

Specification for

Automatic electrical controls for household and similar use —

**Part 2-9: Particular requirements for
temperature sensing controls**

The European Standard EN 60730-2-9:1995 has the status of a
British Standard

ICS 97.120

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee CPL/72, Electrical control devices for household equipment and appliances, upon which the following bodies were represented:

Association of Control Manufacturers (BEAMA Ltd.)
Association of Manufacturers of Domestic Electrical Appliances
British Combustion Equipment Manufacturers' Association
British Electrotechnical Approvals Board
British Gas plc
British Refrigeration Association
Consumer Policy Committee of BSI
Department of the Environment (Building Research Establishment)
Department of Trade and Industry (Consumer Safety Unit, CA Division)
Electricity Association
ERA Technology Ltd.
Membrane Switch Manufacturers' Association
Society of British Gas Industries

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National foreword

This British Standard has been prepared by Technical Committee CPL/72 and is the English language version of EN 60730:1995 *Automatic electric controls for household and similar use — Part 2-9: Particular requirements for temperature sensing controls* including its amendments A1:1996, A11:1997, A2:1997, corrigendum 1997, amendment A12:2001, corrigendum March 2001 and amendment A13:2004, published by the European Committee for Electrotechnical Standardization (CENELEC). It was derived from IEC 60730-2-9:1990, first edition, including amendments 1 and 2, published by the International Electrotechnical Commission (IEC).

Corrigendum March 2001 replaces the latest date of withdrawal of conflicting national standards in the EN foreword and the forewords to amendments A1, A11 and A2.

The CENELEC common modifications have been implemented at the appropriate places in the text. The start and finish of each common modification is indicated in the text by tags **[C]** **[C]**. Where a common modification has been introduced by amendment, the tags carry the number of the amendment. For example, the common modifications introduced by CENELEC amendment A13 are indicated by **[C13]** **[C13]**.

Parts of the original IEC text that have been modified by CENELEC have been quoted in National annex NA. Annexes designated “normative” are part of the body of the standard. Annexes designated “informative” are given for information only. National annexes are designated “informative”.

The foreword of EN 60730-2-9 makes reference to the “date of withdrawal”, dow, of the relevant national standard. In this case the relevant national standard is BS 3955 which will cease to be applicable to temperature sensing controls within the scope of BS EN 60730-2-9 on 1 January 2004. Certification and marks will not be awarded after this date with respect to BS 3955. BS 3955 will be progressively amended to delete specific controls at the dates of withdrawal agreed.

The foreword of amendment A1 to the EN makes reference to the “date of withdrawal (dow) of conflicting national standards” as 2004-01-01. In this case, the relevant national standard is BS EN 60730-2-9:1995, but the date of withdrawal relates only to those parts of the British Standard subject to Amendment No. 1. Certificates and marks will not be awarded after this date with respect to the British Standard not incorporating Amendment No. 1. They will be awarded only to the amended British Standard.

This British Standard is to be read in conjunction with BS EN 60730-1:1995 *General requirements*. The many references to Part 1 should be read as references to BS EN 60730-1, which is the English language version of EN 60730-1:1995 which was derived from IEC Publication 60730-1 (1993) second edition.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 32, an inside back cover and a back cover.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60730-2-9 + A2

February 1995

April 1997

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English version

Automatic electrical controls for household and similar use — Part 2-9: Particular requirements for temperature sensing controls

(includes amendments A1:1996 + A11:1997 + A2:1997 + A12:2001 + A13:2004)
(IEC 60730-2-9:1992 + A1:1996 + A2:1994, modified)

Dispositifs de commande électrique automatiques à usage domestique et analogue
Partie 2-9: Règles particulières pour les dispositifs de commande thermosensibles
(inclut les amendements A1:1996 + A11:1997 + A2:1997 + A12:2001 + A13:2004)
(CEI 60703-2-9:1992 + A1:1996 + A2:1994, modifiée)

Automatische elektrische Regel- und Steuergeräte für den Hausgebrauch und ähnliche Anwendungen
Teil 2-9: Besondere Anforderungen an Temperaturabhängige Regel- und Steuergeräte
(enthält Änderungen A1:1996 + A11:1997 + A2:1997 + A12:2001 + A13:2004)
(IEC 60730-2-9:1992 + A1:1996 + A2:1994, modifiziert)

This European Standard was approved by CENELEC on 1994-10-04.
Amendment A13 was approved by CENELEC on 2004-09-01. 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, 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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Ref. No. EN 60730-2-9:1995 + A1:1996 + A11:1997 + A2:1997 + A12:2001 + A13:2004

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Foreword

This European Standard has been prepared by the CENELEC Technical Committee TC 72, Automatic controls for household use.

