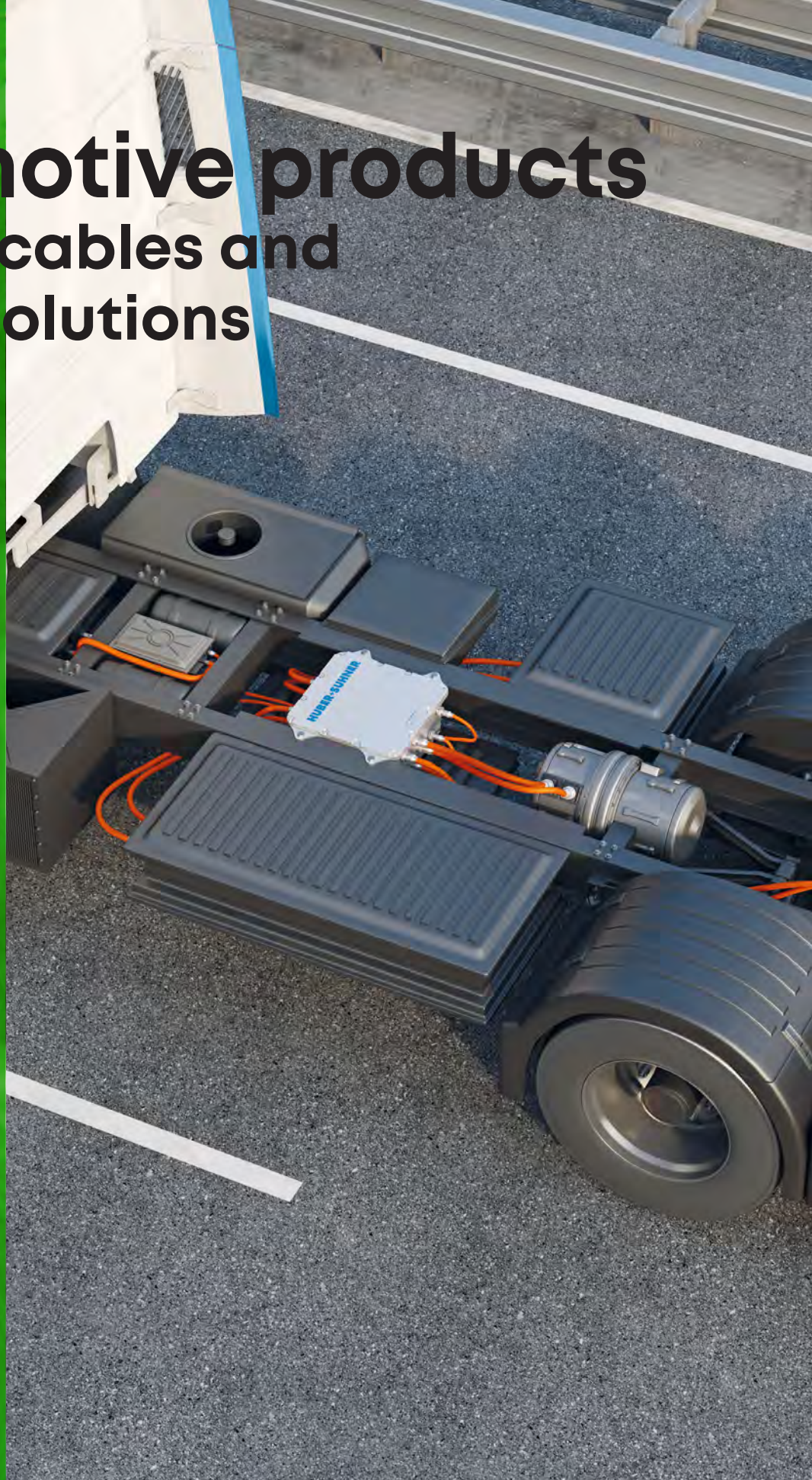


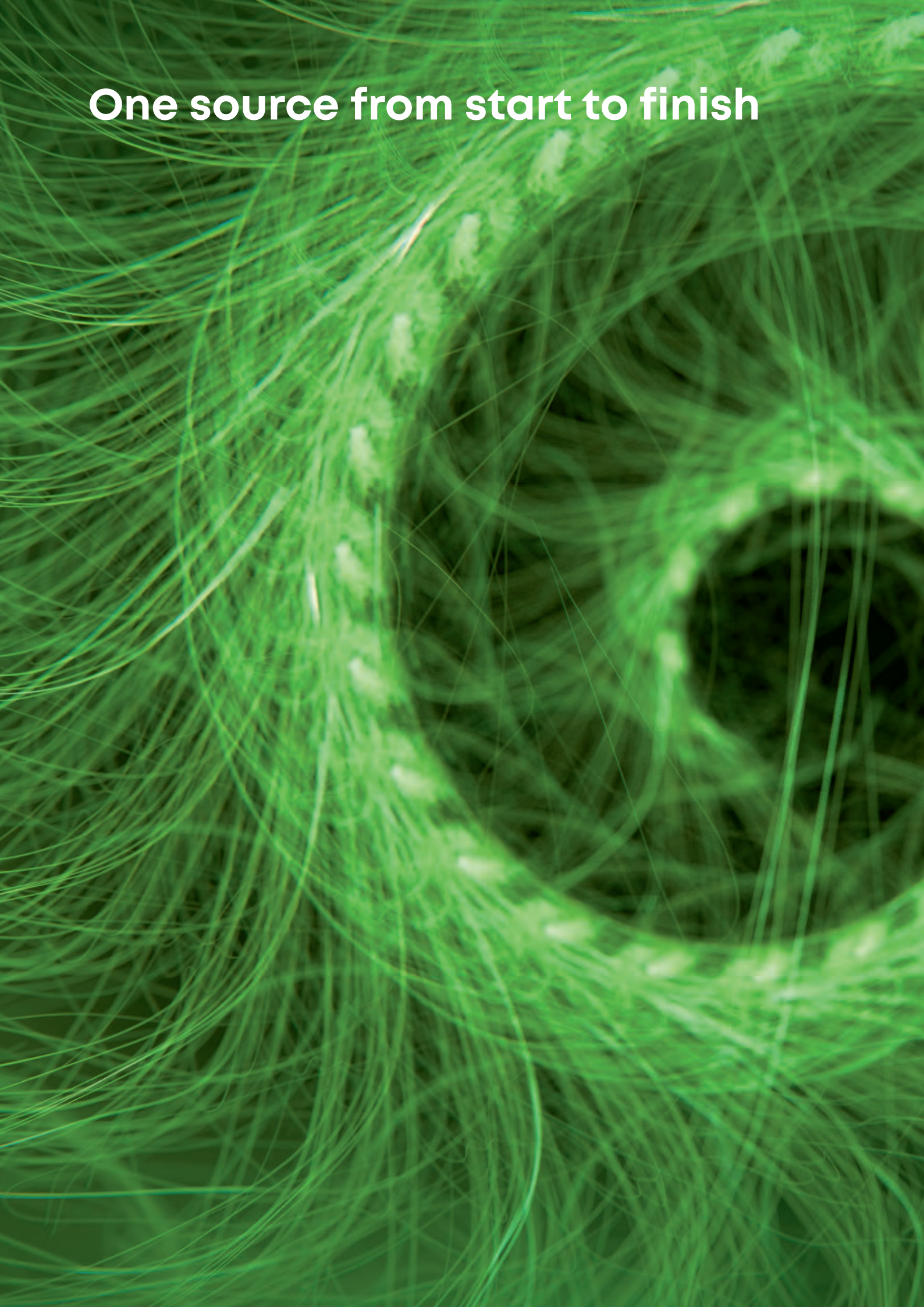
Automotive products

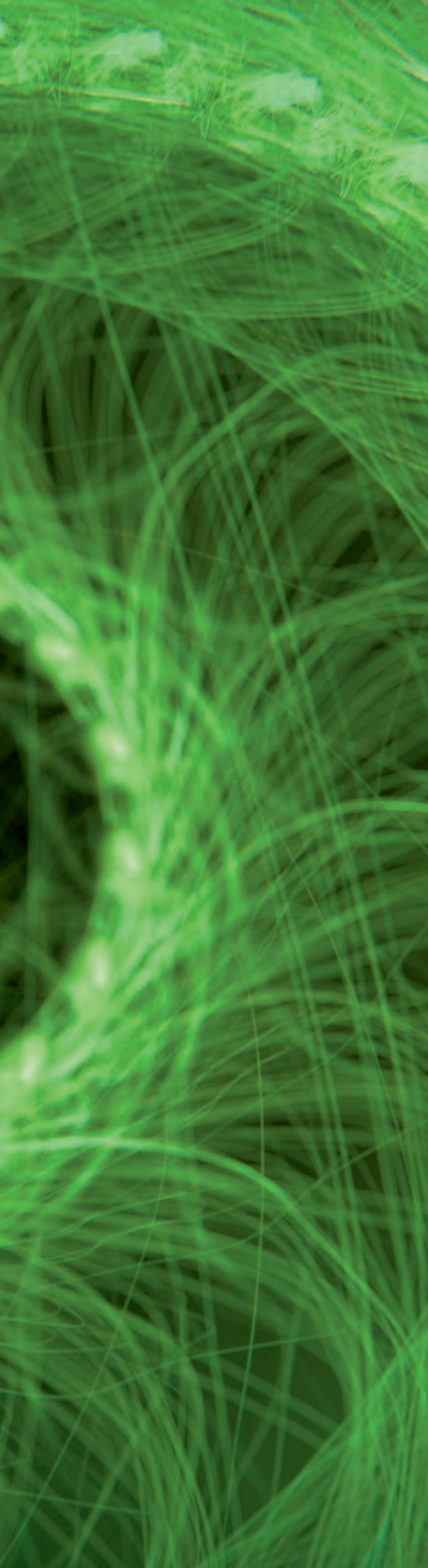
RADOX® cables and system solutions

Edition 2023/05



One source from start to finish



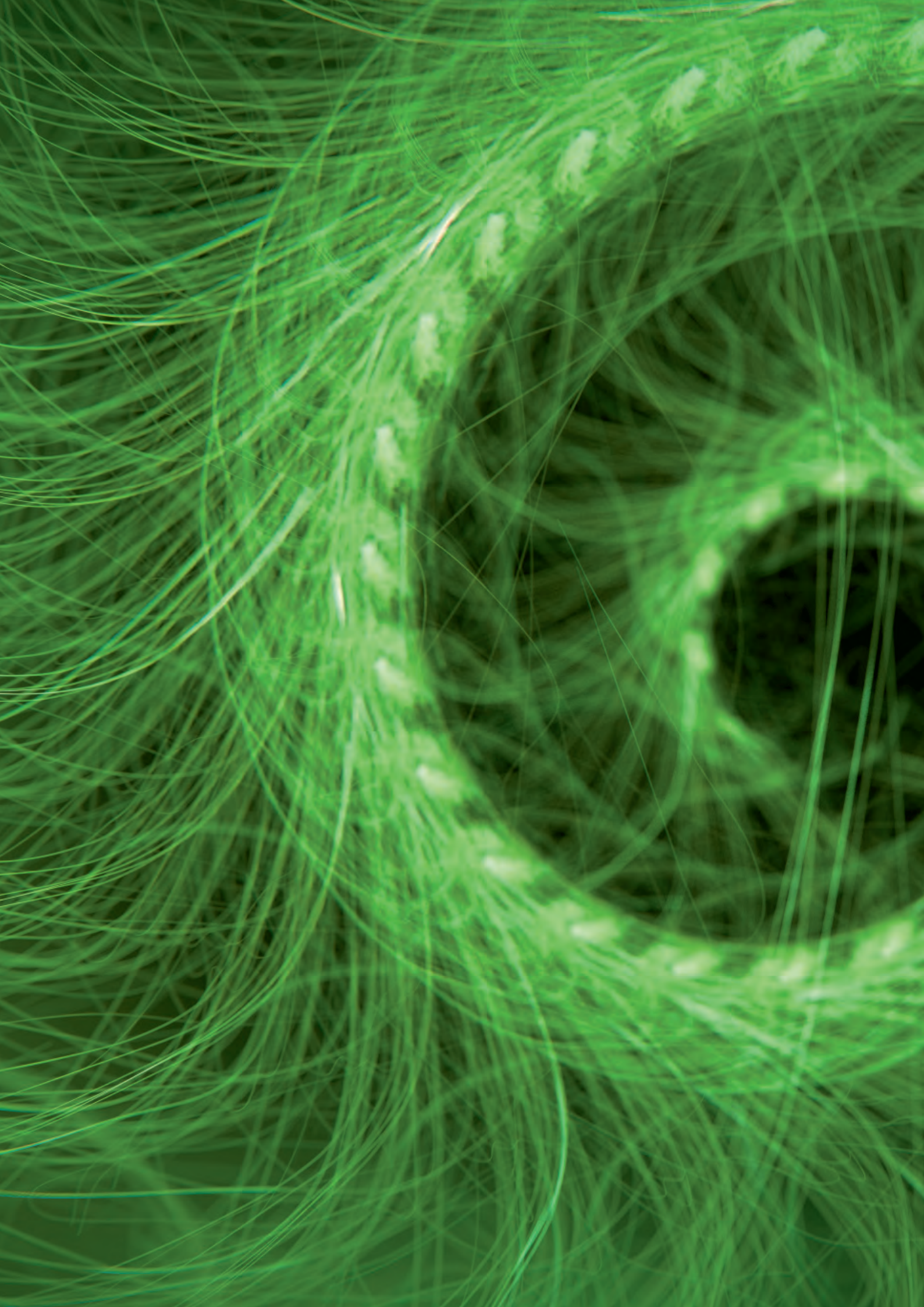


Innovation to achieve the goal

HUBER+SUHNER is a global company with headquarters in Switzerland which develops and manufactures components and system solutions for electrical and optical connectivity. With cables, connectors and systems – developed from the three core technologies of radio frequency, fiber optics and low frequency – the company serves customers in the communication, transportation and industrial sectors.

Increasing engine efficiency, lower power consumption and smaller space restrictions gave rise to higher temperature in the engine compartment. Temperatures of -70 to $+200$ °C (3000 h) are commonplace. The wiring is exposed to various fluids, such as diesel, oils, battery acids, salt water, cleaning agents and humidity in everyday service. HUBER+SUHNER offers the innovative solution for these special requirements: With the well-known RADOX® cables such as single core cables, battery cables and databus cables.

All our products fully comply with the European Directive 2002/95/EC (RoHS).





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RADOX[®] automotive single core cables



Low voltage cable for road vehicles, class D and F according to ISO 6722 and ISO 19642, temperature rating -40 to +150 °C/200 °C

A growing demand of sensors, higher operating temperatures and restricted space are typical in today's motor compartments. These cables have been developed with these specific requirements in mind.

These cables are class D temperature range cables with reduced outer diameter. They have superb resistance to motor oils, fluids and hydrolysis. Thanks to their electron beam cross-linked RADOX insulation, these cables have excellent resistance to extremes of temperature and abrasion even with reduced outer diameter. Furthermore these RADOX cables have outstanding electrical characteristics.

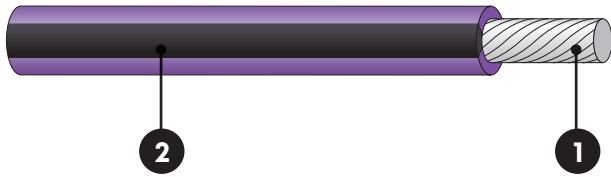
The characteristics of these RADOX cables make them ideal for use in a wide range of applications, where space is at a premium and where cables are subjected to high temperatures. Even high humidity levels and motor vehicle fluids do not negatively affect the lifetime of the cables.

