

# LEONI Automotive Cables



**The Quality Connection**

**LEONI**

# Automotive cables – Overview

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Issue: February 2019

**Subject to change and error.**

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## Cables with innovative conductor materials

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## Single-core cables

unshielded, shielded, compliant with international standards for interior harnesses

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## LEONI Mocar®

high temperature resistant automotive cables for drive systems, engine compartment and temperature sensors

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## Heating cables

high temperature resistant cables for hose heating, seat heating and steering wheel heating

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## LEONI Hivocar®

high voltage cables for electric vehicles and vehicles with hybrid and fuel cell drive

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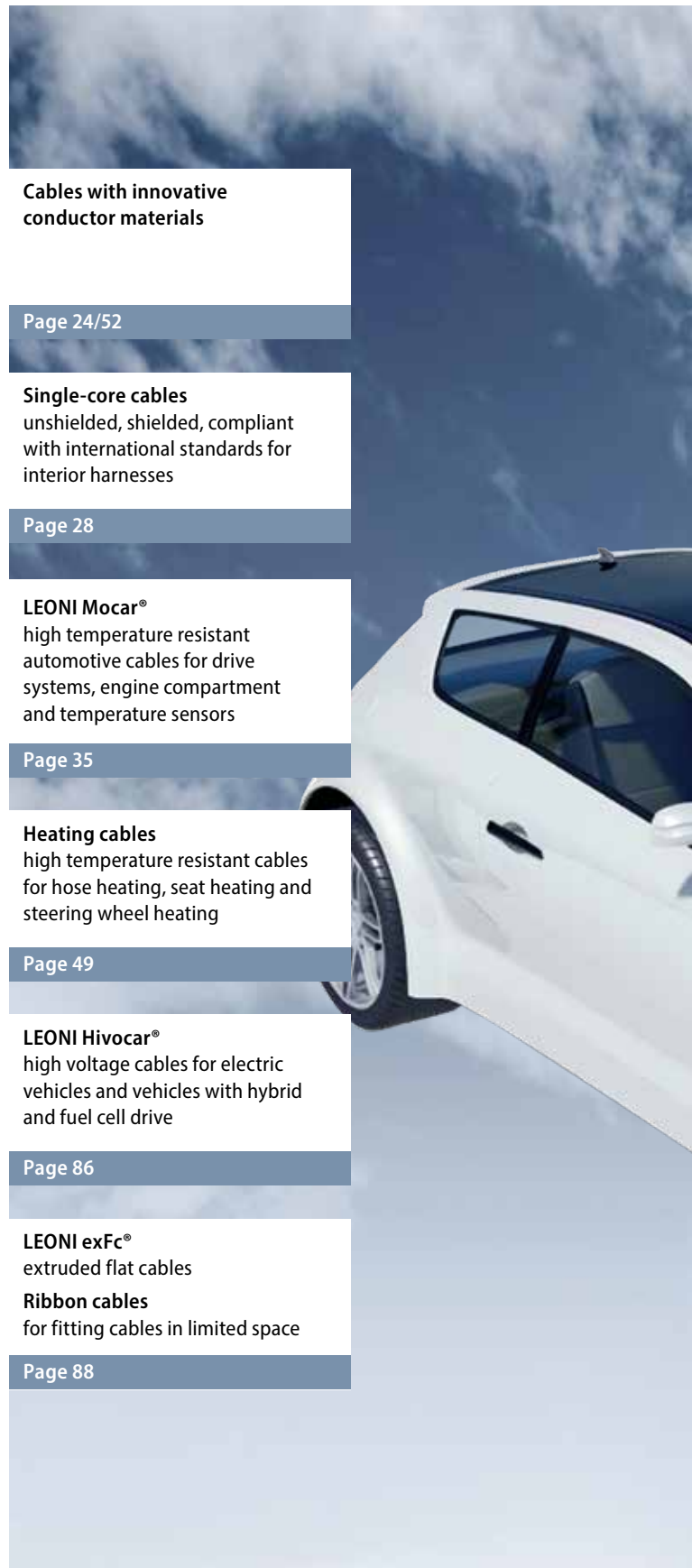
## LEONI exFc®

extruded flat cables

## Ribbon cables

for fitting cables in limited space

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On our website you will find your contact person for every product range

[www.leoni-automotive-cable.com](http://www.leoni-automotive-cable.com)  
under Products and Solutions

**LEONI Adascar®***Comfort/Control/Power*

Multi-core automotive cables with sheath, shielded and unshielded for comfort, control and power applications

Page 54

**LEONI Adascar®***Safety*

Multi-core automotive cables for safety applications

Page 62

**LEONI Adascar®***Truck*

Multi-core automotive cables with ADR certification for commercial vehicles

Page 64

**LEONI Adascar®***Sensor*

Sensor cables for driver assistance and active safety systems in the axle wiring

Page 68

**LEONI Adascar®**

High temperature automotive cables for temperatures  $\geq 150\text{ }^{\circ}\text{C}$

Page 70

**LEONI Dacar®**

Multi-core data cables  
Symmetrical data transmission cables for various transmission standards

Page 72

**LEONI Dacar®**

Coaxial cables  
Coaxial cables (unsymmetrical) for antennas made for special and standard applications

Page 80

## Our core competencies

Since 1931 LEONI is a leading manufacturer of cables and conductors for the automotive industry and has advanced to become the world's largest and most successful supplier – a global player. The business group Automotive Cables is sub-divided into the Automotive Standard Cables and Automotive Special Cables business units:

### Automotive Standard Cables

The Automotive Standard Cables business unit is among the global market leaders for single-core vehicle cables and supports you through its comprehensive product range with a wide variety of approvals from OEMs and Tier 1 customers.

#### Core competences:

##### Global presence:

Proximity to the customer is a key part of our corporate policy. In addition to production facilities in Mexico, Germany, Poland, Hungary, Turkey, India and China, LEONI offers you a global marketing and product management network which advises and supports you the world over.

##### Comprehensive product range:

LEONI supplies cables in accordance with international standards, such as ISO (Europe), JASO (Japan) and SAE (United States of America) and based on the specifications of all major international carmakers. The challenge is to produce worldwide standardised products in highest quality for the automotive industry

##### Highly quality standard:

Standardisation of methods and the clear definition of processes ensure a consistently high level of LEONI quality at all production facilities in all corners of the globe.

In short, the broad and varied range of services offered by the Automotive Standard Cables business unit makes it a sought-after partner of wiring systems manufacturers and assemblers around the world.

### Automotive Special Cables

The Automotive Special Cables business unit supports you with customised solutions for the wiring of your product.

#### Core competences:

##### Customised development:

Experienced product specialists maintain close contact with automotive producers, Tier 1 suppliers and socket manufacturers and also collaborate with experts in international cable organisations. You benefit from know-how at first hand.

##### Extensive materials portfolio:

LEONI develops and produces its own formulas for materials which are specifically tailored to the requirements of the automotive industry. This also includes insulation materials for high-temperature applications up to +1,250 °C. The business unit faces the challenge of launching innovative products on the market.

LEONI has state-of-the-art machinery in the areas of ram extrusion and silicon processing at its disposal. It covers different types of crosslinking such as the chemical and irradiation variants, as well as various foaming methods.

In short, the Automotive Special Cables business unit identifies the latest technologies at an early stage and offers the best possible conditions to ensure that together we can master the challenges of the automotive industry.

**Whether standard or special cables, LEONI provides customized solutions of the highest quality all around the world – committing itself to making a significant contribution to your corporate success and satisfaction.**



# Marking of automotive cables

## Manufacturer's markings

1. Single-core cables with a nominal cross-section of 0.5 mm<sup>2</sup> and more are permanently marked with the manufacturer's logo "LEONI" at maximum intervals of 200 mm (embossed or printed).

The marking of wires with a nominal cross-section smaller than 0.5 mm<sup>2</sup> is the subject of agreement between the customer and supplier.

2. For multi-core cables, there are several manufacturer marking options::

- marking of one (or several) core(s) see Pos. 1
- impression or print on the sheath

3. In addition to this marking, the identification for the individual plants can be expressed by an additional letter.

## Colour coding

1. The colours commonly used for the insulation of automotive cables are: white, yellow, grey, green, red, violet, brown, blue, black, orange (DIN 72551-7 and DIN IEC 304). Other colour identifications are permissible on request.

2. Two-colour automotive cables are marked by two diametrically opposed extruded longitudinal stripes. The width of every stripe must cover at least 7 % of the surface of the wire, with both marking stripes together covering at most 35 % of the surface.

3. Tricolour automotive cables are marked according to LV 112-1:

- 1. First colour: primary colour
- 2. Second colour: longitudinal stripes (as under 2 above)
- 3. Third colour: in the form of rings

Width of rings 3±1 mm. Distance between two successive rings: 6 to 20 mm. An offset of maximum 1 mm between the two ring halves is permissible.

## Other markings

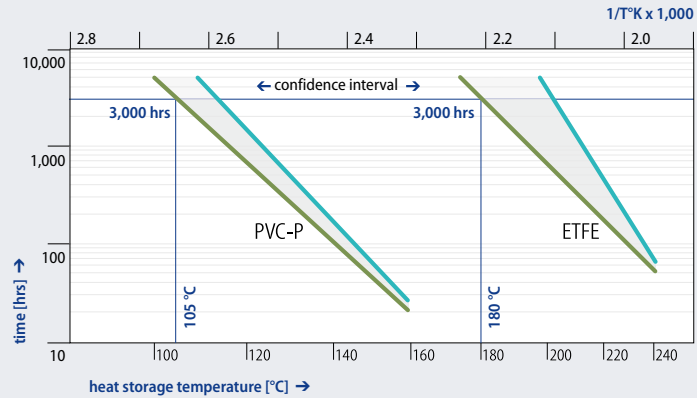
On request the wires can also be supplied with numbers printed on them. Since automotive cables fall into the class of low-voltage wires, no CE marking is needed. Cables in the high-voltage range should be provided with orange as a primary colour.



# Insulation materials

## How to determine the continuous service temperature.

temperature/time curve ————  
measurement curve ————



LEONI develops and uses insulation materials that provide high reliability and durability under operating conditions. The structure and properties of the materials used are listed below and in the table on page 8–9.

### Thermoplastics

- Plasticised or semi-crystalline polymers
- Viscoplastic properties in the service temperature range
- Plastically ductile at temperatures above the yield limit

### Thermoplastic elastomers

- Polymer soft and hard segments
- Rubber-like elastic properties in the service temperature range
- Plastically ductile at temperatures above the yield limit

### Elastomers/crosslinked plastics

- Crosslinked polymer soft and hard segments
- Rubber-like elastic properties with high reversible deformability in the service temperature range
- No thermoplastic flow properties – the crosslinked structure is retained up to decomposition temperature, i.e. well above service temperature

### Requirements and quality

- Material testing and development according to customer specifications and/or national and international standards
- Optimisation of properties to meet changed or new requirements
- Regular quality control in the form of product audits

### Selection criteria

- Service temperatures
- Electrical values
- Flexibility/hardness
- Mechanical stability under load
- Wear resistance
- Resistance to oil, fuels, brake fluid, acids/alkalis, organic agents
- Flame-retardant
- halogen-free
- low halogen

### Service temperatures

The low service temperature range is determined by cold strength tests, dynamic bending strength tests or by wrapping tests at low temperature in accordance with ISO 6722-1.

The maximum continuous service temperature for materials with impairment of specific material properties is defined by the temperature index according to DIN ISO 2578.

Temperature-time curves with a 50 % reduction of the original elongation at break after heat storage define the temperature index at 3,000 hrs. Higher temperatures are permitted for shorter time intervals (thermal overload capacity).

The diagram above shows examples of how to determine the continuous service temperature. The measurement curves lie above the temperature-time curves specified for the material. The zone in between represents the confidence interval.

# Insulation material properties

LEONI Dacar® cables



Symbol	Name e.g. DIN ISO 1629 and 7728	Code	Hardness Shore A/D DIN 53504 ± 5,0	Tensile strength DIN 53504 MPa	Elongation at break DIN 53504 %	Service temperatures ISO 2578/6722, DIN 0472 °C	Dielectric strength DIN 53481 kV/mm	Dielectric constant DIN 53483
<b>Thermoplastic polymers</b>								
PVC-P	Polyvinyl chloride (plasticised)	Y	acc. to sample (75 A–95 A)	>12,5	>150	–40 to +90	>10	4–6
PVC-P	(heat resistant) lead free	YW	acc. to sample (90 A–97 A)	>15	>150	–40 to +105	>10	4–6
PE-LD-E	Cellular polyethylene	02Y	40D	>10	>100	–40 to +85	>10	1.25–1.7
PE	Polyethylene	2Y	50D	>10	>300	–40 to +85	>30	2.3
PP	Cellular polypropylene	09Y	50D	>15	>100	–40 to +105	>10	1.5–1.7
PP	Polypropylene	9Y	70D	>25	>300	–40 to +125	>30	2.3
FEP	Tetrafluoroethylene/hexafluoropropylene	6Y	55D	>15	>200	–65 to +210	>30	21
ETFE	Ethylene/tetrafluoroethylene	7Y	75D	>30	>200	–65 to +180	>30	2.6
<b>Thermoplastic elastomers</b>								
TPE-U	Thermoplastic polyether polyurethane	11Y	85 A–95 A	>30	>400	–40 to +125	>10	7
TPE-O	Thermoplastic polyolefin elastomer	91Y	60 A–50 D	>10	>300	–40 to +125	>20	3
<b>Cross-linked plastics</b>								
PE-X	Polyethylene, crosslinked	2X	95 A	>10	>200	–40 to +125	>20	3–4
depends on recipe								

# Insulation material properties

## LEOMER®

It's all in the mix

LEONI carries its insulation materials for the production of cable under the brand name of LEOMER. With more than 50 of its own formulas developed in-house, LEONI ensures that the requirements arising from the particular applications of our customers are fulfilled in the best possible way. The manufacture of our insulation materials in-house and the close collaboration

between our production and materials development guarantee a consistently high standard of quality.

The name LEOMER is composed of the terms LEONI and polymer, and represents the diversity of the materials used at LEONI. LEONI.



Symbol	Name	Code	Density	Halogen content	Hardness Shore A/D	Tensile strength	Elongation at break
	e.g. DIN ISO 1629 and 7728	DIN 76722	ISO 11183		ISO 868	ISO 527	ISO 527 DIN 53504
Thermoplastic polymers			g/cm <sup>3</sup>	appr. %		MPa	%
PVC-P	Polyvinyl chloride (plasticised)	Y	1.30–1.45	30	80A–60D	>10	>150
PVC-P	Polyvinyl chloride-cold-resistant	YK	1.24–1.34	30	80A–95A	>10	>150
PVC-P	Polyvinyl chloride-heat-resistant	YW	1.24–1.34	30	87A–95D	>15	>150
PE	Polyethylene	2Y	0.92–0.95	0	50D–62D	>15	>300
PA	Polyamide	4Y	1.01	0	72D	>40	>300
PP	Polypropylene	9Y	0.91	0	–/70D	>15	>200
PP-FR	Polypropylene-flame-retardant	9Y	1.05–1.3	12	42D–60D	>15	>200
Thermoplastic elastomers			g/cm <sup>3</sup>	appr. %		MPa	%
TPE-U	Thermoplastic polyether polyurethane	11Y	1.12	0	75A–54D	>30	>400
TPE-E	Thermoplastic polyether ester elastomer	12Y	1.16–1.25	0	40D–82D	>25	>400
TPE-E	Thermoplastic polyether elastomer	13Y	1.25–1.28	0	55D–62D	>30	>300
TPE-S	Thermoplastic polystyrene block copolymer	31Y	1.10–1.30	0–10	50D–65D	>15	>200
TPE-A	Thermoplastic polyamide elastomer	41Y	1.01–1.06	0	63D	>25	>400
TPE-O	Thermoplastic polyolefine elastomer	91Y	0.95–1.25	0–10	87A/–	>10	>300
Crosslinked polymers / silicone			g/cm <sup>3</sup>	appr. %		MPa	%
SIR	Silicone rubber	2G	1.20–1.30	0	40A–90A	6–20	>200
EVA	Ethylene vinyl acetate	4G	1.30–1.40	0	80A–87A	>7	>150
PVC-X	Polyvinyl chloride. crosslinked	X	1.35	30	95A	>10	>150
XLPE	Polyethylene (irradiation, silane, peroxide crosslinked)	2X	1.20–1.50	10	30–60D	>10	>200
Fluoropolymers			g/cm <sup>3</sup>	appr. %		MPa	%
PTFE	Polytetrafluoroethylene	5Y	2.12–2.17	75	55D–65D	>20	>200
FEP	Fluorinated ethylene propylene	6Y	2.14	75	55D	>15	>200
ETFE	Ethylen tetrafluoroethylene	7Y	1.70	60	75D	>30	>200
PVDF	Polyvinylidene fluoride	10Y	1.8	35	78D	>25	>100
PFA	Perfluoroalkoxy copolymer	51Y	2.15	75	55D	>20	>200





Service temperatures			Resistance to							
Temperature index	Thermal overload capacity	Cold winding test	Specific volume resistance	Abrasion	Flame retardance	Oil	Fuels	Brake fluid	Acids/alkalis	Organic agents
ISO 6722-1 oder ISO 14572			IEC 93 DIN 53482	ISO 6722-1 oder ISO 14572						
°C/3,000 h	°C/48 h	°C	Ω · cm							
100/105	125	-40	>10 <sup>12</sup>	+	+	+	+	-	+	-
105	110	-50	>10 <sup>12</sup>	+	+	+	+	-	+	-
125	140	-40	>10 <sup>12</sup>	+	+	+	+	-	+	-
90	100	-40	>10 <sup>16</sup>	+	--	-	+	--	+	-
105	140	-40	>10 <sup>12</sup>	++	-	++	++	+	+	+
125	150	-40	>10 <sup>16</sup>	+	--	+	+	-	+	+
125	150	-40	>10 <sup>14</sup>	+	+	+	+	-	+	+
°C/3,000 h	°C/48 h	°C	Ω · cm							
110/125	150	-40	>10 <sup>9</sup>	++	+	++	++	+	+	+
90	150	-40	>10 <sup>9</sup>	++	-	++	++	+	-	+
150	180	-40	>10 <sup>9</sup>	++	+	++	++	+	+	+
125	150	-40	>10 <sup>10</sup>	-	+	+	+	-	+	-
90	120	-40	>10 <sup>10</sup>	++	-	++	++	+	-	+
125	150	-40	>10 <sup>14</sup>	-	+/-	-	-	-	+	-
°C/3,000 h	°C/48 h	°C	Ω · cm							
200	225	-80	>10 <sup>16</sup>	-	+	+	+	++	+	+
140	180	-40	>10 <sup>10</sup>	-	-	-	-	-	-	-
105	140	-40	>10 <sup>12</sup>	++	+	+	+	-	+	+
125-150	150	-40	>10 <sup>14</sup>	+	+	+	+	-	+	+
°C/3,000 h	°C/48 h	°C	Ω · cm							
260	305	-90	>10 <sup>18</sup>	++	++	++	++	++	++	++
210	260	-65	>10 <sup>15</sup>	++	++	++	++	++	++	++
180	230	-65	>10 <sup>15</sup>	++	++	++	++	++	++	++
150	160	-30	>10 <sup>14</sup>	++	++	++	++	++	+	+
260	290	-90	>10 <sup>15</sup>	++	++	++	++	++	++	++

++ excellent    + good    - fair    -- poor    depending on the recipe, on demand

# Conductor materials

Copper (Cu) is the conductive material we most commonly use in our cables.

In addition to pure copper we also process a variety of copper alloys for special applications.

## Extract from EN 1977 – copper

Symbol	Material number	Composition	Density	Melting point	% IACS min.	Notes on properties and use
		in % by weight	g/cm <sup>3</sup>		ISO 868	ISO 527
<b>Oxygenic copper</b>						
Cu-ETP1 (E-Cu)	CW 003 A	Cu ≥ 99.90 oxygen max. 0.040	8.9	1,083 °C	101	Oxygenic (tough-pitch) copper with an electrical conductivity in the soft condition of ≥ 58.58 m/Ωmm <sup>2</sup> at 20 °C.

International Annealed Copper Standard = IACS

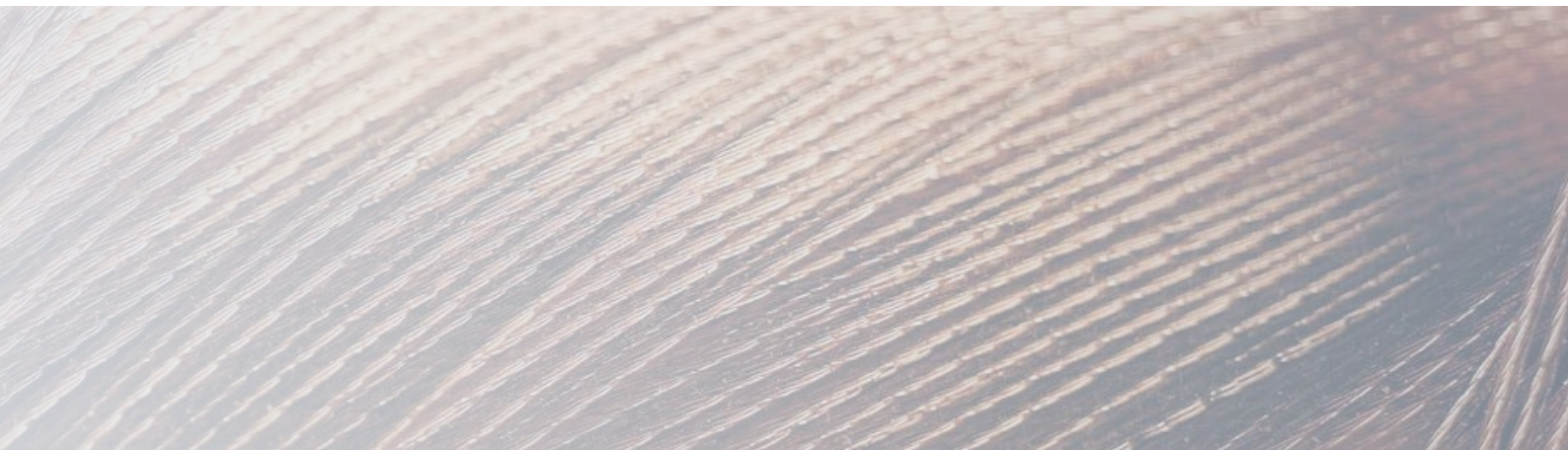
Electrical conductivity of copper = min. 58 m/Ωmm<sup>2</sup> = 100 % IACS

## Excerpt from DIN CEN/TS 13388 and EN 1977 – Alloys

Symbol	Material number	Composition	Density	Melting point	% IACS min.	Notes on properties and use
		in % by weight	g/cm <sup>3</sup>			
CuAg 0.1	CW 013 A	Ag min. 0.08 max. 0.12	8.9	1,083 °C	98	Copper alloys with high tensile strength electrical conductivity of ≥ 57 m/Ωmm <sup>2</sup> at 20 °C in a soft condition.
CuMg 0.2	CW 127 C	Mg <sup>6</sup> min. 0.14 max. 0.26	8.9	1,078 °C	75	Copper alloys with high tensile strength electrical conductivity of ≥ 44 m/Ωmm <sup>2</sup> at 20 °C in a soft condition.
CuSn 0.3 <sup>66</sup>	CW 129 C	Sn <sup>6</sup> min. 0.25 max. 0.35	8.9	1,065 °C	72	Copper alloys with high tensile strength electrical conductivity of ≥ 42 m/Ωmm <sup>2</sup> at 20 °C in a soft condition.

Tolerance deviating from DIN CEN/TS 13388

Symbol deviating from DIN CEN/TS 13388



### Excerpt from EN 573 – Aluminium

Symbol	Material number	Composition	Density	Melting point	% IACS min.	Information regarding properties and use
		in % by weight	g/cm <sup>3</sup>			
EAl 99.7	1370	Al 99.7	2.7	659 °C	62	Aluminium with electrical conductivity of $\geq 35.5 \text{ m}/\Omega\text{mm}^2$ at 20 °C in a soft condition.

### Galvanic coatings:

The metal materials used for galvanically refined copper wires are tin, silver or nickel, depending on the requirements.

Tin		Silver		Nickel	
Designation	Tin 99.90	Designation	Fine silver 99.97	Designation	Nickel 99.90
Density	7.29 g/cm <sup>3</sup>	Density	10.5 g/cm <sup>3</sup>	Density	8.9 g/cm <sup>3</sup>
Melting point	232 °C	Melting point	960 °C	Melting point	1450 °C
Symbol	Sn	Symbol	Ag	Symbol	Ni

### Criteria for use

- |  |  |  |
|--|--|--|
| <ul style="list-style-type: none"> <li>■ Good solderability</li> <li>■ Effective protection against corrosion</li> </ul> | <ul style="list-style-type: none"> <li>■ High temperature resistance</li> <li>■ Good surface conductivity Effekt) (skin effect)</li> </ul> | <ul style="list-style-type: none"> <li>■ High resistance to corrosion and temperature</li> </ul> |
|--|--|--|

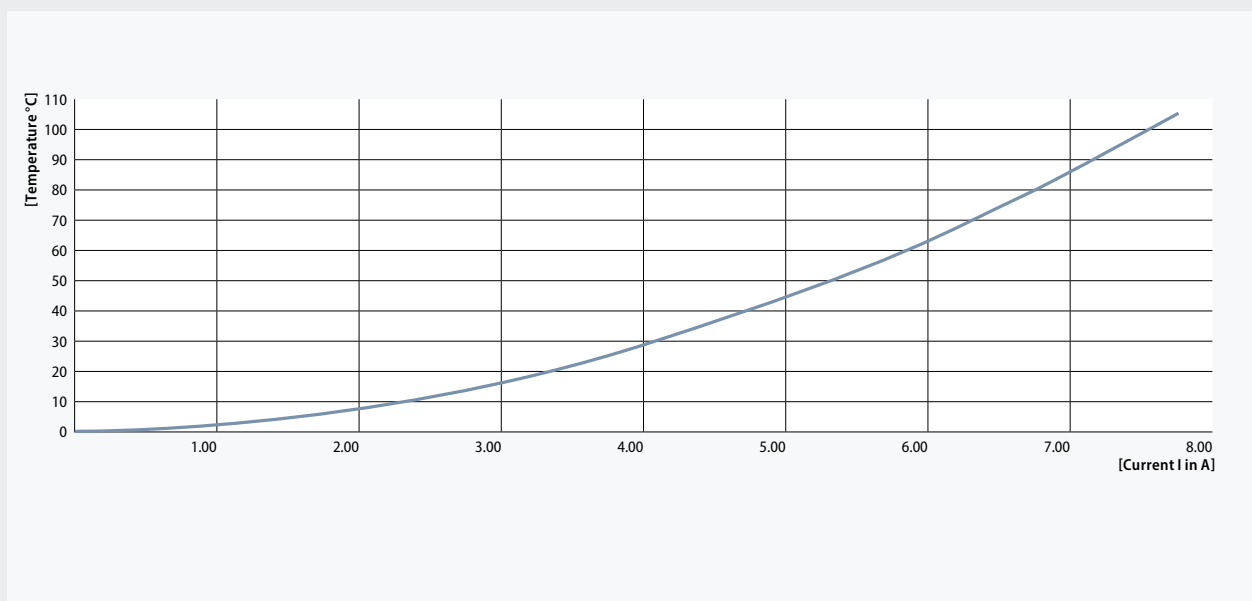
# Innovative conductor materials



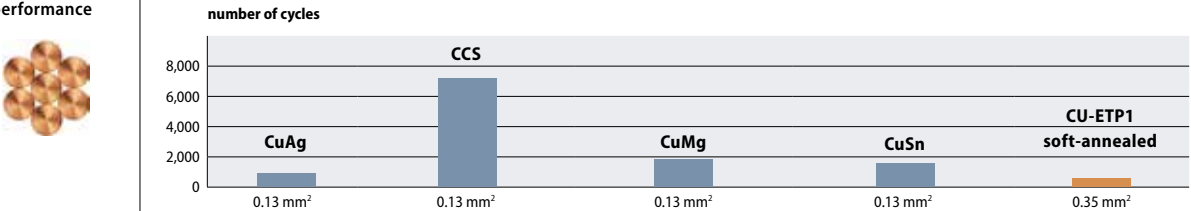
Innovative standard conductor materials for cross-section reduced low-current and signal cables.

