## Legend for icons

### Product characteristics

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<th>Icon</th>
<th>Feature</th>
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<tr>
<td>☀️</td>
<td>Suitable for outdoor use</td>
</tr>
<tr>
<td>🔥</td>
<td>Good chemical resistance</td>
</tr>
<tr>
<td>☢️</td>
<td>Flame-retardant</td>
</tr>
<tr>
<td>🌋</td>
<td>Wide clamping range</td>
</tr>
<tr>
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<td>Halogen-free</td>
</tr>
<tr>
<td>🔥</td>
<td>Heat-resistant</td>
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<tr>
<td>❄️</td>
<td>Cold-resistant</td>
</tr>
<tr>
<td>💯</td>
<td>Corrosion-resistant</td>
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<tr>
<td>💪</td>
<td>Mechanical resistance</td>
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<tr>
<td>🕒</td>
<td>Assembly time</td>
</tr>
<tr>
<td>🍼</td>
<td>Low weight</td>
</tr>
<tr>
<td>🌱</td>
<td>Oil-resistant</td>
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<tr>
<td>🏡</td>
<td>Space requirement</td>
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<tr>
<td>💪</td>
<td>Robust</td>
</tr>
<tr>
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<td>💡</td>
<td>Voltage</td>
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<tr>
<td>👜</td>
<td>Interference signals</td>
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<tr>
<td>🌡️</td>
<td>Temperature-resistant</td>
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<td>☔️</td>
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<td>🌧️</td>
<td>Waterproof</td>
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<tr>
<td>🍃</td>
<td>Variety of approval certifications</td>
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Please note: the purpose of the icons is to provide you with a quick overview and a rough indication of the product features to which the corresponding information relates. You can find details of product characteristics in the "technical data" sections on the product pages.
# Content

<table>
<thead>
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<th>Company Information</th>
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<td>ÖLFLEX®</td>
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<tr>
<td>Power and control cables</td>
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<tr>
<td>UNITRONIC®</td>
<td>47</td>
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<td>Data communication systems</td>
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<tr>
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<td>SKINTOP®</td>
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<tr>
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<tr>
<td>SILVYN® Protective cable conduit systems and cable carrier systems</td>
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<tr>
<td>FLEXIMARK®</td>
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<td>Marking systems</td>
<td></td>
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<tr>
<td>Tools and cable accessories</td>
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</table>
Family business and global player
LAPP is both. The history of our company has been one of success and expansion ever since it was founded in 1959 by Ursula Ida and Oskar Lapp. It remains resolutely family owned to this day. We safeguard our success by staying close to our customers and markets, maintaining our innovative strength and brand quality, and being a reliable partner. We provide continuity, always guided in our thoughts and actions by our values.

Success built on family values
At LAPP, we maintain values that promote cooperation and enable relationships with employees, suppliers and customers based on partnership and trust. Good relations and mutual respect are key elements of our company culture and a central plank of company policy. We know that our successful business development of the last decades is down in particular to our 3,770 skilled and dedicated staff around the world, as well as the reliable partnership with our customers.

With 17 production facilities, over 40 sales companies and hundreds of dedicated consultants, we are always close to the individual needs and challenges of our customers all over the globe. We are constantly developing our products and system solutions, setting standards in safety, quality and functionality. This is why we are one of the world’s leading manufacturers of integrated solutions and branded products in cable and connection technology. As our success story enters its third generation, we are aware of our duty to the future.

www.lappkabel.com/company
Headquarters 4.0

Goodbye isolated individual offices! LAPP’s new European headquarters in Stuttgart-Vaihingen features an open-space design, modern architecture and short distances that enable all-new forms of cooperation. Individual departments are no longer physically separated. Everything is bright and open. Plants are used to separate space, absorb noise and improve air quality. Height-adjustable desks allow staff to concentrate better and work more healthily. The open office design aims to improve communication, teamwork, knowledge exchange, creativity and mobile working. This workplace concept is being rolled out worldwide.

Open office, open cooperation

Our new headquarters presents an entirely new concept of office life. Digital, connected and flexible, it improves communication and cooperation, benefiting both our employees and customers. Our new spatial design allows us to react even more quickly and directly to our customers’ needs. This is because departments that cooperate often are placed closer to each other. Sales and all sales-related departments have now, for example, been brought together under one roof. Despite this, there is still plenty of room for individuality and quiet places where staff can go for greater concentration. As such, the building features team zones, think tanks, lounges and project zones. Staff can also work in the espresso bar on the ground floor or on the roof terrace if they so wish. Here they can use bistro tables and even sun loungers.
The road to the future

Transport is changing. From electric cars to modern rail vehicles, high-performance connection technology is a vital part of future mobility. Based on 60 years of experience in the development and production of electric cables, connectors and accessories, we have steadily developed and expanded our range of products for railway technology. With LAPP brands we provide reliable solutions that make no compromises when it comes to safety, quality and function. Our products meet tough national and international norms and standards like EN 45545-2, and are used in the high-speed trains of Korea Train eXpress (KTX), for example. Our production facility for ÖLFLEX® TRAIN is certified in line with ISO/TS 22163.

www.lappkabel.com/rollingstock
Our range of railway technology products covers over 545 cable types and 485 connectors, along with cable glands, protective conduits and accessories. We have over a million metres of cable in storage for the rolling stock industry.
logistics

Reliably connecting the world

We manage the majority of our railway technology products from stock and make quick deliveries, e.g. within 24 hours in Germany. We have more than 40 sales companies and around an additional 100 sales partners to ensure global availability and excellent service. We do not impose minimum order volumes. We will deliver your goods to anywhere in the world when you order €100 or more of our products.

www.lappkabel.com/service/logistics
The topic is well known: Railway wires and cables must fulfill demanding national and international standards. In addition to EN 45545-2, these include design standards such as EN 50264 and EN 50306. They define the required sheath and insulation thickness and design and stipulate the mechanical, thermal, fire safety and chemical tests.

Testing standards that define the requirements for behaviour in case of fire are of particular importance. These include:

- Flame propagation for a single cable
  DIN EN 60332-1-2
- Smoke density
  DIN EN 61034-2
- Content of halogens
  DIN EN 60754-1
- Acidity/Corrosiveness
  DIN EN 60754-2
- Flame spread of bunched cables
  DIN EN 60332-3-24/25
- Fluorine content
  DIN EN 60684-2
- Toxicity
  EN 50305

These testing standards are part of DIN EN 45545-2: Railway applications – Fire protection on railway vehicles – Part 2: Requirements for fire behaviour of materials and components. It defines the requirements for the fire behaviour.

LAPP has fulfilled the technological requirements for satisfying this standard for railway cables. The result: Cables and wires from LAPP fulfill the key requirements for railway equipment with flying colours. Reliable and safe – up to the highest level defined in EN 45545-2, Hazard Level 3 (HL3).
quality

Technological lead, step-by-step

Our manufacturing facility for the ÖLFLEX® TRAIN is certified in accordance with the ISO/TS 22163, thus operating within the framework of the required processes of the railway industry.

ÖLFLEX® TRAIN manufacturing technology

Cable insulation products are usually made of thermoplastic materials, mainly consisting of macromolecules.

When warmed, the mobility of the molecule chains increases, making the plastic soft and malleable and eventually melting – an exclusion criterion for the use of such materials in railway equipment with its demanding safety and environmental conditions and high temperature requirements.

To counteract these factors, ÖLFLEX® TRAIN cables are physically cross-linked in our electron beam system using high-energy beams. This gives them significantly improved mechanical and chemical resistance, even at elevated temperatures. However, durability and resistance is important not only at high temperatures. In some climatic zones, cables running along the outside of the railways vehicles must be able to withstand temperatures down to -40°C. No problem for cross-linked products from LAPP.

This also applies to our other established brands

- ETHERLINE® data communication systems for Ethernet technology
- UNITRONIC® data communication systems
- SKINTOP® cable glands
- EPIC® industrial connectors
- SILVYN® cable protection and guiding systems
- FLEXIMARK® marking systems
Only the toughest tests guarantee the highest quality. Our trial and test centres, with their extremely high standards for material testing and quality assurance, are a further guarantee of the decisive quality advancements of LAPP products. It is here that every LAPP Group design is subjected to tough performance and endurance tests. For example, our high-flexibility cables undergo millions of bending cycles at different speeds and extreme bending radii. Only products that survive the “folding chamber” are good enough to be included in our product range.

Strict materials testing
- Infra-red spectroscopy for material identification
- Thermogravimetry to determine material proportions
- Thermal analysis to test the thermal properties of materials
- Climate cabinets to test ageing and storability

Comprehensive quality tests for cables
- Tensile and shearing strength test
- Resistance test
- Electrical test
- Torsion test
- Torsion-bending test
- Drag chain test
- Roll bending test
- Fire tests

Quality checks for cable glands
- Protection class testing - water (IP X3 to X8)
- Protection class testing - dust (IP 5X, IP 6X)
- Oil spray test according to UL 514 B
- Pulling protection testing

Our test centre is also open for our customers

A customer-focused mentality and perfect service form part of the LAPP company values. We therefore offer our customers the chance to profit from our trial and test centre beyond the scope of quality assurance of our products.

We will test your products and carry out material tests in accordance with your wishes. For instance, you might bring us a length of cable whose material composition you wish to find out. We will test it for you using infrared spectroscopy and tell you what materials it contains. Using thermoa-analysis we can give you information about the material properties. And we can test materials for aging and shelf-life.

In short: The entire know-how of our specialists is available to you for your analysis and quality assurance.
Products for the railway industry at a glance

1. Brake
2. Driver’s Desk
3. Traction Converter
4. Control Cabinets
5. Coupler
6. Train Control System
7. Traction Motor
8. Brake
9. Blower
10. Battery
11. Auxiliary Power Converter
12. Passenger Information System
13. Lavatory
14. Lighting
15. Air Condition
16. Doors

ÖLFLEX® Power and control cables

ÖLFLEX® TRAIN 301 TW 300V
1 2 3 4 6 8 11 12 13 14 16

ÖLFLEX® TRAIN 310/315 C TW-P 300V
1 2 3 4 6 8 11 12 13 15

ÖLFLEX® TRAIN 317 C TW-P 300V
1 2 3 4 6 8 11 12 13 15

ÖLFLEX® TRAIN 320/325 C TW-E 300V
1 3 8 11 16

ÖLFLEX® TRAIN 327 C TW-E 300V
1 3 5 6 8 11 15

ÖLFLEX® TRAIN 331 600V
1 2 3 4 5 6 8 9 10 11 15

ÖLFLEX® TRAIN 340 600V
1 3 4 5 8 9 11 13 15

ÖLFLEX® TRAIN 345 C 600V
1 3 4 5 8 11 13 15

ÖLFLEX® TRAIN 350 300V/355 C 300V
4 5 6 13

ÖLFLEX® TRAIN 361 1,8kV
3 4 7 9 10 11 15

ÖLFLEX® TRAIN 371 1,8kV
3 4 5 7 9 10 11

ÖLFLEX® TRAIN 381 3,6kV
7

ÖLFLEX® TRAIN HT 150 F/FF
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<td>ETHERLINE® Data communication systems for ETHERNET technology</td>
<td>1  2  3  4  5  6  8  11 12 13 15 16</td>
</tr>
<tr>
<td>EPIC® Industrial connectors</td>
<td>1  2  3  4  5  6  8  9 10 11 12 15</td>
</tr>
<tr>
<td>SKINTOP® Cable glands</td>
<td>1  3  4  5  6  7  8  9 10 11 12 13 15</td>
</tr>
<tr>
<td>SILVYN® Cable protection and guiding systems</td>
<td>1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16</td>
</tr>
<tr>
<td>FLEXIMARK® Marking systems</td>
<td>1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16</td>
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</tbody>
</table>
Overview ÖLFLEX® TRAIN

Single cores according to EN 50306 (Thin Wall)

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<td>EN 50306-2</td>
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<td>GKW R</td>
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<tr>
<td>Type acc. to EN standard</td>
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<table>
<thead>
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<th>m/spool</th>
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<td>15301000</td>
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Multi core cables with twisted pairs according to EN 50306 (Thin Wall)

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<th>Type standard</th>
<th>TRAIN 317 C TW-P 300 V</th>
<th>ÖLFLEX® TRAIN 327 C TW-E 300 V</th>
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<tr>
<td>May substitute previous type</td>
<td>EN 50306-4 / 5P</td>
<td>EN 50306-4 / 5E</td>
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<td>●</td>
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<tr>
<td>Type acc. to EN standard</td>
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<td>MM S</td>
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</table>

<table>
<thead>
<tr>
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<tbody>
<tr>
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<td>7 X (2 X 0.5)</td>
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Photographs and graphics are not to scale and do not represent detailed images of the respective products.
## Multi core cables according to EN 50306 (Thin Wall)

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<th>ÖLFLEX® TRAIN 310 TW-P 300 V</th>
<th>ÖLFLEX® TRAIN 315 C TW-P 300 V</th>
<th>ÖLFLEX® TRAIN 320 TW-E 300 V</th>
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Photographs and graphics are not to scale and do not represent detailed images of the respective products.
# Overview ÖLFLEX® TRAIN

## Single core cables according to EN 50264

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Overview ÖLFLEX® TRAIN

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### Single core cables according to EN 50382 (Silicone high temperature cables)

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Photographs and graphics are not to scale and do not represent detailed images of the respective products.
Overview ÖLFLEX® TRAIN

Multi-core control cables, EN 45545-2 certified

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Photographs and graphics are not to scale and do not represent detailed images of the respective products.
**ÖLFLEX® TRAIN 301 TW 300V**

Single-core cable according to EN 50306-2 type M for high requirements in railway applications

### Info
- Meets EN 50306-2 type M and EN 45545-2
- High temperature resistance: -50°C up to +125°C
- Highly oil- and fuel-resistant

### Benefits
- Reduced insulation wall thickness, thus space-saving installation
- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increases the protection against damage to persons and property in the event of a fire

### Application range
- For use in railway vehicles, for fixed and protected installation and applications where limited movement may occur
- Suitable for switchboards and control panels of trains and locomotives
- Also applicable within oily environments and areas with increased ambient temperature

### Product features
- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50306
  - Fuel resistant acc. to EN 50306
  - Acid resistant acc. to EN 50306
  - Alkali resistant acc. to EN 50306
  - Ozone resistant acc. to EN 50306
- Current rating acc. to EN 50355, appendix A

### Technical data
- **Conductor stranding**
  - SRC (special round conductor)
  - 19 or 37 wires acc. to EN 50306-1
- **Minimum bending radius**
  - Fixed installation:
    - 4 x OD
    - 3 x OD for careful bending, once at connecting terminal
  - Occasional flexing:
    - 5 x OD
    - (OD = outer diameter)
- **Nominal voltage**
  - U0: 600 V AC
  - U0/U: 300/500 V AC acc. to EN 50306
  - U0: 550 V AC
- **Test voltage**
  - 3.5 kV AC; 8.4 kV DC
- **Temperature range**
  - Fixed installation:
    - -45°C to +125°C (20,000 h)
    - -50°C acc. to GOST 20.57.406-81
  - Occasional flexing:
    - -35°C to +105°C
  - Short circuit: +160°C (5s)

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Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request. Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.

Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum

Please specify the preferred

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
**Info**
- Meets EN 50306-4 class P, type MM and EN 45545-2
- High temperature resistance: -50°C up to +125°C
- Highly oil- and fuel-resistant

**Benefits**
- Reduced insulation wall thickness, thus space-saving installation
- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

**Application range**
- For use in railway vehicles, for fixed and protected installation and applications where limited movement may occur
- Suitable for control and monitoring circuits as well as locking circuits and internal wiring of equipment in trains and locomotives
- Also applicable within oily environments and areas with increased ambient temperature

**Product features**
- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50306
  - Fuel resistant acc. to EN 50306
  - Acid resistant acc. to EN 50306
  - Alkali resistant acc. to EN 50306
  - Ozone resistant acc. to EN 50306
- Current rating acc. to EN 50355, appendix A

**Norm references / Approvals**
- EN 50306-4 class P, type MM
- EN 45545-2 HL1, HL2, HL3
- NF F 16-101 – Classification: C / F0 (flame propagation / smoke)
- Compliant with NFPA 130

**Product Make-up**
- Tinned-copper strand, 19 or 37 wires, SRC (Special Round Conductor)
- Insulation: Electron beam cross-linked Polymer compound acc. to EN 50306
- Colour of insulation: White with black numbers
- Outer sheath: electron beam cross-linked polymer-compound S2 acc. to EN 50306
- Outer sheath colour: Black

**Technical data**
- **Core identification code**
  - White with black numbers
- **Conductor stranding**
  - SRC (special round conductor)
  - 19 or 37 wires acc. to EN 50306-1
- **Minimum bending radius**
  - Fixed installation:
    - ≤ 12 mm: 4 x OD / 3 x OD*
    - > 12 mm: 5 x OD / 4 x OD*
  - * for careful bending, once at connecting terminal
  - Occasional flexing:
    - ≤ 12 mm: 5 x OD
    - > 12 mm: 6 x OD
    - (OD = outer diameter)
- **Nominal voltage**
  - Uc: 600 V AC
  - U0/U: 300/500 V AC acc. to EN 50306
  - Uc: 550 V AC
- **Test voltage**
  - 3,5 kV AC, 8,4 kV DC
- **Protective conductor**
  - G = with GN-YE protective conductor
  - X = without protective conductor
- **Temperature range**
  - Fixed installation:
    - -45°C to +125°C (20.000 h)
    - -50°C acc. to GOST 20.57.406-81
  - Occasional flexing:
    - -35°C to +105°C
  - Short circuit:
    - +160°C (5s)

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Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.

Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.

Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum

Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
Power and control cables
Special applications • Rolling stock

ÖLFLEX® TRAIN 315 C TW-P 300V
Screened multi-core cable according to EN 50306-4 3P type MM S for high requirements in railway applications

Benefits
- Reduced insulation wall thickness, thus space-saving installation
- Copper screening complies with EMC requirements and protects against electromagnetic interference
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range
- In EMC-sensitive environments
- For use in railway vehicles, for fixed and protected installation and applications where limited movement may occur
- Suitable for control and monitoring circuits as well as locking circuits and internal wiring of equipment in trains and locomotives
- Also applicable within oily environments and areas with increased ambient temperature

Product features
- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gas acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 61034-2
  - Flame-retardant acc. to EN 60332-1-2
  - Flame propagation acc. to EN 50305
- Core identification code: White with black numbers
- Copper index: Tinned-copper strand, 19 or 37 wires, SRC (special round conductor)
- Insulation: Electron beam cross-linked polymer compound acc. to EN 50306
- Colour of insulation: White with black numbers
- Wrapping: Halogen-free plastic foil
- Screen: Tinned-copper braiding
- Outer sheath: electron beam cross-linked polymer-compound S2 acc. to EN 50306
- Outer sheath colour: Black

Technical data
- Core identification code: White with black numbers
- Conductor stranding: SRC (special round conductor)
- Test voltage: 3.5 kV AC; 8.4 kV DC
- Rating voltage: U = 1000 V AC
- Nominal voltage: Uc = 600 V AC
- Occasional flexing:
- Fixed installation:
- Minimum bending radius:
- Occasional flexing:
- Short circuit:
- Temperature range:
- Minimum bending radius:
- Occasional flexing:

unless specified otherwise, the shown product values are nominal values. detailed values (e.g. tolerances) are available upon request.

For current information see: www.lappgroup.com
**ÖLFLEX® TRAIN 317 C TW-P 300V**

Screened multi-core cable according to EN 50306-4 SP type MM S for high requirements in railway applications

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**Benefits**

- Reduced insulation wall thickness, thus space-saving installation.
- Copper screening complies with EMC requirements and protects against electromagnetic interference.
- Resistant to mechanical influences in harsh environmental conditions.
- Extended temperature range.
- Reduced flame spreading increases the protection against damage to persons and property in the event of a fire.

**Application range**

- In EMC-sensitive environments.
- For use in railway vehicles, for fixed and protected installation and applications where limited movement may occur.
- Suitable for control and monitoring circuits as well as locking circuits and internal wiring of equipment in trains and locomotives.
- Also applicable within oily environments and areas with increased ambient temperature.

**Product features**

- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2.
- Chemical properties:
  - Oil resistant acc. to EN 50306
  - Fuel resistant acc. to EN 50306
  - Acid resistant acc. to EN 50306
  - Alkali resistant acc. to EN 50306
  - Ozone resistant acc. to EN 50306
- Current rating acc. to EN 50355, appendix A.

**Norm references / Approvals**

- EN 50306-4 class P, type MM S
- EN 45545-2 H1L1, H1L2, H1L3
- NF F 16-101 – Classification: C / F1 (flame propagation / smoke).

**Product Make-up**

- Tinned-copper strand, 19 or 37 wires, SRC (Special Round Conductor).
- Insulation: Electron beam cross-linked Polymer compound acc. to EN 50306.
- Colour of insulation: White with black numbers.
- Screen: Tinned-copper braiding over each pair.
- Jacket over screen: electron beam cross-linked polymer compound S2 acc. to EN 50306.
- Outer sheath: electron beam cross-linked polymer compound S2 acc. to EN 50306.
- Outer sheath colour: Black.

