

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Automatic electrical controls for household and similar use –
Part 2-7: Particular requirements for timers and time switches**

**Dispositifs de commande électrique automatiques à usage domestique et
analogue –
Partie 2-7: Règles particulières pour les minuteries et les minuteries cycliques**

IEC 60730-2-7:2008

<https://standards.iteh.ai/details/standards/iec/58/190c9-eac9-4066-a63b-a7aaf384a14c/iec-60730-2-7-2008>



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 It also gives information on projects, withdrawn and replaced publications.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 2-7: Particular requirements for timers and time switches**

**Dispositifs de commande électrique automatiques à usage domestique et
analogue –
Partie 2-7: Règles particulières pour les minuteries et les minuteries cycliques**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

U

CONTENTS

FOREWORD.....	3
1 Scope and normative references	6
2 Definitions	7
3 General requirements	8
4 General notes on tests	8
5 Rating	8
6 Classification.....	9
7 Information.....	10
8 Protection against electric shock	11
9 Provision for protective earthing	11
10 Terminals and terminations	11
11 Constructional requirements.....	11
12 Moisture and dust resistance	12
13 Electric strength and insulation resistance.....	12
14 Heating	12
15 Manufacturing deviation and drift.....	13
16 Environmental stress	13
17 Endurance.....	13
18 Mechanical strength	18
19 Threaded parts and connections.....	18
20 Creepage distances, clearances and distances through solid insulation	18
21 Fire hazard testing	18
22 Resistance to corrosion	19
23 Electromagnetic compatibility (EMC) requirements – emission	19
24 Components	19
25 Normal operation.....	19
26 Electromagnetic compatibility (EMC) requirements – immunity	19
27 Abnormal operation	19
28 Guidance on the use of electronic disconnection	19
Annex D (normative) Heat, fire and tracking (applicable in Canada and the USA)	20
Annex H (normative) Requirements for electronic controls	24
Annex AA (normative) Number of cycles, automatic and manual action.....	26
Figure D.101 – Positioning of electrodes.....	22
Figure D.102 – Arc resistance test circuit.....	23
Table 17.16.103.1.2 – Electrical conditions for overload and endurance testing	17
Table D.101 – Sequence of 1-min current steps.....	22
Table AA.1 – Values for free standing, independently mounted and in-line cord timers and time switches ^a	26

INTERNATIONAL ELECTROTECHNICAL COMMISSION

AUTOMATIC ELECTRICAL CONTROLS FOR HOUSEHOLD AND SIMILAR USE –

Part 2-7: Particular requirements for timers and time switches

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 60730-2-7 has been prepared by IEC technical committee 72: Automatic controls for household use.

This second edition cancels and replaces the first edition published in 1990 and its Amendment 1 (1994). This second edition constitutes a technical revision. This new edition incorporates requirements for tungsten filament lamp loadings as well as updates the standard to IEC 60730-1:1999, Amendment 2 (2007).

The text of this standard is based on the following documents:

FDIS	Report on voting
72/760/FDIS	72/764/RVD

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

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

This Part 2-7 is 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) and Amendment 2 (2007). Consideration may be given to future editions of, or amendments to, IEC 60730-1.

This Part 2-7 supplements or modifies the corresponding clauses in IEC 60730-1 so as to convert that publication into the IEC standard: Particular requirements for timers and time switches.

Where this Part 2-7 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, this Part 2-7 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 clauses and subclauses:

- 4.1.4
- 4.3.2
- 6.3.6.101
- Table 7.2, Notes 101 and 103
- 7.2.9
- 11.4.103
- 11.4.104
- 14.101
- 17.16.101.3
- 17.16.103.1
- Table 17.2-2, Notes 101 and 102
- Table 17.2-3, Notes 101 and 102
- 21.101
- Annex D
- H.26.11

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, tables or figures 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 for household and similar use*, can be found on the IEC website.

The committee has decided that the contents of this publication 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.

Withdawn

iTech Standards
(<https://standards.itih.ai>)
Document Preview

<https://standards.itih.ai/standards/iec/581190c9-eac9-4066-a63b-a7aaf384a14c/iec-60730-2-7-2008>

<https://standards.itih.ai/standards/iec/581190c9-eac9-4066-a63b-a7aaf384a14c/iec-60730-2-7-2008>

AUTOMATIC ELECTRICAL CONTROLS FOR HOUSEHOLD AND SIMILAR USE –

Part 2-7: Particular requirements for timers and time switches

1 Scope and normative references

This clause of Part 1 is applicable except as follows:

1.1 Replacement:

In general, this part of IEC 60730 applies to timers and time switches for household and similar use that may use electricity, gas, oil, solid fuel, solar thermal energy, etc. or a combination thereof, including heating, air conditioning and similar applications.

This standard is also applicable to individual timers utilized as part of a control system or timers which are mechanically integral with multifunctional controls having non-electrical outlets. This standard does not apply to time-delay switches (TDS) within the scope of IEC 60669-2-3¹⁾.

Throughout this standard, the word "timers" means timers and time switches, unless the type is specifically mentioned.

