Cable + Connectivity Solutions

Control Solutions

Ethernet Connectivity

Infrastructure solutions from a single source

LUTZE SYSTEMATIC TECHNOLOGY

Efficiency in Automation

Cable • Connectivity • Cabinet • Control

Cable Solutions

Connectivity Solutions

Cabinet Solutions

Control Solutions

Transportation Solutions

Welcome to LÜTZE

Efficiency in Automation - A reflection of our company philosophy

As an experienced specialist in automation technology, with solutions for flexible and high flexing cables, cable assemblies, interfaces, current control and cabinet wiring, we have had a focus on efficiency for many years.

LÜTZE defines Efficiency in Automation field as the use of sustainable products and solutions to further increase the performance of our products in our customers applications.

We realise this by using components for highly efficient control systems, products with above average life cycles and raising energy efficiency in control cabinets by means of the LSC wiring system.

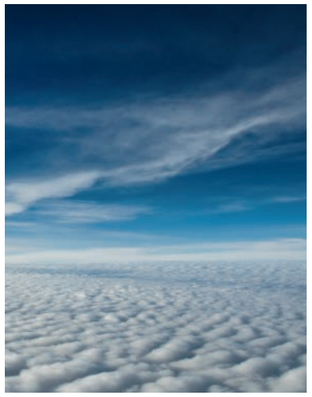
Efficiency in Automation reflects our efforts in striving for efficient working relationships with our customers: in a medium sized family owned company we have short communcation channels and a high level of manufacturing competence.

The value of a product or a solution from LÜTZE is determined by its sustainable qualities. Every innovation will only be successful in the future if it has a long term positive effect. Therefore, we provide long lasting as well as highly efficient components.

Thus LÜTZE creates value through efficiency. LÜTZE provides answers and demonstrates how to handle resources responsibly, with our environment and our future in mind.
LÜTZE - Efficiency in Automation

For more information on our solutions, please visit www.luetze.com or www.lutze.com

LÜTZE
SYSTEMATIC TECHNOLOGY



Business Management:
Sustainable and forward-looking

„The competitiveness of our industry and of its suppliers depends quite substantially on how we succeed in developing practical results. The results that we produce together today, are our competitive advantages in the future.“
Udo LÜTZE,
Member of the Executive Committee of the Green Carbody Innovation Alliance

The future is blue

Sustainable enterprise means thinking and planning ahead, understanding and embedding the belief that long lasting success is more important than short-term profit maximisation.

This is an attitude that has existed within LÜTZE for quite some time. Economic and environmental responsibilities complement each other well and are reflected in the sustainable management and product policy - and from now in the *Sky***BLUE** campaign.

We manufacture our products in a resourceful and energy-conscious manner. We use long lasting, environmentally-friendly materials. And our products, in turn, help our customers save energy and resources.
Good for everyone: for us, for the environment, for our customers a win-win-win situation.

Goods with real value

The value of a product or a solution from LÜTZE is determined by its sustainable qualities as well. Every innovation is only as successful in the future if it has a long-term positive effect. Therefore, we provide long lasting as well as highly efficient components.
We are incorporating the necessary knowledge and manufacturing competence in numerous joint projects with the objective of improving energy efficiency and sustainable technologies and industries. Thus, LÜTZE provides answers and demonstrates how to handle resources responsibly, with our environment and our future in mind.

Innovations-Allianz Green Carbody Technologies

ISO 14001

BLUecoMPETENCE Alliance Member
Partner of the Engineering Industry Sustainability Initiative

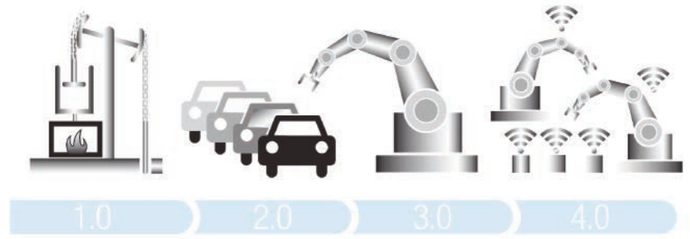
RoHS

IIoT - **Industrial Internet of Things**

What is Industry 4.0?

A German government memo released way back in 2013 was one of the first times that 'Industrie 4.0' was mentioned.

The high-tech strategy document outlined a plan to almost fully computerise the manufacturing industry without the need for human involvement.



The first industrial revolution was the one that saw the transition from farming to factory production in the 19th Century.
The second ran from around the 1850s, and began with the introduction of steel, culminating in the early electrification of factories and the first signs of mass production.

In more recent times is the third industrial revolution that refers to the change from analogue, mechanical, and electronic technology to digital technology that took place from the late 1950s to the late 1970s.

Industry 4.0 is another area where the Internet of Things looks to play a huge role thanks to the sheer volume of sensors and "things" that have the potential to feed information into it and add value to manufacturing processes. Projections on the industry have mentioned the IoT alongside cyber-physical systems as ways in which a combination of software, sensors, processors and communications technology will underpin the very development of Industry 4.0.

LÜTZE Connectivity

The smart machines of the future need reliable connections. Lütze has a large range of industrial ethernet cables and connectors and is capable of producing cable assemblies that provide users of automation equipment with the connections they need, using either RJ45, M12 or M8 connectors.

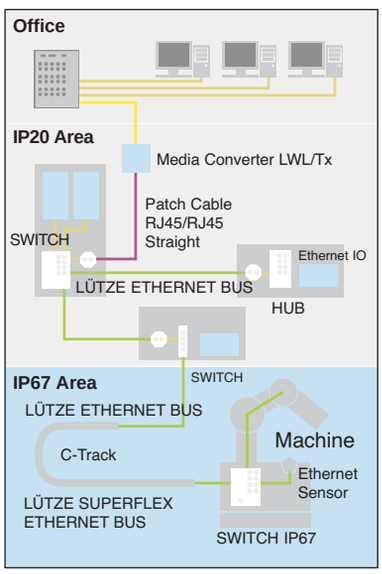
Smart electronic fuses from Lütze

The control equipment on machines needs DC voltage, so the monitoring of these circuits is a logical next step as part of the IIoT concept.

The LOCC Box range from Lütze can provide complete information from the machine load circuits and communicate this information via Ethercat/Profinet to facilitate external monitoring at either the machine level and or remotely.

LÜTZE – Ethernet Connectivity

LÜTZE Ethernet Connectivity - Solutions from a single source
The requirements placed on efficient manufacturing systems are becoming more and more complex. Increased networking between production and management means that more and more automation systems are requiring the use of PC-based controllers and Ethernet communication networks. Ethernet is the name of a widely used, standardised communication infrastructure with various communication media. Together with higher-level communication software, Ethernet is today the basis for a large number of industrial local networks. In contrast to the office environment, communication in automation technology requires open, transparent system solutions. The seamlessness of information is a major priority here. This means that it is necessary to plan, install and administer industrial networks in such a way that they function reliably under the toughest conditions and in the harshest environments, while exhibiting controllable behaviour. The correct selection of suitable cables, connection technology and components is thus a significant factor in reliability. In this area LÜTZE offers a seamless system for designing network infrastructures.



Thanks to our many years of experience in the planning and implementation of industrial networks and the necessary components, we are also able to develop customer-specific solutions to satisfy your requirements optimally.

Ethernet in industrial applications
In industry, communication takes place in a hierarchical system consisting of plant, management and field levels. The use of Ethernet is standard at plant and management levels. At field level, field buses such as Profibus DP, CAN or other protocol variants are still dominant. The reason for this is the considerably higher or differing requirements at field level. Here the network encounters interference factors that can have a significant effect on transmission quality. The risk of interference due to vibrations, dirt, moisture or harmful substances is especially high at the connection points. To meet these requirements, LÜTZE supplies a solution that will stand up to the sometimes adverse conditions encountered in light and heavy industry, railway tunnels, on board ships, or in other environments.
The simplest form of load sharing is achieved through the use of switches.

Switched Ethernet **INFO**

In industrial applications, the following transmission requirements apply:
- very high network availability
- small data packets
- timely transmission

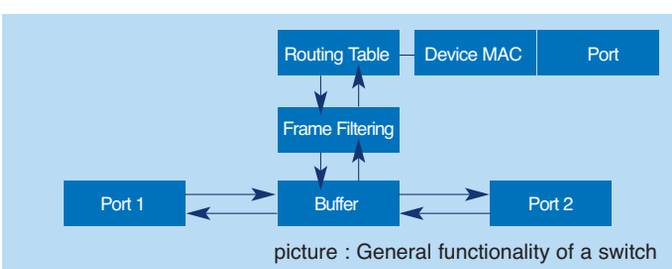
In order to cope with these requirements, the network has to be subdivided into logical and physical segments. This makes it possible in most cases to limit communication links between network nodes to a sub network, without affecting the bandwidth of other sub networks. The load sharing means that the full bandwidth is available in each segment.

A network in which each node is assigned exactly one port of a switch is called switched Ethernet. Ethernet switches are used to resolve collision domains into simple point-to-point connections between the switch and the other network nodes (terminals, infrastructure components).

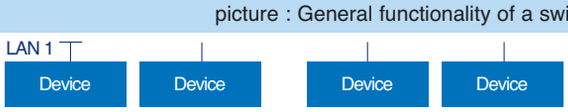
Ethernet Switches
Simple switches work on the data link layer (OSI model, link 2), and can connect LANs with differing physical characteristics. If all of the protocols of the upper layers in the network are the same, then the switch is protocol-transparent. When a packet is received, the switch processes the 48-bit long MAC-address and creates an entry for it in the SAT (Source Address Table), which stores, in addition to the MAC address, the physical Port at which it is received. Each port of a switch constitutes a separate network segment, with the entire network bandwidth being available to each of these segments. Each individual port of a switch can receive and transmit data. The speed required for this is achieved via an internal high-speed bus (backplane). Data buffers ensure that as far as possible no data packets are lost. As a result, the network performance is increased not only in the network as a whole, but also in the individual segments. Switches examine each incoming data packet for the MAC address of the target segment, and can forward it there directly. The particular advantage of switches is their ability to connect ports with each other directly, i.e. being able to establish dedicated links. Switches break the Ethernet bus structure down into a bus and star structure. Sub-segments with a bus structure are now coupled in a star pattern, each via one port of the switch. Packets can be transmitted between the individual ports at the maximum Ethernet speed. Another major advantage is simultaneous data transmission between different segments. This increases the bandwidth in the entire network. However, to make use of the full performance capability of the switch technology it is necessary to implement a suitable network topology. This requires distributing the data load as evenly as possible among the individual ports. Furthermore, it is advisable to connect systems that communicate a great deal with each other to the same switch. The goal of this is to reduce the quantity of data that travels through more than one segment.

	OSI-Layer	Classification	DoD-Layer	Classification	Protocol Example	Units	Coupling elements
7	Application	Application orientated	Application	End to End (Multihop)	HTTP FTP HTTPS SMTP LDAP NCP	Data	Gateway, Content-Switch, Layer 4-7-Switch
6	Presentation						
5	Session						
4	Transport	Transport orientated	Transport		TCP UDP SCTP SPX	Segments	
3	Network		Internet	Point to Point	ICMP IGMP IP IPX	Pakets	Router, Layer-3-Switch
2	Data Link		Web entry		Ethernet Token Ring FDDI ARCNET	Frames	Bridge, Switch
1	Physical					Bits	Hub, Repeater

picture : ISO / OSI Reference Model



picture : General functionality of a switch



LÜTZE – Ethernet Connectivity

Cables - A lot depends on them
The classical Ethernet began with the coaxial cable. Today, new installations use only symmetric cables, so-called balanced cables, or fibre-optic cables.

Copper cables
Various types of copper cable are used. The term "symmetric cable" does not refer to the structure of the cable, but rather exclusively to its electrical characteristics and the signal transmission. The symmetrical transmission of a signal requires two conductors; full duplex thus requires four conductors. A 10/100 MB Ethernet cable that is suitable for industrial use will thus have at least four conductors. The number of conductors increases by another four if the application requires 1Gbit.

Twisted-Pair
In order to obtain the best possible interference suppression, the individual conductors have to be twisted. For different requirements, regarding the transmission, different types of twisted pair cables were developed. The difference between this cables is the shield :

- **UTP (Unshielded Twisted Pair):**
  The twisted signal pairs are stranded together without any screening under the outer jacket.
- **Overall shielded S/UTP or F/UTP:**
  The twisted pairs are stranded together and surrounded by a common screen made of a metal laminated polymer tape or a copper wire braid. The outer jacket encloses the screen.
- **Cables with shielded pairs FTP (Foiled Twisted Pair), also U/FTP, S/FTP:** Each twisted pair is wrapped by a metallic screen (mostly a metal laminated polymer tape). In Germany often called PiMF (pair in metal foil). In most cases the PiMFs are stranded together and surrounded by a cop per wire braid as a common screen. This provides an optimized EMC per formance

The short term for shielded twisted pair cable - S/FTP, F/FTP or SF/FTP (Screened Foiled Twisted Pair) is used in a different way from various standards and various suppliers. In the current EN50173, these cables are designated "F" for a foil shield, and "S" for a copper mesh shield. The degree of coverage of the braid should be greater than 30% in order to achieve sufficient shielding against low-frequency fields. New designation according to ISO/IEC-11801 (2002)E is also : S/FTP (meshwork), F/FTP (foil), SF/FTP (braid+foil). Therefore the letter before the slash describes the overall shield, the letter behind the pair shield.

INFO

LÜTZE Cables of the category 5e offer generally an overall shield as braid (S/UTP).

LÜTZE provides category 6 and 7 shielded pair cables with an additional all-round braided-copper shield (S/FTP).

Categories and Classes
CAT 3,5,6 or 7 describes the categories with regard to the cable and connector requirements. The transmission bandwidth is determined by the cable class (A - 100kHz, B - 1MHz, C - 16MHz, D - 100MHz, E - 300MHz, F - 600MHz). The requirements for the cable are defined in different parts of the standard EN 50288. The EN 50173 and ISO/IEC 11801 describe the installation of cables, connectors, and net structures.

CAT 1 - Class A
Cat 1 cables are designed for maximum operating frequencies up to 100 kHz, and are thus not suitable for data transmission. They are used for voice transmission, for example in telephone applications. Only UTP cables.

CAT 2 - Class B
CAT 2 cables are suitable for maximum frequencies up to 1 or 1.5 MHz; they are used, for example, for cabling in buildings with an ISDN primary multiplex connection.

CAT 3 - Class C
The 100BASE-T4 standard allows 100 Mbit/s over existing Category 3 installations, using all four conductor pairs. CAT 3 cables are no longer used in new installations; rather at least CAT 5 cables are used.

CAT 5 - Class D
CAT 5 cables are most often encountered in installations today; they are used for signal transmission at high data transmission rates. Their specific standardised designation is EIA/TIA-568. CAT 5 cables are intended for operating frequencies up to 100 MHz. Due to the high signal frequencies, particular care must be taken during laying and assembly, especially for the connection points of the conductors. Category 5 cables are often used in structured cabling for computer networks, such as Fast Ethernet or Gigabit Ethernet. This has been encouraged by the widespread use of 1000BASE-T (Gigabit Ethernet), because it requires only one CAT 5 cable.

CAT 5e - Class De
The CAT 5e cable is a more specialised version of CAT 5 that is mainly used in German speaking countries in Europe for 100BASE-T network connections over long distances. Carefully executed installations, originally made and approved as CAT 5, generally also satisfy the CAT 5e standard. The designations EIA/TIA-568A and EIA/TIA-568B are also used informally to mean the two assignments for the colour-coded conductor pairs to the connecting contact of the RJ45 connector that are defined in this standard; in this case, however, this does not say anything about the transmission quality.

CAT 6 - Class E
CAT 6 cables are defined by EN50288. CAT 6 cables are intended for operating frequencies up to 300 MHz. The transmission speed suffers at longer lengths; however, slight excess lengths may be no problem, depending on the external influences. Ultimately reliability can be ensured by testing with an appropriate test device to verify compliance with the limit values of the current versions of EN50173-1, IS 11801 and EIA/TIA 568B2.1. The fields of application for CAT 6 are voice and data transmission, multimedia and ATM networks. Greater performance is provided by CAT 6a cables (500 MHz) .

CAT 7 - Class F
CAT 7 cables have four individually shielded pairs of conductors (Screened/Foiled shielded Twisted Pair S/FTP) within an overall shield. CAT 7 cables are intended for operating frequencies up to 600 MHz. CAT 7 cables fulfill the requirements of standard IEEE 802.3an, and are thus suitable for 10-Gigabit Ethernet.

Wiring Tips
According to the standardised approach, the combination of components of the same category is expected to achieve the correlating class. But experience reveals that this is not the case, especially when higher transmission performance is required. Therefore it is recommended to use matched components from a single source supplier especially in a harsh industrial environment.
Components of a higher category meet all the transmission requirements of the lower classes. They therefore provide an additional performance margin. For very critical applications (environment, EMC, distances) it is recommended to use this margin applying components of a higher category as required. Transmission safety can be achieved by testing the transmission performance using a suitable cabling tester which will verify the limits of the appropriate standards EN50173-1, ISO/IEC 11801, resp. EIA/TIA-568B2.1. Sometimes the terms EIA/TIA-568A and EIA/TIA-568B are used informally to show the different assignments of the colour coded pairs to the connector pins of the RJ45, in this case this is not a statement regarding the transmission quality.

LÜTZE – Ethernet Connectivity

Overview Data Rate / Transmission Medium

Ethernet	Data Rate MBit/s	Transmission Medium	IEEE
10Base5	10	RG 8 Coaxial Cable 50 Ohm, 500 m segment length	802.3
10Base2	10	RG 85 Coaxial Cable 50 Ohm, 500 m segment length	802.3a
10Broad36	10	Coaxial Cable 75 Ohm, max. Expansion 3.600 m	802.3b
10BaseT	10	Twisted Pair Cable, Kat 3, 100 m segment length	802.3i
10BaseFL	10	Multi Mode Fibre, 850 nm 2.000 m segment length	
10BaseFB	10	Multi Mode Fibre 850 nm 2.000 m segment length	
1000BaseT	1000	Twisted Pair Cable, Kat 5, 100 m segment length	802.3ab
1000BaseSX	1000	Multi Mode Fibre, 830 nm 550 m segment length	802.3z
1000BaseLX	1000	Multi Mode Fibre, 1.270 nm, 5.000 m segment length	802.3z
1000BaseCX	1000	Twinax-Copper Cable 150 Ohm, 25 m segment length	802.3z
Ethernet	**Data Rate MBit/s**	**Transmission Medium**	
100BaseTX	100	Twisted Pair Cable, Kat 5, 100 m segment length	
100BaseT2	100	Twisted Pair Cable, Kat 3, 100 m segment length, 2 x 2 Wire	
100BaseT4	100	Twisted Pair Cable, Kat 3, 100 m segment length, 4 x 2 Wire	
100BaseFX	100	Multi Mode Fibre, 1.300 nm, 2.000 m segment length	
10GBaseSR	10	Seriell, Multi Mode Fibre, 850 nm, 2.300 m segment length, without WAN Adjustment	
10GBaseSW	10	Serial Fibre Optic, 850 nm, 2.300 m segment length, with WAN Adjustment	
10GBaseLR	10	Serial Fibre Optic, 1.310 nm, 2-10.000 m segment length, without WAN Adjustment	
10GBaseLW	10	Serial Fibre Optic, 1.310 nm, 2-10.000 m segment length, with WAN Adjustment	
10GBaseER	10	Serial Fibre Optic, 1.550 nm, 2-40.000 m segment length, without WAN Adjustment	
10GBaseEW	10	Serial Fibre Optic,1.550 nm, 2-40.000 m segment length, with WAN Adjustment	
10GBaseLX4	10	Serial Fibre Optic, 1.310 nm, 2-10.000 m WWDM-Technology with 4 Channels	

Installation instructions for copper cables **INFO**

- Strip cables for as short a length as possible
- Never kink cables by more than 90°
- Minimum bending radius is four times the diameter
- Do not subject cables to twisting, elongation or tensile loads
- Do not crush cables when fastening them
- Apply shielding on the equipotential bonding over a large area, on both ends and with low impedance
- Apply shielding for several cables at a single point of the equipotential bonding
- Do not undo twisting of the individual conductors by more than 13 mm.

The current versions of relevant national and international laws, regulations and standards will always be binding. It may also be necessary to observe company standards. This then leads to additional requirements for installation, such as: Design in accordance with DIN EN 50174-1/2/3, Compliance with EMC Directives EN 55022, EN 50310 and DIN VDE 0878, Secure isolation between data and power cables, VDE 0804/DIN57804, Shielding measures, VDE 0100, TN-S, Power supply according to TN-S method, Observance of the earthing concept according to VDE 0100, Fire regulations, Accident prevention regulations, and perhaps others.

Pin assignment

The most commonly used Ethernet connector is the so called RJ45 connector, which is available in shielded and unshielded variants. Of the RJ45 connector's eight pins, four are used for 10/100MBit/s, and all eight for 1000MBit/s.

