



IEC 60335-2-103

Edition 3.0 2015-04

# INTERNATIONAL STANDARD

---

**Household and similar electrical appliances – Safety –  
Part 2-103: Particular requirements for drives for gates, doors and windows**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

---

ICS 13.120; 91.060.50

ISBN 978-2-8322-2590-5

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references .....	9
3 Terms and definitions .....	9
4 General requirement.....	10
5 General conditions for the tests .....	11
6 Classification.....	11
7 Marking and instructions.....	11
8 Protection against access to live parts.....	14
9 Starting of motor-operated appliances .....	14
10 Power input and current.....	14
11 Heating.....	14
12 Void.....	14
13 Leakage current and electric strength at operating temperature.....	14
14 Transient overvoltages .....	14
15 Moisture resistance .....	15
16 Leakage current and electric strength.....	15
17 Overload protection of transformers and associated circuits .....	15
18 Endurance.....	15
19 Abnormal operation .....	15
20 Stability and mechanical hazards.....	16
21 Mechanical strength .....	16
22 Construction .....	16
23 Internal wiring.....	17
24 Components .....	17
25 Supply connection and external flexible cords .....	17
26 Terminals for external conductors.....	18
27 Provision for earthing .....	18
28 Screws and connections .....	18
29 Clearances, creepage distances and solid insulation .....	18
30 Resistance to heat and fire.....	18
31 Resistance to rusting.....	18
32 Radiation, toxicity and similar hazards.....	19
Annexes .....	22
Annex R (normative) Software evaluation .....	23
Annex AA (normative) Drives for powered pedestrian doors used in emergency routes and emergency exits.....	24
Annex BB (normative) Drives for windows.....	26
Annex CC (normative) Drives for pedestrian doors.....	32
Annex DD (normative) Drives for horizontally and vertically moving doors and gates .....	37

Annex EE (normative) Measuring point for protective devices of horizontally moving pedestrian doors .....	44
Annex FF (normative) Reference bodies .....	53
Annex GG (normative) Test method of entrapment protection system of drives for revolving doors .....	55
GG.1 Main closing edge/opposing closing edge – no contact protection .....	55
GG.2 Main closing edge/opposing closing edge – contact protection .....	55
GG.3 Secondary closing edge/floor .....	55
GG.4 Main closing edge/inside wall .....	55
Annex HH (normative) Limitation of impact forces of pedestrian doors .....	56
HH.1 Permissible dynamic forces .....	56
HH.2 Permissible static forces .....	57
HH.3 Impact force measuring equipment .....	57
HH.4 Field impact force measuring equipment .....	58
Annex II (normative) Measuring points for limitation of impact forces of pedestrian doors .....	59
Annex JJ (normative) Low energy movement of pedestrian doors .....	62
JJ.1 Low energy movement .....	62
JJ.1.1 General .....	62
JJ.1.2 Additional requirements for low-energy movement of hinged and swing doorsets .....	62
Annex KK (normative) Speed setting for low energy movement of pedestrian doors .....	63
KK.1 Speed settings for low energy power operated swing doorsets .....	63
KK.2 Speed settings for low energy sliding doorsets .....	63
Annex LL (normative) Safeguarding of swing pedestrian doors .....	65
Bibliography .....	67
Figure 101 – Examples of driven parts .....	20
Figure 102 – Inactive floor areas of pressure-sensitive pads .....	21
Figure CC.1 – Safety distances for opening movement of swing door .....	36
Figure EE.1 – Single-leaf sliding doorset .....	44
Figure EE.2 – Double-leaf sliding doorset .....	44
Figure EE.3 – Single-leaf swing doorset .....	45
Figure EE.4 – Double-leaf swing doorset .....	45
Figure EE.5 – Folding doorset .....	46
Figure EE.6 – Revolving doorset, two leaves .....	48
Figure EE.7 – Revolving doorset, three leaves .....	50
Figure EE.8 – Revolving doorset, four leaves .....	52
Figure FF.1 – Reference bodies .....	54
Figure HH.1 – Force versus time .....	57
Figure II.1 – Single-leaf sliding doorset .....	59
Figure II.2 – Double-leaf sliding doorset .....	59
Figure II.3 – Folding doorset .....	60
Figure II.4 – Revolving doorset, 2-leaf .....	60
Figure II.5 – Revolving doorset, 3-leaf .....	61
Figure II.6 – Revolving doorset, 4-leaf .....	61

Figure LL.1 – Areas of the door sweep..... 65

Table HH.1 – Permissible dynamic forces ..... 56

Table KK.1 – Speed settings..... 63

Table KK.2 – Minimum travelling time per doorset leaf vs. mass of door leaf ..... 64

Table LL.1 – Minimum width of door leaf to be protected vs. radius of doorset and doorset travelling time..... 66

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –  
SAFETY –**
**Part 2-103: Particular requirements for drives  
for gates, doors and windows**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This part of International Standard IEC 60335 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

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

FDIS	Report on voting
61/4877A/FDIS	61/4913/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 third edition cancels and replaces the second edition published in 2006 and its Amendment 1 (2010). It constitutes a technical revision.

The principal changes in this edition as compared with the second edition of IEC 60335-2-103 are as follows (minor changes are not listed):

- modification of requirements in Clause 20 by introduction of new annexes.

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

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the fifth edition (2010) of that standard.

NOTE 1 When “Part 1” is mentioned in this standard, it refers to IEC 60335-1.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Safety requirements for electric drives for gates, doors and windows.

When a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. When this standard states “addition”, “modification” or “replacement”, the relevant text in Part 1 is to be adapted accordingly.

NOTE 2 The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.

NOTE 3 The following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;*
- notes: in small roman type.

Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

A list of all parts of the IEC 60335 series, under the general title: *Household and similar electrical appliances – Safety*, can be found on the IEC website.

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 publication. 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.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

The following differences exist in the countries indicated below.

- 6.1: Class 0 and class 01 are allowed for **drives** for indoor use having a rated voltage up to 150 V (Japan).

## INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, national wiring rules may differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another part 2 of IEC 60335, the relevant part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

When a part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE 1 This means that the technical committees responsible for the part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 Horizontal and generic standards covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards. For example, in the case of temperature requirements for surfaces on many appliances, generic standards, such as ISO 13732-1 for hot surfaces, are not applicable in addition to Part 1 or part 2 standards.

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

# HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

## Part 2-103: Particular requirements for drives for gates, doors and windows

### 1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electric **drives** for horizontally and vertically moving gates, doors, garage doors and **windows** for household and similar purposes, their **rated voltage** being not more than 250 V for single-phase **drives** and 480 V for other **drives**. It also covers the hazards associated with the movement of the **driven part**.

Battery-operated drives and other d.c. supplied **drives** are within the scope of this standard. Dual supply **drives**, either mains-supplied or battery-operated, are regarded as battery-operated **drives** when operated in the battery mode.

**Drives** not intended for normal household use but which nevertheless may be a source of danger to the public, such as **drives** intended to be used by laymen in shops, offices, hotels, restaurants, hospitals, in industry and on farms, are within the scope of this standard.

Requirements for **drives** for doors that may be used in emergency routes and exits are given in Annex AA.

NOTE 101 Examples of **drives** within the scope of this standard are **drives** for

- folding doors;
- revolving doors;
- rolling doors;
- roof **windows**;
- sectional overhead doors;
- swinging and sliding gates or doors.

Examples are shown in Figure 101.

NOTE 102 **Drives** may be supplied with a **driven part**.

As far as is practicable, this standard deals with the common hazards presented by **drives** that are encountered by all persons in and around the home. However, in general, it does not take into account

- persons (including children) whose
  - physical, sensory or mental capabilities; or
  - lack of experience and knowledgeprevents them from using the **drive** safely without supervision or instruction;
- children playing with the **drive**.

NOTE 103 Attention is drawn to the fact that in many countries additional requirements are specified by the national authorities responsible for the protection of labour and similar authorities.

NOTE 104 This standard does not apply to **drives**

- for vertically moving garage doors for residential use (60335-2-95);



- for shutters covering doors and **windows** (including locations where the door is set back from the shutter), awnings, blinds and similar equipment (60335-2-97);
- intended exclusively to be used by trained persons in commercial and industrial premises;
- for specific purposes, such as fire doors;
- for natural smoke exhaust ventilators not used as **windows** (ISO 21927-2);
- intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas).

NOTE 105 This standard does not apply to movement of a pedestrian door where such movement is based solely on stored energy.

## 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

IEC 60068-2-52, *Environmental testing – Part 2: Tests – Test Kb: Salt mist, cyclic (sodium, chloride solution)*

IEC 60825-1:2014, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC 61496-3:2008, *Safety of machinery – Electro-sensitive protective equipment – Part 3: Particular requirements for Active Opto-electronic Protective Devices responsive to Diffuse Reflection (AOPDDR)*