Material		Material-Standard
<b>CuAg</b>	Copper Silver low alloyed copper	DIN CN/TS 13388
<b>CCS</b>	Copper Clad Steel	ASTM B 227, ASTM B 228, ASTM B 452
<b>CuMg</b>	Copper Magnesium low alloyed copper	DIN CN/TS 13388
<b>CuSn</b>	Copper Tin low alloyed copper	DIN CN/TS 13388

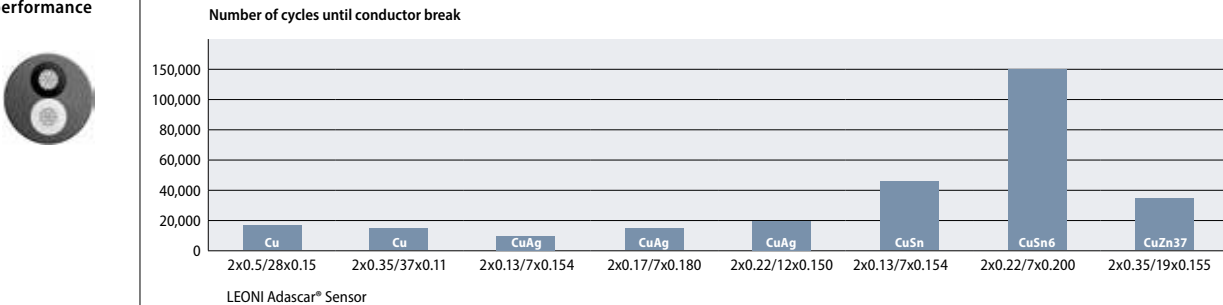
Current rating diagram – FLCUMG02RY 0.13-A



Characteristics

	CuAg	CCS	CuMg	CuSn	Cu-ETP																		
Electrical conductivity	95 %, IACS	40 %, IACS	75 %, IACS	72 %, IACS	100 %, IACS																		
Tensile strength <sup>6</sup>	> 540 N/mm <sup>2</sup>	> 770 N/mm <sup>2</sup>	> 670 N/mm <sup>2</sup>	> 620 N/mm <sup>2</sup>	> 220 N/mm <sup>2</sup>																		
Elongation at break	approx. 1 %	approx. 1 %	approx. 1 %	approx. 1 %	> 16 %																		
Bending test performance	 <table border="1"> <caption>Bending test performance (number of cycles)</caption> <thead> <tr> <th>Material</th> <th>Cross-section</th> <th>Number of cycles</th> </tr> </thead> <tbody> <tr> <td>CuAg</td> <td>0.13 mm<sup>2</sup></td> <td>~1,000</td> </tr> <tr> <td>CCS</td> <td>0.13 mm<sup>2</sup></td> <td>~7,000</td> </tr> <tr> <td>CuMg</td> <td>0.13 mm<sup>2</sup></td> <td>~2,000</td> </tr> <tr> <td>CuSn</td> <td>0.13 mm<sup>2</sup></td> <td>~1,500</td> </tr> <tr> <td>CU-ETP1 soft-annealed</td> <td>0.35 mm<sup>2</sup></td> <td>~500</td> </tr> </tbody> </table>					Material	Cross-section	Number of cycles	CuAg	0.13 mm <sup>2</sup>	~1,000	CCS	0.13 mm <sup>2</sup>	~7,000	CuMg	0.13 mm <sup>2</sup>	~2,000	CuSn	0.13 mm <sup>2</sup>	~1,500	CU-ETP1 soft-annealed	0.35 mm <sup>2</sup>	~500
Material	Cross-section	Number of cycles																					
CuAg	0.13 mm <sup>2</sup>	~1,000																					
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CuSn	0.13 mm <sup>2</sup>	~1,500																					
CU-ETP1 soft-annealed	0.35 mm <sup>2</sup>	~500																					

Values based on soft-annealed ETP-copper and hard-drawn CuAg, CCS, CuMg and CuSn

	CuZn37	CuSn6																											
Electrical conductivity	27 % IACS	13 % IACS																											
Tensile strength	> 900 N/mm <sup>2</sup>	> 800 N/mm <sup>2</sup>																											
Bending test performance	 <table border="1"> <caption>Bending test performance (Number of cycles until conductor break)</caption> <thead> <tr> <th>Material</th> <th>Dimensions</th> <th>Number of cycles</th> </tr> </thead> <tbody> <tr> <td>Cu</td> <td>2x0.5/28x0.15</td> <td>~10,000</td> </tr> <tr> <td>Cu</td> <td>2x0.35/37x0.11</td> <td>~10,000</td> </tr> <tr> <td>CuAg</td> <td>2x0.13/7x0.154</td> <td>~10,000</td> </tr> <tr> <td>CuAg</td> <td>2x0.17/7x0.180</td> <td>~10,000</td> </tr> <tr> <td>CuAg</td> <td>2x0.22/12x0.150</td> <td>~10,000</td> </tr> <tr> <td>CuSn</td> <td>2x0.13/7x0.154</td> <td>~40,000</td> </tr> <tr> <td>CuSn6</td> <td>2x0.22/7x0.200</td> <td>~150,000</td> </tr> <tr> <td>CuZn37</td> <td>2x0.35/19x0.155</td> <td>~30,000</td> </tr> </tbody> </table>		Material	Dimensions	Number of cycles	Cu	2x0.5/28x0.15	~10,000	Cu	2x0.35/37x0.11	~10,000	CuAg	2x0.13/7x0.154	~10,000	CuAg	2x0.17/7x0.180	~10,000	CuAg	2x0.22/12x0.150	~10,000	CuSn	2x0.13/7x0.154	~40,000	CuSn6	2x0.22/7x0.200	~150,000	CuZn37	2x0.35/19x0.155	~30,000
Material	Dimensions	Number of cycles																											
Cu	2x0.5/28x0.15	~10,000																											
Cu	2x0.35/37x0.11	~10,000																											
CuAg	2x0.13/7x0.154	~10,000																											
CuAg	2x0.17/7x0.180	~10,000																											
CuAg	2x0.22/12x0.150	~10,000																											
CuSn	2x0.13/7x0.154	~40,000																											
CuSn6	2x0.22/7x0.200	~150,000																											
CuZn37	2x0.35/19x0.155	~30,000																											

LEONI Adascar® Sensor



# Coding key

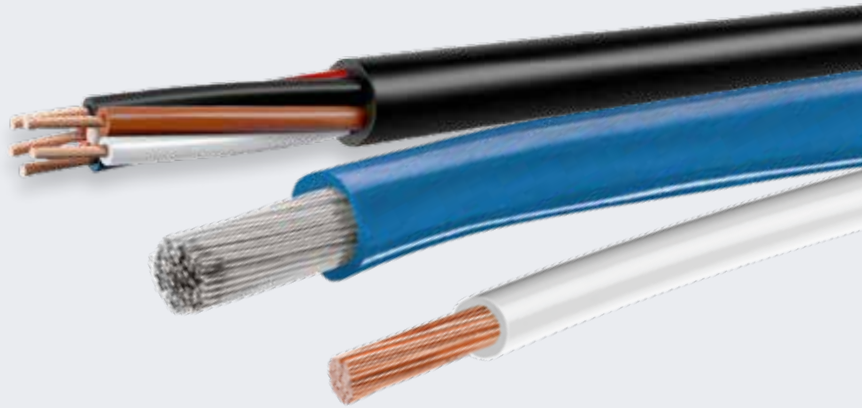
The type designation provides information on the type of wire, the insulation and sheath materials used and the principle design features in abbreviated and simplified form. Further details are listed in DIN 76722.

A type designation is made up of several groups. The type of wire is specified first and then its construction from inside to outside:

1.	<b>Type of cable</b>	Automotive cable	FL
		Automotive ignition cable	FZL
2.	<b>Conductor materials</b> Copper is not named additionally  * The composition of the alloys is fully specified. Examples: CuMg02, CuSn03, CuAg01	Aluminium	AL
		Resistance conductors	W
		Other conductor materials	M
		Copper alloys*	CU "xx"
		Aluminium alloys*	AL "xx"
		Copper Clad Steel	CCS
3.	<b>Geometric construction of insulation</b>	Ultrathin thickness of insulation acc. to ISO 6722-1	U
		Reduced thickness of insulation acc. to ISO 6722-1	R
		Thick wall acc. to ISO 6722-1 (is not identified)	
		Ultrathick insulation (thickness bigger than specified in ISO 6722-1)	S
4.	<b>Codes for conductor materials</b> Designations used as abbreviations for insulation materials	Soft-PVC (Polyvinyl chloride plasticized)	Y
		Soft-PVC (Polyvinyl chloride, heat-resistant)	YW
		Soft-PVC (Polyvinyl chloride, cold-resistant)	YK
		PE (Polyethylene)	2Y
		PA (Polyamide)	4Y
		PTFE (Polytetrafluoroethylene)	5Y
		FEP (Fluorinated ethylene propylene)	6Y
		ETFE (Ethylene tetrafluoroethylene)	7Y
		PP (Polypropylene)	9Y
		PVDF (Polyvinylidene fluoride)	10Y
		TPE-U (Thermoplastic elastomer on polyurethane basis, PUR)	11Y
		TPE-E (Thermoplastic polyester elastomer on polyether ester basis)	12Y
		TPE-E (Thermoplastic polyester elastomer on polyester ester basis)	13Y
		TPE-S (Thermoplastic polyester elastomer on polystyrene basis)	31Y
		TPE-A (Thermoplastic polyester elastomer on polyamide basis)	41Y
		PFA (Perfluoroalkoxy copolymer)	51Y
		PVC-X (Polyvinyl chloride crosslinked)	X
		PE-X (Polyethylene crosslinked)	2X
		SIR (Silicone rubber)	2G
EVA (Ethylene/vinyl acetate)	4G		
5.	<b>Codes for constructional elements</b> Codes for further constructional elements and non-extruded coverings	Foil shield	B
		Copper wire braiding	C
		Copper wire spiral shield	D
		Glass fiber braiding	G
		Insulation foil	P
		Textile braiding	T
6.	<b>Conductor cross-section and construction</b> These are at the end of the respective designation block. The following different constructions are used for the conductor	Symmetric conductor structure in accordance with ISO 6722-1	A
		Asymmetric conductor structure in accordance with ISO 6722-1	B
		Multi-strand conductor structure in accordance with ISO 6722-1**	C
7.	<b>Special design features</b>	Flat cable	F
		Multi-core, divisible cable	Z

8.	<b>Surface conductor coating</b> In some cases the type of metal plating is specified as follows	Tin-plated	SN
		Nickel-plated	NI
		Silver-plated	AG

\*\* Finally the number of cores (except in the case of single core wires) and the nominal cross-section in mm<sup>2</sup> are specified. Especially flexible or highly flexible stranded conductors are identified by additional specification of the nominal diameter of the single wire.



## Example

### Single-core cables

#### FLRY 0.75

automotive cable	FL
reduced wall thickness of insulation	R
PVC insulation	Y
nominal cross-section 0.75 mm <sup>2</sup>	0.75

#### FLYK 25.0/0.1

automotive cable	FL
insulation (cold-resistant PVC)	YK
nominal cross-section 25 mm <sup>2</sup>	25.0
max. individual wire-diameter 0.1 mm	0.1

#### FLR5Y 0.5NI-A

automotive cable	FL
reduced wall thickness of insulation	R
PTFE insulation	5Y
nominal cross-section 0.5 mm <sup>2</sup>	0.5
nickel-plated single conductors	NI
symmetric conductor structure	-A

### Twisted cables (without sheath)

#### FLRY 2x1.5SN-B

automotive cable	FL
reduced wall thickness of insulation	R
PVC insulation	Y
two cores	2x
nominal cross-section 1.5 mm <sup>2</sup>	1.5
tinned conductor	SN
asymmetrical conductor structure	-B

### Cables with alternative conductor materials

#### FLCUAG01RY 0.13-A

automotive cable	FL
copper alloys with silver (Ag) share of 0.1 %	CuAg01
reduced wall thickness of insulation	R
PVC insulation	Y
nominal cross-section 0.13 mm <sup>2</sup>	0.13
symmetric conductor structure	-A

# Nomenclature

## LEONI Adascar® Power

5020 – B 2x0.35 + DW

<b>Special design/shielding</b>	
Flat cable	F
Cable with foil shielding (B shielding)	B
Cable with coiled shielding (D shielding)	D
Cables with braiding shielding (C shielding)	C
<b>Number of cores &amp; nominal cross-section</b>	
<b>Further information</b>	
Drainwire	DW
Conductive core	CC
Tinned conductor	SN
High flexible cable	Flex
Twin cable	Twin

### Example

Nomenclature LEONI Adascar® Comfort, Control, Power, Safety, Truck and Wheel Sensor cables

## LEONI Mocar®

210 F 0.5 – A

<b>Geometric construction of insulation</b>	
(only optional) ultra-thin insulation according to ISO 6722-1	U
<b>Temperature range according to ISO 6722-1</b>	
<b>Marking of insulation materials</b>	
PE-XS	XS
PE-XE	XE
PP	P
TPE-S	S
TPE-0	R
TPE-E	A
TPE-E	C
TPE-U	L
ETFE	E
SI	G
FEP	F
PTFE/FEP	R/F
MFA	M
PFA	T
<b>Cable construction and nominal cross-section in mm<sup>2</sup></b>	
<b>Conductor cross-section and cable constructions</b>	
Symmetric conductor structure according to ISO 6722-1	Typ A
Asymmetric conductor structure according to ISO 6722-1	Typ B
Multi-strand conductor structure according to ISO 6722-1	Typ C

### Example

Nomenclature LEONI Mocar® cables

## LEONI Hivocar®

125 – S 35 0.20 14.1 mm

<b>Temperature range according to ISO 6722-1</b>		
<b>Cable construction</b>		
Diameter of single wire ≤ 0.10 mm	F	
Diameter of single wire < 0.40 mm	S	
Diameter of single wire ≥ 0.40 mm	A	
Conductor material aluminium		
<b>Shielding</b>		
Unshielded	U	
Shielded		
<b>Cross-section</b>	35	
<b>Diameter of shielding single wire</b>		
<b>Outer diameter</b>		

### Example

Nomenclature LEONI Hivocar® cables

## International standards

# International standards

SAE J 1128 Engineering Society  
for advancing mobility Land, Sea, Air and Space

### International standards

ISO 6722 -1	Road vehicles, 60 V and 600 V single-core cables
ISO 6722 -2	Road vehicles, 60 V and 600 V single-core aluminium cables
ISO 14 572	Road vehicles – round, screened and unshielded, 60 V and 600 V multi-core sheathed cables
LV 112-1	Electrical cables for motor vehicles (copper, single-core, unshielded)
LV 112-2	Electrical cables for motor vehicles (aluminium, single-core, unshielded)
LV 112-3	Specification of the current rating of vehicle cables
LV 112-4	Electrical cables for motor vehicles (copper alloy cables, single-core, unshielded)
LV 122	Twisted cables
LV 212	Sheathed cables for motor vehicles (requirements and testing)
LV 213-1 & LV 213-2	High-frequency cables for motor vehicles
LV 216-1 & LV 216-2	Shielded high-voltage sheathed cables for motor vehicles and their electrical drives

### SAE J 1128 Engineering Society for advancing mobility Land, Sea, Air and Space

TWP	Thin wall, Thermoplastic Insulated
GPT	General Purpose, Thermoplastic Insulated
HDT	Heavy Duty, Thermoplastic Insulated
TXL	Thin wall, Cross (X) Linked Polyolefin Insulated
GXL	General Purpose, Cross (X) Linked Polyolefin Insulated
SXL	Special Purpose, Cross (X) Linked Polyolefin Insulated
TWE	Thin wall, Thermoplastic elastisches Elastomer Insulated
GTE	General Purpose, Thermoplastic Elastomer Insulated
HTE	Heavy Duty, Thermoplastic Elastomer Insulated





## Customer standards

### JASO D 611: 2009 Japanese Automobile Standard

JASO D 611:2009	Japanese Automobile Standard
AV	Vinyl insulated low tension electric cable for automobiles
AVS	Low tension cable with reduced outside diameter for automobiles, general wall thickness
AVSS	Low tension cable with reduced outside diameter for automobiles, thin wall thickness
AVSSf	Low tension cable with reduced outside diameter for automobiles, thin wall thickness, high flexibility
CAVS	Construction of conductors pressed in circular shape, low tension cable with reduced outside diameter for automobiles, general wall thickness
AVX	Crosslinked vinyl heat-resistant low-tension cable for automobiles
AEX	Crosslinked polyethylene heat-resistant low-tension cable for automobiles

#### Customer standards

In addition, we produce according to various customer standards (see excerpt):

Customer	Customer standard
BMW	GS 95007-1-1, GS 95007-1-2, GS 95007-2
Bosch	5 998 340 ..., 5 998 342 ..., 5 998 350..., N34A AE011B S003, N34A AE011D S006
Daimler	DBL 6312, MBN 22 014
FIAT	FIAT 91107/17, 91107/18, 91107/19
FORD	ES-AU5T-1A348, ES-5M5T-14401
GM/OPEL	GMW 15 626, GME 14 022
Jaguar / Landrover	TPJLR.18.007, JPS D02-17
MAN	MAN 3135-1, MAN 3135-2
PSA	B25 1110, STE 96 461 475 99
Renault	36 - 05 - 009/--N
Rover	RES.62.21.759
Volvo	7611 131 R2, 7611 131 R3, 7611 131 R2B, 31834866
VW	VW 60306-1

# LEONI Product programme

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# Single-core automotive cables

Cables with innovative conductor materials	
<b>FLMR Y</b>	with thin wall PVC insulation
<b>FLMU Y</b>	with ultra-thin PVC insulation
<b>FLM Y</b>	with thick wall PVC insulation
<b>FLMR2 X</b>	with crosslinked PE insulation
<b>FLMR9 Y</b>	with PP insulation

Aluminium cable	
<b>FLALRY</b>	Aluminium cable with thin wall PVC insulation
<b>FLALRYW</b>	Aluminium cable with thin wall PVC insulation hot-pressure resistant

Standard cables	
<b>FLY</b>	with PVC insulation
<b>FLYW</b>	with PVC insulation hot-pressure resistant
<b>FLYK</b>	with PVC insulation cold-resistant with increased flexibility
<b>FLRYK</b>	with thin wall PVC insulation cold-resistant
<b>FLRY</b>	with thin wall PVC insulation Type A / Type B
<b>FLUY</b>	with ultra-thin wall PVC insulation
<b>FLRYW</b>	with thin wall PVC insulation Type A / Type B, hot-pressure resistant
<b>FLR4Y</b>	with thin wall PA insulation Type A / Type B
<b>FLRYH</b>	with thin wall PVC insulation fine wire, highly flexible

LEONI Mocar® cables	
<b>LEONI Mocar® 125 S</b>	with TPE-S insulation for flexible and standard applications
<b>LEONI Mocar® 125 P</b>	with PP insulation Type A / Type B, heat-resistant
<b>LEONI Mocar® 125 XS</b>	with crosslinked PE insulation Type A / Type B, heat-resistant
<b>LEONI Mocar® 125 XE</b>	with crosslinked PE insulation Type A / Type B, heat-resistant

<b>LEONI Mocar® 150 A</b>	with TPE-E insulation Type A / Type B, heat-resistant
<b>LEONI Mocar® 150 C</b>	with TPE-E insulation Type A / Type B, heat-resistant
<b>LEONI Mocar® 180 E</b>	with ETFE insulation Type A / Type B, high temperature resistant
<b>LEONI Mocar® 200 G</b>	with silicone insulation high temperature resistant
<b>LEONI Mocar® 200 G AL</b>	with silicone insulation Aluminium conductors, high temperature resistant
<b>LEONI Mocar® 210 F</b>	with FEP insulation Type A / Type B, high temperature resistant
<b>LEONI Mocar® 260 T</b>	with PFA insulation high temperature resistant
<b>LEONI Mocar® 260 R</b>	with PTFE insulation Type A / Type B, high temperature resistant

## Cables according to American standards

<b>TWP</b>	with thin wall PVC insulation
<b>TXL</b>	with thin wall, crosslinked PE insulation
<b>WTA</b>	with ultra-thin wall PVC insulation
<b>WXC</b>	with ultra-thin wall XLPE insulation

## Cables according to Japanese standards

<b>AV</b>	with PVC insulation
<b>AVS</b>	with thin wall PVC insulation, type 1
<b>AVSS</b>	with thin wall PVC insulation, type 2

## Spezialleitungen

<b>FL11Y</b>	with TPE-U insulation battery cables
<b>FLYY</b>	with core insulation and PVC sheath

## Twisted cables

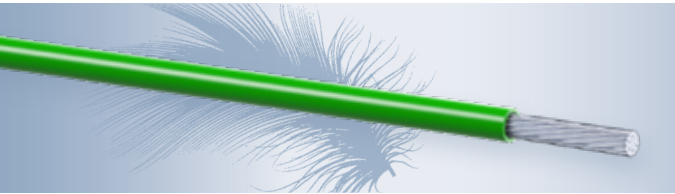
<b>FLRY n x...</b>	Twisted cables unshielded (without sheath)
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## Heating cables

<b>LEONI Mocar® W.../ LEONI SHC...</b>	high temperature resistant
--	----------------------------



## FLMRY with thin wall PVC insulation



### Temperature range (3,000 hrs)

**-40 °C bis +105 °C**

### Construction / materials

Conductor Copper alloy

Copper clad steel

Insulation Soft-PVC with properties according to ISO 6722-1, Class B

### Special properties

Tensile strength conductor material for cross-section reduction

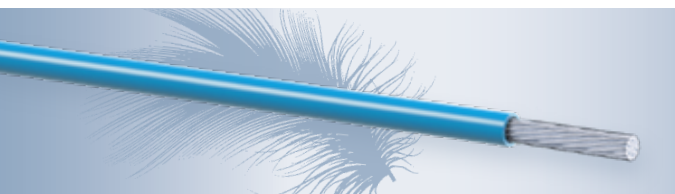
Considerable weight and material savings

### Standards / specifications

ISO 6722-1

Nominal cross-section	Conductor construction				Insulation	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
<b>CuAg01</b>								
0.13	7	0.16	0.49	145	0.2	1.05	-0.1	2.0
0.17	7	0.18	0.56	105	0.2	1.1	-0.1	2.5
0.22	7	0.21	0.7	86	0.2	1.2	-0.1	3.1
0.35	7	0.27	0.8	58	0.2	1.3	-0.1	4.7
<b>CuSn03</b>								
0.13	7	0.16	0.49	170	0.2	1.05	-0.1	2.0
0.17	7	0.18	0.56	115	0.2	1.1	-0.1	2.5
0.22	7	0.21	0.7	102	0.2	1.2	-0.1	3.1
0.35	7	0.27	0.8	81	0.2	1.3	-0.1	4.7
<b>CuMg02</b>								
0.13	7	0.16	0.49	170	0.2	1.05	-0.1	2.0
<b>CCS</b>								
0.13	7	0.16	0.49	317	0.2	1.05	-0.1	2.1
0.22	7	0.21	0.7	210	0.2	1.2	-0.1	2.9

## FLMUY with ultra-thin insulation



### Temperature range (3,000 hrs)

**-40 °C bis +105 °C**

### Construction / materials

Conductor Copper alloy

Copper clad steel

Insulation Soft-PVC with properties according to ISO 6722-1, Class B

### Special properties

Tensile strength conductor material for cross-section reduction

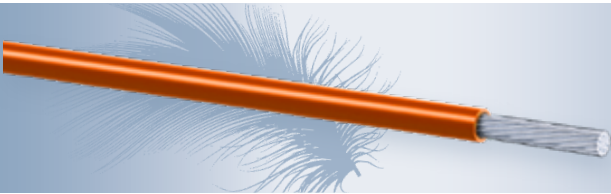
Considerable weight and material savings

### Standards / specifications

ISO 6722-1

Nominal cross-section	Conductor construction				Insulation	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
<b>CuAg01</b>								
0.13	7	0.16	0.49	145	0.16	0.95	-0.1	2.0
0.17	7	0.18	0.56	105	0.16	1.0	-0.1	2.5
<b>CuSn03</b>								
0.13	7	0.16	0.49	170	0.16	0.95	-0.1	2.0
<b>CuMg02</b>								
0.13	7	0.16	0.49	170	0.16	0.95	-0.1	2.0
<b>CCS</b>								
0.13	7	0.16	0.49	317	0.16	0.95	-0.1	2.1

## FLMY with thick wall PVC insulation



### Temperature range (3,000 hrs)

**-40 °C bis +105 °C**

### Construction / materials

Conductor Copper alloy  
Copper clad steel

Insulation Soft-PVC with properties according to ISO 6722-1, Class B

### Special properties

High strength conductor material for cross-section reduction

increased outer diameter – outer diameter compatible to FLRY 0.35 mm<sup>2</sup> and FLRY 0.5 mm<sup>2</sup>

### Standards / specifications

according to ISO 6722-1

Nominal cross-section	Conductor construction				Insulation	Cable			
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness min.	Outer diameter		Weight approx.
							max.	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km	
<b>CuAg01</b>									
0.13	7	0.16	0.49	145	0.2	1.4	-0.2	2.8	
0.13	7	0.16	0.49	145	0.2	1.6	-0.2	3.4	
0.17	7	0.18	0.56	105	0.2	1.4	-0.2	2.5	
0.17	7	0.18	0.56	105	0.2	1.6	-0.2	2.5	
<b>CuSn03</b>									
0.13	7	0.16	0.49	170	0.2	1.4	-0.2	2.8	
0.13	7	0.16	0.49	170	0.2	1.6	-0.2	3.4	
<b>CCS</b>									
0.13	7	0.16	0.49	317	0.2	1.4	-0.2	2.8	
0.13	7	0.16	0.49	317	0.2	1.6	-0.2	3.4	

## FLMR2X with crosslinked PE insulation



### Temperature range (3,000 hrs)

**-40 °C bis +125 °C**

### Construction / materials

Conductor Copper alloy  
Copper clad steel

Insulation PE-X (Polyethylene silane crosslinked) with properties according to 6722-1, Class C

### Special properties

Tensile strength conductor material for cross-section reduction

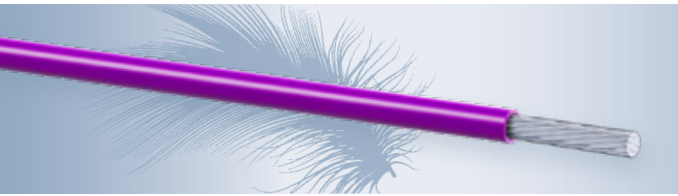
Considerable weight and material savings

### Standards / specifications

ISO 6722-1

Nominal cross-section	Conductor construction				Insulation	Cable			
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness min.	Outer diameter		Weight approx.
							max.	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km	
<b>CuAg01</b>									
0.13	7	0.16	0.49	145	0.2	1.05	-0.1	2.0	
0.17	7	0.18	0.56	105	0.2	1.1	-0.1	2.5	
0.22	7	0.21	0.7	86	0.2	1.2	-0.1	3.1	
0.35	7	0.27	0.8	58	0.2	1.3	-0.1	4.7	
<b>CuSn03</b>									
0.13	7	0.16	0.49	170	0.2	1.05	-0.1	2.0	
0.17	7	0.18	0.56	115	0.2	1.1	-0.1	2.5	
0.22	7	0.21	0.7	102	0.2	1.2	-0.1	3.1	
0.35	7	0.27	0.8	81	0.2	1.3	-0.1	4.7	
<b>CuMg02</b>									
0.13	7	0.16	0.49	170	0.2	1.05	-0.1	2.0	
<b>CCS</b>									
0.13	7	0.16	0.49	317	0.2	1.05	-0.1	2.1	
0.22	7	0.21	0.7	210	0.2	1.2	-0.1	2.9	

## FLMR9Y with PP insulation



### Temperature range (3,000 hrs)

**-40 °C bis +125 °C**

### Construction / materials

Conductor	Copper alloy Copper clad steel
Insulation	PP-FR (Polypropylene flame retardant), low halogen silane according to 6722-1, Class C

### Special properties

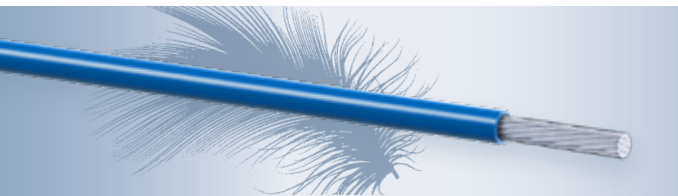
- Tensile strength conductor material for cross-section reduction
- Considerable weight and material savings

### Standards / specifications

ISO 6722-1

Nominal cross-section	Conductor construction				Insulation	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness min.	Outer diameter	
					max.		Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
CuAg01								
0.13	7	0.16	0.49	145	0.2	1.05	-0.1	2.0
CuSn03								
0.13	7	0.16	0.49	170	0.2	1.05	-0.1	2.0
CuMg02								
0.13	7	0.16	0.49	170	0.2	1.05	-0.1	2.0
CCS								
0.13	7	0.16	0.49	317	0.2	1.05	-0.1	2.1

## FLALRY with thin wall PVC insulation



### Temperature range (3,000 hrs)

**-40 °C to +105 °C**

### Construction / materials

Conductor	Aluminium 99.7 %, ≥ 1.25 mm <sup>2</sup> Aluminium alloy < 1.25 mm <sup>2</sup>
Insulation	Soft-PVC with properties according to ISO 6722-2, Class B

### Special properties

- Cables with cross-sections > 10 mm<sup>2</sup> can be used as battery cables
- Considerable weight savings compared to copper

### Standards / specifications

ISO 6722-2

Nominal cross-section	Conductor construction				Insulation	Cable		Weight approx.
	No. of strands <sup>6</sup>	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness <sup>66</sup> min.	Outer diameter	
					max.		Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.75	11	0.3	1.3	43.6	0.24	1.9	-0.2	5.0
1	16	0.29	1.5	32.7	0.24	2.1	-0.2	6.0
1.25	16	0.32	1.7	24.8	0.24	2.3	-0.2	7.0
1.5	16	0.35	1.8	21.2	0.24	2.4	-0.2	8.0
2	15	0.42	2.0	15.7	0.28	2.8	-0.3	10.0
2.5	19	0.43	2.2	12.7	0.28	3.0	-0.3	12.0
3	23	0.42	2.4	10.2	0.32	3.4	-0.3	15.0
4	30	0.42	2.8	7.85	0.32	3.7	-0.3	18.0
5	36	0.42	3.1	6.57	0.32	4.2	-0.3	23.0
6	45	0.42	3.4	5.23	0.32	4.3	-0.3	25.0
8	59	0.42	4.3	3.97	0.32	5.0	-0.4	29.0
10	50	0.52	4.5	3.03	0.48	6.0	-0.7	44.0
12	60	0.52	5.4	2.53	0.48	6.5	-0.7	50.0
16	78	0.52	5.8	1.93	0.52	7.2	-0.8	65.0
20	95	0.52	6.9	1.59	0.52	7.8	-0.8	75.0
25	122	0.52	7.2	1.24	0.52	8.7	-0.8	91.0
30	141	0.52	8.3	1.08	0.64	9.6	-0.9	110.0
35	172	0.52	8.5	0.878	0.64	10.4	-1.0	132.0
40	193	0.52	9.6	0.788	0.71	11.1	-1.1	148.0
50	247	0.52	10.5	0.613	0.71	12.2	-1.2	183.0
60	289	0.52	11.6	0.525	0.80	13.3	-1.3	217.0
70	351	0.52	12.5	0.432	0.80	14.4	-1.4	253.0
85	420	0.52	13.6	0.365	0.90	15.8	-1.4	305.0
95	463	0.52	14.8	0.327	0.90	16.7	-1.4	334.0
120 <sup>666</sup>	305	0.72	16.5	0.255	1.28	19.7	-2.0	456.0
160 <sup>666</sup>	398	0.72	19.0	0.195	1.28	22.5	-2.0	570.0

<sup>6</sup> Nominal value, deviations from number of strands for cross-sections ≥ 6.0 mm<sup>2</sup> are permitted (± 5%).

