

PROFINET[®], EtherNet/IP and Ethernet Connectivity Solutions



THIRD Edition

**Connectors and
Components for PROFINET,
EtherNet/IP and Ethernet
Applications**

 **lumbergautomation**

A **BELDEN** BRAND

Lumberg Automation Provides
Reliable PROFINET®, EtherNet/IP and
Ethernet Connectivity Solutions for
Automation Applications Worldwide.





Belden® Industrial Solutions – More Convenience and Solutions for Networks in Harsh Environments and Large-scale Infrastructures

Belden Industrial Solutions

For mission-critical applications, Belden is the signal transmission partner that delivers confidence in signal availability, integrity and performance because only Belden can offer solutions that satisfy any requirement.

A majority of system failures occur within the signal transmission space, and trouble-shooting can be very difficult and time-consuming. We want everyone to "Be Certain" that when choosing Belden you receive **Signal Availability** – always there, **Signal Integrity** – always trusted and secure, and **Signal Performance** – always when and where you need it.

Belden has brought together a comprehensive line of industrial cabling, connectivity and networking devices, offering the most reliable communications solutions for your application. Whether you are networking your devices to the controllers, connecting the controllers to the control room, relaying data between the control room, the engineering department, and remote manufacturing sites – or all of the above – Belden has the products you need to seamlessly connect your communications.

From the petrochemical, automotive, pharmaceutical, power generation, pulp and paper, metals, food and beverage, or general manufacturing plant to the corporate headquarters – and everywhere in between – Belden has your signal transmission solution. Belden offers the most dependable network and communications system performance in tough and mission-critical environments.

Our Synergy Ensures Continuous Performance

With the Hirschmann and Lumberg Automation product line additions to the Belden offering, our line of Complete Industrial Solutions is uniquely positioned to provide the best network and communications infrastructure possible. Belden products and systems expertise means that you can maintain ongoing operations without interruption and costly downtime – in any environment.

Here are a few more good reasons why Belden is your best choice for industrial networking, communications and control:

- We have the expertise to integrate your industrial and commercial networks.
- Our products are engineered to perform in tough and difficult environments.
- We offer the broadest selection of products, for a complete, end-to-end Ethernet solution.
- Our sales and engineering professionals can audit, recommend/design, configure and assemble the products and systems to your specific requirements.
- Our global manufacturing and distribution network make our products available to you globally.

Offering Comprehensive Service & Support

Belden recognizes that comprehensive know-how is necessary to ensure an optimized, homogenous solution. We also know that consultation, support and training requires more than just a general understanding of the products, technologies and market trends. It requires a solid understanding of the application and the ability to provide the type of support that is needed – when and where it is needed. It requires the four key service and support areas that are critical to success:

- Network Design
- Training
- Technical Support
- System Performance

Network Design

Belden eliminates your design challenges because we understand the issues surrounding the design and operation of networks in industrial and mission-critical environments. Our engineers are available to work with you to deliver high-availability networks that meet your enterprise-wide IT needs. Whether it's designing systems for Greenfield facilities, or integrating into existing industrial IT environments, our highly-trained staff lifts the design burden from your shoulders to ours.

We'll consult with you to develop a strategy – or we'll develop and implement your full design – either way our staff is available to you.

Training

Backed by years of meeting and exceeding the needs of a broad range of end-user applications, Belden is ideally suited to offer beginners and networking experts alike the opportunity to expand their understanding of mission-critical industrial networks. Belden has developed a series of training programs that are given by Belden-certified individuals – all experts in industrial networking and cabling.

Technical Support

At Belden, our personnel are poised to assist our customers – ensuring maximum uptime and reliability. And with offices in North America, Asia and Europe, Belden can respond globally.

System Performance

If Belden designs it, we guarantee performance – period. We are committed to ensuring world-class signal connectivity and to significantly improve your operational up-time. All Belden components are "designed" to deliver optimum performance: from connectors, to cable, to routers and switches. Based on this comprehensive product portfolio, we have the necessary industrial solutions DNA to deliver reliability.

For more information on our service and support offering, including our warranties, please go to the Belden web site at www.belden.com/industrial to locate a Belden sales representative near you.

The Lumberg Automation Brand Sets the Standard for Quality, Reliability and Service.



About Our Solutions

Today, more than ever, manufacturing productivity depends upon seamless data communication and automation systems. Lumberg Automation has assembled one of the most diversified portfolios for industrial connectivity and distributed I/O systems for control applications.

With the advancements in technology and improved machine designs, industrial controls, such as sensors, actuators, safety light curtains, pushbutton switches and the like are moving closer to the application.

Our Enclosure~less™ Concept

The Enclosure~less concept from Lumberg Automation addresses these applications with an entire suite of industrial hardened connectivity and distributed I/O products.

Enhanced environmental characteristics, modular designs, plug-and-play electronics with quick-disconnect designs are all integrated to increase speed of installation, decrease troubleshooting and maintenance while reducing the overall complexity of the control application. These products provide the optimal solution in machine and equipment design and offer excellent opportunities and benefits to OEMs, system integrators, and end users alike.

Easing the Design Process

Our system approach leads to decreased time and money to develop complete integrated connectivity solutions. Using our Enclosure~less concept is one of the most effective ways to dramatically reduce the design time.

Re-Useable Solutions

OEM's now have access to a set of standard products designed around the concept that everything is pluggable and interchangeable.

Having the flexibility to re-configure or expand an existing system without worrying about customization is made possible with our Enclosure~less concept. Most importantly, our products are re-usable and can be adapted to future designs or merely put back on the shelf for future use.

Improved Installation Time with Less Mistakes

A recent study by a group of European manufacturers concluded that Enclosure~less assembly costs save as much as 30 percent over conventional installation methods.

These savings are realized through not only the Enclosure~less concept, but by the technology that is being employed. With a modular design approach and plug-and-play electronic features, less time will be spent running down errors or replacing parts from incorrect wiring.

Trouble-Shooting is Simplified

Troubleshooting circuits can be a long process, especially when one is dealing with several hundred termination points.

Many of our products have integrated LED function indicators which provide a visual notification that a circuit is functioning properly.

By using products that have integrated LED functions, mechanics and engineers alike can quickly isolate and resolve the problem.

Testing Made Simple

OEMs can cost-effectively build and pre-test a machine at their facility, disassemble and transport it to an end user's plant knowing that everything has been tested. This is primarily made possible through the reduction of wiring terminations throughout the system, which makes testing a much simpler and quicker process.

Reliability is Maximized

Enclosure~less™ solutions can minimize wiring errors because wiring is pre-manufactured with quick-disconnect features. With less manual wiring involved, there are fewer points of failure.

Some studies suggest that a large portion of system failures come from installation rather than part failures. The decrease in errors associated with pre-manufactured wiring leads to an increase in the overall reliability of the control system.

In the end, this helps speed installation and commissioning, maintenance, troubleshooting, and ultimately boosts a plant's production.

Maintenance/Repair Time is Reduced

Maintenance technicians and operators no longer need to access the control panel since much of the maintenance and troubleshooting can be done outside.

With the simplicity of wiring layout and connections, end users can efficiently isolate problems and replace a starter or I/O locally, rather than sorting through a complex panel. The result is significantly easier troubleshooting and shorter Mean-Time-To-Repair (MTTR).

Floor Space at a Premium

Control cabinets can occupy a substantial amount of the production floor. The Enclosure~less™ concept dramatically reduces the need for that real estate, allowing companies to leverage more of their facility.

Industries like semiconductor and pharmaceutical manufacturing have realized the benefits of the On-Machine approach for years, as their clean-room space is at a premium.



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Industrial Ethernet Media Cordsets, Connectors and Switches with Plug-N-Play Features Reduce Overall Installation and Maintenance Costs.



Introduction to PROFINET, EtherNet/IP and Ethernet

About Industrial Ethernet

The use of Ethernet in IT for connecting various terminals is widespread, especially in local area networks (LAN). Since 1985, the Institute of Electrical and Electronics Engineers (IEEE) has used the Ethernet technology developed by Dr. Metcalfe as its official standard (802.3). This standard remains the basic technology used in an effective data transfer system that continues to be developed (Fast Ethernet, 10-Gigabit Ethernet, switching, full duplex data transfer, wireless LAN).

One Standard, Many Protocols.

Generally speaking, Ethernet is also suitable for automation applications. Nevertheless, the requirements of industrial communication are more rigorous with regard to the mechanical and electrical characteristics of the devices and media used.

Two examples that can be named here are ambient conditions and real-time behavior. In addition, no uniform application protocol exists that is tailored to meet the needs of automation technology. A host of different organizations have defined higher application protocols that can be embedded in the standard Ethernet data package. As a result, different protocols and specifications are currently in use. Neither protocols are compatible with one another:

- TCP/IP ("Office" Ethernet Protocol)
- EtherNet/IP (ODVA)
- PROFINET (Profibus user organization)
- Modbus/TCP (Modbus-IDA Group)

In addition, other manufacturer-specific approaches exist such as EtherCat, Ethernet-Powerlink, and JetSync. Lumberg Industrial Ethernet products have been designed for use with TCP/IP, EtherNet/IP, PROFINET, and Modbus/TCP systems.

Data Transfer Technology

While there are different approaches to real-time communication, all of them have a common core, which comprise the established standards of Layers 1-2 as well as the Ethernet data transfer technology and bus access procedure (CSMA/CD, Layer 2). All systems support industrial IT functions such as Web servers, file transferring, and e-mail. For IT functions such as these, the Internet protocol

(Layer 3) as well as TCP and UDP protocol (Layer 4) are used. In addition, other IT standards can be used such as Hypertext Transfer Protocol (http) and File Transfer Protocol (FTP).

Carrier Sense Multiple Access with Collision Detection (CSMA/CD)

MA-Multiple Access All devices in an Ethernet network are equal and can exchange data with other devices at any time. Devices access media together. Ethernet does not rely on a master/slave procedure of the type used with field buses, where communication is controlled by a central device.

CS-Carrier Sense

If a device wants to send a data package, it first checks to see whether the medium is available or communication is already in progress. If the medium is busy, the device will wait for completion of the current data transfer and will only send data when the medium is no longer busy.

CD-Collision Detection

While sending data, the device monitors the medium to detect collisions with data packages sent by other devices. If a collision has been detected, the devices involved stop sending data and wait for a specific amount of time to elapse before restarting the sending procedure.

The system assumes that a data package has been sent successfully if no collisions occur. In this process, the transfer time depends greatly on the power supply load and cannot be predetermined. For this reason, this data transfer procedure is only suitable for certain types of industrial automation.

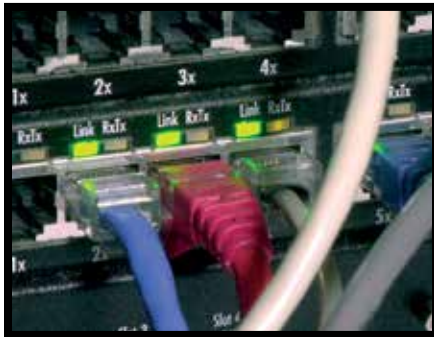
The performance of an Ethernet network can be improved through the use of switches and Ethernet interfaces with full duplex operation. The CSMA/CD procedure is deactivated during full duplex device operation (simultaneous data package sending and receiving).



Ethernet Connectors

RJ45 connectors are widely used for connecting devices to Ethernet networks for office communication. For these types of applications, an IP 20 protection rating is required. For applications in tough industrial environments M12 connectors with IP 67 protection are widely used. M12 connectors have proven to be a reliable connecting method for sensors and actuators as well as for use in transferring data.

Ethernet Data Lines



Originally, the Ethernet specification provided for the use of coaxial cables as the transfer medium. A distinction was made between thick coax (10BASE-5) and thin coax (10BASE-2), depending on the cable structure. Because of its low cost, thin coax was commonly referred to as "Cheaper net".

Today, the use of twisted-pair cable (10BASE-T, 100 BASE-TX) is more common. This type of cable represents a divergence from the original mechanisms in a number of ways. In twisted-pair cables, sending and receiving channels are separated. The channels are then transferred over a wire pair. The lines are organized according to categories.

Within the industry, use of Fast Ethernet with a data transfer rate of 100 Mbit/s is widespread. The required cable must meet Category-5 standards. To improve network expansion capability and increase data transfer rates, fiber-optic cables are also used as transfer medium (10BASE-F, 100BASE-FX, and 1000BASEX).

Use of Hubs/Switches

If only two devices are used, the sending channel of one device must be connected to the receiving channel of the other device for twisted-pair wiring. If more than two devices are to communicate with one another, hubs or switches are used as the central station. Usually, hubs and switches have multiple ports to which terminals or other hubs or switches can be connected to allow network cascading. The difference between a hub and a switch lies in the method used to forward data packages. A hub sends a data package it has received at one port to all other ports.

A switch, on the other hand, evaluates the target address of the data package and only forwards the data package to the port leading to the device that was intended as the recipient. By forwarding data packages only to targeted recipients, switches reduce the load on the network and increase communication speed.

Topology

Using a switch or hub as the central element produces wiring in the shape of a star, which, in turn, serves as the basis for the network topology. By using several switches it is possible to build a tree-like structure.

Wire Length

The permitted wire length between one hub or switch and a terminal or between two terminals (channel) according to specifications is 100 m for twisted-pair wiring. Nevertheless, the network expansion capability is greatly determined by the wires and connectors that are used.

Data Transfer Rate

The data transfer rate for standard Ethernet (10BASE-T) is 10 MBit/s. For Fast Ethernet (100BASE-TX) it is 100 MBit/s.

Auto Negotiation

Today's Ethernet devices support both standard and Fast Ethernet data transfer. This ensures the downward compatibility of the devices, so that older devices can still be used to exchange data. On the basis of the "auto negotiation" procedure defined in Fast Ethernet, two devices agree upon a common method of data transfer before the exchange of data actually takes place (10 or 100 MBit/s, half or full duplex).

Auto Crossing

Implementing this function enables Ethernet device interfaces to cross sending and receiving wires automatically for twisted-pair wiring. This

makes it possible to use 1-to-1 wired lines instead of crossed data lines when wiring the system.

Auto Polarity

Today's Ethernet interfaces for 10BASE-T and 100BASE-TX are able to change the polarity of both of the sending or receiving lines to correct wiring errors.

Shielded (STP) and Un-Shielded (UTP) Cables

The use of shielded cables is recommended for environments with increased EMI levels. It is important to ensure the proper grounding of the shield to avoid ground loops that may lead to interference of the data communication.

Today's commonly used Ethernet cables for office applications use a 4-pair construction. For standard applications with transmission speeds up to a 100 Mbit/s (10BASE-T) however only two of the four pairs are used (one transmit and one receive pair). The additional wires were intended for future additions (e.g. higher transmission speeds such as Gigabit Ethernet). 100 Mbit/s are sufficient for the real-time demands on the factory floor. Therefore many of the automation specific protocols utilize the 2-pair technology.

M12 Circular Connectors, 8-Pole

The M12 8-pole connector is mostly used in applications where standard Ethernet is brought from the office to the factory floor (e.g. via TCP/IP).

The cordsets meet the requirements for Category 5e according to the TIA/EIA 568B standard. The continuous use of 4-pair cables makes it possible to use all standard Ethernet cable testers that might already be available in the IT department (not all cable testers support 2-pair cables).

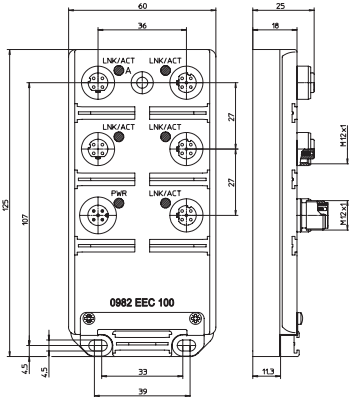
The unused wires can also be used for additional functionalities like power over Ethernet or the transmission of video signals.

M12 Circular Connectors, 4-Pole

Since this connector type uses only 2-pair cables it is mostly used in automation specific applications. It is standardized for EtherNet/IP and PROFINet and is part of the IAONA specification.

The specified connector type utilizes the Dcoding. This newly developed keyway helps avoid incorrect connections (e.g. connecting an Ethernet cable to a power supply) and possibly destroying network equipment.

Industrial Ethernet Switches for PROFINET or EtherNet/IP Applications



Type	0982 EEC 100
Product description	Ethernet-Switch, IP 67, 5-port switch for 10 and 100 Mbaud transmission rates, M12 socket 4 poles D coding, M12 power supply 5 poles standard coding.
Environmental	
Degree of protection	IP67
Operating temperature range	0°C (32°F) to +60°C (+140°F)
Mechanical	
Weight	210 g
Housing material	PUR
Switch functionality	
Mode of operation	Store and forward
Number of storable addresses	1000
Aging time	300 s
Tagging	EtherNet telegrams with VLAN tag field are transmitted unchanged
Ethernet ports	
Data transmission rate	10 Mbit/s and 100 Mbit/s
Cable type	Twisted Pair (TP/TX) or star quad, CAT 5, shielded
Number of ports	5
Length of a TP segment	100 m
Link control	yes
Autopolarity	yes
Autonegotiation	yes
Autocrossing	yes
Channel status indicator	LED green per port
Electronics power supply	
Rated voltage	24 V DC
Voltage range	18-20 V DC
Power consumption	2.4 W
Reverse polarity protection	yes
Indication	LED green

The application of these products in harsh environments should always be checked before use. Specifications subject to alteration.

Pin assignment

M12 Socket



- 1 = TD+
- 2 = RD+
- 3 = TD-
- 4 = RD-
- 5 = shield

Power supply M12



- 1 = 24 V
- 2 = n.c
- 3 = GND (0 V)
- 4 = n.c.
- 5 = earth

Part number

0982 EEC 100

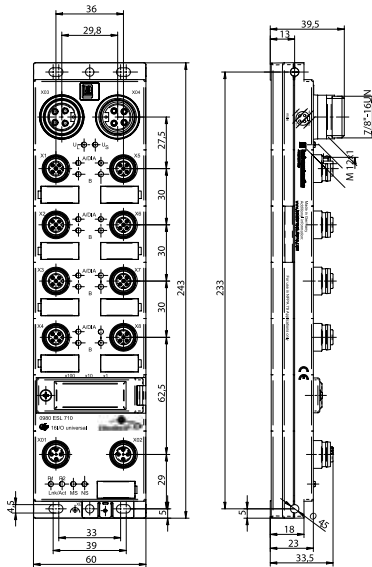
Order number

900001160





Lio-N-M EtherNet/IP I/O Modules with 16 Digital Inputs and 16 Digital Outputs



Type	0980 ESL 710
Product Description	Lio-N-M EtherNet/IP Device with 16 digital I/O channels, channels can be used universally as inputs or outputs, M12 socket, rotary address switches for addressing, M12 LAN-Ports, D-coded, 7/8" power supply.

Diagnostic indication		
LED	Indication	Condition
1...8 A	Yellow	Channel status 1
1...8 DIA A	Red	Periphery fault
1... 8 B	Yellow	Channel status 2
1... 8 DIA B	Red	Periphery fault
Us	Green Off	Sensor power supply applied Sensor power supply missing
UL	Green Off	Actuator power supply applied Actuator power supply missing
P1 Lnk/Act	Green Yellow flashing	Connected to an Ethernet device I/O device exchanging data
P2 Lnk/Act	Green Green flashing	Connected to an Ethernet device I/O device exchanging data
MS (Module status)	Green Green flashing Red/Green flashing Red flashing Off	Device is ready for operating Wrong configuration Self test is running Firmware update Device is off
NS (Network status)	Green Green flashing Red Red flashing Off	Connection to master exists IP address exists, but no connection to the master IP address is used by a different device Connection has timed out Device is off

Bit assignment								
DIA	7	6	5	4	3	2	1	0
M12 Input								
Byte 0	4B	4A	3B	3A	2B	2A	1B	1A
Byte 1	8B	8A	7B	7A	6B	6A	5B	5A
M12 Output								
Byte 0	4B	4A	3B	3A	2B	2A	1B	1A
Byte 1	8B	8A	7B	7A	6B	6A	5B	5A

Pin assignment		
LAN connection M12, D-coded <ul style="list-style-type: none"> 1 = TD+ 2 = RD+ 3 = TD- 4 = RD Housing = shielding	Power supply 7/8" <ul style="list-style-type: none"> 1 = +24 V Actuators 2 = +24 V Logic / Sensors 3 = GND (0 V) Logic / Sensors 4 = GND (0 V) Actuators Housing = FE	Input/Output M12 <ul style="list-style-type: none"> 1 = +24 V 2 = IN/OUT B 3 = GND (0 V) 4 = IN/OUT A 5 = earth Housing = FE

Part number	Order number
0980 ESL 710	0980 ESL 710



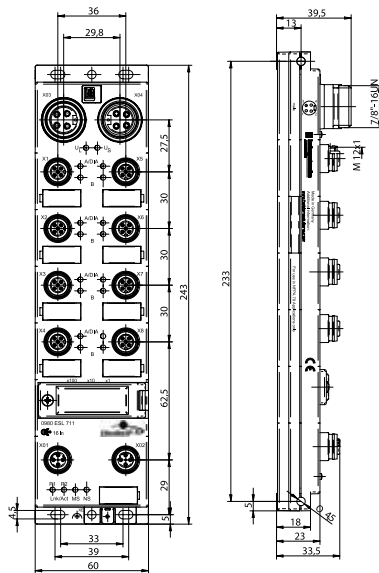
Lion-M EtherNet/IP I/O Modules with 16 Digital Inputs and 16 Digital Outputs

Environmental	
Degree of protection	IP 67
Operating temperature range	-10°C (+14°F) to +60°C (+140°F)
Mechanical	
Weight	380 g
Housing material	PBT
Bus system	EtherNet/IP
Vendor ID	21
Device ID	710
EDS-File	EDS-v3.9 - LumbergAutomation-0980ESL710-20110420.eds (or later)
Transmission rate	10/100 Mbs
Address range	0-255
Rotary address switches	0-255
Default address	1
System/Sensors power supply	System power supply
Nominal voltage	24V DC
Voltage range	11–30 V DC
Power consumption	typ. 90 mA
Reverse polarity protection	yes
Input power supply	US
Voltage range	19–30 V DC
Sensor current	200 mA per port (at Tamb 30°C)
Short-circuit proof	yes
Indication	LED green
Inputs	Type 3 acc. to IEC 61131-3
Rated input voltage	24 V DC
Channel type N.O.	p-switching
Number of digital channels	max. 16
Channel status indicator	LED yellow per channel
Diagnostic indication	LED red per socket
Output power supply	UL
Rated voltage	24 V DC
Voltage range	19–30 V DC
Reverse polarity protection	yes/antiparallel diode
Indication	LED green
Outputs	
Rated output current	1.6 A per channel
Short-circuit proof	yes
Max. output current	9 A (12 A*) per module
*Test proven and approved under the following conditions:	
· looped through System/Sensor power supply max. 2.5 A	
· Power supply cable STL 204 (5x1.00 mm ²)	
· Operating temperature range max. 40°C	
Overload-proof	yes
Number of digital channels	max. 16
Channel type N.O.	p-switching
Channel status indicator	LED yellow per channel
Diagnostic indication	LED red per socket
Included in delivery/accessories	
Dust covers M12	4 pieces
Attachable labels	10 pieces

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.



