

Digital Output Module

RIO3-Y...
User Manual



Version 1.01

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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 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 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 50°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.

1.1 Safety Instructions

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 identify 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, GBUS Pin.
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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

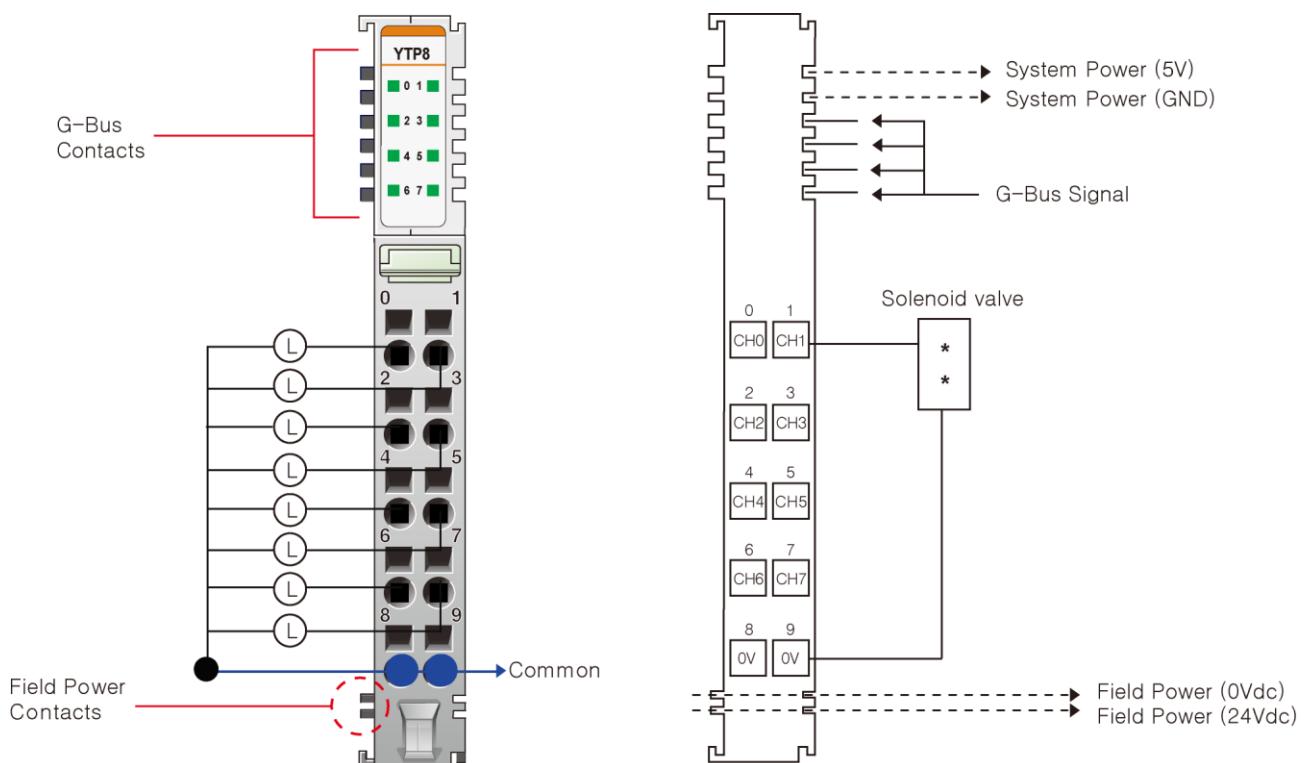
2 Digital Output Module List

RIO3-Number	Description	ID (hex)
RIO3-YTP8	Digital Output, 8 Points, Source (Positive), 24VDC, 0.5A, 10 RTB	2328
RIO3-YTP16C	Digital Output, 16 Points, Source (Positive), 24VDC, 0.3A, 20P Connector	222F
RIO3-YTP16T	Digital Output 16 POINTS, SOURCE, 18RTB	226F
RIO3-YTP32C	Digital Output, 32 Points, Source (Positive), 24VDC, 0.3A, 40P Connector	22CA
RIO3-YS4	Digital Output, 4 Points, MOS Relay (Solid State Relay), 240V (AC/ DC), 0.5A, 10 RTB	2734
RIO3-YR4	Digital Output, 4 Points, Relay, 24VDC / 220VAC, 2.0A, 10 RTB	2744
RIO3-YS8	Digital Output, 8 Points, Relay Output Terminal, 240Vdc/ac, 0.5A	2738

3 Specification

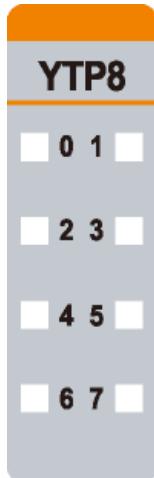
3.1 RIO3-YTP8

3.1.1 Wiring Diagram



Pin No.	Signal Description	Signal Description	Pin No.
0	Output Channel 0	Output Channel 1	1
2	Output Channel 2	Output Channel 3	3
4	Output Channel 4	Output Channel 5	5
6	Output Channel 6	Output Channel 7	7
8	Common (Field Power 0V)	Common (Field Power 0V)	9

3.1.2 LED Indicator



LED No.	LED Function / Description	LED Color
0	Output Channel 0	Green
1	Output Channel 1	Green
2	Output Channel 2	Green
3	Output Channel 3	Green
4	Output Channel 4	Green
5	Output Channel 5	Green
6	Output Channel 6	Green
7	Output Channel 7	Green

3.1.3 Channel Status LED

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

3.1.4 Environment Specification

Environmental specification	
Operating Temperature	-40°C ~ 70°C
UL Temperature	-20°C ~ 60°C
Storage Temperature	-40°C ~ 85°C
Relative Humidity	5% ~ 90% non-condensing
Mounting	DIN rail
General specification	
Shock Operating	IEC 60068-2-27: 2008 / 15g, 11ms
Vibration Resistance	Based on IEC 60068-2-6 DNVGL-CG-0039: 2016/6 Vibration Class B, 4g
Industrial Emissions	EN 61000-6-4: 2007 +A1: 2011
Industrial Immunity	EN 61000-6-2: 2005
Installation Position	Vertical and horizontal installation is possible.
Product Certifications	CE, UL, EAC

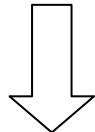
3.1.5 Specification

Items	Specification
Output Specification	
Output per module	8 Points Source type
Indicators (Logic side)	8 Green output state
Output Voltage Range	24Vdc Nominal Min. 15Vdc to Max. 30Vdc
ON-state voltage drop	0.3Vdc @ 25°C 0.5Vdc @ 70°C
ON-State Min. Current	Min. 1mA
OFF-State Leakage current	Max. 5uA
Output Signal Delay	OFF to ON: 0.3ms maximum ON to OFF: 0.3ms maximum
Output Current Rating	Max. 0.5A per channel / Max. 4A per unit
Protection	Over-Current Limit: Min 6.5A @ 25°C per each channel Thermal Shutdown: Min 4A @ 25°C per each channel Short circuit protection
COMMON Type	8 points / 2 COM
General specification	
Power dissipation	40mA maximum @ 5.0Vdc
Isolation	I/O to Logic: photocoupler isolation Field Power: Non-isolation
UL field power	Supply voltage: 24Vdc nominal, Class 2
Field Power	Supply voltage: 24Vdc nominal Voltage range: 15 to 30Vdc Power dissipation: 10mA @ 24Vdc
Wiring	I/O Cable Max. 2.0mm ² (AWG 14)
Weight	60g
Module Size	12mm x 99mm x 70mm

3.1.6 Mapping Data into the Image Table

Output Image Value

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0	D7	D6	D5	D4	D3	D2	D1	D0



Output Module Data

D7	D6	D5	D4	D3	D2	D1	D0
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3.1.7 Parameter Data

