R95C 8-Port 2-Channel Discrete and Analog In-Out IO-Link Hub Product Manual

Original Instructions
p/n: 234456 Rev. B
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ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

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Chapter 1 Features



- Compact IO-Link device converter with the ability to send 4 ports of discrete input and 4 ports of analog input data (voltage or current) to an IO-Link Master
- The IO-Link Master Process Data Output can also output discrete values and analog outputs (voltage or current) through any of the respective sets of 4 ports
- 2-Channel Discrete Features:
  - Enabled Delay Modes: ON/OFF Delay, ON/OFF One-shot, ON/OFF/Retriggerable One-shot, ON/OFF Pulse-stretcher and Totalizer
  - Measurement Metrics: Count, Events Per Minute (EPM), and Duration
  - Discrete input/output can be independently configured as NPN or PNP
  - Discrete Mirroring: Discrete signals (In/Out) from the four discrete ports can be mirrored to any of the output channels of the four discrete ports
  - PFM output of 0 Hz to 600 Hz can be selected on either or both discrete output channels
- Analog In/Out Features:
  - Analog Out Mirroring: The analog input from all four analog ports can be mirrored as an output to any of the four analog ports
  - PFM Output: The analog input from all four analog ports can be mirrored as PFM outputs to any of the four discrete ports.
- Rugged overmolded design meets IP65, IP67, and IP68
- Connects directly to a sensor or anywhere in-line for ease of use
- R95C IO-Link hubs are a quick, easy, and economical way to integrate non-IO-Link devices into an IO-Link system

Models

Model Number	Function	Converter Type	Control	Connectors
R95C-4B4UI-KQ	Converter	8-ports: 4B: 4 ports, bimodal discrete input/output 4UI: 4 ports, analog input/output	IO-Link	Integral 4-pin M12 quick-disconnect connectors

Overview

The R95C 8-Port 2-Channel Discrete and Analog In/Out IO-Link Hub provides a mix of both discrete input/output and analog input/output functionality distributed to two sets of 4-ports.

Ports 1 through 4 contain the discrete functionality, and Ports 5 through 8 contain the analog functionality. These two sets of ports can be monitored and configured using an IO-Link master.

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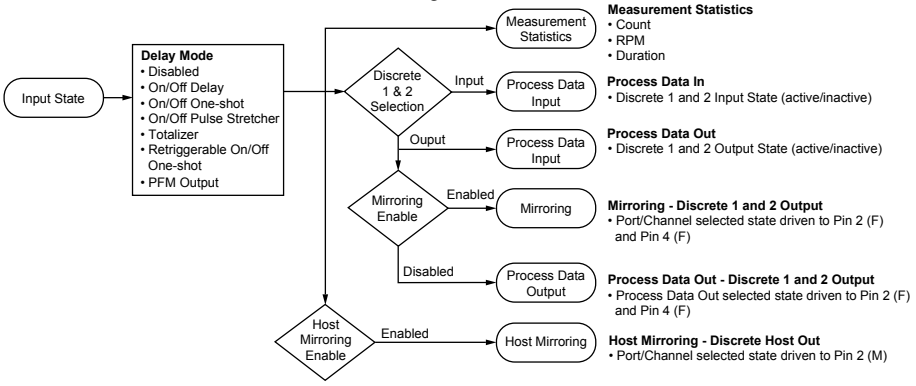
Chapter 2 Configuration

For more information, see P/N 234458 *R95C-4B4UI-KQ IO-Link Data Reference Guide* and P/N 234457 *R95C-4B4UI-KQ IODD Files*.

Discrete In/Out Configuration

Ports 1 through 4 contain discrete functionality. The figure below details the logic flow for each of the four bimodal discrete in/out ports, and the tables define the configuration for each pin of the four bimodal ports.

Logic Flow



Measurements – Female Pins

Port 1-Port 4 Pin Number: Description	IO Metric	Description
Pin 4 – Discrete 1 **Pin 2 – Discrete 2**	Count Value	Running count of the received input pulses
	Duration Value	Duration of the last input pulse in µs with 500 µs granularity
	Events per Minute Value	Running count of the number of pulses received averaged over one minute Range: 1 to 12,000
	Reset Metrics	• Do Not Reset • Reset

Pin Configuration – Female Input

Port 1-Port 4 Pin Number: Description	Name	Values
Pin 4 – Discrete 1 **Pin 2 – Discrete 2**	Discrete I/O Selection	• NPN Input • PNP Input • NPN Output with Pull Up • PNP Output with Pull Down • NPN Output with Push/Pull • PNP Output with Push/Pull

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Port 1-Port 4 Pin Number: Description	Name	Values
	Discrete Delay Mode	• Disabled • On/Off Delay • On/Off One-shot • On/Off Pulse-stretcher • Totalizer • Retriggerable On/Off One-shot • PFM Output
	Discrete Delay Timer 1	Discrete On Delay, One-shot, Pulse-Stretcher Time, or Totalizer Count
	Discrete Delay Timer 2	Discrete Off Delay or Totalizer Time
	Mirroring Enable	• Disabled • Enabled
	Mirroring Port Selection	If Port 1-4, then discrete mirroring occurs If Port 5-8, then PFM of Analog In port occurs
	Mirroring Channel Selection	• Pin 4 – Discrete 1 • Pin 2 – Discrete 2
	Mirroring Inversion	• Not Inverted • Inverted

Pin Configuration – Male Output

Pin Number: Description	Name	Values
Pin 2 – Discrete Host Out	Host Mirroring Enable	• Disabled • Enabled
	Host Mirroring Port Selection	If Port 1-4, then discrete mirroring occurs If Port 5-8, then PFM of Analog In port occurs
	Host Mirroring Channel Selection	• Pin 4 – Discrete 1 • Pin 2 – Discrete 2
	Host Mirroring Inversion	• Not Inverted • Inverted
	Host Mirroring Polarity	• PNP • NPN
	Host Mirroring Output Type	• Open Collector • Push/Pull

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Analog In/Out Configuration

Ports 5 through 8 contain analog functionality.

Analog In
When an analog input value is received in Ports 5 through 8, the numerical representational value is sent to an IO-Link master via Process Data In (PDI).

PDI Analog Input Ranges:

- Voltage = 0 mV to 11,000 mV
- Current = 0 µA to 24,000 µA

Analog Out
Ports 5 through 8 also allow for the user to output an analog value by sending the numerical analog value from the IO-Link Master via Process Data Out (PDO).

PDO Analog Ranges:

- Voltage = 0 mV to 11,000 mV
- Current = 0 µA to 24,000 µA

PDO Outside Valid Range (POVR)
If the PDO value sent to this converter is outside of the PDO Analog Range value, then the actual analog output value will be set to one of the three selectable POVR levels after a 2 second delay:

- Low (default): 0 V or 3.5 mA
- High: 10.5 V or 20.5 mA
- Hold: Level retains previous value indefinitely

NOTE: If a connected IO-Link sensor is changed back to SIO mode, then the previous value will be held.

IO-Link®

IO-Link® is a point-to-point communication link between a master device and a sensor and/or light. It can be used to automatically parameterize sensors or lights and to transmit process data. For the latest IO-Link protocol and specifications, please visit www.io-link.com.

For the latest IODD files, please refer to the Banner Engineering Corp website at: www.bannerengineering.com.

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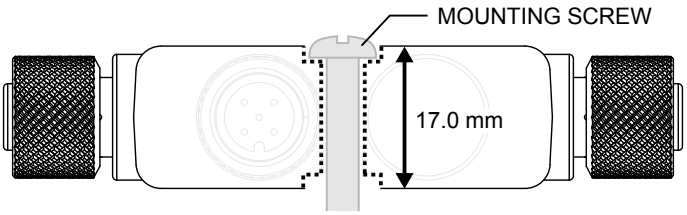
Chapter 3 Mechanical Installation

Install the R95C to allow access for functional checks, maintenance, and service or replacement. Do not install the R95C in such a way to allow for intentional defeat.

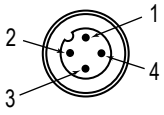
Fasteners must be of sufficient strength to guard against breakage. The use of permanent fasteners or locking hardware is recommended to prevent the loosening or displacement of the device. The mounting hole (4.5 mm) in the R95C accepts M4 (#8) hardware.

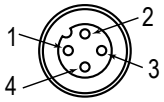
See the figure below to help in determining the minimum screw length.

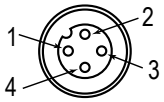


CAUTION: Do not overtighten the R95C's mounting screw during installation. Overtightening can affect the performance of the R95C.

