



User Manual

Text

(Rev.01)



Table of Contents

Contents

Table of Contents	2
1. Safety Pre-caution and Note on Installation.....	3
1 – 1. Precautions.....	3
1 – 2. Notes on Installation.....	5
2. Specifications and Dimensions.....	6
2 – 1. Specifications	6
2 – 2. Dimensions.....	7
3. Configuration.....	8
3 – 1. Part Numbering	8
3 – 2. System Configuration	8
4. Names and Functions.....	9
5. Signal Cabling	13
5 – 1. Signal Cabling.....	13
5 – 2. Internal Circuit Diagram.....	13
6. Communication Function	14
7. Functions of Ezi-IO Ethernet AD.....	15
7 – 1. Input Range Setting.....	15
7 – 1 – 1. Input range : -10 ~ 10V.....	15
7 – 1 – 2. Input range : -5 ~ 5V	15
7 – 1 – 3. Input range : -2.5 ~ 2.5V.....	16
7 – 1 – 4. Input range : 0 ~ 10V.....	16
7 – 1 – 5. Input range : 0 ~ 20mA.....	17
7 – 2. Moving Average Filter	17
7 – 3. Offset	17
8. Appendix.....	18
8 – 1. Connector	18
8 – 2. Options	18

1 . Safety Pre-caution and Note on Installation

※ Before Operation

- Thank you for purchasing our Ezi-IO Ethernet AD products.
- Ezi-IO Ethernet AD is a high-performance 32bit ARM chip embedded Analog to Digital conversion module.
- This manual describe the handling, maintenance, repair diagnosis and troubleshooting of Ezi-IO Ethernet AD.
- Before start operation of Ezi-IO Ethernet AD, thoroughly read this.
- After reading this manual, keep the manual near Ezi-IO Ethernet AD, so that any user can read this manual whenever needed.



1 - 1 . Precautions

◆ General Precautions

- Contents of this manual are subject to change without prior notice for functional improvements, change of specifications or user's better understanding. Thoroughly read the manual which is provided with the purchased product.
- In case of manual is damaged or lost, please contact FASTECH or our agents. You can find our contact information on the last page of this manual.
- FASTECH is not responsible for a product breakdown due to the user's dismantling of the product, and such a breakdown is not guaranteed by the warranty.


◆ Safety Precautions

- Before installation, operation, or repairing of the products, thoroughly read the manual and fully understand the contents. Before operating the products, please understand the mechanical characteristics of the products and related safety information and precautions.
- Safety precautions are indicated by **Attention** and **Warning**.



 Attention	If a user does not properly handle the products, the user may be seriously or lightly injured, and damages may occur to the machine.
 Warning	If a user does not properly handle the products, a dangerous situation (such as an electric shock) may occur resulting in deaths or serious injuries.

- Although precaution is only a **Attention**, a serious result could be caused depending on the situation. Follow safety precaution.



◆ Check the Product

 Attention	<p>Check if there is any damage on the product and if any part is missing. Otherwise, the machine may get damaged or the user may get injured.</p>
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◆ Installation

 Attention	<p>Carry the product carefully. Otherwise, the product may get damaged or user's foot may get injured by dropping the product.</p> <p>Use non-flammable materials such as metal in the place where the product is to be installed. Otherwise, a fire may occur.</p> <p>When installing multiple products in an enclosed place, use a cooling fan to keep the ambient temperature of the product at or below 50°C. Otherwise, a fire or other kinds of accidents may occur due to overheating.</p>
 Warning	<p>The process of installation, Connection, Operation, Checking and Repairing should be done by qualified person. Otherwise, a fire or other kinds of accidents may occur.</p>


◆ Cable Connection

 Attention	<p>Keep the rated range of input voltage for the drive. Otherwise, a fire or other kinds of accidents may occur.</p> <p>Connect cables according to the wiring diagram in this manual. Otherwise, a fire or malfunction of the machine may occur.</p>
 Warning	<p>Before connecting cables, make sure the input power is off. Otherwise, an electric shock or a fire may occur.</p> <p>The case of this Ezi-IO Ethernet AD is installed from the ground of the internal circuit by the condenser. Ground the Ezi-IO Ethernet AD properly. Otherwise, an electric shock, a fire or a malfunction of the machine may occur.</p>

