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COMMENTED VERSION

INTERNATIONAL STANDARD

colour inside

Household and similar electrical appliances – Safety – Part 2-95: Particular requirements for drives for vertically moving garage doors for residential use

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Part 2-95: Particular requirements for drives for vertically moving garage doors for residential use

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.
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This commented version (CMV) of the official standard IEC 60335-2-95:2023 edition 5.0 allows the user to identify the changes made to the previous IEC 60335-2-95:2019 edition 4.0. Furthermore, comments from IEC TC 61 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 60335-2-95 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 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, 7.12.1, 7.101, 20.103, 20.107, 22.104);
d) application of test probe 19 has been introduced (8.1.1, 20.2);
e) addition of surface temperatures for external accessible surfaces (11.3, 11.8);
f) requirements are added for drives intended for permanent connection delivered with a connector to ease the installation (22.110, 24.1.101, 25.3);
g) clarification for connectors that are non-detachable once engaged (24.1.5).

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

Draft	Report on voting
61/7015/FDIS	61/7080/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: Particular requirements for drives for vertically moving garage doors for residential use.

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, or
- revised.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations can 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.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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~~ can 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~~ 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. ~~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.~~ 1

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. 2

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-95: Particular requirements for drives for vertically moving garage doors for residential use

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 garage doors for residential use that open and close in a vertical direction, the **rated voltage** of the **drives** being not more than 250 V for single-phase appliances and 480 V for other appliances, including direct current (DC) supplied appliances and **battery-operated appliances** 3. It also covers the hazards associated with the movement of these electrically driven garage doors.

~~NOTE 101~~ Examples of garage doors are shown in Figure 101.

~~NOTE 102~~ The **drive** can be supplied with a garage door.

~~NOTE 103~~ This standard also applies to **entrapment protection devices** for use with **drives**. It does not cover hazards related to the mechanisms of the door itself.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account playing with the appliance by young children, but recognizes that children ~~may~~ can be in the vicinity of the garage door.

~~NOTE 104 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.~~

For appliances intended to be used in vehicles or on board ships or aircraft, additional requirements can 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. 4

~~NOTE 105~~ This standard does not apply to **drives**

– for shutters, awnings, blinds and similar equipment (IEC 60335-2-97);
– for gates, doors and windows (IEC 60335-2-103);
– for commercial and industrial purposes;
– intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60068-2-52:2017, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*

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 ~~*Replacement*~~ *Modification:*

Replace the first paragraph with the following: **5**

~~**normal operation**~~
operation of the **drive** under the following conditions:

– **drives** supplied without a door are operated with their **rated load**.
– **drives** supplied with a door are operated with the door installed in accordance with the instructions.

3.1.101
rated load
force or torque 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 door

Note 1 to entry: Examples of components are gears, controls, brakes and **entrapment protection systems**.

3.5.102
automatic drive
drive that operates the door in at least one direction without intentional activation by the user

3.7 Definitions relating to safety components

3.7.101
biased-off switch
~~switch that automatically returns to the **off position** when its actuating member is released~~

hold to run device that initiates and maintains the **drive** movement only as long as the manual control is actuated by the user **6**

3.7.102
entrapment protection system
part of the **drive** that protects against trapping which could result in the human body being squeezed or crushed by the door

Note 1 to entry: Trapping in the garage is covered by the manual release of 20.109.

Note 2 to entry: An **entrapment protection system** may be incorporated in the motor assembly or may be installed separately. It may consist of one or more devices, such as pressure sensitive edges, passive infrared, active light sensing devices or a **biased-off switch**.

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 door, the door specified for installation with the **drive** that gives the most unfavourable conditions for the test is used. An artificial load may be used to simulate the door for some of the tests. The **drive** is adjusted in accordance with the instructions.*

5.5 *Addition:*

Wicket doors are kept closed during the tests.

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 *Modification:*

Replace the first paragraph with the following:

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

6.2 *Addition:*

Drives intended to be exposed to outdoor conditions shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 *Modification:*

Replace the third dashed item of the first paragraph with the following:

Drives shall be marked with the **rated power input**.

Addition:

Drives supplied without a door shall be marked with the **rated load** in N or in Nm.

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 all instructions. Save these instructions.

The instructions shall include the substance of the following:

– do not allow children to play with door controls. Keep remote controls away from children;

~~– watch the moving door and keep people away until the door is completely opened or closed (not necessary for **automatic drives**);~~

– take care when operating the manual release since an open door may fall rapidly due to weak or broken springs, or being out of balance;

– frequently examine the installation, in particular check cables, springs and mountings for signs of wear, damage or imbalance. Do not use if repair or adjustment is needed since a fault in the installation or an incorrectly balanced door may cause injury;

– each month check that the drive reverses when the door contacts a 40 mm high object placed on the floor. Adjust if necessary and recheck since an incorrect adjustment may present a hazard;

– disconnect the supply when cleaning or carrying out other maintenance.

The instructions shall include the following information:

– details on how to use the manual release;

– information concerning the adjustment of the door and **drive** (when applicable).

The instruction for other than **automatic drives** shall state the substance of the following:

Watch the moving door and keep people away until the door is completely opened or closed. **7**

The instructions for **automatic drives** shall state the substance of the following:

WARNING: Automatic door – The door may operate unexpectedly, therefore do not allow anything to stay in the path of the door.

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 include details for the installation of the **drive** and its associated components, including the minimum height for installation of parts of **drives** intended to be mounted more than 850 mm, 1,8 m or 2,3 m or at least 2,5 m above the floor in accordance with 8.1.1, Table 101, 20.2, 20.103, B.22.3 or B.22.4. **8**

For **drives** supplied without a door, the installation instructions shall indicate the type, size and mass of doors for which the **drive** is intended to be used.

The installation instructions shall include the substance of the following:

– before installing the drive, remove all unnecessary ropes or chains and disable any equipment, such as locks, not needed for powered operation;

– before installing the drive, check that the door is in good mechanical condition, correctly balanced and opens and closes properly;

– install the actuating member for the manual release at a height less than 1,8 m;

– install any fixed control, other than key-operated switches, at a height of at least 1,5 m ~~and within sight of the door but away from moving parts~~;

~~NOTE 101 It is not required to specify a minimum height for key-operated switches.~~

– install any fixed control within sight of the door but away from moving parts; **9**

– permanently fix the labels warning against entrapment in a prominent place or near any fixed controls;

– permanently fix the label concerning the manual release adjacent to its actuating member;

– after installation, ensure that the mechanism is properly adjusted and that the drive reverses when the door contacts a 40 mm high object placed on the floor;

– the drive must not be used with a door incorporating a wicket door (unless the drive cannot be operated with the wicket door open);

– after installation, ensure that parts of the door do not extend over public footpaths or roads.

The instructions shall include necessary information for the 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.

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. **10**

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** shall be supplied with a label suitable for permanent fixing. For **automatic drives**, the label shall state the substance of the following:

WARNING: Automatic drive – Keep away from the area of the door since it may operate unexpectedly.

For other **drives**, the label shall include a warning sign having a height of at least 60 mm. The label shall also include the substance of the following:

WARNING: Keep children away when the door is moving.

~~NOTE~~ An example of a suitable warning sign is shown in Figure 102.

Compliance is checked by inspection and measurement.

7.102 **Drives** that use contact sensing as an **entrapment protection system** shall be supplied with a label that states the substance of the following:

WARNING: Risk of entrapment – Regularly check and, if necessary, adjust to ensure that, when the door contacts a 40 mm high object placed on the floor, the door reverses or the object can be freed.

Compliance is checked by inspection.

7.103 **Drives** shall be supplied with a label suitable for permanent fixing that describes how to use the manual release.

Compliance is checked by inspection.

7.104 If the **drive** is intended to be installed by the user, the packaging shall indicate the type of door, including its size and mass, that the **drive** is intended to operate and, if applicable, that the **drive**

– is intended to be installed at least 2,5 m above the floor or other access level;

– can be used with doors having openings greater than 50 mm in diameter;

– is intended for automatic operation.

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. 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 of more than 850 mm above the floor in normal use.* **11**

*Test probe 18 of IEC 61032 is not applied to parts of **drives** that according to the instructions are required to be mounted at a height of more than 1,8 m above the floor.* **12**

*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 test probe B, test probe 18 or test probe 19, as applicable.*

8.2 ~~*Modification*~~ *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.

10.2 *Modification:*

Instead of determining the mean value, the maximum value of the current is determined, inrush currents being ignored.

11 Heating

This clause of Part 1 is applicable except as follows.

11.3 *Addition:*

*Where the external **accessible surfaces** are suitably flat and access permits, then the test probe of Figure 103 is used to measure the temperature rises of external **accessible surfaces** specified in Table 101. The probe is applied with a force of 4 N ± 1 N to the surface in such a way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.*

The probe may be held in place using a laboratory stand clamp or similar device. Any measuring instrument giving the same results as the probe may be used. **13**

11.7 *Replacement:*

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

***Automatic drives** are operated without rest periods for 3 cycles based on the maximum size of door the **drive** is intended to operate or 4 min, whichever is longer.*

*Other **drives** are operated as follows:*

– ***drives** supplied without a door are operated without rest periods for a minimum of 2 min unless the rated operating time is longer;*
– ***drives** supplied with a door are operated without rest periods for 3 cycles.*

*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**.* **14**

*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, 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.* **15**

11.8 *Modification:*

Replace the first paragraph with the following:

During the test, the temperature rises are monitored continuously and shall not exceed the values shown in Table 3 and Table 101. **16**

Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions

Surface	*Temperature rise of external accessible surfaces* [a] *K*	
	Surfaces of appliances not more than 850 mm above the floor after installation	*Surfaces of appliances between 850 mm and 2,3 m above the floor after installation*
Bare metal	38	42
Coated metal [b]	42	49
Glass and ceramic	51	56
Plastic and plastic coating > 0,4 mm [c, d]	58	62

NOTE The temperature rise limits of handles, knobs, grips, keyboards, keypads and similar parts are specified in Table 3.

[a] *Temperature rises are not measured on surfaces of appliances which, according to the instructions, shall be fixed to a wall or ceiling and where these surfaces are inaccessible to a 75 mm diameter probe having a hemispherical end.*

[b] *Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel, powder or non-substantially plastic coating is used.*

[c] *The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.*

[d] *When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal for underlying metal apply or the temperature rise limits for glass or ceramic material for underlying glass or ceramic material apply.*

12 ~~Void~~ Charging of metal-ion batteries

This clause of Part 1 is applicable. **17**

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.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.1.1 *Addition:*

*Parts of **drives** intended to be exposed to outdoor conditions are subjected to the tests specified for IPX4 appliances.*

15.1.2 *Addition*:

*IPX4 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.

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:*

***Drives** are also subjected to the test of 19.101.*

19.9 Not applicable.

19.10 *Addition:*

*For **drives** having a manual release, the test is repeated with the **drive** released.*

The test is carried out for one cycle of operation if this is longer than 1 min.

19.13 *Addition:*

*If for the tests in 19.11.2 and 19.11.3, the **drive** can be operated when any of the fault conditions are simulated, the tests of 20.101 to 20.106 are carried out, the **drive**, however, being supplied at **rated voltage**.*

*After each test, the **drive** shall stop with the driven part in a safe position after a maximum of one cycle of operation or, if the **drive** can still be operated normally, it shall comply with the requirements of 20.101 to 20.104.*

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.

20.2 *Addition:*

*Moving parts of **drives** intended to be installed at a height of at least 2,5 m above the ~~ground~~ floor are considered to be positioned so that adequate protection is provided.*

~~*Addition:*~~

Chains moving at less than 0,2 m/s are not considered to be dangerous moving parts.

