

User Manual – Digital Input Module

EH-RIO2 Series

RIO2-XDP4, -XDP8, -XDP16, -XAH4

Version 1.04



User Manual – Digital Input Module

DOCUMENT CHANGE SUMMARY				
REV	PAGE	REMARKS	DATE	EDITOR
1.4	All	Created	18.06.2015	Winter
1.5	P.9, 10 P14	RIO2-XDP8, RIO2-XDP16 power dissipation changed Configuration parameters added	08.01.2018	Mitachi

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1. Important Notes

Solid state equipment has operational characteristics differing from those of electromechanical equipment.

Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls describes some important differences between solid state equipment and hard-wired electromechanical devices.

Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Hitachi be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Hitachi cannot assume responsibility or liability for actual use based on the examples and diagrams.

Warning!

- ✓ **If you don't follow the directions, it could cause a personal injury, damage to the equipment or explosion**
- Do not assemble the products and wire with power applied to the system. Else it may cause an electric arc, which can result into unexpected and potentially dangerous action by field devices. Arching is explosion risk in hazardous locations. Be sure that the area is non-hazardous or remove system power appropriately before assembling or wiring the modules.
- Do not touch any terminal blocks or IO modules when system is running. Else it may cause the unit to an electric shock or malfunction.
- Keep away from the strange metallic materials not related to the unit and wiring works should be controlled by the electric expert engineer. Else it may cause the unit to a fire, electric shock or malfunction.

Caution!

- ✓ **If you disobey the instructions, there may be possibility of personal injury, damage to equipment or explosion. Please follow below Instructions.**
- Check the rated voltage and terminal array before wiring. Avoid the circumstances over 55°C of temperature. Avoid placing it directly in the sunlight.
- Avoid the place under circumstances over 85% of humidity.
- Do not place Modules near by the inflammable material. Else it may cause a fire.
- Do not permit any vibration approaching it directly.
- Go through module specification carefully, ensure inputs, output connections are made with the specifications. Use standard cables for wiring.
- Use Product under pollution degree 2 environment..

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1.1. Safety Instruction

1.1.1. Symbols

DANGER 	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death property damage, or economic loss
IMPORTANT	Identifies information that is critical for successful application and understanding of the product
ATTENTION 	Identifies information about practices or circumstances that can lead to personal injury, property damage, or economic loss. Attentions help you to identity a hazard, avoid a hazard, and recognize the consequences

1.1.2. Safety Notes

DANGER 	The modules are equipped with electronic components that may be destroyed by electrostatic discharge. When handling the modules, ensure that the environment (persons, workplace and packing) is well grounded. Avoid touching conductive components, e.g. FnBUS Pin.
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1.1.3. Certification

CE Certificate

EN 61000-6-2; Industrial Immunity

EN 61000-6-4; Industrial Emissions

RoHS (EU, CHINA)

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2. DIGITAL INPUT MODULE LIST

