

Specification for

Automatic electrical controls for household and similar use —

Part 2: Particular requirements —

Section 2.5 Automatic electrical burner
control systems

The European Standard EN 60730-2-5:1995 with the incorporation of its amendments A1:1996 and A2:1998 has the status of a British Standard

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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 60730-2-5:1995 *Automatic electrical controls for household and similar use — Part 2: Particular requirements for automatic electrical burner control systems* including amendment A1:1996 and its corrigendum dated July 1997 and amendment A2:1998 and its corrigendum dated January 1998 published by the European Committee for Electrotechnical Standardization (CENELEC). It was derived by CENELEC from IEC 730-2-5:1993 including Amendment 1:1996 and Amendment 2:1997, published by the International Electrotechnical Commission (IEC).

The CENELEC common modifications have been implemented at the appropriate places in the text and are indicated by a side line in the margin. Parts of the original IEC text that have been modified by CENELEC have been quoted in National annex NA.

This British Standard supersedes BS EN 60730-2-5:1992 which will be withdrawn on 15 December 2000 in accordance with the CENELEC Internal regulations. Analogous provisions obtain with respect to Amendment No. 1 and Amendment No. 2, for each of which the date is 2000-12-15.

This British Standard is to be read in conjunction with BS EN 60730-1:1995 *General requirements*, which it supplements or modifies. The many references to Part 1 should be read as references to BS EN 60730-1:1995 which is the English language version of EN 60730-1:1995 which was derived from IEC 730-1:1993.

Product approval. Attention is drawn to the fact that products conforming to this British Standard may be approved by the British Electrotechnical Approvals Board for purposes of participation in the CENELEC Certification Agreement and in the CB Scheme of the IECEE. (Details of the BEAB Approval Scheme are given on the inside back cover.)

Cross-reference

Publication referred to	Corresponding British Standard
IEC 60989:1991	BS 7452:1991 <i>Specification for separating transformers, auto transformers, variable transformers and reactors</i>

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.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 30, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

English version

Automatic electrical controls for household and similar use Part 2: Particular requirements for automatic electrical burner control systems

(includes amendments A1:1996 and A2:1998)
(IEC 730-2-5:1993, modified + A1:1996 + A2:1997)

Dispositifs de commande électrique
automatiques à usage domestique et analogue
Partie 2: Règles particulières pour les systèmes
de commande électrique automatiques des
brûleurs
(inclut les amendments A1:1996 + A2:1998)
(CEI 730-2-5:1993, modifiée + A1:1996
+ A2:1997)

Automatische elektrische Regel- und
Steuergeräte für den Hausgebrauch und
ähnliche Anwendungen
Teil 2: Besondere Anforderungen an
automatische elektrische Brenner-Steuerungs-
und Überwachungssysteme
(enthält Änderungen A1:1996 + A2:1998)
(IEC 730-2-5:1993, modifiziert + A1:1996
+ A2:1997)

This European Standard was approved by CENELEC on 1994-12-06. 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, 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

Central Secretariat: rue de Stassart 35, B-1050 Brussels

Foreword

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

It consists of the text of IEC 730-2-5:1993 and a number of common modifications which were submitted to the Unique Acceptance Procedure and approved by CENELEC as EN 60730-2-5 on 1994-12-06.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1995-12-15
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2000-12-15

This Part 2 is to be used in conjunction with EN 60730-1:1995 *Automatic electrical controls for household and similar use — Part 1: General requirements*. Consideration may be given to future editions of, or amendments to, EN 60730-1.

This Part 2 supplements or modifies the corresponding clauses of EN 60730-1 so as to convert it into the European Standard: *Safety requirements for automatic electrical burner control systems*.

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

Subclauses, notes, tables and figures which are in addition to those in Part 1 are numbered 101, 102, etc.

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

There are no special national conditions (snc) causing a deviation from this European Standard other than those listed in Annex ZB of EN 60730-1. National deviations from this European Standard are listed in Annex ZC and are in addition to those in EN 60730-1:1995.

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

The text of document 72/342/FDIS, future amendment 1 to IEC 730-2-5:1993, prepared by IEC TC 72, Automatic controls for household use, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 60730-2-5:1995 on 1996-10-01.

