Cable Solutions
Connectivity Solutions
Control Solutions

Ethernet Connectivity

Infrastructure solutions from a single source

LÜTZE
SYSTEMATIC TECHNOLOGY

Efficiency in Automation

Cable • Connectivity • Cabinet • Control

Welcome to LÜTZE

Cable Solutions

Connectivity Solutions

Cabinet Solutions

Control Solutions

Transportation Solutions

LÜTZE - Efficiency in Automation

A tradition in automation for over 60 years, with countless pioneering achievements and patents, the LUETZE INTERNATIONAL Group is today one of the leading companies in the automation industry. LÜTZE supplies very efficient electronic and electrotechnical components, system solutions for automation and high tech for rail engineering.

The comprehensive and coordinated supply program ranges from high flexing cables and cable assemblies, to energy efficient *Air***STREAM** wiring systems for control cabinets through to intelligent Industry 4.0 solutions from the fields of interface technology, current monitoring, power supply and Ethernet infrastructure.

The LUETZE INTERNATIONAL Group has multiple locations throughout Europe, Asia and the USA and numerous distribution partners across the world to provide global product availability and service to our customers in all markets.

LÜTZE is one of the leading suppliers in the rail technology field. LÜTZE Transportation solutions are installed in numerous locomotives, city rail and underground rail systems, as well as high-speed trains across the world.

LÜTZE
SYSTEMATIC TECHNOLOGY

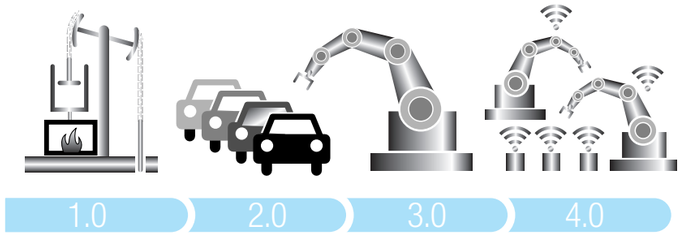
INDUSTRY 4.0

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.

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.

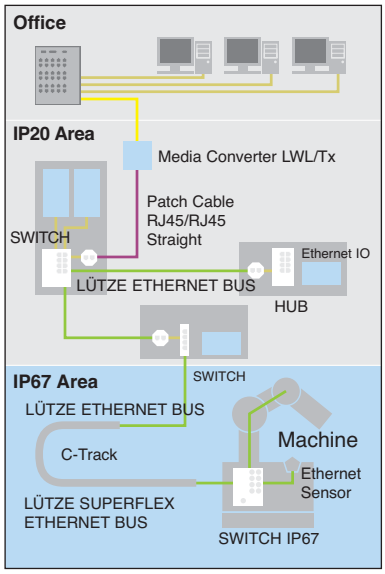
Smart electronic current control from LÜTZE

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 devices 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.

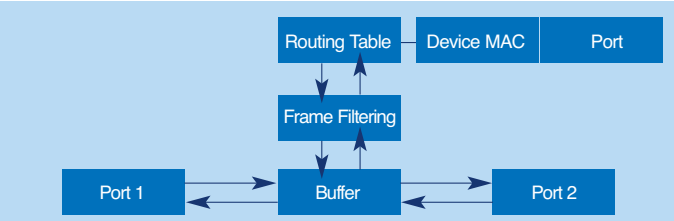
A network in which each node is assigned exactly one port of a switch is called switched Ethernet. Ethernet switches are used to resolve collision domains into simple point-to-point connections between the switch and the other network nodes (terminals, infrastructure components).

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

	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

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.



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.

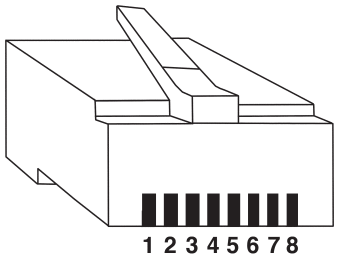
Pin assignment RJ45:

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 (T568B)
1	3	2		
2	3	2		
3	2	3		
4	1	1		
5	1	1		
6	2	3		
7	4	4		
8	4	4		



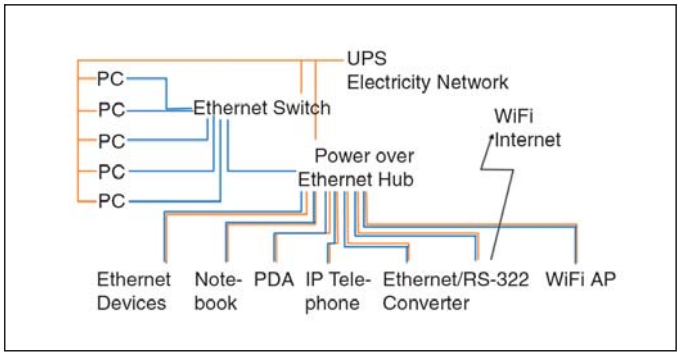
PIN Position

Plug in Connector:

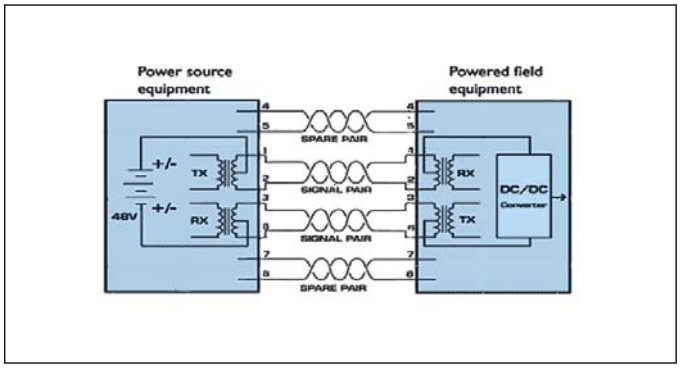
Plug in Connector Typ	Connection	IEC	Organisation 67076-3 106	LÜTZE
RJ45	Bajonet	Version 1	IAONA, ODVA	
RJ45	Snap in	Version 2		
RJ45	Screw	Version 3		
RJ45	Push Pull	Version 4	PNO	
RJ45	with Lock	Version 5	PNO	
RJ45	Push Pull	Version 6	IAONA, IDA	•
RJ45	with Lock	Version 7	PNO	
RJ45	Screw	Version 8		
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

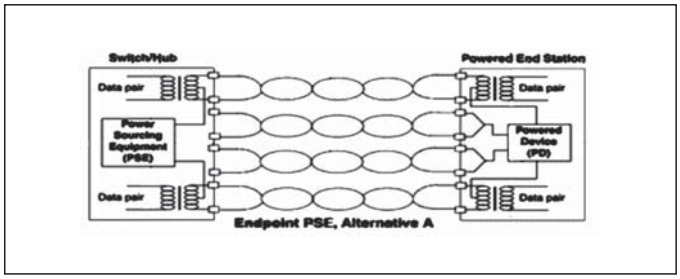
Ethernet components need power:
The elimination of local power supplies by use of Power over Ethernet (PoE) can provide significantcost savings with systems such as VoiP, Web-Cams, embeded PCs, IP sensors, local automation and security systems.



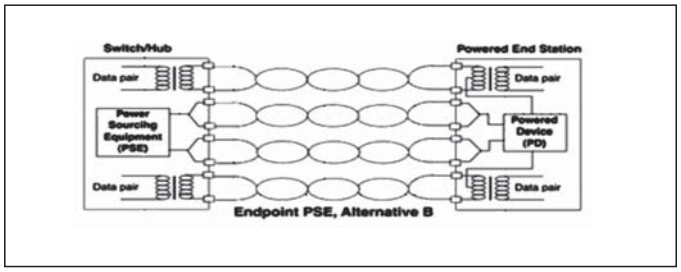
Standardised as 802.3af:
- CAT5 Infrastructure for Data and Power
- Voltage between 44 and 57 Volt
- max. Current 550 mA
- max. Trigger Current 500 mA
- typical Current 10 mA ... 350 mA
- Overload recognition 350 mA - 500 mA
- mind. 5 mA-Idle Current



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

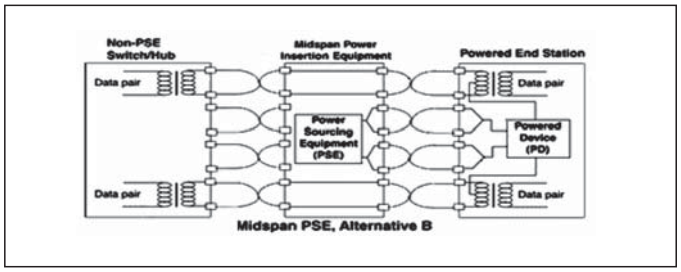


Power supply via free conductor pairs; Positive and negative voltage sides are transmitted via two conductor pairs
Cannot be used for T4 transmission (Gbit Ethernet)



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/s

Page 16

8 port
10/100 MBit/s

Page 17

E-CO Switches

5-Port
10/100 MBit/s

Page 19

8-Port
10/100 MBit/s

Page 20

16-Port
10/100 MBit/s

Page 21

5-Port
10/100/1000
MBit/s

Page 22

8-Port
10/100/1000
MBit/s

Page 23

16-Port
10/100/1000
MBit/s

Page 24

Unmanaged PoE Switches, PoE splitter

5 port
10/100/1000
MBit/s

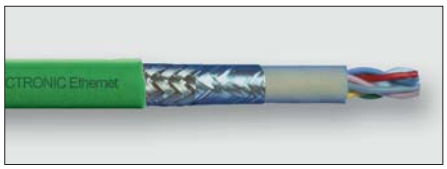
Page 25

10/100/1000
MBit/s

Page 26

Ethernet Connectivity · Product Overview

Ethernet Bus cables



Standard

C-track compatible

Page 32 - 36

Page 37 - 39

Actuator sensor interface network cables

PROFINET
M12 / RJ45
PVC cable

Page 41

PROFINET /
ETHERNET
RJ45 / RJ45
PVC cable

Page 42 - 43

Patch cable
Cat5e / Cat. 6_A
LSZH cable

Page 44

PROFINET
M12
PUR cable

Page 45

Actuator sensor interface network cables

PROFINET
M12 / M12
PUR cable

Page 46

PROFINET
M12 Panel
PUR cable

Page 47

PROFINET
RJ45 / M12
PUR cable

Page 48

PROFINET
RJ45 / RJ45 Cat. 5e
PUR cable

Page 49 - 50

Ethernet
RJ45 / RJ45 Cat. 6
PUR cable

Page 51

Actuator sensor interface connector

RJ45 Industrial
connector

Page 52

RJ45 Industrial
connector

Page 53

RJ45 Industrial
connector,
angled

Page 54

RJ45 Module
holder, female /
IDC

Page 55

M12, Male
D coded
gerade

Page 56

M12, Female
D coded
Cat 5e

Page 57

M12, Male
X coded
Cat. 6_A

Page 58

Actuator sensor interface panel connector and module holder

RJ45
Control cabinet
bushing

Page 59

M12 - RJ45 Cat. 5e
Control cabinet
bushing

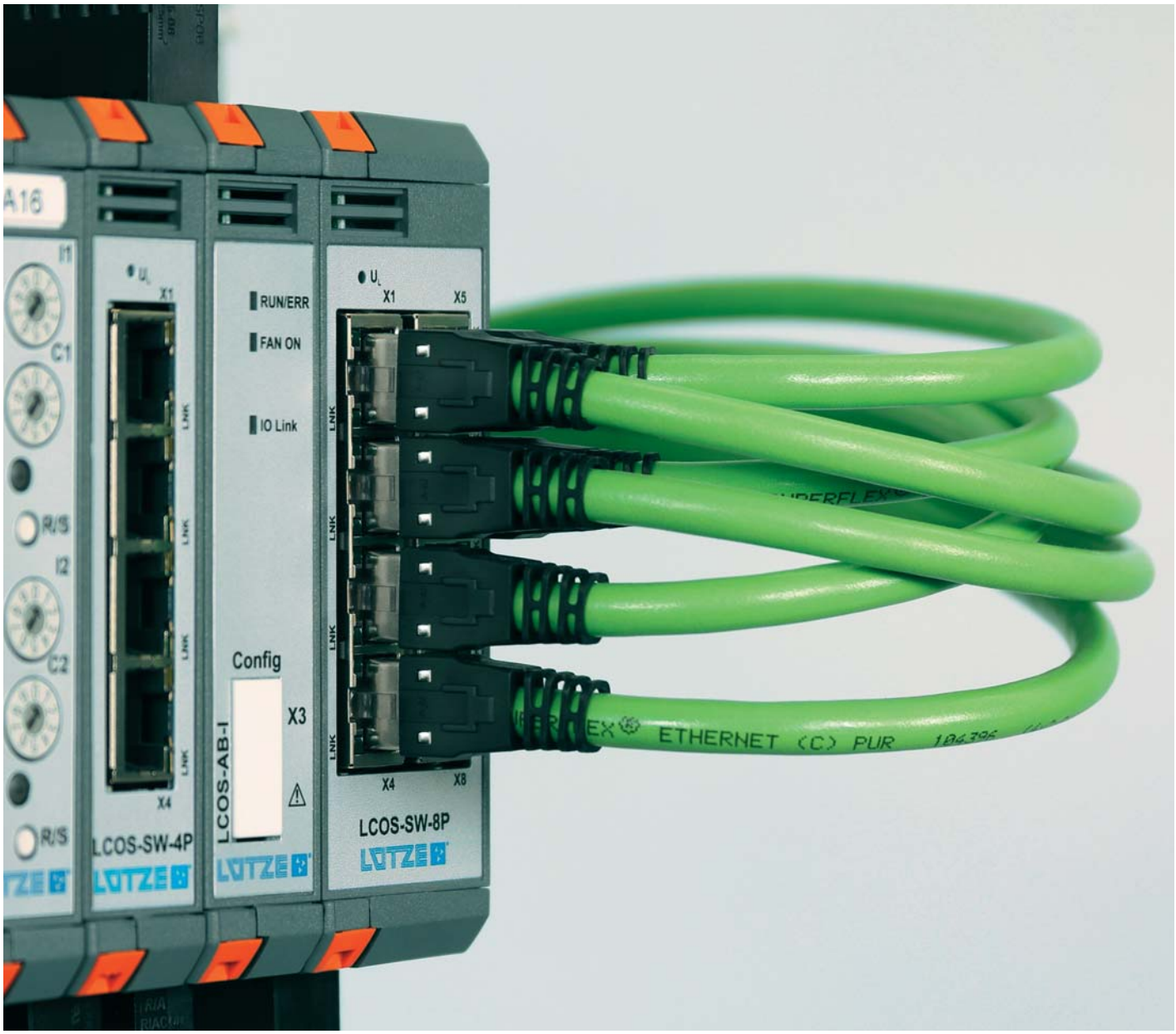
Page 60

M12 - RJ45 Cat. 6_A
Control cabinet
bushing

Page 61

Notes

LCOS Communication



LCOS industrial communication

- Unmanaged Switches
- 10/100 MBit/s
- QoS – Quality of Service
- PROFINET Conformance Class A
- 4 or 8 ports
- Can be used as a standalone module or in the "Lütze Communication System" - LCOS system setup
- Extended temperature range
- Fast and safe replacement thanks to 'hot swapping'
- Available with or without function carrier

Ethernet · unmanaged switch 4 ports, 10/100 MBit/s

QoS - Quality of Service, PROFINET Conformance Class A
4 Fast Ethernet ports RJ-45, usable in the LCOS system
AC/DC 24 V, compact design, extended temperature range

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 U_N	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	1,3 W
Degree of protection	IP20 (EN 60529)
Installation position	Vertical
Over voltage category	II
Degree of pollution	2
Max. altitude operation	2000 m
Operation temperature range	-25 °C … +70 °C
Storage temperature range	-40 °C … +85 °C
Relative humidity (operation)	5 % – 95 % (non-condensing)
Relative humidity (storage)	0 % – 95 % (non-condensing)
Dimensions (w × h × d)	22.5 mm × 110.0 mm × 102.0 mm
Weight/unit	0.11 kg
Housing material	PA 6.6 (UL 94 V-0, NFF I2, F2)
PU (units)	1

Safety

Reverse voltage protection	Yes
Isolating voltage Ethernet/supply/FE	1000 V

Certifications/Standards

Certifications	CE UKCA cULus (E170585)
Standards	EN 61131-2:2007 IEC 61000-6-2:2016 IEC 61000-6-4:2018

Equipment/Spare parts

Accessories

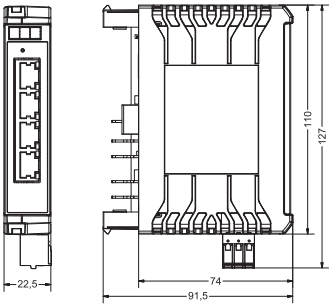
Function carrier 22.5 mm, cannot be expanded with modules: Part.-No. 780201.225.1 | LCOS-FT-PE-225-00-00-1 | PU: 1 unit
Function carrier 22.5 mm, can be expanded with modules: Part.-No. 780402.225.1 | LCOS-FT-PE-225-0P-02-1 | PU: 1 unit
Function carrier 57.5 mm, with power supply DC 24 V, no FBS, plug-and-play: 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 | PU: 100 units
Power bridge 1-pin insulated: Part.-No. 780961.001.2 | LCOS-ZB-PB-01-00 | PU: 10 units

Notes and Comments

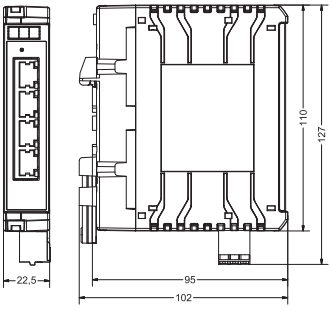
Note: For AC supply, there must be external over-voltage protection that limits the voltage between the supply and the FE to below 1000 V.