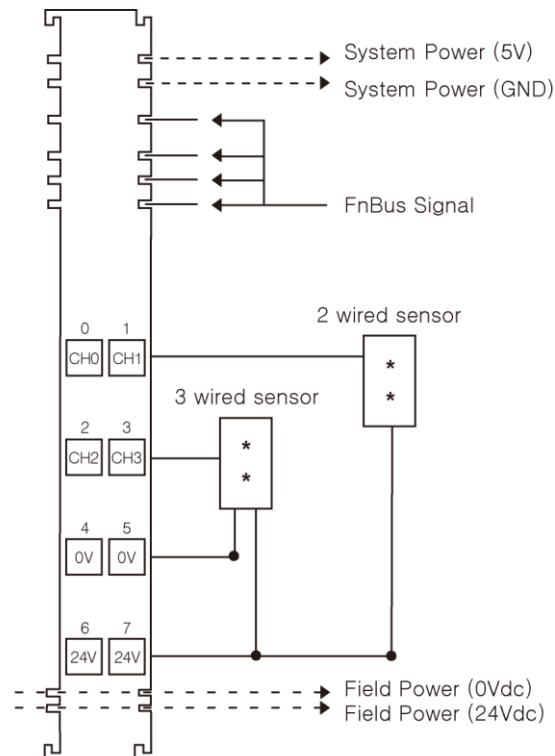
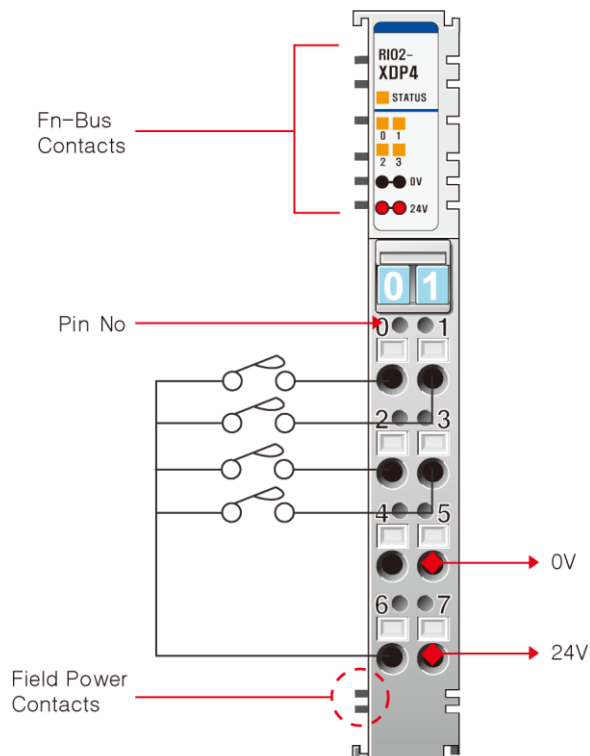
Number	Description	Production Status
RIO2-XDP4	4 Points, Sink(Positive), 12V/24Vdc, Terminal	Active
RIO2-XDP8	8 Points, Sink(Positive), 12V/24Vdc, Terminal	Active
RIO2-XDP16	16 Points, Sink(Positive), 12V/24Vdc, 20P Connector	Active
RIO2-XAH4	4 Points, 220Vac, Terminal	Active

