

UL 60730-2-9

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Automatic Electrical Controls For Household and Similar Use; Part 2: Particular Requirements For Temperature Sensing Controls

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UL Standard for Safety for Automatic Electrical Controls For Household and Similar Use; Part 2: Particular Requirements For Temperature Sensing Controls, UL 60730-2-9

First Edition, Dated January 17, 2003

Summary of Topics

In order to more closely align the UL standard number with the IEC standard number, UL has published the first edition of UL 60730-2-9 to replace UL 8730-2-9.

In addition to changing the standard number, UL has editorially reformatted the standard due to internal administrative needs. The reformatting includes, but is not limited to, referring to "deviations" as "national differences" and implementing a new numbering system for the national differences.

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The requirements in this Standard are now in effect, except for those paragraphs, sections, tables, figures, and/or other elements of the Standard having future effective dates as indicated in the preface. The prior text for requirements that have been revised and that have a future effective date are located after the Standard, and are preceded by a "SUPERSEDED REQUIREMENTS" notice.

New product submittals made prior to a specified future effective date will be judged under all of the requirements in this Standard including those requirements with a specified future effective date, unless the applicant specifically requests that the product be judged under the current requirements. However, if the applicant elects this option, it should be noted that compliance with all the requirements in this Standard will be required as a condition of continued Listing, Recognition, and Follow-Up Services after the effective date, and understanding of this should be signified in writing.

In an effort to more closely match the IEC text, information in the following checklist related to annexes that do not correlate correctly at this time with the annex identification in the annexes themselves will be corrected in future revision cycles.

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This Standard consists of pages dated as shown in the following checklist:

Page	Date
1-48	January 17, 2003
A1-A2	January 17, 2003
B1-B6	January 17, 2003

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1

UL 60730-2-9

**Standard for Automatic Electrical Controls For Household and Similar
Use; Part 2: Particular Requirements For Temperature Sensing Controls**

Prior to the first edition of UL 60730-2-9, the requirements for the products covered by this Standard were included in UL 8730-2-9.

First Edition

January 17, 2003

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc.

Revisions of this Standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revised requirements.

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UL 60730-2-9 2003

No Text on This Page

CONTENTS

Preface (UL)	6
Foreword (UL)	8
NATIONAL DIFFERENCES	9
FOREWORD	10
1 Scope and normative references	13
1.5 Normative references	14
2 Definitions	14
2.2 Definitions of types of control according to purpose	14
2.3 Definitions relating to the function of controls	15
2.5 Definitions of types of control according to construction	15
3 General requirements	15
4 General notes on tests	15
4.1 Conditions of test	15
4.2 Samples required	16
5 Rating	16
6 Classification	16
6.4 According to features of AUTOMATIC ACTION	16
6.7 According to ambient temperature limits of the SWITCH HEAD	17
6.15 According to construction	17
7 Information	17
7.2 Methods of providing information	17
8 Protection against electric shock	20
8.2 ACTUATING MEMBERS and ACTUATING MEANS	20
9 Provision for protective earthing	20
9.1 General requirements	20
9.3 Adequacy of earth connection	20
10 Terminals and TERMINATIONS	20
11 Constructional requirements	20
11.1 Materials	20
11.3 ACTUATION and OPERATION	21
11.4 Actions	21
11.101 TIME FACTOR	24
12 Moisture and dust resistance	24
12.101 Refrigeration controls	24
13 Electric strength and insulation resistance	25
14 Heating	25
15 MANUFACTURING DEVIATION and DRIFT	26
16 Environmental stress	27
17 Endurance	27
17.15 BI-METALLIC SODS	28
17.16 Tests for particular purpose controls	29
17.101 Type 2.P cycling test	31
18 Mechanical strength	33
18.101 PUSH-AND-TURN OR PULL-AND-TURN ACTUATION	33
18.102 Parts containing liquid metal	34
19 Threaded parts and connections	34

20	CREEPAGE DISTANCES, CLEARANCES and distances through insulation	35
21	Resistance to heat, fire and tracking	35
22	Resistance to corrosion	35
23	Radio interference suppression	35
23.101.1	Test conditions	35
23.101.2	Test procedure	36
24	Components	36
25	Normal OPERATION	36
26	OPERATION with mains borne perturbations, magnetic and electromagnetic disturbances	36
27	Abnormal OPERATION	36
28	Guidance on the use of electronic disconnection	36

