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Responsible committee: CPL/61/1 Motorised appliance group

Interested committees:

Title: BS EN IEC 60335-2-103 Ed.4.0 Household and similar electrical appliances - Safety

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

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

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- iii) requires additional national guidance or information

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



61/6529/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: IEC 60335-2-103 ED4	
DATE OF CIRCULATION: 2022-06-10	CLOSING DATE FOR VOTING: 2022-09-02
SUPERSEDES DOCUMENTS:	

IEC TC 61 : SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES	
SECRETARIAT: United States of America	SECRETARY: Ms Randi Myers
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☒ SAFETY	
☐ SUBMITTED FOR CENELEC PARALLEL VOTING	☒ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

This document is still under study and subject to change. It should not be used for reference purposes.

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:

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

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

This document is circulated according to the decisions taken at the TC 61 meetings for the 2020 web meetings – see 61/6183/RM and 2021 Web Series-II – see 61/6435A/RM

History refer to:

61/5989/DC and 61/6054A/INF in 61/6184/RM, item 54

61/6333/DC and 61/6406A/INF in 61/6435A/RM, item 17

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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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IEC 60335-2-103 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2015, Amendment 1: 2017 and Amendment 2:2019. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) the text has been aligned with IEC 60335-1:2020;
- b) scope includes DC-supplied appliances and battery-operated appliances (Clause 1);
- c) some notes have been converted to normative text (Clause 1);
- d) additional requirements for installation instructions have been incorporated (7.12);
- e) application of test probe 18 and test probe 19 have been introduced (8.1.1, 20.2, Annexes BB, CC and DD);

- f) requirements for loading accessible appliance outlets and socket outlets are added (11.7);
- g) requirements for appliances incorporating integral batteries or separable batteries are added (11.7);
- h) requirements are added for drives intended for permanent connection delivered with a connector to ease the installation (22.108, 24.101, 25.3);

The text of this International Standard is based on the following documents:

Draft	Report on voting
61/XX/FDIS	61/XX/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of the sixth edition (2020) 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 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.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The National Committees are requested to note that for this publication the stability date is 2025.

THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

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).

Note of the Secretary: National Committees are asked to reconfirm their in some countries notes. They will be deleted unless reconfirmed.

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.

Guidance documents concerning the application of the safety requirements for appliances can be accessed via TC 61 supporting documents on the IEC website

<https://www.iec.ch/tc61/supportingdocuments>

This information is given for the convenience of users of this International Standard and does not constitute a replacement for the normative text in this standard.

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 publications, basic safety publications and group safety publications 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.

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.

NOTE 3 Standards dealing with non-safety aspects of household appliances are:

- IEC standards published by TC 59 concerning methods of measuring performance;
- CISPR 11, CISPR 14-1 and relevant IEC 61000-3 series standards concerning electromagnetic emissions;
- CISPR 14-2 concerning electromagnetic immunity;
- IEC standards published by TC 111 concerning environmental matters.

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 part of IEC 60335 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 including direct current (DC) supplied appliances and battery-operated appliances**. It also covers the hazards associated with the movement of the **driven part**.

Drives not intended for normal household use but which nevertheless can 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 **normative** Annex AA.

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.

NOTE 101 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**.

For appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary. In many countries, additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

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).

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 60068-2-52:2017, *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 61496-3:2018, *Safety of machinery – Electro-sensitive protective equipment – Part 3: Particular requirements for Active Opto-electronic Protective Devices responsive to Diffuse Reflection (AOPDDR)*

IEC 61984:2008, *Connectors - Safety requirements and tests*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.9 *Addition:*

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.

3.1.101

rated load

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

3.1.102

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.

3.1.103

rated number of operating cycles

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

3.5 Definitions relating to types of appliances

3.5.101

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**.

3.5.102

automatic drive

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

3.5.103

reversible drive

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

3.7 Definitions relating to safety components

3.7.101

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.

3.7.102

biased-off switch

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

3.8 Definitions relating to miscellaneous matters

3.8.101

driven part

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

3.8.102

window

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

3.8.103

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.

3.8.104

horizontally moving pedestrian door

swinging, sliding or rotating door designed for pedestrian use

3.8.105

main closing edge

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

3.8.106

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 include 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;
- 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).

For drives intended for permanent connection to fixed wiring, delivered with a separate connector to ease the installation and establish the supply connection, the instructions shall state the substance of the following: Only use the supplied connector when installing the drive.

The instructions shall include the following information:

- 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;
- the minimum height for installation of the drive.

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.

8.1.1 Replacement:

The requirement of 8.1 applies for all positions of the appliance when it is operated as in normal use.

