

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

AMENDMENT 2  
AMENDEMENT 2

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

**Dispositifs de commande électrique automatiques à usage domestique et  
analogue –  
Partie 2-5: Règles particulières pour les systèmes de commande électrique  
automatiques des brûleurs**



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## FOREWORD

This amendment has been prepared by IEC technical committee 72: Automatic controls for household use.

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

FDIS	Report on Voting
72/770/FDIS	72/773/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.

This amendment is based on 60730-2-5, Edition 3 (2000) and its Amendment 1 (2004).

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the maintenance result 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- withdrawn,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.

Page 5

### FOREWORD

*Replace, on page 7, the third paragraph after the report on voting table by the following new paragraph:*

This Part 2-5 is intended to be used in conjunction with IEC 60730-1. It was established on the basis of the third edition (1999) and Amendment 1 (2003) and Amendment 2 (2007) of that publication. Consideration may be given to future editions of, or amendments to, IEC 60730-1.

Page 7

*Replace the "in some countries" note by the following new note:*

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.26.10
- H.26.11.103
- Table H.27.1, Note 7

– H.27.1.3

Page 11

## 1.5 Normative references

*Delete the following reference:*

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

*Add the following new references:*

IEC 60127-1:2006, *Miniature fuses – Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links*

IEC 60947-1:2007, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60947-5-1:2003, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

Page 13

## 2 Definitions

*Replace, on page 17, definitions 2.3.112, 2.2.112.1 and 2.3.112.2 by the following:*

### **2.3.112 lock-out**

process in which the system goes into one of the following lock-out conditions, following safety shutdown

#### **2.3.112.1 non-volatile lock-out**

condition such that a restart can only be accomplished by a manual reset of the system and by no other cause

#### **2.3.112.2 volatile lock-out**

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

Page 25

**4.1.1** *Revise the font of the text to italics.*

Page 29

**6.7 According to ambient temperature limits of the system and system components**

*Delete the modification to replace the title of the subclause.*

Page 31

**7.2.9** *Replace “Replacement:” with “Modification:”.*

Page 33

**Table 7.2**

*In the table, delete Items 52 and 57.*

*Replace items 119 and 126 as follows:*

Information	Clause or subclause	Method
119 See Annex H		
126 Electronic high-voltage ignition spark gap <sup>102)</sup>	11.3.107, 13.2.101	D

*Add the following new rows:*

135 Type of lock-out	2.3.112, 11.3.108, H.27.1.3.101	D
136 See Annex H		

Page 37

**8.1.101 High-voltage ignition sources**

*Replace item a) with the following item:*

- a) for continuous spark ignition (pulses within the mains frequency range):
  - the maximum voltage is higher than 10 kV (peak), and/or
  - the maximum current is higher than 0,7 mA (peak);

**Figure 101**

*Replace the existing figure title with the following new title:*

**Figure 101 – Pulse spark generation**

Page 39

## 11 Constructional requirements

*Add the following new subclause:*

### 11.3.5 Contacts – General

*Additional subclauses:*

**11.3.5.101** The system shall include at least two switching elements to directly de-energize the safety relevant valve terminals.

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

#### 11.3.5.101.1 Measures to prevent common mode errors

Requirements and test methods are under consideration.

Page 41

### 11.3.105

*Replace the last paragraph with the following new paragraph:*

*Compliance is checked by H.26.5.4.*

*Delete subclauses 11.3.105.1 to 11.3.105.6 inclusive including the "in some countries" note.*

Page 47

*Add, after 11.4.15, the following text:*

*Additional subclauses:*

Page 49

*Add the following new subclause after 11.11.6:*

**11.13** Not applicable.

Page 55

## **15 Manufacturing deviation and drift**

*Replace “Replacement:” with “This clause of Part 1 is replaced as follows:”.*

Page 67

## **25 Normal operation**

*Replace “See annex H.” with “This clause of Part 1 is applicable.”*

## **27 Abnormal operation**

*Delete “See annex H.”*

## **28 Guidance on the use of electronic disconnection**

*Replace “See annex H.” with “This clause of Part 1 is applicable.”*

Page 69

## **Annex H – Requirements for electronics**

*Replace the existing title with the following new title:*

## **Annex H – Requirements for electronic controls**

### **H.2.5 Definitions of type of control according to the construction**

*Delete the addition of definition H.2.5.101.*



## H.7 Information

**Table 7.2**

Add, to the existing modification, the following new instructions:

Information	Clause or subclause	Method
<p><i>Modify the existing requirement:</i></p> <p>71 Not applicable</p>		
<p><i>Add the following additional requirement:</i></p> <p>119 Defined state "out of operation"</p>	H.26.8.2	X
<p><i>Add the following additional requirement:</i></p> <p>136 Software fault/error detection time(s) for controls of software class C <sup>12), 104), 105)</sup><sub>106)</sub></p>	H.27.1.3.102 H.27.1.3.103	X
<p><b>NOTES:</b></p> <p><i>Additional notes:</i></p> <p><sup>104)</sup> The fault/error detection time is the period between the execution (after the fault has occurred), of the relevant software segment, either for function or for checking purposes and the completion of the declared control response.</p> <p><sup>105)</sup> For systems designed for non-permanent operations, the fault/error detection time for the:</p> <ul style="list-style-type: none"> <li>• first fault shall be according to H.27.1.3.102.1 and H.27.1.3.104.1</li> <li>• second fault shall be according to H.27.1.3.102.2 and H.27.1.3.104.2</li> </ul> <p><sup>106)</sup> For systems designed for permanent operations, the fault/error detection time for the:</p> <ul style="list-style-type: none"> <li>• first fault shall be according to H.27.1.3.103.1 and H.27.1.3.104.1</li> <li>• second fault shall be according to H.27.1.3.103.2 and H.27.1.3.104.2</li> </ul>		

Page 71

Add, after H.11.12.12, the following new subclause:

*Additional subclause:*

**H.11.12.101** If time slot monitoring is used, it shall be sensitive to both an upper and a lower limit of the time interval. Faults resulting in the shift of the upper and/or lower limit shall be taken into account.

Add, after Clause H.26, the following new subclause:

**H.26.1** *Modification:*

The third paragraph is not applicable.

**H.26.5 Test of the influence of voltage dips and short voltage interruptions in the power supply network**

Replace the existing title with the following new title:

**H.26.5 Voltage dips and voltage interruptions in the power supply network**

**H.26.5.2**

Delete the existing subclause (introduced by Amendment 1) and replace with following new subclause:

**H.26.5.2 Test values**

Replacement:

The system shall tolerate voltage dips, short interruptions and voltage variations in the electricity supply so that, when tested in accordance with H.26.5.3,

- a) for the values of Table H.101 criteria a): it shall continue to function in accordance with the requirements of this standard. It shall neither proceed to safety shutdown or lock-out, nor shall it reset from lock-out;
- b) for the values of Table H.101 criteria b): either it shall perform as in a) or it may proceed to safety shutdown followed by a system restart, or if in volatile lock-out it may proceed to a system restart.

NOTE Non-volatile lock-out excludes the use of system restart.

When the power supply is restored, the system restart shall comply with the requirements for a start-up sequence.

Requirement b) can be ignored, provided that the power failure is less than 60 s and occurs within 60 s after call for heat. On restoration of the power, the programme may be continued from the point at which it was interrupted.

A shortened start-up sequence, for example, a start-up sequence without pre-purge or waiting time, is allowed, provided that the power failure occurs within 60 s after the end of the start-up sequence and is shorter than 60 s.

**Table H.101 – Voltage dips, short interruptions and voltage variations**

Assessment criteria	Duration	$\Delta U$		
		30 %	60 %	100 %
a)	Half-cycle of supply waveform			X
	One cycle of supply waveform			X
b)	2,5 cycles	X	X	X
	25 cycles	X	X	X
	50 cycles	X	X	X

The test shall be performed in accordance with H.26.5.3.

**H.26.5.4 Severity levels**

*Replace the existing title and text with the following new title and text:*

**H.26.5.4 Voltage variation test**

*Replacement:*

The control shall tolerate short-term supply voltage variations.

*Compliance is checked by the test of H.26.5.4.*

*Add the following new subclauses:*

**H.26.5.4.1 Purpose of the test**

*Replacement:*

The purpose of the test is to verify the immunity of the control against voltage change taking place over a short period which may occur due to a change of load or stored energy in local power networks. The control shall operate according to the functional specification (see 11.3.105) at least within the voltage tolerance band of the rated voltage  $+10\%$ , and below  $-15\%$  of the rated voltage the control shall stay safe.

**H.26.5.4.2 The duration and procedure**

*Replacement:*

The duration of the voltage changes and the time for which the reduced voltages are to be maintained are given in Table H.26.5.4.2 and illustrated in Figure H.26.5.4.2. The rate of change of voltage shall be constant; however, the voltage is allowed to be stepped. The steps shall be positioned at 0 crossing and shall be not larger than  $10\%$  of  $V_R$ . Steps under  $1\%$  of  $V_R$  are evaluated as constant rate of change of voltage.

The control, in the running position, is supplied at rated voltage, or at the lowest rated voltage of a rated voltage range. After approximately 1 min, the power supply voltage is reduced to a level such that the control ceases to respond to safety related inputs and/or drive safety related outputs (e.g. flame signal, fuel valve).

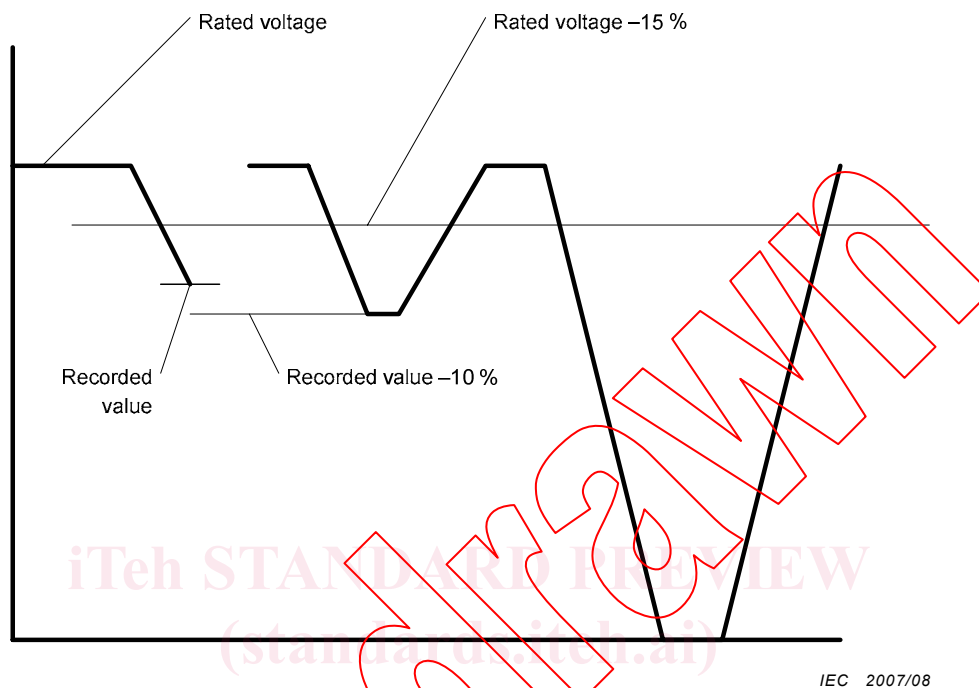
This value of the supply voltage is recorded.

**Table H.26.5.4.2 – Timing of short-term supply voltage variations**

Voltage test level	Time for decreasing voltage	Time at reduced voltage	Time for increasing voltage
Recorded value – $10\%$	$60\text{ s} \pm 20\%$	$10\text{ s} \pm 20\%$	$60\text{ s} \pm 20\%$
0 V	$60\text{ s} \pm 20\%$	$10\text{ s} \pm 20\%$	$60\text{ s} \pm 20\%$

In the voltage range of operation, from rated voltage to 1,05 times of the recorded value, the control shall conform to 11.3.105 a). In the voltage range of operation, between  $85\%$  of the rated voltage and 1,05 times of the recorded value, the control shall conform to 11.3.105 b).

For test purposes, precautions shall be taken to ensure that signals e.g. from sensors or switches that can initiate a safety action and the presence of which normally may be independent of the supply voltage, are present at any level of the supply voltage. The signal may be simulated to prevent the control de-energizing the safety relevant output(s) as a result of disappearance of such input signals.



**Figure H.26.5.4.2 – Voltage variation test**

**H.26.5.4.3**

*Addition:*

Each of the above tests is repeated three times in each of the operating conditions indicated in H.26.5.3.

After the tests, the system:

- a) shall continue to function in accordance with the requirements of this standard. It shall neither proceed to safety shutdown or lock-out, nor shall it reset from lock-out, or
- b) shall either perform as in a) or it may proceed to safety shutdown followed by a system restart, or if in volatile lock-out it may proceed to a system restart.

NOTE Non-volatile lock-out excludes the use of system restart.

**H.26.5.5**

*Delete the existing subclause.*

**H.26.5.6 Ramp voltage tests**

*Delete the existing subclause with its title.*

## H.26.8 Surge immunity test

Add the following subclause:

### H.26.8.2 Test values

Addition:

The system shall tolerate voltage surges on the mains supply and relevant signal terminals, so that, when tested in accordance with H.26.8.3,

- a) for the values of Table H.26.8.2 installation class 2, it shall continue to function in accordance with the requirements of this standard. It shall neither proceed to safety shutdown or lock-out nor shall it reset from lock-out;
- b) for the values of Table H.26.8.2 installation class 3 for all listed tests, either it shall perform as in a) or it may proceed to safety shutdown, which may be followed by a system restart, or if in volatile lock-out it may proceed to a system restart.

NOTE Non-volatile lock-out excludes the use of system restart.

- c) for the values of Table H.26.8.2 installation class 4 with line to earth on power supply only, either it shall perform as in a) or b) or it shall go into the defined state "out of operation" as declared by the manufacturer in accordance with Table 7.2 Item 119.

For compliance criteria a) and b), after the tests of this clause, the surge protective components shall not be destroyed.

Add the following subclause:

### H.26.8.3 Test procedure

Replacement of the second paragraph:

The test shall be carried out by subjecting the system to five pulses and with the voltage and current values listed in Table H.26.8.2 at intervals of not less than 60 s.

The five pulses of each polarity (+, -) and each phase angle as described in IEC 61000-4-5 are delivered in the following order:

- a) 2 pulses with the system in the lock-out position;
- b) 1 pulse with the system in the running position;
- c) 2 pulses randomly applied during the start-up sequence.

The tests on interface cables are not carried out if the manufacturer explicitly specifies that the length of that cable shall not exceed 10 m.

If "VDR" are used as surge protective devices, they shall comply with IEC 61643-1. Additionally, they shall be selected to withstand the impulses corresponding to the installation class level.

For controls having surge protective device arresters incorporating spark gaps, the test is repeated at a level that is 95 % of the flashover voltage.

### H.26.8.4 Severity levels

Delete the addition of subclause H.26.8.4.101.