It consists of the text of IEC 730-2-9:1992 and a number of common modifications which were submitted to the formal vote and approved by CENELEC as EN 60730-2-9 on 1994-10-04.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1996-01-01
- latest date of withdrawal of conflicting national standards (dow) 2004-01-01

This part 2 has to be used in conjunction with EN 60730-1:1991, *Automatic electrical controls for household and similar use — Part 1: General requirements*, and its amendments A1:1991, A11:1991 and A12:1993. Consideration may be given to future editions of, or amendments to, EN 60730-1.

Where a particular sub-clause of part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. Where this standard states addition, modification or replacement, the relevant text of part 1 is to be adapted accordingly.

Subclauses which are in addition to those in IEC 730-1 are numbered 101, 102 etc. Subclauses which are in addition to those in IEC 730-2-9 are numbered 601, 602, etc. Additional appendices are labelled AA, BB etc. CENELEC annexes are numbered ZA, ZB, etc.

There are no special national conditions (snc) causing a deviation from this European Standard other than those listed in Annex ZA of EN 60730-1.

Where reference is made to other international or harmonized standards, the edition of that standard quoted in Annex ZB (normative) is applicable.

NOTE In this document the following print types are used:

- requirements proper: in roman type;
- *test specifications: in italic type*;
- explanatory matter: in smaller roman type;
- instructions for modification of the reference document: **in bold type**.

Foreword to amendment A1

This amendment to the European Standard has been prepared by the Technical Committee CENELEC TC 72, Automatic controls for household use.

It consists of the text of amendment 1:1994 to the International Standard IEC 730-2-9:1992 and common modifications prepared by CENELEC TC 72. The text of the draft was submitted to the formal vote and was approved by CENELEC as amendment A1 to EN 60730-2-9:1995 on 1996-03-05.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1997-03-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2004-01-01

This document supplements or modifies the corresponding clauses of amendment 1:1994 to IEC 730-2-9:1992 so as to convert it into amendment A1 to EN 60730-2-9:1995.

This document was established on the basis of EN 60730-1:1995. Consideration may be given to future editions of, or amendments to, EN 60730-1.

Where reference is made to other international or harmonized standards, the edition of that standard quoted in Annex ZA (normative) is applicable.

Special national conditions to this amendment are listed in Annex ZB (normative) and are in addition to those in Annex ZB to EN 60730-1.

NOTE In this document, the following print types are used:

- requirements: in roman type;
- *test specifications: in italic type*;
- notes: in small roman type;
- instructions for modification of the reference document: **in bold type**.

Foreword to amendment A11

This amendment was prepared by the CENELEC Technical Committee TC 72, Automatic controls for household use. It adds requirements for a voltage maintained thermal cut-out.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A11 to EN 60730-2-9:1995 on 1996-12-09.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by publication (dop) 1997-07-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2004-01-01

Foreword to amendment A2

The text of amendment 2:1994 to the International Standard IEC 730-2-9:1992, prepared by IEC TC 72, Automatic controls for household use, together with the common modifications prepared by the Technical Committee CENELEC TC 72, was submitted to the formal vote and was approved by CENELEC as amendment A2 to EN 60730-2-9:1995 on 1997-03-11.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1997-10-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2004-01-01

This document supplements or modifies the corresponding clauses of EN 60730-2-9:1995.

Foreword to amendment A12

The amendment to EN 60730-2-9:1995 has been prepared by the Technical Committee CENELEC TC 72, Automatic controls for household use.

The text was agreed for submission to the CENELEC Unique Acceptance Procedure (UAP) at the meeting of CLC/TC 72 in Luzern, Switzerland, on 1999-09-09/10.

The draft was circulated as prAA (amending Table 7.2 to include a declaration for a click rate of temperature sensing controls) and prAB (amending Table 7.2 and subclause 14.4.3.1 concerning the test conditions of voltage maintained thermal cut-outs) in December 1999 and was approved by CENELEC as amendment A12 to EN 60730-2-9:1995 on 2000-08-01.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2001-10-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2004-01-01

Foreword to amendment A13

This amendment to the European Standard has been prepared by the CENELEC Technical Committee TC 72: Automatic controls for household use.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A13 to EN 60730-2-9:1995 on 2004-09-01.

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2005-09-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2007-09-01

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1 Scope

This clause of part 1 is replaced as follows:

1.1 This part 2 applies to automatic electrical temperature sensing controls for use in, on or in association with equipment for household and similar use, including electrical controls for heating, air-conditioning and similar applications. The equipment may use electricity, gas, oil, solid fuel, solar thermal energy, etc. or a combination thereof.