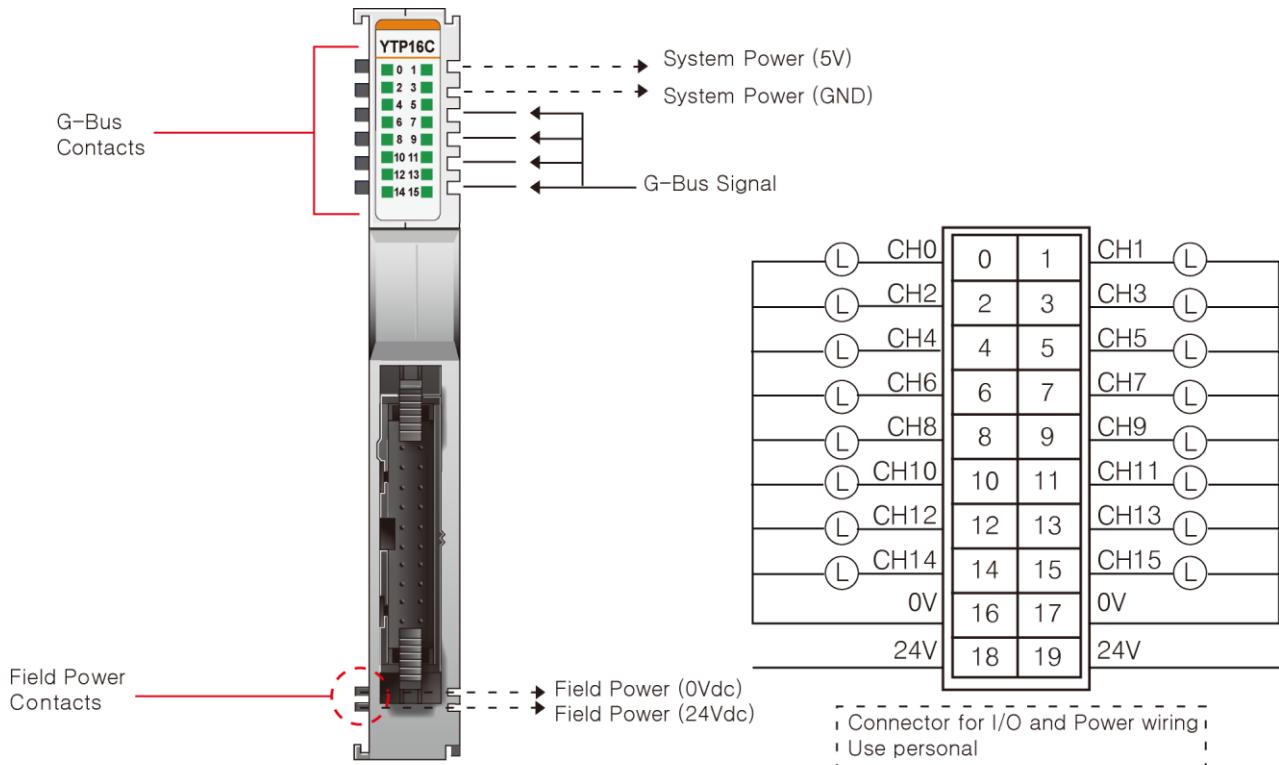
Valid Parameter Length: 2 Bytes

Parameter Data

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0	Fault Action (ch0 ~ ch7) 0: Fault value, 1: Hold last state							
Byte1	Fault value (ch0 ~ ch7) 0: Off, 1: On							

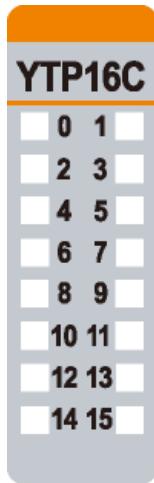
3.2 RIO3-YTP16C

3.2.1 Wiring Diagram



Pin No.	Signal Description	Signal Description	Pin No.
0	Output Channel 0	Output Channel 1	1
2	Output Channel 2	Output Channel 3	3
4	Output Channel 4	Output Channel 5	5
6	Output Channel 6	Output Channel 7	7
8	Output Channel 8	Output Channel 9	9
10	Output Channel 10	Output Channel 11	11
12	Output Channel 12	Output Channel 13	13
14	Output Channel 14	Output Channel 15	15
16	Common (Field Power 0V)	Common (Field Power 0V)	17
18	Common (Field Power 24V)	Common (Field Power 24V)	19

3.2.2 LED Indicator



LED No.	LED Function / Description	LED Color
0	Output Channel 0	Green
1	Output Channel 1	Green
2	Output Channel 2	Green
3	Output Channel 3	Green
4	Output Channel 4	Green
5	Output Channel 5	Green
6	Output Channel 6	Green
7	Output Channel 7	Green
8	Output Channel 8	Green
9	Output Channel 9	Green
10	Output Channel 10	Green
11	Output Channel 11	Green
12	Output Channel 12	Green
13	Output Channel 13	Green
14	Output Channel 14	Green
15	Output Channel 15	Green

3.2.3 Channel Status LED

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

3.2.4 Environment Specification

Environmental Specification	
Operation Temperature	-40°C ~ 70°C
UL Temperature	-20°C ~ 60°C
Storage Temperature	-40°C ~ 85°C
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	EN 61000-6-4: 2007 +A1: 2011
Industrial Immunity	EN 61000-6-2: 2005
Protection Class	Variable / IP20
Installation Position	Vertical and horizontal installation is possible
Product Certifications	CE, UL, EAC

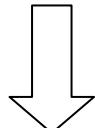
3.2.5 Specification

Items	Specification
Output Specification	
Output Per Module	16 Points Source Type
Indicators	16 Green Output Status
Output Voltage Range	Nominal 24Vdc 15Vdc ~ 30Vdc @ 70°C
ON-state Voltage Drop	0.3Vdc @ 25°C 0.5Vdc @ 70°C
ON-State Min. Current	Min. 1mA
OFF-State Leakage Current	Max. 5uA
Output Signal Delay	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.3ms
Output Current Rating	Max. 0.3A / Channel, Max. 3.6A Per Unit
Protection	Over-Current Limit: Min. 6.5A @ 25°C / Channel Thermal Shutdown: Min. 4A @ 25°C / Channel Short Circuit Protection
Common Type	16 points / 2 Common
General Specification	
Power Dissipation	Max. 50mA @ 5Vdc
Isolation	I/O to Logic: Photocoupler Isolation Field Power: Non-Isolation
UL field power	Supply voltage: 24Vdc nominal, Class 2
Field Power	Supply Voltage: 24Vdc nominal Voltage Range: 15 ~ 30Vdc Power Dissipation: 20mA @ 24Vdc
Wiring	Module connector: HIF3BA-20D-2.54R
Weight	52g
Module Size	12mm x 99mm x 70mm

3.2.6 Mapping Data into the Image Table

Output Image Value

Bit No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0	D7	D6	D5	D4	D3	D2	D1	D0
Byte1	D15	D14	D13	D12	D11	D10	D9	D8



Output Module Data

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

3.2.7 Parameter Data

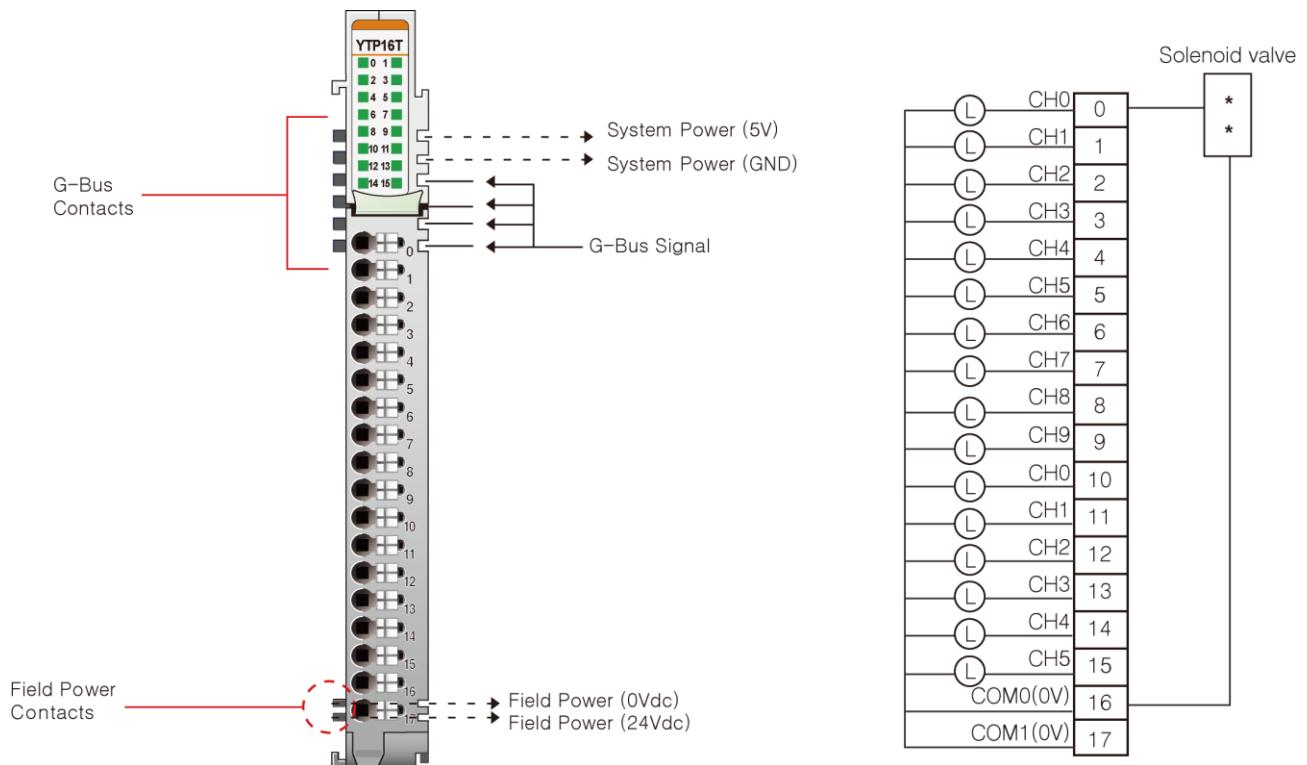
Valid Parameter length: 4 Bytes

Parameter Data

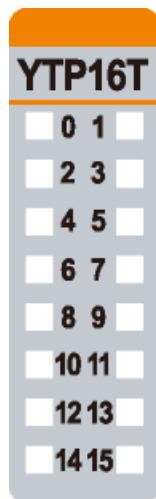
Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0		Fault Action (ch0 ~ ch7)		0: Fault value, 1: Hold last state				
Byte1		Fault Action (ch8 ~ ch15)		0: Fault value, 1: Hold last state				
Byte2			Fault value (ch0 ~ ch7)		0: Off, 1: On			
Byte3			Fault value (ch8 ~ ch15)		0: Off, 1: On			

3.3 RIO3-YTP16T

3.3.1 Wiring Diagram



3.3.2 LED Indicator



LED No.	LED Function / Description	LED Color
0	OUTPUT Channel 0	Green
1	OUTPUT Channel 1	Green
2	OUTPUT Channel 2	Green
3	OUTPUT Channel 3	Green
4	OUTPUT Channel 4	Green
5	OUTPUT Channel 5	Green
6	OUTPUT Channel 6	Green
7	OUTPUT Channel 7	Green
8	OUTPUT Channel 8	Green
9	OUTPUT Channel 9	Green
10	OUTPUT Channel 10	Green
11	OUTPUT Channel 11	Green
12	OUTPUT Channel 12	Green
13	OUTPUT Channel 13	Green
14	OUTPUT Channel 14	Green
15	OUTPUT Channel 15	Green

3.3.3 Channel Status LED

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

3.3.4 Environment Specification

Environmental specification	
Operation Temperature	-40°C ~ 70°C
UL Temperature	-20°C ~ 60°C
Non-Operating Temperature	-40°C ~ 85°C
Relative Humidity	5% to 95% 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	EN 61000-6-4: 2007 +A1: 2011
Industrial Immunity	EN 61000-6-2: 2005
Installation Position	Vertical and horizontal installation is possible.
Product Certifications	CE, UL, EAC

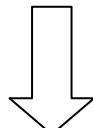
3.3.5 Specification

Items	Specification
Input Specification	
Output per module	16 Points Source type
Indicators	16 Green output state
Output Voltage Range	24Vdc Nominal Min. 15Vdc ~ Max. 32Vdc
ON-State Voltage Drop	0.3Vdc @ 25°C 0.5Vdc @ 70°C
ON-State Min. Current	Min. 1mA
OFF-State Leakage current	Max. 5uA
Output Signal Delay	OFF to ON: 0.3ms maximum ON to OFF: 0.3ms maximum
Output Current Rating	Max. 0.3A per channel / Max. 4.8A per unit
Protection	Over Current Limit: Min 6.5A @ 25°C per channel Thermal Shutdown: Min 4A @ 25°C per channel Short Circuit Protection
COMMON Type	16 points / 2 COM
General specification	
Power dissipation	Max. 50mA @ 5Vdc
Isolation	I/O to Logic: Photocoupler isolation Field power: non-isolation
UL field power	Supply voltage: 24Vdc nominal, Class 2
Field Power	Supply voltage: 24Vdc nominal Voltage range: 15 ~ 30Vdc Power dissipation: 40mA @ 24Vdc
Wiring	I/O Cable Max. 0.75mm ² (AWG 18)
Weight	63g
Module Size	12mm x 109mm x 70mm

3.3.6 Mapping Data into the Image Table

Output Image Value

Bit No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0
Byte 1	D15	D14	D13	D12	D11	D10	D9	D8



Output Module Data

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

3.3.7 Parameter Data

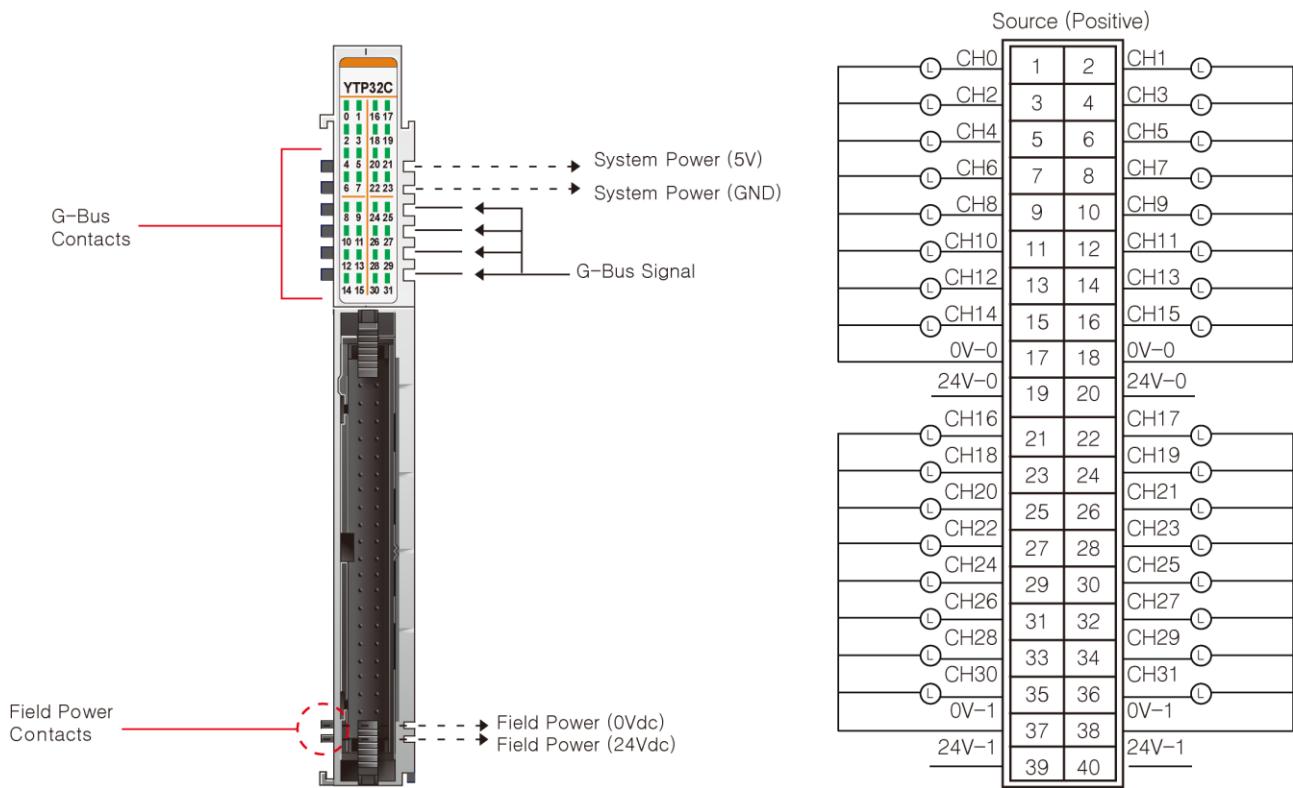
Valid Parameter length: 4 Bytes

Parameter Data

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Fault Action (ch0 ~ ch7)			0: Fault value, 1: Hold last state				
Byte 1	Fault Action (ch8 ~ ch15)			0: Fault value, 1: Hold last state				
Byte 2	Fault Value (ch0 ~ ch7)				0: Off, 1: On			
Byte 3	Fault Value (ch8 ~ ch15)				0: Off, 1: On			

3.4 RIO3-YTP32C

3.4.1 Wiring Diagram



Pin No.	Signal Description	Signal Description	Pin No.
0	Output Channel 0	Output Channel 1	1
2	Output Channel 2	Output Channel 3	3
4	Output Channel 4	Output Channel 5	5
6	Output Channel 6	Output Channel 7	7
8	Output Channel 8	Output Channel 9	9
10	Output Channel 10	Output Channel 11	11
12	Output Channel 12	Output Channel 13	13
14	Output Channel 14	Output Channel 15	15
16	Common (Field Power 0V)	Common (Field Power 0V)	17
18	Common (Field Power 24V)	Common (Field Power 24V)	19
20	Output Channel 16	Output Channel 17	21
22	Output Channel 18	Output Channel 19	23
24	Output Channel 20	Output Channel 21	25
26	Output Channel 22	Output Channel 23	27
28	Output Channel 24	Output Channel 25	29

30	Output Channel 26	Output Channel 27	31
32	Output Channel 28	Output Channel 29	33
34	Output Channel 30	Output Channel 31	35
36	Common (Field Power 0V)	Common (Field Power 0V)	37
38	Common (Field Power 24V)	Common (Field Power 24V)	39

3.4.2 LED Indicator



LED No.	LED Function / Description	LED Color
0	Output Channel 0	Green
1	Output Channel 1	Green
2	Output Channel 2	Green
...
31	Output Channel 31	Green

3.4.3 Channel Status LED

Status	LED	To indicate
Off Signal	Off	No output Signal
On Signal	Green	Normal Operation

