



XMH/XP3-16 Expansion BD board

User manual

WUXI XINJE ELECTRIC CO., LTD.

Data NO: PC14 20091124 3.2

Catalog

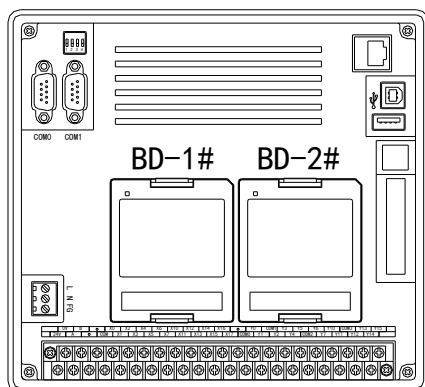
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Chapter1. BD configuration

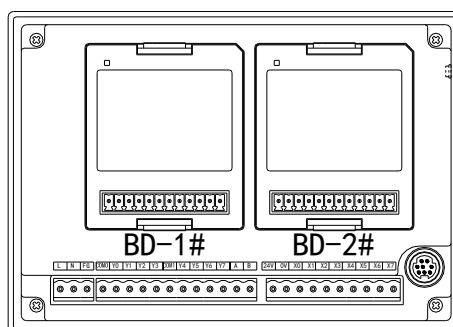
BD board configuration steps:

- (1) Install the BD board on XMH3-30 or XP3-16 which can expand 2 BD boards. But XP-4AD2DA-BD2 only can install in BD-1# position, and no need to configure.

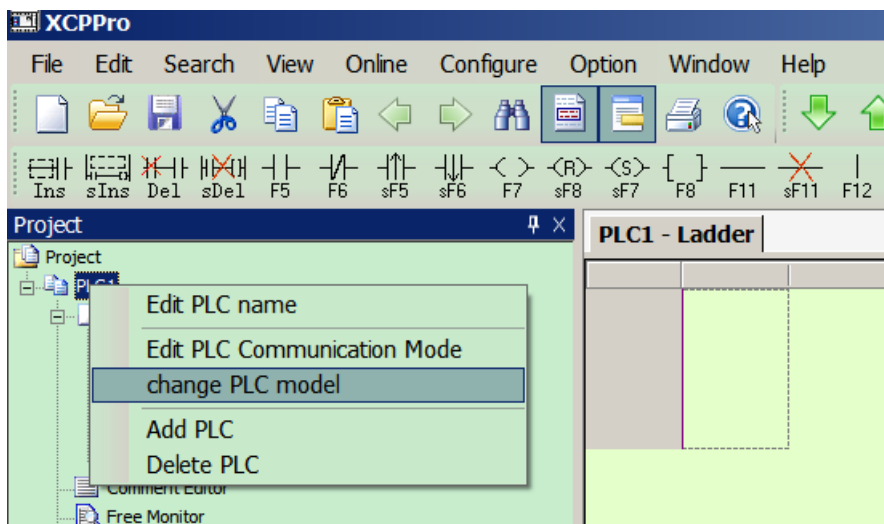
XMH3-30



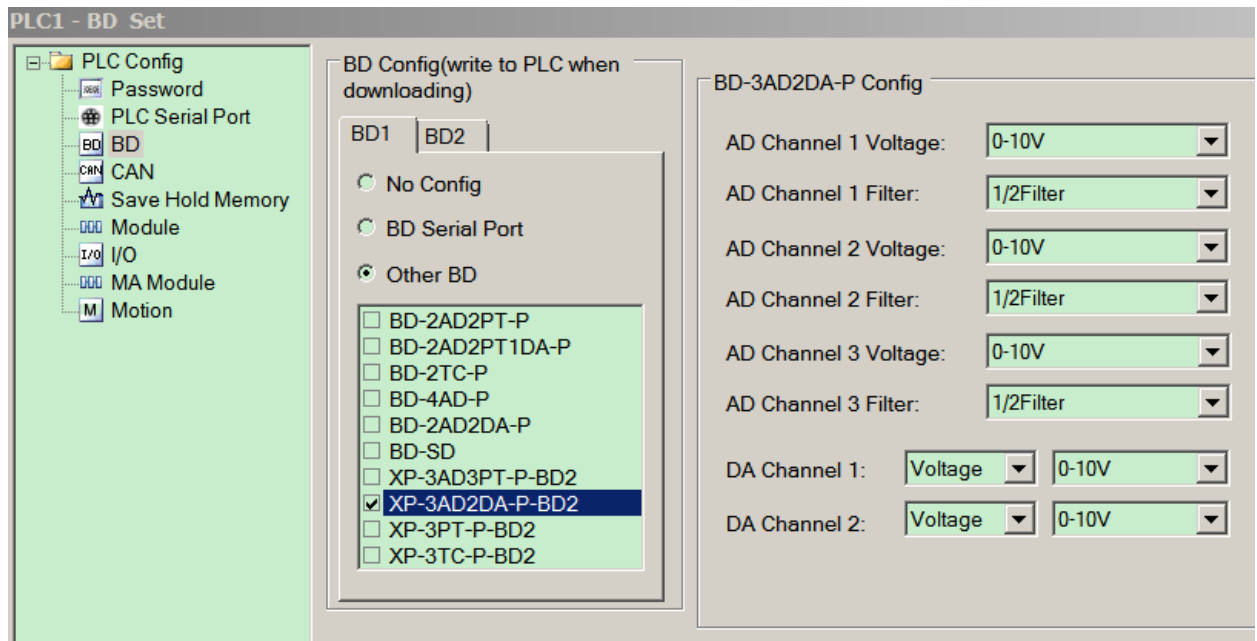
XP3-16



- (2) Connect the XMH3-30 or XP3-16 with PC, open XCPpro software. Right click PLC1 in the project menu, click change PLC model. Then select XMH3-30 or XP3-16. Then click Configure/BD setting. Now you can configure the BD1 and BD2. (see from the back cover of XMH3-30 or XP3-16, left position is BD1, right position is BD2)



- (3) Select BD board type, and configure each channel in below window. After configuration, click OK. Then download program and re-start the XMH3-30 or XP3-16 to make the configuration effective.

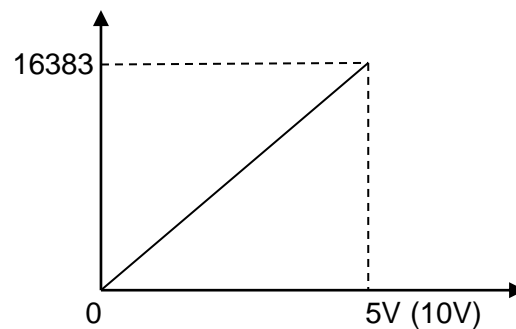


Chapter2. BD board precision

The analog input or output of BD board is related to the precision. Next we will take some examples to explain it.

Example: analog input precision is 14-bit; range is 0-5V/0-10V.

The analog transforms to digital range is 0-16383. Please see below diagram:

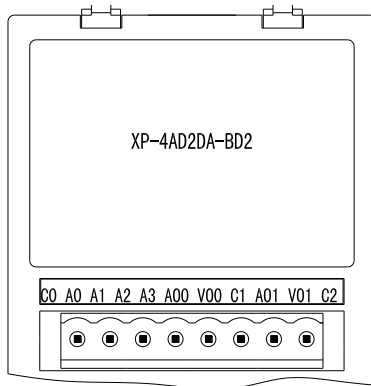


If the pressure sensor range is 0-15MPa, analog signal is 0-10V.