Part No.		Type	Included in the delivery	Not included in the delivery	Mounting
without function carrier					
779200.0401	S*	LCOS-SW-4P	Plug-in terminal black, RM 5.08, 3-pin, 2.5 mm²	other accessories, see „accessories“	can be connected to LCOS function carrier 22.5 mm (accessories), hat rail mounting EN 60715
with function carrier					
779201.0401	S*	LCOS-SW-4P	Function carrier 22.5 mm, cannot be expanded with modules Plug-in terminal black, RM 5.08, 3-pin, 2.5 mm²	other accessories, see „accessories“	DIN rail mounting EN 60715

Dimensions



Dimensions



Further product information at
www.luetze.com

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

Ethernet · unmanaged switch 8 ports, 10/100 MBit/s

QoS - Quality of Service, PROFINET Conformance Class A
8 Fast Ethernet ports RJ-45, usable in the LCOS system
AC/DC 24 V, compact design, extended temperature range

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 U_N	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	1,6 W
Degree of protection	IP20 (EN 60529)
Installation position	Vertical
Over voltage category	II
Degree of pollution	2
Max. altitude operation	2000 m
Operation temperature range	-25 °C … +70 °C
Storage temperature range	-40 °C … +85 °C
Relative humidity (operation)	5 % – 95 % (non-condensing)
Relative humidity (storage)	0 % – 95 % (non-condensing)
Dimensions (w × h × d)	35.0 mm × 110.0 mm × 102.0 mm
Weight/unit	0.17 kg
Housing material	PA 6.6 (UL 94 V-0, NFF I2, F2)
PU (units)	1

Safety

Reverse voltage protection	Yes
Isolating voltage Ethernet/supply/FE	1000 V

Certifications/Standards

Certifications	CE UKCA cULus (E170585)
Standards	EN 61131-2:2007 IEC 61000-6-2:2016 IEC 61000-6-4:2018

Equipment/Spare parts

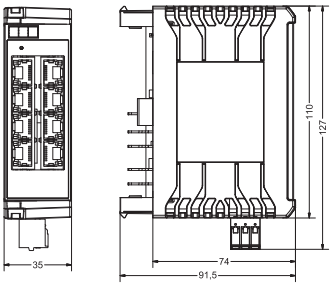
Accessories	**Function carrier 35 mm, cannot be expanded with modules:** Part.-No. 780201.350.1 | LCOS-FT-PE-350-00-00-1 | PU: 1 unit **Function carrier 35 mm, can be expanded with modules:** Part.-No. 780402.350.1 | LCOS-FT-PE-350-0P-02-1 | PU: 1 unit **Function carrier 70 mm, with power supply DC 24 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 | PU: 100 units **Power bridge 1-pin insulated:** Part.-No. 780961.001.2 | LCOS-ZB-PB-01-00 | PU: 10 units

Notes and Comments

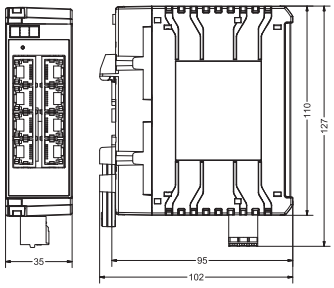
Note	For AC supply, there must be external over-voltage protection that limits the voltage between the supply and the FE to below 1000 V.

Part No.		Type	Included in the delivery	Not included in the delivery	Mounting
without function carrier					
779200.0801	S*	LCOS-SW-8P	Plug-in terminal black, RM 5.08, 3-pin, 2.5 mm²	other accessories, see „accessories“	can be connected to LCOS function carrier 35 mm (accessories), hat rail mounting EN 60715
with function carrier					
779201.0801	S*	LCOS-SW-8P	Function carrier 35 mm, cannot be expanded with modules Plug-in terminal black, RM 5.08, 3-pin, 2.5 mm²	other accessories, see „accessories“	connected to LCOS function carrier, hat rail mounting EN 60715

Dimensions



Dimensions

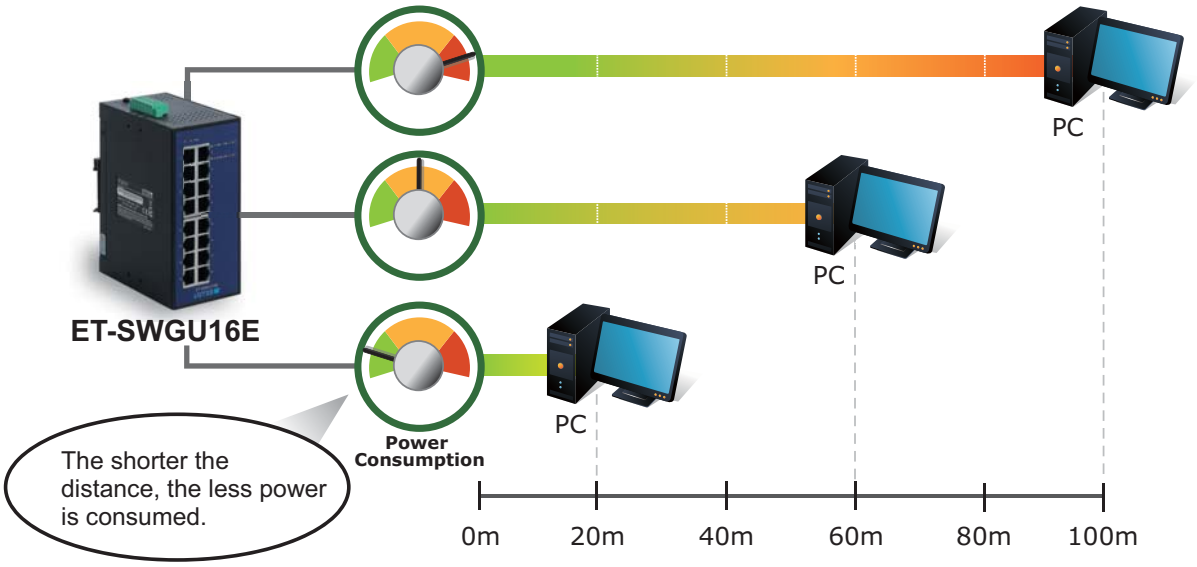


Sustainable answers and solutions!

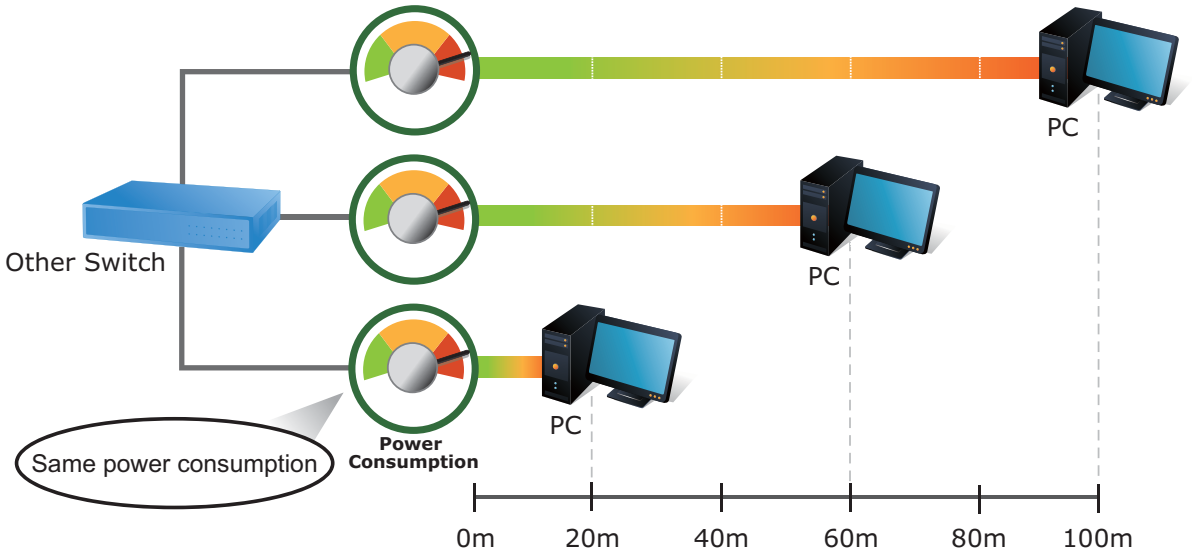
As part of the *Sky***BLUE** sustainability initiative, LÜTZE develops and markets highly sustainable and innovative solutions.

The new E-CO Switches offer intelligent expansions for creating energy-saving Ethernet networks. Energy Efficient Ethernet (EEE) is implemented in compliance with the IEEE 802.3az norm. The result: consistent energy savings.

Intelligent energy management



Standard application



Ethernet · Unmanaged E-CO Switch, 5-Port, 10/100 MBit/s

QoS - Quality of Service, PROFINET Conformance Class A
5 Fast Ethernet ports RJ-45, compact design, energy management
Redundant AC/DC supply, extended temperature range, ESD 6 kV

Communication

Standard	IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX/100BASE-FX IEEE 802.3x flow control and back pressure IEEE 802.1p Class of Service IEEE 802.3az Energy Efficient Ethernet (EEE) IEC 60068-2-32 (free fall), IEC 60068-2-27 (shock), IEC 60068-2-6 (vibration)
LAN	10/100 Base-TX RJ45 Auto-MDI/MDI-X
Cable length (segment)	Max. 100 m
Transfer rate	max. 10/100 Mbit/s
Connection technology (data)	5 × RJ45
Status display communication	System: Power 1 (P1): green Power 2 (P2): green Alarm, (Fault): red Per 10/100TX RJ45 Ports: 10/100 LNK/ACT: green

General

Rated voltage U_N	DC 12 – 48 V redundant, AC 24 V
Degree of protection	IP30
Installation position	Any
Operation temperature range	-40 °C … +75 °C
Storage temperature range	-40 °C … +75 °C
Relative humidity (operation)	5 % – 90 % (non-condensing)
Relative humidity (storage)	0 % – 90 % (non-condensing)
Housing material	Metal
Mounting	DIN rail mountable TS35 (EN 60715) Wall mounting
Connection type	6-pole pluggable screw terminal for power supply and fault diagnosis single wire/fine wire 0.25 mm² – 2.5 mm² AWG 20 – AWG 14 fine stranded wire with ferrule 0.25 mm² – 1.5 mm² AWG 20 – AWG 16
PU (units)	1

Safety

ESD (Ethernet)	DC 6 kV
Surge (EFT for power)	DC 4 kV
Reverse voltage protection	Yes

Monitoring

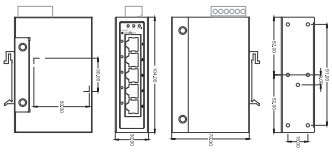
Error output	Relay, 1 NO contact - 1 A @ DC 24 V
Switching voltage	AC 120 V / DC 28 V
Switching current	1 A @ DC 24 V
Isolation voltage	DC 500 V

Certifications/Standards

Certifications	CE FCC Part 15 Class A UKCA cULus (E332878)
Standards	EN 55032 EN 55035 IEC 61000-4-2/3/4/5/6/8 IEC 60068-2-27 IEC 60068-2-32 IEC 60068-2-6

Part No.	Type	Dimensions (w × h × d)	Weight/unit kg
772004	ET-SWU5E	30.0 mm × 104.0 mm × 70.0 mm	0.255

Dimensions



Ethernet · Unmanaged E-CO Switch, 8-Port, 10/100 MBit/s

QoS - Quality of Service, PROFINET Conformance Class A
8 Fast Ethernet ports RJ-45, compact design, energy management
Redundant AC/DC supply, extended temperature range, ESD 6 kV

Communication

Standard	IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX/100BASE-FX IEEE 802.3x flow control and back pressure IEEE 802.1p Class of Service IEEE 802.3az Energy Efficient Ethernet (EEE) IEC 60068-2-32 (free fall), IEC 60068-2-27 (shock), IEC 60068-2-6 (vibration)
LAN	10/100 Base-TX RJ45 Auto-MDI/MDI-X
Cable length (segment)	Max. 100 m
Transfer rate	max. 10/100 Mbit/s
Connection technology (data)	8 × RJ45
Status display communication	System: Power 1 (P1): green Power 2 (P2): green Alarm, (Fault): red Per 10/100TX RJ45 Ports: 10/100 LNK/ACT: green

General

Rated voltage U_N	DC 12 – 48 V redundant, AC 24 V
Degree of protection	IP30
Installation position	Any
Operation temperature range	-40 °C … +75 °C
Storage temperature range	-40 °C … +75 °C
Relative humidity (operation)	5 % – 90 % (non-condensing)
Relative humidity (storage)	0 % – 90 % (non-condensing)
Housing material	Metal
Mounting	DIN rail mountable TS35 (EN 60715) Wall mounting
Connection type	6-pole pluggable screw terminal for power supply and fault diagnosis single wire/fine wire 0.25 mm² – 2.5 mm² AWG 20 – AWG 14 fine stranded wire with ferrule 0.25 mm² – 1.5 mm² AWG 20 – AWG 16
PU (units)	1

Safety

ESD (Ethernet)	DC 6 kV
Surge (EFT for power)	DC 4 kV
Reverse voltage protection	Yes

Monitoring

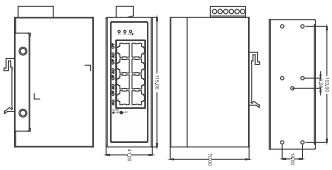
Error output	Relay, 1 NO contact - 1 A @ DC 24 V
Switching voltage	AC 120 V / DC 28 V
Switching current	1 A @ DC 24 V
Isolation voltage	DC 500 V

Certifications/Standards

Certifications	CE FCC Part 15 Class A UKCA cULus (E332878)
Standards	EN 55032 EN 55035 IEC 61000-4-2/3/4/5/6/8 IEC 60068-2-27 IEC 60068-2-32 IEC 60068-2-6

Part No.	Type	Dimensions (w × h × d)	Weight/unit kg
772006	ET-SWU8E	41.0 mm × 115.0 mm × 70.0 mm	0.3

Dimensions



Further product information at
www.luetze.com

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

Ethernet · Unmanaged E-CO Switch, 16-Port, 10/100 MBit/s

QoS - Quality of Service, PROFINET Conformance Class A
16 Fast Ethernet ports RJ-45, compact design, energy management
Redundant AC/DC supply, extended temperature range, ESD 6 kV

Communication

Standard	IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX/100BASE-FX IEEE 802.3x flow control and back pressure IEEE 802.1p Class of Service IEEE 802.3az Energy Efficient Ethernet (EEE) IEC 60068-2-32 (free fall), IEC 60068-2-27 (shock), IEC 60068-2-6 (vibration)
LAN	10/100 Base-TX RJ45 Auto-MDI/MDI-X
Cable length (segment)	Max. 100 m
Transfer rate	max. 10/100 Mbit/s
Connection technology (data)	16 × RJ45
Status display communication	System: Power 1 (P1): green Power 2 (P2): green Alarm, (Fault): red Per 10/100TX RJ45 Ports: 10/100 LNK/ACT: green

General

Rated voltage U_N	DC 12 – 48 V redundant, AC 24 V
Degree of protection	IP30
Installation position	Any
Operation temperature range	-40 °C … +75 °C
Storage temperature range	-40 °C … +75 °C
Relative humidity (operation)	5 % – 90 % (non-condensing)
Relative humidity (storage)	0 % – 90 % (non-condensing)
Housing material	Metal
Mounting	DIN rail mountable TS35 (EN 60715) Wall mounting
Connection type	6-pole pluggable screw terminal for power supply and fault diagnosis single wire/fine wire 0.25 mm² – 2.5 mm² AWG 20 – AWG 14 fine stranded wire with ferrule 0.25 mm² – 1.5 mm² AWG 20 – AWG 16
PU (units)	1

Safety

ESD (Ethernet)	DC 6 kV
Surge (EFT for power)	DC 4 kV
Reverse voltage protection	Yes

Monitoring

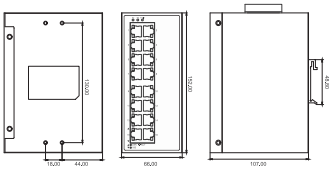
Error output	Relay, 1 NO contact - 1 A @ DC 24 V
Switching voltage	AC 120 V / DC 28 V
Switching current	1 A @ DC 24 V
Isolation voltage	DC 500 V

Certifications/Standards

Certifications	CE FCC Part 15 Class A UKCA cULus (E332878)
Standards	EN 55032 EN 55035 IEC 61000-4-2/3/4/5/6/8 IEC 60068-2-27 IEC 60068-2-32 IEC 60068-2-6

Part No.	Type	Dimensions (w × h × d)	Weight/unit kg
772008	ET-SWU16E	66.0 mm × 152.0 mm × 107.0 mm	0.75

Dimensions



Ethernet · Unmanaged E-CO Switch, 5-Port, 10/100/1000 MBit/s

QoS - Quality of Service, PROFINET Conformance Class A
5 RJ45 ports 1 GBit/s, compact design, energy management, ESD 6 kV
Redundant supply, extended temperature range, Jumbo Frames up to 9 kB

Communication

Standard	IEEE 802.3 Ethernet, IEEE 802.3u Fast Ethernet, IEEE 802.3ab Gigabit Ethernet IEEE 802.3x Full-Duplex Flow Control IEEE 802.3az Energy Efficient Ethernet (EEE) IEEE 802.1p Class of Service IEC 60068-2-32 (free fall), IEC 60068-2-27 (shock), IEC 60068-2-6 (vibration)
LAN	10/100/1000 Base-T RJ45 Auto-MDI/MDI-X, Auto Negotiation
Cable length (segment)	Max. 100 m
Transfer rate	max. 1000 Mbit/s
Connection technology (data)	5 × RJ45
Status display communication	System: Power 1 (P1): green Power 2 (P2): green Alarm, (Fault): red Per 10/100TX RJ45 Ports: 10/100 LNK/ACT: green 100/1000 LNK/ACT: orange (/amber)