**Technical data**

- **Core identification code**
  - White with black numbers.
- **Conductor stranding**
  - SRC (special round conductor)
  - 19 or 37 wires acc. to EN 50306.
- **Minimum bending radius**
  - Fixed installation: 5 x outer diameter.
  - Occasional flexing: 10 x outer diameter.
- **Nominal voltage**
  - U0 : 600 V AC
  - U0/U: 300/500 V AC acc. to EN 50306.
  - U0 : 550 V AC.
- **Test voltage**
  - 3.5 kV AC; 8.4 kV DC.
- **Temperature range**
  - Fixed installation: -45°C to +125°C (20,000 h).
  - 50°C acc. to GOST 20.57.406-81.
  - Occasional flexing: -35°C to +105°C.
  - Short circuit: +160°C (5s).

**Article number**

- **Number of cores and mm² per conductor**
  - **Outer diameter (mm)**
  - **Copper index (kg/km)**
  - **Weight (kg/km)**

<table>
<thead>
<tr>
<th>Article number</th>
<th>Number of cores and mm² per conductor</th>
<th>Outer diameter (mm)</th>
<th>Copper index (kg/km)</th>
<th>Weight (kg/km)</th>
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Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.

- Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.
- Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum.
- Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).
- Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
ÖLFLEX® TRAIN 320 TW-E 300V
Multi-core cable according to EN 50306-4 1E type MM for high requirements in railway applications

Benefits
• Reduced insulation wall thickness, thus space-saving installation
• Good chemical resistance
• Resistant to mechanical influences in harsh environmental conditions
• Extended temperature range
• Reduced flame spreading increases the protection against damage to persons and property in the event of a fire

Application range
• For use in railway vehicles, for fixed installations and applications where limited movement may occur
• Suitable for control and monitoring circuits as well as locking circuits and internal wiring of equipment in trains and locomotives
• Also applicable within oily environments and areas with increased ambient temperature

Product Make-up
• Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 61034-2
  - Alkali resistant acc. to EN 50306
  - Acid resistant acc. to EN 50306
  - Fuel resistant acc. to EN 50306
  - Oil resistant acc. to EN 50306
  - No flame propagation acc. to NF C 32-070, C1 and C2
  - Low smoke density acc. to NF X 10-702
  - Flame-retardant acc. to EN 60332-1-2
  - No toxic gases acc. to EN 50305
  - No fluorine acc. to EN 60684-2
  - No corrosive gases acc. to EN 60754-1
  - Fire behaviour according to NF:
    - Toxicity of gases acc. to NF X 70-100
    - Low smoke density acc. to NF X 10-702
    - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
  - Chemical properties:
    - Oil resistant acc. to EN 50306
    - Fuel resistant acc. to EN 50306
    - Acid resistant acc. to EN 50306
    - Alkali resistant acc. to EN 50306
    - Ozone resistant acc. to EN 50306
  - Current rating acc. to EN 50355, appendix A

Technical data

<table>
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<tr>
<th>Article number</th>
<th>Number of cores and mm² per conductor</th>
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</table>

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.

Core identification code
White with black numbers

Conductor stranding
SRC (Special Round Conductor)
19 or 37 wires acc. to EN 50306-1

Minimum bending radius
Fixed installation:
≤ 12 mm: 4 x OD / 3 x OD*
> 12 mm: 5 x OD / 4 x OD* * for careful bending,
once at connecting terminal
Occasional flexing:
≤ 12 mm: 5 x OD
> 12 mm: 6 x OD
(OD = outer diameter)

Nominal voltage
U0: 600 V AC
U0/U: 300/500 V AC acc. to EN 50306
U0: 550 V AC

Test voltage
3.5 kV AC; 8.4 kV DC

Protective conductor
G = with GN-YE protective conductor
X = without protective conductor

Temperature range
Fixed installation:
-45°C to +125°C (20,000 h)
-50°C acc. to GOST 20.57.406-81
Occasional flexing:
-35°C to +105°C
Short circuit:
+160°C (5s)

For current information see: www.lappgroup.com
ÖLFLEX® TRAIN 325 C TW-E 300V

Screened multi-core cable according to EN 50306-4 3E type MM S for high requirements in railway applications

Benefits
• Reduced insulation wall thickness, thus space-saving installation
• Copper screening complies with EMC requirements and protects against electromagnetic interference
• Resistant to mechanical influences in harsh environmental conditions
• Extended temperature range
• Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range
• In EMC-sensitive environments
• For use in railway vehicles, for fixed installations and applications where limited movement may occur
• Suitable for control and monitoring circuits as well as locking circuits and internal wiring of equipment in trains and locomotives
• Also applicable within oily environments and areas with increased ambient temperature

Product features
• Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50306
  - Acid resistant acc. to EN 50306
  - Alkali resistant acc. to EN 50306
  - Low smoke density acc. to EN 61034-2
  - Fire propagation according to NF:
    - Toxicity of gases acc. to NF X 70-100
    - Low smoke density acc. to NF X 10-072
    - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
  - Chemical properties:
    - Oil resistant acc. to EN 50306
    - Fuel resistant acc. to EN 50306
    - Acid resistant acc. to EN 50306
    - Alkali resistant acc. to EN 50306
    - Ozone resistant acc. to EN 50306
  - Current rating acc. to EN 50355, appendix A

Norm references / Approvals
EN 50306-4 class E, type MM S
EN 45545-2 HL1, HL2, HL3
NF F 16-101 - Classification: C / F0 (fire propagation / smoke)

Technical data
Core identification code
White with black numbers
Conductor stranding
SRC (special round conductor)
19 or 37 wires acc. to EN 50306-1
Nominal voltage
U0: 600 V AC
U0/U: 300/500 V AC acc. to EN 50306
U0: 550 V AC
Test voltage
3.5 kV AC; 8.4 kV DC
Protective conductor
G = with GN-YE protective conductor
X = without protective conductor
Temperature range
-45°C to +125°C (20,000 h)
-50°C acc. to GOST 20.57.406-81
Ocassional flexing:
-35°C to +105°C
Short circuit:
+160°C (5s)

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.
Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.
Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum
Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).
Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
**ÖLFLEX® TRAIN 327 C TW-E 300V**

Screened multi-core cable according to EN 50306-4 5E type MM S for high requirements in railway applications

### Benefits
- Reduced insulation wall thickness, thus space-saving installation
- Copper screening complies with EMC requirements and protects against electromagnetic interference
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

### Application range
- In EMC-sensitive environments
- For use in railway vehicles, for fixed installations and applications where limited movement may occur
- Suitable for control and monitoring circuits as well as locking circuits and internal wiring of equipment in trains and locomotives
- Also applicable within oily environments and areas with increased ambient temperature

### Product features
- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50306
  - Fuel resistant acc. to EN 50306
  - Acid resistant acc. to EN 50306
  - Alkaline resistant acc. to EN 50306
  - Ozone resistant acc. to EN 50306
- Current rating acc. to EN 50355, appendix A

### Technical data
- **Core identification code**
  - White with black numbers
- **Conductor stranding**
  - SRC (special round conductor)
- **Nominal voltage**
  - U0: 600 V AC
  - U0/U: 300/500 V AC acc. to EN 50306
  - U0: 550 V AC
- **Test voltage**
  - 3.5 kV AC; 8.4 kV DC
- **Temperature range**
  - Fixed installation:
    - -45°C to +125°C (20.000 h)
    - -50°C acc. to GOST 20.57.406-81
    - Occasional flexing:
    - -35°C to +105°C
    - Short circuit:
      - +160°C (5s)

### Normal references / Approvals
- EN 50306-4 class E, type MM S
- EN 45545-2 Cat. C1 and C2
- NF F 16-101 - Classification: C / F1 (flame propagation / smoke)

### Product Make-up
- Tinned-copper strand, 19 or 37 wires, SRC (special round conductor)
- Insulation: Electron beam cross-linked polymer compound acc. to EN 50306
- Colour of insulation: White with black numbers
- Screen: Tinned-copper braiding over each pair
- Jacket over screen: electron beam cross-linked polymer-compound S2 acc. to EN 50306
- Outer sheath: electron beam cross-linked polymer-compound S2 acc. to EN 50306
- Outer sheath colour: Black

### Article number | Number of cores and mm² per conductor | Outer diameter (mm) | Copper index (kg/km) | Weight (kg/km)
--- | --- | --- | --- | ---
15327000 | 2 X (2 X 0.5) | 10.7 | 38.86 | 179
15327001 | 3 X (2 X 0.5) | 11.4 | 58.30 | 212
15327002 | 4 X (2 X 0.5) | 12.4 | 77.73 | 254
15327003 | 7 X (2 X 0.5) | 14.7 | 136.38 | 375
15327004 | 2 X (2 X 0.75) | 11.1 | 51.49 | 213
15327005 | 3 X (2 X 0.75) | 12.2 | 77.24 | 250
15327006 | 4 X (2 X 0.75) | 13.4 | 102.99 | 301
15327007 | 7 X (2 X 0.75) | 15.9 | 180.64 | 442
15327008 | 2 X (2 X 1) | 11.9 | 63.00 | 235
15327009 | 3 X (2 X 1) | 12.6 | 94.50 | 282
15327010 | 4 X (2 X 1) | 13.8 | 126.00 | 342
15327011 | 7 X (2 X 1) | 16.5 | 220.93 | 499
15327012 | 2 X (2 X 1.5) | 13.9 | 77.86 | 317
15327013 | 3 X (2 X 1.5) | 14.8 | 90.10 | 317
15327014 | 4 X (2 X 1.5) | 16.3 | 136.00 | 383
15327015 | 7 X (2 X 1.5) | 19.5 | 185.00 | 492

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.

Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.

Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum.

Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
ÖLFLEX® TRAIN 331 600V
Single-core cable according to EN 50264-3-1 type M for high requirements in railway applications

Benefits
- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range
- For use in railway vehicles, for fixed installations and applications where limited movement may occur
- Suitable for connecting lamps, heating equipment, switchgear, terminal boxes and power supply
- Also applicable within oily environments and areas with increased ambient temperature

Product features
- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 60332-3-24
  - Flame-retardant acc. to EN 61034-2
  - Flame-retardant acc. to EN 60228, conductor class 5
- Chemical properties:
  - Oil resistant acc. to EN 50264-3-1
  - Fuel resistant acc. to EN 50264-3-1
  - Acid resistant acc. to EN 50264-3-1
  - Alkali resistant acc. to EN 50264-3-1
  - Flame resistant acc. to EN 50264-3-1/EN 50305
- Current rating acc. to EN 50355, appendix A

Norm references / Approvals
- EN 50264-3-1 type M
- EN 45454-2 HL1, HL2, HL3
- NF F 16-101 – Classification: C / F0 (flame propagation / smoke)
- Compliant with NFPA 130

Product Make-up
- Tinned-copper strand, fine-wire
- Insulation: Electron beam cross-linked Polymer compound EI 109
- Colour: Black or green-yellow
- Also available in red and blue colour

Technical data
- Conductor stranding: Fine-wired/Finely stranded acc. to IEC 60228, conductor class 5
- Minimum bending radius
  - Fixed installation: ≤ 12 mm: 3 x OD > 12 mm: 4 x OD
  - Occasional flexing: ≤ 12 mm: 4 x OD > 12 mm ≤ 20 mm: 5 x OD > 20 mm: 6 x OD
  - Nominal voltage: U0/U AC 0.6/1 kV, V0 AC 1.2 kV
  - Test voltage: 3.5 kV AC, 8.4 kV DC
- Temperature range
  - Fixed installation: -45°C to +120°C (20.000 h)
  - Occasional flexing: -35°C to +90°C
  - Short circuit: +200°C (5s)

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Unless otherwise specified, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.

For current information see: www.lappgroup.com
Power and control cables
Special applications • Rolling stock

ÖLFLEX® TRAIN 340 600V
Multi-core cable according to EN 50264-3-2 type MM for high requirements in railway applications

Benefits
• Good chemical resistance
• Resistant to mechanical influences in harsh environmental conditions
• Extended temperature range
• Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range
• For use in railway vehicles, for fixed installations and applications where limited movement may occur
• Suitable for connecting lamps, heating equipment, switchgear, terminal boxes and power supply
• Also applicable within oily environments and areas with increased ambient temperature

Product features
• Fire behaviour according to NF (please refer to data sheet):
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
• Chemical properties:
  - Oil resistant acc. to EN 50264-3-2
  - Fuel resistant acc. to EN 50264-3-2
  - Acid resistant acc. to EN 50264-3-2
  - Alkali resistant acc. to EN 50264-3-2
  - Ozone resistant acc. to EN 50264-3-2/EN 50305
• Current rating acc. to EN 50355, appendix A

Norm references / Approvals
• EN 50264-3-2 type MM
• EN 45545-2 HL1, HL2, HL3
• NF F 16-101 – Classification: C / F0 (flame propagation / smoke) please refer to data sheet

Product Make-up
• Tinned-copper strand, fine-wire
• Insulation: Electron beam cross-linked Polymer compound EI 109
• Colour of insulation: Black with white numbers
• Outer sheath: electron beam cross-linked polymer-compound EM 104
• Outer sheath colour: Black

Technical data
Core identification code
Black with white numbers

Conductor stranding
Fine-wired/Finely stranded acc. to IEC 60228, conductor class 5

Minimum bending radius
Fixed installation:
≤ 12 mm: 3 x OD
> 12 mm: 4 x OD
Occasional flexing:
≤ 12 mm: 4 x OD
> 12 mm ≤ 20 mm: 5 x OD
> 20 mm: 6 x OD
(OD = outer diameter)

Nominal voltage
U0/U AC 0.6/1 kV
Ue, AC 1.2 kV
V0, DC 0.9 kV

Test voltage
3.5 kV AC; 8.4 kV DC

Protective conductor
G = with GN-YE protective conductor
X = without protective conductor

Temperature range
Fixed installation:
-45°C to +120°C (20.000 h)
-50°C acc. to GOST 20.57.406-81
Occasional flexing:
-35°C to +90°C
Short circuit:
+200°C (5s)
Multi-core cable according to EN 50264-3-2 type MM for high requirements in railway applications

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Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.

Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.

Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum

Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
Power and control cables
Special applications • Rolling stock

ÖLFLEX® TRAIN 345 C 600V
Screened multi-core cable according to EN 50264-3-2 type MM S for high requirements in railway applications

Benefits
- Copper screening complies with EMC requirements and protects against electromagnetic interference
- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increases the protection against damage to persons and property in the event of a fire

Application range
- For use in railway vehicles, for fixed installations and applications where limited movement may occur
- Suitable for connecting lamps, heating equipment, switchgear, terminal boxes and power supply
- Also applicable within oily environments and areas with increased ambient temperature

Product features
- Fire behaviour according to NF (please refer to data sheet):
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50264-3-2
  - Fuel resistant acc. to EN 50264-3-2
  - Acid resistant acc. to EN 50264-3-2
  - Alkali resistant acc. to EN 50264-3-2
  - Ozone resistant acc. to EN 50264-3-2/EN 50305
- Current rating acc. to EN 50355, appendix A

Norm references / Approvals
- EN 50264-3-2 type MM S
- EN 45545-2 HL1, HL2, HL3
- NF F 16-101 - Classification: C / F0 (flame propagation / smoke) please refer to data sheet

Product Make-up
- Conductor: Fine-wire strands of tinned copper
- Insulation: Electron beam cross-linked Polymer compound EI 109
- Colour of insulation: Black with white numbers
- Wrapping: Halogen-free plastic foil
- Screen: Tinned-copper braiding
- Outer sheath: electron beam cross-linked polymer-compound EM 104
- Outer sheath colour: Black

Technical data
- Core identification code: Black with white numbers
- Conductor stranding: Fine-wired/Finely stranded acc. to IEC 60228, conductor class 5
- Minimum bending radius
  - Fixed installation: ≤ 12 mm: 3 x OD
  - Occasional flexing: ≤ 12 mm: 4 x OD
  - Occasional flexing: > 12 mm ≤ 20 mm: 5 x OD
  - Occasional flexing: > 20 mm: 6 x OD
  (OD = outer diameter)
- Nominal voltage
  - U0/U AC 0.6/1 kV
  - U1, AC 1.2 kV
  - V1, DC 0.9 kV
- Test voltage
  - 3.5 kV AC; 8.4 kV DC
- Protective conductor
  - G = with GN-YE protective conductor
  - X = without protective conductor
- Temperature range
  - Fixed installation: -45°C to +120°C (20,000 h)
  - occasional flexing: -50°C acc. to GOST 20.57.406-81
  - occasional flexing: -35°C to +90°C
  - Short circuit: +200°C (5s)

Info
- Meets EN 50264-3-2 type MM S and EN 45545-2
- High temperature resistance: -50°C up to 120°C
- Highly oil- and fuel-resistant

For current information see: www.lappgroup.com
Screened multi-core cable according to EN 50264-3-2 type MM S for high requirements in railway applications.

### Table: Specifications

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Unless otherwise specified, the shown product values are nominal values. Detailed values (e.g., tolerances) are available upon request.

Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.

Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum

Please specify the preferred type of packaging (e.g., 1 x 500 m drum or 5 x 100 m coils).

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
Power and control cables
Special applications • Rolling stock

ÖLFLEX® TRAIN 350 300V
Multi-core cable according to EN 50264-3-2 type MM for high requirements in railway applications

Benefits
• Good chemical resistance
• Resistant to mechanical influences in harsh environmental conditions
• Extended temperature range
• Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range
• For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
• Suitable for connecting lamps, heating equipment, switchgear, terminal boxes and power supply
• For use in railway vehicles, for fixed installations and applications where limited movement may occur

Product features
• Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 61034-2
  - Flame-retardant acc. to EN 60332-1-2
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
• Chemical properties:
  - Oil resistant acc. to EN 50264-3-2
  - Fuel resistant acc. to EN 50264-3-2
  - Acid resistant acc. to EN 50264-3-2
  - Alkali resistant acc. to EN 50264-3/2
• Current rating acc. to EN 50355, appendix A

Technical data

<table>
<thead>
<tr>
<th>Article number</th>
<th>Number of cores and mm² per conductor</th>
<th>Outer diameter (mm)</th>
<th>Copper index (kg/km)</th>
<th>Weight (kg/km)</th>
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• Meets EN 50264-3-2 type MM and EN 45545-2
• High temperature resistance: -50°C up to 120°C
• Highly oil- and fuel-resistant

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
**Benefits**
- Copper screening complies with EMC requirements and protects against electromagnetic interference
- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

**Application range**
- For use in railway vehicles, for fixed installations and applications where limited movement may occur
- Suitable for connecting lamps, heating equipment, switchgear, terminal boxes and power supply
- Also applicable within oily environments and areas with increased ambient temperature

**Product features**
- Fire behaviour according to EN / IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 60134-2
  - Flame-retardant acc. to EN 60332-1-2
  - No flame propagation acc. to EN 50355, appendix A

**Technical data**
- Core identification code: Black with white numbers
- Conductor stranding: Fine-wired/Finely stranded acc. to IEC 60228, conductor class 5
- Minimum bending radius
- Fixed installation: ≤ 12 mm: 3 x OD
  > 12 mm: 4 x OD
- Occasional flexing: ≤ 12 mm: 4 x OD
  > 12 mm: 5 x OD
  > 20 mm: 6 x OD
  (OD = outer diameter)
- Nominal voltage
  - U0/U: 300/500 V
  - U1: 600 V
  - V0: DC 450 V
- Test voltage
  - 2 kV AC, 4.8 kV DC
- Protective conductor: G = with GN-YE protective conductor
- X = without protective conductor
- Temperature range
  - Fixed installation: -45°C to +120°C (20.000 h)
  - Occasional flexing: -35°C to +90°C
  - Short circuit: +200°C (5s)

**ÖLFLEX® TRAIN 355 C 300V**
Screened multi-core cable according to EN 50264-3-2 type MM S for high requirements in railway applications

<table>
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Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.

For current information see: www.lappgroup.com
Power and control cables
Special applications • Rolling stock

ÖLFLEX® TRAIN 361 1.8kV
Single-core cable according to EN 50264-3-1 type M for high requirements in railway applications

Benefits
- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range
- For use in railway vehicles, for fixed installations and applications where limited movement may occur
- Suitable for connecting lamps, heating equipment, switchgear, terminal boxes and power supply
- Also applicable within oily environments and areas with increased ambient temperature

Product features
- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 60332-1-2
  - No flame propagation acc. to EN 60332-3-24
- Conductors acc. to EN 50335, appendix A

Technical data
- Conductor stranding: Fine-wired/Finely stranded acc. to IEC 60228, conductor class 5
- Minimum bending radius: Fixed installation: ≤ 12 mm: 3 x OD > 12 mm: 4 x OD Occasional flexing: ≤ 12 mm: 4 x OD > 12 mm ≤ 20 mm: 5 x OD > 20 mm: 6 x OD (OD = outer diameter)
- Nominal voltage: U0/U AC 1.8/3 kV U1 AC 3.6 kV
- Test voltage: 6.5 kV AC; 15 kV DC
- Temperature range: Fixed installation: -45°C to +120°C (20.000 h) -50°C acc. to GOST 20.57.406-81 Occasional flexing: -35°C to +90°C Short circuit: +200°C (5s)

Norm references / Approvals
- EN 50264-3-1 type M
- EN 45545-2 HL1, HL2, HL3
- NF F 16-101 – Classification: C/F1 (flame propagation / smoke)

Product Make-up
- Tinned-copper strand, fine-wire
- Insulation: Electron beam cross-linked Polymer compound EI 109
- Colour: Black

Article number | Conductor cross-section (mm²) | Outer diameter (mm) | Copper index (kg/km) | Weight (kg/km)
--- | --- | --- | --- | ---
ÖLFLEX® TRAIN 361 1.8kV
15361000 | 1.5 | 5.6 | 14.4 | 48
15361001 | 2.5 | 6.0 | 24.0 | 61
15361002 | 4.0 | 6.7 | 38.4 | 80
15361003 | 6.0 | 7.2 | 57.6 | 105
15361004 | 10.0 | 8.2 | 96.0 | 153
15361005 | 16.0 | 9.2 | 153.6 | 224
15361006 | 25.0 | 10.5 | 240.0 | 323
15361007 | 35.0 | 11.7 | 336.0 | 431
15361008 | 50.0 | 13.7 | 480.0 | 592
15361009 | 70.0 | 15.4 | 672.0 | 801
15361010 | 95.0 | 17.8 | 912.0 | 1076
15361011 | 120.0 | 19.4 | 1152.0 | 1329
15361012 | 150.0 | 21.4 | 1440.0 | 1634
15361013 | 185.0 | 23.3 | 1776.0 | 2011
15361014 | 240.0 | 26.8 | 2304.0 | 2571
15361015 | 300.0 | 28.0 | 2880.0 | 3176

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.
Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum
Please specify the preferred
Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
### ÖLFLEX® TRAIN 371 1.8kV

Single-core cable according to EN 50264-3-1 type MM for high requirements in railway applications

#### Benefits
- High electrical strength and mechanical durability due to dual-layer cable construction
- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

#### Application range
- For use in railway vehicles, for fixed installations and applications where limited movement may occur
- Suitable for wiring of control cabinets, distributors, converters, motors and batteries
- Also applicable within oily environments and areas with increased ambient temperature

#### Product features
- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50264-3-1
  - Fuel resistant acc. to EN 50264-3-1
  - Acid resistant acc. to EN 50264-3-1
  - Alkali resistant acc. to EN 50264-3-1
  - Ozone resistant acc. to EN 50264-3-1/
  - EN 50305
- Current rating acc. to EN 5055, appendix A

#### Technical data

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Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.

Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.

Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum

Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
Power and control cables
Special applications • Rolling stock

ÖLFLEX® TRAIN 381 3.6kV
Single-core cable according to EN 50264-3-1 type MM for high requirements in railway applications

Benefits
• High electrical strength and mechanical durability due to dual-layer cable construction
• Good chemical resistance
• Resistant to mechanical influences in harsh environmental conditions
• Extended temperature range
• Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

Application range
• For use in railway vehicles, for fixed installations and applications where limited movement may occur
• Suitable for wiring of control cabinets, distributors, converters, motors and batteries
• Also applicable within oily environments and areas with increased ambient temperature

Product features
• Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - Low smoke density acc. to EN 61034-2
  - Flame-retardant acc. to EN 60332-1-2
• Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
• Chemical properties:
  - Oil resistant acc. to EN 50264-3-1
  - Fuel resistant acc. to EN 50264-3-1
  - Acid resistant acc. to EN 50264-3-1
  - Alkali resistant acc. to EN 50264-3-1
  - Ozone resistant acc. to EN 50264-3-1
• Current rating acc. to EN 50355, appendix A

Norm references / Approvals
• EN 50264-3-1 type MM
• EN 45545-2 HL1, HL2, HL3
• NF F 16-101 – Classification: C / F1 (flame propagation / smoke)

Product Make-up
• Tinned-copper strand, fine-wire
• Insulation: Electron beam cross-linked Polymer compound EI 109
• Outer sheath: electron beam cross-linked polymer-compound EM 104
• Outer sheath colour: Black

Technical data
Conductor stranding
Fine-wired/Finely stranded acc. to IEC 60228, conductor class 5

Minimum bending radius
Fixed installation:
- ≤ 12 mm: 3 x OD
- > 12 mm: 4 x OD
Occasional flexing:
- ≤ 12 mm: 4 x OD
- > 12 mm ≤ 20 mm: 5 x OD
- > 20 mm: 6 x OD
(OD = outer diameter)

Nominal voltage
U0/U AC 3,6/6 kV
Ue, AC 7,2 kV
V0, DC 5,4 kV

Test voltage
11 kV AC, 26 kV DC

Temperature range
Fixed installation:
-45°C to +120°C (20.000 h)
-50°C acc. to GOST 20.57.406-81
Occasional flexing:
-35°C to +90°C
Short circuit:
+200°C (5s)

Article number Conductor cross-section (mm²) Outer diameter (mm) Copper index (kg/km) Weight (kg/km)
15381000 2.5 9.0 24.0 118
15381001 4.0 9.7 38.4 146
15381002 6.0 10.2 57.8 176
15381003 10.0 11.2 96.0 232
15381004 16.0 12.2 153.6 303
15381005 25.0 14.5 240.0 445
15381006 35.0 15.7 336.0 566
15381007 50.0 17.7 480.0 747
15381008 70.0 19.4 672.0 972
15381009 95.0 21.4 912.0 1250
15381010 120.0 23.4 1152.0 1557
15381011 150.0 25.4 1440.0 1895
15381012 185.0 27.5 1776.0 2281
15381013 240.0 31.8 2304.0 2982
15381014 300.0 33.0 2880.0 3554

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
ÖLFLEX® TRAIN HT 150 F 1.8kV

Single-core cable according to EN 50382-2 type F for high requirements in railway applications

**Info**
- Meets EN 50382-2 type F and EN 45545-2
- High temperature resistance: -40°C up to +150°C
- Highly oil- and fuel-resistant

**Benefits**
- Good flexibility - easy installation with tight space requirements
- Good chemical resistance
- For high ambient temperatures
- Reduced flame spreading increases the protection against damage to persons and property in the event of a fire

**Application range**
- For use in railway vehicles, for fixed and protected installation and applications where limited movement may occur
- Suitable for wiring of control cabinets, distributors, converters, motors and batteries
- Also applicable within oily environments and areas with increased ambient temperature

**Product features**
- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
- Low smoke density acc. to EN 60332-1-2
- Reduced flame propagation acc. to EN 60332-3-24 / EN 60332-3-25 / EN 50305
- Chemical properties:
  - Oil resistant acc. to EN 50382-2
  - Acid resistant acc. to EN 50382-2
  - Alkali resistant acc. to EN 50382-2
  - Ozone resistant acc. to EN 50382-2
- Current rating acc. to EN 50355, appendix A

**Norm references / Approvals**
- EN 50382-2 type F
- EN 45545-2 HL1, HL2, HL3

**Product Make-up**
- Tinned-copper strand, fine-wire
- Insulation: Silicone rubber compound, type EI 111
- Colour: Black

**Technical data**
- **Conductor stranding**
  - Fine-wired/Finely stranded acc. to IEC 60228, conductor class 5
- **Minimum bending radius**
  - Fixed installation: 3 x outer diameter
  - Occasional flexing: 5 x outer diameter
- **Nominal voltage**
  - $U_0$ / $U$ AC 1.8/3 kV
  - $U_1$ AC 3.6 kV
  - $V_1$ DC 2.7 kV
- **Test voltage**
  - 6.5 kV AC; 15 kV DC
- **Temperature range**
  - -40°C to +150°C

**Article number**
- Number of cores and mm² per conductor
- Outer diameter (mm)
- Copper index (kg/km)
- Weight (kg/km)

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Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.

Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.

Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum

Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
**ÖLFLEX® TRAIN HT 150 F 3.6kV**

Single-core cable according to EN 50382-2 type F for high requirements in railway applications

### Benefits
- Good flexibility – easy installation with tight space requirements
- Good chemical resistance
- For high ambient temperatures
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

### Application range
- For use in railway vehicles, for fixed and protected installation and applications where limited movement may occur
- Suitable for wiring of control cabinets, distributors, converters, motors and batteries
- Also applicable within oily environments and areas with increased ambient temperature

### Product features
- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 60332-1-2
  - No flame propagation acc. to EN 60332-3-24 / EN 60332-3-25 / EN 50305
- Chemical properties:
  - Oil resistant acc. to EN 50382-2
  - Acid resistant acc. to EN 50382-2
  - Alkali resistant acc. to EN 50382-2
  - Ozone resistant acc. to EN 50382-2
- Current rating acc. to EN 50355, appendix A

### Technical data
- **Conductor stranding**
  Fine-wired/Finely stranded acc. to IEC 60228, conductor class 5
- **Minimum bending radius**
  Fixed installation: 3 x outer diameter
  Occasional flexing: 5 x outer diameter
- **Nominal voltage**
  U₀/U AC 3,6/6 kV
  Uₚ, DC 5,4 kV
- **Test voltage**
  11 kV AC; 26 kV DC
- **Temperature range**
  Fixed installation: -40°C to +150°C

### Norm references / Approvals
- EN 50382-2 type F
- EN 45545-2 HL1, HL2, HL3

### Product Make-up
- Tinned-copper strand, fine-wire
- Insulation: Silicone rubber compound, type EI 111
- Colour: Black

### Article number

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Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request. Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.

Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum

Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
ÖLFLEX® TRAIN HT 150 FF 1.8kV

Single-core cable according to EN 50382-2 type FF for high requirements in railway applications

**Benefits**
- Good flexibility - easy installation with tight space requirements
- Good chemical resistance
- For high ambient temperatures
- Reduced flame spreading increases the protection against damage to persons and property in the event of a fire

**Application range**
- For use in railway vehicles, for fixed installations and applications where limited movement may occur
- Suitable for wiring of control cabinets, distributors, converters, motors and batteries
- Also applicable within oily environments and areas with increased ambient temperature

**Product features**
- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 61034-2
- Chemical properties:
  - Oil resistant acc. to EN 50382-2
  - Acid resistant acc. to EN 50382-2
  - Alkali resistant acc. to EN 50382-2
  - Ozone resistant acc. to EN 50382-2
  - Current rating acc. to EN 50355, appendix A

**Technical data**
- Conductor stranding: Fine-wired/Finely stranded acc. to IEC 60228, conductor class 5
- Minimum bending radius: Fixed installation: 3 x outer diameter Occasional flexing: 5 x outer diameter
- Nominal voltage: $U_{N}/U AC$ 1.8/3 kV $U_{m} AC$ 3.6 kV $V_{0} DC$ 2.7 kV
- Test voltage: 6.5 kV AC; 15 kV DC
- Temperature range: Fixed installation: -40°C to +150°C

**Article number | Number of cores and mm² per conductor | Outer diameter (mm) | Copper index (kg/km) | Weight (kg/km)**
--- | --- | --- | --- | ---
15382040 | 1 X 1.5 | 7.4 | 14.4 | 63
15382041 | 1 X 2.5 | 7.8 | 24.0 | 76
15382042 | 1 X 4.0 | 8.4 | 38.4 | 93
15382043 | 1 X 6.0 | 8.9 | 57.6 | 115
15382044 | 1 X 10 | 10.2 | 96.0 | 168
15382045 | 1 X 16 | 11.4 | 153.6 | 236
15382046 | 1 X 25 | 13.4 | 240.0 | 339
15382047 | 1 X 35 | 14.8 | 336.0 | 432
15382048 | 1 X 50 | 16.3 | 480.0 | 583
15382049 | 1 X 70 | 18.3 | 672.0 | 780
15382050 | 1 X 95 | 20.6 | 912.0 | 1039
15382051 | 1 X 120 | 22.6 | 1152.0 | 1276
15382052 | 1 X 150 | 24.2 | 1440.0 | 1539
15382053 | 1 X 185 | 26.6 | 1776.0 | 1871
15382054 | 1 X 240 | 29.4 | 2304.0 | 2417
15382055 | 1 X 300 | 32.1 | 2880.0 | 2760
15382056 | 1 X 400 | 36.1 | 3840.0 | 3620

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.

Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.

Packaging size: coil ≤ 35 kg or ≤ 250 m, otherwise drum

Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
Power and control cables

Special applications • Rolling stock

ÖLFLEX® TRAIN HT 150 FF 3.6kV
Single-core cable according to EN 50382-2 type FF for high requirements in railway applications

Benefits

• Good flexibility - easy installation with tight space requirements
• Good chemical resistance
• For high ambient temperatures
• Reduced flame spreading increases the protection against damage to persons and property in the event of a fire

Application range

• For use in railway vehicles, for fixed installations and applications where limited movement may occur
• Suitable for wiring of control cabinets, distributors, converters, motors and batteries
• Also applicable within oily environments and areas with increased ambient temperature

Product features

• Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 5035
  - Low smoke density acc. to EN 61034-2
  - Flame-retardant acc. to EN 60332-1-2
  - No flame propagation acc. to EN 60332-3-24 / EN 60332-3-25

Norm references / Approvals

• EN 50382-2 type FF
• EN 45545-2 HL1, HL2, HL3

Product Make-up

• Tinned-copper strand, fine-wire
• Insulation: Silicone rubber compound, type EI 111
• Wrapping: Halogen-free plastic foil (optional)
• Outer sheath: Silicone rubber compound, type EM 107
• Outer sheath colour: Black

Info

• Meets EN 50382-2 type FF and EN 45545-2
• High temperature resistance: -40°C up to +150°C
• Highly oil- and fuel-resistant

Technical data

Conductor stranding
Fine-wired/Finely stranded acc. to IEC 60228, conductor class 5

Minimum bending radius
Fixed installation: 3 x outer diameter
Occasional flexing: 5 x outer diameter

Nominal voltage
U_0/U AC 3.6/6 kV
U_r AC 7.2 kV
V_r DC 5.4 kV

Test voltage
11 kV AC; 25 kV DC

Temperature range
Fixed installation: -40°C to +150°C

Article number Number of cores and mm² per conductor Outer diameter (mm) Copper index (kg/km) Weight (kg/km)

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Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.

Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.

Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum

Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
ÖLFLEX® TRAIN HT 150 FX 3.6kV

Single-core cable according to EN 50382-2 type FX for high requirements in railway applications

Benefits
- Good flexibility – easy installation with tight space requirements
- Good chemical resistance
- For high ambient temperatures
- Reduced flame spreading increases the protection against damage to persons and property in the event of a fire

Application range
- For use in railway vehicles, for fixed installations and applications where limited movement may occur
- Suitable for wiring of control cabinets, distributors, converters, motors and batteries
- Also applicable within oily environments and areas with increased ambient temperature

Product features
- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluoride acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 60332-1-2
  - Flame-retardant acc. to EN 60811
  - No flame propagation acc. to EN 60332-3-24
  - No corrosive gases acc. to EN 60754-2
  - No fluoride acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 60332-1-2
  - Flame-retardant acc. to EN 60811
  - No flame propagation acc. to EN 60332-3-24

Technical data
- Conductor stranding
  - Extra-fine-wire acc. to VDE0295, class 6
  - IEC 60228, conductor class 6
- Minimum bending radius
  - Fixed installation: 3 x outer diameter
  - Occasional flexing: 5 x outer diameter
- Nominal voltage
  - U0 / U AC 3.6/6 kV
  - U1, AC 7.2 kV
  - VDC 5.4 kV
- Test voltage
  - 11 kV AC; 26 kV DC
- Temperature range
  - Fixed installation: -40°C to +150°C

Product Make-up
- Tinned-copper strand, extra-fine-wired
- Insulation: Silicone rubber compound, type EI 111
- Colour: Black

Artikel number | Number of cores and mm² per conductor | Outer diameter (mm) | Copper index (kg/km) | Weight (kg/km)
--- | --- | --- | --- | ---
ÖLFLEX® TRAIN HT 150 F 1.8kV
15382080 | 1 X 50 | 16.5 | 480 | 580
15382081 | 1 X 70 | 18.4 | 672 | 770
15382082 | 1 X 95 | 19.9 | 912 | 995
15382083 | 1 X 120 | 21.8 | 1152 | 1240
15382084 | 1 X 150 | 23.5 | 1440 | 1485
15382085 | 1 X 185 | 25.4 | 1776 | 1830

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.

Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.

Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum

Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
Power and control cables
Various applications • Halogen-free

ÖLFLEX® CLASSIC 110 H SF
Halogen-free control cable, EN 45545-2 certified, oil resistant and very flexible

Benefits
• Easy handling and installation due to very flexible cable type
• Wide application range due to excellent product features
• EN 45545-2 certified for rolling stock applications

Application range
• Railway applications
• Public buildings like airports or railway stations
• Plant engineering, Industrial machinery
• Heating and air-conditioning systems
• Stage applications
• Particularly where human and animal life as well as valuable property are exposed to high risk of fire hazards

Product features
• Flame-retardant according to IEC 60332-1-2 (flame spread on a single cable)
• No flame-propagation according to IEC 60332-3-24 respectively IEC 60332-3-25 ( Flame spread on vertical cable or wire bundle)

• Halogen-free according to IEC 60754-1 (amount of halogen acid gas)
• Corrosiveness of combustion gases according to IEC 60754-2 (degree of acidity)
• Low smoke density according to IEC 61034-2
• Oil-resistant according to EN 50363-4-1 (TM5) and UL OIL RES I and UL OIL RES II
• UV and weather-resistant according to ISO 4892-2
• Ozone-resistant according to EN 50396

Norm references / Approvals
• EN 45545-2
• Based on EN 50525-3-11
• Based on EN 50525-2-51

Product Make-up
• Extra-fine-wired strand made of bare copper wires
• Core insulation: Halogen-free
• Cores twisted in layers
• Outer sheath: Special halogen-free compound, black

Technical data

<table>
<thead>
<tr>
<th>Article number</th>
<th>Number of cores and mm² per conductor</th>
<th>Outer diameter (mm)</th>
<th>Copper index (kg/km)</th>
<th>Weight (kg/km)</th>
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Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request. Copper price basis: EUR 150/100 kg. Refer to catalogue appendix 117 for the definition and calculation of copper-related surcharges. Please find our standard lengths at: www.lappkabel.de/en/cable-standardlengths

Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
Power and control cables
Various applications • Halogen-free

ÖLFLEX® CLASSIC 115 CH SF
Screened halogen-free control cable, EN 45545-2 certified, oil resistant and very flexible

Benefits
- Easy handling and installation due to very flexible cable type
- Wide application range due to excellent product features
- EN 45545-2 certified for rolling stock applications

Application range
- Railway applications
- Public buildings like airports or railway stations
- Plant engineering, Industrial machinery
- Heating and air-conditioning systems
- Stage applications
- Particularly where human and animal life as well as valuable property are exposed to high risk of fire hazards
- In EMC-sensitive environments

Product features
- Flame-retardant according to IEC 60332-1-2 (flame spread on a single cable)
- No flame-propagation according to IEC 60332-3-24 respectively IEC 60332-3-25 ( Flame spread on vertical cable or wire bundle)
- Halogen-free according to IEC 60754-1 (amount of halogen acid gas)
- Corrosiveness of combustion gases according to IEC 60754-2 (degree of acidity)
- Low smoke density according to IEC 61034-2
- Oil-resistant according to EN 50363-4-1 (TM5) and UL OIL RES I and UL OIL RES II
- UV and weather-resistant according to ISO 4892-2
- Ozone-resistant according to EN 50396

Norm references / Approvals
- EN 45545-2
- Based on EN 50525-3-11
- Based on EN 50525-2-51

Product Make-up
- Extra-fine-wired strand made of bare copper wires
- Cores twisted in layers
- Wrapping: Halogen-free plastic foil
- Tinned-copper braiding
- Outer sheath: Special halogen-free compound, black

Technical data

Core identification code
Black with white numbers acc. to VDE 0293-1

Conductor stranding
Extra-fine-wire acc. to VDE 0295, class 6/IEC 60228, class 6

Minimum bending radius
Occasional flexing: 15 x outer diameter
Fixed installation: 6 x outer diameter

Nominal voltage
U0/U: 300/500 V
Test voltage
Core/core: 4000 V
Core/screen: 2000 V

Protective conductor
G = with GN-YE protective conductor
X = without protective conductor

Temperature range
Occasional flexing: -30°C to +70°C
Fixed installation: -40°C to +80°C

Article number | Number of cores and mm² per conductor | Outer diameter (mm) | Copper index (kg/km) | Weight (kg/km)
--- | --- | --- | --- | ---
OLFLEX® CLASSIC 115 CH SF
1002164 | 5 G 0.5 | 7.1 | 43.3 | 97
1002165 | 36 X 0.5 | 16.1 | 267.1 | 538
1002166 | 3 G 0.75 | 6.6 | 40.9 | 86
1002167 | 5 G 0.75 | 7.9 | 58.1 | 122
1002168 | 7 G 0.75 | 8.5 | 85.8 | 160
1002169 | 25 G 0.75 | 15.1 | 248.4 | 485
1002170 | 7 G 1.0 | 8.9 | 92.3 | 172
1002171 | 13 G 1.0 | 12.4 | 162.0 | 318
1002172 | 25 G 1.0 | 16.2 | 306.0 | 600
1002173 | 2 X 1.5 | 7.2 | 56.5 | 103
1002174 | 3 G 1.5 | 7.6 | 65.3 | 119
1002175 | 5 G 1.5 | 9.1 | 108.9 | 186
1002176 | 4 G 2.5 | 10.0 | 124.9 | 217
1002177 | 4 G 4.0 | 11.9 | 186.2 | 303
1002178 | 4 G 6.0 | 14.2 | 277.7 | 443
1002179 | 4 G 10.0 | 17.5 | 453.8 | 725

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.
Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.
Please find our standard lengths at: www.lappkabel.de/en/cable-standardlengths
Packaging size: coil ≤ 30 kg or ≤ 250 m, otherwise drum
Please specify the preferred type of packaging (e.g. 1 x 500 m drum or 5 x 100 m coils).
Single lengths for sizes: ≥ 4G50 max. 500 m
Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
**ÖLFLEX® CLASSIC 115 CH SF (TP)**

Screened halogen-free control cable, EN 45542-2 certified, oil resistant, very flexible with twisted pairs

---

### Benefits
- Easy handling and installation due to very flexible cable type
- Wide application range due to excellent product features
- EN 45545-2 certified for rolling stock applications

### Application range
- Railway applications
- Public buildings like airports or railway stations
- Plant engineering, Industrial machinery
- Heating and air-conditioning systems
- Stage applications
- Particularly where human and animal life as well as valuable property are exposed to high risk of fire hazards
- In EMC-sensitive environments

### Product features
- Flame-retardant according to IEC 60332-1-2 (flame spread on a single cable)
- No flame-propagation according to EN 60332-3-24 respectively IEC 60332-3-25 (flame spread on vertical cable or wire bundle)
- Halogen-free according to IEC 60754-1 (amount of halogen acid gas)
- Corrosiveness of combustion gases according to IEC 60754-2 (degree of acidity)
- Low smoke density according to IEC 61034-2
- Oil-resistant according to EN 50363-4-1 (TM5) and UL OIL RES I and UL OIL RES II
- UV and weather-resistant according to ISO 4892-2
- Ozone-resistant according to EN 50396

### Norm references / Approvals
- EN 45545-2
- Based on EN 50525-3-11
- Based on EN 50525-2-51

### Technical data

**Core identification code**
- Black with white numbers acc. to VDE 0293-1

**Conductor stranding**
- Extra-fine-wire acc. to VDE 0295, class 6 / IEC 60228, class 6

**Minimum bending radius**
- Occasional flexing: 15 x outer diameter
- Fixed installation: 6 x outer diameter

**Nominal voltage**
- U0/U: 300/500 V
- Core/core: 4000 V
- Core/screen: 2000 V

**Test voltage**
- Core/core: 4000 V
- Core/screen: 2000 V

**Protective conductor**
- G = with GN-YE protective conductor
- X = without protective conductor

**Temperature range**
- Occasional flexing: -30°C to +70°C
- Fixed installation: -40°C to +80°C

---

### Article number

<table>
<thead>
<tr>
<th>Article number</th>
<th>Number of cores and mm² per conductor</th>
<th>Outer diameter (mm)</th>
<th>Copper index (kg/km)</th>
<th>Weight (kg/km)</th>
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</table>

Unless specified otherwise, the shown product values are nominal values. Detailed values (e.g. tolerances) are available upon request.

