



SLOVENSKI STANDARD

oSIST prEN IEC 62314:2020

01-november-2020

Polprevodniški releji

Solid-state relays

Halbleiterrelais

Relais statiques

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Ta slovenski standard je istoveten z: prEN IEC 62314:2020

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94/480/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

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IEC TC 94 : ALL-OR-NOTHING ELECTRICAL RELAYS	
SECRETARIAT: Austria	SECRETARY: Mr Bernhard Spalt
OF INTEREST TO THE FOLLOWING COMMITTEES:	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 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	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING
<p>Attention IEC-CENELEC parallel voting</p> <p>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.</p> <p>The CENELEC members are invited to vote through the CENELEC online voting system.</p>	

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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:

Solid-state relays

PROPOSED STABILITY DATE: 2023

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SOLID-STATE RELAYS

FOREWORD

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International Standard IEC 62314 has been prepared by technical committee 94: All-or-nothing electrical relays.

This second edition cancels and replaces the first edition published in 2006. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) addition of load category LC N, LC O and LC P for DC load;
- b) addition of load category LC G for self-ballasted lamp load;
- c) addition of "sockets" terminal;
- d) requirement for degree of protection;
- e) update of references.

Secretary note: this list is subject to being updated at the appropriate times in the project workflow and this note will be removed when having reached the FDIS stage.

Secretary note: clauses and/or subclauses which are titled as "Vacant" will be deleted and re-numbered during the next step. The text of this International Standard is based on the following documents:

4CD	CC
94/470/CD	94/473/CC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2. The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific document. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

The National Committees are requested to note that for this document the stability date is 20XX.

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THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

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SOLID-STATE RELAYS

1 Scope

This International Standard applies to particular all-or-nothing electrical relays denominated solid-state relays intended for performing electrical operations by single step function changes to the state of electric circuits between the OFF-state and the ON-state and vice versa.

This document deals with solid-state relays which are intended for incorporation in other products or equipment. As such, solid-state relays are considered to be components and this document defines the basic safety-related and functional requirements for solid-state relays as stand-alone components.

Such solid-state relays are incorporated in products or equipment which themselves have to comply with the relevant product and/or application standard(s) to meet their intended application. The following are examples of such applications:

- general industrial equipment;
- electrical facilities;
- electrical machines;
- electrical appliances;
- office communications;
- building automation and environmental control;
- automation and process control;
- electrical installation engineering;
- medical engineering;
- telecommunications;
- vehicle engineering;
- transportation engineering;
- lighting control.

Where the component is intended to be incorporated into the equipment by the final user without EMC knowledge, an assessment for EMC compliance is available. There are no EMC requirements for solid state relays intended for incorporation into the equipment by the equipment manufacturer, because the performance strongly depends on the application into the equipment.

Solid-state switching devices with monolithic structures fall within the scope of IEC subcommittee 47E and are not covered in this document.

Semiconductor controllers and contactors fall within the scope of the IEC 60947 series of standards – *Low-voltage switchgear and controlgear* – developed by IEC subcommittee 121A and are not covered in this document.

Compliance with the requirements of this document is verified by the type tests and routine tests indicated.

The object of this document is to state:

- the characteristics of solid-state relays;
- the requirements which solid-state relays shall comply with reference to
 - a) their operation and behaviour;

- b) their dielectric properties;
- the tests verifying that the requirements have been met, and the test methods to be adopted;
 - the information to be given with the solid-state relay or in the manufacturer's documentation.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60038:2009, *IEC standard voltages*

IEC 60050-444:2002, *International Electrotechnical Vocabulary (IEV) – Part 444: Elementary relays*

IEC 60068-2-1:2007, *Environmental testing – Part 2: Tests. Tests A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2: Tests. Tests B: Dry heat*

IEC 60068-2-14:2009, *Environmental testing – Part 2: Tests. Test N: Change of temperature*

IEC 60068-2-20:2008, *Environmental testing – Part 2: Tests. Test T: Soldering*

IEC 60068-2-78:2012, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60112:2003/AMD1:2009, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

Secretary note : IEC 60664-1:2020 is under confirming.