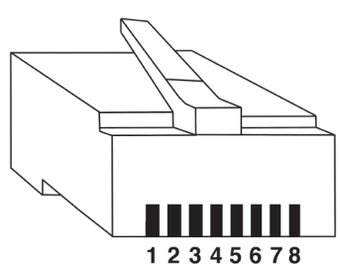
Pin assignment RJ45:

PIN-Nr.	10BaseT	100BaseT	1000BaseT
1	TD+ (Transmit)	TD+ (Transmit)	BI_DA+ (Bidirectional)
2	TD- (Transmit)	TD- (Transmit)	BI_DA- (Bidirectional)
3	RD+ (Recieve)	RD- (Recieve)	BI_DB+ (Bidirectional)
4	-	-	BI_DC+ (Bidirectional)
5	-	-	BI_DC- (Bidirectional)
6	RD- (Receive)	RD- (Receive)	BI_DB- (Bidirectional)
7	-	-	BI_DD+ (Bidirectional)
8	-	-	BI_DD- (Bidirectional)

Colour coded according to EN 50173 - hard wiring

In the EN 50173 standard, two colour codings are defined for installation, namely T568A and T568B. The user is free to choose between them, but should ensure during installation that the selected coding is maintained throughout the entire installation. Mixing the two codings will result in malfunctions

PIN-No.	Pair (T568A)	Pair (T568B)	Colour (T568A)	Colour (T568A)
1	3	2		
2	3	2		
3	2	3		
4	1	1		
5	1	1		
6	2	3		
7	4	4		
8	4	4		



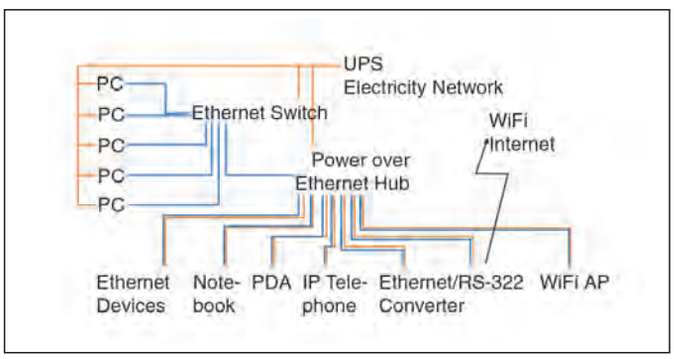
PIN Position

Plug in Connector:

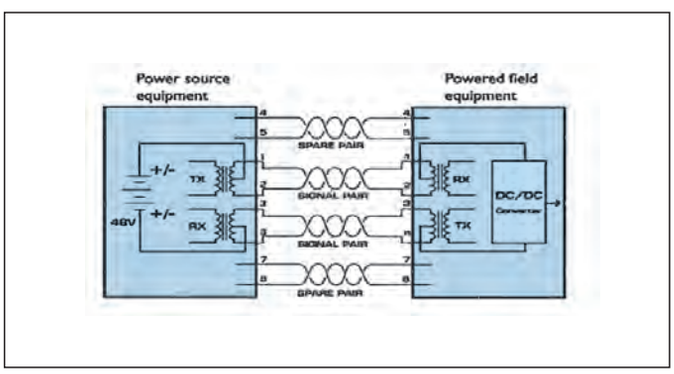
Plug in Connector Typ	Connection	IEC	Organisation 67076-3 106	LÜTZE
RJ45	Bajonet	Version 1	IAONA, ODVA	
RJ45	Snap in	Version 2		
RJ45	Screw	Version 3		
RJ45	Push Pull	Version 4	PNO	
RJ45	with Lock	Version 5	PNO	
RJ45	Push Pull	Version 6	IAONA, IDA	•
RJ45	with Lock	Version 7	PNO	
RJ45	Screw	Version 8		
RJ45	Screw	Version 9		
RJ45	Pulse Lock	Version 10		
M12 D kod	Screw	IEC 61076-2-101	IAONA, ODVA PNO	
LWL	LWL	IEC 60874-74	PNO	

LÜTZE - Ethernet Connectivity

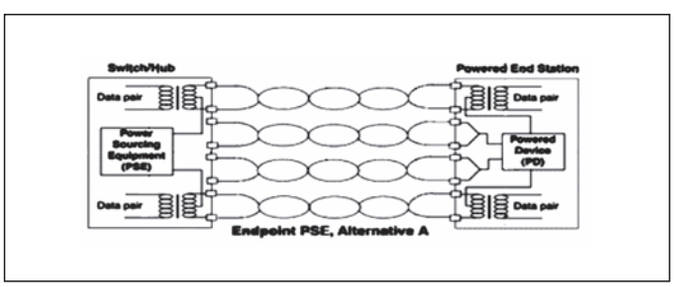
Ethernet components need power:
The elimination of local power supplies by use of Power over Ethernet (PoE) can provide significantcost savings with systems such as VoiP, Web-Cams, embeded PCs, IP sensors, local automation and security systems.



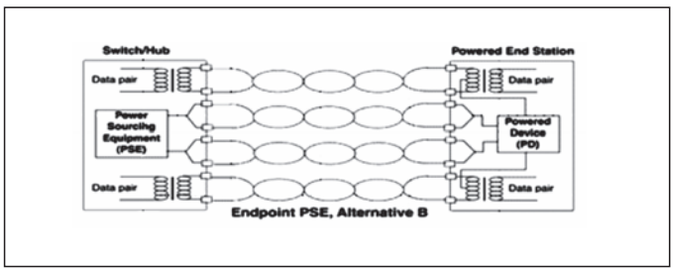
Standardised as 802.3af:
- CAT5 Infrastructure for Data and Power
- Voltage between 44 and 57 Volt
- max. Current 550 mA
- max. Trigger Current 500 mA
- typical Current 10 mA ... 350 mA
- Overload recognition 350 mA - 500 mA
- mind. 5 mA-Idle Current



Power supply via data cables; Supply via the centre points of the isolating transformer:
Endpoint PSE Alternative A.

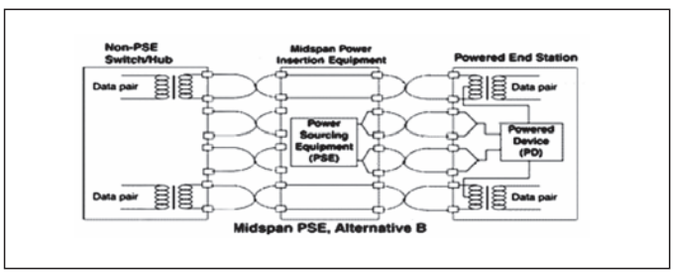


Power supply via free conductor pairs; Positive and negative voltage sides are transmitted via two conductor pairs
Cannot be used for T4 transmission (Gbit Ethernet)



Endpoint PSE Alternative B.

Power supply via supply sources used; the power supply is looped into the data path



Midspan PSE, Alternative C.

Comments on wiring the variants
In order to prevent voltage drops, all 4 pairs can be used for the power supply. The current trend is to make use of the unused conductor pairs, because this provides better insulation.

Wire	Variant A MDI-X	Variant A MDI	Variant B All
1	-V Port	+V Port	
2	-V Port	+V Port	
3	+V Port	-V Port	
4			+V Port
5			+V Port
6	+V Port	-V Port	
7			-V Port
8			-V Port

Ethernet Connectivity · Product Overview

Unmanaged Switches

4 port
10/100 Mbit

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8 port
10/100 Mbit

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Unmanaged Switches

5 port
10/100 Mbit

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5 port
10/100/1000 Mbit

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8 port
10/100 Mbit

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8 port
10/100/1000 Mbit

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16+2G port
10/100/1000 Mbit

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4+1,2 FX port
10/100 Base TX

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Unmanaged PoE Switches, PoE splitter

5 port
10/100 Mbit

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10/100/1000 Mbit

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Ethernet Connectivity · Product Overview

Ethernet Bus cables

Standard

C-track compatible

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Actuator sensor interface network cables

PROFINET M12 / RJ45 PVC cable

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PROFINET / ETHERNET RJ45/RJ45 PVC cable

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Patch cable Cat5e / Cat.6

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PROFINET RJ45/RJ45 PVC cable

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PROFINET RJ45/RJ45 PVC cable

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PROFINET M12 panel connectors

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Actuator sensor interface connector

RJ45 Industrial connector

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RJ45 Industrial connector

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RJ45 Industrial connector, angled

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RJ45 Module holder, female / IDC

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M12, Male D coded angled

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M12, Female D coded Cat 5e

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M12, Male X coded Cat 6A

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M12, Female X coded Cat 6A

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Actuator sensor interface panel connector and module holder

RJ45 Front installation

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M12 - RJ45 Control cabinet bushing

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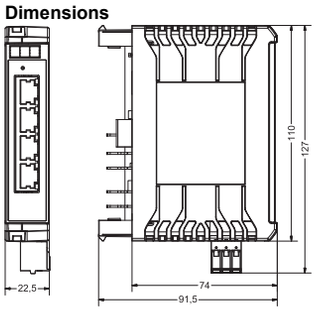
Ethernet · Unmanaged switch 4 ports

10 / 100 Mbit, auto negotiation, Auto MDI/MDI-X, QoS
4 Fast Ethernet ports, Broadcast storm protection
AC/DC 24 V extended temperature range

Dimensions



Description		Part-No.		Type	PU
without function carrier					
Rated voltage	AC/DC 24 V (SELV, PELV)	779200.0401	**S***	LCOS-SW-4P	1
with function carrier					
Rated voltage	AC/DC 24 V (SELV, PELV)	779201.0401	**S***	LCOS-SW-4P	1

Part-No.	779200.0401	779201.0401
Note		
Included in the delivery	–	Function carrier 22.5 mm, cannot be expanded with modules
Not included in the delivery	Function carrier and other accessories	other accessories, see „accessories“
Communication		
Standard	IEEE 802.3, 802.3u, 802.3x	
LAN	10 / 100 Base-TX	
Cable length (segment)	Max. 100 m	
Transfer rate	max. 100 Mbit/s	
Connection technology (data)	4 × RJ45	
Status display communication	Link activity	
General		
Rated voltage	AC/DC 24 V (SELV, PELV)	
Operation voltage range	AC 19.2–28.8 V / DC 18–31.2 V	
Connection technology (supply)	3-pin terminal clamp, push-in, RM 5.08 or via LCOS-FT Powerbus	
Power consumption	1.2 W	
Power output	–	
Protection class	IP20	
Installation position	any	
Over voltage category	II	
Degree of polution	2	
Application height	2000 m	
Operation temperature range	-25 °C … +70 °C	
Storage temperature range	-40 °C … +75 °C	
Relative humidity (operation)	5 % - 95 % (non-condensing)	
Relative humidity (storage)	0 % - 95 % (non-condensing)	
Standards	EN 61000-6-2, EN 61000-6-4, EN 61010-1, UL 61010-2-196, EN 55022	
Approvals	CE, cULus in preparation, DNV GL in preparation	
Safety		
Reverse voltage protection	Yes	
Isolating voltage Ethernet/supply/FE	1000 V	
Mechanics		
Dimensions (w × h × d)	22.5 × 110.0 × 102.0 mm	
Weight	– kg/piece	
Housing material	PA 6.6 (UL 94 V-0, NFF I2, F2)	
Mounting	can be connected to LCOS function carrier 22.5 mm (accessories), hat rail mounting EN 60715	connected to LCOS function carrier, hat rail mounting EN 60715

Accessories

Function carrier 22.5 mm, cannot be expanded with modules:
Part.-No. 780201.225.1 | LCOS-FT-PE-225-00-00-1 | PU: 1 unit
Function carrier 22.5 mm, can be expanded with modules:
Part.-No. 780402.225.1 | LCOS-FT-PE-225-0P-02-1 | PU: 1 unit
Function carrier 57.5 mm, with power supply DC 24 V, no FBS, plug-and-play:
Part.-No. 780700.575.1 | LCOS-FTE-PE-575-NC-00-1 | PU: 1 unit
Side cover plate for function carrier:
Part.-No. 780600.000.4 | LCOS-ZB-AD-00-1 | VE: 100 units
Plug-in terminal black, RM 5.08, 3-pin, 2.5 mm^2:
Part-No. 780922.006.2 | LCOS-ZB-KL-FS-508-25-3 | VE: 10 units
Power bridge 1-pin insulated:
Part.-No. 780961.001.2 | LCOS-ZB-PB-01-00 | VE: 10 unit

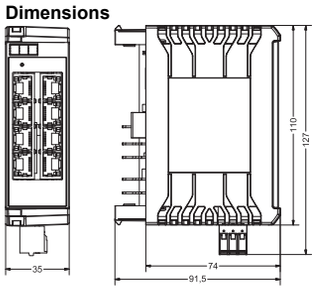
Note
For AC supply, there must be external over-voltage protection that limits the voltage between the supply and the FE to below 1000 V.

* **S** Article from stock
A Available with a lead time
R Available on request

Ethernet · Unmanaged switch 8 ports

10 / 100 Mbit, auto negotiation, Auto MDI/MDI-X, QoS
8 Fast Ethernet ports, Broadcast storm protection
AC/DC 24 V extended temperature range

Dimensions



Description		Part-No.		Type	PU
without function carrier					
Rated voltage	AC/DC 24 V (SELV, PELV)	779200.0801	**S***	LCOS-SW-8P	1
with function carrier					
Rated voltage	AC/DC 24 V (SELV, PELV)	779201.0801	**S***	LCOS-SW-8P	1

Part-No.	779200.0801	779201.0801
Note		
Included in the delivery	–	Function carrier 35 mm, cannot be expanded with modules
Not included in the delivery	Function carrier and other accessories	other accessories, see „accessories“
Communication		
Standard	IEEE 802.3, 802.3u, 802.3x	
LAN	10 / 100 Base-TX	
Cable length (segment)	Max. 100 m	
Transfer rate	max. 100 Mbit/s	
Connection technology (data)	8 × RJ45	
Status display communication	Link activity	
General		
Rated voltage	AC/DC 24 V (SELV, PELV)	
Operation voltage range	AC 19.2–28.8 V / DC 18–31.2 V	
Connection technology (supply)	3-pin terminal clamp, push-in, RM 5.08 or via LCOS-FT Powerbus	
Power consumption	1.5 W	
Power output	–	
Protection class	IP20	
Installation position	any	
Over voltage category	II	
Degree of polution	2	
Application height	2000 m	
Operation temperature range	-25 °C … +70 °C	
Storage temperature range	-40 °C … +75 °C	
Relative humidity (operation)	5 % - 95 % (non-condensing)	
Relative humidity (storage)	0 % - 95 % (non-condensing)	
Standards	EN 61000-6-2, EN 61000-6-4, EN 61010-1, UL 61010-2-196, EN 55022	
Approvals	CE, cULus in preparation, DNV GL in preparation	
Safety		
Reverse voltage protection	Yes	
Isolating voltage Ethernet/supply/FE	1000 V	
Mechanics		
Dimensions (w × h × d)	35.0 × 110.0 × 102.0 mm	
Weight	– kg/piece	
Housing material	PA 6.6 (UL 94 V-0, NFF I2, F2)	
Mounting	can be connected to LCOS function carrier 35 mm (accessories), hat rail mounting EN 60715	connected to LCOS function carrier, hat rail mounting EN 60715
Accessories	**Function carrier 35 mm, cannot be expanded with modules:** Part.-No. 780201.350.1 | LCOS-FT-PE-350-00-00-1 | PU: 1 unit **Function carrier 35 mm, can be expanded with modules:** Part.-No. 780402.350.1 | LCOS-FT-PE-350-0P-02-1 | PE: 1 unit **Function carrier 70 mm, with power supply DC 24 V, no FBS, plug-and-play:** Part.-No. 780700.700.1 | LCOS-FTE-PE-700-NC-00-1 | PU: 1 unit **Side cover plate for function carrier:** Part.-No. 780600.000.4 | LCOS-ZB-AD-00-1 | VE: 100 units **Plug-in terminal black, RM 5.08, 3-pin, 2.5 mm²:** Part-No. 780922.006.2 | LCOS-ZB-KL-FS-508-25-3 | VE: 10 units **Power bridge 1-pin insulated:** Part.-No. 780961.001.2 | LCOS-ZB-PB-01-00 | VE: 10 unit	

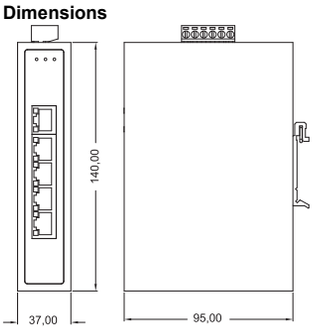
Note
For AC supply, there must be external over-voltage protection that limits the voltage between the supply and the FE to below 1000 V.

* **S** Article from stock
A Available with a lead time
R Available on request

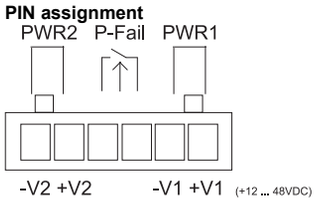
Ethernet · Unmanaged switch 5 ports

10 / 100 Mbit, autonegotiation, Auto MDI/MDI-X, DC 12 V – 48 V, redundant
5 Fast Ethernet ports, Broadcast storm protection
ESD 4 kV, surge 3 kV, expanded temperature range

Dimensions



PIN assignment



Description		Part-No.		Type	PU
5 port, RJ45					
Operation temperature range	-10 °C … +60 °C	772000	**S***	unm. switch ET-SWU5ST	1
	-40 °C … +75 °C	772001	**S***	unm. switch ET-SWU5ET	1

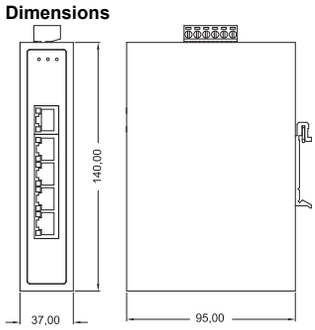
Communication	**772000**	**772001**
Standard	IEEE 802.3, 802.3u, 802.3x	
LAN	10 / 100 Base-TX	
Cable length (segment)	Max. 100 m	
Transfer rate	max. 100 Mbit/s	
Connection technology (data)	5 × RJ45	
Broadcast Storm Rate Limit	200 pps (200M), 20 pps (10M)	
Status display communication	P1, P2, P-Fail, 10/100T(x): link/activity, duplex/collision	
General		
Operation voltage range	DC 12–48 V, redundant	
Power consumption	3 W	
Operation temperature range	-10 °C … +60 °C	-40 °C … +75 °C
Storage temperature range	-40 °C … +85 °C	
Relative humidity (operation)	5 % - 95 % (non-condensing)	
Relative humidity (storage)	0 % - 95 % (non-condensing)	
Protection class	IP20	
Standards	UL 60950-1, CAN/CSA-C22.2 No. 60950, USA-FCC Part 15 CISPR22, EN 55011, EN 55022 Class A, EN 61000-3-2/3, EN 55024, IEC 61000-4-2/3/4/5/6/8, EN 61000-6-2, IEC 60068-2-27, IEC 60068-2-32, IEC 60068-2-6	
Approvals	cULus, CE, FCC	
Safety		
ESD (Ethernet)	DC 4 kV	
Surge (EFT for power)	DC 3 kV	
Reverse voltage protection	Yes	
Rated over load protection	0.9 A @ DC 12 V	
Mechanics		
Dimensions (w × h × d)	37.0 × 140.0 × 95.0 mm	
Weight	0.600 kg/piece	
Housing material	Metal	
Mounting	DIN rail mountable TS35 (EN 60715) Wall mounting	
Installation position	any	
Connection device	Screw terminal plug-in 0.20 mm^2 – 2.5 mm^2	
Monitoring		
Power supply voltage monitoring	Relay, 1 normally open	
Switching voltage	AC 120 V / DC 28 V	
Switching current	1 A @ DC 24 V	
Isolation voltage	DC 500 V	

Note
For more information on LED definition, see the data sheet.

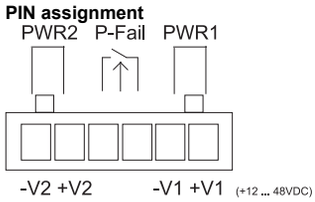
* **S** Article from stock
A Available with a lead time
R Available on request

10 / 100 / 1000 Mbit, autonegotiation, Auto MDI/MDI-X, DC 12 V / 24 V, redundant
5 Fast Ethernet ports, frame transmission up to 9 kB (Jumbo frames)
ESD 4 kV, surge 3 kV, expanded temperature range

Dimensions



PIN assignment



Description		Part-No.		Type	PU
5 port, RJ45					
Operation temperature range	-10 °C … +60 °C	772010	**S***	unm. switch ET-SWUG5ST	1
	-40 °C … +75 °C	772011	**S***	unm. switch ET-SWGU5ET	1

Communication	**772010**	**772011**
Standard	IEEE 802.3, 802.3u, 802.3x	
LAN	10 / 100 Base-TX, 10 / 1000 Base-T	
Cable length (segment)	Max. 100 m (4-wire Cat.5e, Cat.6 RJ45 cable)	
Transfer rate	max. 1000 Mbit/s	
Connection technology (data)	5 × RJ45	
Broadcast Storm Rate Limit	7926 pps	
Status display communication	P1, P2, P-Fail, 10/100T(x): link/activity, duplex/collision	
General		
Operation voltage range	DC 12–48 V, redundant	
Power consumption	4.6 W	
Operation temperature range	-10 °C … +60 °C	-40 °C … +75 °C
Storage temperature range	-40 °C … +85 °C	
Relative humidity (operation)	5 % - 95 % (non-condensing)	
Relative humidity (storage)	0 % - 95 % (non-condensing)	
Protection class	IP20	
Standards	UL 60950-1, CAN/CSA-C22.2 No. 60950, USA-FCC Part 15 CISPR22, EN 55011, EN 55022 Class A, EN 61000-3-2/3, EN 55024, IEC 61000-4-2/3/4/5/6/8, EN 61000-6-2, IEC 60068-2-27, IEC 60068-2-32, IEC 60068-2-6	
Approvals	cULus, CE, FCC	
Safety		
ESD (Ethernet)	DC 4 kV	
Surge (EFT for power)	DC 3 kV	
Reverse voltage protection	Yes	
Rated over load protection	0.9 A @ DC 12 V	
Mechanics		
Dimensions (w × h × d)	37.0 × 140.0 × 95.0 mm	
Weight	0.600 kg/piece	
Housing material	Metal	
Mounting	DIN rail mountable TS35 (EN 60715)	
Installation position	any	
Connection device	Screw terminal plug-in 0.20 mm^2 – 2.5 mm^2	
Monitoring		
Power supply voltage monitoring	Relay, 1 normally open	
Switching voltage	AC 120 V / DC 28 V	
Switching current	1 A @ DC 24 V	
Isolation voltage	DC 500 V	

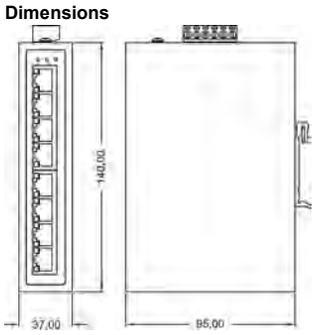
Note
For more information on LED definition, see the data sheet.

