

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Automatic electrical controls for household and similar use –
Part 2-14: Particular requirements for electric actuators**

**Dispositifs de commande électrique automatiques à usage domestique et
analogue –
Partie 2-14: Règles particulières pour les actionneurs électriques**

<https://standards.iteh.ai/iec/60730-2-14:1995>

<https://standards.iteh.ai/catalog/standards/iec/14/110de8-e08f-4868-acb9-af6b53683209/iec-60730-2-14-1995>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2008 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch

Tel.: +41 22 919 02 11

Fax: +41 22 919 03 00

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

- Catalogue des publications de la CEI: www.iec.ch/searchpub/cur_fut-f.htm

Le Catalogue en-ligne de la CEI vous permet d'effectuer des recherches en utilisant différents critères (numéro de référence, texte, comité d'études,...). Il donne aussi des informations sur les projets et les publications retirées ou remplacées.

- Just Published CEI: www.iec.ch/online_news/justpub

Restez informé sur les nouvelles publications de la CEI. Just Published détaille deux fois par mois les nouvelles publications parues. Disponible en-ligne et aussi par email.

- Electropedia: www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International en ligne.

- Service Clients: www.iec.ch/webstore/custserv/custserv_entry-f.htm

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions, visitez le FAQ du Service clients ou contactez-nous:

Email: csc@iec.ch

Tél.: +41 22 919 02 11

Fax: +41 22 919 03 00

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Automatic electrical controls for household and similar use –
Part 2-14: Particular requirements for electric actuators**

**Dispositifs de commande électrique automatiques à usage domestique et
analogue –
Partie 2-14: Règles particulières pour les actionneurs électriques**

<https://standards.iteh.ai/iec/60730-2-14:1995>

<https://standards.iteh.ai/catalog/standards/iec/14/110de8-e08f-4868-acb9-af6b53683209/iec-60730-2-14-1995>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

CONTENTS

FOREWORD	3
1 Scope and normative references	5
2 Definitions	6
3 General requirements	7
4 General notes on tests	7
5 Rating	7
6 Classification	7
7 Information	8
8 Protection against electric shock	9
9 Provision for protective earthing	9
10 Terminals and terminations	9
11 Constructional requirements	9
12 Moisture and dust resistance	9
13 Electric strength and insulation resistance	9
14 Heating	9
15 Manufacturing deviation and drift	10
16 Environmental stress	10
17 Endurance	11
18 Mechanical strength	11
19 Threaded parts and connections	11
20 Creepage distances, clearances and distances through solid insulation	11
21 Resistance to heat, fire and tracking	11
22 Resistance to corrosion	11
23 Electromagnetic compatibility (EMC) requirements – Emission	11
24 Components	11
25 Normal operation	11
26 Electromagnetic compatibility (EMC) requirements – Immunity	12
27 Abnormal operation	12
28 Guidance on the use of electronic disconnection	13
Annexes	14
Annex D (informative) Heat, fire and tracking (applicable in Canada and the USA)	14
Annex H (normative) Requirements for electronic controls	15
Figures	13
Table 7.2	8
Table 27.2 – Maximum permitted temperatures for test of blocked output conditions	12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

AUTOMATIC ELECTRICAL CONTROLS FOR HOUSEHOLD AND SIMILAR USE –

Part 2-14: Particular requirements for electric actuators

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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

This consolidated version of IEC 60730-2-14 consists of the first edition (1995) [documents 72/307/FDIS and 72/339/RVD], its amendment 1 (2001) [documents 72/480/FDIS and 72/502/RVD] and its amendment 2 (2007) [documents 72/748/FDIS and 72/756/RVD].

The technical content is therefore identical to the base edition and its amendments and has been prepared for user convenience.

It bears the edition number 1.2.

A vertical line in the margin shows where the base publication has been modified by amendments 1 and 2.

This Part 2-14 is intended to be used in conjunction with IEC 60730-1. It was established on the basis of the third edition of that standard (1999) and its amendment 1 (2003). 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 7.2
- 14.4
- 27.2.1
- Annex D

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.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the maintenance result 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.

AUTOMATIC ELECTRICAL CONTROLS FOR HOUSEHOLD AND SIMILAR USE –

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 of IEC 60730 applies to electric actuators for use in, on, or in association with equipment for household and similar use for heating, air-conditioning and ventilation. The equipment may use electricity, gas, oil, solid fuel, solar thermal energy, etc., or a combination thereof.

This part 2 applies to electric actuators using NTC or PTC thermistors, additional requirements for which are contained in annex J.

1.1.1 This part 2 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, on or in association with, equipment for household and similar use for heating, air-conditioning and ventilation.