General

Rated voltage U_N	DC 9 – 48 V redundant, AC 24 V
Degree of protection	IP30
Installation position	Any
Operation temperature range	-40 °C … +75 °C
Storage temperature range	-40 °C … +75 °C
Relative humidity (operation)	5 % – 90 % (non-condensing)
Relative humidity (storage)	0 % – 90 % (non-condensing)
Housing material	Metal
Mounting	DIN rail mountable TS35 (EN 60715) Wall mounting
Connection type	6-pole pluggable screw terminal for power supply and fault diagnosis single wire/fine wire 0.25 mm² – 2.5 mm² AWG 20 – AWG 14 fine stranded wire with ferrule 0.25 mm² – 1.5 mm² AWG 20 – AWG 16
PU (units)	1

Safety

ESD (Ethernet)	DC 6 kV
Surge (EFT for power)	DC 4 kV
Reverse voltage protection	Yes

Monitoring

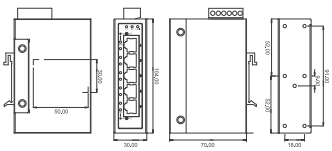
Error output	Relay, 1 NO contact - 1 A @ DC 24 V
Switching voltage	AC 120 V / DC 28 V
Switching current	1 A @ DC 24 V
Isolation voltage	DC 500 V

Certifications/Standards

Certifications	CE FCC Part 15 Class A UKCA cULus (E332878)
Standards	EN 55032 EN 55035 IEC 61000-4-2/3/4/5/6/8 IEC 60068-2-27 IEC 60068-2-32 IEC 60068-2-6

Part No.	Type	Dimensions (w × h × d)	Weight/unit kg
772013	ET-SWGU5E	30.0 mm × 104.0 mm × 70.0 mm	0.252

Dimensions



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

Ethernet · Unmanaged E-CO Switch, 8-Port, 10/100/1000 MBit/s

QoS - Quality of Service, PROFINET Conformance Class A
8 RJ45 ports 1 GBit/s, compact design, energy management, ESD 6 kV
Redundant supply, extended temperature range, Jumbo Frames up to 9 kB

Communication

Standard	IEEE 802.3 Ethernet, IEEE 802.3u Fast Ethernet, IEEE 802.3ab Gigabit Ethernet IEEE 802.3x Full-Duplex Flow Control IEEE 802.3az Energy Efficient Ethernet (EEE) IEEE 802.1p Class of Service IEC 60068-2-32 (free fall), IEC 60068-2-27 (shock), IEC 60068-2-6 (vibration)
LAN	10/100/1000 Base-T RJ45 Auto-MDI/MDI-X, Auto Negotiation
Cable length (segment)	Max. 100 m
Transfer rate	max. 1000 Mbit/s
Connection technology (data)	8 × RJ45
Status display communication	System: Power 1 (P1): green Power 2 (P2): green Alarm, (Fault): red Per 10/100TX RJ45 Ports: 10/100 LNK/ACT: green 100/1000 LNK/ACT: orange (/amber)

General

Rated voltage U_N	DC 12 – 48 V redundant, AC 24 V
Degree of protection	IP30
Installation position	Any
Operation temperature range	-40 °C … +75 °C
Storage temperature range	-40 °C … +75 °C
Relative humidity (operation)	5 % – 90 % (non-condensing)
Relative humidity (storage)	0 % – 90 % (non-condensing)
Housing material	Metal
Mounting	DIN rail mountable TS35 (EN 60715) Wall mounting
Connection type	6-pole pluggable screw terminal for power supply and fault diagnosis single wire/fine wire 0.25 mm² – 2.5 mm² AWG 20 – AWG 14 fine stranded wire with ferrule 0.25 mm² – 1.5 mm² AWG 20 – AWG 16
PU (units)	1

Safety

ESD (Ethernet)	DC 6 kV
Surge (EFT for power)	DC 4 kV
Reverse voltage protection	Yes

Monitoring

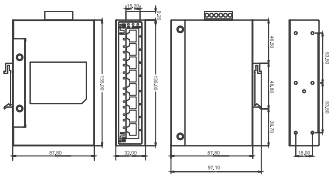
Error output	Relay, 1 NO contact - 1 A @ DC 24 V
Switching voltage	AC 120 V / DC 28 V
Switching current	1 A @ DC 24 V
Isolation voltage	DC 500 V

Certifications/Standards

Certifications	CE FCC Part 15 Class A UKCA cULus (E332878)
Standards	EN 55032 EN 55035 IEC 61000-4-2/3/4/5/6/8 IEC 60068-2-27 IEC 60068-2-32 IEC 60068-2-6

Part No.	Type	Dimensions (w × h × d)	Weight/unit kg
772015	ET-SWGU8E	32.0 mm × 135.0 mm × 88.0 mm	0.473

Dimensions



Ethernet · Unmanaged E-CO Switch, 16-Port, 10/100/1000 MBit/s

QoS - Quality of Service, PROFINET Conformance Class A
16 RJ45 ports 1 GBit/s, compact design, energy management, ESD 6 kV
Redundant supply, extended temperature range, Jumbo Frames up to 9 kB

Communication

Standard	IEEE 802.3 Ethernet, IEEE 802.3u Fast Ethernet, IEEE 802.3ab Gigabit Ethernet IEEE 802.3x Full-Duplex Flow Control IEEE 802.3az Energy Efficient Ethernet (EEE) IEEE 802.1p Class of Service IEC 60068-2-32 (free fall), IEC 60068-2-27 (shock), IEC 60068-2-6 (vibration)
LAN	10/100/1000 Base-T RJ45 Auto-MDI/MDI-X, Auto Negotiation
Cable length (segment)	Max. 100 m
Transfer rate	max. 1000 Mbit/s
Connection technology (data)	16 × RJ45
Status display communication	System: Power 1 (P1): green Power 2 (P2): green Alarm, (Fault): red Per 10/100TX RJ45 Ports: 10/100 LNK/ACT: green 100/1000 LNK/ACT: orange (/amber)

General

Rated voltage U_N	DC 12 – 48 V redundant, AC 24 V
Degree of protection	IP30
Installation position	Any
Operation temperature range	-40 °C … +75 °C
Storage temperature range	-40 °C … +75 °C
Relative humidity (operation)	5 % – 90 % (non-condensing)
Relative humidity (storage)	0 % – 90 % (non-condensing)
Housing material	Metal
Mounting	DIN rail mountable TS35 (EN 60715) Wall mounting
Connection type	6-pole pluggable screw terminal for power supply and fault diagnosis single wire/fine wire 0.25 mm² – 2.5 mm² AWG 20 – AWG 14 fine stranded wire with ferrule 0.25 mm² – 1.5 mm² AWG 20 – AWG 16
PU (units)	1

Safety

ESD (Ethernet)	DC 6 kV
Surge (EFT for power)	DC 4 kV
Reverse voltage protection	Yes

Monitoring

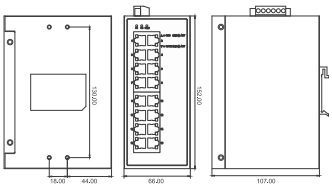
Error output	Relay, 1 NO contact - 1 A @ DC 24 V
Switching voltage	AC 120 V / DC 28 V
Switching current	1 A @ DC 24 V
Isolation voltage	DC 500 V

Certifications/Standards

Certifications	CE FCC Part 15 Class A UKCA cULus (E332878)
Standards	EN 55032 EN 55035 IEC 61000-4-2/3/4/5/6/8 IEC 60068-2-27 IEC 60068-2-32 IEC 60068-2-6

Part No.	Type	Dimensions (w × h × d)	Weight/unit kg
772017	ET-SWGU16E	66.0 mm × 152.0 mm × 107.0 mm	0.743

Dimensions



Further product information at
www.luetze.com

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

Ethernet · Unmanaged PoE switches, 4 ports, 10/100/1000 MBit/s

4 RJ45 PoE ports 1GBit/s + 1 RJ45 port 1GBit/s + 1 SFP port 1GBit/s
Compact design, Jumbo Frames up to 9 kB
Redundant supply, extended temperature range

Communication

Standard	IEEE 802.3, 802.3u, 802.3x, 802.1ab, 802.1z
LAN	10 / 100 / 1000 Base-T(x), 100/1000 SFP Ports
Cable length (segment)	RJ-45 max. 100 m (4-wire Cat.5e, Cat.6 RJ45 cable) SFP max. 110 km
Transfer rate	max. 1000 Mbit/s
Connection technology (data)	5 × RJ45, 1 × SFP (mini-GBIC)
Status display communication	P1, P2, P-Fail, 10/100/1000 T(x): Link/ Speed/Activity

General

Operation voltage range	DC 24–48 V, redundant
Power consumption	60 W full load PoE
Power output	15 W @ 48 V (per PoE port)
Degree of protection	IP30
Installation position	Any
Operation temperature range	-40 °C … +75 °C
Storage temperature range	-40 °C … +85 °C
Relative humidity (operation)	10 % – 95 % (non-condensing)
Relative humidity (storage)	10 % – 95 % (non-condensing)
Housing material	Metal
Mounting	DIN rail mountable TS35 (EN 60715)
Connection type	Screw terminal plug-in 0,20 mm² – 2,5 mm²
PU (units)	1

Safety

ESD (Ethernet)	DC 4 kV
Surge (EFT for power)	DC 3 kV
Reverse voltage protection	Yes
Rated over load protection	15 W @ 48 V (per PoE port)

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

Certifications/Standards

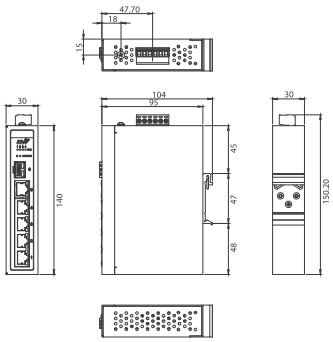
Certifications	cULus CE FCC
Standards	UL 62368 FCC Class A IEC 61000-4-2/3/4/5/6/8 IEC 60068-2-27 IEC 60068-2-32 IEC 60068-2-6

Notes and Comments

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

Part No.		Type	Dimensions (w × h × d)	Weight/unit kg
PoE 5 port, 24/48 V				
772021	S*	unm. PoE switch ET-PU5AST	30.0 mm × 140.0 mm × 95.0 mm	0.8

Dimensions



Ethernet · PoE splitter, 10/100/1000 MBit/s

1 RJ45 PoE input 1 GBit/s + 1 RJ45 data output 1 GBit/s
Output DC 24 V / 12.95 W, compact design
Extended temperature range, ESD 4 kV

Communication

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
Status display communication	Power, Link/Activity, Duplex/Collision

General

Operation voltage range	DC 44–57 V
Power consumption	17.8 W @ 48 V
Power output	12.95 W @ 24 V
Degree of protection	IP20
Installation position	Any
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)
Housing material	Metal
Mounting	DIN rail mountable TS35 (EN 60715)
Connection type	Screw terminal plug-in 0,20 mm² – 2,5 mm²
PU (units)	1

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

Certifications/Standards

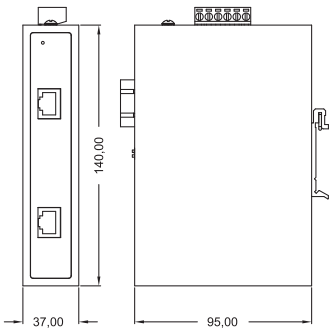
Certifications	cULus CE FCC
Standards	UL 60950-1 CAN/CSA-C22.2 No. 60950 USA-FCC Part 15 CISPR22 EN 55011 EN 55022 Class A EN 61000-3-2/3 EN 55024 IEC 61000-4-2/3/4/5/6/8 EN 61000-6-2 IEC 60068-2-27 IEC 60068-2-32 IEC 60068-2-6

Notes and Comments

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

Part No.		Type	Dimensions (w × h × d)	Weight/unit kg
772022	S*	PoE Splitter ET-PSPET	37.0 mm × 140.0 mm × 95.0 mm	0.6

Dimensions



Further product information at
www.luetze.com

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

LÜTZE - Ethernet cables · Overview

LÜTZE SUPERFLEX® Single Pair Ethernet	
Category	
Application according to	
Dimensions	(1×2×AWG26/7)C
Part-No.	104450
Screen	S/UTP
Jacket	PUR
UL	

LÜTZE SUPERFLEX® Profinet Torsion			
Category	Cat. 6_A	Cat. 7	Cat. 5e
Application according to	Profinet Typ C	Profinet Typ C	Profinet Typ R
Dimensions	(4×2×AWG24/7)StC	(4×(2×AWG24/7)St)C	(2×2×AWG22/19)StC
Part-No.	104401	104404	104050
Screen	SF/UTP	S/FTP	SF/UTQ
Jacket	PUR	PUR	PUR
UL	AWM 21198	CMX	AWM 21238

LÜTZE SUPERFLEX® Industrial Ethernet / ProfiNet / Ethercat		
Category	Cat. 5e	Cat. 5e
Application according to	Profinet Typ C	Profinet Typ C
Dimensions	(2×2×AWG22/19)C	(2×2×AWG22/7)C
Part-No.	104302	104303
Screen	S/UTQ	S/UTQ
Jacket	PUR	PUR
UL	CMX	CMX

LÜTZE SUPERFLEX® Industrial Ethernet / Ethernet IP				
Category	Cat. 5e	Cat. 5e	Cat. 5e	Cat. 6
Dimensions	(2×2×AWG26/19)StC	(4×2×AWG24/19)C	(4×2×AWG26/19)StC	(4×2×AWG26/19)StC
Part-No.	104379	104337	104396	104347
Screen	S/UTQ	S/UTP	S/UTP	S/UTP
Jacket	PUR	PUR	PUR	PUR
UL	AWM 21198 300 V	AWM 21198 300 V	AWM 21198 300 V	CMX

LÜTZE ELECTRONIC Industrial Ethernet / PROFINET / ETHERCAT				
Category	Cat. 5e	Cat. 5e	Cat. 6_A	Cat. 7
Application according to	Profinet Typ A	Profinet Typ B	Profinet Typ A	Typ B
Dimensions	(2×2×AWG22/1)StC	(2×2×AWG22/7)StC	(4×(2×AWG22/1)St)C.	(4×(2×AWG23/7)St)C
Part-No.	104301	104307	104397	104110
Screen	S/UTQ	S/UTQ	S/FTP	S/FTP
Jacket	PVC	PVC	PVC	PVC
UL	CMG, PLTC, AWM 20201 600 V	CMG, PLTC, AWM 20201 600 V	CMG, PLTC, AWM 2570 600 V	AWM 2095

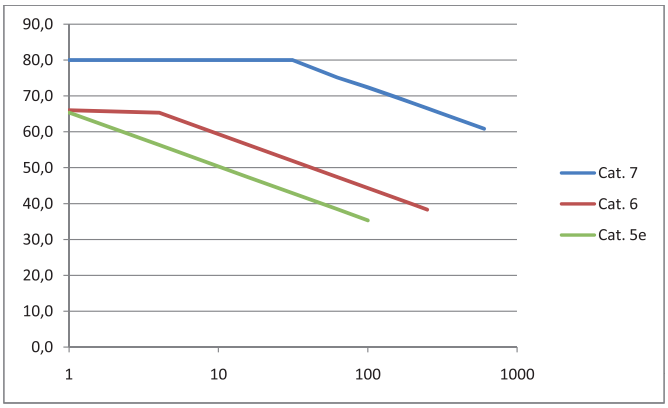
LÜTZE ELECTRONIC Industrial Ethernet / Ethernet IP				
Category	Cat. 5e	Cat. 5e	Cat. 6_A	Cat. 7
Dimensions	(4×2×AWG26/7)StC	(4×2×AWG24/7)StC	(4×(2×AWG24/7)St)C	(4×(2×AWG26/7)St)C
Part-No.	104335	104336	104338	104331
Screen	S/UTP	S/UTP	S/FTP	S/FTP
Jacket	PVC	PVC	PVC	PVC
UL	CMG	CMG	CMG	CMG

LÜTZE ELECTRONIC Industrial Ethernet	
Category	Cat. 5e
Application according to	
Dimensions	(4×2×AWG22/7)StC
Part-No.	104350
Screen	SF/UTP
Jacket	PVC
UL	PLTC, CMG, CMX Outdoor, AWM 2570

LÜTZE - Ethernet Cables • Transmission Parameters

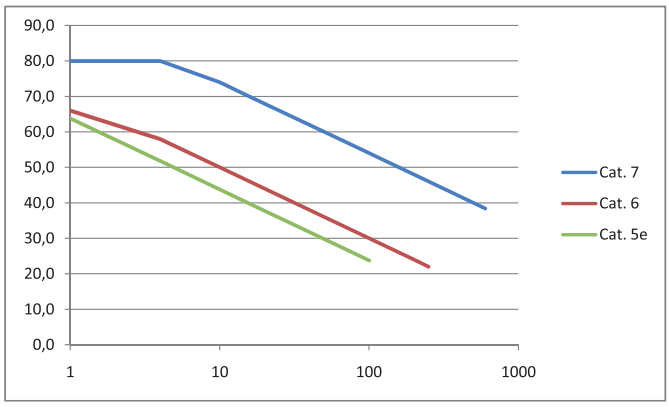
min. Near End Crosstalk (NEXT)

Frequenz	EN 50288-2-2 Cat. 5e	EN 50288-5-2 Cat. 6	EN 50288-4-2 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