IEC 60664-3:2016, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60669-1:2017, *Switches for household and similar fixed-electrical installations – Part 1: General requirements*

IEC 60695-2-10:2013, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60747-5-5:2007, *Semiconductor devices - Discrete devices – Part 5-5: Optoelectronic devices - Photocouplers*

IEC 60999-1:1999, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm² (included)*

IEC 61000-4 (all parts), *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques*

240 IEC 61210:2010, *Connecting devices – Flat quick-connect terminations for electrical copper*
 241 *conductors – Safety requirements*

242 IEC 61760-1:2006, *Surface mounting technology – Part 1: Standard method for the*
 243 *specification of surface mounting components (SMDs)*

244 IEC 61810-1:2015, *Electromechanical elementary relays – Part 1: General and safety*
 245 *requirements*

246 IEC 61984:2008, *Connectors – Safety requirements and tests*

247 IEC 62368-1:2018, *Audio/video, information and communication technology equipment – Part 1:*
 248 *Safety requirements*

249 IEC TS 62993:2018, *Guidance for determination of clearances, creepage distances and*
 250 *requirements for solid insulation for equipment with a rated voltage above 1 000 V AC and 1*
 251 *500 V DC, and up to 2 000 V AC and 3 000 V DC*

252 CISPR 11:2015+AMD1:2016+AMD2:2019, *Industrial, scientific and medical equipment – Radio-*
 253 *frequency disturbance characteristics – Limits and methods of measurement*
 254 *Amendment 1 (2010)*

255 CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission*
 256 *requirements*

257 **Secretary note: all normative references will be checked and updated in a later stage.**

258 **3 Terms and definitions**

259 For the purposes of this document, the terms and definitions given in IEC 60050-444 and the
 260 following apply.

261 **3.1 Terms and definitions related to relays**

262 **3.1.1**

263 **electrical relay**

264 device designed to produce sudden and predetermined changes in one or more output circuits
 265 when certain conditions are fulfilled in the electrical input circuits controlling the device

266 [SOURCE: IEC 60050-444:2002, 444-01-01]

267 **3.1.2**

268 **solid-state relay**

269 electrical relay in which the intended response is produced by electronic, magnetic, optical or
 270 other components without mechanical motion

271 [SOURCE: IEC 60050-444:2002, 444-01-06]

272 **3.1.3**

273 **rated operational voltage**

274 U_e

275 value of voltage which determines the application of the solid-state relay and to which the
 276 relevant tests and the load categories are referred

3.1.4**rated insulation voltage** U_i

value of voltage to which dielectric tests and creepage distances are referred

3.1.5**rated impulse withstand voltage** U_{imp}

peak value of an impulse voltage of prescribed form and polarity which the solid-state relay is capable of withstanding without failure under specified conditions of test and to which the values of the clearances are referred

3.1.6**ON-state**

specified condition of the solid-state relay when the output semiconductor is in the conducting state

3.1.7**OFF-state**

specified condition of the solid-state relay when the output semiconductor is in the isolating (non-conducting) state

3.1.8**normally open element**

switching element which is in ON-state condition when the solid-state relay is in its operate condition and which is in OFF-state condition when the solid-state relay is in its release condition

3.1.9**normally closed element**

switching element which is in OFF-state condition when the solid-state relay is in its operate condition and which is in ON-state condition when the solid-state relay is in its release condition

3.1.10**rated operational current** I_e

normal operating current when the solid-state relay is in the ON-state and takes into account the rated frequency (see 5.1), the load category (see 5.2) and the overload characteristics at 40 °C ambient temperature unless otherwise specified

3.1.11**rated uninterrupted current** I_u

value of current, stated by the manufacturer, which the solid-state relay can carry in uninterrupted duty

3.1.12**rated frequency**

supply frequency for which a solid-state relay is designed and to which the other characteristic values correspond

Note 1 to entry: The same solid-state relay may be assigned a number or a range of rated frequencies or be rated for both AC and DC

3.1.13**overload current profile**

gives the current/time coordinates for the controlled overload current

3.1.14**operating capability**

represents the combined capabilities of

– establishing and sustaining the ON-state and current carrying, and

– establishing and sustaining the OFF-state (blocking),

at maximum rated operational voltage under specified load and overload conditions in accordance with load category, overload current profile and specified duty cycles

3.1.15**rated conditional short-circuit current**

value of prospective current, stated by the manufacturer, which the solid-state relay, protected by a short-circuit protective device specified by the manufacturer, can withstand satisfactorily for the operating time of this device under the test conditions specified in the relevant product standard

3.1.16**leakage current**

I_l

maximum current (peak or RMS value for AC), stated by the manufacturer, flows through the output circuit in OFF-state condition

3.1.17**ON-state voltage drop**

U_d

maximum voltage (peak or RMS value for AC), stated by the manufacturer, between output terminals in the ON-state condition

3.1.18**ON-state resistance**

R_{on}

maximum value of resistance, stated by the manufacturer, between output terminals in the ON-state condition

3.1.19**power consumption**

P_s

value of total power consumed of the control circuit and/or the supply circuit, if any

3.1.20**rated control circuit voltage**

U_c

rated value of the control signal voltage

3.1.21**rated control circuit current**

I_c

rated value of the control circuit current

3.1.22**rated control circuit supply voltage**

U_s

rated value of the supply circuit voltage

3.1.23**operate**

change from the OFF-state condition to the ON-state condition

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3.1.24**release**

change from the ON-state condition to the OFF-state condition

3.1.25**release voltage**

value of the control signal voltage at which a solid-state relay switched off; the term “switch-off voltage” was used in previous edition