<sup>66</sup> Also available with increased wall thickness.

<sup>666</sup> With increased wall thickness.

# FLALRYW with thin wall PVC insulation

hot-pressure resistant



## Temperature range (3,000 hrs)

**-40 °C to +125 °C**

## Construction / materials

Conductor Aluminium 99.7%,  $\geq 1.25 \text{ mm}^2$   
Aluminium alloy  $< 1.25 \text{ mm}^2$

Insulation Soft-PVC with properties according to ISO 6722-2, Class C

## Special properties

Suitable for applications inside the engine compartment  
Considerable weight savings compared to copper

## Standards / specifications

ISO 6722-2

Nominal cross-section	Conductor construction				Insulation	Cable		
	No. of strands <sup>6</sup>	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness min.	Outer diameter max.	Limit tolerance
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.75	11	0.3	1.3	43.6	0.24	1.9	-0.2	5.0
1	16	0.29	1.5	32.7	0.24	2.1	-0.2	6.0
1.25	16	0.32	1.7	24.8	0.24	2.3	-0.2	7.0
1.5	16	0.35	1.8	21.2	0.24	2.4	-0.2	8.0
2	15	0.42	2.0	15.7	0.28	2.8	-0.3	10.0
2.5	19	0.43	2.2	12.7	0.28	3.0	-0.3	12.0
3	23	0.42	2.4	10.2	0.32	3.4	-0.3	15.0
4	30	0.42	2.8	7.85	0.32	3.7	-0.3	18.0
5	36	0.42	3.1	6.57	0.32	4.2	-0.3	23.0
6	45	0.42	3.4	5.23	0.32	4.3	-0.3	25.0
8	59	0.42	4.3	3.97	0.32	5.0	-0.4	29.0
10	50	0.52	4.5	3.03	0.48	6.0	-0.7	44.0
12	60	0.52	5.4	2.53	0.48	6.5	-0.7	50.0
16	78	0.52	5.8	1.93	0.52	7.2	-0.8	65.0
20	95	0.52	6.9	1.59	0.52	7.8	-0.8	75.0
25	122	0.52	7.2	1.24	0.52	8.7	-0.8	91.0
30	141	0.52	8.3	1.08	0.64	9.6	-0.9	110.0
35	172	0.52	8.5	0.878	0.64	10.4	-1.0	132.0
40	193	0.52	9.6	0.788	0.71	11.1	-1.1	148.0
50	247	0.52	10.5	0.613	0.71	12.2	-1.2	183.0
60	289	0.52	11.6	0.525	0.80	13.3	-1.3	217.0
70	351	0.52	12.5	0.432	0.80	14.4	-1.4	253.0
85	420	0.52	13.6	0.365	0.90	15.8	-1.4	305.0
95	463	0.52	14.8	0.327	0.90	16.7	-1.4	334.0
120 <sup>666</sup>	305	0.72	16.5	0.255	1.28	19.7	-2.0	456.0
160 <sup>666</sup>	398	0.72	19.0	0.195	1.28	22.5	-2.0	570.0

<sup>6</sup> Nominal value, deviations from number of strands for cross-sections  $\geq 6.0 \text{ mm}^2$  are permitted ( $\pm 5\%$ ).

<sup>66</sup> Also available with increased wall thickness.

<sup>666</sup> With increased wall thickness.

## Aluminium (battery) cables

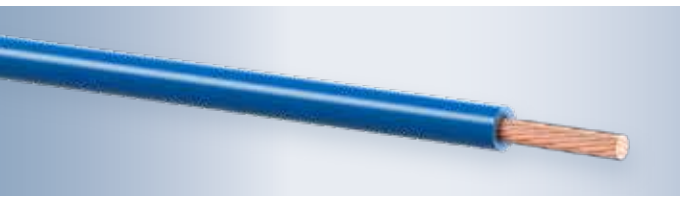
Maximum performance – minimum weight.

### Aluminium and copper in comparison

	Cu	Al
density (at 20 °C)	8.92 kg/dm <sup>3</sup>	2.7 kg/dm <sup>3</sup>
electrical conductivity	100 %	60 % IACS
tensile strength	>200 N/mm <sup>2</sup>	>70 – 100 N/mm <sup>2</sup>
elongation at break	>16 %	>16 %



## FLY with PVC insulation



### Temperature range (3,000 hrs)

**-40 °C to +105 °C**

### Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602, bare  
conductor constr. acc. to ISO 6722-1

**Insulation** Soft-PVC with properties  
according to ISO 6722-1, Class B

### Special properties

Conductors with cross-sections > 6 mm<sup>2</sup>  
are also suitable as battery cables

### Standards / specifications

LV 112-1 · BMW GS 95007-1-1 · VW 60306-1  
ISO 6722-1

Nominal cross-section	Conductor construction				Insulation	Cable		Weight approx.
	No. of strands <sup>6</sup>	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness nom.	Outer diameter	
					max.		Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.5	16	0.21	1.0	37.1	0.60	2.3	-0.3	9.0
0.75	24	0.21	1.2	24.7	0.60	2.5	-0.3	12.0
1	32	0.21	1.35	18.5	0.60	2.7	-0.3	15.0
1.25	16	0.33	1.7	14.9	0.60	2.95	-0.55	15.0
1.5	30	0.26	1.7	12.7	0.60	3.0	-0.3	20.0
2	28	0.31	2.0	9.42	0.60	3.3	-0.3	26.0
2.5	50	0.26	2.2	7.6	0.70	3.6	-0.3	32.0
3	60	0.26	2.4	6.15	0.70	4.1	-0.3	38.0
4	56	0.31	2.75	4.71	0.80	4.4	-0.4	49.0
5	65	0.33	3.1	3.94	0.80	4.9	-0.4	60.0
6	84	0.31	3.3	3.14	0.80	5.0	-0.4	69.0
8	50	0.46	4.3	2.38	0.80	5.9	-0.9	90.0
10	80	0.41	4.5	1.82	1.00	6.5	-0.5	113.0
12	96	0.41	5.4	1.52	1.00	7.4	-0.8	144.0
16	126	0.41	6.3	1.16	1.00	8.3	-0.6	181.0
20	152	0.41	6.9	0.955	1.10	9.1	-1.0	221.0
25	196	0.41	7.8	0.743	1.30	10.4	-0.7	288.0
30	224	0.41	8.3	0.647	1.30	10.9	-1.2	325.0
35	276	0.41	9.0	0.527	1.30	11.6	-0.6	361.0
40	308	0.41	9.6	0.473	1.40	12.4	-1.2	438.0
50	396	0.41	10.5	0.368	1.50	13.5	-2.0	521.0
60	296	0.51	11.6	0.315	1.50	14.6	-1.2	644.0
70	360	0.51	12.5	0.259	1.50	15.5	-2.0	716.0
95	475	0.51	14.8	0.196	1.60	18.0	-2.0	918.0
120	608	0.51	16.5	0.153	1.60	19.7	-2.0	1220.0

<sup>6</sup> Nominal value, deviations from number of strands for cross-sections  $\geq 6.0 \text{ mm}^2$  are permitted ( $\pm 5\%$ ).





# FLYW with PVC insulation

hot-pressure resistant



## Temperature range (3,000 hrs)

**-40 °C to +125 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602, bare  
conductor constr. acc. to ISO 6722

**Insulation** Soft-PVC with properties according  
to ISO 6722-1, Class C

## Special properties

Hot-pressure resistance test at 120 °C  
Suitable for applications inside the engine  
compartment.

## Standards / specifications

Bosch 5 998 341... · DBL 6312

Nominal cross-section	Conductor construction				Insulation	Cable		
	No. of strands <sup>6</sup>	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness nom.	Outer diameter	
					max.		Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.5	16	0.21	1.0	37.1	0.60	2.3	-0.3	8.0
0.75	24	0.21	1.2	24.7	0.60	2.5	-0.3	11.0
1	32	0.21	1.35	18.5	0.60	2.7	-0.3	14.0
1.25	16	0.33	1.7	14.9	0.60	2.95	-0.55	14.0
1.5	30	0.26	1.7	12.7	0.60	3.0	-0.3	19.0
2	28	0.31	2.0	9.42	0.60	3.3	-0.3	25.0
2.5	50	0.26	2.2	7.6	0.70	3.6	-0.3	31.0
3	60	0.26	2.4	6	0.70	4.1	-0.3	37.0
4	56	0.31	2.75	4.71	0.80	4.4	-0.4	47.0
5	65	0.33	3.1	3.94	0.80	4.9	-0.4	58.0
6	84	0.31	3.3	3.14	0.80	5.0	-0.4	68.0
8	50	0.46	4.3	2.38	0.80	5.9	-0.9	88.0
10	80	0.41	4.5	1.82	1.00	6.5	-0.5	111.0
12	96	0.41	5.4	1.52	1.00	7.4	-0.8	142.0
16	126	0.41	6.3	1.16	1.00	8.3	-0.6	179.0
20	152	0.41	6.9	0.955	1.10	9.1	-1.0	218.0
25	196	0.41	7.8	0.743	1.30	10.4	-1.0	278.0

<sup>6</sup> Nominal value, deviations from number of strands for cross-sections  $\geq 6.0 \text{ mm}^2$  are permitted ( $\pm 5\%$ ).





## FLYK with PVC insulation

cold-resistant with increased flexibility



### Temperature range (3,000 hrs)

**-50 °C to +105 °C**

### Construction / materials

Conductor Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602, bare  
Insulation Soft-PVC, cold-resistant

### Special properties

Cold bending test acc. to ISO 6722-1 at -50 °C  
Short-term and long-term ageing according  
to ISO 6722-1, Class B

Nominal cross-section <sup>6</sup>	Conductor construction				Insulation Wall thickness nom.	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
					max.	Limit tolerance		
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.5	28	0.16	1.1	37.7	0.60	2.3	-0.3	9.0
0.75	42	0.16	1.3	25.1	0.60	2.5	-0.3	12.0
1	57	0.16	1.5	18.8	0.60	2.7	-0.3	15.0
1.5	84	0.16	1.8	12.7	0.60	3.0	-0.3	20.0
2.5	140	0.16	2.3	7.54	0.70	3.9	-0.4	32.0
4	1015	0.08	3.3	4.71	0.80	4.9	-0.4	53.0
6	1548	0.08	4.2	3.14	0.80	5.9	-0.4	76.0
10	2510	0.08	5.2	1.85	1.00	7.3	-0.6	124.0
16	4033	0.08	6.7	1.16	1.00	8.8	-0.6	198.0
25	3169	0.11	8.0	0.743	1.20	10.5	-0.6	298.0

Additional cross-sections and strands constructions on request.

## FLRYK with thin wall PVC insulation

cold-resistant



### Temperature range (3,000 hrs)

**-50 °C to +105 °C**

### Construction / materials

Conductor Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602, bare  
conductor constr. acc. to ISO 6722-1  
Insulation Soft-PVC, cold-resistant

### Special properties

Cold bending test acc. to ISO 6722-1 at -50 °C  
Short-term and long-term ageing according  
to ISO 6722-1, Class B

### Standards / specifications

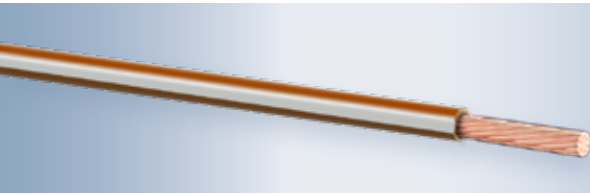
Bosch 5 998 342...

Nominal cross-section <sup>6</sup>	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
					max.	Limit tolerance		
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.5	16	0.21	1.0	37.1	0.22	1.6	-0.2	6.0
1	32	0.21	1.4	18.5	0.30	2.1	-0.2	12.0
1.5	30	0.26	1.7	12.7	0.24	2.4	-0.3	16.0
2.5	50	0.26	2.1	7.6	0.70	3.7	-0.4	30.0

Additional cross-sections and strands constructions on request.

# FLRY with thin wall PVC insulation

Type A / Type B



## Temperature range (3,000 hrs)

**-40 °C to +105 °C**

## Construction / materials

Conductor	Soft-annealed electrolytic copper Cu-ETP1 acc. to DIN EN 13602, bare or tinned conductor constr. acc. to ISO 6722-1
Insulation	Soft-PVC with properties according to ISO 6722-1, Class B

## Standards / specifications

BMW GS 95007-1-1 · VW 60306-1 · DBL 6312  
Ford ES-AU5T-1A348 · LV 112-1 · MAN 3135  
BOSCH 5 998 340 · FIAT 91107/18

Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx.
	No. of strands <sup>6</sup>	Diam. of single wire max.	Diam. of conductor max.	Electr. resistance at 20 °C bare/tinned max.		Outer diameter max.	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
<b>FLRY – Type A</b>								
0.22	7	0.21	0.7	84.8 / 86.5	0.20	1.2	-0.1	3.0
0.35 <sup>66</sup>	7	0.26	0.8	54.4 / 55.5 <sup>666</sup>	0.20	1.3	-0.1	5.0
0.5	19	0.19	1.0	37.1 / 38.2	0.22	1.6	-0.2	7.0
0.75	19	0.23	1.2	24.7 / 25.4	0.24	1.9	-0.2	9.0
1	19	0.26	1.35	18.5 / 19.1	0.24	2.1	-0.2	11.0
1.25	19	0.3	1.7	14.9 / 15.9	0.24	2.3	-0.2	15.0
1.5	19	0.32	1.7	12.7 / 13.0	0.24	2.4	-0.2	16.0
2	19	0.38	2.0	9.42 / 9.69	0.28	2.8	-0.3	22.0
2.5	19*	0.41	2.2	7.6 / 7.82	0.28	3.0	-0.3	26.0
2,5	37	0,28	0,2	7,6 / 7,82	0,28	3,0	-0,3	26,0
<b>FLRY – Type B</b>								
0.35	12	0.21	0.9	54.4 / 55.5 <sup>666</sup>	0.20	1.4	-0.2	5.0
0.5	16	0.21	1.0	37.1 / 38.2	0.22	1.6	-0.2	7.0
0.75	24	0.21	1.2	24.7 / 25.4	0.24	1.9	-0.2	9.0
1	32	0.21	1.35	18.5 / 19.1	0.24	2.1	-0.2	11.0
1.25	16	0.33	1.7	14.9 / 15.9	0.24	2.3	-0.2	14.0
1.5	30	0.26	1.7	12.7 / 13.0	0.24	2.4	-0.2	16.0
2	28	0.31	2.0	9.42 / 9.69	0.28	2.8	-0.3	23.0
2.5	50	0.26	2.2	7.6 / 7.8	0.28	3.0	-0.3	26.0
3	45	0.31	2.4	6.15 / 6.36	0.32	3.4	-0.3	34.0
4	56	0.31	2.75	4.71 / 4.85	0.32	3.7	-0.3	42.0
5	65	0.33	3.1	3.94 / 4.02	0.32	4.2	-0.3	52.0
6	84	0.31	3.3	3.14 / 3.23	0.32	4.3	-0.3	61.0
8	50	0.46	4.3	2.38 / 2.52	0.32	5.0	-0.4	87.0
10	80	0.41	4.5	1.82 / 1.85	0.48	5.8	-0.4	108.0
12	96	0.41	5.4	1.52 / 1.6	0.48	6.5	-0.7	122.0
16	126	0.41	5.5	1.16 / 1.18	0.52	7.0	-0.5	170.0
20	152	0.41	6.9	0.955 / 0.999	0.52	7.8	-0.8	194.0
25	196	0.41	7.0	0.743 / 0.757	0.52	8.7	-0.8	265.0

<sup>6</sup> Nominal value, deviations from number of strands for cross-sections  $\geq 6.0$  mm<sup>2</sup> are permitted ( $\pm 5\%$ ).

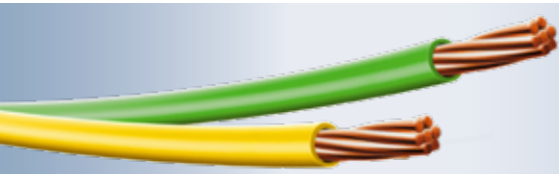
<sup>66</sup> This cross-section with tinned stranded conductor is suitable for use with insulation displacement connectors.

<sup>66</sup> Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.

\* customer-specific



# FLUY with ultra-thin PVC insulation



## Temperature range (3,000 hrs)

**-40 °C bis +105 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602,  
bare or tinned  
conductor constr. acc. to ISO 6722-1

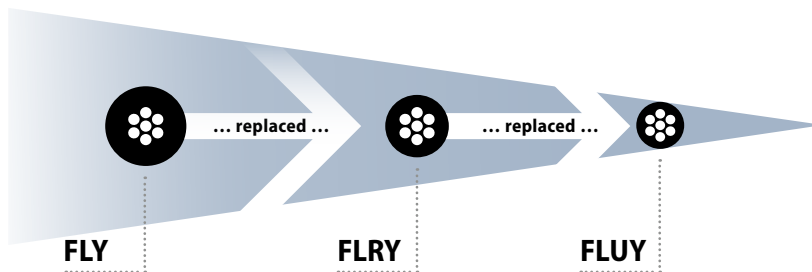
**Insulation** Soft-PVC with properties  
according to ISO 6722-1, Class B

## Standards / specifications

LV 112-1

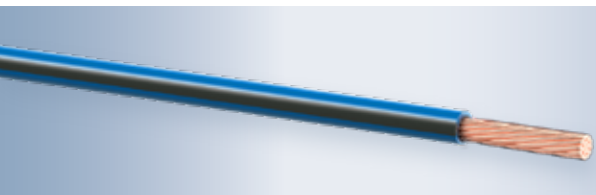
Nominal cross-section <sup>6</sup>	Conductor construction				Insulation	Cable		
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.	Wall thickness nom.	Outer diam. max.	Limit tolerance	Weight approx.
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg
0.35	7	0.27	0.8	52	0.16	1.2	-0.1	4.0
0.5	19	0.19	1	37.1	0.16	1.4	-0.1	6.0
0.75	19	0.24	1.2	24.7	0.16	1.6	-0.15	8.0
1	19	0.27	1.35	18.5	0.16	1.75	-0.15	10.0
1.25	19	0.3	1.5	14.9	0.16	2	-0.2	13.0
1.5	19	0.33	1.7	12.7	0.16	2.1	-0.2	15.0
2	19	0.37	1.9	9.42	0.2	2.4	-0.2	20.0
2.5	37	0.3	2.2	7.6	0.2	2.7	-0.2	25.0

Additional cross-sections and strand constructions on request.



# FLRYW with thin wall PVC insulation

Type A / Type B, hot-pressure resistant



## Temperature range (3,000 hrs)

**-40 °C to +125 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602,  
bare or tinned  
conductor constr. acc. to ISO 6722-1

**Insulation** Soft-PVC with properties according  
to ISO 6722-1, Class C

## Special properties

Heat resistant cable  
Suitable for applications inside the engine  
compartment

## Standards / specifications

DBL 6312 · Ford ES-AU5T-1A348

Nominal cross-section	Conductor construction				Insulation	Cable			
	No. of strands <sup>6</sup>	Diam. of single wire max.	Diam. of conductor max.	Electr. resistance at 20 °C bare/tinned max.		Wall thickness min.	Outer diameter-Ø		Weight approx.
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km	
<b>FLRYW – Type A</b>									
0.35	7	0.26	0.8	54.4 / 55.5 <sup>66</sup>	0.20	1.3	-0.1	5.0	
0.5	19	0.19	1.0	37.1 / 38.2	0.22	1.6	-0.2	7.0	
0.75	19	0.23	1.2	24.7 / 25.4	0.24	1.9	-0.2	9.0	
1	19	0.26	1.35	18.5 / 19.1	0.24	2.1	-0.2	11.0	
1.25	19	0.30	1.7	14.9 / 15.9	0.24	2.3	-0.2	12.0	
1.5	19	0.32	1.7	12.7 / 13.0	0.24	2.4	-0.2	16.0	
2	19	0.38	2.0	9.42 / 9.69	0.28	2.8	-0.3	22.0	
2,5	37	0,28	0,2	7,6/7,82	0,28	3,0	-0,3	222,0	
<b>FLRYW – Type B</b>									
0.35	12	0.21	0.9	54.4 / 55.5 <sup>66</sup>	0.20	1.4	-0.2	5.0	
0.5	16	0.21	1.0	37.1 / 38.2	0.22	1.6	-0.2	7.0	
0.75	24	0.21	1.2	24.7 / 25.4	0.24	1.9	-0.2	9.0	
1	32	0.21	1.35	18.5 / 19.1	0.24	2.1	-0.2	11.0	
1.25	16	0.33	1.7	14.9 / 15.9	0.24	2.3	-0.2	12.0	
1.5	30	0.26	1.7	12.7 / 13.0	0.24	2.4	-0.2	16.0	
2	28	0.31	2.0	9.42 / 9.69	0.28	2.8	-0.3	22.0	
2.5	50	0.26	2.2	7.6 / 7.8	0.28	3.0	-0.3	26.0	
3	45	0.31	2.4	6.15 / 6.36	0.32	3.4	-0.3	33.0	
4	56	0.31	2.75	4.71 / 4.85	0.32	3.7	-0.3	42.0	
5	65	0.33	3.1	3.94 / 4.02	0.32	4.2	-0.3	50.0	
6	84	0.31	3.3	3.14 / 3.23	0.32	4.3	-0.3	61.0	
8	50	0.46	4.3	2.38 / 2.52	0.32	5.0	-0.4	82.0	
10	80	0.41	4.5	1.82 / 1.85	0.48	5.8	-0.4	108.0	
12	96	0.41	5.4	1.52 / 1.6	0.48	6.5	-0.7	120.0	
16	126	0.41	5.5	1.16 / 1.18	0.52	7.0	-0.5	170.0	
20	152	0.41	6.9	0.955 / 0.999	0.52	7.8	-0.8	192.0	
25	196	0.41	7.0	0.743 / 0.757	0.52	8.7	-0.8	265.0	

<sup>6</sup> Nominal value, deviations from number of strands for cross-sections  $\geq 6.0 \text{ mm}^2$  are permitted ( $\pm 5\%$ ).

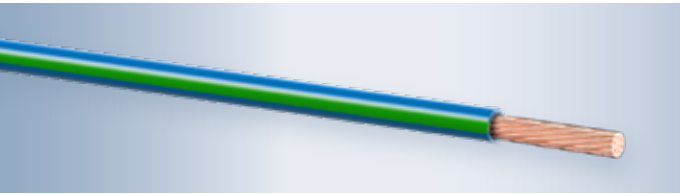
<sup>66</sup> Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.

\* customer-specific



# FLR4Y with thin wall PA insulation

Type A / Type B



## Temperature range (3,000 hrs)

**-40 °C to +105 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 according to DIN EN 13602,  
bare or tinned conductor constr.  
acc. to ISO 6722-1

**Insulation** PA (Polyamide)

## Special properties

Outstanding fuel resistance  
Especially suitable as fuel gauge wire

Nominal cross-section	Conductor construction				Electr. resistance at 20 °C bare/tinned max.	Insulation Wall thickness min.	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Outer diameter					
				max.			Limit tolerance		
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km	
<b>FLR4Y – Type A</b>									
0.35	7	0.26	0.8	54.4 / 55.5 <sup>6</sup>	0.20	1.3	-0.1	4.0	
0.5	19	0.19	1.0	37.1 / 38.2	0.22	1.6	-0.2	6.0	
0.75	19	0.23	1.2	24.7 / 25.4	0.24	1.9	-0.2	8.0	
1	19	0.26	1.35	18.5 / 19.1	0.24	2.1	-0.2	11.0	
1.5	19	0.32	1.7	12.7 / 13.0	0.24	2.4	-0.2	15.0	
2.5	19*	0.41	2.2	7.6 / 7.8	0.28	3.0	-0.3	24.0	
2.5	37	0.82	0.2	7.6/7.82	0.28	3.0	-0.3	24.0	
<b>FLR4Y – Type B</b>									
0.35	12	0.21	0.9	54.4 / 55.5 <sup>6</sup>	0.20	1.4	-0.2	4.0	
0.5	16	0.21	1.0	37.1 / 38.2	0.22	1.6	-0.2	6.0	
0.75	24	0.21	1.2	24.7 / 25.4	0.24	1.9	-0.2	8.0	
1	32	0.21	1.35	18.5 / 19.1	0.24	2.1	-0.2	11.0	
1.5	30	0.26	1.7	12.7 / 13.0	0.24	2.4	-0.2	15.0	
2.5	50	0.26	2.2	7.6 / 7.8	0.28	3.0	-0.3	24.0	
4	56	0.31	2.75	4.71 / 4.8	0.32	3.7	-0.3	40.0	

<sup>6</sup> Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.

\* customer-specific

# FLRYH with thin wall PVC insulation

fine wire, highly flexible



## Temperature range (3,000 hrs)

**-40 °C to +105 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602,  
fine wire, bare

**Insulation** Soft-PVC, with properties according  
to ISO 6722-1, Class B

## Special properties

Flexible strand structure

## Standards / specifications

LV 112-1

Nominal cross-section	Conductor construction				Electrical resistance at 20 °C max.	Insulation Wall thickness min.	Cable		Weight approx.
	No. of strands <sup>6</sup>	Diam. of single wire <sup>666</sup> max.	Diam. of conductor max.	Outer diameter					
				max.			Limit tolerance		
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km	
0.35	45	0.11	0.9	54.4 <sup>66</sup>	0.20	1.4	-0.2	5	
0.5	64	0.11	1.0	37.1	0.22	1.6	-0.2	6	
0.75	96	0.11	1.2	24.7	0.24	1.9	-0.2	9	
1	126	0.11	1.35	18.5	0.24	2.1	-0.2	12	
1.5	196	0.11	1.7	12.7	0.24	2.4	-0.2	16	
2.5	315	0.11	2.2	7.6	0.28	3.0	-0.3	27	
4	126	0.21	2.75	4.71	0.32	3.7	-0.3	42	
6	189	0.21	3.4	3.1	0.32	4.3	-0.3	68	
10	324	0.21	4.5	1.82	0.48	5.8	-0.4	118	
16	518	0.21	5.5	1.16	0.52	7.0	-0.5	174	
25	798	0.21	7.0	0.743	0.64	8.8	-0.6	263	
35	1107	0.21	8.3	0.527	0.8	10.5	-0.7	377	

<sup>6</sup> In compliance with the electrical resistance and the max. single wire diameter, slight deviations in the number of strands are allowed (± 5 %)

<sup>66</sup> Also available with a resistance value of 52.0 mΩ/m.

<sup>666</sup> Also available in highly flexible version.



