MegaLine® cabling systems in copper
for DataCenter · Office · Industry · @home

The Quality Connection

LEONI
Welcome to the mega-store for cable and system solutions

MegaLine® cabling systems
The range of products encompasses everything from the in-house production of copper data cables, ready-made patch cords and trunk cables with connection components through to complete cabling systems.

Everything from a single source ➤
With its product spectrum in copper cable and connectivity, LEONI provides future-proof cabling systems for data center, floor and workplace cabling.

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All necessary planning documentation available online: www.leoni-data.com
Subject to technical modifications, misprints and errors.

Safety instructions
Cables are to be used for the designated applications only.

Waiver
The specifications in this document are provided acc. to our best current knowledge. However, these specifications may not be considered an assurance of specific properties or suitability for specific purposes of the respective products. Such indications may not be interpreted as a misguidance for the violation of property rights or as an assurance of a corresponding license. The suitability of each product for any particular purpose must be checked beforehand with our specialists. Our policy is to continuously improve our materials and products. Therefore, we reserve the right to offer alternatives consistent with our manufacturing programme at the time of enquiry.

All information concerning material properties, fire performance, construction, electrical and technical data, prices etc. reflects our current level of knowledge and is provided on a non-binding basis. Dimensions and weights are indicative only. All specifications can be changed at any time without prior notification.

General conditions of sale and delivery
We refer to the currently valid General Conditions of Sale and Delivery which can be obtained from the respective companies.

Definitions
Some of the terms used in this document are not used consistently in the industry. To promote mutually intelligible business relationships and customer communications, however, LEONI strives to ensure consistent term usage. To avoid difficulties with interpretation, we refer you to www.leoni.com/en/company/copper-business/, where we have provided definitions of the terms that we use. The version applicable at the time of handover for this document is authoritative. These definitions form part of the contract. Insofar as terms defined there are used in this document, they have the meanings as defined there. We will also be happy to send you the definitions on request.
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LEONI is a global provider of products, solutions and services for energy and data management in the automotive sector and other industries. The market-listed group of companies has more than 92,000 employees in 31 countries and generated consolidated sales of EUR 5.1 billion in 2018.

LEONI’s largest customer group comprises the global car, commercial vehicle and component supply industry, for which the Company makes both standard and special cables as well as custom-developed wiring systems and related components. LEONI furthermore supplies products and services to these markets: data communication & networks, healthcare, process industry, transportation, energy & infrastructure, factory automation, machinery & sensors as well as marine. An integrated network for research & development, production as well as distribution and service gives customers the assurance of tailor-made support at more than 90 locations around the globe. LEONI operates as a solutions provider with pronounced development and systems expertise.

Innovative solutions based on development and systems partnership
Especially in the automotive industry, LEONI offers substantial added value to motor vehicle manufacturers in both technological and commercial terms by being an innovation partner based on profound understanding of the overall system and by being involved in the early stages of development. In addition to standard and special cables as well as custom-developed wiring systems and related components, the Company’s offering also includes software solutions and such services as architecture design and simulation. LEONI concentrates its automotive research and development work on the sector’s major trends such as electromobility, autonomous driving and connectivity – enhanced by lightweight construction solutions, multi-voltage and function integration, but also by logistics and engineering expertise.

Digital transformation thanks to intelligent products and smart services
LEONI pursues the aim of becoming a leading solutions provider of intelligent systems for the megatrends of energy transmission and data management. To achieve this, the Company’s offering will in the future also include intelligent cables, cable systems and components – which is gaining importance particularly in the wake of digitalization and the development of fail-safe systems with a high level of connectivity. The Company is consequently enhancing its know-how in such fields as electronics, sensor technology and big data, and provides such customised smart services as predictive maintenance and error analyses. The digital transformation within LEONI manifests itself in digital processes and software expertise, which is used, for instance, to implement more automated production. Together with international customer networks and strategic partnerships, this is creating new, digital business models – individually tailored to customers’ requirements.

Tradition and progress since the 16th century
A small wire factory in the Franconia region of Bavaria laid the foundation for today’s global player LEONI back in 1569. At that time, Frenchman Anthoni Fournier began with a handful of staff in Nuremberg to produce finest gold and silver threads, known as Lyonese wares, for precious woven products. From these beginnings, Leonische Werke Roth-Nürnberg AG emerged in 1917. The ability to change as well as a keen sense for trends in the market and for customer requirements are still among the Company’s key characteristics.

More information is to be found at www.leoni.com
Data Communication & Networks
Profile

We’re taking the smart route to managing bigger volumes of data.

Since the beginnings of the world of digital data, we’ve provided our customers with the power to innovate and visionary steps designed to deliver high-performance components for communication channels worldwide. New challenges are now faced as part of the digitalization of efficient energy and data management, smart cities and the Internet of Things. To ensure greater customer focus and a wider choice of business models, the future is all about capturing and exploiting these data flows.

We’re the experts in channelling data. Connectivity is our business. For over 40 years, we’ve been developing reliable, high-performance transmission systems for bigger bandwidth and higher speeds – and always with an eye on the application, the specification – and our customers worldwide. Today, our product portfolio covers the entire spectrum of transmission standards for data and communication networks.

This is the engine that drives our ‘Passion for Intelligent Energy and Data Solutions’. We get data to work for us and for you – for greater efficiency and long-term business success. We will use innovative products for continuous network monitoring and optimization, for eliminating potential bottlenecks and faults, and to ensure the optimum planning and configuration of your solution. We will use intelligent solutions to analyse network infrastructure, and to channel your data and energy more efficiently.

We’re channelling data again – but this time, our smart data will be working for you.

Let’s use data intelligence to grow our business together.
Great brands, great service
Rely on the best partner to meet your needs

Our commitment to developing innovative products proves our dedication to our responsibility. In conjunction with our consulting services, we establish trust as we help our partners accomplish maximum safety for people and infrastructure.

Installers and retail receive their cabling, connectivity and complete cabling solutions from a single source. This includes system solutions in copper, aluminium and fiber optic technology as well as halogen-free energy cables with or without circuit integrity. Continuous innovations in safety, environmental compatibility and energy efficiency complete the list of customer benefits.

A global presence and consulting on site during all stages of a project as well as extensive experience gained from numerous projects and far-reaching synergies inside and outside the LEONI Group make us one of the most highly regarded partners in the field of building and infrastructure cabling at the international level.

Datacom –
for maximum data integrity and bandwidth

From the very beginning of the digital data era, we have fulfilled data networking requirements for both the short term and the far future by using great innovation and a forward-looking approach. The profound expertise of the Infrastructure & Datacom Business Unit in copper and fiber optical cabling technologies represents a powerful advantage in structured cabling systems for industry, data centres and offices – the sustainable copper and glass fiber cables of our own production are among the safest and most innovative products in the primary to tertiary cabling market.

- MegaLine®
  copper cables and passive system components

- GigaLine®
  fiber optic cables and passive system components

- VarioLine® modular system periphery
Technologies – investments in sustainable safety

Universal use with extremely high functional integrity

Our development and production centres LEONI Studer (CH) and LEONI Kerpen (D) have one thing in common above all else: expertise. In extensive production areas, we work with state-of-the-art methods and systems in plastics processing, materials processing, extrusion technology, electron beam cross-linking and testing the entire range of products.

We use state-of-the-art production equipment to ensure that we can offer our customers the highest possible levels of product safety and quality. New and innovative plastics mixtures and cables are constantly being developed in modern laboratories. Our focus here is on improved insulating properties, higher temperature tolerances, longer lifetimes, easy handling and better safety features. Our test laboratories for flammability tests, HF technology and optical measurement technology safeguard our quality standards and promote innovation.

This is demonstrated by the large number of approvals and certificates coming from well-known independent testing institutes worldwide.

In the fire test laboratory, the fire-resistant properties of our products are tested by certified testers, technicians and engineers. With this capability, we are able to carry out testing to fulfil the wide-ranging measuring tasks in accordance with BS 6387 C.W.Z., IEC 60331-11/21 and DIN 4102 Part 12, as well as customer-specific specifications and special testing.

Numerous national and international certificates provide proof of the company’s power to innovate.

- **Halogen free**
  - IEC 60754-1, EN 50267-2-1
- **Corrosive effects of combustion gases**
  - IEC 60754-2, EN 50267-2-2
- **Smoke density**
  - IEC 61034, EN 61034
- **Flame retardancy**
  - IEC 60332-1, EN 60332-1, VDE 0482-332-1
- **Circuit integrity**
  - BS 6387 C.W.Z., DIN VDE 0472-814, EN 50200, EN 50362, IEC 60331-11/21, VdS 3423, VDE 0482–200
- **System integrity under fire**
  - DIN 4102 part 12
- **Non-flame propagating**
  - IEC 60332-3, EN 60332-3, VDE 0482-332-3 series
- **Construction Products Regulation**
  - EN 50575, EN 50399, EN 60332-1
- **IT cabling systems for offices**
  - EN 50173-2, ISO/IEC 11801
- **IT cabling systems for industry**
  - EN 50173-3, ISO/IEC 24702
- **IT cabling systems for data centers**
  - EN 50173-5, ISO/IEC 24764

Numerous national and international certificates confirm the company’s ability to provide innovative solutions.
Our vision is to create sustainable connections in technological harmony with the natural resources. The cycle of nature gives us the best model to emulate. It is our responsibility to learn from nature and make use of it while conserving it and treating it with care. The growing scarcity of the natural resources and the increasing burden on the environment require a rethink at all levels of society. For LEONI, sustainability is an integral part of group policy. We were the first cable manufacturer in the world to develop an integrated “green technology” programme.

While trends such as globalisation, mobility and urbanisation are crucial for market movements, our core principles are sustainability and global responsibility. This is why we have set ourselves the goal of becoming an innovative producer of cables for ecotechnology. Other points of vital interest to us are to detect the needs and requirements of tomorrow today and to supply the markets of the future with sustainable, future-proof solutions. We also view it as our responsibility to take an active role in shaping the markets for environmentally friendly energy production – such as solar thermal technology.

Green technology stands for the resource-conserving and low-emission production of sustainable quality cables made with low-pollution elements. We constantly work at optimising the efficiency with which resources are used in the manufacturing process by deploying energy-efficient machines or taking heat recovery measures. More and more locations in our global production network are environmentally certified according to the ISO 14001 standard.

In our worldwide operations as a leading European supplier of wires, optical fiber, cables and cable systems for communication and infrastructure projects, it is our responsibility to continuously optimise the sustainability and durability of our products, system solutions and services so as to reduce their impact on the environment. We have to increase the amount of environmentally compatible raw materials in our cable products as well as the recyclability of processed materials or components and in doing so create end products that are developed for the environmental standards of tomorrow today.

In conjunction with the ecological compatibility, future technologies are measured in terms of efficiency, service life, emission reduction and the conservation of natural resources. Innovative cable products and systems, holistic solutions and maximum performance in project management are the added value which we offer to our customers and business partners. These are also our cornerstones for strong connections into the future.

This means avoiding the following substances, among others:
- Polybrominated diphenyl ether (PBDE)
- Decabromodiphenyl ether (DecaBDE)
- Perfluorooctane sulfonate (PFOS)
- Pentabromodiphenyl ether (PentaBDE)
- Octabromodiphenyl ether (OctaBDE)
- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent chromium (Cr VI)
- Polybrominated biphenyls (PBB)

Cables and conductors and their associated connectors are only affected by Directive 2012/19/EU WEEE where they are an internal part of the listed equipment and components.

Cables and conductors have been regulated separately in 2011/65/EU RoHS 2 since 2013 (category 11 or defined as an internal component of the respective product). This does not pertain to optical fiber cable, energy cable (> 250 V) and cable with fixed installation, e.g. in buildings. The only permissible marking according to RoHS 2 is the CE marking, which is printed on the product package.

What does REACH mean?

REACH stands for Registration, Evaluation, Authorisation and Restriction of Chemicals.

REACH represents a fundamental harmonisation and simplification of previous chemicals law and applies in all EU Member States.

REACH introduced a so-called candidate list for substances of very high concern (SVHC), which are subject to certain information obligations and should be substituted in the long term. The list of candidate substances is updated twice yearly by the European Chemicals Agency (ECHA) in Helsinki.
MegaLine®
Copper data cable
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- Office cables
- Data center cables
- Industrial cables
- @home cables (Smart Home)
LEONI’s SPACE concept is based on a pragmatic and clearly structured matrix. This decision-making aid will help you to find the right data cable for your application faster.

The concept is based on the classification of the five main selection criteria for determining the potential overall performance of a data cable:

Security · Performance · Application · Construction · EMC

It also allows the value for money to be assessed and makes room for alternative technical and economic scenarios. The demands made on the segment in question rise in step with the increase in the SPACE index.

Example of a data cable with the code $S_3 P_4 A_4 C_5 E_5$:

- $S_3$: It passes the fire test according to IEC 60332-3-24 (Security Level 3)
- $P_4$: It meets the minimum requirements of Class F (Performance Level 4)
- $A_4$: It is designed for applications with more than 10 GbE (Application Level 4)
- $C_5$: It consists of a conductor with AWG 22 (Construction Level 5) and thus has low attenuation values and an increased max. current rating
- $E_5$: The coupling attenuation is > 80 dB (EMC Level 5)

With the VDE kitemark (an independent hallmark of quality including production monitoring), LEONI guarantees the SPACE quality features at all times.
As a result of the constant increase in the installed basis and the installation density, the fire behaviour of data cables is an important safety criterion. When manufactured according to the legal regulations and installed correctly, data cables cannot cause a fire. If they do catch fire, however, they can inflame and spread the fire.

One of the aims here is to prevent the propagation of fire and the resulting damage by using flame-retardant, halogen-free cable designs.

Security (fire behaviour)

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</tbody>
</table>

The five security levels with regard to fire propagation/flame retardancy:

S1 IEC 60332-2-2
Testing of the vertical propagation in a core or single cable. Test method: incandescent flame.

S2 IEC 60332-1-2
Testing of the vertical propagation in a core or single cable. Test method: 1 KW flame. A flame is applied to the lower end of a vertical sample of the cable about 60 cm in length for about 60 seconds using a type of Bunsen burner. After removal of the burner, the flames must go out by themselves. The parts of the cable damaged by the flames must not reach its upper end (distance: 50 mm).

S3 IEC 60332-3-24
Testing of the flame propagation in an arrangement of several cables, a so-called cable bundle, is carried out according to IEC 60332-3-24. In this cable bundle test, a flame is applied to the lower part of the test samples on a vertical ladder with a length of 360 cm using a high-performance burner. During and after intensive application of the flame for a test period of 20 minutes, the cables must not burn higher than 250 cm.

S4 EFP (Enhanced Fire Performance) Grade 1
In this cable bundle test, a flame is applied to the lower part of the test samples on a vertical ladder with a length of 360 cm using a high-performance burner. During and after intensive application of the flame for a test period of 20 minutes, only approx. 1 m of the section to which the flame is applied may burn. Immediately after removal of the flame, the self-extinguishing process must start. Only specially designed data cables can stand up to this exacting fire test.

S5 EFP (Enhanced Fire Performance) Grade 2
This stricter security level is application-specific.

Security levels $S_3$, $S_4$ and $S_5$ are used in particular where high and very high security measures are required for the protection of persons or material assets. For example in hospitals, schools, hotels, airports, railway stations, departments stores, power and electricity plants, data centers, banks, insurance companies and alarm systems.

MegaLine® data cables have improved fire protection characteristics:

- Extremely low smoke development according to IEC 61034
  - Facilitates rescue and removal activities
- Low toxicity (dioxins are not produced)
  - Reduces the risk of poisoning
- Halogen free according to IEC 60754-2
  - No consequential damage to material assets as a result of corrosion
- Low fire load values
  - Limits the exacerbating effects on the source of the fire
- High oxygen index (OI up to 45)
  - Reduces the flammability
In cabling systems, a service life of 10 to 15 years is expected. This requires far-sighted planning of the required performance of cabling systems and their components.

Because of their hard-fought compromises and in view of fast-increasing transmission rates, international standards often fall short. Since the development of 10 Gigabit Ethernet, none of the cabling classes below Class F can be said to meet the demands of the future.

MegaLine® data cables have excellent transmission performance. They offer high security reserves and are always one step ahead of the standard. MegaLine® – an investment with a future!

The five classes for performance (cabling class, bandwidth) have very high reserves with regard to the standard involved.

MegaLine® F6-90 S/F
Better than Category 7 according to EN 50288 and IEC 61156, excellent NEXT, excellent shielding characteristics (pairs and overall shielding), low skew

Example: MegaLine® F6-90 S/F
Example: MegaLine® E2-45 U/F
Better than Category 6 according to EN 50288 and IEC 61156, very good NEXT, low skew

Example: MegaLine® E5-70 S/F
Better than Category 6 A according to EN 50288 and IEC 61156 very good NEXT, very good shielding characteristics (pairs and overall shielding), low skew

Example: MegaLine® F10-130 S/F
Better than Category 7, according to EN 50288 and IEC 61156, excellent NEXT, low attenuation, excellent shielding characteristics (pairs and overall shielding), low skew

Example: MegaLine® G12-150 S/F
Better than Category 7, according to EN 50288 and IEC 61156 excellent NEXT, low attenuation, excellent shielding characteristics (pairs and overall shielding), low skew
The large security reserves mean that multimedia applications such as TV and transmission protocols with high bandwidth requirements such as 10 Gigabit Ethernet and 8 Gigabit Fiber Channel can be transmitted over 100 m. Experts have calculated that, as far as we know today, MegaLine® Category 7A data cables allow transmission rates of as much as 100 Gbit/s.

The use of low-loss broadband S/FTP cables with individual or overall shielding in conjunction with multimedia cabling systems allows so-called cable or service sharing.

Cables and connectors form a perfect symbiosis: 4 pairs, 4 connecting clips – each with GHz performance. This allows parallel, simultaneous use of different applications via one cable and one connector: data, voice and images.

Multimedia systems do not need to cost more than conventional systems, in which an individual cable and an individual connector is usually required for each service. This allows savings of up to 50 % of the necessary cables, connectors, wall outlets and patch panels.

Multiple use reduces the system costs by 15 to 30 % (depending on the services used). The reduction in the number of cables and wall outlets actually required usually also allows reductions in the costs for cable ducts, switching cabinets, etc.

But MegaLine® data cables are capable of more

The supply of current (up to 350/600 mA) and voltage (up to 48 V) can be provided via PoE/PoE+ (according to IEEE 802.3a/at). The current is fed in centrally via the floor distributor or switch. Devices such as IP telephones, web cameras, wireless LAN access points, etc. are supplied via the telecommunications outlet. The voltage is tapped via a phantom circuit or two unassigned pairs.

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**SPACE concept**

The SPACE concept provides five different application levels.

<table>
<thead>
<tr>
<th>Application (Ethernet, TV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
</tr>
<tr>
<td>A2</td>
</tr>
<tr>
<td>A3</td>
</tr>
<tr>
<td>A4</td>
</tr>
<tr>
<td>A5</td>
</tr>
</tbody>
</table>
High-precision conductor and core geometries, optimally matched lay lengths in the pairs and the use of very high-quality insulation and sheath materials are the characteristic features of our range of cables.

Our cables are produced on ultra-modern equipment which corresponds with the "state of the art" as a result of procedural innovations. The use of physical foaming in the manufacture of high-frequency cores allows excellent, uniform electrical and geometrical characteristics to be achieved. Double skin layers ensure excellent mechanical stability while patented stranding techniques demonstrate technical leadership.

The designs have low outer diameters, thus allowing high packing densities and small bending radii. The weight reductions and the robust cable construction offer advantages for assembly and installation, even under difficult conditions.

The five different conductor classes describe the permitted tensile stress during installation and the conductor resistance.

Note: The copper sales factor is a purely commercial calculation factor that is used to calculate the total price of a cable. Although usually expressed in the trade in kg/km, the copper sales factor does not indicate the quantity or weight of the actual copper contained in the cable.

It is a purely arithmetic calculation factor that does not give any direct indication of the amount of copper used in the cable.

| Construction (conductor dimension, tensile strength) | | |
|-----------------------------------------------------|----------------------------------------------------------|
| **C** | **1 AWG 27** | **2 AWG 26/25** | **3 AWG 24** | **4 AWG 23** | **5 AWG 22** |
| **C1** | **AWG 27 (7x0.14 mm/0.112 mm²)** | | | | |
| | Tensile stress: max. 40/20 N (4 p/2 p) | | | | |
| | Conductor resistance: max. 170 Ω/km | | | | |
| **C2** | **AWG 26 or AWG 25** | | | | |
| | → **C21** AWG 26 (7x0.16 mm/0.14 mm²) | | | | |
| | Tensile stress: max. 60/30 N (4 p/2 p) | | | | |
| | Conductor resistance: max. 145 Ω/km | | | | |
| | → **C22** AWG 25 (7x0.18 mm/0.175 mm²) | | | | |
| | Tensile stress: max. 70/35 N (4 p/2 p) | | | | |
| | Conductor resistance: max. 120 Ω/km | | | | |
| **C3** | **AWG 24 (0.51 mm/0.205 mm²)** | | | | |
| | Tensile stress: max. 90/45 N (4 p/2 p) | | | | |
| | Conductor resistance: max. 95 Ω/km | | | | |
| **C4** | **AWG 23 (0.57 mm/0.258 mm²)** | | | | |
| | Tensile stress: max. 110/55 N (4 p/2 p) | | | | |
| | Conductor resistance: max. 75 Ω/km | | | | |
| **C5** | **AWG 22 (0.64 mm/0.325 mm²)** | | | | |
| | Tensile stress: max. 130/65 N (4 p/2 p) | | | | |
| | Conductor resistance: max. 57 Ω/km | | | | |

The current-handling capacity for a maximum ambient temperature of 60 °C and the maximum installation lengths in the transmission channel can be derived from this on request.
With the MegaLine® SPACE concept, LEONI provides five different EMC levels to choose from.

The evaluation criterion is the coupling attenuation (interference power suppression). As the sum of the shielding attenuation and the symmetry attenuation, the coupling attenuation is the “be-all and end-all” for the assessment and comparison of the overall EMC behaviour of different types of data cable.

The main danger is increasingly a result of the alien crosstalk between adjacent data cables. Depending on their construction, data cables have different capabilities with regard to the prevention or reduction of interference.

- Unshielded data cables have very good symmetry characteristics but are not shielded against internal, external or adjacent sources of interference. They are endangered to a high degree by the environment in which they are installed.

- Data cables with individual or overall shielding have very good symmetry characteristics and good or even very good shield characteristics. The EMC is very good or even excellent. Interference coming from the installation environment (adjacent data cables) can be ruled out completely.

MegaLine® data cables with dual shielding achieve values of > 80 dB to 1000 MHz, thereby suppressing incoming or outgoing potential interference by a factor of > 10,000. Cables with individual and overall shielding (S/FTP) have excellent EMC, making them an obvious choice for the fail-safe transmission of high data rates such as those offered by 10 Gigabit Ethernet.
It is rapidly becoming more popular to use copper wiring for the dual purpose of supplying IT devices with data and energy simultaneously. More and more users are beginning to turn to the “Power over Ethernet” (PoE) technology that has been designed to do this.

The benefits of PoE
It is no longer necessary to use a 230 V power supply. It is now possible to supply end-user devices with up to 100 W (PoE++) rather than the previous 15W (PoE) or 30W (PoE+), supplied via 4-pair data cables.

Find out more
LEONI provides information on future developments and applications, looking into the question of which data cables and connectors are suitable for transmitting electric current.

Technical information

The standard IEEE 802.3af (PoE) allows energy supply to Ethernet devices with an output of 15 W via data cabling. Here the reliable amperage is 175 mA per conductor (350 mA per pair).

In the case of IEEE 802.3at (PoE+) the output is 30 W. The reliable amperage in this case is 300 mA per conductor (600 mA per pair).

<table>
<thead>
<tr>
<th></th>
<th>PoE</th>
<th>PoE+</th>
<th>PoE++</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>IEEE 802.3af-2003</td>
<td>IEEE802.3at-2009</td>
<td>IEEE802.3bt-2018</td>
</tr>
<tr>
<td>Useful power for the PD</td>
<td>13 W</td>
<td>25 W</td>
<td>60 – 100 W</td>
</tr>
<tr>
<td>PD voltage</td>
<td>37 – 57 V</td>
<td>42.5 – 57 V</td>
<td>44 – 57 V</td>
</tr>
<tr>
<td>Max. power consumption per pair</td>
<td>350 mA</td>
<td>600 mA</td>
<td>1000 mA</td>
</tr>
</tbody>
</table>

A current-carrying circuit is required (one pair) for supply and return wiring.

In the case of Cisco’s proprietary UPoE technology (Universal Power over Ethernet), two pairs are used for the supply and return wiring (maintaining the current load for each conductor). This allows the output to be doubled to 60 W.

The IEEE 802.3bt (PoE++) standard is also referred to as four-pair Power over Ethernet (4PPoE). So far, only two of the four wire pairs of a data cable have been used in PoE, so all 4 pairs are used for power transmission of up to 100 W, with a permissible current of 500 mA per conductor.
Benefits of PoE

The PoE-capable switch used (Power Sourcing Equipment – PSE) offers enormous benefits in conjunction with PoE-capable end devices (Powered Devices – PD):

- **Saves 230 V energy supply**
  (cable and socket)

- **Internationally secured compatibility**
  (based on international standardisation)

- **Comprehensive management and monitoring options**

- **Reduced energy costs**
  due to needs-oriented routing of energy and deactivation of unused ports

- **Fail-safe**
  due to central, uninterrupted power supply (UPS).

These applications are supported

There are now numerous end devices that support and use PoE or PoE+. A number of these are shown here, but this selection by no means claims to be exhaustive. In addition, new applications are to be developed which require a power supply of up to 100 W.

**PoE (15 W)**
- IP telephones
- IP cameras
- Wireless LAN access points
- Bluetooth access points

**PoE (30 W)**
- Devices for the high-speed WLAN standard IEEE 802.11n
- Outdoor IP camera with heat, pan, tilt and zoom function
- Access control systems with controller, reading devices and lock system
- Video IP telephone

**PoE (up to 100 W)**
- Nursing call system in the healthcare sector
- Credit card reading devices and printers, e.g. in retail
- Laptops, thin-client computers
- Lighting (LED), building management
- Industrial applications, e.g. step motors
- Bluetooth access points
What to note when wiring

Data cabling was not originally designed for energy transmission at all. Nonetheless, dual use as desired is possible if the defined framework conditions are taken into account and suitable components selected.

The following points must be taken into account, however:

- Overheating of the data cable
- Contact burn in connectors

**Overheating of the data cable**

The increased power levels involved with the use of PoE, combined with cable accumulation in the installation duct and poor heat dissipation, can lead to perceptible increases in temperature in the data cables, potentially rising to dangerous levels in extreme cases.

Cable warming depends on the following factors:

- Current load (depending on the PoE standard used)
- Cable design (in particular conductor cross-section)
- Number of cable bundles in the installation channel
- Installation environment (heat release)
- Ambient temperature

The correct cable design makes a crucial contribution in minimising cable warming.

The rule of thumb is:
the higher the category, the less the warming!

The higher the category, the larger the conductor cross-section, the less the direct current resistance and therefore the less heat loss, too.

In the example shown from ISO/IEC TR 29125, Category 7 cables exhibit 36 per cent lower heating as compared to Category 5 data cables.

**Cable warming based on cable category (from ISO/IEC TR 29125)**

<table>
<thead>
<tr>
<th>Size of cable cluster (no. of cables)</th>
<th>Temperature increase in °C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAT 5</td>
</tr>
<tr>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>7</td>
<td>1.4</td>
</tr>
<tr>
<td>19</td>
<td>2.6</td>
</tr>
<tr>
<td>37</td>
<td>4.7</td>
</tr>
<tr>
<td>61</td>
<td>6.9</td>
</tr>
<tr>
<td>91</td>
<td>9.7</td>
</tr>
<tr>
<td>127</td>
<td>13.1</td>
</tr>
<tr>
<td>169</td>
<td>16.9</td>
</tr>
</tbody>
</table>
Overheating of the data cable

Another generally neglected effect is the increase in attenuation – caused by the rise in temperature and the reduction in range which this derives from. This can lead to incorrect transmission and in extreme cases result in system failure.

Here, shielded data cables offer clear benefits over unshielded data cables due to the lower temperature coefficient.

**Example 1 – unshielded**
Class D(a) at 60 °C with Cat.5 cable UTP
\[ H_{60\degree C} = (109 \text{ m} - 10 \times 1.5 \text{ m}) - (0.4/100 \times 20 \times 94 \text{ m}) - (0.6/100 \times 20 \times 94 \text{ m}) = 75 \text{ m} \]

**Example 2 – shielded**
Class D(a) at 60 °C with Cat.5 cable STP
\[ H_{60\degree C} = (109 \text{ m} - 10 \times 1.5 \text{ m}) - (0.2/100 \times 40 \times 94) = 86 \text{ m} (+15 \%) \]

Equation for horizontal transmission links

<table>
<thead>
<tr>
<th>Model</th>
<th>Class D</th>
<th>Class E and E_a</th>
<th>Class F and F_a</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Through connection TO</td>
<td>( H = 109 - F \times X )</td>
<td>( H = 107 - 3 - F \times X )</td>
<td>( H = 107 - 2 - F \times X )</td>
</tr>
<tr>
<td>b) Marshalling TO</td>
<td>( H = 107 - F \times X )</td>
<td>( H = 106 - 3 - F \times X )</td>
<td>( H = 106 - 2 - F \times X )</td>
</tr>
<tr>
<td>c) Through-connection SP – TO</td>
<td>( H = 107 - F \times X - C \times Y )</td>
<td>( H = 106 - 3 - F \times X - C \times Y )</td>
<td>( H = 106 - 2 - F \times X - C \times Y )</td>
</tr>
<tr>
<td>d) Marshalling SP – TO</td>
<td>( H = 105 - F \times X - C \times Y )</td>
<td>( H = 105 - 3 - F \times X - C \times Y )</td>
<td>( H = 105 - 2 - F \times X - C \times Y )</td>
</tr>
</tbody>
</table>

\( H \) = max. length of tertiary cable (m)
\( F \) = total length of marshalling cords, marshalling pairs, device connection and device connector cords (m)
\( C \) = length of collection point cable (m)
\( X \) = relation between the insertion loss of the flexible cable (dB/m) and the insertion loss of the tertiary cable (dB/m)
\( Y \) = relation between the insertion loss of the collection point cable (dB/m) and the insertion loss of the tertiary cable (dB/m)

At temperatures above +20 °C \( H \) should be reduced in shielded cables by 0.2 % per 1 °C and in unshielded cables by 0.4 % per °C (+20 °C to +40 °C) and by 0.6 % per 1 °C (> +40 °C to +60 °C).

Our recommendation for the right data cable

- Shielded cable with the highest possible category: e.g. Category 7,
- Large conduction cross-section (AWG 22)
- If required – special designs with permitted operating temperature > 60 °C

<table>
<thead>
<tr>
<th>Conductor</th>
<th>Bare copper wire, AWG 22/1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation twisting element</td>
<td>Cellular PE, core Ø: nominal value 1.6 mm Pair</td>
</tr>
<tr>
<td>Individual shielding Twisting</td>
<td>Aluminium bonded polyester foil, metal on the outside (PiMF) 4 pairs</td>
</tr>
<tr>
<td>Overall shielding</td>
<td>Tinned copper braid</td>
</tr>
<tr>
<td>Outer sheath</td>
<td>Halogen-free, flame-retardant compound</td>
</tr>
</tbody>
</table>

S/FTP data cable with cross-section AWG22/1
*eg. MegaLine® F10-130 S/F*
**Contact burn in connectors**

In connection technology, removing a plug under load can cause damage – so-called contact burn – due to the occurrence of an electric arc or sparking. An irreversible impairment of the contacts is caused, possibly even failure.

A potential remedy here is to use the appropriate port power management – i.e. first switch off the power supply, then remove the plug.

However, intentional or unintentional removal of the plug under load cannot be entirely avoided.

**Certified safety**

*MegaLine® Connect100 and MegaLine® Connect45*

For this reason, LEONI had the product families MegaLine® Connect100 and MegaLine® Connect45 independently tested according to IEC 60512-99-001 and IEC 60512-9-3.

For this purpose, the socket/plug combinations were exposed to frequent insertion cycles under load. The permitted deviation of transition resistances (max. 20 MΩ) is easily maintained – which means certified safety!

**Summary and outlook**

Thanks to Power Ethernet, numerous IT devices are now able to do without a 230 V power supply. This technology enables buildings and offices to be planned and operated more intelligently and with greater energy efficiency.

Not least due to the increase in power levels to be expected, LEONI recommends the use of shielded data cables of Category 7, with conductor dimension AWG 22 and connection technology with staggered contact and insulation zones.

Our recommendation for your choice of connection technology: use staggered contact and insulation zones – over and above the relevant connector standards.
Fire protection cable in accordance with the EU Construction Products Regulation
Maximum safety with B2ca cables by LEONI

Fire provides heat, light and a comforting sense of security.

But it can also be potentially fatal and result in horrific devastation.
Safety in the event of a fire

Where fires occur

One-third of all fires occur in buildings. Numerous deaths due to gas and smoke poisoning are the consequence. The average length of time from the development of a fire until the rollover (pyrolysis gases) has decreased drastically in recent years.

- 1950: 15 minutes
- 1985: 5 minutes
- 2010: 3 minutes

As a result, the available time for a possible escape from the building has also been drastically reduced.

This situation has prompted construction material manufacturers to produce increasingly better and more flame-retardant products.
Fire safety of cable systems
Save lives, impede fires, minimise consequential damage

Saving lives, impeding fires and minimising consequential damages are the priorities when fires break out. Electrical and optical cables must also have their part to play, especially given the fact that cable density in modern buildings is constantly increasing. How can cables contribute to a positive behaviour in the event of a fire and/or what dangers are posed by obsolete, insufficiently fire-resistant cables? These questions can be assigned to three categories:

1. The cable must not make a significant contribution to fire propagation. In particular, it must not propagate the fire from one storey to the next. It must also be ensured that there are no droplets and particles that contribute to fire propagation.

2. Smoke and toxic gases must be avoided, because they make safe building evacuation and impede the efforts of rescue or make them impossible. Most cases of death in the event of a fire can be traced to smoke and toxic gases, not to the fire itself. Therefore, this aspect should actually be given top priority.

3. The rebuilding phase comes after the fire. This is complicated when large quantities of corrosive combustion gases have developed from the fire, because these gases build corrosive acids (e.g. hydrochloric acid) when combined with extinguishing water. Such acids are finely dispersed well beyond the location of the fire throughout the entire building, causing damage to all metallic objects. Potential examples include: structural steel, metal constructions, electrical installations, electronics and IT systems.

These three requirements have been incorporated in the fire classification of the new EU Construction Products Regulation.
CE marking and declaration of performance
EU Construction Products Regulation

Power, control and communication cables that are permanently installed in structures fall under EU Regulation 305/2011 (Construction Products Regulation). Excluded from this: lift cables, cables inside machinery and cables for use in industrial plants.

The EU Construction Products Regulation defines the conditions for the CE marking and requires a declaration of performance of the manufacturer on the following essential product features derived from the protective goals: fire safety (flame propagation, heat development, smoke production, acid formation, flaming droplets) and the absence of harmful substances. In addition, the Construction Products Regulation specifies how conformity with the requirements is permanently ensured.

With the publication of the harmonised standard EN 50575:2014 in the Official Journal of the European Union, the requirement for implementation of the Construction Products Regulation has now been established for all market participants. This standard states the following: 'Power, control and communication cables, cables for general applications in construction works terms of fire behaviour requirements'. Effective 01 July 2016, a cable manufacturer must provide a CE marking on products that have been tested and certified by a notified body and issue a corresponding Declaration of Performance.

After expiry of the coexistence period, which is one year, the CE marking and creation of a Declaration of Performance are mandatory.

The Declaration of Performance certifies compliance with the fire classes defined below and is thus a requirement for use of the cable for the applications defined by the EU Member States.

Note: Cables with circuit and system integrity (resistance to fire) are handled separately in a different standard to be harmonised in the future. They are therefore not subject to current implementation of the Construction Products Regulation. Application of the Construction Products Regulation for these cables is not expected prior to 2017.
Fire classifications and proof of conformity
EU Construction Products Regulation

The classes of fire response are shown in the following table, with a classification of requirements ranging from A_ca (non-flammable) and B1_ca or B2_ca (very high) to C_ca (high), D_ca (moderate), E_ca (low) and F_ca (no requirement). This classification from A to F applies in general to all construction products. The index ‘ca’ stands for cable.

### Classes of fire behaviour of electrical cabins according to DIN EN 13501-6

<table>
<thead>
<tr>
<th>Test method</th>
<th>Parameter</th>
<th>A_ca</th>
<th>B1_ca</th>
<th>B2_ca</th>
<th>C_ca</th>
<th>D_ca</th>
<th>E_ca</th>
<th>F_ca</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN ISO 1716</td>
<td>PCS (MJ/kg)</td>
<td>≤ 2.0</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>EN 60332-1</td>
<td>H (mm)</td>
<td>–</td>
<td>≤ 425</td>
<td>≤ 425</td>
<td>≤ 425</td>
<td>≤ 425</td>
<td>≤ 425</td>
<td>–</td>
</tr>
<tr>
<td>EN 50399</td>
<td>Flame source (kW)</td>
<td>–</td>
<td>30</td>
<td>20.5</td>
<td>20.5</td>
<td>20.5</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>EN 50399</td>
<td>FS (m)</td>
<td>–</td>
<td>≤ 1.75</td>
<td>≤ 1.5</td>
<td>≤ 2.0</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>EN 50399</td>
<td>THR (MJ)</td>
<td>–</td>
<td>≤ 10</td>
<td>≤ 15</td>
<td>≤ 30</td>
<td>≤ 70</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>EN 50399</td>
<td>max. HRR (kW)</td>
<td>–</td>
<td>≤ 20</td>
<td>≤ 30</td>
<td>≤ 60</td>
<td>≤ 400</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>EN 50399</td>
<td>FIGRA (W/s)</td>
<td>–</td>
<td>≤ 120</td>
<td>≤ 150</td>
<td>≤ 300</td>
<td>≤ 1300</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

### Additional classification

<table>
<thead>
<tr>
<th>Test method</th>
<th>Parameter</th>
<th>S1</th>
<th>S1a</th>
<th>S1b</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 50399/EN 60134</td>
<td>Smoke development</td>
<td>–</td>
<td>s1, s1a, s1b</td>
<td>s1, s1a, s1b</td>
<td>s1, s1a, s1b</td>
<td>s1, s1a, s1b</td>
<td>s1, s1a, s1b</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>EN 60754-2</td>
<td>Corrosiveness</td>
<td>–</td>
<td>a1, a2, a3</td>
<td>a1, a2, a3</td>
<td>a1, a2, a3</td>
<td>a1, a2, a3</td>
<td>no</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>EN 50399</td>
<td>Burning droplets</td>
<td>–</td>
<td>d0, d1, d2</td>
<td>d0, d1, d2</td>
<td>d0, d1, d2</td>
<td>d0, d1, d2</td>
<td>no</td>
<td>no</td>
<td></td>
</tr>
</tbody>
</table>

H: Flame Spread, vertical flame propagation (mm)  
FS: Flame Spread, vertical flame propagation (m)  
PCS: Pouvoir Calorifique Supérieur, gross calorific value  
THR: Total Heat Release (MJ)  
HRR: Heat Release Rate, maximum heat release rate (kW)  
FIGRA: Fire Growth Rate, index of heat release rate (W/s)  
TSP: Total Smoke Production, (m²)  
SPR: Smoke Production Rate, max. (m²/s)

### Explanation

- **s1** = TSP ≤ 50 m² and max. SPR ≤ 0.25 m²/s  
- **s1a** = s1 and transmission value acc. to EN 61034-2 ≥ 80 %  
- **s1b** = s1 and transmission value acc. to EN 61034-2 ≥ 60 % < 80 %  
- **s2** = TSP ≤ 400 m² and max. SPR ≤ 1.5 m²/s  
- **s3** = neither s1 nor s2  
- **d0** = no flaming droplets/particles  
- **d1** = no flaming droplets/particles for longer than 10 s  
- **d2** = neither d0 nor d1  

EN 60754-2:  
- **a1** = electrical conductivity < 2.5 μS/mm and pH value > 4.3  
- **a2** = electrical conductivity < 10 μS/mm and pH value > 4.3  
- **a3** = neither a1 nor a2. No data = no performance determined.

### Conformity monitoring

Conformity monitoring is also set out in detail in the Construction Products Regulation and defined by EN 50575. The following is a simplified summary of the obligations for the notified approval body and the manufacturer:

<table>
<thead>
<tr>
<th>Class of fire behaviour</th>
<th>A_ca</th>
<th>B1_ca</th>
<th>B2_ca</th>
<th>C_ca</th>
<th>D_ca</th>
<th>E_ca</th>
<th>F_ca</th>
</tr>
</thead>
<tbody>
<tr>
<td>System of conformity monitoring</td>
<td>1+</td>
<td>–</td>
<td>–</td>
<td>3</td>
<td>4</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Obligations of the notified body</td>
<td>Sample testing and recurring factory auditing with random sampling</td>
<td>Sample testing</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obligations of the manufacturer</td>
<td>Production monitoring</td>
<td>Production monitoring</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Overview of fire testing
These are the goals when using safety cables.

1. **Save lives**
2. **Impede fires**
3. **Minimise consequential damage**

The fire test according to EN 50399 covers Goals 1 and 2 because reduced fire propagation, smoke and flaming droplets make an essential contribution to fire safety.

The cables (number used dependent on cable diameter) are mounted onto a ladder in a vertical tube furnace and a flame is applied to them for 20 minutes using an air gas burner (20 kW / 30 kW). The flue gases are collected with a defined air current (nominal value 8000 l/min) and conducted into an exhaust air duct in which the speed of the air current, the oxygen and CO₂ content, the light absorption and the temperature are measured. This allows the above values to be determined. As many parameters differ from those occurring in the test according to IEC 60332-3, the results cannot be transferred. In particular, the installation of the cable with the distance and elevated air current make the fire scenario more demanding than in IEC 60332-3.

The test according to EN 50399 clearly demonstrates the difference between a cable with high fire safety (below) and a cable of lower quality. The fire propagation, smoke and flaming droplets can be clearly seen (above).

**Fire classes according to the Construction Products Regulation**

Cables for energy, control and communication. The fire performance of power, control and communication cables for fixed installation in buildings is analysed and classified according to EU Regulation 305/2011. For this purpose, the heat release and the flame spread are measured via the above test method according to EN 50399 and evaluated in order to classify the cables according to the relevant fire class. The cables can also achieve additional classification according to the Construction Products Regulation if smoke production, flaming droplets and acidity are determined.

The test according to EN 50399 allows flame propagation, heat release, smoke production and flaming droplets/particles to be determined.
Smoke production is subject to especially strict evaluation in the test according to EN 61034. Reduced smoke generation is a key factor in meeting Objective 1 when evacuating buildings with a high density of people and difficult evacuation conditions. Evaluation of corrosiveness and acidity (EN 50267) is important not just in order to avoid the damage resulting from corrosion (Objective 3), but also to avoid their toxic effect on people attempting to escape in the event of a fire (Objective 2).

The flame test on a single cable according to EN 60332-1 provides the basis for less demanding requirements. These objectives are met by the Construction Products Regulation in that the safety levels defined by the fire tests are applied in relation to the building in question. The German Electrical and Electronic Manufacturers’ Association (ZVEI) has drafted a proposal for the effective application of these safety levels. This is presented below and on the following pages.

Depending on the safety requirement in buildings, the ZVEI recommends the use of fire-resistant cables. The use of class B2ca cables is effective in buildings with very high safety requirements, while the use of class Cca cables makes sense in buildings with high safety requirements. A recommendation for the building classification according to the German Model Building Code (MBO) was also drafted on this basis. Finally, these recommendations are also being incorporated in new versions of installation requirements for energy and communications cabling (DIN EN 50174 Part 1-3, DIN VDE 0100-520 and DIN VDE 0100-420).
Cable type with Euroclass B2ca s1a d1 a1
Overview of the areas of application

Recommendation of the ZVEI for the fire classes to be applied for cable under the Construction Products Regulation

<table>
<thead>
<tr>
<th>Fire classes</th>
<th>Safety requirements in buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flame propagation</td>
<td>Smoke development / density</td>
</tr>
<tr>
<td>Aca</td>
<td>–</td>
</tr>
<tr>
<td>B1ca</td>
<td>–</td>
</tr>
<tr>
<td>B2ca s1a d1 a1</td>
<td>Very high</td>
</tr>
<tr>
<td>Cca s1 d1 a1</td>
<td>High</td>
</tr>
<tr>
<td>Dca s2 d2 a1</td>
<td>Moderate</td>
</tr>
<tr>
<td>Eca</td>
<td>–</td>
</tr>
<tr>
<td>Fca</td>
<td>–</td>
</tr>
</tbody>
</table>

Proposal of the ZVEI for building classification

<table>
<thead>
<tr>
<th>Building classes according to the German Model Building Code</th>
<th>ZVEI proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
<td>Description</td>
</tr>
<tr>
<td>Building (except escape route)</td>
<td>Escape route</td>
</tr>
<tr>
<td>1</td>
<td>Free-standing buildings and free-standing buildings used for agricultural or forestry purposes up to 7 m high</td>
</tr>
<tr>
<td>2</td>
<td>Building up to 7 m high</td>
</tr>
<tr>
<td>3</td>
<td>Other buildings up to 7 m high</td>
</tr>
<tr>
<td>4</td>
<td>Other buildings up to 13 m high</td>
</tr>
<tr>
<td>5</td>
<td>Other buildings including underground buildings up to n x 400 m²</td>
</tr>
</tbody>
</table>

Special structures

<table>
<thead>
<tr>
<th>Building classes according to the German Model Building Code</th>
<th>ZVEI proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
<td>Description</td>
</tr>
<tr>
<td>Industry</td>
<td></td>
</tr>
<tr>
<td>Server rooms</td>
<td></td>
</tr>
<tr>
<td>Road tunnels</td>
<td></td>
</tr>
<tr>
<td>Railway tunnels</td>
<td></td>
</tr>
<tr>
<td>Underground garages</td>
<td></td>
</tr>
</tbody>
</table>

Additional specified structures

<table>
<thead>
<tr>
<th>Building classes according to the German Model Building Code</th>
<th>ZVEI proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td></td>
</tr>
<tr>
<td>Server rooms</td>
<td></td>
</tr>
<tr>
<td>Road tunnels</td>
<td></td>
</tr>
<tr>
<td>Railway tunnels</td>
<td></td>
</tr>
<tr>
<td>Underground garages</td>
<td></td>
</tr>
</tbody>
</table>
On the safe side with LEONI

LEONI has been one of the world’s leading providers of safety cables for many years. Whether infrastructure, energy, data or communication cables:

LEONI offers the best cable technology that is currently available for fire protection.

In addition to standard cables corresponding to the new fire classes Dca and Eca, LEONI also provides fire class B2ca cables. Euroclass B2ca s1 d1 a1 fire-resistant cables offer increased safety due to:

- Reduced fire propagation
- Reduced heat development
- Low smoke density
- Low acid production
- Reduced droplet formation

The quality of these cable products is assured by:

- Conformity verification 1+
- Declaration of Performance
- CE mark
Data cable colour code according to CPR classes
Increased safety for logistics, installation and building approval due to colour distinctions

For simple and safe installation in buildings with different fire protection requirements, LEONI MegaLine® data cables are distinguished according to different CPR classes by means of colour coding.

As well as increasing safety, this colour scheme benefits logistics experts and fitters.

- Cable according to CPR Class D, in "rape yellow"
- Cable according to CPR Class C, in "lime green"
- Cable according to CPR Class B2, in "yellow green"
The type codes for the MegaLine® copper data cables are compatible in structure with the SPACE concept. This makes it easier to assign cables to the old and new cabling classes and the corresponding categories.