Test probe B, test probe 18 and test probe 19 of IEC 61032 are applied with a force not exceeding 1 N, the appliance being in every possible position, except that appliances normally used on the floor and having a mass exceeding 40 kg are not tilted. Through openings, the test probe is applied to any depth that the probe will permit and is rotated or angled before, during and after insertion to any position. If the opening does not allow the entry of the probe, the force on the probe in the straight position is increased to 20 N when probe B is used or 10 N when test probe 18 or test probe 19 are used. If the test probe then enters the opening, the test is repeated with the probe in the angled position.

*During the tests with test probe B, all **detachable parts** are removed except lamps. However, during insertion or removal of lamps protection against contact with **live parts** of the lamp cap shall be ensured.*

During the tests with test probe 18 and test probe 19 of IEC 61032, the appliance shall be fully assembled as in normal use without any parts removed

*Test probe 19 of IEC 61032 is not applied to parts of **drives** that are located at a height greater than 850 mm in normal use.*

*Test probes 18 of IEC 61032 is not applied to parts of **drives** that according to the instructions are required to be mounted at a height exceeding 1,8 m above the floor.*

Test probe 18 and test probe 19 of IEC 61032 are not applied to appliances for commercial use unless they are intended to be installed in an area open to the public.

*It shall not be possible to touch **live parts** or **live parts** protected only by lacquer, enamel, ordinary paper, cotton, oxide film, beads, or sealing compound except self-hardening resins, with the probe.*

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;
- other **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.

Appliance outlets accessible to the user and socket-outlets accessible to the user are loaded with a resistive load that gives the marked outlet load.

For appliances incorporating integral batteries or separable batteries not disconnected from the appliance for charging purposes:

- **the battery that has been fully discharged is charged for 1 h, while the appliance is operated as specified performing its intended function, if allowed by the construction of the appliance;**
- **the battery that has been fully discharged is charged, for a duration of 24 h or until it is fully charged whichever is shorter, without the battery-operated appliance performing its intended function.**

12 Charging of metal-ion batteries

This clause of part 1 is applicable.

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.

19.11.2 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:

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.

19.101 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 applicable except as follows and as modified in the normative Annexes AA, BB, CC and DD.

20.1 Not applicable

20.2 Addition:

Test probe 18 of IEC 61032 is not applied to parts of **drives** that according to the installation instructions are required to be mounted at a height exceeding 1,8 m above the floor.

The test probe that is similar to test probe B of IEC 61032 but having a circular stop face with a diameter of 50 mm, instead of the non-circular face is not applied to parts of **drives** that according to the instructions are required to be mounted at a height exceeding 2,3 m above the floor or other access level.

NOTE 101 Stairs and terraces are examples of access levels. Surfaces not normally used for standing on, such as window-sills, and movable equipment such as ladders, are not considered to be access levels.

Test probe 19 of IEC 61032 is applied to parts of the appliance placed at a height below 850 mm from the floor in normal use under the conditions specified for test probe 18.

~~Annex BB Drives for windows.~~

~~Annex CC Drives for pedestrian doors.~~

~~Annex DD Drives for horizontally and vertically moving doors, horizontally moving garage doors and gates.~~

21 Mechanical strength

This clause of Part 1 is applicable.

22 Construction

This clause of Part 1 is applicable except as follows.

22.40 Not applicable.

22.46 *Addition:*

If compliance with the requirements in Clause 20 relies on the operation of a programmable **electronic circuit**, the software shall contain measures to control the fault/error conditions specified in Table R.1.

22.101 Drives weighing more than 20 kg shall incorporate suitable means for handling, such as hooks.

Compliance is checked by inspection.

22.102 All controls supplied with the **drive** shall be marked to indicate the functions in the same way.

When the **drive** is provided with a dedicated stop button, that stop button shall be clearly identifiable.

Compliance is checked by inspection.

22.103 When several modes of operation can be selected by the user, the selected mode shall be clearly indicated.

Compliance is checked by inspection.

22.104 It shall only be possible to make adjustments that could affect compliance with this standard by means of a **tool** or by use of a code.

Compliance is checked by inspection.

22.105 A **drive** for a door or gate incorporating a wicket door shall be constructed so that the **drive**

- cannot be operated 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 operated 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).

Compliance is checked by inspection.

22.106 Drives shall be supplied with all associated components necessary for compliance with this standard for the defined mode of operation. Components required for alternative modes of operation may be delivered separately provided they are listed in the instructions.

Compliance is checked by inspection.

22.107 Controls shall not be capable of overriding an **entrapment protection system** unless they can only activate the **drive** in sight of the **driven part**.

Compliance is checked by test.

22.108 Drives intended for permanent connection to fixed wiring, may be delivered with a separate connector, to ease the installation and establish the supply connection. Such a connector shall be a **non-detachable part** once engaged.