# LEONI Mocar® 125 S with TPE-S insulation

for flexible and standard applications



## Temperature range (3,000 hrs)

**-50 °C to +125 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602,  
bare or tinned  
conductor constr. acc. to ISO 6722-1

**Insulation** TPE-S insulation with properties  
according to LV112-2, ISO 6722-1,  
Class C

## Special properties

Cables for flexible applications

Very good bending resistance

Use: Door, convertible top, rear hatch,  
sliding door

## Standards / specifications

LV 112-1 · FORD ES 5M5T-14401

Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable Outer diameter		Weight approx.
	No. of strands <sup>6</sup>	Diam. of single wire max.	Diam. of conductor max.	Electr. resistance at 20 °C bare/tinned max.		max.	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
<b>LEONI Mocar® 125 S – Flexible conductor construction</b>								
0.35	45	0.11	0.9	54.4 / 55.5 <sup>66</sup>	0.20	1.4	-0.2	5.0
0.5	64	0.11	1.0	37.1 / 38.6	0.22	1.7	-0.2	7.0
0.75	96	0.11	1.2	24.7 / 25.2	0.24	1.9	-0.2	9.0
1	126	0.11	1.35	18.5 / 19.1	0.24	2.1	-0.2	11.0
1.5	192	0.11	1.7	12.7 / 13.0	0.24	2.4	-0.2	16.0
2.5	320	0.11	2.2	7.6 / 7.82	0.28	3.0	-0.3	26.0
4	120	0.20	2.75	4.71 / 4.85	0.32	3.7	-0.3	42.0

<b>LEONI Mocar® 125 S – Standard conductor construction</b>								
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.35	7	0.26	0.8	54.4 / 55.5 <sup>66</sup>	0.20	1.3	-0.1	5.0
0.5	19	0.19	1.0	37.1 / 38.6	0.22	1.6	-0.2	7.0
0.75	24	0.21	1.2	24.7 / 25.2	0.24	1.9	-0.2	9.0
1	32	0.21	1.35	18.5 / 19.1	0.24	2.1	-0.2	11.0
1.5	30	0.26	1.7	12.7 / 13.0	0.24	2.4	-0.2	16.0
2.5	80	0.21	2.2	7.6 / 7.82	0.28	3.7	-0.3	26.0

<sup>6</sup> Minor deviations are allowed:

At a maximum of 40 single wires ±1 %, more than 40 single wires ±5 %.

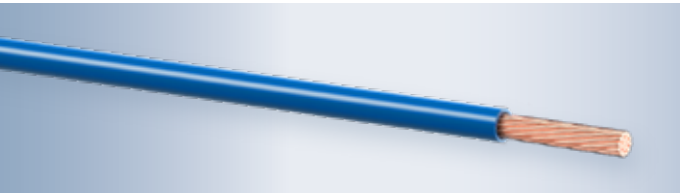
<sup>66</sup> Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.





# LEONI Mocar® 125 P with PP insulation

Type A / Type B, heat-resistant



## Temperature range (3,000 hrs)

**-40 °C to +125 °C**

## Construction / materials

Conductor Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602, bare  
conductor constr. acc. to ISO 6722-1

Insulation PP-FR (Polypropylene, flame  
retardant), low halogen

## Special properties

Marking according to customer requirement  
Use in the engine compartment

## Standards / specifications

Ford ES-AU5T-1A348 · FIAT 91107/17

Renault 36-05-009/--N · VW 60306-1

Nominal cross-section	Conductor construction				Insulation Wall thickness <sup>6</sup> min.	Cable		Weight approx. kg/km
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
					max.	Limit tolerance		
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm		
<b>LEONI Mocar® 125 P – Type A</b>								
0.35	7	0.26	0.8	54.4 <sup>66</sup>	0.20	1.3	-0.1	5.0
0.5	19	0.19	1.0	37.1	0.22	1.6	-0.2	7.0
0.75	19	0.23	1.2	24.7	0.24	1.9	-0.2	9.0
1	19	0.26	1.35	18.5	0.24	2.1	-0.2	11.0
1.5	19	0.32	1.7	12.7	0.24	2.4	-0.2	16.0
2	19	0.38	2.0	9.42	0.28	2.8	-0.3	22.0
2.5	19*	0.41	2.2	7.6	0.28	3.0	-0.3	26.0
2.5	37	0.28	0.2	7.6	0.28	3.0	-0.3	26.0
<b>LEONI Mocar® 125 P – Type B</b>								
0.35	12	0.21	0.9	54.4 <sup>66</sup>	0.20	1.4	-0.2	5.0
0.5	16	0.21	1.0	37.1	0.22	1.6	-0.2	7.0
0.75	24	0.21	1.2	24.7	0.24	1.9	-0.2	9.0
1	32	0.21	1.35	18.5	0.24	2.1	-0.2	11.0
1.5	30	0.26	1.7	12.7	0.24	2.4	-0.2	16.0
2	28	0.31	2.0	9.42	0.28	2.8	-0.3	22.0
2.5	50	0.26	2.2	7.6	0.28	3.0	-0.3	26.0
3	45	0.31	2.4	6.15	0.32	3.4	-0.3	33.0
4	56	0.31	2.75	4.71	0.32	3.7	-0.3	42.0
6	84	0.31	3.3	3.14	0.32	4.3	-0.3	61.0
10	80	0.41	4.5	1.82	0.48	5.8	-0.4	104.0
16	126	0.41	5.5	1.16	0.52	7.0	-0.5	158.0
25	196	0.41	7.8	0.743	0.52	8.7	-0.5	243.0
35	276	0.41	9.0	0.527	1.04	11.6	-0.6	351.0
50	396	0.41	10.5	0.368	1.20	13.5	-0.6	490.0
70	360	0.51	11.6	0.259	1.20	14.6	-0.8	692.0

<sup>6</sup> Also available with increased wall thickness.

<sup>66</sup> Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.

\* customer-specific

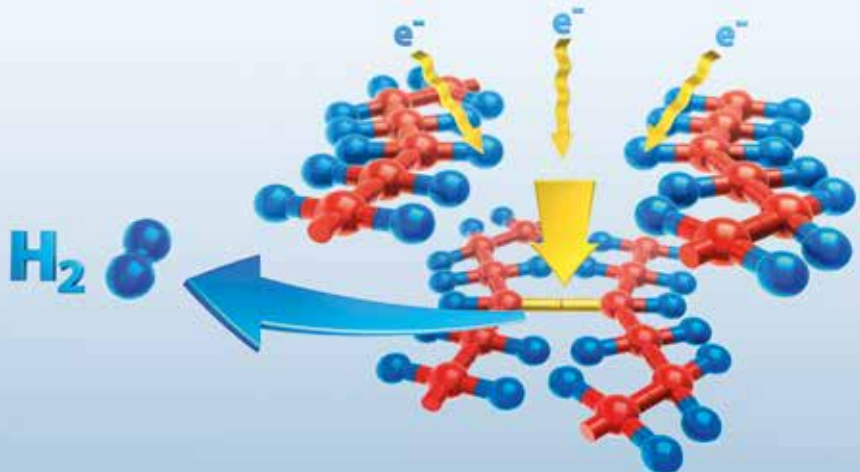
## Irradiation crosslinking

As a global technology leader, LEONI complements and optimises its developed and used plastics by irradiation crosslinking.

Polyethylene macro molecules can be crosslinked three-dimensionally into PE-X or XLPE.

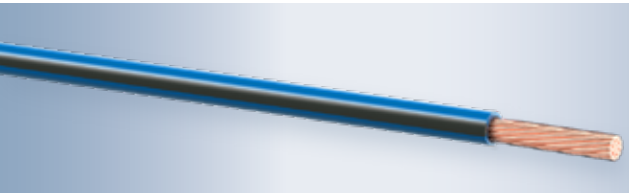
Irradiation crosslinked plastics are characterized not only by improved thermal pressure deforming, they also provide high performances in terms of:

- temperature resistance**
- chemical resistance**
- solvent resistant** (increased swell resistance)
- bending resistance**
- abrasion resistance.**



# LEONI Mocar® 125 XS with crosslinked PE insulation

Type A / Type B, heat-resistant



## Temperature range (3,000 hrs)

**-40 °C to +125 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602, bare  
conductor construction  
according to ISO 6722-1

**Insulation** PE-X (Silane crosslinked polyethylene)  
with properties according to  
ISO 6722-1, Class C

## Special properties

Use in the engine compartment

## Standards / specifications

ISO 6722-1

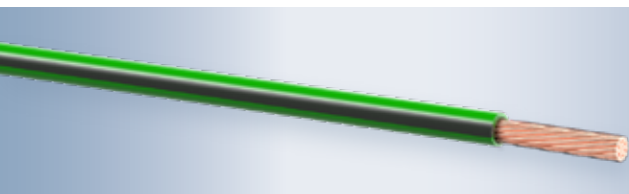
Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx. kg/km
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
						max.	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm		
<b>LEONI Mocar® 125 XS – Type A</b>								
0.22	7	0.21	0.7	84.8	0.20	1.2	-0.1	3.0
0.35	7	0.26	0.8	54.4 <sup>6</sup>	0.20	1.3	-0.1	5.0
0.5	19	0.19	1.0	37.1	0.22	1.6	-0.2	7.0
0.75	19	0.23	1.2	24.7	0.24	1.9	-0.2	9.0
1	19	0.26	1.35	18.5	0.24	2.1	-0.2	11.0
1.5	19	0.32	1.7	12.7	0.24	2.4	-0.2	16.0
2	19	0.38	2.0	9.42	0.28	2.8	-0.3	22.0
2.5	19*	0.41	2.2	7.6	0.28	3.0	-0.3	26.0
2,5	37	0,28	0,2	7,6	0,28	3,0	-0,3	26,0
<b>LEONI Mocar® 125 XS – Type B</b>								
0.35	12	0.21	0.9	54.4 <sup>6</sup>	0.20	1.4	-0.2	5.0
0.5	16	0.21	1.0	37.1	0.22	1.6	-0.2	7.0
0.75	24	0.21	1.2	24.7	0.24	1.9	-0.2	9.0
1	32	0.21	1.35	18.5	0.24	2.1	-0.2	11.0
1.5	30	0.26	1.7	12.7	0.24	2.4	-0.2	16.0
2	30	0.31	2.0	9.42	0.28	2.8	-0.3	22.0
2.5	50	0.26	2.2	7.6	0.28	3.0	-0.3	26.0
3	45	0.31	2.4	6.15	0.32	3.4	-0.3	33.0
4	56	0.31	2.75	4.71	0.32	3.7	-0.3	42.0
6	84	0.31	3.3	3.14	0.32	4.3	-0.3	61.0

<sup>6</sup> Also available with a resistance value of 52.0 mΩ/m

\* customer-specific

# LEONI Mocar® 125 XE with crosslinked PE insulation

Type A / Type B, heat-resistant



## Temperature range (3,000 hrs)

**-40 °C to +125 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602, bare  
conductor constr. acc. to ISO 6722-1

**Insulation** PE-X (Irradiated crosslinked polyethylene) with properties according to  
ISO 6722-1, Class C

## Special properties

Use in the engine compartment

## Standards / specifications

ISO 6722-1 · LV 112-1 · VW 60306-1

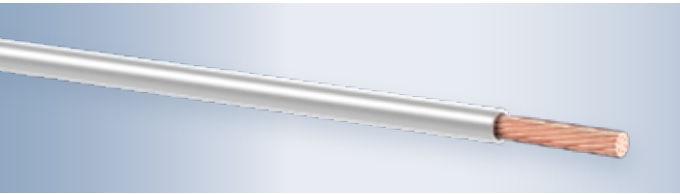
Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx. kg/km
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
						max.	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm		
<b>LEONI Mocar® 125 XE – Type A</b>								
0.22	7	0.21	0.7	84.8	0.20	1.2	-0.1	3.0
0.35	7	0.26	0.8	54.4 <sup>6</sup>	0.20	1.3	-0.1	5.0
0.5	19	0.19	1.0	37.1	0.22	1.6	-0.2	7.0
0.75	19	0.23	1.2	24.7	0.24	1.9	-0.2	9.0
1	19	0.26	1.35	18.5	0.24	2.1	-0.2	11.0
1.5	19	0.32	1.7	12.7	0.24	2.4	-0.2	16.0
2	19	0.38	2.0	9.42	0.28	2.8	-0.3	22.0
2.5	19*	0.41	2.2	7.6	0.28	3.0	-0.3	26.0
2,5	37	0,28	0,2	7,6	0,28	3,0	-0,3	26,0
<b>LEONI Mocar® 125 XE – Type B</b>								
0.35	12	0.21	0.9	54.4 <sup>6</sup>	0.20	1.4	-0.2	5.0
0.5	16	0.21	1.0	37.1	0.22	1.6	-0.2	7.0
0.75	24	0.21	1.2	24.7	0.24	1.9	-0.2	9.0
1	32	0.21	1.35	18.5	0.24	2.1	-0.2	11.0
1.5	30	0.26	1.7	12.7	0.24	2.4	-0.2	16.0
2	28	0.31	2.0	9.42	0.28	2.8	-0.3	22.0
2.5	50	0.26	2.2	7.6	0.28	3.0	-0.3	26.0
3	45	0.31	2.4	6.15	0.32	3.4	-0.3	33.0
4	56	0.31	2.75	4.71	0.32	3.7	-0.3	42.0
6	84	0.31	3.3	3.14	0.32	4.3	-0.3	61.0

<sup>6</sup> Also available with a resistance value of 52.0 mΩ/m.

\* customer-specific

# LEONI Mocar® 150 A with TPE-E insulation

Type A / Type B, heat-resistant



## Temperature range (3,000 hrs)

**-40 °C to +150 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602,  
bare or tinned conductor constr.  
acc. to ISO 6722-1

**Insulation** TPE-E (Thermoplastic polyester  
elastomer) with properties similar to  
ISO 6722-1, Class D

## Special properties

Limited resistance to hydrolysis

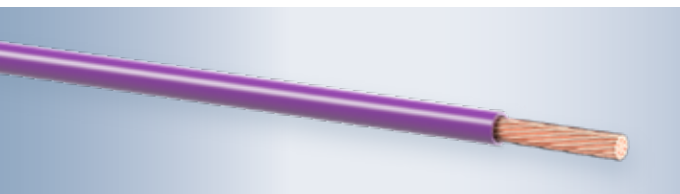
Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight tolerance approx. kg/km
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
						max.	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	kg/km	
<b>LEONI Mocar® 150 A – Type A</b>								
0.22	7	0.21	0.7	84.8	0.20	1.2	-0.1	3.0
0.35	7	0.26	0.8	54.4 <sup>6</sup>	0.20	1.3	-0.1	5.0
0.5	19	0.19	1.0	37.1	0.22	1.6	-0.2	6.0
0.75	19	0.23	1.2	24.7	0.24	1.9	-0.2	9.0
1	19	0.26	1.35	18.5	0.24	2.1	-0.2	11.0
1.5	19	0.32	1.7	12.7	0.24	2.4	-0.2	16.0
2	19	0.37	2.0	9.42	0.28	2.8	-0.3	22.0
2.5	19*	0.41	2.2	7.6	0.28	3.0	-0.3	26.0
2.5	37	0.28	0.2	7.6	0.28	3.0	-0.3	26.0
<b>LEONI Mocar® 150 A – Type B</b>								
0.35	12	0.21	0.9	54.4 <sup>6</sup>	0.20	1.4	-0.2	5.0
0.5	16	0.21	1.0	37.1	0.22	1.6	-0.2	6.0
0.75	24	0.21	1.2	24.7	0.24	1.9	-0.2	9.0
1	32	0.21	1.35	18.5	0.24	2.1	-0.2	11.0
1.5	30	0.26	1.7	12.7	0.24	2.4	-0.2	16.0
2	30	0.31	2.0	9.42	0.28	2.8	-0.3	22.0
2.5	50	0.26	2.2	7.6	0.28	3.0	-0.3	26.0
4	56	0.31	2.75	4.71	0.32	3.7	-0.3	42.0
6	84	0.31	3.3	3.14	0.32	4.3	-0.3	61.0

<sup>6</sup> Also available with a resistance value of 52.0 mΩ/m.

\* customer-specific

# LEONI Mocar® 150 C with TPE-E insulation

Type A / Type B, heat-resistant



## Temperature range (3,000 hrs)

**-40 °C to +150 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602,  
bare or tinned conductor constr.  
acc. to ISO 6722-1

**Insulation** TPE-E (Thermoplastic polyester  
elastomer) with properties similar to  
ISO 6722-1, Class D

## Special properties

Resistance to hydrolysis

Limited resistance to battery acid

Use in headlight application

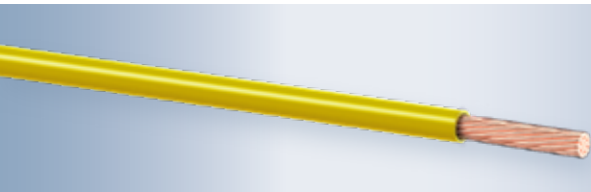
Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight tolerance approx. kg/km
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
						max.	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	kg/km	
<b>LEONI Mocar® 150 C – Type A</b>								
0.22	7	0.21	0.7	84.8	0.20	1.2	-0.1	3.0
0.35	7	0.26	0.8	54.4 <sup>6</sup>	0.20	1.3	-0.1	4.0
0.5	19	0.19	1.1	37.1	0.22	1.6	-0.2	6.0
0.75	19	0.24	1.2	24.7	0.24	1.9	-0.2	9.0
1	19	0.26	1.35	18.5	0.24	2.1	-0.2	12.0
1.5	19	0.32	1.7	12.7	0.24	2.4	-0.2	16.0
2	19	0.37	2.0	9.42	0.28	2.8	-0.3	22.0
2.5	19*	0.41	2.2	7.6	0.28	3.0	-0.3	26.0
2.5	37	0.28	0.2	7.6	0.28	3.0	-0.3	26.0
<b>LEONI Mocar® 150 C – Type B</b>								
0.35	12	0.21	0.9	54.4 <sup>6</sup>	0.20	1.4	-0.2	5.0
0.5	16	0.21	1.0	37.1	0.22	1.6	-0.2	6.0
0.75	24	0.21	1.2	24.7	0.24	1.9	-0.2	9.0
1	32	0.21	1.35	18.5	0.24	2.1	-0.2	11.0
1.5	30	0.26	1.7	12.7	0.24	2.4	-0.2	16.0
2	30	0.31	2.0	9.42	0.28	2.8	-0.3	22.0
2.5	50	0.26	2.2	7.6	0.28	3.0	-0.3	26.0
3	45	0.31	2.4	6.15	0.32	3.4	-0.3	32.0
4	56	0.31	2.8	4.71	0.32	3.7	-0.3	41.0
6	84	0.31	3.4	3.14	0.32	4.3	-0.3	61.0

<sup>6</sup> Also available with a resistance value of 52.0 mΩ/m.

\* customer-specific

# LEONI Mocar® 180 E with ETFE insulation

Type A / Type B, high temperature resistant



## Temperature range (3,000 hrs)

**-65 °C to +180 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper

Cu-ETP1 acc. to DIN EN 13602,  
bare, tinned or silver-plated  
fine-wire stranded conductor  
according to ISO 6722-1

**Insulation** ETFE (Ethylene tetrafluoroethylene)  
with properties acc. to ISO 6722-1, Class E

## Special properties

Good mechanical and thermal properties  
with excellent chemical resistance  
Particularly suitable for wiring inside the engine  
compartment and as a fuel level indicator wire

## Standards / specifications

DBL 6312 · VW 60306-1 · LV 112-1

Nom. cross-section	Conductor construction				Insulation	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C bare/tinned max.		Outer diameter max.	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
<b>LEONI Mocar® 180 E – Type A</b>								
0.35	7	0.26	0.8	54.4 / 55.5 <sup>66</sup>	0.20	1.3	-0.1	5.0
0.5	19	0.19	1.0	37.1 / 38.2	0.22	1.6	-0.2	6.0
0.75	19	0.23	1.2	24.7 / 25.4	0.24	1.9	-0.2	9.0
1	19	0.26	1.35	18.5 / 19.1	0.24	2.1	-0.2	12.0
1.5	19	0.32	1.7	12.7 / 13.0	0.24	2.4	-0.2	17.0
2.5	19*	0.41	2.2	7.6 / 7.82	0.28	3.0	-0.3	28.0
2.5	37	0.28	0.2	7.6 / 7.82	0.28	3.0	-0.3	28.0
<b>LEONI Mocar® 180 E – Type B</b>								
0.35	12	0.21	0.9	54.4 / 55.5 <sup>66</sup>	0.20	1.4	-0.2	5.0
0.5	16	0.21	1.0	37.1 / 38.2	0.22	1.6	-0.2	6.0
0.75	24	0.21	1.2	24.7 / 25.4	0.24	1.9	-0.2	9.0
1	32	0.21	1.35	18.5 / 19.1	0.24	2.1	-0.2	12.0
1.5	30	0.26	1.7	12.7 / 13.0	0.24	2.4	-0.2	17.0
2.5	50	0.26	2.2	7.6 / 7.82	0.28	3.0	-0.3	28.0
4	56	0.31	2.75	4.71 / 4.85	0.32	3.7	-0.3	42.0
6	84	0.31	3.3	3.14	0.32	4.3	-0.3	61.0

<sup>6</sup> Ultra-thin wall thickness on request (ISO 6722-1).

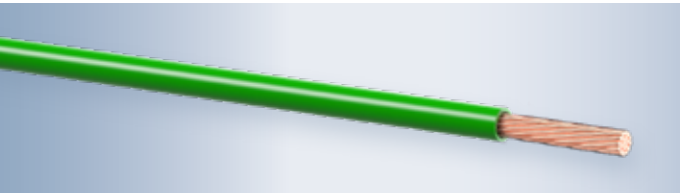
<sup>66</sup> Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.

\* customer-specific



## LEONI Mocar® 200 G with silicone insulation

high temperature resistant



### Temperature range (3,000 hrs)

**-80 °C to +200 °C**

### Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602, bare  
(also available in multi-strand version)

**Insulation** SIR, Silicone rubber with properties  
according to ISO 6722-1, Class F

### Special properties

Good thermal properties and high flexibility at  
low temperatures

Nominal cross-section	Conductor construction				Insulation	Cable		
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness min.	Outer diameter	
					max.		Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.35	12	0.21	0.9	54.4 <sup>6</sup>	0.50	2.0	-0.2	7.0
0.5	16	0.21	1.0	37.1	0.60	2.3	-0.2	9.0
0.75	24	0.21	1.2	24.7	0.60	2.5	-0.2	12.0
1	32	0.21	1.35	18.5	0.60	2.7	-0.2	14.0
1.5	30	0.26	1.7	12.7	0.60	3.1	-0.3	20.0
2.5	50	0.26	2.2	7.6	0.70	3.8	-0.3	31.0
4	56	0.31	2.8	4.71	0.80	4.8	-0.4	50.0
6	84	0.31	3.4	3.1	0.80	5.4	-0.4	71.0
10	80	0.41	4.5	1.82	1.00	7	-0.5	118.0
16	126	0.41	5.8	1.16	1.00	8.4	-0.6	180.0
25	196	0.41	7.2	0.743	1.30	10.4	-0.6	276.0
35	276	0.41	8.5	0.527	1.30	11.9	-0.8	379.0
50	396	0.41	10.5	0.368	1.50	14.3	-0.8	546.0
70	360	0.51	12.5	0.259	1.50	16.7	-1.2	753.0
95	457	0.51	14.8	0.196	1.60	19.2	-1.2	999.0

<sup>6</sup> Also available with a resistance value of 52.0 mΩ/m.

## LEONI Mocar® 200 G AL with silicone insulation

Aluminium conductors, high temperature resistant



### Temperature range (3,000 hrs)

**-80 °C to +200 °C**

### Construction / materials

**Conductor** Aluminium 99,7%, conductor construction according to ISO 6722-2

**Insulation** SIR, Silicone rubber with properties according to ISO 6722-2, Class F

### Special properties

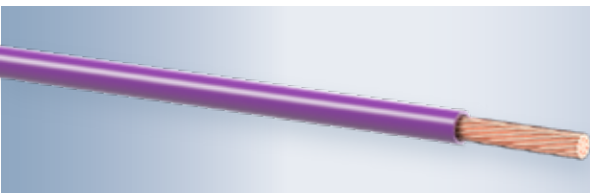
Good thermal properties  
Considerable weight savings compared to copper

Nominal cross-section	Conductor construction				Insulation	Cable		
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness min.	Outer diameter	
					max.		Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
10	50	0.52	4.5	3.03	0.80	6.5	-0.6	51.0
16	78	0.52	5.8	1.93	0.80	8.3	-0.6	85.0
25	122	0.52	7.2	1.24	1.04	10.4	-1.0	131.0
35	172	0.52	8.5	0.878	1.04	11.6	-2.0	150.0
50	247	0.52	10.5	0.613	1.20	13.5	-2.0	209.0
70	351	0.52	12.5	0.432	1.20	15.5	-2.0	265.0
95	463	0.52	14.8	0.327	1.28	18.0	-2.0	370.0
120	305	0.72	16.5	0.255	1.28	19.7	-2.0	452.0



# LEONI Mocar® 210 F with FEP insulation

Type A / Type B, high temperature resistant



## Temperature range (3,000 hrs)

**-65 °C to +210 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602, bare,  
tinned, silver-plated or nickel-plated  
fine-wire stranded conductor  
according to ISO 6722-1

**Insulation** FEP (Tetrafluoroethylene hexafluoro-  
propylene) with properties according  
to ISO 6722-1, Class F

## Special properties

Good mechanical and thermal properties  
with excellent chemical resistance  
Suitable for applications inside the engine  
compartment

## Standards / specifications

LV 112-1 · VW 60306-1 · PSA B25 1110

Nom. cross-section	Conductor construction				Insulation	Cable		
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C bare/tinned max.		Outer diameter		Weight approx.
						max.	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
<b>LEONI Mocar® 210 F – Type A</b>								
0.35	7	0.26	0.8	54.4 / 55.5 <sup>66</sup>	0.20	1.3	-0.1	5.0
0.5	19	0.19	1.0	37.1 / 38.2	0.22	1.6	-0.2	7.0
0.75	19	0.23	1.2	24.7 / 25.4	0.24	1.9	-0.2	10.0
1	19	0.26	1.35	18.5 / 19.1	0.24	2.1	-0.2	13.0
1.5	19	0.32	1.7	12.7 / 13.0	0.24	2.4	-0.2	18.0
2.5	19*	0.41	2.2	7.6 / 7.82	0.28	3.0	-0.3	29.0
2.5	37	0.28	0.2	7.6 / 7.82	0.28	3.0	-0.3	29.0
<b>LEONI Mocar® 210 F – Type B</b>								
0.35	12	0.21	0.9	54.4 / 55.5 <sup>66</sup>	0.20	1.4	-0.2	5.0
0.5	16	0.21	1.0	37.1 / 38.2	0.22	1.6	-0.2	7.0
0.75	24	0.21	1.2	24.7 / 25.4	0.24	1.9	-0.2	10.0
1	32	0.21	1.35	18.5 / 19.1	0.24	2.1	-0.2	13.0
1.5	30	0.26	1.7	12.7 / 13.0	0.24	2.4	-0.2	18.0
2.5	50	0.26	2.2	7.6 / 7.82	0.28	3.0	-0.3	29.0
4	56	0.31	2.75	4.71 / 4.85	0.32	3.7	-0.3	44.0
6	84	0.31	3.3	3.14	0.32	4.3	-0.3	61.0

<sup>6</sup> Ultra-thin wall thickness on request (ISO 6722-1).

<sup>66</sup> Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.

\* customer-specific





# LEONI Mocar® 260 T with PFA insulation

high temperature resistant



## Temperature range (3,000 hrs)

**-80 °C to +260 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602, bare,  
tinned, silver-plated or nickel-plated  
conductor construction acc. to  
ISO 6722-1

**Insulation** PFA (Perfluoroalkoxy copolymer) with  
properties acc. to ISO 6722-1, Class H

Nom. cross-section	Conductor construction				Insulation Wall thickness <sup>6</sup> min.	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C bare/tinned max.		Outer diameter		
						max.	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	kg/km	
0.35	7	0.26	0.8	54.4 / 55.5 <sup>66</sup>	0.20	1.3	-0.1	5.0
0.5	19	0.19	1.0	37.1 / 38.2	0.22	1.6	-0.2	7.0
0.75	19	0.23	1.2	24.7 / 25.4	0.24	1.9	-0.2	10.0
1	19	0.26	1.35	18.5 / 19.1	0.24	2.1	-0.2	13.0
1.5	19	0.32	1.7	12.7 / 13.0	0.24	2.4	-0.2	18.0
2.5	19*	0.41	2.2	7.6 / 7.82	0.28	3.0	-0.3	29.0
2.5	37	0.28	0.2	7.6 / 7.82	0.28	3.0	-0.3	29.0
4	56	0.31	2.75	4.71 / 4.85	0.32	3.7	-0.3	44.0

<sup>6</sup> Ultra-thin wall thickness on request (ISO 6722-1).

<sup>66</sup> Also available with resistance values 52.0 / 53.1 mΩ/m bare / tinned.