The type codes also provide:
- Specifications for the bandwidth in comparison with the standard
- Specifications for the design according to international standard
- Specifications for the sheath material used

**Copper data cables: MegaLine® F10-130 S/F H**

- F   according to cable class F, (1000 MHz)
- 10  Bandwidth according to standard: 1000 MHz
- 130 MegaLine bandwidth: 1300 MHz
- S/F in S/FTP design
- H   with halogen-free outer sheath
Cable types
MegaLine® copper data cable

<table>
<thead>
<tr>
<th>Overall shielding</th>
<th>Cable type</th>
<th>F/FTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foil shielding</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>Braided shielding</td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>Braiding and foil shielding</td>
<td></td>
<td>SF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Individual shielding</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unshielded</td>
<td></td>
<td>U</td>
</tr>
<tr>
<td>Foil shielding</td>
<td></td>
<td>F</td>
</tr>
</tbody>
</table>

| Symmetrical element     |            | P     |

S/FTP (PiMF with overall shielding) | F/FTP | U/FTP |
---|---|---|
Outer sheath | Foil shielding | Cable pair |
Braided shielding | Foil shielding | Conductor |
Cable pair | Foil shielding | Conductor |
| Conductor | Foil shielding | Conductor |

SF/UTP | F/UTP | U/UTP |
---|---|---|
Outer sheath | Foil shielding | Cable pair |
Braided and foil shielding | Foil shielding | Conductor |
Cable pair | Foil shielding | Conductor |
| Conductor | Foil shielding | Conductor |

Cable type
There are a large number of different type designations. In the second edition ISO/IEC 11801, a standardisation was defined which unambiguously determines the elements of the design.

**SF/UTP** Cable with overall braided and foil shielding / with unshielded individual elements.

**S/FTP** Cable with overall braided shielding / foil-shielded individual elements.

**PiMF** Pair in metal foil (xx/FTP)
MegaLine® G20 S/F
Category 8.2

Types
KS-02YSCH 4x2x0.62 mm/~AWG 22/1 PIMF
KS-02YSCH 2x(4x2x0.62 mm/~AWG 22/1 PIMF)

Advantages
- Data center cabling
- Better than Cat. 8.2
- Bandwidth 2000 MHz
- Excellent shielding characteristics
- VDE certified
- PVP-GHMT
- RoHS and REACH conformity

Performance (cable class, bandwidth)

Applications (Ethernet, TV)

Mechanical characteristics

Electromagnetic behaviour

EMC (coupling attenuation)
Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation dB at 50 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 50 m</th>
<th>PS-ACR dB at 50 m</th>
<th>EL-FEXT dB at 50 m</th>
<th>PS-ELFEXT dB at 50 m</th>
<th>RL dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>typ. 2.4 max.* Cat. 8.2 2.9</td>
<td>typ. 2.4 max.* Cat. 8.2 2.9</td>
<td>typ. 2.4 max.* Cat. 8.2 2.9</td>
<td>typ. 2.4 max.* Cat. 8.2 2.9</td>
<td>typ. 2.4 max.* Cat. 8.2 2.9</td>
<td>typ. 2.4 max.* Cat. 8.2 2.9</td>
<td>typ. 2.4 max.* Cat. 8.2 2.9</td>
<td>typ. 2.4 max.* Cat. 8.2 2.9</td>
</tr>
<tr>
<td>100</td>
<td>8.6 9.3</td>
<td>100 75.4</td>
<td>97 72.4</td>
<td>91.4 66.1</td>
<td>88.4 63.1</td>
<td>90 60.6</td>
<td>87 57.6</td>
<td>36.2 22.5</td>
</tr>
<tr>
<td>250</td>
<td>13.7 14.7</td>
<td>100 69.5</td>
<td>97 66.5</td>
<td>86.3 54.8</td>
<td>83.3 51.8</td>
<td>84 52.6</td>
<td>83 49.6</td>
<td>34.8 20.1</td>
</tr>
<tr>
<td>500</td>
<td>18.9 21.4</td>
<td>100 64.9</td>
<td>97 61.9</td>
<td>81.1 43.5</td>
<td>78.1 40.5</td>
<td>79 39.6</td>
<td>76 43.6</td>
<td>31.8 17.3</td>
</tr>
<tr>
<td>600</td>
<td>22 23.6</td>
<td>100 63.7</td>
<td>97 60.7</td>
<td>78 40.2</td>
<td>75 37.2</td>
<td>78 45</td>
<td>75 42</td>
<td>28.5 17.3</td>
</tr>
<tr>
<td>800</td>
<td>25.6 27.5</td>
<td>95 61.9</td>
<td>92 58.9</td>
<td>69.4 34.4</td>
<td>66.4 31.4</td>
<td>71 42.5</td>
<td>68 39.5</td>
<td>25.3 16.1</td>
</tr>
<tr>
<td>1000</td>
<td>28.9 31</td>
<td>92 60.4</td>
<td>89 57.4</td>
<td>63.1 29.4</td>
<td>60.1 26.4</td>
<td>62 40.6</td>
<td>59 37.6</td>
<td>22.2 15.2</td>
</tr>
<tr>
<td>1200</td>
<td>31.6 34.2</td>
<td>88 59.2</td>
<td>85 56.2</td>
<td>56.4 25</td>
<td>53.4 22</td>
<td>60 39</td>
<td>57 36</td>
<td>20.2 14.7</td>
</tr>
<tr>
<td>1500</td>
<td>35.2 38.6</td>
<td>77 57.8</td>
<td>74 54.8</td>
<td>40.8 19.2</td>
<td>37.8 16.2</td>
<td>53 37.1</td>
<td>50 34.1</td>
<td>19.2 14</td>
</tr>
<tr>
<td>1600</td>
<td>36.6 40</td>
<td>75 57.3</td>
<td>72 54.3</td>
<td>37.8 17.3</td>
<td>34.8 14.3</td>
<td>50 36.5</td>
<td>47 33.5</td>
<td>18.4 13.8</td>
</tr>
<tr>
<td>1700</td>
<td>38.1 41.4</td>
<td>75 56.9</td>
<td>72 53.9</td>
<td>36.9 15.5</td>
<td>33.9 12.5</td>
<td>45 36</td>
<td>42 33</td>
<td>17.1 13.6</td>
</tr>
<tr>
<td>1800</td>
<td>39.5 42.7</td>
<td>75 56.6</td>
<td>72 53.6</td>
<td>35.5 13.9</td>
<td>32.5 10.9</td>
<td>42 35.5</td>
<td>39 32.5</td>
<td>16.3 13.4</td>
</tr>
<tr>
<td>1900</td>
<td>41.1 44</td>
<td>75 56.2</td>
<td>71 53.2</td>
<td>33.9 12.2</td>
<td>30.9 9.2</td>
<td>40 35</td>
<td>37 32</td>
<td>15.6 13.3</td>
</tr>
<tr>
<td>2000</td>
<td>43.5 45.3</td>
<td>75 55.9</td>
<td>72 52.9</td>
<td>31.5 10.7</td>
<td>28.5 7.7</td>
<td>40 34.6</td>
<td>37 31.6</td>
<td>15.1 13.1</td>
</tr>
</tbody>
</table>

* IEC 61156-9 (2016) If IO-FEXT is min. 90 dB to 1000 MHz and min. 80 dB to 2000 MHz, EL-FEXT is fulfilled by design.

Electrical characteristics (LF) at 20 °C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct current resistance</td>
<td>max.</td>
<td>68 Ω/km</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>min.</td>
<td>5 GΩ x km</td>
</tr>
<tr>
<td>Mutual capacitance</td>
<td>approx.</td>
<td>43 pF/m</td>
</tr>
<tr>
<td>Capacitive coupling (e)</td>
<td>approx.</td>
<td>1000 pF/km</td>
</tr>
<tr>
<td>Signal tempo (c)</td>
<td>approx.</td>
<td>0.76 ns/100 m</td>
</tr>
<tr>
<td>Propagation delay</td>
<td>approx.</td>
<td>440 ns/100 m</td>
</tr>
<tr>
<td>Skew at 100 MHz</td>
<td>approx.</td>
<td>12 ns/100 m</td>
</tr>
<tr>
<td>Charact. Impedance</td>
<td>at 100 MHz</td>
<td>100 ± 5 Ω</td>
</tr>
<tr>
<td>Testing voltage U_{eff}</td>
<td>max.</td>
<td>1000 V</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>max.</td>
<td>125 V</td>
</tr>
</tbody>
</table>

Thermal properties

For fixed installation: −20 °C to +60 °C
For mobile operation: 0 °C to +50 °C

Chemical characteristics

Free of hazardous substances acc. to RoHs 2011/65/EU

Cable printing

LEONI MegaLine G20 S/F 4P H 25G 4PPoE "CPR Class"

"DoP no." "VDE mark" Made in Germany "Batch number"

"Metre marking"

Colour code

WH/BU, WH/OG, WH/GN, WH/BN

Certificates and approvals

Quality mark with production control:

<VDEN>, GHMT PVP

Link performance: LEONI MegaLine® systems and other commonly available connector systems

Test certificates: according to DIN 55350-18-4.2.1 or EN 10204

Compliant with LVD (2014/35/EU)

Compliant with Construction Products Regulation (EU/305/2011): ☑ ☑

Dimension

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4P</td>
<td>8.1</td>
<td>68</td>
<td>38</td>
<td>D_{s} s2 d_{2} a1</td>
<td>CDESK0000007</td>
<td>Rape yellow</td>
<td>LKD 7KS 80020 xxxx</td>
</tr>
<tr>
<td>2 x 4P</td>
<td>8.6 x 17.5</td>
<td>162</td>
<td>90</td>
<td>D_{s} s2 d_{2} a1</td>
<td>CDESK0000008</td>
<td>Rape yellow</td>
<td>LKD 7KS 80022 xxxx</td>
</tr>
<tr>
<td>4P</td>
<td>8.6</td>
<td>68</td>
<td>38</td>
<td>C_{s1} s1 d_{1} a1</td>
<td>CDESK00000034</td>
<td>Lime green</td>
<td>LKD 7KS 80200 xxxx</td>
</tr>
<tr>
<td>4P</td>
<td>8.6</td>
<td>68</td>
<td>38</td>
<td>B_{2s} s1a d_{1} a1</td>
<td>CDESK00000010</td>
<td>Yellow green</td>
<td>LKD 7KS 80200 xxxx</td>
</tr>
</tbody>
</table>

Packaging: xxxx

Standard length: 0100 = 1000 m 0050 = 500 m 0000 = general

* see page 17: Definition of copper no.
**MegaLine® G20 S/F Mini**

**Category 8.2**

---

**Advantages**
- Better than Cat. 8.2
- Data center cabling
- Bandwidth 2000 MHz
- Excellent shielding characteristics
- VDE certified
- RoHS and REACH conformity

---

### Construction for 4P

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KS-02YSCH 4x2xAWG26/1 PIMF</td>
<td></td>
</tr>
</tbody>
</table>

---

**Fire behaviour**
- Flame retardancy: acc. to IEC 60332-2-2
- Smoke density: acc. to IEC 60332-3-24
- Fire load (reference value): 0.38 MJ/m²
- EU Construction Products Regulation: acc. to EN 50575 / EN 50399

**Security (fire behaviour)**

<table>
<thead>
<tr>
<th>S</th>
<th>1</th>
<th>IEC 60332-2-2</th>
<th>2</th>
<th>IEC-60332-1-2</th>
<th>3</th>
<th>IEC-60332-3-24</th>
<th>4</th>
<th>EFP Grade 1</th>
<th>5</th>
<th>EFP Grade 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dca</td>
<td>Eca/Dca</td>
<td>Eca/Dca</td>
<td>Cca</td>
<td>B2ca</td>
<td></td>
<td></td>
<td></td>
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**Performance**
- Better than Cat. 8.2 acc. to IEC 61156-10, excellent NEXT, very low attenuation, excellent shielding characteristics (pairs and overall shielding), low skew, bandwidth (typical) 2000 MHz

---

**Applications**
- Connection cable and patch cord for use in structured cabling acc. to ISO/IEC 11801 and EN 50173 (3rd Edition) and data center cabling acc. to TR 11801-9901. Ideal for all applications of Classes D to F A and Class II, multimedia (TV, video, data voice) 25/40 GbE acc. to IEEE 802.3 b, cable sharing, VoIP, PoE/PoE+/4PPoE.

---

**Mechanical characteristics**
- Bending radius: during installation 8 x outer diameter (min.), after installation 4 x outer diameter (min.)
- Tensile strength (max.): 60 N

---

**Electromagnetic behaviour**
- Coupling resistance at 10 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 60 dB
- Coupling attenuation up to 1000 MHz (nom.): 85 dB
- Separating class acc. to EN 50174-2 d

---

**Security**
- Flame retardancy acc. to IEC 60332-2-2
- Smoke density acc. to IEC 60332-3-24
- Coupling resistance at 10 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 60 dB
- Coupling attenuation up to 1000 MHz (nom.): 85 dB
- Separating class acc. to EN 50174-2 d

---

**Performance (cable class, bandwidth)**

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<th>&gt; Class E1 &gt; 500 MHz</th>
<th>3</th>
<th>&gt; Class F &gt; 600 MHz</th>
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<th>&gt; Class F1 &gt; 1000 MHz</th>
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<th>&gt; Class F1+ &gt; 1200 MHz</th>
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<td>Eca/Dca</td>
<td>Cca</td>
<td>B2ca</td>
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**Application (Ethernet, TV)**

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<th>2</th>
<th>&gt; 1 GbE</th>
<th>3</th>
<th>up to 10 GbE</th>
<th>4</th>
<th>&gt; 10 GbE</th>
<th>5</th>
<th>&gt; 10 GbE TV</th>
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**Construction (conductor dimension, tensile strength)**

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<th>2</th>
<th>AWG 26/25</th>
<th>3</th>
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<th>4</th>
<th>AWG 23</th>
<th>5</th>
<th>AWG 22</th>
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**EMC (coupling attenuation)**

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<th>2</th>
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<th>&gt; 80 dB</th>
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</thead>
<tbody>
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<td>Eca/Dca</td>
<td>Cca</td>
<td>B2ca</td>
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</table>
## Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>Attenuation dB/30m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 30m</th>
<th>PS-ACR dB at 30m</th>
<th>EL-FEXT dB at 30m</th>
<th>PS-ELFEXT dB at 30m</th>
<th>RL dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>1.8 max.</td>
<td>2.6</td>
<td>100</td>
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<td>87.4</td>
<td>98.2</td>
<td>87.8</td>
<td>95.2</td>
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<tr>
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<td>6.6 max.</td>
<td>8.3</td>
<td>100</td>
<td>75.4</td>
<td>72.4</td>
<td>93.4</td>
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<td>13.4</td>
<td>100</td>
<td>69.4</td>
<td>66.4</td>
<td>89.4</td>
<td>56.1</td>
<td>86.4</td>
</tr>
<tr>
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<td>15.5 max.</td>
<td>19.2</td>
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<td>79.5</td>
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<td>76.2</td>
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<td>81.6</td>
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<td>84.3</td>
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<td>52.9</td>
<td>93.5</td>
<td>15.2</td>
<td>38.4</td>
</tr>
</tbody>
</table>

*IEC 61156-10 (2016 draft) if IO-FEXT is min. 90 dB to 1000 MHz and min. 80 dB to 2000 MHz, EL-FEXT is fulfilled by design.

## Electrical characteristics (NF) at 20 °C

- **Direct current resistance**: max. 145 Ω/km
- **Insulation resistance**: min. 5 GΩ x km
- **Mutual capacitance**: approx. 49 pF/m
- **Signal tempo (c)**: approx. 0.78
- **Propagation delay**: approx. 490 ns/100 m
- **Skew at 100 MHz**: approx. 5 ns/100 m
- **Charact. impedance**: at 100 MHz 100 ± 5 Ω
- **Testing voltage U_{im}**: 1000 V
- **Operating voltage**: max. 125 V

## Thermal properties

- **For fixed installation**: –20 °C to +60 °C
- **For mobile operation**: 0 °C to +50 °C

## Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU

---

### Cable printing

LEONI MegaLine G20 S/F 4P H 25G 4PPoE "DoP no." "VDE mark"
Made in Germany "Batch number"
"Metre marking"

### Colour code

WH/BU, WH/OG, WH/GN, WH/BN

### Certificates and approvals

Quality mark with production control: <VDE>
Link performance: LEONI MegaLine* systems
and other commonly available connector systems
Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
Compliant with LVD (2014/35/EU): Ç Ç

---

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
<th>Order no.</th>
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<td>Rape yellow</td>
<td>LKD 7KS8 8023 xxxx</td>
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</tbody>
</table>

Packaging: xxxx

Standard length: 0100 = 1000 m 0050 = 500 m 0000 = general

* see page 17: Definition of copper no.
MegaLine® G12-150 S/F
Category 7A+

Construction for 4P

Fire behaviour
- Flame retardancy: acc. to IEC 60332-3-24
- Smoke density: acc. to IEC 601034-1-2
- Acid formation: acc. to EN 60754-2
- Fire load (reference value): 0.74 MJ/m² (Sx), 1.5 MJ/m² (Dx)
- EU Construction Products Regulation: acc. to EN 50575 / EN 50399

Performance
- Better than Category 7, acc. to EN 50288 and IEC 61156,
- excellent NEXT, low attenuation,
- excellent shielding characteristics (pairs and overall shielding),
- low skew, bandwidth (typical) 1500 MHz

Applications
- Installation cable for use in structured cabling acc. to ISO/IEC 11801 and
- EN 50173 (3rd Edition), ideal for all applications of Classes D to F, multimedia
- (TV, video, data, voice) > 10 GbE acc. to IEEE 802.3 an, 25G acc. to TR-11801-9905
- as Channel-Link up to 50 m, cable sharing, VoIP, PoE/PoE+/4PPoE.

Mechanical characteristics
- Bending radius during installation: 8 x outer diameter (min.)
- after installation: 4 x outer diameter (min.)
- Tensile strength (max.): 130 N (Sx), 260 N (Dx)
- Crush strength: 1000 N/100 mm²
- Impact strength (number of shocks): 10

Electromagnetic behaviour
- Coupling resistance at 10 MHz (nom.): 2 mΩ/m
- Shield attenuation up to 1200 MHz (nom.): 80 dB
- Coupling attenuation up to 1200 MHz (nom.): 90 dB
- Separating class acc. to EN 50174-2: 90 dB

Advantages
- Better than Category 7A+
- bandwidth 1500 MHz
- excellent shielding characteristics
- VDE certified
- PVP-GHMT
- RoHS and REACH conformity

Conductor
- Bare copper wire, AWG 22/1

Insulation
- Cellular PE, core Ø: nominal value 1.6 mm

Twisting element
- Pair

Individual shielding
- Aluminium bonded polyester foil,
- metal on the outside (PiMF)

Twisting
- 4 pairs

Overall shielding
- Tinned copper braid

Outer sheath
- Halogen-free, flame-retardant compound

Performance (class, bandwidth)
- > Class E
- > 250 MHz
- > Class E₂
- > 500 MHz
- > Class F
- > 600 MHz
- > Class F₂
- > 1000 MHz
- > Class F₂+
- > 1200 MHz

Application (Ethernet, TV)
- > 100 Mbe
- > 1 GBE
- up to 10 Gbe
- > 10 Gbe
- > 10 Gbe TV

Construction (conductor dimension, tensile strength)
- AWG 27
- AWG 26/25
- AWG 24
- AWG 23
- AWG 22

EMC (coupling attenuation)
- > 40 dB
- > 50 dB
- > 60 dB
- > 70 dB
- > 80 dB
## Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation dB/100 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>EL-FEXT dB at 100 m</th>
<th>PS-ELFEXT dB at 100 m</th>
<th>RL dB</th>
</tr>
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<td>typ. 110 Cat. 7,+ min.* 80</td>
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<td>106 72</td>
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<td>93 54</td>
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<td>102 67</td>
<td>81 42</td>
<td>78 39</td>
<td>83 46</td>
<td>80 43</td>
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<td>102 62.5</td>
<td>71 24</td>
<td>68 21</td>
<td>70 40</td>
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</tbody>
</table>

* EN 50288-9-1(2013)/IEC 61156-5 (2009)/IEC 61156-7(2003). If IO FEXT is min. 90 dB, EL-FEXT is fulfilled by design.

## Electrical characteristics (LF) at 20 °C

- **Direct current resistance**
  - max. 57.1 Ω/km
- **Insulation resistance**
  - min. 5 GΩ x km
- **Mutual capacitance**
  - approx. 42 pF/m
- **Capacitive coupling (e)**
  - approx. 1000 pF/km
- **Signal tempo (c)**
  - approx. 0.77
- **Propagation delay**
  - approx. 420 ns/100 m
- **Skew at 100 MHz**
  - approx. 3 ns/100 m
- **Charact. impedance**
  - 100 ± 5 Ω
- **Testing voltage U_eff**
  - max. 1000 V
- **Operating voltage**
  - max. 125 V

## Thermal properties

- **For fixed installation**
  - –20 °C to +60 °C
- **For mobile operation**
  - 0 °C to +50 °C

## Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU

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**Cable printing for 4P**

LEONI MegaLine G12-150 S/F 4P 25G 4PPoE

"CPR Class" “DoP no." “VDE mark” Made in Germany

"Batch number" "Metre marking"

**Colour code**

WH/BU, WH/OG, WH/GN, WH/BN

**Certificates and approvals**

Quality mark with production control:

<VDE>, GHMT PVP

Link performance: LEONI MegaLine® systems and other commonly available connector systems

Test certificates: according to DIN 55350-18-4.2.1 or EN 10204

Compliant with LVD (2014/35/EU):

Compliant with Construction Products Regulation (EU/305/2011):

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### Copper data cables

**Office**, **DataCenter**, **Industry**

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**www.leoni-data.com**
MegaLine® F10-130 S/F
Category 7a

Advantages
- Better than Category 7a
- Bandwidth 1300 MHz
- Excellent shielding characteristics
- VDE certified
- PVP-GHMT
- RoHS and REACH conformity

Types
KS-02YSCH 4x2xAWG 22/1 PIMF
KS-02YSCH 2x(4x2xAWG 22/1 PIMF)

Construction
Conductor: Bare copper wire, AWG 22/1
Insulation: Cellular PE, core Ø: nominal value 1.6 mm
Twisting element: Pair
Individual shielding: Aluminium bonded polyester foil, metal on the outside (PiMF)
Twisting: 4 pairs
Overall shielding: Tinned copper braid
Outer sheath: Halogen-free, flame-retardant compound

Fire behaviour
Fire load (reference value) 0.70 MJ/m (Sx), 1.4 MJ/m (Dx)
EU Construction Products Regulation acc. to EN 50575 / EN 50399

Performance
Better than Category 7a, acc. to EN 50288 and IEC 61156
Excellent NEXT, low attenuation, excellent shielding characteristics (pairs and overall shielding), low skew, bandwidth (typical) 1300 MHz

Applications
Installation cable for use in structured cabling acc. to ISO/IEC 11801 and EN 50173 (3rd Edition). Ideal for all applications of Classes D to FA, multimedia (TV, video, data, voice) > 10 GbE acc. to IEEE 802.3 an, 25G acc. to TR-11801-9905 as Channel-Link up to 50 m, cable sharing, VoIP, PoE/PoE+/4PPoE.

Mechanical characteristics
Bending radius during installation 8 x outer diameter (min.)
after installation 4 x outer diameter (min.)
Tensile strength (max.) 130 N (Sx), 260 N (Dx)
Crush strength 1000 N/100 mm
Impact strength (number of shocks) 10

Electromagnetic behaviour
Coupling resistance at 10 MHz (nom.) 5 mΩ/m
Shield attenuation up to 1000 MHz (nom.) 70 dB
Coupling attenuation up to 1000 MHz (nom.) 85 dB
Separating class acc. to EN 50174-2 d

Security (fire behaviour)
S
1 IEC 60332-2-2
2 IEC 60332-1-2
3 IEC 60332-3-24
4 EFP
5 EFP

Eca/Dca Eca/Dca Cca B2ca

Performance (cable class, bandwidth)
P
1 > Class E > 250 MHz
2 > Class E, > 500 MHz
3 > Class F, > 600 MHz
4 > Class F, > 1000 MHz
5 > Class F, > 1200 MHz

Application (ethernet, TV)
A
1 > 100 MbE
2 > 1 GbE
3 up to 10 GbE
4 > 10 GbE
5 > 10 GbE TV

Construction (conductor dimension, tensile strength)
C
1 AWG 27
2 AWG 26/25
3 AWG 24
4 AWG 23
5 AWG 22

EMC (coupling attenuation)
E
1 > 40 dB
2 > 50 dB
3 > 60 dB
4 > 70 dB
5 > 80 dB

Copper data cables
### Electrical characteristics (LF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency Mhz</th>
<th>Attenuation dB/100 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>ACR-F dB at 100 m</th>
<th>PSACR-F dB at 100 m</th>
<th>RL dB</th>
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<td>typ. Cat. 7, min.*</td>
<td>typ. Cat. 7, min.*</td>
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<td>87</td>
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<td>38</td>
<td>2.6</td>
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</table>

* EN 50288-9-1 (2013)/IEC 61156-5 (2009). As a result of the configuration of several individual elements, up to 3 % higher attenuation values and frequency-selective reflections can occur.

### Electrical characteristics (HF) at 20 °C

- **Frequency**: MHz
- **Attenuation dB/100 m**: typ. Cat. 7, max.*
- **NEXT dB**: typ. Cat. 7, min.*
- **PS-NEXT dB**: typ. Cat. 7, min.*
- **ACR dB at 100 m**: typ. Cat. 7, min.*
- **PS-ACR dB at 100 m**: typ. Cat. 7, min.*
- **ACR-F dB at 100 m**: typ. Cat. 7, min.*
- **PSACR-F dB at 100 m**: typ. Cat. 7, min.*
- **RL dB**: typ. Cat. 7, min.*

### Cable printing for 4 P

- **LEONI MegaLine F10-130 S/F 4P H 25G 4PPoE**
- **“CPR Class” “DoP no.” “VDE mark” Made in Germany**
- **“Batch number” “Metre marking”**

### Colour code

- **WH/BU, WH/OG, WH/GN, WH/BN**

### Certificates and approvals

- Quality mark with production control:
  - <VDE>, GHMT PVP
- Link performance: LEONI MegaLine® systems and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU):
- Compliant with Construction Products Regulation (EU/305/2011):

### Thermal properties

- **For fixed installation**: –20 °C to +60 °C
- **For mobile operation**: 0 °C to +50 °C

### Chemical characteristics

- Free of hazardous substances acc. to RoHS 2011/65/EU
MegaLine® F10-125 S/F
Category 7a

Types
KS-02YSCH 4x2x0.62 mm/~AWG 22/1 PIMF
KS-02YSCH 2x(4x2x0.62 mm/~AWG 22/1 PIMF)

Conductor
Bare copper wire, 0.62 mm/~AWG 22/1

Insulation
Cellular PE, core Ø: nominal value 1.5 mm

Twisting element
Pair

Individual shielding
Aluminium bonded polyester foil, metal on the outside (PiMF)

Twisting
4 pairs

Overall shielding
Tinned copper braid

Outer sheath
Halogen-free, flame-retardant compound

Advantages
- Better than Category 7a
- bandwidth 1300 MHz
- excellent shielding characteristics
- VDE certified
- PVP-GHMT
- RoHS and REACH conformity

Fire behaviour
Flame retardancy
acc. to IEC 60332-3-24

Halogen free
acc. to IEC 60754-1/2

Smoke density
acc. to IEC 60332-3-24

Fire load (reference value)
0.65 MJ/m (Sx), 1.33 MJ/m (Dx)

Acid formation
acc. to EN 60754-2

EU Construction Products Regulation
acc. to EN 50075 / EN 50399

Smoke density
acc. to IEC 61034-1/2

Fire load (reference value)
0.65 MJ/m (Sx), 1.33 MJ/m (Dx)

Acid formation
acc. to EN 60754-2

EU Construction Products Regulation
acc. to EN 50075 / EN 50399

Performance
Better than Category 7a, acc. to EN 50288 and IEC 61156
excellent NEXT, low attenuation, excellent shielding characteristics
(pairs and overall shielding), low skew, bandwidth (typical) 1300 MHz

Applications
Installation cable for use in structured cabling acc. to ISO/IEC 11801
and EN 50173 (3rd Edition).
Ideal for all applications of Classes D to F a, multimedia (video, data, voice)
> 10 GbE acc. to IEEE 802.3 an, 25G acc. to TR-11801-9905 as Channel-Link
up to 50 m, cable sharing, VoIP, PoE/PoE+/APPoE.

Mechanical characteristics
Bending radius during installation 8 x outer diameter (min.)
4 x outer diameter (min.)
Tensile strength (max.)
110 N (Sx), 220 N (Dx)
Crush strength
1000 N/100 mm
Impact strength (number of shocks)
10

Electromagnetic behaviour
Coupling resistance at 10 MHz (nom.)
5 mΩ/m
Shield attenuation up to 1000 MHz (nom.)
70 dB
Coupling attenuation up to 1000 MHz (nom.)
85 dB
Separating class acc. to EN 50174-2

Security (fire behaviour)

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<th>S</th>
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<th>1</th>
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<th>EFP Grade 1</th>
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Performance (cable class, bandwidth)

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Application (ethernet, TV)

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<th>&gt; Class F</th>
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Construction (conductor dimension, tensile strength)

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<td>&gt; 70 dB</td>
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EMC (coupling attenuation)
### Electrical characteristics at 20 °C

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<tr>
<th>Frequency Mhz</th>
<th>Direct current resistance</th>
<th>Insulation resistance</th>
<th>Mutual capacitance</th>
<th>Capacitive coupling (e)</th>
<th>Signal tempo (c)</th>
<th>Propagation delay</th>
<th>Skew at 100 MHz</th>
<th>Charact. Impedance</th>
<th>Testing voltage $U_{\text{eff}}$</th>
<th>Operating voltage</th>
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<tbody>
<tr>
<td></td>
<td>max.</td>
<td>65 $\Omega$/km</td>
<td>5 GΩ x km</td>
<td>approx.</td>
<td>0.80</td>
<td>approx. 420 ns/100 m</td>
<td>approx. 5 ns/100 m</td>
<td>at 100 MHz</td>
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<td>125 V</td>
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</tbody>
</table>

**Thermal properties**

- For fixed installation: $-20 ^\circ C$ to $+60 ^\circ C$
- For mobile operation: $0 ^\circ C$ to $+50 ^\circ C$

**Chemical characteristics**

- Free of hazardous substances acc. to RoHS 2011/65/EU

---

### Cable printing for 4 P

LEONI MegaLine F10-12S S/F 4P H 25G 4PPoE

- "CPR Class" "DoP no. "VDE mark" Made in Germany
- "Batch number" "Metre marking"

**Colour code**

- WH/BU, WH/OG, WH/GN, WH/BN

**Certificates and approvals**

- Quality mark with production control: &lt;VDE&gt;, GHMT PVP
- Link performance: LEONI MegaLine® systems and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU): ⚡
- Compliant with Construction Products Regulation (EU/305/2011): ⚡

---

**Order no.**

LEONI MegaLine® systems and other commonly available connector systems

Packaging: xxxx

- Standard length: 0100 = 1000 m  0050 = 500 m  0000 = general

* see page 17: Definition of copper no.
### MegaLine® F10-115 S/F

**Category 7.**

#### Construction for 4P

- **B2ca**
- **Cca**
- **Dca**

#### Types
- KS-02YSCH 4x2xAWG 23/1 PIMF
- KS-02YSCH 2x(4x2xAWG 23/1 PIMF)

### Advantages
- Better than Category 7.
- Bandwidth 1200 MHz.
- Excellent shielding characteristics.
- VDE certified.
- PVP-GHMT.
- RoHS and REACH conformity.

### Security (fire behaviour)

<table>
<thead>
<tr>
<th>S</th>
<th>IEC 60332-2-2</th>
<th>Eca/Dca</th>
<th>Eca/Dca</th>
<th>Cca</th>
<th>B2ca</th>
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<tr>
<td>1</td>
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<td>Eca/Dca</td>
<td>Eca/Dca</td>
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<td>B2ca</td>
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### Performance (cable class, bandwidth)

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<tr>
<th>P</th>
<th>&gt; 100 Mbit/s</th>
<th>&gt; 1 Gbit/s</th>
<th>up to 10 Gbit/s</th>
<th>&gt; 10 Gbit/s</th>
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<tr>
<td>1</td>
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<td>&gt; 1000 MHz</td>
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<td>2</td>
<td>Class E</td>
<td>&gt; 500 MHz</td>
<td>&gt; 600 MHz</td>
<td>&gt; 1000 MHz</td>
<td>&gt; 1200 MHz</td>
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</table>

### Application (ethernet, TV)

<table>
<thead>
<tr>
<th>A</th>
<th>&gt; 100 Mbit/s</th>
<th>&gt; 1 Gbit/s</th>
<th>up to 10 Gbit/s</th>
<th>&gt; 10 Gbit/s</th>
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<td>&gt; 600 MHz</td>
<td>&gt; 1000 MHz</td>
<td>&gt; 1200 MHz</td>
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<tr>
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<td>&gt; 1000 MHz</td>
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### Construction (conductor dimension, tensile strength)

<table>
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<tr>
<th>C</th>
<th>AWG 27</th>
<th>AWG 26/25</th>
<th>AWG 24</th>
<th>AWG 23</th>
<th>AWG 22</th>
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<tbody>
<tr>
<td>1</td>
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<td>&gt; 50 dB</td>
<td>&gt; 60 dB</td>
<td>&gt; 70 dB</td>
<td>&gt; 80 dB</td>
</tr>
</tbody>
</table>

### Mechanical characteristics

- Bending radius during installation: 8 x outer diameter (min.)
- Tensile strength (max.): 110 N (Sx), 220 N (Dx)
- Crush strength: 440 N (4-fold), 650 N (6-fold)
- Impact strength (number of shocks): 10

### Electromagnetic behaviour

- Coupling resistance at 10 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 70 dB
- Coupling attenuation up to 1000 MHz (nom.): 85 dB
- Separating class acc. to EN 50174-2: 2
Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation dB/100 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>EL-FEXT dB at 100 m</th>
<th>PS-ELFEXT dB at 100 m</th>
<th>RL dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cat. 7, typ.*</td>
<td>Cat. 7, max.*</td>
<td>Cat. 7, min.*</td>
<td>Cat. 7, min.*</td>
<td>Cat. 7, min.*</td>
<td>Cat. 7, min.*</td>
<td>Cat. 7, min.*</td>
<td>Cat. 7, min.*</td>
</tr>
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<td>10</td>
<td>1.9 2.1</td>
<td>105 78</td>
<td>102 75</td>
<td>104 75.9</td>
<td>101 72.9</td>
<td>98 69.2</td>
<td>103 75.3</td>
<td>100 72.3</td>
</tr>
<tr>
<td>100</td>
<td>16.3 18.5</td>
<td>105 75.4</td>
<td>102 72.4</td>
<td>89 56.9</td>
<td>86 53.9</td>
<td>89 55.3</td>
<td>86 52.3</td>
<td>39.6 20.1</td>
</tr>
<tr>
<td>200</td>
<td>24.3 26.5</td>
<td>105 70.9</td>
<td>102 67.9</td>
<td>81 44.4</td>
<td>78 41.4</td>
<td>82 49.3</td>
<td>79 46.3</td>
<td>36 18</td>
</tr>
<tr>
<td>250</td>
<td>27.5 29.7</td>
<td>105 69.4</td>
<td>102 66.4</td>
<td>78 39.7</td>
<td>75 36.7</td>
<td>79 47.3</td>
<td>76 44.3</td>
<td>34 17.3</td>
</tr>
<tr>
<td>500</td>
<td>37.9 42.8</td>
<td>100 64.9</td>
<td>97 61.9</td>
<td>62 22.2</td>
<td>59 19.2</td>
<td>67 41.3</td>
<td>64 38.3</td>
<td>29 17.3</td>
</tr>
<tr>
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<td>92 60.7</td>
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<tr>
<td>700</td>
<td>47.2 51.1</td>
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<td>92 59.7</td>
<td>48 11.6</td>
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<td>50 34.2</td>
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<td>87 58.1</td>
<td>35 2.6</td>
<td>32 –0.4</td>
<td>49 36.2</td>
<td>46 33.2</td>
<td>22.6 15.5</td>
</tr>
<tr>
<td>1000</td>
<td>58 61.9</td>
<td>88 60.4</td>
<td>85 57.4</td>
<td>30 –1.5</td>
<td>27 –4.5</td>
<td>44 35.3</td>
<td>41 32.3</td>
<td>21.5 15.1</td>
</tr>
<tr>
<td>1200</td>
<td>64 –</td>
<td>85 –</td>
<td>82 –</td>
<td>21 –</td>
<td>18 –</td>
<td>35 –</td>
<td>32 –</td>
<td>19 –</td>
</tr>
</tbody>
</table>

Electrical characteristics (LF) at 20 °C

- Direct current resistance: max. 75 Ω/km
- Insulation resistance: min. 5 GΩ x km
- Mutual capacitance: approx. 42 pF/m
- Capacitive coupling (e): approx. 1100 pF/km
- Signal tempo: approx. 0.78
- Propagation delay: approx. 420 ns/100 m
- Skew at 100 MHz: approx. 5 ns/100 m
- Charact. impedance: at 100 MHz 100 ± 5 Ω
- Testing voltage $U_{\text{eff}}$: 1000 V
- Operating voltage: max. 125 V

Thermal properties

- For fixed installation: –20 °C to +60 °C
- For mobile operation: 0 °C to +50 °C

Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU
**MegaLine® F6-90 S/F**  
**Category 7**

---

### Construction for 4P

- **B2ca**  
- **Cca**  
- **Dca**

---

### Fire behaviour

- Flame retardancy: acc. to IEC 60332-3-24  
- Halogen free: acc. to IEC 60754-1/2  
- Smoke density: acc. to IEC 601034-1/2  
- Acid formation: acc. to EN 60754-2  
- Fire load (reference value): 0.60 MJ/m (Sx), 1.2 MJ/m (Dx)  
- EU Construction Products Regulation: acc. to EN 50575 / EN 50399

### Performance

- Better than Category 7 acc. to EN 50288 and IEC 61156  
- Excellent NEXT, excellent shielding characteristics (shielding in pairs and overall shielding), low skew, bandwidth (typical): 1000 MHz

### Applications

- Ideal for all applications of Classes D to F, multimedia (video, data, voice) > 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.

### Mechanical characteristics

- Bending radius during installation: 8 x outer diameter (min.)  
- After installation: 4 x outer diameter (min.)  
- Tensile strength (max.): 110 N (Sx), 220 N (Dx), 400 N (4-fold), 600 N (6-fold), 850 N (8-fold)  
- Crush strength: 1000 N/100 mm  
- Impact strength (number of shocks): 10

### Electromagnetic behaviour

- Coupling resistance at 10 MHz (nom.): 5 mΩ/m  
- Shield attenuation up to 1000 MHz (nom.): 70 dB  
- Coupling attenuation up to 1000 MHz (nom.): 85 dB  
- Separating class acc. to EN 50174-2: d

### Security (fire behaviour)

- Conductor: Bare copper wire, AWG 23/1  
- Insulation: Cellular PE, core Ø: nominal value 1.4 mm  
- Twisting element: Pair  
- Individual shielding: Aluminium bonded polyester foil, metal on the outside (PiMF)  
- Twisting pairs: 4 pairs  
- Overall shielding: Tinned copper braid  
- Outer sheath: halogen-free, flame-retardant compound

### Performance (cable class, bandwidth)

- **P**  
  - Class E > 250 MHz  
  - Class E, > 500 MHz  
  - Class F > 600 MHz  
  - Class F, > 1000 MHz  
  - Class F+, > 1200 MHz

### Application (ethernet, TV)

- **A**  
  - > 100 MbE  
  - > 1 GbE  
  - Up to 10 GbE  
  - > 10 GbE  
  - > 10 GbE

### Construction (conductor dimension, tensile strength)

- **C**  
  - AWG 27  
  - AWG 26/25  
  - AWG 24  
  - AWG 23  
  - AWG 22

### EMC (coupling attenuation)

- **E**  
  - > 40 dB  
  - > 50 dB  
  - > 60 dB  
  - > 70 dB  
  - > 80 dB
### Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Attenuation dB/100 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>EL-FEXT dB at 100 m</th>
<th>PS-ELFEXT dB at 100 m</th>
<th>RL dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHz</td>
<td>typ.</td>
<td>Cat. 7 max.*</td>
<td>typ.</td>
<td>Cat. 7 min.*</td>
<td>typ.</td>
<td>Cat. 7 max.*</td>
<td>typ.</td>
<td>Cat. 7 min.*</td>
</tr>
<tr>
<td>1</td>
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<td>102</td>
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<td>18.5</td>
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<td>89</td>
<td>58</td>
<td>49</td>
<td>12</td>
</tr>
<tr>
<td>700</td>
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<td>–</td>
<td>92</td>
<td>–</td>
<td>89</td>
<td>–</td>
<td>44</td>
<td>–</td>
</tr>
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</table>


### Electrical characteristics (LF) at 20 °C

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
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<td>7.4</td>
<td>57</td>
<td>35</td>
<td>D2_s2 d2 a1</td>
<td>CDESK0000005</td>
<td>Rape yellow</td>
<td>LKD 7KS7 0010 xxxx</td>
</tr>
<tr>
<td>2 x 4P</td>
<td>7.5 x 15.2</td>
<td>117</td>
<td>70</td>
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<td>Rape yellow</td>
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<tr>
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<td>35</td>
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<td>CDESK0000035</td>
<td>Lime green</td>
<td>LKD 7KS7 C010 xxxx</td>
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<tr>
<td>2 x 4P</td>
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<td>70</td>
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</tr>
<tr>
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<td>35</td>
<td>B2_s1a d1 a1</td>
<td>CDESK0000009</td>
<td>Yellow green</td>
<td>LKD 7KS7 B010 xxxx</td>
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<tr>
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<td>70</td>
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<td>CDESK0000032</td>
<td>Yellow green</td>
<td>LKD 7KS7 B011 xxxx</td>
</tr>
</tbody>
</table>

Packaging: xxxx
Standard length: 0100 = 1000 m 0050 = 500 m 0000 = general

**Cable printing for 4P**
LEONI MegaLine F6-90 S/F 4P H "CPR Class" "DoP no."
"VDE mark" Made in Germany "Batch number" "Metre marking"

**Colour code**
WH/BU, WH/OG, WH/GN, WH/BN

**Certificates and approvals**
Quality mark with production control:
<<VDE>>, GHMT PVP
Link performance: LEONI MegaLine® systems and other commonly available connector systems
Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
Compliant with LVD (2014/35/EU):
Compliant with Construction Products Regulation (EU/305/2011):

**Chemical characteristics**
Free of hazardous substances acc. to RoHS 2011/65/EU
MegaLine® F6-90 S/F CI
Category 7

Type KS-02YSCH CI 4x2xAWG 23/1 PIMF

Construction for 4P

Conductor
Bare copper wire, AWG 23/1

Insulation
Cellular PE, core Ø: nominal value 1.4 mm

Twisting element
Pair

Taping
Fire protection foil

Individual shielding
Aluminium bonded polyester foil, metal on the outside (PIMF)

Twisting
4 pairs

Overall shielding
Tinned copper braid, opt. coverage 65 %

Outer sheath
halogen-free, flame-retardant compound

Fire behaviour

| Flame retardancy | acc. to IEC 60332-3-24/22 |
| Smoke density | acc. to IEC 61034-1/2 |
| Fire load (reference value) | 1.05 MJ/m |

Performance
Better than Category 7 acc. to EN 50288 and IEC 61156, excellent NEXT, excellent shielding characteristics (pairs and overall shielding), low skew, circuit integrity acc. to IEC 60331-23 (FE90) and system integrity based on EN 50200 (PH120) and EN 50289-4-16 (Cat. 6.), bandwidth (typical) 900 MHz

Applications
Ideal for all applications of Classes D to F, multimedia (video, data, voice) > 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE and for IT wiring systems with circuit and system integrity.

Mechanical characteristics

| Bending radius | 8 x outer diameter (min.) after installation 4 x outer diameter (min.) |
| Tensile strength (max.) | 110 N |
| Crush strength | 2000 N/100 mm |
| Impact strength (number of shocks) | 20 |

Electromagnetic behaviour

| Coupling resistance at 10 MHz (nom.) | 5 mΩ/m |
| Shield attenuation up to 1000 MHz (nom.) | 70 dB |
| Coupling attenuation up to 1000 MHz (nom.) | 85 dB |
| Separating class acc. to EN 50174-2 | d |

Advantages
- Better than Category 7
- Bandwidth 900 MHz
- Excellent shielding characteristics
- RoHS and REACH conformity

System integrity on exposure to fire for at least 90 minutes

Security (fire behaviour)

<table>
<thead>
<tr>
<th>S</th>
<th>1</th>
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<th>3</th>
<th>4</th>
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Performance (cable class, bandwidth)

<table>
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<td>&gt; Class F</td>
<td>&gt; Class F</td>
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<td>&gt; 500 MHz</td>
<td>&gt; 600 MHz</td>
<td>&gt; 1000 MHz</td>
<td>&gt; 1200 MHz</td>
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</tr>
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</table>

Application (ethernet, TV)

<table>
<thead>
<tr>
<th>I</th>
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<th>4</th>
<th>5</th>
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<tbody>
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<td>&gt; 100 MbE</td>
<td>&gt; 1 GbE</td>
<td>up to 10 GbE</td>
<td>&gt; 10 GbE</td>
<td>&gt; 10 GbE</td>
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</tr>
<tr>
<td>TV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Construction (conductor dimension, tensile strength)

<table>
<thead>
<tr>
<th>C</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
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<td>AWG 24</td>
<td>AWG 23</td>
<td>AWG 22</td>
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EMC (coupling attenuation)

<table>
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<tr>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>&gt; 40 dB</td>
<td>&gt; 50 dB</td>
<td>&gt; 60 dB</td>
<td>&gt; 70 dB</td>
<td>&gt; 80 dB</td>
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</tr>
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### Electrical characteristics (HF) at 20 °C

<table>
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<tr>
<th>Frequency Mhz</th>
<th>Attenuation dB/100 m typ.</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m typ.</th>
<th>PS-ACR dB at 100 m typ.</th>
<th>EL-FEXT dB at 100 m typ.</th>
<th>PS-ELFEXT dB at 100 m typ.</th>
<th>RL dB</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Cat. 7 max.*</td>
<td>Cat. 7 min.*</td>
<td>Cat. 7 max.*</td>
<td>Cat. 7 min.*</td>
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<tr>
<td>100</td>
<td>16.4</td>
<td>18.5</td>
<td>102</td>
<td>72</td>
<td>99</td>
<td>69</td>
<td>86</td>
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<td>200</td>
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<tr>
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<td>30.2</td>
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</tr>
<tr>
<td>450</td>
<td>36.1</td>
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<td>–</td>
<td>89</td>
<td>–</td>
<td>44</td>
<td>–</td>
</tr>
</tbody>
</table>

* EN 50288-4-1 (2014)/IEC 61156-5 (2009)

### Electrical characteristics (LF) at 20 °C

- **Direct current resistance**
  - max. 75 Ω/km
- **Insulation resistance**
  - min. 5 GΩ x km
- **Mutual capacitance**
  - approx. 42 pF/m
- **Capacitive coupling (e)**
  - approx. 1100 pF/km
- **Signal tempo (c)**
  - approx. 0.80
- **Propagation delay**
  - approx. 420 ns/100 m
- **Skew at 100 MHz**
  - approx. 5 ns/100 m
- **Charact. Impedance at 100 MHz**
  - 100 ± 5 Ω
- **Testing voltage U_{eff}**
  - 1000 V
- **Operating voltage**
  - max. 125 V

### Thermal properties

- **For fixed installation**: -25 °C to +75 °C
- **For mobile operation**: -10 °C to +50 °C

### Chemical characteristics

- Free of hazardous substances acc. to RoHS 2011/65/EU
- UV resistance according to UL 1581 and ISO 4892
- Free of lacquer-wetting substances (e.g. silicon oil)

### Cable printing

- LEONI MegaLine F6-90 S/F CI 4P H FIRE RESISTANT EN 50289-4-16 EN 50200 PH120 "Batch number" "Metre marking"

### Colour code

- WH/BU, WH/OG, WH/GN, WH/BN

### Certificates and approvals

- Link performance: LEONI MegaLine® systems and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU):
  - CE

### Package

- Drum 1000 m

* see page 17: Definition of copper no.

---

**Order no.**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>Sheath colour</th>
<th>LKD 7KS7 0324 0000</th>
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<td>10.5</td>
<td>133</td>
<td>54.9</td>
<td>Jet black RAL 9005</td>
<td></td>
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</table>
MegaLine® E5-70 S/F
Category 6.

