

Multi-Function Harmonic Meter Type ME237H



Products Instruction Manual

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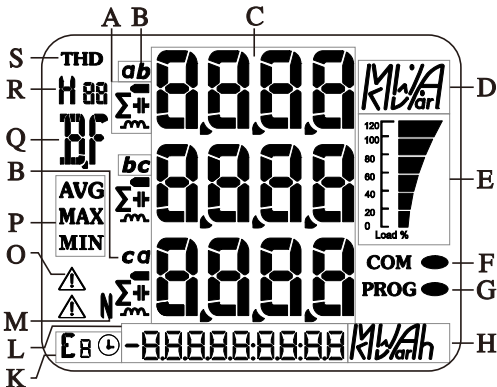
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1 Display interface and button description

1.1 Display Content Description

This series of instruments is a large-screen LCD screen, and the display content is shown in the figure below.



1.1.1 Display the description of the interface area

serial number	meaning
A	“ Σ ” Total value prompt
	“ $\mathcal{M}$ ” Inductive loads
	“ $\pm$ ” Capacitive load
	“—” Positive and negative prompts
B	Phase sequence prompt
C	Real-time data display zones
D	Real-time data units
E	Percentage prompt
F	Communication prompt
G	Programming prompts
H	Energy data unit

serial number	meaning
K	Electricity, time prompt
L	Electrical energy, time display area
M	Average, zero-order prompt
O	Error prompt
P	*AVG" mean prompt
	*MAX" maximum value prompt
	"MIN" minimum value prompt
Q	Real-time data type prompt
R	Higher-order harmonic prompts
S	Harmonic distortion rate prompt

1.2 Displays an overview of the interface

This series of instruments is divided into 7 display interfaces, press the  key to switch the display interface

type	Three-phase four-wire	Three-phase three-wire	Single
 Current interface	current	current	current
 Voltage, power and other parameters interface	Phase voltage Line voltage Active power Reactive power Apparent power Factor Active power demand Reactive power demand frequency 1-4 open-circuit shutdown input 5-8 switching inputs Switching output status	Line voltage Active power Reactive power Apparent power Factor Active power demand Reactive power demand frequency 1-4 open-circuit shutdown input 5-8 switching inputs Switching output status	Phase voltage Active power Reactive power Apparent power Factor Active power demand Reactive power demand frequency 1-4 open-circuit shutdown input 5-8 switching inputs Switching output status

Uh Voltage harmonic interface	Voltage harmonic interface 1-31st voltage harmonics	Voltage harmonic interface 1-31st voltage harmonics	Voltage harmonic interface 1-31st voltage harmonics
Ih Current harmonic interface	Current total harmonics 1-31st current harmonics	Current total harmonics 1-31st current harmonics	Current total harmonics 1-31st current harmonics
F₀₁ Forward and reverse energy interfaces	Positive active electrical energy Reverse active energy Forward reactive energy Reverse reactive energy	Positive active electrical energy Reverse active energy Forward reactive energy Reverse reactive energy	Positive active electrical energy Reverse active energy Forward reactive energy Reverse reactive energy

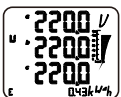
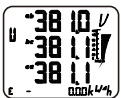
1.3 Displays the content of the interface

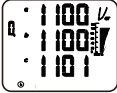
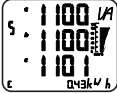
In any display interface, press  the key to switch the display interface, and then press to   switch to display the measurement parameters.

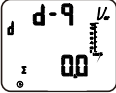
1.3.1 The current display interface is as follows:

Display the interface	illustrate
	Displays three-phase current in A; 1st row: $I_a=5.000A$; 2nd row: $I_b=5.000A$; 3rd row: $I_c=5.000A$; Fourth row: forward active energy = 0.43kwh.

1.3.2 Voltage, power, power factor, frequency, switching quantity, etc As follows:

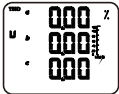
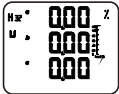
Display the interface	illustrate
	Display phase voltage in V; When the wiring method is three-phase When there are four lines, this page is displayed, otherwise it is not displayed. First row: $U_a=220.0V$; 2nd row: $U_b=220.0V$; Third row: $U_c=220.0V$; Fourth row: forward active energy = 0.43kwh.
	Display line voltage, unit: V; First row: $U_{ab}=381.0V$; 2nd row: $U_{bc}=381.1V$; 3rd row: $U_{ca}=381.1V$; Fourth row: reverse active energy = 0.00kwh.