\* customer-specific

## Special properties

Excellent resistance to chemicals

Very good mechanical stability

Due to its high temperature resistance,  
an equivalent alternative to PTFE

## Standards / specifications

ISO 6722-1

# LEONI Mocar® 260 R with PTFE insulation

Type A / Type B, high temperature resistant



## Temperature range (3,000 hrs)

**-90 °C to +260 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602,  
copper nickel-plated  
conductor constr. acc. to ISO 6722-1

**Insulation** PTFE (Polytetrafluoroethylene) with  
properties acc. to ISO 6722-1, Class H

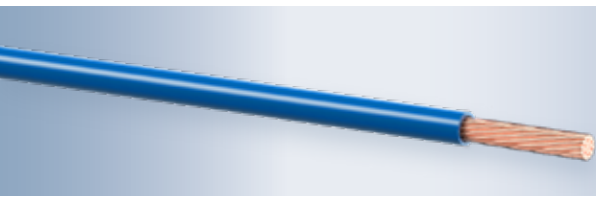
## Special properties

Excellent resistance to chemicals  
Very good mechanical stability  
Excellent temperature resistance

Nominal cross-section	Conductor construction				Insulation Wall thickness min.	Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Outer diameter		
						max.	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	kg/km	
<b>LEONI Mocar® 260 R – Type A</b>								
0.22	7	0.21	0.7	87.9	0.20	1.2	-0.1	4.0
0.35	7	0.27	0.8	56.8	0.20	1.35	-0.1	5.0
0.5	19	0.19	1.0	38.6	0.22	1.6	-0.2	7.0
0.75	19	0.24	1.2	25.7	0.24	1.9	-0.2	10.0
1	19	0.27	1.35	19.3	0.24	1.95	-0.2	13.0
1.5	19	0.33	1.7	13.2	0.24	2.3	-0.2	19.0
2.5	19	0.41	2.2	7.92	0.28	2.8	-0.3	29.0
2.5	37*	0.28	0.2	7.6	0.28	3.0	-0.3	26.0
<b>LEONI Mocar® 260 R – Type B</b>								
0.35	12	0.21	0.9	87.9	0.20	1.35	-0.1	5.0
0.5	16	0.21	1.0	56.8	0.22	1.6	-0.2	7.0
0.75	24	0.21	1.2	38.6	0.24	1.9	-0.2	10.0
1	32	0.21	1.4	25.7	0.24	1.95	-0.2	13.0
1.5	30	0.26	1.7	19.3	0.24	2.3	-0.2	19.0
2.5	50	0.26	2.2	13.2	0.28	2.8	-0.3	29.0
4	56	0.31	2.75	4.91	0.32	3.35	-0.3	45.0
6	84	0.31	3.4	3.27	0.32	4.15	-0.3	69.0

\* customer-specific

## TWP with thin wall PVC insulation



### Temperature range

**-40 °C to +85 °C** (3,000 hrs)  
**+105 °C** (48 hrs)

### Construction / materials

**Conductor** Soft-annealed electrolytic copper  
acc. to ASTM B3, conductor construction acc. to customer specification

**Insulation** PVC, insulation material according to  
SAE J 1128 / ESB-M1 L 120-A / MS-7889 /  
UTMS 12501

Size	Conductor construction				Insulation		Cable	
	Nominal cross-section	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Wall thickness		Outer diameter max.	Weight approx.
					nom.	min.		
AWG	mm <sup>2</sup>		mm	mm	mm	mm	mm	kg/km
22	0.35	7	0.25	0.76	0.40	0.33	1.7	5.0
20	0.5	7	0.32	0.97	0.40	0.33	1.9	8.0
18	0.8	16	0.25	1.17	0.40	0.33	2.2	11.0
18	0.8	19	0.23	1.17	0.40	0.33	2.2	11.0
16	1.3	19	0.28	1.45	0.40	0.33	2.4	15.0
14	2	19	0.36	1.8	0.40	0.33	2.7	22.0
12	3	19	0.45	2.29	0.46	0.38	3.3	34.0
10	5	19	0.57	2.87	0.50	0.43	4.0	53.0

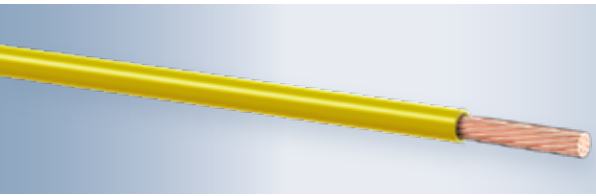
### Special properties

Also available as GPT, HDT type and tinned version

### Standards / specifications

American standards: SAE J1128

## TXL with thin wall, crosslinked PE insulation



### Temperature range (3,000 hrs)

**-40 °C to +125 °C**

### Construction / materials

**Conductor** Soft-annealed electrolytic copper  
according to ASTM B3, conductor construction acc. to customer specification

**Insulation** XLPE (Polyethylene, crosslinked),  
flame-retardant, halogen-free  
insulation material acc. to SAE J 1128 /  
ESB-M1 L 123-A / MS-8288 / UTMS 12501

Size	Conductor construction				Insulation		Cable	
	Nominal cross-section	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Wall thickness		Outer diameter max.	Weight approx.
					nom.	min.		
AWG	mm <sup>2</sup>		mm	mm	mm	mm	mm	kg/km
22	0.35	7	0.25	0.76	0.40	0.33	1.7	5.0
20	0.5	7	0.32	0.97	0.40	0.33	1.9	8.0
18	0.8	16	0.25	1.17	0.40	0.33	2.2	11.0
18	0.8	19	0.23	1.17	0.40	0.33	2.2	11.0
16	1.3	19	0.28	1.45	0.40	0.33	2.4	15.0
14	2	19	0.36	1.8	0.40	0.33	2.7	22.0
12	3	19	0.45	2.29	0.46	0.38	3.3	34.0
10	5	19	0.57	2.87	0.50	0.43	4.0	53.0

### Special properties

Also available as SXL, GXL type and tinned

### Standards / specifications

American standards: SAE J1128

## WTA with ultra-thin wall PVC insulation



Size	Conductor construction					Insulation Wall thickness min.	Cable		Weight approx.
	Nom. cross- section	No. of strands	Diam. of single wire max.	Diam. of con- ductor max.	Electr.resistance at 20 °C bare/tinned max.		Outer diameter		
							max.	Limit toler- ance	
AWG	mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	kg/km	
22	0.35	7	0.25	0.76	53.9 / 57.8	0.20	1.35	-0.15	5.0
20	0.5	7	0.32	0.97	34.3 / 36.4	0.20	1.55	-0.15	7.0
18	0.8	19	0.23	1.17	23.0 / 24.7	0.20	1.75	-0.15	9.0
16	1.3	19	0.28	1.45	15.5 / 16.6	0.20	2.03	-0.15	13.0
14	2	19	0.36	1.8	9.44 / 10.0	0.20	2.39	-0.15	21.0
12	3	19	0.45	2.3	6.0 / 6.37	0.24	3.00	-0.15	31.0

### Temperature range (3,000 hrs)

**-40 °C to +85 °C**

### Construction / materials

Conductor Soft-annealed electrolytic copper  
acc. to ASTM B3, conductor construction  
acc. to customer specifications

Insulation PVC, ultra-thin wall  
insulation material acc. to SAE J 1678 /  
Ford WSB M1L134-A / Chrysler MS  
9532 / Lear UTMS 12501 / SAE J1678

### Special properties

Also available in UTA version

### Standards / specifications

American standards: SAE J1678

## WXC with ultra-thin wall XLPE insulation



Size	Conductor construction					Insulation Wall thickness min.	Cable		Weight approx.
	Nom. cross- section	No. of strands	Diam. of single wire max.	Diam. of con- ductor max.	Electrical resistance at 20 °C bare/tinned max.		Outer diameter		
							max.	Limit toler- ance	
AWG	mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	kg/km	
22	0.35	7	0.25	0.76	53.9 / 57.8	0.20	1.35	-0.15	5.0
20	0.5	7	0.32	0.97	34.3 / 36.4	0.20	1.55	-0.15	7.0
18	0.8	19	0.23	1.17	23.0 / 24.7	0.20	1.75	-0.15	9.0
16	1.3	19	0.28	1.45	15.5 / 16.6	0.20	2.03	-0.15	13.0
14	2	19	0.36	1.8	9.44 / 10.0	0.20	2.39	-0.15	21.0
12	3	19	0.45	2.3	6.0 / 6.37	0.24	3.00	-0.15	32.0

### Temperature range (3,000 hrs)

**-40 °C to +125 °C**

### Construction / materials

Conductor Soft-annealed electrolytic copper  
acc. to ASTM B3, conductor construc-  
tion acc. to customer specification

Isolierung XLPE, ultra-thin wall, flame-retardant,  
halogen-free  
insulation material acc. to SAE J 1678 /  
Ford WSS M1L-135-A / Lear UTMS 12501

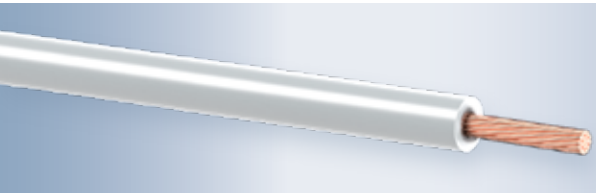
### Special properties

Also available in UXC version

### Standards / specifications

American standards: SAE J1678

## AV with PVC insulation



### Temperature range

**-40 °C to +80 °C**

### Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 nach D 609-90, bare  
conductor construction according to  
JASO D 611:2009

**Insulation** PVC, insulation material according to  
JASO D 611:2009

### Standards / specifications

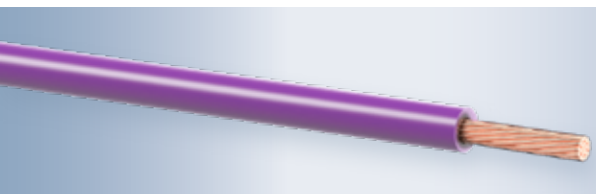
Japanese standards:

JASO D 611:2009 · JASO D 618:2008 · JIS C 3406

Nominal cross-section	Conductor construction				Insulation	Cable		
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness min.	Outer diameter	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.5	7	0.32	1.0	32.7	0.60	2.4	-0.2	10.0
0.85	11	0.32	1.2	20.8	0.60	2.6	-0.2	13.0
1.25	16	0.32	1.5	14.3	0.60	2.9	-0.2	17.0
2	26	0.32	1.9	8.81	0.60	3.4	-0.3	26.0
3	41	0.32	2.4	5.59	0.70	4.1	-0.3	40.0
5	65	0.32	3.0	3.52	0.80	4.9	-0.3	62.0
8	50	0.45	3.7	2.32	0.90	5.8	-0.3	92.0
10	63	0.45	4.5	1.84	1.00	6.9	-0.4	120.0
15	84	0.45	4.8	1.38	1.10	7.4	-0.4	160.0
0.5 f	20	0.18	1.0	36.7	0.60	2.4	-0.2	9.0
0.75 f	30	0.18	1.2	24.4	0.60	2.6	-0.2	12.0
1.25 f	50	0.18	1.5	14.7	0.60	2.9	-0.2	18.0
2 f	37	0.26	1.8	9.5	0.60	3.4	-0.4	25.0
3 f	61	0.26	2.4	5.76	0.70	4.1	-0.3	40.0

<sup>6</sup> The "f" in the nominal cross-section column indicates a flexible conductor with a finer wire diameter.

## AVS with thin wall PVC insulation, type 1



### Temperature range

**-40 °C to +80 °C**

### Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 nach D 609-90, bare  
conductor construction according to  
JASO D 611:2009

**Insulation** PVC, insulation material according to  
JASO D 611:2009

### Standards / specifications

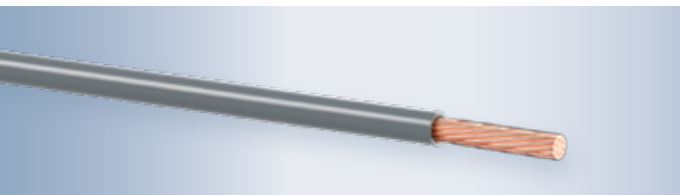
Japanese standards:

JASO D 611:2009 · JASO D 618:2008

Nominal cross-section	Conductor construction				Insulation	Cable		
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness min.	Outer diameter	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.3	7	0.26	0.8	50.2	0.50	1.9	-0.1	6.0
0.5	7	0.32	1.0	32.7	0.50	2.1	-0.1	8.0
0.85	11	0.32	1.2	20.8	0.50	2.3	-0.1	12.0
1.25	16	0.32	1.5	14.3	0.50	2.6	-0.1	16.0
2	26	0.32	1.9	8.81	0.50	3.1	-0.2	25.0
3	41	0.32	2.4	5.59	0.60	3.8	-0.2	39.0
5	65	0.32	3.0	3.52	0.70	4.6	-0.2	60.0
0.3 f	15	0.18	0.8	48.9	0.50	1.9	-0.1	6.0
0.5 f	20	0.18	1.0	36.7	0.50	2.1	-0.1	8.0
0.75 f	30	0.18	1.2	24.4	0.50	2.3	-0.1	11.0
1.25 f	50	0.18	1.5	14.7	0.50	2.6	-0.1	17.0
2 f	37	0.26	1.8	9.5	0.50	3.1	-0.2	24.0

<sup>6</sup> The "f" in the nominal cross-section column indicates a flexible conductor with a finer wire diameter.

## AVSS with thin wall PVC insulation, type 2



Nominal cross-section	Conductor construction				Insulation	Cable		
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness min.	Outer diameter	
					max.		Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
0.3	7	0.26	0.8	50.2	0.30	1.5	-0.1	5.0
0.5	7	0.32	1.0	32.7	0.30	1.7	-0.1	7.0
0.85	19	0.24	1.2	21.7	0.30	1.9	-0.1	10.0
1.25	19	0.29	1.5	14.9	0.30	2.2	-0.1	14.0
2 (f)	37	0.26	1.8	9.5	0.40	2.7	-0.1	22.0
0.3 f	19	0.16	0.8	48.8	0.30	1.5	-0.1	5.0
0.5 f	19	0.19	1.0	34.6	0.30	1.7	-0.1	7.0
0.75 f	19	0.23	1.2	23.6	0.30	1.9	-0.1	10.0
1.25 f	37	0.21	1.5	14.6	0.30	2.2	-0.1	14.0

### Temperature range

**-40 °C to +80 °C**

### Construction / materials

Conductor Soft-annealed electrolytic copper  
Cu-ETP1 nach JIS C 3102, bare  
conductor construction according to  
JASO D 611:2009

Insulation PVC, insulation material according to  
JASO D 611:2009

<sup>6</sup>The "f" in the nominal cross-section column indicates a flexible conductor with a finer wire diameter.

### Standards / specifications

Japanese standards:

JASO D 611:2009 · JASO D618:2008



## FL11Y with TPE-U insulation

battery cables



Temperature range (3,000 hrs)

**-40 °C to +110 °C**

### Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602, bare

**Insulation** TPE-U (Thermoplastic polyurethane elastomer) according to ISO 6722-1, Class B

### Special properties

Also available as aluminium battery cables

Nominal cross-section	Conductor construction				Insulation	Cable		
	No. of strands <sup>6</sup>	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.		Wall thickness min.	Outer diameter	
					max.		Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	kg/km
6	84	0.31	3.3	3.14	0.80	5.0	-0.4	66.0
10	80	0.41	4.5	1.82	1.00	6.5	-0.5	109.0
16	126	0.41	6.3	1.16	1.00	8.3	-0.6	176.0
25	196	0.41	7.8	0.743	1.30	10.4	-0.7	273.0
35	276	0.41	9.0	0.527	1.30	11.6	-0.6	355.0
50	396	0.41	10.5	0.368	1.50	13.5	-2.0	511.0
70	360	0.51	12.5	0.259	1.50	15.5	-2.0	705.0
95	475	0.51	14.8	0.196	1.60	18.0	-2.0	905.0
120	608	0.51	16.5	0.153	1.60	19.7	-2.0	1170.0

<sup>6</sup> Nominal value, tolerance of number of strands (±5 %).

## FLYY with core insulation and PVC sheath



Temperature range (3,000 hrs)

**-40 °C to +105 °C**

### Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602, bare  
conductor construction acc. to ISO 6722-1

**Insulation/ sheath** Plasticised PVC with properties according to ISO 6722-1, Class B

### Special properties

Sheath options: adherent or separable from inner core

Nom. cross-section	Conductor construction				Insulation <sup>6</sup>			Cable		Weight approx.
	No. of strands	Diam. of single wire max.	Diam. of conductor max.	Electrical resistance at 20 °C max.	Wall thickness min.	Core diam.	Sheath wall thickness min.	Outer diameter		
								max.	Limit tolerance	
mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	mm	mm	kg/km
0.5	16	0.21	1.0	37.1	0.60	2.1	0.4	3.1	-0.4	14.0
0.75	24	0.21	1.2	24.7	0.60	2.3	0.4	3.3	-0.3	17.0
1	32	0.21	1.35	18.5	0.60	2.5	0.4	3.6	-0.4	20.0
1.5	30	0.26	1.7	12.7	0.60	2.8	0.5	4.1	-0.4	28.0
2	40	0.26	2.0	9.42	0.60	3.0	0.5	4.3	-0.4	33.0
2.5	50	0.26	2.2	7.61	0.70	3.5	0.5	4.8	-0.5	41.0

<sup>6</sup> All cross-sections can also be supplied with reduced insulation thickness (FLYY).



# FLRY n x... Twisted cables

unshielded (without sheath)



## Temperature range (3,000 hrs)

**-40 °C to +105 °C**

## Construction / materials

**Conductor** Soft-annealed electrolytic copper  
Cu-ETP1 acc. to DIN EN 13602,  
bare or tinned conductor constr. acc.  
to ISO 6722-1

**Insulation** Plasticised PVC with properties  
according to ISO 6722-1, Class B

## Special properties

Additional versions with  
higher heat resistance  
tinned conductor  
other lay lengths  
available on request

## Example of designation

### FLRY 2 x 0.5-A BN/YE S30MM

twisted cable  
2 cores x nominal cross-section 0.5 mm<sup>2</sup>  
conductor construction type A  
Colour of core BN, YE  
Lay length S 30 MM

## Standards / specifications

LV 122 · Daimler B47 · VW 75205

Con- struction	Conductor construction core				Insulation core		Cable			
	No of cores x nominal cross- section	No. of strands	Diam. of single wire max.	Diam. of con- ductor max.	Electrical resistance at 20 °C max.	Wall thick- ness min.	Core diam. max.	Lay length nom.	Outer diam. max.	Weight approx.
	mm <sup>2</sup>		mm	mm	mΩ/m	mm	mm	mm	mm	kg/km
2 x 0.35	7	7	0.26	0.8	52.0	0.20	1.3	16	2.6	9.0
2 x 0.35	7	7	0.26	0.8	52.0	0.20	1.3	20	2.6	9.0
2 x 0.35	7	7	0.26	0.8	52.0	0.20	1.3	30	2.6	9.0
2 x 0.5	19	19	0.19	1.0	37.1	0.22	1.6	15	3.2	13.0
2 x 0.5	19	19	0.19	1.0	37.1	0.22	1.6	30	3.2	13.0
2 x 0.5	16	16	0.21	1.0	37.1	0.22	1.6	20	3.2	13.0
2 x 0.5	16	16	0.21	1.0	37.1	0.22	1.6	30	3.2	13.0
2 x 0.5	19	19	0.19	1.0	37.1	0.22	1.6	30	3.5	20.0
2 x 0.5	16	16	0.21	1.0	37.1	0.22	1.6	40	3.5	20.0
2 x 0.75	19	19	0.23	1.2	24.7	0.24	1.9	30	3.8	18.0
2 x 0.75	24	24	0.21	1.2	24.7	0.24	1.9	30	3.8	18.0
3 x 0.75	19	19	0.23	1.2	24.7	0.24	1.9	30	4.1	27.0
2 x 1.0	19	19	0.26	1.35	18.5	0.24	2.1	30	4.2	22.0
2 x 1.0	32	32	0.21	1.35	18.5	0.24	2.1	30	4.2	22.0
3 x 1.0	32	32	0.21	1.35	18.5	0.24	2.1	25	4.5	33.0
4 x 1.0	19	19	0.26	1.35	18.5	0.24	2.1	30	5.1	44.0
2 x 1.5	19	19	0.32	1.7	12.7	0.24	2.4	30	4.8	32.0
2 x 2.5	50	50	0.26	2.2	7.8	0.28	3.0	30	6.0	52.0
5 x 2.5	50	50	0.26	2.2	7.8	0.28	3.0	50	8.1	130.0
6 x 2.5	50	50	0.26	2.2	7.8	0.28	3.0	55	9.0	156.0

# LEONI Mocar® W... / LEONI SHC... heating cable

high temperature resistant, for applications in the engine compartment / interior



### Temperature range (3,000 hrs)

variable **-90 °C to +260 °C**

### Construction / materials

depending on requirements see table

### Special properties

With a defined electrical resistance, the heating cables can be used for a wide range of applications.

### Examples for applications

- Seat heating
- Hose heating

Description	Insulation material	Electrical resistance at 20 °C	Temperature range (3,000 hrs)
		Ω/km	°C
<b>Heating cables for applications in the engine compartment</b>			
LEONI Mocar® 150 C W...	TPE	60 ... 100k	<b>-40 °C to +150 °C</b>
LEONI Mocar® 180 E W...	ETFE		<b>-65 °C to +180 °C</b>
LEONI Mocar® 210 F W...	FEP		<b>-65 °C to +210 °C</b>
LEONI Mocar® 260 T W...	PFA		<b>-80 °C to +260 °C</b>
LEONI Mocar® 260 R W...	PTFE		<b>-90 °C to +260 °C</b>

<b>Heating cables for applications in the interior</b>			
LEONI SHC Y...	PVC	60 ... 100k	<b>-40 °C to +105 °C</b>
LEONI SHC 12Y...	TPE		<b>-40 °C to +105 °C</b>
LEONI SHC 7Y...	ETFE		<b>-65 °C to +180 °C</b>
LEONI SHC 6Y...	FEP		<b>-65 °C to +210 °C</b>

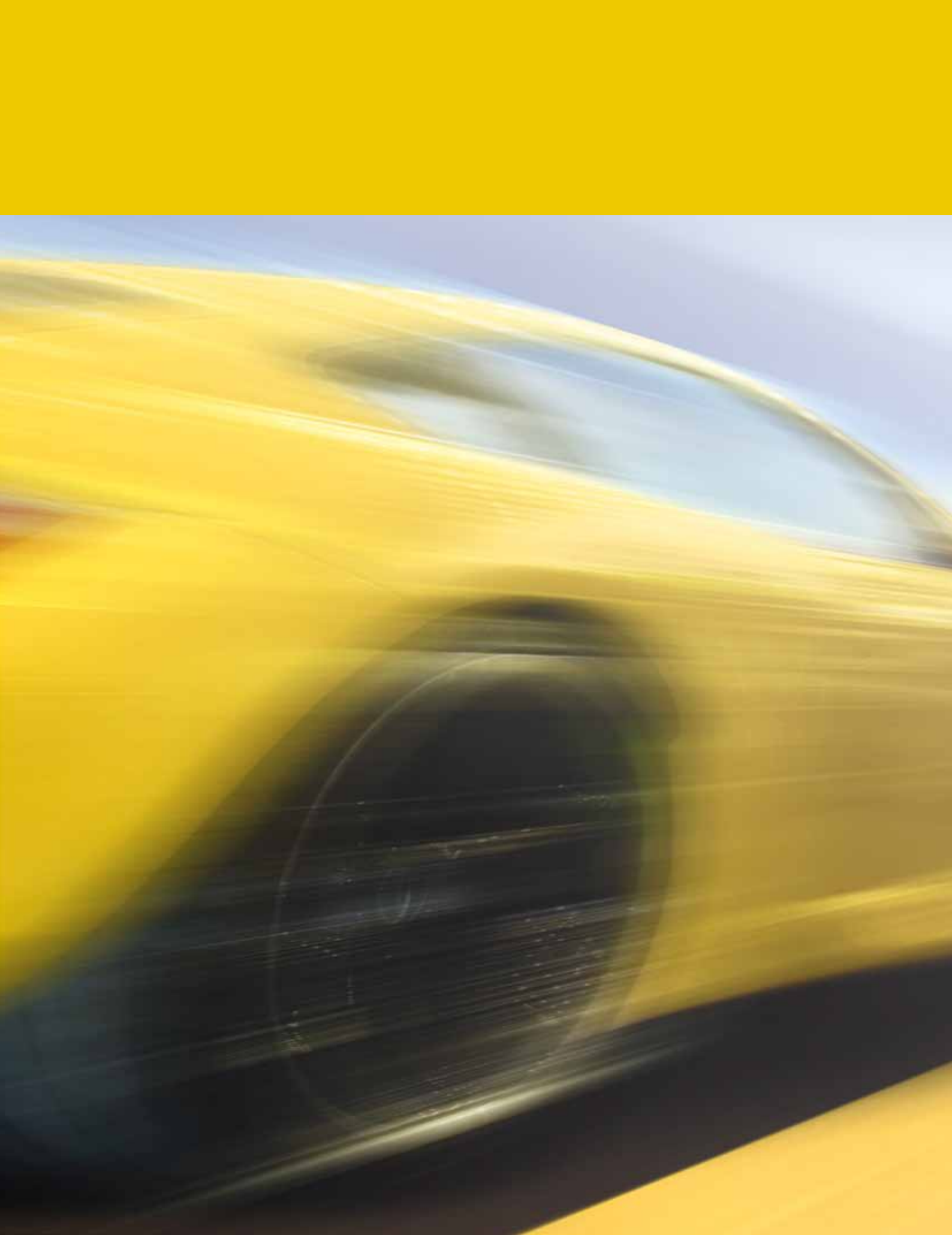
<b>Conductor construction (LEONI SHC)</b>	
C	Soft-annealed electrolytic copper Cu-ETP1
T	Tinsel Core thread braided with laminated copper wires
E	Enamelled copper wire conductors Single wires with laquer coating
H	Hybrid conductors Strand with individual wires made of various materials
R	Special conductor with incorporated strain-relief element
A	Alloy

### Examples

<b>Example LEONI Mocar® 180 E W550</b>		
Description	Max. continuous use temperature (insulation material)	Electrical resistance
LEONI Mocar®	180 E	W550

<b>Example LEONI SHC 7Y A 2000</b>			
Description	Insulation material	Conductor construction	Electrical resistance
LEONI SHC	7Y	A	2000





# LEONI Adascar® – multi-core cables for several applications

## **Weight reduction**

Multi-core automotive cables with innovative conductor materials.

### **Applications:**

ABS, ESP, brake wear indicator and electrical parking brake.

### **Standards:**

Compliant with customer specifications.

## **Comfort Applications / Control Applications / Power Applications**

Multi-core automotive cables with sheath, shielded and unshielded.

### **Comfort Applications**

roof, seat, heating, ventilation and climate control systems, park assistance, consumer electronics etc.

### **Power Applications**

lighting and wiring systems, electrical installation wiring, engine compartment etc.

### **Control Applications**

sensors for rain, weight and occupant recognition, fill level, lambda probe, applications with capacity and inductivity requirements etc.

### **Standards:**

Compliant with ISO 6722, LV 112, ISO 14572 JAS and customer requirements.

### **Safety Applications**

Multi-core automotive cables for safety applications.

### **Applications:**

airbag, belt, pre-crash, collision avoidance and closing systems, clamping protections, chassis safety, distance controllers etc.

### **Standards:**

Compliant with ISO 6722, LV 112, ISO 14572 JAS and customer requirements.

## **Truck Applications**

Multi-core automotive cables in straight and coiled version with ADR approval for commercial vehicles.

### **Applications:**

connection cable between tractor and trailer or semi-trailer, lighting and wiring systems with ADR approval etc.

### **Standards:**

Compliant with ISO 6722, LV 112, ISO 14572, LV 212, ISO 414 and customer specifications.

## **Sensor Applications**

Sensor cables for driver assistance and active safety systems in the axel wiring.

### **Applications:**

ABS, ESP, brake wear indicator and electrical parking brake.

### **Standards:**

Compliant with customer specifications.

## **Applications for temperatures $\geq 150$ °C**

High temperature cables with special materials, irradiation crosslinking and high performance polymer.

### **Applications:**

Catalysator, turbo, exhaust system, brake system wiring, engine compartment, gear unit, temperature sensors, cooling system, axel wiring, head lamp.

### **Standards:**

Compliant with ISO 6722, ISO 14572, LV 112 and LV 212.