LioN-M EtherNet/IP I/O Modules with 16 Digital Inputs



Type	0980 ESL 711	
Product Description	LioN-M EtherNet/IP Device with 16 digital inputs, M12 socket, rotary address switches for addressing, M12 LAN-Ports, D-coded, 7/8" power supply.	
Diagnostic indication		
LED	Indication	Condition
1...8 A	Yellow	Channel status 1
1...8 DIA A	Red	Periphery fault
1... 8 B	Yellow	Channel status 2
1... 8 DIA B	Red	Periphery fault
US	Green Off	Sensor power supply applied Sensor power supply missing
P1 Lnk/Act	Green Yellow flashing	Connected to an Ethernet device I/O device exchanging data
P2 Lnk/Act	Green Green flashing	Connected to an Ethernet device I/O device exchanging data
MS (Module status)	Green Green flashing Red/Green flashing Red flashing Off	Device is ready for operating Wrong configuration Self test is running Firmware update Device is off
NS (Network status)	Green Green flashing Red Red flashing Off	Connection to master exists IP address exists, but no connection to the master IP address is used by a different device Connection has timed out Device is off

Bit assignment								
DIA	7	6	5	4	3	2	1	0
M12 Input								
Byte 0	4B	4A	3B	3A	2B	2A	1B	1A
Byte 1	8B	8A	7B	7A	6B	6A	5B	5A

Pin assignment		
LAN connection M12, D-coded	Power supply 7/8"	Input/Output M12
<ul style="list-style-type: none"> 1 = TD+ 2 = RD+ 3 = TD- 4 = RD Housing = shielding	<ul style="list-style-type: none"> 1 = +24 V Actuators¹ 2 = +24 V Logic / Sensors 3 = GND (0 V) Logic / Sensors 4 = GND (0 V) Actuators Housing = PE ¹ In 16DI devices only for pass through	<ul style="list-style-type: none"> 1 = +24 V 2 = IN B 3 = GND (0 V) 4 = IN A 5 = earth Housing = PE

Part number	Order number
0980 ESL 711	0980 ESL 711



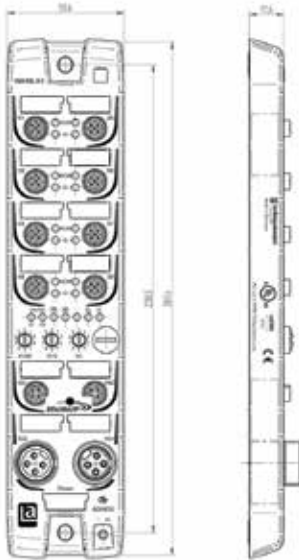
Lion-M EtherNet/IP I/O Modules with 16 Digital Inputs

Environmental	
Degree of protection	IP 67
Operating temperature range	-10°C (+14°F) to +60°C (+140°F)
Mechanical	
Weight	380 g
Housing material	PBT
Bus system	
Bus system	EtherNet/IP
Vendor ID	21
Device ID	710
EDS-File	EDS-v3.9 - LumbergAutomation-0980ESL710-20110420.eds (or later)
Transmission rate	10/100 Mbps
Address range	0-255
Rotary address switches	0-255
Default address	1
System/Sensors power supply	
System power supply	System power supply
Nominal voltage	24V DC
Voltage range	11–30 V DC
Power consumption	typ. 90 mA
Reverse polarity protection	yes
Input power supply	
Input power supply	US
Voltage range	19–30 V DC
Sensor current	200 mA per port (at Tamb 30°C)
Short-circuit proof	yes
Indication	LED green
Inputs	
Inputs	Type 3 acc. to IEC 61131-3
Rated input voltage	24 V DC
Channel type N.O.	p-switching
Number of digital channels	max. 16
Channel status indicator	LED yellow per channel
Diagnostic indication	LED red per socket
Included in delivery/accessories	
Dust covers M12	4 pieces
Attachable labels	10 pieces

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.






LioN-R EtherNet/IP I/O Rugged Modules with 16 Digital Inputs



Type	0980 ESL 811-EIP 16DI-M12-R	
Product Description	LioN-R Digital input module, 16 digital input channels, EtherNet/IP devices, rotary address switches for setting addresses, M12 LAN connector, D-coded	
Order Number	934 691-001	
Diagnostic indication		
LED	Indication	Condition
1...8 A	White	Channel status
1...8 DIA A	Red	Periphery error
1...8 B	White	Channel status
1...8 DIA B	Red	Periphery error
P1 Lnk/Act	Green Yellow flashing Off	Connection to an Ethernet device I/O device exchanging data No connection to any other device
P2 Lnk/Act	Green Green flashing Off	Connection to an Ethernet device I/O device exchanging data No connection to any other devices
MS (Module status)	Green Green flashing Red/Green flashing Red flashing Off	Device is ready for operating Wrong configuration Self test is running Firmware update Device is switches off
NS (Network status)	Green flashing Green Red flashing Red Red/Green flashing Off	IP address is available Connection to master is available At least one connection has timed out IP address is already being used by another device Self test is running Device is switched off/Device has no IP address
Us	Green Red	Voltage 18 V <= US <= 30 V Voltage US < 18 V or US > 30 V
UL	Green Red	Voltage 18 V <= US <= 30 V Voltage US < 18 V or US > 30 V


Technical modifications reserved.

Bit assignment								
Bit	7	6	5	4	3	2	1	0
M12 Input 16DI								
Byte 0	4B	4A	3B	3A	2B	2A	1B	1A
Byte 1	8B	8A	7B	7A	6B	6A	5B	5A

Pin assignment		
LAN connection M12, D-coded	Power supply 7/8"	Input/Output M12
 <ul style="list-style-type: none"> 1 = TD+ 2 = RD+ 3 = TD- 4 = RD Housing = shielding 	 <ul style="list-style-type: none"> 1 = +24 V Actuators 2 = +24 V Logic/Sensor 3 = GND (0 V) Logic/Sensor 4 = GND (0 V) Actuators Housing = PE 	 <ul style="list-style-type: none"> 1 = +24 V 2 = IN B 3 = GND (0 V) 4 = IN A 5 = earth Housing = PE

Part number	Order number	     
0980 ESL 811-EIP 16DI-M12-R	934 691-001	

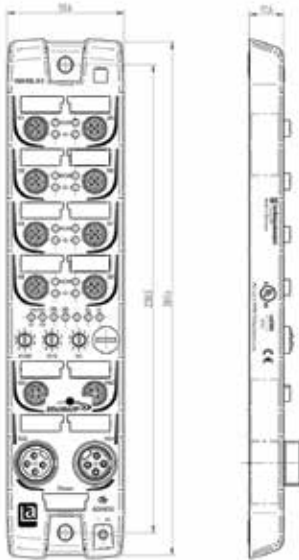
LioN-R EtherNet/IP I/O Rugged Modules with 16 Digital Inputs

Product Description	
Type	0980 ESL 811-EIP 16DI-M12-R
	
Technical Data	
Protection Class	IP67
Operating Temperature Range	-10°C to +60°C
Weight	605 g
Housing Material	Metal (diecast zinc)
Bus System	
Transmission Rate	10/100 Mbs
Address Range	0 to 255
Default Address	0
Inputs	
Rated Input Voltage	24 V DC
Sensor Type	PNP (source)
Power Consumption of Sensor	Max. 200 mA
Reverse Polarity Protection	Yes
Short Circuit-proof	Yes
Number of Digital Channels	16
Status Indicator	LED white per channel
Diagnostic Indicator	LED red per port
Included in Delivery	
M12 Dust Covers	4 pieces
Attachable Labels	10 pieces

The use of these products in aggressive media should be verified in each case. Technical modifications reserved.
 Certifications have been applied for UL and CSA.






LioN-R EtherNet/IP I/O Rugged Modules with 16 Digital Outputs



Type	0980 ESL 812-EIP 16DO-M12-R	
Product Description	LioN-R Digital output module, 16 digital output channels with galvanic isolation, EtherNet/IP devices, rotary address switches for setting addresses, M12 LAN connector, D-coded	
Order Number	934 691-002	
Diagnostic indication		
LED	Indication	Condition
1...8 A	White	Channel status
1...8 DIA A	Red	Periphery error
1... 8 B	White	Channel status
1... 8 DIA B	Red	Periphery error
P1 Lnk/Act	Green Yellow flashing Off	Connection to an Ethernet device I/O device exchanging data No connection to any other device
P2 Lnk/Act	Green Green flashing Off	Connection to an Ethernet device I/O device exchanging data No connection to any other devices
MS (Module status)	Green Green flashing Red/Green flashing Red flashing Off	Device is ready for operating Wrong configuration Self test is running Firmware update Device is switches off
NS (Network status)	Green flashing Green Red flashing Red Red/Green flashing Off	IP address is available Connection to master is available At least one connection has timed out IP address is already being used by another device Self test is running Device is switched off/Device has no IP address
US	Green Red	Voltage 18 V <= US <= 30 V Voltage US < 18 V or US > 30 V
UL	Green Red	Voltage 18 V <= US <= 30 V Voltage US < 18 V or US > 30 V


Technical modifications reserved.

Bit assignment								
Bit	7	6	5	4	3	2	1	0
M12 Input 16DO								
Byte 0	4B	4A	3B	3A	2B	2A	1B	1A
Byte 1	8B	8A	7B	7A	6B	6A	5B	5A

Pin assignment		
LAN connection M12, D-coded	Power supply 7/8"	Input/Output M12
 <ul style="list-style-type: none"> 1 = TD+ 2 = RD+ 3 = TD- 4 = RD Housing = shielding 	 <ul style="list-style-type: none"> 1 = +24 V Actuators 2 = +24 V Logic/Sensor 3 = GND (0 V) Logic/Sensor 4 = GND (0 V) Actuators Housing = PE 	 <ul style="list-style-type: none"> 1 = +24 V 2 = IN B 3 = GND (0 V) 4 = IN A 5 = earth Housing = PE

Part number	Order number	    
0980 ESL 812-EIP 16DO-M12-R	934 691-002	

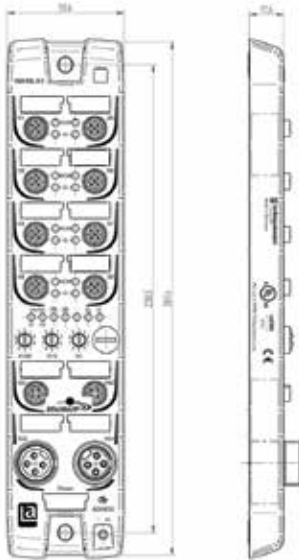
LioN-R EtherNet/IP I/O Rugged Modules with 16 Digital Outputs

Product Description	
Type	0980 ESL 812-EIP 16D0-M12-R
	
Technical Data	
Protection Class	IP67
Operating Temperature Range	-10°C to +60°C
Weight	605 g
Housing Material	Metal (diecast zinc)
Bus System	
Transmission Rate	10/100 Mbs
Address Range	0 to 255
Default Address	0
Actuator Power Supply UL	
Rated Output Current	24 V DC
Voltage Range	19 to 30 V DC
Reverse Polarity Protection	Yes/antiparallel diode
Indicator	LED white
Outputs	
Rated Output Current	1.6 A per channel
Short Circuit-proof	Yes
Max. Current Carrying Capacity	9 A per module
Overload-proof	Yes
Number of Digital Channels	16
Channel Type N.O.	p-switching
Status Indicator	LED white per channel
Diagnostic Indicator	LED red per port
Galvanic Isolation from Electronics	Yes
Included in Delivery	
M12 Dust Covers	4 pieces
Attachable Labels	10 pieces

The use of these products in aggressive media should be verified in each case. Technical modifications reserved. Certifications have been applied for UL and CSA.






LioN-R EtherNet/IP I/O Rugged Modules with 8 Digital Inputs and 8 Digital Outputs



Type	0980 ESL 813-EIP 8DI/8DO-M12-R	
Product Description	LioN-R Digital input and output module, 8 digital input channels and 8 output channels with galvanic isolation, EtherNet/IP devices, rotary address switches for setting addresses, M12 LAN connector, D-coded	
Order Number	934 691-003	
Diagnostic indication		
LED	Indication	Condition
1...8 A	White	Channel status
1...8 DIA A	Red	Periphery error
1... 8 B	White	Channel status
1... 8 DIA B	Red	Periphery error
P1 Lnk/Act	Green Yellow flashing Off	Connection to an Ethernet device I/O device exchanging data No connection to any other device
P2 Lnk/Act	Green Green flashing Off	Connection to an Ethernet device I/O device exchanging data No connection to any other devices
MS (Module status)	Green Green flashing Red/Green flashing Red flashing Off	Device is ready for operating Wrong configuration Self test is running Firmware update Device is switches off
NS (Network status)	Green flashing Green Red flashing Red Red/Green flashing Off	IP address is available Connection to master is available At least one connection has timed out IP address is already being used by another device Self test is running Device is switched off/Device has no IP address
US	Green Red	Voltage 18 V <= US <= 30 V Voltage US < 18 V or US > 30 V
UL	Green Red	Voltage 18 V <= US <= 30 V Voltage US < 18 V or US > 30 V


Technical modifications reserved.

Bit assignment								
Bit	7	6	5	4	3	2	1	0
M12 Input 8DI								
Byte 0	4B	4A	3B	3A	2B	2A	1B	1A
M12 Input 8DO								
Byte 0	8B	8A	7B	7A	6B	6A	5B	5A

Pin assignment		
LAN connection M12, D-coded	Power supply 7/8"	Input/Output M12
 <ul style="list-style-type: none"> 1 = TD+ 2 = RD+ 3 = TD- 4 = RD Housing = shielding 	 <ul style="list-style-type: none"> 1 = +24 V Actuators 2 = +24 V Logic/Sensor 3 = GND (0 V) Logic/Sensor 4 = GND (0 V) Actuators Housing = PE 	 <ul style="list-style-type: none"> 1 = +24 V 2 = IN B 3 = GND (0 V) 4 = IN A 5 = earth Housing = PE

Part number	Order number	    
0980 ESL 813-EIP 8DI/8DO-M12-R	934 691-003	

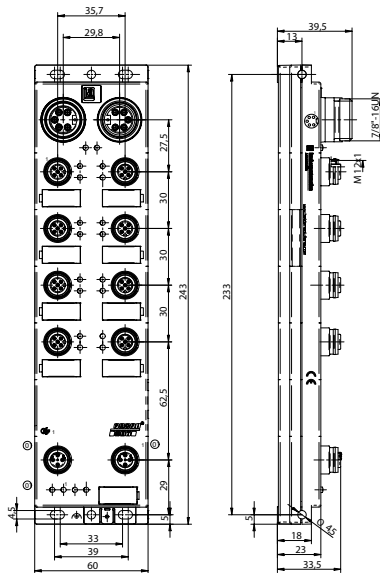
LioN-R EtherNet/IP I/O Rugged Modules with 8 Digital Inputs and 8 Digital Outputs

Product Description	
Type	0980 ESL 813-EIP 8DI/8DO-M12-R
	
Technical Data	
Protection Class	IP67
Operating Temperature Range	-10°C to +60°C
Weight	605 g
Housing Material	Metal (diecast zinc)
Bus System	
Transmission Rate	10/100 Mbs
Address Range	0 to 255
Default Address	0
Inputs	
Rated Input Voltage	24 V DC
Sensor Type	PNP (source)
Power Consumption of Sensor	Max. 200 mA
Reverse Polarity Protection	Yes
Short Circuit-proof	Yes
Number of Digital Channels	8
Status Indicator	LED white per channel
Diagnostic Indicator	LED red per port
Actuator Power Supply UL	
Rated Output Current	25 V DC
Voltage Range	19 to 30 V DC
Reverse Polarity Protection	Yes/antiparallel diode
Indicator	LED white
Outputs	
Rated Output Current	1.6 A per channel
Short Circuit-proof	Yes
Max. Current Carrying Capacity	9 A per module
Overload-proof	Yes
Number of Digital Channels	8
Channel Type N.O.	p-switching
Status Indicator	LED white per channel
Diagnostic Indicator	LED red per port
Galvanic Isolation from Electronics	Yes
Included in Delivery	
M12 Dust Covers	4 pieces
Attachable Labels	10 pieces

The use of these products in aggressive media should be verified in each case. Technical modifications reserved. Certifications have been applied for UL and CSA.



LioN-M PROFINET I/O Modules with 16 Digital Inputs and 16 Digital Outputs



Type	0980 ESL 700
Product Description	LioN-M Profinet device with 16 digital I/O channels, channels can be used universally as inputs or outputs, M12 socket, rotary address switches for addressing, M12 LAN-Ports, D-coded, 7/8" power supply

Diagnostic indication		
LED	Indication	Condition
US	Green	Sensor power supply
UL	Green	Actuator power supply
1...8 A	Yellow	Channel status 1
1...8 DIA A	Red	Periphery fault
1...8 B	Yellow (alternative White)	Channel status 2
1...8 DIA B	Red	Periphery fault
P1 Lnk/Act	Green	Connected to a Profinet device
	Yellow flashing	I/O device exchanging data
	Off	No connection to a Profinet device
P2 Lnk/Act	Green	Connected to a Profinet device
	Yellow flashing	I/O device exchanging data
	Off	No connection to a Profinet device
BF	Red	Device I/O controller or wrong configuration
	Off	No faults
DIA	Red	General indication for periphery faults
	Red flashing	Firmware update
	Off	No faults

Bit assignment								
DIA	7	6	5	4	3	2	1	0
M12 Input								
Byte 0	4B	4A	3B	3A	2B	2A	1B	1A
Byte 1	8B	8A	7B	7A	6B	6A	5B	5A
M12 Output								
Byte 0	4B	4A	3B	3A	2B	2A	1B	1A
Byte 1	8B	8A	7B	7A	6B	6A	5B	5A

Pin assignment		
LAN connection M12, D-coded <ul style="list-style-type: none"> 1 = TD+ 2 = RD+ 3 = TD- 4 = RD Housing = shielding	Power supply 7/8" <ul style="list-style-type: none"> 1 = GND (0 V) 2 = GND (0 V) 3 = PE/Earth 4 = 24 V 5 = 24 V 	Input/Output M12 <ul style="list-style-type: none"> 1 = +24 V 2 = IN/OUT B 3 = GND (0 V) 4 = IN/OUT A 5 = earth Housing = PE

Part number	Order number
0980 ESL 700	0980 ESL 700



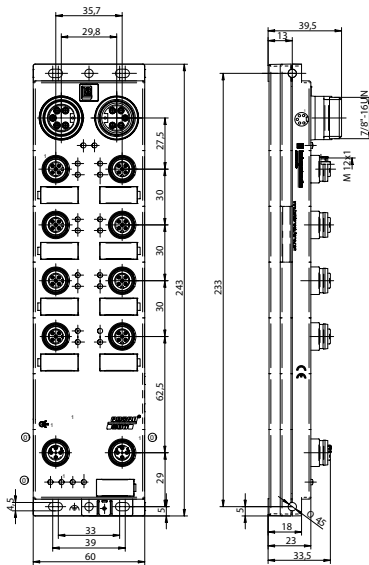
LioN-M PROFINET I/O Modules with 16 Digital Inputs and 16 Digital Outputs

Environmental	
Degree of protection	IP 67
Operating temperature range	-10°C (+14°F) to +60°C (+140°F)
Mechanical	
Weight	380 g
Housing material	PBT
Bus system	
Transmission rate	10/100 Mbs
Address range	0 - 255
Rotary address switches	0 - 255
Default address	0
System/Sensors power supply	
Nominal voltage	24V DC
Voltage range	11–30 V DC
Power consumption	typ. 90 mA
Reverse polarity protection	yes
Input power supply	
Voltage range	19–30 V DC
Sensor current	200 mA per port (at Tamb 30°C)
Short-circuit proof	yes
Indication	LED green
Inputs	
Rated input voltage	24 V DC
Channel type N.O.	p-switching
Number of digital channels	max. 16
Channel status indicator	LED yellow per channel
Diagnostic indication	LED red per socket
Output power supply	
Rated voltage	24 V DC
Voltage range	19–30 V DC
Reverse polarity protection	yes/antiparallel diode
Indication	LED green
Diagnostic indication	LED red per socket
Outputs	
Rated output current	1.6 A per channel
Short-circuit proof	yes
Max. output current	9 A (12 A*) per module
Overload-proof	yes
Number of digital channels	max. 16
Channel type N.O.	p-switching
Channel status indicator	LED yellow per channel
Diagnostic indication	LED red per socket
Included in delivery/accessories	
Dust covers M12	4 pieces
Attachable labels	10 pieces

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.