*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 of more than 1,8 m above the floor.* **18**

*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 2,5 m above the floor.* **19**

Test probe 19 of IEC 61032 is applied to parts of the appliance placed at a height not more than 850 mm above the floor in normal use under the conditions specified for test probe 18. **20**

20.101 **Drives** shall prevent doors from closing unexpectedly during normal use.

Compliance is checked by the following test.

*The **drive** is supplied at **rated voltage** but is not operated. It is loaded with 1,2 times the **rated load** applied for 30 min. If the **drive** is supplied with a door, the load is applied to the door and is equal to the highest force exerted by it. The highest force is determined with the door in the most unfavourable position, the **drive** not being energized. Automatic operation of **automatic drives** is rendered inoperative.*

There shall be no movement except for removal of any play in the system.

*The test is repeated with the **drive** supplied at 0,85 times **rated voltage** and with the supply disconnected.*

20.102 **Drives** controlled by a **biased-off switch** shall stop when the actuating member of the switch is released.

Compliance is checked by the following test.

*The **drive** is installed with a door and supplied at the most unfavourable voltage between 0,94 times and 1,06 times the **rated voltage**. It is operated to close the door. When the actuating member of the switch is released,*

- *if the closing force exerted by the door does not exceeds 150 N, as measured in 20.104.1, the bottom edge of the door shall stop;*
- *if the closing force exerted by the door exceeds 150 N, as measured in 20.104.1, the bottom edge of the door shall stop before it has travelled more than 50 mm vertically.*

The test is repeated during the opening movement of the door.

20.103 **Drives** incorporating an **entrapment protection system** with sensing devices which prevent the door coming into contact with an obstacle shall not cause injury resulting from a moving door.

Compliance is checked by the following test.

*The **drive** is installed with a door, the force exerted by the **drive** is set at the maximum value according to the instructions and the **drive** is supplied at the most unfavourable voltage between 0,94 times and 1,06 times the **rated voltage**.*

An obstacle having dimensions of approximately 80 mm × 300 mm and a height of 100 mm is placed on the ~~ground~~ floor and centrally along its 300 mm length across the door opening. The

drive *is operated to close the door from heights of 100 mm, 1 000 mm and the fully open position of the door. The door shall not move or only move in the opening direction.*

~~NOTE~~ *The obstacle is normally made of rough wood and painted white but other materials and colors can be used to simulate the most unfavourable conditions.*

The obstacle is positioned centrally in the door opening and is then raised in increments up to 300 mm from the height of the door, but not higher than 2,5 m. At each increment, the ***drive*** *is operated to close the door. The door shall stop within 50 mm or reverse its movement without contacting the obstacle.*

A cylindrical obstacle, having a diameter of 50 mm and a length of 850 mm, is suspended centrally in the door opening. It is suspended vertically with the upper end at a height of 900 mm above the ~~*ground*~~ *floor.*

The ***drive*** *is operated to close the door and the cylinder is swung across the door opening from an angle of 45°. The* ***entrapment protection system*** *shall cause the door to reverse its movement.*

The test is repeated from the fully open position with the obstacle positioned at 100 mm from each end of the door opening in turn.

During the tests, any ***biased-off switch*** *is held closed.*

20.104 **Drives** incorporating an **entrapment protection system** with sensing devices which rely on the door contacting an obstacle shall not cause injury resulting from a moving door.

Compliance is checked by the test of 20.104.1. If the ***drive*** *is an* ***automatic drive****, or a* ***drive*** *that operates the driven part in at least one direction by a command that can be initiated via a telecommunication or communication network, and for* ***drives*** *with a closing force exceeding 400 N, compliance is also checked by the test of 20.104.2 for a closing movement.*

The ***drive*** *is installed with a door, the force exerted by the* ***drive*** *is set at the maximum value according to the instructions and the* ***drive*** *is supplied at the most unfavorable voltage between 0,94 times and 1,06 times the* ***rated voltage****.*

During the tests, any ***biased-off switch*** *is held closed.*

20.104.1 *Any non-contact* ***entrapment protection system*** *is rendered inoperative.*

The ***drive*** *is operated to close the door from the fully open position and the* ***entrapment protection system*** *shall limit the vertical component of the average closing force to*

- *150 N during the first 5 s after the force has exceeded 25 N and*
- *25 N thereafter;*

or

- *400 N during the first 0,75 s after the force has exceeded 150 N,*
- *150 N during a further period of 4,25 s and*
- *25 N thereafter;*

or

- *800 N during the first 2 s after the force has exceeded 150 N for doors that do not swing outward,*
- *600 N during the first 2 s after the force has exceeded 150 N for doors that swing outward,*

– *150 N during a further period of 3 s and*

– *25 N thereafter.*

The force is measured by means of an instrument that incorporates a rigid plate having a diameter of 80 mm and a spring having a ratio of 500 N/mm ± 50 N/mm. The spring acts on a sensing element that is connected to an amplifier having a rise and fall time not exceeding 5 ms. The measuring instrument shall be accurate to within 5 %.

The force is measured on the bottom edge of the door at the following heights above the ~~ground~~ floor:

– *50 mm;*

– *300 mm;*

– *500 mm;*

– *2 500 mm, or 300 mm below the maximum opening height of the door if this is less than 2 800 mm.*

At each height, the force is measured at the following locations:

– *in the centre of the bottom edge of the door;*

– *200 mm from each end of the bottom edge of the door.*

The test is carried out three times and the arithmetic average closing force is calculated for each location.

NOTE The door can reverse its movement after contacting the obstacle.

20.104.2 *An obstacle having dimensions of approximately 80 mm × 300 mm and a height of 100 mm is placed on the ~~ground~~ floor and centrally along its 300 mm length across the door opening. The **drive** is operated to close the door from heights of 100 mm, 1 000 mm and the fully open position of the door. The door shall not move or only move in the opening direction.*

The test is repeated from the fully open position with the obstacle positioned at 100 mm from each end of the door opening in turn.

A cylindrical obstacle, having a diameter of 50 mm and a length of 850 mm, is suspended centrally in the door opening. It is suspended vertically with the upper end at a height of 900 mm above the ~~ground~~ floor.

*The **drive** is operated to close the door and the cylinder is swung across the door opening from an angle of 45°. The **entrapment protection system** shall cause the door to reverse its movement.*

20.105 **Drives** shall prevent entrapment in the opening direction.

Compliance is checked by the following test.

*The force exerted by the **drive** is set at the maximum value according to the instructions. A test piece having dimensions of approximately 200 mm × 300 mm, a height of 700 mm and a mass of 20 kg ± 0,5 kg is fixed centrally to the outside of the door, with the 300 mm edge adjacent to the bottom edge of the door.*

*The **drive** is supplied at the most unfavorable voltage between 0,94 times and 1,06 times the **rated voltage** and operated to open the door. The movement of the door shall stop before the test piece comes into contact with the lintel.*

20.106 Entrapment protection systems shall provide an adequate level of protection in the event of a failure within the system installation wiring.

*Compliance is checked by the following test, unless the **entrapment protection system** is a **biased-off switch**.*

*The **drive** is installed with a door and supplied at **rated voltage**. The **drive** is operated to close the door. During the movement, a short circuit or open circuit is simulated in the system installation wiring.*

*Unless the **entrapment protection system** continues to operate normally, the door shall stop moving or reverse and stop at the fully open position. After completing its movement, the door may be controlled by a supplementary **biased-off switch**.*

*If the **entrapment protection system** continues to operate normally, the test is repeated with one additional fault simulated.*

The test is repeated during the opening movement of the door.

20.107 A mechanical fault in the **drive** shall not result in a hazardous condition.

Compliance is checked by inspection and if necessary by test.

*The inspection shall evaluate which parts can affect the safety of operation and whether they are likely to break or become loose. These parts may be within the **drive** or used for connecting the **drive** to the door.*

~~NOTE~~ *Examples of parts which are evaluated are screws, pins, shafts, wheels, chains and supporting parts.*

*If the inspection cannot determine whether the **drive** will continue to operate normally or stop its movement when the part has failed, the following test is carried out.*

*The **drive** is installed with a door, the force exerted by the **drive** is set at the maximum value according to the instructions and the **drive** is supplied at the most unfavourable voltage between 0,94 times and 1,06 times the **rated voltage**.*

*The faults are introduced one at a time and the **drive** is operated as in normal use.*

*Unless the **drive** and the door continue to operate normally,*

- *the **drive** shall stop operating by the end of the cycle, and*
- *further operation shall not be possible, and*
- *the speed of the door shall not increase by more than 20 %.*

20.108 During the movement of the **drive** in either direction, the actuation of a manual control shall stop the movement if there is no separate button for the stop function.

If the control has a single button for controlling the movement, further actuation shall reverse the direction of movement.

If the control has three buttons for controlling the movement, one button shall be a stop button.

Compliance is checked by a manual test.

NOTE The test can be carried out without a door.

20.109 The appliance shall incorporate a manual release so that the door can be operated manually. Operation of the manual release shall not give rise to a hazard, such as kickback or unexpected operation of the **drive**.

Compliance is checked by operating the manual release with the door blocked by an obstacle placed at different heights during closing. The release shall be operable with a force not exceeding 220 N or a torque not exceeding 1,6 Nm.

*The test is carried out with the entrapment protection devices rendered inoperative and then without the **drive** being energized.*

20.110 **Drives** shall not restart automatically after the movement has stopped unintentionally.

NOTE 1 Unintentional stopping can be caused by interruption of the power supply or by operation of a **thermal cut-out**.

Compliance is checked by the following test.

*The appliance is supplied at **rated voltage** and operated under **normal operation**. The supply is then interrupted for at least 2 s. After the supply is restored, the **drive** shall not restart. However, **automatic drives** may restart, provided they function as in normal use.*

*The appliance is operated again and operation of a **thermal cut-out** is simulated. After the fault condition has been removed, the **drive** shall not restart. However, **automatic drives** may restart, provided they function as in normal use.*

NOTE 2 The test can be carried out without a door.

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 It shall not be possible to adjust the **drive** without the use of a **tool**.

Compliance is checked by inspection.

22.102 **Drives** shall be supplied with all associated components necessary for compliance with this standard.

Compliance is checked by inspection.

22.103 If the **entrapment protection system** is a **biased-off switch**, it shall only be possible to activate the **drive** when operating the switch within sight of the door.

Compliance is checked by inspection and test.

22.104 **Drives** shall not be provided with a control that renders the **entrapment protection system** inoperative. A malfunctioning **entrapment protection system** shall only be overridden by a **biased-off switch** in sight of the door but not on its first activation.

NOTE 1 The **biased-off switch** can be the control used to operate the **drive** as in normal use.

Compliance is checked by inspection and the following test.

*Each **entrapment protection system** is tested for proper operation and that it is not overridden when the **entrapment protection system** is fully functional. For each test, a fault is introduced in the **entrapment protection system**. The **biased-off switch** shall not override the malfunctioning **entrapment protection system** on its first activation.*

*Portable remote controls shall be checked to ensure that they do not override a malfunctioning **entrapment protection system** unless they can only activate the **drive** in sight of the door.*

NOTE 2 Releasing the **biased-off switch** is the same as introducing an obstruction.

~~NOTE 3~~ *It is acceptable for the activation of a **biased-off switch** to override a malfunctioning **entrapment protection system** on the second activation but not on the first activation which will act as an obstruction.*

22.105 The actuating member of the manual release shall be coloured red.

Compliance is checked by inspection.

