

EUROPEAN STANDARD

EN 60335-2-95

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English version

Safety of household and similar electrical appliances
Part 2-95: Particular requirements for drives for
vertically moving garage doors for residential use
(IEC 60335-2-95:1998, modified)

Sécurité des appareils
électrodomestiques et analogues
Partie 2-95: Règles particulières pour
les motorisations de portes de garage à
ouverture verticale, pour usage résidentiel
(CEI 60335-2-95:1998, modifiée)

Sicherheit elektrischer Geräte für den
Hausgebrauch und ähnliche Zwecke
Teil 2-95: Besondere Anforderungen für
Antriebe von Garagentoren mit
Senkrechtbewegung zur Verwendung
im Wohnbereich
(IEC 60335-2-95:1998, modifiziert)

This European Standard was approved by CENELEC on 2001-09-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of the International Standard IEC 60335-2-95:1998, prepared by the IEC Technical Committee 61, was submitted to CENELEC enquiry in June 1998. The comments were discussed during the Pamplona meeting in June 1999 when it was decided to submit a draft for EN 60335-2-95 to the Unique Acceptance Procedure.

This draft was circulated in October 1999 but did not receive sufficient support. The comments were discussed during the Kristiansand meeting in June 2000 when it was decided to submit a second draft for EN 60335-2-95 to the voting procedure. This draft was circulated in February 2001 and was approved by CENELEC as EN 60335-2-95 on 2001-09-01.

The following dates are applicable:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2002-09-01
- date on which national standards conflicting with the EN have to be withdrawn (dow) 2004-09-01

This standard has to be used in conjunction with EN 60335-1, Safety of household and similar electrical appliances, Part 1: General requirements. It was established on the basis of the 1994 edition of that standard. Amendments and revisions of part 1 have also to be taken into account and the dates when such changes become applicable will be stated in the relevant amendment or revision of part 1.

This part 2 supplements or modifies the corresponding clauses of EN 60335-1, so as to convert it into the European Standard: Safety requirements for electric 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 of part 1 is to be adapted accordingly.

Subclauses and figures which are additional to those in part 1 are numbered starting with 101.

There are no special national conditions causing a deviation from this European Standard other than those listed in annex ZA in EN 60335-1.

There are no national deviations from this European Standard other than those listed in annex ZB in EN 60335-1.

NOTE - 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 2. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

Introduction

An investigation by CENELEC TC 61 has shown that all risks from products within the scope of this standard are fully covered by the Low Voltage Directive, 73/23/EEC. If the product has mechanical moving parts, a risk assessment in accordance with the Machinery Directive, 89/392/EEC, has shown that the risks are mainly of electrical origin and consequently this directive is not applicable. However, the relevant essential safety requirements of the Machinery Directive are covered by this standard together with the principal objectives of the Low Voltage Directive.

Endorsement notice

The text of the International Standard IEC 60335-2-95:1998 was approved by CENELEC as a European Standard with common modifications.

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SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – 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:

This standard deals with the safety of electric **drives** for garage doors for residential use which 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. It also covers the hazards associated with the movement of these electrically driven garage doors.

NOTE 1 – Examples of garage doors which open and close in a vertical direction are shown in figure 101.

NOTE 2 – The **drive** may be supplied with a garage door.

NOTE 3 – This standard also applies to **entrapment protection devices** for use with **drives**.

☒ NOTE 4 – This standard does not cover hazards related to the mechanisms of the door itself or to wicket doors. ☒

So far as is practicable, this standard deals with the common hazards presented by appliances which are encountered by all persons in and around the home.

This standard does not in general take into account playing with the appliance by young children, but recognizes that children may be in the vicinity of the garage door.

NOTE 5 – Attention is drawn to the fact that

- for appliances intended to be used in tropical countries, special requirements may be necessary;
- in many countries additional requirements are specified by the national authorities responsible for the protection of labour and similar authorities.

☒ NOTE 6 – This standard does not apply to

- **drives** for garage doors for use by more than one household;
- **drives** for garage doors higher than 3,5 m;
- **drives** that are activated automatically;
- **drives** for rolling shutters, awnings, blinds and similar equipment (IEC 60335-2-97);
- **drives** for commercial and industrial purposes;
- **drives** 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 Definitions

This clause of part 1 is applicable except as follows:

2.2.9 *Replacement* **normal operation**

operation of the appliance under the following conditions:

- **drives** supplied without a door are operated with the **rated load**;
- **drives** supplied with a door are operated with the door, as in normal use.

