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Product Bulletin

LioN-Power I/O Modules

Multiprotocol Digital I/O Modules

The family of LioN-Power multiprotocol modules offer highly customizable features to deliver fieldbus-independent automation for the leading industrial Ethernet protocols.

Replace modules faster by using the universal channels as digital input or digital output, without any configuration. This flexibility **lowers configuration time**.

Streamline your field devices through the **industry's first multiprotocol I/O device** for PROFINET, EtherNet/IP and EtherCAT protocols.

Connect more field devices in a daisy-chain with the **industry's only I/O module powerful enough** to support 2 x 16 amps.

Key Features

- IO function available in 16DIO (universal), 16DI, 16DO and 8DI 8DO
- Power supply connections – M12 L-coded or 7/8"
- Flexible, independent bitmapping via Flex-Bit Technology
- PROFINET V2.3 (CC-C), Netload Class III, FSU, MRP
- EtherNet/IP according to CIP Edition V3.11, EIP adaption of CIP V1.12, DLR, Quick Connect
- EtherCAT I/O according to ETG.1000 V1.2, auto-increment and fixed addressing, CoE, EoE, FoE
- IP-rated for IP65, IP67 and up to IP69K

With multiprotocol functionality and 16 universal digital channels, the LioN-Power I/O modules are the most versatile on the market. Belden's unique "Flex-Bit Technology" enables LioN-Power devices to connect to systems with different bit mappings and make them Ethernet-ready.

Be certain.
Belden.

Fieldbus-Independent Automation with Universal I/O Modules

Power your industrial automation solutions for Industry 4.0 connectivity with the most versatile multiprotocol I/O modules on the market. Within one device, these modules **support three of the most dominant Ethernet protocols** – PROFINET, EtherNet/IP and EtherCAT.

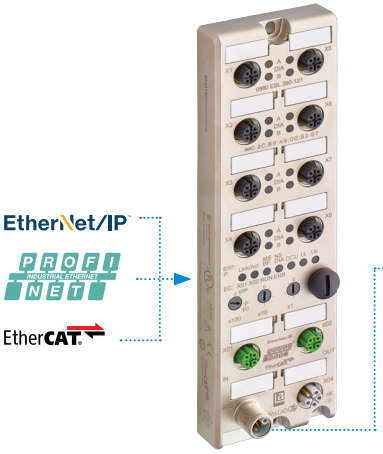
Easily Select Protocols in the Field

Engineers and mechanics need flexibility in the field. To choose the desired protocol, simply turn the first rotary switch. To return to the original factory settings, turn the rotary switches to 979 and reset the power.

Power More Field Devices

Achieve the power you need at the field-level with two types of power connections:

- M12 Power L-Coded
  The module's M12 power technology **offers the highest current rating in the industry** – unscaled 2 x 16 amps per module.
- 7/8" Power
  In addition to having the latest M12 power technology, the modules also offer standard 7/8" power technology.



	M12 Power	7/8" Power
Power		
Conductor Size	Max. 2.5 mm²	Max. 1.5 mm²
Length at Full Power	Up to 17 m (with 2.5 mm²)	Up to 10 m
Daisy-Chain	Max. 2 x 16 amps	Max. 2 x 9 amps

Applications

Fieldbus-independent LioN-Power I/O Modules are especially helpful for applications where machines or systems are built in an identical way, but with different programmable logic controllers (PLCs). A single LioN-Power I/O device can be used across three different control systems (protocols) and helps you design standardized machines with identical field-level components.

Markets

The LioN-Power I/O Modules were designed to operate in harsh environments across different sectors, such as automotive or food and beverage manufacturing, material handling or packaging and transportation. It can also be used by machine builders or with robotic machinery.

What's new?

Flexible Bitmapping with New "Flex-Bit Technology"

Each I/O module has a specific bitmapping. Bitmapping defines how the physical channels of the I/O module are accessible by the PLC. The mapping often differs between different module types, product families or vendors.

With Flex-Bit Technology, you can now transform the bit assignment within the 16DIO module to match your already established bit mapping scheme, no matter how complicated or customized. Flexible bitmapping means that each bit will not have a fixed guideline or bit assignment but can be freely mapped.

It's finally **easy to retrofit older machines** with different bitmappings and get your machines Ethernet-ready with this universal and manufacturer-independent technology.

In these example charts below, the module exhange between old and new would require a program change because of different bitmappings.