Devices which only indicate time or passage of time are not included.

This standard does not apply to multi-functional controls having an integrated timing function which is not capable of being tested as a separate timing device.

1.1.1 This standard applies to the inherent safety, to the operating characteristics where such are associated with equipment protection and to the testing of automatic electrical control devices used in appliances and other apparatus, electrical and non-electrical, for household and similar purposes, but also extended to industrial purposes when no dedicated product standards exist, such as that for central heating, air conditioning, process heating, etc.

Timers 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 standard.

This standard is also applicable to timers for appliances within the scope of IEC 60335-1.

This standard does not apply to timers designed exclusively for industrial applications.

Throughout this standard, the word "equipment" means "appliance and equipment".

1.1.2 This standard applies to automatic electrical control devices, mechanically, electromechanically, electrically or electronically operated, responsive to or controlling parameters such as temperature, pressure, passage or time, humidity, light, electrostatic effect, flow or liquid level.

¹⁾ IEC 60669-2-3:2006, *Switches for household and similar fixed electrical installations – Part 2-3: Particular requirements – Time-delay switches (TDS)*

1.1.3 This standard applies to automatic electrical control devices serving the starting of small motors that are used principally in appliances and apparatus for household and similar purposes. Such control devices may be built into or be separate from the motor.

1.1.4 This standard applies to non-automatic control devices when such are associated with automatic control devices.

1.2 Replacement:

This standard applies to controls with a rated voltage not exceeding 690 V and a rated current not exceeding 63 A.

1.3 Replacement:

This standard does not take into account the response value of an automatic action of a control, if such a response value is dependent upon the method of mounting the control in the equipment. If a response value is of significant purpose for the safety of the user or surroundings, the value defined in the appropriate household equipment standard or as determined by the manufacturer shall apply.

1.4 Replacement:

This standard applies also to timers incorporating electronic devices, requirements for which are contained in Annex H.

1.5 Normative references

This subclause of Part 1 applies except as follows:

Addition:

IEC 60669-1:1998, *Switches for household and similar fixed-electrical installations – Part 1: General requirements* ²⁾
Amendment 1 (1999)
Amendment 2 (2006)

IEC 61010-1, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*

2 Definitions

This clause of Part 1 is applicable except as follows:

2.3 Definitions relating to the function of controls

Additional definition:

**2.3.101
timing cycle**

program including all the switching activities involved in a start-to-finish operation of a controlled appliance

²⁾ There exists a consolidated edition 3.2 (2007) that includes edition 3 and its Amendments 1 and 2.

2.5 Definitions of types of control according to construction

Additional definitions:

2.5.101

plug-in timer

timer or time switch designed for direct plug-in to a socket-outlet

NOTE The plug-in timer is equipped with conductor blades, pins or other means, protruding from the enclosure of the control or the control body itself, to match the dimensional parameters of the socket-outlet to which the control will be connected.

2.5.102

TV timer

control for television equipment that can be set by the user, switching very high inrush currents of a very short duration generated by electrical power supply components and associated electronic component parts with various electrical characteristics

NOTE Examples are power transformers, electronic tube filaments, large electric capacitors and others in television receivers, radio and video products.

2.5.103

synchronous timer

timer or a time switch in which the transmission is effected by a device that is time-based on the frequency of the power supply for the prime mover or the load

2.5.104

hand-wound timer

timer or time switch in which the transmission is provided by actuation

3 General requirements

This clause of Part 1 is applicable. <https://standards.iteh.ai/catalog/standards/sic/5d3190c9-eac9-4066-a63b-a7aaf384a14e/iec-60730-2-7-2008>

4 General notes on tests

This clause of Part 1 is applicable except as follows:

4.1.4 *Addition:*

In the USA, the test in 14.101 is conducted first and the remaining tests are carried out in the order of the clauses of this standard.

4.3.2.1 *Addition:*

In Canada and the USA, to reduce testing, a timer that is classified for use with motor loads at more than one rated voltage is to be tested at the current and voltage in Table 17.2-2 corresponding to the highest rated voltage. If the current in Table 17.2-2 corresponding to a lower rated voltage is greater than 135 % of the current corresponding to the highest rated voltage, then the timer is also to be tested at the lower rated voltage. The greater current involved at a lower rated voltage may necessitate a separate heating test under Clause 14. If more than one test is conducted, one sample is to be used for each test.

5 Rating

This clause of Part 1 is applicable.

6 Classification

This clause of Part 1 is applicable except as follows:

6.3 According to their purpose

6.3.6 Additional subclause:

6.3.6.101 – TV timer;

In Canada and the USA, timers for use on televisions have to be declared and tested as indicated in this standard.

6.4 According to features of automatic action

6.4.3 Additional subclauses:

6.4.3.101 – a timing action which automatically resets upon loss of the electrical supply (Type 1.Q or 2.Q);

6.4.3.102 – a timing action which is interrupted upon loss of the electrical supply and resumes at the point of interruption upon restoration of the electrical supply (Type 1.R or 2.R);

6.4.3.103 – a timing action of a time switch which, after interruption of the electrical supply for any interval up to the declared period of power reserve, resumes its intended operating sequence as if no interruption of the supply has occurred (Type 1.S or 2.S);

6.4.3.104 – a timing action with a declared running accuracy in an ambient temperature of 20 °C to 25 °C (Type 1.T or 2.T);

6.4.3.105 – a timing action in which the difference between set time and actual switching time does not exceed the declared amount (Type 1.U or 2.U).