	Display three-phase active power, unit: W; First row: $P_a=1100W$; 2nd row: $P_b=1100W$; 3rd row: $P_c=1101W$; Fourth row: forward reactive energy = 0.75kvarh.
	Display the total active power of three phases, unit: W; First row: $P=3301W$; Second row: reverse reactive energy = 0.00kvarh.
	Display three-phase reactive power, unit: Var; First row: $Q_a=1100Var$; 2nd row: $Q_b=1100Var$; 3rd row: $Q_c=1101Var$;
	Display the total reactive power of three phases, unit: Var; First row: $Q=3301Var$;
	Displays three-phase apparent power, unit: VA; First row: $S_a=1100VA$; 2nd row: $S_b=1100VA$; 3rd row: $S_c=1101VA$; Fourth row: forward active energy = 0.43kwh.

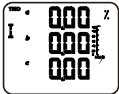
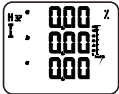
	Display three-phase active power, unit: W; First row: $P_a=1100W$; 2nd row: $P_b=1100W$; 3rd row: $P_c=1101W$; Fourth row: forward reactive energy = 0.75kvarh.
	Display of three-phase power factor; 1st row: $PF_a=1.000$; 2nd row: $PF_b=1.000$; 3rd row: $PF_c=1.000$; Fourth row: forward reactive energy = 0.75kvarh.
	Display of three-phase total power factor; 1st row: $PF=1.000$; Second row: reverse reactive energy = 0.75kvarh.
	Displays the active power demand; First row: d-p = active power demand; Second row: active power demand = 0.0W;
	Display reactive power demand; First row: d-q = reactive power demand; Second row: reactive power demand = 0.0Var;

 The display shows 'Frq' at the top left, '50.00' in the middle, and 'Hz' below it. At the bottom right, it shows '0.43 kWh'.	Display frequency, unit: Hz; First row: Frq = frequency; 2nd row: F=50.00Hz; Third row: Forward active energy = 0.43kwh.
 The display shows 'dI' at the top left, '1234' in the middle, and '0000' below it. At the bottom right, it shows '0.00 kWh'.	First row: DI = switching input; The second row: 1234 means the 1st road, the 2nd road, 3rd and 4th switching inputs; Third row: 0 for disconnected, 1 for closed; From left to right, it represents the input status of 1-4 switches; Fourth row: reverse active energy = 0.00kwh.
 The display shows 'dI' at the top left, '5678' in the middle, and '0000' below it. At the bottom right, it shows '0.75 kVarh'.	First row: DI = switching input; The second row: 5678 means the 5th road, the 6th road, 7th channel, 8th channel switching input; Third row: 0 for disconnected, 1 for closed; From left to right, it represents the input status of 5-8 switches; Fourth row: Forward reactive energy = 0.75karh.
 The display shows 'do' at the top left, '1234' in the middle, and '0000' below it. At the bottom right, it shows '0.00 kVarh'.	First row: do indicates switching output; The second row: 1234 means the 1st road, the 2nd road, 3rd channel, 4th switching output; Third row: 0 for disconnected, 1 for closed; From left to right, 1-4 switching output status; Fourth row: reverse reactive energy = 0.00karh.

1.3.3 The voltage harmonic display interface is as follows:

Display the interface	illustrate
	Display of voltage total harmonics;
	Display of the 1st voltage total harmonics;
⋮	⋮
	The 32nd voltage total harmonic is displayed;

1.3.4 The current harmonic display interface is as follows:

Display the interface	illustrate
 The interface shows a digital display with three rows of '000'. To the left of the display is a vertical label 'I' with a small 'H' above it. To the right of the display is a vertical label 'H' with a small 'H' above it. A small 'Z' is at the top right, and a lightning bolt icon is at the bottom right.	Display of current total harmonics;
 The interface is identical to the first one, but the vertical label on the left is 'H01' instead of 'I'.	Display of the 1st current total harmonic;
 A vertical ellipsis consisting of five dots.	 A vertical ellipsis consisting of five dots.
 The interface is identical to the first one, but the vertical label on the left is 'H32' instead of 'I'.	The 32nd current total harmonic is displayed;

1.3.5 The electric energy display interface is as follows:

Display the interface	illustrate
	Shows forward active energy = 0.43kWh;
	Reverse active energy = 0.00kWh;
	Shows forward reactive energy = 0.75kvarh;
	Shows reverse reactive energy = 0.00kvarh;

Note: The maximum displayed value for electric energy is 9,999,999.99 kWh. When it reaches 10 million kWh, it will automatically reset to zero.

