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.
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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 absolutely 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
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
Absolute safety on the tracks

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).
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 thermo-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

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<th>ÖLFLEX® Power and control cables</th>
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<td>14  16</td>
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</table>
### Overview ÖLFLEX® TRAIN

#### Single cores according to EN 50306 (Thin Wall)

**ÖLFLEX® TRAIN 317 C TW-P**

- **Type standard**: EN 50306-4 / 5P
- **May substitute previous type**: GKW R
- **With screen**: ▯ ▯
- **Type acc. to EN standard**: MM S

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#### Multi core cables with twisted pairs according to EN 50306 (Thin Wall)

**ÖLFLEX® TRAIN 317 C TW-P**

- **Type standard**: EN 50306-4 / 5P
- **May substitute previous type**: GKW R
- **With screen**: ●
- **Type acc. to EN standard**: MM S

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<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.
### Overview ÖLFLEX® TRAIN

#### 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>
<th>ÖLFLEX® TRAIN 325 C 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.
### Single core cables according to EN 50264

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<th>ÖLFLEX® TRAIN 361 1.8 kV</th>
<th>ÖLFLEX® TRAIN 371 1.8 kV</th>
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### Multi core cables according to EN 50264

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

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| 4 X 1.5                  | 15340002                 | 15345002                 |
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Photographs and graphics are not to scale and do not represent detailed images of the respective products.
### Single core cables according to EN 50382 (Silicone high temperature cables)

![Image: Single core cables according to EN 50382](image)

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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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**Power and control cables**

Special applications • Rolling stock

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

For current information see: www.lappgroup.com

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**ÖLFLEX® TRAIN 301 TW 300V**

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

---

![Image](image_url)

**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

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**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

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**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

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**Norm references / Approvals**

- EN 50306-2, type M
- EN 45545-2 HL1, HL2, HL3
- NF F 16-101 - Classification: C / F0 (flame propagation / smoke)

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**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 core insulation: white

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**Technical data**

**Conductor stranding**

SRC (special round conductor)  
19 or 37 wires acc. to EN 50306-1

**Minimum bending radius**

Fixed installation:  
4 × OD  
3 × OD for careful bending, once at connecting terminal  
Occasional flexing:  
5 × 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)

---

**Article number**

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<th>m/Spule</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 Photographs and graphics are not to scale and do not represent detailed images of the respective products.
### 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 and EN 45545-2
- Flame-retardant acc. to EN 60332-1-2
- Low smoke density acc. to EN 61034-2
- No toxic gases acc. to EN 50305
- No fluorine acc. to EN 60684-2
- No corrosive gases acc. to EN 60754-2
- Ha
- Polymeric compound acc. to EN 50306
- SRC (special round conductor)

### 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
  - 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)
  - Occasional flexing: -35°C to +105°C
  - Short circuit: +160°C (5s)

### Table

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<tr>
<th>Article number</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 coil). 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 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 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
  - 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
- Core identification code
  White with black numbers
- Conductor stranding
  SRC (special round conductor)
  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

Screened multi-core cable according to EN 50306-4 3P type MM S and EN 45545-2

High temperature resistance: -50°C up to +125°C
Highly oil- and fuel-resistant

Article number | Number of cores and mm² per conductor | Outer diameter (mm) | Copper index (kg/km) | Weight (kg/km) | 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 317 C TW-P 300V
Screened multi-core cable according to EN 50306-4 5P 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 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 60355, appendix A

Norm references / Approvals
- EN 50306-4 class P, type MM S
- EN 45545-2 HL1, HL2, HL3
- 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)
- Minimum bending radius
  - Fixed installation: 5 × outer diameter
  - Occasional flexing: 10 × 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)

Table:ÖLFLEX® TRAIN 317 C TW-P 300V

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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 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 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 50503
  - Low smoke density acc. to EN 60104-2
  - Flame-retardant acc. to EN 60332-1-2
  - No flame propagation acc. to EN 60332-3-24 / EN 60332-9-25 / EN 50503

- 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 E, type MM
- EN 45545-2 HL1, HL2, HL3
- NF F 16-101 - Classification: C / F0 (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
- 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 × OD / 3 × OD* > 12 mm: 5 × OD / 4 × OD* * for careful bending, once at connecting terminal
- Occasional flexing: ≤ 12 mm: 5 × OD > 12 mm: 6 × OD
- Nominal voltage: Ue / U: 600 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)
  - Occasional flexing: -35°C to +105°C
  - Short circuit: +160°C (5s)

---

**Table: ÖLFLEX® TRAIN 320 TW-E 300V**

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<th>Article number</th>
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<th>Outer diameter (mm)</th>
<th>Copper index (kg/km)</th>
<th>Weight (kg/km)</th>
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**Table: ÖLFLEX® TRAIN 320 TW-E 300V**

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---

**Info**

- Meets EN 50306-4 class E, type MM and EN 45545-2
- High temperature resistance: -50°C up to +125°C
- Highly oil- and fuel-resistant

---

For current information see: [www.lappgroup.com](http://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

### 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
- **Wrapping:** Halogen-free plastic foil (optional)
- **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) 19 or 37 wires acc. to EN 50306-1
- **Minimum bending radius:**
  - Fixed installation: 5 × outer diameter
  - Occasional flexing: 10 × 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

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

### 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 in oil environments and areas with increased ambient temperature

### 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

### 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 NFC 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 (flame propagation / smoke)

### Conductor stranding
- X = without protective conductor
- G = with protective conductor

### Number of cores and mm² per conductor

<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 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
  - 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 / 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)
- 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

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

Technical data
- Cable index: 25°C (in air)
- Copper price basis: EUR 150/100 kg. Refer to catalogue appendix T17 for the definition and calculation of copper-related surcharges.
- Packaging: 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 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 50355, appendix A

**Technical data**

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<th>Conductor cross-section (mm²)</th>
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**ÖLFLEX® ACCESSORIES**

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

**Info**
- 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

**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 × OD
  - > 12 mm: 4 × OD
- Occasional flexing:
  - ≤ 12 mm: 4 × OD
  - > 12 mm ≤ 20 mm: 5 × OD
  - > 20 mm: 6 × OD
  (OD = outer diameter)

**Nominal voltage**
- U0/U AC 0.6/1 kV
- Un, 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)

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**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

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**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

---

**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 × OD
    - > 12 mm: 4 × OD
  - Occasional flexing:
    - ≤ 12 mm: 4 × OD
    - > 12 mm ≤ 20 mm: 5 × OD
    - > 20 mm: 6 × OD
  (OD = outer diameter)
- Nominal voltage
  - U0/U AC 0.6/1 kV
- Un, 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)

---

**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 × OD
  - > 12 mm: 4 × OD
- Occasional flexing:
  - ≤ 12 mm: 4 × OD
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  - > 20 mm: 6 × OD
  (OD = outer diameter)

**Nominal voltage**
- U0/U AC 0.6/1 kV
- Un, 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)
**ÖLFLEX® TRAIN 340 600V**

Multi-core cable according to EN 50264-3-2 type MM for high requirements in railway applications

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.

<table>
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<th>Article number</th>
<th>Number of cores and mm² per conductor</th>
<th>Outer diameter (mm)</th>
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For current information see: www.lappgroup.com
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 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

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 × OD
  > 12 mm ≤ 12 mm: 4 × OD
  > 12 mm ≤ 20 mm: 5 × OD
  > 20 mm: 6 × OD
  (OD = outer diameter)
- Nominal voltage
  U0/U AC 0.6/1 kV
  Ue, AC 1.2 kV
  VDC 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)
Screened multi-core cable according to EN 50264-3-2 type MM S 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.
Power and control cables

Special applications • Rolling stock

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

APPENDIX

15350003 9 X 1 9.6 86.4 179
15350004 12 X 1 10.1 15.2 204

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

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

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For current information see: www.lappgroup.com

15350000 2 X 1 5.4 19.2 54
15350002 7 X 1 7.7 67.2 128
15350001 4 X 1 6.2 38.4 81

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 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 50264-3-2
  - 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 45454-2 HL1, HL2, HL3
• NF F 16-101 – Classification: C / F0 (flame propagation / smoke)

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 × OD
  > 12 mm: 4 × OD
  Occasional flexing:
  ≤ 12 mm: 4 × OD
  > 12 mm ≤ 20 mm: 5 × OD
  > 20 mm: 6 × OD
  (OD = outer diameter)

Nominal voltage
U0/U: 300/500 V
Ue, AC 600 V
V, DC 450 V

Test voltage
2.0 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)
-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 and EN 45545-2
• High temperature resistance:
  -50°C up to 120°C
• Highly oil- and fuel-resistant

Multi-core cable according to EN 50264-3-2 type MM for high requirements in railway applications

ÖLFLEX® TRAIN 350 300V

For current information see: www.lappgroup.com
**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
  - Acid resistant acc. to EN 605035
  - Low smoke density acc. to EN 601034-2
  - Flame-retardant acc. to EN 60332-1-2
  - No flame propagation acc. to EN 60332-3-2/EN 605035
- Current rating acc. to EN 50355, appendix A.
- 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.

