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Koordinacija električnih naprav

Electrical devices coordination

Koordinierung elektrischer Einrichtungen

Coordination des dispositifs électriques

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Coordination des dispositifs électriques

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This draft Harmonization Document is submitted to CENELEC members for CENELEC enquiry.
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It has been drawn up by CENELEC TC 64.

If this draft becomes a Harmonization Document, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document on a national level.

This draft Harmonization Document was established by CENELEC in three official versions (English, French, German).

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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CENELEC

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

This document (prHD 50573-5-57:2012) has been prepared by CLC /TC64 "Electrical installations and protection against electric shock".

This document is currently submitted to the second Enquiry.

During the design of an electrical installation, HD 60364 applies.

In an electrical installation, each device is required to comply with its relevant product standard according to clause 133.1 of HD 60364-1:2008 and to clause 511 of HD 60364-5-51:2009.

It is also recognised that in an electrical installation, the combination of various device shall be selected carefully so as not to impair safety. In case of a fault, the combination of several protective devices (circuit-breakers, fuses, residual current devices…) may also affect the continuity of supply of the installation if the upstream devices open, whereas the fault could be cleared by the downstream device.

This standard is intended to bring complementary rules to part 5 of HD 60364 for selection and erection of electrical equipment, and cover aspects of coordination.

570 Coordination of electrical equipment for protection, isolation, switching and control

570.1 Scope

This European Standard specifies the rules for the selection and erection of electrical equipments for protection, isolation, switching and control (hereafter referred to as electrical devices and assemblies) with respect to coordination.

This European Standard applies to electrical installations as detailed in HD 60364-1 clause 11.1.

This European Standard is intended to provide requirements for the safety of humans, livestock and property against danger and damage which may arise in the reasonable use of electrical installations and to specify rules for the proper functioning of those installations. The rules also cover aspects of continuity of supply of the installation.

This part covers coordination in the case of a fault condition (e.g. short circuit, overload, residual currents) and also takes into consideration aspects of HD 60364-1 clause 33.1 relevant to the coordination of electrical devices as follows :

- overcurrent protective device (OCPD);
- control and protective switching device (CPS);
- residual current device (RCD);
- contactor and starter;
- switch and disconnector.

NOTE 1 Coordination of monitoring devices is under consideration.

NOTE 2 Reference to the meaning of the acronyms used in this document may be found in Table 57.1.

This European Standard does not provide requirements for the selection of an electrical device alone, but provides requirements for the selection of electrical devices to ensure electrical coordination between them.

570.2 Normative references

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

EN 60269 series, *Low-voltage fuses*

HD 60364-1:2008, *Low-voltage electrical installations – Part 1: Fundamental principles, assessment of general characteristics, definitions (IEC 60364-1:2005, mod.)*

HD 60364-4-43:2010, *Low-voltage electrical installations – Part 4-43: Protection for safety – Protection against overcurrent (IEC 60364-4-43:2008 + corrigendum Oct. 2008)*

HD 60364-5-51:2009, *Electrical installations of buildings – Part 5-51: Selection and erection of electrical equipment – Common rules (IEC 60364-5-51:2005, mod.)*

EN 60669-2-2, *Switches for household and similar fixed electrical installations - Part 2-2: particular requirements - Electromagnetic remote-control switches (RCS)*

EN 60669-2-4, *Switches for household and similar fixed electrical installations - Part 2-4: particular requirements - Isolating switches*

EN 60947-1, Low-voltage switchgear and controlgear – Part 1: General rules

EN 60947-2, Low-voltage switchgear and controlgear – Part 2: Circuit-breakers

EN 60947-3, Low-voltage switchgear and controlgear - Part 3 : switches, disconnectors, switch-disconnectors and fuse-combination units

EN 60947-4-1, Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor starters

EN 60947-6-1, Low-voltage switchgear and controlgear - Part 6-1 : multiple function equipment - Transfer Switching Equipment

EN 60947-6-2, Low-voltage switchgear and controlgear - Part 6-2 : multiple function equipment - Control and protective switching devices (or equipment) (CPS)

EN 60898-1, Electrical accessories – Circuit breakers for overcurrent protection for household and similar installations – Part 1: Circuit-breakers for a.c. operation

EN 60898-2, Electrical accessories – Circuit-breakers for overcurrent protection for household and similar installations – Part 2: Circuit-breakers for a.c. and d.c. operation

EN 61008-1, Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) – Part 1: General rules

EN 61008-2-1, Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's). Part 2-1 : applicability of the general rules to rccb'S functionally independent of line

EN 61009-1, Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) – Part 1: General rules

EN 61009-2-1, Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's). Part 2-1 : applicability of the general rules to rcbo'S functionally independent of line the voltage

EN 61095, Electromechanical contactors for household and similar purposes

EN 62423, Type B residual current operated circuit-breakers with and without integral overcurrent protection for household and similar uses (Type B RCCBs and Type B RCBOs)

IEC 60050-151, International Electrotechnical Vocabulary – Part 151: Electrical and magnetic devices

IEC 60050-441, International Electrotechnical Vocabulary – Part 441: Switchgear, controlgear and fuses

IEC 60050-442, International Electrotechnical Vocabulary – Part 442: Electrical accessories

IEC 60050-826, International Electrotechnical Vocabulary – Part 826: Electrical installations

570.3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

570.3.1
coordination of electrical equipment
correct way of using electrical devices in series to ensure safety and continuity of service of the installation taking into account short-circuit protection and/or overload protection and/or selectivity

570.3.2
safety of electrical installation
safety of human, livestock and property against danger and damage which may arise in the reasonable use of electrical installations and which is covered by measures for:

- protection against electric shock;
- protection against thermal effects;
- protection against overcurrent;
- protection against fault currents;
- protection against voltage disturbances and measures against o electromagnetic influences;
- protection against power supply interruption where danger or damage is expected.

