lumbergautomation
A BELDEN BRAND

Product Bulletin

LioN-Power IO-Link System

Multiprotocol IO-Link Masters and I/O Hubs

IO-Link is the first standardized I/O technology for communicating with sensors and actuators. LioN-Power IO-Link Masters and Hubs enable this standardization with several industry-first features.

- **Process up to 132 I/O signals** per system by connecting IO-Link I/O Hubs with an IO-Link Master. This helps to improve your process efficiency by transmitting data to higher level PLCs in an economical way.
- **Implement preventive maintenance** by transmitting diagnostic data of intelligent IO-Link sensors and actuators before a failure happens.
- Transmit up to 2 x 16 A per module with the **industry's first IO-Link System with M12 L-coding** power connection.

Key Features

- LioN-Power IO-Link portfolio with IO-Link Masters and I/O Hubs in many variations
- 8-port IO-Link Masters in 30mm and 60mm housing with M8 and M12 I/O connection
- Port variations: 4xClass A and 4xClass B, with galvanic isolated power supply
- IO-Link Device Tool of TMG enables easy configuration of devices 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
- Withstand harsh conditions – IP65, IP67, IP69K-rated tolerances for mechanical stress
- IO-Link Hubs available in 16DI, 10DI 6DO (soon) and 16DIO (soon) with M12 Power connection

Our IO-Link system helps ensure consistent, intelligent communication between the enterprise resource planning (ERP) level and sensor level – which is 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 System

With the addition of IO-Link I/O Hubs, our IO-Link system offers the right solution to **improve all your sensor and actuator connectivity:** Whether you need an economical way to **update from passive to active systems, collect many digital signals** or need to connect your intelligent IO-Link devices, critical for today's digital factory.

With IP65, IP67 and IP69K ratings, the LioN-Power IO-Link System has **superior resistance to mechanical stress, shock and vibration**, and can operate in temperatures ranging from -20 °C to +70 °C.

IO-Link Masters

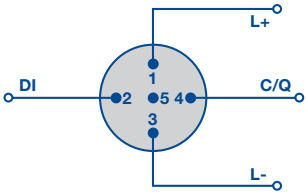
As the **world's first IO-Link Masters to provide multiprotocol** support for PROFINET and EtherNet/IP in combination with the new M12 Power L-coded power supply connection, the LioN-Power modules offer a major step forward in the miniaturization and future-proofing for intelligent industrial connectivity.

Masters are available in standard **60 mm and ultra-compact 30 mm housings**, and have eight IO-Link ports (four Class A and four Class B ports).

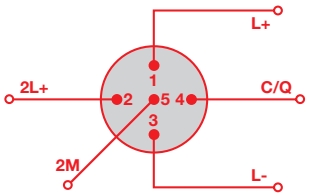
IO-Link Master Port Classes

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. Which allows a total of four additional digital inputs (DIs).



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. If the power supply is not needed it can be completely switched off (deactivated) to transform Class B ports into Class A ports.



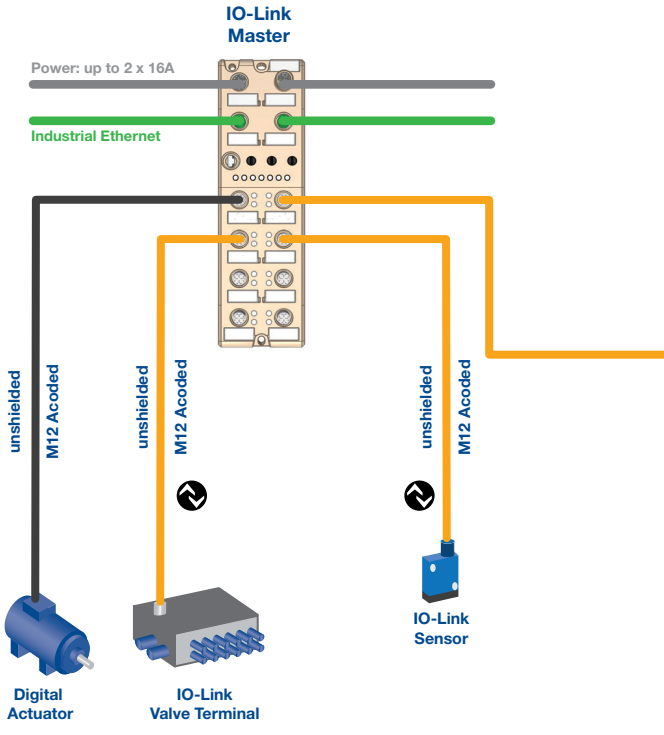
Pin 2 on 60 mm IO-Link Masters can also be used as a standard switching digital output channel.

The following maximum port configurations are possible:

Variations	Slim (30 mm)	Standard (60 mm)
IOL	max. 8 (Pin 4)	max. 8 (Pin 4)
DI	max. 12, 8 (Pin 4) + 4 (Pin 2 of Class A Ports)	max. 12, 8 (Pin 4) + 4 (Pin 2 of Class A Ports)
DO	max. 8 (Pin 4 @ 500 mA)	max. 8 (Pin 4 @ 500 mA) + 4 (Pin 2 of Class B Ports)

Markets

The LioN-Power IO-Link Masters and I/O Hubs can withstand the 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 and wind power applications and wastewater treatment plants.



LioN-P IO-Link Master

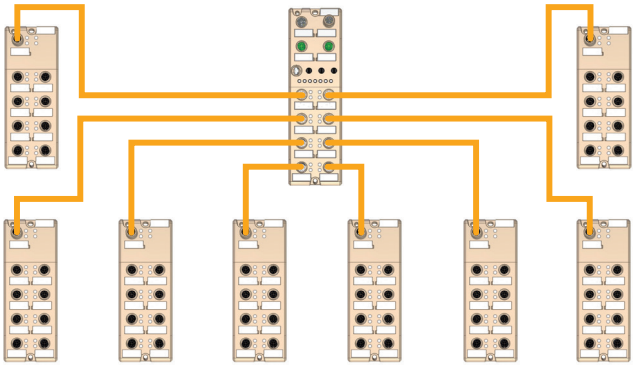
IO-Link Masters simplify the work of system engineers. They can use one smart sensor or actuator for different types of applications to offer flexibility, while reducing the variety of devices in your inventory.

EMEA: +49 (0) 2355 / 5044-000 | US: 1-800-BELDEN-1 | www.lumberg-automationusa.com

IO-Link I/O Hubs

Cost-Effective Signal Transmission with IO-Link I/O Hubs

IO-Link I/O Hubs connect up to 16 standard digital signals on one end and transmit the signals to the controller via the IO-Link protocol. Thus need to be connected to an IO-Link Master.



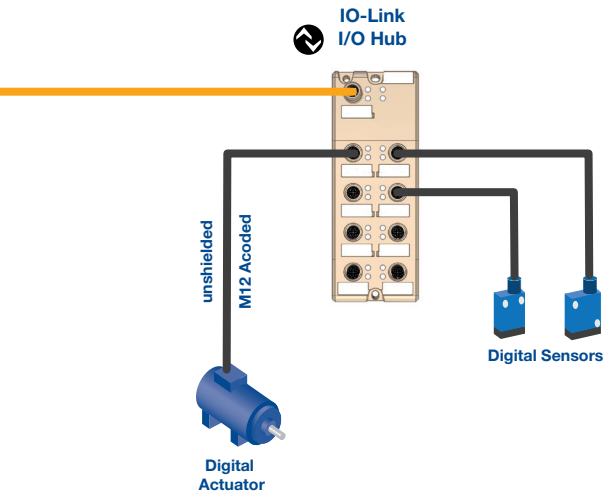
When LioN-Power IO-Link I/O Hubs are combined with the LioN-Power IO-Link Masters, you can **cost-effectively transmit a maximum of 132 digital signals up to 20 m away from the Masters**. It now makes financial and economic sense to upgrade from passive to active systems, or for distributed environments to collect many digital signals.

One Standard Connector

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).

One Bus Address

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



LioN-Power IO-Link I/O Hub

IO-Link I/O Hubs collect up to 16 standard digital signals and transmit them through an IO-Link Master to the controller via the IO-Link protocol. This makes the hubs particullary suitable for applications which have many digital sensors and actuators in a restricted space.

