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Product Bulletin

LioN-Power IO-Link System

Multiprotocol IO-Link Masters and IO-Link Hubs

The LioN-Power IO-Link system combines powerful I/O modules in different variations which enable intelligent communication between sensors and actuators in industrial environments through standardized IO-Link technology.

- **Reduced machine costs** in comparison to traditional fieldbus connections due to efficient combination of IO-Link Master and IO-Link Hubs which allow processing up to 132 I/O signals.
- **Simple implementation** thanks to preconfigured PX0 modules and no individual parameterization efforts.
- **Extended portfolio** offering **extreme temperature operation** as low as -40°C through the new Extended Environmental Conditions (EEC) line.

Key Features

- LioN-Power IO-Link portfolio with IO-Link Masters and IO-Link Hubs in many variations
- 8-port IO-Link Masters in 30 mm and 60 mm housing with M8 and M12 I/O connection
- Port variations: (4) Class A and (4) Class B with galvanic isolated power supply
- IO-Link Device Tool of TMG enables easy device configuration and provides full IODD support
- PROFINET V2.3 (CC-C), Netload Class II, FSU, MRP, Shared Device
- EtherNet/IP according to CIP edition V3.11, EIP adaption of CIP V1.12, DLR, Quick Connect
- Developed for harsh conditions – IP65, IP67, IP69K-rated tolerances for mechanical stress
- IO-Link Hubs available in 16DI, 10DI 6DO and 16DIO with M12 Power connection

Our IO-Link system helps ensure consistent, intelligent communication between the enterprise resource planning (ERP) level and sensor level, needed for Industry 4.0/IIoT environments. Choose from many IO-Link devices and variations for flexible, cost-efficient automation.

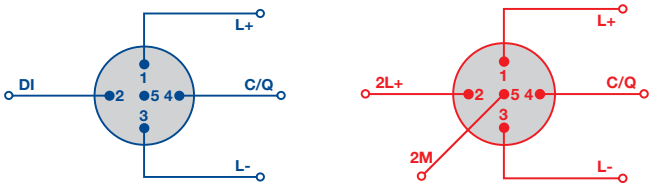
Be certain.
Belden.

LioN-Power IO-Link Master

Versatility through multiprotocol function

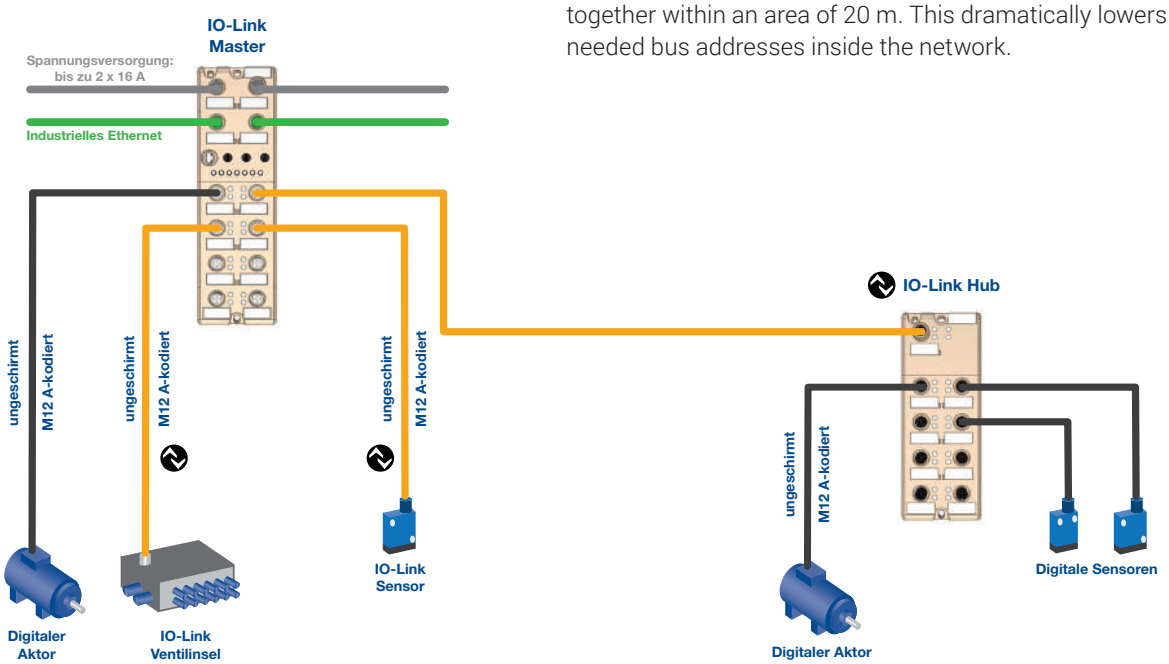
IO-Link Masters guarantee efficient and reliable communication between control and sensor/actuator level by adopting a gateway function between Ethernet and IO-Link. The **world's first IO-Link Masters providing multiprotocol support** for PROFINET and EtherNet/IP in combination with the new M12 Power L-coded power supply connection offer a major step forward in the miniaturization and future-proofing for intelligent industrial connectivity.