---

**For current information see:** www.lappgroup.com
Data communication systems

Bus systems for special applications • Bus systems for TCN

UNITRONIC® TRAIN

Bus cables – MVB and WTB – Electron beam cross-linked for high requirements in railway applications

Info

- Small outer diameters for maximum saving of space and weight
- Extremely low attenuation ≤ 5 MHz

Benefits

- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire
- EMC-optimised design

Application range

- The communication systems WTB (wire train bus) and MVB (multifunction vehicle bus) make up the so-called TCN (train communication network)
- UNITRONIC® TRAIN bus cables are designed for use in TCN acc. IEC 61375
- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Also applicable within oily environments and areas with increased ambient temperature

Product features

- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 61034-2
  - Flame-retardant acc. to EN 60332-1-2
  - No flame propagation acc. to EN 60332-3-25
- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50264-1
  - Fuel resistant acc. to EN 50264-1
  - Acid resistant acc. to EN 50264-1
  - Alkali resistant acc. to EN 50264-1
  - Ozone resistant acc. to EN 50264-3-2

Norm references / Approvals

- EN 45545-2 HL1, HL2, HL3
- EN 50264-1

Product Make-up

- Stranded tinned 19-wire conductor
- Core insulation: Based on Polyolefin
- Outer sheath: electron beam cross-linked polymer-compound EM 104
- Outer sheath colour: Black

Technical data

- Peak operating voltage (not for power applications)
  125 V
- Minimum bending radius
  Flexing: 10 x outer diameter
  Fixed installation: 6 x outer diameter
- Test voltage
  Core/core: 1000 V
  Core/screen: 1000 V
- Characteristic impedance
  120 ohm (±10%)
- Temperature range
  Fixed installation: -45°C to +90°C
  Occasional flexing: -35°C up to +90°C

Technical data

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article designation</th>
<th>Number of cores and mm² per conductor</th>
<th>Outer diameter (mm)</th>
<th>Copper index (kg/km)</th>
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Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
**ETHERLINE® TRAIN**

Ethernet cables according to EN 50264-3-1 Type XM for high requirements in railway applications

---

**Benefits**
- Good chemical resistance
- Resistant to mechanical influences in harsh environmental conditions
- Extended temperature range
- Reduced flame spreading increase the protection against damage to persons and property in the event of a fire

**Application range**
- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Suitable for connecting of e.g. camera systems, enter-/infotainment for passengers, ticketing systems
- Also applicable within oily environments and areas with increased ambient temperature

**Product features**
- Fire behaviour according to EN/IEC:
  - Halogen-free acc. to EN 60754-1
  - No corrosive gases acc. to EN 60754-2
  - No fluorine acc. to EN 60684-2
  - No toxic gases acc. to EN 50305
  - Low smoke density acc. to EN 61034-2
  - Flame-retardant acc. to EN 60332-1-2
- Fire behaviour according to NF:
  - Toxicity of gases acc. to NF X 70-100
  - Low smoke density acc. to NF X 10-702
  - No flame propagation acc. to NF C 32-070, Cat. C1 and C2
- Chemical properties:
  - Oil resistant acc. to EN 50264-1
  - Fuel resistant acc. to EN 50264-1
  - Acid resistant acc. to EN 50264-1
  - Alkali resistant acc. to EN 50264-1
  - Ozone resistant acc. to EN 50264-3-2

**Norm references / Approvals**
- Electrical requirements acc. to IEC 61156-6
- EN 50264-1
- EN 45545-2 HL1, HL2, HL3

**Product Make-up**
- 7-wire tinned stranded copper conductor
- Core insulation: Based on Polyolefin
- Cat.5e: SF/UTP – copper braid and foil screening as overall screening
- Cat.6, Cat.7: S/FTP - copper braid as overall screening and pair screening with aluminium compound foil
- Outer sheath: electron beam cross-linked polymer-compound EM 104
- Outer sheath colour: Black

**Technical data**
- **Peak operating voltage** (not for power applications): 125 V
- **Minimum bending radius**
  - Flexing: 10 x outer diameter
  - Fixed installation: 8 x outer diameter
- **Test voltage**
  - Core/core: 1000 V
  - Core/screen: 1000 V
- **Characteristic impedance**
  - nom. 100 W acc. to IEC 61156-6
- **Temperature range**
  - Fixed installation: -45°C to +90°C
  - Occasional flexing: -35°C to +90°C

**Article number** | **Article designation** | **Number of pairs and AWG per conductor** | **Core diameter (mm)** | **Outer diameter (mm)** | **Copper index (kg/km)**
--- | --- | --- | --- | --- | ---
2170906 | ETHERLINE® TRAIN FLEX Cat.5e 1 × 4 × AWG22/7 PE | 1 × 4 × AWG22/7 | 1.5 | 6.5 | 30
2170910 | ETHERLINE® TRAIN FLEX Cat.5e 1 × 0.5/7 PE | 1 × 0.5/7 | 2 | 7.6 | 41
2170907 | ETHERLINE® TRAIN Cat.5e 4 × 2 × AWG24/7 PE | 4 × 2 × AWG24/7 | 1.2 | 7.7 | 38
2170908 | ETHERLINE® TRAIN Cat.6 4 × 2 × AWG24/7 PE | 4 × 2 × AWG24/7 | 1.4 | 8.4 | 38
2170909 | ETHERLINE® TRAIN Cat.7 4 × 2 × AWG24/7 PE | 4 × 2 × AWG24/7 | 1.4 | 8.4 | 43

Unless specified otherwise, the shown product values are nominal values.
Detailed values (e.g. tolerances) are available upon request.

Please find our standard lengths at: www.lappkabel.de/en/cable-standardlengths

**PROFINET®** is a registered trademark of the PNO (PROFIBUS user organization)

Detailed data sheets are available upon request. Please specify the type/dimensions of the required cable.
Photographs and graphics are not to scale and do not represent detailed images of the respective products.
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<thead>
<tr>
<th>Properties</th>
<th>Connection type</th>
<th>Screw</th>
<th>Crimp</th>
<th>Push-In</th>
<th>Snap</th>
<th>Rated voltage according to standards</th>
<th>Rated current for largest connection cross section</th>
<th>Approvals</th>
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<td>Screw</td>
<td>Crimp</td>
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<td>Snap</td>
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<td>Crimp</td>
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<td>Snap</td>
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<td>Snap</td>
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<td>600 V</td>
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<td>Crimp</td>
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<td>Snap</td>
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<td>Crimp</td>
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<td>600 V</td>
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<td>Crimp</td>
<td>Push-In</td>
<td>Snap</td>
<td>0.5 – 2.5</td>
<td>630 V</td>
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<td>Screw</td>
<td>Crimp</td>
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<td>Snap</td>
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<td>Crimp</td>
<td>Push-In</td>
<td>Snap</td>
<td>0.5 – 2.5</td>
<td>230 V/400 V</td>
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<td>EPIC® H-D 7, 8</td>
<td>Screw</td>
<td>Crimp</td>
<td>Push-In</td>
<td>Snap</td>
<td>0.5 – 2.5</td>
<td>250 V</td>
<td>600 V</td>
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<td>EPIC® H-D 15, 25, 40, 64</td>
<td>Screw</td>
<td>Crimp</td>
<td>Push-In</td>
<td>Snap</td>
<td>0.5 – 2.5</td>
<td>250 V</td>
<td>600 V</td>
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<td>EPIC® H-DD 24, 42, 72, 108</td>
<td>Screw</td>
<td>Crimp</td>
<td>Push-In</td>
<td>Snap</td>
<td>0.5 – 2.5</td>
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<td>Crimp</td>
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<td>600 V</td>
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<td>Crimp</td>
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<td>Snap</td>
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<td>Snap</td>
<td>0.5 – 15/ max. 15</td>
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<td>48 V</td>
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<td>Crimp</td>
<td>Push-In</td>
<td>Snap</td>
<td>0.14 – 4.0</td>
<td>230 V/400 V</td>
<td>600 V</td>
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<td>Crimp</td>
<td>Push-In</td>
<td>Snap</td>
<td>0.14 – 2.5</td>
<td>250 V</td>
<td>600 V</td>
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<td>EPIC® H-D 15, 25, 40, 64</td>
<td>Screw</td>
<td>Crimp</td>
<td>Push-In</td>
<td>Snap</td>
<td>0.14 – 2.5</td>
<td>250 V</td>
<td>600 V</td>
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<td>EPIC® H-DD 24, 42, 72, 108</td>
<td>Screw</td>
<td>Crimp</td>
<td>Push-In</td>
<td>Snap</td>
<td>0.14 – 2.5</td>
<td>250 V</td>
<td>600 V</td>
</tr>
</tbody>
</table>

*P*: Power  
*S*: Signal  
**H***: In metal housing: 24 VAC/60 VDC; in plastic housing: 250 V
EPIC® Industrial connectors

At a glance

EPIC® rectangular connectors
Flexible, robust connectors for mechanical engineering

EPIC® circular connectors
Compact connectors for motion control and energy transfer

The connector system for mechanical and plant engineering and wherever a robust connection system is required. EPIC® Rectangular connectors are available as components. The right connector for any application can be made individually from housings, inserts and contacts. www.lappgroup.com/connectorfinder

For the housing, there are two performance classes to choose from
• EPIC® Standard is robust and there is a flexible choice of cable entries www.lappgroup.com/connector-housing
• EPIC® ULTRA has a high corrosion protection, EMC protection as well as a stainless steel interlocking device

EPIC® inserts are available in a fixed pin design and as a modular system
• EPIC® fixed pin inserts are easy to handle and come in a wide variety of designs
• EPIC® modular inserts offer flexibility with modules for data, signals, power, fibre-optics and pneumatics. This means every insert is individually tailor-made for the relevant modul configuration
• EPIC® offers two different modular systems:
  - the MC system with an easy to assemble plastic frame
  - the MH system with the metal frame, mateable with the market standard
The two systems are stand alone and cannot be combined.

Circular connections come in two designs, a signal design with gold-plated contacts for transmitting delicate signals and as high-reserve power connectors.

EPIC® SIGNAL connectors are available as M17, M23 and R3.0 (M27)
• The metal housing with an integrated EMC screen contact reliably prevents electromagnetic interferences
• Gold-plated signal contacts reliably transmit with the lowest of currents and voltages

EPIC® POWER connectors are available as M12, M17, LS1 (M23), LS1.5 (M40) and LS3 (M58)
• The integrated EMC cable glands offer strain relief and are perfectly sealed
• High-quality sealing materials for good chemical protection

EPIC® POWERLOCK
• Perfect for transmitting very high currents
• Colour coded and geometrically coded in order to prevent incorrect connections

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
EPIC® Industrial connectors
Rectangular connectors • EPIC® H-A Inserts

Info

EPIC® H-A 3
H-A inserts with screw termination up to 2.5 mm² wire cross section

Info

EPIC® H-A 4
H-A inserts with screw termination up to 2.5 mm² wire cross section

Suitable housing

- EPIC® H-A 3 Housings

Benefits

- Railway applications
  - Fire protection on railway vehicles: Test according EN 45545-2.
  - Requirement sets R22 and R23.
  - Hazard level HL1, HL2 and HL3.
- The small H-A 3/H-A 4 are used whenever there is minimal space.
- Easy to service screw connection
- Easy cable connection with straight cable entry in the contacts

Application range

- Railway applications/vehicle construction
- Machine and equipment manufacturing
- Control engineering
- Apparatus construction

Suitable tools

- Recommended crimping tool when conductor end-sleeves are used: PEW 8.186

Technical data

- Rated voltage (V)
  - IEC: 400 V  UL: 600 V  CSA: 600 V
- Rated impulse voltage
  - 4 kV
- Rated current (A)
  - IEC: 23 A  UL: 10 A  CSA: 10 A
- Pollution degree
  - 3
- Contact resistance
  - 1.5 – 4 mOhm
- Contacts
  - Copper alloy, hard silver-plated
- Number of contacts
  - EPIC® H-A 3
    - 3 + PE
  - EPIC® H-A 4
    - 4 + PE
- Termination methods
  - Screw termination: 0.5 – 2.5 mm² (2.5 mm² with conductor end sleeves depending on the crimping profile)
  - Stripping length (mm)
    - 6
- Cycle of mechanical operation
  - 100
- VDE-tested
- Certified production control:
  - VDE-REG. no.: B437
  - UL-tested:
    - UL File Number: E75770
- Temperature range
  - -40°C to +100°C, short-term up to +125°C

Article number | Article description | Contact type | Number of operating contacts | Pieces / PU
--- | --- | --- | --- | ---
H-A 3 screw termination
- 10420000 | H-A 3 SS male | 1 – 3 | 10
- 10421000 | H-A 3 BS female | 1 – 3 | 10
H-A 4 screw termination
- 10431000 | H-A 4 SS male | 1 – 4 | 10
- 10432000 | H-A 4 BS female | 1 – 4 | 10

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
**EPIC® H-BE 6 Screw termination**
The proven standard inserts for easy assembly

**EPIC® H-BE 6 Push-In termination**
The proven standard inserts for easy assembly

### Technical data

<table>
<thead>
<tr>
<th>Rated voltage (V)</th>
<th>Stripping length (mm)</th>
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</thead>
<tbody>
<tr>
<td>IEC: 500 V UL: 600 V CSA: 600 V</td>
<td>EPIC® H-BE 6 Screw termination 8</td>
</tr>
<tr>
<td>Rated impulse voltage 6 kV</td>
<td>EPIC® H-BE 6 Push-In termination 10</td>
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<td>Cycle of mechanical operation 500</td>
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<tr>
<td>EPIC® H-BE 6 Screw termination</td>
<td>Certifications</td>
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<td><strong>Contact resistance</strong> &lt; 2 mOhm</td>
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<td><strong>Contacts</strong></td>
<td><strong>Temperature range</strong> -40°C to +100°C, short-term up to +125°C</td>
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<tr>
<td>Copper alloy, hard silver-plated</td>
<td><strong>Application range</strong></td>
</tr>
<tr>
<td><strong>Number of contacts</strong> 6 + PE</td>
<td><strong>EPIC® H-BE 6 Screw termination</strong></td>
</tr>
<tr>
<td><strong>Termination methods</strong></td>
<td>Mechanical engineering</td>
</tr>
<tr>
<td>EPIC® H-BE 6 Screw termination</td>
<td>Plastics industry</td>
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<tr>
<td>Screw termination: 0.5 – 2.5 mm²</td>
<td>Light &amp; sound technology</td>
</tr>
<tr>
<td>EPIC® H-BE 6 Push-In termination</td>
<td>Railway applications/vehicle construction</td>
</tr>
<tr>
<td>Screw termination: 0.5 – 2.5 mm²</td>
<td><strong>EPIC® H-BE 6 Push-In termination</strong></td>
</tr>
<tr>
<td>EPIC® H-BE 6 Push-In termination: 0.14 – 2.5 mm²</td>
<td>Mechanical engineering</td>
</tr>
<tr>
<td><strong>Suitable tools</strong></td>
<td>Plastics industry</td>
</tr>
<tr>
<td><strong>EPIC® H-BE 6 Screw termination</strong></td>
<td>Light &amp; sound technology</td>
</tr>
<tr>
<td>Kraftform® adjustable torque screwdriver/Kraftform Kompakt® Set</td>
<td>Railway applications/vehicle construction</td>
</tr>
<tr>
<td><strong>EPIC® H-BE 6 Push-In termination</strong></td>
<td><strong>Application range</strong></td>
</tr>
<tr>
<td>Recommended crimping tool when conductor end-sleeves are used: PEW 8.186</td>
<td></td>
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</tbody>
</table>

### Application range

**EPIC® H-BE 6 Screw termination**
- Mechanical engineering
- Plastics industry
- Light & sound technology
- Railway applications/vehicle construction

**EPIC® H-BE 6 Push-In termination**
- Mechanical engineering
- Plastics industry
- Light & sound technology
- Railway applications/vehicle construction

### Suitable tools

**EPIC® H-BE 6 Screw termination**
- Kraftform® adjustable torque screwdriver/Kraftform Kompakt® Set
- Recommended crimping tool when conductor end-sleeves are used: PEW 8.186

### Suitable housing

- **EPIC® ULTRA H-B 6**
- **EPIC® H-B 6 Housings**
- **EPIC® QUICK & EASY Mounting system**

### Benefits

**EPIC® H-BE 6 Screw termination**
- Standard inserts with screw, crimp cage clamp and Push-In termination
- The EPIC® H-BE series is suitable for applications that require a reliable connection when working with high voltages and currents
- UL tested for application in control cabinets according UL 508/UL 2237

**EPIC® H-BE 6 Push-In termination**
- Insertion of cores with end sleeves in Push-In inserts gives mounting safety and time saving without any tools
- Easy dismantling and insertion of wires by pushing the orange button
- Test socket for standard 2 mm test tip for easy testing of Push-In inserts
- The EPIC® H-BE series is suitable for applications that require a reliable connection when working with high voltages and currents

### Information

- Proven screw for easy installation
- Railway applications

- Push-In version – fast and easy tool free connection technology
- Multifunctional insert for versatile applications

### Technical specifications

- **Stripping length (mm)**
  - EPIC® H-BE 6 Screw termination: 8
  - EPIC® H-BE 6 Push-In termination: 10
- **Cycle of mechanical operation**: 500
- **Certifications**
  - EPIC® H-BE 6 Screw termination: Certified production control: VDE-REG.no.: B437
  - UL-tested: UL File Number: E75770
  - EPIC® H-BE 6 Push-In termination: UL-tested: UL File Number: E75770
- **Temperature range**: -40°C to +100°C, short-term up to +125°C

### Application range

**EPIC® H-BE 6 Screw termination**
- Mechanical engineering
- Plastics industry
- Light & sound technology
- Railway applications/vehicle construction

**EPIC® H-BE 6 Push-In termination**
- Mechanical engineering
- Plastics industry
- Light & sound technology
- Railway applications/vehicle construction

### Table

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article description</th>
<th>Contact type</th>
<th>Wire protection</th>
<th>Number of operating contacts</th>
<th>Pieces / PU</th>
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Photographs and graphics are not to scale and do not represent detailed images of the respective products.
EPIC® H-BE 10 Screw termination
The proven standard inserts for easy assembly

EPIC® H-BE 10 Push-In termination
The proven standard inserts for easy assembly

Suitable housing
- EPIC® ULTRA H-B 10
- EPIC® H-B 10 Housings
- EPIC® QUICK & EASY Mounting systems

Benefits
EPIC® H-BE 10 Screw termination
- Standard inserts with screw, crimp cage clamp and Push-In termination
- The EPIC® H-BE series is suitable for applications that require a reliable connection when working with high voltages and currents
- Railway applications
  - UL tested for application in control cabinets according UL 508 / UL 2237.

