Remote I/O Modules
HX-RIO3 Series

Automation Solutions by Hitachi

Network Adapter

The network adapters act as a core module within an HX-RIO3 system that enables the connectivity to a superior device for highly efficient I/O processing.

HIGHLIGHTS

- Flexible integration into almost all applications with the support of various fieldbus communication protocols such as MODBUS TCP/RTU, PROFINET, PROFIBUS, EtherCAT, Ethernet/IP and CANopen.

- Selectable network adapter type. Standard Network Adapter allows controlling up to 63 I/O modules for powerful applications with high demand on I/O points.
Light Network Adapter type to achieve a cost-effective solution by using up to 16 I/O modules.

- An expanded selection of digital and analog I/O modules enables a specific remote I/O set up that is precisely tailored to the requirements.

- Available device description files simplify the seamless integration into CODESYS project environments.

- HX-RIO3 systems have been optimized for tight installation locations with easy DIN-rail mounting.

	RIO3-PBA	RIO3-PNA	RIO3-ECA	RIO3-MBT	RIO3-MBR	RIO3-CAN
Protocol	PROFIBUS	PROFINET	EtherCAT (ID Type)	MODBUS TCP, Ethernet IP	MODBUS RS485	CANopen
Max. Node	125 Nodes	Limited by Ethernet Spec.	65,535 Nodes	Limited by Ethernet Spec.	99 Nodes	99 Nodes
Max. I/O Expansion	63 Slots	32 Slots	63 Slots	63 Slots	63 Slots	63 Slots
I/O Data Size	Input : 244 bytes Output : 244 bytes	Max 1440 bytes	Max 128 bytes each slot	Max 128 bytes each slot	Max 128 bytes each slot	Input : 252 bytes Output : 252 bytes
Baud Rate	9.6 K (1.2km) ~ 12 Mbps (100m)	100 Mbps	100 Mbps	100 Mbps	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps	10, 20, 50, 100, 125, 250, 500, 800, 1000 Kbps (default)
Connector Type	9 Pin D-Sub	2 x RJ-45	2 x RJ-45	2 x RJ-45	5 Pin Open-Style	5 Pin Open-Style
Power Dissipation	100mA @ 24 Vdc	70mA @ 24 Vdc	70mA @ 24 Vdc	70mA @ 24 Vdc	70mA @ 24 Vdc	70mA @ 24 Vdc
System /Field Power	24 Vdc nominal (15~32 Vdc) / 24 Vdc typical (Max. 32 Vdc) / * Field Power Range is different depending on I/O Module series. Refer to I/O Module's Specification.					

Network Adapter Light

	RIO3-PNAL	RIO3-ECAL	RIO3-MBTL	RIO3-MBRL
Protocol	PROFINET	EtherCAT (ID Type)	MODBUS TCP, Ethernet IP	MODBUS RS485
Max. Node	Limited by Ethernet Spec.	65,535 Nodes	Limited by Ethernet Spec.	99 Nodes
Max. I/O Expansion	10 Slots	16 Slots	16 Slots	16 Slots
I/O Data Size	Max 128 bytes	Max. Input 256 bytes / Output 256 bytes	Max 256 bytes	Max 256 bytes
Baud Rate	100 Mbps, Full duplex	10/100 Mbps, Full duplex	10/100 Mbps, Full duplex	2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
Connector Type	2 x RJ-45			
Power Dissipation	55mA typical @ 24 Vdc	40mA typical @ 24 Vdc	75mA typical @ 24 Vdc	75mA typical @ 24 Vdc
System / Field Power	24 Vdc nominal (15~32 Vdc) / 24 Vdc typical (Max. 32 Vdc) / *Field Power Range is different depending on I/O Module series. Refer to I/O Module's Specification.			

Programmable Network Adapter

The CODESYS V3 programmable adapter has its strength if data pre-processing within a remote I/O is required to relieve a connected master device.

HIGHLIGHTS

- CODESYS V3 development environment fully compliant to IEC61131-3.

- Configurable network adapter as a MODBUS TCP Client/Server or MODBUS RTU Master/Slave.

- Support of OPC Unified Architecture (OPC UA) and OPC Data Access (OPC DA).

- Integrated CODESYS WebVisu allows the visualisation of your application throughout standardized web browser technology.

- Increased memory size of 16 MB program and 16 MB of data memory for enhanced programming flexibility.

