

Information and Installation Instructions

for UL and CSA cables

UL/CSA cables must be protected against mechanical, thermal and chemical damages.

Installation in switchboards and control boards

- Inside switchboards, flexible single core cables must be installed in cable channels of plastics
- As american cables are not so flexible, the minimum bending radius must be taken into consideration during flexible installation.

For connections on machinery and equipment

- Permissible tube and conduit-Ø:
minimum-Ø = 1/2" (inch)
maximum-Ø = 4" (inch)
Minimum wall-thickness of the conduit = 1,9 mm
- Normal steel armoured tubes with transition socket PG-NPT is used. Further metal cable channels must also be used.
- The cables are permitted to be filled with only max. 50% cross-section of the cable channel.
- Flexible single cores must be installed in PVC tubes inside the conduits.
- If connectors are used, both the main and the control cables should be installed separately.

Delivery program:

- PVC tubes
- Metal tubes and glands
- Fixing material
- Steel armoured tubes.

Cable Channels

- Cable channels in switchboards must be made out of a flame resistant PVC and must have enough spare space.
- Cable channels on machineries and equipment must be made out of metal. They must also be closed and oil resistant.

Cable identification

- Cable identification is achieved through continuous numbers, letters or number/letter combination. The beginning and end of the cable have the same identification system.

Cable connections to apparatus

● Main and Control cables

It is depending on the type of connection to the apparatus if screw or press clamps are used.

- In USA, it is normal to install cables without using cable lugs or cable crushing socket. The connection is only possible with the UL-wires sizes. These sizes are not designed with fine wire stranding make-up.

Conductor cross-section

General rules

minimum cross-section for

- | | |
|---------------------------|--------|
| ● Motor Cables | AWG 14 |
| ● Control Cables | |
| – in switchboards | AWG 18 |
| – in the installed system | AWG 16 |

This rule does not apply to electronic devices and systems.

In case, the electronic cables and other circuits are installed together, all cables must be set for maximum voltage.

Colour identification

● Black

For main circuits, control- and subcircuits, direct connected to main voltage.

● Blue

For direct voltage- (d.c.), control- and subcircuits, which are connected to the main circuit.

● Red

For alternating voltage (a.c.), control and subcircuits.

● Yellow or brown

For interlock circuits from an external power source.

● White or grey

For current conveying earthed conductors at main, control and subcircuits.

● Green or green-yellow

For insulated earth-connectors as protective conductor.

Motor-driving voltages

200 / 230 / 460 / 575 V, 60 Hz

Driving voltage

Normally the driving voltage is 120 V, 60 Hz or lower. Transformers must be operated with separate windings.