22.106 All manual controls that operate the door shall have the same markings to indicate the functions.

Compliance is checked by inspection.

NOTE The control can be for remote operation or for wall mounting.

22.107 It shall only be possible to open and close the door by use of a manual control unless an **automatic drive** is provided.

Compliance is checked by inspection and test.

22.108 A **drive** for a door incorporating a wicket door shall be constructed so that the **drive** cannot be operated when the wicket door is open.

Compliance is checked by inspection and by the following test.

*The **drive** is installed with a door incorporating a wicket door and is supplied at **rated voltage**. The wicket door is opened and the **drive** is operated so as to open the door. The door shall not open.*

22.109 **Drives** shall incorporate

– a **biased-off switch**; or
– an **entrapment protection system** with sensing devices which prevent the door coming into contact with an obstacle; or
– an **entrapment protection system** with sensing devices which rely on the door contacting an obstacle.

Compliance is checked by inspection.

22.110 **Drives** intended for permanent connection to fixed wiring may be delivered with a separate connector to ease the installation and establish the supply connection. This connector shall be a **non-detachable part** once engaged. **21**

Additionally, this 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. **22**

Compliance is checked by inspection.

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.*

24.1.5 *Addition:*

*Connectors which are **non-detachable parts** once engaged are not considered to be part of an appliance coupler.* **23**

24.1.101 *The relevant standard for a connector as referenced in 22.110 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 subclauses 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. Subclause 6.5.1 is also applicable for connectors without breaking capacity (COC). Subclauses 6.15 and 6.16 are applicable but are modified to the **drive** temperature ratings. The tests in Subclauses 7.3.6 and 7.3.7 are performed when the connector referenced in this subclause is engaged.* **24**

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.3 *Add the following after the first dashed item*:

NOTE 101 The set of terminals can be located in a separate connector complying with 24.1.101. **25**

25.7 *Addition*:

The **supply cord** of **drives** for outdoor use shall be polychloroprene sheathed and not be lighter than ordinary polychloroprene sheathed 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.

29.2 *Addition:*

The microenvironment is pollution degree 3 unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.2.2 Not 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.

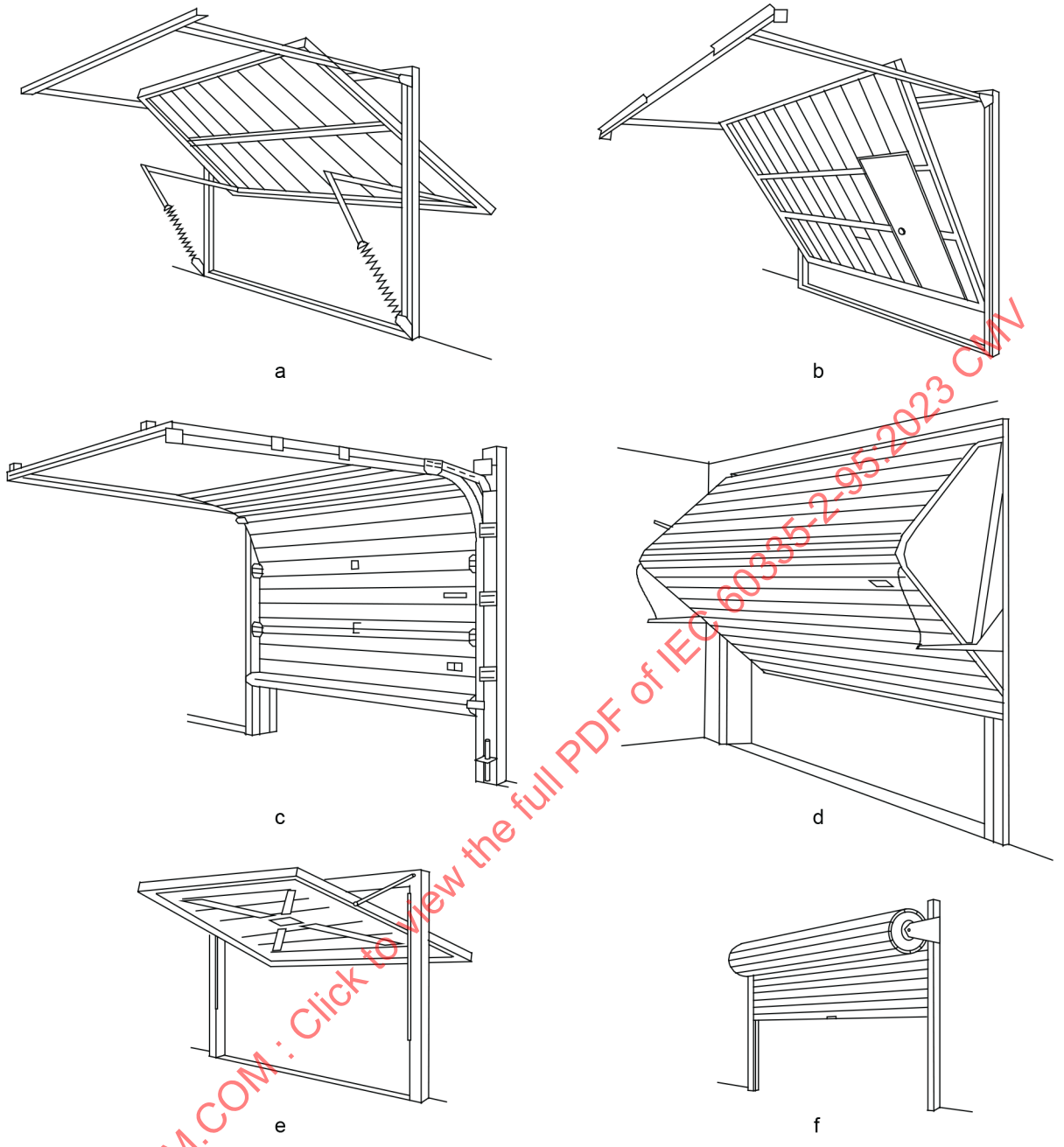
Before the test, coatings are scratched by means of a hardened steel pin, the end of which has the form of a cone with an angle of 40°. Its tip is rounded with a radius of 0,25 mm ± 0,02 mm. The pin is loaded so that the force exerted along its axis is 10 N ± 0,5 N. The scratches are

made by drawing the pin along the surface 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 appliance 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.



Types

a One-piece door with horizontal track

b One-piece door, with vertical and horizontal tracks, containing a wicket door

c Sectional door with horizontal and vertical track

d Sectional door with horizontal folding

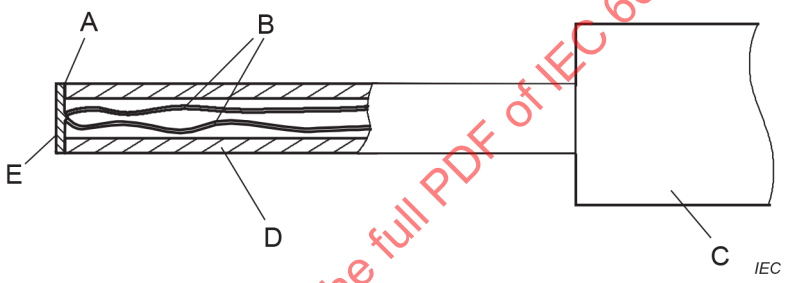
e Vertical tracked canopy door

f Rolling door

Figure 101 – Examples of types of garage doors

NOTE Form and colours are in accordance with ISO 3864-1.

Figure 102 – Example of pictogram warning against child entrapment



Key

A adhesive

B thermocouple wires 0,3 mm diameter to IEC 60584-1 Type K

C handle arrangement permitting a contact force of 4 N ± 1 N

D polycarbonate tube: inside diameter 3 mm, outside diameter 5 mm

E tinned copper disc: 5 mm diameter, 0,5 mm thick with a flat contact face

Figure 103 – Probe for measuring surface temperatures

Annexes

The annexes of Part 1 are applicable except as follows:

Annex B
(normative)

Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances

This annex of Part 1 is applicable except as follows:

11.1 *Replacement:*

Battery-operated appliances, their surroundings, and **batteries** shall not attain excessive temperatures in normal use.

Compliance is checked by determining the temperature rise of the various parts under the conditions specified in B.11.1, 11.2, 11.3, 11.7, and 11.8.

*For **drives** for continuous operation B.11.1 is applicable.*

*For other **drives**, B.11.1 is not applicable. Instead, other **drives** are tested according to 11.7 started with **fully charged battery**.*

*Any **batteries** shall not be depleted before the end of the rated operating time or rated number of operating cycles defined in 11.7.* **26**

NOTE The temperature rising of the motor and surroundings parts are checked according to 11.7.

B.22.3 *Addition:*

Test probe 19 of IEC 61032 is also applied as specified for test probe 18.

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

*Test probe 18 of IEC 61032 is not applied to parts of **drives** that according to the instructions are required to be mounted at a height of more than 1,8 m above the floor.* **27**

B.22.4 *Addition:*

Test probe 19 of IEC 61032 is also applied as specified for test probe 18.

*Test probe 19 of IEC 61032 is not applied to parts of **batteries** that are located at a height of more than 850 mm above the floor in normal use.*

*Test probe 18 of IEC 61032 is not applied to parts of **batteries** that according to the instructions are required to be mounted at a height of more than 1,8 m above the floor.* **28**

Annex R
(normative)

Software evaluation

This annex of Part 1 is applicable except as follows:

R.2.2.5 *Addition:*

For other **programmable electronic circuits** with functions requiring software incorporating measures to control the fault/error conditions specified in Table R.1, detection of a fault/error shall occur within one cycle of operation if compliance with Clause 20 is impaired.

R.2.2.9 *Addition:*

For other **programmable electronic circuits**, the software and safety-related hardware under its control shall be initialized and shall terminate within one cycle of operation if compliance Clause 20 is impaired.

Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

IEC 60335-2-97, *Household and similar electrical appliances – Safety – Part 2-97: Particular requirements for drives for shutters, awnings, blinds and similar equipment*

IEC 60335-2-103, *Household and similar electrical appliances – Safety – Part 2-103: Particular requirements for drives for gates, doors and windows*

ISO 3864-1, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings*

List of comments

1 This revision is for alignment with IEC 60335-1:2020.

2 This revision is for alignment with IEC 60335-1:2020.

3 This revision is for alignment with IEC 60335-1:2020.

4 This revision is for alignment with IEC 60335-1:2020.

5 This revision maintains the normal operation while charging as specified in IEC 60335-1:2020.

6 Rewording of the existing definition to be coherent with other Part 2 of the standard (e.g. IEC 60335-2-97).

7 The instruction is relocated to avoid any confusion for automatic and non-automatic system.

8 Because the minimum height of installation determines the appropriate accessibility probes and surface temperature limits, the installation instructions must include the minimum height of installation.

9 This rewording is for clarification of the existing requirements.

10 This additional instruction is related to the allowance of a separate connector in Subclause 22.110. The instruction is intended to avoid the mating of male and female parts of connectors not tested with the drive.

11 Parts of drives can be located on or near the floor where they would be accessible to children up to 3 years in age. However, parts of drives located above 850 mm are not considered to be within reach of these children, so test probe 19 is not applied.

12 Parts of drives located above 1,8 m are not considered to be within reach of children up to 14 years in age according to IEC Guide 117, so test probe 18 is not applied.

13 Limits on the temperature rise of external accessible surfaces are introduced to address the risk of thermal injury from contact with external accessible surfaces based on IEC Guide 117 for Temperatures of touchable hot surfaces.