2.101

drive

motor and other components which control the movement of the garage door

NOTE – Examples of components are gears, controls, brakes and **entrapment protection systems**.

2.102

inherent entrapment protection system

Void

2.103

non-inherent entrapment protection device

Void

2.104

biased-off switch

switch which automatically returns to the **off position** when its actuating member is released

2.105

rated load

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

2.Z101

entrapment protection system

part of the **drive** that provides protection against entrapment

NOTE 1 - An **entrapment protection system** may consist of one or more devices, such as pressure sensitive edges, passive infrared and active light sensing devices.

NOTE 2 - An **entrapment protection system** may be incorporated in the motor assembly or be installed separately.

NOTE 3 - A **biased-off switch** may be used as an **entrapment protection system**.

2.Z102

rated operating time

duration of uninterrupted sequence of operating cycles assigned to the **drive** by the manufacturer

NOTE - An operating cycle consists of an opening and closing movement of the door.

2.Z103

rated number of operating cycles

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

3 General requirement

This clause of part 1 is applicable.

4 General conditions for the tests

This clause of part 1 is applicable except as follows.

4.2 Addition:

Ⓒ When a test has to be carried out with a door, the door specified for installation with the **drive** which provides the most unfavourable condition for the test is used. The **drive** is adjusted in accordance with the instructions. Ⓒ

NOTE – Parts specified in the instructions for installation have to be submitted with the appliance.

Ⓒ **4.7 Addition:**

If **drives** are intended to operate beyond the ambient temperature range of +5 °C to +40 °C, the tests of clause 20 are carried out at the most unfavourable marked temperature. Ⓒ

5 Void

6 Classification

This clause of part 1 is applicable except as follows:

6.1 Modification:

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

6.2 Addition:

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

7 Marking and instructions

This clause of part 1 is applicable except as follows:

7.1 Addition:

Ⓒ **Drives** shall be marked with the minimum and maximum ambient temperatures in which they are intended to operate.

Drives supplied without a door shall be marked with:

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

Drives supplied with a door shall be marked with the **rated number of operating cycles**, unless the **drive** is intended for continuous operation. Ⓒ

Ⓒ

7.6 Addition:



Upper limit of temperature (ISO 7000/0533)



Lower limit of temperature (ISO 7000/0534)

Ⓒ

7.12 Addition:

The instructions for use shall state the following:

IMPORTANT SAFETY INSTRUCTIONS
WARNING – IT IS VITAL FOR THE SAFETY OF PERSONS TO
FOLLOW ALL INSTRUCTIONS
SAVE THESE INSTRUCTIONS

The instructions for use 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;

Ⓒ Text deleted Ⓒ

- frequently examine the installation, in particular 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;

Ⓒ Text deleted Ⓒ

The instructions for use shall give

- Ⓒ details on how to use the manual release and , if applicable, state that activation of the manual release may cause uncontrolled movement of the door if the springs are weak or broken or if the door is out of balance Ⓒ;
- information concerning the adjustment of the door and drive.

Ⓒ For **drives** incorporating a pressure sensing system, the instructions for use shall include the substance of the following:

Each month, check that the drive reverses when the door contacts a 50 mm high object placed on the ground. Adjust if necessary and check again since an incorrect adjustment may present a hazard. Ⓒ

Ⓒ **7.Z101** If the **drive** is intended to be installed at a height of at least 2,5 m above the floor or other access level, the packaging shall be marked accordingly. This information shall also be given in the instructions for installation.

Compliance is checked by inspection. Ⓒ

7.12.1 Addition:

Ⓒ The instructions for installation shall include details for the installation of the **drive** and its associated components. They shall indicate the types of doors and mechanism for which the **drive** is intended to be used. Ⓒ

The instructions for installation shall state the following:

IMPORTANT SAFETY INSTRUCTIONS FOR INSTALLATION
WARNING – INCORRECT INSTALLATION CAN LEAD TO SEVERE INJURY
FOLLOW ALL INSTALLATION INSTRUCTIONS

The instructions for installation shall include the substance of the following:

- Ⓒ before installing the drive, remove all unnecessary ropes or chains and disable any equipment which is not needed after installation of the drive Ⓒ;
- before installing the drive, check that the door is in good mechanical condition and correctly balanced, and that it opens and closes properly;
- install the actuating member for the manual release at a height less than 1,8 m;
- install any fixed control within sight of the door but away from moving parts and at a height of at least 1,5 m;

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

- 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 50 mm high object placed on the floor (for **drives** incorporating a pressure sensing system).
- after installation, ensure that the parts of the door do not extend over public footpaths or roads;
- after installation, ensure that the drive prevents or stops the opening movement when the door is loaded with a mass of 20 kg, fixed centrally on the bottom edge of the door (for **drives** that can be used with doors having openings larger than 50 mm in diameter). ☐

7.14 Addition:

The labels specified in 7.101 to 7.103 shall be clearly legible, durable and suitable for permanent fixing.

