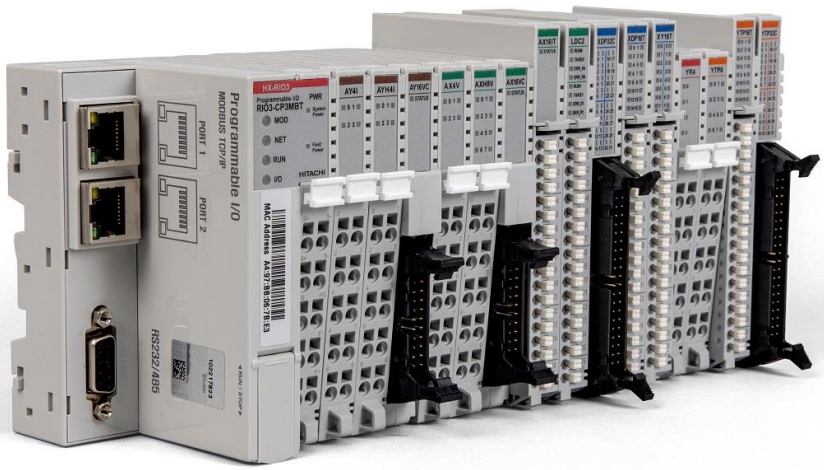
Special I/O Module

RIO3-PWM2
User Manual



Version 1.001

HITACHI
Inspire the Next

REVISION HISTORY				
REV	**PAGE**	**REMARKS**	**DATE**	**EDITOR**
1.00		New Document	Nov 2020	(OPR), (PF)
1.00	15	Remove product list table and add a reference	Aug 2021	Faber
1.001	8, 9	Pulse output frequency value adjusted, Frequency range information added	Nov 2022	Faber

Table of Contents

1 Important Notes 4
1.1 Safety Instruction 5
1.1.1 Symbols 5
1.1.2 Safety Notes 5
1.1.3 Certification 5
2 Specification 6
2.1 RIO3-PWM2 6
2.1.1 Wiring Diagram 6
2.1.2 LED Indicator 7
2.1.3 Channel Status LED 7
2.1.4 Specification 8
2.1.5 Mapping data from the image table 9
2.1.6 Parameter Data 9
3 Environment Specification 10
4 Dimension 11
4.1 18-Pts. Spring Type 11
5 Mounting 12
5.1 I/O Inserting and Removing Devices 12
5.2 RTB (Removable Terminal Block) 13
6 G-Bus Pin Description 14
7 APPENDIX A 15
7.1 Product List 15
7.2 Glossary 15

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 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 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 equipmentor 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 50℃ 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.

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, RBUS Pin.