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3. Specification

3.1. The Interface

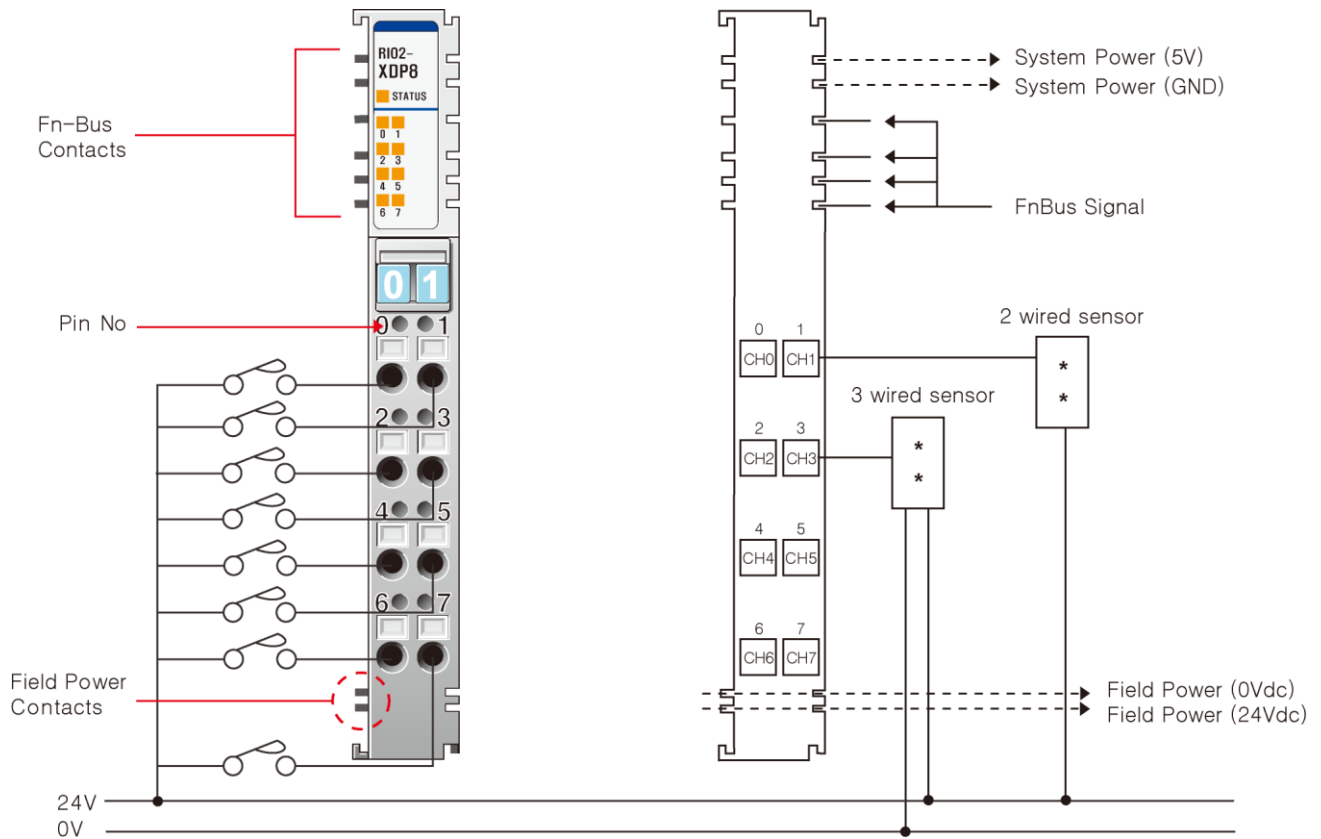
3.1.1. RIO2-XDP4



Pin No.	Description	Pin No.	Description
0	Input Channel 0	1	Input Channel 1
2	Input Channel 2	3	Input Channel 3
4	Field Ground (0V)	5	Field Ground (0V)
6	Field Power (+24Vdc)	7	Field Power (+24Vdc)

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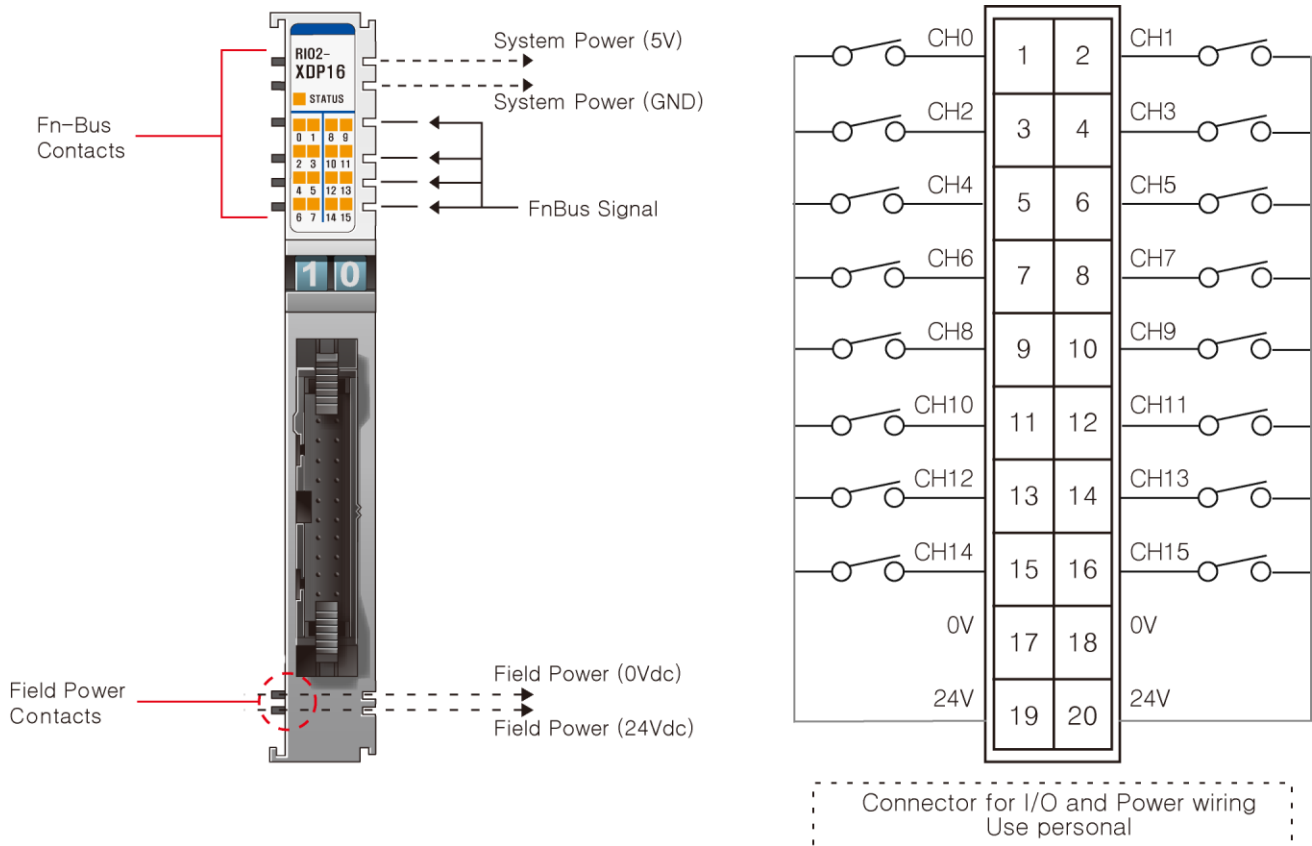
3.1.2. RIO2-XDP8



Pin No.	Description	Pin No.	Description
0	Input Channel 0	1	Input Channel 1
2	Input Channel 2	3	Input Channel 3
4	Input Channel 4	5	Input Channel 5
6	Input Channel 6	7	Input Channel 7

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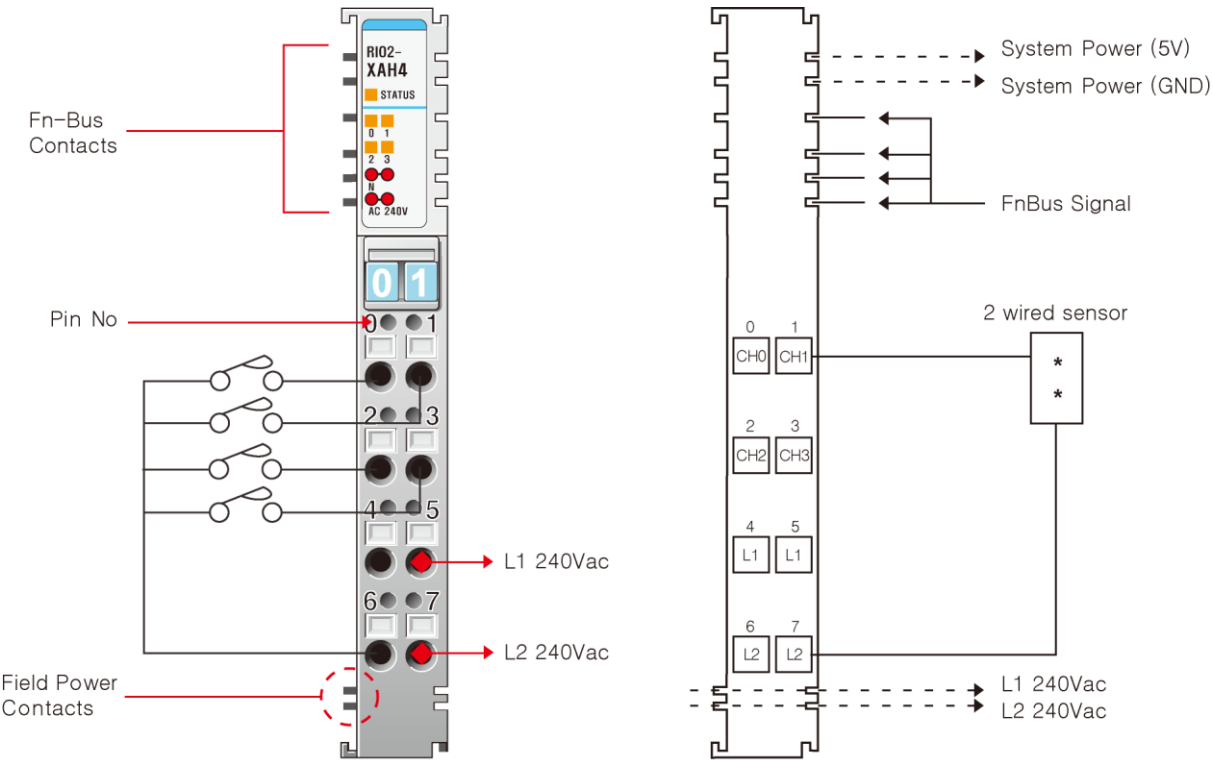
3.1.3. RIO2-XDP16



