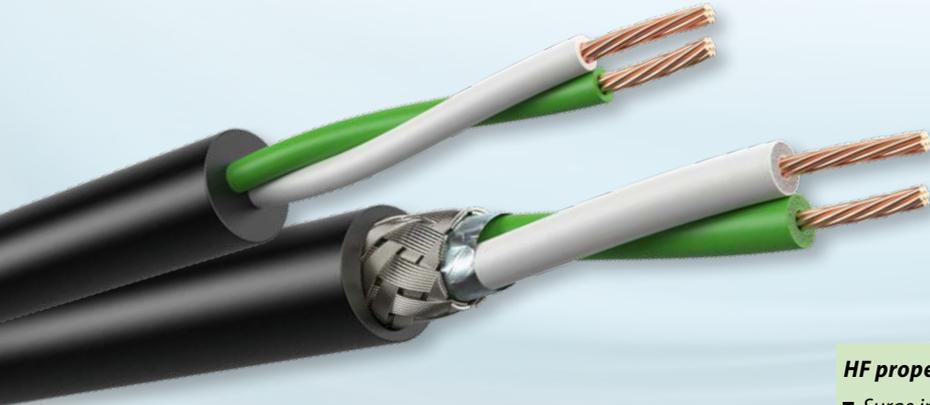


On the customer's pulse

LEONI Dacar® cables portfolio for BroadR-Reach technology



The continual widening of bandwidths is moving the aim of OEMs, of seamlessly integrating the consumer environment in the functions of the motor vehicle and offering more infotainment and driver assist systems, within reach. Forming the basis for this is the introduction of Ethernet for automotive applications. The chip manufacturer Broadcom has, with its BroadR-Reach technology, developed a form of meanwhile standardised data communication. This facilitates bidirectional data transfer at 100 Mbps across a single, unshielded twisted-pair cable.

From the beginning LEONI has been working together with other component manufacturers along the value chain in the OPEN Alliance SIG on standardising components for BroadR-Reach technology. We therefore have first-hand knowledge of the wishes and requirements of the international motor vehicle manufacturers and have adjusted our portfolio of LEONI Dacar Ethernet cables accordingly. Below you will find the component specifications for Ethernet cables as established by the OPEN Alliance SIG. With our LEONI Dacar cables you have our guarantee of absolute compliance with and fulfilment of these cable specifications:

HF properties of LEONI Dacar Ethernet cables:

- Surge impedance: Z [Ohm] 100+/-10
- Insertion loss: IL [dB/m] 0.06 @1 MHz, 0.16 @ 10 MHz, 0.31 @ 33 MHz, 0.45 @ 66 MHz
- Return loss: RL [dB] 20 @ 1 MHz, 20 @ 20 MHz, 14.8 @ 66 MHz
- Longitudinal conversion transfer loss: LCTL [dB]: 46 @ 1 MHz, 46 @ 50 MHz, 34 @ 200 MHz
- Longitudinal conversion loss: LCL [dB]: 46 @ 1 MHz, 46 @ 50 MHz, 34 @ 200 MHz

The key to the functionality of these comparatively simple cable designs lies in the high longitudinal conversion transfer loss requirements of the cables: the design must be spatiotemporally as symmetrical as possible. Only then is it possible to forego such constructive shielding elements as metal-clad foils or braids and nevertheless reduce external interference or mutually detrimental influence near cables running closely together.

Portfolio of standard LEONI Dacar Ethernet cables

LEONI recommends the use of sheathed cables to reliably maintain the cables' key property; its high degree of symmetry even under such adverse ambient conditions as vibration, humidity or dirt across the entire lifecycle of the vehicle.

