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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Automatic electrical controls -
Part 2-13: Particular requirements for humidity sensing controls

Dispositifs de commande électrique automatiques -
Partie 2-13: Exigences particulières pour les dispositifs de commande sensibles à l'humidité

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Automatic electrical controls - Part 2-13: Particular requirements for humidity sensing controls

FOREWORD

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IEC 60730-2-13 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
72/1487/FDIS	72/1503/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.

A list of all parts of the IEC 60730 series, under the general title: *Automatic electrical controls*, can be found on the IEC website.

This part 2-13 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 2-13 supplements or modifies the corresponding clauses in IEC 60730-1, so as to convert that publication into the IEC standard: Particular requirements for humidity sensing controls.

Where this part 2-13 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:

1) 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**.
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 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 automatic **electrical humidity sensing controls**

- for use in, on, or in association with equipment for household appliance and similar use;

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

- for building automation within the scope of ISO 16484 series and IEC 63044 series (HBES/BACS);
- 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 1 **Humidity sensing controls** for commercial catering, heating and air-conditioning equipment.

- that are **smart enabled controls**;

EXAMPLE 2 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 such characteristics as temperature, pressure, passage of time, humidity, light, electrostatic effects, flow, or liquid level, current, voltage, acceleration, or combinations thereof;
- 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 humidity sensing controls**, and

– functional safety of automatic **electrical humidity sensing controls** and safety related systems,

– **humidity sensing 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 **humidity sensing controls** used in, on, or in association with an equipment.

This document does not

- apply to automatic **electrical humidity 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 **humidity sensing 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 **humidity sensing control**, if such a response value is dependent upon the method of mounting the **humidity sensing 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.

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
humidity sensing control
automatic **electrical control** which is either intended to keep the controlled humidity above, below or between a particular value(s)

3.2.102
room humidistat
independently mounted or incorporated **humidity sensing control** intended to control the humidity of habitable space

3.3 Definitions relating to the function of controls

3.3.101
permanent operation
continuous monitoring of the protective function during the **operation** of the appliance or system for longer than 24 h

Note 1 to entry: 24 h is considered the typical time interval between a first and a second **fault**.

3.3.102
non-permanent operation
continuous monitoring of the protective function during the **operation** of the appliance or system for less than 24 h

Note 1 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.

5 Required technical information

This clause of Part 1 is applicable.

6 Protection against electric shock

This clause of Part 1 is applicable.

7 Provision for protective earthing

This clause of Part 1 is applicable.

8 Terminals and terminations

This clause of Part 1 is applicable.

9 Constructional requirements

This clause of Part 1 is applicable.

10 Threaded parts and connections

This clause of Part 1 is applicable.

11 Creepage distances, clearances and distances through solid insulation

This clause of Part 1 is applicable.

12 Components

This clause of Part 1 is applicable.

13 Fault assessment on electronic circuits

This clause of Part 1 is applicable except as follows:

13.1 Fault assessment for inherent safety

13.1.3 Component fault assessment

13.1.3.2 Test procedure

Modification:

Replace the first line with the following:

*The **control** shall be operated under the following conditions. In addition, **controls** declared under Table H.1, requirement 101 shall be tested when the **control** is in the declared condition and when it is not.*

13.1.3.8 Compliance criteria

Modification:

Item c) is not applicable.

14 Moisture and dust resistance

This clause of Part 1 is applicable.

15 Electric strength and insulation resistance

This clause of Part 1 is applicable except as follows:

Table 16 – Insulation or disconnection test voltages

Addition to footnote m:

In the case of **humidity sensing controls**, it can be necessary to provide specially calibrated samples to enable this test to be performed.

16 Heating

This clause of Part 1 is applicable.

17 Manufacturing deviation and drift

This clause of Part 1 is applicable.

18 Environmental stress

This clause of Part 1 is applicable.

19 Endurance

This clause of Part 1 is applicable except as follows:

19.1 General requirements

19.1.6 Test sequence and conditions

Additional subclause:

19.1.6.101 For **humidity sensing controls**, the tests of Clause 19 are conducted with the activating quantity agreed between the manufacturer and testing authority.