Examples of such controls include boiler thermostats, fan controls, temperature limiters and thermal cut-outs.

☞

This standard applies to automatic electrical controls using NTC or PTC thermistors, additional requirements for which are contained in Annex J.

1.1.1 This part 2 applies to the inherent safety, to the operating values, operating times, and operating sequences where such are associated with equipment safety. ☞

This part 2 does not apply to automatic electrical controls designed exclusively for industrial applications.

This part 2 is also applicable to individual controls utilized as part of a control system or controls which are mechanically integral with multifunctional controls having non-electrical outputs.

☞ Automatic electrical controls for equipment not intended for normal household use, but which nevertheless may be used by the public, such as equipment intended to be used by laymen in shops, in light industry and on farms, are within the scope of this standard. ☞

1.1.2 This part 2 also applies to the electrical safety of temperature sensing controls with non-electrical outputs such as refrigerant flow and gas controls.

☞ **1.1.3** EN 60730-2-1 is not applicable to temperature sensing controls. ☞

Throughout this part 2 the word “equipment” includes “appliance” and “control system”.

1.1.4 This part 2 applies to manual controls when such are electrically and/or mechanically integral with automatic controls.

☞ Requirements for manual switches not forming part of an automatic control are contained in IEC 1058-1. ☞

1.1.5 This part 2 applies to bi-metallic single operation devices as defined in this standard.

1.2 This part 2 applies to controls with a rated voltage not exceeding 660 V and with a rated current not exceeding 63 A.

1.3 This part 2 does not take into account the response value of an automatic action of a control, if such a response value is dependent upon the method of mounting the control in the equipment. Where a response value is of significant purpose for the protection of the user, or surroundings, the value defined in the appropriate household equipment standard or as determined by the manufacturer shall apply.

1.4 This part 2 applies also to controls incorporating electronic devices, requirements for which are contained in Appendix H.

☞ 1.5 Normative references

This subclause of part 1 applies except as follows:

Add the following IEC standard:

IEC 691:1980, *Thermal links* ☞

2 Definitions

This clause of part 1 is applicable except as follows:

2.2 Definitions of types of control according to purposes

2.2.9

replacement:

2.2.9

☐ single operation device (SOD) ☐

bi-metallic single operation device denotes a control having a bi-metallic temperature sensing element which is intended to operate only once and then requires complete replacement

a bi-metallic single operation device does not reset above a declared temperature (see 11.4.103)

☐ requirements for thermal links (which are not allowed to reset) are contained in EN 60691

non bi-metallic single operation device denotes a part of a control the operation of which cannot be separated from other functions of the control and having a non bi-metallic temperature sensing element which operates only once and then requires complete or partial replacement ☐

when such parts can be tested separately, they are considered to be thermal links within the scope of EN 60691

Additional subclauses:

2.2.101

room thermostat

room thermostat denotes an independently mounted or incorporated thermostat intended to control the temperature of habitable space

2.2.102

fan control

fan control denotes an automatic temperature sensing control intended to control the operation of a fan or blower

2.2.103

boiler thermostat

boiler thermostat denotes a thermostat intended to control boiler/liquid temperature

2.2.104

modulating thermostat

modulating thermostat denotes a thermostat which controls the temperature between two limits by continuously controlling the input to the load

2.2.601

☐ voltage maintained thermal cut-out

a thermal cut-out which is maintained in its operated condition by the voltage which appears across it in that condition ☐

2.3 Definitions relating to the function of controls

2.3.14 Additional definition:

2.3.14.101

time factor

time factor denotes the transient response of temperature sensing controls by defined change of the activating quantity

☐ 2.5 Definitions of type of control according to construction

Add the following definitions:

2.5.101

push-and-turn actuation

a two-step actuation accomplished by first pushing, and then rotating the actuating member of the control

2.5.102

pull-and-turn actuation

a two-step actuation accomplished by first pulling, and then rotating the actuating member of the control ☐

3 General requirement

This clause of part 1 is applicable.

4 General notes on tests

4.10 Conditions of test

This clause of part 1 is applicable except as follows:

4.1.7 Not applicable.

4.1.101 For the purposes of the tests of this standard and unless otherwise indicated, ambient temperature excursions beyond $T_{\max}$ during abnormal operation as a precursor to the operation of a manual reset thermal cut-out or a bi-metallic S-O-D are ignored.

4.1.102 For manual reset thermal cut-outs and bi-metallic S-O-Ds which have an operating value above $T_{\max}$, the temperature at the sensing element is raised, as necessary, to achieve any cycling required during the tests. **11**

4.2 Samples required

4.2.1 *Addition:*

11 Six samples of single operation devices are used for the test of clause 15. **11**

Additional samples are required for the tests of clause 17.