☐ 7.15 Addition:

When it is not practical for the marking to be visible after the **drive** has been installed, the marking shall also be included in the instructions. ☐

7.101 Drives shall be supplied with a label which states the substance of the following:

Keep children away when the door is moving

☐ The text may be replaced by the warning sign shown in figure 102. ☐

☐ **7.102 Drives** incorporating a pressure sensing system shall be supplied with a label which states the substance of the following warning:

WARNING – Risk of entrapment

Regularly check and if necessary adjust to ensure that
the door reverses when it contacts a 50 mm
high object placed on the floor. ☐

Compliance is checked by inspection.

7.103 Drives shall be supplied with a label describing how to use the manual release.

Compliance is checked by inspection.

8 Protection against access to live parts

This clause of part 1 is applicable except as follows:

8.2 Addition:

Basic insulation and parts separated from **live parts** by **basic insulation** only 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 power input is determined as the maximum value, the effect of inrush currents being ignored.

10.2 Modification:

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

11 Heating

This clause of part 1 is applicable except as follows:

11.7 Replacement:

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

Other drives are operated as follows:

- **drives** supplied without a door are operated without rest periods for the **rated operating time** but for not less than three cycles of operation or 4 min, whichever is longer;

- **drives** supplied with a door are operated without rest periods for the **rated number of operating cycles** but for not less than three cycles of operation. **☐**

12 Void

13 Leakage current and electric strength at operating temperature

This clause of part 1 is applicable.

14 Void

15 Moisture resistance

Ⓒ This clause of part 1 is applicable except as follows:

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 rev/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:

Compliance is also checked by the test of 19.Z101. Ⓒ

19.9 Not applicable.

19.10 Ⓒ Addition:

The test is continued for one cycle of operation if this is longer. Ⓒ

19.11.2 Addition:

If the **drive** can be operated when any of the fault conditions are simulated, the tests of 20.Z101 to 20.Z103 are carried out, the **drive** however being supplied at **rated voltage**.

The average forces specified in 20.Z103.1 may be exceeded but they shall not be greater than 600 N during the first 2 s after the force has exceeded 150 N, and shall not be greater than 150 N thereafter. C

19.13 C Text deleted C

19.Z101 **Drives** marked with a **rated operating time** or a **rated number of operating cycles** are supplied at **rated voltage** and operated continuously under **normal operation**.

During the test the winding temperatures shall not exceed the values specified in 19.9. C

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 need not be protected.

20.101 **Drives** shall prevent doors from closing accidentally.

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** which is 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 the door.

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

NOTE – The highest force is determined with the door in the most unfavourable position, the **drive** not being energized.

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

☐ 20.102 Void

20.103 Void

20.104 Void

20.105 Void

20.106 Void

20.107 Void ☐

☐ 20.Z101 **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 and 1,06 times **rated voltage**. It is operated to close the door.*

When the actuating member of the switch is released, the bottom edge of the door shall stop before it has moved more than 50 mm.

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

The requirement for the door to stop within a distance of 50 mm only applies if the closing force exerted by the door exceeds 150 N, as measured in 20.Z103.1.

20.Z102 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** being set at maximum in accordance with the instructions for use. The **drive** is supplied at the most unfavourable voltage between 0,94 and 1,06 times **rated voltage**.*

An obstacle having dimensions of approximately 200 mm x 300 mm, a height of 700 mm and a mass of 20 kg \pm 0,5 kg is placed on the ground under the closing door in the most unfavourable orientation.

NOTE - The obstacle is normally made of rough wood and painted white but other materials and colours may be used to simulate the most unfavourable conditions.

*The **drive** is operated to close the door. The door shall stop or reverse its movement without contacting the obstacle.*

The test is repeated with the obstacle rotated at a speed not greater than 15 rev/min and then while it is moved under the closing door at a speed of 3 m/s \pm 0,6 m/s.

