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LX3V-2PT2DA

BD Board
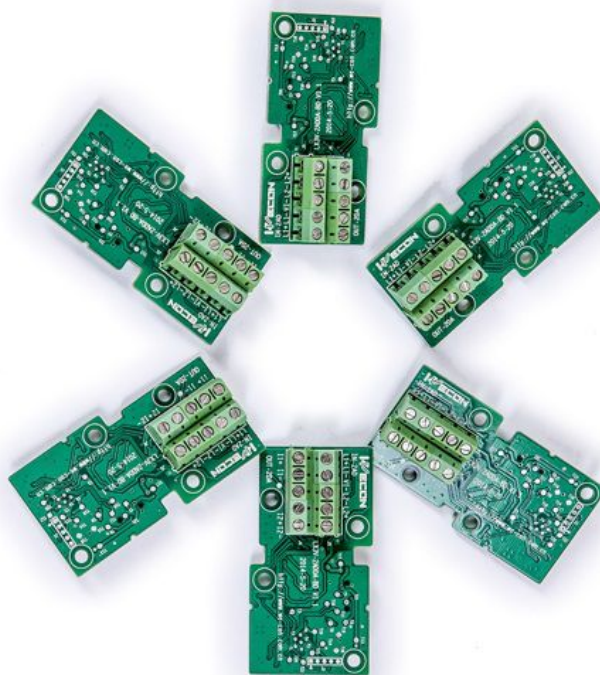
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Ⅰ. Mounting instruction

Make sure to power off the PLC before mounting the 2PT2DA module and remove the top cover of PLC, screwed to the PLC.

Caution: when output current, make sure that the load resistance should be less than 500Ω, otherwise the output will be lower.

**Warring:** make sure to power off the PLC before mounting or removing the BD module.

Ⅱ. The features of LX3V-2PT2DA-BD

It adds two analog inputs and two analog outputs. The module is mounted on top of PLC, so there is no need to change the PLC installation area.

Digital to analog conversion is performed by PT100 in LX3V-2PT2DA-BD, and the converted digital value is stored in a special registers. However, the characteristics of the analog to digital converter can not be adjusted. Address assignment in the following table.

Address	Description	
M8112	The flag of RTD type in CH1 OFF: RTD Type is PT100	ON: turn off
M8113	The flag of RTD type in CH2 OFF: RTD Type is PT100	
M8114	The flag of CH3 output mode OFF: current output mode(4-20mA:0-2000)	
M8115	The flag of CH4 output mode OFF: current output mode(4-20mA:0-2000)	
D8112	CH1's temperature at 0.1 ℃ units	
D8113	CH2's temperature at 0.1 ℃ units	
D8114	The value of CH3	
D8115	The value of CH4	

Ⅲ. Terminal Description and shape

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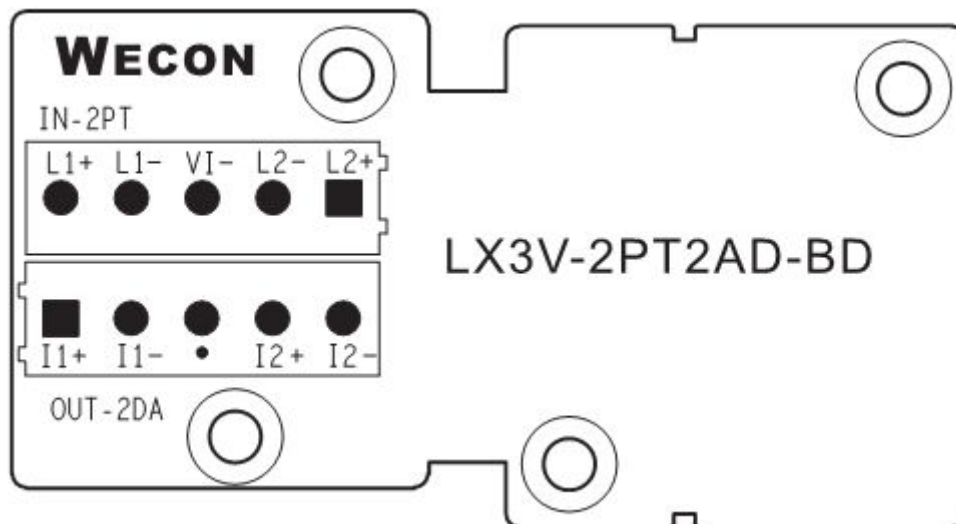
The detail information of each terminal as following form table shows,
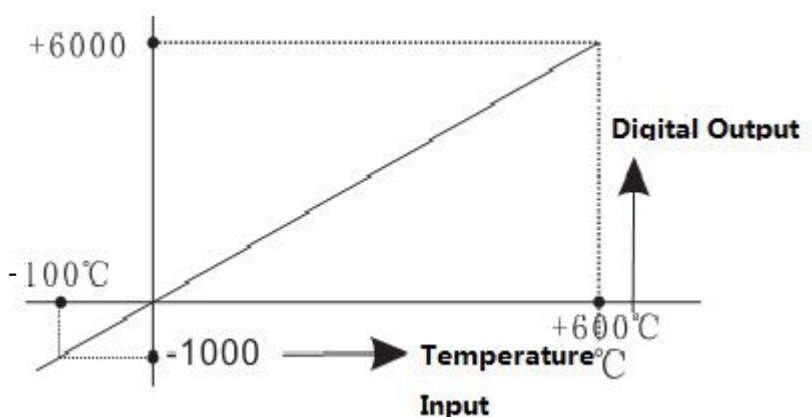
IN-2PT	
sensor type: 2 or 3 wires PT100	
L1+	First channel PT100 signal input (+)
L1-	First channel PT100 signal input (-)
L2+	Second channel PT100 signal input (+)
L2-	Second channel PT100 signal input (-)
VI-	Common

OUT - 2DA	
Output current range：4~20mA	
I1+	First channel current output (+)
I1-	First channel current output (-)
.	No connection
I2+	Second channel current output (+)
I2-	First channel current output (-)

IV. Specification

1. General Specifications: same as PLC main unit..

2. Power Specifications: Powered by PLC.

3. Performance Specifications:

Item	Explanation
Analog circuitry	DC 24V ±10%, 50mA
Digital circuitry	DC 5V, 90mA (From the PLC internal power supply)
Celsius	Read data by buffers

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Analog input signal	PT100 sensor, 3 wires, 4 channels (CH1, CH2, CH3, CH4), 3850PPM/℃
Sensor current	1mA
Compensation range	-100℃ - 600℃
Digital output	-1000 - 6000
	12 bits total, 11 bits for data and 1 bit for sign
Accuracy	0.2℃ - 0.3℃
Overall accuracy	±1%
Conversion rate	50ms
Conversion characteristics	

V. Wiring

Explanation:

2-wire PT100: when using channel 1, short-circuit L1+ and VI-, connect PT100's 2 wires to L1+ and L1- respectively. the same setting in channel 2.

3-wire PT100: when using channel 1, two same color wires, connected to the L1- and VI-, the third one connect to L1+.

Warning: Please cut off the power firstly, before installation / removal of expansion boards to avoid electric shock or damage to the product.

Note:

1. Stay away from high-voltage cables to avoid interference or surge;

2. Grounding is required, but please do not share the ground site with high-voltage cable.

3. Do not weld any cable ends, and make ensure that the number of connecting cables, no more than a predetermined number.

1. Cable

● Connecting output device by AWG25-16.

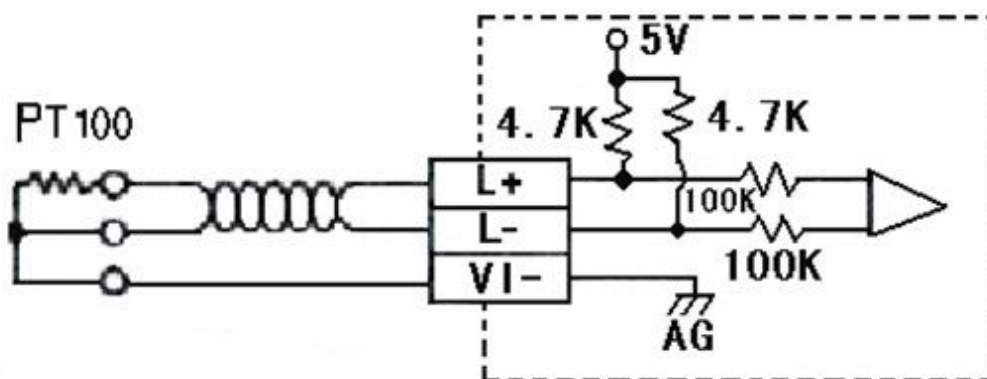● Terminal maximum tightening torque is 0.5 to 0.6 N.m

Types of cables and cross-sectional area

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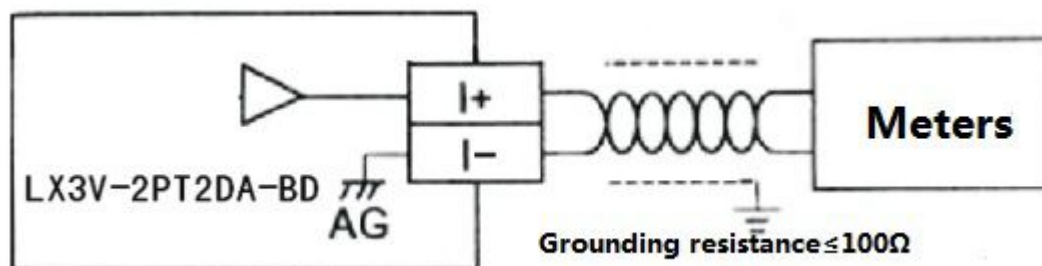| Type	Cross-sectional(mm²)	End
AWG26	0.1288	Stranded cable: Strip the sheath, matching core wire connection cable.
.	.	
.	.	
AWG16	1.309	Single cable: Strip the sheath, connecting cables
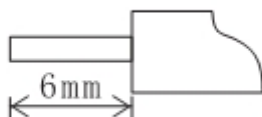
2. I/O mode