Masters are available in standard **60mm and ultra-compact 30 mm housings** and have eight IO-Link ports (four Class A and four Class B ports). On each IO-Link Master for both port classes, Pin 1 and Pin 3 are fixed for power supply connections for IO-Link devices. Pin 4 is for the IO-Link communication (IOL) and can also be configured as either digital input (DI) or digital output (DO).



Class A Ports (X1-X4) are best suited for sensors because next to the usual Pin 4 (IO-Link communication) they have an additional hardwired digital input channel on Pin 2. This allows a total of four additional digital inputs.

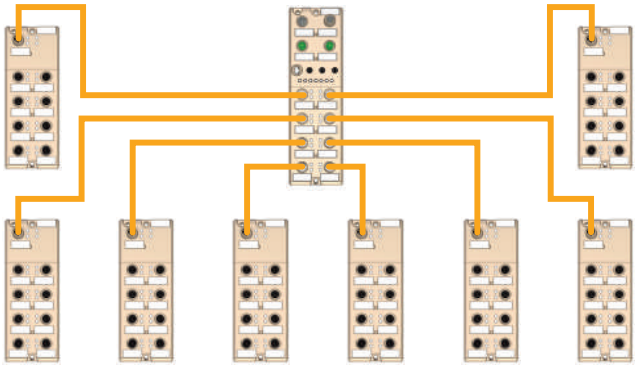
Class B Ports (X5-X8) provide **additional galvanically isolated power supplies** on Pin 2 and 5 for the connection of IO-Link devices that have increased power needs, such as IO-Link valve terminal.



LioN-Power IO-Link Hubs

Cost-effective signal transmission through standardization

IO-Link Hubs connect up to 16 standard digital signals on one end and transmit signals to the controller via the IO-Link protocol.



When LioN-Power IO-Link I/O Hubs are combined with the LioN-Power IO-Link Masters, you can **cost-efficiently transmit a maximum of 132 digital signals up to 20 m away from the Masters.** This enables efficient upgrades from passive to active systems, or for distributed environments to collect many digital signals.

One Standard Connector, One Bus Address

To **simplify your device needs and lower costs**, you may only need one A-coded M12 connector to power the I/O Hub and collect and transmit the I/O data, depending on the I/O Hub selected.

For added operational efficiency, **IO-Link Hubs only need one bus address** (via the Masters) to variably group sensor signals together within an area of 20 m. This dramatically lowers needed bus addresses inside the network.

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EEC - Extended Environmental Conditions

The IO-Link System for Extreme Temeperature Conditons

The introduction of the **EEC-Line** (Extended Environmental Conditions) makes the entire LioN-Power IO-Link system from Lumberg Automation suitable **for operation in temperatures as low as -40°C**. This performance feature considerably extends the range of use of the LioN-Power IO-Link Master and IO-Link Hubs to applications in harsh environmental conditions. These include wind turbine plants or deep-freeze warehouses.

Markets

The LioN-Power IO-Link Masters and I/O Hubs can withstand harsh operating environments across all industrial sections with ingress protection up to IP69K and welding spark-resistant housings. This includes manufacturing, robotics, material handling, intralogistics and machine building, as well as transportation, wind power applications and wastewater treatment plants.

PX0 - Parameterization = 0

The IO-Link System without any parameterization effort

"Out of the box and ready for use", the **PX0 IO-Link Hub Line** is mainly focused on end users and enables quick and easy device replacement in the IO-Link system based on the combination of IO-Link Master and IO-Link Hubs. Due to the **pre-configuration of the PX0 IO-Link Hubs**, maintenance effort is reduced to almost zero, a clear advantage in terms of reducing maintenance costs.