1.1.3 Certification

UL Listed Industrial Control Equipment, certified for U.S

See UL File E196687

CE Certificate

EN 61000-6-2; Industrial Immunity

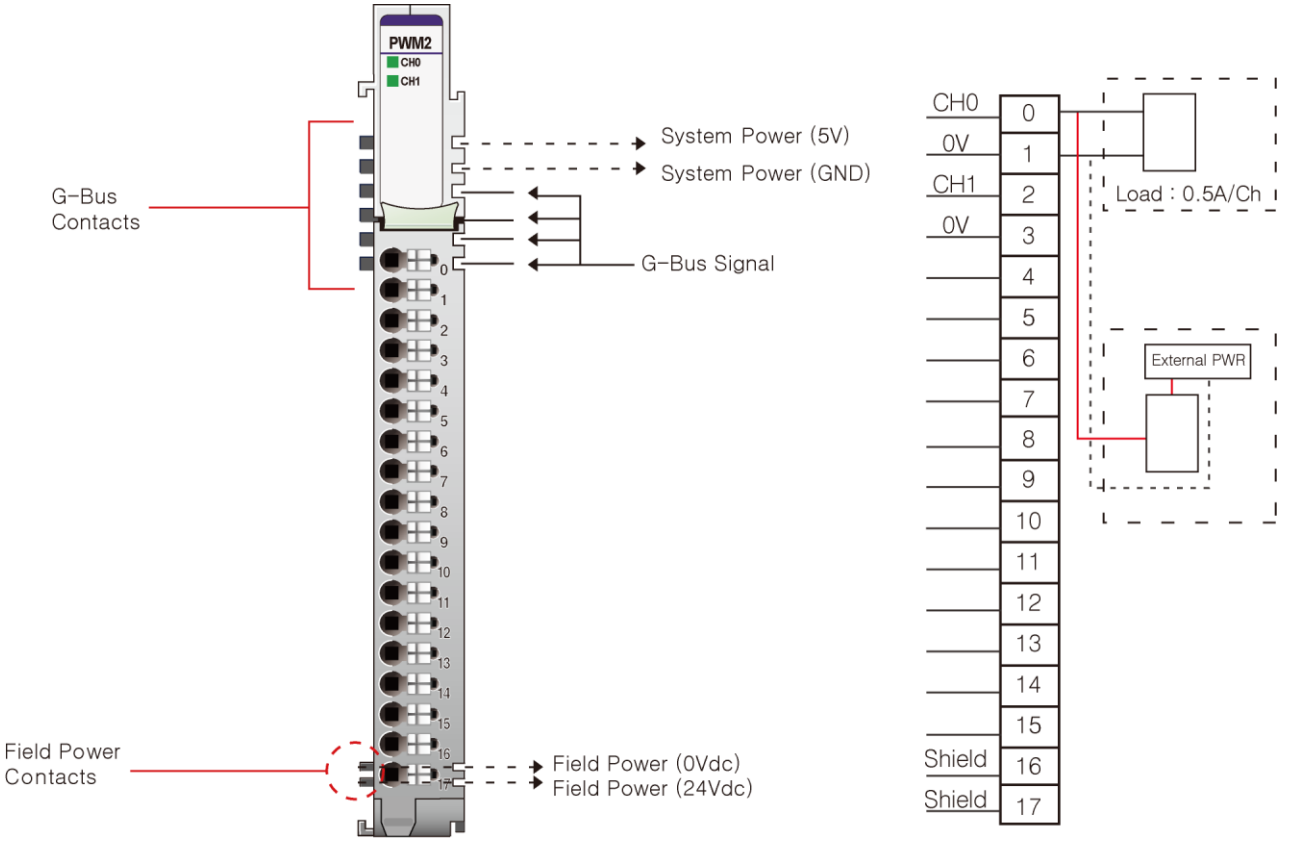
EN 61000-6-4; Industrial Emissions

Reach, RoHS (EU, CHINA), EAC

2 Specification

2.1 RIO3-PWM2

2.1.1 Wiring Diagram



Pin No.	Signal Description
0	PWM Output Channel #0
1	Field Power 0V, Common
2	PWM Output Channel #1
3	Field Power 0V, Common
4	N.C.
5	N.C.
6	N.C.
7	N.C.
8	N.C.
9	N.C.
10	N.C.
11	N.C.

12	N.C.
13	N.C.
14	N.C.
15	N.C.
16	Shield
17	Shield

2.1.2 LED Indicator

LED No.	LED Function / Description	LED Color
0	PWM Output Channel #0	Green
1	PWM Output Channel #1	Green

2.1.3 Channel Status LED

Status	LED	To Indicate
No Signal	Off	No Operation
On Signal	Green	Normal Operation

2.1.4 Specification

Items	Specification
Output Specification	
Number of channels	2 channels
Number of outputs	2 outputs, push-pull type
Indicators	2 green pulse output status
Output voltage	24Vdc
Output current	0.5A per channel, 1.0A per unit Operating temperature -40℃ ~ 45℃: Max. 0.5A per channel 45℃ ~ 60℃: Max. 0.3A per channel
Pulse output frequency	1 – 5000Hz ± 0.5%
Pulse output duty	0.0-100.0% ± 1.0% (0.1%/1LSB), Ton > 1us, Toff > 1us
Protection	Short circuit protection
Common type	2 common, Field power 0V is common
General Specification	
Power dissipation	Max. 75mA @ 5Vdc
Isolation	I/O to Logic: photocoupler isolation Field power: non-isolation
UL field power	Supply voltage: 24Vdc nominal, Class2
Field power	Supply voltage: 24Vdc nominal Voltage range: 15 ~ 30Vdc Power dissipation: Max. 10mA @ 24Vdc except load
Single Wiring	I/O Cable Max. 0.75 (AWG 18)
Weight	63g
Module size	12 x 109 x 70
Environment condition	**Refer to 'Environment Specification'**

2.1.5 Mapping data from the image table

Input Image Value - 2Byte

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Reserved							
Byte 1	Reserved							

Output Image Value - 8Byte

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Frequency CH#0 Low Byte							
Byte 1	Frequency CH#0 High Byte							
Byte 2	Duty CH#0 Low Byte							
Byte 3	Duty CH#0 High Byte							
Byte 4	Frequency CH#1 Low Byte							
Byte 5	Frequency CH#1 High Byte							
Byte 6	Duty CH#1 Low Byte							
Byte 7	Duty CH#1 High Byte							

- Range of each Duty is 0 (0.0%) ~ 1000 (100.0%). If Duty value is 365, then duty rate is 36.5%

- Frequency range 1 – 5000Hz. If Frequency value is 2500, then frequency is 2500 Hz.

