

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Household and similar electrical appliances – Safety –
Part 2-103: Particular requirements for drives for gates, doors and windows
(standards.iteh.ai)

Appareils électrodomestiques et analogues – Sécurité –
Partie 2-103: Exigences particulières pour les motorisations de portails, portes
et fenêtres





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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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

Appareils électrodomestiques et analogues – Sécurité –
Partie 2-103: Exigences particulières pour les motorisations de portails, portes
et fenêtres

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –**

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

FOREWORD

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

This bilingual version (2018-11) corresponds to the monolingual English version, published in 2015-04.

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.

The French version of this document has not been voted upon.

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: [IEC 60335-2-103:2015](https://standards.iteh.ai/catalog/standards/sist/193b6e6-aa83-4459-b439-9c14fd831758/iec-60335-2-103-2015)

- 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.

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)*

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3 Terms and definitions

[IEC 60335-2-103:2015](https://standards.iteh.ai/catalog/standards/sist/193b6e6-aa83-4459-b439-d1478317585/iec-60335-2-103-2015)

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This clause of Part 1 is applicable except as follows.

3.1.9 Replacement:

normal operation

operation of the **drive** under the following conditions

Drives supplied without a **driven part** are operated with their **rated load**.

Drives supplied with a **driven part** are operated with the **driven part** installed in accordance with the instructions.

3.101

drive

motor and other components that control the movement of the **driven part**

Note 1 to entry: Examples of components are gears, controls, brakes, components for power transmission from the **drive** to the **driven part** and **entrapment protection systems**.

3.102

driven part

part of a gate, door, garage door or **window** that is intended to be moved by the **drive**

3.103

window

part in a building that opens and closes in order to regulate the air and light and that is not intended for passage

3.104**rated load**

force or torque assigned to the **drive** by the manufacturer

3.105**rated operating time**

duration of continuous operation assigned to the **drive** by the manufacturer

Note 1 to entry: During continuous operation, the **drive** may reverse its direction.

3.106**rated number of operating cycles**

number of uninterrupted **cycles** assigned to the **drive** by the manufacturer

3.107**cycle**

complete opening and closing movement of the **driven part**

Note 1 to entry: For revolving doors a **cycle** means the necessary rotation to allow a person to pass through it.

3.108**entrapment protection system**

part of the **drive** that protects against crushing

Note 1 to entry: An **entrapment protection system** may consist of one or more devices, such as pressure sensitive edges, passive infrared and active light sensing devices, **biased-off switches** or motor current monitoring devices.

Note 2 to entry: An **entrapment protection system** may be incorporated in the motor assembly or installed separately.

[IEC 60335-2-103:2015](https://standards.iteh.ai/catalog/standards/sist/193b6e6-aa83-4459-b439-9c14fd831758/iec-60335-2-103-2015)

3.109**biased-off switch**

hold to run device that initiates and maintains the **drive** movement only as long as the manual control is actuated

3.110**automatic drive**

drive that operates the **driven part** in at least one direction without intentional activation by the user

3.111**horizontally moving pedestrian door**

swinging, sliding or rotating door designed for pedestrian use

3.112**reversible drive**

drive that can be manually operated with or without power in both directions by manual action on the **driven part**

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

5.2 Addition:

When a test has to be carried out with a **driven part**, the **driven part** specified for installation with the **drive** that gives the most unfavourable conditions for the test is used. The **drive** is adjusted in accordance with the instructions.

The **driven part** may be simulated by an artificial load.

5.5 Addition:

A wicket door is kept in the fully closed position if it travels together with the door during the tests or in the fully open position or completely removed position if it does not travel with the door during the tests.

5.7 Addition:

If the **drive** is marked with an ambient temperature beyond the range of +5 °C to +40 °C, the tests of Clauses 11, 13, BB.20.101, BB.20.105, BB.20.106, BB.20.107, BB.20.109, CC.20.103, CC.20.104, CC.20.105, CC.20.106, DD.20.105, DD.20.106, DD.20.107, DD.20.108, and 21 are carried out at the most unfavourable marked temperature.

5.101 Drives shall be tested for compliance with this standard for any of the following modes of operation as intended by the manufacturer:

- automatic operation (operation in at least one direction without intentional activation by the user);
- impulse activation (operation in either direction with an intentional activation by the user);
- biased-off (hold to run) operation.

Whenever required by the instructions, components shall be added or changed to perform the tests.

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 Modification:

Drives shall be class I, class II or class III.

6.2 Addition:

Drives, or parts of **drives**, that are intended for exposure to outdoor conditions shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition:

Drives shall be marked with their ambient temperature range.

Drives supplied without a **driven part** shall be marked with

- the **rated load**, in newtons (N) or in newton-metres (Nm);
- the **rated operating time**, in minutes, unless the **drive** is intended for continuous operation.

Drives supplied with a **driven part** shall be marked with the **rated number of operating cycles** or the **cycles** per hour, unless the **drive** is intended for continuous operation.

7.6 Addition:

[symbol ISO 7000-0533 (2004-01)]

upper limit of temperature



[symbol ISO 7000-0534 (2004-01)]

lower limit of temperature

7.12 Addition:

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The instructions shall state the substance of the following:

WARNING: Important safety instructions. It is important for the safety of persons to follow these instructions. Save these instructions.

The instructions shall include the substance of the following:

- do not allow children to play with fixed controls. Keep remote controls away from children;
- explanation of mode indicators;
- details on how to use any manual release, or **reversible drive** used as a manual release, and if applicable, state that activation of the manual release may cause uncontrolled movement of the driven part due to mechanical failures or an out-of-balance condition;
- when operating a biased-off switch, make sure that other persons are kept away;
- when closing a window that has been opened by a smoke control system, make sure that other persons are kept away;
- details on how to re-adjust controls, if applicable;
- frequently examine the installation for imbalance where applicable and signs of wear or damage to cables, springs and mounting. Do not use if repair or adjustment is necessary;
- disconnect the supply(s) when cleaning or other maintenance is being carried out.

7.12.1 Addition:

The installation instructions shall state the substance of the following:

WARNING: Important safety instructions. Follow all instructions since incorrect installation can lead to severe injury.

The installation instructions shall specify the type, size and mass of the **driven part**, locations where the **drive** can be installed and shall include details of whether the **drive** is suitable only for balanced driven vertical parts.

They shall state that the installer shall check that the temperature range marked on the **drive** is suitable for the location.

They shall state that the drive

- cannot be used when the wicket door is open (for **drives** that are constructed so the **drive** can only operate when the wicket door is closed); or
- cannot be used when the wicket door is closed (for **drives** that are constructed so the **drive** can only operate when the wicket door is open or removed).

The instructions shall include the substance of the following:

- the necessary information for safe handling of a **drive** weighing more than 20 kg. This information shall describe how to use the handling means, such as hooks and ropes;
- vertical doors and gates need an anti-drop feature or device;
- before installing the drive, check that the driven part is in good mechanical condition, opens and closes properly and correctly balanced where applicable;
- information if a hazardous part of the **drive** is intended to be installed at a height of at least 2,5 m above floor level or other access level;
- except for **horizontally moving pedestrian doors**, ensure that entrapment between the driven part and the surrounding fixed parts due to the opening movement of the driven part is avoided;
- for **horizontally moving pedestrian doors**, ensure that entrapment between the driven part and the surrounding fixed parts due to the movement of the driven part is avoided. This can be achieved if the relevant distance does not exceed 8 mm. However, the following distances are considered sufficient to avoid entrapments for the parts of the body identified:
 - for fingers, a distance greater than 25 mm;
 - for feet, a distance greater than 50 mm;
 - for heads, a distance greater than 200 mm; and
 - for the whole body, a distance greater than 500 mm.

If these distances cannot be achieved, safeguarding devices shall be provided;

- details of the maximum allowed distance from the wall that is parallel to the sliding movement to the outside of horizontally sliding **driven parts**;
- details for the installation of the **drive** and its associated components, including details of relevant accessories required for alternate modes of operation;
- that the actuating member of a **biased-off switch** is to be located within direct sight of the **driven part** but away from moving parts. Unless it is key operated, it is to be installed at a minimum height of 1,5 m and not accessible to the public;
- details on how to set controls;
- after installation, ensure that the mechanism is properly adjusted and that the protection system and any manual release function correctly;
- permanently fix the label concerning the manual release, adjacent to its actuating member.

7.101 Drives having a manual release shall be supplied with a label describing how to use the release unless the information is already marked on the **drive**.

Compliance is checked by inspection.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.2 Addition:

Basic insulation and parts separated from **live parts** by **basic insulation** may be touched during adjustment, if a **tool** is needed to gain access to the adjustment means.

9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

10 Power input and current

This clause of Part 1 is applicable except as follows.

10.1 Modification:

Instead of determining the mean value, the maximum value of power input is determined, the effect of inrush currents being ignored.

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(standards.iteh.ai)

11 Heating

This clause of Part 1 is applicable except as follows.

11.7 Replacement:

<https://standards.iteh.ai/catalog/standards/sist/19f3b6e6-aa83-4459-b439-9c14fd831758/iec-60335-2-103-2015>

***Drives** for continuous operation are operated for consecutive **cycles** until steady conditions are established.*

***Drives** not for continuous operation are operated as follows:*

***Drives** for gates for one household and horizontally moving garage doors for one household are operated without rest periods for three cycles or the **rated number of operating cycles**, whichever is longer.*

***Drives** for **windows** drives are operated without rest periods for the **rated number of operating cycles**.*

*Other **drives** are operated without rest periods for the **rated number of operating cycles** but for not less than five **cycles** of operation.*

12 Void

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable.

14 Transient overvoltages

This clause of Part 1 is applicable.