The tests are repeated with the obstacle placed on its side so that its height is 200 mm. ☐

Ⓒ) The obstacle, in its vertical position, is then raised in increments up to 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 or reverse its movement without contacting the obstacle.

The obstacle, in its vertical position, is placed at any location next to the closed door. The **drive** is operated to open the door. The door shall stop or reverse its movement without contacting the obstacle.

20.Z103 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.Z103.1 for a closing movement and, if the **drive** is supplied with a door, by the test of 20.Z103.2 for an opening movement.

20.Z103.1 The **drive** is installed with a door, the force exerted by the **drive** being set at maximum in accordance with the instructions for use. The **drive** is supplied at the most unfavourable voltage between 0,94 and 1,06 times **rated voltage**.

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 closing force to

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

or

- 600 N during the first 2 s after the force has exceeded 150 N,
- 150 N thereafter.

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

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

- 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 average closing force is calculated for each location.

If the measured force exceeds 400 N, the following test is carried out to detect stationary and moving obstacles.

An obstacle having dimensions of approximately 80 mm x 300 mm and a height of 100 mm is placed on the ground and centrally across the door opening.

The **drive** is operated to close the door. The door shall reverse its movement when detecting the obstacle.

The test is repeated 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 by one end 900 mm above the ground and centrally in the door opening.

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 detect the obstacle and cause the door to reverse its movement.

The force exerted by the **drive** is then set at the maximum in accordance with the instructions for installation.

The closing force is measured again and shall not exceed

- 600 N during the first 2 s after the force has exceeded 150 N,
- 150 N thereafter.

20.Z103.2 Drives intended to be used with a door having openings in which a 50 mm diameter cylinder can be inserted are subjected to an opening test, the door being provided with a load. The force exerted by the **drive** is set at maximum in accordance with the instructions for use. The load has dimensions of approximately 200 mm x 200 mm x 200 mm, a mass of 20 kg, and is fixed centrally to the outside of the door with one edge adjacent to the bottom edge of the door. Ⓒ

Ⓒ) The **drive** is supplied at the most unfavourable voltage between 0,94 and 1,06 times **rated voltage** and operated to open the door. If the bottom edge of the door moves more than 500 mm, the load is replaced by a test piece having dimensions of approximately 200 mm x 300 mm, a height of 700 mm and a mass not exceeding 20 kg, with the 300 mm edge adjacent to the bottom edge of the door.

The **drive** is again operated to open the door. The movement of the door shall stop before the test piece comes into contact with the lintel.

20.Z104 Entrapment protection systems shall provide an adequate level of protection in the event of a failure within the system.

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 or installation wiring.

Unless the **entrapment protection system** continues to operate normally, the door shall stop moving or the movement of the door shall only be controlled by a supplementary **biased-off switch** after the door has completed its movement.

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

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

NOTE - It may be necessary to simulate several faults before the test is completed.

20.Z105 A mechanical fault in the **drive** shall not result in a hazardous operation.

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** being set at maximum in accordance with the instructions for use. The **drive** is supplied at the most unfavourable voltage between 0,94 and 1,06 times **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,
- further operation shall not be possible,
- 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 the control has a single button, further actuation shall reverse the direction of movement.

If the control has two buttons, one button shall stop the movement. Actuation of the other button shall restart the movement in the opposite direction.

If the control has three buttons, one button shall stop the movement. Another button shall initiate the opening movement. If this button is actuated during the closing movement, the movement shall continue or reverse. The third button shall initiate the closing movement. If this button is actuated during the opening movement, the movement shall continue or reverse.

Compliance is checked by manual test.

NOTE - The test may 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 – Unintentional stopping may be caused by interruption of the power supply or by operation of a **thermal cut-out**.

Compliance is checked by the following tests.

*The appliance is supplied at **rated voltage** and operated under **normal operation**. The supply is then interrupted. After the supply is restored, the **drive** shall not restart automatically.*


*The appliance is operated again and operation of the **thermal cut-out** is simulated. After the fault condition has been removed, the **drive** shall not restart automatically.*

21 Mechanical strength


This clause of part 1 is applicable.

22 Construction

This clause of part 1 is applicable except as follows:


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

Compliance is checked by inspection.

NOTE – This requirement only applies to adjustments affecting compliance with the standard 



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

Compliance is checked by inspection.

