EH8 Single Phase Digital Voltage/Ampere Meter
User's Manual

Features:

⊙Accuracy : ±0.5%F.S
⊙Can measure: voltage, current
⊙Input and output are completely isolated .
⊙With high/low limit settable alarms of voltage / current .
⊙With 4-20mA analog output for voltage / current .
⊙With RS485 communication interface，Modbus RTU communication protocol
⊙Can measure true/effective value .
⊙Menu setting can be operated conveniently,

For your safety, please read following content carefully before you are using the meter!

▣ Safe Caution

※ Please read the manual carefully before you use the meter!
Please comply with the below important points: ⚠ Warning An accident may happen if the operation does not comply with the instruction. ⚠ Notice An operation that does not comply with the instruction may lead to product damage.
※ The instruction of the symbol in the manual is as below: ⚠ An accident danger may happen in a special condition.

⚠ Warning

1. A safty protection equipment must be installed or please contact with us for the relative information if the product is used under the circumstance such as nuclear control, medical treatment equipment, automobile, train, airplane, aviation, entertainment or safty equipment, etc. Otherwise, it may cause serious loss, fire or person injury.
2. A panel must be installed, otherwise it may cause creepage (leakage).
3. Do not touch wire connectors when the power is on, otherwise you may get an electric shock.
4. Do not dismantle or modify the product. If you have to do so, please contact with us first. Otherwise it may cause electric shock and fire.
5. Please check the connection number while you connect the power supply wire or input signal, otherwise it may cause fire.

⚠ Caution

1. This product cannot be used outdoors. Otherwise the working life of the product will become shorter, or an electric shock accident may happen.
2. When you connect wire to the power input connectors or signal input connectors, the moment of the No.20 AWG (0.50 mm2) screw tweaked to the connector is 0.74n.m - 0.9n.m. Otherwise the connectors may be damaged or get fire.
3. Please comply with the rated specification. Otherwise it may cause fire after the working life of the product becomes shorter.
4. Do not use water or oil base cleaner to clean the product. Otherwise it may cause electric shock or fire, and damage the product.
5. This product should be avoid working under the circumstance that is flammable, explosive, moist, under sunshine, heat radiation and vibration. Otherwise it may cause explosion.
6. In this unit it must not have dust or deposit, otherwise it may cause fire or mechanical malfunction.
7. Do not use gasoline, chemical solvent to clean the cover of the product because such solvent can damage it. Please use some soft cloth with water or alcohol to clean the plastic cover.

1.Code Illustration

EH8-□□□□

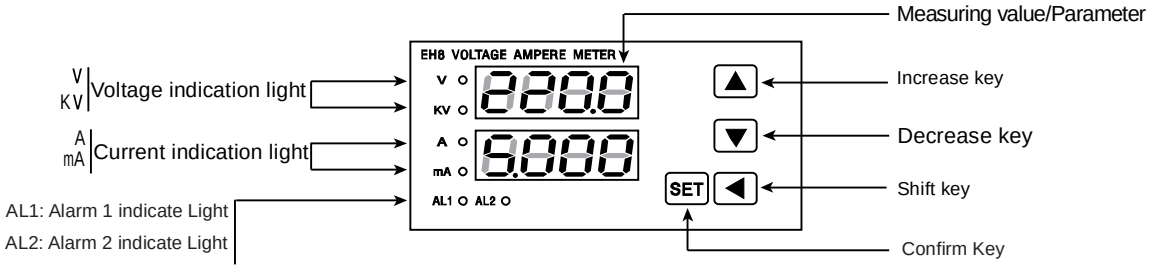
- □: Range :450V×5A D:Other range
- □: Single phase input 18：Single phase input with RS485 communication
- □: Alarm function: A: Without alarm function B: with one loop of alarm C: with two loops of alarm
- □: Output function：R: without analog D:with analog (4-20mA)
- 8: Dimension :(mm) 8:48H×96W×100L
- EH: EH Series voltage/ampere meter

Code	Alarm	Analog	Communication	Input
EH8-A10B	without	without	without	B：5Ax450V D：Other range could be ordered
EH8-A18B	without	without	RS485	
EH8-RB10B	one	without	without	
EH8-RB18B	one	without	RS485	
EH8-RC10B	two	without	without	
EH8-RC18B	two	without	RS485	
EH8-DA10B	without	4-20mA	without	
EH8-DA18B	without	4-20mA	RS485	
EH8-DB10B	one	4-20mA	without	
EH8-DB18B	one	4-20mA	RS485	
EH8-DC10B	two	4-20mA	without	
EH8-DC18B	two	4-20mA	RS485	

2.Main Technical Parameter

Measuring function	Voltage ,ampere
Input impedance	Voltage input impedance:≥2MΩ(450V) , current input impedance:≤0.02Ω(when direct input is 0～5A)
Direct input range	Voltage:AC6-450V Current:AC0.015-5A
Displaying mode	Dual line LED display
CT	1.0-1999 settable
Measuring accuracy	±0.5%FS
Sampling speed	About 2 times/s
Power supply	AC/DC 100-240V
Dielectric strength	DC 2000V 1min
Communication	RS485 communication interface,adopt Modbus RTU protocol
Analog output	DC4-20mA analog output, accuracy :±0.5%FS loading ability≤600Ω
Insulated impedance	＞100MΩ
Ambient temperature	0～50℃, Relative humidity≤85%RH
Relay capacity	AC 250V/3A or DC 30V/5A
Dimension(mm)	48H×96W×100L

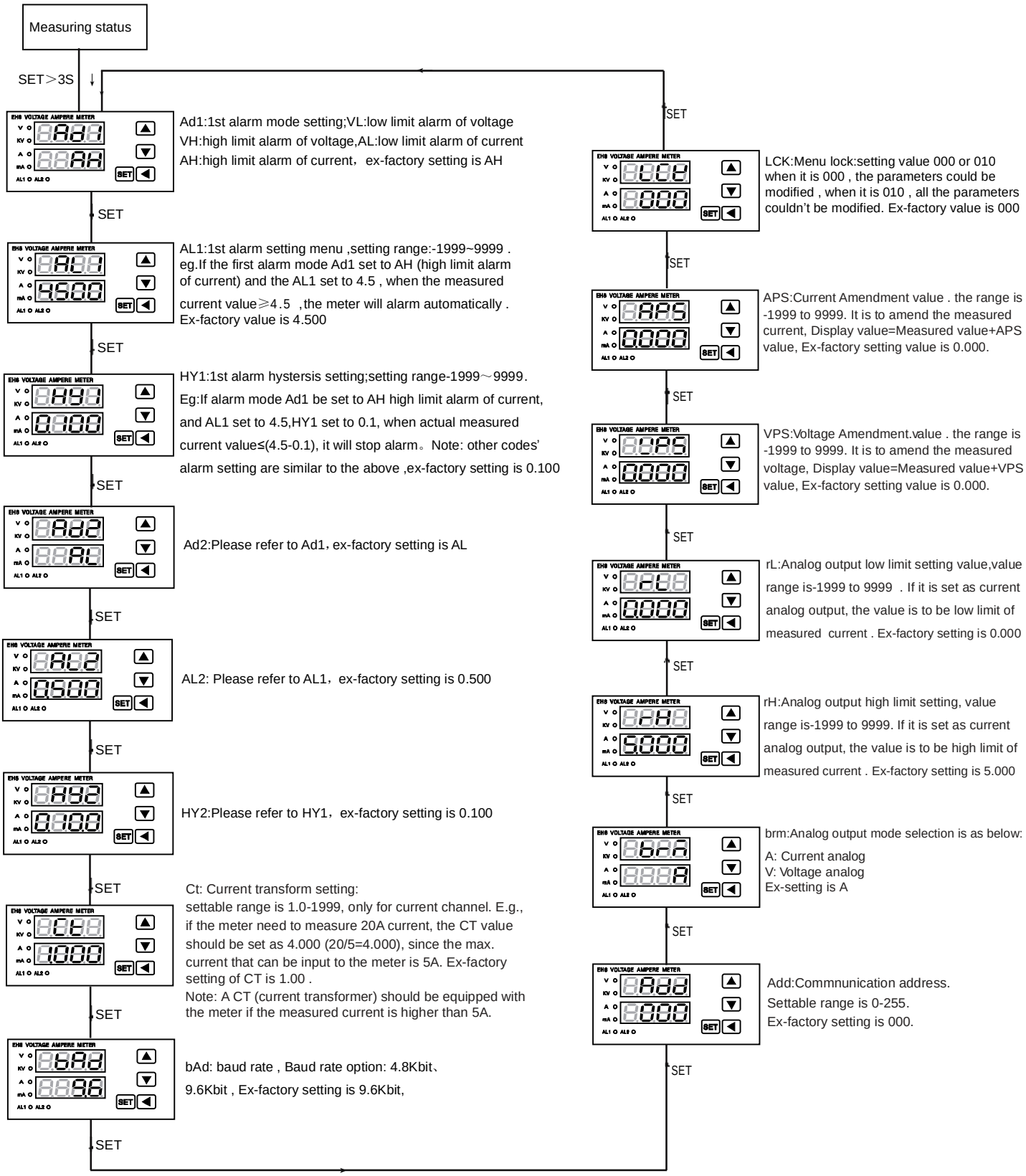
3.Panel Indication



Note：* When the measured voltage beyond 1000V, the “KV” indicating light will be on , otherwise the “v” indicating light on.
When the measured current beyond 1A , the “A” indicating light will be on , otherwise the “mA” indicating light on .

4.Operation Sequence

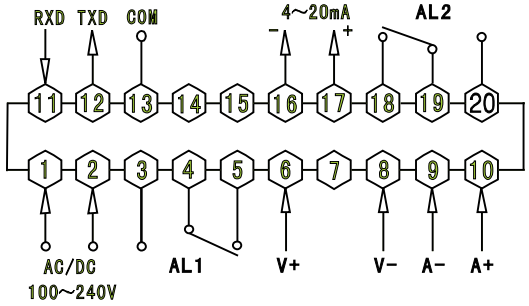
Power on and reset
↓
Meter Self-check
↓
Measuring status
↓ SET＞3s
Enter alarm setting status
↓ Press SET＞3S or without any operation more than 60s
Measuring status



The instruction for the above menu operation and settings are as below:

1. Press SET key for 3 seconds，the meter will show the parameter setting menu.
2. Press SET key to select the parameter needing modified ,press ◄ to make the parameter flick ,and press ▲/▼ to set needed value and press SET key to confirm the modifying .Press ◄ to make the needing modified parameter flick, press ▲+ ◄ to shift the decimal point, press SET key to go on for another menu.
3. Under setting status，long press SET>3s can return to measuring status .

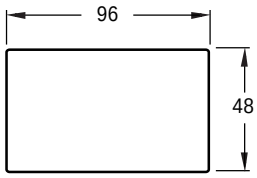
5.Connecting Drawing



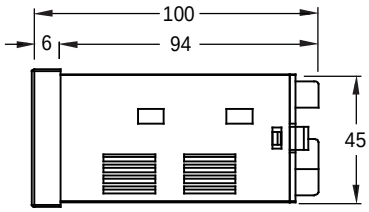
Note: If there is any changes, please subject to the drawing on the actual meter

6.Dimension (Unit:mm)

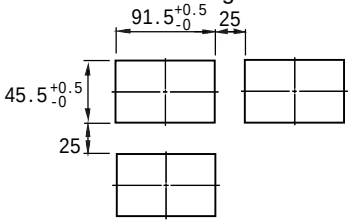
Panel size



Side-face size



Mounting size



7.Caution

1、Available ambient temperature is 0～50℃， relative humidity is below 85% .
2、It should be adjusted every year .
3、Avoid vibration and crash . Don't use it under the circustance which is over dusty / harmful chemicals and gas .
4、If it is stored for a long time and unused ,connect on power for more than 4 hours once every 3 months .
5、Don't explose it in the sunshine long term ,the available store temperature is 0～50℃ .humidity should be below 60% . Please make sure not to contact with gasoline, chemical solvent

8. Communication protocol

EH8 series meter adpots Modbus RTU communication protocol , RS485 half duplex communication,read function code 0x03, write function code 0x10, adpots 16 digit CRC check,the meter does not feedback when check error

Data frame format:

Start bit	Data bit	Stop bit	Check bit
1	8	1	No

Communication abnormal solution:

When abnormal answer, the highest bit of function code will be set to 1. For example, if the request function code from master unit is 0x04, the return function code from the meter is 0x84.

Error type code

0x01---Function code error: The meter does not support the function code it receives.
0x02---Data position error: The data position assigned by master unit is out of the range of the meter
0x03---Data value error: The data value sent from master unit is out of the range of the meter

8.1. Read multi-register

For example, master unit reads float data AL1 (1st alarm value 241.5)
The address code of AL1 is 0x0000, because AL1 is floating data(4 byte), it covers 2 data registers. According to IEEE-754, the standard hexadecimal memory code of decimalist float data 241.5 is 0x00807143.

Master unit request (Read multi-register)							
1	2	3	4	5	6	7	8
Meter address	Function code	Start address High bit	Start address Low bit	Data byte length High bit	Data byte length Low bit	CRC code Low bit	CRC code high bit
0x01	0x03	0x00	0x00	0x00	0x02	0xC4	0x0B

Slave unit normal answer (Read multi-register)								
1	2	3	4	5	6	7	8	9
Meter address	Function code	Data byte number	Data 1 High bit	Data 1 Low bit	Data 2 High bit	Data 2 Low bit	CRC code Low bit	CRC code high bit
0x01	0x03	0x04	0x00	0x80	0x71	0x43	0x9E	0x7A

Function code abnormal answer:(For example, master unit request function code is 0x04)

Slave unit abnormal answer(Read multi-register)				
1	2	3	8	9
Meter address	Function code	Error code	CRC code Low bit	CRC code high bit
0x01	0x84	0x01	0x82	0xC0

8.2. Write multi-register

For example：Master unit reads float data HY1(1st alarm hysteresis value 20.5).The address code of HY1 is 0x0001, because HY1 is float data (4 bytes),seizes 2 data registers. According to IEEE-754 standard, the hexadecimal memory code of decimalist float data 20.5 is 0x0000A441.

Master unit request (Write multi-register)												
1	2	3	4	5	6	7	8	9	10	11	12	13
Meter address	Function code	Start address High bit	Start address Low bit	Data byte length High bit	Data byte length Low bit	Data byte length	Data 1 high bit	Data 1 low bit	Data 2 high bit	Data 2 low bit	CRC code Low bit	CRC code high bit
0x01	0x10	0x00	0x01	0x00	0x02	0x04	0x00	0x00	0xA4	0x41	0x88	0x93

Slave unit normal answer (Write multi-register)							
1	2	3	4	5	6	7	8
Meter address	Function code	Start address High 8 bit	Start address Low 8 bit	Data byte length High bit	Data byte length Low bit	CRC code Low bit	CRC code high bit
0x01	0x10	0x00	0x01	0x00	0x02	0x10	0x08

Data position error answer:(For example, master unit request write address index is 0x0050)

Slave unit abnormal answer (Read multi-register)				
1	2	3	8	9
Meter address	Function code	Error code	CRC code Low bit	CRC code high bit
0x01	0x90	0x02	0xCD	0xC1

8.3. EH8 parameter address reflection table

Note: address code is the index of variable array

No.	Address code	Variable name	Byte length	Display range	Read/Write allow	Remark
0	0x0000	1st alarm value AL1	2	-1999~9999	R/W	
1	0x0001	1st alarm hysteresis HY1	2	-1999~9999	R/W	
2	0x0002	2nd alarm value AL2	2	-1999~9999	R/W	
3	0x0003	2nd alarm hysteresis HY2	2	-1999~9999	R/W	
4	0x0004	Current transform CT	2	-0.000~9999	R/W	
5	0x0005	Hihg limit value of analog rH	2	-1999~9999	R/W	
6	0x0006	Low limit value of analog rL	2	-1999~9999	R/W	
7	0x0007	Voltage amend value VPS	2	-1999~9999	R/W	
8	0x0008	Current amend value APS	2	-1999~9999	R/W	
9	0x0009	Full range of voltage FSV	2	0.000~9999	R	
10	0x000A	Full range of current FSA	2	0.000~9999	R	
11	0x000B	Voltage effective value	2	0.000~9999	R	
12	0x000C	Current effective value	2	0.000~9999	R	
Reservation						
20	0x0014	1st alarm mode Ad1	1	0~ 9	R/W	Note①
21	0x0015	2nd alarm mode Ad2	1	0~ 9	R/W	
22	0x0016	Analog mode brM	1	0~ 3	R/W	Note②
23	0x0017	Menu lock LCK	1	0~255	R/W	
24	0x0018	Baud rate bAd	1	0~1	R	Note③
25	0x0019	Address of the meter Add	1	0~255	R	
26	0x001A	Measuring status indicate	1	0~255	R	Note④
27	0x001B	Name	1	0xDE	R	
Reservation						

Note ①: Alarm mode

High limit alarm	Communication data value	Low limit alarm	Communication data value	Alarm item
VH	0	VL	1	Voltage
AH	2	AL	3	Current

Note② : Analog mode

Communication value	0	1
Display menu	V	A
Analog item	Voltage	Current

Note ③: Baud rate

Communication value	0	1
Menu display	4.8	9.6

Note ④ : Measuring status indicate

D7	D6	D5	D4	D3	D2	D1	D0
		AL2	AL1	mA	A	KV	V

The program of 4 byte character code float data converts to decimalist float data

```
float BytesToFloat(unsigned char*pch)
{
      float result;
      unsigned char *p;
      p=(unsigned char*)&result;
    * p=*pch;*(p+1)=*(pch+1);*(p+2)=*(pch+2);*(p+3)=*(pch+3);
     return result;
}
```

The program of decimalist float data converts to 4 byte character code as IEEE-754 standards .

```
void FloatToChar(float Fvalue,unsigned char*pch)
{
     unsigned char*P;
     p=(unsigned char*)&Fvalue;
    *pch=*p;*(pch+1)=*(p+1);*(pch+2)=*(p+2);*(pch+3)=*(p+3);
}
```

Program of obtaining 16 digits CRC checking code

```
unsigned int Get_CRC (uchar*pBuf,uchar num)
{
      unsigned i,j;
      unsigned int wCrc=0xFFFF;
      for(i=0;i<num;i++)
{
      wCrc^=(unsigned int)(pBuf[i]);
      for(j=0;j<8;j++)
{
      if(wCrc &1){wCrc>>=1;   wCrc=0xA001;}
      else wCrc>>=1;
            }
        }
      return wCrc;
}
```