

ABS-/ESP-Sensor Cables



LEONI – Your way to be connected

THE QUALITY CONNECTION

LEONI

Wire • Cable • Wiring Systems

ABS-/ESP-Sensor Cables

Anti-lock brake systems have been in use for more than 25 years. Nevertheless, development activities are still being done to further enhance the driving experience. This is especially true when talking about “security issues for vehicle applications”, consumers are very sensitive to these types of issues and are open to every improvement. In the beginning the only aim was to prevent the wheel from locking during the brake application and to improve the tractability and stability of the vehicle. In the following years, the systems have become more complex to include Anti-Slip-Regulation which during acceleration prevents the drive wheels from losing traction, monitoring of the conditions of the brake pad and the electronic stability program. These features have become standard equipment for many of the car manufacturers.

For more than 25 years, LEONI Kabel has been designing and producing cables for anti-lock brake systems for the transmission of important information to the anti-lock brake system controllers and is today the leading supplier in Europe and North America.

Applications and Approvals of LEONI Sensor Cables

- Standard cables for inductive sensors
- Standard cables for active sensors
- ABS-/ESP-sensor cables with ABC (Active Body Control)
- ABS-/ESP-sensor cables with BVA (brake pad condition)
- Sensor cables for automatic regulation of head lamp leveling
- Extension cable for ABS systems of trucks and trailers

Approvals are available from BMW, DaimlerChrysler, VW and other OEM's. Also LEONI has approvals from leading system manufacturers such as Bosch, Continental Teves, Siemens VDO, Wabco and others.



Our production locations

- LEONI Kabel, Roth, Germany
- LEONI Cable Mexico, Chihuahua, Mexico
- LEONI Cable Changzhou, China

Requirements on sensor cables

Since the cables are installed without any protective system in the exterior area of the vehicle, they are directly exposed to the influences of oil, fuel and road conditions. In addition, the vibrations of the wheels and the steering movement can affect the cables.

Characteristics

- **Media stability**
- **Resistance to charring**
- **Abrasion resistance**
- **Resistance to hydrolysis**
- **Bending strength**
- **Recyclability**
- **Thermal stability**
- **Halogen-free cable construction**



Product Overview



Type	FL4G11Y	FLR4G11Y	FLR2X11Y	FLR31Y11Y	FLRY11Y
Insulation	E/VA	E/VA reduced wall thickness	XLPE	TPE-S	PVC
Sheath	TPE-U	TPE-U resistant to hot deformation at 150 °C	TPE-U	TPE-U	TPE-U
Temperature	-40 °C to +125 °C	-40 °C to +125 °C	-40 °C to +125 °C	-40 °C to +125 °C	-40 °C to +105 °C
Construction	≥ 2 cores	≥ 2 cores	≥ 2 cores	≥ 2 cores	≥ 2 cores
Field of application	Inductive sensors	Active sensors		Active sensors	Extension cable, cabling of truck and trailer axes
Special properties	High bending strength, high abrasion resistance of outer sheath, possibility of molding at high temperatures (up to 280 °C)	High bending strength, high abrasion resistance of outer sheath, possibility of molding at high temperatures (up to 280 °C)	For use in the American market	High bending strength, high abrasion resistance of outer sheath	Favourable priced



Conductor

- Soft-annealed electrolytic copper Cu ETP1 according to DIN EN 13602, bare or tinned
- Use of fine and ultra-fine stranded conductors with diameters of single conductors $\leq 0,15$ mm
- Cross section 0.35 mm²
19 x 0.15 mm
- Cross section 0.5 mm²
28 x 0.15 mm or 64 x 0.10 mm (standard)
140 x 0.07 mm or 256 x 0.05 mm
(Special type for high flex applications)
- Cross section 0.75 mm²
42 x 0.15 mm or 96 x 0.10 mm
(construction with single conductor diameters of 0.07 mm and 0.05 mm available)

Construction of cable

- 2 to 9 cores, unshielded resp. single shielded or double shielded using foil, wire covering or braid;
- The third and additional cores can be used for functions such as brake pad monitoring, diagnostic information, etc.

Insulation

The insulation material defines the characteristics of the cable and the field of application.

Outer sheath

TPE-U resp. TPE-U resistant to hot deformation up to 150 °C.

Insulation materials of cores

E/VA-Continuous vulcanization crosslinked copolymer	<ul style="list-style-type: none"> ■ Resistant to hot deformation up to 250 °C, resistant to constant temperature up to 140 °C ■ Most common insulation material for ABS cables; due to its resistance to charring the material withstands for a short period temperatures of up to 280 °C which occur during the molding process of the plug
TPE-S thermoplastic elastomer on polystyrol base	<ul style="list-style-type: none"> ■ Resistant to temperatures up to 125 °C/3,000 h
XLPE Continuous vulcanization crosslinked polyethylene	<ul style="list-style-type: none"> ■ Resistant to temperatures up to 125 °C/3,000 h ■ Especially designed for the American market
PVC	<ul style="list-style-type: none"> ■ Cost-efficient alternative if there are no special requirements on heat resistance



In the beginning, the cores were thick-walled automotive cables (OD 6.2 mm) with a relatively high cross section of 0.75 mm². In the mid 90's, LEONI as a trendsetter launched thin-walled cables with a special compound which fully corresponds to the above-mentioned requirements while using an adapted geometry of the cable.

Meanwhile, cables with a cross section of 0.5 mm² and reduced outer diameters (4.2 mm and 5.1 mm) have become standard. Furthermore, a new cable with an additionally reduced inner conductor cross section (0.35 mm²) is available. With the launch of additional functionalities like ASR and ESP, the number of cores of the ABS cables had to be increased from two to up to nine conductors today.

From innovation to standard



Requirements in the field of high temperatures in the focus

In the past, resistance to extremely high temperatures was an exclusive demand of the truck manufacturing industry. Now, car manufacturers are increasingly calling for this profile. The reason for this lies in the ongoing development of modern braking systems, which enable shorter stopping distances. This generates more frictional heat on the brake discs. Until now, the cables designed for constant exposure to a max. temperature of 110 °C to 125 °C were protected by the use of expensive heat shields.

To realize ideal cost reduction potential, cables are used which can withstand high temperature requirements without the need for add-on protection for the cable.

Insulation material for constant exposure to 150 °C for 3,000 hours

LEONI Kabel has developed a cross-linked TPE-U jacket material that is designed for exposure to 150 °C for 3,000 hours without any issues.

The cable types designated FL4G11X and FLR4G11X (version with reduced wall thickness) successfully passed tests according to the pertinent specifications of the leading manufacturers of ABS systems.

Scale of tests (outline)

Mechanical stability	Resistance to media	Resistance to hydrolysis
Elongation and stability after ageing 200 °C / 6 h 175 °C / 240 h 150 °C / 3,000 h	Storage in oil and fuel	80 °C / 168 h in water quench

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