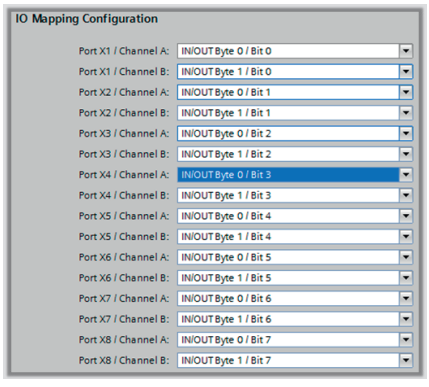
Old I/O module: LioN-C PB 16DI – Bitmapping

Bit	7	6	5	4	3	2	1	0
Byte 0	8A	7A	6A	5A	4A	3A	2A	1A
Byte 1	8B	7B	6B	5B	4B	3B	2B	1B

New I/O module: LioN-P MP 16DIO – Bitmapping (Default)

Bit	7	6	5	4	3	2	1	0
Byte 0	4B	4A	3B	3A	2B	2B	1B	1A
Byte 1	8B	8A	7B	7A	6B	6B	5B	5A

The innovative Flex-Bit Technology inside the LioN-Power 16DIO universal module makes it possible to easily reconfigure bit assignments and achieve manufacturer-independent bitmapping.



Manufacturer independent bitmapping

For example in PROFINET with Siemens TIA portal flexible bitmapping can be achieved very easily inside the IO module parameters via drop down menu.

Control Your Devices with LioN-Power Webserver

Remote information, diagnostics and configuration has never been easier. With a user-friendly webserver, you can get module information and adjust technical settings. This control across your devices enables you to make more informed operational and business decisions.

Through the LioN-Power webserver you can view various data points about the I/O modules and control it, including:

- Connections and network status
- Channel diagnostic (new)
- Channel forcing (new)
- IP address settings
- System and firmware information

Adjust Device Configurations

The LioN-Power I/O modules enable remote configurations, such as IP settings. You can easily edit the IP address, subnet mask or gateway through the webserver.

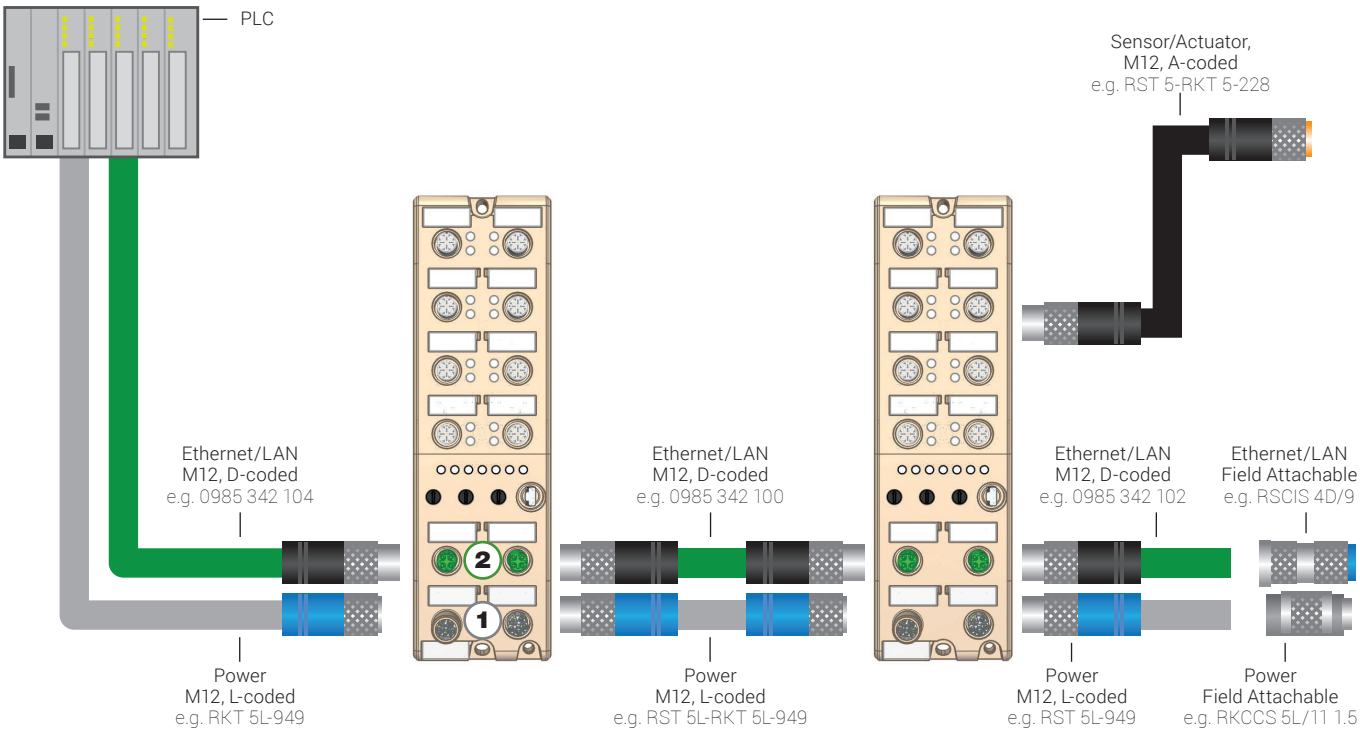
Technical Information M12 Power Multiprotocol I/O

