BANNER R95C-4B4UI-KQ 8 Port 2 Channel Discrete and Analog IO Link Hub Instruction Manual

Contents

BANNER R95C-4B4UI-KQ 8 Port 2 Channel Discrete and Analog IO-Link Hub

Specifications

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

Product Usage Instructions

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.

Configuration

For more detailed configurations, refer to 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. Follow the logic flow for each of the four bimodal discrete in/out ports and configure as needed based on the provided tables.

Analog In/Out Configuration

Ports 5 through 8 contain analog functionality. Utilize these ports for analog input/output operations.

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
- **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 over-moulded 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

Specifications

- **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

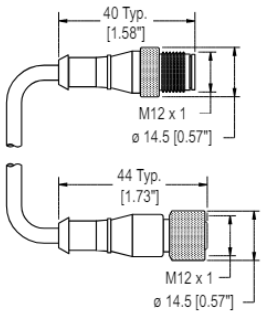
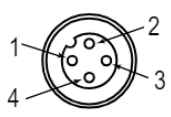
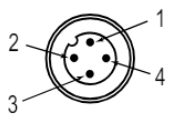
- **Supply Protection Circuitry**

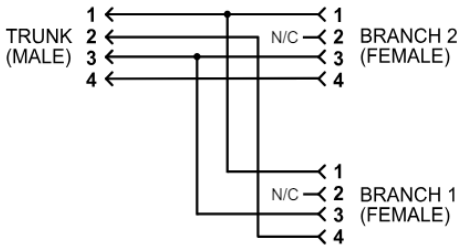
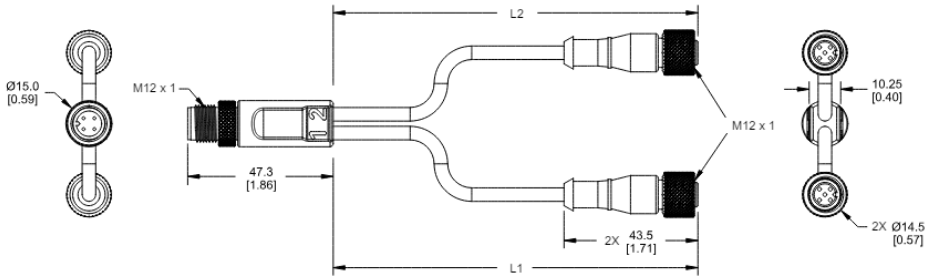
  Protected against reverse polarity and transient voltages
- **Leakage Current Immunity**

  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 the 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)

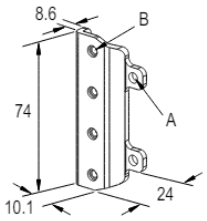
Accessories

Cordsets

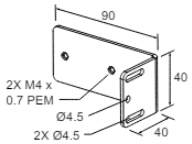
4-Pin Threaded M12 Cordsets—Double Ended				
Model	**Length**	**Style**	**Dimensions**	**Pinout**
MQDEC-401SS	0.31 m (1 ft)	Male Straight/Female Straight		Female  Male  1 = Brown 2 = White 3 = Blue 4 = Black
MQDEC-403SS	0.91 m (2.99 ft)			
MQDEC-406SS	1.83 m (6 ft)			
MQDEC-412SS	3.66 m (12 ft)			
MQDEC-415SS	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 Threaded M12 Male to 5-Pin Threaded M12 Female Splitter Cordset		
Model	**Branches (Female)**	**Wiring**
S15YA4-M124-M124-0.2M	**L1, L2** 2 × 0.2 m (7.9 in)	
		

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	

Brackets

SMBR95RA • Stainless steel right-angle bracket • M4 x 0.7 mm #316SS screws (qty 2)	