Chapter3. XP-4AD2DA-BD2

1. Characteristics



- 12-bit analog input
- 8-bit analog output
- 4 channels 0-10V voltage input
- 2 channel 0-20mA/0-10V analog output

2. Specification

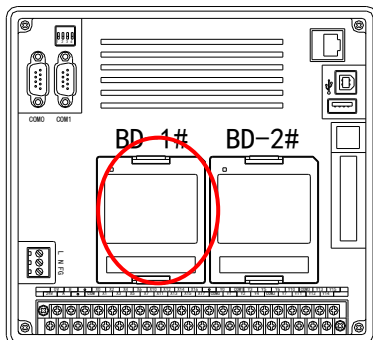
Item	Voltage input	Current/voltage output
Analog input	0~10V (input resistor 300kΩ)	-
Analog output	-	DC0~20mA (external load resistor below 500Ω) or DC0~10V
Resolution	1/4095 (12Bit); the transformed value is stored in PLC in Hex (12Bit)	1/255 (8Bit); the transformed value is stored in PLC in hex
Digital output	12-bit binary value (0~4095)	-
Digital input	-	8-bit binary value (0~255)
Integrated accuracy	±0.8% of full scale	
Transform time	15ms/1 channel	3ms/1 channel
PID output	-	-
Insulation	There is no insulation between the channel	

3. Wiring and installation

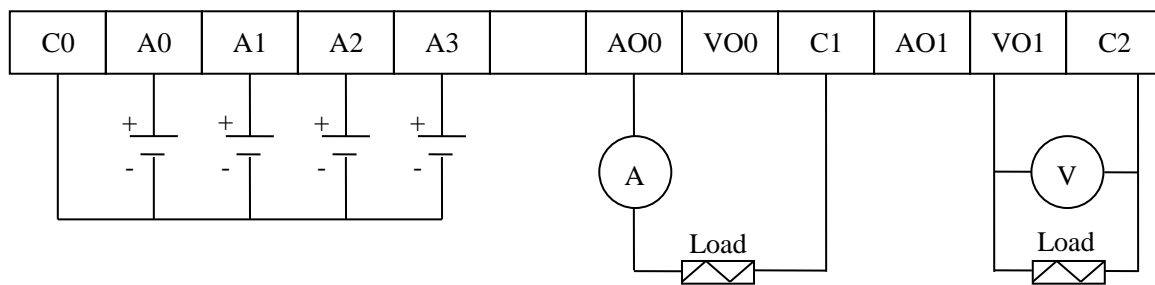
(1) Installation:

Open the cover of BD-1#, insert the BD board into the pins. Then close the cover.

Please note: XP-4AD2DA-BD2 only can be installed in BD-1#.



(2) Wiring



Note:

- (1) The first 4 channels are analog input; the input signal is 0-10V. A0 connects signal+, C0 connects to signal-.
- (2) The last 2 channels are analog output; the output signal is 0-20mA or 0-10V. In up diagram, the power supply of analog input channel is the actual voltage supply. The ammeter and voltmeter are used to test the output current and voltage. They are not necessary for actual use.
- (3) It is no needs to serial connect +24V power supply in analog output circuit.

4. I/O address

This BD board doesn't occupy I/O space; the value is stored in PLC register.

Each channel has related PLC register:

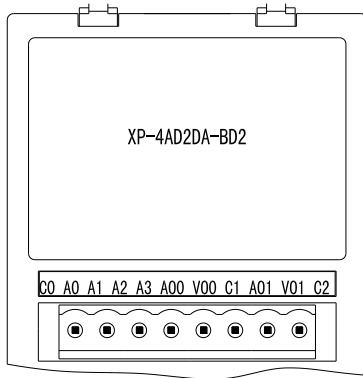
Channel	AD signal
0CH	ID0
1CH	ID1
2CH	ID2
3CH	ID3
Channel	DA signal
0CH	QD0
1CH	QD1

Note:

- (1) This BD board has no PID function.
- (2) If QD>255, DA output value will maintain at 20mA or 10V.

Chapter4. XP-3AD2DA-BD2

1. Characteristic



- 14-bit analog input
- 10-bit analog output
- 3 channels 0-5V/0-10V input
- 2 channels 0-20mA/4-20mA or 0-5V/0-10V output

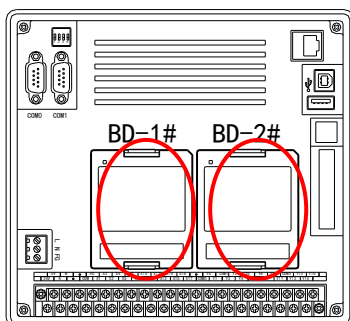
2. Specification

Item	Voltage input	Current/voltage output
Analog input	0-10V/0-5V selectable (input resistor 300kΩ)	-
Analog output	-	0-20mA/4-20mA (external load resistor below 500Ω) or 0-10V/2-10V
Resolution	1/16383 (14-bit), the transformed value is stored in PLC in hex (14-bit)	1/1023 (10-bit), the transformed value is stored in PLC in hex
Digital output	14-bit binary value (0~16383)	-
Digital input	-	10-bit binary value (0~1023)
Integrated accuracy	±0.8% of the full scale	
Transform time	15ms/1 channel	3ms/1 channel
PID output	-	-
Insulation	There is no insulation between the channel	

3. Wiring and installation

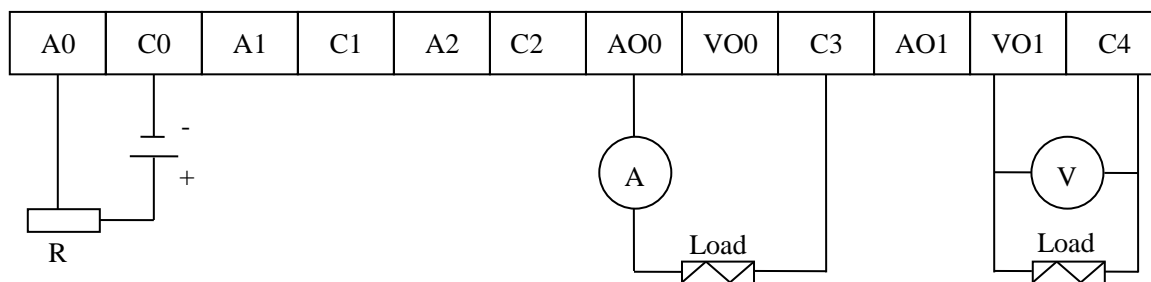
(1) Installation:

Open the back cover of XMH3-30 or XP3-16, insert the BD board into the pins, close the cover.



Note: XP-3AD2DA-BD2 can be installed in BD-1# or BD-2#.

(2) Wiring



Note:

(1) The first 3 channels are analog input; accept 0-5V, 0-10V signal. A0 connects to analog+ signal; C0 connects to analog- signal.

(2) The last 2 channels are analog output; can output 0-20mA/4-20mA or 0-5V/0-10V. The ammeter and voltmeter are used to test the output current and voltage; they are not needed in real connection. For analog output, AO is current output, VO is voltage output. It can be configured in the software.

(3) It is no need to connect +24V power supply for analog current output.

4. I/O address

This BD board doesn't occupy I/O space; the value is stored in PLC register.

Each channel has related PLC register:

BD-1#:

Channel	AD signal	PID output	PID ON/OFF	Set value	PID parameter: Kp, Ki, Kd, Diff, Death
0CH	ID1000	ID1003	Y1000	QD1002	Kp-----QD1005; Ki-----QD1006; Kd-----QD1007; Diff---QD1008; Death--QD1009
1CH	ID1001	ID1004	Y1001	QD1003	
1CH	ID1002	ID1005	Y1002	QD1004	
Channel	DA signal	-	-	-	-
0CH	QD1000	-	-	-	
1CH	QD1001	-	-	-	

BD-2#:

Channel	AD signal	PID output	PID ON/OFF	Set value	PID parameter: Kp, Ki, Kd, Diff, Death
0CH	ID1050	ID1053	Y1050	QD1052	Kp-----QD1055; Ki-----QD1056; Kd-----QD1057; Diff---QD1058; Death--QD1059
1CH	ID1051	ID1054	Y1051	QD1053	
1CH	ID1052	ID1055	Y1052	QD1054	
Channel	DA signal	-	-	-	-

0CH	QD1050	-	-	-	
1CH	QD1051	-	-	-	

Explanation:

(1) Kp: proportion parameter; Ki: integral parameter; Kd: differential parameter

(2) Diff: control range, make PID control in certain range

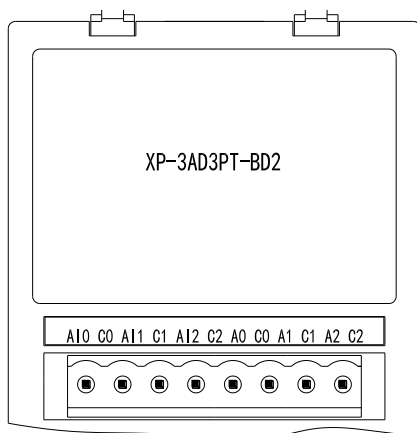
(3) PID ON/OFF signal Y: Y=0, PID is OFF, Y=1, PID is ON

(4) Death: death range, if the difference between the last and current PID value is less than the death range, the current PID value will be abandoned, the last PID value will be stored in the PLC.