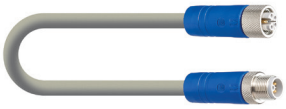
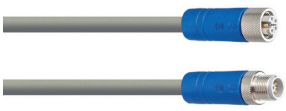
Type	16DIO	16DI	16DO	8DI 8DO
				
Order Designation	0980 ESL 390-121	0980 ESL 391-121	0980 ESL 392-121	0980 ESL 393-121
Product Description	LioN-P, I/O device, Multiprotocol (PROFINET, EtherNet/IP and EtherCAT), industrial metal housing, 60 mm, up to IP69K, 16 digital in-/output channels (universal I/O) (2 A), 8 x M12 A-coded I/O connection, 5-poles, 2 x M12 D-coded bus connection, 4-poles, 2 x M12 L-coded power supply connection, 5-poles	LioN-P, I/O device, Multiprotocol (PROFINET, EtherNet/IP and EtherCAT), industrial metal housing, 60 mm, up to IP69K, 16 digital input channels, 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, I/O device, Multiprotocol (PROFINET, EtherNet/IP and EtherCAT), industrial metal housing, 60 mm, up to IP69K, 16 digital output channels (2 A) with galvanic isolation, 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, I/O device, Multiprotocol (PROFINET, EtherNet/IP and EtherCAT), industrial metal housing, 60 mm, up to IP69K, 8 digital input and 8 digital output channels (2 A) with galvanic isolation, 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
General Data				
Housing	Zinc die-cast housing, potted			
Dimensions (W x H x D)	60 mm x 31 mm x 200 mm			
Weight	500 g			
Ambient Temperature	-20 °C to +70 °C (Operation)			
Protection Degree	IP65, IP67, IP69K*			
Schock / 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. 120 mA (at 24 V DC)			
Bus System	2			
Protocol	Multiprotocol (PROFINET, EtherNet/IP and EtherCAT)			
Connection	2 x M12, D-coded, 4-poles			
PROFINET Features	PROFINET V2.3 (CC-C), Netload Class III, FSU, MRP			
EtherNet/IP Features	EtherNet/IP acc. to CIP Edition V3.11, EIP Adaption of CIP V1.12, DLR, Quick Connect			
EtherCAT Features	EtherCAT IO acc. to ETG.1000 V1.2, Auto-increment and fixed addressing, CoE, EoE, FoE			
Digital Input Channels				
Digital Input Channels	max. 16 (universal I/O)	16, fixed	-	8, fixed
Connection	8 x M12, 5-pole, A-coded	8 x M12, 5-pole, A-coded	-	4x M12, 5-pole, A-coded
DI Channel Type	Type 3 acc. To IEC 61131-2, PNP	Type 3 acc. to IEC 61131-2, PNP	-	Type 3 acc. To IEC 61131-2, PNP
Nominal Input Current	typ. 5 mA	typ. 5 mA	-	typ. 5 mA
Sensor Current Supply	max. 500 mA per port	max. 200 mA per port	-	max. 200 mA per port
Digital Output Channels				
Digital Output Channels	max. 16 (universal I/O)	-	16, fixed	8, fixed
Connection	8x M12, 5-pole, A-coded	-	8x M12, 5-pole, A-coded	4x M12, 5-pole, A-coded
DO Output Current	max. 2 A per channel	-	max. 2 A per channel	max. 2 A per channel
DO Channel Type	p-switching	-	p-switching	p-switching
Galv. Isolated Outputs	No	-	Yes, all outputs	Yes, all outputs
Protective Circuit	Electronically: Overload and short-circuit protection	-	Electronically: Overload and short-circuit protection	Electronically: Overload and short-circuit protection

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

We reserve the right to make technical changes.

Connection Guide M12 Power Multiprotocol I/O



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**

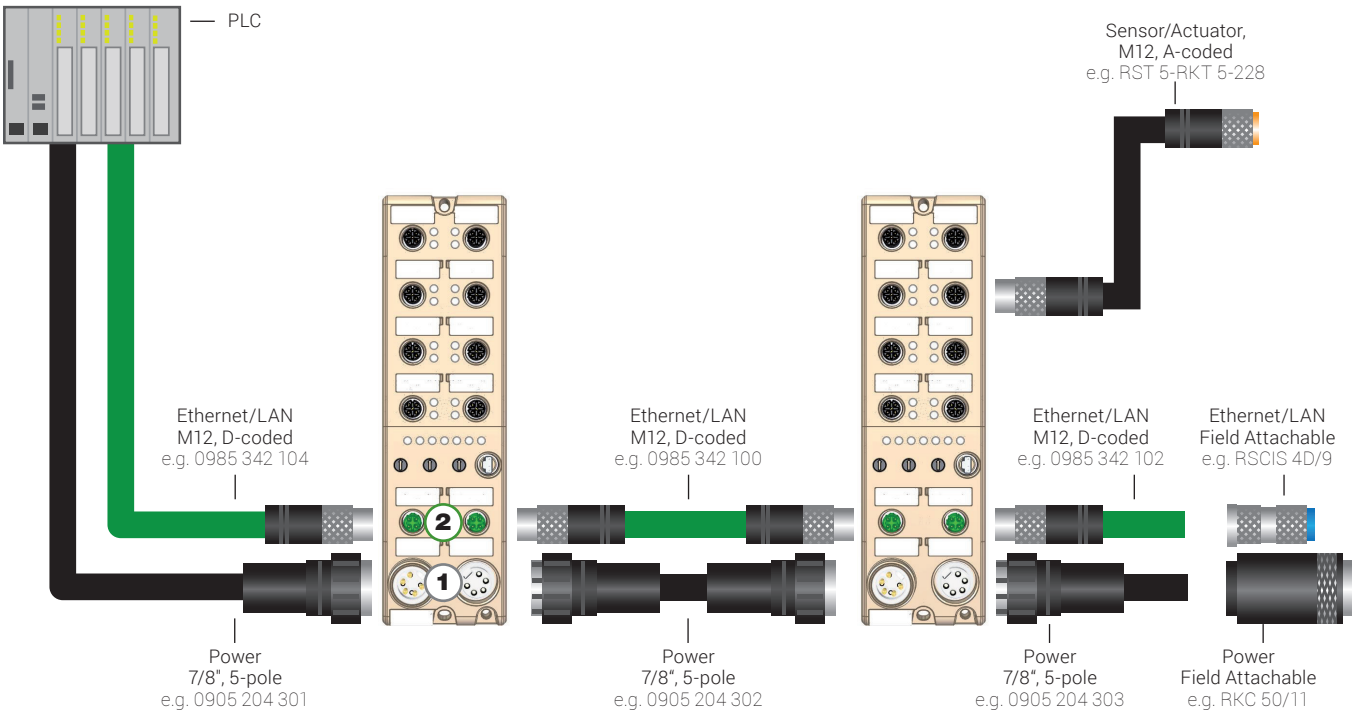
Technical Information 7/8" Power Multiprotocol I/O