Overview

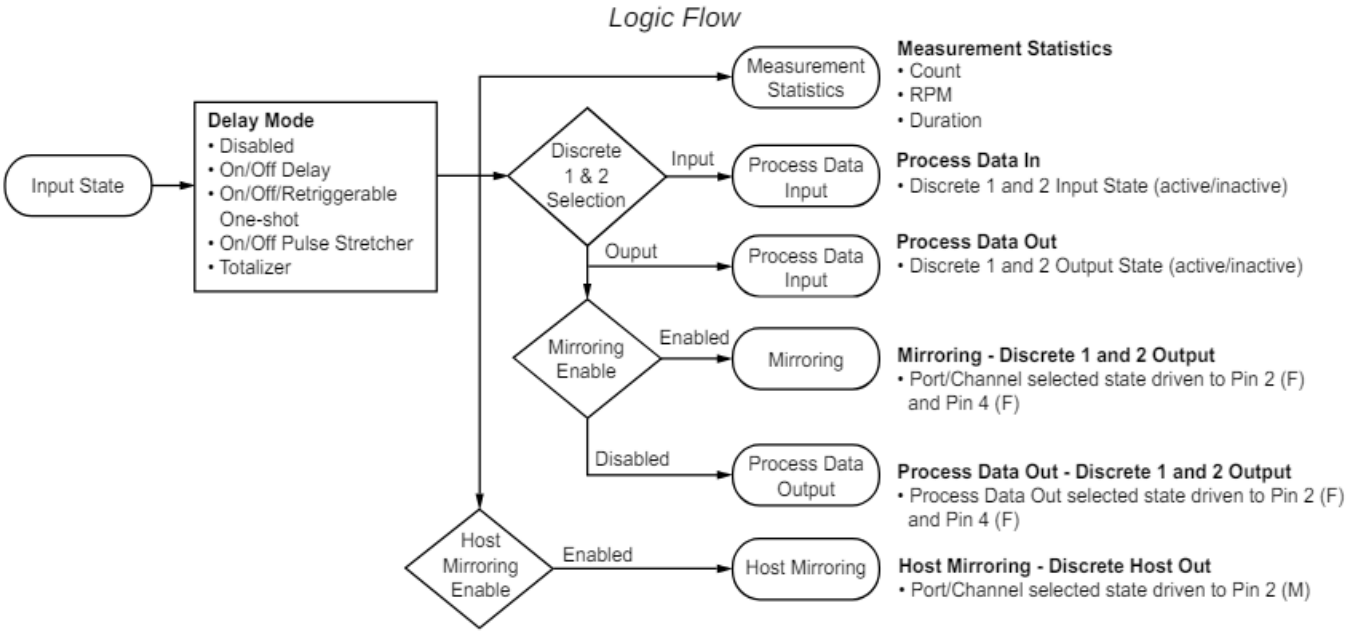
The R95C 8-Port 2-Channel Discrete and Analog In/Out IO-Link Hub provides a mix of both discrete input/output and analog input/output functionality distributed to two sets of 4-ports.
Ports 1 through 4 contain the discrete functionality, and Ports 5 through 8 contain the analog functionality. These two sets of ports can be monitored and configured using an IO-Link master.

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.



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**

	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
	Discrete Delay Mode	• Disabled • On/Off Delay • On One-shot • Off One-shot • On Pulse-stretcher • Off Pulse-stretcher • Totalizer • Retriggerable On One-shot • Retriggerable Off One-shot
Pin 4 – Discrete 1 **Pin 2 – Discrete 2**		
	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 o ccurs
		If Port 5-8, then PFM of Analog In p ort 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

Pin Number: Description	Name	Values
	Host Mirroring Output Type	• Open Collector • Push/Pull

Analog In/Out Configuration

Ports 5 through 8 contain analog functionality.

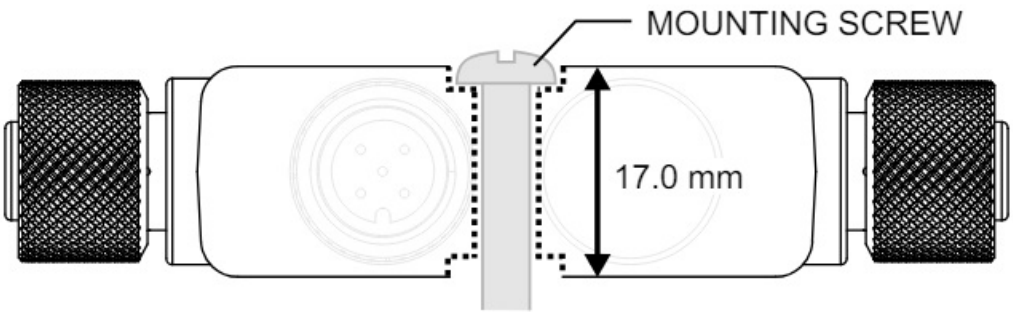
Analog In	Analog Out	PDO Outside Valid Range (POVR)
When an analog input value is received in Ports 5 through 8, the numerical representational value is sent to an IO-Link master via Process Data In (PDI).	Ports 5 through 8 also allow for the user to output an analog value by sending the numerical analog value from the IO-Link Master via Process Data Out (PDO).	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:
PDI Analog Input Ranges: • Voltage = 0 mV to 11,000 mV • Current = 0 µA to 24,000 µA	PDO Analog Ranges: • Voltage = 0 mV to 11,000 mV • Current = 0 µA to 24,000 µA	• 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**.

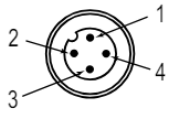
Mechanical Installation

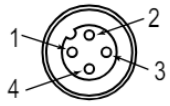
Install the R95C to allow access for functional checks, maintenance, and service or replacement. Do not install the R95C in such a way to allow for intentional defeat. Fasteners must be of sufficient strength to guard against breakage. The use of permanent fasteners or locking hardware is recommended 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.