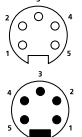



LioN-M PROFINET I/O Modules with 16 Digital Inputs



Type	0980 ESL 701	
Product Description	LioN-M Profinet device with 16 digital input channels, M12 socket, rotary address switches for addressing, M12 LAN-Ports, D-coded, 7/8" power supply	
Diagnostic indication		
LED	Indication	Condition
1...8 A	Yellow	Channel status 1
1...8 DIA A	Red	Periphery fault
1... 8 B	Yellow	Channel status 2
Us	Green Off	Sensor power supply applied Sensor power supply missing
UL	Green Off	Actuator power supply applied Actuator power supply missing
P1 Lnk/Act	Green Yellow flashing	Connected to an PROFINET device I/O device exchanging data
P2 Lnk/Act	Green Green flashing	Connected to an PROFINET device I/O device exchanging data
MS (Module status)	Green Green flashing Red/Green flashing Red flashing Off	Device is ready for operating Wrong configuration Self test is running Firmware update Device is off
NS (Network status)	Green Green flashing Red Red flashing Off	Connection to master exists IP address exists, but no connection to the master IP address is used by a different device Connection has timed out Device is off

Bit assignment								
DIA	7	6	5	4	3	2	1	0
	M12 Input							
Byte 0	4B	4A	3B	3A	2B	2A	1B	1A
Byte 1	8B	8A	7B	7A	6B	6A	5B	5A

Pin assignment		
LAN connection M12, D-coded	Power supply 7/8"	Input/Output M12
 <ul style="list-style-type: none"> 1 = TD+ 2 = RD+ 3 = TD- 4 = RD Housing = shielding	 <ul style="list-style-type: none"> 1 = GND (0 V) 2 = GND (0 V) 3 = PE/Earth 4 = 24 V sensors 5 = 24 V actuators 	 <ul style="list-style-type: none"> 1 = +24 V 2 = IN/OUT B 3 = GND (0 V) 4 = IN/OUT A 5 = earth Housing = PE

Part number	Order number
0980 ESL 701	0980 ESL 701



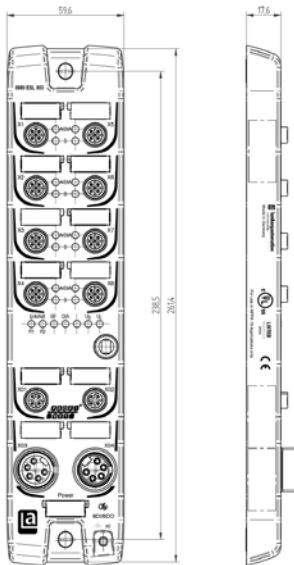
LioN-M PROFINET I/O Modules with 16 Digital Inputs

Environmental	
Degree of protection	IP 67
Operating temperature range	-10°C (+14°F) to +60°C (+140°F)
Mechanical	
Weight	380 g
Housing material	PBT
Bus system	
Transmission rate	10/100 Mbs
Address range	0 - 255
Rotary address switches	0 - 255
Default address	0
System/Sensors power supply	
Nominal voltage	24V DC
Voltage range	11–30 V DC
Power consumption	typ. 90 mA
Reverse polarity protection	yes
Input power supply	
Voltage range	19–30 V DC
Sensor current	200 mA per port (at Tamb 30°C)
Short-circuit proof	yes
Indication	LED green
Inputs	
Rated input voltage	24 V DC
Channel type N.O.	p-switching
Number of digital channels	max. 16
Channel status indicator	LED yellow per channel
Diagnostic indication	LED red per socket
Included in delivery/accessories	
Dust covers M12	4 pieces
Attachable labels	10 pieces

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.




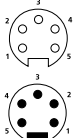

Lio-N-R PROFINET I/O Rugged Modules with 16 Digital Inputs



Type	0980 ESL 801-PNET 16DI-M12-R	
Product Description	Lio-N-R Digital input module, 16 digital input channels, PROFINET device, M12 LAN port, 4 poles D-coded, 7/8" power supply 5 poles	
Order Number	934 692-001	
Diagnostic indication		
LED	Indication	Condition
Us	Green	Logic/sensor power supply
Ul	Green	Actuator power supply
1...8 A	Yellow	Channel status
1...8 DIA A	Red	Periphery error
1...8 B	Yellow	Channel status
1...8 DIA B	Red	Periphery error
P1 Lnk/Act	Green Yellow flashing Off	Connection to an PROFINET device IO device exchanging data No connection to any other device
P2 Lnk/Act	Green Yellow flashing Off	Connection to an PROFINET device IO device exchanging data No connection to any other device
BF	Red Off	Bus error, no data exchange with I/O controller via PROFINET No error message
DIA	Red Red flashing Off	Common indicator for periphery errors Firmware update No error message


Technical modifications reserved.

Bit assignment								
Bit	7	6	5	4	3	2	1	0
M12 Input 16DI								
Byte 0	4B	4A	3B	3A	2B	2A	1B	1A
Byte 1	8B	8A	7B	7A	6B	6A	5B	5A

Pin assignment		
LAN connection M12, D-coded  <ul style="list-style-type: none"> 1 = TD+ 2 = RD+ 3 = TD- 4 = RD Housing = shielding	Power supply 7/8"  <ul style="list-style-type: none"> 1 = GND (0 V) 2 = GND (0 V) 3 = PE/Earth 4 = 24 V 5 = 24 V 	Input/Output M12  <ul style="list-style-type: none"> 1 = +24 V 2 = IN B 3 = GND (0 V) 4 = IN A 5 = earth Housing = PE

Part number	Order number	     
0980 ESL 801-PNET 16DI-M12-R	934 692-001	

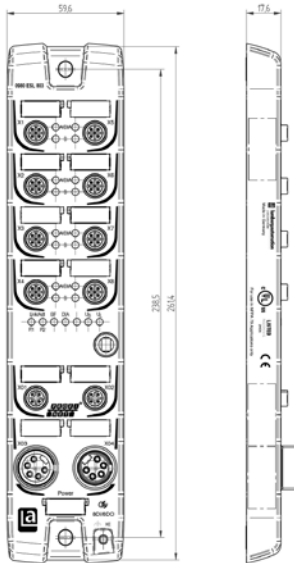
LioN-R PROFINET I/O Rugged Modules with 16 Digital Inputs

Product Description	
Type	0980 ESL 801-PNET 16DI-M12-R
	
Technical Data	
Protection Class	IP67
Operating Temperature Range	-10°C to +60°C
Weight	605 g
Housing Material	Metal (diecast zinc)
Bus System	
Transmission Rate	10/100 Mbs
Address Range	0 to 255
Default Address	0
Inputs	
Rated Input Voltage	24 V DC
Sensor Type	PNP (source)
Power Consumption of Sensor	Max. 100 mA
Reverse Polarity Protection	Yes
Short Circuit-proof	Yes
Number of Digital Channels	16
Status Indicator	LED white per channel
Diagnostic Indicator	LED red per port
Included in Delivery	
M12 Dust Covers	4 pieces
Attachable Labels	10 pieces

The use of these products in aggressive media should be verified in each case. Technical modifications reserved.
 Certifications have been applied for UL and CSA.




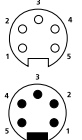

LioN-R PROFINET I/O Rugged Modules with 16 Digital Outputs



Type	0980 ESL 802-PNET 16DO-M12-R	
Product Description	LioN-R Digital output module, 16 digital output channels with galvanic isolation, PROFINET device, M12 LAN port, 4 poles D-coded, 7/8" power supply 5 poles	
Order Number	934 692-002	
Diagnostic indication		
LED	Indication	Condition
Us	Green	Logic/sensor power supply
Ul	Green	Actuator power supply
1...8 A	Yellow	Channel status
1...8 DIA A	Red	Periphery error
1...8 B	Yellow	Channel status
1...8 DIA B	Red	Periphery error
P1 Lnk/Act	Green Yellow flashing Off	Connection to an PROFINET device IO device exchanging data No connection to any other device
P2 Lnk/Act	Green Yellow flashing Off	Connection to an PROFINET device IO device exchanging data No connection to any other device
BF	Red Off	Bus error, no data exchange with I/O controller via PROFINET No error message
DIA	Red Red flashing Off	Common indicator for periphery errors Firmware update No error message


Technical modifications reserved.

Bit assignment								
Bit	7	6	5	4	3	2	1	0
M12 Input 16DO								
Byte 0	4B	4A	3B	3A	2B	2A	1B	1A
Byte 1	8B	8A	7B	7A	6B	6A	5B	5A

Pin assignment		
LAN connection M12, D-coded  <ul style="list-style-type: none"> 1 = TD+ 2 = RD+ 3 = TD- 4 = RD Housing = shielding 	Power supply 7/8"  <ul style="list-style-type: none"> 1 = GND (0 V) 2 = GND (0 V) 3 = PE/Earth 4 = 24 V 5 = 24 V 	Input/Output M12  <ul style="list-style-type: none"> 1 = +24 V 2 = IN B 3 = GND (0 V) 4 = IN A 5 = earth Housing = PE

Part number	Order number	     
0980 ESL 802-PNET 16DO-M12-R	934 692-002	

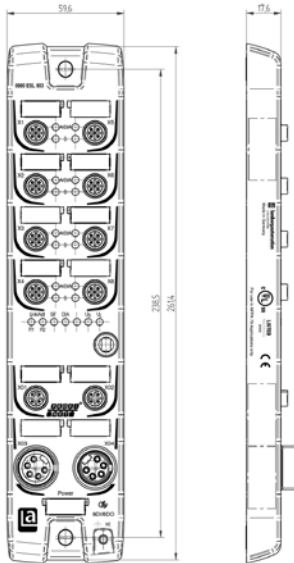
LioN-R PROFINET I/O Rugged Modules with 16 Digital Outputs

Product Description	
Type	0980 ESL 802-PNET 16DO-M12-R
	
Technical Data	
Protection Class	IP67
Operating Temperature Range	-10°C to +60°C
Weight	605 g
Housing Material	Metal (diecast zinc)
Bus System	
Transmission Rate	10/100 Mbs
Address Range	0 to 255
Default Address	0
Actuator Power Supply UL	
Rated Output Current	24 V DC
Voltage Range	19 to 30 V DC
Reverse Polarity Protection	Yes/antiparallel diode
Indicator	LED green
Outputs	
Rated Output Current	1.6 A per channel
Short Circuit-proof	Yes
Max. Current Carrying Capacity	9 A per module
Overload-proof	Yes
Number of Digital Channels	16
Channel Type N.O.	p-switching
Status Indicator	LED white per channel
Diagnostic Indicator	LED red per port
Galvanic Isolation from Electronics	Yes
Included in Delivery	
M12 Dust Covers	4 pieces
Attachable Labels	10 pieces

The use of these products in aggressive media should be verified in each case. Technical modifications reserved. Certifications have been applied for UL and CSA.




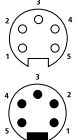

Lio-N-R PROFINET I/O Rugged Modules with 8 Digital Inputs and 8 Digital Outputs



Type	0980 ESL 803-PNET 8DI/8DO-M12-R	
Product Description	Lio-N-R Digital I/O module, 8 digital I/O channels with galvanic separation, PROFINET device, M12 LAN port, 4 poles D-coded, 7/8" power supply 5 poles	
Order Number	934 692-003	
Diagnostic indication		
LED	Indication	Condition
Us	Green	Logic/sensor power supply
Ul	Green	Actuator power supply
1...8 A	Yellow	Channel status
1...8 DIA A	Red	Periphery error
1...8 B	Yellow	Channel status
1...8 DIA B	Red	Periphery error
P1 Lnk/Act	Green Yellow flashing Off	Connection to an PROFINET device IO device exchanging data No connection to any other device
P2 Lnk/Act	Green Yellow flashing Off	Connection to an PROFINET device IO device exchanging data No connection to any other device
BF	Red Off	Bus error, no data exchange with I/O controller via PROFINET No error message
DIA	Red Red flashing Off	Common indicator for periphery errors Firmware update No error message


Technical modifications reserved.

Bit assignment								
Bit	7	6	5	4	3	2	1	0
	M12 Input 8DI							
Byte 0	4B	4A	3B	3A	2B	2A	1B	1A
	M12 Input 8DO							
Byte 0	8B	8A	7B	7A	6B	6A	5B	5A

Pin assignment		
LAN connection M12, D-coded	Power supply 7/8"	Input/Output M12
 <ul style="list-style-type: none"> 1 = TD+ 2 = RD+ 3 = TD- 4 = RD Housing = shielding 	 <ul style="list-style-type: none"> 1 = GND (0 V) 2 = GND (0 V) 3 = PE/Earth 4 = 24 V 5 = 24 V 	 <ul style="list-style-type: none"> 1 = +24 V 2 = IN B 3 = GND (0 V) 4 = IN A 5 = earth Housing = PE

Part number	Order number	     
0980 ESL 803-PNET 8DI/8DO-M12-R	934 692-003	

LioN-R PROFINET I/O Rugged Modules with 8 Digital Inputs and 8 Digital Outputs

Product Description	
Type	0980 ESL 813-EIP 8DI/8DO-M12-R
	
Technical Data	
Protection Class	IP67
Operating Temperature Range	-10°C to +60°C
Weight	605 g
Housing Material	Metal (diecast zinc)
Bus System	
Transmission Rate	10/100 Mbs
Address Range	0 to 255
Default Address	0
Inputs	
Rated Input Voltage	24 V DC
Sensor Type	PNP (source)
Power Consumption of Sensor	Max. 100 mA
Reverse Polarity Protection	Yes
Short Circuit-proof	Yes
Number of Digital Channels	8
Status Indicator	LED white per channel
Diagnostic Indicator	LED red per port
Actuator Power Supply UL	
Rated Output Current	24 V DC
Voltage Range	19 to 30 V DC
Reverse Polarity Protection	Yes/antiparallel diode
Indicator	LED green
Outputs	
Rated Output Current	1.6 A per channel
Short Circuit-proof	Yes
Max. Current Carrying Capacity	9 A per module
Overload-proof	Yes
Number of Digital Channels	8
Channel Type N.O.	p-switching
Status Indicator	LED white per channel
Diagnostic Indicator	LED red per port
Galvanic Isolation from Electronics	Yes
Included in Delivery	
M12 Dust Covers	4 pieces
Attachable Labels	10 pieces

The use of these products in aggressive media should be verified in each case. Technical modifications reserved. Certifications have been applied for UL and CSA.



EtherNet/IP Double-Ended Cord Sets

Cat5e, High-Flex, 2 Twisted Bonded Pair, Stranded/Unshielded, 24 AWG, TPE Jacket

Type	0985 806 100	0985 806 101	0985 806 125	0985 806 102	0985 806 127																																			
Product Description	EtherNet/IP, high-flex, double-ended cord set, M12 male to male straight, 4-pin, D-coding, 24 AWG TPE cable, stranded/unshielded, 2 twisted bonded pair with teal jacket.	Ethernet I/P, high-flex, double-ended cord set, M12 male to M12 male, teal TPE jacket, 4 pin, 24 AWG, stranded/unshielded cross-over cable with 2 twisted bonded pairs.	Ethernet I/P, double-ended cord set, M12 male right angle to M12 male, straight, teal TPE jacket, 4 pin, 24 AWG, stranded/unshielded cable with 2 twisted bonded pairs.	Ethernet I/P, double-ended cord set, M12 male to M12 female, straight, teal TPE jacket, 4 pin, 24 AWG, stranded/unshielded cable with 2 twisted bonded pairs.	Ethernet I/P, double-ended cord set, M12 male, right angle to M12 female, straight, teal TPE jacket, 4 pin, 24 AWG, stranded/unshielded cable with 2 twisted bonded pairs.																																			
Technical Illustration																																								
Wiring diagram	<table border="1"> <thead> <tr> <th>M12</th> <th>Color</th> <th>C1</th> <th>Color</th> <th>C2</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>White Orange</td> <td>1</td> <td>White Orange</td> <td>2</td> </tr> <tr> <td>2</td> <td>White Green</td> <td>2</td> <td>White Green</td> <td>1</td> </tr> <tr> <td>3</td> <td>Orange</td> <td>3</td> <td>Orange</td> <td>4</td> </tr> <tr> <td>4</td> <td>Green</td> <td>4</td> <td>Green</td> <td>3</td> </tr> </tbody> </table>	M12	Color	C1	Color	C2	1	White Orange	1	White Orange	2	2	White Green	2	White Green	1	3	Orange	3	Orange	4	4	Green	4	Green	3			<table border="1"> <thead> <tr> <th>M12</th> <th>Color</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>White Orange</td> </tr> <tr> <td>2</td> <td>White Green</td> </tr> <tr> <td>3</td> <td>Orange</td> </tr> <tr> <td>4</td> <td>Green</td> </tr> </tbody> </table>	M12	Color	1	White Orange	2	White Green	3	Orange	4	Green	
M12	Color	C1	Color	C2																																				
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4	Green	4	Green	3																																				
M12	Color																																							
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2	White Green																																							
3	Orange																																							
4	Green																																							
Face views																																								
Part number	0985 806 100/...M	0985 806 101/...M	0985 806 125/...M	0985 806 102/...M	0985 806 127/...M																																			
Standard cable lengths	0.5 M / 1 M / 2 M / 5 M / 10 M / 15 M / 20 M / 25 M / 30 M / 35 M / 40 M / 45 M / 50 M / 60 M / 70 M / 80 M	0.5 M / 1 M / 2 M / 5 M / 10 M	0.5 M / 1 M / 2 M / 5 M / 10 M / 15 M / 20 M / 30 M / 35 M / 40 M / 45 M / 50 M / 60 M / 70 M / 80 M	0.5 M / 1 M / 2 M / 5 M / 10 M	0.5 M / 1 M / 2 M / 5 M / 10 M / 15 M / 20 M / 30 M / 35 M / 40 M / 45 M / 50 M / 60 M / 70 M / 80 M																																			

EtherNet/IP Double-Ended Cord Sets

Cat5e, High-Flex, 2 Twisted Bonded Pair, Stranded/Unshielded, 24 AWG, TPE Jacket

Type	0985 806 100	0985 806 101	0985 806 125	0985 806 102	0985 806 127
Degree of protection	IP68				
Temperature	-40°C to 75°C				
Mechanical					
M12 and M12 Receptacle					
Molded body	PUR, black				
Coupling nut	Brass, nickel plated				
Contacts	Brass, gold plated				
Insert	PUR, black				
RJ45					
Plug	Polycarbonate				
Contacts	Phosphor Bronze, gold plated				
Boot	Elastomer Polyolefin				
Electrical					
Current rating	4A				
Voltage rating	250V				
Performance	Cat5e, Belden bonded twisted pair cable				
Cable specifications					
Cable jacket	TPE				
Color	Teal				
Overall diameter	.275"				
Conductor	24 AWG stranded tinned copper				
Temperature	Operating: -40°C to 75°C / Installation: -25°C to 75°C				
Flame test	UL: CMR / CSA: CMG				
Continuous Flex	2 million cycles @ 10X, 10 million cycles @ 20X bend radius				
Characteristics					



The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.





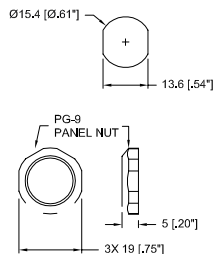
EtherNet/IP Double-Ended Cord Sets

Cat5e, High-Flex, 2 Twisted Bonded Pair, Stranded/Unshielded, 24 AWG, TPE Jacket

Type	0985 806 112	0985 806 124	0985 806 126	0985 806 103	0985 806 104																									
Product Description	EtherNet/IP, high-flex, double-ended cord set, M12 female, straight to M12 male straight, 4-pin, D-coding, 24 AWG TPE cable, stranded/unshielded, 2 twisted bonded pair with teal jacket.	EtherNet/IP, high-flex, double-ended cord set, M12 male, right angle to M12 male right angle, 4-pin, D-coding, 24 AWG TPE cable, stranded/unshielded, 2 twisted bonded pair with teal jacket.	EtherNet/IP, high-flex, double-ended cord set, M12 male, right angle to RJ45 male, 4-pin, D-coding, 24 AWG TPE cable, stranded/unshielded, 2 twisted bonded pair with teal jacket.	EtherNet/IP, high-flex, double-ended cord set, M12 male to RJ45 male, 4 pin, D-coded, 24 AWG, teal TPE jacket, stranded/unshielded cable with 2 twisted bonded pairs.	EtherNet/IP, high-flex, double-ended cord set, M12 female 4 pin, D-coded receptacle to male RJ45, 24 AWG, teal TPE jacket, stranded/unshielded with 2 bonded twisted pairs.																									
Technical Illustration																														
Wiring diagram	<table border="1"> <thead> <tr> <th>M12</th> <th>Color</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>White Orange</td> </tr> <tr> <td>2</td> <td>White Green</td> </tr> <tr> <td>3</td> <td>Orange</td> </tr> <tr> <td>4</td> <td>Green</td> </tr> </tbody> </table>		M12	Color	1	White Orange	2	White Green	3	Orange	4	Green	<table border="1"> <thead> <tr> <th>M12</th> <th>Color</th> <th>RJ45</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>White Orange</td> <td>1</td> </tr> <tr> <td>2</td> <td>White Green</td> <td>3</td> </tr> <tr> <td>3</td> <td>Orange</td> <td>2</td> </tr> <tr> <td>4</td> <td>Green</td> <td>6</td> </tr> </tbody> </table>			M12	Color	RJ45	1	White Orange	1	2	White Green	3	3	Orange	2	4	Green	6
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Face views																														
Part number	0985 806 112/...M	0985 806 124/...M	0985 806 126/...M	0985 806 103/...M	0985 806 104/...M																									
Standard cable lengths	0.5 M / 1 M / 2 M / 5 M / 10 M	0.5 M / 1 M / 2 M / 5 M / 10 M / 15 M / 20 M / 30 M / 35 M / 40 M / 45 M / 50 M / 60 M / 70 M / 80 M	0.5 M / 1 M / 2 M / 5 M / 10 M / 15 M / 20 M / 25 M / 30 M / 35 M	0.5 M / 1 M / 2 M / 5 M / 10 M / 15 M / 20 M / 25 M / 30 M / 35 M	0.5 M / 1 M / 2 M / 5 M / 10 M / 15 M / 20 M / 25 M / 30 M / 35 M																									

EtherNet/IP Double-Ended Cord Sets

Cat5e, High-Flex, 2 Twisted Bonded Pair, Stranded/Unshielded, 24 AWG, TPE Jacket


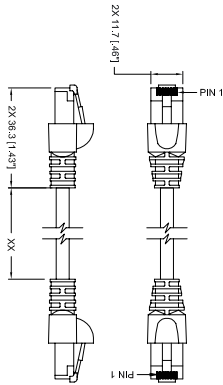

Type	0985 806 112	0985 806 124	0985 806 126	0985 806 103	0985 806 104
Degree of protection	IP68			IP68 / IP20	
Temperature	-40°C to 75°C			-20°C to 60°C	
Mechanical					
M12 and M12 Receptacle					
Molded body	PUR, black				
Coupling nut	Brass, nickel plated				
Contacts	Brass, gold plated				
Insert	PUR, black				
RJ45					
Plug	Polycarbonate				
Contacts	Phosphor Bronze, gold plated				
Boot	Elastomer Polyolefin				
Electrical					
Current rating	4A			1.5 A	
Voltage rating	250V			30VAC / 42 VDC	
Performance	Cat5e, Belden bonded twisted pair cable				
Cable specifications					
Cable jacket	TPE				
Color	Teal				
Overall diameter	.275"				
Conductor	24 AWG stranded tinned copper				
Temperature	Operating: -40°C to 75°C / Installation: -25°C to 75°C				
Flame test	UL: CMR / CSA: CMG				
Continuous Flex	2 million cycles @ 10X, 10 million cycles @ 20X bend radius				
Characteristics					
				 NOTE: Vibration & Oil Resistant applies to M12 side only.	
Recommended panel cut out					
					

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.



EtherNet/IP Double-Ended Cord Sets

Cat5e, High-Flex, 2 Twisted Bonded Pair, Stranded/Unshielded, 24 AWG, TPE Jacket

Type	<p>0985 806 500</p> 										
Product Description	<p>Ethernet I/P, high-flex, double-ended cord set, RJ45 male to RJ45 male, 24 AWG, teal TPE jacket, stranded/unshielded cable with 2 twisted bonded pairs.</p>										
Technical Illustration											
Wiring diagram	<table border="1"> <thead> <tr> <th>Color</th> <th>RJ45</th> </tr> </thead> <tbody> <tr> <td>White Orange</td> <td>1</td> </tr> <tr> <td>White Green</td> <td>3</td> </tr> <tr> <td>Orange</td> <td>2</td> </tr> <tr> <td>Green</td> <td>6</td> </tr> </tbody> </table>	Color	RJ45	White Orange	1	White Green	3	Orange	2	Green	6
Color	RJ45										
White Orange	1										
White Green	3										
Orange	2										
Green	6										
Face views											
Part number	<p>0985 806 500/...M</p>										
Standard cable lengths	<p>0.5 M / 1 M / 2 M / 5 M / 10 M / 15 M / 20 M / 25 M / 30 M / 35 M / 40 M / 45 M / 50 M / 60 M / 70 M / 80 M</p>										

EtherNet/IP Double-Ended Cord Sets

Cat5e, High-Flex, 2 Twisted Bonded Pair, Stranded/Unshielded, 24 AWG, TPE Jacket

Type	0985 806 500
Degree of protection	IP20
Temperature	-20°C to 60°C
Mechanical	
RJ45	
Plug	Polycarbonate
Contacts	Phosphor Bronze, gold plated
Boot	Elastomer Polyolefin
Electrical	
Current rating	1.5 A
Voltage rating	30VAC / 42 VDC
Performance	Cat5e, Belden bonded twisted pair cable
Cable specifications	
Cable jacket	TPE
Color	Teal
Overall diameter	.275"
Conductor	24 AWG stranded tinned copper
Temperature	Operating: -40°C to 75°C / Installation: -25°C to 75°C
Flame test	UL: CMR / CSA: CMG
Continuous Flex	2 million cycles @ 10X, 10 million cycles @ 20X bend radius
Characteristics	



The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.



EtherNet/IP Double-Ended Cord Sets

Cat5e, Moderate-Flex, 2 Twisted Bonded Pair, Solid/Shielded, 24 AWG, PVC Jacket

Type	0985 707 100	0985 707 101	0985 707 500																																																						
Product description	EtherNet/IP, moderate-flex, double-ended cord set, M12 male to male straight, 4-pin, D-coding, 24 AWG PVC cable, solid/shielded, 2 twisted bonded pairs with teal jacket.	EtherNet/IP, moderate-flex, double-ended cord set, M12 male to male straight, 4-pin, D-coding, 24 AWG PVC cable, solid/shielded, cross-over cable, 2 twisted bonded pairs with teal jacket.	Ethernet I/P, moderate-flex, double-ended cord set, RJ45 male to RJ45 male, 24 AWG, PVC cable, solid/shielded cable, 2 twisted bonded pairs with teal jacket.																																																						
Technical illustration																																																									
Wiring diagram	<table border="0"> <thead> <tr> <th>M12</th> <th>Color</th> <th>M12</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>White/Orange</td> <td>1</td> </tr> <tr> <td>3</td> <td>Orange</td> <td>3</td> </tr> <tr> <td>2</td> <td>White/Green</td> <td>2</td> </tr> <tr> <td>4</td> <td>Green</td> <td>4</td> </tr> <tr> <td>Nut</td> <td>Shield</td> <td>Nut</td> </tr> </tbody> </table>	M12	Color	M12	1	White/Orange	1	3	Orange	3	2	White/Green	2	4	Green	4	Nut	Shield	Nut	<table border="0"> <thead> <tr> <th>M12</th> <th>Color</th> <th>M12</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>White/Orange</td> <td>2</td> </tr> <tr> <td>3</td> <td>Orange</td> <td>4</td> </tr> <tr> <td>2</td> <td>White/Green</td> <td>1</td> </tr> <tr> <td>4</td> <td>Green</td> <td>3</td> </tr> <tr> <td>Nut</td> <td>Shield</td> <td>Nut</td> </tr> </tbody> </table>	M12	Color	M12	1	White/Orange	2	3	Orange	4	2	White/Green	1	4	Green	3	Nut	Shield	Nut	<table border="0"> <thead> <tr> <th>RJ45</th> <th>Color</th> <th>RJ45</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>White/Orange</td> <td>1</td> </tr> <tr> <td>2</td> <td>Orange</td> <td>2</td> </tr> <tr> <td>3</td> <td>White/Green</td> <td>3</td> </tr> <tr> <td>6</td> <td>Green</td> <td>6</td> </tr> <tr> <td>Shell</td> <td>Shield</td> <td>Shell</td> </tr> </tbody> </table>	RJ45	Color	RJ45	1	White/Orange	1	2	Orange	2	3	White/Green	3	6	Green	6	Shell	Shield	Shell
M12	Color	M12																																																							
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Nut	Shield	Nut																																																							
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Shell	Shield	Shell																																																							
Face views	M12 to M12 	M12 to M12 	RJ45 to RJ45 																																																						
Part number	0985 707 100/...M	0985 707 101/...M	0985 707 500/...M																																																						
Standard cable lengths	2 M / 5 M / 10 M / 20 M / 30 M / 40 M / 50 M / 60 M / 70 M / 80 M / 90 M	2 M / 5 M / 10 M / 20 M / 30 M / 40 M / 50 M / 60 M / 70 M / 80 M / 90 M	0.5 M / 1 M / 2 M / 5 M / 10 M / 15 M / 20 M / 25 M / 30 M / 40 M / 50 M																																																						

EtherNet/IP Double-Ended Cord Sets

Cat5e, Moderate-Flex, 2 Twisted Bonded Pair, Solid/Shielded, 24 AWG, PVC Jacket


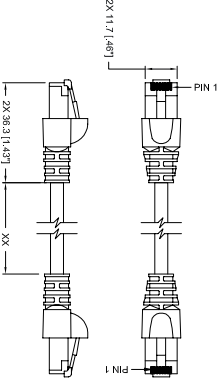

Type	0985 707 100	0985 707 101	0985 707 500
Degree of protection	IP68, NEMA 6P		IP20
Operating temperature range	-20°C(-4°F) to +75°C(+167°F)		
Mechanical			
M12			
Molded body	Polyurethane, black		
Coupling nut	Brass, nickel plated		
Contacts	Brass, gold over nickel plated		
Insert	Polyurethane, black		
RJ45			
Housing	Pre-tinned copper alloy		
Insert	Clear polycarbonate		
Contacts	50 μ" gold in contact area over nickel plating		
Cable specifications			
Cable jacket	PVC, (sun and oil Resistant)		
Color	Teal		
Overall diameter	7.6mm, nominal		
Conductor	24 AWG, solid bare copper		
Insulation	Polyolefin		
Inner jacket	PVC		
Foil shield	Aluminum/polyester tape, 100% coverage		
Braided shield	Tinned copper, 70% coverage		
Agency approval	UL rated CMR		
Performance	Cat5e, Belden bonded twisted pair cable		
Flex	Moderate Flex, High Noise, Cat5e Industrial Ethernet Cable		
Characteristics			
	  	  	 

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.



EtherNet/IP Double-Ended Cord Sets

Cat5e, Moderate-Flex, 2 Twisted Bonded Pair, Solid/Unshielded, 24 AWG, PVC Jacket

Type	<p style="text-align: right;">0985 705 500</p> 															
Product description	<p>Ethernet I/P, moderate-flex, double-ended cord set, RJ45 male to RJ45 male, 24 AWG, teal PVC jacket, solid/unshielded cable with 2 twisted bonded pairs.</p>															
Technical illustration																
Wiring diagram	<table border="0" style="width: 100%; text-align: center;"> <thead> <tr> <th>RJ45</th> <th>Color</th> <th>RJ45</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>White/Orange</td> <td>1</td> </tr> <tr> <td>2</td> <td>Orange</td> <td>2</td> </tr> <tr> <td>3</td> <td>White/Green</td> <td>3</td> </tr> <tr> <td>6</td> <td>Green</td> <td>6</td> </tr> </tbody> </table>	RJ45	Color	RJ45	1	White/Orange	1	2	Orange	2	3	White/Green	3	6	Green	6
RJ45	Color	RJ45														
1	White/Orange	1														
2	Orange	2														
3	White/Green	3														
6	Green	6														
Face views	<p style="text-align: center;">RJ45 to RJ45</p> 															
Part number	<p style="text-align: center;">0985 705 500/...M</p>															
Standard cable lengths	<p style="text-align: center;">0.5 M / 1 M / 2 M / 5 M / 10 M / 15 M</p>															

EtherNet/IP Double-Ended Cord Sets

Cat5e, Moderate-Flex, 2 Twisted Bonded Pair, Solid/Unshielded, 24 AWG, PVC Jacket

Type	0985 706 500
Degree of protection	IP20
Operating temperature range	-20°C(-4°F) to +75°C(+167°F)
Mechanical	
Housing	Pre-tinned copper alloy
Insert	Clear polycarbonate
Contacts	50 μ" gold in contact area over nickel plating
Cable specifications	
Cable jacket	PVC, (sun and oil resistant)
Color	Teal
Overall diameter	5.62 mm, nominal
Conductor	24 AWG, solid bare copper
Insulation	Polyolefin
Agency approval	UL rated CMR
Performance	Cat5e, Belden bonded twisted pair cable
Flex	Moderate Noise, Cat5e Industrial Ethernet Cable
Characteristics	



The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.







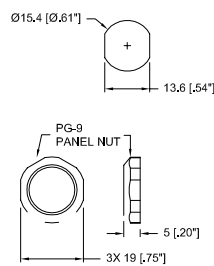
EtherNet/IP Double-Ended Cord Sets

Cat5e, High-Flex, 2 Twisted Bonded Pair, Stranded/Shielded, 24 AWG, TPE Jacket

Type	0985 YM57530 100	0985 YM57530 103	0985 YM57530 104	0985 YM57530 500																																																		
Product description	EtherNet/IP, double-ended cord set, M12 male to male straight, 4-pin, D-coding, 24 AWG TPE cable, stranded/shielded, 2 twisted bonded pairs with teal jacket.	EtherNet/IP, double-ended cord set, M12 male to RJ45 male, 4-pin, D-coding, 24 AWG TPE cable, stranded/shielded, 2 twisted bonded pairs with teal jacket.	EtherNet/IP, double-ended cord set, M12 female receptacle to RJ45 male, 4-pin, D-coding, 24 AWG TPE cable, stranded/shielded, 2 twisted bonded pairs with teal jacket.	EtherNet/IP, double-ended cord set, RJ45 male to RJ45 male, 4-pin, 24 AWG TPE cable, stranded/shielded, 2 twisted bonded pairs with teal jacket.																																																		
Technical illustration																																																						
Color Code	<table border="1"> <thead> <tr> <th>M12</th> <th>Color</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>White Orange</td> </tr> <tr> <td>2</td> <td>White Green</td> </tr> <tr> <td>3</td> <td>Orange</td> </tr> <tr> <td>4</td> <td>Green</td> </tr> </tbody> </table>	M12	Color	1	White Orange	2	White Green	3	Orange	4	Green	<table border="1"> <thead> <tr> <th>M12</th> <th>Color</th> <th>RJ45</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>White Orange</td> <td>1</td> </tr> <tr> <td>2</td> <td>White Green</td> <td>3</td> </tr> <tr> <td>3</td> <td>Orange</td> <td>2</td> </tr> <tr> <td>4</td> <td>Green</td> <td>6</td> </tr> </tbody> </table>	M12	Color	RJ45	1	White Orange	1	2	White Green	3	3	Orange	2	4	Green	6	<table border="1"> <thead> <tr> <th>M12</th> <th>Color</th> <th>RJ45</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>White Orange</td> <td>1</td> </tr> <tr> <td>2</td> <td>White Green</td> <td>3</td> </tr> <tr> <td>3</td> <td>Orange</td> <td>2</td> </tr> <tr> <td>4</td> <td>Green</td> <td>6</td> </tr> </tbody> </table>	M12	Color	RJ45	1	White Orange	1	2	White Green	3	3	Orange	2	4	Green	6	<table border="1"> <thead> <tr> <th>Color</th> <th>RJ45</th> </tr> </thead> <tbody> <tr> <td>White Orange</td> <td>1</td> </tr> <tr> <td>White Green</td> <td>3</td> </tr> <tr> <td>Orange</td> <td>2</td> </tr> <tr> <td>Green</td> <td>6</td> </tr> </tbody> </table>	Color	RJ45	White Orange	1	White Green	3	Orange	2	Green	6
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Face views	M12 to M12	M12 to RJ45	M12 to RJ45	RJ45 to RJ45																																																		
Part number	0985 YM57530 100/...M	0985 YM57530 103/...M	0985 YM57530 104/...M	0985 YM57530 500/...M																																																		
Standard cable lengths	1 M / 2 M / 5 M / 10 M / 15 M / 20 M / 30 M	0.15M / 0.25M / 1 M / 2 M / 3 M / 5 M / 10 M / 15 M / 20 M / 30 M	0.25M / 0.5 M / 1 M / 2 M / 5 M / 10 M / 15 M / 20 M	0.5 M / 1 M / 2 M / 3 M / 5 M / 10 M / 15 M / 20 M																																																		

EtherNet/IP Double-Ended Cord Sets

Cat5e, High-Flex, 2 Twisted Bonded Pair, Stranded/Shielded, 24 AWG, TPE Jacket

Type	0985 YM57530 100	0985 YM57530 103	0985 YM57530 104	0985 YM57530 500
Degree of protection	IP68	IP67 / IP20	IP67 / IP20	IP20
Operating temperature range	-20°C to 60°C			
Mechanical				
M12				
Molded body	Polyurethane, black			
Coupling nut	Brass, nickel plated			
Contacts	Brass, gold plated			
Insert	Polyurethane, black			
M12 Receptacle				
Housing	Brass, nickel plated			
Insert	PUR, black			
Contacts	Brass, gold plated			
RJ45				
Plug	Polycarbonate			
Contacts	Phosphor Bronze, gold plated			
Boot	Elastomer Polyolefin			
Electrical				
Current rating	4 A		1.5 A	
Voltage rating	250 V		60 V	
Cable specifications				
Cable jacket	TPE			
Color	Teal			
Overall diameter	.300"			
Conductor	24 AWG, stranded			
Number of pairs	2			
Shield	Tinned Copper braid and Aluminum/Polyester foil			
Performance	Cat5e, Belden bonded twisted pair cable			
Characteristics				
		 NOTE: Vibration & Oil Resistant applies to M12 side only.	 NOTE: Vibration & Oil Resistant applies to M12 side only.	
Recommended panel cut out				
				

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.








PROFINET Double-Ended Cord Sets

Cat5e, High-Flex, Stranded/Shielded, 22 AWG, TPE/PLTC Cable

Type	0985 S4742 100	0985 S4742 117	0985 S4742 116	0985 S4742 104	0985 S4742 502																																										
Product Description	PROFINET data cable according to type C, molded on both sides with M12 male connector, D coding, stranded/shielded, 22 AWG with green jacket.	PROFINET data cable according to type C, molded on both sides with M12 male to M12 female connector, D coding, stranded/shielded, 22 AWG with green jacket.	PROFINET data cable according to type C, molded on both sides with M12 female to M12 female connector, D coding, stranded/shielded, 22 AWG with green jacket.	PROFINET data cable according to type C, molded on both sides with M12 male to RJ45 male connector, D coding, stranded/shielded, 22 AWG with green jacket.	PROFINET data cable according to type C, molded on both sides with RJ45 to RJ45 male connector, D coding, stranded/shielded, 22 AWG with green jacket.																																										
Technical Illustration																																															
Wiring diagram	<table border="0"> <tr> <td>M12</td> <td>Color</td> <td>M12</td> </tr> <tr> <td>1</td> <td>Yellow</td> <td>1</td> </tr> <tr> <td>2</td> <td>White</td> <td>2</td> </tr> <tr> <td>3</td> <td>Orange</td> <td>3</td> </tr> <tr> <td>4</td> <td>Blue</td> <td>4</td> </tr> <tr> <td>Nut</td> <td>Shield</td> <td>Nut</td> </tr> </table>			M12	Color	M12	1	Yellow	1	2	White	2	3	Orange	3	4	Blue	4	Nut	Shield	Nut	<table border="0"> <tr> <td>RJ45</td> <td>Color</td> <td>M12</td> <td>RJ45</td> </tr> <tr> <td>1</td> <td>Yellow</td> <td>1</td> <td>1</td> </tr> <tr> <td>2</td> <td>White</td> <td>2</td> <td>2</td> </tr> <tr> <td>3</td> <td>Orange</td> <td>3</td> <td>3</td> </tr> <tr> <td>6</td> <td>Blue</td> <td>4</td> <td>6</td> </tr> <tr> <td>Case</td> <td>Shield</td> <td>Nut</td> <td>Case</td> </tr> </table>		RJ45	Color	M12	RJ45	1	Yellow	1	1	2	White	2	2	3	Orange	3	3	6	Blue	4	6	Case	Shield	Nut	Case
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Case	Shield	Nut	Case																																												
Face views																																															
Part number																																															
	0985 S4742 100/...M	0985 S4742 117/...M	0985 S4742 116/...M	0985 S4742 104/...M	0985 S4742 502/...M																																										
Standard cable lengths	1 M / 2 M / 3 M / 4 M / 5 M / 10 M / 15 M / 20 M	2 M / 3 M	0.5 M / 5 M	2 M / 5 M / 8 M / 9 M / 10 M / 12 M / 15 M / 20 M / 25 M / 30 M	0.5 M / 2 M / 5 M / 10 M / 20 M																																										

PROFINET Double-Ended Cord Sets

Cat5e, High-Flex, Stranded/Shielded, 22 AWG, TPE/PLTC Cable

Type	0985 S4742 100	0985 S4742 116	0985 S4742 117	0985 S4742 104	0985 S4742 502
Degree of protection	IP68		IP68 / IP20		IP20
Temperature	-40°C to 80°C		-40°C to 70°C		
Mechanical					
M12 and M12 Receptacle					
Molded body	PUR, black				
Coupling nut	Brass, nickel plated				
Contacts	Brass, gold over nickel plated				
Insert	PUR, black				
RJ45					
Plastic housing	Polyamid, black				
Cable specifications					
Cable jacket	TPE				
Color	Green				
Conductor	22 AWG stranded tinned copper				
Foil shield	Aluminum/Polyester				
Braided shield	100% coverage, tinned copper, 85% coverage				
Approvals	(UL) PLTC				
Characteristics					
				 NOTE: Vibration & Oil Resistant applies to M12 side only.	

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.

PROFINET Double-Ended Cord Sets

Cat5e, High-Flex, High Noise, 22 AWG, PUR Halogen-Free Jacket

Type	0985 342 100	0985 342 104	0985 342 500
Degree of protection	IP67	IP67 / IP20	IP20
Operating temperature range	-20°C (-4°F) to +75°C (+167°F)		
Mechanical			
M12			
Molded body	PUR, black		
Coupling nut	Brass, nickel plated		
Contacts	Brass, gold over nickel plated		
Insert	PUR, self extinguishing		
RJ45			
Housing	Pre-tinned copper alloy		
Insert	Clear polycarbonate		
Contacts	50 µ" gold in contact area over nickel plating		
Electrical			
Current rating	1.5 A		
Voltage rating	30 V AC / 42 V DC		
Performance	Cat5e		
Cable specifications			
Cable jacket	PUR, halogen-free		
Color	Green		
Overall diameter	6.2mm, nominal		
Conductor	22 AWG, 7 stranded bare copper		
Insulation	Polyethylene foam skin		
Foil shield	Aluminum/polyester tape, 100% coverage		
Braid shield	Tinned copper, 85% coverage		
Agency approval	AWM 20236		
Cable type	High Flex, High Noise, PROFINET cable		
Characteristics			
		 NOTE: Vibration & Oil Resistant applies to M12 side only.	

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.







PROFINET Double-Ended Cord Sets

Cat5e, High-Flex, High Noise, 22 AWG, PUR Halogen-Free Jacket, 360° Shielding

Type	0985 342 S4723	0985 342 S4724	0985 342 118	0985 342 106
Configuration	M12 (male) to M12 (female)	M12 (female) to M12 (female)	M12 (female)	M12 (male)
Product description	PROFINET data cable according to type C, molded on both sides with M12 male to female connector, D coding, 360° shielding with green jacket.	PROFINET data cable according type C, molded on both sides with M12 female connectors, D coding, 360° shielding with green jacket.	PROFINET data cable according to type C with M12 female connector and open leads, 360° shielding with green jacket.	Industrial Ethernet data cable, M12 male right angle connector D coded, molded on one side, 360° shielding connected to knurled screw.
Technical illustration				
Face views	<p>1 = yellow 2 = white 3 = orange 4 = blue</p>	<p>1 = yellow 2 = white 3 = orange 4 = blue</p>	<p>1 = yellow 2 = white 3 = orange 4 = blue</p>	<p>1 = yellow 2 = white 3 = orange 4 = blue</p>
Part number	0985 342 S4723/...M	0985 342 S4724/...M	0985 342 118/...M	0985 342 130/...M
Standard cable lengths	0.5 M / 1 M / 2 M / 5 M / 5.5 M / 6 M / 6.5 M / 7 M / 7.5 M / 10 M / 15 M / 20 M / 25 M / 30 M / 35 M	0.5 M / 1 M / 2 M / 5 M / 10 M / 15 M / 20 M / 25 M / 30 M / 35 M / 40 M / 45 M / 50 M / 60 M / 70 M	0.5 M / 1 M / 2 M / 5 M / 10 M / 15 M / 20 M	5 M

PROFINET Double-Ended Cord Sets

Cat5e, High-Flex, High Noise, 22 AWG, PUR Halogen-Free Jacket, 360° Shielding

Type	0985 342 S4723	0985 342 S4724	0985 342 118	0985 342 106
Degree of protection (IEC 60529)*	IP 67 / IP68 / IP69K			
Operating temperature range	-25°C to +85°C, notice Derating			
Number of contacts	4			
Standard	IEC 61076-2-101			
Construction type	D-coded			
Mechanical				
Molded body	TPU, black			
Contact bearer	PBT, black			
Contacts	CuSn			
Contact surface	Cu/Au			
Knurled nut	CuZn, nickel-plated			
Shielding sleeve	CuZn, tin-plated			
O-ring	FKM			
Electrical				
Operating voltage	60 V AC/DC			
Rated voltage	240 V AC/DC			
Rated current (derating)	4 A			
Rated impulse voltage	2.0 kV			
Pollution degree	3 acc. to DIN EN 60664-1 (VDE0110)			
Contact resistance	≤ 5 mOhm			
Insulation resistance	> 10 ⁹ Ohm			
Cable specifications				
Cable jacket	PUR, halogen-free			
Color	Green			
Overall diameter	6.2mm, nominal			
Conductor	22 AWG, 7 stranded bare copper			
Insulation	Polyethylene foam skin			
Foil shield	Aluminum/polyester tape, 100% coverage			
Braid shield	Tinned copper, 85% coverage			
Agency approval	AWM 20236			
Cable type	High Flex, High Noise, PROFINET cable			
Characteristics				
				

Good chemical resistance.

The resistance has to be checked in individual cases.

* only if mounted and locked in combination with the corresponding connector.

Cutline

Do not connect / disconnect under load.

"L" = standard length of control line (other lengths of control lines on request)

Further technical information on control lines see 909 342



EtherMATE™ Industrial Ethernet Double-Ended Cord Sets

Moderate- or High-Flex, Moderate Noise, 4 Twisted Bonded Pair, 24 AWG, PVC Jacket

Type	0985 606 500	0985 607 500																											
Configuration	RJ45 to RJ45																												
Product description	Industrial Ethernet double-ended cord set, moderate-flex, male, RJ45 straight, 4-pair, 24 AWG, PVC cable, solid/unshielded with 4 twisted bonded pairs, teal jacket.	Industrial Ethernet double-ended cord set, high-flex, male, RJ45 to RJ45 straight, 4-pair, 24 AWG, PVC cable, stranded/unshielded with 4 twisted bonded pairs, teal jacket.																											
Category Rating	Cat5e																												
Technical illustration																													
Wiring diagram	<table border="0"> <thead> <tr> <th>RJ45</th> <th>Color</th> <th>RJ45</th> </tr> </thead> <tbody> <tr> <td>1 X</td> <td>White/Orange</td> <td>1 X</td> </tr> <tr> <td>2 X</td> <td>Orange</td> <td>2 X</td> </tr> <tr> <td>5 X</td> <td>White/Blue</td> <td>5 X</td> </tr> <tr> <td>4 X</td> <td>Blue</td> <td>4 X</td> </tr> <tr> <td>3 X</td> <td>White/Green</td> <td>3 X</td> </tr> <tr> <td>6 X</td> <td>Green</td> <td>6 X</td> </tr> <tr> <td>7 X</td> <td>White/Brown</td> <td>7 X</td> </tr> <tr> <td>8 X</td> <td>Brown</td> <td>8 X</td> </tr> </tbody> </table>		RJ45	Color	RJ45	1 X	White/Orange	1 X	2 X	Orange	2 X	5 X	White/Blue	5 X	4 X	Blue	4 X	3 X	White/Green	3 X	6 X	Green	6 X	7 X	White/Brown	7 X	8 X	Brown	8 X
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7 X	White/Brown	7 X																											
8 X	Brown	8 X																											
Face views																													
Part number	0985 606 500/...M	0985 607 500/...M																											
Standard cable lengths	<p>0.3 M / 0.5 M / 1 M / 2 M / 3 M / 4 M / 5 M / 10 M / 15 M / 20 M / 25 M / 30 M / 35 M / 40 M / 45 M / 50 M / 55 M / 60 M / 65 M / 70 M / 75 M / 80 M / 85 M* / 90 M* / 100 M*</p> <p>* Cable lengths denoted with an asterisk are limited to cables with solid conductors</p>																												

EtherMATE™ Industrial Ethernet Double-Ended Cord Sets

Moderate- or High-Flex, Moderate Noise, 4 Twisted Bonded Pair, 24 AWG, PVC Jacket

Type	0985 606 500	0985 607 500
Degree of protection	IP20	
Operating temperature range	-20°C(-4°F) to +75°C(+167°F)	
Mechanical		
Plug	Polycarbonate	
Contacts	Phosphor bronze, gold plated	
Boot	Elastomer polyolefin	
Shell	Copper alloy, nickel plated	
Cable specifications		
Cable jacket	PVC (sun and oil resistant)	
Color	Teal	
Overall diameter	5.87 mm	6.50 mm
Conductor	24 AWG, solid	24 AWG, stranded (tin copper)
Number of pairs	4	
Cable type	Cat5e, moderate flex / moderate noise	Cat5e, high flex / moderate noise
Performance	Cat5e, Belden bonded twisted pair cable	
Characteristics		



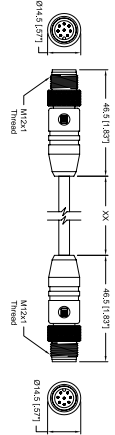
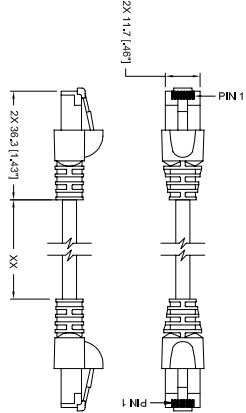




The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.



EtherMATE™ Industrial Ethernet Double-Ended Cord Sets

Moderate-Flex/High Noise, Solid/Shielded, 24 AWG, PVC Jacket

Type	0985 609 100	0985 609 101	0985 609 500																																																																																										
Configuration	M12 to M12	M12 to M12 (crossover)	RJ45 to RJ45																																																																																										
																																																																																													
Product Description	Industrial Ethernet double-ended cord set, moderate-flex, male, M12 to M12 straight, 4-pair, 24 AWG, PVC cable, solid/shielded with teal jacket and orange inserts. Cat5	Industrial Ethernet double-ended cord set, moderate-flex, male, M12 to M12 straight, 4-pair, 24 AWG, PVC cable, solid/shielded, crossover with teal jacket and orange inserts. Cat5	Industrial Ethernet double-ended cord set, moderate-flex, male, RJ45 to RJ45 straight, 4-pair, 24 AWG, PVC cable, solid/shielded with teal jacket. Cat5e																																																																																										
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Shell	Shield	Shell																																																																																											
Face views	M12 to M12		RJ45 to RJ45																																																																																										
																																																																																													
Part number	0985 609 100...M	0985 609 101/...M	0985 609 500/...M																																																																																										
Standard cable lengths	0.3 M / 0.5 M / 1 M / 2 M / 3 M / 4 M / 5 M / 10 M / 15 M / 20 M / 25 M / 30 M / 35 M / 40 M / 45 M / 50 M / 55 M / 60 M / 65 M / 70 M / 75 M / 80 M / 85 M / 90 M																																																																																												

EtherMATE™ Industrial Ethernet Double-Ended Cord Sets

Moderate-Flex/High Noise, Solid/Shielded, 24 AWG, PVC Jacket



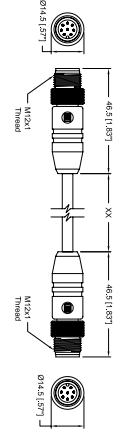
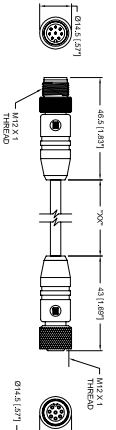

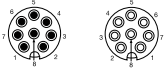
Type	0985 609 100	0985 609 101	0985 609 500
Degree of protection	IP67		IP20
Operating temperature range	-20°C(-4°F) to +75°C(+167°F)		
Mechanical			
M12			
Molded body	PUR, black		
Coupling nut	Brass, nickel plated		
Contacts	Brass, gold over nickel plated		
Insert	PUR, self extinguishing		
RJ45			
Plug			Polycarbonate
Contacts			Phosphor bronze, gold plated
Boot			Elastomer polyolefin
Shell			Copper alloy, nickel plated
Cable specifications			
Cable jacket	PVC, (sun and oil Resistant)		
Color	Teal		
Overall diameter	7.26mm, nominal		
Conductor	24 AWG, solid		
Number of pairs	4		
Insulation	Polyethylene		
Foil shield	Aluminum/polyester tape, 100% coverage		
Braided shield	Tinned copper, 65% coverage		
EMI protection	50 dB @ 0.772 MHz - 1000 MHz		
Agency approval	ETL rated CMR		
Cable type	Cat5, moderate flex / high noise (0985 609 500 - Cat5e)		
Characteristics			
			

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.



EtherMATE™ Industrial Ethernet Double-Ended Cord Sets

High-Flex/High Noise, Stranded/Shielded, 24 AWG, PVC Jacket

Type	0985 656 100	0985 656 101	0985 656 102																																																																																										
Configuration	M12 to M12	M12 to M12 (crossover)	M12 to M12																																																																																										
																																																																																													
Product Description	Industrial Ethernet double-ended cord set, high-flex, male, M12 to M12 straight, 4-pair, 24 AWG, PVC cable, stranded/shielded with teal jacket and orange inserts.	Industrial Ethernet double-ended cord set, high-flex, male, M12 to M12 straight, 4-pair, 24 AWG, PVC cable, stranded/shielded, crossover with teal jacket and orange inserts.	Industrial Ethernet double-ended cord set, high-flex, male, M12 to female M12 straight, 4-pair, 24 AWG, PVC cable, stranded/shielded with teal jacket and orange inserts.																																																																																										
Category Rating	Cat5																																																																																												
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Wiring diagram	<table border="0"> <thead> <tr> <th>M12</th> <th>Color</th> <th>M12</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>White/Orange</td> <td>6</td> </tr> <tr> <td>4</td> <td>Orange</td> <td>4</td> </tr> <tr> <td>1</td> <td>White/Blue</td> <td>1</td> </tr> <tr> <td>7</td> <td>Blue</td> <td>7</td> </tr> <tr> <td>5</td> <td>White/Green</td> <td>5</td> </tr> <tr> <td>8</td> <td>Green</td> <td>8</td> </tr> <tr> <td>2</td> <td>White/Brown</td> <td>2</td> </tr> <tr> <td>3</td> <td>Brown</td> <td>3</td> </tr> <tr> <td>Nut</td> <td>Shield</td> <td>Nut</td> </tr> </tbody> </table>	M12	Color	M12	6	White/Orange	6	4	Orange	4	1	White/Blue	1	7	Blue	7	5	White/Green	5	8	Green	8	2	White/Brown	2	3	Brown	3	Nut	Shield	Nut	<table border="0"> <thead> <tr> <th>M12</th> <th>Color</th> <th>M12</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>White/Orange</td> <td>5</td> </tr> <tr> <td>4</td> <td>Orange</td> <td>8</td> </tr> <tr> <td>1</td> <td>White/Blue</td> <td>1</td> </tr> <tr> <td>7</td> <td>Blue</td> <td>7</td> </tr> <tr> <td>5</td> <td>White/Green</td> <td>6</td> </tr> <tr> <td>8</td> <td>Green</td> <td>4</td> </tr> <tr> <td>2</td> <td>White/Brown</td> <td>2</td> </tr> <tr> <td>3</td> <td>Brown</td> <td>3</td> </tr> <tr> <td>Nut</td> <td>Shield</td> <td>Nut</td> </tr> </tbody> </table>	M12	Color	M12	6	White/Orange	5	4	Orange	8	1	White/Blue	1	7	Blue	7	5	White/Green	6	8	Green	4	2	White/Brown	2	3	Brown	3	Nut	Shield	Nut	<table border="0"> <thead> <tr> <th>M12</th> <th>Color</th> <th>M12</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>White/Orange</td> <td>5</td> </tr> <tr> <td>4</td> <td>Orange</td> <td>8</td> </tr> <tr> <td>1</td> <td>White/Blue</td> <td>1</td> </tr> <tr> <td>7</td> <td>Blue</td> <td>7</td> </tr> <tr> <td>5</td> <td>White/Green</td> <td>6</td> </tr> <tr> <td>8</td> <td>Green</td> <td>4</td> </tr> <tr> <td>2</td> <td>White/Brown</td> <td>2</td> </tr> <tr> <td>3</td> <td>Brown</td> <td>3</td> </tr> <tr> <td>Screw</td> <td>Shield</td> <td>Nut</td> </tr> </tbody> </table>	M12	Color	M12	6	White/Orange	5	4	Orange	8	1	White/Blue	1	7	Blue	7	5	White/Green	6	8	Green	4	2	White/Brown	2	3	Brown	3	Screw	Shield	Nut
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Screw	Shield	Nut																																																																																											
Face views	Male/Male		Male/Female																																																																																										
																																																																																													
Part number	0985 656 100/...M	0985 656 101/...M	0985 656 102/...M																																																																																										
Standard cable lengths	0.3 M / 0.5 M / 1 M / 2 M / 3 M / 4 M / 5 M / 10 M / 15 M / 20 M / 25 M / 30 M / 35 M / 40 M / 45 M / 50 M / 55 M / 60 M / 65 M / 70 M / 75 M / 80 M / 85 M / 90 M	0.3 M / 0.5 M / 1 M / 2 M / 3 M / 4 M / 5 M / 10 M / 15 M / 20 M / 25 M / 30 M / 35 M / 40 M / 45 M / 50 M / 55 M / 60 M / 65 M / 70 M / 75 M / 80 M / 85 M / 90 M	0.3M / 0.5M / 0.6M / 1M / 2M / 3M / 4M / 5M / 6M / 7M / 8M / 9M / 10M / 15M / 20M / 30M / 40M / 50M																																																																																										

EtherMATE™ Industrial Ethernet Double-Ended Cord Sets

High-Flex/High Noise, Stranded/Shielded, 24 AWG, PVC Jacket

Type	0985 656 100	0985 656 101	0985 656 102
Degree of protection	IP67		
Operating temperature range	-20°C(-4°F) to +75°C(+167°F)		
Mechanical			
M12			
Molded body	PUR, black		
Coupling nut	Brass, nickel plated		
Contacts	Brass, gold over nickel plated		
Insert	PUR, orange (male), black (female)		
Cable specifications			
Cable jacket	PVC, (sun and oil resistant)		
Color	Teal		
Overall diameter	7.77mm, nominal		
Conductor	24 AWG, 7 strands tinned copper		
Number of pairs	4		
Number of pins	8		
Insulation	Polyethylene		
Foil shield	Aluminum/polypropylene tape, 100% coverage		
Braided shield	Tinned copper, 65% coverage		
EMI protection	50 dB @ 0.772 MHz - 1000 MHz		
Agency approval	ETL rated CMR		
Cable type	Cat5, high flex / high noise (0985 656 500/504 Cat5e)		
Characteristics			



The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.