◆ Operating & Setting

 <p>Attention</p>	<p>If a protection function (Alarm) occurs, remove the cause and then release (Alarm reset) the protection function.</p> <p>If you operate continuously without removing the cause, the machine may get damaged or the user may get injured.</p> <p>Change all input signals to "OFF", before supplying input voltage to Ezi-IO Ethernet AD drive.</p> <p>The machine may get damaged or the user may get injured by motor operation.</p> <p>All parameter values are set by default factory setting value. Before changing the values, read this manual thoroughly.</p> <p>Otherwise, the machine may get damaged or other kinds of accidents may occur.</p>
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◆ Repairing & Maintenance

 <p>Warning</p>	<p>Stop supplying power to the main circuit and wait for sufficient time before checking or repairing the product.</p> <p>Electricity remained in the condenser may cause an electric shock.</p> <p>Do not change cabling while power is being supplied.</p> <p>Otherwise, the user may get injured or the product and machine may get damaged.</p> <p>Do not reconstruct the product.</p> <p>Otherwise, an electric shock may occur or the product and machine get damaged. Reconstructed product cannot get after service.</p>
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1 - 2 . Notes on Installation

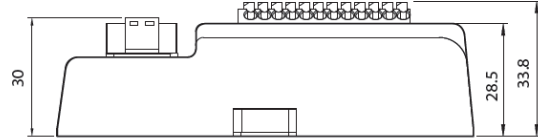
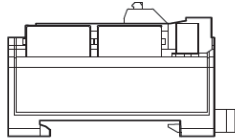
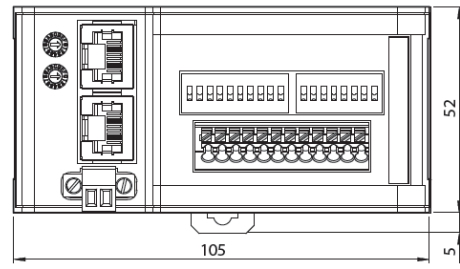
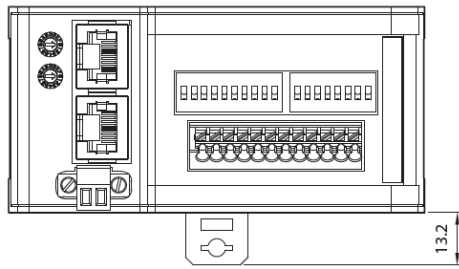
- 1) This product has been designed for indoor use. Use the product in the ambient temperature 0°~ 50°C.
- 2) If the temperature of the case is 50°C or higher, heat shall be radiated.
- 3) Do not install the product under direct rays, near magnetic or radioactive objects.

2 . Specifications and Dimensions

2 - 1 . Specifications

Model		Ezi-IO-EN-AD08-T	
Input Mode		Voltage Input	Current Input
Input Voltage		DC24V \pm 10%	
Current Consumption		Max. 120mA (Excl. load current)	
Operating Condition	Ambient Temperature	In Use : 0~50°C In Storage : -20~70°C	
	Humidity	In Use : 35~85%RH (Non-Condensing) In Storage : 10~90%RH (Non-Condensing)	
	Vib. Resist.	0.5g	
Function	Number of Channels		8CH
	Max. Input Signal		\pm 15V \pm 30mA
	Input Range		-10~10V -5~5V -2.5~2.5V 0~10V 0~20Ma
	Input Range Setting Method		Parameter (Separate setting for each channel) DIP Switch (Separate setting for each channel)
	Input Impedance		1M Ω 249 Ω
	Resolution		1/8191(Full Scale)
	Measuring Error	25°C	\pm 0.3%(Full Scale) \pm 0.3%(Full Scale)
		0~50°C	\pm 0.4%(Full Scale) \pm 0.6%(Full Scale)
	Analog Conversion Cycle		200us/8CH
	A/D Converted Data		-10~10V : -4096~4095 -5~5V : -4096~4095 -2.5~2.5V : -4096~4095 0~10V : 0~8191 0~20mA : 0~8191
	Signal Isolation Method		Digital isolation between analog input and communication connections
LED Indication		<ul style="list-style-type: none"> Power Status(PWR) Run Status(RUN) Ethernet Status(Link, Activity) 	
Communication Interface		<ul style="list-style-type: none"> Ethernet UDP/TCP Communication Ethernet standard: 10BASE-T, 100BASE-TX Full-duplex 	
GUI		User Interface Program for within Windows	
Library		Motion Library (DLL) for Windows 7/8/10	