14 This revision is for alignment with IEC 60335-1:2020.

15 This revision is for alignment with IEC 60335-1:2020 taking into account the cyclical operation of drives.

16 Limits on the temperature rise of external accessible surfaces are introduced to address the risk of thermal injury from contact with external accessible surfaces based on IEC Guide 117 for Temperatures of touchable hot surfaces.

17 This revision is for alignment with IEC 60335-1:2020.

18 Parts of drives located above 1,8 m are not considered to be within reach of children up to 14 years in age according to IEC Guide 117, so test probe 18 is not applied.

19 Parts of drives located above 2,5 m are not considered to be within reach of adults according to IEC Guide 117, so test probe B is not applied.

20 Parts of drives can be located on or near the floor where they would be accessible to children up to 3 years in age. However, parts of drives located above 850 mm are not considered to be within reach of these children, so test probe 19 is not applied.

21 This addition allows use of a separate connector for the supply connection. Since fixed drives are connected to the power cord, the length is often adapted. Some flexibility during installation is required.

22 This is to avoid the separate connector for installation purposes that can mate with standardised plug systems.

23 This note clarifies that the separate connector referenced in Subclause 22.110 should not be confused with an appliance coupler because it cannot be disconnected “at will“ (IEC ref 442-07-01).

24 Subclause 24.1.101 sets the requirements for the separate connector referenced in Subclause 22.110 and the conditions under which it must comply with selected parts of IEC 61984:2008. Requirements in clauses made not applicable are already part of 60335 elsewhere or not relevant for this type of connector.

25 This is a clarification that a supply connection utilising a separate connector as referenced in Subclause 22.110, will be allowed under the first dashed item (see Subclause 25.3 in IEC 60335-1:2020)

26 This revision is for alignment with IEC 60335-1:2020 taking into consideration the cyclical operation of drives.

27 This text is introduced to specify where test probes 18 and 19 are applied to align with the requirements in Subclause 8.1.1.

28 This text is introduced to specify where test probes 18 and 19 are applied to align with the requirements in Subclause 8.1.1.

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IEC 60335-2-95

Edition 5.0 2023-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Household and similar electrical appliances – Safety – Part 2-95: Particular requirements for drives for vertically moving garage doors for residential use

Appareils électrodomestiques et analogues – Sécurité – Partie 2-95: Exigences particulières pour les motorisations de portes de garage à ouverture verticale, pour usage résidentiel

IEC 60335-2-95:2023-12(en-fr)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-95: Particular requirements for drives for vertically moving garage doors for residential use

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IEC 60335-2-95 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 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, 7.12.1, 7.101, 20.103, 20.107, 22.104);

d) application of test probe 19 has been introduced (8.1.1, 20.2);

e) addition of surface temperatures for external accessible surfaces (11.3, 11.8);

f) requirements are added for drives intended for permanent connection delivered with a connector to ease the installation (22.110, 24.1.101, 25.3);

g) clarification for connectors that are non-detachable once engaged (24.1.5).

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

Draft	Report on voting
61/7015/FDIS	61/7080/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: Particular requirements for drives for vertically moving garage doors for residential use.

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, or
- revised.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations can 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.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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 can 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 2-95: Particular requirements for drives for vertically moving garage doors for residential use

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 garage doors for residential use that open and close in a vertical direction, the **rated voltage** of the **drives** being not more than 250 V for single-phase appliances and 480 V for other appliances, including direct current (DC) supplied appliances and **battery-operated appliances**. It also covers the hazards associated with the movement of these electrically driven garage doors.

Examples of garage doors are shown in Figure 101.

The **drive** can be supplied with a garage door.

This standard also applies to **entrapment protection devices** for use with **drives**. It does not cover hazards related to the mechanisms of the door itself.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account playing with the appliance by young children, but recognizes that children can be in the vicinity of the garage door.

For appliances intended to be used in vehicles or on board ships or aircraft, additional requirements can 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 shutters, awnings, blinds and similar equipment (IEC 60335-2-97);
– for gates, doors and windows (IEC 60335-2-103);
– for commercial and industrial purposes;
– intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60068-2-52:2017, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*

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 *Modification:*

Replace the first paragraph with the following:

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

– **drives** supplied without a door are operated with their **rated load**.

– **drives** supplied with a door are operated with the door installed in accordance with the instructions.

3.1.101
rated load
force or torque 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 door

Note 1 to entry: Examples of components are gears, controls, brakes and **entrapment protection systems**.

3.5.102
automatic drive
drive that operates the door in at least one direction without intentional activation by the user

3.7 Definitions relating to safety components

3.7.101
biased-off switch
hold to run device that initiates and maintains the **drive** movement only as long as the manual control is actuated by the user

3.7.102
entrapment protection system
part of the **drive** that protects against trapping which could result in the human body being squeezed or crushed by the door

Note 1 to entry: Trapping in the garage is covered by the manual release of 20.109.

Note 2 to entry: An **entrapment protection system** may be incorporated in the motor assembly or may be installed separately. It may consist of one or more devices, such as pressure sensitive edges, passive infrared, active light sensing devices or a **biased-off switch**.

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 door, the door specified for installation with the **drive** that gives the most unfavourable conditions for the test is used. An artificial load may be used to simulate the door for some of the tests. The **drive** is adjusted in accordance with the instructions.*

5.5 *Addition:*

Wicket doors are kept closed during the tests.

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 *Modification:*

Replace the first paragraph with the following:

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

6.2 *Addition:*

Drives intended to be exposed to outdoor conditions shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 *Modification:*

Replace the third dashed item of the first paragraph with the following:

Drives shall be marked with the **rated power input**.

Addition:

Drives supplied without a door shall be marked with the **rated load** in N or in Nm.

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 all instructions. Save these instructions.

The instructions shall include the substance of the following:

– do not allow children to play with door controls. Keep remote controls away from children;
– take care when operating the manual release since an open door may fall rapidly due to weak or broken springs, or being out of balance;
– frequently examine the installation, in particular check cables, springs and mountings for signs of wear, damage or imbalance. Do not use if repair or adjustment is needed since a fault in the installation or an incorrectly balanced door may cause injury;

– each month check that the drive reverses when the door contacts a 40 mm high object placed on the floor. Adjust if necessary and recheck since an incorrect adjustment may present a hazard;
– disconnect the supply when cleaning or carrying out other maintenance.

The instructions shall include the following information:

– details on how to use the manual release;
– information concerning the adjustment of the door and **drive** (when applicable).

The instruction for other than **automatic drives** shall state the substance of the following:

Watch the moving door and keep people away until the door is completely opened or closed.

The instructions for **automatic drives** shall state the substance of the following:

WARNING: Automatic door – The door may operate unexpectedly, therefore do not allow anything to stay in the path of the door.

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 include details for the installation of the **drive** and its associated components, including the minimum height for installation of parts of **drives** intended to be mounted more than 850 mm, 1,8 m or 2,3 m or at least 2,5 m above the floor in accordance with 8.1.1, Table 101, 20.2, 20.103, B.22.3 or B.22.4.

For **drives** supplied without a door, the installation instructions shall indicate the type, size and mass of doors for which the **drive** is intended to be used.

The installation instructions shall include the substance of the following:

– before installing the drive, remove all unnecessary ropes or chains and disable any equipment, such as locks, not needed for powered operation;
– before installing the drive, check that the door is in good mechanical condition, correctly balanced and opens and closes properly;
– install the actuating member for the manual release at a height less than 1,8 m;
– install any fixed control, other than key-operated switches, at a height of at least 1,5 m;
– install any fixed control within sight of the door but away from moving parts;
– permanently fix the labels warning against entrapment in a prominent place or near any fixed controls;
– permanently fix the label concerning the manual release adjacent to its actuating member;
– after installation, ensure that the mechanism is properly adjusted and that the drive reverses when the door contacts a 40 mm high object placed on the floor;
– the drive must not be used with a door incorporating a wicket door (unless the drive cannot be operated with the wicket door open);
– after installation, ensure that parts of the door do not extend over public footpaths or roads.

The instructions shall include necessary information for the 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.

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.

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** shall be supplied with a label suitable for permanent fixing. For **automatic drives**, the label shall state the substance of the following:

WARNING: Automatic drive – Keep away from the area of the door since it may operate unexpectedly.

For other **drives**, the label shall include a warning sign having a height of at least 60 mm. The label shall also include the substance of the following:

WARNING: Keep children away when the door is moving.

An example of a suitable warning sign is shown in Figure 102.

Compliance is checked by inspection and measurement.

7.102 **Drives** that use contact sensing as an **entrapment protection system** shall be supplied with a label that states the substance of the following:

WARNING: Risk of entrapment – Regularly check and, if necessary, adjust to ensure that, when the door contacts a 40 mm high object placed on the floor, the door reverses or the object can be freed.

Compliance is checked by inspection.

7.103 **Drives** shall be supplied with a label suitable for permanent fixing that describes how to use the manual release.

Compliance is checked by inspection.

7.104 If the **drive** is intended to be installed by the user, the packaging shall indicate the type of door, including its size and mass, that the **drive** is intended to operate and, if applicable, that the **drive**

– is intended to be installed at least 2,5 m above the floor or other access level;
– can be used with doors having openings greater than 50 mm in diameter;
– is intended for automatic operation.

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. 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 of more than 850 mm above the floor in normal use.*

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

*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 test probe B, test probe 18 or test probe 19, as applicable.*

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.

10.2 *Modification:*

Instead of determining the mean value, the maximum value of the current is determined, inrush currents being ignored.

11 Heating

This clause of Part 1 is applicable except as follows.

11.3 *Addition:*

Where the external ***accessible surfaces*** *are suitably flat and access permits, then the test probe of Figure 103 is used to measure the temperature rises of external* ***accessible surfaces*** *specified in Table 101. The probe is applied with a force of 4 N ± 1 N to the surface in such a way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.*

The probe may be held in place using a laboratory stand clamp or similar device. Any measuring instrument giving the same results as the probe may be used.

11.7 *Replacement:*

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

Automatic drives *are operated without rest periods for 3 cycles based on the maximum size of door the* ***drive*** *is intended to operate or 4 min, whichever is longer.*

Other ***drives*** *are operated as follows:*

– ***drives*** *supplied without a door are operated without rest periods for a minimum of 2 min unless the rated operating time is longer;*

– ***drives*** *supplied with a door are operated without rest periods for 3 cycles.*

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, 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.*

11.8 *Modification:*

Replace the first paragraph with the following:

During the test, the temperature rises are monitored continuously and shall not exceed the values shown in Table 3 and Table 101*.*

Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions

Surface	*Temperature rise of external accessible surfaces* [a] *K*	
	Surfaces of appliances not more than 850 mm above the floor after installation	***Surfaces of appliances between 850 mm and 2,3 m above the floor after installation***
Bare metal	38	42
Coated metal [b]	42	49
Glass and ceramic	51	56
Plastic and plastic coating > 0,4 mm [c, d]	58	62
NOTE The temperature rise limits of handles, knobs, grips, keyboards, keypads and similar parts are specified in Table 3.		

[a] *Temperature rises are not measured on surfaces of appliances which, according to the instructions, shall be fixed to a wall or ceiling and where these surfaces are inaccessible to a 75 mm diameter probe having a hemispherical end.*

[b] *Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel, powder or non-substantially plastic coating is used.*

[c] *The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.*

[d] *When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal for underlying metal apply or the temperature rise limits for glass or ceramic material for underlying glass or ceramic material apply.*

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.

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.1.1 *Addition:*

*Parts of **drives** intended to be exposed to outdoor conditions are subjected to the tests specified for IPX4 appliances.*

15.1.2 *Addition*:

*IPX4 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.