# Weight reduction

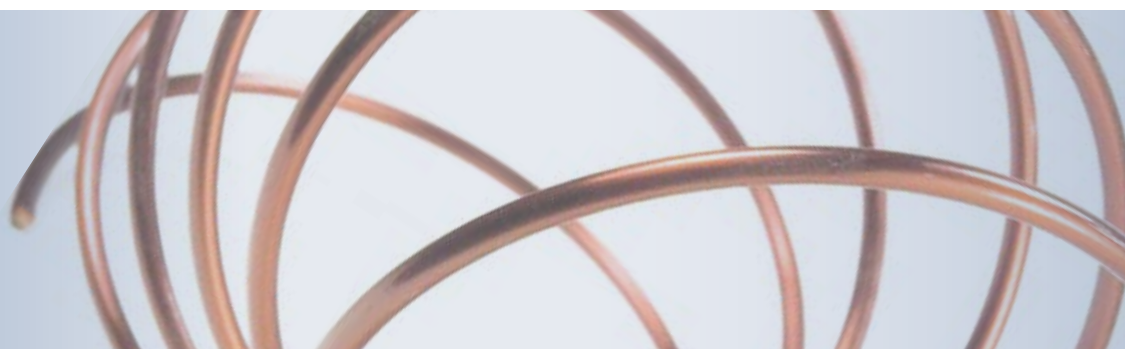
Multi-core automotive cables with innovative conductor materials – LEONI Adascar® Sensor



Code	Conductor construction				Insulation	Cable	
	Nominal cross-section	No. of strands	Diam. of single wire	Electrical resistance at 20 °C max.	Core diam.	Outer diameter	Weight
	mm <sup>2</sup>		nom. mm	Ω/km	nom. mm	nom. mm	approx. kg/km
<b>CuAg</b>							
LEONI Adascar® Sensor 2x0.13 CuAg	2x0.13	7	0.154	150	1.00	3.0	10
LEONI Adascar® Sensor 2x0.17 CuAg	2x0.17	7	0.180	110	1.05	3.1	12
LEONI Adascar® Sensor 2x0.22 CuAg	2x0.22	12	0.150	100	1.15	3.5	14
LEONI Adascar® Sensor 2x0.22 CuAg Flex	2x0.22	19	0.120	100	1.15	3.5	14
LEONI Adascar® Sensor 2x0.35 CuAg	2x0.35	19	0.155	55	1.30	4.0	18
<b>CuSn</b>							
LEONI Adascar® Sensor 2x0.13 CuSn	2x0.13	7	0.154	175	1.00	3.0	10
LEONI Adascar® Sensor 2x0.13 CuSn Flex	2x0.13	12	0.120	175	1.00	3.0	10
LEONI Adascar® Sensor 2x0.22 CuSn	2x0.22	7	0.200	125	1.15	3.5	14
LEONI Adascar® Sensor 2 x 0.25 CuSn Flex	2x0.25	48	0.080	95	1.45	4.0	20
LEONI Adascar® Sensor 2 x 0.30 CuSn Flex	2x0.30	60	0.080	85	1.45	4.0	21
LEONI Adascar® Sensor 2x0.35 CuSn	2x0.35	19	0.155	80	1.30	4.0	18
LEONI Adascar® Sensor 2 x 0.50 CuSn Flex	2x0.50	105	0.080	50	1.90	6.2	45
<b>CuMg</b>							
LEONI Adascar® Sensor 2x0.13	2x0.13	7	0.154	175	1.00	3.0	10
LEONI Adascar® Sensor 2x0.35	2x0.35	19	0.155	80	1.30	4.0	18
<b>CuZn37</b>							
LEONI Adascar® Sensor 2x0.22	2x0.22	7	0.200	350	1.15	3.5	14
LEONI Adascar® Sensor 2x0.35	2x0.35	19	0.155	250	1.30	4.0	16
<b>CuSn6</b>							
LEONI Adascar® Sensor 2x0.22	2x0.22	7	0.200	520	1.15	4.0	16

Comment: other cable types are also available, e.g. shielded.

## Advanced Automotive Special Cables.



Temperature classes according up to ISO 6722		Core material	Sheath material
Class A+B	to +105 °C (3.000 h)	PVC	PVC
Class C	to +125 °C (3.000 h)	XLPE	TPE-U
Class D	to +150 °C (3.000 h)	XLPE	TPE-U or TPE-A

### Comparison of some cable types

	LEONI Adascar® Sensor 2x0.5 Cu	LEONI Adascar® Sensor 2x0.35 Cu	LEONI Adascar® Sensor 2x0.17mm <sup>2</sup> CuAg	LEONI Adascar® Sensor 2x0.13mm CuSn	Benefits
Cross-section	2x0.5 mm <sup>2</sup>	2x0.35 mm <sup>2</sup>	2x0.17 mm <sup>2</sup>	2x0.13 mm <sup>2</sup>	reduction up to 75 %
Conductor construction	Cu ETP1 28x0.15 mm	Cu ETP1 37x0.11 mm	CuAg01 7x0.180 mm	CuSn03 7x0.154 mm	easier contacting
Diameter	5.1 mm	4.0 mm	3.1 mm	3.0 mm	reduction up to 40 %
Tensile strength	>200 N	>140 N	>200 N	>200 N	same respectively higher or reduced diameter
Weight approx.	32 kg/km	20 kg/km	11 kg/km	10 kg/km	reduction up to 30 %



## Comfort applications



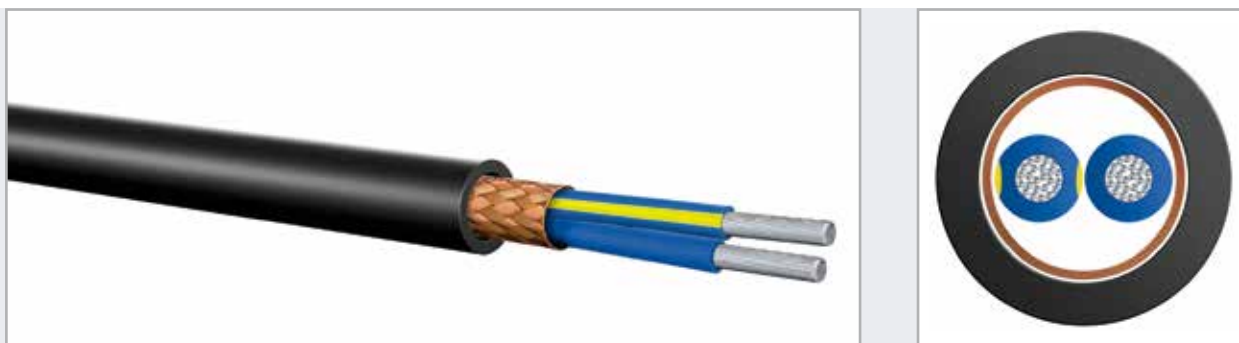
Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
<b>LEONI Adascar® – PVC round cables</b>					
LEONI Adascar® Comfort 6010	2x0.75	24	0.21	1.10	BL
LEONI Adascar® Comfort 6020	4x0.5	19	0.19	0.90	BL
LEONI Adascar® Comfort 6030	3x0.5	19	0.19	0.90	BL
LEONI Adascar® Comfort 6040	5x0.35 Flex	45	0.11	0.80	BL
<b>LEONI Adascar® – PVC special cables</b>					
LEONI Adascar® Comfort 6410	3x0.5	16	0.21	1.00	BL
<b>LEONI Adascar® – PVC 125 °C round/flat</b>					
LEONI Adascar® Comfort 6610	2x0.75	24	0.21	1.10	BL
LEONI Adascar® Comfort 6620-F	4x0.22	7	0.21	0.60	BL
<b>LEONI Adascar® – Special cables unshielded</b>					
LEONI Adascar® Comfort 6710	4x0.35 Flex	45	0.11	0.80	BL
<b>LEONI Adascar® – PVC shielded</b>					
LEONI Adascar® Comfort 7010-C	3x0.35+DW	19	0.16	0.90	BL
LEONI Adascar® Comfort 7020-B	2x0.35+DW	7	0.26	0.75	SN
LEONI Adascar® Comfort 7025-B	4x0.5+DW	16	0.21	1.00	BL
LEONI Adascar® Comfort 7030-B	6x0.5+DW	19	0.19	0.90	BL
LEONI Adascar® Comfort 7040-C	2x3+DW	98	0.21	2.20	BL
LEONI Adascar® Comfort 7050-B	4x0.22	7	0.21	0.60	BL
LEONI Adascar® Comfort 7060-B	2x2x0.75+DW	24	0.21	1.10	BL
LEONI Adascar® Comfort 7110-D	2x0.35	12	0.21	0.80	BL
LEONI Adascar® Comfort 7120-D	4x0.35	7	0.26	0.75	BL
LEONI Adascar® Comfort 7130-D	2x0.5	19	0.19	0.90	BL
LEONI Adascar® Comfort 7140-D	3x0.75	24	0.21	1.15	BL
LEONI Adascar® Comfort 7150-B	2x0.5+DW	19	0.19	0.90	BL
LEONI Adascar® Comfort 7160-B	4x0.35+DW	7	0.26	0.80	BL
LEONI Adascar® Comfort 7170-B	3x0.35+DW	7	0.26	0.75	BL
<b>LEONI Adascar® – Special cables shielded</b>					
LEONI Adascar® Comfort 7710-D	2x0.25 Flex	32	0.11	0.60	BL
LEONI Adascar® Comfort 7720-B	2x0.35+DW	7	0.26	0.75	BL
LEONI Adascar® Comfort 7730-D	3x0.35 Flex	45	0.11	0.80	BL

## Advanced Automotive Special Cables.



Diameter of cores nom.	Outer cable diameter nom.	Shield type	Insulation material	Jacket material	Conductor resistance max.	Temperature range
[mm]	[mm]				[Ω/km]	[°C]
1.80	4.60	–	PVC	PVC	24.7	–40 to +105
1.50	5.30	–	PVC	PVC	37.1	–40 to +105
1.55	4.70	–	PVC	PVC	37.1	–40 to +105
1.30	4.70	–	PVC	PVC	54.4	–40 to +105
1.95	5.40	–	PVC	PVC	36.7	–50 to +90
1.80	4.80	–	PVC	PVC	24.7	–40 to +125
1.10	5.60 x 2.15	–	TPE-E	PVC	84.8	–40 to +125
1.30	5.80	–	TPE-E	TPE-U	54.4	–40 to +105
1.30	4.20	C	PVC	PVC	54.4	–40 to +105
1.25	3.70	B	PVC	PVC	55.5	–40 to +105
1.55	5.60	B	PVC	PVC	37.1	–40 to +105
1.55	6.40	B	PVC	PVC	37.1	–40 to +105
3.10	6.80	C	PVC	PVC	6.15	–40 to +105
1.05	3.50	B	PVC	PVC	84.8	–40 to +105
1.75	6.90	B	PVC	PVC	24.7	–40 to +105
1.35	4.40	D	PVC	PVC	54.4	–40 to +105
1.25	5.30	D	PVC	PVC	54.4	–40 to +105
1.55	4.80	B + D	PVC	PVC	37.1	–40 to +105
1.75	5.30	D	PVC	PVC	24.7	–40 to +105
1.55	4.50	B	PVC	PVC	37.1	–40 to +105
1.25	4.50	B	PVC	PVC	54.4	–40 to +105
1.25	4.50	B	PVC	PVC	54.4	–40 to +105
1.20	4.20	D	TPE-E	TPE-U	70.3	–40 to +105
1.35	4.90	B	PP	PVC	54.4	–40 to +90
1.25	3.50	D	PVC	TPE-U	54.4	–40 to +105

## Control applications



Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
<b>LEONI Adascar® – PVC round cables</b>					
LEONI Adascar® Control 8010	5x0.5	16	0.21	1.00	BL
<b>LEONI Adascar® – PVC 125 °C round/flat</b>					
LEONI Adascar® Control 8610	2x0.75	24	0.21	1.10	BL
<b>LEONI Adascar® – Special cables unshielded</b>					
LEONI Adascar® Control 8710	7x0.35sn	7	0.26	0.75	SN
LEONI Adascar® Control 8720	6x0.5sn	19	0.19	0.90	SN
LEONI Adascar® Control 8730	4x0.75sn	24	0.21	1.10	SN
LEONI Adascar® Control 8740	2x0.35	7	0.26	0.75	BL
LEONI Adascar® Control 8750	5x0.5	16	0.21	1.00	BL
LEONI Adascar® Control 8760	16x0.22sn Flex	28	0.11	0.95	SN
LEONI Adascar® Control 8770	2x0.22sn	7	0.21	0.60	SN
LEONI Adascar® Control 8780	6x0.22 FR	11	0.16	0.60	SN
LEONI Adascar® Control 8790	4x0.25 Flex	32	0.11	0.60	BL
<b>LEONI Adascar® – PVC shielded</b>					
LEONI Adascar® Control 9010-C	2x2.5+DW	140	0.16	2.10	BL
LEONI Adascar® Control 9020-B	6x1+DW	32	0.21	1.30	BL
LEONI Adascar® Control 9030-B	2x1.5+DW	30	0.26	1.60	BL
LEONI Adascar® Control 9040-B	2x0.5+CC	19	0.19	0.90	BL
LEONI Adascar® Control 9060-B	3x0.35+DW	7	0.26	0.75	BL
LEONI Adascar® Control 9070-B	3x0.35+DW	7	0.26	0.75	BL
LEONI Adascar® Control 9110-C	4x0.16+DW	19	0.11	0.50	BL
LEONI Adascar® Control 9120-B	1x0.35+DW	7	0.26	0.75	BL
<b>LEONI Adascar® – Special cables shielded</b>					
LEONI Adascar® Control 9710-B	2x0.35+DW	7	0.26	0.75	SN
LEONI Adascar® Control 9715-B	2x1+CC	32	0.21	1.30	BL
LEONI Adascar® Control 9730-C	12x0.22 Flex	28	0.11	0.60	SN

## Advanced Automotive Special Cables.



Diameter of cores nom. [mm]	Outer cable diameter nom. [mm]	Shield type	Insulation material	Jacket material	Conductor resistance max. [Ω/km]	Temperature range [°C]
2.10	7.30	–	PVC	PVC	37.1	–40 to +105
1.80	4.80	–	PVC	PVC	24.7	–40 to +125
1.25	6.30	–	PVC	TPE-U	55.5	–40 to +105
1.50	6.30	–	ETFE	TPE-U	38.2	–40 to +125
2.20	6.20	–	TPE-U	TPE-U	25.4	–40 to +125
1.40	4.20	–	TPE-S	TPE-O	54.4	–40 to +90
1.55	5.50	–	TPE-O	TPE-U	37.1	–40 to +125
1.05	6.30	–	ETFE	TPE-U	86.5	–40 to +125
1.00	3.70	–	TPE-E	TPE-U	86.5	–40 to +125
1.10	4.50	–	TPE-E	TPE-U	86.5	–30 to +85
1.14	3.80	–	TPE-E	TPE-U	72.9	–40 to +105
2.80	7.00	C	PVC	PVC	7.6	–40 to +105
2.00	8.00	B	PVC	PVC	18.5	–40 to +105
2.30	6.40	B	PVC	PVC	12.7	–40 to +105
1.55	5.00	B	PVC	PVC	37.1	–40 to +105
1.25	3.90	B	PVC	PVC	54.4	–40 to +105
1.25	4.50	B	PVC	PVC	54.4	–40 to +105
1.05	4.60	C	PVC	PVC	132.0	–40 to +105
1.30	3.10	B	PVC	PVC	54.4	–40 to +105
1.30	4.00	B	TPE-E	TPE-U	54.4	–40 to +125
2.00	5.60	B	PVC	TPE-U	18.5	–40 to +105
1.00	6.70	C	ETFE	TPE-U	86.5	–40 to +125

## Power applications



Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
<b>LEONI Adascar® – PVC round cables</b>					
LEONI Adascar® Power 4010	2x0.5	16	0.21	1.00	BL
LEONI Adascar® Power 4020	2x0.75	24	0.21	1.10	BL
<b>LEONI Adascar® – PVC flat cables</b>					
LEONI Adascar® Power 4505	2x0.35 Twin	7	0.26	0.80	BL
LEONI Adascar® Power 4510	2x0.5 Twin	16	0.21	1.00	BL
LEONI Adascar® Power 4520	2x0.75 Twin	24	0.21	1.10	BL
LEONI Adascar® Power 4530	2x1 Twin	19	0.26	1.30	BL
LEONI Adascar® Power 4540	2x1.5 Twin	30	0.26	1.60	BL
LEONI Adascar® Power 4550	2x2.5 Twin	19	0.41	2.00	BL
<b>LEONI Adascar® – Special cables unshielded</b>					
LEONI Adascar® Power 4710	4x0.75	24	0.21	1.10	BL
<b>LEONI Adascar® – PVC shielded</b>					
LEONI Adascar® Power 5010-C	2x2x0.5sn	16	0.21	1.00	SN
LEONI Adascar® Power 5001-C	1x0.35	7	0.26	0.75	BL
LEONI Adascar® Power 5002-C	1x0.5	7	0.31	0.90	BL
LEONI Adascar® Power 5005-C	1x1.5sn	30	0.26	1.60	SN
LEONI Adascar® Power 5020-B	4x0.22	7	0.21	0.60	BL
LEONI Adascar® Power 5030-D	2x0.5	19	0.19	0.90	BL
LEONI Adascar® Power 5040-B	2x0.5+DW	19	0.19	0.90	BL
LEONI Adascar® Power 5050-B	2x1+DW	19	0.26	1.30	BL
LEONI Adascar® Power 5060-B	1x0.5+DW	19	0.19	0.90	BL
LEONI Adascar® Power 5070-B	2x2.5+DW	50	0.26	2.00	BL
LEONI Adascar® Power 5080-B	2x0.5+DW	19	0.19	0.90	BL
LEONI Adascar® Power 5110-C	10x0.22+DW	7	0.21	0.60	BL
LEONI Adascar® Power 5120-C	2x0.35	7	0.26	0.75	BL
LEONI Adascar® Power 5130-C	3x0.35	7	0.26	0.75	BL

## Advanced Automotive Special Cables.



Diameter of cores nom. [mm]	Outer cable diameter nom. [mm]	Shield type	Insulation material	Jacket material	Conductor resistance max. [Ω/km]	Temperature range [°C]
1.55	4.45	–	PVC	PVC	37.1	–40 to +105
1.80	4.90	–	PVC	PVC	24.7	–40 to +105
–	3.80 x 1.80	–	–	PVC	54.4	–40 to +105
–	4.40 x 2.10	–	–	PVC	37.1	–40 to +105
–	4.40 x 2.10	–	–	PVC	24.7	–40 to +105
–	3.80 x 1.90	–	–	PVC	18.5	–40 to +105
–	5.60 x 2.80	–	–	PVC	12.7	–40 to +105
–	5.20 x 2.60	–	–	PVC	7.6	–40 to +105
1.95	6.70	–	PVC	TPE-U	24.7	–40 to +105
1.80	8.60	C	PVC	PVC	38.2	–40 to +105
1.45	2.95	C	PVC	PVC	54.4	–40 to +105
1.70	3.50	C	PVC	PVC	37.1	–40 to +105
2.60	4.10	C	PVC	PVC	13.0	–40 to +105
1.10	3.50	B	PVC	PVC	84.8	–40 to +105
1.55	4.80	D	PVC	PVC	37.1	–40 to +105
1.55	4.20	B	PVC	PVC	37.1	–40 to +105
1.95	5.10	B	PVC	PVC	18.5	–40 to +105
1.55	3.80	B	PVC	PVC	37.1	–40 to +105
2.80	7.50	B	PVC	PVC	7.6	–40 to +105
1.55	4.50	B	PVC	PVC	37.1	–40 to +105
1.10	6.00	C	PVC	PVC	84.8	–40 to +105
1.45	4.40	C	PVC	PVC	54.4	–40 to +105
1.45	5.00	C	PVC	PVC	54.4	–40 to +105

Dimensions nom. width x height [mm x mm]



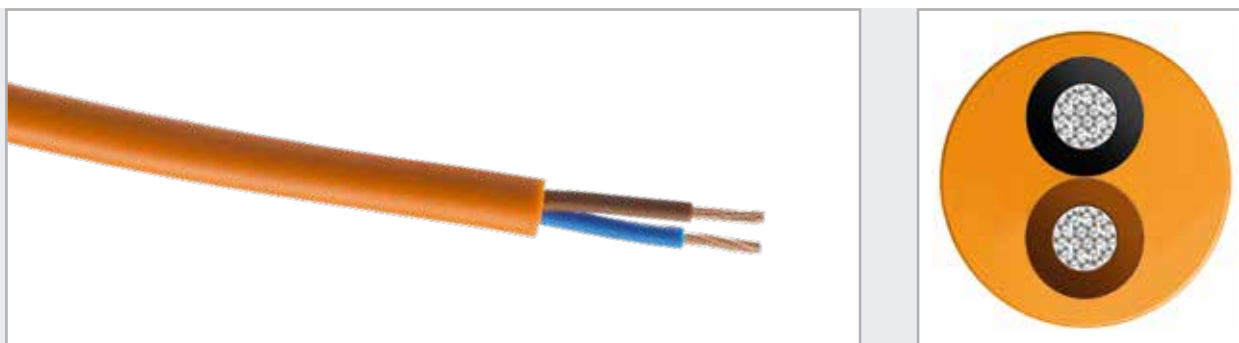
Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
LEONI Adascar® Power 5140-C	4x0.35+DW	19	0.26	0.75	BL
LEONI Adascar® Power 5150-C	5x0.35+DW	19	0.16	0.75	BL
LEONI Adascar® Power 5160-C	6x0.35	7	0.26	0.75	BL
LEONI Adascar® Power 5170-C	8x0.35+DW	19	0.16	0.75	BL
LEONI Adascar® Power 5180-C	10x0.35+DW	19	0.16	0.75	BL
LEONI Adascar® Power 5210-C	2x0.5	28	0.16	1.00	SN
LEONI Adascar® Power 5220-C	3x0.50+DW Flex	64	0.11	0.90	BL
LEONI Adascar® Power 5230-C	2x0.75	24	0.21	1.10	BL
LEONI Adascar® Power 5240-D	2x2.5	50	0.26	2.00	BL
LEONI Adascar® Power 5250-D	3x1	32	0.21	1.30	BL

#### LEONI Adascar® – Special cables shielded

LEONI Adascar® Power 5710-C	2x0.22+DW	7	0.21	0.60	SN
LEONI Adascar® Power 5720-D	1x0.75	24	0.21	1.10	BL
LEONI Adascar® Power 5820-B	3x0.35sn+DW	19	0.16	0.75	SN
LEONI Adascar® Power 5810-C	3x0.35sn	19	0.16	0.75	SN
LEONI Adascar® Power 5830-C	3x0.5sn+DW	19	0.16	0.75	SN

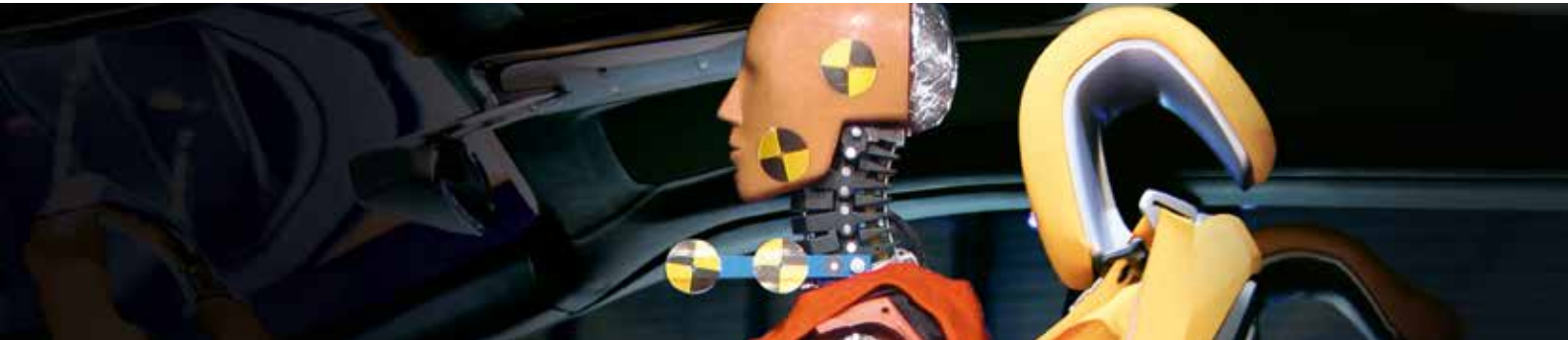
Diameter of cores nom.	Outer cable diameter nom.	Shield type	Insulation material	Jacket material	Conductor resistance max.	Temperature range
[mm]	[mm]				[Ω/km]	[°C]
1.25	5.30	C	PVC	PVC	54.4	-40 to +105
1.30	4.90	C	PVC	PVC	58.5	-40 to +105
1.45	6.40	C	PVC	PVC	54.4	-40 to +105
1.25	6.00	C	PVC	PVC	58.5	-40 to +105
1.25	6.70	C	PVC	PVC	58.5	-40 to +105
1.70	5.20	C	PVC	PVC	38.2	-40 to +105
1.55	5.00	C	PVC	PVC	37.1	-40 to +105
1.75	5.00	C	PVC	PVC	24.7	-40 to +105
2.85	7.80	D	PVC	PVC	7.6	-40 to +105
1.95	5.70	D	PVC	PVC	18.5	-40 to +105
1.15	3.70	C	ETFE	TPE-O	86.5	-40 to +180
2.00	3.20	D	TPE-E	TPE-U	24.7	-40 to +105
1.32	5.00	B	FEP	SIR	58.8	-40 to +180
1.32	5.45	C	FEP	SIR	58.8	-40 to +180
1.34	5.55	C	FEP	SIR	50.0	-40 to +180

## Safety applications



Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
<b>LEONI Adascar® – PVC round cables</b>					
LEONI Adascar® Safety 2010	2x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2011	2x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2012	2x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2013	2x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2015	3x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2020	2x0.5-A	19	0.19	0.90	BL
LEONI Adascar® Safety 2021	2x0.5-B	16	0.21	0.90	BL
LEONI Adascar® Safety 2022	2x0.5-A	19	0.19	0.90	BL
LEONI Adascar® Safety 2023	2x0.5/7	7	0.31	0.90	BL
LEONI Adascar® Safety 2024	2x0.5-A	19	0.19	0.90	BL
LEONI Adascar® Safety 2025	2x0.5sn-A	19	0.19	0.90	SN
LEONI Adascar® Safety 2026	2x0.5sn-A	19	0.19	0.90	SN
LEONI Adascar® Safety 2030	3x0.5-A	19	0.19	0.90	BL
LEONI Adascar® Safety 2035	2x0.5sn+0.5	19	0.19	0.90	SN
LEONI Adascar® Safety 2040	4x0.5-A	19	0.19	0.90	BL
<b>LEONI Adascar® – PVC special cables</b>					
LEONI Adascar® Safety 2410	4x0.35+2x2.5	12 / 50	0.21 / 0.26	0.75 / 2.00	BL / BL
<b>LEONI Adascar® – PVC flat cables</b>					
LEONI Adascar® Safety 2510-F	2x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2511-F	2x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2512-F	2x0.35sn-A	7	0.26	0.75	SN
LEONI Adascar® Safety 2520-F	2x0.5-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2521-F	2x0.5-B	16	0.21	0.90	BL
LEONI Adascar® Safety 2522-F	2x0.5-A	19	0.19	0.90	BL
<b>LEONI Adascar® – PVC 125 °C</b>					
LEONI Adascar® Safety 2610	2x0.5-A	19	0.19	0.90	BL
<b>LEONI Adascar® – Special cables unshielded</b>					
LEONI Adascar® Safety 2710	2x0.22-A	7	0.21	0.60	BL
LEONI Adascar® Safety 2720	2x0.35-A	7	0.26	0.75	BL
LEONI Adascar® Safety 2721	2x0.37-A AVSS	7	0.27	0.80	BL
<b>LEONI Adascar® – PVC shielded</b>					
LEONI Adascar® Safety 3010-B	2x0.35+DW	7	0.26	0.75	BL

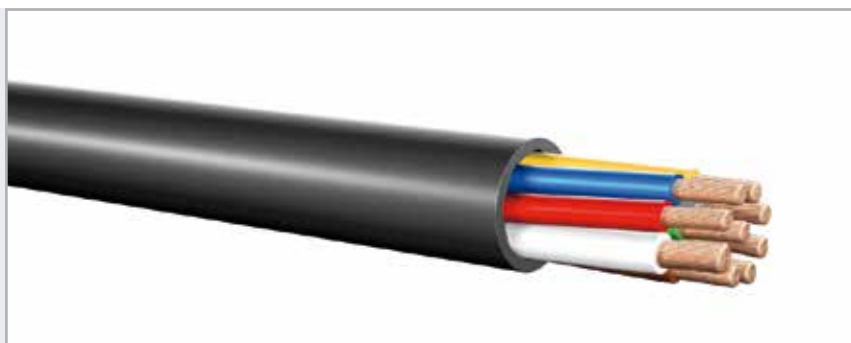
## Advanced Automotive Special Cables.



