

BP Analog I/O Expansion Block

- CM2-BP04EAA

CIMON-PLC
PROGRAMMABLE LOGIC CONTROLLER



GENERAL SPECIFICATIONS

Items	Specifications				Standards	
Op. Temp.	-10°C ~ 60°C					
St. Temp.	-25°C ~ 80°C					
Op. Hum.	5~95% RH, Not Condensed					
St. Hum.	5~95% RH, Not Condensed					
Vibration	In case of intermittent vibration				IEC 1131-2	
	Freq.	Accel.	Amplitude	Sweep		
	10≤f<57Hz	-	0.075mm	10 time each X,Y,Z axis		
	57≤f≤150Hz	9.8%{1G}	-			
	In case of continuous vibration					
	Freq.	Accel.	Amplitude			
10≤f<57Hz	-	0.035mm				
57≤f≤150Hz	4.9%{0.5G}	-				
Shock	· Max. shock Accel. : 147% _g (15G)				IEC 1131-2	
	· Time : 11ms					
	· Pulse : Half sine wave pulse (3 times each X, Y, Z axis)					
Noise	Sq. wave impulse	±2,000V			KDT Standard	
	ESD	4kV (Contact discharge)			IEC 1131-2 IEC 801-2	
	Radiated EMF	27 ~ 500MHz, 10V/m			IEC 1131-2 IEC 801-2	
	Fast transient / burst	burst	Digital I/O (24V or more)	Digital I/O (Less than 24V) Analog I/O Communication	IEC 1131-2 IEC 801-2	
			2kV	2kV	0.25kV	
Env.	No corrosive gas and no dust					
Altitude	2,000m or less					
Pollution	2 or less					
Cooling	Natural air cooling					

MODULE SPECIFICATIONS

Items	A/D Part	D/A Part	
Number of Ch	2 Channels	2 Channels	
Signal Range	Voltage	0 ~ 5V	-10 ~ 10V
		1 ~ 5V	
	0 ~ 10V		
	-10 ~ 10V		
Current	0 ~ 20mA	4 ~ 20mA	
	4 ~ 20mA		
Digital Value Range	0 ~ 16000 (-8000 ~ 8000)		
Resolution	0 ~ 5V	0.3125mV	-
	1 ~ 5V	0.25mV	-
	0 ~ 10V	0.625mV	-
	-10 ~ +10V	1.25mV	1.25mV
	0 ~ 20mA	1.25μA	-
4 ~ 20mA	1.0μA	1.0μA	
Precision	±0.3% (Full Scale)		
Conversion Speed	5ms/1Ch.		
Max. Signal Range	V : ±12V	V : ±12V	
	I : ±25mA	I : ±21mA	
Insulation	PLC main circuit : Photo Coupler		
	Between channels : Not Insulated		
Occupied I/O	8 Points	8 Points	
Terminal Block	12 points T/B × 2pcs		
External Power Supply	24VDC		
Power Consumption	50mA		

I/O MAP

Direction : CPU→AD/DA		Direction : CPU→AD/DA	
Input	Descriptions	Output	Descriptions
X0	A/D Ready	Y0	Req. to Configure A/D
X1	A/D Converted Successfully	Y1	Req. to Select A/D Channel
X2	A/D Configured Successfully	Y2	Req. to Save Offset/Gain
X3	A/D Ch. Selected Successfully	Y3	Req. to Enter Offset/Gain Mode
X4	reserved	Y4	Req. to Clear Min/Max Log
X5	A/D Offset/Gain Mode	Y5	Reserved
X6	Reserved	Y6	Reserved
X7	A/D Error	Y7	Req. to Clear Error
X8	D/A Ready	Y8	Req. to Configure D/A
X9	Reserved	Y9	Req. to Select D/A Channel
XA	D/A Configured Successfully	YA	Req. to Save D/A Offset/Gain
XB	D/A Ch. Selected Successfully	YB	Req. to Enter D/A Offset/Gain Mode
XC	D/A Calibrated Successfully	YC	Req. to Calib. D/A
XD	D/A Offset/Gain Mode	YD	Reserved
XE	Reserved	YE	Reserved
XF	D/A Error	YF	Req. to Clear Error