19.8 Test of automatic action at accelerated rate

19.8.4 *Additional subclause:*

19.8.4.101 The number of automatic and manual cycles for independently mounted and **in-line cord controls** shall be as indicated in Annex AA, unless a higher number is declared by the manufacturer.

19.15 Test for particular purpose controls

Additional subclause:

19.15.101 Tests for humidity sensing controls

- Subclauses 19.1 to 19.5 inclusive are applicable.
- Subclause 19.6 is applicable to actions classified as type 1.M or 2.M, the value of "X" being agreed between manufacturer and testing authority.
- Subclause 19.7 is applicable.
- Subclause 19.8 is applicable.
- Subclause 19.9 is applicable, except for the last paragraph of 19.9.3.
- Subclauses 19.10 to 19.14 inclusive are applicable.

20 Mechanical strength

This clause of Part 1 is applicable.

21 Resistance to heat, fire and tracking

This clause of Part 1 is applicable.

22 Resistance to corrosion

This clause of Part 1 is applicable.

23 Electromagnetic compatibility (EMC) requirements – Emission

This clause of Part 1 is applicable.

24 Normal operation

This clause of Part 1 is applicable.

25 Electromagnetic compatibility (EMC) requirements – Immunity

This clause of Part 1 is applicable.

26 Abnormal operation tests

This clause of Part 1 is applicable.

Annex H
(normative)

Requirements related to functional safety

This annex of Part 1 is applicable except as follows:

H.5 Information

Table H.1 – Additional items to Table 1

Additional items:

	Information	Clause or subclause	Method
H.101	The output condition of Type 2 **humidity sensing controls** after operation [101]	H.25.5.2.2	X
H.102	Frequency of the **defined state** test function	H.13.2.2.2, H.13.2.3.2, H.13.2.3.3	X
H.103	The **control** is for **permanent operation** or **non-permanent operation**	3.3.101, 3.3.102, H.13.2.2.2, H.13.2.3.2	X
Additional footnote: [101] In general, **humidity sensing controls** perform **class A control functions**.			

H.9 Constructional requirements

H.9.12 Controls using software

H.9.12.2 Measures to control faults/errors

H.9.12.2.6 *Modification:*

Replace the second paragraph with the following note:

NOTE 101 The values declared in Table H.1, requirement H.8, can be given in the applicable appliance standard.

H.9.12.2.7 *Additional note:*

NOTE 101 The values declared in Table H.1, requirement H.9, can be given in the applicable appliance standard.

H.13 Fault assessment on electronic circuits

H.13.2 Fault assessment to ensure functional safety

H.13.2.2 Class B control function

H.13.2.2.2 First fault

Modification:

Replace item b) as follows:

b) the **control** shall react within the **fault reaction time** (see Table H.1, requirement H.11) by proceeding to the **defined state** provided that a subsequent restart under the same **fault** conditions results in the **system** returning to the same **defined state** condition;

Replace item c) as follows:

c) for **systems** with **non-permanent operation** only, the **control** shall continue to operate as intended, the **fault** shall be detected during the next start-up sequence. The compliance criteria shall be a) or b).

NOTE Requirements for **systems** with **permanent operation** are under consideration.

Replace item d) as follows:

d) the **control** shall continue to operate as intended.

Replace the last two paragraphs with the following:

The **fault reaction time** shall be declared by the manufacturer (see Table H.1, requirement H.11).

For **permanent operation** as declared by the manufacturer (see Table H.1, requirement H.103), item c) is under consideration.

For a **control** function, where a mechanical actuator is part of a circuit that characterizes the **defined state**, a test up to, but not including, the switching contacts is sufficient. If the test of the **defined state** fails, the **control** shall initiate the **safety shut-down**. Frequency of test is as declared by the manufacturer (see Table H.1, requirement H.102). Internal **faults** of the components of the checking circuits are not considered.

H.13.2.3 Class C control function

H.13.2.3.2 First fault

Modification:

Replace item b) as follows:

b) the **control** reacting within the **fault reaction time** (see Table H.1, requirement H.11) by proceeding to **defined state** provided that subsequent restart under the same **fault** condition results in the **system** returning to the **defined state** condition;

Replace item c) follows:

c) for **systems** with **non-permanent operation**, the **control** shall continue to operate as intended, the **fault** shall be detected during the next start-up sequence. The compliance criteria shall be a) or b).