Note: if QD (DA signal) is over 1023, DA output will maintain at the max value. (10V, 5V or 20mA)

Chapter5. XP-3AD3PT-BD2

1. Features



- 14-bit analog input
- 3 channels voltage input, 0~10V/0~5V optional
- 3 channels Pt100 (2-wire) temperature sensor input

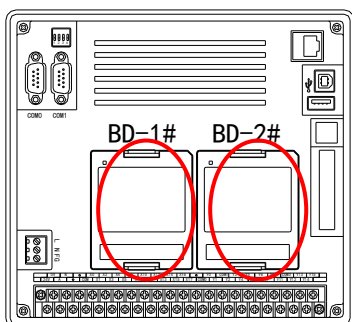
2. General specifications

Item	Voltage input	Temperature input
Analog input range	0~10V/0~5V optional (input resistor is 300kΩ)	Pt resistor Pt100 (2-wire)
Temperature range	-	-100~500°C
Resolution	1/16383 (14Bit); AD transformed value is stored in PLC in hex	0.1°C
Digital output range	14-bit binary value (0~16383)	-1000~5000
Integrated precision	±0.8% of the full scale	
Transforming time	15ms per channel	3ms per channel
PID output	0~K4095	0~K4095
Insulation	No insulation between each channel of PLC	

3. Wiring and installation

(1) Installation

Take XMH3-30 as an example. Open the back cover for BD, insert the BD into the pins. Close the cover.



Note: XP-3AD3PT-BD2 can be installed at BD-1# or BD-2#. The BD address is different for each location.

(2) Wiring

AI0	C0	AI1	C1	AI2	C2	A0	C0	A1	C1	A2	C2
-----	----	-----	----	-----	----	----	----	----	----	----	----

Note:

- (1) AI0, AI1, AI2 are voltage input channel. For example: AI0 connects to voltage +; C0 connects to voltage -.
- (2) A0, A1, A2 are temperature input channel. For example: A0 connects to Pt100 +; C0 connects to Pt100-.

4. I/O address

BD module doesn't occupy I/O units, the value will store in PLC register. The following is the related PLC register address.

BD-1#:

Channel	Voltage	PID output	PID ON/OFF bit	Set value	PID parameter: Kp, Ki, Kd, Diff, Death
0CH	ID1000	ID1006	Y1000	QD1000	Kp-----QD1006; Ki-----QD1007; Kd-----QD1008; Diff---QD1009; Death---QD1010
1CH	ID1001	ID1007	Y1001	QD1001	
2CH	ID1002	ID1008	Y1002	QD1002	
Channel	Temperature	-	-	-	Kp-----QD1011; Ki-----QD1012; Kd-----QD1013; Diff---QD1014;
0CH	ID1003	ID1009	Y1003	QD1003	
1CH	ID1004	ID1010	Y1004	QD1004	
2CH	ID1005	ID1011	Y1005	QD1005	

BD-2#:

Channel	Voltage	PID output	PID ON/OFF bit	Set value	PID parameter: Kp, Ki, Kd, Diff, Death
0CH	ID1050	ID1056	Y1020	QD1050	Kp-----QD1056; Ki-----QD1057; Kd-----QD1058; Diff---QD1059; Death---QD1060
1CH	ID1051	ID1057	Y1021	QD1051	
2CH	ID1052	ID1058	Y1022	QD1052	

Channel	Temperature	-	-	-	Kp-----QD1061; Ki-----QD1062; Kd-----QD1063; Diff---QD1064;
0CH	ID1053	ID1059	Y1023	QD1053	
1CH	ID1054	ID1060	Y1024	QD1054	
2CH	ID1055	ID1061	Y1025	QD1055	

Explanations:

(1) Kp: proportion parameter; Ki: integral parameter; Kd: differential parameter

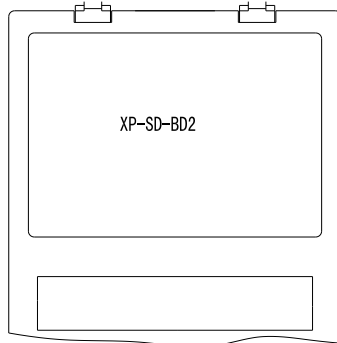
(2) Diff: control range, make PID control in certain range

(3) PID ON/OFF signal Y: Y=0, PID is OFF, Y=1, PID is ON

(4) Death: death range, if the difference between the last and current PID value is less than the death range, the current PID value will be abandoned, the last PID value will be stored in the PLC.

Chapter6. XP-SD-BD2

1. Features



- To install SD card and expand the XC memory
- PLC can read and write the data of SD card
- Support 4 data formats (single word, double word, float, character)
- Software and hardware version must be V3.3 and above

2. Explanation

(1) SD card

- XP-SD-BD2 has not been installed the SD card when out of factory, user needs to prepare MicroSD (TF card), the card memory should be not more than 2GB.
- Before install the SD card in the XP-SD-BD2, please use card reader to format the SD to FAT16 in the PC.



(2) The file standard of SD card

- SD card supports .csv file, these file should be saved in the root directory.
- All the .csv files must be named as dataxxx.csv, xxx is the file index number, the range is 001~999, when xxx is less than 100, add 0 from the left side. For example, if file index number is 1, the file name will be data001.csv.

(3) Data format and type of SD card

- SD card supports 4 kinds of data type: single word (W), double word (DW), float(Fm.n), character (Sx).
- The data range and space:

Data type	W	DW	Fm.n(m<=15,n<=15)	Sx(x<=16)
Data range	-32768~32767	-2147483648~2147483647	-18446742974197923840~18446742974197923840	\
Character occupied in SD card	6	11	m+1+n	2*x
WORD number	1	2	2	x

NOTE:

- (1) When the real data length is less than the character length in SD card, add space from the left side. For example, single word data 454, data type is W, character length is 6, so add 6-3 = 3 spaces. The real number is L L L 454. (L is space).

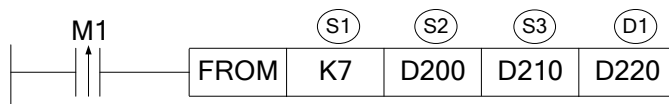
- (2) When Fm.n is negative number, the sign bit occupies one character. For example, F5.3, after writing the number -12345.123 in SD card, the lowest valid bit will be deleted; the number will become -12345.12.
- (3) The x of character Sx means word length, but not character length.

3. Operation for SD card

XMH3-30 and XP3-16 can connect XP-SD-BD2, and write/read the data from SD card.

(1) Read the SD card

After installing the XP-SD-BD2, PLC can read the data in SD card. FROM instruction can read the appointed data in .csv file of SD card.



- Read the data from SD card to PLC register, the unit is word.
- S1: K7 means the XP-SD-BD2 in BD-1# position. If it is installed in BD-2# position, the operand is K8.
- S2~S2+2: the index number, column and row number of data block in the designated .csv file. Operand: D.
- In the example, D200 is the .csv file index number
D201 is the column head address of the data block
D202 is the row head address of the data block
- S3: the data quantity you want to read. (word quantity). Operand: D.
- D1: the PLC register to store the read data. Operand: D.
- In this example, if D200=2, D201=1, D202=3, D210=3. The instruction will do like this: read 3 numbers start from column 1, row 2 of the file "data002.csv" in SD card, and save it in D220 of PLC.
- If the data002.csv is shown as the following, then the numbers in the red color area will be read.

Data002.csv opens in notepad:

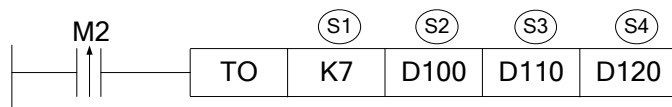
w, dw, s8, f4.15, dw, w, dw						
2980,	178605,	HFASDFNQWEJFN,	769.467894,	-1321240,	-330,	780240
2471,	-191280,	JKSAHDKFHAKLS,	830.26683,	-2515275,	-23782,	-665320
9628,	39984,	jakjfkakl,	387.56305,	458388,	-7728,	-884013
9045,	-251190,	testh,	949.899791,	-417510,	39600,	195264
1824,	141351,	hellbaby,	408.248854,	2644828,	-1836,	558904
22300,	70153,	testh,	570.088499,	-583542,	-6534,	1095926
-1742,	271975,	HSDKLJDF,	162.57849,	-1238233,	-25761,	-125260
1636,	207536,	JSKDJFDSALF,	735.422261,	293940,	2400,	345495
9962,	37107,	HDJNFCJDSNC,	860.864485,	538920,	24660,	827472

Explanation:

- (1) The first line is data type definition; the row address in FROM instruction should include the data type definition row.
- (2) The data type of second row where 2471 is in is w (word), the second column where -191280 is in is dw(double words). The two numbers occupy 3 words.