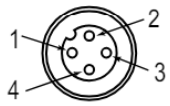


CAUTION: Do not overtighten the R95C's mounting screw during installation. Overtightening can affect the performance of the R95C.

Wiring

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

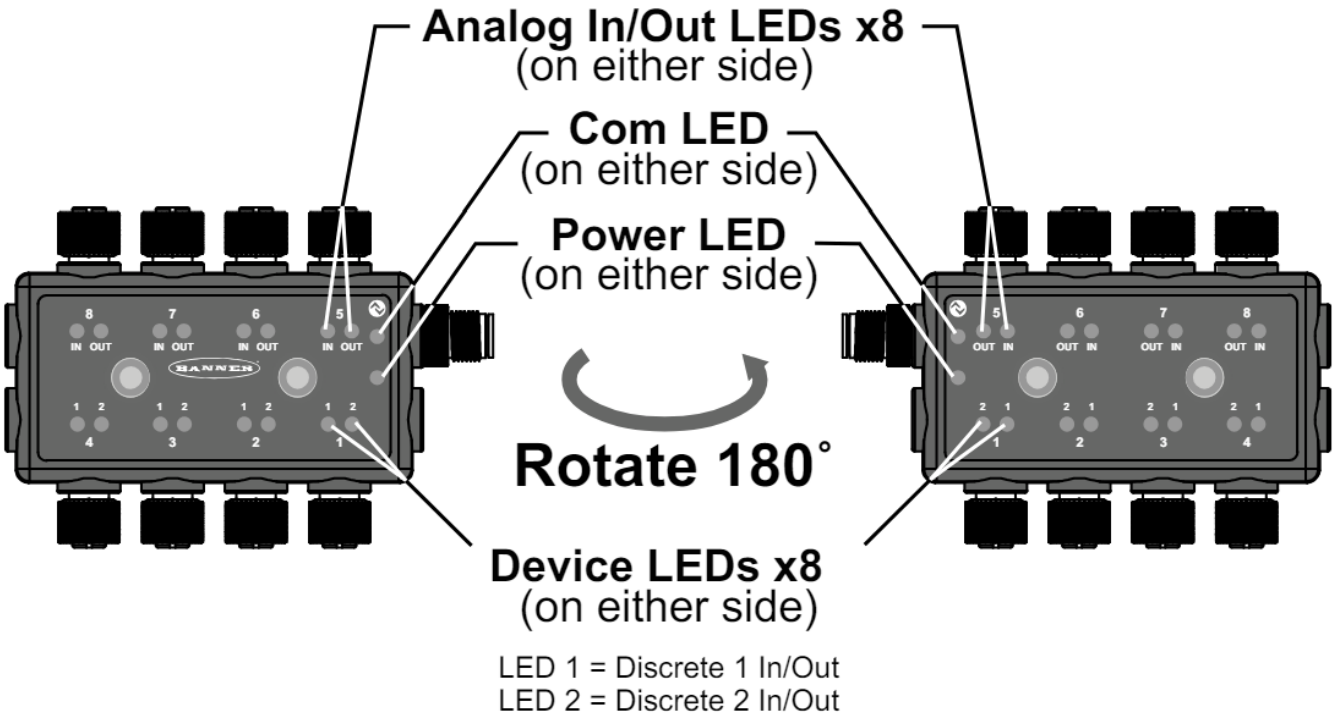
Port 1-Port 4 — Female	Pin	Signal Description
	1	18 V DC to 30 V DC
	2	Discrete 2 (IN/OUT)
	3	Ground
	4	Discrete 1 (IN/OUT)

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

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	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 i s 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 outp ut range **Allowable Voltage Range:** 0 V to 10 V. **Allowable Current Range:** 4 mA to 20 mA.

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

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

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.

