XP-BD Manual

Operating Manual

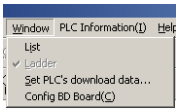
68119

Analog Input and Temperature Sampling Board XP3-2AD2PT-BD

Configure method of BD board

Configure Method of BD Board:

1) Install BD correctly on the main unit;
2) Then connect the model online via XCP edit tool, in the "Window" menu, choose "Config. BD Board(C)" as shown in the following graph1.
3) Click it, in the "Config. BD Board(C)" dialog box, choose "Other BD" (Just as showed in the graph 2), click "OK" to download the program.

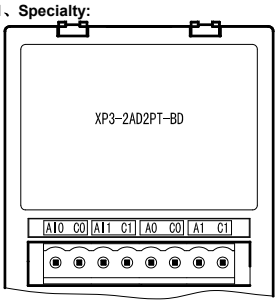


Graph 1

Graph 2

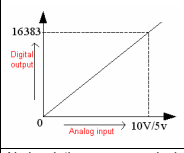
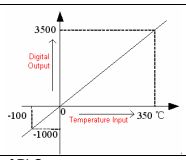
Analog Input and Temperature Sampling Board XP3-2AD2PT-BD

1、Specialty:



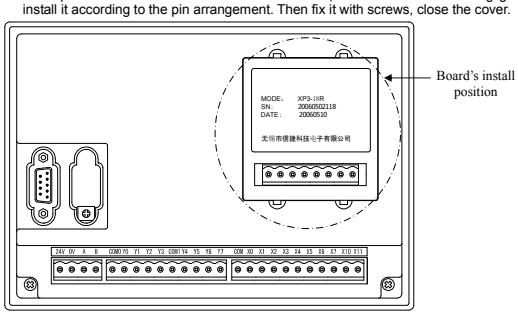
- 14 bits high precision analog input
- 2 channels voltage 0~10V, 0~5V (selectable) analog input
- 2 channels PT temperature testing resistor (PT100 two-line form) temperature sensor analog input

2、General Specification

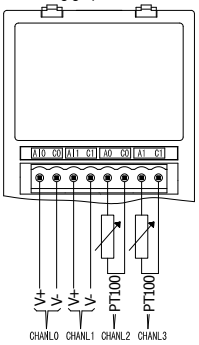
Item	Voltage Input	Temperature Input
Analog Input Signal	DC0~5V、0~10V (Input resistor 300kΩ)	Platinum Resistor PT100 (2 lines format)
Temperature Testing Bound	-	-100~350℃
Distinguish Ratio	0.15mV（10/16383）	0.1℃
Digital Output Bound	0~16383	-1000~3500
Integrate Precision	±0.8% of full scale	
Convert Time	15ms×4 channels	
PID Output Value	0~K4095	
Vacant Defaulted Value	0	3500
Input Specialty		
Insulation	No insulation among each channel of PLC	
Engrossed points	0 point (As operated via data register, so the engrossed points are not limited by PLC's max control points)	

3、External Installation and Connection

1) The Installation Method of Board:
Open the board's cover at the back of XP3 (As shown in the following graph), install it according to the pin arrangement. Then fix it with screws, close the cover.



2) Connection: See the following graph



4、Assignment of Input ID

This BD board does not engross I/O units, the converted data will directly send into PLC register. The channel's correspond PLC register ID is:

Channel	0CH	1CH	2CH	3CH
AD signal/Temperature value	ID1000	ID1001	ID1002	ID1003
PID output value	ID1004	ID1005	ID1006	ID1007
Set the target value	QD1000	QD1001	QD1002	QD1003
Kp	QD1004		QD1009	
Ki	QD1005		QD1010	
-Kd	QD1006		QD1011	
Diff	QD1007		QD1012	
Death	QD1008		-	
Start/Stop	Y1000	Y1001	Y1002	Y1003

Note：

1）Kp：proportion parameter; Ki：Integral parameter; Kd：Differential parameter; Diff：Control proportion band;
PID value：PID output value（0~4095）

2）Control coil's status（Y1000/Y1001）：0：means close PID control；1：means start PID control

Description:

1) 0CH, 1CH are AD input channels; 2CH, 3CH are Pt input channels

2) Kp：proportion parameter; Ki：Integral parameter; Kd：Differential parameter; Diff：Control band;

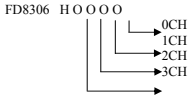
Control Band **Diff**: Carry on PID control in the assigned bound, beyond the bound, don't carry on PID control

