

Svenska Elektriska Kommissionen, SEK

Fastställt	Utgåva	Sida	Ingår i
2003-09-22	2	1 (1+116)	SEK Område 65

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Programmerbara styrsystem – Del 2: Utrustning – Fordringar och provning

*Programmable controllers –
Part 2: Equipment requirements and tests*

Som svensk standard gäller europastandarden EN 61131-2:2003^{*)}. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61131-2:2003.

Nationellt förord

Europastandarden EN 61131-2:2003

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 61131-2, Second edition, 2003 - Programmable controllers - Part 2: Equipment requirements and tests**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare utgiven svensk standard SS-EN 61131-2, utgåva 1, 1995, SS-EN 61131-2/A11, utgåva 1, 1997, SS-EN 61131-2 C1, utgåva 1, 1998 och SS-EN 61131-2/A12, utgåva 1, 2000, gäller ej fr o m 2006-05-01.

^{*)} Corrigendum till EN 61131-2:2003 är inarbetat i texten.

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EUROPEAN STANDARD

EN 61131-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2003

ICS 35.240.50; 25.040.40

Supersedes EN 61131-2:1994 + A11:1996 + A12:2000
Incorporates Corrigendum August 2003

English version

Programmable controllers
Part 2: Equipment requirements and tests
(IEC 61131-2:2003)

Automates programmables
Partie 2: Spécifications et essais des
équipements
(CEI 61131-2:2003)

Speicherprogrammierbare Steuerungen
Teil 2: Betriebsmittelanforderungen und
Prüfungen
(IEC 61131-2:2003)

This European Standard was approved by CENELEC on 2003-05-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 65B/470A/FDIS, future edition 2 of IEC 61131-2, prepared by SC 65B, Devices, of IEC TC 65, Industrial-process measurement and control, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61131-2 on 2003-05-01.

This European Standard supersedes EN 61131-2:1994 + A11:1996 + A12:2000.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2004-02-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2006-05-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes C and ZA are normative and annexes A, B, D and E informative.

Annex ZA has been added by CENELEC.

The contents of the corrigendum of August 2003 have been included in this copy.

Endorsement notice

The text of the International Standard IEC 61131-2:2003 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 60038	NOTE	Harmonized as HD 472 S1:1989 (modified)
IEC 60112	NOTE	IEC 60112:2003 is harmonized as EN 60112:2003 (not modified)
IEC 60445	NOTE	Harmonized as EN 60445:2000 (not modified)
IEC 60947-5-2	NOTE	Harmonized as EN 60947-5-2:1998 (modified)
IEC 61140	NOTE	Harmonized as EN 61140:2002 (not modified)
IEC 62079	NOTE	Harmonized as EN 62079:2001 (not modified)

Corrigendum to IEC 61131-2:2003:

In Table 41, **replace** "Table 64" by "Table D.2".

In Table 56, **replace** "Figure 13" by "Figure 12".

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-2-1	1990	Environmental testing Part 2: Tests - Tests A: Cold	EN 60068-2-1	1993
IEC 60068-2-2	1974	Part 2: Tests - Test B: Dry heat	EN 60068-2-2 ¹⁾	1993
IEC 60068-2-6 + corr. March	1995 1995	Part 2: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	1995
IEC 60068-2-14	1984	Part 2: Tests - Test N: Change of temperature	EN 60068-2-14 ²⁾	1999
IEC 60068-2-27	1987	Part 2: Tests - Test Ea and guidance: Shock	EN 60068-2-27	1993
IEC 60068-2-30	1980	Part 2: Tests - Test Db and guidance: Damp heat, cyclic (12 + 12 hour cycle)	EN 60068-2-30 ³⁾	1999
IEC 60068-2-31	1969	Part 2: Tests - Test Ec: Drop and topple, primarily for equipment-type specimens	EN 60068-2-31 ⁴⁾	1993
IEC 60068-2-32	1975	Part 2: Tests - Test Ed: Free fall	EN 60068-2-32 ⁵⁾	1991
IEC 60417	series	Graphical symbols for use on equipment	EN 60417	series
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr May	1991 1993

¹⁾ EN 60068-2-2 includes IEC 60068-2-2A:1976.

²⁾ EN 60068-2-14 includes A1:1986 to IEC 60068-2-14.