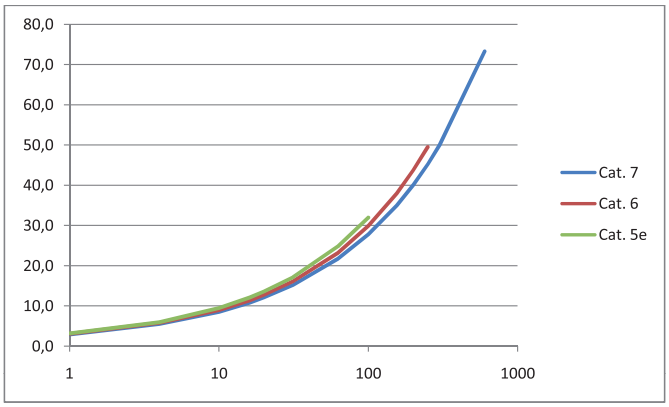
min. Far End Crosstalk (FEXT)

Frequenz	EN 50288-2-2 Cat. 5e	EN 50288-5-2 Cat. 6	EN 50288-4-2 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



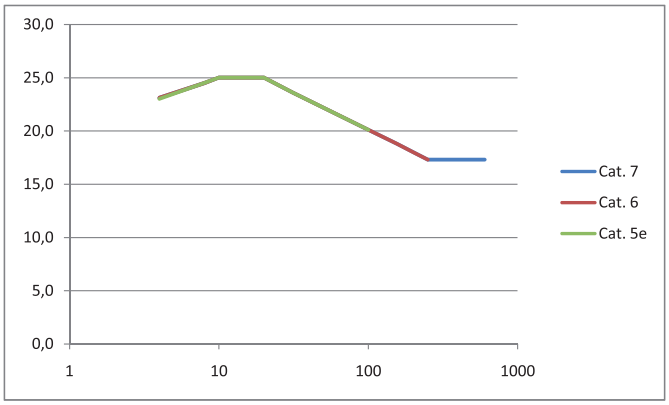
max. Attenuation (α)

Frequenz	EN 50288-2-2 Cat. 5e	EN 50288-5-2 Cat. 6	EN 50288-4-2 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)

Frequenz	EN 50288-2-2 Cat. 5e	EN 50288-5-2 Cat. 6	EN 50288-4-2 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

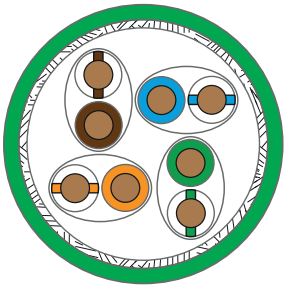


ETHERNET – Overview

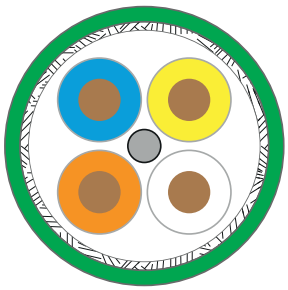
1. LÜTZE ETHERNET Cables

We recommend shielded industrial Ethernet cable, such as LÜTZE ETHERNET cable, for use in industrial environment to ensure secure connectivity. Motors and other electrical noise producing devices are often located in close proximity to network cabling. EMI (Electro Magnetic Interference) and RFI (Radio Frequency Interference) can distort data transmission on copper-based network cable. To lessen or eliminate interference, called alien-crosstalk, the use of shielded industrial cable and connectors is recommended.

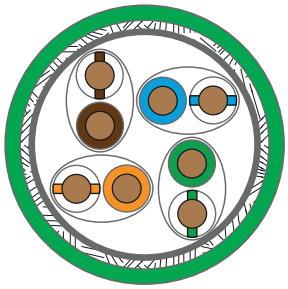
Available LÜTZE ETHERNET Cables:



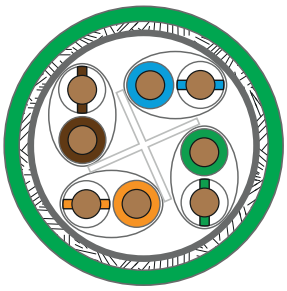
S/UTP



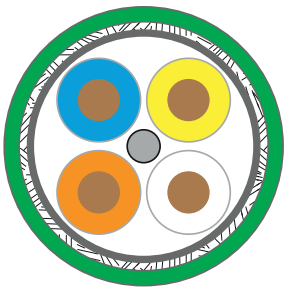
S/UTQ (Quad)



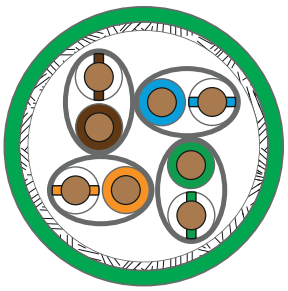
SF/UTP



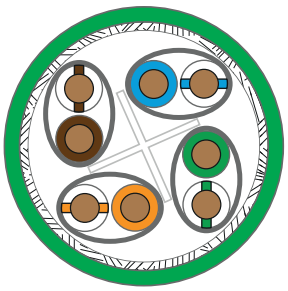
SF/UTP
with cross element



SF/UTQ (Quad)



S/FTP



S/FTP
with cross element

Susceptibility for Interference

S/UTP	S/UTQ (Quad)	SF/UTP	SF/UTP with cross element	SF/UTQ (Quad)	S/FTP	S/FTP with cross element
Susceptibility for Interference						
some	some	low	low	low	low	low

2. Key for twisted pair cables according to ISO/IEC-11801 (2002)E

XX/YZZ

XX – outer jacket	/ **Y** – for the pair shielding	**ZZ** – wire paring
U = unshielded	/ **U** = unshielded	**TP** = twisted pair (regular)
F = foiled shield	/ **F** = foiled shield	**TQ** = quad pair (star quad)
S = braided shield	/ **S** = braided shield	
SF = braided and foiled shield		

In order to utilize EMI/RFI shielding, the shield must be properly terminated at both ends!

3. ETHERNET cable selection tool

Category	Use	2- or 4-pair	Part number	Shielding	AWG	AD (mm)	UL Recognized	UL Listed Type
Cat. 5e	high flexing	2-pair	104050	SF/UTQ	22	6,5	cURus	
Cat. 5	high flexing	2-pair	104303	S/UTQ	22	6,5		CMX
Cat. 5e	high flexing	2-pair	104302	S/UTQ	22	6,6		CMX
Cat. 5e	high flexing	2-pair	104379	SF/UTQ	26	5,3	cURus	
Cat. 5e	high flexing	4-pair	104337	S/UTP	24	7,8	cURus	
Cat. 5e	high flexing	4-pair	104396	SF/UTP	26	6,7	cURus	
Cat. 5e	static	2-pair	104301	SF/UTQ	22-single wire	6,5	cURus	PLTC, CMG
Cat. 5e	static	2-pair	104307	SF/UTQ	22	6,5	cURus	PLTC, CMG
Cat. 5e	static	4-pair	104335	SF/UTP	26	6,3		CMG
Cat. 5e	static	4-pair	104336	SF/UTP	24	7,3		CMG
Cat. 5e	static	4-pair	104350	SF/UTP	22	8,6	cURus	PLTC, CMG, CMX Outdoor
Cat. 6	high flexing	4-pair	104347	SF/UTP	26	7,9		CMX
Cat. 6_A	high flexing	4-pair	104401	SF/UTP	24	8,9	cURus	
Cat. 6_A	static	4-pair	104397	S/FTP	22-single wire	9,6	cURus	PLTC, CMG
Cat. 6_A	static	4-pair	104338	S/FTP	26	6,4		CMG
Cat. 7	high flexing	4-pair	104404	S/FTP	24	9,4		CMX
Cat. 7	static	4-pair	104331	S/FTP	26	6,4		CMG
Cat. 7	static	4-pair	104110	S/FTP	23	8,7	cURus	

4. Correct Handling and Installation of Network Copper Cable

Do not subject cable to tension
Do not kink the cable
Do not bend the cable more than 90° (See individual specifications for bending radius)
Strip the cable as short as possible
Do not crush cable when fastening
Do not untwist the conductor pairs by more than 15 mm
Terminate the shielding on both ends

ETHERNET – Overview

5. ProfiNet – Star Quad Design and Termination

The star quad is a specific low-impedance cable configuration.
Four conductors are twisted on a common axis. The conductors across from each other make a pair.

In Figure 1 the pairs are as follows:

Pair 1:
Conductor A ⟷ Conductor D

Pair 2:
Conductor B ⟷ Conductor C

Other terminations than in Figure 1 lead to interferences, decreased connectivity or no connectivity at all.

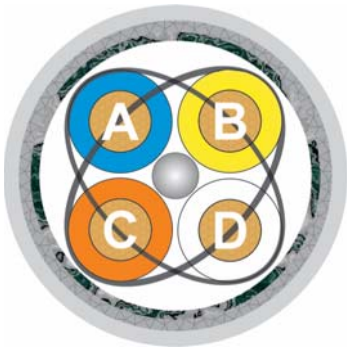


Image 1

6. Pin Assignment and Installation

RJ45 is the most common Ethernet connector and is available both shielded and unshielded.
All pins of the RJ45 connector are used for 1000 Mbit/s (4-pair transmission). Four pins are used for 10/100 Mbit/s (2-pair transmission).

According to the EN 50173 standard, two color codes are defined for installation: T568A and T568B. It makes no difference which color code is used, however the same code should be used consistently throughout the entire installation. Mixing up the two color codes will result in malfunctions.

Pin assignement RJ45 – Color code according to EN 50173 – hard wiring:

ETHERNET cables							
	Star Quad (ProfiNet)			Paired			
Pin#	**100BASE-TX**	**Colorcode**	**10 BASE-T, 100BASE-TX**	**1000BASE-T**		**Colorcode T568A**	**Colorcode T568B**
1	Transmit+	yellow	Transmit+	BI_DA+	(bidirectional)	WH/GN	WH/OR
2	Transmit-	orange	Transmit-	BI_DA-	(bidirectional)	GN	OR
3	Receive+	white	Receive+	BI_DB+	(bidirectional)	WH/OR	WH/GN
4	–		–	BI_DC+	(bidirectional)	BL	BL
5	–		–	BI_DC-	(bidirectional)	WH/BL	WH/BL
6	Receive-	blue	Receive-	BI_DB-	(bidirectional)	OR	GN
7	–		–	BI_DD+	(bidirectional)	WH/BN	WH/BN
8	–		–	BI_DD-	(bidirectional)	BN	BN

7. ETHERNET Categories and Classes

	ProfiNet®	**Ca.t 5**	**Cat. 5e**	**Cat. 6**	**Cat. 6_A**	**Cat. 7**
Class	D	D	De	E	Ea	F
Construction	2 pair (AWG 22)	2 pair (AWG22, AWG24, AWG26)	4 pair (AWG 24, AWG 26)	4 pair (26 AWG)	4 pair (AWG22, AWG24, AWG26)	4 pair (AWG22, AWG24, AWG26)
Speed	10/100 Mbit/s	10/100 Mbit/s	10/100/1000 Mbit/s	10/100/1000 Mbit/s	10/100/1000/10000 Mbit/s	10/100/1000/10000 Mbit/s
LAN Applications (max.)	10BASE-T (2 pair) 100BASE-TX (2 pair)	10BASE-T (2 pair) 100BASE-TX (2 pair)	10BASE-T (2 pair) 100BASE-TX (2 pair) 1000BASE-T (4 pair)	10BASE-T 100BASE-TX 1000BASE-T 10BASE-T	10BASE-T 100BASE-TX 1000BASE-T 10GBASE-T	10BASE-T 100BASE-TX 1000BASE-T 10GBASE-T
Nominal Impedance	100 Ohm	100 Ohm	100 Ohm	100 Ohm	100 Ohm	100 Ohm
Bandwidth	100 MHz	100 MHz	100 MHz	250 MHz	500 MHz	600 MHz
max. lenght	100 m (10BASE-T) 100 m (100BASE-TX)	100 m (10BASE-T) 100 m (100BASE-TX)	100 m (10BASE-T) 100 m (100BASE-TX) 100 m (1000BASE-T)	100 m (10BASE-T) 100 m (100BASE-TX) 100 m (1000BASE-T)	100 m (10BASE-T) 100 m (100BASE-TX) 100 m (1000BASE-T) 100 m (10GBASE-T)	100 m (10BASE-T) 100 m (100BASE-TX) 100 m (1000BASE-T) 100 m (10GBASE-T)
Cat. compatibility	Cat. 5	Cat. 5	Cat. 5	Cat. 5, Cat. 5e	Cat. 5, Cat. 6	Cat. 5, Cat. 6, Cat. 6_A
ISO/IEC standard	–	ISO/IEC 11801	ISO/IEC 11801	ISO/IEC 11801	Modification 1 ISO/IEC 11801	ISO/IEC 11801
ANSI/TIA standard	–	ANSI/TIA-568-B	ANSI/TIA-568-C.2	ANSI/TIA-568-C.2	ANSI/TIA-568-C.2	Not recognized

LÜTZE SUPERFLEX® SINGLE PAIR ETHERNET (C) PUR

Application
- For wiring 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

Construction

Conductor	CU-wire bare AWG conductor
Conductor insulation	Special Polyolefin
Overall shield	plastic-laminated aluminum foil Braid shield tinned copper wires optical cover approx. 85 %
Jacket material	PUR
Surface	matte
Jacket color	green RAL 6018

Technical data

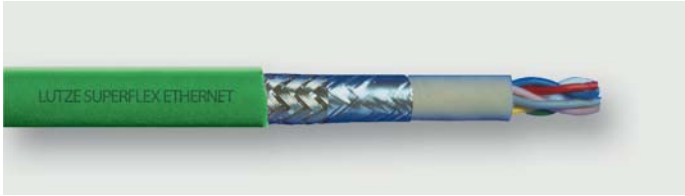
Rated voltage	300 V
Test voltage type	AC 2000 V
Impedance	nom.100 Ω
Insulation resistance at 20 °C	≥500 MΩ×km
Operating capacitance wire-shield	approx.50 pF/m
Temperature range moving	-30 °C … +70 °C
Temperature range fixed	-40 °C … +80 °C
Minimum bending radius moving	15×D
Minimum bending radius fixed	8×D
Oil resistant according to	DIN EN 50363-10-2 DIN EN 60811-404
Burning behavior according to	IEC 60332-1-2
Halogen free according to	IEC 60754-1 VDE 0472-815

Part No.		Number of conductors/cross-section	Overall stranding	Conductor marking	Outer Ø mm	Weight kg/100 m	Cu-Index kg/100 m
104450	S*	(1×2×AWG26/7)	stranded pairs layer pitch optimised	white • blue	4.7	2.5	1.5

Further product information at
www.luetze.com

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

LÜTZE SUPERFLEX® ETHERNET R (C) PUR
For highest requirements



Application
- For wiring 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
- RoHS compliant

Construction

Conductor	AWG conductor CU-wire tin-plated
Conductor insulation	TPE
Overall shield	aluminium-laminated film shield optical cover approx. 100 % Braid shield tinned copper wires optical cover approx. 85 %
Jacket material	PUR
Jacket color	green RAL 6018

Technical data

UL style	AWM 21238
Rated voltage	600 V
Test voltage type	2000 V
Impedance	nom.100 Ω
Insulation resistance at 20 °C	5,000 MΩ×km
Operating capacitance wire-wire	approx.50 pF/m
Temperature range moving	-20 °C … +60 °C
Temperature range fixed	-40 °C … +80 °C
Minimum bending radius moving	15×D
Minimum bending radius fixed	4×D
Torsion	± 180°/m
Oil resistant according to	IEC 60811-404 DIN EN 50363-10-2
Burning behavior according to	UL 1581 sec. 1100 HFT/FT2 acc. to UL 2556 sec. 9.1 IEC 60332-1-2
Halogen free according to	IEC 60754-1 DIN 0472 Part 815
Certifications	cURus

Part No.		Number of conductors/cross-section	Category	Overall stranding	Conductor marking	Outer Ø mm	Weight kg/100 m	Cu-Index kg/100 m
ELECTRONIC Industrial Ethernet/Profinet/EtherCat								
104050	S*	(2×2×AWG22/19) StC	Cat.5e	star quad stranding layer pitch optimised	white • yellow • blue • orange	6.5	6	3.4

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

LÜTZE SUPERFLEX® ETHERNET (C) PUR
For highest requirements

Application
- For wiring 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
- Torsion-resistant

Construction

Conductor	CU-wire bare AWG conductor
Conductor insulation	Special Polyolefin
Overall shield	Foil shield Braid shield tinned copper wires optical cover approx. 90 %
Inner jacket	FRNC
Jacket material	PUR
Surface	adhesion-free, matte
Jacket color	green similar to RAL 6018

Technical data

UL style	AWM 21198
Rated voltage	300 V
Test voltage type	AC 2000 V
Impedance	nom.100 Ω
Insulation resistance at 20 °C	≥500 MΩ×km
Temperature range moving	-30 °C … +70 °C
Temperature range fixed	-40 °C … +80 °C
Minimum bending radius moving	15×D
Minimum bending radius fixed	4×D
Torsion	± 180°/m
Oil resistant according to	DIN EN 60811-404 DIN EN 50363-10-2
Burning behavior according to	IEC 60332-1-2 Horizontal Flame Test UL FT2
Halogen free according to	DIN EN 60754-1 IEC 60754-1
Certifications	cURus

Part No.		Number of conductors/cross-section	Category	Overall stranding	Conductor marking	Outer Ø mm	Weight kg/100 m	Cu-Index kg/100 m
SUPERFLEX® Industrial ETHERNET, Cat. 6A, CU-wire bare								
104401	S*	(4×2×AWG24/7) StC	Cat.6$_A$	stranding with cross element	white/blue • blue • white/orange • orange • white/green • green • white/brown • brown	8.9	8.8	4