Types
KS-02YSCH 4x2xAWG 23/1 PIMF
KS-02YSCH 2x(4x2xAWG 23/1 PIMF)

Advantages
- Better than Category 6,
- Bandwidth 700 MHz
- Excellent shielding characteristics
- VDE certified
- PVP-GHMT
- RoHS and REACH conformity

Fire behaviour
- Flame retardancy acc. to IEC 60332-3-24
- Halogen free acc. to IEC 60754-1/2
- Smoke density acc. to IEC 60334-1/2
- Acid formation acc. to EN 60754-2
- Fire load (reference value) 0.60 MJ/m² (Sx), 1.2 MJ/m² (Dx)
- EU Construction Products Regulation acc. to EN 50575 / EN 50399

Performance
- Better than Category 6, acc. to EN 50288 and IEC 61156, very good NEXT, excellent shielding characteristics (pairs and overall shielding), low skew, bandwidth (typical) 700 MHz

Applications
- Ideal for all applications of classes D to E A up to 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.

Mechanical characteristics
- Bending radius during installation 8 x outer diameter (min.)
- after installation 4 x outer diameter (min.)
- Tensile strength (max.) 110 N (Sx), 220 N (Dx)
- Crush strength 1000 N/100 mm
- Impact strength (number of shocks) 10

Electromagnetic behaviour
- Coupling resistance at 10 MHz (nom.) 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.) 60 dB
- Coupling attenuation up to 1000 MHz (nom.) 80 dB
- Separating class acc. to EN 50174-2 c

Security (fire behaviour)

Performance (cable class, bandwidth)

Application (ethernet, TV)

Construction (conductor dimension, tensile strength)

EMC (coupling attenuation)
### Electrical characteristics at 20 °C

| Frequency (MHz) | Direct current resistance typ. Cat. 6, max.* | Cat. 6, min.* | Insulation resistance typ. Cat. 6, min.* | Mutual capacitance typ. Cat. 6, min.* | Capacitive coupling (e) typ. Cat. 6, min.* | Signal tempo approx. | Propagation delay approx. | Skew at 100 MHz approx. | Charact. impedance at 100 MHz | Testing voltage U_{eff} max. | Operating voltage typ. Cat. 6, min.* | PS-ACR-F typ. Cat. 6, min.* | PSACR-F typ. Cat. 6, min.* | Aw typ. Cat. 6, min.* | PS typ. Cat. 6, min.* | RL typ. Cat. 6, min.* | Aw typ. Cat. 6, min.* | PS typ. Cat. 6, min.* | RL typ. Cat. 6, min.* |
|----------------|---------------------------------------------|---------------|------------------------------------------|--------------------------------------|------------------------------------------|---------------------|--------------------------|-----------------------------|-------------------------------|--------------------------|--------------------------------|-------------------------|-------------------------|----------------------|----------------------|---------------------|----------------------|---------------------|---------------------|----------------------|---------------------|
| 1              | 1.9                                         | 2.1           | 95                                       | 75.3                                 | 92                                       | 72.3                | 57                                      | 26.2                        | 54                            | 23.2                     | 90                       | 68                      | 88                      | 65                   | 26                   | 20                   | 10                  | 9                   | 9                   |
| 10             | 5.2                                         | 5.9           | 90                                       | 60.3                                 | 87                                       | 57.3                | 85                                      | 54.4                        | 82                            | 51.4                     | 96                       | 48                      | 93                      | 45                   | 35.9                 | 25                   | 20                  | 10                  | 9                   | 9                   |
| 100            | 17.7                                        | 19.1          | 75                                       | 45.3                                 | 72                                       | 42.3                | 57                                      | 26.2                        | 54                            | 23.2                     | 90                       | 28                      | 87                      | 25                   | 37.2                 | 20.1                 | 10                  | 9                   | 9                   |
| 200            | 26.4                                        | 27.6          | 68                                       | 40.8                                 | 65                                       | 37.8                | 42                                      | 13.2                        | 39                            | 10.2                     | 78                       | 22                      | 75                      | 19                   | 33.1                 | 18                   | 10                  | 9                   | 9                   |
| 250            | 29.9                                        | 31.1          | 66                                       | 39.3                                 | 63                                       | 36.3                | 36                                      | 8.3                         | 33                            | 5.3                      | 75                       | 20                      | 72                      | 17                   | 30.5                 | 17.3                 | 10                  | 9                   | 9                   |
| 300            | 31.9                                        | 34.3          | 65                                       | 38.1                                 | 62                                       | 35.1                | 33                                      | 3.9                         | 30                            | 0.9                      | 72                       | 18.5                     | 69                      | 15.5                 | 29.9                 | 17.3                 | 10                  | 9                   | 9                   |
| 450            | 38.9                                        | 42.7          | 63                                       | 35.5                                 | 60                                       | 32.5                | 24                                      | -7.2                        | 21                            | -10.2                     | 69                       | 14.9                     | 66                      | 11.9                 | 28.9                 | 17.3                 | 10                  | 9                   | 9                   |
| 500            | 41.2                                        | 45.3          | 61                                       | 34.8                                 | 58                                       | 31.8                | 20                                      | -10.4                       | 17                            | -13.4                     | 66                       | 14                      | 63                      | 11                   | 28.3                 | 17.3                 | 10                  | 9                   | 9                   |
| 600            | 46.2                                        | 54            | 54                                       | 38                                   | 54                                       | 31.8                | 20                                      | -10.4                       | 17                            | -13.4                     | 66                       | 14                      | 63                      | 11                   | 28.3                 | 17.3                 | 10                  | 9                   | 9                   |
| 700            | 51.4                                        | 54            | 51                                       | 38                                   | 51                                       | 31.8                | 20                                      | -10.4                       | 17                            | -13.4                     | 66                       | 14                      | 63                      | 11                   | 28.3                 | 17.3                 | 10                  | 9                   | 9                   |


### Cable printing for 4 P

LEONI MegaLine® E5-70 S/F 4P H "CPR Class" "DoP no."
"VDE mark" Made in Germany "Batch number" "Metre marking"

### Colour code

WH/BU, WH/OG, WH/GN, WH/BN

### Certificates and approvals

Quality mark with production control:

<\VDE>, GHMT PVP

Link performance: LEONI MegaLine® systems and other commonly available connector systems

Test certificates: according to DIN 55350-18-4.2.1 or EN 10204

Compliant with LVD (2014/35/EU):

Compliant with Construction Products Regulation (EU/305/2011):

### Thermal properties

For fixed installation: -20 °C to +60 °C

For mobile operation: 0 °C to +50 °C

### Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU

---

### Copper data cables

Office DataCenter Industry @home

---

**Dimension**

<table>
<thead>
<tr>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
<th>Order no.</th>
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</thead>
<tbody>
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<td>kg/km</td>
<td>kg/km</td>
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<td></td>
</tr>
<tr>
<td>4P</td>
<td>7.4</td>
<td>55</td>
<td>26</td>
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<td>2 x 4P</td>
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<td>D_s, d2 d_a1</td>
<td>CDES000000006</td>
<td>CDESK0000006</td>
</tr>
</tbody>
</table>

* see page 17: Definition of copper no.

---

**Packaging:** xxxx

Standard length: 0100 = 1000 m 0050 = 500 m 0000 = general

---

www.leoni-data.com

---

LEONI
### MegaLine® E5-70 F/F

**Category 6**

<table>
<thead>
<tr>
<th>Construction for 4P</th>
<th>Conductor</th>
<th>Bare copper wire, AWG 23/1</th>
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<tbody>
<tr>
<td></td>
<td>Insulation</td>
<td>Cellular PE, core Ø: nominal value 1.24 mm</td>
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<td></td>
<td>Twisting element</td>
<td>Pair</td>
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<tr>
<td></td>
<td>Individual shielding</td>
<td>Aluminium bonded polyester foil, metal on the outside (PiMF)</td>
</tr>
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<td></td>
<td>Twisting</td>
<td>4 pairs</td>
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<td></td>
<td>Overall shielding</td>
<td>Aluminium bonded polyester foil, metal on the inside and copper supplementary cable</td>
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<tr>
<td></td>
<td>Outer sheath</td>
<td>halogen-free, flame-retardant compound</td>
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</tbody>
</table>

#### Advantages
- Better than Category 6
- Bandwidth 700 MHz
- Good shielding characteristics
- VDE certified
- PVP-GHMT
- RoHS and REACH conformity

#### Types
- KS-02YS(ST)H 4x2xAWG 23/1 PIMF
- KS-02YS(ST)H 2x(4x2xAWG 23/1 PIMF)

#### Fire behaviour
- Flame retardancy: acc. to IEC 60332-3-24
- Halogen free: acc. to IEC 60754-1/2
- Smoke density: acc. to IEC 60334-1/2
- Acid formation: acc. to EN 60754-2
- Fire load (reference value): 0.60 MJ/m (Sx), 1.2 MJ/m (Dx)
- EU Construction Products Regulation: acc. to EN 50575 / EN 50399

#### Security (fire behaviour)

<table>
<thead>
<tr>
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<td>Cca</td>
<td>B2ca</td>
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</table>

#### Performance (cable class, bandwidth)

<table>
<thead>
<tr>
<th>P</th>
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<th>&gt; Class E</th>
<th>&gt; Class F</th>
<th>&gt; Class F</th>
<th>&gt; Class F</th>
<th>&gt; Class F+</th>
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<td>&gt; 500 MHz</td>
<td>&gt; 600 MHz</td>
<td>&gt; 1000 MHz</td>
<td>&gt; 1200 MHz</td>
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<td>2</td>
<td>&gt; 1 GbE</td>
<td>up to 10 GbE</td>
<td>&gt; 10 GbE</td>
<td>&gt; 10 GbE</td>
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<td></td>
</tr>
<tr>
<td>3</td>
<td>&gt; 10 GbE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>&gt; 10 GbE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>&gt; 10 GbE</td>
<td></td>
<td></td>
<td></td>
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</table>

#### Application (ethernet, TV)

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<th>&gt; 1 GbE</th>
<th>up to 10 GbE</th>
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</tr>
<tr>
<td>2</td>
<td>&gt; 10 GbE</td>
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<td></td>
</tr>
<tr>
<td>3</td>
<td>&gt; 10 GbE</td>
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<td></td>
</tr>
<tr>
<td>4</td>
<td>&gt; 10 GbE</td>
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<tr>
<td>5</td>
<td>&gt; 10 GbE</td>
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#### Construction (conductor dimension, tensile strength)

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<th>C</th>
<th>AWG 27</th>
<th>AWG 26/25</th>
<th>AWG 24</th>
<th>AWG 23</th>
<th>AWG 22</th>
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<td></td>
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<tr>
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<td>3</td>
<td>&gt; 60 dB</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>&gt; 70 dB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>&gt; 80 dB</td>
<td></td>
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</table>

#### Mechanical characteristics
- Bending radius: 8 x outer diameter (min.)
- Tensile strength (max.): 110 N (Sx), 220 N (Dx)
- Crush strength: 1000 N/100 mm
- Impact strength (number of shocks): 10

#### Electromagnetic behaviour
- Coupling resistance at 10 MHz (nom.): 50 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 60 dB
- Coupling attenuation up to 1000 MHz (nom.): 70 dB
- Separating class acc. to EN 50174-2: c

#### EMC (coupling attenuation)

<table>
<thead>
<tr>
<th>E</th>
<th>&gt; 40 dB</th>
<th>&gt; 50 dB</th>
<th>&gt; 60 dB</th>
<th>&gt; 70 dB</th>
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<tr>
<td>1</td>
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### Electrical characteristics (HF) at 20 °C

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<th>Frequency MHz</th>
<th>Attenuation dB/100 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>ACR-F dB at 100 m</th>
<th>PSACR-F dB at 100 m</th>
<th>RL dB</th>
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<td>typ. Cat. 6, min.*</td>
<td>typ. Cat. 6, max.*</td>
<td>typ. Cat. 6, min.*</td>
<td>typ. Cat. 6, max.*</td>
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<td>typ. Cat. 6, min.*</td>
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<td>57.3</td>
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<tr>
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<td>–</td>
<td>51</td>
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<td>3</td>
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</tbody>
</table>


### Electrical characteristics (LF) at 20 °C

- **Direct current resistance**: max. 82 Ω/km
- **Insulation resistance**: min. 5 GΩ x km
- **Mutual capacitance**: approx. 42 pF/m
- **Capacitive coupling (e)**: approx. 1100 pF/km
- **Signal tempo (c)**: approx. 0.80
- **Propagation delay**: approx. 417 ns/100 m
- **Skew at 100 MHz**: approx. 7 ns/100 m
- **Charact. impedance**: at 100 MHz 100 ± 5 Ω
- **Testing voltage U_{eff}**: 1000 V
- **Operating voltage**: max. 125 V

### Mechanical properties

- For fixed installation: –20 °C to +60 °C
- For mobile operation: 0 °C to +50 °C

### Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU

### Technical information

- **Cable printing for 4P**
  LEO NI MegaLine E5-70 F/F 4P H "CPR Class" "DoP no."
  "VDE mark" Made in Germany "Batch number" "Metre marking"

- **Colour code**
  WH/BU, WH/OG, WH/GN, WH/BN

- **Certificates and approvals**
  Quality mark with production control:
  <VDE>, GHMT PVP
  Link performance: LEO NI MegaLine® systems and other commonly available connector systems
  Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
  Compliant with LVD (2014/35/EU):
  Compliant with Construction Products Regulation (EU/305/2011):

### Order information

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>kg/km</td>
<td>kg/km</td>
<td></td>
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</tr>
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<td>23.5</td>
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Packaging: xxxx

- Standard length: 0100 = 1000 m  0050 = 500 m  0000 = general

* see page 17: Definition of copper no.
**MegaLine®**

**E5-60 U/F**

Category 6A

### Types

- KS-02YSH 4x2xAWG 23/1 PIMF
- KS-02YSH 2x(4x2xAWG 23/1 PIMF)

### Construction for 4P

- **Conductor**: Bare copper wire, AWG 23/1
- **Insulation**: Cellular PE, core Ø: nominal value 1.24 mm
- **Twisting element**: Pair
- **Individual shielding**: Aluminium bonded polyester foil, metal on the outside (PiMF)
- **Twisting**: 4 pairs
- **Overall shielding**: Plastic foil (optional) and supplementary copper wire AWG24/1
- **Outer sheath**: Halogen-free, flame-retardant compound

### Advantages

- Better than Category 6A
- Bandwidth 600 MHz
- VDE certified
- PVP-GHMT
- RoHS and REACH conformity

### Security (fire behaviour)

<table>
<thead>
<tr>
<th>Class</th>
<th>E</th>
<th>D</th>
<th>C</th>
<th>B</th>
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</table>

### Performance (cable class, bandwidth)

- **P1**: > Class E > 250 MHz
- **P2**: > Class E > 500 MHz
- **P3**: > Class F > 600 MHz
- **P4**: > Class F > 1000 MHz
- **P5**: > Class F > 1200 MHz

### Application (Ethernet, TV)

- **A1**: > 100 MbE
- **A2**: > 1 GbE
- **A3**: up to 10 GbE
- **A4**: > 10 GbE
- **A5**: > 10 GbE TV

### Construction (conductor dimension, tensile strength)

<table>
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<tr>
<th>Class</th>
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<td>AWG 22</td>
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</table>

### Electromagnetic behaviour

- **Coupling resistance at 10 MHz (nom.)**: 50 mΩ/m
- **Shield attenuation up to 1000 MHz (nom.)**: 55 dB
- **Coupling attenuation up to 1000 MHz (nom.)**: 65 dB
- **Separating class acc. to EN 50174-2**: 3

### Mechanical characteristics

- **Bending radius**: 8 x outer diameter (min.)
- **Tensile strength (max.)**: 110 N (Sx), 220 N (Dx)
- **Crush strength**: 1000 N/100 mm
- **Impact strength (number of shocks)**: 10

### Fire behaviour

- Flame retardancy: acc. to IEC 60332-3-24
- Halogen free: acc. to IEC 60754-1/2
- Smoke density: acc. to IEC 60332-1-2
- Acid formation: acc. to EN 60754-2
- **EU Construction Products Regulation**: acc. to EN 50575 / EN 50399

### Application


Ideal for all applications of classes D to E, up to 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.

### Performance

Better than Category 6, acc. to EN 50288 and IEC 61156 very good NEXT, good shielding characteristics (pairs and overall shielding), low skew, bandwidth (typical) 600 MHz

### EMC (coupling attenuation)

- **E1**: > 40 dB
- **E2**: > 50 dB
- **E3**: > 60 dB
- **E4**: > 70 dB
- **E5**: > 80 dB
### Electrical characteristics (LF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency Mhz</th>
<th>Attenuation dB/100 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>ACR-F dB at 100 m</th>
<th>PSACR-F dB at 100 m</th>
<th>RL dB</th>
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### Electrical characteristics (HF) at 20 °C

<table>
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<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>ACR-F dB at 100 m</th>
<th>PSACR-F dB at 100 m</th>
<th>RL dB</th>
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<tr>
<td>100 17.7</td>
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<td>13.2</td>
<td>39</td>
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<tr>
<td>250 29.9</td>
<td>31.1</td>
<td>66</td>
<td>39.3</td>
<td>63</td>
<td>36.3</td>
<td>36</td>
<td>8.3</td>
<td>33</td>
</tr>
<tr>
<td>300 31.9</td>
<td>34.3</td>
<td>65</td>
<td>38.1</td>
<td>62</td>
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<td>33</td>
<td>3.9</td>
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<tr>
<td>450 38.9</td>
<td>42.7</td>
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<td>60</td>
<td>32.5</td>
<td>24</td>
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<tr>
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<td>20</td>
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<tr>
<td>600 46.2</td>
<td>49.3</td>
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<td>34.8</td>
<td>58</td>
<td>31.8</td>
<td>20</td>
<td>-10.4</td>
<td>17</td>
</tr>
</tbody>
</table>

### Cable printing for 4 P

- **LEONI MegaLine E5-60 U/F 4P H "CPR Class" "DoP no."
- "VDE mark" Made in Germany "Batch number" "Metre marking"

### Colour code

- WH/BU, WH/OG, WH/GN, WH/BN

### Certificates and approvals

- Quality mark with production control: GHMT PVP <VDE>
- Link performance: LEONI MegaLine® systems and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU):
- Compliant with Construction Products Regulation (EU/305/2011):

### Thermal properties

- For fixed installation: -20 °C to +60 °C
- For mobile operation: 0 °C to +50 °C

### Chemical characteristics

- Free of hazardous substances acc. to RoHS 2011/65/EU

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**LEONI**

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**MegaLine® E2-45 U/F**

**Category 6**

**Advantages**

- Better than Category 6
- Bandwidth 450 MHz
- VDE certified
- RoHS and REACH conformity

**Types**

- KS-02YSH 4x2xAWG 23/1 PIMF
- KS-02YSH 2x(4x2xAWG 23/1 PIMF)

**Construction for 4P**

- Conductor: Bare copper wire, AWG 23/1
- Insulation: Cellular PE, core Ø: nominal value 1.24 mm
- Twisting element: Pair
- Individual shielding: Aluminium-bonded polyester foil, metal on the outside (PiMF)
- Twisting: 4 pairs
- Taping: plastic foil (optional) and supplementary copper wire AWG24/1
- Outer sheath: halogen-free, flame-retardant compound

**Fire behaviour**

- Flame retardancy: acc. to IEC 60332-1-2
- Halogen free: acc. to IEC 60754-1-2
- Smoke density: acc. to IEC 60334-1/2
- Acid formation: acc. to EN 60754-2
- Fire load (reference value): 0.60 MJ/m(Sx), 1.2 MJ/m (Dx)
- EU Construction Products Regulation: acc. to EN 50575 / EN 50399

**Performance**

Better than Category 6 acc. to EN 50288 and IEC 61156

- very good NEXT, low skew, bandwidth (typical) 450 MHz

**Applications**


Ideal for all applications of classes D to E up to 1 GbE acc. to IEEE 802.3 ab, cable sharing, VoIP, PoE/PoE+/4PPoE.

**Mechanical characteristics**

- Bending radius (during installation): 8 x outer diameter (min.)
- Tensile strength (after installation): 4 x outer diameter (min.)
- Crush strength: 110 N(Sx), 220 N (Dx)
- Impact strength (number of shocks): 10

**Electromagnetic behaviour**

- Coupling resistance at 10 MHz (nom.): 80 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 50 dB
- Coupling attenuation up to 1000 MHz (nom.): 60 dB
- Separating class acc. to EN 50174-2: b

**Security (fire behaviour)**

<table>
<thead>
<tr>
<th>S</th>
<th>E</th>
<th>C</th>
<th>B</th>
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<td>1</td>
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<td>C&lt;sub&gt;Ea&lt;/sub&gt;</td>
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</table>

**Performance (cable class, bandwidth)**

- Class E: > 250 MHz
- Class Ea: > 500 MHz
- Class F: > 600 MHz
- Class F<sub>a</sub>: > 1000 MHz
- Class F<sub>a</sub>: > 1200 MHz

**Application (Ethernet, TV)**

- 1 > 100 Mbe
- 2 > 1 Gbe
- 3 up to 10 Gbe
- 4 > 10 Gbe
- 5 > 10 Gbe TV

**Construction (conductor dimension, tensile strength)**

- AWG 27
- AWG 26/25
- AWG 24
- AWG 23
- AWG 22

**EMC (coupling attenuation)**

- 1 > 40 dB
- 2 > 50 dB
- 3 > 60 dB
- 4 > 70 dB
- 5 > 80 dB
## Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation dB/100 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>EL-FEXT dB at 100 m</th>
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<th>RL dB</th>
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<td>1</td>
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<td>38</td>
<td>63</td>
<td>36</td>
<td>36</td>
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</table>


## Electrical characteristics (LF) at 20 °C

- **Direct current resistance**: max. 82 Ω/km
- **Insulation resistance**: min. 5 GΩ x km
- **Mutual capacitance**: approx. 42 pF/m
- **Capacitive coupling (e)**: approx. 1100 pF/km
- **Signal tempo (c)**: approx. 0.80
- **Propagation delay**: approx. 420 ns/100 m
- **Skew at 100 MHz**: approx. 7 ns/100 m
- **Charact. Impedance**: at 100 MHz 100 ± 5 Ω
- **Testing voltage Uₚₚ**: 1000 V
- **Operating voltage**: max. 125 V

**Thermal properties**
- For fixed installation: –20 °C to +60 °C
- For mobile operation: 0 °C to +50 °C

**Chemical characteristics**
- Free of hazardous substances acc. to RoHS 2011/65/EU

---

**Cable printing for 4 P**
- LEONI MegaLine E2-4S U/F 4P H "CPR Class" "DoP no."
  - "VDE mark" Made in Germany "Batch number" "Metre marking"

**Colour code**
- WH/BU, WH/OG, WH/GN, WH/BN

**Certificates and approvals**
- Quality mark with production control: <VDE> LEONI MegaLine® systems and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU):
- Compliant with Construction Products Regulation (EU/305/2011):

---

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<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
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<td>CDESK00000002</td>
<td>● Rape yellow</td>
<td>LKD 7K56 0006 xxxx</td>
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* see page 17: Definition of copper no.

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www.leoni-data.com
**MegaLine® E2-30 U/U**  
Category 6

### Construction for 4P

- **Conductor**: Bare copper wire, AWG 23/1
- **Insulation**: PE
- **Twisting element**: Pair
- **Twisting**: 4 pairs separated by a cross element
- **Outer sheath**: halogen-free, flame-retardant compound

### Fire behaviour

- **Flame retardancy**: acc. to IEC 60332-1-2
- **Smoke density**: acc. to IEC 601034-1/2
- **Acid formation**: acc. to EN 60754-2
- **Fire load (reference value)**: 0.65 MJ/m²
- **EU Construction Products Regulation**: acc. to EN 50575 / EN 50399

### Performance (cable class, bandwidth)

- **Better than Category 6 acc. to EN 50288 and IEC 61156, bandwidth (typical)**: 300 MHz

### Application (ethernet, TV)

- **Ideal for all applications of classes D to E up to 1 GbE acc. to IEEE 802.3 ab, VoIP, PoE/PoE+/4PPoE**

### Mechanical characteristics

- **Bending radius during installation**: 8 x outer diameter (min.)
- **after installation**: 4 x outer diameter (min.)
- **Tensile strength (max.)**: 110 N
- **Crush strength**: 1000 N/100 mm
- **Impact strength (number of shocks)**: 10

### Electromagnetic behaviour

- **Coupling attenuation up to 1000 MHz (nom.)**: 45 dB
- **Separating class acc. to EN 50174-2**: b

### Security (fire behaviour)

<table>
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<td>$E_{ca}/D_{ca}$</td>
<td>$C_{ca}$</td>
<td>$B_{2ca}$</td>
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### Construction (conductor dimension, tensile strength)

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<th>1 AWG 27</th>
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<th>3 AWG 24</th>
<th>4 AWG 23</th>
<th>5 AWG 22</th>
</tr>
</thead>
</table>

### EMC (coupling attenuation)

| E | 1 > 40 dB | 2 > 50 dB | 3 > 60 dB | 4 > 70 dB | 5 > 80 dB |

### Advantages

- Better than Category 6
- Bandwidth 300 MHz
- RoHS and REACH conformity
### Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>EL-FEXT dB at 100 m</th>
<th>PS-ELFEXT dB at 100 m</th>
<th>RL dB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>typ. Cat. 6 max.*</td>
<td>typ. Cat. 6 min.*</td>
<td>typ. Cat. 6 max.*</td>
<td>typ. Cat. 6 min.*</td>
<td>typ. Cat. 6 max.*</td>
<td>typ. Cat. 6 min.*</td>
<td>typ. Cat. 6 max.*</td>
</tr>
<tr>
<td>1</td>
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<td>94</td>
<td>66</td>
<td>91</td>
<td>64</td>
<td>102</td>
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<td>4</td>
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<td>3.8</td>
<td>88</td>
<td>65</td>
<td>85</td>
<td>63</td>
<td>82</td>
</tr>
<tr>
<td>10</td>
<td>4.7</td>
<td>6</td>
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<td>59</td>
<td>78</td>
<td>57</td>
<td>76</td>
</tr>
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<td>16</td>
<td>6.6</td>
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<td>73</td>
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<td>70</td>
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<tr>
<td>32.25</td>
<td>9.5</td>
<td>10.9</td>
<td>72</td>
<td>52</td>
<td>69</td>
<td>50</td>
<td>62</td>
</tr>
<tr>
<td>62.5</td>
<td>13</td>
<td>15.5</td>
<td>68</td>
<td>47</td>
<td>65</td>
<td>45</td>
<td>55</td>
</tr>
<tr>
<td>100</td>
<td>17.4</td>
<td>19.9</td>
<td>64</td>
<td>44</td>
<td>61</td>
<td>42</td>
<td>46</td>
</tr>
<tr>
<td>155</td>
<td>22</td>
<td>25.3</td>
<td>60</td>
<td>41</td>
<td>57</td>
<td>39</td>
<td>38</td>
</tr>
<tr>
<td>200</td>
<td>26.6</td>
<td>29.1</td>
<td>58</td>
<td>40</td>
<td>55</td>
<td>38</td>
<td>31</td>
</tr>
<tr>
<td>250</td>
<td>30.4</td>
<td>33</td>
<td>57</td>
<td>38</td>
<td>54</td>
<td>36</td>
<td>27</td>
</tr>
</tbody>
</table>

### Direct current resistance: 78 Ω/km

### Insulation resistance: 5 GΩ x km

### Mutual capacitance: 50 pF/m

### Capacitive coupling (e): 1100 pF/km

### Signal tempo (c): 0.67

### Propagation delay: 528 ns/100 m

### Skew at 100 MHz: 30 ns/100 m

### Charact. Impedance at 100 MHz: 100 ± 5 Ω

### Testing voltage $U_{eff}$: 1000 V

### Operating voltage: 125 V

### Thermal properties

- For fixed installation: –20 °C to +60 °C
- For mobile operation: 0 °C to +50 °C

### Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU

---

### Electrical characteristics (LF) at 20 °C

- Direct current resistance: 78 Ω/km
- Insulation resistance: 5 GΩ x km
- Mutual capacitance: 50 pF/m
- Capacitive coupling (e): 1100 pF/km
- Signal tempo (c): 0.67
- Propagation delay: 528 ns/100 m
- Skew at 100 MHz: 30 ns/100 m
- Charact. Impedance at 100 MHz: 100 ± 5 Ω
- Testing voltage $U_{eff}$: 1000 V
- Operating voltage: 125 V

### Thermal properties

- For fixed installation: –20 °C to +60 °C
- For mobile operation: 0 °C to +50 °C

### Certificate and approvals

- Link performance: LEONI MegaLine® systems
- and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU): ☑
- Compliant with Construction Products Regulation (EU/305/2011): ☑

---

### Cable printing

LEONI MegaLine E2-30 U/U 4P H "CPR Class" "DoP no."

*Batch number" *Metre marking"

### Colour code

WH-BU/BU, WH-OG/OG, WH-GN/GN, WH-BN/BN

---

### Dimension

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4P</td>
<td>6.4</td>
<td>45</td>
<td>21</td>
<td>E_k</td>
<td>CDESK0000011</td>
<td>Rape yellow</td>
<td>LKD 7KS6 0002 xxxx</td>
</tr>
</tbody>
</table>

Packaging: xxxx

Standard length: 0100 = 1000 m 0050 = 500 m 0000 = general

* see page 17: Definition of copper no.
MegaLine® D1–20 SF/U
Category 5

Types
KS-02YS(ST+C)H 4x2xAWG 24/1
KS-02YS(ST+C)H 2x(4x2xAWG 24/1)

Performance
Better than Category 5 acc. to EN 50288 and IEC 61156
excellent shielding characteristics, bandwidth (typical) 200 MHz

Applications
Installation cable for use in structured cabling acc. to ISO/IEC 11801 and
EN 50173 (3rd Edition).
Ideal for all applications of classes D up to 1 GbE acc. to IEEE 802.3 ab, VoIP,
PoE/PoE+/4PPoE.

Mechanical characteristics
Bending radius during installation 8 x outer diameter (min.)
after installation 4 x outer diameter (min.)
Tensile strength (max.) 85 N (Sx), 170 N (Dx)
Crush strength 1000 N/100 mm
Impact strength (number of shocks) 10

Electromagnetic behaviour
Coupling resistance at 10 MHz (nom.) 10 mΩ/m
Shield attenuation up to 1000 MHz (nom.) 55 dB
Coupling attenuation up to 1000 MHz (nom.) 70 dB
Separating class acc. to EN 50174-2 c

Advantages
- Better than Category 5
- Bandwidth 200 MHz
- Good shielding characteristics
- RoHS and REACH conformity

Security (fire behaviour)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>IEC 60332-1-2</td>
<td>IEC 60332-3-24</td>
<td>EFP Grade 1</td>
<td>EFP Grade 2</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Eca/Dca</td>
<td>Eca/Dca</td>
<td>Cca</td>
<td>B2ca</td>
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</table>

Performance (cable class, bandwidth)

<table>
<thead>
<tr>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
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<td>&gt; Class E</td>
<td>&gt; Class F</td>
<td>&gt; Class F</td>
<td>&gt; Class F</td>
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<tr>
<td></td>
<td>&gt; 250 MHz</td>
<td>&gt; 500 MHz</td>
<td>&gt; 600 MHz</td>
<td>&gt; 1000 MHz</td>
<td>&gt; 1200 MHz</td>
</tr>
<tr>
<td>A</td>
<td>&gt; 100 Mbe</td>
<td>&gt; 1 Gbe</td>
<td>up to 10 Gbe</td>
<td>&gt; 10 Gbe</td>
<td>&gt; 10 Gbe</td>
</tr>
<tr>
<td>T</td>
<td>TV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Construction (conductor dimension, tensile strength)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>AWG 27</td>
<td>AWG 26/25</td>
<td>AWG 24</td>
<td>AWG 23</td>
<td>AWG 22</td>
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</tbody>
</table>

EMC (coupling attenuation)

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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>&gt; 40 dB</td>
<td>&gt; 50 dB</td>
<td>&gt; 60 dB</td>
<td>&gt; 70 dB</td>
<td>&gt; 80 dB</td>
</tr>
</tbody>
</table>
# Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency</th>
<th>MHz</th>
<th>Attenuation</th>
<th>NEXT</th>
<th>PS-NEXT</th>
<th>ACR</th>
<th>PS-ACR</th>
<th>EL-FEXT</th>
<th>PS-ELFEXT</th>
<th>RL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>dB/100 m</td>
<td>dB</td>
<td>dB</td>
<td>dB at 100 m</td>
<td>dB at 100 m</td>
<td>dB at 100 m</td>
<td>dB at 100 m</td>
<td>dB</td>
</tr>
<tr>
<td>typ. Cat. 5 max.*</td>
<td>typ. Cat. 5 min.*</td>
<td>typ. Cat. 5 max.*</td>
<td>typ. Cat. 5 min.*</td>
<td>typ. Cat. 5 max.*</td>
<td>typ. Cat. 5 min.*</td>
<td>typ. Cat. 5 max.*</td>
<td>typ. Cat. 5 min.*</td>
<td>typ. Cat. 5 max.*</td>
<td>typ. Cat. 5 min.*</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
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<td>75</td>
<td>65</td>
<td>72</td>
<td>62</td>
<td>73</td>
<td>63</td>
<td>70</td>
</tr>
<tr>
<td>4</td>
<td>3.1</td>
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<td>69</td>
<td>56</td>
<td>66</td>
<td>53</td>
<td>63</td>
<td>49</td>
<td>84</td>
</tr>
<tr>
<td>10</td>
<td>5.1</td>
<td>6.3</td>
<td>62</td>
<td>50</td>
<td>59</td>
<td>47</td>
<td>57</td>
<td>44</td>
<td>54</td>
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<tr>
<td>16</td>
<td>7</td>
<td>8</td>
<td>58</td>
<td>47</td>
<td>55</td>
<td>44</td>
<td>52</td>
<td>39</td>
<td>48</td>
</tr>
<tr>
<td>31.25</td>
<td>9.7</td>
<td>11.4</td>
<td>53</td>
<td>43</td>
<td>50</td>
<td>40</td>
<td>44</td>
<td>31</td>
<td>41</td>
</tr>
<tr>
<td>62.5</td>
<td>13.2</td>
<td>16.5</td>
<td>49</td>
<td>38</td>
<td>46</td>
<td>35</td>
<td>42</td>
<td>32</td>
<td>28</td>
</tr>
<tr>
<td>100</td>
<td>17.6</td>
<td>21.3</td>
<td>45</td>
<td>35</td>
<td>42</td>
<td>32</td>
<td>28</td>
<td>14</td>
<td>25</td>
</tr>
</tbody>
</table>


## Electrical characteristics (LF) at 20 °C

- **Direct current resistance (max.)**: 95 Ω/km
- **Insulation resistance (min.)**: 5 GΩ x km
- **Mutual capacitance (approx.)**: 45 pF/m
- **Capacitive coupling (e) (approx.)**: 1100 pF/km
- **Signal tempo (c) (approx.)**: 0.75
- **Propagation delay (approx.)**: 440 ns/100 m
- **Skew at 100 MHz (approx.)**: 15 ns/100 m
- **Charact. impedance (at 100 MHz)**: 100 ± 5 Ω
- **Testing voltage \( V_{U_{eff}} \)**: 1000 V
- **Operating voltage max.**: 125 V

## Thermal properties

- **For fixed installation**: –20 °C to +60 °C
- **For mobile operation**: 0 °C to +50 °C

## Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU

## Cable printing for 4P

### LEONI MegaLine D1–20 SF/U 4P H "CPR Class"

"DoP no. " Made in Germany "Batch number " "Metre marking"

### Colour code


## Certificates and approvals

- Link performance: LEONI MegaLine® systems and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU): ✅
- Compliant with Construction Products Regulation (EU/305/2011): ✅

## Dimensions and Packaging

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4P</td>
<td>6.0</td>
<td>42</td>
<td>D_{s2}d_{2}a_{1}</td>
<td>020</td>
<td>CDESK0000020</td>
<td>Yellow rape</td>
<td>LKD 7KS5 0005 xxxx</td>
</tr>
<tr>
<td>2 x 4P</td>
<td>6.0 x 12.5</td>
<td>86</td>
<td>D_{s2}d_{2}a_{1}</td>
<td>021</td>
<td>CDESK0000021</td>
<td>Yellow rape</td>
<td>LKD 7KS5 0006 xxxx</td>
</tr>
</tbody>
</table>

Packaging: xxxx

Standard length: 0100 = 1000 m 0050 = 500 m 0000 = general

* see page 17: Definition of copper no.
## MegaLine® Pro 1500
Category 7

### Types
- KS-02YSCH 4x2x0.62 mm/~AWG 22/1 PIMF
- KS-02YSCH 2x(4x2x0.62 mm/~AWG 22/1 PIMF)

### Conductor
- Bare copper wire, 0.62 mm ~AWG 22/1

### Insulation
- Cellular PE, core Ø: nominal value 1.6 mm

### Twisting element
- Pair

### Individual shielding
- Aluminium-bonded polyester foil, metal on the outside (PiMF)

### Twisting
- 4 pairs

### Overall shielding
- Tinned copper braid

### Outer sheath
- Halogen-free, flame-retardant compound

---

### Security (fire behaviour)

<table>
<thead>
<tr>
<th>S</th>
<th>Eca/Dca</th>
<th>Eca/Dca</th>
<th>Cca</th>
<th>B2ca</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IEC 60332-2-2</td>
<td>&gt; 40 dB</td>
<td>&gt; 50 dB</td>
<td>&gt; 60 dB</td>
</tr>
<tr>
<td>2</td>
<td>IEC 60332-1-2</td>
<td>&gt; 50 dB</td>
<td>&gt; 60 dB</td>
<td>&gt; 70 dB</td>
</tr>
<tr>
<td>3</td>
<td>IEC 60332-3-24</td>
<td>&gt; 60 dB</td>
<td>&gt; 70 dB</td>
<td>&gt; 80 dB</td>
</tr>
<tr>
<td>4</td>
<td>EFP Grade 1</td>
<td>&gt; 70 dB</td>
<td>&gt; 80 dB</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>EFP Grade 2</td>
<td>&gt; 80 dB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Performance (cable class, bandwidth)

<table>
<thead>
<tr>
<th>P</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; Class E</td>
<td>&gt; 250 MHz</td>
<td>&gt; 500 MHz</td>
<td>&gt; 600 MHz</td>
<td>&gt; 1000 MHz</td>
<td>&gt; 1200 MHz</td>
</tr>
<tr>
<td>1 &gt; 100 Mbe</td>
<td>2 &gt; 1 Gbe</td>
<td>3 up to 10 Gbe</td>
<td>4 &gt; 10 Gbe</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Application (ethernet, TV)

<table>
<thead>
<tr>
<th>A</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 100 Mbe</td>
<td>2 &gt; 1 Gbe</td>
<td>3 &gt; 10 Gbe</td>
<td>4 &gt; 10 Gbe</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Construction (conductor dimension, tensile strength)

<table>
<thead>
<tr>
<th>C</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWG 27</td>
<td>AWG 26/25</td>
<td>AWG 24</td>
<td>AWG 23</td>
<td>AWG 22</td>
<td></td>
</tr>
</tbody>
</table>

### Mechanical characteristics

- Bending radius: during installation 8 x outer diameter (min.), after installation 4 x outer diameter (min.).
- Tensile strength (max.): 110 N (Sx), 220 N (Dx).
- Crush strength: 1000 N/100 mm.
- Impact strength (number of shocks): 10.

### Electromagnetic behaviour

- Coupling resistance at 10 MHz (nom.): 5 mΩ/m.
- Shield attenuation up to 1000 MHz (nom.): 70 dB.
- Coupling attenuation up to 1000 MHz (nom.): 85 dB.
- Separating class acc. to EN 50174-2: d.

### Advantages
- Better than Category 7.
- Bandwidth 1500 MHz.
- RoHS and REACH conformity.

---

**MegaLine® Pro 1500**

Copper data cables
Electrical characteristics at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation dB/100 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>RL dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.8</td>
<td>2.1</td>
<td>105</td>
<td>78</td>
<td>103</td>
<td>75.9</td>
</tr>
<tr>
<td>10</td>
<td>4.7</td>
<td>5.8</td>
<td>105</td>
<td>78</td>
<td>103</td>
<td>72.2</td>
</tr>
<tr>
<td>100</td>
<td>16.4</td>
<td>18.5</td>
<td>105</td>
<td>75.4</td>
<td>102</td>
<td>72.4</td>
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<td>250</td>
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<td>29.7</td>
<td>101</td>
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<td>66.4</td>
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<td>500</td>
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<td>100</td>
<td>64.9</td>
<td>97</td>
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<tr>
<td>600</td>
<td>42.0</td>
<td>47.1</td>
<td>100</td>
<td>63.7</td>
<td>97</td>
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<td>61.9</td>
<td>92</td>
<td>58.9</td>
</tr>
<tr>
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<td>52.0</td>
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<td>95</td>
<td>61.1</td>
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<td>75.9</td>
<td>92</td>
<td>60.4</td>
<td>89</td>
<td>57.4</td>
</tr>
</tbody>
</table>

* EN 50288-9-1:2013 / IEC 61156-5:2009. If IO FEXT is min. 90 dB, EL-FEXT is fulfilled by design.

Cable printing for 4 P
LEONI MegaLine Pro 1500 °CPR Class" "DoP no."
Made in Germany "Batch number" "Metre marking"

Colour code
WH/BU, WH/OG, WH/GN, WH/BN

Certificates and approvals
Link performance: LEONI MegaLine® systems
and other commonly available connector systems
Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
Compliant with LVD (2014/35/EU):
Compliant with Construction Products Regulation
(EU/305/2011):

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
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<tr>
<td>4P</td>
<td>8.6</td>
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<td>38</td>
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<td>CDESK00000007</td>
<td>Rape yellow</td>
</tr>
<tr>
<td></td>
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<td></td>
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</tr>
<tr>
<td>2 x 4P</td>
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<td>Rape yellow</td>
</tr>
</tbody>
</table>

Packaging: xxxx
Standard length: 0100 = 1000 m  0050 = 500 m  0000 = general
* see page 17: Definition of copper no.
**MegaLine® Pro 1300**

**Category 7a**

---

**Construction for 4P**

- **Conductor**: Bare copper wire, 0.62mm²/AWG 22/1
- **Insulation**: Cellular PE, core Ø: nominal value 1.5 mm
- **Twisting element**: Pair
- **Individual shielding**: Aluminium bonded polyester foil, metal on the outside (PiMF)
- **Twisting**: 4 pairs
- **Overall shielding**: Tinned copper braid
- **Outer sheath**: Halogen-free, flame-retardant compound

---

**Fire behaviour**
- Flame retardancy: acc. to IEC 60332-3-24
- Halogen free: acc. to IEC 60754-1/2
- Smoke density: acc. to IEC 61034-1/2
- Acid formation: acc. to EN 60754-2
- Fire load (reference value): 0.74 MJ/m² (Sx), 1.5 MJ/m² (Dx)
- EU Construction Products Regulation: acc. to EN 50575 / EN 50399

**Security (fire behaviour)**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Performance</th>
<th>Cable class, bandwidth</th>
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<tbody>
<tr>
<td>S</td>
<td>1 IEC 60332-2-2</td>
<td>1 &gt; Class E&lt;br&gt;2 &gt; Class E₂&lt;br&gt;3 &gt; Class F&lt;br&gt;4 &gt; Class F₂&lt;br&gt;5 &gt; Class F₂⁺</td>
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<tr>
<td></td>
<td>E₁₂/D₁₂</td>
<td>E₂₂/D₂₂</td>
</tr>
<tr>
<td></td>
<td>&gt; 100 Mbe</td>
<td>&gt; 1 Gbe</td>
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</table>

**Performance**
- Better than Category 7a, acc. to EN 50288 and IEC 61156, excellent NEXT, low attenuation, excellent shielding characteristics (pairs and overall shielding), low skew, bandwidth (typical) 1300 MHz

**Applications**
- Installation cable for use in structured cabling acc. to ISO/IEC 11801 and EN 50173 (3rd Edition), ideal for all applications of Classes D to F₂, multimedia (TV, video, data, voice) > 10 Gbe acc. to IEEE 802.3 an, 25G acc. to TR-11801-9905 as Channel-Link up to 50 m, cable sharing, VoIP, PoE/PoE+/4PPoE.

**Mechanical characteristics**
- Bending radius during installation: 8 x outer diameter (min.)
- Bending radius after installation: 4 x outer diameter (min.)
- Tensile strength (max.): 130 N (Sx), 260 N (Dx)
- Crush strength: 1000 N/100 mm
- Impact strength (number of shocks): 10

**Electromagnetic behaviour**
- Coupling resistance at 10 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1200 MHz (nom.): 70 dB
- Coupling attenuation up to 1200 MHz (nom.): 85 dB
- Separating class acc. to EN 50174-2: d

**Advantages**
- Better than Category 7a
- Bandwidth 1300 MHz
- RoHS and REACH conformity
### Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation dB/100 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>EL-FEXT dB at 100 m</th>
<th>PS-ELFEXT dB at 100 m</th>
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</tbody>
</table>


### Electrical characteristics (LF) at 20 °C

- **Direct current resistance**: max. 65 Ω/km
- **Insulation resistance**: min. 5 GΩ x km
- **Mutual capacitance**: approx. 42 pF/m
- **Capacitive coupling (e)**: approx. 1100 pf/km
- **Signal tempo (c)**: approx. 0.80
- **Propagation delay**: approx. 420 ns/100 m
- **Skew at 100 MHz**: approx. 5 ns/100 m
- **Charact. impedance**: at 100 MHz 100 ± 5 Ω
- **Testing voltage U_\text{eff}**: 1000 V
- **Operating voltage**: max. 125 V

### Thermal properties
- For fixed installation: −20 °C to +60 °C
- For mobile operation: 0 °C to +50 °C

### Chemical characteristics
Free of hazardous substances acc. to RoHS 2011/65/EU

---

### Cable printing for 4P
- **LEONI MegaLine Pro 1300 "CPR Class" "DoP no."**
- **Made in Germany "Batch number" "Metre marking"**

### Colour code
- WH/BU, WH/OG, WH/GN, WH/BN

### Certificates and approvals
- **Link performance: LEONI MegaLine® systems**
- **and other commonly available connector systems**
- **Test certificates: according to DIN 55350-18-4.2.1 or EN 10204**
- **Compliant with LVD (2014/35/EU):**
- **Compliant with Construction Products Regulation (EU/305/2011):**

---

### Dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx. mm</th>
<th>Weight approx. kg/km</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
<th>Order no.</th>
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</thead>
<tbody>
<tr>
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<td>2 x 4P</td>
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<td>LKD 7KS7 0381 xxxx</td>
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</tbody>
</table>

* see page 17: Definition of copper no.
### MegaLine® Pro 1200

**Category 7A**

#### Construction for 4P

**Conductor**: Bare copper wire, AWG 23/1

**Insulation**: Cellular PE, core Ø: nominal value 1.4 mm

**Twisting element**: Pair

**Individual shielding**: Aluminium bonded polyester foil, metal on the outside (PiMF)

**Twisting**: 4 pairs

**Overall shielding**: Tinned copper braid

**Outer sheath**: Halogen-free, flame-retardant compound

---

### Fire behaviour

<table>
<thead>
<tr>
<th>Flame retardancy</th>
<th>acc. to IEC 60332-3-24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halogen free</td>
<td>acc. to IEC 60754-1/2</td>
</tr>
<tr>
<td>Smoke density</td>
<td>acc. to IEC 6034-1/2</td>
</tr>
<tr>
<td>Acid formation</td>
<td>acc. to EN 60754-2</td>
</tr>
<tr>
<td>Fire load (reference value)</td>
<td>0.60 MJ/m (Sx), 1.2 MJ/m (Dx)</td>
</tr>
<tr>
<td>EU Construction Products Regulation</td>
<td>acc. to EN 50575 / EN 50399</td>
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</tbody>
</table>

### Performance (cable class, bandwidth)

<table>
<thead>
<tr>
<th>Performance</th>
<th>Bandwidth (typical)</th>
</tr>
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<tbody>
<tr>
<td>Better than Category 7</td>
<td>1200 MHz</td>
</tr>
<tr>
<td>Bandwidth 1200 MHz</td>
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</tr>
</tbody>
</table>

### Applications


Ideal for all applications of Classes D to F A, multimedia (video, data, voice), > 10 GbE acc. to IEEE 880.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.