Core cross-section					
0.13 mm ² 0.14 mm ²	~ 26 AWG	LEONI Dacar® 543 2x0.13 CuMg U/TP	LEONI Dacar® 544 2x0.13 CuAg U/TP	LEONI Dacar® 547/-2 2x0.13 CuSn U/TP	LEONI Dacar® 626 2x0.14 Cu U/TP
0.17 mm ²	~ 25 AWG	LEONI Dacar® 617* 2x0.17 CuAg TP	LEONI Dacar® 545 2x0.17 CuAg U/TP		
0.22 mm ²	~ 24 AWG	LEONI Dacar® 642 2x0.22 Cu U/TP			
0.35 mm ²	~ 22 AWG	LEONI Dacar® 624* 2x0.35 Cu TP	LEONI Dacar® 546/-2 2x0.35 Cu U/TP	LEONI Dacar® 625-3 4x0.35 Cu U/TQ	

Chart 1: Portfolio of Dacar Ethernet cables (100 Mbps) with comprehensive and *customer-specific high frequency properties. As standard, the cables are designed for a continuous use temperature of 105°C; for some types we already provide variants for 125 °C and 150 °C.



Broad market coverage

The first LEONI Dacar Ethernet cables are already in widespread use in the Surround view camera systems fitted by well-known, global carmakers. Further ones are currently being subjected to component validation depending on customer requirements in either third-party labs or LEONI's own. Be it the standard portfolio or special customer requirements based on the established design specifications – LEONI will put your wishes into practice.

All LEONI Dacar Ethernet cables are made worldwide at our facilities in Germany, Slovakia, Mexico as well as China and are tested with corresponding high-frequency measurement technology.

Our flame-retardant PP compound proved to be the ideal core material. A corresponding materials qualification together with LEONI Development & Compounding and according to LV 112, which was carried out as part of the cable development, ensures that this compound does not influence the data transfer properties. Customised LEONI Dacar Ethernet cables can be put together in modular form using a product configurator. The configuration takes into account all customer specifications: the desired cross-section, the conductor concept material used (Cu or CU alloy), the chosen connector, the favoured connection technology as well as the planned temperature range (see Chart 1).

Portfolio of LEONI Dacar Ethernet cables with shielding

In EMC-sensitive installation spaces, interference suppression by way of the symmetry is not enough and a braided or foiled shield is required. The cores are frequently foamed in such cases to reduce the outer diameter of these cables. Rather than the longitudinal conversion loss parameters linked with symmetry properties, transfer impedances or shielding attenuation are specified for these cable designs. The other cable properties stipulated in the OPEN Alliance SIG specification are described in the data sheets (see Chart 2).

inFocus

OPEN Alliance SIG

The OPEN Alliance (One-Pair Ether-Net) Special Interest Group (SIG) is a non-profit, open industry alliance of mainly automotive industry and technology providers collaborating to encourage wide scale adoption of Ethernet-based networks as the standard in automotive networking applications. The SIG is responsible for development of the BroadR-Reach technology.

BroadR-Reach technology

BroadR-Reach technology, developed and meanwhile standardised by Broadcom, is an Ethernet physical layer for bidirectional, Ethernet-based data communication at 100 Mbps over a single, unshielded twisted pair cable.

Detailed information about "Automotive Ethernet – the future standard in automotive connectivity" you will find in our LEONI inTEAM 1-2015, page 6 – 7.

Core cross-section			
0.13 mm ² 0.14 mm ²	~ 26 AWG	LEONI Dacar® 686-3 2x0.14 Cu SF/TP	LEONI Dacar® 535 (and variants) 4x0.14 Cu SF/TQ
0.17 mm ²	~ 25 AWG	LEONI Dacar® 645-1/-2 2x0.17 CuAg 0.1 F/TP +1x/2x Drain Wire	
0.35 mm ²	~ 22 AWG	LEONI Dacar® 646-1/-2 2x0.35 Cu F/TP +1x/2x Drain Wire	LEONI Dacar® 656-3 2x0.35 Cu SF/TP

Chart 2: Portfolio of LEONI Dacar Ethernet cables (100 Mbps) with high frequency properties in line with OPEN SIG. As standard, the cables are designed for a continuous use temperature of 105°C; for some types we already provide variants for 125 °C and 150 °C.