 **22.103** Void

22.104 Void

22.105 Void 

22.106  If the **drive** is supplied with a three-button control, all other manual controls shall be of the same type. The marking of the buttons shall be the same. 


Compliance is checked by inspection.

NOTE 1 – This requirement only applies to controls for the movement of the door.

NOTE 2 – The control may be for remote operation or wall mounting.

22.107 It shall only be possible to open and close the door by use of a manual control.

Compliance is checked by inspection.

 **22.Z101** If the **entrapment protection system** is a **biased-off switch**, it shall only be possible to operate the switch within sight of the door.

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:

The number of cycles of operation for switches which disconnect the appliance when the manual release is operated is 300.

25 Supply connection and external flexible cords

This clause of part 1 is applicable except as follows.

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).

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 Creepage distances, clearances and distances through insulation

This clause of part 1 is applicable.

30 Resistance to heat, fire and tracking

This clause of part 1 is applicable except as follows:

30.2.2 Not applicable.

30.3 Add:

NOTE - Parts of insulation material are considered to be subjected to severe duty conditions unless they are enclosed so that pollution is unlikely to occur. **30.3**

31 Resistance to rusting

This clause of part 1 is applicable except as follows:

Addition:

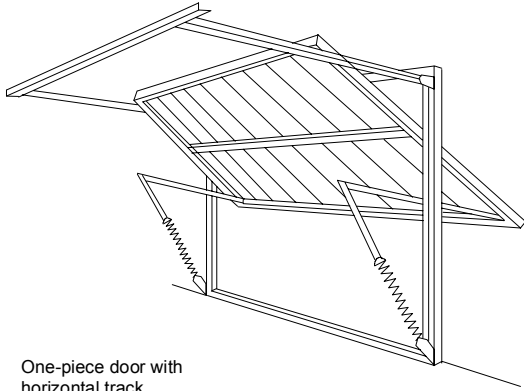
For parts intended to be installed outdoors, compliance is checked by the salt mist test of IEC 60068-2-52, severity 2 being applicable.

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.

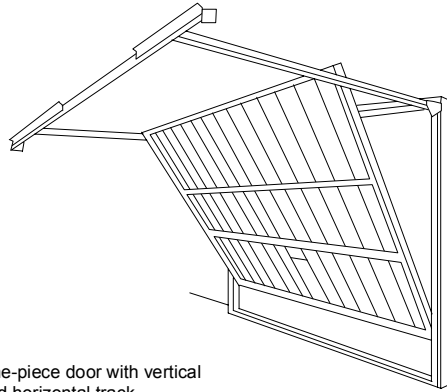
After the test, the appliance shall not have deteriorated to such an extent that compliance with this standard, in particular with clauses 8 and 27, is impaired. The coating shall not be broken and shall not have loosened from the metal surface.

32 Radiation, toxicity and similar hazards

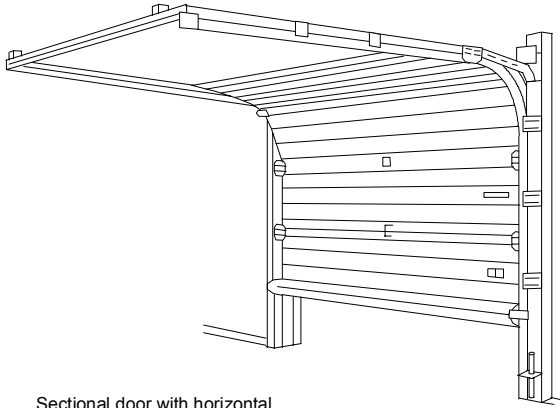
This clause of part 1 is applicable.



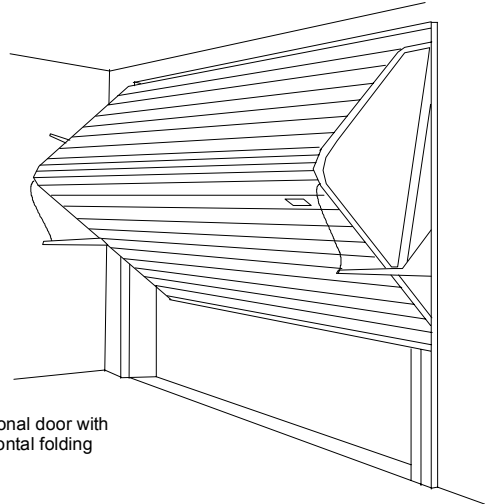
One-piece door with horizontal track



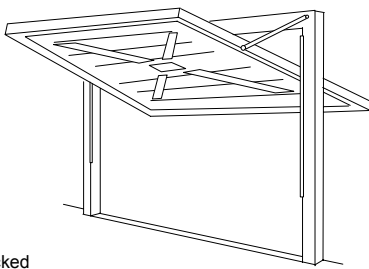
One-piece door with vertical and horizontal track