### Mechanical characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bending radius</td>
<td>8 x outer diameter (min.)</td>
</tr>
<tr>
<td>after installation</td>
<td>4 x outer diameter (min.)</td>
</tr>
<tr>
<td>Tensile strength (max.)</td>
<td>110 N (Sx), 220 N (Dx)</td>
</tr>
<tr>
<td>Crush strength</td>
<td>1000 N/100 mm</td>
</tr>
<tr>
<td>Impact strength</td>
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</tbody>
</table>

### Electromagnetic behaviour

<table>
<thead>
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<th>Characteristic</th>
<th>Value</th>
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<tr>
<td>Coupling resistance</td>
<td>5 mΩ/m</td>
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<tr>
<td>Shield attenuation</td>
<td>70 dB</td>
</tr>
<tr>
<td>Coupling attenuation</td>
<td>85 dB</td>
</tr>
<tr>
<td>Separating class acc.</td>
<td>to EN 50174-2 d</td>
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### Security (fire behaviour)

#### Eca/Dca Eca/Dca Cca B2ca

<table>
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<tr>
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<th>Eca/Dca</th>
<th>Eca/Dca</th>
<th>Cca</th>
<th>B2ca</th>
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</thead>
<tbody>
<tr>
<td>&gt; 40 dB</td>
<td>&gt; 50 dB</td>
<td>&gt; 60 dB</td>
<td>&gt; 70 dB</td>
<td>&gt; 80 dB</td>
</tr>
</tbody>
</table>

---

**Conductor**

KS-02YSCH 4x2xAWG 23/1 PIMF

KS-02YSCH 2x(4x2xAWG 23/1 PIMF)

**Applications**


Ideal for all applications of Classes D to F A, multimedia (video, data, voice), > 10 GbE acc. to IEEE 880.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.
### Electrical characteristics (LF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Direct current resistance</th>
<th>Insulation resistance</th>
<th>Mutual capacitance</th>
<th>Capacitive coupling (e)</th>
<th>Signal tempo (c)</th>
<th>Propagation delay</th>
<th>Skew at 100 MHz</th>
<th>Character Impedance</th>
<th>Testing voltage $U_{\text{eff}}$</th>
<th>Operating voltage</th>
</tr>
</thead>
<tbody>
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<td>1</td>
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<td>2.1</td>
<td>105</td>
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### Electrical characteristics (HF) at 20 °C

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<th>PS-NEXT dB</th>
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<td>59.0</td>
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<tr>
<td>1200</td>
<td>66.3</td>
<td></td>
<td>85</td>
<td></td>
<td>82</td>
<td></td>
<td>19</td>
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</tr>
</tbody>
</table>


### Cable printing for 4 P
LEONI MegaLine Pro 1200 "CPR Class" "DoP no."
Made in Germany "Batch number" "Metre marking"

### Colour code
WH/BU, WH/OG, WH/GN, WH/BN

### Certificates and approvals
Link performance: LEONI MegaLine® systems
and other commonly available connector systems
Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
Compliant with LVD (2014/35/EU):
Compliant with Construction Products Regulation (EU/305/2011):

### Electrical characteristics (LF) at 20 °C

- **Direct current resistance**: 75 Ω/km
- **Insulation resistance**: 5 GΩ x km
- **Mutual capacitance**: 42 pF/m
- **Capacitive coupling (e)**: 1100 pF/km
- **Signal tempo (c)**: 0.78
- **Propagation delay**: 420 ns/100 m
- **Skew at 100 MHz**: 5 ns/100 m
- **Character Impedance**: 100 ± 5 Ω
- **Testing voltage $U_{\text{eff}}$**: 1000 V
- **Operating voltage**: 125 V

### Thermal properties
- For fixed installation: -20 °C to +60 °C
- For mobile operation: 0 °C to +50 °C

### Chemical characteristics
Free of hazardous substances acc. to RoHS 2011/65/EU

### Copper data cables
- **Office**
- **DataCenter**
- **Industry**
- **@home**

### Packaging
- xxxx

### Standard length
- 0100 = 1000 m
- 0050 = 500 m
- 0000 = general

### Copper no.*
* see page 17: Definition of copper no.
**MegaLine® Pro 1000**

**Category 7**

**Types**

KS-02YSCH 4x2x0.56 mm/≈AWG 23/1 PIMF

KS-02YSCH 2x(4x2x0.56 mm/≈AWG 23/1 PIMF)

---

### Fire behaviour

- **Flame retardancy**: acc. to IEC 60332-2-2
- **Halogen free**: acc. to IEC 60754-1/2
- **Smoke density**: acc. to IEC 61034-1/2
- **Acid formation**: acc. to EN 60754-2
- **Fire load (reference value)**: 0.5 MJ/m (Sx), 1.2 MJ/m (Dx)
- **EU Construction Products Regulation**: acc. to EN 50575 / EN 50399

### Performance

- Better than Category 7 acc. to EN 50288 and IEC 61156
- Excellent NEXT, excellent shielding characteristics (pairs and overall shielding), low skew, bandwidth (typical) 1000 MHz

### Applications


Ideal for all applications of Classes D to F, multimedia (video, data, voice) >10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.

### Mechanical characteristics

- **Bending radius during installation**: 8 x outer diameter (min.)
- **Tensile strength (max.)**: 100 N (Sx), 220 N (Dx)
- **Crush strength**: 1000 N/100 mm
- **Impact strength (number of shocks)**: 10

### Electromagnetic behaviour

- **Coupling resistance at 10 MHz (nom.)**: 5 mΩ/m
- **Shield attenuation up to 1000 MHz (nom.)**: 70 dB
- **Coupling attenuation up to 1000 MHz (nom.)**: 85 dB
- **Separating class acc. to EN 50174-2**: d

### Security (fire behaviour)

<table>
<thead>
<tr>
<th>S</th>
<th>1 IEC 60332-2-2</th>
<th>2 IEC-60332-1-2</th>
<th>3 IEC-60332-3-24</th>
<th>4 EFP Grade 1</th>
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<tbody>
<tr>
<td></td>
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<td></td>
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</tr>
<tr>
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</tr>
<tr>
<td>Ec/Dbca</td>
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</tr>
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<tr>
<td>B2ca</td>
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### Performance (cable class, bandwidth)

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<th>&gt; Class E &gt; 500 MHz</th>
<th>&gt; Class F &gt; 600 MHz</th>
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<td>up to 10 Gbe</td>
<td>&gt; 10 Gbe</td>
<td>&gt; 10 Gbe</td>
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<tr>
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### Application (ethernet, TV)

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<th>up to 10 Gbe</th>
<th>&gt; 10 Gbe</th>
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### Construction (conductor dimension, tensile strength)

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### EMC (coupling attenuation)

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**Advantages**

- Better than Category 7
- Bandwidth 1000 MHz
- PVP-GHMT
- RoHS and REACH conformity
Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency</th>
<th>MHz</th>
<th>Attenuation dB/100 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>EL-EXT dB at 100 m</th>
<th>PS-ELFEXT dB at 100 m</th>
<th>RL dB</th>
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<td>typ.</td>
<td>Cat. 7 min.*</td>
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<td>typ.</td>
<td>Cat. 7 min.*</td>
<td>typ.</td>
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<td>18.5</td>
<td>100</td>
<td>72</td>
<td>97</td>
<td>69</td>
<td>81</td>
<td>54</td>
<td>78</td>
</tr>
<tr>
<td>200</td>
<td>26.3</td>
<td>26.8</td>
<td>90</td>
<td>68</td>
<td>87</td>
<td>65</td>
<td>63</td>
<td>41</td>
<td>60</td>
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<td>250</td>
<td>29.4</td>
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<td>46.3</td>
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<td>61</td>
<td>82</td>
<td>58</td>
<td>38</td>
<td>12</td>
<td>35</td>
</tr>
</tbody>
</table>

* EN 50288-4-1 (2014)/IEC 61156-5 (2009)

Electrical characteristics (LF) at 20 °C

- **Direct current resistance**: max. 78 Ω/km
- **Insulation resistance**: min. 5 GΩ x km
- **Mutual capacitance**: approx. 40 pF/m
- **Capacitive coupling (e)**: approx. 1100 pF/km
- **Signal tempo (c)**: approx. 0.80
- **Propagation delay**: approx. 400 ns/100 m
- **Skew at 100 MHz**: approx. 5 ns/100 m
- **Charact. impedance**: at 100 MHz 100 ± 5 Ω
- **Testing voltage Ueff at 100 MHz**: 100 V
- **Operating voltage**: max. 125 V

**Thermal properties**

- For fixed installation: –20 °C to +60 °C
- For mobile operation: 0 °C to +50 °C

**Chemical characteristics**

Free of hazardous substances acc. to RoHS 2011/65/EU

**Cable printing for 4 P**

LEONI MegaLine Pro 1000 "CPR Class" "DoP no."

Made in Germany "Batch number" "Metre marking"

**Colour code**

WH/BU, WH/OG, WH/GN, WH/BN

**Certificates and approvals**

- Quality mark with production control: GHMT PVP
- Link performance: LEONI MegaLine® systems and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU):
- Compliant with Construction Products Regulation (EU/305/2011):

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4P</td>
<td>7.4</td>
<td>56</td>
<td>32</td>
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<td>CDESK00000005</td>
<td>Rape yellow</td>
<td>LKD 7KS7 0305 xxxx</td>
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<tr>
<td>2 x 4P</td>
<td>7.4 x 14.8</td>
<td>112</td>
<td>64</td>
<td>D_s, s2 d2 a1</td>
<td>CDESK00000006</td>
<td>Rape yellow</td>
<td>LKD 7KS7 0308 xxxx</td>
</tr>
</tbody>
</table>

Packaging: xxxx

Standard length: 0100 = 1000 m 0050 = 500 m 0000 = general

* see page 17: Definition of copper no.

www.leoni-data.com
**MegaLine® G20 S/F flex**
Category 8.2

---

**Advantages**
- Data center cabling
- Better than Cat. 8.2
- Bandwidth 2000 MHz
- Excellent shielding characteristics
- VDE certified
- RoHS and REACH conformity

---

**Type KS-02YSCH 4x2xAWG 26/7 PIMF**

---

### Construction for 4P

<table>
<thead>
<tr>
<th>Conductor</th>
<th>Bare stranded copper wire, AWG26/7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation</td>
<td>Cellular PE, core-diameter: max. 1.05 mm</td>
</tr>
<tr>
<td>Twisting element</td>
<td>Pair</td>
</tr>
<tr>
<td>Individual shielding</td>
<td>Aluminium bonded polyester foil, metal on the outside (PiMF)</td>
</tr>
<tr>
<td>Twisting</td>
<td>4 pairs</td>
</tr>
<tr>
<td>Overall shielding</td>
<td>Tinned copper braid</td>
</tr>
<tr>
<td>Outer sheath</td>
<td>Halogen-free, flame-retardant compound</td>
</tr>
</tbody>
</table>

---

**Fire behaviour**
- Flame retardancy acc. to IEC 60332-1-2
- Smoke density acc. to IEC 61034-1-2
- Fire load (reference value) 0.38 MJ/m

---

**Performance**
- Better than Category 8.2 acc. to IEC 61156-10
- Excellent NEXT, low attenuation, excellent shielding characteristics (pairs and overall shielding), low skew, bandwidth (typical) 2000 MHz

---

**Applications**
- Connection cable and patch cord for use in structured cabling acc. to ISO/IEC 11801 and EN 50173 (2nd Edition) and for data center cabling acc. to ISO/IEC 24764 and EN 50173-5, as well as PDTR 11801-99-9901. Ideal for all applications of Classes D to F and Class II, multimedia (TV, video, data, voice), > 40 GbE acc. to IEEE 802.3 b(q) (draft), cable sharing, VoIP, PoE/PoE+/4PPoE.

---

**Mechanical characteristics**
- Bending radius in operation 5 x outer diameter (min.)
- Tensile strength (max.) 60 N

---

**Electromagnetic behaviour**
- Coupling resistance at 10 MHz (nom.) 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.) 60 dB
- Shielding attenuation up to 1000 MHz (nom.) 85 dB
- Separating class acc. to EN 50174-2 d

---

**Security (fire behaviour)**

<table>
<thead>
<tr>
<th>S</th>
<th>1 IEC 60332-2-2</th>
<th>2 IEC 60332-3-24</th>
<th>3 EFP Grade 1</th>
<th>4 EFP Grade 2</th>
<th>5 EFP Grade 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>E&lt;sub&gt;ca&lt;/sub&gt;/D&lt;sub&gt;ca&lt;/sub&gt;</td>
<td>E&lt;sub&gt;ca&lt;/sub&gt;/D&lt;sub&gt;ca&lt;/sub&gt;</td>
<td>C&lt;sub&gt;ca&lt;/sub&gt;</td>
<td>B&lt;sub&gt;2ca&lt;/sub&gt;</td>
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<td></td>
</tr>
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</table>

---

**Performance (cable class, bandwidth)**

<table>
<thead>
<tr>
<th>P</th>
<th>1 &gt; Class E&lt;sub&gt;1&lt;/sub&gt; &gt; 250 MHz</th>
<th>2 &gt; Class E&lt;sub&gt;2&lt;/sub&gt; &gt; 500 MHz</th>
<th>3 &gt; Class F&lt;sub&gt;1&lt;/sub&gt; &gt; 600 MHz</th>
<th>4 &gt; Class F&lt;sub&gt;2&lt;/sub&gt; &gt; 1000 MHz</th>
<th>5 &gt; Class F&lt;sub&gt;3&lt;/sub&gt; &gt; 1200 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 &gt; 100 Mbe</td>
<td>2 &gt; 1 Gbe</td>
<td>3 up to 10 Gbe</td>
<td>4 &gt; 10 Gbe</td>
<td>5 &gt; 10 Gbe</td>
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---

**Application (ethernet, TV)**

<table>
<thead>
<tr>
<th>A</th>
<th>1 AWG 27</th>
<th>2 AWG 26/25</th>
<th>3 AWG 24</th>
<th>4 AWG 23</th>
<th>5 AWG 22</th>
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<tbody>
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<td>1 &gt; 40 dB</td>
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<td>3 &gt; 60 dB</td>
<td>4 &gt; 70 dB</td>
<td>5 &gt; 80 dB</td>
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</tbody>
</table>

---

**Construction (conductor dimension, tensile strength)**

<table>
<thead>
<tr>
<th>C</th>
<th>1 AWG 27</th>
<th>2 AWG 26/25</th>
<th>3 AWG 24</th>
<th>4 AWG 23</th>
<th>5 AWG 22</th>
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<tbody>
<tr>
<td>1 &gt; 40 dB</td>
<td>2 &gt; 50 dB</td>
<td>3 &gt; 60 dB</td>
<td>4 &gt; 70 dB</td>
<td>5 &gt; 80 dB</td>
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**EMC (coupling attenuation)**

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<th>3 &gt; 60 dB</th>
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<th>5 &gt; 80 dB</th>
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</table>
### Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation dB/50 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 30 m</th>
<th>PS-ACR dB at 30 m</th>
<th>EL-FEXT dB</th>
<th>PS-ELFEXT dB</th>
<th>RL dB</th>
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<tbody>
<tr>
<td>10</td>
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<td>71</td>
<td>56.9</td>
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<td>19.7</td>
<td>8.3</td>
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<tr>
<td>1800</td>
<td>29.3</td>
<td>38.4</td>
<td>66</td>
<td>56.6</td>
<td>63</td>
<td>53.6</td>
<td>18.2</td>
<td>9.3</td>
</tr>
<tr>
<td>1900</td>
<td>30.4</td>
<td>39.6</td>
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<td>53.2</td>
<td>16.6</td>
<td>10.3</td>
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<td>31.4</td>
<td>40.7</td>
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<td>55.9</td>
<td>60</td>
<td>52.9</td>
<td>15.2</td>
<td>11.3</td>
</tr>
</tbody>
</table>

* IEC 61156-10 (2016). If IO FEXT is min. 90 dB to 1000 MHz and min. 80 dB to 2,000 MHz, EL-FEXT is fulfilled by design.

### Electrical characteristics (LF) at 20 °C

<table>
<thead>
<tr>
<th></th>
<th>max.</th>
<th>145 Ω/km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct current resistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>min.</td>
<td>5 GΩ x km</td>
</tr>
<tr>
<td>Mutual capacitance</td>
<td>approx.</td>
<td>43 pF/m</td>
</tr>
<tr>
<td>Signal temp (c)</td>
<td>approx.</td>
<td>0.78</td>
</tr>
<tr>
<td>Propagation delay</td>
<td>approx.</td>
<td>430 ns/100 m</td>
</tr>
<tr>
<td>Skew at 100 MHz</td>
<td>approx.</td>
<td>5 ns/100 m</td>
</tr>
<tr>
<td>Charact. impedance</td>
<td>at 100 MHz</td>
<td>100 ± 5 Ω</td>
</tr>
<tr>
<td>Testing voltage $U_{in}$</td>
<td>1000 V</td>
<td></td>
</tr>
<tr>
<td>Operating voltage</td>
<td>max.</td>
<td>125 V</td>
</tr>
</tbody>
</table>

### Thermal properties

- For fixed installation: −20 °C to +60 °C
- For mobile operation: 0 °C to +50 °C

### Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU

### Dimension

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4P</td>
<td>5.8</td>
<td>41</td>
<td>23.5</td>
<td>D₁, s2 d₂ a1</td>
<td>CDESK0000023</td>
<td>Light grey</td>
<td>LKD 7KS8 0013 xxxx</td>
</tr>
</tbody>
</table>

Packaging: xxxx

Standard length: 0100 = 1000 m 0050 = 500 m 0000 = general

* see page 17: Definition of copper no.
**MegaLine® F10-120 S/F flex**  
Category 7

**Advantages**
- Better than Category 7
- Bandwidth 1200 MHz
- Excellent shielding characteristics
- VDE certified
- RoHS and REACH conformity

**Types**  
KS-02YSCH 4x2xAWG 26/7 PIMF

**Conductor**  
Bare stranded copper wire, AWG26/7

**Insulation**  
Cellular PE, core-diameter: max. 1.05 mm

**Twisting element**  
Pair

**Individual shielding**  
Aluminium-bonded polyester foil, metal on the outside (PiMF)

**Twisting**  
4 pairs

**Overall shielding**  
Tinned copper braid

**Outer sheath**  
Halogen-free, flame-retardant compound

**Fire behaviour**
- Flame retardancy acc. to IEC 60332-1-2
- Smoke density acc. to IEC 60332-1-2
- Fire load (reference value) 0.38 MJ/m (Sx)
- EU Construction Products Regulation acc. to EN 50575 / EN 50399

**Performance**
- Better than Category 7 acc. to EN 50288 and IEC 61156
- Excellent NEXT, low attenuation, excellent shielding characteristics
- (pairs and overall shielding), low skew, bandwidth (typical) 1200 MHz

**Applications**
- Collection point, connection cables and patch cords for use in structured cabling acc. to ISO/IEC 11801 and EN 50173 (3rd Edition), as well as ISO/IEC 24764 and EN 50173-5.
- Ideal for all applications of Classes D to F A, multimedia (TV, video, data voice)
  - > 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.

**Construction**
- Conductor dimension, tensile strength
- Bending radius in operation 5 x outer diameter (min.)
- Tensile strength (max.) 60 N (Sx), 400 N (8-fold)

**Electromagnetic behaviour**
- Coupling resistance at 10 MHz (nom.) 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.) 60 dB
- Shielding attenuation up to 1000 MHz (nom.) 85 dB
- Separating class acc. to EN 50174-2 d

**Security (fire behaviour)**
- IEC 60332-1-2
- IEC 60332-3-24
- EFP Grade 1
- EFP Grade 2

- E<sub>ca</sub>/D<sub>ca</sub> E<sub>ca</sub>/D<sub>ca</sub> C<sub>ca</sub> B<sub>2ca</sub>

**Performance (cable class, bandwidth)**
- > Class E > 250 MHz
- > Class E<sub>L</sub> > 500 MHz
- > Class F > 600 MHz
- > Class F<sub>B</sub> > 1000 MHz
- > Class F<sub>B</sub> > 1200 MHz

**Application (ethernet, TV)**
- > 100 MBe
- > 1 GbE
- > 10 GbE
- > 10 GbE
- > 10 GbE TV

**Electromagnetic coupling (coupling attenuation)**
- > 40 dB
- > 50 dB
- > 60 dB
- > 70 dB
- > 80 dB
### Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation dB/10m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 10m</th>
<th>PS-ACR dB at 10m</th>
<th>EL-FEXT dB at 10m</th>
<th>PS-ELFEXT dB at 10m</th>
<th>RL dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.25</td>
<td>0.29</td>
<td>100</td>
<td>80</td>
<td>97</td>
<td>77</td>
<td>100</td>
<td>80</td>
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<tr>
<td>10</td>
<td>0.76</td>
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<td>99</td>
<td>80</td>
<td>96</td>
<td>77</td>
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<td>100</td>
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<td>92</td>
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<tr>
<td>200</td>
<td>3.69</td>
<td>3.97</td>
<td>92</td>
<td>74</td>
<td>89</td>
<td>71</td>
<td>88</td>
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<tr>
<td>250</td>
<td>4.18</td>
<td>4.46</td>
<td>90</td>
<td>72</td>
<td>87</td>
<td>69</td>
<td>86</td>
<td>68</td>
</tr>
<tr>
<td>500</td>
<td>5.6</td>
<td>6.41</td>
<td>83</td>
<td>68</td>
<td>80</td>
<td>65</td>
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<td>62</td>
</tr>
<tr>
<td>600</td>
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<td>7.06</td>
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<td>64</td>
<td>74</td>
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<td>700</td>
<td>7.32</td>
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<td>800</td>
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<td>77</td>
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<td>74</td>
<td>62</td>
<td>69</td>
<td>57</td>
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<tr>
<td>900</td>
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<tr>
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<td>9.11</td>
<td>9.29</td>
<td>74</td>
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<td>71</td>
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<td>65</td>
<td>54</td>
</tr>
<tr>
<td>1100</td>
<td>9.5</td>
<td>–</td>
<td>72</td>
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<td>69</td>
<td>–</td>
<td>63</td>
<td>–</td>
</tr>
<tr>
<td>1200</td>
<td>9.9</td>
<td>–</td>
<td>70</td>
<td>–</td>
<td>67</td>
<td>–</td>
<td>61</td>
<td>–</td>
</tr>
</tbody>
</table>


### Electrical characteristics (LF) at 20 °C

- **Direct current resistance**: max. 145 Ω/km
- **Insulation resistance**: min. 5 GΩ x km
- **Mutual capacitance**: approx. 44 pF/m
- **Signal tempo (c)**: approx. 0.78
- **Propagation delay**: approx. 440 ns/100 m
- **Skew at 100 MHz**: approx. 2.5 ns/100 m
- **Charact. impedance**: at 100 MHz 100 ± 5 Ω
- **Testing voltage U_{in}**: 1000 V
- **Operating voltage**: max. 125 V

### Thermal properties

- **For fixed installation**: –20 °C to +60 °C
- **For mobile operation**: 0 °C to +50 °C

### Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU

---

**Cable printing for 4 P**

LEONI MegaLine F10-120 S/F flex 4P H “CPR Class” “DoP no.”

“VDE mark” Made in Germany “Batch number” “Metre marking”

**Colour code**

WH/BU, WH/OG, WH/GN, WH/BN

**Certificates and approvals**


### Dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>kg/km</td>
<td>kg/km</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4P</td>
<td>5.8</td>
<td>41</td>
<td>23.5</td>
<td>D_s, s2 d_a1</td>
<td>CDESK0000023</td>
<td>Light grey</td>
<td>LKD 7K57 0003 xxxx</td>
</tr>
</tbody>
</table>

Packaging: xxxx

Standard length: 0100 = 1000 m 0050 = 500 m 0000 = general

* see page 17: Definition of copper no.
MegaLine® F6-90 S/F flex
Category 7

Type KS-02YSCH 4x2xAWG 27/7 PIMF

**Fire behaviour**
- Flame retardancy acc. to IEC 60332-1-2
- Halogen free acc. to IEC 60754-1
- Smoke density acc. to IEC 601034-1-2
- Fire load (reference value) 0.33 MJ/m
- EU Construction Products Regulation acc. to EN 50575 / EN 50399

**Performance**
Better than Category 7 acc. to EN 50288 and IEC 61156
excellent NEXT, excellent shielding characteristics (pairs and overall shielding),
low skew, bandwidth (typical) 900 MHz

**Applications**
Connection cable and patch cord for use in structured cabling acc. to
Ideal for all applications of Classes D to F, multimedia (video, data, voice)
> 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.

**Mechanical characteristics**
- Bending radius in operation 5 x outer diameter (min.)
- Tensile strength (max.) 40 N

**Electromagnetic behaviour**
- Coupling resistance at 10 MHz (nom.) 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.) 60 dB
- Coupling attenuation up to 1000 MHz (nom.) 80 dB
- Separating class acc. to EN 50174-2 d

**Advantages**
- Better than Category 7
- bandwidth 900 MHz
- excellent shielding characteristics
- VDE certified
- RoHS and REACH conformity

**Conductor**
Bare stranded copper wire, AWG22/7

**Insulation**
Cellular PE, core-diameter: max. 1.0 mm

**Twisting element**
Pair

**Individual shielding**
Aluminium bonded polyester foil,
metal on the outside (PiMF)

**Twisting**
4 pairs

**Overall shielding**
Tinned copper braid

**Outer sheath**
halogen-free, flame-retardant compound

<table>
<thead>
<tr>
<th>Security (fire behaviour)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S</strong></td>
</tr>
<tr>
<td>E_{ca}/D_{ca}</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance (cable class, bandwidth)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P</strong></td>
</tr>
<tr>
<td>&gt; 100 Mbe</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Application (ethernet, TV)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
</tr>
<tr>
<td>&gt; 100 Mbe</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Construction (conductor dimension, tensile strength)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EMC (coupling attenuation)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E</strong></td>
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</tbody>
</table>
### Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation dB/10m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 10m</th>
<th>PS-ACR dB at 10m</th>
<th>EL-FEXT dB at 10m</th>
<th>PS-ELFEXT dB at 10m</th>
<th>RL dB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>typ. Cat. 7 min.*</td>
<td>typ. Cat. 7 max.*</td>
<td>typ. Cat. 7 min.*</td>
<td>typ. Cat. 7 max.*</td>
<td>typ. Cat. 7 min.*</td>
<td>typ. Cat. 7 max.*</td>
<td>typ. Cat. 7 min.*</td>
</tr>
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<td>0.29</td>
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<td>92</td>
<td>77</td>
<td>95</td>
<td>80</td>
</tr>
<tr>
<td>10</td>
<td>0.83</td>
<td>0.85</td>
<td>94</td>
<td>80</td>
<td>91</td>
<td>77</td>
<td>94</td>
<td>79</td>
</tr>
<tr>
<td>100</td>
<td>2.74</td>
<td>2.78</td>
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<td>72</td>
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<td>69</td>
<td>88</td>
<td>70</td>
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<tr>
<td>200</td>
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<td>4.01</td>
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<td>73</td>
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</tr>
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<td>700</td>
<td>7.48</td>
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<td>67</td>
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<td>64</td>
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</tr>
<tr>
<td>800</td>
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<td>–</td>
<td>64</td>
<td>–</td>
</tr>
<tr>
<td>900</td>
<td>8.62</td>
<td>70</td>
<td>67</td>
<td>62</td>
<td>59</td>
<td>11</td>
<td>8</td>
<td>–</td>
</tr>
</tbody>
</table>

### Electrical characteristics (LF) at 20 °C

- **Direct current resistance:** max. 170 Ω/km
- **Insulation resistance:** min. 5 GΩ x km
- **Mutual capacitance:** approx. 44 pF/m
- **Signal tempo (c):** approx. 0.78 ns/m
- **Propagation delay:** approx. 430 ns/100 m
- **Skew at 100 MHz:** approx. 2.5 ns/100 m
- **Charact. impedance:** at 100 MHz 50 ± 5 Ω
- **Testing voltage U_{in}:** 1000 V
- **Operating voltage:** max. 125 V

### Thermal properties

- **For fixed installation:** –20 °C to +60 °C
- **For mobile operation:** 0 °C to +50 °C

### Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU

### Cable printing

- LEONI MegaLine F6-90 S/F flex 4P H "CPR Class" "DoP no."
- "VDE mark "Made in Germany "Batch number" "Metre marking"

### Colour code

- WH/BU, WH/OG, WH/GN, WH/BN

### Certificates and approvals

- Quality mark with production control: <VDE>1
- Link performance: LEONI MegaLine® systems and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU):
- Compliant with Construction Products Regulation (EU/305/2011):

**Order no.:**

- LKD 7KS7 0014 xxxx
- LKD 7KS7 0015 xxxx
- LKD 7KS7 0016 xxxx
- LKD 7KS7 0017 xxxx
- LKD 7KS7 0018 xxxx

**Packaging:** xxxx
**Standard length:** 0100 = 1000 m 0050 = 500 m 0000 = general

* see page 17: Definition of copper no.

---

**Copper data cables**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
<th>Order no.</th>
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</thead>
<tbody>
<tr>
<td>4P</td>
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<td>CDESX00000022</td>
<td>Light grey</td>
<td>LKD 7KS7 0014 xxxx</td>
</tr>
</tbody>
</table>

---

For mobile operation: 0 °C to +50 °C
MegaLine® D1–20 SF/U flex
Category 5

Type KS-02YS(ST+C)Y 4x2xAWG 26/7

Fire behaviour
- Flame retardancy: acc. to IEC 60332-1-2
- Fire load (reference value): 0.4 MJ/m

Performance
- Better than Category 5 acc. to EN 50288 and IEC 61156 excellent shielding characteristics
- Bandwidth (typical): 200 MHz

Applications
- Ideal for all applications of Classes D up to 1 GbE acc. to IEEE 802.3 ab, VoIP, PoE / PoE+

Bending radius in operation: 5 x outer diameter (min.)

Tensile strength (max.): 60 N

Electromagnetic behaviour
- Coupling resistance at 10 MHz (nom.): 10 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 50 dB
- Coupling attenuation up to 1000 MHz (nom.): 65 dB
- Separating class acc. to EN 50174-2: c

Advantages
- Better than Category 5
- Bandwidth 200 MHz
- Good shielding characteristics
- RoHS and REACH conformity

Conductor
- bare copper wire, AWG 26/7

Insulation
- Cellular PE, core-diameter: max. 1.0 mm

Twisting element
- Pair

Twisting
- 4 pairs

Overall shielding
- Aluminium bonded polyester foil and
- Tinned copper braid

Outer sheath
- PVC

Security (fire behaviour)

<table>
<thead>
<tr>
<th>S</th>
<th>1 IEC 60332-2-2</th>
<th>2 IEC 60332-1-2</th>
<th>3 IEC 60332-3-24</th>
<th>4 EFP Grade 1</th>
<th>5 EFP Grade 2</th>
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<tbody>
<tr>
<td>Performance (cable class, bandwidth)</td>
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<td></td>
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</table>

<table>
<thead>
<tr>
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<th>2 &gt; Class E &gt; 500 MHz</th>
<th>3 &gt; Class F &gt; 600 MHz</th>
<th>4 &gt; Class F &gt; 1000 MHz</th>
<th>5 &gt; Class F &gt; 1200 MHz</th>
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</thead>
<tbody>
<tr>
<td>Application (ethernet, TV)</td>
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</table>

<table>
<thead>
<tr>
<th>A</th>
<th>1 &gt; 100 Mbe</th>
<th>2 &gt; 1 Gbe</th>
<th>3 up to 10 Gbe</th>
<th>4 &gt; 10 Gbe</th>
<th>5 &gt; 10 Gbe TV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction (conductor dimension, tensile strength)</td>
<td></td>
<td></td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>C</th>
<th>1 AWG 27</th>
<th>2 AWG 26/25</th>
<th>3 AWG 24</th>
<th>4 AWG 23</th>
<th>5 AWG 22</th>
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<tr>
<td>EMC (coupling attenuation)</td>
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| E | 1 > 40 dB | 2 > 50 dB | 3 > 60 dB | 4 > 70 dB | 5 > 80 dB |
### Electrical characteristics (HF) at 20 °C

<table>
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<tr>
<th>Frequency MHz</th>
<th>Attenuation dB/10m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 10m</th>
<th>PS-ACR dB at 10m</th>
<th>EL-FEXT dB at 10m</th>
<th>PS-ELFEXT dB at 10m</th>
<th>RL dB</th>
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</table>


### Electrical characteristics (LF) at 20 °C

- **Direct current resistance**: max. 145 Ω/km
- **Insulation resistance**: min. 5 GΩ x km
- **Mutual capacitance**: approx. 51 pF/m
- **Signal tempo (c)**: approx. 0.65
- **Propagation delay**: approx. 510 ns/100 m
- **Skew at 100 MHz**: approx. 15 ns/100 m
- **Charact. impedance**: at 100 MHz 100 ± 5 Ω
- **Testing voltage U_{in}**: max. 1000 V
- **Operating voltage**: max. 125 V

### Thermal properties

- **For fixed installation**: –20 °C to +60 °C
- **For mobile operation**: 0 °C to +50 °C

### Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU

### Cable printing

LEONI MegaLine D1–20 SF/U flex 4P Y Made in Germany

"Batch number" *Metre marking"

**Colour code**

WH-BU/BU, WH-OG/OG, WH-GN/GN, WH-BN/BN

### Certificates and approvals

- **Link performance**: LEONI MegaLine® systems and other commonly available connector systems
- **Test certificates**: according to DIN 55350-18-4.2.1 or EN 10204
- **Compliant with LVD (2014/35/EU)**: €€

### Dimension

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>Sheath colour</th>
<th>Order no.</th>
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</thead>
<tbody>
<tr>
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<td>33</td>
<td>21</td>
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<tr>
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<tr>
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<td></td>
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<td></td>
<td>Turquoise green</td>
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<tr>
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<td></td>
<td></td>
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<td>Sky blue</td>
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<tr>
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<td></td>
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<td>Fire red</td>
<td>LKD 7K55 0012 xxxx</td>
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</tbody>
</table>

Packaging: xxxx

Standard length: 0100 = 1000 m 0050 = 500 m 0000 = general

* see page 17: Definition of copper no.
**MegaLine® F10-130 S/F (L)2Y**

**Category 7A**

---

### Advantages
- Better than Category 7
- Bandwidth: 1300 MHz
- Excellent shielding characteristics
- Designed for installation outdoors and in the ground
- VDE certified
- PVP-GHMT
- RoHS and REACH conformity

---

### Construction for 4P

- **Conductor**: Bare copper wire, AWG 22/1
- **Insulation**: Cellular PE, core Ø: nominal value 1.6 mm
- **Twisting element**: Pair
- **Individual shielding**: Aluminium-bonded polyester foil, metal on the outside (PiMF)
- **Twisting**: 4 pairs
- **Overall shielding**: Tinned copper braid
- **Inner sheath**: Halogen-free, flame-retardant compound
- **Outer sheath**: AL-PE

---

### Fire behaviour
- **Halogen free**: acc. to IEC 60754-1/2
- **Smoke density**: acc. to IEC 61034-1/2
- **Fire load (reference value)**: 3.04 MJ/m²

### Performance
- **Better than Category 7 acc. to EN 50288 and IEC 61156**
- Excellent NEXT, low attenuation, excellent shielding characteristics (pairs and overall shielding), low skew, bandwidth (typical) 1300 MHz

### Applications
- **Installation cable for use in structured cabling acc. to ISO/IEC 11801 and EN 50173 (3rd Edition)**.
- Ideal for all applications of Classes D to FA, multimedia (video, data, voice) > 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.
- For use outdoors and underground installation.

### Mechanical characteristics
- **Bending radius during installation**: 8 x outer diameter (min.)
- **after installation**: 4 x outer diameter (min.)
- **Tensile strength (max.)**: 130 N
- **Crush strength**: 2000 N/100 mm
- **Impact strength (number of shocks)**: 20

### Electromagnetic behaviour
- **Coupling resistance at 10 MHz (nom.)**: 5 mΩ/m
- **Shield attenuation up to 1000 MHz (nom.)**: 70 dB
- **Coupling attenuation up to 1000 MHz (nom.)**: 85 dB
- **Separating class acc. to EN 50174-2**: d

### Security (fire behaviour)

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<td>&gt; Class E</td>
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### Performance (cable class, bandwidth)

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### Industrial application (ethernet, TV)

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<td>&gt; 1 GbE</td>
<td>up to 10 GbE</td>
<td>&gt; 10 GbE</td>
<td>&gt; 10 GbE&lt;br&gt;TV</td>
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<td>&gt; 1 GbE</td>
<td>up to 10 GbE</td>
<td>&gt; 10 GbE</td>
<td>&gt; 10 GbE&lt;br&gt;TV</td>
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<td>up to 10 GbE</td>
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<td>&gt; 10 GbE&lt;br&gt;TV</td>
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### Construction (conductor dimension, tensile strength)

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### EMC (coupling attenuation)

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<tbody>
<tr>
<td><strong>&gt; 40 dB</strong></td>
<td>&gt; 40 dB</td>
<td>&gt; 50 dB</td>
<td>&gt; 60 dB</td>
<td>&gt; 70 dB</td>
<td>&gt; 80 dB</td>
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**Type KS-02YSCH(L)2Y** 4x2xAWG 22/1 PIMF
Electrical characteristics (HF) at 20 °C

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<tr>
<th>Frequency Mhz</th>
<th>Attenuation</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>EL-FEXT dB at 100 m</th>
<th>PS-ELFEXT dB at 100 m</th>
<th>RL dB</th>
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<td>–</td>
<td>90</td>
<td>–</td>
<td>87</td>
<td>–</td>
<td>38</td>
<td>–</td>
</tr>
</tbody>
</table>

* EN 50288-4-1 (2014)/IEC 61156-5 (2009)

Electrical characteristics (LF) at 20 °C

- Direct current resistance: max. 57.1 Ω/km
- Insulation resistance: min. 5 GΩ x km
- Mutual capacitance: approx. 40 pF/m
- Capacitive coupling (e): approx. 1100 pF/km
- Signal tempo (c): approx. 0.80
- Propagation delay: approx. 420 ns/100 m
- Skew at 100 MHz: approx. 5 ns/100 m
- Charact. impedance: at 100 MHz 100 ± 5 Ω
- Testing voltage U_{eff}: 1000 V
- Operating voltage: max. 125 V

Thermal properties

- For fixed installation: -25 °C to +70 °C
- For mobile operation: -10 °C bis +50 °C

Chemical characteristics

- Free of hazardous substances acc. to RoHS 2011/65/EU
- UV resistance according to UL 1581 and ISO 4892

Cable printing

- **Inner sheath**
  - LEONI MegaLine F10-130 S/F 4P H "CPR Class" "DoP no."
  - "VDE mark" Made in Germany "Batch number" "Metre marking"

- **Outer sheath**
  - LEONI MegaLine F10-130 S/F 4P H(L)2Y Made in Germany
  - "Batch number" "Metre marking"

Colour code

- WH/BU, WH/OG, WH/GN, WH/BN

Certificates and approvals

- Quality mark with production control: <VDE>, GHMT PVP
- Link performance: LEONI MegaLine® systems and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU):

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>Sheath colour</th>
<th>Order no.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>kg/km</td>
<td>kg/km</td>
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<tr>
<td>4P</td>
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<td>45</td>
<td>● Jet black</td>
<td>LKD 7KS7 002U xxxx</td>
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</table>

Packaging: xxxx
Standard length: 0100 = 1000 m 0000 = general

* see page 17: Definition of copper no.
**MegaLine® F10-130 S/F QH**  
Category 7A

**Construction for 4P**

### Fire behaviour
- Flame retardancy: acc. to IEC 60332-3-24
- Halogen free: acc. to IEC 60754-1/2
- Smoke density: acc. to IEC 61034-1/2
- Fire load (reference value): 1.53 MJ/m²

### Security (fire behaviour)

<table>
<thead>
<tr>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
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<td>EFP Grade 1</td>
<td>EFP Grade 2</td>
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</table>

### Performance (cable class, bandwidth)

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<th>3</th>
<th>4</th>
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<td>&gt; Class F</td>
<td>&gt; Class F₂</td>
<td>&gt; Class F₂⁺</td>
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<td>&gt; 500 MHz</td>
<td>&gt; 600 MHz</td>
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<td>&gt; 1200 MHz</td>
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### Industrial application (ethernet, TV)

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<td>&gt; 1 GbE</td>
<td>up to 10 GbE</td>
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<td>&gt; 10 GbE TV</td>
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### Construction (conductor dimension, tensile strength)

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<th>4</th>
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<td>AWG 26/25</td>
<td>AWG 24</td>
<td>AWG 23</td>
<td>AWG 22</td>
<td></td>
</tr>
</tbody>
</table>

### Electromagnetic behaviour

- Coupling resistance at 10 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 70 dB
- Shield attenuation up to 1000 MHz (nom.): 85 dB
- Separating class acc. to EN 50174-2: d

### Advantages
- Better than Category 7
- Bandwidth: 1300 MHz
- Excellent shielding characteristics
- For installation in outdoor areas and in harsh environments
- VDE certified
- PVP-GHMT
- RoHS and REACH conformity

**Type KS-02YSCHQH 4x2xAWG 22/1 PIMF**

**Conductor**: Bare copper wire, AWG 22/1  
**Insulation**: Cellular PE, core Ø: nominal value 1.6 mm  
**Twisting element**: Pair  
**Individual shielding**: Aluminium bonded polyester foil, metal on the outside  
**Twisting**: 4 pairs  
**Overall shielding**: Tinned copper braid  
**Inner sheath**: Halogen-free, flame-retardant compound  
**Armour**: Galvanised steel wire braiding  
**Outer sheath**: Halogen-free, flame-retardant compound
Electrical characteristics (LF) at 20 °C

| Frequency | Direct current resistance typ. | Cat. 7 max.* | Insulation resistance typ. | Cat. 7 max.* | Mutual capacitance approx. | Capacitive coupling (e) approx. | Signal tempo (c) approx. | Propagation delay approx. | 420 ns/100 m | Skew at 100 MHz approx. | 5 ns/100 m | Charact. impedance at 100 MHz typ. | 100 ± 5 Ω | Testing voltage U_eff typ. | 1000 V | Operating voltage typ. | max. | 125 V |
|-----------|-------------------------------|--------------|---------------------------|--------------|---------------------------|-----------------------------|--------------------------|------------------------|-------------------|------------------------|----------|-------------------------------|-----------|--------------------------|------|--------|
| MHz       | dB/100 m                      |              | dB                        |              | pF/m                      | pF/km                       | ns/100 m                 | dB                     |                   | ns                     | s/100 m  | dB                            | s/100 m  | dB                       |      |        |
| 1         | 1.7                           | 2            | 105                       | 80           | 102                       | 77                          | 104                      | 78                     | 101               | 75                    | 105      | 80                           | 102      | 77                       | 27.1 | 23    |
| 10        | 4.5                           | 5.7          | 105                       | 80           | 102                       | 77                          | 101                      | 74                     | 98                | 71                    | 108      | 74                           | 105      | 71                       | 35.2 | 25    |
| 100       | 15.4                          | 18.5         | 105                       | 72           | 102                       | 69                          | 90                       | 54                     | 87                | 51                    | 93       | 54                           | 90       | 51                       | 38.9 | 20.1  |
| 200       | 22.9                          | 26.8         | 105                       | 68           | 102                       | 65                          | 83                       | 41                     | 80                | 38                    | 85       | 48                           | 82       | 45                       | 36.6 | 18    |
| 250       | 26                            | 30.2         | 105                       | 66           | 102                       | 63                          | 79                       | 36                     | 76                | 33                    | 82       | 46                           | 79       | 43                       | 35.3 | 17.3  |
| 500       | 35.9                          | 44.1         | 100                       | 62           | 97                        | 59                          | 64                       | 18                     | 61                | 15                    | 70       | 40                           | 67       | 37                       | 29.4 | 17.3  |
| 600       | 40.4                          | 48.9         | 95                        | 61           | 92                        | 58                          | 55                       | 12                     | 52                | 9                    | 63       | 38                           | 60       | 35                       | 26.6 | 17.3  |
| 700       | 44.6                          |              | 95                        | 61           | 92                        | 50                          | 47                       | 40                     | 57                | 54                    | 54       | 54                           |          |             |      |        |
| 800       | 47.7                          |              | 93                        | 90           | 87                        | 38                          | 35                       | 35                     | 53                | 50                    | 50       | 50                           |          |             |      |        |
| 900       | 51.6                          |              | 90                        | 90           | 87                        | 38                          | 35                       | 35                     | 53                | 50                    | 50       | 50                           |          |             |      |        |
| 1000      | 54.8                          |              | 88                        | 85           | 85                        | 33                          | 30                       | 30                     | 48                | 45                    | 45       | 45                           |          |             |      |        |
| 1100      | 56.9                          |              | 87                        | 84           | 84                        | 30                          | 27                       | 27                     | 44                | 41                    | 41       | 41                           |          |             |      |        |
| 1300      | 61.4                          |              | 80                        | 77           | 77                        | 21                          | 18                       | 18                     | 39                | 36                    | 36       | 36                           |          |             |      |        |

* EN 50288-4-1 (2014)/IEC 61156-5 (2009)

Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Attenuation MHz</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>EL-FEXT dB at 100 m</th>
<th>PS-ELFEXT dB at 100 m</th>
<th>RL dB</th>
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<tr>
<td>MHz</td>
<td>MHz</td>
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<td>77</td>
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<td>21</td>
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</tbody>
</table>

Cable printing

Inner sheath

LEONI MegaLine F10-130 S/F 4P H "CPR Class" "DoP no."

"VDE mark" Made in Germany "Batch number" "Metre marking"

Outer sheath

LEONI MegaLine F10-130 S/F 4P H QHQ Made in Germany

"Batch number" "Metre marking"

Colour code

WH/BU, WH/OG, WH/GN, WH/BN

Certificates and approvals

Quality mark with production control: 

< VDE >, GHMT PVP

Link performance: LEONI MegaLine® systems and other commonly available connector systems

Test certificates: according to DIN 55350-18-4.2.1 or EN 10204

Compliant with LVD (2014/35/EU):

Free of hazardous substances acc. to RoHS 2011/65/EU

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>Sheath colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>kg/km</td>
<td>kg/km</td>
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<td>185</td>
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<td>Sky blue</td>
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</table>

Packaging: xxxx

Standard length: 0100 = 1000 m 0000 = general

* see page 17: Definition of copper no.
MegaLine® F10-130 S/F Vö
Category 7A

TypeKS-02YSCHVö 4x2xAWG 22/1 PIMF

Fire behaviour
Flame retardancy acc. to IEC 60332-3-24
Halogen free acc. to IEC 60754-1/2
Smoke density acc. to IEC 61034-1/2
Fire load (reference value) 0.80 MJ/m

Performance
Better than Category 7, bandwidth 1300 MHz, excellent shielding characteristics, reinforced outer sheath, VDE certified, PVP-GHMT, RoHS and REACH conformity

Applications
Installation cable for use in structured cabling acc. to ISO/IEC 11801 and EN 50173 (3rd Edition). Ideal for all applications of Classes D to F A, multimedia (video, data, voice) > 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE. For use in harsh environments due to high-strength H sheath.

Mechanical characteristics
Bending radius during installation 8 x outer diameter (min.)
Tensile strength (max.) 130 N
Crush strength 1000 N/100 mm
Impact strength (number of shocks) 10

Electromagnetic behaviour
Coupling resistance at 10 MHz (nom.) 5 mΩ/m
Shield attenuation up to 1000 MHz (nom.) 70 dB
Coupling attenuation up to 1000 MHz (nom.) 85 dB
Separating class acc. to EN 50174-2 d

Advantages
- Better than Category 7
- Bandwidth 1300 MHz
- Excellent shielding characteristics
- Reinforced outer sheath
- VDE certified
- PVP-GHMT
- RoHS and REACH conformity

Conductor
Bare copper wire, AWG 22/1

Insulation
Cellular PE, core Ø: nominal value 1.6 mm

Twisting element
Pair

Individual shielding
Aluminium bonded polyester foil, metal on the outside (PIMF)

Twisting
4 pairs

Overall shielding
Tinned copper braid

Outer sheath
Halogen-free, flame-retardant compound

Security (fire behaviour)

<table>
<thead>
<tr>
<th>S</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<td>Eca/Dca</td>
<td>Cca</td>
<td>B2ca</td>
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Performance (cable class, bandwidth)

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<td>&gt; 10 GbE</td>
<td>&gt; 10 GbE</td>
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<td>&gt; 500 MHz</td>
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<td>&gt; Class F</td>
<td>&gt; 1200 MHz</td>
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Industrial application (ethernet, TV)

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<th>4</th>
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Construction (conductor dimension, tensile strength)

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<td>AWG 24</td>
<td>AWG 23</td>
<td>AWG 22</td>
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EMC (coupling attenuation)

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<td>&gt; 60 dB</td>
<td>&gt; 70 dB</td>
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## Electrical characteristics (LF) at 20 °C

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<tr>
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<th>Attenuation dB/100 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>EL-FEXT dB at 100 m</th>
<th>PS-ELFEXT dB at 100 m</th>
<th>RL dB</th>
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* EN 50288-4-1 (2014)/IEC 61156-5 (2009)

---

### Cable printing

LEONI MegaLine F10-130 S/F 4P HV6 "CPR Class" "DoP no."