5 Rating

This clause of part 1 is applicable.

6 Classification

This clause of part 1 is applicable except as follows:

6.4 According to features of automatic action

6.4.3 *Additional subclauses:*

6.4.3.101 — for sensing actions, no increase in the operating value as a result of any leakage from the sensing element, or from parts connecting the sensing element to the switch head (Type 2.N).

6.4.3.102 — an action which operates after a declared thermal cycling test as specified in 17.101 (Type 2.P).

11 In general, thermal cut-outs for specific applications, such as pressurized water-heating systems, may be classified as having Type 2.P action.

6.4.3.103 — an action which is initiated only after a push-and-turn or pull-and-turn actuation and in which only rotation is required to return the actuating member to the off or rest position (Type 1.X or 2.X).

6.4.3.104 — an action which is initiated only after a push-and-turn or pull-and-turn actuation (Type 1.Z or 2.Z).

13 NOTE The following modification applies to the text of EN 60730-2-9:1995/A11:1997. **13**

6.4.3.601 **13** — an action which cannot be reset under declared electrically loaded conditions and at temperatures above -20°C or a lower temperature if so declared (type 1.AK or type 2.AK). **13**

6.7 According to ambient temperature limits of the switch head

Add the following subclauses:

6.7.101 Controls for use in or on cooking appliances.

6.7.102 Controls for use in or on ovens of the self-cleaning type.

6.7.103 Controls for use in or on food-handling appliances. **11**

6.8.3 *Modification:*

Replace the first paragraph by:

For an in-line cord control, a free standing control, an independently mounted control or a control integrated or incorporated in an assembly utilizing a non-electrical energy source.

6.15 According to construction

Add the following subclause:

6.15.101 Controls having parts containing liquid metal. C11**7 Information**

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

7.2 Methods of providing information**Table 7.2**

Information	Clause or subclause	Method
<i>Modify as follows:</i>		
C11 48 Operating value (or values) or operating time	2.3.11, 2.3.12, 6.4.3.10, 11, 12, 15.4, 15.6, 17	C11 D
101 Maximum sensing element temperature (other than relevant to requirement 105) ¹⁰¹	17.101	X
102 Time factor	11.101 2.3.14.101	X
103 Bi-metallic S.O.D. reset temperature (either –35 °C or 0 °C)	11.4.103 2.2.9	X
104 Number of cycles for bi-metallic single-operation devices with 0 °C reset	17.15.3.1	X
105 Maximum sensing temperature for the test of 17.16.107 (T_e)	6.7.102 17.16.107	D
106 Controls having parts containing liquid metal ¹⁰²	6.15.101 18.102 11.1.101	D
107 Tensile yield strength	11.1.101	X
108 Minimum current for the purpose of the test of 23.101 ¹⁰³	23.101	D
601 Automatic reset temperature of a manual reset thermal cut-out (this shall not be higher than minus 20 °C)		X
C11 602 $T_{\max}$ 1 is the maximum ambient temperature in which the control may remain continuously in the operated condition so that Table 14.1 temperatures are not exceeded ⁶⁰¹	14.4.3.1	D
603 Time period, t_1 , is the maximum time during which the ambient temperature can be higher than $T_{\max}$ 1 after the control has operated ⁶⁰¹	14.4.3.1	D C11
C12 604 The click rate N or switching operations per minute for the purposes of testing to EN 55014-1	23	X C12
<i>Additional notes to Table 7.2:</i>		
C11 ³⁾ The manufacturer may declare a time before which, or a specific value of activating quantity above which, manual reset shall not occur. A manual reset thermal cut-out and a voltage maintained thermal cut-out shall not reset automatically at a higher temperature than – 20 °C, or at a lower temperature if this has been declared. This requirement applies to a voltage maintained thermal cut-out in the operated condition with the voltage across it. C11 ¹⁰¹⁾ This declaration applies to all temperature sensing controls. For temperature sensing controls used in or on self-cleaning ovens, this declaration is the temperature for the cooking operation. ¹⁰²⁾ Refer SMC ¹⁰³⁾ When no minimum is declared, the test value is 15 mA. C11 ⁶⁰¹⁾ Consideration should be given to the provision of information relating to the minimum time that a voltage maintained thermal cut-out has to be disconnected from the supply to allow reset to take place. C11 C12 ⁶⁰²⁾ Not applicable if the maximum operating temperature is lower than the declared $T_{\max 1}$. C12		

Addition: