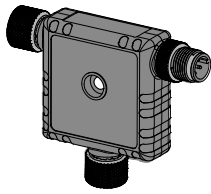


# R45C IO-Link to Dual Analog Input-Output Converter



## Instruction Manual



- Compact IO-Link device to analog converter that outputs an analog value, voltage or current, as presented by the IO-Link master
- The converter also connects to an analog source, voltage or current, and outputs the value to the IO-Link master and as a representative PFM output
- 4-pin M12 male quick-disconnect connector supports IO-Link
- Two 4-pin M12 female quick-disconnect connectors that each support analog inputs and outputs
- Rugged over-molded design meets IP65, IP67, and IP68
- Connects directly to a sensor or anywhere in-line for ease of use

## Models

Housing	Function	Male	Female 1	Female 2	Connector
R45	C	K	II	II	Q
	C = Converter	K = IO-Link	II = Analog 1 Current In/Current Out UU = Analog 1 Voltage In/Voltage Out	II = Analog 2 Current In/Current Out UU = Analog 2 Voltage In/Voltage Out	Q = Integral M12 quick disconnect



**Note:** Available models are analog current in/out, and analog voltage in/out.

## Overview

### Analog In

When an analog input value is received by this converter, the numerical representational value is sent to an IO-Link Master via Process Data In (PDI).

PDI Analog Ranges:

- Voltage = 0 mV to 10,000 mV
- Current = 4,000  $\mu$ A to 20,000  $\mu$ A

### Analog Out

This converter also allows 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  $\mu$ A to 24,000  $\mu$ A

### 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 the 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.

### PFM Out

Enables a PFM representation of an analog input as an output.

### PFM Input Source Channel

Selects the analog input value from Port 1 or Port 2 as the PFM output source.

### Pulse Frequency Configuration

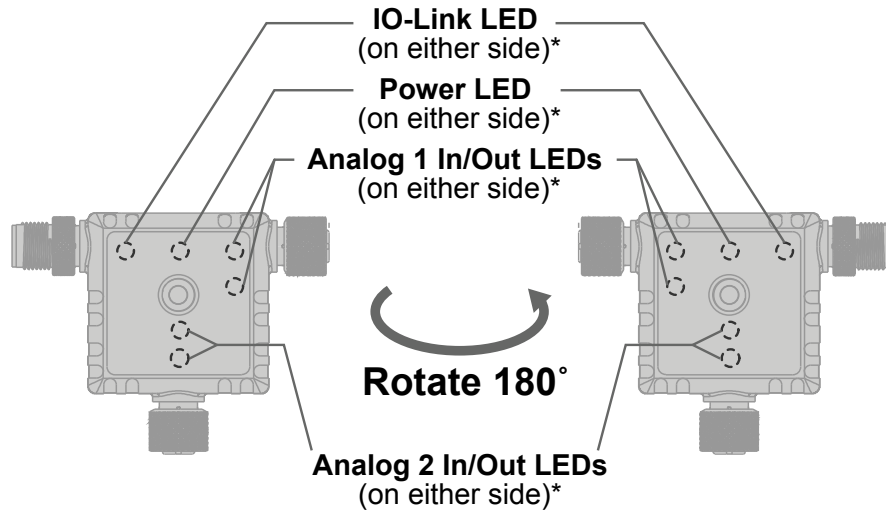
Sets the near and far frequency values.



## Status Indicators

The R45C IO-Link to Dual Analog Input-Output Converter has four amber LED indicators on both sides for IO-Link and analog communications to allow for installation needs and still provide adequate indication visibility. There is also a green LED indicator on both sides of the converter, which signals the device's power status.

Figure 1. R45C status indicators – front and back



\* Indicator LEDs are visible through translucent housing

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

Analog In Amber LED	
Indication	Status
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
Default Current Values:	Default Voltage Values:
<ul style="list-style-type: none"> <li>• SP1 = 0.004 A</li> <li>• SP2 = 0.02 A</li> </ul>	<ul style="list-style-type: none"> <li>• SP1 = 0 V</li> <li>• SP2 = 10 V</li> </ul>

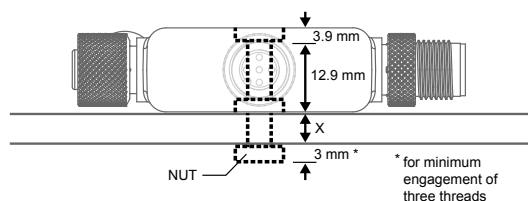
Analog Out Amber LED	
Indication	Status
Off	Turns off if written PDO analog value is outside the allowable output range
Solid Amber	Turns on if written PDO analog value is inside the allowable output range
Allowable Current Range: 0 mA to 24 mA	
Allowable Voltage Range: 0 V to 11 V	

## Installation Instructions

### Mechanical Installation

Install the R45C to allow access for functional checks, maintenance, and service or replacement. Do not install the R45C in such a way to allow for intentional defeat.

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 R45C accepts M4 (#8) hardware. See the figure below to help in determining the minimum screw length.



Screw Length (with screw head fitting in counterbore) = 12.9 mm + "X" mm + 3 mm



**CAUTION:** Do not overtighten the R45C's mounting screw during installation. Overtightening can affect the performance of the R45C.

## Wiring Diagrams

Male	Female	Pin	Wire Color
		1	Brown
		2	White
		3	Blue
		4	Black

Male (IO-Link Master)	Signal Description
Pin 1	18 V DC to 30 V DC
Pin 2	PFM/Banner-specific
Pin 3	Ground
Pin 4	IO-Link

Female (Analog 1)	Signal Description
Pin 1	18 V DC to 30 V DC
Pin 2	Analog 1 In
Pin 3	Ground
Pin 4	Analog 1 Out

Female (Analog 2)	Signal Description
Pin 1	18 V DC to 30 V DC
Pin 2	Analog 2 In
Pin 3	Ground
Pin 4	Analog 2 Out

## 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](http://www.io-link.com).

For the latest IODD files, please refer to the Banner Engineering Corp website at: [www.bannerengineering.com](http://www.bannerengineering.com).

## Configuration

The measured current value is available via Process Data as the measure value  $\mu\text{A}$ , and the voltage is available in mV.

For more information, see Banner P/N 228482 *R45C-KUUUI-UUIIQ IO-Link Data Reference Guide* and Banner P/N 228483 *R45C-KUUUI-UUIIQ IO-LINK IODD Files*.

## Specifications

### Supply Voltage

18 V DC to 30 V DC at 50 mA maximum

### Power Pass-Through Current

4 A maximum

### Analog Input Impedance

Current version: Approximately 450 ohms

Voltage version: Approximately 14.3K ohms

### Analog Output Load Resistance

Current version: 1 kilo-ohm maximum load resistance at 24 V DC

Maximum Load Resistance =  $[(V_{cc} - 4.5) \div 0.02 \text{ ohms}]$

Voltage version: 2.5 kilo-ohms minimum load resistance

### Supply Protection Circuitry

Protected against reverse polarity and transient voltages

### Leakage Current Immunity

400  $\mu\text{A}$

### Resolution

14 bits

### Connections

Integral male/female 4-pin M12 quick disconnect

### Construction

Coupling Material: Nickel-plated brass

Connector Body: PVC translucent black

### Environmental Rating

IP65, IP67, IP68

UL Type 1

### Operating Conditions

**Temperature:** -40 °C to +60 °C (-40 °F to +140 °F)

90% at +60 °C maximum relative humidity (non-condensing)

**Storage Temperature:** -40 °C to +80 °C (-40 °F to +176 °F)



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For patent information, see [www.bannerengineering.com/patents](http://www.bannerengineering.com/patents).

### FCC Part 15 Class 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.

### 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.