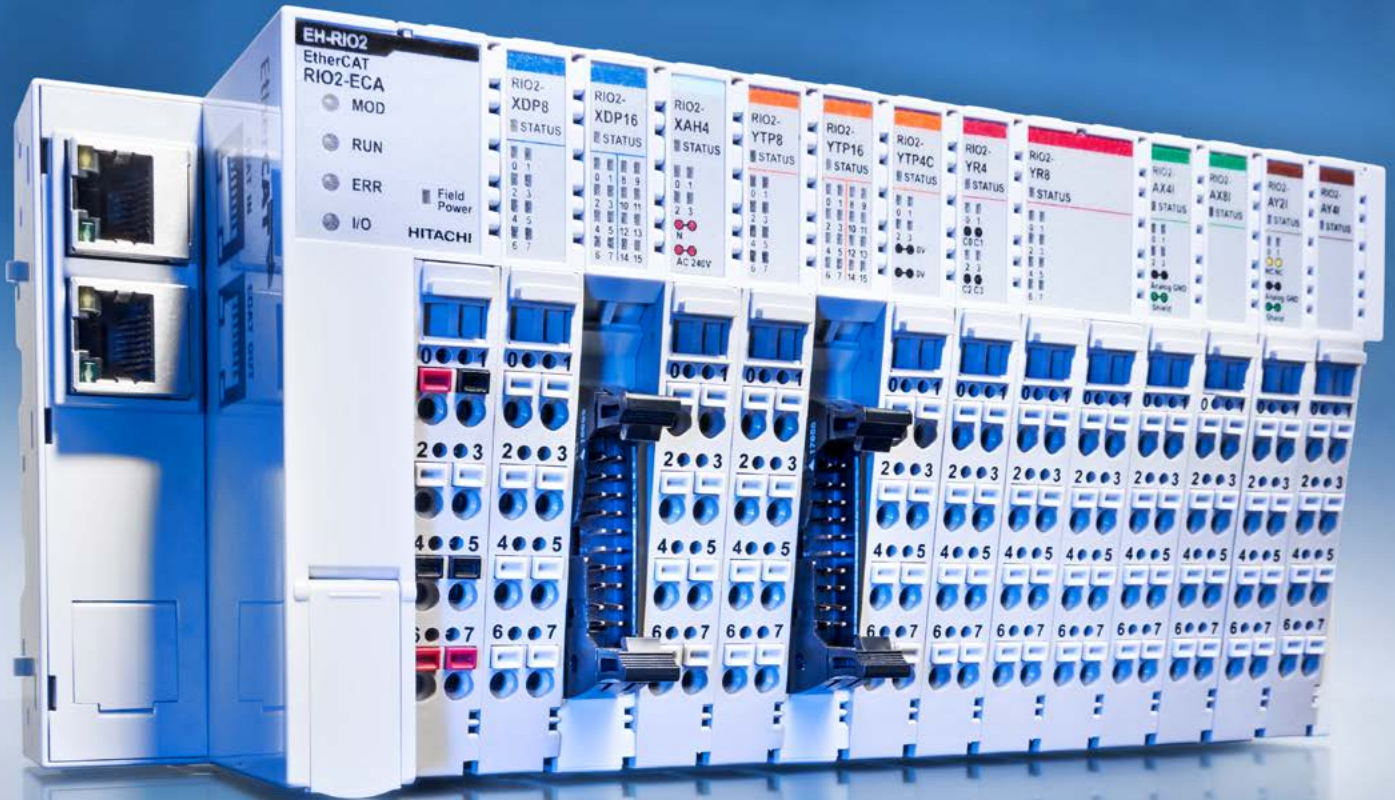


# Remote I/O Modules EH-RIO2 Series

# HITACHI

Inspire the Next



EtherCAT

PROFI  
BUS

PROFI  
NET

Modbus

DeviceNet

- Fieldbus adapter: ProfiNET, EtherCAT, Modbus TCP/RTU, Profibus-DP, DeviceNet
- Separation of electronics module and terminal block for easy installation and maintenance
- Spring clamp terminals on connection wiring
- Large selection of I/O Modules
- Super slim design 16 I/O = 12 mm
- Standard DIN rail mounting

Automation Solutions by Hitachi

# Flexible design, highly modular, user-friendly handling.

The EH-RIO2 series of Remote I/O modules allows you the flexibility to distribute I/O throughout your application. Using EH-RIO2, you can precisely plan and expand your I/O and locate them right where they are needed: close to the sensors and actors. A proximity which pays back: By mounting I/Os in a junction box directly on or near the machine, you minimize wiring and eliminate the need for further control and cabinets. This solution benefits today's modular production processes and is especially advantageous when upgrading centralized automation systems.



## Design Concept

Each I/O assembly consists of the following two components:

1. The I/O modules convert field device signals to control status indicators. The LEDs indicate module-, network-, power-, and calibration status as well as I/O point status (ON/OFF/Error or diagnostic). The I/O modules also provide the locations for the removable terminal blocks and forms the interconnection for the FnBus communication and the field power distribution.
2. The Removable Terminal Block provides 8 separate terminal locations for your field wiring. High density modules (16DI/DO) and certain special function modules are equipped with a 20-pole socket which require the commercially available 20-pole connector.



## Mounting

The I/O modules are mounted on a standard DIN rail, providing easy installation by vertically inserting the modules, without using any additional tools. The modules can either be mounted separately or as a complete, pre-mounted system. Up to 63 I/O modules can be inserted in one fieldbus slave station.



## Easy Maintenance

Thanks to the incorporated unlock latch, it is possible to remove and replace individual I/O modules without reassembling the complete EH-RIO2 station. EH-RIO2 modules incorporate test pin holes for each terminal on the removable terminal block. The test pin hole allows to check the input or output value by a multimeter. This feature makes troubleshooting much easier.



## Ease of use

The I/O Modules are equipped by default with the removable terminal block, so the module can be used out-of-the-box without the need of additional accessories. The removable terminal block can be removed easily, without having to remove the wiring or interfering with system communication.

## Fieldbus Modules

Fieldbus Modules	RIO2-ECA EtherCAT Adapter	RIO2-DNA DeviceNet Adapter	RIO2-PNA Profinet Adapter	RIO2-PBA Profibus-DP Adapter	RIO2-MBT Modbus TCP Ethernet Adapter	RIO2-MBR Modbus RTU RS-485 Adapter
Expansion I/O Capacity	63 modules	32 modules			63 modules	32 modules
Maximum Input Size	252 bytes			128 bytes	252 bytes	
Maximum Output Size	252 bytes			128 bytes	252 bytes	
Communication Rate	100 Mbps	125 Kbps (500 m max.) 250 Kbps (250 m max.) 500 Kbps (100 m max.)	100 Mbps Full-Duplex	9.6 K to 12 Mbps (Auto baudrate selection)	10/100 Mbps, Auto-negotiation, full duplex	1200 to 115200 bps
Maximum Nodes	65535 nodes	64 nodes	Limited by IP address	100 nodes	Limited by Ethernet specification	64 nodes
Indicators	5 status indicators ■ Module Status (MOD) ■ Current Running Status (RUN) ■ Error Status (ERR) ■ Expansion I/O Module Status (I/O) ■ Field Power Status (24 V from field supply)	4 status indicators ■ Module Status (MOD) ■ Network Status (NET) ■ Expansion I/O Module Status (I/O) ■ Field Power Status (24 V from field supply)	6 status indicators ■ Module Status (MOD) ■ Network Status (NET) ■ Expansion I/O Module Status (I/O) ■ Port1 Link / Active Status Indicator (PORT1) ■ Port2 Link / Active Status Indicator (PORT2) ■ Field Power Status (24 V from field supply)	4 status indicators ■ Module Status (MOD) ■ Network Status (NET) ■ Expansion I/O Module Status (I/O) ■ Field Power Status (24 V from field supply)	5 status indicators ■ Module Status (MOD) ■ Physical Connection (LINK) ■ Exchange Data/ Traffic Present (ACTIVE) ■ Expansion Module Status (IOS) ■ Field Power Status (24 V from field supply)	5 status indicators ■ Module Status (MOD) ■ Received Data (RXD) ■ Transmit Data (TXD) ■ Expansion Module Status (I/O) ■ Field Power Status (24 V from field supply)
Power Requirements	24VDC					
Protection	Output Current Limit (min. 1.5A)					
Current for I/O Module	1.5A at 5VDC	1.2A at 5VDC	1.5A at 5VDC			
Dimensions (H x W x D)	99 mm x 54 mm x 70 mm	99 mm x 42 mm x 70 mm	99 mm x 45 mm x 70 mm	99 mm x 42 mm x 70 mm	99 mm x 54 mm x 70 mm	99 mm x 45 mm x 70 mm



## I/O-Modules

DC / AC Input Modules	RIO2-XDP4 24VDC 4-channel sink input module	RIO2-XDP8 24VDC 8-channel sink input module	RIO2-XDP16 24VDC 16-channel sink input module	RIO2-XAH4 230V AC 4-channel input module
Indicators	4 Green Input Status LEDs, 1 Green/Red Fn-Bus Status LED	8 Green Input Status LEDs, 1 Green/Red Fn-Bus Status LED	16 Green Input Status LEDs, 1 Green/Red Fn-Bus Status LED	4 Green Status LEDs, 1 Green/Red Fn-Bus Status LED
ON - State Voltage	min. 10.2VDC to max. 28.8VDC			min. 170VAC to max. 264VDC
OFF - State Voltage	max. 5VDC			max. 130VAC
ON - State Current	max. 6 mA / Point at 28.8VDC			max. 12 mA / Point at 264VAC
Input Signal Delay	OFF to ON: max. 3 ms / ON to OFF: max. 3 ms			OFF to ON: max. 10ms / ON to OFF: max. 10ms
Common Type	4 Points / 2COM (Single common)	External common	16 Points / 2COM	4 Points / 2COM (Single common)
Power Consumption	max. 35 mA at 5.0VDC		max. 45 mA at 5.0VDC	max. 35 mA at 5.0VDC
Field Power	Supply voltage: 24VDC nominal Voltage range: 11 to 28.8VDC			Supply voltage: 240VAC nominal Voltage range: min. 170 max. 264VAC, 47 - 63 Hz
Wiring	I/O cable max. 2.0 mm <sup>2</sup> (AWG 14)		Module connector: HIF3BA-20D-2.54R	I/O cable max. 2.0 mm <sup>2</sup> (AWG 14)
Dimensions (H x W x D)	99 mm x 12 mm x 70 mm			



DC Output Modules	RIO2-YTP4 24VDC 4-channel source output module	RIO2-YTP8 24VDC 8-channel source output module	RIO2-YTP16 24VDC 16-channel source output module	RIO2-YTP4C 24VDC 4-channel source output module
Indicators	4 Green Output Status LEDs, 1 Green/Red Fn-Bus Status LED	8 Green Output Status LEDs, 1 Green/Red Fn-Bus Status LED	16 Green Output Status LEDs, 1 Green/Red Fn-Bus Status LED	4 Green Output Status LEDs, 1 Green/Red Fn-Bus Status LED
Output Voltage Range	24VDC nominal, min. 11 VDC to max. 28.8VDC			
ON - State Voltage Drop	max. 0.3VDC at 25°C			max. 1 VDC at 25°C
ON - State Current	min. 1mA / channel			
OFF - State Leakage Current	max. 50 uA			max. 150 uA
Output Signal Delay	OFF to ON: max. 0.3 ms / ON to OFF: max. 0.3 ms			
Output Current Rating	max. 0.5A per channel / max. 2.0A all common	max. 0.5A per channel / max. 4.0A all common	max. 0.5A per channel / max. 4.0A all common	max. 2A per channel / max. 8A all common
Common Type	4 Points / 4 COM (Single common)	8 Points / External common	16 Points / 2 COM (Single common)	4 Points / 4 COM (Single common)
Power Consumption	max. 45 mA at 5.0VDC	max. 60 mA at 5.0VDC	max. 80 mA at 5.0VDC	max. 45 mA at 5.0VDC
Field Power	Supply voltage: 24VDC nominal Voltage range: 11 to 28.8VDC			
Wiring	I/O cable max. 2.0 mm <sup>2</sup> (AWG 14)		Module connector: HIF3BA-20D-2.54R	I/O cable max. 2.0 mm <sup>2</sup> (AWG 14)
Dimensions (H x W x D)	99 mm x 12 mm x 70 mm			



Relay Output Modules	RIO2-YR4 4-channel relay output module	RIO2-YR8 8-channel relay output module
Indicators	4 Green Output Status LEDs, 1 Green/Red Fn-Bus Status LED	8 Green Output Status LEDs, 1 Green/Red Fn-Bus Status LED
Relay Type	Form A, normally open, Single Pole, Single Throw	
Minimum Load	100 uA, 100 mVDC per point	
On-State Voltage Drop	max. 0.5V at 2.0A, Resistive Load, 24VDC	
OFF-State Leakage Current	max. 1.5 mA	
Output Signal Delay	OFF to ON: max. 10 ms / ON to OFF: max. 10 ms	
Common Type	1 Point / 1 COM	
Power Consumption	max. 130 mA at 5.0VDC	max. 235 mA at 5.0VDC
Field Power	No connection with Field Power. Field Power passes through to the next module	
Wiring	I/O cable max. 2.0 mm <sup>2</sup> (AWG 14)	
Dimensions (H x W x D)	99 mm x 12 mm x 70 mm	



## Analog Modules

DC Analog Input Modules	RI02-AX4I 4-channel 20 mA current analog input module	RI02-AX8I 8-channel 20 mA current analog input module	RI02-AX4V 4-channel 0 - 10V voltage analog input module	RI02-AX8V 8-channel 0 - 10V voltage analog input module	RI02-AX4H 4-channel -10 to +10V voltage analog input module
Indicators	4 Green/Red Status LEDs, 1 Green/Red Fn-Bus Status LED	1 Green/Red Fn-Bus Status LED	4 Green/Red Status LEDs, 1 Green/Red Fn-Bus Status LED	1 Green/Red Fn-Bus Status LED	4 Green/Red Status LEDs, 1 Green/Red Fn-Bus Status LED
Resolution in Ranges	12 bits: 3.9 uA/bit		12 bits: 2.44 mV/bit		12 bits: 4.8 mV/bit
Input Current Range	4 to 20 mA		-	-	-
Input Voltage Range	-	-	0 to 10VDC		-10 to 10VDC
Data Format	16 bits Integer (2's compliment)				
Input Impedance	120 Ω		500 Ω		
Conversion Time	4msec/all channel				
Common Type	4 channels/2COM (Single common)	Field Power 0V (AGND)	4 channels/2COM (Single common)	Field Power 0V (AGND)	4 channels/2COM (Single common)
Power Consumption	max. 165 mA at 5.0VDC	max. 80 mA at 5.0VDC	max. 80 mA at 5.0VDC	max. 80 mA at 5.0VDC	max. 170 mA at 5.0VDC
Field Power	Not used	Supply voltage: 24VDC nominal Voltage range: 18 to 28.8VDC	Not used	Supply voltage: 24VDC nominal Voltage range: 18 to 28.8VDC	Not used
Wiring	I/O cable max. 2.0 mm <sup>2</sup> (AWG 14)				
Dimensions (H × W × D)	99 mm × 12 mm × 70 mm				



RTD Input Modules	RI02-RTD2 2-channel RTD input module	RI02-RTD4 4-channel RTD input module	RI02-RTD8 8-channel RTD input module
Indicators	2 Green/Red Status LEDs, 1 Green/Red Fn-Bus Status LED	4 Green/Red Status LEDs, 1 Green/Red Fn-Bus Status LED	8 Green/Red Status LEDs, 1 Green/Red Fn-Bus Status LED
Sensor Types	<b>RTD Input:</b> PT50, PT100, PT200, PT500, PT1000, JPT100, JPT200, JPT500, JPT1000, NI100, NI200, NI500, NI1000, NI120, CU10 <b>Resistance Input:</b> 100 mΩ/bit, 10 mΩ/bit, 20 mΩ/bit	<b>RTD Input:</b> PT50, PT100, PT200, PT500, PT1000, JPT50, JPT100, JPT200, JPT500, JPT1000, NI100, NI200, NI500, NI1000, NI120, NI1000LG <b>Resistance Input:</b> 100 mΩ/bit, 10 mΩ/bit, 20 mΩ/bit, 50 mΩ/bit	
Conversion Time	200 msec/all channels	30 msec/ 1 channel when normal conversion	
Data Format	16 bits Integer (2's compliment)		
Resolution of Data	0.1°C/10 mΩ	± 0.1°C/F, 10 mΩ	
Module Accuracy	± 0.1% Full Scale at 25°C / ± 0.3% Full Scale at 0°C, 60°C	± 0.3% Full Scale at 25°C / ± 0.5% Full Scale at 0°C, 60°C	
Common Type	2 channels/2COM (Single common)	4 common/Module	
Power Consumption	max. 70 mA at 5.0VDC	max. 100 mA at 5.0VDC	max. 110 mA at 5.0VDC
Field Power	From System Power DC/DC	Not used	
Wiring	I/O cable max. 2.0 mm <sup>2</sup> (AWG 14)	Module connector: HIF3BA-20D-2.54R	
Dimensions (H × W × D)	99 mm × 12 mm × 70 mm		



Thermocouple Input Modules	RI02-TC2 2-channel isolated thermocouple module	RI02-TC4 4-channel isolated thermocouple module
Indicators	2 Green/Red Status LEDs, 1 Green/Red Fn-Bus Status LED	4 Green Input Status LEDs, 1 Green Cold Junction, 1 Green/Red Fn-Bus Status LED
Sensor Types	<b>Thermocouple Input:</b> Type K/J/T/B/R/S/E/N/L/U/C/D <b>mV Input:</b> 10 uV/bit, 1 uV/bit, 2 uV/bit	
Conversion Time	200 msec/all channels	30 msec/ 1 channel when normal conversion
Data Format	16 bits Integer (2's compliment)	
Resolution of Data	0.1°C/10 mΩ	± 0.1°C/F, 10 mΩ
Module Accuracy	± 0.1% Full Scale at 25°C / ± 0.3% Full Scale at 0°C, 60°C	± 0.3% Full Scale at 25°C / ± 0.5% Full Scale at 0°C, 60°C
Common Type	2 channels/2COM (Single common)	1 common/1 Input
Power Consumption	max. 70 mA at 5.0VDC	max. 120 mA at 5.0VDC
Field Power	From System Power DC/DC	Not used
Wiring	I/O cable max. 2.0 mm <sup>2</sup> (AWG 14)	Module Connector: HIF3BA-20D-2.54R
Dimensions (H × W × D)	99 mm × 12 mm × 70 mm	



DC Analog Output Modules	RI02-AY2I 2-channel 4 - 20 mA current analog output module	RI02-AY4I 4-channel 4 - 20 mA current analog output module	RI02-AY2V 2-channel 0 - 10V voltage analog output module	RI02-AY4V 4-channel 0 - 10V voltage analog output module	RI02-AY2H 2-channel -10 to +10V voltage analog output module
Indicators	2 Green Status LEDs, 1 Green/Red Fn-Bus Status LED	1 Green/Red Fn-Bus Status LED	2 Green Status LEDs, 1 Green/Red Fn-Bus Status LED	1 Green/Red Fn-Bus Status LED	2 Green Status LEDs, 1 Green/Red Fn-Bus Status LED
Resolution in Ranges	12 bits: 3.9 uA/bit		12 bits: 2.44 uA/bit		12 bits: 4.8 mV/bit
Output Current Range	4 to 20 mA		0 to 10VDC		-10 to 10VDC
Data Format	16 bits Integer (2' compliment)				
Load Resistance	max. 500 Ω		min. 5KΩ	min. 2KΩ	min. 5KΩ
Conversion Time	2 msec/all channels	4 msec/all channels	2 msec/all channels	4 msec/all channels	2 msec/all channels
Common Type	2 channels/2COM (Single channel)	4 common, Field Power 0V	2 channels/2COM (Single channel)	4 common, Field Power 0V	2 channels/2COM (Single channel)
Power Consumption	max. 60 mA at 5.0VDC		max. 155 mA at 5.0VDC	max. 60 mA at 5.0VDC	max. 155 mA at 5.0VDC
Field Power	Supply voltage: 24VDC nominal Voltage range: 15 to 28.8VDC		From System Power DC/DC	Supply voltage: 24VDC nominal Voltage range: 18 to 28.8VDC	From System Power DC/DC
Wiring	I/O cable max. 2.0 mm <sup>2</sup> (AWG 14)				
Dimensions (H × W × D)	99 mm × 12 mm × 70 mm				



## Special function Modules

Counter Modules	RI02-CU24 1-channel 2-phase counter module	RI02-CU24L 2-channel 1-phase counter module
Indicators	3 Green Input Status LEDs, 2 Green Up/Down Status LEDs, 1 Green Output Status LED, 1 Green/Red Fn-Bus Status LED	2 Green Input Status LEDs, 2 Green Output Status LEDs, 1 Green/Red Fn-Bus Status LED
Input Voltage (Rated)	24VDC	
Input Current	6.1 mA at 24VDC	
On-Status Volt / Current	min. 12VDC / 2.9 mA	
Off-Status Volt / Current	max. 1.8VDC / 0.15 mA	max. 7VDC / 1.0 mA
Input Frequency	max. 1.5 MHz	max. 100 KHz except Encoder × 4 / max. 50 KHz Encoder × 4
Input Duty Range	10% to 90%	20% to 80%
Counting Mode	1 Pulse Mode / 2 Pulse Mode; Encoder × 1 / Encoder × 2 / Encoder × 4; Period / Rate Mode; PWM Output Mode	1 Input Mode - Up, Down; 2 Input Mode - Up / Inhibit, Up / Reset, Down / Inhibit, Down / Reset, Up / Down, Clock / Direction, Encoder × 1, Encoder × 2, Encoder × 4
Counter Size	24 bit-wide	32 bit-wide / channel
Common Type	1 common	2 common
Output Channel	1 channel sink type	2 channel source type
Output Voltage	5 to 28.8VDC	24VDC
Output Current	0.5A	0.5A / channel, short protection
Power Consumption	max. 80 mA at 5.0VDC	max. 160 mA at 5.0VDC
Field Power	<b>Supply voltage:</b> 24VDC nominal <b>Voltage range:</b> 18 to 28.8VDC	
Wiring	I/O cable max. 2.0 mm <sup>2</sup> (AWG 14)	
Dimensions (H × W × D)	99 mm × 12 mm × 70 mm	



PWM / Pulse Output Modules	RI02-PWM2 2-channel PWM Output	RI02-P02 2-channel Pulse Output
Indicators	2-channel Output Status LEDs, 1 Green/Red Fn-Bus Status LED	2 Pulse Output Status LEDs, 2 Pulse Direction Output Status LEDs, 1 Green/Red Fn-Bus Status LED
Output Current	0.5A / channel, 2A / all channels, short protection	0.5A / output, 2A / all outputs, short protection
Output Frequency	1 to 2500 Hz ± 0.5%	1 to 20,000 Hz ± 0.5%
Output Duty	0.0 to 100.0% ± 1.0% (0.1% / 1LSB), Ton > 5us, Toff > 5us	50% ± 3.0% Fixed, Ton > 5us, Toff > 5us
Common Type	2 common	
Power Consumption	max. 150 mA at 5.0VDC	
Field Power	<b>Supply voltage:</b> 24VDC nominal <b>Voltage range:</b> 18 to 28.8VDC	
Wiring	I/O cable max. 2.0 mm <sup>2</sup> (AWG 14)	
Dimensions (H × W × D)	99 mm × 12 mm × 70 mm	



Communication Modules	RI02-RS232 1-channel RS-232 communication module	RI02-RS485 1-channel RS-485 communication module
Transfer Channels	TxD, RxD, full duplex	
Transfer Rate	300 to 115200	
Data Bit	7 bit, 8 bit	
Parity Bit	none, odd, even	
Stop Bit	1 bit, 2 bit	
Flow Control	RTS, CTS	
Bit Distortion	< 1.6%	
Cable Length	max. 15 m	
Low Signal Voltage	-18V to -3V	
High Signal Voltage	+18V to +3V	
RxD Buffer	1024 byte	
TxD Buffer	256 byte	
Input Image Size	6 byte	12 byte
Output Image Size	6 byte	12 byte
Power Consumption	max. 95 mA at 5.0VDC	max. 110 mA at 5.0VDC
Dimensions (H × W × D)	99 mm × 12 mm × 70 mm	



## Field Power Supply and others

	RI02-SHD Shield Module	RI02-0VDC Common 0VDC	RI02-24VDC Common 24VDC	RI02-0/24VDC Common 0V / 24VDC	RI02-PSD Expansion Power supply, Input 24 VDC, Output 1,0A / 5V	RI02-PS Field distributor 5V, 24V, 48VDC, 110V, 230VAC
System Input Voltage Range	—	—	—	—	11 VDC to 28.8VDC	—
System Power Input Voltage	—	—	—	—	Normal 24VDC	—
Field Power Voltage	Shield signal	0V	24VDC	24VDC, 0VDC	Normal 24VDC (± 20%)	Optional
Contacts Current	max. 10A					
Indicators	—	—	—	—	2 Green Input Status LEDs	—
Power Consumption	Expansion Power Distributor	—	—	Expansion Power Distributor	—	—
Wiring	I/O cable max. 2.0 mm <sup>2</sup> (AWG 14)					
Dimensions (H × W × D)	99 mm × 12 mm × 70 mm					



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