3.1.26**operate voltage**

value of the control signal voltage at which a solid-state relay switched on; the term “switch-on voltage” was used in previous edition

3.1.27**release current**

value of the control signal current at which a solid-state relay switched off; the term “switch-off current” is used as the same meaning

3.1.28**operate current**

value of the control signal current at which a solid-state relay switched on; the term “switch-on current” is used as the same meaning

3.1.29**marking**

identification of a solid-state relay which, when completely given to the manufacturer of this solid-state relay, allows the unambiguous indication of its electrical, dimensional and functional parameters

3.1.30**existing design**

design which was already approved by the preceding Edition of this document

3.1.31**type test**

test of one or more devices made to a certain design to show that the design meets certain specifications

3.1.32**routine test**

test to which each individual device is subjected during and/or after manufacture to ascertain whether it complies with certain criteria

3.1.33**sampling test**

test on a number of devices taken at random from a batch

3.1.34**ambient temperature**

temperature(s) prescribed for the air surrounding the solid-state relay under certain conditions, when the solid-state relay is mounted as indicated by the manufacturer

3.1.35**rated value**

value of a quantity used for specification purposes, established for a specific set of operating conditions

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[SOURCE: IEC 60050-444:2002, 444-02-18, modified – modification of the definition]

3.1.36

test value

value of a quantity for which the solid-state relay shall comply with a specified action during a test

3.2 Terms and definitions related to insulation coordination (see clause 11)

3.2.1

conductive part

part which is capable of conducting electric current, although it may not necessarily be used for this purpose

3.2.2

live part

conductor or conductive part intended to be energized in normal operation, including a neutral conductor, but by convention not a PEN conductor

Note 1 to entry: A PEN conductor combines the functions of both a protective earthing conductor and a neutral conductor.

[SOURCE: IEC 60050-195:1998, 195-02-19, modified – modification of the definition]

3.2.3

clearance

shortest distance in air between two conductive parts

[SOURCE: IEC 60664-1:2007, 3.2]

3.2.4

creepage distance

shortest distance along the surface of the insulating material between two conductive parts

[SOURCE: IEC 60664-1:2007, 3.3, modified – modification of the definition]

3.2.5

functional insulation

insulation between conductive parts which is necessary only for the proper functioning of the equipment

[SOURCE: IEC 60664-1:2007, 3.17.1]

3.2.6

solid insulation

solid insulating material interposed between two conductive parts

[SOURCE: IEC 60664-1:2007, 3.4]

3.2.7

basic insulation

insulation of hazardous-live-parts which provides basic protection against electric shock

Note 1 to entry: Basic insulation does not necessarily include insulation used exclusively for functional purposes.

[SOURCE: IEC 60664-1:2007, 3.17.2, modified – modification of the definition]

3.2.8**supplementary insulation**

independent insulation applied in addition to basic insulation, in order to provide protection against electric shock in the event of a failure of basic insulation

[SOURCE: IEC 60664-1:2007, 3.17.3, modified – modification of the definition]

3.2.9**double insulation**

insulation comprising both basic insulation and supplementary insulation

[SOURCE: IEC 60664-1, 3.17.4]

3.2.10**reinforced insulation**

insulation of hazardous-live-parts which provides a degree of protection against electric shock equivalent to double insulation

Note 1 to entry: Reinforced insulation may comprise several layers which cannot be tested singly as basic or supplementary insulation.

[SOURCE: IEC 60664-1:2007, 3.17.5]

3.2.11**overvoltage**

any voltage having a peak value exceeding the corresponding peak value of maximum steady-state voltage at normal operating conditions

[SOURCE: IEC 60664-1:2007, 3.7] oSIST prEN IEC 62314:2020

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3.2.12**overvoltage category**

numeral defining a transient overvoltage condition

Note 1 to entry: Overvoltage categories I, II, III and IV are used, see 4.3.3.2 of IEC 60664-1.

[SOURCE: IEC 60664-1:2007, 3.10]

3.2.13**pollution**

any addition of foreign matter, solid, liquid or gaseous that can result in a reduction of electric strength or surface resistivity of the insulation

[SOURCE: IEC 60664-1:2007, 3.11]

3.2.14**micro-environment**

immediate environment of the insulation which particularly influences the dimensioning of the creepage distances

[SOURCE: IEC 60664-1:2007, 3.12.2]

3.2.15**macro-environment**

environment of the room or other location in which the equipment is installed or used

[SOURCE: IEC 60664-1:2007, 3.12.1]