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

Throughout this part 2 the word "equipment" means "appliance and equipment".

Electric actuators 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 part 2.

This part 2 does not apply to electric actuators designed exclusively for industrial applications.

This part 2 does not apply to electric actuators which are mechanically integral with valves.

See IEC 60730-2-8, Particular requirements for electrically operated valves, including mechanical requirements and IEC 60730-2-17, Particular requirements for electrically operated gas valves.

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

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

1.2 Replacement

This part 2 applies to electric actuators with a rated voltage not exceeding 690 V and with a rated current not exceeding 63 A.

1.3 Replacement

This part 2 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.

1.4 *Replacement:*

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

2 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

a 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. 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

the time taken by an electric actuator to move from one defined position to another

2.3.104

stroke

the distance travelled by a linear actuator

2.3.105

angular rotation

the operating movement of a rotary actuator given in radians or degrees

2.13 Miscellaneous definitions

Additional definition:

2.13.101

linkage

those parts which mechanically connect the electric actuator with a valve, damper or similar device

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

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 subclause:

6.3.101 – electric actuator;

6.3.102 – electric actuator as a component of a multi-purpose control or system (Type 1.AC or 2.AC).

NOTE For example, as a component of a burner control system according to IEC 60730-2-5.

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

6.4.102.2 Linear movement

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:

Delete subclause 6.11.8 to 6.11.12 inclusive.

7 Information

This clause of part 1 is applicable except as follows:

Table 7.2

Information	Clause or subclause	Method
<i>Modifications:</i>		
7 The type of load controlled by each external circuit ¹⁰²⁾	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)	6.12.2, 14.1, 17.3	D
27 Number of automatic cycles (A) for each automatic action ¹⁰³⁾	6.11	X
28 Not applicable		
34 Detail of any limitation of operating time ^{101) 104)}	14, 17	C
37 Not applicable		
38 Not applicable		
43 Not applicable		
44 Not applicable		
47 Not applicable		
<i>Addition:</i>		
101 Impedance protected motor ¹⁰²⁾	14.4.101	D
102 Thermally protected motor ¹⁰²⁾	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	15.5.102	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
<i>Additional notes:</i>		
¹⁰¹⁾ 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⁾ In the USA, for independently mounted actuators, the marking method is C.		
¹⁰³⁾ Electric actuators are subjected to a minimum of 6 000 cycles.		
¹⁰⁴⁾ For integrated and incorporated electric actuators, the method is D.		

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 item 109 of table 7.2, the actuator assumes the predefined position and resumes normal operation upon restoration of the supply.

Compliance is checked by test.

11.4.102 A type 1.AB or 2.AB action shall operate normally between $1,1 V_R$ and $0,85 V_R$ inclusive and shall respond as declared by the manufacturer at voltages below $0,85 V_R$ and the voltage declared in item 110 of table 7.2.

Compliance is checked by test.

12 Moisture and dust resistance

This clause of part 1 is applicable.

13 Electric strength and insulation resistance

This clause of part 1 is applicable.

14 Heating

This clause of part 1 is applicable except as follows:

14.3 Not applicable.

14.4.3.1 to 14.4.3.3 Not applicable.

14.4.4 Not applicable.

14.4 *Addition:*

In the USA, the test is conducted at the voltages specified in 17.2.3.1 and 17.2.3.2.

Additional subclauses:

14.4.101 If stalling of the electric actuator drive shaft is part of normal operation, then the drive shaft of motorized actuators shall be stalled and temperatures measured after steady-state conditions are reached. The temperatures shall comply with the limits of table 14.1. In addition, if any protective device provided does not cycle under stalled conditions, then the electric actuator is also considered to comply with the requirements of the blocked output test of 27.2.

14.4.102 If stalling of the electric actuator drive shaft is not part of normal operation, then table 14.1 limits do not apply during stalling. The electric actuator shall comply with the requirements of the blocked output test of 27.2.

14.5.1 *Replacement:*

Change "switchhead" to "electric actuator".

14.5.2 Not applicable.

14.6 *Replacement:*

The temperatures specified for the electric actuator shall be attained in approximately 1 h.

14.7 *Replacement:*

The temperature of the medium in which the electric actuator is located shall be measured as near as possible to the centre of the space occupied by the samples and at a distance of approximately 50 mm from the actuator.

15 Manufacturing deviation and drift

This clause of part 1 is applicable except as follows:

15.5 *Additional subclauses:*

15.5.101 The travel time shall be measured at $0,85 V_R$.

15.5.102 The travel time and the response time shall be measured with the mechanical load declared by the manufacturer and in the most unfavourable mounting position declared by the manufacturer.

15.6 Not applicable.

16 Environmental stress

This clause of part 1 is applicable.