General features

- Operating temperature range -55 to +200 °C
- Reduced outer diameter
- Resistant to motor fluids, fuels
- Hydrolysis resistant
- Resistant to pressure at high temperatures
- High abrasion resistance
- Excellent electrical characteristics

| | |
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RADOX® 155S FLR (FLR91X and FHLR91X)



| | |
|----------------------|---------------------------|
| Number of conductors | 1 |
| Cross section | 0.35 to 6 mm ² |
| Voltage rating | 60/1500 V DC |
| Temperature range | -55 to +150 °C (3000 h) |
| Min. bending radius | 3 × cable dia. |

Composition of cable

1. Conductor stranded tinned or bare copper
2. Insulation RADOX 155S, extruded irradiation cross-linked polyolefin, various colours

Characteristics and specialities

- High and low temperature resistance
- Ozone and weathering resistance
- Resistant to pressure at high temperature
- Resistant to motor oils, fuels and hydrolysis
- Flame retardant
- High abrasion resistance
- Easy to strip and process

Application

Low voltage cable for use in road vehicle applications, such as motor wiring, fan motor or sensor applications.

Standards

| Conductor | General |
|----------------------------------|--|
| ISO 6722, ISO 19642-3 and -5 | ISO 6722, ISO 19642-3 and -5, class D, thin-wall |
| DIN EN 13602, Cu-ETPI-A (CW003A) | |

Customer approvals

- GMW 15626
- VW 60306-1
- Ford ES-AU5T-1A348-AA
- BMW GS 95007
- FCA MS.90034
- JLR TPJLR.18.007
- Scania TB1914
- Volvo STD 525-001
- Bosch N34A AE011D S007

For further technical details please refer to our data sheet STD 548776.

RADOX® 155S FLR (FLR91X and FHLR91X)

Extract from our delivery programme

Dimensions according to ISO 6722-1/ISO 19642, structure A

| Cross section | Conductor | | | | | Core | |
|---------------|-------------------------|----------------------------|--------------------------------------|------------------|-------------------------------|------|------------------------|
| | Nominal mm ² | Number of individual wires | Diameter of individual wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | | Wall thickness min. mm |
| tinned | | | | | bare | | |
| 0.35 | 7 | 0.26 | 0.8 | 55.5 | 54.4 | 0.20 | 1.25 ± 0.05 |
| 0.5 | 19 | 0.19 | 1.0 | 38.2 | 37.1 | 0.22 | 1.5 ± 0.1 |
| 0.75 | 19 | 0.23 | 1.2 | 25.4 | 24.7 | 0.24 | 1.8 ± 0.1 |
| 1 | 19 | 0.26 | 1.3 | 19.1 | 18.5 | 0.24 | 2.0 ± 0.1 |
| 1.5 | 19 | 0.32 | 1.7 | 13.0 | 12.7 | 0.24 | 2.3 ± 0.1 |
| 2.5 | 19 | 0.41 | 2.2 | 7.82 | 7.60 | 0.28 | 2.85 ± 0.15 |
| 2.5 | 37 | 0.29 | 2.2 | 7.82 | 7.60 | 0.28 | 2.85 ± 0.15 |
| 4 | 37 | 0.38 | 2.6 | 4.85 | 4.71 | 0.32 | 3.55 ± 0.15 |
| 6 | 37 | 0.45 | 3.1 | 3.23 | 3.14 | 0.32 | 4.15 ± 0.15 |

Datasheet STD 548776

Dimensions according to ISO 6722-1/ISO 19642, structure B

| Cross section | Conductor | | | | | Core | |
|---------------|-------------------------|----------------------------|--------------------------------------|------------------|-------------------------------|------|------------------------|
| | Nominal mm ² | Number of individual wires | Diameter of individual wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | | Wall thickness min. mm |
| tinned | | | | | bare | | |
| 0.75 | 24 | 0.21 | 1.2 | 25.4 | 24.7 | 0.24 | 1.8 ± 0.1 |
| 1 | 32 | 0.21 | 1.3 | 19.1 | 18.5 | 0.24 | 2.0 ± 0.1 |
| 1.5 | 30 | 0.26 | 1.7 | 13.0 | 12.7 | 0.24 | 2.3 ± 0.1 |
| 2.5 | 50 | 0.26 | 2.2 | 7.82 | 7.60 | 0.28 | 2.85 ± 0.15 |
| 4 | 56 | 0.31 | 2.6 | 4.85 | 4.71 | 0.32 | 3.55 ± 0.15 |
| 6 | 84 | 0.31 | 3.1 | 3.23 | 3.14 | 0.32 | 4.15 ± 0.15 |

Datasheet STD 548776

RADOX® 155S RW (FLU91X)



| | |
|----------------------|---------------------------|
| Number of conductors | 1 |
| Cross section | 0.14 to 1 mm ² |
| Voltage rating | 60 V DC |
| Temperature range | -55 to +150 °C (3000 h) |
| Min. bending radius | 3 × cable dia. |

Composition of cable

1. Conductor stranded, tin plated
2. Insulation RADOX 155S, extruded irradiation cross-linked polyolefin, various colours

Characteristics and specialities

- High and low temperature resistance
- Ozone and weathering resistance
- Resistant to pressure at high temperature
- Resistant to motor oils, fuels and hydrolysis
- Flame retardant
- High abrasion resistance
- Easy to strip and process

Application

Low voltage cable for use in road vehicle applications, such as motor wiring, fan motor or sensor applications.

Standards

| Conductor | General |
|----------------------------------|--|
| ISO 6722, ISO 19642-3 and -5 | ISO 6722, ISO 19642-3 and -5, class D, ultra thin-wall |
| DIN EN 13602, Cu-ETPI-A (CW003A) | |

For further technical details please refer to our data sheets STD 548401 and STD 583960.

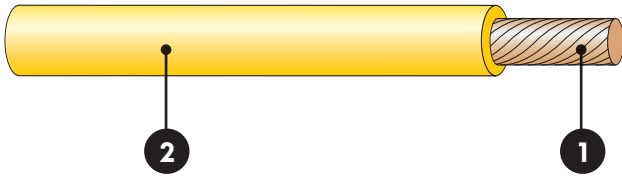
RADOX[®] 155S RW (FLU91X)

Extract from our delivery programme

| Cross section | Conductor | | | | Core | | |
|---------------|-------------------------|----------------------------|--------------------------------------|------------------|-------------------------------------|------------------------|-------------|
| | Nominal mm ² | Number of individual wires | Diameter of individual wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km, bare | Wall thickness min. mm | Diameter mm |
| 0.35 | 7 | 0.26 | 0.80 | 52.0 | 0.20 | 1.25 ± 0.05 | 0.4 |
| 0.5 | 19 | 0.19 | 1.00 | 37.1 | 0.20 | 1.40 ± 0.05 | 0.6 |
| 0.75 | 19 | 0.23 | 1.20 | 24.7 | 0.21 | 1.65 ± 0.05 | 0.8 |
| 1.0 | 19 | 0.26 | 1.35 | 18.5 | 0.22 | 1.80 ± 0.05 | 1.0 |
| 1.25 | 19 | 0.29 | 1.40 | 15.5 | 0.23 | 2.00 ± 0.05 | 1.3 |
| 1.5 | 19 | 0.32 | 1.70 | 12.7 | 0.23 | 2.10 ± 0.05 | 1.5 |

Datasheet STD 583960

ETFE (FLR7Y and FLU7Y)



| | |
|----------------------|---------------------------|
| Number of conductors | 1 |
| Cross section | 0.14 to 6 mm ² |
| Voltage rating | 60/600 V DC |
| Temperature range | -55 to +200 °C (3000 h) |
| Min. bending radius | 3 × cable dia. |

Composition of cable

1. Conductor stranded bare copper
2. Insulation ETFE, extruded fluoropolymer, various colours

Characteristics and specialities

- High and low temperature resistance
- Ozone and weathering resistance
- Resistant to pressure at high temperature
- Resistant to hot motor oils, fuels and hydrolysis
- Flame retardant
- High abrasion resistance
- Easy to strip and process

Application

Low voltage cable for use in road vehicle applications, where constant hot oil immersion is required.

Standards

| Conductor | General |
|----------------------------------|--|
| ISO 6722, ISO 19642-3 and -5 | ISO 6722, ISO 19642-3 and -5, class D, thin-wall and ultra thin-wall |
| DIN EN 13602, Cu-ETPI-A (CW003A) | |

For further technical details please refer to our data sheets STD 378562 (FLR7Y) and STD 585353 (FLU7Y).

ETFE (FLR7Y and FLU7Y)

Extract from our delivery programme

Dimensions according to ISO 6722-1/ISO 19642

| Cross section | Conductor | | | | | Core | | |
|---------------|-------------------------|--|--------------------------------------|------------------|-------------------------------|------|------------------------|----------------------|
| | Nominal mm ² | Number of individual wires guide value | Diameter of individual wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | | Wall thickness min. mm | Weight nom. kg/100 m |
| tinned | | | | | bare | | | |
| 0.35 | 7 | 0.26 | 0.8 | – | 52.0 | 0.20 | 0.4 | 1.25 ± 0.05 |
| 1.00 | 19 | 0.26 | 1.35 | – | 18.5 | 0.24 | 1.2 | 2.00 ± 0.10 |

Datasheet STD 378562 (FLR7Y)

Dimensions according to ISO 6722-1/ISO 19642

| Cross section | Conductor | | | | | Core | | |
|---------------|-------------------------|--|--------------------------------------|------------------|-------------------------------|------|------------------------|----------------------|
| | Nominal mm ² | Number of individual wires guide value | Diameter of individual wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | | Wall thickness min. mm | Weight nom. kg/100 m |
| tinned | | | | | bare | | | |
| 0.25 | 19 | 0.13 | 0.61 | 86.0 | – | 0.19 | 0.33 | 1.10 ± 0.05 |
| 0.35 | 7 | 0.26 | 0.79 | – | 50.2 | 0.16 | 0.45 | 1.20 ± 0.05 |
| 0.50 | 19 | 0.19 | 0.90 | – | 36.4 | 0.16 | 0.58 | 1.30 ± 0.05 |
| 0.75 | 19 | 0.23 | 1.12 | – | 24.5 | 0.16 | 0.84 | 1.50 ± 0.05 |
| 1.0 | 19 | 0.26 | 1.26 | – | 18.3 | 0.16 | 1.06 | 1.65 ± 0.07 |
| 1.5 | 19 | 0.32 | 1.52 | – | 12.6 | 0.16 | 1.55 | 2.00 ± 0.10 |
| 2.5 | 50 | 0.26 | 2.00 | – | 7.52 | 0.20 | 2.59 | 2.55 ± 0.10 |
| 4 | 56 | 0.31 | 2.50 | – | 4.66 | 0.24 | 3.98 | 3.15 ± 0.10 |
| 6 | 84 | 0.31 | 2.98 | – | 3.11 | 0.24 | 5.92 | 3.65 ± 0.10 |
| 10 | 78 | 0.41 | 4.30 | – | 1.82 | 0.24 | 9.89 | 5.00 ± 0.15 |

Datasheet STD 585353 (FLU7Y)

RADOX[®] anticapillary (single insulation)



| | |
|----------------------|-------------------------|
| Number of conductors | 1 |
| Cross section | 0.35 10 mm ² |
| Voltage rating | 60/1500 V DC |
| Temperature range | -55 to +150 °C (3000 h) |
| Min. bending radius | 3 × cable dia. |

Composition of cable

1. Conductor stranded tinned or bare copper, special coating
2. Insulation RADOX 155S, extruded irradiation cross-linked polyolefin (FLR91X), various colours

Characteristics and specialities

- Barrier sealed, avoids penetration of fluids along conductor (fluids such as water and AdBlue)
- High and low temperature resistance
- Ozone and weathering resistance
- Resistant to pressure at high temperature
- Resistant to motor oils, fuels, hydrolysis and AdBlue
- Flame retardant
- High abrasion resistance
- Easy to strip and process

Application

Low voltage cable with anticapillary properties for use in road vehicle applications.

Standards

| Conductor | General |
|----------------------------------|--|
| ISO 6722, ISO 19642-3 and -5 | ISO 6722, ISO 19642-3 and -5, class D, thin-wall |
| DIN EN 13602, Cu-ETPI-A (CW003A) | |

Customer approvals

- Daimler DR 15863
- BMW 9 338 777.9 – 796.9
- JLR
- Bosch N34_AE011D_S014
- Ford ES-AU5T-1A348-AA

For further technical details please refer to our data sheets STD 582554D, STD 412701 (filled with fluorinated grease), STD 582272 (filled with silicon grease).

RADOX[®] anticapillary (single insulation)

Extract from our delivery programme

Dimensions according to ISO 6722-1/ISO 19642 structure A

| Cross section | Conductor | | | | | Core | |
|---------------|-------------------------|----------------------------|--------------------------------------|------------------|-------------------------------|------|------------------------|
| | Nominal mm ² | Number of individual wires | Diameter of individual wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | | Wall thickness min. mm |
| tinned | | | | | bare | | |
| 0.35 | 7 | 0.26 | 0.8 | 54.5 | 52.0 | 0.20 | 1.25 ± 0.05 |
| 0.5 | 19 | 0.19 | 1.0 | 38.2 | 37.1 | 0.22 | 1.5 ± 0.1 |
| 0.75 | 19 | 0.23 | 1.2 | 25.4 | 24.7 | 0.24 | 1.8 ± 0.1 |
| 1.0 | 19 | 0.26 | 1.35 | 19.1 | 18.5 | 0.24 | 2.0 ± 0.1 |
| 1.5 | 19 | 0.32 | 1.7 | 13.0 | 12.7 | 0.24 | 2.3 ± 0.1 |

Datasheet STD 582554

Dimensions according to ISO 6722-1/ISO 19642

| Cross section | Conductor | | | | | Core | |
|---------------|-------------------------|----------------------------|--------------------------------------|------------------|-------------------------------|------|------------------------|
| | Nominal mm ² | Number of individual wires | Diameter of individual wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | | Wall thickness min. mm |
| tinned | | | | | bare | | |
| 2 | 19 | 0.38 | 1.86 | 9.69 | 9.42 | 0.28 | 2.65 ± 0.15 |
| 2.5 | 19 | 0.42 | 2.2 | 7.82 | 7.60 | 0.28 | 2.85 ± 0.15 |
| 4 | 19 | 0.55 | 2.75 | 4.85 | 4.71 | 0.32 | 3.55 ± 0.15 |
| 6 | 19 | 0.67 | 3.3 | 3.23 | 3.14 | 0.32 | 4.15 ± 0.15 |
| 10 | 37 | 0.61 | 3.9 | 1.85 | 1.82 | 0.73 | 5.75 ± 0.20 |

Datasheet STD 412701

RADOX[®] anticapillary (double insulation)



| | |
|----------------------|---------------------------|
| Number of conductors | 1 |
| Cross section | 0.35 to 6 mm ² |
| Voltage rating | 60/1500 V DC |
| Temperature range | -55 to +150 °C (3000 h) |
| Min. bending radius | 3 × cable dia. |

Composition of cable

1. Conductor stranded tinned or bare copper, special coating
2. Insulation RADOX 155S, extruded irradiation cross-linked polyolefin
3. Insulation extruded irradiation crosslinked fluoropolymer (PVDF-X) for hot oil applications

Characteristics and specialities

- Barrier sealed, avoids penetration of fluids along conductor (fluids such as water, AdBlue and hot oils)
- High and low temperature resistance
- Ozone and weathering resistance
- Resistant to pressure at high temperature
- Resistant to motor oils, fuels and hydrolysis
- Flame retardant
- High abrasion resistance
- Easy to strip and process

Application

Low voltage cable with anticapillary properties for use in road vehicle applications.