* **S** Article from stock
A Available with a lead time
R Available on request

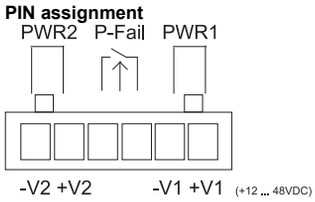
Ethernet · Unmanaged switch 8 ports

10 / 100 Mbit, autonegotiation, Auto MDI/MDI-X, DC 12 V / 24 V, redundant
8 Fast Ethernet ports, Broadcast storm protection
ESD 4 kV, surge 3 kV, expanded temperature range

Dimensions



PIN assignment



Description		Part-No.		Type	PU
8 port, RJ45					
Operation temperature range	-10 °C … +60 °C	772002	**S***	unm. switch ET-SWU8ST	1
	-40 °C … +75 °C	772003	**S***	unm. switch ET-SWU8ET	1

Communication	**772002**	**772003**
Standard	IEEE 802.3, 802.3u, 802.3x	
LAN	10 / 100 Base-TX	
Cable length (segment)	Max. 100 m	
Transfer rate	max. 100 Mbit/s	
Connection technology (data)	8 × RJ45	
Broadcast Storm Rate Limit	200 pps (200M), 20 pps (10M)	
Status display communication	P1, P2, P-Fail, 10/100T(x): link/activity, duplex/collision	
General		
Operation voltage range	DC 12–48 V, redundant	
Power consumption	5 W	
Operation temperature range	-10 °C … +60 °C	-40 °C … +75 °C
Storage temperature range	-40 °C … +85 °C	
Relative humidity (operation)	5 % - 95 % (non-condensing)	
Relative humidity (storage)	0 % - 95 % (non-condensing)	
Protection class	IP20	
Standards	UL 60950-1, CAN/CSA-C22.2 No. 60950, USA-FCC Part 15 CISPR22, EN 55011, EN 55022 Class A, EN 61000-3-2/3, EN 55024, IEC 61000-4-2/3/4/5/6/8, EN 61000-6-2, IEC 60068-2-27, IEC 60068-2-32, IEC 60068-2-6	
Approvals	cULus, CE, FCC	
Safety		
ESD (Ethernet)	DC 4 kV	
Surge (EFT for power)	DC 3 kV	
Reverse voltage protection	Yes	
Rated over load protection	0.9 A @ DC 12 V	
Mechanics		
Dimensions (w × h × d)	37.0 × 140.0 × 95.0 mm	
Weight	0.600 kg/piece	
Housing material	Metal	
Mounting	DIN rail mountable TS35 (EN 60715)	
Installation position	any	
Connection device	Screw terminal plug-in 0.20 mm^2 – 2.5 mm^2	
Monitoring		
Power supply voltage monitoring	Relay, 1 normally open	
Switching voltage	AC 120 V / DC 28 V	
Switching current	1 A @ DC 24 V	
Isolation voltage	DC 500 V	

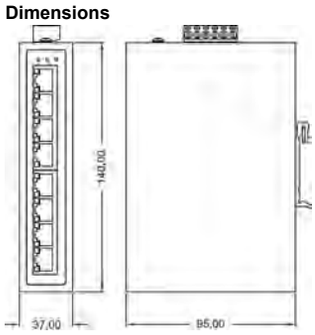
Note
For more information on LED definition, see the data sheet.

* **S** Article from stock
A Available with a lead time
R Available on request

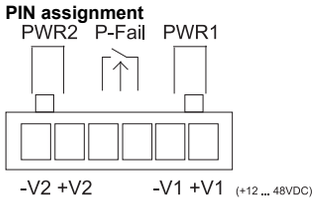
Ethernet · Unmanaged switch 8 ports

10 / 100 / 1000 Mbit, autonegotiation, Auto MDI/MDI-X, DC 12 V / 24 V, redundant
8 Fast Ethernet ports, frame transmission up to 9 kB
ESD 4 kV, Surge 3 kV

Dimensions



PIN assignment



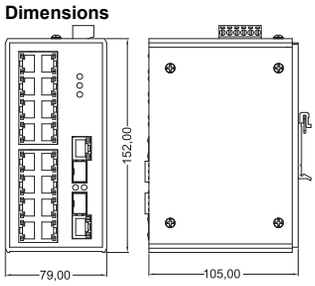
Description		Part-No.		Type	PU
Description	8 port, RJ45	772012	**S***	unm. switch ET-SWGU8ST	1
Communication		**772012**			
Standard		IEEE 802.3, 802.3u, 802.3x			
LAN		10 / 100 Base-TX, 10 / 1000 Base-T			
Cable length (segment)		Max. 100 m (4-wire Cat.5e, Cat.6 RJ45 cable)			
Transfer rate		max. 1000 Mbit/s			
Connection technology (data)		8 × RJ45			
Broadcast Storm Rate Limit		7926 pps			
Status display communication		P1, P2, P-Fail, 10/100T(x): link/activity, duplex/collision			
General					
Rated voltage		–			
Operation voltage range		DC 12–48 V, redundant			
Power consumption		4.6 W			
Power output		–			
Operation temperature range		-10 °C … +60 °C			
Storage temperature range		-40 °C … +85 °C			
Relative humidity (operation)		5 % - 95 % (non-condensing)			
Relative humidity (storage)		0 % - 95 % (non-condensing)			
Protection class		IP20			
Standards		UL 60950-1, CAN/CSA-C22.2 No. 60950, USA-FCC Part 15 CISPR22, EN 55011, EN 55022 Class A, EN 61000-3-2/3, EN 55024, IEC 61000-4-2/3/4/5/6/8, EN 61000-6-2, IEC 60068-2-27, IEC 60068-2-32, IEC 60068-2-6			
Approvals		cULus, CE, FCC			
Safety					
ESD (Ethernet)		DC 4 kV			
Surge (EFT for power)		DC 3 kV			
Reverse voltage protection		Yes			
Rated over load protection		1.6 A @ DC 12 V			
Mechanics					
Dimensions (w × h × d)		37.0 × 140.0 × 95.0 mm			
Weight		0.600 kg/piece			
Housing material		Metal			
Mounting		DIN rail mountable TS35 (EN 60715)			
Installation position		any			
Connection device		Screw terminal plug-in 0.20 mm^2 – 2.5 mm^2			
Monitoring					
Power supply voltage monitoring		Relay, 1 normally open			
Switching voltage		AC 120 V / DC 28 V			
Switching current		1 A @ DC 24 V			
Isolation voltage		DC 500 V			
Note For more information on LED definition, see the data sheet.					

* **S** Article from stock
A Available with a lead time
R Available on request

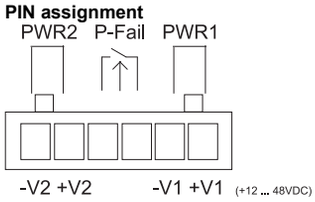
Ethernet · Unmanaged switch 16+2G ports

10 / 100 / 1000 Mbit, autonegotiation, Auto MDI/MDI-X, DC 12 V / 24 V, redundant
Simple and flexible expansion to fibre optic with SFP base

Dimensions



PIN assignment



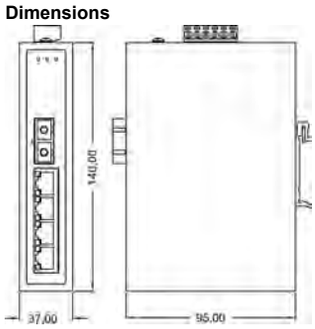
Description		Part-No.		Type	PU
Description	16 port + 2G, RJ45/SFP	772014	**S***	unm. switch ET-SWGU18ST	1

Communication	**772014**
Standard	IEEE 802.3, 802.3ab, 802.3u, 802.3x, 802.3z
LAN	100 Base-TX, 10 / 1000 Base-T, 1000 Base-SX/LX/LHX/XD/ZX/EZX
Cable length (segment)	Max. 100 m (4-wire Cat.5e, Cat.6 RJ45 cable)
Transfer rate	Ethernet: 10/100 Mbit/s, Gigabit Chopper: 10/100/1000 Mbit/s
Connection technology (data)	16 RJ45 + 2 RJ45/SFP (mini GBIC)
Broadcast Storm Rate Limit	–
Status display communication	PWR1, PWR2, P-Fail, Gigabit Chopper: Link/Activity, Speed (1000MBps), Gigabit SFP: Link/Activity
General	
Operation voltage range	DC 12–48 V, redundant
Power consumption	6.5 W
Operation temperature range	-10 °C … +60 °C
Storage temperature range	-40 °C … +85 °C
Relative humidity (operation)	5 % - 95 % (non-condensing)
Relative humidity (storage)	0 % - 95 % (non-condensing)
Protection class	IP20
Standards	UL 60950-1, CAN/CSA-C22.2 No. 60950, USA-FCC Part 15 CISPR22, EN 55011, EN 55022 Class A, EN 61000-3-2/3, EN 55024, IEC 61000-4-2/3/4/5/6/8, EN 61000-6-2, IEC 60068-2-27, IEC 60068-2-32, IEC 60068-2-6
Approvals	cULus, CE, FCC
Safety	
ESD (Ethernet)	DC 4 kV
Surge (EFT for power)	DC 3 kV
Reverse voltage protection	Yes
Rated over load protection	3.5 A @ DC 12 V
Mechanics	
Dimensions (w × h × d)	79.0 × 152.0 × 105.0 mm
Weight	1.100 kg/piece
Housing material	Metal
Mounting	DIN rail mountable TS35 (EN 60715)
Installation position	any
Connection device	Screw terminal plug-in 0.20 mm^2 – 2.5 mm^2
Monitoring	
Power supply voltage monitoring	Relay, 1 normally open
Switching voltage	AC 120 V / DC 28 V
Switching current	1 A @ DC 24 V
Isolation voltage	DC 500 V
Note For more information on LED definition, see the data sheet.	

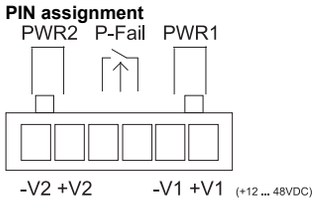
* **S** Article from stock
A Available with a lead time
R Available on request

10/100Base TX, 100Base FX Multi Mode, Auto MDI/MDI-X, DC 24 V – 48 V, redundant
4 Fast Ethernet ports, 1× Multimode SC, 2× Single Mode SC
ESD 4 kV, surge 3 kV, full/half duplex operation, broadcast storm protection

Dimensions



PIN assignment



Description		Part-No.		Type	PU
Description	4 port, RJ45, 1 port Multimode	772005	**S***	unm. switch ET-SWU4-1STSC	1
	4 port, RJ45, 2 port single mode	772007	**S***	unm. switch ET-SWU4-2STSC	1

Communication	**772005**	**772007**
Standard	IEEE 802.3, 802.3u, 802.3x	
LAN	10 / 100 Base-TX, 100 Base-FX	
Cable length (segment)	Copper max. 100 m, multi-mode fibre max. 2000 m	
Transfer rate	max. 1000 Mbit/s	
Connection technology (data)	4 × RJ45, 1 × SC or 4 × RJ45, 2 × SC	
Broadcast Storm Rate Limit	200 pps (200M), 20 pps (10M)	
Status display communication	P1, P2, P-Fail, 10/100T(x): link/activity, duplex/collision	
Fibre-optic cables (Multi Mode)		
Wavelength	1310 nm	–
Tx Power	-14 / -20 dBm	–
Rx sensitivity	-31 dBm	–
Parameters	50/125 µm, 62.5/125 µm	–
Fibre-optic cables (Single Mode)		
Wavelength	–	1310 nm
Tx Power	–	-8 / -15 dBm
Rx sensitivity	–	-34 dBm
Parameters	–	9/125 µm
General		
Operation voltage range	DC 24–48 V, redundant	
Power consumption	5 W (1SC), 6.5 W (2SC)	
Operation temperature range	-10 °C … +60 °C	
Storage temperature range	-40 °C … +85 °C	
Relative humidity (operation)	5 % - 95 % (non-condensing)	
Relative humidity (storage)	0 % - 95 % (non-condensing)	
Protection class	IP20	
Standards	UL 60950-1, CAN/CSA-C22.2 No. 60950, USA-FCC Part 15 CISPR22, EN 55011, EN 55022 Class A, EN 61000-3-2/3, EN 55024, IEC 61000-4-2/3/4/5/6/8, EN 61000-6-2, IEC 60068-2-27, IEC 60068-2-32, IEC 60068-2-6	
Approvals	cULus, CE, FCC	
Safety		
ESD (Ethernet)	DC 4 kV	
Surge (EFT for power)	DC 3 kV	
Reverse voltage protection	Yes	
Rated over load protection	0.9 A @ DC 12 V (1SC), 1.6 A @ DC 12 V (2SC)	
Mechanics		
Dimensions (w × h × d)	37.0 × 140.0 × 95.0 mm	
Weight	0.600 kg/piece	
Housing material	Metal	
Mounting	DIN rail mountable TS35 (EN 60715)	
Installation position	any	
Connection device	Screw terminal plug-in 0.20 mm^2 – 2.5 mm^2	
Monitoring		
Power supply voltage monitoring	Relay, 1 normally open	
Switching voltage	AC 120 V / DC 28 V	
Switching current	1 A @ DC 24 V	
Isolation voltage	DC 500 V	

Note
For more information on LED definition, see the data sheet.

* **S** Article from stock
A Available with a lead time
R Available on request

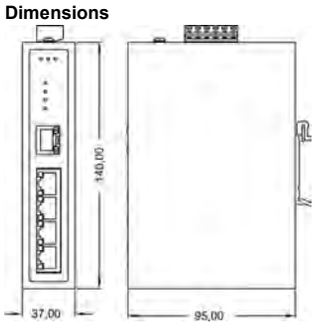
10 / 100 Mbit, Auto MDI/MDI-X, DC 24 V – 48 V, redundant
5 Fast Ethernet ports, autonegotiation
ESD 4 kV, Surge 3 kV

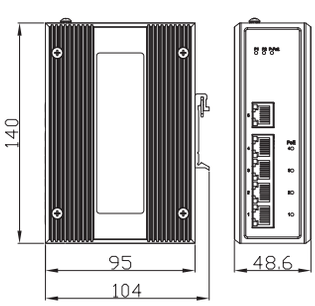
Description		Part-No.		Type	PU
Description	PoE 5 port, 48 V	772020	**S***	unm. PoE switch ET-PU5ST	1
	PoE 5 port, 24/48 V	772021	**S***	unm. PoE switch ET-PU5AST	1

Communication	**772020**	**772021**
Standard	IEEE 802.3, 802.3u, 802.3x, 802.3af	
LAN	10 / 100 Base-TX	
Cable length (segment)	Max. 100 m (4-wire Cat.5e, Cat.6 RJ45 cable)	
Transfer rate	max. 100 Mbit/s	
Connection technology (data)	5 × RJ45	
Broadcast Storm Rate Limit	–	
Status display communication	P1, P2, P-Fail, 10/100T(x): link/activity, duplex/collision	
General		
Operation voltage range	DC 48 V redundant	DC 24–48 V, redundant
Power consumption	65 W full load PoE	62.5 W full load PoE
Operation temperature range	-10 °C … +60 °C	
Storage temperature range	-40 °C … +85 °C	
Relative humidity (operation)	5 % - 95 % (non-condensing)	
Relative humidity (storage)	0 % - 95 % (non-condensing)	
Protection class	IP20	
Standards	UL 60950-1, CAN/CSA-C22.2 No. 60950, USA-FCC Part 15 CISPR22, EN 55011, EN 55022 Class A, EN 61000-3-2/3, EN 55024, IEC 61000-4-2/3/4/5/6/8, EN 61000-6-2, IEC 60068-2-27, IEC 60068-2-32, IEC 60068-2-6	
Approvals	cULus, CE, FCC	
Safety		
ESD (Ethernet)	DC 4 kV	
Surge (EFT for power)	DC 3 kV	
Reverse voltage protection	Yes	
Rated over load protection	15,4 W @ 48 V (per PoE port)	
Mechanics		
Dimensions (w × h × d)	37.0 × 140.0 × 95.0 mm	48.6 × 140.0 × 95.0 mm
Weight	0.600 kg/piece	0.800 kg/piece
Housing material	Metal	
Mounting	DIN rail mountable TS35 (EN 60715)	
Installation position	any	
Connection device	Screw terminal plug-in 0.20 mm^2 – 2.5 mm^2	
Monitoring		
Power supply voltage monitoring	Relay, 1 normally open	
Switching voltage	AC 120 V / DC 28 V	
Switching current	1 A @ DC 24 V	
Isolation voltage	DC 500 V	

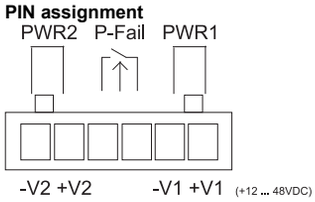
Note
For more information on LED definition, see the data sheet.

Dimensions





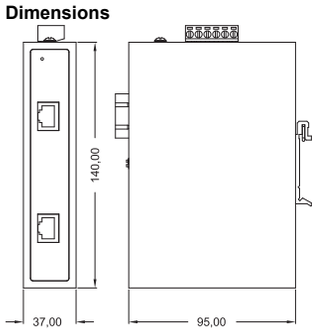
PIN assignment



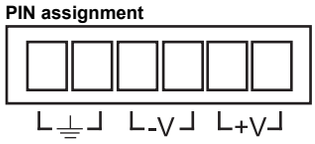
* **S** Article from stock
A Available with a lead time
R Available on request

10 / 100 / 1000 Mbit, PoE input and data output
12.95 W with DC 24 V, DC 48 V IN, DC 24 V OUT
IEC 802.3af compatible, -40°C – +75°C, ESD 4 kV, surge 3 kV

Dimensions



PIN assignment



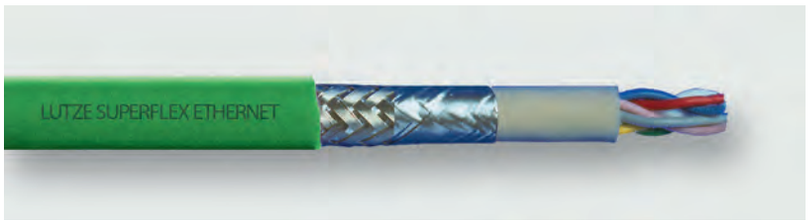
Output DC 24V

Description		Part-No.		Type	PU
Description	Power splitter	772022	**S***	PoE Splitter ET-PSPET	1

Communication	**772022**
Standard	IEEE 802.3, 802.3u, 802.3x, 802.3af, 802.3ab
LAN	10 / 100 Base-TX, 10 / 1000 Base-T
Cable length (segment)	Max. 100 m (4-wire Cat.5e)
Transfer rate	max. 100 Mbit/s
Connection technology (data)	PoE IN, OUT: RJ 45
Broadcast Storm Rate Limit	–
Status display communication	Power, Link/Activity, Duplex/Collision
General	
Rated voltage	–
Operation voltage range	DC 44–57 V
Power consumption	17.8 W @ 48 V
Power output	12.95 W @ 24 V
Operation temperature range	-40 °C … +75 °C
Storage temperature range	-40 °C … +85 °C
Relative humidity (operation)	5 % - 95 % (non-condensing)
Relative humidity (storage)	0 % - 95 % (non-condensing)
Protection class	IP20
Standards	UL 60950-1, CAN/CSA-C22.2 No. 60950, USA-FCC Part 15 CISPR22, EN 55011, EN 55022 Class A, EN 61000-3-2/3, EN 55024, IEC 61000-4-2/3/4/5/6/8, EN 61000-6-2, IEC 60068-2-27, IEC 60068-2-32, IEC 60068-2-6
Approvals	cULus, CE, FCC
Safety	
ESD (Ethernet)	DC 4 kV
Surge (EFT for power)	DC 3 kV
Reverse voltage protection	Yes
Rated over load protection	0.539 A @ DC 24 V
Mechanics	
Dimensions (w × h × d)	37.0 × 140.0 × 95.0 mm
Weight	0.600 kg/piece
Housing material	Metal
Mounting	DIN rail mountable TS35 (EN 60715)
Installation position	any
Connection device	Screw terminal plug-in 0.20 mm^2 – 2.5 mm^2
Monitoring	
Power supply voltage monitoring	–
Switching voltage	–
Switching current	–
Isolation voltage	–
Note For more information on LED definition, see the data sheet.	

