IEC 60730-2-14

Edition 2.0 2017-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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(en-fr)

Documents
Document Sharing Hub

Full document details: IEC 60730-2-14 2017

THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2017 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 l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
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.

IEC Catalogue - webstore.iec.ch/catalogue
The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org
The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) 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 IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue
Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,…). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary
65 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

Documents
Document Sharing Hub

Full document details: IEC 60730-2-14 2017

IEC 60730-2-14

Edition 2.0 2017-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.120.01; 97.120

ISBN 978-2-8322-4695-5

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

® Registered trademark of the International Electrotechnical Commission
Marque déposée de la Commission Electrotechnique Internationale

Documents
Document Sharing Hub

Full document details: IEC 60730-2-14 2017

CONTENTS

FOREWORD 3
1 Scope and normative references 5
2 Terms and 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 11
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 12
25 Normal operation 12
26 Electromagnetic compatibility (EMC) requirements – Immunity 12
27 Abnormal operation 12
28 Guidance on the use of electronic disconnection 14
Annex H (normative) Requirements for electronic controls 15
Annex AA (normative) Regional differences 20
Annex BB (informative) Specific regional requirements in Japan 21
Bibliography 22

Table 1 – (7.2 of edition 3) – Required information and methods of providing information 8

Documents
Document Sharing Hub

Full document details: IEC 60730-2-14 2017

INTERNATIONAL ELECTROTECHNICAL COMMISSION

AUTOMATIC ELECTRICAL CONTROLS –

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 itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
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 electrical controls.

This second edition cancels and replaces the first edition, published in 1995, its Amendment 1 (2001) and its Amendment 2 (2007). This 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 5th edition of that standard (2013). Consideration may be given to future editions of, or amendments to, IEC 60730-1.

Documents
Document Sharing Hub

Full document details: IEC 60730-2-14 2017

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.

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

FDIS	Report on voting
72/1079/FDIS	72/1100/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

Documents
Document Sharing Hub

Full document details: IEC 60730-2-14 2017

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 the word "equipment" means "appliance and equipment."

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

This International Standard is applicable to **controls** 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.

1.1.1 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 be given in the standards for appliances and equipment.

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

AVA Documents
Document Sharing Hub

Full document details: IEC 60730-2-14 2017

1.1.3 *Replacement*

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*

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.

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

Documents
Document Sharing Hub
Full document details: IEC 60730-2-14 2017

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

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);

AVA Documents
Document Sharing Hub

Full document details: IEC 60730-2-14 2017

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

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)	6.12.2, 14.1, 17,3	D
27	Number of automatic cycles (A) for each **automatic action** [102]	6.11	X
28	Not applicable		
34	Detail of any limitation of **operating time** [101, 103]	14, 17	C
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	14.4, 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
Additional notes:			
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	**Electric actuators** are subjected to a minimum of 6 000 cycles.		
103	For integrated and incorporated **electric actuators**, the method is D.		

Documents
Document Sharing Hub
Full document details: IEC 60730-2-14 2017

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.

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 Table 1, requirement 110.

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.

Documents
Document Sharing Hub

Full document details: IEC 60730-2-14 2017

14.4 *Replacement of the first paragraph by the following:*

The tests based on an action type 1.AB or 2.AB shall be checked by the lowest (0,85 V_R) and the highest (1,1 V_R) rated voltage as declared by the manufacturer. During this test, the temperature shall not exceed the values specified in Table 13 (14.1 of edition 3.)

*The actuator shall be loaded with the maximum rated mechanical load. Each **duty cycle** shall be operated at the declared maximum **stroke** or **angular rotation**.*

14.4.3.1 to **14.4.3.3** Not applicable.

14.4.4 Not applicable.

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 13. 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 burnout test of 27.2.

14.4.102 If stalling of the **electric actuator** drive shaft is not part of normal **operation**, then Table 13 limits do not apply during stalling. The **electric actuator** shall comply with the requirements of the burnout test of 27.2.

14.5.1 *Replacement:*

Change "switch head" 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 maximum rated mechanical load declared by the manufacturer and in the most unfavourable mounting position declared by the manufacturer.

15.6 Not applicable.

Documents
Document Sharing Hub
Full document details: IEC 60730-2-14 2017

16 Environmental stress

This clause of Part 1 is applicable.

17 Endurance

This clause of Part 1 is applicable except as follows:

17.4 Manual and mechanical conditions for the tests

17.4.2 *Replacement:*

The speed of movement of the **electric actuator** drive shaft shall be as declared by the manufacturer.

17.4.4 *Replacement:*

The method of acceleration shall be as agreed between the manufacturer and the testing authority.

17.6 Not applicable.

Additional subclause:

17.8.101 The tests based on an action type 1.AB or 2.AB shall be checked with 50 % of the cycles at 0,85 of the minimum V_R at ambient temperature or T_{min}, if lower than 0 °C, and 50 % of the cycles at 1,1 of the maximum V_R at $\boldsymbol{T_{max}}$.

18 Mechanical strength

This clause of Part 1 is applicable.

19 Threaded parts and connections

This clause of Part 1 is applicable.

20 Creepage distances, clearances and distances through solid insulation

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.

Documents
Document Sharing Hub

Full document details: IEC 60730-2-14 2017

24 Components

This clause of Part 1 is applicable.

25 Normal operation

This clause of Part 1 is applicable.

26 Electromagnetic compatibility (EMC) requirements – Immunity

This clause of Part 1 is applicable.

27 Abnormal operation

This clause of Part 1 is applicable except as follows:

27.2 Burnout test

Replacement of the first sentence by the following:

This clause is applicable to actuators where an external mechanical blockage will not cause an internal overload of the actuator. If means (e.g. a **clutch**) is used to decouple the external blockage to the internal mechanical structure, then a blockage of the mechanical parts between the motor and the decoupling means shall be tested according 27.2.1.

27.2.2 *Replacement:*

After this test, the actuator shall comply with the items a) to g) of H.27.1.1.3 .

27.2.3 Blocked mechanical output test (abnormal temperature test)

Replacement of the first paragraph by the following:

Electric actuators shall withstand the effects of blocked output without exceeding the temperatures indicated in Table 26. Temperatures are measured by the method specified in 14.7.1.

This test is not conducted on **electric actuators** which meet the requirements of 14.4.101.

27.2.3.1

Replacement of the first and second paragraph, including the NOTE, by the following:

Electric actuators *are tested for 24 h or until thermal equilibrium has been reached with the output blocked in the most unfavorable position at rated voltage and in a room temperature in the range of 15 °C to 30 °C, the resulting measured temperature being corrected to a 25 °C reference value.*

NOTE For the test with disconnected phase on three phase actuators, see 27.101.

27.3 Not applicable.

Documents
Document Sharing Hub

Full document details: IEC 60730-2-14 2017

27.101 Test with disconnected phase on three phase actuators

27.101.1 *With any one phase disconnected, the actuator is operated under normal* ***operation*** *and supplied at* ***rated voltage****. For asymmetrical motor windings, the test is to be repeated until all phases have been singly opened.*

27.101.1.1 *The test duration shall be such that the first and second hour winding temperatures are recorded or until temperatures stabilize, whichever is longer. Temperatures are measured by the method specified in 14.7.1.*

27.101.1.2 *The temperature of the winding shall not exceed the temperatures indicated in Table 26.*

27.102 Running overload

27.102.1 *A running overload test is carried out on electrical actuators that are intended to be remotely or automatically controlled or liable to be operated continuously in unattended mode. If present, overload protective devices relying on electronic circuits to protect the motor windings are also subjected to the running overload test. This test is not applicable to integrated actuators.*

27.102.2 *The electrical actuator is operated under normal* ***operation****, carrying its rated load and supplied at rated voltage until the temperature of the motor windings stabilizes. The protector or protective circuit shall not operate or open the circuit while the actuator is operating under the above conditions.*

27.102.2.1 *For all actuators where the trip point in the sensing variable is not known or cannot be quickly determined (for example, temperature sensing, impedance protected motors, sensor-less motor protection, position sensing, etc.), the load to the actuator is increased in increments of 10 % of the rated value (torque, current, etc.) and operated until temperatures of the winding stabilize. If the protector or the protective circuit does not operate under this overload condition, the load to the actuator is again increased by 10 % of the previous load setting and the actuator is operated until temperatures of the windings stabilize. This process is continued until the protective device or protective circuit operates.*

When the protector or protective circuit operates, the load is slowly decreased until the protector or protective circuit is not activated. The loading parameters (torque, current, etc.) shall be measured and recorded. The actuator is then run at this load until the temperature of the winding stabilizes.

Any mechanical protection, such as a ***clutch****, shall be defeated for this test.*

27.102.2.2 *For actuators where the trip point in the sensing variable is known or can be quickly determined (example, current sensing), the load to the actuator is gradually increased, in a controlled manner, until the protective device or protective circuit is activated. This is the trip point and the loading parameters (torque, current etc.) shall be measured and recorded. Then, the load is slowly decreased until the protector or protective circuit is not activated. The actuator is then run at this load until the temperature of the winding stabilizes.*

NOTE A brake dynamometer can be used to gradually increase the torque on the actuator shaft in a controlled manner.

27.102.3 *During the test, the winding temperature prior to the operation of the protective device or protective circuit shall not exceed*

– *140 °C, for class 105 (A) winding insulation;*
– *155 °C, for class 120 (E) winding insulation;*
– *165 °C, for class 130 (B) winding insulation;*

Documents
Document Sharing Hub
Full document details: IEC 60730-2-14 2017