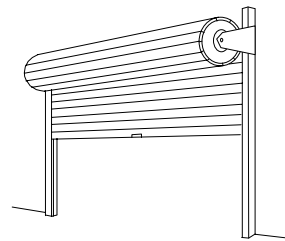
Sectional door with horizontal and vertical track



Sectional door with horizontal folding



Vertically tracked canopy door



Rolling door

IEC 299/98

Figure 101 – Examples of types of garage doors



Minimum height: 60 mm

Form and colours to be in accordance with ISO 3864

Figure 102 - Sign warning against child entrapment 

Annexes

The annexes of part 1 are applicable except as follows:

Ⓒ Annex A (normative)

Normative references

Addition:

<u>IEC Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
60068-2-52	1996	Environmental testing – Part 2: Tests Test Kb: Salt mist, cyclic (sodium chloride solution)	EN 60068-2-52 1996	
<u>ISO Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
3864	1984	Safety colours and safety signs	-	-
7000	1989	Graphical symbols for use on equipment Index and synopsis	-	-

Ⓒ

National Annex NA
(informative)

Original IEC text amended by CENELEC common modifications

The text of the International Standard IEC 60335-2-95:1998 was approved by CENELEC as a European Standard with common modifications as given below.

COMMON MODIFICATIONS

p NOTE - In this document p is used in the margin to indicate instructions for preparing the printed version.

1 Scope

p Add to note 4: "or to wicket doors".

p Note 6, add after the first dashed item:

- **drives** for garage doors higher than 3,5 m;
- **drives** that are activated automatically.

2 Definitions

p **2.101** In the note, delete the word "inherent".

p **2.102** Replace the text by "Void".

p **2.103** Replace the text by "Void".

p Add:

2.Z101

entrapment protection system

part of the **drive** that provides protection against entrapment

NOTE 1 - An **entrapment protection system** may consist of one or more devices, such as pressure sensitive edges, passive infrared and active light sensing devices.

NOTE 2 - An **entrapment protection system** may be incorporated in the motor assembly or be installed separately.

NOTE 3 - A **biased-off switch** may be used as an **entrapment protection system**.

2.Z102

rated operating time

duration of uninterrupted sequence of operating cycles assigned to the **drive** by the manufacturer

NOTE - An operating cycle consists of an opening and closing movement of the door.

2.Z103

rated number of operating cycles

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

4 General conditions for the tests

p 4.2 Replace the addition by:

*When a test has to be carried out with a door, the door specified for installation with the **drive** which provides the most unfavourable condition for the test is used. The **drive** is adjusted in accordance with the instructions.*

p Add:

4.7 *Addition:*

*If **drives** are intended to operate beyond the ambient temperature range of +5 °C to +40 °C, the tests of clause 20 are carried out at the most unfavourable marked temperature.*

6 Classification

p 6.2 Replace the addition by:

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

7 Marking and instructions

p 7.1 Replace the addition by:

Drives shall be marked with the minimum and maximum ambient temperatures in which they are intended to operate.

Drives supplied without a door shall be marked with:

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

Drives supplied with a door shall be marked with the **rated number of operating cycles**, unless the **drive** is intended for continuous operation.

p Add:

7.6 *Addition:*



Upper limit of temperature (ISO 7000/0533)



Lower limit of temperature (ISO 7000/0534)

p **7.12** Delete the fourth and sixth dashed items.

p Add to the seventh dashed item:

and, if applicable, state that activation of the manual release may cause uncontrolled movement of the door if the springs are weak or broken or if the door is out of balance.

p Add:

For **drives** incorporating a pressure sensing system, the instructions for use shall include the substance of the following:

Each month, check that the drive reverses when the door contacts a 50 mm high object placed on the ground. Adjust if necessary and check again since an incorrect adjustment may present a hazard.

p Add:

7.Z101 If the **drive** is intended to be installed at a height of at least 2,5 m above the floor or other access level, the packaging shall be marked accordingly. This information shall also be given in the instructions for installation.