2.1.6 Parameter Data

Valid Parameter length: 2 Bytes

Parameter Data

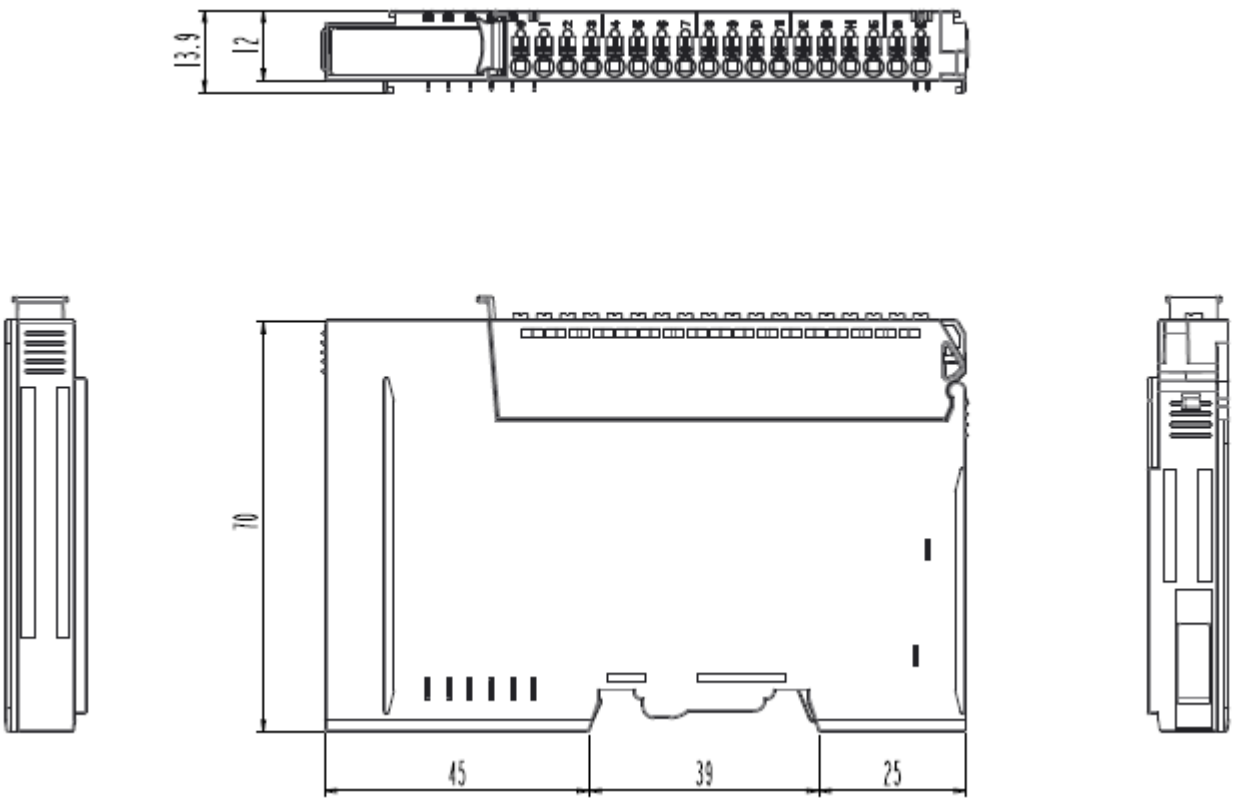
Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Reserved							
Byte 1	Reserved							

3 Environment Specification

Environmental specification	
Operating Temperature	-40℃ ~ 60℃
UL Temperature	-20℃ ~ 60℃
Storage Temperature	-40℃ ~ 85℃
Relative Humidity	5% ~ 90% non-condensing
Mounting	DIN Rail
General Specification	
Shock Operating	IEC 60068-2-27
Vibration Resistance	Based on IEC 60068-2-6 DNVGL-CG-0039: Vibration Class B, 4g
Industrial Emissions	EN61000-6-4: 2007 + A1:2011
Industrial Immunity	EN61000-6-2: 2005
Installation Position	Vertical and horizontal installation is possible
Product Certifications	CE, UL, EAC

4 Dimension

4.1 18-Pts. Spring Type



Dimensions in mm

5 Mounting

Caution!