3.4.4 Environment Specification

Environmental Specification	
Operation Temperature	-40°C ~ 60°C
UL Temperature	-20°C ~ 60°C
Storage Temperature	-40°C ~ 85°C
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	EN 61000-6-2: 2005
Installation Position	Vertical and horizontal installation is possible
Product Certifications	CE, UL, EAC

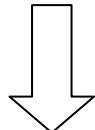
3.4.5 Specification

Items	Specification
Output Specification	
Output Per Module	32 Points Source type
Indicators	32 Green Output Status
Output Voltage Range	24Vdc nominal 15Vdc ~ 30Vdc @ 60°C
ON-state Voltage Drop	0.3Vdc @ 25°C 0.5Vdc @ 60°C
ON-State Min. Current	Min. 1mA
OFF-State Leakage Current	Max. 5uA
Output Signal Delay	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.5ms
Output Current Rating	Max. 0.3A / Channel, Max. 6.0A Per Unit
Protection	Over Current Limit: Min. 6.5A @ 25°C per channel Thermal Shutdown: Min. 4A @ 25°C per channel Short Circuit Protection
Common Type	32 points / 8 Common
General Specification	
Power Dissipation	Max. 65mA @ 5Vdc
Isolation	I/O to Logic : Photocoupler Isolation Field Power : Non-Isolation
UL field power	Supply voltage: 24Vdc nominal, Class 2
Field Power	Supply Voltage: 24Vdc nominal Voltage Range: 15 ~ 30Vdc Power Dissipation: 30mA @ 24Vdc
Wiring	Module Connector: HIF3BA-40D-2.54R
Weight	63g
Module Size	12mm x 109mm x 70mm

3.4.6 Mapping Data into the Image Table

Output Image Value

Bit No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0
Byte 1	D15	D14	D13	D12	D11	D10	D9	D8
Byte 2	D23	D22	D21	D20	D19	D18	D17	D16
Byte 3	D31	D30	D29	D28	D27	D26	D25	D24



Output Module data

D7	D6	D5	D4	D3	D2	D1	D0
D15	D14	D13	D12	D11	D10	D9	D8
D23	D22	D21	D20	D19	D18	D17	D16
D31	D30	D29	D28	D27	D26	D25	D24

3.4.7 Parameter Data

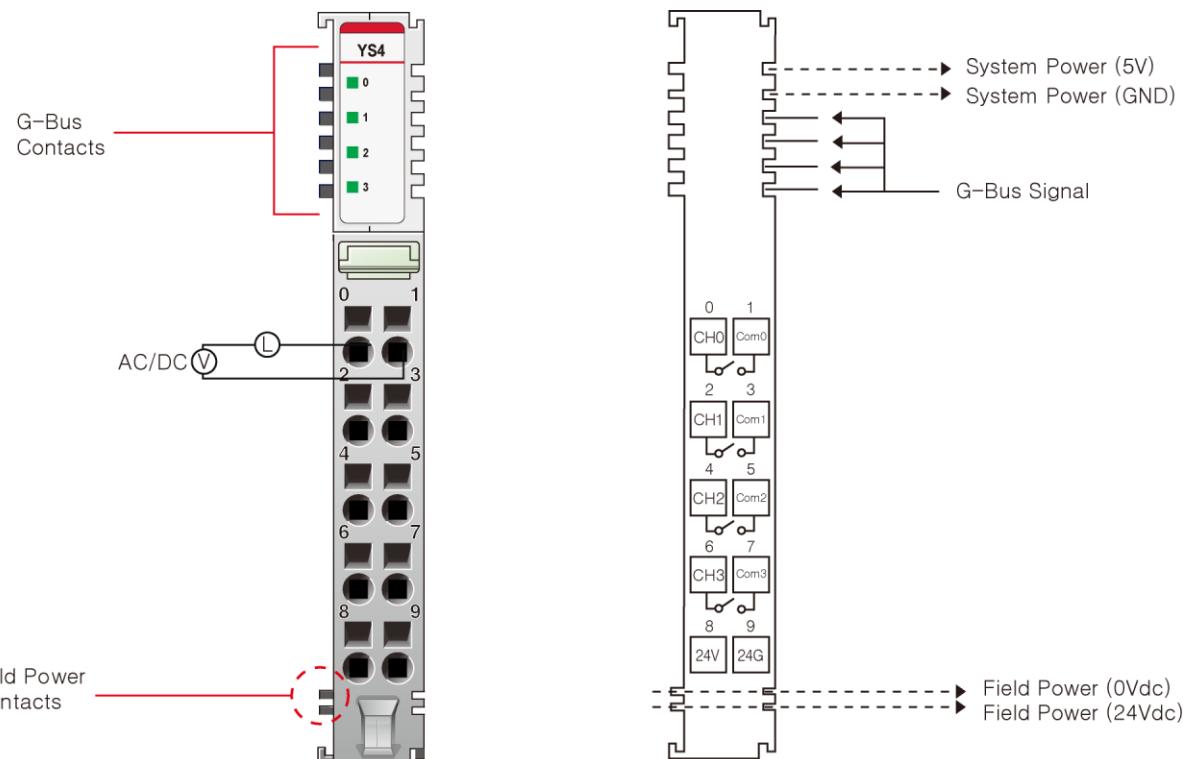
Valid Parameter Length: 8 Bytes

Parameter Data

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0				Fault Action (ch0 ~ ch7)	0: Fault value, 1: Hold last state			
Byte 1				Fault Action (ch8 ~ ch15)	0: Fault value, 1: Hold last state			
Byte 2				Fault Action (ch16 ~ ch23)	0: Fault value, 1: Hold last state			
Byte 3				Fault Action (ch24 ~ ch31)	0: Fault value, 1: Hold last state			
Byte 4				Fault Value (ch0 ~ ch7)	0: Off, 1: On			
Byte 5				Fault Value (ch8 ~ ch15)	0: Off, 1: On			
Byte 6				Fault Value (ch16 ~ ch23)	0: Off, 1: On			
Byte 7				Fault Value (ch24 ~ ch31)	0: Off, 1: On			

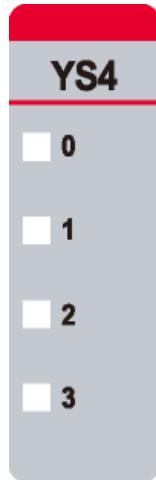
3.5 RIO3-YS4

3.5.1 Wiring Diagram



Pin No.	Signal Description	Signal Description	Pin No.
0	Output Channel 0	COM 0	1
2	Output Channel 1	COM 1	3
4	Output Channel 2	COM 2	5
6	Output Channel 3	COM 3	7
8	Common (Field Power 24V)	Common (Field Power 0V)	9

3.5.2 LED Indicator



LED No.	LED Function / Description	LED Color
0	Output Channel 0	Green
1	Output Channel 1	Green
2	Output Channel 2	Green
3	Output Channel 3	Green

3.5.3 Channel Status LED

Status	LED	To indicate
No Signal	Off	No output Signal
On Signal	Green	Normal Operation

3.5.4 Environment Specification

Environmental Specification	
Operation Temperature	-40°C ~ 70°C
UL Temperature	-20°C ~ 60°C
Storage Temperature	-40°C ~ 85°C
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	EN 61000-6-2: 2005
Installation Position	Vertical and horizontal installation is possible
Product Certifications	CE, UL, EAC

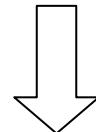
3.5.5 Specification

Items	Specification
Output Specification	
Output Per Module	4 Points Bi-directional
Indicators	4 Green Output Status LEDs
Relay Type	MOS Relay (Solid State Relay)
Output Voltage Range (Load Dependent)	Max. 240Vac @ 0.5A resistive Max. 240Vdc @ 0.5A resistive
Output Delay Time (Resistive Load)	Max. 240Vac / 240Vdc OFF to ON: Max. 0.6ms ON to OFF: Max. 3ms
Output Current Rating	Max. 0.5A / Channel
Frequency Range (Vac)	47 ~ 63Hz
Common Type	4 points / 2 Common
General Specification	
Power Dissipation	80mA @ 5Vdc
Isolation	I/O to Logic: Photocoupler Isolation
UL field power	Supply Voltage: 24Vdc nominal, Class 2
Field Power	Supply Voltage: 24Vdc nominal Voltage Range: 15 ~ 30Vdc (AC Power not used)
Wiring	I/O Cable Max. 2.0mm ² (AWG 14)
Torque	0.8Nm (7 lb-in)
Weight	58g
Module Size	12mm x 99mm x 70mm

3.5.6 Mapping Data into the Image Table

Output Image Value

Bit No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0	Reserved				D3	D2	D1	D0



Output Module data

D3	D2	D1	D0
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3.5.7 Parameter Data