Start Signal (Y): PID control is closed when Y is 0, open PID control when Y is 1

Death Bound "Death": Compare the current PID output value with the preceding PID output value. If their difference is less than the set death bound, the module will abandon the current PID output value, still transfer the preceding PID output value to PLC main unit

3、Setting of Working Mode

1) Expansion's input has voltage 0~5V、0~10V these two modes and filter form to select. Set via special FLASH data register FD8306 in PLC. Refer to the graph by the right, each register set the 4 channels' mode, each register has 16 bits. From low bit to high bit, each 4 bits set one channel's mode



2) Each channel's working mode is assigned by the four bits of the correspond register, each bit's definition is shown below:

Register FD8306:

CH1				CH 0			
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
00：1/2 filter 01：not filter 10：1/3 filter 11：1/4 filter		-	0:0~10V 1:0~5V	00：1/2 filter 01：not filter 10：1/3 filter 11：1/4 filter		-	0:0~10V 1:0~5V

CH3				CH 2			
Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
00：1/2 filter 01：not filter 10：1/3 filter 11：1/4 filter		-	-	00：1/2 filter 01：not filter 10：1/3 filter 11：1/4 filter		-	-

1）Usage of four parameters: Proportion parameter（Kp）、integral parameter (Ki)、differential parameter (Kd)、control proportion band（Diff）

Parameter P is proportion parameter，mainly reflect system's wrap, when system wrap appears, carry on control immediately to decrease the wrap.

Parameter I is integral parameter, mainly used to remove net difference, improve the system's no-difference degree

Parameter D is differential parameter, mainly used to control signal's change trend, decrease system's shake.

Temperature control proportion band means: in the assigned bound, carry on PID control，beyond the bound, do not carry on PID control.

5、Control Specialties

1) Usage of four parameters: Proportion parameter (Kp)、integral parameter (Ki)、differential parameter (Kd)、control proportion band (Diff)

Parameter P is proportion parameter，mainly reflect system's wrap, when system wrap appears, carry on control immediately to decrease the wrap.

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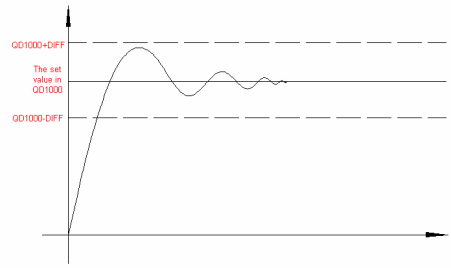
Temperature Control Band Means: in the assigned bound, carry on PID control，beyond the bound, do not carry on PID control.

1) Control Specialties

The bound of carry on PID adjustment is: (QD-Diff， QD+Diff), when temperature is low than QD-Diff, controller go on heating, when temperature is higher than QD+Diff, controller stop heating.

PID Temperature Control Curve is Shown Below:



1）Each parameter's reference value：Kp=20~100；Ki=5~20；Kd=200~500；DIFF=100~200；

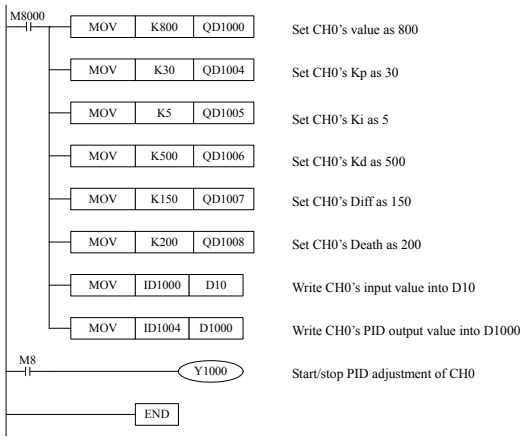
This reference value only for normal condition，according to the locale detail condition, each reference value could be beyond the bound.

6、Application of PID Output Value

When carry on PID adjustment, this BD board heat with the cycle of 2 second. According to the comparison of PID output value (Channel 1 ID1004、channel 2 ID1005) and 4095, open and cut of heating form different high-low level ratio. Assume the output value of PID is X (0≤X≤4095). In the heat cycle of 2 seconds, heat with 2X/4095 second. Stop heat with (2－2X/4095).

7、Program

E.g.1、Real time read the AD value of CH0, then carry on PID parameters setting with CH0, then read the PID output value.



E.g.2. PID temperature control example