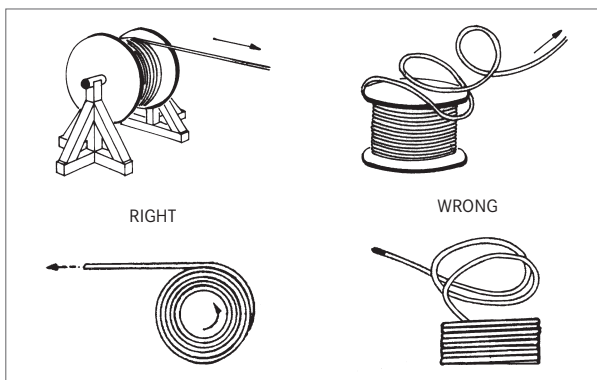


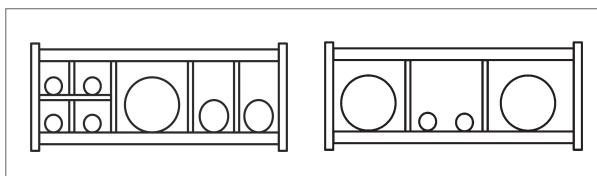
ÖLFLEX® FD/CHAIN, UNITRONIC® FD, ETHERLINE® FD and HITRONIC® FD cables in power chains

- Power chains must be selected in accordance with the relevant project documentation of the chain manufacturers. The bending radius must comply with the minimum bending radius of the cables. If possible, we recommend avoiding a multi-layer cable configuration, i.e. >25 cores, and instead distributing the required quantity amongst several cables.
- The cables must be unreeled from the ring or drum free of any twists (at a tangent) and must be laid out straight. This work should be carried out before starting the installation works so that the cables can relax in this time.
Due to the manufacturing process, the markings on the cable jacket run round in a gentle spiral. Therefore this cannot be used to ensure that the cables have been straightened out without any twists.



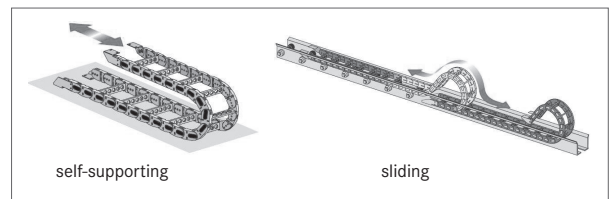
- The cable temperature should not drop below +5 °C at any point during installation.
- The cables also need to be installed without any twisting when inserted into the chambers. If a cable is twisted during installation, it can lead to premature damage to the core stranding. This effect can be reinforced during operation and result in so-called cork-screwing. This leads to core breaks, which ultimately cause malfunctions.

- The cables must lie loosely next to each other in the chain chambers. They should be separated as much as possible using separators. The clearance between the cables and the cross bar, the separators or the neighbouring cables should be at least 10% of the cable diameter.

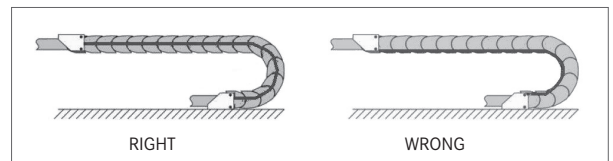


- The cables should be installed symmetrically in terms of their weight and size; those with greater diameters and weights on the outside, those with smaller diameters and weights on the inside. They can also be placed in descending size order from inside to outside. Avoid arranging the cables above one another without the use of a shelf.
- If the chain configurations are suspended vertically, additional free space must be provided in terms of the stay height, as the cables are lengthened during operation. After a short period of operation time, it is important to check whether the cables are still running along the neutral zone. It may be necessary to readjust them.

- With self-supporting chain configurations, a cable is fastened both to the moving point and to the fixed point. Suitable cable supports of the chain manufacturer should be used here. With high accelerations, cable ties only have limited suitability. Avoid tying multiple cables together. The cables must not be secured or in any way bound together in the moving part of the chain. The clearance between the fixed point and the bending movements should be sufficiently wide.



- With sliding chains, we recommend that the cable only be fastened to the moving point. A small cable reserve should be factored in at the fixed point.
(Note the assembly instructions of the chain manufacturer).
- Make sure that the cables in the bending radius run in the neutral zone, i.e. there must be no forced guidance through the chain in the inner or outer radius, so that the cables can still move relative to one another and to the chain.



- If a cable does not run smoothly, i.e. if it becomes twisted along the longitudinal axis during operation, the cable should be rotated gradually at one of the fastening points until it runs smoothly again.
- The length-changing characteristics of a cable and a chain differ considerably from one another in terms of their absolute sizes. In the first few hours of operation, cables undergo natural lengthening. With chains, it takes many hours of operation for this effect to take place. This oppositional behaviour should be addressed by regularly checking the installation position of the cables. We recommend carrying out the inspections regularly, every three months, in the first year of operation – after they should be carried out whenever a maintenance interval is due. This involves checking that the cables in the bending radius can move completely freely. It may be necessary to make readjustments. We recommend incorporating the maintenance instructions into the inspection plan of the system.

- The travel distance (L) results from 2 x chain length (LS)