(2) Write the SD card

TO instruction can write data from PLC register to the .csv file of SD card. But user has to build the .csv file in the SD card and define the write-in data type. If not, the LED of XP-SD-BD2 will be OFF.



- Write the PLC data to SD card, the unit is word.
- S1: K7 means the XP-SD-BD2 in BD-1# position. If it is installed in BD-2# position, the operand is K8. Operand: K7, K8.
- S2~S2+2: the index number, column and row number of data block in the designated .csv file. Operand: D.
- In the instruction, D100 is the index number of the .csv file
D101 is the column number of the data block
D102 is the row number of the data block
- S3: the write-in data quantity (word quantity), operand: D.
- S4: PLC register address which needs to write-in, operand: D.

If D100=1, D101=1, D102=2, D110=5, D120=365, D121=10235465, D123=26456, the instruction means write 5 words data from D120 to column1, row2 of data001.csv. The write-in data is shown as below red area:

w, dw, dw, f4. 15,			
365,	10235465,	26456,	769.467894,
2471,	-191280,	70153,	830.26683,

Note: the write-in data type should be coincidence with data type definition, otherwise ID1000 and ID1050 will report the error.

(3) Notice

- Character type Sx
 - A. Sx supports visible character such as letter, number, the same as ASCII code [32,126], but not support comma “,”.
 - B. Invisible character, Sx supports end character.
- Reading and writing word quantity limitation
 - A. Limited by the RAM capacity of PLC, the reading and writing word quantity should be less than 50.
 - B. Cannot read part of the data. For example, define the data type to be “W, DW, S8”, if the reading word quantity is 10 and read from the first column W, the S8 will not be read completely, ID1000, ID1050 will return error value. When the program found that the parameters were wrong, it will not read and write the SD card.
 - C. When reading or writing data, if one row is over, it will jump to the first column of the next row.
 - D. “.csv” file cannot have space between data. When writing data into SD card, the address must be continuous, if not the ID1000 and ID1050 will have error code 20.

E. When reading the data, the address cannot over the last data address, if not the ID1000 and ID1050 will produce error code.

- Default operation file

To save the time, after installing the SD card, it will read the data001.csv file, if there is no this file in the SD card, ID1000 and ID1050 will return code 2. But this will not affect the following operation for data001.csv file.

4. SD card state (BD-1# is ID1000, BD-2# is ID1050)

The SD card state is shown in ID1000 and ID1050.

ID1000/ ID1050	Meaning	Reason
0	Succeed	
1	Initialization failed	SD card damaged or did not install well
2	Read/write file doesn't exist	The file doesn't exist
3	Reserved	
4	Reserved	
5	Reserved	
6	Reserved	
7	Reserved	
8	Read/write error	Uninstall the SD card when reading/writing
9	Reserved	
10	Reserved	
11	FAT16 error	SD card is not formatted to FAT16
12	Reserved	
13	Reserved	
14	Reserved	
15	Reserved	
16	Reserved	
17	Reserved	
18	Reserved	
19	SD card is not inserted	SD card is not inserted
20	Read/write parameter error	Check the file index, column/row number, word number
21	Read/write data is not coincidence with format definition	Illegal characters in character Sx
22	File data type error	Data type is not included in w, dw, Sx, Fm.n
23	Data type doesn't match when reading file	Illegal characters in character Sx
24	Illegal file name	index>999
25	Illegal column index	Column index > file max column number
26	Illegal row index	Row index= 0 or 1

27	Illegal read/write word quantity	Word quantity >50
----	----------------------------------	-------------------

5. Type definition in “.csv” file

Before writing data into .csv file, you need to define the data type in the Excel table.

A. Build a new Excel file, define the data type in the first row.

	A	B	C	D	E
1	w	dw	f3.2	s5	dw
2					
3					

B. Save the file and named as dataxxx.csv. For example, data003.csv.

C. After saving the file, open it in txt file, you will see the following things: each data type is divided by “,” automatically. In that way PLC can recognize it easily.

Data003.csv opens in notepad:

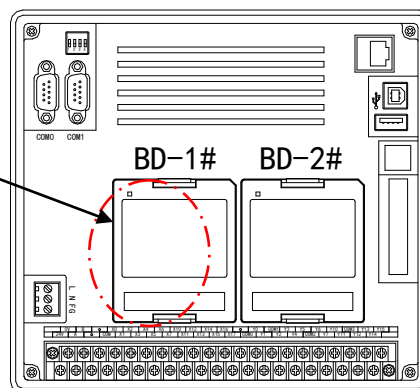
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w ,dw,f3.2,s5,dw
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6. Install and configure XP-SD-BD2

(1) Installation

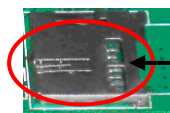
Open the cover of BD-1#, insert the BD board into the pins, fix it with the screw then close the cover.

Installation position



(2) Install the SD card

Insert the SD card into the slot on XP-SD-BD2.



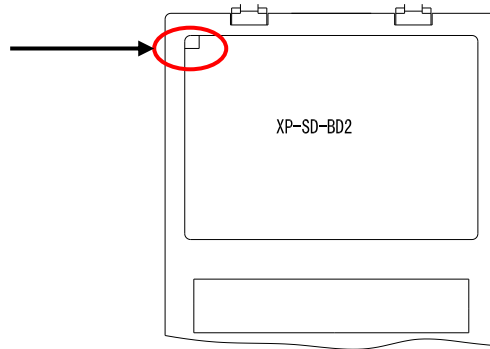
Installation position

BD board has a LED lamp:

LED is always ON when PLC and BD communicate well

LED is OFF when PLC and BD communicate error

LED lamp



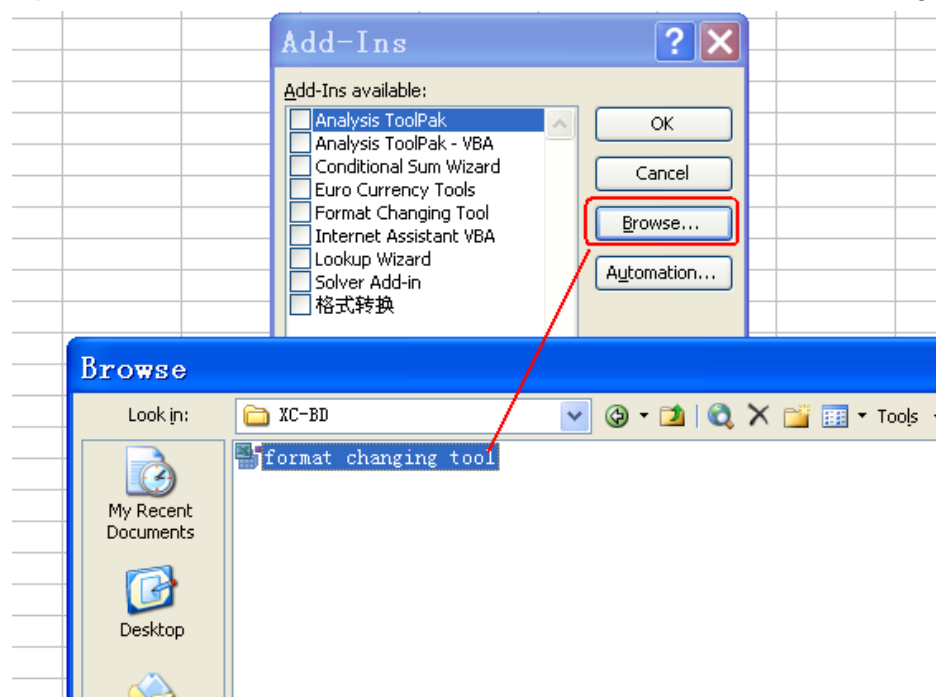
(3) Configure the BD board

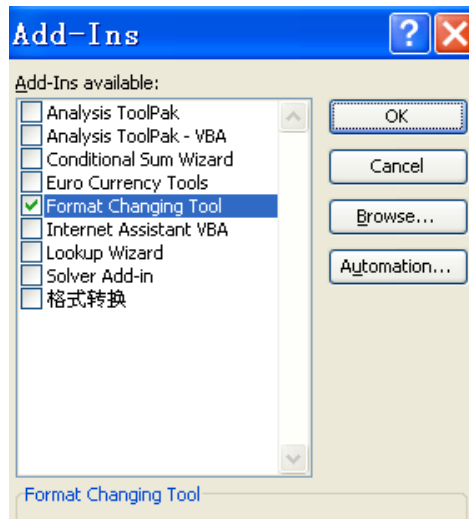
Please refer to chapter1 BD configuration.