Type	16DIO	16DI	16DO	8DI 8DO
				
Order Designation	0980 ESL 390-111	0980 ESL 391-111	0980 ESL 392-111	0980 ESL 393-111
Product Description	LioN-P, I/O device, Multiprotocol (PROFINET, EtherNet/IP and EtherCAT), industrial metal housing, 60 mm, up to IP67, 16 digital in-/output channels (universal I/O) (2 A), 8 x M12 A-coded I/O connection, 5-poles, 2 x M12 D-coded bus connection, 4-poles, 2 x 7/8" power supply connection, 5-poles	LioN-P, I/O device, Multiprotocol (PROFINET, EtherNet/IP and EtherCAT), industrial metal housing, 60 mm, up to IP67, 16 digital input channels, 8 x M12 A-coded I/O connection, 5-poles, 2 x M12 D-coded bus connection, 4-poles, 2 x 7/8" power supply connection, 5-poles	LioN-P, I/O device, Multiprotocol (PROFINET, EtherNet/IP and EtherCAT), industrial metal housing, 60 mm, up to IP67, 16 digital output channels (2 A) with galvanic isolation, 8 x M12 A-coded I/O connection, 5-poles, 2 x M12 D-coded bus connection, 4-poles, 2 x 7/8" power supply connection, 5-poles	LioN-P, I/O device, Multiprotocol (PROFINET, EtherNet/IP and EtherCAT), industrial metal housing, 60 mm, up to IP67, 8 digital input 8 digital output channels (2 A) with galvanic isolation, 8 x M12 A-coded I/O connection, 5-poles, 2 x M12 D-coded bus connection, 4-poles, 2 x 7/8" power supply connection, 5-poles
General Data				
Housing	Zinc die-cast housing, potted			
Dimensions (W x H x D)	60 mm x 27 mm x 206 mm			
Weight	ca. 520 g			
Ambient Temperature	-20 °C to +70 °C (Operation)			
Protection Degree	IP65, IP67*			
Schock / Vibration	50 g / 15 g			
Power Supply	1			
Nominal Voltage	24 V DC (18 to 30 V DC)			
Connection	2 x 7/8", 5-poles, up to 2 x 9 A			
Current Consumption	typ. 120 mA (at 24 V DC)			
Bus System	2			
Protocol	Multiprotocol (PROFINET, EtherNet/IP and EtherCAT)			
Connection	2 x M12, D-coded, 4-poles			
PROFINET Features	PROFINET V2.3 (CC-C), Netload Class III, FSU, MRP			
EtherNet/IP Features	EtherNet/IP acc. to CIP Edition V3.11, EIP Adaption of CIP V1.12, DLR, Quick Connect			
EtherCAT Features	EtherCAT IO acc. to ETG.1000 V1.2, Auto-increment and fixed addressing, CoE, EoE, FoE			
Digital Input Channels				
Digital Input Channels	max. 16, universal I/O	16, fixed	-	8, fixed
Connection	8 x M12, 5-pole, A-coded	8 x M12, 5-pole, A-coded	-	4 x M12, 5-pole, A-coded
DI Channel Type	Type 3 acc. To IEC 61131-2, PNP	Type 3 acc. to IEC 61131-2, PNP	-	Type 3 acc. To IEC 61131-2, PNP
Nominal Input Current	typ. 5 mA	typ. 5 mA	-	typ. 5 mA
Sensor Current Supply	max. 500 mA per port	max. 200 mA per port	-	max. 200 mA per port
Digital Output Channels				
Digital Output Channels	max. 16, universal I/O	-	16, fixed	8, fixed
Connection	8 x M12, 5-pole, A-coded	-	8 x M12, 5-pole, A-coded	4 x M12, 5-pole, A-coded
DO Output Current	max. 2 A per channel	-	max. 2 A per channel	max. 2 A per channel
DO Channel Type	p-switching	-	p-switching	p-switching
Galv. Isolated Outputs	No	-	Yes, all outputs	Yes, all outputs
Protective Circuit	Electronically: Overload and short-circuit protection	-	Electronically: Overload and short-circuit protection	Electronically: Overload and short-circuit protection

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

We reserve the right to make technical changes.

Connection Guide 7/8" Power Multiprotocol I/O



1 Power – 7/8", 5-poles		2 Data – D-coded M12 LAN/Ethernet, 4-poles	
	**Male straight / Female straight** 0905 204 302/* M **Male angled / Female angled** 0905 204 309/* 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** 0905 204 303/* M **Male angled / Open** 0905 204 302/* M **Female straight / Open** 0905 204 301/* M **Female angled / Open** 0905 204 308/* 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, Screw Type** **PG 9: RSC 50/9** PG 11: RSC 50/11 PG 13.5: RSC 50/13.5 PG 16: RSC 50/16 **Field attachable – Female straight, Screw Type** **PG 9: RKC 50/9** PG 11: RKC 50/11 PG 13.5: RKC 50/13.5 PG 16: RKC 50/16		**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**