EPIC® H-BE 10 Push-In termination
- Insertion of cores with end sleeves in Push-In inserts gives mounting safety and time saving without any tools
- Easy dismantling and insertion of wires by pushing the orange button
- Test socket for standard 2 mm test tip for easy testing of Push-In inserts
- Railway applications
  - The EPIC® H-BE series is suitable for applications that require a reliable connection when working with high voltages and currents

Technical data

<table>
<thead>
<tr>
<th>Stripping length (mm)</th>
<th>EPIC® H-BE 10 Screw termination</th>
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<tr>
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<tr>
<td>Pollution degree</td>
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<tr>
<td>Contact resistance</td>
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<td>&lt; 2 mOhm</td>
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<td>Contacts</td>
<td>EPIC® H-BE 10 Screw termination</td>
<td>Copper alloy, hard silver-plated</td>
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<td>Number of contacts</td>
<td>EPIC® H-BE 10 Push-In termination</td>
<td>10 + PE</td>
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<tr>
<td>Termination methods</td>
<td>EPIC® H-BE 6 Screw termination</td>
<td>Screw termination: 0.5 – 2.5 mm²</td>
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<tr>
<td></td>
<td>EPIC® H-BE 10 Push-In termination</td>
<td>Push-In termination: 0.14 – 2.5 mm²</td>
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Application range
EPIC® H-BE 10 Screw termination
- Mechanical engineering
- Plastics industry
- Light & sound technology
- Railway applications/vehicle construction

EPIC® H-BE 10 Push-In termination
- Mechanical engineering
- Plastics industry
- Light & sound technology
- Railway applications/vehicle construction

Suitable tools
EPIC® H-BE 10 Screw termination
- Kraftform® adjustable torque screwdriver/Kraftform Kompakt® Set
- Recommended crimping tool when conductor end-sleeves are used: PEW 8.186

Table: Articles
<table>
<thead>
<tr>
<th>Article number</th>
<th>Article description</th>
<th>Contact type</th>
<th>Wire protection</th>
<th>Number of operating contacts</th>
<th>Pieces / PU</th>
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For current information see: www.lappgroup.com
EPIC® H-BE 16 Screw termination
The proven standard inserts for easy assembly

EPIC® H-BE 16 Push-In termination
The proven standard inserts for easy assembly

Suitable housing
- EPIC® ULTRA H-B 16
- EPIC® H-B 16 Housing
- EPIC® QUICK & EASY Mounting system

Similar products
EPIC® H-BE 16 Screw termination
- Further products with higher numbering in the internet (H-BE 32, H-BE 48)

Benefits
EPIC® H-BE 16 Screw termination
- Standard inserts with screw, crimp cage clamp and Push-In termination
- The EPIC® H-BE series is suitable for applications that require a reliable connection when working with high voltages and currents
- Railway applications
  - UL tested for application in control cabinets according UL 508 / UL 2237

EPIC® H-BE 16 Push-In termination
- Insertion of cores with end sleeves in Push-In inserts gives mounting safety and time saving without any tools
- Easy dismantling and insertion of wires by pushing the orange button
- Test socket for standard 2 mm test tip for easy testing of Push-In inserts
- Railway applications

Technical data
- Rated voltage (V)
  - IEC: 500 V
  - UL: 600 V
  - CSA: 600 V
- Rated impulse voltage
  - 6 kV
- Rated current (A)
  - EPIC® H-BE 16 Screw termination
    - IEC: 16 A
    - UL: 16 A
    - CSA: 16 A
  - EPIC® H-BE 16 Push-In termination
    - IEC: 16 A
    - UL: 13 A
    - CSA: 13 A
- Pollution degree
  - 3
- Contact resistance
  - < 2 mOhm
- Contacts
  - Copper alloy, hard silver-plated
- Number of contacts
  - 16 + PE
- Termination methods
  - EPIC® H-BE 16 Screw termination
    - Screw termination: 0.5 – 2.5 mm²
    - EPIC® H-BE 16 Push-In termination
      - Push-In termination: 0.14 – 2.5 mm²

Application range
EPIC® H-BE 16 Screw termination
- Mechanical engineering
- Plastics industry
- Light & sound technology
- Railway applications/vehicle construction

EPIC® H-BE 16 Push-In termination
- Mechanical engineering
- Plastics industry
- Light & sound technology
- Railway applications/vehicle construction

Table: Suitable applications

<table>
<thead>
<tr>
<th>Article number</th>
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<th>Contact type</th>
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<td>EPIC® H-BE 16 SS</td>
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<td>–</td>
<td>1 – 16</td>
<td>5</td>
</tr>
<tr>
<td>10195100</td>
<td>EPIC® H-BE 16 BS</td>
<td>female</td>
<td>–</td>
<td>1 – 16</td>
<td>5</td>
</tr>
<tr>
<td>44423204</td>
<td>EPIC® H-BE 16 SP</td>
<td>male</td>
<td>yes</td>
<td>1 – 16</td>
<td>5</td>
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<tr>
<td>44423205</td>
<td>EPIC® H-BE 16 BP</td>
<td>female</td>
<td>yes</td>
<td>1 – 16</td>
<td>5</td>
</tr>
</tbody>
</table>

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
EPIC® H-BE 24 Screw termination
The proven standard inserts for easy assembly

EPIC® H-BE 24 Push-In termination
The proven standard inserts for easy assembly

Suitable housing
- EPIC® ULTRA H-B 24
- EPIC® H-B 24 Housings
- EPIC® QUICK & EASY Mounting system

Similar products
EPIC® H-BE 24 Screw termination
- Further products with higher numbering in the internet. (H-BE 32, H-BE 48)

Benefits
EPIC® H-BE 24 Screw termination
- Standard inserts with screw, crimp cage clamp and Push-In termination
- The EPIC® H-BE series is suitable for applications that require a reliable connection when working with high voltages and currents
- Railway applications
  - UL tested for application in control cabinets according UL 508 / UL 2237

EPIC® H-BE 24 Push-In termination
- Insertion of cores with end sleeves in Push-In inserts gives mounting safety and time saving without any tools
- Easy dismantling and insertion of wires by pushing the orange button
- Test socket for standard 2 mm test tip for easy testing of Push-In inserts
- Railway applications
  - The EPIC® H-BE series is suitable for applications that require a reliable connection when working with high voltages and currents

Technical data
- Rated voltage (V)
  - IEC: 500 V  UL: 600 V  CSA: 600 V
  - Rated impulse voltage
    - 6 kV
- Rated current (A)
  - EPIC® H-BE 24 Screw termination
    - IEC: 16 A  UL: 16 A  CSA: 16 A
    - EPIC® H-BE 24 Push-In termination
    - IEC: 16 A  UL: 13 A  CSA: 13 A
- Pollution degree
  - 3
- Contact resistance
  - < 2 mOhm
- Contacts
  - Copper alloy, hard silver-plated
- Number of contacts
  - 24 + PE
- Termination methods
  - EPIC® H-BE 24 Screw termination
    - Screw termination: 0.5 – 2.5 mm²
  - EPIC® H-BE 24 Push-In termination
    - Push-In termination: 0.14 – 2.5 mm²
- Stripping length (mm)
  - EPIC® H-BE 24 Screw termination
    - 8
  - EPIC® H-BE 24 Push-In termination
    - 10
- Cycle of mechanical operation
  - 500
- Certifications
  - EPIC® H-BE 24 Screw termination
    - Certified production control: VDE-REG. no.: B437
    - UL-tested:
      - UL File Number: E75770
      - UL File Number: E75770
      - UL tested:
        - UL File Number: E75770
        - UL File Number: E75770
      - Temperature range
        - -40°C to +100°C, short-term up to +125°C

Application range
EPIC® H-BE 24 Screw termination
- Mechanical engineering
- Plastics industry
- Light & sound technology
- Railway applications/vehicle construction

EPIC® H-BE 24 Push-In termination
- Mechanical engineering
- Plastics industry
- Light & sound technology
- Railway applications/vehicle construction

Suitable tools
EPIC® H-BE 24 Screw termination
- Kraftform® adjustable torque screwdriver/Kraftform Kompakt® Set
- Recommended crimping tool when conductor end-sleeves are used: PEW B.186

Article number  Article description  Contact type  Wire protection  Number of operating contacts  Pieces / PU
H-BE 24 Screw termination
10196000  EPIC® H-BE 24 SS male  yes  1 – 24  5
10197000  EPIC® H-BE 24 BS female  yes  1 – 24  5
10196100  EPIC® H-BE 24 SS male  –  1 – 24  5
10197100  EPIC® H-BE 24 BS female  –  1 – 24  5
H-BE 24 Push-In termination
44423206  EPIC® H-BE 24 SP male  yes  1 – 24  5
44423207  EPIC® H-BE 24 BP male  yes  1 – 24  5

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
EPIC® Industrial connectors

Rectangular connectors • EPIC® H-BS Inserts

EPIC® H-BS 6
Inserts for high currents.

EPIC® H-BS 12
Inserts for high currents.

Suitable housing
EPIC® H-BS 6
- EPIC® ULTRA H-B 16
- EPIC® H-B 16 Housing
- EPIC® QUICK & EASY Mounting system
EPIC® H-BS 12
- EPIC® H-B 32 Housing

Benefits
EPIC® H-BS 6
- High rating for currents up to 35 A
- Screw termination up to a conductor cross section of 6 mm²
- Railway applications
  - Fire protection on railway vehicles: Test according EN 45545-2.
  - Requirement sets R22 and R23.
  - Hazard level HL1, HL2 and HL3.
EPIC® H-BS 12
- High rating for currents up to 35 A
- Screw termination up to a conductor cross section of 6 mm²
- Two H-BS 6 inserts with different contact-numbering for one housing

Technical data
- Rated voltage (V)
  - IEC: 500 V UL: 600 V CSA: 600 V
  - Conductor – conductor: 690 V
- Rated impulse voltage
  - 6 kV
- Rated current (A)
  - IEC: 35 A UL: 35 A CSA: 35 A
- Pollution degree
  - 3
- Contact resistance
  - < 2 mOhm
- Contacts
  - Copper alloy, hard silver-plated
- Number of contacts
  - EPIC® H-BS 6
    - 6 + PE
  - EPIC® H-BS 12
    - 12 + PE

Termination methods
- Screw termination: 0.5 – 6 mm²
- Stripping length (mm)
  - 8
- Cycle of mechanical operation
  - 100
- VDE-tested
- Certified production control:
  - VDE-REG. no.: B437
  - UL-tested:
    - UL File Number: E75770
- Temperature range
  - -40°C to +100°C, short-term up to +125°C

Application range
EPIC® H-BS 6
- Railway applications/vehicle construction
- Plant engineering
- Mechanical engineering
- Drive systems

EPIC® H-BS 12
- Plant engineering
- Mechanical engineering
- Drive systems

Suitable tools
EPIC® H-BS 6
- Kraftform® adjustable torque screwdriver/Kraftform Kompakt® Set
EPIC® H-BS 12
- Kraftform® adjustable torque screwdriver/Kraftform Kompakt® Set

Article number | Article description | Contact type | Wire protection | Number of operating contacts | Pieces / PU
--- | --- | --- | --- | --- | ---
H-BS 6 Screw termination
10170000 | H-BS 6 SS | male | yes | 1 – 6 | 5
10170100 | H-BS 6 BS | female | yes | 1 – 6 | 5
H-BS 12 Screw termination
10170400 | H-BS 6 SS | male | yes | 7 – 12 | 5
10171600 | H-BS 6 BS | female | yes | 7 – 12 | 5

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
EPIC® Industrial connectors

Rectangular connectors • EPIC® MH modular system module

**EPIC® MH 2**
High flexibility by the use of any combination of inserts in one connector

- Modular connector system, pluggable with the market standard
- High power module 2 pole for compact power transmission

**EPIC® MH 3**
High flexibility by the use of any combination of inserts in one connector

- Modular connector system, pluggable with the market standard
- Power module 3 pole for compact power transmission

### Suitable housing
- EPIC® H-B housing use in high version

### Benefits
- Crimp connection for permanent vibration proof contact
- EPIC® MH system is mateable with the market standard
- The mix of different functions in one plug guarantees high flexibility
- Railway applications
  - Fire protection on railway vehicles: Test according EN 50545-2.
  - Requirement sets R22 and R23.
  - Hazard level HL1, HL2 and HL3.

**EPIC® MH 2**
- High power module 2 pole for compact power transmission

**EPIC® MH 3**
- High power module 3 pole for compact power transmission

### Application range
- Mechanical engineering
- Robotics industry
- Plant engineering
- Renewable energy
- Railway applications/vehicle construction

### Technical data

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rated voltage (V)</strong></td>
<td><strong>EPIC® MH 2</strong>&lt;br&gt;1000 V&lt;br&gt;<strong>EPIC® MH 3</strong>&lt;br&gt;400 V (conductor – ground)&lt;br&gt;690 V (conductor – conductor)</td>
</tr>
<tr>
<td><strong>Rated impulse voltage</strong></td>
<td>8 kV</td>
</tr>
<tr>
<td><strong>Rated current (A)</strong></td>
<td><strong>EPIC® MH 2</strong>&lt;br&gt;100 A&lt;br&gt;<strong>EPIC® MH 3</strong>&lt;br&gt;40 A</td>
</tr>
<tr>
<td><strong>Pollution degree</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Flammability</strong></td>
<td>UL94 V-0</td>
</tr>
<tr>
<td><strong>Contact resistance</strong></td>
<td>&lt; 5 mOhm</td>
</tr>
<tr>
<td><strong>Number of contacts</strong></td>
<td><strong>EPIC® MH 2</strong>&lt;br&gt;2&lt;br&gt;<strong>EPIC® MH 3</strong>&lt;br&gt;3</td>
</tr>
<tr>
<td><strong>Termination methods</strong></td>
<td><strong>EPIC® MH 2</strong>&lt;br&gt;Crimp termination: 10 – 35 mm²&lt;br&gt;<strong>EPIC® MH 3</strong>&lt;br&gt;Crimp termination: 1.5 – 10 mm²</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>Polyamide, glass fibre-reinforced</td>
</tr>
<tr>
<td><strong>Cycle of mechanical operation</strong></td>
<td>500</td>
</tr>
<tr>
<td><strong>Certifications</strong></td>
<td>UL-tested:&lt;br&gt;UL File Number: E75770</td>
</tr>
<tr>
<td><strong>Temperature range</strong></td>
<td>-40°C to +125°C</td>
</tr>
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</table>

### Article numbers

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article description</th>
<th>Contact type</th>
<th>Number of operating contacts</th>
<th>Slots</th>
<th>Pieces / PU</th>
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<tbody>
<tr>
<td>44423212</td>
<td>EPIC® MHS 2 CM male</td>
<td>2</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>44423213</td>
<td>EPIC® MHB 2 CM female</td>
<td>2</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>44423214</td>
<td>EPIC® MHS 3 CM male</td>
<td>3</td>
<td>1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>44423215</td>
<td>EPIC® MHB 3 CM female</td>
<td>3</td>
<td>1</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

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For current information see: [www.lappgroup.com](http://www.lappgroup.com)
EPIC® Industrial connectors

Rectangular connectors • EPIC® MH modular system module

NEW

EPIC® MH 3 + 4
The mixed assembly guarantees high flexibility. For applications in mechanical and plant engineering, for printing machines and slide-in technology.

EPIC® MH 4
High flexibility by the use of any combination of inserts in one connector

Suitable housing
EPIC® MH 4
• EPIC® H-B housing use in high version

Benefits
• Crimp connection for permanent vibration proof contact
• EPIC® MH system is mateable with the market standard
• The mix of different functions in one plug guarantees high flexibility

EPIC® MH 3 + 4
• Hybridmodule for energy- and signal transmission in a minimum of space

EPIC® MH 4
• Power module 4 pole for compact power transmission

Application range
• Mechanical engineering
• Robotics industry
• Plant engineering
• Renewable energy
• Railway applications/vehicle construction

Technical data

<table>
<thead>
<tr>
<th>Property</th>
<th>EPIC® MH 3 + 4</th>
<th>EPIC® MH 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage (V)</td>
<td>830 V</td>
<td>830 V</td>
</tr>
<tr>
<td>Rated impulse voltage (kV)</td>
<td>8 kV</td>
<td>8 kV</td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>40 A</td>
<td>40 A</td>
</tr>
<tr>
<td></td>
<td>10 A</td>
<td>10 A</td>
</tr>
<tr>
<td>Number of contacts</td>
<td>3 + 4</td>
<td>4</td>
</tr>
</tbody>
</table>

Termination methods
EPIC® MH 4
Crimp termination: 1.5 – 10 mm²

Material
EPIC® MH 3 + 4
PA

EPIC® MH 4
Polyamide, glass fibre-reinforced

Cycle of mechanical operation
500

Certifications
EPIC® MH 4
UL-tested: UL File Number: E75770

Temperature range
-40°C to +125°C

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
**EPIC® MH 6**

High flexibility by the use of any combination of inserts in one connector

- Modular connector system, plugable with the market standard
- Module 6 pole for control signals

**EPIC® MH 8**

High flexibility by the use of any combination of inserts in one connector

- Modular connector system, plugable with the market standard
- Module 8 pole for control signals

---

**Technical data**

<table>
<thead>
<tr>
<th>Description</th>
<th>EPIC® MH 6</th>
<th>EPIC® MH 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage (V)</td>
<td>500 V</td>
<td>400 V</td>
</tr>
<tr>
<td>Rated impulse voltage (kV)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>16</td>
<td></td>
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<tr>
<td>Pollution degree</td>
<td>3</td>
<td></td>
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<tr>
<td>Flammability</td>
<td>UL94 V-0</td>
<td></td>
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<tr>
<td>Contact resistance</td>
<td>&lt; 5 mOhm</td>
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<table>
<thead>
<tr>
<th>Description</th>
<th>EPIC® MH 6</th>
<th>EPIC® MH 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of contacts</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Termination methods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cycle of mechanical operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40°C to +125°C</td>
<td></td>
</tr>
</tbody>
</table>

**Application range**

- Mechanical engineering
- Robotics industry
- Plant engineering
- Renewable energy
- Railway applications/vehicle construction

**Suitable housing**

- EPIC® H-B housing use in high version

**Benefits**

- Crimp connection for permanent vibration proof contact
- EPIC® MH system is mateable with the market standard
- The mix of different functions in one plug guarantees high flexibility
- EPIC® MH 6
  - Module 6 pole for control signals
- EPIC® MH 8
  - Module 8 pole for control signals

---

**Article numbers**

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article description</th>
<th>Contact type</th>
<th>Number of operating contacts</th>
<th>Slots</th>
<th>Pieces / PU</th>
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</thead>
<tbody>
<tr>
<td>44423218</td>
<td>EPIC® MHS 6 CM male</td>
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<td>1</td>
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<tr>
<td>44423219</td>
<td>EPIC® MHB 6 CM female</td>
<td>6</td>
<td>1</td>
<td>10</td>
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<td>44423220</td>
<td>EPIC® MHS 8 CM male</td>
<td>8</td>
<td>1</td>
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<tr>
<td>44423221</td>
<td>EPIC® MHB 8 CM female</td>
<td>8</td>
<td>1</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

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EPIC® Industrial connectors

Rectangular connectors • EPIC® MH modular system module

NEW

EPIC® MH 12
High flexibility by the use of any combination of inserts in one connector

EPIC® MH 17
High flexibility by the use of any combination of inserts in one connector

Suitable housing
• EPIC® H-B housing use in high version

Benefits
• Crimp connection for permanent vibration proof contact
• EPIC® MH system is mateable with the market standard
• The mix of different functions in one plug guarantees high flexibility
• EPIC® MH 12
  • Module 12 pole for control signals
• EPIC® MH 17
  • Universal module for 17 contacts in smallest space

Application range
• Mechanical engineering
• Robotics industry
• Plant engineering
• Renewable energy
• Railway applications/vehicle construction

Technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Rated voltage (V)</td>
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</tr>
<tr>
<td>EPIC® MH 12</td>
<td>250 V</td>
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<tr>
<td>EPIC® MH 17</td>
<td>160 V</td>
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<tr>
<td>Rated impulse voltage (kV)</td>
<td>4</td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>10</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>3</td>
</tr>
<tr>
<td>Flammability (UL94 V-0)</td>
<td></td>
</tr>
<tr>
<td>Contact resistance</td>
<td>&lt; 5 mOhm</td>
</tr>
</tbody>
</table>

Number of contacts
EPIC® MH 12: 12
EPIC® MH 17: 17

Termination methods
Crimp termination: 0.14 – 2.5 mm²

Material
Polyamide, glass fibre-reinforced

Cycle of mechanical operation
500

Certifications
UL-tested: UL File Number: E75770

Temperature range
-40°C to +125°C

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
EPIC® MH 20

High flexibility by the use of any combination of inserts in one connector

EPIC® MH 36

High flexibility by the use of any combination of inserts in one connector

Info

• Modular connector system, pluggable with the market standard
• Double module for 36 contacts in smallest space

Suitable housing

• EPIC® H-B housing use in high version

Benefits

• Crimp connection for permanent vibration proof contact
• EPIC® MH system is mateable with the market standard
• The mix of different functions in one plug guarantees high flexibility
• Railway applications - Fire protection on railway vehicles: Test according EN 45545-2.
  Requirement sets R22 and R23. Hazard level HL1, HL2 and HL3.
• EPIC® MH 20
  • Double module 20 pole for control signals
• EPIC® MH 36
  • Double module for 36 contacts in smallest space

Application range

• Mechanical engineering
• Robotics industry
• Plant engineering
• Renewable energy
• Railway applications/vehicle construction

Technical data

<table>
<thead>
<tr>
<th>Rated voltage (V)</th>
<th>EPIC® MH 20</th>
<th>EPIC® MH 36</th>
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</thead>
<tbody>
<tr>
<td>500 V</td>
<td>250 V</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Rated impulse voltage</th>
<th>EPIC® MH 20</th>
<th>EPIC® MH 36</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 kV</td>
<td>4 kV</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated current (A)</th>
<th>EPIC® MH 20</th>
<th>EPIC® MH 36</th>
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</thead>
<tbody>
<tr>
<td>16 A</td>
<td>10 A</td>
<td></td>
</tr>
</tbody>
</table>

| Pollution degree      | 3           |
| Flammability          | UL94 V-0    |
| Contact resistance    | < 5 mOhm    |

<table>
<thead>
<tr>
<th>Number of contacts</th>
<th>EPIC® MH 20</th>
<th>EPIC® MH 36</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>36</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Termination methods</th>
<th>EPIC® MH 20</th>
<th>EPIC® MH 36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crimp termination:</td>
<td>0.14 – 4.0 mm²</td>
<td></td>
</tr>
<tr>
<td>0.14 – 2.5 mm²</td>
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<td></td>
</tr>
</tbody>
</table>

| Material              | Polyamide, glass fibre-reinforced |
| Cycle of mechanical operation | 500 |

<table>
<thead>
<tr>
<th>Certifications</th>
<th>UL-tested:</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL File Number</td>
<td>E75770</td>
</tr>
</tbody>
</table>

| Temperature range     | -40°C to +125°C |

Article number | Article description | Contact type | Number of operating contacts | Slots | Pieces / PU |
<table>
<thead>
<tr>
<th></th>
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<tbody>
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<td>EPIC® MHS 20 CM</td>
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<td>20</td>
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<td>10</td>
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<tr>
<td>44423227</td>
<td>EPIC® MHB 20 CM</td>
<td>female</td>
<td>20</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>44423266</td>
<td>EPIC® MHS 36 CM</td>
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<td>36</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>44423267</td>
<td>EPIC® MHB 36 CM</td>
<td>female</td>
<td>36</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>

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EPIC® Industrial connectors
Rectangular connectors • EPIC® MH modular system module

NEW

EPIC® MH Gigabit Modul
The mixed assembly guarantees high flexibility. For applications in mechanical and plant engineering, for printing machines and slide-in technology.