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:*

***Drives** are also subjected to the test of 19.101.*

19.9 Not applicable.

19.10 *Addition:*

*For **drives** having a manual release, the test is repeated with the **drive** released.*

The test is carried out for one cycle of operation if this is longer than 1 min.

19.13 *Addition:*

*If for the tests in 19.11.2 and 19.11.3, the **drive** can be operated when any of the fault conditions are simulated, the tests of 20.101 to 20.106 are carried out, the **drive**, however, being supplied at **rated voltage**.*

*After each test, the **drive** shall stop with the driven part in a safe position after a maximum of one cycle of operation or, if the **drive** can still be operated normally, it shall comply with the requirements of 20.101 to 20.104.*

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.

20.2 *Addition:*

*Moving parts of **drives** intended to be installed at a height of at least 2,5 m above the floor are considered to be positioned so that adequate protection is provided.*

Chains moving at less than 0,2 m/s are not considered to be dangerous moving parts.

*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 of more than 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 2,5 m above the floor.*

Test probe 19 of IEC 61032 is applied to parts of the appliance placed at a height not more than 850 mm above the floor in normal use under the conditions specified for test probe 18.

20.101 **Drives** shall prevent doors from closing unexpectedly during normal use.

Compliance is checked by the following test.

*The **drive** is supplied at **rated voltage** but is not operated. It is loaded with 1,2 times the **rated load** applied for 30 min. If the **drive** is supplied with a door, the load is applied to the door and is equal to the highest force exerted by it. The highest force is determined with the door in the most unfavourable position, the **drive** not being energized. Automatic operation of **automatic drives** is rendered inoperative.*

There shall be no movement except for removal of any play in the system.

*The test is repeated with the **drive** supplied at 0,85 times **rated voltage** and with the supply disconnected.*

20.102 **Drives** controlled by a **biased-off switch** shall stop when the actuating member of the switch is released.

Compliance is checked by the following test.

*The **drive** is installed with a door and supplied at the most unfavourable voltage between 0,94 times and 1,06 times the **rated voltage**. It is operated to close the door. When the actuating member of the switch is released,*

- *if the closing force exerted by the door does not exceeds 150 N, as measured in 20.104.1, the bottom edge of the door shall stop;*
- *if the closing force exerted by the door exceeds 150 N, as measured in 20.104.1, the bottom edge of the door shall stop before it has travelled more than 50 mm vertically.*

The test is repeated during the opening movement of the door.

20.103 **Drives** incorporating an **entrapment protection system** with sensing devices which prevent the door coming into contact with an obstacle shall not cause injury resulting from a moving door.

Compliance is checked by the following test.

*The **drive** is installed with a door, the force exerted by the **drive** is set at the maximum value according to the instructions and the **drive** is supplied at the most unfavourable voltage between 0,94 times and 1,06 times the **rated voltage**.*

*An obstacle having dimensions of approximately 80 mm × 300 mm and a height of 100 mm is placed on the floor and centrally along its 300 mm length across the door opening. The **drive** is operated to close the door from heights of 100 mm, 1 000 mm and the fully open position of the door. The door shall not move or only move in the opening direction.*

The obstacle is normally made of rough wood and painted white but other materials and colors can be used to simulate the most unfavourable conditions.

*The obstacle is positioned centrally in the door opening and is then raised in increments up to 300 mm from the height of the door, but not higher than 2,5 m. At each increment, the **drive** is operated to close the door. The door shall stop within 50 mm or reverse its movement without contacting the obstacle.*

A cylindrical obstacle, having a diameter of 50 mm and a length of 850 mm, is suspended centrally in the door opening. It is suspended vertically with the upper end at a height of 900 mm above the floor.

*The **drive** is operated to close the door and the cylinder is swung across the door opening from an angle of 45°. The **entrapment protection system** shall cause the door to reverse its movement.*

The test is repeated from the fully open position with the obstacle positioned at 100 mm from each end of the door opening in turn.

*During the tests, any **biased-off switch** is held closed.*

20.104 **Drives** incorporating an **entrapment protection system** with sensing devices which rely on the door contacting an obstacle shall not cause injury resulting from a moving door.

*Compliance is checked by the test of 20.104.1. If the **drive** is an **automatic drive**, or a **drive** that operates the driven part in at least one direction by a command that can be initiated via a telecommunication or communication network, and for **drives** with a closing force exceeding 400 N, compliance is also checked by the test of 20.104.2 for a closing movement.*

*The **drive** is installed with a door, the force exerted by the **drive** is set at the maximum value according to the instructions and the **drive** is supplied at the most unfavorable voltage between 0,94 times and 1,06 times the **rated voltage**.*

*During the tests, any **biased-off switch** is held closed.*

20.104.1 *Any non-contact **entrapment protection system** is rendered inoperative.*

*The **drive** is operated to close the door from the fully open position and the **entrapment protection system** shall limit the vertical component of the average closing force to*

- *150 N during the first 5 s after the force has exceeded 25 N and*
- *25 N thereafter;*

or

- *400 N during the first 0,75 s after the force has exceeded 150 N,*
- *150 N during a further period of 4,25 s and*
- *25 N thereafter;*

or

- *800 N during the first 2 s after the force has exceeded 150 N for doors that do not swing outward,*
- *600 N during the first 2 s after the force has exceeded 150 N for doors that swing outward,*
- *150 N during a further period of 3 s and*
- *25 N thereafter.*

The force is measured by means of an instrument that incorporates a rigid plate having a diameter of 80 mm and a spring having a ratio of 500 N/mm ± 50 N/mm. The spring acts on a sensing element that is connected to an amplifier having a rise and fall time not exceeding 5 ms. The measuring instrument shall be accurate to within 5 %.

The force is measured on the bottom edge of the door at the following heights above the floor:

- *50 mm;*
- *300 mm;*
- *500 mm;*
- *2 500 mm, or 300 mm below the maximum opening height of the door if this is less than 2 800 mm.*

At each height, the force is measured at the following locations:

- *in the centre of the bottom edge of the door;*
- *200 mm from each end of the bottom edge of the door.*

The test is carried out three times and the arithmetic average closing force is calculated for each location.

NOTE The door can reverse its movement after contacting the obstacle.

20.104.2 *An obstacle having dimensions of approximately 80 mm × 300 mm and a height of 100 mm is placed on the floor and centrally along its 300 mm length across the door opening. The **drive** is operated to close the door from heights of 100 mm, 1 000 mm and the fully open position of the door. The door shall not move or only move in the opening direction.*

The test is repeated from the fully open position with the obstacle positioned at 100 mm from each end of the door opening in turn.

A cylindrical obstacle, having a diameter of 50 mm and a length of 850 mm, is suspended centrally in the door opening. It is suspended vertically with the upper end at a height of 900 mm above the floor.

*The **drive** is operated to close the door and the cylinder is swung across the door opening from an angle of 45°. The **entrapment protection system** shall cause the door to reverse its movement.*

20.105 **Drives** shall prevent entrapment in the opening direction.

Compliance is checked by the following test.

*The force exerted by the **drive** is set at the maximum value according to the instructions. A test piece having dimensions of approximately 200 mm × 300 mm, a height of 700 mm and a mass of 20 kg ± 0,5 kg is fixed centrally to the outside of the door, with the 300 mm edge adjacent to the bottom edge of the door.*

*The **drive** is supplied at the most unfavorable voltage between 0,94 times and 1,06 times the **rated voltage** and operated to open the door. The movement of the door shall stop before the test piece comes into contact with the lintel.*

20.106 **Entrapment protection systems** shall provide an adequate level of protection in the event of a failure within the system installation wiring.

*Compliance is checked by the following test, unless the **entrapment protection system** is a **biased-off switch**.*

*The **drive** is installed with a door and supplied at **rated voltage**. The **drive** is operated to close the door. During the movement, a short circuit or open circuit is simulated in the system installation wiring.*

*Unless the **entrapment protection system** continues to operate normally, the door shall stop moving or reverse and stop at the fully open position. After completing its movement, the door may be controlled by a supplementary **biased-off switch**.*

*If the **entrapment protection system** continues to operate normally, the test is repeated with one additional fault simulated.*

The test is repeated during the opening movement of the door.

20.107 A mechanical fault in the **drive** shall not result in a hazardous condition.

Compliance is checked by inspection and if necessary by test.

*The inspection shall evaluate which parts can affect the safety of operation and whether they are likely to break or become loose. These parts may be within the **drive** or used for connecting the **drive** to the door.*

Examples of parts which are evaluated are screws, pins, shafts, wheels, chains and supporting parts.

*If the inspection cannot determine whether the **drive** will continue to operate normally or stop its movement when the part has failed, the following test is carried out.*

*The **drive** is installed with a door, the force exerted by the **drive** is set at the maximum value according to the instructions and the **drive** is supplied at the most unfavourable voltage between 0,94 times and 1,06 times the **rated voltage**.*

*The faults are introduced one at a time and the **drive** is operated as in normal use.*

*Unless the **drive** and the door continue to operate normally,*

- *the **drive** shall stop operating by the end of the cycle, and*
- *further operation shall not be possible, and*
- *the speed of the door shall not increase by more than 20 %.*

20.108 During the movement of the **drive** in either direction, the actuation of a manual control shall stop the movement if there is no separate button for the stop function.

If the control has a single button for controlling the movement, further actuation shall reverse the direction of movement.

If the control has three buttons for controlling the movement, one button shall be a stop button.

Compliance is checked by a manual test.

NOTE The test can be carried out without a door.

20.109 The appliance shall incorporate a manual release so that the door can be operated manually. Operation of the manual release shall not give rise to a hazard, such as kickback or unexpected operation of the **drive**.

Compliance is checked by operating the manual release with the door blocked by an obstacle placed at different heights during closing. The release shall be operable with a force not exceeding 220 N or a torque not exceeding 1,6 Nm.

*The test is carried out with the entrapment protection devices rendered inoperative and then without the **drive** being energized.*

20.110 **Drives** shall not restart automatically after the movement has stopped unintentionally.

NOTE 1 Unintentional stopping can be caused by interruption of the power supply or by operation of a **thermal cut-out**.

Compliance is checked by the following test.

*The appliance is supplied at **rated voltage** and operated under **normal operation**. The supply is then interrupted for at least 2 s. After the supply is restored, the **drive** shall not restart. However, **automatic drives** may restart, provided they function as in normal use.*

*The appliance is operated again and operation of a **thermal cut-out** is simulated. After the fault condition has been removed, the **drive** shall not restart. However, **automatic drives** may restart, provided they function as in normal use.*

NOTE 2 The test can be carried out without a door.

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 It shall not be possible to adjust the **drive** without the use of a **tool**.

Compliance is checked by inspection.

22.102 **Drives** shall be supplied with all associated components necessary for compliance with this standard.

Compliance is checked by inspection.

22.103 If the **entrapment protection system** is a **biased-off switch**, it shall only be possible to activate the **drive** when operating the switch within sight of the door.

Compliance is checked by inspection and test.

22.104 **Drives** shall not be provided with a control that renders the **entrapment protection system** inoperative. A malfunctioning **entrapment protection system** shall only be overridden by a **biased-off switch** in sight of the door but not on its first activation.

NOTE 1 The **biased-off switch** can be the control used to operate the **drive** as in normal use.

Compliance is checked by inspection and the following test.

*Each **entrapment protection system** is tested for proper operation and that it is not overridden when the **entrapment protection system** is fully functional. For each test, a fault is introduced in the **entrapment protection system**. The **biased-off switch** shall not override the malfunctioning **entrapment protection system** on its first activation.*

*Portable remote controls shall be checked to ensure that they do not override a malfunctioning **entrapment protection system** unless they can only activate the **drive** in sight of the door.*

NOTE 2 Releasing the **biased-off switch** is the same as introducing an obstruction.