**Product Make-up**
- Conductor: Fine-wire strands of tinned copper.
- Colour of insulation: Black with white numbers.
- Wrapping: Halogen-free plastic foil.
- Screen: Tinned-copper braiding.
- Outer sheath: electron beam cross-linked polymer-com-pound 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 × OD
  - > 12 mm: 4 × OD
  - Optional flexing:
    - ≤ 12 mm: 4 × OD
    - > 12 mm: 5 × OD
    - > 20 mm: 6 × OD (OD = outer diameter)
- Nominal voltage: 
  - U_0 / U: 300/500 V
  - U_1, AC 600 V
  - V_1, 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)
  - 50°C acc. to GOST 20.57.406-81
  - Occasional flexing:
    - -35°C to +90°C
    - Short circuit: +200°C (5s).

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

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

ÖLFLEX® TRAIN 361 1.8 kV
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 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 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 50305
- Current rating acc. to EN 50355, appendix A

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

Technical data

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

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

Nominal voltage
- U0 /U AC 1.8/3 kV
- Ue, AC 3.6 kV
- V0, DC 2.7 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)

Article number | Conductor cross-section (mm²) | Outer diameter (mm) | Copper index (kg/km) | Weight (kg/km)
--- | --- | --- | --- | ---
15361000 | 1.5 | 5.6 | 14.4 | 48
15361001 | 2.5 | 6 | 24 | 61
15361002 | 4 | 6.7 | 38.4 | 80
15361003 | 6 | 7.2 | 57.6 | 105
15361004 | 10 | 8.2 | 96 | 153
15361005 | 16 | 9.2 | 153.6 | 224
15361006 | 25 | 10.5 | 240 | 323
15361007 | 35 | 11.7 | 336 | 431
15361008 | 50 | 13.7 | 480 | 592
15361009 | 70 | 15.4 | 672 | 801
15361010 | 95 | 17.8 | 912 | 1076
15361011 | 120 | 19.4 | 1152 | 1329
15361012 | 150 | 21.4 | 1440 | 1634
15361013 | 185 | 23.3 | 1776 | 2011
15361014 | 240 | 26.8 | 2304 | 2571
15361015 | 300 | 28 | 2880 | 3176

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 371 1.8 kV**

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 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**
  - $U_{0}/U_{AC}$: 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:
    - -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**

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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 381 3.6 kV
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
  - No flame propagation acc. to EN 60332-3-24 / EN 50305
- 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 × OD
    > 12 mm: 4 × OD
  - Occasional flexing: ≤ 12 mm: 4 × OD
    > 12 mm < 20 mm: 5 × OD
    > 20 mm: 6 × OD
  - (OD = outer diameter)
- Nominal voltage
  - U0 / U AC 3.6/6 kV
  - U0, 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)

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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.

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

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 60864-2
  - 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 60332-3-24 / 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
  - $U_e$ AC 3.6 kV
  - $V_0$ DC 2.7 kV
- **Test voltage**
  - 6.5 kV AC; 15 kV DC
- **Temperature range**
  - -40°C to +150°C

### Conductor stranding and technical data

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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.
Power and control cables
Special applications • Rolling stock

NEW

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

APPENDIX

For current information see: www.lappgroup.com

ÖLFLEX® TRAIN HT 150 F 3.6 kV
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 61034-2
  - Flame-retardant 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

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
U0/U AC 3.6/6 kV
V0/1 DC 5.4 kV

Test voltage
11 kV AC; 26 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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15382023 1 X 10 10.8 96 170
15382024 1 X 16 11.4 153.6 241
15382025 1 X 25 12.8 240 329
15382026 1 X 35 14.1 336 422
15382027 1 X 50 15.7 480 571
15382028 1 X 70 17.5 672 760
15382029 1 X 95 19 912 984
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15382031 1 X 150 22.6 1440 1474
15382032 1 X 185 24.6 1776 1810
15382033 1 X 240 27.6 2304 2326
15382034 1 X 300 30.1 2880 2780
15382035 1 X 400 33.4 3840 3610

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.

For current information see: www.lappgroup.com
ÖLFLEX® ACCESSORIES FLEXIMARK ® SILVYN® SKINTOP® EPIC® HITRONIC® ETHERLINE® UNITRONIC ®

APPENDIX

For current information see: www.lappgroup.com

Special applications • Rolling stock

Power and control cables

**ÖLFLEX® TRAIN HT 150 FF 1.8 kV**

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

---

**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

**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 60332-1-2
  - No flame retardant acc. to EN 60332-2
  - No flame propagation acc. to EN 60332-3-24
  - Flame retardant acc. to EN 60332-3-25
  - Low smoke density acc. to EN 61034-2
  - Flame retardation acc. to EN 60332-3-25
- 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 FF
- EN 45545-2 HL1, HL2, HL3

**Product Make-up**

- Tin-plated 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

**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 1.8/3 kV
  - U1 AC 3.6 kV
  - V0 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)

<table>
<thead>
<tr>
<th>Article number</th>
<th>Number of cores and mm² per conductor</th>
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<th>Copper index (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 41
Power and control cables

Special applications • Rolling stock

ÖLFLEX® TRAIN HT 150 FF 3.6 kV

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 fluorescent 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 60332-3-24
  - No corroding gases acc. to 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

Technical data

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

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

Nominal voltage
U0/U AC 3.6/6 kV
U0, AC 7.2 kV
V0 DC 5.4 kV

Test voltage
11 kV AC; 26 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)
--- | --- | --- | --- | ---
ÖLFLEX® TRAIN HT 150 F 3.6kV
15382060 | 1 X 2.5 | 10.8 | 24 | 172
15382061 | 1 X 4 | 11.3 | 38.4 | 143
15382062 | 1 X 6 | 11.9 | 57.6 | 167
15382063 | 1 X 10 | 12.8 | 96 | 217
15382064 | 1 X 16 | 13.9 | 153.6 | 291
15382065 | 1 X 25 | 16 | 240 | 403
15382066 | 1 X 35 | 17.3 | 336 | 503
15382067 | 1 X 50 | 19 | 480 | 668
15382068 | 1 X 70 | 20.8 | 672 | 827
15382069 | 1 X 95 | 22.6 | 912 | 1110
15382070 | 1 X 120 | 24.3 | 1152 | 1343
15382071 | 1 X 150 | 26.2 | 1440 | 1631
15382072 | 1 X 185 | 28.7 | 1776 | 2004
15382073 | 1 X 240 | 31.9 | 2304 | 2555
15382074 | 1 X 300 | 34.4 | 2880 | 3070
15382075 | 1 X 400 | 38 | 3840 | 3970

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.

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
ÖLFLEX® TRAIN HT 150 FX 3.6 kV
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 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 fluoride acc. to EN 60684-2
  - No toxic gases acc. to EN 50355
  - Low smoke density acc. to EN 60332-3-24
- Flame-retardant acc. to EN 60332-1-2
- 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

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

Technical data
- Conductor stranding
  - Extra-fine-wire acc. to VDE0295, class 6
  - IEC 60228, conductor class 6
- Minimum bending radius
  - Fixed installation: 3 × outer diameter
  - Occasional flexing: 5 × outer diameter
- Nominal voltage
  - U0/U AC 3,6/6 kV
  - U0, AC 7,2 kV
  - V0, DC 5,4 kV
- Test voltage
  - 11 kV AC, 26 kV DC
- Temperature range
  - Fixed installation: -40°C to +150°C

More information can be found at www.lappgroup.com
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