Such connector shall not be interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1 or with appliance couplers complying with the standard sheets of IEC 60320-3.

Compliance is checked by test.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows.

24.1.3 Addition:

*If a switch is used to disconnect the **drive** when the manual release is operated, the switch is tested for 300 **cycles** of operation.*

Addition:

24.101 *The relevant standard for a connector as referenced in 22.108 is IEC 61984:2008. Classification and ratings used for the tests of IEC 61984:2008 shall correspond to the ratings of the **drive** and its intended use.*

*The following clauses of IEC 61984:2008 and the corresponding test requirements in clause 7, are not applicable: 5.2 a), 5.4 d), 6.2.1, 6.2.2, 6.4.1, 6.4.2, 6.4.3, 6.10, 6.14.2, 6.14.3, 6.17, 6.19 and 6.20. Sub-clause 6.5.1 is also applicable for connectors without breaking capacity (COC). Sub-clauses 6.15 and 6.16 are applicable but are modified to the **drive** temperature ratings. The tests in clause 7.3.6, 7.3.7 are performed when the connector referenced in this clause is engaged.*

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.3 *Add the following note under the first dashed item, and rename existing note to Note 1:*

NOTE 2 The set of terminals may be located in a separate connector complying with clause 24.1.108.

25.5 *Modification:*

Type Z attachment is allowed for separate power supplies for indoor use for **drives** having a **rated power input** not exceeding 100 W.

25.7 *Addition:*

The **supply cord** of **drives** for outdoor use shall be polychloroprene sheathed and not be lighter than ordinary polychloroprene sheathed flexible cord (code designation 60245 IEC 57).

25.8 *Addition:*

Supply cords of **class III appliances** need not comply with Table 11 if the temperature rises of the cord insulation specified in Table 3 and Table 9 are not exceeded during the tests of Clause 11 and Clause 19, respectively.

25.15 *Addition:*

*For **class III appliances** and parts of **class III construction** that have a **rated power input** higher than 15 W, the pull force is 30 N. The test is not carried out on **class III appliances** or parts of a **class III construction** that have a **rated power input** less than or equal to 15 W.*

26 Terminals for external conductors

This clause of Part 1 is applicable.

27 Provision for earthing

This clause of Part 1 is applicable.

28 Screws and connections

This clause of Part 1 is applicable.

29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable except as follows.

29.1 *Addition:*

*For a **rated voltage** > 300 V and ≤ 346 V, the rated impulse voltage is for*

- overvoltage category I: 2 500 V;*
- overvoltage category II: 4 000 V;*
- overvoltage category III: 6 000 V.*

29.3.4 *Addition:*

*For a **rated voltage** > 300 V and ≤ 346 V, the minimum thickness for accessible parts of **reinforced insulation** consisting of a single layer is for*

- overvoltage category I: 0,6 mm;*
- overvoltage category II: 1,2 mm;*

– overvoltage category III: 2,0 mm.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.2 Addition:

For **drives** **only** operated by a **biased-off switch**, 30.2.2 is applicable.

For other **drives**, 30.2.3 is applicable.

31 Resistance to rusting

This clause of Part 1 is applicable except as follows.

Addition:

For parts intended to be installed outdoors, compliance is checked by the salt mist test of IEC 60068-2-52:2017, test method 2 being applicable.

Before the test, coatings are scratched by means of a hardened steel pin, the end of which has the form of a cone with an angle of 40°. Its tip is rounded with a radius of 0,25 mm ± 0,02 mm. The pin is loaded so that the force exerted along its axis is 10 N ± 0,5 N. The scratches are made by drawing the pin along the surfaces of the coating at a speed of approximately 20 mm/s. Five scratches are made at least 5 mm apart and at least 5 mm from the edges.

After the test, the **drive** shall not have deteriorated to such an extent that compliance with this standard, in particular with Clauses 8 and 27, is impaired. The coating shall not be broken and shall not have loosened from the metal surface.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable except as follows.

32.101 Drives incorporating a laser shall be constructed so that they provide adequate protection from laser radiation.

Compliance is checked by the following test.

Detachable parts are removed. Any **accessible controls** are adjusted to give the highest laser radiation even if a tool is required to make the adjustment. If the control is inaccessible, it is also adjusted to give the highest laser radiation unless its actuating member is adequately locked in position.