2 - 2 . Dimensions

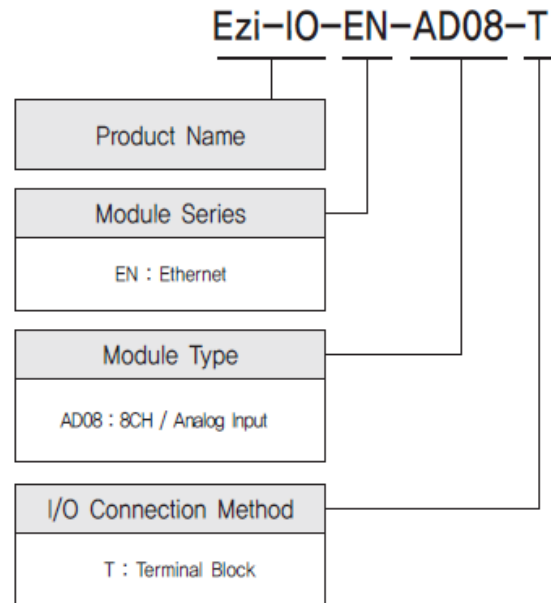


- Install the product on a din rail with a width of 35 mm.

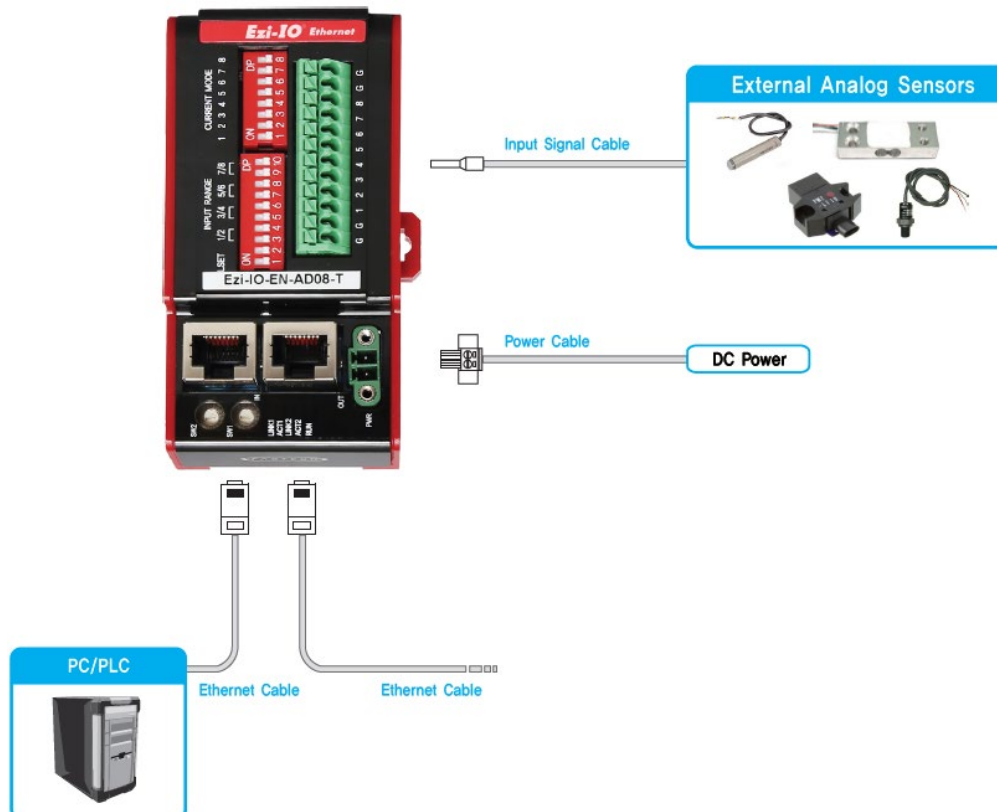
3 . Configuration

3 - 1 . Part Numbering

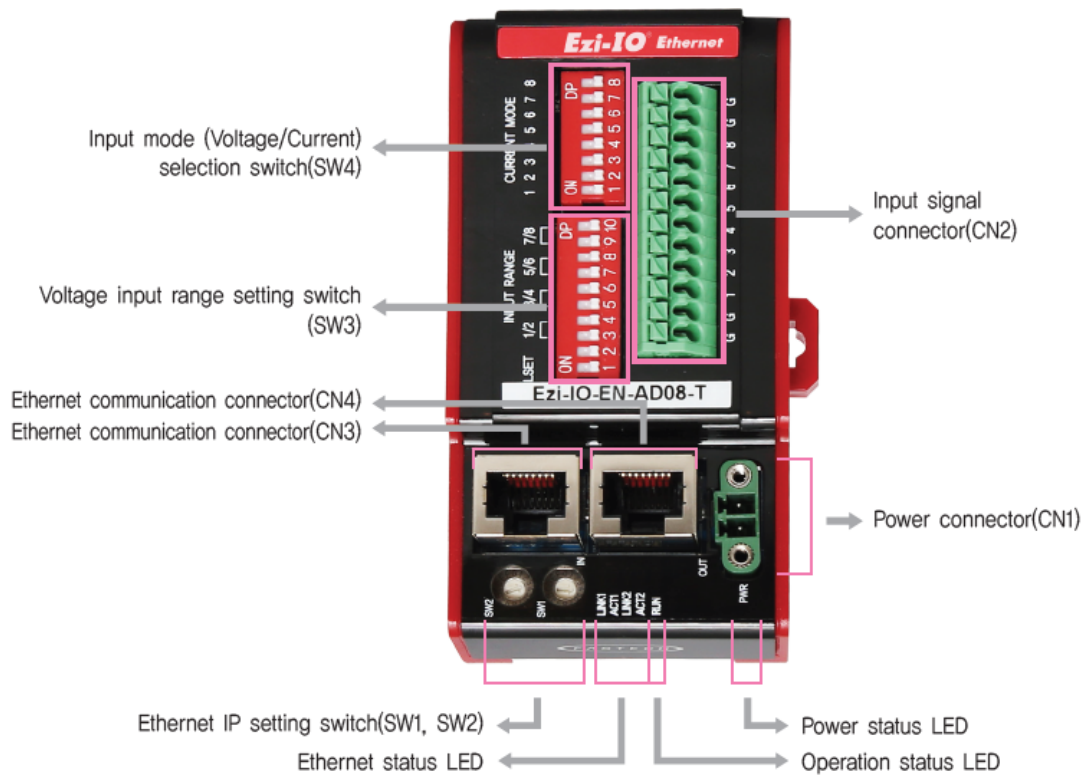
1) Ezi-IO Ethernet AD Part Numbering



3 - 2 . System Configuration



4 . Names and Functions



1) LED Indications

① Power Status LED

LED	Color	Status	Description
PWR	RED	OFF	Power OFF
		ON	Power ON

② Run Status LED

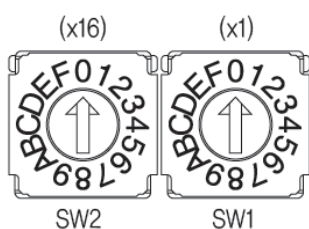
LED	Color	Status	Description
RUN	GREEN	OFF	Abnormal Operation
		Blinking	Normal Operation

③ Ethernet Connection LED

LED	Color	Status	Description
LINK1,2	GREEN	OFF	Link not Established
		ON	Link Established
ACT1,2	YELLOW	OFF	Stand-by
		Blinking	In Operation

2) IP Address Selection Switch (SW1:x1, SW2:x16)

- ① It can be set "from 1 to 254". Make sure to avoid IP address overlapping.
 - "0" and "255" cannot be used for IP setting. Be sure to set it "from 1 to 254".
 - The default Gateway is 192.168.0.1. When the switch is set to "1", change the Gateway. Refer to the [Manual – User Program 2-4] section for change method. If IP Address and Gateway are same, Alarm(201 or 202) occurs.
 - It is recommended to use "2~254" for IP setting.
(Default: SW1 : 2, SW2 : 0)
- ② Basic setting is "192.168.0.xxx", and xxx can be set by switch.



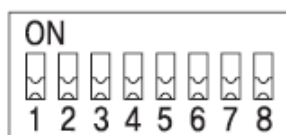
Ex) In case of SW2 : 6, SW1 : 9,

$$6 * 16 + 9 * 1 = 105$$

- ③ If the switches are set to 255(FF), IP Address is automatically set.
Because DHCP is used, IP Address is set automatically when using router.
(Connect the Ethernet to Ethernet IN connector.)