7. Format changing tool

When there are data in the Excel, please use format changing tool to transform the Excel format to .csv. The tool will be attached with this manual. Please see the operation steps:

Open Excel, click Tool/Add-Ins/Browse..., then select the format changing tool, click ok.





- A. In the tool menu, there is a format changing tool item. That means the tool installation is finished.
- B. When finished the data inputting, click “format changing tool”.
- C. At last, save the file as .csv format.

	A	B	C	D	E	F	G	H
1	ww	dw	s8	f4.15	dw	ww	dw	
2	2980	1786	HFASDF		-13212	-330	780240	
3	2471	-1912	JKSAHL		-25152	-23782	-665320	
4	9628	399	jak		4583	-7728	-884013	
5	9045	-2511			-4175	39600	195264	
6	1824	1413	f		26448	-1836	558904	
7	22300	701			-5835	-6534	1095926	
8	-1742	2719	f		-12382	-25761	-125260	
9	1636	2075	JSKI		2935	2400	345495	
10	9962	371	HDJM		5385	24660	827472	

8. Application

Write data in data001.csv in SD card, read data from data002.csv.

Process: format the SD card→build a csv file→make the program→install SD card and BD board→configure the BD board, download the program and the data→debug the program, monitor the running result

Step:

1. Transform the SD card format to FAT16 by card reader

- (1) Use card reader to connect SD card with PC. (SD card capacity should be less than 2GB).
- (2) Right click the SD card disk, choose format.
- (3) File system please select FAT.
- (4) Click start to format the SD card.

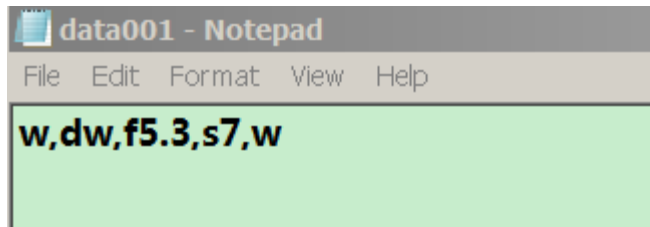
2. Build an empty file “data001.csv” and a file “data002.csv” with data in the root directory of SD card.

- (1) Open the SD card, build two new Excel files.

(2) Open one of the file, input the following data types:

1	w	dw	f5.3	s7	w
2					

(3) Save the file as “data001.csv”. Then open it in txt, make sure it is correct.



(4) Open another Excel file, input the data type in the first line, and input data in each row, the data in each row should be accord with the data type.

	A	B	C	D
1	w	s8	dw	f6.2
2	245	hfiw	1234567890	543631.32
3	415	sdlgjjeoa	-534007321	464.1
4	14456	8gskhd	77182	7654.65
5	26654	nd903jlp	8945	3563
6	12356	48djlj=j	9054873	-13251.98
7	97	ey67	326483894	-645.8
8	-27658	e21	89490	15.54
9	4579	k*nlw	737328923	3165.3
10				

(5) Transform the data via format changing tool.

	A	B	C	D
1	w	s8	dw	f6.2
2	245	hfiw	1234567890	543631.32
3	415	sdlgjjeoa	-534007321	464.1
4	14456	8gskhd	77182	7654.65
5	26654	nd903jlp	8945	3563
6	12356	48djlj=j	9054873	-13251.98
7	97	ey67	326483894	-645.8
8	-27658	e21	89490	15.54
9	4579	k*nlw	737328923	3165.3

(6) Save as “data002.csv”. Then open it in txt file:

```

data002 - Notepad
File Edit Format View Help
w, s8, dw, f6. 2
245,          hfiw, 1234567890, 543631.32
415,          sdlgjeoa, -534007321, 464.1
14456,        8gskhd, 77182, 7654.65
26654,        nd903jlp, 8945, 3563
12356,        48djlj=j, 9054873, -13251.98
97,           ey67, 326483894, -645.8
-27658,       e21, 89490, 15.54
4579,         k*nlw, 737328923, 3165.3

```

Before

```

data002 - Notepad
File Edit Format View Help
w, s8, dw, f6. 2
245, hfiw, 1234567890, 543631.32
415, sdlgjeoa, -534007321, 464.1
14456, 8gskhd, 77182, 7654.65
26654, nd903jlp, 8945, 3563
12356, 48djlj=j, 9054873, -13251.98
97, ey67, 326483894, -645.8
-27658, e21, 89490, 15.54
4579, k*nlw, 737328923, 3165.3

```

After

Attention: after format changing, if the data length is not enough, it will add space from the left side of the numbers. Before format changing, the data are out of order.

(7) File “data001” and “data002” setting are finished. Please delete the disk and pull out the SD card from the PC.

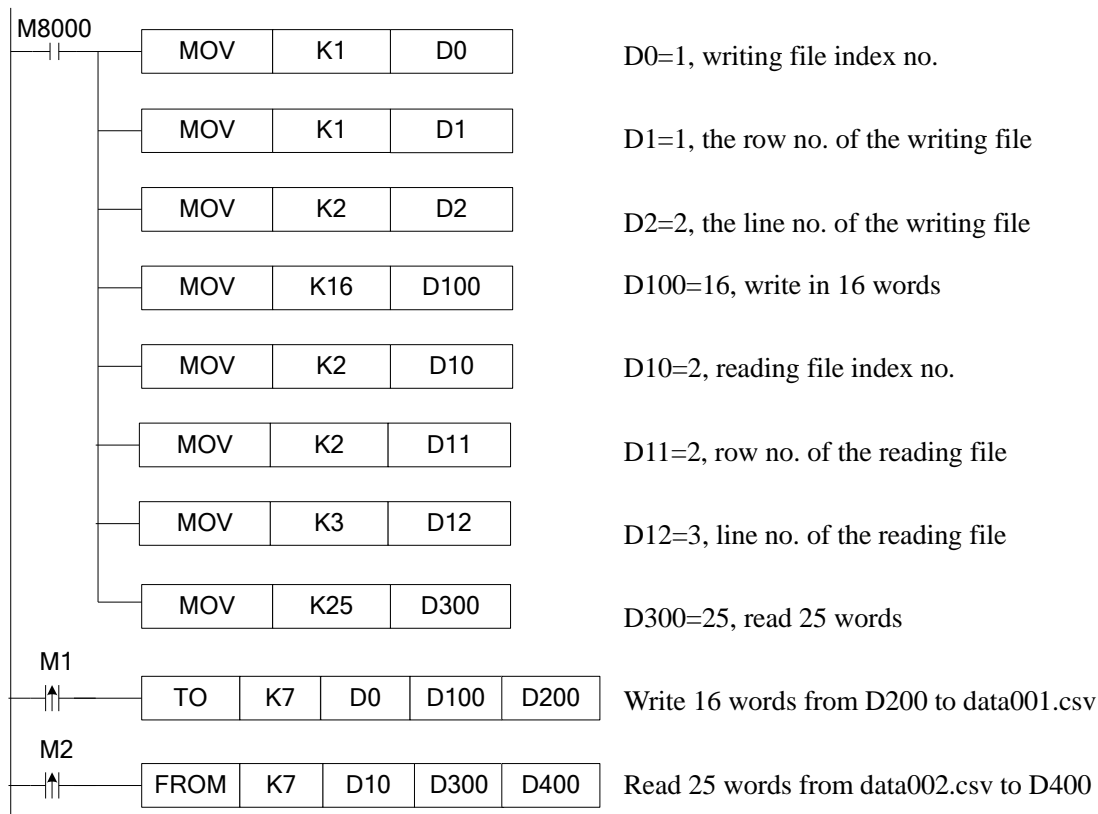
3. Make program in XCPpro

(1) Purpose:

A. write 16 words from D200 to row 1, line 2 of data001.csv.

B. read 25 words from row 2, line 3 of data002.csv to D400.

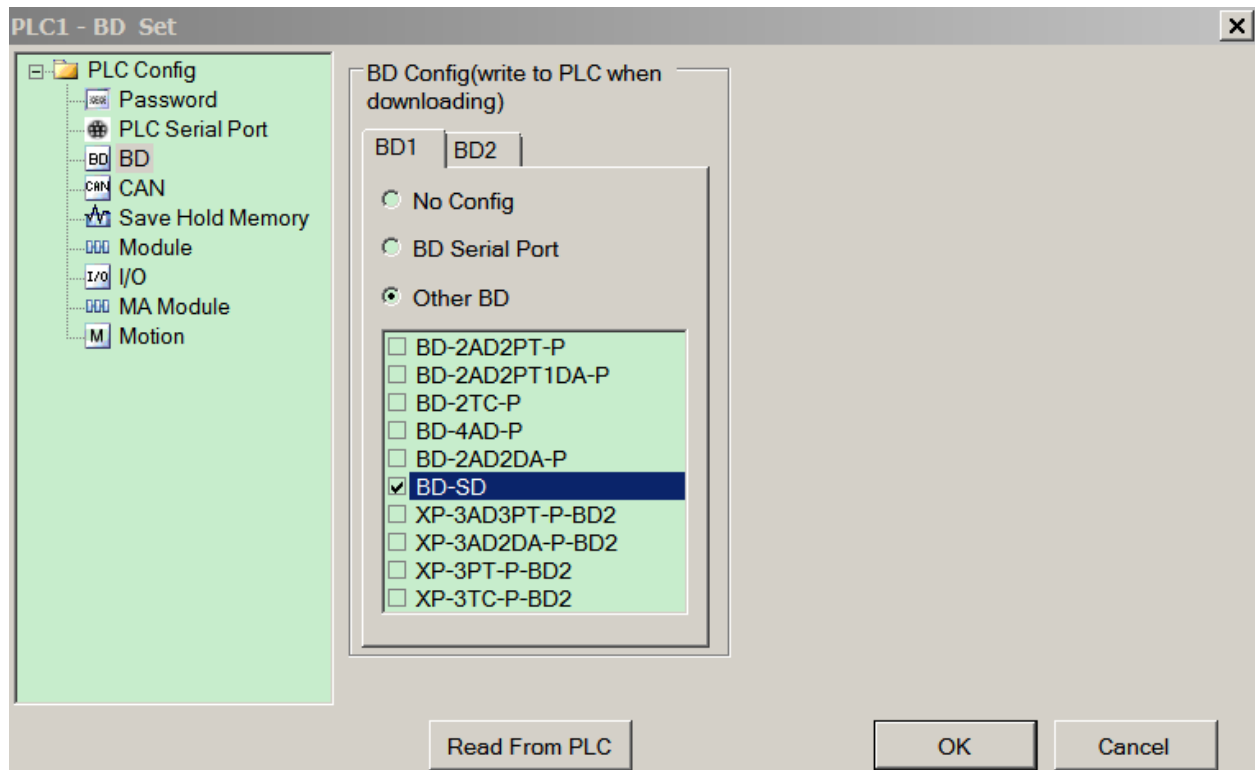
(2) Process:



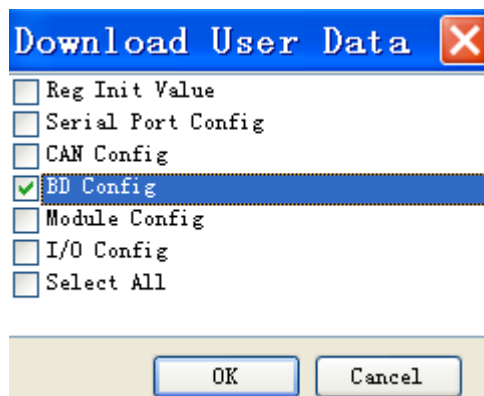
4. Installation and configuration

(1) Install the SD card in the XP-SD-BD2, install the BD on the XMH3-30 or XP3-16. The LED of

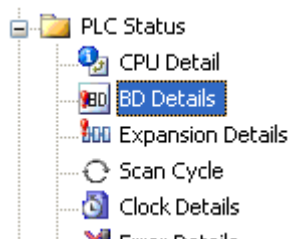
BD board is ON when power on the product; otherwise please check BD board or SD card.
 (2) Connect XMH3-30 or XP3-16 with PC, then open XCPpro software. Click File/change PLC model→select XMH3-30 or XP3-16. Click configure/BD setting→see below window→select BD-SD→click OK.



(3) click Online/download program&data→select BD config:



(4) Click BD details in the project bar to check the BD information.



5. Run the program
 - A. write data001.csv

(a) D200~D215 in the PLC:

PLC1- Free Monitor			
Monitor Add Edit Del Upward Downward			
Reg	Monitor value	Word length	Num Format
D200	12335	Word	Dec
D201	555881125	DWord	Dec
D203	78545.23	Float	Dec
D205	gh	Word	ASCII
D206	45	Word	ASCII
D207	9j	Word	ASCII
D208	3#	Word	ASCII
D209	+<	Word	ASCII
D210	5v	Word	ASCII
D211	?&	Word	ASCII
D212	-6786	Word	Dec
D213	-23412	Word	Dec
D214	-474327809	DWord	Dec

(b) When M1 is from OFF to ON, the write instruction worked, please see the result in data001.csv

```
w, dw, f5. 3, s7, w
12335, 555881125, 78545. 227, gh459j3#+<5v?&, -6786
-23412, -474327809,
```

B. read data002.csv

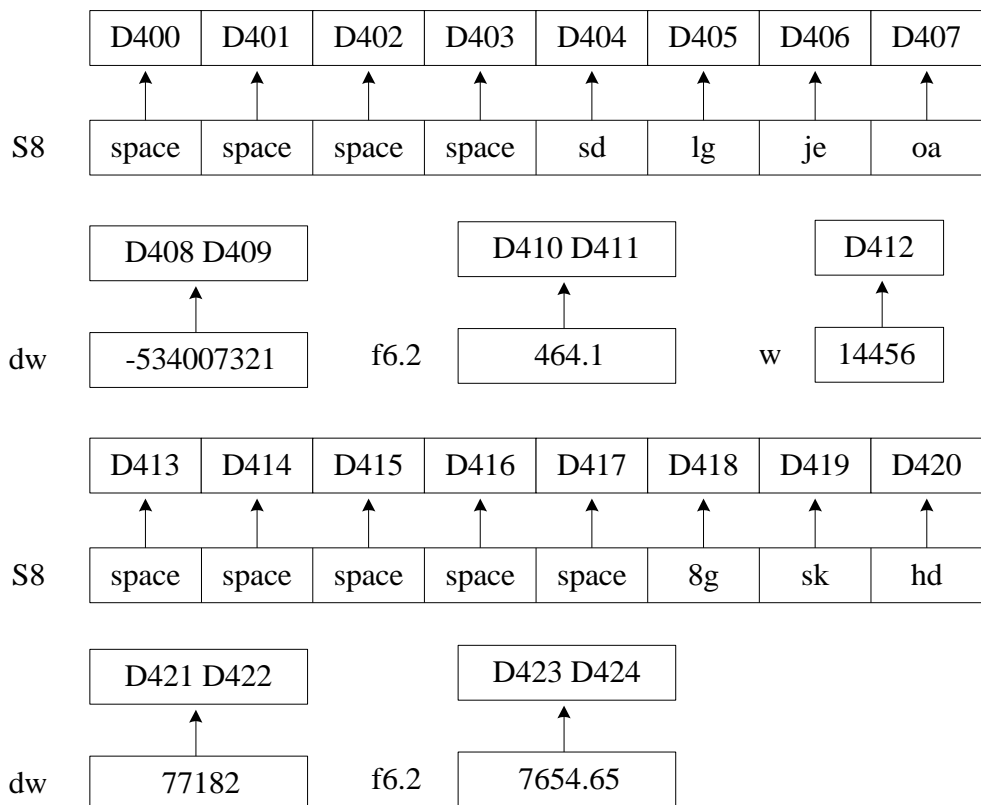
(a) The read area in data002.csv:

```
r, s8, dw, f6. 2
245, hfiw, 1234567890, 543631. 32
415. sdlgieoa. -534007321. 464. 1
14456, 8gskhd, 77182, 7654. 65
26654, nd903jlp, 8945, 3563
12356, 48djlj=j, 9054873, -13251. 98
97, ey67, 326483894, -645. 8
-27658, e21, 89490, 15. 54
4579, k*nlw, 737328923, 3165. 3
```