Example: If the electric energy is 10,000,300.00 kWh, the meter will display 300.00 kWh. Please keep a record when reading the meter.

1.4 Key Description

This multi-function watch has 4 buttons, which are left-click, right-turn, confirm and multi-function.

Current Page Key	Display Interface	Level 1 Menu Interface	Level 2 Menu Interface	Level 3 Menu Interface
Left key 	Switch parameter interfaces under the display interface	Menu up	Query previous parameter	Data increment
Right key 	Switch parameter interfaces under the display interface	Menu down	Query next parameter	Data decrement
Confirm key 	Switch display interface	Enter level 2 menu	Enter level 3 menu	Save setting parameters and return to level 2 menu
Multi-function key 	Enter password input page, single press to shift	Return to display interface	Return to level 1 menu	Set cursor to move left

Note: If you do not act for 60 seconds in the settings interface, you will return to the display interface.

2 Technical Indicators

2.1 Performance Parameters

Performance		Index
Wiring mode		Three-phase three-wire / Three-phase four-wire
Voltage	Rated value	57.7/100V, 220/380V, 400/690V, 500/866V
	Overload	Continuous: 1.2 times; Instantaneous: 2 times / 1s
	Power consumption	<0.5VA / phase
	Accuracy	RMS (true effective value) measurement accuracy: 0.5%
Current	Rated value	5A, 1A
	Overload	Continuous: 1.2 times; Instantaneous: 20 times / 1s
	Power consumption	<0.5VA / phase
	Accuracy	RMS (true effective value) measurement accuracy: 0.5%
	Measurement accuracy range	$0.02I_n \leq I < 1.2I_n$
Frequency		45~65Hz, accuracy $\pm 0.02\text{Hz}$
Power, power factor		Accuracy: 0.5%
Electric energy (for reference only, not for billing)		Active energy: 1%; Reactive energy: 2%
Electric energy pulse		Passive optocoupler collector output, fixed pulse width 80ms
Communication		RS485 interface, ModBus-RTU communication protocol
Working voltage		AC220V or AC85~270V / DC100~300V
Power consumption		Less than 5W
Working environment		-10~55°C
Storage environment		-20~75°C

3 Function Introduction

3.1 Measurements

Type	Description	1	2	3	Average	Total
Voltage	Phase voltage	✓	✓	✓	✓	
	Line voltage	✓	✓	✓	✓	
Current	Current	✓	✓	✓	✓	
Power	Active power	✓	✓	✓		✓
	Reactive power	✓	✓	✓		✓
Factor	Factor	✓	✓	✓		✓
Frequency	Frequency					✓
Active power demand	Real-time demand					✓
Reactive power demand	Real-time demand					✓
Voltage harmonic	1-31st order					✓
Current harmonic	1-31st order					✓

3.2 Input/Output Functions (Optional)

Type	Description	1 channel	2 channel	3 channel	4 channel	5 channel	6 channel
Rs485 communication	C	✓					
Digital input	DI		✓		✓	✓	✓
Digital output	DO	✓	✓	✓	✓		
Analog output	AO	✓	✓	✓	✓		

Note: Due to the many combinations of optional functions, please verify with the manufacturer.

3.3 Energy metering

The basic energy parameters include: forward and reverse active energy (kWh), forward and reverse reactive energy (kVarh), with a reading resolution of 0.01. The maximum value is 9999999.99, beyond which it will be flipped to zero and re-accumulated. Through the panel or communication, all energy data can be cleared to zero.

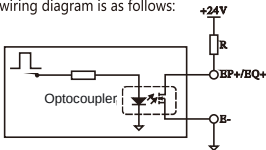
3.4 Pulse output of electrical energy

The power pulse output can be applied to the verification of the basic error of the power and the remote transmission of the power data. The remote terminal unit, PLC, and DI switch collector can be used to count the pulses, and the basic error of the electric energy can be verified in combination with the electric energy verification device. The device can optionally distribute the power pulse output, and the power pulse constant can be set through the panel or communication. The pulse output is the secondary side electrical energy pulse, and the actual electric energy pulse generated on the primary side is the secondary side electric energy multiplied by the ratio of TV and TA.