Compliance is checked by inspection.

p **7.12.1** In the first paragraph, delete "including any non-inherent protection device".

p Replace the first dashed item by:

- before installing the drive, remove all unnecessary ropes or chains and disable any equipment which is not needed after installation of the drive.

p In the last dashed item, replace "40 mm" by "50 mm" and add "(for **drives** incorporating a pressure sensing system)".

p Add the following dashed items:

- after installation, ensure that the parts of the door do not extend over public footpaths or roads;
- after installation, ensure that the drive prevents or stops the opening movement when the door is loaded with a mass of 20 kg, fixed centrally on the bottom edge of the door (for **drives** that can be used with doors having openings larger than 50 mm in diameter).

p Add:

7.15 *Addition:*

When it is not practical for the marking to be visible after the **drive** has been installed, the marking shall also be included in the instructions.

p **7.101** Replace the second paragraph and the note by:

The text may be replaced by the warning sign shown in figure 102.

p **7.102** Replace "**Drives**" by "**Drives** incorporating a pressure sensing system" and replace "40 mm" by "50 mm".

11 Heating

p 11.7 Replace the text by:

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

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

- ***drives** supplied without a door are operated without rest periods for the **rated operating time** but for not less than three cycles of operation or 4 min, whichever is longer;*
- ***drives** supplied with a door are operated without rest periods for the **rated number of operating cycles** but for not less than three cycles of operation.*

15 Moisture resistance

p Replace the text by:

This clause of part 1 is applicable except as follows:

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 rev/min.*

19 Abnormal operation

p Add:

19.1 Addition:

Compliance is also checked by the test of 19.Z101.

p 19.10 Replace the text by:

Addition:

The test is continued for one cycle of operation if this is longer.

p Add:

19.11.2 Addition:

*If the **drive** can be operated when any of the fault conditions are simulated, the tests of 20.Z101 to 20.Z103 are carried out, the **drive** however being supplied at **rated voltage**.*

The average forces specified in 20.Z103.1 may be exceeded but they shall not be greater than 600 N during the first 2 s after the force has exceeded 150 N, and shall not be greater than 150 N thereafter.

p 19.13 Delete the addition.

p Add:

19.Z101 *Drives marked with a **rated operating time** or a **rated number of operating cycles** are supplied at **rated voltage** and operated continuously under **normal operation**.*

During the test the winding temperatures shall not exceed the values specified in 19.9.

20 Stability and mechanical hazards

p **20.102** Replace the text by "Void".

p **20.103** Replace the text by "Void".

p **20.104** Replace the text by "Void".

p **20.105** Replace the text by "Void".

p **20.106** Replace the text by "Void".

p **20.107** Replace the text by "Void".

p Add:

20.Z101 **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 and 1,06 times **rated voltage**. It is operated to close the door.*

When the actuating member of the switch is released, the bottom edge of the door shall stop before it has moved more than 50 mm.

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

The requirement for the door to stop within a distance of 50 mm only applies if the closing force exerted by the door exceeds 150 N, as measured in 20.Z103.1.

20.Z102 **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** being set at maximum in accordance with the instructions for use. The **drive** is supplied at the most unfavourable voltage between 0,94 and 1,06 times **rated voltage**.*

An obstacle having dimensions of approximately 200 mm x 300 mm, a height of 700 mm and a mass of 20 kg \pm 0,5 kg is placed on the ground under the closing door in the most unfavourable orientation.

NOTE - The obstacle is normally made of rough wood and painted white but other materials and colours may be used to simulate the most unfavourable conditions.

The **drive** is operated to close the door. The door shall stop or reverse its movement without contacting the obstacle.

The test is repeated with the obstacle rotated at a speed not greater than 15 rev/min and then while it is moved under the closing door at a speed of $3 \text{ m/s} \pm 0,6 \text{ m/s}$.

The tests are repeated with the obstacle placed on its side so that its height is 200 mm.

The obstacle, in its vertical position, is then raised in increments up to 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 or reverse its movement without contacting the obstacle.

The obstacle, in its vertical position, is placed at any location next to the closed door. The **drive** is operated to open the door. The door shall stop or reverse its movement without contacting the obstacle.

20.Z103 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.Z103.1 for a closing movement and, if the **drive** is supplied with a door, by the test of 20.Z103.2 for an opening movement.

20.Z103.1 The **drive** is installed with a door, the force exerted by the **drive** being set at maximum in accordance with the instructions for use. The **drive** is supplied at the most unfavourable voltage between 0,94 and 1,06 times **rated voltage**.

