Z series expansion BD board

User manual

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Data No. ZC 02 20151218 3.2

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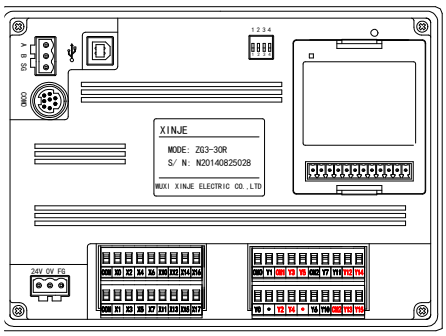
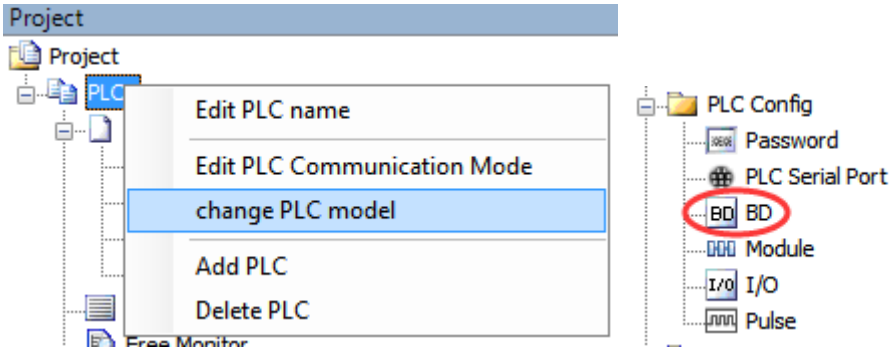
1. Configuration

The steps to configure the BD:

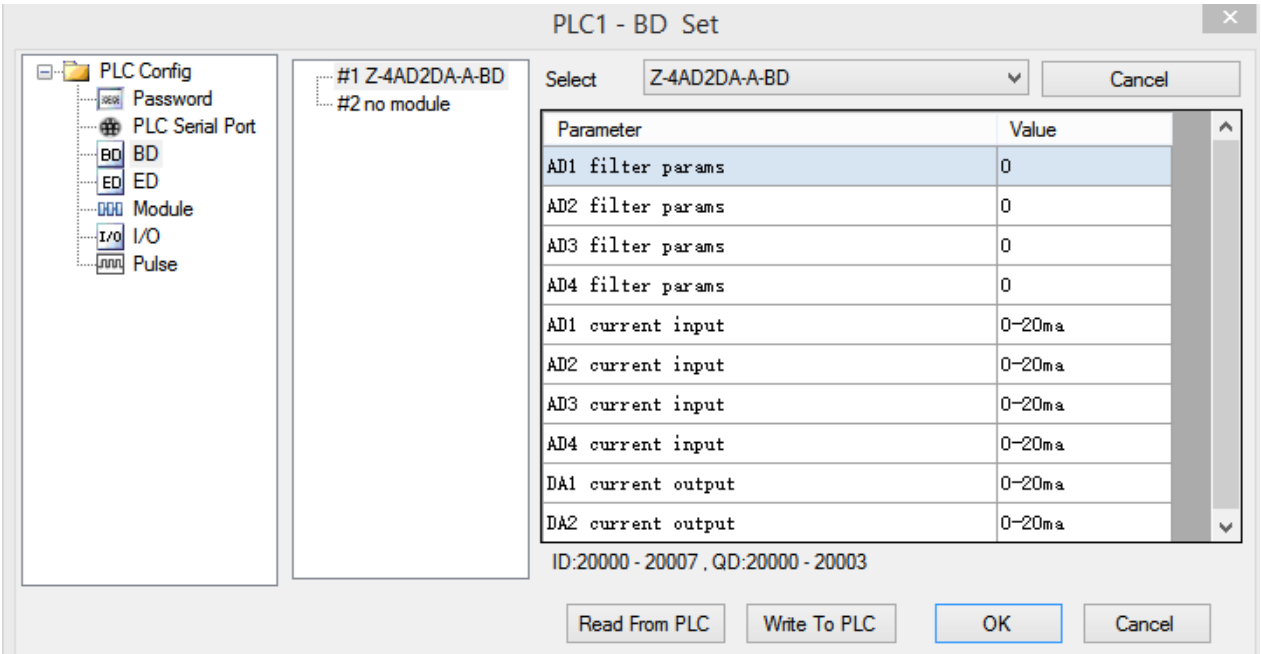
1. Install the BD board in the ZG3 series controller:



2. Connect XDPpro with the product, in the software, please click change PLC model, select ZG3-30. Then click BD in PLC project.



