kept in the following environment: water vapor permeability, changeable temperature, vibration, dust, inflammable and explosive dangerous goods or corrosive gases.

BP400 has electrostatic sensitive devices, so that anti-static wristband should be put on when open the chassis for the sake of avoiding direct contact with the equipment.

It would have no claim on warranty if the equipment seals are damaged and no longer ensure the normal operation.

Catalogue

1 Summary

1.1 BP400 ACR controller is a new generation of digital relaying control terminal produced by BAIYUE electric Co., Ltd. It can protect, control, measure and monitor the grid with voltage below 35kV. It is suitable for a variety of system operating modes, including isolated neutral system, resistance-grounded system and arc suppression coils grounding system.
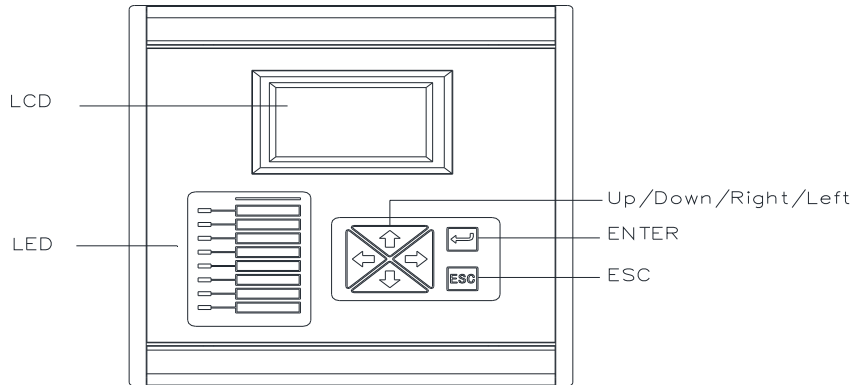

Figure1: BP400 Device Panel

BP400 series device collect full power value and isolate the measurement current circuit from the protection current circuit, which not only improve the reliability of protection but also ensures the measurement accuracy. High-precision measurement function ensures the factor of voltage, current and power to grade 0.2, as well as the factor of grade 0.5 to four- quadrant power measuring and metering.

BP400 series supports function of GPS B code time setting. Two RS485 channels support for the double-net communication mode as well as the communication protocol of Modbus and IEC60870-5-103. It provides extremely reliable net communication for the users, for different protocols could be applied into different networks.

1.2 Main characteristics

✧ **Rich interface resources**

The interface resources provided by BP400 are: the input passband of 7 channels AC current and 4 channel AC voltage. 10 channel switching value input passband (suitable for AC and DC), 7 channel switching value output; the communication interface has two RS485 and one RS232 maintenance ports.

✧ **Flexible and convenient connection method**

The four AC voltage inputs of BP400 can connect with the phase voltage, Line voltage or zero-sequence voltage or unbalanced voltage, which adapt to a variety of PT Connection.

✧ **Highly reliable design**

With the design principles of stable, reliable and durable, industrial components are adopted, all connections with the outside world are fully isolated as well as anti-lightning protection circuit and power filter are built in. Professional EMC design provides a fundamental guarantee for the reliability of operation through real-time monitoring towards the device input power, analog and digital power supply, as well as perfect self-check program. To monitor the input power helps BP400 to save the important data in good time before the power is removed.

✧ **event record in order**

BP400 will provider users 100 pieces of SOE for fault analysis (100 is a circle, namely, the next first SOE will cover the 101 SOE), the resolution of SOE is 1ms. SOE can not only record various protection actions but also filtered switching value deformation, as well as other information for fault analysis, which includes power-on, power-down, reset, self-test error of device and signal reversion, remote operation, modification of protection valuation.

✧ **High-precision measurement**

The measurement function of BP400 can measure IA、IB、IC、I0、Ua、Ub、Uc、Uab、Ubc、Uca、P、Q、F、fs、PF precisely and monitor the protection current Ia、Ib、Ic, as well as measurement towards forward kWh, reverse kWh, forward kVarh, forward kVarh. The measurement accuracy of voltage, current and power factor reaches to grade 0.2, the accuracy of power and electric degree reaches to grade 0.5. The maximum frequency measurement bias is ±0.01Hz calculation error caused by fundamental frequency fluctuation can be eliminated completely through adopting the frequency tracking technique, and real-time monitoring the changes of system frequency, as well as adjusting the time interval of data sampling.

✧ **Accurate time setting**

BP400 has three types of time setting: time setting of artificial device panel, communication time setting and IRIG-B code time setting. Among them, artificial instrument panel is rough time setting, generally for debugging; and the precision of communication time setting is less than± 100ms; whereas the precision of IRIG-B code time setting reaches to ±1ms. Accurate time setting ensures the reliability of SOE information, and enhances their value in the fault analysis. Particularly, the clock accuracy will not be affected (the clock keeps on running) even when reset or short-term power-down occur.

1.3 Performance index

✧ **Rated data**

Power: 110/220VDC or VAC , allowable deviation ＋15%, －20%;

　　　24/48 VDC, allowable deviation ＋15%, －20%.

　　　220VDC or VAC gap break (IEC 60255-11) 100 ms device without losing power

AC voltage: 100V or $100/\sqrt{3}$ V, linear measurement range is 0.2V～150V.

AC current: 5A, 1A

Measuring linear range is 0.01A～6A(5A) or 0.002A～1.2A(1A);

Protecting linear range is 0.1A～120A(5A) or 0.02A～24A(1A);

I0 measuring linear range is0.02A～20A or 0.004A～4A is optional.

Frequency: 50Hz, the measurement range is 45.00 Hz～55.00 Hz.

