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IEC 60335-2-103 Ed 3.2 (2019)
(Incorporating Amendments up to and including No. 2)



Australian/New Zealand Standard™

Household and similar electrical appliances — Safety

Part 2.103: Particular requirements for drives for gates, doors and windows



AS/NZS 60335.2.103:2016

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee EL-002, Safety of Household and Similar Electrical Appliances and Small Power Transformers and Power Supplies. It was approved on behalf of the Council of Standards Australia on 17 June 2016 and by the New Zealand Standards Approval Board on 2 June 2016.

This Standard was published on 30 June 2016.

The following are represented on Committee EL-002:

- Association of Accredited Certification Bodies
- Australian Industry Group
- National Retailers Association (Australia)
- Business New Zealand
- Consumer Electronic Suppliers Association, Australia
- Consumers' Federation of Australia
- Electrical Regulatory Authorities, Australia
- Electrical Compliance Testing Association
- Electrical consultants
- Engineers Australia
- Testing Interests New Zealand
- WorkSafe, New Zealand
- New Zealand Electric Fence Energizer Manufacturers' Standards Group

This Standard was issued in draft form for comment as DR 15930.

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Australian/New Zealand Standard™

Household and similar electrical appliances — Safety

Part 2.103: Particular requirements for drives for gates, doors and windows

Originated as AS/NZS 3350.2.103:2007.
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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

AS/NZS 60335.2.103:2016

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –

Part 2.103: Particular requirements for drives for gates, doors and windows

Foreword

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-002- Safety of Household and Similar Electrical Appliances and Small Power Transformers to supersede AS/NZS 60335.2.103:2011 three years from the date of publication. During this period it is anticipated that regulatory authorities will approve drives for gates, doors and windows to either standard.

The objective of this Standard is to provide manufacturers, designers, regulatory authorities, testing laboratories and similar organizations with safety requirements designed to give the user protection against hazards that might occur during normal operation and abnormal operation of the appliance and which may be used as the basis for approval for sale or for connection to the electricity supply mains in Australia and New Zealand.

The text of IEC 60335-2-103 Ed 3, prepared by IEC Technical Committee TC 61, was submitted to the Standards Australia/Standards New Zealand Combined Procedure (dual public comment and committee vote) for adoption of the IEC standard as a Standards Australia/Standards New Zealand joint standard.

The principal changes in this edition as compared with the 2011 edition of AS/NZS 60335.2.103 are as follows (minor changes are not listed):

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

A1 | The text of IEC 60335-2-103 edition 3 amendment 1, prepared by IEC Technical Committee TC 61, was submitted to the Standards Australia/Standards New Zealand Combined Procedure (dual public comment and committee vote) for adoption as an amendment to the Standards Australia/Standards New Zealand joint standard AS/NZS 60335.2.103:2016.

A1 |

A2
DOW
27/11/22

This standard incorporates Amendment No.1 (November 2018). The changes introduced by the amendments are indicated in the text by a marginal bar and amendment number against the part affected. Where an application date other than immediate is applicable to an amendment the date of application (DOA) and the date of withdrawal (DOW) if relevant, is indicated by the marginal bar against the part affected. Unless otherwise indicated, the application date of the changes introduced by Amendment No. 1 is 30 November 2020.

NOTE: Regulatory authorities that reference this Standard in regulation may apply these amendment requirements at a different time. Users of this Standard should consult with these authorities to confirm their requirements

This standard is an adoption with national modifications of the third edition of IEC 60335-2-103, *Household and similar electrical appliances – Safety – Part 2-103: Particular requirements for drives for gates, doors and windows* including its amendment 1 (2017). It has been varied as indicated to take account of Australian and New Zealand conditions.

The text of IEC 60335-2-103 edition 3 amendment 2, prepared by IEC Technical Committee TC 61, was submitted to the Standards Australia/Standards New Zealand Combined Procedure (dual public comment and committee vote) for adoption as an amendment to the Standards Australia/Standards New Zealand joint standard AS/NZS 60335.2.103:2016.

This standard incorporates Amendment No. 1 (November 2018) and Amendment No. 2 (November 2020). The changes introduced by the amendments are indicated in the text by a marginal bar and amendment number against the part affected. Where an application date other than immediate is applicable to an amendment the date of application (DOA) and the date of withdrawal (DOW) if relevant, is indicated by the marginal bar against the part affected. Unless otherwise indicated, the application date of the changes introduced by Amendment No. 2 is 27 November 2022.

