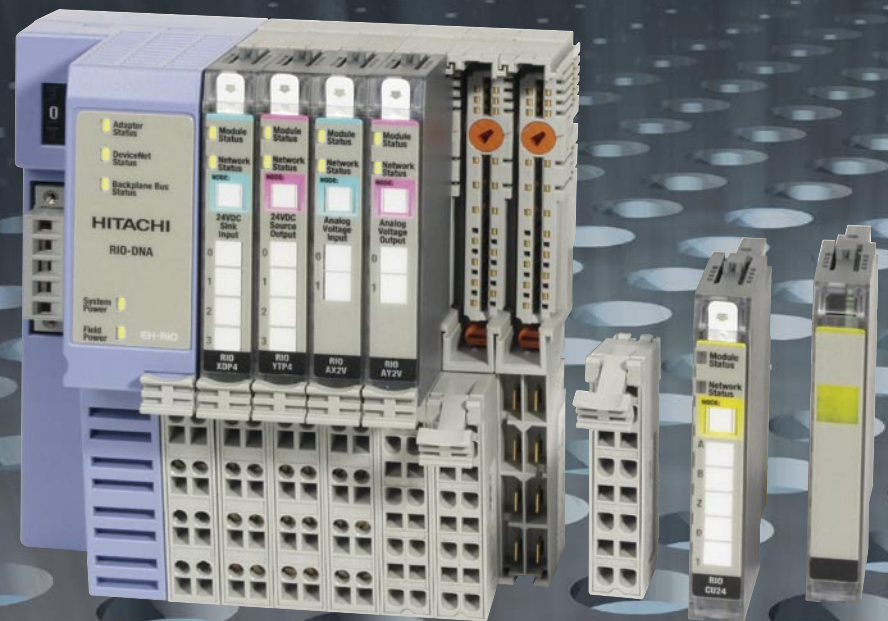


# Remote I/O Modules EH-RIO Series

Hitachi's Remote I/O series for increased flexibility and cost efficiency

**HITACHI**  
Inspire the Next



- Fieldbus adapters for Profibus-DP and DeviceNet (others coming soon)
- Separation of electronics module and wiring base for ease of installation and maintenance
- „Hot Swapping“: remove and exchange modules under power
- Optional screw clamp or spring clamp terminals
- Large selection of I/O modules
- Super slim design: 8 I/O = 12 mm
- Standard DIN rail mounting

*DeviceNet*



# Remote I/O Modules

## EH-RIO Series

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

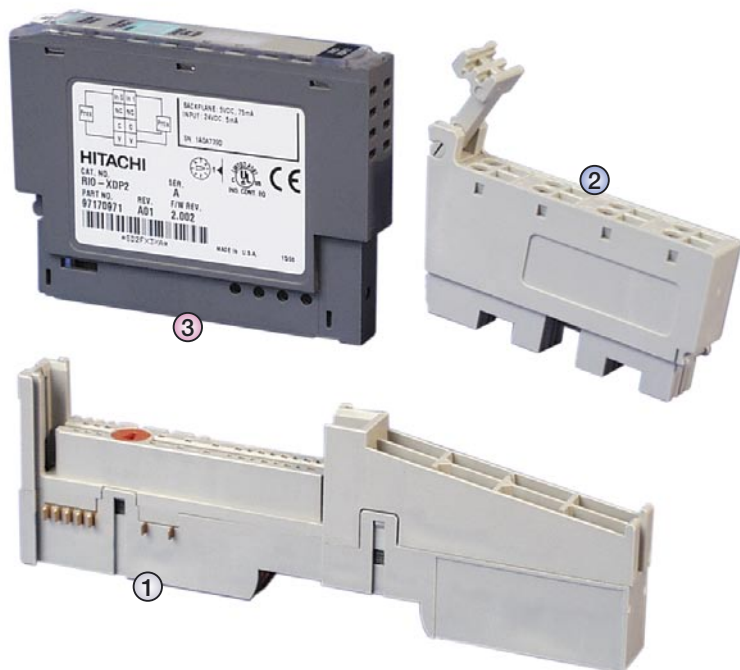
The EH-RIO series of Remote I/O modules allows you the flexibility to distribute I/O throughout your application. Using EH-RIO, you can precisely plan and expand your I/O and locate them right where they are needed: close to the sensors and actors. A proximity which pays back: By mounting I/Os in

a junction box directly on or near the machine, you minimize wiring and eliminate the need for further control and marshalling cabinets. This solution benefits today's modular production processes and is especially advantageous when upgrading centralized automation systems.