Standards

| Conductor | General |
|----------------------------------|-----------------------------|
| DIN 72551 part 6 | ISO 6722 class D, thin-wall |
| ISO 6722 | DIN 72551 part 5 (1993) |
| DIN EN 13602, Cu-ETPI-A (CW003A) | LV 112 |

Customer approvals

- Bosch N34A AEO11D_S015

For further technical details please refer to our data sheets STD 470829 (filled with fluorinated grease), STD 759203 (filled with silicon grease).

RADOX[®] anticapillary (double insulation)

Extract from our delivery programme

Dimensions according to ISO 6722/ISO 19642 structure B

| Cross section | Conductor | | | | | Core | |
|---------------|-------------------------|----------------------------|--------------------------------------|------------------|-------------------------------|------|------------------------|
| | Nominal mm ² | Number of individual wires | Diameter of individual wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | | Wall thickness min. mm |
| tinned | | | | | bare | | |
| 0.5 | 19 | 0.19 | 1.0 | 38.2 | 37.1 | 0.22 | 1.5 ± 0.1 |
| 0.75 | 19 | 0.23 | 1.2 | 25.4 | 24.7 | 0.24 | 1.8 ± 0.1 |
| 1 | 19 | 0.26 | 1.3 | 19.1 | 18.5 | 0.24 | 2.0 ± 0.1 |
| 1.5 | 19 | 0.32 | 1.7 | 13.0 | 12.7 | 0.24 | 2.3 ± 0.1 |
| 2 | 19 | 0.38 | 1.8 | 9.69 | 9.42 | 0.28 | 2.65 ± 0.15 |
| 4 | 19 | 0.55 | 2.5 | 4.85 | 4.71 | 0.32 | 3.55 ± 0.15 |

Datasheet STD 470829

Dimensions according to ISO 6722/ISO 19642

| Cross section | Conductor | | | | | Core | |
|---------------|-------------------------|----------------------------|--------------------------------------|------------------|-------------------------------|------|------------------------|
| | Nominal mm ² | Number of individual wires | Diameter of individual wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | | Wall thickness min. mm |
| tinned | | | | | bare | | |
| 0.5 | 19 | 0.19 | 1.0 | 38.2 | 37.1 | 0.22 | 1.5 ± 0.1 |
| 0.75 | 19 | 0.23 | 1.2 | 25.4 | 24.7 | 0.24 | 1.8 ± 0.1 |
| 1 | 19 | 0.26 | 1.35 | 19.1 | 18.5 | 0.24 | 2.0 ± 0.1 |
| 1.5 | 19 | 0.32 | 1.7 | 13.0 | 12.7 | 0.24 | 2.3 ± 0.1 |
| 2.5 | 19 | 0.42 | 2.2 | 7.82 | 7.60 | 0.28 | 2.85 ± 0.15 |

Datasheet STD 759203

RADOX® battery cables – thin-wall, flexible



Power cables for road vehicles, class D according to ISO 6722, operating temperature –40 to +150 °C

RADOX battery cables are high temperature resistant products with a reduced outer diameter.

The cable is highly resistant to temperature, ozone, weathering, hydrolysis and has excellent resistance to battery acid and cooling agents. It is also resistant against oils, fuels and other fluids used inside and outside of the motor compartment.

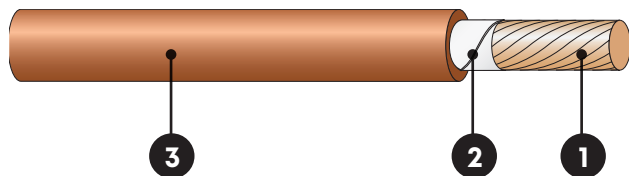
Thanks to its electron beam cross-linked RADOX insulation, the cable has, despite the reduced outer diameter, excellent resistance to heat pressure and abrasion. In addition, the RADOX battery cable has outstanding dielectric properties. The flame retardant insulation does not melt or flow at high temperatures and is easy to strip.

General features

- Operating temperature –70 to +150 °C
- Outstanding flexibility
- Reduced outer diameter
- Resistant to motor oils, battery acid and fuels
- High resistance to heat pressure
- Excellent abrasion resistance

| | |
|--|----|
| RADOX 155 battery cable | 20 |
| RADOX Elastomer S (REMS) battery cable | 24 |
| RADOX screened battery cable | 30 |
| RADOX screened multi core cable | 32 |

RADOX® 155 battery cable, flexible (FLR4G and FHLR4G)



| | |
|----------------------|---------------------------|
| Number of conductors | 1 |
| Cross section | 10 to 150 mm ² |
| Voltage rating | 1000 V AC/1500 V DC |
| Temperature range | -55 to +150 °C (3000 h) |
| Min. bending radius | 3 × cable dia. |

Composition of cable

- | | |
|-----------------|--|
| 1. Conductor | stranded bare copper |
| 2. Plastic tape | optional |
| 3. Insulation | RADOX 155, extruded irradiation cross-linked polyolefin, various colours |

Characteristics and specialities

- Excellent high and low temperature resistance
- Ozone, weathering and hydrolysis resistance
- Outstanding resistance against battery acids, humidity, petrol, brake fluids, engine coolant, window washer, fluids, diesel and various oils
- Flame retardant
- Easy to strip and process

Application

ADR approved battery or power cable for use in road vehicle applications.

Standards

| Conductor | General |
|----------------------------------|---|
| ISO 6722-1 | ISO 6722, ISO 19642-5, class D, thin-wall |
| DIN EN 13602, Cu-ETPI-A (CW003A) | ADR approved |

Customer approvals

- GMW 15626
- VW 60306-1
- Ford ES-AU5T-1A348-AA
- BMW GS 95007
- FCA MS.90034
- JLR TPJLR.18.007
- Scania TB1914
- Volvo STD 525-001
- Bosch N34A AE011D S007
- VW 75210-1

For further technical details please refer to our data sheet STD 718404.

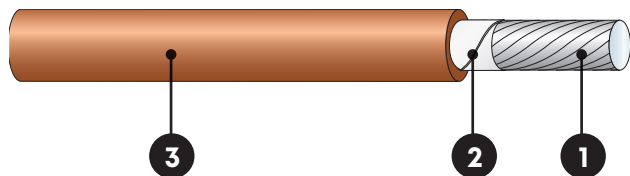
RADOX® 155 battery cable, flexible (FLR4G and FHLR4G)

Extract from our delivery programme

| Cross section | Conductor | | | | Core | | |
|---------------|-------------------------|--|--------------------------------------|------------------|-------------------------------|------------------------|----------------------|
| | Nominal mm ² | Number of individual wires guide value | Diameter of individual wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | Wall thickness min. mm | Weight nom. kg/100 m |
| 8 | 60 | 0.41 | 3.8 | 2.38 | 0.40 | 8.0 | 5.05 ± 0.15 |
| 10 | 78 | 0.41 | 4.3 | 1.82 | 0.50 | 10.5 | 5.75 ± 0.20 |
| 12 | 92 | 0.41 | 4.7 | 1.52 | 0.50 | 12.0 | 6.10 ± 0.20 |
| 16 | 126 | 0.41 | 5.4 | 1.16 | 0.52 | 16.5 | 6.90 ± 0.20 |
| 20 | 154 | 0.41 | 6.2 | 0.955 | 0.52 | 20.0 | 7.60 ± 0.20 |
| 25 | 189 | 0.41 | 6.7 | 0.743 | 0.55 | 24.2 | 8.20 ± 0.20 |
| 30 | 224 | 0.41 | 7.4 | 0.647 | 0.64 | 29.0 | 9.10 ± 0.25 |
| 35 | 273 | 0.41 | 7.9 | 0.527 | 0.65 | 35.0 | 9.70 ± 0.25 |
| 40 | 301 | 0.41 | 8.5 | 0.473 | 0.73 | 38.7 | 10.40 ± 0.25 |
| 50 | 385 | 0.41 | 9.4 | 0.368 | 0.80 | 49.2 | 11.50 ± 0.25 |
| 60 | 294 | 0.51 | 10.6 | 0.315 | 0.80 | 57.8 | 12.60 ± 0.25 |
| 70 | 360 | 0.51 | 11.6 | 0.259 | 0.80 | 69.7 | 13.70 ± 0.25 |
| 95 | 480 | 0.51 | 13.5 | 0.196 | 0.90 | 93.8 | 16.20 ± 0.30 |
| 120 | 589 | 0.51 | 15.1 | 0.153 | 0.90 | 114.7 | 18.00 ± 0.30 |
| 150 | 741 | 0.51 | 17.0 | 0.122 | 1.00 | 143.4 | 20.00 ± 0.30 |

Datasheet STD 718404

RADOX® 155 battery cable, aluminium (FLR4G or FHLR4G)



| | |
|----------------------|---------------------------|
| Number of conductors | 1 |
| Cross section | 10 to 120 mm ² |
| Voltage rating | 1000 V AC/1500 V DC |
| Temperature range | -55 to +150 °C (3000 h) |
| Min. bending radius | 3 × cable dia. |

Composition of cable

- | | |
|-----------------|--|
| 1. Conductor | stranded aluminium |
| 2. Plastic tape | optional |
| 3. Insulation | RADOX 155, extruded irradiation cross-linked polyolefin, various colours |

Characteristics and specialities

- Excellent high and low temperature resistance
- Ozone, weathering and hydrolysis resistance
- Outstanding resistance against battery acids, humidity, petrol, brake fluids, engine coolant, window washer, fluids, diesel and various oils
- Flame retardant
- Easy to strip and process

Application

ADR approved battery or power cable for use in road vehicle applications.

Standards

| Conductor | General |
|------------|---|
| ISO 6722-2 | ISO 6722-2, ISO 19642-6, class D, thin-wall |
| ISO 6892-1 | |
| ASTM B231 | |
| EN 573-1 | |

For further technical details please refer to our data sheet STD 776028.

RADOX[®] 155 battery cable, aluminium (FLR4G or FHLR4G)

Extract from our delivery programme

| Cross section | Conductor | | | | Core | | |
|---------------|-------------------------|--|--------------------------------------|------------------|-------------------------------|------------------------|----------------------|
| | Nominal mm ² | Number of individual wires guide value | Diameter of individual wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | Wall thickness min. mm | Weight nom. kg/100 m |
| 16 | 80 | 0.52 | 5.40 | 1.93 | 0.52 | 8.7 | 6.75 ± 0.20 |
| 25 | 122 | 0.52 | 6.70 | 1.24 | 0.52 | 12.8 | 8.40 ± 0.20 |
| 35 | 172 | 0.52 | 7.90 | 0.878 | 0.64 | 18.3 | 10.05 ± 0.25 |
| 50 | 247 | 0.52 | 9.40 | 0.368 | 0.72 | 21.3 | 11.50 ± 0.25 |
| 60 | 289 | 0.52 | 10.50 | 0.613 | 0.80 | 28.1 | 12.85 ± 0.25 |
| 70 | 351 | 0.52 | 10.60 | 0.432 | 0.80 | 34.1 | 13.85 ± 0.25 |
| 95 | 472 | 0.52 | 13.50 | 0.327 | 1.09 | 49.2 | 16.20 ± 0.30 |
| 120 | 305 | 0.72 | 15.10 | 0.255 | 1.28 | 68.0 | 18.00 ± 0.30 |

Datasheet STD 776028

RADOX® Elastomer S (REMS) battery cable, flexible (FLR13X)



| | |
|----------------------|---------------------------|
| Number of conductors | 1 |
| Cross section | 10 to 150 mm ² |
| Voltage rating | 600 V AC/900 V DC |
| Temperature range | -70 to +150 °C (3000 h) |
| Min. bending radius | 3 × cable dia. |

Composition of cable

- | | |
|-----------------|--|
| 1. Conductor | stranded bare copper |
| 2. Plastic tape | optional |
| 3. Insulation | RADOX Elastomer S (REMS), extruded irradiation cross-linked copolymer, various colours |

Characteristics and specialities

- Excellent high and low temperature resistance
- Very flexible
- Ozone and weathering resistance
- Outstanding resistance against battery acids, diesel, various oils, engine coolant and window washer fluids
- Resistance against humidity, petrol and brake fluids
- Flame retardant
- Easy to strip and process

Application

Flexible battery or power cable for use in road vehicle applications.

Standards

| Conductor | General |
|----------------------------------|--|
| ISO 6722 -1, ISO 19642-5 | ISO 6722, ISO 19642-5 class D, thin-wall |
| DIN EN 13602, Cu-ETPI-A (CW003A) | |

For further technical details please refer to our data sheet STD 565167

RADOX® Elastomer S (REMS) battery cable, flexible (FLR13X)

Extract from our delivery programme

| Cross section | Conductor | | | | Cable | | |
|---------------|-------------------------|--|--------------------------------------|------------------|-------------------------------|------------------------|----------------------|
| | Nominal mm ² | Number of individual wires guide value | Diameter of individual wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | Wall thickness min. mm | Weight nom. kg/100 m |
| 10 | 78 | 0.41 | 4.3 | 1.82 | 0.50 | 10.7 | 5.75 ± 0.15 |
| 12 | 92 | 0.41 | 4.65 | 1.52 | 0.50 | 12.1 | 6.05 ± 0.15 |
| 16 | 126 | 0.41 | 5.4 | 1.16 | 0.52 | 16.7 | 6.90 ± 0.20 |
| 20 | 154 | 0.41 | 6.2 | 0.955 | 0.52 | 20.2 | 7.60 ± 0.20 |
| 25 | 189 | 0.41 | 6.7 | 0.743 | 0.55 | 24.5 | 8.20 ± 0.20 |
| 30 | 224 | 0.41 | 7.4 | 0.647 | 0.64 | 29.9 | 9.10 ± 0.25 |
| 35 | 273 | 0.41 | 7.9 | 0.527 | 0.65 | 35.4 | 9.70 ± 0.25 |
| 50 | 385 | 0.41 | 9.4 | 0.368 | 0.80 | 49.8 | 11.50 ± 0.25 |
| 70 | 360 | 0.51 | 11.6 | 0.259 | 0.80 | 70.4 | 13.70 ± 0.25 |
| 95 | 480 | 0.51 | 13.5 | 0.196 | 0.90 | 95.0 | 16.25 ± 0.30 |
| 120 | 589 | 0.51 | 15.1 | 0.153 | 0.90 | 115.9 | 18.00 ± 0.30 |

Datasheet STD 565167

RADOX® Elastomer S (REMS) battery cable, high flexible (FLR13X)



| | |
|----------------------|---------------------------|
| Number of conductors | 1 |
| Cross section | 10 to 150 mm ² |
| Voltage rating | 600 V AC/900 V DC |
| Temperature range | -70 to +150 °C (3000 h) |
| Min. bending radius | 3 × cable dia. |

Composition of cable

| | |
|-----------------|--|
| 1. Conductor | stranded bare copper |
| 2. Plastic tape | optional |
| 3. Insulation | RADOX Elastomer S (REMS), extruded irradiation cross-linked copolymer, various colours |

Characteristics and specialities

- Excellent high and low temperature resistance
- Very flexible
- Ozone and weathering resistance
- Outstanding resistance against battery acids, diesel, various oils, engine coolant and window washer fluids
- Resistance against humidity, petrol and brake fluids
- Flame retardant
- Easy to strip and process

Application

High flexible battery or power cable for use in road vehicle applications.