Hot surface!

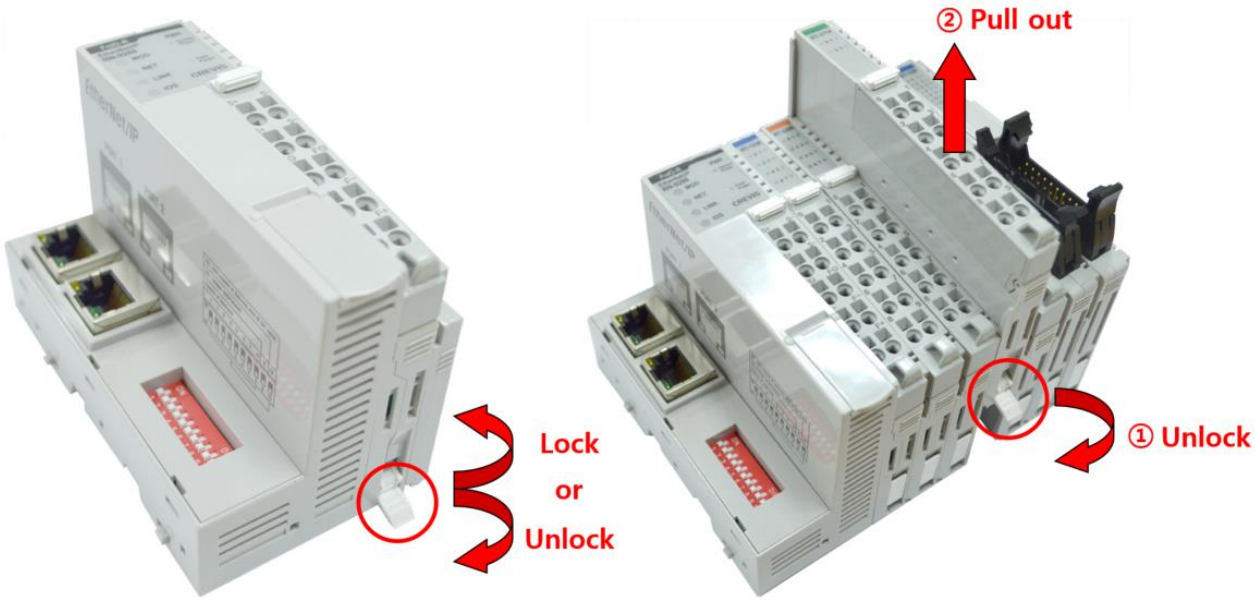
The surface of the housing can become hot during operation. If the device was operated at high ambient temperatures, allow it to cool off before touching it.

Notice!

Perform work on devices only if they are de-energized!

Working on energized devices can damage them. Therefore, turn off the power supply before working on the devices.

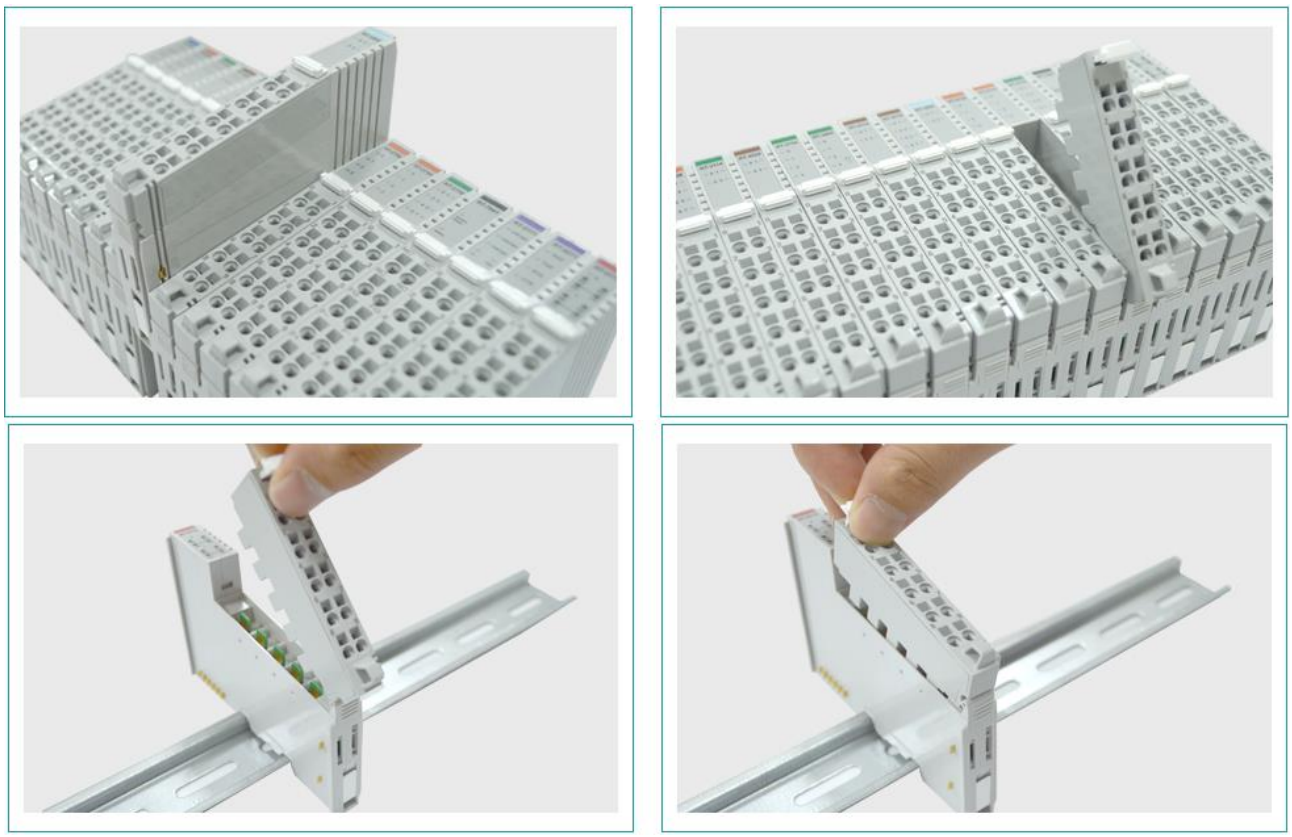
5.1 I/O Inserting and Removing Devices



As above figure in order to safeguard the RIO3-Module from jamming, it should be fixed onto the DIN rail with locking lever. To do so, fold on the upper of the locking lever.

To pull out the RIO3-Module, unfold the locking lever as below figure.

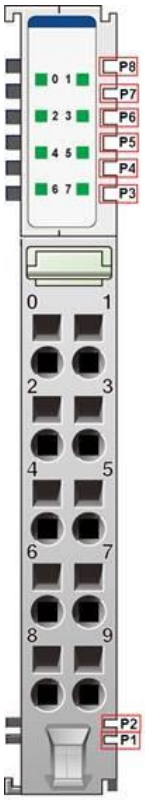
5.2 RTB (Removable Terminal Block)



Whole terminal block can be combined and removed for the convenience if its maintenance.
There is a locking switch on the RTB for the easy combination and easy removal.
Easy combination and easy removal for IO modules on the din rail through One Touch Locking Switch.

6 G-Bus Pin Description

Communication between the Network Adapter and the expansion module as well as system / field power supply of the bus modules is carried out via the internal bus. It is comprised of 6 data pin and 2 field power pin.



*Please refer to the table below regarding the pin description from P1 to P8.

No.	Description
P1	Field Power (VCC)
P2	Field Power (GND)
P3	GBUS CLK
P4	GBUS MISO
P5	GBUS MOSI
P6	GBUS Token
P7	System Power (GND)
P8	System Power (VCC)

DANGER 	Do not touch data and field power pins in order to avoid soiling and damage by ESD noise.

7 APPENDIX A

7.1 Product List

Please refer the separate HX-RIO3 product list document

7.2 Glossary

System Power: The power for starting up CPU.
Field Power: The power for input and output line.
Terminator Resistor: Resistor for prevention reflected wave.
EDS: Electronic Data Sheet.
Sink: The method of in/output power supply if a device has no power source.
Source: The method of in/output power supply if a device has the power source.