

## User manual for cables

### **1. Definition**

The cables are made of a conductor (copper) and isolated with a plastic material (Crosslinked Polyolefin)  
The cables can be connected to connectors, instruments and connection boxes. This list is not exhaustive.

### **2. General safety precautions**

#### **2.1 Safety notes on modifications or installation/deinstallation:**

Alterations and modifications to cables are not allowed. Installations, conversions and deinstallations may only be carried out by trained and qualified personnel.

#### **2.2 Safety note on intended use:**

The cables may only be used for the areas of application specified by KBE in technical datasheet.  
KBE accepts no liability for damage of any kind caused by improper use.

#### **2.3 Safety note on working with electrical equipment:**

Installation work on cable must never be carried out when it is connected to a system carrying electrical voltage.  
Only trained and qualified personnel may carry out installation work.

Take effective measures to secure electrical equipment or components that have been switched off from being switched back on.

Comply with the applicable regulations on grounding and earth connections when installing and setting up cables.

Protective equipment such as gloves, safety goggles, helmets and safety clothing must be used and worn accordingly. Relevant international, national, local and other applicable regulations must be observed and followed.

#### **2.4 Safety note on fire prevention:**

All parts of a cable and cable system and the complete system must fully meet all applicable standards on fire safety, such as IEC 60332 and other national and/or local standards. The national and local building and fire safety regulations must also be complied with.

The minimum cable bend radius must be complied with in cable and cable systems. The minimum bend radius can be found in the respective data sheet. If the minimum bend radius is not observed, this can cause a local overheating.

Protective equipment such as gloves, safety goggles, helmets and safety clothing must be used and worn accordingly. Relevant international, national, local and other applicable regulations must be observed and followed.

### **3. Notes on handling cable systems**

#### **3.1 Packaging**

The cables are packed by KBE for transport and storage in a manner that is appropriate for the specific product. The removal or damage of the packaging can cause a risk to safety or damage to the cable in case of further transport or storage.

#### **3.2 Transport and storage**

The customer is responsible for safe and secure transport when moving and storing the goods. Appropriate auxiliary equipment must be used for transporting the goods.

The following points must be observed regarding the storage of cables.

- The storage temperatures must not fall below or rise above the temperatures specified in the data sheet.
- The cables and cable systems must be protected against harmful radiation.
- The cable reels supplied with the cables must not be stacked.
- The cable reels should in principle be transported and stored in a Vertical axis position, unless the system is delivered in a different position.

#### **3.3 Handling cable reels**

The cables must never be wound or unwound under high tensile load.

The cable should always be completely unwound. Any remaining winding on the reel can negatively affect the attenuation or cause increased temperatures to develop.

The cables should always be wound onto the reel evenly. Criss-crossing windings, kinks, loops and knots must be avoided.

#### **3.4 Handling cables**

##### **3.4.1 Bending**

Improper bending of cables causes excessive loads on the cable

The minimum bend radius of a cable can be found in the technical datasheet.

- Do not bend or pull the cable around sharp objects.
- Avoid narrow bending radii by using bend protection.

An improper bending can cause electric shocks, which can result in injury or death!

##### **3.4.2 Lateral pressure**

Excessive lateral pressure on cables causes excessive loads on the cable and copper wires, and can cause deviations from the data sheet to occur. This can lead to an altered insulation distance, the risk of disruptive discharge, increased line attenuation from radiation leakage and lasting damage to the cable.

- Do not clamp cables between sharp objects.
- Do not fasten cables with general hose clamps.
- Prevent stress on cables that is caused by loads (e.g. heavy objects... etc.).

### **3.4.3 Tensile load**

Excessive tensile loads on cables cause excessive stress on the cable and copper wires, and can cause deviations from the data sheet to occur. This can lead to an altered insulation distance, the risk of disruptive discharge and lasting damage to the cable.

- Do not wind cables without load limitation.
- Do not create loops in cables in order to draw in the cable.
- Do not use rope clamps to draw in cables.
- Tensile forces must never be applied via the connector.
- Never pull cables over sharp objects.
- Prevent stress on the cable that is caused by loads (e.g. heavy objects, driving over with vehicles, etc.).

Improper tensile loads can cause electric shocks, which can result in injury or death!

## **4. General information on the installation of cable systems**

### **4.1 Winding and unwinding reels**

When winding and unwinding the cable the following points should also be observed:

- For winding and unwinding, place the reel flanges on a readily mobile base with wheels or use a suitable winding device with axis in order to ensure that the cable is not exposed to high tensile forces.
- Unwind the cable in the same direction shown by the cable winding.
- The cable reel must be positioned in front of the installation object, so that the angle between the cable (direction of pulling) and installation object is as small as possible.

Non-observance of these points may result in damage to the cable.

### **4.2 Lifting gear**

The installer is responsible for ensuring that only inspected and appropriate lifting gear (crane, cable winches, etc.) is used for lifting loads.

Incorrect or unsuitable lifting gear can cause damage to persons and objects, and even cause death!

### **4.3 Cable fastening**

Improper cable fastening can cause excessive loads on the cables. This can lead to an altered insulation distance, the risk of disruptive discharge and lasting damage to the cable.

- Cable ends must be fastened in such a way that high loads cannot be applied to the cable cores.
- Fasten the cable sheath with special cable clamps that hold the cable in the proper way. Clamps without a defined maximum clamping force (e.g. hose clamps and cable ties) must not be used, as the cable can be crushed too tightly without being noticed and therefore damaged.
- In case of tight cable entries, do not constrict the cable too much through the cable gland.
- The cable clamps must be able to withstand the applied forces. The appropriate installation must be chosen so that no forces are exerted onto the cable system housing by the cable.