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

LÜTZE SUPERFLEX® ETHERNET (C) PUR
For highest requirements

Application
- For wiring 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
- Torsion-resistant

Construction

Conductor	CU-wire tin-plated AWG conductor
Conductor insulation	Special Polyolefin
Overall shield	Braid shield tinned copper wires optical cover approx. 85 %
Jacket material	PUR
Surface	adhesion-free, matte
Jacket color	green similar to RAL 6018

Technical data

Rated voltage	300 V
Test voltage type	AC 3000 V
Impedance	nom.100 Ω
Insulation resistance at 20 °C	≥500 MΩ×km
Temperature range moving	-30 °C … +70 °C
Temperature range fixed	-40 °C … +80 °C
Minimum bending radius moving	15×D
Minimum bending radius fixed	8×D
Torsion	± 180°/m
Oil resistant according to	DIN EN 60811-404 DIN EN 50363-10-2
Burning behavior according to	IEC 60332-1-2 UL 1581 part 1080 VW-1
Halogen free according to	VDE 0472-815 IEC 60754-1
Certifications	CMX

Part No.		Number of conductors/cross-section	Category	Overall stranding	Conductor marking	Outer Ø mm	Weight kg/100 m	Cu-Index kg/100 m
SUPERFLEX® Industrial ETHERNET, Cat. 7, CU-wire tin-plated								
104404	S*	(4×(2×AWG24/7) St)C	Cat.7	stranding with cross element metallized fleece	white • blue • white • orange • white • green • white • brown	9.4	9.6	4.4

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

LÜTZE SUPERFLEX® ETHERNET (C) PUR
For highest requirements

Application
- For wiring 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

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, matte
Jacket color	green similar to RAL 6018

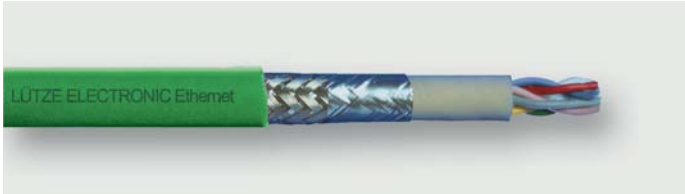
Technical data

Rated voltage	300 V
Test voltage type	AC 1500 V
Impedance	nom.100 Ω
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
Certifications	CMX cULus

Part No.		Number of conductors/cross-section	Category	Overall stranding	Conductor marking	Outer Ø mm	Weight kg/100 m	Cu-Index kg/100 m
SUPERFLEX® Industrial Ethernet/ProfiNet/Ethercat, FC								
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
SUPERFLEX® Industrial Ethernet/Ethernet IP								
104379	S*	(2×2×AWG26/19) StC	Cat.5e	star quad stranding	white • blue • yellow • orange	5.3	3.5	1.8
104337	S*	(4×2×AWG24/19)C	Cat.5e	stranded pairs	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	Cat.5e	stranded pairs	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 pairs	white/blue • blue • white/orange • orange • white/green • green • white/brown • brown	7.8	7.4	3.4

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

LÜTZE ELECTRONIC ETHERNET (C) PVC



Application
- For wiring of industrial field bus systems with the globally accepted TCP/IP protocol
- For fixed installation or moving use without compulsory guide in the automation technology, transport and conveyor technology, machine tool manufacture
- Cable design for harsh industrial environments and operating conditions with high noise levels
- Applicable in automation technology, transport and conveyor technology, machine tool manufacture
- Based on NFPA 79 standards

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

Construction

Conductor	AWG conductor CU-wire bare
Conductor insulation	Special Polyolefin
Overall shield	plastic-laminated aluminum foil Braid shield tinned copper wires optical cover approx. 80 %
Inner jacket	TPE
Jacket material	PVC
Surface	adhesion-free, matte
Jacket color	green similar to RAL 6018

Technical data

UL style	AWM 20201
Rated voltage	300 V
Test voltage type	2000 V
Impedance	nom.100 Ω
Insulation resistance at 20 °C	5,000 MΩ×km
Operating capacitance wire-wire	approx.50 pF/m
Temperature range fixed	-40 °C … +80 °C
Minimum bending radius moving	15×D
Minimum bending radius fixed	10×D
Oil resistant according to	Oil Res I UL 1581 part 480
Burning behavior according to	UL FT4 UL Vertical-Tray UL 1685 part 1164 UL 1581 section 1061 Flame-Test IEC 60332-3-24 DIN EN 60332-3-24
Certifications	cULus CMG 75 °C acc. UL 444 PLTC cURus Class I and II, Div. 2 Class 1 Div. 2 per NEC 501, 502, 505

Part No.		Number of conductors/cross-section	Category	Overall stranding	Conductor marking	Outer Ø mm	Weight kg/100 m	Cu-Index kg/100 m
ELECTRONIC Industrial Ethernet/Profinet/EtherCat								
104301	S*	(2×2×AWG22/1) StC	Cat.5e	star quad stranding	white • yellow • blue • orange	6.5	6.8	3.2
104307	S*	(2×2×AWG22/7) StC	Cat.5e	star quad stranding	white • yellow • blue • orange	6.5	6.9	3.2
104397	S*	(4×(2×AWG22/1) St)C	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
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

LÜTZE ELECTRONIC ETHERNET (C) PVC

Application
- For wiring of industrial field bus systems with the globally accepted TCP/IP protocol
- For fixed installation or moving use without compulsory guide in the automation technology, transport and conveyor technology, machine tool manufacture
- Cable design for harsh industrial environments and operating conditions with high noise levels
- Applicable in automation technology, transport and conveyor technology, machine tool manufacture
- Based on NFPA 79 standards

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

Construction

Conductor	AWG conductor CU-wire tin-plated
Conductor insulation	Special Polyolefin
Overall shield	aluminium-laminated film shield Braid shield tinned copper wires optical cover approx. 85 %
Jacket material	PVC
Surface	matte, adhesion-free
Jacket color	green similar to RAL 6018

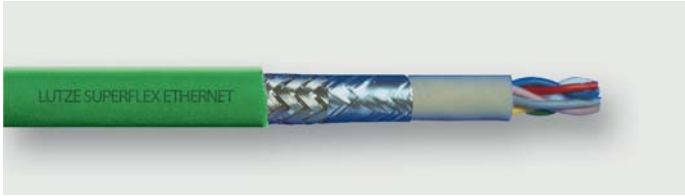
Technical data

UL style	AWM 2570
Rated voltage	300 V
Test voltage type	AC 1000 V
Impedance	nom.100 Ω
Insulation resistance at 20 °C	≥5,000 MΩ×km
Operating capacitance wire-wire	approx.50 pF/m
Temperature range moving	-25 °C … +70 °C
Temperature range fixed	-40 °C … +80 °C
Minimum bending radius moving	12×D
Minimum bending radius fixed	6×D
Oil resistant according to	Oil Res I
Burning behavior according to	DIN EN 60332-1-2 DIN EN 60332-3-24 UL 1685 UL FT4
Certifications	cULus CMG CMX Outdoor PLTC cURus

Part No.		Number of conductors/cross-section	Category	Conductor marking	Outer Ø mm	Weight kg/100 m	Cu-Index kg/100 m
104350	S*	(4×2×AWG22/7)	Cat.5e	white/blue • blue • white/orange • orange • white/green • green • white/brown • brown	8.6	9.2	4.8

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

LÜTZE ELECTRONIC ETHERNET (C) PVC



Application
- For wiring of industrial field bus systems with the globally accepted TCP/IP protocol
- Suitable for static laying and slight movement of machine components (not C-track)

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

Construction

Conductor	AWG conductor CU-wire tin-plated
Conductor insulation	foamed TPE
Overall shield	Braid shield tinned copper wires optical cover approx. 85 %
Jacket material	PVC
Jacket color	green RAL 6018

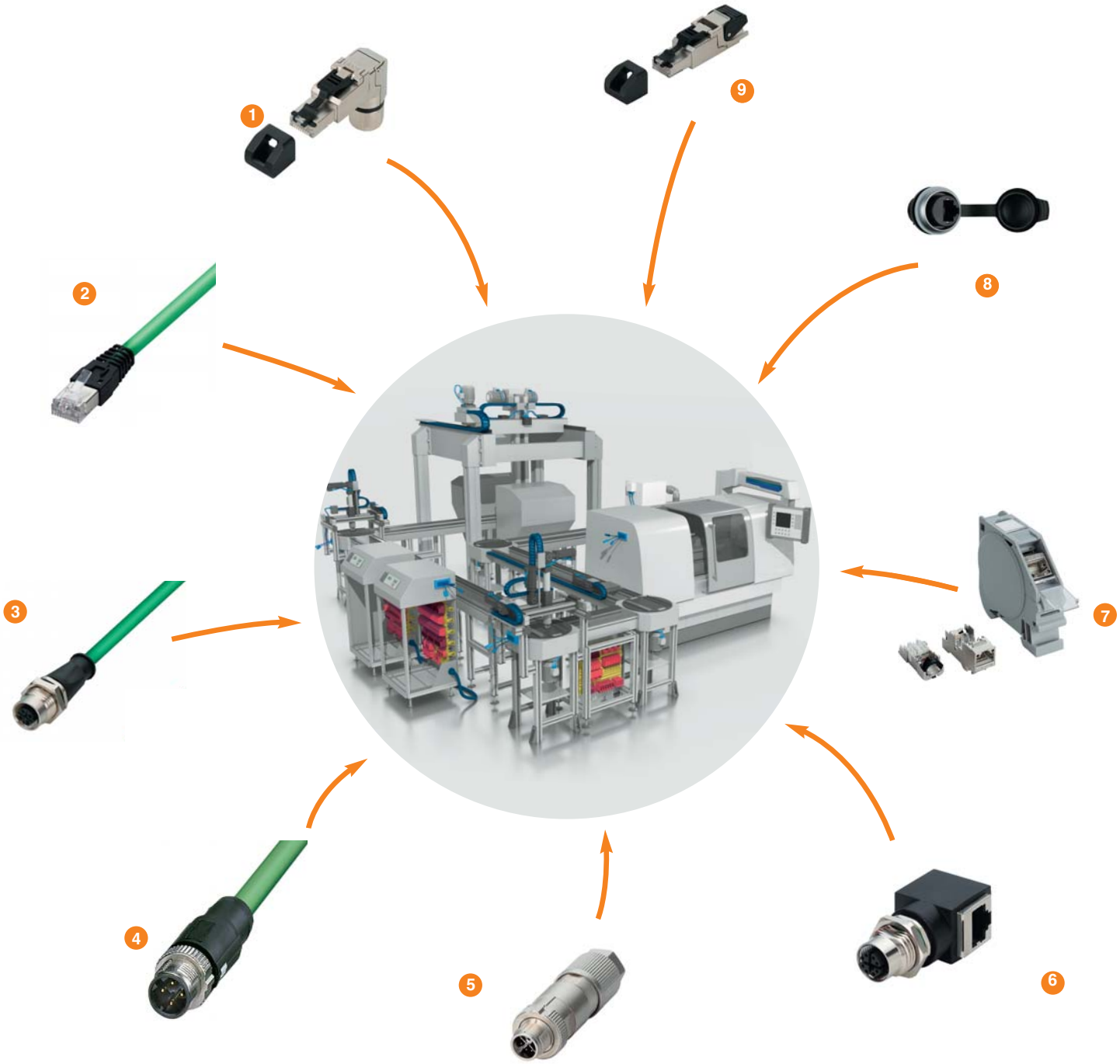
Technical data

UL style	AWM 2095
Rated voltage	300 V
Test voltage type	2000 V
Impedance	100 Ω
Insulation resistance at 20 °C	5,000 MΩ×km
Operating capacitance wire-wire	50 pF/m
Temperature range moving	-10 °C … +70 °C
Temperature range fixed	-40 °C … +80 °C
Minimum bending radius moving	8×D
Minimum bending radius fixed	4×D
Burning behavior according to	UL 1581 sec. 1100 HFT/FT2 acc. to UL 2556 sec. 9.1 IEC 60332-1-2
Certifications	cURus UL 758 - AWM

Part No.		Number of conductors/cross-section	Category	Overall stranding	Conductor marking	Outer Ø mm	Weight kg/100 m	Cu-Index kg/100 m
ELECTRONIC Industrial Ethernet/Ethernet IP								
104110	S*	(4×(2×AWG23/7) St)C	Cat.7	conductors layered construction	Twisted pair • blue/white • orange/white • green/white • brown/white	8.7	10.1	5

* 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 M12 straight with PVC cable shielded, Cat 5e
Self-locking screw connection M12

Construction

Number of conductors/cross-section	(2×2×AWG22/7)
Number of conductors	4
Jacket material	PVC
Jacket color	green RAL 6018
Minimum bending radius fixed	6×D
Minimum bending radius moving	12×D

Technical data

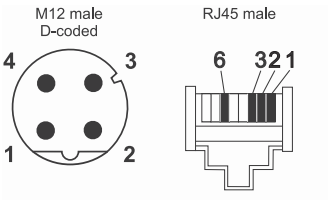
Operating voltage max.	50 V
Rated current	1.5 A
Form male 1	RJ45
Form male 2	M 12
Degree of protection	IP20
Color of the housing	black
Mounting	Breakaway torque 0.4 Nm
Temperature range connector	-25 °C … +85 °C
Temperature range fixed	-30 °C … +80 °C
Temperature range moving	-5 °C … +70 °C

Accessories

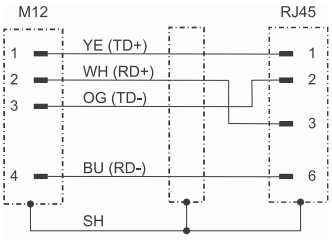
Torque setting tool M 12: Part-No. 490091 | DM-SET M12 | PU: 1 unit

Part No.		Type	Pole number	Coding	Cable length m	Cable diameter mm	PU (units)
192014.0030	S*	STG4-RJ45/STG4-M12/ PN PVC 0,3M	4	D	0.3	6.5	1
192014.0060	S*	STG4-RJ45/STG4-M12/ PN PVC 0,6M	4	D	0.6	6.5	1
192014.0100	S*	STG4-RJ45/STG4-M12/ PN PVC 1,0M	4	D	1.0	6.5	1
192014.0150	S*	STG4-RJ45/STG4-M12/ PN PVC 1,5M	4	D	1.5	6.5	1
192014.0200	S*	STG4-RJ45/STG4-M12/ PN PVC 2,0M	4	D	2.0	6.5	1
192014.0500	S*	STG4-RJ45/STG4-M12/ PN PVC 5,0M	4	D	5.0	6.5	1
192014.1000	S*	STG4-RJ45/STG4-M12/ PN PVC 10,0M	4	D	10.0	6.5	1
192014.1500	A*	STG4-RJ45/STG4-M12/ PN PVC 15,0M	4	D	15.0	6.5	1
192014.2000	A*	STG4-RJ45/STG4-M12/ PN PVC 20,0M	4	D	20.0	6.5	1

Pin layout



Circuit diagram



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

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

Construction

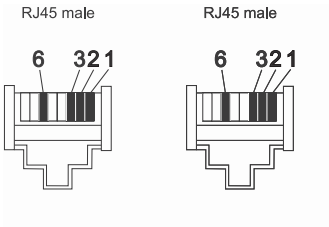
Number of conductors/cross-section	(2×2×AWG22/7)
Number of conductors	4
Jacket material	PVC
Jacket color	green RAL 6018
Minimum bending radius fixed	6×D
Minimum bending radius moving	12×D

Technical data

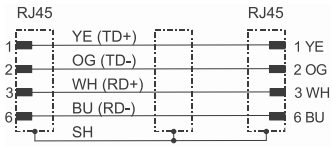
Operating voltage max.	50 V
Rated current	1.5 A
Form male 1	RJ45 male straight
Form male 2	RJ45 male straight
Degree of protection	IP20
Color of the housing	black
Temperature range connector	-25 °C … +85 °C
Temperature range fixed	-30 °C … +80 °C
Temperature range moving	-5 °C … +70 °C

Part No.		Type	Pole number	Cable length m	Cable diameter mm	PU (units)
192016.0030	S*	STG4-RJ45/STG4-RJ45/PN PVC 0,3M	4	0.3	6.5	1
192016.0060	S*	STG4-RJ45/STG4-RJ45/PN PVC 0,6M	4	0.6	6.5	1
192016.0100	S*	STG4-RJ45/STG4-RJ45/PN PVC 1,0M	4	1.0	6.5	1
192016.0150	S*	STG4-RJ45/STG4-RJ45/PN PVC 1,5M	4	1.5	6.5	1
192016.0200	S*	STG4-RJ45/STG4-RJ45/PN PVC 2,0M	4	2.0	6.5	1
192016.0500	S*	STG4-RJ45/STG4-RJ45/PN PVC 5,0M	4	5.0	6.5	1
192016.1000	S*	STG4-RJ45/STG4-RJ45/PN PVC 10,0M	4	10.0	6.5	1
192016.1500	S*	STG4-RJ45/STG4-RJ45/PN PVC 15,0M	4	15.0	6.5	1
192016.2000	S*	STG4-RJ45/STG4-RJ45/PN PVC 20,0M	4	20.0	6.5	1

Pin layout



Circuit diagram



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

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

Construction

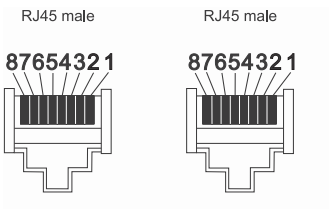
Number of conductors/cross-section	(4×2×AWG26/7)
Number of conductors	8
Jacket material	PVC
Jacket color	green RAL 6018
Minimum bending radius fixed	6×D
Minimum bending radius moving	12×D

