

**SLOVENSKI STANDARD**  
**oSIST prEN IEC 62020-1:2019**  
**01-januar-2019**

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**Električni pribor - Monitorji preostalega (diferenčnega) toka za gospodinjsko in podobno uporabo**

Electrical accessories - Residual current monitors for household and similar uses (RCMs)

Elektrisches Installationsmaterial - Differenzstrom-Überwachungsgeräte für Hausinstallationen und ähnliche Verwendungen (RCMs)

Petit appareillage électrique - Contrôleurs d'isolement à courant différentiel résiduel (RCM) pour usages domestiques et analogues

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**ICS:**

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Varovalke in druga  
medtokovna zaščita

Fuses and other overcurrent  
protection devices

**oSIST prEN IEC 62020-1:2019**

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# 23E/1081/CDV

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SECRETARIAT: Italy	SECRETARY: Mr Giovanni Cassinelli
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 22, TC 61, TC 64, TC 69, TC 82, TC 88, TC 105, TC 114, TC 117, SC 121A	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 checked="" type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input checked="" type="checkbox"/> SAFETY	
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<p><b>Attention IEC-CENELEC parallel voting</b></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:

**Electrical accessories - Residual current monitors for household and similar uses (RCMs)**

PROPOSED STABILITY DATE: 2022

NOTE FROM TC/SC OFFICERS:

This document is the revision of IEC 62020, but, according to the decision agreed with SC121A (See 23E/1070/INF), has been renumbered IEC 62020-1 (see also documents 23E/1071/Q and 23E/1078/RQ).

Therefore the new IEC 62020-1 when published will replace IEC 62020: 1998 + AMD 1: 2003.

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

# **ELECTRICAL ACCESSORIES – RESIDUAL CURRENT MONITORS FOR HOUSEHOLD AND SIMILAR USES (RCMs)**

## FOREWORD

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International Standard IEC 62020 has been prepared by subcommittee 23E: Circuit-breakers and similar equipment for household use, of IEC technical committee 23: Electrical accessories.

The text of this standard is based on the following documents:

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

Full information on the voting for the approval of this 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.

This edition constitutes a technical revision.

319 The main changes with respect to the previous edition are as follows:

- 320 – definition of Type F and Type B RCM;
- 321 – marking of Type F and Type B RCM;
- 322 – introduction of subclause 8.20 - Response to temporary overvoltages on the LV-side due to  
323 fault conditions on the HV-side;
- 324 – modification of subclause 9.7 – Test of dielectric properties;
- 325 – update of subclause 9.9 - Verification of the operating characteristics;
- 326 – modification of subclause 9.14 - Test of resistance to abnormal heat and to fire;
- 327 – modification of subclause 9.19 - Additional verification of the correct operation at residual  
328 currents with DC components, for introduction of the relevant test for Type F and Type B  
329 RCM.

330 The committee has decided that the contents of this publication will remain unchanged until the  
331 stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to  
332 the specific publication. At this date, the publication will be

- 333 • reconfirmed;
- 334 • withdrawn;
- 335 • replaced by a revised edition, or
- 336 • amended.

337

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# **ELECTRICAL ACCESSORIES – RESIDUAL CURRENT MONITORS FOR HOUSEHOLD AND SIMILAR USES (RCMs)**

## **Introduction**

The purpose of a residual current monitor (hereinafter referred to as RCM) is to monitor an electrical installation or circuit for the presence of an unbalanced earth fault current and to indicate, by means of an alarm, the presence of such a residual current when it exceeds a predetermined level.

An RCM may be used in conjunction with protective devices (see IEC 60364-4).

Installation and application rules are given in IEC 60364 (all parts).

## **1 Scope**

This document applies to residual current monitors having rated voltages not exceeding 440 V AC and rated currents not exceeding 125 A for household and similar purposes.

RCMs are intended to monitor the residual current of the installation and to give a warning if the residual current between a live part and an exposed conductive part or earth exceeds a predetermined level.

