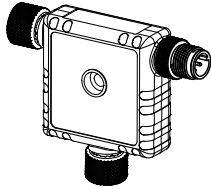


# R45C IO-Link to Analog Converter



## Datasheet



- Compact analog to IO-Link device 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
- 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	I	I	Q
	C = Converter	K = IO-Link	I = Analog Current Out U = Analog Voltage Out	I = Analog Current In U = Analog Voltage In	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

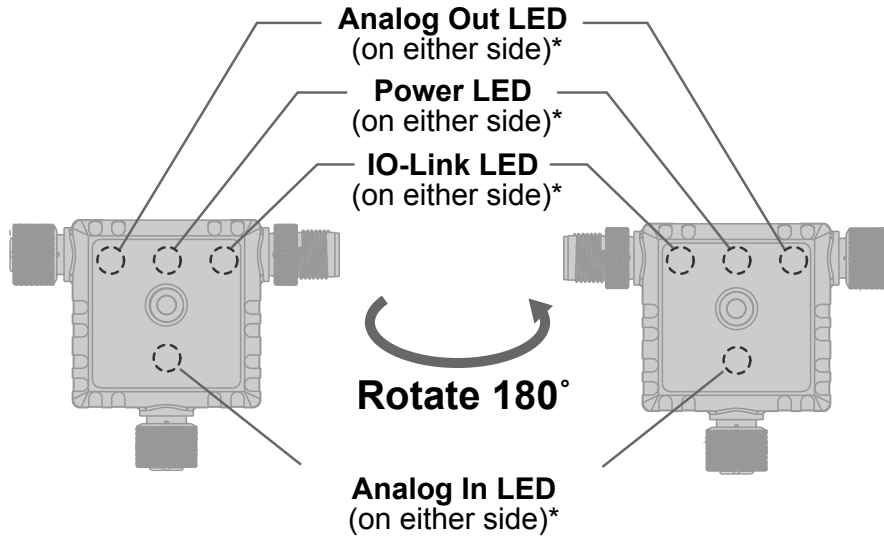
**Note:** If a connected IO-Link sensor is changed back to SIO mode, then the previous value will be held.



## Status Indicators

The R45C Analog to IO-Link Device Converter has two 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

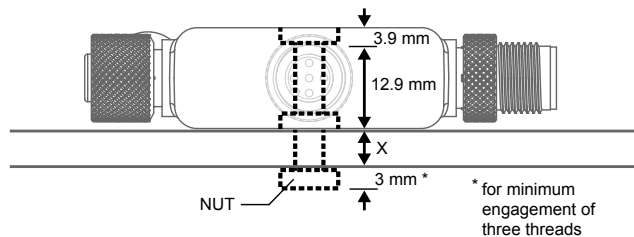
Analog In Amber LED		Analog Out Amber LED	
Indication	Status	Indication	Status
Off	Analog current value is less than setpoint SP1 OR analog value is greater than setpoint SP2	Off	Turns off if written PDO analog value is outside the allowable output range
Solid Amber	Analog current value is between setpoint SP1 AND setpoint SP2	Solid Amber	Turns on if written PDO analog value is inside the allowable output range
Default Current Values:	Default Voltage Values:	Allowable Current Range: 0 mA to 24 mA	Allowable Voltage Range: 0 V to 11 V
<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>		

## Installation Instructions

### Mechanical Installation

Install the R45C 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 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. Maximum torque 'TBD'.

## 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	Banner-specific
Pin 3	Ground
Pin 4	IO-Link

Female (Analog In)	Signal Description
Pin 1	18 V DC to 30 V DC
Pin 2	Analog In
Pin 3	Ground
Pin 4	Not Used

Female (Analog Out)	Signal Description
Pin 1	18 V DC to 30 V DC
Pin 2	Not Used
Pin 3	Ground
Pin 4	Analog 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 223174 *R45C Analog Converter (Voltage and Current) IO-Link Data Reference Guide* and Banner P/N 223171 *R45C-K-Analog 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

### Supply Protection Circuitry

Protected against reverse polarity and transient voltages

### Leakage Current Immunity

400  $\mu\text{A}$

### Resolution

14 bits

### Accuracy

0.5%

### Indicators

Green: Power  
Amber: IO-Link communications  
Amber: Analog input value present  
Amber: Analog output value in range

### Connections

Integral male/female 4-pin M12 quick disconnect

### 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

### 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](http://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



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

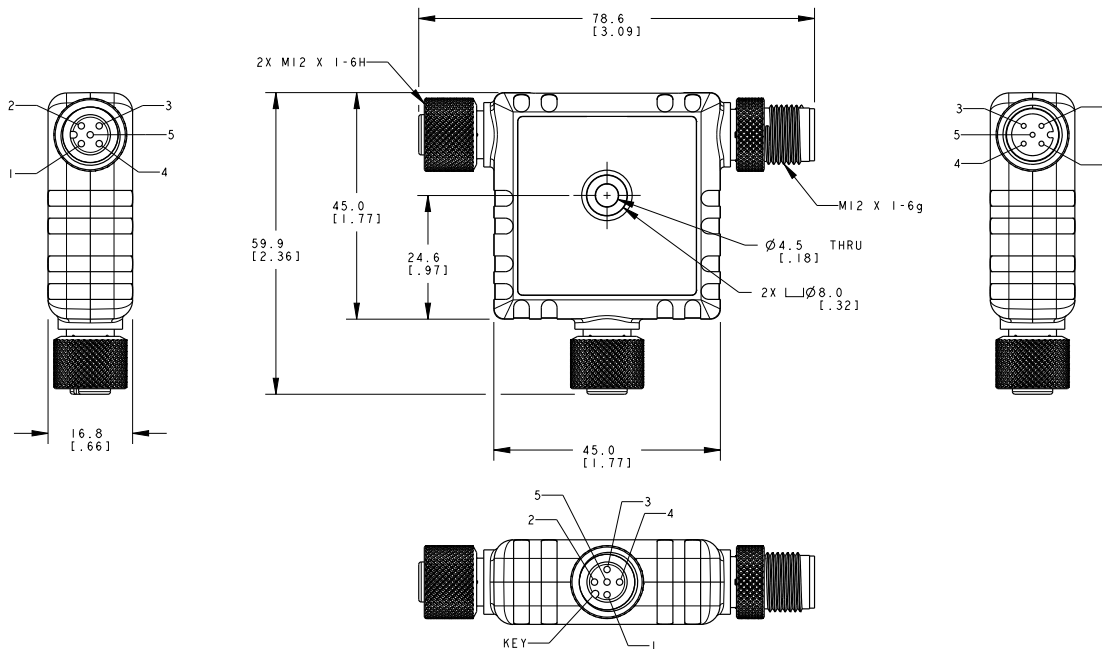


**Turck Banner LTD** Blenheim House, Blenheim Court, Wickford, Essex SS11 8YT, Great Britain



## 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	<p>40 Typ. [1.58"] M12 x 1 ø 14.5 [0.57"]</p> <p>44 Typ. [1.73"] M12 x 1 ø 14.5 [0.57"]</p>	Female	
MQDEC-403SS	0.91 m (2.99 ft)				
MQDEC-406SS	1.83 m (6 ft)			Male	
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)			<p>1 = Brown 2 = White 3 = Blue 4 = Black</p>	

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

### FCC Part 15

This device complies with Part 15 of the FCC Rules. 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.