SVENSK STANDARD SS-EN 61131-2

| Fastställd | Utgåva | Sida | Ansvarig kommitté |
|---|---|---|---|
| 2007-10-22 | 3 | 1 (1+126) | SEK TK 65 |



# Programmerbara styrsystem – Del 2: Utrustning – Fordringar och provning

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

Som svensk standard gäller europastandarden EN 61131-2:2007. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61131-2:2007.

**Nationellt förord**

Europastandarden EN 61131-2:2007

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 61131-2, Third edition, 2007 - Programmable controllers - Part 2: Equipment requirements and tests**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 61131-2, utgåva 2, 2003, gäller ej fr o m 2010-08-01.

ICS 35.240.50; 25.040.40

Denna standard är fastställd av SEK Svensk Elstandard,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
Postadress: SEK, Box 1284, 164 29 KISTA
*Telefon*: 08 - 444 14 00. *Telefax*: 08 - 444 14 30
*E-post*: sek@elstandard.se. *Internet*: www.elstandard.se

## *Standarder underlättar utvecklingen och höjer elsäkerheten*

Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

## *SEK är Sveriges röst i standardiseringsarbetet inom elområdet*

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

## *Stora delar av arbetet sker internationellt*

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

## *Var med och påverka!*

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard
Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 61131-2

September 2007

ICS 35.240.50; 25.040.40

Supersedes EN 61131-2:2003

English version

# Programmable controllers - Part 2: Equipment requirements and tests

(IEC 61131-2:2007)

Automates programmables - Partie 2: Spécifications et essais des équipements (CEI 61131-2:2007)

Speicherprogrammierbare Steuerungen - Teil 2: Betriebsmittelanforderungen und Prüfungen (IEC 61131-2:2007)



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**



Ref. No. EN 61131-2:2007 E

## Foreword

The text of document 65B/623/FDIS, future edition 3 of IEC 61131-2, prepared by SC 65B, Devices & process analysis, of IEC TC 65, Industrial-process measurement, control and automation, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61131-2 on 2007-08-01.

This European Standard supersedes EN 61131-2:2003.

EN 61131-2:2007 includes the following significant technical changes with respect to EN 61131-2:2003.

a) DC power port requirements have been moved from Clause 8 to Clause 5.

b) Correction of the following tests of Clause 6:

- voltage range test;
- fast supply voltage variation test;
- slow supply voltage variation test;
- gradual shut-down/start-up test.

c) Change of EMC requirements in Clause 8:

- requirements for radiofrequency interference in Table 33 changed from 3 V to 10 V;
- for Zone B equipment;
- reference to EMC basic standards with the last version;
- reference to generic standards 61000-6-x;
- cable length aligned to generic standards.

d) Correction of the following tests in Clause 9:

- voltage dips and interruptions – power port type tests and verifications.

e) New organization of Clause 11:

- equipment types and protection;
- open PLC-system equipment;
- enclosed PLC-system equipment:
  - Class I equipment,
  - Class II equipment,
  - Class III equipment;
- protection against electric shock;
- definition of secondary circuits which do not pose a risk of electric shock:
  - Class 2 circuit,
  - limited voltage/current circuit,
  - limited voltage circuit,
  - limited energy circuit ≤ 30 V a.c. or 42,2 V peak,
  - limited impedance circuit;
- protection against the spread of fire within limited power circuits;
- protective earthing requirements for enclosed equipment;
- minor improvements in different subclauses;
- impulse test only for verification of clearances.

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) | 2008-05-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2010-08-01 |

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directives EMC (89/336/EEC) and EMC2 (2004/108/EC). See Annex ZZ.

Annexes ZA and ZZ have been added by CENELEC.

---

## Endorsement notice

The text of the International Standard IEC 61131-2:2007 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 standards indicated:

| | | |
|---|---|---|
| IEC 60112 | NOTE | Harmonized as EN 60112:2003 (not modified). |
| IEC 60445 | NOTE | Harmonized as EN 60445:2007 (not modified). |
| IEC 61140 | NOTE | Harmonized as EN 61140:2002 (not modified). |
| IEC 62079 | NOTE | Harmonized as EN 62079:2001 (not modified). |

---

## Annex ZA
(normative)

## Normative references to international publications with their corresponding European publications

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.