Wiring

Male	Pin	Signal Description
	1	18 V DC to 30 V DC
	2	Banner-specific
	3	Ground
	4	IO-Link

Port 1-Port 4 — Female	Pin	Signal Description
	1	18 V DC to 30 V DC
	2	Discrete 2 (IN/OUT)
	3	Ground
	4	Discrete 1 (IN/OUT)

Port 5-Port 8 — Female	Pin	Signal Description
	1	18 V DC to 30 V DC
	2	Analog In
	3	Ground
	4	Analog Out

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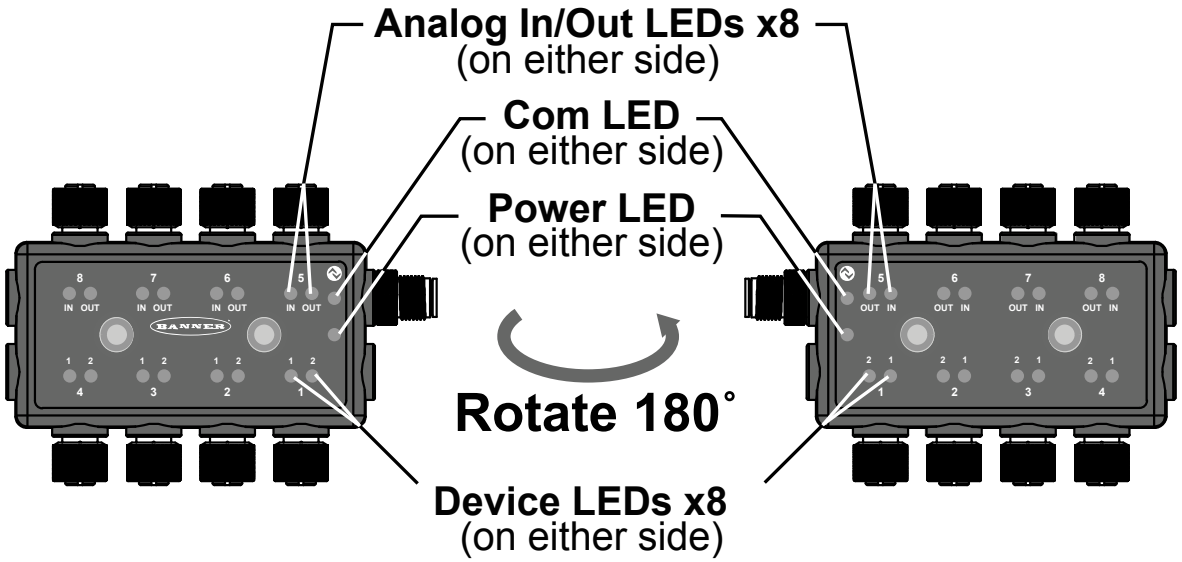
Chapter 4 Status Indicators

On both sides of the R95C IO-Link hub, Ports 1 through 4 have two matching amber LED discrete output indicators, and Ports 5 through 8 have two matching amber LED analog in/analog out indicators. There is also an additional amber LED indicator on both sides of the converter, which is specific to the IO-Link communication, and a green LED indicator that shows power status.



LED 1 = Discrete 1 In/Out
LED 2 = Discrete 2 In/Out

LED	Indication	Status
Discrete Device Amber LEDs	Off	Discrete In and Out are inactive
	Solid Amber	Discrete In or Out is active
Analog In Amber LED[1]	Off	Analog current value is less than setpoint SP1 OR analog value is greater than setpoint SP2
	Solid Amber	Analog current value is between setpoint SP1 AND setpoint SP2
Analog Out Amber LED	Off	Turns off if written PDO analog value is outside the allowable output range **Allowable Voltage Range:** 0 V to 10 V. **Allowable Current Range:** 4 mA to 20 mA.
	Solid Amber	Turns on if written PDO analog value is inside the allowable output range **Allowable Voltage Range:** 0 V to 10 V. **Allowable Current Range:** 4 mA to 20 mA.
IO-Link Communication Amber LED	Off	IO-Link communications are not present

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[1] **Default Current Values:** SP1 = 0.004 A, SP2 = 0.02 A. **Default Voltage values:** SP1 = 0 V, SP2 = 10 V.

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LED	Indication	Status
	Flashing Amber (900 ms On, 100 ms Off)	IO-Link communications are active
Power Indicator Green LED	Off	Power off
	Solid Green	Power on

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Supply Voltage
18 V DC to 30 V DC at 400 mA maximum (exclusive of load)

Power Pass-Through Current
Not to exceed 4 amps total

Discrete Output Load Rating
200 mA

Analog Input Impedance
Current version: Approximately 250 Ω
Voltage version: Approximately 14.3k Ω

Analog Output Load Requirements
Voltage version = Resistance > 1000 Ω
Current version = Resistance < 500 Ω

Supply Protection Circuitry
Protected against reverse polarity and transient voltages

Leakage Current Immunity
400 µA

Indicators
Green: Power
Amber: IO-Link communications
Amber: 2x Discrete IN/OUT status
Amber: Analog input value present
Amber: Analog output value in range

