

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 2 AMENDEMENT 2

Automatic electrical controls –
Part 2-5: Particular requirements for automatic electrical burner control systems
(standards.iteh.ai)

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



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
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

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 It also gives information on projects, replaced and withdrawn publications.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 Just Published - 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.

IEC Customer Service Centre - 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.

IEC online collection - 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.

Electropedia - 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.

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

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 Just Published - 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.

Service Clients - 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.

IEC online collection - 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.

Electropedia - 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.



INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 2
AMENDEMENT 2

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 978-2-8322-9282-2

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.

FOREWORD

This amendment has been prepared by IEC technical committee 72: Automatic electrical controls.

The text of this amendment is based on the following documents:

FDIS	Report on voting
72/1259/FDIS	72/1262/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC website 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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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

FOREWORD

Replace the 2nd sentence in the 3rd paragraph with the following:

It was established on the basis of the fifth edition:2013, including Amendment 1:2015 and Amendment 2:2020 of that publication.

Delete the paragraph beginning with "The title of IEC 60730-2-5 Ed. 4 has been ...".

Replace the 5th dashed entry in paragraph beginning with "The "in some countries" notes regarding..." with:

– H.26.11.101

Replace the 6th dashed entry in paragraph beginning with "The "in some countries" notes regarding..." with:

– Table H.24, Note i

1 Scope and normative references

1.1 Scope

Add "Replacement" below the title of 1.1.

Add the following as a new bullet point before Note 1:

- 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.

Add the following new paragraph as the last paragraph of 1.1:

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

Add the following new subclauses:

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.

[IEC 60730-2-5:2013/AMD2:2021](https://standards.iteh.ai/catalog/standards/sist/449e533f-1b0c-4bfb-8529-cf26fcd7a1cf/iec-60730-2-5-2013-amd2-2021)

<https://standards.iteh.ai/catalog/standards/sist/449e533f-1b0c-4bfb-8529-cf26fcd7a1cf/iec-60730-2-5-2013-amd2-2021>

2 Terms and definitions

2.2 Definitions of types of control according to purpose

Replace the Note with the following:

2.2.23 Not applicable.

2.3.127

Add to the Note 1 to entry the words "and Canada" after "USA".

Delete definition 2.3.131.

6 Classification

6.4 According to features of automatic action

Addition:

6.4.3.110 – electromechanical differential air pressure switch as an alternative to one of the two switching elements to directly de-energize the safety relevant terminals (see 11.3.5.2) for use in warm air heating appliances (furnaces) (Type 2.AL).

NOTE The warm air is the heat transfer media to heat up a space.

7 Information

7.2.6 Replace the existing text with the following:

Replacement:

Except as indicated in 7.4, for integrated systems all information is provided by means of declaration (X). For incorporated systems not declared under item 50, the marking required is as indicated in Table 1 (7.2 of the previous edition). For incorporated systems declared under item 50, the only marking required is the manufacturer's name or trademark and the **unique type reference** if other required marking is provided by documentation (D, E).

NOTE See the explanation of documentation (D, E) contained in 7.2.1.

Table 1 – Required information and methods of providing information

Add the following new items to the table:

141	Electromechanical differential pressure control for use with Type 2.AL burner control systems	6.4.3.110, 11.103.3	X
142	(Type 2.AL) burner control systems for use in warm air heating appliances (furnaces)	11.3.5.2, 11.103	X

11 Constructional requirements

11.3.5 Contacts – General

Replace the existing Subclause 11.3.5.2 by the following:

11.3.5.2 Replacement:

Systems of **class C control functions** shall include at least two switching elements to directly de-energize the safety relevant terminals.

NOTE 1 A single relay operating two independent contacts is considered to be only one switching element.

Designs where relays are used as switching elements, a non-replaceable fuse (see Table H.24 Note I) in series with two independent relay contacts with I_N fuse $< 0,6 * I_e$ relay are considered to comply with the following requirements for prevention of common cause **error**.

NOTE 2 I_N : values for the fuse (see IEC 60127-1:2015, 3.16);

I_e : rated operational current of the contact (see IEC 60947-1:2007; 4.3.2.3).

As an alternative to the two switching elements that directly de-energize the safety relevant terminals, burner control systems (Type 2.AL) are permitted and shall meet all of the following:

- have at least one switching element that directly de-energizes the safety relevant terminals and be connected to an external pressure control in such a manner that both the direct and indirect switching contacts are in series to each other,
- be integrated within the warm air heating appliances (furnaces),
- meet the requirements of 11.103.

NOTE 3 The burner control system is a class C control function.

In Part 1, the term

- “safety related output terminals” is equivalent to “valve terminals”.
- “safety shut-down” shall be used as defined in this document,
- “control” shall be used as “burner control systems”.

11.4.105

Add in the first paragraph after "Type 2.AF" the text "or Type 2.AL".

Replace in the 2nd paragraph "positive" with "sufficient".

Add at the end of the clause the following Note:

NOTE Sufficient external air pressure/flow control signal is indicated by closed switching contacts and an insufficient external air pressure/flow control signal is indicated by open switching contacts.

11.102.2 Performance requirements

Replace the existing text with the following:

The **reset from lock-out function** shall be a class B control function according to H.27.1.2.2.

The use of an **automatic action** to perform the **reset from lock-out function** (e.g. **resets** generated by automatic devices, like **timers**, etc.) shall be permitted provided it is accepted by the specific application standards.

Unintended or spontaneous **resets** from lockout which may impact the safe behavior of the appliance shall not occur.

Whenever the **reset from lock-out function** is performed by the use of a mobile device, at least two **manual actions** are required to activate the **reset**.

Any **fault** within the **reset** function shall not cause the appliance to operate outside the applicable requirements. It shall be detected before the next start-up or shall not prevent the appliance from going to shut-down or **lock-out**.

For **reset** functions where the **manual action** is initiated without being within the visible sight of the appliance, the following additional requirements apply:

- actual status and relevant information of the process under control shall be visible to the **user** before, during and after the reset action;
- maximum number of **resets** shall be limited. Where it is not specified in the specific application standard, the number of **resets** shall be limited to five actions or less within a time span of 15 min. Following this, any further remote **resets** shall be denied unless a non-remote **reset** from lock-out.

If the **reset** action is activated by manual switching of a **thermostat** or device with a similar function, this shall be declared by the manufacturer.

For systems where unintended resets do not impact the safe behavior of the controlled appliance, any kind of remote reset device (including class A control function) is used, if a at least **class B control function** of the burner control system is limiting the maximum number of **resets** to five actions or less within a time span of 15 min. Following this, any further remote **resets** shall be denied unless a non-remote **reset** from lock-out.

Add after 11.102, the following new Subclause 11.103:

11.103 Application requirements for the use of Type 2.AL burner control systems in warm air heating appliances (furnaces)

11.103.1 General

The design of Type 2.AL burner control systems for warm air heating appliances (furnaces) is intended for appliances that shall have the following construction:

- An operating range of the turn down ratio between 30 % and 100 % combustion air flow.
- The draft inducer motor, the draft inducer motor drive circuit, the differential pressure control in the appliance and the burner control shall all be part of the entire burner control systems and shall comply with the relevant clauses for class C control functions including the conditions that exist due to integration in the appliance.

NOTE The intent of this is to recognize that with this type of burner control systems, all of the external circuits and/or components are considered together in the design of the circuit to meet the requirements of class C control function.

- Heat input does not exceed 120 kW.
- For non-permanent operation.
- For room independent applications, the combustion air inlet and the combustion products outlet on the building shall be in close proximity, see Figure 102.
- The operating voltage to the safety relevant terminals is **SELV** delivered by a **SELV** transformer within the appliance.
- When a short-circuit of the direct switching element is detected, the system shall immediately perform safety shut down, any ventilation and automatic restart shall be prevented.

ITEH STANDARD PREVIEW
(standards.iteh.ai)
IEC 60730-2-5:2013/AMD2:2021
<https://standards.iteh.ai/catalog/standards/sist/449e533f-1b0c-4bf6-8529-cf26fd7a1cf/iec-60730-2-5-2013-amd2-2021>



IEC

Figure 102 – Typical installation of the independent combustion air supply for room independent operation

11.103.2 The contacts of the electromechanical differential pressure sensing control shall be connected in series with the direct switching element in the burner control that directly de-energizes the safety-relevant terminals of the control.

11.103.3 The terminals of the burner control intended for the connection of the external pressure sensing control shall be considered safety relevant and comply with the appropriate requirements of Clause 20 for functional insulation, considering that it drives the gas valve.

11.103.4 To maintain the safety integrity of the burner control system, the manufacturer shall specify the classification of the pressure sensing control used in the appliance by the following parameters:

- operating control with Type 2.B.N action,
- ratings – electrical, thermal and mechanical with the amount of cycles as given in 6.11,

- complying with the appropriate requirements of Clause 20 for functional insulation, considering that it drives the gas valve.

NOTE Type 2.B is described in IEC 60730-1 as micro-disconnection and Type 2.N is described in IEC 60730-2-6.

11.103.5 For Type 2.AL burner controls intended to be used in warm air heating appliances (furnaces), the contacts/terminals of the electromechanical differential pressure control shall be monitored continuously during start-up and operating sequence.

15 Manufacturing deviation and drift

15.5 Operating times

Add at the end of the 1st and 2nd paragraph the following:

"as soon as thermal equilibrium has been reached."

17 Endurance

17.1 General requirements

17.1.3 Test sequence and conditions

Replace the second paragraph starting with "The number of operations performed..." with the following:

The same sample shall be used for the following test sequence. The number of automatic cycles performed during each of the tests in 17.16.101, 17.16.102 and 17.16.104 shall be recorded. When the actual number of automatic cycles completed is equal to the number declared in 6.11, this test sequence is concluded and the following sequence is performed:

25 Normal operation

Replace the existing text with the following:

Replacement:

This clause of Part 1 is applicable except as follows:

25.2 Overvoltage and undervoltage test

Not applicable.

27 Abnormal operation

Replace the existing text with the following:

This clause of Part 1 is applicable.

Annex H (normative)

Requirements for electronic controls

Add the following new clause:

H.2 Terms and definitions

This clause of Part 1 is applicable except as follows:

H.2.23.3

Replacement:

defined state

means lock-out or safety shut-down

H.26.2

Replace "H.26.12" with "H.26.14".

H.26.9 Electrical fast transient/burst test

Replace the existing title with the following:

Electrical fast transient/burst immunity test

H.26.9.3 Test procedure

Replace in the 2nd sentence in indent a) of the 2nd paragraph the word "not" with "nor":

H.26.10 Ring wave test

H.26.10.4 Test levels

Delete Table H.103.

H.26.10.5.105

Replace at the end of 1st sentence the reference to "H.26.10.5.101.6" with "H.26.10.5.106".

H.26.12 Radio-frequency electromagnetic field immunity

Delete "H.26.12.2.1 Test levels for conducted disturbances"

and

"The tests on interface cables are not carried out if the manufacturer explicitly specifies that the length of that cable shall not exceed 1 m."

H.27.1.1.5 Electronic circuit fault conditions

Modification:

Replace the title of Table H.24 with the following:

Table H.24 (H.27.1 of edition 3) – Electrical/electronic component fault modes table

Replace the text "Replace note 12" with "Replace note m".

Add, after footnote m, the following new text:

Add in Table H.24 under the column "short" and in the line "Contacts", the footnote "p".

Add, after last dot, the following new text:

Add the following footnote to Table H.24:

^p Spontaneous closing of relay contacts is not considered without energizing the coil of the relay.

H.27.1.2.3.2 First fault

Replace in the brackets of the 1st sentence "H.21" with "H.24".

Add the following new subclause:

H.27.1.2.4.1 General

Replacement:

Whenever the **control** is in a **defined state** without an internal **fault**, an assessment according to H.27.1.2.4.2 and H.27.1.2.4.3 shall be performed.

Whenever the **control** is inoperative with all safety related output terminals de-energized or in a status in which they ensure a safe situation, in a **defined state** with an internal **fault** introduced during H.27.1.2.3.2 resulting in a) or b), an additional single **fault** assessment according to H.27.1.2.4.3 shall be performed.

NOTE Safety related output terminals as used in H.27.1.2.4.2 and H.27.1.2.4.3 are terminals which are safety related even in the **safety shut-down** or in a **defined state**, for example a gas valve terminal, but not a terminal for an actuator driving the controlling element which does not degrade the safety in the **defined state**.

H.27.1.2.4.2 Second fault introduced during lock-out or safety shut-down

Replace the existing title with the following:

First fault introduced during defined state