



# IC70-16N-K In-Cabinet IO-Link Hub Product Manual

Original Instructions

p/n: 248590 Rev. A

12-May-25

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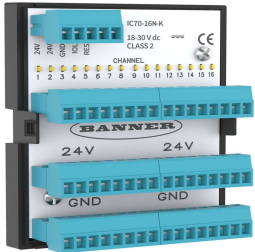
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# Chapter 1      Features

IO-Link hubs are a quick, easy, and economical way to integrate non-IO-Link devices into an IO-Link system

- Compact, rugged, and lightweight IP20 IO-Link hub
- Metal screw terminal connectors
- 16 NPN discrete channels can be configured as inputs or outputs
- DIN rail mountable hub base for easy control cabinet installation
- Compact IO-Link hub connects discrete inputs as Process Data In and outputs a discrete value as Process Data Out
- Enabled delay modes: ON/OFF Delay, ON/OFF One-shot, ON/OFF/Retriggerable Oneshot, and ON/OFF Pulse-stretcher and Totalizer
- Measurement metrics: Count, Events Per Minute (EPM), and Duration
- Discrete Mirroring: Discrete signals (in/out) from all 16 channels can be mirrored to any of the 16 channels, discrete out



## Models

| Model      | Function  | Type                         | Control | Connector             |
|------------|-----------|------------------------------|---------|-----------------------|
| IC70-16N-K | Converter | 16 NPN input/output channels | IO-Link | Metal screw terminals |

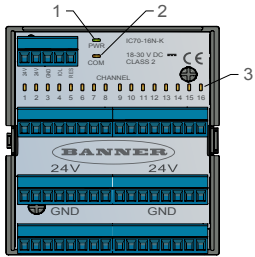
## Overview

Banner Engineering's IC70-16N-K In-Cabinet IO-Link Hub provides a compact, affordable, and lightweight solution for consolidating discrete signals from sensors and actuators, making it easy to connect these devices to an IO-Link master.

The hub's compact design and DIN-rail mountable base make it an excellent solution for mounting within control cabinets. Two 24 V DC power supply screw terminals are connected internally to the 24 V DC rail, allowing you to use multiple 24 V DC sources if needed or supply power to a nearby device.

The IC70-16N-K In-Cabinet IO-Link Hub connects the 16 inputs as Process Data In and the 16 outputs as Process Data Out. Use an IO-Link master device to monitor and configure the I/O channels.

1. Power LED
2. COM LED
3. Sixteen I/O channel LEDs



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## Chapter 2 IC70N Configuration

For more information, see the [IO-Link Data Reference Guide](#) chapter (also a standalone document p/n [248591](#)) and the IODD file (p/n 248441).

### Measurements

| Channels 1-16 Description | IO Metric               | Description                                                                                   |
|---------------------------|-------------------------|-----------------------------------------------------------------------------------------------|
| Channels 1-16             | Count Value             | Running count of the received input pulses                                                    |
|                           | Duration Value          | Duration of the last input pulse in $\mu\text{s}$ with 500 $\mu\text{s}$ granularity          |
|                           | Events per Minute Value | Running count of the number of pulses received averaged over one minute<br>Range: 1 to 37,500 |
|                           | Reset Metrics           | Do not reset<br>Reset                                                                         |

### Channel Configuration – Input

| Channels 1-16 Description | Name                        | Values                                                                |
|---------------------------|-----------------------------|-----------------------------------------------------------------------|
| Channels 1-16             | Discrete I/O Selection      | NPN Input<br>NPN Output with Pull-Up                                  |
|                           | 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                                            |
|                           | 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<br>Enabled                                                   |
|                           | Mirroring Channel Selection | Channel 1 through 16                                                  |
|                           | Mirroring Inversion         | Not Inverted<br>Inverted                                              |

## 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).

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# Chapter 3 Mechanical Installation

Install the IC70 to allow access for functional checks, maintenance, and service or replacement.

Do not exceed the operating specifications for reliable operation. The enclosure must provide adequate heat dissipation so that the air closely surrounding the IC70 does not exceed its maximum operating temperature.

The IC70 mounts to a standard 35 mm DIN-rail track. It must be installed inside an enclosure rated NEMA 3 (IEC IP54) or better.

To mount the IC70:

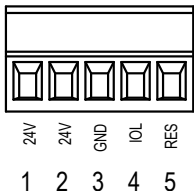
- 1. Tilt the top of the module slightly backward and place it on the DIN rail.
- 2. Straighten the module against the rail.
- 3. Lower the module onto the rail.

To remove the IC70

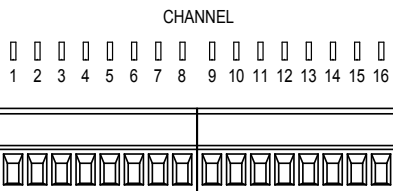
- 1. Push up on the bottom of the module.
- 2. Tilt the top of the module slightly forward.
- 3. Lower the module after the top rigid clip is clear of the DIN rail.

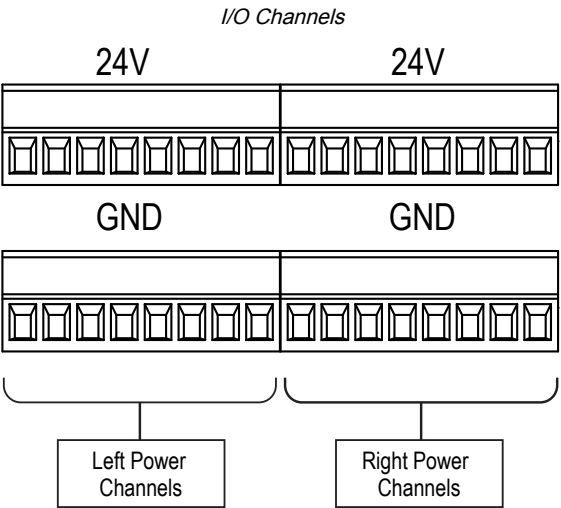
## Wiring

Power supply screw terminals

| Power Supply Screw Terminals                                                        | Terminals | Description            |
|-------------------------------------------------------------------------------------|-----------|------------------------|
|  | 1         | 18 to 30 V DC          |
|                                                                                     | 2         | 18 to 30 V DC          |
|                                                                                     | 3         | Ground                 |
|                                                                                     | 4         | IO-Link                |
|                                                                                     | 5         | Not used/no connection |

Input/output screw terminals

| I/O Channel Screw Terminals                                                         | Terminals | Description    |
|-------------------------------------------------------------------------------------|-----------|----------------|
|  | 1         | I/O Channel 1  |
|                                                                                     | 2         | I/O Channel 2  |
|                                                                                     | 3         | I/O Channel 3  |
|                                                                                     | ...       | ...            |
|                                                                                     | 16        | I/O Channel 16 |



The left and right power channels are tied internally to screw terminals 1–3 on the power supply screw terminals.