"VDE mark" Made in Germany "Batch number" "Metre marking"

### Colour code

WH/BU, WH/OG, WH/GN, WH/BN

### Certificates and approvals

Quality mark with production control:

&LT;VDE&GT;, GHMT PVP

Link performance: LEONI MegaLine® systems and other commonly available connector systems

Test certificates: according to DIN 55350-18-4.2.1 or EN 10204

Compliant with LVD (2014/35/EU); €

---

### Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU

Oil resistance acc. to ICEA S-82-552 (60 °C)
**MegaLine® F10-115 S/F V**

Category 7A

---

**Advantages**
- Better than Category 7,
- bandwidth 1200 MHz
- excellent shielding characteristics
- reinforced outer sheath
- VDE certified
- PVP-GHMT
- RoHS and REACH conformity

---

**Type KS-02YSCHV 4x2xAWG 23/1 PIMF**

**Conductor**
- Bare copper wire, AWG 23/1

**Insulation**
- Cellular PE, core Ø: nominal value 1.4 mm

**Twisting element**
- Pair

**Twisting**
- 4 pairs

**Overall shielding**
- Tinned copper braid

**Outer sheath**
- halogen-free, flame-retardant compound, wall thickness 1.0 mm

---

**Fire behaviour**
- Flame retardancy: acc. to IEC 60332-3-24
- Halogen free: acc. to IEC 60754-1/2
- Fire load (reference value): 0.7 MJ/m

**Performance**
- Better than Category 7 acc. to EN 50288 and IEC 61156
- excellent NEXT, excellent shielding characteristics (pairs and overall shielding), low skew, bandwidth (typical) 1150 MHz

**Applications**
- Installation cable for use in structured cabling acc. to ISO/IEC 11801 and EN 50173 (2nd Edition). Ideal for all applications of Classes D to F A, multimedia (video, data, voice) > 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.
- For use in harsh environments due to high-strength H sheath.

**Mechanical characteristics**
- Bending radius during installation: 8 x outer diameter (min.)
- after installation: 4 x outer diameter (min.)
- Tensile strength (max.): 110 N
- Crush strength: 1000 N/100 mm
- Impact strength (number of shocks): 10

**Electromagnetic behaviour**
- Coupling resistance at 10 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 70 dB
- Coupling attenuation up to 1000 MHz (nom.): 85 dB
- Separating class acc. to EN 50174-2: d

---

**Security (fire behaviour)**

<table>
<thead>
<tr>
<th>Security (fire behaviour)</th>
<th>1</th>
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<th>3</th>
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<td>Halogen free</td>
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<tr>
<td>Fire load (reference value)</td>
<td>0.7 MJ/m</td>
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**Performance (cable class, bandwidth)**

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**Industrial application (ethernet, TV)**

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<td>Fire load (reference value)</td>
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**Construction (conductor dimension, tensile strength)**

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**EMC (coupling attenuation)**

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<td>Fire load (reference value)</td>
<td>0.7 MJ/m</td>
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**Electromagnetic behaviour**
- Coupling resistance at 10 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 70 dB
- Coupling attenuation up to 1000 MHz (nom.): 85 dB
- Separating class acc. to EN 50174-2: d

---

**Security**
- Flame retardancy acc. to IEC 60332-3-24
- Halogen free acc. to IEC 60754-1/2
- Fire load (reference value): 0.7 MJ/m

---

**Fire behaviour**
- Flame retardancy acc. to IEC 60332-3-24
- Halogen free acc. to IEC 60754-1/2
- Fire load (reference value): 0.7 MJ/m
### Electrical characteristics (LF) at 20 °C

| Frequency MHz | Direct current resistance typ. Cat. 7, min.* | Insulation resistance typ. Cat. 7, min.* | Mutual capacitance approx. | Capacitive coupling (e) approx. | Signal tempo (c) approx. | Propagation delay approx. | Skew at 100 MHz approx. | Charact. impedance at 100 MHz 100 ± 5 Ω | Testing voltage $U_{\text{eff}}$ 1000 V | Operating voltage max. | Thermal properties | Chemical characteristics |
|---------------|---------------------------------|---------------------------------|---------------------------|-----------------------------|--------------------------|--------------------------|--------------------------|--------------------------------|---------------------|----------------------|------------------------|
| 1             | 75 Ω/km | 5 GΩ x km | 42 pF/m | 1100 pF/km | 0.80 | 420 ns/100 m | 5 ns/100 m | 100 ± 5 Ω | 1000 V | 125 V | For fixed installation: −20 °C to +60 °C | Free of hazardous substances acc. to RoHS 2011/65/EU |
| 10            | 75 Ω/km | 5 GΩ x km | 42 pF/m | 1100 pF/km | 0.80 | 420 ns/100 m | 5 ns/100 m | 100 ± 5 Ω | 1000 V | 125 V | For mobile operation: 0 °C to +50 °C | |
| 100           | 75 Ω/km | 5 GΩ x km | 42 pF/m | 1100 pF/km | 0.80 | 420 ns/100 m | 5 ns/100 m | 100 ± 5 Ω | 1000 V | 125 V | |
| 200           | 75 Ω/km | 5 GΩ x km | 42 pF/m | 1100 pF/km | 0.80 | 420 ns/100 m | 5 ns/100 m | 100 ± 5 Ω | 1000 V | 125 V | |
| 500           | 75 Ω/km | 5 GΩ x km | 42 pF/m | 1100 pF/km | 0.80 | 420 ns/100 m | 5 ns/100 m | 100 ± 5 Ω | 1000 V | 125 V | |
| 1000          | 75 Ω/km | 5 GΩ x km | 42 pF/m | 1100 pF/km | 0.80 | 420 ns/100 m | 5 ns/100 m | 100 ± 5 Ω | 1000 V | 125 V | |
| 1150          | 75 Ω/km | 5 GΩ x km | 42 pF/m | 1100 pF/km | 0.80 | 420 ns/100 m | 5 ns/100 m | 100 ± 5 Ω | 1000 V | 125 V | |


### Electrical characteristics (HF) at 20 °C

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<th>Attenuation NEXT dB</th>
<th>PS-NEXT dB</th>
<th>PS-ACR dB at 100 m</th>
<th>EL-FEXT dB at 100 m</th>
<th>PS-ELFEXT dB at 100 m</th>
<th>RL dB</th>
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<td>102</td>
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<td>10</td>
<td>4.8</td>
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<td>102</td>
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<td>101</td>
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<tr>
<td>100</td>
<td>16.3</td>
<td>18.5</td>
<td>105</td>
<td>75.4</td>
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<tr>
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<td>24.3</td>
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### Cable printing

- LEONI MegaLine F10-115 S/F 4P HV "CPR Class" "DoP no."
- "VDE mark" Made in Germany "Batch number" "Metre marking"
- Colour code: WH/BU, WH/OG, WH/GN, WH/BN

### Certificates and approvals

- Quality mark with production control: <VDE>, GHMT PVP
- Link performance: LEONI MegaLine® systems and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU):
  - Dimension Outer Ø approx.
  - Weight approx.
  - Copper no.*
  - CPR class
  - DoP no.
  - Sheath colour
  - Order no.

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<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
<th>Order no.</th>
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<td>77</td>
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<td>CDES50000004S</td>
<td>● Rape yellow</td>
<td>LKD 7K57 0049 xxxx</td>
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Packaging: xxxx
Standard length: 0100 = 1000 m 0050 = 500 m 0000 = general

* see page 17: Definition of copper no.
Type KS-02YSC2Y 4x2xAWG 23/1 PIMF

**Conductor**
Bare copper wire, AWG 23/1

**Insulation**
Cellular PE, core Ø: nominal value 1.4 mm

**Twisting element**
Pair

**Individual shielding**
Aluminium bonded polyester foil, metal on the outside (PIMF)

**Twisting**
4 pairs

**Overall shielding**
Tinned copper braid

**Outer sheath**
PE

---

**Advantages**
- Better than Category 7
- Bandwidth 1000 MHz
- Excellent shielding characteristics
- For installation outdoors and in the ground
- PVP-GHMT
- RoHS and REACH conformity

---

**Fire behaviour**
- Halogen free: acc. to IEC 60754-1/2
- Smoke density: acc. to IEC 60754-1/2

**Performance**
- Better than Category 7 acc. to EN 50288 and IEC 61156
- Excellent NEXT, excellent shielding characteristics (pairs and overall shielding), low skew, bandwidth (typical) 900 MHz

**Applications**
Ideal for all applications of Classes D to F, multimedia (video, data voice) > 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.
For use outdoors and underground installation.

**Mechanical characteristics**
- Bending radius during installation: 8 x outer diameter (min.)
- after installation: 4 x outer diameter (min.)
- Tensile strength: 110 N
- Crush strength: 2000 N/100 mm
- Impact strength (number of shocks): 20

**Electromagnetic behaviour**
- Coupling resistance at 10 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 70 dB
- Coupling attenuation up to 1000 MHz (nom.): 85 dB
- Separating class acc. to EN 50174-2: d

**Security (fire behaviour)**

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**Performance (cable class, bandwidth)**

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**Industrial application (ethernet, TV)**

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<td>AWG 24</td>
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**Construction (conductor dimension, tensile strength)**

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<td>&gt; 60 dB</td>
<td>&gt; 70 dB</td>
<td>&gt; 80 dB</td>
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**EMC (coupling attenuation)**
## Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation dB/100 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>EL-FEXT dB at 100 m</th>
<th>PS-ELFEXT dB at 100 m</th>
<th>RL dB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>typ.</td>
<td>Cat. 7 max.*</td>
<td>typ.</td>
<td>Cat. 7 min.*</td>
<td>typ.</td>
<td>Cat. 7 min.*</td>
<td>typ.</td>
<td>Cat. 7 min.*</td>
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<td>98</td>
<td>74</td>
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<tr>
<td>100</td>
<td>17.8</td>
<td>18.5</td>
<td>102</td>
<td>72</td>
<td>99</td>
<td>69</td>
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<td>24.5</td>
<td>26.8</td>
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<td>99</td>
<td>65</td>
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<td>42.9</td>
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<td>92</td>
<td>61</td>
<td>89</td>
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<td>87</td>
<td>-</td>
<td>39</td>
<td>-</td>
</tr>
<tr>
<td>800</td>
<td>50.8</td>
<td>-</td>
<td>90</td>
<td>-</td>
<td>87</td>
<td>-</td>
<td>39</td>
<td>-</td>
</tr>
<tr>
<td>900</td>
<td>55.1</td>
<td>-</td>
<td>85</td>
<td>-</td>
<td>82</td>
<td>-</td>
<td>30</td>
<td>-</td>
</tr>
</tbody>
</table>

* EN 50288-4-1 (2014)/IEC 61156-5 (2009)

## Electrical characteristics (LF) at 20 °C

- **Direct current resistance**: max. 75 Ω/km
- **Insulation resistance**: min. 5 GΩ x km
- **Mutual capacitance**: approx. 42 pF/m
- **Capacitive coupling (e)**: approx. 1100 pF/km
- **Signal tempo (c)**: approx. 0.80 μs
- **Propagation delay**: approx. 420 ns/100 m
- **Skew at 100 MHz**: approx. 5 ns/100 m
- **Charact. impedance (RL)**: max. 100 ± 5 Ω
- **Testing voltage U_{eff}**: 1000 V
- **Operating voltage**: max. 125 V

### Thermal properties

- **For fixed installation**: -25 °C to +70 °C
- **For mobile operation**: -10 °C to +50 °C

### Chemical characteristics

- Free of hazardous substances acc. to RoHS 2011/65/EU
- UV resistance according to UL 1581 and ISO 4892,
- Free of lacquer-wetting substances (e.g. silicon oil)

## Cable printing

- LEONI MegaLine F6-90 S/F 4P 2Y
- Made in Germany “Batch number” “Metre marking”

## Colour code

- WH/BU, WH/OG, WH/GN, WH/BN

## Certificates and approvals

- Quality mark with production control: GHMT PVP
- Link performance: LEONI MegaLine® systems and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU):

## Dimension

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>Sheath colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>kg/km</td>
<td>kg/km</td>
<td></td>
<td>LKD 7K57 0169 xxxx</td>
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<td>4P</td>
<td>9.0</td>
<td>70</td>
<td>35</td>
<td>Jet black</td>
<td></td>
</tr>
</tbody>
</table>
**MegaLine® D1–20 SF/U 2Y**

Category 5

**Type KS-02YS(ST+C)H2Y  4x2xAWG 24/1**

**Construction for 4P**

**Conductor**
- Bare copper wire, AWG 24/1

**Insulation**
- Cellular PE, core Ø: nominal value 1.1 mm

**Twisting element**
- Pair

**Twisting**
- 4 pairs

**Overall shielding**
- Aluminium bonded polyester foil and Tinned copper braid

**Inner sheath**
- Halogen-free, flame-retardant compound

**Outer sheath**
- PE

**Advantages**
- Better than Category 5
- Bandwidth 200 MHz
- Good shielding characteristics
- For installation outdoors and in the ground
- RoHS and REACH conformity

**Fire behaviour**
- Halogen free
- Smoke density: acc. to IEC 60754-1/2
- Fire load (reference value): 1.88 MJ/m

**Performance**
- Better than Category 5 acc. to EN 50288 and IEC 61156
- Excellent shielding characteristics, bandwidth (typical): 200 MHz

**Applications**
- Installation cable for use in structured cabling acc. to ISO/IEC 11801 and EN 50173 (3rd Edition). Ideal for all applications of classes D up to 1 GbE acc. to IEEE 802.3 ab, VoIP, PoE/PoE+/4PPoE.
- For use outdoors and underground installation.

**Mechanical characteristics**
- Bending radius: 8 x outer diameter (min.) during installation and 4 x outer diameter (min.) after installation
- Tensile strength (max.): 85 N
- Crush strength: 3000 N/100 mm
- Impact strength (number of shocks): 50

**Electromagnetic behaviour**
- Coupling resistance at 10 MHz (nom.): 10 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 55 dB
- Coupling attenuation up to 1000 MHz (nom.): 70 dB
- Separating class acc. to EN 50174-2: c

**Security (fire behaviour)**

<table>
<thead>
<tr>
<th>S</th>
<th>IEC 60332-2-2</th>
<th>IEC 60332-1-2</th>
<th>IEC 60332-3-24</th>
<th>4 EFP Grade 1</th>
<th>5 EFP Grade 2</th>
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</thead>
<tbody>
<tr>
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<td>&gt; Class E &gt; 500 MHz</td>
<td>&gt; Class F &gt; 600 MHz</td>
<td>&gt; Class F &gt; 1000 MHz</td>
<td>&gt; Class F &gt; 1200 MHz</td>
</tr>
<tr>
<td>2</td>
<td>&gt; Class E &gt; 250 MHz</td>
<td>&gt; Class E &gt; 500 MHz</td>
<td>&gt; Class F &gt; 600 MHz</td>
<td>&gt; Class F &gt; 1000 MHz</td>
<td>&gt; Class F &gt; 1200 MHz</td>
</tr>
<tr>
<td>3</td>
<td>&gt; Class F &gt; 600 MHz</td>
<td>&gt; Class F &gt; 1000 MHz</td>
<td>&gt; Class F &gt; 1200 MHz</td>
<td>&gt; Class F &gt; 1200 MHz</td>
<td>&gt; Class F &gt; 1200 MHz</td>
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<td>4</td>
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<td>&gt; Class F &gt; 1200 MHz</td>
<td>&gt; Class F &gt; 1200 MHz</td>
<td>&gt; Class F &gt; 1200 MHz</td>
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<td>&gt; Class F &gt; 1200 MHz</td>
<td>&gt; Class F &gt; 1200 MHz</td>
<td>&gt; Class F &gt; 1200 MHz</td>
<td>&gt; Class F &gt; 1200 MHz</td>
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</tbody>
</table>

**Performance (cable class, bandwidth)**

<table>
<thead>
<tr>
<th>P</th>
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<th>&gt; 1 GbE</th>
<th>up to 10 GbE</th>
<th>&gt; 10 GbE</th>
<th>&gt; 10 GbE TV</th>
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<tbody>
<tr>
<td>1</td>
<td>AWG 27</td>
<td>AWG 26/25</td>
<td>AWG 24</td>
<td>AWG 23</td>
<td>AWG 22</td>
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</table>

**Industrial application (ethernet, TV)**

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<tr>
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<th>&gt; 60 dB</th>
<th>&gt; 70 dB</th>
<th>&gt; 80 dB</th>
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<td>4</td>
<td>5</td>
<td>6</td>
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</table>

**Construction (conductor dimension, tensile strength)**

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<th>AWG 26/25</th>
<th>AWG 24</th>
<th>AWG 23</th>
<th>AWG 22</th>
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<tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>5</td>
<td></td>
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<td></td>
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</table>

**EMC (coupling attenuation)**
### Electrical characteristics (LF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Direct current resistance</th>
<th>Insulation resistance</th>
<th>Mutual capacitance</th>
<th>Capacitive coupling (e)</th>
<th>Signal tempo (c)</th>
<th>Propagation delay</th>
<th>Skew at 100 MHz</th>
<th>Character impedance</th>
<th>Testing voltage $U_{\text{eff}}$</th>
<th>Operating voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.1</td>
<td>75</td>
<td>4</td>
<td>110</td>
<td>440</td>
<td>440</td>
<td>17.6</td>
<td>100 ± 5</td>
<td>1000</td>
<td>125</td>
</tr>
<tr>
<td>4</td>
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<td>440</td>
<td>440</td>
<td>17.6</td>
<td>100 ± 5</td>
<td>1000</td>
<td>125</td>
</tr>
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<td>10</td>
<td>5.3</td>
<td>62</td>
<td>6</td>
<td>110</td>
<td>440</td>
<td>440</td>
<td>17.6</td>
<td>100 ± 5</td>
<td>1000</td>
<td>125</td>
</tr>
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<td>16</td>
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<td>110</td>
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<td>440</td>
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<td>100 ± 5</td>
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<td>31.25</td>
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<td>9</td>
<td>110</td>
<td>440</td>
<td>440</td>
<td>17.6</td>
<td>100 ± 5</td>
<td>1000</td>
<td>125</td>
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<tr>
<td>62.5</td>
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<td>110</td>
<td>440</td>
<td>440</td>
<td>17.6</td>
<td>100 ± 5</td>
<td>1000</td>
<td>125</td>
</tr>
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<td>440</td>
<td>440</td>
<td>17.6</td>
<td>100 ± 5</td>
<td>1000</td>
<td>125</td>
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<tr>
<td>155</td>
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<td>42</td>
<td>18</td>
<td>110</td>
<td>440</td>
<td>440</td>
<td>17.6</td>
<td>100 ± 5</td>
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<td>125</td>
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<td>440</td>
<td>17.6</td>
<td>100 ± 5</td>
<td>1000</td>
<td>125</td>
</tr>
</tbody>
</table>

### Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB</th>
<th>PS-ACR dB at 100 m</th>
<th>EL-FEXT dB at 100 m</th>
<th>PS-ELFEXT dB at 100 m</th>
<th>RL dB</th>
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<tbody>
<tr>
<td>1</td>
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<td>73</td>
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<td>28</td>
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<td>62.5</td>
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<td>22</td>
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<td>37</td>
<td>37</td>
<td>14</td>
<td>37</td>
<td>45</td>
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</table>

### Thermal properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td>For fixed installation</td>
<td>-25 °C to +70 °C</td>
</tr>
<tr>
<td>For mobile operation</td>
<td>-10 °C to +50 °C</td>
</tr>
</tbody>
</table>

### Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU
UV resistance according to UL 1581 and ISO 4892

### Cable printing

**Inner sheath**
LEONI MegaLine D1–20 SF/U 4P H "CPR Class" "DoP no."
Made in Germany "Batch number" "Metre marking"

**Outer sheath**
LEONI MegaLine D1–20 SF/U 4P H2Y
Made in Germany "Batch number" "Metre marking"

**Colour code**
WH-BU/BU, WH-OG/OG, WH-GN/GN,WH-BN/BN

### Certificates and approvals

Link performance: LEONI MegaLine® systems
and other commonly available connector systems
Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
Compliant with LVD (2014/35/EU):

---

### Dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>Sheath colour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>kg/km</td>
<td>kg/km</td>
<td></td>
</tr>
<tr>
<td>4P</td>
<td>8.8</td>
<td>70</td>
<td>26</td>
<td>Jet black</td>
</tr>
</tbody>
</table>

* see page 17: Definition of copper no.
MegaLine® D1–20 SF/U HQH
Category 5

Type KS-02YS(ST+C)HHQH 4x2xAWG 24/1

Conductor
Bare copper wire, AWG 24/1

Insulation
Cellular PE, core Ø: nominal value 1.1 mm

Twisting element
Pair

Twisting
4 pairs

Overall shielding
Aluminium bonded polyester foil and Tinned copper braid

Inner sheath
2 layers of halogen-free, flame-retardant compound

Armour
Galvanised steel wire braiding

Outer sheath
halogen-free, flame-retardant compound

Advantages
- Better than Category 5
- Bandwidth 200 MHz
- Good shielding characteristics
- For installation in outdoor areas
- And in harsh environments
- RoHS and REACH conformity

Security (fire behaviour)

<table>
<thead>
<tr>
<th>1</th>
<th>IEC 60332-2-2</th>
<th>2</th>
<th>IEC 60332-1-2</th>
<th>3</th>
<th>IEC-60332-3-24</th>
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<th>EFP Grade 2</th>
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<tbody>
<tr>
<td>S</td>
<td>1</td>
<td>Class E</td>
<td>&gt; 250 MHz</td>
<td>2</td>
<td>Class E</td>
<td>&gt; 500 MHz</td>
<td>3</td>
<td>Class F</td>
<td>&gt; 600 MHz</td>
</tr>
</tbody>
</table>
| Performance (cable class, bandwidth)

Industrial application (ethernet, TV)

<table>
<thead>
<tr>
<th>1</th>
<th>&gt; 100 MbE</th>
<th>2</th>
<th>&gt; 1 GbE</th>
<th>3</th>
<th>up to 10 GbE</th>
<th>4</th>
<th>&gt; 10 GbE</th>
<th>5</th>
<th>&gt; 10 GbE TV</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1</td>
<td>AWG 27</td>
<td>2</td>
<td>AWG 26/25</td>
<td>3</td>
<td>AWG 24</td>
<td>4</td>
<td>AWG 23</td>
<td>5</td>
</tr>
</tbody>
</table>
| Construction (conductor dimension, tensile strength)

EMC (coupling attenuation)

<table>
<thead>
<tr>
<th>1</th>
<th>&gt; 40 dB</th>
<th>2</th>
<th>&gt; 50 dB</th>
<th>3</th>
<th>&gt; 60 dB</th>
<th>4</th>
<th>&gt; 70 dB</th>
<th>5</th>
<th>&gt; 80 dB</th>
</tr>
</thead>
</table>

Mechanical characteristics
- Bending radius during installation: 8 x outer diameter (min.)
- After installation: 4 x outer diameter (min.)
- Tensile strength (max.): 1200 N
- Crush strength: 3000 N/100 mm
- Impact strength (number of shocks): 50

Electromagnetic behaviour
- Coupling resistance at 10 MHz (nom.): 10 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 55 dB
- Coupling attenuation up to 1000 MHz (nom.): 70 dB
- Separating class acc. to EN 50174-2: 60 dB

Fire behaviour
- Flame retardancy: acc. to IEC 60332-1-2
- Smoke density: acc. to IEC 60754-1/2
- Fire load (reference value): 2.1 MJ/m

Performance
Better than Category 5 acc. to EN 50288 and IEC 61156
Excellent shielding characteristics, bandwidth (typical): 200 MHz

Applications
Ideal for all applications of Classes D up to 1 GbE acc. to IEEE 802.3 ab, cable sharing, VoIP, PoE/PoE+/4PPoE. For universal indoor and outdoor use.
### Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation dB/100 m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 100 m</th>
<th>PS-ACR dB at 100 m</th>
<th>EL-FEXT dB at 100 m</th>
<th>PS-ELFEXT dB at 100 m</th>
<th>RL dB</th>
</tr>
</thead>
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<td>typ.</td>
<td>Cat. 5 min.*</td>
<td>typ.</td>
<td>Cat. 5 min.*</td>
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</table>


### Electrical characteristics (LF) at 20 °C

- **Direct current resistance**: max. 95 Ω/km
- **Insulation resistance**: min. 5 GΩ x km
- **Mutual capacitance**: approx. 45 pF/m
- **Capacitive coupling (e)**: approx. 1100 pF/km
- **Signal tempo (c)**: approx. 0.75 ns
- **Propagation delay**: approx. 440 ns/100 m
- **Skew at 100 MHz**: approx. 15 ns/100 m
- **Charact. impedance**: at 100 MHz 100 ± 5 Ω
- **Testing voltage Uₜₚ**: 1000 V
- **Operating voltage**: max. 125 V

### Thermal properties
- **For fixed installation**: –20 °C to +60 °C
- **For mobile operation**: 0 °C to +50 °C

### Chemical characteristics
- Free of hazardous substances acc. to RoHS 2011/65/EU

### Cable printing

- **Inner sheath**: LEONI MegaLine D1–20 SF/U 4P H "CPR Class" "DoP no."
- Made in Germany "Batch number" "Metre marking"

- **Outer sheath**: LEONI MegaLine D1–20 SF/U 4P HHQH
- Made in Germany "Batch number" "Metre marking"

### Colour code

### Certificates and approvals
- Link performance: LEONI MegaLine® systems and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU): CE

### Packaging: xxxx
- Standard length: 0100 = 1000 m 0000 = general
- * see page 17: Definition of copper no.

### Copper data cables
## MegaLine® F10-120 S/F 11Y flex
Category 7

### Type KS-02YSC11Y 4x2xAWG 26/7 PIMF

<table>
<thead>
<tr>
<th>Construction for 4P</th>
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<tbody>
<tr>
<td><strong>Conductor</strong></td>
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<tr>
<td><strong>Insulation</strong></td>
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<tr>
<td><strong>Twisting element</strong></td>
</tr>
<tr>
<td><strong>Individual shielding</strong></td>
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<tr>
<td><strong>Twisting</strong></td>
</tr>
<tr>
<td><strong>Overall shielding</strong></td>
</tr>
<tr>
<td><strong>Outer sheath</strong></td>
</tr>
</tbody>
</table>

### Fire behaviour
- Flame retardancy: acc. to IEC 60332-2-2
- Halogen-free: acc. to 60754-1/2
- Smoke density: acc. to IEC 60334-1/2
- Fire load (reference value): 0.7 MJ/m

### Performance
Better than Category 7 acc. to EN 50288 and IEC 61156
excellent NEXT, low attenuation, excellent shielding characteristics
(pairs and overall shielding), low skew, bandwidth (typical) 1200 MHz

### Applications
Connection cable and patch cord for use in structured cabling acc. to
ISO/IEC 11801 and EN 50173 (3rd Edition). Ideal for all applications of Classes D
to F, multimedia (TV, video, data, voice) > 10 GbE acc. to IEEE 802.3 an,
cable sharing, VoIP, PoE/PoE+/4PPoE.
For use in harsh environments due to very rugged PUR sheath.

### Mechanical characteristics
- Bending radius in operation: 5 x outer diameter (min.)
- Tensile strength (max.): 60 N

### Electromagnetic behaviour
- Coupling resistance at 10 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 60 dB
- Coupling attenuation up to 1000 MHz (nom.): 85 dB
- Separating class acc. to EN 50174-2: d

### Security (fire behaviour)

<table>
<thead>
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<td><strong>C</strong></td>
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<td>2 AWG 26/25</td>
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### EMC (coupling attenuation)

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<tbody>
<tr>
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### Advantages
- Better than Category 7
- Bandwidth 1200 MHz
- Excellent shielding characteristics
- For installation in outdoor areas and in harsh environments
- RoHS and REACH conformity
**Electrical characteristics (HF) at 20 °C**

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation (\text{dB}/10\text{m})</th>
<th>NEXT (\text{dB})</th>
<th>PS-NEXT (\text{dB})</th>
<th>ACR (\text{dB at 10m})</th>
<th>PS-ACR (\text{dB at 10m})</th>
<th>EL-FEXT (\text{dB at 10m})</th>
<th>PS-ELFEXT (\text{dB at 10m})</th>
<th>RL (\text{dB})</th>
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<td>–</td>
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<td>1200</td>
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<td>–</td>
<td>67</td>
<td>–</td>
<td>61</td>
<td>–</td>
</tr>
</tbody>
</table>

* EN 50288-4-2(2014)/IEC 61156-6 (2010)

---

**Electrical characteristics (LF) at 20 °C**

- **Direct current resistance**: max. 145 Ω/km
- **Insulation resistance**: min. 5 GΩ x km
- **Mutual capacitance**: approx. 44 pF/m
- **Signal tempo (c)**: approx. 0.78
- **Propagation delay**: approx. 440 ns/100 m
- **Skew at 100 MHz**: approx. 2.5 ns/100 m
- **Charact. impedance**: at 100 MHz 100 ± 5 Ω
- **Testing voltage \(U_{in}\)**: 1000 V
- **Operating voltage**: max. 125 V

**Thermal properties**

- **For fixed installation**: -40 °C to +70 °C
- **For mobile operation**: -10 °C to +50 °C

**Chemical characteristics**

- Free of hazardous substances acc. to RoHS 2011/65/EU
- Oil resistance acc. to EN 60811-2-1
- Microbe resistance acc. to DIN VDE 0282
- Chemical resistance
- Hydrolysis resistance acc. to DIN 53504
- Free of lacquer-wetting substances (e.g. silicon oil)

**Cable printing**

LEONI MegaLine F10-120 S/F flex 4P 11Y

Made in Germany "Batch number" "Metre marking"

**Colour code**

WH/BU, WH/OG, WH/GN, WH/BN

**Certificates and approvals**

- Link performance: LEONI MegaLine® systems
- and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU):

---

**Dimension**

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Packaging: xxxx

Standard length: 0100 = 1000 m 0000 = general

* see page 17: Definition of copper no.
MegaLine® F6-70 S/F 11Y flex
Category 7

Type KS-02YSC11Y 4x2xAWG 24/7 PIMF

Advantages
- Better than Category 7
- Bandwidth 700 MHz
- Excellent shielding characteristics
- For installation in outdoor areas and in harsh environments
- RoHS and REACH conformity

Construction for 4P

Fire behaviour
- Flame retardancy: acc. to IEC 60332-1-2
- Smoke density: acc. to IEC 60341-1/2
- Fire load (reference value): 0.99 MJ/m

Performance
- Better than Category 7 acc. to EN 50288 and IEC 61156
- Excellent NEXT, low attenuation, excellent shielding characteristics (pairs and overall shielding), low skew, bandwidth (typical) 700 MHz

Applications
- Ideal for all applications of Classes D to F, multimedia (video, data, voice), > 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.
- For use in harsh environments due to very rugged PUR sheath.

Mechanical characteristics
- Bending radius: in operation 5 x outer diameter (min.)
- Tensile strength (max.): 100 N
- Crush strength: 1000 N/100 mm
- Impact strength (number of shocks): 10

Electromagnetic behaviour
- Coupling resistance at 10 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 60 dB
- Coupling attenuation up to 1000 MHz (nom.): 90 dB
- Separating class acc. to EN 50174-2: d

Security (fire behaviour)

Performance (cable class, bandwidth)

Industrial application (ethernet, TV)

Construction (conductor dimension, tensile strength)

EMC (coupling attenuation)
## Electrical characteristics (LF) at 20 °C

<table>
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<th>Frequency Mhz</th>
<th>Attenuation dB/10m</th>
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<th>PS-NEXT dB</th>
<th>ACR dB at 10m</th>
<th>PS-ACR dB at 10m</th>
<th>EL-FEXT dB at 10m</th>
<th>PS-ELFEXT dB at 10m</th>
<th>RL dB</th>
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<td>typ. Cat. 7 min.*</td>
<td>typ. Cat. 7 max.*</td>
<td>typ. Cat. 7 min.*</td>
<td>typ. Cat. 7 max.*</td>
<td>typ. Cat. 7 min.*</td>
<td>typ. Cat. 7 max.*</td>
<td>typ. Cat. 7 min.*</td>
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* EN 50288-4-2(2014)/IEC 61156-6 (2010)

## Electrical characteristics (HF) at 20 °C

<table>
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<th>Frequency MHz</th>
<th>Attenuation</th>
<th>NEXT</th>
<th>PS-NEXT</th>
<th>ACR</th>
<th>PS-ACR</th>
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<td>59</td>
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</tbody>
</table>

## Chemical characteristics

- Free of hazardous substances acc. to RoHS 2011/65/EU
- Oil resistance acc. to EN 60811-2-1
- Ozone resistance acc. to EN 60811
- Microbe resistance acc. to DIN VDE 0282
- Chemical resistance
- Hydrolysis resistance acc. to DIN 53504
- Free of lacquer-wetting substances (e.g. silicon oil)

## Cable printing

LEONI MegaLine F6-70 S/F flex 4P 11Y
Made in Germany “Batch number*” “Metre marking”

## Colour code

- WH/BU, WH/OG, WH/GN, WH/BN

## Certificates and approvals

- Link performance: LEONI MegaLine® systems
- Made and other commonly available connector systems
- Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
- Compliant with LVD (2014/35/EU): 

## Physical characteristics

### Thermal properties

- For fixed installation: -40 °C to +70 °C
- For mobile operation: -10 °C to +50 °C

### Copper data cables

**Office**  
**DataCenter**  
**Industry**  
**@home**  
**Copper data cables** | 97

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* see page 17: Definition of copper no.
MegaLine® D1–20 SF/U flex CI
Category 5

Advantages
- Better than Category 5
- Bandwidth 200 MHz
- Excellent shielding characteristics
- Circuit integrity
- RoHS and REACH conformity

System integrity on exposure to fire for at least 90 minutes

Type KS-v2Y(ST+C)H CI 1x4xAWG 22/7

Conductor: bare cooper wire, AWG 22/7
Insulation: PE core
Twisting element: Fire protection foil
Taping: 4 cores
Overall shielding: Aluminium bonded polyester foil and copper braiding, optical coverage approx. 85%
Taping: Fire protection foil
Outer sheath: halogen-free, flame-retardant compound

Fire behaviour
- Flame retardancy: acc. to IEC 60332-3-24 / EN 50266-2-4
- Halogen free: acc. to IEC 60075-1-2
- Fire load: 0.5 MJ/m

Performance
- Better than Category 5 acc. to EN 50288 and IEC 61156
- Excellent shielding characteristics, circuit integrity acc. to FE90 IEC 60331-23, bandwidth (typical) 200 MHz

Applications
- Ideal for all applications of Classes D up to 1 GbE acc. to IEEE 802.3 ab, cable sharing, VoIP, PoE/PoE+/4PPoE and for fire alarm systems.

Mechanical characteristics
- Bending radius during installation: 8 x outer diameter (min.)
- Tensile strength (max.): 60 N
- Crush strength: 1000 N/100 mm
- Impact strength (number of shocks): 10

Electromagnetic behaviour
- Coupling resistance at 50 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 60 dB
- Coupling attenuation up to 1000 MHz (nom.): 85 dB
- Separating class: acc. to EN 50174-2 d

Security (fire behaviour)
- Flame retardancy acc. to IEC 60332-3-24 / EN 50266-2-4
- Halogen free acc. to IEC 60754-1/2
- Smoke density acc. to IEC 61034-1/2
- Fire load (reference value): 0.5 MJ/m

Performance (cable class, bandwidth)
- Better than Category 5 acc. to EN 50288 and IEC 61156
- Excellent shielding characteristics, circuit integrity acc. to FE90 IEC 60331-23, bandwidth (typical) 200 MHz

Industrial application (ethernet, TV)
- Ideal for all applications of Classes D up to 1 GbE acc. to IEEE 802.3 ab, cable sharing, VoIP, PoE/PoE+/4PPoE and for fire alarm systems.

Construction (conductor dimension, tensile strength)

EMC (coupling attenuation)
Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation dB/10m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 10m</th>
<th>PS-ACR dB at 10m</th>
<th>EL-FEXT dB at 100 m</th>
<th>PS-ELFEXT dB at 10m</th>
<th>RL dB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>typ. Cat. S max.*</td>
<td>typ. Cat. S min.*</td>
<td>typ. Cat. 5 max.*</td>
<td>typ. Cat. 5 min.*</td>
<td>typ. Cat. 5 max.*</td>
<td>typ. Cat. 5 min.*</td>
<td>typ. Cat. 5 max.*</td>
<td>typ. Cat. 5 min.*</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>2.1</td>
<td>75</td>
<td>65</td>
<td>72</td>
<td>62</td>
<td>73</td>
<td>63</td>
</tr>
<tr>
<td>4</td>
<td>3.3</td>
<td>4</td>
<td>69</td>
<td>56</td>
<td>66</td>
<td>53</td>
<td>66</td>
<td>52</td>
</tr>
<tr>
<td>10</td>
<td>5.1</td>
<td>6.3</td>
<td>62</td>
<td>50</td>
<td>59</td>
<td>47</td>
<td>57</td>
<td>44</td>
</tr>
<tr>
<td>16</td>
<td>7</td>
<td>8</td>
<td>58</td>
<td>47</td>
<td>55</td>
<td>44</td>
<td>51</td>
<td>39</td>
</tr>
<tr>
<td>31.25</td>
<td>9.7</td>
<td>11.4</td>
<td>53</td>
<td>43</td>
<td>50</td>
<td>40</td>
<td>44</td>
<td>31</td>
</tr>
<tr>
<td>62.5</td>
<td>13.2</td>
<td>16.5</td>
<td>49</td>
<td>38</td>
<td>46</td>
<td>35</td>
<td>36</td>
<td>22</td>
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<tr>
<td>100</td>
<td>17.6</td>
<td>21.3</td>
<td>45</td>
<td>35</td>
<td>42</td>
<td>32</td>
<td>28</td>
<td>14</td>
</tr>
</tbody>
</table>


Electrical characteristics (LF) at 20 °C

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct current resistance</td>
<td>max. 120 Ω/km</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>min. 5 GΩ x km</td>
</tr>
<tr>
<td>Signal tempo (c)</td>
<td>approx. 0.65</td>
</tr>
<tr>
<td>Propagation delay</td>
<td>approx. 530 ns/100 m</td>
</tr>
<tr>
<td>Skew at 100 MHz</td>
<td>approx. 15 ns/100 m</td>
</tr>
<tr>
<td>Charact. impedance</td>
<td>at 100 MHz 100 ± 5 Ω</td>
</tr>
<tr>
<td>Testing voltage U_{im}</td>
<td>700 V</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>max. 80 V</td>
</tr>
</tbody>
</table>

Thermal properties

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>For fixed installation</td>
<td>–20 °C to +60 °C</td>
</tr>
<tr>
<td>For mobile operation</td>
<td>0 °C to +50 °C</td>
</tr>
</tbody>
</table>

Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU

Cable printing

LEONI MegaLine D1–20 SF/U flex 1Q H FIRE RESISTANT
FE90 IEC 60331-23 "Batch number" "Metre marking"

Colour code

WH, YE, BU, OG

Certificates and approvals

Link performance: LEONI MegaLine® systems
and other commonly available connector systems
Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
Compliant with LVD (2014/35/EU): C C

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>Sheath colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>kg/km</td>
<td>kg/km</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4P</td>
<td>6.5</td>
<td>62</td>
<td>30</td>
<td>Jet black</td>
<td>LKD 7KS5 0075 xxxx</td>
</tr>
</tbody>
</table>

Packaging: xxxx
Standard length: 0100 = 1000 m 0000 = general

* see page 17: Definition of copper no.
MegaLine® D1–20 S/U 11Y superflex
Category 5

Type KS-6Y3GC11Y 4x2xAWG 26/19

Advantages
- Better than Category 5
- Bandwidth 100 MHz
- Good shielding characteristics
- Suitable for use with drag chains
- RoHS and REACH conformity

Conductor
- bare copper wire, AWG 26/19

Insulation
- FEP, core Ø: nominal value 1.0 mm

Twisting element
- Pair

Twisting
- 4 pairs

Taping
- Fleece foiling

Inner sheath
- EPDM

Taping
- Fleece foiling

Overall shielding
- copper braiding, optical coverage approx. 90%

Outer sheath
- PUR

Security (fire behaviour)

Performance (cable class, bandwidth)

Industrial application (ethernet, TV)

Construction (conductor dimension, tensile strength)

EMC (coupling attenuation)

Fire behaviour
- Flame retardancy acc. to IEC 60332-2-2
- Fire load (reference value) 0.7 MJ/m

Performance
- Better than Category 5 acc. to EN 50288 and IEC 61156
- Excellent shielding properties, bandwidth (typical): 100 MHz

Applications
- Connection cable and patch cord for use in structured cabling acc. to ISO/IEC 11801 and EN 50173 (3rd Edition). Ideal for all applications of Classes D up to 1 GbE acc. to IEEE 802.3 ab, VoIP, PoE/PoE+/4PPoE.
- For use in harsh environments due to very rugged EPDM inner sheath and highly rugged PUR outer sheath. Suitability for drag chain use (Type 5 million cycles).
- Torsional suitability acc. to EN 50289-3-10. Suitable for use in cleanrooms of air purity class 2 acc. to ISO 14644-1.

Mechanical characteristics
- Bending radius in operation: 5 x outer diameter (min.)
- Tensile strength (max.): 60 N
- Crush strength: 2000 N/100 mm
- Impact strength (number of shocks): 20

Electromagnetic behaviour
- Coupling resistance at 10 MHz (nom.): 100 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 55 dB
- Coupling attenuation up to 1000 MHz (nom.): 75 dB
- Separating class acc. to EN 50174-2: c

---

MegaLine®
www.leoni-data.com
Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency Mhz</th>
<th>Attenuation dB/10m typ.</th>
<th>Cat. S max.</th>
<th>NEXT dB typ.</th>
<th>Cat. S min.</th>
<th>PS-NEXT dB typ.</th>
<th>Cat. S min.</th>
<th>ACR dB at 10m typ.</th>
<th>Cat. S min.</th>
<th>PS-ACR dB at 10m typ.</th>
<th>Cat. S min.</th>
<th>EL-FEXT dB at 10m typ.</th>
<th>Cat. S min.</th>
<th>PS-ELFEXT dB at 10m typ.</th>
<th>Cat. S min.</th>
<th>RL dB typ.</th>
<th>Cat. S min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.22</td>
<td>0.32</td>
<td>80</td>
<td>65</td>
<td>77</td>
<td>62</td>
<td>80</td>
<td>65</td>
<td>77</td>
<td>62</td>
<td>80</td>
<td>64</td>
<td>77</td>
<td>61</td>
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<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0.58</td>
<td>0.60</td>
<td>67</td>
<td>56</td>
<td>64</td>
<td>53</td>
<td>67</td>
<td>56</td>
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<td>53</td>
<td>69</td>
<td>52</td>
<td>66</td>
<td>49</td>
<td>26</td>
<td>23</td>
</tr>
<tr>
<td>10</td>
<td>1.1</td>
<td>1.03</td>
<td>63</td>
<td>50</td>
<td>60</td>
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<td>47</td>
<td>61</td>
<td>44</td>
<td>65</td>
<td>58</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>16</td>
<td>1.4</td>
<td>1.45</td>
<td>61</td>
<td>47</td>
<td>58</td>
<td>44</td>
<td>60</td>
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<td>57</td>
<td>44</td>
<td>56</td>
<td>40</td>
<td>53</td>
<td>37</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>20</td>
<td>1.6</td>
<td>1.6</td>
<td>59</td>
<td>46</td>
<td>56</td>
<td>43</td>
<td>58</td>
<td>44</td>
<td>55</td>
<td>43</td>
<td>53</td>
<td>38</td>
<td>50</td>
<td>35</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>31.25</td>
<td>2.3</td>
<td>2</td>
<td>57</td>
<td>43</td>
<td>54</td>
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<td>30</td>
<td>23.6</td>
</tr>
<tr>
<td>62.5</td>
<td>3.2</td>
<td>3</td>
<td>52</td>
<td>38</td>
<td>49</td>
<td>35</td>
<td>50</td>
<td>36</td>
<td>47</td>
<td>35</td>
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<td>40</td>
<td>25</td>
<td>28</td>
<td>21.5</td>
</tr>
<tr>
<td>100</td>
<td>4.2</td>
<td>4</td>
<td>45</td>
<td>35</td>
<td>42</td>
<td>32</td>
<td>42</td>
<td>32</td>
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<td>32</td>
<td>38</td>
<td>24</td>
<td>35</td>
<td>21</td>
<td>26</td>
<td>20.1</td>
</tr>
</tbody>
</table>


Electrical characteristics (LF) at 20 °C

<table>
<thead>
<tr>
<th>Direct current resistance</th>
<th>max.</th>
<th>130 Ω/km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation resistance</td>
<td>min.</td>
<td>5 GΩ x km</td>
</tr>
<tr>
<td>Mutual capacitance</td>
<td>approx.</td>
<td>50 pF/m</td>
</tr>
<tr>
<td>Signal tempo (c)</td>
<td>approx.</td>
<td>0.68</td>
</tr>
<tr>
<td>Propagation delay</td>
<td>approx.</td>
<td>490 ns/100 m</td>
</tr>
<tr>
<td>Skew at 100 MHz</td>
<td>approx.</td>
<td>15 ns/100 m</td>
</tr>
<tr>
<td>Charact. impedance at 100 MHz</td>
<td>100 ± 5 Ω</td>
<td></td>
</tr>
<tr>
<td>Testing voltage U_int</td>
<td>max.</td>
<td>1000 V</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>max.</td>
<td>125 V</td>
</tr>
</tbody>
</table>

Thermal properties

- For fixed installation: –40 °C to +85 °C
- For mobile operation: 0 °C to +50 °C

Cable printing

LEONI MegaLine D1–20 S/U superflex 4P 11Y
Made in Germany “Batch number“ *“Metre marking“

Chemical characteristics

- Free of hazardous substances acc. to RoHS 2011/65/EU
- Oil resistance acc. to EN 60811-2-1
- Ozone resistance acc. to EN 60811
- Cleanability acc. to riboflavin test (VDMA)
- Microbe resistance acc. to DIN VDE 0282
- Chemicals resistance acc. to ISO 2812-1 and ISO 4628-1: excellent
- Hydrolysis resistance acc. to DIN 53504
- Free of lacquer-wetting substances (e.g. silicon oil)
- Emissions response of TVOC according to ISO 14644-8: ISO-AMCm-8,1

Colour code

GY/OG, BK/RD, GNYE, BU/BN

Certificates and approvals

- Quality mark with production control:
  - Fraunhofer IPA Tested Device Report No. LE 1212-626
  - Link performance: LEONI MegaLine® systems
  - and other commonly available connector systems
  - Test certificates: according to DIN 55350-18-4.2.1 or EN 10204
  - Compliant with LVD (2014/35/EU):

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>Sheath colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4P</td>
<td>6.8</td>
<td>58</td>
<td>28.6</td>
<td>Rape yellow</td>
<td>LKD 7KS5 0051 xxxx</td>
</tr>
</tbody>
</table>
MegaLine® home 600
Category 7

Type KS-02YSCH 4x2xAWG 26/1 PIMF

Advantages
- Category 7 up to 65 m
- Highly flexible, thin and light
- White sheath, perfect for your home

Fire behaviour
- Flame retardancy: acc. to IEC 60332-1-2
- Halogen free: acc. to IEC 60754-1/2
- Smoke density: acc. to IEC 60332-3-1
- Fire load (reference value): 0.4 MJ/m
- EU Construction Products Regulation: acc. to EN 50575 / EN 50399

Security (fire behaviour)

Performance (cable class, bandwidth)

Applications (ethernet, TV)

Mechanical characteristics
- Bending radius during installation: 8 x outer diameter (min.)
- Tensile strength (max.): 50 N
- Crush strength: 1000 N/100 mm
- Impact strength (number of shocks): 10

Electromagnetic behaviour
- Coupling resistance at 10 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 70 dB
- Coupling attenuation up to 1000 MHz (nom.): 85 dB
- Separating class acc. to EN 50174-2: d

Conductor: Bare copper wire, AWG 26/1
Insulation: Cellular PE, core Ø: nominal value 1.0 mm
Twisting element: Pair
Individual shielding: Aluminium bonded polyester foil, metal on the outside (PIMF)
Twisting: 4 pairs
Overall shielding: Tinned copper braid
Outer sheath: halogen-free, flame-retardant compound

Performance
Better than Category 7 acc. to EN 50288 and IEC 61156, excellent NEXT, excellent shielding characteristics (pairs and overall shielding), low skew.
High degree of installation comfort and space-saving due to small diameter and tending radius as well as low weight. Bandwidth (typical) 700 MHz

Applications
Installation cable for household cabling.
Ideal for all applications of Classes D bis F, multimedia (video, data voice)
> 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.
For transmission links of max. 65 m.