³⁾ EN 60068-2-30 includes A1:1985 to IEC 60068-2-30.

⁴⁾ EN 60068-2-31 includes A1:1982 to IEC 60068-2-31.

⁵⁾ EN 60068-2-32 includes A2:1990 to IEC 60068-2-32.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60664-1	1992	Insulation coordination for equipment within low-voltage systems Part 1: Principles, requirements and tests	EN 60664-1 ⁶⁾	2003
IEC 60664-3	1992	Part 3: Use of coatings to achieve insulation coordination of printed board assemblies	HD 625.3 S1 ⁷⁾	1997
IEC 60695-2-1/x	series	Fire hazard testing Part 2: Test methods – Section 1: Glow-wire test and methods	EN 60695-2-1/x ⁸⁾	series
IEC 60707	1999	Flammability of solid non-metallic materials when exposed to flame sources - List of test methods	EN 60707	1999
IEC 60947-5-1	1997	Low-voltage switchgear and controlgear Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices	EN 60947-5-1 + A12	1997 1999
IEC 60947-7-1	2002	Part 7-1: Ancillary equipment - Terminal blocks for copper conductors	EN 60947-7-1	2002
IEC 60950-1 (mod)	2001	Information technology equipment - Safety Part 1: General requirements	EN 60950-1	2001
IEC 61000-4-2	1995	Electromagnetic compatibility (EMC) Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	1995
IEC 61000-4-3	2002	Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2002
IEC 61000-4-4	1995	Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	1995
IEC 61000-4-5	1995	Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	1995
IEC 61000-4-6	1996	Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	1996

⁶⁾ EN 60664-1 includes A1:2000 + A2:2002 to IEC 60664-1.

⁷⁾ HD 625.3 S1 is superseded by EN 60664-3:2003, which is based on IEC 60664-3:2003.

⁸⁾ EN 60695-2-1/x are superseded by EN 60695-2-10 to EN 60695-2-13:2001, Fire hazard testing, Part 2-1X: Glowing/hot-wire based test methods.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-4-8	1993	Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8	1993
IEC 61000-4-12	1995	Part 4-12: Testing and measurement techniques - Oscillatory waves immunity test	EN 61000-4-12	1995
IEC 61010-1	2001	Safety requirements for electrical equipment for measurement, control, and laboratory use Part 1: General requirements	EN 61010-1 + corr June	2001 2002
CISPR 11 (mod)	1997	Industrial, scientific and medical (ISM) radio-frequency equipment - Radio disturbance characteristics - Limits and methods of measurement	EN 55011	1998
A1	1999		A1	1999
CISPR 16-1	1999	Specification for radio disturbance and immunity measuring apparatus and methods Part 1: Radio disturbance and immunity measuring apparatus	-	-
CISPR 16-2	1996	Part 2: Methods of measurement of disturbances and immunity	-	-
A1	1999		-	-

CONTENTS

1	General	10
1.1	Scope and object.....	10
1.2	Compliance with this standard	11
1.3	Normative references	11
2	Type tests.....	13
2.1	Equipment to be tested (equipment under test/EUT).....	13
2.2	Special features for immunity and EMC tests	15
2.3	Withstand test conditions.....	16
2.4	Verification procedure.....	16
2.5	Requirements for test programmes and proper functioning verification procedures (PFVPs) to be provided by the manufacturer	16
2.6	General conditions for tests	17
3	Terms and definitions	17
4	Normal service conditions and requirements.....	24
4.1	Climatic conditions and requirements.....	24
4.2	Mechanical service conditions and requirements	25
4.3	Transport and storage conditions and requirements.....	26
4.4	Electrical service conditions and requirements.....	27
4.5	Special conditions and requirements.....	28
5	Functional requirements	28
5.1	Functional power supply and memory back-up requirements	30
5.2	Digital I/Os	31
5.3	Analogue I/Os.....	38
5.4	Communication interface requirements	39
5.5	Main processing unit(s) and memory(ies) of the PLC-system requirements.....	39
5.6	Remote input/output stations (RIOSs) requirements.....	39
5.7	Peripherals (PADTs, TEs, HMIs) requirements	39
5.8	PLC-system self-tests and diagnostics requirements	40
5.9	Functional earthing	40
5.10	Mounting requirements	40
5.11	General marking requirements.....	41
5.12	Requirements for normal service and functional type tests and verifications	41
5.13	Requirements for information on normal service and function	41
6	Normal service and functional type tests and verifications	41
6.1	Climatic tests.....	41
6.2	Mechanical tests.....	43
6.3	Verification of special functional requirements for power ports and memory back-up – Special immunity limits for power ports.....	45
6.4	Verification of input/output requirements.....	50
6.5	Verification of communication interface requirements	53
6.6	Verification of MPU requirements.....	53
6.7	Verification of remote I/O stations.....	53
6.8	Verification of peripheral (PADTs, TEs, HMIs) requirements	54
6.9	Verification of PLC-system self-tests and diagnostics	54