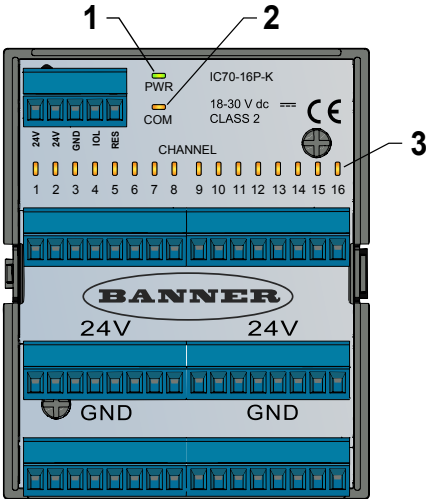
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# Chapter 4      Operating Instructions

## Status Indicators

The IC70-16N-K In-Cabinet IO-Link Hub has 16 amber LEDs to indicate discrete I/O status. There is also an additional amber LED specific to the IO-Link communications and a green power indication LED.



| LED                                 | Indication                             | Status                                 |
|-------------------------------------|----------------------------------------|----------------------------------------|
| Discrete Device Amber LEDs (3)      | Off                                    | Discrete In and Out are inactive       |
|                                     | Solid Amber                            | Discrete In or Out is active           |
| IO-Link Communication Amber LED (2) | Off                                    | IO-Link communications are not present |
|                                     | Flashing Amber (900 ms On, 100 ms Off) | IO-Link communications are active      |
| Power Indicator Green LED (1)       | Off                                    | Power off                              |
|                                     | Solid Green                            | Power on                               |

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## Chapter 5 IO-Link Data Reference Guide

This document refers to the following IODD file: Banner\_Engineering-IC70-16N-K-20241101-IODD1.. The IODD file and support files can be found on [www.bannerengineering.com](http://www.bannerengineering.com) under the download section of the product family page.

### Communication Parameters

| Parameter               | Value     | Parameter              | Value |
|-------------------------|-----------|------------------------|-------|
| IO-Link revision        | V1.1      | Port class             | A     |
| Process data in length  | 16-bits   | SIO mode               | Yes   |
| Process data out length | 16-bits   | Smart sensor profile   | No    |
| Bit rate                | 38400 bps | Block parameterization | Yes   |
| Minimum cycle time      | 3.3 ms    | Data storage           | Yes   |
| Device ID               | 659478    |                        |       |

### Process Data In (Device to Master)

| Subindex | Name                   | Number of Bits | Data Values                 |
|----------|------------------------|----------------|-----------------------------|
| 1        | Channel 1 Input State  | 1              | false=inactive, true=active |
| 2        | Channel 2 Input State  | 1              | false=inactive, true=active |
| 3        | Channel 3 Input State  | 1              | false=inactive, true=active |
| 4        | Channel 4 Input State  | 1              | false=inactive, true=active |
| 5        | Channel 5 Input State  | 1              | false=inactive, true=active |
| 6        | Channel 6 Input State  | 1              | false=inactive, true=active |
| 7        | Channel 7 Input State  | 1              | false=inactive, true=active |
| 8        | Channel 8 Input State  | 1              | false=inactive, true=active |
| 9        | Channel 9 Input State  | 1              | false=inactive, true=active |
| 10       | Channel 10 Input State | 1              | false=inactive, true=active |
| 11       | Channel 11 Input State | 1              | false=inactive, true=active |
| 12       | Channel 12 Input State | 1              | false=inactive, true=active |
| 13       | Channel 13 Input State | 1              | false=inactive, true=active |
| 14       | Channel 14 Input State | 1              | false=inactive, true=active |
| 15       | Channel 15 Input State | 1              | false=inactive, true=active |
| 16       | Channel 16 Input State | 1              | false=inactive, true=active |

*Octet 0*

|            |    |    |    |    |    |    |   |   |
|------------|----|----|----|----|----|----|---|---|
| Subindex   | 8  | 7  | 6  | 5  | 4  | 3  | 2 | 1 |
| Bit offset | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
| Value      | 1  | 1  | 1  | 1  | 1  | 1  | 0 | 1 |

*Octet 1*

|            |    |    |    |    |    |    |    |   |
|------------|----|----|----|----|----|----|----|---|
| Subindex   | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |
| Bit offset | 7  | 6  | 5  | 4  | 3  | 2  | 1  | 0 |
| Value      | 1  | 1  | 1  | 0  | 1  | 1  | 1  | 0 |

*Example based on the listed values*

|   |                       |          |    |                        |          |
|---|-----------------------|----------|----|------------------------|----------|
| 1 | Channel 1 input state | active   | 9  | Channel 9 input state  | inactive |
| 2 | Channel 2 input state | inactive | 10 | Channel 10 input state | active   |
| 3 | Channel 3 input state | active   | 11 | Channel 11 input state | active   |
| 4 | Channel 4 input state | active   | 12 | Channel 12 input state | active   |
| 5 | Channel 5 input state | active   | 13 | Channel 13 input state | inactive |
| 6 | Channel 6 input state | active   | 14 | Channel 14 input state | active   |
| 7 | Channel 7 input state | active   | 15 | Channel 15 input state | active   |
| 8 | Channel 8 input state | active   | 16 | Channel 16 input state | active   |