Technical data
- Core identification code
  Black with white numbers according to VDE 0293-1
- Conductor stranding
  Extra-fine wire according to VDE 0295, class 6/IEC 60228 class 6
- Minimum bending radius
  Occasional flexing: 10 x outer diameter
  Fixed installation: 4 x outer diameter
- Nominal voltage
  U0/U: 300/500 V
- Test voltage
  4000 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)

| ÖLFLEX® CLASSIC 110 H SF | 5 G 0.5 | 6.3 | 24 | 83 |
| 1002140 | 3 G 1 | 6.1 | 28.8 | 75 |
| 1002141 | 5 G 1 | 7.3 | 48 | 123 |
| 1002142 | 7 G 1 | 8.1 | 67 | 159 |
| 1002143 | 10 G 1 | 11.4 | 124.8 | 295 |
| 1002144 | 15 G 1 | 15 | 240 | 515 |
| 1002145 | 25 G 1 | 19.8 | 412.8 | 899 |
| 1002146 | 43 G 1 | 25.3 | 700.8 | 1402 |
| 1002147 | 73 G 1 | 6.8 | 43.2 | 96 |
| 1002148 | 3 G 1.5 | 8.3 | 72 | 163 |
| 1002149 | 5 G 1.5 | 9 | 100.8 | 208 |
| 1002150 | 7 G 1.5 | 10.1 | 187.2 | 394 |
| 1002151 | 10 G 1.5 | 17.2 | 360 | 704 |
| 1002152 | 16 G 1.5 | 22.6 | 619.2 | 1198 |
| 1002153 | 18 G 1.5 | 25.6 | 878.4 | 1637 |
| 1002154 | 30 G 2.5 | 8.3 | 72 | 147 |
| 1002155 | 50 G 2.5 | 10.1 | 168 | 333 |
| 1002156 | 70 G 2.5 | 11.2 | 255 | 541 |
| 1002157 | 10 G 3.5 | 14.5 | 430.3 | 712 |
| 1002158 | 16 G 3.5 | 16 | 480 | 915 |
| 1002159 | 25 G 6 | 18.4 | 768 | 1344 |
| 1002160 | 50 G 6 | 22.3 | 1680 | 2778 |

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).

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 115 CH SF
Screened halogen-free control cable, 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
- Copper screening complies with EMC requirements and protects against electromagnetic interference

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)

Technical data
- Core identification code
  Black with white numbers according to VDE 0293-1
- Conductor stranding
  Extra fine wire according to VDE 0295, class 6/IEC 60228 class 6
- Minimum bending radius
  Occasional flexing: 15 × outer diameter
  Fixed installation: 6 × 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)
--- | --- | --- | --- | ---
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 | 9.6 | 40.9 | 68
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 | 8.9 | 92.3 | 172
1002171 | 13 G 1 | 12.4 | 162 | 318
1002172 | 25 G 1 | 16.2 | 306 | 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 | 124.9 | 217
1002177 | 4 G 4 | 11.9 | 188.2 | 303
1002178 | 4 G 6 | 14.2 | 271.7 | 443
1002179 | 4 G 10 | 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 × 500 m drum or 5 × 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

NEW
Power and control cables

Various applications • Halogen-free

ÖLFLEX® CLASSIC 115 CH SF (TP)
Screened halogen-free control cable, EN 45545-2 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
- Copper screening complies with EMC requirements and protects against electromagnetic interference

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
- Core insulation: Halogen-free
- TP structure
- Wrapping: Halogen-free plastic foil
- Outer sheath: Special halogen-free compound, black

Technical data

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<th>Conductor stranding</th>
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<th>Test voltage</th>
<th>Core/screen</th>
<th>Protective conductor</th>
<th>Temperature range</th>
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<td>Extra-fine wire according to VDE 0295, class 6</td>
<td>Occasional flexing: 15 × outer diameter</td>
<td>300/500 V</td>
<td>Core/core: 4000 V</td>
<td>Core/screen: 2000 V</td>
<td>G = with GN-YE protective conductor</td>
<td>Occasional flexing: -30°C to +70°C</td>
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<td>Fixed installation: 6 × outer diameter</td>
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<td>X = without protective conductor</td>
<td>Fixed installation: -40°C to +80°C</td>
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Article number | Number of cores and mm² per conductor | Outer diameter (mm) | Copper index (kg/km) | Weight (kg/km)
--- | --- | --- | --- | ---
ÖLFLEX® CLASSIC 115 CH SF (TP)
1002180 | 3 X (2 × 0.75) | 9.6 | 69 | 171
1002181 | 4 X (2 × 0.75) | 10.9 | 90.4 | 202
1002182 | 6 X (2 × 0.75) | 12.3 | 130 | 287
1002183 | 12 X (2 × 0.75) | 16.4 | 271.8 | 530
1002184 | 2 X (2 × 1) | 9.2 | 72.1 | 176
1002185 | 4 X (2 × 1) | 11.5 | 126.2 | 244
1002186 | 12 X (2 × 1) | 17.4 | 336.5 | 615
1002187 | 3 X (2 × 1.5) | 11.7 | 139.5 | 259

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 × 500 m drum or 5 × 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.
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 MVB according IEC 61375-3-1 WTB according IEC 61375-2-1
- 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

Technical data
- Peak operating voltage (not for power applications)
  125 V
- Minimum bending radius
  Flexing: 10 × outer diameter
  Fixed installation: 6 × 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

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 60864-2
  - 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

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<th>Article number</th>
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<td>2173003</td>
<td>UNITRONIC® TRAIN MVB 2 × 2 × 0.5 + 0.25</td>
<td>2 × 2 × 0.5 + 0.25</td>
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<td>Cables for WTB</td>
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<td>2173004</td>
<td>UNITRONIC® TRAIN WTB 1 × 2 × 0.75</td>
<td>1 × 2 × 0.75</td>
<td>8.4</td>
<td>41</td>
</tr>
</tbody>
</table>

Photographs and graphics are not to scale and do not represent detailed images of the respective products.
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 60864-2
  - 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 50264-1
    - 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 50305
  - 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 50305

Norm references / Approvals
- Electrical requirements acc. to IEC 61566-6
- 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.6a/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 × outer diameter Fixed installation:
- 8 × outer diameter
Test voltage
Core/core: 1000 V
Core/screen: 1000 V
Characteristic impedance
nom. 100 Ω 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)
---|---|---|---|---|---
Cat.5e, 2-pair version
2170906 | ETHERLINE® TRAIN FLEX Cat.5e 1 × 4 × 22/7 PE | 1 × 4 × AWG22/7 | 1.5 | 6.5 | 30
2170910 | ETHERLINE® TRAIN FLEX Cat.5e 1 × 4 × 0.5 PE | 1 × 4 × 0.5/7 | 2 | 7.6 | 41
Cat.5e, 4-pair version
2170907 | ETHERLINE® TRAIN FLEX Cat.5e 4 × 2 × 24/7 PE | 4 × 2 × AWG24/7 | 1.2 | 7.7 | 38
Cat.6a
2170908 | ETHERLINE® TRAIN FLEX Cat.6a 4 × 2 × 24/7 PE | 4 × 2 × AWG24/7 | 1.4 | 8.4 | 38
Cat.7
2170909 | ETHERLINE® TRAIN FLEX Cat.7 4 × 2 × 24/7 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 organisation)
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.