- Ability to connect and control up to 63 HX-RIO3 I/O modules for individual adjusting the system according to the industrial application.

Programmable Adapter

RIO3-CP3MBT		
CODESYS		Version 3.5.11.3
Memory	**Program Memory**	16 Mbytes
	Data Memory	16 Mbytes
	Non Volatile Memory	32 Kbytes
Program Laguages / Run Time System / RTC		IEC 61131-3 (LD, IL, ST, FBD, SFC, CFC) / Multiple PLC Tasks / Retain Time : 15 days
OPC UA, OPC Server (DA), Online Change, Breakpoint, Source Up/Download, File Transmit		supporting
Webvisualization		supporting
Process Time		7μsec (90 Instructions)
Max. Task / Max. Cycle Task / Max. Status Task		10
Controller Type (Master, Slave)		Modbus TCP/UDP (Master/Slave), Modbus RTU (Master/Slave)
Protocol		Ethernet Protocol (Modbus/TCP, Modbus/UDP), SNTP, HTTP (Webvisualization, Web-Server), DHCP/BOOTP, Serial Protocol (Modbus RTU)
Max. Node / Max. I/O Expansion / I/O Data Size		Limited by Ethernet specification / 63 Slots / Max 128 byte each slot
Baud Rate		Ethernet (10/100 Mbps) / Modbus RTU (2400~115200 bps)
Connector Type		2 x RJ-45
System Power		Supply voltage : 24 Vdc nominal (15~28.8 Vdc)
Field Power		Supply voltage : 24 Vdc typical (Max. 32 Vdc)
Power Dissipation / Current for I/O Module		110mA typical @ 24 Vdc / 1.5 A @ 5 Vdc
Dimensions		54mm x 99mm x 70mm

Digital I/O

The HX-RIO3 digital input and output modules support the efficient detection and switching of logic states within industrial applications.

HIGHLIGHTS

- Spring type terminals up to 16 I/O points for simplified wiring and maintenance.

- Connector type up to 32 I/O points for an effective cost per I/O ratio for price sensitive applications.

- Digital Inputs modules available for 24 Vdc and 240 Vac.

- Digital Output modules available as transistor, mechanical relay or solid-state relay.

- Combined module containing sink input and source outputs in one module.

- Easy handling using the lever to lock or unlock the modules on DIN-rail mounting.

- Removable terminal block allows rewiring without interrupting the communication of subsequent modules.

Digital Input

Digital Output

Digital Input

Module	Channel	Type	Voltage	Signal Delay (OFF to ON / ON to OFF)	Power Dissipation	Connector
RIO3-XDP8	8	Universal	24 Vdc	0.3ms / 0.3ms	35mA	10 RTB
RIO3-XDP16C	16	Universal		0.3ms / 0.3ms	50mA	20P Connector
RIO3-XDP16T	16	Universal		0.3ms / 0.3ms	50mA	18 RTB
RIO3-XDP32C	32	Universal		0.2ms / 0.2ms	55mA	40P Connector
RIO3-XY16T	16	8 Sink Input / 8 Source Output		In: 0.3ms / 0.3ms Out: 0.1ms / 0.35ms	55mA	18 RTB
RIO3-XY16TF	16	16 channel individually selectable Input (Sink) or Output (Source)		In: 0.4ms / 0.5ms Out: 0.3ms / 0.5ms	55mA	18 RTB
RIO3-XAH4	4	AC Input	240 Vac	30ms / 140ms	30mA	10 RTB

Digital Output

Module	Channel	Type	Voltage	Signal Delay (OFF to ON / ON to OFF)	Power Dissipation	Connector
RIO3-YTP8	8	Source	24 Vdc	0.3ms / 0.3ms	40mA	10 RTB
RIO3-YTP16C	16			0.3ms / 0.3ms	50mA	20P Connector
RIO3-YTP16T	16			0.3ms / 0.3ms	50mA	18 RTB
RIO3-YTP32C	32			0.3ms / 0.5ms	65mA	40P Connector
RIO3-YS4	4	MOS Relay (Solid State)	240 Vac / 240 Vdc	0.6ms / 3ms	80mA	10 RTB
RIO3-YS8	8			0.5ms / 2.5ms	130mA	18 RTB
RIO3-YR4	4	Relay Output (Form A, SPST)	0~32 Vdc / 48 Vdc / 110 Vdc / 240 Vac	5ms / 8 ~ 15ms	35mA	10 RTB

Analog I/O

The HX-RIO3 analog input and output modules captures signals from sensors which can measure surrounding factors such as temperature, pressure or flow rate.