IO-Link Device Configuration Tool

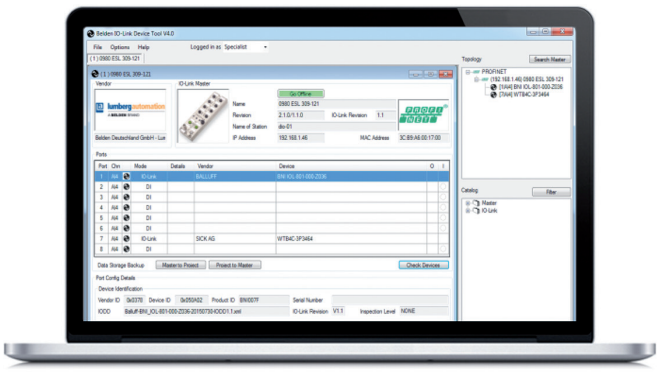
To configure your IO-Link devices, you can use one of the most popular and **easy-to-use IO-Link software** tools on the market – **TMG TE's IO-Link Device Tool**.

With this tool, you can 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.

The tool's main features include:

- 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*	0980 ESL 199-121	0980 ESL 199-122
Product Description	LioN-P, IO-Link Master, 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, 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, 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	Die-cast zinc housing, 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)		
Protection Degree	IP65, IP67, IP69K*		
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 (COM 1 … 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 / 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, 5-pole, A-coded		8 x M8, 5-pole, B-coded
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		

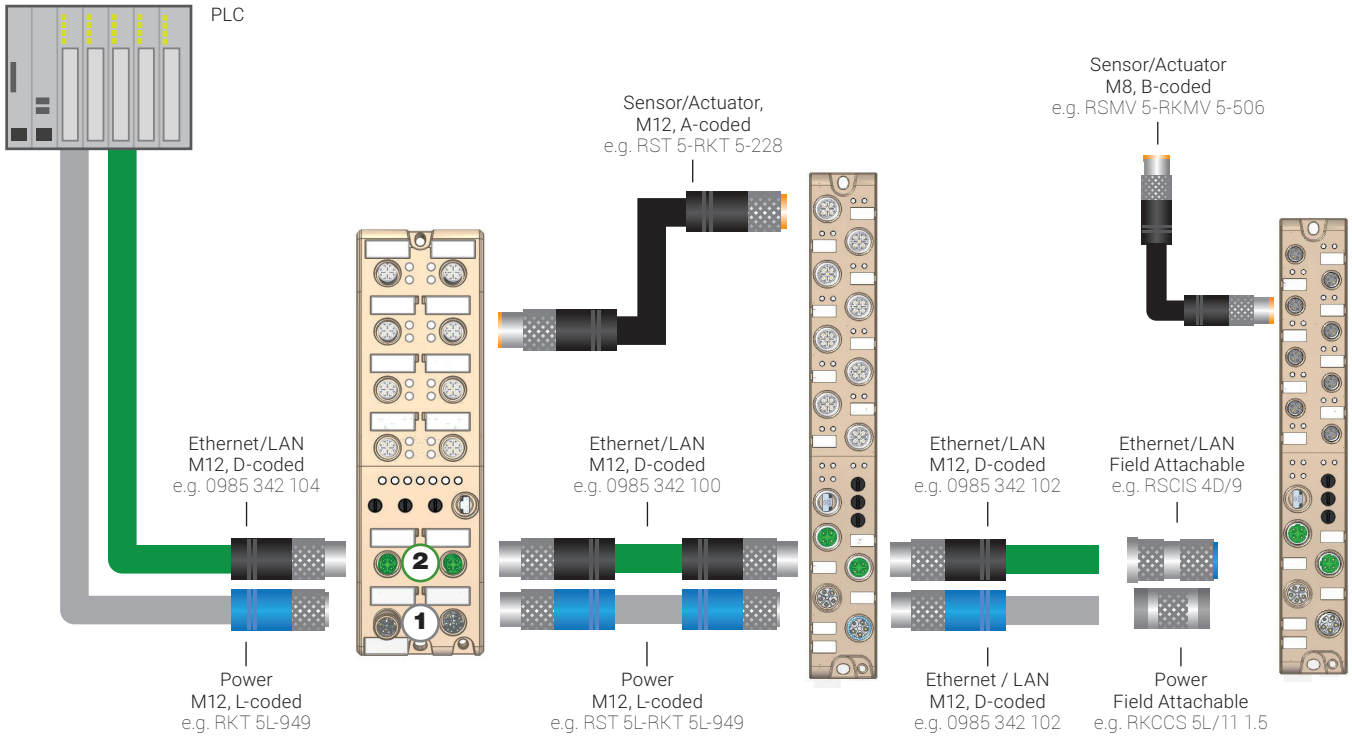
***Also available as: 0980 ESL 398-121 - With extra decoupling of Pin 2L+ / Uaux w ith series diode against power feedback from L+ for maximum security. Nominal current of 2L+ (Pin 2) is limited to 1.6 A due to protective circuit.**

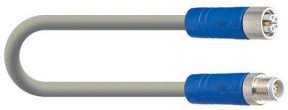
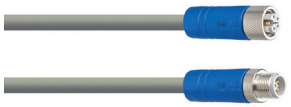
*only if mounted and locked and in combination with Hirschmann / Lumberg connector.

We reserve the right to make technical changes.

EMEA: +49 (0) 2355 / 5044-000 | US: 1-800-BELDEN-1 | www.lumberg-automationusa.com

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 Shielded version: RSWTS 5L-RKWTS 5L-956/*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 Shielded version: RSWTS 5L-956/*M **Female straight/Open** RKT 5L-949/*M Shielded version: RKTS 5L-956/*M **Female angled/Open** RKWT 5L-949/*M Shielded version: RKWTS 5L-956/*M		**Male straight/Open** 0985 342 102/* M **Male angled/Open** 0985 342 102/* M
			**RJ45/M12, Male straight** 0985 342 104/* M umspritzt **RJ45/RJ45** 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 (COMING SOON)	16DIO (COMING SOON)
			
Order Designation	0960 IOL 381-001	0960 IOL 385-001	0960 IOL 380-021
Product Description	LioN-P, IO-Link I/O Hub, IO-Link, 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 I/O Hub, IO-Link, industrial metal housing, 60 mm, up to IP69K, 10 digital input and 4 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 I/O Hub, IO-Link, 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 B connection, 5-poles, 1 x M12 L-coded power supply connection, 5-poles
General Data			
Housing	Die-cast zinc housing, 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)		
Protection Degree	IP65, IP67, IP69K*		
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, 5-poles, A-coded		1 x M12, 5-poles, A-coded (Module), 1 x M12, 5-poles, L-coded
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	Not needed	Yes	
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, 5-pole, A-coded	5 x M12, 5-pole, A-coded	8 x M12, 5-pole, A-coded
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* *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, 5-pole, A-coded	8 x M12, 5-pole, A-coded
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	

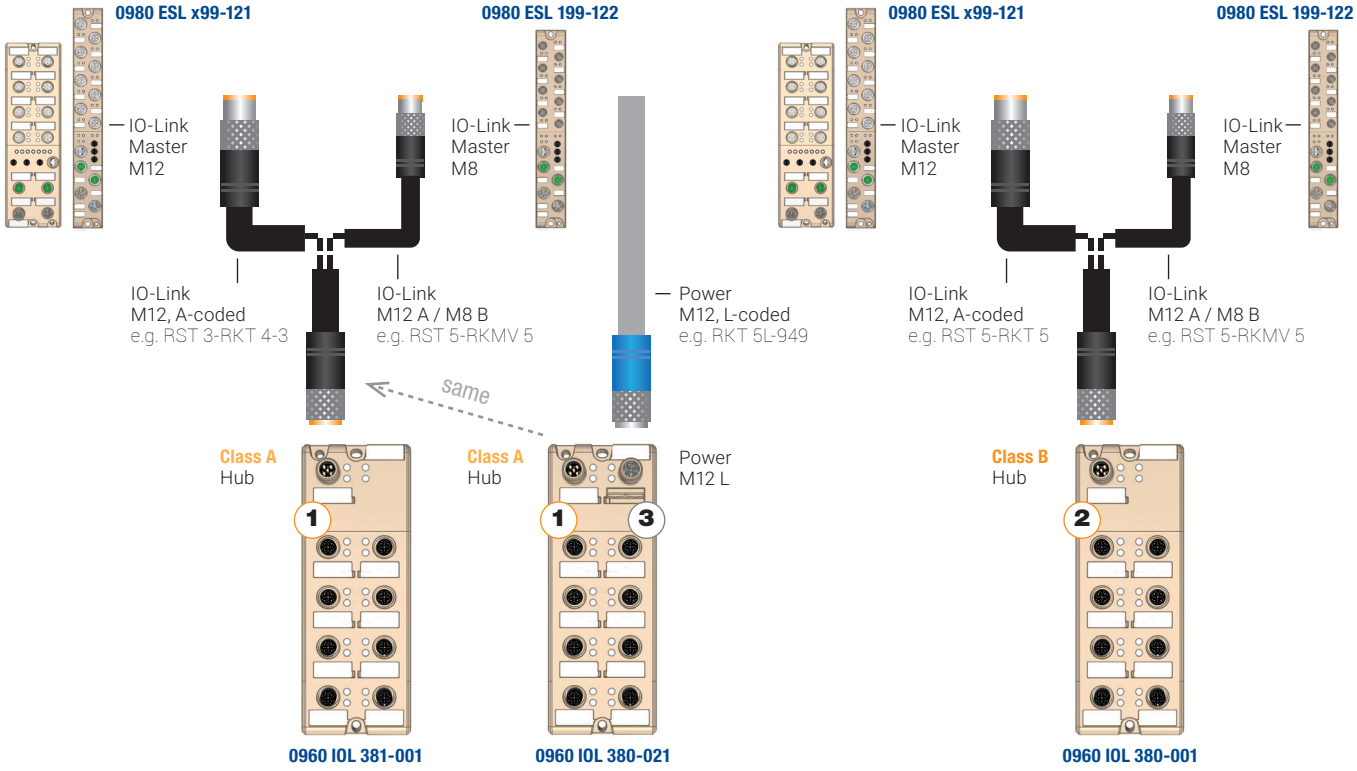
*IO-Link Master Limitation	0980 ESL 3x8-121	0980 ESL 3x9-121	0980 ESL 1x9-12x	0980 ESL 1x9-33x
1L+, max.	max. 500 mA per Port			
2L+, max.	max. 1.6 A per Port	max. 2 A per Port	max. 4 A per Module	max. 4 A per Module

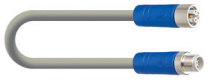
*only if mounted and locked and in combination with Hirschmann / Lumberg connector.

We reserve the right to make technical changes.

EMEA: +49 (0) 2355 / 5044-000 | US: 1-800-BELDEN-1 | www.lumberg-automationusa.com

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 Shielded version: RSWTS 5L-RKWTS
 	**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 Shielded version: RSWTS 5L-956/*M **Female straight / Open** RKT 5L-949/*M Shielded version: RKTS 5L-956/*M **Female angled / Open** RKWT 5L-949/*M Shielded version: RKWTS 5L-956/*M
	**Male straight, Screw Type** SW 15: RSC 3/7 SW 19: RSC 3/9 **Male straight, SpringType** 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-pole
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*	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, 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-pole
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*	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									
934992001	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

Belden Competence Center

As the complexity of communication and connectivity solutions has increased, so have the requirements for design, implementation and maintenance of these solutions. For users, acquiring and verifying the latest expert knowledge plays a decisive role in this. As a reliable partner for end-to-end solutions, Belden offers expert consulting, design, technical support, as well as technology and product training courses, from a single source: Belden Competence Center. In addition, we offer you the right qualification for every area of expertise through the world's first certification program for industrial networks. Up-to-date manufacturer's expertise, an international service network and access to external specialists guarantee you the best possible support for products.

Irrespective of the technology you use, you can rely on our full support – support-automation@belden.com – from implementation to optimization of every aspect of daily operations.

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 and follow us on Twitter @BeldenIND.