

ELEKTRILISED AUTOMAATJUHTIMISSEADMED. OSA 2-9:
ERINÕUDED
TEMPERATUURIANDUR-JUHTIMISSEADISTELE

Automatic electrical controls - Part 2-9: Particular
requirements for temperature sensing controls

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 60730-2-9:2019 sisaldab Euroopa standardi EN IEC 60730-2-9:2019 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 60730-2-9:2019 consists of the English text of the European standard EN IEC 60730-2-9:2019.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 22.02.2019.	Date of Availability of the European standard is 22.02.2019.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 97.120

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

Automatic electrical controls - Part 2-9: Particular requirements for temperature sensing controls (IEC 60730-2-9:2015)

Dispositifs de commande électrique automatiques - Partie
2-9: Règles particulières pour les dispositifs de commande
thermosensibles
(IEC 60730-2-9:2015)

Automatische elektrische Regel- und Steuergeräte - Teil 2-
9: Besondere Anforderungen an temperaturabhängige
Regel- und Steuergeräte
(IEC 60730-2-9:2015)

This European Standard was approved by CENELEC on 2015-07-01. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 72/990/FDIS, future edition 4 of IEC 60730-2-9, prepared by IEC/TC 72 "Automatic electrical controls" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60730-2-9:2019.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-08-22
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-02-22

This document supersedes EN 60730-2-9:2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

Endorsement notice

The text of the International Standard IEC 60730-2-9:2015 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated :

IEC 60079 NOTE Harmonized in EN 60079 series.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Annex ZA of EN 60730-1:2016 applies, except as follows:

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
Addition:				
IEC 60216-1	2013	Electrical insulating materials - Thermal endurance properties - Part 1: Ageing procedures and evaluation of test results	EN 60216-1	2013
IEC 60691	-	Thermal-links - Requirements and application guide	EN 60691	-
IEC 60730-2-4	-	Automatic electrical controls for household and similar use - Part 2-4: Particular requirements for thermal motor protectors for motor-compressors of hermetic and semi-hermetic type	EN 60730-2-4	-

CONTENTS

FOREWORD.....	4
1 Scope and normative references.....	7
2 Terms and definitions.....	8
3 General requirements.....	10
4 General notes on tests.....	10
5 Rating.....	11
6 Classification.....	11
7 Information.....	12
8 Protection against electric shock.....	14
9 Provision for protective earthing.....	14
10 Terminals and terminations.....	14
11 Constructional requirements.....	14
12 Moisture and dust resistance.....	17
13 Electric strength and insulation resistance.....	18
14 Heating.....	18
15 Manufacturing deviation and drift.....	19
16 Environmental stress.....	20
17 Endurance.....	20
18 Mechanical strength.....	26
19 Threaded parts and connections.....	28
20 Creepage distances, clearances and distances through solid insulation.....	28
21 Resistance to heat, fire and tracking.....	28
22 Resistance to corrosion.....	28
23 Electromagnetic compatibility (EMC) requirements – Emission.....	28
24 Components.....	29
25 Normal operation.....	29
26 Electromagnetic compatibility (EMC) requirements – Immunity.....	29
27 Abnormal operation.....	29
28 Guidance on the use of electronic disconnection.....	29
Annexes.....	30
Annex G (normative) Heat and fire resistance tests.....	30
Annex H (normative) Requirements for electronic controls.....	31
Annex J (normative) Requirements for thermistor elements and controls using thermistors.....	38
Annex AA (informative) Maximum manufacturing deviation and drift ^{a, b}	39
Annex BB (informative) Time factor.....	40
Annex CC (informative) Number of cycles.....	43
Annex DD (normative) Controls for use in agricultural confinement buildings.....	44
Annex EE (informative) Guide to the application of temperature sensing controls within the scope of IEC 60730-2-9.....	47
Bibliography.....	63

Figure 101 – Impact tool.....	16
Figure 102 – Aluminium cylinder for temperature change method.....	26
Figure BB.1 – Determination of time factor in the case of a sudden temperature change	41
Figure BB.2 – Determination of time factor in the case of a linear rise of test-bath temperature	42
Figure EE.1 – Thermostat	55
Figure EE.2 – Self-resetting temperature limiter.....	56
Figure EE.3 – Non-self-resetting temperature limiter.....	57
Figure EE.4 – Self-resetting thermal cut-out	58
Figure EE.5 – Manual reset thermal cut-out.....	58
Figure EE.6 – Single operation device	60
Figure EE.7 – Three-stage control system	61
Table 1 – Required information and methods of providing information.....	13
Table H.101 – Compliance criteria.....	33
Table BB.1 – Method to determine and verify time factor values (see 11.101)	42
Table EE.1 – Typical examples of the classification of temperature sensing controls in accordance with IEC 60730-2-9.....	62

INTERNATIONAL ELECTROTECHNICAL COMMISSION

AUTOMATIC ELECTRICAL CONTROLS –

Part 2-9: Particular requirements for temperature sensing controls

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.

International Standard IEC 60730-2-9 has been prepared by technical committee TC 72: Automatic electrical controls.

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

FDIS	Report on voting
72/990/FDIS	72/998/RVD

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

This fourth edition cancels and replaces the third edition published in 2008, and its Amendment 1:2011. This edition constitutes a technical revision. This edition includes alignment with the text of 60730-1 fifth edition and the following significant technical changes with respect to the previous edition:

- a) modification of heating-freezing tests in Clause 12;
- b) alignment of the EMC requirements in H.26 to those in other part 2 standards;
- c) addition of requirements in Clause H.27 to cover class B and C control functions of temperature sensing controls;

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

This Part 2-9 is intended to be used in conjunction with IEC 60730-1. It was established on the basis of the fifth edition (2013) of that publication. Consideration may be given to future editions of, or amendments to, IEC 60730-1.

This Part 2-9 supplements or modifies the corresponding clauses in IEC 60730-1 so as to convert that publication into the IEC standard: Particular requirements for temperature sensing controls.

Where this Part 2-9 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 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:

4.1.101	17.8.4.101	Annex AA
7.2, Table 1	17.16.101	Clause CC.2
11.4.101	17.16.102	DD.9.2
11.101	17.16.105	EE.3.6
12.101.3	18.102.3	
13.2	23.101	

In this publication:

- 1) The following print types are used:
 - Requirements proper: in roman type;
 - *Test specifications: in italic type;*
 - Notes; 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, published under the title *Automatic electrical controls* can be found on the IEC website.

The committee has decided that the contents of this publication 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.

A bilingual version of this publication may be issued at a later date.

This document is a preview generated by EVS

AUTOMATIC ELECTRICAL CONTROLS –

Part 2-9: Particular requirements for temperature sensing controls

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 temperature **sensing controls** for use in, on or in association with equipment, 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.

NOTE Throughout this standard, the word "equipment" includes "appliance" and "control system".

This standard is applicable to automatic electrical temperature **sensing controls** forming part of a building automation **control system** within the scope of ISO 16484.

This standard also applies to automatic electrical temperature **sensing controls** for equipment that may be used by the public, such as equipment intended to be used in shops, offices, hospitals, farms and commercial and industrial applications.

This standard does not apply to automatic electrical temperature **sensing controls** intended exclusively for industrial process applications, unless explicitly mentioned in the relevant equipment standard.

1.1.1

Replacement:

This standard applies to the inherent safety, to the **operating values, operating times, and operating sequences** where such are associated with equipment safety, and to the testing of automatic electrical temperature **sensing control** devices used in, or in association with, equipment.

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

This standard is also applicable to the functional safety of low complexity safety-related temperature **sensing controls and systems**.

1.1.2

Addition:

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