HIGHLIGHTS

- Spring type terminal up to 16 I/O as well as cost effective connector type modules up to 32 I/O points are available.

- Analog voltage and current I/O modules supporting 12 bit resolution or for precise applications up to 16 bit.

- Analog voltage I/O modules supporting for ranges 1-5 V, 0-5 V, 0-10 V and -10 V to +10 V.

- Analog current I/O for ranges 0-20mA and 4-20mA.

- Temperature measuring using 4 or 8 points Resistance Temperature Device (RTD) or 4 points Thermocouple inputs modules.

- AC measurement module to measure voltage and current in a 3 phase environment.

Analog Input

AX8V

8 input channel overview panel

Analog Output

AY8V

8 output channel overview panel
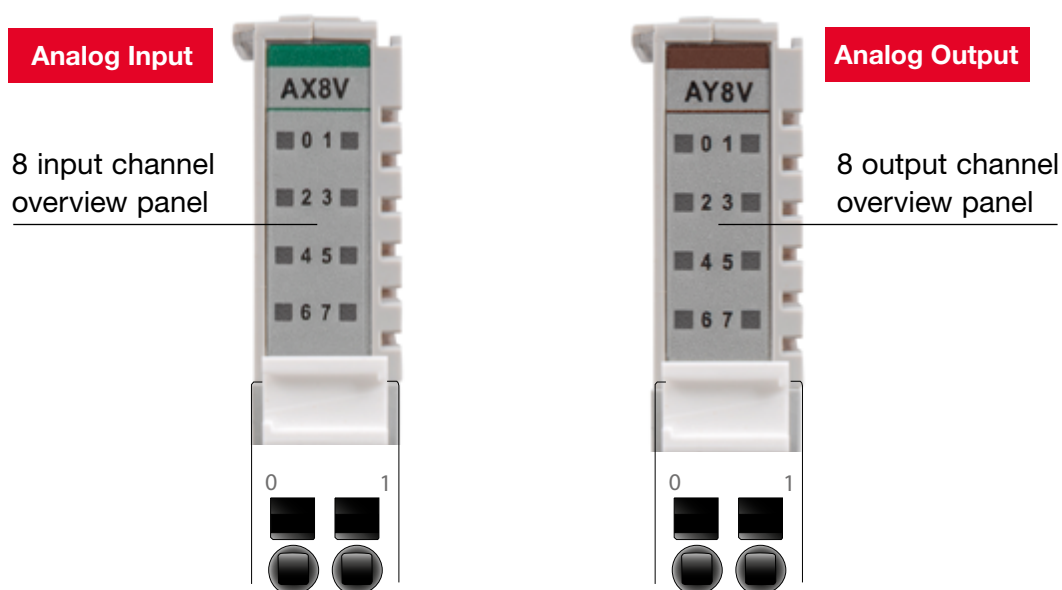
Analog Input

Load Cell	Channel	Type	Range	Resolution	Power Dissipation	Connector
RIO3-LDC2	2	Strain Gauge	-150~150mV	24 bit	25mA	18 RTB

Single Ended	Channel	Type	Range	Resolution	Power Dissipation	Connector
RIO3-AX4I	4	Current	0~20, 4~20mA	12 bit	25mA	10 RTB
RIO3-AXH4I	4			16 bit	25mA	10 RTB
RIO3-AX8I	8			12 bit	30mA	10 RTB
RIO3-AXH8I	8			16 bit	30mA	10 RTB
RIO3-AX16IC	16			12 bit	30mA	20P Connector
RIO3-AX16IT	16			12 bit	200mA	18 RTB
RIO3-AX4V	4	Voltage	0~10, 0~5, 1~5 Vdc	12 bit	25mA	10 RTB
RIO3-AXH4V	4			16 bit	25mA	10 RTB
RIO3-AX8V	8			12 bit	30mA	10 RTB
RIO3-AXH8V	8			16 bit	30mA	10 RTB
RIO3-AX16VC	16			12 bit	30mA	20P Connector
RIO3-AX16VT	16			12 bit	210mA	18 RTB
RIO3-AX4V	4	Voltage (Differential type)	0~10, 0~5, -10~+10, -5~+5 Vdc	12 bit	100mA	10 RTB