Phase sequence: ABC

◇ Power consumption

Power: normal<7W; exit actuation <10W

AC voltage: <0.3VA/circuit（when it is rated input）

AC current: <0.2VA/phase（when it is rated input）

◇ Output interface capability

Continuous power: 6A (DC)

Switched current: 20A (DC)

Breaking capacity (10,000times of operation, L/R=40ms):5A/48VDC or 1A/220VDC

---(trip). (Overload relay)

1A/48VDC, 0.15A/220VDC

---(signal). (Signal relay)

Actuation time: <5 ms

◇ Switching value input

Insulation voltage rating: 5kVDC

Rated voltage value: 110/220VDC or VAC, allowable deviation ±20%;

24/48 VDC, allowable deviation ±20%.

Current consumption: <3m A /circuit.

Filtering time: 0ms～999ms can be set, Filtering time will not affect the ACcurACy of recording time

◇ Communication

Insulation voltage rating: 2kV DC (except RS232）

RS485 port: baud rate 1200、2400、4800、9600、19200、38400 are optional

Communication protocol: IEC60870-5-103protocol、Modbus, see appendix of communication part

RS232: baud rate is fixed at 19200, exclusive for PLPShell. Non-public communication protocol

Communication media: GSM or GPRS wireless communication can be used, specific operation requires consultation with the manufacturer.

◇ IRIG-B input

To adopt RS422 apparatus standard or TTL reception level IRIG-B. Non-modulation signal (optional)

Insulation voltage rating: 2kVDC

TTL receiving load: <2 mA (steady state)

RS422 receiving load: <0.2 mA (steady state)

Time setting accuracy: ±1 ms

◇ AC sampling and processing

filtering circuit: second-order low-pass filtering，cut-off frequency is 700 Hz, quality factor is 0.707.

Software filtering: full-cycle cos frequency

Sampling frequency: 32 point/cycle

Actuation interval of protection and control algorithm: 1/4cycle

Actuation interval of measuring algorithm: 1cycle

✧ **Actuation precision of steady-state protection and control**

Phase current element: ±3%

Voltage element: ±3%

Phase angle: ±2°

Frequency element: ±0.01 Hz

Slip: ±0.1 Hz/S

time element: ±15 mS (1.2times setting value, includes export time）

Fixed Actuation time <35 mS

Curve timing of inverse time limitation: ±5% or ±40 mS

Coefficient of over-value return: 0.98

Coefficient of under-value return: 1.02

✧ **Precision of measurement and metrology**

Phase current: ±0.2%

Voltage: ±0.2%

Phase angle: ±0.5°

Rate fACtor: ±0.5%

Frequency: ±0.01 Hz

Power: ±0.5%

KWh: ±0.5%

Temperature coefficient: ±2ppm/（℃）^{2}

✧ **Ambient conditions**

Temperature range of operation: －20℃～＋65℃

Temperature range of transportation and storage －35℃～＋70℃

Humidity: 15%～95% non-condensing

IEC60068-2-2 dry heat testing

IEC60068-2-1 dry cold testing

Cyclic damp heat test: IEC60068-2-30, relative humidity >93%，T=20~65℃

Storage temperature testing: IEC60068-2-48

✧ **Insulation performance(IEC 60255-5)**

2kV, 50 Hz/1minute Dielectric strength (between the loop and ground, between the independent circuits): 2kV, 50 Hz / 1 minute

Impulse withstands voltage: ±5kV (1.2/50us, 0.5J)

Insulation resistance: >100MΩ, 500VDC

♦ **Mechanical testing**
IEC60255-21-1: 1 stage
Impact testing: IEC60255-21-2: 1stage
Earthquake testing: IEC60255-21-3:2 stage

♦ **Electromagnetic compatibility**
Anti-interference towards high-frequency: IEC 60255-22-1: 3stage（1MHz，2.5kV
　　　　common-mode and 1.0kV differential-mode）
Anti-static discharge: IEC 60255-22-2: 4 stage (± 8kV contact discharge)
Anti-frequency magnetic interference IEC 1000-4-8: 5stage（100A/m）
Anti-radiated electromagnetic field interference IEC 60255-22-3: 3stage（10V/m,
　　　　f=80～1000M Hz）
Anti-fast transient disturbance interference: IEC 60255-22-4: 4stage （2.5kHz &
　　　　5kHz,±4kV）
Anti-surge interference: IEC 1000-4-5: 4stage（±5kV common-mode, ±2kV
differential-mode ）

2　Device panel introduction

2.1　LED screen

The LED of the device is 128*32 lattices, which displays both English letters and Chinese characters with back lightening.

The LCD screen on man-machine interface can display 4 lines of English or 2 lines of Chinese characters. The device can be operated locally. It is convenient for users to search and set through supporting software PLP-Shell®.

2.2　Indicators（LED）

There are 8 indicators on the panel; the meaning of each indicator is stated as below:

Operation indicator: green, flashes when the unit operates normally
Alarm indicator: yellow, it lights up to show there is alarm output
Tripping indicator: red, it lights up when there is tripping output
Closing indicator: red, it lights up to show the closing output
Communication 1 indicator: green, flashes during the operation of communication1.
Communication 2 indicator: green, flashes during the operation of communication2.
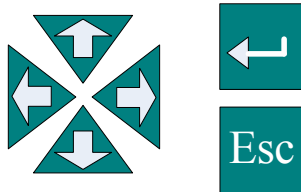OFF indicator: green, it lights up when the state of the switch is OFF
ON indicator: red, it lights up when the state of the switch is ON

2.3 Key-presses and key combination

The panel has 6 key-presses like figure2 has showed, and their functions are shown in the following figure (figure1).

（figure 2）

Figure 1

Up/Down	⬆ ⬇	move the cursor up/down or numerical addition
Left/Right	⬅ ➡	move the cursor left/right or switching between the main screens
Enter	⏎	confirm the content displays on the main screen
Back/Delete	Esc	back to the upper menu/ without saving the modifications made

Key combination:
（1） Signal reset key: appears beneath the main screen, the operating relay and the indicators on the panel are reset in 3 seconds after having pressed the "down" and "back" keys simultaneously.
（2） SOE (event record) delete key: press "enter" and "back" keys simultaneously beneath the interface of event record, all the event records are deleted.

figure 3

figure 4

figure 5

3.　Main screen introduction

Start Screen

The following graphics (figure3-5) will be showed in order once the device is turn on.

