

# AT281Y

## Digital three-phase multi-function harmonic monitoring meter

### User manual

### V1.0



Hangzhou Antin Power Technology Co., Ltd

## Statement

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## Chapter 1 Product Overview

### 1.1 Product Introduction

This series of multifunctional power meters is an ideal device for power monitoring. The meter has the functions of current, voltage, frequency, active power, reactive power, apparent power, positive and negative active energy, positive and negative reactive energy, power factor, complex rate, and 2-31 harmonics in the power grid. It is suitable for distributed detection of transformers, generator sets, capacitor banks and motors, and on-site monitoring and display of power grids and automatic control systems.

This series of multifunctional power meters can replace many traditional analog or digital measuring instruments (such as ammeters, voltmeters, power meters, power factor meters, frequency meters, etc.), which can greatly reduce system costs, facilitate on-site wiring, and improve system reliability. The multifunctional power monitor is equipped with a serial port, allowing connection to an open-structured computer network; the Modbus communication protocol is used to facilitate computer programming settings or data reading.

### 1.2 Product Features

- Three-phase power parameter calculation
- Modular design, flexible configuration of various functions
- Adjustable voltage and current ratio
- Password lock for parameter setting, permanent storage after power failure

- Support RS-485 communication, MODBUS-RTU protocol
- AC and DC dual-purpose power supply, high and low voltage isolation
- Segment code LCD display
- Simple and convenient installation and wiring

### 1.3 Product Parameter

<b>Measurement and metrology</b>	
Voltage	Phase voltage, line voltage
Current	Three-phase current
Active power	Split-phase and total active power
Reactive power	Split-phase and total reactive power
Apparent power	Split-phase and total apparent power
Power factor	Split-phase and total power factor
Frequency	45-65Hz
<b>Electricity metering</b>	
Active energy	Forward/reverse active energy
Reactive energy	Forward/reverse reactive energy
<b>Communication function</b>	
Communication protocols	MODBUS-RTU
Communication method	RS485

## Chapter 2 Technical Specifications

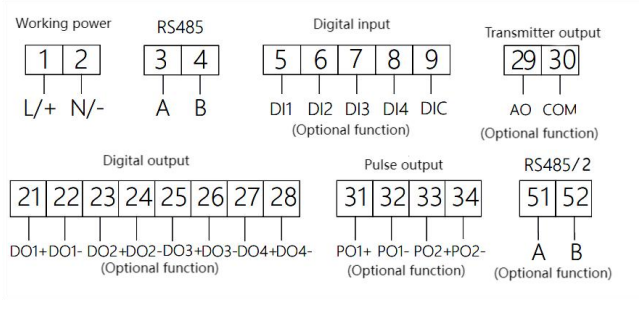
### 2.1 Technical parameters

Technical parameters		Norm	
Applicable networks		Three-phase four-wire, three-phase three-wire	
Operating power	Voltage range	AC/DC85~265V; DC18V~72V(Optional)	
	Power wastage	<2W	
Accuracy level		Reactive 1 level, the rest 0.5 level	
Import	Voltage	Rating	AC 100V、220V、400V
		Power wastage	<0.4VA/Phase
		(electrical) impedance	$\geq 200k\Omega$
	Current	Rating	AC 5A(0.02A-6A)
		Power wastage	<0.2VA/Phase
		(electrical) impedance	$\geq 0.1\Omega$
	Frequency		45Hz~65Hz
Switching input		Dry contact input, optically isolated	
Output	Switching output	Relay output; any power alarm can be set, default remote control	
	Analogue output	0~20mA/0~5V(can be set arbitrarily)	
	Digital communication interface	RS485/Modbus-RTU	
	Pulse output	1~2 power pulses, four-quadrant power metering	