*It is acceptable for the activation of a **biased-off switch** to override a malfunctioning **entrapment protection system** on the second activation but not on the first activation which will act as an obstruction.*

22.105 The actuating member of the manual release shall be coloured red.

Compliance is checked by inspection.

22.106 All manual controls that operate the door shall have the same markings to indicate the functions.

Compliance is checked by inspection.

NOTE The control can be for remote operation or for wall mounting.

22.107 It shall only be possible to open and close the door by use of a manual control unless an **automatic drive** is provided.

Compliance is checked by inspection and test.

22.108 A **drive** for a door incorporating a wicket door shall be constructed so that the **drive** cannot be operated when the wicket door is open.

Compliance is checked by inspection and by the following test.

*The **drive** is installed with a door incorporating a wicket door and is supplied at **rated voltage**. The wicket door is opened and the **drive** is operated so as to open the door. The door shall not open.*

22.109 **Drives** shall incorporate

– a **biased-off switch**; or
– an **entrapment protection system** with sensing devices which prevent the door coming into contact with an obstacle; or
– an **entrapment protection system** with sensing devices which rely on the door contacting an obstacle.

Compliance is checked by inspection.

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

Additionally, this 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 inspection.

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.*

24.1.5 *Addition:*

*Connectors which are **non-detachable parts** once engaged are not considered to be part of an appliance coupler.*

24.1.101 *The relevant standard for a connector as referenced in 22.110 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 subclauses 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. Subclause 6.5.1 is also applicable for connectors without breaking capacity (COC). Subclauses 6.15 and 6.16 are applicable but are modified to the **drive** temperature ratings. The tests in Subclauses 7.3.6 and 7.3.7 are performed when the connector referenced in this subclause is engaged.*

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.3 *Add the following after the first dashed item*:

NOTE 101 The set of terminals can be located in a separate connector complying with 24.1.101.

25.7 *Addition*:

The **supply cord** of **drives** for outdoor use shall be polychloroprene sheathed and not be lighter than ordinary polychloroprene sheathed 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.

29.2 *Addition:*

The microenvironment is pollution degree 3 unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.2.2 Not 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.

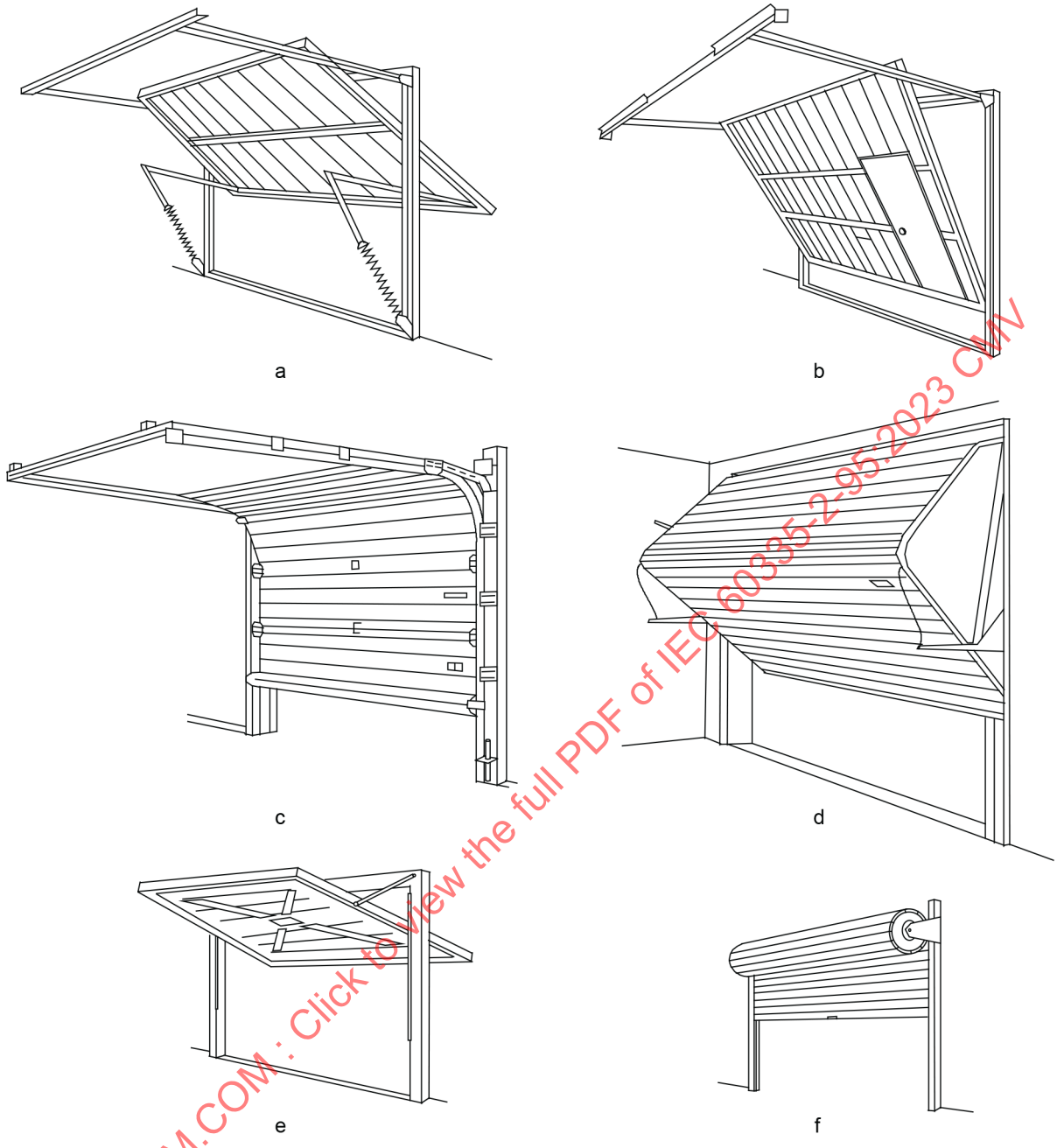
Before the test, coatings are scratched by means of a hardened steel pin, the end of which has the form of a cone with an angle of 40°. Its tip is rounded with a radius of 0,25 mm ± 0,02 mm. The pin is loaded so that the force exerted along its axis is 10 N ± 0,5 N. The scratches are

made by drawing the pin along the surface 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 appliance 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.



Types

a One-piece door with horizontal track

b One-piece door, with vertical and horizontal tracks, containing a wicket door

c Sectional door with horizontal and vertical track

d Sectional door with horizontal folding

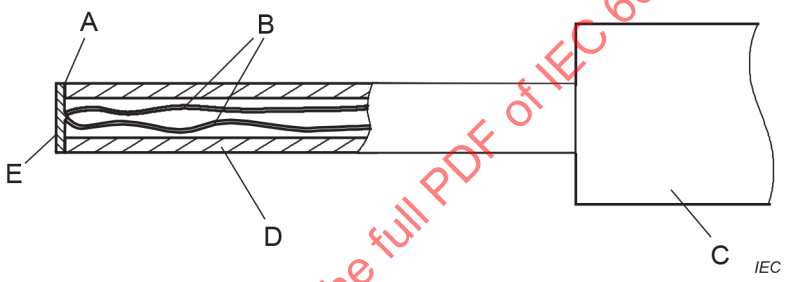
e Vertical tracked canopy door

f Rolling door

Figure 101 – Examples of types of garage doors

NOTE Form and colours are in accordance with ISO 3864-1.

Figure 102 – Example of pictogram warning against child entrapment



Key

A adhesive

B thermocouple wires 0,3 mm diameter to IEC 60584-1 Type K

C handle arrangement permitting a contact force of 4 N ± 1 N

D polycarbonate tube: inside diameter 3 mm, outside diameter 5 mm

E tinned copper disc: 5 mm diameter, 0,5 mm thick with a flat contact face

Figure 103 – Probe for measuring surface temperatures

Annexes

The annexes of Part 1 are applicable except as follows:

Annex B
(normative)

Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances

This annex of Part 1 is applicable except as follows:

11.1 *Replacement:*

Battery-operated appliances, their surroundings, and **batteries** shall not attain excessive temperatures in normal use.

Compliance is checked by determining the temperature rise of the various parts under the conditions specified in B.11.1, 11.2, 11.3, 11.7, and 11.8.

*For **drives** for continuous operation B.11.1 is applicable.*

*For other **drives**, B.11.1 is not applicable. Instead, other **drives** are tested according to 11.7 started with **fully charged battery**.*

*Any **batteries** shall not be depleted before the end of the rated operating time or rated number of operating cycles defined in 11.7.*

NOTE The temperature rising of the motor and surroundings parts are checked according to 11.7.

B.22.3 *Addition:*

Test probe 19 of IEC 61032 is also applied as specified for test probe 18.

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

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

B.22.4 *Addition:*

Test probe 19 of IEC 61032 is also applied as specified for test probe 18.

*Test probe 19 of IEC 61032 is not applied to parts of **batteries** that are located at a height of more than 850 mm above the floor in normal use.*

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

Annex R
(normative)

Software evaluation

This annex of Part 1 is applicable except as follows:

R.2.2.5 *Addition:*

For other **programmable electronic circuits** with functions requiring software incorporating measures to control the fault/error conditions specified in Table R.1, detection of a fault/error shall occur within one cycle of operation if compliance with Clause 20 is impaired.

R.2.2.9 *Addition:*

For other **programmable electronic circuits**, the software and safety-related hardware under its control shall be initialized and shall terminate within one cycle of operation if compliance Clause 20 is impaired.

Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

IEC 60335-2-97, *Household and similar electrical appliances – Safety – Part 2-97: Particular requirements for drives for shutters, awnings, blinds and similar equipment*

IEC 60335-2-103, *Household and similar electrical appliances – Safety – Part 2-103: Particular requirements for drives for gates, doors and windows*

ISO 3864-1, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings*

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SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-95: Exigences particulières pour les motorisations de portes de garage à ouverture verticale, pour usage résidentiel

AVANT-PROPOS

1) La Commission Électrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
9) L'IEC attire l'attention sur le fait que la mise en application du présent document peut entraîner l'utilisation d'un ou de plusieurs brevets. L'IEC ne prend pas position quant à la preuve, à la validité et à l'applicabilité de tout droit de brevet revendiqué à cet égard. À la date de publication du présent document, l'IEC n'avait pas reçu notification qu'un ou plusieurs brevets pouvaient être nécessaires à sa mise en application. Toutefois, il y a lieu d'avertir les responsables de la mise en application du présent document que des informations plus récentes sont susceptibles de figurer dans la base de données de brevets, disponible à l'adresse https://patents.iec.ch. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

L'IEC 60335-2-95 a été établie par le comité d'études 61 de l'IEC: Sécurité des appareils électrodomestiques et analogues. Il s'agit d'une Norme internationale.

Cette cinquième édition annule et remplace la quatrième édition parue en 2019. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) le texte a été aligné sur l'IEC 60335-1:2020;

b) le domaine d'application comprend les appareils alimentés en courant continu et les appareils alimentés par batteries (Article 1);

c) certaines notes ont été converties en texte normatif (Article 1, 7.12.1, 7.101, 20.103, 20.107, 22.104);

d) l'application du calibre d'essai 19 a été introduite (8.1.1, 20.2);

e) des températures de surface ont été ajoutées pour les surfaces accessibles extérieures (11.3, 11.8);

f) des exigences ont été ajoutées pour les motorisations destinées à être raccordées de façon permanente livrées avec un connecteur afin de faciliter l'installation (22.110, 24.1.101, 25.3);

g) une clarification a été apportée pour les connecteurs qui ne sont pas amovibles lorsqu'ils sont engagés (24.1.5).