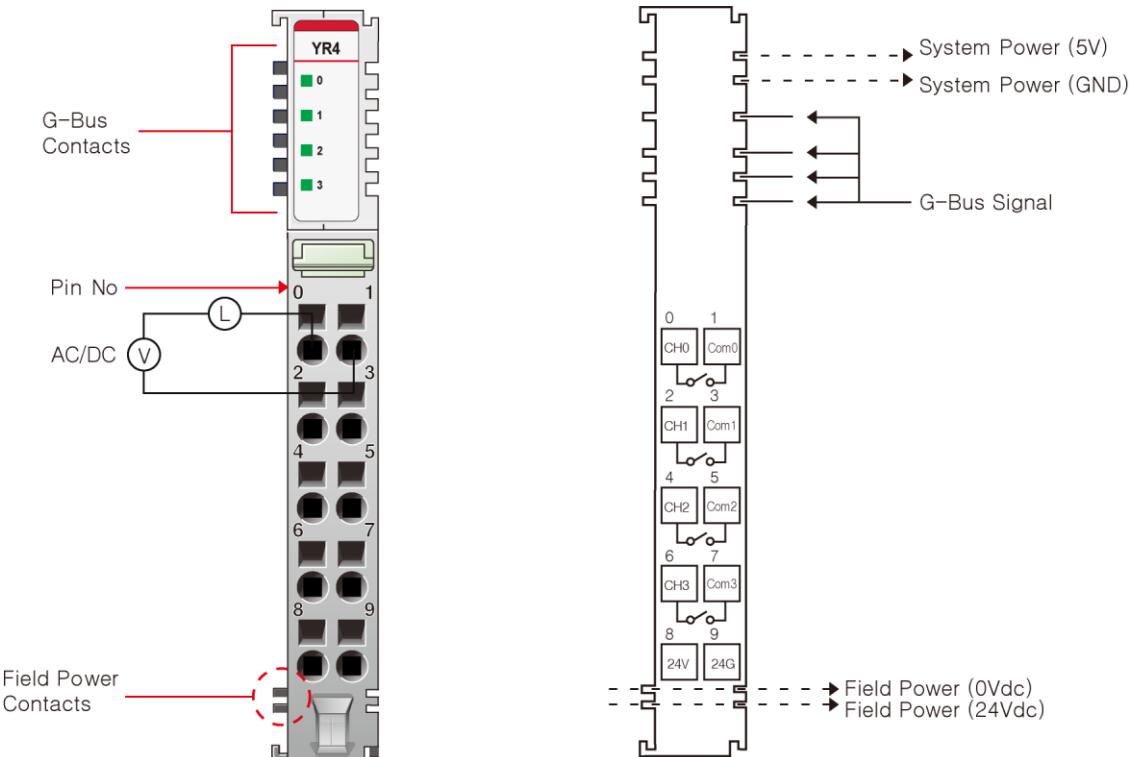
Valid Parameter Length: 2 Bytes

Parameter Data

Offset	Decimal Bit	Description	Default Value
Byte 0	00-03	Fault Action (0~3) 0: Fault value, 1: Hold last state	0 (Fault value)
Byte 1	00-03	Fault value (0~3) 0: Off, 1: On	0 (Off)

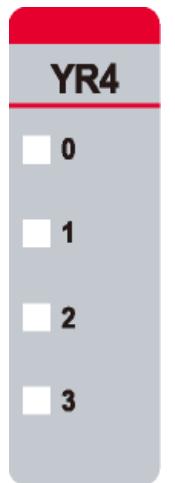
3.6 RIO3-YR4

3.6.1 Wiring Diagram



Pin No.	Signal Description	Signal Description	Pin No.
0	Output Channel 0	COM 0	1
2	Output Channel 1	COM 1	3
4	Output Channel 2	COM 2	5
6	Output Channel 3	COM 3	7
8	Common (Field Power 24V)	Common (Field Power 0V)	9

3.6.2 LED Indicator



LED No.	LED Function / Description	LED Color
0	Output Channel 0	Green
1	Output Channel 1	Green
2	Output Channel 2	Green
3	Output Channel 3	Green

3.6.3 Channel Status LED

Status	LED	To indicate
No Signal	Off	No output Signal
On Signal	Green	Normal Operation

3.6.4 Environment Specification

Environmental Specification	
Operation Temperature	-40°C ~ 60°C
UL Temperature	-20°C ~ 60°C
Storage Temperature	-40°C ~ 85°C
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: 2016/6 Vibration Class B, 4g
Industrial Emissions	EN 61000-6-4: 2007 +A1: 2011
Industrial Immunity	EN 61000-6-2: 2005
Installation Position	Vertical and horizontal installation is possible
Product Certifications	CE, UL, EAC

3.6.5 Specification

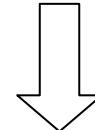
Items	Specification
Output Specification	
Output Per Module	4 Points Bi-directional
Indicators	4 Green Output Status LEDs
Relay Type	Form A, Single Pole Single Throw (SPST)
Output Voltage Range (Load Dependent)	0~32Vdc @ 2A resistive 48Vdc @ 0.8A resistive 110Vdc @ 0.5A resistive Max. 240Vac @ 2A resistive
Output Delay Time (Resistive Load)	OFF to ON: Max. 5ms @ 24Vdc ON to OFF: Max. 8ms @ 24Vdc OFF to ON: Max. 5ms @ 220Vac ON to OFF: Max. 15ms @ 220Vac
Output Current Rating (At Rated Power)	2.0A @ 0~32Vdc 0.8A @ 48Vdc 0.5A @ 110Vdc 2.0A @ 240Vac -40°C ~ 70°C (2A Load 2ch) -40°C ~ 60°C (2A Load 4ch)
Expected Contact Life	20M Cycles (Resistive)
Max. On-State Voltage Drop	0.5V @ 2A, Resistive Load, 24Vdc
Frequency Range(Vac)	47 ~ 63Hz
Common Type	4 points / 2 COM
General Specification	
Power Dissipation	Max. 35mA @ 5Vdc
Isolation	I/O to Logic: Photocoupler Isolation Field Power: Non-Isolation
Field Power	Supply Voltage: 24Vdc nominal Voltage Range: 22 ~ 26Vdc Power dissipation: 30mA @ 24Vdc (AC Power not used)
Wiring	I/O Cable Max. 2.0mm ² (AWG 14)
Weight	58g
Module Size	12mm x 99mm x 70mm

* Voltage Drop specification is dependent on the cable length due to the high load.

3.6.6 Mapping Data into the Image Table

Output Image Value

Bit No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0		Reserved			D3	D2	D1	D0



Output Module data

D3	D2	D1	D0
----	----	----	----

3.6.7 Parameter Data

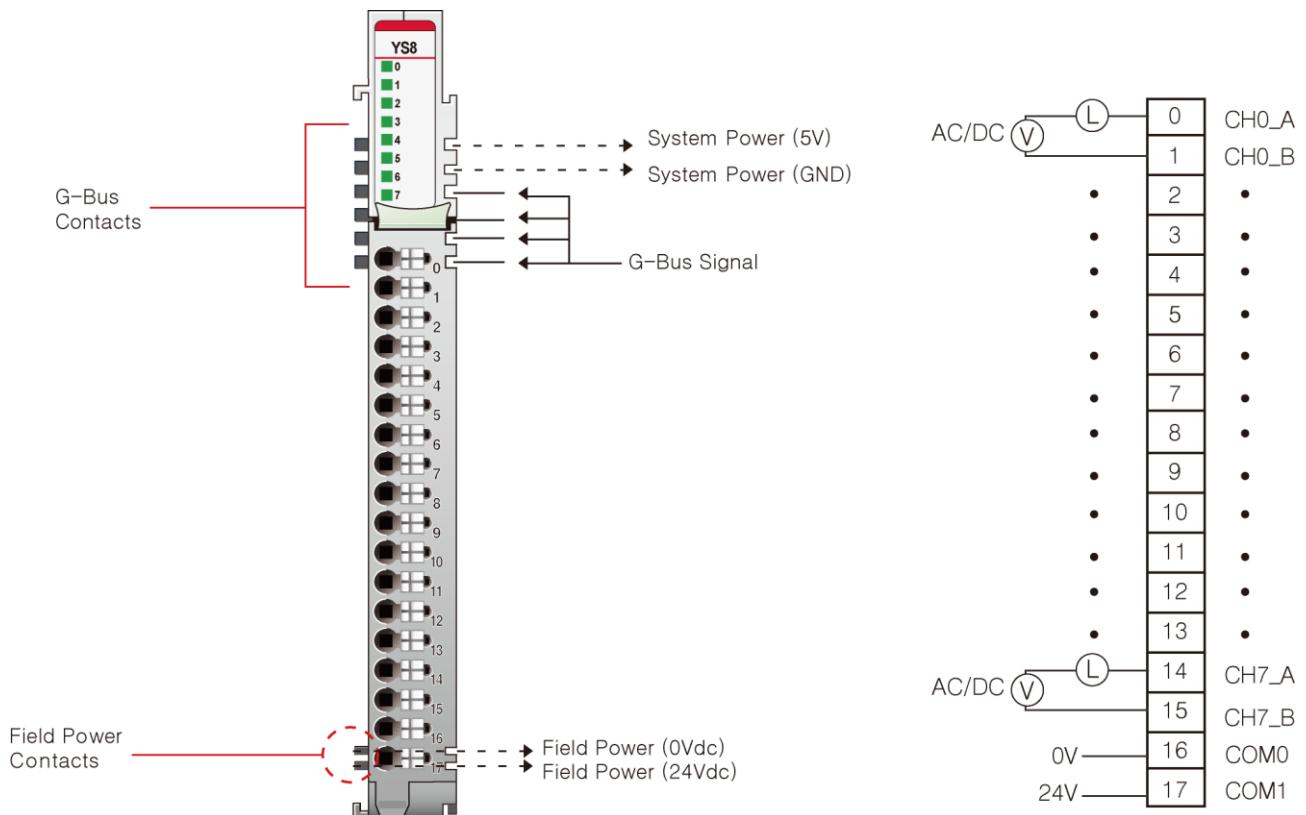
Valid Parameter Length: 2 Bytes

Parameter Data

Offset	Decimal Bit	Description	Default Value
Byte 0	00-03	Fault Action (0 ~ 3) 0: Fault value, 1: Hold last state	0 (Fault value)
Byte 1	00-03	Fault value (0~3) 0: Off, 1: On	0 (Off)