Technical data

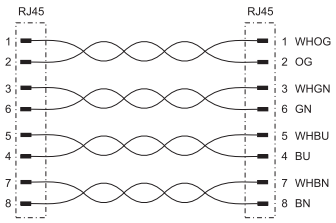
Operating voltage max.	50 V
Rated current	1.5 A
Form male 1	RJ45 male straight
Form male 2	RJ45 male straight
Degree of protection	IP20
Color of the housing	black
Temperature range connector	-25 °C … +85 °C
Temperature range fixed	-30 °C … +70 °C
Temperature range moving	-5 °C … +70 °C

Part No.		Type	Pole number	Cable length m	Cable diameter mm	PU (units)
192018.0030	S*	STG8-RJ45/STG8-RJ45/ET PVC 0,3M	8	0.3	6.3	1
192018.0060	S*	STG8-RJ45/STG8-RJ45/ET PVC 0,6M	8	0.6	6.3	1
192018.0100	S*	STG8-RJ45/STG8-RJ45/ET PVC 1,0M	8	1.0	6.3	1
192018.0150	S*	STG8-RJ45/STG8-RJ45/ET PVC 1,5M	8	1.5	6.3	1
192018.0200	S*	STG8-RJ45/STG8-RJ45/ET PVC 2,0M	8	2.0	6.3	1
192018.0500	S*	STG8-RJ45/STG8-RJ45/ET PVC 5,0M	8	5.0	6.3	1
192018.1000	S*	STG8-RJ45/STG8-RJ45/ET PVC 10,0M	8	10.0	6.3	1
192018.1500	S*	STG8-RJ45/STG8-RJ45/ET PVC 15,0M	8	15.0	6.3	1
192018.2000	S*	STG8-RJ45/STG8-RJ45/ET PVC 20,0M	8	20.0	6.3	1

Pin layout



Circuit diagram



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

Patch cable Cat.5e/Cat.6/Cat.6$_A$

RoHS

Application
- Ethernet network wiring

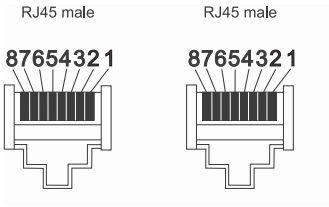
Properties
- Straight connector
- Assignment according to EIA/TIA 568B
- Moulded sleeve with length imprint (not suitable for drag chain and industrial design)
- Various colors available
- catch protection

Technical data

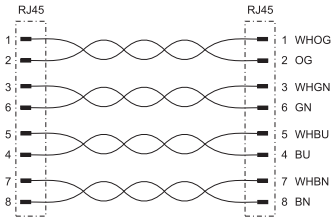
Operating voltage max.	50 V
Connector	Shielded RJ45, 1,27µm AU
Wiring	1:1
Compatibility	Fully plug compatible to IEC 60603-7
Ethernet Key	SF/UTP
Burning behavior according to	IEC 60332-1

Part No.		Number of conductors/cross-section	Jacket color	Sleeve color	Wiring	Temperature range fixed	Cable length m
Cat.5e PVC							
192000.0100	S*	(4x2xAWG26/7)	grey	grey	1:1	-5 °C … +70 °C	1.0
192022.0100	S*	(4x2xAWG26/7)	blue	blue	1:1	-5 °C … +70 °C	1.0
192030.0100	S*	(4x2xAWG26/7)	green	green	1:1	-5 °C … +70 °C	1.0
192050.0100	S*	(4x2xAWG26/7)	grey	red	Crossover	-5 °C … +70 °C	1.0
Cat.5e PVC UL							
192010.0100	S*	(4x2xAWG26/7)	grey	grey	1:1	-5 °C … +70 °C	1.0
Cat.6A LSZH							
192353.0100	S*	(4x2xAWG26/7)	grey	grey	1:1	-20 °C … +75 °C	1.0
192355.0100	S*	(4x2xAWG26/7)	blue	blue	1:1	-20 °C … +75 °C	1.0
192342.0100	S*	(4x2xAWG26/7)	yellow	yellow	1:1	-20 °C … +75 °C	1.0
192352.0100	S*	(4x2xAWG26/7)	green	green	1:1	-20 °C … +75 °C	1.0
192354.0100	S*	(4x2xAWG26/7)	red	red	1:1	-20 °C … +75 °C	1.0
Cat.6 industrial version PUR							
192201.0100	S*	(4x2xAWG27/7)	red	black	1:1	-30 °C … +75 °C	1.0

Pin layout



Circuit diagram



Further product information at
www.luetze.com

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

Male M12 straight with PUR cable, shielded 360°, open end
Cat.5e, D-coded, self-locking screw connection
C-track compatible, halogen free

halogen free
flame retardant

LÜTZE SUPERFLEX connected

Construction

Number of conductors/cross-section	1 × 4 × AWG 22/7
Number of conductors	4
Jacket material	PUR
Jacket color	green RAL 6018
Minimum bending radius moving	12×D

Technical data

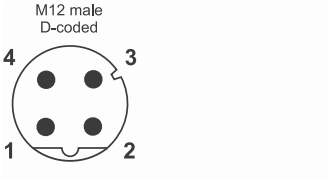
Rated voltage U_N	AC/DC 24 V
Operating voltage max.	60 V
Rated current	4 A
Form male 1	M 12 male straight
Form male 2	line end open
Degree of protection	IP65/67
Color of the housing	black
Mounting	Breakaway torque 0.4 Nm
Storage temperature range	-40 °C … +90 °C
Temperature range connector	-25 °C … +90 °C
Temperature range fixed	-40 °C … +70 °C
Temperature range moving	-30 °C … +70 °C

Accessories

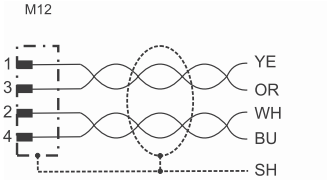
Torque setting tool M 12: Part-No. 490091 | DM-SET M12 | PU: 1 unit

Part No.		Type	Pole number	Coding	Cable length m	Cable diameter mm	PU (units)
475300.0200	S*	STG4-M12/PN 2M-PUR	4	D	2.0	6.5	1
475300.0500	S*	STG4-M12/PN 5M-PUR	4	D	5.0	6.5	1
475300.1000	S*	STG4-M12/PN 10M-PUR	4	D	10.0	6.5	1
475300.1500	S*	STG4-M12/PN 15M-PUR	4	D	15.0	6.5	1
475300.2000	S*	STG4-M12/PN 20M-PUR	4	D	20.0	6.5	1

Pin layout



Circuit diagram



* 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° Cat.5e, D-coded, self-locking screw connection C-track compatible, halogen free

halogen free flame retardant

LÜTZE SUPERFLEX connected

Construction

Number of conductors/cross-section	1 × 4 × AWG 22/7
Number of conductors	4
Jacket material	PUR
Jacket color	green RAL 6018
Minimum bending radius moving	12×D

Technical data

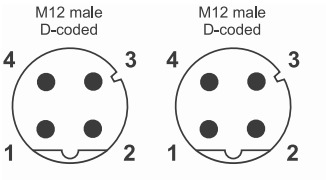
Rated voltage U_N	AC/DC 24 V
Rated voltage max.	30 V
Operating voltage max.	48 V
Rated current	4 A
Form male 1	M 12 male straight
Form male 2	M 12 male straight
Degree of protection	IP65/67
Color of the housing	black
Mounting	Breakaway torque 0.4 Nm
Storage temperature range	-30 °C … +90 °C
Temperature range connector	-25 °C … +90 °C
Temperature range fixed	-40 °C … +80 °C
Temperature range moving	-30 °C … +70 °C

Accessories

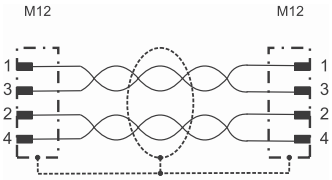
Torque setting tool M 12: Part-No. 490091 | DM-SET M12 | PU: 1 unit

Part No.		Type	Pole number	Coding	Cable length m	Cable diameter mm	PU (units)
475400.0030	S*	STG4-M12/STG4-M12/ PN 0,3M PUR	4	D	0.3	6.5	1
475400.0060	S*	STG4-M12/STG4-M12/ PN 0,6M PUR	4	D	0.6	6.5	1
475400.0100	S*	STG4-M12/STG4-M12/ PN 1,0M PUR	4	D	1.0	6.5	1
475400.0150	S*	STG4-M12/STG4-M12/ PN 1,5M PUR	4	D	1.5	6.5	1
475400.0200	S*	STG4-M12/STG4-M12/ PN 2,0M PUR	4	D	2.0	6.5	1
475400.0500	S*	STG4-M12/STG4-M12/ PN 5,0M PUR	4	D	5.0	6.5	1
475400.1000	S*	STG4-M12/STG4-M12/ PN 10,0M PUR	4	D	10.0	6.5	1
475400.1500	S*	STG4-M12/STG4-M12/ PN 15,0M PUR	4	D	15.0	6.5	1
475400.2000	S*	STG4-M12/STG4-M12/ PN 20,0M PUR	4	D	20.0	6.5	1

Pin layout



Circuit diagram



Further product information at www.luetze.com

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

M12 panel connectors using PG9 thread for rear panel installation, PUR cable, open end Cat.5e, female - D coded
C-track compatible, halogen free

halogen free
flame retardant

LÜTZE SUPERFLEX connected

Construction

Number of conductors/cross-section	1×4×AWG22/7
Jacket material	PUR
Jacket color	green RAL 6018
Minimum bending radius moving	10×D

Technical data

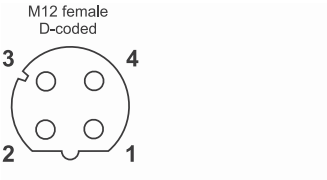
Rated voltage U_N	AC/DC 24 V
Rated voltage max.	30 V
Operating voltage max.	48 V
Rated current	4 A
Form male 1	M 12 female
Degree of protection	IP65/67
Storage temperature range	-40 °C … +90 °C
Temperature range connector	-25 °C … +90 °C
Temperature range fixed	-40 °C … +80 °C
Temperature range moving	-30 °C … +70 °C

Accessories

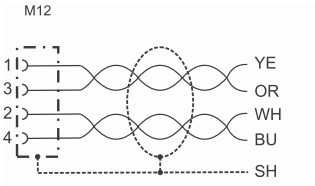
Torque setting tool M 12: Part-No. 490091 | DM-SET M12 | PU: 1 unit

Part No.		Type	Pole number	Coding	Cable length m	Cable diameter mm	PU (units)
475500.0200	S*	KUGE4-M12/PN 2M PUR	4	D	2.0	6.5	1
475500.0500	S*	KUGE4-M12/PN 5M PUR	4	D	5.0	6.5	1
475500.1000	S*	KUGE4-M12/PN 10M PUR	4	D	10.0	6.5	1

Pin layout



Circuit diagram



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

Male RJ45 straight to female M12 straight with PUR cable shielded 360° Cat.5e, D-coded, self-locking screw connection C-track compatible, halogen free

Construction

Number of conductors/cross-section	(2×2×AWG22/7)
Number of conductors	4
Jacket material	PUR
Jacket color	green RAL 6018
Minimum bending radius fixed	6×D
Minimum bending radius moving	12×D

Technical data

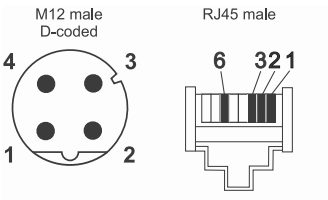
Rated voltage U_N	DC 24 V
Operating voltage max.	50 V
Rated current	1.5 A
Form male 1	RJ45 male straight
Form male 2	M 12 male straight
Degree of protection	IP20
Color of the housing	black
Mounting	Breakaway torque 0.4 Nm
Temperature range connector	-25 °C … +85 °C
Temperature range fixed	-40 °C … +80 °C
Temperature range moving	-30 °C … +70 °C

Accessories

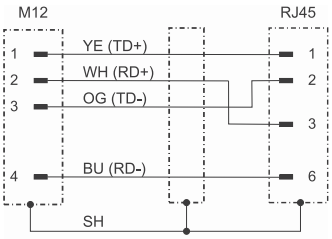
Torque setting tool M 12: Part-No. 490091 | DM-SET M12 | PU: 1 unit

Part No.		Type	Pole number	Coding	Cable length m	Cable diameter mm	PU (units)
192013.0030	S*	STG4-RJ45/STG4-M12/ PN PUR 0,3M	4	D	0.3	6.5	1
192013.0060	S*	STG4-RJ45/STG4-M12/ PN PUR 0,6M	4	D	0.6	6.5	1
192013.0100	S*	STG4-RJ45/STG4-M12/ PN PUR 1,0M	4	D	1.0	6.5	1
192013.0150	S*	STG4-RJ45/STG4-M12/ PN PUR 1,5M	4	D	1.5	6.5	1
192013.0200	S*	STG4-RJ45/STG4-M12/ PN PUR 2,0M	4	D	2.0	6.5	1
192013.0500	S*	STG4-RJ45/STG4-M12/ PN PUR 5,0M	4	D	5.0	6.5	1
192013.1000	S*	STG8-RJ45/STG4-M12/ PN CAT5 10,0M PUR	4	D	10.0	6.5	1
192013.1500	S*	STG4-RJ45/STG4-M12/ PN PUR 15,0M	4	D	15.0	6.5	1
192013.2000	S*	STG4-RJ45/STG4-M12/ PN PUR 20,0M	4	D	20.0	6.5	1

Pin layout



Circuit diagram



Further product information at
www.luetze.com

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

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

Construction

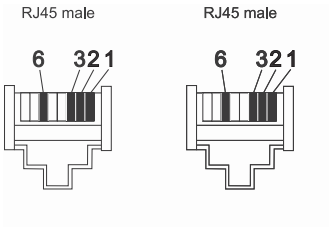
Number of conductors/cross-section	(2×2×AWG22/7)
Number of conductors	4
Jacket material	PUR
Jacket color	green RAL 6018
Minimum bending radius fixed	6×D
Minimum bending radius moving	12×D

Technical data

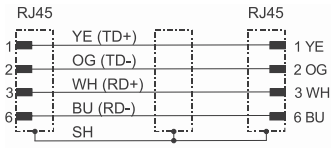
Operating voltage max.	50 V
Rated current	1.5 A
Form male 1	RJ45 male straight
Form male 2	RJ45 male straight
Degree of protection	IP20
Color of the housing	black
Temperature range connector	-25 °C … +85 °C
Temperature range fixed	-30 °C … +80 °C
Temperature range moving	-30 °C … +70 °C

Part No.		Type	Pole number	Cable length m	Cable diameter mm	PU (units)
192015.0030	S*	STG4-RJ45/STG4-RJ45/PN PUR 0,3M	4	0.3	6.5	1
192015.0060	S*	STG4-RJ45/STG4-RJ45/PN PUR 0,6M	4	0.6	6.5	1
192015.0100	S*	STG4-RJ45/STG4-RJ45/PN PUR 1,0M	4	1.0	6.5	1
192015.0150	S*	STG4-RJ45/STG4-RJ45/PN PUR 1,5M	4	1.5	6.5	1
192015.0200	S*	STG4-RJ45/STG4-RJ45/PN PUR 2,0M	4	2.0	6.5	1
192015.0500	S*	STG8-RJ45/STG8-RJ45/PN 5,0M PUR	4	5.0	6.5	1
192015.1000	S*	STG8-RJ45/STG8-RJ45/PN CAT5 10,0M PUR	4	10.0	6.5	1
192015.1500	S*	STG8-RJ45/STG8-RJ45/PN 15,0M PUR	4	15.0	6.5	1
192015.2000	S*	STG8-RJ45/STG8-RJ45/PN 20,0M PUR	4	20.0	6.5	1

Pin layout



Circuit diagram



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

Male RJ45 straight to female RJ45 straight with PUR cable shielded 360°, Cat.5e C-track compatible, halogen free

Construction

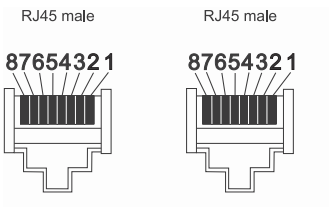
Number of conductors/cross-section	(4×2×AWG26/19)
Number of conductors	8
Jacket material	PUR
Jacket color	green RAL 6018
Minimum bending radius fixed	6×D
Minimum bending radius moving	12×D

Technical data

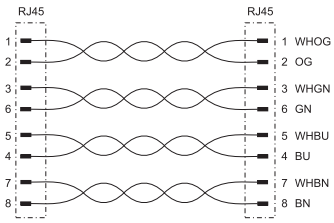
Operating voltage max.	50 V
Rated current	1.5 A
Form male 1	RJ45 male straight
Form male 2	RJ45 male straight
Degree of protection	IP20
Color of the housing	black
Temperature range connector	-25 °C … +85 °C
Temperature range fixed	-40 °C … +80 °C
Temperature range moving	-30 °C … +70 °C

Part No.		Type	Pole number	Cable length m	Cable diameter mm	PU (units)
192017.0030	S*	STG8-RJ45/STG8-RJ45/ET PUR 0,3M	8	0.3	6.7	1
192017.0060	S*	STG8-RJ45/STG8-RJ45/ET PUR 0,6M	8	0.6	6.7	1
192017.0100	S*	STG8-RJ45/STG8-RJ45/ET PUR 1,0M	8	1.0	6.7	1
192017.0150	S*	STG8-RJ45/STG8-RJ45/ET PUR 1,5M	8	1.5	6.7	1
192017.0200	S*	STG8-RJ45/STG8-RJ45/ET PUR 2,0M	8	2.0	6.7	1
192017.0500	S*	STG8-RJ45/STG8-RJ45/ET PUR 5,0M	8	5.0	6.7	1
192017.1000	S*	STG8-RJ45/STG8-RJ45/ET PUR 10,0M	8	10.0	6.7	1
192017.1500	S*	STG8-RJ45/STG8-RJ45/ET PUR 15,0M	8	15.0	6.7	1
192017.2000	S*	STG8-RJ45/STG8-RJ45/ET PUR 20,0M	8	20.0	6.7	1