EtherMATE™ Industrial Ethernet Double-Ended Cord Sets



High-Flex/High Noise, Stranded/Shielded, 24 AWG, PVC Jacket

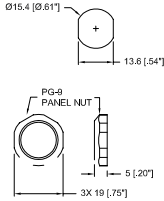
Type	0985 656 103	0985 656 104	0985 656 500	0985 656 504																																																																																																																								
Configuration	M12 to RJ45	M12 (receptacle) to RJ45	RJ45 to RJ45	RJ45 to RJ45 (crossover)																																																																																																																								
Product Description	Industrial Ethernet double-ended cord set, high-flex, male, M12 to RJ45 straight, 4-pair, 24 AWG, PVC cable, stranded/shielded with teal jacket and orange inserts.	Industrial Ethernet, double-ended cord set, high-flex, M12 female receptacle to RJ45 male, 4-pair, 24 AWG, PVC cable, stranded/shielded, with teal jacket.	Industrial Ethernet double-ended cord set, high-flex, male, RJ45 to RJ45 straight, 4-pair, 24 AWG, PVC cable, stranded/shielded with teal jacket.	Industrial Ethernet double-ended cord set, high-flex, male, RJ45 to RJ45 straight, 4-pair, 24 AWG, PVC cable, stranded/shielded crossover with teal jacket.																																																																																																																								
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Face views																																																																																																																												
Part number	0985 656 103/...M	0985 656 104/...M	0985 656 500/...M	0985 656 504/...M																																																																																																																								
Standard cable lengths	0.3 M / 0.5 M / 1 M / 2 M / 3 M / 4 M / 5 M / 10 M / 15 M / 20 M	0.5 M / 1 M / 2 M / 5 M / 10 M / 15 M / 20 M	0.3 M / 0.5 M / 1 M / 2 M / 3 M / 4 M / 5 M / 10 M / 15 M / 20 M / 25 M / 30 M / 35 M / 40 M / 45 M / 50 M / 55 M / 60 M / 65 M / 70 M / 75 M / 80 M / 85 M / 90 M	0.6 M / 1 M / 2 M / 5 M / 10 M / 15 M / 30 M																																																																																																																								

EtherMATE™ Industrial Ethernet Double-Ended Cord Sets

High-Flex/High Noise, Stranded/Shielded, 24 AWG, PVC Jacket

Type	0985 656 103	0985 656 104	0985 656 500	0985 656 504
Degree of protection	IP67 / IP20		IP20	
Operating temperature range	-20°C(-4°F) to +75°C(+167°F)			
Mechanical				
M12				
Molded body	PUR, black			
Coupling nut	Brass, nickel plated			
Contacts	Brass, gold over nickel plated			
Insert	PUR orange			
M12 Receptacle				
Housing	Brass, nickel plated			
Insert	PUR, black			
Contacts	Brass, gold plated			
RJ45				
Housing	Pre-tinned copper alloy			
Insert	Clear polycarbonate			
Contacts	50 μ" gold in contact area over nickel plating			
Cable specifications				
Cable jacket	PVC, (sun and oil resistant)			
Color	Teal			
Overall diameter	7.77mm, nominal			
Conductor	24 AWG, 7 strands tinned copper			
Number of pairs	4			
Insulation	Polyethylene			
Foil shield	Aluminum/polypropylene tape, 100% coverage			
Braided shield	Tinned copper, 65% coverage			
EMI protection	50 dB @ 0.772 MHz - 1000 MHz			
Agency approval	ETL rated CMR			
Cable type	Cat5, high flex / high noise (0985 656 500/504 Cat5e)			
Safety Voltage Rating (for cable)				

Characteristics	
 <p>NOTE: Vibration & Oil Resistant applies to M12 side only.</p>	



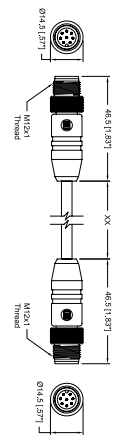
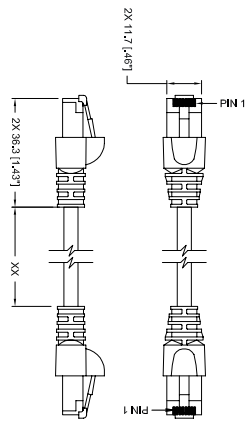


Recommended panel cut out


The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.




EtherMATE™ Industrial Ethernet Double-Ended Cord Sets

Stranded/Shielded, 26 AWG, PUR Jacket

Type	0985 S3667 100	0985 S3667 101	0985 S3667 500																																																																																										
Configuration	M12 to M12	M12 to M12 (crossover)	RJ45 to RJ45																																																																																										
																																																																																													
Product description	Industrial Ethernet double-ended cord set, male, M12 to M12 straight, 4-twisted pair, 26 AWG, PUR cable, stranded/shielded with blue jacket, orange inserts.	Industrial Ethernet double-ended cord set, male, M12 to M12 straight, 4-twisted pair, 26 AWG, PUR cable, stranded/shielded, crossover with blue jacket, orange inserts.	Industrial Ethernet double-ended cord set, male, RJ45 to RJ45 straight, 4-twisted pair, 26 AWG, PUR cable, stranded/shielded, with blue jacket.																																																																																										
Category Rating	Cat5		Cat5e																																																																																										
Technical illustration																																																																																													
Wiring diagram	<table border="0"> <thead> <tr> <th>M12</th> <th>Color</th> <th>M12</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>White/Orange</td> <td>6</td> </tr> <tr> <td>4</td> <td>Orange</td> <td>4</td> </tr> <tr> <td>1</td> <td>White/Blue</td> <td>1</td> </tr> <tr> <td>7</td> <td>Blue</td> <td>7</td> </tr> <tr> <td>5</td> <td>White/Green</td> <td>5</td> </tr> <tr> <td>8</td> <td>Green</td> <td>8</td> </tr> <tr> <td>2</td> <td>White/Brown</td> <td>2</td> </tr> <tr> <td>3</td> <td>Brown</td> <td>3</td> </tr> <tr> <td>Nut</td> <td>Shield</td> <td>Nut</td> </tr> </tbody> </table>	M12	Color	M12	6	White/Orange	6	4	Orange	4	1	White/Blue	1	7	Blue	7	5	White/Green	5	8	Green	8	2	White/Brown	2	3	Brown	3	Nut	Shield	Nut	<table border="0"> <thead> <tr> <th>M12</th> <th>Color</th> <th>M12</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>White/Orange</td> <td>5</td> </tr> <tr> <td>4</td> <td>Orange</td> <td>8</td> </tr> <tr> <td>1</td> <td>White/Blue</td> <td>1</td> </tr> <tr> <td>7</td> <td>Blue</td> <td>7</td> </tr> <tr> <td>5</td> <td>White/Green</td> <td>6</td> </tr> <tr> <td>8</td> <td>Green</td> <td>4</td> </tr> <tr> <td>2</td> <td>White/Brown</td> <td>2</td> </tr> <tr> <td>3</td> <td>Brown</td> <td>3</td> </tr> <tr> <td>Nut</td> <td>Shield</td> <td>Nut</td> </tr> </tbody> </table>	M12	Color	M12	6	White/Orange	5	4	Orange	8	1	White/Blue	1	7	Blue	7	5	White/Green	6	8	Green	4	2	White/Brown	2	3	Brown	3	Nut	Shield	Nut	<table border="0"> <thead> <tr> <th>RJ45</th> <th>Color</th> <th>RJ45</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>White/Orange</td> <td>1</td> </tr> <tr> <td>2</td> <td>Orange</td> <td>2</td> </tr> <tr> <td>4</td> <td>White/Blue</td> <td>4</td> </tr> <tr> <td>5</td> <td>Blue</td> <td>5</td> </tr> <tr> <td>3</td> <td>White/Green</td> <td>3</td> </tr> <tr> <td>6</td> <td>Green</td> <td>6</td> </tr> <tr> <td>7</td> <td>White/Brown</td> <td>7</td> </tr> <tr> <td>8</td> <td>Brown</td> <td>8</td> </tr> <tr> <td>Shell</td> <td>Shield</td> <td>Shell</td> </tr> </tbody> </table>	RJ45	Color	RJ45	1	White/Orange	1	2	Orange	2	4	White/Blue	4	5	Blue	5	3	White/Green	3	6	Green	6	7	White/Brown	7	8	Brown	8	Shell	Shield	Shell
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Part number	0985 S3667 100...M	0985 S3667 101/...M	0985 S3667 500/...M																																																																																										
Standard cable lengths	0.3 M / 0.5 M / 1 M / 2 M / 3 M / 4 M / 5 M / 10 M / 15 M / 20 M / 25 M / 30 M / 35 M / 40 M / 45 M / 50 M		0.6 M / 1 M / 20 M / 30 M																																																																																										

EtherMATE™ Industrial Ethernet Double-Ended Cord Sets

Stranded/Shielded, 26 AWG, PUR Jacket



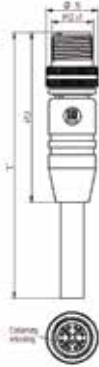
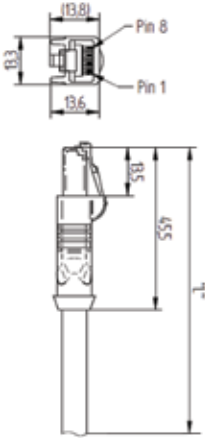
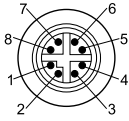

Type	0985 S3667 100	0985 S3667 101	0985 S3667 500
Degree of protection	IP 68, NEMA 6P		IP 20
Operating temperature range	-40°C(-40°F) to +80°C(+176°F)		-20°C(-4°F) to +75°C(+167°F)
Mechanical			
M12			
Molded body	PUR, black		
Coupling nut	Brass, nickel plated		
Contacts	Brass, gold over nickel plated		
Insert	PUR, self extinguishing		
RJ45			
Plug			Polycarbonate
Shell			Copper Alloy, nickel plated
Contacts			Phosphor Bronze, gold plated
Cover			Elastomer Polyolefin
Electrical			
Current rating	1.5 A		
Voltage rating	60 V		
Cable specifications			
Cable jacket	PUR		
Color	Blue		
Overall diameter	6.1 mm		
Conductor	26 AWG stranded		
Number of pairs	4		
Insulation	Foam-skin		
Foil shield	Aluminium foil		
Braided shield	Tinned copper, 85% coverage		
Characteristics			
			

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.




Gigabit Shielded Ethernet Single-Ended Cord Sets

Foil/Braid Shield, 26 AWG, PUR Jacket

Type	0985 478 600	0985 478 602																
																		
Product description	Cord sets, single-ended, M12, Industrial Ethernet data cable for GigaBit applications, molded, 8 poles X coded, 1M, 2M, and 5M cable lengths.	Cord set, single-ended, RJ45, Industrial Ethernet data cable, Cat 5 (ProfiNet), 4 poles, D coding, PUR jacket, halogen-free, black, 2M, 5M, 10M and 15M cable lengths.																
Note	Transmission properties for Cat 6 and Cat 6A compliant with IEC PAS 61076-2-109. The application of these products in harsh environments should always be checked before use.																	
Color of housing	black																	
Number of contacts	8																	
Product characteristics	Oil resistance, EMC resistance, Drag chains suitable, UV resistance																	
Ordering information	<table border="1"> <thead> <tr> <th>Part number</th> <th>Order number</th> <th>Part number</th> <th>Order number</th> </tr> </thead> <tbody> <tr> <td>0985 478 600/2M</td> <td>934-637-025</td> <td>0985 478 602/2M</td> <td>Upon request</td> </tr> <tr> <td>0985 478 600/5M</td> <td>934-637-026</td> <td>0985 478 602/5M</td> <td>Upon request</td> </tr> <tr> <td>0985 478 600/10M</td> <td>934-637-027</td> <td>0985 478 602/10M</td> <td>Upon request</td> </tr> </tbody> </table>	Part number	Order number	Part number	Order number	0985 478 600/2M	934-637-025	0985 478 602/2M	Upon request	0985 478 600/5M	934-637-026	0985 478 602/5M	Upon request	0985 478 600/10M	934-637-027	0985 478 602/10M	Upon request	
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Technical illustration	M12	RJ45																
																		
Face views / Wiring	 <table> <tr> <td>1 = white/orange</td> <td>5 = white/brown</td> </tr> <tr> <td>2 = orange</td> <td>6 = brown</td> </tr> <tr> <td>3 = white/green</td> <td>7 = white/blue</td> </tr> <tr> <td>4 = green</td> <td>8 = blue</td> </tr> </table>	1 = white/orange	5 = white/brown	2 = orange	6 = brown	3 = white/green	7 = white/blue	4 = green	8 = blue	 <table> <tr> <td>1 = white/orange</td> <td>5 = white/brown</td> </tr> <tr> <td>2 = orange</td> <td>6 = brown</td> </tr> <tr> <td>3 = white/green</td> <td>7 = white/blue</td> </tr> <tr> <td>4 = green</td> <td>8 = blue</td> </tr> </table>	1 = white/orange	5 = white/brown	2 = orange	6 = brown	3 = white/green	7 = white/blue	4 = green	8 = blue
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Gigabit Shielded Ethernet Single-Ended Cord Sets

Foil/Braid Shield, 26 AWG, PUR Jacket



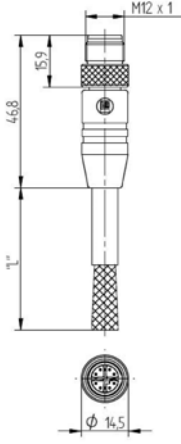
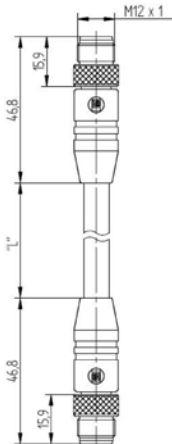

Environmental conditions	0985 478 600	0985 478 602
Degree of protection (IP), mounted	IP 67	IP20
Environmental temperature	-40°C to +85°C	-20°C to +75°C
Pollution degree	3	
Classifications		
Belden class	Industrial Ethernet Data Cables	
Belden brand	Lumberg Automation	
Mechanical data		
Type of plug-in contact	Male	
Design of housing	Straight	
Thread	M12	RJ45
Coding	D	-
Materials		
Housing material / Molded body	PA	TPU
Contact bearer material	PBT	PC
Contact material	CuSn	
Contact material / Surface refinement	gold-plated	
Knurled screw / nut material	CuZn, nickel-plated	
Approvals		
Approvals	EN 50155, IEC 61373, DIN CLC/TS 50467, DIN CEN/TS 45545, DIN 5510	-
RoHS 2002/95 EG compliant	yes	
Cable specifications		
Cable jacket	PUR	
Color	Black	
Gauge	26 AWG	
Overall diameter	6.5 mm	
Conductor	8	
Insulation	PE	
Foil shield	yes	
Braided shield	yes	
Electrical data		
Contact resistance	≤ 5 mΩ	
Rated current I _n	4 A at 40°C	1 A at 40°C
Nominal voltage	60 V	50 V
Rated voltage	250 V	-
Test voltage	2 kV eff./60 s	-
Insulation resistance	> 1 GΩ	
Characteristics		
		

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.



Gigabit Shielded Industrial-Ethernet M12 Cord Sets

UL approved versions

Type	RSTS 8X-478/... M		RSTS 8X-RSTS 8X-478/... M									
												
Product description	Ethernet Gigabit Cord set, single ended M12 male connector with molded cable, X-coded, supports transfer rates up to 10 Gigabit, 360° shielding connected to knurled screw, 2M, 5M, 10M and 15M cable lengths.		Ethernet Gigabit Cord set, double ended M12 male connector with molded cable, X-coded, supports transfer rates up to 10 Gigabit, 360° shielding connected to knurled screw, 2M, 5M, 10M and 15M cable lengths.									
Standards	IEC 61076-2-109 Control Cable: • ISO/IEC 11801 Cat 7 • EN 50173-1 • TIA/EIA-568-B.2 (May 2001)											
Approvals	UL DUXR *											
Ordering information	Part number	Order number	Part number	Order number								
	RSTS 8X-478/2 M	934809001	RSTS 8X-RSTS 8X-478/2 M	934809005								
	RSTS 8X-478/5 M	934809002	RSTS 8X-RSTS 8X-478/5 M	934809006								
	RSTS 8X-478/10 M	934809003	RSTS 8X-RSTS 8X-478/10 M	934809007								
	RSTS 8X-478/15 M	934809004	RSTS 8X-RSTS 8X-478/15 M	934809008								
Technical illustration	M12		M12 to M12									
												
Pin Assignment	 <table style="display: inline-table; vertical-align: top; margin-left: 10px;"> <tr> <td>1 = white/orange</td> <td>5 = white/brown</td> </tr> <tr> <td>2 = orange</td> <td>6 = brown</td> </tr> <tr> <td>3 = white/green</td> <td>7 = white/blue</td> </tr> <tr> <td>4 = green</td> <td>8 = blue</td> </tr> </table>				1 = white/orange	5 = white/brown	2 = orange	6 = brown	3 = white/green	7 = white/blue	4 = green	8 = blue
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* Pending

Gigabit Shielded Industrial-Ethernet M12 Cord Sets

UL approved versions

Environmental conditions	RSTS 8X-478/... M	RSTS 8X-RSTS 8X-478/...M
Degree of protection (IP), mounted		IP 67
Environmental temperature		-40 °C to +80 °C
Mechanical data		
Type of plug-in contact		Male
Design of housing		Straight
Thread		M12
Coding		X
Materials		
Housing material / Molded body		PA, Black
Contact bearer		PA, Black
Contact		CuZn
Contact plating		Cu/Au
Knurled nut		CuZn, surface: nickel-plated
Shielding sleeve		die casting, surface: tin-plated
Approvals		
Approvals		UL DUXR *
RoHS 2002/95 EG compliant		yes
Cable specifications		
Cable jacket		PUR jacket, halogen-free
Color		Blue
Electrical data		
Rated voltage		48 V
Rated current		0.5 A at 40°C
Rated impulse voltage		1.5 kV
Pollution degree		3 acc. to DIN EN 60664-1 (VDE 0110)
Contact resistance		≤ 5 mΩ
Characteristics		
		*   



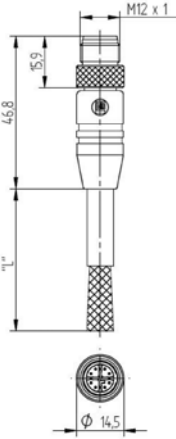
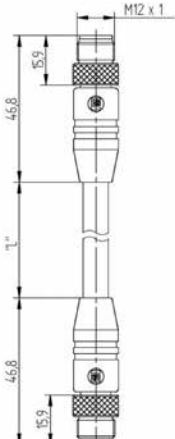

* Pending

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.



Gigabit Shielded Industrial-Ethernet M12 Cord Sets

Rail-approved versions

Type	BRSTS 8X-552/... M	BRSTS 8X-BRSTS 8X-552/... M																				
																						
Product description	Ethernet Gigabit Cord set, single ended M12 male connector with molded cable, X-coded, supports transfer rates up to 10 Gigabit, 360° shielding connected to knurled screw, 2M, 5M, 10M and 15M cable lengths. Connectors comply with international railway standards	Ethernet Gigabit Cord set, double ended M12 male connector with molded cable, X-coded, supports transfer rates up to 10 Gigabit, 360° shielding connected to knurled screw, 2M, 5M, 10M and 15M cable lengths. Connectors comply with international railway standards																				
Standards		IEC 61076-2-109 Control Cable: <ul style="list-style-type: none"> • ISO/IEC 11801 Cat 7 • EN 50173-1 • DIN 5510-2, EN 45545-2 • TIA/EIA-568-B.2 (May 2001) 																				
Approvals	DIN EN 50155 (in accordance), DIN EN 45545-2, DIN EN 50467, DIN EN 61373																					
Ordering information	<table border="1"> <thead> <tr> <th>Part number</th> <th>Order number</th> </tr> </thead> <tbody> <tr> <td>BRSTS 8X-552/2 M</td> <td>934809009</td> </tr> <tr> <td>BRSTS 8X-552/5 M</td> <td>934809010</td> </tr> <tr> <td>BRSTS 8X-552/10 M</td> <td>934809011</td> </tr> <tr> <td>BRSTS 8X-552/15 M</td> <td>934809012</td> </tr> </tbody> </table>	Part number	Order number	BRSTS 8X-552/2 M	934809009	BRSTS 8X-552/5 M	934809010	BRSTS 8X-552/10 M	934809011	BRSTS 8X-552/15 M	934809012	<table border="1"> <thead> <tr> <th>Part number</th> <th>Order number</th> </tr> </thead> <tbody> <tr> <td>BRSTS 8X-BRSTS 8X-552/2 M</td> <td>934809013</td> </tr> <tr> <td>BRSTS 8X-BRSTS 8X-552/5 M</td> <td>934809014</td> </tr> <tr> <td>BRSTS 8X-BRSTS 8X-552/10 M</td> <td>934809015</td> </tr> <tr> <td>BRSTS 8X-BRSTS 8X-552/15 M</td> <td>934809016</td> </tr> </tbody> </table>	Part number	Order number	BRSTS 8X-BRSTS 8X-552/2 M	934809013	BRSTS 8X-BRSTS 8X-552/5 M	934809014	BRSTS 8X-BRSTS 8X-552/10 M	934809015	BRSTS 8X-BRSTS 8X-552/15 M	934809016
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BRSTS 8X-BRSTS 8X-552/5 M	934809014																					
BRSTS 8X-BRSTS 8X-552/10 M	934809015																					
BRSTS 8X-BRSTS 8X-552/15 M	934809016																					
Technical illustration	M12	M12 to M12																				
																						
Pin Assignment	 <table> <tbody> <tr> <td>1 = white/orange</td> <td>5 = white/brown</td> </tr> <tr> <td>2 = orange</td> <td>6 = brown</td> </tr> <tr> <td>3 = white/green</td> <td>7 = white/blue</td> </tr> <tr> <td>4 = green</td> <td>8 = blue</td> </tr> </tbody> </table>		1 = white/orange	5 = white/brown	2 = orange	6 = brown	3 = white/green	7 = white/blue	4 = green	8 = blue												
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2 = orange	6 = brown																					
3 = white/green	7 = white/blue																					
4 = green	8 = blue																					

Gigabit Shielded Industrial-Ethernet M12 Cord Sets

Rail-approved versions

Environmental conditions	BRSTS 8X-552/... M	BRSTS 8X-BRSTS 8X-552/... M
Degree of protection (IP), mounted	IP 67	
Environmental temperature	-40°C to +85°C	
Pollution degree	3 acc. to DIN EN 60664-1 (VDE 0110)	
Mechanical data		
Type of plug-in contact	Male	
Design of housing	Straight	
Thread	M12	
Coding	X	
Materials		
Housing material / Molded body	PA, Black	
Contact bearer	PA, Black	
Contact	CuZn	
Contact plating	Cu/Au	
Knurled nut	CuZn, surface: nickel-plated	
Shielding sleeve	die casting, surface: tin-plated	
Approvals		
Approvals	EN 50155, IEC 61373, DIN 454, E DIN EN 61076-2-109	
RoHS 2002/95 EG compliant	yes	
Cable specifications		
Cable jacket	X-FRNC/LSNH jacket, halogen-free	
Color	Blue	
Electrical data		
Rated voltage	48 V	
Rated current	0.5 A at 40°C	
Rated impulse voltage	1.5 kV	
Pollution degree	3 acc. to DIN EN 60664-1 (VDE 0110)	
Contact resistance	≤ 5 mΩ	
Characteristics		
  		

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.