- PT100 input mode

- Current output mode

Ⅵ. Examples

The value of each chanel's PT100 is storaged in the registers(D8112, D8113) in the form of digital.

For output, in each "END" instruction, M8114 and M8115 converts the digital value into an analog output.

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1. Basic Programming

Note:

- M8112 and M8113 are used to analog to digital conversion for CH1 and CH2;
- 2PT only supports PT100;
- 2DA only supports current analog output;
- When M8112-M8115 are ON, the channels will not work, all showe "0";
- Don't try to change the value in D8112 or D8113, when finished the A/D conversion;

Example:

The following project sets CH1 and CH2 as PT100 input, and the value is storaged in D0 and D2.
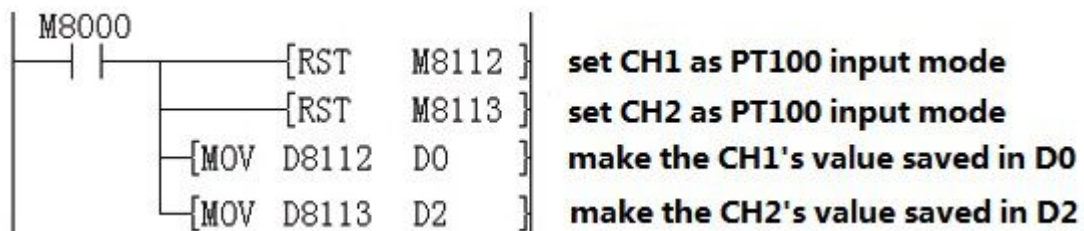
The following projects set current output mode, and convert the data in D0 and D2 to analog value and output.
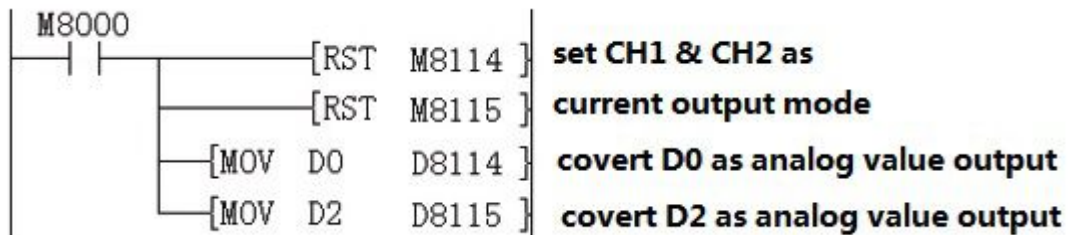
2. Application

Because LX3V-2PT2DA-BD no offset and gain function, so if the value is outside the range of values, it requires to use the four operations to complete the conversion.
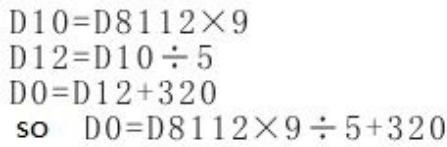
Note:

- Because the use of additional programming instructions, so the accuracy and resolution of analog to digital conversion are changed;
- Original range of the analog output will not change;

RTD input mode：

In RTD input mode, 2PT covert a analog value to a digital value in degrees Celsius. If in the program was degrees Fahrenheit as a unit it needs to be converted to Celsius value.

Fahrenheit and Celsius conversion formula, Fahrenheit = Celsius * 9/5 + 32, the unit is 0.1 ℃

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```
M8000
 ├─┤ ├─────────────────────[RST    M8112]    D10=D8112×9
         ├─[MUL  D8112  K9    D10 ]           D12=D10÷5
         ├─[DIV  D10    K5    D12 ]           D0=D12+320
         └─[ADD  D12    K320  D0  ]       so  D0=D8112×9÷5+320
```

Current output mode：

In current output mode, 2DA covert digital value 0-2000 into an analog value 4-20mA. If the range of digital in the program was 0-A, it must be converted to 0-2000.

```
M8000
 ├─┤ ├─────────────────────[RST    M8114]  D8114=2000×D0÷A
         ├─[DIV  D0    K5    D2  ]                =2000×D0÷10000(A=10000)
         └───────[MOV  D2    D8114]                =D0÷5
```

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