

Standardization activities related to servo drives

Bernd Hormmeyer / Phoenix Contact GmbH&CoKG

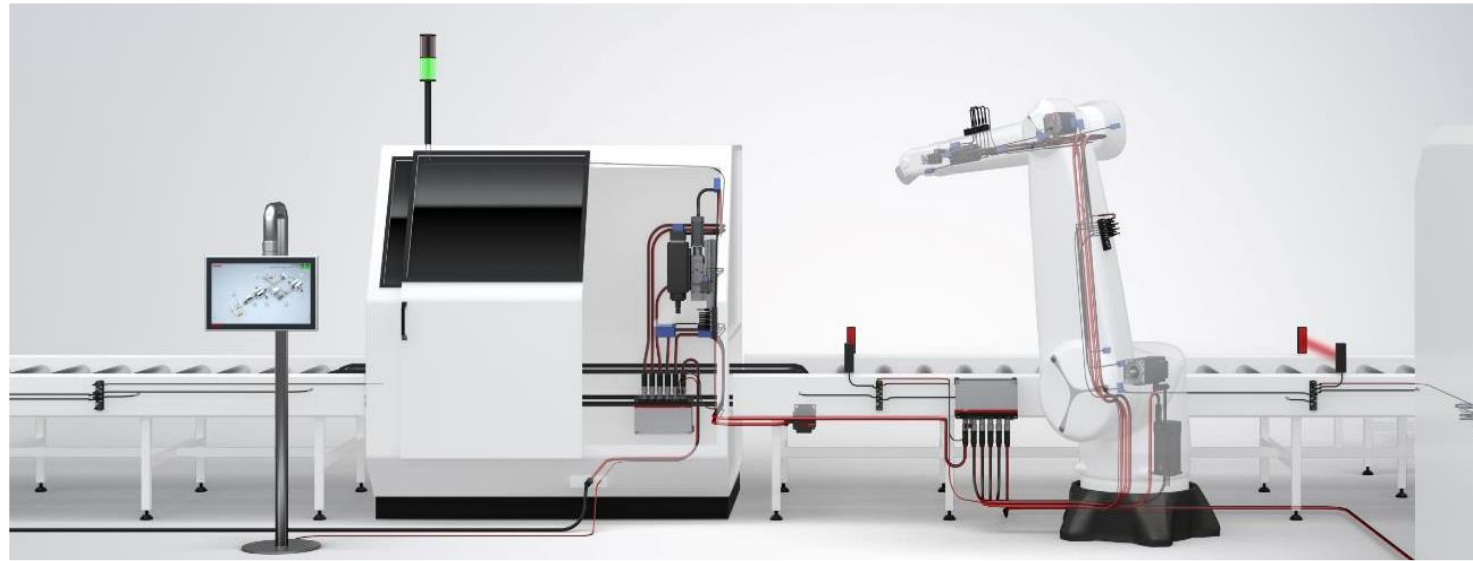
2022-07-13

Basics

Prehistory:

xu_3dg_01_05252022

fischer_3dg_01_20220622



Servo drives key characteristics:

Rotary field with 3 Phases, <1kHz, modulated

600V, 70A

Harmonics/PWM/disturbances <100 MHz

Link length <100m

Shielding: non / data lines / power lines / data & power lines / overall

Equalpotential bonding: non / star / mesh / direct / capacitor / resistor

Standardization - Drives

IEC 61800-3:2017: Adjustable speed electrical power drive systems -Part 3: EMC requirements and specific test methods

Ed4 CDV finalized

⇒ Too late for technical changes



22G/450/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: IEC 61800-3 ED4	
DATE OF CIRCULATION: 2022-02-11	CLOSING DATE FOR VOTING: 2022-05-06
SUPERSEDES DOCUMENTS: 22G/436/CD, 22G/441A/CC	

IEC SC 22G : ADJUSTABLE SPEED ELECTRIC POWER DRIVE SYSTEMS (PDS)	
SECRETARIAT: United States of America	SECRETARY: Mr Christopher Johnson
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 77, SC 77B, ISO/TC 39	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input checked="" type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING

This document is still under study and subject to change. It should not be used for reference purposes.
Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:
Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods for PDS and machine tools

Standardization - Connectors



48B/2968/NP

Detail specification for shielded, free and fixed circular connectors M12 to M40 for power, signal and data transmission with frequencies up to 600 MHz

NP (=application) ongoing,
signal integrity tbd
⇒ Right time for mutual efforts

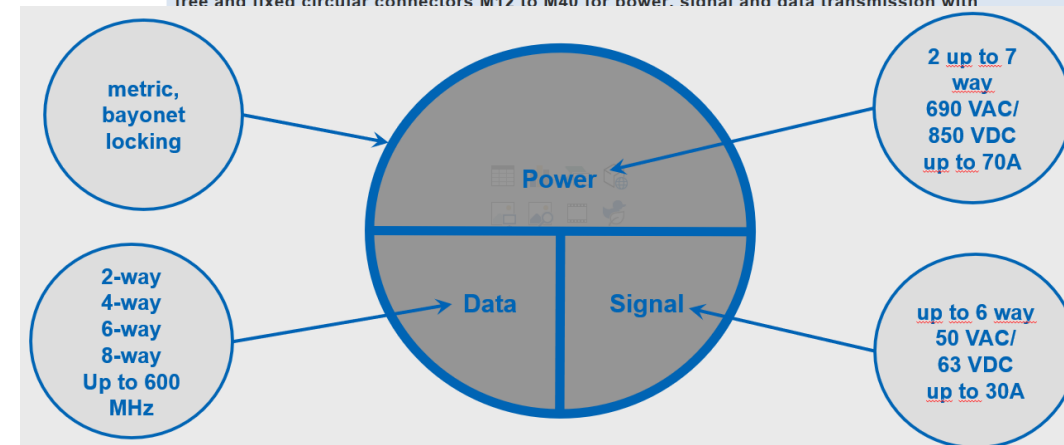
Cables:
No standard suitable for hybrid cables

NEW WORK ITEM PROPOSAL (NP)

PROPOSER: Secretariat	DATE OF PROPOSAL: 2022-05-27
DATE OF CIRCULATION: 2022-05-27	CLOSING DATE FOR VOTING: 2022-08-19

IEC SC 48B : ELECTRICAL CONNECTORS	
SECRETARIAT: United States of America	SECRETARY: Mr Jeffrey Toran
NEED FOR IEC COORDINATION:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this NP to the TC/SC secretary
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	

TITLE OF PROPOSAL:
CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – Detail specification for shielded, free and fixed circular connectors M12 to M40 for power, signal and data transmission with



Standardization – EMC & Signal integrity

IEC 61000-4-4:2012

Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques
- Electrical fast transient/burst immunity test

IEC 61000-4-5:2014

Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques
- Surge immunity test
techniques - Electrical fast transient/burst immunity test

⇒ System test

⇒ Many low-energy and single high-energy pulses

⇒ Capacitive coupling only

Standardization - EMC & Signal integrity

IEC 62153-4-7: Metallic cables and other passive components test methods – Part 4-7: Electromagnetic compatibility (EMC) – Test method for measuring of transfer impedance and screening attenuation or coupling attenuation of connectors and assemblies – Triaxial tube in tube method