Application examples:

When the pulse counter collects 1000 pulses, it means that 1kWh of active energy is generated on the secondary side, and the actual energy generated on the primary side is $1 \times 100 \times 100 = 10000 \text{ kWh}$.

The pulse output wiring diagram is as follows:

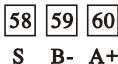


4 Terminal Number

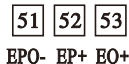
4.1 Working Power Supply



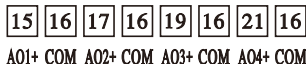
4.2 RS485 communication



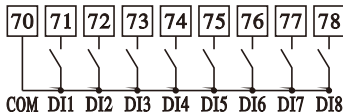
4.3 Pulse Output



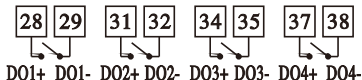
4.4 Analog output (mA/V)



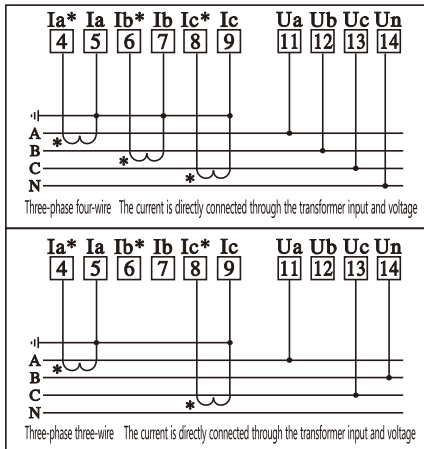
4.5 Switching inputs

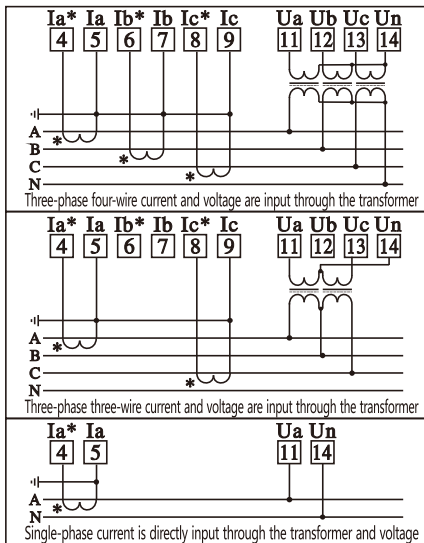


4.6 Switching output



4.7 Input signal wiring method





5 Menu Settings

5.1 Password Entry Page



On any real-time measurement page, press the multi-function button to enter the password entry page. You can enter the password correctly and press the confirm button First-level menu, press the multi-function button to return to the display page.

The password needs to be entered correctly to set the parameters, the password can be modified, the range is 0000~9999, and the factory password of the device is 0001.

5.2 Main Menu Page

The first-level main menu page includes: common settings system class (SYS), communication setting (E000), alarm setting (AL00), transmission setting (SEND), and clearing setting (CLR).

Under the first-level main menu, select the function to be set through the up and down keys and press the confirm button to enter the second-level sub-menu page, which can query all parameters in the device, and can also set and modify the corresponding parameters.

When the parameter tuning is complete, press the Confirm button to  save, and return to the parent menu.

When the password is entered correctly, enter the three-level menu, and the parameters will flash, which can be set as parameters; When the password is entered incorrectly, it enters the three-level menu, and the parameters do not flash, and the parameters cannot be set.

If you have forgotten your password, you can enter any password to enter the menu and query your password.

5.3 System Operation Menu

Level 1 Menu	Level 2 Menu	Level 3 Menu	Description
System SYS	rU Voltage transformation ratio	0001 1-4999	Used to set the voltage transformation ratio of the input circuit; When voltage is connected via a transformer, Pt = rated voltage of primary circuit / rated voltage of secondary circuit; When voltage is directly connected, Pt should be set to 1.
	rA Current transformation ratio	0001 1-9999	Used to set the current transformation ratio of the input circuit; When current is connected via a transformer, Ct = rated current of primary circuit / rated current of secondary circuit; When current is directly connected, Ct should be set to 1.
	rA_r TA reverse	nC C A CA b CB bA CbA	Settings for reversed current wires of the transformer to the meter : nC : Normal C : C phase reversed A : A phase reversed CA : AC phases reversed b : B phase reversed CB : BC phases reversed bA : AB phases reversed CbA : ABC phases
	rA_n Number of Tas	2tA 3tA	2tA: 2 current transformers; 3tA: 3 current transformers; (Valid only for three-phase three-wire condition)
	Li nE Input network	P1L2 P3L3 P3L4	P1L2 : Three-phase fourwire; P3L3 : Three-phase three-wire; P3L4 : Singlephase;

System class sys	Active pulse constant	4000 00-20000	When the product input specification is 57.7V, 1A or 100V, 1A: pulse constant range is 100-20000; otherwise, 100-4000;
	Reactive pulse constant	4000 100-20000	When the product input specification is 57.7V, 1A or 100V, 1A: pulse constant range is 100-20000; otherwise, 100-4000;
	Demand period	0001 1-99	Demand period range: 1-99;
	Number of demand periods	0001 1-15	Number of demand periods (slip time) range: 1-15;
	Harmonic calculation method	rms Fund	rms : RMS effective value; Fund : FUND fundamental wave;

System class 545	P _{all}	0001 1-20	This is the cycle display time setting within a single interface; when ≥ 5 , parameters are displayed cyclically within the current display interface
	C _{adE}	0000 0-9999	Product password setting, default 0001;
	d _{SP}	Curr UPQ nOSt Uh Ih EnG r _r F	default display parameter type of the product Curr : Current parameters; UPQ : Voltage, power, frequency and other parameters; nOSt : Maximum/minimum values and other parameters; Uh : Voltage harmonic parameters; Ih : Current harmonic parameters; EnG : Forward/reverse energy and other parameters;
	b _{Lcd}	0001 0-60	0: Backlight always on; 1-60: Backlight on time 1-60 seconds

5.4 Communication Operation Menu

Level 1 Menu	Level 2 Menu	Level 3 Menu	Description
Communication Settings Comm	Addr Communication address	0001 1-247	Set the local communication address of the meter; this address must not be the same as other slave addresses in the entire communication bus;
	bAud Communication baud rate	9600 1200 4800 2400 4800 9600 19200	Default setting 9600 bps 1200 : Communication baud rate 1200bps; 2400 : Communication baud rate 2400bps; 4800 : Communication baud rate 4800bps; 9600 : Communication baud rate 9600bps; 19200 : Communication baud rate 19200bps;
	Prot Communication check	No 2 od 1 Ev 1 No 1 d645	No 2 : No check, 2 stop bits; od 1 : Odd check, 1 stop bit; Ev 1 : Even check, 1 stop bit; No 1 : No check, 1 stop bit; d645 : DL/T645-2007 protocol;

5.5 Alarm Operation Menu

Level 1 Menu	Level 2 Menu	Level 3 Menu	Description																																				
Alarm Settings	r y p 1 1st channel alarm type	r E n t H A L L A L H L A L	r E n t : Remote alarm; H A L : Upper limit alarm; L A L : Lower limit alarm; H L A L : Upper and lower limit alarm;																																				
	a b u 1 The first way to alarm the object	n o The 35 parameters are shown in the table on the right	<table><tr><td>n o</td><td>u l y</td><td>p a</td><td>s b</td></tr><tr><td>u a</td><td>u l</td><td>p b</td><td>s c</td></tr><tr><td>u b</td><td>u o</td><td>p c</td><td>s s</td></tr><tr><td>u c</td><td>i a</td><td>p s</td><td>p f a</td></tr><tr><td>u y</td><td>i b</td><td>q a</td><td>p f b</td></tr><tr><td>u</td><td>i c</td><td>q b</td><td>p f c</td></tr><tr><td>u a b</td><td>i y</td><td>q c</td><td>p f s</td></tr><tr><td>u b c</td><td>i</td><td>q s</td><td>f r q</td></tr><tr><td>u c a</td><td>i o</td><td>s a</td><td></td></tr></table>	n o	u l y	p a	s b	u a	u l	p b	s c	u b	u o	p c	s s	u c	i a	p s	p f a	u y	i b	q a	p f b	u	i c	q b	p f c	u a b	i y	q c	p f s	u b c	i	q s	f r q	u c a	i o	s a	
	n o	u l y	p a	s b																																			
u a	u l	p b	s c																																				
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u y	i b	q a	p f b																																				
u	i c	q b	p f c																																				
u a b	i y	q c	p f s																																				
u b c	i	q s	f r q																																				
u c a	i o	s a																																					
u p 1 1st channel upper limit alarm point	1200 0-150.0 (%)	Set the over-limit alarm range of the meter together with the lower limit alarm point; the set value is expressed as a percentage of the rated value (power takes absolute value), satisfying u P 1 ≥ L o u 1 + d · F 1 ; When the measured value > u P 1 and the duration reaches d l a 1 , an upper limit alarm is generated; When the measured value < u P 1 - d · F 1 , the upper limit alarm is released; u P 1 Setting to the maximum value can avoid lower limit alarm.																																					