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The quality of the LED can be checked through whether there has missing images or not.

The ideal boot image is defined as the 8indicators light up orderly and correctly. Then, the event record image of "device power on" appears, and switch to the "main image" automatically in seconds (figure 6); or, when there is the event record image, press "back" key twice, the main screen appears.

Main screen

The main screen has a total number of 6 pages (figure7-12). The monitoring images are displayed in order when press the "left" "right" keys. They are respectively: Secondary current protection value, primary circuit current measurement value, secondary line voltage, primary line voltage, primary actual power and power factor, secondary four-quadrant metrology kWh.

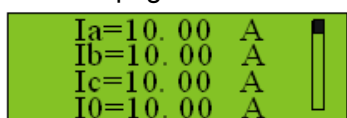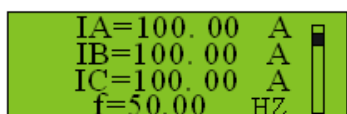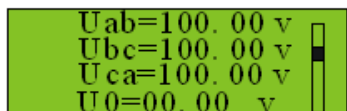The current screen page is showed on the right scroll bar.

```
Ia=10.00   A
Ib=10.00   A
Ic=10.00   A
I0=10.00   A
```
figure 7

```
IA=100.00   A
IB=100.00   A
IC=100.00   A
 f=50.00    HZ
```
figure 8

```
Uab=100.00 v
Ubc=100.00 v
Uca=100.00 v
U0=00.00   v
```
figure 9

```
Uab=10.00 kv
Ubc=10.00 kv
Uca=10.00 kv
```
figure 10

```
Grouped Element
System Settings
```
figure 13

```
          kw
          kvar
          00
```

```
          0000
-kwh=000000
+kvarh=000000
-kvarh=000000
```
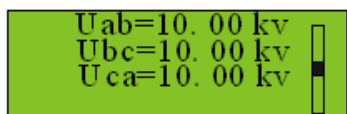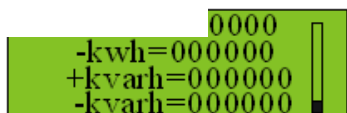figure 12

4.   Menu introduction

No matter which main image is, press "enter" to the main menu, just like figure13 shows. The main menu includes 5 articles: fixed protection value, unit parameters, unit record, unit testing and unit information. The main menu options can roll and cycle by

pressing the "up"," down" keys respectively. The selected one is displayed with black surround, then press "enter" to the submenu of the next level and back to the main screen by pressing the "back" key.

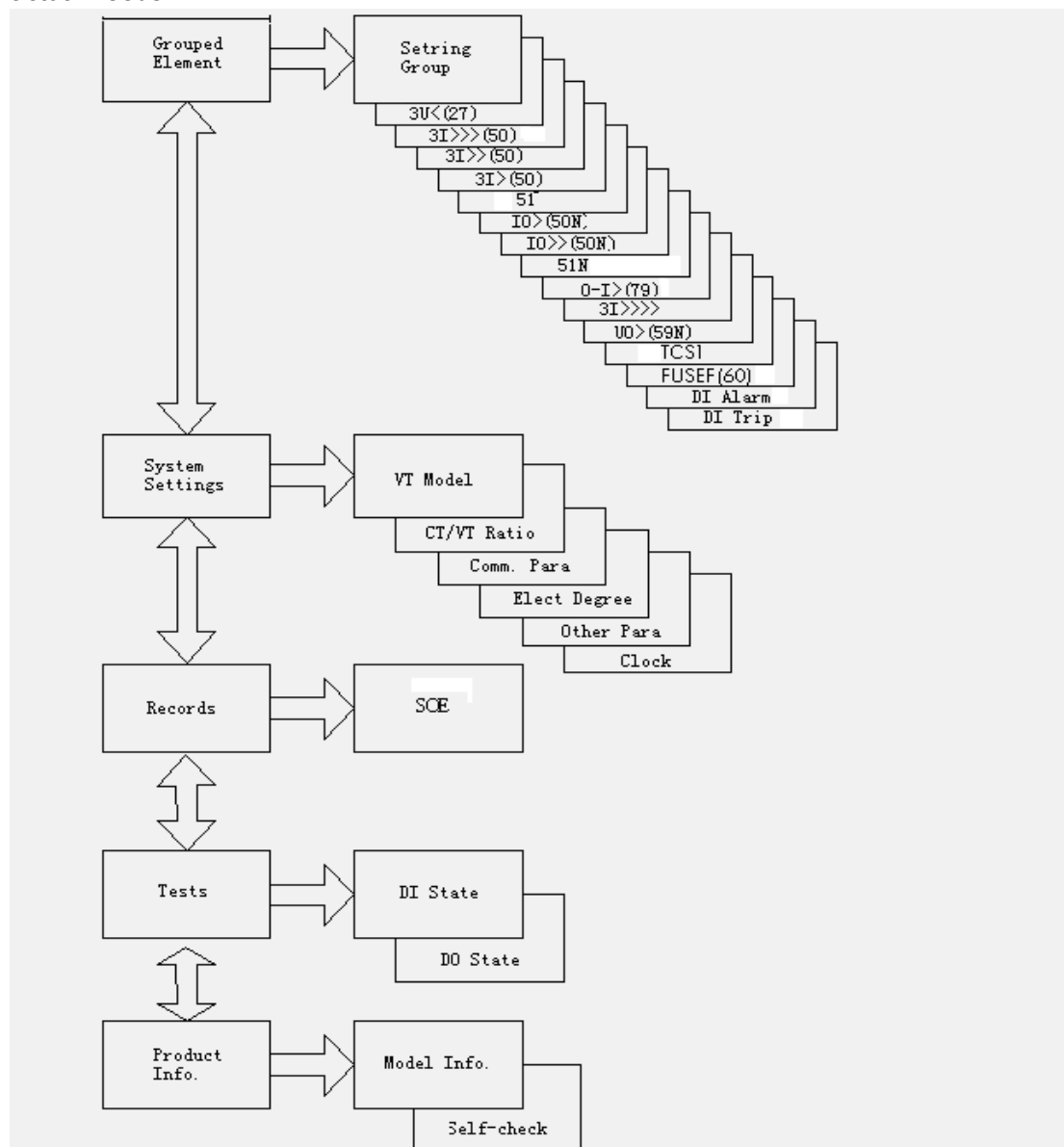BP461 is shown in figure 14,Users can choose the correct channel in accordance with the actual needs.