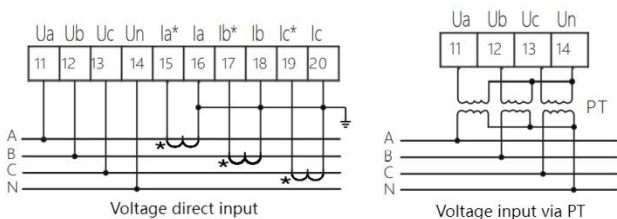
Environments	Temperature	Operating temperature: -20℃~55℃, Storage: -25℃~70℃
	Humidity	≤90%RH, no condensation, no corrosive gas place
	Height above sea level	≤2500m
EMC electromagnetic compatibility test	Electrostatic discharge immunity test	GB/T 17626.2-2006: Test level 4, test voltage 8kV
	Radio Frequency Electromagnetic Field Immunity Test	GB/T 17626.3-2006: test level 3, test field strength 10V/m
	Rapid transient pulse group test	GB/T 17626.4-2008: Test level 2, current voltage 1kV, other 500V
	Surge (shock) immunity test	GB/T 17626.5-2008: Test level 4, test voltage 4kV
	Conducted Nuisance Immunity Test for RF Field Induction	GB/T 17626.6-2008: test level 3, test field strength 10V/m
	Immunity tests for voltage dips, short-term interruptions and voltage variations	GB/T 17626.11-2008: Qualified current and voltage test error
	Oscillatory wave immunity test	GB/T 17626.12-1998: Class B ITE test, qualified



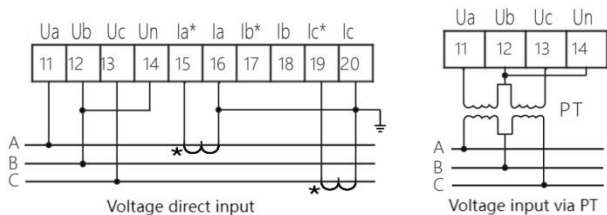
## 2.2 Wiring Diagram



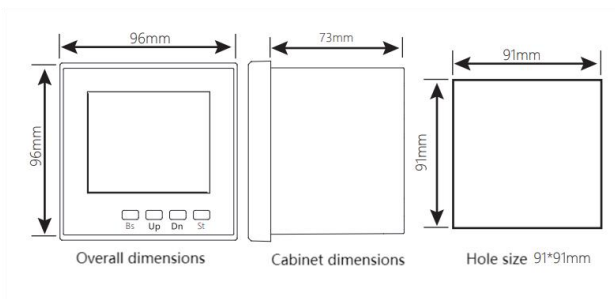
Three-phase four-wire terminal wiring diagram ▼



Three-phase three-wire terminal wiring diagram ▼







## 2.3 Appearance/opening dimensions and installation drawing





## Chapter 3 Operating Instructions

### 3.1 Key Description

 Bs	Bs key: return to the previous menu. During parameter setting, if in the last level menu, it is used as a shift key to move the blinking bit.
 Up	Up key: View the previous screen display of the power, when setting up, select the previous option of the same level menu or type in the value when the value is incremented.
 Dn	Dn key: View the next screen display of the power level, select the next option of the same level menu or type in the value when setting the value decreases.
 St	St key: enter the next level menu. In the parameter setting, if in the last level menu, it will be "save and return to the previous level menu"; when the current menu is the password input menu, it will judge whether the


	<p>password is correct or not, if it is correct, it will enter the next level menu, otherwise, it will return to the previous level menu. -Otherwise, it returns to the previous menu.</p>
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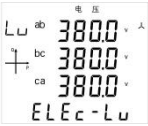
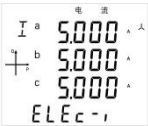
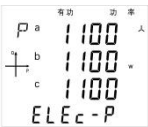
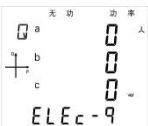

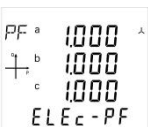
## 3.2 Launch Interface

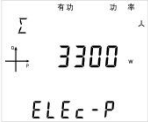





 <p>现在正反向有功电能电压波动频率</p> <p>ab -8888</p> <p>bc -8888</p> <p>ca -8888</p> <p>88888888</p>	<p>The startup interface displays all the segment codes on the full screen, and the interface stays for 1s, which is used to detect whether the LCD screen can display normally.</p>
 <p>电压</p> <p><math>P_u^a</math> 220.0 v</p> <p><math>P_u^b</math> 220.0 v</p> <p><math>P_u^c</math> 220.0 v</p> <p>E L E c - <math>P_u</math></p>	<p>After the startup interface completes self-test, it enters the three-phase voltage display interface and acts as the main interface to display the instrument power parameters.</p>

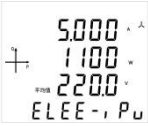





## 3.3 Battery Level Enquiry







Under the initial display interface, through "Up" and "Dn" keys, select the power interface, electric energy interface or other extended parameter interface to be displayed, and after the query is completed, through "Bs". When the query is finished, return to the first interface by "Bs" key.