NOTE: Regulatory authorities that reference this Standard in regulation may apply these amendment requirements at a different time. Users of this Standard should consult with these authorities to confirm their requirements

This standard is an adoption with national modifications of the third edition of IEC 60335-2-103, *Household and similar electrical appliances – Safety – Part 2-103: Particular requirements for drives for gates, doors and windows* including its amendment 1 (2017) and amendment 2 (2019). It has been varied as indicated to take account of Australian and New Zealand conditions.

This part 2 has to be used in conjunction with the latest edition of AS/NZS 60335.1 Household and similar electrical appliances – Safety – Part 1: General requirements and its Amendments. It was established on the basis of AS/NZS 60335.1:2020.

This part 2 supplements or modifies the corresponding clauses of AS/NZS 60335.1 so as to convert it into the Australian/New Zealand Standard: Safety requirements for 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 of Part 1 is to be adapted accordingly.

NOTE 1 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.;
- subclauses, notes and annexes that are additional to those in the IEC standard are prefixed with the letters AZ.

NOTE 2 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.

p NOTE 3 In this document, p is used in the margin to indicate instructions for preparing a consolidated version.

The essential safety requirements in AS/NZS 3820¹ that could be applicable to requirements for drives for gates, doors and windows are covered by this standard.

The national variations to IEC 60335-2-103 Ed 3.1 form the Australian and New Zealand national variations for purposes of the IECEE scheme for recognition of results of testing to standards for safety of electrical equipment (the CB scheme).

¹ AS/NZS 3820 *Essential safety requirements for electrical equipment*

A2 DOA 27/11/22	The national variations to IEC 60335-2-103 Ed 3.2 form the Australian and New Zealand national variations for purposes of the IECEE scheme for recognition of results of testing to standards for safety of electrical equipment (the CB scheme).
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A1	
A2 DOW 27/11/22	The text of the International Standard IEC 60335-2-103 Ed 3.1 was approved as a joint Australia/New Zealand Standard with the agreed national variations as given below.
A2 DOA 27/11/22	The text of the International Standard IEC 60335-2-103 Ed 3.2 was approved as a joint Australia/New Zealand Standard with the agreed national variations as given below.

AUSTRALIAN NATIONAL VARIATIONS

A2	There are no national variations to this Part 2 other than those listed in the national variations in AS/NZS 60335.1:2020.
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NEW ZEALAND NATIONAL VARIATIONS

A2	There are no national variations to this Part 2 other than those listed in the national variations in AS/NZS 60335.1:2020.
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Annex ANZ (normative)

Normative references to international publications with their corresponding joint Australia/New Zealand publications

The following referenced documents are indispensable for the application 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.

NOTE When an international publication has been modified by national variations the relevant joint Australia/New Zealand publications applies if the national variations are needed to ensure the safety of the appliance for Australia/New Zealand conditions. These international publications are indicated by (mod). If an international publication is not so indicated, then either it or the listed Australia/New Zealand publication may be used.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>AS/NZS</u>	<u>Year</u>
IEC 60068-2-52:		<i>Environmental testing – Part 2: Tests – Test Kb: Salt mist, cyclic (sodium, chloride solution)</i>		
IEC 60825-1:	2014	<i>Safety of laser products – Part 1: Equipment classification and Requirements</i>		
IEC 61496-3:	2008,	<i>Safety of machinery – Electro-sensitive protective equipment – Part 3: Particular requirements for Active Opto-electronic Protective Devices responsive to Diffuse Reflection (AOPDDR)</i>		

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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

- 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.
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- 6) All users should ensure that they have the latest edition of this publication.
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- 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.

DISCLAIMER

This Consolidated version is not an official IEC Standard and has been prepared for user convenience. Only the current versions of the standard and its amendment(s) are to be considered the official documents.

This Consolidated version of IEC 60335-2-103 bears the edition number 3.2. It consists of the third edition (2015-04) [documents 61/4877A/FDIS and 61/4913/RVD], its amendment 1 (2017-10) [documents 61/5296/CDV and 61/5382A/RVC] and its amendment 2 (2019-11) [documents 61/5927/FDIS and 61/5943/RVD]. The technical content is identical to the base edition and its amendments.

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

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

This third edition 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 the base publication and its amendments 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 600 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 knowledge
 prevents 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)*

3 Terms and definitions

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.

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**

3.113**main closing edge**

edge(s) of a pedestrian door leaf, whose distance from a parallel **opposing closing edge** or surface determines the usable pathway

3.114**opposing closing edge**

edge(s) of a pedestrian door leaf formed by the **main closing edge** and a fixed edge or a surface against which the pedestrian door leaf is moving

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).