Alarm Settings Al 22	Lou 1 1st channel lower limit alarm point	0000 0-150.0 (%)	Set the over-limit alarm range of the meter together with the upper limit alarm point; the set value is expressed as a percentage of the rated value (power takes absolute value), satisfying $Lou 1 \leq Up 1 + d.F 1$; When the measured value $< Lou 1$, and the duration reaches dlA 1 , a lower limit alarm is generated; When the measured value $> Lou 1 + d.F 1$, the lower limit alarm is released; Setting to Lou 1 the maximum value can avoid lower limit alarm.
	d.F 1 1st channel alarm hysteresis	00 10 0.1-50.0 (%)	To avoid frequent actions of output under the critical state of the alarm point, the alarm hysteresis can be set; the set value is expressed as a percentage of the rated value, see Up 1 , Lou 1 setting instructions.
	dlA 1 1st channel alarm delay time	0005 1-1200 (s)	To suppress alarms caused by time-varying input signals, the delay time for over-limit alarm actions can be set, see Up 1 , Lou 1 setting instructions.
	Note: The 2nd, 3rd, and 4th channel alarm settings are the same as the 1st channel. Detailed annotations are omitted below.		

5.6 Transducer Operation Menu

Level 1 Menu	Level 2 Menu	Level 3 Menu	Description																																				
Transducer Settings	obj 1 1st channel transducer object	no The 35 parameters are shown in the table on the right	<table><tr><td>no</td><td>ULY</td><td>PR</td><td>Sb</td></tr><tr><td>UR</td><td>UL</td><td>Pb</td><td>Sc</td></tr><tr><td>Ub</td><td>Ua</td><td>Pc</td><td>Ss</td></tr><tr><td>Uc</td><td>IR</td><td>PS</td><td>PfA</td></tr><tr><td>UY</td><td>Ib</td><td>qA</td><td>Pfb</td></tr><tr><td>U</td><td>Ic</td><td>qb</td><td>Pfc</td></tr><tr><td>URb</td><td>IY</td><td>qF</td><td>PfS</td></tr><tr><td>Ubc</td><td>I</td><td>qS</td><td>F-r</td></tr><tr><td>UR</td><td>Ia</td><td>SA</td><td></td></tr></table>	no	ULY	PR	Sb	UR	UL	Pb	Sc	Ub	Ua	Pc	Ss	Uc	IR	PS	PfA	UY	Ib	qA	Pfb	U	Ic	qb	Pfc	URb	IY	qF	PfS	Ubc	I	qS	F-r	UR	Ia	SA	
	no	ULY	PR	Sb																																			
	UR	UL	Pb	Sc																																			
	Ub	Ua	Pc	Ss																																			
	Uc	IR	PS	PfA																																			
UY	Ib	qA	Pfb																																				
U	Ic	qb	Pfc																																				
URb	IY	qF	PfS																																				
Ubc	I	qS	F-r																																				
UR	Ia	SA																																					
	typ 1 1st channel transducer type	4-20	0-5U :0-5V; 0-20 :0-20mA; 1-5U :1-5V; 4-20 :4-20mA; 0-10 :0-10mA;																																				
5Fnd	up 1 1st channel transducer high value	1000 0-120.0 (%)	Percentage of the rated value, calculation factor 0.1;																																				
	low 1 1st channel transducer low value	0000 0-100.0 (%)	Percentage of the rated value, calculation factor 0.1;																																				
Note: The 2nd, 3rd, and 4th channel transducer settings are the same as the 1st channel. Detailed annotations are omitted below.																																							

5.7 Reset Operation Menu

Level 1 Menu	Level 2 Menu	Level 3 Menu	Description
Reset Settings 	 Reset energy	 0-9999	 : Reset;
	 Reset demand	 0-9999	 : Reset;
	 Reset max/min values	 0-9999	 : Reset;
	 Reset all records	 0-9999	 : Reset;

Appendix