 <p>电压</p> <p><math>P_u^a</math> 220.0 v</p> <p><math>P_u^b</math> 220.0 v</p> <p><math>P_u^c</math> 220.0 v</p> <p>E L E c - <math>P_u</math></p>	<p>In the initial interface state, through the "Up" and "Dn" keys, select the interface of the power parameter to be displayed, and in the case of three-phase four-wire system, the three-phase voltage interface is the first interface.</p>
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	<p>Press "Dn" key to display the three-phase line voltage, and this interface is displayed by default for three-phase three-wire system.</p>
	<p>Press the "Dn" key to display the three-phase current.</p>
	<p>Press the "Dn" key to display the three-phase active power.</p>
	<p>Press the "Dn" key to display the three-phase reactive power.</p>
	<p>Press the "Dn" key to display the three-phase apparent power.</p>
	<p>Press the "Dn" key to display the three-phase power factor.</p>





 <p>有功 功率 Σ 3300 ELEC-P</p>	<p>Press the "Dn" key to display the three-phase total active power.</p>
 <p>无功 功率 Σ 0 ELEC-Q</p>	<p>Press the "Dn" key to display the three-phase total reactive power.</p>
 <p>视在 功率 Σ 3300 ELEC-S</p>	<p>Press "Dn" to display the three-phase total apparent power.</p>
 <p>Σ 1.000 ELFC-PF</p>	<p>Press the "Dn" key to display the total three-phase power factor.</p>
 <p>频率 HZ 50.00 ELEE-F</p>	<p>Press the "Dn" key to display the frequency.</p>
 <p>5000 A 1100 W 2200 V ELEE-1, PUV</p>	<p>Press the "Dn" key to display the maximum value of current, power and voltage.</p>

	<p>Press the "Dn" key to display the average value of current, power and voltage.</p>
	<p>Press the "Dn" key to display the date.</p>
	<p>Press the "Dn" key to display the positive active energy.</p>
	<p>Press the "Dn" key to display the reverse active energy.</p>
	<p>Press the "Dn" key to display the positive reactive energy.</p>
	<p>Press the "Dn" key to display the reverse reactive energy.</p>



	Press the "Dn" key to display the tip positive active energy.
	Press the "Dn" key to display the tip-reverse active energy.
	Press the "Dn" key to display the tip positive reactive energy.
	Press the "Dn" key to display the tip-reverse reactive energy.
	Press the "Dn" key to display the peak positive active energy.
	Press the "Dn" key to display the peak-to-reverse active energy.

	<p>Press the "Dn" key to display the peak positive reactive energy.</p>
	<p>Press the "Dn" key to display the peak reverse reactive energy.</p>
	<p>Press the "Dn" key to display the levelled active energy.</p>
	<p>Press the "Dn" key to display the active energy in both directions.</p>
	<p>Press the "Dn" key to display the flat positive reactive energy.</p>
	<p>Press the "Dn" key to display the parallel and reverse reactive energy.</p>



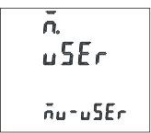

	<p>Press the "Dn" key to display the valley positive active energy.</p>
	<p>Press the "Dn" key to display the valley reverse active energy.</p>
	<p>Press the "Dn" key to display the valley positive reactive energy.</p>
	<p>Press the "Dn" key to display the valley reverse reactive energy.</p>

### 3.4 Harmonic interface

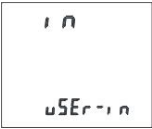
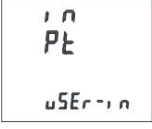

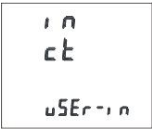

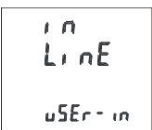
	<p>Press and hold down the "Bs" key in the main interface to display the voltage harmonics.</p>
	<p>Press the "Dn" key to display the current harmonics.</p>


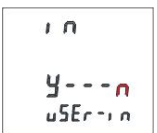
### 3.5 User parameter settings

Under the initial display interface, press "St" key continuously and "Dn" key continuously to find the menu item of user setting, as shown in the following figure, press "St" key to enter the user password input interface to complete the password input, increase or decrease the number through "Up" key and "Dn" key, and shift the number blinking through "Bs" key. Press "St" key to enter the user password input interface to complete the password input, through the "Up" key and "Dn" key to increase or decrease the number, and through the "Bs" key to shift the number blinking, the factory initial password is The initial factory password is "0001".





