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INTERNATIONAL STANDARD

Automatic electrical controls -
Part 2-15: Particular requirements for automatic electrical air flow, water flow and water level sensing controls

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Automatic electrical controls - Part 2-15: Particular requirements for automatic electrical air flow, water flow and water level sensing controls

FOREWORD

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IEC 60730-2-15 has been prepared by IEC technical committee 72: Automatic electrical controls. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2017. This edition constitutes a technical revision.

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

a) adoption to 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
72/1524/FDIS	72/1533/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 2-15 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 may be given to future editions of, or amendments to, IEC 60730-1.

This part 2-15 supplements or modifies the corresponding clauses in IEC 60730-1, so as to convert that publication into the IEC standard: Particular requirements for automatic electrical air flow, water flow and water level sensing controls.

Where this part 2-15 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 Q, 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 part of IEC 60730 applies to automatic electrical air flow, water flow and water level sensing controls

– for use in, on, or in association with boilers with a maximum pressure rating of 2 000 kPa (20 bar) and equipment for general household and similar use including controls for heating, air-conditioning and similar applications;

NOTE 1 Throughout this document, the word "equipment" means "appliance and equipment" and "controls" means "automatic electrical air flow, water flow and water level sensing controls".

EXAMPLE 1 Water flow and water level sensing controls of the float or electrode-sensor type used in boiler applications and air flow, water flow and water level sensing controls for swimming pool pumps, water tank pumps, cooling towers, dishwashers, washing machines, air conditioning chillers and ventilation applications.

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

EXAMPLE 2 Independently mounted air flow, water flow and water level sensing 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 3 Controls for commercial boilers, heating and air-conditioning equipment.

– that are smart enabled controls;

EXAMPLE 4 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 are mechanically or electrically operated, responsive to or controlling air flow, water flow and water level;

– 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 air flow, water flow and water level sensing controls, and

– functional safety of automatic air flow, water flow and water level sensing electrical 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.

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

This document takes into account the response value of an automatic action of a control where such a response value is dependent upon the method of mounting the control. 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 applies.

This document does not

– apply to air flow, water flow and water level 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 air flow, water flow and water level sensing **controls** intended specifically for industrial applications in cases where no relevant safety standard exists;
– 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;
– apply to pressure sensing controls, the requirements for which are contained in IEC 60730-2-6.

2 Normative references

This clause of Part 1 is applicable.

3 Terms and definitions

This clause of Part 1 is applicable except as follows:

3.2 Definitions of types of control according to purpose

Additional definitions:

3.2.101
boiler water level cut-out
water level **sensing control** of the float or electrode-sensor type for boiler applications intended to respond to a low water level during abnormal operating conditions and which has no provision for **setting by the user**

Note 101 to entry: A water level cut-out can be of the automatic or of the manual reset type. A boiler water level cutout has a type 2 action, it is a type of **water level protective control** (see 3.2.105).

3.2.102
boiler water level limiter
water level **sensing control** of the float or electrode-sensor type for boiler applications which is intended to keep a water level below or above one particular value during normal operating conditions and which can have provision for **setting by the user**

Note 101 to entry: A **boiler water level limiter** has a type 2 action and is normally of the automatic reset type.

3.2.103
boiler water feed control
water level **sensing control** of the float or electrode-sensor type for boiler applications which is intended to keep the water level in a boiler above one particular value during normal operating conditions and which can have provision for **setting by the user**

Note 101 to entry: A **boiler water feed control** is of the automatic reset type and has a type 1 action. A **boiler water feed control** is used on a boiler to cycle a feeder pump or feeder water valve. For the purposes of this document, a type 2 **boiler water feed control** is considered to be a **boiler water level limiter**.

3.2.104
water level operating control
control which is intended to keep the water level below or above one particular value during normal operating conditions and which can have provision for **setting by the user**

Note 101 to entry: A **water level operating control** is of the automatic reset type.

3.2.105
water level protective control
control which is intended to prevent a hazardous situation during abnormal **operation** of the equipment either by

a) keeping the water level below or above one or more particular values, or by
b) energizing or de-energizing the associated equipment at one or more particular values of water level

3.2.106
water flow operating control
flow **sensing control** intended to sense or maintain the water flow between two particular values during normal operating conditions and which can have provision for **setting by the user**

Note 101 to entry: A **water flow operating control** is of the automatic reset type.

3.2.107
air flow operating control
flow **sensing control** intended to sense or maintain the air flow between two particular values during normal operating conditions and which can have provision for **setting by the user**

Note 101 to entry: An **air flow operating control** is of the automatic reset type.

3.2.108
water flow cut-out
flow **sensing control** intended to respond to a lack of water flow during abnormal operating conditions and which has no provision for **setting by the user**

Note 101 to entry: A **water flow cut-out** is of the automatic or manual reset type.

3.2.109
air flow cut-out
flow **sensing control** intended to respond to a lack of air flow during abnormal operating conditions and which has no provision for **setting by the user**

Note 101 to entry: An **air flow cut-out** is of the automatic or manual reset type.

3.3 Definitions relating to the function of controls

Additional definition:

3.3.101
response delay
delay provided to increase the response value of a **water level operating control** for the purpose of preventing unnecessary cycling of the equipment due to fluctuating liquid level

Note 101 to entry: This is usually expressed in units of time.

3.22 Definitions relating to functional safety

Additional definitions:

3.22.101
permanent operation
continuous monitoring of the protective function during the operation of the appliance or system for longer than 24 h

Note 101 to entry: 24 h is considered the typical time interval between a first and a second fault.

3.22.102
non-permanent operation
continuous monitoring of the protective function during the operation of the appliance or system for less than 24 h

Note 101 to entry: 24 h is considered the typical time interval between a first and a second fault.

4 General

This clause of Part 1 is applicable except as follows:

4.3 General notes on tests

4.3.2 Conditions of test

4.3.2.7 *Addition:*

The rates of change of level or flow declared in Table 1, requirement 31 and used in Clause 19 (i.e. α_1, β_1, α_2, β_2) shall have test tolerances as declared by the manufacturer.

4.3.4 Instructions for test

4.3.4.1 According to submission

Additional subclause:

4.3.4.1.101 The values in Annex AA, Table AA.1 apply for the testing of independently mounted water level sensing controls used in boiler applications in Clause 19 unless a higher number is declared. The values in Annex CC, Table CC.1 apply for the testing of independently mounted air and water flow sensing controls in Clause 19 unless otherwise declared. Values for integrated and incorporated controls are specified in the appropriate equipment standard.

4.3.4.5 According to purpose

4.3.4.5.1 *Modification:*

Replace the second sentence with the following text:

For multi-purpose controls other than combinations of boiler water level **sensing controls** using a common sensing mechanism, during the tests for any one purpose, the activating quantities and prime movers applicable to all other purposes shall be maintained constant at the most arduous value or position within the declared range or ranges.

5 Required technical information

This clause of Part 1 is applicable except as follows:

5.2 Methods of providing technical information

Table 1 – Required technical information and methods of providing these information

	Information	Clause or subclause	Method
Replacement:			
16	Temperature limits of mounting surfaces (T_s)	19.3	D
20	Number of automatic cycles (A) for each automatic action.[101] Preferred values are: 300 000 cycles; 200 000 cycles; 100 000 cycles; 30 000 cycles; 20 000 cycles; 10 000 cycles; 6 000 cycles; 3 000 cycles[1)]; 1 000 cycles[1)]; 300 cycles[2)]; 30 cycles[2)4)]; 1 cycle[3)]. [1)] Not applicable to thermostats or to other fast cycling actions. [2)] Applicable only to manual reset. [3)] Applicable only to actions which require the replacement of a part after each operation. [4)] Can only be reset during manufacturer servicing. NOTE For controls having more than one automatic action, a different value can be declared for each.	13.1.3.3, Table 14, 19.7.6, 19.8.4	X
29	Not applicable		
38	Not applicable		
Additional items:			
101	Maximum fluid temperature (T_L) in °C	16.5 a), 20.101.2	D
102	Response time, if applicable, for boiler water level **sensing controls**	H.17	C
103	Maximum working pressure, if applicable	3.3.28, 20.101.1	C/D [104]
104	Method of determining response time for boiler water level **sensing controls**	H.17.6.101	X
105	Test method for 20.101.3 for boiler water level **sensing controls**	20.101.1, 20.101.3	X