For current information see: www.lappgroup.com
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<th>Properties</th>
<th>Connection type</th>
<th>Connection cross section</th>
<th>Rated voltage according to standards</th>
<th>Rated current for largest connection cross section according to standards</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectangular – inserts fixed</td>
<td></td>
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<tr>
<td>EPIC® H-A 3, 4</td>
<td>Screw</td>
<td>0.5 – 2.5</td>
<td>400 V 600 V 600 V</td>
<td>23 A 10 A 10 A</td>
<td>VDE, UR, CSA</td>
</tr>
<tr>
<td>EPIC® H-A 10, 16, 32, 48</td>
<td>Screw</td>
<td>0.5 – 2.5</td>
<td>250 V 600 V 600 V</td>
<td>16 A 14 A 16 A</td>
<td>VDE, UR, CSA</td>
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<tr>
<td>EPIC® STA 6, 14, 20</td>
<td>Screw</td>
<td>0.5 – 15/ max. 1.5</td>
<td>24 VAC/60 VDC 48 V</td>
<td>48 V 10 A 10 A 10 A</td>
<td>UR, CSA</td>
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<tr>
<td>EPIC® H-Q 5</td>
<td>Screw</td>
<td>0.14 – 4.0</td>
<td>230 V/400 V 600 V</td>
<td>600 V 16 A 16 A 16 A</td>
<td>UR, CSA</td>
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<td>EPIC® H-D 7, 8</td>
<td>Screw</td>
<td>0.14 – 2.5</td>
<td>250 V</td>
<td>600 V 10 A 8,5 A 10 A</td>
<td>UR, CSA</td>
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<td>EPIC® H-D 15, 25, 40, 64</td>
<td>Screw</td>
<td>0.14 – 2.5</td>
<td>250 V</td>
<td>600 V 10 A – –</td>
<td>UR</td>
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<td>EPIC® H-DD 24, 42, 72, 108</td>
<td>Screw</td>
<td>0.14 – 2.5</td>
<td>250 V</td>
<td>600 V 10 A – –</td>
<td>UR</td>
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<tr>
<td>EPIC® H-BS 6, 12</td>
<td>Screw</td>
<td>0.5 – 6.0</td>
<td>500 V 600 V 600 V</td>
<td>35 A 35 A 35 A</td>
<td>UR, CSA</td>
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<tr>
<td>EPIC® H-BVE 3, 6, 10</td>
<td>Screw</td>
<td>0.5 – 2.5</td>
<td>630 V 600 V 600 V</td>
<td>16 A 16 A 16 A</td>
<td>UR, CSA</td>
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<tr>
<td>EPIC® H-BE 6, 10, 16, 24, 32, 48</td>
<td>Screw</td>
<td>0.5 – 2.5</td>
<td>500 V</td>
<td>600 V 16 A 16 A 16 A</td>
<td>VDE, cURus</td>
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<td>Screw</td>
<td>0.14 – 4.0</td>
<td>500 V</td>
<td>600 V 16 A 16 A 16 A</td>
<td>VDE, cURus</td>
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<tr>
<td>EPIC® H-BS 6, 12</td>
<td>Screw</td>
<td>0.5 – 6.0</td>
<td>500 V 600 V 600 V</td>
<td>35 A 35 A 35 A</td>
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<td>EPIC® H-VBE 3, 6, 10</td>
<td>Screw</td>
<td>0.5 – 2.5</td>
<td>630 V 600 V 600 V</td>
<td>16 A 16 A 16 A</td>
<td>UR, CSA</td>
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<td>EPIC® TB-H-BE 16, 24</td>
<td>Screw</td>
<td>0.5 – 4.0</td>
<td>500 V 600 V 600 V</td>
<td>16 A 16 A 16 A</td>
<td>UR, CSA</td>
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<tr>
<td>Rectangular – inserts modular</td>
<td>High voltage 1+PE, 2</td>
<td>10.0 – 25.0</td>
<td>1000 V 600 V 600 V</td>
<td>82 A 82 A 82 A</td>
<td>VDE, cURus</td>
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<tr>
<td>EPIC® POWER HC2</td>
<td>Screw</td>
<td>16</td>
<td>1000 V</td>
<td>– – 65 A</td>
<td>– – –</td>
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<tr>
<td>POWER HHC2</td>
<td>Screw</td>
<td>16.0 – 35.0</td>
<td>1000 V</td>
<td>– – 150 A</td>
<td>– – –</td>
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<tr>
<td>POWER HHC1</td>
<td>Screw</td>
<td>50.0 – 95.0</td>
<td>1000 V</td>
<td>– – 220 A</td>
<td>– – –</td>
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<td>High voltage 3-pin</td>
<td>Screw</td>
<td>1.5 – 10.0</td>
<td>1000 V</td>
<td>– – 50 A</td>
<td>– – –</td>
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<tr>
<td>High voltage 4+PE</td>
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<td>1000 V</td>
<td>– – 16 A</td>
<td>– – –</td>
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<tr>
<td>3-pin</td>
<td>Screw</td>
<td>1.5 – 10.0</td>
<td>630 V 600 V 600 V</td>
<td>40 A 40 A 35 A</td>
<td>UR, CSA</td>
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<tr>
<td>HE 4-pin</td>
<td>Screw</td>
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<td>630 V</td>
<td>– – 25 A</td>
<td>– – –</td>
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<tr>
<td>Cage clamp 4-pin</td>
<td>Screw</td>
<td>0.5 – 2.5</td>
<td>400 V</td>
<td>– – 14 A</td>
<td>– – –</td>
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<tr>
<td>5-pin</td>
<td>Screw</td>
<td>0.5 – 4.0</td>
<td>400 V 400 V 400 V</td>
<td>20 A 20 A 16 A</td>
<td>UR, CSA</td>
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<tr>
<td>10-pin</td>
<td>Screw</td>
<td>0.14 – 2.5</td>
<td>250 V 250 V 240 V</td>
<td>10 A 10 A 10 A</td>
<td>UR, CSA</td>
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<tr>
<td>10-pin stamped</td>
<td>Screw</td>
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<td>250 V</td>
<td>– – 10 A</td>
<td>– – –</td>
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<tr>
<td>20-pin</td>
<td>Screw</td>
<td>0.08 – 0.56</td>
<td>100 V 100 V 100 V</td>
<td>4 A 4 A 4 A</td>
<td>UR, CSA</td>
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<tr>
<td>Blind</td>
<td>Screw</td>
<td>– – –</td>
<td>–</td>
<td>– – –</td>
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<tr>
<td>Coaxial</td>
<td>Screw</td>
<td>–</td>
<td>–</td>
<td>250 V</td>
<td>– – –</td>
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<tr>
<td>PROFIBUS® DP</td>
<td>Screw</td>
<td>0.08 – 1.5</td>
<td>30 V</td>
<td>– – 1 A</td>
<td>– – –</td>
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<tr>
<td>Universal bus</td>
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<td>0.08 – 1.5</td>
<td>30 V</td>
<td>– – 1 A</td>
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<tr>
<td>RJ45</td>
<td>Screw</td>
<td>0.14 – 2.5/ 0.12 – 0.2</td>
<td>600 V/ 125 V</td>
<td>– – P*: 10 A S*: 3,6 A</td>
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<td>Pneumatic 1, 2-pin</td>
<td>Screw</td>
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<td>0.75 /4.0 mm</td>
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<td>Screw</td>
<td>0.75 – 1.5</td>
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<td>12 A 12 A 12 A</td>
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<td>EPIC® SIGNAL M17 8, 17</td>
<td>Screw</td>
<td>0.06 /0.06 – 1.0</td>
<td>60 V</td>
<td>– – 3,6 A</td>
<td>– – –</td>
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<td>0.5 – 2.5</td>
<td>630 V</td>
<td>– – 20 A</td>
<td>– – –</td>
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<tr>
<td>EPIC® POWER M17 5+PE, 6+PE, 7+PE</td>
<td>Screw</td>
<td>0.06 – 1.0</td>
<td>630 V</td>
<td>– – 14 A</td>
<td>– – –</td>
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<tr>
<td>EPIC® POWER M17 3+PE+5</td>
<td>Screw</td>
<td>0.06 – 1.0/ 0.06 – 0.56</td>
<td>630 V / 60 V</td>
<td>– – P*: 14 A S*: 3,6 A</td>
<td>– – –</td>
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<tr>
<td>EPIC® SIGNAL M23 6, 7</td>
<td>Screw</td>
<td>0.06 – 2.5</td>
<td>150 V 150 V 150 V</td>
<td>18 A 15 A 15 A</td>
<td>VDE, cURus</td>
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<td>EPIC® SIGNAL M23 8+1</td>
<td>Screw</td>
<td>0.06 – 2.5</td>
<td>150 V 150 V 150 V</td>
<td>P*: 20 A S*: 7,7 A</td>
<td>P*: 20 A S*: 7,7 A</td>
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<td>EPIC® SIGNAL M23 9</td>
<td>Screw</td>
<td>0.06 – 1.0</td>
<td>100 V 100 V 100 V</td>
<td>7 A 7 A 6 A</td>
<td>VDE, cURus</td>
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<td>EPIC® SIGNAL M23 12, 16</td>
<td>Screw</td>
<td>0.06 – 1.0</td>
<td>100 V 100 V 100 V</td>
<td>7 A 7 A 6 A</td>
<td>VDE, cURus</td>
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<tr>
<td>EPIC® SIGNAL M23 17</td>
<td>Screw</td>
<td>0.06 – 1.0</td>
<td>50 V 50 V 50 V</td>
<td>7 A 7 A 7 A</td>
<td>VDE, cURus</td>
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<tr>
<td>EPIC® SIGNAL R3.0</td>
<td>Screw</td>
<td>0.06 – 1.0</td>
<td>24 VAC/60 VDC</td>
<td>– – 7,5 A</td>
<td>– – –</td>
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<tr>
<td>EPIC® POWER LS1 5+PE</td>
<td>Screw</td>
<td>0.5 – 4.0</td>
<td>630 V 600 V 600 V</td>
<td>25 A 22 A 17 A</td>
<td>VDE, cURus</td>
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<tr>
<td>EPIC® POWER LS1 3+PE+4</td>
<td>Screw</td>
<td>0.5 / 0.4 – 1.0</td>
<td>630 V/250 V 600 V/250 V</td>
<td>25 A P*: 26 A 22 A S*: 7,7 A</td>
<td>P*: 26 A S*: 7,7 A</td>
</tr>
<tr>
<td>EPIC® POWER LS1.5 3+PE+2, 3+PE+4</td>
<td>Screw</td>
<td>0.75 – 10.0/ 0.14 – 4.0</td>
<td>630 V/250 V</td>
<td>– – P*: 70 A S*: 30 A</td>
<td>–</td>
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<tr>
<td>EPIC® POWER LS3 3+PE+2, 3+PE+4</td>
<td>Screw</td>
<td>0.75 – 10.0/ 0.14 – 4.0</td>
<td>630 V/250 V</td>
<td>– – P*: 150 A S*: 12 A</td>
<td>–</td>
</tr>
<tr>
<td>EPIC® POWERLOCK S</td>
<td>Screw</td>
<td>50.0 – 120.0</td>
<td>1000 V</td>
<td>– – 400 A</td>
<td>– – –</td>
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<tr>
<td>EPIC® POWERLOCK C</td>
<td>Screw</td>
<td>35.0 – 240.0</td>
<td>1000 V</td>
<td>– – 660 A</td>
<td>– – –</td>
</tr>
</tbody>
</table>

**P**: Power  **S**: Signal  **H**: In metal housing: 24 VAC/60 VDC, in plastic housing: 250 V

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

At a glance

**EPIC® rectangular connectors**
Flexible, robust connectors for mechanical engineering

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.