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
61/7015/FDIS	61/7080/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Le présent document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

Une liste de toutes les parties de la série IEC 60335, publiées sous le titre général *Appareils électrodomestiques et analogues – Sécurité*, se trouve sur le site web de l'IEC.

La présente partie 2 doit être utilisée conjointement avec la dernière édition de l'IEC 60335-1 et ses amendements sauf si cette édition l'exclut. Dans ce cas, la dernière édition qui n'exclut pas la présente partie 2 est utilisée. Elle a été établie sur la base de la sixième édition (2020) de cette norme.

NOTE 1 L'expression "la Partie 1" utilisée dans la présente norme fait référence à l'IEC 60335-1.

La présente partie 2 complète ou modifie les articles correspondants de l'IEC 60335-1, de façon à transformer cette publication en norme IEC: Exigences particulières pour les motorisations de portes de garage à ouverture verticale, pour usage résidentiel.

Lorsqu'un paragraphe particulier de la Partie 1 n'est pas mentionné dans la présente partie 2, ce paragraphe s'applique pour autant que cela soit raisonnable. Lorsque la présente norme mentionne "addition", "modification" ou "remplacement", le texte correspondant de la Partie 1 doit être adapté en conséquence.

NOTE 2 Le système de numérotation suivant est utilisé:

– les paragraphes, tableaux et figures qui s'ajoutent à ceux de la Partie 1 sont numérotés à partir de 101;

– à l'exception de celles qui sont dans un nouveau paragraphe ou de celles qui concernent des notes de la Partie 1, les notes sont numérotées à partir de 101, y compris celles des articles ou paragraphes qui sont remplacés;

– les annexes qui sont ajoutées sont désignées AA, BB, etc.

NOTE 3 Les caractères d'imprimerie suivants sont utilisés:

– exigences: caractères romains;

– *modalités d'essais: caractères italiques;*

– notes: petits caractères romains.

Les termes en **gras** dans le texte sont définis à l'Article 3. Lorsqu'une définition concerne un adjectif, l'adjectif et le nom associé figurent également en gras.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé, ou
- révisé.

NOTE 4 L'attention des Comités nationaux est attirée sur le fait que les fabricants d'appareils et les organismes d'essai peuvent avoir besoin d'une période transitoire après la publication d'une nouvelle publication IEC, ou d'une publication amendée ou révisée, pour fabriquer des produits conformes aux nouvelles exigences et pour adapter leurs équipements aux nouveaux essais ou aux essais révisés.

Le comité recommande que le contenu de cette publication soit adopté pour application nationale (obligatoire) au plus tôt 12 mois et au plus tard 36 mois après la date de publication.

IMPORTANT – Le logo "colour inside" qui se trouve sur la page de couverture de ce document indique qu'il contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer ce document en utilisant une imprimante couleur.

INTRODUCTION

Il a été admis par hypothèse, en établissant la présente Norme internationale, que l'exécution de ses dispositions était confiée à des personnes expérimentées et ayant une qualification appropriée.

Les documents de recommandations concernant l'application des exigences de sécurité pour les appareils peuvent être consultés dans les documents de support du CE 61, accessibles sur le site web de l'IEC à l'adresse:

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

Cette information est donnée à l'intention des utilisateurs de la présente Norme internationale et ne constitue nullement un remplacement du texte normatif de la présente norme.

La présente norme reconnaît le niveau de protection internationalement accepté contre les dangers électriques, mécaniques, thermiques, liés au feu et au rayonnement des appareils, lorsqu'ils fonctionnent comme en usage normal en tenant compte des instructions du fabricant. Elle couvre également les situations anormales auxquelles on peut s'attendre dans la pratique et elle tient compte de la façon dont les phénomènes électromagnétiques peuvent affecter le fonctionnement sûr des appareils.

La présente norme tient compte autant que possible des exigences de l'IEC 60364, de façon à rester compatible avec les règles d'installation quand l'appareil est raccordé au réseau d'alimentation. Cependant, des règles nationales d'installation peuvent être différentes.

Si un appareil relevant du domaine d'application de la présente norme comporte également des fonctions couvertes par une autre partie 2 de l'IEC 60335, la partie 2 correspondante est appliquée à chaque fonction séparément, dans la limite du raisonnable. Si cela s'applique, l'influence d'une fonction sur les autres fonctions est prise en compte.

Lorsqu'une partie 2 ne comporte pas d'exigences complémentaires pour couvrir les dangers traités dans la Partie 1, la Partie 1 s'applique.

NOTE 1 Cela signifie que les comités d'études responsables pour les parties 2 ont déterminé qu'il n'était pas nécessaire de spécifier des exigences particulières pour l'appareil en question en plus des exigences générales.

La présente norme est une norme de famille de produits traitant de la sécurité d'appareils et a préséance sur les normes horizontales et génériques couvrant le même sujet.

NOTE 2 Les publications horizontales, les publications fondamentales de sécurité et les publications groupées de sécurité couvrant un danger ne s'appliquent pas, parce qu'elles ont été prises en considération lorsque les exigences générales et particulières ont été étudiées pour la série de normes IEC 60335.

Un appareil conforme au texte de la présente norme ne sera pas nécessairement jugé conforme aux principes de sécurité de la norme si, lorsqu'il est examiné et soumis aux essais, il apparaît qu'il présente d'autres caractéristiques qui compromettent le niveau de sécurité visé par ces exigences.

Un appareil utilisant des matériaux ou présentant des modes de construction différents de ceux décrits dans les exigences de la présente norme peut être examiné et soumis aux essais en fonction de l'objectif poursuivi par ces exigences et, s'il est jugé pratiquement équivalent, il peut être estimé conforme aux principes de sécurité de la présente norme.

NOTE 3 Les normes traitant des aspects non relatifs à la sécurité des appareils électrodomestiques sont:

– les normes IEC publiées par le comité d'études 59 concernant les méthodes de mesure d'aptitude à la fonction;
– les normes CISPR 11 et CISPR 14-1, ainsi que les normes applicables de la série IEC 61000-3 concernant les émissions électromagnétiques;
– la norme CISPR 14-2 concernant l'immunité électromagnétique;
– les normes IEC publiées par le comité d'études 111 concernant l'environnement.

APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-95: Exigences particulières pour les motorisations de portes de garage à ouverture verticale, pour usage résidentiel

1 Domaine d'application

L'article de la Partie 1 est remplacé par le texte suivant.

La présente partie de l'IEC 60335 traite de la sécurité des **motorisations** électriques des portes de garage pour usage résidentiel, qui ouvrent et ferment la porte verticalement et dont la **tension assignée** n'est pas supérieure à 250 V pour les appareils monophasés et à 480 V pour les autres appareils, y compris les appareils alimentés en courant continu et les **appareils alimentés par batteries**. Elle couvre également les dangers liés au mouvement de ces portes de garage motorisées.

Des exemples de portes de garage sont représentés à la Figure 101.

La **motorisation** peut être livrée avec une porte de garage.

La présente norme s'applique également aux **dispositifs de protection contre l'écrasement** à utiliser avec les **motorisations**. Elle ne couvre pas les dangers liés au mécanisme de la porte elle-même.

Dans la mesure du possible, la présente norme traite des dangers ordinaires présentés par les appareils et encourus par tous les individus à l'intérieur et autour de l'habitation. Cependant, elle ne tient pas compte en général de l'utilisation de l'appareil comme jouet par de jeunes enfants, mais reconnaît que des enfants peuvent se trouver à proximité de la porte de garage.

Pour les appareils destinés à être utilisés dans des véhicules ou à bord de navires ou d'avions, des exigences supplémentaires peuvent être nécessaires. Dans de nombreux pays, des exigences supplémentaires sont spécifiées par les organismes nationaux de la santé, par les organismes nationaux responsables de la protection des travailleurs, par les organismes nationaux responsables de l'alimentation en eau et par des organismes similaires.

La présente norme ne s'applique pas aux **motorisations**

– De volets, stores, rideaux et équipements analogues (IEC 60335-2-97).
– De portails, portes et fenêtres (IEC 60335-2-103.
– Pour usages commerciaux et industriels.
– Destinées à être utilisées dans des locaux présentant des conditions particulières, telles que la présence d'une atmosphère corrosive ou explosive (poussière, vapeur ou gaz).

2 Références normatives

L'article de la Partie 1 s'applique, avec l'exception suivante.

Addition:

IEC 60068-2-52:2017, *Essais d'environnement – Partie 2-52: Essais – Essai Kb: Brouillard salin, essai cyclique (solution de chlorure de sodium)*

IEC 60584-1, *Couples thermoélectriques – Partie 1: Spécifications et tolérances en matière de FEM*

IEC 61984:2008, *Connecteurs – Exigences de sécurité et essais*

3 Termes et définitions

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

3.1 Définitions relatives aux caractéristiques physiques

3.1.9 *Modification:*

Remplacer le premier alinéa par ce qui suit:

fonctionnement de la **motorisation** dans les conditions suivantes:

– les **motorisations** livrées sans porte sont mises en fonctionnement sous la **charge assignée**;
– les **motorisations** livrées avec une porte sont mises en fonctionnement avec la porte installée conformément aux instructions.

3.1.101
charge assignée
charge ou couple attribué à la **motorisation** par le fabricant

3.5 Définitions relatives aux types d'appareils

3.5.101
motorisation
moteur et autres composants qui commandent le mouvement de la porte

Note 1 à l'article: Exemples de composants: les engrenages, les dispositifs de commande, les freins et les **systèmes de protection contre l'écrasement**.

3.5.102
motorisation automatique
motorisation qui fait fonctionner la porte dans au moins une direction sans activation intentionnelle par l'utilisateur

3.7 Définitions relatives aux composants de sécurité

3.7.101
interrupteur sans verrouillage
dispositif à action maintenue qui déclenche et maintient le mouvement de la **motorisation** tant que la commande manuelle est actionnée par l'utilisateur

3.7.102
système de protection contre l'écrasement
partie de la **motorisation** qui procure la protection contre un piégeage susceptible d'entraîner un écrasement ou un coincement du corps par la porte

Note 1 à l'article: Le piégeage dans le garage est couvert par le dispositif de débrayage manuel du 20.109.

Note 2 à l'article: Un **système de protection contre l'écrasement** peut être incorporé dans l'assemblage du moteur ou être installé séparément. Il peut être constitué d'un ou de plusieurs dispositifs, tels que des bords sensibles à la pression, des capteurs infrarouges passifs et des capteurs photosensibles actifs ou un **interrupteur sans verrouillage**.

4 Exigences générales

L'article de la Partie 1 s'applique.

5 Conditions générales d'essais

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

5.2 *Addition:*

Lorsqu'un essai doit être effectué avec une porte, la porte spécifiée pour l'installation avec cette ***motorisation*** *qui donne les conditions les plus défavorables pour l'essai est utilisée. Pour certains essais, une charge artificielle peut être utilisée pour simuler la porte. La* ***motorisation*** *est réglée conformément aux instructions.*

5.5 *Addition:*

Les portillons sont fermés pendant les essais.

6 Classification

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

6.1 *Modification:*

Remplacer le premier alinéa par ce qui suit:

Les **motorisations** doivent être de la **classe I**, de la **classe II** ou de la **classe III**.