Unless the **drive** is intended for continuous operation, **drives** supplied without a **driven part** shall be marked with the **rated operating time** in minutes, or the number of **cycles** per hour, or the **rated number of operating cycles**.

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:

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 state the substance of the following:

- do not allow children to play with fixed controls. Keep remote controls away from children;
- activation of the manual release may cause uncontrolled movement of the **driven part** due to mechanical failures or an out-of-balance condition; (if applicable);
- 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;
- 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.

The instructions shall include the following information:

- explanation of mode indicators;
- details on how to use any manual release, or **reversible drive** used as a manual release;
- details on how to re-adjust controls, (if applicable);
- where the operation of the **drive** is specified in **cycles** per hour, the rest period required between **cycles**.

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.

7.15 Addition:

The markings shall also be provided with the instructions. In addition, the marking relevant to name, trademark or identification mark, of the manufacturer or responsible vendor and the model or type reference can also be retrieved from a label, such as a matrix barcode, visible on the appliance after installation.

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.

11 Heating

This clause of Part 1 is applicable except as follows.

11.7 Replacement:

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 operating time** or the **rated number of operating cycles**, whichever is longer;
- **drives** for windows are operated without rest periods for the **rated number of operating cycles** or the **rated operating time** in minutes;

- others **drives** are operated without rest periods for four minutes or the **rated operating time** or the **rated number of operating cycles** but for not less than five **cycles** of operation, whichever is longer.
- **drives** rated in cycles per hour are operated for 20 % more than the rated number of cycles per hour and with the relevant rest period(s) declared by the manufacturer.

12 Void

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

13.3 Addition:

In Table 4, add the following to table footnote a:

*The test voltage for 600 V multi-phase appliances is that specified for a **working voltage** > 250 V, where U is taken as the **rated voltage**.*

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.1.2 Addition:

*Tubular **drives** are installed in a tube that is open at both ends and has the largest diameter specified in the instructions. The tube has a length twice that of the motor and is mounted on a support as in normal use. The support is rotated at a speed of 1 r/min.*

16 Leakage current and electric strength

This clause of Part 1 is applicable as follows.

16.3 In Table 7, add the following to table footnote a:

*The test voltage for 600 V multi-phase appliances is that specified for a **working voltage** > 250 V, where U is taken as the **rated voltage**.*

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is not applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 Addition:

Compliance is also checked by the test of 19.101.

19.13 Addition:

*If the **drive** can be operated when any of the fault conditions are simulated, the applicable tests of BB.20.104, BB.20.107, CC.20.105, DD.20.104 and DD.20.107 are carried out, the **drive**, however, being supplied at **rated voltage**.*

*Either the **drive** continues to fulfil the requirements, or, after a maximum of one **cycle** of operation, it shall stop with the **driven part** in a safe position or the **drive** shall change to a **biased-off switch** mode of operation.*

19.11.2 Addition:

*If the **drive** can be operated when any of the fault conditions are simulated, the applicable tests of BB.20.104, BB.20.107, CC.20.105, DD.20.104 and DD.20.107 are carried out, the **drive**, however, being supplied at **rated voltage**.*

*Either the **drive** continues to fulfill the requirements, or, after a maximum of one **cycle** of operation, it shall stop with the **driven part** in a safe position, or the **drive** shall change to a **biased-off switch** mode of operation.*

19.11.4.8 Replacement:

*The **drive** is supplied at **rated voltage** and operated under **normal operation**. After approximately 60 s, the power supply voltage is reduced to a level such that the **drive** ceases to respond to user inputs or parts controlled by the programmable component cease to operate, whichever occurs first. This value of supply voltage is recorded. The **drive** is supplied at **rated voltage** and operated under **normal operation**. The voltage is then reduced to a value of approximately 10 % less than the recorded voltage. It is held at this value for approximately 60 s and then increased to **rated voltage**. The rate of decrease and increase of the power supply voltage is to be approximately 10 V/s.*

*The **drive** shall either continue to move in the same direction of movement in its operating **cycle** at which the voltage decrease occurred or a manual operation shall be required to restart it.*

19.13 Addition:

During the test of 19.101, the winding temperature shall not exceed the values specified in 19.9.

19.101 Drives, other than those for continuous operation, are supplied at **rated voltage** and operated continuously under **normal operation**.

20 Stability and mechanical hazards

This clause of Part 1 is replaced by the following annexes.

Annex BB Drives for windows.