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

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

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EPIC® Industrial connectors
Rectangular connectors • EPIC® H-A Inserts

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

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

Info
- Small power connector for single- or three-phase current
- Easy to assemble due to straight entry of conductors
- Railway applications

Info
- Insert for three-phase current application with neutral conductor
- Easy to assemble due to straight entry of conductors
- Railway applications

### 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 strait 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 mΩ
- **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

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

**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

**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
  - Railway applications
    - UL tested for application in control cabinets according UL 508/UL 2237

- **EPIC® H-BE 6 Push-In termination**
  - Insertions 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>Parameter</th>
<th>EPIC® H-BE 6 Screw termination</th>
<th>EPIC® H-BE 6 Push-In termination</th>
</tr>
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<tbody>
<tr>
<td>Rated voltage (V)</td>
<td>IEC: 500 V UL: 600 V CSA: 600 V</td>
<td></td>
</tr>
<tr>
<td>Rated impulse voltage (kV)</td>
<td>6 kV</td>
<td></td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>EPIC® H-BE 6 Screw termination</td>
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</tr>
<tr>
<td></td>
<td>IEC: 16 A UL: 16 A CSA: 16 A</td>
<td></td>
</tr>
<tr>
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<td>EPIC® H-BE 6 Push-In termination</td>
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<tr>
<td>Pollution degree</td>
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<td></td>
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<tr>
<td>Contact resistance</td>
<td>&lt; 2 mOhm</td>
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<tr>
<td>Contacts</td>
<td>Copper alloy, hard silver-plated</td>
<td></td>
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<tr>
<td>Number of contacts</td>
<td>6 + PE</td>
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</tr>
<tr>
<td>Termination methods</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EPIC® H-BE 6 Screw termination</td>
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<tr>
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<td>Screw termination: 0.5 – 2.5 mm²</td>
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<tr>
<td></td>
<td>EPIC® H-BE 6 Push-In termination</td>
<td>Push-In termination: 0.14 – 2.5 mm²</td>
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</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

**Article number**

<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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</tr>
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</table>

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

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
- **Rated voltage (V)**
  - IEC: 500 V  UL: 600 V  CSA: 600 V
- **Rated impulse voltage**
  - 6 kV
- **Rated current (A)**
  - EPIC® H-BE 10 Screw termination
    - IEC: 16 A  UL: 16 A  CSA: 16 A
  - EPIC® H-BE 10 Push-In termination
    - IEC: 16 A  UL: 16 A  CSA: 13 A
- **Pollution degree**
  - 3
- **Contact resistance**
  - < 2 mOhm
- **Contacts**
  - Copper alloy, hard silver-plated
- **Number of contacts**
  - 10 + PE
- **Termination methods**
  - EPIC® H-BE 6 Screw termination
    - Screw termination: 0.5 – 2.5 m²
  - EPIC® H-BE 10 Push-In termination
    - Push-In termination: 0.14 – 2.5 m²
- **Stripping length (mm)**
  - EPIC® H-BE 10 Screw termination
    - 8
  - EPIC® H-BE 10 Push-In termination
    - 10
- **Cycle of mechanical operation**
  - 500
- **Certifications**
  - EPIC® H-BE 10 Screw termination
    - Certified production control: VDE-REG. no.: B437
    - UL-tested: UL File Number: E75770
  - EPIC® H-BE 10 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 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

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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
• 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

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
  Push-In termination: 0.14 – 2.5 mm²

EPIC® H-BE 16 Push-In termination
• The EPIC® H-BE series is suitable for applications that require a reliable connection when working with high voltages and currents

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

Suitable tools
EPIC® H-BE 16 Screw termination
• Kraftform™ adjustable torque screwdriver/Kraftform Kompakt® Set
• Recommended crimping tool when conductor end-sleeves are used: PEW 8.186

Table: EPIC® H-BE 16 Screw termination
<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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<tbody>
<tr>
<td>10194000</td>
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<td>10194100</td>
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For current information see: www.lappgroup.com

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

Info
• Proven screw for easy installation
• Also as EPIC® H-BE 48 available
• Railway applications

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

Info
• Push-In version – fast and easy tool free connection technology
• Also as EPIC® H-BE 48 available
• Railway applications

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
  - Fire protection on railway vehicles: Test according EN 45545-2.
  - Requirement sets R22 and R23.
  - Hazard level HL1, HL2 and HL3.
• 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
  - Fire protection on railway vehicles: Test according EN 45545-2.
  - Requirement sets R22 and R23.
  - Hazard level HL1, HL2 and HL3.
• 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)
  IEC: 16 A
  UL: 16 A
  CSA: 16 A
  IEC: 16 A
  UL: 13 A
  CSA: 13 A
- Pollution degree
  3
- Contact resistance
  < 2 mΩm
- 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
- Temperature range
  -40°C to +100°C, short-term up to +125°C
- UL tested for application in control cabinets according UL 508 / UL 2237

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 8.186

Table: EPIC® H-BE 24 Screw termination
<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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<tr>
<td>10197000</td>
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<td>5</td>
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<td>10198100</td>
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<td>1 – 24</td>
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<tr>
<td>10197100</td>
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<td>female</td>
<td>—</td>
<td>1 – 24</td>
<td>5</td>
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Table: EPIC® H-BE 24 Push-In termination
<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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<td>44423207</td>
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<td>Female</td>
<td>yes</td>
<td>1 – 24</td>
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</table>

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

**Rectangular connectors - EPIC® H-BS Inserts**

### EPIC® H-BS 6

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

**Info**
- Standard insert for currents up to 35 A
- Railway applications

### EPIC® H-BS 12

Inserts for high currents.

**Suitable housing**

**EPIC® H-BS 12**
- EPIC® ULTRA H-B 32 Housing

**Benefits**

**EPIC® H-BS 6**
- High rating for currents up to 35 A
- Screw terminal up to a conductor cross section of 6 mm²
- Railway applications
**EPIC® H-BS 12**
- High rating for currents up to 35 A
- Screw terminal 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

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**Appendix**

For current information see: www.lappgroup.com

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**Article number** | **Article description** | **Contact type** | **Wire protection** | **Number of operating contacts** | **Pieces / PU**
--- | --- | --- | --- | --- | ---
H-BS 6 Screw termination

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<td>10170100</td>
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</table>

**H-BS 12 Screw termination**

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</thead>
<tbody>
<tr>
<td>10170400</td>
<td>male</td>
<td>yes</td>
</tr>
<tr>
<td>10171600</td>
<td>female</td>
<td>yes</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 2
High flexibility by the use of any combination of inserts in one connector

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

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

Info
- Modular connector system, pluggable with the market standard
- Power module 3pole 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

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

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

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

Technical data
- Rated voltage (V)
  EPIC® MH 2: 1000 V
  EPIC® MH 3: 400 V (conductor – ground)
  690 V (conductor – conductor)
- Rated impulse voltage: 8 kV
- Rated current (A)
  EPIC® MH 2: 100 A
  EPIC® MH 3: 40 A
- Pollution degree: 3
- Flammability: UL94 V-0
- Contact resistance: < 5 mOhm
- Number of contacts
  EPIC® MH 2: 2
  EPIC® MH 3: 3
- Termination methods
  EPIC® MH 2: Crimp termination: 10 – 35 mm²
  EPIC® MH 3: Crimp termination: 1.5 – 10 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