Figure 14

4.1 fixed protection value setting

The protection functions of each protection device are different; however, they have the same setting method. Firstly, groups of fixed value are set, and then each function needs to throw/withdraw the control word, as well as the fixed current or voltage value and fixed time value are set. The fixed values of the control word and current of each function

are in the same menu. All the fixed values are set through "left", "right" keys. This manual takes instantaneous protection for example. It requires password to change the original setting. Part 5, user password is the password description.
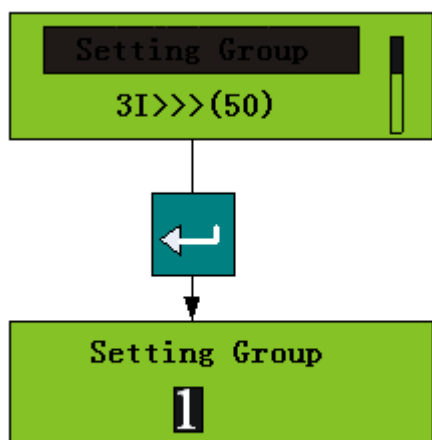
Groups of fixed value setting

figure 15

The default of the groups is 1, namely, the first group. The password is showed by pressing the "enter" key (if the operation doesn't carry out in 1minute, the password is no more in effect). Press "up", "down" to make a choice between the groups. Press "enter" when the setting is finished, then press "back" twice, there will appear the menu of "save settings on exit", "exit without saving". "Enter" represents "save settings on exit", whereas "back" represent "exit without saving".
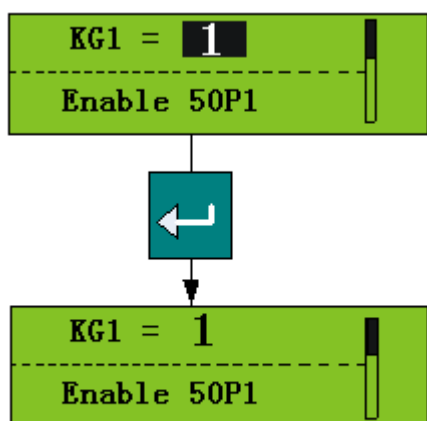
Take fixed instantaneous value for example

figure 16

The fixed instantaneous value includes the throwing and withdrawing of control word, fixed instantaneous current value. When the throwing and withdrawing of control word is ready, turn the pages by pressing the "left", "right" keys to set the fixed current value.

1) Throwing and withdrawing of the protection control word.

After having pressed the "enter" key, a choice between throw or withdraw is made by pressing "up" or "down", 1 represents throwing, and 0 represent withdrawing. The fixed current value is chosen through "left", "right" key after having pressed the "enter" key.
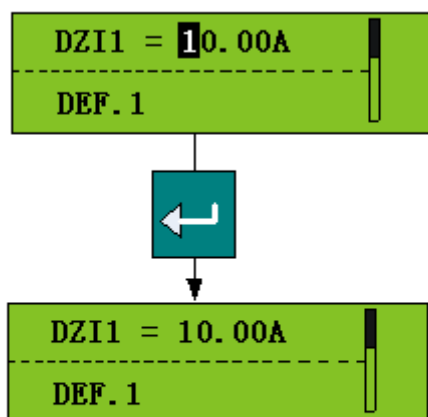

figure 17

2) setting of current fixed value.Firstly, press the "enter" key to the edit page, then press the "left", "right" keys to move the cursor, finally, press the "up", "down" keys to adjust

12

the values.

3) Firstly, press the "enter" key to exit the edit page, secondly, press "back" to the top-level menu, and then press "back" again, finally press "enter" to save the modification, whereas press "back" key means no saving.

4.2 Unit Parameter

The setting of the unit parameter includes the following 6 articles:
1）VT wire connection mode
2）CT/VT ratio (two rated values are displayed together)
3）communication parameter
4）kWh value
5） other parameters (protection element, minimal pulse of tripping and closing, password)
6） clock

figure 18

The graphics are shown as below after having entered into the unit menu.

The "up", "down" keys are used to make a free choice among the 6 articles, and then press "enter" to the next-level menu.
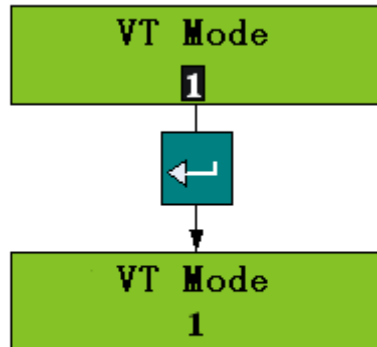
4.2.1 VT Wire connection mode

figure 19

Press "enter" to choose the method, the switching of graphics is shown as below:

Choose the connection mode by pressing the "up", "down" keys.

There are two kinds of wire connection modes:

mode1：Ua、Ub、Uc、U0/UL

mode2：Uab、Ubc、U0

Mode1 is three-phase voltage with zero-sequence voltage input, namely, voltage wire connection belongs to the connection mode of star topology.

Mode2 is line voltage with zero-sequence voltage input, namely, the connection mode is angle topology.