6.10	Verification of markings and manufacturer's documentation	54
7	General information to be provided by the manufacturer	54
7.1	Information on type and content of documentation	54
7.2	Information on compliance with this standard	55
7.3	Information on reliability	55
7.4	Information on other conditions	55
7.5	Information on shipping and storage	55
7.6	Information on a.c. and d.c. power supply	55
7.7	Information on digital inputs (current sinking)	56
7.8	Information on digital outputs for alternating currents (current sourcing)	56
7.9	Information on digital outputs for direct current (current sourcing)	57
7.10	Information on analogue inputs	57
7.11	Information on analogue outputs	58
7.12	Information on communication interfaces	59
7.13	Information on main processing unit(s) and memory(ies) of the PLC-system	59
7.14	Information on remote input/output stations (RIOSs)	60
7.15	Information on peripherals (PADTs, TEs, HMIs)	61
7.16	Information on self-tests and diagnostics	61
8	Electromagnetic compatibility (EMC) requirements	61
8.1	General	61
8.2	Emission requirements	62
8.3	EMC immunity requirements	62
8.4	Requirements for EMC tests and verifications	68
8.5	Requirements for information on EMC	68
9	Electromagnetic compatibility (EMC) type tests and verifications	68
9.1	Electromagnetic compatibility-related tests	68
9.2	Test environment	69
9.3	Measurement of radiated interference	69
9.4	Measurement of conducted interference	69
9.5	Electrostatic discharge	70
9.6	Radiofrequency electromagnetic field – Amplitude modulated	71
9.7	Power-frequency magnetic fields	71
9.8	Fast transient bursts	72
9.9	High-energy surges	73
9.10	Conducted radiofrequency interference	74
9.11	Damped oscillatory wave (for zone C only)	75
9.12	Voltage drops and interruptions - Power port type tests and verifications	75
10	Electromagnetic compatibility (EMC) information to be provided by the manufacturer	76
11	Safety requirements	77
11.1	Protection against electrical shock	77
11.2	Protection against the spread of fire	82
11.3	Limited power circuits	82
11.4	Clearance and creepage distances requirements	83
11.5	Flame-retardant requirements for non-metallic materials	89
11.6	Temperature limits	90
11.7	Enclosures	90
11.8	Field-wiring terminals constructional requirements	91

11.9 Provisions for protective earthing.....	91
11.10 Wiring.....	92
11.11 Switching devices.....	93
11.12 Components.....	93
11.13 Battery requirements.....	94
11.14 Maximum voltage and minimum voltage.....	94
11.15 Markings and identification.....	94
11.16 Requirements for safety type tests and verifications.....	96
11.17 Requirements for safety routine tests and verifications.....	96
11.18 Requirements for information on safety.....	96
12 Safety type tests and verifications.....	96
12.1 Safety-related mechanical tests and verifications.....	96
12.2 Safety-related electrical tests.....	99
12.3 Single-fault condition test – General.....	103
13 Safety routine tests.....	104
13.1 Dielectric withstand test.....	104
13.2 Dielectric withstand verification test.....	105
13.3 Protective earthing test.....	105
14 Safety information to be provided by the manufacturer.....	106
14.1 Information on evaluation of enclosures for open equipment (power dissipation).....	106
14.2 Information on mechanical terminal connection.....	106
Annex A (informative) Illustration of PLC-system hardware definitions.....	107
Annex B (informative) Digital input standard operating range equations.....	108
Annex C (normative) Test tools.....	109
Annex D (informative) Zone C – EMC immunity levels.....	112
Annex E (informative) Overvoltage example.....	114
Bibliography.....	115
Figure 1 – EUT configurations.....	15
Figure 2 – Typical interface/port diagram of a PLC-system.....	29
Figure 3 – I/O Parameters.....	31
Figure 4 – U-I operation regions of current-sinking inputs.....	33
Figure 5 – Temporary overload waveform for digital a.c. outputs.....	35
Figure 6 – Temporary overload waveform for digital d.c. outputs.....	37
Figure 7 – Gradual shut-down/start-up test.....	46
Figure 8 – Fast supply voltage variation test.....	46
Figure 9 – Third harmonic immunity test.....	47
Figure 10 – Slow supply voltage variation test.....	49
Figure 11 – EMC immunity zones.....	63
Figure 12 – Impact withstand test procedure.....	97
Figure 13 – Dielectric withstand test procedures.....	102
Figure A.1 – Programmable controller system (PLC-system).....	107
Figure C.1 – Jointed test finger.....	109

