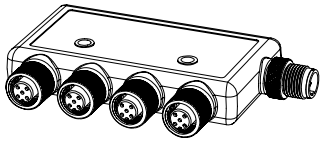
R90C 4-Port Discrete Bimodal to IO-Link Hub

Instruction Manual



- Compact bimodal to IO-Link device converter that connects discrete inputs and sends the value to the IO-Link Master
- Enabled Delay Modes: ON/OFF Delay, ON/OFF/Retriggerable One-shot, ON/OFF Pulse-stretcher and Totalizer
- Measurement Metrics: Count, Events Per Minute (EPM), and Duration
- Discrete Mirroring: Discrete signals (In/Out) from all four ports can be mirrored to any of the four ports, Discrete Out, or the host white wire output
- Outputs a discrete value as received from IO-Link Master Process Data Out
- Discrete input/output can be independently configured as NPN or PNP
- Rugged over-molded design meets IP65, IP67, and IP68
- Connects directly to a sensor or anywhere in-line for ease of use
- R90C IO-Link hubs are a quick, easy, and economical way to integrate non-IO-Link devices into an IO-Link system

Models

Housing	Function		Converter		Control	Connector
R90	C	–	4B21	–	K	Q
	C = Converter		4B21 = 4-port, bimodal, 2 inputs, 1 output		K = IO-Link	Q = M12 integral quick disconnect

Overview

The R90C-4B21-KQ hub connects two discrete channels to each of the four unique ports, providing access to monitoring and configuring those ports with an IO-Link master. Host mirroring is available where a selected port input/output discrete signal can be routed to Pin 2 (male) on the PLC/ Host connection.

Configuration

For more information, see P/N 221282 *R90C-4B21-KQ IO-Link Data Reference Guide* and P/N 221283 *R90C-4B21-KQ IODD Files*.

Figure 1. Logic Flow

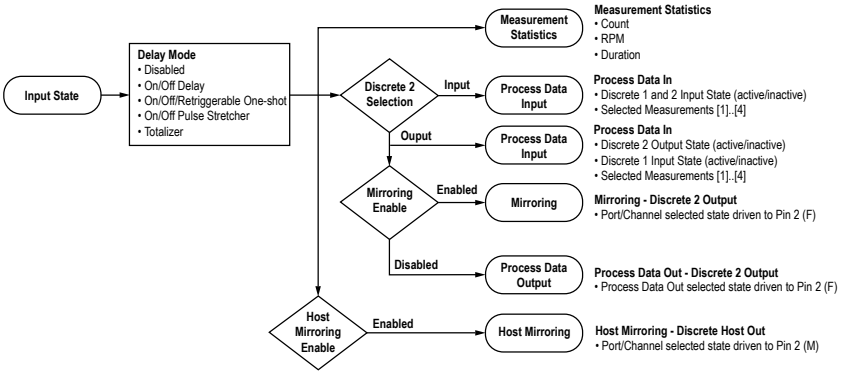


Table 1: Measurements – Female Pins

Port 1–Port 4 Pin Number – Description	IO Metric	Description
Pin 4 – Discrete 1	Count Value	Running count of the received input pulses
	Duration Value	Duration of the last input pulse in µs with 200 µs granularity
	Events per Minute Value	Running count of the number of pulses received averaged over one minute Range: 1 to 75,000
	Reset Metrics	• Do Not Reset • Reset
Pin 2 – Discrete 2	Count Value	Running count of the received input pulses
	Duration Value	Duration of the last input pulse in µs with 200 µs granularity

Original Document
221279 Rev. C

15 December 2022

221279

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

Port 1–Port 4 Pin Number – Description	IO Metric	Description
	Events per Minute Value	Running count of the number of pulses received averaged over one minute Range: 1 to 75,000
	Reset Metrics	• Do Not Reset • Reset

Table 2: Pin Configuration – Female Input

Port 1–Port 4 Pin Number – Description	Name	Values
Pin 4 – Discrete 1	I/O Selection	• NPN Input • PNP Input
	Discrete 1 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
	Discrete 1 Delay Timer 1	Discrete 1 On Delay, One-shot, Pulse-Stretcher Time, or Totalizer Count
	Discrete 1 Delay Timer 2	Discrete 1 Off Delay or Totalizer Time
Pin 2 – Discrete 2	I/O Selection	• NPN Input • PNP Input • NPN Output with Pull Up • PNP Output with Pull Down • NPN Output with Push/Pull [1] • PNP Output with Push/Pull [1]
	Discrete 2 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
	Discrete 2 Delay Timer 1	Discrete 2 On Delay, One-shot, Pulse-stretcher Time, Or Totalizer Count
	Discrete 2 Delay Timer 2	Discrete 2 Off Delay or Totalizer Time
	Mirroring Enable	• Disabled • Enabled
	Mirroring Port Selection	• Port 1 • Port 2 • Port 3 • Port 4
	Mirroring Channel Selection	• Pin 4 – Discrete 1 • Pin 2 – Discrete 2
	Mirroring Inversion	• Not Inverted • Inverted

Table 3: Pin Configuration – Male Output

Pin Number – Description	Name	Values
Pin 2 – Discrete Host Out	Host Mirroring Enable	• Disabled • Enabled
	Host Mirroring Port Selection	• Port 1 • Port 2 • Port 3 • Port 4
	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

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.

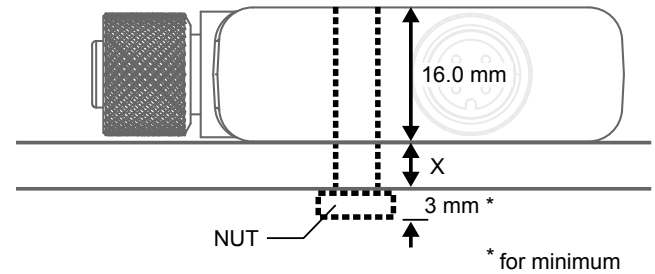
[1] When the Pin 2 - I/O Selection is NPN or PNP Output with Push/Pull, the corresponding output LEDs are energized.

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

Mechanical Installation

Install the R90C 4-Port Hub to allow access for functional checks, maintenance, and service or replacement.

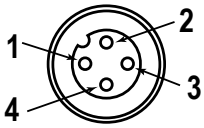
All mounting hardware is supplied by the user. Fasteners must be of sufficient strength to guard against breakage. Use of permanent fasteners or locking hardware is recommended to prevent the loosening or displacement of the device. The mounting hole (4.5 mm) in the R90C 4-Port Hub accepts M4 (#8) hardware. See the figure below to help in determining the minimum screw length.

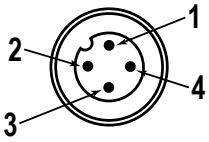


Screw Length = 16.0 mm + “X” mm + 3 mm

CAUTION: Do not overtighten the R90C 4-Port Hub's mounting screw during installation. Overtightening can affect the performance of the R90C 4-Port Hub.

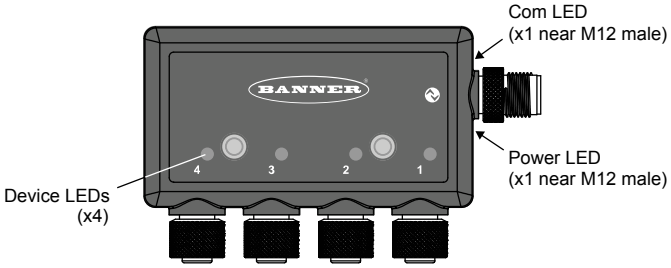
Wiring

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

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

Status Indicators

The R90C 4-Port Discrete Bimodal to IO-Link Hub has matching amber LED indicators on both sides for each discrete device port to allow for installation needs and still provide adequate indication visibility. There is also an additional amber LED indicator on both sides of the converter, which is specific to the IO-Link communication.



Discrete Device Amber LEDs	
Indication	**Status**
Off	Discrete OUT is inactive
Solid Amber	Discrete OUT is active

IO-Link Communication Amber LED	
Indication	**Status**
Off	IO-Link communications are not present
Flashing Amber (900 ms On, 100 ms Off)	IO-Link communications are active

Power Indicator Green LED	
Indication	**Status**
Off	Power off
Solid Green	Power on

Specifications

Supply Voltage
18 V DC to 30 V DC at 100 mA maximum

Power Pass-Through Current
1 A per port maximum

Discrete Output Load Rating
100 mA

Supply Protection Circuitry
Protected against reverse polarity and transient voltages

Leakage Current Immunity
400 µA

Indicators
Green: Power
Amber: IO-Link communications
Amber: Discrete OUT status

Connections
(4) Integral 4-pin M12 female quick disconnect
(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)

Certifications

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

Turck Banner LTD Blenheim House, Blenheim Court, Wickford, Essex SS11 8YT, Great Britain

Environmental Rating
IP65, IP67, IP68
NEMA/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

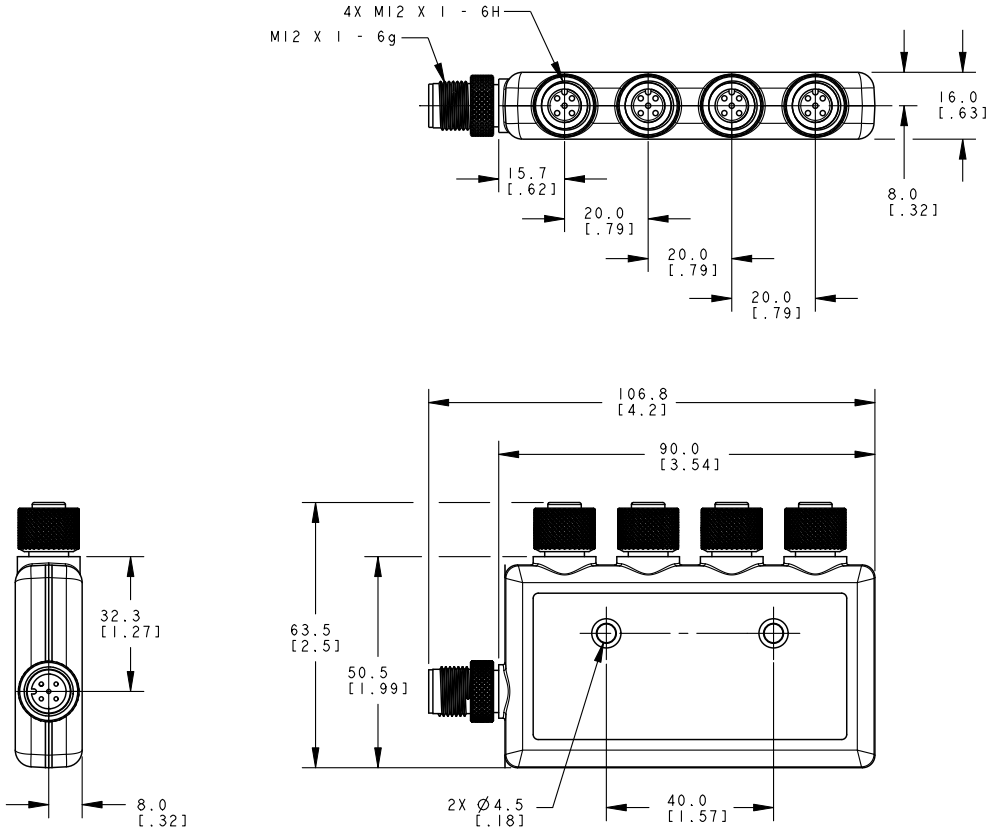
WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

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 (Amps)
20	5.0
22	3.0
24	2.0
26	1.0
28	0.8
30	0.5

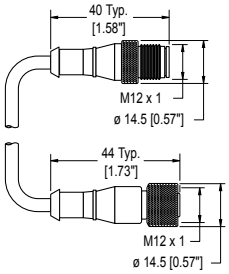
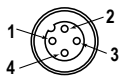
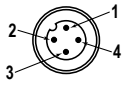
Dimensions

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



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-420SS	6.10 m (20 ft)			
MQDEC-430SS	9.14 m (30.2 ft)			
MQDEC-450SS	15.2 m (49.9 ft)			

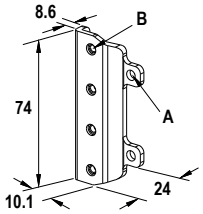
Brackets

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



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 the 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.**

Banner Engineering Corp. reserves the right to change, modify or improve the design of the product without assuming any obligations or liabilities relating to any product previously manufactured by Banner Engineering Corp. Any misuse, abuse, or improper application or installation of this product or use of the product for personal protection applications when the product is identified as not intended for such purposes will void the product warranty. Any modifications to this product without prior express approval by Banner Engineering Corp will void the product warranties. All specifications published in this document are subject to change; Banner reserves the right to modify product specifications or update documentation at any time. Specifications and product information in English supersede that which is provided in any other language. For the most recent version of any documentation, refer to: www.bannerengineering.com.

For patent information, see www.bannerengineering.com/patents.

FCC Part 15

This device complies with Part 15 of the FCC Rules. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. 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.

Industry Canada

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.

© Banner Engineering Corp. All rights reserved