### Design concept

Each I/O module consists of the following three components:

- ① The Mounting Base provides the mounting locations for the I/O modules and the removable terminal blocks. The mounting base also forms the inter-connection for the I/O backplane communication and the field power distribution.
- ② The Removable Terminal Block provides 8 or 12 separate terminal locations for your field wiring. You can choose between screw clamp or spring clamp terminations.
- ③ 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). I/O modules report diagnostic information back over the network communication adapter, thus making debugging tasks much easier.



### Mounting

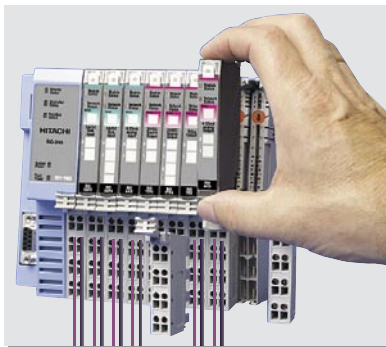
The I/O modules are mounted on a standard DIN rail, providing easy installation by vertically inserting the modules, without using any additional tools. The modules can either be mounted separately or as a complete, pre-mounted system.

A mechanical key slot protects the modules from being inserted into a wrong mounting base and therefore from being exposed to incorrect signal levels.



### Hot Swapping

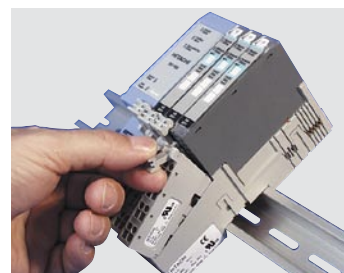
The separation of the electronics unit from the removable terminal block makes it possible to remove and exchange the electronics unit under power, without having to re-wire the entire I/O module.



### Ease of use

The Removable Terminal Block and Electronics Module insert into the mounting base with an audible click, so you know they are correctly installed.

The connection can be released just as easily, without having to remove the wiring or interfering with system communication.



## Fieldbus Modules



### RIO-DNA DeviceNet Adapter

Expansion I/O Capacity	63 modules
Communication rate (per scanner configuration)	125 kbit/s (500 m maximum) 250 kbit/s (250 m maximum) 500 kbit/s (100 m maximum)
Power Requirements	24 V DC
Input Overvoltage Protection	Reverse polarity protected
Indicators	3 red/green status indicators <ul style="list-style-type: none"> <li>• adapter status</li> <li>• DeviceNet status</li> <li>• Backplane Bus status</li> </ul> 2 green power supply status indicators <ul style="list-style-type: none"> <li>• system power (backplane bus 5 V power)</li> <li>• field power (24 V from field supply)</li> </ul>
Output Current to Backplane Bus	1 A maximum at 5 V DC $\pm 5\%$ (4.75 – 5.25)
Dimensions (HxWxD)	76.2 mm x 54.9 mm x 133.4 mm

### RIO-DNP DeviceNet Interface

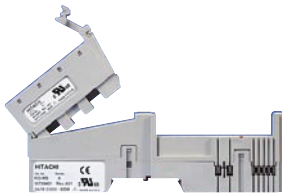
Expansion I/O Capacity	12 modules
Communication rate (per scanner configuration)	125 kbit/s (500 m maximum) 250 kbit/s (250 m maximum) 500 kbit/s (100 m maximum)
Power Requirements	24 V DC
Input Overvoltage Protection	Reverse polarity protected
Indicators	3 red/green status indicators: <ul style="list-style-type: none"> <li>• adapter status</li> <li>• DeviceNet status</li> <li>• Backplane Bus status</li> </ul> 2 green power supply status indicators <ul style="list-style-type: none"> <li>• system power (backplane bus 5 V power)</li> <li>• DeviceNet power (24 V from DeviceNet)</li> </ul>
Output Current to Backplane Bus	1 A maximum at 5 V DC $\pm 5\%$ (4.75 – 5.25)
Dimensions (HxWxD)	76.2 mm x 25.4 mm x 133.4 mm