Figure C.2 – 15 mm × 3 mm test pin.....	110
Figure C.3 – 100 mm × 4 mm test pin.....	110
Figure C.4 – 100 mm × 3 mm test pin.....	111
Figure E.1 – Creepage distances of circuits where recurring peak voltages are generated.....	114
Table 1 – General conditions for tests	17
Table 2 – Operating ambient air temperature of PLC-systems	24
Table 3 – Sinusoidal vibration service conditions for PLC-systems.....	26
Table 4 – Free fall on concrete floor for portable and hand-held equipment.....	26
Table 5 – Free fall on concrete floor in manufacturer’s original packaging.....	27
Table 6 – Rated values and operating ranges of incoming power supply	30
Table 7 – Standard operating ranges for digital inputs (current sinking)	34
Table 8 – Rated values and operating ranges for current sourcing digital a.c. outputs.....	35
Table 9 – Rated values and operating ranges (d.c.) for current sourcing digital d.c. outputs.....	37
Table 10 – Rated values and impedance limits for analogue inputs	38
Table 11 – Rated values and impedance limits for analogue outputs	38
Table 12 – Dry-heat and cold withstand tests	42
Table 13 – Change of temperature, withstand and immunity tests	42
Table 14 – Cyclic (12 + 12) damp-heat test	43
Table 15 – Immunity vibration test.....	43
Table 16 – Immunity shock test.....	44
Table 17 – Free-fall immunity/withstand tests (portable and hand-held equipment)	44
Table 18 – Free-fall withstand test (units within manufacturer's original packaging)	44
Table 19 – Insertions/withdrawals of removable units.....	45
Table 20 – Voltage-ripple and frequency-range immunity test (1)	45
Table 21 – Third harmonic immunity test.....	46
Table 22 – Gradual shut-down/start-up test.....	48
Table 23 – Supply voltage variation tests	48
Table 24 – Back-up duration withstand test	49
Table 25 – Change of energy source test.....	50
Table 26 – Overload and short-circuit tests for digital outputs	51
Table 27 – Emission limits.....	62
Table 28 – EMC immunity zones	64
Table 29 – Criteria to prove the performance of a PLC-system against EMC disturbances	64
Table 30 – Radiated immunity and enclosure ports (1) Conducted immunity, Zones A-B	65
Table 31 – Conducted immunity, Zone B	66
Table 32 – Conducted immunity, Zone A	67
Table 33 – Voltage drops and interruptions	68
Table 34 – Radiated emission measurement	69
Table 35 – Conducted emission measurement	69
Table 36 – Electrostatic discharge immunity test.....	70

Table 37 – Radiated electromagnetic field immunity test	71
Table 38 – Power frequency magnetic field immunity test.....	71
Table 39 – Fast transient burst immunity test	72
Table 40 – High-energy surge immunity test.....	73
Table 41 – Conducted RF immunity test.....	74
Table 42 – Damped oscillatory wave immunity test.....	75
Table 43 – Voltage drop and interruption immunity test	76
Table 44 – Operator accessibility for open and enclosed equipment.....	80
Table 45 – Limits of output current and output power for inherently limited power sources	83
Table 46 – Limits of output current, output power and ratings for over-current protective devices for non-inherently limited power sources	83
Table 47 – Minimum clearances in air corresponding to overvoltage category II conditions (except for field-wiring terminals) for basic/supplementary insulation.....	84
Table 48 – Minimum clearances in air corresponding to overvoltage category II conditions (except for field-wiring terminals) for double /reinforced insulation.....	85
Table 49 – Minimum clearances in air at field-wiring terminals	85
Table 50 – Minimum clearances in air for micro-environment where the voltages are known and controlled	86
Table 51 – Classification of material group according to comparative tracking index (CTI)	87
Table 52 – Minimum creepage distances for other than printed circuit boards (1).....	87
Table 53 – Minimum creepage distances for printed circuit boards (1), (6), (9) (basic and supplementary insulation).....	88
Table 54 – Minimum creepage distances related to recurring peak voltages on printed wiring boards without protective coating (1) (pollution degrees 1 and 2).....	89
Table 55 – Temperature limits	90
Table 56 – Impact withstand test (1).....	96
Table 57 – Operator accessibility tests (1)	97
Table 58 – Dielectric withstand voltages for impulse a.c. power frequency and d.c. tests for basic/supplementary insulation (5).....	101
Table 59 – Dielectric withstand voltages for impulse a.c. power frequency and d.c. tests for double/reinforced insulation (5)	101
Table 60 – Overload test circuit values.....	103
Table 61 – Endurance test circuit values	103
Table 62 – Routine dielectric withstand test (5)	105
Table D.1 – Radiated immunity and enclosure ports (1) conducted immunity, Zone C	112
Table D.2 – Conducted immunity, Zone C	113

PROGRAMMABLE CONTROLLERS –

Part 2: Equipment requirements and tests

1 General

1.1 Scope and object

This Part of IEC 61131 specifies requirements and related tests for programmable controllers (PLC) and their associated peripherals (for example, programming and debugging tools (PADTs), human-machine interfaces (HMIs), etc.) which have as their intended use the control and command of machines and industrial processes.

PLCs and their associated peripherals are intended to be used in an industrial environment and may be provided as open or enclosed equipment. If a PLC or its associated peripherals are intended for use in other environments, then the specific requirements, standards and installation practices for those other environments must be additionally applied to the PLC and its associated peripherals.

This standard also applies to any products performing the function of PLCs and/or their associated peripherals.

Equipment covered in this standard is intended for use in overvoltage category II (IEC 60664-1) in low-voltage installations, where the rated mains supply voltage does not exceed a.c. 1 000 V r.m.s. (50/60 Hz), or d.c. 1 500 V. (If PLCs or their associated peripherals are applied in overvoltage category III installations, then additional analysis will be required to determine the suitability of the equipment for those applications.)

This standard does not deal with the functional safety or other aspects of the overall automated system. PLCs, their application programme and their associated peripherals are considered as components of a control system.

Since PLCs are component devices, safety considerations for the overall automated system including installation and application are beyond the scope of this standard. However, PLC safety as related to electric shock and fire hazards, electrical interference immunity and error detecting of the PLC-system operation (such as the use of parity checking, self-testing diagnostics, etc.), are addressed. Refer to IEC 60364 or applicable national/local regulations for electrical installation and guidelines.

The object of this standard is

- to establish the definitions and identify the principal characteristics relevant to the selection and application of PLCs and their associated peripherals;
- to specify the minimum requirements for functional, electrical, mechanical, environmental and construction characteristics, service conditions, safety, EMC, user programming and tests applicable to PLCs and the associated peripherals.

This Part also specifies

- a) service, storage and transportation requirements for PLCs and their associated peripherals (Clause 4);
- b) functional requirements for PLCs and their associated peripherals (Clause 5);
- c) EMC requirements for PLCs and their associated peripherals (Clause 8);
- d) safety requirements for PLCs and their associated peripherals (Clause 11);

- e) information that the manufacturer is required to supply (Clauses 7, 10 and 13);
- f) test methods and procedures that are to be used for the verification of compliance of PLCs and their associated peripherals with the requirements (5.12, 8.5, 11.18 and Clause 13).

The tests are type tests or production routine tests, and not tests related to the ways PLC systems are applied.

1.2 Compliance with this standard

When compliance with this Part of IEC 61131 is indicated without qualification, compliance with all clauses, including all tests and verifications required in this part, must be verified. Moreover, the manufacturer's obligations expressed in this part are not waived if no type test is required, or if the test conditions are restricted for practical reasons.

