IEC 60730-2-14

Edition 2.2 2021-10
CONSOLIDATED VERSION

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Automatic electrical controls –
Part 2-14: Particular requirements for electric actuators

Dispositifs de commande électrique automatiques –
Partie 2-14: Exigences particulières pour les actionneurs électriques

IEC 60730-2-14:2017-08+AMD1:2019-03+AMD2:2021-10 CSV(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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AUTOMATIC ELECTRICAL CONTROLS –

Part 2-14: Particular requirements for electric actuators

FOREWORD

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This consolidated version of the official IEC Standard and its amendments has been prepared for user convenience.

IEC 60730-2-14 edition 2.2 contains the second edition (2017-08) [documents 72/1079/FDIS and 72/1100/RVD], its amendment 1 (2019-03) [documents 72/1168FDIS and 72/1175/RVD] and its amendment 2 (2021-10) [documents 72/1284/FDIS and 72/1286/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendments 1 and 2. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 60730-2-14 has been prepared by IEC technical committee 72: Automatic electrical controls.

This second edition constitutes a technical revision. This edition includes the following significant technical changes with respect to the previous edition:

- adapting it to the 5th Ed of IEC 60730-1,
- addition of checking electric actuators with action 1.AB or 2AB, and
- modification of tests under abnormal condition.

This part 2-14 is intended to be used in conjunction with IEC 60730-1. It was established on the basis of the fifth edition of that standard (2013) including its amendment 1 (2015) and amendment 2 (2021). Consideration may be given to future editions of, or amendments to, IEC 60730-1.

This part 2-14 supplements or modifies the corresponding clauses in IEC 60730-1, so as to convert that publication into the IEC standard: Particular requirements for electric actuators.

Where this part 2-14 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 part 2-14 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:~~

~~• Table 1,~~

~~• 27.2.3.1.~~

The reader's attention is drawn to the fact that Annex AA and Annex BB 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.

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

The committee has decided that the contents of the base publication and its amendment 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.

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AUTOMATIC ELECTRICAL CONTROLS –

Part 2-14: Particular requirements for electric actuators

1 Scope and normative references

This clause of Part 1 is applicable except as follows:

1.1 *Replacement:*

This part 2-14 applies to **electric actuators** for use in, on, or in association with equipment for household and similar use. The equipment may use electricity, gas, oil, solid fuel, solar thermal energy, etc., or a combination thereof.

NOTE Throughout this ~~standard~~ document the word "equipment" means "appliance and equipment".

EXAMPLE 1 **Electric actuators** for appliances within the scope of IEC 60335.

This ~~International Standard~~ document is applicable to ~~**controls**~~ **electric actuators** for building automation within the scope of ISO 16484.

This part 2-14 also applies to automatic **electrical 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.

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

This part 2-14 is also applicable to individual **electric actuators** utilized as part of a **control system** or **controls**, which are mechanically integral with **multifunctional controls** having non-electrical outputs.

EXAMPLE 3 Independently mounted water valves, **controls** in smart grid **systems** and **controls** for building automation systems within the scope of ISO 16484-2.

This part 2-14 does not apply to automatic **electric actuators** intended exclusively for industrial process applications unless explicitly mentioned in the relevant part 2 or the equipment standard.

This part 2-14 applies to **electric actuators** powered by primary or secondary batteries, requirements for which are contained within the standard, including Annex V.

1.1.1 *Replacement*:

This part 2-14 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 **electric actuators** used in or in association with equipment.

NOTE Requirements for specific **operating values**, **operating times** and **operating sequences** ~~may~~ can be given in the standards for appliances and equipment.

This ~~standard~~ document is also applicable to the **functional safety** of **low complexity safety related systems** and **controls**.

This part 2-14 does not apply to **electric actuators** which are mechanically integrated with valves covered by a separate part 2, e.g. IEC 60730-2-8.

This part 2-14 does not apply to electric motors, requirements for which are contained in IEC 60034.

1.1.2 *Replacement*:

This part -2-14 applies to automatic **electric actuators**, 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.

Requirements for manual switches not integral with an **electric actuator** are contained in IEC 61058-1 and IEC 61058-1-1.