LioN Management Suite Software

With the LioN Management Suite, the free software tool from Belden, several LioN-P devices in your network can receive **automated firmware updates, securely and efficiently**. The LioN Management Suite recognizes connected devices and transfers the new firmware file to any number of devices simultaneously. This process completely eliminates the need for time-consuming connection between individual devices and the software tool, common for many other manufacturers. Furthermore, the LioN Management Suite can also be helpful for **initial system implementation**. An IP address range is pre-defined in the tool, so any Ethernet devices found are automatically assigned to a correct, valid IP address range.

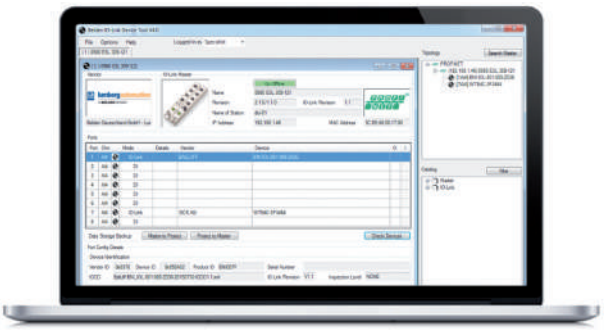
TMG IO-Link Device Tool

To configure your IO-Link devices, you can use one of the most popular and easy-to-use IO-Link software tools on the market – **TMG TE's IO-Link Device Tool**. This tool allows you to load and store IO Device Description (IODD) files for your IO-Link devices. It can be used as a standalone program, or integrated through a Tool Calling Interface (TCI) found in PLC engineering tools, such as STEP 7 or TIA Portal.

Main Features:

- Operation and configuration of IO-Link devices via IODD
- Support for IO-Link V1.1
- Port configuration of IO-Link Masters without a connected controller
- Direct access to IO-Link device data (process, identification, diagnostic and parameter)

Additional benefits of the IO-Link Device Tool include the ability to **quickly, easily and reliably change parameter or IO-Link devices** and to reduce overall machine costs. **LioN-Power IO-Link Masters are designed to work seamlessly with Version 5 of the TMG TE IO-Link Device Tool.**



TMG TE IO-Link Device Tool

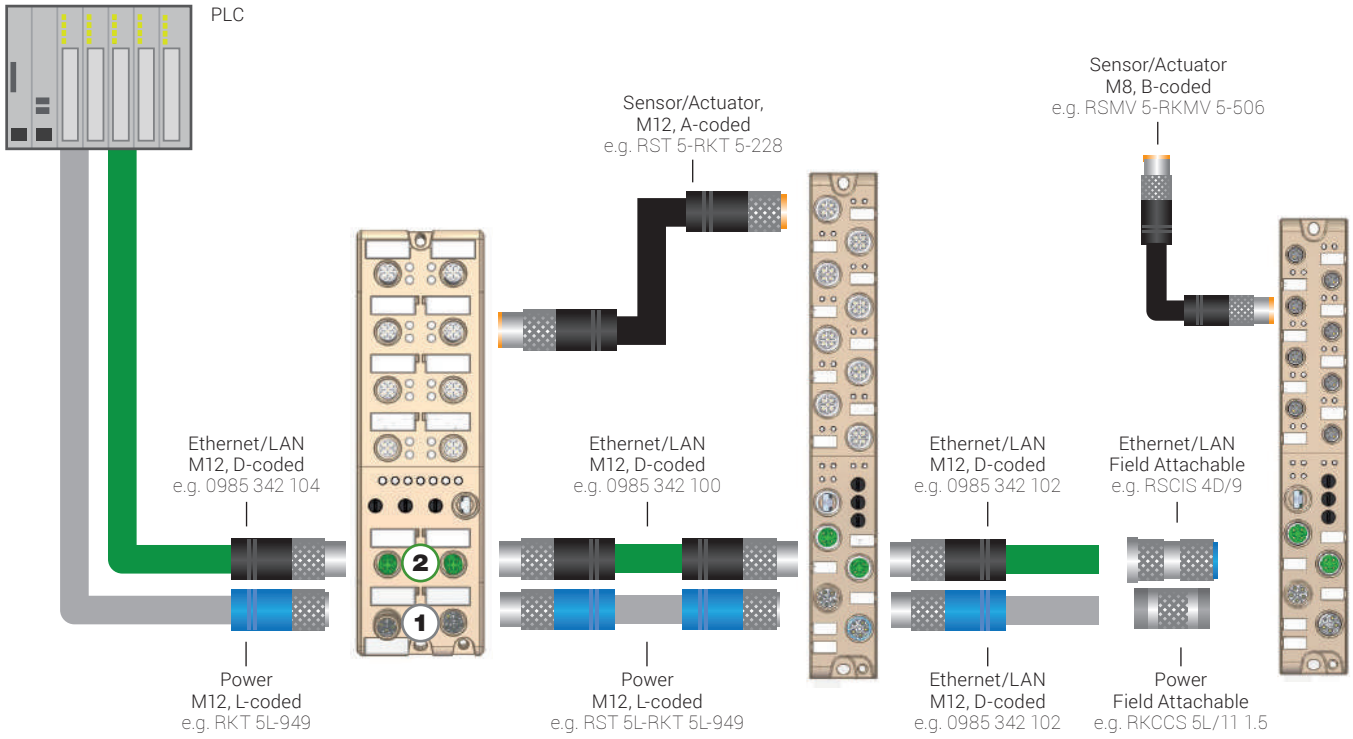
With its user-friendly graphical interface for port configuration and device parameterization, you can intuitively configure IO-Link devices without any PLC programming or having to study the device's data sheets. For more information on the TMG TE IO-Link Device Tool, visit www.tmgte.com

Technical Information IO-Link Master

Type	4DI 4DO 8IOL	4DI 8IOL	4DI 8IOL
			
Order Designation	0980 ESL 399-121[1]-(EEC)	0980 ESL 199-121	0980 ESL 199-122
Product Description	LioN-P, IO-Link Master, PROFINET or Multiprotocol (PROFINET and EtherNet/IP), industrial metal housing, 60 mm, up to IP69K, 4 digital input and 4 digital output channels (2 A) with galvanic isolation and 8 IO-Link Master, 8 x M12 A-coded I/O connection, 5-poles, 2 x M12 D-coded bus connection, 4-poles, 2 x M12 L-coded power supply connection, 5-poles	LioN-P, IO-Link Master, PROFINET or Multiprotocol (PROFINET and EtherNet/IP), industrial metal housing, 30 mm, up to IP69K, 4 digital input and 8 IO-Link Master, 8 x M12 A-coded I/O connection, 5-poles, 2 x M12 D-coded bus connection, 4-poles, 2 x M12 L-coded power supply connection, 5-poles	LioN-P, IO-Link Master, PROFINET or Multiprotocol (PROFINET and EtherNet/IP), industrial metal housing, 30 mm, up to IP69K, 4 digital input and 8 IO-Link Master, 8 x M8 B-coded I/O connection, 5-poles, 2 x M12 D-coded bus connection, 4-poles, 2 x M12 L-coded power supply connection, 5-poles
General Data			
Housing	Metal, zinc die-cast, potted		
Dimensions (W x H x D)	60 mm x 31 mm x 200 mm	30 mm x 43 mm x 225 mm	30 mm x 43 mm x 204 mm
Weight	ca. 500 g	ca. 480 g	ca. 450 g
Ambient Temperature	-20 °C to +70 °C (Operation)/-40 °C to +70 °C for all EEC[2] modules		
Protection Degree	IP65, IP67, IP69K[3]		
Shock/Vibration	50 g/15 g		
Power Supply 1			
Nominal Voltage	24 V DC (18 to 30 V DC)		
Connection	2 x M12, L-coded, 5-poles, up to 2 x 16 A		
Current Consumption	typ. 180 mA (at 24 V DC)		
IO-Link Master			
IO-Link Specification	V1.1.2 (COM 1, COM 2, COM 3)		
IO-Link Class A Ports	4 x (X1 to X4)		
IO-Link Class B Ports	4 x (X5 to X8)		
Nominal Current C/Q (Pin 4)	500 mA		
Nominal Current 1L+ (Pin 1)	500 mA		
Nominal Current 2L+ (Pin 2)	max. 2 A per Port	max. 4 A per Module	
Bus System 2			
Protocol	Multiprotocol (PROFINET or EtherNet/IP)		
Connection	2 x M12, D-coded, 4-poles		
PROFINET Features	PROFINET V2.3 (CC-C), Netload Class II, FSU, MRP, Shared Device		
EtherNet/IP Features	EtherNet/IP acc. to CIP Edition V3.11, EIP Adaption of CIP V1.12, DLR		
I/O Channels			
I/O Function	4 digital inputs, 4 digital outputs and 8 IO-Link Master (configurable as DI, DO, IOL)	4 digital inputs and 8 IO-Link Master (configurable as DI, DO, IOL)	
Connection	8 x M12, A-coded, 5-poles		8 x M8, B-coded, 5-poles
Digital Input Channels	max. 12 (4 x Pin 2 (Class A) and 8 x configurable via Pin 4)		
DI Channel Type	Type 1 acc. To IEC 61131-2, PNP		
Sensor Current Supply	max. 500 mA per port		
DO Output Current	max. 500 mA per channel via C/Q, max. 2 A per channel via 2L+ (Pin 2)	max. 500 mA per channel via C/Q	
Galv. Isolated Outputs	Yes, 2L+ (Pin 2) outputs	No	
Protective Circuit	Electronically: Overload and short-circuit protection		