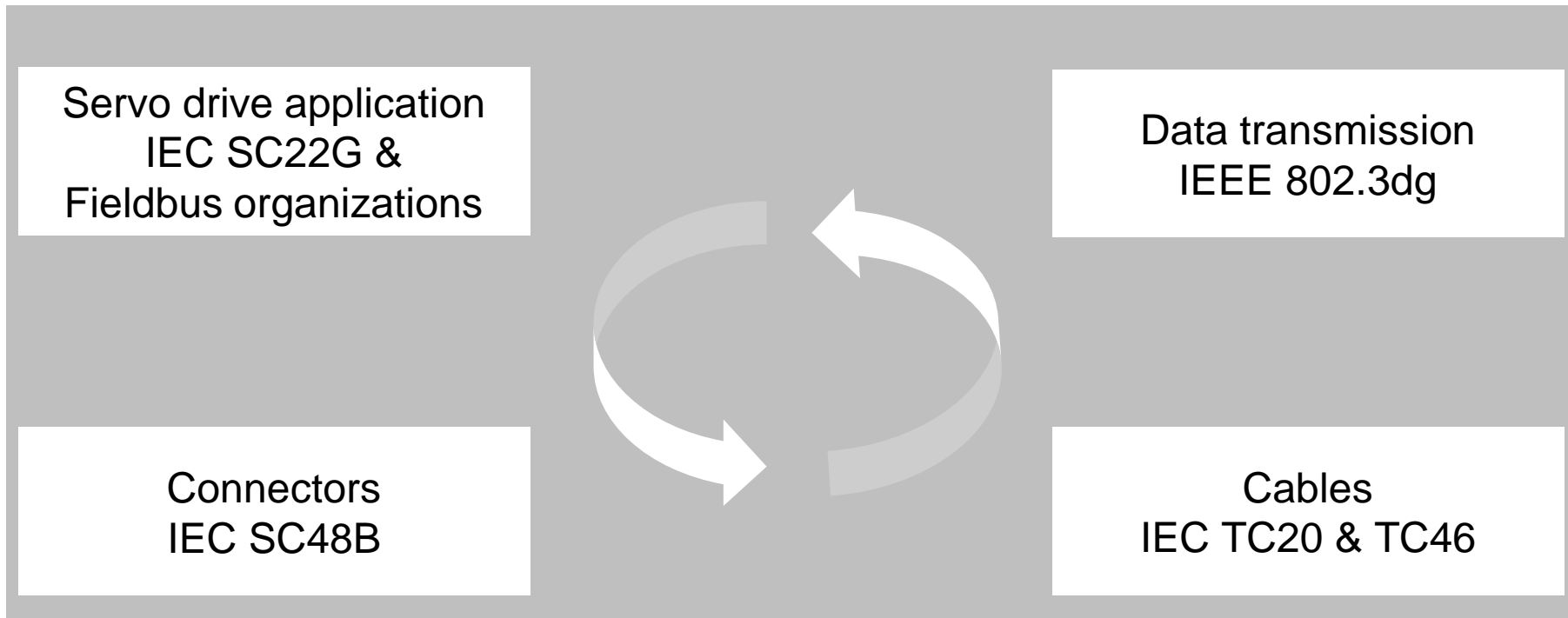
IEC 60512-25-9, test 25i Power sum alien (exogenous) NEXT

- ⇒ Component test
- ⇒ IEC 62153-4-7: internal interference between power and data lines is not evaluated, only the performance to the outside.
- ⇒ IEC 60512-25-9: Measurement of a disturbance between two data pairs, not between power and data

System approach needed

Standard	Character	Servo drive	Signalling	Cable	Connector
Burst	System	X	X		
Surge	System	X	X		
Transfer impedance or coupling attenuation	Component		X	X	X
PS-Next	Component		X	X	X

System approach needed

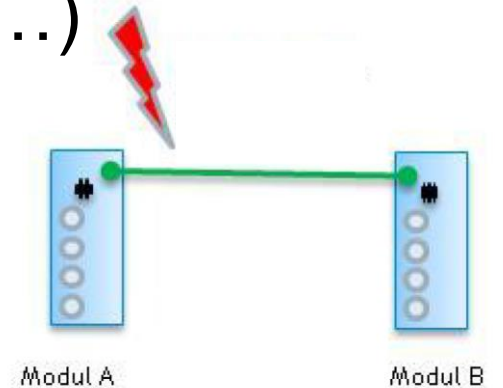


We need all parties at the table

The way forward

Define:

- DUT (Eva-boards, cable, connector, length, bonding, ...)
- Disturbance levels for burst and surge
- Extended test setup with galvanic coupling, etc



Evaluate:

Configuration and parameters for BER we need,
e.g. frequencies and limit values

Discribe:

Use findings in new standards and amend standards as appropriate

Thanks for your attention

Stop messing around

Coordinated work needed

The right time is now

Slight similarity: IEEE 802.3 – IEC 11801 – Cable & connector standards

⇒ Discussion