When compliance with some portion of this Part of IEC 61131 is indicated, it is only necessary to verify compliance with those clauses against which the compliance claim is made. The manufacturer's obligations as indicated above are still applicable. The smallest unit of this part for compliance purposes shall be a clause, such as Clauses 5, 8 or 11.

Compliance with a portion of this Part of IEC 61131 is provided to facilitate efforts with respect to particular conformity assessment requirements (for example, Clause 8 as the compliance requirement for the EU electromagnetic compatibility directive or Clause 11 as the compliance requirement for the EU low-voltage directive).

Compliance with constructional requirements and with requirements for information to be provided by the manufacturer shall be verified by suitable examination, visual inspection and/or measurement.

All requirements not tested according to the clauses on tests and verifications shall be verifiable under a procedure to be agreed to by the manufacturer and the user.

The manufacturer shall provide, on request, compliance verification information for all requirements referenced in the claims of compliance with all or a portion of this Part of IEC 61131.

It is the manufacturer's responsibility to ensure that delivered PLC equipment and associated peripherals are equivalent to the sample(s) which have been type-tested according to this Part of IEC 61131 and therefore that they comply with all requirements of this part.

Significant modifications shall be indicated through the use of suitable revision level indexes and markings (see 5.11 and 11.15) and shall comply with this Part of IEC 61131.

NOTE A new type test may be required to confirm compliance.

Where the manufacturer is allowed to select among several options, he shall clearly specify in his catalogues and/or datasheets those to which any portion of the PLC-system equipment complies. This applies to severity classes of voltage drops (i.e. PS1 or PS2) and types of digital inputs (i.e. Type 1 or Type 3).

All relevant functions and parts of the EUT (i.e. units and modules) shall be functioning in such a way that the information paths to/from these functions and parts are exercised.

1.3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-1:1990, *Environmental testing – Part 2: Tests – Tests A: Cold*

- IEC 60068-2-2:1974, *Environmental testing – Part 2: Tests – Tests B: Dry heat*
- IEC 60068-2-6:1995, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*
- IEC 60068-2-14:1984, *Environmental testing – Part 2: Tests – Test N: Change of temperature*
- IEC 60068-2-27:1987, *Environmental testing – Part 2: Tests – Test Ea and guidance: Shock*
- IEC 60068-2-30:1980, *Environmental testing – Part 2: Tests – Test Db and guidance: Damp heat, cyclic (12 + 12-hour cycle)*
- IEC 60068-2-31:1969, *Environmental testing – Part 2: Tests – Test Ec: Drop and topple, primarily for equipment-type specimens*
- IEC 60068-2-32:1975, *Environmental testing – Part 2: Tests – Test Ed: Free fall (Procedure 1)*
- IEC 60417 (all parts), *Graphical symbols for use on equipment*
- IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
- IEC 60664-1:1992, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*
- IEC 60664-3:1992, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coatings to achieve insulation coordination of printed board assemblies*
- IEC 60695-2-1 (all sheets), *Fire hazard testing – Part 2: Test methods – Section 1: Glow-wire test and methods*
- IEC 60707:1999, *Flammability of solid non-metallic materials when exposed to flame sources – List of test methods*
- IEC 60947-5-1:1997, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*
- IEC 60947-7-1:2002, *Low-voltage switchgear and controlgear – Part 7-1: Ancillary equipment – Terminal blocks for copper conductors*
- IEC 60950-1:2001, *Information technology equipment—Safety – Part 1: General requirements*
- IEC 61000-4-2:1995, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*
- IEC 61000-4-3:2002, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated radio-frequency electromagnetic field immunity test*
- IEC 61000-4-4:1995, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 4: Electrical fast transient/burst immunity test*
- IEC 61000-4-5:1995, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*
- IEC 61000-4-6:1996, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances induced by radio-frequency fields*

IEC 61000-4-8:1993, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-12:1995, *Electromagnetic compatibility (EMC) – Part 4-12: Testing and measurement techniques – Oscillatory waves immunity test*

IEC 61010-1:2001, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*

CISPR 11:1999, *Industrial, scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and methods of measurement*

CISPR 16-1:1999, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1: Radio disturbance and immunity measuring apparatus*

CISPR 16-2:1999, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2: Methods of measurement of disturbances and immunity*