[1] Also available as: 0980 ESL 3x8-121 – With extra decoupling of Pin 2L+/Uaux with series diode against power feedback from L+ for maximum security. Nominal current of 2L+ (Pin 2) is limited to 1.6 A due to protective circuit.
[2] EEC - Extended Environmental Conditions (Operating Temperature -40 °C to +70 °C).
[3] Only if mounted and locked and in combination with Hirschmann/Lumberg Automation connector.
We reserve the right to make technical changes.

Connection Guide IO-Link Master



1 Power – L-coded M12 Power, 5-poles		2 Data – D-coded M12 LAN/Ethernet, 4-poles	
	**Male straight/Female straight** RST 5L-RKT 5L-949/* M Shielded version: RSTS 5L-RKTS 5L-956/*M **Male angled/Female angled** RSWT 5L-RKWT 5L-949/* M		**Male straight/Male straight** 0985 342 100/* M **Male straight/Male angled** 0985 342 132/* M **Male angled/Male angled** 0985 342 131/* M
	**Male straight/Open** RST 5L-949/*M Shielded version: RSTS 5L-956/*M **Male angled/Open** RSWT 5L-949/*M **Female straight/Open** RKT 5L-949/*M Shielded version: RKTS 5L-956/*M **Female angled/Open** RKWT 5L-949/*M		**Male straight/Open** 0985 342 102/* M **Male angled/Open** 0985 342 130/* M
			**M12-RJ45 Industrial Ethernet data cordset** 0985 342 104/* M umspritzt **RJ45-RJ45 Industrial Ethernet data cordset** 0985 342 500/* M umspritzt
	**Field attachable – Male straight** Crimp type: RSCCS 5L/11 1.5 **Field attachable – Male angled** Crimp type: RSCWCS 5L/11 1.5 **Field attachable – Female straight** Crimp type: RKCCS 5L/11 1.5 **Field attachable – Female angled** Crimp type: RKCWCS 5L/11 1.5		**Field attachable – Male Straight** Clamping cage: RSCIS 4D/9 Spring type: 0986 EMC 102
			**Adapter – M12/RJ45** 0981 ENC 100

* = cable length in m (e.g. 30 cm -> 0.3 M). Standard cable lengths: 0.3 m, 0.6 m, 1 m, 2 m, 5 m, 10 m, 15 m, 20 m, 30 m.
For other cable lengths and connectors please contact **icos-sales@belden.com**

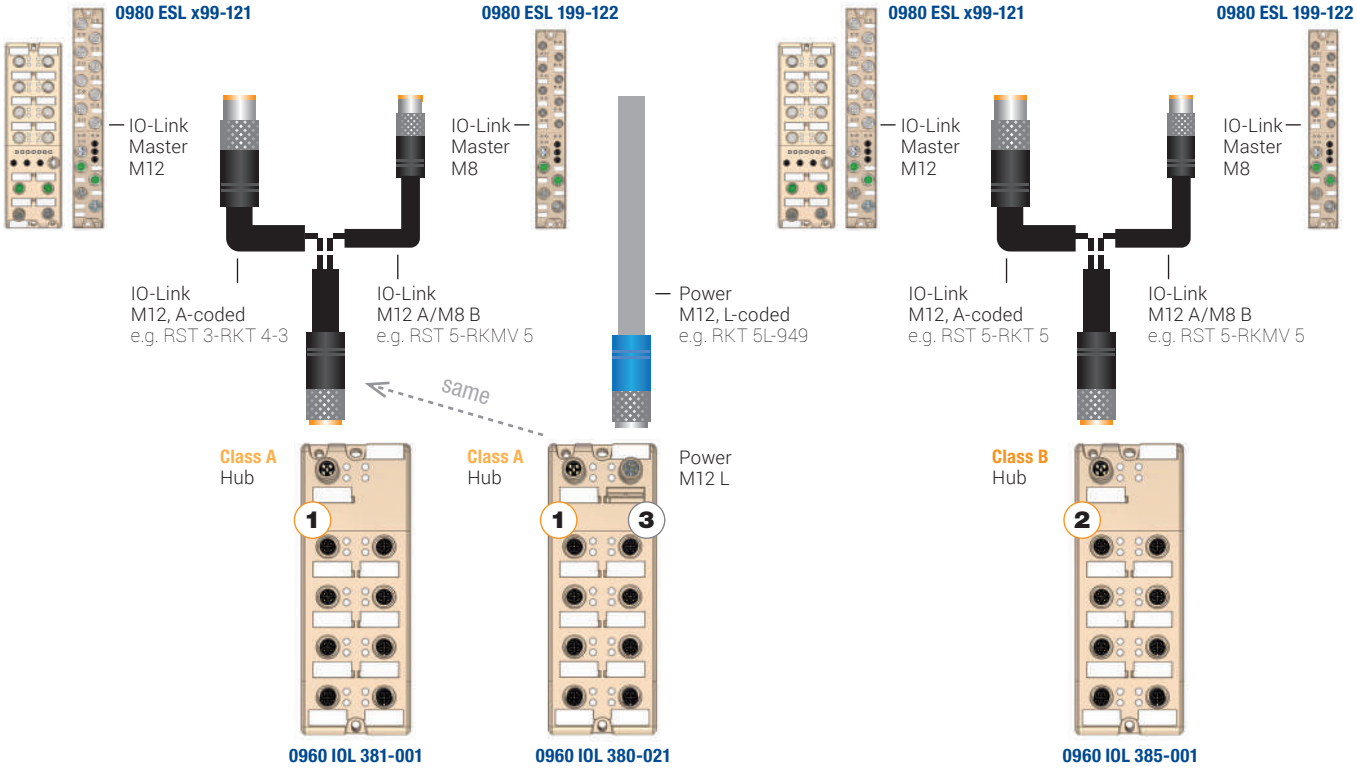
Technical Information IO-Link Hub

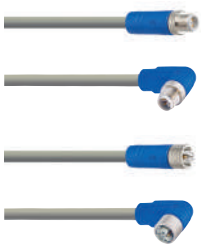
Type	16DI NEW	10DI 6DO NEW	16DIO NEW
			
Order Designation	0960 IOL 381-001	0960 IOL 385-001	0960 IOL 380-021
Order Designation	0960 IOL 381-001-EEC	0960 IOL 385-001-EEC	0960 IOL 380-021-EEC
Order Designation	0960 IOL 381-001-PXO[3]	0960 IOL 385-001-PXO[3]	0960 IOL 380-021-PXO[3]
Product Description	LioN-P, IO-Link Hub, industrial metal housing, 60 mm, up to IP69K, 16 digital input channels, 8 x M12 A-coded I/O connection, 5-poles, 1 x M12 A-coded IO-Link Class A connection, 5-poles	LioN-P, IO-Link Hub, industrial metal housing, 60 mm, up to IP69K, 10 digital input and 6 digital output channels (0.5 A) with galvanic isolation, 8 x M12 A-coded I/O connection, 5-poles, 1 x M12 A-coded IO-Link Class B connection, 5-poles	LioN-P, IO-Link Hub, industrial metal housing, 60 mm, up to IP69K, 16 digital in-/output channels (universal I/O) (2 A), 8 x M12 A-coded I/O connection, 5-poles, 1 x M12 L-coded IO-Link Class A connection, 5-poles, 1 x M12 L-coded power supply connection, 5-poles
General Data			
Housing	Metal, zinc die-cast, potted		
Dimensions (W x H x D)	60 mm x 31 mm x 159 mm		
Weight	ca. 280 g		
Ambient Temperature	-20 °C to +70 °C (Operation)/-40 °C to +70 °C for all EEC[2] modules		
Protection Degree	IP65, IP67, IP69K[1]		
Shock/Vibration	50 g/15 g		
Power Supply	1	1	3
Nominal Voltage	24 V DC (18 to 30 V DC)		
Connection	1 x M12, A-coded, 5-poles		1 x M12, A-coded, 5-poles (Module), 1 x M12, L-coded, 5-poles
Module Supply Voltage	1L+ (US), Pin 1/3		
Sensor Supply Voltage	1L+ (US), Pin 1/3		US via M12, L-coded
Actuator Supply Voltage	N/A	2L+ (Uaux), Pin 2/5	UL via M12, L-coded
Current Consumption	typ. 80 mA (at 24 V DC)		
Galvanically Isolated	No	Yes	No
IO-Link	1	2	1
IO-Link Specification	V1.1.2		
COM Mode	COM 3		
IO-Link Class	Class A	Class B	Class A
Data Storage	Supported		
Digital Input Channels			
Connection	8 x M12, A-coded, 5-poles	5 x M12, A-coded, 5-poles	8 x M12, A-coded, 5-poles
Digital Input Channels	16, fixed	10, fixed	max. 16, universal I/O
DI Channel Type	Type 1 acc. To IEC 61131-2, PNP		Type 3 acc. To IEC 61131-2, PNP
Nominal Input Current	typ. 4.6 mA		typ. 5.3 mA
Sensor Current Supply	max. 700 mA per module[1] see below: IO-Link Master Limitation[*]		max. 500 mA per port max. 16 A per hub
Supplied by	1L+ (US)		M12 Power: Pin 1/3
Digital Output Channels			
Connection	–	3 x M12, A-coded, 5-poles	8 x M12, A-coded, 5-poles
Digital Output Channels	–	6, fixed	max. 16, universal I/O
DO Output Current	–	max. 500 mA see below: IO-Link Master Limitation[*]	max. 2 A max. 16 A per hub
Supplied by	–	2L+/Uaux	M12 Power: Pin 2/4
Galv. Isolated Outputs	–	Yes, all outputs	
Protective Circuit	–	Electronically: Overload and short-circuit protection	

* IO-Link Master Limitation	0980 ESL 3x8-121	0980 ESL 3x9-121	0980 ESL 1x9-12x	0980 ESL 1x9-33x
1L+, max.	max. 500 mA per Port			
2L+, max.	max. 1.6 A per Port	max. 2 A per Port	max. 4 A per Module	max. 4 A per Module

[1] Only if mounted and locked and in combination with Hirschmann/Lumberg Automation connector.
[2] EEC - Extended Environmental Conditions (Operating Temperature -40 °C to +70 °C).
[3] PX0 - Basic parameter set (no parameterization).
We reserve the right to make technical changes.

Connection Guide IO-Link Hub



IO-Link	1 Class A	2 Class B	3 Power – L-coded M12 Power, 5-poles	
	**Male straight/Female straight** RST 3-RKT 4-3-224/* M **Male straight/Female angled** RST 3-RKWT 4-3-224/* M	RST 5-RKT 5-228/* M RST 5-RKWT 5-228/* M		**Male straight/Female straight** RST 5L-RKT 5L-949/* M Shielded version: RSTS 5L-RKTS 5L-956/*M **Male angled/Female angled** RSWT 5L-RKWT 5L-949/* M
	**Male straight/Open** RST 3-224/*M **Male angled/Open** RSWT 3-224/*M **Female straight/Open** RKT 4-3-224/*M **Female angled/Open** RKWT 4-3-224/*M	RST 5-228/* M RSWT 5-228/*M RKT 5-228/* M RKWT 5-228/* M		**Male straight/Open** RST 5L-949/*M Shielded version: RSTS 5L-956/*M **Male angled/Open** RSWT 5L-949/*M **Female straight/Open** RKT 5L-949/*M Shielded version: RKTS 5L-956/*M **Female angled/Open** RKWT 5L-949/*M
 	**Male straight, Screw Type** SW 15: RSC 3/7 SW 19: RSC 3/9 **Male straight, Spring Type** SW 15: RSCQ 3/7 SW 19: RSCQ 3/9 **Male angled, Screw Type** SW 15: RSCW 3/7 SW 19: RSCQ 3/9 **Female straight, Screw Type** SW 15: RKC 4/3/7 SW 19: RKC 4/3/9 **Female angled, Screw Type** SW 15: RKCW 4/3/7 SW 19: RKCW 4/3/9	RSC 5/7 RSC 5/9 RSCW 5/7 RSCW 5/9 RKC 5/7 RKC 5/9 RKCW 5/7 RKCW 5/9	 	**Field attachable – Male straight** Crimp type: RSCCS 5L/11 1.5 **Field attachable – Male angled** Crimp type: RSCWCS 5L/11 1.5 **Field attachable – Female straight** Crimp type: RKCCS 5L/11 1.5 **Field attachable – Female angled** Crimp type: RKCWCS 5L/11 1.5

* = cable length in m (e.g. 30 cm -> 0.3 M). Standard cable lengths: 0.3 m, 0.6 m, 1 m, 2 m, 5 m, 10 m, 15 m, 20 m, 30 m.
For other cable lengths and connectors please contact **icos-sales@belden.com**

Order Information

Order Number	Order Designation	Bus Protocol	Housing	Width	IP	I/O	PWR Connection	Bus Connection	I/O Connection
IO-Link Master, PROFINET, M12 Power									
934861001	0980 ESL 109-121	PROFINET	Metal	30 mm	up to IP69K	4DI 8IOL	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934857001	0980 ESL 109-122	PROFINET	Metal	30 mm	up to IP69K	4DI 8IOL	2 x M12, L-coded	2 x M12, D-coded	8 x M8, 5-poles
934878004	0980 ESL 309-121	PROFINET	Metal	60 mm	up to IP69K	4DI 4DO 8IOL	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934878005	0980 ESL 308-121[1]	PROFINET	Metal	60 mm	up to IP69K	4DI 4DO 8IOL	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
IO-Link Master, M12 Power, Operating Temperature -40 °C to +70 °C (EEC)[2]									
934878050	0980 ESL 309-121-EEC	PROFINET	Metal	60 mm	up to IP69K	4DI 4DO 8IOL	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934879072	0980 ESL 399-121-EEC[2]	Multiprotocol	Metal	60 mm	up to IP69K	4DI 4DO 8IOL	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
IO-Link Master, Multiprotocol (PROFINET and EtherNet/IP), M12 Power									
934964004	0980 ESL 199-121	Multiprotocol	Metal	30 mm	up to IP69K	4DI 8IOL	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934964003	0980 ESL 199-122	Multiprotocol	Metal	30 mm	up to IP69K	4DI 8IOL	2 x M12, L-coded	2 x M12, D-coded	8 x M8, 5-poles
934879004	0980 ESL 399-121	Multiprotocol	Metal	60 mm	up to IP69K	4DI 4DO 8IOL	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934879009	0980 ESL 398-121[1]	Multiprotocol	Metal	60 mm	up to IP69K	4DI 4DO 8IOL	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
IO-Link I/O Hub									
934992002	0960 IOL 381-001	IO-Link	Metal	60 mm	up to IP69K	16DI	via bus connection	1 x M12, A-coded	8 x M12, A-coded
935001001	0960 IOL 385-001	IO-Link	Metal	60 mm	up to IP69K	10DI 6DO	via bus connection	1 x M12, A-coded	8 x M12, A-coded
934994001	0960 IOL 380-021	IO-Link	Metal	60 mm	up to IP69K	16DIO	1 x M12, L-coded	1 x M12, A-coded	8 x M12, A-coded
IO-Link I/O Hub, Basic Parameter Set[3]									
934992052	0960 IOL 381-001-PXO	IO-Link	Metal	60 mm	up to IP69K	16DI	via bus connection	1 x M12, A-coded	8 x M12, A-coded
935001052	0960 IOL 385-001-PXO	IO-Link	Metal	60 mm	up to IP69K	10DI 6DO	via bus connection	1 x M12, A-coded	8 x M12, A-coded
934994052	0960 IOL 380-021-PXO	IO-Link	Metal	60 mm	up to IP69K	16DIO	1 x M12, L-coded	1 x M12, A-coded	8 x M12, A-coded
IO-Link I/O Hub, Operating Temperature -40 °C to +70 °C (EEC)[2]									
934992050	0960 IOL 381-001-EEC	IO-Link	Metal	60 mm	up to IP69K	16DI	via bus connection	1 x M12, A-coded	8 x M12, A-coded
935001050	0960 IOL 385-001-EEC	IO-Link	Metal	60 mm	up to IP69K	10DI 6DO	via bus connection	1 x M12, A-coded	8 x M12, A-coded
934994050	0960 IOL 380-021-EEC	IO-Link	Metal	60 mm	up to IP69K	16DIO	1 x M12, L-coded	1 x M12, A-coded	8 x M12, A-coded

[1] Only if mounted and locked and in combination with Hirschmann/Lumberg Automation connector.
[2] EEC - Extended Environmental Conditions (Operating Temperature -40 °C to +70 °C).
[3] PXO - Basic parameter set (no parameterization).
We reserve the right to make technical changes.

About Belden

Belden Inc., a global leader in high quality, end-to-end signal transmission solutions, delivers a comprehensive product portfolio designed to meet the mission-critical network infrastructure needs of industrial, enterprise and broadcast markets. With innovative solutions targeted at reliable and secure transmission of rapidly growing amounts of data, audio and video needed for today's applications, Belden is at the center of the global transformation to a connected world. Founded in 1902, the company is headquartered in St. Louis, USA, and has manufacturing capabilities in North and South America, Europe and Asia.

For more information, visit us at www.belden.com