Article number | Article description | Contact type | Number of operating contacts | Slots | Pieces / PU
--- | --- | --- | --- | --- | ---
44423212 | EPIC® MHS 2 CM male | 2 | 2 | 10
44423213 | EPIC® MHB 2 CM female | 2 | 2 | 10
44423214 | EPIC® MHS 3 CM male | 3 | 1 | 10
44423215 | EPIC® MHB 3 CM female | 3 | 1 | 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® 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 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 3 + 4
  - Hybridmodul 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**
- **Rated voltage (V)**
  - 830 V
- **Rated impulse voltage**
  - 8 kV
- **Rated current (A)**
  - EPIC® MH 3+4
    - 40 A
    - 10 A
  - EPIC® MH 4
    - 40 A
- **Pollution degree**
  - 3
- **Flammability**
  - UL94 V-0
- **Number of contacts**
  - EPIC® MH 3+4
    - 3 + 4
  - EPIC® MH 4
    - 4

**Termination methods**
- 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

<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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<td>EPIC® MH 4</td>
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<td>1</td>
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</table>

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

Info
• 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

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

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 6
• Module 6 pole for control signals
EPIC® MH 8
• Module 8 pole for control signals

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

Technical data

<table>
<thead>
<tr>
<th></th>
<th>EPIC® MH 6</th>
<th>EPIC® MH 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage (V)</td>
<td>500 V</td>
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</tr>
<tr>
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<td>Rated current (A)</td>
<td>16 A</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>
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<tr>
<td>Contact resistance</td>
<td>&lt; 5 mOhm</td>
<td></td>
</tr>
<tr>
<td>Number of contacts</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

Termination methods
• Crimp termination: 0.14 – 4 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

Article number | Article description | Contact type | Number of operating contacts | Slots | Pieces / PU |
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tr>
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<tr>
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<td>EPIC® MH 8</td>
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<td>44423220</td>
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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 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
• 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 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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<tbody>
<tr>
<td>Rated voltage (V)</td>
<td>EPIC® MH 12: 250 V, EPIC® MH 17: 160 V</td>
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<tr>
<td>Rated impulse voltage (kV)</td>
<td>4 kV</td>
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<td>Rated current (A)</td>
<td>10 A</td>
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<tr>
<td>Pollution degree</td>
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<tr>
<td>Flammability</td>
<td>UL94 V-0</td>
</tr>
<tr>
<td>Contact resistance</td>
<td>&lt; 5 mOhm</td>
</tr>
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</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

Table:

<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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<td>44423223</td>
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<tr>
<td>44423224</td>
<td>EPIC® MHS 17 CM</td>
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</table>

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

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>Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>Rated voltage (V)</td>
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<td>EPIC® MH 20</td>
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<tr>
<td>EPIC® MH 36</td>
<td>250 V</td>
</tr>
<tr>
<td>Rated impulse voltage EPIC® MH 20</td>
<td>6 kV</td>
</tr>
<tr>
<td></td>
<td>EPIC® MH 36</td>
</tr>
<tr>
<td>Rated current (A)</td>
<td></td>
</tr>
<tr>
<td>EPIC® MH 20</td>
<td>16 A</td>
</tr>
<tr>
<td></td>
<td>EPIC® MH 36</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>3</td>
</tr>
<tr>
<td>Flammability</td>
<td>UL94 V-0</td>
</tr>
<tr>
<td>Contact resistance</td>
<td>&lt; 5 mOhm</td>
</tr>
</tbody>
</table>

Number of contacts
• EPIC® MH 20
  - 20
• EPIC® MH 36
  - 36

Termination methods
• EPIC® MH 20
  - Crimp termination: 0.14 – 4 mm²
• EPIC® MH 36
  - 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 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

| Rated voltage (V) | 50 V |
| Rated impulse voltage | 0.8 kV |
| Rated current (A) | 5 A |
| Flammability | UL94 V-0 |
| Number of contacts | 8 |

Termination methods
- Crimp termination: AWG 20 – 28

Material
- PA Polyamid
- Zinc die-cast

Cycle of mechanical operation
- 500

Temperature range
- -40°C to +125°C

Table:

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

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

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

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 1.6 mm
• EPIC® MH Coax 2.5 mm
• EPIC® MH Potential set

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

Technical data
- Rated voltage (V) 50 V
- Rated impulse voltage 0.8 kV
- Rated current (A) 10 A
- Pollution degree 3
- Flammability UL94 V-0
- EPIC® MH Bus PIN 1 x (4) contact holder 4

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 modul 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

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

Article number | Article description | Contact type | Number of operating contacts | Slots | Pieces / PU
--- | --- | --- | --- | --- | ---
EPIC® MH BUS | EPIC® MHS Bus male | 2 | 2 | 10
| EPIC® MHB Bus female | 2 | 2 | 10
EPIC® MH BUS 1x(4) Kontaktträger | EPIC® MHS Bus PIN 1 x (4) CM male | 4 + shield | – | 10
| EPIC® MHB Bus PIN 1 x (4) CM female | 4 + shield | – | 10

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

**Technical data**

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

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---

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
  - 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

**Technical data**

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article description</th>
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<th>Pieces / PU</th>
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<tbody>
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<td>44423233</td>
<td>EPIC® MH 0 Z</td>
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EPIC® Industrial connectors

Rectangular connectors • EPIC® MH Modular System contacts and accessories

NEW

EPIC® MH 8.0 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
• Robot-building
• Plant engineering
• Renewable energy
• Railway applications/vehicle construction

Technical data

<table>
<thead>
<tr>
<th>Contact resistance</th>
<th>Stripping length (mm)</th>
<th>Termination methods</th>
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<tr>
<td>&lt; 5 mOhm</td>
<td>18</td>
<td>Crimp termination: 10 ... 35 mm²</td>
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<tr>
<td>Cycle of mechanical operation</td>
<td>500</td>
<td></td>
</tr>
</tbody>
</table>

Suitable tools
• EPIC® TOOL DIE 8.0mm
• For use in battery hydraulic crimping tool Klaue type EK 120/42-L

EPIC® TOOL DIE 8.0 mm
High flexibility by the use of any combination of inserts in one connector

Suitable Contacts
EPIC® TOOL DIE 8.0 mm
• EPIC® MH 8.0 mm Contacts

Benefits
• Tool for removing the 8.0 mm contacts from the EPIC® MH modules

EPIC® MH contact removal tool 8.0 mm
High flexibility by the use of any combination of inserts in one connector

Suitable tools
EPIC® TOOL DIE 8.0 mm
• For use in battery hydraulic crimping tool Klaue type EK 120/42-L

EPIC® MH contact removal tool 8.0 mm
High flexibility by the use of any combination of inserts in one connector

Technical data

<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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<tbody>
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<td>EPIC® MH BCEM AG 16mm² D=8.0</td>
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<td>16</td>
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<td>female</td>
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</table>

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EPIC® Industrial connectors

Rectangular connectors • EPIC® MH Modular System contacts and accessories

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

APPENDIX

For current information see: www.lappgroup.com

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>
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<tbody>
<tr>
<td>&lt; 5 mOhm</td>
<td>10</td>
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</table>

Termination methods

Crimp termination: 1.5 – 10 mm²

Cycle of mechanical operation

500

Technical data

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

Termination methods

Crimp termination: 1.5 – 10 mm²

Cycle of mechanical operation

500

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

Table:

<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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<tbody>
<tr>
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<td>100</td>
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<tr>
<td>44423255</td>
<td>EPIC® MH BCEM AG 1.5sqmm D=4.0</td>
<td>female</td>
<td>1.5</td>
<td>100</td>
</tr>
<tr>
<td>44423251</td>
<td>EPIC® MH SCEM AG 2.5sqmm D=4.0</td>
<td>male</td>
<td>2.5</td>
<td>100</td>
</tr>
<tr>
<td>44423256</td>
<td>EPIC® MH BCEM AG 2.5sqmm D=4.0</td>
<td>female</td>
<td>2.5</td>
<td>100</td>
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<tr>
<td>44423252</td>
<td>EPIC® MH SCEM AG 4sqmm D=4.0</td>
<td>male</td>
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<td>EPIC® MH SCEM AG 6sqmm D=4.0</td>
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<td>44423258</td>
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<td>EPIC® MH SCEM AG 10sqmm D=4.0</td>
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<td>44423259</td>
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</table>

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

EPIC® Tools for contacts MH 4.0 mm machined

For inserts and modules of the EPIC® rectangular connectors

Product features

• Locator and crimping dies fit together with the crimping tool 11147000 and the crimping machine 11147001

Table:

<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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<tbody>
<tr>
<td>11147000</td>
<td>Crimping tool</td>
<td>without crimping dies, without locator</td>
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<td>In tool case</td>
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<td>Crimping machine</td>
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<td>Crimping dies</td>
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<td>0.14 – 4</td>
<td>For contacts: H-D 1.6 machined, H-BE 2.5 machined, MG 2.5 machined, MH 4.0</td>
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<td>Crimping dies</td>
<td>For crimping tools: 11147000, 11147001</td>
<td>4 – 10</td>
<td>For contacts: MH 4.0</td>
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<td>Locator</td>
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<td>For contacts: MH 4.0</td>
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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>
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<tr>
<th>Stripping length (mm)</th>
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<th>Cycle of mechanical operation</th>
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Material

- brass gold plated CuZn/Au

Technical data

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<tr>
<th>Article number</th>
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</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 frame

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

![EPIC® MH 6 multi frame](image)

Info
- Modular connector system, pluggable 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

![EPIC® MH 10 multi frame](image)

Info
- Modular connector system, pluggable 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

![EPIC® MH 16 multi frame](image)

Info
- Modular connector system, pluggable 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

![EPIC® MH 24 multi frame](image)

Info
- Modular connector system, pluggable with the market standard
- Frame system for modules

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

![EPIC® MH Clip](image)

Info
- Modular connector system, pluggable 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
- EPIC® MH 10 multi frame
- EPIC® MH 16 multi frame
- EPIC® MH 24 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
- 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>
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<tbody>
<tr>
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</table>

**Applicaton range**

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

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

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article designation / size</th>
<th>Clamping range ∅F (mm)</th>
<th>SW wrench size (mm)</th>
<th>Overall length. C (mm)</th>
<th>Thread length. D (mm)</th>
<th>Pieces / PU</th>
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For current information see: www.lappgroup.com
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**

<table>
<thead>
<tr>
<th>Colour delivered</th>
<th>Light grey (RAL 7035)</th>
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<tr>
<td>Material</td>
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<td>Temperature range</td>
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**Article number**

<table>
<thead>
<tr>
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**Article number**

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</table>

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

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

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article designation / size</th>
<th>Clamping range ∅F (mm)</th>
<th>SW wrench size (mm)</th>
<th>Overall length, C (mm)</th>
<th>Thread length, D (mm)</th>
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</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
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 polyamide 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

Article number | Article designation / size | Clamping range (mm) | Minimum Ø above braiding (mm) | SW wrench size (mm) | Overall length, C (mm) | Thread length, D (mm) | Pieces / PU
--- | --- | --- | --- | --- | --- | --- | ---
53112530 | M 12 × 1.5 | 3.5 – 7 | 1 | 16 | 26.5 | 6.5 | 50
53112531 | M 16 × 1.5 | 4.5 – 10 | 4 | 20 | 33 | 7 | 50
53112532 | M 20 × 1.5 | 7 – 13 | 5 | 24 | 37 | 8.5 | 25
53112533 | M 25 × 1.5 | 9 – 17 | 7.5 | 29 | 38.5 | 8 | 25
53112534 | M 32 × 1.5 | 11 – 21 | 9 | 36 | 45.5 | 9 | 25
53112535 | M 40 × 1.5 | 19 – 28 | 15 | 45 | 48 | 10 | 10
53112536 | M 50 × 1.5 | 27 – 35 | 21 | 54 | 55.5 | 10 | 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 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

| Caution | Refer to Appendix T21 for the installation dimensions and torques |
| Material | Body: nickle plated brass Insert: halogen-free polyamide acc. to UL 94 V0 EMC-brush: brass wire 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 |

<table>
<thead>
<tr>
<th>Article number</th>
<th>Article designation / size</th>
<th>Clamping range F (mm)</th>
<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.
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

Note
- Refer to SKINTOP® metric accessories for suitable accessories

Technical data

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</tbody>
</table>

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

**SKINTOP® MULTI**

**Info**

- Compact multi cable bushing system with innovative gel technology

**Benefits**

- Large clamping range of 4 mm and AS-I 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

**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

**Product Make-up**

- For cut-outs for 24-pin industrial connectors (36 × 112 mm)
- SKINTOP® MULTI including mounting material

**Technical data**

<table>
<thead>
<tr>
<th>Certifications</th>
<th>UL File No. E349737</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire behaviour</td>
<td>acc. to UL94 V-2</td>
</tr>
</tbody>
</table>

**Material**

- Frame: Polycarbonat
- Sealing: Gel

**Protection rating**

- IP 68
- Temperature range
  - -30°C to +110°C

**Article number**

<table>
<thead>
<tr>
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<th>Max. number of executions</th>
<th>Number of cables × clamping range</th>
<th>Pieces / PU</th>
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<td>8 × 8 – 12 mm, 2 × 12 – 16 mm, 1 × 16 – 20 mm</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
Cable glands
SKINTOP® cable bushing systems • EMC

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>
<thead>
<tr>
<th>Article number</th>
<th>Dimension overall (mm)</th>
<th>Bushing section (mm)</th>
<th>Bore (mm)</th>
<th>PU</th>
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<td>60 – 140</td>
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</table>

Material
• Frame: Aluminium
• EMC brush: brass

Temperature range
• -30°C to +110°C

Info
• EMC Kit with brush technology suitable for the SKINTOP® multi cable bushing systems for the 24 pin cut-outs

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

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

Certifications
Metric thread acc. to EN 60423

Note
Membrane: Acryl – CoPolymere

Colour delivered
Light grey (RAL 7035)
Black/UV-resistant (RAL 9005)

Material
Polyamide 6 – Standard version / UL 94 V2
Polyamide 66 – UL Version / UL 94 V0
Flat sealing NBR – Standard version
O-ring NBR – UL version

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

Temperature range
-20°C to +100°C

Article number | Article designation / size | Overall length, C (mm) | Thread length, D (mm) | Pieces / PU
---|---|---|---|---
51730200 | SKINDICHT® VENT 12 × 1.5 BK | 17.3 | 10 | 25
51730202 | SKINDICHT® VENT 12 × 1.5 LGY | 17.3 | 10 | 25
51730201 | SKINDICHT® VENT 12 × 1.5 BK plus | 17.3 | 10 | 25
51730203 | SKINDICHT® VENT 12 × 1.5 LGY plus | 17.3 | 10 | 25

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For current information see: www.lappgroup.com
Cable glands
SKINDICHT® metric cable gland accessories • Pressure compensation

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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<tr>
<th>Article number</th>
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</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
## 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
- Silicone-free.
- Halogen-free.
- Fire behaviour according to UL 94V-0.