Standards

| Conductor | General |
|----------------------------------|--|
| ISO 6722 -1, ISO 19142-5 | ISO 6722, ISO 19642-5 class D, thin-wall |
| DIN EN 13602, Cu-ETPI-A (CW003A) | |

For further technical details please refer to our data sheet STD 451483.

RADOX[®] Elastomer S (REMS) battery cable, high flexible (FLR13X)

Extract from our delivery programme

| Cross section | Conductor | | | | Cable | | |
|---------------|-------------------------|--|--------------------------------------|------------------|-------------------------------|------------------------|----------------------|
| | Nominal mm ² | Number of individual wires guide value | Diameter of individual wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | Wall thickness min. mm | Weight nom. kg/100 m |
| 16 | 490 | 0.21 | 5.4 | 1.16 | 0.52 | 16.7 | 6.80 ± 0.20 |
| 25 | 760 | 0.21 | 7.0 | 0.743 | 0.52 | 25.0 | 8.45 ± 0.25 |
| 35 | 1'064 | 0.21 | 8.3 | 0.527 | 0.64 | 35.5 | 10.15 ± 0.25 |
| 50 | 1'520 | 0.21 | 9.9 | 0.368 | 0.71 | 50.3 | 11.95 ± 0.25 |
| 70 | 2'146 | 0.21 | 11.8 | 0.259 | 0.80 | 69.6 | 14.10 ± 0.30 |
| 95 | 2'849 | 0.21 | 13.3 | 0.196 | 0.90 | 93.5 | 16.40 ± 0.30 |
| 120 | 3'538 | 0.21 | 15.3 | 0.153 | 1.28 | 120.1 | 19.40 ± 0.30 |

Datasheet STD 451483

RADOX® Elastomer S (REMS) battery cable, flexible, thick-wall (FL13X)



| | |
|----------------------|---------------------------|
| Number of conductors | 1 |
| Cross section | 10 to 150 mm ² |
| Voltage rating | 600 V AC/900 V DC |
| Temperature range | -70 to +150 °C (3000 h) |
| Min. bending radius | 3 × cable dia. |

Composition of cable

- | | |
|-----------------|--|
| 1. Conductor | stranded bare copper |
| 2. Plastic tape | optional |
| 3. Insulation | RADOX Elastomer S (REMS), extruded radiation cross-linked copolymer, various colours |

Characteristics and specialities

- Excellent high and low temperature resistance
- Very flexible
- Ozone and weathering resistance
- Outstanding resistance against battery acids, diesel, various oils, engine coolant and window washer fluids
- Resistance against humidity, petrol and brake fluids
- Flame retardant
- Easy to strip and process

Application

ADR approved, thick-wall battery or power cable for use in road vehicle applications.

Standards

| Conductor | General |
|----------------------------------|---|
| ISO 6722 -1, ISO 19642-5 | ISO 6722, ISO 19642-5 class D, thick-wall |
| DIN EN 13602, Cu-ETPI-A (CW003A) | ADR approved |

For further technical details please refer to our data sheets STD 711923 and STD 412055.

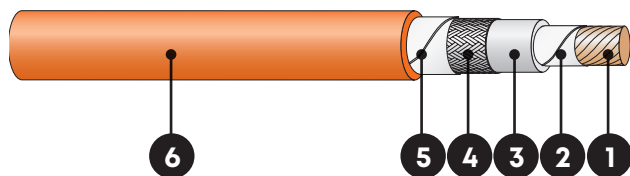
RADOX® Elastomer S (REMS) battery cable, flexible, thick-wall (FL13X)

Extract from our delivery programme

| Cross section | Conductor | | | | Cable | | |
|---------------|-------------------------|--|--------------------------------------|------------------|-------------------------------|------------------------|----------------------|
| | Nominal mm ² | Number of individual wires guide value | Diameter of individual wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | Wall thickness min. mm | Weight nom. kg/100 m |
| 10 | 78 | 0.41 | 4.3 | 1.82 | 0.80 | 11.4 | 6.30 ± 0.20 |
| 16 | 126 | 0.41 | 5.4 | 1.16 | 1.10 | 18.6 | 8.10 ± 0.20 |
| 25 | 189 | 0.41 | 6.7 | 0.743 | 1.40 | 28.3 | 10.15 ± 0.25 |
| 35 | 273 | 0.41 | 7.9 | 0.527 | 1.40 | 39.1 | 11.35 ± 0.25 |
| 50 | 385 | 0.41 | 9.4 | 0.368 | 1.60 | 54.4 | 13.25 ± 0.25 |
| 70 | 360 | 0.51 | 11.6 | 0.259 | 1.45 | 75.0 | 15.20 ± 0.30 |
| 95 | 480 | 0.51 | 13.5 | 0.196 | 1.70 | 100.2 | 17.70 ± 0.30 |
| 120 | 589 | 0.51 | 15.1 | 0.153 | 1.35 | 117.8 | 18.50 ± 0.30 |

Datasheet TD 711923

RADOX[®] screened single core cable (FHLR91XC13X and FHLR4GC13X)



| | |
|----------------------|----------------------------|
| Number of conductors | 1 |
| Cross section | 1.5 to 150 mm ² |
| Voltage rating | 1000 V AC/1500 V DC |
| Temperature range | -55 to +150 °C (3000 h) |
| Min. bending radius | 4 × cable dia. |

Composition of cable

| | |
|---------------|---|
| 1. Conductor | stranded bare copper |
| 2. Tape | plastic |
| 3. Insulation | RADOX 155S (91X) for 1.5, 2.5, 4.0, 6.0 mm ² RADOX 155 (4G) for > 6 mm ² |
| 4. EMC screen | tin plated copper braid optimised |
| 5. Tape | plastic (PEC) |
| 6. Sheath | RADOX Elastomer S (13X), colour: orange |

Characteristics and specialities

- Excellent high and low temperature resistance
- Ozone and weathering resistance
- Outstanding resistance against battery acid, diesel, various oils, engine coolant and window washer fluids
- Resistance against humidity, petrol and brake fluids
- Flame retardant
- Soldering iron resistant
- Easy to strip and process

Application

Screened power cable for use in hybrid and electrical vehicles.

Standards

| Conductor | General |
|----------------------------------|--|
| ISO 6722 -1, ISO 19642-9 | ISO 6722, ISO 19642-9 class D, thin-wall |
| DIN EN 13602, Cu-ETPI-A (CW003A) | |

For further technical details please refer to our data sheet STD 806104.

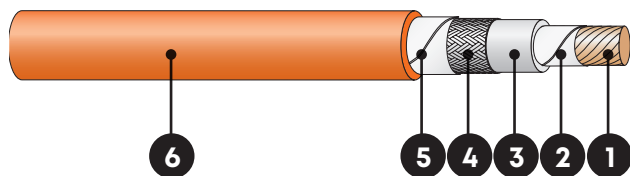
RADOX[®] screened single core cable (FHLR91XC13X and FHLR4GC13X)

Extract from our delivery programme

| Cross section | Conductor | | | | Cable | | | | |
|---------------|-------------------------|----------------------------------|----------------------------|------------------|-------------------------------|--------------------------------|----------------------------|--------------------------|------------------------------------|
| | Nominal mm ² | Number of ind. wires guide value | Dia. of ind. wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | Diameter of insulation nom. mm | Diameter of screen max. mm | Overall-diameter nom. mm | Z _T at 30 MHz nom. mΩ/m |
| 2.5 | 50 | 0.26 | 2.0 | 7.60 | 2.85 | 3.3 | 5.0 ± 0.2 | 100 | 4.9 |
| 4 | 56 | 0.31 | 2.5 | 4.71 | 3.55 | 4.0 | 5.8 ± 0.2 | 110 | 7.0 |
| 6 | 84 | 0.31 | 3.0 | 3.14 | 4.15 | 4.7 | 6.6 ± 0.3 | 70 | 9.8 |
| 8 | 60 | 0.41 | 3.8 | 2.38 | 5.05 | 5.6 | 7.6 ± 0.3 | 40 | 12.5 |
| 10 | 78 | 0.41 | 4.3 | 1.82 | 5.75 | 6.3 | 8.4 ± 0.3 | 30 | 15.8 |
| 12 | 92 | 0.41 | 4.7 | 1.52 | 6.10 | 6.7 | 8.9 ± 0.3 | 30 | 17.9 |
| 16 | 126 | 0.41 | 5.4 | 1.16 | 6.90 | 7.5 | 9.7 ± 0.3 | 40 | 23.0 |
| 20 | 154 | 0.41 | 6.2 | 0.955 | 7.60 | 8.3 | 10.6 ± 0.3 | 30 | 28.2 |
| 25 | 189 | 0.41 | 6.7 | 0.743 | 8.20 | 8.9 | 11.2 ± 0.3 | 40 | 32.8 |
| 30 | 224 | 0.41 | 7.4 | 0.647 | 9.10 | 9.8 | 12.1 ± 0.3 | 30 | 38.5 |
| 35 | 273 | 0.41 | 7.9 | 0.527 | 9.70 | 10.4 | 12.7 ± 0.3 | 60 | 44.7 |
| 40 | 301 | 0.41 | 8.5 | 0.473 | 10.40 | 11.3 | 13.6 ± 0.3 | 20 | 51.3 |
| 50 | 385 | 0.41 | 9.4 | 0.368 | 11.50 | 12.6 | 14.9 ± 0.3 | 30 | 64.2 |
| 60 | 294 | 0.51 | 10.6 | 0.315 | 12.60 | 13.5 | 15.9 ± 0.3 | 30 | 73.1 |
| 70 | 360 | 0.51 | 11.6 | 0.259 | 13.70 | 14.6 | 17.0 ± 0.3 | 30 | 85.8 |
| 95 | 480 | 0.51 | 13.5 | 0.196 | 16.20 | 17.3 | 19.9 ± 0.4 | 20 | 115.3 |
| 120 | 589 | 0.51 | 15.1 | 0.153 | 18.00 | 19.1 | 22.6 ± 0.4 | 20 | 145.5 |
| 150 | 741 | 0.51 | 17.0 | 0.122 | 20.00 | 21.3 | 24.9 ± 0.5 | 30 | 177.4 |

Datasheet TD 806104

RADOX[®] screened FLEX single core cable (FHLR4GC13X)



| | |
|----------------------|---------------------------|
| Number of conductors | 1 |
| Cross section | 16 to 120 mm ² |
| Voltage rating | 1000 V AC/1500 V DC |
| Temperature range | -55 to +150 °C (3000 h) |
| Min. bending radius | 3 × cable dia. |

Composition of cable

| | |
|---------------|---|
| 1. Conductor | stranded bare copper ISO structure C (flexible) |
| 2. Tape | plastic |
| 3. Insulation | RADOX 155 (4G) |
| 4. EMC screen | tin plated copper braid optimized |
| 5. Tape | plastic (PEC) |
| 6. Sheath | RADOX Elastomer S (13X), colour: orange |

Characteristics and specialities

- Excellent high and low temperature resistance
- Enhanced cable flexibility
- Easy and low-effort cable routing
- Ozone and weathering resistance
- Outstanding resistance against battery acid, diesel, various oils, engine coolant and window washer fluids
- Resistance against humidity, petrol and brake fluids
- Flame retardant
- Soldering iron resistant
- Easy to strip and process

Application

Screened cable for power transmission in hybrid and electrical vehicles.

Standards

| Conductor | General |
|--|--|
| ISO 6722-1, ISO 19642-9 (ISO structure C) | ISO 6722-1, ISO 19642-9 class D, thin-wall |
| DIN EN 13602, Cu-ETPI-A (CW003A) | |

For further technical details please refer to our data sheet STD 859519.

RADOX[®] screened FLEX single core cable (FHLR4GC13X)

Extract from our delivery programme

| Cross section | Conductor | | | | Cable | | | | |
|---------------|-------------------------|----------------------------------|----------------------------|------------------|-------------------------------|--------------------------------|----------------------------|--------------------------|------------------------------------|
| | Nominal mm ² | Number of ind. wires guide value | Dia. of ind. wires max. mm | Diameter max. mm | Resistance at 20 °C max. Ω/km | Diameter of insulation nom. mm | Diameter of screen max. mm | Overall-diameter nom. mm | Z _T at 30 MHz nom. mΩ/m |
| 16 | 490 | 0.21 | 5.4 | 1.16 | 6.85 | 8.0 | 9.3 ± 0.3 | 60 | 22.8 |
| 25 | 760 | 0.21 | 7.1 | 0.743 | 8.35 | 9.5 | 11.0 ± 0.3 | 50 | 32.2 |
| 35 | 1064 | 0.21 | 8.2 | 0.527 | 9.90 | 11.2 | 12.9 ± 0.3 | 40 | 46.1 |
| 50 | 1520 | 0.21 | 9.9 | 0.368 | 11.70 | 13.0 | 14.9 ± 0.3 | 30 | 63.1 |
| 70 | 1427 | 0.26 | 11.6 | 0.259 | 14.00 | 15.2 | 17.0 ± 0.4 | 30 | 85.2 |
| 95 | 1936 | 0.26 | 13.3 | 0.196 | 16.20 | 17.7 | 19.5 ± 0.4 | 20 | 113.7 |
| 120 | 2450 | 0.26 | 15.1 | 0.153 | 19.10 | 20.7 | 22.6 ± 0.4 | 20 | 143.5 |

Datasheet STD 859519

RADOX[®] screened multi core cable (FHLR91XC13X and FHLR4GC13X)



| | |
|----------------------|---------------------------|
| Number of conductors | 2 to 5 |
| Cross section | 1.5 to 70 mm ² |
| Voltage rating | 1000 V AC/1500 V DC |
| Temperature range | -55 to +150 °C (3000 h) |
| Min. bending radius | 4 × cable dia. |

Composition of cable

| | |
|---------------|---|
| 1. Conductor | stranded bare copper |
| 2. Insulation | RADOX 155S (91X) or RADOX 155 (4G) |
| 3. EMC screen | tin plated copper braid optimised |
| 4. Tape | plastic or aluminium screen (optional) |
| 5. Sheath | RADOX Elastomer S (13X), colour: orange |

Characteristics and specialities

- Excellent high and low temperature resistance
- Ozone and weathering resistance
- Outstanding resistance against battery acid, diesel, various oils, engine coolant and window washer fluids
- Resistance against humidity, petrol and brake fluids
- Flame retardant
- Soldering iron resistant
- Easy to strip and process

Application

Screened power cable for use in hybrid and electrical vehicles.

Standards

| Conductor | General |
|----------------------------------|--|
| ISO 6722 | ISO 6722, ISO 19642-9 class D, thin-wall |
| DIN EN 13602, Cu-ETPI-A (CW003A) | |

For further technical details please refer to our data sheet STD 806686.