	<p>In the initial interface, press the "St" key, and then press the "Dn" key continuously to find the menu item of user setting.</p>
	<p>Press "St" key, the password input interface will be displayed, as shown in the left figure, input the correct setup parameter to enter the setup parameter interface, the factory initial password is 0001.</p>

## 3.5.1 Power parameter setting

	<p>Enter the user parameter setting interface, press "Dn" key to find the power parameter setting menu item interface.</p>
	<p>Press the "St" key to display the electrical parameter setting option interface, use the "Up" and "Dn" keys to find the PT ratio setting menu item.</p>
	<p>Press the "St" key to display the PT ratio parameter setting interface, and set the desired PT ratio value (setting value: 1-5000) through the numeric increase/decrease key and "Bs" shift key.</p>
	<p>Press the "St" key to return to the electrical parameter setting option interface, and use the "Up" and "Dn" keys to find the CT ratio setting menu item.</p>
	<p>Press the "St" key to display the CT ratio parameter setting interface, and set the desired CT ratio value (setting value: 1-5000) through the numeric increment/decrement keys and the "Bs" shift key.</p>
	<p>Press the "St" key to return to the electrical parameter setting option interface, and use the "Up" and "Dn" keys to find the line system setting menu item.</p>

	<p>Press the "St" key to display the line system parameter setting interface, and use the "Up" and "Dn" keys to set the desired line system value (setting options: 3P4L, 3P3L).</p>
	<p>After setting, press "St" to confirm the setting, press "Bs" continuously to select "y" blinking, and press "St". Press "Bs" key continuously to select "y" blinking, and press "St" key to confirm to save the parameter.</p>



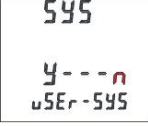
### 3.5.2 Communication parameter setting

	<p>Enter the user parameter setting interface, press the "Dn" key to find the communication parameter setting menu item interface.</p>
	<p>Press the "St" key to display the communication parameter option screen, use the "Up" and "Dn" keys to find the communication address setting menu item.</p>
	<p>Press the "St" key to display the communication address setting interface, and set the desired communication address value (setting value: 1-253) with the "Up" and "Dn" keys.</p>
	<p>Press the "St" key to return to the communication parameter option interface, and use the "Up" and "Dn" keys to find the communication baud rate menu item.</p>


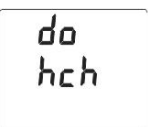
	<p>Press "SL" key to display the baud rate setting interface, use "Up" and "Dn" keys to set the desired communication baud rate (setting options: 4800/9600/9600). 19200).</p>
	<p>Press the "St" key to return to the communication parameter option interface, and use the "Up" and "Dn" keys to find the communication verification setting menu item.</p>
	<p>Press the "St" key to display the parity parameter setting interface, and set the required parity bit (setting value: no/even/odd) through the "Up" and "Dn" keys.</p>
	<p>After setting, press "St" to confirm the setting, press "Bs" continuously to select "y" blinking, and press "St". Press "Bs" key continuously to select "y" blinking, and press "St" key to confirm to save the parameter.</p>


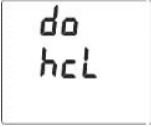




### 3.5.3 Power zero setting



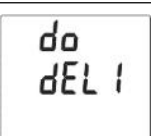

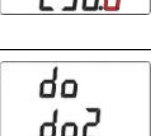
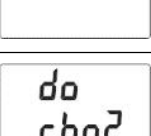
	<p>Enter the user parameter setting interface, press the "Dn" key to find the system parameter setting menu item interface.</p>
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	<p>Press the "St" key to display the system parameter setting interface, and use the "Up" and "Dn" keys to find the menu item of power clearing.</p>
	<p>Press "St" key to display the interface of power zero setting, switch "yes" by "Up" and "Dn" key. Select "yes" by pressing "Up" and "Dn".</p>
	<p>After setting, press "St" to confirm the setting, press "Bs" continuously to select "y" blinking, and press "St". Press "Bs" key continuously to select "y" blinking, and press "St" key to confirm to save the parameter.</p>


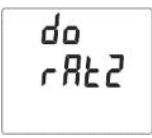

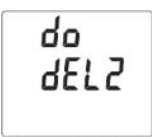

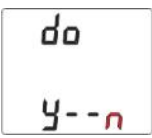
### 3.5.4 Parameter setting for open volume