4.2.2 CT/VT Ratio

name	range	Step length	Unit

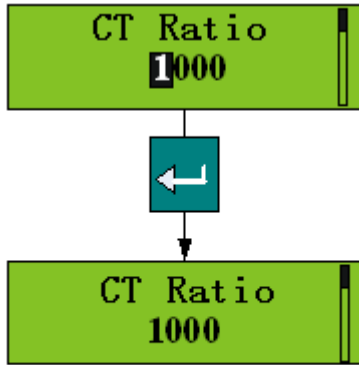| CT ratio	1—9999	1	无
VT ratio	1—9999	1	无

1）The setting of CT ratio

figure 20

The graphics of CT ratio setting is shown as below: the bits of number is decided by pressing the "left", "right" keys, and the numerical value can be changed by pressing the "up", "down" keys, then press "enter" to save it.

2）Press "left", "right" to make a choice between CT setting and VT setting, as well as VT ratio setting and CT ratio setting.

4.2.3 Communication parameter

The communication parameters which need to be set include communication address, communication speed, and communication protocol.

The communication terminal D89 at the lower left of the BP400 panel is used to connect with the interface RS232 (DB9) of PC machine which is installed with the PLPShell software package. The connection cable is with the machine (see the following figure). (2pin, receiving; 3pin, sending; 1, 4, 5 are grounding)

Tip: well-grounded is necessary when the maintenance port RS232 is connected with the desktop computer. When it is connected with the luggable computer, built-in battery is recommended to supply power instead of using power cord.
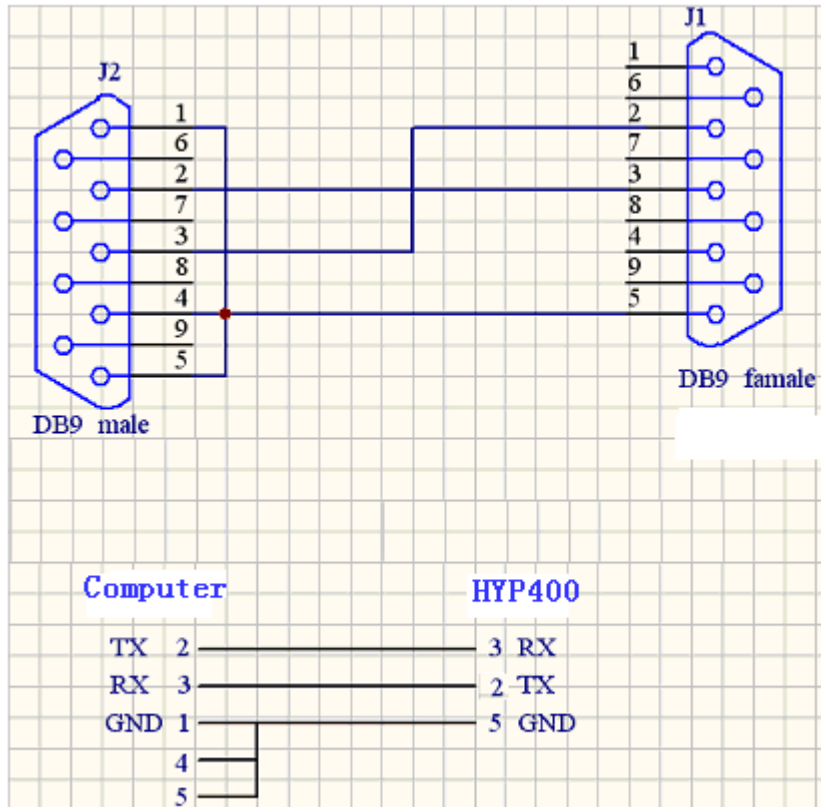
The operation mode of the maintenance port RS232 and the 485port2 on the back panel of BP400 is either-or mode. Once the connecting cable is plug into the terminal DB9 on the BP400 panel, the 485 port 2 stops working soon, and it starts to work again to disconnect the communication cable from BP400.

The communication parameter of this maintenance port RS232 is fixed: the speed rate is 19200bit/s, parity check, 1 initiation bit, 1 stop bit, no handling control signal, the communication address is 254.

The communication parameters need to be set include communication address, communication speed rate and communication protocol.
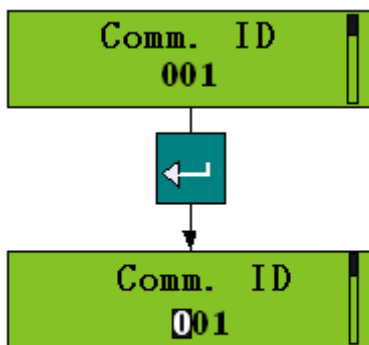
1）communication address
the rang of communication address：1—255
The setting graphics are stated as below:

Press "left", "right" keys to move the cursor, whereas the numerical value is adjusted by pressing the "up", "down" keys.
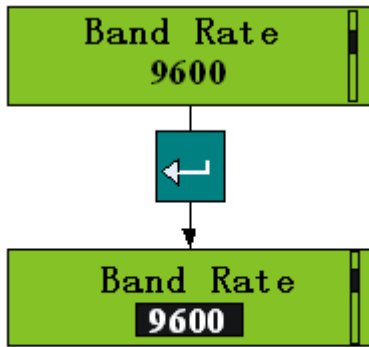
figure 21

Band Rate
9600

↵

Band Rate
9600

figure 22

2）communication speed rate

The baud rate which is able to be set by the communication speed rate are 1200，2400，4800，9600，19200，38400.（unit: bit/s），

Different baud rates are chosen by pressing the "up", "down" keys at this moment.