1.1.3 ~~*Replacement*~~ Void.

~~This part 2-14 applies to a.c. or d.c. powered **electric actuators** with a rated voltage not exceeding 690 V a.c. or 600 V d.c.~~

1.1.4 ~~*Replacement*~~ Void.

~~This part 2-14 does not take into account the **response value** of an **automatic action** of an **electric actuator**, if such a **response value** is dependent upon the method of mounting the **electric actuator** 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 or as determined by the manufacturer shall apply.~~

1.1.5 ~~Void.~~ *Replacement:*

This part 2-14 applies to AC or DC powered **electric actuators** with a rated voltage not exceeding 690 V AC or 600 V DC.

1.1.6 ~~Void.~~ *Replacement*:

This part 2-14 does not take into account the **response value** of an **automatic action** of an **electric actuator**, if such a **response value** is dependent upon the method of mounting the **electric actuator** 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 or as determined by the manufacturer applies.

1.1.7 *Replacement:*

This part 2-14 applies also to **electric actuators** incorporating **electronic devices**, requirements for which are contained in Annex H.

1.1.8 *Replacement:*

This part 2-14 applies also to **electric actuators** using NTC or PTC **thermistors**, requirements for which are contained in Annex J.

1.1.9 *Replacement:*

This part 2-14 applies to the electrical and **functional safety** of **electric actuators** capable of receiving and responding to communications signals, including signals for power billing rate and demand response.

The signals may be transmitted to or received from external units being part of the **electric actuator** (wired), or to and from external units, which are not part of the **electric actuator** (wireless) under test.

1.1.10 *Replacement:*

This part 2-14 does not 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.

1.2 Normative references

Additional reference:

IEC 61058-1-1, *Switches for appliances – Part 1-1: Requirements for mechanical switches*

2 Terms and definitions

This clause of part 1 is applicable, except as follows:

2.2 Definitions of types of control according to purpose

Additional definition:

2.2.101
electric actuator
device in which a **prime mover** is mechanically linked to a valve, damper or similar device and which responds to **initiation** from a **control** or switch

Note 1 to entry: The **electric actuator** moves the valve, damper or similar device to defined positions and may also incorporate other functions, such as electric interlock switches and/or feedback.

2.3 Definitions relating to the function of controls

Additional definitions:

2.3.101
multi-position action
action denoting that the **electric actuator** operates in such a manner that only two or more defined positions can be reached

2.3.102
modulating action
action denoting that the **electric actuator** operates in such a manner that every position between two defined limits can be reached

2.3.103
travel time
time taken by an **electric actuator** to move from one defined position to another

2.3.104
stroke
distance travelled by a linear actuator

2.3.105
angular rotation
operating movement of a rotary actuator given in radians or degrees

2.3.106
maximum rated mechanical load
maximum mechanical resistance to the active movement of an actuator under normal operating conditions

Note 1 to entry: See also 6.4.102.1 and 6.4.102.2.

3 General requirements

This clause of Part 1 is applicable.

4 General notes on tests

This clause of Part 1 is applicable.

5 Rating

This clause of Part 1 is applicable.

6 Classification

This clause of Part 1 is applicable, except as follows:

6.1 According to nature of supply

6.1.1 Control for a.c. only

Replacement:

Electric actuators which are designed for a.c. supply only shall not be used on d.c. supply.

6.3 According to their purpose

Additional subclauses:

6.3.101 – electric actuator;

6.3.102 – electric actuator as a component of a multi-purpose control or **system**.

NOTE See also H.6.18 according to classes of **control** functions.

6.4 According to features of automatic action

Additional subclauses:

6.4.101 Type of action

6.4.101.1 Multi-position action

6.4.101.2 Modulating action

6.4.102 Type of movement

6.4.102.1 Rotary movement

NOTE **Maximum rated mechanical load** for rotary movement actuators can be declared in terms of rated torque (for the complete **angular rotation**) or, alternatively, in terms of maximum torque, running torque and percentage of the angular rotation in which the maximum torque occurs. The value of the percentage of the angular rotation in which the maximum torque occurs is independent from any specific position within the travel of the actuator; maximum torque can be reached at any position within the actuator travel (e.g. at start position, at end position, at each end, in the middle, etc.).