- Be sure to set the IP address with switches, when connecting directly to the controller (PC/PLC).
- Set the IP address automatically only when the default IP address is not used. When the IP Address is automatically set, connect the user program (GUI) and save the IP address. Then, turn off the power and set the last number of IP with the switch.
- When the switch is set to 0, the IP setting becomes the initial (default) value.
In the initial state, communication is not connected.
- Basic IP Address : 192.168.0.xxx, Subnet Mask : 255.255.255.0, Gateway : 192.168.0.1

3) Voltage/Current Selection Switch (SW4)



Select either Voltage or Current Input Mode for each channel with SW4 referring to the chart.

	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
	SW4.1	SW4.2	SW4.3	SW4.4	SW4.5	SW4.6	SW4.7	SW4.8
Voltage Input	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Current Input	ON	ON	ON	ON	ON	ON	ON	ON

- Select the input mode for each channel with SW4 before supplying power to the module.

4) Input Range Setting Switch(SW3)



Select the input range with SW3 referring to the chart. Input range can be set by the combination of each switch.

① Selecting Input Setting Method

Select the setting method with LSET(SW3.1) referring to the chart.

Setting Method \ Switch	LSET	Description
	SW3.1	
DIP Switch	ON	Setting voltage input range with DIP switches (SW3.3~SW3.10)
Parameter	OFF	Setting voltage/current input range with parameters through Ethernet

- If you use any channel in the current input mode, set with parameter through Ethernet. (SW3.1 = OFF)
- Set SW4 before supplying power to the module.
- SW3.2 is not used.

② Selecting Voltage Input Range

When DIP Switch is used for the input setting method (SW3.1 = ON), voltage input range can be set referring to the chart.

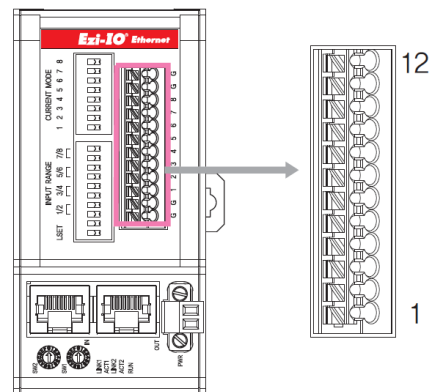
	CH1/CH2		CH3/CH4		CH5/CH6		CH7/CH8	
	SW3.3	SW3.	SW3.5	SW3.6	SW3.7	SW3.8	SW3.9	SW3.10
-10~10V	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
-5~5V	OFF	ON	OFF	ON	OFF	ON	OFF	ON
-2.5~2.5V	ON	OFF	ON	OFF	ON	OFF	ON	OFF
0~10V	ON	ON	ON	ON	ON	ON	ON	ON

5) Power Connector (CN1)

NO.	Function	I/O
1	DC24V	Input
2	GND	Input

6) Input Connector (CN2)

NO.	Indication	Function	I/O
1	G	Analog GND	Input
2	G	Analog GND	Input
3	1	Analog In1	Input
4	2	Analog In2	Input
5	3	Analog In3	Input
6	4	Analog In4	Input
7	5	Analog In5	Input
8	6	Analog In6	Input
9	7	Analog In7	Input
10	8	Analog In8	Input
11	G	Analog GND	Input
12	G	Analog GND	Input



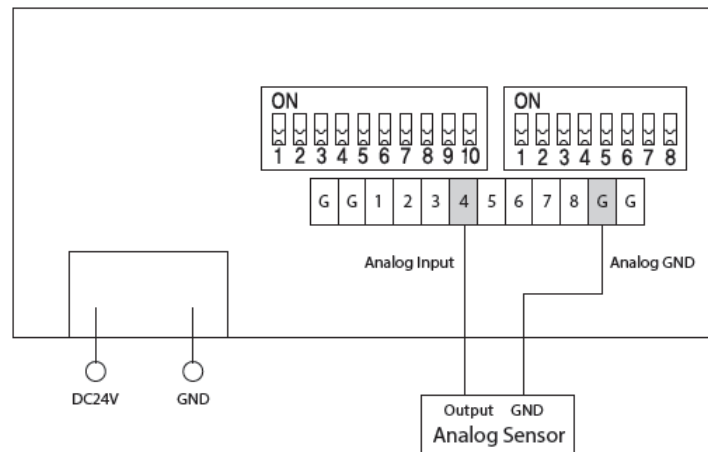
7) Ethernet Connectors (CN3, CN4)