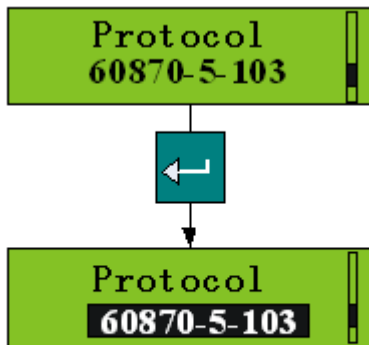**Protocol**
60870-5-103

↵

Protocol
60870-5-103

figure 23

3）communication protocol

Press "enter" when the communication speed rate is set, and then choose the communication protocol by pressing "left", "right" keys. This protection device series has two communication protocols: 60870-5-103 and MODBUS-RTU OR DNP3.0 OR 60870-5-101/104 OR MODBUS-TCP

Press "up", "down" keys to choose communication protocols at this moment.

4.2.4 kWh value

+Kwh
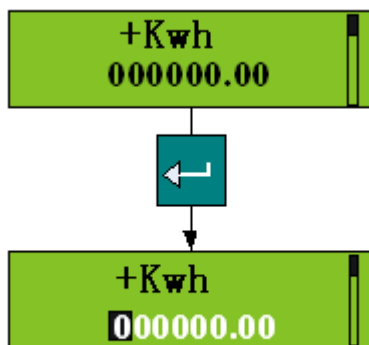**000000.00**

↵

+Kwh
000000.00

figure 24

kWh value includes: forward active kWh, reverse active kWh, forward reactive kWh, reverse reactive kWh. The setting graphics are shown as below:

Press "left", "right" keys to move the cursor, and the numerical value is adjusted by pressing the "up", "down" keys. The other three values are set similarly. The unit is kWh.

Notice: the KWh values here are quadric, the actual KWh value needs to be multiplied by the ratio of CT and VT.

4.2.5 Other parameters

A total of three other parameters, see the table below:

	Name	Range	Step length	Unit	Default

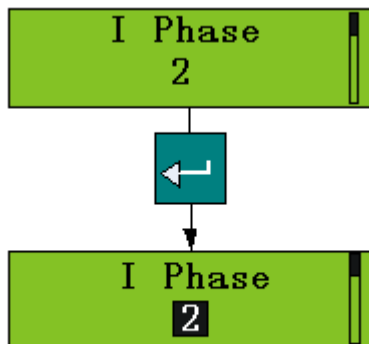| 1	Protection component	two-phase /three-phase	no	no	three-phase
2	Minimum pulse-width of tripping and closing	0~9.99	0.01	S	0.5
3	user password	0~99999	1	no	000000

1) protection component

figure 25

There are two kinds of protection components, namely, two-phase and three-phase. The setting method is shown as below:

Press "up", "down" keys to make a choice between two-phase and three-phase at this moment.

2) minimum pulse-width of tripping and closing：
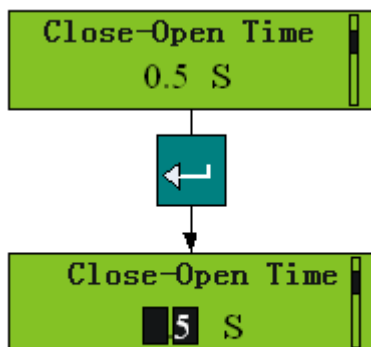

figure 26

The setting method is shown as below:
Press "up", "down" keys to adjust the numerical value.
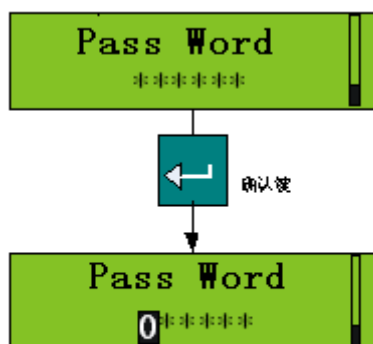
3) user password

figure 27

The resetting of the parameters and fixed value of the device needs a password to access. The setting steps of the password are shown as below: At this moment, move the cursor through the "left", "right" keys, whereas the numerical value are adjusted by pressing the "up", "down" keys.

The initial password is: 000000
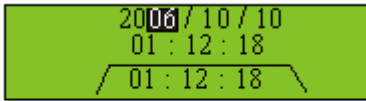
4.2.6 Clock

figure 28

Time settings include the setting of year, month, day, hour, minute, seconds; the screen graphic is shown as the Figure below:

Press the "left", "right" keys to move the cursor, while the numerical value is adjusted by pressing the "up", "down" keys.
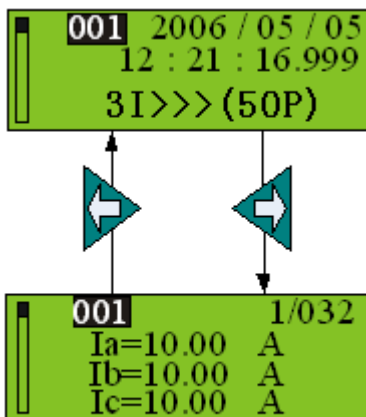
4.3 event record

figure 29

The event record mainly refers to SOE. The latest event is always No.1. The device restores100 pieces of SOE and each piece can be browsed by pressing the "up", "down" keys. Every piece of information has two graphics, in which the first one shows the SOE serial number, time (year, month, day, hour, minute, second), the name of the event. Take instantaneous quick-break for example, the specific time of the actuation in graphic is at 999 ms 12:21:16 on May 5, 2006; the second graphic includes two situations: if it is protection Actuation, then it records the component value of the Actuation

has happened, the state after deformation and the serial number of SOE (figure 29); otherwise, it only shows the SOE serial number. The example indicates the three fault-current A, B, C phase are 10A.

The switching of the two graphics is by pressing the "up", "down" keys directly, it shows in the figure.

4.4 Unit Testing

The unit testing mainly tests the switching input value (DI) and switching output value (DO) of the device.

There are two testing graphics; they are respectively the switching input test and the switching output test. Press the "left", "right" keys to make a choice between the two graphics.