6.2 *Addition:*

Les **motorisations** destinées à être exposées aux conditions extérieures doivent être au moins IPX4.

7 Marquage et instructions

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

7.1 *Modification:*

Remplacer le troisième tiret du premier alinéa par ce qui suit:

Les **motorisations** doivent porter le marquage de la **puissance assignée**.

Addition:

Les **motorisations** livrées sans porte doivent porter le marquage de la **charge assignée** en N ou en Nm.

7.12 *Addition:*

Les instructions doivent comporter, en substance, la mise en garde suivante:

MISE EN GARDE: Instructions importantes de sécurité. Il est important pour la sécurité des personnes de suivre toutes les instructions. Conserver ces instructions.

Les instructions doivent comporter, en substance, les indications suivantes:

– ne pas laisser les enfants jouer avec les dispositifs de commande de la porte. Mettre les télécommandes hors de portée des enfants;
– prêter une attention particulière lors de l'utilisation du dispositif de débrayage manuel, car une porte ouverte peut retomber rapidement du fait de ressorts faibles ou cassés, ou être mal équilibrée;
– vérifier fréquemment l'installation, notamment les câbles, les ressorts et les fixations, pour déceler tout signe d'usure, de détérioration ou de mauvais équilibrage. Ne pas utiliser le système si une réparation ou un réglage est nécessaire, car un défaut dans l'installation ou une porte mal équilibrée peut provoquer des blessures;
– chaque mois, vérifier que la motorisation change de sens lorsque la porte rencontre un objet de 40 mm de haut placé sur le sol. Régler, si nécessaire, et revérifier, car un mauvais réglage peut présenter un danger;
– déconnecter l'alimentation lors du nettoyage ou de la réalisation d'un autre entretien.

Les instructions doivent comporter les informations suivantes:

– des détails sur la façon d'utiliser le dispositif de débrayage manuel;
– des informations concernant le réglage de la porte et de la **motorisation** (s'il y a lieu).

Les instructions des **motorisations** autres que les **motorisations automatiques** doivent comporter, en substance, les indications suivantes:

Surveiller la porte en mouvement et maintenir les personnes éloignées jusqu'à ce que la porte soit complètement ouverte ou fermée.

Les instructions pour les **motorisations automatiques** doivent comporter, en substance, la mise en garde suivante:

MISE EN GARDE: Porte automatique – La porte peut fonctionner de manière inattendue, par conséquent ne rien laisser dans la trajectoire de la porte.

7.12.1 *Addition:*

Les instructions d'installation doivent comporter, en substance, la mise en garde suivante:

MISE EN GARDE: Instructions importantes de sécurité. Suivre toutes les instructions, dans la mesure où une installation incorrecte peut entraîner des blessures graves.

Les instructions d'installation doivent comporter des précisions concernant l'installation de la **motorisation** et de ses composants associés, notamment la hauteur minimale pour l'installation des parties des **motorisations** prévues pour être montées à plus de 850 mm, 1,8 m ou 2,3 m ou au moins 2,5 m du sol conformément au 8.1.1, au Tableau 101, au 20.2, au 20.103, au B.22.3 ou au B.22.4.

Pour les **motorisations** livrées sans porte, les instructions d'installation doivent indiquer le type, les dimensions et la masse des portes pour lesquelles la **motorisation** est destinée à être utilisée.

Les instructions d'installation doivent comporter, en substance, les indications suivantes:

– avant d'installer la motorisation, enlever toutes les cordes ou chaînes inutiles et mettre hors service tous les équipements qui ne sont pas nécessaires pour un fonctionnement motorisé, tels que les verrous;
– avant d'installer la motorisation, vérifier que la porte est en bonne condition mécanique, qu'elle est correctement équilibrée et qu'elle se ferme et s'ouvre convenablement;
– installer l'organe de manœuvre du dispositif de débrayage manuel à moins de 1,8 m du sol;
– installer tout dispositif de commande fixe, à l'exception des interrupteurs à clé, à une hauteur d'au moins 1,5 m;
– installer tout dispositif de commande fixe en vue de la porte, mais éloigné des parties mobiles;
– fixer à demeure les étiquettes de mise en garde contre l'écrasement en un endroit très visible ou près des dispositifs de commande fixes éventuels;
– fixer à demeure l'étiquette concernant le dispositif de débrayage manuel près de son organe de manœuvre;
– après installation, vérifier que le mécanisme est correctement réglé et que la motorisation change de sens lorsque la porte rencontre un objet de 40 mm de hauteur placé sur le sol;
– la motorisation ne doit pas être utilisée avec une porte comprenant un portillon (à moins que la **motorisation** ne puisse pas être mise en fonctionnement avec le portillon ouvert);
– après installation, vérifier que des parties de la porte n'empiètent pas sur les trottoirs ou sur la voie publique.

Les instructions doivent comporter les informations nécessaires pour la manipulation en toute sécurité d'une **motorisation** qui pèse plus de 20 kg. Ces informations doivent décrire comment utiliser les dispositifs de manipulation tels que les crochets et les câbles.

Pour les **motorisations** destinées à être raccordées de façon permanente à des conducteurs fixes, fournies avec un connecteur distinct afin de faciliter l'installation et d'effectuer le raccordement au réseau, les instructions doivent comporter, en substance, le texte suivant:

Utiliser uniquement le connecteur fourni lors de l'installation de la motorisation.

7.15 *Addition:*

Les marquages doivent également être fournis avec les instructions. En outre, le marquage relatif au nom, à la marque commerciale ou à la marque d'identification du fabricant ou du fournisseur responsable et la référence du modèle ou du type peuvent également être extraits d'une étiquette, par exemple une étiquette à code à barres, visible lorsque l'appareil est installé.

7.101 Les **motorisations** doivent être fournies avec une étiquette qui peut être fixée à demeure. Pour les **motorisations automatiques**, l'étiquette doit comporter, en substance, la mise en garde suivante:

MISE EN GARDE: Motorisation automatique – Rester éloigné de la porte, celle-ci pouvant fonctionner de manière inattendue.

Pour les autres **motorisations**, l'étiquette doit comporter un symbole de mise en garde d'une hauteur minimale de 60 mm. L'étiquette doit également comporter, en substance, la mise en garde suivante:

MISE EN GARDE: Éloigner les enfants lorsque la porte est en mouvement.

Un exemple de symbole de mise en garde approprié est représenté à la Figure 102.

La vérification est effectuée par examen et par mesurage.

7.102 Les **motorisations** qui utilisent un dispositif sensible au contact comme **système de protection contre l'écrasement** doivent être livrées avec une étiquette qui comporte, en substance, la mise en garde suivante:

MISE EN GARDE: Risque d'écrasement – Effectuer une vérification régulière et, si nécessaire, procéder à un réglage pour s'assurer que, lorsque la porte rencontre un objet d'une hauteur de 40 mm placé sur le sol, celle-ci change de sens ou l'objet peut être libéré.

La vérification est effectuée par examen.

7.103 Les **motorisations** doivent être fournies avec une étiquette qui peut être fixée à demeure et qui indique comment utiliser le dispositif de débrayage manuel.

La vérification est effectuée par examen.

7.104 Pour les **motorisations** destinées à être installées par l'utilisateur, l'emballage doit indiquer le type de porte, dimensions et masse comprises, que la **motorisation** peut entraîner et indiquer, le cas échéant, que la **motorisation**

– Est prévue pour être installée à au moins 2,5 m au-dessus du sol ou d'un autre niveau d'accès.
– Peut être utilisée avec des portes ayant des ouvertures de diamètre supérieur à 50 mm.
– Est prévue pour un fonctionnement automatique.

La vérification est effectuée par examen.

8 Protection contre l'accès aux parties actives

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

8.1.1 *Remplacement:*

L'exigence du 8.1 s'applique à toutes les positions de l'appareil lorsqu'il est mis en fonctionnement comme en usage normal.

Le calibre d'essai B, le calibre d'essai 18 et le calibre d'essai 19 de l'IEC 61032 sont appliqués avec une force qui ne dépasse pas 1 N, l'appareil étant dans toutes les positions possibles. Le calibre d'essai est appliqué à travers les ouvertures, à toute profondeur admise par le calibre, et il est tourné ou plié avant, pendant et après l'insertion à travers l'ouverture dans toute position. Si l'ouverture ne permet pas l'entrée du calibre, la force appliquée sur le calibre en position droite est portée à 20 N lorsque le calibre B est utilisé ou à 10 N lorsque le calibre d'essai 18 ou le calibre d'essai 19 sont utilisés. Si le calibre d'essai pénètre alors dans l'ouverture, l'essai est répété, le calibre étant en position pliée.

*Pendant les essais avec le calibre d'essai B, toutes les **parties amovibles** sont retirées, à l'exception des lampes. Toutefois, lors de la mise en place ou du retrait de lampes, la protection contre le contact avec les **parties actives** du culot de lampe doit être assurée.*

Pendant les essais avec le calibre d'essai 18 et le calibre d'essai 19 de l'IEC 61032, l'appareil doit être entièrement assemblé comme en usage normal, sans qu'aucune partie ne soit retirée.

*Le calibre d'essai 19 de l'IEC 61032 n'est pas appliqué aux parties des **motorisations** qui sont situées à une hauteur supérieure à 850 mm en usage normal.*

*Le calibre d'essai 18 de l'IEC 61032 n'est pas appliqué aux parties des **motorisations** dont les instructions précisent que celles-ci doivent être montées à plus de 1,8 m du sol.*

*Il ne doit pas être possible de toucher des **parties actives** ou des **parties actives** protégées uniquement par laque, émail, papier ordinaire, coton, film d'oxyde, billes ou matériau d'étanchéité, à l'exception des résines autodurcissantes, avec le calibre d'essai B, le calibre d'essai 18 ou le calibre d'essai 19, selon le cas.*

8.2 *Addition:*

L'**isolation principale** et les parties séparées des **parties actives** par l'**isolation principale** peuvent être touchées pendant le réglage, si un **outil** est nécessaire pour accéder aux moyens de réglage.

9 Démarrage des appareils à moteur

L'article de la Partie 1 ne s'applique pas.

10 Puissance et courant

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

10.1 *Modification:*

Au lieu de déterminer la valeur moyenne, la valeur maximale de la puissance est déterminée, sans tenir compte de l'effet du courant d'appel.

10.2 *Modification:*

Au lieu de déterminer la valeur moyenne, la valeur maximale du courant est déterminée, sans tenir compte du courant d'appel.

11 Échauffements

L'article de la Partie 1 s'applique, avec l'exception suivante.

11.3 *Addition:*

*Lorsque les **surfaces accessibles** extérieures sont suffisamment planes et que l'accès le permet, le calibre d'essai de la Figure 103 est utilisé pour mesurer les échauffements des **surfaces accessibles** extérieures spécifiées dans le Tableau 101. Le calibre est appliqué sur la surface avec une force de 4 N ± 1 N de manière à établir le meilleur contact possible entre le calibre et la surface. Le mesurage est effectué après une durée de contact de 30 s.*

Le calibre peut être maintenu en place à l'aide d'une pince de laboratoire sur statif ou d'un dispositif analogue. Tout instrument de mesure qui donne les mêmes résultats que le calibre peut être utilisé.

11.7 *Remplacement:*

*Les **motorisations** pour fonctionnement continu sont soumises à des cycles de fonctionnement consécutifs jusqu'à établissement des conditions de régime.*

*Les **motorisations automatiques** sont mises en fonctionnement sans période de repos pendant 3 cycles en se fondant sur la taille maximale de porte que la **motorisation** est destinée à faire fonctionner ou 4 min, en choisissant la durée la plus longue.*