3. choose the BD board model and parameters such as voltage 0-10V, then click ok, download program in the PLC, and restart the PLC to make the setting effective.



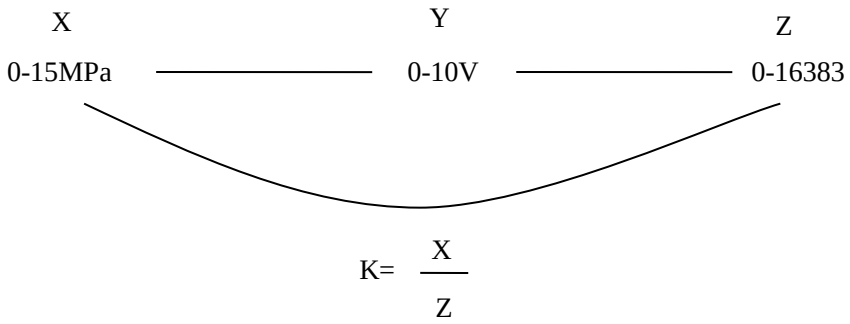
Note: please configure the BD board before using.

2. BD board precision

Here is an example to explain the precision of BD board.

Example: AD channel precision is 14-bit, analog input range is 0-5V or 0-10V. The transformed digital range is 0~16383. If the analog range is 0~5V, when the input voltage is 0V, the digital value is 0V, when the input voltage is 5V, the digital value is 16383. If the analog range is 0~10V, when the input voltage is 0V, the digital value is 0V, when the input voltage is 10V, the digital value is 16383. This is the relationship between input signal and transformed digital value.

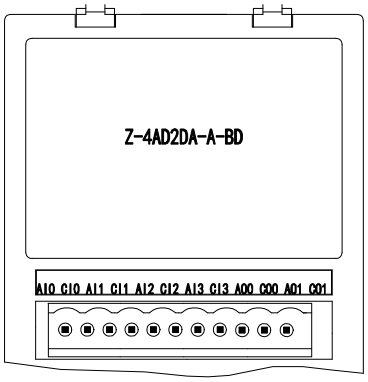
For example, the pressure sensor signal is 0-10V, the sensor range is 0-15Mpa, the present pressure value will be shown on the HMI screen.



As the above diagram, it can get the result of K. K means the pressure value when digital value is 1 (please use float number calculation), then multiply ID with K to get the present pressure.

3. Analog I/O BD Z-4AD2DA-A-BD

1. Features



- 12-bit high precision analog input
- 10-bit high precision analog output
- 4 channels 0~20mA or 4~20mA analog input
- 2 channels 0~20mA or 4~20mA analog output
- It needs external power supply for current output

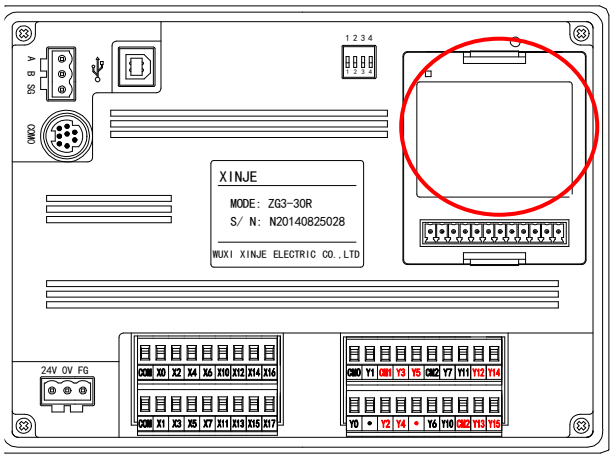
2. General specifications

Item	Current input	Current output
Analog input range	0~20mA, 4~20mA (input resistor 125Ω)	-
Analog output range	-	DC0~20mA, 4~20mA (external load resistor less than 500Ω)
Resolution	1/4096 (12Bit); the transformed data will store in the PLC in hex format (12Bit)	1/1024 (10Bit); the transformed data will store in the PLC in hex format
Digital input range	12-bit binary number (0~4095)	-
Digital output range	-	10-bit binary number (0~1023)
Integrated precision	±0.8% of full scale	
Transformed time	1ms/1 channel	1ms/1 channel
Insulation	There is no insulation between each I/O channel, there is insulation between I/O and internal circuit	
Points occupy	0 points (the data are operated in data register, it will not be limited by PLC max I/O points)	