RCMs covered by this standard are not intended to be used as protective devices.

RCMs detect residual currents that may circulate in an AC circuit (e.g. residual alternating current, residual pulsating direct current, residual smooth direct current), whether suddenly applied or slowly rising.

NOTE 1 RCM for DC systems are under consideration.

This document applies to monitors performing simultaneously the functions of detection of the residual current, of comparison of the value of this current with the residual operating current of the device and providing the prescribed warning signal(s) when the residual current exceeds this value.

RCMs having internal batteries are not covered by this document.

The requirements of this document apply for normal environmental conditions (see 7.1). Additional requirements may be necessary for RCMs used in locations having severe environmental conditions.

This document does not cover Insulation Monitoring Devices (IMDs) which are covered by the scope of IEC 61557-8.

NOTE 2 An RCM is distinguished from an IMD in that it is passive in its monitoring function and only responds to an unbalanced fault current in the installation being monitored. An IMD is active in its monitoring and measuring functions in that it can measure the balanced and unbalanced insulation resistance or impedance in the installation (see IEC 61557-8).

## **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.

- 383 IEC 60038:2009, *IEC standard voltages*
- 384 IEC 60051(all parts), *Direct acting indicating analogue electrical measuring instruments and*  
385 *their accessories*
- 386 IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic*  
387 *(12 + 12-hour cycle)*
- 388 IEC 60068-3-4:2001, *Environmental testing - Part 3-4: Supporting documentation and guidance*  
389 *- Damp heat tests*
- 390 IEC 60364 (all parts), *Low-voltage electrical installations*
- 391 IEC 60479 (all parts), *Effects of current on human beings and livestock*
- 392 IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*  
393 IEC 60529:1989/AMD1:1999  
394 IEC 60529:1989/AMD2:2013
- 395 IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage supply systems –*  
396 *Part 1: Principles, requirements and tests*
- 397 IEC 60664-3:2003, *Insulation coordination for equipment within low-voltage systems – Part 3:*  
398 *Use of coating, potting or moulding for protection against pollution*  
399 IEC 60664-3:2003/AMD1:2010
- 400 IEC 60695-2-10:2013, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods -*  
401 *Glow-wire apparatus and common test procedure*
- 402 IEC 60695-2-11:2014, *Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods -*  
403 *Glow-wire flammability test method for end-products (GWEPT)*  
<https://standards.iteh.ai/catalog/standards/sist/085a3161-0eb6-4a53-a7fe-60d6a8effbbc/ksist-pr-en-iec-62020-1-2020>
- 404 IEC 61000 (all parts), *Electromagnetic compatibility (EMC)*
- 405 IEC 61008-1:2010, *Residual current operated circuit-breakers without integral overcurrent*  
406 *protection for household and similar uses (RCCBs) – Part 1: General rules*  
407 IEC 61008-1:2010/AMD1:2012  
408 IEC 61008-1:2010/AMD2:2013
- 409 IEC 61543:1995, *Residual current-operated protective devices (RCDs) for household and*  
410 *similar use – Electromagnetic compatibility*  
411 IEC 61543:1995/AMD1:2004  
412 IEC 61543:1995/AMD2:2005
- 413 IEC 61557-8:2014, *Electrical safety in low-voltage distribution systems up to 1 000 V a.c. and*  
414 *1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 8:*  
415 *Insulation monitoring devices for IT systems*
- 416 CISPR 14-1:2016, *Electromagnetic compatibility – Requirements for household appliances,*  
417 *electric tools and similar apparatus – Part 1: Emission*
- 418 ISO/IEC Guide 2:2004, *Standardization and related activities -- General vocabulary*