3.7 RIO3-YS8

3.7.1 Wiring Diagram



3.7.2 LED Indicator

YS8	LED No.	LED Function / Description	LED Color
<input type="checkbox"/> 0	0	Output Channel 0	Green
<input type="checkbox"/> 1	1	Output Channel 1	Green
<input type="checkbox"/> 2	2	Output Channel 2	Green
<input type="checkbox"/> 3	3	Output Channel 3	Green
<input type="checkbox"/> 4	4	Output Channel 4	Green
<input type="checkbox"/> 5	5	Output Channel 5	Green
<input type="checkbox"/> 6	6	Output Channel 6	Green
<input type="checkbox"/> 7	7	Output Channel 7	Green

3.7.3 Channel Status LED

Status	LED	To indicate
No Signal	Off	No Output Signal
On Signal	Green	Normal Operation

3.7.4 Environment Specification

Environmental Specification	
Operation Temperature	-40°C ~ 60°C
UL Temperature	-20°C ~ 60°C
Storage Temperature	-40°C ~ 85°C
Relative Humidity	5% ~ 90% Non-condensing
Mounting	DIN Rail
General Specification	
Shock Operating	IEC 60068-2-27: 2008/15g, 11ms
Vibration Resistance	Based on IEC 60068-2-6 DNVGL-CG-0039: 2016/6 Vibration Class B, 4g
Industrial Emissions	EN61000-6-4: 2007 +A1: 2011
Industrial Immunity	EN 61000-6-2: 2005
Installation Position	Vertical and horizontal installation is possible
Product Certifications	CE, UL, EAC

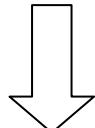
3.7.5 Specification

Items	Specification
Output Specification	
Output Per Module	8 points bi-directional
Indicators	8 Green Output State
Relay type	MOS Relay (solid state relay)
Output Voltage Range (load dependent)	240Vac @ 0.5A resistive 240Vdc @ 0.5A resistive
Output delay time (resistive load)	Max. AC/DC : 240V OFF to ON: Max. 0.5ms ON to OFF: Max. 2.5ms
Output current rating	Max. 0.5A per channel
Frequency range (Vac)	47 ~ 63Hz
Open-state leakage current	Max. 40uA
Common Type	8 points / 2 COM
General Specification	
Power Dissipation	Max. 130mA @ 5Vdc
Isolation	I/O to Logic: Photocoupler Isolation
UL field power	Supply voltage: 24Vdc nominal, Class 2
Field Power	Supply Voltage: 24Vdc nominal Voltage Range: 15 ~ 30Vdc (AC Power Not Used)
Wiring	I/O Cable Max. 0.75mm ² (AWG 18)
Weight	63g
Module Size	12mm x 109mm x 70mm

3.7.6 Mapping Data into the Image Table

Output Image Value

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0



Output Module data

D7	D6	D5	D4	D3	D2	D1	D0
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3.7.7 Parameter Data

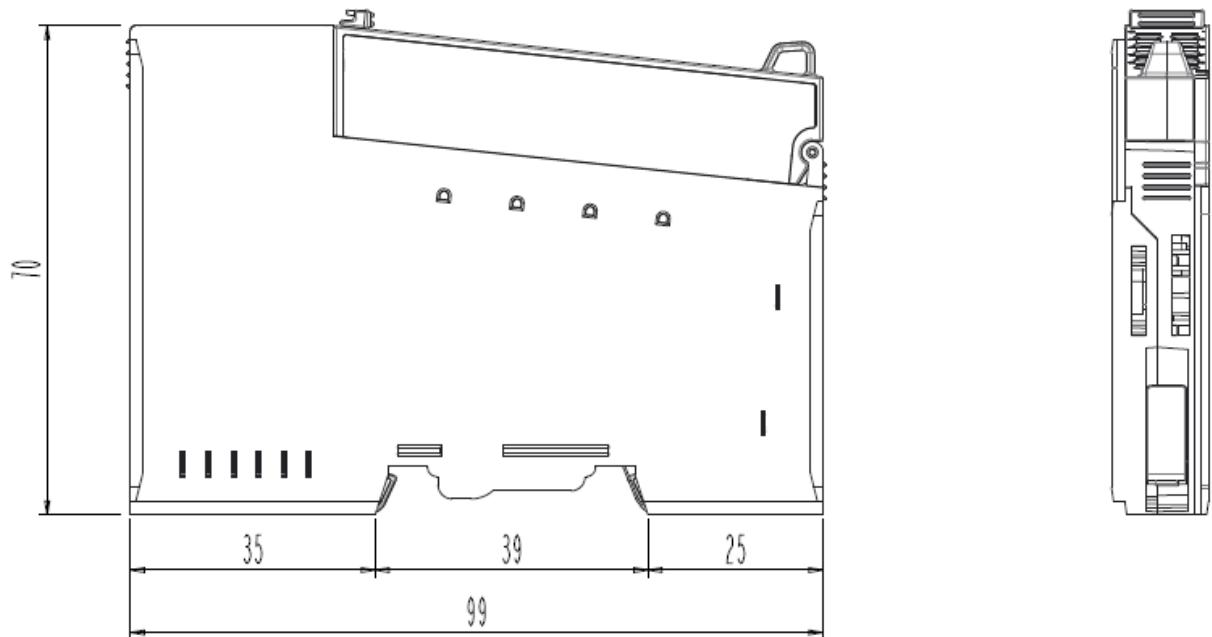
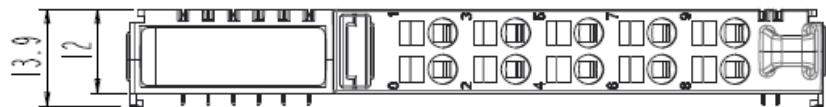
Valid Parameter Length: 2 Bytes

Parameter Data

Offset	Decimal Bit	Description	Default Value
0	00-07	Fault Action (0~7) 0: Fault Value, 1: Hold last state	0 (Fault Value)
1	00-07	Fault Value (0~7): off, 1: on	0 (off)