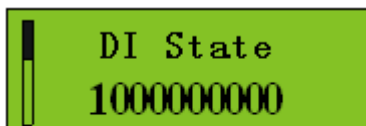the graphic of switching input testing is shown as below:

figure 30

There are 10 numbers from the left to the right, which respectively represent the state of the ten switching input values.

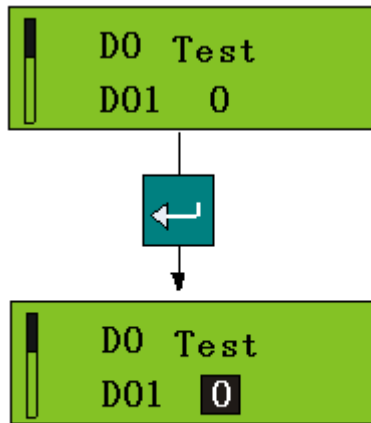the graphic of the switching output testing is shown as below:

figure 31

There are 7 channels in the graphic of switching output, namely, DO1-DO7. Press "up", "down" keys to check the state of all switching output channels. It requires a valid password to enter into the testing menu for Actuation testing. (The password should be valid), then press "up", "down" keys to choose the channel, and next press "enter" to test the switching output.

Tip: the seventh channel is always closing, the others are always opening.

4.5 Unit information

The unit information has two pages of submenu, press "left", "right" keys to turn the pages. Page1: check the module, version, serial number, see figure32.
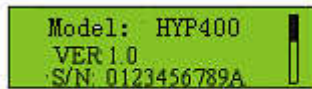

figure 32

•The serial number of BP400 consists of 11 numbers• AA CC DD EEEEE• AA: Represents the module (the serial number of the device is 04, if the module is BP461)

• CC: represents the year（06）

• DD： Represents (weeks)

• EEEEE： Represents serial number

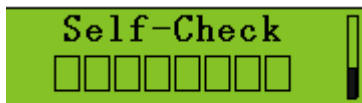1） correct self-checking is shown in the following graphic:

figure 33

Means the self- checking has passed, the internal chip and logic are correct.
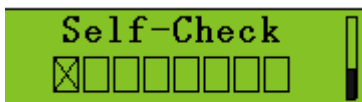
2） self- checking error

figure 34

There are 8 situations of self- checking error, The eight squares from left to right represent their own situations. "✕" in square refers to errors exist. Their meanings are respectively stated in the following table:

1	control word error
2	fixed value error

3	logical data error
4	RAM error
5	fixed value setting error
6	FRAM error
7	clock error
8	blank

5. User password

The password consists of 6 numbers. The password dialog box pops and require valid password input before resetting or setting Actuation take place.
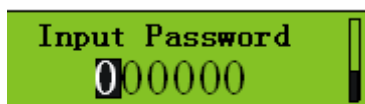
Press "left", "right" keys to change the position of the cursor, press "up", "down" keys to change the position of the cursor, and then press "up", "down" to adjust the numerical value. After having input the password, press "enter" to the resetting page.

The original password of the unit is 000000.

figure 35

## 6. Electrical wire connection

6.1 wire connection of AC value

BP400 is double CT design of measurement and protection. It provides accurate measuring functon under the premise of ensuring the reliability.

X1.1 and X1.2, 1.3 and X1.4,X1.5 and X1.6 of the backpanel of BP400 is respectively correspond to the A, B, C phase of the protecting CT; X1.7 and X1.8 of the backpanel are zero-sequence CT, which can provide reliable grounding protection; 1.9 and X1.10、X1.11 and X1.12、X1.13 and X1.14 are respectively correspond to A, B, C phase of the measuring CT, which can adopt two-phase or three-phase connection mode.

X1.15 and X1.16、X1.17 and X1.18、X1.19 and X1.20 are respectively the voltage A, B, C phase, which can adopt either the Y topology connection or $\triangle$ topology connection in accordance with the wire connection mode of PT. Just like the following figure shows, X1.21 and X1.22 are correspond to the input of opening voltage, to achieve the input of full power value with the above AC wire connection.
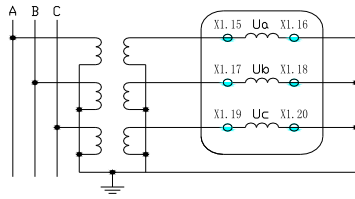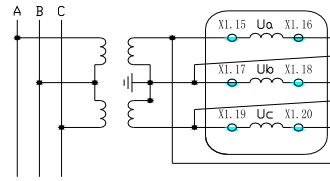
Y topology connection   △ topology connection

6.2 Input/output wire connection

BP400 provides the switching value input of ten channels, all the switching value inputs are non-polar, which can connect with AC/DC voltage. The switching value inputs must have the same polarity, because they have one termination connected with the public termination.

The 7th channel electromagnetic relay in BP400 is non-polar contact. In addition to the OUT7 is always closing contact output, the other 6 channels are always opening contacts.