NO.	Function	NO.	Function
1	TD+	5	----
2	TD-	6	RD-
3	RD+	7	----
4	----	8	----
Connector Hood	F.GND		

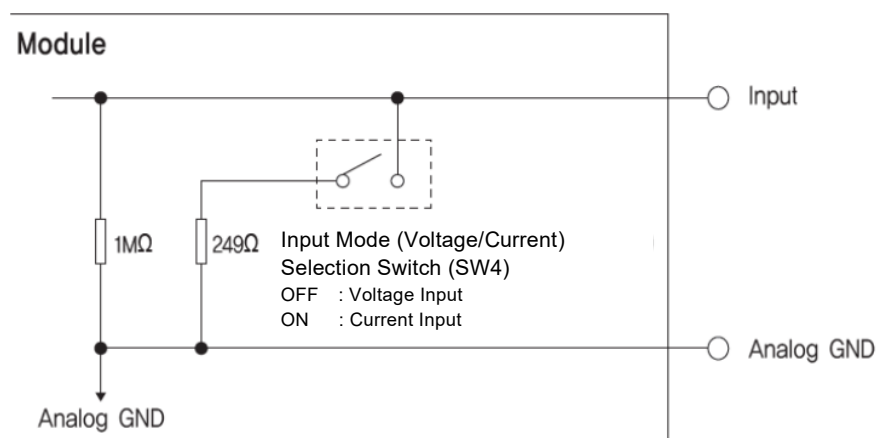
5 . Signal Cabling

5 - 1 . Signal Cabling

Ezi-IO Ethernet AD is supplied with push-in spring type terminal blocks. Push-in spring type terminal blocks make the wiring easy by using ferrule connectors, so the product can be simply connected to analog devices.



5 - 2 . Internal Circuit Diagram



6 . Communication Function

- 1) 2 Port Ethernet switching Hub is embedded in the product for daisy-chain connection.
- 2) TCP and UDP Protocol are used.
- 3) When using TCP Protocol, GUI(Graphical User Interface) and user program can be connected to the drive at the same time.
- 4) When using UDP Protocol, GUI(Graphical User Interface) and one or more user program can be connected to the drive at the same time. However, connection delay may occur when 2 or more user programs are connected.
- 5) Refer to 「[3-2 System Configuration](#)」 for PC connection example.
- 6) The signal contents of the RJ45 connector of the drive are as follows.

(Same as general Ethernet 10/100 Base-T)

RJ45 Pin No.	Function
1	TD+
2	TD-
3	RD+
4	----
5	----
6	RD-
7	----
8	----
case	Frame GND

- 7) **Basic IP Address : 192.168.0.xxx**
Basic Gateway : 192.168.0.1
Basic Subnet Mask : 255.255.255.0

7 . Functions of Ezi-IO Ethernet AD

Ezi-IO Ethernet AD converts analog voltage and current inputs such as sensor signals to digital data and transfer the converted values through Ethernet network. Input Range Setting, Moving Average Filter and Offset Setting Function are provided. Each function of Ezi-IO Ethernet AD is described as follows.

7 - 1 . Input Range Setting

Set the input range of analog signal according to the magnitude of output signal of the sensors and voltage/current output device.

Input range can be set either by Parameter setting or DIP Switch(SW3).

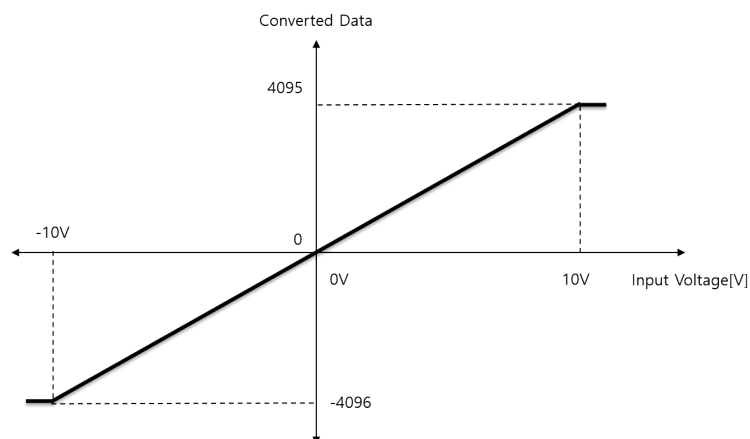
Input range can be set as follows..