USER PROGRAM MEMORY MAP

Addr.		Descriptions	R/W
Hex.	Dec.		
0H	0	A/D Conversion Enable	R/W
1H	1	Avr. Time/Count for CH1	R/W
2H	2	Avr. Time/Count for CH2	R/W
3H	3	Reserved	-
4H	4		
5H	5	Avr. Mode Enable	R/W
6H	6	A/D Conversion Status Flags	R
7H	7	CH1 Converted(Input) Value	R
8H	8	CH2 Converted(Input) Value	R
9H	9	Reserved	-
AH	10		
BH	11	A/D Error Code	R
CH	12	Input Range (CH1 ~ CH2)	R/W
DH	13	A/D Calib.(Offset) Channel Select	R/W
EH	14	A/D Calib.(Gain) Channel Select	R/W
FH	15	Range of Converted Value	R/W
10H	16	Reserved	-
11H	17		
12H	18		
13H	19		
14H	20	Max. Converted Value (CH1)	R/W
15H	21	Min. Converted Value (CH1)	R/W
16H	22	Max. Converted Value (CH2)	R/W
17H	23	Min. Converted Value (CH2)	R/W

USER PROGRAM MEMOTRY MAP

Addr.		Descriptions	R/W
Hex.	Dec.		
18H	24	Reserved	-
19H	25		
1AH	26		
1BH	27		
1CH	28		
1DH	29		
1EH	30		
1FH	31		
20H	32	D/A Converting Enable	R/W
21H	33	CH1 Output Value	R/W
22H	34	CH2 Output Value	R/W
23H	35	Reserved	-
24H	36		
25H	37	D/A Error Code	R
26H	38	HOLD(1)/CLEAR(0) Mode Select	R/W
27H	39	Invalid Value was Written to CH1	R
28H	40	Invalid Value was Written to CH2	R
29H	41	Reserved	-
2AH	42		
2BH	43	D/A Calib.(Offset) Channel Select	R/W
2CH	44	D/A Calib.(Gain) Channel Select	R/W
2DH	45	Offset/Gain Value	R/W
2EH	46	Range of Digital Value	R/W
2FH	47	D/A Signal Output Enable	R/W
30H	48	Reserved	-

ERROR CODES

Codes	Descriptions
1□	Invalid input signal range defined. This error can be occurred when the module was configured with inadequate configuration tool. Assure the menu that had been used for configuration is "Tool → Optional Module Setup → ADDA Module".
2□	Invalid average time was defined. This error can be occurred when the module was configured with inadequate configuration tool. Assure the menu that had been used for configuration is "Tool → Optional Module Setup → ADDA Module".
3□	Invalid average count was defined. This error can be occurred when the module was configured with inadequate configuration tool. Assure the menu that had been used for configuration is "Tool → Optional Module Setup → ADDA Module".
4□	Calibration error. This error will be occurred in case of inaccurate reference current or voltage signal is supplied during calibration.
49	Calibration error. 'Offset' and 'Gain' calibration must not be fulfilled simultaneously.
10△	System error. Check the CPU block and expansion cable.

□ is replaced with channel number (1 ~ 4) which is in trouble.

△ can be any number between 0 to 3

EXTERNAL WIRING

.	CH1 -	.	CH2 -	.	.	.
CH1 I+	CH1 V+	CH2 I+	CH2 V+	.	.	.

Upper Terminal Block(Analog Inputs)

CH3 V+	CH4 V+	CH3 I+	CH4 I+	.	FG	.
CH3 V-	CH4 V-	CH3 I-	CH4 I+	24V	24G	.