Diameter of cores nom. [mm]	Outer cable diameter nom. [mm]	Shield type	Insulation material	Jacket material	Conductor resistance max. [Ω/km]	Temperature range [°C]
1.25	5.45	–	PVC	PVC	54.4	–40 to +105
1.30	3.75	–	PVC	PVC	54.4	–40 to +105
1.25	3.50	–	PVC	PVC	54.4	–40 to +105
1.25	4.00	–	PVC	PVC	54.4	–40 to +105
1.25	3.90	–	PVC	PVC	54.4	–40 to +105
1.55	4.40	–	PVC	PVC	37.1	–40 to +105
1.55	4.50	–	PVC	PVC	37.1	–40 to +105
1.70	4.45	–	PVC	PVC	37.1	–40 to +105
1.55	4.45	–	PVC	PVC	37.1	–40 to +105
1.55	4.80	–	PVC	PVC	37.1	–40 to +105
1.55	4.45	–	PVC	PVC	38.2	–40 to +105
1.55	4.25	–	PVC	PVC	38.2	–40 to +105
1.55	4.50	–	PVC	PVC	37.1	–40 to +105
1.55	4.50	–	PVC	PVC	38.2	–40 to +105
1.50	4.80	–	PVC	PVC	37.1	–40 to +105
1.30 / 2.70	6.85	–	PVC	PVC	54.4	–40 to +105
1.25	3.90 x 2.60	–	PVC	PVC	54.4	–40 to +105
1.25	4.10 x 2.80	–	PVC	PVC	54.4	–40 to +105
1.25	4.10 x 2.80	–	PVC	PVC	55.5	–40 to +105
1.55	4.40 x 2.80	–	PVC	PVC	37.1	–40 to +105
1.55	3.80 x 2.25	–	PVC	PVC	37.1	–40 to +105
1.55	4.40 x 2.80	–	PVC	PVC	37.1	–40 to +105
1.55	4.40	–	PVC	PVC	37.1	–40 to +125
1.15	3.40	–	PVC	TPE-O	84.8	–30 to +90
1.60	4.10	–	PVC	TPE-O	54.4	–30 to +90
1.40	4.00	–	PVC	TPE-O	50.2	–30 to +90
1.25	3.70	B	PVC	PVC	54.4	–40 to +105

Dimensions nom. width x height [mm x mm]

## Truck applications



Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
<b>LEONI Adascar® – PVC round cables</b>					
LEONI Adascar® Truck 10201	2x0.5	16	0.21	0.90	BL
LEONI Adascar® Truck 10202	2x1	32	0.21	1.30	BL
LEONI Adascar® Truck 10203	2x1.5	30	0.26	1.60	BL
LEONI Adascar® Truck 10204	2x0.5	19	0.19	0.90	BL
LEONI Adascar® Truck 10206	2x0.75	24	0.21	1.10	BL
LEONI Adascar® Truck 10207	2x2.5	50	0.26	2.00	BL
LEONI Adascar® Truck 10300	3x0.5	19	0.19	0.90	BL
LEONI Adascar® Truck 10301	3x0.75	19	0.23	1.10	BL
LEONI Adascar® Truck 10302	3x1.5	19	0.32	1.55	BL
LEONI Adascar® Truck 10303	3x2.5	19	0.41	2.00	BL
LEONI Adascar® Truck 10304	3x1	32	0.21	1.30	BL
LEONI Adascar® Truck 10401	4x0.75	19	0.23	1.10	BL
LEONI Adascar® Truck 10402	4x1	32	0.21	1.30	BL
LEONI Adascar® Truck 10403	2x1.5+2x0.5	19 / 19	0.32 / 0.19	1.55 / 0.90	BL
LEONI Adascar® Truck 10501	5x0.5	16	0.21	0.95	BL
LEONI Adascar® Truck 10502	5x1.5	19	0.32	1.55	BL
LEONI Adascar® Truck 10503	2x4+3x1.5	56 / 19	0.31 / 0.32	2.55 / 1.55	BL
LEONI Adascar® Truck 10504	2x6+3x1.5	84 / 19	0.31 / 0.32	3.10 / 1.60	BL
LEONI Adascar® Truck 10505	3x1.5+2x0.5	19 / 19	0.32 / 0.19	1.60 / 0.90	BL
LEONI Adascar® Truck 10506	5x0.75	24	0.21	1.10	BL
LEONI Adascar® Truck 10601	1x1+5x0.75	32 / 24	0.21 / 0.21	1.30 / 1.10	BL
LEONI Adascar® Truck 10602	6x0.5	16	0.21	0.90	BL
LEONI Adascar® Truck 10603	2x1.5+4x0.5	30 / 16	0.26 / 0.21	1.70 / 1.00	BL
LEONI Adascar® Truck 10701	1x1.5+6x1	30 / 32	0.26 / 0.21	1.60 / 1.30	BL
LEONI Adascar® Truck 10702	7x1	19	0.26	1.30	BL
LEONI Adascar® Truck 10703	7x1.5	30	0.26	1.60	BL
LEONI Adascar® Truck 10706	3x2.5+4x1.5	50 / 30	0.26 / 0.26	2.00 / 1.60	BL
LEONI Adascar® Truck 10707	4x2+3x0.75	24 / 30	0.21 / 0.31	1.80 / 1.10	BL

*Advanced Automotive Special Cables.*

Diameter of cores nom.	Outer cable diameter nom.	Shield type	Insulation material	Jacket material	Conductor resistance max.	Temperature range
[mm]	[mm]				[Ω/km]	[°C]
1.55	4.80	–	PVC	PVC	37.1	–40 to +105
2.00	6.00	–	PVC	PVC	18.5	–40 to +105
2.30	6.60	–	PVC	PVC	12.7	–40 to +105
1.55	5.00	–	PVC	PVC	37.1	–40 to +105
2.30	5.60	–	PVC	PVC	24.7	–40 to +105
2.85	7.70	–	PVC	PVC	12.7	–40 to +105
1.55	4.80	–	PVC	PVC	37.1	–40 to +105
1.80	5.90	–	PVC	PVC	24.7	–40 to +105
2.30	7.15	–	PVC	PVC	12.7	–40 to +85
2.90	8.65	–	PVC	PVC	7.6	–40 to +85
2.50	6.80	–	PVC	PVC	18.5	–40 to +105
1.85	6.60	–	PVC	PVC	24.7	–40 to +105
2.00	6.70	–	PVC	PVC	18.5	–40 to +105
2.30 / 1.55	6.50	–	PVC	PVC	12.5 / 37.1	–40 to +85
1.55	5.80	–	PVC	PVC	37.1	–40 to +105
2.30	8.40	–	PVC	PVC	12.7	–40 to +105
3.65 / 2.30	10.60	–	PVC	PVC	4.7 / 12.7	–40 to +105
4.20 / 2.30	11.60	–	PVC	PVC	3.2 / 12.7	–40 to +105
2.30 / 1.55	8.50	–	PVC	PVC	12.7 / 37.1	–40 to +105
1.75	6.50	–	PVC	PVC	24.7	–40 to +105
2.00 / 1.75	7.30	–	PVC	PVC	18.5 / 24.7	–40 to +105
1.55	6.50	–	PVC	PVC	37.1	–40 to +105
2.30 / 1.55	7.50	–	PVC	PVC	12.7 / 37.1	–40 to +105
2.30 / 2.30	9.30	–	PVC	PVC	12.7 / 18.5	–40 to +105
2.00	8.00	–	PVC	PVC	18.5	–40 to +105
2.30	10.30	–	PVC	PVC	12.7	–40 to +105
2.85 / 2.30	10.30	–	PVC	PVC	7.6 / 12.7	–40 to +105
2.50 / 1.80	9.30	–	PVC	PVC	9.4 / 24.7	–40 to +105



Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
LEONI Adascar® Truck 10801	1x2.5+7x1	50 / 32	0.26 / 0.26	2.00 / 1.30	BL
LEONI Adascar® Truck 10101	2x2.5+8x1	32 / 50	0.26 / 0.21	2.00 / 1.30	BL
LEONI Adascar® Truck 10111	4x2.5+7x1	32 / 50	0.26 / 0.21	2.00 / 1.30	BL
LEONI Adascar® Truck 10131	4x2.5+9x1.5	50 / 30	0.26 / 0.26	2.20 / 1.70	BL
LEONI Adascar® Truck 10151	3x2.5+12x1	50 / 32	0.26 / 0.21	2.00 / 1.30	BL
LEONI Adascar® Truck 10153	5x2.5+8x1.5	50 / 30	0.26 / 0.26	2.00 / 1.60	BL

#### LEONI Adascar® – PVC flat cables

LEONI Adascar® Truck 11201	2x1.5sn	30	0.26	1.50	SN
LEONI Adascar® Truck 11202	2x1.5	30	0.26	1.55	BL
LEONI Adascar® Truck 11204	2x2.5	50	0.26	2.10	BL
LEONI Adascar® Truck 11301	3x1.5	30	0.26	1.70	BL

#### LEONI Adascar® – PVC/PU round cables

LEONI Adascar® Truck 12201	2x0.75	24	0.26	1.10	BL
LEONI Adascar® Truck 12301	3x1.5	30	0.26	1.55	BL
LEONI Adascar® Truck 12501	2x6+3x1.5	84 / 30	0.31 / 0.26	3.15 / 1.60	BL
LEONI Adascar® Truck 12502	5x1.5	30	0.26	1.60	BL
LEONI Adascar® Truck 12701	1x2+6x1	28 / 32	0.31 / 0.21	1.80 / 1.30	BL

#### LEONI Adascar® – PVC/PU flat cables

LEONI Adascar® Truck 13201	2x1sn	32	0.21	1.30	SN
LEONI Adascar® Truck 13202	2x1.5sn	30	0.26	1.50	SN

#### LEONI Adascar® – PU round cables

LEONI Adascar® Truck 14301	3x1.5	19	0.32	1.55	BL
LEONI Adascar® Truck 14302	3x2.5	19	0.41	2.00	BL
LEONI Adascar® Truck 14303	2x2.5+1x0.5	19 / 19	0.41 / 0.19	2.20 / 1.00	BL
LEONI Adascar® Truck 14401	4x0.25	14	0.16	0.65	BL
LEONI Adascar® Truck 14501	2x4+3x1.5	56 / 30	0.31 / 0.26	2.70 / 1.70	BL
LEONI Adascar® Truck 14601	6x0.25	14	0.16	0.70	BL
LEONI Adascar® Truck 14701	7x0.25	14	0.16	0.70	BL

#### LEONI Adascar® – Cables with PP data pair

LEONI Adascar® Truck 15151	3x2.5+12x1.5	50 / 32	0.26 / 0.21	2.00 / 1.50	BL
LEONI Adascar® Truck 15401	2x0.75+2x0.75	24	0.21	1.10	BL
LEONI Adascar® Truck 15701	2x4+5x1.5	56 / 30	0.31 / 0.26	2.75 / 1.70	BL
LEONI Adascar® Truck 15702	4+3x1.5+3x0.75	56 / 30 / 24	0.31 / 0.26 / 0.21	2.75 / 1.70 / 1.20	BL

#### LEONI Adascar® – Spiral cable hytrel/special cables

LEONI Adascar® Truck 16701	2x4+5x1.5	56 / 30	0.31 / 0.26	2.75 / 1.70	BL
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#### LEONI Adascar® – Shielded cables

LEONI Adascar® Truck 18171	13x1+(4x1)-C	32 / 32	0.21 / 0.21	1.30 / 1.30	BL
LEONI Adascar® Truck 18201-D	2x0.75	24	0.21	1.15	BL

Diameter of cores nom.	Outer cable diameter nom.	Shield type	Insulation material	Jacket material	Conductor resistance max.	Temperature range
[mm]	[mm]				[Ω/km]	[°C]
2.60 / 1.90	8.40	–	PVC	PVC	7.6 / 18.5	–40 to +105
2.85 / 2.00	10.50	–	PVC	PVC	7.6 / 18.5	–40 to +105
2.60 / 2.00	11.00	–	PVC	PVC	7.6 / 18.5	–40 to +105
2.80 / 2.25	13.40	–	PVC	PVC	7.6 / 12.7	–40 to +105
2.80 / 2.00	12.60	–	PVC	PVC	7.6 / 18.5	–40 to +105
2.80 / 2.30	13.60	–	PVC	PVC	7.6 / 12.7	–40 to +105
2.70	6.80 x 4.50	–	PVC	PVC	13.0	–40 to +105
2.75	3.80 x 6.60	–	PVC	PVC	12.7	–40 to +105
3.40	4.60 x 8.10	–	PVC	PVC	7.6	–40 to +105
2.65	3.80 x 9.20	–	PVC	PVC	12.7	–40 to +105
1.85	6.10	–	PVC	PVC / TPE-U	24.7	–40 to +105
2.30	7.50	–	PVC	PVC / TPE-U	12.7	–40 to +105
4.20 / 2.25	12.00	–	PVC	PVC / TPE-U	3.4 / 12.7	–40 to +90
2.30	10.40	–	PVC	PVC / TPE-U	12.7	–40 to +125
2.50 / 2.10	9.10	–	PVC	PVC / TPE-U	9.42 / 18.5	–40 to +105
2.00	6.20 x 4.10	–	PVC	PVC / TPE-U	19.1	–40 to +105
2.35	6.80 x 4.50	–	PVC	PVC / TPE-U	13	–40 to +105
2.30	7.50	–	PVC	TPE-U	12.7	–40 to +105
2.90	9.20	–	PVC	TPE-U	7.6	–40 to +105
2.80 / 1.55	7.60	–	TPE-O	TPE-U	7.6 / 37.1	–40 to +125
1.30	5.20	–	PVC	TPE-U	80.0	–40 to +80
3.65 / 2.55	10.60	–	PVC	TPE-U	4.7 / 12.7	–40 to +90
1.30	5.90	–	PVC	TPE-U	80.0	–40 to +105
1.30	5.90	–	PVC	TPE-U	80.0	–40 to +105
2.60 / 2.50	14.50	–	PVC / PP	PVC / TPE-U	7.6 / 12.7	–40 to +85
1.95 / 1.85	8.00	–	PVC / PP	PVC	24.7 / 24.7	–40 to +85
3.40 / 2.30	11.50	–	PVC / PP	PVC	4.7 / 12.7	–40 to +85
3.40 / 2.30 / 1.85	11.80	–	PVC / PP	PVC	4.7 / 12.7 / 24.7	–40 to +85
3.40 / 2.60 / 2.30	12.00	–	TPE-O / TPE-O / PP	TPE-E	4.7 / 12.7 / 12.7	–40 to +90
2.40 / 2.30	8.40 / 15.50	C	PVC	PVC / PVC	18.5 / 18.5	–40 to +105
1.75	5.10	D	PVC	PVC	24.7	–40 to +105

## Wheel sensor applications

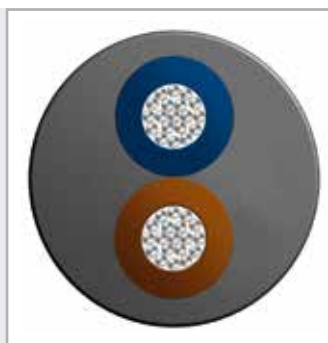
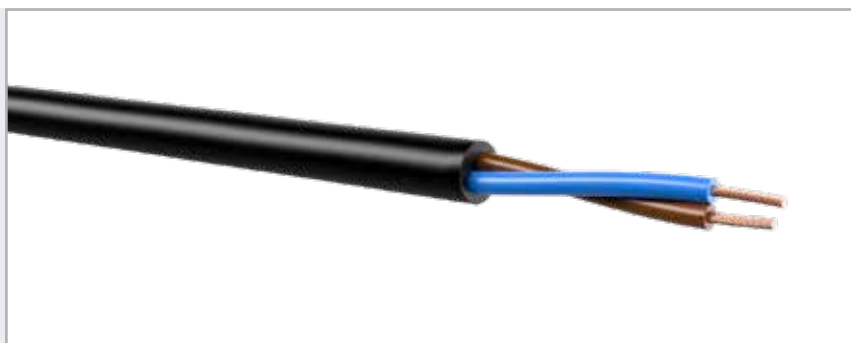


Code	Cable structure	No. of strands	Diameter of single wire max.	Diameter of conductor nom.	Conductor surface
			[mm]	[mm]	
<b>LEONI Adascar® – PVC insulation</b>					
LEONI Adascar® Sensor 1620	2x0.75	42	0.16	1.20	BL
LEONI Adascar® Sensor 1650	3x1.5	30	0.26	1.70	BL
LEONI Adascar® Sensor 1630	2x1.5	30	0.26	1.60	BL
<b>LEONI Adascar® – EVA insulation</b>					
LEONI Adascar® Sensor 210	2x0.5	28	0.16	1.00	SN
LEONI Adascar® Sensor 220	2x0.5	28	0.16	1.00	SN
LEONI Adascar® Sensor 310	2x0.75	42	0.16	1.20	SN
LEONI Adascar® Sensor 110	2x0.35	37	0.11	0.80	SN
LEONI Adascar® Sensor 120	4x0.35	19	0.16	0.85	SN
LEONI Adascar® Sensor 211	2x0.5	64	0.11	1.00	SN
<b>LEONI Adascar® – TPE insulation</b>					
LEONI Adascar® Sensor 1100	2x0.5	19	0.19	1.00	BL
LEONI Adascar® Sensor 1400	2x0.75	42	0.16	1.20	BL
LEONI Adascar® Sensor 1301	4x0.5	64	0.11	1.00	BL
LEONI Adascar® Sensor 1300	4x0.5	28	0.16	1.00	BL
LEONI Adascar® Sensor 1401	2x0.75	96	0.11	1.20	BL
<b>LEONI Adascar® – PE-X insulation</b>					
LEONI Adascar® Sensor 810	2x0.5	28	0.16	1.00	SN
LEONI Adascar® Sensor 820	2x0.75	42	0.16	1.20	SN
LEONI Adascar® Sensor 811	2x0.5	19	0.19	0.95	BL
<b>LEONI Adascar® – Special cables</b>					
LEONI Adascar® Sensor 1840	3x0.5	19	0.19	1.00	BL
LEONI Adascar® Sensor 1820	2x0.75	42	0.16	1.20	SN
LEONI Adascar® Sensor 1810	2x0.35	19	0.16	0.85	BL
LEONI Adascar® Sensor 1310	2x0.25	19	0.13	0.25	NI

*Advanced Automotive Special Cables.*

Diameter of cores nom.	Outer cable diameter nom.	Shield type	Insulation material	Jacket material	Conductor resistance max.	Temperature range
[mm]	[mm]				[Ω/km]	[°C]
1.90	5.40	–	PVC	TPE-U	24.7	–40 to +105
2.40	6.70	–	PVC	TPE-U	13.3	–40 to +105
1.90	6.80	–	PVC	TPE-U	13.3	–40 to +105
1.65	4.30	–	EVA	TPE-U	40.1	–40 to +125
1.65	5.15	–	EVA	TPE-U	40.1	–40 to +125
2.20	6.20	–	EVA	TPE-U	27.1	–40 to +125
1.42	4.00	–	EVA	TPE-U	54.5	–40 to +125
1.45	4.70	–	EVA	TPE-U	54.5	–40 to +125
1.65	4.30	–	EVA	TPE-U	40.1	–40 to +125
1.60	5.00	–	TPE-S	TPE-U	37.1	–40 to +125
1.90	6.20	–	TPE-S	TPE-U	24.7	–40 to +125
1.50	6.20	–	TPE-S	TPE-U	37.1	–40 to +125
1.50	6.20	–	TPE-S	TPE-U	37.1	–40 to +125
1.80	6.20	–	TPE-S	TPE-U	24.7	–40 to +125
1.65	4.30	–	XLPE	TPE-U	40.1	–40 to +125
2.20	6.20	–	XLPE	TPE-U	27.1	–40 to +125
1.70	5.00	–	XLPE	TPE-U	37.4	–40 to +125
1.65	5.10	–	ETFE	TPE-U	37.1	–40 to +150
1.80	5.00	–	ETFE	TPE-U	27.1	–40 to +150
1.35	4.00	–	ETFE	TPE-U	56.0	–40 to +150
0.95	5.15	–	PFA	TPE-U	84.8	–60 to +125

## Applications for temperatures $\geq 150$ °C



Number of cores	Cross-section [mm]	Insulation	Sheath	Temperature range [°C]
<b>LEONI Adascar® Control unshielded or shielded (B/C/D)</b>				
2 – 7	0.13 – 2.5	TPE-E/XLPE/EVA	TPE-U	+150
		XLPE/ETFE	TPE-A/TPE-E	+150
		XLPE/ETFE	XLPE	+150
		ETFE	ETFE	+180
		FEP	SIR	+200
		FEP	FEP	+210
		PFA/PTFE	PFA/PTFE	+260

Number of cores	Cross-section [mm]	Insulation	Sheath	Temperature range [°C]
<b>LEONI Adascar® Power unshielded or shielded (B/C/D)</b>				
2 – 7	0.13 – 2.5	TPE-E/XLPE/EVA	TPE-U	+150
		XLPE/ETFE	TPE-A/TPE-E	+150
		XLPE/ETFE	XLPE	+150
		ETFE	ETFE	+180
		FEP	SIR	+200
		FEP	FEP	+210
		PFA/PTFE	PFA/PTFE	+260

Number of cores	Cross-section [mm]	Insulation	Sheath	Temperature range [°C]
<b>LEONI Adascar® Sensor unshielded or shielded (B/C/D)</b>				
2 – 7	0.13 – 2.5	TPE-E/XLPE/EVA	TPE-U	+150
		XLPE/ETFE	TPE-A/TPE-E	+150
		XLPE/ETFE	XLPE	+150
		ETFE	ETFE	+180
		FEP	SIR	+200
		FEP	FEP	+210
		PFA/PTFE	PFA/PTFE	+260

## *Advanced Automotive Special Cables.*



### **Description of the used insulation materials:**

- TPE-E Thermoplastic elastomer on polyether ester basis
- TPE-U Thermoplastic elastomer on polyurethane basis
- TPE-A Thermoplastic elastomer on polyamide basis
- XLPE Polyethylene (irradiation, silane, peroxide crosslinked)
- EVA Ethylene/vinyl acetate crosslinked
- ETFE Ethylene/tetrafluoroethylene
- FEP Tetrafluoroethylene / Hexafluoropropylene
- PFA Perfluoroalkoxy copolymer
- PTFE Polytetrafluoroethylene
- SIR Silicone rubber

### **Benefits and properties:**

- good heat resistance within thermal overload
- high flexibility
- good insert moulding
- good media resistance
- chemical resistance
- flame retardance
- bending strength
- abrasion resistance
- solvent resistance (increased swelling resistance)
- crosslinked resp. non crosslinked sheath material





## LEONI Dacar® – multi-core data transmission cables and coaxial cables

The LEONI Dacar product range is divided into symmetrical and unsymmetrical data transmission cables.

We differentiate as follows between information and communication:

- Information as an unidirectional data flow where data is processed e.g. in the vehicle.
- Communication is a bi-directional flow of data, as for example a telephone conversation between two or more people.

### Standards

Compliant with customer specifications.

### Symmetrical data transmission cables for various transmission standards

#### Applications

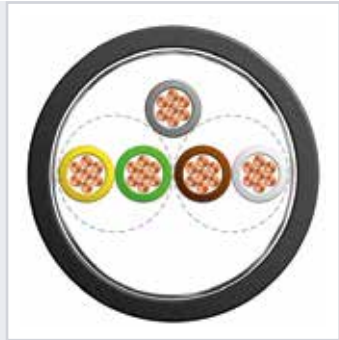
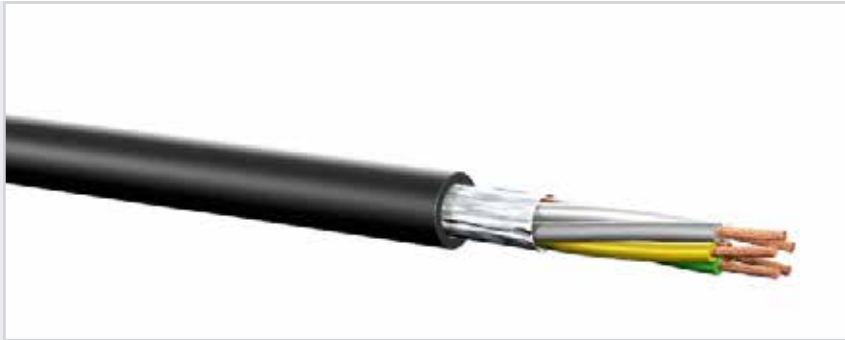
CD changer, multimedia / MP3 player, TFT, rear view camera system, bus systems (Flexray/FireWire/CAN/USB), LVDS, mobile phone interface and iPod.

### Coaxial cables for antennas made for special and standard applications

#### Applications

GSM, GPS/Galileo, DVB, Radio, WCDMA, HSPDA, WLAN, WUSB, WiMAX, mobile broadcast, Car to Car Communication

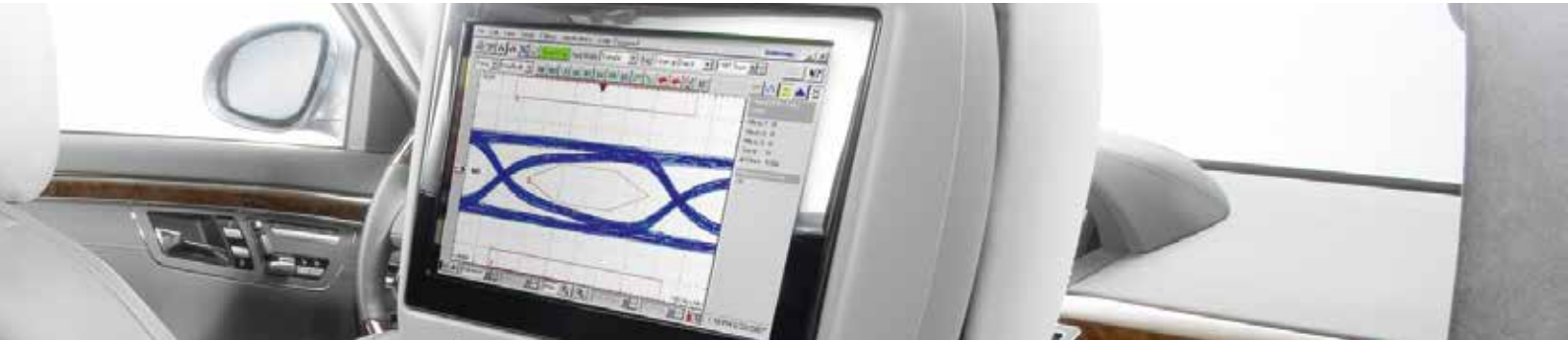
## Probe *Data transmission cables*



Code	Part Number	Cable structure	Conductor diameter	Core diameter	Shield type	Outer diameter
			[mm]	[mm]		
<b>LEONI Dacar 540</b>	76841012A	2x2x0.35+(0.35)	0.80	1.30	PETP-AL	6.20
<b>LEONI Dacar 541</b>	76881015A	2x2x0.35+(0.35)+(0.35)	0.80	1.30	PETP-AL	6.20
<b>LEONI Dacar 550</b>	76780000A	1x0.35+(0.35)	0.80	1.25	PVC-AL	4.10
<b>LEONI Dacar 551</b>	76780002A	2x0.35+(0.35)	0.80	1.30	PVC-AL	4.30



*Focused on communication.*



Insulation material	Jacket material	Service temperature	Capacity	Conductor resistance	Weight
		[°C]	[max. pF/m]	[Ω/km]	[kg/km]
PVC	PVC	-40 up to +105	200	52	52.0
PVC	PVC	-40 up to +105	200	52	52.0
PVC	TPE-U	-40 up to +105	380	52	22.0
PVC	TPE-U	-40 up to +105	360	52	25.0

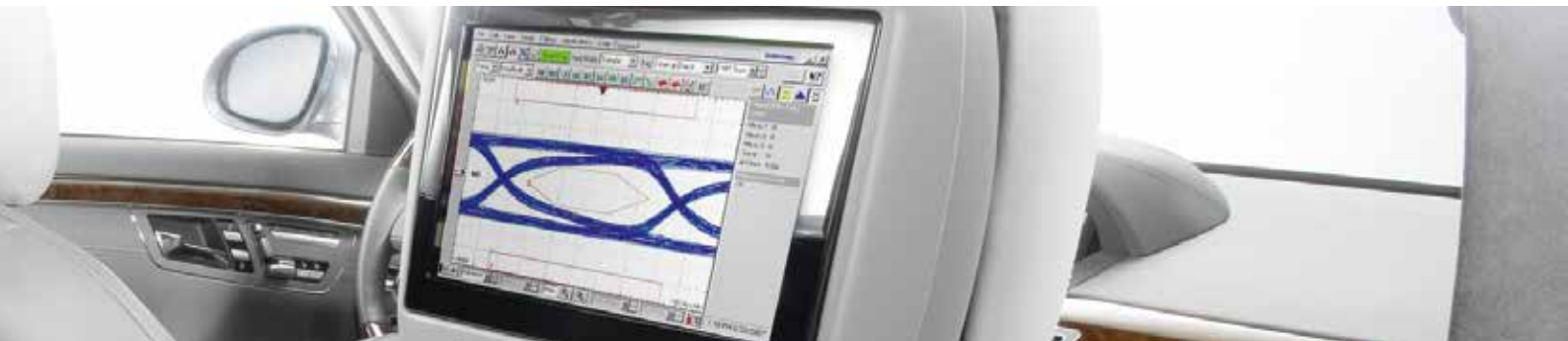
## LVDS + Bus systems *Data transmission cables*



Code	Part number	Cable structure	Conductor material / shield type	Diameter over shield nom.
				[mm]
<b>LVDS</b>				
LEONI Dacar 501	76981008A	4x2x0.22+0.22	Cu bare / PETP-AL / C-shield	5.80
LEONI Dacar 502	76981009A	4x2x0.22+0.22	Cu bare / PETP-AL / C-shield	5.80
LEONI Dacar 503	76981003A	4x2x0.22	Cu bare / PETP-AL / C-shield	5.60
LEONI Dacar 505	76981000A	4x2x0.22+(0.22)	Cu bare / AL coated foil / C-shield	5.50
LEONI Dacar 506	76981020A	4x2x0.22+(0.22)	Cu tinned / AL coated foil / C-shield	5.50
LEONI Dacar 508	76981006A	5x2x0.22	Cu bare / PETP-AL / C-shield	6.50
LEONI Dacar 509	76981007A	5x2x0.22	Cu bare / PETP-AL / C-shield	6.00
LEONI Dacar 511	76981060A	5x2x0.22	Cu bare / PETP-AL / C-shield	6.00
LEONI Dacar 522	76981035A	2x0.14	Cu tinned / PVC-AL / C-shield	3.10
LEONI Dacar 538	76981056A	4x0.14	Cu tinned / PVC-AL / C-shield	3.40
<b>CAN</b>				
LEONI Dacar 520	79116800A	2x0.35	Cu bare / PETP	–
LEONI Dacar 560	76731000A	2x0.35	Cu bare	–
LEONI Dacar 562	76731010A	2x0.5	Cu bare / PETP	–
LEONI Dacar 565	76981030A	2x0.75+(0.75)	Cu bare / PETP-AL	–
<b>Flexray</b>				
LEONI Dacar 533	76981025A	2x0.35+(0.35)	Cu bare / PETP-AL	–
<b>Fire Wire</b>				
LEONI Dacar 536	76981040A	4x0.14	Cu tinned / PVC-AL / C-shield	3.40
<b>USB</b>				
LEONI Dacar 516	76981063A	(2x0.089)+2x0.24+(0.089)	Cu tinned / PETP-AL / C-shield	3.20
LEONI Dacar 518	76981065A	(2x0.35)+2x0.35+(0.35)	Cu bare / PETP-AL / C-shield	4.10

The table only shows an excerpt of our portfolio – please contact us for further cable designs.