Input Range	LSB size	Input Mode
-10 ~ 10V	2.441mV	Voltage
-5 ~ 5V	1.22mV	
-2.5 ~ 10V	0.61mV	
0 ~ 10V	1.22mV	
0 ~ 20mA	2.441uA	Current

7 - 1 - 1 . Input range : -10 ~ 10V

Voltage input between -10 ~ 10[V] is displayed as analog data. A/D conversion data in the corresponding range is indicated between -4096 ~ 4095(Full Scale). If the value is out of the input range, it is displayed as maximum or minimum value.

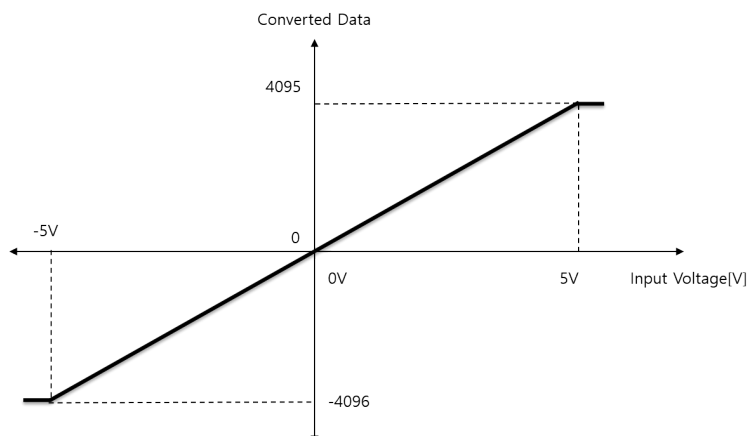
Input Range	Converted Date	LSB size
-10 ~ 10V	-4096 ~ 4095	2.441mV



7 - 1 - 2 . Input range : -5 ~ 5V

Voltage input between -5 ~ 5[V] is displayed as analog data. A/D conversion data in the corresponding range is indicated between -4096 ~ 4095 (Full Scale). If the value is out of the input range, it is displayed as maximum or minimum value.

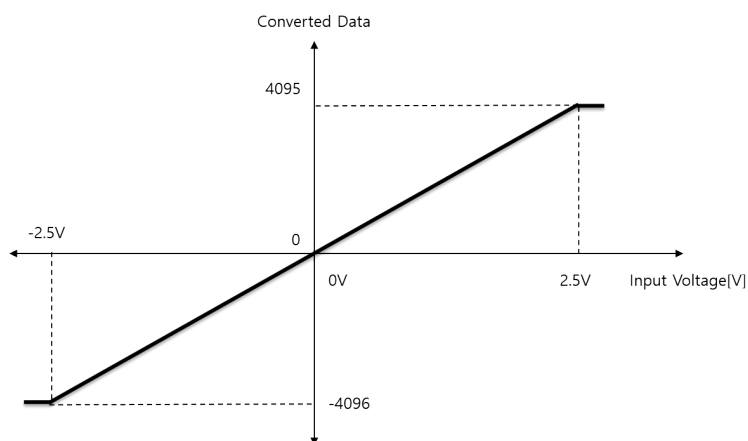
Input range	Conversion data	LSB size
-5 ~ 5V	-4096 ~ 4095	1.22mV



7 - 1 - 3 . Input range : -2.5 ~ 2.5V

Voltage input between -2.5 ~ 2.5[V] is displayed as analog data. A/D conversion data in the corresponding range is indicated between -4096 ~ 4095 (Full Scale). If the value is out of the input range, it is displayed as maximum or minimum value.

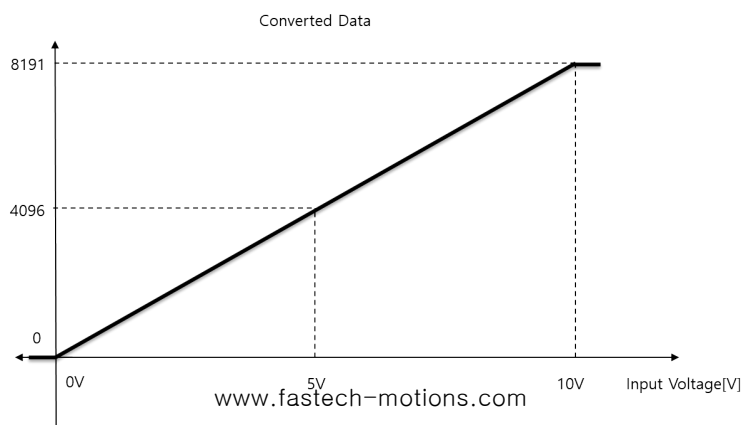
Input range	Conversion data	LSB size
-2.5 ~ 2.5V	-4096 ~ 4095	0.61mV



7 - 1 - 4 . Input range : 0 ~ 10V

Voltage input between 0 ~ 10[V] is displayed as analog data. A/D conversion data in the corresponding range is indicated between 0 ~ 8191(Full Scale). If the value is out of the input range, it is displayed as maximum or minimum value.

Input range	Conversion data	LSB size
0 ~ 10V	0 ~ 8191	1.22mV



7 - 1 - 5 . Input range : 0 ~ 20mA

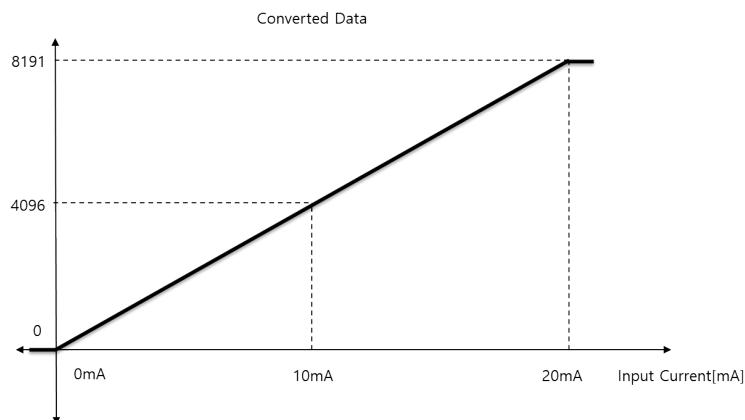
Voltage input between 0 ~ 20[mA] is displayed as analog data. A/D conversion data in the corresponding range is indicated between 0 ~ 8191(Full Scale). If the value is out of the input range, it is displayed as maximum or minimum value.

Input range	Conversion data	LSB size
0 ~ 20mA	0 ~ 8191	2.441uA

Set the input range setting switch as OFF, before the power is applied.

Set SW4 for each CH according to current mode, before the power is applied.

Set the parameter with current input range setting(4) after power is applied.



7 - 2 . Moving Average Filter

Moving average filter function is set by parameter for each CH and operates by CH.

Moving average filter function is provided to remove the noise in the analog signal and reduce the fluctuation of analog input value.

Filter length buffer can be set between 0~200[ms](0 ~ 100)

Moving average filter time = A/D conversion cycle(200[μs]) * Filter buffer length

If filter buffer length is large, responsiveness may become low. So, set the filter buffer length appropriately.

When using moving average filter, set the filter buffer length 2 or higher.

When the filter buffer length is 0 or 1, moving average filter function is not provided.

7 - 3 . Offset

Offset function for each channel is set by parameter.

Deviation of voltage and current input data caused by installation environment can be corrected by the Offset function.

Offset can be set from -1000 to 1000.

A/D converted value is applied as [A/D converted value + Offset value].

Change in Offset value is applied immediately.

8 . Appendix

8 - 1 . Connector

Purpose	Item	Part Number	Manufacturer
Power (CN1)	Terminal Block	MC421-38102	DECA

8 - 2 . Options

1) Ethernet Cable

Purpose	Part Number	Length[m]	Remarks
Ethernet Connection	CGNR-EC-001F	1	·STP(Shielded Twisted Pair) cable ·Category 5e or higher ·Max. length: 100m ·Normal cable
	CGNR-EC-002F	2	
	CGNR-EC-003F	3	
	CGNR-EC-005F	5	

- If you need cables with length(in units of 1m) not listed on the table or robot cables, please contact FASTECH for more information.



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