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- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1997-07-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2000-12-15

Foreword to Amendment A2

The text of document 72/391/FDIS, future amendment 2 to IEC 60730-2-5:1993, prepared by IEC TC 72, Automatic controls for household use, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A2 to EN 60730-2-5:1997 on 1998-01-01.

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) 1998-10-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2000-12-15

Annexes designated “normative” are part of the body of the standard. In this standard, Annex H, Annex K and Annex ZA are normative. Annex ZA has been added by CENELEC.

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1 Scope and normative references

This clause of part 1 is applicable except as follows:

1.1 Replacement:

This part of International Standard IEC 730 applies to automatic electrical burner control systems for the automatic control of burners for oil, gas, coal or other combustibles for household and similar use including heating, air conditioning and similar use.

This part 2 is applicable to a complete burner control system and to a separate programming unit. This part 2 is also applicable to a separate electronic high voltage ignition source and to a separate flame detector.

Separate ignition devices (electrodes, pilot burners, etc.) are not covered by this part 2 unless they are submitted as part of a burner control system.

Requirements for separate ignition transformers are contained in IEC 989.

Burner controls systems utilizing thermoelectric flame supervision are not covered by this part 2.

1.1.1 This part 2 applies to the inherent safety, to the manufacturer's declared operating values, operating times and operating sequences where such are associated with burner safety and to the testing of automatic electrical burner control systems used in, on, or in association with burners.

Requirements for specific operating values, operating times and operating sequences are given in the standards for appliances and equipment.

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 part 2.

This part 2 applies to automatic electric controls using NTC or PTC thermistors, additional requirements for which are contained in Annex J.

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

1.1.2 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.

Throughout this part 2, the word "equipment" means "appliance and equipment".

1.2 Replacement:

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 Replacement:

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.

This part 2 includes controls responsive to flame properties.

1.4 Replacement:

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

1.5 Normative references:

Additions:

IEC 989:1991, *Separating transformers, autotransformers, variable transformers and reactors*.

IEC 60384-16:1982, *Fixed capacitors for use in electronic equipment — Part 16: Sectional specification: Fixed metallized polypropylene film dielectric d.c. capacitors*.

2 Definitions

This clause of part 1 is applicable except as follows:

2.2 Definitions of types of controls according to purpose

Additional definitions:

2.2.101

burner control system

a system which monitors the operation of fuel burners. It includes a programming unit, a flame detector and may include an ignition source and/or ignition device

The various functions of an automatic burner control system may be in one or more housings.

2.2.102

flame detector

a device which provides the programming unit with a signal indicating the presence or absence of flame

It includes the flame sensor and may include an amplifier and a relay for signal transmission. The amplifier and relay may be in its own housing or combined with the programming unit.

2.2.103

flame sensor

a device which senses the flame and provides the input signal to the flame detector amplifier

Examples are optical sensors and flame electrodes (flame rods).

2.2.104**ignition source**

an electrical or electronic system which provides energy to an ignition device

It may be separated from or incorporated in the programming unit. Examples are ignition transformers and electronic high voltage generators.

2.2.105**ignition device**

a device mounted on or adjacent to a burner for igniting fuel at the burner

Examples are pilot burners, spark electrodes and hot surface igniters.

2.2.106**programming unit**

a device which controls the burner operation in a declared sequence from start-up to shutdown within declared timings and in response to signals from regulating, limiting and monitoring devices

2.2.107**multitry burner control system**

a system that allows more than one valve open period during its declared operating sequence

2.3 Definitions relating to the function of controls**2.3.30 $T_{\max}$**

replace “switch head” by “burner control system”

Additional definitions:

2.3.101**automatic recycling**

the automatic repetition of the start-up procedure, without manual intervention, following loss of the supervised flame and subsequent fuel supply shut off

2.3.102**controlled shutdown**

the de-energization of the fuel flow means as a result of the opening of a control loop by a control device such as a thermostat. The burner control system returns to the start position

Controlled shutdown may include additional actions by the burner control system.

2.3.103**flame detector response time**

the period of time between the loss of the sensed flame and the signal indicating the absence of flame

2.3.104 flame detector operating characteristics

That function of the flame detector which indicates absence or presence of flame as the output signal of the flame detector relating to the input signal.

Normally the input signal is provided by a flame sensor.

2.3.104.1**signal for presence of flame (S_1)**

the minimum signal which indicates the presence of flame when there was previously no flame

2.3.104.2**signal for absence of flame (S_2)**

the maximum signal which indicates the loss of flame

2.3.104.3**maximum flame signal ($S_{\max}$)**

the maximum signal which does not affect the timings or the sequence

2.3.105**self-checking flame detector**

a flame detector which checks for correct operation of the flame detector and its associated electronic circuitry while the burner is in the running position

2.3.106**flame detector self-checking rate**

the frequency of the self-checking function of the flame detector (in number of operations per unit of time)

2.3.107**flame failure lock-out time**

the period of time between the signal indicating absence of flame and lock-out

2.3.108**flame failure reignition time (relight time)**

the period of time between the signal indicating absence of flame and the signal to energize the ignition device. During this time period the fuel supply is not shut off

2.3.109**flame signal**

the output signal of the flame detector

2.3.110**flame simulation**

a condition which occurs when the flame detector indicates the presence of flame when in reality no flame is present

2.3.111**ignition time**

the period of time during which the ignition device is energized

2.3.112 lock-out

A process in which the burner control system goes into one of two lock-out conditions following safety shutdown.

2.3.112.1**non-volatile lock-out**

the condition of a burner control system following safety shutdown such that a restart can only be accomplished by a manual reset of the burner control system and by no other cause

2.3.112.2**volatile lock-out**

the condition of a burner control system following safety shutdown such that a restart can be accomplished by either a manual reset of the burner control system or by an interruption of the power supply and its subsequent restoration

2.3.113**main flame establishing period**

the period of time between the signal to energize the main fuel flow means and the signal indicating presence of the main burner flame

2.3.114**pilot flame establishing period**

the period of time between the signal to energize the pilot fuel flow means and the signal indicating presence of the pilot flame

2.3.115**post-ignition time**

that period of the ignition time between the signal indicating presence of flame and the signal to de-energize the ignition device

2.3.116**pre-ignition time**

that period of the ignition time between the signal to ignite and the signal to energize the fuel flow means

2.3.117**proved ignition system**

a burner control system in which the fuel flow means is energized only after the availability of sufficient energy to ignite the fuel has been verified

An example is a system using spark supervision.

2.3.118 purge time

The period during which air is introduced to displace any remaining air/fuel mixtures or products of combustion from the combustion zone and flue ways.

No fuel is admitted during this period.

2.3.118.1**post-purge time**

the purge time that takes place immediately following the shutting off of the fuel supply

2.3.118.2**pre-purge time**

the purge time that takes place between initiation of a burner control sequence and the admission of fuel to the burner

2.3.119**reignition (relight)**

the process by which, following loss of the flame signal, the ignition device will be re-energized without interruption of the fuel flow means

2.3.120**recycle time**

the period of time between the signal to de-energize the fuel flow means following the loss of flame and the signal to begin a new start-up procedure

2.3.121**running position**

this position denotes that the main burner flame is established and supervised

2.3.122**safety shutdown**

the de-energization of the main fuel flow means as the result of the action of a limiter, a cut-out or the detection of an internal fault of the burner control system

safety shutdown may include additional actions by the burner control system.

2.3.123**start position**

position which denotes that the burner control system is not in the lock-out condition and has not yet received the start signal, but can proceed with the start-up sequence if required

2.3.124**start signal**

a signal, e.g., from a thermostat, which releases the burner control system from its start position

2.3.125**start-up lock-out time**

the period of time between the signal to energize the fuel flow means and lock-out

for burner control systems which control two separate fuel flow means, two different start-up lock-out times are possible (first and second start-up lock-out times).

2.3.126**waiting time**

the period between the start signal and the signal to energize the ignition device. For burners without fans, natural ventilation of the combustion chamber and the flue passages normally takes place during this time