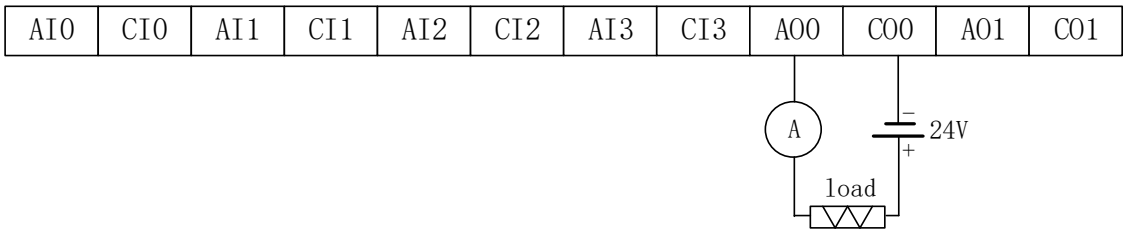
3. External installation and wiring

(1) BD board installation:

Open the BD cover of ZG3 controller, insert the BD board into the pins, then close the cover.



(2) Wiring method:



Note:

(1) The first 4 channels are for AD which can collect analog current 0~20mA or 4~20mA, AI0 connects to signal+, CI0 connects to signal-.

(2) The last 2 channels are for DA which can output the current 0~20mA or 4~20mA. Please see the above wiring diagram, the ammeter is for testing, it no needs to connect in actual application.

(3) It needs to connect external DC24V power supply for current output channel.

4. I/O address

This BD board will not occupy I/O units, the transformed value will send to PLC register, the PLC register of each channel are as the following:

Channel	AD signal
0CH	ID20000
1CH	ID20001
2CH	ID20002
3CH	ID20003
Channel	DA signal
0CH	QD20000
1CH	QD20001

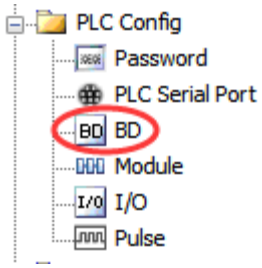
Note:

(1) this BD board has no PID function

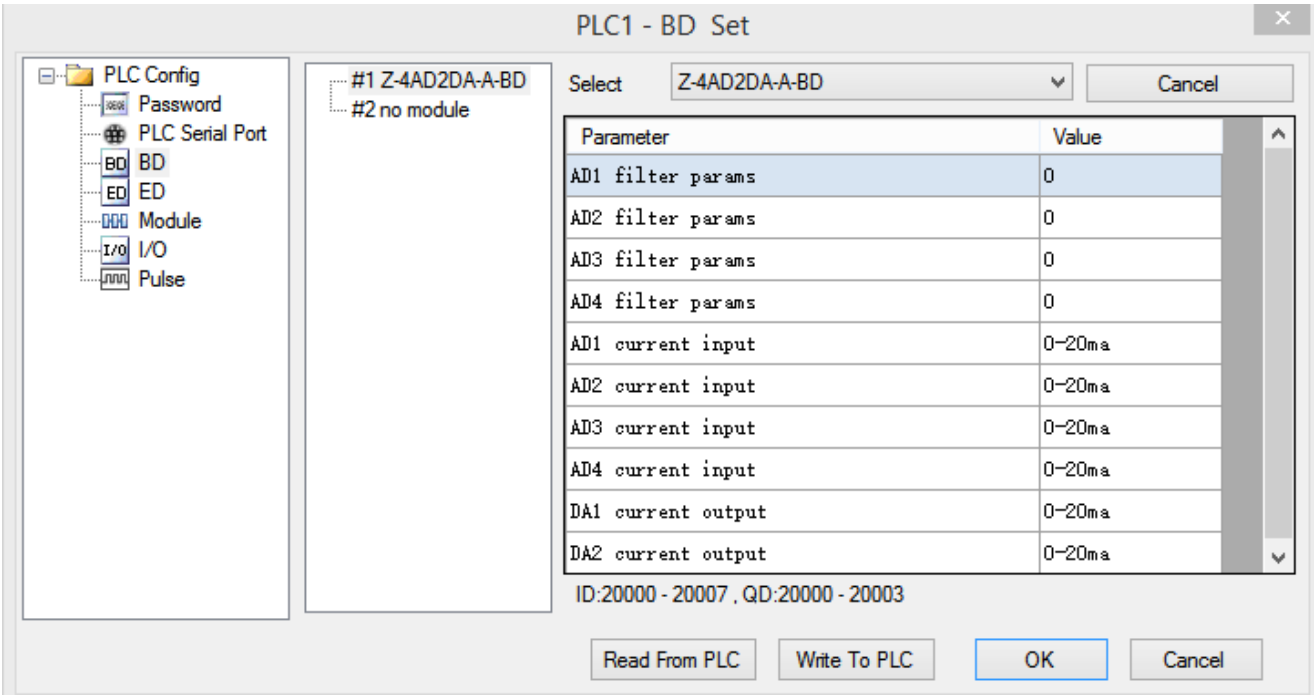
(2) when the input data is over 1023, the DA output will keep 20mA.

