

Autor
D. Gumy

Quality Assurance SAIA®PCD

tel. 277

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Subject **Norms Applied for Programmable Controllers**

Summary of tests applied on SAIA®PCD

For the conception, the development and the verification, SAIA-Burgess Electronics applies the International Standard:

"EN61131-2: Programmable controllers".

The table below is an extract of the contents and gives additional references to generic norms and levels

The PCD2 and PCD4 families are approved by GL (Germanischer Lloyd), DNV (Det Norske Veritas), C-UL (Canadian Requirement) and UL (Underwriters Laboratories Inc.)

The PCD1 is also C-UL and UL approved.

The PCD6 Family with the new modules (E/A/W) correspond to these norms, however no approvals have been executed or are foreseen at the moment..

All families PCA1, PCD1, PCD2, PCD4, PCD6 and PCD7 are conforme to the CE requirements and so are able to cary the CE mark.

The approvals was executed either internally at SAIA Murten with supervision from the experts of certification body or through external institutes which are approved in their specialised activities:

- EMC Fribourg in Rossens CH for verification of the ElectroMagnetical Compatibility.
- Quinel in Zug (ex Landis & Gyr) for the environment tests (vibration and shocks).

<u>EN61131-2</u>	<u>Subject</u>	<u>Norms, parameters, levels,...</u>
6.3.4	Climatic test	
6.3.4.1	General conditions	
6.3.4.2	Withstands tests	
	• Dry heat	70°C 96h
	• cold	-25°C 96h
6.3.4.3	Change of temperature	
	• withstand test (non-functional)	-25 / +70 °C, en 3 min, during 3h; 2 cycles
	• immunity test (functional)	+5 / 40 °C, à 3°C/min, during 3h; 5 cycles
6.3.4.4	Cyclic damp heat withstand test	+25°C/60%HR 12h, 55°C/95%HR 12h; 1 + 1 cycle
6.3.5	Mechanical tests	
6.3.5.1	Vibrations	10...57Hz/0.075mm, 57...150Hz/1.0g, axes: x,y,z, 2h/axe.
		<u>additional for PCD4:</u>
		IEC 571: 1...10 Hz, 2.5 mm / 100...100 Hz, 0.5g
		50 Hz, 3g, 2 minutes
6.3.5.2	Shocks	15g, 11ms, 3 axes, 3 shocks/axes
6.3.5.3	Free fall (portable and hand-held)	1 000 mm
		100 mm, 2 falls
6.3.5.4	Free fall (original packaging)	1 000 mm, 5 falls
6.3.5.5	Safety related tests	
6.3.5.5.1	• Impact withstand test	smooth steel sphere 500g, 1 300 mm
6.3.5.5.2	• Accessibility test	the finger: IP2X
6.3.5.5.3	• clearance distance	physical measurement
6.3.5.5.4	• internal/external wiring	wire and cable flexing withstand test
6.3.5.5.5	• Flammability of isolating material	UL 94V
6.3.5.5.6	• temperature rise test	
6.3.5.5.7	• protective coating test	
6.3.5.6	Verification of terminal connection characteristics	
6.3.5.7	Plugging/unplugging of removable units	50 (20) insertions/withdrawals (for permanent installed) 500 insertions/withdrawals (for non permanent installed)

6.3.6	Electrical tests	
6.3.6.1	Safety tests	
6.3.6.1.1	Dielectric test	1.2/50µs (or: 500VAC / 1 minute) (Germanischer Lloyd: 1000VAC / 1 minute)
6.3.6.1.2	Protective earthing continuity	
6.3.6.1.3	Stored energy injury risk test	
6.3.6.2	Noise immunity tests	
6.3.6.2.1	Electrostatic discharge test	EN61000-4-2; cl. 3: contact 6 kV, air 8 kV; (restriction for PCD4: Led and connector for PGU)
6.3.6.2.2	Immunity against Radiated ElectroMagnetical field	EN61000-4-3: 26MHz...1GHz 10 V/m (with 80% amplitude modulation)
6.3.6.2.3	Fast transient burst test	EN61000-4-4: 5/50ns • Supply: 4kV, • I/O dig.: 2kV, • I/O anal. + Serial: 1kV
6.3.6.2.4	Damped oscillatory wave test	IEC 255-4: no more applied by SAIA because less strength than IEC 801-4 IEC 801-5
	Emission of EMC not requested from EN61131-2	1) EN 55022 + EN 50081-2: Power supply lines (0.01) 0.15...30MHz: cl.B 2) EN 55022 + EN 50081-2: emitted field 30...1000MHz: cl B
6.3.7	Verification of AC and DC power supply characteristics	
6.3.7.1	Voltage and frequency range	
6.3.7.2	External energy supply interruption	
6.3.7.3	Start up	
6.3.7.4	Improper power supply connection	
6.3.7.5	Verification of memory back-up	
6.3.8	Verification of input/output characteristics	
6.3.9	Verification of MPU characteristics	
6.3.10	Verification of remote I/O stations	
6.3.11	Verification of peripheral characteristics	
6.3.12	Verification of basic PC-System self- tests and diagnostics	
6.3.13	Verification of markings and manufacturer's documentation	
6.4	Routine tests	

Remarks

- 1 EN61131-2 is the Product Norm for the Programmable Controllers. It is identical to IEC1131-2.
A Product Norm has always priority on all other general Norm. As example Severity Level will not more defined by EN50081 and EN50082 but by EN61131-2.
- 2 EN61000-4-1, -2, -3, 4, ... are the Retail Norm which specify how Electrostatic Discharge, Burst, Surge, ... are to be tested. They are identical to IEC801-4-1, 2, 3, 4,
- 3 EN50081 specified the admissible emitted disturbance for application in -1 domestic and -2 industrial environment
- 4 EN50082 specified the requested immunity for application in -1 domestic and -2 industrial environment.

SAIA-Burgess Electronics Ltd

Quality Assurance PCD



Daniel Gumy