6.3 Communication wire connection

BP400 provides double RS485 communication interface. X2.3、X2.4 and   X2.5 on the back panel constitute RS485(1) communication terminals, which are respectively called RS485-(1)、RS485+(1) and SHIELD(1)（communication area1）. X2.6、X2.7 and   X2.8 constitute RS485(2) communication terminal, which are respectively called RS485-(2)、RS485+(2) and SHIELD(2)（communication area2）. In order to avoid circuit caused by grounding current, the connected shielding layer and SHIELD must and only be grounded at one end, which is usually grounded in the master end of the station. Each communication node must ensure perfect connection of the shielding layer.
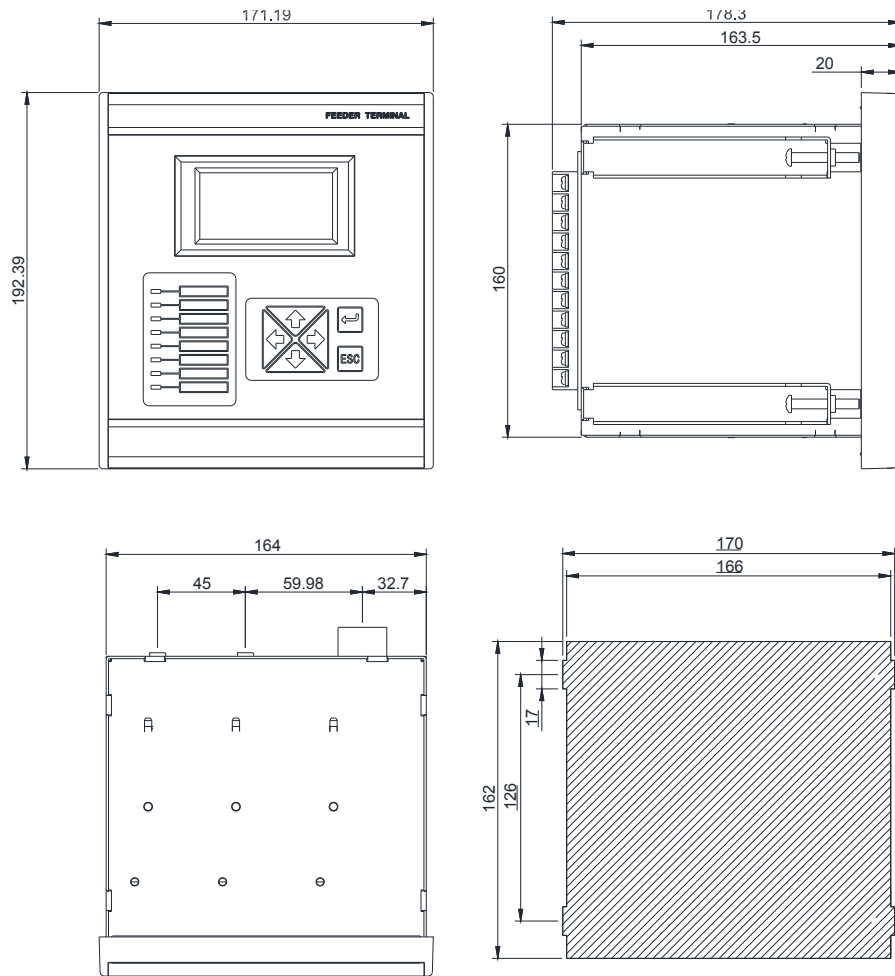
7. BP400 hole size

Figure 37 is the profile and hole size of BP400 (unit: mm)
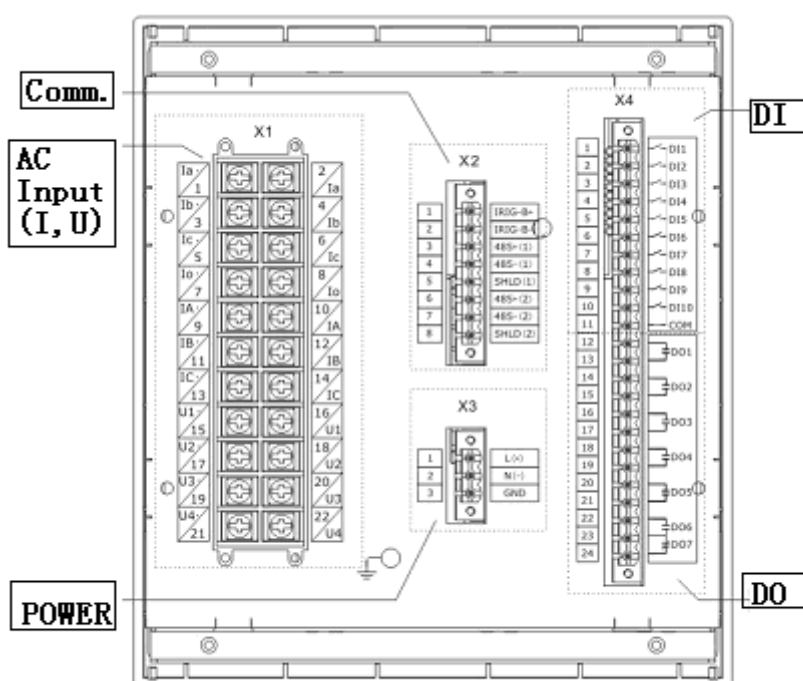
8. back terminal figure of BP400

Figure 38 back terminal figure of BP400

9. Maintanence and FAQ

Categories	issues	causes	solutions
Protection	The relay does not trip	the function is prohibited yet throw-in closedown of conditions	To heck whether the self-testing information is correct or not throw the corresponding protective control words on to check whether the conditions of closedown is satisfied or not
Common	The indicators on the panel fail to light on when BP400 is power on	Lack of power voltage Protective tube fuse the protective tube is not installed wiring error	to check the power voltage To use new T 3A protective tube To install T 3A Protective tube to check the auxiliary power terminal No.
Common	The clock is extremely inconsistent with the actual time, when BP400 is power on	the button battery ceases to be in effect inside the device	Replacement of new 3V button battery

Communication	The RS232 port of BP400 panel is enable to communicate with the Shell	wrong communication cable damage of the communication cable ungrounded of BP400 or PC	to use special cable offered by the manufacturer to use a new communication cable to ensure reliable grounding of them two（grounding is unnecessary for portable PC and is powered by battery)
Communication	Enable to communicate with the RS485port of the BP400 back panel	communication parameter error of PC damage of RS 232 port of PC polarity error of wiring ungrounded of BP400 or the main station communication parameters or protocols are inconsistent	to check the communication parameter setting of PC to check whether the RS232 port of PC is well operating to exchange the 10 wire and 1 wire to ensure correct grounding of them two to check the setting of communication parameters and protocols

The devices on each printed board inside the BP400 chassis are almost electrostatic sensitive, so well-grounded anti-static wristband must be worn when open the chassis.