### RIO-PBA Profibus-DP Adapter

Expansion I/O Capacity	63 modules
Communication rate (per scanner configuration)	9.6 kBaud – 12 MBaud
Power Requirements	24 V DC
Input Overvoltage Protection	Reverse polarity protected

Indicators	3 red/green status indicators <ul style="list-style-type: none"> <li>• adapter status</li> <li>• PROFIBUS status</li> <li>• Backplane Bus status</li> </ul> 2 green power supply status indicators <ul style="list-style-type: none"> <li>• system power (backplane bus 5 V power)</li> <li>• field power (24 V from field supply)</li> </ul>
Output Current to Backplane Bus	1 A maximum at 5 V DC $\pm 5\%$ (4.75 – 5.25)
Dimensions (HxWxD)	76.2 mm x 54.9 mm x 133.4 mm

## Mounting Base



### RIO-BSP / -BSP3 Mounting Base with Removable Terminal Block and spring clamp terminations /3-wire connection

### RIO-BSC / -BSC3 Mounting Base with Removable Terminal Block and screw clamp terminations /3-wire connection

### RIO-BSCT Mounting Base with integrated cold-junction-compensation (for RIO-TC2)

Terminations		Field Power Bus Supply Voltage	28.8 V DC, 120/240 V AC
RIO-BSP, -BSP3	Spring clamp terminations	Supply Current	10 A maximum
RIO-BSC, -BSC3	Screw clamp terminations	Dimensions (HxWxD)	65.0 mm x 12.0 mm x 133.4 mm
RIO-BSCT	Screw clamp terminations		

## I/O-Modules

### DC/AC Input Modules



### RIO-XDP2 / RIO-XD2 2 digital inputs, 24 V DC, positive logic / negative logic

### RIO-XDP4 / RIO-XD4 4 digital inputs, 24 V DC, positive logic / negative logic

### RIO-XDP8 8 digital inputs, 24 V DC, positive logic

### RIO-XAH2 2 digital inputs, 220 V AC

Inputs per module		Indicators	2 green/red module/network status indicators
RIO-XDP2, -XD2	2 (1 group of 2), positive logic (RIO-XD2 negative logic)	RIO-XD2, -XD2	2 yellow input status indicators
RIO-XDP4, -XD4	4 (1 group of 4) positive logic (RIO-XD4 negative logic)	RIO-XDP4, -XD4	4 yellow input status indicators
RIO-XDP8	8 (1 group of 8) positive logic	RIO-XDP8	8 yellow input status indicators
RIO-XAH2	2 (1 group of 2)	Backplane Bus Current	75 mA maximum at 5 V DC
ON-State Voltage XDP2 - XDP8	10 V DC min., 24 V DC nominal, 28.8 V DC max.	Field Power Bus Supply Voltage XDP2 - XDP8	24 V DC nominal
ON-State Voltage XAH2	159 V AC min., 220 V AC nominal, 264 V AC max.	Voltage Range XDP2 - XDP8	10 - 28.8 V DC
Input Filter Time XDP2 - XDP8	0 - 65 ms (1 ms default setting)	Supply Voltage XAH2	220 V AC nominal
OFF to ON/ON to OFF	20 ms hardware filter + 1 ms - 64 ms	Voltage Range XAH2	159 - 264 V AC, 47 - 63 Hz
Input Filter Time XAH2		Dimensions (HxWxD)	56.0 mm x 12.0 mm x 75.5 mm

