

Remote I/O Modules

EH-RIO Series

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

- 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



EH-RIO Series

Flexible design, highly modular, user-friendly handling.

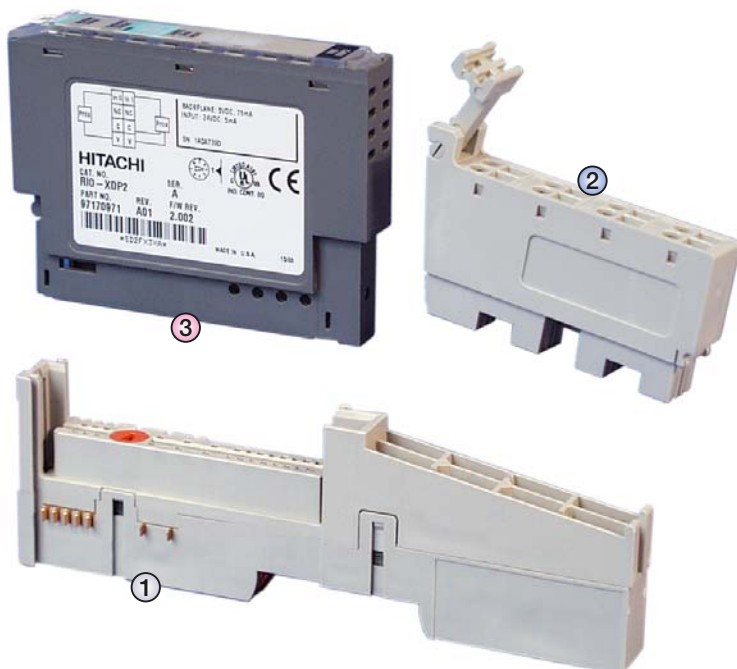
The EH-RIO series of Remote I/O modules allows you the flexibility to distribute I/O throughout your application. Using EH-RIO, you can precisely plan and expand your I/O and locate them right where they are needed: close to the sensors and actors. A proximity which pays back: By mounting I/Os in

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

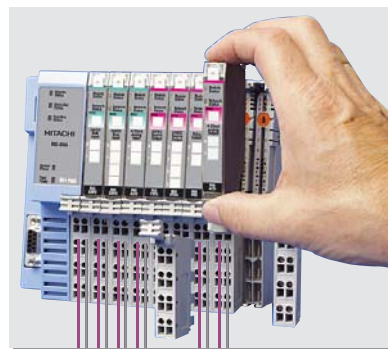
The I/O modules are mounted on a standard DIN rail, providing easy installation by vertically inserting the modules, without using any additional tools. The modules can either be mounted separately or as a complete, pre-mounted system.

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

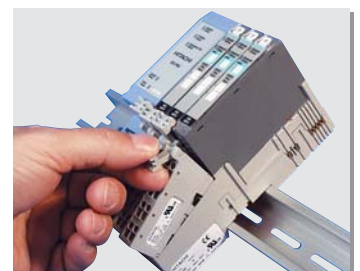
The separation of the electronics unit from the removable terminal block makes it possible to remove and exchange the electronics unit under power, without having to re-wire the entire I/O module.



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"> • adapter status • DeviceNet status • Backplane Bus status 2 green power supply status indicators <ul style="list-style-type: none"> • system power (backplane bus 5 V power) • field power (24 V from field supply)
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"> • adapter status • DeviceNet status • Backplane Bus status 2 green power supply status indicators <ul style="list-style-type: none"> • system power (backplane bus 5 V power) • DeviceNet power (24 V from DeviceNet)
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"> • adapter status • PROFIBUS status • Backplane Bus status 2 green power supply status indicators <ul style="list-style-type: none"> • system power (backplane bus 5 V power) • field power (24 V from field supply)
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	RIO-BSP, -BSP3 RIO-BSC, -BSC3 RIO-BSCT	Spring clamp terminations Screw clamp terminations Screw clamp terminations	Field Power Bus Supply Voltage Supply Current Dimensions (HxWxD)	28.8 V DC, 120/240 V AC 10 A maximum 65.0 mm x 12.0 mm x 133.4 mm
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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	RIO-XDP2, -XD2 RIO-XDP4, -XD4 RIO-XDP8 RIO-XAH2	2 (1 group of 2), positive logic (RIO-XD2 negative logic) 4 (1 group of 4) positive logic (RIO-XD4 negative logic) 8 (1 group of 8) positive logic 2 (1 group of 2)	Indicators RIO-XD2, -XD2, XAH2 RIO-XDP4, -XD4 RIO-XDP8 Backplane Bus Current	2 green/red module/network status indicators 2 yellow input status indicators 4 yellow input status indicators 8 yellow input status indicators 75 mA maximum at 5 V DC
ON-State Voltage XDP2 - XDP8 ON-State Voltage XAH2	10 V DC minimum, 24 V DC nominal, 28.8 V DC maximum 159 V AC minimum, 220 V AC nominal, 264 V AC maximum		Field Power Bus Supply Voltage XDP2 - XDP8 Voltage Range XDP2 - XDP8 Supply Voltage XAH2 Voltage Range XAH2	24 V DC nominal 10 - 28.8 V DC 220 V AC nominal 159 - 264 V AC, 47 - 63 Hz
Input Filter Time XDP2 - XDP8 OFF to ON/ON to OFF Input Filter Time XAH2	0 - 65 ms (1 ms default setting) 20 ms hardware filter + 1 ms - 64 ms		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	RIO-YTP2 RIO-YTP4 RIO-YTP8 RIO-YS2	2 (1 group of 2) positive logic 4 (1 group of 4) positive logic 8 (1 group of 8) positive logic 2 (1 group of 2)	Indicators RIO-YTP4 Indicators RIO-YTP8	2 green/red module/network status indicators 4 yellow output status indicators 4 red output fault indicators 2 green/red module/network status indicators 8 yellow output status indicators 8 red output fault indicators
ON-State Voltage YTP2 - YTP8 ON-State Voltage YS2	10 V DC minimum, 24 V DC nominal, 28.8 V DC maximum 74 V AC minimum, 120/220 V AC nominal, 264 V AC maximum		Backplane Bus Current External DC power Supply Voltage YTP2 - YTP8 Voltage Range YTP2 - YTP8 Supply Voltage YS2 Voltage Range YS2	75 mA maximum at 5 V DC 24 V DC nominal 10 - 28.8 V DC 120/220 V AC nominal 85 - 264 V AC, 47 - 63 Hz
Output Signal Delay OFF to ON/ON to OFF Output Current YTP2 - YTP8 Output Current YS2 Indicators RIO-YTP2/-YS2	0,1 ms maximum; YS2: 1/2 cycle max. Maximum 1.0 A per output, maximum 2.0 A per module Maximum 0.75 A per output, maximum 1.5 A per module 2 yellow output status indicators 2 red output fault indicators		Dimensions (HxWxD)	56.0 mm x 12.0 mm x 75.5 mm

Relais 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 ON to OFF Switching Frequency	10 ms maximum 26 ms maximum 1 Operation/3 s (0.3 Hz at rated load) maximum	Field Power Bus Supply Voltage Voltage Range Switching Capacity Dimensions (HxWxD)	None required 240 V AC maximum 2 A per channel maximum, 4 A per module 56.0 mm x 12.0 mm x 75.5 mm

DC Analog Input Modules



RIO-AX2I 2 analog inputs, 0/4 - 20 mA, 24 V DC

RIO-AX2V 2 analog inputs, 0 - 10 V / ±10 V

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

DC Analog Input Modules



RIO-PT2 RTD-Inputs

RIO-TC2 Thermocouple-Input

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

DC Analog Output Modules



RIO-AY2I 2 analog outputs, 0/4 - 20 mA, 24 VDC

RIO-AY2V 2 analog outputs, 0 - 10 V / ±10 V

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

High Function Modules



RIO-CU24 High speed counter module for 24 DC encoder with outputs

RIO-CU5 High speed counter module for 5 V DC encoder with outputs

RIO-CU24L High speed counter module for 24 V DC encoder without outputs

RIO-CU5L High speed counter module for 5 V DC encoder without outputs

RIO-RS232 Serial communication module, 1.2 - 38.4 kBaud

Counter module	RIO-CU24 / RIO-CU5	RIO-CU24L / RIO-CU5L	Communication module	RIO-RS232
max. Frequency	1000 kHz	1000 kHz	Serial comm. speed	1.2 - 38.4 kBaud
Number of Inputs	1, two phase (A, B, Z)	1, two phase (A, B, Z)	Indicators	1 green/red module status 1 green/red network status 2 green TXD, RXD status
Input Current	RIO-CU24: 15 - 24 V DC / RIO-CU5: 5 V DC	RIO-CU24: 15 - 24 V DC / RIO-CU5: 5 V DC	Supply Voltage	24 V DC nominal
Number of Outputs	2, load capacity 0.5 A at 24V DC	-	Dimensions (HxWxD)	56.0mm x 12.0mm x 75.5mm
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		

Field Power Supply Expansion Power Supply (DC)



RIO-PS 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)

RIO-PSD Expansion Power Supply for 12 I/O modules maximum

RIO-PS	Field Power Supply	RIO-PSD	Expansion Power Supply (DC)
Input Voltage Rating	12 V DC, 24 V DC, 120 V AC, 240 V AC nominal	Input Voltage Rating	24 V DC nominal
Input Voltage Protection	Reverse polarity protected	Input Voltage Protection	Reverse polarity protected
Input Current	10 A maximum	Input Current	400 mA
Backplane Bus	Pass-Through	Backplane Bus Current	1.3 A (at 19.2 - 28.8 V)
Module Location	Between I/O modules in EH-RIO system, breaks power bus	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	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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