Pin No.	Description	Pin No.	Description
1	Input Channel 0	2	Input Channel 1
3	Input Channel 2	4	Input Channel 3
5	Input Channel 4	6	Input Channel 5
7	Input Channel 6	8	Input Channel 7
9	Input Channel 8	10	Input Channel 9
11	Input Channel 10	12	Input Channel 11
13	Input Channel 12	14	Input Channel 13
15	Input Channel 14	16	Input Channel 15
17	Field Ground(0V)	18	Field Ground(0V)
19	Field Power (+24Vdc)	20	Field Power (+24Vdc)

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3.1.4. RIO2-XAH4



Pin No.	Description	Pin No.	Description
0	Input Channel 0	1	Input Channel 1
2	Input Channel 2	3	Input Channel 3
4	L1	5	L1
6	L2	7	L2

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3.2. Environment Specification

Environmental Specifications

Operating Temperature	-20 to 55°C (Discrete I/O) 0 to 55°C (Analog I/O)
Non-Operating Temperature	-40°C to 85°C
Relative Humidity	5%~90% non-condensing
Operating Altitude	2000m
Mounting	DIN rail

General Specifications

Shock Operating	10g
Shock Non-Operating	30g
Vibration/Shock resistance	Displacement : 0.012Inch p-p from 10~57Hz Acceleration : 2G's from 57~500Hz Sweep Rate : 1 octave Per Minute Axes to test : x, y, z Frequency Sweeps Per Axis : 10
EMC resistance burst/ESD	Conforms to EN-61000-6-2
EMI	Conforms to EN-61000-6-4
Installation Pos. /Protect. Class	Variable / IP20
Product Certification	CE
Network Conformance	RIO2-PBA : PTO Conformance Test Completion
Isolation	DC Module (Included Analog Module) : Terminal Block to F.G 500Vac/1min AC Module : Terminal Block to F.G 1500Vac/1min Relay Module : Terminal Block to F.G 2500Vac/1min

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3.3. Specification

3.3.1. RIO2-XDP4

Items	Specification
Input Specification	
Inputs Per Module	4 Points Sink Type
Indicators	4 Green Input States, 1 Green/Red FnBUS State
ON-state Voltage	24Vdc nominal Min. 10.2Vdc ~ Max. 28.8Vdc
Min. OFF-state Voltage	Max. 5Vdc
ON-state Current	Max. 6mA / Point @ 28.8Vdc
Input Signal Delay	OFF to ON: Max. 3ms ON to OFF: Max. 3ms
Nominal Input Impedance	Typ. 5.1KΩ
Filtering Time	Typ. 1.5ms
Common Type	4 Points / 2COM (Single Common)
General Specification	
Power Dissipation	Max. 35mA @ 5.0Vdc
Isolation	I/O to Logic : Photocoupler isolation
Field Power	Supply Voltage : 24Vdc nominal Voltage Range : 11~28.8Vdc
Wiring	I/O Cable Max. 2.0mm ² (AWG 14)
Weight	70g
Module Size	12mm x 99mm x 70mm
Environment Condition	Refer to " Environment Specification"(page : 8)