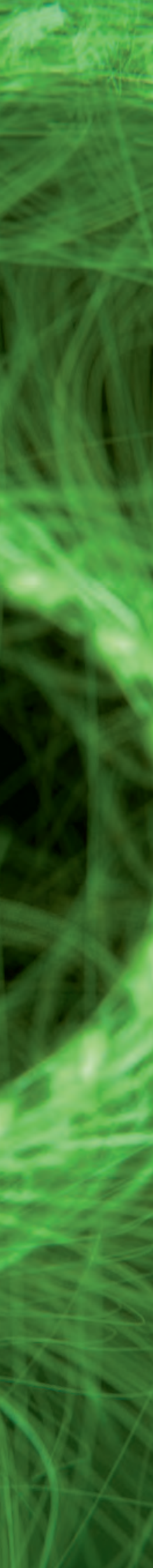
RADOX[®] screened multi core cable (FHLR91XC13X and FHLR4GC13X)

Extract from our delivery programme

| Cable type | Conductor | | | Cores | Cable | | | | |
|------------|-----------------------------|----------------------------------|----------------------------|-------|----------------------------|---------------------------|-------------------------------|----------------------------|--------------------------|
| | Nominal n × mm ² | Number of ind. wires guide value | Dia. of ind. wires max. mm | | Conductor diameter max. mm | Diameter of cores nom. mm | Resistance at 20 °C max. Ω/km | Diameter of screen max. mm | Overall-diameter nom. mm |
| 2 × 2.5 | 50 | 0.26 | 2.2 | 2.85 | 798 | 6.3 | 8.4 ± 0.3 | 50 | 12.0 |
| 2 × 4 | 56 | 0.31 | 2.6 | 3.55 | 4.95 | 7.8 | 10.2 ± 0.3 | 30 | 18.2 |
| 2 × 6 | 84 | 0.31 | 3.1 | 4.15 | 3.30 | 9.0 | 11.0 ± 0.35 | 50 | 22.5 |
| 2 × 8 | 60 | 0.41 | 3.8 | 5.05 | 2.50 | 11.0 | 12.8 ± 0.4 | 40 | 31.1 |
| 2 × 10 | 78 | 0.41 | 4.3 | 5.75 | 1.91 | 12.4 | 14.4 ± 0.4 | 40 | 40.5 |
| 3 × 2.5 | 50 | 0.26 | 2.2 | 2.85 | 798 | 6.8 | 8.4 ± 0.3 | 70 | 14.4 |
| 3 × 4 | 56 | 0.31 | 2.6 | 3.55 | 4.95 | 8.4 | 10.1 ± 0.4 | 80 | 21.0 |
| 3 × 6 | 84 | 0.31 | 3.1 | 4.15 | 3.30 | 10.0 | 12.4 ± 0.4 | 70 | 32.2 |
| 3 × 10 | 78 | 0.41 | 4.3 | 5.75 | 1.91 | 13.4 | 15.8 ± 0.5 | 30 | 49.6 |
| 3 × 16 | 126 | 0.41 | 5.4 | 6.90 | 1.21 | 16.0 | 18.5 ± 0.5 | 30 | 75.1 |
| 3 × 35 | 273 | 0.41 | 7.9 | 9.70 | 0.554 | 22.5 | 24.9 ± 0.5 | 140 | 148.8 |
| 4 × 2.5 | 50 | 0.26 | 2.2 | 2.85 | 798 | 7.6 | 9.2 ± 0.3 | 40 | 18.1 |
| 4 × 4 | 56 | 0.31 | 2.6 | 3.55 | 4.95 | 9.3 | 11.3 ± 0.4 | 50 | 26.5 |
| 4 × 6 | 84 | 0.31 | 3.1 | 4.15 | 3.30 | 11.0 | 12.9 ± 0.4 | 50 | 37.6 |
| 4 × 10 | 78 | 0.41 | 4.3 | 5.75 | 1.91 | 15.0 | 17.1 ± 0.5 | 40 | 64.7 |
| 5 × 4 | 56 | 0.31 | 2.6 | 3.55 | 4.95 | 10.8 | 13.3 ± 0.4 | 70 | 36.2 |
| 5 × 6 | 84 | 0.31 | 3.1 | 4.15 | 3.30 | 12.4 | 14.4 ± 0.4 | 30 | 47.0 |

Datasheet TD 806686

RADOX[®] sensor cables



Sensor cables for road vehicles: Resistant to low and high temperatures, flame retardant, flexible and media resistant, customer specific designs.

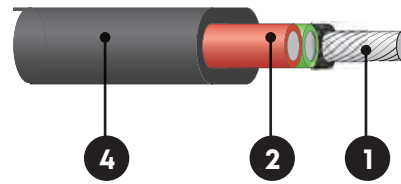
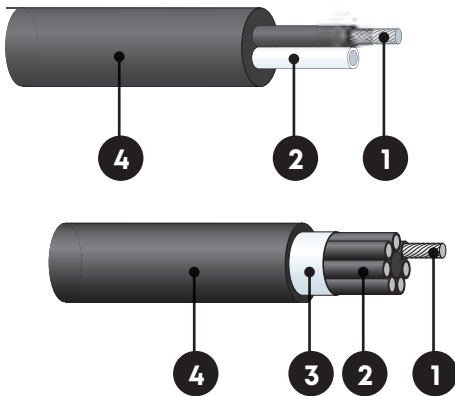
Pressure, knock and temperature sensors are standard today, and sensors for seatbelt tighteners, automatic transmissions, diesel pumps, ABS/EPS systems, speed monitoring plus other applications are an increasing demand. It must be ensured that critical electrical circuits will perform faultlessly under the most adverse conditions.

Electrical systems for fan motors, water pumps, power steering, brakes and accelerators are increasingly replacing V-belts, various hydraulic motors and mechanical actuators. Sensor cables serve for controlling the electronics and supplying power to the electric motors.

General features

- Temperature range -55 to $+150$ °C
- Resistant to motor oils, fuels, hydrolysis
- Electron beam cross-linked RADOX insulation does not melt or flow at high temperatures
- Usable in automated processing
- Resistant to potting or overmoulding
- Compact and flexible

RADOX[®] sensor cables



| | |
|----------------------|-------------------------------|
| Number of conductors | 1 to 50 |
| Cross section | 0.14 to 6 mm ² |
| Voltage rating | 60 to 600 V DC |
| Temperature range | (-55) -40 to +150 °C (3000 h) |

Composition of cable

- | | |
|---------------|--------------------------------------|
| 1. Conductor | stranded tinned or bare copper |
| 2. Insulation | various RADOX, fluoropolymers |
| 3. EMC screen | copper braiding or aluminium tape |
| 4. Jacket | various RADOX, TPU or fluoropolymers |

Characteristics and specialities

- High and low temperature resistance
- Ozone and weathering resistance
- Resistant to pressure at high temperature
- Resistant to motor oils, fuels and hydrolysis
- Flame retardant
- High abrasion resistance
- Easy to strip and process

Application

Sensor cables for use in road vehicle applications.

Standards

| Conductor | General |
|----------------------------------|--------------|
| ISO 6722 | ISO 19642 |
| DIN EN 13602, Cu-ETPI-A (CW003A) | ADR approved |

For further technical details please refer to our data sheet.

RADOX[®] sensor cables

Customised cables to your requirements

- Round or flat cable?
- EMC shielding necessary?
- What degree of flexibility is required?
- Special temperature requirements?
- Special requirements for voltage rating, impedance, attenuation?
- Special chemical or environmental concerns?
- Potting or overmoulding?
- Special requirements on processing (crimping, welding, ultrasonic welding, etc.)?
- Approvals?

Our leads

single-coloured or two-coloured

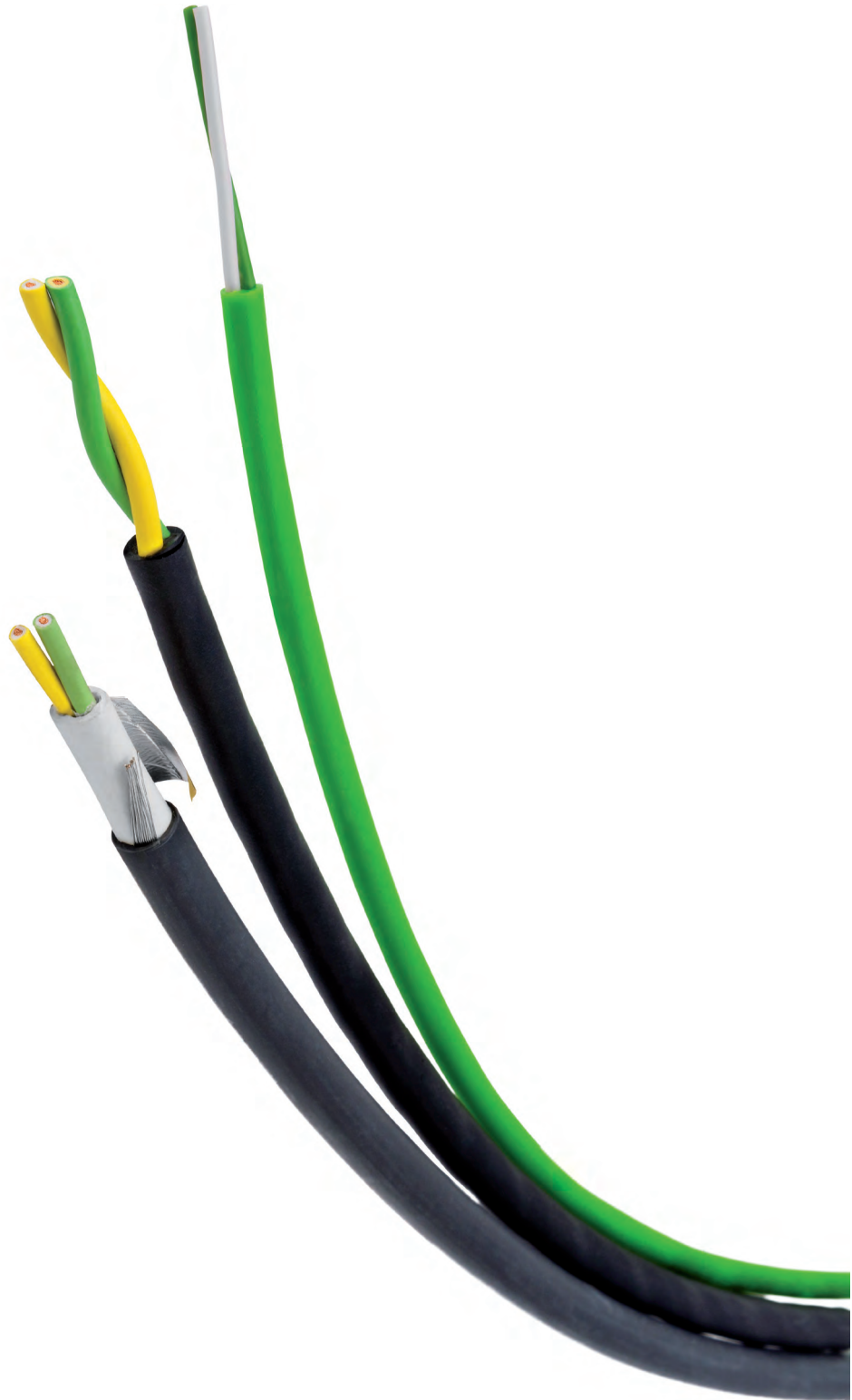


| Lead type | Temperature range | Cross section | Designation |
|----------------|-------------------|-----------------|--|
| | 3000 h | mm ² | |
| RADOX 155S RW | -55 to +150 °C | 0.14 to 1 | Following „ultra thin-wall“ according to ISO 6722, excellent media resistance, for applications where a small diameter is required |
| RADOX 155S FLR | -55 to +150 °C | 0.35 to 6 | „Thin-wall“ according to ISO 6722, excellent media resistance, for standard applications |
| PE-X | -40 to +125 °C | 0.35 to 1 | Databus cable with 110/120 Ω impedance |
| ETFE FLR | -55 to +200 °C | 0.35 to 6 | „Thin-wall“ according to ISO 6722, excellent media resistance, such as hot oil |

Our jacket materials

| Jacket material | Temperature range | Electron beam cross-linked | Mechanical resistance | Flexibility | Media resistance |
|-------------------|-------------------|----------------------------|-----------------------|-------------|------------------|
| | 3000 h | | | | |
| RADOX Elastomer S | -70 to +150 °C | yes | very good | excellent | excellent |
| RADOX 155 | -55 to +150 °C | yes | good | good | good |
| TPU | -40 to +125 °C | no | very good | excellent | good |

RADOX[®] databus cables



Optimum protection of sensitive data with RADOX

The continuous growth in the application of electronic systems in road vehicles requires reliable databus cables for transmitting information at high frequencies. CAN, LIN, MOST, FlexRay and Ethernet applications have become part of the modern on-board network structures inside vehicles.

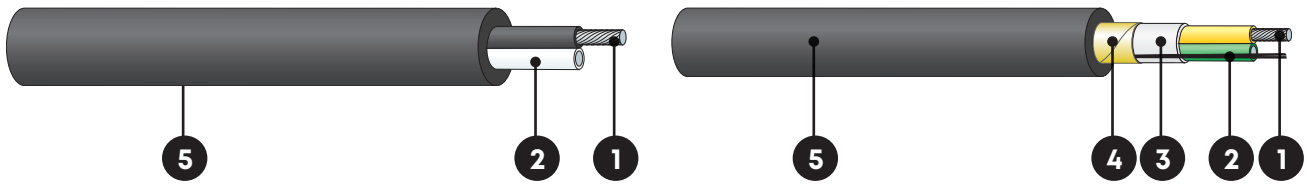
HUBER+SUHNER combines its know-how in data communications with electron beam cross-linked materials technology to offer cables meeting specifications such as SAE J1939-11, -15 or ISO 11898-2 (CAN).

Using their electron beam cross-linked RADOX insulation, the cables offer high thermal pressure resistance, resistance to fluids and good abrasion resistance, and they can be applied across a wide temperature range.

General features

- Excellent dielectric performance
- Flame retardant insulation, neither melting nor flowing when exposed to high temperatures
- Operating temperature -55 to +150 °C
- Outstanding data transmission performance
- Optimal protection using RADOX insulation
- Application is possible in engine compartments

RADOX® databus cables



| | |
|----------------------|--------------------------------------|
| Number of conductors | 2 to 4 |
| Cross section | 0.35 to 0.75 mm ² |
| Voltage rating | 60 V DC |
| Temperature range | (-55) -40 to +125 °C/+150 °C(3000 h) |
| Min. bending radius | 4 × cable dia. |

Composition of cable

| | |
|---------------|---|
| 1. Conductor | stranded tinned or bare copper |
| 2. Insulation | various RADOX insulation materials or PE-X |
| 3. Sheath | various RADOX jacket materials |
| 4. Screen | plastic laminated aluminium tape and drain wire |
| 5. Sheath | various RADOX jacket materials or TPU |

Characteristics and specialities

- Excellent dielectric performance
- Outstanding data transmission performance
- Possible application in engine compartments
- High and low temperature resistance
- Flame retardant

Application

Databus cable for transmitting information at high frequencies in road vehicles.

Standards

| Conductor | General |
|----------------------------------|-----------------------------------|
| ISO 6722 | ISO 6722, ISO 14642 class C and D |
| DIN EN 13602, Cu-ETP1-A (CW003A) | SAE J1939-11/-15 |

For further technical details please refer to our data sheet.

