

## ACS 140 EMC Instructions

Follow the instructions given in the ACS 140 User's Guide, ACS 140 Programming Guide and the instructions delivered with different accessories.

### Cabling Instructions

Keep individual unscreened wires between the cable clamps and the screw terminals as short as possible. Route control cables away from power cables.

### Mains Cable

A three conductor cable (single phase and neutral with protective earth) or four conductor cable (three phase with protective earth) are recommended for the mains cabling. Shielding is not necessary. Dimension the cables and fuses in accordance with the input current. Always pay attention to local legislation when sizing the cables and fuses.

The mains input connectors are at the top of the converter unit. Mains cable routing must be done so that the distance from the sides of the converter is at least 20 cm to avoid excessive radiation to the mains cable. Twist the cable screen wires together into a bundle not longer than five times its width and connect to the PE terminal of the converter. (Or PE terminal of input filter, if present.)

### Motor Cable

The motor cable must be a symmetrical three conductor cable with a concentric PE conductor or a four conductor cable with a concentric shield. Minimum requirement for the motor cable screen is presented in Figure 1.

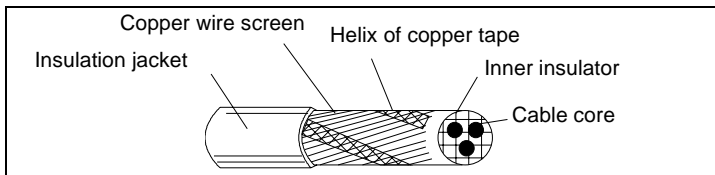


Figure 1 Minimum requirement for motor cable screen (e.g. MCMK, Nokia Kaapeli).\*

The general rule for cable screen effectiveness is: the better and tighter the screen of the cable, the lower the radiated emission level. Example of an effective construction is presented in Figure 2..

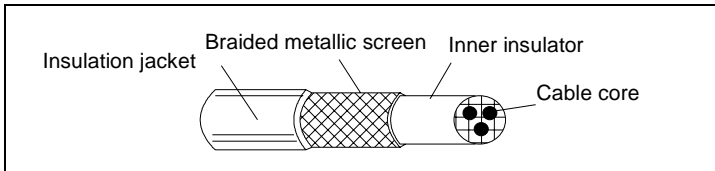


Figure 2 Effective motor cable screen (e.g. Ölflex-Servo-FD 780 CP, Lappkabel or MCMK, Nokia Kaapeli).

\* For ACS 141-4K1-1 and ACS143-4K1-1, a cable shown in Figure 2 is required.

Twist the cable screen wires together into a bundle not longer than five times its width and connect to the bottom left-hand corner of the converter heatsink (terminal marked  $\perp$  ).

At the motor end the motor cable screen must be earthed 360 degrees with an EMC cable gland (e.g. ZEMREX SCG Screened cable glands) or the screen wires must be twisted together into a bundle not longer than five times its width and connected to the PE terminal of the motor.

### Control Cables

Control cables must be multi-core cable with a braided copper wire screen.

The screen must be twisted together into a bundle not longer than five times its width and connected to terminal X1:1.

Route the control cables as far away as possible from the mains and motor cables (at least 20 cm). Where control cables must cross power cables make sure they are at an angle as near 90 degrees as possible. Also the cable routing must be done so that the distance from the sides of the converter is at least 20 cm to avoid excessive radiation to the cable.

A double shielded twisted pair cable is recommended for the analogue signals.

Unused wires should be earthed at the converter end.

**Note!** When the overriding control equipment and the ACS 140 are installed inside the same cabinet, these recommendations might be overly cautious. If the customer plans to test the entire installation, there is an opportunity to save some costs by relaxing these recommendations, for example by using unshielded cable for the digital inputs. But the customer must verify this.

### Control Panel Cable

If the control panel is connected to the converter with a cable, use only the cable provided with the option package ACS100-EXT. Follow the instructions delivered with the option package.

Route the control panel cable as far away as possible from the mains and motor cables (at least 20 cm). Also the cable routing must be done so that the distance from the sides of the converter is at least 20 cm to avoid excessive radiation to the cable.

## Additional Instructions for the First Environment

Product standard EN 61800-3 (Adjustable speed electrical power drive systems - Part 3: EMC product standard including specific test methods) defines the **First Environment** as environment that includes domestic premises. It also includes establishments directly connected without intermediate transformers to a low voltage power supply network which supplies buildings used for domestic purposes. (**Second Environment** includes establishments other than those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes. With ACS 140, no filter is needed in Second Environment.)

Always use optional RFI filter ACS100-FLT-A, ACS100-FLT-B or ACS140-FLT-A in First Environment and follow the instructions in the filter package for all cable screen connections.

The motor cable lengths have to be limited as specified in Table 1.

*Table 1 Maximum motor cable lengths with input filter ACS100-FLT-A or -B or ACS140-FLT-A and switching frequency 4 kHz or 8 kHz in First Environment.*

Converter type	ACS100-FLT-A	ACS100-FLT-B	
	4 kHz	4 kHz	8 kHz*
ACS 141-K75-1	20 m	30 m	20 m
ACS 141-1K1-1	20 m	30 m	20 m
ACS 141-1K6-1	20 m	30 m	20 m
ACS 141-2K1-1	10 m	30 m	20 m
ACS 141-2K7-1	10 m	30 m	20 m
ACS 141-4K1-1		30 m	20 m
Converter type		ACS140-FLT-A	
		4 kHz	8 kHz*
ACS 143-xKx-1**		30 m	15 m
ACS 143-xKx-3		25 m	10 m

\* Effective motor cable screen is required, according to Figure 2.

\*\*ACS 143-4K1-1: maximum continuous load 70 % of nominal.

## Line Current Harmonics

The product standard EN 61800-3 refers to IEC 1000-3-2 which specifies limits for harmonic current emissions for equipment connected to low voltage public supply network.

The supply authorities shall be notified as authorisation may be required before connection.

The current harmonic levels under rated load conditions are available on request.

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