3.3.2. RIO2-XDP8

Items	Specification
Input Specification	
Inputs Per Module	8 Points Sink Type
Indicators	8 Green Input States, 1 Green/Red FnBUS State
ON-state Voltage	24Vdc nominal Min. 10.2Vdc ~ Max. 28.8Vdc
Min. OFF-state Voltage	Max. 5Vdc
ON-state Current	Max. 6mA / Point @ 28.8Vdc
Input Signal Delay	OFF to ON: Max. 3ms ON to OFF: Max. 3ms
Nominal Input Impedance	Typ. 5.1KΩ
Filtering Time	Typ. 1.5ms
Common Type	External Common
General Specification	
Power Dissipation	Max. 50mA @ 5.0Vdc
Isolation	I/O to Logic : Photocoupler isolation
Field Power	Supply Voltage : 24Vdc nominal Voltage Range : 11~28.8Vdc
Wiring	I/O Cable Max. 2.0mm ² (AWG 14)
Weight	70g
Module Size	12mm x 99mm x 70mm
Environment Condition	Refer to " Environment Specification"(page : 8)

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3.3.3. RIO2-XDP16

Items	Specification
Input Specification	
Inputs Per Module	16 Points Sink Type
Indicators	16 Green Input States, 1 Green/Red FnBUS State
ON-state Voltage	24Vdc nominal Min. 10.2Vdc ~ Max. 28.8Vdc
Min. OFF-state Voltage	Max. 5Vdc
ON-state Current	Max. 6mA / Point @ 28.8Vdc
Input Signal Delay	OFF to ON: Max. 3ms ON to OFF: Max. 3ms
Nominal Input Impedance	Typ. 5.1KΩ
Filtering Time	Typ. 1.5ms
Common Type	16 Points / 2COM
General Specification	
Power Dissipation	Max. 50mA @ 5.0Vdc
Isolation	I/O to Logic : Photocoupler isolation
Field Power	Supply Voltage : 24Vdc nominal Voltage Range : 11~28.8Vdc Power Dissipation : 5mA@28.8Vdc Per Point
Wiring	Module Connector : HIF3BA-20D-2.54DSA
Weight	70g
Module Size	12mm x 99mm x 70mm
Environment Condition	Refer to "Environment Specification"(page : 8)