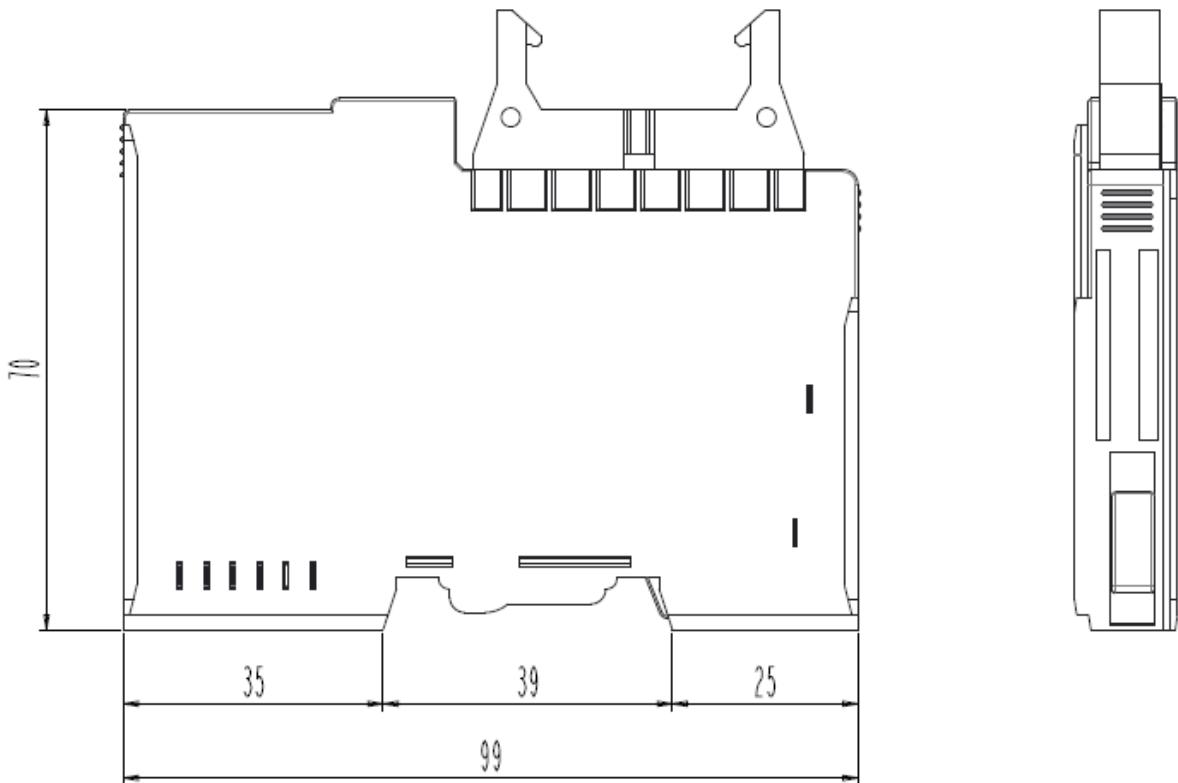
4 Dimension

4.1 10-Pts. Spring Type



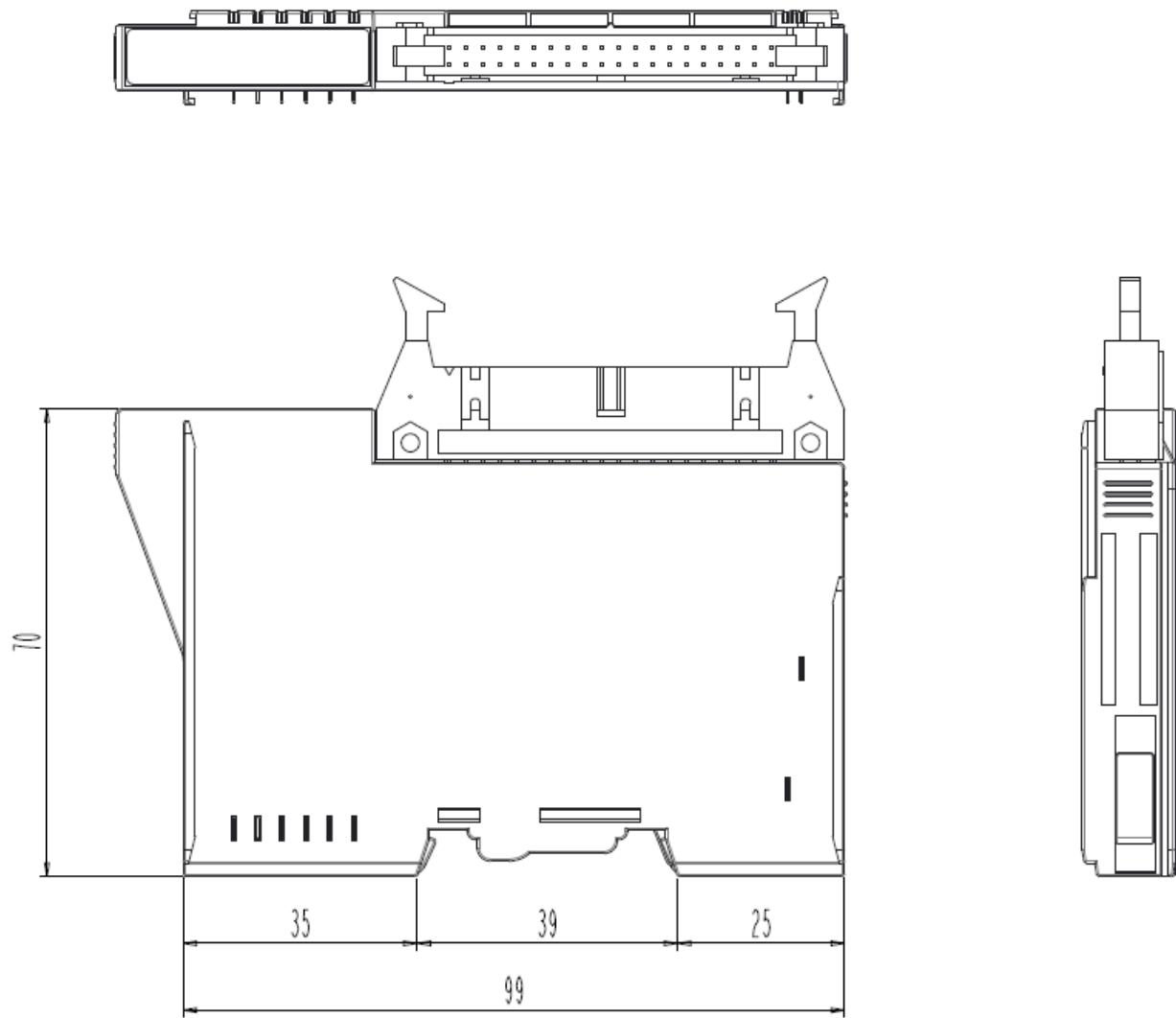
Dimensions in mm

4.2 20-Pin Connector Type



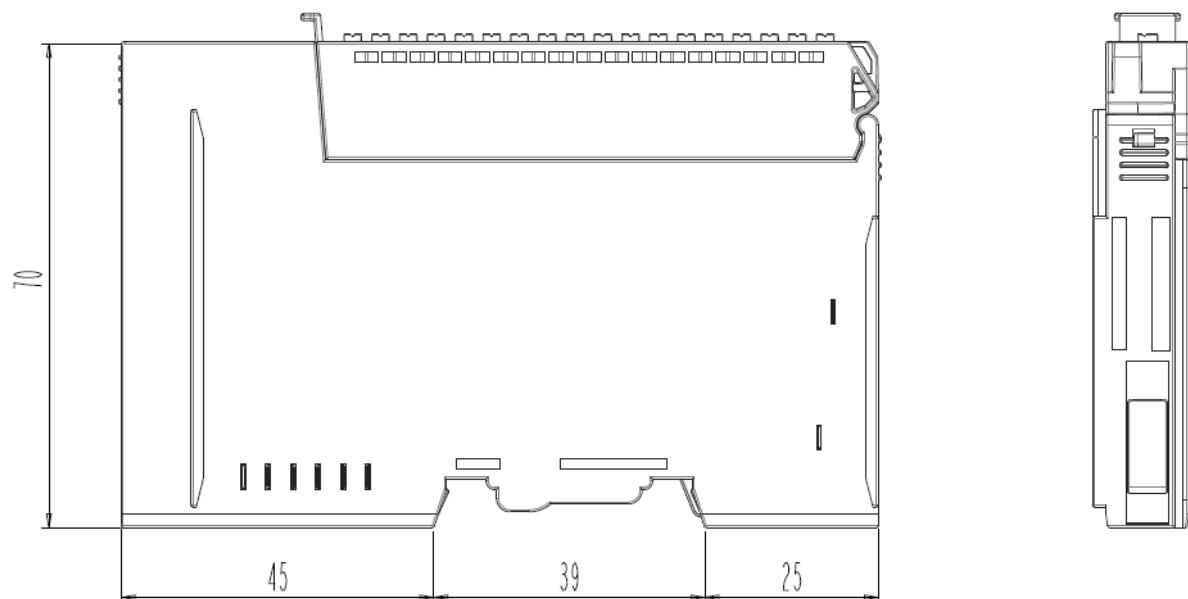
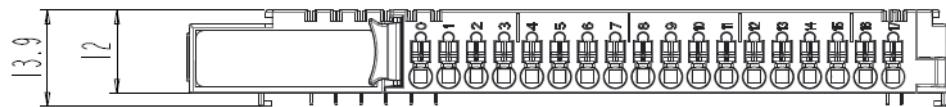
Dimensions in mm

4.3 40-Pin Connector Type



Dimensions in mm

4.4 18-Pts. Spring Type



Dimensions in mm

5 Mounting

Caution!

Hot surface!