6.5 According to the degree of protection and control pollution degree

Additional subclause:

6.5.101 According to declared industrial environmental conditions (see IEC 61010-1):

6.10 According to number of cycles of actuation (M) for each manual actuation

Additional subclauses:

6.10.101 – 500 cycles;

6.10.102 – 2 500 cycles;

6.10.103 – 5 000 cycles.

6.15 According to construction

Additional subclause:

6.15.101 – plug-in timer.

7 Information

This clause of Part 1 is applicable except as follows:

7.2 Methods of providing information

7.2.9 Addition:

In Germany, for Type 1.S or 2.S actions, the power reserve is to be marked on the timer by the letter "R", followed by the duration of the power reserve, followed by the symbol indicating the time unit as follows:

minutes	min
hours	h
days	d
years	a

Table 7.2

Modification:

Replace the lines corresponding to items 7, 26, 27 and 28 by the following:

Information	Clause or subclause	Method
7 The type of load controlled by each circuit ⁷⁾¹⁰¹⁾	6.2 14 17	C
26 Number of cycles of actuation (M) for each manual action ¹⁰²⁾	6.10	X
27 Number of automatic cycles (A) for each automatic action ¹⁰²⁾	6.11	X
28 Ageing period (Y) for Type 1.M or 2.M action ¹⁰²⁾	6.16	X

Add the following additional items:

Information	Clause or subclause	Method
101 TV timer ¹⁰³⁾	2.5.102	C
102 Power reserve duration	6.4.3.103	D
103 Running time for manually wound switches	11.4.103	D
104 Running accuracy and setting accuracy	6.4.3.104 6.4.3.105 11.4.104	D

Additional notes to Table 7.2:

101) In Canada and the USA, timers with a tungsten-filament lamp load rating or direct current as well as alternating current, in addition to the regular electrical information shall be marked to indicate the type of load, type of current and rated voltage.

The marking shall be "T" for controls used with direct as well as alternating current and "L" for controls used on alternating current only. The marking shall follow the unique type reference or the electrical rating of the control.

102) Values for in-line cord, free-standing and independently mounted controls are given in Annex AA (see also 17.1.3.101).

103) In Canada and the USA, a timer with a TV rating shall be marked with the manufacturer's name or trademark, load type designation and electrical rating. The marking shall consist of "TV" followed by the ampere rating. This rating shall follow any other electrical rating the control may have or can be a single, stand-alone marking if the control has no additional ratings.

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 Type 1.Q or 2.Q action

A Type 1.Q or 2.Q action shall be so designed that it resets automatically upon loss of the electrical supply.

Compliance is checked by inspection and by test.

11.4.102 Type 1.R or 2.R action

A Type 1.R or 2.R action shall be so designed that it is interrupted upon loss of the electrical supply and resumes at the point of interruption upon restoration of the electrical supply.

Compliance is checked by inspection and by test.

11.4.103 Type 1.S or 2.S action

A Type 1.S or 2.S action shall be so designed that, after interruption of the electrical supply for any interval up to the declared period of power reserve, it resumes its intended operating sequence as if no interruption of the supply has occurred.

Compliance is checked by a switching operation, carried out immediately after a given period of power reserve. The power reserve shall be obtained at a voltage equal to 0,85 times rated voltage and 1,1 times rated voltage. Each test shall be carried out once after a complete wind-up of the time switch.

In the case of a manually wound time switch, the running time shall be as declared.

In Germany, the minimum running time shall be three days and preferably up to eight days.

11.4.104 Type 1.T or 2.T action

A Type 1.T or 2.T action shall be so designed that its running accuracy in an ambient temperature of 20 °C to 25 °C is as declared.

In Germany, the running accuracy for time switches shall be within ± 60 s per day. For the power reserve period of synchronous time switches (Type S.T), the running accuracy shall be within ± 500 s per day.

In Germany, the deviation from the calculated elapsed time shall be less than 30 min per year, relative to actual elapsed time under fluctuations of 0,85 times to 1,1 times rated voltage and ± 2 % rated frequency.

Compliance is checked by inspection and by test.

11.4.105 Type 1.U or 2.U action

A Type 1.U or 2.U action shall be so designed that its setting means, dial assembly, indicating devices and switch operating means function so that the difference between set time and actual time shall not be more than the declared amount.

This deviation shall not be more than:

- ± 1 min for time switches with "hour" dial;
- ± 30 min for time switches with "24 hour" dial;
- $\pm 3,5$ h for time switches with "7 day" dial;
- ± 14 h for time switches with "month" dial;
- ± 7 days for time switches with "12 month" dial.

Compliance is checked only on time switches with hour, 24 hour and 7 day dial by three consecutive measurements.

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: