

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Automatic electrical controls –  
Part 2-5: Particular requirements for automatic electrical burner control systems**

**Commandes électriques automatiques –  
Partie 2-5: Exigences particulières pour les systèmes de commande électrique  
automatique des brûleurs**

[standards/sist/6dcf345e-d881-4ca1-8a13-b4cd641328dc/iec-60730-2-5-2013](https://standards.sist/6dcf345e-d881-4ca1-8a13-b4cd641328dc/iec-60730-2-5-2013)



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2021 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

#### IEC online collection - [oc.iec.ch](http://oc.iec.ch)

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 18 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

### A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### Recherche de publications IEC -

[webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC online collection - [oc.iec.ch](http://oc.iec.ch)

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [sales@iec.ch](mailto:sales@iec.ch).



IEC 60730-2-5

Edition 4.2 2021-01  
CONSOLIDATED VERSION

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Automatic electrical controls –  
Part 2-5: Particular requirements for automatic electrical burner control systems**

**Commandes électriques automatiques –  
Partie 2-5: Exigences particulières pour les systèmes de commande électrique  
automatique des brûleurs**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 97.120

ISBN 978-2-8322-9355-3

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**



## REDLINE VERSION

## VERSION REDLINE



**Automatic electrical controls –  
Part 2-5: Particular requirements for automatic electrical burner control systems**

**Commandes électriques automatiques –  
Partie 2-5: Exigences particulières pour les systèmes de commande électrique  
automatique des brûleurs**

[standards/sist/6dcf345e-d881-4ca1-8a13-b4cd641328dc/iec-60730-2-5-2013](https://standards.sist/6dcf345e-d881-4ca1-8a13-b4cd641328dc/iec-60730-2-5-2013)

## CONTENTS

FOREWORD .....	4
1 Scope and normative references .....	7
2 Terms and definitions .....	10
3 General requirements .....	17
4 General notes on tests .....	17
5 Rating .....	18
6 Classification .....	18
7 Information .....	20
8 Protection against electric shock .....	23
9 Provision for protective earthing .....	23
10 Terminals and terminations .....	23
11 Constructional requirements .....	24
12 Moisture and dust resistance .....	33
13 Electric strength and insulation resistance .....	33
14 Heating .....	34
15 Manufacturing deviation and drift .....	35
16 Environmental stress .....	36
17 Endurance .....	36
18 Mechanical strength .....	40
19 Threaded parts and connections .....	40
20 Creepage distances, clearances and distances through solid insulation .....	40
21 Resistance to heat, fire and tracking .....	40
22 Resistance to corrosion .....	40
23 Electromagnetic compatibility (EMC) requirements – Emission .....	40
24 Components .....	40
25 Normal operation .....	40
26 Electromagnetic compatibility (EMC) requirements – Immunity .....	41
27 Abnormal operation .....	41
28 Guidance on the use of electronic disconnection .....	41
Annex H (normative) Requirements for electronic controls .....	42
Annex J (normative) Requirements for thermistor elements and controls using thermistors .....	60
Annex BBAA (informative) Functional characteristics of burner control systems to be specified by the relevant appliance standards, as applicable .....	61
Annex BB (informative) Specific regional requirements in Japan .....	62
Bibliography .....	64
Figure 101 – Pulse spark generation .....	23
Figure 102 – Typical installation of the independent combustion air supply for room independent operation .....	32
Figure H.101 – Voltage variation test .....	46

Table 1 (7.2 of edition 3) – Required information and methods of providing information (1 of 2) .....	21
Table H.1 (7.2 of the previous edition) .....	43
Table H.101 – Timing of short-term supply voltage variations .....	46
Table H.103 – Test levels for electrostatic discharge .....	52
Table H.24 (H.27.1 of edition 3) – Electrical/electronic component fault modes table .....	57
Table AA.1 – Functional characteristics of burner control systems to be specified by the relevant appliance standards, as applicable .....	61
Table BB.1 – Comparison between JIS and adopted international standard .....	63

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[IEC 60730-2-5:2013](https://standards.iteh.ai/catalog/standards/sist/6dcf345e-d881-4ca1-8a13-b4cd641328dc/iec-60730-2-5-2013)

<https://standards.iteh.ai/catalog/standards/sist/6dcf345e-d881-4ca1-8a13-b4cd641328dc/iec-60730-2-5-2013>

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

**AUTOMATIC ELECTRICAL CONTROLS –****Part 2-5: Particular requirements for automatic  
electrical burner control systems****FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

**This consolidated version of the official IEC Standard and its amendments has been prepared for user convenience.**

**IEC 60730-2-5 edition 4.2 contains the fourth edition (2013-11) [documents 72/922/FDIS and 72/929/RVD], its amendment 1 (2017-08) [documents 72/1084/FDIS and 72/1103/RVD] and its amendment 2 (2021) [documents 72/1259/FDIS and 72/1262/RVD].**

**In this Redline version, a vertical line in the margin shows where the technical content is modified by amendments 1 and 2. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.**



International Standard IEC 60730-2-5 has been prepared by IEC technical committee 72: Automatic electrical controls.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This part 2-5 is intended to be used in conjunction with IEC 60730-1. It was established on the basis of ~~the fourth edition (2010) of that publication~~ the fifth edition:2013, including Amendment 1:2015 and Amendment 2:2020 of that publication. Consideration may be given to future editions of, or amendments to, IEC 60730-1.

~~The title of IEC 60730-2-5 Ed. 4 has been updated to the title of IEC 60730-1 Ed. 5.0. However, IEC 60730-2-5 Ed. 4.0 has not been updated in accordance with the technical requirements in IEC 60730-1 Ed. 5.0.~~

This part 2-5 supplements or modifies the corresponding clauses in IEC 60730-1 so as to convert that publication into the IEC standard: Safety requirements for automatic electrical burner control systems.

Where this part 2-5 states "addition", "modification", or "replacement", the relevant requirement, test specification or explanatory matter in Part 1 should be adapted accordingly.

Where no change is necessary, this part 2-5 indicates that the relevant clause or subclause applies.

In the development of a fully international standard, it has been necessary to take into consideration the differing requirements resulting from practical experience in various parts of the world and to recognize the variation in national electrical systems and wiring rules.

The "in some countries" notes regarding differing national practices are contained in the following subclauses:

- 2.3.127
- 6.11
- 15.7
- 17.16.102.1
- H.26.11.103101
- ~~Table H.21, Note 7~~ Table H.24, Note i

In this publication:

- 1) The following print types are used:
  - Requirements proper: in roman type;
  - *Test specifications: in italic type;*
  - Explanatory matter; in small roman type;
  - Words defined in Clause 2: **bold**.
- 2) Subclauses, notes, tables and figures which are additional to those in Part 1 are numbered starting from 101, *additional* annexes are lettered AA, BB, etc.

A list of all parts of the IEC 60730 series, under the general title *Automatic electrical controls* can be found on the IEC website.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

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

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[IEC 60730-2-5:2013](https://standards.iteh.ai/catalog/standards/sist/6dcf345e-d881-4ca1-8a13-b4cd641328dc/iec-60730-2-5-2013)

<https://standards.iteh.ai/catalog/standards/sist/6dcf345e-d881-4ca1-8a13-b4cd641328dc/iec-60730-2-5-2013>

## AUTOMATIC ELECTRICAL CONTROLS –

### Part 2-5: Particular requirements for automatic electrical burner control systems

#### 1 Scope and normative references

This clause of Part 1 is applicable except as follows:

##### 1.1 Scope

###### *Replacement:*

~~This part of IEC 60730 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 2-5 is applicable to a complete burner control system and to a separate **programming unit**. This part 2-5 is also applicable to a separate electronic high voltage **ignition source** and to a separate **flame detector**.~~

~~NOTE Separate **ignition devices** (electrodes, **pilot** burners, etc.) are not covered by this part 2-5 unless they are submitted as part of a burner control system. Requirements for separate ignition transformers are contained in IEC 60989.~~

~~Throughout this part 2-5, where it can be used unambiguously, the word "system" means "burner control system" and "systems" means "burner control systems".~~

~~Systems utilizing thermoelectric flame supervision are not covered by this part 2-5.~~

~~**1.1.1** This part 2-5 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.~~

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

~~Systems 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 2-5.~~

~~This part 2-5 applies to systems using NTC or PTC thermistors, additional requirements for which are contained in Annex J.~~

~~This part 2-5 does not apply to systems designed exclusively for industrial applications.~~

~~**1.1.2** This part 2-5 applies to **manual controls** when such are electrically and/or mechanically integral with **automatic controls**.~~

~~NOTE Requirements for manual switches not forming part of an **automatic control** are contained in IEC 61058-1.~~

~~Throughout this part 2-5, the word "equipment" means "appliance and equipment".~~

*Replacement:*

This part of IEC 60730 applies to automatic electrical **burner control systems** for the **automatic control** of burners for oil, gas, coal or other combustibles intended to be used

- for household and similar use,
- in shops, offices, hospitals, farms and commercial and industrial applications.

This International Standard is applicable

- to a complete **burner control system**,
- to a separate **programming unit**,
- to a separate electronic high-voltage **ignition source**,
- to a separate **flame detector** and
- to a separate **high-temperature operation (HTO) detector**.
- to a **burner control system** intended to be used in warm air heating appliances (furnaces) where the appliance is equipped with an electromechanical differential pressure control to monitor the difference of the combustion air pressure (Type 2.AL). This pressure control provides a switch as an alternative to one of the two switching elements to directly de-energize the safety relevant terminals.

NOTE 1 Throughout this document, where it can be used unambiguously, the word "system" means "burner control system" and "systems" means "burner control systems".

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

This standard does not apply to thermoelectric flame supervision controls; thermoelectric flame supervision controls are covered by ISO 23551-6.

This document also applies to electrical **burner control systems** intended exclusively for industrial process applications e.g. those applications covered by ISO TC 244 (ISO 13577).

This document applies to controls powered by primary or secondary batteries, requirements for which are contained within the standard, including Annex V.

**1.1.1** This document applies to the inherent safety, to the 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.

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

**1.1.2** This document applies to AC or DC powered systems with a rated voltage not exceeding 660 V AC or 600 V DC.

**1.1.3** This document 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 equipment standard or as determined by the manufacturer applies.

**1.1.4** This document applies also to systems incorporating **electronic devices**, requirements for which are contained in Annex H.

**1.1.5** This document applies to systems using NTC or PTC thermistors, additional requirements for which are contained in Annex J.

**1.1.6** This document includes systems responsive to flame properties and temperature for HTO.

**1.1.7** This document applies to the electrical and functional safety of controls capable of receiving and responding to communications signals. The signals may be transmitted to or received from external units, connected wired or wireless, that may or may not be part of the burner control system.

**1.1.8** This document does not address the integrity of the output signal to the network devices, such as interoperability with other devices, unless it has been evaluated as part of the control system.

~~**1.2 Replacement:**~~

~~This part 2-5 applies to systems with a rated voltage not exceeding 660 V and with a rated current not exceeding 63 A.~~

~~**1.3 Replacement:**~~

~~This part 2-5 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 applies.~~

~~NOTE This part 2-5 includes systems responsive to flame properties.~~

~~**1.4 Replacement:**~~

~~This part 2-5 applies also to systems incorporating **electronic devices**, requirements for which are contained in Annex H.~~

**4.51.2 Normative references**

This clause of Part 1 is applicable except as follows:

*Addition:*

IEC 60068-2-6, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60079-20-1:2010, *Explosive atmospheres – Part 20-1: Material characteristics for gas and vapour classification – Test methods and data*

~~IEC 61643-11, *Low-voltage surge protective devices – Part 11: Surge protective devices connected to low-voltage power systems – Requirements and test methods*~~

ISO 23551-6:2014, *Safety and control devices for gas burners and gas-burning appliances – Part 6: Thermoelectric flame supervision controls*

*Replacement:*

IEC 60127-1:2015, *Miniature fuses – Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links*

## 2 Terms and definitions

This clause of Part 1 is applicable except as follows:

### 2.2 Definitions of types of control according to purpose

~~NOTE—Definition 2.2.23 is not applicable.~~

**2.2.23** Not applicable.

*Additional definitions:*

#### 2.2.101

##### **burner control system**

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

Note 1 to entry: The various functions of the system may be in one or more housings.

#### 2.2.102

##### **flame detector**

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

Note 1 to entry: 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**

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

Note 1 to entry: Examples are optical sensors and flame electrodes (flame rods).

#### 2.2.104

##### **ignition source**

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

Note 1 to entry: 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**

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

Note 1 to entry: Examples are **pilot** burners, spark electrodes and hot surface igniters.

#### 2.2.106

##### **programming unit**

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

#### 2.2.107

##### **multitry system**

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

### 2.2.108

#### HTO detector

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

Note 1 to entry: It includes the **HTO-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**.

### 2.2.109

#### HTO-sensor

device which senses the temperature of a surface or a medium within the combustion chamber which is in direct contact with a flammable fuel-air mixture and provides a signal indicating presence or absence of **HTO**

### 2.2.110

#### auto-ignition temperature

##### AIT

lowest temperature (of a hot surface or the environment) at which an ignition of a flammable fuel/air mixture occurs

[SOURCE: IEC 60079-20-1:2010,3.3, modified : "or the environment" has been added in the parenthesis, "at which under specified test conditions" has been deleted and " flammable gas or vapour in mixture with air or air/inert gas" has been replaced by " flammable fuel/air mixture"]

### 2.2.111

#### high-temperature operation

##### HTO

operation on the basis of **auto-ignition temperature** which assures ignition and burning of fuel

Note 1 to entry: **High-temperature operation** is used e.g. in fuel cells (IEC 62282-3-100) and in industrial furnaces and associated processing equipment (ISO 13577) where ignition and burning is detected by means of sensing the temperature.

## 2.3 Definitions relating to the function of controls

### 2.3.30

#### $T_{\max}$

Replace "**switch head**" by "**burner control system**."

### 2.3.32

#### safety shut-down

*Replacement:*

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 system

Note 1 to entry: **Safety shut-down** may include additional actions by the system.

*Additional definitions:*

### 2.3.101

#### automatic recycle

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