

WHITE PAPER

ISOBUS PUR

» SOLUTIONS FOR THE AGRICULTURAL INDUSTRY: ISOBUS PUR

Electronics for the Efficiency of Agricultural Machinery

The reliable transmission of electricity and data is also becoming increasingly important in agricultural technology - after all, more and more agricultural machinery and equipment feature electric drives and sensors. Thanks to the globally standardised ISOBUS system, the use of electronics in agricultural machinery is easier and the efficiency of equip-

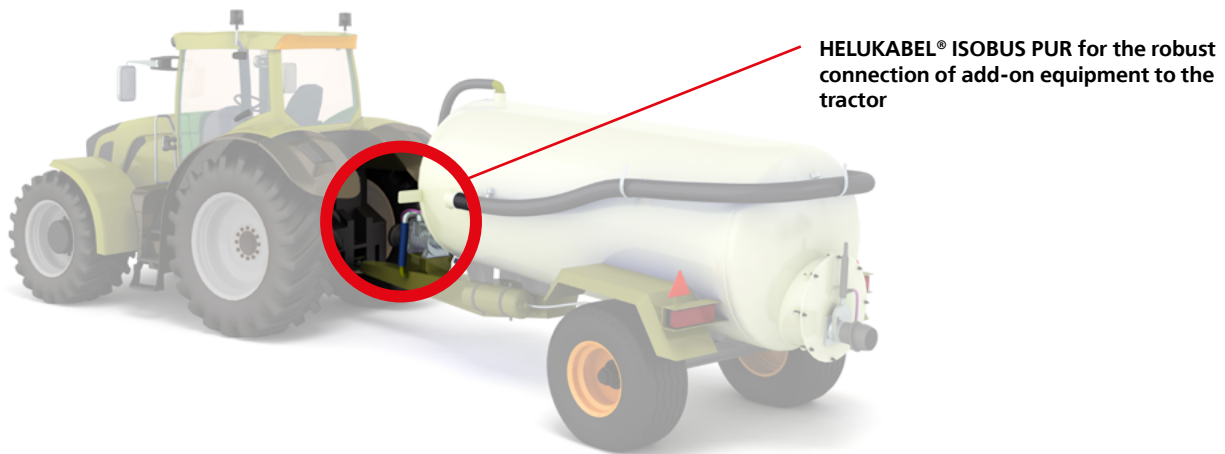
ment is greater than ever before. However, in order to avoid errors in communication and power supply, robust and weather-resistant cables are essential. This white paper describes important elements in the structure of ISOBUS cables and how you, as a user, can benefit from this technology.



How can you use our ISOBUS cables?

ISOBUS cables are used worldwide in agriculture as a connecting cable between the tractor or a mobile working machine and add-on equipment. They ensure data communication between the machines and the power supply to the control units and working drives. This is why these

cables have a hybrid structure. For cabling that transmits information within a machine, other cable types are typically used. These are also based on ISOBUS or CAN bus communication and are sometimes combined with wires for power supply.



What advantages does the ISOBUS system offer you and your customers compared to machines without ISOBUS functionality?

In the past, different types of add-on equipment also meant several control units in the tractor cab as well as different cables and plug connections. This made work unnecessarily complicated for farmers, and, even more, individual units could often not be replaced due to a lack of compatibility. The globally standardised ISOBUS system solves this problem by providing a uniform cable connection for data communication between agricultural machines. As a result, users can easily and conveniently attach different types of add-on equipment, operate them from the tractor with the same terminal and make adjustments while driving. Farmers can therefore

respond much more precisely to individual soil conditions and other needs, as well as dose fertilisers and other chemical substances more accurately. This improves the quality of work and therefore boosts yields. At the same time, the soil and groundwater are protected and operating costs are reduced. In this way, ISOBUS makes a holistic contribution to greater efficiency in agriculture. The technology makes the farmer's daily work easier and reduces workload. Data obtained during the daily work can be evaluated and provide a transparent overview of an agricultural operation.

What is important for you and your customers when it comes to ISOBUS cables?