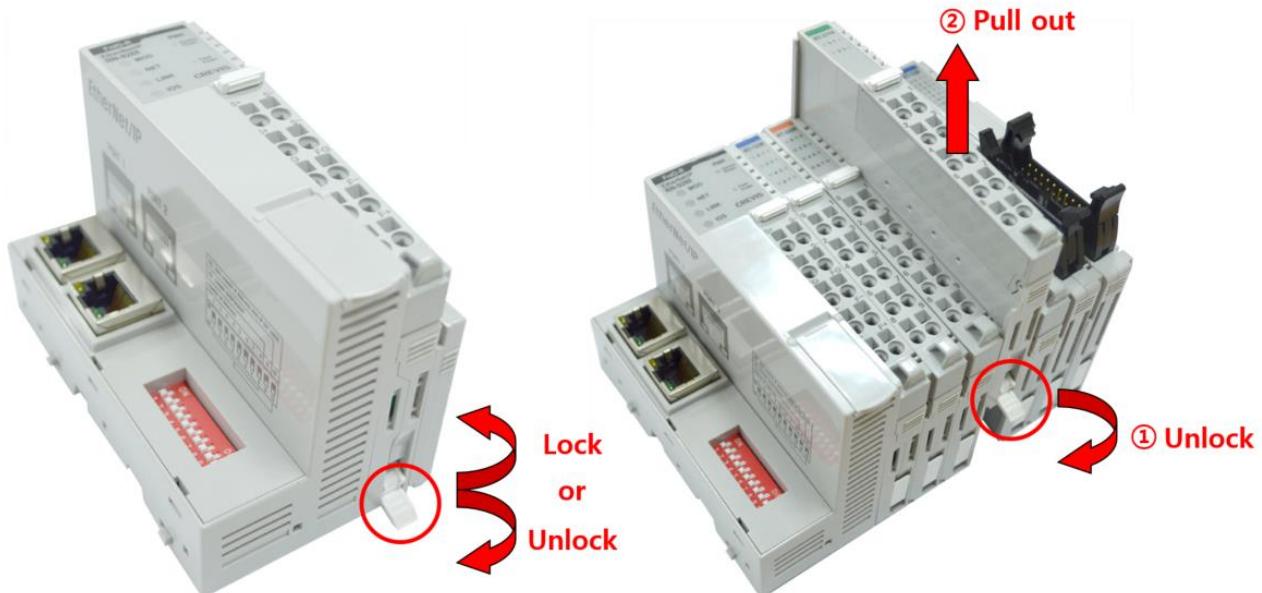
The surface of the housing can become hot during operation. If the device was operated at high ambient temperatures, allow it to be cool before touching it.

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.

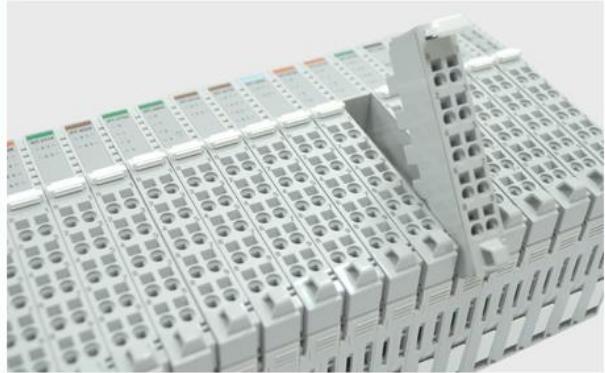
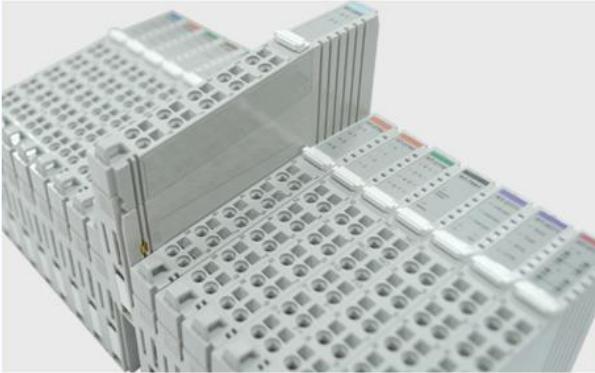
5.1 I/O Inserting and Removing Devices



As above figure in order to safeguard the RIO3-Series 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 HX-RIO3-Series module, unfold the locking lever as below figure.

5.2 RTB (Removable Terminal Block)



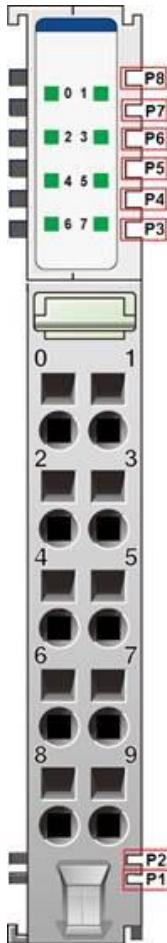
Whole terminal block can be combined and removed for the convenience.

There is a locking switch on the RTB for the easy combination and easy removal.

Easy combination and easy removal for I/O 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

No.	RIO3-Number	Description	ID (hex)
Digital Input Module			
01	RIO3-XDP8	8 Points, Universal, 24Vdc, 10RTB	1238
02	RIO3-XDP16C	16 Points, Universal, 24Vdc, 20P connector	123F
03	RIO3-XDP16T	16 Points, Universal, 24Vdc, 18RTB	12DF
04	RIO3-XDP32C	32 Points, Universal, 24Vdc, 40P connector	12FA
05	RIO3-XY16T	8 Sink Input / 8 Source Output with Diagnostic, 24Vdc	1428
06	RIO3-XAH4	4 Points, 240Vac, 10RTB	1904
Digital Output Module			
07	RIO3-YTP8	8 Points, Source, 24Vdc/0.5A, 10RTB	2328
08	RIO3-YTP16C	16 Points, Source, 24Vdc/0.3A, 20P connector	222F
09	RIO3-YTP16T	16 Points, Source, 24Vdc/0.3A, 18RTB	226F
10	RIO3-YTP32C	32 Points, Source, 24Vdc/0.3A, 40P connector	22CA
11	RIO3-YS4	4 Points, MOS Relay, 240Vdc/ac, 0.5A, 10RTB	2734
12	RIO3-YS8	8 Points, MOS Relay Output Terminal, 240Vdc, 0.5A	2738
13	RIO3-YR4	4 Points, Relay, 24Vdc/2A, 240Vac/2A, 10RTB	2744
Analog Input Module			
14	RIO3-LDC2	2ch load cell input unit, strain gauge	3002
15	RIO3-AX4I	4 Channels, 0~20, 4~20mA, 12bits, 10RTB	3114
16	RIO3-AXH4I	4 Channels, 0~20, 4~20mA, 16bits, 10RTB	3154
17	RIO3-AX8I	8 Channels, 0~20, 4~20mA, 12bits, 10RTB	3118
18	RIO3-AXH8I	8 Channels, 0~20, 4~20mA, 16bits, 10RTB	3158
19	RIO3-AX16IC	16 Channels, 0~20, 4~20mA, 12bits, 20P connector	311F
20	RIO3-AX16IT	16 Channels, 0~20, 4~20mA, 12bits, 18RTB	317F
21	RIO3-AX4V	4 Channels, 0~10, 0~5, 1~5Vdc, 12bits, 10RTB	3424
22	RIO3-AXH4V	4 Channels, 0~10, 0~5, 1~5Vdc, 16bits, 10RTB	3464
23	RIO3-AX8V	8 Channels, 0~10, 0~5, 1~5Vdc, 12bits, 10RTB	3428
24	RIO3-AXH8V	8 Channels, 0~10, 0~5, 1~5Vdc, 16bits, 10RTB	3468
25	RIO3-AX16VC	16 Channels, 0~10, 0~5, 1~5Vdc, 12bits, 20P connector	342F
26	RIO3-AX16VT	16 Channels, 0~10, 0~5, 1~5Vdc, 12bits, 18RTB	347F
27	RIO3-RTD4T	4 Channels, RTD, 10RTB	3704
28	RIO3-RTD8C	8 Channels, RTD, 20P connector	3708
29	RIO3-TC4T	4 Channels, Thermocouple, 10RTB	3804
30	RIO3-E3AC	AC Measurement	3901
Analog Output Module			
31	RIO3-AY4I	4 Channels, Current Output, 4~20mA, 12bits	4214
32	RIO3-AYH4I	4 Channels, Current Output, 4~20mA, 16bits	4254

33	RIO3-AY8I	8 CHANNELS CURRENT OUTPUT, 4~20mA, 12BIT	4218
34	RIO3-AY4V	4CH, 0~10Vdc, 12Bits, 10RTB	4424
35	RIO3-AYH4V	4CH, 0~10Vdc, 16Bits, 10RTB	4464
36	RIO3-AY8V	8CH, 0~10Vdc, 12Bits, 10RTB	4428
37	RIO3-AY16VC	16CH, 0~10Vdc, 12Bits, 20P Connector	442F
38	RIO3-AY16VT	16CH, 0~10Vdc, 12Bits, 18RTB	447F
Special Module			
39	RIO3-CU24L	High Speed Counter, 2CHs, 24Vdc, Encoder Input, 10RTB	
40	RIO3-RS232	1CH, RS 232, RTS/CTS, Full Duplex Type, 10RTB	5211
41	RIO3-RS485	1CH, RS 485, Half Full Duplex Type, 10RTB	5231
42	RIO3-PWM2	PWM Output, 2CHs, 0.5A/24Vdc, Source, 18RTB	5442
43	RIO3-PO2	Pulse Output, 2CHs, 0.5A/24Vdc, Source, 18RTB	5642
Power Module			
44	RIO3-SHD	Shield Module	7408
45	RIO3-0VDC	Common for 0Vdc	7508
46	RIO3-PSD	Power Expansion, In 24Vdc, Out 1A/5Vdc	7511
47	RIO3-24VDC	Common for 24Vdc	7518
48	RIO3-VDC	Common for 0Vdc, 24Vdc	7588
49	RIO3-PS	Field Power, 5/24/48 Vdc, 110/220 Vac	7641

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.