Gigabit Shielded Ethernet Double-Ended Cord Sets

Foil/Braid Shield, 26 AWG, PUR Jacket

Type	0985 478 601		0985 478 603		0985 478 604	
Product description	Cord sets, double-ended, M12-M12, Industrial Ethernet data cable for GigaBit applications, molded, 8 poles X coded, PUR jacket, halogen-free, black, 1M, 2M, and 5M cable lengths.		Cord set, double-ended, RJ45-RJ45, Industrial Ethernet data cable for GigaBit applications, molded with RJ45 connectors, PUR jacket, halogen-free, black, 2M, 5M, 10M and 15M cable lengths.		Cord set, double-ended, M12-RJ45, Industrial Ethernet data cable for GigaBit applications, molded with M12 male connector (X coded, 8 poles) and RJ45 connector, PUR jacket, halogen-free, black, 1M, 2M, and 5M cable lengths.	
Note	Transmission properties for Cat 6 and Cat 6A compliant with IEC PAS 61076-2-109. The application of these products in harsh environments should always be checked before use.					
Color of housing	black					
Number of contacts	8					
Product characteristics	Oil resistance, EMC resistance, Drag chains suitable, UV resistance					
Ordering information	Part number	Order number	Part number	Order number	Part number	Order number
	0985 478 601/1M	934-637-028	0985 478 603/2 M	934 637-613	0985 478 604/1 M	on request
	0985 478 601/2M	934-637-029	0985 478 603/5M	934-637-615	0985 478 604/2M	on request
	0985 478 601/5M	934-637-030	0985 478 603/10M	934-637-616	0985 478 604/5M	on request
	-	-	0985 478 603/15M	934-637-663	-	-
Technical illustration	M12 to M12		RJ45 to RJ45		M12 to RJ45	
Face View / Color Code	M12 to M12		RJ45 to RJ45		M12 to RJ45	
	<ul style="list-style-type: none"> 1 = white/orange 2 = orange 3 = white/green 4 = green 5 = white/brown 6 = brown 7 = white/blue 8 = blue 		<ul style="list-style-type: none"> 1 = white/orange 2 = orange 3 = white/green 4 = green 5 = white/brown 6 = brown 7 = white/blue 8 = blue 		<ul style="list-style-type: none"> 1 = white/orange 2 = orange 3 = white/green 4 = green 5 = white/brown 6 = brown 7 = white/blue 8 = blue 	

Gigabit Shielded Ethernet Double-Ended Cord Sets

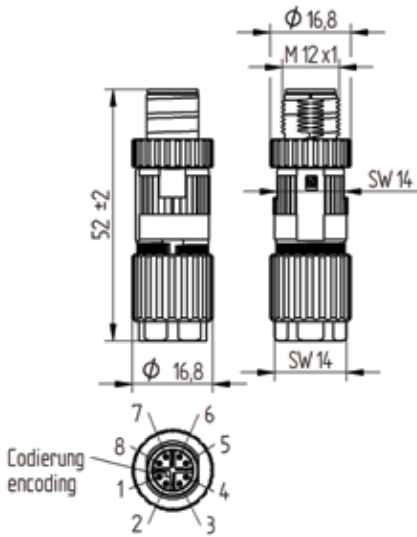
Foil/Braid Shield, 26 AWG, PUR Jacket

Environmental conditions	0985 478 601	0985 478 603	0985 478 604
Degree of protection (IP), mounted	IP 67	IP20	IP 67 (M12) / IP 20 (RJ45)
Environmental temperature	-40°C to +85°C	-20°C to +75°C	-30°C to 90°C (M12), -20°C to 75°C (RJ45)
Pollution degree	3		
Classifications			
Belden class	Industrial Ethernet Data Cables		
Belden brand	Lumberg Automation		
Mechanical data			
Type of plug-in contact	Male to Male		
Design of housing	Straight to Straight		
Thread	M12 to M12	RJ45 to RJ45	M12 to RJ45
Coding	D	-	D (M12)
Materials			
Housing material / Molded body	PA	TPU	PA (M12) / TPU (RJ45)
Contact bearer material	PBT	PC	PA (M12)
Contact material	CuSn	CuZn	
Contact material / Surface refinement	gold-plated		
Contact bearer material		PC	PC (RJ45)
Knurled screw / nut material	CuZn, nickel-plated		
Approvals			
Approvals	EN 50155, IEC 61373, DIN CLC/TS 50467, DIN CEN/TS 45545, DIN 5510	-	-
RoHS 2002/95 EG compliant	yes		
Cable specifications			
Cable jacket	PUR		
Color	Black		
Gauge	26 AWG		
Overall diameter	6.5 mm		
Conductor	8		
Insulation	PE		
Foil shield	yes		
Braided shield	yes		
Electrical data			
Contact resistance	≤ 5 mΩ		
Rated current I _n	4 A at 40°C	1 A at 40°C	
Nominal voltage	60 V	50 V	
Rated voltage	250 V	-	
Test voltage	2 kV eff./60 s	-	
Insulation resistance	> 1 GΩ		
Characteristics			
			

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.



Gigabit Shieldable Field Attachable Connector

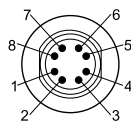


Type	0986 EMC 600
Product description	Field attachable connector, M12 male connector with threaded joint, shieldable, assembling with insulation displacement connection, 8 poles X coded.
Environmental	
Degree of protection	IP 67 (only in locked position with it proper counterparts.)
Operating temperature range	-25°C to +85°C
Materials	
Housing	Zinc die casting, nickel-plated
Insert	PA
Contacts	CuZn, gold-plated
Receptacle shell	CuZn, zinc die casting, nickel-plated
O-ring	-
Electrical	
Nominal current at 40° C	0.5 A
Nominal voltage	48 V
Insulation resistance	> 10 ⁹ Ω
Pollution degree	3

The application of these products in harsh environments should always be checked before use. Specifications subject to alteration.

Pin assignment

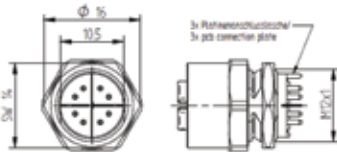
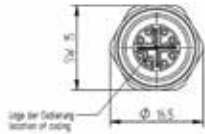
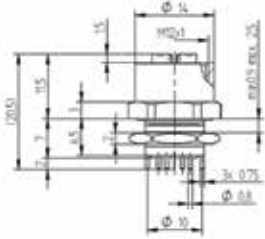
M12 Socket



Part number	Order number
0986 EMC 600	934-637-032



Gigabit Receptacle, Front Mounting, PCB Contacts



Type	0986 EFC 651
Product description	Receptacle connectors, M12 female connector for front mounting, assembling with Printed contacts, 8 poles X coded.
Type contacts	Female
Number of contacts	8
Environmental	
Degree of protection	IP 67 (only in locked position with it proper counterparts.)
Operating temperature range	-25°C to +85°C
Materials	
Housing	CuZn, nickel-plated
Insert	PA
Contacts	CuZn, gold-plated
Receptacle shell	CuZn, nickel-plated
O-ring	FPM
Electrical	
Nominal current at 40° C	0.5 A
Nominal voltage	48 V
Insulation resistance	> 10 ⁹ Ω
Pollution degree	3 / 2 acc. to DIN EN 60664-1 (VDE0110)

The application of these products in harsh environments should always be checked before use. Specifications subject to alteration.

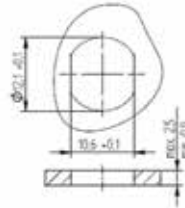
Face view

M12 Female

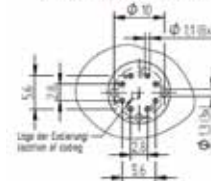


Panel cut out

Einbohröffnung für Verdrehschutz
cut out for anti-rotation



Bohrplan/ Lotpadgeometrie
drilling plan/ geometry of solder-past



Part number

0986 EFC 651

Order number

On request



Ethernet Single-Ended and Double-Ended Cord Sets for Railway Applications

Cat5e (PROFINET), Shielded, 4-Poles, D coding

Environmental conditions	0985 508 120	0985 508 121
Environmental temperature	IP 67	
Degree of protection (IP), mounted	-40°C to +85°C	
Pollution degree	3	
Classifications		
Belden class	Industrial Ethernet Railway Connectors	
Belden brand	Lumberg Automation	
Mechanical data		
Type of plug-in contact	Male	Male to Male
Design of housing	Straight	Straight to Straight
Thread	M12	M12 to M12
Coding	D	
Materials		
Housing material / Molded body	PA	
Contact bearer material	PBT	
Contact material	CuSn	
Contact material / Surface refinement	gold-plated	
Knurled screw / nut material	CuZn, nickel-plated	
Approvals		
Approvals	EN 50155, IEC 61373, DIN CLC/TS 50467, DIN CEN/TS 45545, DIN 5510	
RoHS 2002/95 EG compliant	yes	
Cable specifications		
Cable jacket	PUR	
Color	Black	
Gauge	26 AWG	
Overall diameter	6.5 mm	
Conductor	8	
Insulation	PE	
Foil shield	yes	
Braided shield	yes	
Electrical data		
Contact resistance	≤ 5 mΩ	
Rated current I _n	4 A at 40°C	
Nominal voltage	60 V	
Rated voltage	250 V	
Test voltage	2 kV eff./60 s	
Insulation resistance	> 1 GΩ	

The application of these products in harsh environments should always be checked before use.
 Specifications subject to alteration.



Ethernet Shieldable Field Attachable Connectors for Railway Applications

4-poles, Female and Male Connectors with Sprint-Type Terminals



Type	0986 EFC 107	0986 EMC 105
Product description	Field attachable connector, M12 female connector with threaded joint, shieldable, assembling with spring-type terminals, 4 poles, D coding.	Field attachable connector, M12 male connector with threaded joint, shieldable, assembling with spring-type terminals, 4 poles, D coding.
Environmental		
Degree of protection	IP 67 (only in locked position with its proper counterparts.)	
Operating temperature range	-40 °C to 90 °C	
Pollution degree	3	
Description		
Order Number	109969	109471
Note	Cat 5 and Cat 5e transmission properties according to ISO IEC 11801 and TIA/EIA-568-B.2. The application of these products in harsh environments should always be checked before use.	
Color housing	Silver	
Number of contacts	4	
Mechanical		
Type of plug-in contact	Male	Female
Thread	M12	
Design of electrical connection	spring-type terminals	
Coding of the M12 round plug	D	
Connectable conductor cross-section multiple wire (without sleeve)	0.14 - 0.50 mm ²	
connectable conductor cross-section multiple wire (with sleeve)	0.14 mm ²	
Materials		
Housing	GD-ZnAl	
Insert / Contact bearer	PBT	
Contact material	stainless steel	
Contact material - Surface refinement	silver-plated and gold-plated	
Knurled screw / nut material	CuZn, nickel-plated	
Sealing material	EPDM	
Shield sleeve	Shield contacting spring: CuBe, tined	
Electrical		
Contact resistance	≤ 5 mΩ	
Nominal current at 40° C	4A at 40°C	
Nominal voltage	60 V	
Rated voltage	250 V	
Test voltage	1.5 kV eff. /60 s	
Insulation resistance	> 1 GΩ	
Approvals		
Approvals	EN 50155, IEC 61373, DIN CLC/TS 50467, DIN CEN/TS 45545, DIN 5510	
RoHS 2002/95/EG compliant	yes	

The application of these products in harsh environments should always be checked before use. Specifications subject to alteration.

Face View

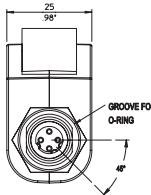
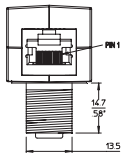
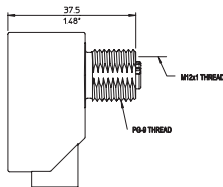
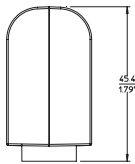
Male



Part number	Order number
0986 EFC 107	109969
0986 EMC 105	109471



Industrial Ethernet Panel-Mount Adaptors for PROFINET or EtherNet/IP Applications

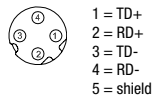


Type	0981 ENC 100
Product description	RJ45/M12 adaptor, female receptacle connector M12, D coding, chassis side thread PG 9, RJ45 female connector, 90 degree.
Environmental	
Degree of protection	IP 20 / IP 67
Operating temperature range	0°C (32°F) to +70°C (+158°F)
Materials	
Housing	PA
M12	
Contacts	CuZn, pre-nickelated and gold-plated
Housing	CuZn, nickel-plated
insert	PUR, self extinguishing
O-ring	FKM
RJ45	
Contacts	CuSn, pre-nickelated and gold-plated
Housing	CuZn, tin-plated
Insert	PA GF
Electrical	
Nominal current	1.5 A
Nominal voltage	max. 60 V

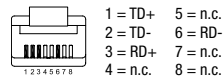
The application of these products in harsh environments should always be checked before use. Specifications subject to alteration.

Pin assignment

M12 Socket



RJ45 Jacket



Part number

0981 ENC 100

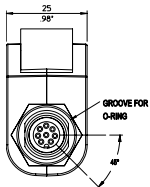
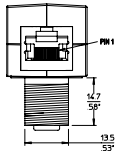
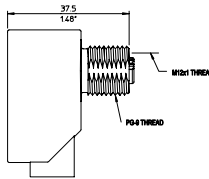
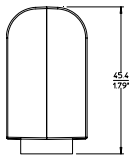
Order number

63484





EtherMATE™ Industrial Ethernet Panel-Mount Adaptor



Type	0981 ENC 102
Product description	RJ45/M12 adaptor, female receptacle connector, 8 pin, M12, standard coding, chassis side thread PG 9, RJ45 female connector, 90 degree.
Environmental	
Degree of protection	M12: IP 67 / RJ45: IP 20
Operating temperature range	0°C (32°F) to +70°C (+158°F)
Materials	
Housing	PA
M12	
Contacts	CuZn, pre-nickeled and gold-plated
Housing	CuZn, nickel-plated
insert	PUR, self extinguishing
O-ring	FKM
RJ45	
Contacts	CuSn, pre-nickeled and gold-plated
Housing	CuZn, tin-plated
Insert	PA GF
Electrical	
Nominal current	1.5 A
Nominal voltage	max. 60 V

The application of these products in harsh environments should always be checked before use. Specifications subject to alteration.

Pin assignment

M12 Socket



RJ45 Jacket



Wiring diagram

M12

6
4
5
7
1
8
2
3

RJ45

1
2
3
4
5
6
7
8

6 — Tx+ — 1
4 — Tx- — 2
5 — Rx+ — 3
7 — 4
1 — 5
8 — Rx+ — 6
2 — 7
3 — 8

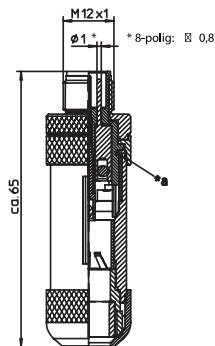
Part number

0981 ENC 102

Order number



Industrial Ethernet Field Attachable Connectors for PROFINET or EtherNet/IP Applications



*a O-Ring

Type	0986 EMC 102
Product description	Field attachable connector, M12 male connector, 3- and 4-pole with threaded joint, shieldable, assembling with spring-type terminals. 0986 EMC 102: 4 poles, D coding, especially suitable for Industrial EtherNet data cable 0985 342 000/... M
Environmental	
Degree of protection	IP 67 / NEMA 6P
Operating temperature range	-25°C (-13°F) / +90°C (+194°F)
Mechanical	
Housing / Molded body	GD-ZnAl, pre-coppered and nickel-plated
Pins	4D
Cable diameter range	Ø 4.0-9.0 mm
Insert	PBT
Contacts	Stainless steel, silver-plated, gold-plated
Receptacle	CuZn, nickel-plated
Shield sleeve	CuBe, tin-plated
O-ring	FKM
Mode of connection	Spring-type terminals
Connectable conductor	0.14–0.50 mm ² , 0.14 mm ² with terminal pin sleeve
Electrical	
Contact resistance	≤ 5 mΩ
Nominal current at 40°C	4 A
Nominal voltage	120 V
Rated voltage	125 V
Test voltage	1.5 kV eff. / 60 s
Insulation resistance	> 109 Ω
Pollution degree	3

The application of these products in harsh environments should always be checked before use. Specifications subject to alteration.

Pin assignment

M12, Male, 4-poles D-coding

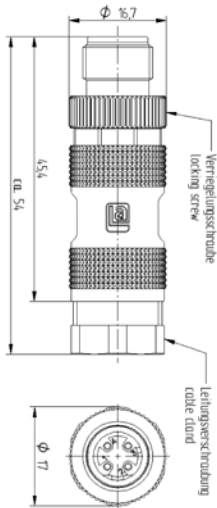


Part number	Order number
0986 EMC 102	900001428





Rugged Field Attachable Micro M12 Connectors for EtherNet/IP and PROFINET applications with IDC technology – International Railway Standard



Type	BRSCIS 4D/9
Product description	Field attachable connector, M12 male connector, 4-pole with threaded joint. 4 poles, PG 9 cable gland, strain-relief clamping cage, AWG24, AWG 22 *, DIN EN 61076-2-101, D-coded, Data transfer rate up to 100 Mbit/s (cat 5), silver color housing
RoHS (2011/66/EU)	Yes
Standards	IEC 61076-2-101
Approvals	– Rail approved version – DIN EN 50155, DIN 45545-2, DIN EN 50487, DIN EN 61373
Environmental	
Degree of protection	IP65, IP67** (Only in properly locked position with suitable counterpart)
Operating temperature range	(connector) -40°C to +85°C, assembly in the field: 0°C to +50°C
Mechanical	
Contact	CuSn
Contact plating	Ni/Au
Contact bearer	PA
heald	PA transparent
Housing	CuZn, Ni-plated
Surface housing	Ni
O-ring	FKM
Flammability class	Contact bearer UL 94 V-2
Fastening torque (locking screw)	M 12x1: (50) Ncm , hand-tight
Knurled Screw/Nut Material	CuZn, Ni-plated
Electrical	
Insulation Resistance	$\leq 10 \text{ m}\Omega$
Pin dimensions	$\emptyset 1 \text{ mm}$
Rated voltage	250V AC/DC
Rated impulse voltage	2.5 kV
Rated current ***	4 A
Mating cycles	100
Pollution degree	3 acc. to DIN EN 60664-1 (VDE0110)
Type of connection	Insulation Displacement
Suitable cables*	$\emptyset 6.0 \text{ mm}$ to $\emptyset 8.0 \text{ mm}$ and AWG 22 to AWG 24

Good chemical resistance. The resistance has to be checked in individual cases.

* Use of cable 508 (no. 197508000) only. Additional cables can be qualified on request.