*Your way to be connected.*



Outer cable diameter nom. [mm]	Insulation material		Jacket material	Service temperature [°C]	Impedance [Ω]	Weight [kg/km]
	1	2				
6.80	PE	–	PVC	–40 up to +90	100	56.0
6.80	PP	–	PVC	–40 up to +105	100	55.0
6.80	cellular PP	–	PVC	–40 up to +105	100	56.0
6.30	PE	–	TPE-U	–40 up to +90	100	51.0
6.30	FEP	–	TPE-U	–40 up to +110	100	61.0
7.40	PE	–	PVC	–40 up to +90	100	63.5
7.40	PP	–	PVC	–40 up to +105	100	71.0
7.00	cellular PP	–	PVC	–40 up to +105	100	69.0
4.60	PP	–	PVC	–40 up to +105	100	27.0
4.60	PP	–	PVC	–40 up to +105	100	34.0
4.90	cellular PP	–	TPE-U	–40 up to +105	120	22.0
5.00	TPE-O-X	–	TPE-U	–40 up to +125	120	28.5
5.40	TPE-O-X	–	TPE-U	–40 up to +120	120	31.0
8.00	cellular PP	–	PVC	–40 up to +105	120	62.0
4.80	cellular PP	–	PVC	–40 up to +105	100	28.0
4.60	cellular PP	–	PVC	–40 up to +105	110	32.0
4.30	PP	PVC	PVC	–40 up to +105	90	29.0
5.80	cellular PP	PVC	PVC	–30 up to +105	90	54.0

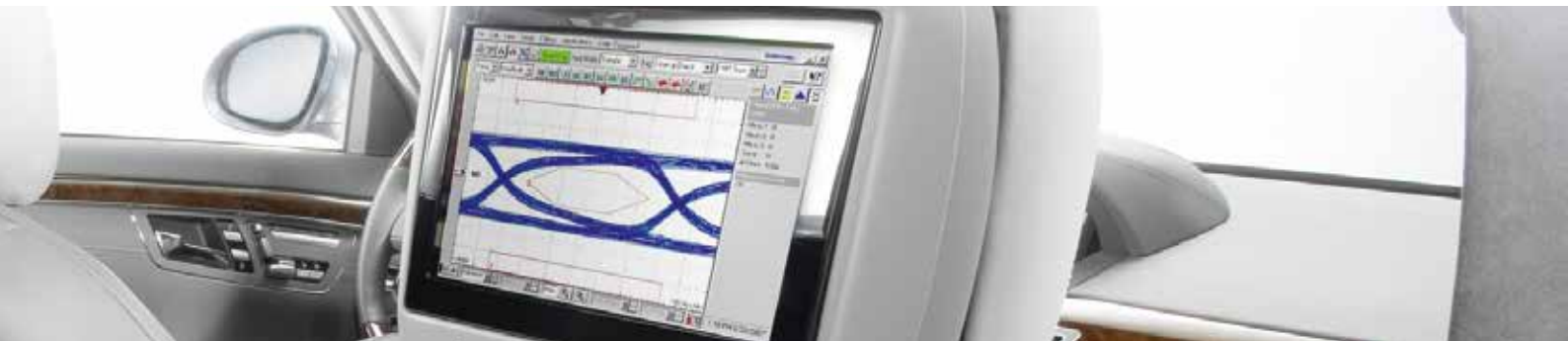


## Multimedia *Data transmission cables*



Code	Part number	Cable structure	Conductor material / shield type
<b>Multimedia</b>			
LEONI Dacar 594	76981103A	$(3 \times 0.14) + 4 \times 0.14 + 2 \times 0.5 + Z50 + (0.14)$	Cu bare / Copper clad steel conductor bare / PETP / C-shield
LEONI Dacar 805	76981108A	$(2 \times 0.055) + ((2 \times 0.14) + (0.14)) + 4 \times Z53$	Cu bare / PETP-AL / D-shield
<b>Car phone</b>			
LEONI Dacar 590	76981090A	$8 \times 0.22 + 2 \times 0.35 + Z50$	Cu tinned / Cu bare / PETP-AL / C-shield
LEONI Dacar 514	76981080A	$5 \times 2 \times 0.14 + 2 \times 0.5$	Cu tinned / Cu bare / AL-PETP-AL / C-shield
<b>iPod</b>			
LEONI Dacar 533	76981025A	$2 \times 0.35 + (0.35)$	Cu bare / PETP-AL
LEONI Dacar 592	76981025A	$((2 \times 0.089) + 2 \times 0.22 + (0.22)) + 2 \times (3 \times 0.089)$	Cu tinned / AL-PETP-AL / C-shield

The table only shows an excerpt of our portfolio – please contact us for further cable designs.

*Pioneering digital entertainment.*

Diameter over shield nom. [mm]	Outer cable diameter nom. [mm]	Insulation material				Jacket material	Service temperature [°C]	Impedance [Ω]	Weight [kg/km]
		1	2	3	4				
5.50	6.70	PVC	PVC	PP	–	PVC	–40 up to +105	50	70.0
5.50	5.80	PP	PP	PP	–	PVC	–25 up to +90	53	54.0
5.60	6.70	ETFE	ETFE	PE	–	TPE-U	–40 up to +85	50	104.0
4.60	5.80	TPE-E	TPE-E	–	–	PVC	–40 up to +105	–	60.0
–	4.80	cellular PP	–			PVC	–40 up to +105	100	28.0
5.40	7.10	PP	PVC	PVC	PVC	PVC	–40 up to +105	90	75.0

## Coaxial cables *with foam dielectric*



Code	Part number	Cross section	Diameter of conductor	Conductor material	Diameter of core
		nom. [mm <sup>2</sup> ]	nom. [mm]		nom. [mm]
<b>50 Ohm</b>					
LEONI Dacar 031	85120003A	0.40	0.81	Cu bare	2.10
LEONI Dacar 037	85120030D	0.75	1.11	Cu bare	2.95
LEONI Dacar 302	85120380D	0.40	0.81	Cu bare	2.10
LEONI Dacar 380	85120385A	0.22	0.60	Cu bare	1.53
<b>75 Ohm</b>					
LEONI Dacar 360	85120370A	0.089	0.385	Cu bare	1.68
LEONI Dacar 362	85120381D	0.141	0.48	Cu tinned	2.10
<b>120 Ohm</b>					
LEONI Dacar 077	85120035D	0.055	0.32	Copper clad steel conductor bare	3.10

Code	Impedance	Capacity at 1kHz	Conductor resistance at 20 °C	Velocity of propagation	Weight					
	[Ω]	[pF/m]	[Ω/km]	[%]	[kg/km]	0.1	0.2	0.5	0.8	
<b>50 Ohm</b>										
LEONI Dacar 031	50.00	85.00	48.50	77	23.00	20.5	25.9	–	48.3	
LEONI Dacar 037	50.00	88.50	25.50	78	39.00	11.2	16.1	26	33.5	
LEONI Dacar 302	50.00	85.00	48.50	78	23.00	–	21.1	30.3	43.7	
LEONI Dacar 380	50.00	90.00	85.00	78	12.00	22.7	33.7	54.4	69.7	
<b>75 Ohm</b>										
LEONI Dacar 360	75.00	61.00	208.00	–	11.00	22.8	–	–	–	
LEONI Dacar 362	75.00	58.00	126.00	–	13.50	15.6	22.2	35.9	46.2	
<b>120 Ohm</b>										
LEONI Dacar 077	120.00	37.00	850.00	–	23.00	14.2	20.3	32.7	42.1	

Connecting the world.



Foil shield	Shield optical coverage nom. [%]	Diameter over shield nom. [mm]	Shield material	Outer diameter nom. [mm]	Material jacket	Material dielectric	Service temperature [°C]
AL-PP-AL	92.00	2.65	Cu tinned	3.20	PVC	cellular PE	-40 up to +85
PETP-AL	95.00	3.58	Cu tinned	4.95	PVC	cellular PP	-40 up to +105
AL-PETP-AL	90.00	2.50	Cu tinned	3.20	PVC	cellular PP	-40 up to +105
AL-PETP-AL	80.00	2.03	Cu tinned	2.60	PVC	cellular PP	-40 up to +105
-	90.00	2.08	Cu tinned	2.70	PVC	cellular PP	-40 up to +105
-	89.00	2.50	Cu tinned	3.10	PVC	cellular PP	-40 up to +105
-	75.00	3.50	Cu bare	4.80	PVC	cellular PE	-40 up to +85

Attenuation [dB/100 m]															
Frequency [GHz]															
1	1.2	1.5	1.8	2	2.2	2.8	3	3.5	4	4.5	5	5.5	5.60	6	
53.5	58.6	65.3	72.4	76.7	81.7	95	99.1	110.0	120.0	131.0	141.3	151.2	153.5	161.1	
38	41.8	47.8	53.3	56.6	60	69.3	72.4	80.1	87.9	95.3	103.1	110.7	112.6	119.6	
48.9	53.6	60.5	66.3	70.5	74	84.4	88.1	96.6	104.2	112.3	120.4	127.8	129.3	134.9	
78.7	86.2	97.8	107.9	113.9	118.4	134.4	138.7	150.0	160.4	171.2	182.0	192.9	-	203.0	
74.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
52.1	57.5	65.1	-	-	-	-	-	-	-	-	-	-	-	-	
47.5	52.5	59.4	65.7	69.7	73.6	84.4	87.8	-	-	-	-	-	-	-	

## Coaxial cables *with solid dielectric*



Code	Part number	Cross section	Diameter of conductor	Conductor material	Diameter of core
		nom. [mm <sup>2</sup> ]	nom. [mm]		nom. [mm]
<b>50 Ohm</b>					
LEONI Dacar 100	85020350D	0.14	0.48	copper clad steel conductor	1.50
LEONI Dacar 110	85020610D	0.50	0.9	Cu tinned	2.95
LEONI Dacar 300	85120355D	0.14	0.5	copper clad steel conductor	1.52
LEONI Dacar 310	85122990D	0.50	0.9	Cu tinned	2.95
LEONI Dacar 400	85022050A	0.14	0.51	Copper clad steel conductor silver-plated	1.48
LEONI Dacar 403	85022055A	0.15	0.51	Cu tinned	1.48
LEONI Dacar 410	85021080A	0.057	0.31	Copper clad steel conductor silver-plated	0.81
<b>75 Ohm</b>					
LEONI Dacar 200	85023015D	0.182	0.55	Cu tinned	3.10
LEONI Dacar 450	85020360A	0.055	0.31	Copper clad steel conductor silver-plated	1.60
LEONI Dacar 210	85040320D	0.22	0.58	Copper clad steel conductor bare	3.70

Code	Impedance	Capacity at 1kHz	Conductor resistance at 20 °C	Velocity of propagation	Weight
	[Ω]	[pF/m]	[Ω/km]	[%]	[kg/km]
<b>50 Ohm</b>					
LEONI Dacar 100	50.00	106.00	317.00	66	13.00
LEONI Dacar 110	50.00	105.00	41.00	66	39.00
LEONI Dacar 300	50.00	106.00	317.00	66	13.00
LEONI Dacar 310	50.00	105.00	41.00	66	39.00
LEONI Dacar 400	50.00	106.00	317.00	70	17.00
LEONI Dacar 403	50.00	98.00	125.00	67	14.00
LEONI Dacar 410	50.00	105.00	800.00	70	9.00
<b>75 Ohm</b>					
LEONI Dacar 200	75.00	70.00	97.00	–	36.00
LEONI Dacar 450	75.00	75.00	802.00	–	17.00
LEONI Dacar 210	75.00	73.00	157.00	–	56.00

Your link to mobile communication.



Shield optical coverage nom.	Diameter over shield nom.	Shield material	Outer diameter nom.	Material jacket	Material dielectric	Service temperature
[%]	[mm]		[mm]			[°C]
86.00	1.90	Cu tinned	2.80	PVC	PE	-40 up to +85
94.00	3.50	Cu tinned	4.95	PVC	PE	-40 up to +85
85.00	1.92	Cu tinned	2.80	PVC	PP	-40 up to +85
95.00	3.45	Cu tinned	4.95	PVC	PP	-40 up to +85
96.00	1.90	Cu silver plated	2.50	FEP	FEP	-65 up to +205
96.00	1.90	Cu tinned	2.50	TPE-E	FEP	-40 up to +125
96.00	1.25	Cu silver plated	1.80	FEP	FEP	-65 up to +205

95.00	3.70	Cu tinned	4.60	PVC	PE	-40 up to +85
92.00	2.00	Cu silver plated	2.60	FEP	FEP	-65 up to +205
94.00	4.35	Cu tinned	6.15	PVC	PE	-40 up to +85

Attenuation [dB/100 m] frequency [GHz]												
0.1	0.2	0.5	0.8	1	1.2	1.5	1.8	2	2.2	2.5	2.8	3
31.3	43.8	69.3	85.9	96.7	105.9	121.1	134.5	141.8	152.5	162.6	172.1	180.9
20.3	27.2	43.0	53.5	60.4	66.2	77.8	87.9	92.7	103.8	110.6	122.1	126.3
29.7	41.8	66.2	81.9	91.9	100.8	115.5	128.5	135.5	145.5	155.1	165.9	171.7
20.3	27.2	43.0	53.5	60.4	66.2	77.8	87.9	92.7	103.8	110.6	122.1	126.3
29.5	42.0	67.7	86.6	97.5	108.0	121.0	134.0	142.0	149.0	160.0	170.0	177.0
29.4	-	61.7	92.8	106.4	-	137.7	-	163.9	-	189.2	-	-
50.4	71.3	112.8	152.6	173.5	198.7	222.1	247.0	260.4	285.7	304.5	328.6	340.1
16	22.5	37.0	48.0	55.0	62.0	72.0	81.0	88.0	94.0	103.0	112.0	117.0
27.6	38.1	59.3	75.0	84.1	92.3	103.7	114.2	120.7	127.0	136.0	144.6	150.1
12.4	17.9	29.3	37.9	42.9	-	-	-	-	-	-	-	-







## Special cables

### **LEONI Hivocar® – High voltage cables for the electric powertrain**

With LEONI Hivocar cables, LEONI offers a product family for use in electric and hybrid vehicles.

#### **Applications:**

- HV battery connections
- Connection between inverter and electric motor
- Power supply for ancillary components, e. g. air conditioning compressors, electric heating
- Internal wiring of HV components, e. g. battery
- Charging cable for HV battery

#### **Standards:**

Compliant with ISO 6722 and ISO 14572.

Compliant with LV 216-1, LV 216-2 and customised specifications.

### **LEONI exFC® – Extruded flat cable for fitting in the vehicle**

The automotive industry requires reducing of weight and size in all areas.

#### **Applications:**

- Fitting in cars with limited space
- Clock spring applications
- Sliding doors

#### **Ribbon cables**

#### **Applications:**

- Flat cable for fitting in vehicles with limited space
- Compatible with all common bonding systems
- A wide selection of cross-sections from 0.22 mm<sup>2</sup> to 2.5 mm<sup>2</sup>

# LEONI Hivocar®



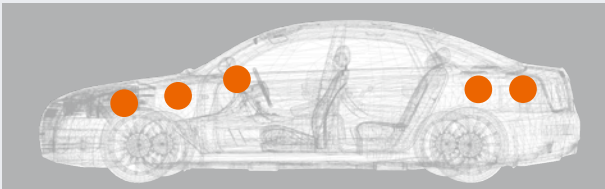
## High voltage cables LEONI Hivocar®

The LEONI Hivocar® brand encompasses cables for alternative drives.

Code	Conductor	Number of cores	Shielding	Nominal cross-section mm <sup>2</sup>	Insulation sheath	Temperature (°C) (3.000 h)
LEONI Hivocar® 105-(S)U	Cu wire/bare	single- and multi-core cables	High flex braids made of tinned copper wires Nom. surface coverage: 95 %. Optional: Combination with foil shield.	0.35 – 120	PVC/PVC	–40 °C to +105 °C
LEONI Hivocar® 180-SU	Cu wire/bare	single- and multi-core cables	High flex braids made of tinned copper wires Nom. surface coverage: 95 %. Optional: Combination with foil shield.	0.35 – 6.0	ETFE/ETFE	–40 °C to +180 °C
LEONI Hivocar® 200-(S)U	Cu wire/bare	single- and multi-core cables	High flex braids made of tinned copper wires Nom. surface coverage: 95 %. Optional: Combination with foil shield.	0.50 – 120	SIR/SIR	–40 °C to +200 °C
LEONI Hivocar® 200-A	Aluminium wire/bare	single- and multi-core cables	Braiding of Cu wires, tinned/ Aluminium clad foil	10 – 70	notch resistant silicone	–40 °C to +125 °C
LEONI Hivocar® 200-S (single-core)	Cu wire/bare	single-core cables	Braiding of Cu wires, tinned/ Aluminium clad foil	1.5 – 120	notch resistant silicone	–40 °C to +180 °C
LEONI Hivocar® 200-S (multi-core)	Cu wire/bare	multi-core cables	Braiding of Cu wires, tinned/ Aluminium clad foil	2 x 2.5; 2 x 4.0; 2 x 6.0	notch resistant silicone	–40 °C to +180 °C
	Cu wire/bare	multi-core cables	Braiding of Cu wires, tinned/ Aluminium clad foil	3 x 2.5; 3 x 4.0; 3 x 6.0	notch resistant silicone	–40 °C to +180 °C
	Cu wire/bare	multi-core cables	Braiding of Cu wires, tinned/ Aluminium clad foil	5 x 2.5; 5 x 4.0; 5 x 6.0	notch resistant silicone	–40 °C to +180 °C

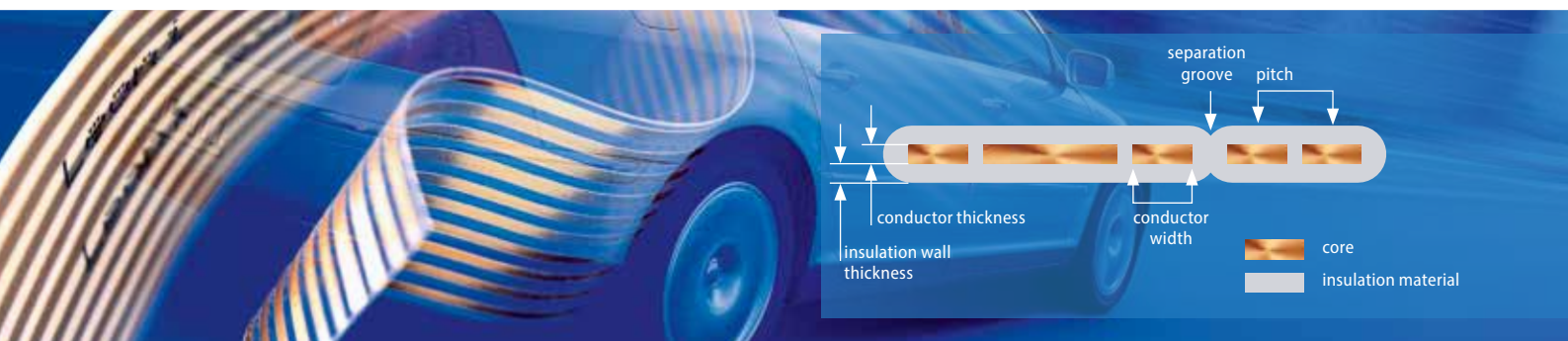
### Properties

• specially selected materials for high voltage applications  
• very good thermal properties up to a continuous operating temperature of 200 °C  
• very good mechanical properties  
• electric properties  
• highly flexible  
• shielded and unshielded  
• designed for 600 V AC / 900 V DC  
• copper or aluminium conductor  
• temperature classes with PVC up to 105 °C, with silicone up to 200 °C





# LEONI exFC®



## Construction

### Conductors

Soft-annealed electrolytic copper Cu-ETP1 according to DIN EN 13599.

### Insulation

- Heat-resistant PVC, lead free
- Thermoplastic polyurethane-based elastomer
- Thermoplastic polyolefin elastomer
- Polypropylene, flame-retardant
- Ethylene/tetrafluoroethylene

Insulation wall thicknesses from 0.1– 0.25 mm are available, depending on the insulation material and cable structure involved.

### Tolerances

- Insulation wall thickness  $\pm 0.04$  mm
- Cable width  $\pm 0.30$  mm (up to cable width of 70 mm)
- Pitch:  $\pm 0.15$  mm (up to cable width of 20 mm)

### Marking options

- Imprint
- Edge marking to indicate the first conductor
- Dyed insulation material

### Separation grooves

It is possible to produce the cable with separation grooves. These can be utilised during further processing when cutting the cable.

### Pitch

2.54 mm (standard). Other pitch dimensions are available on request.

## Material designations

### Insulation materials

<b>Y</b>	PVC	–40 °C to +105 °C
<b>YW</b>	Heat-resistant PVC	–40 °C to +110 °C
<b>11Y</b>	PUR	–40 °C to +110 °C
<b>12Y</b>	TPE-E	–40 °C to +105 °C
<b>9Y</b>	PP FR	–40 °C to +110 °C
<b>7Y</b>	ETFE	–65 °C to +180 °C

### Conductor materials

<b>BL</b>	Bare copper
<b>SN</b>	Tinned copper
<b>AG</b>	Silver-plated copper

### Example of a material designation

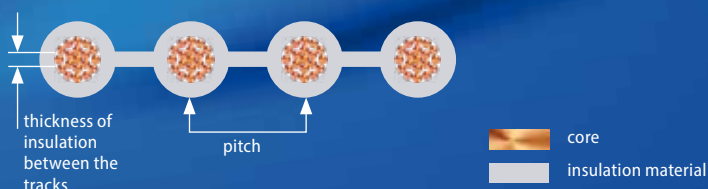
LEONI exFC–YW 5x1.54+3x4,08/0.2 BL

extruded flat cable, heat-resistant PVC insulation,  
5 x conductors (1,54 x 0,2 mm) + 3 x conductors (4,08 x 0,2 mm),  
bare copper conductor material

### Chart of standard dimensions

Conductor thickness mm	Conductor width mm								
	0.80	1.00	1.23	1.35	1.40	1.54	2.05	4.08	6.62
0.076						6			
0.100	6		6			6		6	
0.120	6	6							
0.130					6		6		
0.150							6		
0.200		6				6		6	6
0.450				6	6				

# Ribbon cables



## Construction

### Conductors

Soft-annealed electrolytic copper Cu-ETP1 according to DIN EN 13602.

### Insulation

- Heat-resistant PVC, lead free
- PP, flame-retardant

### Dimensions

- according to LV 112
- max. 24 conductors

### Marking options

- Imprint
- Edge marking to indicate the first conductor
- Dyed insulation material

### Pitch

2.54 mm (standard). Other pitch dimensions are available on request

## Material designations

### Insulation materials

<b>Y</b>	PVC	-40 °C to +105 °C
<b>YW</b>	Heat-resistant PVC	-40 °C to +110 °C
<b>9Y</b>	PP FR	-40 °C to +110 °C

### Conductor materials

<b>BL</b>	Bare copper
<b>SN</b>	Tinned copper
<b>AG</b>	Silver-plated copper



## Production technologies

for high-temperature cables



*Silicone extrusion*

### PRODUCTION TECHNOLOGIES

LEONI has state-of-the-art machinery for processing high-temperature materials and covers all the relevant technologies in-house:

#### CROSSLINKING OF MATERIALS

Crosslinked materials involve the use of simple base materials that are mixed with a corresponding crosslinking accelerator. The crosslink in the material can be activated by three methods: physical, chemical and by irradiation. Additional crosslinks of the molecule chains form in the insulation material, which create greater resistance to environmental influences.

#### RAM EXTRUSION

PTFE may be processed by means of ram extrusion. The base material for this special process is a PTFE powder that is mixed with a lubricant and is, using a preform press, pressed into a cylindrical preform with an inner bore.

This preform is inserted into the ram extrusion cylinder and pressed through an extruder nozzle with a piston. The material coats the conductor that is fed through the extruder head. After the extrusion process, the lubricant is extracted again from the cable by applying heat and the cable is subsequently sintered at high temperature in a continuous furnace.

#### SILICONE PROCESSING

The principle for processing silicone is similar to that for PVC extrusion.

Yet the key difference lies in the temperature profile. Silicone is always processed cold, i.e. the mixing mill and the extruder are kept at a constant temperature of less than 20 °C via a large number of different control areas. The heat generated during compounding and extrusion is directly dissipated. After extrusion, the silicone rubber has to be crosslinked. The molecules are linked into three-dimensional webs using a crosslinking agent. This takes place inside separately controllable crosslinking furnaces through which the product passes immediately after extrusion. Various temperature profiles can be set here. Applying a high temperature enables or accelerates the crosslinking process, depending on the two following methods:

Peroxide crosslinking requires a higher temperature and more time before the crosslinking process is completed.

The process of platinum catalysed crosslinking takes place even below room temperature. To prevent premature crosslinking of the silicone rubber, sufficient cooling of the mixing mill and the extruder is therefore absolutely necessary.

## Quality and environmental management

LEONI – The Quality Connection

The wire and cable production locations of LEONI are certified worldwide in line with ISO 9001:2015; all locations, in which automotive cables are produced, are certified in accordance with IATF TS16949:2016.

Our environmental management is certified in compliance with DIN EN ISO 14001:2015.



# LEONI worldwide

Facilities of the Business Group Automotive Cables



Proximity to our customers is a core element of our corporate policy. LEONI is a dependable partner to its customers – all over the world. We also regard maintaining, as well as raising quality and service at the same high level everywhere in the world as a sign of proximity.

We support efficient operating as well as our customers' power of innovation and market position on the basis of our own international positioning, standardised methods and clearly defined processes.

No matter where we apply our know-how, commitment and ideas: we want satisfied customers worldwide.

## An overview of all entities

### Germany

LEONI Kabel GmbH, Roth  
 LEONI HighTemp Solutions GmbH, Halver

### China

LEONI Wire (Changzhou) Co. Ltd.,  
 Changzhou

### Japan

LEONI Wire & Cable Solutions Japan K.K.,  
 Aichiken

### India

LEONI Cable Solutions (India) Pvt. Ltd.,  
 Pune

### Mexico

LEONI Cable Mexico S.A. de C.V.,  
 Cuauhtémoc

### Poland

LEONI Kabel Polska Sp.z.o.o.,  
 Kobierzyce

### Slovakia

LEONI Slovakia, spol. s r.o.,  
 Trenčianska Teplá

### Turkey

LEONI Kablo ve Teknolojileri  
 San. ve Tic. Ltd. Sti., Gemlik

### Hungary

LEONI Kábelgyár Hungaria Kft.,  
 Hatvan

### USA

LEONI Cable Inc.,  
 Rochester

Find out more:

**Business Group Automotive Cables**

[www.leoni-automotive-cables.com](http://www.leoni-automotive-cables.com)

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