* **S** Article from stock
A Available with a lead time
R Available on request

LÜTZE - Ethernet cables • Overview



ELECTRONIC Industrial Ethernet / PROFINET / ETHERCAT			
Category	Cat5	Cat5	Cat6a
Application according to	ProfiNet Type A	Profinet Type B	
Dimensions	2x2xAWG22/1	2x2xAWG22/7	4x2xAWG22/1
Part-No.	104301	104307	104397
Screen	SF / UTQ	SF / UTC	S / FTP
Jacket	PVC	PVC	PVC
UL	CMG, PLTC, AWM 20201 600 V	CMG, PLTC, AWM 20201 600 V	CMG, PLTC, AWM 2570 600 V

ELECTRONIC Industrial Ethernet / Ethernet IP				
Category	Cat5e	Cat5e	Cat6a	Cat7
Dimensions	4x2xAWG 26/7	4x2xAWG 24/7	4x2xAWG 26/7	4x2xAWG 26/7
Part-No.	104335	104336	104338	104331
Screen	SF / UTP	SF / UTP	S / FTP	S / FTP
Jacket	PVC	PVC	PVC	PVC
UL	CMG	CMG	CMG	CMG

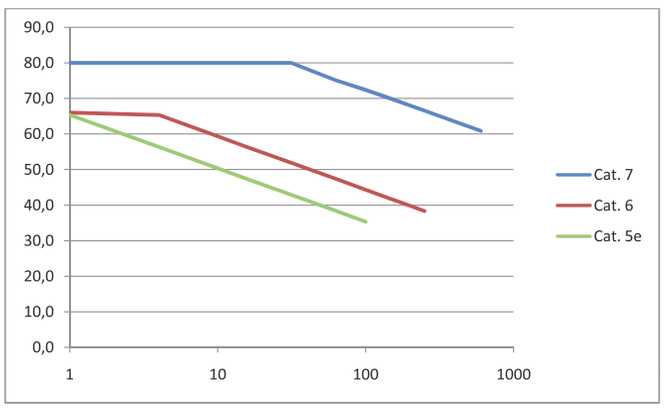
SUPERFLEX Industrial Ethernet / ProfiNet / Ethercat		
Category	Cat5	Cat5
Dimensions	2x2xAWG 22/19	2x2xAWG 22/7
Part-No.	104302	104303
Screen	SF / UTQ	SF / UTC
Jacket	PUR	PUR
UL	CMX	CMX

SUPERFLEX Industrial Ethernet / Ethernet IP				
Category	Cat5e	Cat5e	Cat5e	Cat6
Dimensions	2x2xAWG 26/19	4x2xAWG 24/19	4x2xAWG 26/19	4x2xAWG 26/19
Part-No.	104379	104337	104396	104347
Screen	SF / UTQ	SF / UTP	SF / UTP	SF / UTP
Jacket	PUR	PUR	PUR	PUR
UL	AWM	AWM	AWM	CMX

LÜTZE - Ethernet Cables • Transmission Parameters

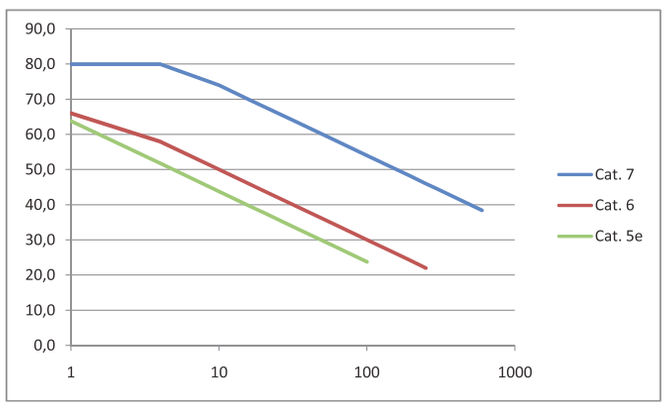
min. Near End Crosstalk (NEXT)

	EN 50288-2-2	EN 50288-5-2	EN 50288-4-2	
Frequenz	Cat. 5e	Cat. 6	Cat. 7	[Unit]
1 MHz	65,3	66,0	80,0	dB
4 MHz	56,3	65,3	80,0	dB
10 MHz	50,3	59,3	80,0	dB
16 MHz	47,2	56,2	80,0	dB
20 MHz	45,8	54,8	80,0	dB
31,25 MHz	42,9	51,9	80,0	dB
62,5 MHz	38,4	47,4	75,1	dB
100 MHz	35,3	44,3	72,4	dB
155 MHz	-	41,4	69,6	dB
200 MHz	-	39,8	67,9	dB
250 MHz	-	38,3	66,5	dB
300 MHz	-	-	65,3	dB
600 MHz	-	-	60,8	dB



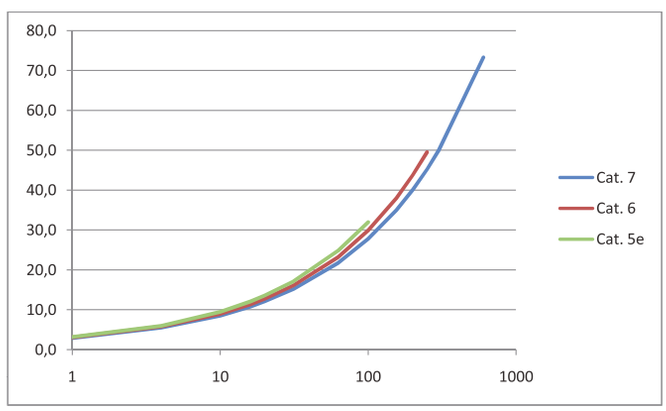
min. Far End Crosstalk (FEXT)

	EN 50288-2-2	EN 50288-5-2	EN 50288-4-2	
Frequenz	Cat. 5e	Cat. 6	Cat. 7	[Unit]
1 MHz	63,8	66,0	80,0	dB
4 MHz	51,8	58,0	80,0	dB
10 MHz	43,8	50,0	74,0	dB
16 MHz	39,7	45,9	69,9	dB
20 MHz	37,8	44,0	68,0	dB
31,25 MHz	33,9	40,1	64,1	dB
62,5 MHz	27,9	34,1	58,1	dB
100 MHz	23,8	30,0	54,0	dB
155 MHz	-	26,2	50,2	dB
200 MHz	-	24,0	48,0	dB
250 MHz	-	22,0	46,0	dB
300 MHz	-	-	44,5	dB
600 MHz	-	-	38,4	dB



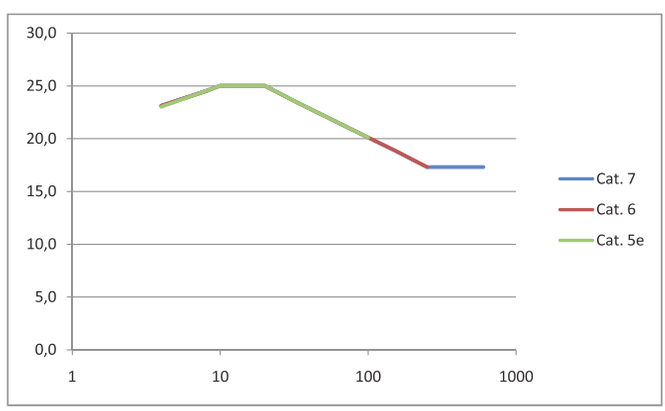
max. Attenuation (α)

	EN 50288-2-2	EN 50288-5-2	EN 50288-4-2	
Frequenz	Cat. 5e	Cat. 6	Cat. 7	[Unit]
1 MHz	3,2	3,1	2,9	dB/100m
4 MHz	6,0	5,8	5,5	dB/100m
10 MHz	9,5	9,0	8,5	dB/100m
16 MHz	12,1	11,4	10,8	dB/100m
20 MHz	13,6	12,8	12,1	dB/100m
31,25 MHz	17,1	16,1	15,2	dB/100m
62,5 MHz	24,8	23,2	21,7	dB/100m
100 MHz	32,0	29,9	27,8	dB/100m
155 MHz	-	38,0	35,0	dB/100m
200 MHz	-	43,7	40,1	dB/100m
250 MHz	-	49,5	45,3	dB/100m
300 MHz	-	-	50,0	dB/100m
600 MHz	-	-	73,3	dB/100m



Return Loss (RL)

	EN 50288-2-2	EN 50288-5-2	EN 50288-4-2	
Frequenz	Cat. 5e	Cat. 6	Cat. 7	[Unit]
4 MHz	23,0	23,1	23,1	dB
8 MHz	24,5	24,5	24,5	dB
10 MHz	25,0	25,0	25,0	dB
16 MHz	25,0	25,0	25,0	dB
20 MHz	25,0	25,0	25,0	dB
31,25 MHz	23,6	23,6	23,6	dB
62,5 MHz	21,5	21,5	21,5	dB
100 MHz	20,1	20,1	20,1	dB
155 MHz	-	18,8	18,8	dB
200 MHz	-	18,0	18,0	dB
250 MHz	-	17,3	17,3	dB
350 MHz	-	-	17,3	dB
600 MHz	-	-	17,3	dB



LÜTZE ELECTRONIC ETHERNET (C) PVC

Application
- For the cabling of industrial field bus systems with the globally accepted TCP/IP protocol
- For fixed installation or mobile use without continuous flexing in automation technology, transport, conveyor technology and machine tools

Properties
- High active and passive interference resistance (EMC)
- Silicone free
- RoHS-compliant

Technical data

Rated voltage	125 V
Test voltage	AC 1500 V
Impedance	approx. 100 Ω
Loop resistance	AWG 22: ≤ 115 mΩ/m AWG 24: ≤ 165 mΩ/m AWG 26: ≤ 273 mΩ/m
Operating capacitance wire-wire	approx. 48 pF/m
Temperature range moving	-10 °C … +70 °C
Temperature range fixed	-40 °C … +80 °C
Minimum bending radius moving	15×D
Minimum bending radius fixed	10×D
Burning behavior according to	IEC 60332-3-24 CMG: FT4 UL 1685
Conformity	CE RoHS REACH
Approvals	PLTC CMG cULus cURus

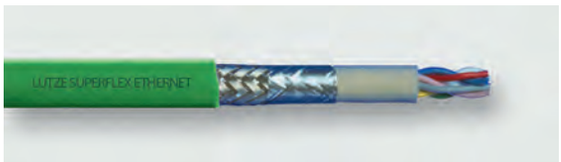
Construction
- Conductor: AWG conductor, CU-wire bare
- Conductor insulation: Special Polyolefin
- Overall shield: Foil shield, Braid shield, Tinned copper wires, optical cover approx. 85%
- Jacket material: PVC
- Surface: adhesion-free, matt
- Jacket color: green RAL 6018

Part-No.		Number of strands/cross-section/strand colors	Outer ∅ mm	Weight kg/100 m	Cu-Index kg/100 m
ELECTRONIC Industrial Ethernet/Profinet/EtherCat					
104301	**S***	(2×2×AWG22/1)StC AWM 20201 Cat.5e Star quad stranding white, yellow, blue, orange	6.5	6.8	3.2
104307	**S***	(2×2×AWG22/7)StC AWM 20201 Cat.5e Star quad stranding white, yellow, blue, orange	6.5	6.9	3.2
104397	**S***	(4×(2×AWG22/1)St)C AWM 2570 Cat.6_A stranded pairs white/blue, blue, white/orange, orange, white/green, green , white/brown, brown	9.6	9.6	5.3
ELECTRONIC Industrial Ethernet/Ethernet IP					
104335	**S***	(4×2×AWG26/7)StC Cat.5e stranded pairs white/blue, blue, white/orange, orange, white/green, green , white/brown, brown	6.3	5.5	3.0
104336	**S***	(4×2×AWG24/7)StC Cat.5e stranded pairs white/blue, blue, white/orange, orange, white/green, green , white/brown, brown	7.3	6.9	3.8
104338	**S***	(4×(2×AWG26/7)St)C Cat.6_A stranded pairs white/blue, blue, white/orange, orange, white/green, green , white/brown, brown	6.4	5.8	3.3
104331	**S***	(4×(2×AWG26/7)St)C Cat.7 stranded pairs white/blue, blue, white/orange, orange, white/green, green , white/brown, brown	6.4	5.8	3.3

CE These products are in conformity with the EU Low Voltage Directive 2014/35/EU

* **S** Article from stock
A Available with a lead time
R Available on request

LÜTZE SUPERFLEX®ETHERNET (C) PUR
For highest requirements



Application
- For the cabling of industrial field bus systems with the globally accepted TCP/IP protocol
- For continuous flexing use e.g. in c-tracks or free movement in the automation technology, transport and conveyor technology, machine tool manufacture

Properties
- High active and passive interference resistance (EMC)
- Silicone free
- Halogen free
- RoHS-compliant

Technical data

Rated voltage	300 V
Test voltage	AC 1500 V
Impedance	approx. 100 Ω
Loop resistance	AWG 22: ≤ 110 mΩ/m AWG 24: ≤ 159.5 mΩ/m AWG 26: ≤ 280 mΩ/m
Operating capacitance wire-wire	approx. 48 pF/m
Temperature range moving	-30 °C … +70 °C
Temperature range fixed	-40 °C … +80 °C
Minimum bending radius moving	12×D
Minimum bending radius fixed	6×D
Burning behavior according to	IEC 60332-1 DIN EN 60332-1-2 VDE 0482 322-1-2 UL 1581 Part VW-1 Flame Test UL FT1
Halogen free according to	DIN EN 60754-1 IEC 60754-1
Conformity	CE RoHS REACH
Approvals	CMX cULus

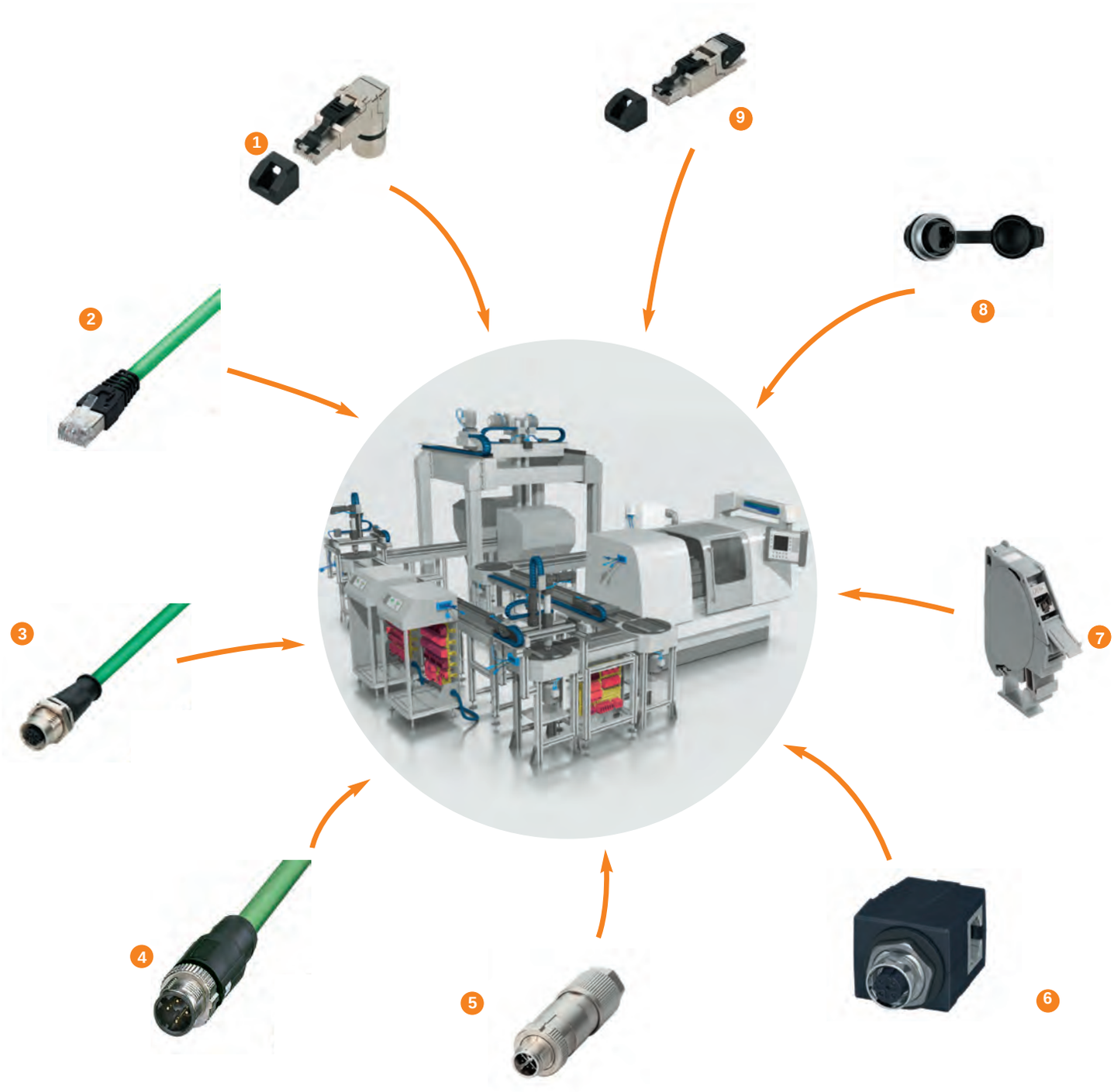
Construction
- Conductor: AWG conductor, CU-wire bare
- Conductor insulation: Special Polyolefin
- Overall shield: Braid shield, Tinned copper wires, optical cover approx. 85%
- Jacket material: PUR
- Surface: adhesion-free, matt
- Jacket color: green RAL 6018

Part-No.		Number of strands/cross-section/ strand colors	Outer ∅ mm	Weight kg/100 m	Cu-Index kg/100 m
SUPERFLEX Industrial Ethernet/ProfiNet/Ethercat					
104302	S*	(2×2×AWG22/19)C Cat.5e Star quad stranding blue, white, yellow, orange	6.6	6.3	3.2
104303	S*	(2×2×AWG22/7)C Cat.5e Star quad stranding blue, white, yellow, orange	6.5	6.5	3.0
104401	S*	(4×2×AWG24/7)StC AWM 21198 Cat.6_A Elements stranded together white, blue, white, orange, white, green , white, brown	8.9	8.8	4.0
SUPERFLEX Industrial Ethernet/Ethernet IP					
104379	S*	(2×2×AWG26/19)StC AWM 21198 Cat.5e Star quad stranding white, blue, yellow, orange	5.3	3.5	1.8
104337	S*	(4×2×AWG24/19)C AWM 21198 Cat.5e stranded layers white/blue, blue, white/orange, orange, white/green, green , white/ brown, brown	7.8	8.5	4.4
104396	S*	(4×2×AWG26/19)StC AWM 21198 Cat.5e stranded layers white/blue, blue, white/orange, orange, white/green, green , white/ brown, brown	6.7	5.1	2.8
104347	S*	(4×2×AWG26/19)StC Cat.6 stranded layers white/blue, blue, white/orange, orange, white/green, green , white/ brown, brown	7.9	7.4	3.4

CE These products are in conformity with the EU Low Voltage Directive 2014/35/EU

* **S** Article from stock
A Available with a lead time
R Available on request

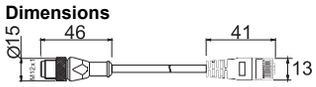
Internet of things



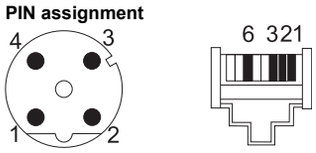
1. RJ45 industrial connector, angled
2. RJ45 connector
3. M12 panel connector
4. M12 connector
5. M12 Male X-coded
6. M12 / RJ45 control cabinet bushing
7. RJ45 Module holder
8. RJ45 panel connector for front installation
9. RJ45 connector

Male RJ45 straight to female M 12 straight with PVC cable, Cat 5e self-locking screwed connection

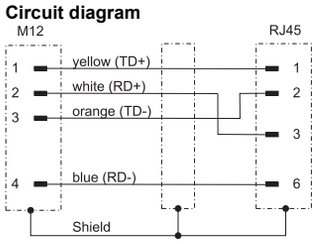
Dimensions



PIN assignment



Circuit diagram



Description		Part-No.		Type	PU
Cable length	0.3 m	192014.0030	**S***	STG4-RJ45/STG4-M12/PN PVC 0,3M	1
	0.6 m	192014.0060	**S***	STG4-RJ45/STG4-M12/PN PVC 0,6M	1
	1.0 m	192014.0100	**S***	STG4-RJ45/STG4-M12/PN PVC 1,0M	1
	1.5 m	192014.0150	**S***	STG4-RJ45/STG4-M12/PN PVC 1,5M	1
	2.0 m	192014.0200	**S***	STG4-RJ45/STG4-M12/PN PVC 2,0M	1
	5.0 m	192014.0500	**S***	STG4-RJ45/STG4-M12/PN PVC 5,0M	1

Technical data						
Rated voltage U_N	DC 24 V					
Rated voltage max.	30 V					
Rated current	1.5 A					
Pole number	4					
Cable length (m)	0.3	0.6	1.0	1.5	2.0	5.0
Coding	D					
Shielding	360°					
General						
Form male 1	RJ45					
Form male 2	M 12					
Test voltage	1000 V					
Degree of polution	–					
Insulation resistance at 20 °C	≥ 1000 MΩ×km					
Contact resistance	< 20 mΩ					
Protection class	IP20					
Housing material	TPU PA					
Color of the housing	black					
Contact material	CuSn, gold-plated					
Thread material	Zinc die-casting, nickel-plated					
Number of conductors/cross-section	(2×2×AWG22/7)					
Number of conductors	4					
Conductor color	various					
Jacket material	PVC					
Jacket color	green RAL 6018					
Conductor insulation	TPE-O					
Cable diameter	6.5 mm					
Minimum bending radius fixed	6×D					
Minimum bending radius moving	12×D					
Mounting	Breakaway torque 0.4 Nm					
Temperature range connector	-25 °C … +85 °C					
Temperature range fixed	-30 °C … +80 °C					
Temperature range moving	-5 °C … +70 °C					
Weight (kg/piece)	0.035	0.055	0.083	0.117	0.151	0.340

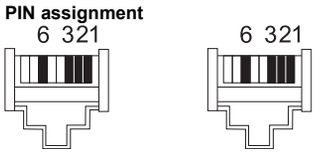
Accessories	**Part-No.**	**Type**	**PU**
Torque setting tool M 12	490091	DM-SET M12	1

* **S** Article from stock
A Available with a lead time
R Available on request

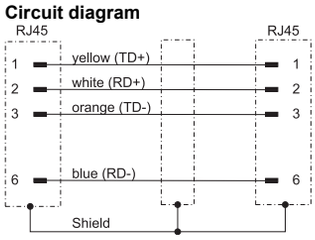
Male RJ45 straight to female RJ45 straight with PVC cable, Cat 5e 4-pin

Dimensions

PIN assignment



Circuit diagram



Description		Part-No.		Type	PU
Cable length	0.3 m	192016.0030	**S***	STG4-RJ45/STG4-RJ45/PN PVC 0,3M	1
	0.6 m	192016.0060	**S***	STG4-RJ45/STG4-RJ45/PN PVC 0,6M	1
	1.0 m	192016.0100	**S***	STG4-RJ45/STG4-RJ45/PN PVC 1,0M	1
	1.5 m	192016.0150	**S***	STG4-RJ45/STG4-RJ45/PN PVC 1,5M	1
	2.0 m	192016.0200	**S***	STG4-RJ45/STG4-RJ45/PN PVC 2,0M	1
	5.0 m	192016.0500	**S***	STG4-RJ45/STG4-RJ45/PN PVC 5,0M	1

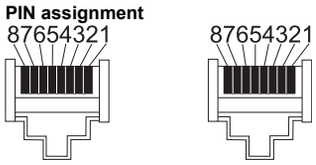
Technical data						
Rated voltage U_N	DC 50 V					
Rated voltage max.	– V					
Rated current	1.5 A					
Pole number	4					
Cable length (m)	0.3	0.6	1.0	1.5	2.0	5.0
Coding	–					
Shielding	360°					
General						
Form male 1	RJ45 male straight					
Form male 2	RJ45 Male straight					
Test voltage	1000 V					
Degree of polution	–					
Insulation resistance at 20 °C	≥ 1000 MΩ×km					
Contact resistance	< 20 mΩ					
Protection class	IP20					
Housing material	PA					
Color of the housing	black					
Contact material	CuSn, gold-plated					
Thread material	–					
Number of conductors/cross-section	(2×2×AWG22/7)					
Number of conductors	4					
Conductor color	various					
Jacket material	PVC					
Jacket color	green RAL 6018					
Conductor insulation	TPE-O					
Cable diameter	6.5 mm					
Minimum bending radius fixed	6×D					
Minimum bending radius moving	12×D					
Mounting	–					
Temperature range connector	-25 °C … +85 °C					
Temperature range fixed	-30 °C … +80 °C					
Temperature range moving	-5 °C … +70 °C					
Weight (kg/piece)	0.035	0.055	0.083	0.117	0.151	0.340

* **S** Article from stock
A Available with a lead time
R Available on request

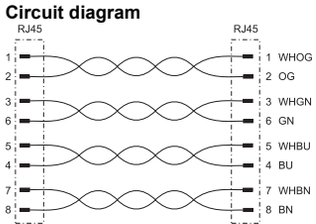
Male RJ45 straight to female RJ45 straight with PVC cable, Cat 5e 8-pin

Dimensions

PIN assignment



Circuit diagram



Description		Part-No.		Type	PU
Cable length	0.3 m	192018.0030	**S***	STG8-RJ45/STG8-RJ45/ET PVC 0,3M	1
	0.6 m	192018.0060	**S***	STG8-RJ45/STG8-RJ45/ET PVC 0,6M	1
	1.0 m	192018.0100	**S***	STG8-RJ45/STG8-RJ45/ET PVC 1,0M	1
	1.5 m	192018.0150	**S***	STG8-RJ45/STG8-RJ45/ET PVC 1,5M	1
	2.0 m	192018.0200	**S***	STG8-RJ45/STG8-RJ45/ET PVC 2,0M	1
	5.0 m	192018.0500	**S***	STG8-RJ45/STG8-RJ45/ET PVC 5,0M	1

Technical data						
Rated voltage U_N	DC 50 V					
Rated voltage max.	– V					
Rated current	1.5 A					
Pole number	8					
Cable length (m)	0.3	0.6	1.0	1.5	2.0	5.0
Coding	–					
Shielding	360°					
General						
Form male 1	RJ45 male straight					
Form male 2	RJ45 Male straight					
Test voltage	1000 V					
Degree of polution	–					
Insulation resistance at 20 °C	≥ 1000 MΩ×km					
Contact resistance	< 20 mΩ					
Protection class	IP20					
Housing material	PA					
Color of the housing	black					
Contact material	CuSn, gold-plated					
Thread material	–					
Number of conductors/cross-section	(4×2×AWG26/7)					
Number of conductors	8					
Conductor color	various					
Jacket material	PVC					
Jacket color	green RAL 6018					
Conductor insulation	TPE-O					
Cable diameter	6.3 mm					
Minimum bending radius fixed	6×D					
Minimum bending radius moving	12×D					
Mounting	–					
Temperature range connector	-25 °C … +85 °C					
Temperature range fixed	-30 °C … +70 °C					
Temperature range moving	-5 °C … +70 °C					
Weight (kg/piece)	0.032	0.049	0.071	0.098	0.126	0.279

* **S** Article from stock
A Available with a lead time
R Available on request

Patch cable Cat.5e/Cat.6

RoHS

Application
- Ethernet network wiring

Properties
- Straight connector
- Assignment according to EIA/TIA 568B
- Moulded sleeve with length imprint (not for cable carrier suitable and industrial design)
- Various colors available (not for cable carrier suitable and industrial design)
- **Cat.5e PVC:**
  PVC (4x2xAWG26/7) SF/UTP
  assignment according to TIA/EIA 568B
  flame-retardant IEC 60332-1
  extruded anti-kink sleeve with catch protection

- **Cat.5e cable carrier suitable PUR:**
  PUR yellow (4x2xAWG26/19) S/UTP
  prefabricated RJ45 male
  Oil resistance in accordance with EN60811-2-1
  Alternating bending stress test (with load) in accordance with VDE 0472 T603

- **Cat.6 LSZH:**
  (4x2xAWG27/7) S/FTP
  flame-retardant IEC 60332-1
  halogen-free IEC 60754-2
  silicone free
  extruded anti-kink sleeve with catch protection

- **Cat.6 industrial design PUR:**
  PUR red (4x2xAWG27/7) S/FTP
  Pre-fabricated RJ45 male
  Resistant to mineral oil, ASTM oil and UV radiation,
  highly abrasion-resistant
  flame-retardant IEC60332-1
  halogen-free IEC 60754
  low-smoke IEC61034
  UV-resistant IEC60068-2-5
  ozone resistant EN60811-2-1
  suitable for outdoor areas, not for laying directly in earth

Technical data

Connector	Shielded RJ45, 3µ–50µ AU
Wiring	according to EIA/TIA 568B 1:1 or crossover
Compatibility	Fully plug compatible to IEC 60603-7
Note	Standard lengths: 0.5 m / 1.0 m / 2.0 m / 3.0 m / 5.0 m / 10.0 m

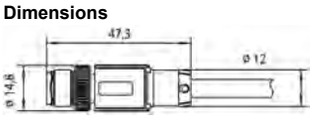
Part-No.		Number of conductors/cross-section	Jacket color	Sleeve color	Wiring	Cable length m
Cat.5e PVC						
192000.0100	**S***	(4x2xAWG26)	grey	grey	1:1	1
192022.0100	**S***	(4x2xAWG26)	blue	blue	1:1	1
192030.0100	**S***	(4x2xAWG26)	green	green	1:1	1
192010.0100	**S***	(4x2xAWG26)	grey/UL cable	grey	1:1	1
Cat.5e PVC						
192050.0100	**S***	(4x2xAWG26/19)	grey	red	Crossover	1
Cat.5E C-track compatible PUR						
192300.0100	**S***	(4x2xAWG27)	yellow	yellow	1:1	1
Cat.6 LSZH						
192100.0100	**S***	(4x2xAWG27)	grey	grey	1:1	1
192112.0100	**S***	(4x2xAWG27)	yellow	yellow	1:1	1
192130.0100	**S***	(4x2xAWG27)	green	green	1:1	1
Cat.6 industrial version PUR						
192201.0100	**S***	(4x2xAWG27/7)	red	black	1:1	1

* **S** Article from stock
A Available with a lead time
R Available on request

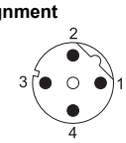
Male M12 straight with PUR cable, shielded 360°, open end self-locking screwed connection c-track compatible, halogen free

halogen free
flame retardant

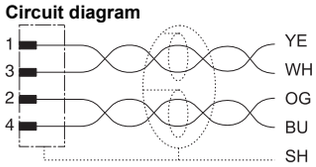
Dimensions



PIN assignment



Circuit diagram



Description		Part-No.		Type	PU
Cable length	2.0 m	475300.0200	S*	STG4-M12/PN 2M-PUR	1
	5.0 m	475300.0500	S*	STG4-M12/PN 5M-PUR	1
	10.0 m	475300.1000	S*	STG4-M12/PN 10M-PUR	1

Technical data			
Rated voltage U_N	AC/DC 24 V		
Rated voltage max.	30 V		
Rated current	4 A		
Pole number	4		
Cable length (m)	2.0	5.0	10.0
Status indication	–		
Current Consumption	– mA		
Coding	D		
Shielding	360°		
General			
Form male 1	M 12 male straight		
Nominal insulation voltage	250 V		
Test voltage	1500 V		
Degree of polution	3		
Insulation resistance at 20 °C	≥ 1000 MΩ×km		
Contact resistance	< 5 mΩ		
Flamability according to UL 94	V0		
Protection class	IP65/67		
Housing material	TPU		
Contact material	CuSn, gold-plated		
Thread material	Zinc die-casting, nickel-plated		
Material sealing ring	–		
Number of conductors/cross-section	1 × 4 × AWG 22/7		
Jacket material	PUR		
Jacket color	green RAL 6018		
Conductor insulation	PO		
Cable diameter	6.5 mm		
Bending radius	10 × D		
Storage temperature range	-40 °C … +90 °C		
Temperature range connector	-25 °C … +90 °C		
Temperature range fixed	-40 °C … +70 °C		
Temperature range moving	-40 °C … +70 °C		
Mechanical service life	–		
Weight (kg/piece)	0.140	0.330	0.640
Approvals	–		

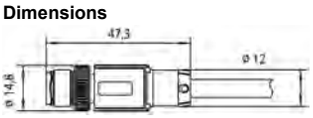
Accessories	Part-No.	Type	PU
Torque setting tool M 12	490091	DM-SET M12	1

* **S** Article from stock
A Available with a lead time
R Available on request

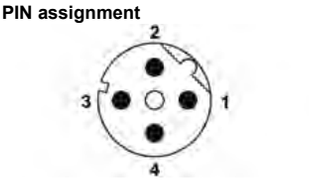
Male M12 straight on male M12 straight with PUR cable, shielded 360° self-locking screwed connection c-track compatible, halogen free

halogen free
flame retardant

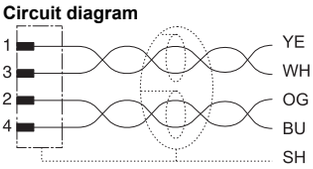
Dimensions



PIN assignment



Circuit diagram



Description		Part-No.		Type	PU
Cable length	0.3 m	475400.0030	**S***	STG4-M12/STG4-M12/PN 0,3M PUR	1
	0.6 m	475400.0060	**S***	STG4-M12/STG4-M12/PN 0,6M PUR	1
	1.0 m	475400.0100	**S***	STG4-M12/STG4-M12/PN 1,0M PUR	1
	1.5 m	475400.0150	**S***	STG4-M12/STG4-M12/PN 1,5M PUR	1
	2.0 m	475400.0200	**S***	STG4-M12/STG4-M12/PN 2,0M PUR	1
	5.0 m	475400.0500	**S***	STG4-M12/STG4-M12/PN 5,0M PUR	1

Technical data						
Rated voltage U_N	AC/DC 24 V					
Rated voltage max.	30 V					
Rated current	4 A					
Pole number	4					
Cable length (m)	0.3	0.6	1.0	1.5	2.0	5.0
Status indication	–					
Current Consumption	– mA					
Coding	D					
Shielding	360°					
General						
Form male 1	M 12 male straight					
Form male 2	M 12 male straight					
Nominal insulation voltage	250 V					
Test voltage	1500 V					
Degree of polution	3					
Insulation resistance at 20 °C	≥ 1000 MΩ×km					
Contact resistance	< 5 mΩ					
Flamability according to UL 94	V0					
Protection class	IP65/67					
Housing material	TPU					
Contact material	CuSn, gold-plated					
Thread material	Zinc die-casting, nickel-plated					
Material sealing ring	–					
Number of conductors/cross-section	1 × 4 × AWG 22/7					
Jacket material	PUR					
Jacket color	green RAL 6018					
Conductor insulation	PP					
Cable diameter	6.5 mm					
Bending radius	10 × D					
Storage temperature range	-30 °C … +90 °C					
Temperature range connector	-25 °C … +90 °C					
Temperature range fixed	-40 °C … +80 °C					
Temperature range moving	-30 °C … +70 °C					
Mechanical service life	–					
Weight (kg/piece)	0.060	0.070	0.090	0.110	0.150	0.325
Approvals	–					

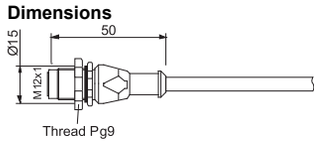
Accessories	**Part-No.**	**Type**	**PU**
Torque setting tool M 12	490091	DM-SET M12	1

* **S** Article from stock
A Available with a lead time
R Available on request

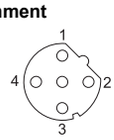
M12 panel connectors using PG9 thread for rear panel installation, open end
Female - D coded (Ethernet Cat. 5e)
shielded

halogen free
flame retardant

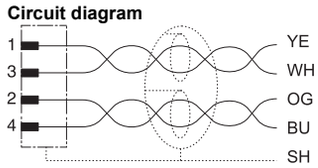
Dimensions



PIN assignment



Circuit diagram



Description		Part-No.		Type	PU
Cable length	2.0 m	475500.0200	S*	KUGE4-M12/PN 2M PUR	1
	5.0 m	475500.0500	S*	KUGE4-M12/PN 5M PUR	1
	10.0 m	475500.1000	S*	KUGE4-M12/PN 10M PUR	1

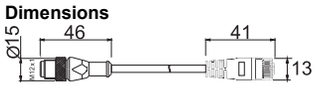
Technical data			
Rated voltage U_N	AC/DC 24 V		
Rated voltage max.	30 V		
Rated current	4 A		
Pole number	4		
Cable length (m)	2.0	5.0	10.0
Status indication	–		
Current Consumption	– mA		
Coding	D		
Shielding	360°		
General			
Form male 1	M 12 female		
Nominal insulation voltage	250 V		
Test voltage	1500 V		
Degree of polution	3		
Insulation resistance at 20 °C	≥ 1000 MΩ×km		
Contact resistance	< 5 mΩ		
Flamability according to UL 94	–		
Protection class	IP65/67		
Housing material	TPU		
Contact material	CuSn, gold-plated		
Thread material	Zinc die-casting, nickel-plated		
Material sealing ring	–		
Number of conductors/cross-section	1×4×AWG22/7		
Jacket material	PUR		
Jacket color	green RAL 6018		
Conductor insulation	PP		
Cable diameter	6.5 mm		
Bending radius	10 × D		
Storage temperature range	-40 °C … +90 °C		
Temperature range connector	-25 °C … +90 °C		
Temperature range fixed	-40 °C … +80 °C		
Temperature range moving	-30 °C … +70 °C		
Mechanical service life	–		
Weight (kg/piece)	0.140	0.330	0.640
Approvals	–		

Accessories	Part-No.	Type	PU
Torque setting tool M 12	490091	DM-SET M12	1

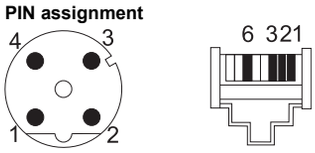
* **S** Article from stock
A Available with a lead time
R Available on request

Male RJ45 straight to female M12 straight with PUR cable, Cat 5e
self-locking screwed connection
c-track compatible, halogen free

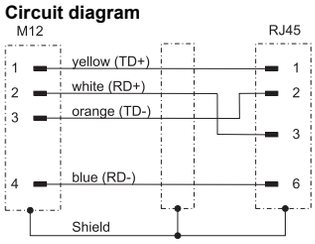
Dimensions



PIN assignment



Circuit diagram



Description		Part-No.		Type	PU
Cable length	0.3 m	192013.0030	**S***	STG4-RJ45/STG4-M12/PN PUR 0,3M	1
	0.6 m	192013.0060	**S***	STG4-RJ45/STG4-M12/PN PUR 0,6M	1
	1.0 m	192013.0100	**S***	STG4-RJ45/STG4-M12/PN PUR 1,0M	1
	1.5 m	192013.0150	**S***	STG4-RJ45/STG4-M12/PN PUR 1,5M	1
	2.0 m	192013.0200	**S***	STG4-RJ45/STG4-M12/PN PUR 2,0M	1
	5.0 m	192013.0500	**S***	STG4-RJ45/STG4-M12/PN PUR 5,0M	1

Technical data						
Rated voltage U_N	DC 24 V					
Rated voltage max.	30 V					
Rated current	1.5 A					
Pole number	4					
Cable length (m)	0.3	0.6	1.0	1.5	2.0	5.0
Coding	D					
Shielding	360°					
General						
Form male 1	RJ45 male straight					
Form male 2	M 12 male straight					
Test voltage	1000 V					
Degree of polution	–					
Insulation resistance at 20 °C	≥ 1000 MΩ×km					
Contact resistance	< 20 mΩ					
Protection class	IP20					
Housing material	TPU PA					
Color of the housing	black					
Contact material	CuSn, gold-plated					
Thread material	Zinc die-casting, nickel-plated					
Number of conductors/cross-section	(2×2×AWG22/7)					
Number of conductors	4					
Conductor color	various					
Jacket material	PUR					
Jacket color	green RAL 6018					
Conductor insulation	TPE-O					
Cable diameter	6.5 mm					
Minimum bending radius fixed	6×D					
Minimum bending radius moving	12×D					
Mounting	Breakaway torque 0.4 Nm					
Temperature range connector	-25 °C … +85 °C					
Temperature range fixed	-40 °C … +80 °C					
Temperature range moving	-30 °C … +70 °C					
Weight (kg/piece)	0.035	0.054	0.080	0.113	0.145	0.340

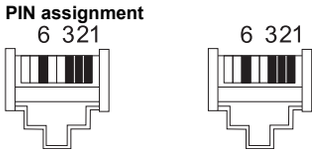
Accessories	**Part-No.**	**Type**	**PU**
Torque setting tool M 12	490091	DM-SET M12	1

* **S** Article from stock
A Available with a lead time
R Available on request

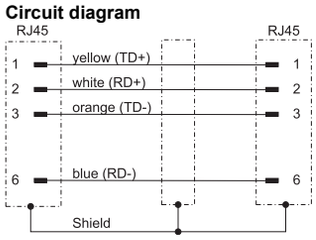
Male RJ45 straight to female RJ45 straight with PUR cable, Cat 5e c-track compatible, halogen free

Dimensions

PIN assignment



Circuit diagram



Description		Part-No.		Type	PU
Cable length	0.3 m	192015.0030	**S***	STG4-RJ45/STG4-RJ45/PN PUR 0,3M	1
	0.6 m	192015.0060	**S***	STG4-RJ45/STG4-RJ45/PN PUR 0,6M	1
	1.0 m	192015.0100	**S***	STG4-RJ45/STG4-RJ45/PN PUR 1,0M	1
	1.5 m	192015.0150	**S***	STG4-RJ45/STG4-RJ45/PN PUR 1,5M	1
	2.0 m	192015.0200	**S***	STG4-RJ45/STG4-RJ45/PN PUR 2,0M	1
	5.0 m	192015.0500	**S***	STG8-RJ45/STG8-RJ45/PN 5,0M PUR	1

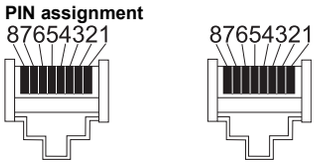
Technical data						
Rated voltage U_N	DC 50 V					
Rated voltage max.	– V					
Rated current	1.5 A					
Pole number	4					
Cable length (m)	0.3	0.6	1.0	1.5	2.0	5.0
Coding	–					
Shielding	360°					
General						
Form male 1	RJ45 male straight					
Form male 2	RJ45 male straight					
Test voltage	1000 V					
Degree of polution	–					
Insulation resistance at 20 °C	≥ 1000 MΩ×km					
Contact resistance	< 20 mΩ					
Protection class	IP20					
Housing material	PA					
Color of the housing	black					
Contact material	CuSn, gold-plated					
Thread material	–					
Number of conductors/cross-section	(2×2×AWG22/7)					
Number of conductors	4					
Conductor color	various					
Jacket material	PUR					
Jacket color	green RAL 6018					
Conductor insulation	TPE-O					
Cable diameter	6.5 mm					
Minimum bending radius fixed	6×D					
Minimum bending radius moving	12×D					
Mounting	–					
Temperature range connector	-25 °C … +85 °C					
Temperature range fixed	-30 °C … +80 °C					
Temperature range moving	-30 °C … +70 °C					
Weight (kg/piece)	0.035	0.054	0.080	0.113	0.145	0.340

* **S** Article from stock
A Available with a lead time
R Available on request

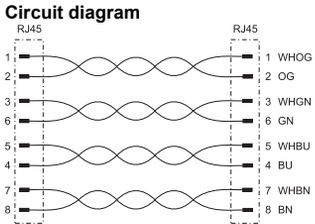
Male RJ45 straight to female RJ45 straight with PUR cable, Cat5e c-track compatible, halogen free

Dimensions

PIN assignment



Circuit diagram



Description		Part-No.		Type	PU
Cable length	0.3 m	192017.0030	**S***	STG8-RJ45/STG8-RJ45/ET PUR 0,3M	1
	0.6 m	192017.0060	**S***	STG8-RJ45/STG8-RJ45/ET PUR 0,6M	1
	1.0 m	192017.0100	**S***	STG8-RJ45/STG8-RJ45/ET PUR 1,0M	1
	1.5 m	192017.0150	**S***	STG8-RJ45/STG8-RJ45/ET PUR 1,5M	1
	2.0 m	192017.0200	**S***	STG8-RJ45/STG8-RJ45/ET PUR 2,0M	1
	5.0 m	192017.0500	**S***	STG8-RJ45/STG8-RJ45/ET PUR 5,0M	1

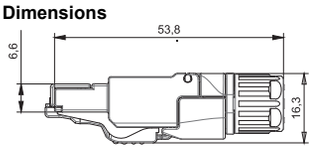
Technical data						
Rated voltage U_N	DC 50 V					
Rated voltage max.	– V					
Rated current	1.5 A					
Pole number	8					
Cable length (m)	0.3	0.6	1.0	1.5	2.0	5.0
Coding	–					
Shielding	360°					
General						
Form male 1	RJ45 male straight					
Form male 2	RJ45 male straight					
Test voltage	1000 V					
Degree of polution	–					
Insulation resistance at 20 °C	≥ 1000 MΩ×km					
Contact resistance	< 20 mΩ					
Protection class	IP20					
Housing material	PA					
Color of the housing	black					
Contact material	CuSn, gold-plated					
Thread material	–					
Number of conductors/cross-section	(4×2×AWG26/19)					
Number of conductors	8					
Conductor color	various					
Jacket material	PUR					
Jacket color	green RAL 6018					
Conductor insulation	TPE-O					
Cable diameter	6.7 mm					
Minimum bending radius fixed	6×D					
Minimum bending radius moving	12×D					
Mounting	–					
Temperature range connector	-25 °C … +85 °C					
Temperature range fixed	-40 °C … +80 °C					
Temperature range moving	-30 °C … +70 °C					
Weight (kg/piece)	0.031	0.046	0.066	0.092	0.118	0.431

* **S** Article from stock
A Available with a lead time
R Available on request

Industrial connector RJ45
solid metal housing, quick-connect technology AWG 27–22
Cat 6_A / Cat 5e

Description		Part-No.		Type	PU
Description	Connection according to TIA 568 B	490174	**S***	RJ45-M 8pol. Cat.6A T568B	1
	Connection according to TIA 568 A	490175	**S***	RJ45-M 8pol. Cat.6A T568A	1
	Connection according to TIA 568 B	490176	**S***	RJ45-M 8pol. Cat.6A T568B	1
	Connecting according to color coded Profinet.	490177	**S***	RJ45-MS 4pol. PROFINET	1

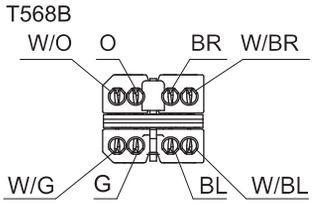
Dimensions



Connection assignment

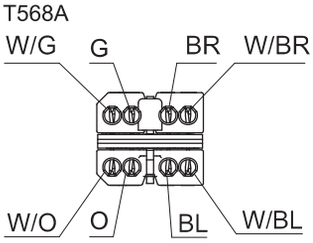
490174

T568B



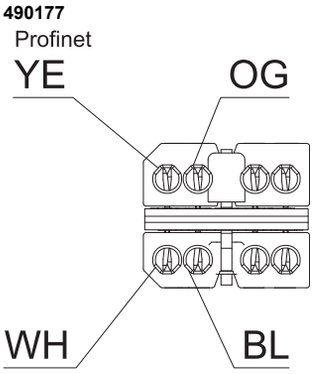
490175, 490176

T568A



490177

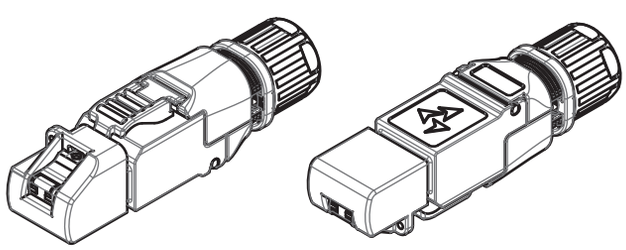
Profinet



Technical data	490174	490175	490176	490177
Rated voltage	30 V			
Rated current	≤1 A per contact			
Pole number	8			4
Transfer rate	10 Gbit/s			100 Mbit/s
Category	$Cat.6_A$			Cat.5e
Shielding	shielded			
General				
Design	RJ45			
Degree of polution	1			
Insulation resistance	> 500 MΩ			
Contact resistance	< 20 mΩ			
Flamability according to UL 94	V0			
Protection class	IP20			
Housing material	Zinc die-casting			
Color of the housing	silver			
Cover	PBT black			
Contact material	Spring steel gold-plated			
Strand diameter	1 – 1.6 mm			
Cable diameter	5.5 – 10 mm			
Cross-section AWG	AWG 24/1-22/1, AWG 27/7-22/7, AWG 24/19-22/19		AWG 26/1-24/1, AWG 27/7-24/7, AWG 26/19	AWG 24/1-22/1, AWG 27/7-22/7, AWG 24/19-22/19
Operation temperature range	-40 °C … +85 °C			
Storage temperature range	-40 °C … +85 °C			
Mechanical service life	>750 insertion cycles			
Dimensions (w × h × d)	13.9 × 16.3 × 53.8 mm			
Weight (kg/piece)	0.025			
Approvals	cULus (E326112)			
Standards	IEC 60603-7-51			IEC 61784-5-3

Comments
Suitable for Profinet, SERCOS3, Ethercat, Ethernet/IP, Powerlink, VARAN, Power over Ethernet+ (PoE+IEEE 802.3at)
Suitable cables, see overview assignment Ethernet cables to connectors

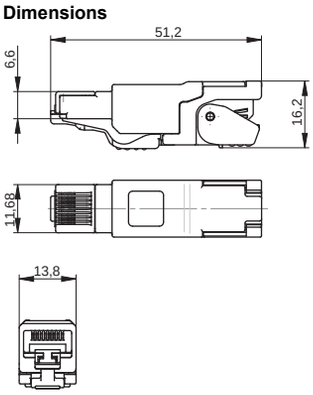
Mounting diagram



* **S** Article from stock
A Available with a lead time
R Available on request

Industrial connector RJ45
solid metal housing, quick-connect technology AWG 27–22
Cat 6_A

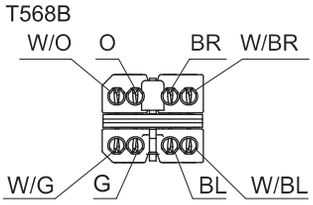
Dimensions



Connection assignment

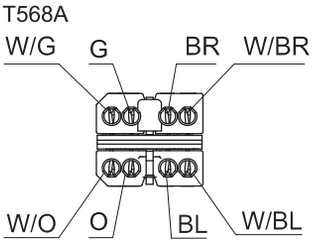
490128

T568B



490129, 490138

T568A



Description		Part-No.		Type	PU
Description	Connection according to TIA 568 B	490128	**S***	RJ45-M 8pol. Cat.6A T568B	1
	Connection according to TIA 568 A	490129	**S***	RJ45-M 8pol. Cat.6A T568A	1
	Connection according to TIA 568 B	490138	**S***	RJ45-M 8pol. Cat.6A T568B AWG 26/19	1

Technical data	**490128**	**490129**	**490138**
Rated voltage		30 V	
Rated current		≤1 A	
Pole number		8	
Transfer rate		10 Gbit/s	
Category		Cat.6_A	
Shielding		shielded	
General			
Design		RJ45	
Degree of polution		1	
Insulation resistance		> 500 MΩ	
Contact resistance		< 20 mΩ	
Flamability according to UL 94		V0	
Protection class		IP20	
Housing material		Zinc die-casting	
Color of the housing		black	
Cover		PBT black	
Contact material		Spring steel gold-plated	
Strand diameter	0.85 – 1.6 mm		0.85 – 1.1 mm
Cable diameter		5 – 9 mm	
Cross-section AWG	AWG 24/1-22/1, AWG 27/7-22/7		AWG 26/1, AWG 26/7, AWG 26/19
Operation temperature range		-40 °C … +70 °C	
Storage temperature range		-40 °C … +70 °C	
Mechanical service life		>750 insertion cycles	
Dimensions (w × h × d)		13.8 × 16.2 × 53.1 mm	
Weight (kg/piece)		0.025	
Approvals		cULus (E326112)	
Standards		IEC 60603-7-51	

Comments

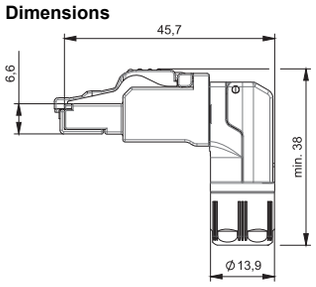
Suitable for Profinet, SERCOS3, Ethercat, Ethernet/IP, Powerlink, VARAN, Power over Ethernet+ (PoE+IEEE 802.3at)
Suitable cables, see overview assignment Ethernet cables to connectors

* **S** Article from stock
A Available with a lead time
R Available on request

Industrial connector RJ45, angled
solid metal housing, quick-connect technology AWG 27–22
Cat 6_A / Cat 5e

Description		Part-No.		Type	PU
Description	Connection according to TIA 568 B	490151	**S***	RJ45-X 8pol. Cat.6A T568B	1
	Connection according to TIA 568 A	490152	**S***	RJ45-X 8pol. Cat.6A T568A	1
	Connection according to TIA 568 B	490153	**S***	RJ45-X 8pol. Cat.6A T568B AWG 26/19	1
	Connecting according to color coded Profinet.	490178	**S***	RJ45-MR 4pol. PROFINET	1

Dimensions

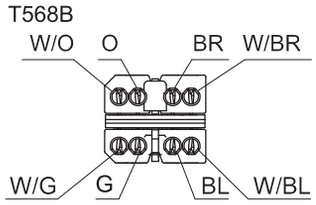


Technical data	490151	490152	490153	490178
Rated voltage	30 V			
Rated current	≤1 A per contact			
Pole number	8			4
Transfer rate	10 Gbit/s			100 Mbit/s
Category	$Cat.6_A$			Cat.5e
Shielding	shielded			
General				
Design	RJ45 angle connector			
Degree of polution	1			
Insulation resistance	> 500 MΩ			
Contact resistance	< 20 mΩ			
Flamability according to UL 94	V0			
Protection class	IP20			
Housing material	Zinc die-casting			
Color of the housing	silver			
Cover	PBT black			
Contact material	Spring steel gold-plated			
Strand diameter	1 – 1.6 mm		0.85 – 1.1 mm	1 – 1.6 mm
Cable diameter	5.5 – 10 mm			
Cross-section AWG	AWG 24/1-22/1, AWG 27/7-22/7		AWG 26/1-24/1, AWG 27/7-24/7, AWG 26/19	AWG 24/1-22/1, AWG 27/7-22/7, AWG 24/19-22/19
Operation temperature range	-40 °C … +85 °C			
Storage temperature range	-40 °C … +85 °C			
Mechanical service life	>750 insertion cycles			
Dimensions (w × h × d)	13.9 × 38.0 × 45.7 mm			
Weight (kg/piece)	0.030			0.025
Approvals	cULus (E326112)			
Standards	IEC 60603-7-51			IEC 61784-5-3
Comments				
Suitable for Profinet, SERCOS3, Ethercat, Ethernet/IP, Powerlink, VARAN, Power over Ethernet+ (PoE+IEEE 802.3at) Suitable cables, see overview assignment Ethernet cables to connectors				

Connection assignment

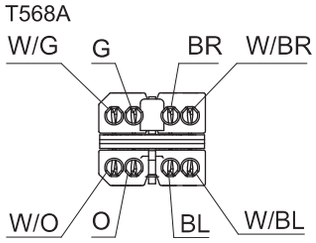
490151

T568B

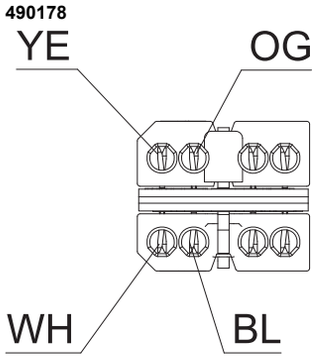


490152, 490153

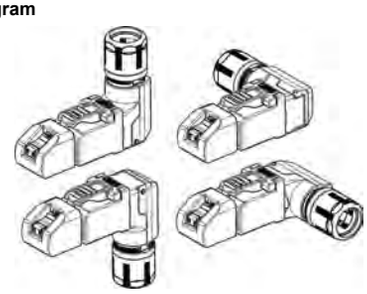
T568A



490178



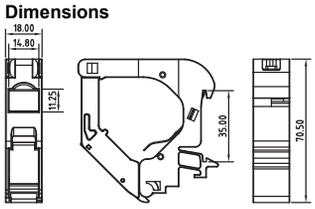
Mounting diagram



* **S** Article from stock
A Available with a lead time
R Available on request

Module holder, RJ45, female / IDC
For TS35 DIN rail
Cat. 6_A

Dimensions



Connection assignment
RJ45

	TIA 568A	TIA 568 B	Profinet
1	WHGN	WHOG	YE
2	GN	OG	OG
3	WHOG	WHGN	WH
4	BU	BU	-
5	WHBU	WHBU	-
6	OG	GN	BU
7	WHBR	WHBR	-
8	BR	BR	-

Description		Part-No.		Type	PU
Suitable for Ethernet applications					
Description	8-pin	490166	**S***	MDT-RJ45 F 8pol. Cat.6A	1

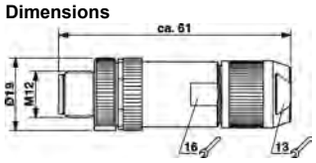
Technical data	**490166**
Rated voltage	125
Rated current	≤1.5 A per contact
Pole number	8
Transfer rate	10 Gbit/s
Category	Cat.6
Contact type	IDC
Shielding	shielded
General	
Design	RJ45 female
Nominal insulation voltage	– V
Test voltage	– V
Degree of polution	1
Insulation resistance	> 100 MΩ
Contact resistance	< 50 mΩ
Flamability according to UL 94	V0
Protection class	IP20
Housing material	PC
Color of the housing	grey
Contact material	CuSn, gold-plated
Cable diameter	4.5 – 8 mm
Cross-section AWG	AWG 24-22
Operation temperature range	-40 °C … +70 °C
Storage temperature range	-40 °C … +70 °C
Mechanical service life	>750 insertion cycles
Dimensions (w × h × d)	18.0 × 70.5 × 67.5 mm
Weight (kg/piece)	0.063
Approvals	cULus (E326112)
Standards	–

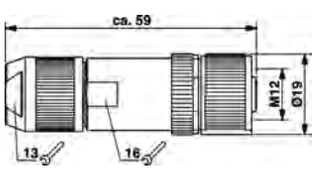
Accessories	**Part-No.**	**Type**	**PU**
Patch cable RJ45 Cat.5e	192000.xxxx	xxxx cable length from 0.5 - 30 m	1
Patch cable RJ45 Cat.6	192100.xxxx	xxxx cable length from 0.5 - 30 m	1

* **S** Article from stock
A Available with a lead time
R Available on request

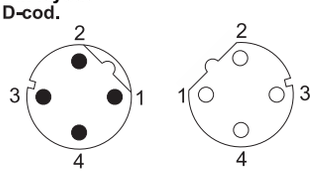
Field wireable connector, M12 straight, shielded
Male / female D-coded (Ethernet, Profinet, Sercos)
Spring terminal: Push-in connection technology

Dimensions





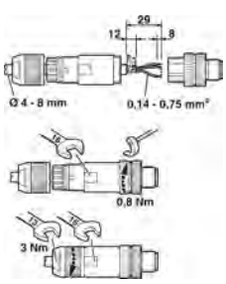
Pin layout
D-cod.



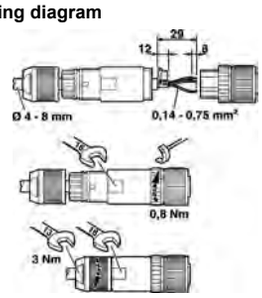
Description		Part-No.		Type	PU
Male					
Coding	D	490212	**S***	STGK4-M12 (C)-D FK	1
Female					
Coding	D	490213	**S***	KUGK4-M12 (C)-D FK	1

Technical data	**Male**	**Female**
Part-No.	490212	490213
Rated voltage U_N	AC/DC 24 V	
Rated voltage max.	60 V	
Rated current	4 A	
Pole number	4	
Status indication	–	
Current Consumption	– mA	
Coding	D	
Shielding	–	
General		
Connection device	Spring terminal Push-In	
Design	M 12×1 male straight	M 12×1 female straight
Rated insulation voltage (EN 50178)	–	
Test voltage	1500 V	
Degree of polution	3	
Insulation resistance	> 100 MΩ	
Contact resistance	< 5 mΩ	
Flamability according to UL 94	V0	
Protection class	IP65, IP67 in screwed condition	
Housing material	Zinc die-casting, nickel-plated	
Color of the housing	silver	
Contact material	CuSn, gold-plated	
Material knurled nut	Zinc die-casting, nickel-plated	
Material sealing ring	NBR	
Cross-section, metric	without AE: 0.14–0.75 mm^2 with AE: 0.14–0.5 mm^2	
Cross-section AWG	without AE: AWG26–AWG18 with AE: AWG 28–AWG20	
Cable diameter	4 – 8 mm	
Tightening torque	M12-knurled nut: 0.4 Nm sleeve housing: 0.8 Nm pressure nut: 3 Nm	
Storage temperature range	40 °C … +85 °C	
Temperature range connector	40 °C … +85 °C	
Mechanical service life	>100 insertion cycles	
Weight (kg/piece)	0.037	0.042
Approvals	–	
Standards	IEC 61076-2-101, EN 50155 (2001) vibration and shock	

Mounting diagram



Mounting diagram



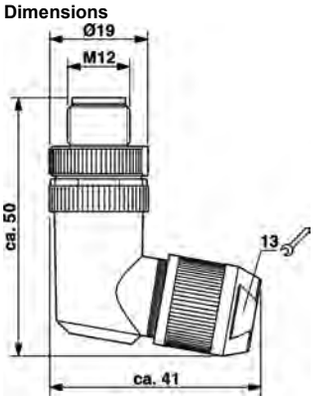
* **S** Article from stock
A Available with a lead time
R Available on request

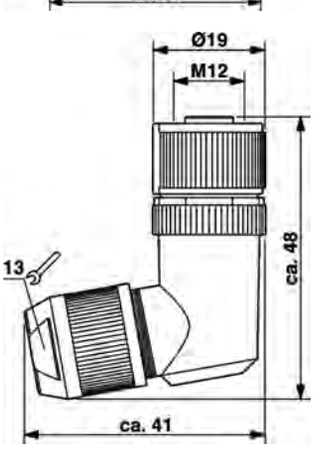
Field wireable connector, M12 straight, shielded
Male / female D-coded (Ethernet, Profinet, Sercos)
Spring terminal: Push-in connection technology

Description		Part-No.		Type	PU
Male					
Pole number	4	490214	**S***	STWK4-M12 (C)-D FK	1
Female					
Pole number	4	490215	**S***	KUWK4-M12 (C)-D FK	1

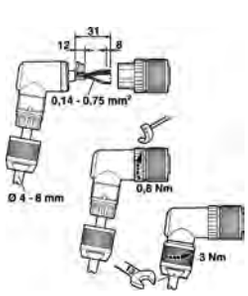
Technical data	Male	Female
Part-No.	490214	490215
Rated voltage U_N	AC/DC 24 V	
Rated voltage max.	60 V	
Rated current	4 A	
Pole number	4	
Cable length	– m	
Status indication	–	
Stromaufnahme pro LED	– mA	
Coding	D	
Shielding	–	
General		
Connection device	Spring terminal Push-In	
Design	M 12×1 male angle connector	M 12×1 female angle connector
Rated insulation voltage (EN 50178)	–	
Mounting	Coding can be rotated in the 45° increments	
Test voltage	1500 V	
Degree of polution	3	
Insulation resistance	> 100 MΩ	
Contact resistance	< 5 mΩ	
Flamability according to UL 94	V0	
Protection class	IP65, IP67 in screwed condition	
Housing material	Zinc die-casting, nickel-plated	
Color of the housing	silver	
Contact material	CuSn, gold-plated	
Material knurled nut	Zinc die-casting, nickel-plated	
Material sealing ring	NBR	
Cross-section, metric	without AE: 0.14–0.75 mm² with AE: 0.14–0.5 mm²	
Cross-section AWG	without AE: AWG26–AWG18 with AE: AWG 28–AWG20	
Cable diameter	4 – 8 mm	
Tightening torque	M12-knurled nut: 0.4 Nm sleeve housing: 0.8 Nm pressure nut: 3 Nm	
Storage temperature range	40 °C … +85 °C	
Temperature range connector	40 °C … +85 °C	
Mechanical service life	>100 insertion cycles	
Weight (kg/piece)	0.039	0.044
Approvals	–	
Standards	IEC 61076-2-101, EN 50155 (2001) vibration and shock	

Dimensions

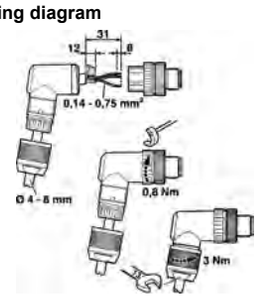




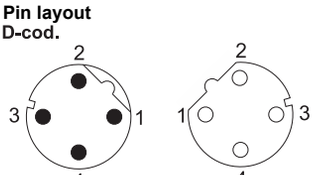
Mounting diagram



Mounting diagram



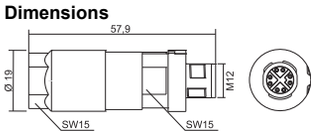
Pin layout
D-cod.

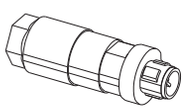


* **S** Article from stock
A Available with a lead time
R Available on request

Field wireable connector, M12 straight shielded
Male - X coded Cat 6_A (Ethernet, Profinet)
IDC/quick-connect technology

Dimensions





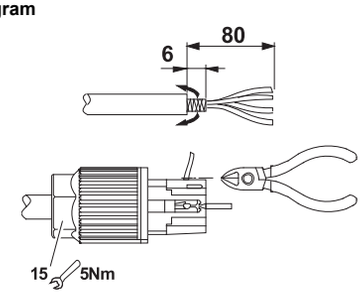
Pin layout

Description		Part-No.		Type	PU
Male					
Pole number	8	490167	**S***	STGK8-M12(C) 8pol. X-kod. Cat.6A	1

Technical data	**Male**
Rated voltage U_N	DC 50 V
Rated current	0.6 A
Pole number	8
Coding	X
Shielding	360°
General	
Design	M 12×1
Degree of polution	3
Insulation resistance	> 100 MΩ
Flamability according to UL 94	V0
Contact resistance	≤5 mΩ
Protection class	IP65/67
Housing material	Zinc die-casting
Contact material	CuSn, gold-plated
Material sealing ring	NBR
Strand diameter	
Cable diameter	0.9 – 1.6 mm
Storage temperature range	-40 °C … +85 °C
Temperature range connector	-40 °C … +85 °C
Connection device	Compliant terminal
Cross-section AWG	AWG 26-22
Mechanical service life	>100 insertion cycles
Weight (kg/piece)	0.043

Accessories	**Part-No.**	**Type**	**Jacket material**
matching cables	104338	EL BUS(C)PVC ET(4×(2×AWG26/7)St)C Cat.6A	PVC
	104331	EL ET BUS(C)PVC PIMF (4×(2×AWG26/7)) GN	PVC
	104347	SU BUS(C)P ET(4×2×AWG26/19)C UL Cat.6	PUR

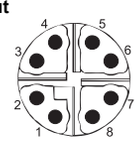
Mounting diagram



* **S** Article from stock
A Available with a lead time
R Available on request

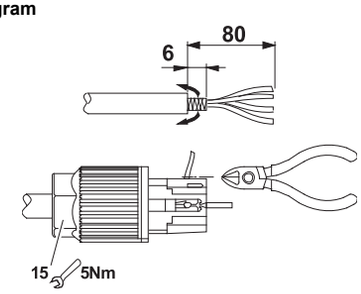
Field wireable connector, M12 straight shielded
Female - X coded Cat 6_A (Ethernet, Profinet)
IDC/quick-connect technology

Pin layout



Description		Part-No.		Type	PU
Pole number	8	490168	**S***	KUGK8-M12(C) 8pol. X-kod. Cat.6A	1
Technical data				–	
Rated voltage U_N				DC 50 V	
Rated current				0.6 A	
Pole number				8	
Coding				X	
Shielding				360°	
General					
Design				M 12×1	
Degree of polution				3	
Insulation resistance				> 100 MΩ	
Flamability according to UL 94				V0	
Contact resistance				–	
Protection class				IP65/67	
Housing material				Zinc die-casting	
Contact material				CuSn, gold-plated	
Material sealing ring				NBR	
Strand diameter					
Cable diameter				5 – 9.7 mm	
Storage temperature range					
Temperature range connector				-40 °C … +85 °C	
Connection device				Compliant terminal	
Cross-section AWG				AWG 26-22	
Mechanical service life				>100 insertion cycles	
Weight (kg/piece)				0.022	

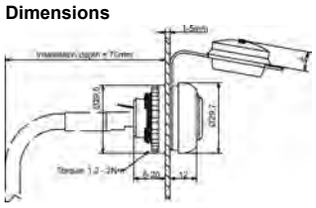
Mounting diagram



* **S** Article from stock
A Available with a lead time
R Available on request

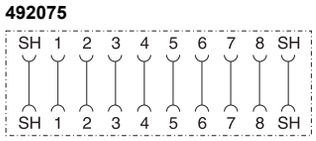
RJ45 panel connector for front installation 22.5 mm female/female 1:1 Cat 5e/6

Dimensions

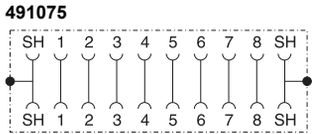


Circuit diagram

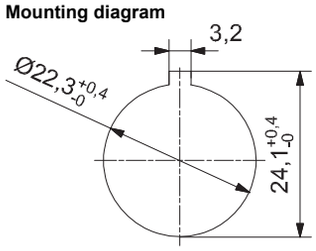
492075



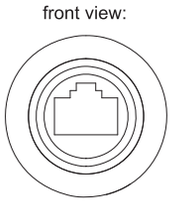
491075



Mounting diagram



front view:



Description		Part-No.		Type	PU
Category					
Category	Cat.5e	492075	**S***	RJ45 F/F 8/8 Cat.5e	1
	Cat.6	491075	**S***	RJ45 F/F 8/8 Cat.6	1

Technical data	**492075**	**491075**
Rated voltage U_N	AC 24 V	
Rated voltage max.	50 V	150 V
Rated current	1.5 A	
Pole number	8	
Cable length	– m	
Transfer rate	100 MHz	250 MHz
Category	Cat.5e	Cat.6
Contact type	1 : 1	
Shielding	connected through	360°
Coding	–	
General		
Design	RJ45	
Test voltage	– V	
Degree of polution	3	
Insulation resistance	> 100 MΩ	
Contact resistance	< 30 mΩ	
Flamability according to UL 94	V0	
Protection class	IP65 IP20	
Housing material	PA PBT	
Cover	TPU	
Contact material	CuSn, gold-plated	
Mounting	Front installation	
Installation depth	70 mm	
Number of conductors/cross-section	8×2	
Jacket material	–	
Cable diameter	– mm	
Bending radius	–	
Operation temperature range	-25 °C … +70 °C	
Storage temperature range	-25 °C … +80 °C	
Mechanical service life	>750 insertion cycles	
Dimensions (∅×d)	29.5 × 29 mm	
Weight (kg/piece)	0.016	
Approvals	cULus (E326112)	

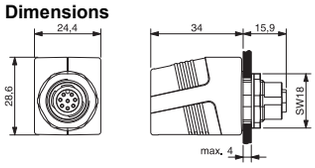
* **S** Article from stock
A Available with a lead time
R Available on request

Control cabinet bushing M12 - RJ45 female/female 1:1 Cat 5e (Ethernet, Profinet)

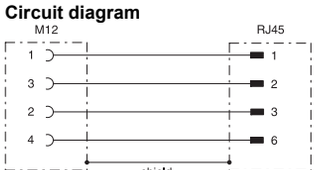
Description	Part-No.		Type	PU
Design	490105	S*	M12-RJ45 F/F 90° 4/4 Cat.5e Profinet	1
	490106	S*	M12-RJ45 F/F 180° 4/4 Cat.5e Profinet	1

Technical data	490105	490106
Rated voltage U_N	24 V	
Rated voltage max.	50 V	
Rated current	1 A	
Pole number	4	
Cable length	– m	
Transfer rate	0.1 Gbit/s	
Category	Cat.5e	
Contact type	1 : 1	
Shielding	360°	
Coding	D	
General		
Design	RJ45/M 12×1	
Test voltage	– V	
Degree of polution	–	
Insulation resistance	> 100 MΩ	
Contact resistance	< 30 mΩ	
Flamability according to UL 94	V0	
Protection class	IP67	
Housing material	PA	
Cover	–	
Contact material	Phosphor Bronze, gold-plated	
Mounting	–	
Installation depth	70 mm	
Number of conductors/cross-section	–	
Jacket material	–	
Cable diameter	– mm	
Bending radius	–	
Operation temperature range	-25 °C … +85 °C	
Storage temperature range	-25 °C … +85 °C	
Mechanical service life	>750 insertion cycles	
Dimensions (∅×d)	29.5 × 29 mm	
Weight (kg/piece)	0.037	
Approvals	–	

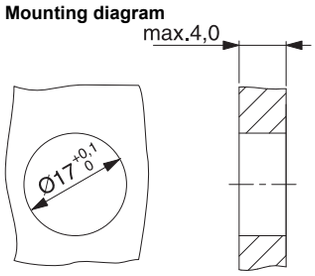
Dimensions



Circuit diagram



Mounting diagram



* **S** Article from stock
A Available with a lead time
R Available on request

Notes

Product Overview:
Cassification Etherne t

Ethernet cables

Art.no	Description	C-track compatible	Cat	Iso.	490128 - 490174 - 490151 AWG 27 - 22	490129 - 490175 - 490152 AWG 27 - 22	490138 - 490176 - 490153 AWG 26	490177 - 490178 - AWG 27 - 22	490166 AWG 24 - 22	490212 - 490215 AWG 28 - 20	490167 - 490168 AWG 26 - 22	PROFINET	EtherCAT	POWERLINK	sercos	CC-Link IE Field	EtherNet/IP
104301	Prof. (2X2XAWG22/1) UL		Type A	PVC				•	•	•		•	•		•		
104302	Prof. (2X2XAWG22/19) UL	•	Type C	PUR				•	•	•		•	•		•		
104303	Prof. (2X2XAWG22/7) UL	•	Type C	PUR				•	•	•		•	•		•		
104307	Prof. (2X2XAWG22/7) UL		Type B	PVC				•	•	•		•	•		•		
104331	Eth. (4X(2XAWG26/7) UL		7	PVC			•				•						•
104335	Eth. (4X2XAWG26/7) UL		5e	PVC			•										•
104336	Eth. (4X2XAWG24/7) UL		5e	PVC	•	•			•							•	•
104337	Eth. (4X2XAWG24/19) UL	•	5e	PUR	•	•			•							•	•
104338	Eth. (4X(2XAWG26/7) UL		6_A	PVC			•		•		•						•
104347	Eth. (4X2XAWG26/19) UL	•	6	PUR			•		•		•						•
104350	Eth. (4X2XAWG22/7) UL		5e	PVC	•	•			•								•
104379	Prof. (2X2XAWG26/19) UL	•	5e	PUR			•			•		•	•	•			
104396	Eth. (4X2XAWG26/19) UL	•	5e	PUR			•										•
104397	Eth. (4X(2XAWG22/1) UL		6_A	PVC	•	•			•		•	•				•	•
104401	Eth. (4X(2XAWG24/7) UL	•	6_A	PUR	•	•			•		•	•					•

t Cable and connector

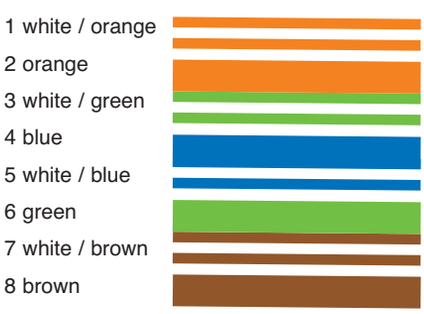
Ethernet connector RJ45 / M12

RJ45 T568B

490128
with cable
clamp

490174
with cable
fitting

490151
with cable
fitting

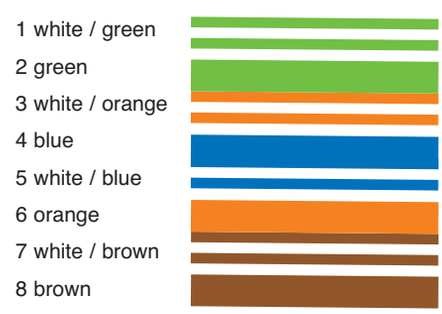


RJ45 T568A

490129
with cable
clamp

490175
with cable
fitting

490152
with cable
fitting

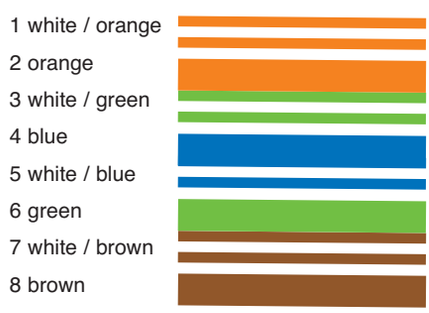


RJ45 T568B AWG26

490138
with cable
clamp

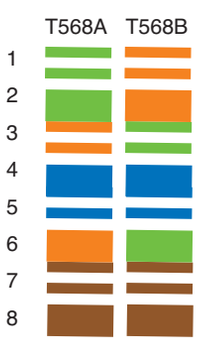
490176
with cable
fitting

490153
with cable
fitting



RJ45 T568A/B

490166
Module holder



M12

490212
D-cod. pin

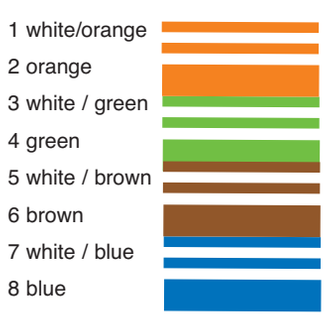
490214
D-cod. pin

490213
D-cod. female

490215
D-cod. female

490167
X-cod. pin

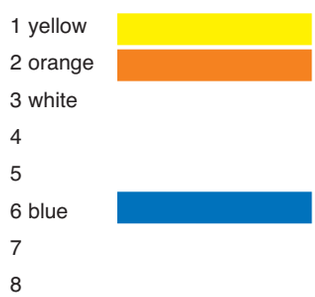
490168
X-cod. female



Profinet RJ45

490177
straight

490178
angled



AC Access Client Radio-supported communication unit that has to log onto the Access Point (--> AP). Only after successful authentication is it possible for the Access Client to transmit data to the network, or to receive data from the network. (--> Wireless LAN)
Access Protocol Access procedure. Governs access to the medium. Ethernet: CSMA/CD; Token Ring: Token FDDI: Append Token; WLAN: CSMA/CA
Access procedure --> Access Protocol.
ACK Acknowledge Designates a positive confirmation of receipt. ACK is part of the communication protocol and is responsible for the confirmation of receipt of the transmission.
ACR attenuation to crosstalk ratio; corresponds to a signal-to-disturbance signal distance for interference from other pairs. Is determined by simple subtraction of the dB values
ADSL Asymmetric Digital Subscriber Line. Long-distance access
AES Advanced Encryption Standard. Encryption standard with 128-, 192- and 256-bit encryption. This symmetrical encryption is intended to replace the previous DES standard.
Aging Process (algorithm) for updating data, especially address memory. After a time elapses, an address is marked as "old" and deleted in the next pass, if it is not detected at a port before that.
AP Access Point. In wireless networks the Access Point is the --> bridge to the wire-bound networks. It can be connected directly to Ethernet, Token Ring or ATM. The access point is connected with all of the network accounts ("access clients"), and performs central functions such as roaming or security. (--> Wireless LAN)
API Application Programming Interface
ARP Address Resolution Protocol requests the associated MAC address via the IP address. --> RARP
ARS Automatic Rate Selection. Independent selection of the transmission speed by the access point (--> AP) depending on the connection quality (distance).
ASN 1 Abstract Syntax Notation One. Programming language of the --> MIB.
ATM Asynchronous Transfer Mode. Based on cells of 53 bytes. Suitable for telephone, video and other data transmission. Is primarily used in WAN applications.
AUI Attachment Unit Interface. Interface for physical isolation of transceivers from Ethernet controllers (cable up to a max. of 50 m)
Autocrossing A function that allow automatic crossing of the transmission and reception conductors at twisted pair interfaces. Switches that support this function can be connected to each other via a 1:1 wired cable instead of a crossover cable.
Autonegotiation Detects on the port the transmission parameters of the connected device, such as speed, duplex mode and flow control, and automatically adjusts itself to the optimal values.
Autopolarity A function of devices with a 10 BASE-T or 100 BASE-TX interface for automatic correction of wiring errors in twisted pair cables, which leads to a polarity reversal of the data signals.
Autosensing A function that allows a device to automatically detect the data rate (10 Mbit/s or 100 Mbit/s, 1 Gbit/s), and to transmit and receive using this data rate.
Backpressure Simulates a collision in HDX mode by generating a jam signal. --> Flow-Control
Bandwidth Amount of data that can be transferred in one second. For a single connection this is the same as the speed.
Bandwidth-length product Used to estimate what distance a multimode fibre supports with a certain data rate (speed). The gross rate must be used here.
BFOC Bayonet Fiber Optical Connector. Also known as an ST Connector (AT&T brand). Fibre-optic connector with bayonet connector. The only standardised connector for 10 Mbit/s Ethernet. Available for multimode and single mode glass fibres and also for --> POF.
BGNW The BGNW (Benutzergruppe Netzwerke / Network User Group) is a manufacturer-neutral, independent interest group for leading international users and manufacturers of Network systems. The goal of the association is to promote its participants and to facilitate the exchange of information among them, as well as developing recommendations for the planning, installation, and operation of networks.
BGP Border Gateway Protocol. Routing protocol in the --> WAN.
BLP --> Bandwidth Length Product
BNC Bayonet Neill-Concelman. Connector for connection of 10 Base2 coax cables to a --> MAU.
BOOTP Bootstrap Protocol. Supplies the statically assigned IP address for an assigned MAC address. In comparison to --> RARP rootbar.
Bridge --> Switch
Broadcast data packet that is address to everyone in a network. Hubs and switches are transparent for broadcasts. Only routers limit a broadcast, if necessary. --> Multicast and Unicast.
BT Bit Time, duration of a bit.
CCITT Comité Consultatif International Téléphonique et Télégraphique. Now --> ITU-T
CC-Link - Control and Communication Link, Industrial automation network based on Ethernet
CCK Complementary Code Keying. CCK is used in the 11 Mbit/s-version of the 802.11 LAN (80211b), and can pack a number of bits in a single symbol. This allow a higher transmission rate.
CD Collision Detect.
CHAP Challenge Handshake Authentication Protocol. PPP authentication method. Passwords are transmitted with a random number. Comparison -> PAP
Cheapernet coax cable according to Ethernet partial standard 10BASE2. Synonyms: ThinWire, RG58.
CoS Class of Service. A network with class of service makes it possible to to transfer data with minimal delay in an environment in which a network is shared by many users, CoS classifies the data data traffic into categories such a high, medium and low (gold, silver and bronze)
CRC Cyclic Redundancy Check. Error check mechanism in which the recipient performs a polynomial calculation. The result is compared with a value saved in the frame that is determined by the transmitter using the same procedure. See also FCS.
CSMA/CD Carrier Sense Multiple Access Collision Detect. Access procedure for Ethernet. A station that wants to transmit listens whether the network is free (carrier sense). After that it begins to transmit, and at the same time check whether other stations have also begun to transmit (multiple access), which could lead to collisions (collision detection). The collision is detected by the station and they cancel the transmission. They start a new transmission attempt after a time determined by a random generator.
Cut-Through Switching method in which a packet is forwarded as soon as the target address is recognised. This means that the latency is short, but faulty packets are still forwarded. This is also known as "on-the-fly packet switching". Also see Store & Forward.
DA See Destination address.
Attenuation Ratio of power fed to power received on a transmission line, both for copper cables and for fibre-optic cables. Specified in dB per unit of length
DBPSK Differential Binary Phase Shift Keying. DBPSK is a modulation process for systems with 1 Mbit/s that is used with the --> DSSS transmission process according to the 802.11 standard.
DCE Data Communication Equipment, e.g. printers, modems. --> DTE
DES Data Encryption Standard. Systematic encryption algorithm. The same secret key is used for encryption and decryption; i.e. all instances that have to be able to encrypt and decrypt have to know the key. DES encodes with a 56-bit key. 3DES increases the security of the normal DES method by encrypting the data with a key that is three times longer (168 bits).
Destination Address Destination address in Ethernet, IP, etc. "Address on the data packet"
DeviceNet DeviceNet is a low cost industrial network that uses CAN technology. It links industrial components such as limit switches, valves, motor switches and drives with a PLC or a PC.
DHCP Dynamic Host Configuration Protocol. On request informs a device as to its IP address, which is fixed via the associated MAC address, or is assigned dynamically.
Dispersion - Signal spreading through propagation time differences, especially in optical fibres: Mode dispersion in multimode, chromatic dispersion in single mode)
DNS Domain Name System. Resets host name in IP addresses per DNS server or statically per “hosts” file.
Domain Broadcast domain: Network area that is only limited by routers, i.e. within which a broadcast can propagate freely. --> Collisions domain: Network area that is delimited by switches or routers, and in which collisions can propagate freely.
DQPSK Differential Quaternary Phase Shift Keying. DQPSK is a modulation process for systems with 1 Mbit/s or 2 Mbit/s, which is used with the **DSSS** transmission process, standard 802.11.
DSC Duplex straight connector. See also SC.
DSL Digital Subscriber Line. Technology to operate the Internet with 1.5 MBit/s over copper cables.

DSSS Direct Sequence Spread Spectrum. DSSS is a transmission method according to standard 802.11. By means of encoding, this method converts the narrowband signal into a broadband signal. In this way it is possible to use the entire frequency band, thus achieving a higher data transmission rate and lower susceptibility to interference.
DTE Data Terminal Equipment, e.g. computers. See also difference from **DCE** Pin assignment.
Dual Homing Network technology in which a device is linked to a network via two independent points of attachment. One point of attachment is the primary connection, while the other is standby connection that is activated if the primary connection fails.
DVMRP Distance Vector Multicast Routing Protocol: Internetwork gateway protocol, largely based on RIP. DVMRP uses IGMP to exchange routing datagrams with its neighbours.
DWDM Dense Wavelength Division Multiplex.
Dynamic DNS: Assigns the same name when there is a changing IP address.
EMC - electromagnetic compatibility
Electromagnetic compatibility. Interference immunity and emissions behaviour with regard to electromagnetic interference, Class A/B.
EtherCat: Industrial Ethernet system from the company Beckhoff
Ethernet Data network, standardised in IEEE 802.3 since 1983. Based on the access procedure --> CSMA/C. Variable packet length from 64 bytes to 1518 bytes (1522 with TAG field). Speeds/bandwidth: 10 Mbit/s, 100 Mbit/s (Fast Ethernet), 1000 Mbit/s (Gigabit Ethernet) and 10000 Mbit/s (10-gigabit Ethernet).
EtherNet/IP is a protocol stack for Ethernet that has been developed for industrial applications. EtherNet/IP is based on the standard TCP/IP protocol, and uses a common application layer with DeviceNet. It thus makes it easier to exchange information between device level networks and information systems at the plant level.
Industrial Ethernet system of the --> ODVA
ETHERNET Packet Designation for a data packet. Besides the actual user data, it also contains the destination and source address fields (DA and SA), the TAG field (4 bytes, optional) and the Length/Type field.
FCS Frame Check Sequence. Checksum at the end of an Ethernet packet; is calculated and entered by the sender. The recipient calculates the checksum based on the received packet and compares it with the entered value. See also CRC.
FDB Forwarding Data Base. Address table of a switch that it uses to decide what port a packet has to be sent to. In the address table, a MAC address is assigned to the port that is used to reach the corresponding device. The table is updated regularly (--> Aging).
FDDI Fiber Distributed Data Interface. Data network, standardised in ISO 9314, ANSI X3T9.5 and X3T1 2.
FDX Full Duplex. Transmission mode of a component: simultaneous transmitting and receiving is possible. No access procedure necessary. See also HDX.
FEXT Far End Crosstalk: Crosstalk at the far end in symmetrical copper cables.
Flame-retardant - Characteristic of a cable not to spread a flame (wicking effect) and/or to extinguish it.
Flow-Control Strategy in case of overload at the output port and the start of a memory overflow: discarding of packets at the input port or signalling to connected devices that they should stop transmitting by simulating a collision in HDX mode or by transmitting special "Pause" packets in FDX mode.
F/O Fiber optics.
Frame Relay Modified version of X.25 packet switching in a WAN.
FTP - Foiled Twisted Pair, foil-shielded symmetrical data cable
FTP 1. File Transfer Protocol. Protocol on Layer 5, uses TCP for transfer, therefore used in WANs. 2. Foiled Twisted Pair.
FTTD Fiber To The Desk Office wiring with fibre-optic cables as far as the end node
Full Duplex --> FDX
GARE Generic Attribute Registration Protocol. Protocol family for exchanging parameters between switches on Layer 2, at present there exist --> GMRP and --> GVRP.
Gateway Component above Layer 2 of the ISO/OSI Reference Model. On Layer 3 usually called a router. Converts protocols of these layers into each other.
GBIC Gigabit interface converter. See under SFP.
Gbps Gigabits per second, Gbit/s.
GMRP --> GARP Multicast Registration Protocol.
GVRP --> GARP VLAN Registration Protocol.
Half Duplex --> HDX
Halogen-free: In the event of a fire, halogen-free cables do not form any acidic fumes, which are very dangerous for both people and electronic devices
HASH Checksum that ensures the integrity of information.
HCS® Hard Polymer Clad Silica. Plastic fibre with a core of fuse quartz. --> PCF --> POF.
HDX Half Duplex. Transmission mode of a component: Either transmitting or receiving is possible. In Ethernet, the access procedure CSMA/CD is required for this. --> FDX.
HiRRP Protocol for controlling redundant routers. If one of the two routers fails, then within 800 ms the remaining router completely assumes the tasks of the other one.
Hops Maximum number of router steps possible for a data packet. See also TTL.
HSRP Hot Standby Routing Protocol. Protocol for controlling redundant routers. See also VRRP.
HTML Hypertext Markup Language.
HTTP Hypertext Transfer Protocol. Protocol used by web browsers and web servers for transmitting data, such as text and images.
HTTPS --> HTTP Secure. HTTP communication encrypted in packets.
Hub Component on Layer 1 of the ISO/OSI Reference Model. Regenerates the amplitude and the signal shape of the incoming signal and forwards it to all of the other ports. Synonyms: Star coupler, concentrator.
IAONA (Industrial Automation Open Networking Alliance Europe e.V) Europe was founded in 1999 at the SPS/IPC/Drives trade fair Nuremberg. IAONA is an association that now includes more than 130 leading international manufacturers and users of automation systems. The association's goal is to establish Ethernet on the international level as the standard application in all industrial environments. The purpose of this is to bring about uniform, interface-free communication through all levels of a company. This relates to all areas of factory, process and building automation. For further information: http://www.iaona-eu.com/
ICMP Internet Control Message Protocol. Best-known command: Ping.
ID Identifier.
IDA Interface for Distributed Automation. Open interface based on the TCP/IP stack, for automation applications.
IEC International Electrotechnical Commission. international standardisation body
IEEE Institute of Electrical and Electronics Engineers. Standardisation body for LANs with the important standards 802.3 for Ethernet, 802.1 for switches.
IETF Internet Engineering Task Force.
IFG Inter Frame Gap. Minimum gap between two packets. Synonym: Inter Packet Gap (IPG).
IGMP Internet Group Management Protocol. Layer 3 protocol for multicast transport, see also GMRP.
IGMP Snooping Internet Group Management Protocol Snooping. A function in which the switches examine IGMP packets and assign the membership of a node to a multicast group to the respective port. In this manner it possible to send multicasts specifically to those segments that contain nodes of a group.
IGP Interior Gateway Protocol.
IGRP Interior Gateway Routing Protocol. Internet Protocol see IP.
IP Internet Protocol. Transmission protocol on Layer 3, widely used (> 80%). IPv4: Vers. 4=4-byte addresses; IPv6: Vers. 6 =16-byte addresses, IPnG=IPv6
IP address Logical address, assigned by the network operator. Address format (v4): 4 bytes in decimal code, separated by dots, e.g. 192.178.2.1. See also net mask.
IPnG IP next generation. Transmission protocol, see IP.
IPsec IP Security. Standard that makes it possible to ensure the authenticity of the sender, confidentiality and the integrity of data in IP datagrams by means of encryption. With IPSec a --> VPN can be set up on Layer 3. For encryption IPsec uses --> 3DES, for example.
IPv4 IP Version 4. Transmission protocol, see IP.
IPv6 IP Version 6. Transmission protocol, see IP.
IPX Internet Packet Exchange. Protocol stack from Novell, comparable to TCP/IP.