	<p>Enter the user parameter setting interface, press the "Dn" key, and find the menu item of parameter setting interface.</p>
	<p>Press the "St" key to display the open volume setting options screen, and use the "Up" and "Dn" keys to find the upper limit return parameter setting menu item.</p>

	<p>Press "St" key to display the upper limit return parameter setting interface, use "Up" and "Dn" keys to set the upper limit return value (the default is 0.9: i.e. the action value is the same as the set value). (default is 0.9: the action value is 0.9 times of the setting value).</p>
	<p>Press the "St" key to return to the open volume setting option interface, and use the "Up" and "Dn" keys to find the lower limit return parameter setting menu item.</p>
	<p>Press "St" key to display the lower limit return parameter setting interface, through the "Up" and "Dn" keys, set the lower limit return value (the default is 1.1: i.e. the action value is the setting value). (default is 1.1: i.e. the action value is 1.1 times of the setting value).</p>
	<p>Press the "St" key to return to the output setting options screen, and use the "Up" and "Dn" keys to find the DO1 output setting menu item.</p>
	<p>Press the "St" key to display the DO1 output parameter setting interface, the default is DO1 output parameter channel selection menu item.</p>
	<p>Press the "St" key to display the DO1 parameter channel setting interface, and use the "Up" and "Dn" keys to set the desired channel parameter (setting value: UH/UL/IH/H). IL, etc.; no is remote control output).</p>


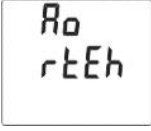


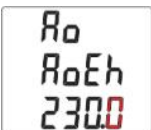
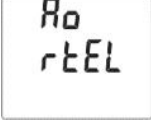
	<p>Press the "St" key to return to the DO1 output parameter setting interface, and use the "Up" and "Dn" keys to find the DO1 parameter multiplier setting menu item.</p>
	<p>Press the "St" key to display the multiplier setting option interface, use the "Up" and "Dn" keys to set the DO1 parameter multiplier (setting value: 1, K (i.e., actual value = setting value)). x1000), default is 1).</p>
	<p>Press the "St" key to return to the DO1 output parameter setting interface, and use the "Up" and "Dn" keys to find the DO1 parameter setting menu item.</p>
	<p>Press the "St" key to display the parameter setting option interface, use the "Up" and "Dn" keys to set the parameters of DO1 channel (setting value: change based on the default parameter value, such as). (Setting value: change based on the default parameter value, e.g., the upper limit value of voltage is 250V by default).</p>
	<p>Press "St" and "Bs" key to return to the output setting option screen, and then press "Up" and "Dn" key to select "Up" and "Dn". Up" and "Dn" keys to locate the DO2 output setting menu item.</p>
	<p>Press the "St" key to display the DO2 output parameter setting interface, the default is the DO2 output parameter channel selection menu item.</p>

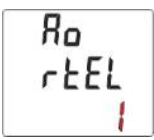


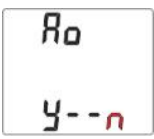


	<p>Press the "St" key to display the DO1 parameter channel setting interface, use the "Up" and "Dn" keys to set the desired channel parameters (Setting value: all power parameters are optional.); no is remote control output).</p>
	<p>Press the "St" key to return to the DO2 output parameter setting interface, and use the "Up" and "Dn" keys to find the DO2 parameter multiplier setting menu item.</p>
	<p>Press the "St" key. The multiplier setting option interface will be displayed, through the "Up" and "Dn" keys, set the DO2 parameter multiplier (setting value: 1, K (i.e., the actual value = setting value × 1000), the default is 1).</p>
	<p>Press the "St" key to return to the DO2 output parameter setting interface, and use the "Up" and "Dn" keys to find the DO2 parameter setting menu item.</p>
	<p>Press the "St" key to display the parameter setting option interface, use the "Up" and "Dn" keys to set the parameters of DO2 channel (setting value: change based on the default parameter value, such as). (Setting value: change based on the default parameter value, e.g. the lower voltage limit value is 150V by default).</p>
	<p>After setting, press "St" to confirm the setting, press "Bs" continuously to select "y" blinking, and press "St". Press "Bs" key continuously to select "y" blinking, and press "St" key to confirm to save the parameter.</p>