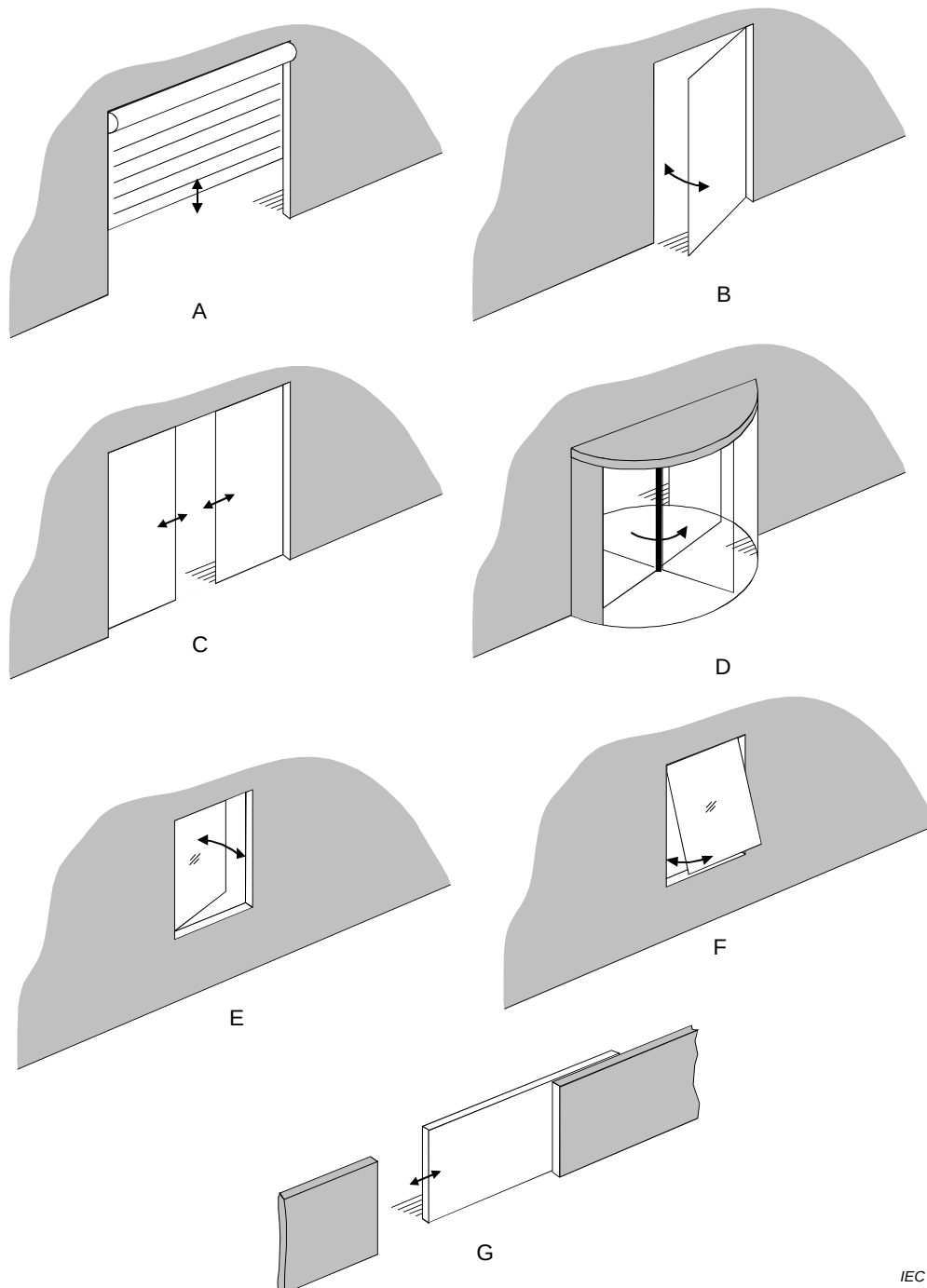
NOTE Solder or sealing compound is considered to provide adequate locking.

The **drive** is supplied at **rated voltage** and operated under **normal operation**. The laser radiation is measured in accordance with 5.2 of IEC 60825-1:2014 and the accessible emission level shall not exceed the limits for a Class 1 laser product specified in Table 3 of that standard for an emission duration of 100 s.

The test is repeated but under the conditions specified in Clause 19 and the laser radiation measured again. The accessible emission level shall not exceed five times the limits specified

682 for Class I for wavelengths of 400 nm to 700 nm. For other wavelengths, it shall not exceed the
 683 limits for a Class 3R laser product as specified in Table 6 of IEC 60825-1:2014.

684 If compliance with IEC 60825-1:2014 relies on the operation of an interlock, this interlock shall
 685 be of the fail-safe type or be tested for 30 000 cycles of operation under the conditions of 24.1.4.



IEC

686

687 **Key**

- 688 A rolling door
 689 B horizontally swinging door
 690 C horizontally sliding door
 691 D revolving door
 692 E vertically hinged **window** (horizontally moving)
 693 F horizontally hinged **window** (vertically moving)