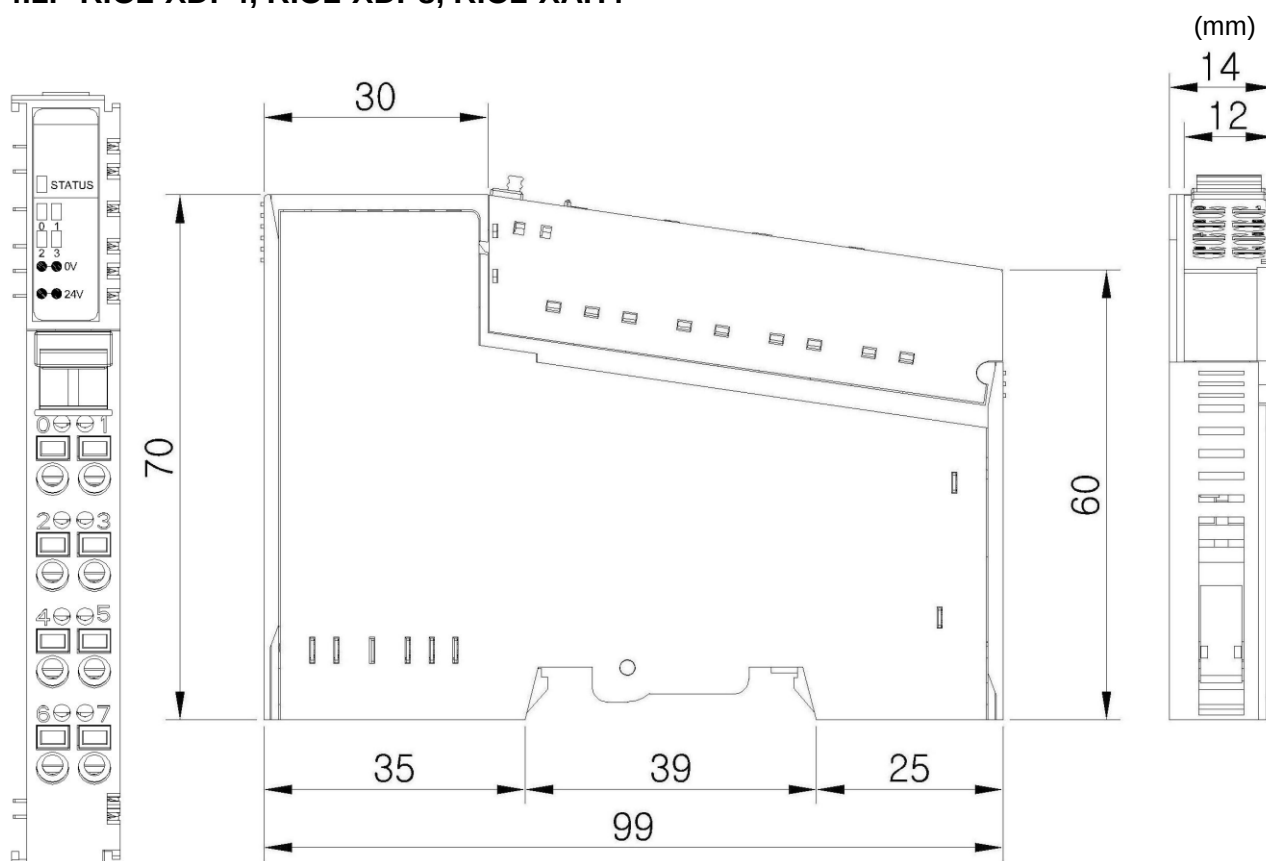
3.3.4. RIO2-XAH4

Items	Specification
Input Specification	
Inputs Per Module	4 Points
Indicators	4 Green Input States, 1 Green/Red FnBUS State
ON-state Voltage	220Vac nominal Min. 170Vac ~ Max. 264Vdc
Min. OFF-state Voltage	Max. 130Vac
ON-state Current	Max. 12mA / Point @ 264Vdc
Input Signal Delay	OFF to ON: Max. 10ms ON to OFF: Max. 10ms
Nominal Input Impedance	Typ. 22KΩ
Frequency Range	47-63Hz
Common Type	4 Points / 2COM (Single Common)
General Specification	
Power Dissipation	Max. 35mA @ 5.0Vdc
Isolation	I/O to Logic : Photocoupler isolation
Field Power	Supply Voltage : 240Vac nominal Voltage Range: Min. 170Vac ~ Max. 264Vac
Wiring	I/O Cable Max. 2.0mm ² (AWG 14)
Weight	70g
Module Size	12mm x 99mm x 70mm
Environment Condition	Refer to "Environment Specification"(page : 8)

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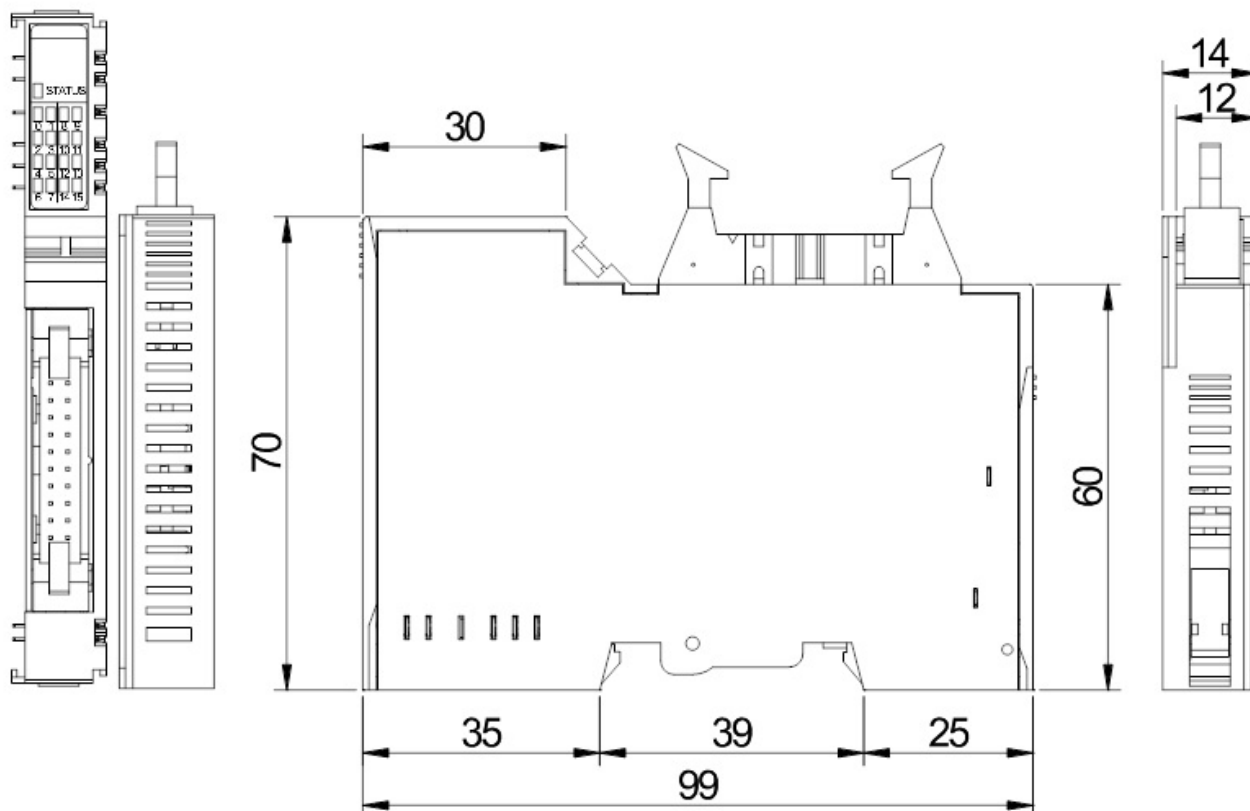
4. Dimension

4.1. RIO2-XDP4, RIO2-XDP8, RIO2-XAH4



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4.2. RIO2-XDP16



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5. Mapping Data into the image Table

5.1. RIO2-XDP4, RIO2-XAH4

Input Module Data

D3	D2	D1	D0
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Input Image Value

Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved				D3	D2	D1	D0

5.2. RIO2-XDP8

Input Module Data

D7	D6	D5	D4	D3	D2	D1	D0
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Input Image Value

Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0

5.3. RIO2-XDP16

Input Module Data

D7	D6	D5	D4	D3	D2	D1	D0
D15	D14	D13	D12	D11	D10	D9	D8



Input Image Value

Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0
Byte 1	D15	D14	D13	D12	D11	D10	D9	D8

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6. Configuration parameter

6.1. Configuration parameter

No configuration parameters on EH-RIO2 series input module.

7. Trouble Shooting

ATTENTION



In this manual, it couldn't be described all variety case with Network Adapter of several protocols. So if you couldn't find any fault after investigating all below cases refer to NA user manual.

LED Status	Cause	Action
EXPANSION MODULE STATUS LED		Device has no expansion Module or may not be powered
Off	Not Power No Initialized	The Parameter is not initialized yet.
Green	Fn-Bus Connection	FnBus normal Operation
Flashing Green	Fn-Bus Ready	FnBus ready
Flashing Red	Fn-Bus Fault	FnBus Time Out, FnBus Failed Communication
Red	Device Fault	Device fault
CHANNEL STATUS LED		
Off	Not Signal	Normal Operation
Green	On Signal	Normal Operation

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