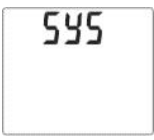
## 3.5.5 Transmission parameter setting

Ro	Enter the user parameter setting interface, press the "Dn" key to find the menu item of parameter setting interface of variable transmission.
Ro chnL	Press the "St" key to display the variable output setting option interface, use the "Up" and "Dn" keys to find the variable output channel setting menu item.
Ro chnL no	Press the "St" key to display the transmission parameter channel setting interface, and use the "Up" and "Dn" keys to set the required channel parameters (setting value: all power parameters are optional).
Ro RoRh	Press the "St" key to display the variable output setting option interface, and use the "Up" and "Dn" keys to find the variable output upper limit setting menu item.
Ro RoRh 20	Press the "St" key to display the upper limit setting interface of variable output, set the required upper limit value parameter through the "Up" and "Dn" keys (setting value: 4-20; default 20). ).
Ro RoRl	Press the "St" key to return to the variable output setting option interface, and use the "Up" and "Dn" keys to find the variable output lower limit setting menu item.

	<p>Press "St" key to display the lower limit setting interface of variable output, set the desired lower limit value parameter through "Up" and "Dn" keys (setting value: 4-20; default 4). The lower limit is set by "Up" and "Dn" keys.</p>
	<p>Press the "St" key to return to the variable setting options interface, and use the "Up" and "Dn" keys to find the variable channel parameter upper limit multiplier setting menu item.</p>
	<p>Press the "St" key to display the interface of variable transmission upper limit multiplication setting, and set the required parameters (setting value: 1, K (i.e., the actual value = setting value) through the "Up" and "Dn" keys). × 1000), default is 1).</p>
	<p>Press the "St" key to return to the variable setting option interface, and use the "Up" and "Dn" keys to find the variable channel parameter upper limit setting menu item.</p>
	<p>Press "St" key to display the upper limit setting interface of variable transmission parameter, through "Up" and "Dn" keys, set the required parameters (setting value: change based on the default parameter value, such as variable transmission parameter). (Setting value: change based on the default parameter value, e.g. the default value of transmission upper limit is 230V).</p>
	<p>Press the "St" key to return to the variable setting options interface, and use the "Up" and "Dn" keys to find the variable channel parameter lower limit multiplier setting menu item.</p>

	<p>Press "St" key to display the lower limit multiplier setting interface, through the "Up" and "Dn" keys, set the required parameters (setting value: 1, K (i.e., the actual value = setting value)). × 1000), default is 1).</p>
	<p>Press the "St" key to return to the variable setting option interface, and use the "Up" and "Dn" keys to find the lower limit setting menu item of the variable channel parameters.</p>
	<p>Press "St" key to display the lower limit setting interface of variable transmission parameter, through "Up" and "Dn" keys, set the required parameter (setting value: change based on the default parameter value, such as variable). (Setting value: change based on the default parameter value, e.g. the default value of lower limit of variable transmission is 0.0V).</p>
	<p>After setting, press "St" to confirm the setting, press "Bs" continuously to select "y" blinking, and press "St". Press "Bs" key continuously to select "y" blinking, and press "St" key to confirm to save the parameter.</p>

### 3.5.6 User Password Setting

	<p>Enter the user parameter setting interface, press the "Dn" key to find the system parameter setting menu item interface.</p>
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	<p>Press the "St" key to display the system parameter setting interface, and use the "Up" and "Dn" keys to find the user password menu item.</p>
	<p>Press the "St" key to display the user password setting interface, and use the "Up" and "Dn" keys to set the desired new user password.</p>
	<p>After setting, press "St" to confirm the setting, press "Bs" continuously to select "y" blinking, and press "St". Press "Bs" key continuously to select "y" blinking, and press "St" key to confirm to save the parameter.</p>

\*Note: The power parameters corresponding to the open output and variable output are quadratic values, i. e. the voltage range is 0-400V; the current range is 0-5A.

## Digital Tube English Correspondence Table

1	2	3	4	5	6	7	8	9	0	A	B
1	2	3	4	5	6	7	8	9	0	A	B
C	D	E	F	G	H	I	J	K	L	M	N
C	d	E	F	G	H	I	J	K	L	ñ	n
O	P	Q	R	S	T	U	V	W	X	Y	Z
o	P	q	r	s	t	u	v	w	x	y	z

## After-sales service

1. If the user does not understand the description in the manual during installation and commissioning, please contact the aftersales team.
2. The company's technology is ready to answer product-related questions.
3. The problems arising in the use of the product will be replied within one working day.
4. Our company has a one-year free warranty for the above products from the date of sale.

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Technical descriptions are subject to change without notice

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