NOTE Requirements for **systems** with **permanent operation** are under consideration.

Replace item d) as follows:

d) The **control** shall continue to operate as intended.

Replace the last sentence with the following:

The **fault reaction time** shall be declared by the manufacturer (see Table H.1, requirement H.11).

For **permanent operation** as declared by the manufacturer (see Table H.1, requirement H.103), item c) is under consideration.

For a **control** function, where a mechanical actuator is part of a circuit that characterizes the **defined state**, a test up to, but not including, the switching contacts is sufficient. If the test of the **defined state** fails, the **control** shall initiate the **safety shut-down**. Frequency of test is as declared by the manufacturer (see Table H.1, requirement H.102). Internal **faults** of the components of the checking circuits are not considered.

H.13.2.3.3 Second fault

Modification:

Replace second sentence and items a) and b) with the following:

During assessment, for **systems** with **non-permanent operation**, the second **fault** shall only be considered to occur when a start-up sequence has been performed after the first **fault**. For **systems** with **permanent operation**, the second **fault** occurs 24 h after the first **fault**.

Replace the last two sentences with the following:

The **fault reaction time**, as well as the applicability of c) of H.13.2.3.2, shall be as declared by the manufacturer.

For a **control** function, where a mechanical actuator is part of a circuit that characterizes the **defined state**, a test up to, but not including, the switching contacts is sufficient. If the test of the **defined state** fails, the **control** shall initiate the **safety shut-down**. Frequency of test is as declared by the manufacturer (see Table H.1, requirement H.102). Internal **faults** of the components of the checking circuits are not considered.

H.13.2.4 Faults during defined state

Replacement:

H.13.2.4 is not applicable.

H.17 Manufacturing deviation and drift

H.17.4 *Addition:*

Alternatively, the declared **manufacturing deviation** and **drift** may be expressed separately as a tolerance value to the declared **operating value**.

H.17.5.3 *Additional subclauses:*

H.17.5.3.101 **Controls** intended for **setting by the user** shall be set at the maximum humidity value permitted by the adjustment unless otherwise declared by the manufacturer.

H.17.5.3.102 The **operation** of the **control** shall be sensed by a suitable device with a sensing current not exceeding 0,05 A.

The circuit voltage may be any convenient value that will give reliable indication of the function being monitored.

H.17.5.4 Not applicable.

H.25 Electromagnetic compatibility (EMC) requirements – Immunity

H.25.4 Harmonics and interharmonics including mains signalling at AC power port, low frequency immunity tests

Additional subclause:

H.25.4.101 Compliance

When disturbance is applied before operation, one of the following shall apply:

a) The control shall remain in its current condition and thereafter shall continue to operate as declared within the limits verified in Clause 17, if applicable.

b) The control shall assume the condition declared in Table H.1, requirement H.101 and thereafter shall operate as in a).

c) The control shall assume the condition declared in Table H.1, requirement H.101 such that it cannot be reset automatically or manually. The output waveform shall be sinusoidal or as declared in Table 1, requirement 48 for normal operation.

d) For integrated or incorporated controls other than pressure cut-outs, the outputs and functions shall be as declared in Table H.1, requirement H.1 or requirement H.2 and the control shall comply with the requirement of 19.5.

When disturbance is applied after operation, one of the following shall apply:

a) The control shall remain in the condition declared in Table H.1, requirement H.101. A non-self-resetting control shall be such that it can only reset manually. After the pressure which caused cut-out to occur is removed, it shall operate as in H.25.4.101 or shall remain in the declared condition as in c).

b) The control may return to its initial state and thereafter shall operate as in a).

c) For integrated or incorporated controls other than pressure cut-outs, the outputs and functions shall be as declared in Table H.1, requirement H.1 or requirement H.2 and the control shall comply with the requirement of 19.5.

H.25.5 Voltage dips, voltage interruptions and voltage variations in the power supply network

H.25.5.1 Voltage dips and interruptions

Additional subclause:

H.25.5.1.101 Compliance

When disturbance is applied before operation, one of the following shall apply:

a) The control shall remain in its current condition and thereafter shall continue to operate as declared within the limits verified in Clause 17, if applicable.

b) The control shall assume the condition declared in Table H.1, requirement H.101 and thereafter shall operate as in a).