## Process Data Out (Master to Device)

| Subindex | Name                    | Number of Bits | Data Values                        |
|----------|-------------------------|----------------|------------------------------------|
| 1        | Channel 1 Output State  | 1              | false=Off/InActive, true=On/Active |
| 2        | Channel 2 Output State  | 1              | false=Off/InActive, true=On/Active |
| 3        | Channel 3 Output State  | 1              | false=Off/InActive, true=On/Active |
| 4        | Channel 4 Output State  | 1              | false=Off/InActive, true=On/Active |
| 5        | Channel 5 Output State  | 1              | false=Off/InActive, true=On/Active |
| 6        | Channel 6 Output State  | 1              | false=Off/InActive, true=On/Active |
| 7        | Channel 7 Output State  | 1              | false=Off/InActive, true=On/Active |
| 8        | Channel 8 Output State  | 1              | false=Off/InActive, true=On/Active |
| 1        | Channel 9 Output State  | 1              | false=Off/InActive, true=On/Active |
| 2        | Channel 10 Output State | 1              | false=Off/InActive, true=On/Active |
| 3        | Channel 11 Output State | 1              | false=Off/InActive, true=On/Active |
| 4        | Channel 12 Output State | 1              | false=Off/InActive, true=On/Active |
| 5        | Channel 13 Output State | 1              | false=Off/InActive, true=On/Active |
| 6        | Channel 14 Output State | 1              | false=Off/InActive, true=On/Active |
| 7        | Channel 15 Output State | 1              | false=Off/InActive, true=On/Active |
| 8        | Channel 16 Output State | 1              | false=Off/InActive, true=On/Active |

*Octet 0*

|            |    |    |    |    |    |    |   |   |
|------------|----|----|----|----|----|----|---|---|
| Subindex   | 8  | 7  | 6  | 5  | 4  | 3  | 2 | 1 |
| Bit offset | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |

*Octet 1*

|            |    |    |    |    |    |    |    |   |
|------------|----|----|----|----|----|----|----|---|
| Subindex   | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |
| Bit offset | 7  | 6  | 5  | 4  | 3  | 2  | 1  | 0 |

## Parameters Set Using IO-Link

These parameters can be read from and/or written to an IC70-16N-K IO-Link Hub. Also included is information about whether the variable in question is saved during data storage and whether the variable came from the IO-Link Smart Sensor Profile. Unlike process data in, which is transmitted from the IO-Link device to the IO-Link master cyclically, these parameters are read or written acyclically as needed.

| Index     | Subindex | Name                                                                 | Length              | Value Range                                                                                                    | Default | Access Rights | Data Storage? |
|-----------|----------|----------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------|---------|---------------|---------------|
| 0         | 1-16     | Direct Parameter Page 1 (incl. Vendor ID & Device ID)                |                     |                                                                                                                |         | ro            |               |
| 1         | 1-16     | Direct Parameters Page 2                                             |                     |                                                                                                                |         | rw            |               |
| 2         |          | System Command                                                       |                     | 130 = Restore Factory Settings 162 = Start discovery 163 = Stop discovery 164 = Reset All Metrics              |         | wo            |               |
| 3         |          | Data Storage Index (device-specific list of parameters to be stored) |                     |                                                                                                                |         | rw            |               |
| 4-11      |          | reserved by IO-Link Specification                                    |                     |                                                                                                                |         |               |               |
| <b>12</b> |          | <b>Device Access Locks</b>                                           |                     |                                                                                                                |         |               |               |
| 12        | 1        | Parameter Write Access Lock                                          |                     | 0 = off 1 = on                                                                                                 | 0       | rw            | y             |
| 12        | 2        | Data Storage Lock                                                    |                     | 0 = off, 1 = on                                                                                                | 0       | rw            | y             |
| 12        | 3        | Local Parameterization Lock                                          |                     | 0 = off, 1 = on                                                                                                | 0       | rw            | y             |
| 12        | 4        | Local User Interface Lock                                            |                     | 0 = off, 1 = on                                                                                                | 0       | rw            | y             |
| 16        |          | Vendor Name string                                                   |                     | Banner Engineering Corporation                                                                                 |         | ro            |               |
| 17        |          | Vendor Text string                                                   |                     | More Sensors. More Solutions.                                                                                  |         | ro            |               |
| 18        |          | Product Name string                                                  |                     | IC70-16N-K                                                                                                     |         | ro            |               |
| 19        |          | Product ID string                                                    |                     | IC70-16N-K                                                                                                     |         | ro            |               |
| 20        |          | Product Text string                                                  |                     |                                                                                                                |         | ro            |               |
| 21        |          | Serial Number                                                        |                     |                                                                                                                |         | ro            |               |
| 23        |          | Firmware Version                                                     |                     |                                                                                                                |         | ro            |               |
| 24        |          | App Specific Tag (user-defined)                                      |                     |                                                                                                                |         | rw            | y             |
| 36        |          | Device Status                                                        | 8-bit integer       | 0=Device is OK, 1=Maintenance required, 2=Out of specification, 3=Functional check, 4=Failure, 5..255 Reserved |         | ro            |               |
| 37        |          | Detailed Device Status                                               | Array[6] of 3-octet |                                                                                                                |         | ro            |               |
| 38-39     |          | reserved                                                             |                     |                                                                                                                |         |               |               |
| 40        |          | Process Data Input                                                   |                     | see Process Data In                                                                                            |         | ro            |               |
| 41        |          | Process Data Output                                                  |                     | see Process Data Out                                                                                           |         | ro            |               |
| 42-57     |          | unused/reserved                                                      |                     |                                                                                                                |         |               |               |
| <b>69</b> |          | <b>All-Time Run Time</b>                                             |                     |                                                                                                                |         |               |               |

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| Index     | Subindex | Name                                  | Length          | Value Range                    | Default | Access Rights | Data Storage? |
|-----------|----------|---------------------------------------|-----------------|--------------------------------|---------|---------------|---------------|
| 69        | 1        | Run counter                           | 32-bit Unsigned | 0..2147483647                  |         | ro            | y             |
| <b>70</b> |          | <b>Resettable Run Time</b>            |                 |                                |         |               |               |
| 70        | 1        | Run counter                           | 32-bit Unsigned | 0..2147483647                  | 0       | rw            |               |
| <b>78</b> |          | <b>All-Time Run Time Event Time</b>   |                 |                                |         |               |               |
| 78        | 1        | Event Time                            | 32-bit Unsigned | 0..2147483647                  | 0       | rw            | y             |
| <b>79</b> |          | <b>Resettable Run Time Event Time</b> |                 |                                |         |               |               |
| 79        | 1        | Event Time                            | 32-bit Unsigned | 0..2147483647                  | 0       | rw            | y             |
| <b>80</b> |          | <b>IO Metrics Channels 1 to 8</b>     |                 |                                |         |               |               |
| 80        | 1        | Channel 1 Count                       | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 2        | Channel 1 Count Duration -            | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 80        | 3        | Channel 1 Count Events per Minute     | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 80        | 4        | Channel 1 Count Totalizer Counter     | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 5        | Channel 2 Count                       | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 6        | Channel 2 Duration                    | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 80        | 7        | Channel 2 Events per Minute           | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 80        | 8        | Channel 2 Totalizer Counter           | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 9        | Channel 3 Count                       | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 10       | Channel 3 Duration                    | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 80        | 11       | Channel 3 Events per Minute           | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 80        | 12       | Channel 3 Totalizer Counter           | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 13       | Channel 4 Count                       | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 14       | Channel 4 Duration                    | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 80        | 15       | Channel 4 Events per Minute           | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 80        | 16       | Channel 4 Totalizer Counter           | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 17       | Channel 5 Count                       | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 18       | Channel 5 Duration                    | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 80        | 19       | Channel 5 Events per Minute           | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 80        | 20       | Channel 5 Totalizer Counter           | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 21       | Channel 6 Count                       | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 22       | Channel 6 Duration                    | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |

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| Index     | Subindex | Name                               | Length          | Value Range                    | Default | Access Rights | Data Storage? |
|-----------|----------|------------------------------------|-----------------|--------------------------------|---------|---------------|---------------|
| 80        | 23       | Channel 6 Events per Minute        | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 80        | 24       | Channel 6 Totalizer Counter        | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 25       | Channel 7 Count                    | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 26       | Channel 7 Duration                 | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 80        | 27       | Channel 7 Events per Minute        | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 80        | 28       | Channel 7 Totalizer Counter        | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 29       | Channel 8 Count                    | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 80        | 30       | Channel 8 Duration                 | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 80        | 31       | Channel 8 Events per Minute        | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 80        | 32       | Channel 8 Totalizer Counter        | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| <b>81</b> |          | <b>IO Metrics Channels 9 to 16</b> |                 |                                |         |               |               |
| 81        | 1        | Channel 9 Count                    | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 2        | Channel 9 Duration -               | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 81        | 3        | Channel 9 Events per Minute        | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 81        | 4        | Channel 9 Totalizer Counter        | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 5        | Channel 10 Count                   | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 6        | Channel 10 Duration                | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 81        | 7        | Channel 10 Events per Minute       | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 81        | 8        | Channel 10 Totalizer Counter       | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 9        | Channel 11 Count                   | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 10       | Channel 11 Duration                | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 81        | 11       | Channel 11 Events per Minute       | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 81        | 12       | Channel 11 Totalizer Counter       | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 13       | Channel 12 Count                   | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 14       | Channel 12 Duration                | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 81        | 15       | Channel 12 Events per Minute       | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 81        | 16       | Channel 12 Totalizer Counter       | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 17       | Channel 13 Count                   | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 18       | Channel 13 Duration                | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 81        | 19       | Channel 13 Events per Minute       | 32-bit Unsigned | 1..300000                      |         | ro            |               |

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| 81        | 20       | Channel 13 Totalizer Counter   | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 21       | Channel 14 Count               | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 22       | Channel 14 Duration            | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 81        | 23       | Channel 14 Events per Minute   | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 81        | 24       | Channel 14 Totalizer Counter   | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 25       | Channel 15 Count               | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 26       | Channel 15 Duration            | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 81        | 27       | Channel 15 Events per Minute   | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 81        | 28       | Channel 15 Totalizer Counter   | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 29       | Channel 16 Count               | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| 81        | 30       | Channel 16 Duration            | 32-bit Unsigned | 0..2147483647, 50µS resolution |         | ro            |               |
| 81        | 31       | Channel 16 Events per Minute   | 32-bit Unsigned | 1..300000                      |         | ro            |               |
| 81        | 32       | Channel 16 Totalizer Counter   | 32-bit Unsigned | 0..2147483647                  |         | ro            |               |
| <b>82</b> |          | <b>Selectable Metric Reset</b> |                 |                                |         |               |               |
| 82        | 1        | Channel 1                      | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 2        | Channel 2                      | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 3        | Channel 3                      | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 4        | Channel 4                      | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 5        | Channel 5                      | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 6        | Channel 6                      | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 7        | Channel 7                      | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 8        | Channel 8                      | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 9        | Channel 9                      | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 10       | Channel 10                     | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 11       | Channel 11                     | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 12       | Channel 12                     | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 13       | Channel 13                     | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 14       | Channel 14                     | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 15       | Channel 15                     | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 16       | Channel 16                     | Boolean         | false=Do Not Reset, true=Reset | false   | rw            |               |
| 82        | 17       | Channel 1 Reset Count          | 32-bit Unsigned | 0..2147483647                  | 0       | rw            |               |
| 82        | 18       | Channel 1 Reset Count          | 32-bit Unsigned | 0..2147483647                  | 0       | rw            |               |
| 82        | 19       | Channel 3 Reset Count          | 32-bit Unsigned | 0..2147483647                  | 0       | rw            |               |
| 82        | 20       | Channel 4 Reset Count          | 32-bit Unsigned | 0..2147483647                  | 0       | rw            |               |
| 82        | 21       | Channel 5 Reset Count          | 32-bit Unsigned | 0..2147483647                  | 0       | rw            |               |
| 82        | 22       | Channel 6 Reset Count          | 32-bit Unsigned | 0..2147483647                  | 0       | rw            |               |

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| 82        | 23       | Channel 7 Reset Count          | 32-bit Unsigned | 0..2147483647                                                                                                                                                                                                               | 0       | rw            |               |
| 82        | 24       | Channel 8 Reset Count          | 32-bit Unsigned | 0..2147483647                                                                                                                                                                                                               | 0       | rw            |               |
| 82        | 25       | Channel 9 Reset Count          | 32-bit Unsigned | 0..2147483647                                                                                                                                                                                                               | 0       | rw            |               |
| 82        | 26       | Channel 10 Reset Count         | 32-bit Unsigned | 0..2147483647                                                                                                                                                                                                               | 0       | rw            |               |
| 82        | 27       | Channel 11 Reset Count         | 32-bit Unsigned | 0..2147483647                                                                                                                                                                                                               | 0       | rw            |               |
| 82        | 28       | Channel 12 Reset Count         | 32-bit Unsigned | 0..2147483647                                                                                                                                                                                                               | 0       | rw            |               |
| 82        | 29       | Channel 13 Reset Count         | 32-bit Unsigned | 0..2147483647                                                                                                                                                                                                               | 0       | rw            |               |
| 82        | 30       | Channel 14 Reset Count         | 32-bit Unsigned | 0..2147483647                                                                                                                                                                                                               | 0       | rw            |               |
| 82        | 31       | Channel 15 Reset Count         | 32-bit Unsigned | 0..2147483647                                                                                                                                                                                                               | 0       | rw            |               |
| 82        | 32       | Channel 16 Reset Count         | 32-bit Unsigned | 0..2147483647                                                                                                                                                                                                               | 0       | rw            |               |
| <b>87</b> |          | <b>Channel 1 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 87        | 1        | IO Selection                   | 8-bit Unsigned  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |
| 87        | 2        | Delay Mode                     | 8-bit Unsigned  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 87        | 3        | Delay Timer 1                  | 32-bit Unsigned | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 87        | 4        | Delay Timer 2                  | 32-bit Unsigned | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 87        | 5        | Mirroring Enable               | 8-bit Unsigned  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 87        | 6        | Mirroring Channel Selection    | 8-bit Unsigned  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 87        | 7        | Mirroring Inversion            | 8-bit Unsigned  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |
| <b>88</b> |          | <b>Channel 2 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 88        | 1        | IO Selection                   | 8-bit Unsigned  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |
| 88        | 2        | Delay Mode                     | 8-bit Unsigned  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 88        | 3        | Delay Timer 1                  | 32-bit Unsigned | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 88        | 4        | Delay Timer 2                  | 32-bit Unsigned | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 88        | 5        | Mirroring Enable               | 8-bit Unsigned  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 88        | 6        | Mirroring Channel Selection    | 8-bit Unsigned  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 88        | 7        | Mirroring Inversion            | 8-bit Unsigned  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |
| <b>89</b> |          | <b>Channel 3 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 89        | 1        | IO Selection                   | 8-bit Unsigned  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |

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| 89        | 2        | Delay Mode                     | 8-bit Uinteger  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 89        | 3        | Delay Timer 1                  | 32-bit Uinteger | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 89        | 4        | Delay Timer 2                  | 32-bit Uinteger | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 89        | 5        | Mirroring Enable               | 8-bit Uinteger  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 89        | 6        | Mirroring Channel Selection    | 8-bit Uinteger  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 89        | 7        | Mirroring Inversion            | 8-bit Uinteger  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |
| <b>90</b> |          | <b>Channel 4 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 90        | 1        | IO Selection                   | 8-bit Uinteger  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |
| 90        | 2        | Delay Mode                     | 8-bit Uinteger  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 90        | 3        | Delay Timer 1                  | 32-bit Uinteger | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 90        | 4        | Delay Timer 2                  | 32-bit Uinteger | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 90        | 5        | Mirroring Enable               | 8-bit Uinteger  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 90        | 6        | Mirroring Channel Selection    | 8-bit Uinteger  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 90        | 7        | Mirroring Inversion            | 8-bit Uinteger  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |
| <b>91</b> |          | <b>Channel 5 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 91        | 1        | IO Selection                   | 8-bit Uinteger  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |
| 91        | 2        | Delay Mode                     | 8-bit Uinteger  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 91        | 3        | Delay Timer 1                  | 32-bit Uinteger | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 91        | 4        | Delay Timer 2                  | 32-bit Uinteger | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 91        | 5        | Mirroring Enable               | 8-bit Uinteger  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 91        | 6        | Mirroring Channel Selection    | 8-bit Uinteger  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 91        | 7        | Mirroring Inversion            | 8-bit Uinteger  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |
| <b>92</b> |          | <b>Channel 6 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 92        | 1        | IO Selection                   | 8-bit Uinteger  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |
| 92        | 2        | Delay Mode                     | 8-bit Uinteger  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 92        | 3        | Delay Timer 1                  | 32-bit Uinteger | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |

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| 92        | 4        | Delay Timer 2                  | 32-bit Unsigned | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 92        | 5        | Mirroring Enable               | 8-bit Unsigned  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 92        | 6        | Mirroring Channel Selection    | 8-bit Unsigned  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 92        | 7        | Mirroring Inversion            | 8-bit Unsigned  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |
| <b>93</b> |          | <b>Channel 7 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 93        | 1        | IO Selection                   | 8-bit Unsigned  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |
| 93        | 2        | Delay Mode                     | 8-bit Unsigned  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 93        | 3        | Delay Timer 1                  | 32-bit Unsigned | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 93        | 4        | Delay Timer 2                  | 32-bit Unsigned | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 93        | 5        | Mirroring Enable               | 8-bit Unsigned  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 93        | 6        | Mirroring Channel Selection    | 8-bit Unsigned  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 93        | 7        | Mirroring Inversion            | 8-bit Unsigned  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |
| <b>94</b> |          | <b>Channel 8 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 94        | 1        | IO Selection                   | 8-bit Unsigned  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |
| 94        | 2        | Delay Mode                     | 8-bit Unsigned  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 94        | 3        | Delay Timer 1                  | 32-bit Unsigned | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 94        | 4        | Delay Timer 2                  | 32-bit Unsigned | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 94        | 5        | Mirroring Enable               | 8-bit Unsigned  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 94        | 6        | Mirroring Channel Selection    | 8-bit Unsigned  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 94        | 7        | Mirroring Inversion            | 8-bit Unsigned  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |
| <b>95</b> |          | <b>Channel 9 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 95        | 1        | IO Selection                   | 8-bit Unsigned  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |
| 95        | 2        | Delay Mode                     | 8-bit Unsigned  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 95        | 3        | Delay Timer 1                  | 32-bit Unsigned | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 95        | 4        | Delay Timer 2                  | 32-bit Unsigned | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 95        | 5        | Mirroring Enable               | 8-bit Unsigned  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |

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| 95        | 6        | Mirroring Channel Selection     | 8-bit Unsigned  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 95        | 7        | Mirroring Inversion             | 8-bit Unsigned  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |
| <b>96</b> |          | <b>Channel 10 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 96        | 1        | IO Selection                    | 8-bit Unsigned  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |
| 96        | 2        | Delay Mode                      | 8-bit Unsigned  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 96        | 3        | Delay Timer 1                   | 32-bit Unsigned | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 96        | 4        | Delay Timer 2                   | 32-bit Unsigned | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 96        | 5        | Mirroring Enable                | 8-bit Unsigned  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 96        | 6        | Mirroring Channel Selection     | 8-bit Unsigned  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 96        | 7        | Mirroring Inversion             | 8-bit Unsigned  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |
| <b>97</b> |          | <b>Channel 11 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 97        | 1        | IO Selection                    | 8-bit Unsigned  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |
| 97        | 2        | Delay Mode                      | 8-bit Unsigned  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 97        | 3        | Delay Timer 1                   | 32-bit Unsigned | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 97        | 4        | Delay Timer 2                   | 32-bit Unsigned | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 97        | 5        | Mirroring Enable                | 8-bit Unsigned  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 97        | 6        | Mirroring Channel Selection     | 8-bit Unsigned  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 97        | 7        | Mirroring Inversion             | 8-bit Unsigned  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |
| <b>98</b> |          | <b>Channel 12 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 98        | 1        | IO Selection                    | 8-bit Unsigned  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |
| 98        | 2        | Delay Mode                      | 8-bit Unsigned  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 98        | 3        | Delay Timer 1                   | 32-bit Unsigned | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 98        | 4        | Delay Timer 2                   | 32-bit Unsigned | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 98        | 5        | Mirroring Enable                | 8-bit Unsigned  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 98        | 6        | Mirroring Channel Selection     | 8-bit Unsigned  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 98        | 7        | Mirroring Inversion             | 8-bit Unsigned  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |

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| Index      | Subindex | Name                            | Length          | Value Range                                                                                                                                                                                                                 | Default | Access Rights | Data Storage? |
|------------|----------|---------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------------|---------------|
| <b>99</b>  |          | <b>Channel 13 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 99         | 1        | IO Selection                    | 8-bit Uinteger  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |
| 99         | 2        | Delay Mode                      | 8-bit Uinteger  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 99         | 3        | Delay Timer 1                   | 32-bit Uinteger | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 99         | 4        | Delay Timer 2                   | 32-bit Uinteger | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 99         | 5        | Mirroring Enable                | 8-bit Uinteger  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 99         | 6        | Mirroring Channel Selection     | 8-bit Uinteger  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 99         | 7        | Mirroring Inversion             | 8-bit Uinteger  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |
| <b>100</b> |          | <b>Channel 14 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 100        | 1        | IO Selection                    | 8-bit Uinteger  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |
| 100        | 2        | Delay Mode                      | 8-bit Uinteger  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 100        | 3        | Delay Timer 1                   | 32-bit Uinteger | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 100        | 4        | Delay Timer 2                   | 32-bit Uinteger | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 100        | 5        | Mirroring Enable                | 8-bit Uinteger  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 100        | 6        | Mirroring Channel Selection     | 8-bit Uinteger  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 100        | 7        | Mirroring Inversion             | 8-bit Uinteger  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |
| <b>101</b> |          | <b>Channel 15 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 101        | 1        | IO Selection                    | 8-bit Uinteger  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |
| 101        | 2        | Delay Mode                      | 8-bit Uinteger  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 101        | 3        | Delay Timer 1                   | 32-bit Uinteger | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 101        | 4        | Delay Timer 2                   | 32-bit Uinteger | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 101        | 5        | Mirroring Enable                | 8-bit Uinteger  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 101        | 6        | Mirroring Channel Selection     | 8-bit Uinteger  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 101        | 7        | Mirroring Inversion             | 8-bit Uinteger  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |
| <b>102</b> |          | <b>Channel 16 Configuration</b> |                 |                                                                                                                                                                                                                             |         |               |               |
| 102        | 1        | IO Selection                    | 8-bit Uinteger  | 0=NPN Input, 2=NPN Output with Pull Up                                                                                                                                                                                      | 2       | rw            | y             |

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| Index | Subindex | Name                        | Length          | Value Range                                                                                                                                                                                                                 | Default | Access Rights | Data Storage? |
|-------|----------|-----------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------------|---------------|
| 102   | 2        | Delay Mode                  | 8-bit Uinteger  | 0 = Disabled, 1 = On Off Delay, 2 = On One-shot, 3 = Off One-shot, 4 = On Pulse-stretcher, 5 = Off Pulse-stretcher, 6 = Totalizer, 7 = Retriggerable On One-shot, 8 = Retriggerable Off One-Shot                            | 0       | rw            | y             |
| 102   | 3        | Delay Timer 1               | 32-bit Uinteger | 0..2147483647 [Channel On Delay, One-shot, Pulse-stretcher time(ms) or Totalizer Count]                                                                                                                                     | 0       | rw            | y             |
| 102   | 4        | Delay Timer 2               | 32-bit Uinteger | 0..2147483647 (Channel Off Delay or Totalizer time)ms                                                                                                                                                                       | 0       | rw            | y             |
| 102   | 5        | Mirroring Enable            | 8-bit Uinteger  | 0=Disabled, 1=Enabled                                                                                                                                                                                                       | 0       | rw            | y             |
| 102   | 6        | Mirroring Channel Selection | 8-bit Uinteger  | 0=Channel 1, 1=Channel 2, 2=Channel 3, 3=Channel 4, 4=Channel 5, 5=Channel 6, 6=Channel 7, 7=Channel 8, 8=Channel 9, 9=Channel 10, 10=Channel 11, 11=Channel 12, 12=Channel 13, 13=Channel 14, 14=Channel 15, 15=Channel 16 | 0       | rw            | y             |
| 102   | 7        | Mirroring Inversion         | 8-bit Uinteger  | 0=Not Inverted, 1=Inverted                                                                                                                                                                                                  | 0       | rw            | y             |

## IO-Link Events

Events are acyclic transmissions from the IO-Link device to the IO-Link master. Events can be error messages and/or warning or maintenance data.

| Code           | Type    | Name                      | Description                                                             |
|----------------|---------|---------------------------|-------------------------------------------------------------------------|
| 25376 (0x6320) | Error   | Parameter error           | Check datasheet and values                                              |
| 36000 (0x8CA0) | Warning | All-time Run Time Event   | Event indicating the corresponding configured running time has elapsed. |
| 36001 (0x8CA1) | Warning | Resettable Run Time Event | Event indicating the corresponding configured running time has elapsed. |

## Chapter Contents

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## Chapter 6 Specifications

**Supply Voltage**

18 V DC to 30 V DC at 400 mA maximum (exclusive of load)  
Use only with a suitable Class 2 power supply (UL) or Limited Power Supply (CE)

**Power Pass-Through Current**

4 amps maximum total for up to 24 V DC  
3.3 amps maximum total for up to 30 V DC

**Discrete Output Load Rating**

200 mA maximum at 40 °C  
Derating of 2 mA per degree Celsius above 40 °C  
140 mA maximum at 70 °C

**Supply Protection Circuitry**

Protected against reverse polarity and transient voltages

**Leakage Current Immunity**

400 µA

**Indicators**

Green: Power  
Amber: IO-Link communications  
Amber: 16x Discrete In/Out statuses

**Connections**

Screw terminals

**Removable Screw Terminals**

Wire size: 24–16AWG  
Wire strip length: 7 mm  
Tightening torque: 0.2 N·m

**Construction**

Hub Base: black plastic polybutylene terephthalate (PBT)

**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**

IP20; for use inside an IP54 or better enclosure

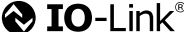
**Operating Conditions**

**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)

**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

 IO-Link®

**Product Identification**

 SNAP SIGNAL®

## 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.

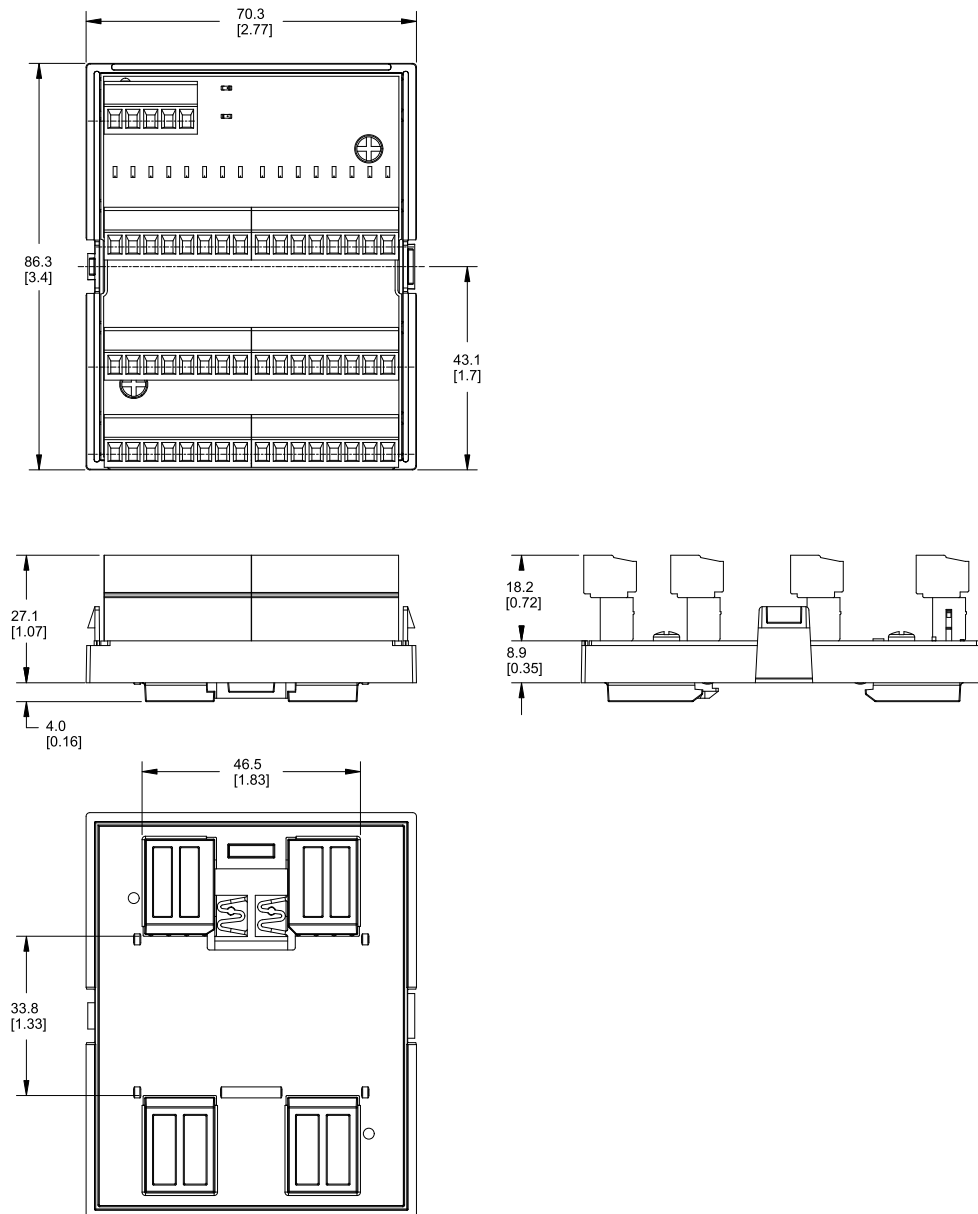
## Industry Canada ICES-003(B)

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.

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.

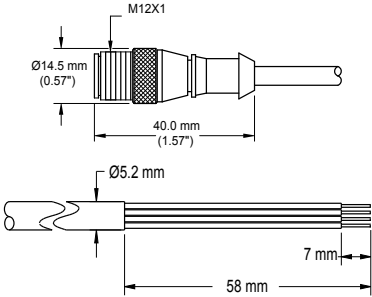
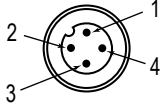
## Dimensions

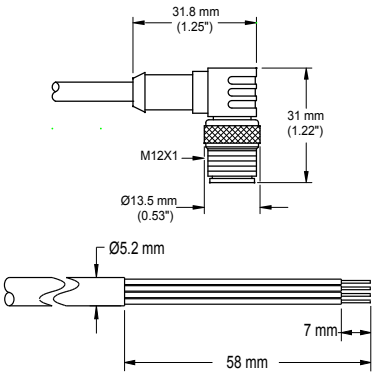
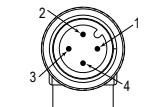
All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.

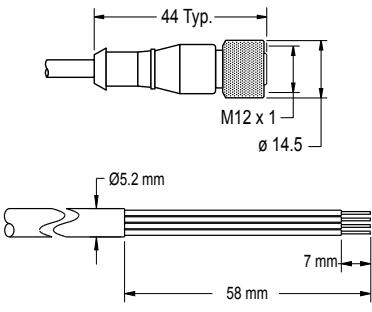
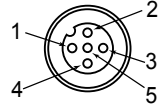


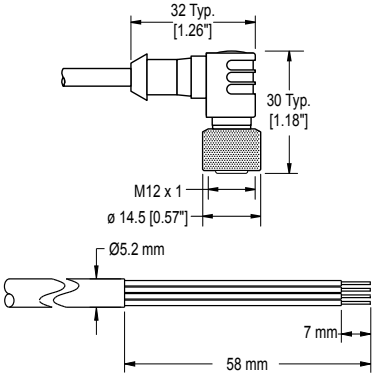
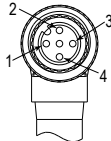
# Chapter 7 Accessories

## IC70 Cordsets

| 4-pin Single-Ended M12 Male Cordsets |                 |                                                                                    |                                                                                     |                                                 |
|--------------------------------------|-----------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------|
| Model                                | Length          | Dimensions (mm)                                                                    | Pinout (Male)                                                                       |                                                 |
| BC-M12M4-22-1                        | 1 m (3.28 ft)   |  |  | 1 = Brown<br>2 = White<br>3 = Blue<br>4 = Black |
| BC-M12M4-22-2                        | 2 m (6.56 ft)   |                                                                                    |                                                                                     |                                                 |
| BC-M12M4-22-5                        | 5 m (16.4 ft)   |                                                                                    |                                                                                     |                                                 |
| BC-M12M4-22-8                        | 8 m (26.25 ft)  |                                                                                    |                                                                                     |                                                 |
| BC-M12M4-22-10                       | 10 m (30.81 ft) |                                                                                    |                                                                                     |                                                 |
| BC-M12M4-22-15                       | 15 m (49.2 ft)  |                                                                                    |                                                                                     |                                                 |

| 4-pin Single-Ended M12 Male Right-Angle Cordsets |                 |                                                                                      |                                                                                       |                                                 |
|--------------------------------------------------|-----------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------|
| Model                                            | Length          | Dimensions (mm)                                                                      | Pinout (Male)                                                                         |                                                 |
| BC-M12M4A-22-1                                   | 1 m (3.28 ft)   |  |  | 1 = Brown<br>2 = White<br>3 = Blue<br>4 = Black |
| BC-M12M4A-22-2                                   | 2 m (6.56 ft)   |                                                                                      |                                                                                       |                                                 |
| BC-M12M4A-22-5                                   | 5 m (16.4 ft)   |                                                                                      |                                                                                       |                                                 |
| BC-M12M4A-22-8                                   | 8 m (26.25 ft)  |                                                                                      |                                                                                       |                                                 |
| BC-M12M4A-22-10                                  | 10 m (30.81 ft) |                                                                                      |                                                                                       |                                                 |
| BC-M12M4A-22-15                                  | 15 m (49.2 ft)  |                                                                                      |                                                                                       |                                                 |

| 4-pin Single-Ended M12 Female Cordsets |                 |                                                                                      |                                                                                       |                                                               |
|----------------------------------------|-----------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------|
| Model                                  | Length          | Dimensions (mm)                                                                      | Pinout (Female)                                                                       |                                                               |
| BC-M12F4-22-1                          | 1 m (3.28 ft)   |  |  | 1 = Brown<br>2 = White<br>3 = Blue<br>4 = Black<br>5 = Unused |
| BC-M12F4-22-2                          | 2 m (6.56 ft)   |                                                                                      |                                                                                       |                                                               |
| BC-M12F4-22-5                          | 5 m (16.4 ft)   |                                                                                      |                                                                                       |                                                               |
| BC-M12F4-22-8                          | 8 m (26.25 ft)  |                                                                                      |                                                                                       |                                                               |
| BC-M12F4-22-10                         | 10 m (30.81 ft) |                                                                                      |                                                                                       |                                                               |
| BC-M12F4-22-15                         | 15 m (49.2 ft)  |                                                                                      |                                                                                       |                                                               |
| BC-M12F4-22-20                         | 20 m (65.61 ft) |                                                                                      |                                                                                       |                                                               |
| BC-M12F4-22-25                         | 25 m (82.02 ft) |                                                                                      |                                                                                       |                                                               |
| BC-M12F4-22-30                         | 30 m (98.42 ft) |                                                                                      |                                                                                       |                                                               |

| 4-pin Single-Ended M12 Female Right-Angle Cordsets |                 |                                                                                                                                                                                                                                                                                                                                                                                |                                                                                     |                                                                                                          |
|----------------------------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Model                                              | Length          | Dimensions (mm)                                                                                                                                                                                                                                                                                                                                                                | Pinout (Female)                                                                     |                                                                                                          |
| BC-M12F4A-22-1                                     | 1 m (3.28 ft)   |  |  | <div>1 = Brown</div> <div>2 = White</div> <div>3 = Blue</div> <div>4 = Black</div> <div>5 = Unused</div> |
| BC-M12F4A-22-2                                     | 2 m (6.56 ft)   |                                                                                                                                                                                                                                                                                                                                                                                |                                                                                     |                                                                                                          |
| BC-M12F4A-22-5                                     | 5 m (16.4 ft)   |                                                                                                                                                                                                                                                                                                                                                                                |                                                                                     |                                                                                                          |
| BC-M12F4A-22-8                                     | 8 m (26.25 ft)  |                                                                                                                                                                                                                                                                                                                                                                                |                                                                                     |                                                                                                          |
| BC-M12F4A-22-10                                    | 10 m (30.81 ft) |                                                                                                                                                                                                                                                                                                                                                                                |                                                                                     |                                                                                                          |
| BC-M12F4A-22-15                                    | 15 m (49.2 ft)  |                                                                                                                                                                                                                                                                                                                                                                                |                                                                                     |                                                                                                          |

|                                                |    |
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# Chapter 8      Product Support and Maintenance

## Resources

For more information, see the following documents and files.

IC70-16N-K In-Cabinet IO-Link Hub IO-Link Data Reference Guide, p/n [248591](#)  
IODD file: Banner\_Engineering-IC70-16N-K-20241101-IODD1.1  
IC70-16N-K In-Cabinet IO-Link Hub Product Manual, p/n [248590](#)

The IODD file and support files can be found on [www.bannerengineering.com](http://www.bannerengineering.com) under the download section of the product family page.

## 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](http://www.bannerengineering.com).

## 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.**

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