Mechanical characteristics
- Bending radius during installation: 8 x outer diameter (min.)
- Tensile strength (max.): 50 N
- Crush strength: 1000 N/100 mm
- Impact strength (number of shocks): 10

Electromagnetic behaviour
- Coupling resistance at 10 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 70 dB
- Coupling attenuation up to 1000 MHz (nom.): 85 dB
- Separating class acc. to EN 50174-2: d

Applications
Installation cable for household cabling.
Ideal for all applications of Classes D bis F, multimedia (video, data voice)
> 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.
For transmission links of max. 65 m.

Mechanical characteristics
- Bending radius during installation: 8 x outer diameter (min.)
- Tensile strength (max.): 50 N
- Crush strength: 1000 N/100 mm
- Impact strength (number of shocks): 10

Electromagnetic behaviour
- Coupling resistance at 10 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 70 dB
- Coupling attenuation up to 1000 MHz (nom.): 85 dB
- Separating class acc. to EN 50174-2: d

Applications
Installation cable for household cabling.
Ideal for all applications of Classes D bis F, multimedia (video, data voice)
> 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.
For transmission links of max. 65 m.

Mechanical characteristics
- Bending radius during installation: 8 x outer diameter (min.)
- Tensile strength (max.): 50 N
- Crush strength: 1000 N/100 mm
- Impact strength (number of shocks): 10

Electromagnetic behaviour
- Coupling resistance at 10 MHz (nom.): 5 mΩ/m
- Shield attenuation up to 1000 MHz (nom.): 70 dB
- Coupling attenuation up to 1000 MHz (nom.): 85 dB
- Separating class acc. to EN 50174-2: d

Applications
Installation cable for household cabling.
Ideal for all applications of Classes D bis F, multimedia (video, data voice)
> 10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE/PoE+/4PPoE.
For transmission links of max. 65 m.
## Electrical characteristics (LF) at 20 °C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct current resistance</td>
<td>max. 145 Ω/km</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>min. 5 GΩ x km</td>
</tr>
<tr>
<td>Mutual capacitance</td>
<td>approx. 44 pF/m</td>
</tr>
<tr>
<td>Capacitive coupling (e)</td>
<td>approx. 1100 pF/km</td>
</tr>
<tr>
<td>Signal tempo (c)</td>
<td>approx. 0.71 ns/100 m</td>
</tr>
<tr>
<td>Propagation delay</td>
<td>approx. 440 ns</td>
</tr>
<tr>
<td>Skew at 100 MHz</td>
<td>approx. 5 ns/100 m</td>
</tr>
<tr>
<td>Charact. Impedance</td>
<td>at 100 MHz 100 ± 5 Ω</td>
</tr>
<tr>
<td>Testing voltage U_eff</td>
<td>1000 V</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>max. 125 V</td>
</tr>
</tbody>
</table>

### Thermal properties

- For fixed installation: -20 °C to +60 °C
- For mobile operation: 0 °C to +50 °C

### Chemical characteristics

Free of hazardous substances acc. to RoHS 2011/65/EU

---

## Electrical characteristics (HF) at 20 °C

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Attenuation dB/10m</th>
<th>NEXT dB</th>
<th>PS-NEXT dB</th>
<th>ACR dB at 10m</th>
<th>PS-ACR dB at 10m</th>
<th>EL-FeXT dB at 10m</th>
<th>PS-ELFeXT dB at 10m</th>
<th>RL dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>typ. 0.25</td>
<td>Cat. 7 max.* 0.29</td>
<td>typ. 100 80</td>
<td>97 77</td>
<td>100 80</td>
<td>97 77</td>
<td>100 80</td>
<td>97 80</td>
</tr>
<tr>
<td>10</td>
<td>typ. 0.76</td>
<td>Cat. 7 min.* 0.85</td>
<td>typ. 99 80</td>
<td>96 77</td>
<td>99 79</td>
<td>96 77</td>
<td>95 74</td>
<td>92 71</td>
</tr>
<tr>
<td>100</td>
<td>typ. 2.49</td>
<td>Cat. 7 min.* 2.78</td>
<td>typ. 95 72</td>
<td>92 69</td>
<td>93 70</td>
<td>90 69</td>
<td>69 54</td>
<td>66 51</td>
</tr>
<tr>
<td>200</td>
<td>typ. 3.69</td>
<td>Cat. 7 min.* 4.01</td>
<td>typ. 92 68</td>
<td>89 65</td>
<td>88 64</td>
<td>85 65</td>
<td>65 48</td>
<td>62 45</td>
</tr>
<tr>
<td>250</td>
<td>typ. 4.18</td>
<td>Cat. 7 min.* 4.53</td>
<td>typ. 90 66</td>
<td>87 63</td>
<td>86 62</td>
<td>83 61</td>
<td>62 46</td>
<td>59 43</td>
</tr>
<tr>
<td>500</td>
<td>typ. 5.6</td>
<td>Cat. 7 min.* 6.62</td>
<td>typ. 83 62</td>
<td>80 59</td>
<td>78 55</td>
<td>75 59</td>
<td>54 40</td>
<td>40 37</td>
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<tr>
<td>600</td>
<td>typ. 6.74</td>
<td>Cat. 7 min.* 7.33</td>
<td>typ. 81 61</td>
<td>78 58</td>
<td>74 53</td>
<td>71 58</td>
<td>50 38</td>
<td>47 35</td>
</tr>
<tr>
<td>700</td>
<td>typ. 7.32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* EN 50288-4-2 (2014)/IEC 61156-6 (2010)

---

## Cable printing

LEONI MegaLine home 600 Made in Germany "CPR Class" "DoP no." "Batch number" "Metre marking"

## Colour code

WH/BU, WH/OG, WH/GN, WH/BN

## Certificates and approvals

- Link performance: Excellently suited for use with MegaLine® Connect45 and MegaLine® patch connection components
- Compliant with LVD (2014/35/EU):
- Compliant with Construction Products Regulation (EU/305/2011):

---

## Dimension

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Outer Ø approx.</th>
<th>Weight approx.</th>
<th>Copper no.*</th>
<th>CPR class</th>
<th>DoP no.</th>
<th>Sheath colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4P</td>
<td>5.7</td>
<td>39</td>
<td>20</td>
<td>Dₐ,s₂ d₂ a₁</td>
<td>CDESK0000031</td>
<td>○ Signal white</td>
<td>LKD 7KS7 0304 xxxx</td>
</tr>
</tbody>
</table>

Packaging: xxxx
Standard length: 0100 = 1000 m 0035 = 305 m 0010 = 100 m 0000 = general

* see page 17: Definition of copper no.
MegaLine® Connect100
Cu connectivity

Upgrade your performance to Cat. 6A, 7, 7A, 8.2…
MegaLine® Connect100
The cabling system from 10 – 40 Gbit/s

<table>
<thead>
<tr>
<th>MegaLine® Connect100 Cu connectivity</th>
<th>page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ready for 40 Gbit/s</td>
<td>106</td>
</tr>
<tr>
<td>Perfection in efficiency, future-orientation &amp; electrical performance</td>
<td></td>
</tr>
<tr>
<td>40 GBASE-T over copper</td>
<td>108</td>
</tr>
<tr>
<td>The cabling system from 10 – 40 Gbit/s – system overview</td>
<td>110</td>
</tr>
<tr>
<td>Cable plug</td>
<td>112</td>
</tr>
<tr>
<td>• Cable plug Cat. 7,</td>
<td></td>
</tr>
<tr>
<td>• Cable plug flex Cat. 7,</td>
<td></td>
</tr>
<tr>
<td>Jack modules</td>
<td>113</td>
</tr>
<tr>
<td>• Jack module BC 7A Cat. 7,</td>
<td></td>
</tr>
<tr>
<td>• Jack module 4K 7A Cat. 7,</td>
<td></td>
</tr>
<tr>
<td>• Jack module RJ 4S Cat. 6,</td>
<td></td>
</tr>
<tr>
<td>Interface</td>
<td>114</td>
</tr>
<tr>
<td>• Interface</td>
<td></td>
</tr>
<tr>
<td>• Interface connector solid/flex</td>
<td></td>
</tr>
<tr>
<td>Wall outlets for MegaLine® Connect100 jack modules</td>
<td>115</td>
</tr>
<tr>
<td>• 50 x 50</td>
<td></td>
</tr>
<tr>
<td>• 45 x 45</td>
<td></td>
</tr>
<tr>
<td>Modular patch panel set 19” / 1RU</td>
<td>116</td>
</tr>
<tr>
<td>Patch panel 19”</td>
<td>117</td>
</tr>
<tr>
<td>unequipped</td>
<td></td>
</tr>
<tr>
<td>DIN rail housing</td>
<td>117</td>
</tr>
<tr>
<td>dual, with DIN rail clip</td>
<td></td>
</tr>
<tr>
<td>MegaLine® accessories &amp; cable assembly tools</td>
<td>118</td>
</tr>
<tr>
<td>• Blind cover</td>
<td></td>
</tr>
<tr>
<td>• Dust cap</td>
<td></td>
</tr>
<tr>
<td>• Wadeless side cutter</td>
<td></td>
</tr>
<tr>
<td>• Crimping tool</td>
<td></td>
</tr>
<tr>
<td>• Stripping tool</td>
<td></td>
</tr>
<tr>
<td>• Assembly aid</td>
<td></td>
</tr>
<tr>
<td>• Test adapter</td>
<td></td>
</tr>
</tbody>
</table>

Office
DataCenter
Industry
MegaLine® – Ready for 40 GBit/s
Perfection in efficiency, future-orientation & electrical performance

The MegaLine® comprises the new G20 S/F and G20 S/F flex data cable and the 40-Gbit/s-compatible MegaLine® Connect100 cable plug. The connection is created as required by simply plugging in the desired jack module (RJ45, ARJ45™, TERA™, interface).

**MegaLine® data cable Cat. 7, A**

<table>
<thead>
<tr>
<th>Standard/Information</th>
<th>Category</th>
<th>Maximum Data Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC 61076-3-104</td>
<td>Cat. 7</td>
<td>25 / 40 GBit/s</td>
</tr>
<tr>
<td>IEC 61076-3-110</td>
<td>Cat. 7</td>
<td>25 / 40 GBit/s</td>
</tr>
<tr>
<td>IEC 61076-3-111</td>
<td>Cat. 7</td>
<td>25 / 40 GBit/s</td>
</tr>
<tr>
<td>IEC 60603-7-51</td>
<td>Cat. 6a</td>
<td>10 Gbit/s</td>
</tr>
</tbody>
</table>

**Economy >>**
- Unique cable connection with multiple uses
- Replaceable jack modules
- Varying performance
- Low maintenance and service costs
- Short assembly and upgrade time
- Pre-assembled links (low downtime)

**Performance >>**
Ready for 25 / 40 GBASE-T

**Easy to assemble >>**
- Unique cable connection with multiple uses
- Modular construction
- Pre-assembled links

**Outstanding quality >>**
Independently monitored by the GHMT Premium Verification Program
The combination of high-quality individual components is reflected in the results of the channel measurement (class II). According to the current Edition of ISO/IEC 11801 (3rd edition), good reserves are achieved.

Technological leap: 40 GBASE-T

The next 40 GBASE-T technological leap, driven by the demand for increasingly higher performance on the active component side, requires the technological improvement of passive system technology.

- FO Core Networking Doubling = 18 mos
- Copper Server I/O Doubling = 24 mos
MegaLine® – 40 GBASE-T over copper

40 GBASE-T system technology areas of application: End of Row / Top of Rack topology:

The requirements for the following transmission links in the data center are specified under the designation IEEE 802.3bj:

- EoR/MoR: Server switch links of up to 30 m with 2 connectors
- ToR: "Port to Port2 links using patch cords of 5 m to 10 m
- Range limitation to 7 m with 8-pair CR4 Twinax cables (Top-of-Rack cabling)
- Reduced cost efficiency and migration capability with 8-fiber OM3/OM4 FO cables (End-of-Row cabling)
- Poor economic efficiency of 2-fiber SM-FO cables (1310 CWDM / 1550 nm) up to 10 km / 2 km

The reasons for the introduction of the new Ethernet standards mainly include the deficits of existing solutions according to IEEE 802.3ba for 40 GBit/s applications:
The Technical Report ISO/IEC 11801-99-1 (draft) recommends the following for the realisation of 40 Gbit/s over 4-pair cabling:
- Class I (based on Cat. 8.1 components)
- Class II (based on Cat. 8.2 components)

**Conclusion: Cat.8.2 – the solution for 40 GBASE-T**

**The technical superiority of Class II**
(with Category 8.2 components) derives from the much higher reserves available with NEXT, PSNEXT, ACR-F and PSACR-F.

**Additional advantages:**
- Only components of Category 8.2 offer reserve compatibility with Cat. 7 and Cat.7.
- Category "8.2" components offer reserves for further data increases

Class II cabling is the more cost-effective solution due to the lower design costs of the active technology (lower compensation expenditures). The cost of Cat. 8.1 or Cat. 8.2 cables is assumed to be being equal.
MegaLine® – the cabling system from 10 – 40 Gbit/s

System overview

for data rates up to...

10 Gbit/s
25 Gbit/s
40 Gbit/s

MegaLine® Connect100
pre-assembled trunk
page 152

4K7A jack module
(up to 2 GHz)
page 113

8C7A jack module
(up to 2 GHz)
page 113

VarioLine® UF
Underfloor systems
page 169

MegaLine® flex cable
MegaLine® horizontal cable

Flex cable plug
(up to 2 GHz)
page 112

RJ45 jack module
Cat. 6a,
page 41

Interface (up to 2 GHz)
page 114

Cable plug
(up to 2 GHz)
page 112

MegaLine® Connect100

MegaLine® Connect100
Wall outlets
page 115

MegaLine® VarioLine® CP
Consolidation
Point housing
page 166

Copper systems technology
MegaLine®

MegaLine® Connect100
Patch panel 19" / 1 RU
page 117

MegaLine® RJ45 patch cord
page 147

MegaLine® ARJ patch cord
TERA® patch cord
page 155

MegaLine® Interface patch cord
page 114

10 Gbit/s 25 Gbit/s 40 Gbit/s
MegaLine® Connect100 cable plug
Category 7A

Description
Interface for individually interchangeable MegaLine® Connect100 jack module. The cable plug enables generic transmission links far exceeding the requirements for Class F, to be achieved. The mating face can also be identified later without any additional installation effort.

- Various mating faces available
- Simple and fast assembly

Construction
Material: PC; die-cast zinc, nickel-plated
Wiring: 4 pairs via punchdown method
Strain relief: via cable ties
Shielding: extensive 360° shield connection
Electrical values: Class F, / Category 7A / bis 2 GHz

Electrical characteristics
Contact resistance: ≤ 20 Ω
Isolation resistance: ≥ 500 MΩ between contacts
Proof voltage: ≥ 1000 V DC/AC contact – contact
≥ 1500 V DC/AC contact – shielding
Max. current: 1.25 A at 50°C

Standards
- ISO/IEC 11801
- EN 50173-1
- IEEE 802.3af/at (PoE/PoE+)

<table>
<thead>
<tr>
<th>Article</th>
<th>Category</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect100 Cable plugs (AWG 24-22 solid)</td>
<td>Cat. 7A</td>
<td>LKD 9A90 2330 0000</td>
</tr>
<tr>
<td>MegaLine® Connect100 Cable plugs flex (AWG 27-26 flex)</td>
<td>Cat. 7A</td>
<td>LKD 9A90 2331 0000</td>
</tr>
</tbody>
</table>
MegaLine® Connect100 jack modules
Category 7a / 6a

Description
For transmitting analogue and digital voice, image and data signals. The performance features correspond to Category 7a (up to 2 GHz).

Construction
Material Full metal; die-cast zinc, nickel-plated
Installation according to the installation dimensions of the RJ45 jack module and therefore interchangeable
Dimensions 4 pairs via cable plug
Connection Jack 8C7A / 4K7A

Standards
- ISO/IEC 11801
- EN 50173-1
- EN 61076-3-110 & EN 61076-3-104
- IEEE 802.3af/at (PoE/PoE+)

Accessories
Colour dust caps for coding of modules

MegaLine® Connect100 jack module 8C7A / 4K7A

MegaLine® Connect100 jack module RJ45

Description
For transmitting analogue and digital voice, image and data signals. The performance features correspond to Category 6a, up to 500 MHz.

Construction
Material Full metal; die-cast zinc, nickel-plated
Installation according to the installation dimensions of the 4K7A / 8C7A jack module and therefore mutually exchangeable
Dimensions 4 pairs via cable plug
Connection Jack RJ45

Standards
- ISO/IEC 11801
- EN 50173-1
- EN 61076-3-110 & EN 61076-3-104
- IEEE 802.3af/at (PoE/PoE+)

Accessories
Colour dust caps for coding of modules

Article Category Order no.
MegaLine® Connect100 Jack module 4K7A – white Cat. 7a LKD 9A90 2030 0000
MegaLine® Connect100 Jack module 8C7A – black LKD 9A90 2020 0000

MegaLine® Connect100 Jack module RJ45 – aqua Cat. 6 LKD 9A90 2010 0000
MegaLine® Connect100 Interface
Category 7a (up to 2 GHz)

MegaLine® Connect100 Interface

Description
For transmitting analogue and digital voice, image and data signals. The performance features correspond to Category 7a (up to 2 GHz).

Construction
- Material: Full metal; die-cast zinc, nickel-plated
- Installation dimensions: according to the installation dimensions of the RJ45 jack module and therefore interchangeable
- Wiring: 4 pairs via cable plug
- Connection: Interface jack

Standards
- ISO/IEC 11801
- EN 50173-1
- IEEE 802.3af/at (PoE/PoE+)

<table>
<thead>
<tr>
<th>Article</th>
<th>Category</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect100 Interface</td>
<td>Cat. 7a, (up to 2 GHz)</td>
<td>LKD 9A90 2050 0000</td>
</tr>
</tbody>
</table>

Interface connector solid / flex

Description
For transmitting analogue and digital voice, image and data signals. The performance features correspond to Category 7a (up to 2 GHz).

Construction
- Material: Full metal; die-cast zinc, nickel-plated
- Wiring: 4 pairs via cable plug
- Connection: Interface connector

Standards
- ISO/IEC 11801
- EN 50173-1
- IEEE 802.3af/at (PoE/PoE+)

<table>
<thead>
<tr>
<th>Article</th>
<th>Category</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect100 Interface connector solid (AWG24–22)</td>
<td>Cat. 7a, (up to 2 GHz)</td>
<td>LKD 9A90 2051 0000</td>
</tr>
<tr>
<td>MegaLine® Connect100 Interface connector flex (AWG27–26)</td>
<td>Cat. 7a, (up to 2 GHz)</td>
<td>LKD 9A90 2052 0000</td>
</tr>
</tbody>
</table>
**MegaLine® Connect100 wall outlets**

for MegaLine® Connect100 jack modules

---

### German design

Wall outlets for installation in commonly available 50 x 50 mm cover frames for fitting with MegaLine® Connect100 jack modules. Compatible with the jack modules MegaLine® Connect45 (VK format).

#### Housing

- **Housing body:** Full metal; die-cast zinc, nickel-plated
- **Colours:** Pure white, RAL 9010
- **Labelling:** via labelling field

#### Installation dimensions

50 mm x 50 mm (H x W), downward inclination of 30°

#### Accessories (optional)

- MegaLine® Connect100 1 and 2-fold cover frame
- 40 mm surface-mounted housing incl. 1-fold flush-mounted cover frame
- Spacer frame for 1-fold surface-mounted housing, 10 mm

---

### French design

Wall outlets for fitting with MegaLine® Connect100 jack modules. Compatible with the jack modules MegaLine® Connect45 (VK format).

#### Housing

- **Housing body:** Plastic
- **Colours:** Pure white, RAL 9010
- **Labelling:** via labelling field

#### Installation dimensions

45 mm x 45 mm x 42 mm (H x B x D), downward inclination 30°

#### Accessories (optional)

- VarioLine® cover frame

---

**Fig. Article Colour Order no.**

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Article</th>
<th>Colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MegaLine® Connect100 wall outlet 50 x 50 / 1-fold (1 pc.)</td>
<td>Pure white, RAL 9010</td>
<td>LKD 9A44 0107 0000</td>
</tr>
<tr>
<td>2</td>
<td>MegaLine® Connect100 wall outlet 50 x 50 / dual (1 pc.)</td>
<td></td>
<td>LKD 9A46 0108 0000</td>
</tr>
<tr>
<td>3</td>
<td>MegaLine® Connect100 wall outlet 50 x 50 / 3-fold (1 pc.)</td>
<td></td>
<td>LKD 9A46 0109 0000</td>
</tr>
<tr>
<td></td>
<td>Flush-mounted cover frame 1-fold (1 pc.)</td>
<td>Pure white, RAL 9010</td>
<td>LKD 9A41 0003 0000</td>
</tr>
<tr>
<td></td>
<td>Flush-mounted cover frame, 2-fold (1 pc.)</td>
<td></td>
<td>LKD 9A41 0005 0000</td>
</tr>
<tr>
<td></td>
<td>Surface-mounted housing 40 mm incl. UP-cover frame 1-fold (1 pc.)</td>
<td></td>
<td>LKD 9A46 0086 0000</td>
</tr>
<tr>
<td></td>
<td>Spacer frame for surface-mounted housing 1-fold 10 mm (1 pc.)</td>
<td></td>
<td>LKD 9A46 0088 0000</td>
</tr>
<tr>
<td>1</td>
<td>MegaLine® Connect100 wall outlet 45 x 45 / 1-fold</td>
<td>Pure white, RAL 9010</td>
<td>LKD 9A90 1101 0000</td>
</tr>
<tr>
<td>2</td>
<td>MegaLine® Connect100 wall outlet 45 x 45 / dual</td>
<td></td>
<td>LKD 9A90 1100 0000</td>
</tr>
<tr>
<td>3</td>
<td>VarioLine® cover frame 45 x 45 (8)</td>
<td></td>
<td>LKD 92E8 0013 0000</td>
</tr>
</tbody>
</table>
MegaLine® Connect100 modular patch panel 19" / 1RU
for MegaLine® Connect100 jack modules

MegaLine® 24 EM patch panel

Description
Modular 3-part universal patch panel for 24 MegaLine® Connect100 ports. Modules can be hot-swapped.

Patch panel set
consisting of base carrier, cable socket carrier, stainless steel front panel

Base support
■ for holding a cable socket carrier
■ is installed in advance in the cabinet or rack

Labelling
Using labelling strip made of aluminium, self-adhesive (must be ordered separately, see table)

Cable socket carrier
■ Unit of cable plugs
■ Mounted outside the cabinet and/or base carrier
■ is inserted into the base carrier on the rear side
■ Fastening by means of slide lock
■ Potential equalisation with two threaded bolts M5 and/or two earth lugs

Stainless steel front cover (depending on version)
Cut-outs for 24 MegaLine® Connect100 jack modules

Construction
Strain relief via cable ties
Earthing see page 119
Cable entrance over the entire width of the cable management rail
Dimension 44 mm x 483 mm x 163 mm (H x B x D)

Accessory (has to be ordered in addition)
Labelling strips

<table>
<thead>
<tr>
<th>Article</th>
<th>Capacity</th>
<th>Ports</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect100 patch panel 24 EM</td>
<td>for installation of 24 jack modules: RJ45 Cat. 6,</td>
<td>for 24 MegaLine® Connect100 ports</td>
<td>LKD 9A90 2203 0000</td>
</tr>
<tr>
<td>Labelling strips</td>
<td></td>
<td></td>
<td>LKD 9A67 0024 0000</td>
</tr>
</tbody>
</table>
**MegaLine® Connect100 Patch panel 19''**

**Description**
The patch panel can be fitted with max. 24 MegaLine® Connect100 jack modules. Compatible with the jack modules MegaLine® Connect45 (VK format).

**Construction**
- **Housing**: Sheet steel
- **Colour**: Light grey, RAL 7035
- **Jet black, RAL 9005**
- **Labelling**: 1–24
- **Capacity**: max. 24 Jack modules:
  - 4K7A / 8C7A / RJ45
- **Strain relief**: via cable ties
- **Earthing**: see page 119
- **Cable entrance**: over the entire width of the cable management rail
- **Construction**: 24 ports

**Dimension**
- 19'' / 1 RU
- 100 mm installation depth

**Article** | **Colour** | **Order no.**
--- | --- | ---
MegaLine® Connect100 patch panel 19'' / 24-port (1 pc.) | Light grey RAL 7035 | LKD 9A90 2201 0000
| Jet black RAL 9005 | LKD 9A90 2202 0000

---

**MegaLine® Connect100 DIN rail housing dual**

**Description**
With dual rail clip to take max. 2 MegaLine® Connect100 jack modules. Compatible with the jack modules MegaLine® Connect45 (VK format).

The housing is mounted by snapping it onto the existing DIN rails. The metal housing is particularly suitable for use in industrial environments.

**Construction**
- **Material**: Sheet steel, powder coated
- **Colour**: Light grey, RAL 7035
- **Capacity**: max. 2 MegaLine® Connect100 jack modules

**Dimension**
- 85 mm x 35 mm x 95 mm (H x B x D)

**Article** | **Order no.**
--- | ---
MegaLine® Connect100 DIN rail housing, dual (1 pc.) | LKD 9A46 0097 0000
MegaLine® accessory and cable assembly tools

### MegaLine® Connect100 blind cover

**Description**
For wall outlets, in white or black.

<table>
<thead>
<tr>
<th>Article</th>
<th>PU</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect100 blind cover</td>
<td>LKD 9A46 0034 0000</td>
<td>50 pc.</td>
</tr>
<tr>
<td>Pure white, RAL 9010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MegaLine® Connect100 blind cover</td>
<td>LKD 9A46 0083 0000</td>
<td>50 pc.</td>
</tr>
<tr>
<td>Black, RAL 9005</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MegaLine® Connect100 dust cap

**Description**
For colour coding. The transparent design also enables the identification of the connector face while closed.

### MegaLine® side cutter

**Description**
For simple and secure shortening of wire pairs.

<table>
<thead>
<tr>
<th>Article</th>
<th>PU</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® side cutter</td>
<td>LKD 92E3 0012 0000</td>
<td>1 pc.</td>
</tr>
</tbody>
</table>

### MegaLine® Connect100 crimping tool

**Description**
For easy assembly of jack modules with the plug and wire manager.

<table>
<thead>
<tr>
<th>Article</th>
<th>PU</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect100 crimping tool</td>
<td>LKD 9A90 4007 0000</td>
<td>1 pc.</td>
</tr>
</tbody>
</table>
**MegaLine® stripping tool**

**Description**
Quick and simple stripping of copper data cables (esp. S/FTP). For removing the outer sheath as well as the PiMF foil.

<table>
<thead>
<tr>
<th>Article</th>
<th>PU</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® stripping tool</td>
<td>1 pc.</td>
<td>LKD 9AW1 6045 0000</td>
</tr>
</tbody>
</table>

**MegaLine® Connect100 test adapter**

**Description**
For direct acceptance measurement of Class F, Channel Class II on the cable plug (≥ 1000 insertion cycles). It is not necessary to use a 8C7A/4K7A jack module or an interface module.

<table>
<thead>
<tr>
<th>Article</th>
<th>PU</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect100 test adapter</td>
<td>2 pc.</td>
<td>LKD 9A90 4020 0000</td>
</tr>
<tr>
<td>MegaLine® Connect100 replacement kit (for an additional 1000 insertion cycles)</td>
<td>2 pc.</td>
<td>LKD 9A90 4022 0000</td>
</tr>
</tbody>
</table>

**MegaLine® Connect100 assembly aid**

**Description**
For easy adjustment and cutting to length of the conductors assembling the MegaLine® Connect100 cable plugs or interface plugs (cross design).

<table>
<thead>
<tr>
<th>Article</th>
<th>PU</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect100 assembly aid</td>
<td>10 pc.</td>
<td>LKD 9A90 4001 0000</td>
</tr>
<tr>
<td>MegaLine® Connect100 assembly tool cross</td>
<td>10 pc.</td>
<td>LKD 9A90 4009 0000</td>
</tr>
</tbody>
</table>

**Example of earthing cable**

**Description**
In order to create a conductive connection of our 19" patch panels in cabinets for IT facilities as well as data wall outlets, we recommend using suitable equipotential bonding conductors according to EN 50310.

<table>
<thead>
<tr>
<th>Article</th>
<th>PU</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® stripping tool</td>
<td>1 pc.</td>
<td>LKD 9AW1 6045 0000</td>
</tr>
</tbody>
</table>

**Note**
Assemble aid
MegaLine® Connect45
MegaLine® Connect45 Pro
Cu connectivity
### MegaLine® Connect45 - the cabling system from 1 – 10 Gbit/s

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<td>• Jack module BM ISO/IEC</td>
<td>Cat. 6, 6a</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Unlocking tool</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MegaLine® Connect45 Pro – the cabling system up to 10 Gbit/s

<table>
<thead>
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<th>Module Type</th>
<th>Description</th>
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<tr>
<td><strong>Jack modules in Keystone® format</strong></td>
<td>• Jack module BM ISO/IEC</td>
<td>Cat. 6, 6a</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>• 90° adapter</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Connect45 patch panel 19&quot;</strong></td>
<td>• Keystone format</td>
<td></td>
<td>141</td>
</tr>
<tr>
<td><strong>Connect45 Pro wall outlets for Keystone® jack modules</strong></td>
<td>• 50 x 50</td>
<td></td>
<td>141</td>
</tr>
</tbody>
</table>
The cable plug – the system basis

RJ45 jack modules of Category 6 A (IEC 60603-7-51) are used here. The new Keystone® jack module has been modified in such a way that it is not necessary to attach a separate cable tie. The transparent cable plug facilitates cable pre-fabrication, thereby allowing visual check of the correct colour assignment of the individual wire pairs.

Using the appropriate stripper it is possible to crimp the cores in the IDC insulation displacement connectors and also remove excess cores so they are flush – this is how to ensure the correct connection!

**Benefits**

- Assembly without additional cable ties
- High level of safety
  Visual check by means of a transparent cable plug
- Components with LEO function
- LED patch cord
- Power over Ethernet (PoE)
- Different formats for maximum packing density
**LEO and LED function**
The "pathfinder features"

The jack modules are optionally available with LEO functionality

> **LEO = Light Emitting Outlet**

With the aid of a transmitter connected to one end of an installed link, the opposite end can be easily identified by means of a red LED display contained within the jack module. This feature is particularly useful in environments with a high packing density, enabling the corresponding modules to be located quickly and reliably. The module is easy to open using the unlocking tool.

With a single click, it is thus possible to expand the existing cabling system by adding on a new module, e.g. the LEO function.

**Shielded technology**

Via the LEO detector the light signal is fed into the link…

And the appropriate jack module on the other side lights up.

**RJ45 patch cord with LED function**

Category 6 or Category 6A, patch cords complete the cabling link.

In complex patch environments inside wiring cabinets, you also have a clear overview of the patch cord sides that belong together thanks to the integrated red LEDs.

The connector can either be lit up permanently or flash at two different frequencies.
Connection components
RJ45 plug and LinkExtender

RJ45 plug (Category 6a)
Using the RJ45 plug, it is possible to use the same MegaLine® Connect45 cable plug very simply to realise Consolidation Point applications or also PoE applications (Power over Ethernet), e.g. connect IP cameras or access points.

In so doing, the existing requirements of IEEE802.3 af/at are supported (15W/25W) as well as future applications up to 100 W. The RJ45 plug can be used in conjunction with both horizontal and flex cables. When using PoE end devices such as access points, components such as additional wall boxes and patch cords are no longer required. The connection is made directly via the data cable.

LinkExtender
The LinkExtender allows you to extend existing Class Ea cabling links quickly and efficiently without loss of performance.

Use the unlocking tool to open the existing jack module, replace it with a LinkExtender and insert a pre-fabricated additional cabling link in the required length – the job is done!

The LinkExtender can be used for easy extension of Class Ea cabling links

Extend existing cable connections …

… by opening the jack module with the unlocking tool …

… and remove the jack module from the cable plug.

Instead of the jack module, add on the LinkExtender …

… and extending accordingly on the second side.

Finally, use two cable ties to securely close the covers.
Installation options
DClink – the real Plug&Play solution

There are a wide range of installation options available for the jack modules. These range from design-capable wall outlets and Consolidation Point housings (also for DIN rail assembly) through to underfloor solutions and various patch panels.

In combination with the MegaLine® Connect45 module (in ELine format) it is possible to realise high-density solutions of up to 48 ports on one rack unit.

When using DClink, the universal LEONI solution for data centers, copper can be flexibly combined with FO inside a rack unit, too.

Summary
No matter how your network is structured, you now have the full range of options available to you.

MegaLine® Connect45 – the cabling system from 1 – 10 Gbit/s when it comes down to very short installation times, maximum flexibility and maximum performance.
Two technologies – one solution … from 1 – 10 Gbit/s
System overview

for data rates up to …

1 Gbit/s
1 – 10 Gbit/s
Unshielded cabling system Cat. 6 / Class E

- Wall outlets
  - Page 136/137

- VarioLine® CP
  - Consolidation Point housing
  - Page 166

- MegaLine® Connect45
  - 24-port patch panel 19” / 1 RU
    - Straight
    - Page 134

- MegaLine® Connect45
  - 24-port patch panel 19” / 1 RU
    - Angled

Shielded cabling system Cat. 6 / Class Eₐ

- MegaLine® RJ45
  - LED patch cord Cat. 6, shielded
    - Page 149

- MegaLine® RJ45
  - Patch cord Cat. 6, shielded
    - Page 147

- Unshielded cabling system Cat. 6 / Class E

- 1 Gbit/s
- 1 – 10 Gbit/s

- Shielded 10 Gbit/s
MegaLine® Connect45 cable plug
AWG24-22 / AWG27-26

Description
The MegaLine® Connect45 cable plug has a cutting/clamping connection and is crimped together with the installation cable. It is the interface to the individually interchangeable MegaLine® Connect45 jack module.

This means that generic transmission links far exceeding the requirements for Class E, can be achieved, depending on the relevant jack module.

The jack module can also be changed retroactively without any additional installation effort.

- Simple and fast assembly

Construction
Material: Plastic
Wiring: 4-pairs via IDC contacts according to EIA/TIA 568A/B
Core type: AWG 24 – 22 solid and flex or AWG 27 – 26 solid and flex

Accessories
see page 118, 138
MegaLine® Connect45 protecting cap
The fitted cable plug can be protected against environmental influences by the protective cap.

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<table>
<thead>
<tr>
<th>Fig.</th>
<th>Article</th>
<th>Core type</th>
<th>Colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MegaLine® Connect45 cable plug AWG24-22 (25 pc.)</td>
<td>AWG 24 – 22 solid and flex</td>
<td>Plastic, yellow</td>
<td>LKD 9A50 4010 0000</td>
</tr>
<tr>
<td>2</td>
<td>MegaLine® Connect45 cable plug AWG27-26 (25 pc.)</td>
<td>AWG 27 – 26 solid and flex</td>
<td>Plastic, transparent</td>
<td>LKD 9A50 4011 0000</td>
</tr>
</tbody>
</table>
**MegaLine® Connect45 jack modules in VK format**

**Category 6A**

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**MegaLine® Connect45 BM ISO/IEC**

**Description**

For transmitting analogue and digital voice, image and data signals. The performance features are the same as for Cat. 6A (ISO/IEC) up to 500 MHz. Class E requirements in terms of channel and permanent links according to ISO/IEC 11801 Amd. 3 are met from 1 m (Cat. 6A). The length specifications relate to the 2-connector model.

**Construction**

- **Material**: Full metal; die-cast zinc, nickel-plated
- **Wiring**: 4 pairs via cable plug
- **Connection**: RJ45 jack, with integrated dust cap compatible with MegaLine® Connect100

**Standards**

- ISO/IEC 11801
- EN 50173-1
- IEC 60603-7-51

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**MegaLine® Connect45 LEO BM ISO/IEC**

**Description**

For transmitting analogue and digital voice, image and data signals. The performance features are the same as for Cat. 6A (ISO/IEC) up to 500 MHz. Class E requirements in terms of channel and permanent links according to ISO/IEC 11801 Amd. 3 are met from 1 m (Cat. 6A). The length specifications relate to the 2-connector model.

**Construction**

- **Material**: Full metal; die-cast zinc, nickel-plated
- **Wiring**: 4 pairs via cable plug
- **Connection**: RJ45 jack, with integrated dust cap compatible with MegaLine® Connect100

**Standards**

- ISO/IEC 11801
- EN 50173-1
- IEC 60603-7-51

**LEO function**

- **LEO** = Light Emitting Outlet
  - Patch panels with LEO function enable simple link tracking during installation.
  - **Light detection** ≤ 200 m
  - **Signal feed** Via the LEO detector
  - For description, see page 138

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<tr>
<th>Article</th>
<th>PU</th>
<th>Marking</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect45 LEO BM ISO/IEC</td>
<td>1 pc.</td>
<td>Aqua</td>
<td>LKD 9A50 2011 0000</td>
</tr>
</tbody>
</table>
**MegaLine® Connect45 jack modules in Keystone® format**

Category 6.

---

**MegaLine® Connect45 BM ISO/IEC**

**Description**
For transmitting analogue and digital voice, image and data signals. The performance features are the same as for Cat. 6, (ISO/IEC) up to 500 MHz. Class E, requirements in terms of channel and permanent links according to ISO/IEC 11801 Amd. 3 are met from 1 m (Cat. 6). The length specifications relate to the 2-connector model.

**Construction**
- **Material**: Full metal; die-cast zinc, nickel-plated
- **Wiring**: 4 pairs via cable plug
- **Connection**: RJ45 jack, with integrated dust cap

**Standards**
- ISO/IEC 11801
- EN 50173-1
- IEC 60603-7-51

---

**MegaLine® Connect45 LEO BM ISO/IEC**

**Description**
For transmitting analogue and digital voice, image and data signals. The performance features are the same as for Cat. 6, (ISO/IEC) up to 500 MHz. Class E, requirements in terms of channel and permanent links according to ISO/IEC 11801 Amd. 3 are met from 1 m (Cat. 6). The length specifications relate to the 2-connector model.

**Construction**
- **Material**: Full metal; die-cast zinc, nickel-plated
- **Wiring**: 4 pairs via cable plug
- **Connection**: RJ45 jack, with integrated dust cap

**Standards**
- ISO/IEC 11801
- EN 50173-1
- IEC 60603-7-51

**LEO function**
- **LEO** = Patch panels with LEO function
- **Light Emitting Outlet**
  - Allow simple link tracking during installation.
  - Light detection ≤ 200 m
  - Signal feed Via the LEO detector
  For description, see page 138

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<table>
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<tr>
<th>Article</th>
<th>PU</th>
<th>Marking</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect45 BM ISO/IEC</td>
<td>24 pc.</td>
<td>Aqua</td>
<td>LKD 9A50 1010 0024</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Article</th>
<th>PU</th>
<th>Marking</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect45 LEO BM ISO/IEC</td>
<td>1 pc.</td>
<td>Aqua</td>
<td>LKD 9A50 1011 0000</td>
</tr>
</tbody>
</table>
### MegaLine® Connect45 BM ISO/IEC angled

**Description**
For transmitting analogue and digital voice, image and data signals. The performance features are the same as for Cat. 6, (ISO/IEC) up to 500 MHz. Class E, requirements in terms of channel and permanent links according to ISO/IEC 11801 Amd. 3 are met from 1 m (Cat. 6.). The length specifications relate to the 2-connector model.

**Construction**
- **Material**: Full metal; die-cast zinc, nickel-plated
- **Wiring**: 4 pairs via cable plug
- **Connection**: RJ45 jack, with integrated dust cap

**Standards**
- ISO/IEC 11801
- EN 50173-1
- IEC 60603-7-51

### MegaLine® Connect45 BM UTP

**Description**
For transmitting analogue and digital voice, image and data signals. The performance features are the same as for Cat. 6 up to 250 MHz. Class E requirements for channel and permanent links are met according to ISO/IEC 11801 Amd. 3

**Construction**
- **Material**: Plastic
- **Wiring**: 4 pairs via cable plug
- **Connection**: RJ45 jack

**Standards**
- ISO/IEC 11801
- EN 50173-1
- IEC 60603-7-4

<table>
<thead>
<tr>
<th>Article Marking Order no.</th>
<th>Article Marking Order no.</th>
</tr>
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<tbody>
<tr>
<td>MegaLine® Connect45 BM ISO/IEC angled (1 pc.) Aqua LKD 9A50 1060 0000</td>
<td>MegaLine® Connect45 BM UTP (24 pc.) Black LKD 9A50 1050 0000</td>
</tr>
</tbody>
</table>
**MegaLine® Connect45 jack modules in ELine format**

Category 6A.

**MegaLine® Connect45 BM ELine ISO/IEC**

**Description**
For transmitting analogue and digital voice, image and data signals. The performance features are the same as for Cat. 6A (ISO/IEC) up to 500 MHz. Class E, requirements in terms of channel and permanent links according to ISO/IEC 11801 Amd. 3 are met from 1 m (Cat. 6A).
The length specifications relate to the 2-connector model.

**Construction**
- Material: Full metal; die-cast zinc, nickel-plated
- Wiring: 4 pairs via cable plug
- Connection: RJ45 jack, with integrated dust cap

**Standards**
- ISO/IEC 11801
- EN 50173-1
- IEC 60603-7-51

**MegaLine® Connect45 BM ELine ISO/IEC Article Marking Order no.**

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<thead>
<tr>
<th>Article</th>
<th>Marking</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect45 BM ELine ISO/IEC</td>
<td>Aqua</td>
<td>LKD 9A50 5010 0000</td>
</tr>
</tbody>
</table>

**MegaLine® Connect45 LinkExtender**

**Description**
For extending an existing cable infrastructure to max. 90 m without transmission loss, based on the MegaLine® Connect45 system.
Due to its small size, the Extender can also be integrated into the cable duct retroactively. The link performance of Class E, to be achieved also enables the transmission of 10 Gigabit Ethernet via an extended link.

**Construction**
- Material: Full metal; die-cast zinc, nickel-plated
- Wiring: 2x 4 pairs via cable plug

**Standards**
- ISO/IEC 11801
- EN 50173-1

**MegaLine® Connect45 BM ELine ISO/IEC Article Marking Order no.**

<table>
<thead>
<tr>
<th>Article</th>
<th>Marking</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect45 BM ELine ISO/IEC</td>
<td>Aqua</td>
<td>LKD 9A50 0010 0000</td>
</tr>
</tbody>
</table>

**MegaLine® Connect45 LinkExtender**

MegaLine® Connect45 BM ELine ISO/IEC Aqua marking
MegaLine® Connect45 RJ45 plug
Category 6a

Description
By using the same MegaLine® Connect45 cable plug, it is possible to implement Consolidation Point and/or PoE applications very simply with the help of the RJ45 plug. Depending on the cable plug used, a horizontal or flex cable can be selected.

The transmission properties are those of Class E, according to ISO/IEC 11801/EN 50173-1. 10 GbE is supported.

Construction
Material: Full metal; die-cast zinc, nickel-plated
Wiring: 4 pairs via cable plug
Connection: RJ45 plug

Mechanical characteristics
- Insertion cycles: ≥ 750 (on RJ45 side)
- Contact area: 50 μ gold plating
- Contacts: AWG 26/-22

Note
- Crimping only using the MC45 assembly tool (see page 138)
- Cable plug has to be ordered separately (page 128)

Environmental requirement
- Connection class: IP20
- Temperature range: −40 °C to +70 °C

Electrical characteristics
- Suitable for PoE+ according to IEEE802.3at

<table>
<thead>
<tr>
<th>Article</th>
<th>PU</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect45 RJ45 plug Cat. 6a (ISO/IEC)</td>
<td>1 pc.</td>
<td>LKD 9A50 0020 0000</td>
</tr>
</tbody>
</table>
**MegaLine® Connect45 patch panels 19”**
in Keystone® or ELine format – various versions

**Description**
The patch panel can be fitted with up to 24 or 48 jack modules.
Refer to the order table below for versions and formats available.

**Construction**

<table>
<thead>
<tr>
<th>Housing</th>
<th>Full metal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Light grey, RAL 7035, Jet black, RAL 9005</td>
</tr>
<tr>
<td>Capacity</td>
<td>See order table below</td>
</tr>
<tr>
<td>Strain relief</td>
<td>via cable ties</td>
</tr>
<tr>
<td>Earthing</td>
<td>see page 119</td>
</tr>
<tr>
<td>Cable entrance</td>
<td>over the entire width of the cable management rail</td>
</tr>
</tbody>
</table>

**Dimension**
19” / 1 RU or 0.5 RU, 110 mm installation depth

---

<table>
<thead>
<tr>
<th>Article</th>
<th>Format</th>
<th>Capacity max. / RU</th>
<th>Labelling</th>
<th>Colour</th>
<th>Order no.</th>
<th>Colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect45 Patch panel 19” Keystone</td>
<td>24 jack modules / 1 RU</td>
<td>1-24</td>
<td>Light grey RAL 7035</td>
<td>LKD 9A50 1200 0000</td>
<td>Jet black RAL 9005</td>
<td>LKD 9A50 1201 0000</td>
<td></td>
</tr>
<tr>
<td>MegaLine® Connect45 Patch panel 19” ELine</td>
<td>24 jack modules / 1 RU</td>
<td>1-24</td>
<td></td>
<td>LKD 9A50 5200 0000</td>
<td></td>
<td>LKD 9A50 5201 0000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>48 jack modules / 1 RU</td>
<td>1-48</td>
<td></td>
<td>LKD 9A50 5206 0000</td>
<td></td>
<td>LKD 9A50 5207 0000</td>
<td></td>
</tr>
</tbody>
</table>
MegaLine® Connect100 patch panel 19"

in VK format

**Description**
The patch panel can be fitted with max. 24 MegaLine®
Connect45 jack modules in VK format.
Compatible with the MegaLine® Connect45 jack modules
(VK format).

**Construction**

<table>
<thead>
<tr>
<th>Housing</th>
<th>Sheet steel</th>
</tr>
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<tbody>
<tr>
<td>Colour</td>
<td>Light grey, RAL 7035</td>
</tr>
<tr>
<td></td>
<td>Jet black, RAL 9005</td>
</tr>
<tr>
<td>Labelling</td>
<td>1–24</td>
</tr>
<tr>
<td>Capacity</td>
<td>max. 24 jack modules in VK format</td>
</tr>
<tr>
<td>Strain relief</td>
<td>via cable ties</td>
</tr>
<tr>
<td>Earthing</td>
<td>see page 119</td>
</tr>
<tr>
<td>Cable entrance</td>
<td>over the entire width of the cable management rail</td>
</tr>
<tr>
<td>Construction</td>
<td>24 ports</td>
</tr>
</tbody>
</table>

**Dimension**

19”/ 1 RU
100 mm installation depth

<table>
<thead>
<tr>
<th>Article Description</th>
<th>Colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect100 patch panel 19”/24-port (1 pc.)</td>
<td>Light grey RAL 7035</td>
<td>LKD 9A90 2201 0000</td>
</tr>
<tr>
<td></td>
<td>Jet black RAL 9005</td>
<td>LKD 9A90 2202 0000</td>
</tr>
</tbody>
</table>
**MegaLine® Connect45 wall outlets**
for Keystone® jack modules

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### MegaLine® Connect45
Wall outlet Keystone 50 x 50

**German design**

Wall outlets for fitting with MegaLine® Connect45 jack modules in Keystone® format.

**Construction**

**Housing body**: Full metal; die-cast zinc, nickel-plated

**Colours**: Pure white, RAL 9010

**Labelling**: via labelling field

**Dimension**

50 mm x 50 mm x 30 mm (H x B x D),
downward inclination 30°

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### MegaLine® Connect45
Wall outlet Keystone 45 x 45

**French design**

Wall outlets for fitting with MegaLine® Connect45 jack modules in Keystone® format.

**Construction**

**Housing body**: Plastic

**Colours**: Pure white, RAL 9003

**Labelling**: via labelling field

**Dimension**

45 mm x 45 mm x 42 mm (H x B x D),
downward inclination 30°

---

#### Fig. Article Order no.

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Article Description</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MegaLine® Connect45 wall outlet Keystone 50 x 50 / 1-fold</td>
<td>LKD 9A50 1100 0000</td>
</tr>
<tr>
<td>2</td>
<td>MegaLine® Connect45 wall outlet Keystone 50 x 50 / dual</td>
<td>LKD 9A50 1101 0000</td>
</tr>
<tr>
<td>3</td>
<td>MegaLine® Connect45 wall outlet Keystone 50 x 50 / 3-fold</td>
<td>LKD 9A50 1102 0000</td>
</tr>
<tr>
<td></td>
<td>40 mm surface-mounted housing</td>
<td>LKD 9A46 0086 0000</td>
</tr>
<tr>
<td></td>
<td>Spacer frame for 1-fold surface-mounted housing, 10 mm</td>
<td>LKD 9A46 0088 0000</td>
</tr>
</tbody>
</table>

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#### Fig. Article Order no.

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Article Description</th>
<th>Order no.</th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>MegaLine® Connect45 wall outlet Keystone 45 x 45 / 1-fold</td>
<td>LKD 9A50 1104 0000</td>
</tr>
<tr>
<td>5</td>
<td>MegaLine® Connect45 wall outlet Keystone 45 x 45 / dual</td>
<td>LKD 9A50 1103 0000</td>
</tr>
<tr>
<td></td>
<td>VarioLine® cover frame 45 x 45 (8 pc.)</td>
<td>LKD 9ZE8 0013 0000</td>
</tr>
</tbody>
</table>
MegaLine® Connect100 wall outlets
for MegaLine® Connect45 and MegaLine® Connect100 jack modules in VK format

**MegaLine® Connect100 50 x 50 wall outlets**

**German design**
Wall outlets for installation in commonly available 50 x 50 mm cover frame. For fitting with MegaLine® Connect45 or MegaLine® Connect100 jack modules in VK format.

**Housing**
- Housing body: Full metal; die-cast zinc, nickel-plated
- Colours: Pure white, RAL 9010
- Labelling: Via labelling field

**Installation dimensions**
50 mm x 50 mm (H x W), downward inclination of 30°

**Accessories (optional)**
- MegaLine® Connect100 1 and 2-fold cover frame
- 40 mm surface-mounted housing incl. 1-fold flush-mounted cover frame
- Spacer frame for 1-fold surface-mounted housing, 10 mm

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Article</th>
<th>Colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MegaLine® Connect100 wall outlet 50 x 50 / 1-fold</td>
<td>Pure white, RAL 9010</td>
<td>LKD 9A46 0107 0000</td>
</tr>
<tr>
<td>2</td>
<td>MegaLine® Connect100 wall outlet 50 x 50 / dual</td>
<td>Pure white, RAL 9010</td>
<td>LKD 9A46 0108 0000</td>
</tr>
<tr>
<td>3</td>
<td>MegaLine® Connect100 wall outlet 50 x 50 / 3-fold</td>
<td>Pure white, RAL 9010</td>
<td>LKD 9A46 0109 0000</td>
</tr>
</tbody>
</table>

**MegaLine® Connect100 45 x 45 wall outlets**

**French design**
Wall outlets fitting with MegaLine® Connect45 or MegaLine® Connect100 jack modules in VK format.

**Housing**
- Housing body: Plastic
- Colours: Pure white, RAL 9010
- Labelling: Via labelling field

**Installation dimensions**
45 mm x 45 mm x 42 mm (H x B x D), downward inclination 30°

**Accessories (optional)**
- VarioLine® cover frame

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Article</th>
<th>Colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MegaLine® Connect100 wall outlet 45 x 45 / 1-fold</td>
<td>Pure white, RAL 9010</td>
<td>LKD 9A41 0003 0000</td>
</tr>
<tr>
<td>2</td>
<td>MegaLine® Connect100 wall outlet 45 x 45 / dual</td>
<td>Pure white, RAL 9010</td>
<td>LKD 9A41 0005 0000</td>
</tr>
<tr>
<td>3</td>
<td>VarioLine® cover frame 45 x 45 (R)</td>
<td>Pure white, RAL 9010</td>
<td>LKD 92E8 0013 0000</td>
</tr>
</tbody>
</table>
## Accessories & tools
for MegaLine® Connect45

### MegaLine® Connect45 LEO detector

**Accessories**
Detector for feeding in the voltage when using a Connect45 jack module with LEO function.

<table>
<thead>
<tr>
<th>Housing</th>
<th>Full metal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contacts</td>
<td>RJ45 plug</td>
</tr>
<tr>
<td>Supply</td>
<td>1x battery 23AE/12V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Article</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect45 LEO detector</td>
<td>LKD 9A50 4005 0000</td>
</tr>
</tbody>
</table>

### MegaLine® Connect45 protecting cap

**Accessories**
For safe and convenient protection of pre-assembled trunk cables supplied with MegaLine® Connect45 cable connectors.

<table>
<thead>
<tr>
<th>Article</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect45 protecting cap</td>
<td>LKD 9A50 4003 0000</td>
</tr>
</tbody>
</table>

### MegaLine® Connect45 assembly tool

**Accessories**
It takes just a single step to press the contacts of the cable connector together and remove the excess wires.

<table>
<thead>
<tr>
<th>Article</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect45 assembly tool</td>
<td>LKD 9A50 4001 0000</td>
</tr>
</tbody>
</table>

### MegaLine® Connect45 unlocking tool

**Accessories**
For quick and easy opening of the MegaLine® Connect45 jack module.

<table>
<thead>
<tr>
<th>Article</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect45 unlocking tool</td>
<td>LKD 9A50 4000 0000</td>
</tr>
</tbody>
</table>
MegaLine® Connect45 Pro – the cabling system up to 10 Gbit/s

System overview

MegaLine® horizontal cable

MegaLine® cables

MegaLine® Connect45 Pro
Jack modules in Keystone® format
page 140

MegaLine® Connect45 Pro
Patch panels 19”
for Keystone® format
page 141

MegaLine® Connect45
Consolidation Point
housing
page 166

Wall outlets
page 141

VarioLine® UF
Underfloor systems
page 169

VarioLine®
copper systems
Technology

MegaLine® RJ45 patch cord
Cat. 6a, shielded
page 147

for data rates up to…

10 Gbit/s
MegaLine® Connect45 Pro jack modules in Keystone® format

Category 6.

**MegaLine® Connect45 Pro BM ISO/IEC**

**Description**
For transmitting analogue and digital voice, image and data signals. The performance features are the same as for Cat. 6, (ISO/IEC) up to 500 MHz. Class E, requirements in terms of channel and permanent links according to ISO/IEC11801 Amd. 1/2 from 1 metre are met.

The length specifications relate to the 2-connector model.

**Construction**
- **Material**: Full metal; die-cast zinc, nickel-plated
- **Wiring**: 4 pairs via cable plug
- **Connection**: RJ45 jack

**Standards**
- ISO/IEC 11801
- EN 50173-1
- IEC 60603-7-51

---

**Article** | **PU** | **Marking** | **Order no.**
--- | --- | --- | ---
MegaLine® Connect45 Pro BM ISO/IEC | 50 pc. | White | LKD 9ZQ0 1000 0000

**MegaLine® Connect45 Pro 90° adapter**

**Description**
Simply add on to the MegaLine® Connect45 jack. This enables installation where space is limited (e.g. wall channel) at a 90° angle.

**Construction**
- **Material**: Full metal; die-cast zinc, nickel-plated

---

**Article** | **PU** | **Order no.**
--- | --- | ---
MegaLine® Connect45 Pro 90° adapter | 20 pc. | LKD 9ZQ0 1001 0000
**MegaLine® Connect45**

**patch panels 19” for Keystone® format**

**Description**
The patch panel can be fitted with max. 24 jack modules in Keystone format.

**Construction**
- **Housing**: Full metal
- **Colour**: Light grey, RAL 7035, Jet black, RAL 9005
- **Capacity**: max. 24 Jack modules in Keystone format
- **Strain relief**: via cable ties
- **Earthing**: see page 119
- **Cable entrance**: over the entire width of the cable management rail

**Dimension**
19” / 1 RU, 110 mm installation depth

<table>
<thead>
<tr>
<th>Article Description</th>
<th>Colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect45 Patch panel 19” Keystone (1 pc.)</td>
<td>Light grey RAL 7035</td>
<td>LKD 9A50 1200 0000</td>
</tr>
<tr>
<td></td>
<td>Jet black RAL 9005</td>
<td>LKD 9A50 1201 0000</td>
</tr>
</tbody>
</table>

---

**MegaLine® Connect45 Pro**

**wall outlets for Keystone® jack modules**

**German design**
Wall outlets for fitting with MegaLine® Connect45 Pro jack modules in Keystone format.

**Construction**
- **Housing body**: Full metal; die-cast zinc, nickel-plated
- **Colours**: Pure white, RAL 9010
- **Labelling**: via labelling field

**Dimension**
50 mm x 50 mm x 30 mm (H x B x D), downward inclination 30°

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Article Description</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MegaLine® Connect45 Pro wall outlet Keystone 50 x 50 / 1-fold</td>
<td>LKD 92Q0 1010 0000</td>
</tr>
<tr>
<td>2</td>
<td>MegaLine® Connect45 Pro wall outlet Keystone 50 x 50 / dual</td>
<td>LKD 92Q0 1011 0000</td>
</tr>
<tr>
<td>3</td>
<td>MegaLine® Connect45 Pro wall outlet Keystone 50 x 50 / 3-fold</td>
<td>LKD 92Q0 1012 0000</td>
</tr>
<tr>
<td>-</td>
<td>40 mm surface-mounted housing</td>
<td>LKD 9A46 0086 0000</td>
</tr>
<tr>
<td>-</td>
<td>Spacer frame for 1-fold surface-mounted housing, 10 mm</td>
<td>LKD 9A46 0088 0000</td>
</tr>
</tbody>
</table>
MegaLine®
Cu patch cords / trunk cables
| Patch cord RJ45/RJ45 Cat. 5 / 100 MHz | 144 |
| Patch cord RJ45/RJ45 Cat. 6 / 250 MHz | 145 |
| Patch cord RJ45/RJ45 Cat. 6 / 500 MHz | 146 |
| Patch cord RJ45/RJ45 Cat. 6 / 500 MHz | 147 |
| LED patch cord RJ45/RJ45 Cat. 6 / 500 MHz with LED signal in connector | 148 |
| LED patch cord RJ45/RJ45 Cat. 6 / 500 MHz with LED signal in connector | 149 |
| Industrial patch cord RJ45/RJ45 Cat. 5 / 100 MHz | 150 |
| Industrial patch cord RJ45/RJ45 Cat. 6 / 500 MHz | 151 |
| Trunk cable Cat. 7 | 152 |
| Consolidation Point cable Cat. 7 | 153 |
| Patch cord TERA™ | 154 |
| Patch cord JRJ45™ | 156 |
| Trunk cable Multi | 157 |
| Trunk cable Cat. 6, module | 158 |
| Consolidation Point cable Multi | 159 |
| Consolidation Point cable Cat. 6, modules | 160 |
| Accessories for LED patch cords + LED colour clip, + LED detector | 161 |
| Accessories for patch cords RJ45 colour coding clip | 161 |

Office cables
Data center cables
Industrial cables
**MegaLine® patch cord RJ45/RJ45**

Cat. 5 / 100 MHz  
shielded, Cat. 5, Class D, with coloured moulded boots

---

**MegaLine® Patch 5D-RJ45**

**Description**

The cable type used is suitable for transmission frequencies of up to 100 MHz. The pair shielding and the high-coverage copper braiding as overall shielding ensure excellent NEXT and impedance values.

The patch and connection cables are fitted at both ends with a shielded RJ45 plug and an overmoulded boot.

**Applications**

IEEE 802.3, 10Base-T, 100Base-T, 1000Base-T, IEEE 802.5 16MB ISDN, FDDI, ATM

---

**Properties / type**

<table>
<thead>
<tr>
<th>Property / Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMC</td>
<td>Foil overall shielding</td>
</tr>
<tr>
<td>RJ45 plug</td>
<td>EN 60603-7</td>
</tr>
<tr>
<td>Electrical values</td>
<td>Cat. 5, Class D</td>
</tr>
<tr>
<td>Assignment</td>
<td>1:1</td>
</tr>
<tr>
<td>Standards</td>
<td>ISO/IEC 11801 / EN50173</td>
</tr>
<tr>
<td>RoHS compliant</td>
<td>with 2011/65/EU</td>
</tr>
</tbody>
</table>

**Fire behaviour**

| Flame retardancy | IEC 60332-1-2 |

**Accessories**

see page 161 for description

MegaLine® Patch RJ45 colour coding clip in various colours for visual coding of the patch cords

---

**Length** | **Article** | **Order no.**
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<td>LKD 9AA1 0413 0000</td>
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<td></td>
<td>LKD 9AA1 0423 0000</td>
<td>LKD 9AA1 0433 0000</td>
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<td>LKD 9AA1 0449 0000</td>
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</table>

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**Accessories**

see page 161 for description

MegaLine® Patch RJ45 colour coding clip in various colours for visual coding of the patch cords
**MegaLine® patch cord RJ45/RJ45** Cat. 6 / 250 MHz
unshielded, Cat. 6, Class E, with coloured moulded boots

**MegaLine® Patch 6E-RJ45U**

**Description**
The cable type used is suitable for transmission frequencies of up to 250 MHz. Due to its construction, the patch cord offers outstanding NEXT and XT return losses.

The patch and connection cables are fitted at both ends with a shielded RJ45 plug and an overmoulded boot.

**Applications**
IEEE 802.3, 10Base-T, 100Base-T, 1000Base-T, IEEE 802.5 16MB, ISDN, FDDI, ATM

**Properties / construction**
- **RJ45 plug**
  - EN 60603-7
- **Electrical values**
  - Cat. 6, Class E
  - Assignment: 1:1
- **Standards**
  - ISO/IEC 11801/ EN50173
  - RoHS compliant with 2011/65/EU

**Fire behaviour**
- **Smoke density**
  - IEC 61034
- **Halogen-free**
  - IEC 60754-2
- **Flame retardancy**
  - IEC 60332-1-2

**Accessories**
see page 161 for description
MegaLine® Patch RJ45 colour coding clip in various colours for visual coding of the patch cords

<table>
<thead>
<tr>
<th>Length (m)</th>
<th>Article</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
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<td>LKD 9A5 0027 0000</td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>LKD 9A5 0028 0000</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>LKD 9A5 0029 0000</td>
<td></td>
</tr>
<tr>
<td>2.0</td>
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<td>2.5</td>
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<tr>
<td>10.0</td>
<td>LKD 9A5 0036 0000</td>
<td></td>
</tr>
</tbody>
</table>
MegaLine® patch cord RJ45/RJ45 Cat. 6 / 250 MHz
shielded, Cat. 6, Class E_{a}, with coloured moulded boots

MegaLine® Patch 6EA-RJ45

Description
The cable type used is suitable for transmission frequencies of up to 250 MHz. The pair shielding and the high-coverage copper braiding as overall shielding ensure excellent NEXT and return loss values.

The patch and connection cables are fitted at both ends with a shielded RJ45 plug and an overmoulded boot.

Applications
Suitable for IEEE 802.3, 10Base-T, 100Base-T, 1000Base-T, 10GBase-T, IEEE 802.5 16MB, ISDN, FDDI, ATM

Properties / construction
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMC</td>
<td>Combined shielding (PIMf + braid)</td>
</tr>
<tr>
<td>RJ45 plug</td>
<td>EN 60603-7</td>
</tr>
<tr>
<td>Electrical values</td>
<td>Cat. 6, Class E_{a}</td>
</tr>
<tr>
<td>Assignment</td>
<td>1:1</td>
</tr>
<tr>
<td>Standards</td>
<td>ISO/IEC 11801 / ENS0173</td>
</tr>
<tr>
<td>RoHS compliant</td>
<td>with 2011/65/EU</td>
</tr>
</tbody>
</table>

Fire behaviour
- Smoke density: IEC 61034
- Halogen-free: IEC 60754-2
- Flame retardancy: IEC 60332-1-2

Accessories
See page 161 for description
- MegaLine® Patch RJ45 colour coding clip
  in various colours for visual coding of the patch cords

Length | Article | Order no. |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td></td>
<td>Grey (LSOH)</td>
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<td>LKD 9AA2 1141 0000</td>
<td>LKD 9AA2 1161 0000</td>
</tr>
</tbody>
</table>
MegaLine® Patch cord RJ45/RJ45 Cat. 6A/500 MHz
shielded, Cat. 6a, Class Ea, with colour moulded boots

MegaLine® patch 6AEA-RJ45

Description
The cable type used is suitable for transmission frequencies of up to 500 MHz. The pair shielding and the high-coverage copper braiding as overall shielding ensure excellent NEXT and return loss values.

The patch and connection cables are fitted at both ends with a shielded RJ45 plug and an overmoulded boot.

Applications
Installation cable for use in structured cabling systems according to ISO/IEC 11801 and EN 50173-x. Ideal for all applications up to class Ea, (video, data, telephony) >10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE

Properties / construction
- **EMC**: Combined shielding (PiMf + braid)
- **RJ45 plug**: EN 60603-7
- **Electrical values**: Cat. 6a, Class Ea
- **Assignment**: 1:1
- **Standards**: ISO/IEC 11801 / EN50173
- **RoHS compliant with 2011/65/EU**

Fire behaviour
- **Smoke density**: IEC 61034
- **Halogen-free**: IEC 60754-2
- **Flame retardancy**: IEC 60332-1-2

Accessories
see page 161 for description
MegaLine® Patch RJ45 colour coding clip
in various colours for visual coding of the patch cords

<table>
<thead>
<tr>
<th>Length (m)</th>
<th>Article</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grey (LSOH)</td>
<td>Blue (LSOH)</td>
</tr>
<tr>
<td>0.5</td>
<td>LKD 9AA2 3020 0000</td>
<td>LKD 9AA2 3030 0000</td>
</tr>
<tr>
<td>1.0</td>
<td>LKD 9AA2 3021 0000</td>
<td>LKD 9AA2 3031 0000</td>
</tr>
<tr>
<td>1.5</td>
<td>LKD 9AA2 3022 0000</td>
<td>LKD 9AA2 3032 0000</td>
</tr>
<tr>
<td>2.0</td>
<td>LKD 9AA2 3023 0000</td>
<td>LKD 9AA2 3033 0000</td>
</tr>
<tr>
<td>2.5</td>
<td>LKD 9AA2 3024 0000</td>
<td>LKD 9AA2 3034 0000</td>
</tr>
<tr>
<td>3.0</td>
<td>LKD 9AA2 3025 0000</td>
<td>LKD 9AA2 3035 0000</td>
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<tr>
<td>4.0</td>
<td>LKD 9AA2 3026 0000</td>
<td>LKD 9AA2 3036 0000</td>
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<td>5.0</td>
<td>LKD 9AA2 3027 0000</td>
<td>LKD 9AA2 3037 0000</td>
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<td>7.5</td>
<td>LKD 9AA2 3028 0000</td>
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<tr>
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<td>LKD 9AA2 3029 0000</td>
<td>LKD 9AA2 3039 0000</td>
</tr>
</tbody>
</table>

Additional lengths on request

www.leoni-data.com
**MegaLine® patch cord RJ45/RJ45** Cat. 6 / 250 MHz

shielded, Cat. 6, Class Eα, with LED light signal in plug

---

**MegaLine® Patch LED 6EA-RJ45**

**Description**

Especially for use in offices, industrial plants and data centers.

The plug contains one red LED. The light signal is activated using a detector that is placed on a contact pair on the rear of the plug.

Three different signal types can be selected by repeatedly pressing the detector button:

- **continuous light** / slow flashing / fast flashing

The other end of the LED patch cord reacts with the identical light signal in order to make it identifiable.

**Applications**

For use in structured cabling according to ISO/IEC 11801 and EN 50173-x. Ideal for all applications up to Class Eα (video, data, telephony)

>10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE

---

**Properties / construction**

- EMC: Combined shielding (PIMf + braid)
- RJ45 plug: EN 60603-7
- Electrical values: Cat. 6, Class Eα
- Assignment: 1:1
- Standards: ISO/IEC 11801 / EN50173
- RoHS compliant with 2011/65/EU

**Fire behaviour**

- Smoke density: IEC 61034
- Halogen-free: IEC 60754-2
- Flame retardancy: IEC 60332-1-2

**Accessories**

see page 161 for description

MegaLine® Patch LED colour clip in various colours for visual coding of the patch cords

---

**Length** | **Article** | **Order no.**
--- | --- | ---
0.5 | Grey (LSOH) | LKD 9A09 0100 0000
0.5 | Blue (LSOH) | LKD 9A09 0110 0000
0.5 | Aqua (LSOH) | LKD 9A09 0140 0000
0.5 | Yellow (LSOH) | LKD 9A09 0130 0000
0.5 | Red (LSOH) | LKD 9A09 0120 0000
0.5 | Red (LSOH) Crossover | LKD 9A09 0160 0000

---

1.0 | Grey (LSOH) | LKD 9A09 0101 0000
1.0 | Blue (LSOH) | LKD 9A09 0111 0000
1.0 | Aqua (LSOH) | LKD 9A09 0141 0000
1.0 | Yellow (LSOH) | LKD 9A09 0131 0000
1.0 | Red (LSOH) | LKD 9A09 0121 0000
1.0 | Red (LSOH) Crossover | LKD 9A09 0161 0000

---

1.5 | Grey (LSOH) | LKD 9A09 0102 0000
1.5 | Blue (LSOH) | LKD 9A09 0112 0000
1.5 | Aqua (LSOH) | LKD 9A09 0142 0000
1.5 | Yellow (LSOH) | LKD 9A09 0132 0000
1.5 | Red (LSOH) | LKD 9A09 0122 0000
1.5 | Red (LSOH) Crossover | LKD 9A09 0162 0000

---

2.0 | Grey (LSOH) | LKD 9A09 0103 0000
2.0 | Blue (LSOH) | LKD 9A09 0113 0000
2.0 | Aqua (LSOH) | LKD 9A09 0143 0000
2.0 | Yellow (LSOH) | LKD 9A09 0133 0000
2.0 | Red (LSOH) | LKD 9A09 0123 0000
2.0 | Red (LSOH) Crossover | LKD 9A09 0163 0000

---

2.5 | Grey (LSOH) | LKD 9A09 0104 0000
2.5 | Blue (LSOH) | LKD 9A09 0114 0000
2.5 | Aqua (LSOH) | LKD 9A09 0144 0000
2.5 | Yellow (LSOH) | LKD 9A09 0134 0000
2.5 | Red (LSOH) | LKD 9A09 0124 0000
2.5 | Red (LSOH) Crossover | LKD 9A09 0164 0000

---

3.0 | Grey (LSOH) | LKD 9A09 0105 0000
3.0 | Blue (LSOH) | LKD 9A09 0115 0000
3.0 | Aqua (LSOH) | LKD 9A09 0145 0000
3.0 | Yellow (LSOH) | LKD 9A09 0135 0000
3.0 | Red (LSOH) | LKD 9A09 0125 0000
3.0 | Red (LSOH) Crossover | LKD 9A09 0165 0000

---

4.0 | Grey (LSOH) | LKD 9A09 0106 0000
4.0 | Blue (LSOH) | LKD 9A09 0116 0000
4.0 | Aqua (LSOH) | LKD 9A09 0146 0000
4.0 | Yellow (LSOH) | LKD 9A09 0136 0000
4.0 | Red (LSOH) | LKD 9A09 0126 0000
4.0 | Red (LSOH) Crossover | LKD 9A09 0166 0000

---

5.0 | Grey (LSOH) | LKD 9A09 0107 0000
5.0 | Blue (LSOH) | LKD 9A09 0117 0000
5.0 | Aqua (LSOH) | LKD 9A09 0147 0000
5.0 | Yellow (LSOH) | LKD 9A09 0137 0000
5.0 | Red (LSOH) | LKD 9A09 0127 0000
5.0 | Red (LSOH) Crossover | LKD 9A09 0167 0000

---

7.5 | Grey (LSOH) | LKD 9A09 0108 0000
7.5 | Blue (LSOH) | LKD 9A09 0118 0000
7.5 | Aqua (LSOH) | LKD 9A09 0148 0000
7.5 | Yellow (LSOH) | LKD 9A09 0138 0000
7.5 | Red (LSOH) | LKD 9A09 0128 0000
7.5 | Red (LSOH) Crossover | LKD 9A09 0168 0000

---

10.0 | Grey (LSOH) | LKD 9A09 0109 0000
10.0 | Blue (LSOH) | LKD 9A09 0119 0000
10.0 | Aqua (LSOH) | LKD 9A09 0149 0000
10.0 | Yellow (LSOH) | LKD 9A09 0139 0000
10.0 | Red (LSOH) | LKD 9A09 0129 0000
10.0 | Red (LSOH) Crossover | LKD 9A09 0169 0000

---

additional lengths on request
MegaLine® Patch cord RJ45/RJ45 Cat. 6A / 500 MHz
shielded, Cat. 6A, Class Ea, with LED light signal in plug

MegaLine® Patch LED 6AEA-RJ45

Description
Especially for use in offices, industrial plants and data centers. The plug contains one red LED. The light signal is activated using a detector that is placed on a contact pair on the rear of the plug.

Three different signal types can be selected by repeatedly pressing the detector button:
- continuous light / slow flashing / fast flashing

The other end of the LED patch cord reacts with the identical light signal in order to make it identifiable.

Applications
For use in structured cabling according to ISO/IEC 11801 and EN 50173-x. Ideal for all applications up to Class E (video, data, telephony)

>10 GbE acc. to IEEE 802.3 an, cable sharing, VoIP, PoE.

Properties / construction
- EMC: Combined shielding (PiMF + braid)
- RJ45 plug: EN 60603-7
- Electrical values: Cat. 6A, Class Ea
- Assignment: 1:1
- Standards: ISO/IEC 11801 / EN50173 / IEC 60603-7-51
- RoHS compliant with 2011/65/EU

Fire behaviour
- Smoke density: IEC 61034
- Halogen-free: IEC 60754-2
- Flame retardancy: IEC 60332-1-2
- Fire load: 0.33 (reference value)

Accessories
- see page 161 for description

MegaLine® Patch LED colour clip in various colours for visual coding of the patch cords

<table>
<thead>
<tr>
<th>Length</th>
<th>Article</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td>Order no.</td>
</tr>
<tr>
<td></td>
<td>Grey (LSOH)</td>
</tr>
<tr>
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<td>5.0</td>
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<td>LKD 9A09 0298 0000</td>
</tr>
<tr>
<td>10.0</td>
<td>LKD 9A09 0299 0000</td>
</tr>
</tbody>
</table>

Additional lengths on request
**MegaLine® industrial patch cord RJ45/RJ45** Cat. 5 / 100 MHz
shielded, Cat. 5, Class D, with yellow moulded boots

---

### MegaLine® Patch Industry 5D-RJ45

**Description**

The cable type used is suitable for transmission frequencies of up to 100 MHz. The pair shielding and the high-coverage copper braiding as overall shielding ensure excellent NEXT and return loss values.

The patch and connection cables are fitted at both ends with a shielded RJ45 plug and boot.

The "superflex" version is excellent for demanding industrial applications (e.g. drag chains).

**Applications**

Suitable for IEEE 802.3, 10Base-T, 100Base-T, 1000Base-T, 10GBase-T, IEEE 802.5 16MB, ISDN, FDDI, ATM

---

### Properties / construction

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EMC</strong></td>
<td>Shield (braid)</td>
</tr>
<tr>
<td><strong>RJ45 plug</strong></td>
<td>EN 60603-7</td>
</tr>
<tr>
<td><strong>Electrical values</strong></td>
<td>Cat. 5, Class D</td>
</tr>
<tr>
<td><strong>Cable/boot</strong></td>
<td>Yellow (PUR superflex) / yellow</td>
</tr>
<tr>
<td><strong>Standards</strong></td>
<td>ISO/IEC 11801 / EN50173 RoHS compliant with 2011/65/EU</td>
</tr>
</tbody>
</table>

### Fire behaviour

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Smoke density</strong></td>
<td>IEC 61034-1/2</td>
</tr>
<tr>
<td><strong>Halogen-free</strong></td>
<td>IEC 60754-1/2</td>
</tr>
<tr>
<td><strong>Flame retardancy</strong></td>
<td>IEC 60332-2-2</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Length (m)</th>
<th>Article</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.0</td>
<td></td>
<td>LKD 9A7 0084 0000</td>
</tr>
<tr>
<td>20.0</td>
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<td>LKD 9A7 0155 0000</td>
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<td>30.0</td>
<td></td>
<td>LKD 9A7 0082 0000</td>
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<tr>
<td>40.0</td>
<td></td>
<td>LKD 9A7 0179 0000</td>
</tr>
<tr>
<td>50.0</td>
<td></td>
<td>LKD 9A7 0085 0000</td>
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</tbody>
</table>
MegaLine® industrial patch cord RJ45/RJ45 Cat. 6 / 250 MHz
shielded, Cat. 6, Class Ea, with black boots

MegaLine® Patch Industry 6EA-RJ45

**Description**
The cable type used is suitable for transmission frequencies of up to 250 MHz. The pair shielding and the high-coverage copper braiding as overall shielding ensure excellent NEXT and return loss values.

The patch and connection cables are fitted at both ends with a shielded RJ45 plug.

**Applications**
Suitable for IEEE 802.3, 10Base-T, 100Base-T, 1000Base-T, 10GBase-T, IEEE 802.5 16MB, ISDN, FDDI, ATM

**Properties / construction**

<table>
<thead>
<tr>
<th>EMC</th>
<th>Combined shielding (PiMf + braid)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ45 plug</td>
<td>EN 60603-7</td>
</tr>
<tr>
<td>Electrical values</td>
<td>Cat. 6, Class Ea,</td>
</tr>
<tr>
<td>Cable/boot</td>
<td>yellow (PUR) / black</td>
</tr>
<tr>
<td>Standards</td>
<td>ISO/IEC 11801 / EN50173</td>
</tr>
<tr>
<td></td>
<td>RoHS compliant with 2011/65/EU</td>
</tr>
</tbody>
</table>

**Fire behaviour**

<table>
<thead>
<tr>
<th>Smoke density</th>
<th>IEC 61034-1/2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halogen-free</td>
<td>IEC 60754-1/2</td>
</tr>
<tr>
<td>Flame retardancy</td>
<td>IEC 60332-2-2</td>
</tr>
</tbody>
</table>

**Accessories**
see page 161 for description

MegaLine® Patch RJ45 colour coding clip in various colours for visual coding of the patch cords

<table>
<thead>
<tr>
<th>Length</th>
<th>Article</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td></td>
<td>LKD 9A7 0160 0000</td>
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<tr>
<td>1.0</td>
<td></td>
<td>LKD 9A7 0161 0000</td>
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<td>LKD 9A7 0167 0000</td>
</tr>
<tr>
<td>10.0</td>
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<td>LKD 9A7 0168 0000</td>
</tr>
</tbody>
</table>
MegaLine® Connect100 trunk cable
pre-assembled trunk, MegaLine® Connect100 Cable plug Cat. 7a

Description
The trunk cable is based on a G20 S/F data cable –
pre-assembled at both ends with Cat 7, MegaLine® Connect100
cable plugs.

Thanks to its high quality components, the pre-assembled cable
meets the requirements for the Permanent Link (typ. > 5 m,
Cat. 7, modules) of Class F, according to ISO/IEC 11801 and
EN 50173 for 10 Gigabit Ethernet and the channel (Class II)
according to the current draft of ISO/IEC 11801-99-1.

Channel Class II
→ Recommended minimum configuration:
   5 m horizontal cable and 2 m patch cord each
→ Maximum configuration:
   26 m horizontal cable and 2 m patch cord each at both ends

Construction

<table>
<thead>
<tr>
<th>Article</th>
<th>Length*</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect100 Trunk cable</td>
<td>10.0 m</td>
<td>LKD 9A6 1782 0000</td>
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<td></td>
<td>50.0 m</td>
<td>LKD 9A6 1823 0000</td>
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</tbody>
</table>

* standard lengths, other lengths and types of cable
(also pre-assembled at one end) on request

Standards
- ISO/IEC 11801
- EN 50173-1
- IEEE 802.3at (PoE+)
**MegaLine® Connect100 Consolidation Point cable**
pre-assembled CP cable, MegaLine® Connect100 Cable plug Cat. 7a

**Description**
The Consolidation Point cable is based on a G20 S/F flex data cable, assembled at both ends with a MegaLine® Connect100 jack and a TERA™ / ARJ45™ connector.

Thanks to its high quality components in combination with a CP link (> 10 m) the pre-assembled cable meets the requirements for the Class F, Permanent Link according to ISO/IEC 11801 Amendment 2 for 10 Gigabit Ethernet.

**Construction**

<table>
<thead>
<tr>
<th>Cable</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>G20 S/F flex (4x2x AWG26/7) (Order no.: LKD 7KS8 0013 0000)</td>
<td></td>
</tr>
<tr>
<td>Side A MegaLine® Connect100 Cat. 7a cable plug</td>
<td></td>
</tr>
<tr>
<td>Side B TERA™ plug / ARJ45™ plug</td>
<td></td>
</tr>
</tbody>
</table>

**Standards**
- ISO/IEC 11801
- EN 50173-1
- IEEE 802.3at (PoE+)

**Article**

<table>
<thead>
<tr>
<th>Length*</th>
<th>Order no.</th>
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</thead>
<tbody>
<tr>
<td>5.0 m</td>
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<table>
<thead>
<tr>
<th>Length*</th>
<th>Order no.</th>
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</thead>
<tbody>
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<td>LKD 9A06 1950 0000</td>
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<td>10.0 m</td>
<td>LKD 9A06 1951 0000</td>
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<tr>
<td>15.0 m</td>
<td>LKD 9A06 1952 0000</td>
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<tr>
<td>20.0 m</td>
<td>LKD 9A06 1953 0000</td>
</tr>
<tr>
<td>25.0 m</td>
<td>LKD 9A06 1954 0000</td>
</tr>
</tbody>
</table>

* Standard lengths / additional lengths on request
**MegaLine® patch cord TERA™**

**Description**
The patch cord and connection cable are fitted with TERA™ or RJ45 plugs as required (the RJ45 plug has a moulded boot). The appropriate cable type for the application is used for assembly. Cable type F10-120 S/F flex used is designed for a bandwidth of up to 1000 MHz with 4-pair assignment.

**Standards**
- ISO/IEC 11801 / EN50173
- RoHS compliant with 2011/65/EU

**Applications**
- 10BASE-T / 100BASE-T2
- Token ring
- ISDN
- Telephony

**Wiring**
- TERA™ 2-pair on RJ45
- TERA™ 2-pair on RJ45
- TERA™ 2-pair on RJ45
- TERA™ 1-pair on RJ45
- TERA™ 4-pair on RJ45
- TERA™ on TERA™

**Applications**

<table>
<thead>
<tr>
<th>Patch cords</th>
<th>10BASE-T / 100BASE-T2</th>
<th>Token ring</th>
<th>ISDN</th>
<th>Telephony</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERA™ 2-pair on RJ45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TERA™ 2-pair on RJ45</td>
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<tr>
<td>TERA™ 2-pair on RJ45</td>
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<tr>
<td>TERA™ 1-pair on RJ45</td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Length (m)</th>
<th>Article</th>
<th>Order no.</th>
<th>Article</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
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<td>LKD 9A44 0006 0000</td>
<td>LKD 9A44 0012 0000</td>
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<td>2.0</td>
<td>MegaLine® Patch TERA™ 2-pair on RJ45</td>
<td>LKD 9A44 0001 0000</td>
<td>LKD 9A44 0007 0000</td>
<td>LKD 9A44 0013 0000</td>
</tr>
<tr>
<td>3.0</td>
<td>TERA™ 2-pair on RJ45 (F10-120 S/F flex)</td>
<td>LKD 9A44 0002 0000</td>
<td>LKD 9A44 0008 0000</td>
<td>LKD 9A44 0014 0000</td>
</tr>
<tr>
<td>5.0</td>
<td>TERA™ 2-pair on RJ45 (326 flex)</td>
<td>LKD 9A44 0003 0000</td>
<td>LKD 9A44 0009 0000</td>
<td>LKD 9A44 0015 0000</td>
</tr>
</tbody>
</table>

TERA™ is a registered trademark of the Siemon Company.
### Applications

- **Telephony:** any
- **2-pair connecting line**
- **4-pair connecting line**

### Patch cords

#### Wiring

<table>
<thead>
<tr>
<th>Length</th>
<th>Article</th>
<th>Order no.</th>
<th>Article</th>
<th>Order no.</th>
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<tbody>
<tr>
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<td>Telephony</td>
<td>any</td>
<td>2-pair connecting line</td>
<td>4-pair connecting line</td>
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<td>1.0</td>
<td>MegaLine® Patch TERA™ 1-pair on RJ11</td>
<td>LKD 9A04 0017 0000</td>
<td>MegaLine® Patch TERA™ 4-pair on RJ45 (F10-120 S/F flex)</td>
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<td>LKD 9A44 0026 0000</td>
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<td>LKD 9A04 0018 0000</td>
<td>TERA™ 4-pair on RJ45 (326 flex)</td>
<td>LKD 9A44 0027 0000</td>
<td>LKD 9A44 0032 0000</td>
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<td>TERA™ 1-pair on RJ11</td>
<td>LKD 9A04 0019 0000</td>
<td>TERA™ on TERA™ (F10-120 S/F flex)</td>
<td>LKD 9A44 0028 0000</td>
<td>LKD 9A44 0033 0000</td>
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<td>5.0</td>
<td>TERA™ 1-pair on RJ11</td>
<td>LKD 9A04 0045 0000</td>
<td>TERA™ on TERA™ (326 flex)</td>
<td>LKD 9A44 0042 0000</td>
<td>LKD 9A44 0034 0000</td>
<td></td>
</tr>
</tbody>
</table>

TERA™ is a registered trademark of the Siemon Company
**MegaLine® patch cord ARJ45™**

shielded, with grey moulded boots

---

**MegaLine® Patch ARJ45**

**Description**
The patch cord and connection cable are fitted with ARJ45™ or RJ45 plugs as required.

**Standards**
- ISO/IEC 11801 / EN50173
- RoHS compliant with 2011/65/EU

---

<table>
<thead>
<tr>
<th>Length</th>
<th>Article</th>
<th>Order no.</th>
<th>Article</th>
<th>Order no.</th>
</tr>
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<tr>
<td>1.0 m</td>
<td>MegaLine® 7A A ARJ45</td>
<td>LKD 9A08 0134 0000</td>
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<td>LKD 9A08 0136 0000</td>
<td></td>
<td>LKD 9A08 0106 0000</td>
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<td>5.0 m</td>
<td></td>
<td>LKD 9A08 0137 0000</td>
<td></td>
<td>LKD 9A08 0107 0000</td>
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</tbody>
</table>
MegaLine® trunk cable
pre-assembled multi-cable with MegaLine® Connect45, or MegaLine® Connect100

MegaLine® Connect45 Multi-Trunk, n-fold
MegaLine® Connect100 Multi-Trunk, n-fold

Description
The trunk cable is based on a multi-data cable (F6-90 S/F; F10-115 S/F; G20 S/F) – assembled at both ends with MegaLine® Connect45 jacks and/or MegaLine® Connect100 cable plugs. Thanks to its high quality components, the pre-assembled cable meets the requirements for the Permanent Link of the relevant class in accordance with ISO/IEC 11801 and EN 50173.

Construction
- Cable Multi-data cable (F6-90 S/F; F10-115 S/F; G20 S/F)
- Jack modules MC100™ VK format
  - MC45™ Keystone, VK format, ELine
- Side A / side B various jacks, see table
- Whip length 0.35 m

Standards
- ISO/IEC 11801
- EN 50173-1

<table>
<thead>
<tr>
<th>Cable type</th>
<th>Cat. 6,</th>
<th>Cat. 7,</th>
<th>Cat. 8.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable length max.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-fold F6-90 S/F</td>
<td>35 m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>6-fold F6-90 S/F</td>
<td>35 m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4-fold F10-115 S/F</td>
<td>35 m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>6-fold F10-115 S/F</td>
<td>35 m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4-fold G20 S/F</td>
<td>35 m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>6-fold G20 S/F</td>
<td>35 m</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

* more on request ✓ available

On request, with documented acceptance measurement on CD.
MegaLine® trunk cable
pre-assembled single cable with MegaLine® Connect45 jack modules Cat. 6a

Description
The trunk cable is based on an F6-90 S/F data cable, pre-assembled at both ends with MegaLine® Connect45 jacks. Thanks to its high quality components, the pre-assembled cable meets the requirements for the Permanent Link (> 1 m, Cat. 6a modules) of Class E1 in accordance with ISO/IEC 11801 and EN 50173 for 10 Gigabit Ethernet. The length specifications relate to the 2-connector model.

MegaLine® Connect45    Trunk Cat. 6a, modules
MegaLine® Connect100    Trunk Cat. 6a, modules

<table>
<thead>
<tr>
<th>Cable type</th>
<th>Jack module format</th>
<th>Jack A</th>
<th>Jack B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat. 6a,</td>
<td>Cable length</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Standard max.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E5-60 U/F</td>
<td>MC45 Pro</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>E5-70 F/F</td>
<td>MC45 RJ45</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>E5-70 S/F</td>
<td>MC100 RJ45</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>F6-90 S/F</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ML Pro 1000</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>F10-115 S/F</td>
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<td>✓</td>
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<tr>
<td>ML Pro 1200</td>
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<td>✓</td>
</tr>
<tr>
<td>F10-125 S/F</td>
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<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ML Pro 1300</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>F10-130 S/F</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>ML Pro 1500</td>
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<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>G12-150</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>G20</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

* more on request ✓ available

Table: Article Cable Modules Length* Jack module format VK Jack module format Keystone* Jack module format ELine

<table>
<thead>
<tr>
<th>Article</th>
<th>Cable</th>
<th>Modules</th>
<th>Length*</th>
<th>Jack module format VK</th>
<th>Jack module format Keystone*</th>
<th>Jack module format ELine</th>
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</thead>
<tbody>
<tr>
<td>MegaLine® Connect45 trunk</td>
<td>MegaLine® F6-90 S/F</td>
<td>Cat. 6a, modules</td>
<td>5.0 m</td>
<td>LKD 9AA6 1173 0000</td>
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<td>LKD 9AA6 1447 0000</td>
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<td></td>
<td></td>
<td></td>
<td>10.0 m</td>
<td>LKD 9AA6 1174 0000</td>
<td>LKD 9AA6 1133 0000</td>
<td>LKD 9AA6 1448 0000</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>15.0 m</td>
<td>LKD 9AA6 1175 0000</td>
<td>LKD 9AA6 1134 0000</td>
<td>LKD 9AA6 1449 0000</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>30.0 m</td>
<td>LKD 9AA6 1176 0000</td>
<td>LKD 9AA6 1135 0000</td>
<td>LKD 9AA6 1450 0000</td>
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<td></td>
<td></td>
<td></td>
<td>90.0 m</td>
<td>LKD 9AA6 1177 0000</td>
<td>LKD 9AA6 1136 0000</td>
<td>LKD 9AA6 1451 0000</td>
</tr>
</tbody>
</table>

* Standard lengths / additional lengths on request

On request, with documented acceptance measurement on CD.
MegaLine® Consolidation Point cable
pre-assembled multi-cable with MegaLine® Connect45 or MegaLine® Connect100

Description
The trunk cable is based on a multi-data cable (F6-90 S/F flex; F10-120 S/F flex; G20 S/F flex) – pre-assembled on both sides with MegaLine® Connect45 jacks and/or MegaLine® Connect100 cable plug flex. Thanks to its high quality components, the pre-assembled cable meets the requirements for the Permanent Link of the relevant class in accordance with ISO/IEC 11801 and EN 50173.

Construction
- Cable: Multi-data cable (F6-90 S/F flex; F10-120 S/F flex; G20 S/F flex)
- Jack modules: MC100 ➤ VK format, MC45 ➤ Keystone, VK format, ELine
- Side A / side B: see table
- Whip length: 0.35 m

Standards
- ISO/IEC 11801
- EN 50173-1

<table>
<thead>
<tr>
<th>Cable type</th>
<th>Cat. 6. Connector</th>
<th>Cat. 7. Connector</th>
<th>Cat. 8.2 Connector</th>
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<tr>
<td>Cable</td>
<td>SL</td>
<td>Jack</td>
<td>Cable</td>
</tr>
<tr>
<td>length max.</td>
<td>RJ45</td>
<td>MC45 Pro</td>
<td>ARJ45</td>
</tr>
<tr>
<td>4-fold F6-90 S/F</td>
<td>35 m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>6-fold F6-90 S/F</td>
<td>35 m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4-fold F10-115 S/F</td>
<td>35 m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>6-fold F10-115 S/F</td>
<td>35 m</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4-fold G20 S/F</td>
<td>35 m</td>
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<tr>
<td>6-fold G20 S/F</td>
<td>35 m</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

* more on request ✓ available

On request, with documented acceptance measurement on CD.
**MegaLine® Consolidation Point cable**
pre-assembled single cable with MegaLine® Connect45 jack modules Cat. 6a

**Description**
The Consolidation Point cable is based on a F10-120 S/F flex data cable – assembled at both ends with a MegaLine® Connect45 jack and a RJ45 SmartLock connector.

Thanks to its high quality components in combination with a CP link (> 10 m), the pre-assembled cable meets the requirements for the Permanent Link of Class E, in accordance with ISO/IEC 11801 Amendment 2 for 10 Gigabit Ethernet.

**Standards**
- ISO/IEC 11801
- EN 50173-1
- IEC60603-7-51

**Construction**
- Cable various types, see table
- Jack modules MC100 > VK format
  - MC45 Keystone, VK format, ELIne
- Side A / side B various jacks, see table
  - RJ45 plug (SmartLock Cat. 6a)

### Table: Cable Type and Specification

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Cat. 6a</th>
<th>Connector SL</th>
<th>Jack module format VK</th>
<th>Jack module format Keystone</th>
<th>Jack module format ELIne</th>
</tr>
</thead>
<tbody>
<tr>
<td>E5-70 S/F flex</td>
<td>50 m</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>F6-90 S/F flex</td>
<td>50 m</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>F10-120 S/F flex</td>
<td>50 m</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>G20 flex</td>
<td>50 m</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

* more on request ✓ available

### Article

<table>
<thead>
<tr>
<th>Cable</th>
<th>Modules</th>
<th>Length*</th>
<th>Jack module format VK</th>
<th>Jack module format Keystone</th>
<th>Jack module format ELIne</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Connect45 trunk CP cable with RJ45 jack</td>
<td>Cat. 6, modules</td>
<td>5.0 m</td>
<td>LKD 9AA2 3353 0000</td>
<td>LKD 9AA2 3343 0000</td>
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<td></td>
<td>10.0 m</td>
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<td>LKD 9AA2 3331 0000</td>
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<td></td>
<td></td>
<td>15.0 m</td>
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<td>LKD 9AA2 3345 0000</td>
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<td>LKD 9AA2 3333 0000</td>
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<tr>
<td></td>
<td></td>
<td>25.0 m</td>
<td>LKD 9AA2 3357 0000</td>
<td>LKD 9AA2 3347 0000</td>
<td>LKD 9AA2 3334 0000</td>
</tr>
</tbody>
</table>

* Standard lengths / additional lengths on request

---

**www.leoni-data.com**
MegaLine® Patch accessories
for LED patch cords

MegaLine® Patch LED colour clip
MegaLine® Patch LED detector

**Accessories**
Colour clip: For visual coding of the LED patch cords. Can be installed by simply snapping into the RJ45 plugs.

Detector:
To feed in the light signal for patch cord identification.