### 419 **3 Terms and definitions**

420 For the purpose of this document, the following definitions apply.

421 ISO and IEC maintain terminological databases for use in standardization at the following  
422 addresses:

423 • ISO Online browsing platform: available at <https://www.iso.org/obp>

424 • IEC Electropedia: available at <http://www.electropedia.org/>

425 Where the terms "voltage" or "current" are used, they imply RMS values, unless otherwise  
426 specified.

### 427 **3.1 Definitions relating to currents flowing from live parts to earth**

#### 428 **3.1.1**

##### 429 **earth fault current**

430 current flowing to earth due to an insulation fault

#### 431 **3.1.2**

##### 432 **earth leakage current**

433 current flowing from the live parts of the installation to earth in the absence of an insulation  
434 fault

#### 435 **3.1.3**

##### 436 **pulsating direct current**

437 current of pulsating wave form which assumes, in each period of the rated power frequency,  
438 the value 0 or a value not exceeding 0,006 A DC during one single interval of time, expressed  
439 in angular measure, of at least 150°

#### 440 **3.1.4**

##### 441 **current delay angle**

442  $\alpha$

443 time, expressed in angular measure, by which the starting instant of current conduction is  
444 delayed by phase control

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ISO 15115-1:2019-01-01  
standards.itech.ai/catalog/standards/sist/085a3f61-0eb6-4a53-a7fe-60d6a8effbbc/ksist-fpren-iec-62020-1-2020

### 445 **3.2 Definitions relating to the energization of an RCM**

#### 446 **3.2.1**

##### 447 **energizing quantity**

448 electrical excitation quantity which alone, or in combination with other such quantities, shall be  
449 applied to an RCM to enable it to accomplish its function under specified conditions

#### 450 **3.2.2**

##### 451 **energizing input-quantity**

452 energizing quantity by which the RCM is activated when it is applied under specified conditions

453 These conditions may involve, for example, the energizing of certain auxiliary elements.

#### 454 **3.2.3**

##### 455 **residual current**

456  $I_{\Delta}$

457 vector sum of the instantaneous values of the current flowing in the main circuit of the RCM  
458 (expressed as RMS value)

#### 459 **3.2.4**

##### 460 **residual operating current**

461  $I_{\Delta n}$

462 value of residual current which causes the RCM to operate under specified conditions

**3.2.5****residual non-operating current** $I_{\Delta no}$ 

value of residual current at which and below which the RCM does not operate under specified conditions

### **3.3 Definitions relating to the operation and to the functions of residual current monitors**

**3.3.1****residual current monitor (RCM)**

device or association of devices which monitors the residual current in an electrical installation, and which activates an alarm when the residual current exceeds the operating value of the device

**3.3.2****RCMs functionally independent of line voltage**

RCMs for which the functions of detection, evaluation and actuation do not depend on the line voltage

**3.3.3****RCMs functionally dependent on line voltage**

RCMs for which the functions of detection, evaluation or actuation depend on the line voltage

Note 1 to entry: It is understood that the line voltage is applied to RCMs for detection, evaluation or actuation.

**3.3.4****limiting non-actuating time**

maximum delay during which a value of residual current higher than the residual operating current can be applied to the RCM without causing it to operate

**3.3.5****time-delay RCM**

RCM specially designed to attain a predetermined value of limiting non-actuating time, corresponding to a given value of residual current

**3.3.6****main circuit (of an RCM)**

all the conductive parts of an RCM included in the current paths (see 4.3)

**3.3.7****control and auxiliary circuit (of an RCM)**

all the conductive parts of an RCM intended to be included in a circuit other than the main circuit of the RCM

Note 1 to entry: The circuits intended for the test device are included in this definition.

**3.3.8****RCM Type A**

RCM for which monitoring is ensured for

- residual sinusoidal alternating currents;
- residual pulsating direct currents;
- residual pulsating direct currents superimposed on a smooth direct current of 0,006 A, with or without phase-angle control, independent of polarity, whether suddenly applied or slowly rising

**3.3.9****test device**

device incorporated in the RCM simulating the residual current conditions for the operation of the RCM under specified conditions