### Temperature range
- -45°C to +120°C.

## Article number | Nominal size | ID × OD (mm) | Bending radius | Suitable for FIPLOCK® ONE M | Colour | PU ring (m)
---|---|---|---|---|---|---
61803908 | 7 | 6.2 × 10 | 15 | 12 × 1.5 | black | 50
61803909 | 10 | 9.6 × 12.8 | 20 | 12 × 1.5 | black | 50
61803910 | 12 | 12 × 15.7 | 30 | 16 × 1.5 | black | 50
61803911 | 17 | 16.1 × 21.1 | 35 | 20 × 1.5 | black | 50
61803912 | 23 | 22.7 × 28.4 | 40 | 25 × 1.5 | black | 50
61803913 | 29 | 28.3 × 34.5 | 50 | 32 × 1.5 | black | 50
61803914 | 36 | 35.8 × 42.2 | 55 | 40 × 1.5 | black | 25
61803915 | 48 | 46.7 × 53.8 | 65 | 50 × 1.5 | black | 25
61803916 | 56 | 56.3 × 67.2 | 100 | – | black | 25
61803917 | 70 | 67.2 × 79.6 | 130 | – | black | 25
61803918 | 95 | 91.3 × 106 | 170 | – | black | 10
61803919 | 125 | 126.5 × 146.5 | 280 | – | black | 10
61803920 | 7 | 6.2 × 10 | 15 | 12 × 1.5 | grey | 50
61803921 | 10 | 9.6 × 12.8 | 20 | 12 × 1.5 | grey | 50
61803922 | 12 | 12 × 15.7 | 30 | 16 × 1.5 | grey | 50
61803923 | 17 | 16.1 × 21.1 | 35 | 20 × 1.5 | grey | 50
61803924 | 23 | 22.7 × 28.4 | 40 | 25 × 1.5 | grey | 50
61803925 | 29 | 28.3 × 34.5 | 50 | 32 × 1.5 | grey | 50
61803926 | 36 | 35.8 × 42.2 | 55 | 40 × 1.5 | grey | 25
61803927 | 48 | 46.7 × 53.8 | 65 | 50 × 1.5 | grey | 25
61803928 | 56 | 56.3 × 67.2 | 100 | – | grey | 25
61803929 | 70 | 67.2 × 79.6 | 130 | – | grey | 25
61803930 | 95 | 91.3 × 106 | 170 | – | grey | 10
61803931 | 125 | 126.5 × 146.5 | 280 | – | grey | 10
61803932 | 17 | 16.1 × 21.1 | 35 | 20 × 1.5 | black | 50
61803933 | 23 | 22.7 × 28.4 | 45 | 25 × 1.5 | black | 50
61803934 | 29 | 28.3 × 34.7 | 55 | 32 × 1.5 | black | 50
61803935 | 36 | 35.8 × 42.3 | 60 | 40 × 1.5 | black | 25
61803936 | 48 | 46.7 × 53.8 | 70 | 50 × 1.5 | black | 25
61803937 | 56 | 56.3 × 67.2 | 100 | – | black | 25
61803938 | 70 | 67.2 × 79.6 | 130 | – | black | 25
61803939 | 95 | 91.3 × 106 | 170 | – | black | 25
61803941 | 125 | 126.5 × 146.5 | 280 | – | black | 25
61803940 | 17 | 16.1 × 21.1 | 35 | 20 × 1.5 | black | 50
61803941 | 23 | 22.7 × 28.4 | 45 | 25 × 1.5 | black | 50
61803942 | 29 | 28.3 × 34.7 | 55 | 32 × 1.5 | black | 50
61803943 | 36 | 35.8 × 42.3 | 60 | 40 × 1.5 | black | 25
61803944 | 48 | 46.7 × 53.8 | 70 | 50 × 1.5 | black | 25
61803945 | 56 | 56.3 × 67.2 | 100 | – | black | 25
61803946 | 70 | 67.2 × 79.6 | 130 | – | black | 25
61803947 | 95 | 91.3 × 106 | 170 | – | black | 25
61803948 | 125 | 126.5 × 146.5 | 280 | – | black | 25
61803949 | 17 | 16.1 × 21.1 | 35 | 20 × 1.5 | black | 50
61803950 | 23 | 22.7 × 28.4 | 45 | 25 × 1.5 | black | 50
61803951 | 29 | 28.3 × 34.7 | 55 | 32 × 1.5 | black | 50
61803952 | 36 | 35.8 × 42.3 | 60 | 40 × 1.5 | black | 25
61803953 | 48 | 46.7 × 53.8 | 70 | 50 × 1.5 | black | 25
61803954 | 56 | 56.3 × 67.2 | 100 | – | black | 25
61803955 | 70 | 67.2 × 79.6 | 130 | – | black | 25
61803956 | 95 | 91.3 × 106 | 170 | – | black | 25
61803957 | 125 | 126.5 × 146.5 | 280 | – | black | 25

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
Certifications
IEC 61386-23
EN 45545-2 HL3

Colour delivered
Black (RAL 9005), UV-resistant

Material
PA 12
Silicone-free
Halogen-free
Fire behaviour according to UL 94V-0

Temperature range
-45°C to +105°C

Table: FIPLOCK® ONE M

<table>
<thead>
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<th>Article number</th>
<th>Nominal size</th>
<th>ID x OD (mm)</th>
<th>Bending radius (mm)</th>
<th>Suitable for FIPLOCK® ONE M</th>
<th>Colour</th>
<th>PU ring (m)</th>
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HPDF - Heavy duty version (closed)

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ZPDF - Divisible version

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For current information see: www.lappgroup.com

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

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

For current information see: www.lappgroup.com
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

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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

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

SILVYN® HFX-V0
64400248 5/16" 10.1 × 14.4 65 16 × 1.5/20 × 1.5 – 30
64400241 3/8" 12.6 × 17.8 85 16 × 1.5/20 × 1.5 – 30
64400253 1/2" 16 × 21.1 110 20 × 1.5 – 30
64400242 3/4" 21 × 26.4 140 25 × 1.5 – 30
64400243 1" 26.5 × 33.1 170 32 × 1.5 – 30
64400244 1 1/4" 35.1 × 41.8 215 40 × 1.5 – 15
64400245 1 1/2" 40.3 × 47.8 250 50 × 1.5 – 15
64400246 2" 51.6 × 59.9 300 63 × 1.5 – 15

SILVYN® FCE-V0
61814708 12 10 × 14 50 – 12 × 1.5 25
61814709 16 13 × 17 60 – 16 × 1.5/20 × 1.5 25
61814710 20 17 × 21.5 80 – 20 × 1.5 25
61814711 25 21.2 × 26 100 – 25 × 1.5 25
61814712 32 28.1 × 34 125 – 32 × 1.5 25
61814713 40 37.7 × 44.5 160 – 40 × 1.5 10
61814714 50 48.4 × 55.5 190 – 50 × 1.5 10

* Trade product, no Lapp product
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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**

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**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

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* Trade product, no Lapp product

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

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

Info
• Space-saving due to compact dimensions

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 | Pieces / PU |
--- | --- | --- | --- |
SILVYN® COMPACT M |  | SILVYN® HTDL/EF/OR/HFX/HCX/HFX |
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

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SILVYN® COMPACT 90° M

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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

**Bene**fits
- High mechanical stability
- High tensile strength
- Space-saving application
- Corrosion-resistant

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

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

**Technical data**

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### Protective Cable Conduit Systems and Cable Carrier Systems

**Protective cable conduit systems for special applications** • **Heat protection**

#### 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

**SILVYN® HIPROSILTAPE**

- Silicone-rubber compound, self-vulcanising, halogen-free

#### Technical data

**Certifications**

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**Protection rating**

- SILVYN® HIPROJACKET
  - IP 54 in combination with SILVYN® HIPROJACKET AMG fitting
  - IP 67 if SILVYN® HIPROSILTAPE is also used

**Temperature range**

- -55°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**

- -55°C to +260 °C permanent temp.

#### Article number | Nominal size | ID × OD (mm) | Suitable gland size | PU ring (m)
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**SILVYN® HIPROSILTAPE**

- 61713040
- 25
- 25 × 0.5
- — | 11

* Trade product, no Lapp product

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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

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 64
IP 67 if SILVYN® HIPROSILTAPE is also used

Temperature range
-45°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.
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)

Suitable tools
- STEEL GUN HT-338 cable tie pliers

Technical data
- 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
- 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

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

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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).
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: 3:1
  - Not halogen-free version: 2:1
- **Temperature range**
  - Halogen-free version: -30°C to +105°C
  - Not halogen-free Version: -30°C to +105°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
- Not halogen-free version: UL 224 certified

### Norm references / Approvals
- UL 249 certified

### Included
- Delivered as a roll of labels

### 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**

### Info

- All symbols according to ISO 7010

### 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

- 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
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  - FLEXIMARK® Mandatory signs: blue
- Material
  - Laminated polyester (halogen-free)
- Temperature range
  - -40°C to +150°C
  - Processing: min. +10°C

### FLEXIMARK® Warning signs

<table>
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<tr>
<th>Picture</th>
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<th>Description</th>
<th>Side length / diameter</th>
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<td><img src="image1.png" alt="FLEXIMARK® W001" /></td>
<td>FLEXIMARK® W001</td>
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<td>83880016 83880017 83880018</td>
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<tr>
<td><img src="image2.png" alt="FLEXIMARK® W002" /></td>
<td>FLEXIMARK® W002</td>
<td>Warning; explosive material</td>
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<td><img src="image3.png" alt="FLEXIMARK® W012" /></td>
<td>FLEXIMARK® W012</td>
<td>Warning; Electricity</td>
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<td><img src="image4.png" alt="FLEXIMARK® W017" /></td>
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<td>Warning; Hot surface</td>
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<td><img src="image5.png" alt="FLEXIMARK® W021" /></td>
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### FLEXIMARK® Prohibition signs

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<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="FLEXIMARK® P007" /></td>
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<td>No access for people with active implanted cardiac devices</td>
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<td><img src="image10.png" alt="FLEXIMARK® P024" /></td>
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<td>Do not walk or stand here</td>
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<td><img src="image11.png" alt="FLEXIMARK® P031" /></td>
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<td>Do not alter the state of the switch</td>
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### FLEXIMARK® Mandatory signs

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<td>Wear protective gloves</td>
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**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

**Article numbers and specifications**

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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

**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

**Technical data**

- Colour delivered: Natural colour
- Material: Polyamide 6.6
- Halogen-free and silicone-free
- Temperature range: -40°C to +85°C

**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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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, however, considerable danger to persons and the environment may arise. For this reason, our cables must only be processed and/or used reasonably 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.

The following applies for the use of our products

The conformity of our products to the relevant European directives and compliance with the provisions contained therein shall be indicated by the CE marking. 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/cams.

Safety

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, however, considerable danger to persons and the environment may arise. For this reason, our cables must only be processed and/or used reasonably 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!

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