(b) When M2 is from OFF to ON, the read instruction worked, the data in D400~D424 is shown as below:

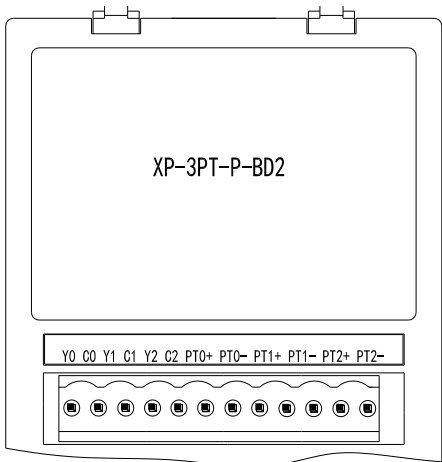
D400		Word	ASCII
D401		Word	ASCII
D402		Word	ASCII
D403		Word	ASCII
D404	sd	Word	ASCII
D405	lg	Word	ASCII
D406	je	Word	ASCII
D407	oa	Word	ASCII
D408	-534007321	DWord	Dec
D410	464.1	Float	Dec
D412	14456	Word	Dec
D413		Word	ASCII
D414		Word	ASCII
D415		Word	ASCII
D416		Word	ASCII
D417		Word	ASCII
D418	8g	Word	ASCII
D419	sk	Word	ASCII
D420	hd	Word	ASCII
D421	77182	DWord	Dec
D423	7654.65	Float	Dec

C. When reading the .csv file, the data is from SD card to PLC register:



Chapter7. XP-3PT-P-BD2

1. Features



- 3 channels PT100 (two wires) temperature sensor input.
- 3 channels output.
- Resolution 0.1°C.

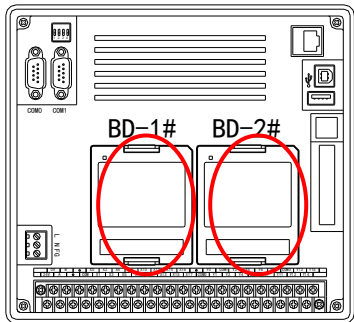
2. General specification

Item	Temperature input
Analog input range	Pt resistor Pt100 (2-wire)
Temperature range	-100~500°C
Resolution	0.1°C
Digital output range	-1000~5000
Integrated precision	±1% of the full scale
Transforming time	40ms/channel
PID output	0~K4095
Take up points	0 points (not limit by PLC max I/O points, the operation is done through data reigster)

3. Installation and wiring

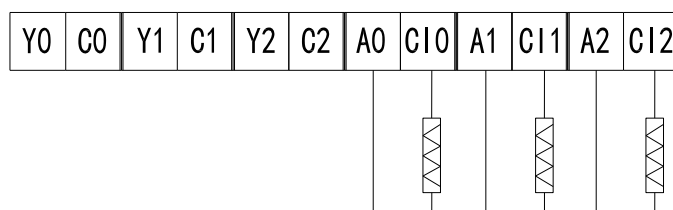
(1) Installation

Take XMH3-30 as an example, as the BD card and the back cover is integrated together, please insert it into the pins of BD installation location, make the cover into the machine.



Note: the BD card can be installed in location BD-1# or BD-2#.

(2) wiring



Note: the three channels are PT100 input, A0 connects to PT100 positive signal, CI0 connects to PT100 negative signal.

4. I/O address

This BD card will not occupy I/O units, the transformed data will send to PLC register directly, the following is PLC register address.

BD-1#:

Channel	PT signal	PID output	PID enable bit	PID setting	PID parameters: Kp, Ki, Kd, Diff
0CH	ID1000	ID1003	Y1000	QD1000	Kp-----QD1003 Ki-----QD1004 Kd-----QD1005 Diff---QD1006
1CH	ID1001	ID1004	Y1001	QD1001	
2CH	ID1002	ID1005	Y1002	QD1002	

BD-2#:

Channel	PT signal	PID output	PID start bit	PID setting	PID parameters: Kp, Ki, Kd, Diff
0CH	ID1050	ID1053	Y1020	QD1050	Kp-----QD1053 Ki-----QD1054 Kd-----QD1055 Diff---QD1056
1CH	ID1051	ID1054	Y1021	QD1051	
2CH	ID1052	ID1055	Y1022	QD1052	

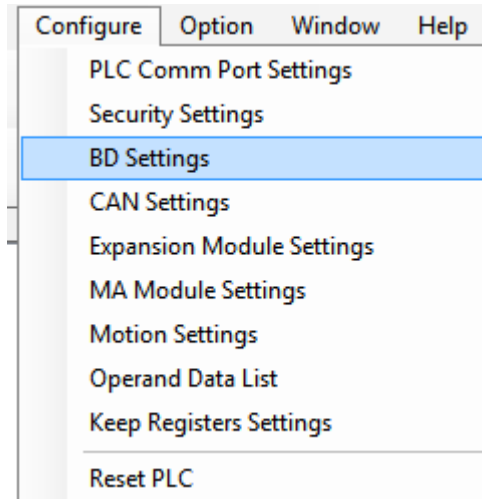
Note:

- (1) Kp: proportion parameter, Ki: integral parameter, Kd: differential parameter, Diff: control range.
- (2) Control range Diff: the PID control only can work in the control range.
- (3) PID start signal Y: Y=0, PID cannot work. Y=1, PID start to work.

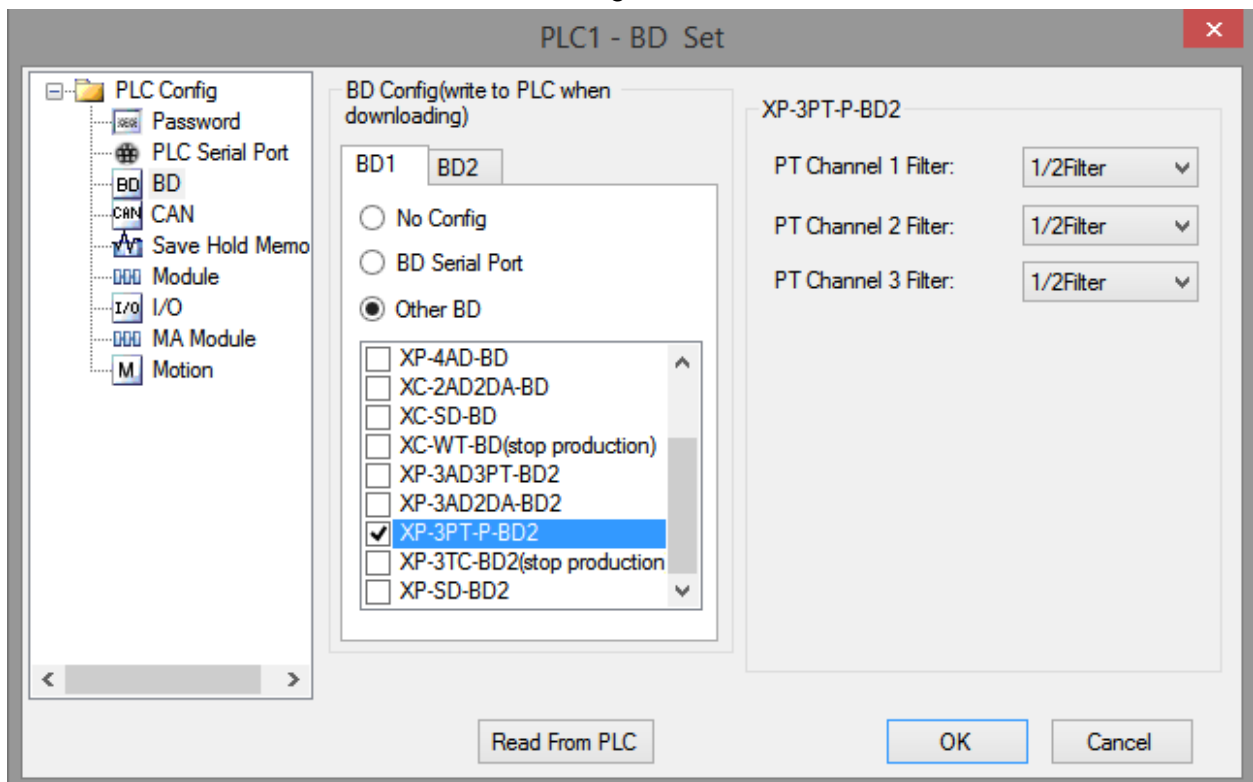
5. Configuration

- (1) configure through software

Open the programming software, click configure/BD setting:



Choose the model and parameters, then click ok. Then download the program in the PLC, the setting is effective when the PLC starts running. Please note for the PLC software version below v3.3, it must restart the PLC to make the setting effective.