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

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60060-1<br>+ corr. March<br>corr. March | 1989<br>1990<br>1992 | High-voltage test techniques -<br>Part 1: General definitions and test requirements | HD 588.1 S1 | 1991 |
| IEC 60068-2-1 | 2007 | Environmental testing -<br>Part 2-1: Tests - Test A: Cold | EN 60068-2-1 | 2007 |
| IEC 60068-2-2 | 1974 | Environmental testing -<br>Part 2: Tests - Tests B: Dry heat | EN 60068-2-2 [1)] | 1993 |
| IEC 60068-2-6<br>+ corr. March | 1995<br>1995 | Environmental testing -<br>Part 2: Tests - Test Fc: Vibration (sinusoidal) | EN 60068-2-6 | 1995 |
| IEC 60068-2-14 | 1984 | Environmental testing -<br>Part 2: Tests - Test N: Change of temperature | EN 60068-2-14 [2)] | 1999 |
| IEC 60068-2-27 | 1987 | Basic environmental testing procedures -<br>Part 2: Tests - Test Ea and guidance: Shock | EN 60068-2-27 | 1993 |
| IEC 60068-2-30 | 2005 | Environmental testing -<br>Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle) | EN 60068-2-30 | 2005 |
| IEC 60068-2-31 | 1969 | Basic environmental testing procedures -<br>Part 2: Tests - Test Ec: Drop and topple, primarily for equipment-type specimens | EN 60068-2-31 [3)] | 1993 |
| IEC 60068-2-32 | 1975 | Environmental testing -<br>Part 2: Tests -Test Ed: Free fall | EN 60068-2-32 [4)] | 1993 |
| IEC 60364-1<br>(mod) | 2005 | Low-voltage electrical installations -<br>Part 1: Fundamental principles, assessment of general characteristics, definitions | prHD 60364-1 | 200X |
| IEC 60364-4-41<br>(mod) | 2005 | Low-voltage electrical installations -<br>Part 4-41: Protection for safety - Protection against electric shock | HD 60364-4-41<br>+ corr. July | 2007<br>2007 |
| IEC 60417 | Data-base | Graphical symbols for use on equipment | - | - |

[1)] EN 60068-2-2 includes supplement A:1976 to IEC 60068-2-2.

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

[3)] EN 60068-2-31 includes A1:1982 to IEC 60068-2-31.

[4)] EN 60068-2-32 includes A2:1990 to IEC 60068-2-32.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60529 | 1989 | Degrees of protection provided by enclosures (IP Code) | EN 60529<br>+ corr. May | 1991<br>1993 |
| A1 | 1999 | | A1 | 2000 |
| IEC 60664-1<br>+ A1<br>+ A2 | 1992<br>2000<br>2002 | Insulation coordination for equipment within low-voltage systems -<br>Part 1: Principles, requirements and tests | EN 60664-1 [5)] | 2003 |
| IEC 60664-3 | 2003 | Insulation coordination for equipment within low-voltage systems -<br>Part 3: Use of coating, potting or moulding for protection against pollution | EN 60664-3 | 2003 |
| IEC 60695-2-11 | 2000 | Fire hazard testing -<br>Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products | EN 60695-2-11 | 2001 |
| IEC 60695-11-10 | 1999 | Fire hazard testing -<br>Part 11-10: Test flames - 50 W horizontal and vertical flame test methods | EN 60695-11-10 | 1999 |
| IEC 60947-5-1 | 2003 | Low-voltage switchgear and controlgear -<br>Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices | EN 60947-5-1<br>+ corr. July | 2004<br>2005 |
| IEC 60947-5-2 (mod)<br>A1<br>A2 | 1997<br>1999<br>2003 | Low-voltage switchgear and controlgear -<br>Part 5-2: Control circuit devices and switching elements - Proximity switches | EN 60947-5-2<br>A1<br>A2 | 1998<br>1999<br>2004 |
| IEC 60947-7-1 | 2002 | Low-voltage switchgear and controlgear -<br>Part 7-1: Ancillary equipment - Terminal blocks for copper conductors | EN 60947-7-1 | 2002 |
| IEC 60950-1 (mod) | 2001 | Information technology equipment - Safety -<br>Part 1: General requirements | EN 60950-1 [6)]<br>+ corr. August<br>+ A11 | 2001<br>2007<br>2004 |
| IEC 61000-4-2 | 1995 | Electromagnetic compatibility (EMC) -<br>Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test | EN 61000-4-2 | 1995 |
| IEC 61000-4-3 | 2006 | Electromagnetic compatibility (EMC) -<br>Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test | EN 61000-4-3 | 2006 |
| IEC 61000-4-4 | 2004 | Electromagnetic compatibility (EMC) -<br>Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test | EN 61000-4-4 | 2004 |
| IEC 61000-4-5 | 2005 | Electromagnetic compatibility (EMC) -<br>Part 4-5: Testing and measurement techniques - Surge immunity test | EN 61000-4-5 | 2006 |

[5)] EN 60664-1 is superseded by EN 60664-1:2007, which is based on IEC 60664-1:2007.

[6)] EN 60950-1 is superseded by EN 60950-1:2006, which is based on IEC 60950-1:2005 (mod).

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 61000-4-6 | 2003 | Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields | EN 61000-4-6 [7)] + corr. August | 2007 2007 |
| IEC 61000-4-8 | 1993 | Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test | EN 61000-4-8 | 1993 |
| IEC 61000-4-11 | 2004 | Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests | EN 61000-4-11 | 2004 |
| IEC 61000-4-18 | 2006 | Electromagnetic compatibility (EMC) - Part 4-18: Testing and measurement techniques - Oscillatory wave immunity test | EN 61000-4-18 | 2007 |
| IEC 61000-4-29 | 2000 | Electromagnetic compatibility (EMC) - Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests | EN 61000-4-29 | 2000 |
| IEC 61000-6-1 | 2005 | Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments | EN 61000-6-1 | 2007 |
| IEC 61000-6-2 | 2005 | Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments | EN 61000-6-2 + corr. September | 2005 2005 |
| IEC 61000-6-4 | 2006 | Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments | EN 61000-6-4 | 2007 |
| 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 |
| IEC 61131-1 | 2003 | Programmable controllers - Part 1: General information | EN 61131-1 | 2003 |
| IEC 61131-3 | 2003 | Programmable controllers - Part 3: Programming languages | EN 61131-3 | 2003 |
| IEC/TR 61131-4 | 2004 | Programmable controllers - Part 4: User guidelines | - | - |
| CISPR 14-1 | 2005 | Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission | EN 55014-1 | 2006 |

[7)] EN 61000-4-6 includes A1:2004 + A2:2006 to IEC 61000-4-6.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| CISPR 16-1-2 | 2003 | Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Conducted disturbances | EN 55016-1-2 | 2004 |
| CISPR 16-1-4<br>A1 | 2003<br>2004 | Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-4: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Radiated disturbances | EN 55016-1-4 [8)]<br>A1 | 2004<br>2005 |
| CISPR 16-2-1<br>A1 | 2003<br>2005 | Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements | EN 55016-2-1<br>A1 | 2004<br>2005 |
| CISPR 16-2-3 | 2006 | Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-3: Methods of measurement of disturbances and immunity - Radiated disturbance measurements | EN 55016-2-3 | 2006 |

[8)] EN 55016-1-4 is superseded by EN 55016-1-4:2007, which is based on CISPR 16-1-4:2007.

# CONTENTS

# 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 (PLCs) 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 (light industrial, commercial, residential), then the specific requirements, standards and installation practices for those other environments should 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 equipment 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. Refer to IEC 60364-1 or applicable national/local regulations for electrical installation and guidelines.

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.

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 standard 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 14);

f) test methods and procedures that are to be used for the verification of compliance of PLCs and their associated peripherals with the requirements (Clauses 6, 9 and 12).

g) safety routine tests for PLCs and their peripherals (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 standard is indicated without qualification, compliance with all clauses, including all tests and verifications required in this standard, should be verified. Moreover, the manufacturer's obligations expressed in this standard 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 standard 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 standard for compliance purposes should be a clause, such as Clauses 5, 8 or 11.

Compliance with a portion of this standard is provided to facilitate efforts with respect to particular conformity assessment requirements (for example, Clause 8, 9 and 10 as the compliance requirements for the EU electromagnetic compatibility directive or Clause 11, 12, 13 and 14 as the compliance requirements for the EU low-voltage directive).

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

All requirements not tested according to the clauses on tests and verifications should 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 standard.

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 standard and therefore that they comply with all requirements of this standard.

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 standard.

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 dips (i.e. PS1 or PS2) and types of digital inputs (i.e. Type 1 or Type 3).

### 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 60060-1:1992, *High-voltage test techniques – Part 1: General definitions and test requirements*