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

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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

This fifth edition cancels and replaces the fourth edition published in 2015, Amendment 1:2018 and Amendment 2:2020. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) adoption of IEC 60730-1:2022 with all of its significant changes to IEC 60730-1:2013, IEC 60730-1:2013/AMD1:2015 and IEC 60730-1:2013/AMD2:2020.

The text of this International Standard is based on the following documents:

Draft	Report on voting
72/1534/FDIS	72/1540/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

This part 2-9 is intended to be used in conjunction with IEC 60730-1. It was established on the basis of the sixth edition of that standard (2022). Consideration can 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.

When a particular subclause of Part 1 is not mentioned in this Part 2, that 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 reader's attention is drawn to the fact that Annex R, Annex S and Annex T list all of the "in-some-country" clauses on differing practices of a less permanent nature relating to the subject of this document.

In this publication:

The following print types are used:

– requirements proper: in roman type;
– *test specifications: in italic type*;
– explanatory matter: in smaller roman type;
– Defined terms: **bold type**.

Subclauses, notes or items 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 this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,
– withdrawn, or
– revised.

1 Scope

This clause of Part 1 is replaced by the following:

This document applies to temperature sensing controls

– for use in, on, or in association with equipment for household appliance and similar use, including equipment for heating, air-conditioning and similar applications. The equipment can use electricity, gas, oil, solid fuel, solar thermal energy, etc., or a combination thereof.

NOTE 1 Throughout this document, the word "equipment" means "appliance and equipment" and "controls" means "temperature sensing controls".

– for building automation within the scope of ISO 16484 series and IEC 63044 series (HBES/BACS);

EXAMPLE 1 Independently mounted temperature sensing controls, controls in smart grid systems and controls for building automation systems within the scope of ISO 16484-2.

– for equipment that is used by the public, such as equipment intended to be used in shops, offices, hospitals, farms and commercial and industrial applications;

EXAMPLE 2 Controls for commercial catering, heating and air-conditioning equipment.

– that are **smart enabled controls**;

EXAMPLE 3 Smart grid control, remote interfaces/control of energy-consuming equipment including computer or smart phone.

– that are AC or DC powered controls with a rated voltage not exceeding 690 V AC or 600 V DC;

– used in, on, or in association with equipment that use electricity, gas, oil, solid fuel, solar thermal energy, etc., or a combination thereof;

– utilized as part of a control system or controls which are mechanically integral with multifunctional controls having non-electrical outputs;

– using NTC or **PTC thermistors** and to discrete **thermistors**, requirements for which are contained in Annex J;

– that have electrical circuits and **control** circuits which are, for example, operated by bimetals, magnet coils, memory metals, pressure elements, temperature-sensitive expansion elements or electronic elements.

– as well as manual controls when such are electrically and/or mechanically integral with automatic controls.

NOTE 2 Requirements for manually actuated mechanical switches not forming part of an automatic control are contained in IEC 61058-1-1.

This document applies to

– the inherent safety of automatic electrical controls, and

– functional safety of temperature **sensing controls** and safety related systems,

– controls where the performance (for example the effect of EMC phenomena) of the product can impair the overall safety and performance of the controlled system,

– 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,

EXAMPLE 4 **Boiler thermostats**, **fan controls**, **temperature limiters** and **thermal cut-outs**.

– electrical safety of temperature sensing controls with non-electrical outputs such as refrigerant flow and gas **controls**,

– **single-operation devices** as defined in this document.

This document specifies the requirements for construction, operation and testing of automatic electrical controls used in, on, or in association with an equipment.

This document does not

– apply to automatic electrical temperature **sensing controls** intended exclusively for industrial process applications unless explicitly mentioned in the relevant part 2 or the equipment standard. However, this document can be applied to evaluate automatic electrical controls intended specifically for industrial applications in cases where no relevant safety standard exists.
– 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 will apply.
– 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.