6.4.102.2 Linear movement

NOTE **Maximum rated mechanical load** for linear movement actuators can be declared in terms of rated force (for the complete **stroke**) or, alternatively, in terms of maximum force, running force and percentage of the stroke in which the maximum force occurs. The value of the percentage of the stroke in which the maximum force occurs is independent from any specific position within the travel of the actuator; maximum force can be reached at any position within the actuator travel (e.g. at start position, at end position, at each end, in the middle, etc.).

6.4.3 *Additional subclauses:*

6.4.3.101 –an action in which the **electric actuator** assumes a predefined position upon loss of the electrical supply and/or upon loss of the **control** signal (type 1.AA or type 2.AA);

6.4.3.102 – an action in which the **electric actuator** operates normally between 1,1 V_R and 0,85 V_R inclusive and in which it either operates normally or assumes a predefined position between 0,85 V_R and a declared lower percentage of rated voltage (type 1.AB or type 2.AB).

6.11 According to number of automatic cycles (A) of each automatic action

Modification:

Subclauses 6.11.8 to 6.11.12 inclusive are not applicable.

7 Information

7.2 Methods of providing information

This clause of part 1 is applicable except as follows:

Table 1 – (7.2 of edition 3) – Required information and methods of providing information

	Information	Clause or subclause	Method
Modifications:			
7	The type of load controlled by each external circuit	6.2, 14	D
22	Temperature limits of the actuator, if T_{min} lower than 0 °C or T_{max} other than 60 °C	6.7, 14,5, 14.7, 17.3	D
23	~~Temperature limits of mounting surfaces (T_s)~~ Maximum temperature of mounting surface ($T_{s\ max}$) if it differs by more than 20 K from T_{max}	6.12.2, 14.1, 17,3	D
27	Number of automatic cycles (A) for each **automatic action** ~~102~~ bb	6.11	X
28	Not applicable		
34	Detail of any limitation of **operating time** ~~101, 103~~ aa	14, 17	C[cc]
37	Not applicable		
38	Not applicable		
43	Not applicable		
44	Not applicable		
47	Not applicable		
Additional requirements:			

101	Impedance protected motor	14.4.101	D
102	Thermally protected motor	14.4.102	D
103	Type of movement	2.3.104, 2.3.105, 6.4.102	D
104	Type of action	2.3.101, 2.3.102, 6.4.101	D
105	~~Maximum rated mechanical load~~ **maximum rated mechanical load**[dd]	2.3.106, 6.4.102.1, 6.4.102.2, 14.4, 15.5.102, 17.4.101	D
106	**Travel time**	2.3.103, 15.5.101, 15.5.102	D
107	**Stroke**	2.3.104	D
108	**Angular rotation**	2.3.105	D
109	Response time and method of measurement (for types 1.AA or 2.AA)	6.4.3.101 15.5.102	D
110	Lower percentage of rated voltage (for types 1.AB or 2.AB)	6.4.3.102	D

Additional footnotes:

~~101~~aa This may be given as a maximum percentage of ON time of the power supply to avoid over-heating of the windings in a declared period of time.

~~102~~bb **Electric actuators** are subjected to a minimum of 6 000 cycles.

~~103~~cc For integrated and incorporated **electric actuators**, the method is D.

dd For test purposes, representative physical load may be defined by agreement between the manufacturer and testing authority (e.g. dedicated test device).

7.3.1 *Addition:*

~~NOTE~~ Actuators of class II construction provided with a cord for connection to the **fixed wiring** which does not have a plug fitted may carry the symbol for class II construction.

8 Protection against electric shock

This clause of part 1 is applicable.

9 Provision for protective earthing

This clause of Part 1 is applicable.

10 Terminals and terminations

This clause of Part 1 is applicable.

11 Constructional requirements

This clause of Part 1 is applicable except as follows:

11.4 Actions

Additional subclauses:

11.4.101 A type 1.AA or 2.AA action shall operate such that for any duration of voltage interruption which is greater than the response time declared in Table 1, requirement 109, the actuator assumes the predefined position and resumes normal **operation** upon restoration of the supply.