Suitable housing
• EPIC® MH 6 R
• EPIC® MH 10 R
• EPIC® MH 16 R
• EPIC® MH 24 R

Suitable contacts
• EPIC® MH 1.0 mm contacts machined

Benefits
• Gigabitmodule, all around shielded, 4 pair of wires, for Ethernet data rates up to 10 GBit/s, Cat. 7
• EPIC® MH system is mateable with the market standard
• The mix of different functions in one plug guarantees high flexibility
• Railway applications
  - Fire protection on railway vehicles:
    Test according EN 45545-2.
    Requirement sets R22 and R23.
    Hazard level HL1, HL2 and HL3.

Application range
• Industrial machinery and plant engineering
• Industry 4.0 applications
• Robotics industry
• Renewable energy
• Railway applications/vehicle construction

Technical data

<table>
<thead>
<tr>
<th>Term</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage (V)</td>
<td>50 V</td>
</tr>
<tr>
<td>Rated impulse voltage</td>
<td>0.8 kV</td>
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<tr>
<td>Rated current (A)</td>
<td>5 A</td>
</tr>
<tr>
<td>Flammability</td>
<td>UL94 V-0</td>
</tr>
<tr>
<td>Number of contacts</td>
<td>8</td>
</tr>
</tbody>
</table>

Termination methods
Crimp termination: AWG 20 – 28

Material
PA Polyamide
Zinc die-cast

Cycle of mechanical operation
500

Temperature range
-40°C to +125°C

Termination methods
Crimp termination: AWG 20 – 28

Material
PA Polyamide
Zinc die-cast

Cycle of mechanical operation
500

Temperature range
-40°C to +125°C

Suitable housing
• EPIC® MH 6 R
• EPIC® MH 10 R
• EPIC® MH 16 R
• EPIC® MH 24 R

Suitable contacts
• EPIC® MH 1.0 mm contacts machined

Benefits
• Gigabitmodule, all around shielded, 4 pair of wires, for Ethernet data rates up to 10 GBit/s, Cat. 7
• EPIC® MH system is mateable with the market standard
• The mix of different functions in one plug guarantees high flexibility
• Railway applications
  - Fire protection on railway vehicles:
    Test according EN 45545-2.
    Requirement sets R22 and R23.
    Hazard level HL1, HL2 and HL3.

Application range
• Industrial machinery and plant engineering
• Industry 4.0 applications
• Robotics industry
• Renewable energy
• Railway applications/vehicle construction

Article number | Article description | Contact type | Clamping range (mm) | Slots | Pieces / PU |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>44423291</td>
<td>EPIC® MHS Gigabit Kit small</td>
<td>male</td>
<td>5 – 7</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>44423292</td>
<td>EPIC® MHB Gigabit Kit small</td>
<td>female</td>
<td>5 – 7</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>44423326</td>
<td>EPIC® MHS Gigabit Kit medium</td>
<td>male</td>
<td>7 – 10</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>44423327</td>
<td>EPIC® MHB Gigabit Kit medium</td>
<td>female</td>
<td>7 – 10</td>
<td>1</td>
<td>1</td>
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<tr>
<td>44423376</td>
<td>EPIC® MHS Gigabit</td>
<td>male</td>
<td>–</td>
<td>1</td>
<td>10</td>
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<tr>
<td>44423377</td>
<td>EPIC® MHB Gigabit</td>
<td>female</td>
<td>–</td>
<td>1</td>
<td>10</td>
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<tr>
<td>44423278</td>
<td>EPIC® MHS Gigabit contact body metal</td>
<td>male</td>
<td>–</td>
<td>–</td>
<td>10</td>
</tr>
<tr>
<td>44423279</td>
<td>EPIC® MHS Gigabit PIN + GND</td>
<td>male</td>
<td>–</td>
<td>–</td>
<td>10</td>
</tr>
<tr>
<td>44423280</td>
<td>EPIC® MHB Gigabit PIN</td>
<td>female</td>
<td>–</td>
<td>–</td>
<td>10</td>
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<tr>
<td>44423281</td>
<td>EPIC® MHB Gigabit PIN + GND</td>
<td>female</td>
<td>–</td>
<td>–</td>
<td>10</td>
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<tr>
<td>44423282</td>
<td>EPIC® MH Clamp 5 – 7 mm</td>
<td>–</td>
<td>5 – 7</td>
<td>–</td>
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<tr>
<td>44423283</td>
<td>EPIC® MH Clamp 7 – 10 mm</td>
<td>–</td>
<td>7 – 10</td>
<td>–</td>
<td>10</td>
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<tr>
<td>44423284</td>
<td>EPIC® MH Clamp 10 – 12 mm</td>
<td>–</td>
<td>10 – 12</td>
<td>–</td>
<td>10</td>
</tr>
</tbody>
</table>

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
EPIC® MH BUS
High flexibility by the use of any combination of inserts in one connector

Info
• Modular connector system, pluggable with the market standard
• Shielded module for data and signal transmission.
  Usable for Ethernet CAT.5e

EPIC® MH Bus PIN 1 x (4) contact holder
High flexibility by the use of any combination of inserts in one connector

Technical data

| Termination methods | Crimp termination: 0.14 – 2.5 mm² |
| Material            | PA |
| Cycle of mechanical operation | 500 |
| Certifications      | UL-tested: UL File Number: E75770 |
| Temperature range   | –40°C to +125°C |

Benefits
• Shielded module for data and signal transmission.
  Usable for Ethernet CAT.5e
• EPIC® MH system is mateable with the market standard
• Crimp connection for permanent vibration proof contact
• The mix of different functions in one plug guarantees high flexibility
• Railway applications
  - Fire protection on railway vehicles:
    Test according EN 45545-2.
    Requirement sets R22 and R23.
    Hazard level HL1, HL2 and HL3.

Application range
• Mechanical engineering
• Robotics industry
• Plant engineering
• Renewable energy
• Railway applications/vehicle construction

Suitable housing
EPIC® MH BUS
• EPIC® MH 6 R
• EPIC® MH 10 R
• EPIC® MH 16 R
• EPIC® MH 24 R
• EPIC® H-B housing use in high version

Suitable contacts
EPIC® MH BUS
• EPIC® H-D 1.6 machined contacts
• EPIC® MH Bus PIN 1 x (4)
• EPIC® MH Coax 1.6mm
• EPIC® MH Coax 2.5mm
• EPIC® MH Potential set

EPIC® MH Bus PIN 1 x (4) contact holder
• EPIC® H-D 1.6 machined contacts

Table: Article Numbers and Descriptions

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article description</th>
<th>Contact type</th>
<th>Number of operating contacts</th>
<th>Slots</th>
<th>Pieces / PU</th>
</tr>
</thead>
<tbody>
<tr>
<td>44423228</td>
<td>EPIC® MHS Bus male</td>
<td>male</td>
<td>2</td>
<td>2</td>
<td>10</td>
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<tr>
<td>44423230</td>
<td>EPIC® MHB Bus female</td>
<td>female</td>
<td>2</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>44423229</td>
<td>EPIC® MHS Bus PIN 1 x (4) CM</td>
<td>male</td>
<td>4 + shield</td>
<td>–</td>
<td>10</td>
</tr>
<tr>
<td>44423231</td>
<td>EPIC® MHB Bus PIN 1 x (4) CM</td>
<td>female</td>
<td>4 + shield</td>
<td>–</td>
<td>10</td>
</tr>
</tbody>
</table>

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
**EPIC® Industrial connectors**

Rectangular connectors • EPIC® MH modular system module

**NEW**

![Image](image1)

**EPIC® MH Potential set**

High flexibility by the use of any combination of inserts in one connector

**Benefits**
- Potential spring for EPIC® MH multi frame
- For use in EPIC® MH BUS modules
- Two springs can be used for an EPIC® MH BUS module

**Application range**
- Mechanical engineering
- Robotics industry
- Plant engineering
- Renewable energy
- Railway applications/vehicle construction

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article description</th>
<th>Contact type</th>
<th>Pieces / PU</th>
</tr>
</thead>
<tbody>
<tr>
<td>44423265</td>
<td>EPIC® MHS Potential Set male</td>
<td>male</td>
<td>20</td>
</tr>
<tr>
<td>44423275</td>
<td>EPIC® MHB Potential Set female</td>
<td>female</td>
<td>20</td>
</tr>
</tbody>
</table>

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

**EPIC® MH 0 blind modul**

High flexibility by the use of any combination of inserts in one connector

**Suitable housing**
- EPIC® H-B housing use in high version

**Benefits**
- Dummy module as a placeholder for future expansion
- EPIC® MH system is mateable with the market standard
- “Z” version with centering function for plug in technique
- The mix of different functions in one plug guarantees high flexibility
- Railway applications

**Technical data**
- Number of contacts: 0
- Temperature range: -40°C to +125°C
- Material: Polyamide, glass fibre-reinforced

**Application range**
- Mechanical engineering
- Robotics industry
- Plant engineering
- Renewable energy
- Railway applications/vehicle construction

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article description</th>
<th>Slots</th>
<th>Pieces / PU</th>
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</thead>
<tbody>
<tr>
<td>44423232</td>
<td>EPIC® MH 0</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>44423233</td>
<td>EPIC® MH 0 Z</td>
<td>1</td>
<td>10</td>
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</tbody>
</table>

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
EPIC® MH 8.0 mm Contacts

High flexibility by the use of any combination of inserts in one connector

Technical data

<table>
<thead>
<tr>
<th>Contact type</th>
<th>Connection cross section (mm²)</th>
<th>Pieces / PU</th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>female</td>
<td>16</td>
<td>10</td>
</tr>
</tbody>
</table>

For use in battery hydraulic crimping tool Klaueke type EK 120/42-L

Suitable tools

EPIC® TOOL DIE 8.0 mm

High flexibility by the use of any combination of inserts in one connector

Suitable Contacts

EPIC® MH 8.0 mm Contacts

EPIC® TOOL DIE 8.0 mm

For use in battery hydraulic crimping tool Klaueke type EK 120/42-L

Suitable tools

EPIC® MH contact removal tool 8.0 mm

High flexibility by the use of any combination of inserts in one connector

Suitable Contacts

EPIC® MH 8.0 mm Contacts

Benefits

EPIC® MH contact removal tool 8.0 mm

For use in battery hydraulic crimping tool Klaueke type EK 120/42-L
EPIC® Industrial connectors
Rectangular connectors • EPIC® MH Modular System contacts and accessories

NEW

EPIC® MH 4.0 mm Contacts
High flexibility by the use of any combination of inserts in one connector

Benefits
• Crimp connection for permanent vibration proof contact
• EPIC® MH system is mateable with the market standard

Application range
• Mechanical engineering
• Robotics industry
• Plant engineering
• Renewable energy
• Railway applications/vehicle construction

Suitable tools
• EPIC® MH tools for 4.0 mm contacts

Technical data

<table>
<thead>
<tr>
<th>Contact resistance</th>
<th>Stripping length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5 mOhm</td>
<td>10</td>
</tr>
</tbody>
</table>

Termination methods
Crimp termination: 1.5 – 10 mm²

Cycle of mechanical operation
500

Table: EPIC® MH 4.0 mm Contacts

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article description</th>
<th>Contact type</th>
<th>Connection cross section (mm²)</th>
<th>Pieces / PU</th>
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</thead>
<tbody>
<tr>
<td>44423250</td>
<td>EPIC® MH SCEM AG 1.5sqmm D=4.0 male</td>
<td>1.5</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>44423255</td>
<td>EPIC® MH BCEM AG 1.5sqmm D=4.0 female</td>
<td>1.5</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>44423251</td>
<td>EPIC® MH SCEM AG 2.5sqmm D=4.0 male</td>
<td>2.5</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>44423256</td>
<td>EPIC® MH BCEM AG 2.5sqmm D=4.0 female</td>
<td>2.5</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>44423252</td>
<td>EPIC® MH SCEM AG 4sqmm D=4.0 male</td>
<td>4</td>
<td>100</td>
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</tr>
<tr>
<td>44423257</td>
<td>EPIC® MH BCEM AG 4sqmm D=4.0 female</td>
<td>4</td>
<td>100</td>
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<tr>
<td>44423253</td>
<td>EPIC® MH SCEM AG 6sqmm D=4.0 male</td>
<td>6</td>
<td>100</td>
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<tr>
<td>44423258</td>
<td>EPIC® MH BCEM AG 6sqmm D=4.0 female</td>
<td>6</td>
<td>100</td>
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<tr>
<td>44423254</td>
<td>EPIC® MH SCEM AG 10sqmm D=4.0 male</td>
<td>10</td>
<td>100</td>
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<tr>
<td>44423259</td>
<td>EPIC® MH BCEM AG 10sqmm D=4.0 female</td>
<td>10</td>
<td>100</td>
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</tr>
</tbody>
</table>

Product features
• Locator and crimping dies fit together

Table: EPIC® Tools for contacts MH 4.0 mm machined

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article description</th>
<th>Inserts</th>
<th>Conductor cross-section (mm²)</th>
<th>Note</th>
<th>Pieces / PU</th>
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</thead>
<tbody>
<tr>
<td>11147000</td>
<td>Crimping tool</td>
<td>without crimping dies, without locator</td>
<td>–</td>
<td>In tool case</td>
<td>1</td>
</tr>
<tr>
<td>11147001</td>
<td>Crimping machine</td>
<td>without crimping dies, without locator</td>
<td>–</td>
<td>Pneumatic, 5–10 bar</td>
<td>1</td>
</tr>
<tr>
<td>11147100</td>
<td>Crimping dies</td>
<td>For crimping tools: 11147000, 11147001</td>
<td>0.14 – 4.0</td>
<td>For contacts: H-D 1.6 machined, H-BE 2.5 machined, MC 2.5 machined, MH 4.0</td>
<td>1</td>
</tr>
<tr>
<td>11147101</td>
<td>Crimping dies</td>
<td>For crimping tools: 11147000, 11147001</td>
<td>4.00 – 10.00</td>
<td>For contacts: MH 4.0</td>
<td>1</td>
</tr>
<tr>
<td>11147201</td>
<td>Locator</td>
<td>For crimping tools: 11147000, 11147001</td>
<td>0.14 – 10.00</td>
<td>For contacts: MH 4.0</td>
<td>1</td>
</tr>
</tbody>
</table>

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
EPIC® MH 1.0 mm contacts machined

The mixed assembly guarantees high flexibility. For applications in mechanical and plant engineering, for printing machines and slide-in technology.

Info

- Machined gold plated contacts with 1 mm diameter for EPIC® MH Gigabit module
- Gold-plated contacts for low transfer resistance

Benefits

- Machined gold plated contacts with 1 mm diameter for EPIC® MH Gigabit module
- Gold-plated contacts for low transfer resistance

Application range

- Mechanical and plant engineering
- Robotics industry
- Renewable energy
- Railway applications/vehicle construction

Technical data

<table>
<thead>
<tr>
<th>Stripping length (mm)</th>
<th>Material</th>
<th>Cycle of mechanical operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2 ± 0.5 mm</td>
<td>brass gold plated CuZn/Au</td>
<td>500</td>
</tr>
</tbody>
</table>

Article number | Article description | Contact type | Conductor cross-section AWG | Pieces / PU |
---             | ---                 | ---          | ---                         | ---         |
44423285       | EPIC® MH SCEM AU 0.09 – 0.25sqmm D=1.0 | male         | 28 – 24                     | 100         |
44423286       | EPIC® MH BCEM AU 0.09 – 0.25sqmm D=1.0 | female       | 28 – 24                     | 100         |
44423287       | EPIC® MH SCEM AU 0.13 – 0.33sqmm D=1.0 | male         | 26 – 22                     | 100         |
44423288       | EPIC® MH BCEM AU 0.13 – 0.33sqmm D=1.0 | female       | 26 – 22                     | 100         |
44423289       | EPIC® MH SCEM AU 0.25 – 0.52sqmm D=1.0 | male         | 24 – 20                     | 100         |
44423290       | EPIC® MH BCEM AU 0.25 – 0.52sqmm D=1.0 | female       | 24 – 20                     | 100         |

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
EPIC® Industrial connectors

Rectangular connectors • EPIC® MH Modular System frame

EPIC® MH 6 multi frame
High flexibility by the use of any combination of inserts in one connector

Info
• Modular connector system, plugable with the market standard
• Frame system for modules

EPIC® MH 10 multi frame
High flexibility by the use of any combination of inserts in one connector

Info
• Modular connector system, plugable with the market standard
• Frame system for modules

EPIC® MH 16 multi frame
High flexibility by the use of any combination of inserts in one connector

Info
• Modular connector system, plugable with the market standard
• Frame system for modules

EPIC® MH 24 multi frame
High flexibility by the use of any combination of inserts in one connector

Info
• Modular connector system, plugable with the market standard
• Frame system for modules

EPIC® MH Clip
High flexibility by the use of any combination of inserts in one connector

Info
• Modular connector system, plugable with the market standard
• Adapter clip for modules of competition

For current information see: www.lappgroup.com
**Suitable housing**

**EPIC® MH 6 multi frame**
- EPIC® ULTRA H-B 6
- EPIC® H-B 6 Housings

**EPIC® MH 10 multi frame**
- EPIC® ULTRA H-B 10
- EPIC® H-B 10 Housings

**EPIC® MH 16 multi frame**
- EPIC® ULTRA H-B 16
- EPIC® H-B 16 Housings

**EPIC® MH 24 multi frame**
- EPIC® ULTRA H-B 24
- EPIC® H-B 24 Housings

**Benefits**
- **EPIC® MH 6 multi frame**
  - Multi frame for own and competition modules
  - EPIC® MH system is mateable with the market standard
  - The mix of different functions in one plug guarantees high flexibility
  - Railway applications
  - Fire protection on railway vehicles: Test according EN 45545-2.
    Requirement sets R22 and R23.
    Hazard level HL1, HL2 and HL3.
- **EPIC® MH 10 multi frame**
  - PE connection from 1 mm² up to 6 mm² with end sleeve, 10 mm² with adapter

**Technical data**

<table>
<thead>
<tr>
<th>Material</th>
<th>Cycle of mechanical operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPIC® MH 6 multi frame</td>
<td>EPIC® MH 10 multi frame</td>
</tr>
<tr>
<td>Zinc die-cast</td>
<td>Zinc die-cast</td>
</tr>
<tr>
<td>EPIC® MH 16 multi frame</td>
<td>EPIC® MH 24 multi frame</td>
</tr>
<tr>
<td>Zinc die-cast</td>
<td>Zinc die-cast</td>
</tr>
</tbody>
</table>

| EPIC® MH 6 multi frame | 500 |
| EPIC® MH 10 multi frame | 500 |
| EPIC® MH 16 multi frame | 500 |
| EPIC® MH 24 multi frame | 500 |

**Temperature range**
-40°C to +125°C

**EPIC® MH Clip**
- EPIC® MH Clip for mounting of competition modules in EPIC® MH frame
- EPIC® MH system is mateable with the market standard
- The mix of different functions in one plug guarantees high flexibility
- Railway applications
  - Fire protection on railway vehicles: Test according EN 45545-2.
    Requirement sets R22 and R23.
    Hazard level HL1, HL2 and HL3.