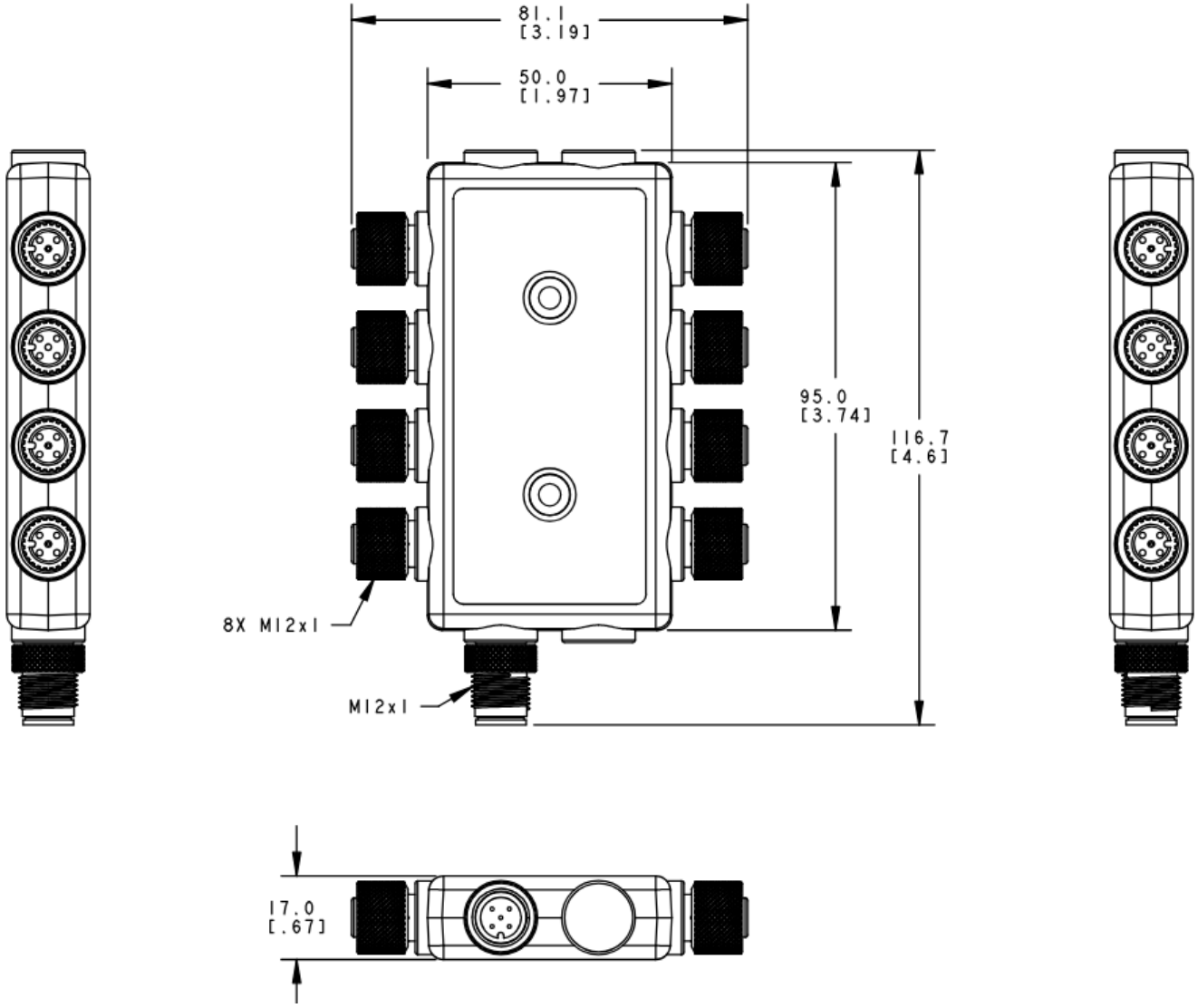
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. Consult the dealer or an experienced radio/TV technician for help.

(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.

Dimensions
All measurements are listed in millimeters [inches], unless noted otherwise.



Banner Engineering Corp Limited Warranty

- Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product

of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or improper application or installation of the Banner product.

- THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.
- This Warranty is exclusive and limited to repair or, at the discretion of Banner Engineering Corp., replacement. IN NO EVENT SHALL BANNER ENGINEERING CORP. BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR ANY EXTRA COSTS, EXPENSES, LOSSES, LOSS OF PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT OR FROM THE USE OR INABILITY TO USE THE PRODUCT, WHETHER ARISING IN CONTRACT OR WARRANTY, STATUTE, TORT, STRICT LIABILITY, NEGLIGENCE, OR OTHERWISE.
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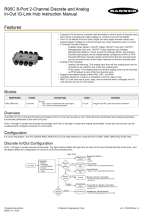
- For patent information, see **www.bannerengineering.com/patents**.

FAQ

Q: Can the discrete signals be mirrored to the analog output channels?
A: No, discrete signals can only be mirrored to the output channels of the discrete ports.

Q: How do I reset metrics on the R95C Hub?
A: To reset metrics, refer to the manual for specific instructions or contact customer support for assistance.

Documents / Resources

	**BANNER R95C-4B4UI-KQ 8 Port 2 Channel Discrete and Analog IO Link Hub** [pdf] Instruction Manual R95C-4B4UI-KQ 8 Port 2 Channel Discrete and Analog IO Link Hub, R95C-4B4UI-KQ, 8 Port 2 Channel Discrete and Analog IO Link Hub, 2 Channel Discrete and Analog IO Link Hub, Discrete and Analog IO Link Hub, Analog IO Link Hub, IO Link Hub, Hub

References

- Patents
- IO-Link
- User Manual