RADOX[®] databus cables

Extract from our delivery programme

Cable types

| Cross section | Conductor | | | Core | | Screen | Outside diameter |
|---------------|-----------------|-------------------------|----------------------|-------------------------------------|------------------------------|----------------|-------------------|
| | mm ² | Construction* n × mm | Diameter. max. mm | Resistance at 20 °C max. Ω/km | Wall thickness min. mm | Diameter mm | Aluminium tape |
| 2 × 0.35 | 7 × 0.26 | 0.77 | 52.0 | 0.66 | 2.1 | no | 5.6 |
| 2 × 0.50 | 19 × 0.18 | 0.89 | 37.1 | 0.80 | 2.5 | no | 6.2 |
| 2 × 0.75 | 19 × 0.22 | 1.10 | 24.7 | 0.95 | 3.0 | no | 7.2 |
| 2 × 0.35 | 7 × 0.26 | 0.77 | 52.0 | 0.66 | 2.1 | yes | 8.0 |
| 2 × 0.50 | 19 × 0.18 | 0.89 | 37.1 | 0.80 | 2.5 | yes | 8.3 |
| 2 × 0.75 | 19 × 0.22 | 1.10 | 24.7 | 0.95 | 3.0 | yes | 10.7 |

Jacket materials

| Jacket material | Temperature range | Electron beam cross-linked | Flexibility | Media resistance |
|-------------------|-------------------|-------------------------------|-------------|------------------|
| | 3000 h | | | |
| RADOX Elastomer S | -70 to +150 °C | yes | excellent | excellent |
| RADOX 155 | -55 to +150 °C | yes | good | good |
| TPU | -40 to +125 °C | no | excellent | good |

Automotive cable systems



The quality of the cabling throughout a vehicle plays a crucial role in transmitting and protecting power as it is stored in the vehicle. The cables need to be able to resist mechanical abrasion, harsh environmental conditions, moisture, temperature, aggressive fluids, as well as handle voltages up to 1000VAC/1500VDC. HUBER+SUHNER wires & cables and cable systems are designed with these challenges in mind.

When it comes to EV cable systems in the automotive sector, the main considerations are: high level of safety, reasonable costs and the correct approvals. Our in-house engineers are well experienced in the EV sector and never lose sight of the bigger picture. As a result, HUBER+SUHNER delivers complete cable system solutions that meet required automotive standards, whilst also optimising the installation processes.

Engineers work closely with our customers, always taking the latest market requirements as a starting point. A wide variety of parts in our automotive product range e.g. 3-pole connector, are tailored to specific customers and specific applications. With our global presence and many years of high voltage experience, we support new products a smooth entry into the EV market.

Benefits of using HUBER+SUHNER cable systems:

- Safe and reliable connection
- Easy assembly, saving time and money
- A smooth and effective integration with HVDU solutions
- High current carrying capacity for higher loads
- High Ingress Protection (IP) for both solid objects and liquids
- High voltage testing & validation services, both internal and external – to guarantee high product quality
- Possibility of joint development projects, allowing access to specialised engineering resources as well as RADOX technology

| | |
|-------------------------------|----|
| mHVDU – standard modular HVDU | 46 |
| RADOX® EV-C cable system | 48 |
| Cable assembly | 51 |
| 3 pole connector | 52 |

mHVDU – standard modular HVDU



Applications

- Standard product solution
- Finalized and available
- Composed of standardized components

Benefits

- Scalability of in- and outputs and fuses (variant configurator)
- Standardized process and short lead times
- Ideal for prototypes/samples in harsh environments
- Space, weight and cost saving
- Fully validated
- Harmonized with HUBER+SUHNER product portfolio (AWC + ACS)

mHVDU – standard modular HVDU

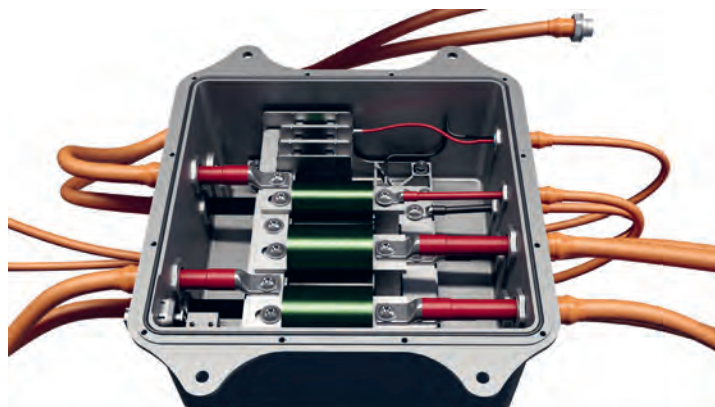
Technical data

| Electrial specifications | Modular High Voltage Distribution Unit |
|--|--|
| Voltage rating | 500 V dc / 800 V dc |
| Current rating | up to 650 A |
| Test voltage | 2,15 kV dc |
| Screen resistance | < 9 mΩ (H+S EV-C connection) |
| Insulation resistance (1000 Vdc, 60 sec., 85 °C) | > 50 MΩ |
| EMC protection | ECE-R10 (E1 certificate) acc. CISPR25 - 2016 6.3-5 |
| Channels (outputs fused only) | Input 2+1 / Output 6 |
| HVIL | (passive) HV-interlock |
| Degree of customization | Scheme based configuration of fuses |

| Mechanical data | Modular |
|---|----------------------------|
| Vibration and shock resistance | ISO 16750-3 (Profile VII.) |
| Housing material | Aluminium die-cast |
| Max. dimensions (length, width, height) | 325 mm × 325 mm × 144 mm |
| Cable connection position | in line from side-to-side |
| Waterproof pressure equalizing valve | yes |

| Environmental Data | Modular |
|-----------------------------|---------------------------------|
| Temperature range (ambient) | -40 to +85 °C |
| relative humidity | 0% – 95% |
| Altitude | 4.000 m above sea level |
| Ingress Protection | IP6K9K / IP67 |
| Corrosion resistance | ISO 16750-4 (incl. VDA 233-102) |

| Available for | Modular |
|-------------------------------|---|
| H+S cable cross section | 4 mm ² to 95 mm ² |
| Application (multifunctional) | commercial-, special- and industrial electric vehicles (incl. passenger cars) |
| APQP process step | A-, B-, C-, (D-) sample, series |



RADOX® EV-C cable system



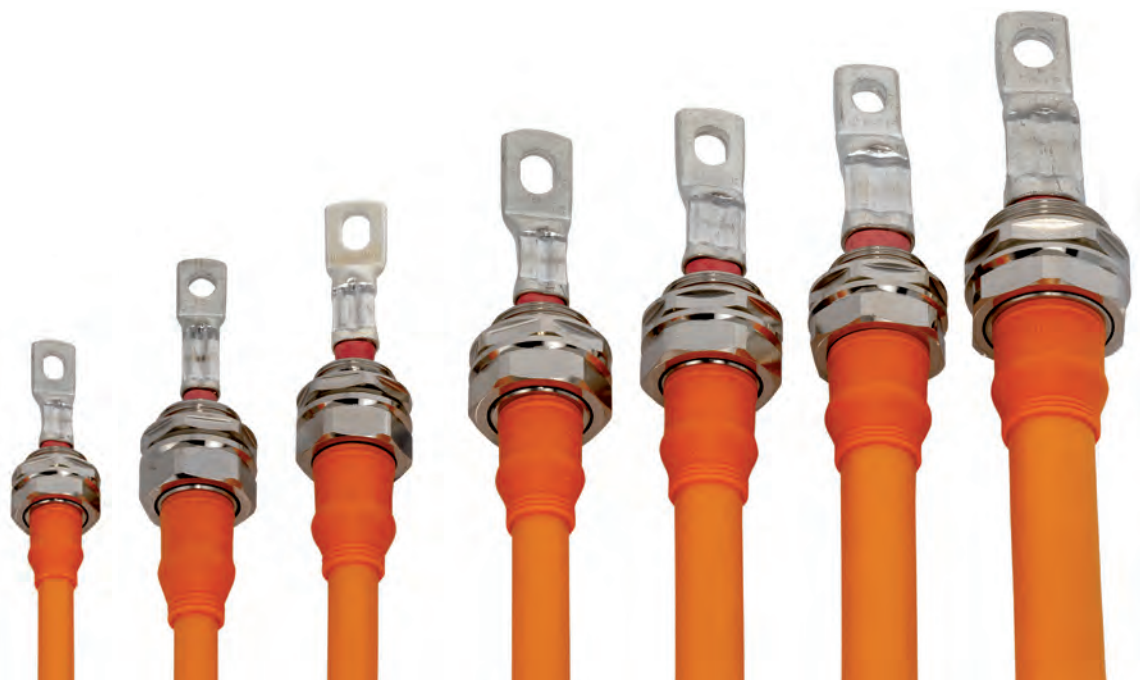
High Voltage cables in hybrid and electric vehicles move power to and from the battery and various systems throughout the vehicle. Managing and keeping these cables in place over the life of the vehicle and through a range of driving conditions is very critical.

High voltage automotive connection systems must stand up to wide temperature fluctuations, vibration and mechanical impact to secure and protect high voltage cables and components running throughout the vehicle. High performance electrical insulation, EMI protection and corrosion resistance are also important properties for this critical application.

Merging RADOX cable technology with a reputation for legendary reliability with innovative connectivity solution RADOX EV-C, HUBER+SUHNER is able to provide customers with an end-to-end offering.

The RADOX EV-C cable feed-cable gland, provides a barrier to moisture and debris, as well as retains cables in place. The connection is designed for high current carrying capability in harsh environments and with minimal space requirements. This robust solution, validated internally and externally for automotive high voltage applications, brings added reliability and durability, great performance and ease of assembling.

RADOX® EV-C Single-Core



Benefits

- Flex Cable
- High ampacity of conductor and shielding
- Compact design with reliable connections and seals
- True 360° screen connection
- Wide shock and vibration resistance
- High temperature range (-40 °C to 140 °C)
- Proven protection against environmental factors IP67 and IP6K9K
- Wide range of cable cross sections — from 16 to 120 mm²

Technical data

| Electrical Data | |
|---------------------------|------------------------------------|
| Voltage rating | 1000 V DC |
| Current carrying capacity | 450A (95 mm ²) at 85°C |
| Screen resistance | < 7 mΩ |

| Mechanical data | |
|-----------------|--|
| Cross section | Single-Core: 16, 25, 35, 50, 70, 95, 120 mm ² |

| Environmental data | |
|---------------------|-----------------|
| Ambient temperature | -40°C to +140°C |
| IP Rating | IP6K9K / IP67 |

RADOX® EV-C Multi-Core



Benefits

- The same interface as single-core version
- Compact design with reliable connections and seals
- High shock and vibration resistance
- Wide temperature range (-40 to 140°C)
- Proven protection against environmental factors IP67 and IP6K9K
- Available cable cross sections – 2x4 , 2x6 and 4x10 mm² (other sizes upon request)

Technical data

| Electrical Data | |
|---------------------------|--|
| Voltage rating | 2 × 4 mm ² , 700V DC 2 × 6 mm ² , 800V DC 3 × 6 mm ² , 800 DC 4 × 10 mm ² , 850V DC |
| Current carrying capacity | 88 A / 105 A / 230 A @ 85°C |
| Screen resistance | < 7 mΩ |

| Mechanical data | |
|-----------------|---|
| Cross section | Multi-Core: 2 × 4, 2 × 6 and 4 × 10 mm ² |

| Environmental data | |
|---------------------|-----------------|
| Ambient temperature | -40°C to +140°C |
| IP Rating | IP6K9K / IP67 |

Cable assembly



HUBER+SUHNER has provided Automotive industry with high-quality custom cable assemblies, wire harnesses and high voltage sub-assemblies since decades. Thanks to RADOX® technology, cable assemblies are extremely durable and able to withstand the conditions of heavy duty applications.

Benefits

- High adaptability (turnkey or custom-built solutions)
- Very fast sample preparation for prototype builds as well as series
- Accelerated homologation process (assembly with RADOX EV-C is already validated by independent laboratory)
- Long operation time under harsh environments
- Possible system usage without corrugated tubes

3 pole connector



Applications

HUBER+SUHNER develops complex and innovative cable systems according to customer requirements.

Benefits

- Assembly of HV harnesses with our cables for specific applications – according to customer requirements
- Compact design, for easy integration into Customer HV system
- High electrical loads permissible
- High shock and vibration resistance
- Proven protection against environmental factors
- Reliable connections and seals

Technical and delivery information

In this chapter you find the following, additional and useful information about automotive wire and cable:

- RADOX® details and advantages
- Temperature classes
- Current carrying capacity
- Delivery spools

| | |
|------------------------------|----|
| RADOX details and advantages | 54 |
| Temperature classes | 55 |
| Current carrying capacity | 56 |
| Delivery spools | 66 |

RADOX® – An unique technology meets wider applications

What is RADOX?

RADOX represents electron beam cross-linked insulating materials developed by HUBER+SUHNER. The RADOX insulations offer excellent resistance to thermal, chemical, electrical and mechanical loads. Thanks to reduced wall thicknesses, it also saves weight and space. RADOX materials enable solutions to be customised to specific applications.

RADOX does not melt!

Thermoplastic insulation materials are sometimes used for automotive wiring. Products such as PVC, PP, PE, PA, TPE and Fluoropolymers are used. These materials all have a melting point and at certain temperature peaks in specific applications they eventually melt with the risk of creating a short circuit. RADOX does not melt and therefore provides an extra safety margin for automotive applications.

RADOX withstands temperature peaks!

Since RADOX is not melting, it will withstand temperature peaks above the defined temperature range. A typical automotive RADOX cable is specified for applications between -40 and $+150$ °C based on a lifetime of 3000 h. Even at higher temperature peaks, RADOX does not melt. There is a rule of thumb that states, $+10$ °C temperature increase reduces lifetime by half (160 °C/1500 h, 170 °C/750 h, etc.), the converse also applies.

RADOX extends lifetime at lower temperature!

In general automotive cables are defined with different temperature ratings based on 3000 h. This makes sense in most of the cases since 3000 h corresponds to 150 000 km lifetime for a car (at 50 km/h average speed). If any application asks for a longer lifetime, especially with trucks and buses, RADOX is the best choice. By using a 150 °C rated RADOX cable at 120 °C, this will extend lifetime to 24 000 h or 1 200 000 km.

RADOX withstands low temperatures!

Automotive specifications define clear temperature ranges. These ranges often start from -40 °C and go up to 85, 100, 125, 150, 175 °C, etc. The range is described as class B, C, D or T2, T3 and T4 and so on. RADOX can do better than that! REMS will withstand -70 °C, RADOX 155S and 155 at least -55 °C. This creates more possibilities where for example a standard PVC can not do the job.

Temperature classes for cables

Automotive specifications define clear temperature ranges. These ranges often start from $-40\text{ }^{\circ}\text{C}$ and go up to 85, 100, 125, 150, 175 $^{\circ}\text{C}$, etc. The range is described as class A, B, C, D, E, F, G and H or T1, T2, T3, T4, T5 and T6. These temperature classes are defined according to ISO 6722, the ratings are valid for 3000 hours.

| Class rating | Temperature | Materials |
|---------------------|---|------------------------------------|
| H | -40 to $+250\text{ }^{\circ}\text{C}$ | fluoropolymers |
| G | -40 to $+225\text{ }^{\circ}\text{C}$ | fluoropolymers |
| F (6) | -40 to $+200\text{ }^{\circ}\text{C}$ | fluoropolymers, silicone |
| E (5) | -40 to $+175\text{ }^{\circ}\text{C}$ | fluoropolymers, silicone |
| D (4) | -40 to $+150\text{ }^{\circ}\text{C}$ | fluoropolymers, Polyesters, RADOX® |
| C (3) | -40 to $+125\text{ }^{\circ}\text{C}$ | PE-X, TPE, PVC-X, RADOX |
| B (2) | -40 to $+100\text{ }^{\circ}\text{C}$ | PE-X, TPE, PVC |
| A (1) | -40 to $+85\text{ }^{\circ}\text{C}$ | PVC |

Current carrying capacity

RADOX® 155 and REMS battery cables and RADOX 155 SFLR single core cables

Standard conditions for current rating

The tabled values for the current rating were calculated according to IEC 60287 for the following standard conditions:

- Continuous operation
- Single circuit for 3-phase current, single conductor for 1-phase current
- 30 °C ambient temperature and sufficiently large and ventilated spaces, whose ambient temperature is not appreciably increased by the heat coming from the cables
- 150 °C conductor temperature
- ISO 6722: 3000 h/150 °C winding test
- Frequency from 0 Hz (DC) up to 200 Hz (AC)

Installation in air, unrestricted heat dissipation, means that the following installation conditions are observed:

- Distance of the cables from the wall, from the floor, from the ceiling \geq cable diameter
- Distance between two adjacent power circuits $\geq 2 \times$ cable diameter
- Vertical distance between power circuits laid one upon another for individual cables $\geq 2 \times$ cable diameter
for layers of cables > 200 mm
- Perforated tray with a perforation > 30 % of the total surface

Open trays are continuous supports with vertical sides, but without cover. A possible perforation accounts for ≤ 30 % of the total surface.

Closed ducts are entirely closed. Pipes belong to this category also. The max. filling degree is 70 %.

Lifetime expectation

If cross-linked wires are used at higher temperatures than indicated by the temperature rating in ISO 6722, the lifetime is reduced accordingly. Analogical, the lifetime will increase at lower temperature. RADOX 155 for example has a life span of 3000 h at a conductor temperature of +150 °C. When it is used at different temperature, lifetime expectations are shown as follows:

Example on basis

RADOX 155, REMS and RADOX 155 SFLR

| | |
|--------|----------|
| 180 °C | 375 h |
| 170 °C | 750 h |
| 160 °C | 1500 h |
| 150 °C | 3000 h |
| 140 °C | 6000 h |
| 130 °C | 12000 h |
| 120 °C | 24000 h |
| 110 °C | 48 000 h |
| 100 °C | 96 000 h |

Current carrying capacity

RADOX® 155 and REMS battery cables and RADOX 155 SFLR single core cables

Current rating under service conditions

$$I = I_N \cdot f_1 \cdot f_2 \cdot f_3 \cdot f_4$$

I [A] current rating for continuous operation under service conditions

I_N [A] current rating for continuous operation under standard conditions

f_1 reduction factor for increased ambient temperature

f_2 conversion factor for deviated conductor temperature

f_3 reduction factor for multicore cables

f_4 reduction factor for increased frequency

Reduction factors for increased ambient temperature (f_1)

| Ambient temp. °C | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 |
|------------------------|----|------|------|------|------|------|------|------|------|------|------|------|
| Reduction factor f_1 | 1 | 0.98 | 0.96 | 0.94 | 0.91 | 0.89 | 0.87 | 0.84 | 0.82 | 0.79 | 0.76 | 0.74 |

Reduction factors for different permissible conductor temperature (f_2)

| Conductor temp. °C | 180 | 170 | 160 | 150 | 140 | 130 | 120 | 110 | 100 | 90 | 80 | 70 | 60 | 50 | 40 |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Reduction factor f_2 | 1.12 | 1.08 | 1.04 | 1.00 | 0.96 | 0.91 | 0.87 | 0.82 | 0.76 | 0.71 | 0.65 | 0.58 | 0.50 | 0.41 | 0.29 |

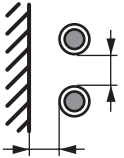

Reduction factors for increased frequency (f_3)

| Frequency Hz* | 400 | 600 | 800 | 1000 | 2000 | 3000 | 4000 | 5000 | 10000 |
|--|--------------|------|------|------|------|------|------|------|-------|
| Copper conductor cross section mm ² | faktor f_3 | | | | | | | | |
| 1.5 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2.5 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.98 |
| 6 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.99 | 0.93 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 0.96 | 0.93 | 0.82 |
| 16 | 1 | 1 | 1 | 1 | 1 | 0.95 | 0.91 | 0.87 | 0.76 |
| 25 | 1 | 1 | 1 | 1 | 0.94 | 0.88 | 0.83 | 0.80 | 0.69 |
| 35 | 1 | 1 | 1 | 0.98 | 0.89 | 0.82 | 0.77 | 0.74 | 0.64 |
| 50 | 1 | 1 | 0.98 | 0.94 | 0.83 | 0.76 | 0.72 | 0.69 | 0.59 |
| 70 | 1 | 0.95 | 0.94 | 0.88 | 0.77 | 0.71 | 0.67 | 0.63 | 0.54 |
| 95 | 0.98 | 0.93 | 0.88 | 0.84 | 0.73 | 0.67 | 0.63 | 0.60 | 0.51 |
| 120 | 0.94 | 0.88 | 0.84 | 0.80 | 0.69 | 0.64 | 0.60 | 0.57 | 0.48 |
| 150 | 0.90 | 0.85 | 0.80 | 0.77 | 0.66 | 0.61 | 0.57 | 0.54 | 0.46 |

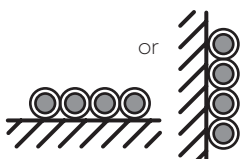

* We recommend that you use a special conductor design for frequencies > 800 Hz and cross sections > 25 mm² (waveguide design).

Current carrying capacity

RADOX® 155 and REMS battery cables

| Installation method | Connecting lead in free air or perforated tray | | | | | | | | | |
|---|---|------|------|------|------|---|------|------|------|--|
| Number of simultaneous loaded conductors on each tray |  | | | | |  | | | | |
| | 1 | 2 | 3 | 4 | 6 | 8 | 10 | 16 | 20 | |
| Reduction factor f_3 | 1 | 0.86 | 0.80 | 0.78 | 0.75 | 0.74 | 0.73 | 0.72 | 0.72 | |
| Copper conductor cross section mm ² | Current carrying capacity A | | | | | | | | | |
| 4 | 72 | 62 | 58 | 56 | 55 | 54 | 53 | 52 | 52 | |
| 6 | 94 | 80 | 76 | 73 | 71 | 70 | 69 | 68 | 67 | |
| 10 | 135 | 115 | 108 | 105 | 101 | 100 | 98 | 97 | 96 | |
| 16 | 178 | 153 | 143 | 139 | 134 | 132 | 130 | 128 | 128 | |
| 25 | 233 | 200 | 187 | 182 | 175 | 173 | 171 | 168 | 167 | |
| 35 | 295 | 253 | 237 | 230 | 222 | 218 | 216 | 213 | 211 | |
| 50 | 378 | 323 | 303 | 294 | 284 | 279 | 276 | 272 | 271 | |
| 70 | 467 | 400 | 375 | 364 | 351 | 346 | 342 | 337 | 335 | |
| 95 | 585 | 501 | 471 | 456 | 441 | 433 | 429 | 422 | 420 | |
| 120 | 679 | 581 | 546 | 529 | 511 | 503 | 497 | 489 | 487 | |
| 150 | 776 | 665 | 624 | 605 | 584 | 575 | 568 | 560 | 556 | |

RADOX® 155 and REMS battery cables

| Installation method | On floor or wall | | | | Fixed on a ceiling or under floor | | | | | | | |
|---|---|------|------|------|---|------|------|------|------|------|------|------|
| Number of simultaneous loaded conductors on each tray |  | | | |  | | | | | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Reduction factor f_3 | 1.00 | 0.84 | 0.78 | 0.76 | 0.97 | 0.77 | 0.71 | 0.67 | 0.66 | 0.64 | 0.63 | 0.63 |
| Copper conductor cross section mm ² | Current carrying capacity A | | | | | | | | | | | |
| 4 | 69 | 58 | 54 | 52 | 67 | 53 | 49 | 47 | 45 | 45 | 44 | 44 |
| 6 | 90 | 76 | 71 | 68 | 87 | 70 | 64 | 61 | 59 | 58 | 57 | 57 |
| 10 | 129 | 108 | 101 | 97 | 124 | 99 | 91 | 87 | 84 | 83 | 82 | 81 |
| 16 | 170 | 143 | 134 | 129 | 164 | 131 | 121 | 115 | 112 | 109 | 108 | 107 |
| 25 | 223 | 186 | 175 | 168 | 215 | 172 | 158 | 150 | 146 | 143 | 141 | 140 |
| 35 | 282 | 236 | 221 | 213 | 272 | 217 | 199 | 190 | 185 | 181 | 179 | 177 |
| 50 | 360 | 302 | 283 | 273 | 348 | 278 | 255 | 243 | 236 | 232 | 229 | 226 |
| 70 | 446 | 373 | 350 | 337 | 430 | 344 | 315 | 301 | 292 | 286 | 283 | 280 |
| 95 | 558 | 468 | 438 | 423 | 539 | 431 | 395 | 377 | 366 | 359 | 354 | 351 |
| 120 | 648 | 543 | 508 | 490 | 625 | 500 | 459 | 437 | 425 | 416 | 411 | 407 |
| 150 | 741 | 621 | 581 | 561 | 715 | 571 | 524 | 500 | 486 | 476 | 470 | 465 |

Continuous current rating

Conductor temperature +150 °C, ambient temperature +30 °C

| | | | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | | | | | | | | | | | | | | | | |
| 4 | 6 | 8 | 10 | 16 | 20 | 4 | 6 | 8 | 10 | 16 | 20 | 4 | 6 | 8 | 10 | 16 | 20 |
| 0.72 | 0.61 | 0.56 | 0.52 | 0.48 | 0.46 | 0.67 | 0.59 | 0.54 | 0.50 | 0.45 | 0.43 | 0.72 | 0.58 | 0.51 | 0.47 | 0.41 | 0.39 |

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 52 | 44 | 40 | 38 | 34 | 33 | 49 | 43 | 39 | 36 | 33 | 31 | 52 | 42 | 37 | 34 | 30 | 28 |
| 68 | 58 | 52 | 49 | 45 | 43 | 63 | 55 | 51 | 47 | 42 | 40 | 67 | 55 | 48 | 44 | 39 | 37 |
| 97 | 82 | 75 | 71 | 64 | 62 | 90 | 79 | 73 | 67 | 61 | 58 | 96 | 78 | 69 | 64 | 55 | 53 |
| 128 | 109 | 99 | 94 | 85 | 82 | 119 | 105 | 96 | 89 | 80 | 77 | 127 | 103 | 91 | 84 | 73 | 70 |
| 168 | 143 | 130 | 122 | 111 | 107 | 156 | 138 | 126 | 117 | 105 | 100 | 167 | 135 | 119 | 110 | 96 | 91 |
| 212 | 181 | 165 | 155 | 140 | 136 | 198 | 174 | 159 | 148 | 133 | 127 | 211 | 171 | 151 | 139 | 121 | 115 |
| 272 | 231 | 211 | 198 | 179 | 174 | 253 | 223 | 204 | 189 | 170 | 162 | 270 | 219 | 193 | 178 | 155 | 148 |
| 336 | 286 | 261 | 245 | 222 | 215 | 313 | 275 | 252 | 233 | 210 | 201 | 334 | 271 | 239 | 221 | 192 | 183 |
| 421 | 358 | 327 | 307 | 278 | 269 | 392 | 345 | 316 | 293 | 263 | 252 | 419 | 340 | 300 | 277 | 240 | 229 |
| 489 | 415 | 379 | 356 | 323 | 312 | 455 | 401 | 367 | 339 | 306 | 292 | 486 | 394 | 348 | 321 | 278 | 265 |
| 558 | 475 | 433 | 407 | 369 | 357 | 520 | 458 | 419 | 388 | 349 | 334 | 555 | 450 | 398 | 367 | 318 | 303 |

Continuous current rating

Conductor temperature +150 °C, ambient temperature +30 °C

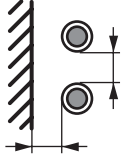

In conduit, in a void or in a pipe

| | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | | | | | | | | | | | | | |
| ≥ 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 14 | 16 | 20 |
| 0.61 | 1.00 | 0.84 | 0.78 | 0.76 | 0.74 | 0.73 | 0.72 | 0.72 | 0.71 | 0.71 | 0.70 | 0.70 | 0.70 | 0.38 |

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 48 | 69 | 58 | 54 | 52 | 51 | 51 | 50 | 50 | 49 | 49 | 49 | 48 | 48 | 30 |
| 61 | 90 | 76 | 71 | 68 | 67 | 66 | 65 | 65 | 64 | 64 | 63 | 63 | 63 | 31 |
| 90 | 129 | 108 | 101 | 97 | 95 | 94 | 93 | 92 | 92 | 91 | 90 | 90 | 90 | 42 |
| 122 | 170 | 143 | 134 | 129 | 126 | 124 | 123 | 122 | 121 | 121 | 120 | 119 | 119 | 57 |
| 163 | 223 | 186 | 175 | 168 | 165 | 162 | 161 | 159 | 159 | 158 | 156 | 156 | 155 | 77 |
| 206 | 282 | 236 | 221 | 213 | 209 | 206 | 203 | 202 | 201 | 199 | 198 | 197 | 196 | 95 |
| 263 | 360 | 302 | 283 | 273 | 267 | 263 | 260 | 258 | 257 | 255 | 253 | 252 | 251 | 120 |
| 332 | 446 | 373 | 350 | 337 | 330 | 325 | 322 | 319 | 317 | 315 | 313 | 312 | 310 | 150 |
| 404 | 559 | 468 | 438 | 423 | 414 | 408 | 404 | 401 | 398 | 396 | 392 | 391 | 389 | 186 |
| 473 | 649 | 544 | 509 | 491 | 481 | 473 | 469 | 465 | 462 | 459 | 455 | 454 | 452 | 215 |
| 550 | 742 | 622 | 582 | 562 | 550 | 542 | 536 | 532 | 529 | 526 | 521 | 519 | 517 | 249 |


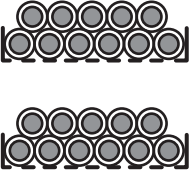

Current carrying capacity

RADOX® 155S FLR single core cables

| Installation method | Connecting lead in free air or perforated tray | | | | | | | | | |
|---|--|------|------|------|------|------|------|------|------|----|
| Number of simultaneous loaded conductors on each tray |   | | | | | | | | | |
| | | 1 | 2 | 3 | 4 | 6 | 8 | 10 | 16 | 20 |
| Reduction factor f_3 | 1 | 0.86 | 0.80 | 0.78 | 0.75 | 0.74 | 0.73 | 0.72 | 0.72 | |
| Copper conductor cross section mm ² | Current carrying capacity A | | | | | | | | | |
| 0.5 | 18.6 | 15.9 | 14.9 | 14.5 | 14.0 | 13.7 | 13.6 | 13.4 | 13.3 | |
| 0.75 | 24.7 | 21.1 | 19.9 | 19.2 | 18.6 | 18.3 | 18.1 | 17.8 | 17.7 | |
| 1.0 | 30 | 25 | 24 | 23 | 22 | 22 | 22 | 21 | 21 | |
| 1.5 | 39 | 33 | 31 | 30 | 29 | 29 | 28 | 28 | 28 | |
| 2.5 | 55 | 47 | 45 | 43 | 42 | 41 | 41 | 40 | 40 | |
| 4 | 72 | 62 | 58 | 56 | 55 | 54 | 53 | 52 | 52 | |
| 6 | 94 | 80 | 76 | 73 | 71 | 70 | 69 | 68 | 67 | |

Continuous current rating

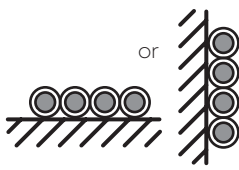

Conductor temperature +150 °C, ambient temperature +30 °C

| | | | | | | | | | | | | | | | | | |
|---|------|------|------|------|------|---|------|------|------|------|------|---|------|------|------|------|------|
|  | | | | | |  | | | | | |  | | | | | |
| 4 | 6 | 8 | 10 | 16 | 20 | 4 | 6 | 8 | 10 | 16 | 20 | 4 | 6 | 8 | 10 | 16 | 20 |
| 0.72 | 0.61 | 0.56 | 0.52 | 0.48 | 0.46 | 0.67 | 0.59 | 0.54 | 0.50 | 0.45 | 0.43 | 0.72 | 0.58 | 0.51 | 0.47 | 0.41 | 0.39 |

| | | | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|
| 13.4 | 11.4 | 10.4 | 9.7 | 8.9 | 8.5 | 12.4 | 11.0 | 10.0 | 9.3 | 8.4 | 8.0 | 13.3 | 10.8 | 9.5 | 8.8 | 7.6 | 7.3 |
| 17.8 | 15.1 | 13.8 | 13.0 | 11.8 | 11.3 | 16.5 | 14.6 | 13.3 | 12.3 | 11.1 | 10.6 | 17.7 | 14.3 | 12.6 | 11.6 | 10.1 | 9.6 |
| 21 | 18 | 16 | 16 | 14 | 14 | 20 | 17 | 16 | 15 | 13 | 13 | 21 | 17 | 15 | 14 | 12 | 12 |
| 28 | 24 | 22 | 20 | 18 | 18 | 26 | 23 | 21 | 19 | 17 | 17 | 28 | 22 | 20 | 18 | 16 | 15 |
| 40 | 34 | 31 | 29 | 26 | 25 | 37 | 33 | 30 | 28 | 25 | 24 | 40 | 32 | 28 | 26 | 23 | 22 |
| 52 | 44 | 40 | 38 | 35 | 33 | 49 | 43 | 39 | 36 | 33 | 31 | 52 | 42 | 37 | 34 | 30 | 28 |
| 68 | 58 | 52 | 49 | 45 | 43 | 63 | 55 | 51 | 47 | 42 | 40 | 67 | 54 | 48 | 44 | 39 | 37 |

Current carrying capacity

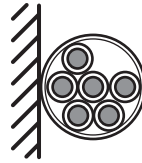
RADOX® 155 and REMS battery cables

| Installation method | On floor or wall | | | | Fixed on a ceiling or under floor | | | | | | | |
|---|---|------|------|------|---|------|------|------|------|------|------|------|
| Number of simultaneous loaded conductors on each tray |  | | | |  | | | | | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Reduction factor f_3 | 1 | 0.84 | 0.78 | 0.76 | 0.97 | 0.77 | 0.71 | 0.67 | 0.66 | 0.64 | 0.63 | 0.63 |
| Copper conductor cross section mm ² | Current carrying capacity A | | | | | | | | | | | |
| 0.5 | 17.8 | 14.9 | 13.9 | 13.5 | 17.2 | 13.7 | 12.6 | 12.0 | 11.7 | 11.4 | 11.3 | 11.1 |
| 0.75 | 23.6 | 19.8 | 18.5 | 17.9 | 22.8 | 18.2 | 16.7 | 16.0 | 15.5 | 15.2 | 15.0 | 14.8 |
| 1.0 | 28 | 24 | 22 | 21 | 27 | 22 | 20 | 19 | 19 | 18 | 18 | 18 |
| 1.5 | 37 | 31 | 29 | 28 | 36 | 29 | 26 | 25 | 24 | 24 | 23 | 23 |
| 2.5 | 53 | 44 | 41 | 40 | 51 | 41 | 37 | 36 | 35 | 34 | 34 | 33 |
| 4 | 69 | 58 | 54 | 52 | 67 | 53 | 49 | 47 | 45 | 44 | 44 | 43 |
| 6 | 90 | 76 | 71 | 68 | 87 | 70 | 64 | 61 | 59 | 58 | 57 | 57 |

Continuous current rating

Conductor temperature +150 °C, ambient temperature +30 °C

In conduit, in a void or in a pipe

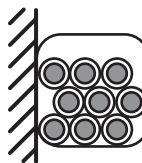


| | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ≥ 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 14 | 16 | 20 |
| 0.61 | 1 | 0.84 | 0.78 | 0.76 | 0.74 | 0.73 | 0.72 | 0.72 | 0.71 | 0.71 | 0.70 | 0.70 | 0.70 | 0.69 |
| 9.1 | 17.8 | 14.9 | 13.9 | 13.5 | 13.2 | 13.0 | 12.8 | 12.7 | 12.7 | 12.6 | 12.5 | 12.4 | 12.4 | 12.3 |
| 11.9 | 23.6 | 19.8 | 18.5 | 17.9 | 17.5 | 17.3 | 17.1 | 16.9 | 16.8 | 16.7 | 16.6 | 16.5 | 16.5 | 16.4 |
| 16 | 28 | 24 | 22 | 21 | 21 | 21 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| 19 | 37 | 31 | 29 | 28 | 27 | 27 | 27 | 27 | 26 | 26 | 26 | 26 | 26 | 26 |
| 24 | 53 | 44 | 41 | 40 | 39 | 39 | 38 | 38 | 38 | 37 | 37 | 37 | 37 | 37 |
| 34 | 69 | 58 | 54 | 52 | 51 | 50 | 50 | 49 | 49 | 49 | 48 | 48 | 48 | 48 |
| 46 | 90 | 76 | 71 | 68 | 67 | 66 | 65 | 65 | 64 | 64 | 63 | 63 | 63 | 62 |

Continuous current rating

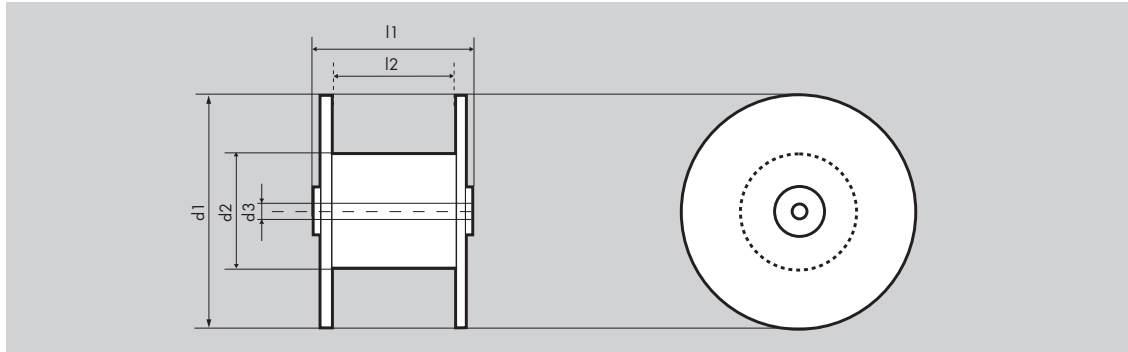
Conductor temperature +150 °C, ambient temperature +30 °C

In conduit, in a void or in a pipe



| | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ≥ 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 14 | 16 | 20 |
| 0.61 | 1 | 0.80 | 0.70 | 0.64 | 0.60 | 0.56 | 0.53 | 0.51 | 0.49 | 0.48 | 0.45 | 0.43 | 0.41 | 0.38 |
| 9.1 | 14.2 | 11.3 | 10.0 | 9.1 | 8.5 | 8.0 | 7.6 | 7.3 | 7.0 | 6.8 | 6.4 | 6.1 | 5.8 | 5.4 |
| 11.9 | 18.8 | 15.1 | 13.2 | 12.1 | 11.2 | 10.6 | 10.1 | 9.7 | 9.3 | 9.0 | 8.5 | 8.1 | 7.7 | 7.2 |
| 16 | 23 | 18 | 16 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9 | 9 |
| 19 | 30 | 24 | 21 | 19 | 18 | 17 | 16 | 15 | 15 | 14 | 13 | 13 | 12 | 11 |
| 24 | 42 | 34 | 30 | 27 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| 34 | 55 | 44 | 39 | 35 | 33 | 31 | 30 | 28 | 27 | 26 | 25 | 24 | 23 | 21 |
| 46 | 90 | 76 | 71 | 68 | 67 | 66 | 65 | 65 | 64 | 64 | 63 | 63 | 63 | 62 |

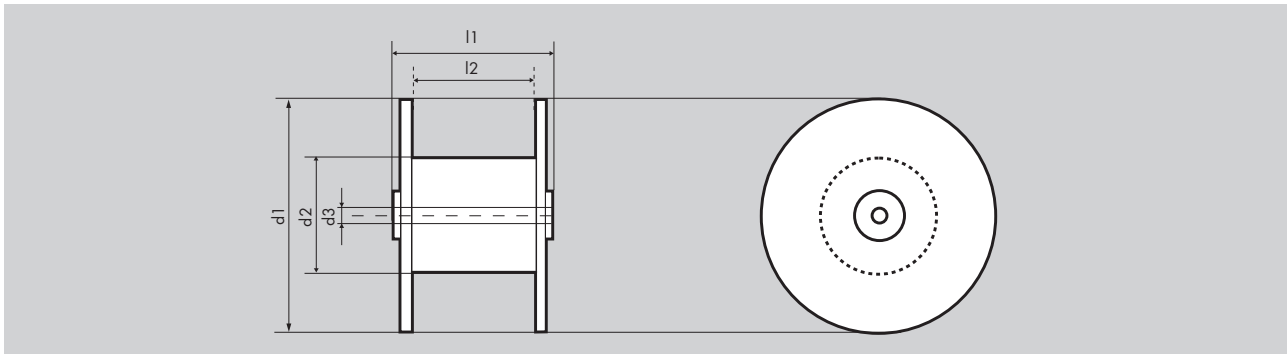
Delivery spools



| | Spool HS 150 | Spool HS 151 | Spool HS 200 | Spool HS400 | Spool HS 401 | Spool HS 600 |
|---------|---|---|---|--|---|---|
| |  |  |  |  |  |  |
| d 1 | 150 | 150 | 195 | 395 | 395 | 595 |
| d 2 | 65 | 65 | 100 | 180 | 180 | 350 |
| d 3 | 60 | 60 | 60 | 60 | 60 | 80 |
| l 1 | 76 | 166 | 250 | 185 | 280 | 500 |
| l 2 | 70 | 160 | 210 | 145 | 240 | 430 |
| Tara kg | 0.095 | 0.135 | 0.480 | 1.475 | 1.645 | 7.460 |

| Cable Ø mm | Cable length per delivery m | | | | | |
|------------|-----------------------------|-------|-------|--------|--------|--------|
| 1 | 804 | 1'837 | 3'698 | 11'263 | 18'642 | 62'553 |
| 2 | 201 | 459 | 924 | 2'816 | 4'661 | 15'638 |
| 3 | 89 | 204 | 411 | 1'251 | 2'071 | 6'950 |
| 4 | 50 | 115 | 231 | 704 | 1'165 | 3'910 |
| 5 | 32 | 73 | 148 | 451 | 746 | 2'502 |
| 6 | 22 | 51 | 103 | 313 | 518 | 1'738 |
| 7 | 16 | 37 | 75 | 230 | 380 | 1'277 |
| 8 | 13 | 29 | 58 | 176 | 291 | 977 |
| 9 | 10 | 23 | 46 | 139 | 230 | 772 |
| 10 | 8 | 18 | 37 | 113 | 186 | 626 |
| 11 | 7 | 15 | 31 | 93 | 154 | 517 |
| 12 | 6 | 13 | 26 | 78 | 129 | 434 |
| 13 | 5 | 11 | 22 | 67 | 110 | 370 |
| 14 | 4 | 9 | 19 | 57 | 95 | 319 |
| 15 | 4 | 8 | 16 | 50 | 83 | 278 |
| 16 | 3 | 7 | 14 | 44 | 73 | 244 |
| 17 | 3 | 6 | 13 | 39 | 65 | 216 |
| 18 | 2 | 6 | 11 | 35 | 58 | 193 |
| 19 | 2 | 5 | 10 | 31 | 52 | 173 |
| 20 | | 5 | 9 | 28 | 47 | 156 |
| 21 | | 4 | 8 | 26 | 42 | 142 |
| 22 | | 4 | 8 | 23 | 39 | 129 |
| 23 | | 3 | 7 | 21 | 35 | 118 |
| 24 | | 3 | 6 | 20 | 32 | 109 |

d1 flange diameter (mm), d2 core diameter (mm), d3 drill hole diameter (mm)
 l1 external width (mm)
 l2 reel width (mm)



| | Spool HS 601 | Spool HS 800 | Spool HS 1000 | Spool HS 1200 | Reusable NPS coil 250 x 400 (CK2) | Reusable NPS coil 400 x 400 (CK4) |
|---------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| d 1 | 595 | 795 | 1000 | 1190 | 400 | 400 |
| d 2 | 250 | 450 | 500 | 600 | 208 to 260 | 176 to 260 |
| d 3 | 80 | 80 | 80 | 80 | 80 | 80 |
| l 1 | 500 | 750 | 800 | 790 | 313 | 463 |
| l 2 | 430 | 620 | 660 | 650 | 250 | 400 |
| Tara kg | 7.150 | 18.875 | 31.000 | 64.200 | 2.4 | 2.7 |

| Cable Ø mm | Cable length per delivery m | | | | For details about length, instruction manual and accessories ask for separate documentation. |
|------------|-----------------------------|---------|---------|---------|--|
| 1 | 78'763 | 167'325 | 311'018 | 431'319 | |
| 2 | 19'691 | 41'831 | 77'754 | 107'830 | |
| 3 | 8'751 | 18'592 | 34'558 | 47'924 | |
| 4 | 4'923 | 10'458 | 19'439 | 26'957 | |
| 5 | 3'151 | 6'693 | 12'441 | 17'253 | |
| 6 | 2'188 | 4'648 | 8'639 | 11'981 | |
| 7 | 1'607 | 3'415 | 6'347 | 8'802 | |
| 8 | 1'231 | 2'614 | 4'860 | 6'739 | |
| 9 | 972 | 2'066 | 3'840 | 5'325 | |
| 10 | 788 | 1'673 | 3'110 | 4'313 | |
| 11 | 651 | 1'383 | 2'570 | 3'565 | |
| 12 | 547 | 1'162 | 2'160 | 2'995 | |
| 13 | 466 | 990 | 1'840 | 2'552 | |
| 14 | 402 | 854 | 1'587 | 2'201 | |
| 15 | 350 | 744 | 1'382 | 1'917 | |
| 16 | 308 | 654 | 1'215 | 1'685 | |
| 17 | 273 | 579 | 1'076 | 1'492 | |
| 18 | 243 | 516 | 960 | 1'331 | |
| 19 | 218 | 464 | 862 | 1'195 | |
| 20 | 197 | 418 | 778 | 1'078 | |
| 21 | 179 | 379 | 705 | 978 | |
| 22 | 163 | 346 | 643 | 891 | |
| 23 | 149 | 316 | 588 | 815 | |
| 24 | 137 | 290 | 540 | 749 | |

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HUBER+SUHNER is certified according to ISO 9001, ISO 14001, OHSAS 18001, EN(AS) 9100, IATF 16949 and ISO/TS 22163 – IRIS.

Waiver

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