



**SLOVENSKI STANDARD**  
**oSIST prEN IEC 62246-4:2022**  
**01-april-2022**

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**Stikala reed - 4. del: Uporaba v povezavi z magnetnim prožilnikom za magnetno občutljive naprave**

Reed switches - Part 4: Application in conjunction with Magnetic Actuator used for Magnetic Sensing Devices

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**Ta slovenski standard je istoveten z: prEN IEC 62246-4:2022**

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94/631/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: <b>IEC 62246-4 ED1</b>	
DATE OF CIRCULATION: <b>2022-02-04</b>	CLOSING DATE FOR VOTING: <b>2022-04-29</b>
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IEC TC 94 : ALL-OR-NOTHING ELECTRICAL RELAYS	
SECRETARIAT: Austria	SECRETARY: Mr Bernhard Spalt
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 9,TC 13,TC 17,SC 17A,TC 18,TC 44,TC 61,TC 62,TC 64,TC 65,TC 69,TC 77,TC 80,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 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><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:

**Reed switches – Part 4: Application in conjunction with Magnetic Actuator used for Magnetic Sensing Devices**

PROPOSED STABILITY DATE: 2024

NOTE FROM TC/SC OFFICERS:

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## REED SWITCHES –

**Part 4: Application in conjunction with Magnetic Actuator  
used for Magnetic Sensing Devices**

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The International Standard of the IEC 62246-4 has been prepared by IEC technical committee 94: All-or-nothing electrical relays.

This document is a **CDV** based on the observations of **CC files on 94\_535\_CD**. The **red** text has changed from the document of **94\_535\_CD**.

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

4CD	CC
94/535CD	94/623/CC

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of IEC 62246 series, published under the general title *Reed switches* can be found on the IEC website.

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

- 261 • reconfirmed,  
262 • withdrawn,  
263 • replaced by a revised edition, or  
264 • amended.

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

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## INTRODUCTION

268 Reed switches are used as sensing devices in a variety of industrial applications (e.g. safety of  
269 machinery, alarm detectors, factory automation, pneumatics and hydraulics, railways,  
270 automotive, utilities, healthcare, consumer electronics and appliances, lifts, etc.

271 The intention of this document is:

272 1. To define the functions, types, characteristics, product information etc. for magnetic  
273 sensing devices:

274 – recommended response speed and frequency operating cycles are determined as  
275 rated values.

276 2. To specify the test and measurement procedures for magnetic sensing devices:

277 – response speed and operating time of load are determined when used as trip function  
278 or presence sensing function according to the relevant standards.

279 3. To specify the additional tests for magnetic sensing devices used for specific product  
280 standards.

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## REED SWITCHES –

### Part 4: Application in conjunction with Magnetic Actuator used for Magnetic Sensing Devices

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#### 1 Scope

289 This document gives additional requirements on reed switching components and gives guidance  
290 for their implementation in selected applications.

291 This part of IEC 62246 applies tests and measurement procedures for the application of reed  
292 switch (contact) based magnetic sensors.

293 **This document can be used in conjunction with specific product standards (e.g., IEC 60947-5-  
294 1:2016) applying reed switching with magnetic actuation.**

295 In case the application of a reed contact magnetic sensor determines additional requirements  
296 exceeding those specified in this standard, the sensor should be evaluated with this application  
297 in accordance with the relevant IEC/ISO standard(s) (e.g., IEC 62061 or ISO 13849 series,  
298 IEC 60335-1 and relevant Parts 2, IEC 60730-1, IEC 61373, ISO 16750, etc.).

299 This document does not apply to:

- 300 – Sensing or monitoring of the position of elements of interlocking devices for movable  
301 guards (see ISO 14119);
- 302 – Sensing or monitoring of the position of elements of pressure sensitive protective  
303 equipment (PSPE, see ISO 13856 series);
- 304 – Electrical equipment for measurement, control, and laboratory use (see IEC 61010-1);
- 305 – Aircraft – proximity switches (see ISO 6859-1).

306 Information contained in this document is relevant to the application of magnetic sensor on new  
307 installations as well as modifications to existing installations.

#### 2 Normative references

309 The following documents are referred to in the text in such a way that some or all of their content  
310 constitutes requirements of this document. For dated references, only the edition cited applies.  
311 For undated references, the latest edition of the referenced document (including any  
312 amendments) applies.