### DC/AC Output Modules



### RIO-YTP2 2 digital outputs, 24 V DC, positive logic, short-circuit protected

### RIO-YTP4 4 digital outputs, 24 V DC, positive logic, short-circuit protected

### RIO-YTP8 8 digital outputs, 24 V DC, positive logic, short-circuit protected

### RIO-YS2 2 digital outputs, 120/220 V AC

Outputs		Indicators RIO-YTP4	2 green/red module/network status indicators 4 yellow output status indicators
RIO-YTP2	2 (1 group of 2) positive logic	Indicators RIO-YTP8	2 green/red module/network status indicators 8 yellow output status indicators 8 red output fault indicators
RIO-YTP4	4 (1 group of 4) positive logic	Backplane Bus Current	75 mA maximum at 5 V DC
RIO-YTP8	8 (1 group of 8) positive logic	External DC power Supply Voltage YTP2 - YTP8	24 V DC nominal
RIO-YS2	2 (1 group of 2)	Voltage Range YTP2 - YTP8	10 - 28.8 V DC
ON-State Voltage YTP2 - YTP8	10 V DC min., 24 V DC nominal, 28.8 V DC max.	Supply Voltage YS2	120/220 V AC nominal
ON-State Voltage YS2	74 V AC min., 120/220 V AC nominal, 264 V AC max.	Voltage Range YS2	85 - 264 V AC, 47 - 63 HZ
Output Signal Delay OFF to ON/ON to OFF	0,1 ms maximum; YS2: 1/2 cycle max.	Dimensions (HxWxD)	56.0 mm x 12.0 mm x 75.5 mm
Output Current YTP2 - YTP8	Max. 1.0 A per output, max. 2.0 A per module		
Output Current YS2	Max. 0.75 A per output, max. 1.5 A per module		
Indicators RIO-YTP2/-YS2	2 green/red module/network status indicators 2 yellow output status indicators 2 red output fault indicators		

## Relays Module



### RIO-YR2 2 relay outputs, potential-free

### RIO-YR4 4 relay outputs, potential-free

Outputs per module	2/4 electromechanical relays (potential-free, normally open)	Indicators	2/4 yellow output status indicators 2 green/red module/network status indicators
ON-State Voltage	10 V DC minimum, 24 V DC nominal, 28.8 V DC maximum	Backplane Bus Current	80 mA maximum at 5 V DC
Output Signal Delay OFF to ON	10 ms maximum	Field Power Bus Supply Voltage	None required
ON to OFF	26 ms maximum	Voltage Range	240 V AC maximum
Switching Frequency	1 Operation/3 s (0.3 Hz at rated load) maximum	Switching Capacity	2 A per channel maximum, 4 A per module
		Dimensions (HxWxD)	56.0 mm x 12.0 mm x 75.5 mm

# Remote I/O Modules

## EH-RIO Series

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### DC Analog Input Modules



<b>RIO-AX2I</b>	2 analog inputs, 0/4 - 20 mA, 24 V DC	
<b>RIO-AX2V</b>	2 analog inputs, 0 - 10 V / ±10 V	
Inputs	2 analog inputs	
Resolution	RIO-AX2I: 16 bits - over 21 mA, 0.32 µA/cnt RIO-AX2V: 16 bits signed, 320 µV/cnt	
Input Current Terminal RIO-AX2I	4-20 mA, 0-20 mA	
Input Voltage Terminal RIO-AX2V	±10 V, 0 - 10 V	
Absolute Accuracy	0.1% full scale at 25 °C	
Current Terminal		
Indicators	2 green/red input status indicators 2 green/red module/network status indicators	
Backplane Bus Current	75 mA maximum at 5 V DC	
External DC Power	24 V DC nominal	
Supply voltage	10 - 28.8 V DC	
Voltage range	10 mA at 24 V DC	
Supply current	56.0 mm x 12.0 mm x 75.5 mm	
Dimensions (HxWxD)		

### DC Analog Input Modules



<b>RIO-PT2</b>	RTD-Inputs	
<b>RIO-TC2</b>	Thermocouple-Input	
RTD-Inputs RIO-PT2		
Inputs per Module	2, PT100, PT200, NI100, NI120	
Resolution	16 bits, 9.5 mV/cnt	
Absolute Accuracy	0.1 % at 25 °C	
Backplane Bus Current	max. 220 mA at 5 V DC	
Dimensions (HxWxD)	56.0 mm x 12.0 mm x 75.5 mm	
Thermocouple-Input RIO-TC2		
Inputs per Module	2, type B, C, E, J, K, N, R, S, T, mV	
Resolution	15 bits signed, 2.5 µV/cnt	
Absolute Accuracy	0.1 % at 25 °C	
Backplane Bus Current	max. 175 mA at 5 V DC	
Dimensions (HxWxD)	56.0 mm x 12.0 mm x 75.5 mm	

### DC Analog Output Modules



<b>RIO-AY2I</b>	2 analog outputs, 0/4 - 20 mA, 24 VDC	
<b>RIO-AY2V</b>	2 analog outputs, 0 - 10 V / ±10 V	
Outputs	2 analog outputs	
Resolution	RIO-AY2I: 13 bits - over 21 mA, 513 µA/cnt RIO-AY2V: 14 bits signed, 1.28 mV/cnt	
Output Current RIO-AY2I	0 mA output until communication is established 4-20 mA user configurable 0-20 mA user configurable	
Output Voltage RIO-AY2V	±10 V, 0 - 10 V	
Absolute Accuracy	0.1 % full scale at 25 °C	
Current Terminal		
Indicators	2 green/red output status indicators 2 green/red module/network status indicators	
Backplane Bus Current	75 mA maximum at 5 V DC	
External DC Power	24 V DC nominal	
Supply Voltage	10 - 28.8 V DC	
Voltage Range	50 mA at 24 V DC (including outputs at 20 mA)	
Supply Current	56.0 mm x 12.0 mm x 75.5 mm	
Dimensions (HxWxD)		

### High Function Modules



<b>RIO-CU24</b>	High speed counter module for 24 DC encoder with outputs	
<b>RIO-CU5</b>	High speed counter module for 5 V DC encoder with outputs	
<b>RIO-CU24L</b>	High speed counter module for 24 V DC encoder without outputs	
<b>RIO-CU5L</b>	High speed counter module for 5 V DC encoder without outputs	
<b>RIO-RS232 / RIO-RS485</b>	Serial communication module, 1.2 - 38.4 kBaud	
<b>RIO-SSI</b>	Synchronous Serial Interfaces - Absolute Encoder	
Counter module	RIO-CU24 / RIO-CU5	RIO-CU24L / RIO-CU5L
max. Frequency	1000 kHz	1000 kHz
Number of Inputs	1, two phase (A, B, Z)	1, two phase (A, B, Z)
Input Current	RIO-CU24: 15 - 24 V DC RIO-CU5: 5 V DC	RIO-CU24: 15 - 24 V DC RIO-CU5: 5 V DC
Number of Outputs	2, load capacity 0.5 A at 24V DC	-
Backplane Bus Current	max. 180 mA at 5 V DC	max. 160 mA at 5 V DC
Dimensions (HxWxD)	56.0 mm x 24.0 mm x 75.5 mm	56.0 mm x 12.0 mm x 75.5 mm
Communication module	RIO-RS232	
Serial comm. speed	1.2 - 38.4 kBaud	
Indicators	1 green/red module status 1 green/red network status, 2 green TXD, RXD status	
Supply Voltage	24 V DC nominal	
Dimensions (HxWxD)	56.0 mm x 12.0 mm x 75.5 mm	
RIO-SSI		
SSI Data Rate	125kHz - 2MHz	
SSI Data Length	12 byte	
Dimensions (HxWxD)	56.0mm x 12.0mm x 75.5mm	

### Field Power Supply Expansion Power Supply (DC)



<b>RIO-PS</b>	Field Power Supply for various potentials (5 - 250 V DC and/or 24-240 V AC) (5 - 250 V DC and/or 24-240 V AC)	
<b>RIO-PSD</b>	Expansion Power Supply for 12 I/O modules maximum	
RIO-PS	Field Power Supply	
Input Voltage Rating	12 V DC, 24 V DC, 120 V AC, 240 V AC nominal	
Input Voltage Protection	Reverse polarity protected	
Input Current	10 A maximum	
Backplane Bus	Pass-Through	
Module Location	Between I/O modules in EH-RIO system, breaks power bus	
Dimensions (HxWxD)	76.2 mm x 25.4 mm x 133.4 mm	
RIO-PSD	Expansion Power Supply (DC)	
Input Voltage Rating	24 V DC nominal	
Input Voltage Protection	Reverse polarity protected	
Input Current	400 mA	
Backplane Bus Current	1.3 A (at 19.2 - 28.8 V)	
Module Location	Between I/O modules in EH-RIO system, breaks field power bus	
Dimensions (HxWxD)	76.2 mm x 25.4 mm x 133.4 mm	

### Environmental conditions

Operational Temperature	-20 to +55 °C
Storage Temperature	-40 to 85 °C
Relative Humidity	5 to 95 % noncondensing

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