Pin layout



Circuit diagram



Further product information at
www.luetze.com

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

Male RJ45 straight to female RJ45 straight with PUR cable shielded 360°, Cat.6 C-track compatible, halogen free, flame-retardant

LÜTZE SUPERFLEX® connected

Construction

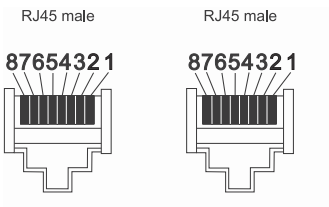
Number of conductors/cross-section	(4×2×AWG26/19)StC
Number of conductors	8
Jacket material	PUR
Jacket color	green RAL 6018
Minimum bending radius fixed	4×D
Minimum bending radius moving	12×D

Technical data

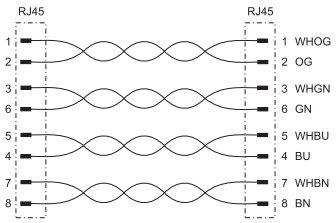
Operating voltage max.	50 V
Rated current	1.5 A
Form male 1	RJ45 male straight
Form male 2	RJ45 male straight
Degree of protection	IP20
Color of the housing	black
Temperature range connector	-25 °C … +85 °C
Temperature range fixed	-40 °C … +80 °C
Temperature range moving	-30 °C … +70 °C

Part No.		Type	Pole number	Cable length m	Cable diameter mm	PU (units)
192766.0030	S*	STG8-RJ45/STG8-RJ45/ET CAT6 PUR GN 0,3M	8	0.3	7.9	1
192766.0060	S*	STG8-RJ45/STG8-RJ45/ET CAT6 PUR GN 0,6M	8	0.6	7.9	1
192766.0100	S*	STG8-RJ45/STG8-RJ45/ET CAT6 PUR GN 1,0M	8	1.0	7.9	1
192766.0150	S*	STG8-RJ45/STG8-RJ45/ET CAT6 PUR GN 1,5M	8	1.5	7.9	1
192766.0200	S*	STG8-RJ45/STG8-RJ45/ET CAT6 PUR GN 2,0M	8	2.0	7.9	1
192766.0500	S*	STG8-RJ45/STG8-RJ45/ET CAT6 PUR GN 5,0M	8	5.0	7.9	1
192766.1000	S*	STG8-RJ45/STG8-RJ45/ET CAT6 PUR GN 10,0M	8	10.0	7.9	1
192766.1500	S*	STG8-RJ45/STG8-RJ45/ET CAT6 PUR GN 15,0M	8	15.0	7.9	1
192766.2000	S*	STG8-RJ45/STG8-RJ45/ET CAT6 PUR GN 20,0M	8	20.0	7.9	1

Pin layout



Circuit 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$_A$, protective cover pre-assembled

c UL us LISTED

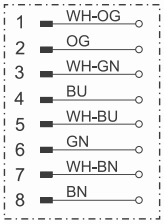
Technical data

Rated voltage U_N	30 V
Connection type	8-pin RJ45 Push-through contacts IPC
Rated current	≤1 A per contact
Design	RJ45
Degree of protection	IP20
Color of the housing	silver
Cable diameter	5.5 mm – 10 mm
Operation temperature range	-40 °C … +85 °C
Mechanical service life	>750 insertion cycles
Dimensions (w × h × d)	13.9 mm × 16.3 mm × 53.8 mm
Certifications	cULus Listed (E326112)
Flamability according to UL 94	V0
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

Part No.		Type	Pole number	Bandwidth	Transfer rate	Category	Strand diameter	Cross-section AWG	PU (units)
8-pin RJ45 Push-through contacts IPC									
490174	S*	RJ45-M 8pol. Cat.6A T568B	8	500 MHz	10 Gbit/s	Cat.6$_A$	1 mm – 1.6 mm	24-22/1, 24-22/7,19	1
490175	S*	RJ45-M 8pol. Cat.6A T568A	8	500 MHz	10 Gbit/s	Cat.6$_A$	1 mm – 1.6 mm	24-22/1, 24-22/7,19	1
490176	S*	RJ45-M 8pol. Cat.6A T568B AWG 26	8	500 MHz	10 Gbit/s	Cat.6$_A$	0.85 mm – 1.1 mm	26-24/1, 27-24/7, 26/19	1
4-pin RJ45 Push-through contacts IPC									
490177	S*	RJ45-MS 4pol. PROFINET	4	100 MHz	1 Gbit/s	Cat.5e	1 mm – 1.6 mm	24-22/1, 24-22/7,19	1

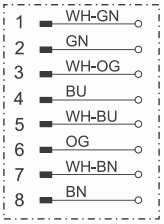
Connection assignment

RJ45 male
Ethernet T568B



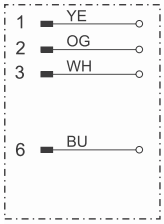
Connection assignment

RJ45 male
Ethernet T568A



Connection assignment

RJ45 male
PROFINET



Further product information at
www.luetze.com

* 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$_A$, 4 levels cable clamp, protective cover pre-assembled

c UL us LISTED

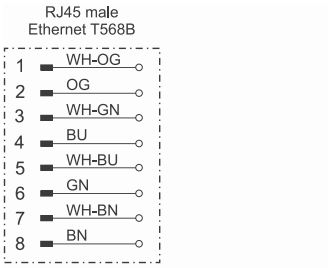
CC-Link IE Field

Technical data

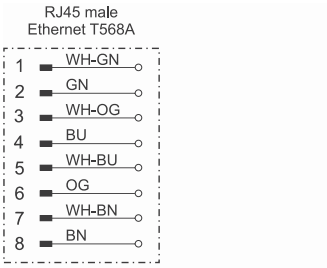
Rated voltage U_N	30 V
Connection type	8-pin RJ45 Push-through contacts IPC
Rated current	≤1 A
Contact type	Penetration contact
Design	RJ45
Degree of protection	IP20
Color of the housing	silver
Cable diameter	5 mm – 9 mm
Operation temperature range	-40 °C … +70 °C
Mechanical service life	>750 insertion cycles
Dimensions (w × h × d)	13.8 mm × 16.2 mm × 53.1 mm
Certifications	cULus Listed (E326112)
Flamability according to UL 94	V0
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

Part No.		Type	Pole number	Bandwidth	Transfer rate	Category	Strand diameter	Cross-section AWG	PU (units)
8-pin RJ45 Push-through contacts IPC									
490128	S*	RJ45-M 8pol. Cat.6A T568B	8	500 MHz	10 Gbit/s	Cat.6$_A$	1 mm – 1.6 mm	24/1-22/1, 27/7-22/7	1
490129	S*	RJ45-M 8pol. Cat.6A T568A	8	500 MHz	10 Gbit/s	Cat.6$_A$	1 mm – 1.6 mm	24/1-22/1, 27/7-22/7	1
490138	S*	RJ45-M 8pol. Cat.6A T568B AWG 26/19	8	500 MHz	10 Gbit/s	Cat.6$_A$	0.85 mm – 1.1 mm	26/1, 26/7, 26/19	1

Connection assignment



Connection assignment



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

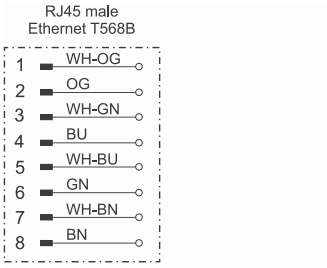
Industrial connector RJ45, angled
Solid metal housing, quick-connect technology AWG 27–22
Cat.6$_A$ / Cat 5e

Technical data

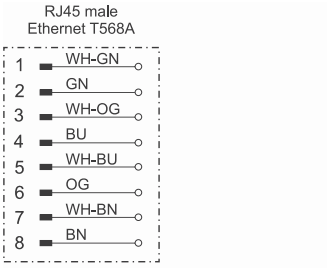
Rated voltage U_N	30 V
Connection type	8-pin RJ45 Push-through contacts IPC
Rated current	≤1 A per contact
Design	RJ45 angle connector
Degree of protection	IP20
Color of the housing	silver
Cable diameter	5.5 mm – 10 mm
Operation temperature range	-40 °C … +85 °C
Mechanical service life	>750 insertion cycles
Dimensions (w × h × d)	13.9 mm × 38.0 mm × 45.7 mm
Certifications	cULus Listed (E326112)
Flamability according to UL 94	V0
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

Part No.		Type	Pole number	Bandwidth	Transfer rate	Category	Strand diameter	Cross-section AWG	PU (units)
8-pin RJ45 Push-through contacts IPC									
490151	S*	RJ45-MR 8pol. Cat.6A T568B	8	500 MHz	10 Gbit/s	Cat.6$_A$	1 mm – 1.6 mm	24-22/1, 24-22/7,19	1
490152	S*	RJ45-MR 8pol. Cat.6A T568A	8	500 MHz	10 Gbit/s	Cat.6$_A$	1 mm – 1.6 mm	24-22/1, 24-22/7,19	1
490153	S*	RJ45-MR 8pol. Cat.6A T568B AWG 26/19	8	500 MHz	10 Gbit/s	Cat.6$_A$	0.85 mm – 1.1 mm	26-24/1, 27-24/7, 26/19	1
4-pin RJ45 Push-through contacts IPC									
490178	S*	RJ45-MR 4pol. PROFINET	4	100 MHz	1 Gbit/s	Cat.5e	1 mm – 1.6 mm	24-22/1, 24-22/7,19	1

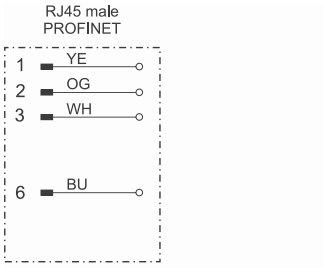
Connection assignment



Connection assignment



Connection assignment



Further product information at
www.luetze.com

* 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$_A$

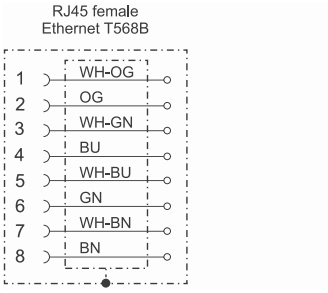
c UL us LISTED

Technical data

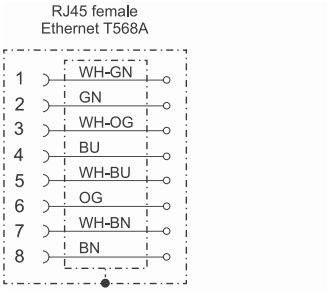
Rated voltage U_N	AC/DC 24 V
Connection type	Compliant terminal
Rated current	≤1 A per contact
Contact type	IDC
Design	RJ45 female
Degree of protection	IP20 (EN 60529)
Color of the housing	grey
Operation temperature range	-40 °C … +70 °C
Mechanical service life	>750 insertion cycles
Dimensions (w × h × d)	18.0 mm × 70.5 mm × 65.7 mm
Certifications	cULus Listed (E326112)
Flamability according to UL 94	V0
Comments	Suitable cables, see overview assi-gnment Ethernet cables to connectors

Part No.		Type	Pole number	Bandwidth	Transfer rate	Category	Strand diameter	Cross-section AWG	PU (units)
Compliant terminal									
490209	S*	MDT-RJ45 F 8pol. Cat.6A TIA 568B	8	500 MHz	10 Gbit/s	Cat.6$_A$	0.9 mm – 1.6 mm	27-22/7, 26-22/1	1
Compliant terminal AWG 27-22/7 AWG 26-22/1									
490238	S*	MDT-RJ45 F 8pol. Cat.6A TIA 568A	8	500 MHz	10 Gbit/s	Cat.6$_A$	0.9 mm – 1.6 mm	27-22/7	1

PIN assignment



PIN assignment



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

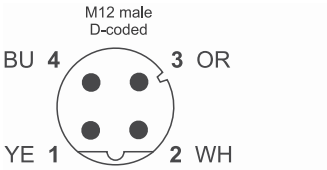
c UL us LISTED

Technical data

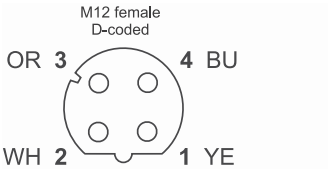
Rated voltage U_N	AC/DC 24 V
Connection type	Spring terminal Push-In
Degree of protection	IP65, IP67 inserted and tightened
Color of the housing	silver
Cross-section, metric	without ferrule: 0.14–0.75 mm² with ferrule: 0.08–0.5 mm²
Cross-section AWG	without ferrule: AWG26–AWG18 with ferrule: AWG28–AWG20
Cable diameter	4 mm – 8 mm
Tightening torque	M12-knurled nut: 0.4 Nm sleeve housing: 0.8 Nm pressure nut: 3 Nm
Temperature range connector	-40 °C … +85 °C
Mechanical service life	>100 insertion cycles
Certifications	cULus Listed (E224249)
Standards	IEC 61076-2-101 EN 50155 (2001) vibration and shock
Flamability according to UL 94	V0

Part No.		Type	Pole number	Coding	Operating voltage max. V	Rated current A	PU (units)
M 12 male straight							
490212	S*	STGK4-M12 (C)-D FK	4	D	60	4	1
M 12 female straight							
490213	S*	KUGK4-M12 (C)-D FK	4	D	60	4	1

Pin layout



Pin layout



Further product information at
www.luetze.com

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

Field wireable connector, M12 angled, shielded, CAT5e (100 MBit/s)
Male D-coded (Ethernet, Profinet, Sercos)
Spring terminal: Push-in connection technology

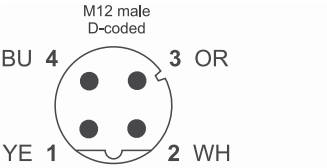
c UL us LISTED

Technical data

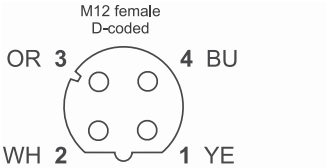
Rated voltage U_N	AC/DC 24 V
Connection type	Spring terminal Push-In
Mounting	Coding can be rotated in the 45° increments
Degree of protection	IP65, IP67 inserted and tightened
Color of the housing	silver
Cross-section, metric	without ferrule: 0.14–0.75 mm² with ferrule: 0.08–0.5 mm²
Cross-section AWG	without ferrule: AWG26–AWG18 with ferrule: AWG28–AWG20
Cable diameter	4 mm – 8 mm
Tightening torque	M12-knurled nut: 0.4 Nm sleeve housing: 0.8 Nm pressure nut: 3 Nm
Temperature range connector	-40 °C … +85 °C
Mechanical service life	>100 insertion cycles
Certifications	cULus Listed (E224249)
Standards	IEC 61076-2-101 EN 50155 (2001) vibration and shock
Flamability according to UL 94	V0

Part No.		Type	Pole number	Coding	Operating voltage max. V	Rated current A	PU (units)
M 12 male angle connector							
490214	S*	STWK4-M12 (C)-D FK	4	D	60	4	1
M 12 female angle connector							
490215	S*	KUWK4-M12 (C)-D FK	4	D	60	4	1

Pin layout



Pin layout



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

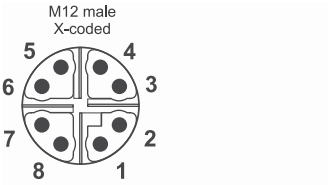
Field wireable connector, M12 straight shielded
Male - X coded Cat.6$_A$ (Ethernet, Profinet)
Fast connection method, IDC termination

Technical data

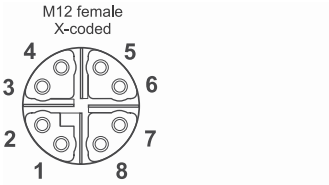
Rated voltage U_N	AC/DC 24 V	Cable diameter	5 mm – 9.7 mm
Connection type	Compliant terminal IDC	Temperature range connector	-40 °C … +85 °C
		Mechanical service life	>100 insertion cycles
Degree of protection	IP65/67	Flamability according to UL 94	V0
Cross-section AWG	26-22	Comments	Suitable cables, see overview assi-gnment Ethernet cables to connectors

Part No.		Type	Pole number	Coding	Operating voltage max. V	Rated current A	PU (units)
M 12							
490167	S*	STGK8-M12(C) 8pol. X-kod. Cat.6A	8	X	60	0.5	1
490168	S*	KUGK8-M12(C) 8pol. X-kod. Cat.6A	8	X	60	0.5	1

Pin layout



Pin layout



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

RJ45 panel connector with M22 thread for front installation
Female/female 1:1
Cat.6$_A$ / Cat 5e

c UL us LISTED

Technical data

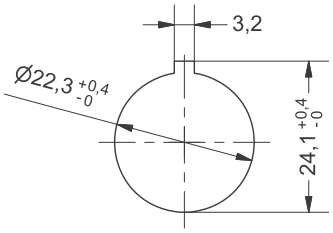
Rated voltage U_N	AC 24 V
Operating voltage max.	50 V
Rated current	1.5 A
Contact type	1 : 1
Shielding	connected through
Form male 1	RJ45
Degree of pollution	3
Insulation resistance	>100 MΩ
Contact resistance	<30 mΩ
Degree of protection	IP65 UL50E Typ 2, 3R, 4, 4X, 12, 13 in closed and IP20 in inserted position
Housing material	PA, PBT
Cover	TPU
Contact material	CuSn, gold-plated
Mounting	Front installation
Installation depth	approx.70 mm
Temperature range connector	-25 °C … +70 °C
Operation temperature range	-25 °C … +70 °C
Storage temperature range	-25 °C … +80 °C
PU (units)	1
Mechanical service life	>750 insertion cycles
Certifications	cULus Listed (E326112)

Accessories

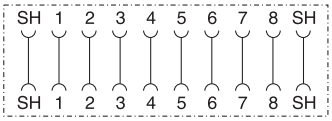
Included in the delivery: captive safety cap

Part No.		Type	Pole number	Bandwidth	Transfer rate	Category	PU (units)
RJ45							
492075	S*	RJ45 F/F 8/8 Cat.5e	8	100 MHz	1 Gbit/s	Cat.5e	1
492076	S*	RJ45 F/F 8/8 Cat.6A	8	500 MHz	10 Gbit/s	Cat.6$_A$	1

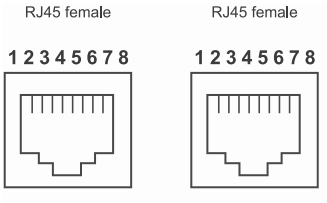
Mounting diagram



Circuit diagram



Pin layout



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

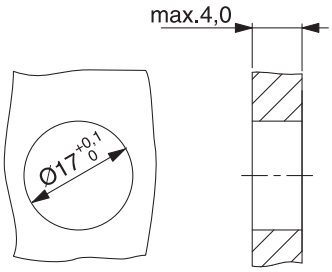
Control cabinet bushing M12 - RJ45
Female/female 1:1
Cat 5e (Ethernet, Profinet)

Technical data

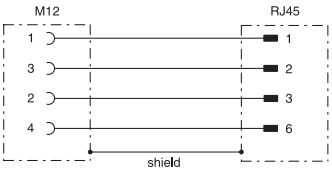
Rated voltage U_N	24 V
Operating voltage max.	50 V
Contact type	1 : 1
Shielding	360°
Form male 1	RJ45 M 12 female
Insulation resistance	>100 MΩ
Contact resistance	<30 mΩ
Degree of protection	IP67
Housing material	PA
Contact material	Phosphor Bronze, gold-plated
Mounting	Rear wall assembly Fastening thread M16 × 1,5
Installation depth	approx.70 mm
Temperature range connector	-25 °C … +85 °C
Operation temperature range	-25 °C … +85 °C
Storage temperature range	-25 °C … +85 °C
PU (units)	1
Mechanical service life	>750 insertion cycles
Flamability according to UL 94	V0

Part No.		Type	Pole number	Coding	Bandwidth	Transfer rate	Category	PU (units)
RJ45/M 12×1								
490105	S*	M12-RJ45 F/F 90° 4/4 Cat.5e Profinet	4	D	100 MHz	1 Gbit/s	Cat.5e	1
490106	S*	M12-RJ45 F/F 180° 4/4 Cat.5e Profinet	4	D	100 MHz	1 Gbit/s	Cat.5e	1

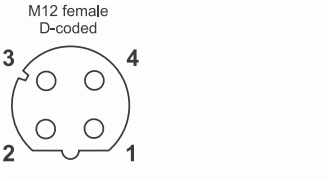
Mounting diagram



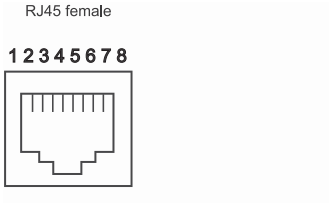
Circuit diagram



Pin layout



Pin layout



Further product information at
www.luetze.com

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

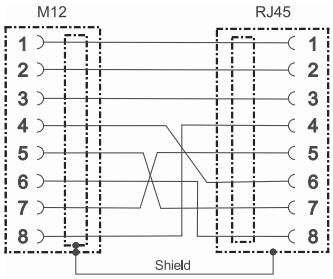
Control cabinet bushing M12 CAT6A X encoded - RJ45
Female/female 1:1
Cat.6$_A$ (Ethernet, Profinet)

Technical data

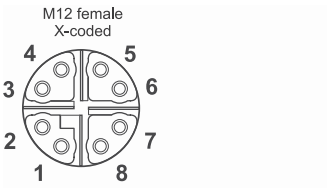
Operating voltage max.	60 V
Shielding	360°
Form male 1	RJ45 M 12 female
Insulation resistance	>100 MΩ
Contact resistance	<5 mΩ
Degree of protection	IP67 IP68
Contact material	CuSnZn
Mounting	Rear wall assembly Fastening thread M16 × 1,5
Installation depth	approx.47 mm
Temperature range connector	-40 °C … +85 °C
Operation temperature range	-40 °C … +85 °C
Storage temperature range	-40 °C … +85 °C
PU (units)	1
Mechanical service life	>500 insertion cycles

Part No.	Type	Pole number	Coding	Bandwidth	Transfer rate	Category	PU (units)
RJ45/M 12×1							
490230	M12-RJ45 F/F 90° 8/8 Cat.6A	8	X	500 MHz	10 Gbit/s	Cat.6$_A$	1
490231	M12-RJ45 F/F 180° 8/8 Cat.6A	8	X	500 MHz	10 Gbit/s	Cat.6$_A$	1

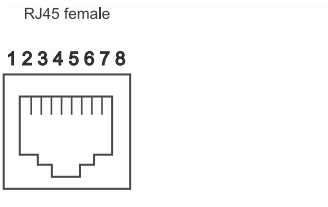
Circuit diagram



Pin layout



Pin layout



Product Overview:
Classification Etherne t Cables and Connectors

Ethernet cables

Art.no	Description	C-track compatible	Cat	Jacket	490128 - 490174 - 490151 AWG 27 - 22	490129 - 490175 - 490152 AWG 27 - 22	490138 - 490176 - 490153 AWG 26	490177 - 490178 - AWG 27 - 22	490209, 490238 - AWG 27-22	4490212- 490215 AWG 26 - 18	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	•	•			•		•	•				•
104404	Eth. (4x(2xAWG24/7) UL	•	7	PUR	•	•			•		•	•				•

Ethernet connector RJ45 / M12

RJ45 T568B

490128 with cable clamp | 490174 with cable fitting | 490151 with cable fitting

1 white / orange
2 orange
3 white / green
4 blue
5 white / blue
6 green
7 white / brown
8 brown

RJ45 T568A

490129 with cable clamp | 490175 with cable fitting | 490152 with cable fitting

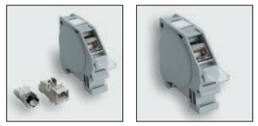
1 white / green
2 green
3 white / orange
4 blue
5 white / blue
6 orange
7 white / brown
8 brown

RJ45 T568B AWG26

490138 with cable clamp | 490176 with cable fitting | 490153 with cable fitting

1 white / orange
2 orange
3 white / green
4 blue
5 white / blue
6 green
7 white / brown
8 brown

RJ45 T568A/B



490238 Module holder | 490209 Module holder

	T568A	T568B
1		
2		
3		
4		
5		
6		
7		
8		

M12

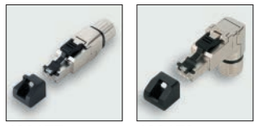
490212 D-cod. pin | 490213 D-cod. female | 490167 X-cod. pin | 490168 X-cod. female

490214 D-cod. pin | 490215 D-cod. female

1 yellow
2 white
3 orange
4 blue

1 white/orange
2 orange
3 white / green
4 green
5 white / brown
6 brown
7 white / blue
8 blue

Profinet RJ45



490177 straight | 490178 angled

1 yellow
2 orange
3 white
4
5
6 blue
7
8

LÜTZE - Ethernet Connectivity • Glossary

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)
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.
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 produc	Used to estimate what distance a multimode fibre supports with a certain data rate (speed). The gross rate must be used here
BFOC Bajonett 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 Bajonet Neill Concelmann	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 Complentary 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	Destination address
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

LÜTZE - Ethernet Connectivity · Glossary

DCE	Data Communication Equipment, e.g. printers, modems. --> DTE
DES	Data Communication Equipment, z.B. Drucker, Modem. --> 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 Adress	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
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, con-centrator
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 adress	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 compute
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

PDM	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
Suitabillity 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
Start 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

Certificates

ONLINE CERTIFICATIONS DIRECTORY

NWGQ7.E332878
Information Technology Equipment Including Electrical Business Equipment Certified for Canada

Page Bottom

Information Technology Equipment Including Electrical Business Equipment Certified for Canada

See General Information for Information Technology Equipment Including Electrical Business Equipment Certified for Canada

FRIEDRICH LUETZE GMBH E332878
Bruckwiesenstrasse 17-19
71384 Weinstadt, GERMANY

Industrial PoE Splitter, Model(s) ET-PSPET

Industrial Switch, Model(s) ET-SWGU18ST, 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

Last Updated on 2014-09-23

Questions? Print this page Terms of Use Page Top

© 2017 UL LLC

The appearance of a company's name or product in this database does not in itself assure that products so identified have been manufactured under UL's Follow-Up Service. Only those products bearing the UL Mark should be considered to be Certified and covered under UL's Follow-Up Service. Always look for the Mark on the product.

UL permits the reproduction of the material contained in the Online Certification Directory subject to the following conditions: 1. The Guide Information, Assemblies, Constructions, Designs, Systems, and/or Certifications (files) must be presented in their entirety and in a non-misleading manner, without any manipulation of the data (or drawings). 2. The statement "Reprinted from the Online Certifications Directory with permission from UL" must appear adjacent to the extracted material. In addition, the reprinted material must include a copyright notice in the following format: "© 2017 UL LLC".

ONLINE CERTIFICATIONS DIRECTORY

NWGQ.E332878
Information Technology Equipment Including Electrical Business Equipment

Page Bottom

Information Technology Equipment Including Electrical Business Equipment

See General Information for Information Technology Equipment Including Electrical Business Equipment

FRIEDRICH LUETZE GMBH E332878
Bruckwiesenstrasse 17-19
71384 Weinstadt, GERMANY

Industrial PoE Splitter, Model(s) ET-PSPET

Industrial Switch, Model(s) ET-SWGU18ST, 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

Last Updated on 2014-09-23

Questions? Print this page Terms of Use Page Top

© 2017 UL LLC

The appearance of a company's name or product in this database does not in itself assure that products so identified have been manufactured under UL's Follow-Up Service. Only those products bearing the UL Mark should be considered to be Certified and covered under UL's Follow-Up Service. Always look for the Mark on the product.

UL permits the reproduction of the material contained in the Online Certification Directory subject to the following conditions: 1. The Guide Information, Assemblies, Constructions, Designs, Systems, and/or Certifications (files) must be presented in their entirety and in a non-misleading manner, without any manipulation of the data (or drawings). 2. The statement "Reprinted from the Online Certifications Directory with permission from UL" must appear adjacent to the extracted material. In addition, the reprinted material must include a copyright notice in the following format: "© 2017 UL LLC".

ONLINE CERTIFICATIONS DIRECTORY

DUXR7.E326112
Communications-, Audio/Video-, Data- and Other Signaling-circuit Accessories Certified for Canada

Page Bottom

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

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

FRIEDRICH LUETZE GMBH E326112
Bruckwiesenstrasse 17-19
71384 Weinstadt, GERMANY

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.

Last Updated on 2017-10-03

Questions? Print this page Terms of Use Page Top

© 2017 UL LLC

The appearance of a company's name or product in this database does not in itself assure that products so identified have been manufactured under UL's Follow-Up Service. Only those products bearing the UL Mark should be considered to be Certified and covered under UL's Follow-Up Service. Always look for the Mark on the product.

UL permits the reproduction of the material contained in the Online Certification Directory subject to the following conditions: 1. The Guide Information, Assemblies, Constructions, Designs, Systems, and/or Certifications (files) must be presented in their entirety and in a non-misleading manner, without any manipulation of the data (or drawings). 2. The statement "Reprinted from the Online Certifications Directory with permission from UL" must appear adjacent to the extracted material. In addition, the reprinted material must include a copyright notice in the following format: "© 2017 UL LLC".

ONLINE CERTIFICATIONS DIRECTORY

DUXR.E326112
Communications-, Audio/Video-, Data- and Other Signaling-circuit Accessories

Page Bottom

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

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

FRIEDRICH LUETZE GMBH E326112
Bruckwiesenstrasse 17-19
71384 Weinstadt, GERMANY

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)

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.

Last Updated on 2017-10-03

Questions? Print this page Terms of Use Page Top

© 2017 UL LLC

The appearance of a company's name or product in this database does not in itself assure that products so identified have been manufactured under UL's Follow-Up Service. Only those products bearing the UL Mark should be considered to be Certified and covered under UL's Follow-Up Service. Always look for the Mark on the product.

UL permits the reproduction of the material contained in the Online Certification Directory subject to the following conditions: 1. The Guide Information, Assemblies, Constructions, Designs, Systems, and/or Certifications (files) must be presented in their entirety and in a non-misleading manner, without any manipulation of the data (or drawings). 2. The statement "Reprinted from the Online Certifications Directory with permission from UL" must appear adjacent to the extracted material. In addition, the reprinted material must include a copyright notice in the following format: "© 2017 UL LLC".

Part number index

Part-No	Page
104050	33
104110	39
104301	37
104302	36
104303	36
104307	37
104331	37
104335	37
104336	37
104337	36
104338	37
104347	36
104350	38
104379	36
104396	36
104397	37
104401	34
104404	35
104450	32
192000.0100	44
192010.0100	44
192013.0030	48
192013.0060	48
192013.0100	48
192013.0150	48
192013.0200	48
192013.0500	48
192013.1000	48
192013.1500	48
192013.2000	48
192014.0030	41
192014.0060	41
192014.0100	41
192014.0150	41
192014.0200	41
192014.0500	41
192014.1000	41
192014.1500	41
192014.2000	41
192015.0030	49
192015.0060	49
192015.0100	49
192015.0150	49
192015.0200	49
192015.0500	49
192015.1000	49
192015.1500	49
192015.2000	49
192016.0030	42
192016.0060	42
192016.0100	42
192016.0150	42
192016.0200	42
192016.0500	42
192016.1000	42
192016.1500	42
192016.2000	42
192017.0030	50
192017.0060	50
192017.0100	50
192017.0150	50
192017.0200	50
192017.0500	50
192017.1000	50
192017.1500	50
192017.2000	50
192018.0030	43
192018.0060	43
192018.0100	43
192018.0150	43
192018.0200	43
192018.0500	43
192018.1000	43
192018.1500	43
192018.2000	43
192022.0100	44
192030.0100	44
192050.0100	44
192201.0100	44
192342.0100	44
192352.0100	44
192353.0100	44
192354.0100	44
192355.0100	44
192766.0030	51
192766.0060	51
192766.0100	51
192766.0150	51
192766.0200	51
192766.0500	51
192766.1000	51
192766.1500	51
192766.2000	51
475300.0200	45
475300.0500	45
475300.1000	45
475300.1500	45
475300.2000	45
475400.0030	46
475400.0060	46
475400.0100	46
475400.0150	46
475400.0200	46
475400.0500	46
475400.1000	46
475400.1500	46
475400.2000	46
475500.0200	47
475500.0500	47
475500.1000	47
490105	60
490106	60
490128	53
490129	53
490138	53
490151	54
490152	54
490153	54
490167	58
490168	58
490174	52
490175	52
490176	52
490177	52
490178	54
490209	55
490212	56
490213	56
490214	57
490215	57
490230	61
490231	61
490238	55
492075	59
492076	59
772004	19
772006	20
772008	21
772013	22
772015	23
772017	24
772021	25
772022	26
779200.0401	16
779200.0801	17
779201.0401	16
779201.0801	17

Notes

Notes

Copyright
Protected trademarks and trade names are not always labelled as such in this publication. This does not mean they are free names as defined in the trademark and brand mark law. Publication does not imply that the descriptions or pictures used are free from rights of third parties. The information is published without regard to possible patent protection. Trade names are used without any guarantee that they can be used freely. In putting together text, pictures and data, we proceeded with the greatest care. Despite this, the possibility of errors cannot be completely excluded. We therefore reject any legal responsibility or liability. We are, of course, grateful for any recommendations for improvement or information useful for making corrections or establishing the truth. But the author does not assume any responsibility for the content of these documents.

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

Germany
Friedrich Lütze GmbH
Postfach 12 24 (PLZ 71366)
Bruckwiesenstraße 17-19
D-71384 Weinstadt
Tel.: +49 71 51 60 53-0
Fax: +49 71 51 60 53-277(-288)
info@luetze.de

USA
LUTZE Inc.
13330 South Ridge Drive
Charlotte, NC 28273
Tel.: +1 704 504-0222
Fax: +1 704 504-0223
info@lutze.com

United Kingdom
LÜTZE Ltd.
Unit 3 Sandy Hill Park
Sandy Way, Amington
Tamworth, Staffs, B77 4DU
Tel.: +44 1827 313330
Fax: +44 1827 313332
sales.gb@lutze.co.uk

Austria
LÜTZE Elektrotechnische
Erzeugnisse Ges.m.b.H.
office@luetze.at

Switzerland
LÜTZE AG
info@luetze.ch

France
LUTZE SASU
info@lutze.fr

Spain
LUTZE, S.L.
info@lutze.es

China
Luetze Trading (Shanghai) Co.Ltd.
info@luetze.cn

Innovations-Allianz
Green Carbody Technologies

Environmental Management
ISO 14001

RoHS

Carbon neutral
Print product
ClimatePartner.com/12146-2204-1008

www.lutze.com

LÜTZE
SYSTEMATIC TECHNOLOGY

P4EB01.05.2022.EN.2000.03.33 • © by Friedrich Lütze GmbH, Weinstadt, Deutschland • Printed in Germany. Subject to technical modification.