313 IEC 60068 (all parts), *Environmental testing*

314 IEC 60079-0: 2017, *Explosive atmospheres – Part 0: Equipment – General requirements*

315 IEC 60079-1:2014, *Explosive atmospheres – Part 1: Equipment protection by flameproof  
316 enclosure “d”*

317 IEC 60079-10-1: 2020, *Explosive atmospheres – Part 10-1: Classification of areas – Explosive  
318 gas atmosphere*

319 IEC 60079-11: 2011, *Explosive atmospheres – Part 11: Equipment protection by intrinsic safety  
320 “i”*

321 IEC 60079-15: 2017, *Explosive atmospheres – Part 15: Equipment protection by type of “n”*

322 IEC 60079-18: 2014 + AMD1:2017, *Explosive atmospheres – Part 18: Equipment protection by  
323 encapsulation “m”*

- 324 IEC 60417:2002, *Graphical symbols for use on equipment (available at <http://www.grapical-symbols.info/equipment>)*
- 325
- 326 IEC 60529:1989 + AMD1:1999 + AMD2:2013, *Degree of protection provided by enclosure (IP code)*
- 327
- 328 IEC 60695-2-10:2021, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*
- 329
- 330 IEC 60695-2-11:2021, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*
- 331
- 332 IEC 60695-2-12:2021, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*
- 333
- 334 IEC 60695-2-13:2021, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire ignition temperature (GWFI) test method for materials*
- 335
- 336 IEC 60695-10-2:2014, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method*
- 337
- 338 IEC 60721-3-3:2019, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Selection 3: Stationary use at weatherprotected locations*
- 339
- 340
- 341 IEC 61076-2 (all parts), *Connectors for electronic equipment – Product requirements – Part 2: Circular connector*
- 342
- 343 IEC 61373: 2010, *Railway applications – Rolling stock equipment – Shock and vibration tests*
- 344 IEC 61810-1:2015 + AMD1:2019, *Electromechanical elementary relays – Part 1: General and safety requirements*
- 345
- 346 IEC 61810-7:2006, *Electromechanical elementary relays – Part 7: Test and measurement procedures*
- 347
- 348 IEC 62246-1:2015, *Reed switches – Part 1: Generic specification*
- 349 ISO 16750-3:2012, *Road vehicles – Environmental conditions and testing for electrical and electronic equipment – Part 3: Mechanical loads*
- 350
- 351 ISO/IEC 80079-20-1: 2017, *Explosive atmospheres – Part 20-1: Material characteristics for gas and vapour classification – Test method and data*
- 352

### 353 **3 Terms and definitions**

354 For the purposes of this document, the terms and definitions given in IEC 62246 (all), and the following apply.

355

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

357

- 358 • IEC Electropedia: available at <http://www.electropedia.org/>
- 359 • ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 360 **3.1 Definitions of a MSD (magnetic-sensing device)**

##### 361 **3.1.1**

##### 362 **Magnetic-Sensing Device (MSD)**

363 assembly of devices and/or components working together for protective tripping or presence sensing purposes and comprising as a minimum of

364

- 365 – reed contact magnetic sensor;
- 366 – output signal switching device.

367 Note 1 to entry: Output switching device may be reed switch.

368 Note 2 to entry: A description of the elements is given in sub-clause 3.2, the one of the external connections in sub-  
369 clause 3.3 and the one of the operation in sub-clause 3.4.

370 Note 3 to entry: Explanations regarding reed contact magnetic sensor are given in Annex A.

371 Note 4 to entry: Explanations regarding operation of reed contact magnetic sensor are given in Annex B.

372 Note 5 to entry: Proximity switches and electromagnetic switches according to IEC 60947-5-1, IEC 60947-5-2 and  
373 IEC 60947-5-3 are not Magnetic Sensing Devices.

374 Note 6 to entry: In safety related applications magnetic sensing devices can be used with safety monitoring device.

### 375 3.1.2

#### 376 reed contact magnetic sensor

377 electromechanical control circuit device without external power supply, operated by the  
378 presence of a magnetic-actuator or magnetic float actuator or ferromagnetic plate without  
379 contact and consisting of a reed contact-based sensor and a magnetic-actuator

### 380 3.1.3

#### 381 reed contact magnetic sensor with magnetic actuator set, <separate type>

382 reed contact-based magnetic sensor operated by the external presence of magnetic actuator  
383 where the sensor and the magnetic-actuator housing are separated

384 Note 1 to entry: The sensor may include one or more reed contacts.

385 Note 2 to entry: The sensor is operated when the magnetic actuator is within operating range. See C.2 for separate  
386 type.

### 387 3.1.4

#### 388 reed contact magnetic sensor with magnetic actuator set, <latching type>

389 reed contact-based magnetic sensor operated by the external presence of magnetic actuator  
390 and maintained by the built-in bias magnet where the sensor and the magnetic-actuator housing  
391 are separated

392 Note 1 to entry: The sensor may include one or more reed contacts.

393 Note 2 to entry: The sensor is maintained when the magnetic actuator exceeds operating range. See C.3 for latching  
394 type.

### 395 3.1.5

#### 396 reed contact magnetic sensor with magnetic actuator set, <fork type>

397 reed contact(s)-based magnetic sensor operated by the external presence of ferromagnetic plate  
398 where the sensor and the magnetic-actuator are mounted in the same housing

399 Note 1 to entry: The sensor may include one or more reed contacts.

400 Note 2 to entry: The sensor is operated when the ferromagnetic plate is placed between the reed switch and the magnetic  
401 actuator. See C.4 for fork type.

### 402 3.1.6

#### 403 reed contact magnetic sensor with magnetic actuator set, <plunger type>

404 reed contact(s)-based magnetic sensor operated by the internal presence of magnetic-  
405 actuator(s) separately mounted in a plunger element

406 Note 1 to entry: The sensor is operated when the plunger element reaches a predetermined range of positions by  
407 the actuator. See C.5 for plunger type.

### 408 3.1.7

#### 409 reed contact magnetic sensor with magnetic actuator set, <float type>

410 reed contact(s)-based magnetic sensor operated by the external presence of magnetic float  
411 actuator(s) separately mounted in a floating element

412 Note 1 to entry: The sensor is operated when the floating element reaches a given position range determined by the  
413 level of the liquid where the actuator floats. See C.6 for float type.

## 414 3.2 Elements of a MSD

### 415 3.2.1

#### 416 switching element, <reed-contact>

417 reed switch <reed-contact> that is driven magnetically and switches the current of electric circuit

### 418 3.2.2

#### 419 magnetic-actuator

420 polarized permanent magnet used to operate the magnetic sensing device

421 Note 1 to entry: Manufacturer advised magnetic-actuator for comparative measurement of operating distance and  
422 releasing distance.

### 423 3.2.3

424 **magnetic float actuator, <magnetic float liquid level sensor>**  
425 polarized magnet built in a float for water or other liquid level sensing

### 426 3.2.4

427 **sensing face**  
428 surface intended to be used to detect a magnetic field and activate the output switch

### 429 3.2.5

430 **ferromagnetic plate**  
431 plate for the fork type magnetic sensor to cut off the magnetic field of in-side magnetic-actuator

## 432 3.3 Connections

### 433 3.3.1 external connections

434 output signal(s) from the magnetic sensing device

435 Note 1 to entry: The design is such as the external connections may be extracted directly from the lead wire, terminal,  
436 connector and/or leaded connector.

## 437 3.4 Operation of a MSD

### 438 3.4.1

439 **rated operating distance ( $S_n$ )**  
440 conventional quantity used to designate the operating distance that is given with the advised  
441 actuator by the manufacturer (e.g., part number of value in Tesla)

442 Note 1 in entry: It does not take into account either manufacturing tolerances or variations due to external conditions  
443 such as temperature

### 444 3.4.2

445 **operating distance ( $S_{on}$ )**  
446 distance at which the target approaching the sensing face along the reference axis causes the  
447 output signal to change state of output contacts

448 Note 1 to entry: The target represents the centre of the magnetic field that is most sensitive to the built-in reed  
449 contact(s) and represents the physical position of the magnetic sensor (see Figure C.1.).

### 450 3.4.3

451 **releasing distance ( $S_{off}$ )**  
452 distance at which the target leaving the sensing face along the reference axis causes the output  
453 signal to change state of output contacts

### 454 3.4.4

455 **sensing distance**  
456 operating distance or releasing distance

### 457 3.4.5

458 **differential travel ( $H$ )**  
459 absolute value of the difference between the operating distance and releasing distance

### 460 3.4.6

461 **sensing area**  
462 area of operating or releasing as obtained using a predetermined magnetic actuator

### 463 3.4.7

464 **magnetic interference**  
465 state in which the performance or characteristics of MSD are affected when 2 or more reed  
466 contact magnetic sensors and their magnetic actuators are placed near to each other

### 467 3.4.8

468 **response time, <for output of MSD>**  
469 length of the delay from the instant when an magnetic actuator enters or leaves the sensing  
470 area until a change is completed in the output of a MSD.