AC Measurement	Channel	Type	Range	Resolution	Power Dissipation	Connector
RIO3-E3AC	1	AC Measurement	VLN = 288 VAC, VLL = 500 VAC	24 bit	125mA	10 RTB

| Temperature	Channel	Type	Sensor Type	Accuracy	Power Dissipation	Connector
RIO3-RTD4T	4	RTD	PT50, PT100, PT200, PT500, PT1000, JPT50, JPT100, JPT200, JPT500, JPT1000, NI100, NI120, NI200, NI500, NI1000, NI1000LG	±0.1% @ 25°C ±0.3% @ -40~70°C	130mA	10 RTB
RIO3-RTD8C	8				130mA	20P Connector
RIO3-TC4T	4	Thermocouple	Type K/J/T/B/R/S/E/N/L/U/C/D, 10uV/1uV/2uV	±0.1% @ 25°C ±0.3% @ -40~70°C	120mA	10 RTB

Analog Output

Single Ended	Channel	Type	Range	Resolution	Power Dissipation	Connector
RIO3-AY4I	4	Current	4~20mA	12 bit	30mA	10 RTB
RIO3-AYH4I	4			16 bit		10 RTB
RIO3-AY8I	8			12 bit		10 RTB
RIO3-AY4V	4	Voltage	0~10 Vdc	12 bit		10 RTB
RIO3-AYH4V	4			16 bit		10 RTB
RIO3-AY8V	8			12 bit		10 RTB
RIO3-AY16VC	16			12 bit		20P Connector
RIO3-AY16VT	16			12 bit		18 RTB

Special I/O & Power Modules

The HX-RIO3 special modules allows remote I/O integration into industrial use cases where the scope goes beyond standard digital or analog input and output modules.

HIGHLIGHTS

- RIO3-LDC2 Load Cell module allows integration into weight measurement application with a resolution of 24 bit.

- Fast two-phase counter module with 2 channels counting up to 750 kHz.

- Motion control solution by PWM and PO output modules as well as controlling stepper motors by using the dedicated RIO3-SMD stepper motor driver.

- Expand your remote I/O connectivity with the use of a wide range of power modules such as field and system power module or 0 Vdc / 24 Vdc common modules.
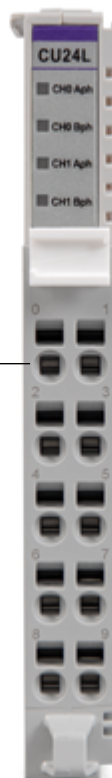
Special Modules

Encoder RIO3-CU24L
Type: High Speed Counter

Special Modules

Module	Channel	Type	Voltage	Frequency (Encoder)	Power Dissipation	Connector
RIO3-CU24	2	High Speed Counter	24 Vdc	0-750 kHz	120mA	18 RTB
RIO3-CU24L	2	High Speed Counter	24 Vdc	0-600 kHz	65mA	10 RTB

Serial Interface	Channel	Type	Voltage	Signal Delay	Power Dissipation	Connector
RIO3-RS232	1	RS-232	-18~18 V	TxD, RxD, Full Duplex	85mA	10 RTB
RIO3-RS485	1	RS-485	-	TxD, RxD, Half Duplex	85mA	10 RTB

Pulse	Channel	Type	Voltage	Frequency	Power Dissipation	Connector
RIO3-PWM2	2	PWM, Push-pull	24 Vdc	1-5 kHz	75mA	10 RTB
RIO3-PO2	2	Pulse Output, Push-pull	24 Vdc	1-300 kHz	75mA	10 RTB

Stepper	Channel	Type	Voltage	Mode	Power Dissipation	Connector
RIO3-SMD	1	2-Phase Bipolar Motor, (Max. 16 microstepping)	24 Vdc	Instant Command, Position Table, Position (absolute/relative), Set Point Change, etc.	100mA	10 RTB

Power Modules

Module	Type	Voltage	Power Dissipation	Connector
RIO3-SHD	Shield Module	24 Vdc	30mA	10 RTB
RIO3-0VDC	Common for 0 Vdc		30mA	10 RTB
RIO3-24VDC	Common for 24 Vdc		30mA	10 RTB
RIO3-VDC	Common for 0 Vdc, 24 Vdc		30mA	10 RTB
RIO3-PSD	Power Expansion, In 24 Vdc, Out 1 A / 5 Vdc		30mA	10 RTB
RIO3-PS	Field Power, 5 / 24 / 48 Vdc, 110 / 220 Vac		30mA	10 RTB

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