**Application range**
- Mechanical engineering
- Robotics industry
- Plant engineering
- Renewable energy
- Railway applications/vehicle construction

**Article number**

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article description</th>
<th>Contact type</th>
<th>Slots</th>
<th>Pieces / PU</th>
</tr>
</thead>
<tbody>
<tr>
<td>44423234</td>
<td>EPIC® MHS 6 R (A, B)</td>
<td>male</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>44423235</td>
<td>EPIC® MHB 6 R (a, b)</td>
<td>female</td>
<td>2</td>
<td>10</td>
</tr>
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<td>44423236</td>
<td>EPIC® MHS 10 R (A, B, C)</td>
<td>male</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>44423237</td>
<td>EPIC® MHB 10 R (a, b, c)</td>
<td>female</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>44423238</td>
<td>EPIC® MHS 16 R (A, B, C, D)</td>
<td>male</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>44423239</td>
<td>EPIC® MHB 16 R (a, b, c, d)</td>
<td>female</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>44423240</td>
<td>EPIC® MHS 24 R (A, B, C, D, E, F)</td>
<td>male</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>44423241</td>
<td>EPIC® MHB 24 R (a, b, c, d, e, f)</td>
<td>female</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>44423264</td>
<td>EPIC® MH Clip</td>
<td>--</td>
<td>--</td>
<td>20</td>
</tr>
</tbody>
</table>

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EPIC® Industrial connectors
Rechtecksteckverbinder • EPIC® MH Modular System Rahmen

Features
• Standardised design – mateable with many rectangular connectors
• Robust, impact-proof
• Tight for application in inner and outer area

• UV resistant
• Single lever for onehanded operation and double lever for extra hold
• Cable entry for metric and PG cable glands
• EMC version available

Design types

Hood
Mateable with a panel mount base, surface mount base or cable coupler

Panel mount base
Big rectangular cable entry for mounting on machine components

Surface mount base
Complete enclosure only offering cable entry through a cable gland mounted either on one or both sides of the base

Cable coupler
Cable to cable connection frequently used for extend cables

EPIC® ULTRA Series
Robust and reliable industrial connector with EMC
• Offers EMC protection
• Corrosion-resistant
• High-quality design

EPIC® Housing Designer
• Online tool for individualised designing of EPIC® housing
• Over 138 Million possible variation
• Available at:
  www.lappgroup.com/connector-housing

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
Cable glands

SKINTOP® metric plastic cable glands • Halogen-free

Benefits
- Extremely flame-retardant acc. to UL 94 V0
- Completely halogen-free (including sealing material)
- Maximum reliability
- Self-extinguishing, no dripping
- Permanent vibration protection

Application range
- Underground railways and trains
- When the protection of people and property is a priority
- Public buildings
- Ventilation systems
- Tunnel construction

Norm references / Approvals
- DIN EN 45545-2: 2013
- Filament testing acc. to EN 60695-2-1/1 +960°C

Product Make-up
- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

Technical data

Caution
Refer to Appendix T21 for the installation dimensions and torques

Colour delivered
Light grey (RAL 7035)
Black (RAL 9005)

Material
Body: halogen-free polyamide acc. to UL 94 V0
Sealing ring: special elastomer
O-ring: NBR, halogen-free

Protection rating
IP 68 - 5 bar
Temperature range
fixed: -40°C to +100°C
dynamic: -20°C to +100°C

Article number | Article designation / size | Clamping range #F (mm) | SW wrench size (mm) | Overall length. C (mm) | Thread length. D (mm) | Pieces / PU
---|---|---|---|---|---|---
SKINTOP® ST-HF-M light grey
53111407 | M 12 × 1.5 | 4 - 5.5 | 15 | 30 | 6 | 100
53111417 | M 16 × 1.5 | 4.5 - 9 | 19 | 34 | 8 | 100
53111427 | M 20 × 1.5 | 7 - 13 | 25 | 37 | 9 | 100
53111437 | M 25 × 1.5 | 9 - 17 | 30 | 40 | 10 | 50
53111447 | M 32 × 1.5 | 11 - 21 | 36 | 47 | 10 | 25
53111457 | M 40 × 1.5 | 19 - 28 | 46 | 52 | 10 | 10
53111467 | M 50 × 1.5 | 27 - 35 | 55 | 62 | 12 | 5
53111477 | M 63 × 1.5 | 34 - 45 | 66 | 71 | 12 | 5

SKINTOP® ST-HF-M black
53111408 | M 12 × 1.5 | 4 - 5.5 | 15 | 30 | 8 | 100
53111418 | M 16 × 1.5 | 4.5 - 9 | 19 | 34 | 8 | 100
53111422 | M 20 × 1.5 | 7 - 13 | 25 | 37 | 9 | 100
53111438 | M 25 × 1.5 | 9 - 17 | 30 | 40 | 10 | 50
53111448 | M 32 × 1.5 | 11 - 21 | 36 | 47 | 10 | 25
53111458 | M 40 × 1.5 | 19 - 28 | 46 | 52 | 10 | 10
53111468 | M 50 × 1.5 | 27 - 35 | 55 | 62 | 12 | 5
53111478 | M 63 × 1.5 | 34 - 45 | 66 | 71 | 12 | 5

For current information see: www.lappgroup.com
Cable glands
SKINTOP® metric cable gland accessories • Counter nuts

SKINTOP® GMP-HF-M

Benefits
• Halogen-free
• Extremely flame-retardant acc. to UL 94 V0
• Self-extinguishing, no dripping

Application range
• For locking SKINTOP® cable glands in boreholes without thread.
• Airports
• Tunnel construction
• Underground railways
• Public buildings

Product Make-up
• Metric connection thread acc. to DIN EN 60423
• Basis for technical information DIN IEC 62444

Note
• Designed for use with SKINTOP® ST-HF-M

Technical data

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<thead>
<tr>
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<th>RAL</th>
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| Material         | halogenfree polyamide acc. to UL 94 V0 |

| Temperature range| fixed: -40°C to +100°C dynamic: -20°C to +100°C |

<table>
<thead>
<tr>
<th>Article number</th>
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<th>SW wrench size (mm)</th>
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</table>

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
Info

• Cable gland for railway applications
• Hazard Level: HL 3

Benefits
• Halogen-free and flame-retardant
• Optimum strain relief
• Wide, variable clamping ranges
• Maximum reliability

Application range
• Underground railways and trains
• In areas where mechanical and chemical stability are critical
• When the protection of people and property is a priority

Norm references / Approvals
• DIN EN 45545-2
• DIN EN 45545-3: 2013-08
• DIN EN 1363-1: 2012-10
• DIN EN 13501-2: Classification E30

Product Make-up
• Metric connection thread acc. to DIN EN 60423
• Basis for technical information DIN IEC 62444

Note
• Refer to SKINTOP® metric accessories for suitable accessories

Technical data

Caution
Refer to Appendix T21 for the installation dimensions and torques

Material
Body: nickel-plated brass
Insert: halogenfree polyamide acc. to UL 94 V0
Sealing: special elastomere O-ring: NBR, halogen-free

Protection rating
IP 68 - 5 bar

Temperature range
fixed: -40°C to +100°C
dynamic: -25°C to + 100°C

Article number | Article designation / size | Clamping range ∅F (mm) | SW wrench size (mm) | Overall length, C (mm) | Thread length, D (mm) | Pieces / PU
--- | --- | --- | --- | --- | --- | ---
53112570 | M 12 x 1.5 | 3.5 – 7 | 16 | 26.5 | 6.5 | 100
53112571 | M 16 x 1.5 | 4.5 – 10 | 20 | 33 | 7 | 100
53112572 | M 20 x 1.5 | 7 – 13 | 24 | 37 | 8 | 50
53112573 | M 25 x 1.5 | 9 – 17 | 29 | 38.5 | 8 | 25
53112574 | M 32 x 1.5 | 11 – 21 | 36 | 45.5 | 9 | 25
53112575 | M 40 x 1.5 | 19 – 28 | 45 | 48 | 9 | 10
53112576 | M 50 x 1.5 | 27 – 35 | 54 | 55.5 | 10 | 5
53112577 | M 63 x 1.5 | 34 – 45 | 67 | 67 | 15 | 5

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
Cable glands

SKINTOP® metric nickel-plated brass cable glands • Halogen-free

SKINTOP® MS-HF-M SC

Benefits
- Halogen-free and flame-retardant
- Suitable for cables with and without inner sheath
- Low-resistance screen contact, optimum EMC protection
- Highly conductive, flexible EMC contact for clamping various screen diameters
- Few operation steps, easy to assemble

Application range
- Underground railways and trains
- For EMC-compliant earthing of the copper braiding, or for cables with copper shaft sheath
- Industrial machinery and plant engineering
- Measurement and control technology
- Automation technology

Norm references/Approvals
- DIN EN 45545-2
- DIN EN 45545-3: 2013-08
- DIN EN 1363-1: 2012-10
- DIN EN 13501-2: Classification E30

Product Make-up
- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

Note
- SKINDICHT® SM-PE-M counter nut should be used to ensure optimum contact with painted, anodised or powder-coated housings
- Refer to SKINTOP® metric accessories for suitable accessories

Technical data

Caution
Refer to Appendix T21 for the installation dimensions and torques

Material
Body: nickel plated brass
Insert: halogen-free polyamid acc. to UL 94 V0
Sealing: special elastomer
O-ring: NBR, halogen-free

Protection rating
IP 68 – 5 bar

Temperature range
fixed: -40°C to +100°C
dynamic: -25°C to +100°C

Table: SKINTOP® MS-HF-M SC

<table>
<thead>
<tr>
<th>Article number</th>
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<th>Minimum ∅ above braiding (mm)</th>
<th>SW wrench size (mm)</th>
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<th>Thread length, D (mm)</th>
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Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
SKINTOP® MS-HF-M BRUSH

Benefits
- Halogen-free and flame-retardant
- Optimum, low-resistance 360° screen contact
- Faster than any other comparable system
- Maximum reliability
- Maximum assembly freedom during adjustment

Application range
- Underground railways and trains
- Automation systems
- High-power drives
- Frequency converters
- Conveyor and transport systems

Norm references / Approvals
- DIN EN 45545-2
- DIN EN 45545-3: 2013-08
- DIN EN 1363-1: 2012-10
- DIN EN 13501-2: Classification E30

Product Make-up
- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444

Note
- SKINDICHT® SM-PE-M counter nut should be used to ensure optimum contact with painted, anodised or powder-coated housings
- Refer to SKINTOP® metric accessories for suitable accessories

Technical data

<table>
<thead>
<tr>
<th>Article number</th>
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Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
Cable glands

SKINTOP® metric nickel-plated brass cable glands • Halogen-free

**SKINTOP® MS-HF-M GRIP**

### Benefits
- Halogen-free and flame-retardant
- Reliable bending and anti-kink protection
- High strain relief
- For high mechanical stress

### Application range
- Saddle clamp strain relief gland for harsh application conditions
- Portable equipment
- Machines and systems on building sites
- Crane and conveying machinery
- Plant engineering

### Norm references / Approvals
- DIN EN 45545-2
- DIN EN 45545-3: 2013-08
- DIN EN 1363-1: 2012-10
- DIN EN 13501-2: Classification E30

### Product Make-up
- Metric connection thread acc. to DIN EN 60423
- Basis for technical information DIN IEC 62444
- Refer to SKINTOP® metric accessories for suitable accessories

### Technical data

#### Caution
Refer to the instruction leaflet for the installation dimensions and torques

#### Material
- Body: nickel plated brass
- Insert: halogen-free polyamid acc. to UL 94 V0
- Sealing: special elastomer
- O-ring: NBR, halogen-free

#### Protection rating
IP 68 – 5 bar

#### Temperature range
Fixed: -40°C to +100°C
Dynamic: -25°C to +100°C

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article designation / size</th>
<th>Clamping range øF (mm)</th>
<th>SW wrench size (mm)</th>
<th>Overall length, C (mm)</th>
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Photographs and graphics are not to scale and do not represent detailed images of the respective products.
Cable glands

SKINTOP® cable bushing systems • Cable bushing systems

**NEW** SKINTOP® MULTI

---

**Info**

- Compact multi cable bushing system with innovative gel technology

---

**Benefits**

- Large clamping range of 4 mm and AS-1 BUS entry system by elastic gel technology with innovative membrane technology
- Easy installation, high packing density
- Optimum strain relief at the entire cable bundle
- Error reduction through clear assignment of cable to be installed by a clear marker of implementing points
- Not used holes remain securely sealed

**Product Make-up**

- For cut-outs for 24-pin industrial connectors (36 × 112 mm)

**Included**

- SKINTOP® MULTI including mounting material

---

**Technical data**

**Certifications**

UL File No. E349737

Fire behaviour acc. to UL94 V-2

**Note**

HL2-enabled material upon request

**Material**

Frame: Polycarbonat

Sealing: Gel

**Protection rating**

IP 68

**Temperature range**

-30°C to +110°C

---

**Application range**

- Used in areas where a lot of cables and wires need to be inserted into housings with minimum space requirements
- For not harnessed cables and media hoses
- Apparatus and switch cabinet construction
- Automation technology

---

**Product features**

- Integrated seal for the cable & housing ( captive)
- Halogen-free
- UV-, Ozon and oil resistant
- The adhesive gel provides a very easy positioning at the enclosure during the assembling

**Norm references / Approvals**

- UL 508A for Industrial Control Panels
- UL File No. E349737

---

**Article number** | **Article designation / size** | **Max. number of executions** | **Number of cables × clamping range** | **Pieces / PU**
---|---|---|---|---
52220065 | SKINTOP® MULTI Version 1 | 22 | 6 × 8 – 12 mm, 16 × 3 – 7 mm | 1
52220073 | SKINTOP® MULTI Version 2 | 21 | 5 × 2 – 6 mm, 8 × 4 – 8 mm, 3 × 5 – 9 mm, 2 × 8 – 12 mm, 1 × 12 – 16 mm, 2 × AS-1 BUS / 2 × 2 – 4 mm | 1
52220080 | SKINTOP® MULTI Version 3 | 30 | 30 × 2 – 6 mm | 1
52220085 | SKINTOP® MULTI Version 4 | 11 | 8 × 8 – 12 mm, 2 × 12 – 16 mm, 1 × 16 – 20 mm | 1

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
Cable glands

SKINTOP® cable bushing systems • EMC

NEW

SKINTOP® BRUSH ADD-ON 24

Benefits
• Faster, easier screen contact
• Optimum EMC protection
• Quicker installation and EMC contacting compared with other systems
• Maximum assembly freedom during adjustment
• Usable with different cable diameters at the same time

Product features
• Low-resistance screen contact
• Visible, large-scale screen contact

Included
• Brush frame
• Spacers
• Mounting material

Application range
• For the EMC screen contacting of cables when using the SKINTOP® multi-cable entry systems
• For EMC-compliant earthing of the copper braiding, or for cables with copper shaft sheath
• Control cabinet manufacturing
• Automation systems

Technical data

<table>
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<tr>
<th>Material</th>
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Temperature range
-30°C to +110°C

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Photographs and graphics are not to scale and do not represent detailed images of the respective products.
Cable glands

SKINDICHT® metric cable gland accessories • Pressure compensation

**Info**
- Breathable pressure compensation element with membrane technology

**Benefits**
- Ventilation system for housing
- Formation of condensation in electronic housings is prevented
- Pressure compensation elements guarantee a trouble-free and maintenance-free operation

**Application range**
- Lighting engineering
- Railway applications
- Weather station
- Housing and distribution boxes
- Manufacturing of control cabinets and equipment

**Product features**
- Closure element and a pressure equalization in one system
- Lower space requirement
- High air flow

**Norm references / Approvals**
- Optionally approved acc. to UL 508 A

**Product Make-up**
- Air flow rates:
  - 100 mbar = 0.8 l/min – Standard version
  - 100 mbar = 3.5 l/min – UL version

**Note**
- Refer to data sheet for more details

**Technical data**

<table>
<thead>
<tr>
<th>Certifications</th>
<th>Metric thread acc. to EN 60423</th>
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<tr>
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<td>Light grey (RAL 7035) Black/UV-resistant (RAL 9005)</td>
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<td>Temperature range</td>
<td>-20°C to +100°C</td>
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Photographs and graphics are not to scale and do not represent detailed images of the respective products.

For current information see: www.lappgroup.com
SKINDICHT® VENT INOX

Benefits
• Ventilation system for housing
• Formation of condensation in electronic housings is prevented
• Pressure compensation elements guarantee a trouble-free and maintenance-free operation

Application range
• Lighting engineering
• Railway applications
• Manufacturing of control cabinets and equipment
• Housing and distribution boxes

Product features
• Closure element and a pressure equalization in one system
• Lower space requirement
• High air flow

Norm references / Approvals
• Optionally approved acc. to UL 508 A

Product Make-up
• Air flow rates:
  100 mbar = 0.4 l/min – Standard version
  100 mbar = 2.4 l/min – UL version

Note
• Refer to data sheet for more details

Technical data

Certifications
 Metric thread acc. to EN 60423

Note
 Membrane: Acryl - CoPolymere

Material
 Stainless steel 303
 O-ring: NBR

Protection rating
 Standard: IP66 / IP68 / IP69
 UL: IP66 / IP67 / IP69

Temperature range
 -40°C to +105°C

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Photographs and graphics are not to scale and do not represent detailed images of the respective products.
Photographs and graphics are not to scale and do not represent detailed images of the respective products.

Protective cable conduit systems and cable carrier systems
Parallel corrugated protective cable conduit systems • Use in Railway application

FIPLOCK® PA6
Flexible, corrugated cable conduit system in closed and divisible version

Info
- Hazard Level: HL 3

Benefits
- The flexible conduit design enables small bending radii and is ideally suited for space-saving installations where space is limited in dry and damp interiors, as well as for outdoor applications
- Robust against mechanical impacts
- Flexible
- Dimensionally stable

Application range
- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Railway technology
- Public transport equipment

Product features
- Low smoke density
- Self-extinguishing, no dripping
- Halogen-free
- High resistance to oil, petrol, acids and other chemicals
- Good weather and UV-resistance

Technical Data
- Certifications
  IEC EN 61386-23
  EN 45545-2 HL3
- Colour delivered
  Grey (RAL 7011)
  Black (RAL 9005), UV-resistant
- Material
  PA 6
  Silicone-free
  Halogen-free
- Fire behaviour according to UL 94V-0
- Temperature range
  -45°C to +120°C

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For current information see: www.lappgroup.com
FIPLOCK® PA12
Flexible, corrugated cable conduit system in closed and divisible version

Benefits
• The flexible conduit design enables small bending radii and is ideally suited for space-saving installations where space is limited in dry and damp interiors, as well as for outdoor applications
• Robust against mechanical impacts
• Highly flexible and high fatigue life
• Dimensionally stable

Application range
• For use in railway vehicles and buses, for fixed installations and applications where continuous movement may occur
• Railway technology
• Public transport equipment
• For indoor and outdoor use
• Carriage roof, jumper connections, Couplings

Product features
• Low smoke density
• Self-extinguishing, no dripping
• Halogen-free
• High resistance to oil, petrol, acids and other chemicals
• Excellent weather and UV-resistance

Technical data
- **Material**: PA 12
- **Silicone-free**
- **Halogen-free**
- **Fire behaviour according to UL 94V-0**

Temperature range
-45°C to +105°C

**Article number** | Nominal size | Bending radius (mm) | Suitable for FIPLOCK® ONE M | Colour | PU ring (m)
--- | --- | --- | --- | --- | ---
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61803953 | 10 | 9.6 x 12.8 | 20 | 12 x 1.5/16 x 1.5/20 x 1.5 | black | 50
61803954 | 12 | 12.0 x 15.7 | 25 | 16 x 1.5/20 x 1.5 | black | 50
61803955 | 17 | 16.1 x 21.1 | 30 | 20 x 1.5/25 x 1.5 | black | 50
61803956 | 23 | 22.0 x 28.5 | 40 | 25 x 1.5/32 x 1.5 | black | 50
61803957 | 29 | 28.3 x 34.7 | 50 | 32 x 1.5/40 x 1.5 | black | 50
61803958 | 36 | 36.6 x 42.3 | 55 | 40 x 1.5/50 x 1.5 | black | 25
61803959 | 48 | 47.0 x 54.4 | 65 | 50 x 1.5/63 x 1.5 | black | 25
61803960 | 56 | 56.3 x 67.2 | 100 | — | black | 25
61803961 | 70 | 67.2 x 79.6 | 135 | — | black | 25
61803962 | 95 | 91.3 x 106.0 | 150 | — | black | 10
61803963 | 125 | 126.5 x 146.5 | 320 | — | black | 10
61803964 | 170 | 172.0 x 193.0 | 440 | — | black | 10
61803965 | 7 | 6.0 x 10.0 | 15 | 12 x 1.5 | black | 50
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61803967 | 12 | 11.8 x 15.7 | 25 | 16 x 1.5/20 x 1.5 | black | 50
61803968 | 17 | 16.1 x 21.1 | 35 | 20 x 1.5/25 x 1.5 | black | 50
61803969 | 23 | 22.0 x 28.5 | 40 | 25 x 1.5/32 x 1.5 | black | 50
61803970 | 29 | 28.3 x 34.7 | 50 | 32 x 1.5/40 x 1.5 | black | 50
61803971 | 36 | 35.8 x 42.3 | 60 | 40 x 1.5/50 x 1.5 | black | 25
61803972 | 48 | 46.7 x 54.2 | 70 | 50 x 1.5/63 x 1.5 | black | 25
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61803975 | 11 | 11.0 x 16.1 | 25 | — | black | 50
61803976 | 14 | 13.2 x 18.7 | 30 | — | black | 50
61803977 | 16 | 16.0 x 21.5 | 35 | — | black | 50
61803978 | 20 | 20.2 x 25.7 | 45 | — | black | 50
61803979 | 23 | 23.9 x 31.3 | 55 | — | black | 50
61803980 | 29 | 27.3 x 35.5 | 105 | — | black | 25
61803981 | 37 | 32.5 x 43.2 | 130 | — | black | 25
61803982 | 45 | 43.1 x 54.2 | 155 | — | black | 25
61803983 | 70 | 67.0 x 79.8 | 175 | — | black | 10
61803984 | 100 | 87.5 x 102.5 | 195 | — | black | 10