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 closing force to

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

or

- 600 N during the first 2 s after the force has exceeded 150 N,
- 150 N thereafter.

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

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

- 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 average closing force is calculated for each location.

If the measured force exceeds 400 N, the following test is carried out to detect stationary and moving obstacles.

An obstacle having dimensions of approximately 80 mm x 300 mm and a height of 100 mm is placed on the ground and centrally across the door opening.

The **drive** is operated to close the door. The door shall reverse its movement when detecting the obstacle.

The test is repeated 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 by one end 900 mm above the ground and centrally in the door opening.

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 detect the obstacle and cause the door to reverse its movement.

The force exerted by the **drive** is then set at the maximum in accordance with the instructions for installation.

The closing force is measured again and shall not exceed

- 600 N during the first 2 s after the force has exceeded 150 N,
- 150 N thereafter.

20.Z103.2 Drives intended to be used with a door having openings in which a 50 mm diameter cylinder can be inserted are subjected to an opening test, the door being provided with a load. The force exerted by the **drive** is set at maximum in accordance with the instructions for use. The load has dimensions of approximately 200 mm x 200 mm x 200 mm, a mass of 20 kg, and is fixed centrally to the outside of the door with one edge adjacent to the bottom edge of the door.

The **drive** is supplied at the most unfavourable voltage between 0,94 and 1,06 times **rated voltage** and operated to open the door. If the bottom edge of the door moves more than 500 mm, the load is replaced by a test piece having dimensions of approximately 200 mm x 300 mm, a height of 700 mm and a mass not exceeding 20 kg, with the 300 mm edge adjacent to the bottom edge of the door.

The **drive** is again operated to open the door. The movement of the door shall stop before the test piece comes into contact with the lintel.

20.Z104 Entrapment protection systems shall provide an adequate level of protection in the event of a failure within the system.

*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 or installation wiring.*

*Unless the **entrapment protection system** continues to operate normally, the door shall stop moving or the movement of the door shall only be controlled by a supplementary **biased-off switch** after the door has completed its movement.*

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

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

NOTE - It may be necessary to simulate several faults before the test is completed.

20.Z105 A mechanical fault in the **drive** shall not result in a hazardous operation.

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** being set at maximum in accordance with the instructions for use. The **drive** is supplied at the most unfavourable voltage between 0,94 and 1,06 times **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,*
- *further operation shall not be possible,*
- *the speed of the door shall not increase by more than 20 %.*

p **20.108** Replace this subclause by:

During the movement of the **drive** in either direction, the actuation of a manual control shall stop the movement.

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

If the control has two buttons, one button shall stop the movement. Actuation of the other button shall restart the movement in the opposite direction.

If the control has three buttons, one button shall stop the movement. Another button shall initiate the opening movement. If this button is actuated during the closing

movement, the movement shall continue or reverse. The third button shall initiate the closing movement. If this button is actuated during the opening movement, the movement shall continue or reverse.

Compliance is checked by manual test.

NOTE - The test may be carried out without a door.

22 Construction

p **22.101** Replace the text by:

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

Compliance is checked by inspection.

NOTE – This requirement only applies to adjustments affecting compliance with the standard.

p **22.103** Replace the text by “Void”.

p **22.104** Replace the text by “Void”.

p **22.105** Replace the text by “Void”.

p **22.106** Add to the requirement:

The marking of the buttons shall be the same.

p Add:

22.Z101 If the **entrapment protection system** is a **biased-off switch**, it shall only be possible to operate the switch within sight of the door.

Compliance is checked by inspection.

30 Resistance to heat, fire and tracking

p **30.3** Add:

NOTE - Parts of insulation material are considered to be subjected to severe duty conditions unless they are enclosed so that pollution is unlikely to occur.

p **Figure 102** Replace by:



Minimum height: 60 mm

Form and colours to be in accordance with ISO 3864

Figure 102 - Sign warning against child entrapment

p **Annex A** Replace by:

Annex A
(normative)

Normative references

Addition:

<u>IEC Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
60068-2-52	1996	Environmental testing – Part 2: Tests Test Kb: Salt mist, cyclic (sodium chloride solution)	EN 60068-2-52	1996
<u>ISO Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
3864	1984	Safety colours and safety signs	-	-
7000	1989	Graphical symbols for use on equipment Index and synopsis	-	-