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

*** Notice derating

Pin assignment

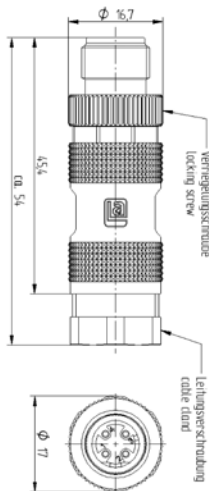
M12, Male, 4-poles D-coding



Part number	Order number
BRSCIS 4D/9	934-828-001



Rugged Field Attachable Micro M12 Connectors for EtherNet/IP and PROFINET applications with IDC technology



Type	RSCIS 4D/9
Product description	Field attachable connector, M12 male connector, 4-pole with threaded joint. 4 poles, PG 9 cable gland, strain-relief clamping cage, AWG24, AWG 22 *, DIN EN 61076-2-101, D-coded, Data transfer rate up to 100 Mbit/s (cat 5), silver color housing
RoHS (2011/66/EU)	Yes
Standards	IEC 61076-2-101
Approvals	– Pending – UL-approved version (RSCIS 4D/9) will meet UL 2238 (available in near future)
Environmental	
Degree of protection	IP65, IP67** (Only in properly locked position with suitable counterpart)
Operating temperature range	(connector) -40°C to +85°C, assembly in the field: 0°C to +50°C
Mechanical	
Contact	CuSn
Contact plating	Ni/Au
Contact bearer	PA
heald	PA transparent
Housing	CuZn, Ni-plated
Surface housing	Ni
O-ring	FKM
Flammability class	Contact bearer UL 94 V-2
Fastening torque (locking screw)	M 12x1: (50) Ncm , hand-tight
Knurled Screw/Nut Material	CuZn, Ni-plated
Electrical	
Insulation Resistance	≤ 10 mΩ
Pin dimensions	Ø 1 mm
Rated voltage	250V AC/DC
Rated impulse voltage	2.5 kV
Rated current ***	4 A
Mating cycles	100
Pollution degree	3 acc. to DIN EN 60664-1 (VDE0110)
Type of connection	Insulation Displacement
Suitable cables*	Ø6.0 mm to Ø8.0 mm and AWG 22 to AWG 24

Good chemical resistance. The resistance has to be checked in individual cases.

** Cable use: Recommended Belden cables only. Additional cables can be qualified on request.

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

*** Notice derating

Pin assignment

M12, Male, 4-poles D-coding

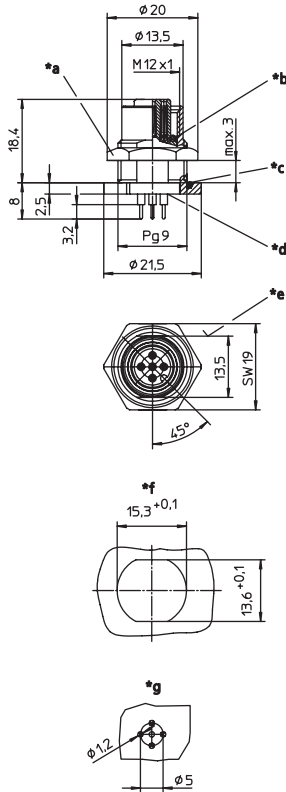


Part number	Order number
RSCIS 4D/9	934-828-002





Industrial Ethernet Receptacle Connectors for PROFINET or EtherNet/IP Applications



- *a nut
- *b O-Ring
- *c solder contacts potted with epoxy
- *d anti-rotation protection
- *e cut out for anti-rotation
- *f hole pattern in printed circuit board
- *v center contact leading

Type	0986 EFC 152
Product description	Receptacle connector, M12 female connector for rear mounting, 4-pole, D-coding, printed contacts, chassis side thread PG 9 (panel nut RSKF 9).
Environmental	
Degree of protection	IP 67 / NEMA 6P
Operating temperature range	-30°C (-22°F) / +80°C (+176°F)
Mechanical	
Housing / Molded body	CuZn, nickel-plated
Pins	4D
Insert	PA
Contacts	CuZn, pre-nickel and 0.8 microns gold-plated
O-ring	FKM
Electrical	
Contact resistance	≤ 5 mΩ
Nominal current at 40°C	4 A
Nominal voltage	240 V
Rated voltage	250 V
Test voltage	2.0 kV eff. / 60 s
Insulation resistance	> 10 ⁹ Ω
Pollution degree	3

The application of these products in harsh environments should always be checked before use. Specifications subject to alteration.

Pin assignments

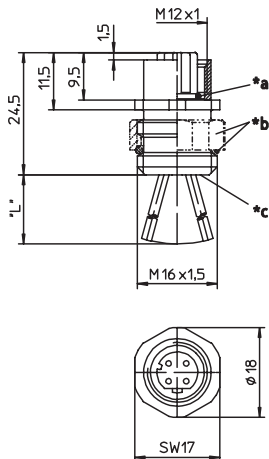
M12, Female, 4-poles D-coding



Part number	Order number
0986 EFC 152	64161



Industrial Ethernet Receptacle Connectors for PROFINET or EtherNet/IP Applications



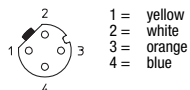
- *a O-Ring
- *b adjustable nut and o-ring enclosed separately
- *c solder contacts potted with epoxy
- *L* 0,5 m

Type	0986 EFC 151 A
Product description	Receptacle connector, M12 female connector for front mounting, 4 poles, D coding, adjustable, assembled stranded wire, solder contacts potted with epoxy, chassis side thread M16 x 1.5. – especially suitable for Industrial Ethernet –
Environmental	
Degree of protection	IP 67 / NEMA 6P
Operating temperature range	-25°C (-13°F) / +80°C (+176°F)
Mechanical	
Housing / Molded body	CuZn, nickel-plated
Pins	4D
Insert	TPU, self extinguishing
Lead (mm²)	22 AWG
Contacts	CuZn, pre-nickel- and 0.3 microns gold-plated
O-ring	FKM
Adjustable nut	CuZn, nickel-plated
Electrical	
Contact resistance	≤ 5 mΩ
Nominal current at 40°C	4 A
Nominal voltage	240 V
Test voltage	2.0 kV eff. / 60 s
Insulation resistance	> 10 ⁹ Ω
Pollution degree	3

The application of these products in harsh environments should always be checked before use. Specifications subject to alteration.

Pin assignment

Female, 4-poles D-coding



Part number	Order number
0986 EFC 151 A	68836



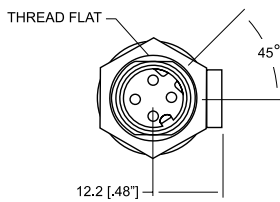
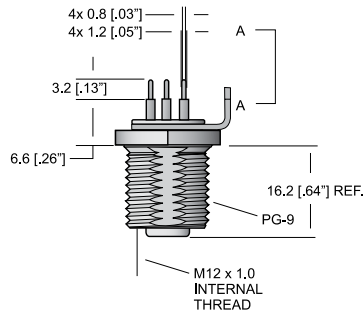


Industrial Ethernet Receptacle Connectors for PROFINET or EtherNet/IP Applications



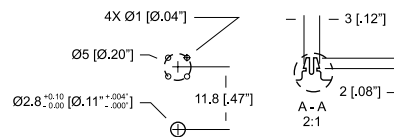
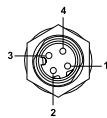
Type	0986 EFC 101
Product description	Receptacle connector, M12 female connector, 4-pole, D-coding, PCB contacts with board lock, chassis side thread PG 9.
Environmental	
Degree of protection	IP 67 / NEMA 6P
Operating temperature range	-25°C (-13°F) / +90°C (+194°F)
Mechanical	
Housing / Molded body	CuZn, nickel-plated
Pins	4D
Insert	PUR, black
Contacts	CuZn, gold over nickel plated
O-ring	Viton
Board lock	Phosphor bronze, tin-lead plated
Electrical	
Current rating	4 A
Voltage rating	250 V

The application of these products in harsh environments should always be checked before use. Specifications subject to alteration.



Pin assignment	Recommended PCB pattern
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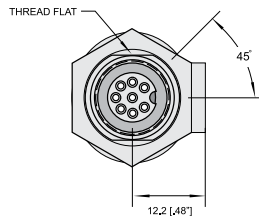
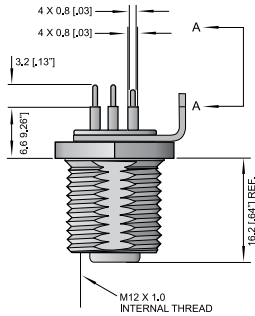
M12, Female 4-poles D-coding



Part number	Order number
0986 EFC 101	900001535

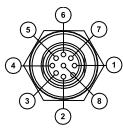
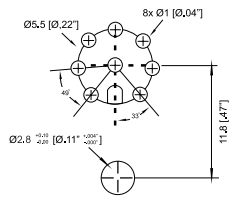


EtherMATE™ Industrial Ethernet PCB Receptacle



Type	0986 EFC 100
Product description	Receptacle connector, M12 female connector, 8-pole, PCB contacts with board lock.
Environmental	
Degree of protection	IP 67 / NEMA 6P
Operating temperature range	-25°C (-13°F) / +90°C (+194°F)
Mechanical	
Housing / Molded body	CuZn, nickel-plated
Pins	8
Insert	PUR, black
Contacts	CuZn, gold over nickel plated
O-ring	Viton
Board lock	Phosphor bronze, tin-lead plated
Electrical	
Current rating	4 A
Voltage rating	250 V

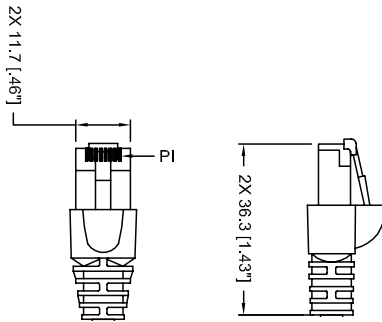
The application of these products in harsh environments should always be checked before use. Specifications subject to alteration.



Pin assignment	Recommended PCB pattern
M12, Female 8-poles 	
Part number	Order number
0986 EFC 100	90000510





Industrial Ethernet Accessories



Type	0986 EMC 500	0986 EMC 501	0986 EMC 502	0986 EMC 503
Product description	RJ45 connectors, Cat5e high performance 8-pin, modular plugs for solid or stranded, shielded or unshielded cable.			
Materials				
Plug	Polycarbonate			
Contacts	Phosphor bronze, gold plated			
Shell (applicable only if shielded)	Copper alloy, nickel plated			
Boot	Elastomer polyolefin			
Mechanical				
Temperature	-20°C to 70°C			
Connecting information				
Pins	8			
Conductor stranding/gage	Solid/24-26 awg	Solid or stranded/24 awg	Solid/ 24-26 awg	Stranded/ 24 awg
Shielding	Shielded	Shielded	Unshielded	Unshielded
Cable Type	909707R	909YM57530R	909705R	909806R
Packaging	25 piece bag			
Characteristics				
				

Packaging specifications
Items come packaged 25 plugs and 25 boots per bag.

Part number	Order number
0986 EMC 500	900001546
0986 EMC 501	900001547
0986 EMC 502	900001548
0986 EMC 503	900001549



Type	0989 EAC 500
Product description	Professional RJ45 premium grade hand tool for terminating modular RJ45 plug connectors on to stranded/solid or shielded or unshielded round cable.

Part number	Order number
0989 EAC 500	900001545

International Protection Classes According to DIN EN 60529 (IEC 529/VDE 047 T1)

The International Electrotechnical

Commission (IEC) is the international standards and conformity assessment body for all fields of electro technology.

IEC International Standard 60529 (Edition 2.1: 2001-02) is a classification of degrees of protection provided by enclosures as a system for specifying the enclosures of electrical equipment on the basis of the degree of protection provided by the enclosure.

Ingress Protection as it relates to sealing against the entry of solid and liquid objects. Complete details of this standard can be obtained from the IEC. This uniform and widely

acknowledged classification system provides equipment designers and specifying agents with a convenient and reliable method of comparing relative levels of sealing between competing (connector) products. In its simplest form, the classification system consists of the letters "IP" followed by two separate digits, which denote increasingly greater sealing from solid objects and from water.

For example, a product rated as being sealed to IP55 will provide some degree of protection from penetration by dust and a jet spray of water, but it would not be expected to completely seal against all dust or being immersed in water.

With an IP67 rating a product will be "dust tight" and remain completely sealed when immersed in water for 30 minutes. The chart below clearly defines levels of IP ratings and should be used as a guide during the specification and design process.

Protection Against Solid Foreign Objects Penetrating the Product.

IP

Ingress Protection

6

First Index Figure
Protection Against
Foreign Objects

7


Second Index Figure
Protection Against Water

1st Index Number	Icon	Brief Description	Definition
0		No protection	Not applicable
1		Protected against solid foreign objects of 50 mm Ø and >	The object probe, sphere of 50 mm Ø, shall not fully penetrate**
2		Protected against solid foreign objects of 12.5 mm Ø and >	The object probe, sphere of 12.5 mm Ø, shall not fully penetrate**
3		Protected against solid foreign objects of 2.5 mm Ø and >	The object probe, sphere of 2.5 mm Ø, shall not fully penetrate**
4		Protected against solid foreign objects of 1.0 mm Ø and >	The object probe, sphere of 1.0 mm Ø, shall not fully penetrate**
5		Dust protected	Ingress of dust is not totally prevented, but dust shall not penetrate in a quantity to interfere with satisfactory operation of the apparatus or to impair safety.
6		Dust tight	No ingress of dust

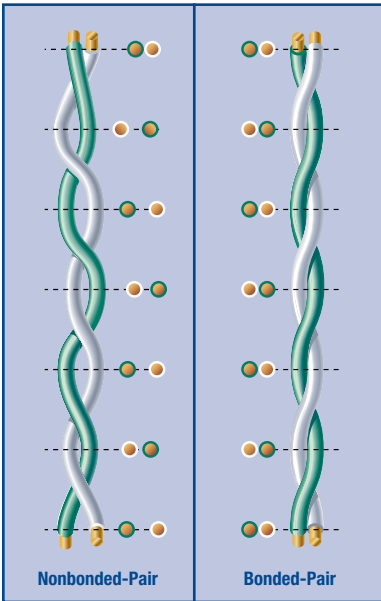


International Protection Classes According to DIN EN 60529 (IEC 529/VDE 047 T1)

Protection Class - Protection Against Ingress of Water with Adverse Effects.	IP Ingress Protection	6 First Index Figure Protection Against Foreign Objects	7 Second Index Figure Protection Against Water
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1st Index Number	Icon	Brief Description	Definition
0		No protection.	Not applicable.
1		Protected against vertically falling water drops.	Vertically falling drops shall have no harmful effects.
2		Protected against vertically falling water drops when the enclosure is tilted up 15°.	Vertically falling drops shall have no harmful effects when the enclosure is tilted at an angle up to 15° on either side of the vertical.
3		Protected against spraying water.	Water sprayed at an angle up to 60° on either side of the vertical shall have no harmful effects.
4		Protected against splashing water.	Water splashed against the enclosure from any direction shall have no harmful effect.
5		Protected against water jets.	Water projected in jets against the enclosure from any direction shall have no harmful effects.
6		Protected against powerful water jets	Water projected in powerful jets against the enclosure shall have no harmful effects.
7		Protected against the effects of temporary immersion in water.	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed in water under standardized conditions of pressure and time.
8		Protected against the effects of continuous immersion in water.	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under the conditions which shall be agreed between the manufacturer and user, but which are more severe than for numeral 7, above.
9K		Protected against water from high-pressure / steam jet cleaners.	Water directed against the enclosure from any direction under extremely high pressure and must have no adverse effects.

About Belden Bonded Twisted Pair Cable



Installed and manipulated nonbonded-pairs (left) have a tendency to gap, varying the centricity of the two conductors. Bonded-Pairs (right) do not gap so the physical integrity of the pair is maintained.



A cable prep tool is included in each reel of Bonded-Pair products. The tool is sold separately as 1797B.

Choose from a Complete Range of High-Quality, High-Reliability Industrial Ethernet Cables

Over the past five years or so, Ethernet has moved increasingly from the office environment into the industrial world – mainly for control and automation applications. But the two environments couldn't differ more: the office environment offers its cabling system a relatively safe harbor and should a signal transmission fault occur, retries are generally acceptable. The industrial world presents a different reality: the cabling system can be integral to a harsh and hazardous environment and yet there's no margin for error since the cables typically carry signals between devices to make events happen on a very exacting schedule.

To ensure successful Ethernet signal transmissions in an industrial environment you need high performance cables designed specifically for the environment. Commercial off-the-shelf (COTS) Cat 5e UTP Ethernet cable just can't stand up. It is quite fragile when compared to an industrial-grade cable, meaning that any number of stresses and challenges encountered in the industrial environment could result in one of the classic failure models: catastrophic failure, intermittent operation, incremental failure and degradation of performance. The result could be a loss of data, process downtime or a drop in the safety level of your operation.

Belden's answer is to offer a complete range of high quality, high reliability DataTuff® Industrial Ethernet cables that have been designed for industrial use and tested using state-of-the-art testing equipment. Belden DataTuff cables are also field-proven relative to exceptional day-in/day-out performance.

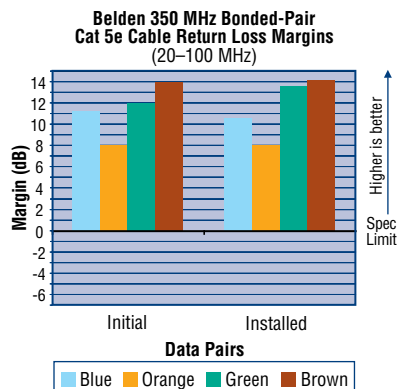
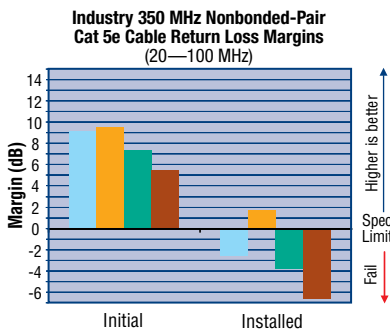
So, even if your cabling system is exposed to the following conditions you can turn to Belden for the right solution:

- Oil, sunlight and gasoline
- Temperature variations
- Abrasion, crushing and burial
- Flexing
- Presence of EMI/RFI (electromagnetic interference or radio frequency interference)
- MSHA mining approval
- Red jackets designating safety network

Only DataTuff Cables with Belden's Patented Bonded-Pair Technology Offer the Benefit of Installable Performance

Most versions of DataTuff cables feature Belden's patented Bonded-Pair technology. This construction feature affixes the conductor insulation of the cable pairs along their longitudinal axes to ensure that no performance-robbing gaps can develop between the conductor pairs. Since no gaps can occur, and the conductor-to-conductor spacing, or centricity, is always uniform, the cable offers excellent and consistently reliable electrical performance – even after the cable has been subjected to the bending, pulling and twisting that is inherent in the installation process. Belden calls this unique after-installation performance capability Installable Performance.

Additionally, when the nonbonded pairs gap, an impedance mismatch occurs. When the transmitted signal encounters this mismatch, portions of the signal are reflected back toward the receiver. This is called return loss, or RL. A cable with poor RL values can significantly impact the performance of an active network, reduce network efficiency and lead to excessive bit error rates.



In an Installation Stress Test that simulates the installation process, the Cat 5e nonbonded-pair cables (left) showed an RL degradation of more than 12 dB. The Bonded-Pair cables (right) exhibited little change in RL performance.



About Belden Bonded Twisted Pair Cable

In tests performed by Belden that simulate the effects of the installation process, both an industry-leading 350 MHz Cat 5e cable (a nonbonded-pair cable) and a Belden 350 MHz Cat 5e Bonded-Pair cable were tested right off the reel and then for the sake of comparison, they were subjected to an Installation Stress Test. This Stress Test simulated just some of the stresses that a cable experiences as it is installed (being bent around corners, creating a service loop and being stuffed into an outlet box). The results? The nonbonded-pair cable showed an RL degradation greater than 12 dB – over 15 times worse than its before-installation value. The Bonded-Pair cables showed little change in RL performance. *(For more detailed information, request the Technical Bulletin TB-66 "The Impact of Installation Stresses on Cable Performance.")*

Quality You Can Trust

These Belden products are RoHS compliant, plus they are manufactured to the industry's highest standards of quality, utilizing the most advanced equipment, systems, controls and processes. In fact, Belden has long been a pioneer in production processes, such as statistical process control (SPC), that have become industry standards. And Belden was the first major designer and manufacturer of cable products to achieve ISO 9000 registration for the majority of its domestic and overseas facilities.



Belden Quality Means Uptime and Superior Safety Performance

Today's critical industrial networking applications can't afford data transmission errors that can cause downtime, delays, and even safety concerns. Belden quality gives you the performance and reliability you need on a day-by-day basis.

Product Characteristics

Product Characteristics



Especially suitable for robotic applications (resistance to torsion).



Very good resistance to oils, coolants and lubricants as well as emulsions.



Suitable for use in C-Tracks.



Very good resistance to flying weld slag (e.g. unfinished constructions).



Very good resistance to acids, lye and chemical cleaning agents.



Very good electromagnetic resistance (EMC) and shielded systems.



Very good vibration and shock resistance.



UL approved.



UL/CSA approved.



Sunlight resistant.

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