Batteries included:
4 x LR41

---

MegaLine® Patch RJ45 colour coding clip

**Accessories**
Colour coding clip for visual coding of the patch cords. Can be installed by simply pushing on.

**Compatibility**
- MegaLine® Patch 5D-RJ45
- MegaLine® Patch 6E-RJ45U
- MegaLine® Patch 6EA-RJ45
- MegaLine® Patch 6AEA-RJ45
- MegaLine® Patch Industry 6EA-RJ45

---

**Table: MegaLine® Patch accessories**

<table>
<thead>
<tr>
<th>Article</th>
<th>Colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Patch LED colour clip (100 pc.)</td>
<td>- Rape yellow RAL 1021</td>
<td>LKD 9A09 0180 0000</td>
</tr>
<tr>
<td></td>
<td>- Fire red RAL 3000</td>
<td>LKD 9A09 0181 0000</td>
</tr>
<tr>
<td></td>
<td>- Sky blue RAL 5015</td>
<td>LKD 9A09 0182 0000</td>
</tr>
<tr>
<td></td>
<td>- Turquoise green RAL 6016</td>
<td>LKD 9A09 0183 0000</td>
</tr>
<tr>
<td>MegaLine® Patch LED detector (1 pc.)</td>
<td></td>
<td>LKD 9A09 0190 0000</td>
</tr>
</tbody>
</table>

**Table: MegaLine® Patch RJ45 colour coding clip**

<table>
<thead>
<tr>
<th>Article</th>
<th>Colour</th>
<th>Order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MegaLine® Patch RJ45 colour coding clip (100 pc.)</td>
<td>- Light grey RAL 7035</td>
<td>LKD 9AW1 6031 0000</td>
</tr>
<tr>
<td></td>
<td>- Turquoise green RAL 6016</td>
<td>LKD 9AW1 6032 0000</td>
</tr>
<tr>
<td></td>
<td>- Sky blue RAL 5015</td>
<td>LKD 9AW1 6033 0000</td>
</tr>
<tr>
<td></td>
<td>- Fire red RAL 3000</td>
<td>LKD 9AW1 6034 0000</td>
</tr>
<tr>
<td></td>
<td>- Pastel orange RAL 2003</td>
<td>LKD 9AW1 6035 0000</td>
</tr>
<tr>
<td></td>
<td>- Rape yellow RAL 1021</td>
<td>LKD 9AW1 6036 0000</td>
</tr>
<tr>
<td></td>
<td>- Jet black RAL 9005</td>
<td>LKD 9AW1 6037 0000</td>
</tr>
</tbody>
</table>
VarioLine®
System periphery in copper and FO

VarioLine®
Modular, robust and easy to install

VarioLine® is designed to fit perfectly with the modular LEONI connection systems MegaLine® Connect100, MegaLine® Connect45 and the VK format.

What is more, all systems can be integrated with Keystone® dimensions and commonly used FO cable couplings.
<table>
<thead>
<tr>
<th>VarioLine® system periphery in copper and fiber</th>
<th>page</th>
</tr>
</thead>
<tbody>
<tr>
<td>• VarioLine® CP – Consolidation Point programme</td>
<td>165</td>
</tr>
<tr>
<td>o dc Consolidation Point housing with DIN rail clip</td>
<td>166</td>
</tr>
<tr>
<td>• VarioLine® UF – underfloor systems</td>
<td>169</td>
</tr>
<tr>
<td>o System overview</td>
<td>170</td>
</tr>
<tr>
<td>o Support plates for underfloor systems for installation of wall boxes</td>
<td>172</td>
</tr>
<tr>
<td>o Support plates for underfloor systems for installation of adapter plates</td>
<td>173</td>
</tr>
<tr>
<td>o Adapter plates for underfloor systems for installation in VarioLine® UF support plates</td>
<td>174</td>
</tr>
<tr>
<td>o Support plates for underfloor systems for installation of adapter plates</td>
<td>176</td>
</tr>
<tr>
<td>o Blind cover for VarioLine® UF support plates</td>
<td>177</td>
</tr>
<tr>
<td>o Office application</td>
<td></td>
</tr>
<tr>
<td>o dc Data center application</td>
<td></td>
</tr>
</tbody>
</table>
**VarioLine® CP Consolidation Point programme**

for copper and FO connectivity

The Consolidation Point programme is an efficient and low-cost solution for highly flexible storey, data center or industrial cabling.

In office cabling (EN 50173-2), Consolidation Points (CP) offer highly flexible cabling solutions for fast-changing office facilities as a collection point between the floor distributor (FD) and the telecommunication outlet (TO).

The CP can be installed in a double floor, false ceiling, column or duct. From there, flexible lines (CP cables) lead to the data sockets at the workplace.

CP cabling links permanently installed cables to modular or mobile office systems such as partition walls or office furniture in which the TO is already installed. In industrial cabling, this is referred to as an intermediate distributor (ID) – a connection between the floor distributor (FD) and the telecommunication outlet (TO) that allows temporary machine cabling, for example (EN 50173-3).

In a data center, CPs offer an additional marshalling option (EN 50173-5) as local distribution points (LDP) between the zone distributor (ZD) and the equipment outlet (EO).

The robust VarioLine® Consolidation Points are made of galvanised sheet metal and are available in various sizes.

Various module panels are available for VarioLine® CP housings:
- MegaLine® Connect100
- MegaLine® Connect45 (Keystone® and VK format)
- MegaLine® Connect45 Pro
- GigaLine® SC Duplex

On request we can expand the product programme quickly and flexibly to include additional modular panels – for modular use with copper and FO systems.

What VarioLine® CP has to offer:
- The patch end is protected by means of a pivoting cover with a brush strip (optional).
- Support for incoming cables and patch cords can be provided by means of cable ties.
- The housings can be earthed if necessary.
- The DIN rail clip included with the housing extends the range of potential uses with rail clips.
**VarioLine® Consolidation Point housing**

**with DIN rail clip**

---

**Description**

For installation in a double floor or false ceiling. CP housing with strain relief by means of cable ties (not included). Can be fitted with MegaLine® Connect45 or MegaLine® Connect100 modules.

A cover flap with integrated brush strip can be optionally inserted on the patch side.

- Modular (exchangeable module panel)
- Optionally with 6 / 12 or 24 ports
- Rugged casing made of galvanised sheet metal
- Free of hazardous substances

---

**Installation**

- CP housing is attached by rail clip (matching clip included)
- Alternative attachment using screws or impact dowels (not included)
- Module panel is attached by snapping into housing
- Modules are attached by snapping into the module panel
Housing SC Duplex Keystone® for jack modules MegaLine® Connect45 (Keystone®) VK format for jack modules MegaLine® Connect45 (VK) and MegaLine® Connect100 LinkExtender for MegaLine® Connect45 LinkExtender cover flap / brush strip

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
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<td>LKD 9ZE6 1064 0000</td>
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VarioLine® UF – underfloor systems
Support plate solution – modular & universal

The VarioLine® UF underfloor systems (floor outlet solutions) offer an efficient and low-cost solution for completing copper and FO systems.

They provide a high degree of flexibility in offices. Workplaces can be connected to the energy and IT grid without the usual cable tangle. The modular and universal support plate solutions are available for all commonly available underfloor systems (e.g. Ackermann or Electraplan).

The support plate replaces the device carrier, so it provides maximum space for cable feed. The slanted feed and exit ensures secure ducting even in very low intermediate floors.

The use of adapter plates allows low-cost, efficient installation of the entire range of LEONI connection technology in both copper and FO technology.

Example of an underfloor solution by LEONI in an OBO Bettermann floor outlet
VarioLine® UF – underfloor systems
System overview

VarioLine® UF AP3-VK
for max. 3 MegaLine® Connect100 modules or
for max. 3 MegaLine® Connect45 modules
(in VK format)
page 174

VarioLine® UF AP3-MC45E
for max. 3 MegaLine® Connect45 modules
(in ELine format)
page 175

VarioLine® UF AP3-MC45K
for max. 3 MegaLine® Connect45 modules
(in Keystone® format)
Seite 174

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4K7A
MegaLine® Connect100
8C7A
MegaLine® Connect100
RJ45
MegaLine® Connect45
(in ELine format)
page 132
MegaLine® Connect45
(in VK format)
page 130
MegaLine® Connect45
(in Keystone® format)

VarioLine® UF TA2
for Ackermann
GES 2, 4, 6, R4, R7
page 173

VarioLine® UF FA3
for Ackermann
GES 9, R7, R9
page 173

VarioLine® UF TEK3
for Electraplan KDR series
(old design)
page 173

VarioLine® UF TEV3
for Electraplan
VQ12, VR12, VR10
page 173
VarioLine® support plates for underfloor systems
for installation of wall boxes

VarioLine® UF TOA2-2 / UF TOA3-2

Description

UF TOA2-2  for installation of max. 2 wall boxes with central plate 50 mm x 50 mm and side attachment or one wall box with surrounding ring.

UF TOA3-2  for installation of max. 2 wall boxes with central plate 50 mm x 50 mm and side attachment or two wall boxes with surrounding ring.

For installation in Ackermann device inserts.

Housing

Support plate  powder-coated sheet metal, 1.5 mm
Colour  Jet black, RAL 9005

VarioLine® UF TOA3-3

Description

For installation of max. 3 wall boxes with central plate 50 mm x 50 mm and side attachment or 2 wall boxes with surrounding ring.

For installation in Ackermann device inserts.

Housing

Support plate  powder-coated sheet metal, 1.5 mm
Colour  Jet black, RAL 9005

Fig. 1  Support plate VarioLine® UF TOA2-2
for Ackermann GES 2, 4, 6, R4, R7

Fig. 2  Support plate VarioLine® UF TOA3-2
for Ackermann GES 9, R7, R9

Fig. 3  Support plate VarioLine® UF TOA3-3
for Ackermann GES 9, R7, R9

Table:

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Article</th>
<th>Order no.</th>
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<tbody>
<tr>
<td>1</td>
<td>VarioLine® UF TOA2-2 (1 pc.)</td>
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<td>2</td>
<td>VarioLine® UF TOA3-2 (1 pc.)</td>
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<td>3</td>
<td>VarioLine® UF TOA3-3 (1 pc.)</td>
<td>LKD 9ZE6 0013 0000</td>
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</table>
VarioLine® **support plates for underfloor systems**

for installation of adapter plates

---

**VarioLine® UF TA2 / UF TA3**

**Description**
For installation of max. 2 or 3 adapter plates.
For installation in Ackermann device inserts.

**Compatibility**
- UF TA2: Ackermann GES 2, 4, 6, R4, R7
- UF TA3: Ackermann GES 9, R7, R9

**Housing**
- Support plate: powder-coated sheet metal, 1.5 mm
- Colour: Jet black, RAL 9005

**Accessories (optional)**
- Cable tray VarioLine® UF K1 / VarioLine® UF K2.
- Adjustable cable strain relief for up to 9 individual cables.

**Order no.**
1. VarioLine® UF TA2 (1 pc.) LKD 9ZE6 0001 0000
2. VarioLine® UF TA3 (1 pc.) LKD 9ZE6 0002 0000

---

**VarioLine® UF TEK3 / UF TEV3**

**Description**
For installation of max. 3 adapter plates.
For installation in Electraplan device inserts.

**Compatibility**
- UF TEK3: Electraplan KDR series (old design)
- UF TEV3: Electraplan VQ12, VR12, VR10

**Housing**
- Support plate: powder-coated sheet metal, 1.5 mm
- Colour: Jet black, RAL 9005

**Accessories (optional)**
- Cable tray VarioLine® UF K1 / VarioLine® UF K2.
- Adjustable cable strain relief for up to 9 individual cables.

**Order no.**
1. VarioLine® UF TEK3 (1 pc.) LKD 9ZE6 0008 0000
2. VarioLine® UF TEV3 (1 pc.) LKD 9ZE6 0042 0000
**VarioLine® adapter plates for underfloor systems**
for installation in VarioLine® UF support plates

**VarioLine® UF AP3-VK**
VarioLine® UF AP3-MC45

**Description**
Adapter plate for installation in VarioLine® UF support plates.
For installation of max. 3 modules.
- With self-adhesive labelling strips for personal labelling
- 2 nut and washer assemblies incl.

**Compatibility**
- **UF AP3 VK** → for max. 3 MegaLine® Connect100 modules or max. 3 MegaLine® Connect45 modules (VK format)
- **UF AP3 MC45K** → for max. 3 MegaLine® Connect45 modules (Keystone®)

**Construction**
- Adapter plate: sheet metal, 1.5 mm
- Surface: Zn – black, conductive

**Matching jacks**

<table>
<thead>
<tr>
<th>VarioLine® UF AP3 VK (compatible with VK format)</th>
<th>MegaLine® Connect100 Interface</th>
<th>MegaLine® Connect100 4K7A</th>
<th>MegaLine® Connect100 8C7A</th>
<th>MegaLine® Connect100 RJ45</th>
<th>MegaLine® Connect45 (VK format)</th>
<th>MegaLine® Connect45 (Keystone®)</th>
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<td>1</td>
<td>VarioLine® UF AP3-VK (1 pc.)</td>
<td>LKD 9A46 0118 0000</td>
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<td>2</td>
<td>VarioLine® UF AP3-MC45 (1 pc.)</td>
<td>LKD 92E6 0044 0000</td>
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</table>
**VarioLine® UF AP3-MC45E**

**Description**
Adapter plate for installation in VarioLine®UF support plates. For installation of max. 3 MC45 modules (in ELine format).

- With earthing or reference connection
- With self-adhesive labelling strips for personal labelling
- 2 nut and washer assemblies incl.

**Construction**
Adapter plate: sheet metal, 1.5 mm
Surface: Aluminium-zinc

**VarioLine® UF AP4-SCD / UF AP4-LCD**

**Description**
Adapter plate for installation in VarioLine®UF support plates. For installation of max. 4 SC or LC Duplex couplings.

- With self-adhesive labelling strips for personal labelling.
- 2 nut and washer assemblies incl.

**Compatibility**
- UF AP4-SCD for max. 4 SC-Duplex or SC Duplex/ST couplings
- UF AP4-LCD for max. 4 LC Duplex, SC Simplex or E-2000 couplings

**Construction**
Adapter plate: sheet metal, 1.5 mm
Surface: ZN – black, conductive

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**matching jacks**

|-------------------------|-------------------------------------|---------------------|------------------------|---------------------|---------------------|------------------|

**Order nos.**

<table>
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<tr>
<th>Fig.</th>
<th>Article</th>
<th>Order no.</th>
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<td>LKD 9ZE6 0106 0000</td>
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<tr>
<td>2</td>
<td>VarioLine® UF AP4-SCD (1 pc.)</td>
<td>LKD 9FZZ 0078 0000</td>
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<td>3</td>
<td>VarioLine® UF AP4-LCD (1 pc.)</td>
<td>LKD 9FZZ 0079 0000</td>
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</tbody>
</table>
**VarioLine® support plates for underfloor systems**

for installation of adapter plates

---

### VarioLine® UF TA2 3VK / UF TA3 3VK

**Description**
Support plate with max. 2 or 3 integrated adapter plates. For installation in Ackermann device inserts.

**Compatibility**
- UF TA2 3VK: Ackermann GES 2, 4, 6, R4, R7
- UF TA3 3VK: Ackermann GES 9, R7, R9

**Housing**
- Support plate: powder-coated sheet metal, 1.5 mm
- Colour: Jet black, RAL 9005

**Accessories (optional)**
- Cable tray VarioLine® UF K1 / VarioLine® UF K2
- Adjustable cable strain relief for up to 9 individual cables

### VarioLine® UF TEK3 3VK / UF TEV3 3VK

**Description**
Support plate with max. 3 integrated adapter plates. For installation in Ackermann device inserts.

**Compatibility**
- UF TEK3 3VK: Electraplan KDR series (old design)
- UF TEV3 3VK: Electraplan VQ12, VR12, VR10

**Housing**
- Support plate: powder-coated sheet metal, 1.5 mm
- Colour: Jet black, RAL 9005

**Accessories (optional)**
- Cable tray VarioLine® UF K1 / VarioLine® UF K2
- Adjustable cable strain relief for up to 9 individual cables

---

### Matching jacks

<table>
<thead>
<tr>
<th>VarioLine®</th>
<th>MegaLine® Connect100 Interface</th>
<th>MegaLine® Connect100 4K7A</th>
<th>MegaLine® Connect100 8C7A</th>
<th>MegaLine® Connect100 RJ45</th>
<th>MegaLine® Connect45 (VK format)</th>
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</thead>
<tbody>
<tr>
<td>UF TA2 3VK / UF TA3 3VK</td>
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</tr>
<tr>
<td>UF TEK3 3VK / UF TEV3 3VK</td>
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### Fig. Article Order no.

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### Fig. Article Order no.

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<td>VarioLine® UF TEK3 3VK (1 pc.)</td>
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<td>2</td>
<td>VarioLine® UF TEV3 3VK (1 pc.)</td>
<td>LKD 9ZE6 0047 0000</td>
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</table>
**VarioLine® blind cover**

for VarioLine® UF support plates

---

**Description**

Blind cover to close an unused opening in the VarioLine® UF support plate (incl. 2 nut and washer assemblies).

**Compatibility**

- **UF BP-T**
  - for VarioLine® UF support plates
- **UF BP-TO**
  - for VarioLine® UF support plates
  - for wall box inserts

**Housing**

- **Support plate**: powder-coated sheet metal, 1.5 mm
- **Colour**: Jet black, RAL 9005

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**Fig. Article Order no.**

<table>
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<th>Article</th>
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<td>1</td>
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<td>2</td>
<td>VarioLine® UF K2 (1 pc.)</td>
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<td>3</td>
<td>VarioLine® UF BP-T (1 pc.)</td>
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<td>4</td>
<td>VarioLine® UF BP-TO (1 pc.)</td>
<td>LKD 9ZE6 0015 0000</td>
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Acceptance measurement
of MegaLine® cabling systems

The acceptance measurement for the MegaLine® cabling systems for the channel or permanent link is carried out in accordance with the requirements of ISO/IEC 11801 or EN 50173, (3rd Edition).

Further standards regarding the acceptance measurement (measurement procedure): DIN EN 50346 and DIN EN 61935.
Acceptance measurement Class E
MegaLine® Connect100 / MegaLine® Connect45

For acceptance measurement according to Class E, the measuring device is set to a measuring bandwidth of 250 MHz.

For details, refer to the instructions on setting the measuring device. Information can be found under:
- www.idealindustries.de
- www.flukenetworks.com
- www.itnetworks.softing.com

<table>
<thead>
<tr>
<th>Standard acceptance: Channel or Permanent Link</th>
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<tbody>
<tr>
<td>System</td>
</tr>
<tr>
<td>MegaLine® Connect45</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Approved measuring devices</th>
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<tbody>
<tr>
<td>LanTEK III-1000 (available from Ideal Industries)</td>
</tr>
<tr>
<td>Fluke DSX 8000 (available from Fluke Networks)</td>
</tr>
<tr>
<td>Softing WireXpert 4500 (available from Softing IT Networks)</td>
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<table>
<thead>
<tr>
<th>Approved measuring cables</th>
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<tbody>
<tr>
<td>Measuring cable set</td>
</tr>
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<td>Order no. LKD 9AW3 0023 0000</td>
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</tbody>
</table>
Acceptance measurement Class E\textsubscript{A}
MegaLine\textsuperscript{®} Connect100 / MegaLine\textsuperscript{®} Connect45

For acceptance measurement according to Class E\textsubscript{A}, the measuring device is set to a measuring bandwidth of 500 MHz.

For details, refer to the instructions on setting the measuring device. Information can be found under:

- [www.idealindustries.de](http://www.idealindustries.de)
- [www.flukenetworks.com](http://www.flukenetworks.com)
- [www.itnetworks.softing.com](http://www.itnetworks.softing.com)

Ensure the measuring adapters are connected to the measuring device and securely engaged. Take the corresponding measuring cable and ensure it is firmly plugged in. If synchronisation is required, this is then carried out according to the instructions for the device.

### Standard acceptance: Channel or Permanent Link

<table>
<thead>
<tr>
<th>System</th>
<th>MegaLine\textsuperscript{®} Connect100 jack module RJ45</th>
<th>MegaLine\textsuperscript{®} Connect45</th>
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<tr>
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<td>LanTEK III-1000 (available from Ideal Industries)</td>
<td>LanTEK III-1000 (available from Ideal Industries)</td>
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<td>Approved cables</td>
<td>Fluke DSX 8000 (available from Fluke Networks)</td>
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<td>Softing WireXpert 4500 (available from Softing IT Networks)</td>
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<th>Measuring cable set Order no. LKD 9AW3 0023 0000</th>
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</table>
Acceptance measurement Class $F_A$

For acceptance measurement according to Class $F_A$, the measuring device is set to a measuring bandwidth of 1000 MHz.

For details, refer to the instructions on setting the measuring device.

Ensure the measuring adapters are connected to the measuring device and securely engaged. Take the corresponding measuring cable and ensure it is firmly plugged in. Carry out the field zeroing on the device according to the operating instructions.

### Standard acceptance: Channel or Permanent Link

<table>
<thead>
<tr>
<th>System</th>
<th>Approved measuring devices</th>
<th>Approved measuring cables</th>
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<tr>
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<td>LanTEK III-1000 (available from Ideal Industries)</td>
<td>Measuring cable set Order no. LKD 9A04 0166 0000</td>
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<td>MegaLine® Connect100 jack module 8C7A</td>
<td>Fluke DSX 8000 (available from Fluke Networks)</td>
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<td>Softing WireXpert 4500 (available from Softing IT Networks)</td>
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<td>Fluke DSX 8000 (available from Fluke Networks)</td>
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<td>LanTEK III-1000 (available from Ideal Industries)</td>
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| Order no. LKD 9AW3 0024 0000 |

www.leoni-data.com
### Channel Class E / E<sub>a</sub> / F / F<sub>a</sub>

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<th>Frequency/MHz</th>
<th>1</th>
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<th>100</th>
<th>250</th>
<th>500</th>
<th>600</th>
<th>1000</th>
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<tr>
<td>Return loss</td>
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<td>8.0</td>
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<td>Insertion loss</td>
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<td>21.7</td>
<td>35.9</td>
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<tr>
<td>NEXT</td>
<td>65.0</td>
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<td>33.1</td>
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<td>PS NEXT/dB</td>
<td>62.0</td>
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<td>ACR-N/dB</td>
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<td>ACR-F/dB</td>
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<td>PS-ACR-F/dB</td>
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<td>12.3</td>
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<tr>
<td>Runtime/μs</td>
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<td>0.553</td>
<td>0.548</td>
<td>0.546</td>
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<td>Runtime difference/μs</td>
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<td>0.050</td>
<td>0.050</td>
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<td></td>
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</tbody>
</table>

| **Channel class E<sub>a</sub>** |     |     |     |     |     |     |      |
| Return loss   | 19.0| 18.0| 12.0| 8.0 | 6.0 |     |      |
| Insertion loss| 4.0 | 8.2 | 20.9| 33.9|49.3 |     |      |
| NEXT          | 65.0| 53.2| 39.9| 33.1| 27.9|     |      |
| PS NEXT/dB    | 62.0| 50.6| 37.1| 30.2|24.8 |     |      |
| ACR-N/dB      | 61.0| 45.0| 19.0|−0.8 |−21.4|     |      |
| PS-ACR-N/dB   | 58.0| 42.4| 16.2|−3.7 |−24.5|     |      |
| ACR-F/dB      | 63.3| 39.2| 23.3| 15.3| 9.3  |     |      |
| PS-ACR-F/dB   | 60.3| 36.2| 20.3| 12.3| 6.3  |     |      |
| Runtime/μs    | 0.580|0.553|0.548|0.546|     |     |      |
| Runtime difference/μs | 0.050|0.050|0.050|0.050|     |     |      |

| **Channel class F** |     |     |     |     |     |     |      |
| Return loss   | 19.0| 18.0| 12.0| 8.0 |49.3 |8.0  |      |
| Insertion loss| 4.0 | 8.1 | 20.8| 33.8|52.4 |54.6 |      |
| NEXT          | 65.0| 65.0| 62.9| 56.9|49.4 |51.2 |      |
| PS NEXT/dB    | 62.0| 62.0| 59.9| 53.9|3.1  |48.2 |      |
| ACR-N/dB      | 61.0| 56.9| 42.1| 23.1| 0.1 |−3.4 |      |
| PS-ACR-N/dB   | 58.0| 53.9| 39.1| 20.1|32.6 |−6.4 |      |
| ACR-F/dB      | 65.0| 57.5| 44.4| 37.8|29.6 |31.3 |      |
| PS-ACR-F/dB   | 62.0| 54.5| 41.4| 34.8| 8.0 |28.3 |      |
| Runtime/μs    | 0.580|0.553|0.548|0.546|0.546|0.545|      |
| Runtime difference/μs | 0.030|0.030|0.030|0.030|0.03 |0.030|      |

| **Channel class F<sub>a</sub>** |     |     |     |     |     |     |      |
| Return loss   | 19.0| 18.0| 12.0| 8.0 | 8.0 |8.0  |6.0   |
| Insertion loss| 4.0 | 8.0 | 20.3| 32.5|46.7 |51.4 |67.6  |
| NEXT          | 65.0| 65.0| 65.0| 59.1|53.6 |52.1 |47.9  |
| PS NEXT/dB    | 62.0| 62.0| 62.0| 56.1|50.6 |49.1 |44.9  |
| ACR-N/dB      | 61.0| 57.0| 44.7| 26.7| 6.9 |0.7  |−19.6 |
| PS-ACR-N/dB   | 58.0| 54.0| 41.7| 23.7| 3.9 |−2.3 |−22.6 |
| ACR-F/dB      | 65.0| 63.3| 47.4| 39.4|33.4 |31.8 |27.4  |
| PS-ACR-F/dB   | 62.0| 60.3| 44.4| 36.4| 30.4| 28.8|24.4  |
| Runtime/μs    | 0.580|0.553|0.548|0.546|0.546|0.545|0.545 |
| Runtime difference/μs | 0.030|0.030|0.030|0.030|0.030|0.030|0.030 |
# Permanent Link

**Class E / E<sub>a</sub> / F / F<sub>a</sub>**

<table>
<thead>
<tr>
<th>Frequency/MHz</th>
<th>1</th>
<th>16</th>
<th>100</th>
<th>250</th>
<th>500</th>
<th>600</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Permanent Link Class E</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return loss</td>
<td>21.0</td>
<td>20.0</td>
<td>14.0</td>
<td>10.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insertion loss</td>
<td>4</td>
<td>7.1</td>
<td>18.5</td>
<td>30.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NEXT</td>
<td>65</td>
<td>54.6</td>
<td>41.8</td>
<td>35.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PS Next/dB</td>
<td>62</td>
<td>52.2</td>
<td>39.3</td>
<td>32.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACR-N/dB</td>
<td>61</td>
<td>47.5</td>
<td>23.3</td>
<td>4.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PS ACR-N/dB</td>
<td>58</td>
<td>45.1</td>
<td>20.8</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACR-F/dB</td>
<td>64.2</td>
<td>40.1</td>
<td>24.2</td>
<td>16.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PS ACR-F/dB</td>
<td>61.2</td>
<td>37.1</td>
<td>21.2</td>
<td>13.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Runtime/μs</td>
<td>0.521</td>
<td>0.496</td>
<td>0.491</td>
<td>0.490</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Runtime difference/μs</td>
<td>0.044</td>
<td>0.044</td>
<td>0.044</td>
<td>0.044</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Permanent Link Class E<sub>a</sub>** |     |     |     |     |     |     |      |
| Return loss | 21.0 | 20.0 | 14.0 | 10.0 | 8.0 |     |      |
| Insertion loss | 4 | 7 | 17.8 | 28.9 | 42.1 |     |      |
| NEXT | 65 | 54.6 | 41.8 | 35.3 | 29.2/27.9 |     |      |
| PS Next/dB | 62 | 52.2 | 39.3 | 32.7 | 26.4/24.8 |     |      |
| ACR-N/dB | 61 | 47.6 | 24 | 6.4 | 12.9/14.2 |     |      |
| PS ACR-N/dB | 58 | 45.2 | 21.5 | 3.8 | 15.7/16.3 |     |      |
| ACR-F/dB | 64.2 | 40.1 | 24.2 | 16.2 | 10.2 |     |      |
| PS ACR-F/dB | 61.2 | 37.1 | 21.2 | 13.2 | 7.2 |     |      |
| Runtime/μs | 0.521 | 0.496 | 0.491 | 0.490 | 0.490 |     |      |
| Runtime difference/μs | 0.044 | 0.044 | 0.044 | 0.044 | 0.044 |     |      |

| **Permanent Link Class F** |     |     |     |     |     |     |      |
| Return loss | 21.0 | 20.0 | 14.0 | 10.0 | 10.0 | 10.0 |      |
| Insertion loss | 4 | 6.9 | 17.7 | 28.8 | 42.1 | 46.6 |      |
| NEXT | 65 | 65 | 65 | 60.4 | 55.9 | 54.7 |      |
| PS Next/dB | 62 | 62 | 62 | 57.4 | 52.9 | 51.7 |      |
| ACR-N/dB | 61 | 58.1 | 47.3 | 31.6 | 13.8 | 8.1 |      |
| PS ACR-N/dB | 58 | 55.1 | 44.3 | 28.6 | 10.8 | 5.1 |      |
| ACR-F/dB | 65 | 59.3 | 46 | 39.2 | 34 | 32.6 |      |
| PS ACR-F/dB | 62 | 56.3 | 43 | 36.2 | 31 | 29.6 |      |
| Runtime/μs | 0.521 | 0.496 | 0.491 | 0.490 | 0.490 | 0.489 |      |
| Runtime difference/μs | 0.026 | 0.026 | 0.026 | 0.026 | 0.026 | 0.026 |      |

| **Permanent Link Class F<sub>a</sub>** |     |     |     |     |     |     |      |
| Return loss | 21.0 | 20.0 | 14.0 | 10.0 | 10.0 | 10.0 | 8.0 |
| Insertion loss | 4 | 6.8 | 17.3 | 27.7 | 39.8 | 43.9 | 57.6 |
| NEXT | 65 | 65 | 65 | 61.7 | 56.1 | 54.7 | 49.1/47.9 |
| PS Next/dB | 62 | 62 | 62 | 58.7 | 53.1 | 51.7 | 46.1/44.9 |
| ACR-N/dB | 61 | 58.2 | 47.7 | 34 | 16.4 | 10.8 | –8.5/9.7 |
| PS ACR-N/dB | 58 | 55.2 | 44.7 | 31 | 13.4 | 7.8 | –11.5/12.7 |
| ACR-F/dB | 65 | 64.7 | 48.8 | 40.8 | 34.8 | 33.2 | 28.8 |
| PS ACR-F/dB | 62 | 61.7 | 45.8 | 37.8 | 31.8 | 30.2 | 25.8 |
| Runtime/μs | 0.521 | 0.496 | 0.491 | 0.490 | 0.490 | 0.489 | 0.489 |
| Runtime difference/μs | 0.026 | 0.026 | 0.026 | 0.026 | 0.026 | 0.026 | 0.026 |

* = 3-constructor link from three providers
**Alien crosstalk**

Alien crosstalk describes the undesirable mutual electrical influence between parallel links in the installation duct and in the vicinity of the patch panels. In contrast to NEXT and attenuation, disturbance through alien crosstalk cannot be compensated for electronically.

Alien crosstalk has become extremely important from a technical point of view. The ISO/IEC 11801 Amendment 1 (Generic cabling for customer premises) takes this into account with relevant specifications for the new transmission Classes $E_A$ (500 MHz) and $F_A$ (1000 MHz).

MegaLine® S/FTP cabling systems meet the requirements for alien crosstalk with a high degree of reliability. External influences from adjacent channels are prevented and suppressed simultaneously via the double shielding of the S/FTP cables and the modular shielding of the connectivity.

Alien crosstalk is attenuated by >100 dB (a factor of 100,000). These characteristics are design-specific and do not change in the installation environment. IEEE 802.3an considers shielded cabling systems to be the preferred solution.

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Minimum PS ANEXT dB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class $E_A$, F</td>
</tr>
<tr>
<td>1</td>
<td>67.0</td>
</tr>
<tr>
<td>100</td>
<td>60.0</td>
</tr>
<tr>
<td>250</td>
<td>54.0</td>
</tr>
<tr>
<td>500</td>
<td>49.5</td>
</tr>
<tr>
<td>1000</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Requirements of PS Alien Next and PS AACR-F at selected frequencies

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Minimum PS AACR-F dB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class $E_A$, F</td>
</tr>
<tr>
<td>1</td>
<td>67.0</td>
</tr>
<tr>
<td>100</td>
<td>37.0</td>
</tr>
<tr>
<td>250</td>
<td>29.0</td>
</tr>
<tr>
<td>500</td>
<td>23.0</td>
</tr>
<tr>
<td>1000</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Requirements of PS Alien Next and PS AACR-F at selected frequencies
**Coupling attenuation**

Coupling attenuation evaluates the overall EMC behaviour of a cable or individual link. The coupling attenuation consists of the shielding attenuation and the asymmetrical attenuation taken together and defines the degree of reduction of electrical influences on a signal path.

If the coupling attenuation for Class E, and F transmission links is 10.0 dB better than in the table below and for Class F, transmission links 25.0 dB better than in the table below, the values for the parameters Power Sum Alien NEXT (PS ANEXT) and Power Sum Alien ACR-F (PS AACR-F) are complied with automatically as a result of the design, making it unnecessary to demonstrate them explicitly.

**MegaLine® measuring results**

All MegaLine® cabling systems with modular or individual shielding have met the extended requirements for coupling attenuation according to Class E. It was possible to conclude the comprehensive assessments with the relevant certifications.

### Table: Requirements of coupling attenuation for cabling classes D to F,

<table>
<thead>
<tr>
<th>Class</th>
<th>Frequency MHz</th>
<th>Min. coupling attenuation dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>D, E, E, F, F</td>
<td>30 ≤ f ≤ Note 2</td>
<td>80 – 200g(f)</td>
</tr>
</tbody>
</table>

**Note 1:** Round down calculated values greater than 40 dB to 40 dB.

**Note 2:** Coupling attenuation is measured up to 1000 MHz but the limit is determined by the upper frequency of the class being tested.

**Requirements of coupling attenuation for cabling classes D to F,**

- **Coupling attenuation for Class E, and F:**
  - > 90 – 20 log(f), > 50 dB up to 100 MHz

- **Coupling attenuation for Class F,:**
  - > 105 – 20 log(f), > 65 dB up to 100 MHz

Due to the coupling mechanisms, this connection only applies for shielded cabling and not for unshielded ones.
MegaLine® @home
One network – no limits
In the near future, we will be able to manage and use our entire home environment using just a few screens such as TVs, smartphones or tablets. This will enable increasingly universal use of applications such as TV viewing, games, streaming and storage, as well as facilitating the control of electrical appliances, lighting, HVAC and security.

With rates of up to 10 Gbit/s, data will be available in the blink of an eye from any wall socket. Films, images and music will take just a few moments to download, and surfing the internet will become a truly new experience.

LEONI provides the necessary neutral data network in the form of MegaLine®@home. Just like an electricity supply, any data socket will able to power any application. With the right modules installed, it will be possible to control building automation systems and hard drive recorders while on the go. Integrating the domestic wireless LAN network is extremely straightforward, too.

Convenience, entertainment, building automation and security are high-priority factors for MegaLine®@home, and it is also able to accommodate your own personal creativity.

### Basic components

**MegaLine® Box:**
The MegaLine® Box is the control centre for your network. All components can be neatly installed and are protected from unauthorised access. All household applications are distributed and controlled from here. It is available in a range of colours and can be integrated in furniture units (min. 55 cm interior depth).

**MegaLine® home 600**
The data cable MegaLine® home 600 forms the backbone of the network, transmitting data to the wall outlets at a rate of 10 Gbit/s. This means the network is perfectly prepared for a long service life. Related products even offer the option of providing the power supply for end devices and setting up an outdoor connection.

**MegaLine® Connect**
The jacks and plugs of the MegaLine® Connect series are the interfaces between cable and wall outlet, ensuring that all applications can make the most of the high data speeds.

**MegaLine® Patch**
The patch cords and connection cables of the MegaLine® Patch series are used to distribute all applications in the MegaLine® Box to the various connections and hook up the end devices to the wall outlets. This are the final link in the transmission chain.

### Convenience components

**Components:**
Active devices are required to turn LEONI’s basic network into a true multimedia network.

The retail sector provides an extensive range of products for this purpose, leaving nothing to be desired.

- Telephone system and wireless LAN router
- Switch
- IP video cameras
- BUS system
- Repeater
- Satellite system
- Sensors and actuators
- End devices
- Installation material
Convenience for all
A data network is the basis for distributing all data within the household,

Providing easy access to centrally stored data such as photos, films and music and making it easier than ever to control heat, lighting and alarm systems.

Connection to the internet is no problem either of course, so everyone to get the full fun out of surfing and gaming for example, or streaming films and photographs.

Communication
Fast surfing and phone calls are becoming increasingly integrated.
The MegaLine®@home data network is ready and waiting for upgrades and already offers data rates of 10 Gbit/s.

Entertainment
Watching TV, gaming, surfing, listening to music, looking at photographs or streaming – everything is available all the time, wherever you want.
The neutral network structures even allow the various applications to be exchanged. MegaLine®@home interconnects all devices, turning the TV into a slide projector or a hi-fi system, for example …

Building automation
Forgotten to switch the light off? Is the cooker still on? No worries!
The interface to the in-house BUS system allows all devices to be operated conveniently even when you’re out and about.

Safety
Whether outdoor surveillance, occupancy detector or alarm control:
MegaLine®@home makes it all possible, and provides the connection so you can check the current state of your home at any time.
Building technology and multimedia
Planning example

- Solar power system control via KNX
- Alarm control via KNX
- Sensor-monitored window and door security via KNX
- Garden irrigation via KNX
- Fun and games in a child’s paradise
- Enjoying the good life in the living area
- Mobile, state-of-the-art kitchen control
- Studying and chilling in the teenager bedroom
- Mobile, state-of-the-art device control
- Rest and relaxation in the bedroom
- Well-connected and relaxed in the home office
- IP video camera
- Panic switch via KNX

MegaLine® Box

### MegaLine® @home – at a glance

**Product range**

**Accessories**
- Assembly tool
- Protecting cap
- Stripping tool for PiMF

**Wall outlet**
- Wall socket dual

**Installation components**
- Box
- Keystone® 24-port panel

**Connectors**
- RJ-45 plug
- LinkExtender Class E
- Jack module (Keystone format) Cat. 6A ISO/IEC

**Cabling**
- Cat. 6, data cable home 600
- 6AEA-RJ45 patch cord RJ45-RJ45, Cat. 6,

### Product Order no.

**MegaLine® home 600, 350 m**
- LK9 7KS7 0304 0035

**MegaLine® home 600, 100 m**
- LK9 7KS7 0304 0010

**MegaLine® Box S RU 19" + 4 RU 10"**
- LKD 9ZE6 2001 0000

**MegaLine® Connect45 jack module (Keystone format) Cat. 6, ISO/IEC**
- LKD 9A50 1010 0000

**MegaLine® Connect45 LinkExtender Class E, shielded without cable plug**
- LKD 9A50 0010 0000

**MegaLine® Connect45 RJ-45 plug, field-configurable**
- LKD 9A50 0020 0000

**Keystone wall socket, dual with design capability**
- LKD 9A50 1110 0000

**Keystone 24-port panel fixed / empty**
- Grey LKD 9A50 1200 0000
- Black LKD 9A50 1201 0000

**MegaLine® Connect45 assembly tool**
- LKD 9A50 4001 0000

**MegaLine® Connect45 protecting cap (packing unit = 25 pc.)**
- LKD 9A50 4003 0000

### MegaLine® Connect45 cable plug

- AWG 24/-22
- AWG 26/-27

### MegaLine® Patch 6AEA-RJ45 Patch cord RJ45-RJ45, Cat. 6,

**Order no.**
- LKD 9A02 3021 0000
- LKD 9A02 3025 0000
- LKD 9A02 3031 0000
- LKD 9A02 3035 0000
- LKD 9A02 3041 0000
- LKD 9A02 3045 0000
- LKD 9A02 3051 0000
- LKD 9A02 3055 0000
- LKD 9A02 3061 0000
- LKD 9A02 3065 0000

* other common lengths and colours available on request

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**www.leoni-infrastructure-datacom.com**

10. 2012
Specialist electricians, specialist wholesalers and LEONI – an unbeatable combination.

The combination of specialist fitter, wholesaler and manufacturer gives you a wide range of options in terms of product diversity, fast availability and outstanding specialist expertise – at every level.

With MegaLine®@home, LEONI provides the basis for your home network, not just with high-quality products but also the experience gathered from more than 20 years of network system technology of the very highest quality. The individual products are manufactured in Germany to top industrial and environmental standards and exceed all current data technology requirements.

**LEONI**
- German manufacturer of professional data networks
- Outstanding expertise relating to data transmission products
- The very highest product quality for future-oriented reliability

**Specialist wholesaler**
- Expertise and consultation on active components and solutions
- Integrated concept for home solutions – covering everything from power and light to data
- High-speed availability

**Specialist electricians**
- Trained personnel for on-site data network set-up
- Custom solutions available
- Peace of mind due to superlative product quality and tested compatibility
Office

Field of application
Generic cabling in office buildings
The complete cable system – from distribution equipment to workstation

A company’s future success is now heavily dependent on having a reliable and modern data processing infrastructure.

The rapid development of data bit rates and the wide range of applications require a very flexible, high-performance network infrastructure that will be able to meet the demands for the next ten years.

High-quality generic IT networks form the backbone of the business in research & development, banks, insurance companies, universities, hospitals, hotels, airports and many other sectors, providing smooth operation and financial success.

The smart use of fiber optics and copper data technologies for the backbone and horizontal wiring to the user enables cost-effective networking of standard resources such as PCs and printers, with an extension to IP telephony and multimedia applications. Other applications, such as Power-over-Ethernet (PoE), support the powering of devices such as web cameras, wireless LAN access points, IP phones and laptops via the copper data cabling.

These structured, generic communication cable systems meet both the international and European standards set by ISO/IEC 11801 and DIN EN 50173.
Industry
Field of application
Generic cabling in the industrial environment

Structure of an application-neutral communications cable system in industrial locations ISO/IEC 24702 and EN 50173-3

ISO/IEC 11801 and EN 50173-2
Information technology
Generic communication cable systems
Office buildings

ISO/IEC 24702 and EN 50173-3
Information technology
Generic communication cable systems
Industry

ISO/IEC 15018 and EN 50173-4
Information technology
Generic communication cable systems
Apartments

ISO/IEC 24764 and EN 50173-5
Information technology
Generic communication cable systems
Data centers

ISO/IEC 11801 and EN 50173-1
Information technology
Generic communication cable systems
General requirements
The boundaries between office and industrial cabling are becoming increasingly indistinct. The need for sales departments to receive current production data or to engage in short-term planning of production processes requires a uniform group-wide IT platform.

Manufacturers of automation and control equipment demand consistent, future-proofed international standards, while users are looking for secure investments. Ever more applications in production processes are implemented via Ethernet, reducing maintenance and operating costs. Existing standards and applications, such as PROFINET, will still need support in the years to come.

This results in a requirement for a clear separation between “application” and “network”, which can only be achieved using a uniform platform as a base, combined with generic communication cabling, in both office and manufacturing environments. This requirement has been standardised in the EN 50173-1, -2, -3 series, and in the international standards ISO/IEC11801 and ISO/IEC 24702.

A consistent extension of the use of generic cabling offers enormous advantages, e.g. the

- Reduction in the assortment of products
- Deployment and distribution of mass-produced products
- Standardisation of acceptance measurements
- Reduction in training costs
- Easy trouble-shooting
- Simplification of network operation, maintenance and documentation.

It is frequently observed these days that the transmission requirements in industrial environments are less challenging than those in the office area. This fact can be exploited to cut costs without compromising long-term system readiness. Since cable laying is expensive, and an expansion of technical requirements would lead to unnecessary additional costs, we recommend that data cables should be selected to meet the highest standards (Category 7 or above).

Connection technology can be limited to the necessary minimum, however, if an intelligent adaptation to changes in circumstances is possible both in terms of pathway technologies and the structural and/or production-related environment.
**MICE concept**

Classification of environmental conditions

<table>
<thead>
<tr>
<th>MICE</th>
<th>Requirement/level</th>
<th>Requirement/level</th>
<th>Requirement/level</th>
</tr>
</thead>
<tbody>
<tr>
<td>M Mechanical</td>
<td>M₁</td>
<td>M₂</td>
<td>M₃</td>
</tr>
<tr>
<td>I Ingress</td>
<td>I₁</td>
<td>I₂</td>
<td>I₃</td>
</tr>
<tr>
<td>C Climatic/Chemical</td>
<td>C₁</td>
<td>C₂</td>
<td>C₃</td>
</tr>
<tr>
<td>E Electromagnetic</td>
<td>E₁</td>
<td>E₂</td>
<td>E₃</td>
</tr>
</tbody>
</table>

**The environmental factor**

As well as the electrical or optical transmission channel, the different conditions in office and industrial settings mean that the environmental factor also plays an important role.

These environmental conditions are described using four basic characteristics:

- **Mechanical**
  - Mechanical properties
- **Ingress**
  - Ingress protection properties
- **Climatic/Chemical**
  - Climatic and chemical properties
- **Electromagnetic**
  - Electromagnetic properties

The four MICE criteria are broken down into different parameters, each with three levels.

- **Office environment** M₁/I₁/C₁/E₁
- **Factory environment** (light duty) M₁/I₁/C₁/E₁
- **Machine environment** (heavy duty) M₁/I₁/C₁/E₁

The MICE classification can vary over the length of the transmission link, for example mechanical loads in the office environment are fairly low and the ingress of liquids or significant climatic and chemical loads are equally unlikely. The conditions in buildings used for industrial purposes, on the other hand, are harsher:

- Mechanical loads as well as the risk of ingress of dust, dirt and liquids; high, quickly changing temperatures; solar radiation and corrosive substances can affect the components. Electromagnetic interference also influences the data communication.
Generic cabling in data centers

Structure

The maximum extension is 2,000 metres. In data centers the main distribution cabling is frequently designed using fiber optic technology, while in smaller networks the external network interface (ENI) is connected directly to the zone distributor (ZD). The standards describe various models for flexible and fixed connections in and between the subsystems.

According to ISO/IEC 11801-5, cabling of the main and zone distribution must meet the requirements of Class E, for copper technology and transmission classes OF-300, OF-500 and OF–2000 for FO technology as a minimum.

Standards

Generic communication cable systems are defined in the standards EN 50173-1 and ISO/IEC 11801.

In addition, specific requirements for data centers are defined in EN 50173-5 and ISO/IEC 11801-5.

The cabling used in data centers consists of three subsystems:
- Network access cabling
- Main distribution cabling
- Zone distribution cabling
DataCenter
The data center – the heart of a business – controls production and administrative processes. Failure here can have catastrophic consequences, so the availability of a data center must be guaranteed more or less round the clock. The cabling system is a key factor in terms of operational reliability.

Performance requirements for modern data centers
- Maximum availability, zero downtime → max. reliability
- Short installation times
- Maximum performance
- Minimal space requirement – high packing density
- Cost efficiency
- Environmental compatibility – Green IT

The diverse requirements for data centers cannot be considered separately. Optimising environmental performance can lead to a reduction in cost, for example. Investing in industrially pre-assembled components usually involves higher costs but enables installation and testing times to be reduced, thereby cutting the costs incurred by downtime.

➡️ High quality
With quality testing carried out at the factory, LEONI products offer built-in performance and safety.

➡️ Minimise downtime
Installation and commissioning take a very short time, with no need for special tools or assembly skills. This keeps downtime to a minimum.

➡️ Cost reduction
A GigaLine® DCLink offers cost savings of up to 55 % as compared to conventional modular systems using MPO connectivity.

Costs per link*

* Example:
Link length: 30 m,
Fibers: 24 x OS2,
Connector: LC Duplex

100 %
45 %

Other solutions
LEONI is able to offer a high-quality range of products that far surpasses currently valid standards and conventional data center requirements:

- an MegaLine® Connect100 plug and the corresponding cable delivers performance far exceeding Class F,
- FO cable systems, assembled with LEONI cables, offer enormous reserves in terms of attenuation and bandwidth

**Installation**

Plug & Play solutions for copper and FO applications comprise ready-to-use factory-fitted links and the VarioLine® DClink frame (19”, 1 RU) to hold the DClink modules. Once the link has been installed, the DClink modules are simply inserted from the rear until they audibly click into place.

**DClink system solutions**

DClink allows the use of FO, copper or mixed set-ups in different categories. This makes on-site assembly entirely superfluous. You can also remove the modules again very easily using a simple unlocking tool.

**Environmentally aware cabling**

Environmentally sound materials and production methods, the possibility of recycling or ecologically viable recovery and, last but not least, the reusability of products if required – these are the factors that guarantee maximum environmental compatibility. Cables and components are free of hazardous substances.

**Optimising attenuation**

A GigaLine® DClink offers up to 70 % less attenuation than conventional modular systems using MPO connectivity.

---

**Attenuation per link**

<table>
<thead>
<tr>
<th>Attenuation per link</th>
<th>Modular solutions with MPO</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_0=1.4 , \text{dB}$</td>
<td>&gt; 30 %</td>
</tr>
<tr>
<td>$I_0=0.4 , \text{dB}$</td>
<td>&gt; 100 %</td>
</tr>
</tbody>
</table>

* Example:
  - Link length: 30 m,
  - Fibers: 24 x OS2,
  - Connector: LC Duplex
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Additional catalogues for MegaLine® and GigaLine® connection systems are available online.

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