Annexes

Annex C (normative) Cotton used for mercury switch test

Annex D (informative) Heat, fire and tracking

Annex H (normative) Requirements for electronic controls

H.6	Classification	37
H.6.18	According to software class	37
H.7	Information	37
H.11	Constructional requirements	38
H.11.12	Controls using software	38
H.26	OPERATION with mains borne perturbations, magnetic and electromagnetic disturbances	38
H.26.4	Test of the influence of signal voltages in the power supply networks	39
H.26.5	Test of the influence of voltage dips and short voltage interruptions in the power supply network	39
H.26.7	Test of the influence of d.c. in a.c. networks	40
H.26.8	1,2/50 μ s – 8/20 μ s voltage-current surge test	40
H.26.9	Fast transient burst test	40
H.26.10	Ring wave test	41
H.26.11	Electrostatic discharge test	41
H.26.12	Radiated electromagnetic field test	41
H.26.13	Evaluation of compliance	41
H.27	Abnormal OPERATION	41

Annex J (normative) Requirements for controls using thermistors

J.4	General notes on tests	42
J.4.3.5	According to purpose	42
J.7	Information	42

Annex AA (informative)

Annex BB (informative) TIME FACTOR

BB.2	Two-bath method	44
BB.3	Gradient method	44

Annex CC (informative)

CC.1 Number of cycles for INDEPENDENTLY MOUNTED and IN-LINE CORD CONTROLS 46

CC.2 Minimum number of cycles for INDEPENDENTLY MOUNTED and IN-LINE CORD CONTROLS (Canada and the USA) 46

ANNEX 9.DVA – Manufacturing and Production Tests (normative)

ANNEX 9.DVB – Controls for Agricultural Buildings (normative)

9.DVB.1 Scope 9.DVB1

9.DVB.2 Construction 9.DVB1

9.DVB.3 Protection against corrosion 9.DVB2

Preface (UL)

This UL Standard 60730-2-9, Standard for Safety for Automatic Electrical Controls For Household and Similar Use; Part 2: Particular Requirements for Temperature Sensing Controls, is to be used in conjunction with the third edition of UL 60730-1A. The requirements for temperature sensing controls are contained in this part 2 Standard and UL 60730-1A.

Requirements of this part 2 Standard, where stated, amend the requirements of UL 60730-1A.

Where a particular subclause of UL 60730-1A is not mentioned in UL 60730-2-9, the UL 60730-1A subclause applies.

The text, figures and tables of IEC Publication Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Temperature Sensing Controls, IEC 60730-2-9 copyright 1999, are used in this Standard with the consent of the IEC and the American National Standards Institute (ANSI). The IEC copyrighted material has been reproduced with permission from ANSI. ANSI should be contacted regarding the reproduction of any portion of the IEC material. The IEC Foreword and Introduction are not a part of the requirements of this Standard but are included for information purposes only. Copies of IEC Publication 60730-2-9 may be purchased from ANSI, 11 West 42nd Street, New York, New York, 10036, (212) 642-4900.

Note – Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.

No Text on This Page

Foreword (UL)

A. This Standard contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Standard. These requirements are based upon sound engineering principles, research, records of tests and field experience, and an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, inspection authorities, and others having specialized experience. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of the requirements of this Standard by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Standard will not necessarily be judged to comply with the Standard if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

D. A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involves a risk of fire or of electric shock or injury to persons shall be evaluated using appropriate additional component and end-product requirements to maintain the level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard does not comply with this standard. Revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgment given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed. UL shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard.

F. Many tests required by the Standards of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

NATIONAL DIFFERENCES

GENERAL

National Differences from the text of International Electrotechnical Commission (IEC) Publication 60730-2-9, Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Temperature Sensing Controls copyright 1999, are indicated by notations (differences) and are presented in bold text.

There are five types of National Differences as noted below. The difference type is noted on the first line of the National Difference in the standard. The standard may not include all types of these National Differences.

DR – These are National Differences based on the **National Electrical Code (NEC)** and **other U.S. Regulatory Requirements**.

D1 – These are National Differences which are based on **basic safety principles and requirements**, elimination of which would compromise safety for U.S. consumers and users of products.

D2 – These are National Differences based on **safety practices**. These are differences for IEC requirements that may be acceptable, but adopting the IEC requirements would require considerable retesting or redesign on the manufacturer's part.

DC – These are National Differences based on the **component standards** and will not be deleted until a particular component standard is harmonized with the IEC component standard.

DE – These are National Differences based on **editorial comments or corrections**.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

AUTOMATIC ELECTRICAL CONTROLS FOR HOUSEHOLD AND SIMILAR USE – Part 2-9: Particular requirements for temperature sensing controls

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.

3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in the sense.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60730-2-9 has been prepared by IEC technical committee 72: Automatic controls for household use.

This second edition cancels and replaces the first edition published in 1992, amendment 1 (1994) and amendment 2 (1994). This second edition constitutes a technical revision.

The text of this standard is based on the first edition, amendment 1, amendment 2 and the following documents:

FDIS	Report on voting
72/431/FDIS	72/449/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

This part 2-9 is intended to be used in conjunction with IEC 60730-1. It was established on the basis of the second edition (1993) of IEC 60730-1 and its amendments 1 (1994) and 2 (1997). 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: Safety 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 2-9 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 practice are contained in the following subclauses:

- 4.1.101
- table 7.2, note 102
- 11.4.3.101
- 11.4.101
- 11.101
- 12.101.3
- 13.2
- 17.8.4.101
- 17.15.3
- 17.15.3.1
- 17.16.102
- 17.16.105
- 18.102.3
- 23.101
- annex C
- annex D
- H.26.10
- CC.2

In this publication:

1) The following print types are used:

- Requirements proper: in roman type.
- *Test specifications: in italic type.*
- Explanatory matter: in smaller roman type.

2) Subclauses, notes or items which are additional to those in Part 1 are numbered starting from 101, additional annexes are lettered AA, BB, etc.

The committee has decided that the contents of this publication will remain unchanged until 2002-06. At this date, the publication will be

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

101DV DE Modification of Item (1) of the part 2:

- Words in SMALL ROMAN CAPITALS in the text are defined in clause 2.

102DV DE Addition to the part 2:

The numbering system in the Standard uses a space instead of a comma to indicate thousands and uses a comma instead of a period to indicate a decimal point. For example, 1 000 means 1,000 and 1,01 means 1.01.

AUTOMATIC ELECTRICAL CONTROLS FOR HOUSEHOLD AND SIMILAR USE – 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 Replacement:

This part of IEC 60730 applies to automatic electrical temperature SENSING CONTROLS for use in, on or in association with equipment for household and similar use, 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.

This part 2-9 applies to automatic ELECTRIC CONTROLS using NTC OR PTC THERMISTORS, additional requirements for which are contained in annex J.

1.1.1 This part 2-9 applies to inherent safety and to OPERATING VALUES, OPERATING TIMES and OPERATING SEQUENCES where such are associated with equipment safety. It applies also to the testing of automatic ELECTRICAL CONTROL devices used in, or in association with, household or similar appliances.

Examples of such controls include BOILER THERMOSTATS, FAN CONTROLS, TEMPERATURE LIMITERS and THERMAL CUT-OUTS.

This part 2-9 does not apply to automatic ELECTRICAL CONTROLS designed exclusively for industrial applications.

This part 2-9 is also applicable to individual controls utilized as part of a control system or controls which are mechanically integral with multifunctional controls having non-electrical outputs.

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 standard.

1.1.2 This part 2-9 also applies to the electrical safety of temperature SENSING CONTROLS with non-electrical outputs such as refrigerant flow and gas controls.

1.1.3 This part 2-9 is also applicable to controls for appliances within the scope of IEC 60335.

Throughout this part 2-9 the word "equipment" includes "appliance" and "control system".

1.1.4 This part 2-9 applies to MANUAL CONTROLS when these are electrically and/or mechanically integral with AUTOMATIC CONTROLS.

Requirements for manual switches not forming part of an AUTOMATIC CONTROL are contained in IEC 61058-1.

1.1.5 This part 2-9 applies to BI-METALLIC SINGLE OPERATION DEVICES as defined in this standard.

1.2 Replacement:

This part 2-9 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 2-9 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.

1.4 Replacement:

This part 2-9 applies also to controls incorporating electronic devices, requirements for which are contained in annex H.

1.5 Normative references

This subclause of part 1 is applicable except as follows:

Addition:

IEC 60335 (all parts),
Safety of household and similar electrical appliances

IEC 60691:1993,
Thermal links – Requirements and application guide

2 Definitions

This clause of part 1 is applicable except as follows:

2.2 Definitions of types of control according to purpose

2.2.9 Replacement:

2.2.9 BI-METALLIC SINGLE OPERATION DEVICE (SOD): control having a bi-metallic temperature SENSING ELEMENT which is intended to operate only once and then requires complete replacement.

A BI-METALLIC SINGLE OPERATION DEVICE does not reset above a declared temperature (see 11.4.103).

Requirements for thermal links (which are not allowed to reset) are contained in IEC 60691.

2.2.19 OPERATING CONTROL

add, to the definition, the following explanatory paragraph:

In general, a THERMOSTAT is an OPERATING CONTROL.