5. Software configuration

Open the XDPpro software, click the BD setting in the left menu:



Choose the BD board model in the window:



(1) choose Z-4AD2DA-A-BD

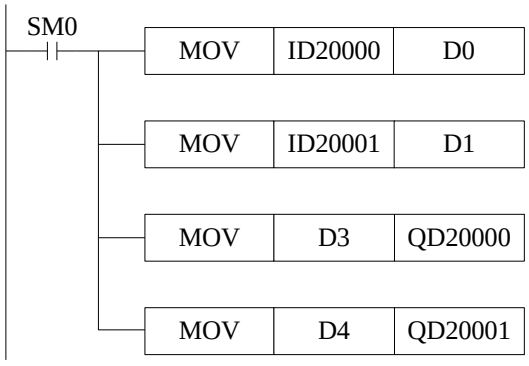
(2) choose AD channel current input mode and filter coefficient, current output mode.

(3) Click ok to confirm the setting, then download the user program in the PLC and repower on the PLC.

6. Application

Example: read 2 channels data, write in 2 channels data.

The program:



Explanations:

M8000 is always ON coil, it is ON when PLC is running.

write the channel 0 data in register D0;

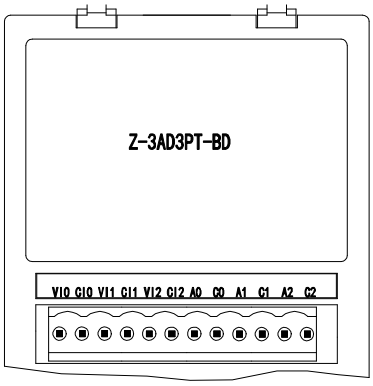
write the channel 1 data in register D1;

move the reigster D3 data to channel 0 for outputting;

move the register D4 data to channel 1 for outputting.

4. Analog temperature BD Z-3AD3PT-BD

1. Features



- 12-bit analog input
- 3 channels voltage 0~10V or 0~5V input.
- 3 channels Pt100(2-wire) temperature sensor input.

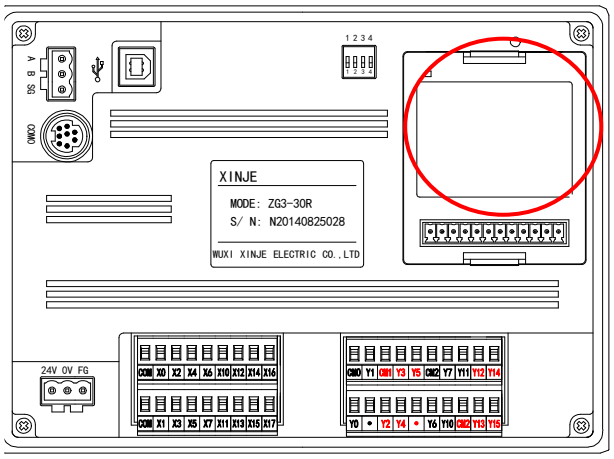
2. General specifications

Item	Voltage input	Temperature input
Analog input range	0~5V, 0~10V (input resistor 13.3kΩ)	Pt100 (2-wire) sensor
Temperature range	-	-100~500℃
Resolution	1/4096 (12Bit); the transformed data is saved in PLC(12-bit) in hex format	0.1℃
Digital input range	12-bit binary numbers (0~4095)	-1000~5000
Integrated accuracy	±0.8% of the full scale	
Conversion time	1ms/1 channel	1ms/1 channel
Insulation	There is no insulation between each I/O channel, there is insulation between I/O and internal circuit	
Point occupa	0 points (the data are operated in data register, it will not be limited by PLC max I/O points)	

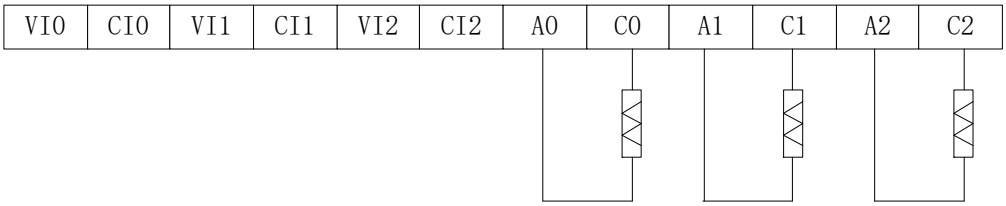
3. Installation and wiring

(1) BD board installation:

Open the BD cover of ZG3 controller, insert the BD board into the pins, then close the cover.



(2) wiring method:



Notes:

(1) The first 3 channels are for AD input, it can input voltage signal 0~5V or 0~10V. VI0 connects to signal+, CI0 connects to signal-.

(2) The last 3 channels are for PT100 sensor signal input. A0 connects to PT100 signal+, C0 connects to PT100 signal-.

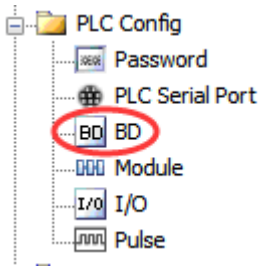
4. I/O address

This BD board will not occupy I/O units, the transformed value will send to PLC register, the PLC register of each channel are as the following:

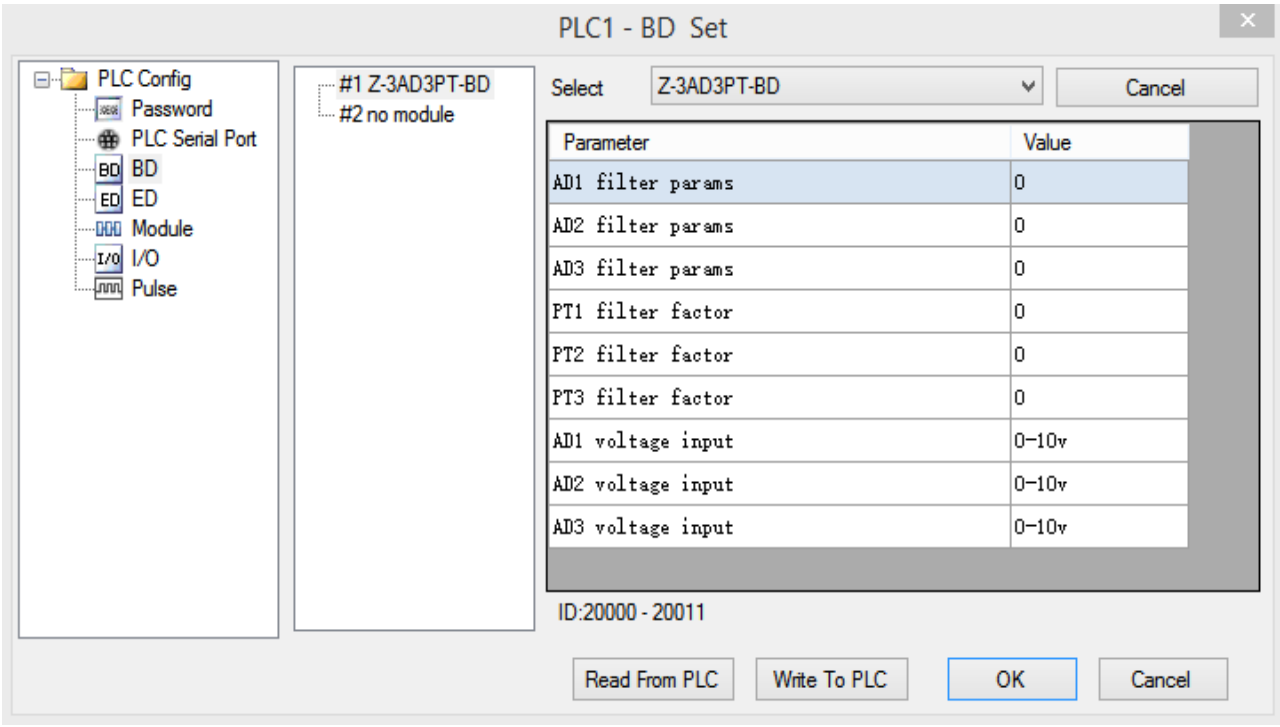
Channel	AD signal
0CH	ID20000
1CH	ID20001
2CH	ID20002
Channel	PT100 signal
0CH	ID20003
1CH	ID20004
2CH	ID20005

5. Software configuration

Open the XDPpro software, click the BD setting in the left menu:



Choose the BD board model in the window:



(1) choose Z-3AD3PT-BD.

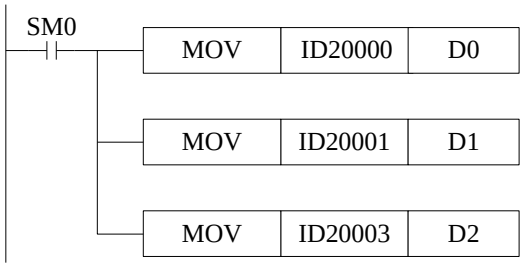
(2) Set the AD channel voltage input mode, filter coefficient and PT channel filter coefficient.

(3) Click ok to confirm the settings, then download the program in the PLC, repower on the PLC and run the program.

6. Application

Read 2 channels analog data, read 1 channel temperature value.

The program:



Explanation:

SM0 is always ON coil, it is ON when PLC is running.

PLC starts to run, write channel 0 analog value to register D0;

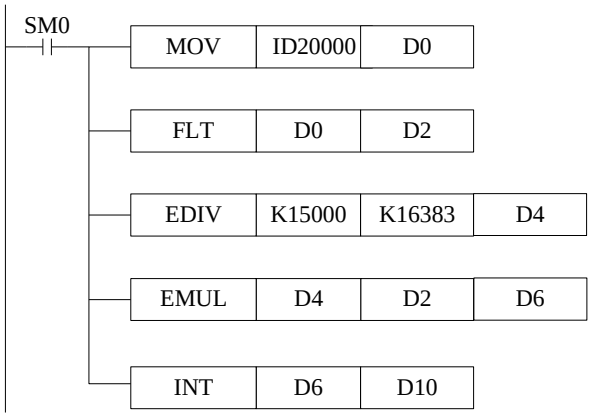
Write channel 1 analog value to register D1;
Write channel 0 temperature value to register D2.

5. Application

Program application:

Take Z-3AD3PT-BD as an example. The pressure sensor range is 0~15Kpa, the corresponding output voltage range is 0~10V. It needs to display the real-time pressure on the HMI screen (register D10, display 3-bit decimal, unit is Kpa).

Program:



Explanation:

ID20000: pressure value, digital register

D0: pressure value

D2: pressure value, floating number

D4: pressure floating number of each digital value

D6: actual pressure floating number

D10：actual pressure integer value, the range is magnified 1000 times, it can display 3-bit decimal to improve precision.

In this example, the digital value related to analog sampled value is 10, the transformed data is 0.009Kpa. the data displayed on the HMI:

Note: D2/D4/D6 are floating numbers, they will display in decimal format in program. Take D2 as an example: D2, D3 store the floating number 10 in decimal format (32-bit). Please select floating format to show the number in the software.

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