(2) Configure through flash register

Besides setting through software, it can write in the flash register to set the BD parameters. Each BD card occupies 8 registers.

BD-1#:

		Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
FD8306	BYTE0	PT channel 2				PT channel 1			

		00: 1/2 filter 01: no filter 10: 1/3 filter 11: 1/4 filter	-	-	00: 1/2 filter 01: no filter 10: 1/3 filter 11: 1/4 filter	-	-
	BYTE1	-			PT channel 3		
		-	-	-	00: 1/2 filter 01: no filter 10: 1/3 filter 11: 1/4 filter	-	-
	BYTE3	-					
FD8307~FD8313		reserved					

BD-2#:

		Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
FD8314	BYTE0	PT channel 2				PT channel 1			
		00: 1/2 filter 01: no filter 10: 1/3 filter 11: 1/4 filter	-	-		00: 1/2 filter 01: no filter 10: 1/3 filter 11: 1/4 filter	-	-	
	BYTE1	-				PT channel 3			
		-	-	-		00: 1/2 filter 01: no filter 10: 1/3 filter 11: 1/4 filter	-	-	
	BYTE3	-							
FD8315~FD8321		reserved							

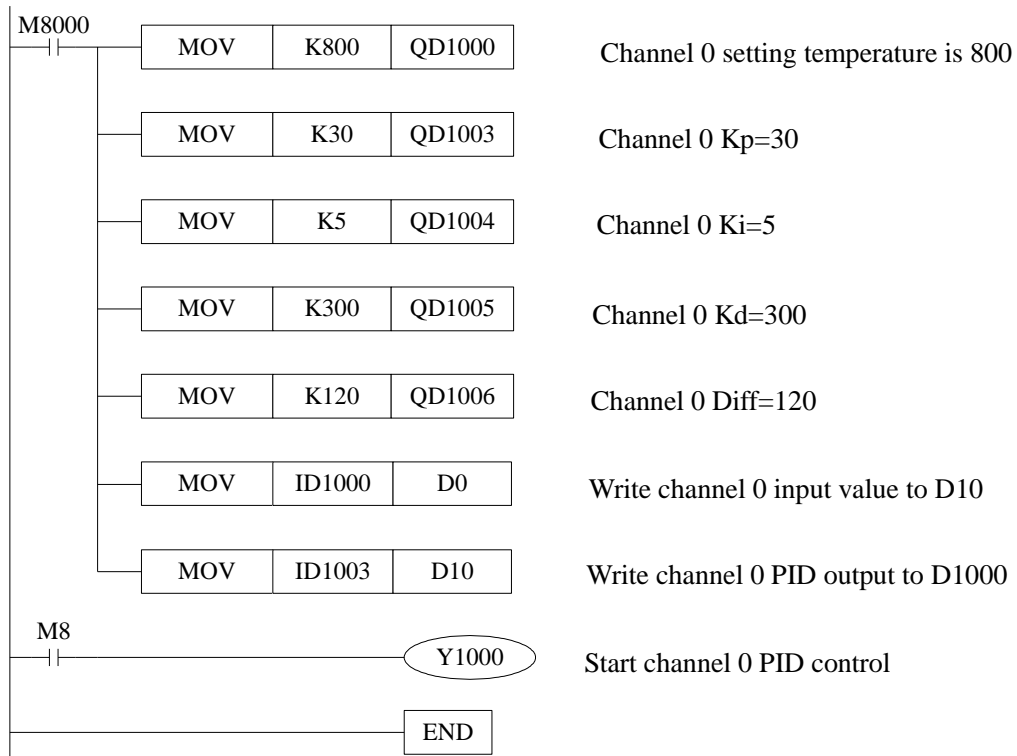
6. PID application

The BD card will output a PID control value every 2 seconds when temperature PID controlling. We can use the duty ratio in 2 seconds of PID output and K4095 ratio to control the heating. The PID output value is X ($0 \leq X \leq 4095$), it will control the duty ratio in 2 seconds. In $2X/4095$ second, the heater will output, in $(2 - 2X/4095)$ second, the heater will not output.

7. Programming

Example: real-time read channel0 temperature, do the PID control and read the PID output.

The program:

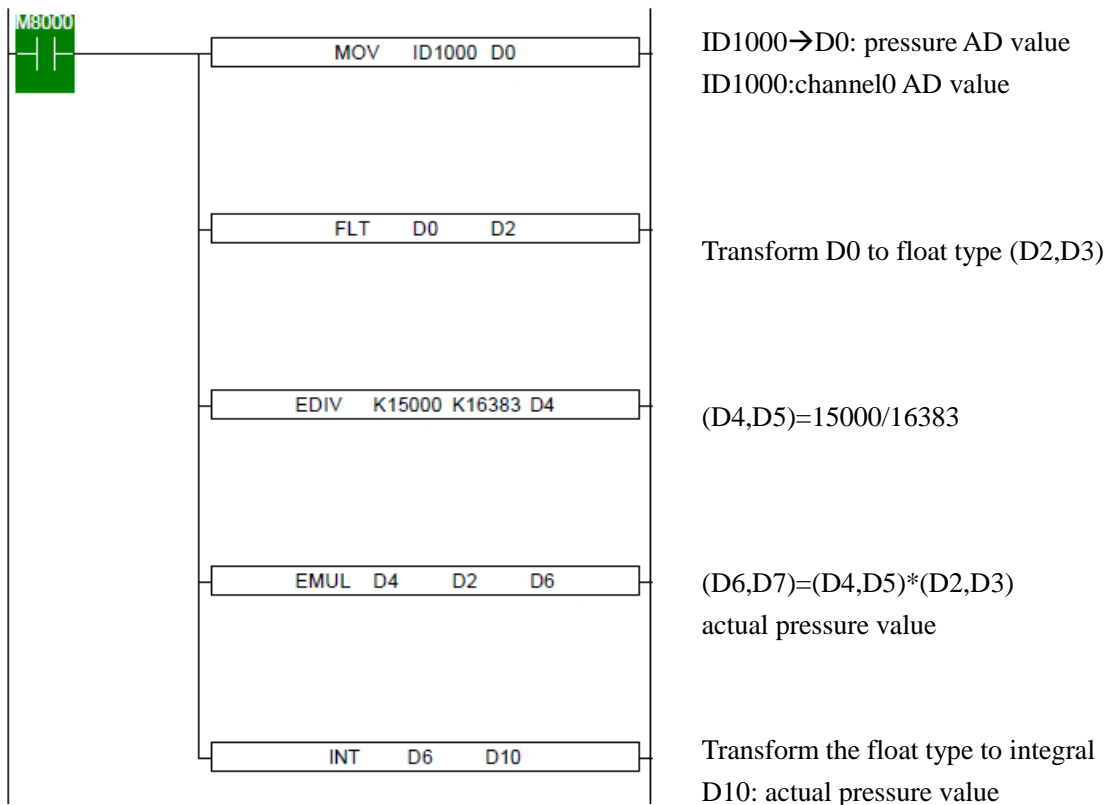
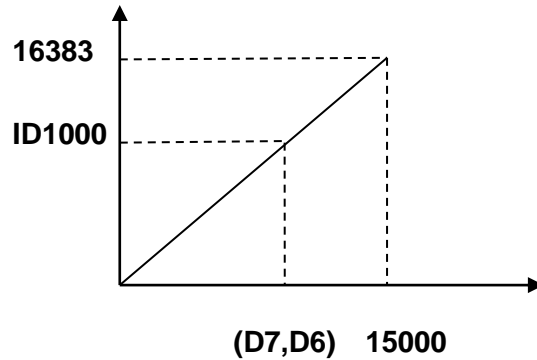


Chapter8. Example

Input the pressure sensor signal to AD channel0 (ID1000, precision: 14-bit) of XP-3AD2DA-BD2. Suppose the pressure sensor range is 0~15Mpa. We enlarge the range to 15000 to simplify the calculation in the program.

According to the AD curve, we can calculate the actual pressure value:

$$(D7,D6)=(15000/16383)*ID1000$$



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