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
Protective cable conduit systems and cable carrier systems

Parallel corrugated protective cable conduit systems • Use in Railway application

**FIPLOCK® ONE M**

Conduit fitting system for highest requirements, suitable for FIPLOCK® PA6 / PA12

---

**Info**

- New conduit fitting system with innovative locking system
- Hazard Level: HL 3

**Benefits**

- Very high tensile strength due to all around tooth system
- Ensures mounting safety due to integrated coding system
- Excellent IP rating
- Cost-saving due to quick and easy installation

**Application range**

- Suitable for FIPLOCK® PA6 / PA12
- Demand of increased liquid tightness
- For indoor and outdoor use

**Product features**

- All around locking mechanism due to 360° tooth system
- Locking mechanism with integrated coding system
- Extended sealing range across multiple corrugated conduit waves

**Note**

- Fitting is not suitable for use with divisible version of FIPLOCK® conduit

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**Technical data**

| Certifications | IEC EN 61386-23  
| EN 45545-2 HL3 |
| Colour delivered | Grey (RAL 7005)  
| Black (RAL 9005), UV-resistant |
| Material | PA 6  
| Halogen-free  
| Fire behaviour acc. to UL 94V-0 |
| Protection rating | IP66 / IP67 / IP68 / IP69 |
| Temperature range | -50°C to +120°C |

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**Article number**

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Photographs and graphics are not to scale and do not represent detailed images of the respective products.
Protective cable conduit systems and cable carrier systems

Accessories for FIPLOCK® corrugated conduit systems

Plastic threaded fittings

FIPLOCK® ONE 90°
Conduit fitting with metric, PG or NPT thread

FIPLOCK® ONE-S
with integrated SKINTOP® cable strain relief
Conduit fitting with metric, PG or NPT thread as well as innovative CLICK connection

Metal threaded fittings

FIPLOCK® ONE Metal
Conduit fitting with metric or PG thread (short/long)

FIPLOCK® ONE 90° Metal
90 degree elbow conduit fitting with metric or PG thread (short/long)

FIPLOCK® ONE-S Metal
with integrated SKINTOP® cable strain relief
Conduit fitting with metric, PG or NPT thread

Divider systems

FIPLOCK® ONE-T
T piece and T-connection system

FIPLOCK® ONE-Y
Y divider system

FIPLOCK® ONE-R
Reducer for T- and Y divider

Coupler systems

FIPLOCK® ONE-C
Conduit coupler with and without screw hole
Protective cable conduit systems and cable carrier systems

Liquid-tight conduits (metal + jacket) • Use in Railway application

SILVYN® HFX-V0 / SILVYN® FCE-V0
Interlocked metal conduit with thick-walled Polyurethane jacket

Benefits
• The flexible conduit design enables small bending radii and is ideally suited for space-saving installations where space is limited in dry and damp interiors, as well as for outdoor applications
• High resistance to oil, petrol, acids and greases
• Liquidtight

Application range
• For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
• Also applicable within oily environments and areas with increased ambient temperature

Product features
• UV-resistant
• Halogen-free and flame-retardant
• High mechanical and chemical resistance

Product Make-up
• Helically-wound metal protective conduit with interlocked profile
• PUR outer sheath

Technical data
Certifications
IEC EN 61386-23
EN 45545-2 HL2

Colour delivered
Black (RAL 9005), UV-resistant

Material
Metal with PUR sheath
Fire behaviour according to UL 94V-0

Temperature range
-50 °C to +105 °C
Short-term up to +125 °C

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For current information see: www.lappgroup.com
Protective cable conduit systems and cable carrier systems

Liquid-tight conduits (metal + jacket) • Use in Railway application

SILVYN® ZHLS / SILVYN® FCE-LFH
Interlocked metal conduit with thick-walled Polyolefin jacket

Benefits
- The flexible conduit design enables small bending radii and is ideally suited for space-saving installations where space is limited in dry and damp interiors, as well as for outdoor applications
- Liquidtight

Application range
- For use in railway vehicles and buses, for fixed installations and applications where limited movement may occur
- Also applicable within oily environments and areas with increased ambient temperature

Product features
- UV-resistant
- Halogen-free and flame-retardant
- High mechanical and chemical resistance

Product Make-up
- Helically-wound metal protective conduit with interlocked profile
- Outer sheath: halogen-free, thermoplastic polyolefin compound

Technical data

Certifications
- IEC EN 61386-23
- EN 45545-2 HL3

Colour delivered
- Black (RAL 9005), UV-resistant

Material
- Metal with Polyolefin jacket

Temperature range
- -25°C to +80°C
  - Short-term: up to +100°C

Table: Article number, Nominal size, ID×OD (mm), Bending radius (mm), Suitable for SILVYN® COMPACT M, Suitable for SILVYN® FCE-M, PU ring (m)

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* Trade product, no Lapp product

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Protective cable conduit systems and cable carrier systems

Liquid-tight conduits (metal + jacket) • Metal conduit with thick-walled jacket

SILVYN® COMPACT M
Nickel-plated brass fitting with space-saving dimensions in various designs

Benefits
• Space-saving application
• For high mechanical stress
• High tensile strength
• Corrosion-resistant

Application range
• In combination with protective conduit:
  • Suitable for SILVYN® HFX-V0/2HLS
  • Railway applications

Product Make-up
• Metric connection thread
• Hexagonal collar
• Threaded sleeve
• Cap nut

Technical data

Norm references / Approvals
UL 514B
On request
Available in stainless steel

Material
Body: nickel-plated brass
Sealing: polyamide
O-ring: NBR

Protection rating
IP 66
IP 67

Temperature range
-45°C to +105°C

Article number Metric size Suitable for SILVYN® HTDL / EF / OR / HCX / HFX Pieces / PU

SILVYN® COMPACT M
61803846 16 × 1.5 5/16" 10
61803800 16 × 1.5 3/8" 10
61803847 20 × 1.5 5/16" 10
61803801 20 × 1.5 3/8" 10
61803802 20 × 1.5 1/2" 10
61803803 25 × 1.5 3/4" 5
61803804 32 × 1.5 1" 5
61803805 40 × 1.5 1 1/4" 5
61803806 50 × 1.5 1 1/2" 2
61803807 63 × 1.5 2" 2

SILVYN® COMPACT 45° M
61803848 16 × 1.5 5/16" 10
61803850 16 × 1.5 3/8" 10
61803849 20 × 1.5 5/16" 10
61803851 20 × 1.5 3/8" 10
61803852 20 × 1.5 1/2" 10
61803853 25 × 1.5 3/4" 5
61803854 32 × 1.5 1" 5

SILVYN® COMPACT 90° M
61803808 16 × 1.5 3/8" 10
61803809 20 × 1.5 3/8" 10
61803810 20 × 1.5 1/2" 10
61803811 25 × 1.5 3/4" 5
61803812 32 × 1.5 1" 5
61803813 40 × 1.5 1 1/4" 5
61803814 50 × 1.5 1 1/2" 2
61803815 63 × 1.5 2" 2

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For current information see: www.lappgroup.com
Protective cable conduit systems and cable carrier systems

Liquid-tight conduits (metal + jacket) • Use in Railway application

SILVYN® FCE-M
Nickel-plated brass fitting with space-saving dimensions in various designs

Benefits
• High mechanical stability
• High tensile strength
• Space-saving application
• Corrosion-resistant

Application range
• In combination with protective conduit:
  • SILVYN® FCE-V0
  • SILVYN® FCE-LFH

Technical data

| Material          | SILVYN® FCE COMPACT金属部件: 镀镍黄铜
|                  | 端口密封: NBR
|                  | SILVYN® FCE-F, FCE-S
|                  | 镀镍黄铜

| Protection rating| SILVYN® FCE COMPACT: IP 68
|                  | SILVYN® FCE-F, FCE-S: IP 54

| Temperature range | SILVYN® FCE COMPACT: -45°C to +105°C
|                  | SILVYN® FCE-F, FCE-S: -55°C to +260°C

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**Protective cable conduit systems and cable carrier systems**

**ÖLFLEX® ACCESSORIES**  
**FLEXIMARK®**  
**SILVYN®**  
**SKINTOP®**  
**EPIC®**  
**HITRONIC®**  
**ETHERLINE®**  
**UNITRONIC®**

APPENDIX

For current information see: www.lappgroup.com

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**Protective cable conduit systems and cable carrier systems**

**SILVYN® HIPROJACKET / SILVYN® HIPROSILTAPE**

Fireproof cable protection conduit to protect the inner from flames and liquid metal with a temperature up to +1640 °C

**Info**

- Outstanding protection for extreme impact of heat
- Hazard Level: HL 3

**Benefits**

- Heat-resistant
- Flexible
- Temporarily reduces the temperature in the conduit by up to 30 %
- The protection rating increases to IP67 if SILVYN® HIPROSILTAPE is also used

**Application range**

- Brake system
- Used in areas where cables and wires are exposed to extreme heat

**Product Make-up**

**SILVYN® HIPROJACKET**

- Woven glass fibre conduit
- Iron oxide silicone coat

**Technical data**

**Certifications**

- SILVYN® HIPROJACKET
  - EN 45545-2 HL1 / HL2 / HL3
  - NF F 16-101 12/F1
  - NF EN ISO 11925-2
  - DIN 5510-2 S4/SR2/ST2
  - SAE AS 1072 Type 2

**Protection rating**

- SILVYN® HIPROJACKET
  - IP 64 in combination with SILVYN® HIPROJACKET AMG fitting
  - IP 67 if SILVYN® HIPROSILTAPE is also used

**Temperature range**

- SILVYN® HIPROJACKET
  - -5°C to +260 °C permanent temp.
  - +800°C for approx. 20 min (flame treatment)
  - +800°C for approx. 20 min (radiation heat)
  - +1,640°C for approx. 15 – 30 sec (liquid-metal contact)

- SILVYN® HIPROSILTAPE
  - -5°C to +260 °C permanent temp.

**Article number Nominal size ID × OD (mm) Suitable gland size PU ring (m)**

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</table>

| SILVYN® HIPROSILTAPE | 25       | 25.0 × 0.5 | — | 11 |

* Trade product, no Lapp product

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
SILVYN® HIPROJACKET AMG

Benefits
• High tensile strength
• For high mechanical stress
• 45° and 90° elbow enables optimal assembly

Application range
• In combination with protective conduit:
  • SILVYN® HIPROJACKET

Product Make-up
• Connection thread metric/PG
• Hexagonal collar, straight/45° elbow/90° elbow
• Threaded sleeve
• Cap nut

Note
• It is possible to extend the temperature range by removing the plastic components

Technical data
On request
NPT connection thread
Material
Body: nickel-plated brass
Clamping ring: nickel-plated brass
O-ring: NBR
Protection rating
IP 54
IP 67 if SILVYN® HIPROSILTAPE is also used
Temperature range
-45°C to +105°C

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
**Benefits**

- Acid-resistant
- Excellent chemical resistance
- High-temperature resistant
- Extremely durable

**Application range**

- Resists harsh environmental influences and extreme weather conditions
- Railway industry, food industry, wind industry, oil and gas industry

**Norm references / Approvals**

- Achilles JQS certified

**Note**

- Markers will be delivered with the desired text (printing service is included in the price)
- Ordering process: Customer-specific data will be emailed as an Excel file to the responsible Lapp employee when the order is made
- Column A: Row 1 content
- Column B: Row 2 content
- Column B or C: Number of markers with corresponding text

- Length of the markers is depending on the number of characters
- All characters are printed in capital letters
- The column "number of characters" refers to the quantity in one line (the maximum amount of characters for a two-line embossing is 30–max.15 per line)

- Included
  - 1 PU = 1 marker, there is no minimum purchase quantity
  - Markers are sorted prior to delivery
  - Included cable ties in article no. 83251406, 83251456, 83251426, 83251468: Stainless steel cable ties LS 4.6-200 (article no. 61812950)

**Technical data**

**Dimensions**
- Character height: 4.2 mm
- Gap between 2 characters: approx. 1 mm
- Borehole diameter: 3.2 mm
- Cable tie width: max. 7.9 mm

**Note**

Blank version
- Article no. 83251575 and 83251576

**Info**

Available characters: A–Ü 0–9 + – / . : = Earth sign

**Material**

- Acid resistant stainless steel
- EN 1.4404 (SS2348, AISI 316L)

**Temperature range**
- -80°C to +500°C

**Blanko version**
- Article no. 83251575 and 83251576

**Technical data**

- Article number
- Article designation
- Height (mm)
- Product Make-up
- Number of characters
- Markers / PU

| One line embossing / with cable tie brackets | 9.9 | with cable tie | 0–15 | 1 |
| One line embossing / with screw hole | 9.9 | with cable tie | 16–25 | 1 |
| Two-line embossing / with cable tie brackets | 9.9 | without cable tie | 0–15 | 1 |
| Two-line embossing / with screw hole | 9.9 | without cable tie | 16–25 | 1 |

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

Blank markers could be found on the product page “SP Metalprint” (article no. 83251575 and 83251576).
Marking systems

FLEXIMARK® Labels for thermal transfer printing • Cable and single core marking

FLEXIMARK® Organized shrink tube

Technical data

- **On request**
  - Also available as diesel-resistant version (with SNCF-NF F00-608 approval)
- **RAI**
  - Standard colour: Yellow
  - Also available in white
- **Material**
  - Polyolefin
  - Shrink ratio:
    - Halogen-free version: 2:1
    - Not halogen-free version: 3:1
- **Temperature range**
  - Halogen-free version: -30°C to +105°C
  - Not halogen-free version: -55°C to +135°C
  - Shrinking temperature: +90°C

Benefits

- **Reduced working time**
- **Already cut to the exact length**

Application range

- Covers a wide range of cable diameters, even applicable for single core marking.

Norm references / Approvals

- **Not halogen-free version:** UL 224 certified

Note

- **Can be printed with the FLEXIMARK® Software and the FLEXIMARK® Thermal transfer printer SQUIX or EOS4**
- **Recommended ribbon:** FTI-X 60-300 BK (article no. 83260206)

Included

- Delivered as a roll of labels

<table>
<thead>
<tr>
<th>Article number</th>
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<th>Colour</th>
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</table>

Photographs and graphics are not to scale and do not represent detailed images of the respective products.

FLEXIMARK® products are sold in packaging units. As example if you like to order 640 labels of LCK 32 you just need to order 1 PU instead of 640 single labels.
# FLEXIMARK® Warning signs / Prohibition signs / Mandatory signs

## Benefits
- Very resistant to UV, moisture, chemicals (e.g. glass cleaner, alcohol, oil)
- Scratch resistant
- Powerful adhesive

## Application range
- Control cabinet manufacturing
- Mechanical engineering
- Robotics
- Safety marking in industrial environment
- Indoor and outdoor applications

## Product features
- Self-adhesive labels

## Technical data
- On request Further dimensions and symbols
- Colour delivered
  - FLEXIMARK® Warning signs yellow
  - FLEXIMARK® Prohibition signs red
  - FLEXIMARK® Mandatory signs blue
- Material
  - Laminated polyester (halogen-free)
- Temperature range
  - -40°C to +150°C
  - Processing: min. +10°C

## Application range
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<table>
<thead>
<tr>
<th>Picture</th>
<th>Article designation</th>
<th>Description</th>
<th>Side length / diameter</th>
<th>Markings / PU</th>
<th>PU</th>
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<tr>
<td><img src="image1.png" alt="Image" /></td>
<td>FLEXIMARK® W001</td>
<td>General warning sign</td>
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<tr>
<td><img src="image2.png" alt="Image" /></td>
<td>FLEXIMARK® W002</td>
<td>Warning; explosive material</td>
<td>50 mm</td>
<td>83880019</td>
<td>83880020</td>
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<tr>
<td><img src="image3.png" alt="Image" /></td>
<td>FLEXIMARK® W012</td>
<td>Warning; Electricity</td>
<td>100 mm</td>
<td>83880049</td>
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<tr>
<td><img src="image4.png" alt="Image" /></td>
<td>FLEXIMARK® W017</td>
<td>Warning; Hot surface</td>
<td>25 mm</td>
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<td><img src="image5.png" alt="Image" /></td>
<td>FLEXIMARK® W021</td>
<td>Warning; Flammable material</td>
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<td><img src="image6.png" alt="Image" /></td>
<td>FLEXIMARK® W025</td>
<td>Warning; Counterrotating rollers</td>
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<td><img src="image7.png" alt="Image" /></td>
<td>FLEXIMARK® W026</td>
<td>Warning; Battery charging</td>
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<tr>
<td><img src="image8.png" alt="Image" /></td>
<td>FLEXIMARK® P003</td>
<td>No open flame; Fire, open ignition source and smoking prohibited</td>
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<td><img src="image9.png" alt="Image" /></td>
<td>FLEXIMARK® P007</td>
<td>No access for people with active implanted cardiac devices</td>
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<td><img src="image10.png" alt="Image" /></td>
<td>FLEXIMARK® P024</td>
<td>Do not walk or stand here</td>
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<td><img src="image11.png" alt="Image" /></td>
<td>FLEXIMARK® P031</td>
<td>Do not alter the state of the switch</td>
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<td><img src="image15.png" alt="Image" /></td>
<td>FLEXIMARK® M009</td>
<td>Wear protective gloves</td>
<td>100 mm</td>
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</table>

For current information see: www.lappgroup.com
Tools and cable accessories

Connection and crimping • Tube cable lugs

**Tube cable lugs KRFN**

**Benefits**
- Can be installed via cable glands, allowing pre-assembly
- High-quality electrolytic copper ensures a good crimping quality
- With inspection hole

**Application range**
- Narrow tube cable lugs for stranded and flexible Cu-conductors 50 – 240 mm², suitable for class 2 and class 5
- Adapted for narrow spaces

**Norm references / Approvals**
- In combination with recommended crimp tool fulfill requirements of SS-EN 61238-1, BS 4579-1, VDE 0220:1, EN-IEC 61238:1

**Suitable tools**
- V 1311-A pressing pliers, hydraulic

---

**Technical data**

**Material**
Tinned electrolyte copper

**Temperature range**
Temperature range up to +90°C
Working temperature: 110°C, max. +140°C

---

**Table: Article number, Article designation, Screw hole ∅ (mm), UL certification, Length (mm), Pressing dies d (mm), W (mm), Pieces / PU**

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article designation</th>
<th>Screw hole ∅ (mm)</th>
<th>UL certification</th>
<th>Length (mm)</th>
<th>Pressing dies d (mm)</th>
<th>W (mm)</th>
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Photographs and graphics are not to scale and do not represent detailed images of the respective products.
**Info**

- Cable tie for railway applications
- Hazard Level: HL 3

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**Benefits**

- The special design of the cable ties guarantees maximum resistance and safety even in the most extreme applications
- Steel nose ensures secure and durable binding
- Lock is also resistant to shocks and vibrations
- Fire behaviour according to UL 94V-0

**Application range**

- Underground railways and trains
- In areas where mechanical and chemical stability are critical
- When the protection of people and property is a priority
- Public utilities

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**Product features**

- The steel blade is fixed to the tie head and is made from corrosion-resistant, anti-magnetic steel (type 316)

**Norm references / Approvals**

- DIN EN 45545-2
- NFF 16-101: I3F1

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**Technical data**

- **Colour delivered**
  - Natural colour

- **Material**
  - Polyamide 6.6
  - Halogen-free and silicone-free

- **Temperature range**
  - -40°C to +85°C

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**Article number** | **Article description** | **UL certification** | **Length x width (mm)** | **Bundling ∅ (mm)** | **Tensile strength (N)** | **PU**
--- | --- | --- | --- | --- | --- | ---
61723330 | TY 23 MFR RW | no | 92 x 2.4 | 2 – 16 | 80 | 1000
61723331 | TY 232 MFR RW | no | 203 x 2.4 | 2 – 50 | 80 | 1000
61723332 | TY 24 MFR RW | no | 140 x 3.6 | 2 – 29 | 180 | 1000
61723333 | TY 25 MFR RW | no | 186 x 4.8 | 3.5 – 45 | 220 | 1000
61723334 | TY 28 MFR RW | no | 360 x 4.8 | 3.5 – 102 | 220 | 500
61723335 | TY 27 MFR RW | no | 340 x 7 | 6 – 90 | 540 | 100

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Without exception, our products are tested for application safety in accordance with defined standards and our own regulations, which complement the standards. Relevant legal requirements and safety regulations are also observed. Provided due care and attention is paid, the possibility of product-specific danger to the user may thus reasonably be excluded. Where products are used carelessly or incorrectly, considerable danger to persons and the environment may arise. For this reason, our cables must only be processed and/or used responsibly by trained electricians or specialists. This catalogue contains general information for the application of each product. Independent of such information, the application standards DIN VDE 0298 and DIN VDE 0891 for cables will apply. Excerpts from these standards, as well as complementary selection and application tables, design and installation guidelines, are contained in the tables in the appendix to this catalogue. Our machines and installation tools are – where necessary – designed in accordance with the machine guidelines and display the CE identification mark. It must be noted, however, that our machines and installation tools must only be used by trained specialist personnel and for the purpose for which they were designed.

Processing is only to be done by an authorised electrician! Otherwise, there is the risk of an electric shock or a fire ignited by electric current!

The following applies for the use of our products

The safety of our products is closely associated with how they are used. A knowledge of and adherence to the respective international/national standards of use (e.g. DIN VDE 0100, 0298) are mandatory. There are particular risks if installed improperly. This applies to all our products/cables.

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