Order Information

Order Number	Order Designation	Bus Protocol	Housing	Width	IP	I/O	PWR Connection	Bus Connection	I/O Connection
PROFINET, M12 Power									
934878001	0980 ESL 301-121	PROFINET	Metal	60 mm	up to IP69K	16DI	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934878002	0980 ESL 302-121	PROFINET	Metal	60 mm	up to IP69K	16DO	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934878003	0980 ESL 303-121	PROFINET	Metal	60 mm	up to IP69K	8DI 8DO	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934878007	0980 ESL 300-121	PROFINET	Metal	60 mm	up to IP69K	16DIO	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
PROFINET, 7/8" Power									
934881001	0980 ESL 301-111	PROFINET	Metal	60 mm	up to IP67	16DI	2 x, 7/8", 5-pole	2 x M12, D-coded	8 x M12, A-coded
934881002	0980 ESL 302-111	PROFINET	Metal	60 mm	up to IP67	16DO	2 x, 7/8", 5-pole	2 x M12, D-coded	8 x M12, A-coded
934881003	0980 ESL 303-111	PROFINET	Metal	60 mm	up to IP67	8DI 8DO	2 x, 7/8", 5-pole	2 x M12, D-coded	8 x M12, A-coded
934881007	0980 ESL 300-111	PROFINET	Metal	60 mm	up to IP67	16DIO	2 x, 7/8", 5-pole	2 x M12, D-coded	8 x M12, A-coded
EtherNet/IP, M12 Power									
934839001	0980 ESL 311-121	EtherNet/IP	Metal	60 mm	up to IP69K	16DI	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934839002	0980 ESL 312-121	EtherNet/IP	Metal	60 mm	up to IP69K	16DO	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934839003	0980 ESL 313-121	EtherNet/IP	Metal	60 mm	up to IP69K	8DI 8DO	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934839007	0980 ESL 310-121	EtherNet/IP	Metal	60 mm	up to IP69K	16DIO	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
EtherNet/IP, 7/8" Power									
934880001	0980 ESL 311-111	EtherNet/IP	Metal	60 mm	up to IP67	16DI	2 x, 7/8", 5-pole	2 x M12, D-coded	8 x M12, A-coded
934880002	0980 ESL 312-111	EtherNet/IP	Metal	60 mm	up to IP67	16DO	2 x, 7/8", 5-pole	2 x M12, D-coded	8 x M12, A-coded
934880003	0980 ESL 313-111	EtherNet/IP	Metal	60 mm	up to IP67	8DI 8DO	2 x, 7/8", 5-pole	2 x M12, D-coded	8 x M12, A-coded
934880007	0980 ESL 310-111	EtherNet/IP	Metal	60 mm	up to IP67	16DIO	2 x, 7/8", 5-pole	2 x M12, D-coded	8 x M12, A-coded
Multiprotocol (PROFINET, EtherNet/IP and EtherCAT), M12 Power									
934879001	0980 ESL 391-121	Multiprotocol	Metal	60 mm	up to IP69K	16DI	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934879002	0980 ESL 392-121	Multiprotocol	Metal	60 mm	up to IP69K	16DO	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934879003	0980 ESL 393-121	Multiprotocol	Metal	60 mm	up to IP69K	8DI 8DO	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
934879007	0980 ESL 390-121	Multiprotocol	Metal	60 mm	up to IP69K	16DIO	2 x M12, L-coded	2 x M12, D-coded	8 x M12, A-coded
Multiprotocol (PROFINET, EtherNet/IP and EtherCAT), 7/8" Power									
934882001	0980 ESL 391-111	Multiprotocol	Metal	60 mm	up to IP67	16DI	2 x, 7/8", 5-pole	2 x M12, D-coded	8 x M12, A-coded
934882002	0980 ESL 392-111	Multiprotocol	Metal	60 mm	up to IP67	16DO	2 x, 7/8", 5-pole	2 x M12, D-coded	8 x M12, A-coded
934882003	0980 ESL 393-111	Multiprotocol	Metal	60 mm	up to IP67	8DI 8DO	2 x, 7/8", 5-pole	2 x M12, D-coded	8 x M12, A-coded
934882007	0980 ESL 390-111	Multiprotocol	Metal	60 mm	up to IP67	16DIO	2 x, 7/8", 5-pole	2 x M12, D-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.