DP4 Series AC/DC Ampere/Voltage Meter Instruction Manual

Features
◎Voltage/Current ranges can be set freely
◎Thumb switch setting (0.0000-19999), high, middle, low three relay control output, easy operation.
◎Track and holding function
◎Isolated analog 4-20mA output
◎Widely used in electronic and Machinery industries for auto-inspection.

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

▣ Safe Caution

※ Please read the manual carefully before you use the temperature controller.
※ 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.

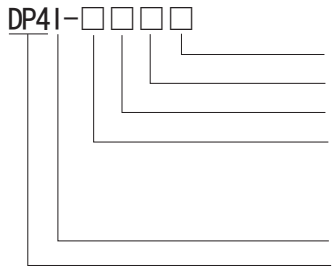
⚠ Warning

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 and 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 electric shock or fire, and damage the product.
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. Ordering Code



Blank:No Thumb Switch A: Import Thumb Switch B/C: Domestic Thumb Switch
Range Code
AV: AC Voltage DV:DC Voltage AA: AC Current DA: DC Current
Blank: Display Only P: Hi & Low Alarm Setting with Thumb Switch
T: No Thumb Switch Setting, but with RS485 Communication
Q: With Thumb Swith Setting And RS485 Communication
Blank: No Analog Output I: 4-20mA Analog Output
4 1/2 Digital Ampere/Voltage Meter (Power Supply: 85-265 V AC/DC)

2. Mode Illustration

◆ AC Digital Voltage Meter

Model	Range	Resolution	Input Impedance	PT	Accuracy	Max. Input
DP4（I）-□AV20A(B/C)	20V	1mV	≥2M	Direct Input	±0.3%F.S±3Digit	40V
DP4（I）-□AV200A(B/C)	200V	10mV	≥2M	Direct Input	±0.3%F.S±3Digit	300V
DP4（I）-□AV600A(B/C)	600V	100mV	≥5.1M	Direct Input	±0.5%F.S±3Digit	1000V
DP4（I）-□AV3KA(B/C)	3KV	1V	≥2M	3KV/100V	±0.5%F.S±3Digit	500V
DP4（I）-□AV10KA(B/C)	10KV	1V	≥2M	10KV/100V	±0.3%F.S±3Digit	500V

Note: "I: in the bracket means analog 4-20mA output, if the user do not need this function, please neglect it. For example: DP4I-QAV20B means that it is an AC Voltage meter with 4-20mA current analog output, domestic thumb switch, with RS485 communication and 20V AC input.

◆ AC Digital Ampere Meter

Model	Range	Resolution	Input Impedance	PT	Accuracy	Max. Input
DP4（I）-□AA0.2A(B/C)	200mA	10μA	1Ω	Direct Input	±0.3%F.S±3Digit	500mA
DP4（I）-□AA2A(B/C)	2A	100μA	0.2Ω	Direct Input	±0.3%F.S±3Digit	3A
DP4（I）-□AA□A(B/C)	Range can be set freely	Vary with range	0.2Ω	5A	±0.3%F.S±3Digit	5A

◆ DC Digital Voltage Meter

Model	Range	Resolution	Input Impedance	Accuracy	Max. Input
DP4 Ⓓ-□DV0.2A(B/C)	200mV	10μV	≥2M	±0.2%F.S±3Digit	10V
DP4 Ⓓ-□DV2A(B/C)	2V	100μV	≥2M	±0.2%F.S±3Digit	20V
DP4 Ⓓ-□DV20A(B/C)	20V	1mV	≥2M	±0.2%F.S±3Digit	200V
DP4 Ⓓ-□DV200A(B/C)	200V	10mV	≥2M	±0.2%F.S±3Digit	300V
DP4 Ⓓ-□DV500A(B/C)	500V	100mV	≥5.1M	±0.5%F.S±3Digit	750V

◆ DC Digital Ampere Meter

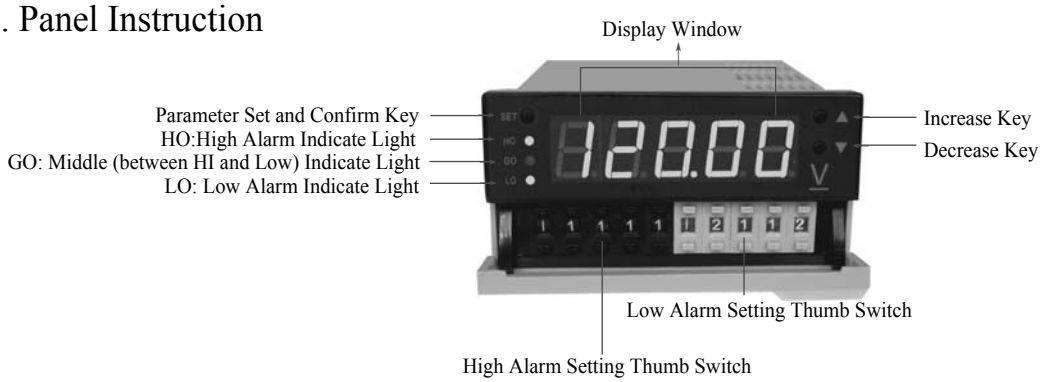
Model	Range	Resolution	Input Impedance	PT	Accuracy	Max. Input
DP4 Ⓓ-□DA0.0002A(B/V)	200uA	10nA	1KΩ	Direct Input	±0.2%F.S±3Digit	10mA
DP4 Ⓓ-□DA0.002A(B/C)	2mA	100nA	100Ω	Direct Input	±0.2%F.S±3Digit	100mA
DP4 Ⓓ-□DA0.02A(B/C)	20mA	1μA	10Ω	Direct Input	±0.2%F.S±3Digit	500mA
DP4 Ⓓ-□DA0.2A(B/C)	200mA	10μA	1Ω	Direct Input	±0.2%F.S±3Digit	1A
DP4 Ⓓ-□DA2A(B/C)	2A	100μA	0.11Ω	Direct Input	±0.2%F.S±3Digit	5A
DP4(I)-□DA□A(B/C)	Range can be set freely	Vary with range		75mV	±0.3%F.S±3Digit	

Illustration:
1. Environment condition for Measuring Accuracy: Temperature: 25±5℃ R.H.:45-85% R.H , The using temperature is 0-50 degree.
2. CT that be mentioned in the grid are normal models, with accuracy of ≤0.3%, we can aslo provide following models according to customers' needs: Rated Current AC 10A,15A,30A,75A,250A,1500A,..., Rated Current DC 10A,15A,75A,300A,1500A...., Rated Voltage AC:1KV,6KV,11KV,35KV,110KV.....
3. Rated Secondary Current for AC Current TC is 5A, Rated Secondary Voltage for AC Voltage Transformer is 100V, Rated Secondary Voltage forDC Current TC is 75mV, coutomers should specially indicate when their Rated Secondary Voltage and Ampere is different from that we showed.
4. PT setting please refer to 4.3 meter's parameter setting, Input impedance generally as for reference, please refer to the parameter on the meter!

3. Technical Specification:

(1) Measuring Range: 0----+/-19999,
(2) Thumb switch High and Low alarm output, relay contact: AC 250V/3A, DC 30V/3A.
(3) Isolated 4-20mA analog output, can adjust to 0-10mA or 0-20mA output freely, load resistance ≤**600** Ω **.**
(4) With RS485 communication and Modbus protocol,
(5) Sampling Speed: >2.5 times/S
(6) Measuring accuracy:0.1%FS ≤ basic accuracy ≤ 0.3%FS.
(7) Power Supply:85-265 V AC/DC, Power Consumption:≤10VA

4. Panel Instruction



5. Menu Parameter Setting Operation

(1). Key Function Illustration

SET: Parameter select Mode setting Key

▲/ ▼:Parameter Increase/ Decrease Key

SET + ▲: Hold SET Key, and press ▲ Key to shift the parameter

(2) Parameter Modify Operation:

A:Press SET key more than 3 seconds to enter to setting menu.

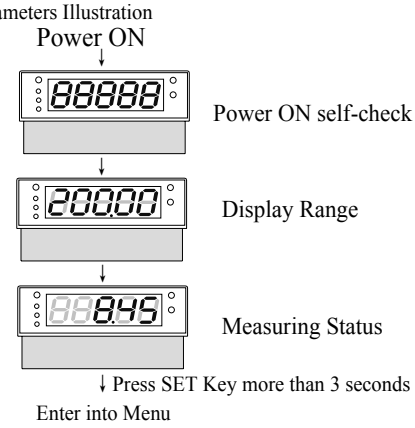
B:Press SET key to select the value you want to change. Press ▲ Key will display the relative value

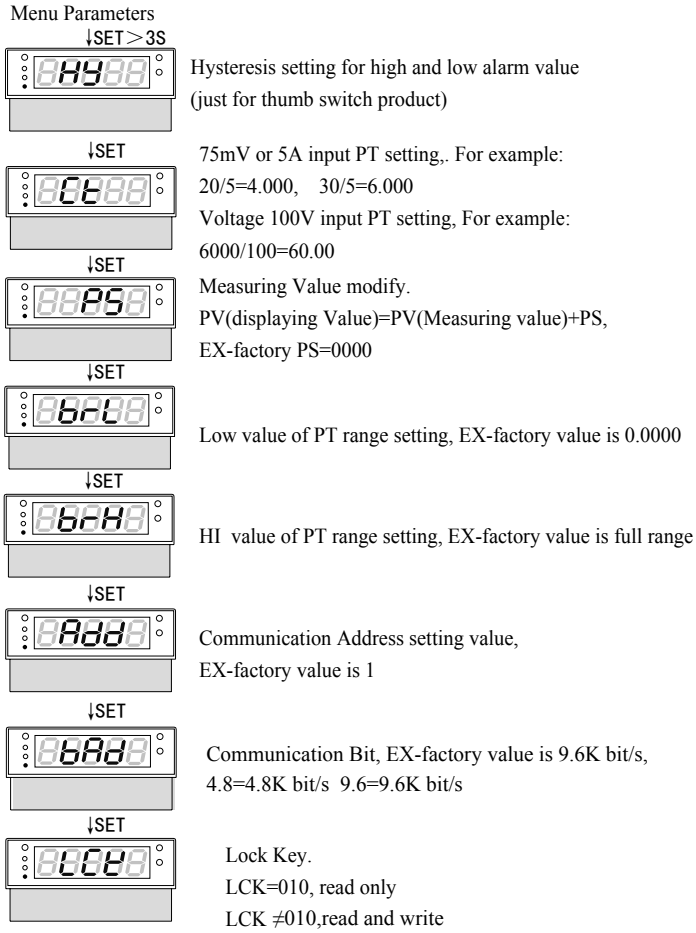
C:Press SET Key, the LED will flash after press ▲ Key, press ▲ Key again for shift and modify.

D: On the process of Modifying, press SET Key, press ▼ Key, shift the decimal point to the place where it sahould be.

E: SET Key should be pressed after each modification.

(3) Parameters Illustration





※ Alarm Cancel

High Alarm

When measuring value is bigger than the high alarm value minus HY . It means., PV<HO-HY, the alarm stops.

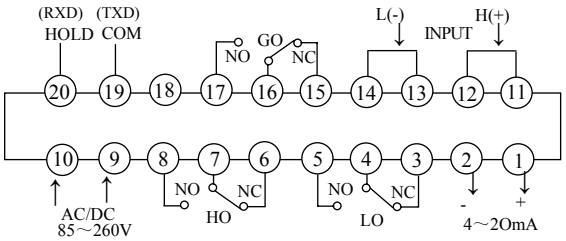
Low Alarm

When measuring value is smaller than the low alarm value plus HY,. It means, PV>LO+HY, the alarm stops.

GO Alarm

When PV is between High and Low alarm value, GO alarm starts. When either High alarm or Low alarm starts, GO alarm stops.

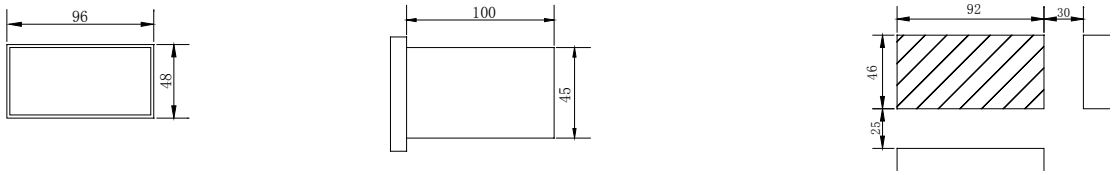
6. Connection Drawing



When HOLD and COM be short connected, the instrument data can be hold,if the meter with communication, this function un-workable.

Note: If there is any change, please subject to the drawing on the meter.

7. Mounting Dimension



8. Communication Parameter

DP4 series adjustor follow Modbus RTU communication protocol, and it can run RS485 half-duplex communication.Read function code is 0x03, write function code is 0x10, 16-bit CRC checking is applied. The coulometer can not return error message.

Data Frame flag:

Start bit	Data bit	Stop bit	Check bit
1	8	1	None

1. Read Multiple Registers

For example: The host computer read the float number FH1 (FH1=200.00).The address code of FH1 is 0x0006, for FH1 is float number (4bits), it will occupy 2 data register. Reference IEEE-574 standard the hexadecimal 16 result of the decimal float number is 0x00004843.

Request from the host computer (Read Multiple Registers)							
1	2	3	4	5	6	7	8
Unit Address	Function code	Start Address Hi	Start Address Lo	Data length Hi	Data length Lo	CRC code Lo	CRC code Hi
0x01	0x03	0x00	0x06	0x00	0x02	0x24	0x0A

Correct answer from slave unit (Read Multiple Registers)								
1	2	3	4	5	6	7	8	9
Address	Function code	Data byte No.	Data1 Hi byte	Data1 Lo byte	Data2 Hi byte	Data2 Lo byte	CRC Code Lo	CRC Code Hi
0x01	0x03	0x04	0x000	0x48	0x43	0x66	0x9E	0x7A

Incorrect answer from slave unit (Read Multiple Registers)				
1	2	3	8	9
Address	Function Code	Error Code	CRC Code Lo	CRC Code HI
0x01	0x84	0x01	0x82	0xC0

2. Write Multiple Registers

For example: The host computer read the float number HY (Hysteresis of alarm value is 20.5) ,
The address code for HY is 0x0000, for HY is float number (4bits), it will occupy 2 data register. Reference IEEE-574 standard the hexadecimal 16 result of the
decimal float number is 0x0000A441.