ISDN Integrated Services Digital Network. WAN transmission protocol.
ISO International Organization for Standardization. Global standardisation body.
ISO/OSI --> OSI reference model..
ISP Internet Service Provider.
Jabber In Ethernet, a faulty frame with more than 1518 bytes.
Jitter Time variation of the signal edge.
Kbps Kilobits per second, kbit/s.
L2TP Layer 2 Tunneling Protocol. For setting up a --> VPN tunnel on Layer 2. --> IPsec.
LACP Link Aggregation Control Protocol.
LAN Local Area Network. Local network, e.g. Ethernet, FDDI and token ring. --> WLAN.
LAP Link Access Protocol.
Latency Time difference between the receipt and forwarding of data, generally between the last bit received and the first bit sent.
Skew Difference in propagation delays on various pairs, extremely important in full duplex parallel operation
Propagation Delay Time that an electromagnetic signal requires for a particular transmission line, inverse of the signal velocity
Link Aggregation Combination of several ports (maximum 4) into one virtual port. Parallel connection transmission with redundancy in case of failure of a port. Standard IEEE 802.3. Colloquially also called "trunking".
LLC Logical Link Control. Layer 2b.
LSB Least Significant Bit.
Fibre-optic cable Optical transmission medium
LX Long Wavelength (Gbit Ethernet).
MAC Medium Access Control. MAC address, hardware address of a component in the network. The MAC address is assigned by the manufacturer. Address format: 6 bytes in hex code, separated by colons, e.g. 00:80:63:01:A2:B3
MAN Metropolitan Area Network. For connecting various --> LANs within a city.
Management Administration, configuration and monitoring of network components. The management agent of the components being managed communicates with the management station (computer) via the management protocol SNMP
MAU Medium Attachment Unit. --> Transceiver.
Mbps Megabits per second, Mbit/s
MD5 Message Digest 5. See also Hash Algorithm.
MDI Medium Dependent Interface.
MDI-X MDI-Crossover, see also MDI.
MIB Management Information Base. Contains the description of the objects and functions connected in a network.
MII Media Independent Interface.
Mini-GBIC Mini gigabit interface converter. --> SFP.
MLPPP Multi Link PPP. --> PPP.
Modbus TCP, industrial Ethernet system based on the Modbus protocol
Modes - Propagation paths of the light in an optical fibre
MPLS Multiprotocol Label Switching. Layer 3 protocol.
MSB Most Significant Bit.
MTBF Mean Time Between Failure.
MTTR Max Time To Repair.
Multicast Data packet directed to a group of devices, e.g. to all Lütze devices.
Multimode fibres Optical fibres with relatively large core diameters. In them, the light propagates over multiple paths - multiple modes. Typical core diameters are 100μm for step index fibres, for glass fibres, 200μm for PCS/HCS® fibres and 980 μm for POF fibres. Gradient index fibres are generally made of glass, and have a typical core diameter of 50 μm or 62.5 μm. Conditionally through these --> Single mode fibre.
NAT Network Address Translation.
NAT-T NAT Traversal. Normally --> IPsec does not function if there is a --> **NAT** Gateway between the two IPsec end points, because the IP address of the end point is also encrypted. This problem can be circumvented using NAT-T. If supported, NAT-T is switched on automatically if necessary when establishing a connection (handshake).
NetBEUI NetBIOS Extended User Interface. Extended version of the **NetBIOS** protocol, which is used by network software such as LAN Manager, LAN Server, Windows for Workgroups and Windows NT.
Net Mask The net mask marks all bits of an IP address that serve to identify the network and the subnetwork. --> IP address.

Binary depiction
IP address 10010101.11011010.00010011.01011010
Net mask 11111111.11111111.11111111.00000000
--> Subnetwork
10010101.11011010.00010011.00000000
Decimal depiction
IP address 149.218.19.90
Net mask 255.255.255.0
-> Subnetwork 149.218.19.0
Available address range
Node addresses 149.218.19.1 to 149.218.19.254
Broadcast address 149.218.19.255
NEXT Near End Cross Talk.
NIC Network Interface Card. Network interface in the computer.
NMS Network management system.
Node Node in a data network (computer, printer, hub, switch, etc.), is sometimes erroneously used with the meaning "hub" or "switch".
NRZ Non Return to Zero. Signal code. --> NRZI.
NRZI Non Return to Zero Invert. Signal code. --> NRZ.
NVRAM Non-Volatile RAM. Non-volatile memory.
ODVA Open Device Vendor Association is an organisation that promotes the worldwide use of DeviceNet and Ethernet/IP network technologies and standards in industrial automation.
OID Object ID.
OLE Object Linking and Embedding is a technology for transmitting different data between devices.
OPC OLE for Process Control. Protocol in process automation for standardised data exchange between Windows applications.
OSI Open Systems Interconnection. International standardisation programme, originated by --> ISO and --> ITU-T, in order to create standards for data networks to ensure the compatibility of devices from various manufacturers.
OSI Model Model describing communication in a network. The functionality of the hardware is subdivided into 7 layers. In the lowest layer (physical layer), adaptation to the medium is performed.
OSPF Open Shortest Path First. Protocol for the exchange of routing information between routers. Faster than --> RIP and suitable for larger networks.
OTDR Optical Time Domain Reflectometer Versatile optical measuring device for fibre-optic networks.
OUI Organizationally Unique Identifier. The first three bytes of the --> MAC address indicate the manufacturer of the components.
Packet size Frame size. Ethernet: 64 ... 1518 bytes (1522 with VLAN tag, FDDI:... 4500 bytes.
PAP Password Authentication Protocol. PPP authentication method. Passwords are transmitted in unencrypted form. PAP is based on usernames.
Parallel Detection Subfunction of -->autonegotiation, to adjust settings for a partner that does not support autonegotiation. A port detects the speed based on FLP or NLP and sets itself to 100 Mbit/s or 10 Mbit/s accordingly. HDX is always used as the duplex mode.
PCF Plastic Cladding Silica Fiber. Plastic fibre with a core of fuse quartz. --> POF --> HCS®.
PD Powered Device. Describes the end device (e.g. an IP telephone, in the draft standard IEEE P802.3af (DTE Power via MDI). IEEE P802.3af defines how a power supply can be provided via an Ethernet twisted pair cable.
PDU Protocol Data Unit.
PHY Physical sublayer. Physical layer/components (on Level 1 b).
PIMF Pair in Metal Foil (data cable). --> STP.
PLC Programmable Logic Control. --> PLC - Programmable Logic Control.
PMD Physical Medium Dependent. Physical layer/components on Level 1 a.
POE Power over Ethernet.
POF Polymer Optical Fiber. Plastic optical fibre --> HCS® --> PCF.
POL Power over LAN.
Port Mirroring The data traffic of a port (In/Out) is mirrored (copied) on another port, for example to allow it to be examined with an analyzer.
Port Trunking --> Link Aggregation.
PowerLink Industrial Ethernet system from the company B&R

PLC Programmable Logic Controller.
PPP Point-to-Point Protocol. Creates router-to-router and host-to-network connections. PPP works with protocols from various level, such as IP, IPX and ARA. PPP has integrated security mechanisms such as CHAP and RAR.
PPPoE --> Point-to-Point-Protocol over Ethernet.
PPS Packets Per Second. Data packets per second
PPTP Point-to-Point Tunneling Protocol.
Prioritisation Data packets are given priority handling based on defined criteria. Identification on Layer 2 with inserted --> tag field, on Layer 3 in the --> TOS field of --> IP.
Private Key --> Private/Public Key: In asymmetrical encryption algorithms, two keys are used: one public one (public key) and one private one (private key). The public key is made available by the future recipient of data to those who will be sending the data to him. The private key is kept only by the recipient. It is used to decrypt the received data.
ProfiNet, industrial Ethernet system from Siemens
PS Power Supply. --> PSU.
PSE Power Sourcing Equipment. Describes the device supplying power (e.g. a switch) in the draft standard IEEE P802.3af (DTE Power via MDI). IEEE P802.3af defines how a power supply can be provided via an Ethernet twisted pair cable.
PSU Power Supply Unit. --> PS.
PTP Precision Time Protocol. Protocol for time synchronisation acc. to IEEE 1588, with a precision of less than 1μs.
Public Key --> Private/Public Key
PUR - Polyurethane, high-quality jacket material for cables
PVC - Polyvinyl chloride, economical insulation and jacket material for cables
PVV Path Variability Value. Specified in bit times.
QoS Quality of Service. Quality of the transmission, e.g. speed, bandwidth, delay, reliability or priority. In Level 2 for IEEE 802.1D implemented only for priority. --> Prioritisation.
RADIUS Remote Authentication Dial In User Service. A RADIUS server authenticates access for a client that logs on with its name and password. Passwords are transmitted in encrypted form.
RAM Random Access Memory. Volatile memory
RARP Reverse Address Resolution Protocol. Supplies the statically assigned IP address for an assigned MAC address. See also BOOTP and DHCP.
RAS Remote Access System.
Repeater Components for signal regeneration on Level 1. Regenerates the amplitude, signal edge and cycle. Repeaters with more than 2 ports are also called hubs.
RFC Request For Comments. Pseudo-standard for the Internet, protocols and applications, issued by IETF.
RG58 Coax cable with 50 characteristic impedance, also called ThinWire or 10BASE2.
RIP Routing Information Protocol. For exchanging routing information between routers in a LAN. There are two versions: RIP V1 and RIP V2. --> OSPF.
RJ45 Connector for twisted pair. Typical for --> Ethernet and --> ISDN.
RMON Remote Monitoring.
Router Components on Layer 3 of the - ISO/OSI Reference Model. Connects networks on Layer 3. By means of additional paths to the destination, provides a choice of paths depending on de
RS 232 Recommended Standard. Serial interface, also designated V.24. Strictly speaking, the supplement to V.24 according to à CCITT.
RSTP Rapid Reconfiguration Spanning Tree Protocol.
RSVP Resource Reservation Protocol. Reserves bandwidths in a àWAN
RTCP Realtime Transport Control Protocol.
finable criteria, such as path costs.
RTP Real Time Protocol.
Return Loss Ratio of disruptive reflection to the transmitted signal power
Rx Receive (received).
SA Source Address
SAN Storage Area Network. Network for connecting servers and memory subsystems, such as hard disks, RAID and tape systems. Generally based on Fibre Channel.
SAP 1. Service Access Point. 2. Service Advertising Protocol.
SC Straight Connector. Connector --> DSC.
SCADA Supervision Control And Data Acquisition. Process visualisation system for process control and visualisation. Windows-based
Shielding attenuation Ratio between the power of electromagnetic interference outside and inside of a shield. A measure of the effectiveness of the shielding, e.g. for cables or also connector housings.
Transfer impedance Current/voltage ratio on cable shields for assessing the shielding effect.
Suitability for drag chains: special cable designs have to be used for operation in energy supply chains.
Noise, broadband electromagnetic interference
SD Starting Delimiter.
SDH Synchronous Digital Hierarchy. Is related to the American SONET (Synchronous Optical Network) standard; with a basic SDH rate of 155.52 Mbit/s (STM-1) and multiples thereof.
SERCOS III, industrial Ethernet system based on the SERCOS interface
SFD Start Frame Delimiter.
SFP Small form-factor pluggable. A --> transceiver for 1 Gbit/s_ networks that converts serial electric signals into optical signals and vice versa, see also GBIC.
SHA-1 Secure Hash Algorithm 1. --> Hash.
Single mode fibre Fibre-optic cable in which, due to its small core diameter (max. 10 μm), the light can only propagate along one path starting with the cut-off wavelength. _ Multimode fibre
SLA Service Level Agreement.
SLIP Serial Line Internet Protocol. Standard protocol for serial point-to-point connections, uses a serial interface (e.g. V24) for IP traffic.
SMON Switch Monitoring.
SMTP Simple Mail Transfer Protocol. Internet protocol that provides e-mail services.
SNTP Simple Network Time Protocol. Protocol for time synchronisation, based on NTP, with a precision of 1ms to 50ms. For higher precision, --> PTP (Precision Time Protocol acc. to IEEE 1588) is used.
SNAP Subnetwork Access Protocol.
SNMP Simple Network Management Protocol. Protocol standardised by IETF for communication between agents and the management station in network management. Used in more than 99% of LANs.
SOHO Small Office Home Office. Networks for small offices/branches and telecommuting workstations.
Spanning Tree Protocol that automatically dissolves network loops. When installed with switches, implements redundant paths for additional reliability if a connection fails. Change-over time 30 s to 60 s.
SQE Signal Quality Error. Signal that is sent back by a transceiver to the LAN controller (processor) in order to report that the packet was sent properly. Also called heartbeat.
SSH Secure Shell. Allows cryptographically secured communication over non-secure networks by means of authentication of the partners, and integrity and confidentiality of the data exchanged.
Star coupler Active star coupler --> Hub. A passive star coupler is a component in fibre-optic equipment with n inputs and m outputs without amplification of the signal.
Store & Forward Switching method in which a packet is first saved completely and only then forwarded. --> Cut-Through
STP 1. Shielded Twisted Pair. Cable with shielded twisted wire pairs. --> PIMF, UTP. 2. - Spanning Tree Protocol.
Switch Component of Layer 2 of the OSI Reference Model. Synonym: Bridge. Unlike a --> hub, forwards a packet only to the port to which the destination station is connected, which leads to switch disconnection of individual segments. Then no access procedure is required between two switches in full duplex operation. So-called Layer-3 and Layer-4 switches are now available that have also implemented sub-functions of these levels.
Symmetry, Symmetrical attenuation Ratio between the power of the normal-mode wave and that of the common-mode wave as a measure of the EMC properties of symmetrical copper cables (for shielded cables additionally --> shielding attenuation)
SX Short Wavelength (Gigabit Ethernet).
Tag Field Optional field in the Ethernet packet, inserted after the so
TCO Total Cost of Ownership.
TCP Transmission Control Protocol. Connection-oriented transmission protocol on Layer 4 of the TCP/IP protocol family. --> UDP.
TCP/IP Transmission Control Protocol/Internet Protocol. Most widely-used protocol family, from Layer 3 upwards. Standardised by --> IETF. Protocols that build upon each other:
Layer 3: IP; Layer 4: TCP, UDP; Layer 5: TFTP, SMTP, FTP, etc.
Layer 5 contains Layers 5 to 7 of the OSI model.

Telnet Virtual terminal program of the TCP/IP stack for remote access via network to the user interface of the serial interface.
TFTP Trivial File Transfer Protocol. Protocol on Layer 5, uses --> UDP for transfer, therefore used in --> LANs.
Token Ring Data network standardised in IEEE 802.5, but also proprietary solutions by IBM.
TOS Type Of Service. Field in IP packet for --> Prioritisation.
TPE - Thermoplastic elastomers, a category of plastics with special characteristics as an insulating and jacket material for cables
TP Twisted Pair. Symmetrical copper data cable.
Transceiver Converts data signals from AUI interfaces to another medium, e.g. twisted pair. New components have transceivers already implemented. For older components there are plug-on transceivers for multimode, twisted pair or coax.
Trunking --> Aggregation.
TTL Time To Live. Field in the IP protocol header that specifies how many hops are allowed for a packet before it is automatically deleted.
Tx Transmit. Transmission rate; speed of the transmission, also --> Bandwidth, Ethernet: 10, 100, 1000, 10000Mbit/s
Token Ring: 4 Mbit/s, 16 Mbit/s
FDDI: 100 Mbit/s
UDP User Datagram Protocol. Connectionless transport protocol on Layer 4 of the TCP/IP protocol family. --> TCP.
Unicast Data packet that is addressed to only one recipient, as opposed to multicast and broadcast.
UPS Uninterruptable Power Supply. --> USV
URL Universal Resource Locator. Standardised addressing scheme for access to hypertext documents and other services via a browser. Z.B. www.luetze.de
USV Uninterruptible power supply.
UTP Unshielded Twisted-Pair. Cable with unshielded twisted pairs of wires, generally with 4 pairs. --> STP
VLAN Virtual LAN, set up with switches. Goal: Limiting broadcasts to the network areas where the broadcast is useful. Is also used to subdivide networks for security reasons.
VPN Virtual Private Network A VPN joins a number of separate private networks (subnetworks) into a common network via a public network, e.g. the Internet. Confidentiality and authenticity is protected through the use of cryptographic protocols. A VPN thus offers a cost-effective alternative to dedicated lines when setting up a trans-regional company network.
VRRP Virtual Redundant Router Protocol. Protocol for controlling redundant routers. See also HSRP.
WAN Wide Area Network Public data and transfer network for connecting local networks. Transmission protocols: ISDN, frame relay, X.21 SDH, SONET, ATM.
WDM Wavelength Division Multiplex.
WEP Wired Equivalent Privacy. WEP is an encryption method in wireless LANs according to 802.11 for protecting the transmitted data.
WFQ Weighted Fair Queuing. Method for processing the priority queues in a switch. For example, the highest queue receives 50% of the bandwidth, the next 25%, etc. .
WiFi Wireless Fidelity. WiFi is a certification for wireless LANs (WLANs) according to standard 802.11, implemented by the WECA (Wireless Ethernet Compatibility Alliance). This certification confirms the interoperability of WLAN products. --> http://www.wi-fi.net
Wireless LAN Local Networks, that operate without cable connections.
Wire-speed, forwarding of the data packets with line speed.
WLAN Wireless --> LAN. According to IEEE 802.11, .15, .16 (Bluetooth).
WWDM With the WWDM system (Wide Wavelength Division Multiplex) it is possible to increase the transmission capacity of the optical fibres in fibre-optic networks. To do this, the system multiplexes a number of single-mode optical signals of various wavelengths to form a composite optical signal. In this manner several applications can be transmitted at the same time over a single fibre-optic cable pair. This means that it is not necessary to install additional fibre-optic cables, thus significantly reducing costs.
WWW World Wide Web.
X.25 Data Packet Control Protocol, that is used in Datex-P, for example.
XML Extended Markup Language.
XNS Xerox Network Systems.

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Certificates

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71384 Weinstadt, GERMANY

Industrial PoE Splitter, Model(s) ET-PSPET

Industrial Switch, Model(s) ET-SWGU8ST, ET-SWGU5ET, ET-SWGU5ST, ET-SWU4-1STC, ET-SWU4-2STC, ET-SWU5ET, ET-SWU5ST, ET-SWU8ET, ET-SWU8ST, MC-2030, MC-2031, MC-2032, MC-2033

Industrial Switch Hub, Model(s) ET-SWGU8ST

PoE Injector Industrial Switch, Model(s) ET-PU5ST

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Industrial PoE Splitter, Model(s) ET-PSPET

Industrial Switch, Model(s) ET-SWGU1BST, ET-SWGU5ET, ET-SWGU5ST, ET-SWU4-1STC, ET-SWU4-2STC, ET-SWU5ET, ET-SWU5ST, ET-SWU8ET, ET-SWU8ST, MC-2030, MC-2031, MC-2032, MC-2033

Industrial Switch Hub, Model(s) ET-SWGU8ST

PoE Injector Industrial Switch, Model(s) ET-PU5ST

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Communications-, Audio/Video-, Data- and Other Signaling-circuit Accessories Certified for Canada

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Communications-, Audio/Video-, Data- and Other Signaling-circuit Accessories Certified for Canada

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RJ45 Angle Plugs, Model(s) 490151, 490152, 490153, 490178

RJ45/RJ45 Coupler Module, Model(s) RJ45 F/F 8/8 Cat. 5e (P/N 492075) (*12)

RJ45/RJ45 Coupler Module, Model(s) RJ45 F/F 8/8 Cat. 6 (P/N 491075) (*12)

RJ45/RJ45 Coupler Module, Model(s) RJ45 F/F 8/8 Cat.3 (P/N 490075) (*12)

STP Plug, Model(s) 490128, 490129, 490174, 490175, 490176, 490177

USB Coupler Module, Model(s) USB-3.0 A/A F/F (P/N 490112) (*12)

USB Patch Cord, Model(s) USB-3.0 A/A F/M x.xM (P/N 490113.xxxx) (*12), where suffixes denote cable length in meters.

(*12) - Denotes additional rating of Type 12

NOTE - Models are intended for indoor use in telecommunication loop circuits or for use in Industrial Ethernet applications, circuits, such as Industrial Ethernet applications.

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ONLINE CERTIFICATIONS DIRECTORY

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Communications-, Audio/Video-, Data- and Other Signaling-circuit Accessories

See General Information for Communications-, Audio/Video-, Data- and Other Signaling-circuit Accessories

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Bruckwiesenstrasse 17-19
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Modular Jacks, Model(s) 490166 / MDT-RJ45 F 8pol. CAT6A

RJ45 Angle Plugs, Model(s) 490151, 490152, 490153, 490178

RJ45/RJ45 Coupler Module, Model(s) RJ45 F/F 8/8 Cat. 5e (P/N 492075) (*12)

RJ45/RJ45 Coupler Module, Model(s) RJ45 F/F 8/8 Cat. 6 (P/N 491075) (*12)

RJ45/RJ45 Coupler Module, Model(s) RJ45 F/F 8/8 Cat.3 (P/N 490075) (*12)

STP Plug, Model(s) 490128, 490129, 490174, 490175, 490176, 490177

USB Coupler Module, Model(s) USB-3.0 A/A F/F (P/N 490112) (*12)

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Cable Solutions
High flexing cables for industrial applications

Connectivity Solutions
Industrial Ethernet, assembled cables, Actuator Sensor Interface, connectors and suppression technology

Cabinet Solutions
*Air***STREAM** complete system for thermally optimized and space-saving cabinet wiring

Control Solutions
Industrial Power Supply and electronic current control for Industrial Internet of Things. Infrastructure for industrial networks, signal converter, relays and modular electronics housing

Transportation Solutions
Solutions for the exacting Railway Sector, for example control technology, Interface solutions and signalling

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