Note 1 to entry: Continuity of supply may be necessary for certain circuits (e.g. circuits in medical locations, circuits supplying emergency systems).

570.3.3
continuity of service
quality of an installation which is expressed by the extent to which the operation of an electrical system approaches the ideal state of freedom from interruption, or which the operation of electrical system minimizes supply interruption thanks to coordination of electrical devices

570.3.4
back-up protection
over-current coordination of a SCPD in series with another electrical device where the SCPD, generally but not necessarily on the supply side, effects the over-current protection and prevents any excessive stress on the electrical device

Note 1 to entry: Back-up protection does not cover the combined short-circuit protection.

570.3.5
combined short-circuit protection
over-current coordination of two SCPDs in series, resulting in a combined short-circuit current capability higher than one SCPD alone

570.3.6
combined short-circuit capability
maximum short-circuit current which can be handled by two short-circuit protective devices in series

570.3.7
selectivity
coordination of the operating characteristics of two or more protective devices such that, on the incidence of overcurrents or residual currents within stated limits, the device intended to operate within these limits does so, while the other(s) does (do) not

[SOURCE: IEV 441-17-15, modified]

Note 1 to entry: Distinction is made between series selectivity involving different overcurrent protective devices passing substantially the same overcurrent and network selectivity involving identical protective devices passing different proportions of the overcurrent.

570.3.8
total selectivity
selectivity where only the OCPD on the load side will operate up to the maximum prospective short-circuit current at its point of installation

570.3.9
partial selectivity
selectivity where the OCPD on the load side only will operate up to a fault current (the selectivity limit current) less than the maximum prospective short-circuit current at its point of installation

570.3.10
switchgear and assembly
electric equipment intended to be connected to an electric circuit for the purpose of carrying out one or more of the following functions: protection, control, isolation, switching

Modified [826-16-03]

570.3.11
overcurrent protective device (OCPD)
device provided to interrupt an electric circuit in case the conductor current in the electric circuit exceeds a predetermined value for a specified duration.

[SOURCE: IEV 826-14-14]

Note 1 to entry: Table 57.1 provides information regarding the different devices corresponding to the main generic function.

570.3.12
short-circuit protective device (SCPD)
device intended to protect a circuit or parts of a circuit against short-circuit currents by interrupting them

[SOURCE: EN 60947-1]

Note 1 to entry: Table 57.1 provides information regarding the different devices corresponding to the main generic function.

570.3.13
circuit-breaker
mechanical switching device, capable of making, carrying and breaking currents under normal circuit conditions and also making, carrying for a specified time and breaking currents under specified abnormal circuit conditions such as those of short circuit.

[SOURCE: IEV 441-14-20]

Note 1 to entry: Table 57.1 provides information regarding the different devices corresponding to the main generic function.

570.3.14
switch
device for changing the electric connections among its terminals

[SOURCE: IEV 151-12-22]

570.3.15
residual current device (RCD)
mechanical switching device designed to make, carry and break currents under normal service conditions and to cause the opening of the contacts when the residual current attains a given value under specified conditions

Note 1 to entry: A residual current device can be a combination of various separate elements designed to detect and evaluate the residual current and to make and break current.

Note 2 to entry: RCD includes devices such as RCCB, RCBO, CBR and MRCD. Table 57.1 provides information regarding the different devices corresponding to the main generic function.

[SOURCE: IEV 442-05-02, modified]

570.3.16
fuse
device that by the fusing of one or more of its specially designed and proportioned components, opens the circuit in which it is inserted by breaking the current when this exceeds a given value for a sufficient time. The fuse comprises all the parts that form the complete device

[SOURCE: IEV 441-18-01]

570.3.17
contactor
mechanical switching device having only one position of rest, operated otherwise than by hand, capable of making, carrying and breaking currents under normal circuit conditions including operating overload conditions

[SOURCE: IEV 441-14-33]

570.3.18
overload relay
over-current relay or release intended for protection against overloads

[SOURCE: EN 60947-1]

570.3.19
control and protective switching device (CPS)
switching device (or equipment) capable of operation other than by hand, but with or without local manual operating means. A CPS device provides both functions of contactor and OCPD

[SOURCE: EN 60947-6-2 modified]

570.3.20
conditional short-circuit current
prospective current that a circuit or a switching device, protected by a specified short-circuit protective device, can satisfactorily withstand for the total operating time of that device under specified conditions of use and behaviour

[SOURCE: EN 60947-1]

571 Electrical devices considered and function provided

Table 57.1 shows the function provided by the different electrical devices considered in this standard marked “X”.