2 Normative references

This clause of Part 1 is applicable except as follows:

Addition:

IEC 60216-1, *Electrical insulating materials - Thermal endurance properties - Part 1: Ageing procedures and evaluation of test results*

Bibliography

IEC 60730-1:2020, Bibliography is applicable except as follows:

Addition:

IEC 60079 (all parts), *Explosive atmospheres*

IEC 60335-2-2, *Household and similar electrical appliances - Safety - Part 2-2: Particular requirements for vacuum cleaners and water-suction cleaning appliances*

IEC 60335-2-3, *Household and similar electrical appliances - Safety - Part 2-3: Particular requirements for electric irons*

IEC 60335-2-4, *Household and similar electrical appliances - Safety - Part 2-4: Particular requirements for spin extractors*

IEC 60335-2-5, *Household and similar electrical appliances - Safety - Part 2-5: Particular requirements for dishwashers*

IEC 60335-2-6, *Household and similar electrical appliances - Safety - Part 2-6: Particular requirements for stationary cooking ranges, hobs, ovens and similar appliances*

IEC 60335-2-7, *Household and similar electrical appliances - Safety - Part 2-7: Particular requirements for washing machines*

IEC 60335-2-8, *Household and similar electrical appliances - Safety - Part 2-8: Particular requirements for shavers, hair clippers and similar appliances*

IEC 60335-2-9, *Household and similar electrical appliances - Safety - Part 2-9: Particular requirements for grills, toasters and similar portable cooking appliances*

IEC 60335-2-11, *Household and similar electrical appliances - Safety - Part 2-11: Particular requirements for tumble dryers*

IEC 60335-2-13, *Household and similar electrical appliances - Safety - Part 2-13: Particular requirements for deep fat fryers, frying pans and similar appliances*

IEC 60335-2-14, *Household and similar electrical appliances - Safety - Part 2-14: Particular requirements for kitchen machines*

IEC 60335-2-15, *Household and similar electrical appliances - Safety - Part 2-15: Particular requirements for appliances for heating liquids*

IEC 60335-2-16, *Household and similar electrical appliances - Safety - Part 2-16: Particular requirements for food waste disposers*

IEC 60335-2-17, *Household and similar electrical appliances - Safety - Part 2-17: Particular requirements for blankets, pads, clothing and similar flexible heating appliances*

IEC 60335-2-21, *Household and similar electrical appliances - Safety - Part 2-21: Particular requirements for storage water heaters*

IEC 60335-2-23, *Household and similar electrical appliances - Safety - Part 2-23: Particular requirements for appliances for skin or hair care*

IEC 60335-2-24, *Household and similar electrical appliances - Safety - Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice makers*

IEC 60335-2-25, *Household and similar electrical appliances - Safety - Part 2-25: Particular requirements for microwave ovens, including combination microwave ovens*

IEC 60335-2-29, *Household and similar electrical appliances - Safety - Part 2-29: Particular requirements for battery chargers*

IEC 60335-2-30, *Household and similar electrical appliances - Safety - Part 2-30: Particular requirements for room heaters*

IEC 60335-2-34, *Household and similar electrical appliances - Safety - Part 2-34: Particular requirements for motor-compressors*

IEC 60335-2-35, *Household and similar electrical appliances - Safety - Part 2-35: Particular requirements for instantaneous water heaters*

IEC 60335-2-41, *Household and similar electrical appliances - Safety - Part 2-41: Particular requirements for pumps*

IEC 60335-2-61, *Household and similar electrical appliances - Safety - Part 2-61: Particular requirements for thermal storage room heaters*

IEC 60335-2-73, *Household and similar electrical appliances - Safety - Part 2-73: Particular requirements for fixed immersion heaters*

IEC 60335-2-75, *Household and similar electrical appliances - Safety - Part 2-75: Particular requirements for commercial dispensing appliances and vending machines*

IEC 60335-2-80, *Household and similar electrical appliances - Safety - Part 2-80: Particular requirements for fans*

IEC 60335-2-89, *Household and similar electrical appliances - Safety - Part 2-89: Particular requirements for commercial refrigerating appliances and ice-makers with an incorporated or remote refrigerant unit or motor-compressor*

IEC 60691, *Thermal-links - Requirements and application guide*

IEC 60730-2-22, *Automatic electrical controls - Part 2-22: Particular requirements for thermal motor protectors*

EN 60730-2-9, *Automatic electrical controls - Part 2-9: Particular requirements for temperature sensing controls*

UL 60730-2-9, *Automatic electrical controls - Part 2-9: Particular requirements for temperature sensing controls*

JIS C 9730-2-9, *Automatic electrical controls - Part 2-9: Particular requirements for temperature sensing controls*

CAN/CSA E60730-2-9, *Automatic electrical controls - Part 2-9: Particular requirements for temperature sensing controls*

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