Request from the host computer (Write Multiple Registers)												
1	2	3	4	5	6	7	8	9	10	11	12	13
Unit address	Function Code	Start address Hi	Start address Lo	Data Length Hi	Data Length Lo	Data Length	Data 1 Hi	Data 1 Lo	Data 2 Hi	Data 2 Lo	CRC Lo	CRC Hi
0x01	0x10	0x00	0x01	0x00	0x02	0x04	0x00	0x00	0xA4	0x41	0x88	0x93

Correct answer from slave unit (Read Multiple Registers)							
1	2	3	4	5	6	7	8
Unit address	Function Code	Start address 8 Hi	Start address 8 Lo	Data Length Hi	Data Length Lo	CRC Lo	CRC Hi
0x01	0x10	0x00	0x01	0x00	0x02	0x10	0x08

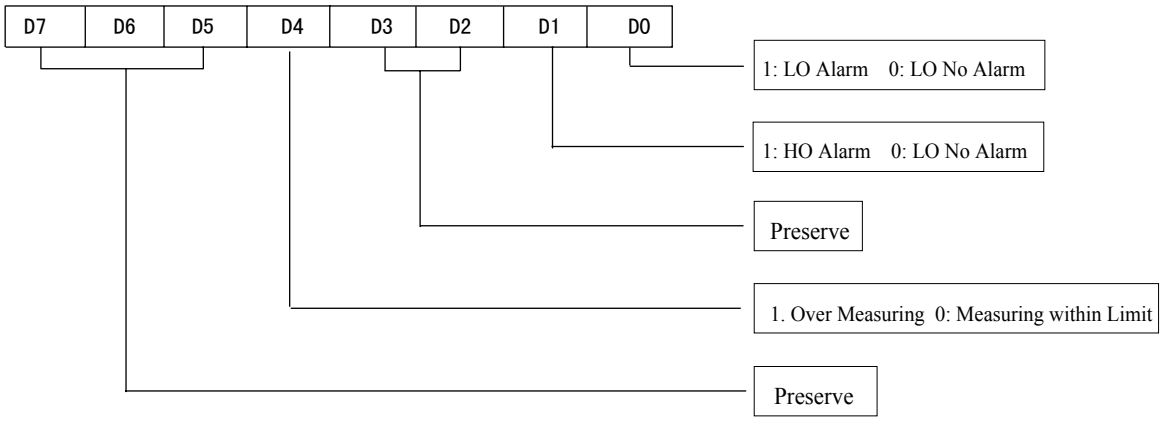
Incorrect answer from slave unit (Read Multiple Registers)				
1	2	3	8	9
Address	Function Code	Error Code	CRC Code Lo	CRC Code HI
0x01	0x90	0x02	0xCD	0xC1

DP4 Series table reference address

Code	Reference address	Number of Variable	Data Length	Value Range	Read & Write allow	Remark
0	0x0000	HY1	2	0.000～±19999	R/W	
1	0x0001	CT	2	0.000～±19999	R/W	
2	0x0002	PS	2	0.000～±19999	R/W	
3	0x0003	BRL	2	0.000～±19999	R/W	
4	0x0004	BRH	2	0.000～±19999	R/W	
5	0x0005	FL1	2	0.000～±19999	R	
6	0x0006	FH1	2	0.000～±19999	R	
7	0x0007	HO Alarm Value	2	0.000～±19999	R	
8	0x0008	LO Alarm Value	2	0.000～±19999	R	
9	0x0009	Real Measuring Value	2	0.000～±19999	R	
Preserve						
20	0x0014	Add	2	0～255	R	
21	0x0015	bAd	2	0～1	R	
22	0x0016	LOCK key	2	0～255	R/W	
23	0x0017	Status Display	2	0～255	R	
24	0x0018	Meter's name	2	0xD4	R	
Preserve						

R/W----read and write R: read only

Measuring Status Indicate



Procedure of 4-byte character code
points into a floating-point number expressed in decimal floating-point

```
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;
}
```

Procedure of decimal floating-point expressed in 4-byte character code
floating-point number according to IEEE-754 Standard

```
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);
}
```

16-bit checksum for CRC programs

```
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;
}
```