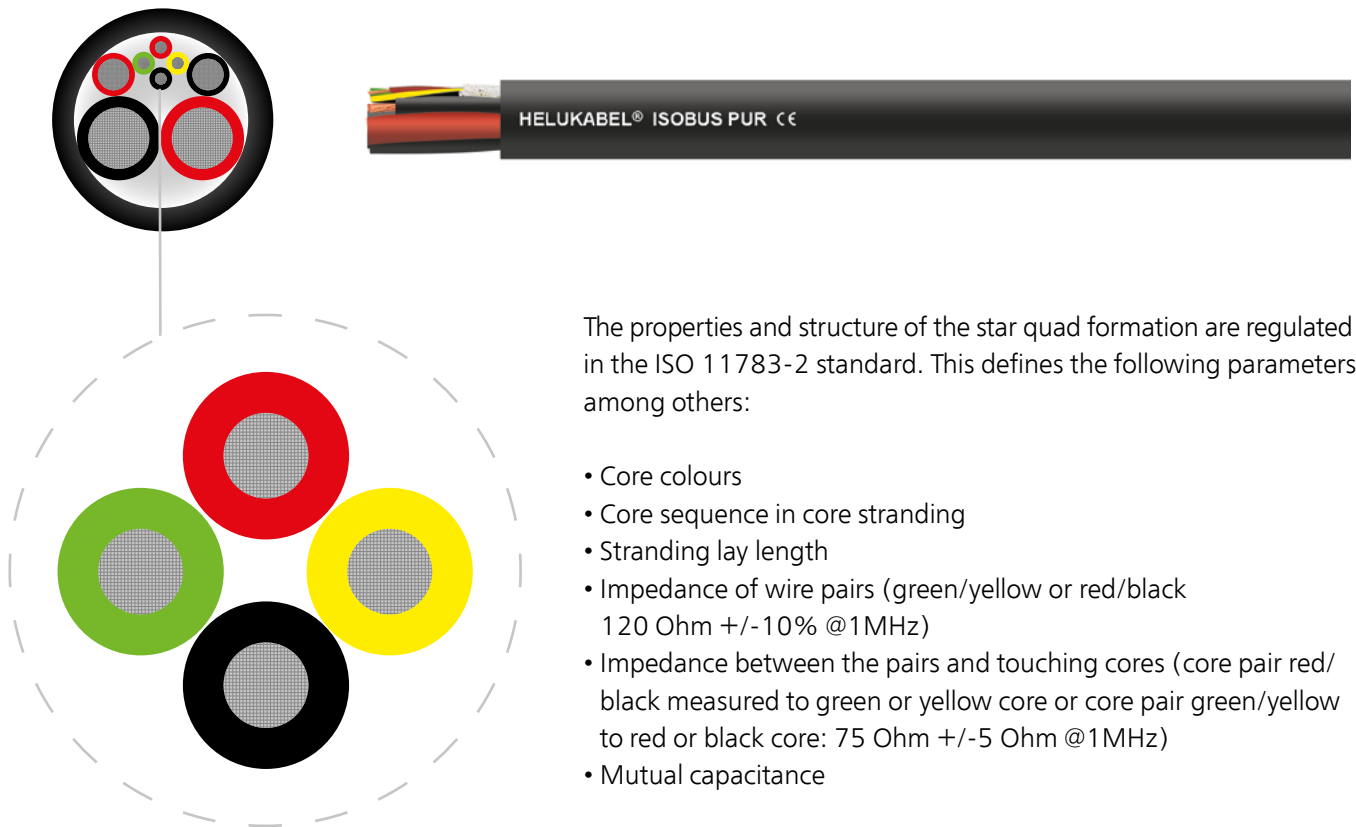
In practice, ISOBUS cables have to withstand different loads. These include fluctuating temperatures, weather and humidity as well as various chemical and mechanical effects such as movement and vibration. Farmers require cable connections that ensure the reliable operation of machines despite all the challenges - after all, malfunctions can result in expensive crop failures, among other things.

For this reason, ISOBUS cables are designed to be especially robust. A special emergency release in the connection socket - the so-called break-away function - prevents damage to the cable and socket if the plug is removed accidentally. This can happen, for example, if the user forgets to disconnect the cable when parking the tractor equipment.

What is important in regards to the construction of ISOBUS cables?

ISOBUS cables are constructed in a so-called star quad formation with $1 \times 4 \times 0.5 \text{ mm}^2$. This structure is crucial for reliable data communication between the machines. The core insulation made of polypropylene (PP) has good electrical properties and is very suitable for data transmission

applications. In addition, this insulation material is frequency-stable while complying with the electrical specifications for data transmission. With PVC insulation materials, this is not the case.




The properties and structure of the star quad formation are regulated in the ISO 11783-2 standard. This defines the following parameters, among others:


- Core colours
- Core sequence in core stranding
- Stranding lay length
- Impedance of wire pairs (green/yellow or red/black 120 Ohm +/- 10% @1MHz)
- Impedance between the pairs and touching cores (core pair red/black measured to green or yellow core or core pair green/yellow to red or black core: 75 Ohm +/- 5 Ohm @1MHz)
- Mutual capacitance

What is the meaning of the core colours?

 CAN-High

 CAN-Low

 TBC-Power

 TBC-Return

Requirements:

- Robust cable construction
- Damage-free break-away
- Reliable data transmission at any time
- For use in various weather conditions and fluctuating temperatures
- Reliable function despite external mechanical and chemical effects
- High current carrying capacities as machines are becoming more and more powerful
- The cable is easy to work with

Advantages:

- PP core insulation in star quad for reliable data transmission according to ISO 11783-2
- Robust TPU jacket, wear and abrasion resistant
- Outer diameters of the sheaths are adapted to the requirements of the common connector types
- Resistant against: weather conditions, UV-rays, microbes, ammonia
- Oil-resistant acc. to DIN VDE 0473-811-404 / DIN EN 60811-404 / IEC 60811-404
- MUD-resistance acc. to IEC 61892-Annex D
- Flame retardant acc. to DIN VDE 0482-332-1-2 / DIN EN 60332-1-2 / IEC 60332-1-2
- High-pressure cleaning possible (depends on temperature, exposure time and water pressure)
- Outer sheath is easy to strip and is excellent for adhering to overmolded assemblies

You can choose from the cable types below as part of the HELUKABEL ISOBUS PUR product family:

HELUKABEL® ISOBUS PUR

Part no.	Core number x Nominal cross-section mm ²	Outer-Ø approx. mm	Cu no. kg/km	Weight kg/km
17001249	2x6 + 2x2.5 + 1x4x0.5	12.7	182.4	280
17001528	2x6 + 2x2.5 + 1x4x0.5	15.3	182.4	349

Part no.	Core number x Nominal cross-section mm ²	Outer-Ø approx. mm	Cu no. kg/km	Weight kg/km
17001250	2x10 + 2x2.5 + 1x4x0.5	15.3	259.2	412
17001251	2x16 + 2x2.5 + 1x4x0.5	16.8	374.4	524

» CONTACT

We remain available for any further information.



Your contact person

Oliver Adler
 Global Segment Manager
 Agriculture
 Tel.: +49 171 6068 419
oliver.adler@helukabel.de



Refer to our flyer
 for more information
ISOBUS PUR