Connections
(8) Integral 4-pin M12 female quick-disconnect connectors
(1) Integral 4-pin M12 male quick-disconnect connector

Construction
Coupling Material: Nickel-plated brass
Connector Body: PVC translucent black

Vibration and Mechanical Shock
Meets IEC 60068-2-6 requirements (Vibration: 10 Hz to 55 Hz, 0.5 mm amplitude, 5 minutes sweep, 30 minutes dwell)
Meets IEC 60068-2-27 requirements (Shock: 15G 11 ms duration, half sine wave)

Environmental Rating
IP65, IP67, IP68
UL Type 1

Operating Conditions
Temperature: –40 °C to +70 °C (–40 °F to +158 °F)
90% at +70 °C maximum relative humidity (non-condensing)
Storage Temperature: –40 °C to +80 °C (–40 °F to +176 °F)

Required Overcurrent Protection

WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

Overcurrent protection is required to be provided by end product application per the supplied table.

Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.

Supply wiring leads < 24 AWG shall not be spliced.

For additional product support, go to www.bannerengineering.com.

Supply Wiring (AWG)	Required Overcurrent Protection (A)	Supply Wiring (AWG)	Required Overcurrent Protection (A)
20	5.0	26	1.0
22	3.0	28	0.8
24	1.0	30	0.5

Certifications

Banner Engineering BV
Park Lane, Culliganlaan 2F bus 3
1831 Diegem, BELGIUM

Turck Banner LTD Blenheim House
Blenheim Court
Wickford, Essex SS11 8YT
GREAT BRITAIN

Product Identification

FCC Part 15 Class B for Unintentional Radiators

(Part 15.105(b)) This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

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- Consult the dealer or an experienced radio/TV technician for help.

(Part 15.21) Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

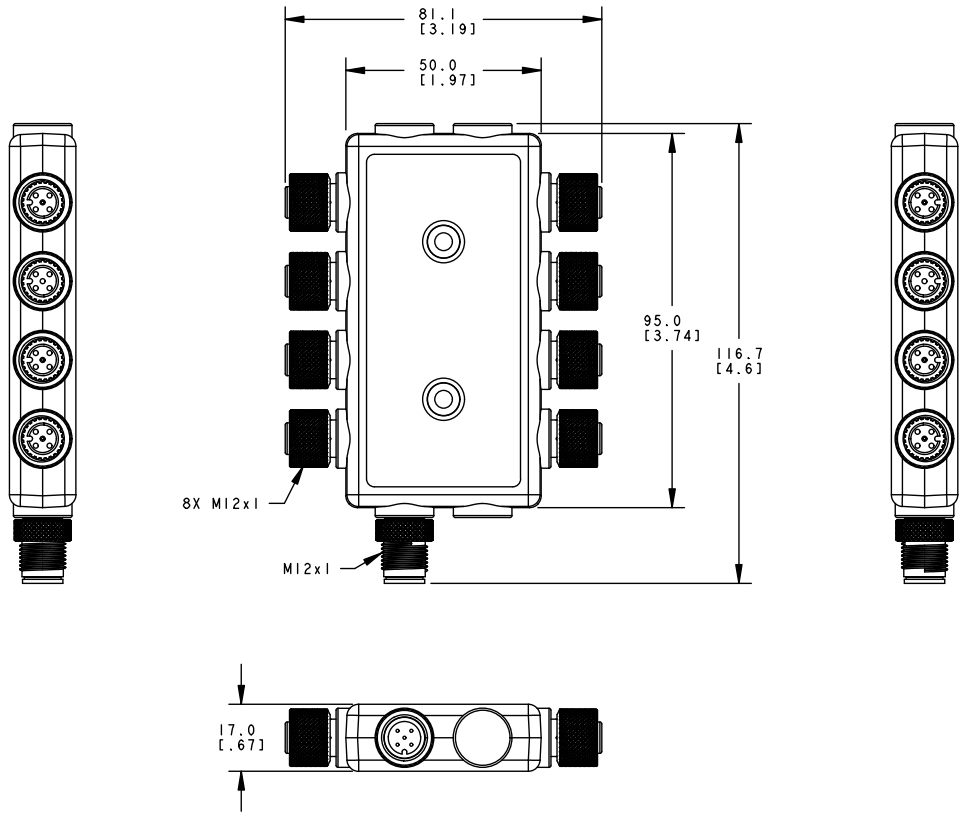
Industry Canada ICES-003(B)

This device complies with CAN ICES-3 (B)/NMB-3(B). Operation is subject to the following two conditions: 1) This device may not cause harmful interference; and 2) This device must accept any interference received, including interference that may cause undesired operation.

Cet appareil est conforme à la norme NMB-3(B). Le fonctionnement est soumis aux deux conditions suivantes : (1) ce dispositif ne peut pas occasionner d'interférences, et (2) il doit tolérer toute interférence, y compris celles susceptibles de provoquer un fonctionnement non souhaité du dispositif.

Dimensions

All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.



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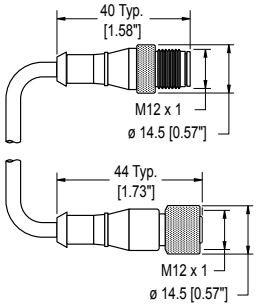
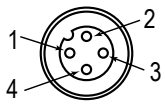
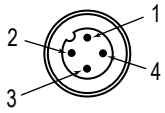
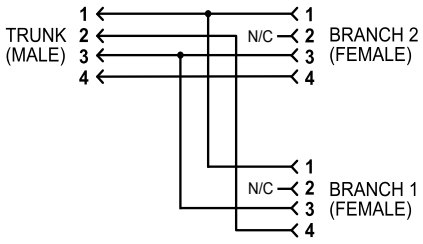
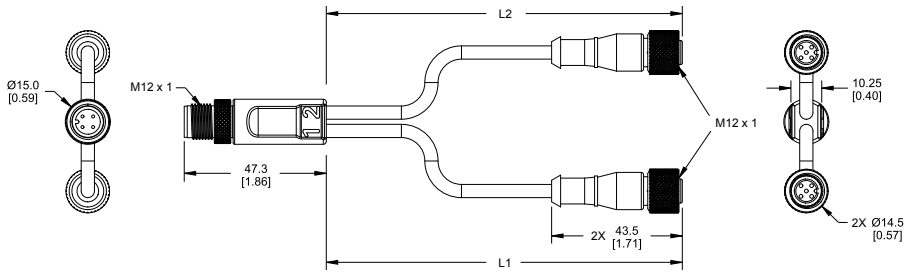
Cordsets

4-Pin Double-Ended M12 Female to M12 Male Cordsets				
Model	**Length**	**Style**	**Dimensions**	**Pinout**
MQDEC-401SS	0.31 m (1 ft)	Male Straight/Female Straight		Female  Male  1 = Brown 2 = White 3 = Blue 4 = Black
MQDEC-403SS	0.91 m (2.99 ft)			
MQDEC-406SS	1.83 m (6 ft)			
MQDEC-412SS	3.66 m (12 ft)			
MQDEC-415SS	4.58 m (15 ft)			
MQDEC-420SS	6.10 m (20 ft)			
MQDEC-430SS	9.14 m (30.2 ft)			
MQDEC-450SS	15.2 m (49.9 ft)			

4-Pin M12 Male to 5-Pin M12 Female Splitter Cordset		
Model	**Branches (Female)**	**Wiring**
S15YA4-M124-M124-0.2M	**L1, L2** 2 × 0.2 m (7.9 in)	



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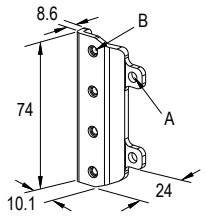
Brackets

SMBR90S

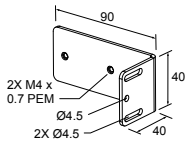
- Stainless steel bracket
- 4x M4-07 pemnuts (B)
- Includes 2x M4 stainless steel hex head screws and flat washers

Hole center spacing: A = 40, B = 20
Hole size: A = ø 5



SMBR95RA

- Stainless steel right-angle bracket
- M4 x 0.7 mm #316SS screws (qty 2)



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Chapter 7 Product Support and Maintenance

Clean with Mild Detergent and Water

Wipe down the device with a soft cloth that has been dampened with a mild detergent and warm water solution.

Repairs

Contact Banner Engineering for troubleshooting of this device. **Do not attempt any repairs to this Banner device; it contains no field-replaceable parts or components.** If the device, device part, or device component is determined to be defective by a Banner Applications Engineer, they will advise you of Banner's RMA (Return Merchandise Authorization) procedure.

> **IMPORTANT:** If instructed to return the device, pack it with care. Damage that occurs in return shipping is not covered by warranty.

Contact Us

Banner Engineering Corp. headquarters is located at: 9714 Tenth Avenue North | Plymouth, MN 55441, USA | Phone: + 1 888 373 6767

For worldwide locations and local representatives, visit www.bannerengineering.com.

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