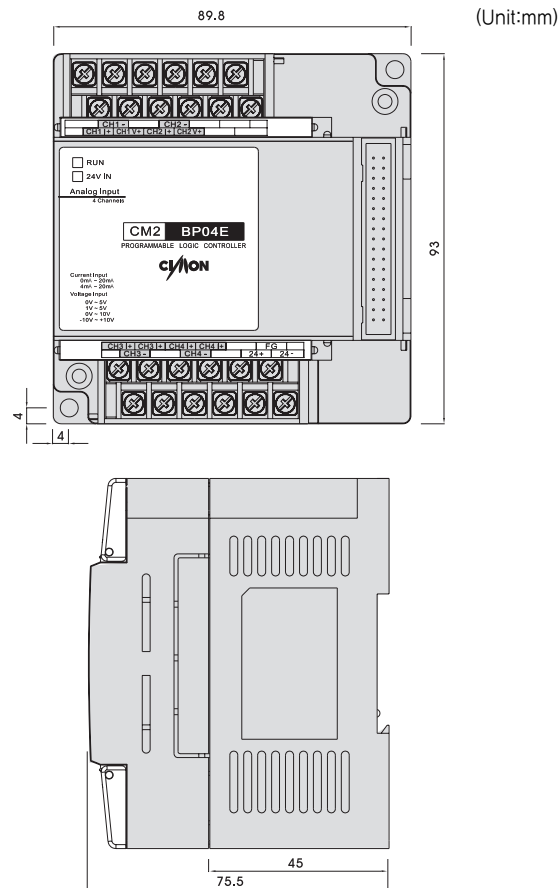
Lower Terminal Block(Analog Outputs)

Power Input

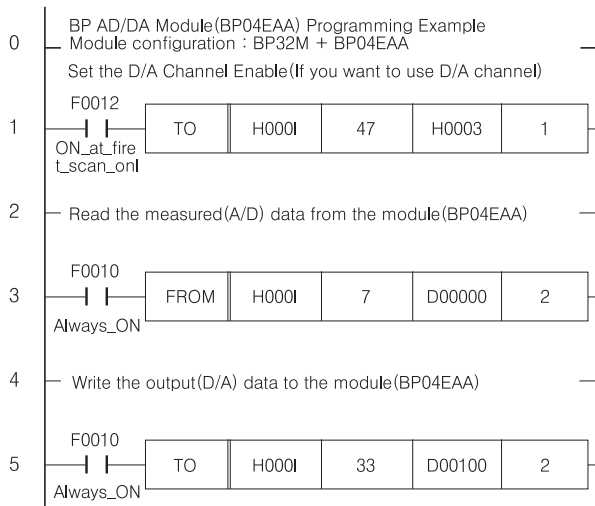
► Wiring Method

	CH 1		CI- 2			
V Input	CH1 + N/C	CI-1 V+ Wire V+	CH1 - Wire V-	CH2 + N/C	CH2 V+ Wire V+	CH2 - Wire V-
I Input	Short CH1 + and CH1 V+ Wire +		CH1 - Wire -	Short CH1 + and CH1 V+ Wire I+		CH2 - Wire -
	CH3		CI- 4			
V Output	CH3 V+ : Wire V+ CH3 V- : Wire V-	CI -3 + : N/C CI -3 - : N/C	CI-4 V+ : Wire V+ CI-4 V- : Wire V-	CI -4 + : N/C CI -4 - : N/C		
Output	CH3 V+ : N/C CH3 V- : N/C	CH3 + : Wire I+ CH3 - : Wire I-	CI-4 V+ : N/C CI-4 V- : N/C	CH4 + : Wire + CH4 - : Wire -		

DIMENSIONS



PROGRAMMING EXAMPLE



► Rung 1

For safety purpose, the module doesn't output D/A signals without definite command from sequence program or CICON. This rung sends signal output command to ADDA module with TO instruction.

The first operand 'H0001' means the first expanded block. If there was another block between CPU and ADDA, this operand should be 'H0002'.

The second operand 47 means the address of this command buffer in 'User Program Memory'. (Refer to the MAP)

PROGRAMMING EXAMPLE

The third operand 'H0003' means enable output of CH3 and CH4. Each channel is allocated bitwisely. If you want to enable only CH3, this value should be 'H0001'.

The fourth operand '1' means 1 WORD writing to 'User Program Memory'.

► Rung 3

Read AD converted value of CH1 and CH2 on every scan. FROM instruction was used, and the first operand of it has the same meaning with TO instruction.

The second operand '7' means the address of 'User Program Memory' where the measured value is stored in. (Refer to the MAP)

The third operand 'D00000' means which device area the measured value would be moved to. The measured value of CH1 will be moved to D00000 and CH2 will be moved to D00001.

The last operand '2' means 2 WORD moving. If you assign '1' to this operand, only a measured value of CH1 would be moved to D00000.

► Rung 5

Write DA values to CH3 and CH4 on every scan simultaneously with a TO instruction. The second operand '33' means the address of 'User Program Memory' where the output value should be written to. (Refer to the MAP)

The third operand 'D00100' means the device which is storing the digital value for signal output.

The last operand '2' means 2 WORD simultaneous writing.

TROUBLE SHOOTING

If there was any mistake on the configuration with CICON or calibration error, the RUN LED will blink every 0,3 second period and the error code will be stored in address 11 of 'User Program Memory'.

▶ Check following points first :

- Assure external power is supplied correctly (DC24V)
- Check expansion cable between blocks.
- Change the CPU to STOP mode, and re-power the entire modules. If LED stops blinking, there will be some mistake in the sequence program. If LED still blinks, read following steps.

▶ How to check the error code :

Select "Tool → Optional Module Setup → ADDA Module" menu of the CICON. A dialog box titled with "AD DA module setup" will be popped-up. Assure the 'Base' number is '0' and 'Slot' number is appropriate number (1..3) for the module. Click the "Status" button of this dialog box. Another dialog box titled with "AD DA module status" will be popped-up, the error code will be displayed in this dialog box. CICON must be in connected status with PLC.

▶ Erasing error code :

After trouble fixing, click the "Reset Error" button in the dialog box titled with "AD DA module status".

FEATURES

- ▶ CM2-BP04EAA is a hybrid type analog I/O block for BP series CIMON-PLC. It is composed with 2 channels of voltage/current AD and 2 channels of voltage/current DA
- ▶ AD channels support 0~20mA, 4~20mA, 0~5V, 1~5V, 0~10V and -10~10V input signal ranges.
- ▶ DA Channels support -10~10V and 4~20mA output signal ranges.
- ▶ Input signal filtering function such as averaging and digital filtering can be selectable by their constant configuration.
- ▶ High resolution (1/16000) analog signal or digital value is provided.
- ▶ AD channels provide additional converted value range to nominal resolution (16000) which is useful in detecting abnormal input signal such as overshoot or under-shoot. The real range of converted value is -192 ~ 16191 (or -8192 ~ 8191)
- ▶ DA channel provide HOLD/CLEAR mode. When HOLD mode is selected this module maintains output even if CPU was stopped.
- ▶ Disabled DA channel maintains outputs 4mA or -10V
- ▶ When the RUN LED blinks, there might be some error. CICON will be helpful for checking and fixing the trouble.
- ▶ DA channels can be manually tested with CICON even if CPU was in STOP mode.

INSTALLATION PRECAUTIONS

- ▶ Use the PLC in an environment that meets the general specifications given in the User's Manual of the CPU module being used.
- ▶ Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other. They should be installed 100mm (3.94 inch) or more from each other. Not doing so could result in noise that may cause malfunction.
- ▶ Switch all phases of the external power supply off when mounting or removing the module. Not doing so may cause damage to the module.
- ▶ Do not directly touch the conductive area or electronic components of the module. Doing so may cause malfunction or failure in the module.

MEMO

SAFETY PRECAUTIONS

When using CIMON PLC, thoroughly read this manual and the associated manuals introduced in the manual. Also pay careful attention to safety and handle the module properly.

KDT
SYSTEMS

www.kdtsys.com

#102-6, Chobu-ri, Mohyeon-myeon, Yongin-si, Gyeonggi-do, Korea
TEL: +82-31-322-8303 FAX: +82-31-332-8343

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